SIEMENS

MICROMASTER 440

Parameter List **Issue 10/03**

User Documentation
6SE6400-5BB00-0BP0

Available Documentation for the MICROMASTER 440

Getting Started Guide

Is for quick commissioning .

Operating Instructions

Gives information about features of the MICROMASTER 440, Installation, Commissioning, Control modes, System Parameter structure, Troubleshooting, Specifications and available options of the MICROMASTER 440.

Parameter List

The Parameter List contains the description of all Parameters structured in functional order and a detailed description. The Parameter list also includes a series of function plans.

Catalogues

In the catalogue you will find all needs to select a certain inverter, as well as filters chokes, operator panels or communications options.

SIEMENS

MICROMASTER 440

Parameter List
User Documentation

Valid for Issue 10/03

Converter Type
MICROMASTER 440

Software Version
V2.0

Issue 10/03

Warning
Please refer to all Definitions and Warnings contained in the Operating Instructions. You will find the Operating Instructions on the Docu CD delivered with your inverter. If the CD is lost, it can be ordered via your local Siemens department under the Order No. 6SE6400-5AD00-1AP0.

Further information can be obtained from Internet website:
http://www.siemens.de/micromaster

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Parameters MICROMASTER 440

This Parameter List must only be used together with the Operating Instructions of the MICROMASTER 440. Please pay special attention to the Warnings, Cautions, Notices and Notes contained in these manuals.

Table of Contents

1 Parameters

1.1 Introduction to MICROMASTER System Parameters

The layout of the parameter description is as follows.

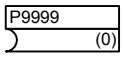
1 Par number [index]	**2 Parameter name**			**9 Min:**	12 Level: **2**
	3 CStat:	**5 Datatype**	**7 Unit:**	**10 Def:**	
	4 P-Group:	**6 active:**	**8 Quick Comm:**	**11 Max:**	
	13	Description:			

1. **Parameter number**
   Indicates the relevant parameter number. The numbers used are 4-digit numbers in the range 0000 to 9999. Numbers prefixed with an “r” indicate that the parameter is a “read-only” parameter, which displays a particular value but cannot be changed directly by specifying a different value via this parameter number (in such cases, dashes “-“ are entered at the points “Unit”, “Min”, “Def” and “Max” in the header of the parameter description.
   All other parameters are prefixed with a “P”. The values of these parameters can be changed directly in the range indicated by the “Min” and “Max” settings in the header.

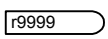
   [index] indicates that the parameter is an indexed parameter and specifies the number of indices available.

2. **Parameter name**
   Indicates the name of the relevant parameter.
   Certain parameter names include the following abbreviated prefixes: BI, BO, CI, and CO followed by a colon.

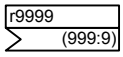
   These abbreviations have the following meanings:

   BI = 

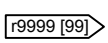
   Binector input, i.e. parameter selects the source of a binary signal

   BO = 

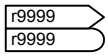
   Binector output, i.e. parameter connects as a binary signal

   CI = 

   Connector input, i.e. parameter selects the source of an analog signal

   CO = 

   Connector output, i.e. parameter connects as an analog signal

   CO/BO = 

   Connector/Binector output, i.e. parameter connects as an analog signal and/or as a binary signal

   To make use of BiCo you will need access to the full parameter list. At this level many new parameter settings are possible, including BiCo functionality. BiCo functionality is a different, more flexible way of setting and combining input and output functions. It can be used in most cases in conjunction with the simple, level 2 settings.

   The BiCo system allows complex functions to be programmed. Boolean and mathematical relationships can be set up between inputs (digital, analog, serial etc.) and outputs (inverter current, frequency, analog output, relays, etc.).

3. **CStat**
   Commissioning status of the parameter. Three states are possible:
   Commissioning C
   Run U
   Ready to run T
   This indicates when the parameter can be changed. One, two or all three states may be specified. If all three states are specified, this means that it is possible to change this parameter setting in all three inverter states
4. **P-Group**
   Indicates the functional group of the particular.

Note
Parameter P0004 (parameter filter) acts as a filter and focuses access to parameters according to the functional group selected.

5. **Datatype**
   The data types available are shown in the table below.

Notation	Meaning
U16	16-bit unsigned
U32	32-bit unsigned
I16	16-bit integer
I32	32-bit integer
Float	Floating point

6. **Active**
   Indicates whether
   - Immediately changes to the parameter values take effective immediately after they have been entered, or
   - Confirm the “P” button on the operator panel (BOP or AOP) must be pressed before the changes take effect.
7. **Unit**
   Indicates the unit of measure applicable to the parameter values
8. **QuickComm**
   Indicates whether or not (Yes or No) a parameter can only be changed during quick commissioning, i.e. when P0010 (parameter groups for commissioning) is set to 1 (quick commissioning).
9. **Min**
   Indicates the minimum value to which the parameter can be set.
10. **Def**
    Indicates the default value, i.e. the value which applies if the user does not specify a particular value for the parameter.
11. **Max**
    Indicates the maximum value to which the parameter can be set.
12. **Level**
    Indicates the level of user access. There are four access levels: Standard, Extended, Expert and Service. The number of parameters that appear in each functional group depends on the access level set in P0003 (user access level).

13. **Description**
    The parameter description consists of the sections and contents listed below. Some of these sections and contents are optional and will be omitted on a case-to-case basis if not applicable.

Description:	Brief explanation of the parameter function.
Diagram:	Where applicable, diagram to illustrate the effects of parameters on a characteristic curve, for example
Settings:	List of applicable settings. These include Possible settings, Most common settings, Index and Bitfields
Example:	Optional example of the effects of a particular parameter setting.
Dependency:	Any conditions that must be satisfied in connection with this parameter. Also any particular effects, which this parameter has on other parameter(s) or which other parameters have on this one.
Warning / Caution / Notice / Note:	Important information which must be heeded to prevent personal injury or damage to equipment / specific information which should be heeded in order to avoid problems / information which may be helpful to the user
More details:	Any sources of more detailed information concerning the particular parameter.

Operators

The following operators are used in the parameter list to represent mathematical interrelationships:

Arithmetic operators

+	Addition
-	Subtraction
*	Multiplication
/	Division

Comparison operators

>	Greater than
>=	Greater than / equal to
<	Less than
<=	Less than / equal to

Equivalence operators

==	Equal to
!=	Not equal to

Logical operators

&&	AND logic operation
||	OR logic operation

1.2 Quick commissioning (P0010 = 1)

The following parameters are necessary for quick commissioning (P0010 = 1).

Quick commissioning (P0010 = 1)

Par.-No.	Name	Access level	Cstat
P0100	Europe / North America	1	C
P0205	Inverter application	3	C
P0300	Select motor type	2	C
P0304	Motor voltage rating	1	C
P0305	Motor current rating	1	C
P0307	Motor power rating	1	C
P0308	Motor cosPhi rating	2	C
P0309	Motor efficiency rating	2	C
P0310	Motor frequency rating	1	C
P0311	Motor speed rating	1	C
P0320	Motor magnetizing current	3	CT
P0335	Motor cooling	2	CT
P0640	Motor overload factor [%]	2	CUT
P0700	Selection of command source	1	CT
P1000	Selection of frequency setpoint	1	CT
P1080	Min. speed	1	CUT
P1082	Max. speed	1	CT
P1120	Ramp-up time	1	CUT
P1121	Ramp-down time	1	CUT
P1135	OFF3 ramp-down time	2	CUT
P1300	Control mode	2	CT
P1500	Selection of torque setpoint	2	CT
P1910	Select motor data identification	2	CT
P1960	Speed control optimisation	3	CT
P3900	End of quick commissioning	1	C

When P0010 = 1 is chosen, P0003 (user access level) can be used to select the parameters to be accessed. This parameter also allows selection of a user-defined parameter list for quick commissioning.

At the end of the quick commissioning sequence, set P3900 = 1 to carry out the necessary motor calculations and clear all other parameters (not included in P0010 = 1) to their default settings.

Note
This applies only in Quick Commissioning mode.

Reset to Factory default

To reset all parameters to the factory default settings; the following parameters should be set as follows:

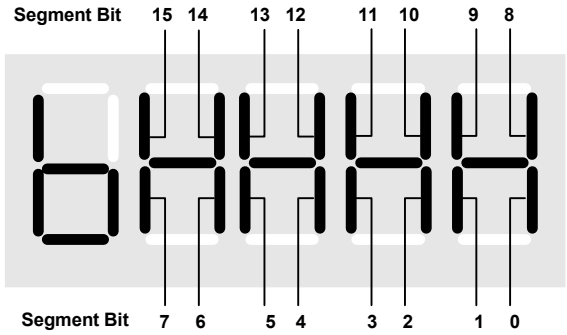
Set P0010 = 30

Set P0970 = 1

Note
The reset process takes approximately 10 seconds to complete. Reset to Factory default

Seven-segment display

The seven-segment display is structured as follows:



The significance of the relevant bits in the display is described in the status and control word parameters.

1.3 Command and Drive Datasets - Overview

Command Datasets (CDS)

ParNo	Parameter name
P0700[3]	Selection of command source
P0701[3]	Function of digital input 1
P0702[3]	Function of digital input 2
P0703[3]	Function of digital input 3
P0704[3]	Function of digital input 4
P0705[3]	Function of digital input 5
P0706[3]	Function of digital input 6
P0707[3]	Function of digital input 7
P0708[3]	Function of digital input 8
P0719[3]	Selection of cmd. & freq. setp.
P0731[3]	BI: Function of digital output 1
P0732[3]	BI: Function of digital output 2
P0733[3]	BI: Function of digital output 3
P0800[3]	BI: Download parameter set 0
P0801[3]	BI: Download parameter set 1
P0840[3]	BI: ON/OFF1
P0842[3]	BI: ON reverse/OFF1
P0844[3]	BI: 1. OFF2
P0845[3]	BI: 2. OFF2
P0848[3]	BI: 1. OFF3
P0849[3]	BI: 2. OFF3
P0852[3]	BI: Pulse enable
P1000[3]	Selection of frequency setpoint
P1020[3]	BI: Fixed freq. selection Bit 0
P1021[3]	BI: Fixed freq. selection Bit 1
P1022[3]	BI: Fixed freq. selection Bit 2
P1023[3]	BI: Fixed freq. selection Bit 3
P1026[3]	BI: Fixed freq. selection Bit 4
P1028[3]	BI: Fixed freq. selection Bit 5
P1035[3]	BI: Enable MOP (UP-command)
P1036[3]	BI: Enable MOP (DOWN-command)
P1055[3]	BI: Enable JOG right
P1056[3]	BI: Enable JOG left
P1070[3]	CI: Main setpoint
P1071[3]	CI: Main setpoint scaling

ParNo	Parameter name
P1074[3]	BI: Disable additional setpoint
P1075[3]	CI: Additional setpoint
P1076[3]	CI: Additional setpoint scaling
P1110[3]	BI: Inhibit neg. freq. setpoint
P1113[3]	BI: Reverse
P1124[3]	BI: Enable JOG ramp times
P1140[3]	BI: RFG enable
P1141[3]	BI: RFG start
P1142[3]	BI: RFG enable setpoint
P1230[3]	BI: Enable DC braking
P1330[3]	CI: Voltage setpoint
P1477[3]	BI: Set integrator of n-ctrl.
P1478[3]	CI: Set integrator value n-ctrl.
P1500[3]	Selection of torque setpoint
P1501[3]	BI: Change to torque control
P1503[3]	CI: Torque setpoint
P1511[3]	CI: Additional torque setpoint
P1522[3]	CI: Upper torque limit
P1523[3]	CI: Lower torque limit
P2103[3]	BI: 1. Faults acknowledgement
P2104[3]	BI: 2. Faults acknowledgement
P2106[3]	BI: External fault
P2151[3]	CI: Monitoring freq. setpoint
P2152[3]	CI: Act. monitoring frequency
P2200[3]	BI: Enable PID controller
P2220[3]	BI: Fixed PID setp. select Bit 0
P2221[3]	BI: Fixed PID setp. select Bit 1
P2222[3]	BI: Fixed PID setp. select Bit 2
P2223[3]	BI: Fixed PID setp. select Bit 3
P2226[3]	BI: Fixed PID setp. select Bit 4
P2228[3]	BI: Fixed PID setp. select Bit 5
P2235[3]	BI: Enable PID-MOP (UP-cmd)
P2236[3]	BI: Enable PID-MOP (DOWN-cmd)
P2253[3]	CI: PID setpoint
P2254[3]	CI: PID trim source
P2264[3]	CI: PID feedback

Drive Datasets (DDS)

ParNo	Parameter name
P0005[3]	Display selection
r0035[3]	CO: Act. motor temperature
P0291[3]	Inverter protection
P0300[3]	Select motor type
P0304[3]	Rated motor voltage
P0305[3]	Rated motor current
P0307[3]	Rated motor power
P0308[3]	Rated motor cosPhi
P0309[3]	Rated motor efficiency
P0310[3]	Rated motor frequency
P0311[3]	Rated motor speed
r0313[3]	Motor pole pairs
P0314[3]	Motor pole pair number
P0320[3]	Motor magnetizing current
r0330[3]	Rated motor slip
r0331[3]	Rated magnetization current
r0332[3]	Rated power factor
r0333[3]	Rated motor torque
P0335[3]	Motor cooling
P0340[3]	Calculation of motor parameters
P0341[3]	Motor inertia [kg*m^2]
P0342[3]	Total/motor inertia ratio
P0344[3]	Motor weight
r0345[3]	Motor start-up time
P0346[3]	Magnetization time
P0347[3]	Demagnetization time
P0350[3]	Stator resistance (line-to-line)
P0352[3]	Cable resistance
P0354[3]	Rotor resistance
P0356[3]	Stator leakage inductance
P0358[3]	Rotor leakage inductance
P0360[3]	Main inductance
P0362[3]	Magnetizing curve flux 1
P0363[3]	Magnetizing curve flux 2
P0364[3]	Magnetizing curve flux 3
P0365[3]	Magnetizing curve flux 4
P0366[3]	Magnetizing curve imag 1
P0367[3]	Magnetizing curve imag 2
P0368[3]	Magnetizing curve imag 3
P0369[3]	Magnetizing curve imag 4

ParNo	Parameter name
r0370[3]	Stator resistance [%]
r0372[3]	Cable resistance [%]
r0373[3]	Rated stator resistance [%]
r0374[3]	Rotor resistance [%]
r0376[3]	Rated rotor resistance [%]
r0377[3]	Total leakage reactance [%]
r0382[3]	Main reactance [%]
r0384[3]	Rotor time constant
r0386[3]	Total leakage time constant
P0400[3]	Select encoder type
P0408[3]	Encoder pulses per revolution
P0491[3]	Reaction on freq. signal loss
P0492[3]	Allowed frequency difference
P0494[3]	Delay frequency loss reaction
P0500[3]	Technological application
P0530[3]	Unit for positioning signal
P0531[3]	Unit conversion
P0601[3]	Motor temperature sensor
P0604[3]	Threshold motor temperature
P0625[3]	Ambient motor temperature
P0626[3]	Overtemperature stator iron
P0627[3]	Overtemperature stator winding
P0628[3]	Overtemperature rotor winding
r0630[3]	CO: Ambient temperature
r0631[3]	CO: Stator iron temperature
r0632[3]	CO: Stator winding temperature
r0633[3]	CO: Rotor winding temperature
P0640[3]	Motor overload factor [%]
P1001[3]	Fixed frequency 1
P1002[3]	Fixed frequency 2
P1003[3]	Fixed frequency 3
P1004[3]	Fixed frequency 4
P1005[3]	Fixed frequency 5
P1006[3]	Fixed frequency 6
P1007[3]	Fixed frequency 7
P1008[3]	Fixed frequency 8
P1009[3]	Fixed frequency 9
P1010[3]	Fixed frequency 10
P1011[3]	Fixed frequency 11
P1012[3]	Fixed frequency 12

ParNo	Parameter name
P1013[3]	Fixed frequency 13
P1014[3]	Fixed frequency 14
P1015[3]	Fixed frequency 15
P1031[3]	Setpoint memory of the MOP
P1040[3]	Setpoint of the MOP
P1058[3]	JOG frequency right
P1059[3]	JOG frequency left
P1060[3]	JOG ramp-up time
P1061[3]	JOG ramp-down time
P1080[3]	Min. frequency
P1082[3]	Max. frequency
P1091[3]	Skip frequency 1
P1092[3]	Skip frequency 2
P1093[3]	Skip frequency 3
P1094[3]	Skip frequency 4
P1101[3]	Skip frequency bandwidth
P1120[3]	Ramp-up time
P1121[3]	Ramp-down time
P1130[3]	Ramp-up initial rounding time
P1131[3]	Ramp-up final rounding time
P1132[3]	Ramp-down initial rounding time
P1133[3]	Ramp-down final rounding time
P1134[3]	Rounding type
P1135[3]	OFF3 ramp-down time
P1202[3]	Motor-current: Flying start
P1203[3]	Search rate: Flying start
P1232[3]	DC braking current
P1233[3]	Duration of DC braking
P1234[3]	DC braking start frequency
P1236[3]	Compound braking current
P1240[3]	Configuration of Vdc controller
P1243[3]	Dynamic factor of Vdc-max
P1245[3]	Switch on level kin. buffering
r1246[3]	CO:Switch-on level kin buffering
P1247[3]	Dyn. factor of kinetic buffering
P1250[3]	Gain of Vdc-controller
P1251[3]	Integration time Vdc-controller
P1252[3]	Differential time Vdc-controller
P1253[3]	Vdc-controller output limitation
P1256[3]	Reaction of kinetic buffering
P1257[3]	Freq limit for kinetic buffering
P1300[3]	Control mode
P1310[3]	Continuous boost

ParNo	Parameter name
P1311[3]	Acceleration boost
P1312[3]	Starting boost
P1316[3]	Boost end frequency
P1320[3]	Programmable V/f freq. coord. 1
P1321[3]	Programmable V/f volt. coord. 1
P1322[3]	Programmable V/f freq. coord. 2
P1323[3]	Programmable V/f volt. coord. 2
P1324[3]	Programmable V/f freq. coord. 3
P1325[3]	Programmable V/f volt. coord. 3
P1333[3]	Start frequency for FCC
P1335[3]	Slip compensation
P1336[3]	Slip limit
P1338[3]	Resonance damping gain V/f
P1340[3]	Imax freq. controller prop. gain
P1341[3]	Imax freq. ctrl. integral time
P1345[3]	Imax voltage ctrl. prop. gain
P1346[3]	Imax voltage ctrl. integral time
P1350[3]	Voltage soft start
P1400[3]	Configuration of speed control
P1442[3]	Filter time for act. speed
P1452[3]	Filter time for act. freq (SLVC)
P1460[3]	Gain speed controller
P1462[3]	Integral time speed controller
P1470[3]	Gain speed controller (SLVC)
P1472[3]	Integral time n-ctrl. (SLVC)
P1488[3]	Droop input source
P1489[3]	Droop scaling
P1492[3]	Enable droop
P1496[3]	Scaling accel. precontrol
P1499[3]	Scaling accel. torque control
P1520[3]	CO: Upper torque limit
P1521[3]	CO: Lower torque limit
P1525[3]	Scaling lower torque limit
P1530[3]	Motoring power limitation
P1531[3]	Regenerative power limitation
P1570[3]	CO: Fixed value flux setpoint
P1574[3]	Dynamic voltage headroom
P1580[3]	Efficiency optimization
P1582[3]	Smooth time for flux setpoint
P1596[3]	Int. time field weak. controller
P1610[3]	Continuous torque boost (SLVC)
P1611[3]	Acc. torque boost (SLVC)

ParNo	Parameter name
P1654[3]	Smooth time for Isq setpoint
P1715[3]	Gain current controller
P1717[3]	Integral time current controller
P1750[3]	Control word of motor model
P1755[3]	Start-freq. motor model (SLVC)
P1756[3]	Hyst.-freq. motor model (SLVC)
P1758[3]	T(wait) transit to feed-fwd-mode
P1759[3]	T(wait) for n-adaption to settle
P1764[3]	Kp of n-adaption (SLVC)
P1767[3]	Tn of n-adaption (SLVC)
P1780[3]	Control word of Rs/Rr-adaption
P1781[3]	Tn of Rs-adaption
P1786[3]	Tn of Xm-adaption
P1803[3]	Max. modulation
P1820[3]	Reverse output phase sequence
P1909[3]	Ctrl. word of motor data ident.
P2000[3]	Reference frequency
P2001[3]	Reference voltage
P2002[3]	Reference current
P2003[3]	Reference torque
r2004[3]	Reference power
P2150[3]	Hysteresis frequency f_hys
P2153[3]	Time-constant frequency filter
P2155[3]	Threshold frequency f_1
P2156[3]	Delay time of threshold freq f_1
P2157[3]	Threshold frequency f_2
P2158[3]	Delay time of threshold freq f_2
P2159[3]	Threshold frequency f_3
P2160[3]	Delay time of threshold freq f_3
P2161[3]	Min. threshold for freq. setp.
P2162[3]	Hysteresis freq. for overfreq.
P2163[3]	Entry freq. for perm. deviation
P2164[3]	Hysteresis frequency deviation
P2165[3]	Delay time permitted deviation
P2166[3]	Delay time ramp up completed
P2167[3]	Switch-off frequency f_off
P2168[3]	Delay time T_off
P2170[3]	Threshold current I_thresh
P2171[3]	Delay time current
P2172[3]	Threshold DC-link voltage

ParNo	Parameter name
P2173[3]	Delay time DC-link voltage
P2174[3]	Torque threshold M_thresh
P2176[3]	Delay time for torque threshold
P2177[3]	Delay time for motor is blocked
P2178[3]	Delay time for motor pulled out
P2181[3]	Belt failure detection mode
P2182[3]	Belt threshold frequency 1
P2183[3]	Belt threshold frequency 2
P2184[3]	Belt threshold frequency 3
P2185[3]	Upper torque threshold 1
P2186[3]	Lower torque threshold 1
P2187[3]	Upper torque threshold 2
P2188[3]	Lower torque threshold 2
P2189[3]	Upper torque threshold 3
P2190[3]	Lower torque threshold 3
P2192[3]	Time delay for belt failure
P2201[3]	Fixed PID setpoint 1
P2202[3]	Fixed PID setpoint 2
P2203[3]	Fixed PID setpoint 3
P2204[3]	Fixed PID setpoint 4
P2205[3]	Fixed PID setpoint 5
P2206[3]	Fixed PID setpoint 6
P2207[3]	Fixed PID setpoint 7
P2208[3]	Fixed PID setpoint 8
P2209[3]	Fixed PID setpoint 9
P2210[3]	Fixed PID setpoint 10
P2211[3]	Fixed PID setpoint 11
P2212[3]	Fixed PID setpoint 12
P2213[3]	Fixed PID setpoint 13
P2214[3]	Fixed PID setpoint 14
P2215[3]	Fixed PID setpoint 15
P2231[3]	Setpoint memory of PID-MOP
P2240[3]	Setpoint of PID-MOP
P2480[3]	Position mode
P2481[3]	Gearbox ratio input
P2482[3]	Gearbox ratio output
P2484[3]	No. of shaft turns = 1 Unit
P2487[3]	Positional error trim value
P2488[3]	Distance / No. of revolutions

1.4 Binector Input Parameters

ParNo	Parameter name
P0731[3]	BI: Function of digital output 1
P0732[3]	BI: Function of digital output 2
P0733[3]	BI: Function of digital output 3
P0800[3]	BI: Download parameter set 0
P0801[3]	BI: Download parameter set 1
P0810	BI: CDS bit 0 (Local / Remote)
P0811	BI: CDS bit 1
P0820	BI: DDS bit 0
P0821	BI: DDS bit 1
P0840[3]	BI: ON/OFF1
P0842[3]	BI: ON reverse/OFF1
P0844[3]	BI: 1. OFF2
P0845[3]	BI: 2. OFF2
P0848[3]	BI: 1. OFF3
P0849[3]	BI: 2. OFF3
P0852[3]	BI: Pulse enable
P1020[3]	BI: Fixed freq. selection Bit 0
P1021[3]	BI: Fixed freq. selection Bit 1
P1022[3]	BI: Fixed freq. selection Bit 2
P1023[3]	BI: Fixed freq. selection Bit 3
P1026[3]	BI: Fixed freq. selection Bit 4
P1028[3]	BI: Fixed freq. selection Bit 5
P1035[3]	BI: Enable MOP (UP-command)
P1036[3]	BI: Enable MOP (DOWN-command)
P1055[3]	BI: Enable JOG right
P1056[3]	BI: Enable JOG left
P1074[3]	BI: Disable additional setpoint
P1110[3]	BI: Inhibit neg. freq. setpoint
P1113[3]	BI: Reverse
P1124[3]	BI: Enable JOG ramp times
P1140[3]	BI: RFG enable
P1141[3]	BI: RFG start
P1142[3]	BI: RFG enable setpoint
P1230[3]	BI: Enable DC braking
P1477[3]	BI: Set integrator of n-ctrl.

ParNo	Parameter name
P1501[3]	BI: Change to torque control
P2103[3]	BI: 1. Faults acknowledgement
P2104[3]	BI: 2. Faults acknowledgement
P2106[3]	BI: External fault
P2200[3]	BI: Enable PID controller
P2220[3]	BI: Fixed PID setp. select Bit 0
P2221[3]	BI: Fixed PID setp. select Bit 1
P2222[3]	BI: Fixed PID setp. select Bit 2
P2223[3]	BI: Fixed PID setp. select Bit 3
P2226[3]	BI: Fixed PID setp. select Bit 4
P2228[3]	BI: Fixed PID setp. select Bit 5
P2235[3]	BI: Enable PID-MOP (UP-cmd)
P2236[3]	BI: Enable PID-MOP (DOWN-cmd)
P2810[2]	BI: AND 1
P2812[2]	BI: AND 2
P2814[2]	BI: AND 3
P2816[2]	BI: OR 1
P2818[2]	BI: OR 2
P2820[2]	BI: OR 3
P2822[2]	BI: XOR 1
P2824[2]	BI: XOR 2
P2826[2]	BI: XOR 3
P2828	BI: NOT 1
P2830	BI: NOT 2
P2832	BI: NOT 3
P2834[4]	BI: D-FF 1
P2837[4]	BI: D-FF 2
P2840[2]	BI: RS-FF 1
P2843[2]	BI: RS-FF 2
P2846[2]	BI: RS-FF 3
P2849	BI: Timer 1
P2854	BI: Timer 2
P2859	BI: Timer 3
P2864	BI: Timer 4

1.5 Connector Input Parameters

ParNo	Parameter name
P0095[10]	CI: Display PZD signals
P0771[2]	CI: DAC
P1070[3]	CI: Main setpoint
P1071[3]	CI: Main setpoint scaling
P1075[3]	CI: Additional setpoint
P1076[3]	CI: Additional setpoint scaling
P1330[3]	CI: Voltage setpoint
P1478[3]	CI: Set integrator value n-ctrl.
P1503[3]	CI: Torque setpoint
P1511[3]	CI: Additional torque setpoint
P1522[3]	CI: Upper torque limit
P1523[3]	CI: Lower torque limit
P2016[8]	CI: PZD to BOP link (USS)
P2019[8]	CI: PZD to COM link (USS)
P2051[8]	CI: PZD to CB

ParNo	Parameter name
P2253[3]	CI: PID setpoint
P2254[3]	CI: PID trim source
P2264[3]	CI: PID feedback
P2869[2]	CI: ADD 1
P2871[2]	CI: ADD 2
P2873[2]	CI: SUB 1
P2875[2]	CI: SUB 2
P2877[2]	CI: MUL 1
P2879[2]	CI: MUL 2
P2881[2]	CI: DIV 1
P2883[2]	CI: DIV 2
P2885[2]	CI: CMP 1
P2887[2]	CI: CMP 2

1.6 Binector Output Parameters

ParNo	Parameter name
r0751	BO: Status word of ADC
r2032	BO: CtrlWrd1 from BOP link (USS)
r2033	BO: CtrlWrd2 from BOP link (USS)
r2036	BO: CtrlWrd1 from COM link (USS)
r2037	BO: CtrlWrd2 from COM link (USS)
r2090	BO: Control word 1 from CB
r2091	BO: Control word 2 from CB
r2811	BO: AND 1
r2813	BO: AND 2
r2815	BO: AND 3
r2817	BO: OR 1
r2819	BO: OR 2
r2821	BO: OR 3
r2823	BO: XOR 1
r2825	BO: XOR 2
r2827	BO: XOR 3
r2829	BO: NOT 1
r2831	BO: NOT 2
r2833	BO: NOT 3
r2835	BO: Q D-FF 1

ParNo	Parameter name
r2836	BO: NOT-Q D-FF 1
r2838	BO: Q D-FF 2
r2839	BO: NOT-Q D-FF 2
r2841	BO: Q RS-FF 1
r2842	BO: NOT-Q RS-FF 1
r2844	BO: Q RS-FF 2
r2845	BO: NOT-Q RS-FF 2
r2847	BO: Q RS-FF 3
r2848	BO: NOT-Q RS-FF 3
r2852	BO: Timer 1
r2853	BO: Nout timer 1
r2857	BO: Timer 2
r2858	BO: Nout timer 2
r2862	BO: Timer 3
r2863	BO: Nout timer 3
r2867	BO: Timer 4
r2868	BO: Nout timer 4
r2886	BO: CMP 1
r2888	BO: CMP 2

1.7 Connector Output Parameters

ParNo	Parameter name
r0020	CO: Freq. setpoint before RFG
r0021	CO: Act. filtered frequency
r0024	CO: Act. filtered output freq.
r0025	CO: Act. filtered output voltage
r0026	CO: Act. filtered DC-link volt.
r0027	CO: Act. filtered output current
r0029	CO: Flux gen. current
r0030	CO: Torque gen. current
r0031	CO: Act. filtered torque
r0032	CO: Act. filtered power
r0035[3]	CO: Act. motor temperature
r0036	CO:Inverter overload utilization
r0037[5]	CO: Inverter temperature [°C]
r0038	CO: Act. power factor
r0039	CO: Energy consumpt. meter [kWh]
r0050	CO: Active command data set
r0051[2]	CO: Active drive data set (DDS)
r0061	CO: Act. encoder frequency
r0062	CO: Freq. setpoint
r0063	CO: Act. frequency
r0064	CO: Dev. frequency controller
r0065	CO: Slip frequency
r0066	CO: Act. output frequency
r0067	CO: Act. output current limit
r0068	CO: Output current
r0069[6]	CO: Act. phase currents
r0070	CO: Act. DC-link voltage
r0071	CO: Max. output voltage
r0072	CO: Act. output voltage
r0074	CO: Act. modulation
r0075	CO: Current setpoint Isd
r0076	CO: Act. current Isd
r0077	CO: Current setpoint Isq
r0078	CO: Act. current Isq
r0079	CO: Torque setpoint (total)
r0080	CO: Act. torque
r0084	CO: Act. air gap flux
r0086	CO: Act. active current
r0090	CO: Act. rotor angle
r0394	CO: Stator resistance IGBT [%]

ParNo	Parameter name
r0395	CO: Total stator resistance [%]
r0396	CO: Act. rotor resistance
r0630[3]	CO: Ambient temperature
r0631[3]	CO: Stator iron temperature
r0632[3]	CO: Stator winding temperature
r0633[3]	CO: Rotor winding temperature
r0755[2]	CO: Act. ADC after scal. [4000h]
r1024	CO: Act. fixed frequency
r1050	CO: Act. Output freq. of the MOP
r1078	CO: Total frequency setpoint
r1079	CO: Selected frequency setpoint
r1114	CO: Freq. setp. after dir. ctrl.
r1119	CO: Freq. setpoint before RFG
r1170	CO: Frequency setpoint after RFG
r1242	CO: Switch-on level of Vdc-max
r1246[3]	CO:Switch-on level kin buffering
r1315	CO: Total boost voltage
r1337	CO: V/f slip frequency
r1343	CO: Imax controller freq. output
r1344	CO: Imax controller volt. output
r1438	CO: Freq. setpoint to controller
r1445	CO: Act. filtered frequency
r1482	CO: Integral output of n-ctrl.
r1490	CO: Droop frequency
r1508	CO: Torque setpoint
r1515	CO: Additional torque setpoint
r1518	CO: Acceleration torque
P1520[3]	CO: Upper torque limit
P1521[3]	CO: Lower torque limit
r1526	CO: Upper torque limitation
r1527	CO: Lower torque limitation
r1536	CO: Max. trq. motoring current
r1537	CO: Max trq regenerative current
r1538	CO: Upper torque limit (total)
r1539	CO: Lower torque limit (total)
P1570[3]	CO: Fixed value flux setpoint
r1583	CO: Flux setpoint (smoothed)
r1597	CO: Outp. field weak. controller
r1598	CO: Flux setpoint (total)
r1718	CO: Output of Isq controller

ParNo	Parameter name
r1719	CO: Integral output of Isq ctrl.
r1723	CO: Output of Isd controller
r1724	CO: Integral output of Isd ctrl.
r1725	CO: Integral limit of Isd ctrl.
r1728	CO: Decoupling voltage
r1770	CO: Prop. output of n-adaption
r1771	CO: Int. output of n-adaption
r1778	CO: Flux angle difference
r1801	CO: Act. pulse frequency
r2015[8]	CO: PZD from BOP link (USS)
r2018[8]	CO: PZD from COM link (USS)
r2050[8]	CO: PZD from CB
r2169	CO: Act. filtered frequency
r2224	CO: Act. fixed PID setpoint
r2250	CO: Output setpoint of PID-MOP

ParNo	Parameter name
r2260	CO: PID setpoint after PID-RFG
r2262	CO: Filtered PID setp. after RFG
r2266	CO: PID filtered feedback
r2272	CO: PID scaled feedback
r2273	CO: PID error
r2294	CO: Act. PID output
r2870	CO: ADD 1
r2872	CO: ADD 2
r2874	CO: SUB 1
r2876	CO: SUB 2
r2878	CO: MUL 1
r2880	CO: MUL 2
r2882	CO: DIV 1
r2884	CO: DIV 2
P2889	CO: Fixed setpoint 1 in [%]
P2890	CO: Fixed setpoint 2 in [%]

1.8 Connector/Binector Output Parameters

ParNo	Parameter name
r0019	CO/BO: BOP control word
r0052	CO/BO: Act. status word 1
r0053	CO/BO: Act. status word 2
r0054	CO/BO: Act. control word 1
r0055	CO/BO: Act. control word 2

ParNo	Parameter name
r0056	CO/BO: Status of motor control
r0403	CO/BO: Encoder status word
r0722	CO/BO: Binary input values
r0747	CO/BO: State of digital outputs
r1407	CO/BO: Status 2 of motor control
r2197	CO/BO: Monitoring word 1
r2198	CO/BO: Monitoring word 2

1.9 Parameter Description

Note

Level 4 Parameters are not visible with BOP or AOP.

r0000 **Drive display** Level **1**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: ALWAYS

Displays the user selected output as defined in P0005.

Note:

Pressing the "Fn" button for 2 seconds allows the user to view the values of DC link voltage, output frequency, output voltage, output current, and chosen r0000 setting (defined in P0005).

r0002 **Drive state** Level **2**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: COMMANDS

Displays actual drive state.

Possible Settings:

0 Commissioning mode (P0010 != 0)
1 Drive ready
2 Drive fault active
3 Drive starting (DC-link precharging)
4 Drive running
5 Stopping (ramping down)

Dependency:

State 3 visible only while precharging DC link, and when externally powered communications board is fitted.

P0003 **User access level** Level **1**

CStat: CUT **Datatype:** U16 **Unit:** - **Min:** 0 **Def:** 1 **Max:** 4

P-Group: ALWAYS **Active:** first confirm **QuickComm.:** No

Defines user access level to parameter sets. The default setting (standard) is sufficient for most simple applications.

Possible Settings:

0 User defined parameter list - see P0013 for details on use
1 Standard: Allows access into most frequently used parameters.
2 Extended: Allows extended access e.g. to inverter I/O functions.
3 Expert: For expert use only.
4 Service: Only for use by authorized service personal - password protected.

P0004 **Parameter filter** Level **1**

CStat: CUT **Datatype:** U16 **Unit:** - **Min:** 0 **Def:** 0 **Max:** 22

P-Group: ALWAYS **Active:** first confirm **QuickComm.:** No

Filters available parameters according to functionality to enable a more focussed approach to commissioning.

Possible Settings:

0 All parameters
2 Inverter
3 Motor
4 Speed sensor
5 Technol. application / units
7 Commands, binary I/O
8 ADC and DAC
10 Setpoint channel / RFG
12 Drive features
13 Motor control
20 Communication
21 Alarms / warnings / monitoring
22 Technology controller (e.g. PID)

Example:

P0004 = 22 specifies that only PID parameters will be visible.

Dependency:

Parameters marked "Quick Comm: Yes" in the parameter header can only be set when P0010 = 1 (Quick Commissioning).

P0005[3] **Display selection**

CStat:	CUT	**Datatype:** U16	**Unit:** -	**Min:**	2
P-Group:	FUNC	**Active:** first confirm	**QuickComm.:** No	**Def:**	21
				Max:	4000

Level **2**

Selects display for parameter r0000 (drive display).

Index:

P0005[0] : 1st. Drive data set (DDS)
P0005[1] : 2nd. Drive data set (DDS)
P0005[2] : 3rd. Drive data set (DDS)

Common Settings:

21 Actual frequency
25 Output voltage
26 DC link voltage
27 Output current

Notice:

These settings refer to read only parameter numbers ("rxxxx").

Details:

See relevant "rxxxx" parameter descriptions.

P0006 **Display mode**

CStat:	CUT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	FUNC	**Active:** first confirm	**QuickComm.:** No	**Def:**	2
				Max:	4

Level **3**

Defines mode of display for r0000 (drive display).

Possible Settings:

0 In Ready state alternate between setpoint and output frequency. In run display output frequency
1 In Ready state display setpoint. In run display output frequency.
2 In Ready state alternate between P0005 value and r0020 value. In run display P0005 value
3 In Ready state alternate between r0002 value and r0020 value. In run display r0002 value
4 In all states just display P0005

Note:

When inverter is not running, the display alternates between the values for "Not Running" and "Running".

Per default, the setpoint and actual frequency values are displayed alternately.

P0007 **Backlight delay time**

CStat:	CUT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	FUNC	**Active:** first confirm	**QuickComm.:** No	**Def:**	0
				Max:	2000

Level **3**

Defines time period after which the backlight display turns off if no operator keys have been pressed.

Value:

P0007 = 0:
Backlight always on (default state).

P0007 = 1 - 2000:
Number of seconds after which the backlight will turn off.

P0010	**Commissioning parameter**			**Min:**	0	Level
	CStat: CT	**Datatype:** U16	**Unit:** -	**Def:**	0	**1**
	P-Group: ALWAYS	**Active:** first confirm	**QuickComm.:** No	**Max:**	30	

Filters parameters so that only those related to a particular functional group are selected.

Possible Settings:

0 Ready
1 Quick commissioning
2 Inverter
29 Download
30 Factory setting

Dependency:

Reset to 0 for inverter to run.

P0003 (user access level) also determines access to parameters.

Note:

P0010 = 1
The inverter can be commissioned very quickly and easily by setting P0010 = 1. After that only the important parameters (e.g.: P0304, P0305, etc.) are visible. The value of these parameters must be entered one after the other. The end of quick commissioning and the start of internal calculation will be done by setting P3900 = 1 - 3. Afterward parameter P0010 and P3900 will be reset to zero automatically.

P0010 = 2
For service purposes only.

P0010 = 29
To transfer a parameter file via PC tool (e.g.: DriveMonitor, STARTER) parameter P0010 will be set to 29 by the PC tool. When download has been finished PC tool resets parameter P0010 to zero.

P0010 = 30
When resetting the parameters of inverter P0010 must be set to 30. Resetting of the parameters will be started by setting parameter P0970 = 1. The inverter will automatically reset all its parameters to their default settings. This can prove beneficial if you experience problems during parameter setup and wish to start again. Duration of factory setting will take about 60 s.

P0011	**Lock for user defined parameter**			**Min:**	0	Level
	CStat: CUT	**Datatype:** U16	**Unit:** -	**Def:**	0	**3**
	P-Group: FUNC	**Active:** first confirm	**QuickComm.:** No	**Max:**	65535	

Details:

See parameter P0013 (user defined parameter)

P0012	**Key for user defined parameter**			**Min:**	0	Level
	CStat: CUT	**Datatype:** U16	**Unit:** -	**Def:**	0	**3**
	P-Group: FUNC	**Active:** first confirm	**QuickComm.:** No	**Max:**	65535	

Details:

See parameter P0013 (user defined parameter).

P0013[20] User defined parameter

CStat:	CUT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	FUNC	**Active:** first confirm	**QuickComm.:** No	**Def:**	0
				Max:	65535

Level **3**

Defines a limited set of parameters to which the end user will have access.

Instructions for use:

1. Set P0003 = 3 (expert user)
2. Go to P0013 indices 0 to 16 (user list)
3. Enter into P0013 index 0 to 16 the parameters required to be visible in the user-defined list. The following values are fixed and cannot be changed:
   - P0013 index 19 = 12 (key for user defined parameter)
   - P0013 index 18 = 10 (commissioning parameter filter)
   - P0013 index 17 = 3 (user access level)
4. Set P0003 = 0 to activate the user defined parameter.

Index:

P0013[0] : 1st user parameter
P0013[1] : 2nd user parameter
P0013[2] : 3rd user parameter
P0013[3] : 4th user parameter
P0013[4] : 5th user parameter
P0013[5] : 6th user parameter
P0013[6] : 7th user parameter
P0013[7] : 8th user parameter
P0013[8] : 9th user parameter
P0013[9] : 10th user parameter
P0013[10] : 11th user parameter
P0013[11] : 12th user parameter
P0013[12] : 13th user parameter
P0013[13] : 14th user parameter
P0013[14] : 15th user parameter
P0013[15] : 16th user parameter
P0013[16] : 17th user parameter
P0013[17] : 18th user parameter
P0013[18] : 19th user parameter
P0013[19] : 20th user parameter

Dependency:

First, set P0011 ("lock") to a different value than P0012 ("key") to prevent changes to user-defined parameter. Then, set P0003 to 0 to activate the user-defined list.

When locked and the user-defined parameter is activated, the only way to exit the user-defined parameter (and view other parameters) is to set P0012 ("key") to the value in P0011 ("lock").

Note:

Alternatively, set P0010 = 30 (commissioning parameter filter = factory setting) and P0970 = 1 (factory reset) to perform a complete factory reset.

The default values of P0011 ("lock") and P0012 ("key") are the same.

P0014[3] Store mode Level **3**

CStat: UT **Datatype:** U16 **Unit:** - **Min:** 0
P-Group: - **Active:** first confirm **QuickComm.:** No **Def:** 0 **Max:** 1

Sets the store mode for parameters ("volatile" (RAM) or "nonvolatile" (EEPROM)).

Possible Settings:

0 volatile (RAM)
1 nonvolatile (EEPROM)

Index:

P0014[0] : Serial interface COM link
P0014[1] : Serial interface BOP link
P0014[2] : PROFIBUS / CB

Note:

1. With the BOP the parameter will always be stored in the EEPROM.
2. P0014 itself will always be stored in the EEPROM.
3. P0014 will not be changed by performing a factory reset (P0010 = 30 and P0971 = 1).
4. P0014 can be transferred during a DOWNLOAD (P0010 = 29).
5. If "Store request via USS/CB = volatile (RAM)" and "P0014[x] = volatile (RAM)", you can make a transfer of all parameter values into the nonvolatile memory via P0971.
6. If "Store request via USS/CB" and P0014[x] are not consistent, the setting of P14[x] = "store nonvolatile (EEPROM)" has always higher priority.

Store request via USS/CB	Value of P0014[x]	Result
EEPROM	RAM	EEPROM
EEPROM	EEPROM	EEPROM
RAM	RAM	RAM
RAM	EEPROM	EEPROM

r0018 Firmware version Level **1**

Datatype: Float **Unit:** - **Min:** - **Def:** - **Max:** -
P-Group: INVERTER

Displays version number of installed firmware.

r0019 CO/BO: BOP control word Level **3**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -
P-Group: COMMANDS

Displays status of operator panel commands.

The settings below are used as the "source" codes for keypad control when connecting to BICO input parameters.

Bitfields:

```
Bit00   ON/OFF1                              0  NO    1  YES
Bit01   OFF2: Electrical stop                0  YES   1  NO
Bit08   JOG right                            0  NO    1  YES
Bit11   Reverse (setpoint inversion)         0  NO    1  YES

Bit13   Motor potentiometer MOP up           0  NO    1  YES
Bit14   Motor potentiometer MOP down         0  NO    1  YES
```

Note:

When BICO technology is used to allocate functions to panel buttons, this parameter displays the actual status of the relevant command.

The following functions can be "connected" to individual buttons:

- ON/OFF1,
- OFF2,
- JOG,
- REVERSE,
- INCREASE,
- DECREASE

r0020 CO: Freq. setpoint before RFG Level **3**

Datatype: Float **Unit:** Hz **Min:** - **Def:** - **Max:** -
P-Group: CONTROL

Displays actual frequency setpoint (output from ramp function generator).

r0021 CO: Act. filtered frequency Level **2**

Datatype: Float **Unit:** Hz **Min:** - **Def:** - **Max:** -
P-Group: CONTROL

Displays actual inverter output frequency (r0021) excluding slip compensation, resonance damping and frequency limitation.

r0022 **Act. filtered rotor speed** Level **3**

Datatype: Float **Unit:** 1/min **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

Displays calculated rotor speed based on inverter output frequency [Hz] x 120 / number of poles.

Note:

This calculation makes no allowance for load-dependent slip.

r0024 **CO: Act. filtered output freq.** Level **3**

Datatype: Float **Unit:** Hz **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

Displays actual output frequency (slip compensation, resonance damping and frequency limitation are included).

r0025 **CO: Act. filtered output voltage** Level **2**

Datatype: Float **Unit:** V **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

Displays [rms] voltage applied to motor.

r0026 **CO: Act. filtered DC-link volt.** Level **2**

Datatype: Float **Unit:** V **Min:** - **Def:** - **Max:** -

P-Group: INVERTER

Displays DC-link voltage.

	Mains		
	200 - 240 V	380 - 480 V	500 - 600 V
$U_{DC\_max\_trip}$ F0002	420 V (FS A - C) 410 V (FS D - F)	840 V (FS A - C) 820 V (FS D - F) 820 V (FS FX, GX)	1020 V
$U_{DC\_min\_trip}$ F0003	215 V	430 V (FS A - F) 380 V (FS FX, GX)	530 V
$U_{DC\_max\_warn}$ A0502 $U_{DC\_max\_ctrl}$ (P1240)	r1242		
$U_{DC\_min\_warn}$ A0503 $U_{DC\_min\_ctrl}$ (P1240)	$\frac{P1245\,[\%]}{100} \cdot \sqrt{2} \cdot P0210$		
U_{DC_Comp} (P1236)	$0.98 \cdot r1242$		
$U_{DC\_Chopper}$ (P1237)	$0.98 \cdot r1242$		

r0027 **CO: Act. filtered output current** Level **2**

Datatype: Float **Unit:** A **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

Displays [rms] value of motor current [A].

r0029 **CO: Flux gen. current** Level **3**

Datatype: Float **Unit:** A **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

Displays flux-generating current component.

The flux-generating current component is based on the nominal flux, which is calculated from the motor parameters (P0340 - Calculation of motor parameters).

Dependency:

Applies when vector control is selected in P1300 (control mode); otherwise, the display shows the value zero.

Note:

The flux-generating current component is generally constant up to the base speed of the motor; above base speed, this component is weakened (field weakening) thus enabling an increase in motor speed but at reduced torque.

r0030 **CO: Torque gen. current** Level **3**

Datatype: Float **Unit:** A **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

Displays torque-generating current component.

The torque-generating current component is calculated from the torque setpoint values delivered by the speed regulator.

Dependency:

Applies when vector control is selected in P1300 (control mode); otherwise, the display shows the value zero.

Note:

For asynchronous motors, a limit is calculated for the torque generating current component (in conjunction with the maximum possible output voltage (r0071), motor leakage and current field weakening (r0377)) and this prevents motor stalling.

r0031 **CO: Act. filtered torque** Level **2**

Datatype: Float **Unit:** Nm **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

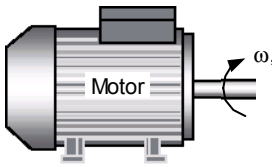
Displays motor torque. Output value will be zero at low speeds when current injection is active (r1751.5 = 1).

r0032 **CO: Act. filtered power** Level **2**

Datatype: Float **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

Displays motor power.



$$P_{mech} = \omega \cdot M = 2 \cdot \pi \cdot f \cdot M$$

$$\Rightarrow$$

$$r0032\,[kW] = \frac{1}{1000} \cdot 2 \cdot \pi \cdot \frac{r0022}{60}\,[1/min] \cdot r0031[Nm]$$

$$r0032\,[hp] = 0.75 \cdot r0032\,[kW]$$

Dependency:

Value is displayed in [kW] or [hp] depending on setting for P0100 (operation for Europe / North America).

r0035[3] **CO: Act. motor temperature** Level **2**

Datatype: Float **Unit:** °C **Min:** - **Def:** - **Max:** -

P-Group: MOTOR

Displays measured motor temperature.

Index:

r0035[0] : 1st. Drive data set (DDS)
r0035[1] : 2nd. Drive data set (DDS)
r0035[2] : 3rd. Drive data set (DDS)

r0036 **CO:Inverter overload utilization** Level **4**

Datatype: Float **Unit:** % **Min:** - **Def:** - **Max:** -

P-Group: INVERTER

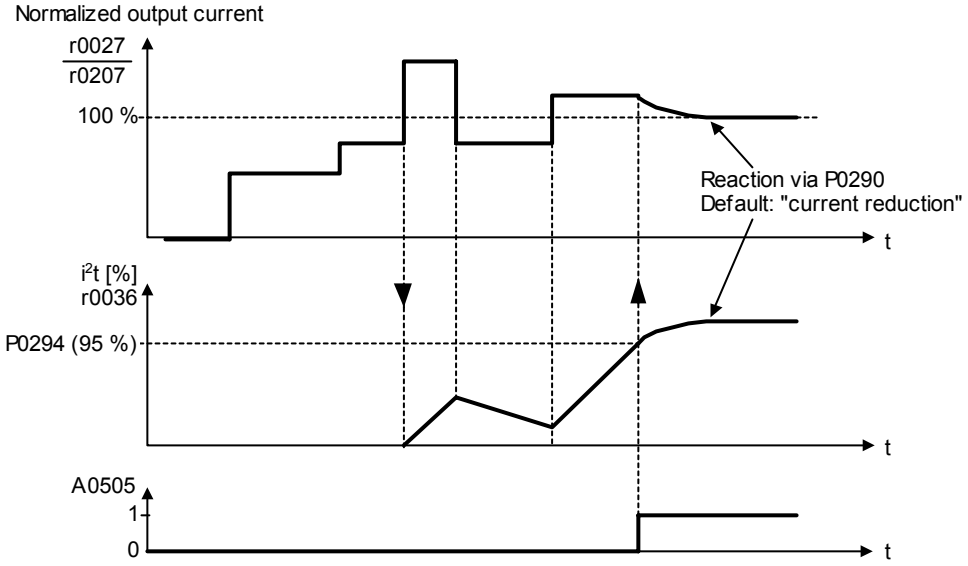
Displays inverter overload utilization calculated via I2t model.

The actual I2t value relative to the max. possible I2t value supplies utilization in [%].

If the current exceeds the threshold for P0294 (inverter I2t overload warning), alarm A0505 (inverter I2t) is generated and the output current of the inverter reduced via P0290 (inverter overload reaction).

If 100 % utilization is exceeded, alarm F0005 (inverter I2t) is tripped.

Example:



Dependency:

r0036 > 0:
If the nominal current of the inverter is exceed, utilization will be displayed. Otherwise, 0 % utilization is displayed.

r0037[5] **CO: Inverter temperature [°C]** Level **3**

Datatype: Float **Unit:** °C **Min:** - **Def:** - **Max:** -

P-Group: INVERTER

Displays measured heatsink temperature and calculated junction temperature of IGBTs based on thermal model.

Index:

r0037[0] : Measured heat sink temperature
r0037[1] : Chip temperature
r0037[2] : Rectifier temperature
r0037[3] : Inverter ambient temperature
r0037[4] : Control board temperature

r0038 **CO: Act. power factor** Level **3**

Datatype: Float **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

Displays actual power factor.

Dependency:

Applies when V/f control is selected in P1300 (control mode); otherwise, the display shows the value zero.

r0039 **CO: Energy consumpt. meter [kWh]** Level **2**

Datatype: Float **Unit:** kWh **Min:** - **Def:** - **Max:** -

P-Group: INVERTER

Displays electrical energy used by inverter since display was last reset (see P0040 - reset energy consumption meter).

Dependency:

Value is reset when
P0040 = 1 reset energy consumption meter.

P0040 **Reset energy consumption meter** Level **2**

CStat: CT **Datatype:** U16 **Unit:** - **Min:** 0
P-Group: INVERTER **Active:** first confirm **QuickComm.:** No **Def:** 0
Max: 1

Resets value of parameter r0039 (energy consumption meter) to zero.

Possible Settings:

0 No reset
1 Reset r0039 to 0

Dependency:

No reset until "P" is pressed.

r0050 **CO: Active command data set** Level **2**

Datatype: U16 **Unit:** - **Min:** -
P-Group: COMMANDS **Def:** -
Max: -

Displays currently selected and active command data set (CDS).

Possible Settings:

0 1st. Command data set (CDS)
1 2nd. Command data set (CDS)
2 3rd. Command data set (CDS)

Details:

See parameter P0810.

r0051[2] **CO: Active drive data set (DDS)** Level **2**

Datatype: U16 **Unit:** - **Min:** -
P-Group: COMMANDS **Def:** -
Max: -

Displays currently selected and active drive data set (DDS).

Possible Settings:

0 1st. Drive data set (DDS)
1 2nd. Drive data set (DDS)
2 3rd. Drive data set (DDS)

Index:

r0051[0] : Selected drive data set
r0051[1] : Active drive data set

Details:

See parameter P0820.

r0052 **CO/BO: Act. status word 1** Level **2**

Datatype: U16 **Unit:** - **Min:** -
P-Group: COMMANDS **Def:** -
Max: -

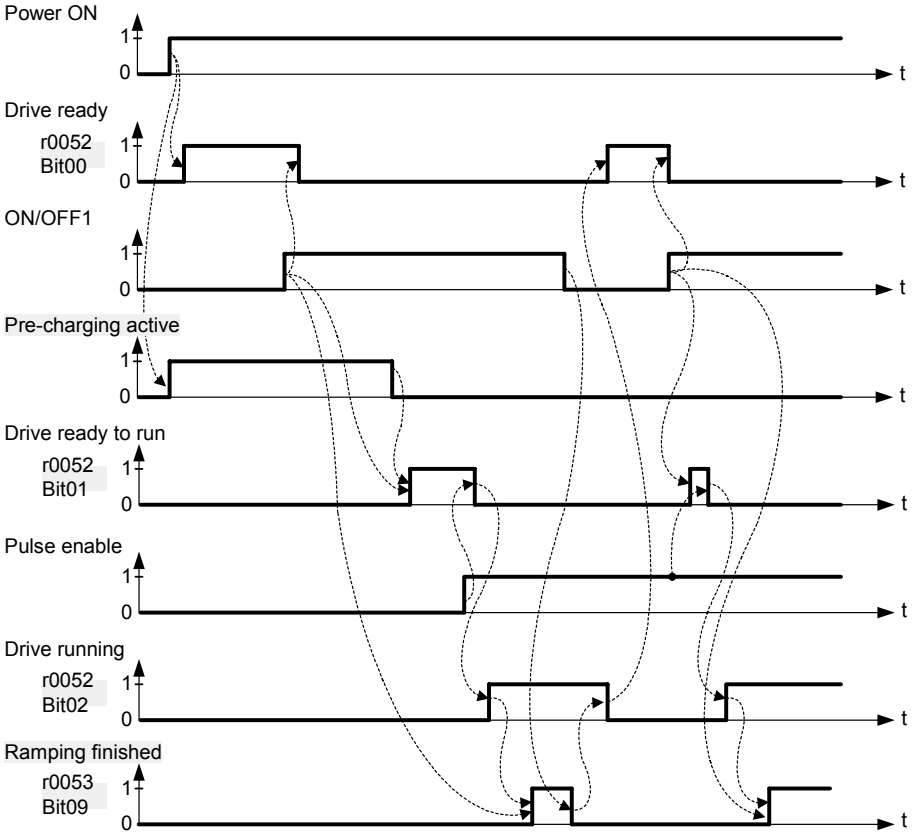
Displays first active status word of inverter (bit format) and can be used to diagnose inverter status.

Bitfields:

Bit00	Drive ready	0	NO	1	YES
Bit01	Drive ready to run	0	NO	1	YES
Bit02	Drive running	0	NO	1	YES
Bit03	Drive fault active	0	NO	1	YES
Bit04	OFF2 active	0	YES	1	NO
Bit05	OFF3 active	0	YES	1	NO
Bit06	ON inhibit active	0	NO	1	YES
Bit07	Drive warning active	0	NO	1	YES
Bit08	Deviation setpoint / act. value	0	YES	1	NO
Bit09	PZD control	0	NO	1	YES
Bit10	Maximum frequency reached	0	NO	1	YES
Bit11	Warning: Motor current limit	0	YES	1	NO
Bit12	Motor holding brake active	0	NO	1	YES
Bit13	Motor overload	0	YES	1	NO
Bit14	Motor runs right	0	NO	1	YES
Bit15	Inverter overload	0	YES	1	NO

Dependency:

r0052 Bit00 - Bit02: State-sequence diagram after Power On or ON/OFF1 respectively: ==> see below



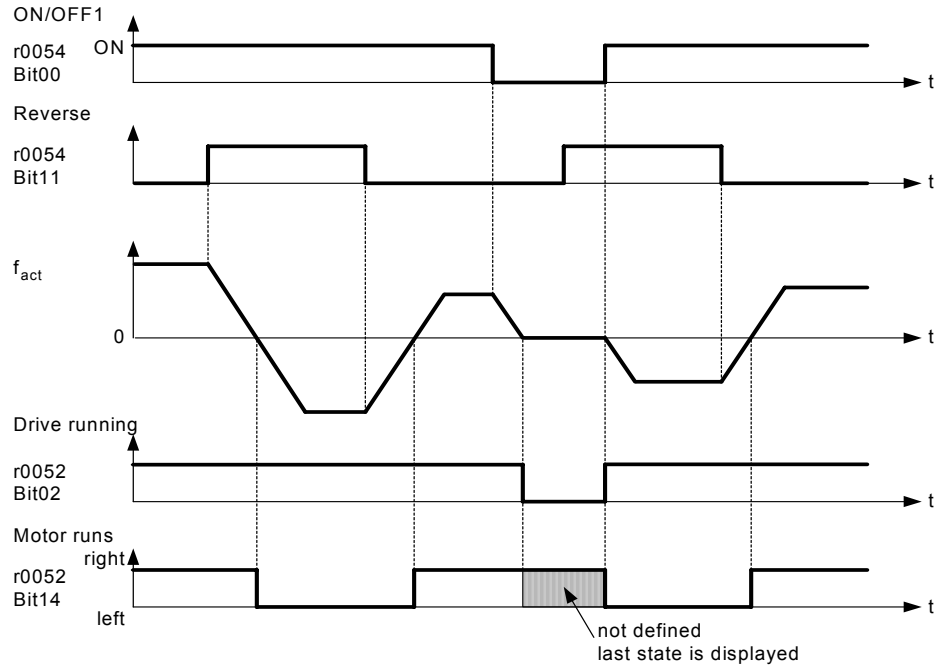
r0052 Bit03 "Drive fault active":
Output of Bit3 (Fault) will be inverted on digital output (Low = Fault, High = No Fault).

r0052 Bit08 "Deviation setpoint / act. value" ==> see parameter P2164

r0052 Bit10 "f_act >= P1082 (f_max)" ==> see parameter P1082

r0052 Bit12 "Motor holding brake active" ==> see parameter P1215

r0052 Bit14 "Motor runs right" ==> see below



Details:

The 7-segment display of the bit-parameters (binary parameters) is explained in the Introduction of the Parameter List.

r0053 **CO/BO: Act. status word 2** Level **2**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: COMMANDS

Displays second status word of inverter (in bit format).

Bitfields:

Bit00	DC brake active	0	NO	1	YES
Bit01	f_act > P2167 (f_off)	0	NO	1	YES
Bit02	f_act > P1080 (f_min)	0	NO	1	YES
Bit03	Act. current r0027 >= P2170	0	NO	1	YES
Bit04	f_act > P2155 (f_1)	0	NO	1	YES
Bit05	f_act <= P2155 (f_1)	0	NO	1	YES
Bit06	f_act >= setpoint	0	NO	1	YES
Bit07	Act. Vdc r0026 < P2172	0	NO	1	YES
Bit08	Act. Vdc r0026 > P2172	0	NO	1	YES
Bit09	Ramping finished	0	NO	1	YES
Bit10	PID output r2294 == P2292 (PID_min)	0	NO	1	YES
Bit11	PID output r2294 == P2291 (PID_max)	0	NO	1	YES
Bit14	Download data set 0 from AOP	0	NO	1	YES
Bit15	Download data set 1 from AOP	0	NO	1	YES

Details:

See description of seven-segment display given in the "Introduction to MICROMASTER System Parameters" in this manual.

r0054 **CO/BO: Act. control word 1** Level **3**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: COMMANDS

Displays first control word of inverter and can be used to diagnose which commands are active.

Bitfields:

Bit00	ON/OFF1	0	NO	1	YES
Bit01	OFF2: Electrical stop	0	YES	1	NO
Bit02	OFF3: Fast stop	0	YES	1	NO
Bit03	Pulse enable	0	NO	1	YES
Bit04	RFG enable	0	NO	1	YES
Bit05	RFG start	0	NO	1	YES
Bit06	Setpoint enable	0	NO	1	YES
Bit07	Fault acknowledge	0	NO	1	YES
Bit08	JOG right	0	NO	1	YES
Bit09	JOG left	0	NO	1	YES
Bit10	Control from PLC	0	NO	1	YES
Bit11	Reverse (setpoint inversion)	0	NO	1	YES
Bit13	Motor potentiometer MOP up	0	NO	1	YES
Bit14	Motor potentiometer MOP down	0	NO	1	YES
Bit15	CDS Bit 0 (Local/Remote)	0	NO	1	YES

Details:

See description of seven-segment display given in the "Introduction to MICROMASTER System Parameters" in this manual.

r0055 **CO/BO: Act. control word 2** Level **3**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: COMMANDS

Displays additional control word of inverter and can be used to diagnose which commands are active.

Bitfields:

Bit00	Fixed frequency Bit 0	0	NO	1	YES
Bit01	Fixed frequency Bit 1	0	NO	1	YES
Bit02	Fixed frequency Bit 2	0	NO	1	YES
Bit03	Fixed frequency Bit 3	0	NO	1	YES
Bit04	Drive data set (DDS) Bit 0	0	NO	1	YES
Bit05	Drive data set (DDS) Bit 1	0	NO	1	YES
Bit08	PID enabled	0	NO	1	YES
Bit09	DC brake enabled	0	NO	1	YES
Bit11	Droop enabled	0	NO	1	YES
Bit12	Torque control	0	NO	1	YES
Bit13	External fault 1	0	YES	1	NO
Bit15	Command data set (CDS) Bit 1	0	NO	1	YES

Details:

See description of seven-segment display given in the "Introduction to MICROMASTER System Parameters" in this handbook.

r0056 **CO/BO: Status of motor control** Level **3**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

Displays status of motor control (MM420: V/f status), which can be used to diagnose inverter status.

Bitfields:

Bit00	Init. control finished	0	NO	1	YES
Bit01	Motor demagnetizing finished	0	NO	1	YES
Bit02	Pulses enabled	0	NO	1	YES
Bit03	Voltage soft start select	0	NO	1	YES
Bit04	Motor excitation finished	0	NO	1	YES
Bit05	Starting boost active	0	NO	1	YES
Bit06	Acceleration boost active	0	NO	1	YES
Bit07	Frequency is negative	0	NO	1	YES
Bit08	Field weakening active	0	NO	1	YES
Bit09	Volts setpoint limited	0	NO	1	YES
Bit10	Slip frequency limited	0	NO	1	YES
Bit11	F_out > F_max Freq. limited	0	NO	1	YES
Bit12	Phase reversal selected	0	NO	1	YES
Bit13	I-max controller active	0	NO	1	YES
Bit14	Vdc-max controller active	0	NO	1	YES
Bit15	KIB (Vdc-min control) active	0	NO	1	YES

Details:

See description of seven-segment display given in the introduction.

r0061 **CO: Act. encoder frequency** Level **2**

Datatype: Float **Unit:** Hz **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

Displays actual frequency detected by encoder.

r0062 **CO: Freq. setpoint** Level **3**

Datatype: Float **Unit:** Hz **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

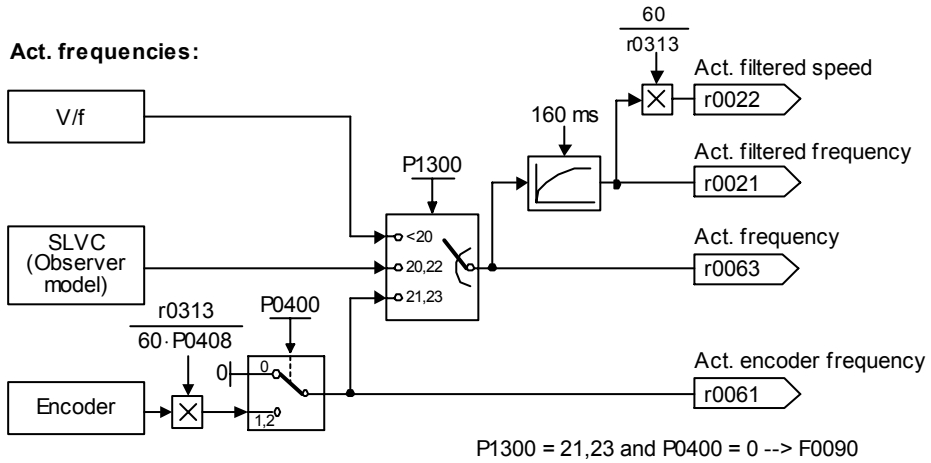
Displays frequency setpoint of vector controller.

r0063 **CO: Act. frequency** Level **3**

Datatype: Float **Unit:** Hz **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

Displays actual unfiltered frequency.



r0064 **CO: Dev. frequency controller** Level **3**

Datatype: Float **Unit:** Hz **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

Displays actual deviation of speed controller.

This value is calculated from the frequency setpoint (r0062) and the actual frequency (r0063).

Dependency:

Applies when vector control is selected in P1300 (control mode); otherwise, the display shows the value zero.

r0065 **CO: Slip frequency** Level **3**

Datatype: Float **Unit:** % **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

Displays slip frequency of motor in [%] relative to the rated motor frequency (P0310).

Details:
For V/f control, see also P1335 (slip compensation).

r0066 **CO: Act. output frequency** Level **3**

Datatype: Float **Unit:** Hz **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

Displays actual output frequency.

Note:
The output frequency is limited by the values entered in P1080 (min. frequency) and P1082 (max. frequency).

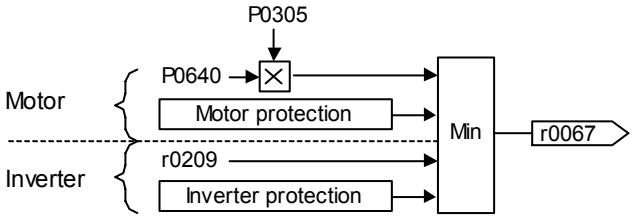
r0067 **CO: Act. output current limit** Level **3**

Datatype: Float **Unit:** A **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

Displays valid maximum output current of inverter.

Parameter r0067 is influenced/determined by the following factors:
- Rated motor current P0305
- Motor overload factor P0640
- Motor protection in dependency of P0610
- r0067 is less than or equal to maximum inverter current r0209
- Inverter protection in dependency of P0290



Note:
A reduction of r0067 may indicate an inverter overload or a motor overload.

r0068 **CO: Output current** Level **3**

Datatype: Float **Unit:** A **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

Displays unfiltered [rms] value of motor current [A].

Note:
Used for process control purposes (in contrast to r0027 (output current), which is filtered and is used to display the value on the BOP/AOP).

r0069[6] **CO: Act. phase currents** Level **4**

Datatype: Float **Unit:** A **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

Displays phase currents.

Index:
r0069[0] : U_phase
r0069[1] : V_phase
r0069[2] : W_phase
r0069[3] : Offset U_phase
r0069[4] : Offset V_phase
r0069[5] : Offset W_phase

r0070 **CO: Act. DC-link voltage** Level **3**

Datatype: Float **Unit:** V **Min:** - **Def:** - **Max:** -

P-Group: INVERTER

Displays (unfiltered) DC-link voltage.

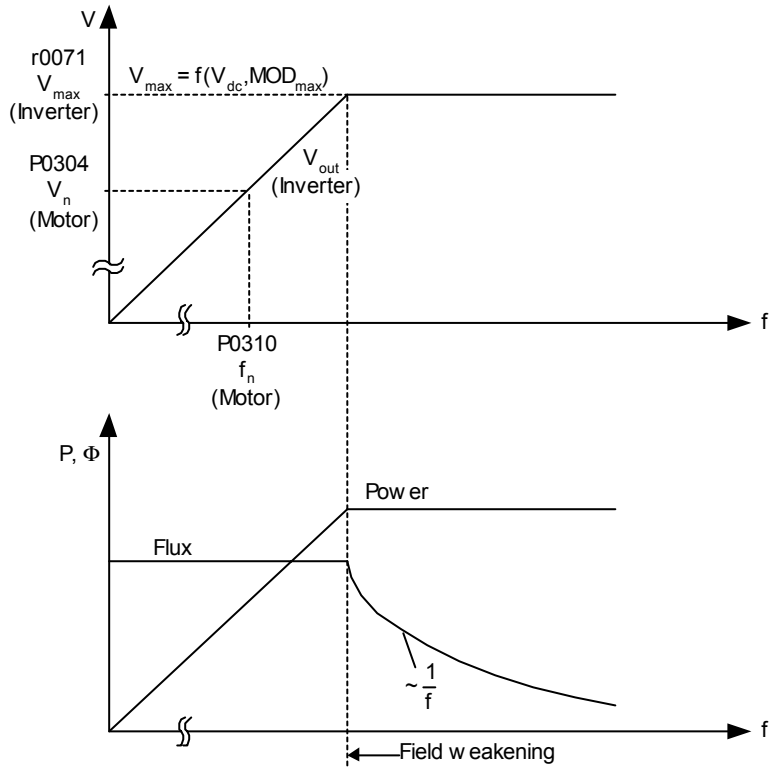
Note:
Used for process control purposes (in contrast to r0026 (actual DC-link voltage), which is filtered and is used to display the value on the BOP/AOP).

r0071 **CO: Max. output voltage** Level **3**

Datatype: Float **Unit:** V **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

Displays maximum output voltage.



Dependency:

Actual maximum output voltage depends on the actual input supply voltage.

r0072 **CO: Act. output voltage** Level **3**

Datatype: Float **Unit:** V **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

Displays output voltage.

r0074 **CO: Act. modulation** Level **4**

Datatype: Float **Unit:** % **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

Displays actual modulation index.

The modulation index is defined as ratio between the magnitude of the fundamental component in the inverter phase output voltage and half of the dc-link voltage.

r0075 **CO: Current setpoint Isd** Level **3**

Datatype: Float **Unit:** A **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

Displays setpoint of flux generating current component.

Dependency:

Applies when vector control is selected in P1300 (control mode); otherwise, the display shows the value zero.

r0076 **CO: Act. current Isd** Level **3**

Datatype: Float **Unit:** A **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

Displays flux generating current component.

Dependency:

Applies when vector control is selected in P1300 (control mode); otherwise, the display shows the value zero.

r0077 **CO: Current setpoint Isq** Level **3**

Datatype: Float **Unit:** A **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

Displays setpoint for component of torque generating current.

Dependency:

Applies when vector control is selected in P1300 (control mode); otherwise, the display shows the value zero.

r0078 **CO: Act. current Isq** Level **3**

Datatype: Float **Unit:** A **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

Displays component of torque generating current.

r0079 **CO: Torque setpoint (total)** Level **3**

Datatype: Float **Unit:** Nm **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

Displays total torque setpoint.

Dependency:

Applies when vector control is selected in P1300 (control mode); otherwise, the display shows the value zero.

r0080 **CO: Act. torque** Level **4**

Datatype: Float **Unit:** Nm **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

Displays actual torque. Output value will be zero at low frequencies when current injection is active (r1751.5 = 1).

r0084 **CO: Act. air gap flux** Level **4**

Datatype: Float **Unit:** % **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

Displays air gap flux in [%] relative to the rated motor flux.

r0086 **CO: Act. active current** Level **3**

Datatype: Float **Unit:** A **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

Displays active (real part) of motor current.

Dependency:

Applies when V/f control is selected in P1300 (control mode); otherwise, the display shows the value zero.

r0090 **CO: Act. rotor angle** Level **2**

Datatype: Float **Unit:** ° **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

Indicates the current angle of the rotor. This function is not available on single input channel encoders.

P0095[10] **CI: Display PZD signals** Level **3**

CStat: CT **Datatype:** U32 **Unit:** - **Min:** 0:0 **Def:** 0:0 **Max:** 4000:0

P-Group: CONTROL **Active:** first confirm **QuickComm.:** No

Selects source of display for PZD signals.

Index:

P0095[0] : 1st PZD signal
P0095[1] : 2nd PZD signal
P0095[2] : 3rd PZD signal
P0095[3] : 4th PZD signal
P0095[4] : 5th PZD signal
P0095[5] : 6th PZD signal
P0095[6] : 7th PZD signal
P0095[7] : 8th PZD signal
P0095[8] : 9th PZD signal
P0095[9] : 10th PZD signal

r0096[10] **PZD signals**

Datatype: Float **Unit:** % **Min:** - **Def:** - **Max:** -

Level **3**

P-Group: CONTROL

Displays PZD signals in [%].

Index:

r0096[0] : 1st PZD signal
r0096[1] : 2nd PZD signal
r0096[2] : 3rd PZD signal
r0096[3] : 4th PZD signal
r0096[4] : 5th PZD signal
r0096[5] : 6th PZD signal
r0096[6] : 7th PZD signal
r0096[7] : 8th PZD signal
r0096[8] : 9th PZD signal
r0096[9] : 10th PZD signal

Note:

r0096 = 100 % corresponds to 4000 hex.

P0100 **Europe / North America**

CStat: C **Datatype:** U16 **Unit:** - **Min:** 0 **Def:** 0 **Max:** 2

Level **1**

P-Group: QUICK **Active:** first confirm **QuickComm.:** Yes

Determines whether power settings (e.g. nominal rating plate power - P0307) are expressed in [kW] or [hp].

The default settings for the nominal rating plate frequency (P0310) and maximum motor frequency (P1082) are also set automatically here, in addition to reference frequency (P2000).

Possible Settings:

0 Europe [kW], frequency default 50 Hz
1 North America [hp], frequency default 60 Hz
2 North America [kW], frequency default 60 Hz

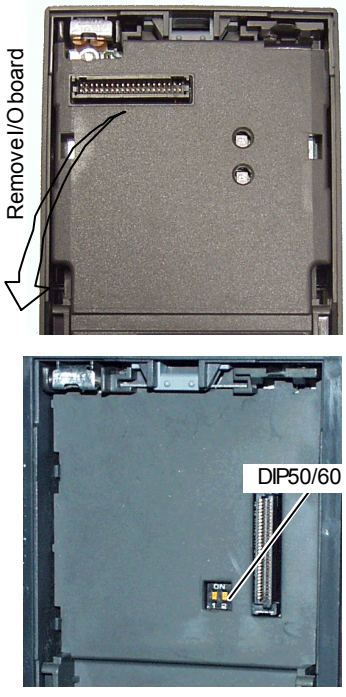
Dependency:

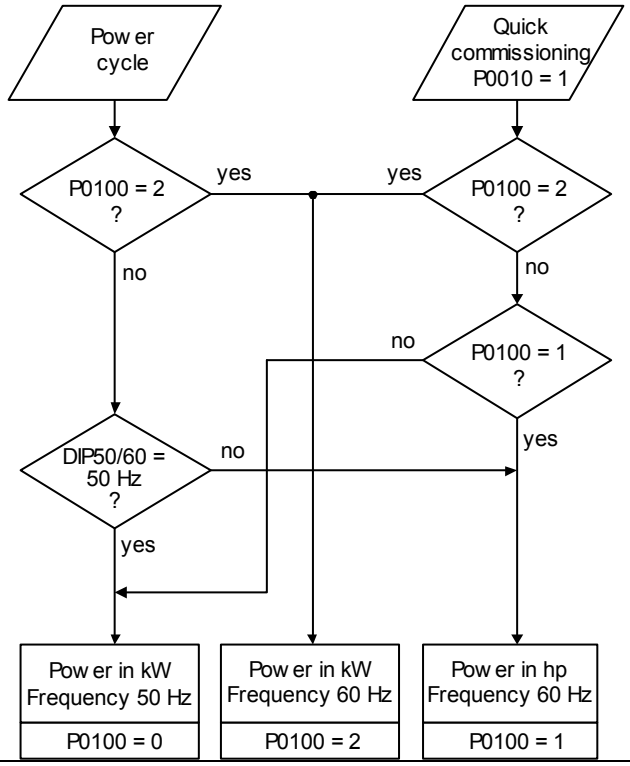
Where:

- Stop drive first (i.e. disable all pulses) before you change this parameter.
- Changing P0100 resets all rated motor parameters as well as other parameters that depend on the rated motor parameters (see P0340 - calculation of motor parameters).

Changing P0100 overwrites the settings of the DIP50/60 switch (location shown in the diagram below):

1. Parameter P0100 has an higher priority than the DIP50/60 switch.
2. However, after the inverter is powered-on again and P0100 < 2, the DIP50/60 setting will take priority and overwrite P0100.
3. The DIP50/60 switch does not have any effect, if P0100 = 2.





Notice:

P0100 setting 2 (==> [kW], frequency default 60 [Hz]) is not overwritten by the setting of DIP switch 2 (see diagram above).

P0199 **Equipment system number** Level **2**

CStat: UT **Datatype:** U16 **Unit:** - **Min:** 0
P-Group: - **Active:** first confirm **QuickComm.:** No **Def:** 0
Max: 255

Equipment system number. This parameter has no operation effect.

r0200 **Act. power stack code number** Level **3**

Datatype: U32 **Unit:** - **Min:** -
P-Group: INVERTER **Def:** -
Max: -

Identifies hardware variant as shown in table below.

Code-No.	MM440 MLFB	Input Voltage & Frequency	CT Power kW	VT Power kW	Internal Filter	Frame Size
41	6SE6440-2UC11-2AAx	1/3AC200-240V +10% -10% 47-63Hz	0,12	0,12	no	A
42	6SE6440-2UC12-5AAx	1/3AC200-240V +10% -10% 47-63Hz	0,25	0,25	no	A
43	6SE6440-2UC13-7AAx	1/3AC200-240V +10% -10% 47-63Hz	0,37	0,37	no	A
44	6SE6440-2UC15-5AAx	1/3AC200-240V +10% -10% 47-63Hz	0,55	0,55	no	A
45	6SE6440-2UC17-5AAx	1/3AC200-240V +10% -10% 47-63Hz	0,75	0,75	no	A
46	6SE6440-2AB11-2AAx	1AC200-240V +10% -10% 47-63Hz	0,12	0,12	Cl. A	A
47	6SE6440-2AB12-5AAx	1AC200-240V +10% -10% 47-63Hz	0,25	0,25	Cl. A	A
48	6SE6440-2AB13-7AAx	1AC200-240V +10% -10% 47-63Hz	0,37	0,37	Cl. A	A
49	6SE6440-2AB15-5AAx	1AC200-240V +10% -10% 47-63Hz	0,55	0,55	Cl. A	A
50	6SE6440-2AB17-5AAx	1AC200-240V +10% -10% 47-63Hz	0,75	0,75	Cl. A	A
51	6SE6440-2UC21-1BAx	1/3AC200-240V +10% -10% 47-63Hz	1,1	1,1	no	B
52	6SE6440-2UC21-5BAx	1/3AC200-240V +10% -10% 47-63Hz	1,5	1,5	no	B
53	6SE6440-2UC22-2BAx	1/3AC200-240V +10% -10% 47-63Hz	2,2	2,2	no	B
54	6SE6440-2AB21-1BAx	1AC200-240V +10% -10% 47-63Hz	1,1	1,1	Cl. A	B
55	6SE6440-2AB21-5BAx	1AC200-240V +10% -10% 47-63Hz	1,5	1,5	Cl. A	B
56	6SE6440-2AB22-2BAx	1AC200-240V +10% -10% 47-63Hz	2,2	2,2	Cl. A	B
57	6SE6440-2UC23-0CAx	1/3AC200-240V +10% -10% 47-63Hz	3	3	no	C
58	6SE6440-2UC24-0CAx	3AC200-240V +10% -10% 47-63Hz	4	5,5	no	C
59	6SE6440-2UC25-5CAx	3AC200-240V +10% -10% 47-63Hz	5,5	7,5	no	C
60	6SE6440-2AB23-0CAx	1AC200-240V +10% -10% 47-63Hz	3	3	Cl. A	C
61	6SE6440-2AC23-0CAx	3AC200-240V +10% -10% 47-63Hz	3	3	Cl. A	C
62	6SE6440-2AC24-0CAx	3AC200-240V +10% -10% 47-63Hz	4	5,5	Cl. A	C
63	6SE6440-2AC25-5CAx	3AC200-240V +10% -10% 47-63Hz	5,5	7,5	Cl. A	C
64	6SE6440-2UC27-5DAx	3AC200-240V +10% -10% 47-63Hz	7,5	11	no	D
65	6SE6440-2UC31-1DAx	3AC200-240V +10% -10% 47-63Hz	11	15	no	D
66	6SE6440-2UC31-5DAx	3AC200-240V +10% -10% 47-63Hz	15	18,5	no	D
67	6SE6440-2AC27-5DAx	3AC200-240V +10% -10% 47-63Hz	7,5	11	Cl. A	D
68	6SE6440-2AC31-1DAx	3AC200-240V +10% -10% 47-63Hz	11	15	Cl. A	D
69	6SE6440-2AC31-5DAx	3AC200-240V +10% -10% 47-63Hz	15	18,5	Cl. A	D
70	6SE6440-2UC31-8EAx	3AC200-240V +10% -10% 47-63Hz	18,5	22	no	E
71	6SE6440-2UC32-2EAx	3AC200-240V +10% -10% 47-63Hz	22	30	no	E
72	6SE6440-2AC31-8EAx	3AC200-240V +10% -10% 47-63Hz	18,5	22	Cl. A	E
73	6SE6440-2AC32-2EAx	3AC200-240V +10% -10% 47-63Hz	22	30	Cl. A	E
74	6SE6440-2UC33-0FAx	3AC200-240V +10% -10% 47-63Hz	30	37	no	F
75	6SE6440-2UC33-7FAx	3AC200-240V +10% -10% 47-63Hz	37	45	no	F
76	6SE6440-2UC34-5FAx	3AC200-240V +10% -10% 47-63Hz	45	45	no	F
77	6SE6440-2AC33-0FAx	3AC200-240V +10% -10% 47-63Hz	30	37	Cl. A	F
78	6SE6440-2AC33-7FAx	3AC200-240V +10% -10% 47-63Hz	37	45	Cl. A	F
79	6SE6440-2AC34-5FAx	3AC200-240V +10% -10% 47-63Hz	45	45	Cl. A	F
80	6SE6440-2UD13-7AAx	3AC380-480V +10% -10% 47-63Hz	0,37	0,37	no	A
81	6SE6440-2UD15-5AAx	3AC380-480V +10% -10% 47-63Hz	0,55	0,55	no	A
82	6SE6440-2UD17-5AAx	3AC380-480V +10% -10% 47-63Hz	0,75	0,75	no	A
83	6SE6440-2UD21-1AAx	3AC380-480V +10% -10% 47-63Hz	1,1	1,1	no	A
84	6SE6440-2UD21-5AAx	3AC380-480V +10% -10% 47-63Hz	1,5	1,5	no	A
85	6SE6440-2UD22-2BAx	3AC380-480V +10% -10% 47-63Hz	2,2	2,2	no	B
86	6SE6440-2UD23-0BAx	3AC380-480V +10% -10% 47-63Hz	3	3	no	B
87	6SE6440-2UD24-0BAx	3AC380-480V +10% -10% 47-63Hz	4	4	no	B
88	6SE6440-2AD22-2BAx	3AC380-480V +10% -10% 47-63Hz	2,2	2,2	Cl. A	B
89	6SE6440-2AD23-0BAx	3AC380-480V +10% -10% 47-63Hz	3	3	Cl. A	B
90	6SE6440-2AD24-0BAx	3AC380-480V +10% -10% 47-63Hz	4	4	Cl. A	B
91	6SE6440-2UD25-5CAx	3AC380-480V +10% -10% 47-63Hz	5,5	7,5	no	C
92	6SE6440-2UD27-5CAx	3AC380-480V +10% -10% 47-63Hz	7,5	11	no	C
93	6SE6440-2UD31-1CAx	3AC380-480V +10% -10% 47-63Hz	11	15	no	C

Code-No.	MM440 MLFB	Input Voltage & Frequency	CT Power kW	VT Power kW	Internal Filter	Frame Size
94	6SE6440-2AD25-5CAx	3AC380-480V +10% -10% 47-63Hz	5,5	7,5	Cl. A	C
95	6SE6440-2AD27-5CAx	3AC380-480V +10% -10% 47-63Hz	7,5	11	Cl. A	C
96	6SE6440-2AD31-1CAx	3AC380-480V +10% -10% 47-63Hz	11	15	Cl. A	C
97	6SE6440-2UD31-5DAx	3AC380-480V +10% -10% 47-63Hz	15	18,5	no	D
98	6SE6440-2UD31-8DAx	3AC380-480V +10% -10% 47-63Hz	18,5	22	no	D
99	6SE6440-2UD32-2DAx	3AC380-480V +10% -10% 47-63Hz	22	30	no	D
100	6SE6440-2AD31-5DAx	3AC380-480V +10% -10% 47-63Hz	15	18,5	Cl. A	D
101	6SE6440-2AD31-8DAx	3AC380-480V +10% -10% 47-63Hz	18,5	22	Cl. A	D
102	6SE6440-2AD32-2DAx	3AC380-480V +10% -10% 47-63Hz	22	30	Cl. A	D
103	6SE6440-2UD33-0EAx	3AC380-480V +10% -10% 47-63Hz	30	37	no	E
104	6SE6440-2UD33-7EAx	3AC380-480V +10% -10% 47-63Hz	37	45	no	E
105	6SE6440-2AD33-0EAx	3AC380-480V +10% -10% 47-63Hz	30	37	Cl. A	E
106	6SE6440-2AD33-7EAx	3AC380-480V +10% -10% 47-63Hz	37	45	Cl. A	E
107	6SE6440-2UD34-5FAx	3AC380-480V +10% -10% 47-63Hz	45	55	no	F
108	6SE6440-2UD35-5FAx	3AC380-480V +10% -10% 47-63Hz	55	75	no	F
109	6SE6440-2UD37-5FAx	3AC380-480V +10% -10% 47-63Hz	75	90	no	F
110	6SE6440-2AD34-5FAx	3AC380-480V +10% -10% 47-63Hz	45	55	Cl. A	F
111	6SE6440-2AD35-5FAx	3AC380-480V +10% -10% 47-63Hz	55	75	Cl. A	F
112	6SE6440-2AD37-5FAx	3AC380-480V +10% -10% 47-63Hz	75	90	Cl. A	F
113	6SE6440-2UE17-5CAx	3AC500-600V +10% -10% 47-63Hz	0,75	1,5	no	C
114	6SE6440-2UE21-5CAx	3AC500-600V +10% -10% 47-63Hz	1,5	2,2	no	C
115	6SE6440-2UE22-2CAx	3AC500-600V +10% -10% 47-63Hz	2,2	4	no	C
116	6SE6440-2UE24-0CAx	3AC500-600V +10% -10% 47-63Hz	4	5,5	no	C
117	6SE6440-2UE25-5CAx	3AC500-600V +10% -10% 47-63Hz	5,5	7,5	no	C
118	6SE6440-2UE27-5CAx	3AC500-600V +10% -10% 47-63Hz	7,5	11	no	C
119	6SE6440-2UE31-1CAx	3AC500-600V +10% -10% 47-63Hz	11	15	no	C
120	6SE6440-2UE31-5DAx	3AC500-600V +10% -10% 47-63Hz	15	18,5	no	D
121	6SE6440-2UE31-8DAx	3AC500-600V +10% -10% 47-63Hz	18,5	22	no	D
122	6SE6440-2UE32-2DAx	3AC500-600V +10% -10% 47-63Hz	22	30	no	D
123	6SE6440-2UE33-0EAx	3AC500-600V +10% -10% 47-63Hz	30	37	no	E
124	6SE6440-2UE33-7EAx	3AC500-600V +10% -10% 47-63Hz	37	45	no	E
125	6SE6440-2UE34-5FAx	3AC500-600V +10% -10% 47-63Hz	45	55	no	F
126	6SE6440-2UE35-5FAx	3AC500-600V +10% -10% 47-63Hz	55	75	no	F
127	6SE6440-2UE37-5FAx	3AC500-600V +10% -10% 47-63Hz	75	90	no	F
1001	6SE6440-2UD38-8FAx	3AC400-480V +10% -10% 47-63Hz	90	110	no	FX
1002	6SE6440-2UD41-1FAx	3AC400-480V +10% -10% 47-63Hz	110	132	no	FX
1003	6SE6440-2UD41-3GAx	3AC400-480V +10% -10% 47-63Hz	132	160	no	GX
1004	6SE6440-2UD41-6GAx	3AC400-480V +10% -10% 47-63Hz	160	200	no	GX
1005	6SE6440-2UD42-0GAx	3AC400-480V +10% -10% 47-63Hz	200	250	no	GX

Notice:
Parameter r0200 = 0 indicates that no power stack has been identified.

P0201 **Power stack code number** Level **3**

CStat: C **Datatype:** U16 **Unit:** - **Min:** 0
P-Group: INVERTER **Active:** first confirm **QuickComm.:** No **Def:** 0
Max: 65535

Confirms actual power stack identified.

r0203 **Act. inverter type** Level **3**

Datatype: U16 **Unit:** - **Min:** -
Def: -
P-Group: INVERTER **Max:** -

Type number of actual inverter identified.

Possible Settings:

1 MICROMASTER 420
2 MICROMASTER 440
3 MICRO- / COMBIMASTER 411
4 MICROMASTER 410
5 Reserved
6 MICROMASTER 440 PX
7 MICROMASTER 430

r0204 **Power stack features** Level **3**

Datatype: U32 **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: INVERTER

Displays hardware features of power stack.

Bitfields:

Bit00	DC input voltage	0	NO	1	YES
Bit01	RFI filter	0	NO	1	YES

Note:

Parameter r0204 = 0 indicates that no power stack has been identified.

P0205 **Inverter application** Level **3**

CStat: C **Datatype:** U16 **Unit:** - **Min:** 0 **Def:** 0 **Max:** 1

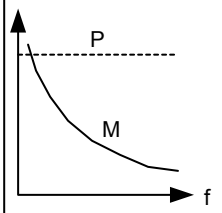
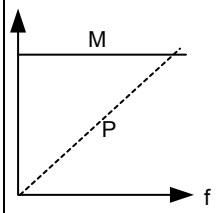
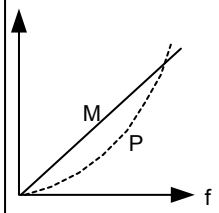
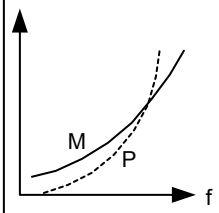
P-Group: INVERTER **Active:** first confirm **QuickComm.:** Yes

Selects inverter application. The inverter and motor requirements are determined by the speed range and torque requirements of the load. The relationship between speed and torque for different loads (constant torque loads or variable torque loads).

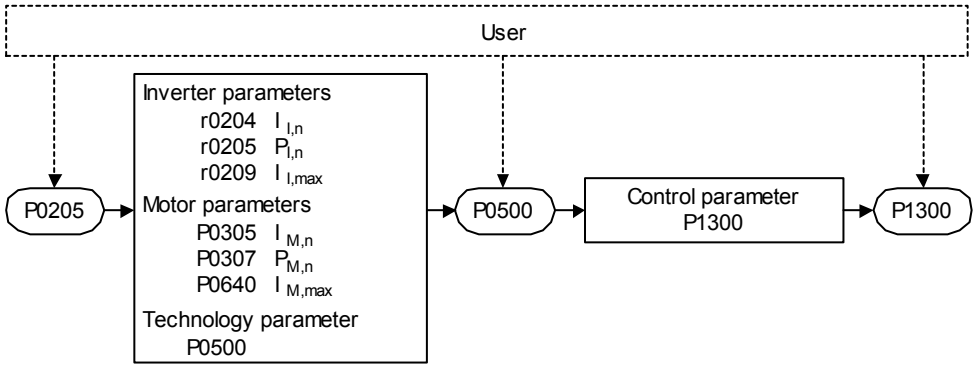
Constant torque (CT):
CT is used if the application needs a constant torque on the whole frequency range. Many loads can be considered to be constant torque loads. Typical constant torque loads are conveyors, compressors and positve displacement pumps (see diagram).

Variable torque (VT):
VT is used if the application has a parabolic frequency-torque characteristic like many fans and pumps. Variable torque allows with the same inverter:
- Higher rated inverter current r0207
- Higher rated inverter power r0206
- Higher threshold for I2t protection

If P0205 is modified in quick commissioning it immediately calculates various motor parameters:
1. P0305 Rated motor current
2. P0307 Rated motor power
3. P0640 Motor overload factor

Torque	$M \sim \frac{1}{f}$	M = const.	M ~ f	$M \sim f^2$
Pow er	P = const.	P ~ f	$P \sim f^2$	$P \sim f^3$
Characteristic				
Application	Winders Facing lathes Rotary cutting machines	Hoisting gear Belt conveyors Process machines Involving forming Rolling mills Planers Compressors	Calenders w ith viscous friction Eddy-current brakes	Pumps Fans Centrifuges

It is recommended to modify P0205 first. Afterwards motor parameter may be adapted. Motor parameter will be overridden by changing this sequence.



Possible Settings:

0 Constant torque
1 Variable torque

Note:

The parameter value is not reset by the factory setting (see P0970).

To set P0205 = 1 (variable torque) is not possible for all inverters.

Notice:

Use setting 1 (variable torque) only for variable-torque applications (e.g. pumps and fans). If used for constant-load applications, I2t warning will be produced too late, causing overheating in the motor.

---

r0206 **Rated inverter power [kW] / [hp]** Level **2**

Datatype: Float **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: INVERTER

Displays nominal rated motor power from inverter.

Dependency:

Value is displayed in [kW] or [hp] depending on setting for P0100 (operation for Europe / North America).

$$r0206[hp] = 0.75 \cdot r0206[kW]$$

---

r0207 **Rated inverter current** Level **2**

Datatype: Float **Unit:** A **Min:** - **Def:** - **Max:** -

P-Group: INVERTER

Displays maximum continuous output current of inverter.

---

r0208 **Rated inverter voltage** Level **2**

Datatype: U32 **Unit:** V **Min:** - **Def:** - **Max:** -

P-Group: INVERTER

Displays nominal AC supply voltage of inverter.

Value:

r0208 = 230 : 200 - 240 V +/- 10 %
r0208 = 400 : 380 - 480 V +/- 10 %
r0208 = 575 : 500 - 600 V +/- 10 %

---

r0209 **Maximum inverter current** Level **2**

Datatype: Float **Unit:** A **Min:** - **Def:** - **Max:** -

P-Group: INVERTER

Displays maximum output current of inverter.

Dependency:

Parameter r0209 depends on the derating which is affected by pulse frequency P1800, ambient temperature and altitude. The data of deration is given in the OPERATING INSRTRUCTION.

P0210 **Supply voltage** Level **3**

CStat: CT **Datatype:** U16 **Unit:** V **Min:** 0 **Def:** 230 **Max:** 1000

P-Group: INVERTER **Active:** Immediately **QuickComm.:** No

Parameter P0210 defines the supply voltage. Its default value depends upon the type of inverter. If P0210 does not correspond to the supply voltage, then it must be modified.

When P0210 has been modified, the following thresholds are changed:

Dependency:

Optimizes Vdc controller, which extends the ramp-down time if regenerative energy from motor would otherwise cause DC link overvoltage trips.

Reducing the value enables controller to cut in earlier and reduce the risk of overvoltage.

Set P1254 ("Auto detect Vdc switch-on levels") = 0. Cut-in levels for Vdc-controller and compound braking are then derived directly from P0210 (supply voltage).

Vdc_min switch-on level	$= P1245 \cdot \sqrt{2} \cdot P0210$
Vdc_max switch-on level	$= 1.15 \cdot \sqrt{2} \cdot P0210$
Compound braking switch-on level	$= 1.13 \cdot \sqrt{2} \cdot P0210$
Dynamic braking switch-on level	$= 1.13 \cdot \sqrt{2} \cdot P0210$

Note:

If mains voltage is higher than value entered, automatic deactivation of the Vdc controller may occur to avoid acceleration of the motor. An alarm will be issued in this case (A0910).

r0231[2] **Max. cable length** Level **3**

Datatype: U16 **Unit:** m **Min:** - **Def:** - **Max:** -

P-Group: INVERTER

Indexed parameter to display maximum allowable cable length between inverter and motor.

Index:

r0231[0] : Max. allowed unscreened cable length
r0231[1] : Max. allowed screened cable length

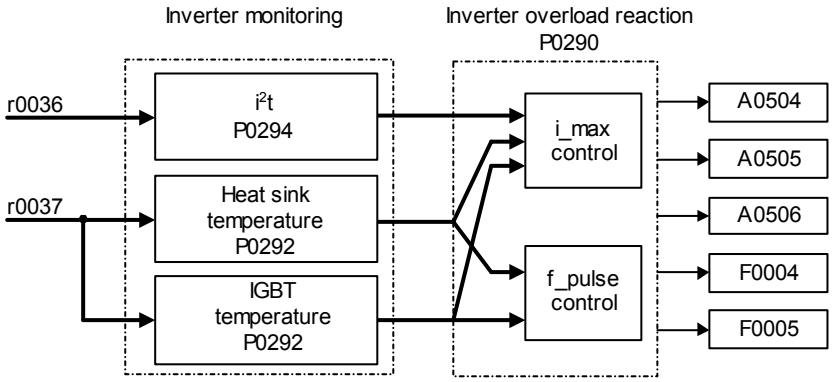
Notice:

For full EMC compliance, the screened cable must not exceed 25 m in length when an EMC filter is fitted.

P0290	**Inverter overload reaction**			**Min:**	0	Level
	CStat: CT	**Datatype:** U16	**Unit:** -	**Def:**	2	**3**
	P-Group: INVERTER	**Active:** first confirm	**QuickComm.:** No	**Max:**	3	

Selects reaction of inverter to an internal over-temperature.

Following physical values influence the inverter overload protection (see diagram):
- heat sink temperature
- junction temperature (IGBT temperature)
- inverter I²t



Possible Settings:

0 Reduce output frequency
1 Trip (F0004)
2 Reduce pulse frequency and output frequency
3 Reduce pulse frequency then trip (F0004)

Notice:

P0290 = 0:
Reduction of output frequency is only effective if the load is also reduced. This is for example valid for variable torque applications with a quadratic torque characteristic as pumps or fans.

A trip will always result, if the action taken does not sufficiently reduce internal temperature.

The pulse frequency P1800 is reduced only if higher than 2 kHz. The actual pulse frequency is displayed in parameter r1801.

P0292 **Inverter temperature warning** Level **3**

CStat:	CUT	**Datatype:** U16	**Unit:** °C	**Min:**	0
P-Group:	INVERTER	**Active:** first confirm	**QuickComm.:** No	**Def:**	15
				Max:	25

Defines the temperature difference (in ºC) between the Overtemperature trip threshold and the warning threshold of the inverter. The trip threshold is stored internally by the inverter and cannot be changed by the user.

Temperature w arning threshold of inverter T_w arn

$T_{warn} = T_{trip} - P0292$

Temperature shutdow n threshold of inverter T_trip

Temperature	**MM440, Frame Size**							
	A - C	**D - F**	**F**	**FX**		**GX**		
			600 V	**95 kW CT**	**110 kW CT**	**132 kW CT**	**160 kW CT**	**200 kW CT**
Heat sink	110 °C	95 °C	80 °C	88 °C	91 °C	80 °C	82 °C	88 °C
IGBT	140 °C	145 °C	145 °C	150 °C	150 °C	145 °C	147 °C	150 °C
Input rectifier	-	-	-	75 °C	75 °C	75 °C	75 °C	75 °C
Cooling air	-	-	-	55 °C	55 °C	55 °C	55 °C	50 °C
Control board	-	-	-	65 °C	65 °C	65 °C	65 °C	65 °C

If the actual inverter temperature (r0037) exceeds the corresponding threshold, a warning A0504, if the temperature still increases then a fault F0004 will be displayed.

P0294 **Inverter I2t overload warning** Level **4**

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	10.0
P-Group:	INVERTER	**Active:** first confirm	**QuickComm.:** No	**Def:**	95.0
				Max:	100.0

Defines the [%] value at which alarm A0505 (inverter I2t) is generated.

Inverter I2t calculation is used to determine a maximum tolerable period for inverter overload. The I2t calculation value is deemed = 100 % when this maximum tolerable period is reached.

Dependency:

That the output current of the inverter has been reduced and that the value of I2t does not exceed 100%.

Note:

P0294 = 100 % corresponds to stationary nominal load.

P0295 **Inverter fan off delay time** Level **3**

CStat:	CUT	**Datatype:** U16	**Unit:** s	**Min:**	0
P-Group:	TERMINAL	**Active:** first confirm	**QuickComm.:** No	**Def:**	0
				Max:	3600

Defines inverter fan switch off delay time in seconds after drive has stopped.

Note:

Setting to 0, inverter fan will switch off when the drive stops, that is no delay.

P0300[3]	**Select motor type**			**Min:** 1	Level
	CStat: C	**Datatype:** U16	**Unit:** -	**Def:** 1	**2**
	P-Group: MOTOR	**Active:** first confirm	**QuickComm.:** Yes	**Max:** 2	

Selects motor type.

This parameter is required during commissioning to select motor type and optimize inverter performance. Most motors are asynchronous; if in doubt, use the formula below.

$$x = P0310 \cdot \frac{60}{P0311}$$

x = 1, 2, ..., n : Synchronous motor

$x \neq 1, 2, ..., n$: Asynchronous motor

If the result is a whole number, the motor is synchronous.

Possible Settings:

1 Asynchronous rotational motor
2 Synchronous rotational motor

Index:

P0300[0] : 1st. Drive data set (DDS)
P0300[1] : 2nd. Drive data set (DDS)
P0300[2] : 3rd. Drive data set (DDS)

Dependency:

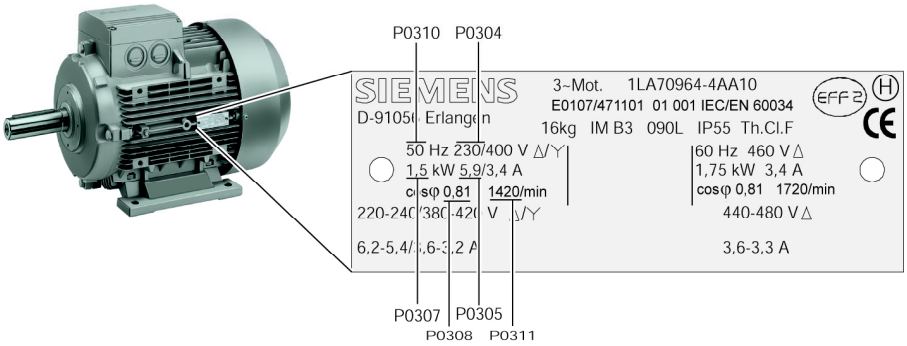
Changeable only when P0010 = 1 (quick commissioning).

If synchronous motor is selected, the following functions are not available:

- P0308 Power factor
- P0309 Motor efficiency
- P0346 Magnetization time
- P0347 Demagnetization time
- P1335 Slip compensation
- P1336 Slip limit
- P0320 Motor magnetizing current
- P0330 Rated motor slip
- P0331 Rated magnetization current
- P0332 Rated power factor
- P0384 Rotor time constant
- P1200, P1202, P1203 Flying start
- P1230, P1232, P1233 DC braking

P0304[3]	**Rated motor voltage**			**Min:**	10	Level
	CStat: C	**Datatype:** U16	**Unit:** V	**Def:**	230	**1**
	P-Group: MOTOR	**Active:** first confirm	**QuickComm.:** Yes	**Max:**	2000	

Nominal motor voltage [V] from rating plate. Following diagram shows a typical rating plate with the locations of the relevant motor data.



Index:

P0304[0] : 1st. Drive data set (DDS)
P0304[1] : 2nd. Drive data set (DDS)
P0304[2] : 3rd. Drive data set (DDS)

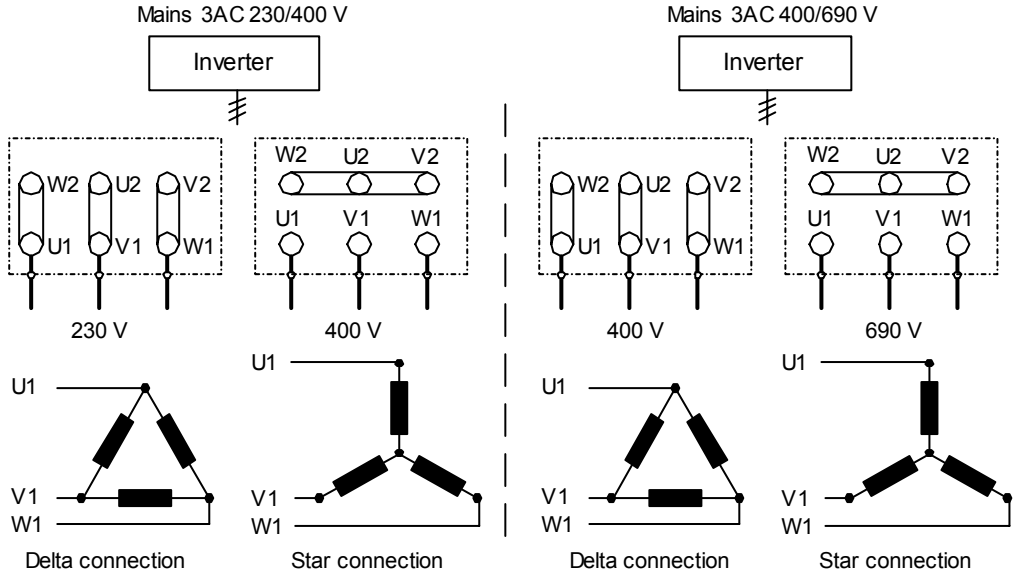
Dependency:

Changeable only when P0010 = 1 (quick commissioning).

Caution:

The input of rating plate data must correspond with the wiring of the motor (star / delta). This means, if delta wiring is used for the motor, delta rating plate data has to be entered.

Three-phase motor connection



P0305[3] Rated motor current Level **1**

CStat:	C	**Datatype:** Float	**Unit:** A	**Min:**	0.01
P-Group:	MOTOR	**Active:** first confirm	**QuickComm.:** Yes	**Def:**	3.25
				Max:	10000.00

Nominal motor current [A] from rating plate - see diagram in P0304.

Index:

P0305[0] : 1st. Drive data set (DDS)
P0305[1] : 2nd. Drive data set (DDS)
P0305[2] : 3rd. Drive data set (DDS)

Dependency:

Changeable only when P0010 = 1 (quick commissioning).

Depends also on P0320 (motor magnetization current).

Note:

The maximum value of P0305 depends on the maximum inverter current r0209 and the motor type:

Asynchronous motor : $P0305_{max,\ asyn} = r0209$

Synchronous motor : $P0305_{max,\ syn} = 2 \cdot r0209$

It is recommanded that the ratio of P0305 (rated motor current) and r0207 (rated inverter current) should not be lower than:

U/f : $\frac{1}{8} \le \frac{P0305}{r0207}$

SLVC and VC : $\frac{1}{4} \le \frac{P0305}{r0207}$

P0307[3] Rated motor power Level **1**

CStat:	C	**Datatype:** Float	**Unit:** -	**Min:**	0.01
P-Group:	MOTOR	**Active:** first confirm	**QuickComm.:** Yes	**Def:**	0.12
				Max:	2000.00

Nominal motor power [kW/hp] from rating plate.

Index:

P0307[0] : 1st. Drive data set (DDS)
P0307[1] : 2nd. Drive data set (DDS)
P0307[2] : 3rd. Drive data set (DDS)

Dependency:

If P0100 = 1, values will be in [hp] - see diagram P0304 (rating plate).

Changeable only when P0010 = 1 (quick commissioning).

P0308[3] Rated motor cosPhi Level **2**

CStat:	C	**Datatype:** Float	**Unit:** -	**Min:**	0.000
P-Group:	MOTOR	**Active:** first confirm	**QuickComm.:** Yes	**Def:**	0.000
				Max:	1.000

Nominal motor power factor (cosPhi) from rating plate - see diagram P0304.

Index:

P0308[0] : 1st. Drive data set (DDS)
P0308[1] : 2nd. Drive data set (DDS)
P0308[2] : 3rd. Drive data set (DDS)

Dependency:

Changeable only when P0010 = 1 (quick commissioning).

Visible only when P0100 = 0 or 2, (motor power entered in [kW]).

Setting 0 causes internal calculation of value (see r0332).

P0309[3] Rated motor efficiency Level **2**

CStat:	C	**Datatype:** Float	**Unit:** %	**Min:**	0.0
P-Group:	MOTOR	**Active:** first confirm	**QuickComm.:** Yes	**Def:**	0.0
				Max:	99.9

Nominal motor efficiency in [%] from rating plate.

Index:

P0309[0] : 1st. Drive data set (DDS)
P0309[1] : 2nd. Drive data set (DDS)
P0309[2] : 3rd. Drive data set (DDS)

Dependency:

Changeable only when P0010 = 1 (quick commissioning).

Visible only when P0100 = 1, (i.e. motor power entered in [hp]).

Setting 0 causes internal calculation of value (see r0332).

Note:

P0309 = 100 % corresponds to superconducting.

Details:

See diagram in P0304 (rating plate).

P0310[3] Rated motor frequency Level **1**

CStat:	C	**Datatype:** Float	**Unit:** Hz	**Min:**	12.00
P-Group:	MOTOR	**Active:** first confirm	**QuickComm.:** Yes	**Def:**	50.00
				Max:	650.00

Nominal motor frequency [Hz] from rating plate.

Index:

P0310[0] : 1st. Drive data set (DDS)
P0310[1] : 2nd. Drive data set (DDS)
P0310[2] : 3rd. Drive data set (DDS)

Dependency:

Changeable only when P0010 = 1 (quick commissioning).

Pole pair number recalculated automatically if parameter is changed.

Details:

See diagram in P0304 (rating plate)

P0311[3] Rated motor speed Level **1**

CStat:	C	**Datatype:** U16	**Unit:** 1/min	**Min:**	0
P-Group:	MOTOR	**Active:** first confirm	**QuickComm.:** Yes	**Def:**	0
				Max:	40000

Nominal motor speed [rpm] from rating plate.

Index:

P0311[0] : 1st. Drive data set (DDS)
P0311[1] : 2nd. Drive data set (DDS)
P0311[2] : 3rd. Drive data set (DDS)

Dependency:

Changeable only when P0010 = 1 (quick commissioning).

Setting 0 causes internal calculation of value.

Required for vector control and V/f control with speed controller.

Slip compensation in V/f control requires rated motor speed for correct operation.

Pole pair number recalculated automatically if parameter is changed.

Details:

See diagram in P0304 (rating plate)

r0313[3] Motor pole pairs Level **3**

		Datatype: U16	**Unit:** -	**Min:**	-
				Def:	-
P-Group:	MOTOR			**Max:**	-

Displays number of motor pole pairs that the inverter is currently using for internal calculations.

Index:

r0313[0] : 1st. Drive data set (DDS)
r0313[1] : 2nd. Drive data set (DDS)
r0313[2] : 3rd. Drive data set (DDS)

Value:

r0313 = 1 : 2-pole motor
r0313 = 2 : 4-pole motor
etc.

Dependency:

Recalculated automatically when P0310 (rated motor frequency) or P0311 (rated motor speed) is changed.

$$r0313 = 60 \cdot \frac{P0310}{P0311}$$

P0314[3] Motor pole pair number Level **4**

CStat:	C	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	MOTOR	**Active:** first confirm	**QuickComm.:** No	**Def:**	0
				Max:	99

Specifies number of pole pairs of motor.

Index:

P0314[0] : 1st. Drive data set (DDS)
P0314[1] : 2nd. Drive data set (DDS)
P0314[2] : 3rd. Drive data set (DDS)

Value:

P0314 = 1 : 2-pole motor
P0314 = 2 : 4-pole motor
etc.

Dependency:

Recalculated automatically when P0310 (rated motor frequency) or P0311 (rated motor speed) is changed.

P0320[3] **Motor magnetizing current** Level **3**

CStat: CT **Datatype:** Float **Unit:** % **Min:** 0.0 **Def:** 0.0 **Max:** 99.0

P-Group: MOTOR **Active:** Immediately **QuickComm.:** Yes

Defines motor magnetization current in [%] relative to P0305 (rated motor current).

Index:

P0320[0] : 1st. Drive data set (DDS)
P0320[1] : 2nd. Drive data set (DDS)
P0320[2] : 3rd. Drive data set (DDS)

Dependency:

P0320 = 0:
Setting 0 causes calculation by P0340 = 1 (data entered from rating plate) or by P3900 = 1 - 3 (end of quick commissioning). The calculated value is displayed in parameter r0331.

r0330[3] **Rated motor slip** Level **3**

Datatype: Float **Unit:** % **Min:** - **Def:** - **Max:** -

P-Group: MOTOR

Displays nominal motor slip in [%] relative to P0310 (rated motor frequency) and P0311 (rated motor speed).

$$r0330\,[\%] = \frac{P0310 - \frac{P0311}{60} \cdot r0313}{P0310} \cdot 100\,\%$$

Index:

r0330[0] : 1st. Drive data set (DDS)
r0330[1] : 2nd. Drive data set (DDS)
r0330[2] : 3rd. Drive data set (DDS)

r0331[3] **Rated magnetization current** Level **3**

Datatype: Float **Unit:** A **Min:** - **Def:** - **Max:** -

P-Group: MOTOR

Displays calculated magnetizing current of motor in [A].

Index:

r0331[0] : 1st. Drive data set (DDS)
r0331[1] : 2nd. Drive data set (DDS)
r0331[2] : 3rd. Drive data set (DDS)

r0332[3] **Rated power factor** Level **3**

Datatype: Float **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: MOTOR

Displays power factor for motor

Index:

r0332[0] : 1st. Drive data set (DDS)
r0332[1] : 2nd. Drive data set (DDS)
r0332[2] : 3rd. Drive data set (DDS)

Dependency:

Value is calculated internally if P0308 (rated motor cosPhi) set to 0; otherwise, value entered in P0308 is displayed.

r0333[3] **Rated motor torque** Level **3**

Datatype: Float **Unit:** Nm **Min:** - **Def:** - **Max:** -

P-Group: MOTOR

Displays rated motor torque.

Index:

r0333[0] : 1st. Drive data set (DDS)
r0333[1] : 2nd. Drive data set (DDS)
r0333[2] : 3rd. Drive data set (DDS)

Dependency:

Value is calculated from P0307 (rated motor power) and P0311 (rated motor speed).

$$r0333\,[\mathrm{Nm}] = \frac{P0307\ [\mathrm{kW}] \cdot 1000}{\frac{P0311\,[1/\mathrm{min}]}{60} \cdot 2\pi}$$

P0335[3]	**Motor cooling**			**Min:** 0	Level
	CStat: CT	**Datatype:** U16	**Unit:** -	**Def:** 0	**2**
	P-Group: MOTOR	**Active:** first confirm	**QuickComm.:** Yes	**Max:** 3	

Selects motor cooling system used.

Possible Settings:

0 Self-cooled: Using shaft mounted fan attached to motor
1 Force-cooled: Using separately powered cooling fan
2 Self-cooled and internal fan
3 Force-cooled and internal fan

Index:

P0335[0] : 1st. Drive data set (DDS)
P0335[1] : 2nd. Drive data set (DDS)
P0335[2] : 3rd. Drive data set (DDS)

Caution:

The following combination of parameter setting should not be combined:

P0610 = 1 and P0335 = 0 or 2 :
When P0335 = 0 or 2 the inverter cools the motor using a shaft mounted fan. If this is used in conjunction with P0610 the cooling of the motor will be inefficient.
In essence, if the i2t calculation reduces the output frequency, then the shaft mounted fan will also reduce its cooling effect, the motor will then eventually overheat and trip.

Exception:
Applications with variable torque the reduction of max. current leeds automatically to a reduction of the load / output current.

Notice:

Motors of series 1LA1 and 1LA8 have an internal fan. This internal motor fan must not be confused with the fan at the end of the motor shaft.

P0340[3] **Calculation of motor parameters**

CStat: CT **Datatype:** U16 **Unit:** - **Min:** 0
P-Group: MOTOR **Active:** first confirm **QuickComm.:** No **Def:** 0
Max: 4

Level **2**

Calculates various motor parameters (see table below):

	P0340 = 1	P0340 = 2	P0340 = 3	P0340 = 4
P0341[3] Motor inertia [kg*m^2]	x			
P0342[3] Total/motor inertia ratio	x			
P0344[3] Motor weight	x			
P0346[3] Magnetization time	x		x	
P0347[3] Demagnetization time	x		x	
P0350[3] Stator resistance (line-to-line)	x	x		
P0352[3] Cable resistance	x	x		
P0354[3] Rotor resistance	x	x		
P0356[3] Stator leakage inductance	x	x		
P0358[3] Rotor leakage inductance	x	x		
P0360[3] Main inductance	x	x		
P0362[3] Magnetizing curve flux 1	x	x		
P0363[3] Magnetizing curve flux 2	x	x		
P0364[3] Magnetizing curve flux 3	x	x		
P0365[3] Magnetizing curve flux 4	x	x		
P0366[3] Magnetizing curve imag 1	x	x		
P0367[3] Magnetizing curve imag 2	x	x		
P0368[3] Magnetizing curve imag 3	x	x		
P0369[3] Magnetizing curve imag 4	x	x		
P0625[3] Ambient motor temperature	x	x		
P1253[3] Vdc-controller output limitation	x		x	
P1316[3] Boost end frequency	x		x	
P1460[3] Gain speed controller	x		x	x
P1462[3] Integral time speed controller	x		x	x
P1470[3] Gain speed controller (SLVC)	x		x	x
P1472[3] Integral time n-ctrl. (SLVC)	x		x	x
P1520[3] CO: Upper torque limit	x			
P1521[3] CO: Lower torque limit	x			
P1530[3] Motoring power limitation	x			
P1531[3] Regenerative power limitation	x			
P1715[3] Gain current controller	x		x	x
P1717[3] Integral time current controller	x		x	x
P1764[3] Kp of n-adaption (SLVC)	x		x	x
P1767[3] Tn of n-adaption (SLVC)	x		x	x
P2000[3] Reference frequency	x			
P2002[3] Reference current	x			
P2003[3] Reference torque	x			
P2174[3] Torque threshold M_thresh	x			
P2185[3] Upper torque threshold 1	x			
P2186[3] Lower torque threshold 1	x			
P2187[3] Upper torque threshold 2	x			
P2188[3] Lower torque threshold 2	x			
P2189[3] Upper torque threshold 3	x			
P2190[3] Lower torque threshold 3	x			

Possible Settings:

0 No calculation
1 Complete parameterization
2 Calculation of equivalent circuit data
3 Calculation of V/f and vector control data
4 Calculation of controller settings only

Index:

P0340[0] : 1st. Drive data set (DDS)
P0340[1] : 2nd. Drive data set (DDS)
P0340[2] : 3rd. Drive data set (DDS)

Note:

This parameter is required during commissioning to optimize inverter performance.

P0341[3] **Motor inertia [kg*m^2]** Level **3**

CStat:	CUT	**Datatype:** Float	**Unit:** -	**Min:**	0.00010
P-Group:	MOTOR	**Active:** Immediately	**QuickComm.:** No	**Def:**	0.00180
				Max:	1000.00000

Sets no-load inertia of motor.

Together with P0342 (inertia ratio total/motor) and P1496 (scaling factor acceleration), this value produces the acceleration torque (r1517), which can be added to any additional torque produced from a BICO source (P1511), and incorporated in the torque control function.

Index:

P0341[0] : 1st. Drive data set (DDS)
P0341[1] : 2nd. Drive data set (DDS)
P0341[2] : 3rd. Drive data set (DDS)

Note:

The result of P0341 * P0342 is included in the speed controller calculation.
P0341 * P0342 (inertia ratio total/motor) = total motor inertia

P1496 (scaling factor acceleration) = 100 % activates acceleration pre-control for the speed controller and calculates the torque from P0341 (motor inertia) and P0342 (inertia ratio total/motor).

P0342[3] **Total/motor inertia ratio** Level **3**

CStat:	CUT	**Datatype:** Float	**Unit:** -	**Min:**	1.000
P-Group:	MOTOR	**Active:** Immediately	**QuickComm.:** No	**Def:**	1.000
				Max:	400.000

Specifies ratio between total inertia (load + motor) and motor inertia.

Index:

P0342[0] : 1st. Drive data set (DDS)
P0342[1] : 2nd. Drive data set (DDS)
P0342[2] : 3rd. Drive data set (DDS)

P0344[3] **Motor weight** Level **3**

CStat:	CUT	**Datatype:** Float	**Unit:** kg	**Min:**	1.0
P-Group:	MOTOR	**Active:** Immediately	**QuickComm.:** No	**Def:**	9.4
				Max:	6500.0

Specifies motor weight [kg].

Index:

P0344[0] : 1st. Drive data set (DDS)
P0344[1] : 2nd. Drive data set (DDS)
P0344[2] : 3rd. Drive data set (DDS)

Note:

This value is used in the motor thermal model.

It is normally calculated automatically from P0340 (motor parameters) but can also be entered manually.

r0345[3] **Motor start-up time** Level **3**

		Datatype: Float	**Unit:** s	**Min:**	-
P-Group:	MOTOR			**Def:**	-
				Max:	-

Displays motor start-up time. This time corresponds to the standardized motor inertia.

The start-up time is the time taken to reach rated motor speed from standstill at acceleration with rated motor torque (r0333).

Index:

r0345[0] : 1st. Drive data set (DDS)
r0345[1] : 2nd. Drive data set (DDS)
r0345[2] : 3rd. Drive data set (DDS)

P0346[3] **Magnetization time** Level **3**

CStat:	CUT	**Datatype:** Float	**Unit:** s	**Min:**	0.000
P-Group:	MOTOR	**Active:** Immediately	**QuickComm.:** No	**Def:**	1.000
				Max:	20.000

Sets magnetization time [s], i.e. waiting time between pulse enable and start of ramp-up. Motor magnetization builds up during this time.

Magnetization time is normally calculated automatically from the motor data and corresponds to the rotor time constant (r0384).

Index:

P0346[0] : 1st. Drive data set (DDS)
P0346[1] : 2nd. Drive data set (DDS)
P0346[2] : 3rd. Drive data set (DDS)

Note:

If boost settings are higher than 100 %, magnetization may be reduced.

Notice:

An excessive reduction of this time can result in insufficient motor magnetization.

P0347[3] Demagnetization time Level **3**

CStat:	CUT	**Datatype:** Float	**Unit:** s	**Min:**	0.000
P-Group:	MOTOR	**Active:** Immediately	**QuickComm.:** No	**Def:**	1.000
				Max:	20.000

Changes time allowed after OFF2 / fault condition, before pulses can be re-enabled.

Index:

P0347[0] : 1st. Drive data set (DDS)
P0347[1] : 2nd. Drive data set (DDS)
P0347[2] : 3rd. Drive data set (DDS)

Note:

The demagnetization time is approximately 2.5 x rotor time constant (r0384) in seconds.

Notice:

Not active following a normally completed ramp-down, e.g. after OFF1, OFF3 or JOG.

Overcurrent trips will occur if the time is decreased excessively.

P0350[3] Stator resistance (line-to-line) Level **2**

CStat:	CUT	**Datatype:** Float	**Unit:** Ohm	**Min:**	0.00001
P-Group:	MOTOR	**Active:** Immediately	**QuickComm.:** No	**Def:**	4.00000
				Max:	2000.00000

Stator resistance value in [Ohms] for connected motor (from line-to-line). The parameter value includes the cable resistance.

There are three ways to determine the value for this parameter:
1. Calculate using
   - P0340 = 1 (data entered from rating plate) or
   - P0010 = 1, P3900 = 1,2 or 3 (end of quick commissioning).
2. Measure using P1910 = 1 (motor data identification - value for stator resistance is overwritten).
3. Measure manually using an Ohmmeter.

Index:

P0350[0] : 1st. Drive data set (DDS)
P0350[1] : 2nd. Drive data set (DDS)
P0350[2] : 3rd. Drive data set (DDS)

Note:

Since measured line-to-line, this value may appear to be higher (up to 2 times higher) than expected.

The value entered in P0350 (stator resistance) is the one obtained by the method last used.

P0352[3] Cable resistance Level **3**

CStat:	CUT	**Datatype:** Float	**Unit:** Ohm	**Min:**	0.0
P-Group:	MOTOR	**Active:** Immediately	**QuickComm.:** No	**Def:**	0.0
				Max:	120.0

Describes cable resistance between inverter and motor for one phase.

The value corresponds to the resistance of the cable between the inverter and the motor, relative to the rated impedance.

Index:

P0352[0] : 1st. Drive data set (DDS)
P0352[1] : 2nd. Drive data set (DDS)
P0352[2] : 3rd. Drive data set (DDS)

P0354[3] Rotor resistance Level **4**

CStat:	CUT	**Datatype:** Float	**Unit:** Ohm	**Min:**	0.0
P-Group:	MOTOR	**Active:** Immediately	**QuickComm.:** No	**Def:**	10.0
				Max:	300.0

Sets rotor resistance of motor equivalent circuit (phase value).

Index:

P0354[0] : 1st. Drive data set (DDS)
P0354[1] : 2nd. Drive data set (DDS)
P0354[2] : 3rd. Drive data set (DDS)

Dependency:

Calculated automatically using the motor model or determined using P1910 (motor identification).

P0356[3] Stator leakage inductance Level **4**

CStat:	CUT	**Datatype:** Float	**Unit:** -	**Min:**	0.00001
P-Group:	MOTOR	**Active:** Immediately	**QuickComm.:** No	**Def:**	10.00000
				Max:	1000.00000

Sets stator leakage inductance [mH] of motor equivalent circuit (phase value).

Index:

P0356[0] : 1st. Drive data set (DDS)
P0356[1] : 2nd. Drive data set (DDS)
P0356[2] : 3rd. Drive data set (DDS)

Dependency:

Calculated automatically using the motor model or determined using P1910 (motor identification).

P0358[3]	**Rotor leakage inductance**			**Min:**	0.0	Level
	CStat: CUT	**Datatype:** Float	**Unit:** -	**Def:**	10.0	**4**
	P-Group: MOTOR	**Active:** Immediately	**QuickComm.:** No	**Max:**	1000.0	

Sets rotor leakage inductance [mH] of motor equivalent circuit (phase value).

Index:

P0358[0] : 1st. Drive data set (DDS)
P0358[1] : 2nd. Drive data set (DDS)
P0358[2] : 3rd. Drive data set (DDS)

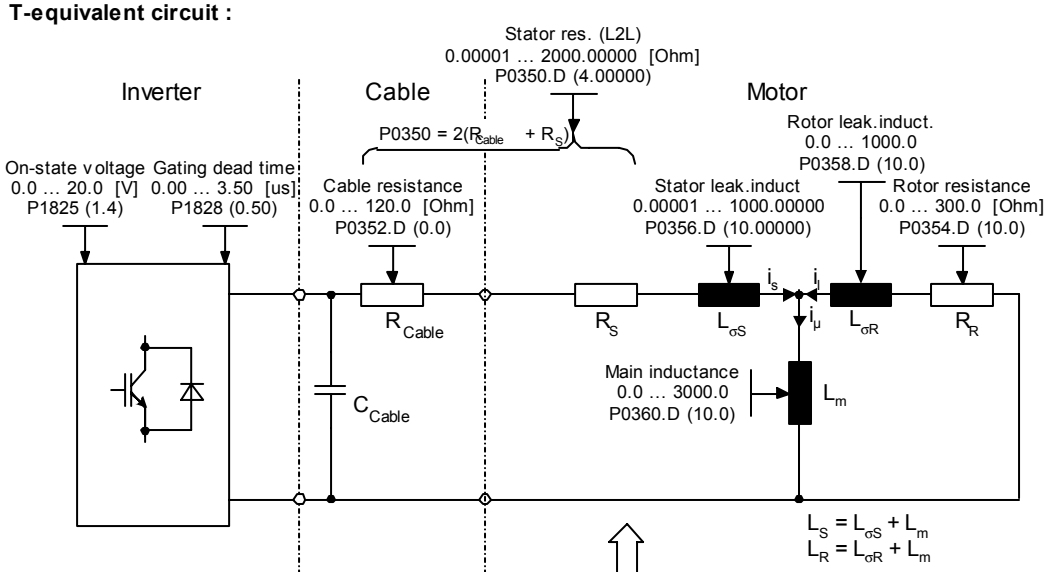
Dependency:

Calculated automatically using the motor model or determined using P1910 (motor identification).

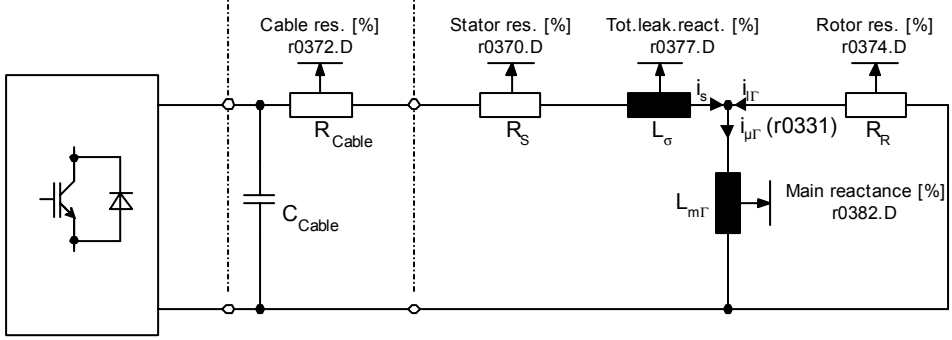
P0360[3]	**Main inductance**			**Min:**	0.0	Level
	CStat: CUT	**Datatype:** Float	**Unit:** -	**Def:**	10.0	**4**
	P-Group: MOTOR	**Active:** Immediately	**QuickComm.:** No	**Max:**	3000.0	

Sets main inductance [mH] of the motor equivalent circuit (phase value), see diagram below.

T-equivalent circuit :



Invers - Γ - equivalent circuit :



$$100\ \% <=> Z_N = \frac{V_{ph}}{I_{ph}} = \frac{V_N}{\sqrt{3}\cdot I_N} = \frac{P0304}{\sqrt{3}\cdot P0305}$$

Index:

P0360[0] : 1st. Drive data set (DDS)
P0360[1] : 2nd. Drive data set (DDS)
P0360[2] : 3rd. Drive data set (DDS)

Dependency:

Calculated automatically using the motor model or determined using P1910 (motor identification).

Caution:

The data of equivalent circuit relates to the star equivalent circuit. Any data of the delta equivalent circuit available, therefore must be transformed to the star equivalent circuit before entering into the inverter.

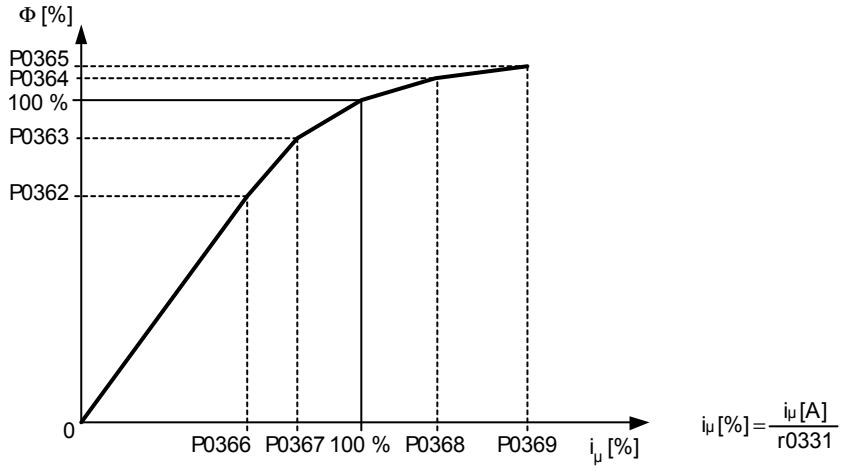
P0362[3] **Magnetizing curve flux 1**

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	0.0
P-Group:	MOTOR	**Active:** Immediately	**QuickComm.:** No	**Def:**	60.0
				Max:	300.0

Level **4**

Specifies first flux value of saturation characteristic in [%] relative to rated motor voltage (P0304).

The parameter settings for the values of P0362 to P0365 respectively P0366 to P0369 are illustrated in the diagram below.



Index:

P0362[0] : 1st. Drive data set (DDS)
P0362[1] : 2nd. Drive data set (DDS)
P0362[2] : 3rd. Drive data set (DDS)

Note:

P0362 = 100 % corresponds to rated motor flux

Rated flux = rated EMF

Notice:

The value belongs to the first magnetizing current value and must be smaller than or equal to magnetizing curve flux 2 (P0363).

If the magnetization values entered in P0362 to P0365 respectively P0366 to P0369 do not match the conditions (see below), a linear characteristic is applied internally.

P0365 ≥ P0364 ≥ P0363 ≥ P0362
P0369 ≥ P0368 ≥ P0367 ≥ P0366

P0363[3] **Magnetizing curve flux 2**

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	0.0
P-Group:	MOTOR	**Active:** Immediately	**QuickComm.:** No	**Def:**	85.0
				Max:	300.0

Level **4**

Specifies second flux value of saturation characteristic in [%] relative to rated motor voltage (P0304).

Index:

P0363[0] : 1st. Drive data set (DDS)
P0363[1] : 2nd. Drive data set (DDS)
P0363[2] : 3rd. Drive data set (DDS)

Note:

P0363 = 100 % corresponds to rated motor flux

Rated flux = rated EMF

Notice:

The value belongs to the second magnetizing current value and must be smaller than or equal to magnetizing curve flux 3 (P0364) and greater than or equal to magnetizing curve flux 1 (P0362).

Details:

See P0362 (magnetizing curve flux 1).

P0364[3] **Magnetizing curve flux 3** Level **4**

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	0.0
P-Group:	MOTOR	**Active:** Immediately	**QuickComm.:** No	**Def:**	115.0
				Max:	300.0

Specifies third flux value of saturation characteristic in [%] relative to rated motor voltage (P0304).

Index:

P0364[0] : 1st. Drive data set (DDS)
P0364[1] : 2nd. Drive data set (DDS)
P0364[2] : 3rd. Drive data set (DDS)

Note:

P0364 = 100 % corresponds to rated motor flux

Rated flux = rated EMF

Notice:

The value belongs to the third magnetizing current value and must be smaller than or equal to magnetizing curve flux 4 (P0365) and greater than or equal to magnetizing curve flux 2 (P0363).

Details:

See P0362 (magnetizing curve flux 1).

P0365[3] **Magnetizing curve flux 4** Level **4**

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	0.0
P-Group:	MOTOR	**Active:** Immediately	**QuickComm.:** No	**Def:**	125.0
				Max:	300.0

Specifies fourth flux value of saturation characteristic in [%] relative to rated motor voltage (P0304).

Index:

P0365[0] : 1st. Drive data set (DDS)
P0365[1] : 2nd. Drive data set (DDS)
P0365[2] : 3rd. Drive data set (DDS)

Note:

P0365 = 100 % corresponds to rated motor flux

Rated flux = rated EMF

Notice:

The value belongs to the third magnetizing current value and must be greater than or equal to magnetizing curve flux 3 (P0364).

Details:

See P0362 (magnetizing curve flux 1).

P0366[3] **Magnetizing curve imag 1** Level **4**

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	0.0
P-Group:	MOTOR	**Active:** Immediately	**QuickComm.:** No	**Def:**	50.0
				Max:	500.0

Specifies first magnetizing current value of the saturation characteristic in [%] relative to the rated magnetizing current (P0331).

Index:

P0366[0] : 1st. Drive data set (DDS)
P0366[1] : 2nd. Drive data set (DDS)
P0366[2] : 3rd. Drive data set (DDS)

Dependency:

Affects P0320 (motor magnetizing current).

Notice:

The value belongs to the first flux value and must be less than or equal to magnetizing curve imag 2 (P0367).

Details:

See P0362 (magnetizing curve flux 1).

P0367[3] **Magnetizing curve imag 2** Level **4**

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	0.0
P-Group:	MOTOR	**Active:** Immediately	**QuickComm.:** No	**Def:**	75.0
				Max:	500.0

Specifies second magnetizing current value of saturation characteristic in [%] relative to rated magnetizing current (P0331).

Index:

P0367[0] : 1st. Drive data set (DDS)
P0367[1] : 2nd. Drive data set (DDS)
P0367[2] : 3rd. Drive data set (DDS)

Dependency:

Affects P0320 (motor magnetizing current).

Notice:

The value belongs to the second flux value and must be less than or equal to magnetizing curve imag 3 (P0368) and greater than or equal to magnetizing curve imag 1 (P0366).

Details:

See P0362 (magnetizing curve flux 1).

P0368[3] **Magnetizing curve imag 3** Level **4**

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	0.0
P-Group:	MOTOR	**Active:** Immediately	**QuickComm.:** No	**Def:**	135.0
				Max:	500.0

Specifies third magnetizing current value of saturation characteristic in [%] relative to rated magnetizing current (P0331).

Index:

P0368[0] : 1st. Drive data set (DDS)
P0368[1] : 2nd. Drive data set (DDS)
P0368[2] : 3rd. Drive data set (DDS)

Dependency:

Affects P0320 (motor magnetizing current).

Notice:

The value belongs to the third flux value and must be less than or equal to magnetizing curve imag 4 (P0369) and greater than or equal to magnetizing curve imag 2 (P0367).

Details:

See P0362 (magnetizing curve flux 1).

P0369[3] **Magnetizing curve imag 4** Level **4**

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	0.0
P-Group:	MOTOR	**Active:** Immediately	**QuickComm.:** No	**Def:**	170.0
				Max:	500.0

Specifies fourth magnetizing current value of saturation characteristic in [%] relative to rated magnetizing current (P0331).

Index:

P0369[0] : 1st. Drive data set (DDS)
P0369[1] : 2nd. Drive data set (DDS)
P0369[2] : 3rd. Drive data set (DDS)

Dependency:

Affects P0320 (motor magnetizing current).

Notice:

The value belongs to the third flux value and must be less than or equal to magnetizing curve imag 3 (P0368).

Details:

See P0362 (magnetizing curve flux 1).

r0370[3] **Stator resistance [%]** Level **4**

		Datatype: Float	**Unit:** %	**Min:**	-
				Def:	-
P-Group:	MOTOR			**Max:**	-

Displays standardized stator resistance of motor equivalent circuit (phase value) in [%] of the temperature value in P0625.

Index:

r0370[0] : 1st. Drive data set (DDS)
r0370[1] : 2nd. Drive data set (DDS)
r0370[2] : 3rd. Drive data set (DDS)

Note:

$$100\ \% <=> Z_N = \frac{V_{ph}}{I_{ph}} = \frac{V_N}{\sqrt{3} \cdot I_N} = \frac{P0304}{\sqrt{3} \cdot P0305}$$

r0372[3] **Cable resistance [%]** Level **4**

		Datatype: Float	**Unit:** %	**Min:**	-
				Def:	-
P-Group:	MOTOR			**Max:**	-

Displays standardized cable resistance of motor equivalent circuit (phase value)in [%]. It is estimated to be 20 % of the stator resistance.

Index:

r0372[0] : 1st. Drive data set (DDS)
r0372[1] : 2nd. Drive data set (DDS)
r0372[2] : 3rd. Drive data set (DDS)

Note:

$$100\ \% <=> Z_N = \frac{V_{ph}}{I_{ph}} = \frac{V_N}{\sqrt{3} \cdot I_N} = \frac{P0304}{\sqrt{3} \cdot P0305}$$

r0373[3] **Rated stator resistance [%]**

Datatype: Float **Unit:** % **Min:** - **Def:** - **Max:** -

Level **4**

P-Group: MOTOR

Displays rated stator resistance of the motor equivalent circuit (phase value) in [%] of the temperature values in P0625 and P0627.

Index:

r0373[0] : 1st. Drive data set (DDS)
r0373[1] : 2nd. Drive data set (DDS)
r0373[2] : 3rd. Drive data set (DDS)

Note:

$$100\ \% <=> Z_N = \frac{V_{ph}}{I_{ph}} = \frac{V_N}{\sqrt{3} \cdot I_N} = \frac{P0304}{\sqrt{3} \cdot P0305}$$

r0374[3] **Rotor resistance [%]**

Datatype: Float **Unit:** % **Min:** - **Def:** - **Max:** -

Level **4**

P-Group: MOTOR

Displays standardized rotor resistance of the motor equivalent circuit (phase value) in [%] of the temperature value in P0625.

Index:

r0374[0] : 1st. Drive data set (DDS)
r0374[1] : 2nd. Drive data set (DDS)
r0374[2] : 3rd. Drive data set (DDS)

Note:

$$100\ \% <=> Z_N = \frac{V_{ph}}{I_{ph}} = \frac{V_N}{\sqrt{3} \cdot I_N} = \frac{P0304}{\sqrt{3} \cdot P0305}$$

r0376[3] **Rated rotor resistance [%]**

Datatype: Float **Unit:** % **Min:** - **Def:** - **Max:** -

Level **4**

P-Group: MOTOR

Displays rated rotor resistance of the motor equivalent circuit (phase value) in [%] of the temperature values in P0625 and P0628.

Index:

r0376[0] : 1st. Drive data set (DDS)
r0376[1] : 2nd. Drive data set (DDS)
r0376[2] : 3rd. Drive data set (DDS)

Note:

$$100\ \% <=> Z_N = \frac{V_{ph}}{I_{ph}} = \frac{V_N}{\sqrt{3} \cdot I_N} = \frac{P0304}{\sqrt{3} \cdot P0305}$$

r0377[3] **Total leakage reactance [%]**

Datatype: Float **Unit:** % **Min:** - **Def:** - **Max:** -

Level **4**

P-Group: MOTOR

Displays standardized total leakage reactance of the motor equivalent circuit (phase value) in [%] of the temperature value in P0625.

Index:

r0377[0] : 1st. Drive data set (DDS)
r0377[1] : 2nd. Drive data set (DDS)
r0377[2] : 3rd. Drive data set (DDS)

Note:

$$100\ \% <=> Z_N = \frac{V_{ph}}{I_{ph}} = \frac{V_N}{\sqrt{3} \cdot I_N} = \frac{P0304}{\sqrt{3} \cdot P0305}$$

r0382[3] **Main reactance [%]**

Datatype: Float **Unit:** % **Min:** - **Def:** - **Max:** -

Level **4**

P-Group: MOTOR

Displays standardized main reactance of the motor equivalent circuit (phase value) in [%] of the temperature value in P0625..

Index:

r0382[0] : 1st. Drive data set (DDS)
r0382[1] : 2nd. Drive data set (DDS)
r0382[2] : 3rd. Drive data set (DDS)

Note:

$$100\ \% <=> Z_N = \frac{V_{ph}}{I_{ph}} = \frac{V_N}{\sqrt{3} \cdot I_N} = \frac{P0304}{\sqrt{3} \cdot P0305}$$

r0384[3] **Rotor time constant**

Datatype: Float **Unit:** ms **Min:** - **Def:** - **Max:** -

Level **3**

P-Group: MOTOR

Displays calculated rotor time constant [ms].

Index:

r0384[0] : 1st. Drive data set (DDS)
r0384[1] : 2nd. Drive data set (DDS)
r0384[2] : 3rd. Drive data set (DDS)

r0386[3] **Total leakage time constant**

Datatype: Float **Unit:** ms **Min:** - **Def:** - **Max:** -

Level **4**

P-Group: MOTOR

Displays total leakage time constant of motor.

Index:

r0386[0] : 1st. Drive data set (DDS)
r0386[1] : 2nd. Drive data set (DDS)
r0386[2] : 3rd. Drive data set (DDS)

r0394 **CO: Stator resistance IGBT [%]**

Datatype: Float **Unit:** % **Min:** - **Def:** - **Max:** -

Level **4**

P-Group: MOTOR

Displays stator resistance calculated in [%] from IGBT ON voltage and current amplitude.

Note:

$$100\ \% <=> Z_N = \frac{V_{ph}}{I_{ph}} = \frac{V_N}{\sqrt{3} \cdot I_N} = \frac{P0304}{\sqrt{3} \cdot P0305}$$

r0395 **CO: Total stator resistance [%]**

Datatype: Float **Unit:** % **Min:** - **Def:** - **Max:** -

Level **3**

P-Group: MOTOR

Displays stator resistance of motor (combined stator/cable resistance) in [%] of the temperature value in r0632.

Note:

$$100\ \% <=> Z_N = \frac{V_{ph}}{I_{ph}} = \frac{V_N}{\sqrt{3} \cdot I_N} = \frac{P0304}{\sqrt{3} \cdot P0305}$$

r0396 **CO: Act. rotor resistance**

Datatype: Float **Unit:** % **Min:** - **Def:** - **Max:** -

Level **3**

P-Group: MOTOR

Displays (adapted) rotor resistance of the motor equivalent circuit (phase value) in [%] of the temperature value in r0633.

Note:

$$100\ \% <=> Z_N = \frac{V_{ph}}{I_{ph}} = \frac{V_N}{\sqrt{3} \cdot I_N} = \frac{P0304}{\sqrt{3} \cdot P0305}$$

Notice:

Values greater than 25 % tend to produce excessive motor slip. Check rated motor speed [rpm] value (P0311).

P0400[3] **Select encoder type**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	ENCODER	**Active:** Immediately	**QuickComm.:** No	**Def:**	0
				Max:	2

Level **2**

Selects encoder type (number of encoder channels).

Possible Settings:

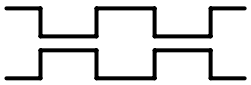
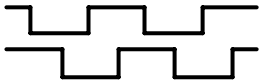
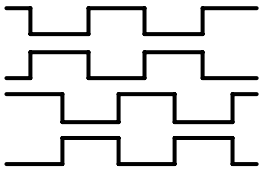
0 Disabled
1 Single channel encoder
2 Quadrature encoder without zero pulse

Index:

P0400[0] : 1st. Drive data set (DDS)
P0400[1] : 2nd. Drive data set (DDS)
P0400[2] : 3rd. Drive data set (DDS)

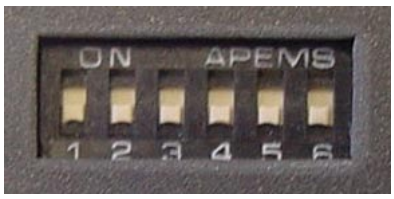
Dependency:

Following table displays the setting of P0400 which depends upon the number of encoder channels:

Parameter	Terminal	Track	Encoder output
P0400 = 1	A		single ended
	A AN		differential
P0400 = 2	A B		single ended
	A AN B BN		differential

Following table displays the setting the of the encoder DIPs on the encoder option modul which have to be set depending on the encoder type (TTL, HTL) and encoder output:

Type	Output	
	single ended	differential
TTL (e.g. 1XP8001-2)	111111	010101
HTL (e.g. 1XP8001-1)	101010	000000



Caution:

When using Vector Control with encoder-feedback , the direction of rotation of the Encoder and Motor must be the same. If this is not achieved, then the functional operation of the Vector Control will not be guaranteed (positive instead of negative feedback). Extreme care must therefore be taken with respect to the connection of the motor to the inverter as well as the correct connection of the encoder to the Encoder module. Motor and Encoder must not be incorrectly wired up !

When commissioning Vector Control with encoder-feedback (VC), the drive should be configured for V/f mode (see P1300) first. Run the drive and compare r0061 with r0021 that should agree in

- sign and
- magnitude (with a deviation of only a few percent).

Only if both criteria are fullfilled, change P1300 and select VC (P1300 = 21 or 23).

P0400 = 1 (single channel encoder) will only allow operation in one direction. If operation in both directions is required, connect an encoder with 2 channels (A and B) and select setting 2. See the Operating Instructions of the encoder module for more information.

Note:

Encoders with zero pulse can also be connected, but the zero pulse is not used in MM4.

The term "quadrature" in setting 2 refers to two periodic functions separated by a quarter cycle or 90 degrees.

r0403 **CO/BO: Encoder status word** Level **2**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: COMMANDS

Displays status word of encoder (in bit format).

Bitfields:

Bit00	Encoder module active	0	NO	1	YES
Bit01	Encoder error	0	NO	1	YES
Bit02	Signal o.k.	0	NO	1	YES
Bit03	Encoder low speed loss	0	NO	1	YES
Bit04	HW timer used	0	NO	1	YES

Details:

See description of seven-segment display given in the "Introduction to MICROMASTER System Parameters" in this manual.

P0408[3] **Encoder pulses per revolution** Level **2**

CStat: CT **Datatype:** U16 **Unit:** - **Min:** 2 **Def:** 1024 **Max:** 20000

P-Group: ENCODER **Active:** Immediately **QuickComm.:** No

Specifies the number of encoder pulses per revolution.

Index:

P0408[0] : 1st. Drive data set (DDS)
P0408[1] : 2nd. Drive data set (DDS)
P0408[2] : 3rd. Drive data set (DDS)

Note:

The encoder resolution (pulses per revolution P0408) which may be entered will be limited by the max. pulse frequency of the encoder option board (f_max = 300 kHz).

The following equation calculates the encoder frequency depending on the encoder resoulution and the rotational speed (rpm). The encoder frequency has to be less than the max. pulse frequency:

$$f_{max} > f = \frac{P0408 \times RPM}{60}$$

P0491[3] **Reaction on freq. signal loss** Level **2**

CStat: CT **Datatype:** U16 **Unit:** - **Min:** 0 **Def:** 0 **Max:** 1

P-Group: ENCODER **Active:** first confirm **QuickComm.:** No

Selects reaction on loss of frequency signal.

Possible Settings:

0 Do not change to SLVC
1 Change to SLVC

Index:

P0491[0] : 1st. Drive data set (DDS)
P0491[1] : 2nd. Drive data set (DDS)
P0491[2] : 3rd. Drive data set (DDS)

P0492[3] **Allowed frequency difference** Level **2**

CStat: CT **Datatype:** Float **Unit:** Hz **Min:** 0.00 **Def:** 10.00 **Max:** 100.00

P-Group: ENCODER **Active:** Immediately **QuickComm.:** No

Parameter P0492 is used for low and high frequency encoder loss detection (fault: F0090).

1. High frequency encoder loss detection:
   This condition occurs when the allowed frequency and the allowed difference of the frequency signals between samples, set in P0492 is exceeded.
   Condition:
   - Act. freq. > P0492 and f(t_2) - f(t_1) > P0492

2. Low frequency encoder loss detection:
   This condition occurs when the actual frequency is < P0492 when encoder loss occurs.
   Condition a):
   - r0061 = 0 and torque limit and then
   - r0061 = 0 with setpoint frequency > 0 for time > P0494

   Condition b):
   - Act. freq. < P0492 and f (t_2) < P0492 and ASIC detect channel B loss

Dependency:

This parameter is updated when motor start-up time P0345 is changed or when a frequency-loop optimisation is performed (P1960 = 1). There is a fixed delay of 40 ms before acting upon loss of encoder at high frequencies.

Caution:

P0492 = 0 (disabled):
When allowed frequency difference is set to 0, both the high frequency and low frequency encoder loss detection is disabled, thus encoder loss will not be detected.

If encoder loss detection is disabled and encoder loss occurs, then operation of the motor may become unstable.

P0494[3] **Delay frequency loss reaction** Level **2**

CStat:	CUT	**Datatype:** U16	**Unit:** ms	**Min:**	0
P-Group:	ENCODER	**Active:** first confirm	**QuickComm.:** No	**Def:**	10
				Max:	65000

Used for low frequency encoder loss detection. If the motor shaft frequency is less than the value in P0492 then encoder loss is detected using a low frequency encoder loss detection algorithm. This parameter selects the delay between loss of encoder at low frequency and reaction to the encoder loss.

Index:

P0494[0] : 1st. Drive data set (DDS)
P0494[1] : 2nd. Drive data set (DDS)
P0494[2] : 3rd. Drive data set (DDS)

Dependency:

This parameter is updated when motor start-up time P0345 is changed or when a frequency-loop optimisation is performed (P1960 = 1).

Caution:

P0494 = 0 (disabled):
When the delay in P0494 is set to 0, then low frequency encoder loss detection is disabled and low frequency encoder loss cannot be detected (high frequency encoder loss detection will still operate if P0492 > 0).

If low frequency encoder loss detection is disabled and encoder should be lost at low frequency, then operation of motor may become unstable.

P0500[3] **Technological application** Level **3**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	TECH_APL	**Active:** first confirm	**QuickComm.:** Yes	**Def:**	0
				Max:	3

Selects technological application. Sets control mode (P1300).

Possible Settings:

0 Constant torque
1 Pumps and fans
3 Simple Positioning

Index:

P0500[0] : 1st. Drive data set (DDS)
P0500[1] : 2nd. Drive data set (DDS)
P0500[2] : 3rd. Drive data set (DDS)

Dependency:

See parameter P0205

P0601[3]	Motor temperature sensor				Min: 0	Level
	CStat: CUT	Datatype: U16	Unit: -		Def: 0	2
	P-Group: MOTOR	Active: first confirm	QuickComm.: No		Max: 2	

Selects motor temperature sensor.

Possible Settings:

0 No sensor
1 PTC thermistor
2 KTY84

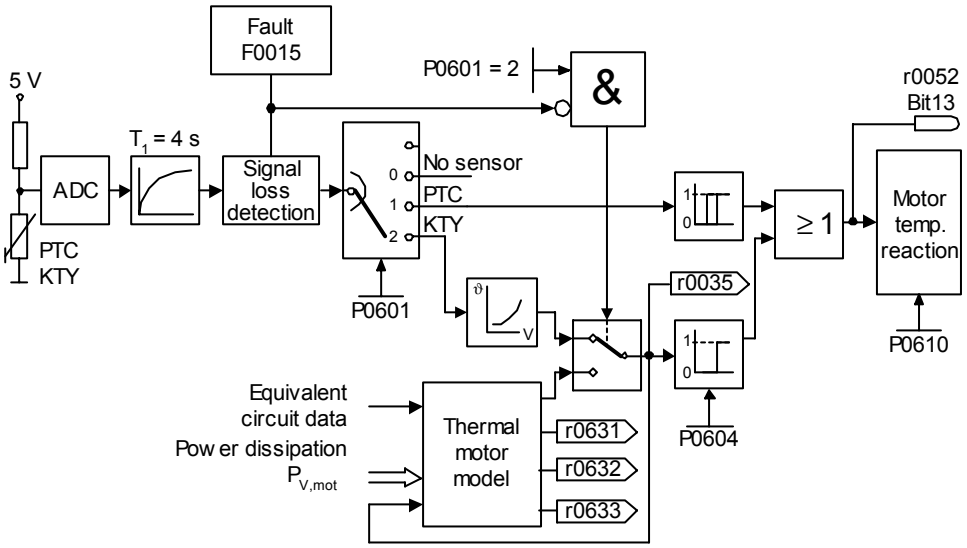
Index:

P0601[0] : 1st. Drive data set (DDS)
P0601[1] : 2nd. Drive data set (DDS)
P0601[2] : 3rd. Drive data set (DDS)

Dependency:

If "no sensor" is selected, the motor temperature monitoring will be done based on the estimated value of the thermal motor model.

The temperature of the motor, when a thermal sensor is connected is calculated using the thermal motor model. When a KTY sensor is fitted, the loss of connection can be detected (Alarm F0015). Using the methods described above the monitoring of the temperature will automatically switch to the thermal model using values derived from the estimated value. Using a PTC sensor the temperature of the motor is calculated by the sensor in conjunction with the thermal model. This allows for redundancy of the monitoring process.



Thermal motor model:
The data, required for the thermal motor model, is estimated from the rating plate data entered during the quick commissioning. This data permits reliable, stable operation for standard Siemens motors. If required, parameter changes must be made for motors from third-party manufacturers. We always recommend that an automatic motor data identification run is made after quick commissioning so that the electrical equivalent circuit diagram data can be determined. This allows a more precise calculation of the losses which occur in the motor which has a positive impact on the accuracy of the thermal motor model.

PTC sensor:
A PTC temperature sensor (Positive-Temperature-Characteristic) is a resistor with a positive temperature characteristic which, at normal temperatures, has a low resistance value (50-100 Ohm). Normally, three PTC temperature sensors are connected in series in the motor (depending on the motor manufacturer), thus producing a "cold resistance value" ranging from 150 to 300 Ohm. PTC temperature sensors are also frequently referred to as cold conductors.

However, at a certain threshold temperature, the resistance rises rapidly. The threshold temperature is selected by the motor manufacturer in such a way that it corresponds to the nominal temperature value of the motor insulation. This allows the change in the resistance value to be deployed to protect the motor, as the PTCs are embedded in the motor windings. PTC temperature sensors are not suitable for measuring temperature.

When the PTC is connected to the control terminals 14 and 15 of the MM4. Once the selection motor temperature sensor has been activated by the setting P0601 = 1 (PTC sensor), the PTC temperature sensor then protects the motor by means of the trip device in the MM4.

Should the resistance value of 2000 Ohm be exceeded, the inverter displays error F0001 (motor overheating).

If the resistance value is below 100 Ohm, the error F0015 (no motor temperature signal) is then output.

This protects the motor from overheating and also from a sensor wire breakage.

The motor is additionally monitored by the thermal motor model in the inverter, thus providing a redundant system for monitoring the motor.

KTY84 sensor:
The sensor KTY84 is basically a semi-conductor thermo-sensor (diode), the resistance value of which varies from some 500 Ohm at 0°C to 2600 Ohm at 300°C. It has a positive temperature coefficient and, in contrast to the PTCs, has an almost linear temperature characteristic. The resistor behaviour is comparable to that of a measuring resistor with a very high temperature coefficient.

Note the following when connecting the polarity. Connect the sensor so that the diode is polarized in the operative direction. That means that the anode needs to be connected to terminal 14 = PTC A (+) and the cathode to terminal 15 = PTC B (-).

If the temperature monitoring function is activated with the setting P0601 = 2, the temperature of the sensor (thus that of the motor windings) is then written to parameter r0035.

The motor overheating warning threshold needs to be assigned with parameter P0604 (the works setting is 130°C). This warning threshold depends on the motor's thermal class. Also refer to the table below in this context.

Extract of IEC 85	
Insulation class	End temperature
Y	90 °C
A	105 °C
E	120 °C
B	130 °C
F	155 °C
H	180 °C

The motor overheating disturbance threshold is automatically set by the inverter at 10% higher than the temperature declared in parameter P0604.

If the sensor KTY84 is activated, the motor temperature is then additionally calculated via the thermal motor model. Should the sensor KTY84 recognise a wire breakage, an alarm F0015 (loss of the motor temperature signal) is then generated and the thermal motor model is automatically switched to.

If the electric circuit to the sensor KTY84 is open or if a short circuit occurs, error F0015 (no motor temperature signal) is then displayed.

Connection failure:
If the connection to the PTC or KTY84 sensor becomes open circuit or short circuit, a fault will be indicated, and by default the drive will trip.

P0604[3] Threshold motor temperature — Level **2**

CStat:	CUT	**Datatype:** Float	**Unit:** °C	**Min:**	0.0
P-Group:	MOTOR	**Active:** Immediately	**QuickComm.:** No	**Def:**	130.0
				Max:	200.0

Enters warning threshold for motor temperature protection.

The trip temperature defined always 10 % higher than the warning level P0604. When act. motor temperature exeeds trip temperature than inverter trip as defined in P0610.

$\vartheta_{trip} = 1.1 \cdot \vartheta_{warn} = 1.1 \cdot P0604$ ϑ_{wam} : Warning threshold (P0604)
ϑ_{trip} : Trip threshold (max. permissible temperature)

Index:
P0604[0] : 1st. Drive data set (DDS)
P0604[1] : 2nd. Drive data set (DDS)
P0604[2] : 3rd. Drive data set (DDS)

Dependency:
This value should be at least 40°C greater than the motor ambient temperature P0625.

P0604 ≥ P0625 + 40 °C

Note:
Default value depends on P0300 (select motor type).

P0610[3] **Motor temperature reaction**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	MOTOR	**Active:** first confirm	**QuickComm.:** No	**Def:**	2
				Max:	2

Level **3**

Defines reaction when motor temperature reaches warning threshold.

Possible Settings:

0 Warning, no reaction, no trip
1 Warning, Imax reduction, trip F0011
2 Warning, no reaction, trip F0011

Index:

P0610[0] : 1st. Drive data set (DDS)
P0610[1] : 2nd. Drive data set (DDS)
P0610[2] : 3rd. Drive data set (DDS)

Dependency:

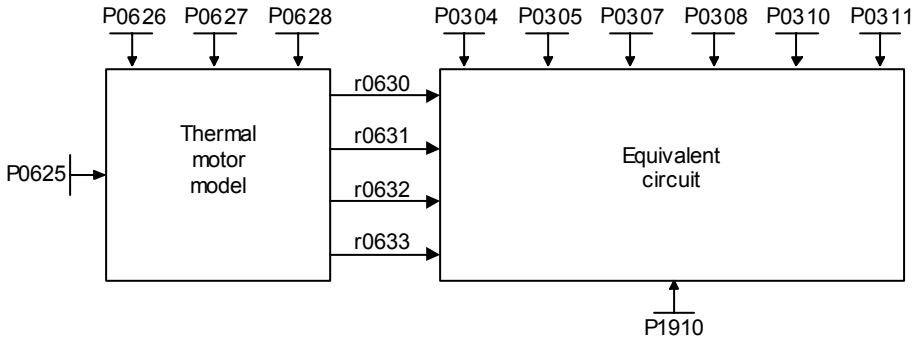
$\vartheta_{trip} = 1.1 \cdot \vartheta_{warn} = 1.1 \cdot P0604$ ϑ_{warn} : Warning threshold (P0604)
ϑ_{trip} : Trip threshold (max. permissible temperature)

P0625[3] **Ambient motor temperature**

CStat:	CUT	**Datatype:** Float	**Unit:** °C	**Min:**	-40.0
P-Group:	MOTOR	**Active:** Immediately	**QuickComm.:** No	**Def:**	20.0
				Max:	80.0

Level **3**

Ambient temperature of motor. The parameter for the stator resistance P0350 and rotor resistance P0354 relate to the ambient temperature.



Index:

P0625[0] : 1st. Drive data set (DDS)
P0625[1] : 2nd. Drive data set (DDS)
P0625[2] : 3rd. Drive data set (DDS)

Note:

Following items should be considered when using P0625:
- The ambient temperature has to be entered prior to motor data identification.
- An accuracy of +/- 5°C is adequate.
- The motor data identification should be carried out on a cold motor (ambient temperature = stator temperature = rotor temperature).
- The highest accuracy at temperature adaption of the stator resistance and rotor resistance can be achieved by connecting a KTY84 sensor.

P0626[3] **Overtemperature stator iron**

CStat:	CUT	**Datatype:** Float	**Unit:** °C	**Min:**	20.0
P-Group:	MOTOR	**Active:** Immediately	**QuickComm.:** No	**Def:**	50.0
				Max:	200.0

Level **4**

Overtemperature of stator iron.

Index:

P0626[0] : 1st. Drive data set (DDS)
P0626[1] : 2nd. Drive data set (DDS)
P0626[2] : 3rd. Drive data set (DDS)

Note:

Temperature rises are valid for sinusoidal operations (line supply temperature rises).

Temperature rises due to converter operation (modulation losses) and output filter are also considered.

P0627[3] **Overtemperature stator winding** Level **4**

CStat: CUT **Datatype:** Float **Unit:** °C **Min:** 20.0
P-Group: MOTOR **Active:** Immediately **QuickComm.:** No **Def:** 80.0
Max: 200.0

Overtemperature of the stator winding.

It is only allowed to change the value when the motor is cold. A motor identification has to be made after changing the value.

Index:

P0627[0] : 1st. Drive data set (DDS)
P0627[1] : 2nd. Drive data set (DDS)
P0627[2] : 3rd. Drive data set (DDS)

Note:

Temperature rises are valid for sinusoidal operations (line supply temperature rises).

Temperature rises due to converter operation (modulation losses) and output filter are also considered.

P0628[3] **Overtemperature rotor winding** Level **4**

CStat: CUT **Datatype:** Float **Unit:** °C **Min:** 20.0
P-Group: MOTOR **Active:** Immediately **QuickComm.:** No **Def:** 100.0
Max: 200.0

Overtemperature of the rotor winding.

Index:

P0628[0] : 1st. Drive data set (DDS)
P0628[1] : 2nd. Drive data set (DDS)
P0628[2] : 3rd. Drive data set (DDS)

Note:

Temperature rises are valid for sinusoidal operations (line supply temperature rises).

Temperature rises due to converter operation (modulation losses) and output filter are also considered.

r0630[3] **CO: Ambient temperature** Level **4**

Datatype: Float **Unit:** °C **Min:** -
P-Group: MOTOR **Def:** -
Max: -

Displays ambient temperature of motor mass model.

Index:

r0630[0] : 1st. Drive data set (DDS)
r0630[1] : 2nd. Drive data set (DDS)
r0630[2] : 3rd. Drive data set (DDS)

r0631[3] **CO: Stator iron temperature** Level **4**

Datatype: Float **Unit:** °C **Min:** -
P-Group: MOTOR **Def:** -
Max: -

Displays iron temperature of motor mass model.

Index:

r0631[0] : 1st. Drive data set (DDS)
r0631[1] : 2nd. Drive data set (DDS)
r0631[2] : 3rd. Drive data set (DDS)

r0632[3] **CO: Stator winding temperature** Level **4**

Datatype: Float **Unit:** °C **Min:** -
P-Group: MOTOR **Def:** -
Max: -

Displays stator winding temperature of motor mass model.

Index:

r0632[0] : 1st. Drive data set (DDS)
r0632[1] : 2nd. Drive data set (DDS)
r0632[2] : 3rd. Drive data set (DDS)

r0633[3] **CO: Rotor winding temperature** Level **4**

Datatype: Float **Unit:** °C **Min:** -
P-Group: MOTOR **Def:** -
Max: -

Displays rotor winding temperature of motor mass model.

Index:

r0633[0] : 1st. Drive data set (DDS)
r0633[1] : 2nd. Drive data set (DDS)
r0633[2] : 3rd. Drive data set (DDS)

P0640[3] **Motor overload factor [%]**

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	10.0
P-Group:	MOTOR	**Active:** Immediately	**QuickComm.:** Yes	**Def:**	150.0
				Max:	400.0

Level **2**

Defines motor overload current limit in [%] relative to P0305 (rated motor current).

Index:

P0640[0] : 1st. Drive data set (DDS)
P0640[1] : 2nd. Drive data set (DDS)
P0640[2] : 3rd. Drive data set (DDS)

Dependency:

Limited to maximum inverter current or to 400 % of rated motor current (P0305), whichever is the lower.

$$P0640_{max} = \frac{\min(r0209, 4 \cdot P0305)}{P0305} \cdot 100$$

Details:

See function diagram for current limitation.

P0700[3] **Selection of command source**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** Yes	**Def:**	2
				Max:	6

Level **1**

Selects digital command source.

Possible Settings:

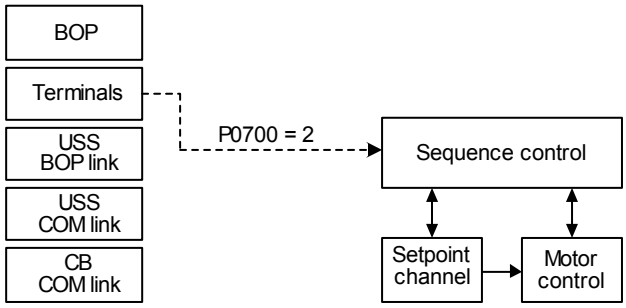
0 Factory default setting
1 BOP (keypad)
2 Terminal
4 USS on BOP link
5 USS on COM link
6 CB on COM link

Index:

P0700[0] : 1st. Command data set (CDS)
P0700[1] : 2nd. Command data set (CDS)
P0700[2] : 3rd. Command data set (CDS)

Example:

Changing form P0700 = 1 to P0700 = 2 sets all digital inputs to default settings.



Caution:

Be aware, by changing of parameter P0700 all BI parameters are reset to the default value or modified as listed in the table below.

If the Inverter is being controlled via the AOP, select USS (with the corresponding interface) for the Command Source. If the AOP is connected to the BOP-Link Interface, then set Parameter P0700 to the value 4 (P0700 = 4).

Note:

Changing this parameter sets (to default) all settings on item selected (see table).

	P0700 = 0	**P0700 = 1**	**P0700 = 2**	**P0700 = 4**	**P0700 = 5**	**P0700 = 6**
P0701	1	0	1	0	0	0
P0702	12	0	12	0	0	0
P0703	9	9	9	9	9	9
P0704	15	15	15	15	15	15
P0705	15	15	15	15	15	15
P0706	15	15	15	15	15	15
P0707	0	0	0	0	0	0
P0708	0	0	0	0	0	0
P0731	52.3	52.3	52.3	52.3	52.3	52.3
P0732	52.7	52.7	52.7	52.7	52.7	52.7
P0733	0.0	0.0	0.0	0.0	0.0	0.0

	P0700 = 0	**P0700 = 1**	**P0700 = 2**	**P0700 = 4**	**P0700 = 5**	**P0700 = 6**
P0800	0.0	0.0	0.0	0.0	0.0	0.0
P0801	0.0	0.0	0.0	0.0	0.0	0.0
P0840	722.0	19.0	722.0	2032.0	2036.0	2090.0
P0842	0.0	0.0	0.0	0.0	0.0	0.0
P0844	1.0	19.1	1.0	2032.1	2036.1	2090.1
P0845	19.1	19.1	19.1	19.1	19.1	19.1
P0848	1.0	1.0	1.0	2032.2	2036.2	2090.2
P0849	1.0	1.0	1.0	1.0	1.0	1.0
P0852	1.0	1.0	1.0	2032.3	2036.3	2090.3
P1020	0.0	0.0	0.0	0.0	0.0	0.0
P1021	0.0	0.0	0.0	0.0	0.0	0.0
P1022	0.0	0.0	0.0	0.0	0.0	0.0
P1023	722.3	722.3	722.3	722.3	722.3	722.3
P1026	722.4	722.4	722.4	722.4	722.4	722.4
P1028	722.5	722.5	722.5	722.5	722.5	722.5
P1035	19.13	19.13	19.13	2032.13	2036.13	2090.13
P1036	19.14	19.14	19.14	2032.14	2036.14	2090.14
P1055	0.0	19.8	0.0	2032.8	2036.8	2090.8
P1056	0.0	0.0	0.0	2032.9	2036.9	2090.9
P1074	0.0	0.0	0.0	0.0	0.0	0.0
P1110	0.0	0.0	0.0	0.0	0.0	0.0
P1113	722.1	19.11	722.1	2032.11	2036.11	2090.11
P1124	0.0	0.0	0.0	0.0	0.0	0.0
P1140	1.0	1.0	1.0	2032.4	2036.4	2090.4
P1141	1.0	1.0	1.0	2032.5	2036.5	2090.5
P1142	1.0	1.0	1.0	2032.6	2036.6	2090.6
P1230	0.0	0.0	0.0	0.0	0.0	0.0
P1477	0.0	0.0	0.0	0.0	0.0	0.0
P1501	0.0	0.0	0.0	0.0	0.0	0.0
P2103	722.2	722.2	722.2	722.2	722.2	722.2
P2104	0.0	0.0	0.0	2032.7	2036.7	2090.7
P2106	1.0	1.0	1.0	1.0	1.0	1.0
P2200	0.0	0.0	0.0	0.0	0.0	0.0
P2220	0.0	0.0	0.0	0.0	0.0	0.0
P2221	0.0	0.0	0.0	0.0	0.0	0.0
P2222	0.0	0.0	0.0	0.0	0.0	0.0
P2223	722.3	722.3	722.3	722.3	722.3	722.3
P2226	722.4	722.4	722.4	722.4	722.4	722.4
P2228	722.5	722.5	722.5	722.5	722.5	722.5
P2235	19.13	19.13	19.13	2032.13	2036.13	2090.13
P2236	19.14	19.14	19.14	2032.14	2036.14	2090.14

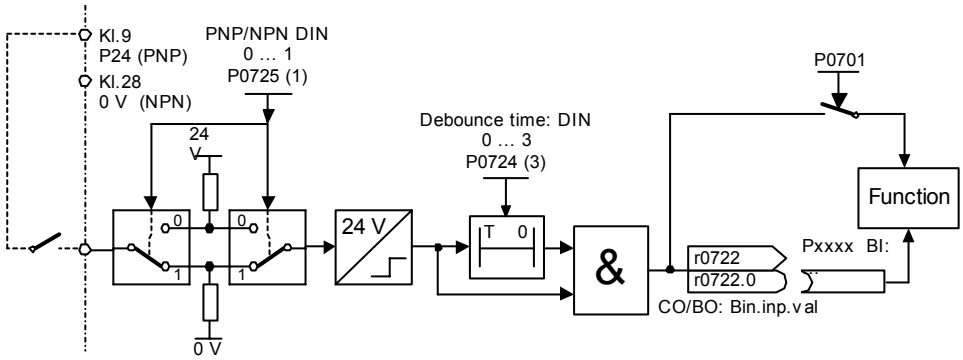
The following parameters are not overwritten when changing P0700:

P0810	P0811	P0820	P0821	P2810	P2812	P2814
P2816	P2818	P2820	P2822	P2824	P2826	P2828
P2830	P2832	P2834	P2837	P2840	P2843	P2846
P2849	P2854	P2859	P2864			

P0701[3]	**Function of digital input 1**			**Min:**	0	Level
	CStat: CT	**Datatype:** U16	**Unit:** -	**Def:**	1	**2**
	P-Group: COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Max:**	99	

Selects function of digital input 1.

DIN channel (e.g. DIN1 - PNP (P0725 = 1))



Possible Settings:

0 Digital input disabled
1 ON/OFF1
2 ON reverse /OFF1
3 OFF2 - coast to standstill
4 OFF3 - quick ramp-down
9 Fault acknowledge
10 JOG right
11 JOG left
12 Reverse
13 MOP up (increase frequency)
14 MOP down (decrease frequency)
15 Fixed setpoint (Direct selection)
16 Fixed setpoint (Direct selection + ON)
17 Fixed setpoint (Binary coded selection + ON)
25 DC brake enable
29 External trip
33 Disable additional freq setpoint
99 Enable BICO parameterization

Index:

P0701[0] : 1st. Command data set (CDS)
P0701[1] : 2nd. Command data set (CDS)
P0701[2] : 3rd. Command data set (CDS)

Dependency:

Setting 99 (enable BICO parameterization) requires
- P0700 command source or
- P0010 = 1, P3900 = 1, 2 or 3 quick commissioning or
- P0010 = 30, P0970 = 1 factory reset in order to reset.

Notice:

Setting 99 (BICO) for expert use only.

P0702[3] **Function of digital input 2** Level **2**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	12
				Max:	99

Selects function of digital input 2.

Possible Settings:

0 Digital input disabled
1 ON/OFF1
2 ON reverse /OFF1
3 OFF2 - coast to standstill
4 OFF3 - quick ramp-down
9 Fault acknowledge
10 JOG right
11 JOG left
12 Reverse
13 MOP up (increase frequency)
14 MOP down (decrease frequency)
15 Fixed setpoint (Direct selection)
16 Fixed setpoint (Direct selection + ON)
17 Fixed setpoint (Binary coded selection + ON)
25 DC brake enable
29 External trip
33 Disable additional freq setpoint
99 Enable BICO parameterization

Index:

P0702[0] : 1st. Command data set (CDS)
P0702[1] : 2nd. Command data set (CDS)
P0702[2] : 3rd. Command data set (CDS)

Details:

See P0701 (function of digital input1).

P0703[3] **Function of digital input 3** Level **2**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	9
				Max:	99

Selects function of digital input 3.

Possible Settings:

0 Digital input disabled
1 ON/OFF1
2 ON reverse /OFF1
3 OFF2 - coast to standstill
4 OFF3 - quick ramp-down
9 Fault acknowledge
10 JOG right
11 JOG left
12 Reverse
13 MOP up (increase frequency)
14 MOP down (decrease frequency)
15 Fixed setpoint (Direct selection)
16 Fixed setpoint (Direct selection + ON)
17 Fixed setpoint (Binary coded selection + ON)
25 DC brake enable
29 External trip
33 Disable additional freq setpoint
99 Enable BICO parameterization

Index:

P0703[0] : 1st. Command data set (CDS)
P0703[1] : 2nd. Command data set (CDS)
P0703[2] : 3rd. Command data set (CDS)

Details:

See P0701 (function of digital input 1).

P0704[3] Function of digital input 4

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	15
				Max:	99

Level **2**

Selects function of digital input 4.

Possible Settings:

0 Digital input disabled
1 ON/OFF1
2 ON reverse /OFF1
3 OFF2 - coast to standstill
4 OFF3 - quick ramp-down
9 Fault acknowledge
10 JOG right
11 JOG left
12 Reverse
13 MOP up (increase frequency)
14 MOP down (decrease frequency)
15 Fixed setpoint (Direct selection)
16 Fixed setpoint (Direct selection + ON)
17 Fixed setpoint (Binary coded selection + ON)
25 DC brake enable
29 External trip
33 Disable additional freq setpoint
99 Enable BICO parameterization

Index:

P0704[0] : 1st. Command data set (CDS)
P0704[1] : 2nd. Command data set (CDS)
P0704[2] : 3rd. Command data set (CDS)

Details:

See P0701 (function of digital input 1).

P0705[3] Function of digital input 5

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	15
				Max:	99

Level **2**

Selects function of digital input 5.

Possible Settings:

0 Digital input disabled
1 ON/OFF1
2 ON reverse /OFF1
3 OFF2 - coast to standstill
4 OFF3 - quick ramp-down
9 Fault acknowledge
10 JOG right
11 JOG left
12 Reverse
13 MOP up (increase frequency)
14 MOP down (decrease frequency)
15 Fixed setpoint (Direct selection)
16 Fixed setpoint (Direct selection + ON)
17 Fixed setpoint (Binary coded selection + ON)
25 DC brake enable
29 External trip
33 Disable additional freq setpoint
99 Enable BICO parameterization

Index:

P0705[0] : 1st. Command data set (CDS)
P0705[1] : 2nd. Command data set (CDS)
P0705[2] : 3rd. Command data set (CDS)

Details:

See P0701 (function of digital input 1).

P0706[3] **Function of digital input 6** Level **2**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	15
				Max:	99

Selects function of digital input 6.

Possible Settings:

0 Digital input disabled
1 ON/OFF1
2 ON reverse /OFF1
3 OFF2 - coast to standstill
4 OFF3 - quick ramp-down
9 Fault acknowledge
10 JOG right
11 JOG left
12 Reverse
13 MOP up (increase frequency)
14 MOP down (decrease frequency)
15 Fixed setpoint (Direct selection)
16 Fixed setpoint (Direct selection + ON)
17 Fixed setpoint (Binary coded selection + ON)
25 DC brake enable
29 External trip
33 Disable additional freq setpoint
99 Enable BICO parameterization

Index:

P0706[0] : 1st. Command data set (CDS)
P0706[1] : 2nd. Command data set (CDS)
P0706[2] : 3rd. Command data set (CDS)

Details:

See P0701 (function of digital input 1).

P0707[3] **Function of digital input 7** Level **2**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	0
				Max:	99

Selects function of digital input 7 (via analog input).

Possible Settings:

0 Digital input disabled
1 ON/OFF1
2 ON reverse /OFF1
3 OFF2 - coast to standstill
4 OFF3 - quick ramp-down
9 Fault acknowledge
10 JOG right
11 JOG left
12 Reverse
13 MOP up (increase freq.)
14 MOP down (decrease freq.)
25 DC brake enable
29 External trip
33 Disable additional freq setpoint
99 Enable BICO parameterization

Index:

P0707[0] : 1st. Command data set (CDS)
P0707[1] : 2nd. Command data set (CDS)
P0707[2] : 3rd. Command data set (CDS)

Note:

Signals above 4 V are active, signals below 1,6 V are inactive.

Details:

See P0701 (function of digital input 1).

P0708[3]	**Function of digital input 8**			**Min:**	0	Level
	CStat: CT	**Datatype:** U16	**Unit:** -	**Def:**	0	**2**
	P-Group: COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Max:**	99	

Selects function of digital input 8 (via analog input)

Possible Settings:

0 Digital input disabled
1 ON/OFF1
2 ON reverse /OFF1
3 OFF2 - coast to standstill
4 OFF3 - quick ramp-down
9 Fault acknowledge
10 JOG right
11 JOG left
12 Reverse
13 MOP up (increase freq.)
14 MOP down (decrease freq.)
25 DC brake enable
29 External trip
33 Disable additional freq setpoint
99 Enable BICO parameterization

Index:

P0708[0] : 1st. Command data set (CDS)
P0708[1] : 2nd. Command data set (CDS)
P0708[2] : 3rd. Command data set (CDS)

Note:

Signals above 4 V are active, signals below 1,6 V are inactive.

Details:

See P0701 (function of digital input 1).

P0719[3] **Selection of cmd. & freq. setp.** Level **3**

CStat: CT **Datatype:** U16 **Unit:** - **Min:** 0 **Def:** 0 **Max:** 66

P-Group: COMMANDS **Active:** first confirm **QuickComm.:** No

Central switch to select control command source for inverter.

Switches command and setpoint source between freely programmable BICO parameters and fixed command/setpoint profiles. Command and setpoint sources can be changed independently.

The tens digit chooses the command source and the units digit chooses the setpoint source.

Possible Settings:

0	Cmd = BICO parameter	Setpoint = BICO parameter
1	Cmd = BICO parameter	Setpoint = MOP setpoint
2	Cmd = BICO parameter	Setpoint = Analog setpoint
3	Cmd = BICO parameter	Setpoint = Fixed frequency
4	Cmd = BICO parameter	Setpoint = USS on BOP link
5	Cmd = BICO parameter	Setpoint = USS on COM link
6	Cmd = BICO parameter	Setpoint = CB on COM link
10	Cmd = BOP	Setpoint = BICO parameter
11	Cmd = BOP	Setpoint = MOP setpoint
12	Cmd = BOP	Setpoint = Analog setpoint
13	Cmd = BOP	Setpoint = Fixed frequency
15	Cmd = BOP	Setpoint = USS on COM link
16	Cmd = BOP	Setpoint = CB on COM link
40	Cmd = USS on BOP link	Setpoint = BICO parameter
41	Cmd = USS on BOP link	Setpoint = MOP setpoint
42	Cmd = USS on BOP link	Setpoint = Analog setpoint
43	Cmd = USS on BOP link	Setpoint = Fixed frequency
44	Cmd = USS on BOP link	Setpoint = USS on BOP link
45	Cmd = USS on BOP link	Setpoint = USS on COM link
46	Cmd = USS on BOP link	Setpoint = CB on COM link
50	Cmd = USS on COM link	Setpoint = BICO parameter
51	Cmd = USS on COM link	Setpoint = MOP setpoint
52	Cmd = USS on COM link	Setpoint = Analog setpoint
53	Cmd = USS on COM link	Setpoint = Fixed frequency
54	Cmd = USS on COM link	Setpoint = USS on BOP link
55	Cmd = USS on COM link	Setpoint = USS on COM link
60	Cmd = CB on COM link	Setpoint = BICO parameter
61	Cmd = CB on COM link	Setpoint = MOP setpoint
62	Cmd = CB on COM link	Setpoint = Analog setpoint
63	Cmd = CB on COM link	Setpoint = Fixed frequency
64	Cmd = CB on COM link	Setpoint = USS on BOP link
66	Cmd = CB on COM link	Setpoint = CB on COM link

Index:

P0719[0] : 1st. Command data set (CDS)
P0719[1] : 2nd. Command data set (CDS)
P0719[2] : 3rd. Command data set (CDS)

Note:

If set to a value other than 0 (i.e. BICO parameter is not the setpoint source), P0844 / P0848 (first source of OFF2 / OFF3) are not effective; instead, P0845 / P0849 (second source of OFF2 / OFF3) apply and the OFF commands are obtained via the particular source defined.

BICO connections made previously remain unchanged.

r0720 **Number of digital inputs** Level **3**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: COMMANDS

Displays number of digital inputs.

r0722 **CO/BO: Binary input values** Level **2**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: COMMANDS

Displays status of digital inputs.

Bitfields:

Bit00	Digital input 1	0	OFF	1	ON
Bit01	Digital input 2	0	OFF	1	ON
Bit02	Digital input 3	0	OFF	1	ON
Bit03	Digital input 4	0	OFF	1	ON
Bit04	Digital input 5	0	OFF	1	ON
Bit05	Digital input 6	0	OFF	1	ON
Bit06	Digital input 7 (via ADC 1)	0	OFF	1	ON
Bit07	Digital input 8 (via ADC 2)	0	OFF	1	ON

Note:

Segment is lit when signal is active.

P0724 **Debounce time for digital inputs** Level **3**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	COMMANDS	**Active:** Immediately	**QuickComm.:** No	**Def:**	3
				Max:	3

Defines debounce time (filtering time) used for digital inputs.

Possible Settings:

0 No debounce time
1 2.5 ms debounce time
2 8.2 ms debounce time
3 12.3 ms debounce time

P0725 **PNP / NPN digital inputs** Level **3**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	COMMANDS	**Active:** Immediately	**QuickComm.:** No	**Def:**	1
				Max:	1

Switches between active high (PNP) and active low (NPN). This is valid for all digital inputs simultaneously.

The following is valid by using the internal supply:

Possible Settings:

0 NPN mode ==> low active
1 PNP mode ==> high active

Value:

NPN: Terminals 5/6/7/8/16/17 must be connected via terminal 28 (O V).
PNP: Terminals 5/6/7/8/16/17 must be connected via terminal 9 (24 V).

r0730 **Number of digital outputs** Level **3**

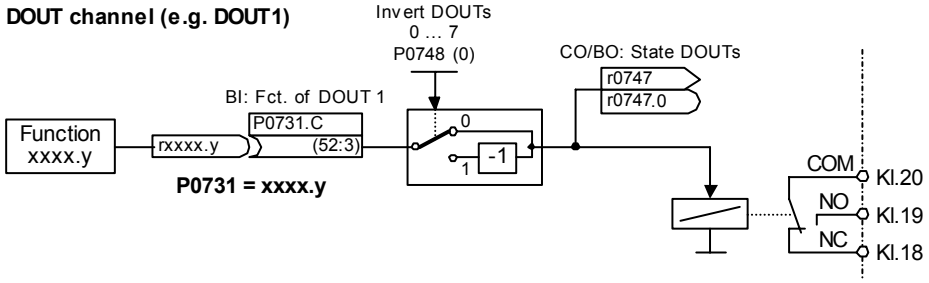
		Datatype: U16	**Unit:** -	**Min:**	-
				Def:	-
P-Group:	COMMANDS			**Max:**	-

Displays number of digital outputs (relays).

P0731[3] **BI: Function of digital output 1** Level **2**

CStat:	CUT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	52:3
				Max:	4000:0

Defines source of digital output 1.



Index:

P0731[0] : 1st. Command data set (CDS)
P0731[1] : 2nd. Command data set (CDS)
P0731[2] : 3rd. Command data set (CDS)

Common Settings:

52.0	Drive ready	0	Closed
52.1	Drive ready to run	0	Closed
52.2	Drive running	0	Closed
52.3	Drive fault active	0	Closed
52.4	OFF2 active	1	Closed
52.5	OFF3 active	1	Closed
52.6	Switch on inhibit active	0	Closed
52.7	Drive warning active	0	Closed
52.8	Deviation setpoint/actual value	1	Closed
52.9	PZD control (Process Data Control)	0	Closed
52.A	Maximum frequency reached	0	Closed
52.B	Warning: Motor current limit	1	Closed
52.C	Motor holding brake (MHB) active	0	Closed
52.D	Motor overload	1	Closed
52.E	Motor running direction right	0	Closed
52.F	Inverter overload	1	Closed
53.0	DC brake active	0	Closed
53.1	Act. freq. f_act > P2167 (f_off)	0	Closed
53.2	Act. freq. f_act > P1080 (f_min)	0	Closed
53.3	Act. current r0027 >= P2170	0	Closed
53.4	Act. freq. f_act > P2155 (f_1)	0	Closed
53.5	Act. freq. f_act <= P2155 (f_1)	0	Closed
53.6	Act. freq. f_act >= setpoint	0	Closed
53.7	Act. Vdc r0026 < P2172	0	Closed
53.8	Act. Vdc r0026 > P2172	0	Closed
53.A	PID output r2294 == P2292 (PID_min)	0	Closed
53.B	PID output r2294 == P2291 (PID_max)	0	Closed

P0732[3] **BI: Function of digital output 2** **Min:** 0:0 Level **2**

CStat: CUT **Datatype:** U32 **Unit:** - **Def:** 52:7

P-Group: COMMANDS **Active:** first confirm **QuickComm.:** No **Max:** 4000:0

Defines source of digital output 2.

Index:

P0732[0] : 1st. Command data set (CDS)
P0732[1] : 2nd. Command data set (CDS)
P0732[2] : 3rd. Command data set (CDS)

Common Settings:

52.0	Drive ready	0	Closed
52.1	Drive ready to run	0	Closed
52.2	Drive running	0	Closed
52.3	Drive fault active	0	Closed
52.4	OFF2 active	1	Closed
52.5	OFF3 active	1	Closed
52.6	Switch on inhibit active	0	Closed
52.7	Drive warning active	0	Closed
52.8	Deviation setpoint/actual value	1	Closed
52.9	PZD control (Process Data Control)	0	Closed
52.A	Maximum frequency reached	0	Closed
52.B	Warning: Motor current limit	1	Closed
52.C	Motor holding brake (MHB) active	0	Closed
52.D	Motor overload	1	Closed
52.E	Motor running direction right	0	Closed
52.F	Inverter overload	1	Closed
53.0	DC brake active	0	Closed
53.1	Act. freq. f_act > P2167 (f_off)	0	Closed
53.2	Act. freq. f_act > P1080 (f_min)	0	Closed
53.3	Act. current r0027 >= P2170	0	Closed
53.4	Act. freq. f_act > P2155 (f_1)	0	Closed
53.5	Act. freq. f_act <= P2155 (f_1)	0	Closed
53.6	Act. freq. f_act >= setpoint	0	Closed
53.7	Act. Vdc r0026 < P2172	0	Closed
53.8	Act. Vdc r0026 > P2172	0	Closed
53.A	PID output r2294 == P2292 (PID_min)	0	Closed
53.B	PID output r2294 == P2291 (PID_max)	0	Closed

P0733[3] **BI: Function of digital output 3** **Min:** 0:0 Level **2**

CStat: CUT **Datatype:** U32 **Unit:** - **Def:** 0:0

P-Group: COMMANDS **Active:** first confirm **QuickComm.:** No **Max:** 4000:0

Defines source of digital output 3.

Index:

P0733[0] : 1st. Command data set (CDS)
P0733[1] : 2nd. Command data set (CDS)
P0733[2] : 3rd. Command data set (CDS)

Common Settings:

52.0	Drive ready	0	Closed
52.1	Drive ready to run	0	Closed
52.2	Drive running	0	Closed
52.3	Drive fault active	0	Closed
52.4	OFF2 active	1	Closed
52.5	OFF3 active	1	Closed
52.6	Switch on inhibit active	0	Closed
52.7	Drive warning active	0	Closed
52.8	Deviation setpoint/actual value	1	Closed
52.9	PZD control (Process Data Control)	0	Closed
52.A	Maximum frequency reached	0	Closed
52.B	Warning: Motor current limit	1	Closed
52.C	Motor holding brake (MHB) active	0	Closed
52.D	Motor overload	1	Closed
52.E	Motor running direction right	0	Closed
52.F	Inverter overload	1	Closed
53.0	DC brake active	0	Closed
53.1	Act. freq. f_act > P2167 (f_off)	0	Closed
53.2	Act. freq. f_act > P1080 (f_min)	0	Closed
53.3	Act. current r0027 >= P2170	0	Closed
53.4	Act. freq. f_act > P2155 (f_1)	0	Closed
53.5	Act. freq. f_act <= P2155 (f_1)	0	Closed
53.6	Act. freq. f_act >= setpoint	0	Closed
53.7	Act. Vdc r0026 < P2172	0	Closed
53.8	Act. Vdc r0026 > P2172	0	Closed
53.A	PID output r2294 == P2292 (PID_min)	0	Closed
53.B	PID output r2294 == P2291 (PID_max)	0	Closed

r0747 **CO/BO: State of digital outputs** Level **3**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: COMMANDS

Displays status of digital outputs (also includes inversion of digital outputs via P0748).

Bitfields:

Bit00	Digital output 1 energized	0	NO	1	YES
Bit01	Digital output 2 energized	0	NO	1	YES
Bit02	Digital output 3 energized	0	NO	1	YES

Dependency:

Bit 0 = 0 :
Relay de-energized / contacts open

Bit 0 = 1 :
Relay energized / contacts closed

P0748 **Invert digital outputs** Level **3**

CStat: CUT **Datatype:** U16 **Unit:** - **Min:** 0 **Def:** 0 **Max:** 7

P-Group: COMMANDS **Active:** first confirm **QuickComm.:** No

Defines high and low states of relay for a given function.

Bitfields:

Bit00	Invert digital output 1	0	NO	1	YES
Bit01	Invert digital output 2	0	NO	1	YES
Bit02	Invert digital output 3	0	NO	1	YES

r0750 **Number of ADCs** Level **3**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: TERMINAL

Displays number of analog inputs available.

r0751 **BO: Status word of ADC** Level **4**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: TERMINAL

Displays status of analog input.

Bitfields:

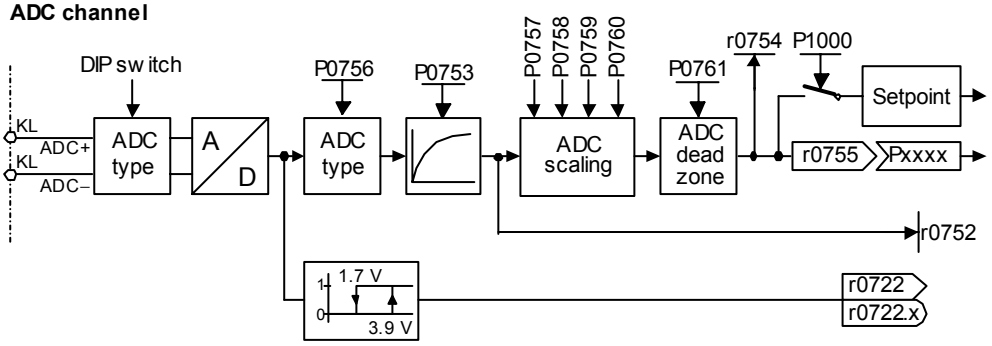
Bit00	Signal lost on ADC 1	0	NO	1	YES
Bit01	Signal lost on ADC 2	0	NO	1	YES

r0752[2] **Act. input of ADC [V] or [mA]** Level **2**

Datatype: Float **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: TERMINAL

Displays smoothed analog input value in volts before the characteristic block.



Index:

r0752[0] : Analog input 1 (ADC 1)
r0752[1] : Analog input 2 (ADC 2)

P0753[2] **Smooth time ADC** Level **3**

CStat: CUT **Datatype:** U16 **Unit:** ms **Min:** 0 **Def:** 3 **Max:** 10000

P-Group: TERMINAL **Active:** first confirm **QuickComm.:** No

Defines filter time (PT1 filter) in [ms] for analog input.

Index:

P0753[0] : Analog input 1 (ADC 1)
P0753[1] : Analog input 2 (ADC 2)

Note:

Increasing this time (smooth) reduces jitter but slows down response to the analog input.

P0753 = 0 : No filtering

r0754[2] **Act. ADC value after scaling [%]** Level **2**

Datatype: Float **Unit:** % **Min:** - **Def:** - **Max:** -

P-Group: TERMINAL

Shows smoothed value of analog input in [%] after scaling block.

Index:

r0754[0] : Analog input 1 (ADC 1)
r0754[1] : Analog input 2 (ADC 2)

Dependency:

P0757 to P0760 define range (ADC scaling).

r0755[2] **CO: Act. ADC after scal. [4000h]** Level **2**

Datatype: I16 **Unit:** - **Min:** - **Def:** - **Max:** -

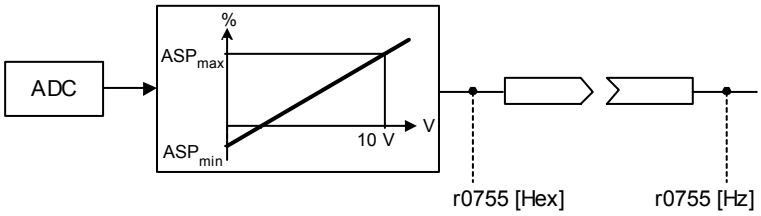
P-Group: TERMINAL

Displays analog input, scaled using ASPmin and ASPmax.

Analog setpoint (ASP) from the analog scaling block can vary from min. analog setpoint (ASPmin) to a max. analog setpoint (ASPmax) as shown in P0757 (ADC scaling).

The largest magnitude (value without sign) of ASPmin and ASPmax defines the scaling of 16384.

By associating parameter r0755 with an internal value (e.g. frequency setpoint), a scaled value is calculated internally by the MM4. The frequency value is calculated using the following equation:



$$r0755\,[Hz] = \frac{r0755\,[Hex]}{4000\,[Hex]} \cdot P2000 \cdot \frac{\max(|ASP_{max}|, |ASP_{min}|)}{100\%}$$

Index:

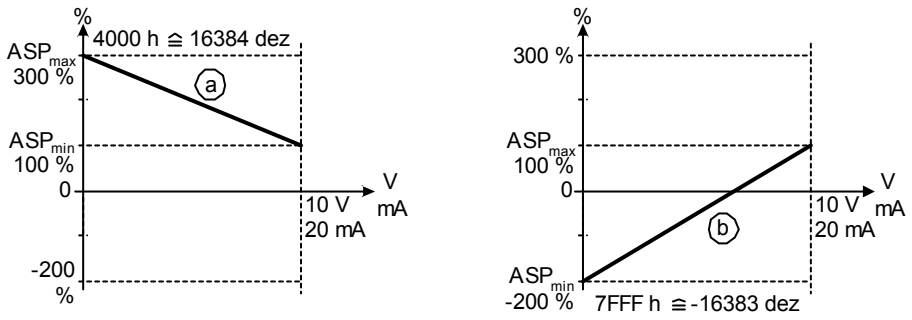
r0755[0] : Analog input 1 (ADC 1)
r0755[1] : Analog input 2 (ADC 2)

Example:

Case a:
- ASPmin = 300 %, ASPmax = 100 % then 16384 represents 300 %.
- This parameter will vary from 5461 to 16384.

Case b:
- ASPmin = -200 %, ASPmax = 100 % then 16384 represents 200 %.
- This parameter will vary from -16384 to +8192.

$$4000h = \max(|ASP_{max}|, |ASP_{min}|)$$



Note:

This value is used as an input to analog BICO connectors.

ASPmax represents the highest analog setpoint (this may be at 10 V).

ASPmin represents the lowest analog setpoint (this may be at 0 V).

Details:

See parameters P0757 to P0760 (ADC scaling)

P0756[2] **Type of ADC**

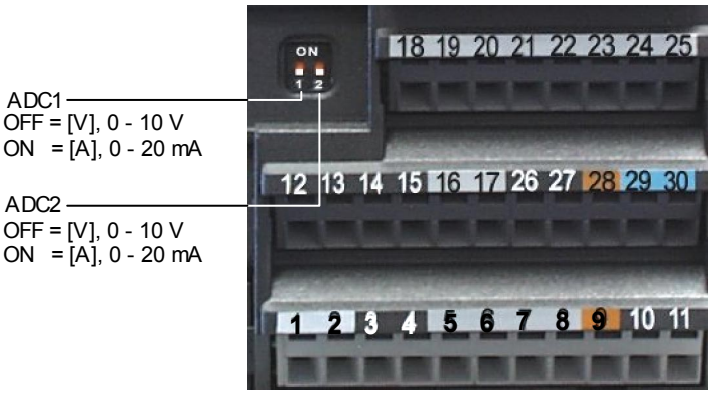
CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	TERMINAL	**Active:** first confirm	**QuickComm.:** No	**Def:**	0
				Max:	4

Level **2**

Defines type of analog input and also enables analog input monitoring.

To switch over from voltage to current analog input it is not sufficient to merely modify parameter P0756. Rather, the DIPs on the terminal board must also be set to the correct position. The DIP settings are as follows:
- OFF = voltage input (10 V)
- ON = current input (20 mA)

Allocation of DIPs to analog inputs is as follows:
- DIP on left (DIP 1) = Analog input 1
- DIP on right (DIP 2) = Analog input 2



Possible Settings:

0 Unipolar voltage input (0 to +10 V)
1 Unipolar voltage input with monitoring (0 to 10 V)
2 Unipolar current input (0 to 20 mA)
3 Unipolar current input with monitoring (0 to 20 mA)
4 Bipolar voltage input (-10 V to +10 V)

Index:

P0756[0] : Analog input 1 (ADC 1)
P0756[1] : Analog input 2 (ADC 2)

Notice:

When monitoring is enabled and a deadband defined (P0761), a fault condition will be generated (F0080) if the analog input voltage falls below 50 % of the deadband voltage.

On account of h/w restirction it is not possible to select the bipolar voltage (see Enum declaration) for analog input 2 (P0756[1] = 4).

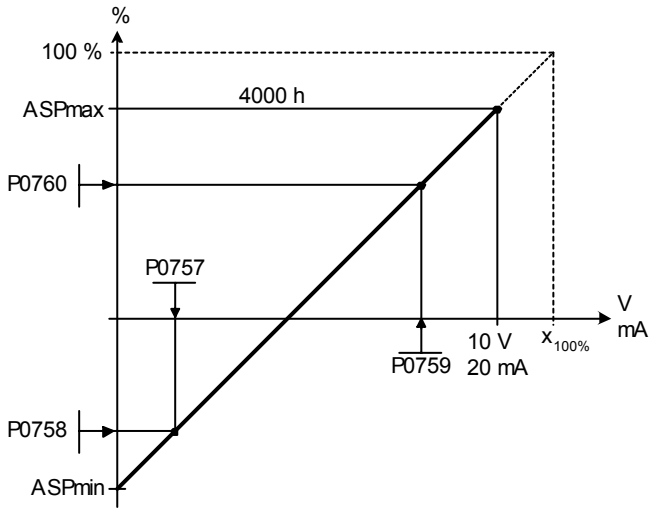
Details:

See P0757 to P0760 (ADC scaling).

P0757[2]	**Value x1 of ADC scaling [V / mA]**				**Min:**	-20	Level
	CStat:	CUT	**Datatype:** Float	**Unit:** -	**Def:**	0	**2**
	P-Group:	TERMINAL	**Active:** first confirm	**QuickComm.:** No	**Max:**	20	

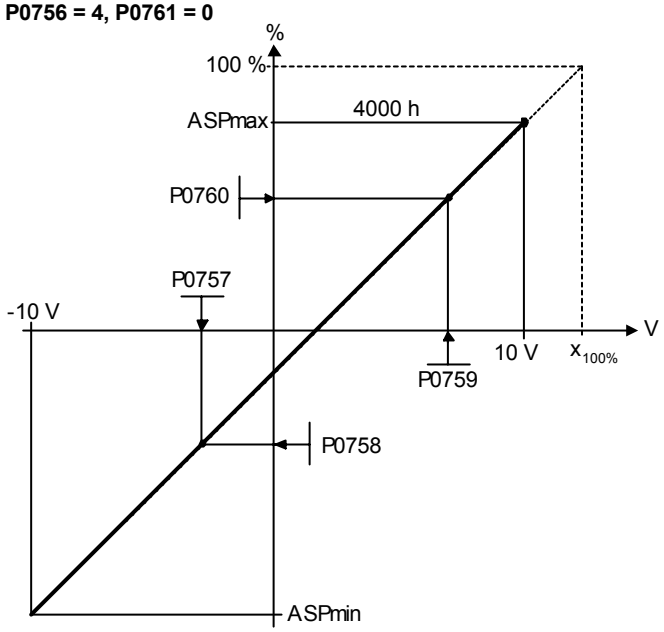
Parameters P0757 - P0760 configure the input scaling as shown in the diagram:

P0756 = 0 ... 3, P0761 = 0



Where:
- Analog setpoints represent a [%] of the normalized frequency in P2000.
- Analog setpoints may be larger than 100 %.
- ASPmax represents highest analog setpoint (this may be at 10 V or 20 mA).
- ASPmin represents lowest analog setpoint (this may be at 0 V or 20 mA).
- Default values provide a scaling of 0 V or 0 mA = 0 %, and 10 V or 20 mA = 100 %.

P0756 = 4, P0761 = 0



Index:

P0757[0] : Analog input 1 (ADC 1)
P0757[1] : Analog input 2 (ADC 2)

Note:

The ADC-linear characteristic is described by 4 coordinates, based on a two-point equation:

$$\frac{y - P0758}{x - P0757} = \frac{P0760 - P0758}{P0759 - P0757}$$

For calculations the point-gradient form (offset and gradient) is more advantageous:

$$y = m \cdot x + y_0$$

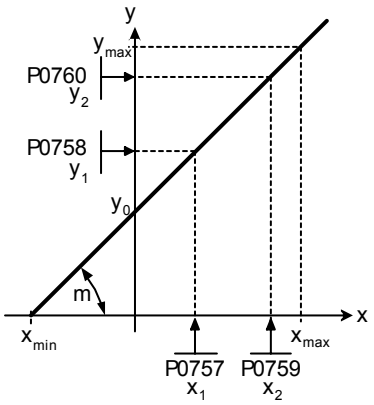
The transformation between these two forms is given by:

$$m = \frac{P0760 - P0758}{P0759 - P0757} \qquad y_0 = \frac{P0758 \cdot P0759 - P0757 \cdot P0760}{P0759 - P0757}$$

For scaling of the input the value of y_max and x_min has to be determined. This is done by the following equations:

$$x_{min} = \frac{P0760 \cdot P0757 - P0758 \cdot P0759}{P0760 - P0758}$$

$$y_{max} = (x_{max} - x_{min}) \cdot \frac{P0760 - P0758}{P0759 - P0757}$$



Notice:

The value x2 of ADC scaling P0759 must be greater than the value x1 of ADC scaling P0757.

P0758[2] Value y1 of ADC scaling — Level **2**

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-99999.9
P-Group:	TERMINAL	**Active:** first confirm	**QuickComm.:** No	**Def:**	0.0
				Max:	99999.9

Sets value of Y1 in [%] as described in P0757 (ADC scaling)

Index:

P0758[0] : Analog input 1 (ADC 1)
P0758[1] : Analog input 2 (ADC 2)

Dependency:

Affects P2000 to P2003 (reference frequency, voltage, current or torque) depending on which setpoint is to be generated.

P0759[2] Value x2 of ADC scaling [V / mA] — Level **2**

CStat:	CUT	**Datatype:** Float	**Unit:** -	**Min:**	-20
P-Group:	TERMINAL	**Active:** first confirm	**QuickComm.:** No	**Def:**	10
				Max:	20

Sets value of X2 as described in P0757 (ADC scaling).

Index:

P0759[0] : Analog input 1 (ADC 1)
P0759[1] : Analog input 2 (ADC 2)

Notice:

The value x2 of ADC scaling P0759 must be greater than the value x1 of ADC scaling P0757.

P0760[2] Value y2 of ADC scaling — Level **2**

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-99999.9
P-Group:	TERMINAL	**Active:** first confirm	**QuickComm.:** No	**Def:**	100.0
				Max:	99999.9

Sets value of Y2 in [%] as described in P0757 (ADC scaling).

Index:

P0760[0] : Analog input 1 (ADC 1)
P0760[1] : Analog input 2 (ADC 2)

Dependency:

Affects P2000 to P2003 (reference frequency, voltage, current or torque) depending on which setpoint is to be generated.

P0761[2]	Width of ADC deadband [V / mA]				Min:	0	Level
	CStat: CUT	Datatype: Float	Unit: -		Def:	0	**2**
	P-Group: TERMINAL	Active: first confirm	QuickComm.: No		Max:	20	

Defines width of deadband on analog input. The diagrams below explain its use.

Index:

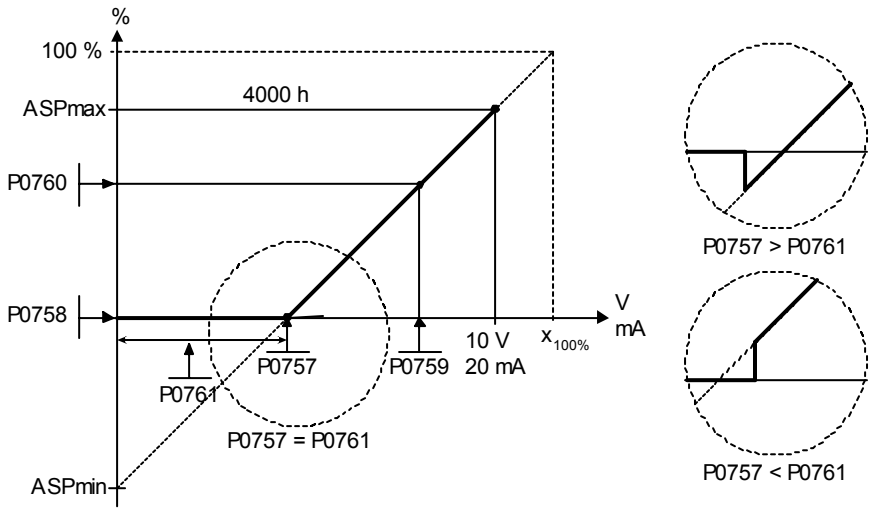
P0761[0] : Analog input 1 (ADC 1)
P0761[1] : Analog input 2 (ADC 2)

Example:

The below example produces a 2 to 10 V analog input 0 to 50 Hz (ADC value 2 to 10 V, 0 to 50 Hz):

- P2000 = 50 Hz
- P0759 = 8 V P0760 = 75 %
- P0757 = 2 V P0758 = 0 %
- P0761 = 2 V
- P0756 = 0 or 1

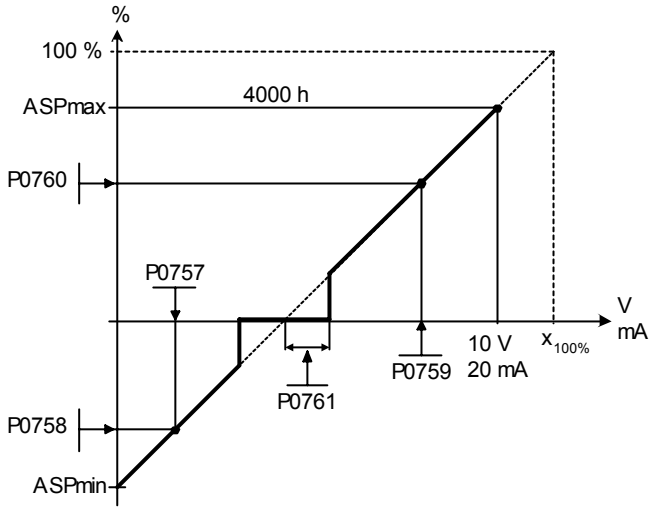
P0761 > 0 and (0 < P0758 < P0760 or 0 > P0758 > P0760)



The below example produces a 0 to 10 V analog input (-50 to +50 Hz) with center zero and a "holding point" 0.2 V wide (0.1 V to each side of center, ADC value 0 to 10 V, -50 to +50 Hz):

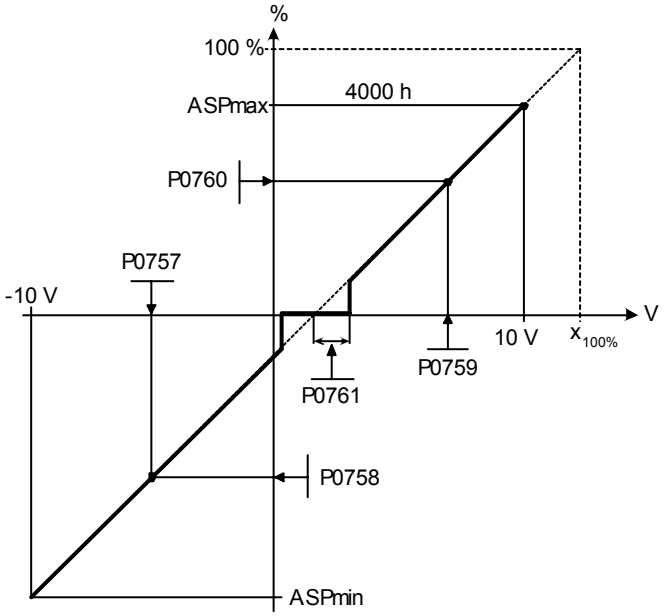
- P2000 = 50 Hz
- P0759 = 8 V P0760 = 75 %
- P0757 = 2 V P0758 = -75 %
- P0761 = 0.1 V
- P0756 = 0 or 1

P0761 > 0 and P0758 < 0 < P0760



ADC value -10 to +10 V (-50 to +50 Hz):
The below example produces a -10 to +10 V analog input (-50 to +50 Hz) with center zero and a "holding point" 0.2 V wide (0.1 V to each side of center).

P0756 = 4 and P0761 > 0 and P0758 < 0 < P0760



Note:

P0761[x] = 0 : No deadband active.

Notice:

Deadband starts from 0 V to value of P0761, if both values of P0758 and P0760 (y coordinates of ADC scaling) are positive or negative respectively. However, deadband is active in both directions from point of intersection (x axis with ADC scaling curve), if sign of P0758 and P0760 are opposite.

Min. frequency P1080 should be zero when using center zero setup. There is no hysteresis at the end of the deadband.

P0762[2]	**Delay for loss of signal action**			**Min:**	0	Level
	CStat: CUT	**Datatype:** U16	**Unit:** ms	**Def:**	10	**3**
	P-Group: TERMINAL	**Active:** Immediately	**QuickComm.:** No	**Max:**	10000	

Defines time delay between loss of analog setpoint and appearance of fault code F0080.

Index:

P0762[0] : Analog input 1 (ADC 1)
P0762[1] : Analog input 2 (ADC 2)

Note:

Expert users can choose the desired reaction to F0080 (default is OFF2).

r0770	**Number of DACs**			**Min:**	-	Level
		Datatype: U16	**Unit:** -	**Def:**	-	**3**
	P-Group: TERMINAL			**Max:**	-	

Displays number of analog outputs available.

P0771[2]	**CI: DAC**			**Min:**	0:0	Level
	CStat: CUT	**Datatype:** U32	**Unit:** -	**Def:**	21:0	**2**
	P-Group: TERMINAL	**Active:** first confirm	**QuickComm.:** No	**Max:**	4000:0	

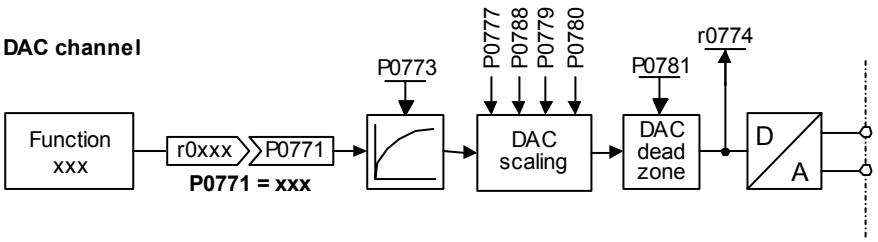
Defines function of the 0 - 20 mA analog output.

Index:

P0771[0] : Analog output 1 (DAC 1)
P0771[1] : Analog output 2 (DAC 2)

Common Settings:

21 CO: Act. frequency (scaled to P2000)
24 CO: Act. output frequency (scaled to P2000)
25 CO: Act. output voltage (scaled to P2001)
26 CO: Act. DC-link voltage (scaled to P2001)
27 CO: Act. output current (scaled to P2002)



P0773[2] **Smooth time DAC** Level **2**

CStat:	CUT	**Datatype:** U16	**Unit:** ms	**Min:**	0
P-Group:	TERMINAL	**Active:** first confirm	**QuickComm.:** No	**Def:**	2
				Max:	1000

Defines smoothing time [ms] for analog output signal. This parameter enables smoothing for DAC using a PT1 filter.

Index:

P0773[0] : Analog output 1 (DAC 1)
P0773[1] : Analog output 2 (DAC 2)

Dependency:

P0773 = 0: Deactivates filter.

r0774[2] **Act. DAC value [mA]** Level **2**

		Datatype: Float	**Unit:** -	**Min:**	-
P-Group:	TERMINAL			**Def:**	-
				Max:	-

Shows value of analog output in [mA] after filtering and scaling.

Index:

r0774[0] : Analog output 1 (DAC 1)
r0774[1] : Analog output 2 (DAC 2)

P0776[2] **Type of DAC** Level **2**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	TERMINAL	**Active:** first confirm	**QuickComm.:** No	**Def:**	0
				Max:	1

Defines type of analog output.

Possible Settings:

0 Current output
1 Voltage output

Index:

P0776[0] : Analog output 1 (DAC 1)
P0776[1] : Analog output 2 (DAC 2)

Note:

The analog output is designed as a current output with a range of 0...20 mA.

For a voltage output with a range of 0...10 V an external resistor of 500 Ohms has to be connected at the terminals (12/13 or 26/27).

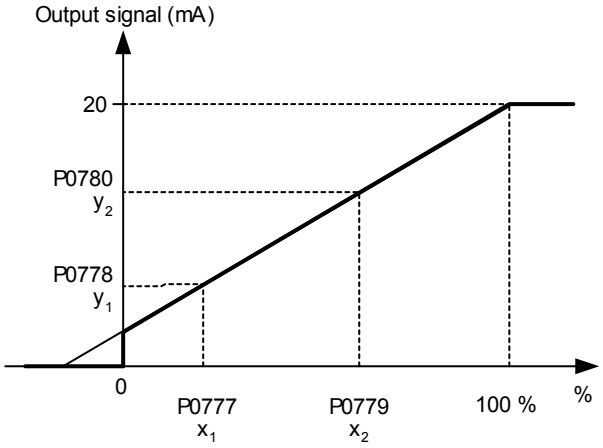
P0777[2] **Value x1 of DAC scaling**

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-99999.0
P-Group:	TERMINAL	**Active:** first confirm	**QuickComm.:** No	**Def:**	0.0
				Max:	99999.0

Level **2**

Defines x1 output characteristic in [%]. Scaling block is responsible for adjustment of output value defined in P0771 (DAC connector input).

Parameters of DAC scaling block (P0777 ... P0781) work as follows:



Where:
Points P1 (x1, y1) and P2 (x2, y2) can be chosen freely.

Index:

P0777[0] : Analog output 1 (DAC 1)
P0777[1] : Analog output 2 (DAC 2)

Example:

The default values of the scaling block provides a scaling of:
P1: 0.0 % = 0 mA
P2: 100.0 % = 20 mA

Dependency:

Affects P2000 to P2003 (referency frequency, voltage, current or torque) depending on which setpoint is to be generated.

Note:

The DAC-linear characteristic is described by 4 coordinates, based on a two-point equation:

$$\frac{y - P0778}{x - P0777} = \frac{P0780 - P0778}{P0779 - P0777}$$

For calculations the point-gradient form (offset and gradient) is more advantageous:

$$y = m \cdot x + y_0$$

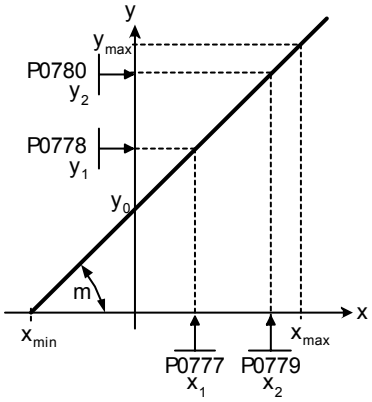
The transformation between these two forms is given by:

$$m = \frac{P0780 - P0778}{P0779 - P0777} \qquad y_0 = \frac{P0778 \cdot P0779 - P0777 \cdot P0780}{P0779 - P0777} \leq |200\ \%|$$

For scaling of the input the value of y_max and x_min has to be determined. This is done by the following equations:

$$x_{min} = \frac{P0780 \cdot P0777 - P0778 \cdot P0779}{P0780 - P0778}$$

$$y_{max} = (x_{max} - x_{min}) \cdot \frac{P0780 - P0778}{P0779 - P0777}$$



P0778[2] **Value y1 of DAC scaling** Level **2**

CStat:	CUT	**Datatype:** Float	**Unit:** -	**Min:**	0
P-Group:	TERMINAL	**Active:** first confirm	**QuickComm.:** No	**Def:**	0
				Max:	20

Defines y1 of output characteristic.

Index:

P0778[0] : Analog output 1 (DAC 1)
P0778[1] : Analog output 2 (DAC 2)

P0779[2] **Value x2 of DAC scaling** Level **2**

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-99999.0
P-Group:	TERMINAL	**Active:** first confirm	**QuickComm.:** No	**Def:**	100.0
				Max:	99999.0

Defines x2 of output characteristic in [%].

Index:

P0779[0] : Analog output 1 (DAC 1)
P0779[1] : Analog output 2 (DAC 2)

Dependency:

Affects P2000 to P2003 (referency frequency, voltage, current or torque) depending on which setpoint is to be generated.

P0780[2] **Value y2 of DAC scaling** Level **2**

CStat:	CUT	**Datatype:** Float	**Unit:** -	**Min:**	0
P-Group:	TERMINAL	**Active:** first confirm	**QuickComm.:** No	**Def:**	20
				Max:	20

Defines y2 of output characteristic.

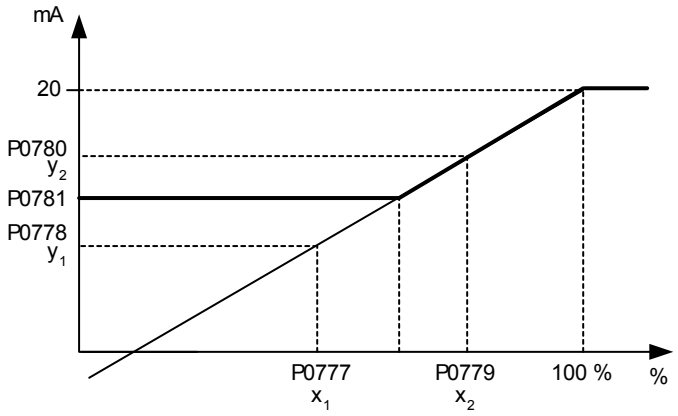
Index:

P0780[0] : Analog output 1 (DAC 1)
P0780[1] : Analog output 2 (DAC 2)

P0781[2] **Width of DAC deadband** Level **2**

CStat:	CUT	**Datatype:** Float	**Unit:** -	**Min:**	0
P-Group:	TERMINAL	**Active:** first confirm	**QuickComm.:** No	**Def:**	0
				Max:	20

Sets width of dead-band in [mA] for analog output.



Index:

P0781[0] : Analog output 1 (DAC 1)
P0781[1] : Analog output 2 (DAC 2)

P0800[3] **BI: Download parameter set 0** Level **3**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	0:0
				Max:	4000:0

Defines source of command to start download of parameter set 0 from attached AOP. The first three digits describe the parameter number of the command source, the last digit refers to the bit setting for that parameter.

Index:

P0800[0] : 1st. Command data set (CDS)
P0800[1] : 2nd. Command data set (CDS)
P0800[2] : 3rd. Command data set (CDS)

Common Settings:

722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
722.3 = Digital input 4 (requires P0704 to be set to 99, BICO)
722.4 = Digital input 5 (requires P0705 to be set to 99, BICO)
722.5 = Digital input 6 (requires P0706 to be set to 99, BICO)

Note:

Signal of digital input:
0 = No download
1 = Start download parameter set 0 from AOP.

P0801[3] **BI: Download parameter set 1**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	0:0
				Max:	4000:0

Level **3**

Defines sources of command to start download of parameter set 1 from attached AOP. The first three digits describe the parameter number of the command source, the last digit refers to the bit setting for that parameter.

Index:

P0801[0] : 1st. Command data set (CDS)
P0801[1] : 2nd. Command data set (CDS)
P0801[2] : 3rd. Command data set (CDS)

Common Settings:

722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
722.3 = Digital input 4 (requires P0704 to be set to 99, BICO)
722.4 = Digital input 5 (requires P0705 to be set to 99, BICO)
722.5 = Digital input 6 (requires P0706 to be set to 99, BICO)

Note:

Signal of digital input:
0 = No download
1 = Start download parameter set 1 from AOP.

P0809[3] **Copy command data set (CDS)**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	0
				Max:	2

Level **2**

Calls 'Copy Command Data Set (CDS)' function.

The list of all Command Data Sets (CDS) are shown in the opening instructions of the Parameter List (PLI).

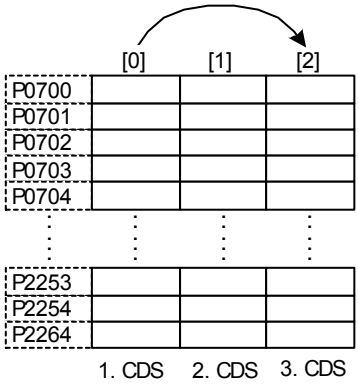
Index:

P0809[0] : Copy from CDS
P0809[1] : Copy to CDS
P0809[2] : Start copy

Example:

Copying of all values from CDS1 to CDS3 can be accomplished by the following procedure:

P0809[0] = 0 1. CDS
P0809[1] = 2 3. CDS
P0809[2] = 1 Start copy

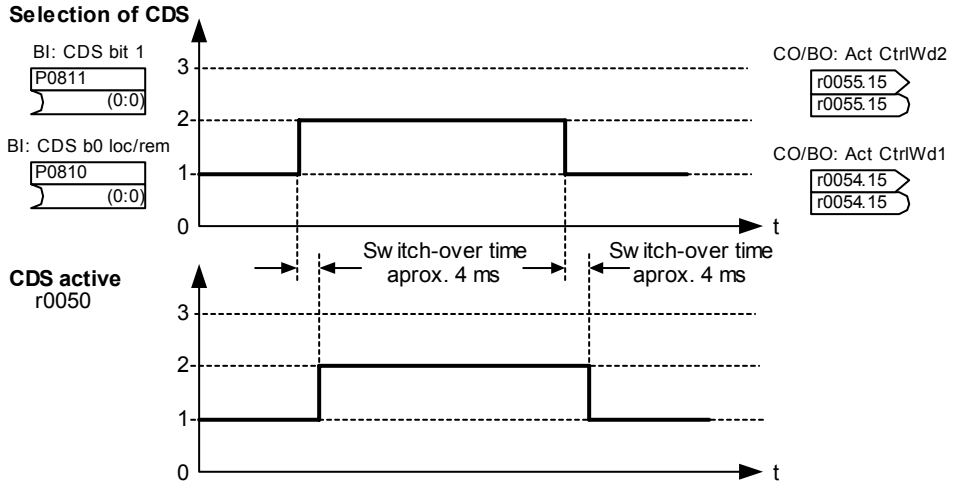


Note:

Start value in index 2 is automatically reset to '0' after execution of function.

P0810	**BI: CDS bit 0 (Local / Remote)**				**Min:**	0:0	Level
	CStat:	CUT	**Datatype:** U32	**Unit:** -	**Def:**	0:0	**2**
	P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Max:**	4095:0	

Selects command source from which to read Bit 0 for selecting a command data set (CDS).



The actual active command data set (CDS) is displayed in parameter r0050.

	selected CDS		active CDS
	r0055 Bit15	r0054 Bit15	r0050
1. CDS	0	0	0
2. CDS	0	1	1
3. CDS	1	0	2
3. CDS	1	1	2

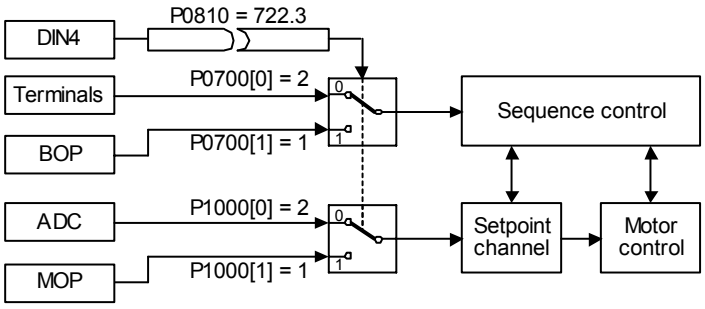
Common Settings:

722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
722.3 = Digital input 4 (requires P0704 to be set to 99, BICO)
722.4 = Digital input 5 (requires P0705 to be set to 99, BICO)
722.5 = Digital input 6 (requires P0706 to be set to 99, BICO)
722.6 = Digital input 7 (via analog input 1, requires P0707 to be set to 99)
722.7 = Digital input 8 (via analog input 2, requires P0708 to be set to 99)

Example:

Typical procedure for CDS switch-over:
- CDS1: Command source via terminal and setpoint source via analog input (ADC)
- CDS2: Command source via BOP and setpoint source via MOP
- CDS switch-over takes place via digital input 4 (DIN 4)

Steps:
1. Commissioning of inverter / drive
2. CDS1 set parameters (P0700[0] = 2 and P1000[0] = 2)
3. Connect P0810 (P0811 if necessary) with the source of CDS switch-over (P0704[0] = 99, P0810 = 722.3)
4. Copy CDS1 to CDS2 (P0809[0] = 0, P0809[1] = 1, P0809[2] = 2)
5. Change CDS2 parameter as required (set parameters for CDS2 [P0700=1 and P1000=1])



Note:
P0811 is also relevant for command data set (CDS) set selection.

P0811 **BI: CDS bit 1**

CStat:	CUT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	0:0
				Max:	4095:0

Level **2**

Selects command source from which to read Bit 1 for selecting a command data set (see P0810).

Common Settings:
722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
722.3 = Digital input 4 (requires P0704 to be set to 99, BICO)
722.4 = Digital input 5 (requires P0705 to be set to 99, BICO)
722.5 = Digital input 6 (requires P0706 to be set to 99, BICO)
722.6 = Digital input 7 (via analog input 1, requires P0707 to be set to 99)
722.7 = Digital input 8 (via analog input 2, requires P0708 to be set to 99)

Note:
P0810 is also relevant for command data set (CDS) selection.

P0819[3] **Copy drive data set (DDS)**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	0
				Max:	2

Level **2**

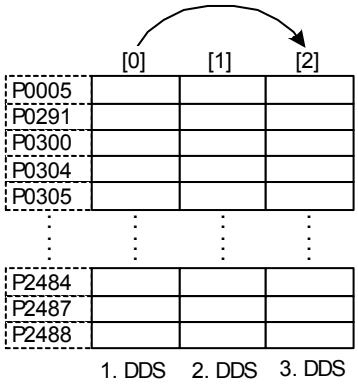
Calls 'Copy Drive Data Set (DDS)' function.

The list of all Drive Data Sets (DDS) are shown in the opening instructions of the Parameter List (PLI).

Index:
P0819[0] : Copy from DDS
P0819[1] : Copy to DDS
P0819[2] : Start copy

Example:
Copying of all values from DDS1 to DDS3 can be accomplished by the following procedure:

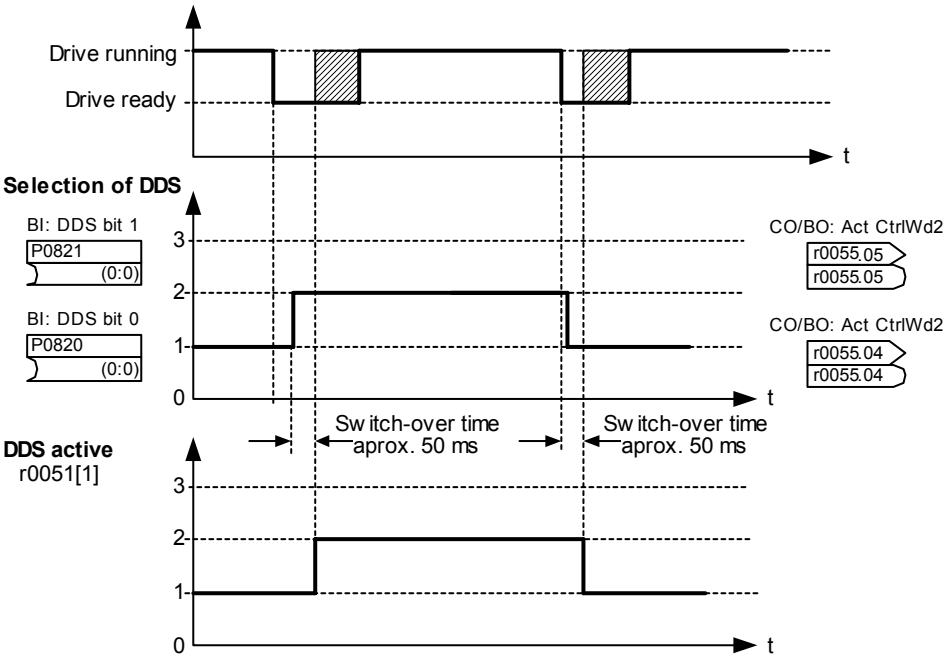
P0819[0] = 0 1. DDS
P0819[1] = 2 3. DDS
P0819[2] = 1 Start copy



Note:
Start value in index 2 is automatically reset to '0' after execution of function.

P0820	BI: DDS bit 0				Min:	0:0	Level
	CStat:	CT	Datatype: U32	Unit: -	Def:	0:0	3
	P-Group:	COMMANDS	Active: first confirm	QuickComm.: No	Max:	4095:0	

Selects command source from which to read Bit 0 for selecting a drive data set (DDS).



The actual active drive data set (DDS) is displayed in parameter r0051[1].

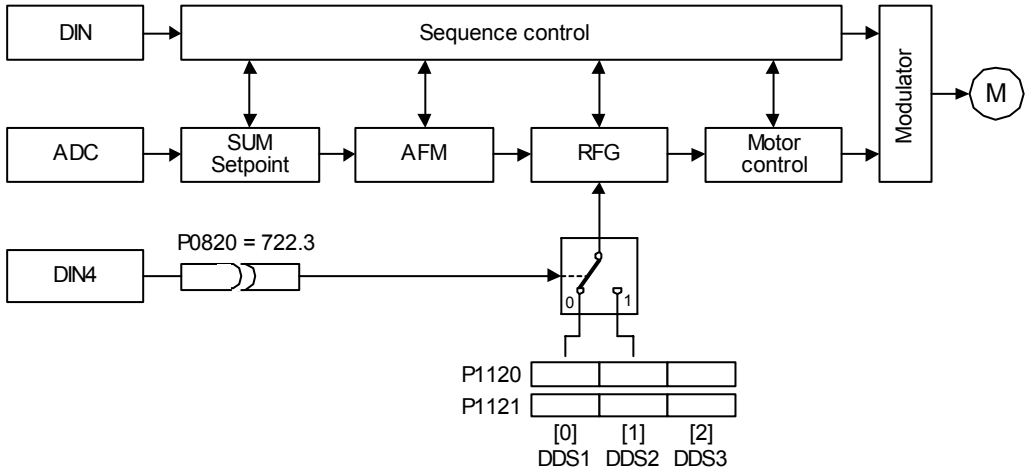
	selected DDS			active DDS
	r0055 Bit05	r0054 Bit04	r0051 [0]	r0051 [1]
1. DDS	0	0	0	0
2. DDS	0	1	1	1
3. DDS	1	0	2	2
3. DDS	1	1	2	2

Common Settings:

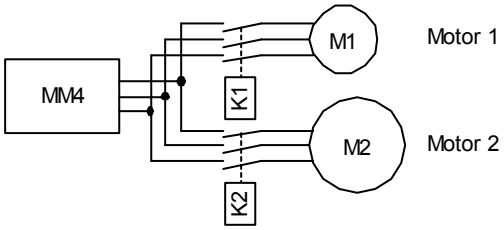
722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
722.3 = Digital input 4 (requires P0704 to be set to 99, BICO)
722.4 = Digital input 5 (requires P0705 to be set to 99, BICO)
722.5 = Digital input 6 (requires P0706 to be set to 99, BICO)
722.6 = Digital input 7 (via analog input 1, requires P0707 to be set to 99)
722.7 = Digital input 8 (via analog input 2, requires P0708 to be set to 99)

Example:

a) Commissioning procedure with one motor:
- Apply commissioning to DDS1
- Connect P0820 (P0821 if necessary) with DDS source (i.e. via DIN 4: P0704[0] = 99, P0820 = 722.3)
- Copy DDS1 to DDS2 (P0819[0] = 0, P0819[1] = 1, P0819[2] = 2)
- Adapt DDS2 parameters (e.g. Ramp-up time P1120[1] and Ramp-down time P1121[1])



b) Commissioning procedure with two motors (Motor 1, Motor 2):
- Commission Motor 1; Adapt all other DDS1 parameters (as required)
- Connect P0820 (P0821 if necessary) with DDS source (i.e. via DIN 4: P0704[0] = 99, P0820 = 722.3)
- Switch-over to DDS2 (check it via r0051)
- Commission Motor 2; Adapt all other DDS2 parameters (as required)



Note:
P0821 is also relevant for drive data set (DDS) selection.

P0821 BI: DDS bit 1

						Level
CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0	**3**
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	0:0	
				Max:	4095:0	

Selects command source from which Bit 1 for selecting a drive data set is to be read in (see parameter P0820).

Common Settings:
722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
722.3 = Digital input 4 (requires P0704 to be set to 99, BICO)
722.4 = Digital input 5 (requires P0705 to be set to 99, BICO)
722.5 = Digital input 6 (requires P0706 to be set to 99, BICO)
722.6 = Digital input 7 (via analog input 1, requires P0707 to be set to 99)
722.7 = Digital input 8 (via analog input 2, requires P0708 to be set to 99)

Note:
P0820 is also relevant for drive data set (DDS) selection.

P0840[3] **BI: ON/OFF1**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	722:0
				Max:	4000:0

Level **3**

Allows ON/OFF1 command source to be selected using BICO. The first three digits describe the parameter number of the command source; the last digit denotes the bit setting for that parameter.

Index:

P0840[0] : 1st. Command data set (CDS)
P0840[1] : 2nd. Command data set (CDS)
P0840[2] : 3rd. Command data set (CDS)

Common Settings:

722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
722.3 = Digital input 4 (requires P0704 to be set to 99, BICO)
722.4 = Digital input 5 (requires P0705 to be set to 99, BICO)
722.5 = Digital input 6 (requires P0706 to be set to 99, BICO)
722.6 = Digital input 7 (via analog input 1, requires P0707 to be set to 99)
722.7 = Digital input 8 (via analog input 2, requires P0708 to be set to 99)

19.0 = ON/OFF1 via BOP

Dependency:

Active only when P0719 = 0 (remote selection of command/setpoint source).

BICO requires P0700 set to 2 (enable BICO).

The default setting (ON right) is digital input 1 (722.0). Alternative source possible only when function of digital input 1 is changed (via P0701) before changing value of P0840.

P0842[3] **BI: ON reverse/OFF1**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	0:0
				Max:	4000:0

Level **3**

Allows ON/OFF1 reverse command source to be selected using BICO. The first three digits describe the parameter number of the command source and the last digit denotes the bit setting for that parameter.

Index:

P0842[0] : 1st. Command data set (CDS)
P0842[1] : 2nd. Command data set (CDS)
P0842[2] : 3rd. Command data set (CDS)

Common Settings:

722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
722.3 = Digital input 4 (requires P0704 to be set to 99, BICO)
722.4 = Digital input 5 (requires P0705 to be set to 99, BICO)
722.5 = Digital input 6 (requires P0706 to be set to 99, BICO)
722.6 = Digital input 7 (via analog input 1, requires P0707 to be set to 99)
722.7 = Digital input 8 (via analog input 2, requires P0708 to be set to 99)

19.0 = ON/OFF1 via BOP

Dependency:

Active only when P0719 = 0 (remote selection of command/setpoint source).

P0844[3] **BI: 1. OFF2**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	1:0
				Max:	4000:0

Level **3**

Defines first source of OFF2 when P0719 = 0 (BICO). The first three digits describe the parameter number of the command source and the last digit denotes the bit setting for that parameter.

Index:

P0844[0] : 1st. Command data set (CDS)
P0844[1] : 2nd. Command data set (CDS)
P0844[2] : 3rd. Command data set (CDS)

Common Settings:

722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
722.3 = Digital input 4 (requires P0704 to be set to 99, BICO)
722.4 = Digital input 5 (requires P0705 to be set to 99, BICO)
722.5 = Digital input 6 (requires P0706 to be set to 99, BICO)
722.6 = Digital input 7 (via analog input 1, requires P0707 to be set to 99)
722.7 = Digital input 8 (via analog input 2, requires P0708 to be set to 99)

19.0 = ON/OFF1 via BOP
19.1 = OFF2: Electrical stop via BOP

Dependency:

Active only when P0719 = 0 (remote selection of command/setpoint source).

If one of the digital inputs is selected for OFF2, the inverter will not run unless the digital input is active.

Note:

OFF2 means immediate pulse-disabling; the motor is coasting.

OFF2 is low-active, i.e. :
0 = Pulse disabling.
1 = Operating condition.

P0845[3] **BI: 2. OFF2**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	19:1
				Max:	4000:0

Level **3**

Defines second source of OFF2. The first three digits describe the parameter number of the command source and the last digit denotes the bit setting for that parameter.

Index:

P0845[0] : 1st. Command data set (CDS)
P0845[1] : 2nd. Command data set (CDS)
P0845[2] : 3rd. Command data set (CDS)

Common Settings:

722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
722.3 = Digital input 4 (requires P0704 to be set to 99, BICO)
722.4 = Digital input 5 (requires P0705 to be set to 99, BICO)
722.5 = Digital input 6 (requires P0706 to be set to 99, BICO)
722.6 = Digital input 7 (via analog input 1, requires P0707 to be set to 99)
722.7 = Digital input 8 (via analog input 2, requires P0708 to be set to 99)

19.0 = ON/OFF1 via BOP

Dependency:

In contrast to P0844 (first source of OFF2), this parameter is always active, independent of P0719 (selection of command and frequency setpoint).

If one of the digital inputs is selected for OFF2, the inverter will not run unless the digital input is active.

Note:

OFF2 means immediate pulse-disabling; the motor is coasting.

OFF2 is low-active, i.e. :
0 = Pulse disabling.
1 = Operating condition.

P0848[3] **BI: 1. OFF3**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	1:0
				Max:	4000:0

Level **3**

Defines first source of OFF3 when P0719 = 0 (BICO). The first three digits describe the parameter number of the command source and the last digit denotes the bit setting for that parameter.

Index:

P0848[0] : 1st. Command data set (CDS)
P0848[1] : 2nd. Command data set (CDS)
P0848[2] : 3rd. Command data set (CDS)

Common Settings:

722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
722.3 = Digital input 4 (requires P0704 to be set to 99, BICO)
722.4 = Digital input 5 (requires P0705 to be set to 99, BICO)
722.5 = Digital input 6 (requires P0706 to be set to 99, BICO)
722.6 = Digital input 7 (via analog input 1, requires P0707 to be set to 99)
722.7 = Digital input 8 (via analog input 2, requires P0708 to be set to 99)

19.0 = ON/OFF1 via BOP

Dependency:

Active only when P0719 = 0 (remote selection of command/setpoint source).

If one of the digital inputs is selected for OFF3, the inverter will not run unless the digital input is active.

Note:

OFF3 means fast ramp-down to 0.

OFF3 is low-active, i.e.
0 = Ramp-down.
1 = Operating condition.

P0849[3] **BI: 2. OFF3**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	1:0
				Max:	4000:0

Level **3**

Defines second source of OFF3. The first three digits describe the parameter number of the command source and the last digit denotes the bit setting for that parameter.

Index:

P0849[0] : 1st. Command data set (CDS)
P0849[1] : 2nd. Command data set (CDS)
P0849[2] : 3rd. Command data set (CDS)

Common Settings:

722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
722.3 = Digital input 4 (requires P0704 to be set to 99, BICO)
722.4 = Digital input 5 (requires P0705 to be set to 99, BICO)
722.5 = Digital input 6 (requires P0706 to be set to 99, BICO)
722.6 = Digital input 7 (via analog input 1, requires P0707 to be set to 99)
722.7 = Digital input 8 (via analog input 2, requires P0708 to be set to 99)

19.0 = ON/OFF1 via BOP

Dependency:

In contrast to P0848 (first source of OFF3), this parameter is always active, independent of P0719 (selection of command and frequency setpoint).

If one of the digital inputs is selected for OFF3, the inverter will not run unless the digital input is active.

Note:

OFF3 means fast ramp-down to 0.

OFF3 is low-active, i.e.
0 = Ramp-down.
1 = Operating condition.

P0852[3] **BI: Pulse enable** Level **3**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	1:0
				Max:	4000:0

Defines source of pulse enable/disable signal.

Index:

P0852[0] : 1st. Command data set (CDS)
P0852[1] : 2nd. Command data set (CDS)
P0852[2] : 3rd. Command data set (CDS)

Common Settings:

722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
722.3 = Digital input 4 (requires P0704 to be set to 99, BICO)
722.4 = Digital input 5 (requires P0705 to be set to 99, BICO)
722.5 = Digital input 6 (requires P0706 to be set to 99, BICO)
722.6 = Digital input 7 (via analog input 1, requires P0707 to be set to 99)
722.7 = Digital input 8 (via analog input 2, requires P0708 to be set to 99)

Dependency:

Active only when P0719 = 0 (remote selection of command/setpoint source).

P0918 **CB address** Level **2**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	COMM	**Active:** first confirm	**QuickComm.:** No	**Def:**	3
				Max:	65535

Defines address of CB (communication board) or address of the other option modules.

There are two ways to set the bus address:
- via DIP switches on the PROFIBUS module
- via a user-entered value

Note:

Possible PROFIBUS settings:
- 1 ... 125
- 0, 126, 127 are not allowed

The following applies when a PROFIBUS module is used:
- DIP switch = 0 Address defined in P0918 (CB address) is valid
- DIP switch not = 0 DIP switch setting has priority and P0918 indicates DIP switch setting.

P0927 **Parameter changeable via** Level **2**

CStat:	CUT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	COMM	**Active:** first confirm	**QuickComm.:** No	**Def:**	15
				Max:	15

Specifies the interfaces which can be used to change parameters.

This parameter allows the user to easily protect the inverter from unauthorized modification of parameters.
Annotation: Parameter P0927 is not password protected.

Bitfields:

Bit00	PROFIBUS / CB	0	NO	1	YES
Bit01	BOP	0	NO	1	YES
Bit02	USS on BOP link	0	NO	1	YES
Bit03	USS on COM link	0	NO	1	YES

Example:

Bits 0, 1, 2 and 3 set:
The default setting allows parameters to be changed via any interface. If all bits are set, the parameter is displayed on BOP as follows:

BOP: P0927 

Bits 0, 1, 2 and 3 reset:
This setting allows no parameters to be modified via any interface with the exception of P0003 and P0927. If all bits are reset, the parameter is displayed on BOP as follows:

BOP: P0927 

Details:

The seven-segment display is explained in the "Introduction to MICROMASTER System Parameters" in this handbook.

r0947[8] **Last fault code**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

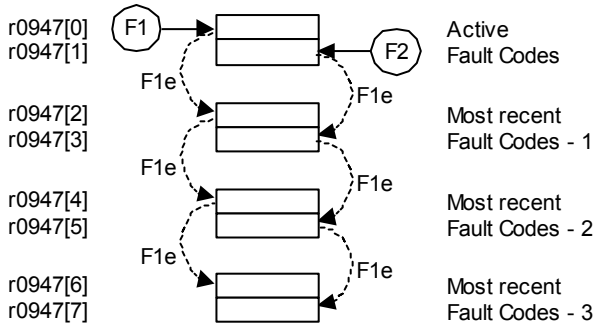
Level **2**

P-Group: ALARMS

Displays fault history according to the diagram below

where:
- "F1" is the first active fault (not yet acknowledged).
- "F2" is the second active fault (not yet acknowledged).
- "F1e" is the occurrence of the fault acknowledgement for F1 & F2.

This moves the value in the 2 indices down to the next pair of indices, where they are stored. Indices 0 & 1 contain the active faults. When faults are acknowledged, indices 0 & 1 are reset to 0.



Index:

r0947[0] : Recent fault trip --, fault 1
r0947[1] : Recent fault trip --, fault 2
r0947[2] : Recent fault trip -1, fault 3
r0947[3] : Recent fault trip -1, fault 4
r0947[4] : Recent fault trip -2, fault 5
r0947[5] : Recent fault trip -2, fault 6
r0947[6] : Recent fault trip -3, fault 7
r0947[7] : Recent fault trip -3, fault 8

Example:

If the inverter trips on undervoltage and then receives an external trip before the undervoltage is acknowledged, you will obtain:
- r0947[0] = 3 Undervoltage (F0003)
- r0947[1] = 85 External trip (F0085)

Whenever a fault in index 0 is acknowledged (F1e), the fault history shifts as indicated in the diagram above.

Dependency:

Index 1 used only if second fault occurs before first fault is acknowledged.

Details:

See "Faults and Warnings"

r0948[12] **Fault time**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

Level **3**

P-Group: ALARMS

Time stamp to indicate when the fault has occurred. P2114 (run-time counter) or P2115 (real time clock) are the possible sources of the time stamp.

Index:

r0948[0] : Recent fault trip --, fault time seconds+minutes
r0948[1] : Recent fault trip --, fault time hours+days
r0948[2] : Recent fault trip --, fault time month+year
r0948[3] : Recent fault trip -1, fault time seconds+minutes
r0948[4] : Recent fault trip -1, fault time hours+days
r0948[5] : Recent fault trip -1, fault time month+year
r0948[6] : Recent fault trip -2, fault time seconds+minutes
r0948[7] : Recent fault trip -2, fault time hours+days
r0948[8] : Recent fault trip -2, fault time month+year
r0948[9] : Recent fault trip -3, fault time seconds+minutes
r0948[10] : Recent fault trip -3, fault time hours+days
r0948[11] : Recent fault trip -3, fault time month+year

Example:

The time is taken from P2115 if this parameter has been updated with the real time. If not, P2114 is used.

Note:

P2115 can be updated via AOP, Starter, DriveMonitor, etc.

r0949[8] **Fault value**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

Level **3**

P-Group: ALARMS

Displays drive fault values. It is for service purposes and indicate the type of fault reported. The values are listed in the code where faults are reported.

Index:

r0949[0] : Recent fault trip --, fault value 1
r0949[1] : Recent fault trip --, fault value 2
r0949[2] : Recent fault trip -1, fault value 3
r0949[3] : Recent fault trip -1, fault value 4
r0949[4] : Recent fault trip -2, fault value 5
r0949[5] : Recent fault trip -2, fault value 6
r0949[6] : Recent fault trip -3, fault value 7
r0949[7] : Recent fault trip -3, fault value 8

P0952 **Total number of faults**

CStat: CT **Datatype:** U16 **Unit:** - **Min:** 0 **Def:** 0 **Max:** 8

Level **3**

P-Group: ALARMS **Active:** first confirm **QuickComm.:** No

Displays number of faults stored in P0947 (last fault code).

Dependency:

Setting 0 resets fault history. (changing to 0 also resets parameter r0948 - fault time).

r0964[5] **Firmware version data**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

Level **3**

P-Group: COMM

Firmware version data.

Index:

r0964[0] : Company (Siemens = 42)
r0964[1] : Product type
r0964[2] : Firmware version
r0964[3] : Firmware date (year)
r0964[4] : Firmware date (day/month)

Example:

No.	Value	Meaning
r0964[0]	42	SIEMENS
r0964[1]	1001	MICROMASTER 420
	1002	MICROMASTER 440
	1003	MICRO- / COMBIMASTER 411
	1004	MICROMASTER 410
	1005	reserved
	1006	MICROMASTER 440 PX
	1007	MICROMASTER 430
r0964[2]	105	Firmware V1.05
r0964[3]	2001	27.10.2001
r0964[4]	2710	

r0965 **Profibus profile**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

Level **3**

P-Group: COMM

Identification for PROFIDrive. Profile number and version.

r0967 **Control word 1** Level **3**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: COMM

Displays control word 1.

Bitfields:

Bit00	ON/OFF1	0	NO	1	YES
Bit01	OFF2: Electrical stop	0	YES	1	NO
Bit02	OFF3: Fast stop	0	YES	1	NO
Bit03	Pulse enable	0	NO	1	YES
Bit04	RFG enable	0	NO	1	YES
Bit05	RFG start	0	NO	1	YES
Bit06	Setpoint enable	0	NO	1	YES
Bit07	Fault acknowledge	0	NO	1	YES
Bit08	JOG right	0	NO	1	YES
Bit09	JOG left	0	NO	1	YES
Bit10	Control from PLC	0	NO	1	YES
Bit11	Reverse (setpoint inversion)	0	NO	1	YES
Bit13	Motor potentiometer MOP up	0	NO	1	YES
Bit14	Motor potentiometer MOP down	0	NO	1	YES
Bit15	CDS Bit 0 (Local/Remote)	0	NO	1	YES

r0968 **Status word 1** Level **3**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: COMM

Displays active status word of inverter (in binary) and can be used to diagnose which commands are active.

Bitfields:

Bit00	Drive ready	0	NO	1	YES
Bit01	Drive ready to run	0	NO	1	YES
Bit02	Drive running	0	NO	1	YES
Bit03	Drive fault active	0	NO	1	YES
Bit04	OFF2 active	0	YES	1	NO
Bit05	OFF3 active	0	YES	1	NO
Bit06	ON inhibit active	0	NO	1	YES
Bit07	Drive warning active	0	NO	1	YES
Bit08	Deviation setpoint / act. value	0	YES	1	NO
Bit09	PZD control	0	NO	1	YES
Bit10	Maximum frequency reached	0	NO	1	YES
Bit11	Warning: Motor current limit	0	YES	1	NO
Bit12	Motor holding brake active	0	NO	1	YES
Bit13	Motor overload	0	YES	1	NO
Bit14	Motor runs right	0	NO	1	YES
Bit15	Inverter overload	0	YES	1	NO

P0970 **Factory reset** Level **1**

CStat: C **Datatype:** U16 **Unit:** - **Min:** 0 **Def:** 0 **Max:** 1

P-Group: PAR_RESET **Active:** first confirm **QuickComm.:** No

P0970 = 1 resets all parameters to their default values.

Possible Settings:

0 Disabled
1 Parameter reset

Dependency:

First set P0010 = 30 (factory settings).

Stop drive (i.e. disable all pulses) before you can reset parameters to default values.

Note:

The following parameters retain their values after a factory reset:

- P0014 Store mode
- r0039 CO: Energy consumption meter [kWh]
- P0100 Europe / North America
- P0918 CB address
- P2010 USS baud rate
- P2011 USS address

P0971	Transfer data from RAM to EEPROM			Min:	0	Level
	CStat: CUT	Datatype: U16	Unit: -	Def:	0	3
	P-Group: COMM	Active: first confirm	QuickComm.: No	Max:	1	

Transfers values from RAM to EEPROM when set to 1.

Possible Settings:

0 Disabled
1 Start transfer

Note:

All values in RAM are transferred to EEPROM.

Parameter is automatically reset to 0 (default) after successful transfer.

The storage from RAM to EEPROM is accomplished via P0971. The communications are reset, if the transfer was successful. During the reset process communications will be interrupted. This creates the following conditions:

- PLC (e.g. SIMATIC S7) enters Stop mode
- Starter automatically recovers communications once they are re-established.
- BOP displays "busy"

After completion of the transfer process, the communication between the inverter and the PC-tools (e.g. Starter) or BOP is automatically re-established.

P1000[3]	**Selection of frequency setpoint**			**Min:** 0	Level
	CStat: CT	**Datatype:** U16	**Unit:** -	**Def:** 2	**1**
	P-Group: SETPOINT	**Active:** first confirm	**QuickComm.:** Yes	**Max:** 77	

Selects frequency setpoint source. In the table of possible settings below, the main setpoint is selected from the least significant digit (i.e., 0 to 7) and any additional setpoint from the most significant digit (i.e., x0 through to x7).

Possible Settings:

0	No main setpoint		
1	MOP setpoint		
2	Analog setpoint		
3	Fixed frequency		
4	USS on BOP link		
5	USS on COM link		
6	CB on COM link		
7	Analog setpoint 2		
10	No main setpoint	+	MOP setpoint
11	MOP setpoint	—	MOP setpoint
12	Analog setpoint	+	MOP setpoint
13	Fixed frequency	+	MOP setpoint
14	USS on BOP link	+	MOP setpoint
15	USS on COM link	+	MOP setpoint
16	CB on COM link	+	MOP setpoint
17	Analog setpoint 2	+	MOP setpoint
20	No main setpoint	+	Analog setpoint
21	MOP setpoint	—	Analog setpoint
22	Analog setpoint	+	Analog setpoint
23	Fixed frequency	+	Analog setpoint
24	USS on BOP link	+	Analog setpoint
25	USS on COM link	+	Analog setpoint
26	CB on COM link	+	Analog setpoint
27	Analog setpoint 2	+	Analog setpoint
30	No main setpoint	+	Fixed frequency
31	MOP setpoint	—	Fixed frequency
32	Analog setpoint	+	Fixed frequency
33	Fixed frequency	+	Fixed frequency
34	USS on BOP link	+	Fixed frequency
35	USS on COM link	+	Fixed frequency
36	CB on COM link	+	Fixed frequency
37	Analog setpoint 2	+	Fixed frequency
40	No main setpoint	+	USS on BOP link
41	MOP setpoint	—	USS on BOP link
42	Analog setpoint	+	USS on BOP link
43	Fixed frequency	+	USS on BOP link
44	USS on BOP link	+	USS on BOP link
45	USS on COM link	+	USS on BOP link
46	CB on COM link	+	USS on BOP link
47	Analog setpoint 2	+	USS on BOP link
50	No main setpoint	+	USS on COM link
51	MOP setpoint	—	USS on COM link
52	Analog setpoint	+	USS on COM link
53	Fixed frequency	+	USS on COM link
54	USS on BOP link	+	USS on COM link
55	USS on COM link	+	USS on COM link
57	Analog setpoint 2	+	USS on COM link
60	No main setpoint	+	CB on COM link
61	MOP setpoint	—	CB on COM link
62	Analog setpoint	+	CB on COM link
63	Fixed frequency	+	CB on COM link
64	USS on BOP link	+	CB on COM link
66	CB on COM link	+	CB on COM link
67	Analog setpoint 2	+	CB on COM link
70	No main setpoint	+	Analog setpoint 2
71	MOP setpoint	—	Analog setpoint 2
72	Analog setpoint	+	Analog setpoint 2
73	Fixed frequency	+	Analog setpoint 2
74	USS on BOP link	+	Analog setpoint 2
75	USS on COM link	+	Analog setpoint 2
76	CB on COM link	+	Analog setpoint 2
77	Analog setpoint 2	+	Analog setpoint 2

Index:

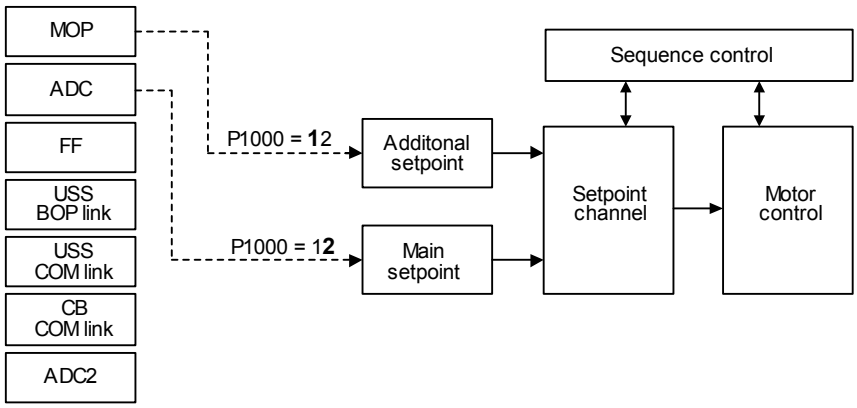
P1000[0] : 1st. Command data set (CDS)
P1000[1] : 2nd. Command data set (CDS)
P1000[2] : 3rd. Command data set (CDS)

Example:

Setting 12 selects main setpoint (2) derived from analog input with additional setpoint (1) taken from the motor potentiometer.

Example P1000 = 12 :

P1000 = **1**2 ⇒ P1070 = 755	P1070 Cl: Main setpoint
	r0755 CO: Act. ADC after scal. [4000h]
P1000 = 1**2** ⇒ P1075 = 1050	P1075 Cl: Additional setpoint
	r1050 CO: Act. Output freq. of the MOP



Caution:

Be aware, by changing of parameter P1000 all BICO parameters (see table below) are modified.

Note:

Single digits denote main setpoints that have no additional setpoint.

Changing this parameter sets (to default) all settings on item selected (see table).

P1000 = xy		y = 0	y = 1	y = 2	y = 3	y = 4	y = 5	y = 6	y = 7	
x = 0		0.0	1050.0	755.0	1024.0	2015.1	2018.1	2050.1	755.1	P1070
		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	P1071
		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	P1075
		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	P1076
x = 1		0.0	1050.0	755.0	1024.0	2015.1	2018.1	2050.1	755.1	P1070
		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	P1071
		1050.0	1050.0	1050.0	1050.0	1050.0	1050.0	1050.0	1050.0	P1075
		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	P1076
x = 2		0.0	1050.0	755.0	1024.0	2015.1	2018.1	2050.1	755.1	P1070
		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	P1071
		755.0	755.0	755.0	755.0	755.0	755.0	755.0	755.0	P1075
		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	P1076
x = 3		0.0	1050.0	755.01	1024.0	2015.1	2018.1	2050.1	755.1	P1070
		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	P1071
		1024.0	1024.0	1024.0	1024.0	1024.0	1024.0	1024.0	1024.0	P1075
		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	P1076
x = 4		0.0	1050.0	755.0	1024.0	2015.1	2018.1	2050.1	755.1	P1070
		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	P1071
		2015.1	2015.1	2015.1	2015.1	2015.1	2015.1	2015.1	2015.1	P1075
		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	P1076
x = 5		0.0	1050.0	755.0	1024.0	2015.1	2018.1		755.1	P1070
		1.0	1.0	1.0	1.0	1.0	1.0		1.0	P1071
		2018.1	2018.1	2018.1	2018.1	2018.1	2018.1		2018.1	P1075
		1.0	1.0	1.0	1.0	1.0	1.0		1.0	P1076
x = 6		0.0	1050.0	755.0	1024.0	2015.1		2050.1	755.1	P1070
		1.0	1.0	1.0	1.0	1.0		1.0	1.0	P1071
		2050.1	2050.1	2050.1	2050.1	2050.1		2050.1	2050.1	P1075
		1.0	1.0	1.0	1.0	1.0		1.0	1.0	P1076
x = 7		0.0	1050.0	755.0	1024.0	2015.1	2018.1	2050.1	755.1	P1070
		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	P1071
		755.1	755.1	755.1	755.1	755.1	755.1	755.1	755.1	P1075
		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	P1076

Example:
P1000 = 21 → P1070 = 1050.0
P1071 = 1.0
P1075 = 755.0

P1001[3] **Fixed frequency 1**

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	-650.00
P-Group:	SETPOINT	**Active:** Immediately	**QuickComm.:** No	**Def:**	0.00
				Max:	650.00

Level **2**

Defines fixed frequency setpoint 1.

There are three options available for selection of the fixed frequencies:
1. Direct selection
2. Direct selection + ON command
3. Binary coded selection + ON command

1. Direct selection (P0701 - P0706 = 15):
   - In this mode of operation 1 digital input selects 1 fixed frequency.
   - If several inputs are active together, the selected frequencies are summed.
   - E.g.: FF1 + FF2 + FF3 + FF4 + FF5 + FF6.

2. Direct selection + ON command (P0701 - P0706 = 16):
   - The fixed frequency selection combines the fixed frequencies with an ON command.
   - In this mode of operation 1 digital input selects 1 fixed frequency.
   - If several inputs are active together, the selected frequencies are summed.
   - E.g.: FF1 + FF2 + FF3 + FF4 + FF5 + FF6.

3. Binary coded selection + ON command (P0701 - P0706 = 17):
   - Up to 16 fixed frequencies can be selected using this method.
   - The fixed frequencies are selected according to the following table:

Index:

P1001[0] : 1st. Drive data set (DDS)
P1001[1] : 2nd. Drive data set (DDS)
P1001[2] : 3rd. Drive data set (DDS)

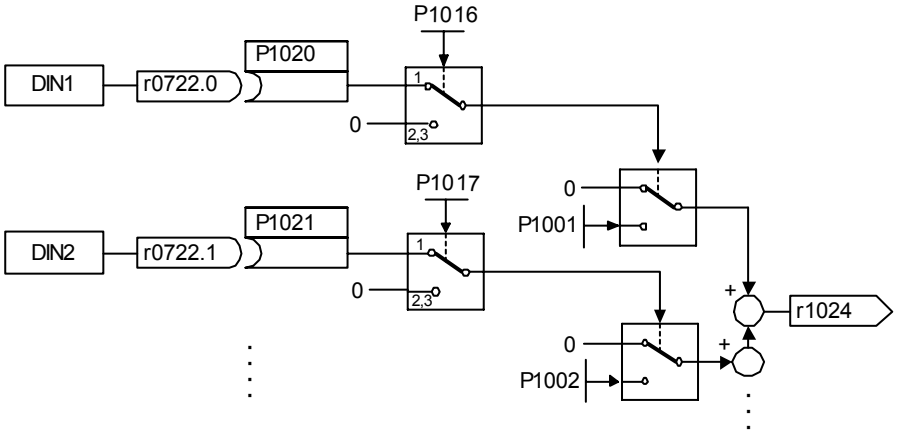
Example:

Binary coded selection :

		DIN4	DIN3	DIN2	DIN1
0 Hz	FF0	0	0	0	0
P1001	FF1	0	0	0	**1**
P1002	FF2	0	0	**1**	0
P1003	FF3	0	0	**1**	**1**
P1004	FF4	0	**1**	0	0
P1005	FF5	0	**1**	0	**1**
P1006	FF6	0	**1**	**1**	0
P1007	FF7	0	**1**	**1**	**1**
P1008	FF8	**1**	0	0	0
P1009	FF9	**1**	0	0	**1**
P1010	FF10	**1**	0	**1**	0
P1011	FF11	**1**	0	**1**	**1**
P1012	FF12	**1**	**1**	0	0
P1013	FF13	**1**	**1**	0	**1**
P1014	FF14	**1**	**1**	**1**	0
P1015	FF15	**1**	**1**	**1**	**1**

Direct selection of FF P1001 via DIN 1:

P0701 = 15 or P0701 = 99, P1020 = 722.0, P1016 = 1
P0702 = 15 or P0702 = 99, P1021 = 722.1, P1017 = 1



Dependency:
Select fixed frequency operation (using P1000).

Inverter requires ON command to start in the case of direct selection (P0701 - P0706 = 15).

Note:
Fixed frequencies can be selected using the digital inputs, and can also be combined with an ON command.

P1002[3] Fixed frequency 2

						Level
CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	-650.00	**2**
P-Group:	SETPOINT	**Active:** Immediately	**QuickComm.:** No	**Def:**	5.00	
				Max:	650.00	

Defines fixed frequency setpoint 2.

Index:
P1002[0] : 1st. Drive data set (DDS)
P1002[1] : 2nd. Drive data set (DDS)
P1002[2] : 3rd. Drive data set (DDS)

Details:
See parameter P1001 (fixed frequency 1).

P1003[3] Fixed frequency 3

						Level
CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	-650.00	**2**
P-Group:	SETPOINT	**Active:** Immediately	**QuickComm.:** No	**Def:**	10.00	
				Max:	650.00	

Defines fixed frequency setpoint 3.

Index:
P1003[0] : 1st. Drive data set (DDS)
P1003[1] : 2nd. Drive data set (DDS)
P1003[2] : 3rd. Drive data set (DDS)

Details:
See parameter P1001 (fixed frequency 1).

P1004[3] Fixed frequency 4

						Level
CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	-650.00	**2**
P-Group:	SETPOINT	**Active:** Immediately	**QuickComm.:** No	**Def:**	15.00	
				Max:	650.00	

Defines fixed frequency setpoint 4.

Index:
P1004[0] : 1st. Drive data set (DDS)
P1004[1] : 2nd. Drive data set (DDS)
P1004[2] : 3rd. Drive data set (DDS)

Details:
See parameter P1001 (fixed frequency 1).

P1005[3] Fixed frequency 5

						Level
CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	-650.00	**2**
P-Group:	SETPOINT	**Active:** Immediately	**QuickComm.:** No	**Def:**	20.00	
				Max:	650.00	

Defines fixed frequency setpoint 5.

Index:
P1005[0] : 1st. Drive data set (DDS)
P1005[1] : 2nd. Drive data set (DDS)
P1005[2] : 3rd. Drive data set (DDS)

Details:
See parameter P1001 (fixed frequency 1).

P1006[3] Fixed frequency 6

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	-650.00
P-Group:	SETPOINT	**Active:** Immediately	**QuickComm.:** No	**Def:**	25.00
				Max:	650.00

Level **2**

Defines fixed frequency setpoint 6.

Index:

P1006[0] : 1st. Drive data set (DDS)
P1006[1] : 2nd. Drive data set (DDS)
P1006[2] : 3rd. Drive data set (DDS)

Details:

See parameter P1001 (fixed frequency 1).

P1007[3] Fixed frequency 7

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	-650.00
P-Group:	SETPOINT	**Active:** Immediately	**QuickComm.:** No	**Def:**	30.00
				Max:	650.00

Level **2**

Defines fixed frequency setpoint 7.

Index:

P1007[0] : 1st. Drive data set (DDS)
P1007[1] : 2nd. Drive data set (DDS)
P1007[2] : 3rd. Drive data set (DDS)

Details:

See parameter P1001 (fixed frequency 1).

P1008[3] Fixed frequency 8

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	-650.00
P-Group:	SETPOINT	**Active:** Immediately	**QuickComm.:** No	**Def:**	35.00
				Max:	650.00

Level **2**

Defines fixed frequency setpoint 8.

Index:

P1008[0] : 1st. Drive data set (DDS)
P1008[1] : 2nd. Drive data set (DDS)
P1008[2] : 3rd. Drive data set (DDS)

Details:

See parameter P1001 (fixed frequency 1).

P1009[3] Fixed frequency 9

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	-650.00
P-Group:	SETPOINT	**Active:** Immediately	**QuickComm.:** No	**Def:**	40.00
				Max:	650.00

Level **2**

Defines fixed frequency setpoint 9.

Index:

P1009[0] : 1st. Drive data set (DDS)
P1009[1] : 2nd. Drive data set (DDS)
P1009[2] : 3rd. Drive data set (DDS)

Details:

See parameter P1001 (fixed frequency 1).

P1010[3] Fixed frequency 10

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	-650.00
P-Group:	SETPOINT	**Active:** Immediately	**QuickComm.:** No	**Def:**	45.00
				Max:	650.00

Level **2**

Defines fixed frequency setpoint 10.

Index:

P1010[0] : 1st. Drive data set (DDS)
P1010[1] : 2nd. Drive data set (DDS)
P1010[2] : 3rd. Drive data set (DDS)

Details:

See parameter P1001 (fixed frequency 1).

P1011[3] Fixed frequency 11

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	-650.00
P-Group:	SETPOINT	**Active:** Immediately	**QuickComm.:** No	**Def:**	50.00
				Max:	650.00

Level **2**

Defines fixed frequency setpoint 11.

Index:

P1011[0] : 1st. Drive data set (DDS)
P1011[1] : 2nd. Drive data set (DDS)
P1011[2] : 3rd. Drive data set (DDS)

Details:

See parameter P1001 (fixed frequency 1).

P1012[3] Fixed frequency 12

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	-650.00
P-Group:	SETPOINT	**Active:** Immediately	**QuickComm.:** No	**Def:**	55.00
				Max:	650.00

Level **2**

Defines fixed frequency setpoint 12.

Index:

P1012[0] : 1st. Drive data set (DDS)
P1012[1] : 2nd. Drive data set (DDS)
P1012[2] : 3rd. Drive data set (DDS)

Details:

See parameter P1001 (fixed frequency 1).

P1013[3] Fixed frequency 13

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	-650.00
P-Group:	SETPOINT	**Active:** Immediately	**QuickComm.:** No	**Def:**	60.00
				Max:	650.00

Level **2**

Defines fixed frequency setpoint 13.

Index:

P1013[0] : 1st. Drive data set (DDS)
P1013[1] : 2nd. Drive data set (DDS)
P1013[2] : 3rd. Drive data set (DDS)

Details:

See parameter P1001 (fixed frequency 1).

P1014[3] Fixed frequency 14

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	-650.00
P-Group:	SETPOINT	**Active:** Immediately	**QuickComm.:** No	**Def:**	65.00
				Max:	650.00

Level **2**

Defines fixed frequency setpoint 14.

Index:

P1014[0] : 1st. Drive data set (DDS)
P1014[1] : 2nd. Drive data set (DDS)
P1014[2] : 3rd. Drive data set (DDS)

Details:

See parameter P1001 (fixed frequency 1).

P1015[3] Fixed frequency 15

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	-650.00
P-Group:	SETPOINT	**Active:** Immediately	**QuickComm.:** No	**Def:**	65.00
				Max:	650.00

Level **2**

Defines fixed frequency setpoint 15.

Index:

P1015[0] : 1st. Drive data set (DDS)
P1015[1] : 2nd. Drive data set (DDS)
P1015[2] : 3rd. Drive data set (DDS)

Details:

See parameter P1001 (fixed frequency 1).

P1016 Fixed frequency mode - Bit 0

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	1
P-Group:	SETPOINT	**Active:** first confirm	**QuickComm.:** No	**Def:**	1
				Max:	3

Level **3**

Fixed frequencies can be selected in three different modes. Parameter P1016 defines the mode of selection Bit 0.

Possible Settings:

1 Direct selection
2 Direct selection + ON command
3 Binary coded selection + ON command

Details:

See table in P1001 (fixed frequency 1) for description of how to use fixed frequencies.

P1017 Fixed frequency mode - Bit 1

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	1
P-Group:	SETPOINT	**Active:** first confirm	**QuickComm.:** No	**Def:**	1
				Max:	3

Level **3**

Fixed frequencies can be selected in three different modes. Parameter P1017 defines the mode of selection Bit 1.

Possible Settings:

1 Direct selection
2 Direct selection + ON command
3 Binary coded selection + ON command

Details:

See table in P1001 (fixed frequency 1) for description of how to use fixed frequencies.

P1018 **Fixed frequency mode - Bit 2** Level **3**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	1
P-Group:	SETPOINT	**Active:** first confirm	**QuickComm.:** No	**Def:**	1
				Max:	3

Fixed frequencies can be selected in three different modes. Parameter P1018 defines the mode of selection Bit 2.

Possible Settings:

1 Direct selection
2 Direct selection + ON command
3 Binary coded selection + ON command

Details:

See table in P1001 (fixed frequency 1) for description of how to use fixed frequencies.

P1019 **Fixed frequency mode - Bit 3** Level **3**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	1
P-Group:	SETPOINT	**Active:** first confirm	**QuickComm.:** No	**Def:**	1
				Max:	3

Fixed frequencies can be selected in three different modes. Parameter P1019 defines the mode of selection Bit 3.

Possible Settings:

1 Direct selection
2 Direct selection + ON command
3 Binary coded selection + ON command

Details:

See table in P1001 (fixed frequency 1) for description of how to use fixed frequencies.

P1020[3] **BI: Fixed freq. selection Bit 0** Level **3**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	0:0
				Max:	4000:0

Defines origin of fixed frequency selection.

Index:

P1020[0] : 1st. Command data set (CDS)
P1020[1] : 2nd. Command data set (CDS)
P1020[2] : 3rd. Command data set (CDS)

Common Settings:

P1020 = 722.0 ==> Digital input 1
P1021 = 722.1 ==> Digital input 2
P1022 = 722.2 ==> Digital input 3
P1023 = 722.3 ==> Digital input 4
P1026 = 722.4 ==> Digital input 5
P1028 = 722.5 ==> Digital input 6

Dependency:

Accessible only if P0701 - P0706 = 99 (function of digital inputs = BICO)

P1021[3] **BI: Fixed freq. selection Bit 1** Level **3**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	0:0
				Max:	4000:0

Defines origin of fixed frequency selection.

Index:

P1021[0] : 1st. Command data set (CDS)
P1021[1] : 2nd. Command data set (CDS)
P1021[2] : 3rd. Command data set (CDS)

Dependency:

Accessible only if P0701 - P0706 = 99 (function of digital inputs = BICO)

Details:

See P1020 (fixed frequency selection Bit 0) for most common settings

P1022[3] **BI: Fixed freq. selection Bit 2** Level **3**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	0:0
				Max:	4000:0

Defines origin of fixed frequency selection.

Index:

P1022[0] : 1st. Command data set (CDS)
P1022[1] : 2nd. Command data set (CDS)
P1022[2] : 3rd. Command data set (CDS)

Dependency:

Accessible only if P0701 - P0706 = 99 (function of digital inputs = BICO)

Details:

See P1020 (fixed frequency selection Bit 0) for most common settings

P1023[3] **BI: Fixed freq. selection Bit 3** Level **3**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	722:3
				Max:	4000:0

Defines origin of fixed frequency selection.

Index:

P1023[0] : 1st. Command data set (CDS)
P1023[1] : 2nd. Command data set (CDS)
P1023[2] : 3rd. Command data set (CDS)

Dependency:

Accessible only if P0701 - P0706 = 99 (function of digital inputs = BICO)

Details:

See P1020 (fixed frequency selection Bit 0) for most common settings

r1024 **CO: Act. fixed frequency** Level **3**

		Datatype: Float	**Unit:** Hz	**Min:**	-
P-Group:	SETPOINT			**Def:**	-
				Max:	-

Displays sum total of selected fixed frequencies.

P1025 **Fixed frequency mode - Bit 4** Level **3**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	1
P-Group:	SETPOINT	**Active:** first confirm	**QuickComm.:** No	**Def:**	1
				Max:	2

Direct selection or direct selection + ON for bit 4

Possible Settings:

1 Direct selection
2 Direct selection + ON command

Details:

See parameter P1001 for description of how to use fixed frequencies.

P1026[3] **BI: Fixed freq. selection Bit 4** Level **3**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	722:4
				Max:	4000:0

Defines origin of fixed frequency selection.

Index:

P1026[0] : 1st. Command data set (CDS)
P1026[1] : 2nd. Command data set (CDS)
P1026[2] : 3rd. Command data set (CDS)

Dependency:

Accessible only if P0701 - P0706 = 99 (function of digital inputs = BICO).

Details:

See P1020 (fixed frequency selection Bit 0) for most common settings.

P1027 **Fixed frequency mode - Bit 5** Level **3**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	1
P-Group:	SETPOINT	**Active:** first confirm	**QuickComm.:** No	**Def:**	1
				Max:	2

direct selection or direct selection + ON for bit 5

Possible Settings:

1 Direct selection
2 Direct selection + ON command

Details:

See parameter P1001 for description of how to use fixed frequencies.

P1028[3] **BI: Fixed freq. selection Bit 5** Level **3**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	722:5
				Max:	4000:0

Defines origin of fixed frequency selection.

Index:

P1028[0] : 1st. Command data set (CDS)
P1028[1] : 2nd. Command data set (CDS)
P1028[2] : 3rd. Command data set (CDS)

Dependency:

Accessible only if P0701 - P0706 = 99 (function of digital inputs = BICO).

Details:

See P1020 (fixed frequency selection Bit 0) for most common settings.

P1031[3] Setpoint memory of the MOP Level **2**

CStat:	CUT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	SETPOINT	**Active:** Immediately	**QuickComm.:** No	**Def:**	0
				Max:	1

Saves last motor potentiometer setpoint (MOP) that was active before OFF command or power down.

Possible Settings:

0 MOP setpoint will not be stored
1 MOP setpoint will be stored (P1040 is updated)

Index:

P1031[0] : 1st. Drive data set (DDS)
P1031[1] : 2nd. Drive data set (DDS)
P1031[2] : 3rd. Drive data set (DDS)

Note:

On next ON command, motor potentiometer setpoint will be the saved value in parameter P1040 (setpoint of the MOP).

P1032 Inhibit negative MOP setpoints Level **2**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	SETPOINT	**Active:** first confirm	**QuickComm.:** No	**Def:**	1
				Max:	1

This parameter suppresses negative setpoints of the MOP output r1050.

Possible Settings:

0 Neg. MOP setpoint is allowed
1 Neg. MOP setpoint inhibited

Note:

The reversing functions (e.g. BOP-Reverse button if P0700 = 1) are not affected by the settings of P1032. Use P1110 to fully prevent change of direction in setpoint channel.

P1035[3] BI: Enable MOP (UP-command) Level **3**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	19:13
				Max:	4000:0

Defines source for motor potentiometer setpoint increase frequency.

Index:

P1035[0] : 1st. Command data set (CDS)
P1035[1] : 2nd. Command data set (CDS)
P1035[2] : 3rd. Command data set (CDS)

Common Settings:

722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
722.3 = Digital input 4 (requires P0704 to be set to 99, BICO)
722.4 = Digital input 5 (requires P0705 to be set to 99, BICO)
722.5 = Digital input 6 (requires P0706 to be set to 99, BICO)
722.6 = Digital input 7 (via analog input 1, requires P0707 to be set to 99)
722.7 = Digital input 8 (via analog input 2, requires P0708 to be set to 99)

19.D = MOP up via BOP

P1036[3] BI: Enable MOP (DOWN-command) Level **3**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	19:14
				Max:	4000:0

Defines source for motor potentiometer setpoint decrease frequency.

Index:

P1036[0] : 1st. Command data set (CDS)
P1036[1] : 2nd. Command data set (CDS)
P1036[2] : 3rd. Command data set (CDS)

Common Settings:

722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
722.3 = Digital input 4 (requires P0704 to be set to 99, BICO)
722.4 = Digital input 5 (requires P0705 to be set to 99, BICO)
722.5 = Digital input 6 (requires P0706 to be set to 99, BICO)
722.6 = Digital input 7 (via analog input 1, requires P0707 to be set to 99)
722.7 = Digital input 8 (via analog input 2, requires P0708 to be set to 99)

19.E = MOP down via BOP

P1040[3] **Setpoint of the MOP**

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	-650.00
P-Group:	SETPOINT	**Active:** Immediately	**QuickComm.:** No	**Def:**	5.00
				Max:	650.00

Level **2**

Determines setpoint for motor potentiometer control (P1000 = 1).

Index:

P1040[0] : 1st. Drive data set (DDS)
P1040[1] : 2nd. Drive data set (DDS)
P1040[2] : 3rd. Drive data set (DDS)

Note:

If motor potentiometer setpoint is selected either as main setpoint or additional setpoint, the reverse direction will be inhibited by default of P1032 (inhibit reverse direction of MOP).

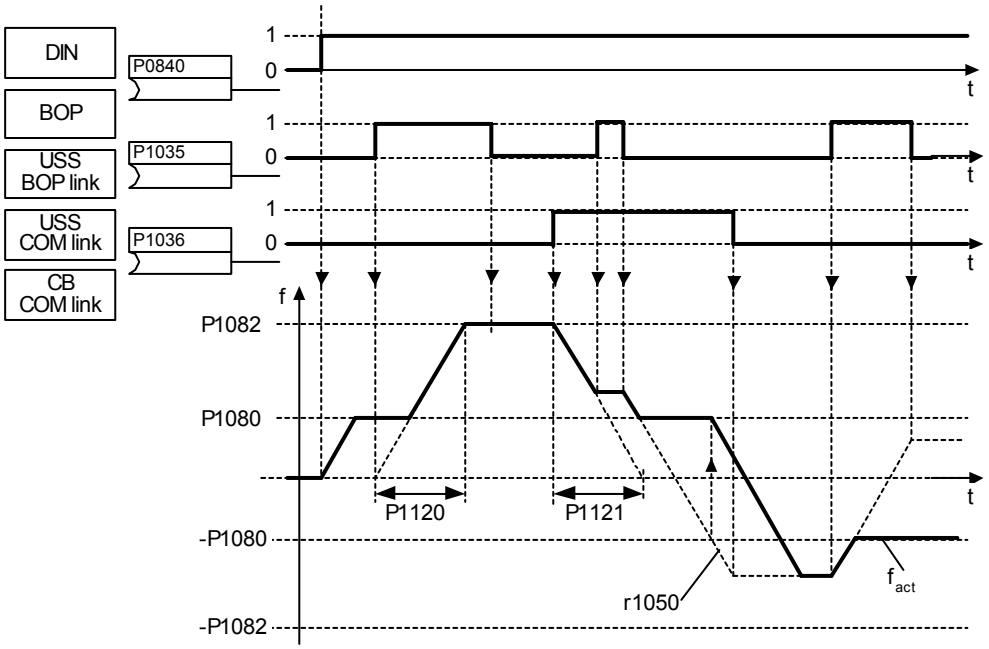
To re-enable reverse direction, set P1032 = 0.

r1050 **CO: Act. Output freq. of the MOP**

		Datatype: Float	**Unit:** Hz	**Min:**	-
P-Group:	SETPOINT			**Def:**	-
				Max:	-

Level **3**

Displays output frequency of motor potentiometer setpoint ([Hz]).



P1055[3] **BI: Enable JOG right**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	0:0
				Max:	4000:0

Level **3**

Defines source of JOG right when P0719 = 0 (remote selection of command/setpoint source).

Index:

P1055[0] : 1st. Command data set (CDS)
P1055[1] : 2nd. Command data set (CDS)
P1055[2] : 3rd. Command data set (CDS)

Common Settings:

722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
722.3 = Digital input 4 (requires P0704 to be set to 99, BICO)
722.4 = Digital input 5 (requires P0705 to be set to 99, BICO)
722.5 = Digital input 6 (requires P0706 to be set to 99, BICO)
722.6 = Digital input 7 (via analog input 1, requires P0707 to be set to 99)
722.7 = Digital input 8 (via analog input 2, requires P0708 to be set to 99)

19.8 = JOG right via BOP

P1056[3] **BI: Enable JOG left**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	0:0
				Max:	4000:0

Level **3**

Defines source of JOG left when P0719 = 0 (remote selection of command/setpoint source).

Index:

P1056[0] : 1st. Command data set (CDS)
P1056[1] : 2nd. Command data set (CDS)
P1056[2] : 3rd. Command data set (CDS)

Common Settings:

722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
722.3 = Digital input 4 (requires P0704 to be set to 99, BICO)
722.4 = Digital input 5 (requires P0705 to be set to 99, BICO)
722.5 = Digital input 6 (requires P0706 to be set to 99, BICO)
722.6 = Digital input 7 (via analog input 1, requires P0707 to be set to 99)
722.7 = Digital input 8 (via analog input 2, requires P0708 to be set to 99)

19.9 = JOG left via BOP

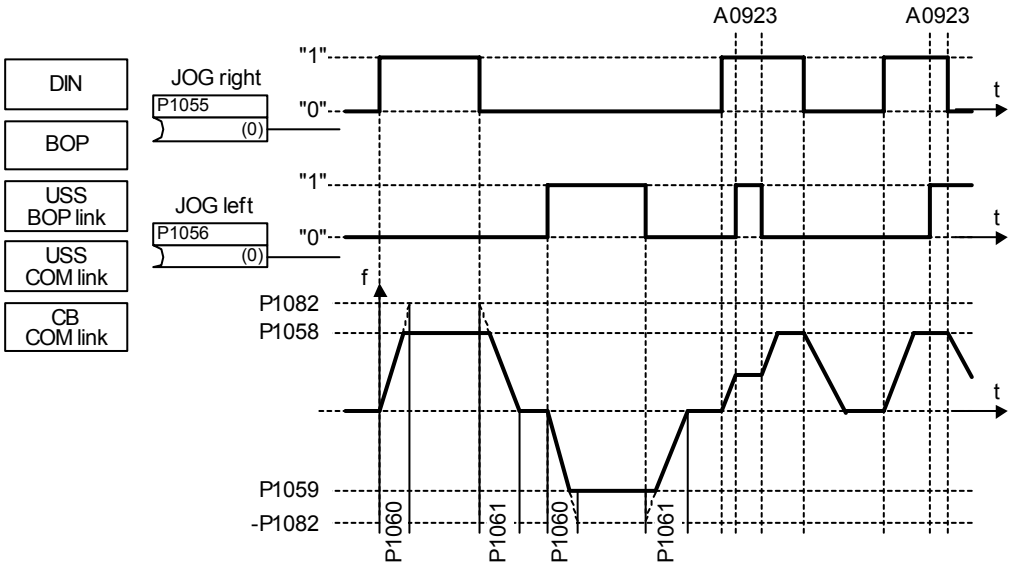
P1058[3] **JOG frequency right**

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	0.00
P-Group:	SETPOINT	**Active:** Immediately	**QuickComm.:** No	**Def:**	5.00
				Max:	650.00

Level **2**

Jogging increases the motor frequency by small amounts. The JOG buttons uses a non-latching switch on one of the digital inputs to control the motor frequency.

While JOG right is selected, this parameter determines the frequency at which the inverter will run.



Index:

P1058[0] : 1st. Drive data set (DDS)
P1058[1] : 2nd. Drive data set (DDS)
P1058[2] : 3rd. Drive data set (DDS)

Dependency:

P1060 and P1061 set up and down ramp times respectively for jogging.

P1059[3] **JOG frequency left**

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	0.00
P-Group:	SETPOINT	**Active:** Immediately	**QuickComm.:** No	**Def:**	5.00
				Max:	650.00

Level **2**

While JOG left is selected, this parameter determines the frequency at which the inverter will run.

Index:

P1059[0] : 1st. Drive data set (DDS)
P1059[1] : 2nd. Drive data set (DDS)
P1059[2] : 3rd. Drive data set (DDS)

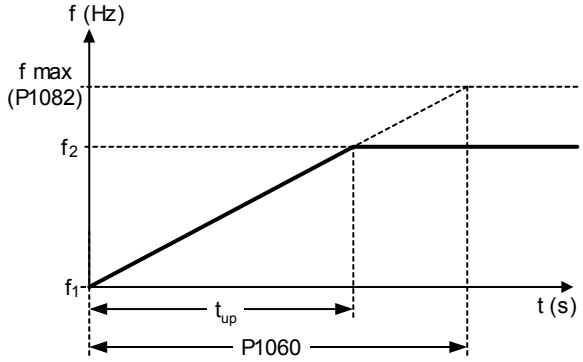
Dependency:

P1060 and P1061 set up and down ramp times respectively for jogging.

P1060[3] **JOG ramp-up time** Level **2**

CStat:	CUT	**Datatype:** Float	**Unit:** s	**Min:**	0.00
P-Group:	SETPOINT	**Active:** first confirm	**QuickComm.:** No	**Def:**	10.00
				Max:	650.00

Sets jog ramp-up time. This is the time used while jogging is active.



$$t_{up} = \frac{|f_2 - f_1|}{P1082} \cdot P1060$$

Index:

P1060[0] : 1st. Drive data set (DDS)
P1060[1] : 2nd. Drive data set (DDS)
P1060[2] : 3rd. Drive data set (DDS)

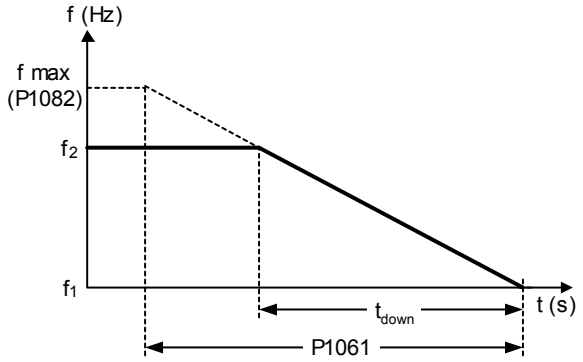
Notice:

Ramp times will be used as follows:
- P1060 / P1061 : JOG mode is active
- P1120 / P1121 : Normal mode (ON/OFF) is active
- P1060 / P1061 : Normal mode (ON/OFF) and P1124 is active

P1061[3] **JOG ramp-down time** Level **2**

CStat:	CUT	**Datatype:** Float	**Unit:** s	**Min:**	0.00
P-Group:	SETPOINT	**Active:** first confirm	**QuickComm.:** No	**Def:**	10.00
				Max:	650.00

Sets ramp-down time. This is the time used while jogging is active.



$$t_{down} = \frac{|f_2 - f_1|}{P1082} \cdot P1061$$

Index:

P1061[0] : 1st. Drive data set (DDS)
P1061[1] : 2nd. Drive data set (DDS)
P1061[2] : 3rd. Drive data set (DDS)

Notice:

Ramp times will be used as follows:
- P1060 / P1061 : JOG mode is active
- P1120 / P1121 : Normal mode (ON/OFF) is active
- P1060 / P1061 : Normal mode (ON/OFF) and P1124 is active

P1070[3] **CI: Main setpoint** Level **3**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	SETPOINT	**Active:** first confirm	**QuickComm.:** No	**Def:**	755:0
				Max:	4000:0

Defines source of main setpoint.

Index:

P1070[0] : 1st. Command data set (CDS)
P1070[1] : 2nd. Command data set (CDS)
P1070[2] : 3rd. Command data set (CDS)

Common Settings:

755 = Analog input 1 setpoint
1024 = Fixed frequency setpoint
1050 = Motor potentiometer (MOP) setpoint

P1071[3] **CI: Main setpoint scaling** Level **3**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	SETPOINT	**Active:** first confirm	**QuickComm.:** No	**Def:**	1:0
				Max:	4000:0

Defines source of the main setpoint scaling.

Index:

P1071[0] : 1st. Command data set (CDS)
P1071[1] : 2nd. Command data set (CDS)
P1071[2] : 3rd. Command data set (CDS)

Common Settings:

755 = Analog input 1 setpoint
1024 = Fixed frequency setpoint
1050 = Motor potentiometer (MOP) setpoint

P1074[3] **BI: Disable additional setpoint** Level **3**

CStat:	CUT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	0:0
				Max:	4000:0

Disables additional setpoint

Index:

P1074[0] : 1st. Command data set (CDS)
P1074[1] : 2nd. Command data set (CDS)
P1074[2] : 3rd. Command data set (CDS)

Common Settings:

722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
722.3 = Digital input 4 (requires P0704 to be set to 99, BICO)
722.4 = Digital input 5 (requires P0705 to be set to 99, BICO)
722.5 = Digital input 6 (requires P0706 to be set to 99, BICO)
722.6 = Digital input 7 (via analog input 1, requires P0707 to be set to 99)
722.7 = Digital input 8 (via analog input 2, requires P0708 to be set to 99))

P1075[3] **CI: Additional setpoint** Level **3**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	SETPOINT	**Active:** first confirm	**QuickComm.:** No	**Def:**	0:0
				Max:	4000:0

Defines source of the additional setpoint (to be added to main setpoint).

Index:

P1075[0] : 1st. Command data set (CDS)
P1075[1] : 2nd. Command data set (CDS)
P1075[2] : 3rd. Command data set (CDS)

Common Settings:

755 = Analog input 1 setpoint
1024 = Fixed frequency setpoint
1050 = Motor potentiometer (MOP) setpoint

P1076[3] **CI: Additional setpoint scaling** Level **3**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	SETPOINT	**Active:** first confirm	**QuickComm.:** No	**Def:**	1:0
				Max:	4000:0

Defines source of scaling for additional setpoint (to be added to main setpoint).

Index:

P1076[0] : 1st. Command data set (CDS)
P1076[1] : 2nd. Command data set (CDS)
P1076[2] : 3rd. Command data set (CDS)

Common Settings:

1 = Scaling of 1.0 (100%)
755 = Analog input 1 Setpoint
1024 = Fixed Frequency Setpoint
1050 = MOP Setpoint

r1078 **CO: Total frequency setpoint** Level **3**

		Datatype: Float	**Unit:** Hz	**Min:**	-
				Def:	-
P-Group:	SETPOINT			**Max:**	-

Displays sum of main and additional setpoints in [Hz].

r1079 **CO: Selected frequency setpoint**

Datatype: Float **Unit:** Hz **Min:** - **Def:** - **Max:** -

Level **3**

P-Group: SETPOINT

Displays selected frequency setpoint.

Following frequency setpoints are displayed:
- r1078 Total frequency setpoint
- P1058 JOG frequency right
- P1059 JOG frequency left

Dependency:

P1055 (BI: Enable JOG right) or P1056 (BI: Enable JOG left) define command source of JOG right or JOG left respectively.

Note:

P1055 = 0 and P1056 = 0 ==> Total frequency setpoint is selected.

P1080[3] **Min. frequency**

CStat: CUT **Datatype:** Float **Unit:** Hz **Min:** 0.00 **Def:** 0.00 **Max:** 650.00

Level **1**

P-Group: SETPOINT **Active:** Immediately **QuickComm.:** Yes

Sets minimum motor frequency [Hz] at which motor will run irrespective of frequency setpoint.

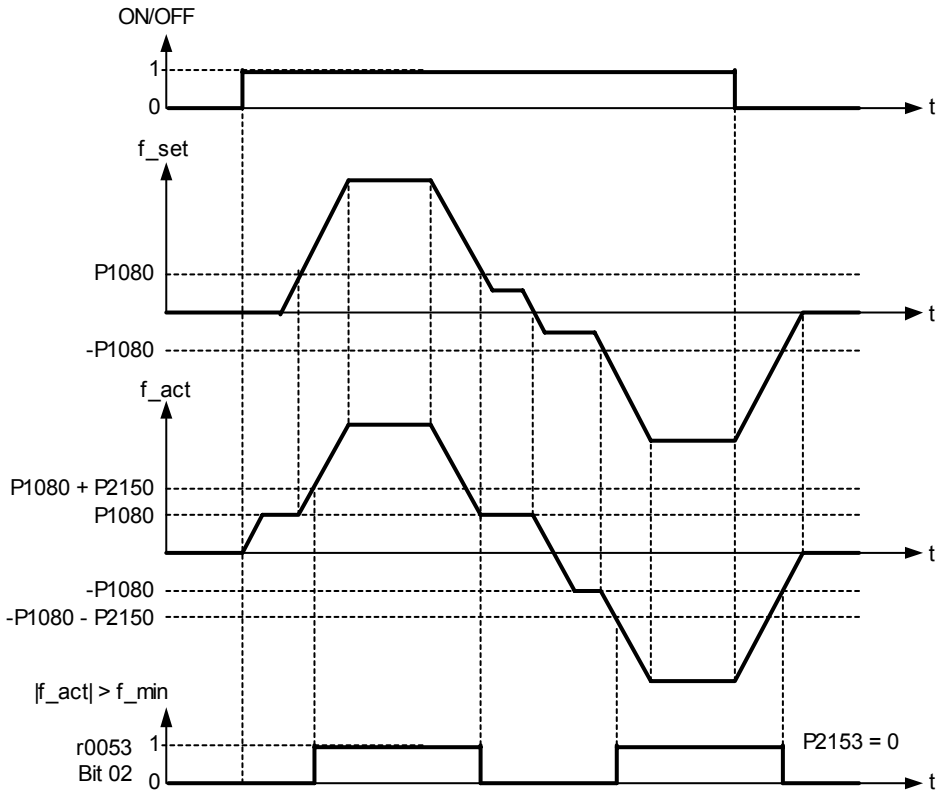
The minimum frequency P1080 represents a masking frequency of 0 Hz for all frequency target value sources (e.g. ADC, MOP, FF, USS), with the exception of the JOG target value source (analogous to P1091). Thus the frequency band +/- P1080 is run through in optimum time by means of the acceleration/deceleration ramps. Dwelling in the frequency band is not possible (see example).

Furthermore, an undershoot of the actual frequency f_act below min. frequency P1080 is output by the following signal function.

Index:

P1080[0] : 1st. Drive data set (DDS)
P1080[1] : 2nd. Drive data set (DDS)
P1080[2] : 3rd. Drive data set (DDS)

Example:



Note:

Value set here is valid both for clockwise and for anticlockwise rotation.

Under certain conditions (e.g. ramping, current limiting), motor can run below minimum frequency.

P1082[3] Max. frequency

CStat:	CT	**Datatype:** Float	**Unit:** Hz	**Min:**	0.00
P-Group:	SETPOINT	**Active:** first confirm	**QuickComm.:** Yes	**Def:**	50.00
				Max:	650.00

Level **1**

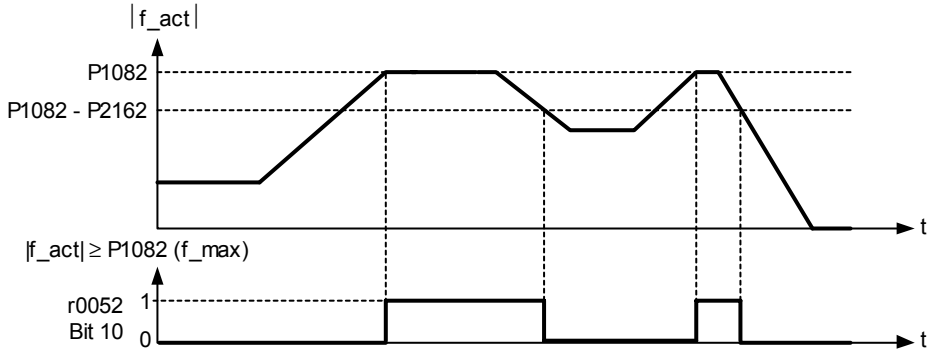
Sets maximum motor frequency [Hz] at which motor will run irrespective of the frequency setpoint. The value set here is valid for both clockwise and anticlockwise rotation.

Futhermore, the monitoring function |f_act| >= P1082 (r0052 Bit10, see example below) is affected by this parameter.

Index:

P1082[0] : 1st. Drive data set (DDS)
P1082[1] : 2nd. Drive data set (DDS)
P1082[2] : 3rd. Drive data set (DDS)

Example:



Dependency:

The maximal value of motor frequency P1082 is limited to pulse frequency P1800. P1082 is dependent on the derating characteristic as followed:

	P1800			
	2 kHz	4 kHz	6 kHz	8 - 16 kHz
f_{max} P1082	0 - 133.3 Hz	0 - 266.6 Hz	0 - 400 Hz	0 - 650 Hz

If Vector Control is selected (P1300 > 19), then the maximum frequency is internally limited by the following equation:

$$f_{max} = \min(P1082,\ 5 \cdot P0310,\ 200.00)$$

The resultant value is displayed in r1084 (resultant maximum frequency).

The maximum output frequency of inverter can be exceeded if one of the following is active:

- P1335 ≠ 0 (Slip compensation active) :

$$f_{max}(P1335) = f_{max} + f_{slip,max} = P1082 + \frac{P1336}{100} \cdot \frac{r0330}{100} \cdot P0310$$

- P1200 ≠ 0 (Flying restart active) :

$$f_{max}(P1200) = f_{max} + 2 \cdot f_{slip,nom} = P1082 + 2 \cdot \frac{r0330}{100} \cdot P0310$$

Note:

When using the setpoint source

- Analog Input
- USS
- CB (e.g. PROFIBUS)

The setpoint frequency (in Hz) is cyclically calculated using a percentage value (e.g. for the analog input r0754) or a hexadecimal value (e.g. for the USS r2018[1]) and the reference frequency P2000.

If for example P1082 = 80 Hz, P2000 = 50 Hz and the analog input is parameterised with P0757 = 0 V, P0758 = 0 %, P0759 = 10 V, P0760 = 100 %, a setpoint frequency of 50 Hz will be applied at 10 V of the analog input.

r1084 **Resultant max. frequency** Level **3**

Datatype: Float **Unit:** Hz **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

Displays resultant maximum frequency.

P1300 < 20

$P1800 \le 6\ kHz \rightarrow r1084 = \min(P1082, \frac{P1800}{15}, 650.00)$

$P1800 \ge 8\ kHz \rightarrow r1084 = \min(P1082, 650.00)$

P1300 ≥ 20

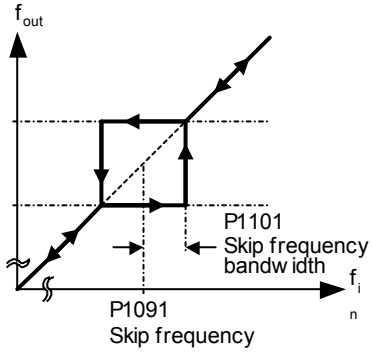
$r1084 = \min(P1082,\ 5 \cdot P0310,\ 200.00)$

P1091[3] **Skip frequency 1** Level **3**

CStat: CUT **Datatype:** Float **Unit:** Hz **Min:** 0.00 **Def:** 0.00 **Max:** 650.00

P-Group: SETPOINT **Active:** Immediately **QuickComm.:** No

Defines skip frequency 1 which avoids effects of mechanical resonance and suppresses frequencies within +/- P1101 (skip frequency bandwidth).



Index:

P1091[0] : 1st. Drive data set (DDS)
P1091[1] : 2nd. Drive data set (DDS)
P1091[2] : 3rd. Drive data set (DDS)

Notice:

Stationary operation is not possible within the suppressed frequency range; the range is merely passed through (on the ramp).

For example, if P1091 = 10 Hz and P1101 = 2 Hz, it is not possible to operate continuously between 10 Hz +/- 2 Hz (i.e. between 8 and 12 Hz).

P1092[3] **Skip frequency 2** Level **3**

CStat: CUT **Datatype:** Float **Unit:** Hz **Min:** 0.00 **Def:** 0.00 **Max:** 650.00

P-Group: SETPOINT **Active:** Immediately **QuickComm.:** No

Defines skip frequency 2 which avoids effects of mechanical resonance and suppresses frequencies within +/- P1101 (skip frequency bandwidth).

Index:

P1092[0] : 1st. Drive data set (DDS)
P1092[1] : 2nd. Drive data set (DDS)
P1092[2] : 3rd. Drive data set (DDS)

Details:

See P1091 (skip frequency 1).

P1093[3] **Skip frequency 3** Level **3**

CStat: CUT **Datatype:** Float **Unit:** Hz **Min:** 0.00 **Def:** 0.00 **Max:** 650.00

P-Group: SETPOINT **Active:** Immediately **QuickComm.:** No

Defines skip frequency 3 which avoids effects of mechanical resonance and suppresses frequencies within +/- P1101 (skip frequency bandwidth).

Index:

P1093[0] : 1st. Drive data set (DDS)
P1093[1] : 2nd. Drive data set (DDS)
P1093[2] : 3rd. Drive data set (DDS)

Details:

See P1091 (skip frequency 1).

P1094[3] Skip frequency 4

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	0.00
P-Group:	SETPOINT	**Active:** Immediately	**QuickComm.:** No	**Def:**	0.00
				Max:	650.00

Level **3**

Defines skip frequency 4 which avoids effects of mechanical resonance and suppresses frequencies within +/- P1101 (skip frequency bandwidth).

Index:

P1094[0] : 1st. Drive data set (DDS)
P1094[1] : 2nd. Drive data set (DDS)
P1094[2] : 3rd. Drive data set (DDS)

Details:

See P1091 (skip frequency 1).

P1101[3] Skip frequency bandwidth

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	0.00
P-Group:	SETPOINT	**Active:** Immediately	**QuickComm.:** No	**Def:**	2.00
				Max:	10.00

Level **3**

Delivers frequency bandwidth to be applied to skip frequencies (in [Hz]).

Index:

P1101[0] : 1st. Drive data set (DDS)
P1101[1] : 2nd. Drive data set (DDS)
P1101[2] : 3rd. Drive data set (DDS)

Details:

See P1091 (skip frequency 1).

P1110[3] BI: Inhibit neg. freq. setpoint

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	0:0
				Max:	4000:0

Level **3**

This parameter suppresses negative setpoints. Therefore, modification of the motor direction is inhibited to the setpoint channel.

Index:

P1110[0] : 1st. Command data set (CDS)
P1110[1] : 2nd. Command data set (CDS)
P1110[2] : 3rd. Command data set (CDS)

Common Settings:

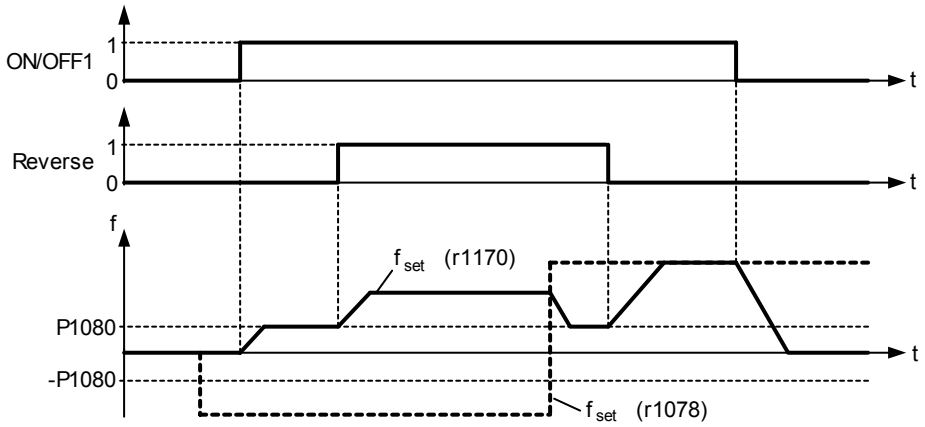
0 = Disabled
1 = Enabled

Notice:

Where

- If a min. frequency (P1080) and a negative setpoint are given, the motor is accelerated by a positive value in relationship to the min. frequency.
- This function does not disable the "reverse command functions" (e.g. Reverse, ON left); rather, a reverse command causes motor to run in the positive direction only, as described above.

P1110 = 1



P1113[3] **BI: Reverse**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	722:1
				Max:	4000:0

Level **3**

Defines source of reverse command used when P0719 = 0 (remote selection of command/setpoint source).

Index:

P1113[0] : 1st. Command data set (CDS)
P1113[1] : 2nd. Command data set (CDS)
P1113[2] : 3rd. Command data set (CDS)

Common Settings:

722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
722.3 = Digital input 4 (requires P0704 to be set to 99, BICO)
722.4 = Digital input 5 (requires P0705 to be set to 99, BICO)
722.5 = Digital input 6 (requires P0706 to be set to 99, BICO)

19.B = Reverse via BOP

r1114 **CO: Freq. setp. after dir. ctrl.**

		Datatype: Float	**Unit:** Hz	**Min:**	-
				Def:	-
P-Group:	SETPOINT			**Max:**	-

Level **3**

Displays setpoint frequency after change of direction.

r1119 **CO: Freq. setpoint before RFG**

		Datatype: Float	**Unit:** Hz	**Min:**	-
				Def:	-
P-Group:	SETPOINT			**Max:**	-

Level **3**

Displays output frequency after modification by other functions, e.g.:

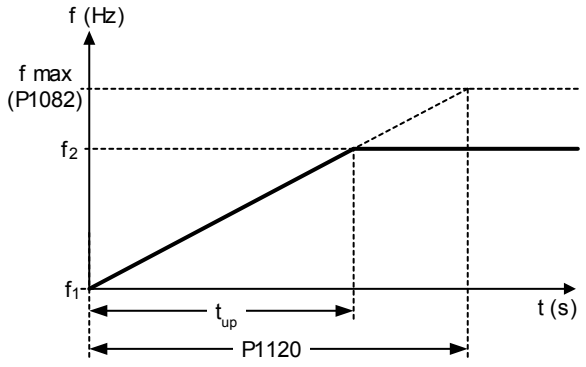
- P1110 BI: Inhibit neg. freq. setpoint,
- P1091 - P1094 skip frequencies,
- P1080 Min. frequency,
- P1082 Max. frequency,
- limitations,
- etc.

P1120[3] **Ramp-up time**

CStat:	CUT	**Datatype:** Float	**Unit:** s	**Min:**	0.00
P-Group:	SETPOINT	**Active:** first confirm	**QuickComm.:** Yes	**Def:**	10.00
				Max:	650.00

Level **1**

Time taken for motor to accelerate from standstill up to maximum motor frequency (P1082) when no rounding is used.



$$t_{up} = \frac{|f_2 - f_1|}{P1082} \cdot P1120$$

Setting the ramp-up time too short can cause the inverter to trip (overcurrent).

Index:

P1120[0] : 1st. Drive data set (DDS)
P1120[1] : 2nd. Drive data set (DDS)
P1120[2] : 3rd. Drive data set (DDS)

Note:

If an external frequency setpoint with set ramp rates is used (e.g. from a PLC). The best way to achieve optimum drive performance is to set ramp times in P1120 and P1121 slightly shorter than those of the PLC.

Notice:

Ramp times will be used as follows:

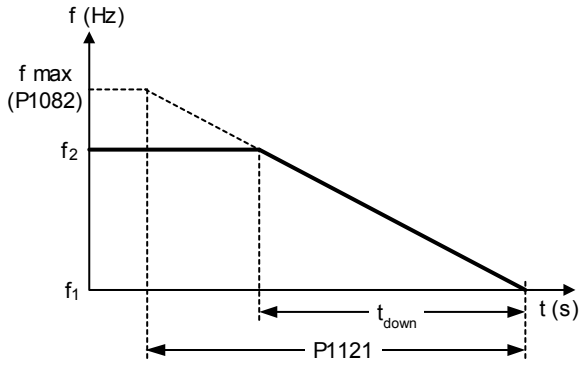
- P1060 / P1061 : JOG mode is active
- P1120 / P1121 : Normal mode (ON/OFF) is active
- P1060 / P1061 : Normal mode (ON/OFF) and P1124 is active

P1121[3] **Ramp-down time**

CStat:	CUT	**Datatype:** Float	**Unit:** s	**Min:**	0.00
P-Group:	SETPOINT	**Active:** first confirm	**QuickComm.:** Yes	**Def:**	10.00
				Max:	650.00

Level **1**

Time taken for motor to decelerate from maximum motor frequency (P1082) down to standstill when no rounding is used.



$$t_{down} = \frac{|f_2 - f_1|}{P1082} \cdot P1121$$

Index:

P1121[0] : 1st. Drive data set (DDS)
P1121[1] : 2nd. Drive data set (DDS)
P1121[2] : 3rd. Drive data set (DDS)

Notice:

Setting the ramp-down time too short can cause the inverter to trip (overcurrent (F0001) / overvoltage (F0002)).

Ramp times will be used as follows:
- P1060 / P1061 : JOG mode is active
- P1120 / P1121 : Normal mode (ON/OFF) is active
- P1060 / P1061 : Normal mode (ON/OFF) and P1124 is active

P1124[3] **BI: Enable JOG ramp times**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	0:0
				Max:	4000:0

Level **3**

Defines source for switching between jog ramp times (P1060, P1061) and normal ramp times (P1120, P1121) as applied to the RFG. This parameter is valid for normal mode (ON/OFF) only.

Index:

P1124[0] : 1st. Command data set (CDS)
P1124[1] : 2nd. Command data set (CDS)
P1124[2] : 3rd. Command data set (CDS)

Common Settings:

722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
722.3 = Digital input 4 (requires P0704 to be set to 99, BICO)
722.4 = Digital input 5 (requires P0705 to be set to 99, BICO)
722.5 = Digital input 6 (requires P0706 to be set to 99, BICO)

Notice:

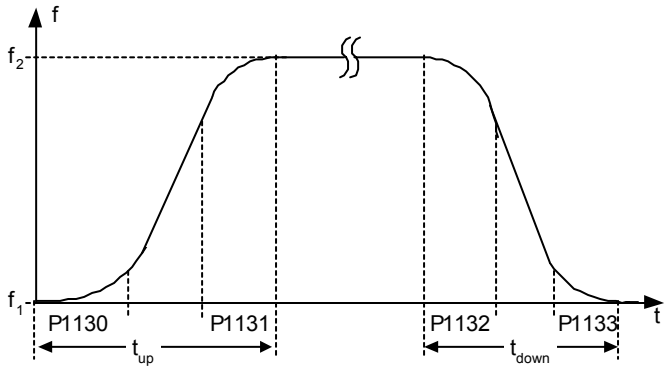
P1124 does not have any impact when JOG mode is selected. In this case, jog ramp times (P1060, P1061) will be used all the time.

Ramp times will be used as follows:
- P1060 / P1061 : JOG mode is active
- P1120 / P1121 : Normal mode (ON/OFF) is active
- P1060 / P1061 : Normal mode (ON/OFF) and P1124 is active

P1130[3] **Ramp-up initial rounding time** Level **2**

CStat:	CUT	**Datatype:** Float	**Unit:** s	**Min:**	0.00
P-Group:	SETPOINT	**Active:** first confirm	**QuickComm.:** No	**Def:**	0.00
				Max:	40.00

Defines initial rounding time in seconds as shown on the diagram below.



where:

for $\frac{f_2 - f_1}{P1082} \cdot P1120 \geq \frac{1}{2}(P1130 + P1131)$

$$t_{up} = \frac{1}{2}(P1130 + P1131) + \frac{f_2 - f_1}{P1082} \cdot P1120$$

for $\frac{f_2 - f_1}{P1082} \cdot P1121 \geq \frac{1}{2}(P1132 + P1133)$

$$t_{down} = \frac{1}{2}(P1132 + P1133) + \frac{f_2 - f_1}{P1082} \cdot P1121$$

Index:
P1130[0] : 1st. Drive data set (DDS)
P1130[1] : 2nd. Drive data set (DDS)
P1130[2] : 3rd. Drive data set (DDS)

Note:
Rounding times are recommended, since they prevent an abrupt response, thus avoiding detrimental effects on the mechanics.

Notice:
Rounding times are not recommended when analog inputs are used, since they would result in overshoot/undershoot in the inverter response.

P1131[3] **Ramp-up final rounding time** Level **2**

CStat:	CUT	**Datatype:** Float	**Unit:** s	**Min:**	0.00
P-Group:	SETPOINT	**Active:** first confirm	**QuickComm.:** No	**Def:**	0.00
				Max:	40.00

Defines rounding time at end of ramp-up as shown in P1130 (ramp-up initial rounding time).

Index:
P1131[0] : 1st. Drive data set (DDS)
P1131[1] : 2nd. Drive data set (DDS)
P1131[2] : 3rd. Drive data set (DDS)

Note:
Rounding times are recommended, since they prevent an abrupt response, thus avoiding detrimental effects on the mechanics.

Notice:
Rounding times are not recommended when analog inputs are used, since they would result in overshoot/undershoot in the inverter response.

P1132[3] **Ramp-down initial rounding time** Level **2**

CStat:	CUT	**Datatype:** Float	**Unit:** s	**Min:**	0.00
P-Group:	SETPOINT	**Active:** first confirm	**QuickComm.:** No	**Def:**	0.00
				Max:	40.00

Defines rounding time at start of ramp-down as shown in P1130 (ramp-up initial rounding time).

Index:
P1132[0] : 1st. Drive data set (DDS)
P1132[1] : 2nd. Drive data set (DDS)
P1132[2] : 3rd. Drive data set (DDS)

Note:
Rounding times are recommended, since they prevent an abrupt response, thus avoiding detrimental effects on the mechanics.

Notice:
Rounding times are not recommended when analog inputs are used, since they would result in overshoot/undershoot in the inverter response.

P1133[3] **Ramp-down final rounding time** Level **2**

CStat:	CUT	**Datatype:** Float	**Unit:** s	**Min:**	0.00
P-Group:	SETPOINT	**Active:** first confirm	**QuickComm.:** No	**Def:**	0.00
				Max:	40.00

Defines rounding time at end of ramp-down as shown in P1130 (ramp-up initial rounding time).

Index:

P1133[0] : 1st. Drive data set (DDS)
P1133[1] : 2nd. Drive data set (DDS)
P1133[2] : 3rd. Drive data set (DDS)

Note:

Rounding times are recommended, since they prevent an abrupt response, thus avoiding detrimental effects on the mechanics.

Notice:

Rounding times are not recommended when analog inputs are used, since they would result in overshoot/undershoot in the inverter response.

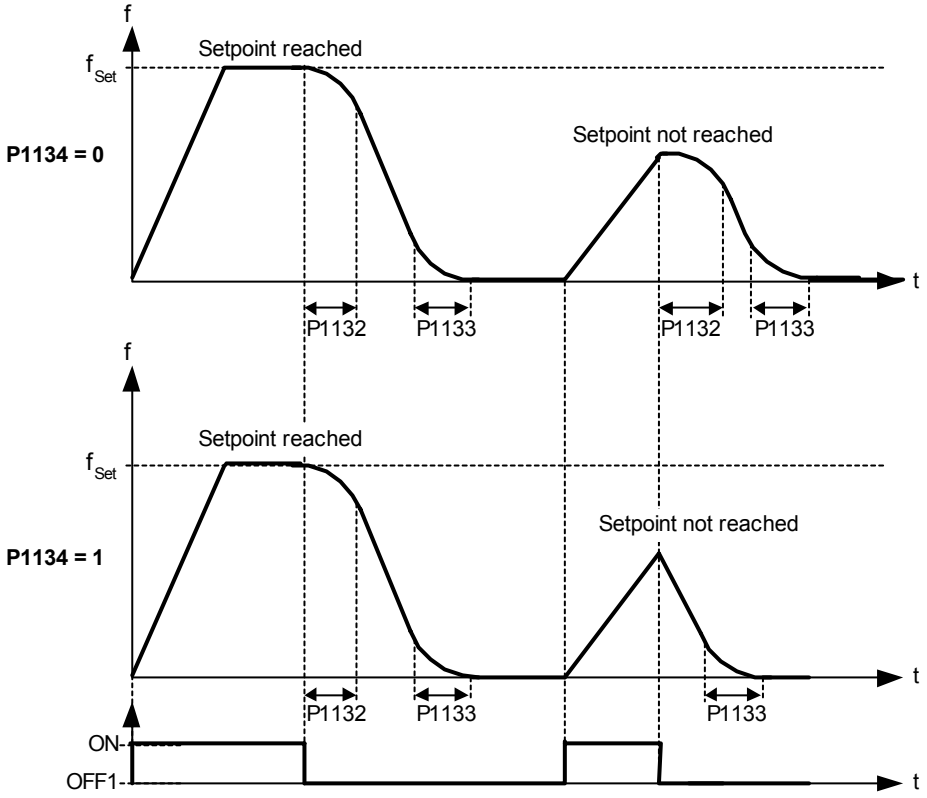
P1134[3] **Rounding type** Level **2**

CStat:	CUT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	SETPOINT	**Active:** Immediately	**QuickComm.:** No	**Def:**	0
				Max:	1

Defines the smoothing which is active by setpoint modifications during acceleration or deceleration (e.g. new setpoint, OFF1, OFF3, REV).

This smoothing is applied, if the motor is ramped-up or ramped-down and
- P1134 = 0,
- P1132 > 0, P1133 > 0 and
- the setpoint is not yet reached.

P1132 > 0, P1133 > 0



Possible Settings:

0 Continuous smoothing
1 Discontinuous smoothing

Index:

P1134[0] : 1st. Drive data set (DDS)
P1134[1] : 2nd. Drive data set (DDS)
P1134[2] : 3rd. Drive data set (DDS)

Dependency:

No effect until P1132 (Ramp-down initial rounding time) or P1133 (Ramp-down final rounding time) > 0 s.

P1135[3] **OFF3 ramp-down time** Level **2**

CStat:	CUT	**Datatype:** Float	**Unit:** s	**Min:**	0.00
P-Group:	SETPOINT	**Active:** first confirm	**QuickComm.:** Yes	**Def:**	5.00
				Max:	650.00

Defines ramp-down time from maximum frequency to standstill for OFF3 command.

Index:

P1135[0] : 1st. Drive data set (DDS)
P1135[1] : 2nd. Drive data set (DDS)
P1135[2] : 3rd. Drive data set (DDS)

Note:

This time may be exceeded if the VDC_max. level is reached.

P1140[3] **BI: RFG enable** Level **3**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	1:0
				Max:	4000:0

Defines command source of RFG enable command (RFG: ramp function generator). If binary input is equal to zero than the RFG output will be set immediately to 0.

Index:

P1140[0] : 1st. Command data set (CDS)
P1140[1] : 2nd. Command data set (CDS)
P1140[2] : 3rd. Command data set (CDS)

P1141[3] **BI: RFG start** Level **3**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	1:0
				Max:	4000:0

Defines command source of RFG start command (RFG: ramp function generator). If binary input is equal to zero than the RFG output is held at it present value.

Index:

P1141[0] : 1st. Command data set (CDS)
P1141[1] : 2nd. Command data set (CDS)
P1141[2] : 3rd. Command data set (CDS)

P1142[3] **BI: RFG enable setpoint** Level **3**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	1:0
				Max:	4000:0

Defines command source of RFG enable setpoint command (RFG: ramp function generator). If binary input is equal to zero than the RFG input will be set to zero and the RFG output will be ramp-down to zero.

Index:

P1142[0] : 1st. Command data set (CDS)
P1142[1] : 2nd. Command data set (CDS)
P1142[2] : 3rd. Command data set (CDS)

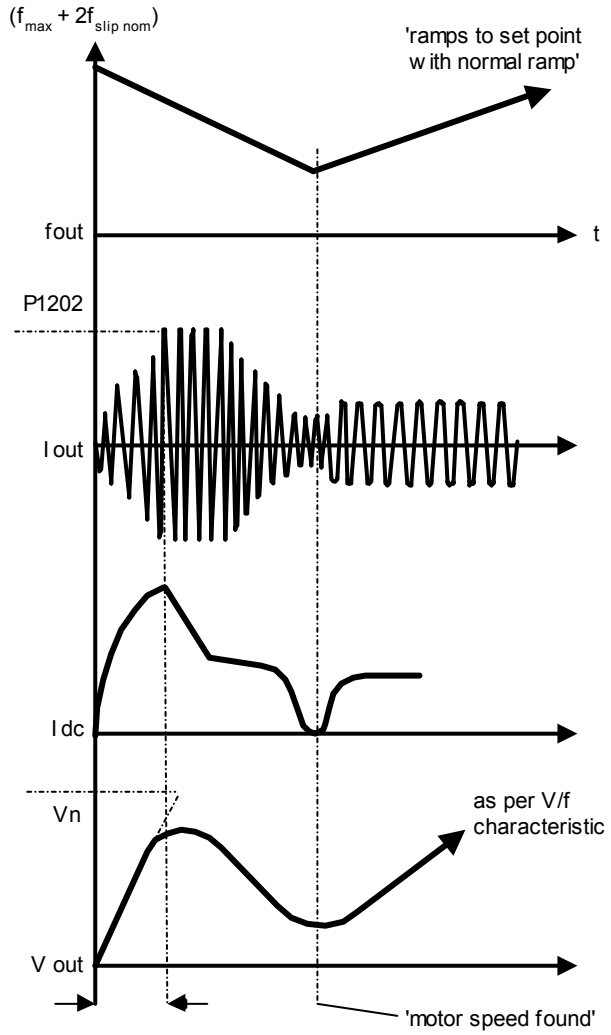
r1170 **CO: Frequency setpoint after RFG** Level **3**

		Datatype: Float	**Unit:** Hz	**Min:**	-
				Def:	-
P-Group:	SETPOINT			**Max:**	-

Displays overall frequency setpoint after ramp generator.

P1200	**Flying start**			**Min:** 0	Level
	CStat: CUT	**Datatype:** U16	**Unit:** -	**Def:** 0	**2**
	P-Group: FUNC	**Active:** first confirm	**QuickComm.:** No	**Max:** 6	

Starts inverter onto a spinning motor by rapidly changing the output frequency of the inverter until the actual motor speed has been found. Then, the motor runs up to setpoint using the normal ramp time.



Possible Settings:

0 Flying start disabled
1 Flying start is always active, start in direction of setpoint
2 Flying start is active if power on, fault, OFF2, start in direction of setpoint
3 Flying start is active if fault, OFF2, start in direction of setpoint
4 Flying start is always active, only in direction of setpoint
5 Flying start is active if power on, fault, OFF2, only in direction of setpoint
6 Flying start is active if fault, OFF2, only in direction of setpoint

Note:

Useful for motors with high inertia loads.

Settings 1 to 3 search in both directions.
Settings 4 to 6 search only in direction of setpoint.

Notice:

Flying start must be used in cases where the motor may still be turning (e.g. after a short mains break) or can be driven by the load. Otherwise, overcurrent trips will occur.

P1202[3]	**Motor-current: Flying start**				**Min:**	10	Level
	CStat:	CUT	**Datatype:** U16	**Unit:** %	**Def:**	100	**3**
	P-Group:	FUNC	**Active:** first confirm	**QuickComm.:** No	**Max:**	200	

Defines search current used for flying start.

Value is in [%] based on rated motor current (P0305).

Index:

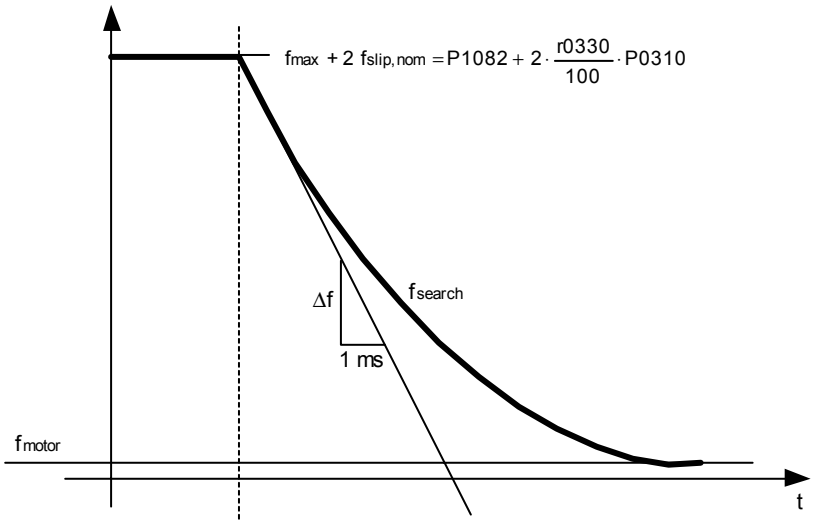
P1202[0] : 1st. Drive data set (DDS)
P1202[1] : 2nd. Drive data set (DDS)
P1202[2] : 3rd. Drive data set (DDS)

Note:

Reducing the search current may improve performance for flying start if the inertia of the system is not very high.

P1203[3]	**Search rate: Flying start**				**Min:**	10	Level
	CStat:	CUT	**Datatype:** U16	**Unit:** %	**Def:**	100	**3**
	P-Group:	FUNC	**Active:** first confirm	**QuickComm.:** No	**Max:**	200	

Sets factor by which the output frequency changes during flying start to synchronize with turning motor. This value is entered in [%] defines the reciprocal initial gradient in the search sequence (see curve below). Parameter P1203 influences the time taken to search for the motor frequency.



$$P1203\,[\%] = \frac{\Delta t\,[ms]}{\Delta f\,[Hz]} \cdot \frac{f_{slip,nom}\,[Hz]}{1[ms]} \cdot 2\,[\%] \quad \Rightarrow \quad \Delta f = \frac{2\,[\%]}{P1203\,[\%]} \cdot \frac{r0330}{100} \cdot P0310$$

The search time is the time taken to search through all frequencies between max. frequency P1082 + 2 x f_slip to 0 Hz.

P1203 = 100 % is defined as giving a rate of 2 % of f_slip,nom / [ms].
P1203 = 200 % would result in a rate of frequency change of 1 % of f_slip,nom / [ms].

Index:

P1203[0] : 1st. Drive data set (DDS)
P1203[1] : 2nd. Drive data set (DDS)
P1203[2] : 3rd. Drive data set (DDS)

Example:

For a motor with 50 Hz, 1350 rpm, 100 % would produce a maximum search time of 600 ms. If the motor is turning, the motor frequency is found in a shorter time.

Note:

A higher value produces a flatter gradient and thus a longer search time.
A lower value has the opposite effect.

r1204 **Status word: Flying start V/f** Level **4**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: FUNC

Bit parameter for checking and monitoring states during search, if V/f control mode is selected (see P1300).

Bitfields:

Bit00	Current applied	0	NO	1	YES
Bit01	Current could not be applied	0	NO	1	YES
Bit02	Voltage reduced	0	NO	1	YES
Bit03	Slope-filter started	0	NO	1	YES
Bit04	Current less threshold	0	NO	1	YES
Bit05	Current-minimum	0	NO	1	YES
Bit07	Speed could not be found	0	NO	1	YES

r1205 **Status word: Flying start SLVC** Level **3**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: FUNC

Bit parameter for checking status of flying start performed with n-adaption of observer. Parameter is only valid, if sensorless vector control (SLVC)) is selected (see P1300).

Bitfields:

Bit00	Transformation active	0	NO	1	YES
Bit01	Initialize n-adaption	0	NO	1	YES
Bit02	Current applying	0	NO	1	YES
Bit03	N-controller closed	0	NO	1	YES
Bit04	Isd-controller open	0	NO	1	YES
Bit05	RFG hold	0	NO	1	YES
Bit06	N-adaption set to zero	0	NO	1	YES
Bit07	Reserved	0	NO	1	YES
Bit08	Reserved	0	NO	1	YES
Bit09	Reserved	0	NO	1	YES
Bit10	Direction Positive	0	NO	1	YES
Bit11	Search is started	0	NO	1	YES
Bit12	Current is applied	0	NO	1	YES
Bit13	Search is aborted	0	NO	1	YES
Bit14	Deviation is zero	0	NO	1	YES
Bit15	N-controller is active	0	NO	1	YES

P1210 **Automatic restart** Level **2**

CStat: CUT **Datatype:** U16 **Unit:** - **Min:** 0 **Def:** 1 **Max:** 6

P-Group: FUNC **Active:** first confirm **QuickComm.:** No

Configures automatic restart function

Possible Settings:

0	Disabled	
1	Trip reset after power on,	P1211 disabled
2	Restart after mains blackout,	P1211 disabled
3	Restart after mains brownout or fault,	P1211 enabled
4	Restart after mains brownout,	P1211 enabled
5	Restart after mains blackout and fault,	P1211 disabled
6	Restart after mains brown- /blackout or fault,	P1211 disabled

Dependency:

Automatic restart requires constant ON command via a digital input wire link.

Caution:

P1210 > 2 can cause the motor to restart automatically without toggling the ON command !

Notice:

A "mains brownout" is where the power in interrupted and re-applied before the display on the BOP (if one is fitted to the inverter) has gone dark (a very short mains break where the DC link has not fully collapsed).

A "mains blackout" is where the display has gone dark (a long mains break where the DC link has fully collapsed) before the power is re-applied.

P1210 = 0:
Automatic restart is disabled.

P1210 = 1:
The inverter will acknowledge (reset) faults i.e. it will reset a fault when the is re-applied. This means the inverter must be fully powered down, a brownout is not sufficed. The inverter will not run until the ON command has been toggled.

P1210 = 2:
The inverter will acknowledge the fault F0003 at power on after blackout and restarts the drive. It is necessary that the ON command is wired via digital input (DIN).

P1210 = 3:
For these settings it is fundamental that the drive only restarts if it has been in a RUN state at the time of the faults (F0003, etc.). The inverter will acknowledge the fault and restarts the drive after a blackout or bronwout. It is necessary that the ON command is wired via digital input (DIN).

P1210 = 4:
For these settings it is fundamental that the drive only restarts if it has been in a RUN state at the time of the fault (F0003). The inverter will acknowledge the fault and restarts the drive after a blackout or bronwout. It is necessary that the ON command is wired via digital input (DIN).

P1210 = 5:
The inverter will acknowledge the faults F0003 etc. at power on after blackout and restarts the drive. It is necessary that the ON command is wired via digital input (DIN).

P1210 = 6:
The inverter will acknowledge the faults (F0003 etc.) at power on after blackout or brownout and restarts the drive. It is necessary that the ON command is wired via digital input (DIN). Setting 6 causes the motor to restart immediately.

Following table presents an overview of parameter P1210 and its functionality.

P1210	ON always active				ON in no-voltage condition
	Fault F0003 on		All other faults on		All faults + F0003
	Blackout	Brownout	Blackout	Brownout	
0	–	–	–	–	–
1	Fault acknowl.	–	–	–	Fault acknowl.
2	Fault acknowl. + restart	–	–	–	Fault acknowl. + restart
3	Fault acknowl. + restart	Fault acknowl. + restart	Fault acknowl. + restart	Fault acknowl. + restart	–
4	Fault acknowl. + restart	Fault acknowl. + restart	–	–	–
5	Fault acknowl. + restart	–	–	Fault acknowl. + restart	Fault acknowl. + restart
6	Fault acknowl. + restart	Fault acknowl. + restart	Fault acknowl. + restart	Fault acknowl. + restart	Fault acknowl. + restart

Flying start must be used in cases where the motor may still be turning (e.g. after a short mains break) or can be driven by the load (P1200).

P1211 Number of restart attempts

						Level
CStat:	CUT	**Datatype:** U16	**Unit:** -	**Min:**	0	**3**
P-Group:	FUNC	**Active:** first confirm	**QuickComm.:** No	**Def:**	3	
				Max:	10	

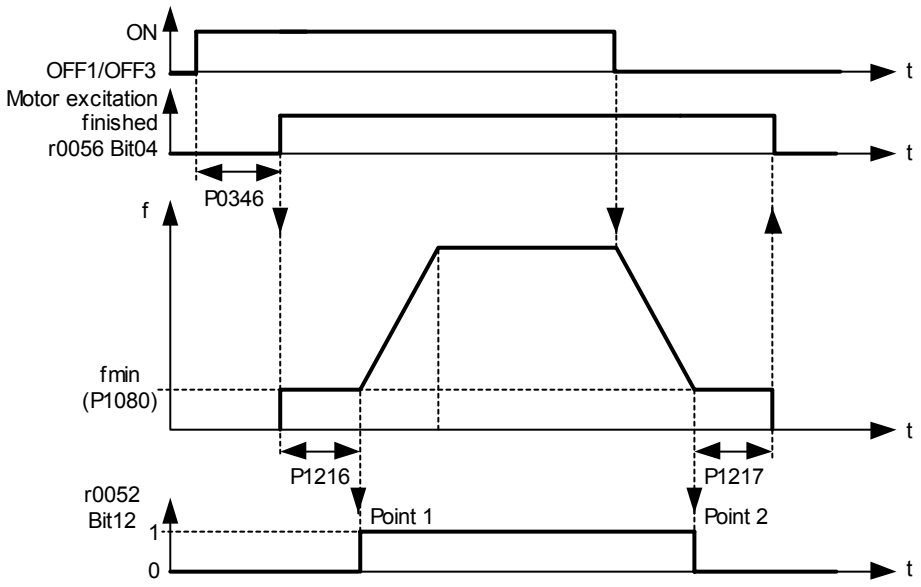
Specifies number of times inverter will attempt to restart if automatic restart P1210 is activated.

P1215	Holding brake enable			Min: 0	Level
	CStat: T	Datatype: U16	Unit: -	Def: 0	2
	P-Group: FUNC	Active: first confirm	QuickComm.: No	Max: 1	

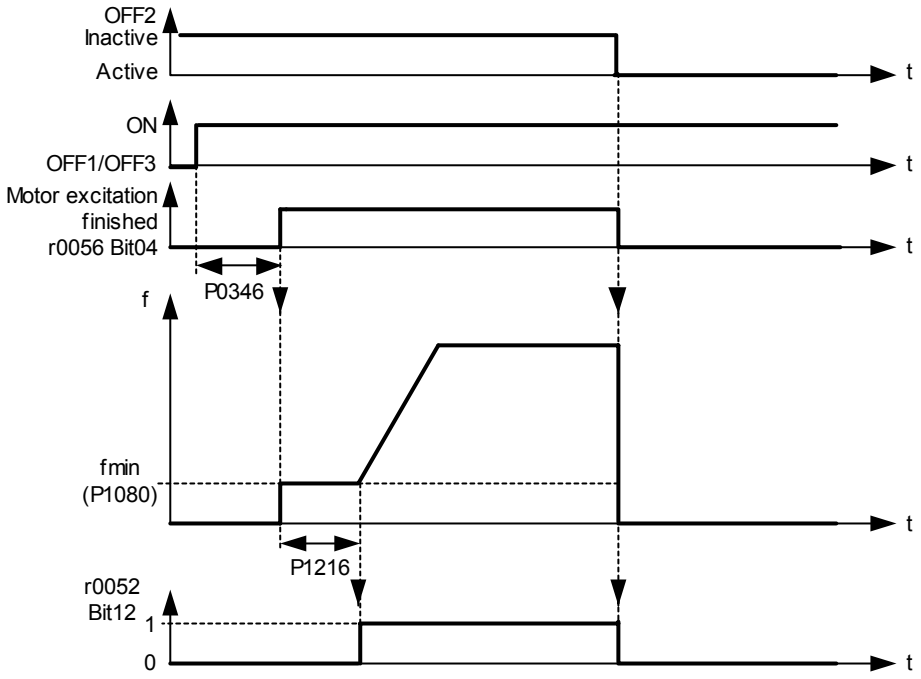
Enables/disables holding brake function.

This function applies the following profile to the inverter:

ON / OFF1/OFF3:



ON / OFF2:



Possible Settings:

0 Motor holding brake disabled
1 Motor holding brake enabled

Caution:

It is not permissible to use the motor holding brake as working brake, as it is generally only designed for a limited number of emergeny braking operations.

Note:

The brake relay opens at point 1, if enabled using P0731 (function of digital output), and closes at point 2.

A typical value of min. frequency P1080 for motor holding brake is the slip frequency of the motor r0330.

P1216 **Holding brake release delay** Level **2**

CStat:	T	**Datatype:** Float	**Unit:** s	**Min:**	0.0
P-Group:	FUNC	**Active:** first confirm	**QuickComm.:** No	**Def:**	1.0
				Max:	20.0

Defines period during which inverter runs at min. frequency P1080 before ramping up at point 1 (as shown in P1215 - holding brake enable). Inverter starts at min. frequency P1080 on this profile, i.e. it does not use a ramp.

Note:

A typical value of min. frequency P1080 for this type of application is the slip frequency of the motor.

You can calculate the rated slip frequency by using the following formula:

$$f_{Slip}[Hz] = \frac{r0330}{100} \cdot P0310 = \frac{n_{syn} - n_n}{n_{syn}} \cdot f_n$$

Notice:

If used to hold the motor at a certain frequency against a mechanical brake (i.e. you are using a relay to control mechanical brake), it is important that min. frequency P1080 < 5 Hz; otherwise, the current drawn may be too high and the relay may not open.

Details:

See diagram P1215 (holding brake enable).

P1217 **Holding time after ramp down** Level **2**

CStat:	T	**Datatype:** Float	**Unit:** s	**Min:**	0.0
P-Group:	FUNC	**Active:** first confirm	**QuickComm.:** No	**Def:**	1.0
				Max:	20.0

Defines time for which inverter runs at minimum frequency (P1080) after ramping down at point 2.

Details:

See diagram P1215 (holding brake enable).

P1230[3] **BI: Enable DC braking**

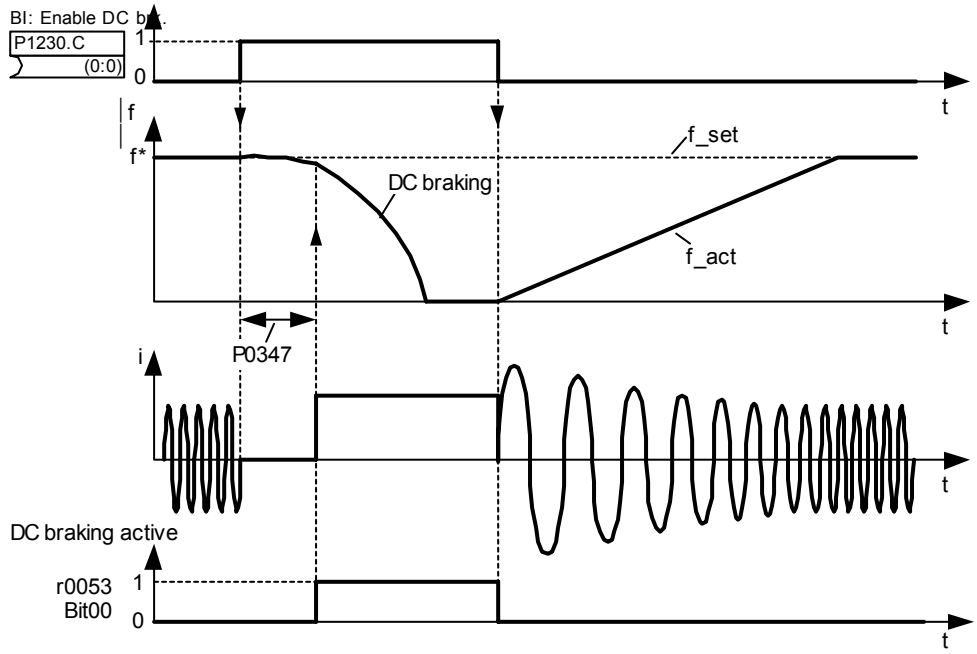
CStat:	CUT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	0:0
				Max:	4000:0

Level **3**

Enables DC braking via a signal applied from an external source. Function remains active while external input signal is active.

DC braking causes the motor to stop rapidly by applying a DC braking current (current applied also holds shaft stationary).

When the DC braking signal is applied, the inverter output pulses are blocked and the DC current is not applied until the motor has been sufficiently demagnetized.



Note: DC brake can be applied in drive states r0002 = 1, 4, 5

The level of DC braking is set in P1232 (DC braking current - relative to the rated motor current) which is set to 100 % by default.

Index:

P1230[0] : 1st. Command data set (CDS)
P1230[1] : 2nd. Command data set (CDS)
P1230[2] : 3rd. Command data set (CDS)

Common Settings:

722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
722.3 = Digital input 4 (requires P0704 to be set to 99, BICO)
722.4 = Digital input 5 (requires P0705 to be set to 99, BICO)
722.5 = Digital input 6 (requires P0706 to be set to 99, BICO)
722.6 = Digital input 7 (via analog input 1, requires P0707 to be set to 99)
722.7 = Digital input 8 (via analog input 2, requires P0708 to be set to 99)

Caution:

With the DC braking, the kinetic energy of the motor is converted into heat in the motor. The drive could overheat if the remains in this status for an exessive period of time !

DC braking is not possible when using a synchronous motor (i.e. P0300 = 2).

Notice:

This delay time is set in P0347 (demagnetization time). If this delay is too short, overcurrent trips can occur.

P1232[3] **DC braking current**

CStat:	CUT	**Datatype:** U16	**Unit:** %	**Min:**	0
P-Group:	FUNC	**Active:** Immediately	**QuickComm.:** No	**Def:**	100
				Max:	250

Level **2**

Defines level of DC current in [%] relative to rated motor current (P0305).

Index:

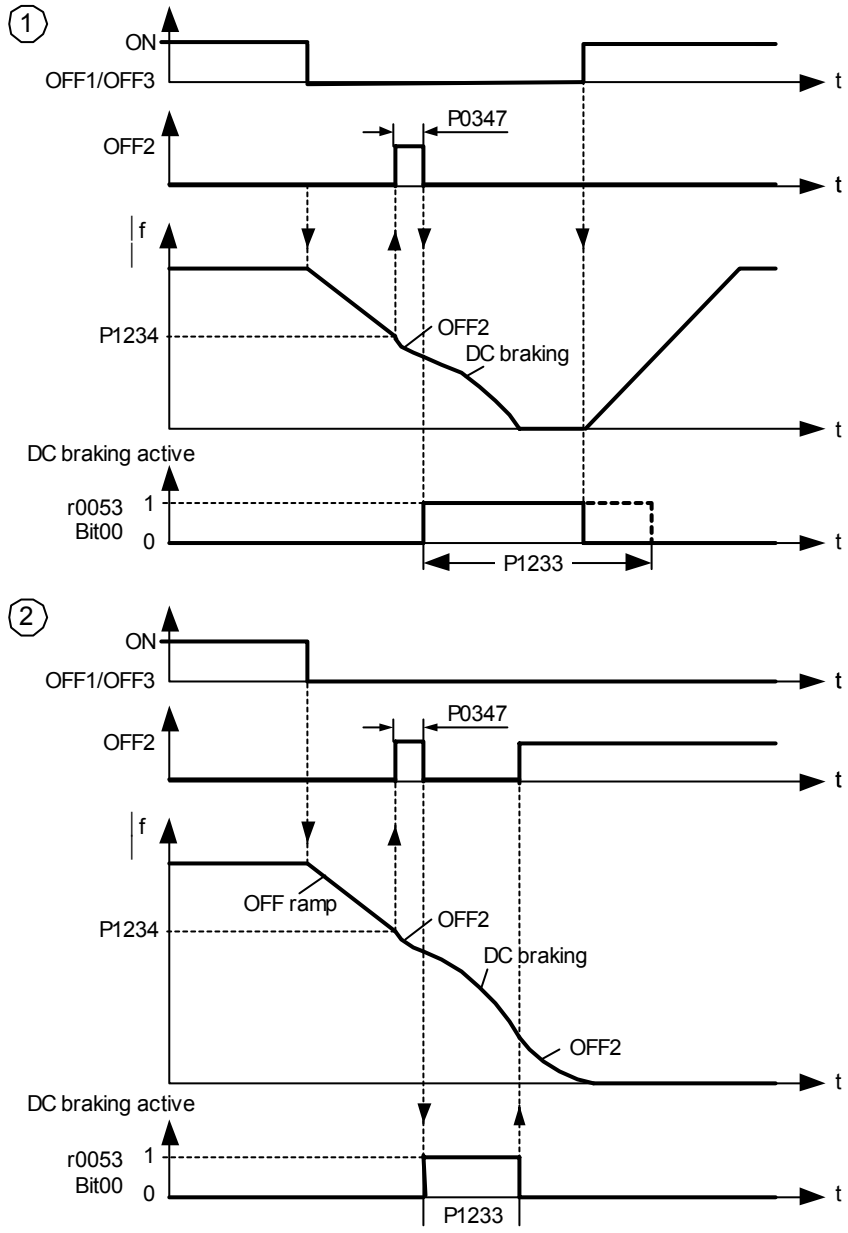
P1232[0] : 1st. Drive data set (DDS)
P1232[1] : 2nd. Drive data set (DDS)
P1232[2] : 3rd. Drive data set (DDS)

P1233[3] **Duration of DC braking**

CStat:	CUT	**Datatype:** U16	**Unit:** s	**Min:**	0
P-Group:	FUNC	**Active:** Immediately	**QuickComm.:** No	**Def:**	0
				Max:	250

Level **2**

Defines duration for which DC injection braking is to be active following an OFF1 or OFF3 command. When an OFF1 or OFF3 command is received by the drive, the output frequency starts to ramp to 0 Hz. When the output frequency reaches the value set in P1234, the drive injects a DC braking current P1232 for the time duration set in P1233.



Parameter P1232 still controls the level of DC injection.

Index:

P1233[0] : 1st. Drive data set (DDS)
P1233[1] : 2nd. Drive data set (DDS)
P1233[2] : 3rd. Drive data set (DDS)

Value:

P1233 = 0 :
Not active following OFF1 / OFF3.

P1233 = 1 - 250 :
Active for the specified duration.

Caution:

With the DC braking, the kinetic energy of the motor is converted into heat in the motor. The drive could overheat if the remains in this status for an exessive period of time !

DC braking is not possible when using a synchronous motor (i.e. P0300 = 2).

Notice:

The DC braking function causes the motor to stop rapidly by applying a DC braking current (the current applied also holds the shaft stationary). When the DC braking signal is applied, the inverter output pulses are blocked and the DC current not applied until the motor has been sufficiently demagnetized (demagnetization time is calculated automatically from motor data).

The inverter will not restart if an ON-command is given during this period.

P1234[3]	**DC braking start frequency**			**Min:**	0.00	Level
	CStat: CUT	**Datatype:** Float	**Unit:** Hz	**Def:**	650.00	**2**
	P-Group: FUNC	**Active:** Immediately	**QuickComm.:** No	**Max:**	650.00	

Sets start frequency for DC braking.

When an OFF1 or OFF3 command is received by the drive, the output frequency starts to ramp to 0 Hz. When the output frequency reaches the value set in start frequency of DC braking P1234, the drive injects a DC braking current P1232 for the time duration set in P1233.

Index:

P1234[0] : 1st. Drive data set (DDS)
P1234[1] : 2nd. Drive data set (DDS)
P1234[2] : 3rd. Drive data set (DDS)

Details:

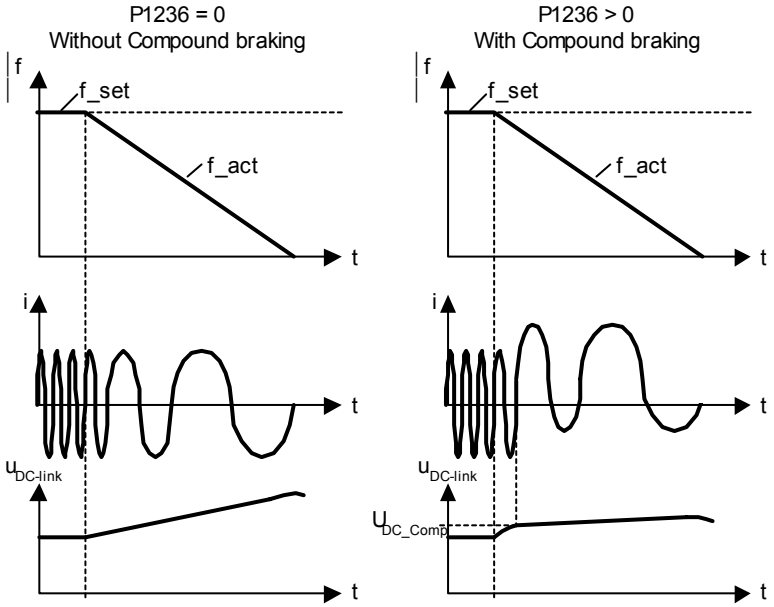
See P1232 (DC braking current) and P1233 (duration of DC braking)

P1236[3]	**Compound braking current**			**Min:**	0	Level
	CStat: CUT	**Datatype:** U16	**Unit:** %	**Def:**	0	**2**
	P-Group: FUNC	**Active:** Immediately	**QuickComm.:** No	**Max:**	250	

Defines DC level superimposed on AC waveform after exeeding DC-link voltage threshold of compound braking. The value is entered in [%] relative to rated motor current (P0305).

If P1254 = 0 :
Compound braking switch-on level $U_{DC\_Comp} = 1.13 \cdot \sqrt{2} \cdot V_{mains} = 1.13 \cdot \sqrt{2} \cdot P0210$
otherwise :
Compound braking switch-on level $U_{DC\_Comp} = 0.98 \cdot r1242$

The Compound Brake is an overlay of the DC brake function with regenerative braking (effective braking at the ramp) after OFF1 or OFF3. This enables braking with controlled motor frequency and a minimum of energy returned to the motor. Through optimization of the ramp-down time and the compound braking an efficient braking without additional HW components is possible.



Index:
P1236[0] : 1st. Drive data set (DDS)
P1236[1] : 2nd. Drive data set (DDS)
P1236[2] : 3rd. Drive data set (DDS)

Value:
P1236 = 0 :
Compound braking disabled.

P1236 = 1 - 250 :
Level of DC braking current defined as a [%] of rated motor current (P0305).

Dependency:
Compound braking depends on the DC link voltage only (see threshold above).

It is disabled, when:
- DC braking is active
- Flying start is active
- Vector mode (SLVC, VC) is selected

Notice:
Increasing the value will generally improve braking performance; however, if you set the value too high, an overcurrent trip may result.

If used with dynamic braking enabled as well compound braking will take priority.

If used with the Vdc max controller enabled the drive behaviour whilst braking may be worsened paticularly with high values of compound braking.

Compound braking does not function when the drive is in vector control.

P1237	**Dynamic braking**			**Min:** 0	Level
	CStat: CUT	**Datatype:** U16	**Unit:** -	**Def:** 0	**2**
	P-Group: FUNC	**Active:** Immediately	**QuickComm.:** No	**Max:** 5	

Dynamic braking absorbs the braking energy. This parameter defines the rated duty cycle of the braking resistor (chopper resistor). Dynamic braking is active when the function is enabled and DC-link voltage exeeds the dynamic braking switch-on level, see below.

Dynamic braking switch-on level

If P1254 = 0 :

$$V_{DC,Chopper} = 1.13 \cdot \sqrt{2} \cdot V_{mains} = 1.13 \cdot \sqrt{2} \cdot P0210$$

otherwise :

$$V_{DC,Chopper} = 0.98 \cdot r1242$$

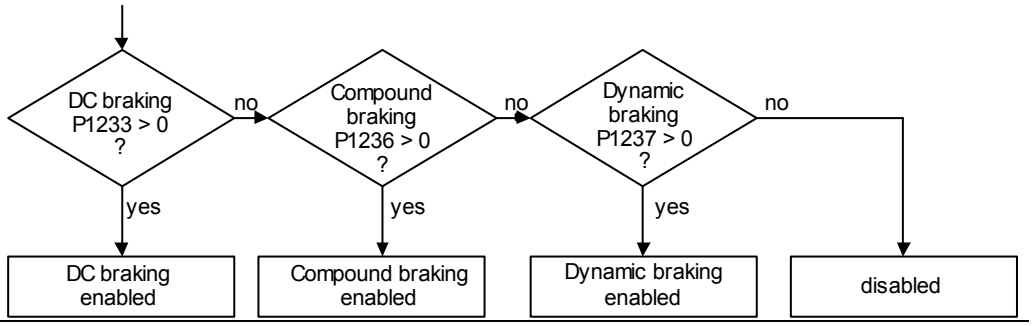
Possible Settings:

0 Disabled
1 5 % duty cycle
2 10 % duty cycle
3 20 % duty cycle
4 50 % duty cycle
5 100 % duty cycle

Dependency:

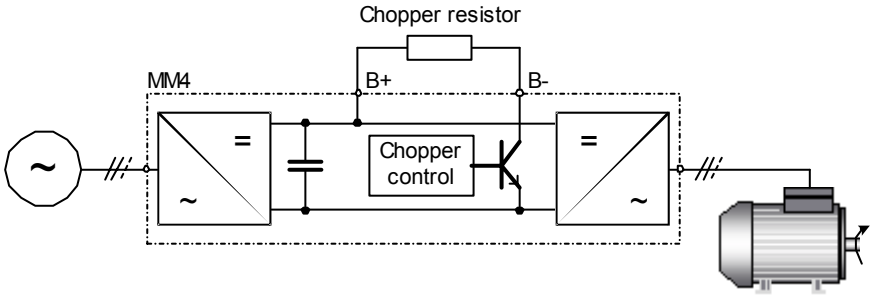
This function is not available for for MM440 PX (FSFX and FSGX).

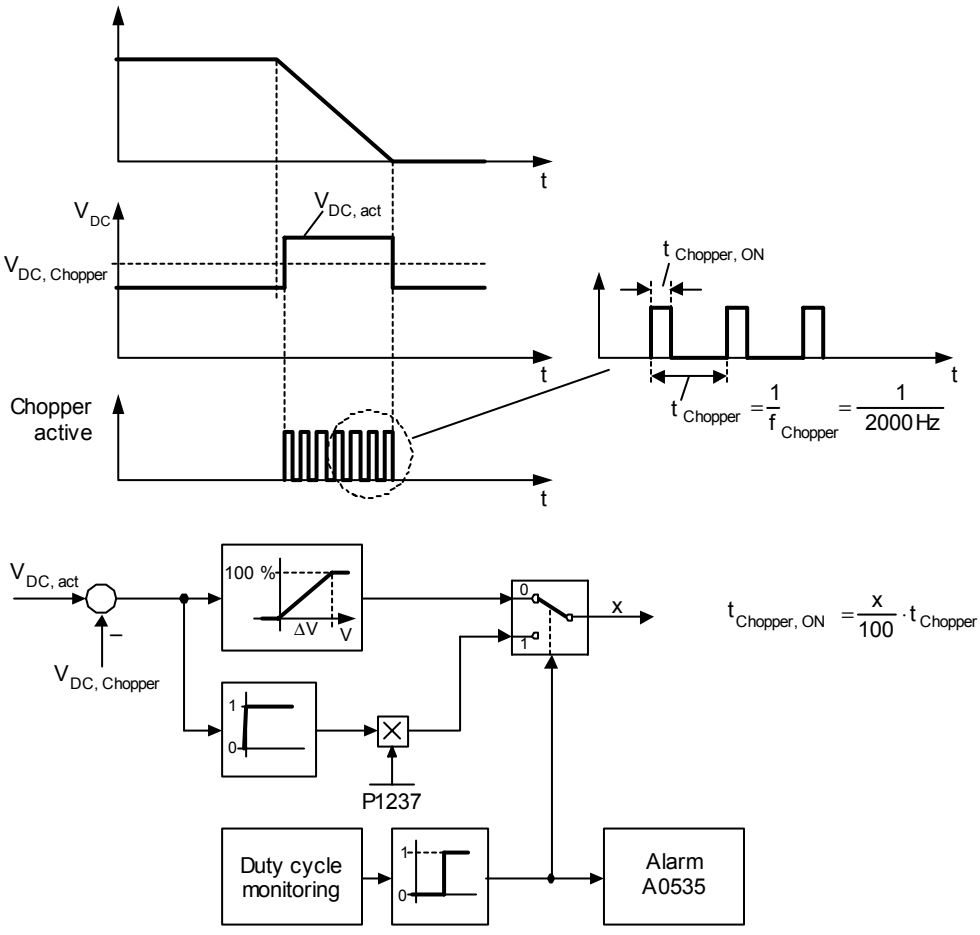
If used with DC braking enabled as well compound braking will take priority.



Notice:

Initially the brake will operate at a high duty cycle dependant on the DC link level until the thermal limit is approached. The duty cycle specified by this parameter will then be imposed. The resistor should be able to operate at this level indefinitely without overheating.





	Mains		
	200 - 240 V	380 - 480 V	500 - 600 V
Δ V	9.8 V	17.0 V	21.3 V

The threshold for the warning A0535 is equivalent to 10 seconds running at 95 % duty cycle. The duty cycle will be limited when it was running 12 seconds at 95 % duty cycle.

P1240[3] **Configuration of Vdc controller** Level **3**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	FUNC	**Active:** Immediately	**QuickComm.:** No	**Def:**	1
				Max:	3

Enables / disables Vdc controller.

The Vdc controller dynamically controls the DC link voltage to prevent overvoltage trips on high inertia systems.

Possible Settings:

0 Vdc controller disabled
1 Vdc-max controller enabled
2 Kinetic buffering (Vdc-min controller) enabled
3 Vdc-max controller and kinetic buffering (KIB) enabled

Index:

P1240[0] : 1st. Drive data set (DDS)
P1240[1] : 2nd. Drive data set (DDS)
P1240[2] : 3rd. Drive data set (DDS)

Caution:

If P1245 increased too much, it may interfere with the drive normal operation.

Note:

Vdc max controller automatically increases ramp-down times to keep the DC-link voltage (r0026) within limits (r1242).

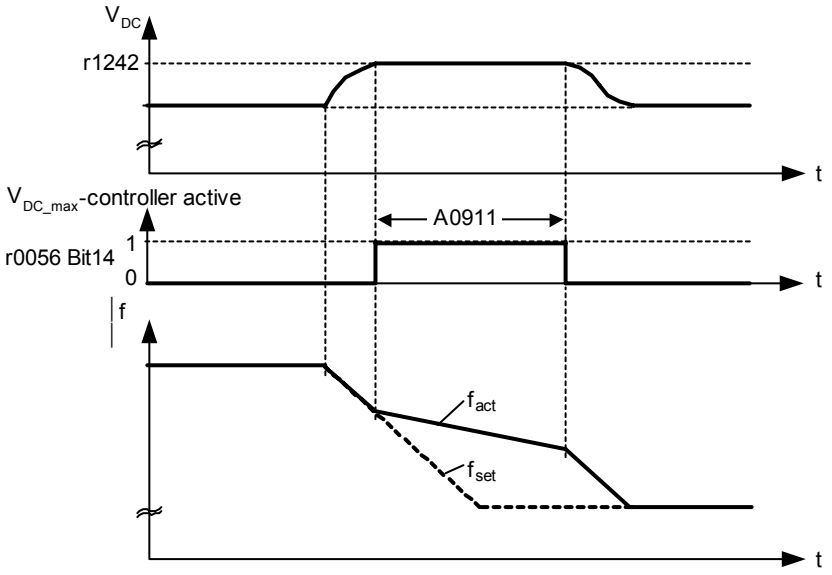
Vdc min is activated if DC-link voltage falls below the switch on level,P1245. The kinetic energy of the motor is then used to buffer the DC-link voltage, thus causing deceleration of the drive. If the drive trips F0003 immediately, try increasing the dynamic factor first, P1247. If still tripping F0003 try then increasing the switch on level, P1245.

r1242 **CO: Switch-on level of Vdc-max** Level **3**

Datatype: Float **Unit:** V **Min:** - **Def:** - **Max:** -

P-Group: FUNC

Displays switch-on level of Vdc max controller.



Following equation is only valid, if P1254 = 0 :

$$r1242 = 1.15 \cdot \sqrt{2} \cdot V_{mains} = 1.15 \cdot \sqrt{2} \cdot P0210$$

otherwise :

r1242 is internally calculated

P1243[3] **Dynamic factor of Vdc-max** Level **3**

CStat: CUT **Datatype:** U16 **Unit:** % **Min:** 10 **Def:** 100 **Max:** 200

P-Group: FUNC **Active:** Immediately **QuickComm.:** No

Defines dynamic factor for DC link controller in [%].

Index:

P1243[0] : 1st. Drive data set (DDS)
P1243[1] : 2nd. Drive data set (DDS)
P1243[2] : 3rd. Drive data set (DDS)

Dependency:

P1243 = 100 % means parameters P1250, P1251 and P1252 (gain, integration time and differential time) are used as set. Otherwise, these are multiplied by P1243 (dynamic factor of Vdc-max).

Note:

Vdc controller adjustment is calculated automatically from motor and inverter data.

P1245[3] **Switch on level kin. buffering** Level **3**

CStat: CUT **Datatype:** U16 **Unit:** % **Min:** 65 **Def:** 76 **Max:** 115

P-Group: FUNC **Active:** Immediately **QuickComm.:** No

Enter switch-on level for kinetic buffering (KIB) in [%] relative to supply voltage (P0210).

$$P1245\,[V] = \frac{P1245\,[\%]}{100} \cdot \sqrt{2} \cdot P0210$$

Index:

P1245[0] : 1st. Drive data set (DDS)
P1245[1] : 2nd. Drive data set (DDS)
P1245[2] : 3rd. Drive data set (DDS)

Warning:

Increasing the value too much, may interfere with the drive normal operation.

Note:

Changing P1254 doesn't affect the switch-on-level for KIB.

r1246[3] **CO:Switch-on level kin buffering** Level **3**

Datatype: Float **Unit:** V **Min:** - **Def:** - **Max:** -

P-Group: FUNC

Displays switch-on level of kinetic buffering (KIB, Vdc min controller).

P1247[3] **Dyn. factor of kinetic buffering** Level **3**

CStat:	CUT	**Datatype:** U16	**Unit:** %	**Min:**	10
P-Group:	FUNC	**Active:** Immediately	**QuickComm.:** No	**Def:**	100
				Max:	200

Enters dynamic factor for kinetic buffering (KIB, Vdc-min controller).

P1247 = 100 %
means parameters P1250, P1251 and P1252 (gain, integration time and differential time) are used as set. Otherwise, these are multiplied by P1247 (dynamic factor of Vdc-min).

Index:
P1247[0] : 1st. Drive data set (DDS)
P1247[1] : 2nd. Drive data set (DDS)
P1247[2] : 3rd. Drive data set (DDS)

Note:
Vdc controller adjustment is calculated automatically from motor and inverter data.

P1250[3] **Gain of Vdc-controller** Level **4**

CStat:	CUT	**Datatype:** Float	**Unit:** -	**Min:**	0.00
P-Group:	FUNC	**Active:** Immediately	**QuickComm.:** No	**Def:**	1.00
				Max:	10.00

Enters gain for Vdc controller.

Index:
P1250[0] : 1st. Drive data set (DDS)
P1250[1] : 2nd. Drive data set (DDS)
P1250[2] : 3rd. Drive data set (DDS)

P1251[3] **Integration time Vdc-controller** Level **4**

CStat:	CUT	**Datatype:** Float	**Unit:** ms	**Min:**	0.1
P-Group:	FUNC	**Active:** Immediately	**QuickComm.:** No	**Def:**	40.0
				Max:	1000.0

Enters integral time constant for Vdc controller.

Index:
P1251[0] : 1st. Drive data set (DDS)
P1251[1] : 2nd. Drive data set (DDS)
P1251[2] : 3rd. Drive data set (DDS)

P1252[3] **Differential time Vdc-controller** Level **4**

CStat:	CUT	**Datatype:** Float	**Unit:** ms	**Min:**	0.0
P-Group:	FUNC	**Active:** Immediately	**QuickComm.:** No	**Def:**	1.0
				Max:	1000.0

Enters differential time constant for Vdc controller.

Index:
P1252[0] : 1st. Drive data set (DDS)
P1252[1] : 2nd. Drive data set (DDS)
P1252[2] : 3rd. Drive data set (DDS)

P1253[3] **Vdc-controller output limitation** Level **3**

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	0.00
P-Group:	FUNC	**Active:** Immediately	**QuickComm.:** No	**Def:**	10.00
				Max:	600.00

Limits maximum effect of Vdc max controller.

Index:
P1253[0] : 1st. Drive data set (DDS)
P1253[1] : 2nd. Drive data set (DDS)
P1253[2] : 3rd. Drive data set (DDS)

P1254 **Auto detect Vdc switch-on levels** Level **3**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	FUNC	**Active:** Immediately	**QuickComm.:** No	**Def:**	1
				Max:	1

Enables/disables auto-detection of switch-on levels for Vdc control functionalities.

Following switch-on levels are calculated

- Switch-on level chopper
- Switch-on level compound brake
- Switch-on level Vdc_max controller r1242

P1254 does not have any effect on the

- Switch-on level kin. buffering r1246

Possible Settings:

0 Disabled
1 Enabled

Note:

The switch-on thresholds are only calculated during the start-up of the inverter after connection to the mains. An online-adaption is not performed during operation. This means that modification of P1254 does not immediately take effect and variations in the mains are also not initially taken into account.

P1254 = 0 (Automatic Detection disabled):
The above thresholds are calculated via P0210, if automatic detection is disabled.

P1256[3] **Reaction of kinetic buffering** Level **3**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	FUNC	**Active:** Immediately	**QuickComm.:** No	**Def:**	0
				Max:	2

Enters reaction for kinetic buffering controller (Vdc-min controller).

Depending on the setting selected, the frequency limit defined in P1257 is used to either hold the speed or disable pulses. If not enough regeneration is produced, drive may trip undervoltage.

Possible Settings:

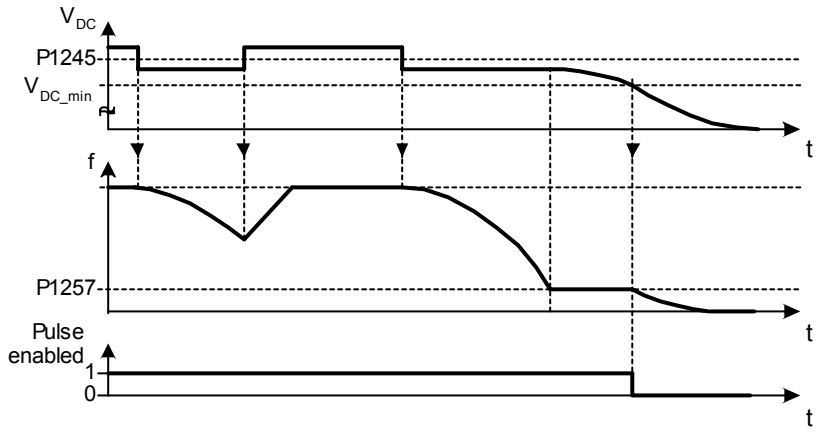
0 Maintain DC-link until trip
1 Maintain DC-link until trip / stop
2 Control stop

Index:

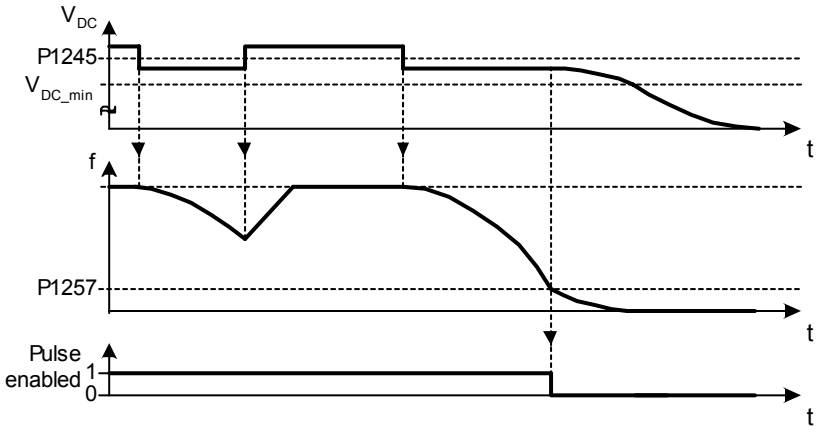
P1256[0] : 1st. Drive data set (DDS)
P1256[1] : 2nd. Drive data set (DDS)
P1256[2] : 3rd. Drive data set (DDS)

Note:

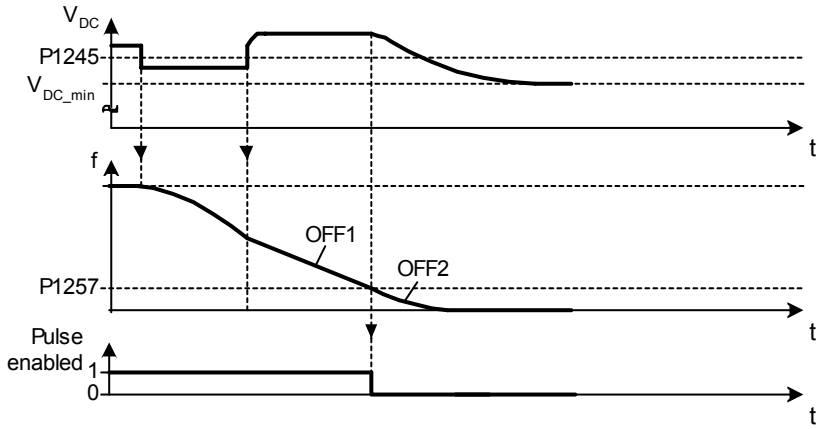
P1256 = 0:
Maintain dclink voltage until mains is returned or drive is tripped undervoltage. The frequency is kept above the frequency limit provided in P1257.



P1256 = 1:
Maintain dclink voltage until mains is returned or drive is tripped undervoltage or pulses disabled when frequency falls below the limit in P1257.



P1256 = 2:
This option ramps down the frequency to stand still even when mains return. If mains does not return, frequency brought down under the control of vdc-min controller until P1257 limit then pulses disabled or undervoltage has occurred. If mains return, then an OFF1 is active until P1257 limit then pulses disabled.



P1257[3]	**Freq limit for kinetic buffering**			**Min:**	0.00	Level
	CStat: CUT	**Datatype:** Float	**Unit:** Hz	**Def:**	2.50	**3**
	P-Group: SETPOINT	**Active:** first confirm	**QuickComm.:** No	**Max:**	600.00	

Frequency which kinetic buffering (KIB) either hold speed or disable pulses depending on P1256.

Index:

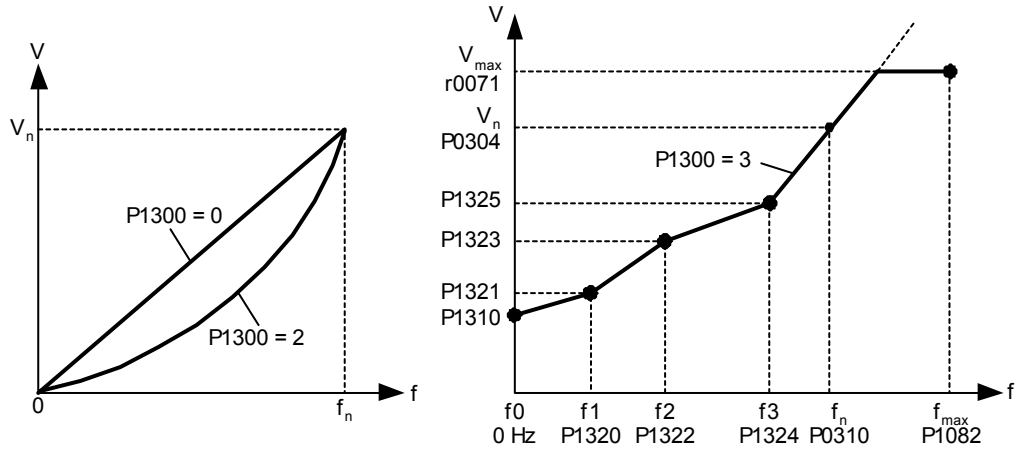
P1257[0] : 1st. Drive data set (DDS)
P1257[1] : 2nd. Drive data set (DDS)
P1257[2] : 3rd. Drive data set (DDS)

P1300[3] **Control mode**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	CONTROL	**Active:** first confirm	**QuickComm.:** Yes	**Def:**	0
				Max:	23

Level **2**

Controls relationship between speed of motor and voltage supplied by inverter as illustrated in the diagram below.



Possible Settings:

0 V/f with linear characteristic
1 V/f with FCC
2 V/f with parabolic characteristic
3 V/f with programmable characteristic
4 Reserved
5 V/f for textile applications
6 V/f with FCC for textile applications
19 V/f control with independent voltage setpoint
20 Sensorless vector control
21 Vector control with sensor
22 Sensorless vector torque-control
23 Vector torque-control with sensor

Index:

P1300[0] : 1st. Drive data set (DDS)
P1300[1] : 2nd. Drive data set (DDS)
P1300[2] : 3rd. Drive data set (DDS)

Dependency:

See parameter P0205, P0500

Caution:

When commissioning Vector Control with encoder-feedback (VC), the drive should be configured for V/f mode (see P1300) first. Run the drive and compare r0061 with r0021 that should agree in

- sign and
- magnitude (with a deviation of only a few percent).

Only if both criteria are fullfilled, change P1300 and select VC (P1300 = 21 or 23).

P0400 = 1 (single channel encoder) will only allow operation in one direction. If operation in both directions is required, connect an encoder with 2 channels (A and B) and select setting 2. See the Operating Instructions of the encoder module for more information.

Note:

P1300 = 1 : V/f with FCC (flux current control)
- Maintains motor flux current for improved efficiency.
- If FCC is chosen, linear V/f is active at low frequencies.

P1300 = 2 : V/f with a quadratic characteristic
- Suitable for centrifugal fans / pumps

P1300 = 3 : V/f with a programmable characteristic
- User defined characteristic (see P1320)
- For synchronous motors (e.g. SIEMOSYN motors)

P1300 = 5,6 : V/f for textil applications
- Slip compensation disabled.
- Imax controller modifies the output voltage only.
- Imax controller does not influence the output frequency.

P1300 = 19 : V/f control with independent voltage setpoint

The following table presents an overview of control parameters (V/f) that can be modify in relationship to P1300 dependencies:

ParNo.	Parameter name	Level	V/f							SLVC		VC	
			P1300 =										
			0	1	2	3	5	6	19	20	22	21	23
P1300[3]	Control mode	2	x	x	x	x	x	x	x	x	x	x	x
P1310[3]	Continuous boost	2	x	x	x	x	x	x	x	–	–	–	–
P1311[3]	Acceleration boost	2	x	x	x	x	x	x	x	–	–	–	–
P1312[3]	Starting boost	2	x	x	x	x	x	x	x	–	–	–	–
P1316[3]	Boost end frequency	3	x	x	x	x	x	x	x	–	–	–	–
P1320[3]	Programmable V/f freq. coord. 1	3	–	–	–	x	–	–	–	–	–	–	–
P1321[3]	Programmable V/f volt. coord. 1	3	–	–	–	x	–	–	–	–	–	–	–
P1322[3]	Programmable V/f freq. coord. 2	3	–	–	–	x	–	–	–	–	–	–	–
P1323[3]	Programmable V/f volt. coord. 2	3	–	–	–	x	–	–	–	–	–	–	–
P1324[3]	Programmable V/f freq. coord. 3	3	–	–	–	x	–	–	–	–	–	–	–
P1325[3]	Programmable V/f volt. coord. 3	3	–	–	–	x	–	–	–	–	–	–	–
P1330[3]	CI: Voltage setpoint	3	–	–	–	–	–	–	x	–	–	–	–
P1333[3]	Start frequency for FCC	3	–	x	–	–	–	x	–	–	–	–	–
P1335[3]	Slip compensation	2	x	x	x	x	–	–	–	–	–	–	–
P1336[3]	CO: U/f Slip limit	2	x	x	x	x	–	–	–	–	–	–	–
P1338[3]	Resonance damping gain V/f	3	x	x	x	x	–	–	–	–	–	–	–
P1340[3]	Imax freq. controller prop. gain	3	x	x	x	x	x	x	x	–	–	–	–
P1341[3]	Imax controller integral time	3	x	x	x	x	x	x	x	–	–	–	–
P1345[3]	Imax controller prop. gain	3	x	x	x	x	x	x	x	–	–	–	–
P1346[3]	Imax voltage ctrl. integral time	3	x	x	x	x	x	x	x	–	–	–	–
P1350[3]	Voltage soft start	3	x	x	x	x	x	x	x	–	–	–	–

Sensorless vector control (SLVC, P1300 = 20,22) and vector control (VC, P1300 = 21,23):
SLVC can provide excellent performance for the following types of application:
- Applications which require high torque performance
- Applications which require fast respond to shock loading
- Applications which require torque holding while passing through 0 Hz
- Applications which require very accurate speed holding
- Applications which require motor pull out protection

Restrictions:
- SLVC / VC is dependent on the accuracy of the motor model being used and the measurements being performed by the inverter. There are therefore certain restrictions on the use of SLVC / VC:

- f_{max} = min(200 Hz, 5 - P0310) (max. frequency)
- $\frac{1}{4} \leq \frac{P0305}{r0207} \leq \frac{r0209}{r0207}$ (ratio of rated motor current to rated inverter current)
- no synchronuos motor

Recommended means of commissioning:
- For correct operation under SLVC / VC control it is imperative that the name plate data of the motor (P0304 - P0310) is correctly entered and that the motor data identification (P1910) must be carried out on a cold motor. It is also necessary to ensure that the motor ambient temperature is correctly entered in P0625 if this is significantly different from the default value of 20°C. This must be done after the quick commissioning has been completed (P3900) but before the motor data identification measurements are carried out.
- See parameter P0400 and documentation of encoder and encoder module when commissioning VC (P1300 = 21 or 23).

Optimisation:
The following parameters can be adjusted by the user to improve performance.
- P0003 = 3
- P0342: Total / motor inertia ratio

Sensorless Vector Control (SLVC):
- P1470: P gain (SLVC)
- P1472: I term (SLVC)
- P1610: Continuous torque boost (SLVC, open loop boost)
- P1611: Acceleration torque boost (SLVC, open loop boost)
- P1750: Control word of motor model
- P1755: Start-frequency motor model (SLVC)

Vector Control (VC):
- P1460: P gain
- P1462: I term

The following table presents an overview of control parameters (SLVC, VC) that can be modify in relationship to P1300 dependencies:

ParNo.	Parameter name	Level	V/f							SLVC		VC	
			P1300 =										
			0	1	2	3	5	6	19	20	22	21	23
P1400[3]	Configuration of speed control	3	–	–	–	–	–	–	–	–	–	x	–
P1442[3]	Filter time for act. speed	3	–	–	–	–	–	–	–	–	–	x	–
P1452[3]	Filter time for act.speed (SLVC)	3	–	–	–	–	–	–	–	x	–	–	–
P1460[3]	Gain speed controller	2	–	–	–	–	–	–	–	–	–	x	–
P1462[3]	Integral time speed controller	2	–	–	–	–	–	–	–	–	–	x	–
P1470[3]	Gain speed controller (SLVC)	2	–	–	–	–	–	–	–	x	–	–	–
P1472[3]	Integral time n-ctrl. (SLVC)	2	–	–	–	–	–	–	–	x	–	–	–
P1477[3]	BI: Set integrator of n-ctrl.	3	–	–	–	–	–	–	–	x	–	x	–
P1478[3]	CI: Set integrator value n-ctrl.	3	–	–	–	–	–	–	–	x	–	x	–
P1488[3]	Droop input source	3	–	–	–	–	–	–	–	x	–	x	–
P1489[3]	Droop scaling	3	–	–	–	–	–	–	–	x	–	x	–
P1492[3]	Enable droop	3	–	–	–	–	–	–	–	x	–	x	–
P1496[3]	Scaling accel. precontrol	3	–	–	–	–	–	–	–	x	–	x	–
P1499[3]	Scaling accel. torque control	3	–	–	–	–	–	–	–	–	x	–	–
P1500[3]	Selection of torque setpoint	2	–	–	–	–	–	–	–	x	x	x	x
P1501[3]	BI: Change to torque control	3	–	–	–	–	–	–	–	x	x	x	x
P1503[3]	CI: Torque setpoint	3	–	–	–	–	–	–	–	–	x	–	x
P1511[3]	CI: Additional torque setpoint	3	–	–	–	–	–	–	–	x	x	x	x
P1520[3]	CO: Upper torque limit	2	–	–	–	–	–	–	–	x	x	x	x
P1521[3]	CO: Lower torque limit	2	–	–	–	–	–	–	–	x	x	x	x
P1522[3]	CI: Upper torque limit	3	–	–	–	–	–	–	–	x	x	x	x
P1523[3]	CI: Lower torque limit	3	–	–	–	–	–	–	–	x	x	x	x
P1525[3]	Scaling lower torque limit	3	–	–	–	–	–	–	–	x	x	x	x
P1530[3]	Motoring power limitation	2	–	–	–	–	–	–	–	x	x	x	x
P1531[3]	Regenerative power limitation	2	–	–	–	–	–	–	–	x	x	x	x
P1570[3]	CO: Fixed value flux setpoint	2	–	–	–	–	–	–	–	x	x	x	x
P1574[3]	Dynamic voltage headroom	3	–	–	–	–	–	–	–	x	x	x	x
P1580[3]	Efficiency optimization	2	–	–	–	–	–	–	–	x	x	x	x
P1582[3]	Smooth time for flux setpoint	3	–	–	–	–	–	–	–	x	x	x	x
P1596[3]	Int. time field weak. controller	3	–	–	–	–	–	–	–	x	x	x	x
P1610[3]	Continuous torque boost (SLVC)	2	–	–	–	–	–	–	–	x	x	–	–
P1611[3]	Acc. torque boost (SLVC)	2	–	–	–	–	–	–	–	x	x	–	–
P1740	Gain for oscillation damping	3	–	–	–	–	–	–	–	x	x	–	–
P1750[3]	Control word of motor model	3	–	–	–	–	–	–	–	x	x	x	x
P1755[3]	Start-freq. motor model (SLVC)	3	–	–	–	–	–	–	–	x	x	–	–
P1756[3]	Hyst.-freq. motor model (SLVC)	3	–	–	–	–	–	–	–	x	x	–	–
P1758[3]	T(wait) transit to feed-fwd-mode	3	–	–	–	–	–	–	–	x	x	–	–
P1759[3]	T(wait) for n-adaption to settle	3	–	–	–	–	–	–	–	x	x	–	–
P1764[3]	Kp of n-adaption (SLVC)	3	–	–	–	–	–	–	–	x	x	–	–
P1780[3]	Control word of Rs/Rr-adaption	3	–	–	–	–	–	–	–	x	x	–	–
P0400[3]	Select encoder type	2	–	–	–	–	–	–	–	–	–	x	x
P0408[3]	Encoder pulses per revolution	2	–	–	–	–	–	–	–	–	–	x	x
P0491[3]	Reaction on speed signal loss	2	–	–	–	–	–	–	–	–	–	x	x
P0492[3]	Allowed speed difference	2	–	–	–	–	–	–	–	–	–	x	x
P0494[3]	Delay speed loss reaction	2	–	–	–	–	–	–	–	–	–	x	x

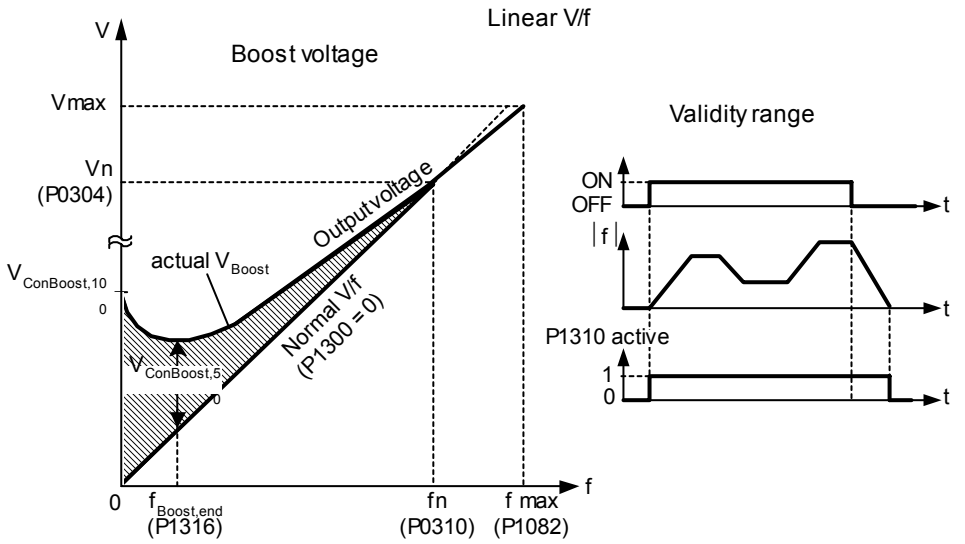
1) If the speed control (main setpoint) is selected a torque setpoint is available via the additional setpoint channel.

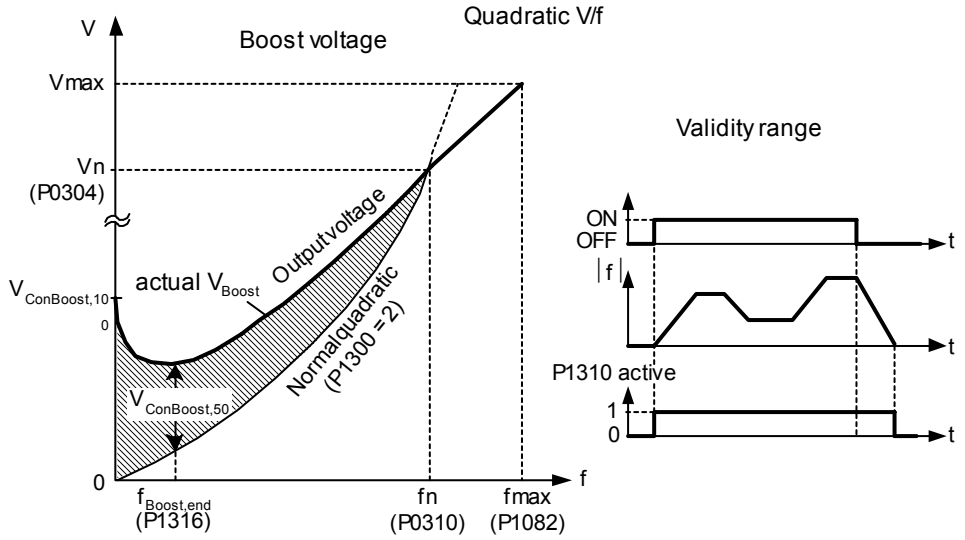
P1310[3]	**Continuous boost**			**Min:**	0.0	Level
	CStat: CUT	**Datatype:** Float	**Unit:** %	**Def:**	50.0	**2**
	P-Group: CONTROL	**Active:** Immediately	**QuickComm.:** No	**Max:**	250.0	

At low output frequencies the output voltage is low to keep the flux level constant. However, the output voltage may be too low

- for magnetisation the asynchronous motor
- to hold the load
- to overcome losses in the system. The output voltage can be increased using parameter P1310.

Defines boost level in [%] relative to P0305 (rated motor current) applicable to both linear and quadratic V/f curves according to the diagram below:





where voltage values are given

$$V_{ConBoost,100} = P0305 \cdot P0350 \cdot \frac{P1310}{100}$$

$$V_{ConBoost,50} = \frac{V_{ConBoost,100}}{2}$$

Index:

P1310[0] : 1st. Drive data set (DDS)
P1310[1] : 2nd. Drive data set (DDS)
P1310[2] : 3rd. Drive data set (DDS)

Dependency:

Continous boost P1310 has no effect during vector operation because the inverter calculates continously the optimum operating conditions.

Note:

Increasing the boost levels increases motor heating (especially at standstill).

The boost values are combined when continuous boost (P1310) used in conjunction with other boost parameters (acceleration boost P1311 and starting boost P1312).

However priorities are allocated to these parameters as follows:
P1310 > P1311 > P1312

The total boost is limited by following equation:

$$\sum V_{Boost} \leq 3 \cdot R_s \cdot I_{Mot} = 3 \cdot P0305 \cdot P0350$$

Setting in P0640 (motor overload factor [%]) limits the boost:

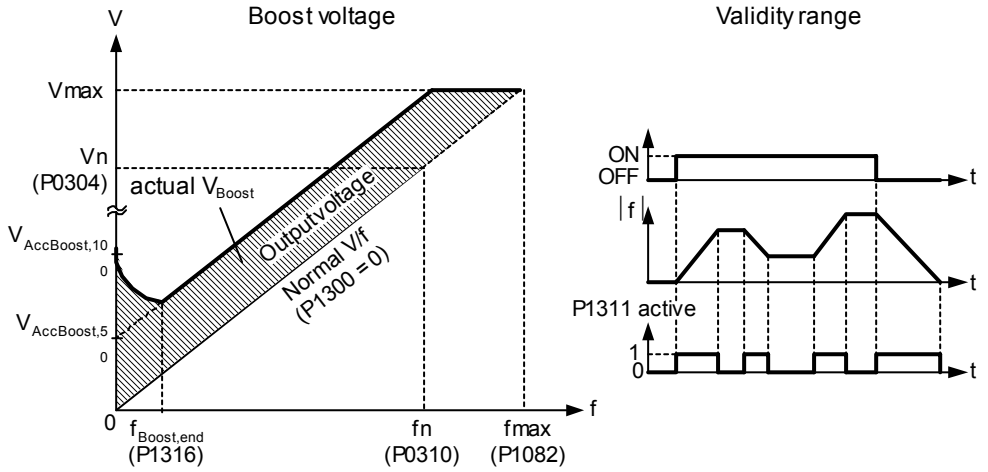
$$\frac{\sum V_{Boost}}{P0305 \cdot P0350} \leq \frac{P0640}{100}$$

P1311[3] Acceleration boost

						Level
CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	0.0	**2**
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.:** No	**Def:**	0.0	
				Max:	250.0	

P1311 will only produce boost during ramping, and is therefore useful for additional torque during acceleration and deceleration.

Applies boost in [%] relative to P0305 (rated motor current) following a positive setpoint change and drops back out once the setpoint is reached.



where voltage values are given

$$V_{AccBoost,100} = P0305 \cdot P0350 \cdot \frac{P1311}{100}$$

$$V_{AccBoost,50} = \frac{V_{AccBoost,100}}{2}$$

Index:

P1311[0] : 1st. Drive data set (DDS)
P1311[1] : 2nd. Drive data set (DDS)
P1311[2] : 3rd. Drive data set (DDS)

Dependency:

Acceleration boost P1311 has no effect during vector operation.

Note:

See parameter P1310

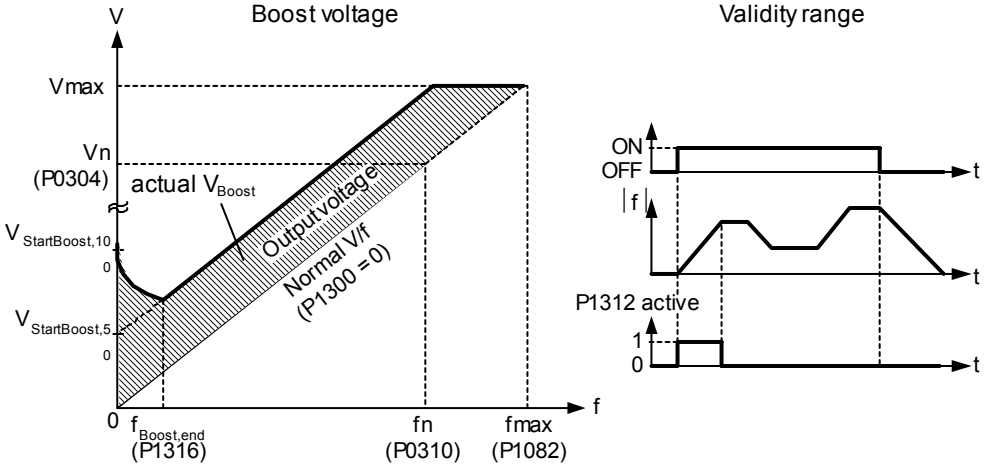
P1312[3] **Starting boost**

						Level
CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	0.0	**2**
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.:** No	**Def:**	0.0	
				Max:	250.0	

Applies a constant linear offset (in [%] relative to P0305 (rated motor current)) to active V/f curve (either linear or quadratic) after an ON command and is active until
1) ramp output reaches setpoint for the first time respectively
2) setpoint is reduced to less than present ramp output

This is useful for starting loads with high inertia.

Setting the starting boost (P1312) too high will cause the inverter to limit the current, which will in turn restrict the output frequency to below the setpoint frequency.



where voltage values are given

$$V_{StartBoost,100} = P0305 \cdot P0350 \cdot \frac{P1312}{100}$$

$$V_{StartBoost,50} = \frac{V_{StartBoost,100}}{2}$$

Index:

P1312[0] : 1st. Drive data set (DDS)
P1312[1] : 2nd. Drive data set (DDS)
P1312[2] : 3rd. Drive data set (DDS)

Example:

Setpoint = 50Hz. Ramping up with starting boost. During ramp up, setpoint changed to 20Hz. As soon as setpoint changed, starting boost removed because setpoint smaller than present ramp output.

Dependency:

Acceleration boost P1312 has no effect during vector operation.

Note:

See parameter P1310

r1315 **CO: Total boost voltage**

						Level
		Datatype: Float	**Unit:** V	**Min:**	-	**4**
P-Group:	CONTROL			**Def:**	-	
				Max:	-	

Displays total value of voltage boost (in volts).

P1316[3] **Boost end frequency** Level **3**

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	0.0
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.:** No	**Def:**	20.0
				Max:	100.0

Defines point at which programmed boost reaches 50 % of its value.

This value is expressed in [%] relative to P0310 (rated motor frequency).

The default frequency is defined as follows:

$$f_{Boost\ min} = 2 \cdot \left(\frac{153}{\sqrt{P_{motor}}} + 3\right)$$

Index:

P1316[0] : 1st. Drive data set (DDS)
P1316[1] : 2nd. Drive data set (DDS)
P1316[2] : 3rd. Drive data set (DDS)

Note:

The expert user may change this value to alter the shape of the curve, e.g. to increase torque at a particular frequency.

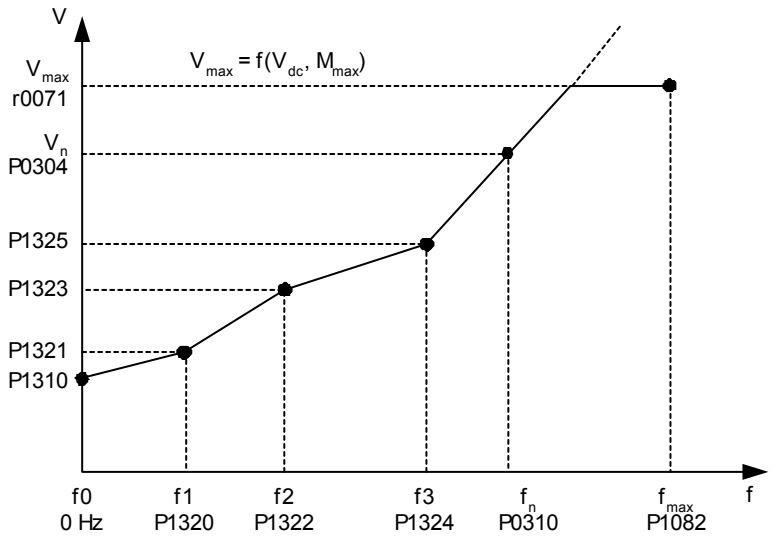
Details:

See diagram in P1310 (continuous boost).

P1320[3] **Programmable V/f freq. coord. 1** Level **3**

CStat:	CT	**Datatype:** Float	**Unit:** Hz	**Min:**	0.00
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.:** No	**Def:**	0.00
				Max:	650.00

Sets V/f coordinates (P1320/1321 to P1324/1325) to define V/f characteristic.



$$P1310[V] = \frac{P1310[\%]}{100[\%]} \cdot \frac{r0395[\%]}{100[\%]} \cdot P0304[V]$$

Index:

P1320[0] : 1st. Drive data set (DDS)
P1320[1] : 2nd. Drive data set (DDS)
P1320[2] : 3rd. Drive data set (DDS)

Example:

This parameter can be used to provide correct torque at correct frequency and is useful when used with synchronous motors.

Dependency:

To set parameter, select P1300 = 3 (V/f with programmable characteristic).

Note:

Linear interpolation will be applied between the individual data points.

V/f with programmable characteristic (P1300 = 3) has 3 programmable points. The two non-programmable points are:

- Continuous boost P1310 at zero 0 Hz
- Rated motor voltage P0304 at rated motor frequency P0310

The acceleration boost and starting boost defined in P1311 and P1312 are applied to V/f with programmable characteristic.

P1321[3] **Programmable V/f volt. coord. 1** Level **3**

CStat:	CUT	**Datatype:** Float	**Unit:** V	**Min:**	0.0
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.:** No	**Def:**	0.0
				Max:	3000.0

See P1320 (programmable V/f freq. coord. 1).

Index:
P1321[0] : 1st. Drive data set (DDS)
P1321[1] : 2nd. Drive data set (DDS)
P1321[2] : 3rd. Drive data set (DDS)

P1322[3] **Programmable V/f freq. coord. 2** Level **3**

CStat:	CT	**Datatype:** Float	**Unit:** Hz	**Min:**	0.00
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.:** No	**Def:**	0.00
				Max:	650.00

See P1320 (programmable V/f freq. coord. 1).

Index:
P1322[0] : 1st. Drive data set (DDS)
P1322[1] : 2nd. Drive data set (DDS)
P1322[2] : 3rd. Drive data set (DDS)

P1323[3] **Programmable V/f volt. coord. 2** Level **3**

CStat:	CUT	**Datatype:** Float	**Unit:** V	**Min:**	0.0
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.:** No	**Def:**	0.0
				Max:	3000.0

See P1320 (programmable V/f freq. coord. 1).

Index:
P1323[0] : 1st. Drive data set (DDS)
P1323[1] : 2nd. Drive data set (DDS)
P1323[2] : 3rd. Drive data set (DDS)

P1324[3] **Programmable V/f freq. coord. 3** Level **3**

CStat:	CT	**Datatype:** Float	**Unit:** Hz	**Min:**	0.00
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.:** No	**Def:**	0.00
				Max:	650.00

See P1320 (programmable V/f freq. coord. 1).

Index:
P1324[0] : 1st. Drive data set (DDS)
P1324[1] : 2nd. Drive data set (DDS)
P1324[2] : 3rd. Drive data set (DDS)

P1325[3] **Programmable V/f volt. coord. 3** Level **3**

CStat:	CUT	**Datatype:** Float	**Unit:** V	**Min:**	0.0
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.:** No	**Def:**	0.0
				Max:	3000.0

See P1320 (programmable V/f freq. coord. 1).

Index:
P1325[0] : 1st. Drive data set (DDS)
P1325[1] : 2nd. Drive data set (DDS)
P1325[2] : 3rd. Drive data set (DDS)

P1330[3] **CI: Voltage setpoint** Level **3**

CStat:	T	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	CONTROL	**Active:** first confirm	**QuickComm.:** No	**Def:**	0:0
				Max:	4000:0

BICO parameter for selecting source of voltage setpoint for independent V/f control.

Index:
P1330[0] : 1st. Command data set (CDS)
P1330[1] : 2nd. Command data set (CDS)
P1330[2] : 3rd. Command data set (CDS)

P1333[3] **Start frequency for FCC** Level **3**

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	0.0
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.:** No	**Def:**	10.0
				Max:	100.0

Defines start frequency at which FCC (flux current control) is enabled as [%] of rated motor frequency (P0310).

Index:
P1333[0] : 1st. Drive data set (DDS)
P1333[1] : 2nd. Drive data set (DDS)
P1333[2] : 3rd. Drive data set (DDS)

Notice:
If this value is too low, the system may become unstable.

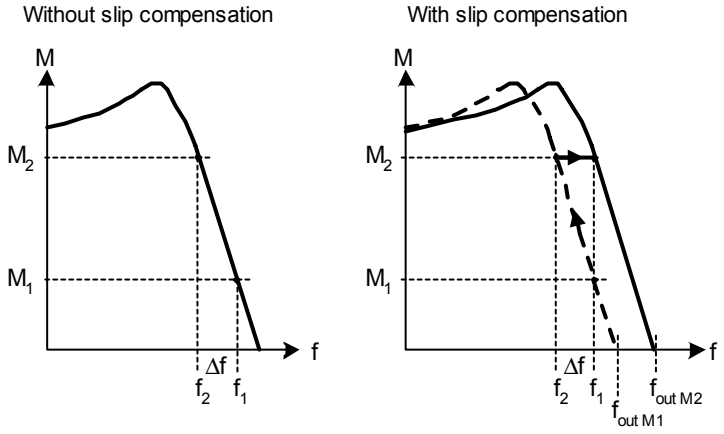
P1335[3] **Slip compensation** Level **2**

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	0.0
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.:** No	**Def:**	0.0
				Max:	600.0

Dynamically adjusts output frequency of inverter so that motor speed is kept constant independent of motor load.

In the V/f-control, the motor speed will always be less than the command speed due to the slip speed. For a given speed command, the speed will drop as load is increased. The speed regulation of drive can be improved by the technique known as slip compensation.

Increasing the load from M1 to M2 (see diagram) will decrease the motor speed from f1 to f2, due to the slip. The inverter can compensate for this by increasing the output frequency slightly as the load increases. The inverter measures the current and increases the output frequency to compensate for the expected slip.



Index:

P1335[0] : 1st. Drive data set (DDS)
P1335[1] : 2nd. Drive data set (DDS)
P1335[2] : 3rd. Drive data set (DDS)

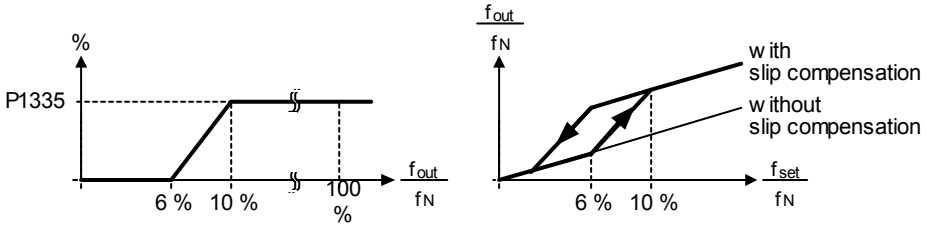
Value:

P1335 = 0 % :
Slip compensation disabled.

P1335 = 50 % - 70 % :
Full slip compensation at cold motor (partial load).

P1335 = 100 % :
Full slip compensation at warm motor (full load).

Range of slip compensation :



Notice:

The applied value of the slip compensation (scaled by P1335) is limited by following equation:

$$f_{Slip\_comp\_max} = \frac{P1336}{100} \cdot r0330$$

P1336[3] **Slip limit** Level **2**

CStat:	CUT	**Datatype:** U16	**Unit:** %	**Min:**	0
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.:** No	**Def:**	250
				Max:	600

Compensation slip limit in [%] relative to r0330 (rated motor slip), which is added to frequency setpoint.

Index:

P1336[0] : 1st. Drive data set (DDS)
P1336[1] : 2nd. Drive data set (DDS)
P1336[2] : 3rd. Drive data set (DDS)

Dependency:

Slip compensation (P1335) active.

r1337 **CO: V/f slip frequency** Level **3**

Datatype: Float **Unit:** % **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

Displays actual compensated motor slip as [%]

Dependency:

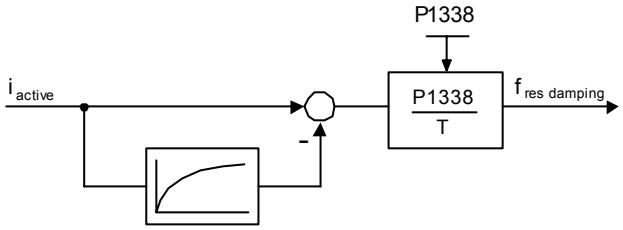
Slip compensation (P1335) active.

P1338[3] **Resonance damping gain V/f** Level **3**

CStat: CUT **Datatype:** Float **Unit:** - **Min:** 0.00 **Def:** 0.00 **Max:** 10.00

P-Group: CONTROL **Active:** Immediately **QuickComm.:** No

Defines resonance damping gain for V/f. Here, di/dt of the acitve current will be scaled by P1338 (see diagram below). If di/dt increases the resonance damping circuit decreases the inverter output frequency.



Index:

P1338[0] : 1st. Drive data set (DDS)
P1338[1] : 2nd. Drive data set (DDS)
P1338[2] : 3rd. Drive data set (DDS)

Note:

The resonance circuit damps oscillations of the active current which frequently occur during no-load operation.

In V/f modes (see P1300), the resonance damping circuit is active in a range from approx. 6 % to 80 % of rated motor frequency (P0310).

If the value of P1338 is too high, this will cause instability (forward control effect).

P1340[3] **Imax freq. controller prop. gain** Level **3**

CStat: CUT **Datatype:** Float **Unit:** - **Min:** 0.000 **Def:** 0.000 **Max:** 0.499

P-Group: CONTROL **Active:** Immediately **QuickComm.:** No

Proportional gain of the I_max frequency controller.

The Imax controller reduces inverter current if the output current exceeds the maximum motor current (r0067).

In linear V/f, parabolic V/f, FCC, and programmable V/f modes the I_max controller uses both a frequency controller (see parameters P1340 and P1341) and a voltage controller (see parameters P1345 and P1346). The frequency controller seeks to reduce current by limiting the inverter output frequency (to a minimum of the two times nominal slip frequency). If this action does not successfully remove the overcurrent condition, the inverter output voltage is reduced using the I_max voltage controller. When the overcurrent condition has been removed successfully, frequency limiting is removed using the ramp-up time set in P1120.

In linear V/f for textiles, FCC for textiles, or external V/f modes only the I_max voltage controller is used to reduce current (See parameters P1345 and P1346).

Index:

P1340[0] : 1st. Drive data set (DDS)
P1340[1] : 2nd. Drive data set (DDS)
P1340[2] : 3rd. Drive data set (DDS)

Note:

The I_max controller can be disabled by setting the frequency controller integral time P1341 to zero. This disables both the frequency and voltage controllers. Note that when disabled, the I_max controller will take no action to reduce current but overcurrent warnings will still be generated, and the Drive will trip in excessive overcurrent or overload conditions.

P1341[3] **Imax freq. ctrl. integral time** Level **3**

CStat:	CUT	**Datatype:** Float	**Unit:** s	**Min:**	0.000
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.:** No	**Def:**	0.300
				Max:	50.000

Integral time constant of the I_max controller.

P1341 = 0 :
I_max frequency and voltage controllers disabled

P1340 = 0 and P1341 > 0 :
frequency controller enhanced integral

P1340 > 0 and P1341 > 0 :
frequency controller normal PI control

See description in parameter P1340 for further information.

Index:
P1341[0] : 1st. Drive data set (DDS)
P1341[1] : 2nd. Drive data set (DDS)
P1341[2] : 3rd. Drive data set (DDS)

r1343 **CO: Imax controller freq. output** Level **3**

		Datatype: Float	**Unit:** Hz	**Min:**	-
P-Group:	CONTROL			**Def:**	-
				Max:	-

Displays effective frequency limitation.

Dependency:
If I_max controller not in operation, parameter normally shows max. frequency P1082.

r1344 **CO: Imax controller volt. output** Level **3**

		Datatype: Float	**Unit:** V	**Min:**	-
P-Group:	CONTROL			**Def:**	-
				Max:	-

Displays amount by which the I_max controller is reducing the inverter output voltage.

P1345[3] **Imax voltage ctrl. prop. gain** Level **3**

CStat:	CUT	**Datatype:** Float	**Unit:** -	**Min:**	0.000
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.:** No	**Def:**	0.250
				Max:	5.499

Proportional gain of the I_max voltage controller. See parameter P1340 for further information.

Index:
P1345[0] : 1st. Drive data set (DDS)
P1345[1] : 2nd. Drive data set (DDS)
P1345[2] : 3rd. Drive data set (DDS)

P1346[3] **Imax voltage ctrl. integral time** Level **3**

CStat:	CUT	**Datatype:** Float	**Unit:** s	**Min:**	0.000
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.:** No	**Def:**	0.300
				Max:	50.000

Integral time constant of the I_max voltage controller.

P1341 = 0 :
I_max frequency and voltage controllers disabled.

P1345 = 0 and P1346 > 0 :
I_max voltage controller enhanced integral

P1345 > 0 and P1346 > 0 :
I_max voltage controller normal PI control

See description in parameter P1340 for further information.

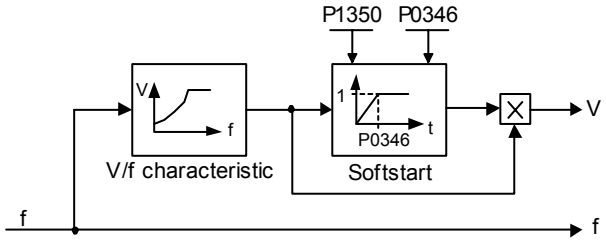
Index:
P1346[0] : 1st. Drive data set (DDS)
P1346[1] : 2nd. Drive data set (DDS)
P1346[2] : 3rd. Drive data set (DDS)

P1350[3] **Voltage soft start**

CStat:	CUT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	CONTROL	**Active:** first confirm	**QuickComm.:** No	**Def:**	0
				Max:	1

Level **3**

Sets whether voltage is built up smoothly during magnetization time (ON) or whether it simply jumps to boost voltage (OFF).



Possible Settings:

0 OFF
1 ON

Index:

P1350[0] : 1st. Drive data set (DDS)
P1350[1] : 2nd. Drive data set (DDS)
P1350[2] : 3rd. Drive data set (DDS)

Note:

The settings for this parameter bring benefits and drawbacks:

P1350 = 0: OFF (jump to boost voltage)
Benefit: flux is built up quickly
Drawback: motor may move

P1350 = 1: ON (smooth voltage build-up)
Benefit: motor less likely to move
Drawback: flux build-up takes longer

P1400[3] **Configuration of speed control**

CStat:	CUT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.:** No	**Def:**	1
				Max:	3

Level **3**

Configuration for speed control.

Bitfields:

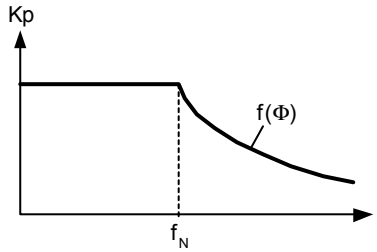
Bit00	Automatic Kp adaption	0	NO	1	YES
Bit01	Integral freeze (SLVC)	0	NO	1	YES

Index:

P1400[0] : 1st. Drive data set (DDS)
P1400[1] : 2nd. Drive data set (DDS)
P1400[2] : 3rd. Drive data set (DDS)

Note:

P1400 Bit 00 = 1:
Automatic gain adaption of speed controller is enabled. In the area of field weakening the gain is reduced in dependence on flux.



P1400 Bit01 = 1:
The integrator of the speed controller is frozen if Sensorless Vector Control (SLVC) is selected and the control is switched from closed-loop to open-loop operation.
Advantage:
The correct amount of slip compensation is calculated and applied to the open-loop function for a motor under load.

r1407 **CO/BO: Status 2 of motor control** Level **3**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

Displays status of motor control, which can be used to diagnose inverter status.

Bitfields:

Bit00	V/f control enable	0	NO	1	YES
Bit01	SLVC enable	0	NO	1	YES
Bit02	Torque control enable	0	NO	1	YES
Bit05	Stop I-comp. speed control	0	NO	1	YES
Bit06	Set I-comp. speed controller	0	NO	1	YES
Bit08	Upper torque limit active	0	NO	1	YES
Bit09	Lower torque limit active	0	NO	1	YES
Bit10	Enable droop	0	NO	1	YES
Bit15	DDS change active	0	NO	1	YES

Details:

See P052 (CO/BO: Status word 1)

r1438 **CO: Freq. setpoint to controller** Level **3**

Datatype: Float **Unit:** Hz **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

Displays setpoint of speed controller.

P1442[3] **Filter time for act. speed** Level **3**

CStat: CUT **Datatype:** U16 **Unit:** ms **Min:** 0 **Def:** 4 **Max:** 32000

P-Group: CONTROL **Active:** Immediately **QuickComm.:** No

Sets time constant of PT1 filter to smooth actual speed of speed controller.

Index:

P1442[0] : 1st. Drive data set (DDS)
P1442[1] : 2nd. Drive data set (DDS)
P1442[2] : 3rd. Drive data set (DDS)

r1445 **CO: Act. filtered frequency** Level **4**

Datatype: Float **Unit:** Hz **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

Displays filtered actual frequency at speed controller input.

P1452[3] **Filter time for act. freq (SLVC)** Level **3**

CStat: CUT **Datatype:** U16 **Unit:** ms **Min:** 0 **Def:** 4 **Max:** 32000

P-Group: CONTROL **Active:** Immediately **QuickComm.:** No

Sets time constant of PT1 filter to filter the frequency deviation of speed controller in operation mode SLVC (sensorless vector control).

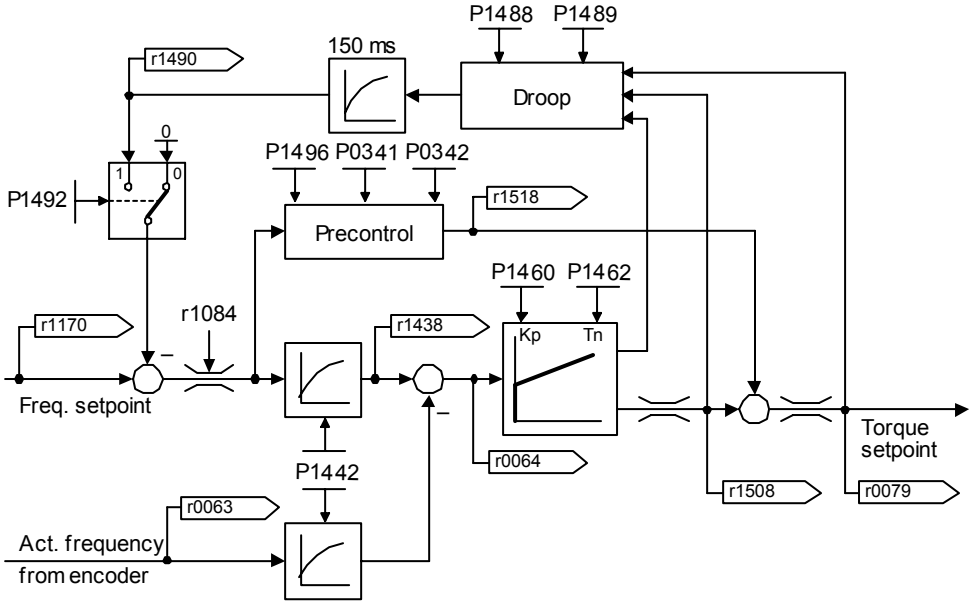
Index:

P1452[0] : 1st. Drive data set (DDS)
P1452[1] : 2nd. Drive data set (DDS)
P1452[2] : 3rd. Drive data set (DDS)

P1460[3] **Gain speed controller** Level **2**

CStat:	CUT	**Datatype:** Float	**Unit:** -	**Min:**	0.0
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.:** No	**Def:**	3.0
				Max:	2000.0

Enters gain of speed controller.



Index:

P1460[0] : 1st. Drive data set (DDS)
P1460[1] : 2nd. Drive data set (DDS)
P1460[2] : 3rd. Drive data set (DDS)

P1462[3] **Integral time speed controller** Level **2**

CStat:	CUT	**Datatype:** U16	**Unit:** ms	**Min:**	25
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.:** No	**Def:**	400
				Max:	32001

Enters integral time of speed controller.

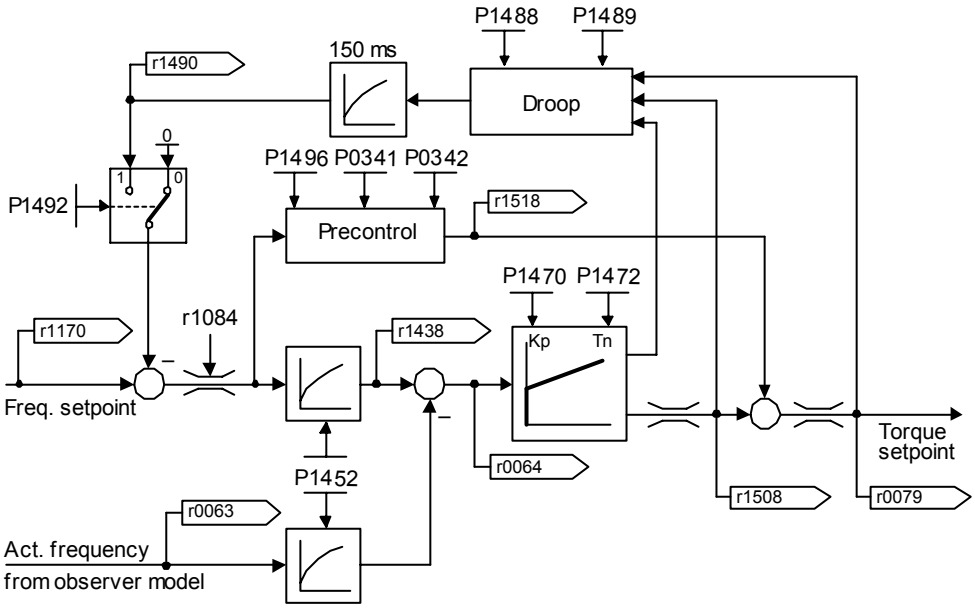
Index:

P1462[0] : 1st. Drive data set (DDS)
P1462[1] : 2nd. Drive data set (DDS)
P1462[2] : 3rd. Drive data set (DDS)

P1470[3] **Gain speed controller (SLVC)** Level **2**

CStat:	CUT	**Datatype:** Float	**Unit:** -	**Min:**	0.0
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.:** No	**Def:**	3.0
				Max:	2000.0

Enters gain of speed controller for sensorless vector control (SLVC).



Index:

P1470[0] : 1st. Drive data set (DDS)
P1470[1] : 2nd. Drive data set (DDS)
P1470[2] : 3rd. Drive data set (DDS)

P1472[3] **Integral time n-ctrl. (SLVC)** Level **2**

CStat:	CUT	**Datatype:** U16	**Unit:** ms	**Min:**	25
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.:** No	**Def:**	400
				Max:	32001

Enters integral time of speed controller for sensorless vector control (SLVC).

Index:

P1472[0] : 1st. Drive data set (DDS)
P1472[1] : 2nd. Drive data set (DDS)
P1472[2] : 3rd. Drive data set (DDS)

P1477[3] **BI: Set integrator of n-ctrl.** Level **3**

CStat:	CUT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	CONTROL	**Active:** first confirm	**QuickComm.:** No	**Def:**	0:0
				Max:	4000:0

Selects source to read in command to enable speed controller.

Index:

P1477[0] : 1st. Command data set (CDS)
P1477[1] : 2nd. Command data set (CDS)
P1477[2] : 3rd. Command data set (CDS)

P1478[3] **CI: Set integrator value n-ctrl.** Level **3**

CStat:	UT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	CONTROL	**Active:** first confirm	**QuickComm.:** No	**Def:**	0:0
				Max:	4000:0

Selects source for integral part of speed controller.

Index:

P1478[0] : 1st. Command data set (CDS)
P1478[1] : 2nd. Command data set (CDS)
P1478[2] : 3rd. Command data set (CDS)

Dependency:

In case of sensorless vector control, integrator freezing must be selected (Bit 1 "Integral freeze (SLVC)" of P1400 has to be set) to save the integrator output.

Note:

If the setting command is not connected (P1477=0), a pending value is read in after pulse enable at the end of the excitation time (P0346) and the integral component of the speed controller is set once. If the P1482 (integral component of speed controller) is connected upon pulse enable, the integral component of the controller is set to the last value prior the pulse inhibit.

Notice:

Neither function works after flying start.

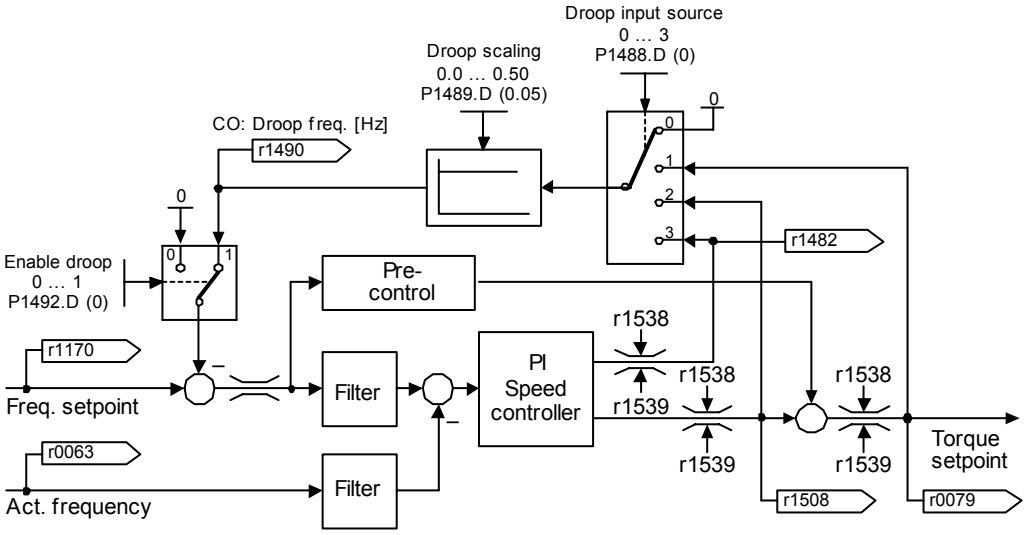
r1482	CO: Integral output of n-ctrl.			Min: -	Level
		Datatype: Float	**Unit:** Nm	**Def:** -	**3**
	P-Group: CONTROL			**Max:** -	

Displays integral part of speed controller output.

P1488[3]	Droop input source			Min: 0	Level
	CStat: CUT	**Datatype:** U16	**Unit:** -	**Def:** 0	**3**
	P-Group: CONTROL	**Active:** first confirm	**QuickComm.:** No	**Max:** 3	

Selects source of droop input signal.

With mechanically coupled motors it is very important that an even load distribution is applied to each motor. The load sharing can be achieved by enabling the droop function on both inverters.



1. Droop is applied as a frequency setpoint on each inverter.
   The droop increases the slip via the negative feedback of the torque setpoint to the frequency setpoint.
   In a steady-state an even load distribution can be achieved if the slip characteristics are identical.
   - P1488 > 0
   - P1489 > 0
   - P1492 = 1

2. Droop can act as a setpoint or limitation for a group of inverters (i.e. master-slave inverters)
   By use of the master-slave inverter technique an even load distribution is achieved across the whole application. This is accomplished by setting the torque setpoint (r1490) on the master inverter which then controls the frequency of the master inverter and all connected slave inverters.
   - P1488 > 0
   - P1489 > 0
   - P1492 = 0

Possible Settings:

0 Droop input disabled
1 Torque setpoint
2 Speed controller output
3 Speed controller integral output

Index:

P1488[0] : 1st. Drive data set (DDS)
P1488[1] : 2nd. Drive data set (DDS)
P1488[2] : 3rd. Drive data set (DDS)

Dependency:

Droop scaling (P1489) must be > 0 for droop to be effective.

P1489[3]	Droop scaling			Min: 0.00	Level
	CStat: CUT	**Datatype:** Float	**Unit:** -	**Def:** 0.05	**3**
	P-Group: CONTROL	**Active:** Immediately	**QuickComm.:** No	**Max:** 0.50	

Defines amount of droop in per unit at full load in [%].

Index:

P1489[0] : 1st. Drive data set (DDS)
P1489[1] : 2nd. Drive data set (DDS)
P1489[2] : 3rd. Drive data set (DDS)

Note:

If 0 is entered as value, no droop is applied.

r1490 **CO: Droop frequency** Level **3**

Datatype: Float **Unit:** Hz **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

Displays output signal of droop function.

This result of droop calculation is subtracted from the speed controller setpoint.

P1492[3] **Enable droop** Level **3**

CStat: CUT **Datatype:** U16 **Unit:** - **Min:** 0 **Def:** 0 **Max:** 1

P-Group: CONTROL **Active:** first confirm **QuickComm.:** No

Enables droop.

Possible Settings:

0 Disabled
1 Enabled

Index:

P1492[0] : 1st. Drive data set (DDS)
P1492[1] : 2nd. Drive data set (DDS)
P1492[2] : 3rd. Drive data set (DDS)

Dependency:

Effective only if droop scaling P1489 > 0.

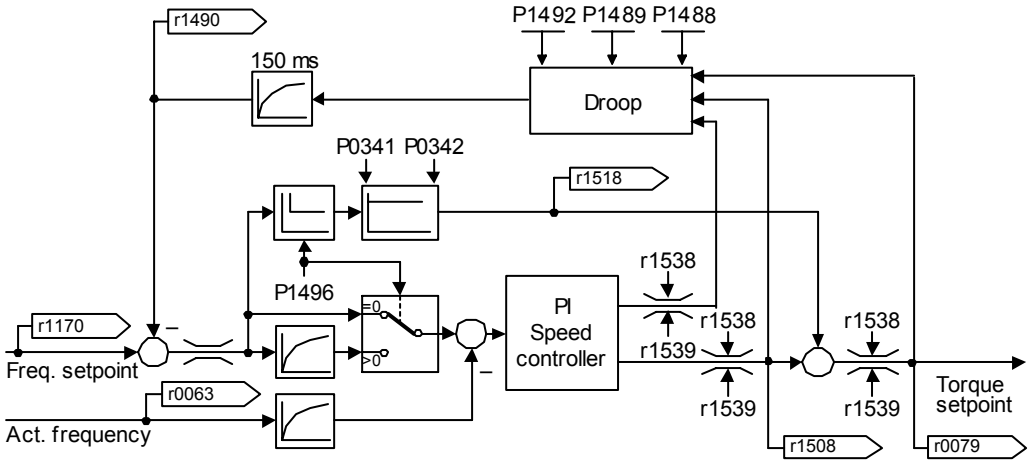
P1496[3] **Scaling accel. precontrol** Level **3**

CStat: CUT **Datatype:** Float **Unit:** % **Min:** 0.0 **Def:** 0.0 **Max:** 400.0

P-Group: CONTROL **Active:** Immediately **QuickComm.:** No

Enters scaling of acceleration in [%].

The response of setpoint changes for the speed control loop can be improved using the precontrol function (P1496). Precontrol is derived from the differential frequency setpoint multiplied by the mass inertia P0341; P0342 is then supplied as a torque setpoint to the current controller. If the filter (VC: P1442, SLVC: P1452) is applied in the correct manner, the derived speed controller is only required to control a small deviation in the value of the corrected variable. Setpoint changes are then passed by the speed controller and are quickly executed.



Index:

P1496[0] : 1st. Drive data set (DDS)
P1496[1] : 2nd. Drive data set (DDS)
P1496[2] : 3rd. Drive data set (DDS)

Note:

P1496 = 0:
Precontrol disabled

P1496 > 0:
Precontrol enabled

P1496 = 100:
Standard setting for precontrol

P1499[3] **Scaling accel. torque control** Level **3**

CStat: CUT **Datatype:** Float **Unit:** % **Min:** 0.0 **Def:** 100.0 **Max:** 400.0

P-Group: CONTROL **Active:** Immediately **QuickComm.:** No

Enters scaling of acceleration in [%] for sensorless torque control (SLVC) at low frequencies.

Index:

P1499[0] : 1st. Drive data set (DDS)
P1499[1] : 2nd. Drive data set (DDS)
P1499[2] : 3rd. Drive data set (DDS)

P1500[3] **Selection of torque setpoint**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	CONTROL	**Active:** first confirm	**QuickComm.:** Yes	**Def:**	0
				Max:	77

Level **2**

Selects torque setpoint source. In the table of possible settings below, the main setpoint is selected from the least significant digit (i.e., 0 to 7) and any additional setpoint from the most significant digit (i.e., x0 through to x7).

Possible Settings:

0	No main setpoint	
2	Analog setpoint	
4	USS on BOP link	
5	USS on COM link	
6	CB on COM link	
7	Analog setpoint 2	
20	No main setpoint	+ Analog setpoint
22	Analog setpoint	+ Analog setpoint
24	USS on BOP link	+ Analog setpoint
25	USS on COM link	+ Analog setpoint
26	CB on COM link	+ Analog setpoint
27	Analog setpoint 2	+ Analog setpoint
40	No main setpoint	+ USS on BOP link
42	Analog setpoint	+ USS on BOP link
44	USS on BOP link	+ USS on BOP link
45	USS on COM link	+ USS on BOP link
46	CB on COM link	+ USS on BOP link
47	Analog setpoint 2	+ USS on BOP link
50	No main setpoint	+ USS on COM link
52	Analog setpoint	+ USS on COM link
54	USS on BOP link	+ USS on COM link
55	USS on COM link	+ USS on COM link
57	Analog setpoint 2	+ USS on COM link
60	No main setpoint	+ CB on COM link
62	Analog setpoint	+ CB on COM link
64	USS on BOP link	+ CB on COM link
66	CB on COM link	+ CB on COM link
67	Analog setpoint 2	+ CB on COM link
70	No main setpoint	+ Analog setpoint 2
72	Analog setpoint	+ Analog setpoint 2
74	USS on BOP link	+ Analog setpoint 2
75	USS on COM link	+ Analog setpoint 2
76	CB on COM link	+ Analog setpoint 2
77	Analog setpoint 2	+ Analog setpoint 2

Index:

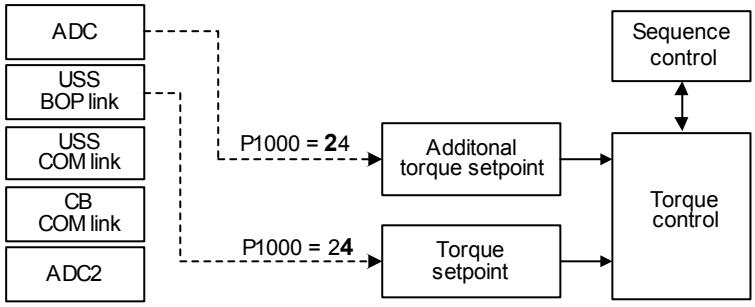
P1500[0] : 1st. Command data set (CDS)
P1500[1] : 2nd. Command data set (CDS)
P1500[2] : 3rd. Command data set (CDS)

Example:

Setting 24 selects the main setpoint (4) derived from the USS on BOP link with the additional setpoint (2) derived from the analog input. Single digits are main setpoints only with no additional setpoint.

Example P1500 = 24 :

P1500 = **2**4 ⇒ P1503 = 755.0	P1503 CI: Torque setpoint
	r0755 CO: Act. ADC after scal. [4000h]
P1500 = 2**4** ⇒ P1511 = r2015.1	P1511 CI: Additional torque setpoint
	r2015 CO: PZD from BOP link (USS)



Caution:

Be aware, by changing of parameter P1500 all BICO parameters (see table below) are modified.

Note:

Changing this parameter sets (to default) all settings on item selected (see table).

P1500 = xy		P1500 = xy						
		y = 0	**y = 2**	**y = 4**	**y = 5**	**y = 6**	**y = 7**	
P1500 = xy	**x = 0**	0.0	755.0	2015.1	2018.1	2050.1	755.1	P1503
		0.0	0.0	0.0	0.0	0.0	0.0	P1511
	x = 2	0.0	755.0	2015.1	2018.1	2050.1	755.1	P1503
		755.0	755.0	755.0	755.0	755.0	755.0	P1511
	x = 4	0.0	755.0	2015.1	2018.1	2050.1	755.1	P1503
		2015.1	2015.1	2015.1	2015.1	2015.1	2015.1	P1511
	x = 5	0.0	755.0	2015.1	2018.1		755.1	P1503
		2018.1	2018.1	2018.1	2018.1		2018.1	P1511
	x = 6	0.0	755.0	2015.1		2050.1	755.1	P1503
		2050.1	2050.1	2050.1		2050.1	2050.1	P1511
	x = 7	0.0	755.0	2015.1	2018.1	2050.1	755.1	P1503
		755.1	755.1	755.1	755.1	755.1	755.1	P1511

Example:

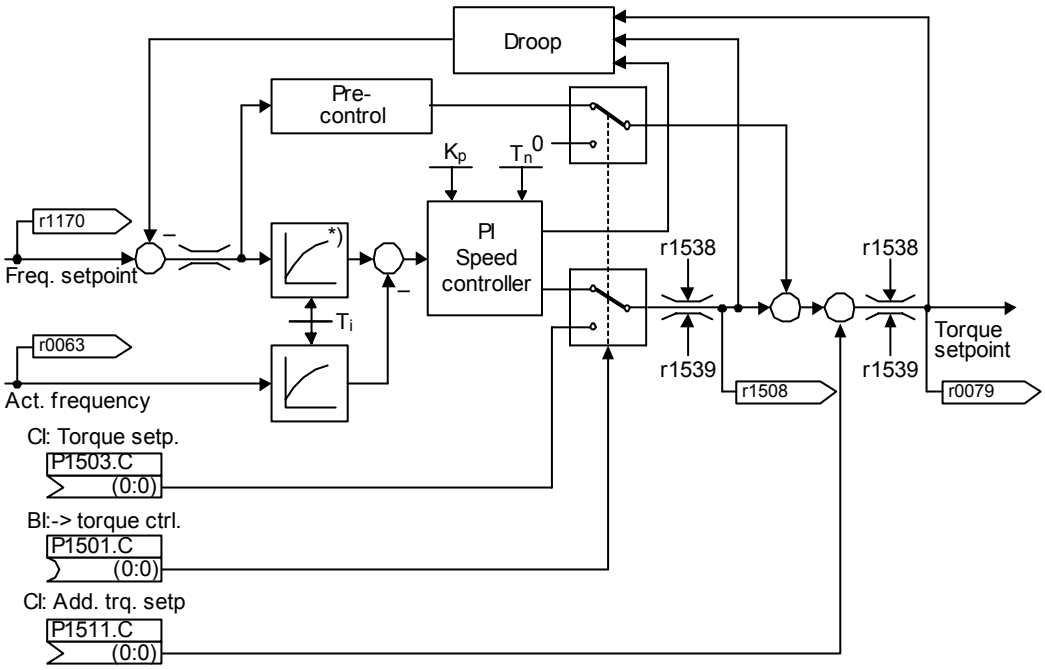
P1500 = 24 → P1503 = 2015.1
P1511 = 755.0

P1501[3] **BI: Change to torque control**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	CONTROL	**Active:** first confirm	**QuickComm.:** No	**Def:**	0:0
				Max:	4000:0

Level **3**

Selects command source from which it is possible to change between master (speed control) and slave (torque control).



*) only active, if pre-control is enabled (P1496 > 0)

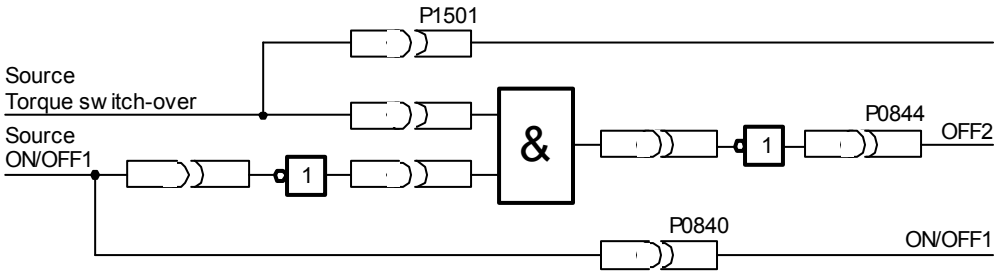
	T_i	K_p	T_n
SLVC:	P1452	P1470	P1472
VC:	P1442	P1460	P1462

Index:

P1501[0] : 1st. Command data set (CDS)
P1501[1] : 2nd. Command data set (CDS)
P1501[2] : 3rd. Command data set (CDS)

Caution:

The OFF1 command is not recognized when torque control is selected indirectly (P1300=20, 21 and P1501=1). However, if direct selection of torque control is used (P1300=22, 23) the OFF1 command is recognized as OFF2. If indirect selection of torque control is used, it is recommended to program an OFF2 command using, for example a digital input or create the following circuit using the Free Function Blocks (FFB):



Details:

Speed control with encoder feedback see P1460
Speed control without encoder feedback see P1470

P1503[3] **CI: Torque setpoint**

CStat:	T	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	CONTROL	**Active:** first confirm	**QuickComm.:** No	**Def:**	0:0
				Max:	4000:0

Level **3**

Selects source of torque setpoint for torque control.

Index:

P1503[0] : 1st. Command data set (CDS)
P1503[1] : 2nd. Command data set (CDS)
P1503[2] : 3rd. Command data set (CDS)

r1508 **CO: Torque setpoint** Level **2**

Datatype: Float **Unit:** Nm **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

Displays torque setpoint before limitation.

P1511[3] **CI: Additional torque setpoint** Level **3**

CStat: T **Datatype:** U32 **Unit:** - **Min:** 0:0 **Def:** 0:0 **Max:** 4000:0

P-Group: CONTROL **Active:** first confirm **QuickComm.:** No

Selects source of additional torque setpoint for torque and speed control.

Index:

P1511[0] : 1st. Command data set (CDS)
P1511[1] : 2nd. Command data set (CDS)
P1511[2] : 3rd. Command data set (CDS)

r1515 **CO: Additional torque setpoint** Level **2**

Datatype: Float **Unit:** Nm **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

Displays additional torque setpoint.

r1518 **CO: Acceleration torque** Level **3**

Datatype: Float **Unit:** Nm **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

Displays acceleration torque.

P1520[3] **CO: Upper torque limit** Level **2**

CStat: CUT **Datatype:** Float **Unit:** Nm **Min:** -99999.00 **Def:** 5.13 **Max:** 99999.00

P-Group: CONTROL **Active:** Immediately **QuickComm.:** No

Specifies fixed value for upper torque limitation.

$P1520_{max} = \pm 4 \cdot r0333$

Index:

P1520[0] : 1st. Drive data set (DDS)
P1520[1] : 2nd. Drive data set (DDS)
P1520[2] : 3rd. Drive data set (DDS)

P1521[3] **CO: Lower torque limit** Level **2**

CStat: CUT **Datatype:** Float **Unit:** Nm **Min:** -99999.00 **Def:** -5.13 **Max:** 99999.00

P-Group: CONTROL **Active:** Immediately **QuickComm.:** No

Enters fixed value of lower torque limitation.

$P1521_{max} = \pm 4 \cdot r0333$

Index:

P1521[0] : 1st. Drive data set (DDS)
P1521[1] : 2nd. Drive data set (DDS)
P1521[2] : 3rd. Drive data set (DDS)

P1522[3] **CI: Upper torque limit** Level **3**

CStat: T **Datatype:** U32 **Unit:** - **Min:** 0:0 **Def:** 1520:0 **Max:** 4000:0

P-Group: CONTROL **Active:** first confirm **QuickComm.:** No

Selects source of upper torque limitation.

Index:

P1522[0] : 1st. Command data set (CDS)
P1522[1] : 2nd. Command data set (CDS)
P1522[2] : 3rd. Command data set (CDS)

P1523[3] **CI: Lower torque limit** Level **3**

CStat: T **Datatype:** U32 **Unit:** - **Min:** 0:0 **Def:** 1521:0 **Max:** 4000:0

P-Group: CONTROL **Active:** first confirm **QuickComm.:** No

Selects source of lower torque limitation.

Index:

P1523[0] : 1st. Command data set (CDS)
P1523[1] : 2nd. Command data set (CDS)
P1523[2] : 3rd. Command data set (CDS)

P1525[3] **Scaling lower torque limit**

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-400.0
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.:** No	**Def:**	100.0
				Max:	400.0

Level **3**

Enters scaling of lower torque limitation in [%].

Index:

P1525[0] : 1st. Drive data set (DDS)
P1525[1] : 2nd. Drive data set (DDS)
P1525[2] : 3rd. Drive data set (DDS)

Note:

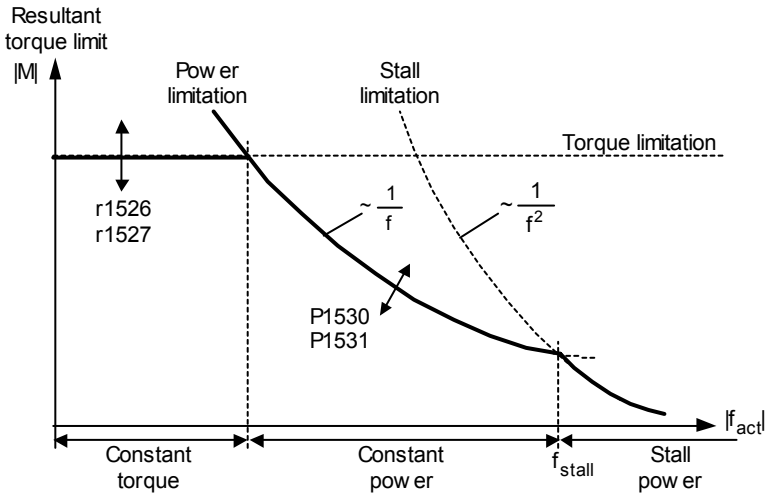
P1525 = 100 % = standard setting

r1526 **CO: Upper torque limitation**

		Datatype: Float	**Unit:** Nm	**Min:**	-
P-Group:	CONTROL			**Def:**	-
				Max:	-

Level **3**

Displays actual upper torque limitation.



Dependency:

The parameters r1526 and r1527 depend on P1520, P1521, P1522, P1523 and P1525.

r1527 **CO: Lower torque limitation**

		Datatype: Float	**Unit:** Nm	**Min:**	-
P-Group:	CONTROL			**Def:**	-
				Max:	-

Level **3**

Displays actual lower torque limitation.

Details:

See parameter r1526.

P1530[3] **Motoring power limitation** Level **2**

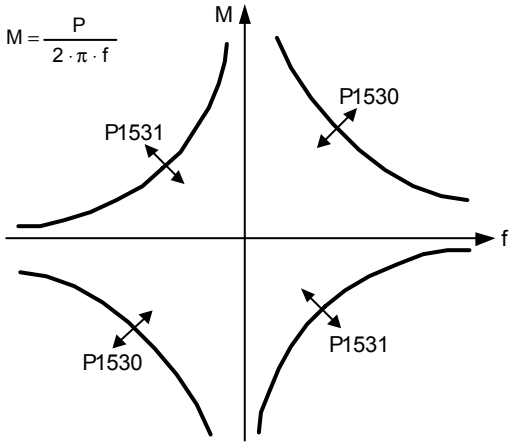
CStat:	CUT	**Datatype:** Float	**Unit:** -	**Min:**	0.00
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.:** No	**Def:**	0.12
				Max:	8000.00

Defines fixed value for the max. permissible motoring active power (motoring power limitation).

$$P1530_{max} = 3 \cdot P0307$$

Parameter P1530 limits the torque in addition to the act. frequency as displayed in the following characteristic.

Pow er limitation (motoring, regenerative)



Index:

P1530[0] : 1st. Drive data set (DDS)
P1530[1] : 2nd. Drive data set (DDS)
P1530[2] : 3rd. Drive data set (DDS)

P1531[3] **Regenerative power limitation** Level **2**

CStat:	CUT	**Datatype:** Float	**Unit:** -	**Min:**	-8000.00
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.:** No	**Def:**	-0.12
				Max:	0.00

Enters fixed value for the max. permissible regenerative active power (regenerative power limitation).

$$P1531_{max} = -3 \cdot P0307$$

Index:

P1531[0] : 1st. Drive data set (DDS)
P1531[1] : 2nd. Drive data set (DDS)
P1531[2] : 3rd. Drive data set (DDS)

Details:

See parameter P1530.

r1536 **CO: Max. trq. motoring current** Level **4**

		Datatype: Float	**Unit:** A	**Min:**	-
				Def:	-
P-Group:	CONTROL			**Max:**	-

Displays maximum torque motoring current component.

r1537 **CO: Max trq regenerative current** Level **4**

		Datatype: Float	**Unit:** A	**Min:**	-
				Def:	-
P-Group:	CONTROL			**Max:**	-

Displays maximum torque of the regenerative current component.

r1538 **CO: Upper torque limit (total)** Level **2**

		Datatype: Float	**Unit:** Nm	**Min:**	-
				Def:	-
P-Group:	CONTROL			**Max:**	-

Displays total upper torque limitation.

r1539 **CO: Lower torque limit (total)** Level **2**

		Datatype: Float	**Unit:** Nm	**Min:**	-
				Def:	-
P-Group:	CONTROL			**Max:**	-

Displays total lower torque limitation.

P1570[3] **CO: Fixed value flux setpoint** Level **2**

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	50.0
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.:** No	**Def:**	100.0
				Max:	200.0

Defines fixed value of flux setpoint in [%] relative to rated motor flux.

Index:

P1570[0] : 1st. Drive data set (DDS)
P1570[1] : 2nd. Drive data set (DDS)
P1570[2] : 3rd. Drive data set (DDS)

Note:

If P1570 > 100%, the flux setpoint rises according to the load from 100 % to the value of P1570 between idling and nominal load.

P1574[3] **Dynamic voltage headroom** Level **3**

CStat:	CUT	**Datatype:** U16	**Unit:** V	**Min:**	0
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.:** No	**Def:**	10
				Max:	150

Sets dynamic voltage headroom for vector control.

Index:

P1574[0] : 1st. Drive data set (DDS)
P1574[1] : 2nd. Drive data set (DDS)
P1574[2] : 3rd. Drive data set (DDS)

P1580[3] **Efficiency optimization** Level **2**

CStat:	CUT	**Datatype:** U16	**Unit:** %	**Min:**	0
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.:** No	**Def:**	0
				Max:	100

Enters degree of efficiency optimization in [%].

Index:

P1580[0] : 1st. Drive data set (DDS)
P1580[1] : 2nd. Drive data set (DDS)
P1580[2] : 3rd. Drive data set (DDS)

Note:

If P1580 > 0, the dynamics for speed control (P1470, P1472) are restricted to prevent vibration.

When no load is applied, a value of 100 % produces full flux reduction (i.e. to 50 % of rated motor flux).

When using optimization, it is necessary to increase the smoothing time of the flux setpoint (P1582).

P1582[3] **Smooth time for flux setpoint** Level **3**

CStat:	CUT	**Datatype:** U16	**Unit:** ms	**Min:**	4
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.:** No	**Def:**	15
				Max:	500

Sets time constant of PT1 filter to smooth flux setpoint.

Index:

P1582[0] : 1st. Drive data set (DDS)
P1582[1] : 2nd. Drive data set (DDS)
P1582[2] : 3rd. Drive data set (DDS)

r1583 **CO: Flux setpoint (smoothed)** Level **4**

		Datatype: Float	**Unit:** %	**Min:**	-
				Def:	-
P-Group:	CONTROL			**Max:**	-

Displays smoothed flux setpoint in [%] relative to rated motor flux.

P1596[3] **Int. time field weak. controller** Level **3**

CStat:	CUT	**Datatype:** U16	**Unit:** ms	**Min:**	20
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.:** No	**Def:**	50
				Max:	32001

Sets integral time for field weakening controller.

Index:

P1596[0] : 1st. Drive data set (DDS)
P1596[1] : 2nd. Drive data set (DDS)
P1596[2] : 3rd. Drive data set (DDS)

r1597 **CO: Outp. field weak. controller** Level **4**

		Datatype: Float	**Unit:** %	**Min:**	-
				Def:	-
P-Group:	CONTROL			**Max:**	-

Displays output signal of field weakening controller in [%] relative to rated motor flux.

r1598 **CO: Flux setpoint (total)** Level **3**

		Datatype: Float	**Unit:** %	**Min:**	-
				Def:	-
P-Group:	CONTROL			**Max:**	-

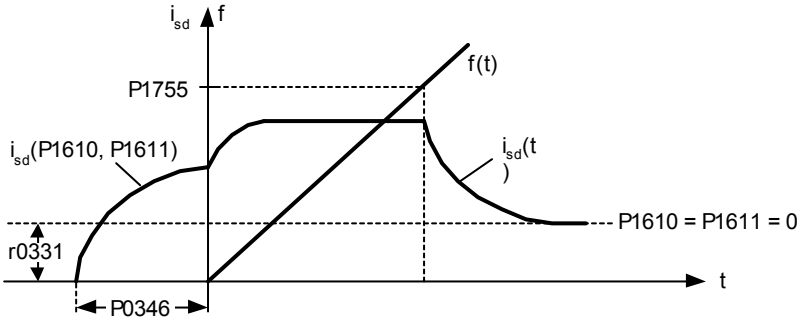
Displays total flux setpoint in [%] relative to the rated motor flux.

P1610[3] **Continuous torque boost (SLVC)** Level **2**

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	0.0
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.:** No	**Def:**	50.0
				Max:	200.0

Sets continuous torque boost in lower frequency range of SLVC (sensorless vector control).

Value is entered in [%] relative to rated motor torque r0333.



Index:
P1610[0] : 1st. Drive data set (DDS)
P1610[1] : 2nd. Drive data set (DDS)
P1610[2] : 3rd. Drive data set (DDS)

Note:
P1610 = 100 % corresponds to rated motor torque.

P1611[3] **Acc. torque boost (SLVC)** Level **2**

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	0.0
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.:** No	**Def:**	0.0
				Max:	200.0

Sets acceleration torque boost in lower frequency range of SLVC (sensorless vector control).

Value is entered in [%] relative to rated motor torque r0333.

Index:
P1611[0] : 1st. Drive data set (DDS)
P1611[1] : 2nd. Drive data set (DDS)
P1611[2] : 3rd. Drive data set (DDS)

Note:
P1611 = 100 % corresponds to rated motor torque.

P1654[3] **Smooth time for Isq setpoint** Level **4**

CStat:	CUT	**Datatype:** Float	**Unit:** ms	**Min:**	2.0
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.:** No	**Def:**	6.0
				Max:	20.0

Sets time constant of PT1 filter to filter setpoint of torque generating current component in field weakening range.

Index:
P1654[0] : 1st. Drive data set (DDS)
P1654[1] : 2nd. Drive data set (DDS)
P1654[2] : 3rd. Drive data set (DDS)

P1715[3] **Gain current controller** Level **4**

CStat:	CUT	**Datatype:** Float	**Unit:** -	**Min:**	0.00
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.:** No	**Def:**	0.25
				Max:	5.00

Enters gain of current controller.

Index:
P1715[0] : 1st. Drive data set (DDS)
P1715[1] : 2nd. Drive data set (DDS)
P1715[2] : 3rd. Drive data set (DDS)

P1717[3] **Integral time current controller** Level **4**

CStat:	CUT	**Datatype:** Float	**Unit:** ms	**Min:**	1.0
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.:** No	**Def:**	4.1
				Max:	50.0

Enters integral time of current controller.

Index:
P1717[0] : 1st. Drive data set (DDS)
P1717[1] : 2nd. Drive data set (DDS)
P1717[2] : 3rd. Drive data set (DDS)

r1718 **CO: Output of Isq controller** Level **4**

		Datatype: Float	**Unit:** V	**Min:**	-
				Def:	-
P-Group:	CONTROL			**Max:**	-

Displays actual output of Isq current (torque current) controller (PI controller). It contains the proportional and integral part of the PI controller.

r1719 **CO: Integral output of Isq ctrl.** Level **4**

Datatype: Float **Unit:** V **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

Displays integral output of Isq current (torque current) controller (PI controller).

r1723 **CO: Output of Isd controller** Level **4**

Datatype: Float **Unit:** V **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

Displays actual output of Isd current (flux current) controller (PI controller). It contains the proportional and integral part of the PI controller.

r1724 **CO: Integral output of Isd ctrl.** Level **4**

Datatype: Float **Unit:** V **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

Displays integral output of Isd current (flux current) controller (PI controller).

r1725 **CO: Integral limit of Isd ctrl.** Level **4**

Datatype: Float **Unit:** V **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

Displays limit of integral output voltage setpoint of Isd current controller.

r1728 **CO: Decoupling voltage** Level **4**

Datatype: Float **Unit:** V **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

Displays actual output voltage setpoint of cross channel decoupling.

P1740 **Gain for oscillation damping** Level **3**

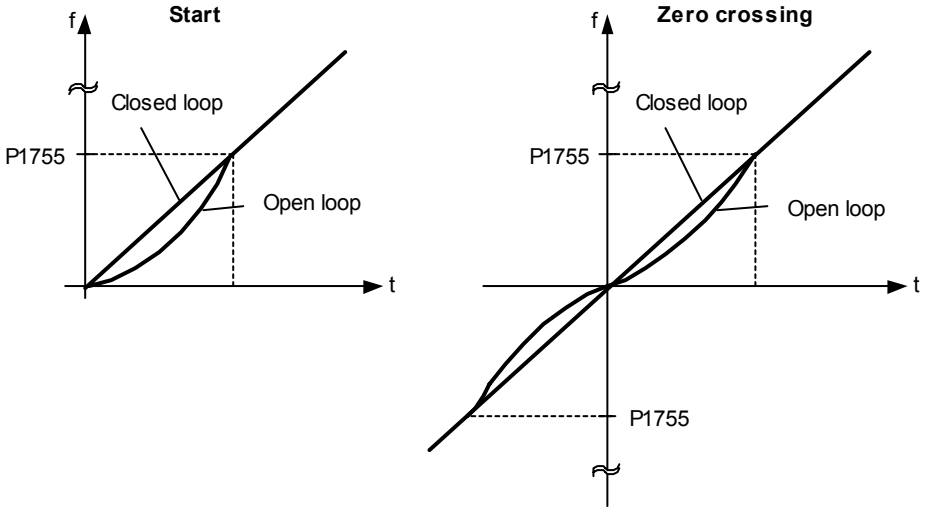
CStat: CUT **Datatype:** Float **Unit:** - **Min:** 0.000 **Def:** 0.000 **Max:** 10.000

P-Group: CONTROL **Active:** Immediately **QuickComm.:** No

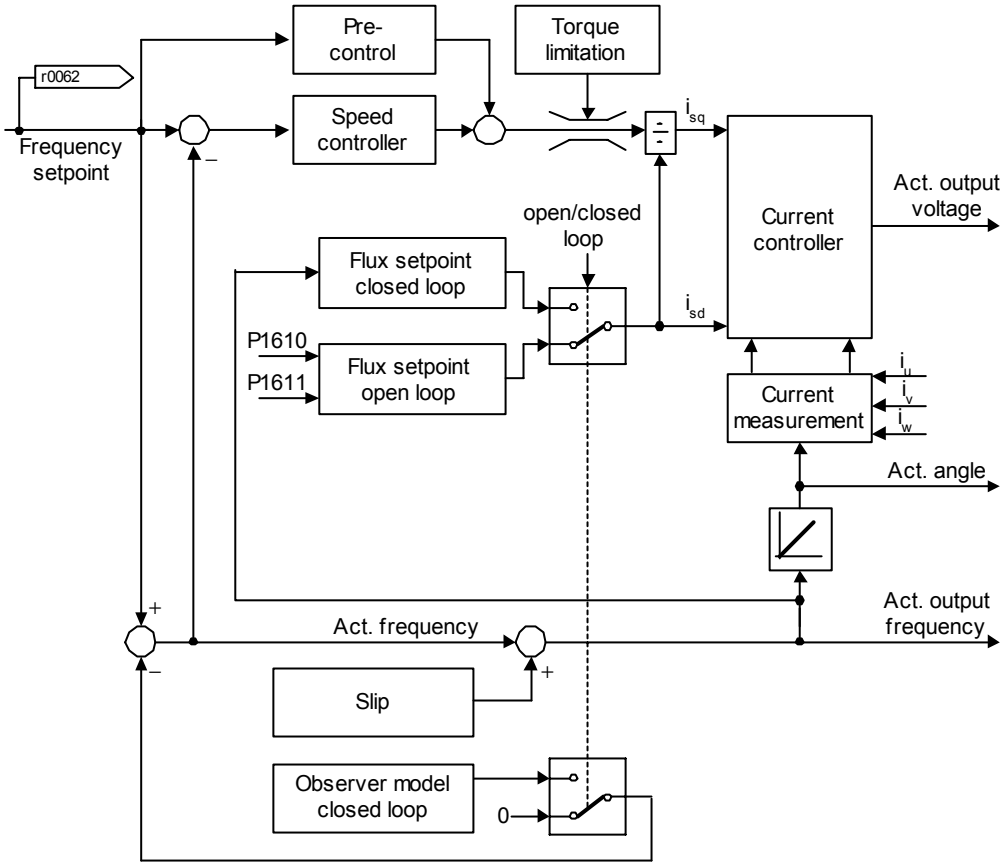
Sets oscillation damping gain for sensorless vector control at low frequencies.

P1750[3]	**Control word of motor model**			**Min:** 0	Level
	CStat: CUT	**Datatype:** U16	**Unit:** -	**Def:** 1	**3**
	P-Group: CONTROL	**Active:** first confirm	**QuickComm.:** No	**Max:** 3	

Control word of motor model. This parameter controls the operation of the sensorless vector control (SLVC) at very low frequencies. This therefore includes the following conditions:
- Operation directly after an ON command
- zero crossing.



SLVC open loop means that the speed controller does not get any frequency feedback from the observer model.



Bitfields:

Bit00	Start SLVC open loop	0	NO	1	YES
Bit01	Zero crossing SLVC open loop	0	NO	1	YES

Index:

P1750[0] : 1st. Drive data set (DDS)
P1750[1] : 2nd. Drive data set (DDS)
P1750[2] : 3rd. Drive data set (DDS)

r1751 **Status word of motor model** Level **3**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

Displays status of transition from feed-forward to observer-control and vice versa.

Bitfields:

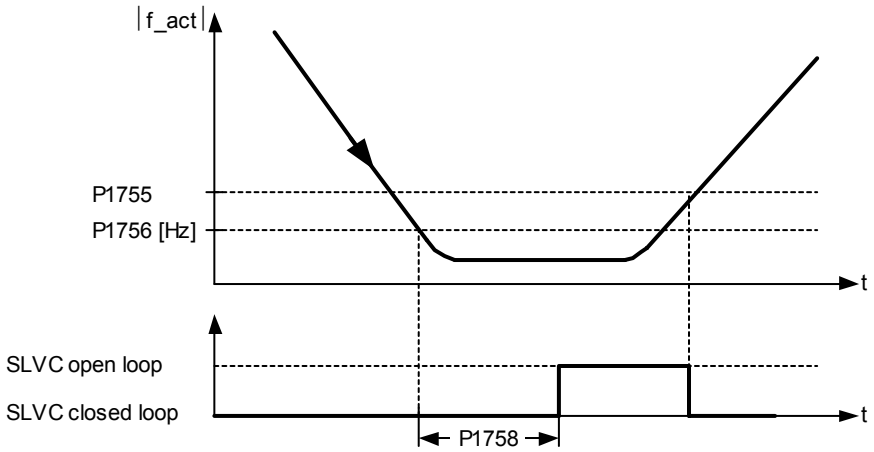
Bit00	Transit to SLVC open loop	0	NO	1	YES
Bit01	N-adaption enabled	0	NO	1	YES
Bit02	Transit to SLVC closed loop	0	NO	1	YES
Bit03	Speed controller enabled	0	NO	1	YES
Bit04	Current injection	0	NO	1	YES
Bit05	Start flux decrease	0	NO	1	YES
Bit14	Rs adapted	0	NO	1	YES
Bit15	Xh adapted	0	NO	1	YES

P1755[3] **Start-freq. motor model (SLVC)** Level **3**

CStat: CUT **Datatype:** Float **Unit:** Hz **Min:** 0.1 **Def:** 5.0 **Max:** 250.0

P-Group: CONTROL **Active:** Immediately **QuickComm.:** No

Enter the start frequency of sensorless vector control (SLVC), thereby SLVC switches over from open-loop to closed-loop at that frequency.



$$P1756\,[Hz] = P1755\,[Hz] \cdot \frac{P1756\,[\%]}{100\,[\%]}$$

Index:

P1755[0] : 1st. Drive data set (DDS)
P1755[1] : 2nd. Drive data set (DDS)
P1755[2] : 3rd. Drive data set (DDS)

P1756[3] **Hyst.-freq. motor model (SLVC)** Level **3**

CStat: CUT **Datatype:** Float **Unit:** % **Min:** 10.0 **Def:** 50.0 **Max:** 100.0

P-Group: CONTROL **Active:** Immediately **QuickComm.:** No

Enters hysteresis frequency (in percent of start-frequency) to switch back from sensorless-vector-control (SLVC) to current model.

Value is entered in the range 0 % to 50 % relative to P1755 (SLVC stop frequency).

Index:

P1756[0] : 1st. Drive data set (DDS)
P1756[1] : 2nd. Drive data set (DDS)
P1756[2] : 3rd. Drive data set (DDS)

P1758[3] **T(wait) transit to feed-fwd-mode** Level **3**

CStat: CUT **Datatype:** U16 **Unit:** ms **Min:** 100 **Def:** 1500 **Max:** 2000

P-Group: CONTROL **Active:** Immediately **QuickComm.:** No

Sets waiting time for change from observer-mode to feed-forward-mode

Index:

P1758[0] : 1st. Drive data set (DDS)
P1758[1] : 2nd. Drive data set (DDS)
P1758[2] : 3rd. Drive data set (DDS)

P1759[3] **T(wait) for n-adaption to settle** Level **3**

CStat:	CUT	**Datatype:** U16	**Unit:** ms	**Min:**	50
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.:** No	**Def:**	100
				Max:	2000

Sets waiting time while transition is done from open-loop to close-loop operation

Index:

P1759[0] : 1st. Drive data set (DDS)
P1759[1] : 2nd. Drive data set (DDS)
P1759[2] : 3rd. Drive data set (DDS)

P1764[3] **Kp of n-adaption (SLVC)** Level **3**

CStat:	CUT	**Datatype:** Float	**Unit:** -	**Min:**	0.0
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.:** No	**Def:**	0.2
				Max:	2.5

Enters gain of speed adaptation controller for sensorless vector control.

Index:

P1764[0] : 1st. Drive data set (DDS)
P1764[1] : 2nd. Drive data set (DDS)
P1764[2] : 3rd. Drive data set (DDS)

P1767[3] **Tn of n-adaption (SLVC)** Level **4**

CStat:	CUT	**Datatype:** Float	**Unit:** ms	**Min:**	1.0
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.:** No	**Def:**	4.0
				Max:	200.0

Enters speed adaptation controller integral time.

Index:

P1767[0] : 1st. Drive data set (DDS)
P1767[1] : 2nd. Drive data set (DDS)
P1767[2] : 3rd. Drive data set (DDS)

r1770 **CO: Prop. output of n-adaption** Level **3**

		Datatype: Float	**Unit:** Hz	**Min:**	-
P-Group:	CONTROL			**Def:**	-
				Max:	-

Displays proportional part of speed adaptation controller.

r1771 **CO: Int. output of n-adaption** Level **3**

		Datatype: Float	**Unit:** Hz	**Min:**	-
P-Group:	CONTROL			**Def:**	-
				Max:	-

Displays integral part of speed adaptation controller.

r1778 **CO: Flux angle difference** Level **4**

		Datatype: Float	**Unit:** °	**Min:**	-
P-Group:	CONTROL			**Def:**	-
				Max:	-

Displays flux angle difference between motor model and current transformation before motor model is active.

P1780[3] **Control word of Rs/Rr-adaption** Level **3**

CStat:	CUT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	CONTROL	**Active:** first confirm	**QuickComm.:** No	**Def:**	3
				Max:	3

Enables thermal adaptation of stator and rotor resistance to reduce torque errors in speed/torque regulation with speed sensor, or frequency errors in speed/torque regulation without speed sensor.

Bitfields:

```
Bit00   Enable thermal  Rs/Rr-adapt.              0  NO         1  YES
Bit01   Enable observer Rs/Xm-adapt.              0  NO         1  YES
```

Index:

P1780[0] : 1st. Drive data set (DDS)
P1780[1] : 2nd. Drive data set (DDS)
P1780[2] : 3rd. Drive data set (DDS)

Note:

Only stator resistance adaptation is carried out for synchronous motors.

P1781[3] **Tn of Rs-adaption** Level **4**

CStat:	CUT	**Datatype:** U16	**Unit:** ms	**Min:**	10
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.:** No	**Def:**	100
				Max:	2000

Enters Rs-adaptation controller integral time.

Index:

P1781[0] : 1st. Drive data set (DDS)
P1781[1] : 2nd. Drive data set (DDS)
P1781[2] : 3rd. Drive data set (DDS)

r1782 **Output of Rs-adaptation** Level **3**

Datatype: Float **Unit:** % **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

Displays stator resistance adaptation from controller in [%] relative to rated motor resistance.

Note:

The rated motor resistance is given by the formula:

Rated motor resistance = $P0304 \cdot \sqrt{3} \cdot P0305$

P1786[3] **Tn of Xm-adaption** Level **4**

CStat: CUT **Datatype:** U16 **Unit:** ms **Min:** 10 **Def:** 100 **Max:** 2000

P-Group: CONTROL **Active:** Immediately **QuickComm.:** No

Enters Xm-adaptation controller integral time.

Index:

P1786[0] : 1st. Drive data set (DDS)
P1786[1] : 2nd. Drive data set (DDS)
P1786[2] : 3rd. Drive data set (DDS)

r1787 **Output of Xm-adaption** Level **3**

Datatype: Float **Unit:** % **Min:** - **Def:** - **Max:** -

P-Group: CONTROL

Displays main reactance adaptation from controller in [%] relative to rated impedance.

Note:

The rated motor resistance is given by the formula:

Rated motor resistance = $P0304 \cdot \sqrt{3} \cdot P0305$

P1800 **Pulse frequency** Level **2**

CStat: CUT **Datatype:** U16 **Unit:** kHz **Min:** 2 **Def:** 4 **Max:** 16

P-Group: INVERTER **Active:** Immediately **QuickComm.:** No

Sets pulse frequency of power switches in inverter. The frequency can be changed in steps of 2 kHz.

Dependency:

Minimum pulse frequency depends on P1082 (maximum frequency) and P0310 (rated motor frequency).

The maximal value of motor frequency P1082 is limited to pulse frequency P1800 (see P1082).

Note:

If the pulse frequency is increased, max. inverter current r0209 can be reduced (derating). The derating characteristic depends on the type and power of the inverter (see manuall OPERATING INSTRUCTION).

If silent operation is not absolutely necessary, lower pulse frequencies may be selected to reduce inverter losses and radio-frequency emissions.

Under certain circumstances, the inverter may reduce the switching frequency to provide protection against over-temperature (see P0290).

r1801 **CO: Act. pulse frequency** Level **3**

Datatype: U16 **Unit:** kHz **Min:** - **Def:** - **Max:** -

P-Group: INVERTER

Actual pulse frequency of power switches in inverter.

Notice:

Under certain conditions (inverter overtemperature, see P0290), this can differ from the values selected in P1800 (pulse frequency).

P1802 **Modulator mode** Level **3**

CStat: CUT **Datatype:** U16 **Unit:** - **Min:** 0 **Def:** 0 **Max:** 2

P-Group: INVERTER **Active:** first confirm **QuickComm.:** No

Selects inverter modulator mode.

Possible Settings:

0 SVM/ASVM automatic mode
1 Asymmetric SVM
2 Space vector modulation

Notice:

Asymmetric space vector modulation (ASVM) produces lower switching losses than space vector modulation (SVM), but may cause irregular rotation at very low frequencies.

Space vector modulation (SVM) with over-modulation may produce current waveform distortion at high output voltages.

Space vector modulation (SVM) without over-modulation will reduce maximum output voltage available to motor.

P1803[3] **Max. modulation** Level **4**

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	20.0
P-Group:	INVERTER	**Active:** Immediately	**QuickComm.:** No	**Def:**	106.0
				Max:	150.0

Sets maximum modulation index.

Index:

P1803[0] : 1st. Drive data set (DDS)
P1803[1] : 2nd. Drive data set (DDS)
P1803[2] : 3rd. Drive data set (DDS)

Note:

P1803 = 100 % : Limit for over-control (for ideal inverter without switching delay). For vector control the modulation limit will be reduced automatically with 4 %.

P1820[3] **Reverse output phase sequence** Level **2**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	INVERTER	**Active:** first confirm	**QuickComm.:** No	**Def:**	0
				Max:	1

Changes direction of motor rotation without changing setpoint polarity.

Possible Settings:

0 OFF
1 ON

Index:

P1820[0] : 1st. Drive data set (DDS)
P1820[1] : 2nd. Drive data set (DDS)
P1820[2] : 3rd. Drive data set (DDS)

Dependency:

If positive and negative revolution is enabled, frequency setpoint is directly used.
If both positive and negative revolution are disabled, reference value is set to zero.

Details:

See P1000 (select frequency setpoint)

P1825 **On-state voltage of IGBT** Level **4**

CStat:	CUT	**Datatype:** Float	**Unit:** V	**Min:**	0.0
P-Group:	INVERTER	**Active:** Immediately	**QuickComm.:** No	**Def:**	1.4
				Max:	20.0

Corrects on-state voltage of the IGBTs.

P1828 **Gating unit dead time** Level **4**

CStat:	CUT	**Datatype:** Float	**Unit:** us	**Min:**	0.00
P-Group:	INVERTER	**Active:** first confirm	**QuickComm.:** No	**Def:**	0.50
				Max:	3.50

Sets compensation time of gating unit interlock.

P1909[3] **Ctrl. word of motor data ident.** Level **4**

CStat:	CUT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	CONTROL	**Active:** first confirm	**QuickComm.:** No	**Def:**	1
				Max:	1

Control word of motor data identification.

Bitfields:

```
Bit00   Estimation of Xs                    0  NO        1  YES
```

Index:

P1909[0] : 1st. Drive data set (DDS)
P1909[1] : 2nd. Drive data set (DDS)
P1909[2] : 3rd. Drive data set (DDS)

P1910 **Select motor data identification** Level **2**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	MOTOR	**Active:** first confirm	**QuickComm.:** Yes	**Def:**	0
				Max:	20

Performs a motor data identification.

Possible Settings:

0 Disabled
1 Identification of all parameters with parameter change
2 Identification of all parameters without parameter change
3 Identification of saturation curve with parameter change
4 Identification of saturation curve without parameter change
5 Identification of XsigDyn (r1920) without parameter change
6 Identification of Tdead (r1926) without parameter change
7 Identification of Rs (r1912) without parameter change
8 Identification of Xs (r1915) without parameter change
9 Identification of Tr (r1913) without parameter change
10 Identification of Xsigma (r1914) without parameter change
20 Set voltage vector

Common Settings:

P1910 = 1:

All motor data and inverter characteristic will be identified and parameter will be changed.
- P0350 stator resistance,
- P0354 rotor resistance,
- P0356 stator leakage inductance,
- P0358 rotor leakage inductance,
- P0360 main inductance
- P1825 on-state voltage of IGBTs
- P1828 compensation time of gating unit interlock

P1910 = 3:

Saturation curve will be identified and parameter will be changed.
- P0362 ... P0365 magnetizing curve flux 1 .. 4
- P0366 ... P0369 magnetizing curve imag 1 .. 4

Caution:

Motor identification should normally be performed on a cold motor. However, the identification of the motor data should only be performed if the motor temperature is within 5°C of the measured ambient temperature stored in P0625. If the motor identification is not within the 5ºC limit then the correct functioning of Vector Control (VC, SLVC) cannot be guaranteed.

The motor rating plate information with respect to the connection of the motor windings (Star or delta connection) must be correct in order to establish the correct equivalent circuit data. The motor identification calculates this data based on a Phase of a Star equivalent circuit P0350 - P0360, irrespective of whether the motor is connected star or delta. This must be considered when the motor data is input directly.

Note:

Before selecting motor data identification, "Quick commissioning" has to be performed in advance.

Once enabled (P1910 = 1), A0541 generates a warning that the next ON command will initiate measurement of motor parameters.

Notice:

When choosing the setting for measurement, observe the following:

1. "with parameter change"
   means that the values are actually adopted as Pxxxx parameter settings (see common settings above) and applied to the controller as well as being shown in the read-only parameters below.

2. "without parameter change"
   means that the values are only displayed, i.e. shown for checking purposes in the read-only parameters r1912 (identified stator resistance), r1913 (identified rotor time constant), r1914 (ident. total leakage reactance), r1915/r1916/r1917/r1918/r1919 (identified nominal stator reactance/identified stator reactance 1 to 4), r1925 (IGBT on-state voltage) and r1926 (identified gating unit dead time). The values are not applied to the controller.

P1911 **No. of phase to be identified** Level **2**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	1
P-Group:	INVERTER	**Active:** Immediately	**QuickComm.:** No	**Def:**	3
				Max:	3

Selects maximum number of motor phases to be identified.

r1912[3] **Identified stator resistance** Level **2**

		Datatype: Float	**Unit:** Ohm	**Min:**	-
P-Group:	MOTOR			**Def:**	-
				Max:	-

Displays measured stator resistance value (line-to-line) in [Ohms]

Index:

r1912[0] : U_phase
r1912[1] : V_phase
r1912[2] : W_phase

Note:

This value is measured using P1910 = 1 or 2 , i.e., identification of all parameters with/without change.

r1913[3] Identified rotor time constant Level **2**

Datatype: Float **Unit:** ms **Min:** - **Def:** - **Max:** -

P-Group: MOTOR

Displays identified rotor time constant.

Index:

r1913[0] : U_phase
r1913[1] : V_phase
r1913[2] : W_phase

r1914[3] Ident. total leakage inductance Level **2**

Datatype: Float **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: MOTOR

Displays identified total leakage inductance.

Index:

r1914[0] : U_phase
r1914[1] : V_phase
r1914[2] : W_phase

r1915[3] Ident. nom. stator inductance Level **2**

Datatype: Float **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: MOTOR

Displays identified stator inductance.

Index:

r1915[0] : U_phase
r1915[1] : V_phase
r1915[2] : W_phase

Notice:

If the value identified (Ls = stator inductance) does not lie within the range 50 % < Xs [p. u.] < 500 % fault message 41 (motor data identification failure) is issued.

P0949 provides further information (fault value = 4 in this case).

r1916[3] Identified stator inductance 1 Level **2**

Datatype: Float **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: MOTOR

Displays identified stator inductance.

Index:

r1916[0] : U_phase
r1916[1] : V_phase
r1916[2] : W_phase

Details:

See P1915 (identified nominal stator inductance).

r1917[3] Identified stator inductance 2 Level **2**

Datatype: Float **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: MOTOR

Displays identified stator inductance.

Index:

r1917[0] : U_phase
r1917[1] : V_phase
r1917[2] : W_phase

Details:

See P1915 (identified nominal stator inductance)

r1918[3] Identified stator inductance 3 Level **2**

Datatype: Float **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: MOTOR

Displays identified stator inductance.

Index:

r1918[0] : U_phase
r1918[1] : V_phase
r1918[2] : W_phase

Details:

See P1915 (identified nominal stator reactance)

r1919[3] **Identified stator inductance 4** Level **2**

Datatype: Float **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: MOTOR

Displays identified stator inductance.

Index:

r1919[0] : U_phase
r1919[1] : V_phase
r1919[2] : W_phase

Details:

See P1915 (identified nominal stator inductance)

r1920[3] **Identified dyn. leak. inductance** Level **2**

Datatype: Float **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: MOTOR

Displays identified total dynamic leakage inductance.

Index:

r1920[0] : U_phase
r1920[1] : V_phase
r1920[2] : W_phase

r1925 **Identified on-state voltage** Level **2**

Datatype: Float **Unit:** V **Min:** - **Def:** - **Max:** -

P-Group: INVERTER

Displays identified on-state voltage of IGBT.

r1926 **Ident. gating unit dead time** Level **2**

Datatype: Float **Unit:** us **Min:** - **Def:** - **Max:** -

P-Group: INVERTER

Displays identified dead time of gating unit interlock.

P1930 **Voltage setpoint for calibration** Level **4**

CStat: CUT **Datatype:** Float **Unit:** V **Min:** 0 **Def:** 0 **Max:** 1000

P-Group: INVERTER **Active:** Immediately **QuickComm.:** No

Specifies reference voltage for generation of a test voltage vector (e.g. used for shunt calibration).

P1931 **Phase** Level **4**

CStat: CUT **Datatype:** U16 **Unit:** - **Min:** 1 **Def:** 1 **Max:** 6

P-Group: INVERTER **Active:** Immediately **QuickComm.:** No

Defines phase of voltage vector

P1960 **Speed control optimisation** Level **3**

CStat: CT **Datatype:** U16 **Unit:** - **Min:** 0 **Def:** 0 **Max:** 1

P-Group: MOTOR **Active:** first confirm **QuickComm.:** No

The drive should be set into a vector mode (P1300 = 20 or 21) to carry out speed controller optimisation. When speed controller optimisation is enabled (P1960 = 1) the warning A0542 will become active.

When the drive is next started it will do the optimisation tests. The drive will accelerate the motor to 20 % of P0310 (rated motor frequency) using the ramp up time P1120 and then under torque control go to 50 % of P0310 (rated motor frequency). The drive will then ramp back down to 20 % using the ramp down time P1121. This procedure is repeated several times and then average time taken. From this an estimation of the inertia of the load on the motor can be derived. From this the inertia ratio parameter (P0342) and the Kp gains for VC (P1460) and SLVC (P1470) are modified to give a response suitable for the measured inertia.

Possible Settings:

0 Disable
1 Enable

Note:

When the test is complete P1960 will be cleared to zero.

Notice:

If there is a problem due to instability the drive may trip with an F0042 fault if a stable value has not been obtained on the ramp up within a reasonable time.

It should be noted that the Dc link controller should be enabled whilst doing the test as otherwise overvoltage trips maybe experienced. This will however depend on the ramp down time and the system inertia.

The speed loop optimisation may not be suitable for some applications due to the nature of the test i.e. accelerating under torque control from 20 % to 50 %.

P2000[3] Reference frequency

CStat:	CT	**Datatype:** Float	**Unit:** Hz	**Min:**	1.00
P-Group:	COMM	**Active:** first confirm	**QuickComm.:** No	**Def:**	50.00
				Max:	650.00

Level **2**

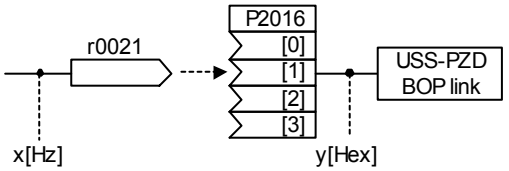
Parameter P2000 represents the reference frequency for frequency values which are displayed/transferred as a percentage or a hexadecimal value. Where:
- hexadecimal 4000 H ==> P2000 (e.g.: USS-PZD)
- percentage 100 % ==> P2000 (e.g.: ADC)

Index:

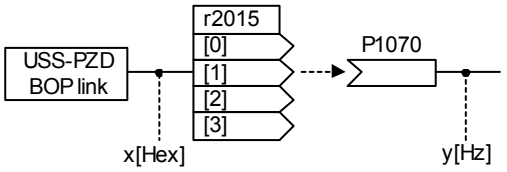
P2000[0] : 1st. Drive data set (DDS)
P2000[1] : 2nd. Drive data set (DDS)
P2000[2] : 3rd. Drive data set (DDS)

Example:

If a BICO connection is made between two parameters or alternatively using P0719 or P1000, the 'unit' of the parameters (standardized (Hex) or physical (i.e. Hz) values) may differ. MICROMASTER implicitly makes an automatic conversion to the target value.



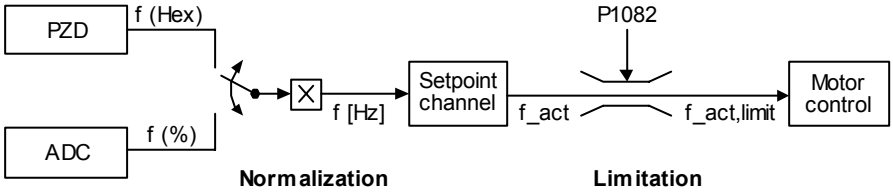
$$y[Hex] = \frac{r0021[Hz]}{P2000[Hz]} \cdot 4000[Hex]$$



$$y[Hz] = \frac{r2015[1]}{4000[Hex]} \cdot P2000$$

Caution:

Parameter P2000 represents the reference frequency of the above mentioned interfaces. A maximum frequency setpoint of 2*P2000 can be applied via the corresponding interface. Unlike parameter P1082 (Max. Frequency) this limits the inverter frequency internally independent of the reference frequency. By modification of P2000 it will also adapt the parameter to the new settings.



$$f[Hz] = \frac{f(Hex)}{4000(Hex)} \cdot P2000 = \frac{f(\%)}{100\,\%} \cdot P2000$$

$$f\_act,limit = \min(P1082, f\_act)$$

Notice:

Reference variables are intended as an aid to presenting setpoint and actual value signals in a uniform manner. This also applies to fixed settings entered as a precentage. A value of 100 % (USS / CB) correspondes to a process data value of 4000H, or 4000 0000H in the case of double values.

In this respect, the following parameters are available:

P2000	Reference frequency	Hz	
P2001	Reference voltage	V	
P2002	Reference current	A	
P2003	Reference torque	Nm	
P2004	Reference power	kW hp	f(P0100)

P2001[3] Reference voltage

CStat:	CT	**Datatype:** U16	**Unit:** V	**Min:**	10
P-Group:	COMM	**Active:** first confirm	**QuickComm.:** No	**Def:**	1000
				Max:	2000

Level **3**

Full-scale output voltage (i.e. 100 %) used over serial link (corresponds to 4000H).

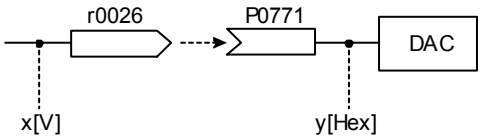
Index:

P2001[0] : 1st. Drive data set (DDS)
P2001[1] : 2nd. Drive data set (DDS)
P2001[2] : 3rd. Drive data set (DDS)

Example:

P2001 = 230 specifies that 4000H received via USS denotes 230 V.

If a BICO connection is made between two parameters, the 'unit' of the parameters (standardized (Hex) or physical (i.e. V) values) may differ. MICROMASTER implicitly makes an automatic conversion to the target value.



$$y[Hex] = \frac{r0026[V]}{P2001[V]} \cdot 4000[Hex]$$

P2002[3] Reference current

CStat:	CT	**Datatype:** Float	**Unit:** A	**Min:**	0.10
P-Group:	COMM	**Active:** first confirm	**QuickComm.:** No	**Def:**	0.10
				Max:	10000.00

Level **3**

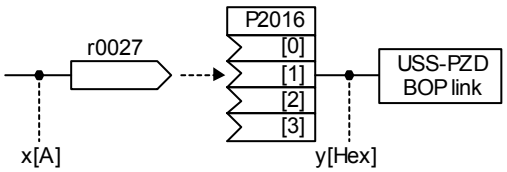
Full-scale output current used over serial link (corresponds to 4000H).

Index:

P2002[0] : 1st. Drive data set (DDS)
P2002[1] : 2nd. Drive data set (DDS)
P2002[2] : 3rd. Drive data set (DDS)

Example:

If a BICO connection is made between two parameters, the 'unit' of the parameters (standardized (Hex) or physical (i.e. A) values) may differ. MICROMASTER implicitly makes an automatic conversion to the target value.



$$y[Hex] = \frac{r0027[A]}{P2002[A]} \cdot 4000[Hex]$$

P2003[3] Reference torque

CStat:	CT	**Datatype:** Float	**Unit:** Nm	**Min:**	0.10
P-Group:	COMM	**Active:** first confirm	**QuickComm.:** No	**Def:**	0.12
				Max:	99999.00

Level **3**

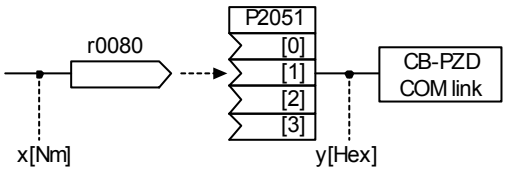
Full-scale reference torque used over the serial link (corresponds to 4000H).

Index:

P2003[0] : 1st. Drive data set (DDS)
P2003[1] : 2nd. Drive data set (DDS)
P2003[2] : 3rd. Drive data set (DDS)

Example:

If a BICO connection is made between two parameters or alternatively using P1500, the 'unit' of the parameters (standardized (Hex) or physical (i.e. Nm) values) may differ. MICROMASTER implicitly makes an automatic conversion to the target value.



$$y[Hex] = \frac{r0080[Nm]}{P2003[Nm]} \cdot 4000[Hex]$$

r2004[3] **Reference power**

Datatype: Float **Unit:** - **Min:** - **Def:** - **Max:** -

Level **3**

P-Group: COMM

Full-scale reference power used over the serial link (corresponds to 4000H).

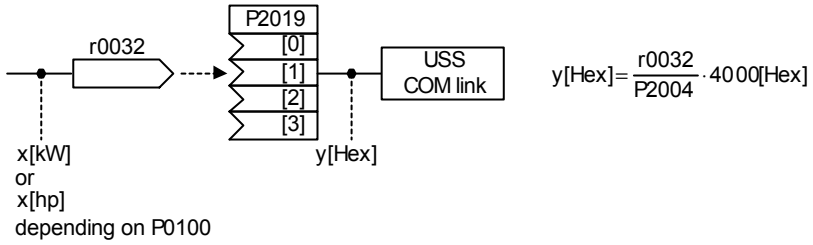
$$r2004 = \frac{1}{2} \cdot 2 \cdot \pi \cdot f \cdot M = \pi \cdot P2000 \cdot P2003$$

Index:

r2004[0] : 1st. Drive data set (DDS)
r2004[1] : 2nd. Drive data set (DDS)
r2004[2] : 3rd. Drive data set (DDS)

Example:

If a BICO connection is made between two parameters, the 'unit' of the parameters (standardized (Hex) or physical (i.e. kW / hp) values) may differ. MICROMASTER implicitly makes an automatic conversion to the target value.



P2009[2] **USS denormalization**

CStat: CT **Datatype:** U16 **Unit:** - **Min:** 0 **Def:** 0 **Max:** 1

Level **3**

P-Group: COMM **Active:** first confirm **QuickComm.:** No

Enables denormalization for USS.

Possible Settings:

0 Disabled
1 Enabled

Index:

P2009[0] : Serial interface COM link
P2009[1] : Serial interface BOP link

Note:

If denormalization is enabled, the main setpoint (word 2 in PZD) is not interpreted as 100 % = 4000H, but as "absolute" instead (e.g. 4000H = 16384 means 163.84 Hz) if this is a frequency. Denormalization (P2009 = 1) only works for frequencies and is intended for backwards compatibility with MM3.

P2010[2] **USS baudrate**

CStat: CUT **Datatype:** U16 **Unit:** - **Min:** 4 **Def:** 6 **Max:** 12

Level **2**

P-Group: COMM **Active:** first confirm **QuickComm.:** No

Sets baud rate for USS communication.

Possible Settings:

4 2400 baud
5 4800 baud
6 9600 baud
7 19200 baud
8 38400 baud
9 57600 baud
10 76800 baud
11 93750 baud
12 115200 baud

Index:

P2010[0] : Serial interface COM link
P2010[1] : Serial interface BOP link

P2011[2] **USS address**

CStat: CUT **Datatype:** U16 **Unit:** - **Min:** 0 **Def:** 0 **Max:** 31

Level **2**

P-Group: COMM **Active:** first confirm **QuickComm.:** No

Sets unique address for inverter.

Index:

P2011[0] : Serial interface COM link
P2011[1] : Serial interface BOP link

Note:

You can connect up to a further 30 inverters via the serial link (i.e. 31 inverters in total) and control them with the USS serial bus protocol.

P2012[2] **USS PZD length** Level **3**

CStat: CUT **Datatype:** U16 **Unit:** - **Min:** 0
P-Group: COMM **Active:** first confirm **QuickComm.:** No **Def:** 2
Max: 8

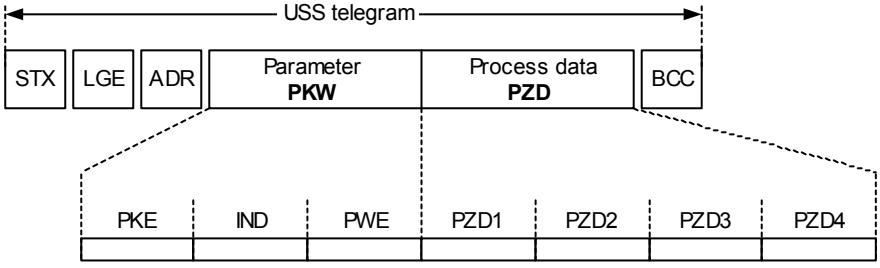
Defines the number of 16-bit words in PZD part of USS telegram. In this area, process data (PZD) are continually exchanged between the master and slaves. The PZD part of the USS telegram is used for the main setpoint, and to control the inverter.

Index:

P2012[0] : Serial interface COM link
P2012[1] : Serial interface BOP link

Notice:

USS protocol consists of PZD and PKW which can be changed by the user via parameters P2012 and P2013 respectively.



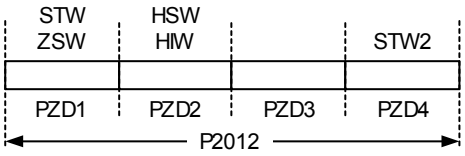
STX	Start of text	PKE	Parameter ID
LGE	Length	IND	Sub-index
ADR	Address	PWE	Parameter value
PKW	Parameter ID value		
PZD	Process data		
BCC	Block check character		

PZD transmits a control word and setpoint or status word and actual values. The number of PZD-words in a USS-telegram are determined by parameter P2012, where the first two words (P2012 >= 2) are either:

- control word and main setpoint or
- status word and actual value.

Restrictions:

- If the serial interface controls the inverter (P0700 or P0719) then the 1st control word must be transferred in the 1st PZD-word.
- If the setpoint source is selected via P1000 or P0719, then the main setpoint must be transfered in the 2nd PZD-word,
- When P2012 is greater than or equal to 4 the additional control word (2nd control word) must transferred in the 4th PZD-word, if the serial interface controls the inverter (P0700 or P0719).



STW	Control word	HSW	Main setpoint
ZSW	Status word	HIW	Main actual value
PZD	Process data		

P2013[2] **USS PKW length**

CStat:	CUT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	COMM	**Active:** first confirm	**QuickComm.:** No	**Def:**	127
				Max:	127

Level **3**

Defines the number of 16-bit words in PKW part of USS telegram. The PKW area can be varied. Depending on the particular requirement, 3-word, 4-word or variable word lengths can be parameterized. The PKW part of the USS telegram is used to read and write individual parameter values.

Possible Settings:

0 No words
3 3 words
4 4 words
127 Variable

Index:

P2013[0] : Serial interface COM link
P2013[1] : Serial interface BOP link

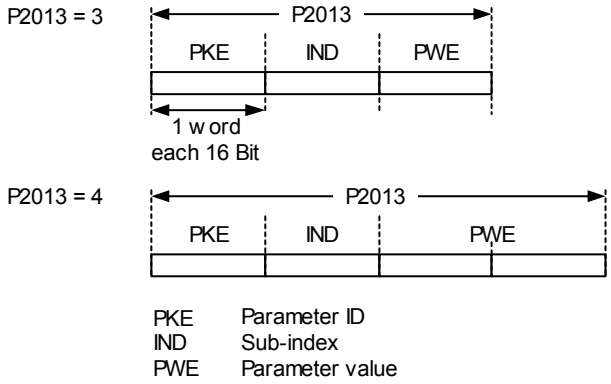
Example:

	Data type		
	U16 (16 Bit)	U32 (32 Bit)	Float (32 Bit)
P2013 = 3	X	Parameter access fault	Parameter access fault
P2013 = 4	X	X	X
P2013 = 127	X	X	X

Notice:

USS protocol consists of PZD and PKW which can be changed by the user via parameters P2012 and P2013 respectively. Parameter P2013 determines the number of PKW-words in a USS-telegram.

Setting P2013 to 3 or 4 determines the length of the PKW words (3 = three words and 4 = four words). When P2013 set to 127 automatically adjusts the length of the PKW words are required.



PKE Parameter ID
IND Sub-index
PWE Parameter value

If a fixed PKW length is selected only one parameter value can be transferred. In the case of indexed parameter, you must use the variable PKW length if you wish to have the values of all indices transferred in a single telegram. In selecting the fixed PKW length, it is important to ensure the value in question can be transferred using this PKW length.

P2013 = 3, fixes PKW length, but does not allow access to many parameter values. A parameter fault is generated when an out-of-range value is used, the value will not be accepted but the inverter state will not be affected. Useful for applications where parameters are not changed, but MM3s are also used. Broadcast mode is not possible with this setting.

P2013 = 4, fixes PKW length. Allows access to all parameters, but indexed parameters can only be read one index at a time. Word order for single word values are different to setting 3 or 127, see example below.

P2013 = 127, most useful setting. PKW reply length varies depending on the amount of information needed. Can read fault information and all indices of a parameter with a single telegram with this setting.

Example:
Set P0700 to value 5 (0700 = 2BC (hex))

	P2013 = 3	P2013 = 4	P2013 = 127
Master → MM4	22BC 0000 0005	22BC 0000 0000 0005	22BC 0000 0005 0000
MM4 → Master	12BC 0000 0005	12BC 0000 0000 0005	12BC 0000 0005

P2014[2] **USS telegram off time** Level **3**

CStat:	CT	**Datatype:** U16	**Unit:** ms	**Min:**	0
P-Group:	COMM	**Active:** Immediately	**QuickComm.:** No	**Def:**	0
				Max:	65535

Defines a time T_off after which a fault will be generated (F0070) if no telegram is received via the USS channels.

Index:

P2014[0] : Serial interface COM link
P2014[1] : Serial interface BOP link

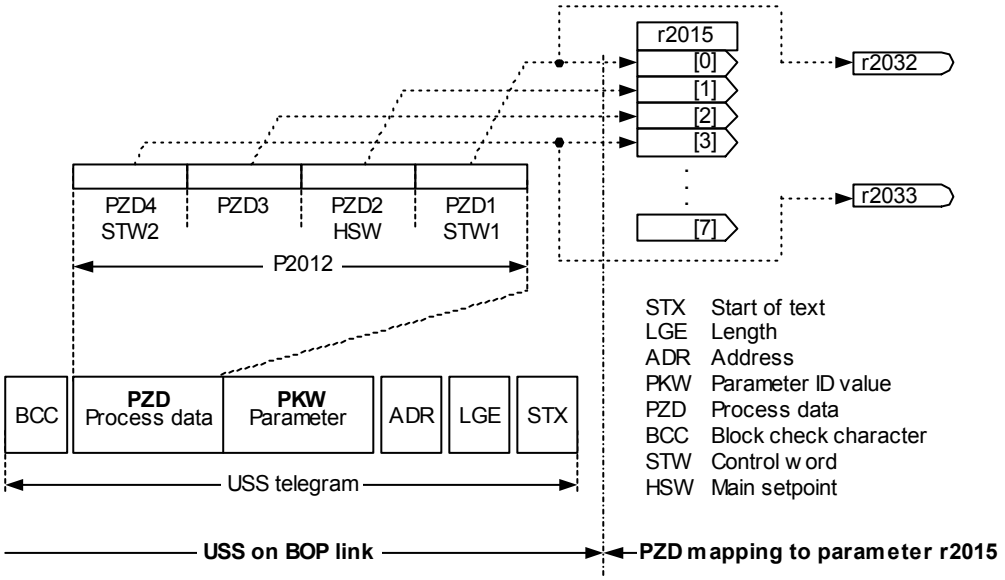
Notice:

By default (time set to 0), no fault is generated (i.e. watchdog disabled).

r2015[8] **CO: PZD from BOP link (USS)** Level **3**

		Datatype: U16	**Unit:** -	**Min:**	-
P-Group:	COMM			**Def:**	-
				Max:	-

Displays process data received via USS on BOP link (RS232 USS).



Index:

r2015[0] : Received word 0
r2015[1] : Received word 1
r2015[2] : Received word 2
r2015[3] : Received word 3
r2015[4] : Received word 4
r2015[5] : Received word 5
r2015[6] : Received word 6
r2015[7] : Received word 7

Note:

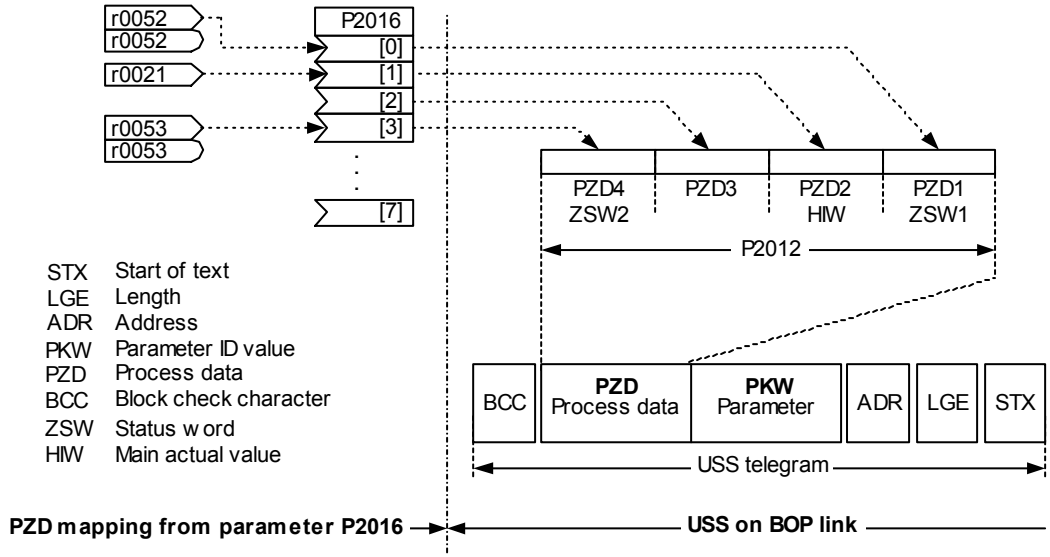
The control words can be viewed as bit parameters r2032 and r2033.

Restrictions:

- If the obove serial interface controls the inverter (P0700 or P0719) then the 1st control word must be transferred in the 1st PZD-word.
- If the setpoint source is selected via P1000 or P0719, then the main setpoint must be transfered in the 2nd PZD-word,
- When P2012 is greater than or equal to 4 the additional control word (2nd control word) must transferred in the 4th PZD-word, if the obove serial interface controls the inverter (P0700 or P0719).

P2016[8]	CI: PZD to BOP link (USS)				Min:	0:0	Level
	CStat:	CT	Datatype: U32	Unit: -	Def:	52:0	3
	P-Group:	COMM	Active: Immediately	QuickComm.: No	Max:	4000:0	

Selects signals to be transmitted to serial interface via BOP link.



Index:

P2016[0] : Transmitted word 0
P2016[1] : Transmitted word 1
P2016[2] : Transmitted word 2
P2016[3] : Transmitted word 3
P2016[4] : Transmitted word 4
P2016[5] : Transmitted word 5
P2016[6] : Transmitted word 6
P2016[7] : Transmitted word 7

Example:

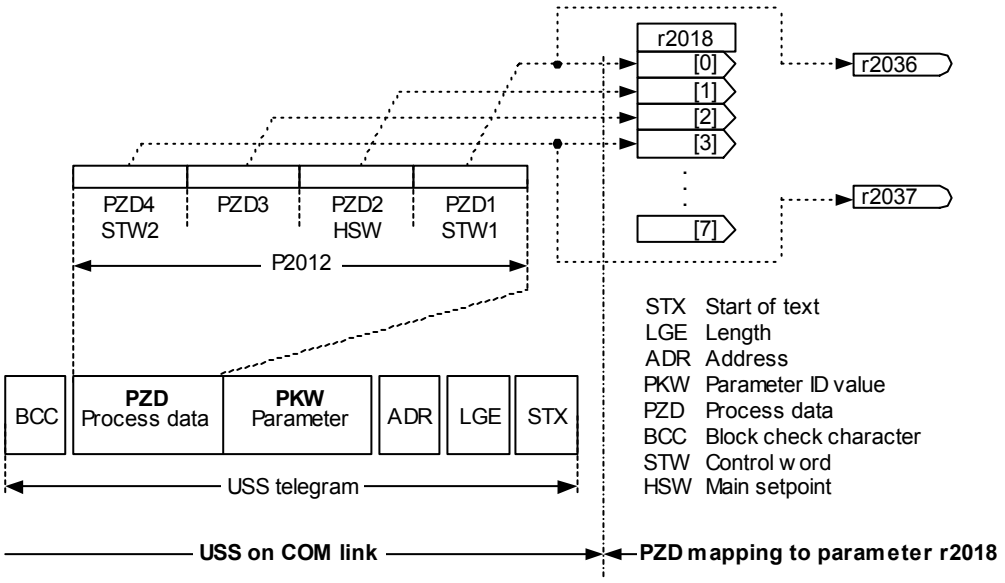
P2016[0] = 52.0 (default). In this case, the value of r0052[0] (CO/BO: Status word) is transmitted as 1st PZD to the BOP link.

Note:

If r0052 not indexed, display does not show an index (".0").

r2018[8]	CO: PZD from COM link (USS)			Min: -	Level
		Datatype: U16	Unit: -	Def: -	3
	P-Group: COMM			Max: -	

Displays process data received via USS on COM link.



Index:

r2018[0] : Received word 0
r2018[1] : Received word 1
r2018[2] : Received word 2
r2018[3] : Received word 3
r2018[4] : Received word 4
r2018[5] : Received word 5
r2018[6] : Received word 6
r2018[7] : Received word 7

Note:

The control words can be viewed as bit parameters r2036 and r2037.

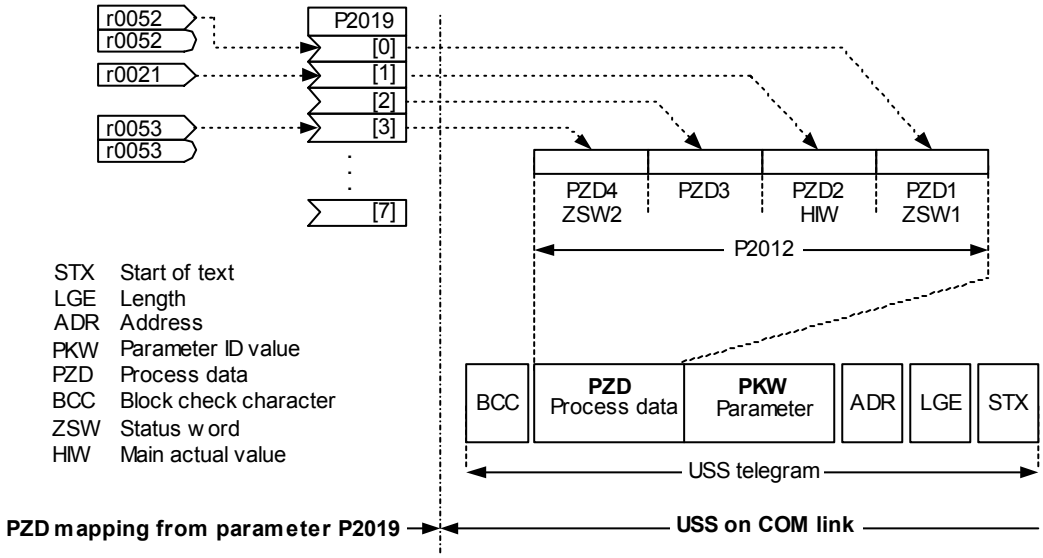
Restrictions:

- If the obove serial interface controls the inverter (P0700 or P0719) then the 1st control word must be transferred in the 1st PZD-word.
- If the setpoint source is selected via P1000 or P0719, then the main setpoint must be transfered in the 2nd PZD-word,
- When P2012 is greater than or equal to 4 the additional control word (2nd control word) must transferred in the 4th PZD-word, if the obove serial interface controls the inverter (P0700 or P0719).

P2019[8] **CI: PZD to COM link (USS)** Level **3**

CStat: CT **Datatype:** U32 **Unit:** - **Min:** 0:0
P-Group: COMM **Active:** Immediately **QuickComm.:** No **Def:** 52:0
Max: 4000:0

Displays process data received via USS on COM link.



Index:
P2019[0] : Transmitted word 0
P2019[1] : Transmitted word 1
P2019[2] : Transmitted word 2
P2019[3] : Transmitted word 3
P2019[4] : Transmitted word 4
P2019[5] : Transmitted word 5
P2019[6] : Transmitted word 6
P2019[7] : Transmitted word 7

Details:
See P2016 (PZD to BOP link)

r2024[2] **USS error-free telegrams** Level **3**

Datatype: U16 **Unit:** - **Min:** -
P-Group: COMM **Def:** -
Max: -

Displays number of error-free USS telegrams received.

Index:
r2024[0] : Serial interface COM link
r2024[1] : Serial interface BOP link

r2025[2] **USS rejected telegrams** Level **3**

Datatype: U16 **Unit:** - **Min:** -
P-Group: COMM **Def:** -
Max: -

Displays number of USS telegrams rejected.

Index:
r2025[0] : Serial interface COM link
r2025[1] : Serial interface BOP link

r2026[2] **USS character frame error** Level **3**

Datatype: U16 **Unit:** - **Min:** -
P-Group: COMM **Def:** -
Max: -

Displays number of USS character frame errors.

Index:
r2026[0] : Serial interface COM link
r2026[1] : Serial interface BOP link

r2027[2] **USS overrun error** Level **3**

Datatype: U16 **Unit:** - **Min:** -
P-Group: COMM **Def:** -
Max: -

Displays number of USS telegrams with overrun error.

Index:
r2027[0] : Serial interface COM link
r2027[1] : Serial interface BOP link

r2028[2] **USS parity error** Level **3**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: COMM

Displays number of USS telegrams with parity error.

Index:
r2028[0] : Serial interface COM link
r2028[1] : Serial interface BOP link

r2029[2] **USS start not identified** Level **3**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: COMM

Displays number of USS telegrams with unidentified start.

Index:
r2029[0] : Serial interface COM link
r2029[1] : Serial interface BOP link

r2030[2] **USS BCC error** Level **3**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: COMM

Displays number of USS telegrams with BCC error.

Index:
r2030[0] : Serial interface COM link
r2030[1] : Serial interface BOP link

r2031[2] **USS length error** Level **3**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: COMM

Displays number of USS telegrams with incorrect length.

Index:
r2031[0] : Serial interface COM link
r2031[1] : Serial interface BOP link

r2032 **BO: CtrlWrd1 from BOP link (USS)** Level **3**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: COMM

Displays control word 1 from BOP link (word 1 within USS).

Bitfields:

Bit00	ON/OFF1	0	NO	1	YES
Bit01	OFF2: Electrical stop	0	YES	1	NO
Bit02	OFF3: Fast stop	0	YES	1	NO
Bit03	Pulse enable	0	NO	1	YES
Bit04	RFG enable	0	NO	1	YES
Bit05	RFG start	0	NO	1	YES
Bit06	Setpoint enable	0	NO	1	YES
Bit07	Fault acknowledge	0	NO	1	YES
Bit08	JOG right	0	NO	1	YES
Bit09	JOG left	0	NO	1	YES
Bit10	Control from PLC	0	NO	1	YES
Bit11	Reverse (setpoint inversion)	0	NO	1	YES
Bit13	Motor potentiometer MOP up	0	NO	1	YES
Bit14	Motor potentiometer MOP down	0	NO	1	YES
Bit15	CDS Bit 0 (Local/Remote)	0	NO	1	YES

r2033 **BO: CtrlWrd2 from BOP link (USS)** Level **3**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: COMM

Displays control word 2 from BOP link (i.e. word 4 within USS).

Bitfields:

Bit00	Fixed frequency Bit 0	0	NO	1	YES
Bit01	Fixed frequency Bit 1	0	NO	1	YES
Bit02	Fixed frequency Bit 2	0	NO	1	YES
Bit03	Fixed frequency Bit 3	0	NO	1	YES
Bit04	Drive data set (DDS) Bit 0	0	NO	1	YES
Bit05	Drive data set (DDS) Bit 1	0	NO	1	YES
Bit08	PID enabled	0	NO	1	YES
Bit09	DC brake enabled	0	NO	1	YES
Bit11	Droop enabled	0	NO	1	YES
Bit12	Torque control	0	NO	1	YES
Bit13	External fault 1	0	YES	1	NO
Bit15	Command data set (CDS) Bit 1	0	NO	1	YES

Dependency:

P0700 = 4 (USS on BOP link) and P0719 = 0 (Cmd / Setpoint = BICO parameter).

r2036 **BO: CtrlWrd1 from COM link (USS)** Level **3**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: COMM

Displays control word 1 from COM link (i.e. word 1 within USS).

Bitfields:

Bit00	ON/OFF1	0	NO	1	YES
Bit01	OFF2: Electrical stop	0	YES	1	NO
Bit02	OFF3: Fast stop	0	YES	1	NO
Bit03	Pulse enable	0	NO	1	YES
Bit04	RFG enable	0	NO	1	YES
Bit05	RFG start	0	NO	1	YES
Bit06	Setpoint enable	0	NO	1	YES
Bit07	Fault acknowledge	0	NO	1	YES
Bit08	JOG right	0	NO	1	YES
Bit09	JOG left	0	NO	1	YES
Bit10	Control from PLC	0	NO	1	YES
Bit11	Reverse (setpoint inversion)	0	NO	1	YES
Bit13	Motor potentiometer MOP up	0	NO	1	YES
Bit14	Motor potentiometer MOP down	0	NO	1	YES
Bit15	CDS Bit 0 (Local/Remote)	0	NO	1	YES

Details:

See r2033 (control word 2 from BOP link).

r2037 **BO: CtrlWrd2 from COM link (USS)** Level **3**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: COMM

Displays control word 2 from COM link (i.e. word 4 within USS).

Bitfields:

Bit00	Fixed frequency Bit 0	0	NO	1	YES
Bit01	Fixed frequency Bit 1	0	NO	1	YES
Bit02	Fixed frequency Bit 2	0	NO	1	YES
Bit03	Fixed frequency Bit 3	0	NO	1	YES
Bit04	Drive data set (DDS) Bit 0	0	NO	1	YES
Bit05	Drive data set (DDS) Bit 1	0	NO	1	YES
Bit08	PID enabled	0	NO	1	YES
Bit09	DC brake enabled	0	NO	1	YES
Bit11	Droop enabled	0	NO	1	YES
Bit12	Torque control	0	NO	1	YES
Bit13	External fault 1	0	YES	1	NO
Bit15	Command data set (CDS) Bit 1	0	NO	1	YES

Details:

See r2033 (control word 2 from BOP link).

P2040 **CB telegram off time** Level **3**

CStat:	CT	**Datatype:** U16	**Unit:** ms	**Min:**	0
P-Group:	COMM	**Active:** Immediately	**QuickComm.:** No	**Def:**	20
				Max:	65535

Defines time after which a fault will be generated (F0070) if no telegram is received via the link.

Dependency:

Setting 0 = watchdog disabled

P2041[5] **CB parameter** Level **3**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	COMM	**Active:** first confirm	**QuickComm.:** No	**Def:**	0
				Max:	65535

Configures a communication board (CB).

Index:

P2041[0] : CB parameter 0
P2041[1] : CB parameter 1
P2041[2] : CB parameter 2
P2041[3] : CB parameter 3
P2041[4] : CB parameter 4

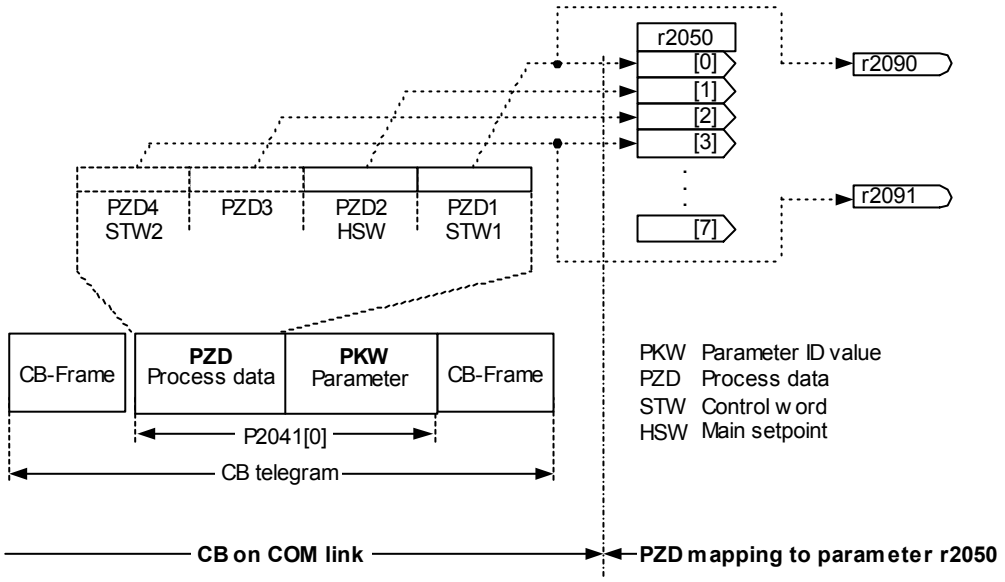
Details:

See relevant communication board manual for protocol definition and appropriate settings.

r2050[8] **CO: PZD from CB** Level **3**

		Datatype: U16	**Unit:** -	**Min:**	-
P-Group:	COMM			**Def:**	-
				Max:	-

Displays PZD received from communication board (CB).



Index:

r2050[0] : Received word 0
r2050[1] : Received word 1
r2050[2] : Received word 2
r2050[3] : Received word 3
r2050[4] : Received word 4
r2050[5] : Received word 5
r2050[6] : Received word 6
r2050[7] : Received word 7

Note:

The control words can be viewed as bit parameters r2090 and r2091.

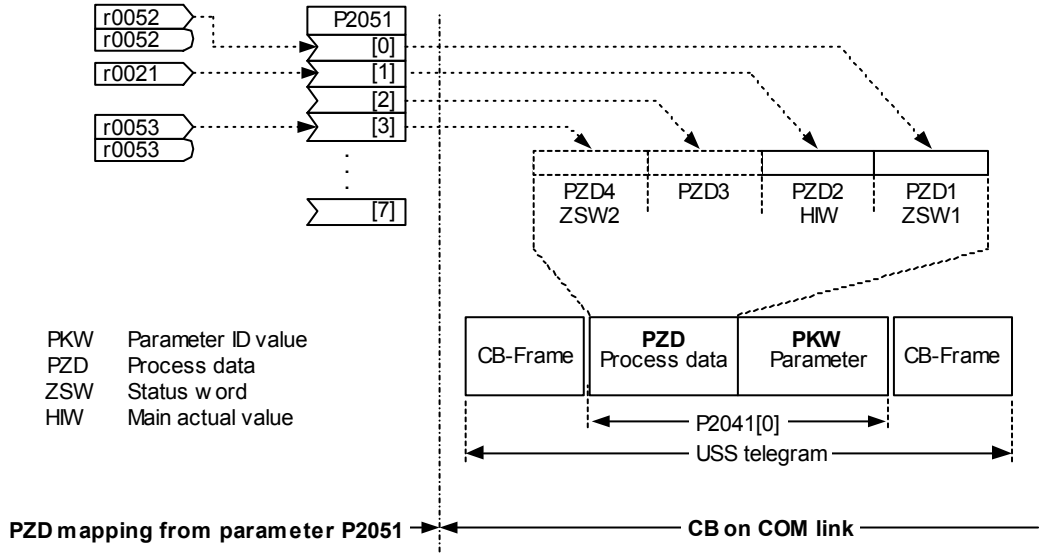
Restrictions:

- If the obove serial interface controls the inverter (P0700 or P0719) then the 1st control word must be transferred in the 1st PZD-word.
- If the setpoint source is selected via P1000 or P0719, then the main setpoint must be transfered in the 2nd PZD-word,
- When P2012 is greater than or equal to 4 the additional control word (2nd control word) must transferred in the 4th PZD-word, if the obove serial interface controls the inverter (P0700 or P0719).

P2051[8]	CI: PZD to CB			Min:	0:0	Level
	CStat: CT	Datatype: U32	Unit: -	Def:	52:0	3
	P-Group: COMM	Active: Immediately	QuickComm.: No	Max:	4000:0	

Connects PZD to CB.

This parameter allows the user to define the source of status words and actual values for the reply PZD.



Index:

P2051[0] : Transmitted word 0
P2051[1] : Transmitted word 1
P2051[2] : Transmitted word 2
P2051[3] : Transmitted word 3
P2051[4] : Transmitted word 4
P2051[5] : Transmitted word 5
P2051[6] : Transmitted word 6
P2051[7] : Transmitted word 7

Common Settings:

Status word 1 = 52 CO/BO: Act. status word 1 (see r0052)
Actual value 1 = 21 inverter output frequency (see r0021)

Other BICO settings are possible

r2053[5]	CB identification			Min:	-	Level
		Datatype: U16	Unit: -	Def:	-	3
	P-Group: COMM			Max:	-	

Displays identification data of the communication board (CB). The different CB types (r2053[0]) are given in the Enum declaration.

Possible Settings:

0 No CB option board
1 PROFIBUS DP
2 DeviceNet
256 not defined

Index:

r2053[0] : CB type (PROFIBUS = 1)
r2053[1] : Firmware version
r2053[2] : Firmware version detail
r2053[3] : Firmware date (year)
r2053[4] : Firmware date (day/month)

r2054[7] **CB diagnosis** Level **3**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: COMM

Displays diagnostic information of communication board (CB).

Index:

r2054[0] : CB diagnosis 0
r2054[1] : CB diagnosis 1
r2054[2] : CB diagnosis 2
r2054[3] : CB diagnosis 3
r2054[4] : CB diagnosis 4
r2054[5] : CB diagnosis 5
r2054[6] : CB diagnosis 6

Details:

See relevant communications board manual.

r2090 **BO: Control word 1 from CB** Level **3**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: COMM

Displays control word 1 received from communication board (CB).

Bitfields:

Bit00	ON/OFF1	0	NO	1	YES
Bit01	OFF2: Electrical stop	0	YES	1	NO
Bit02	OFF3: Fast stop	0	YES	1	NO
Bit03	Pulse enable	0	NO	1	YES
Bit04	RFG enable	0	NO	1	YES
Bit05	RFG start	0	NO	1	YES
Bit06	Setpoint enable	0	NO	1	YES
Bit07	Fault acknowledge	0	NO	1	YES
Bit08	JOG right	0	NO	1	YES
Bit09	JOG left	0	NO	1	YES
Bit10	Control from PLC	0	NO	1	YES
Bit11	Reverse (setpoint inversion)	0	NO	1	YES
Bit13	Motor potentiometer MOP up	0	NO	1	YES
Bit14	Motor potentiometer MOP down	0	NO	1	YES
Bit15	CDS Bit 0 (Local/Remote)	0	NO	1	YES

Details:

See relevant communication board manual for protocol definition and appropriate settings.

r2091 **BO: Control word 2 from CB** Level **3**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: COMM

Displays control word 2 received from communication board (CB).

Bitfields:

Bit00	Fixed frequency Bit 0	0	NO	1	YES
Bit01	Fixed frequency Bit 1	0	NO	1	YES
Bit02	Fixed frequency Bit 2	0	NO	1	YES
Bit03	Fixed frequency Bit 3	0	NO	1	YES
Bit04	Drive data set (DDS) Bit 0	0	NO	1	YES
Bit05	Drive data set (DDS) Bit 1	0	NO	1	YES
Bit08	PID enabled	0	NO	1	YES
Bit09	DC brake enabled	0	NO	1	YES
Bit11	Droop enabled	0	NO	1	YES
Bit12	Torque control	0	NO	1	YES
Bit13	External fault 1	0	YES	1	NO
Bit15	Command data set (CDS) Bit 1	0	NO	1	YES

Details:

See relevant communication board manual for protocol definition and appropriate settings.

P2100[3] Alarm number selection — Level **3**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	ALARMS	**Active:** first confirm	**QuickComm.:** No	**Def:**	0
				Max:	65535

Selects up to 3 faults or warnings for non-default reactions.

Index:

P2100[0] : Fault Number 1
P2100[1] : Fault Number 2
P2100[2] : Fault Number 3

Example:

If you want F0005 to perform an OFF3 instead of an OFF2, set P2100[0] = 5, then select the desired reaction in P2101[0] (in this case, set P2101[0] = 3).

Note:

All fault codes have a default reaction to OFF2. Some fault codes caused by hardware trips (e.g. overcurrent) cannot be changed from the default reactions.

P2101[3] Stop reaction value — Level **3**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	ALARMS	**Active:** first confirm	**QuickComm.:** No	**Def:**	0
				Max:	4

Sets drive stop reaction values for fault selected by P2100 (alarm number stop reaction).

This indexed parameter specifies the special reaction to the faults/warnings defined in P2100 indices 0 to 2.

Possible Settings:

0 No reaction, no display
1 OFF1 stop reaction
2 OFF2 stop reaction
3 OFF3 stop reaction
4 No reaction warning only

Index:

P2101[0] : Stop reaction value 1
P2101[1] : Stop reaction value 2
P2101[2] : Stop reaction value 3

Note:

Settings 0 - 3 only are available for fault codes.

Settings 0 and 4 only are available for warnings.

Index 0 (P2101) refers to fault/warning in index 0 (P2100).

P2103[3] BI: 1. Faults acknowledgement — Level **3**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	722:2
				Max:	4000:0

Defines first source of fault acknowledgement, e.g. keypad/DIN, etc. (depending on setting).

Index:

P2103[0] : 1st. Command data set (CDS)
P2103[1] : 2nd. Command data set (CDS)
P2103[2] : 3rd. Command data set (CDS)

Common Settings:

722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
722.3 = Digital input 4 (requires P0704 to be set to 99, BICO)
722.4 = Digital input 5 (requires P0705 to be set to 99, BICO)
722.5 = Digital input 6 (requires P0706 to be set to 99, BICO)
722.6 = Digital input 7 (via analog input 1, requires P0707 to be set to 99)
722.7 = Digital input 8 (via analog input 2, requires P0708 to be set to 99)

P2104[3] BI: 2. Faults acknowledgement — Level **3**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	0:0
				Max:	4000:0

Selects second source of fault acknowledgement.

Index:

P2104[0] : 1st. Command data set (CDS)
P2104[1] : 2nd. Command data set (CDS)
P2104[2] : 3rd. Command data set (CDS)

Common Settings:

722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
722.3 = Digital input 4 (requires P0704 to be set to 99, BICO)
722.4 = Digital input 5 (requires P0705 to be set to 99, BICO)
722.5 = Digital input 6 (requires P0706 to be set to 99, BICO)
722.6 = Digital input 7 (via analog input 1, requires P0707 to be set to 99)
722.7 = Digital input 8 (via analog input 2, requires P0708 to be set to 99)

P2106[3] **BI: External fault**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	1:0
				Max:	4000:0

Level **3**

Selects source of external faults.

Index:

P2106[0] : 1st. Command data set (CDS)
P2106[1] : 2nd. Command data set (CDS)
P2106[2] : 3rd. Command data set (CDS)

Common Settings:

722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
722.3 = Digital input 4 (requires P0704 to be set to 99, BICO)
722.4 = Digital input 5 (requires P0705 to be set to 99, BICO)
722.5 = Digital input 6 (requires P0706 to be set to 99, BICO)
722.6 = Digital input 7 (via analog input 1, requires P0707 to be set to 99)
722.7 = Digital input 8 (via analog input 2, requires P0708 to be set to 99)

r2110[4] **Warning number**

		Datatype: U16	**Unit:** -	**Min:**	-
P-Group:	ALARMS			**Def:**	-
				Max:	-

Level **2**

Displays warning information.

A maximum of 2 active warnings (indices 0 and 1) and 2 historical warnings (indices 2 and 3) may be viewed.

Index:

r2110[0] : Recent Warnings --, warning 1
r2110[1] : Recent Warnings --, warning 2
r2110[2] : Recent Warnings -1, warning 3
r2110[3] : Recent Warnings -1, warning 4

Note:

The keypad will flash while a warning is active. The LEDs indicate the warning status in this case.

If an AOP is in use, the display will show number and text of the active warning.

Notice:

Indices 0 and 1 are not stored.

P2111 **Total number of warnings**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	ALARMS	**Active:** first confirm	**QuickComm.:** No	**Def:**	0
				Max:	4

Level **3**

Displays number of warning (up to 4) since last reset. Set to 0 to reset the warning history.

r2114[2] **Run time counter**

		Datatype: U16	**Unit:** -	**Min:**	-
P-Group:	ALARMS			**Def:**	-
				Max:	-

Level **3**

Displays run time counter. It is the total time the drive has been powered up. When power goes value is saved, then restored on powerup.

The run time counter r2114 will be calculate as followed:
Multiply the value in r2114[0], by 65536 and then add it to the value in r2114[1]. The resultant answer will be in seconds. This means that r2114[0] is not days.

When AOP is not connected, the time in this parameter is used by r0948 to indicate when a fault has occured.

Index:

r2114[0] : System Time, Seconds, Upper Word
r2114[1] : System Time, Seconds, Lower Word

Example:

If r2114[0] = 1 & r2114[1] = 20864
We get 1 * 65536 + 20864 = 86400 seconds which equals 1 day.

Details:

See r0948 (fault time)

P2115[3] **AOP real time clock**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.:** No	**Def:**	0
				Max:	65535

Level **3**

Displays AOP real time.

All inverters require an on-board clock function with which fault conditions may be timestamped and logged. However, they have no battery backed Real Time Clock (RTC), unlike the AOP. Invertes may support a software driven RTC which requires synchronisation with the RTC of the AOP (heartbeat) - should the heartbeat be lost, the inverter after a timeout period will clear its local RTC to indicate the time is unknown. This will provide compatibility with the Basic Operator Panel (BOP), which cannot supply the time. The heartbeat period shall be 60 s, to avoid overloading the inverter with messages.

The time is stored in a word array parameter P2115. This parameter number is common to all invertes. Inverters not supporting this feature would respond with “Parameter not recognised” - a Master will ignore this. The time will be set by USS Protocol standard “word array parameter write” telegrams.

Within the AOP, while it is acting as a USS Master, at each tick of the heartbeat, the list of available USS Slaves will be flagged with a time update request. As the Master runs around the list of USS slaves on its next USS update cycle, if there are no higher priority tasks to perform, and the slave still has its time update flag set, then an array parameter write telegram will be issued, containing the current time. The request for that slave is cancelled if the slave responds correctly. The AOP will not need to read the time from the slave.

Time is maintained in a word array parameter and encoded as follows - the same format will be used in fault report logs.

Index	High Byte (MSB)	Low Byte (LSB)
0	Seconds (0 - 59)	Minutes (0 - 59)
1	Hours (0 - 23)	Days (1 - 31)
2	Month (1 - 12)	Years (00 - 250)

Time is measured from Jan 1st 2000. Values are in binary form.

Index:

P2115[0] : Real Time, Seconds+Minutes
P2115[1] : Real Time, Hours+Days
P2115[2] : Real Time, Month+Year

Details:

See r0948 (fault time).

P2120 **Indication counter**

CStat:	CUT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.:** No	**Def:**	0
				Max:	65535

Level **4**

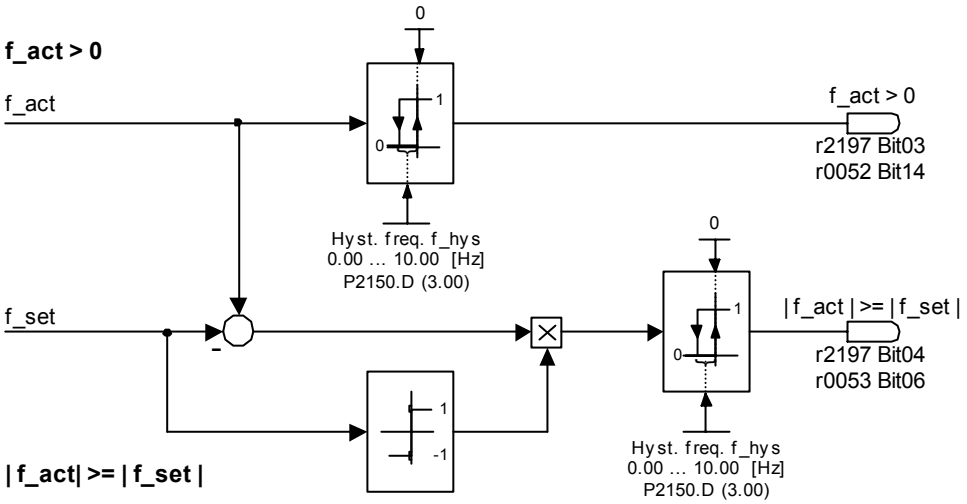
Indicates total number of alarm events. This parameter is incremented whenever an alarm event occurs. It also gets incremented when a warning is cleared or faults are cleared.

This parameter is used by the PC tools.

P2150[3] **Hysteresis frequency f_hys** Level **3**

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	0.00
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.:** No	**Def:**	3.00
				Max:	10.00

Defines hysteresis level applied for comparing frequency and speed to threshold as illustrated in the diagram below.



Index:

P2150[0] : 1st. Drive data set (DDS)
P2150[1] : 2nd. Drive data set (DDS)
P2150[2] : 3rd. Drive data set (DDS)

P2153[3] **Time-constant frequency filter** Level **2**

CStat:	CUT	**Datatype:** U16	**Unit:** ms	**Min:**	0
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.:** No	**Def:**	5
				Max:	1000

Specifies time constant of first-order frequency filter. The filtered frequency is then compared to the thresholds.

Index:

P2153[0] : 1st. Drive data set (DDS)
P2153[1] : 2nd. Drive data set (DDS)
P2153[2] : 3rd. Drive data set (DDS)

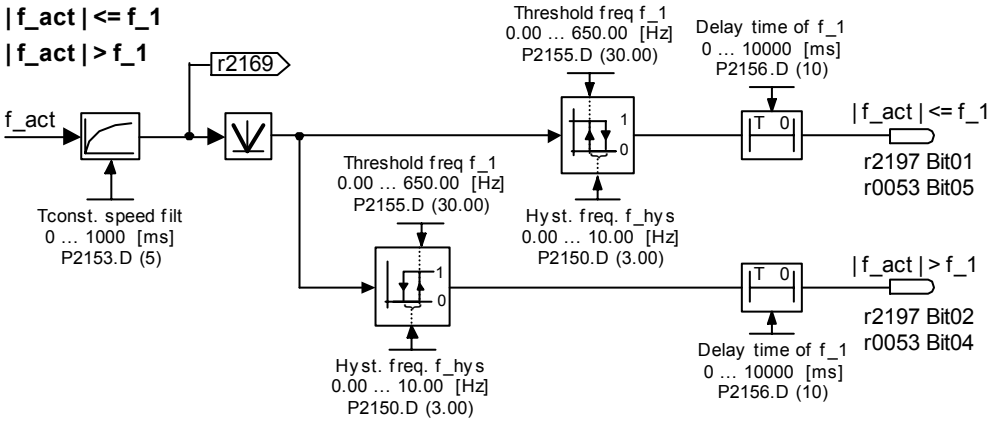
Details:

See diagram in P2155, P2157 and P2159

P2155[3] **Threshold frequency f_1** Level **3**

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	0.00
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.:** No	**Def:**	30.00
				Max:	650.00

Sets a threshold for comparing actual frequency or frequency to threshold values f_1. This threshold controls status bits 4 and 5 in status word 2 (r0053).



Index:

P2155[0] : 1st. Drive data set (DDS)
P2155[1] : 2nd. Drive data set (DDS)
P2155[2] : 3rd. Drive data set (DDS)

P2156[3]	Delay time of threshold freq f_1			Min:	0	Level
	CStat: CUT	Datatype: U16	Unit: ms	Def:	10	3
	P-Group: ALARMS	Active: Immediately	QuickComm.: No	Max:	10000	

Sets delay time prior to threshold frequency f_1 comparison (P2155).

Index:

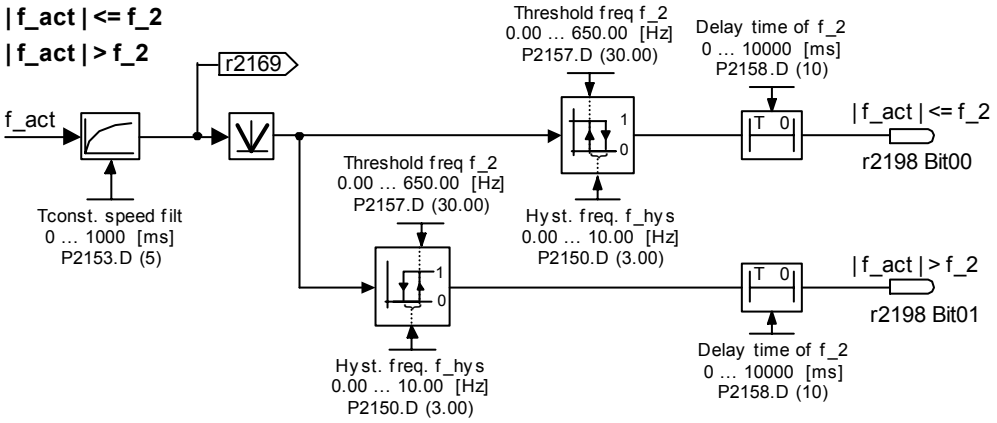
P2156[0] : 1st. Drive data set (DDS)
P2156[1] : 2nd. Drive data set (DDS)
P2156[2] : 3rd. Drive data set (DDS)

Details:

See diagram in P2155 (threshold frequency f_1)

P2157[3]	Threshold frequency f_2			Min:	0.00	Level
	CStat: CUT	Datatype: Float	Unit: Hz	Def:	30.00	2
	P-Group: ALARMS	Active: Immediately	QuickComm.: No	Max:	650.00	

Threshold_2 for comparing frequency or frequency to thresholds as illustrated in the diagram below.



Index:

P2157[0] : 1st. Drive data set (DDS)
P2157[1] : 2nd. Drive data set (DDS)
P2157[2] : 3rd. Drive data set (DDS)

P2158[3]	Delay time of threshold freq f_2			Min:	0	Level
	CStat: CUT	Datatype: U16	Unit: ms	Def:	10	2
	P-Group: ALARMS	Active: Immediately	QuickComm.: No	Max:	10000	

Delay time for comparing frequency to threshold f_2 (P2157).

Index:

P2158[0] : 1st. Drive data set (DDS)
P2158[1] : 2nd. Drive data set (DDS)
P2158[2] : 3rd. Drive data set (DDS)

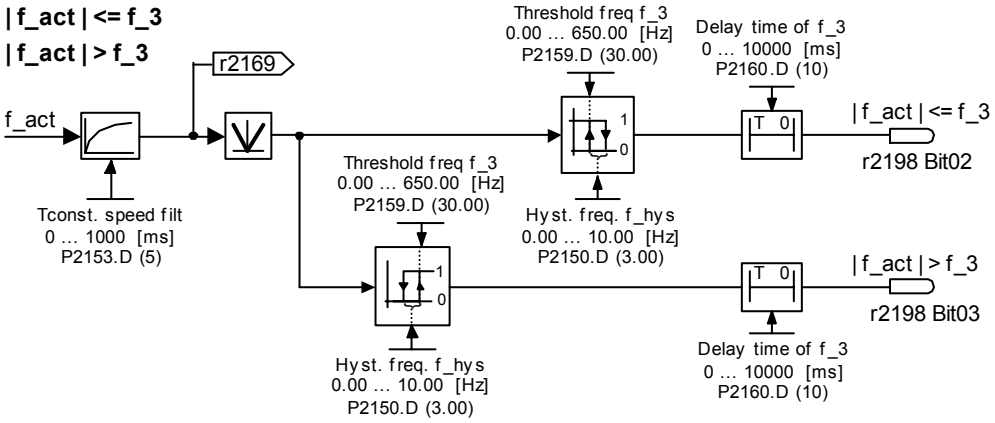
Details:

See diagram in P2157 (threshold frequency f_2)

P2159[3] **Threshold frequency f_3** Level **2**

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	0.00
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.:** No	**Def:**	30.00
				Max:	650.00

Threshold_3 for comparing frequency to thresholds.



Index:

P2159[0] : 1st. Drive data set (DDS)
P2159[1] : 2nd. Drive data set (DDS)
P2159[2] : 3rd. Drive data set (DDS)

P2160[3] **Delay time of threshold freq f_3** Level **2**

CStat:	CUT	**Datatype:** U16	**Unit:** ms	**Min:**	0
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.:** No	**Def:**	10
				Max:	10000

Delay time for comparing frequency to threshold f_3 (P2159).

Index:

P2160[0] : 1st. Drive data set (DDS)
P2160[1] : 2nd. Drive data set (DDS)
P2160[2] : 3rd. Drive data set (DDS)

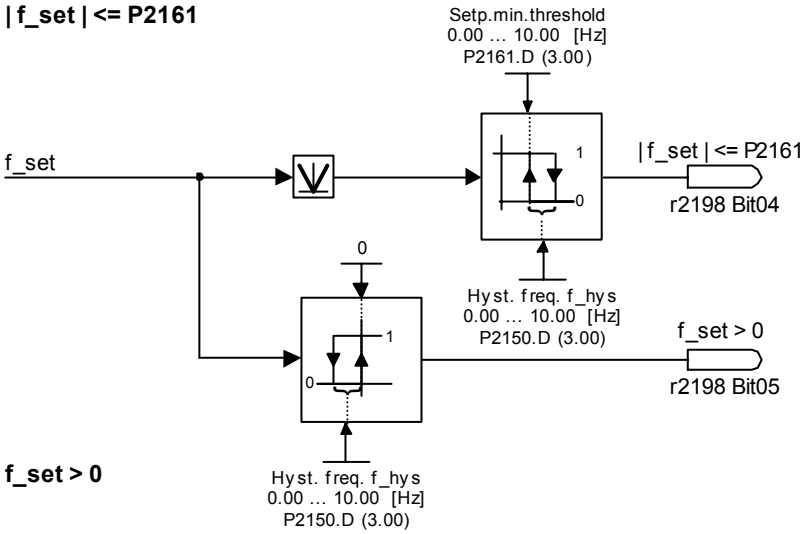
Details:

See diagram in P2159 (threshold frequency f_3)

P2161[3] **Min. threshold for freq. setp.** Level **2**

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	0.00
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.:** No	**Def:**	3.00
				Max:	10.00

Minimum threshold value for comparing frequency setpoint.



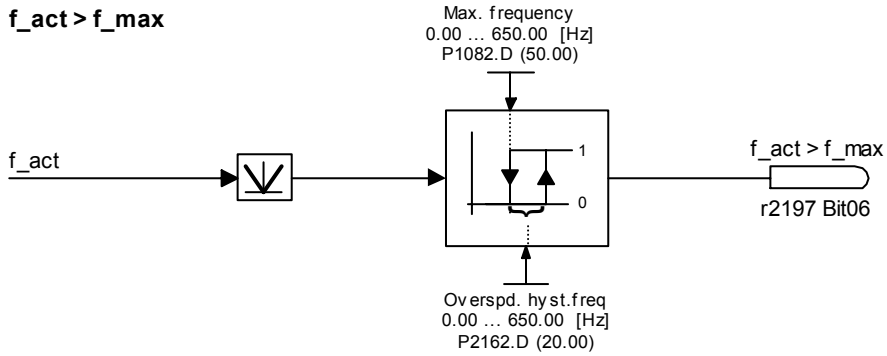
Index:

P2161[0] : 1st. Drive data set (DDS)
P2161[1] : 2nd. Drive data set (DDS)
P2161[2] : 3rd. Drive data set (DDS)

P2162[3] **Hysteresis freq. for overfreq.** Level **2**

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	0.00
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.:** No	**Def:**	20.00
				Max:	650.00

Hysteresis frequency for overfrequency-detection as illustrated in the diagram below.



Index:

P2162[0] : 1st. Drive data set (DDS)
P2162[1] : 2nd. Drive data set (DDS)
P2162[2] : 3rd. Drive data set (DDS)

P2163[3] **Entry freq. for perm. deviation** Level **2**

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	0.00
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.:** No	**Def:**	3.00
				Max:	20.00

Threshold for detecting frequency deviation from setpoint as illustrated in the diagram P2164.

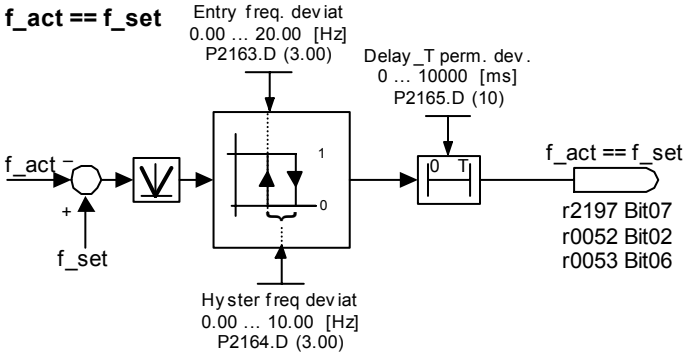
Index:

P2163[0] : 1st. Drive data set (DDS)
P2163[1] : 2nd. Drive data set (DDS)
P2163[2] : 3rd. Drive data set (DDS)

P2164[3] **Hysteresis frequency deviation** Level **3**

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	0.00
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.:** No	**Def:**	3.00
				Max:	10.00

Hysteresis frequency for detecting permitted deviation (from setpoint). This frequency controls bit 8 in status word 1 (r0052) and bit 6 in status word 2 (r0053).



Index:

P2164[0] : 1st. Drive data set (DDS)
P2164[1] : 2nd. Drive data set (DDS)
P2164[2] : 3rd. Drive data set (DDS)

P2165[3] **Delay time permitted deviation** Level **2**

CStat:	CUT	**Datatype:** U16	**Unit:** ms	**Min:**	0
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.:** No	**Def:**	10
				Max:	10000

Delay time for detecting permitted deviation of frequency from setpoint.

Index:

P2165[0] : 1st. Drive data set (DDS)
P2165[1] : 2nd. Drive data set (DDS)
P2165[2] : 3rd. Drive data set (DDS)

Details:

See diagram in P2164.

P2166[3] **Delay time ramp up completed** Level **2**

CStat:	CUT	**Datatype:** U16	**Unit:** ms	**Min:**	0
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.:** No	**Def:**	10
				Max:	10000

Delay time for signal that indicates completion of ramp-up.

Index:

P2166[0] : 1st. Drive data set (DDS)
P2166[1] : 2nd. Drive data set (DDS)
P2166[2] : 3rd. Drive data set (DDS)

Details:

See diagram in P2174.

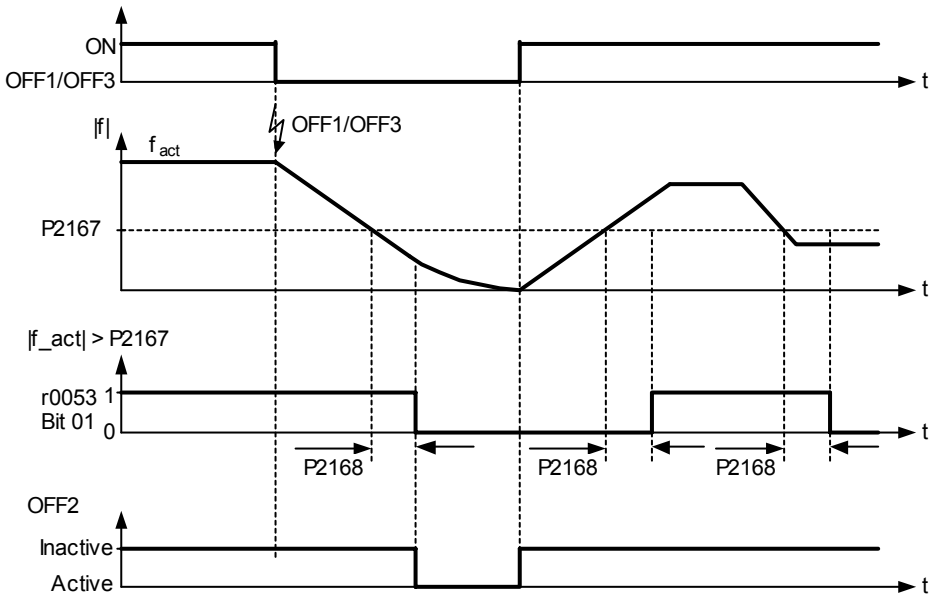
P2167[3] **Switch-off frequency f_off** Level **3**

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	0.00
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.:** No	**Def:**	1.00
				Max:	10.00

Defines the threshold of the monitoring function |f_act| > P2167 (f_off).

P2167 influences following functions:
- If the actual frequency falls below this threshold and the time delay has expired, bit 1 in status word 2 (r0053) is reset.
- If a OFF1 or OFF3 was applied and bit 1 is reset the inverter will disable the pulse (OFF2).

Restriction:
- The monitoring function |f_act| > P2167 (f_off) is not updated and pulses are not disabled, if motor holding brake (MHB, P1215 = 1) is enabled.



Index:

P2167[0] : 1st. Drive data set (DDS)
P2167[1] : 2nd. Drive data set (DDS)
P2167[2] : 3rd. Drive data set (DDS)

P2168[3] **Delay time T_off** Level **3**

CStat:	CUT	**Datatype:** U16	**Unit:** ms	**Min:**	0
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.:** No	**Def:**	10
				Max:	10000

Defines time for which the inverter may operate below switch-off frequency (P2167) before switch off occurs.

Index:

P2168[0] : 1st. Drive data set (DDS)
P2168[1] : 2nd. Drive data set (DDS)
P2168[2] : 3rd. Drive data set (DDS)

Dependency:

Active if holding brake (P1215) not parameterized.

Details:

See diagram in P2167 (switch-off frequency)

r2169 **CO: Act. filtered frequency** Level **2**

		Datatype: Float	**Unit:** Hz	**Min:**	-
				Def:	-
P-Group:	ALARMS			**Max:**	-

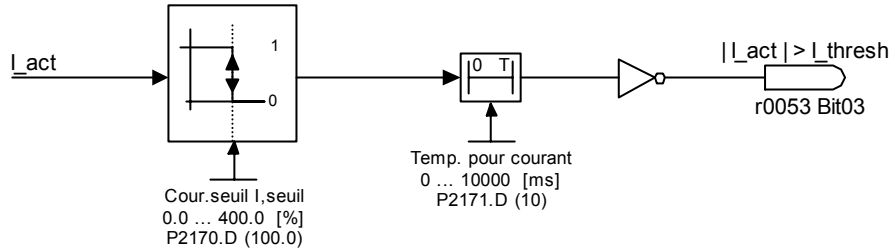
Filtered frequency for monitoring behind first-order lowpass filter.

P2170[3] **Threshold current I_thresh**

						Level
CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	0.0	**3**
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.:** No	**Def:**	100.0	
				Max:	400.0	

Defines threshold current in [%] relative to P0305 (rated motor current) to be used in comparisons of I_act and I_Thresh as illustrated in the diagram below.

|I_act| > I_thresh



Index:

P2170[0] : 1st. Drive data set (DDS)
P2170[1] : 2nd. Drive data set (DDS)
P2170[2] : 3rd. Drive data set (DDS)

Note:

This threshold controls bit 3 in status word 3 (r0053).

P2171[3] **Delay time current**

						Level
CStat:	CUT	**Datatype:** U16	**Unit:** ms	**Min:**	0	**3**
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.:** No	**Def:**	10	
				Max:	10000	

Defines delay time prior to activation of current comparison.

Index:

P2171[0] : 1st. Drive data set (DDS)
P2171[1] : 2nd. Drive data set (DDS)
P2171[2] : 3rd. Drive data set (DDS)

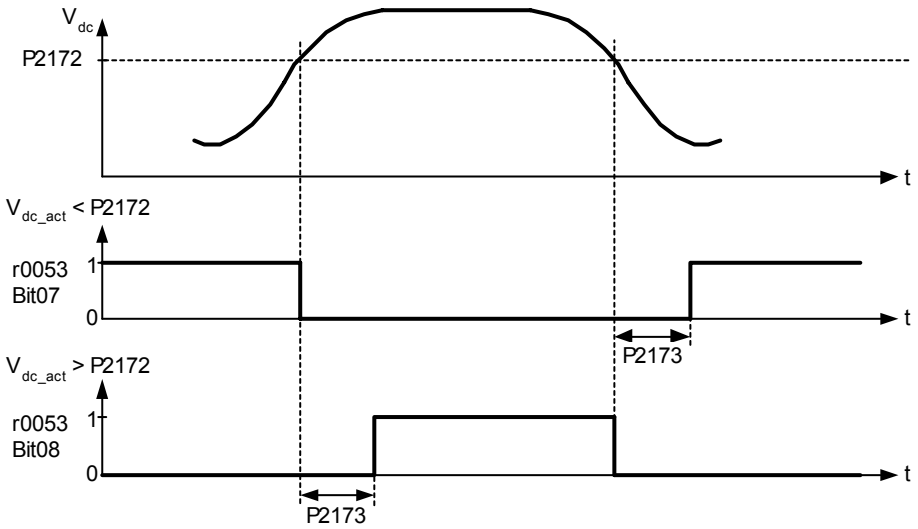
Details:

See diagram in P2170 (threshold current I_thresh)

P2172[3] **Threshold DC-link voltage**

						Level
CStat:	CUT	**Datatype:** U16	**Unit:** V	**Min:**	0	**3**
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.:** No	**Def:**	800	
				Max:	2000	

Defines DC link voltage to be compared to actual voltage as illustrated in the diagram below.



Index:

P2172[0] : 1st. Drive data set (DDS)
P2172[1] : 2nd. Drive data set (DDS)
P2172[2] : 3rd. Drive data set (DDS)

Note:

This voltage controls bits 7 and 8 in status word 3 (r0053).

P2173[3] **Delay time DC-link voltage** Level **3**

CStat:	CUT	**Datatype:** U16	**Unit:** ms	**Min:**	0
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.:** No	**Def:**	10
				Max:	10000

Defines delay time prior to activation of threshold comparison.

Index:

P2173[0] : 1st. Drive data set (DDS)
P2173[1] : 2nd. Drive data set (DDS)
P2173[2] : 3rd. Drive data set (DDS)

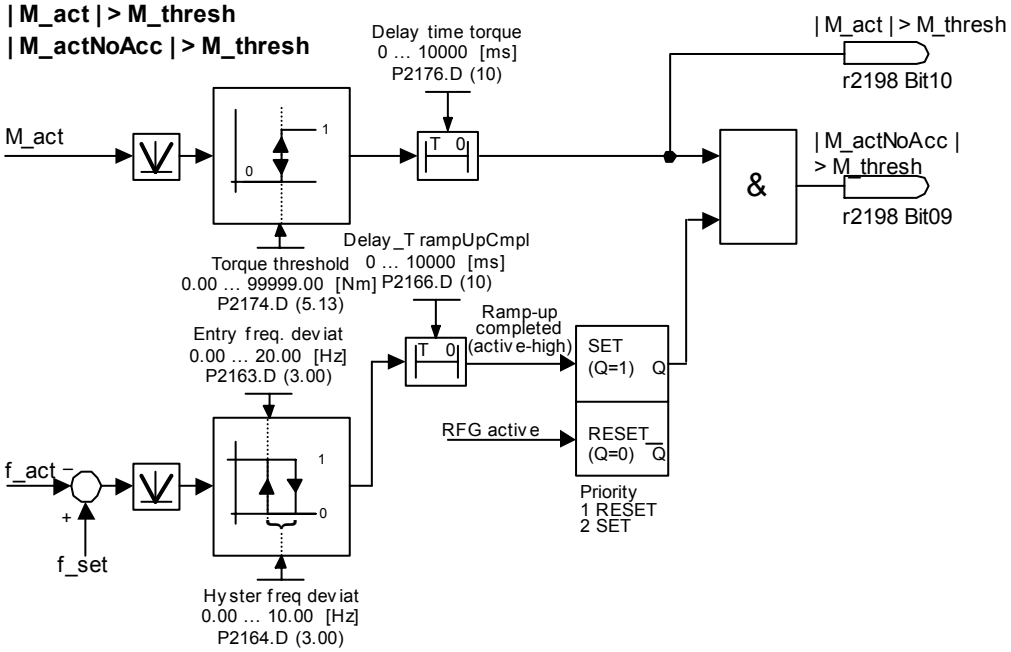
Details:

See diagram in P2172 (threshold DC-link voltage)

P2174[3] **Torque threshold M_thresh** Level **2**

CStat:	CUT	**Datatype:** Float	**Unit:** Nm	**Min:**	0.00
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.:** No	**Def:**	5.13
				Max:	99999.00

Defines torque threshold for comparing actual torque.



Index:

P2174[0] : 1st. Drive data set (DDS)
P2174[1] : 2nd. Drive data set (DDS)
P2174[2] : 3rd. Drive data set (DDS)

P2176[3] **Delay time for torque threshold** Level **2**

CStat:	CUT	**Datatype:** U16	**Unit:** ms	**Min:**	0
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.:** No	**Def:**	10
				Max:	10000

Delay time for comparing actual torque to threshold.

Index:

P2176[0] : 1st. Drive data set (DDS)
P2176[1] : 2nd. Drive data set (DDS)
P2176[2] : 3rd. Drive data set (DDS)

P2177[3] **Delay time for motor is blocked** Level **2**

CStat:	CUT	**Datatype:** U16	**Unit:** ms	**Min:**	0
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.:** No	**Def:**	10
				Max:	10000

Delay time for identification that motor is blocked.

Index:

P2177[0] : 1st. Drive data set (DDS)
P2177[1] : 2nd. Drive data set (DDS)
P2177[2] : 3rd. Drive data set (DDS)

P2178[3]	Delay time for motor pulled out			Min:	0	Level
	CStat: CUT	Datatype: U16	Unit: ms	Def:	10	2
	P-Group: ALARMS	Active: Immediately	QuickComm.: No	Max:	10000	

Delay time for identification that motor is pulled out.

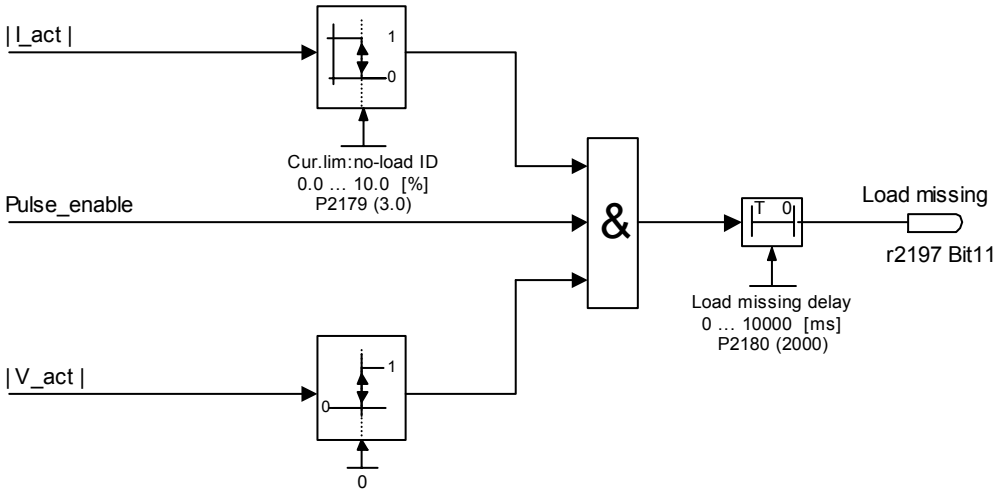
Index:

P2178[0] : 1st. Drive data set (DDS)
P2178[1] : 2nd. Drive data set (DDS)
P2178[2] : 3rd. Drive data set (DDS)

P2179	Current limit for no load ident.			Min:	0.0	Level
	CStat: CUT	Datatype: Float	Unit: %	Def:	3.0	3
	P-Group: ALARMS	Active: Immediately	QuickComm.: No	Max:	10.0	

Threshold current for A0922 (load missing) in [%] relative to P0305 (rated motor current) as illustrated in the diagram below.

Load missing



Note:

It may be that the motor is not connected (load missing) or a phase could be missing.

Notice:

If a motor setpoint cannot be entered and the current limit (P2179) is not exceeded, Alarm A0922 (no load applied) is issued when delay time (P2180) expires.

P2180	Delay time for load missing			Min:	0	Level
	CStat: CUT	Datatype: U16	Unit: ms	Def:	2000	3
	P-Group: ALARMS	Active: Immediately	QuickComm.: No	Max:	10000	

Delay time load missing

Note:

It may be that the motor is not connected (load missing) or a phase could be missing.

Notice:

If a motor setpoint cannot be entered and the current limit (P2179) is not exceeded, alarm A0922 (no load applied) is issued when delay time (P2180) expires.

Details:

See diagram in P2179 (current limit for no load identification).

P2181[3] Belt failure detection mode Level **2**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	ALARMS	**Active:** first confirm	**QuickComm.:** No	**Def:**	0
				Max:	6

Sets belt failure detection mode. This function allows detection of mechanical failure of the drive train, e.g. a broken drive belt. It can also detect conditions which cause an overload, such as a jam.

This is achieved by comparing the actual frequency/torque curve with a programmed envelope (see P2182 - P2190). If the curve falls outside the envelope, a warning or trip is generated.

Possible Settings:

0 Belt failure detection disabled
1 Warning: Low torque / speed
2 Warning: High torque / speed
3 Warning: High / low torque / speed
4 Trip: Low torque / speed
5 Trip: High torque / speed
6 Trip: High / low torque / speed

Index:

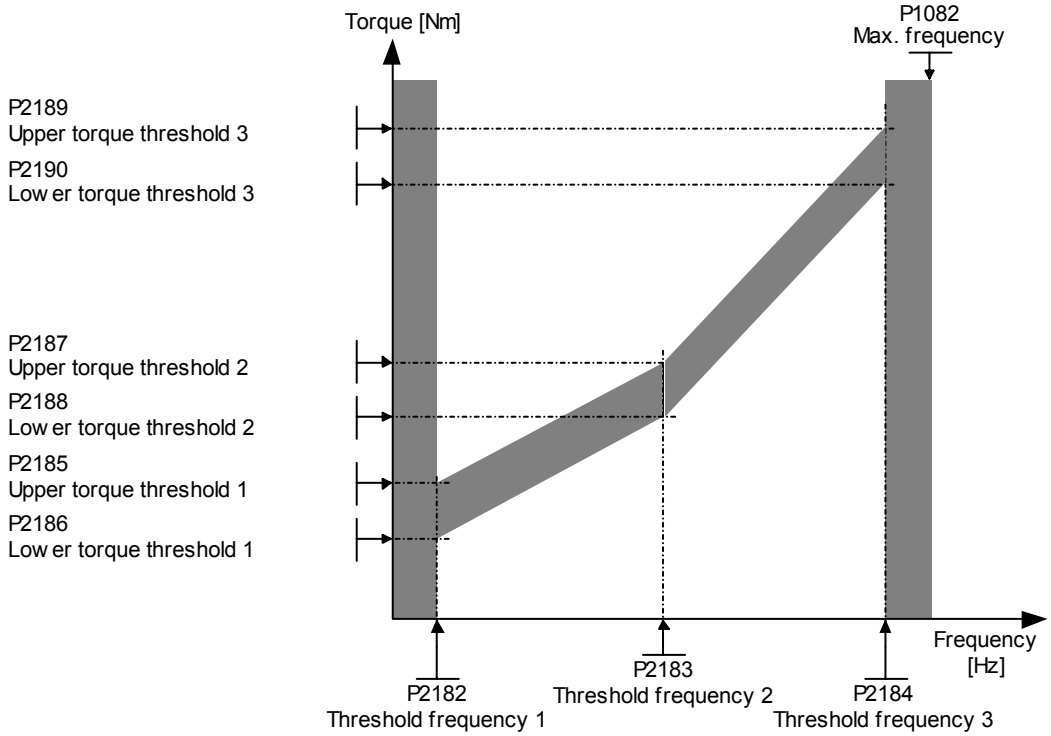
P2181[0] : 1st. Command data set (CDS)
P2181[1] : 2nd. Command data set (CDS)
P2181[2] : 3rd. Command data set (CDS)

P2182[3] Belt threshold frequency 1 Level **3**

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	0.00
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.:** No	**Def:**	5.00
				Max:	650.00

Sets a frequency threshold 1 for comparing actual torque to torque the envelope for belt failure detection.

The frequency torque envelope is defined by 9 parameters - 3 are frequency parameters (P2182 - P2184), and the other 6 define the low and high torque limits (P2185 - P2190) for each frequency (see diagram below).



The allowed frequency/torque region is defined by the shaded area. When the torque falls outside the area shown, a trip or warning occurs (see parameter P2181).

Index:

P2182[0] : 1st. Drive data set (DDS)
P2182[1] : 2nd. Drive data set (DDS)
P2182[2] : 3rd. Drive data set (DDS)

Note:

The torque is unlimited below P2182, and above P2184. Normally P2182 <= lower torque limit (P1521), and P2184 > = upper torque limit (P1520).

P2183[3] Belt threshold frequency 2 — Level **2**

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	0.00
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.:** No	**Def:**	30.00
				Max:	650.00

Sets a threshold F2 for comparing actual torque to torque the envelope for belt failure detection.

Index:

P2183[0] : 1st. Drive data set (DDS)
P2183[1] : 2nd. Drive data set (DDS)
P2183[2] : 3rd. Drive data set (DDS)

Details:

See P2182 (belt threshold frequency 1).

P2184[3] Belt threshold frequency 3 — Level **2**

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	0.00
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.:** No	**Def:**	50.00
				Max:	650.00

Sets a threshold F3 for comparing actual torque to torque the envelope for belt failure detection.

Index:

P2184[0] : 1st. Drive data set (DDS)
P2184[1] : 2nd. Drive data set (DDS)
P2184[2] : 3rd. Drive data set (DDS)

Details:

See P2182 (belt threshold frequency 1).

P2185[3] Upper torque threshold 1 — Level **2**

CStat:	CUT	**Datatype:** Float	**Unit:** Nm	**Min:**	0.0
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.:** No	**Def:**	99999.0
				Max:	99999.0

Upper limit threshold value 1 for comparing actual torque.

Index:

P2185[0] : 1st. Drive data set (DDS)
P2185[1] : 2nd. Drive data set (DDS)
P2185[2] : 3rd. Drive data set (DDS)

Details:

See P2182 (belt threshold frequency 1).

P2186[3] Lower torque threshold 1 — Level **2**

CStat:	CUT	**Datatype:** Float	**Unit:** Nm	**Min:**	0.0
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.:** No	**Def:**	0.0
				Max:	99999.0

Lower limit threshold value 1 for comparing actual torque.

Index:

P2186[0] : 1st. Drive data set (DDS)
P2186[1] : 2nd. Drive data set (DDS)
P2186[2] : 3rd. Drive data set (DDS)

Details:

See P2182 (belt threshold frequency 1).

P2187[3] Upper torque threshold 2 — Level **2**

CStat:	CUT	**Datatype:** Float	**Unit:** Nm	**Min:**	0.0
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.:** No	**Def:**	99999.0
				Max:	99999.0

Upper limit threshold value 2 for comparing actual torque.

Index:

P2187[0] : 1st. Drive data set (DDS)
P2187[1] : 2nd. Drive data set (DDS)
P2187[2] : 3rd. Drive data set (DDS)

Details:

See P2182 (belt threshold frequency 1).

P2188[3] Lower torque threshold 2 — Level **2**

CStat:	CUT	**Datatype:** Float	**Unit:** Nm	**Min:**	0.0
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.:** No	**Def:**	0.0
				Max:	99999.0

Lower limit threshold value 2 for comparing actual torque.

Index:

P2188[0] : 1st. Drive data set (DDS)
P2188[1] : 2nd. Drive data set (DDS)
P2188[2] : 3rd. Drive data set (DDS)

Details:

See P2182 (belt threshold frequency 1).

P2189[3] Upper torque threshold 3 — Level **2**

CStat:	CUT	**Datatype:** Float	**Unit:** Nm	**Min:**	0.0
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.:** No	**Def:**	99999.0
				Max:	99999.0

Upper limit threshold value 3 for comparing actual torque.

Index:

P2189[0] : 1st. Drive data set (DDS)
P2189[1] : 2nd. Drive data set (DDS)
P2189[2] : 3rd. Drive data set (DDS)

Details:

See P2182 (belt threshold frequency 1).

P2190[3] Lower torque threshold 3 — Level **2**

CStat:	CUT	**Datatype:** Float	**Unit:** Nm	**Min:**	0.0
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.:** No	**Def:**	0.0
				Max:	99999.0

Lower limit threshold value 3 for comparing actual torque.

Index:

P2190[0] : 1st. Drive data set (DDS)
P2190[1] : 2nd. Drive data set (DDS)
P2190[2] : 3rd. Drive data set (DDS)

Details:

See P2182 (belt threshold frequency 1).

P2192[3] Time delay for belt failure — Level **2**

CStat:	CUT	**Datatype:** U16	**Unit:** s	**Min:**	0
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.:** No	**Def:**	10
				Max:	65

P2192 defines a delay before warning/trip becomes active. It is used to eliminate events caused by transient conditions. It is used for both methods of fault detection.

Index:

P2192[0] : 1st. Drive data set (DDS)
P2192[1] : 2nd. Drive data set (DDS)
P2192[2] : 3rd. Drive data set (DDS)

r2197 CO/BO: Monitoring word 1 — Level **2**

		Datatype: U16	**Unit:** -	**Min:**	-
P-Group:	ALARMS			**Def:**	-
				Max:	-

Monitoring word 1 which indicates the state of monitor functions. Each bit represents one monitor function.

Bitfields:

Bit00	f_act > P1080 (f_min)	0 NO	1 YES
Bit01	f_act <= P2155 (f_1)	0 NO	1 YES
Bit02	f_act > P2155 (f_1)	0 NO	1 YES
Bit03	f_act > zero	0 NO	1 YES
Bit04	f_act >= setp. (f_set)	0 NO	1 YES
Bit05	f_act > P2167 (f_off)	0 NO	1 YES
Bit06	f_act >= P1082 (f_max)	0 NO	1 YES
Bit07	f_act == setp. (f_set)	0 NO	1 YES
Bit08	Act. current r0068 >= P2170	0 NO	1 YES
Bit09	Act. unfilt. Vdc < P2172	0 NO	1 YES
Bit10	Act. unfilt. Vdc > P2172	0 NO	1 YES
Bit11	Load missing	0 NO	1 YES

r2198 CO/BO: Monitoring word 2 — Level **2**

		Datatype: U16	**Unit:** -	**Min:**	-
P-Group:	ALARMS			**Def:**	-
				Max:	-

Monitoring word 2 which indicates the state of monitor functions. Each bit represents one monitor function.

Bitfields:

Bit00	|f_act| <= P2157 (f_2)	0 NO	1 YES
Bit01	|f_act| > P2157 (f_2)	0 NO	1 YES
Bit02	|f_act| <= P2159 (f_3)	0 NO	1 YES
Bit03	|f_act| > P2159 (f_3)	0 NO	1 YES
Bit04	|f_set| < P2161 (f_min_set)	0 NO	1 YES
Bit05	f_set > 0	0 NO	1 YES
Bit06	Motor blocked	0 NO	1 YES
Bit07	Motor pulled out	0 NO	1 YES
Bit08	| I_act r0068 | < P2170	0 NO	1 YES
Bit09	| m_act | > P2174 & setpoint reached	0 NO	1 YES
Bit10	| m_act | > P2174	0 NO	1 YES
Bit11	Belt failure warning	0 NO	1 YES
Bit12	Belt failure trip	0 NO	1 YES

P2200[3]	BI: Enable PID controller				Min:	0:0	Level
	CStat:	CUT	Datatype: U32	Unit: -	Def:	0:0	2
	P-Group:	TECH	Active: first confirm	QuickComm.: No	Max:	4000:0	

PID mode Allows user to enable/disable the PID controller. Setting to 1 enables the PID closed-loop controller.

Index:

P2200[0] : 1st. Command data set (CDS)
P2200[1] : 2nd. Command data set (CDS)
P2200[2] : 3rd. Command data set (CDS)

Dependency:

Setting 1 automatically disables normal ramp times set in P1120 and P1121 and the normal frequency setpoints.

Following an OFF1 or OFF3 command, however, the inverter frequency will ramp down to zero using the ramp time set in P1121 (P1135 for OFF3).

Note:

The PID setpoint source is selected using P2253. The PID setpoint and the PID feedback signal are interpreted as [%] values (not [Hz]). The output of the PID controller is displayed as [%] and then normalized into [Hz] through P2000 (reference frequency) when PID is enabled.

In level 3, the PID controller source enable can also come from the digital inputs in settings 722.0 to 722.5 for DIN1 to DIN6 or from any other BiCo source.

Notice:

The minimum and maximum motor frequencies (P1080 and P1082) as well as the skip frequencies (P1091 to P1094) remain active on the inverter output. However, enabling skip frequencies with PID control can produce instabilities.

P2201[3] **Fixed PID setpoint 1**

						Level
CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-200.00	**2**
P-Group:	TECH	**Active:** Immediately	**QuickComm.:** No	**Def:**	0.00	
				Max:	200.00	

Defines Fixed PID Setpoint 1

There are three options available for selection of the PID fixed setpoints:
1. Direct selection
2. Direct selection + ON command
3. Binary coded selection + ON command

1. Direct selection (P0701 - P0706 = 15):
   - In this mode of operation, 1 digital input selects one PID fixed setpoint.
   - If several inputs are active together, the selected setpoints are summed.
   - E.g.: PID-FF1 + PID-FF2 + PID-FF3 + PID-FF4 + PID-FF5 + PID-FF6.

2. Direct selection + ON command (P0701 - P0706 = 16):
   - Description as for 1), except that this type of selection issues an ON command concurrent with any setpoint selection.
   - If several inputs are active together, the selected setpoints are summed.
   - E.g.: PID-FF1 + PID-FF2 + PID-FF3 + PID-FF4 + PID-FF5 + PID-FF6.

3. Binary coded selection + ON command (P0701 - P0706 = 17):
   - Using this method to select the fixed PID setpoint (FF-PID) allows you to choose up to 16 different PID setpoints.
   - The setpoints are selected according to the following table:

Index:

P2201[0] : 1st. Drive data set (DDS)
P2201[1] : 2nd. Drive data set (DDS)
P2201[2] : 3rd. Drive data set (DDS)

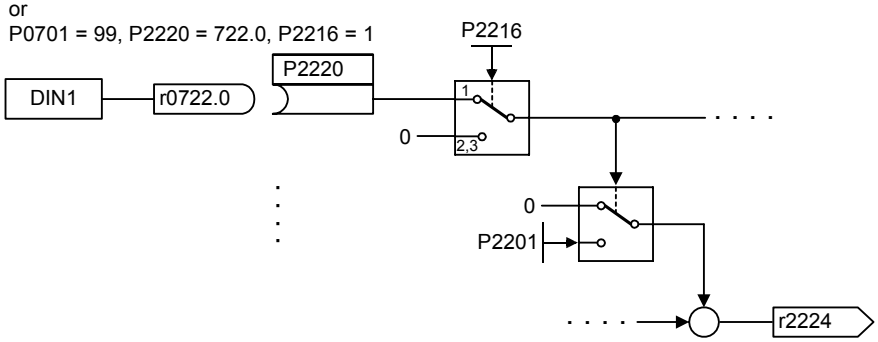
Example:

Binary coded selection :

		DIN4	DIN3	DIN2	DIN1
0 %	PID - FF0	0	0	0	0
P1001	PID - FF1	0	0	0	**1**
P1002	PID - FF2	0	0	**1**	0
P1003	PID - FF3	0	0	**1**	**1**
P1004	PID - FF4	0	**1**	0	0
P1005	PID - FF5	0	**1**	0	**1**
P1006	PID - FF6	0	**1**	**1**	0
P1007	PID - FF7	0	**1**	**1**	**1**
P1008	PID - FF8	**1**	0	0	0
P1009	PID - FF9	**1**	0	0	**1**
P1010	PID - FF10	**1**	0	**1**	0
P1011	PID - FF11	**1**	0	**1**	**1**
P1012	PID - FF12	**1**	**1**	0	0
P1013	PID - FF13	**1**	**1**	0	**1**
P1014	PID - FF14	**1**	**1**	**1**	0
P1015	PID - FF15	**1**	**1**	**1**	**1**

Direct selection of PID-FF1 P2201 via DIN 1:

P0701 = 15
or
P0701 = 99, P2220 = 722.0, P2216 = 1



Dependency:

P2200 = 1 required in user access level 2 to enable setpoint source.

Note:

You may mix different types of frequencies; however, remember that they will be summed if selected together.

P2201 = 100 % corresponds to 4000 hex

P2202[3] Fixed PID setpoint 2

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-200.00
P-Group:	TECH	**Active:** Immediately	**QuickComm.:** No	**Def:**	10.00
				Max:	200.00

Level **2**

Defines Fixed PID Setpoint 2

Index:

P2202[0] : 1st. Drive data set (DDS)
P2202[1] : 2nd. Drive data set (DDS)
P2202[2] : 3rd. Drive data set (DDS)

Details:

See P2201 (Fixed PID Setpoint 1).

P2203[3] Fixed PID setpoint 3

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-200.00
P-Group:	TECH	**Active:** Immediately	**QuickComm.:** No	**Def:**	20.00
				Max:	200.00

Level **2**

Defines Fixed PID Setpoint 3

Index:

P2203[0] : 1st. Drive data set (DDS)
P2203[1] : 2nd. Drive data set (DDS)
P2203[2] : 3rd. Drive data set (DDS)

Details:

See P2201 fixed PID setpoint 1 (FF-PID 1).

P2204[3] Fixed PID setpoint 4

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-200.00
P-Group:	TECH	**Active:** Immediately	**QuickComm.:** No	**Def:**	30.00
				Max:	200.00

Level **2**

Defines Fixed PID Setpoint 4

Index:

P2204[0] : 1st. Drive data set (DDS)
P2204[1] : 2nd. Drive data set (DDS)
P2204[2] : 3rd. Drive data set (DDS)

Details:

See P2201 (Fixed PID Setpoint 1).

P2205[3] Fixed PID setpoint 5

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-200.00
P-Group:	TECH	**Active:** Immediately	**QuickComm.:** No	**Def:**	40.00
				Max:	200.00

Level **2**

Defines Fixed PID Setpoint 5

Index:

P2205[0] : 1st. Drive data set (DDS)
P2205[1] : 2nd. Drive data set (DDS)
P2205[2] : 3rd. Drive data set (DDS)

Details:

See P2201 (Fixed PID Setpoint 1).

P2206[3] Fixed PID setpoint 6

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-200.00
P-Group:	TECH	**Active:** Immediately	**QuickComm.:** No	**Def:**	50.00
				Max:	200.00

Level **2**

Defines Fixed PID Setpoint 6

Index:

P2206[0] : 1st. Drive data set (DDS)
P2206[1] : 2nd. Drive data set (DDS)
P2206[2] : 3rd. Drive data set (DDS)

Details:

See P2201 (Fixed PID Setpoint 1).

P2207[3] Fixed PID setpoint 7

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-200.00
P-Group:	TECH	**Active:** Immediately	**QuickComm.:** No	**Def:**	60.00
				Max:	200.00

Level **2**

Defines Fixed PID Setpoint 7

Index:

P2207[0] : 1st. Drive data set (DDS)
P2207[1] : 2nd. Drive data set (DDS)
P2207[2] : 3rd. Drive data set (DDS)

Details:

See P2201 (Fixed PID Setpoint 1).

P2208[3] Fixed PID setpoint 8

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-200.00
P-Group:	TECH	**Active:** Immediately	**QuickComm.:** No	**Def:**	70.00
				Max:	200.00

Level **2**

Defines Fixed PID Setpoint 8

Index:

P2208[0] : 1st. Drive data set (DDS)
P2208[1] : 2nd. Drive data set (DDS)
P2208[2] : 3rd. Drive data set (DDS)

Details:

See P2201 (Fixed PID Setpoint 1).

P2209[3] Fixed PID setpoint 9

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-200.00
P-Group:	TECH	**Active:** Immediately	**QuickComm.:** No	**Def:**	80.00
				Max:	200.00

Level **2**

Defines Fixed PID Setpoint 9

Index:

P2209[0] : 1st. Drive data set (DDS)
P2209[1] : 2nd. Drive data set (DDS)
P2209[2] : 3rd. Drive data set (DDS)

Details:

See P2201 (Fixed PID Setpoint 1).

P2210[3] Fixed PID setpoint 10

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-200.00
P-Group:	TECH	**Active:** Immediately	**QuickComm.:** No	**Def:**	90.00
				Max:	200.00

Level **2**

Defines Fixed PID Setpoint 10

Index:

P2210[0] : 1st. Drive data set (DDS)
P2210[1] : 2nd. Drive data set (DDS)
P2210[2] : 3rd. Drive data set (DDS)

Details:

See P2201 (Fixed PID Setpoint 1).

P2211[3] Fixed PID setpoint 11

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-200.00
P-Group:	TECH	**Active:** Immediately	**QuickComm.:** No	**Def:**	100.00
				Max:	200.00

Level **2**

Defines Fixed PID Setpoint 11

Index:

P2211[0] : 1st. Drive data set (DDS)
P2211[1] : 2nd. Drive data set (DDS)
P2211[2] : 3rd. Drive data set (DDS)

Details:

See P2201 (Fixed PID Setpoint 1).

P2212[3] Fixed PID setpoint 12

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-200.00
P-Group:	TECH	**Active:** Immediately	**QuickComm.:** No	**Def:**	110.00
				Max:	200.00

Level **2**

Defines Fixed PID Setpoint 12

Index:

P2212[0] : 1st. Drive data set (DDS)
P2212[1] : 2nd. Drive data set (DDS)
P2212[2] : 3rd. Drive data set (DDS)

Details:

See P2201 (Fixed PID Setpoint 1).

P2213[3] Fixed PID setpoint 13

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-200.00
P-Group:	TECH	**Active:** Immediately	**QuickComm.:** No	**Def:**	120.00
				Max:	200.00

Level **2**

Defines Fixed PID Setpoint 13

Index:

P2213[0] : 1st. Drive data set (DDS)
P2213[1] : 2nd. Drive data set (DDS)
P2213[2] : 3rd. Drive data set (DDS)

Details:

See P2201 (Fixed PID Setpoint 1).

P2214[3] Fixed PID setpoint 14

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-200.00
P-Group:	TECH	**Active:** Immediately	**QuickComm.:** No	**Def:**	130.00
				Max:	200.00

Level **2**

Defines Fixed PID Setpoint 14

Index:

P2214[0] : 1st. Drive data set (DDS)
P2214[1] : 2nd. Drive data set (DDS)
P2214[2] : 3rd. Drive data set (DDS)

Details:

See P2201 (Fixed PID Setpoint 1).

P2215[3] Fixed PID setpoint 15

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-200.00
P-Group:	TECH	**Active:** Immediately	**QuickComm.:** No	**Def:**	130.00
				Max:	200.00

Level **2**

Defines Fixed PID Setpoint 15

Index:

P2215[0] : 1st. Drive data set (DDS)
P2215[1] : 2nd. Drive data set (DDS)
P2215[2] : 3rd. Drive data set (DDS)

Details:

See P2201 (Fixed PID Setpoint 1).

P2216 Fixed PID setpoint mode - Bit 0

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	1
P-Group:	TECH	**Active:** first confirm	**QuickComm.:** No	**Def:**	1
				Max:	3

Level **3**

Fixed frequencies for PID setpoint can be selected in three different modes. Parameter P2216 defines the mode of selection Bit 0.

Possible Settings:

1 Direct selection
2 Direct selection + ON command
3 Binary coded selection + ON command

P2217 Fixed PID setpoint mode - Bit 1

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	1
P-Group:	TECH	**Active:** first confirm	**QuickComm.:** No	**Def:**	1
				Max:	3

Level **3**

BCD or direct selection Bit 1 for PID setpoint.

Possible Settings:

1 Direct selection
2 Direct selection + ON command
3 Binary coded selection + ON command

P2218 Fixed PID setpoint mode - Bit 2

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	1
P-Group:	TECH	**Active:** first confirm	**QuickComm.:** No	**Def:**	1
				Max:	3

Level **3**

BCD or direct selection Bit 2 for PID setpoint.

Possible Settings:

1 Direct selection
2 Direct selection + ON command
3 Binary coded selection + ON command

P2219 Fixed PID setpoint mode - Bit 3

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	1
P-Group:	TECH	**Active:** first confirm	**QuickComm.:** No	**Def:**	1
				Max:	3

Level **3**

BCD or direct selection Bit 3 for PID setpoint.

Possible Settings:

1 Direct selection
2 Direct selection + ON command
3 Binary coded selection + ON command

P2220[3] **BI: Fixed PID setp. select Bit 0** Level **3**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	0:0
				Max:	4000:0

Defines command source of fixed PID setpoint selection Bit 0

Index:

P2220[0] : 1st. Command data set (CDS)
P2220[1] : 2nd. Command data set (CDS)
P2220[2] : 3rd. Command data set (CDS)

Common Settings:

722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
722.3 = Digital input 4 (requires P0704 to be set to 99, BICO)
722.4 = Digital input 5 (requires P0705 to be set to 99, BICO)
722.5 = Digital input 6 (requires P0706 to be set to 99, BICO)
722.6 = Digital input 7 (via analog input 1, requires P0707 to be set to 99)
722.7 = Digital input 8 (via analog input 2, requires P0708 to be set to 99)

P2221[3] **BI: Fixed PID setp. select Bit 1** Level **3**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	0:0
				Max:	4000:0

Defines command source of fixed PID setpoint selection Bit 1.

Index:

P2221[0] : 1st. Command data set (CDS)
P2221[1] : 2nd. Command data set (CDS)
P2221[2] : 3rd. Command data set (CDS)

Common Settings:

722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
722.3 = Digital input 4 (requires P0704 to be set to 99, BICO)
722.4 = Digital input 5 (requires P0705 to be set to 99, BICO)
722.5 = Digital input 6 (requires P0706 to be set to 99, BICO)

P2222[3] **BI: Fixed PID setp. select Bit 2** Level **3**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	0:0
				Max:	4000:0

Defines command source of fixed PID setpoint selection Bit 2

Index:

P2222[0] : 1st. Command data set (CDS)
P2222[1] : 2nd. Command data set (CDS)
P2222[2] : 3rd. Command data set (CDS)

Common Settings:

722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
722.3 = Digital input 4 (requires P0704 to be set to 99, BICO)
722.4 = Digital input 5 (requires P0705 to be set to 99, BICO)
722.5 = Digital input 6 (requires P0706 to be set to 99, BICO)

P2223[3] **BI: Fixed PID setp. select Bit 3** Level **3**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	722:3
				Max:	4000:0

Defines command source of fixed PID setpoint selection Bit 3

Index:

P2223[0] : 1st. Command data set (CDS)
P2223[1] : 2nd. Command data set (CDS)
P2223[2] : 3rd. Command data set (CDS)

Common Settings:

722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
722.3 = Digital input 4 (requires P0704 to be set to 99, BICO)
722.4 = Digital input 5 (requires P0705 to be set to 99, BICO)
722.5 = Digital input 6 (requires P0706 to be set to 99, BICO)

r2224 **CO: Act. fixed PID setpoint** Level **2**

		Datatype: Float	**Unit:** %	**Min:**	-
P-Group:	TECH			**Def:**	-
				Max:	-

Displays total output of PID fixed setpoint selection.

Note:

r2224 = 100 % corresponds to 4000 hex

P2225 **Fixed PID setpoint mode - Bit 4** Level **3**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	1
P-Group:	TECH	**Active:** first confirm	**QuickComm.:** No	**Def:**	1
				Max:	2

Direct selection or direct selection + ON Bit 4 for PID setpoint.

Possible Settings:

1 Direct selection
2 Direct selection + ON command

P2226[3] **BI: Fixed PID setp. select Bit 4** Level **3**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	722:4
				Max:	4000:0

Defines command source of fixed PID setpoint selection Bit 4

Index:

P2226[0] : 1st. Command data set (CDS)
P2226[1] : 2nd. Command data set (CDS)
P2226[2] : 3rd. Command data set (CDS)

Common Settings:

722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
722.3 = Digital input 4 (requires P0704 to be set to 99, BICO)
722.4 = Digital input 5 (requires P0705 to be set to 99, BICO)
722.5 = Digital input 6 (requires P0706 to be set to 99, BICO)

P2227 **Fixed PID setpoint mode - Bit 5** Level **3**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	1
P-Group:	TECH	**Active:** first confirm	**QuickComm.:** No	**Def:**	1
				Max:	2

Direct selection / direct selection + ON Bit 5 for PID setpoint.

Possible Settings:

1 Direct selection
2 Direct selection + ON command

P2228[3] **BI: Fixed PID setp. select Bit 5** Level **3**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	722:5
				Max:	4000:0

Defines command source of fixed PID setpoint selection Bit 5

Index:

P2228[0] : 1st. Command data set (CDS)
P2228[1] : 2nd. Command data set (CDS)
P2228[2] : 3rd. Command data set (CDS)

Common Settings:

722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
722.3 = Digital input 4 (requires P0704 to be set to 99, BICO)
722.4 = Digital input 5 (requires P0705 to be set to 99, BICO)
722.5 = Digital input 6 (requires P0706 to be set to 99, BICO)

P2231[3] **Setpoint memory of PID-MOP** Level **2**

CStat:	CUT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	TECH	**Active:** Immediately	**QuickComm.:** No	**Def:**	0
				Max:	1

Setpoint memory

Possible Settings:

0 PID-MOP setpoint will not be stored
1 PID-MOP setpoint will be stored (P2240 is updated)

Index:

P2231[0] : 1st. Drive data set (DDS)
P2231[1] : 2nd. Drive data set (DDS)
P2231[2] : 3rd. Drive data set (DDS)

Dependency:

P2231 = 0:
If 0 selected, setpoint returns to value set in P2240 (setpoint of PID-MOP) after an OFF command.

P2231 = 1:
If 1 is selected, active setpoint is 'remembered' and P2240 updated with current value.

Details:

See P2240 (setpoint of PID-MOP)

P2232 **Inhibit neg. PID-MOP setpoints** Level **2**

CStat: CT **Datatype:** U16 **Unit:** - **Min:** 0
P-Group: TECH **Active:** first confirm **QuickComm.:** No **Def:** 1
Max: 1

This parameter suppresses negative setpoints of the PID-MOP output r2250.

Possible Settings:

0 Neg. PID-MOP setpoint is allowed
1 Neg. PID-MOP setpoint inhibited

Note:

Setting 0 enables a change of motor direction using the motor potentiometer setpoint (increase/decrease frequency either by using digital inputs or motor potentiometer up/down buttons.

P2235[3] **BI: Enable PID-MOP (UP-cmd)** Level **3**

CStat: CT **Datatype:** U32 **Unit:** - **Min:** 0:0
P-Group: COMMANDS **Active:** first confirm **QuickComm.:** No **Def:** 19:13
Max: 4000:0

Defines source of UP command.

Index:

P2235[0] : 1st. Command data set (CDS)
P2235[1] : 2nd. Command data set (CDS)
P2235[2] : 3rd. Command data set (CDS)

Common Settings:

722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
722.3 = Digital input 4 (requires P0704 to be set to 99, BICO)
722.4 = Digital input 5 (requires P0705 to be set to 99, BICO)
722.5 = Digital input 6 (requires P0706 to be set to 99, BICO)

19.D = Keypad UP button

Dependency:

To change setpoint:
1. Use UP / DOWN key on BOP or
2. Set P0702/P0703 = 13/14 (function of digital inputs 2 and 3)

P2236[3] **BI: Enable PID-MOP (DOWN-cmd)** Level **3**

CStat: CT **Datatype:** U32 **Unit:** - **Min:** 0:0
P-Group: COMMANDS **Active:** first confirm **QuickComm.:** No **Def:** 19:14
Max: 4000:0

Defines source of DOWN command.

Index:

P2236[0] : 1st. Command data set (CDS)
P2236[1] : 2nd. Command data set (CDS)
P2236[2] : 3rd. Command data set (CDS)

Common Settings:

722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
722.3 = Digital input 4 (requires P0704 to be set to 99, BICO)
722.4 = Digital input 5 (requires P0705 to be set to 99, BICO)
722.5 = Digital input 6 (requires P0706 to be set to 99, BICO)
722.6 = Digital input 7 (via analog input 1, requires P0707 to be set to 99)
722.7 = Digital input 8 (via analog input 2, requires P0708 to be set to 99)

19.E = Keypad DOWN button

Dependency:

To change setpoint:
1. Use UP / DOWN key on BOP or
2. Set P0702/P0703 = 13/14 (function of digital inputs 2 and 3)

P2240[3] **Setpoint of PID-MOP** Level **2**

CStat: CUT **Datatype:** Float **Unit:** % **Min:** -200.00
P-Group: TECH **Active:** Immediately **QuickComm.:** No **Def:** 10.00
Max: 200.00

Setpoint of the motor potentiometer.

Allows user to set a digital PID setpoint in [%].

Index:

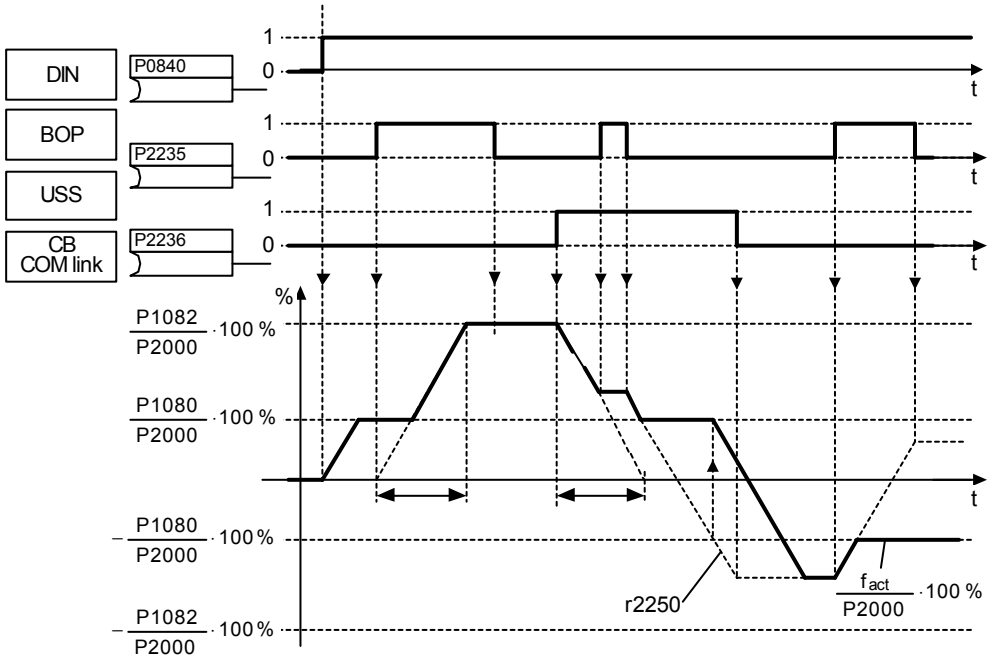
P2240[0] : 1st. Drive data set (DDS)
P2240[1] : 2nd. Drive data set (DDS)
P2240[2] : 3rd. Drive data set (DDS)

Note:

P2240 = 100 % corresponds to 4000 hex

r2250	CO: Output setpoint of PID-MOP			Min: -	Level
		Datatype: Float	**Unit:** %	**Def:** -	**2**
	P-Group: TECH			**Max:** -	

Displays output setpoint of motor potentiometer in [%].



Note:

r2250 = 100 % corresponds to 4000 hex

P2251	PID mode				Min: 0	Level
	CStat: CT	Datatype: U16	Unit: -		Def: 0	3
	P-Group: TECH	Active: Immediately	QuickComm.: No		Max: 1	

Enables function of PID controller.

Possible Settings:

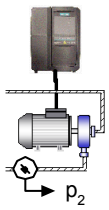
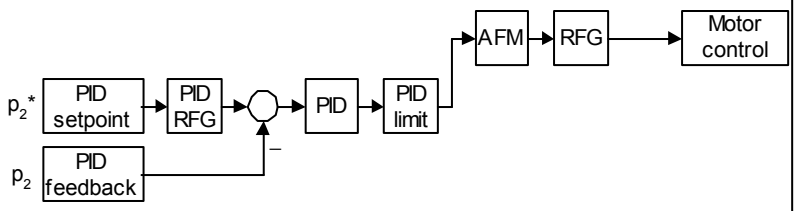
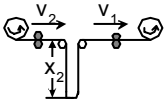
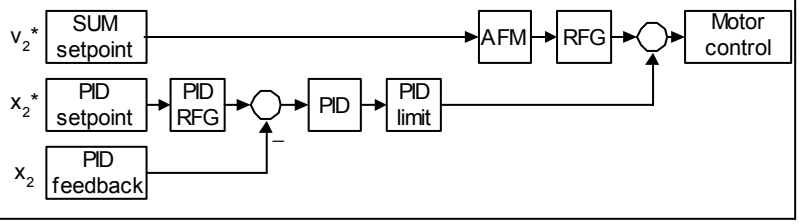
0 PID as setpoint
1 PID as trim

Dependency:

Active when PID loop is enabled (see P2200).

		SUM	PID controller	RFG	PID-RFG
1	**P2200 = 0:0** [2] **P2251 = 0**	Main setpoint	—	ON: active OFF1/3: active	ON: - OFF1/3: -
2	**P2200 = 1:0** [2] **P2251 = 0**	—	Main setpoint	ON: - OFF1/3: active	ON: active OFF1/3: -
3	**P2200 = 0:0** [1] **P2251 = 1**	Main setpoint	—	ON: active OFF1/3: active	ON: - OFF1/3: -
4	**P2200 = 1:0** [1] **P2251 = 1**	Main setpoint	Trim	ON: active OFF1/3: active	ON: active OFF1/3: active

1) will take change with drive running
2) change only taken when drive stopped

	Application	Control structure
2		
4		

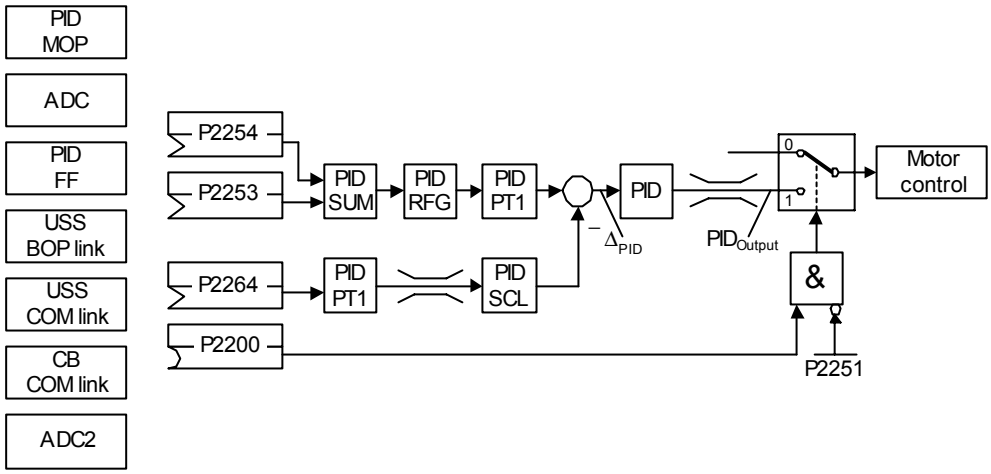
P2253[3] **CI: PID setpoint**

CStat:	CUT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	TECH	**Active:** first confirm	**QuickComm.:** No	**Def:**	0:0
				Max:	4000:0

Level **2**

Defines setpoint source for PID setpoint input.

This parameter allows the user to select the source of the PID setpoint. Normally, a digital setpoint is selected either using a fixed PID setpoint or an active setpoint.



Index:

P2253[0] : 1st. Command data set (CDS)
P2253[1] : 2nd. Command data set (CDS)
P2253[2] : 3rd. Command data set (CDS)

Common Settings:

755 = Analog input 1
2224 = Fixed PI setpoint (see P2201 to P2207)
2250 = Active PI setpoint (see P2240)

P2254[3] **CI: PID trim source**

CStat:	CUT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	TECH	**Active:** first confirm	**QuickComm.:** No	**Def:**	0:0
				Max:	4000:0

Level **3**

Selects trim source for PID setpoint. This signal is multiplied by the trim gain and added to the PID setpoint.

Index:

P2254[0] : 1st. Command data set (CDS)
P2254[1] : 2nd. Command data set (CDS)
P2254[2] : 3rd. Command data set (CDS)

Common Settings:

755 = Analog input 1
2224 = Fixed PI setpoint (see P2201 to P2207)
2250 = Active PI setpoint (see P2240)

P2255 **PID setpoint gain factor**

CStat:	CUT	**Datatype:** Float	**Unit:** -	**Min:**	0.00
P-Group:	TECH	**Active:** Immediately	**QuickComm.:** No	**Def:**	100.00
				Max:	100.00

Level **3**

Gain factor for PID setpoint. The PID setpoint input is multiplied by this gain factor to produce a suitable ratio between setpoint and trim.

P2256 **PID trim gain factor**

CStat:	CUT	**Datatype:** Float	**Unit:** -	**Min:**	0.00
P-Group:	TECH	**Active:** Immediately	**QuickComm.:** No	**Def:**	100.00
				Max:	100.00

Level **3**

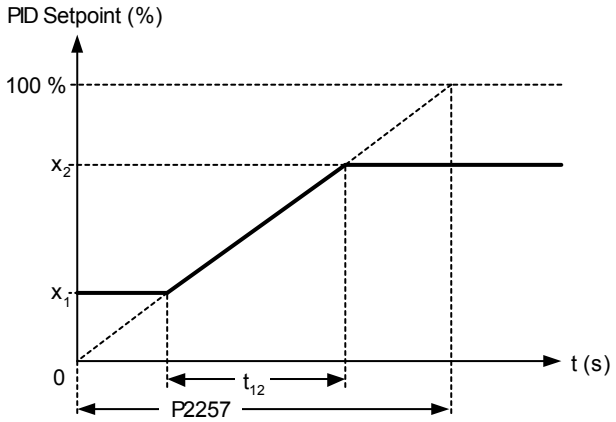
Gain factor for PID trim. This gain factor scales the trim signal, which is added to the main PID setpoint.

P2257 **Ramp-up time for PID setpoint**

CStat:	CUT	**Datatype:** Float	**Unit:** s	**Min:**	0.00
P-Group:	TECH	**Active:** Immediately	**QuickComm.:** No	**Def:**	1.00
				Max:	650.00

Level **2**

Sets the ramp-up time for the PID setpoint.



$$t_{12} = \frac{|x_2 - x_1|}{100\%} \cdot P2257$$

Dependency:

P2200 = 1 (PID control is enabled) disable normal ramp-up time (P1120).

PID ramp time effective only on PID setpoint and only active when PID setpoint is changed or when RUN command is given (when PID setpoint uses this ramp to reach its value from 0 %).

Notice:

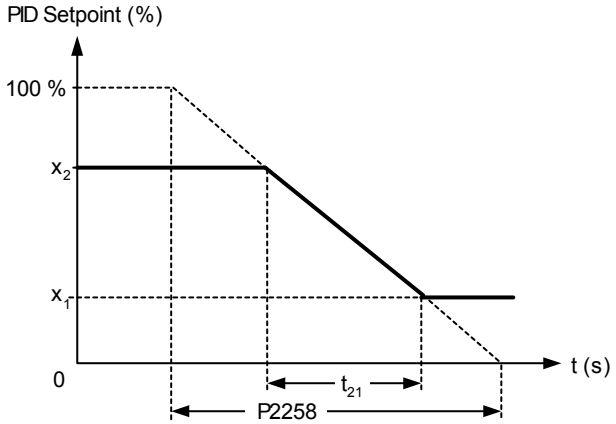
Setting the ramp-up time too short may cause the inverter to trip, on overcurrent for example.

P2258 **Ramp-down time for PID setpoint**

CStat:	CUT	**Datatype:** Float	**Unit:** s	**Min:**	0.00
P-Group:	TECH	**Active:** Immediately	**QuickComm.:** No	**Def:**	1.00
				Max:	650.00

Level **2**

Sets ramp-down time for PID setpoint.



$$t_{21} = \frac{|x_1 - x_2|}{100\%} \cdot P2258$$

Dependency:

P2200 = 1 (PID control is enabled) disables normal ramp-up time (P1120).

PID setpoint ramp effective only on PID setpoint changes.

P1121 (ramp-down time) and P1135 (OFF3 ramp-down time) define the ramp times used after OFF1 and OFF3 respectively.

Notice:

Setting the ramp-down time too short can cause the inverter to trip on overvoltage (F0002) / overcurrent (F0001).

r2260 **CO: PID setpoint after PID-RFG**

		Datatype: Float	**Unit:** %	**Min:**	-
				Def:	-
P-Group:	TECH			**Max:**	-

Level **2**

Displays total active PID setpoint after PID-RFG in [%].

Note:

r2260 = 100 % corresponds to 4000 hex

P2261 **PID setpoint filter timeconstant** Level **3**

CStat:	CUT	**Datatype:** Float	**Unit:** s	**Min:**	0.00
P-Group:	TECH	**Active:** Immediately	**QuickComm.:** No	**Def:**	0.00
				Max:	60.00

Sets a time constant for smoothing the PID setpoint.

Note:
0 = no smoothing

r2262 **CO: Filtered PID setp. after RFG** Level **3**

		Datatype: Float	**Unit:** %	**Min:**	-
P-Group:	TECH			**Def:**	-
				Max:	-

Displays filtered PID setpoint after PID-RFG in [%].

Note:
r2262 = 100 % corresponds to 4000 hex

P2263 **PID controller type** Level **3**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	TECH	**Active:** Immediately	**QuickComm.:** No	**Def:**	0
				Max:	1

Sets the PID controller type.

Possible Settings:
0 D component on feedback signal
1 D component on error signal

P2264[3] **CI: PID feedback** Level **2**

CStat:	CUT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	TECH	**Active:** first confirm	**QuickComm.:** No	**Def:**	755:0
				Max:	4000:0

Selects the source of the PID feedback signal.

Index:
P2264[0] : 1st. Command data set (CDS)
P2264[1] : 2nd. Command data set (CDS)
P2264[2] : 3rd. Command data set (CDS)

Common Settings:
755 = Analog input 1 setpoint
2224 = Fixed PID setpoint
2250 = Output setpoint of PID-MOP

Note:
When analog input is selected, offset and gain can be implemented using parameters P0756 to P0760 (ADC scaling).

P2265 **PID feedback filter timeconstant** Level **2**

CStat:	CUT	**Datatype:** Float	**Unit:** s	**Min:**	0.00
P-Group:	TECH	**Active:** Immediately	**QuickComm.:** No	**Def:**	0.00
				Max:	60.00

Defines time constant for PID feedback filter.

r2266 **CO: PID filtered feedback** Level **2**

		Datatype: Float	**Unit:** %	**Min:**	-
P-Group:	TECH			**Def:**	-
				Max:	-

Displays PID feedback signal in [%].

Note:
r2266 = 100 % corresponds to 4000 hex

P2267 **Max. value for PID feedback** Level **3**

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-200.00
P-Group:	TECH	**Active:** Immediately	**QuickComm.:** No	**Def:**	100.00
				Max:	200.00

Sets the upper limit for the value of the feedback signal in [%].

Note:
P2267 = 100 % corresponds to 4000 hex

Notice:
When PID is enabled (P2200 = 1) and the signal rises above this value, the inverter will trip with F0222 .

P2268 **Min. value for PID feedback** Level **3**

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-200.00
P-Group:	TECH	**Active:** Immediately	**QuickComm.:** No	**Def:**	0.00
				Max:	200.00

Sets lower limit for value of feedback signal in [%].

Note:
P2268 = 100 % corresponds to 4000 hex

Notice:
When PID is enabled (P2200 = 1) and the signal rises below this value, the inverter will trip with F0221.

P2269 **Gain applied to PID feedback** Level **3**

CStat:	CUT	**Datatype:** Float	**Unit:** -	**Min:**	0.00
P-Group:	TECH	**Active:** Immediately	**QuickComm.:** No	**Def:**	100.00
				Max:	500.00

Allows the user to scale the PID feedback as a percentage value [%].

A gain of 100.0 % means that feedback signal has not changed from its default value.

P2270 **PID feedback function selector** Level **3**

CStat:	CUT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	TECH	**Active:** Immediately	**QuickComm.:** No	**Def:**	0
				Max:	3

Applies mathematical functions to the PID feedback signal, allowing multiplication of the result by P2269 (gain applied to PID feedback).

Possible Settings:

0 Disabled
1 Square root (root(x))
2 Square (x*x)
3 Cube (x*x*x)

P2271 **PID transducer type** Level **2**

CStat:	CUT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	TECH	**Active:** Immediately	**QuickComm.:** No	**Def:**	0
				Max:	1

Allows the user to select the transducer type for the PID feedback signal.

Possible Settings:

0 Disabled
1 Inversion of PID feedback signal

Notice:

It is essential that you select the correct tranducer type.

If you are unsure whether 0 or 1 is applicable, you can determine the correct type as follows:

1. Disable the PID function (P2200 = 0).
2. Increase the motor frequency while measuring the feedback signal.
3. If the feedback signal increases with an increase in motor frequency, the PID transducer type should be 0.
4. If the feedback signal decreases with an increase in motor frequency the PID transducer type should be set to 1.

r2272 **CO: PID scaled feedback** Level **2**

		Datatype: Float	**Unit:** %	**Min:**	-
P-Group:	TECH			**Def:**	-
				Max:	-

Displays PID scaled feedback signal in [%].

Note:

r2272 = 100 % corresponds to 4000 hex

r2273 **CO: PID error** Level **2**

		Datatype: Float	**Unit:** %	**Min:**	-
P-Group:	TECH			**Def:**	-
				Max:	-

Displays PID error (difference) signal between setpoint and feedback signals in [%].

Note:

r2273 = 100 % corresponds to 4000 hex

P2274 **PID derivative time** Level **2**

CStat:	CUT	**Datatype:** Float	**Unit:** s	**Min:**	0.000
P-Group:	TECH	**Active:** Immediately	**QuickComm.:** No	**Def:**	0.000
				Max:	60.000

Sets PID derivative time.

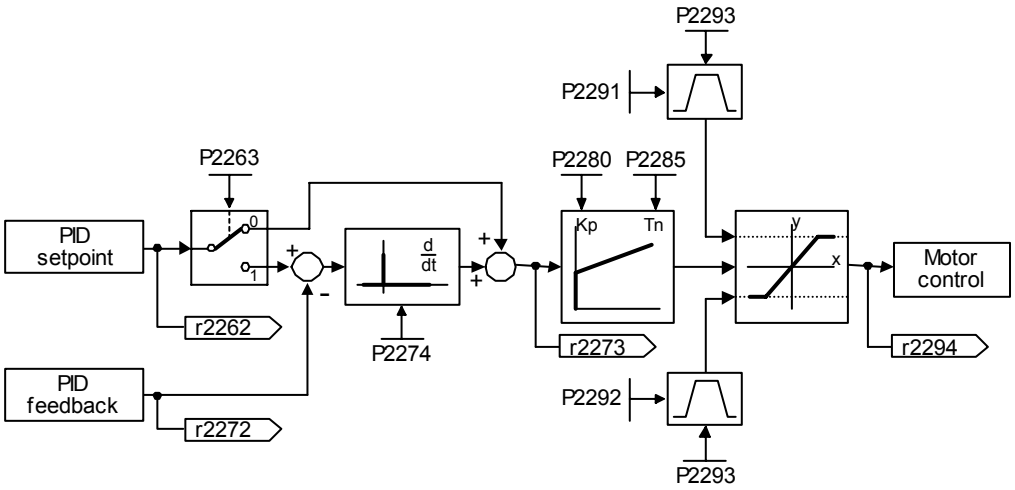
P2274 = 0:
The derivative term does not have any effect (it applies a gain of 1).

P2280 **PID proportional gain** Level **2**

CStat:	CUT	**Datatype:** Float	**Unit:** -	**Min:**	0.000
P-Group:	TECH	**Active:** Immediately	**QuickComm.:** No	**Def:**	3.000
				Max:	65.000

Allows user to set proportional gain for PID controller.

The PID controller is implemented using the standard model.



For best results, enable both P and I terms.

Dependency:

P2280 = 0 (P term of PID = 0):
I term acts on the square of the error signal.

P2285 = 0 (I term of PID = 0):
PID controller acts as a P or PD controller respectively.

Note:

If the system is prone to sudden step changes in the feedback signal, P term should normally be set to a small value (0.5) with a faster I term for optimum performance.

Notice:

The D term (P2274) multiplies the difference between the present and previous feedback signal thus accelerating the controller reaction to an error that appears suddenly.

The D term should be used carefully, since it can cause the controller output to fluctuate as every change in the feedback signal is amplified by the controller derivative action.

P2285 **PID integral time** Level **2**

CStat:	CUT	**Datatype:** Float	**Unit:** s	**Min:**	0.000
P-Group:	TECH	**Active:** Immediately	**QuickComm.:** No	**Def:**	0.000
				Max:	60.000

Sets integral time constant for PID controller.

Details:

See P2280 (PID proportional gain).

P2291 **PID output upper limit** Level **2**

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-200.00
P-Group:	TECH	**Active:** Immediately	**QuickComm.:** No	**Def:**	100.00
				Max:	200.00

Sets upper limit for PID controller output in [%].

Dependency:

If F max (P1082) is greater than P2000 (reference frequency), either P2000 or P2291 (PID output upper limit) must be changed to achieve F max.

Note:

P2291 = 100 % corresponds to 4000 hex (as defined by P2000 (reference frequency)).

P2292 **PID output lower limit** Level **2**

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-200.00
P-Group:	TECH	**Active:** Immediately	**QuickComm.:** No	**Def:**	0.00
				Max:	200.00

Sets lower limit for the PID controller output in [%].

Dependency:

A negative value allows bipolar operation of PID controller.

Note:

P2292 = 100 % corresponds to 4000 hex

P2293 **Ramp-up /-down time of PID limit** Level **3**

CStat:	CUT	**Datatype:** Float	**Unit:** s	**Min:**	0.00
P-Group:	TECH	**Active:** Immediately	**QuickComm.:** No	**Def:**	1.00
				Max:	100.00

Sets maximum ramp rate on output of PID.

When PI is enabled, the output limits are ramped up from 0 to the limits set in P2291 (PID output upper limit) and P2292 (PID output lower limit). Limits prevent large step changes appearing on the output of the PID when the inverter is started. Once the limits have been reached, the PID controller output is instantaneous.

These ramp times are used whenever a RUN command is issued.

Note:

If an OFF1 or OFF 3 are issued, the inverter output frequency ramps down as set in P1121 (ramp-down time) or P1135 (OFF3 ramp-down time).

r2294 **CO: Act. PID output** Level **2**

		Datatype: Float	**Unit:** %	**Min:**	-
P-Group:	TECH			**Def:**	-
				Max:	-

Displays PID output in [%]

Note:

r2294 = 100 % corresponds to 4000 hex

P2295 **Gain applied to PID output** Level **3**

CStat:	CUT	**Datatype:** Float	**Unit:** -	**Min:**	-100.00
P-Group:	TECH	**Active:** Immediately	**QuickComm.:** No	**Def:**	100.00
				Max:	100.00

Allows the user to scale the PID output as a percentage value [%].

A gain of 100.0 % means that output signal has not changed from its default value.

P2350 **PID autotune enable** Level **2**

CStat:	CUT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	TECH	**Active:** Immediately	**QuickComm.:** No	**Def:**	0
				Max:	4

Enables autotune function of PID controller.

Possible Settings:

0 PID autotuning disabled
1 PID autotuning via Ziegler Nichols (ZN) standard
2 PID autotuning as 1 plus some overshoot (O/S)
3 PID autotuning as 2 little or no overshoot (O/S)
4 PID autotuning PI only, quarter damped response

Dependency:

Active when PID loop is enabled (see P2200).

Note:

P2350 = 1
This is the standard Ziegler Nichols (ZN) tuning which should be a quarter damped response to a step.

P2350 = 2
This tuning will give some overshoot (O/S) but should be faster than option 1

P2350 = 3
This tuning should give little or no overshoot but will not be as fast as option 2.

P2350 = 4
This tuning only changes values of P and I and should be a quarter damped response.

The option to be selected depends on the application but braodly speaking option 1 will give an all round good respsonse, whereas if a faster response is desired option 2 should be selected. If no overshoot is desired then option 3 is the choice. For cases where no D term is wanted then option 4 can be selected. The tuning procedure is the same for all options. It is just the calculation of P,I and D values that is different.

After autotune this parameter is set to zero (autotune completed).

P2354 **PID tuning timeout length** Level **3**

CStat:	CUT	**Datatype:** U16	**Unit:** s	**Min:**	60
P-Group:	TECH	**Active:** Immediately	**QuickComm.:** No	**Def:**	240
				Max:	65000

This parameter determines the time that the auto tuning code will wait before aborting a tuning run if no oscillation has been obtained.

P2355 **PID tuning offset** Level **3**

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	0.00
P-Group:	TECH	**Active:** Immediately	**QuickComm.:** No	**Def:**	5.00
				Max:	20.00

Sets applied offset and deviation for PID autotuning.

Note:

This can be varied depending on plant conditions e.g. a very long system time constant might require a larger value.

P2480[3] **Position mode** Level **3**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	1
P-Group:	CONTROL	**Active:** first confirm	**QuickComm.:** No	**Def:**	1
				Max:	1

Sets the mode for positioning mode.

Possible Settings:

1 Open loop positioning

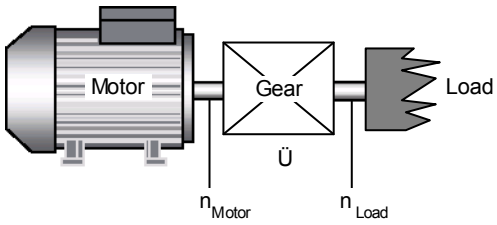
Index:

P2480[0] : 1st. Drive data set (DDS)
P2480[1] : 2nd. Drive data set (DDS)
P2480[2] : 3rd. Drive data set (DDS)

P2481[3] **Gearbox ratio input** Level **3**

CStat:	CUT	**Datatype:** Float	**Unit:** -	**Min:**	0.01
P-Group:	CONTROL	**Active:** first confirm	**QuickComm.:** No	**Def:**	1.00
				Max:	9999.99

Defines the ratio between number of motor shaft revolutions to equal one revolution of the gearbox output shaft.



$$Ü = \frac{\text{Motor revolutions}}{\text{Load revolutions}} = \frac{P2481}{P2482}$$

Index:

P2481[0] : 1st. Drive data set (DDS)
P2481[1] : 2nd. Drive data set (DDS)
P2481[2] : 3rd. Drive data set (DDS)

P2482[3] **Gearbox ratio output** Level **3**

CStat:	CUT	**Datatype:** Float	**Unit:** -	**Min:**	0.01
P-Group:	CONTROL	**Active:** first confirm	**QuickComm.:** No	**Def:**	1.00
				Max:	9999.99

Defines the ratio between number of motor shaft revolutions to equal one revolution of the gearbox output shaft.

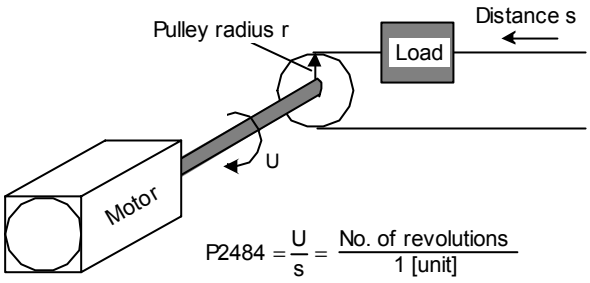
Index:

P2482[0] : 1st. Drive data set (DDS)
P2482[1] : 2nd. Drive data set (DDS)
P2482[2] : 3rd. Drive data set (DDS)

P2484[3] **No. of shaft turns = 1 Unit** Level **3**

CStat:	CUT	**Datatype:** Float	**Unit:** -	**Min:**	0.01
P-Group:	CONTROL	**Active:** first confirm	**QuickComm.:** No	**Def:**	1.00
				Max:	9999.99

Sets the number of rotations of the motor shaft required to represent 1 unit of user selected units.



The following equation determines the number of motor shaft revolutions to stop:

$$\text{Revolutions}_{\text{Motor}} = P2488 \cdot P2484 \cdot \frac{P2481}{P2482}$$

Index:

P2484[0] : 1st. Drive data set (DDS)
P2484[1] : 2nd. Drive data set (DDS)
P2484[2] : 3rd. Drive data set (DDS)

P2487[3] **Positional error trim value** Level **3**

CStat:	CUT	**Datatype:** Float	**Unit:** -	**Min:**	-200.00
P-Group:	CONTROL	**Active:** first confirm	**QuickComm.:** No	**Def:**	0.00
				Max:	200.00

Offset error correction due to mechanical errors. Negative value entered when final position is before required end point. Positive value entered when final postioin is after the required end point.

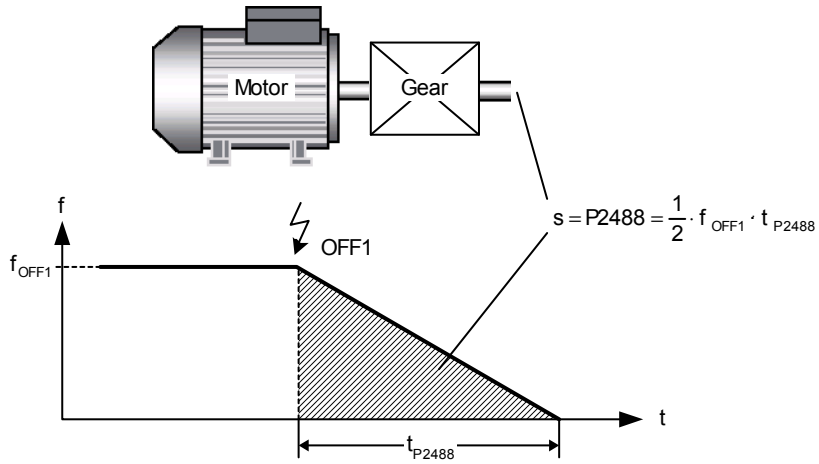
Index:

P2487[0] : 1st. Drive data set (DDS)
P2487[1] : 2nd. Drive data set (DDS)
P2487[2] : 3rd. Drive data set (DDS)

P2488[3] **Distance / No. of revolutions** Level **3**

CStat:	CUT	**Datatype:** Float	**Unit:** -	**Min:**	0.01
P-Group:	CONTROL	**Active:** first confirm	**QuickComm.:** No	**Def:**	1.00
				Max:	9999.99

Sets the required distance or number of revolutions (see P2484).



Index:

P2488[0] : 1st. Drive data set (DDS)
P2488[1] : 2nd. Drive data set (DDS)
P2488[2] : 3rd. Drive data set (DDS)

r2489 **Act. number of shaft revolutions** Level **3**

		Datatype: Float	**Unit:** -	**Min:**	-
				Def:	-
P-Group:	CONTROL			**Max:**	-

Displayes the actual number of shaft revolutions since trigger of positioning.

P2800	Enable FFBs			Min: 0	Level
	CStat: CUT	Datatype: U16	Unit: -	Def: 0	3
	P-Group: TECH	Active: first confirm	QuickComm.: No	Max: 1	

Free function blocks (FFB) are enabled in two steps.
1. Parameter P2800 enables all free function blocks , normally (P2800 = 1).
2. Parameters P2801 and P2802 respectively, enable each free function block individually (P2801[x] > 0 oder P2802[x] > 0).

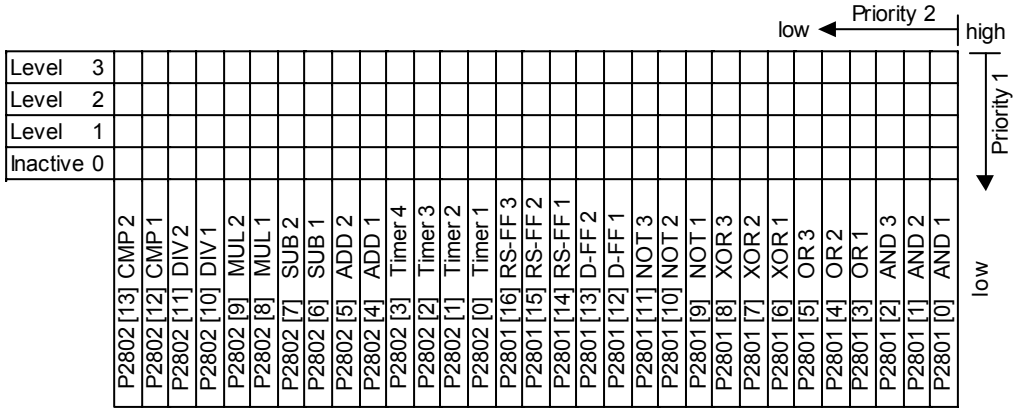
Possible Settings:
0 Disable
1 Enable

Dependency:
All active function blocks will be calculated in every 132 ms.

P2801[17]	Activate FFBs			Min: 0	Level
	CStat: CUT	Datatype: U16	Unit: -	Def: 0	3
	P-Group: TECH	Active: first confirm	QuickComm.: No	Max: 3	

Free function blocks (FFB) are enabled in two steps.
1. Parameter P2800 enables all free function blocks , normally (P2800 = 1)
2. Parameters P2801 and P2802 respectively, enable each free function block individually (P2801[x] > 0 oder P2802[x] > 0)

In addition, Parameters P2801 and P2802 determine the chronological order of each function block. The following table shows that the priority increases from left to right and from bottom to top.



Possible Settings:
0 Not Active
1 Level 1
2 Level 2
3 Level 3

Index:
P2801[0] : Enable AND 1
P2801[1] : Enable AND 2
P2801[2] : Enable AND 3
P2801[3] : Enable OR 1
P2801[4] : Enable OR 2
P2801[5] : Enable OR 3
P2801[6] : Enable XOR 1
P2801[7] : Enable XOR 2
P2801[8] : Enable XOR 3
P2801[9] : Enable NOT 1
P2801[10] : Enable NOT 2
P2801[11] : Enable NOT 3
P2801[12] : Enable D-FF 1
P2801[13] : Enable D-FF 2
P2801[14] : Enable RS-FF 1
P2801[15] : Enable RS-FF 2
P2801[16] : Enable RS-FF 3

Example:
P2801[3] = 2, P2801[4] = 2, P2802[3] = 3, P2802[4] = 2
FFBs will be calculated in following order:
P2802[3], P2801[3] , P2801[4], P2802[4]

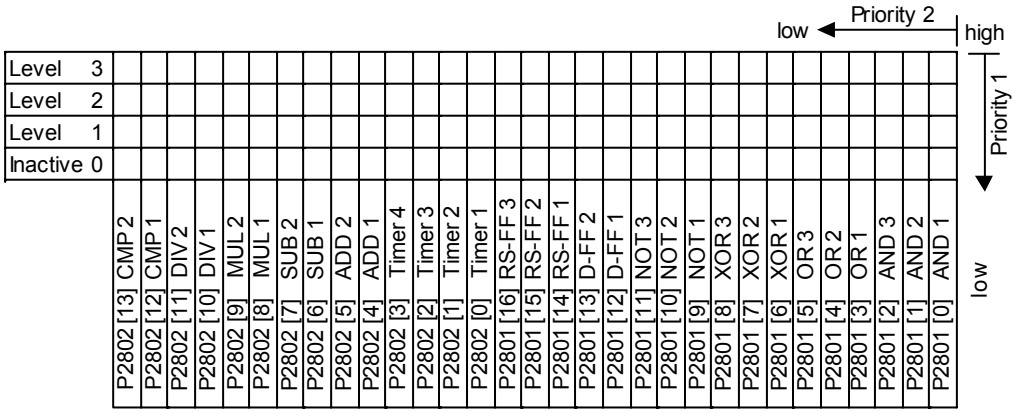
Dependency:
Set P2800 to 1 to enable function blocks.

All active function blocks will be calculated in every 132 ms.

P2802[14]	**Activate FFBs**			**Min:** 0	Level
	CStat: CUT	**Datatype:** U16	**Unit:** -	**Def:** 0	**3**
	P-Group: TECH	**Active:** first confirm	**QuickComm.:** No	**Max:** 3	

Free function blocks (FFB) are enabled in two steps.
1. Parameter P2800 enables all free function blocks , normally (P2800 = 1)
2. Parameters P2801 and P2802 respectively, enable each free function block individually (P2801[x] > 0 oder P2802[x] > 0)

In addition, Parameters P2801 and P2802 determine the chronological order of each function block. The following table shows that the priority increases from left to right and from bottom to top.



Possible Settings:

0 Not Active
1 Level 1
2 Level 2
3 Level 3

Index:

P2802[0] : Enable timer 1
P2802[1] : Enable timer 2
P2802[2] : Enable timer 3
P2802[3] : Enable timer 4
P2802[4] : Enable ADD 1
P2802[5] : Enable ADD 2
P2802[6] : Enable SUB 1
P2802[7] : Enable SUB 2
P2802[8] : Enable MUL 1
P2802[9] : Enable MUL 2
P2802[10] : Enable DIV 1
P2802[11] : Enable DIV 2
P2802[12] : Enable CMP 1
P2802[13] : Enable CMP 2

Example:

P2801[3] = 2, P2801[4] = 2, P2802[3] = 3, P2802[4] = 2
FFBs will be calculated in following order:
P2802[3], P2801[3] , P2801[4], P2802[4]

Dependency:

Set P2800 to 1 to enable function blocks.

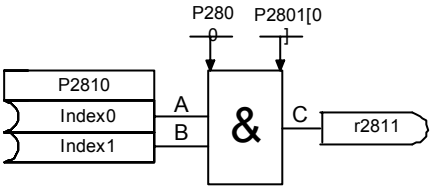
All active function blocks will be calculated in every 132 ms.

P2810[2] **BI: AND 1** Level **3**

CStat: CUT **Datatype:** U32 **Unit:** - **Min:** 0:0 **Def:** 0:0 **Max:** 4000:0

P-Group: TECH **Active:** first confirm **QuickComm.:** No

P2810[0], P2810[1] define inputs of AND 1 element, output is P2811.



A	B	C
0	0	0
0	1	0
1	0	0
1	1	1

Index:

P2810[0] : Binector input 0 (BI 0)
P2810[1] : Binector input 1 (BI 1)

Dependency:

P2801[0] is active level for the AND element.

r2811 **BO: AND 1** Level **3**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: TECH

Output of AND 1 element. Displays and logic of bits defined in P2810[0], P2810[1].

Dependency:

P2801[0] is active level for the AND element.

P2812[2] **BI: AND 2** Level **3**

CStat: CUT **Datatype:** U32 **Unit:** - **Min:** 0:0 **Def:** 0:0 **Max:** 4000:0

P-Group: TECH **Active:** first confirm **QuickComm.:** No

P2812[0], 2812[1] define inputs of AND 2 element, output is P2813.

Index:

P2812[0] : Binector input 0 (BI 0)
P2812[1] : Binector input 1 (BI 1)

Dependency:

P2801[1] is active level for the AND element.

r2813 **BO: AND 2** Level **3**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: TECH

Output of AND 2 element. Displays and logic of bits defined in P2812[0], P2812[1].

Dependency:

P2801[1] is active level for the AND element.

P2814[2] **BI: AND 3** Level **3**

CStat: CUT **Datatype:** U32 **Unit:** - **Min:** 0:0 **Def:** 0:0 **Max:** 4000:0

P-Group: TECH **Active:** first confirm **QuickComm.:** No

P2814[0], P2814[1] define inputs of AND 3 element, output is P2815.

Index:

P2814[0] : Binector input 0 (BI 0)
P2814[1] : Binector input 1 (BI 1)

Dependency:

P2801[2] is active level for the AND element.

r2815 **BO: AND 3** Level **3**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: TECH

Output of AND 3 element. Displays and logic of bits defined in P2814[0], P2814[1].

Dependency:

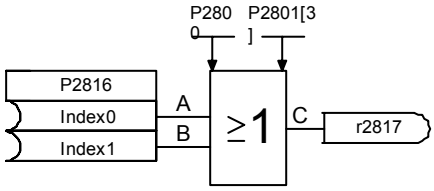
P2801[2] is active level for the AND element.

P2816[2] **BI: OR 1**

CStat: CUT **Datatype:** U32 **Unit:** - **Min:** 0:0
P-Group: TECH **Active:** first confirm **QuickComm.:** No **Def:** 0:0
Max: 4000:0

Level **3**

P2816[0], P2816[1] define inputs of OR 1 element, output is P2817.



A	B	C
0	0	0
0	1	1
1	0	1
1	1	1

Index:
P2816[0] : Binector input 0 (BI 0)
P2816[1] : Binector input 1 (BI 1)

Dependency:
P2801[3] is active level for the OR element.

r2817 **BO: OR 1**

Datatype: U16 **Unit:** - **Min:** -
P-Group: TECH **Def:** -
Max: -

Level **3**

Output of OR 1 element. Displays or logic of bits defined in P2816[0], P2816[1].

Dependency:
P2801[3] is active level for the OR element.

P2818[2] **BI: OR 2**

CStat: CUT **Datatype:** U32 **Unit:** - **Min:** 0:0
P-Group: TECH **Active:** first confirm **QuickComm.:** No **Def:** 0:0
Max: 4000:0

Level **3**

P2818[0], P2818[1] define inputs of OR 2 element, output is P2819.

Index:
P2818[0] : Binector input 0 (BI 0)
P2818[1] : Binector input 1 (BI 1)

Dependency:
P2801[4] is active level for the OR element.

r2819 **BO: OR 2**

Datatype: U16 **Unit:** - **Min:** -
P-Group: TECH **Def:** -
Max: -

Level **3**

Output of OR 2 element. Displays or logic of bits defined in P2818[0], P2818[1].

Dependency:
P2801[4] is active level for the OR element.

P2820[2] **BI: OR 3**

CStat: CUT **Datatype:** U32 **Unit:** - **Min:** 0:0
P-Group: TECH **Active:** first confirm **QuickComm.:** No **Def:** 0:0
Max: 4000:0

Level **3**

P2820[0], P2820[1] define inputs of OR 3 element, output is P2821.

Index:
P2820[0] : Binector input 0 (BI 0)
P2820[1] : Binector input 1 (BI 1)

Dependency:
P2801[5] is active level for the OR element.

r2821 **BO: OR 3**

Datatype: U16 **Unit:** - **Min:** -
P-Group: TECH **Def:** -
Max: -

Level **3**

Output of OR 3 element. Displays or logic of bits defined in P2820[0], P2820[1].

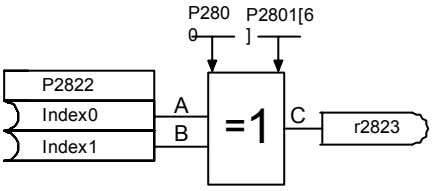
Dependency:
P2801[5] is active level for the OR element.

P2822[2] **BI: XOR 1** Level **3**

CStat: CUT **Datatype:** U32 **Unit:** - **Min:** 0:0 **Def:** 0:0 **Max:** 4000:0

P-Group: TECH **Active:** first confirm **QuickComm.:** No

P2822[0], P2822[1] define inputs of XOR 1 element, output is P2823.



A	B	C
0	0	0
0	1	1
1	0	1
1	1	0

Index:

P2822[0] : Binector input 0 (BI 0)
P2822[1] : Binector input 1 (BI 1)

Dependency:

P2801[6] is active level for the XOR element.

r2823 **BO: XOR 1** Level **3**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: TECH

Output of XOR 1 element. Displays exclusive-or logic of bits defined in P2822[0], P2822[1].

Dependency:

P2801[6] is active level for the XOR element.

P2824[2] **BI: XOR 2** Level **3**

CStat: CUT **Datatype:** U32 **Unit:** - **Min:** 0:0 **Def:** 0:0 **Max:** 4000:0

P-Group: TECH **Active:** first confirm **QuickComm.:** No

P2824[0], P2824[1] define inputs of XOR 2 element, output is P2825.

Index:

P2824[0] : Binector input 0 (BI 0)
P2824[1] : Binector input 1 (BI 1)

Dependency:

P2801[7] is active level for the XOR element.

r2825 **BO: XOR 2** Level **3**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: TECH

Output of XOR 2 element. Displays exclusive-or logic of bits defined in P2824[0], P2824[1].

Dependency:

P2801[7] is active level for the XOR element.

P2826[2] **BI: XOR 3** Level **3**

CStat: CUT **Datatype:** U32 **Unit:** - **Min:** 0:0 **Def:** 0:0 **Max:** 4000:0

P-Group: TECH **Active:** first confirm **QuickComm.:** No

P2826[0], P2826[1] define inputs of XOR 3 element, output is P2827.

Index:

P2826[0] : Binector input 0 (BI 0)
P2826[1] : Binector input 1 (BI 1)

Dependency:

P2801[8] is active level for the XOR element.

r2827 **BO: XOR 3** Level **3**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: TECH

Output of XOR 3 element. Displays exclusive-or logic of bits defined in P2826[0], P2826[1].

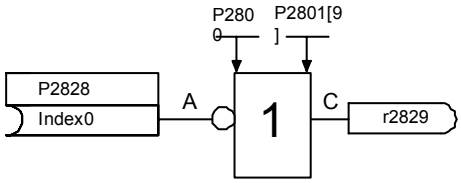
Dependency:

P2801[8] is active level for the XOR element.

P2828 **BI: NOT 1** Level **3**

CStat: CUT **Datatype:** U32 **Unit:** - **Min:** 0:0
P-Group: TECH **Active:** first confirm **QuickComm.:** No **Def:** 0:0
Max: 4000:0

P2828 defines input of NOT 1 element, output is P2829.



A	C
0	1
1	0

Dependency:
P2801[9] is active level for the NOT element.

r2829 **BO: NOT 1** Level **3**

Datatype: U16 **Unit:** - **Min:** -
P-Group: TECH **Def:** -
Max: -

Output of NOT 1 element. Displays not logic of bit defined in P2828.

Dependency:
P2801[9] is active level for the NOT element.

P2830 **BI: NOT 2** Level **3**

CStat: CUT **Datatype:** U32 **Unit:** - **Min:** 0:0
P-Group: TECH **Active:** first confirm **QuickComm.:** No **Def:** 0:0
Max: 4000:0

P2830 defines input of NOT 2 element, output is P2831.

Dependency:
P2801[10] is active level for the NOT element.

r2831 **BO: NOT 2** Level **3**

Datatype: U16 **Unit:** - **Min:** -
P-Group: TECH **Def:** -
Max: -

Output of NOT 2 element. Displays not logic of bit defined in P2830.

Dependency:
P2801[10] is active level for the NOT element.

P2832 **BI: NOT 3** Level **3**

CStat: CUT **Datatype:** U32 **Unit:** - **Min:** 0:0
P-Group: TECH **Active:** first confirm **QuickComm.:** No **Def:** 0:0
Max: 4000:0

P2832 defines input of NOT 3 element, output is P2833.

Dependency:
P2801[11] is active level for the NOT element.

r2833 **BO: NOT 3** Level **3**

Datatype: U16 **Unit:** - **Min:** -
P-Group: TECH **Def:** -
Max: -

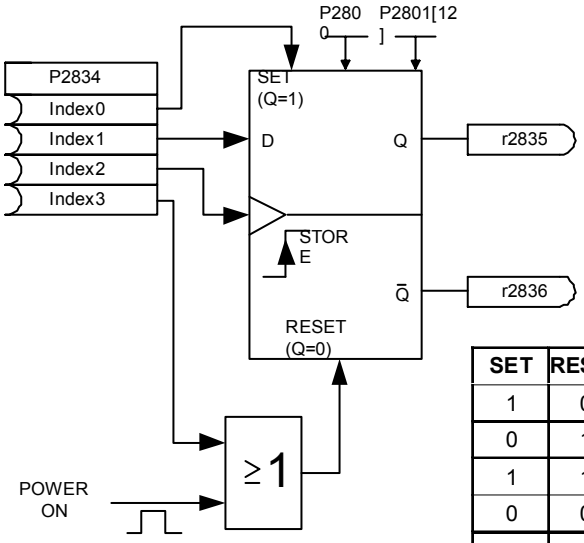
Output of NOT 3 element. Displays not logic of bit defined in P2832.

Dependency:
P2801[11] is active level for the NOT element.

P2834[4] **BI: D-FF 1** Level **3**

CStat: CUT **Datatype:** U32 **Unit:** - **Min:** 0:0
P-Group: TECH **Active:** first confirm **QuickComm.:** No **Def:** 0:0
Max: 4000:0

P2834[0], P2834[1], P2834[2], P2834[3] define inputs of D-FlipFlop 1, outputs are P2835, P2836.



SET	RESET	D	STORE	Q	$\overline{Q}$
1	0	x	x	1	0
0	1	x	x	0	1
1	1	x	x	Q_{n-1}	$\overline{Q}_{n-1}$
0	0	1	↑	1	0
0	0	0	↑	0	1
POWER-ON				0	1

Index:
P2834[0] : Binector input: Set
P2834[1] : Binector input: D input
P2834[2] : Binector input: Store pulse
P2834[3] : Binector input: Reset

Dependency:
P2801[12] is active level for the D-FlipFlop.

r2835 **BO: Q D-FF 1** Level **3**

Datatype: U16 **Unit:** - **Min:** -
P-Group: TECH **Def:** -
Max: -

Displays output of D-FlipFlop 1, inputs are defined in P2834[0], P2834[1], P2834[2], P2834[3]

Dependency:
P2801[12] is active level for the D-FlipFlop.

r2836 **BO: NOT-Q D-FF 1** Level **3**

Datatype: U16 **Unit:** - **Min:** -
P-Group: TECH **Def:** -
Max: -

Displays Not-output of D-FlipFlop 1, inputs are defined in P2834[0], P2834[1], P2834[2], P2834[3]

Dependency:
P2801[12] is active level for the D-FlipFlop.

P2837[4] **BI: D-FF 2** Level **3**

CStat: CUT **Datatype:** U32 **Unit:** - **Min:** 0:0
P-Group: TECH **Active:** first confirm **QuickComm.:** No **Def:** 0:0
Max: 4000:0

P2837[0], P2837[1], P2837[2], P2837[3] define inputs of D-FlipFlop 2, outputs are P2838, 2839.

Index:
P2837[0] : Binector input: Set
P2837[1] : Binector input: D input
P2837[2] : Binector input: Store pulse
P2837[3] : Binector input: Reset

Dependency:
P2801[13] is active level for the D-FlipFlop.

r2838 **BO: Q D-FF 2** Level **3**

Datatype: U16 **Unit:** - **Min:** -
P-Group: TECH **Def:** -
Max: -

Displays output of D-FlipFlop 2, inputs are defined in P2837[0], P2837[1], P2837[2], P2837[3]

Dependency:
P2801[13] is active level for the D-FlipFlop.

r2839 **BO: NOT-Q D-FF 2** Level **3**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: TECH

Displays Not-output of D-FlipFlop 2, inputs are defined in P2837[0], P2837[1], P2837[2], P2837[3]

Dependency:

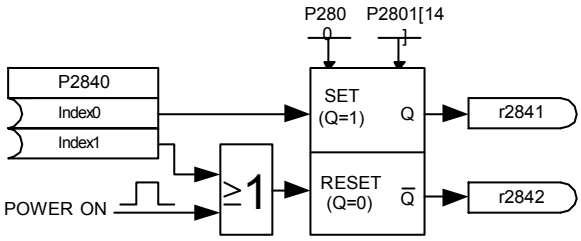
P2801[13] is active level for the D-FlipFlop.

P2840[2] **BI: RS-FF 1** Level **3**

CStat: CUT **Datatype:** U32 **Unit:** - **Min:** 0:0 **Def:** 0:0

P-Group: TECH **Active:** first confirm **QuickComm.:** No **Max:** 4000:0

P2840[0], P2840[1] define inputs of RS-FlipFlop 1, outputs are P2841, P2842.



SET	RESET	Q	$\overline{Q}$
0	0	Q_{n-1}	$\overline{Q}_{n-1}$
0	1	0	1
1	0	1	0
1	1	Q_{n-1}	$\overline{Q}_{n-1}$
POWER-ON		0	1

Index:

P2840[0] : Binector input: Set
P2840[1] : Binector input: Reset

Dependency:

P2801[14] is active level for the RS-FlipFlop.

r2841 **BO: Q RS-FF 1** Level **3**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: TECH

Displays output of RS-FlipFlop 1, inputs are defined in P2840[0], P2840[1]

Dependency:

P2801[14] is active level for the RS-FlipFlop.

r2842 **BO: NOT-Q RS-FF 1** Level **3**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: TECH

Displays Not-output of RS-FlipFlop 1, inputs are defined in P2840[0], P2840[1]

Dependency:

P2801[14] is active level for the RS-FlipFlop.

P2843[2] **BI: RS-FF 2** Level **3**

CStat: CUT **Datatype:** U32 **Unit:** - **Min:** 0:0 **Def:** 0:0

P-Group: TECH **Active:** first confirm **QuickComm.:** No **Max:** 4000:0

P2843[0], P2843[1] define inputs of RS-FlipFlop 2, outputs are P2844, P2845.

Index:

P2843[0] : Binector input: Set
P2843[1] : Binector input: Reset

Dependency:

P2801[15] is active level for the RS-FlipFlop.

r2844 **BO: Q RS-FF 2** Level **3**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: TECH

Displays output of RS-FlipFlop 2, inputs are defined in P2843[0], P2843[1]

Dependency:

P2801[15] is active level for the RS-FlipFlop.

r2845 **BO: NOT-Q RS-FF 2** Level **3**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: TECH

Displays Not-output of RS-FlipFlop 2, inputs are defined in P2843[0], P2843[1]

Dependency:

P2801[15] is active level for the RS-FlipFlop.

P2846[2]	BI: RS-FF 3			Min:	0:0	Level
	CStat: CUT	Datatype: U32	Unit: -	Def:	0:0	3
	P-Group: TECH	Active: first confirm	QuickComm.: No	Max:	4000:0	

P2846[0], P2846[1] define inputs of RS-FlipFlop 3, outputs are P2847, P2848.

Index:

P2846[0] : Binector input: Set
P2846[1] : Binector input: Reset

Dependency:

P2801[16] is active level for the RS-FlipFlop.

r2847	BO: Q RS-FF 3			Min:	-	Level
		Datatype: U16	Unit: -	Def:	-	3
	P-Group: TECH			Max:	-	

Displays output of RS-FlipFlop 3, inputs are defined in P2846[0], P2846[1]

Dependency:

P2801[16] is active level for the RS-FlipFlop.

r2848	BO: NOT-Q RS-FF 3			Min:	-	Level
		Datatype: U16	Unit: -	Def:	-	3
	P-Group: TECH			Max:	-	

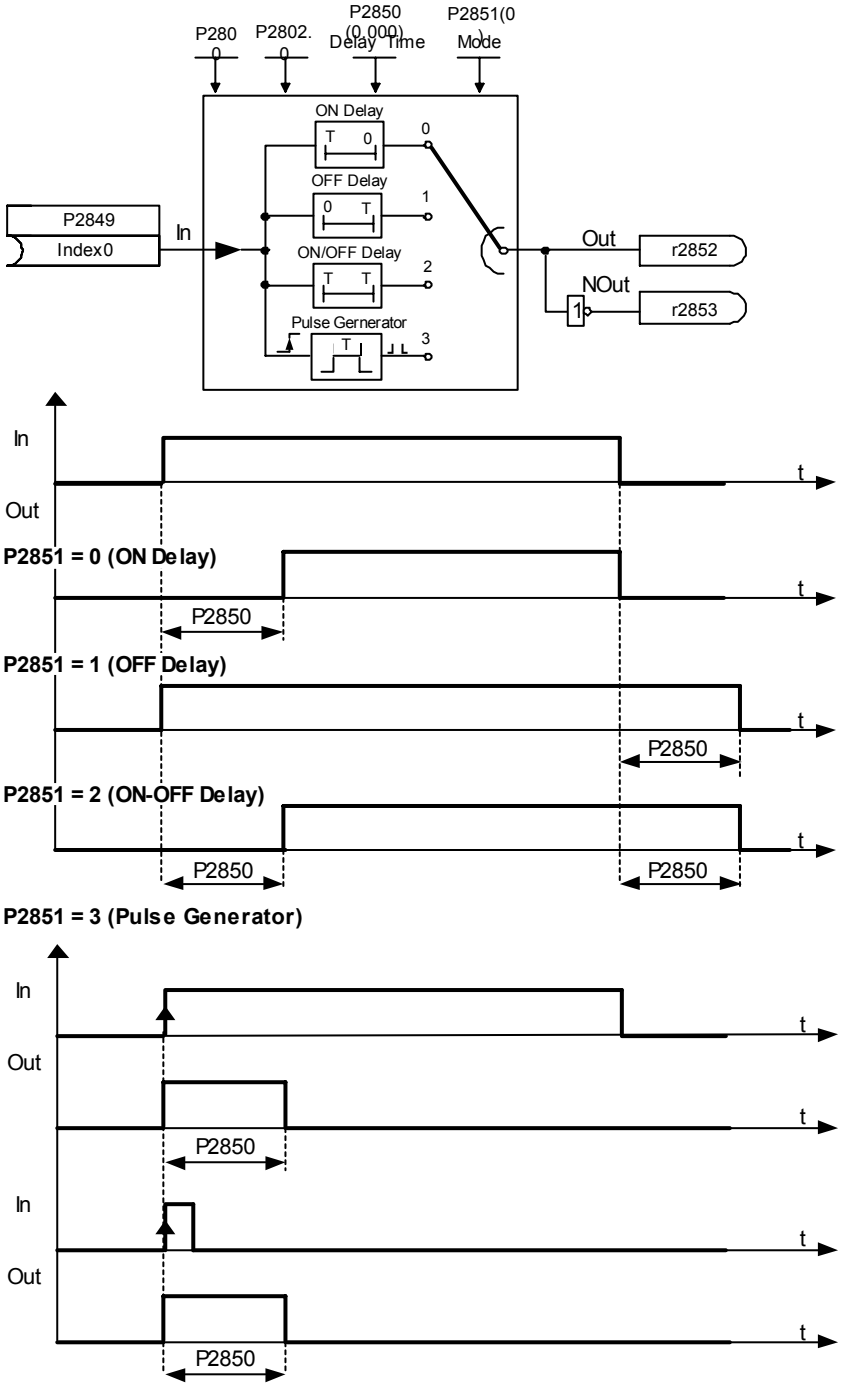
Displays Not-output of RS-FlipFlop 3, inputs are defined in P2846[0], P2846[1]

Dependency:

P2801[16] is active level for the RS-FlipFlop.

P2849	**BI: Timer 1**						Level
	CStat: CUT	**Datatype:** U32	**Unit:** -	**Min:**	0:0		**3**
	P-Group: TECH	**Active:** first confirm	**QuickComm.:** No	**Def:**	0:0		
				Max:	4000:0		

Define input signal of timer 1. P2849, P2850, P2851 are the inputs of the timer, outputs are P2852, P2853.



Dependency:
P2802[0] is active level for the timer.

P2850	**Delay time of timer 1**						Level
	CStat: CUT	**Datatype:** Float	**Unit:** s	**Min:**	0.0		**3**
	P-Group: TECH	**Active:** first confirm	**QuickComm.:** No	**Def:**	0.0		
				Max:	6000.0		

Defines delay time of timer 1. P2849, P2850, P2851 are the inputs of the timer, outputs are P2852, P2853.

Dependency:
P2802[0] is active level for the timer.

P2851 **Mode timer 1** Level **3**

CStat: CUT **Datatype:** U16 **Unit:** - **Min:** 0
P-Group: TECH **Active:** first confirm **QuickComm.:** No **Def:** 0
Max: 3

Selects mode of timer 1. P2849, P2850, P2851 are the inputs of the timer, outputs are P2852, P2853.

Possible Settings:

0 ON delay
1 OFF delay
2 ON/OFF delay
3 Pulse generator

Dependency:

P2802[0] is active level for the timer.

r2852 **BO: Timer 1** Level **3**

Datatype: U16 **Unit:** - **Min:** -
P-Group: TECH **Def:** -
Max: -

Displays output of timer 1. P2849, P2850, P2851 are the inputs of the timer, outputs are P2852, P2853.

Dependency:

P2802[0] is active level for the timer.

r2853 **BO: Nout timer 1** Level **3**

Datatype: U16 **Unit:** - **Min:** -
P-Group: TECH **Def:** -
Max: -

Displays Not-output of timer 1. P2849, P2850, P2851 are the inputs of the timer, outputs are P2852, P2853.

Dependency:

P2802[0] is active level for the timer.

P2854 **BI: Timer 2** Level **3**

CStat: CUT **Datatype:** U32 **Unit:** - **Min:** 0:0
P-Group: TECH **Active:** first confirm **QuickComm.:** No **Def:** 0:0
Max: 4000:0

Define input signal of timer 2. P2854, P2855, P2856 are the inputs of the timer, outputs are P2857, P2858.

Dependency:

P2802[1] is active level for the timer.

P2855 **Delay time of timer 2** Level **3**

CStat: CUT **Datatype:** Float **Unit:** s **Min:** 0.0
P-Group: TECH **Active:** first confirm **QuickComm.:** No **Def:** 0.0
Max: 6000.0

Defines delay time of timer 2. P2854, P2855, P2856 are the inputs of the timer, outputs are P2857, P2858.

Dependency:

P2802[1] is active level for the timer.

P2856 **Mode timer 2** Level **3**

CStat: CUT **Datatype:** U16 **Unit:** - **Min:** 0
P-Group: TECH **Active:** first confirm **QuickComm.:** No **Def:** 0
Max: 3

Selects mode of timer 2. P2854, P2855, P2856 are the inputs of the timer, outputs are P2857, P2858.

Possible Settings:

0 ON delay
1 OFF delay
2 ON/OFF delay
3 Pulse generator

Dependency:

P2802[1] is active level for the timer.

r2857 **BO: Timer 2** Level **3**

Datatype: U16 **Unit:** - **Min:** -
P-Group: TECH **Def:** -
Max: -

Displays output of timer 2. P2854, P2855, P2856 are the inputs of the timer, outputs are P2857, P2858.

Dependency:

P2802[1] is active level for the timer.

r2858 **BO: Nout timer 2** Level **3**

Datatype: U16 **Unit:** - **Min:** -
P-Group: TECH **Def:** -
Max: -

Displays Not-output of timer 2 P2854, P2855, P2856 are the inputs of the timer, outputs are P2857, P2858.

Dependency:

P2802[1] is active level for the timer.

P2859 **BI: Timer 3** Level **3**

CStat: CUT **Datatype:** U32 **Unit:** - **Min:** 0:0
P-Group: TECH **Active:** first confirm **QuickComm.:** No **Def:** 0:0
Max: 4000:0

Define input signal of timer 3. P2859, P2860, P2861 are the inputs of the timer, outputs are P2862, P2863.

Dependency:
P2802[2] is active level for the timer.

P2860 **Delay time of timer 3** Level **3**

CStat: CUT **Datatype:** Float **Unit:** s **Min:** 0.0
P-Group: TECH **Active:** first confirm **QuickComm.:** No **Def:** 0.0
Max: 6000.0

Defines delay time of timer 3. P2859, P2860, P2861 are the inputs of the timer, outputs are P2862, P2863.

Dependency:
P2802[2] is active level for the timer.

P2861 **Mode timer 3** Level **3**

CStat: CUT **Datatype:** U16 **Unit:** - **Min:** 0
P-Group: TECH **Active:** first confirm **QuickComm.:** No **Def:** 0
Max: 3

Selects mode of timer 3. P2859, P2860, P2861 are the inputs of the timer, outputs are P2862, P2863.

Possible Settings:
0 ON delay
1 OFF delay
2 ON/OFF delay
3 Pulse generator

Dependency:
P2802[2] is active level for the timer.

r2862 **BO: Timer 3** Level **3**

Datatype: U16 **Unit:** - **Min:** -
P-Group: TECH **Def:** -
Max: -

Displays output of timer 3. P2859, P2860, P2861 are the inputs of the timer, outputs are P2862, P2863.

Dependency:
P2802[2] is active level for the timer.

r2863 **BO: Nout timer 3** Level **3**

Datatype: U16 **Unit:** - **Min:** -
P-Group: TECH **Def:** -
Max: -

Displays Not-output of timer 3. P2859, P2860, P2861 are the inputs of the timer, outputs are P2862, P2863.

Dependency:
P2802[2] is active level for the timer.

P2864 **BI: Timer 4** Level **3**

CStat: CUT **Datatype:** U32 **Unit:** - **Min:** 0:0
P-Group: TECH **Active:** first confirm **QuickComm.:** No **Def:** 0:0
Max: 4000:0

Define input signal of timer 4. P2864, P2865, P2866 are the inputs of the timer, outputs are P2867, P2868.

Dependency:
P2802[3] is active level for the timer.

P2865 **Delay time of timer 4** Level **3**

CStat: CUT **Datatype:** Float **Unit:** s **Min:** 0.0
P-Group: TECH **Active:** first confirm **QuickComm.:** No **Def:** 0.0
Max: 6000.0

Defines delay time of timer 4. P2864, P2865, P2866 are the inputs of the timer, outputs are P2867, P2868.

Dependency:
P2802[3] is active level for the timer.

P2866 **Mode timer 4** Level **3**

CStat: CUT **Datatype:** U16 **Unit:** - **Min:** 0
P-Group: TECH **Active:** first confirm **QuickComm.:** No **Def:** 0
Max: 3

Selects mode of timer 4. P2864, P2865, P2866 are the inputs of the timer, outputs are P2867, P2868.

Possible Settings:
0 ON delay
1 OFF delay
2 ON/OFF delay
3 Pulse generator

Dependency:
P2802[3] is active level for the timer.

r2867 **BO: Timer 4** Level **3**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: TECH

Displays output of timer 4. P2864, P2865, P2866 are the inputs of the timer, outputs are P2867, P2868.

Dependency:

P2802[3] is active level for the timer.

r2868 **BO: Nout timer 4** Level **3**

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: TECH

Displays Not-output of timer 4. P2864, P2865, P2866 are the inputs of the timer, outputs are P2867, P2868.

Dependency:

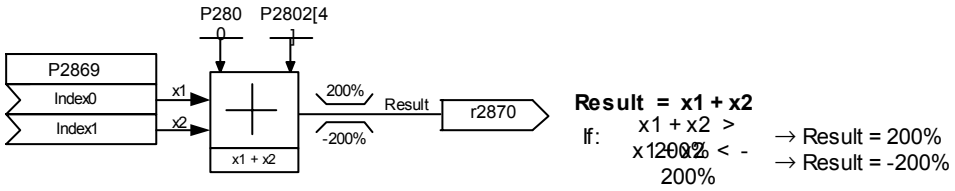
P2802[3] is active level for the timer.

P2869[2] **CI: ADD 1** Level **3**

CStat: CUT **Datatype:** U32 **Unit:** - **Min:** 0:0 **Def:** 755:0 **Max:** 4000:0

P-Group: TECH **Active:** first confirm **QuickComm.:** No

Define inputs of Adder 1, result is in P2870.



Index:

P2869[0] : Connector input 0 (CI 0)
P2869[1] : Connector input 1 (CI 1)

Dependency:

P2802[4] is the active level for the Adder.

r2870 **CO: ADD 1** Level **3**

Datatype: Float **Unit:** % **Min:** - **Def:** - **Max:** -

P-Group: TECH

Result of Adder 1.

Dependency:

P2802[4] is active level for the Adder.

P2871[2] **CI: ADD 2** Level **3**

CStat: CUT **Datatype:** U32 **Unit:** - **Min:** 0:0 **Def:** 755:0 **Max:** 4000:0

P-Group: TECH **Active:** first confirm **QuickComm.:** No

Define inputs of Adder 2, result is in P2872.

Index:

P2871[0] : Connector input 0 (CI 0)
P2871[1] : Connector input 1 (CI 1)

Dependency:

P2802[5] is active level for the Adder.

r2872 **CO: ADD 2** Level **3**

Datatype: Float **Unit:** % **Min:** - **Def:** - **Max:** -

P-Group: TECH

Result of Adder 2.

Dependency:

P2802[5] is active level for the Adder.

P2873[2] **CI: SUB 1**

CStat:	CUT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	TECH	**Active:** first confirm	**QuickComm.:** No	**Def:**	755:0
				Max:	4000:0

Level **3**

Define inputs of Subtracter 1, result is in P2874.

Result = x1 - x2

If: x1 - x2 > 200% → Result = 200%
x1 - x2 < -200% → Result = -200%

Index:
P2873[0] : Connector input 0 (CI 0)
P2873[1] : Connector input 1 (CI 1)

Dependency:
P2802[6] is active level for the Subtracter.

r2874 **CO: SUB 1**

		Datatype: Float	**Unit:** %	**Min:**	-
P-Group:	TECH			**Def:**	-
				Max:	-

Level **3**

Result of Subtracter 1.

Dependency:
P2802[6] is active level for the Subtracter.

P2875[2] **CI: SUB 2**

CStat:	CUT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	TECH	**Active:** first confirm	**QuickComm.:** No	**Def:**	755:0
				Max:	4000:0

Level **3**

Define inputs of Subtracter 2, result is in P2876.

Index:
P2875[0] : Connector input 0 (CI 0)
P2875[1] : Connector input 1 (CI 1)

Dependency:
P2802[7] is active level for the Subtracter.

r2876 **CO: SUB 2**

		Datatype: Float	**Unit:** %	**Min:**	-
P-Group:	TECH			**Def:**	-
				Max:	-

Level **3**

Result of Subtracter 2.

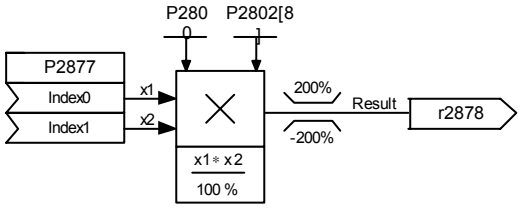
Dependency:
P2802[7] is active level for the Subtracter.

P2877[2] **CI: MUL 1**

CStat:	CUT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	TECH	**Active:** first confirm	**QuickComm.:** No	**Def:**	755:0
				Max:	4000:0

Level **3**

Define inputs of Multiplier 1, result is in P2878.



$$\text{Result} = \frac{x1 * x2}{100\%}$$

If: $\frac{x1 * x2}{100\%} > 200\% \rightarrow$ Result = 200%

$\frac{x1 * x2}{100\%} < -200\% \rightarrow$ Result = -200%

Index:
P2877[0] : Connector input 0 (CI 0)
P2877[1] : Connector input 1 (CI 1)

Dependency:
P2802[8] is active level for the Multiplier.

r2878 **CO: MUL 1**

		Datatype: Float	**Unit:** %	**Min:**	-
P-Group:	TECH			**Def:**	-
				Max:	-

Level **3**

Result of Multiplier 1.

Dependency:
P2802[8] is active level for the Multiplier.

P2879[2] **CI: MUL 2** Level **3**

CStat: CUT **Datatype:** U32 **Unit:** - **Min:** 0:0
P-Group: TECH **Active:** first confirm **QuickComm.:** No **Def:** 755:0
Max: 4000:0

Define inputs of Multiplier 2, result is in P2880.

Index:
P2879[0] : Connector input 0 (CI 0)
P2879[1] : Connector input 1 (CI 1)

Dependency:
P2802[9] is active level for the Multiplier.

r2880 **CO: MUL 2** Level **3**

Datatype: Float **Unit:** % **Min:** -
P-Group: TECH **Def:** -
Max: -

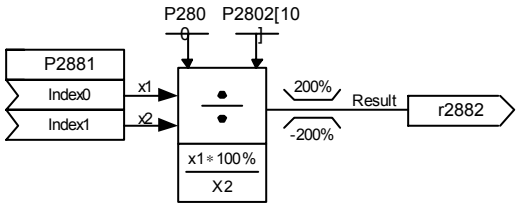
Result of Multiplier 2.

Dependency:
P2802[9] is active level for the Multiplier.

P2881[2] **CI: DIV 1** Level **3**

CStat: CUT **Datatype:** U32 **Unit:** - **Min:** 0:0
P-Group: TECH **Active:** first confirm **QuickComm.:** No **Def:** 755:0
Max: 4000:0

Define inputs of Divider 1, result is in P2882.



$$\text{Result} = \frac{x1 * 100\%}{x2}$$

$$\text{If: } \frac{x1 * 100\%}{x2} > 200\% \rightarrow \text{Result} = 200\%$$

$$\frac{x1 * 100\%}{x2} < -200\% \rightarrow \text{Result} = -200\%$$

Index:
P2881[0] : Connector input 0 (CI 0)
P2881[1] : Connector input 1 (CI 1)

Dependency:
P2802[10] is active level for the Divider.

r2882 **CO: DIV 1** Level **3**

Datatype: Float **Unit:** % **Min:** -
P-Group: TECH **Def:** -
Max: -

Result of Divider 1.

Dependency:
P2802[10] is active level for the Divider.

P2883[2] **CI: DIV 2** Level **3**

CStat: CUT **Datatype:** U32 **Unit:** - **Min:** 0:0
P-Group: TECH **Active:** first confirm **QuickComm.:** No **Def:** 755:0
Max: 4000:0

Define inputs of Divider 2, result is in P2884.

Index:
P2883[0] : Connector input 0 (CI 0)
P2883[1] : Connector input 1 (CI 1)

Dependency:
P2802[11] is active level for the Divider.

r2884 **CO: DIV 2** Level **3**

Datatype: Float **Unit:** % **Min:** -
P-Group: TECH **Def:** -
Max: -

Result of Divider 2.

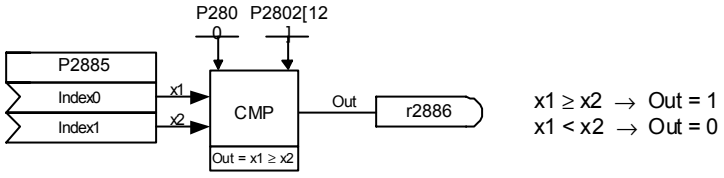
Dependency:
P2802[11] is active level for the Divider.

P2885[2] **CI: CMP 1**

CStat:	CUT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	TECH	**Active:** first confirm	**QuickComm.:** No	**Def:**	755:0
				Max:	4000:0

Level **3**

Defines inputs of Comparator 1, output is P2886.



Index:
P2885[0] : Connector input 0 (CI 0)
P2885[1] : Connector input 1 (CI 1)

Dependency:
P2802[12] is active level for the Comparator.

r2886 **BO: CMP 1**

		Datatype: U16	**Unit:** -	**Min:**	-
P-Group:	TECH			**Def:**	-
				Max:	-

Level **3**

Displays result bit of Comparator 1.

Dependency:
P2802[12] is active level for the Comparator.

P2887[2] **CI: CMP 2**

CStat:	CUT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	TECH	**Active:** first confirm	**QuickComm.:** No	**Def:**	755:0
				Max:	4000:0

Level **3**

Defines inputs of Comparator 2, output is P2888.

Index:
P2887[0] : Connector input 0 (CI 0)
P2887[1] : Connector input 1 (CI 1)

Dependency:
P2802[13] is active level for the Comparator.

r2888 **BO: CMP 2**

		Datatype: U16	**Unit:** -	**Min:**	-
P-Group:	TECH			**Def:**	-
				Max:	-

Level **3**

Displays result bit of Comparator 2.

Dependency:
P2802[13] is active level for the Comparator.

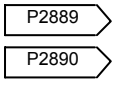
P2889 **CO: Fixed setpoint 1 in [%]**

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-200.00
P-Group:	TECH	**Active:** first confirm	**QuickComm.:** No	**Def:**	0.00
				Max:	200.00

Level **3**

Fixed percent setting 1.

Connector Setting in %



Range : -200% … 200%

P2890 **CO: Fixed setpoint 2 in [%]**

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-200.00
P-Group:	TECH	**Active:** first confirm	**QuickComm.:** No	**Def:**	0.00
				Max:	200.00

Level **3**

Fixed percent setting 2.

P3900 **End of quick commissioning** Level **1**

CStat:	C	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	QUICK	**Active:** first confirm	**QuickComm.:** Yes	**Def:**	0
				Max:	3

Performs calculations necessary for optimized motor operation.

After completion of calculation, P3900 and P0010 (parameter groups for commissioning) are automatically reset to their original value 0.

Possible Settings:

0 No quick commissioning
1 Start quick commissioning with factory reset
2 Start quick commissioning
3 Start quick commissioning only for motor data

Dependency:

Changeable only when P0010 = 1 (quick commissioning)

Note:

P3900 = 1 :
When setting 1 is selected, only the parameter settings carried out via the commissioning menu "Quick commissioning", are retained; all other parameter changes, including the I/O settings, are lost. Motor calculations are also performed.

P3900 = 2 :
When setting 2 is selected, only those parameters, which depend on the parameters in the commissioning menu "Quick commissioning" (P0010 = 1) are calculated. The I/O settings are also reset to default and the motor calculations performed.

P3900 = 3 :
When setting 3 is selected, only the motor and controller calculations are performed. Exiting quick commissioning with this setting saves time (for example, if only motor rating plate data have been changed).

Calculates a variety of motor parameters, overwriting previous values (see parameter P0340, setting P0340 = 1).

P3950 **Access of hidden parameters** Level **4**

CStat:	CUT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	ALWAYS	**Active:** first confirm	**QuickComm.:** No	**Def:**	0
				Max:	255

Accesses special parameters for development (expert only) and factory functionality (calibration parameter).

r3954[13] **CM version and GUI ID** Level **4**

		Datatype: U16	**Unit:** -	**Min:**	-
P-Group:	-			**Def:**	-
				Max:	-

Used to classify firmware (only for SIEMENS internal purposes).

Index:

r3954[0] : CM version (major release)
r3954[1] : CM version (minor release)
r3954[2] : CM version (baselevel or patch)
r3954[3] : GUI ID
r3954[4] : GUI ID
r3954[5] : GUI ID
r3954[6] : GUI ID
r3954[7] : GUI ID
r3954[8] : GUI ID
r3954[9] : GUI ID
r3954[10] : GUI ID
r3954[11] : GUI ID major release
r3954[12] : GUI ID minor release

P3980 **Commissioning command selection** Level **4**

CStat: T **Datatype:** U16 **Unit:** - **Min:** 0
P-Group: - **Active:** first confirm **QuickComm.:** No **Def:** 0
Max: 66

Toggles command and setpoint sources between freely programmable BICO parameters and fixed command/setpoint profiles for commissioning.

The command and setpoint sources can be changed independently. The tens digit selects the command source, the ones digit the setpoint source.

Possible Settings:

0	Cmd = BICO parameter	Setpoint = BICO parameter
1	Cmd = BICO parameter	Setpoint = MOP setpoint
2	Cmd = BICO parameter	Setpoint = Analog setpoint
3	Cmd = BICO parameter	Setpoint = Fixed frequency
4	Cmd = BICO parameter	Setpoint = USS on BOP link
5	Cmd = BICO parameter	Setpoint = USS on COM link
6	Cmd = BICO paramete	Setpoint = CB on COM link
10	Cmd = BOP	Setpoint = BICO parameter
11	Cmd = BOP	Setpoint = MOP setpoint
12	Cmd = BOP	Setpoint = Analog setpoint
13	Cmd = BOP	Setpoint = Fixed frequency
15	Cmd = BOP	Setpoint = USS on COM link
16	Cmd = BOP	Setpoint = CB on COM link
40	Cmd = USS on BOP link	Setpoint = BICO parameter
41	Cmd = USS on BOP link	Setpoint = MOP setpoint
42	Cmd = USS on BOP link	Setpoint = Analog setpoint
43	Cmd = USS on BOP link	Setpoint = Fixed frequency
44	Cmd = USS on BOP link	Setpoint = USS on BOP link
45	Cmd = USS on BOP link	Setpoint = USS on COM link
46	Cmd = USS on BOP link	Setpoint = CB on COM link
50	Cmd = USS on COM link	Setpoint = BICO parameter
51	Cmd = USS on COM link	Setpoint = MOP setpoint
52	Cmd = USS on COM link	Setpoint = Analog setpoint
53	Cmd = USS on COM link	Setpoint = Fixed frequency
54	Cmd = USS on COM link	Setpoint = USS on BOP link
55	Cmd = USS on COM link	Setpoint = USS on COM link
60	Cmd = CB on COM link	Setpoint = BICO parameter
61	Cmd = CB on COM link	Setpoint = MOP setpoint
62	Cmd = CB on COM link	Setpoint = Analog setpoint
63	Cmd = CB on COM link	Setpoint = Fixed frequency
64	Cmd = CB on COM link	Setpoint = USS on BOP link
66	Cmd = CB on COM link	Setpoint = CB on COM link

P3981 **Reset active fault** Level **4**

CStat: CT **Datatype:** U16 **Unit:** - **Min:** 0
P-Group: ALARMS **Active:** first confirm **QuickComm.:** No **Def:** 0
Max: 1

Resets active faults when changed from 0 to 1.

Possible Settings:

0 No fault reset
1 Reset fault

Note:

Automatically reset to 0.

Details:

See P0947 (last fault code)

r3986[2] **Number of parameters** Level **4**

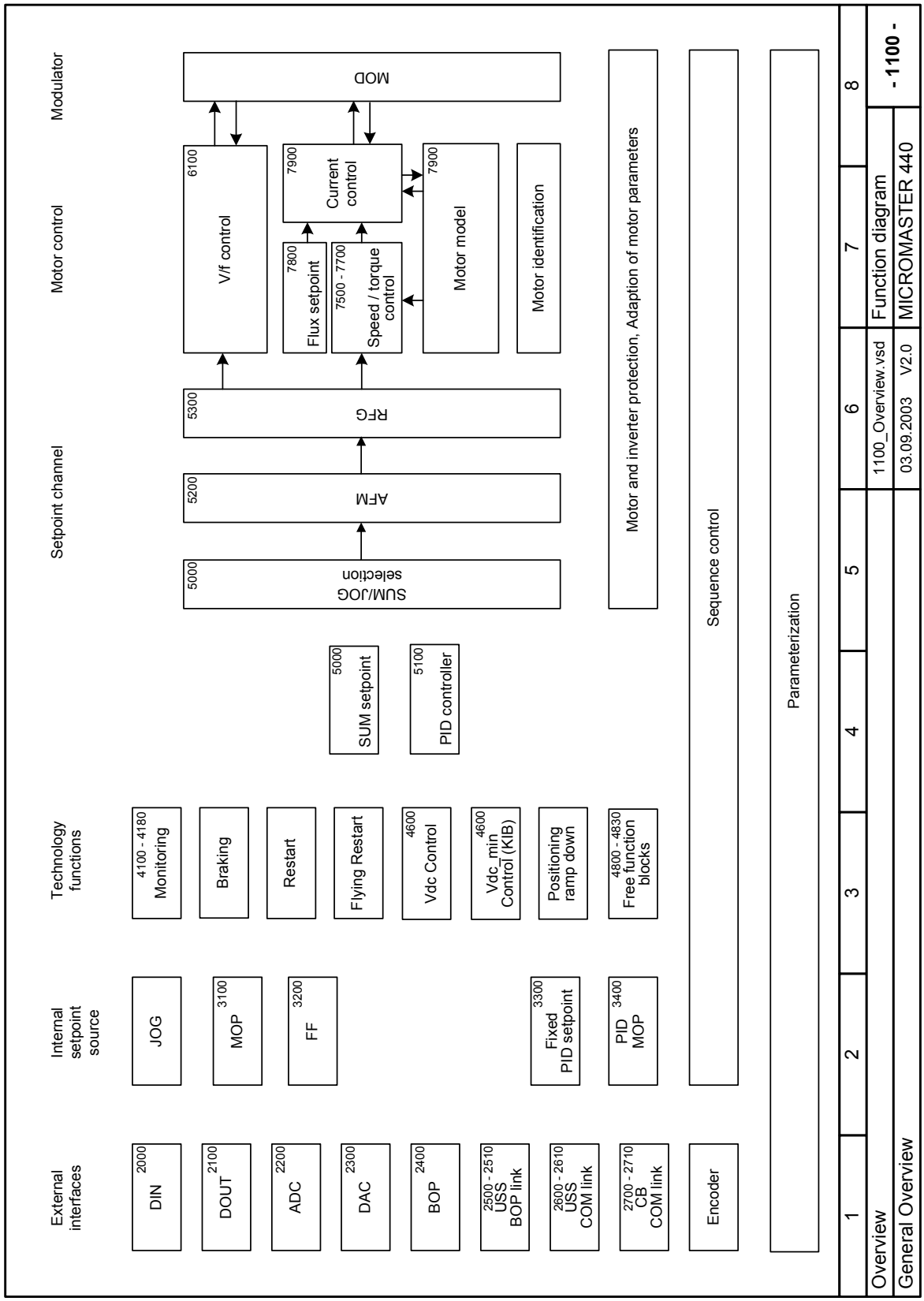
Datatype: U16 **Unit:** - **Min:** -
P-Group: - **Def:** -
Max: -

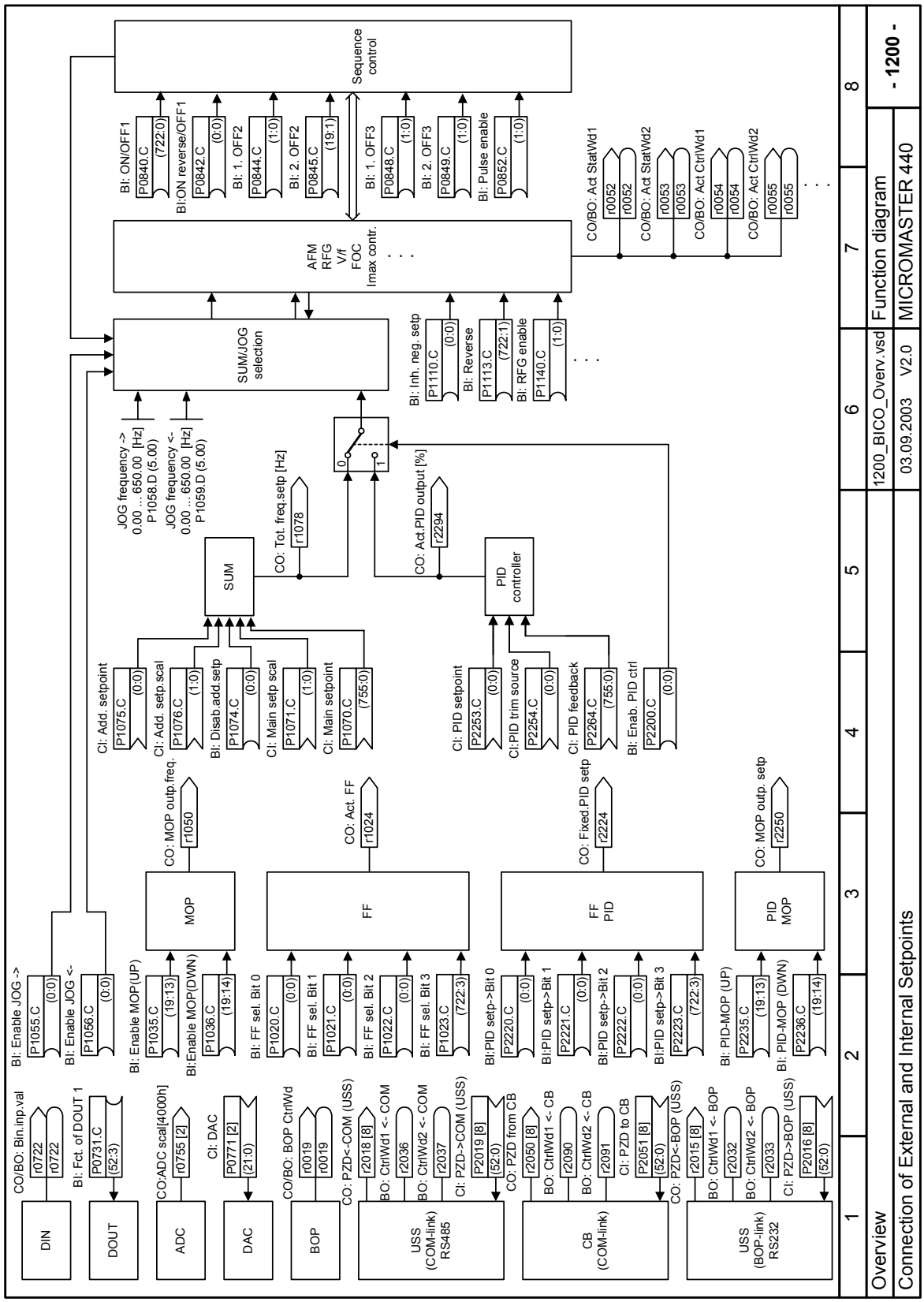
Number of parameters on the drive

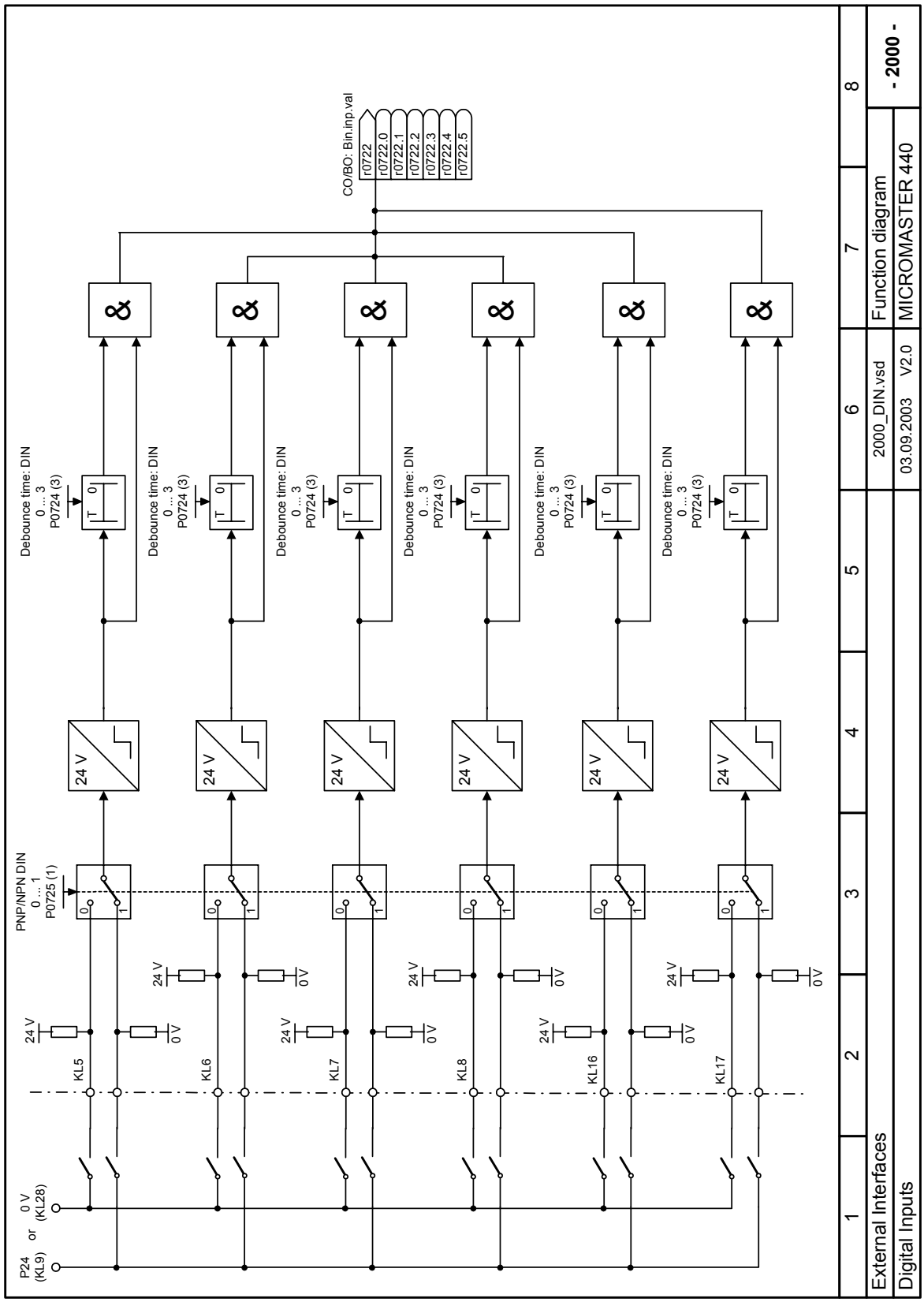
Index:

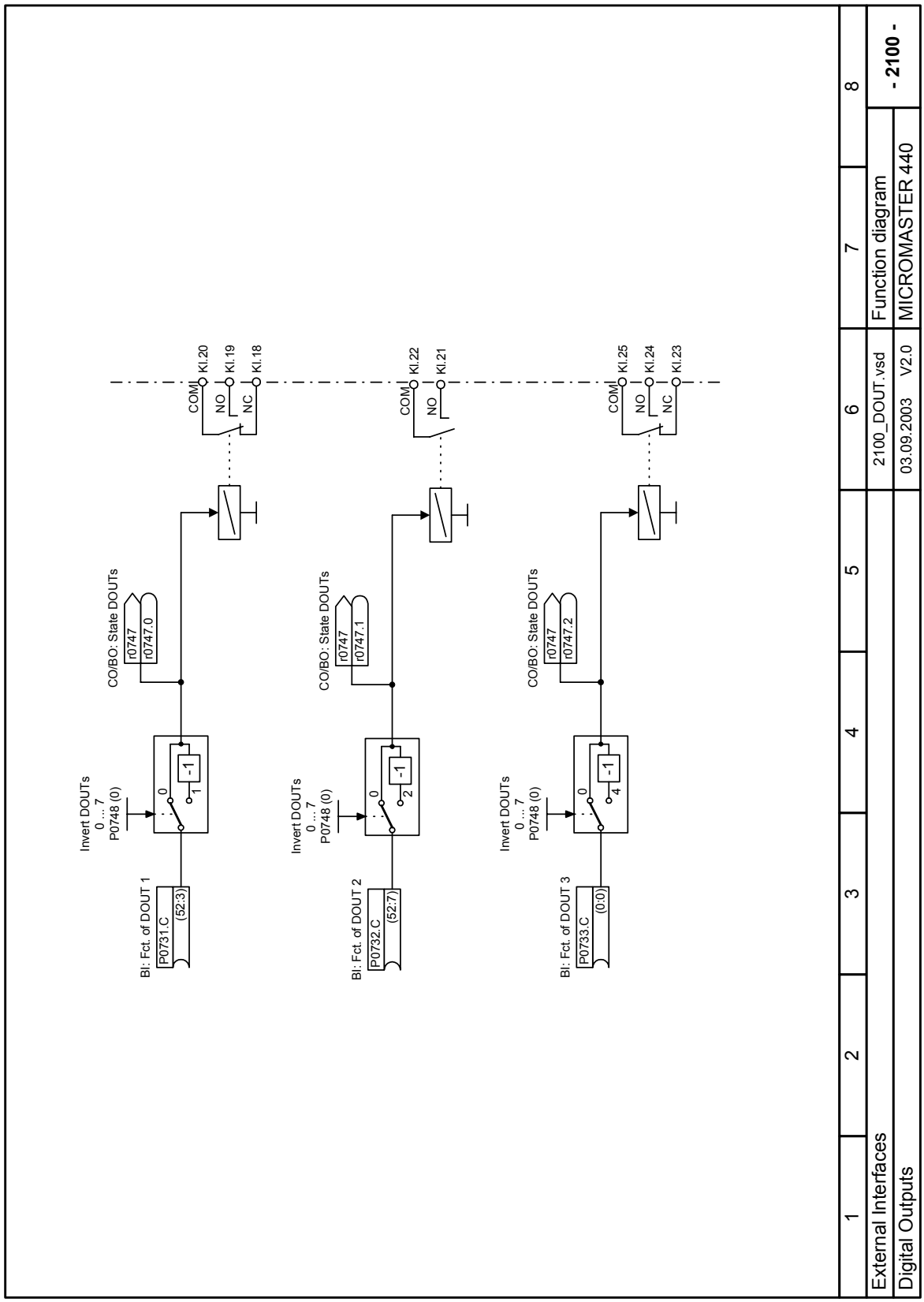
r3986[0] : Read only
r3986[1] : Read & write

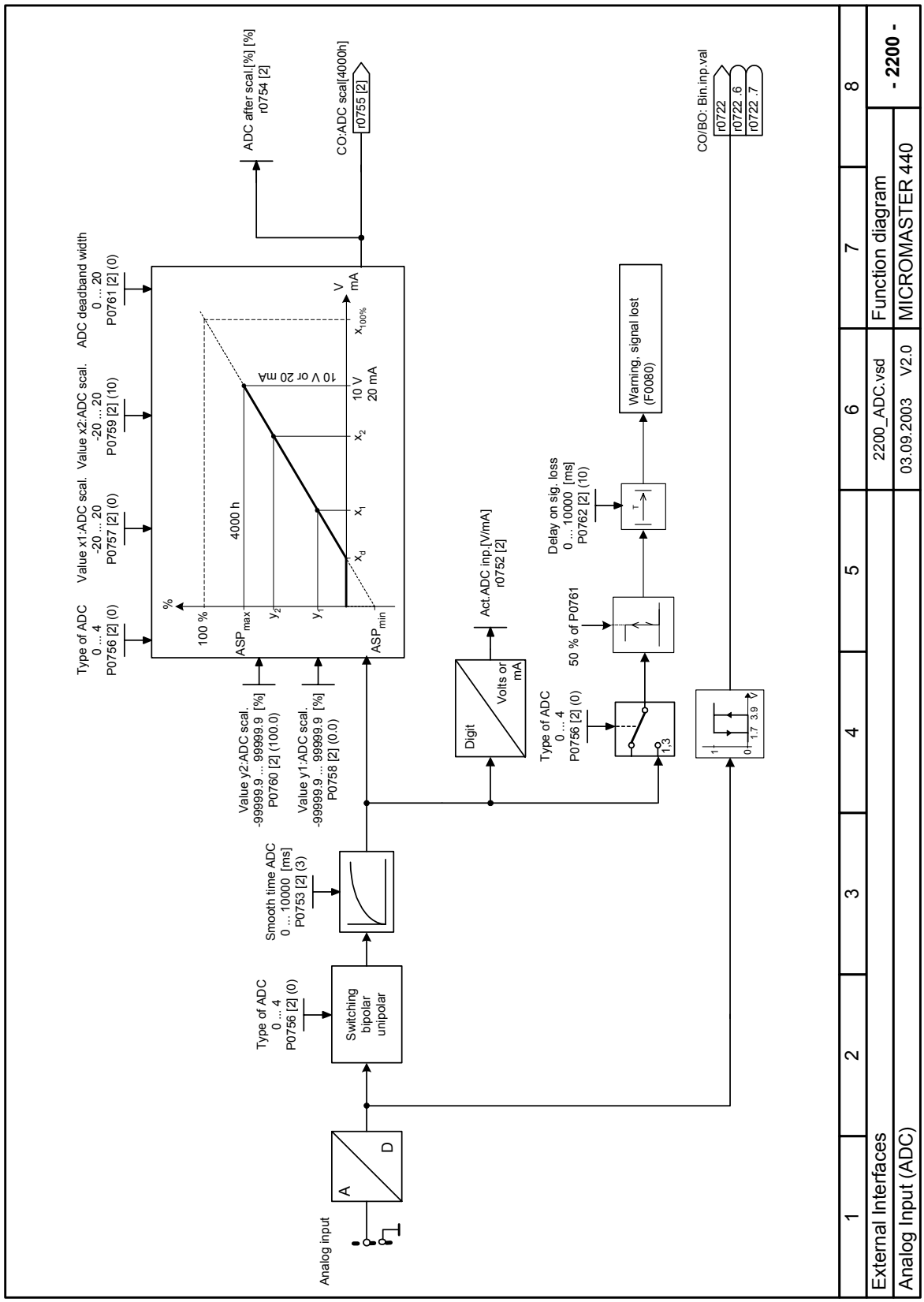
2 Function Diagrams

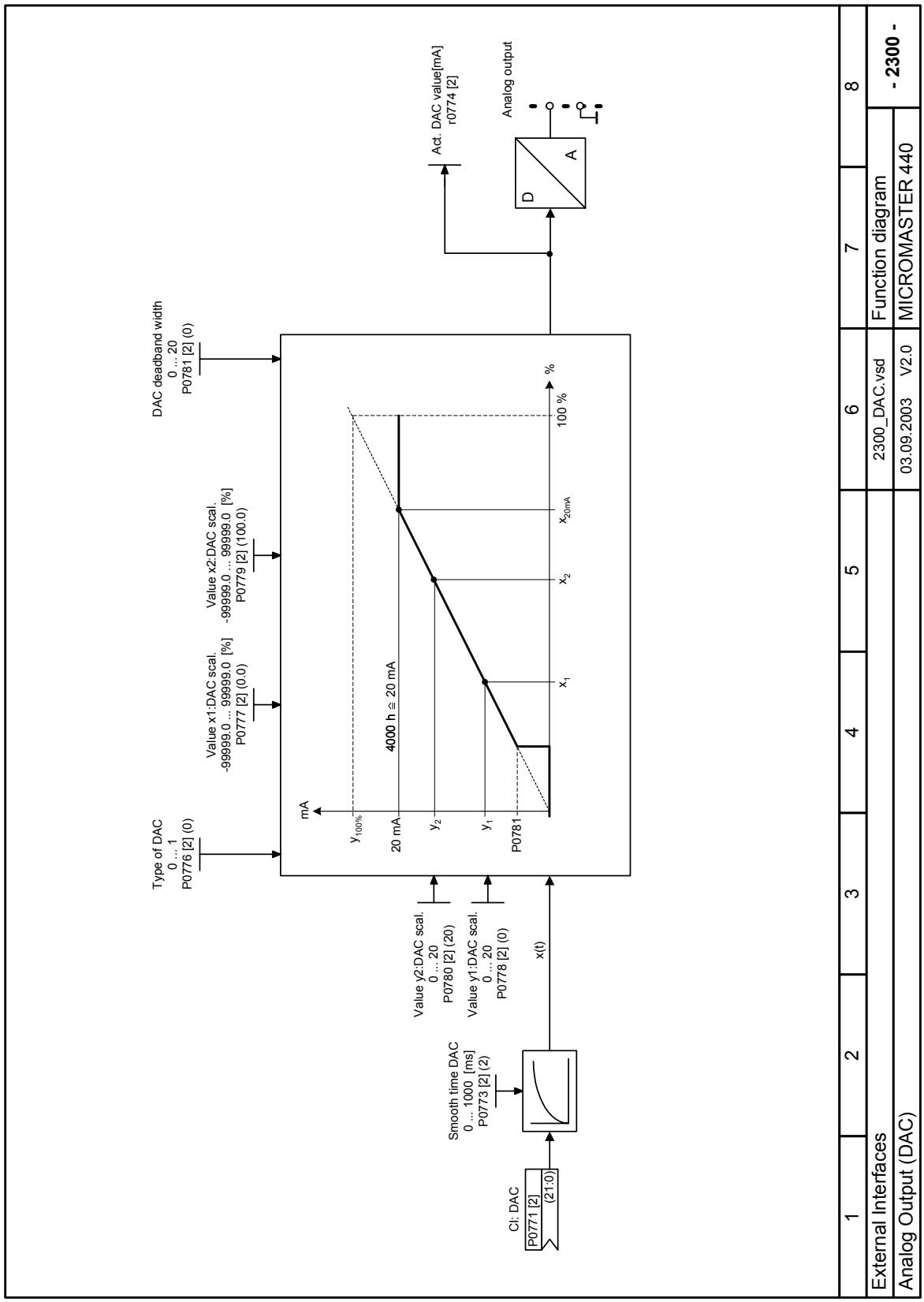


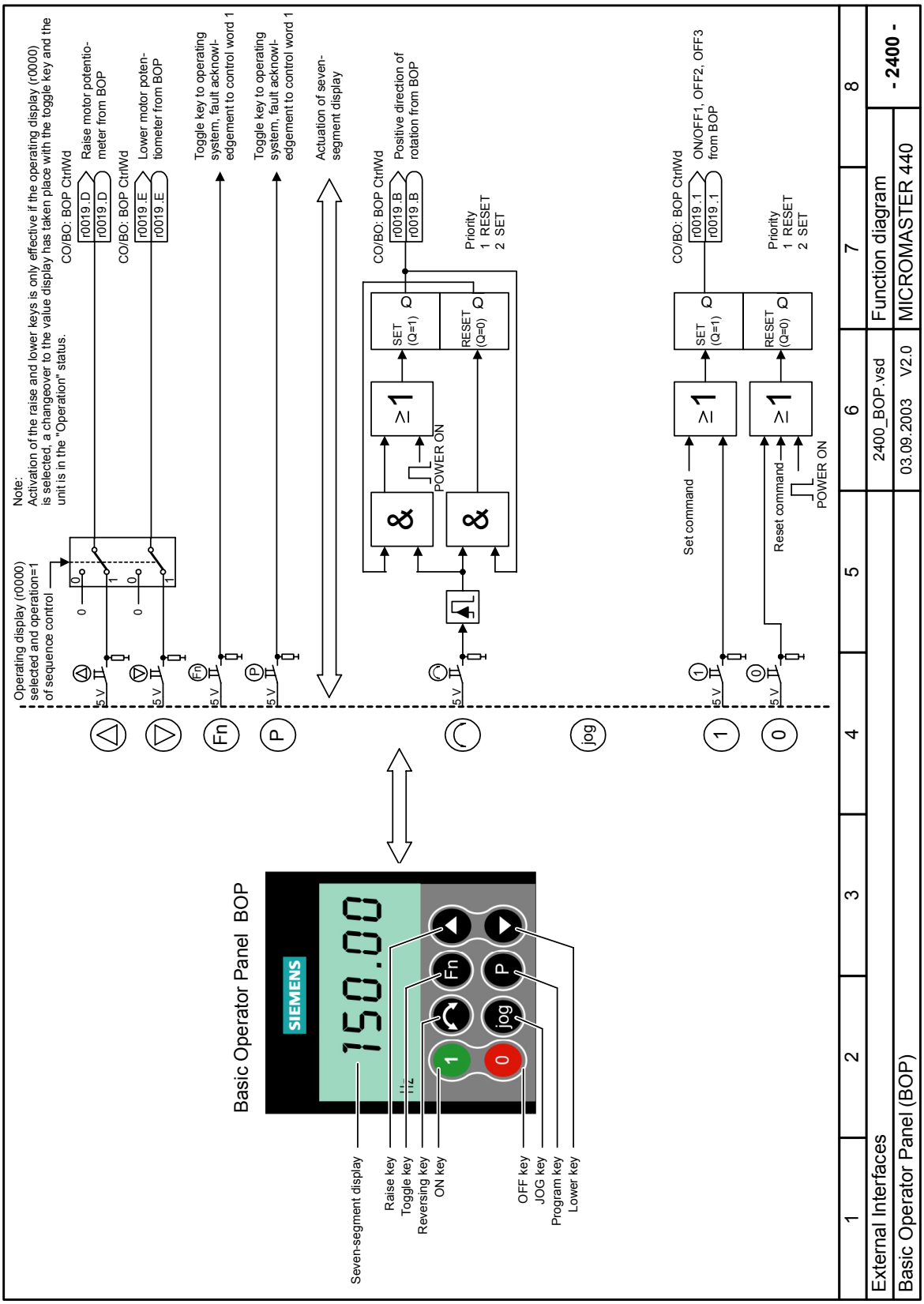

Sequence control
AFM
RFG
V/f
FOC
Imax contr.
SUM/JOG selection
SUM
PID controller
MOP
FF
FF PID
PID MOP
DIN
DOUT
ADC
DAC
BOP
USS (COM-link) RS485
CB (COM-link)
USS (BOP-link) RS232
Overview
Connection of External and Internal Setpoints
1200_BICO_Overv.vsd
03.09.2003 V2.0
Function diagram
MICROMASTER 440
- 1200 -

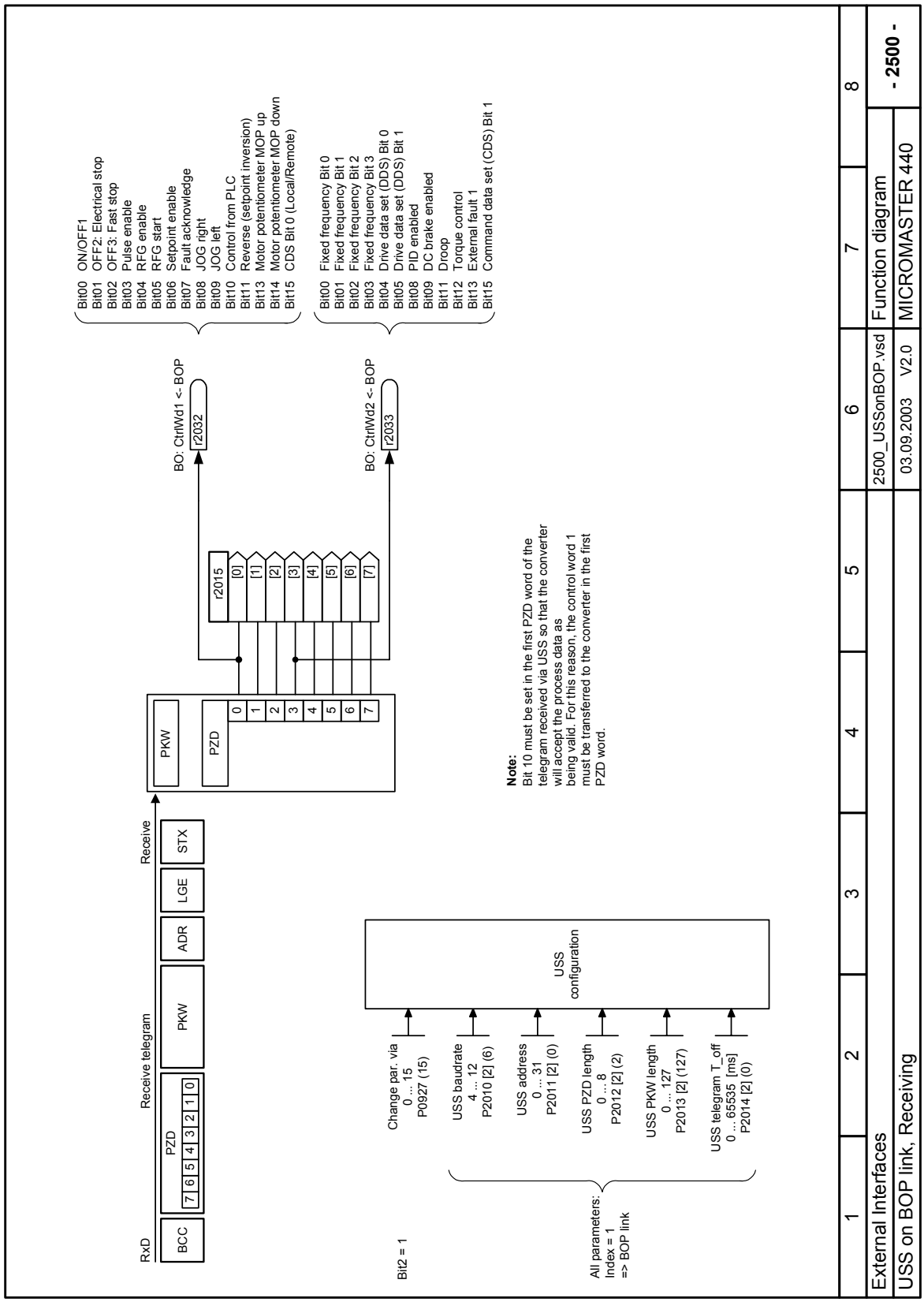

CO/BO: Bin.inp.val
r0722
r0722.0
r0722.1
r0722.2
r0722.3
r0722.4
r0722.5
Debounce time: DIN
0 ... 3
P0724 (3)
PNP/NPN DIN
0 ... 1
P0725 (1)
24 V
0 V
KL5
KL6
KL7
KL8
KL16
KL17
P24 (KL9)
or
0 V (KL28)
1 2 3 4 5 6 7 8
External Interfaces
Digital Inputs
2000_DIN.vsd
03.09.2003 V2.0
Function diagram
MICROMASTER 440
- 2000 -

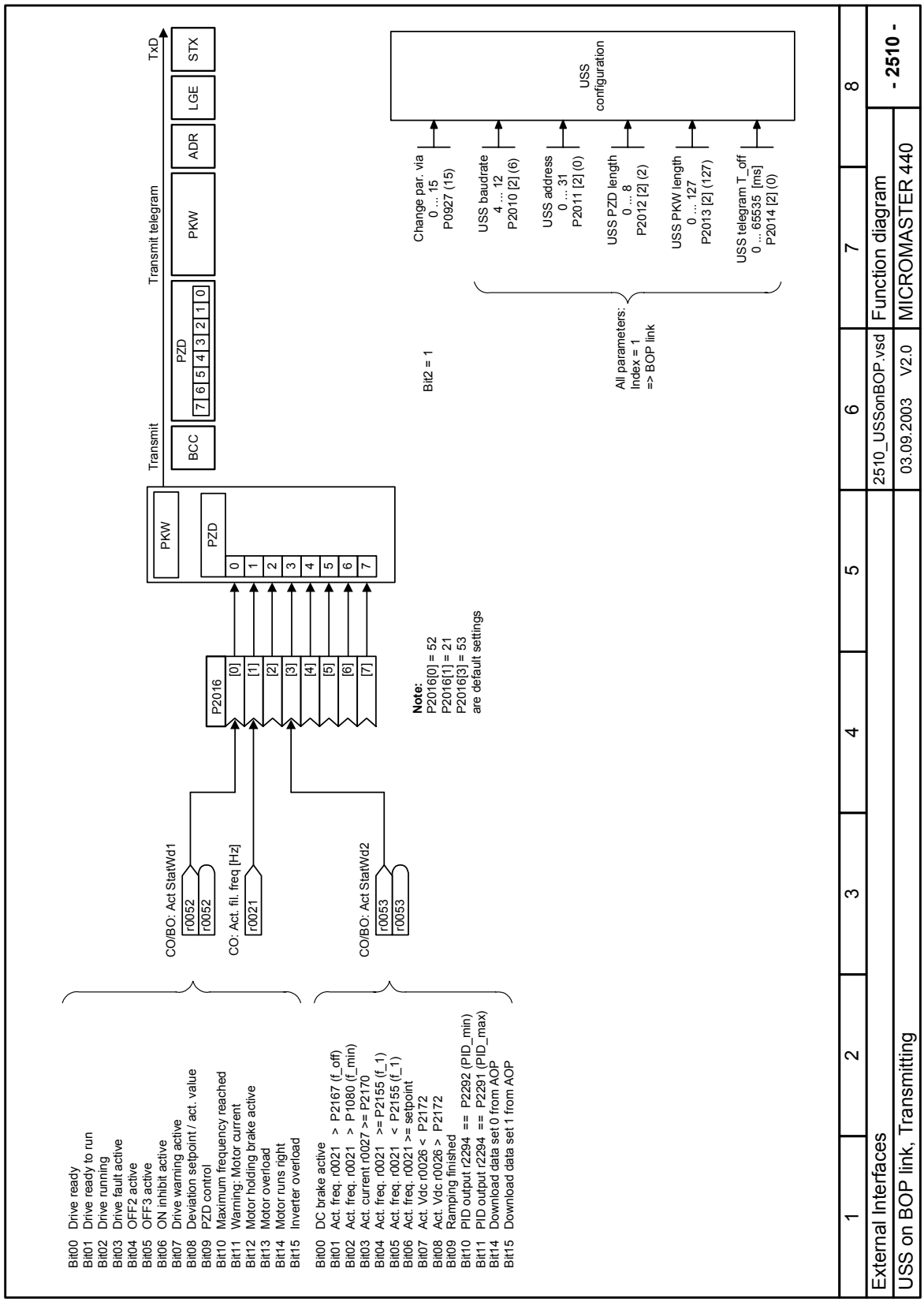

Invert DOUTs 0 ... 7 P0748 (0)
Bi: Fct. of DOUT 1 P0731.C (52:3)
CO/BO: State DOUTs r0747 r0747.0
COM KI.20 NO KI.19 NC KI.18
Invert DOUTs 0 ... 7 P0748 (0)
Bi: Fct. of DOUT 2 P0732.C (52:7)
CO/BO: State DOUTs r0747 r0747.1
COM KI.22 NO KI.21
Invert DOUTs 0 ... 7 P0748 (0)
Bi: Fct. of DOUT 3 P0733.C (0:0)
CO/BO: State DOUTs r0747 r0747.2
COM KI.25 NO KI.24 NC KI.23
1 2 3 4 5 6 7 8
External Interfaces
Digital Outputs
2100_DOUT.vsd
03.09.2003 V2.0
Function diagram
MICROMASTER 440
- 2100 -

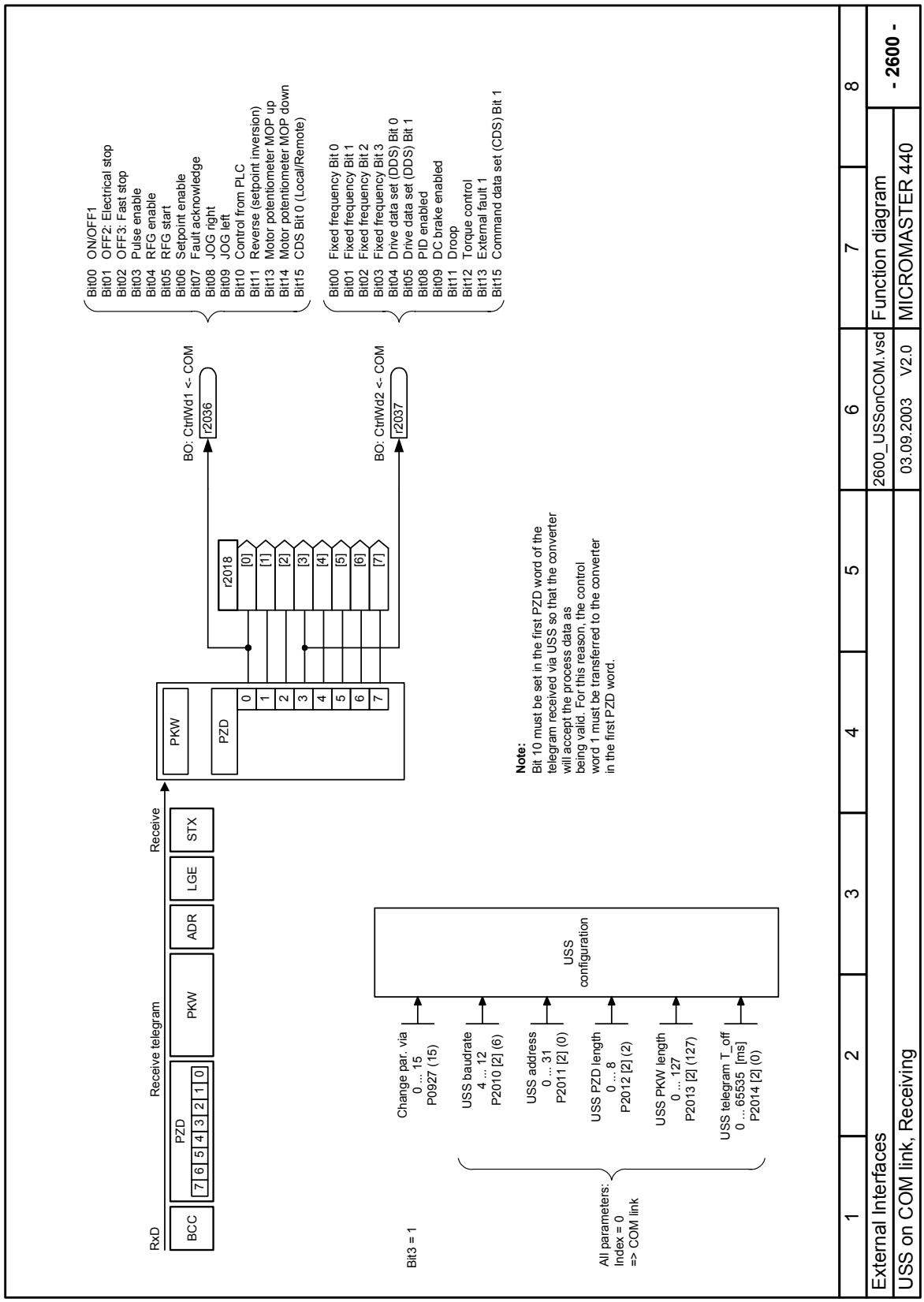

ADC after scal.[%] r0754 [2]
CO:ADC scal[4000h] r0755 [2]
CO/BO: Bin.inp.val r0722 r0722 .6 r0722 .7
ADC deadband width 0 ... 20 P0761 [2] (0)
Value x2:ADC scal. -20 ... 20 P0759 [2] (10)
Value x1:ADC scal. -20 ... 20 P0757 [2] (0)
Type of ADC 0 ... 4 P0756 [2] (0)
10 V or 20 mA
10 V 20 mA
4000 h
100 %
Value y2:ADC scal. -99999.9 ... 99999.9 [%] P0760 [2] (100.0)
Value y1:ADC scal. -99999.9 ... 99999.9 [%] P0758 [2] (0.0)
Act.ADC inp.[V/mA] r0752 [2]
Digit
Volts or mA
Type of ADC 0 ... 4 P0756 [2] (0)
50 % of P0761
Delay on sig. loss 0 ... 10000 [ms] P0762 [2] (10)
Warning, signal lost (F0080)
Smooth time ADC 0 ... 10000 [ms] P0753 [2] (3)
Type of ADC 0 ... 4 P0756 [2] (0)
Switching bipolar unipolar
Analog input
1 2 3 4 5 6 7 8
External Interfaces
Analog Input (ADC)
2200_ADC.vsd
03.09.2003 V2.0
Function diagram
MICROMASTER 440
- 2200 -

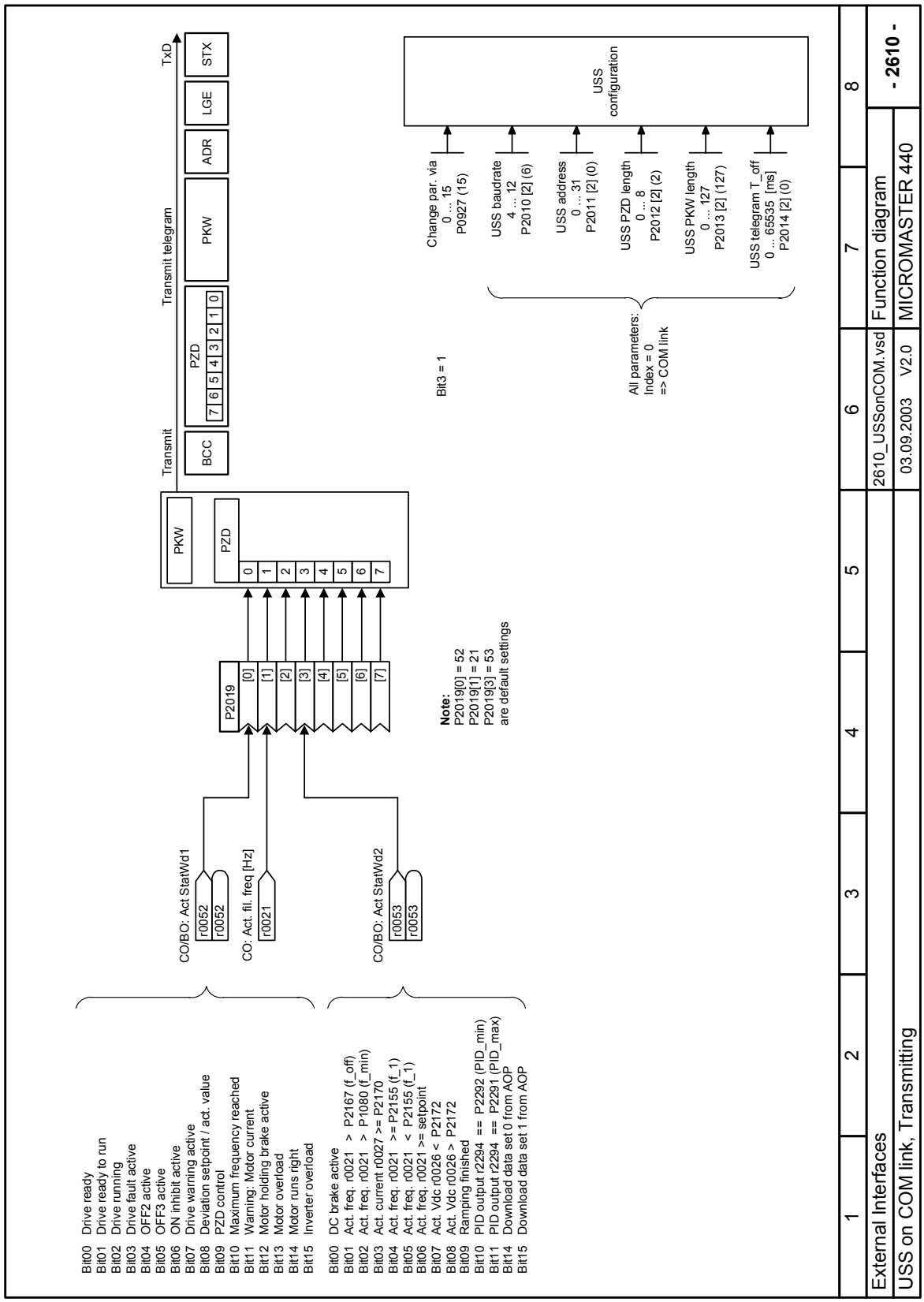

Act. DAC value[mA]
r0774 [2]
Analog output
D
A
DAC deadband width
0 ... 20
P0781 [2] (0)
Value x2:DAC scal.
-99999.0 ... 99999.0 [%]
P0779 [2] (100.0)
Value x1:DAC scal.
-99999.0 ... 99999.0 [%]
P0777 [2] (0.0)
Type of DAC
0 ... 1
P0776 [2] (0)
mA
%
100 %
4000 h ≙ 20 mA
20 mA
P0781
Value y2:DAC scal.
0 ... 20
P0780 [2] (20)
Value y1:DAC scal.
0 ... 20
P0778 [2] (0)
x(t)
Smooth time DAC
0 ... 1000 [ms]
P0773 [2] (2)
CI: DAC
P0771 [2]
(21:0)
1
2
3
4
5
6
7
8
External Interfaces
Analog Output (DAC)
2300_DAC.vsd
03.09.2003 V2.0
Function diagram
MICROMASTER 440
- 2300 -

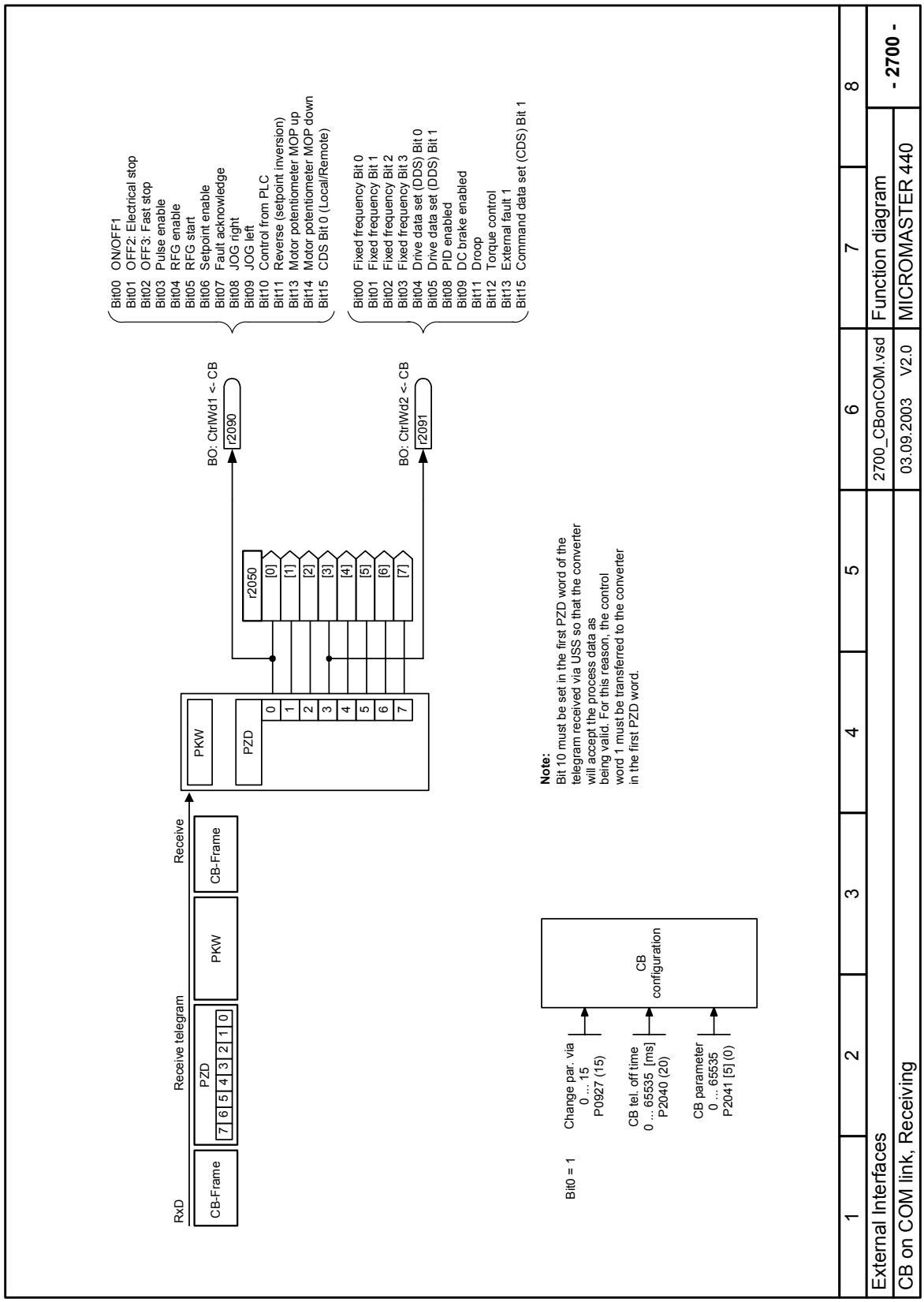

Note:
Activation of the raise and lower keys is only effective if the operating display (r0000) is selected, a changeover to the value display has taken place with the toggle key and the unit is in the "Operation" status.
Operating display (r0000) selected and operation=1 of sequence control
CO/BO: BOP CtrlWd
r0019.D
Raise motor potentio-meter from BOP
CO/BO: BOP CtrlWd
r0019.E
Lower motor poten-tiometer from BOP
Toggle key to operating system, fault acknowl-edgement to control word 1
Toggle key to operating system, fault acknowl-edgement to control word 1
Actuation of seven-segment display
CO/BO: BOP CtrlWd
r0019.B
Positive direction of rotation from BOP
Priority
1 RESET
2 SET
SET (Q=1)
RESET (Q=0)
POWER ON
CO/BO: BOP CtrlWd
r0019.1
ON/OFF1, OFF2, OFF3 from BOP
Set command
Reset command
5 V
Fn
P
jog
Basic Operator Panel BOP
SIEMENS
150.00
Seven-segment display
Raise key
Toggle key
Reversing key
ON key
OFF key
JOG key
Program key
Lower key
1 2 3 4 5 6 7 8
External Interfaces
Basic Operator Panel (BOP)
2400_BOP.vsd
03.09.2003 V2.0
Function diagram
MICROMASTER 440
- 2400 -

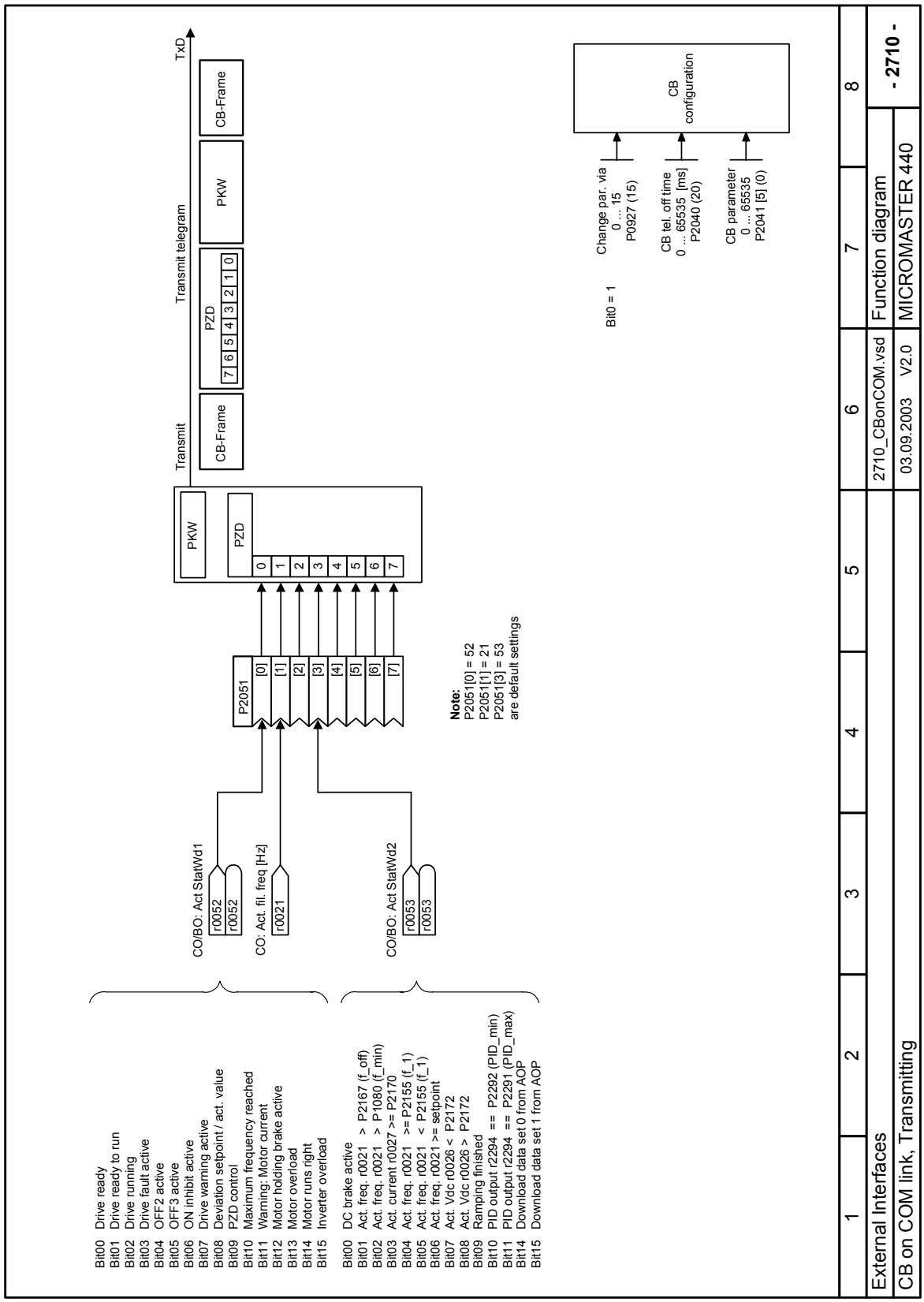

RxD
BCC
PZD
7 6 5 4 3 2 1 0
PKW
ADR
LGE
STX
Receive telegram
Receive
PKW
PZD
0 1 2 3 4 5 6 7
r2015 [0] [1] [2] [3] [4] [5] [6] [7]
BO: CtrlWd1 <- BOP
r2032
BO: CtrlWd2 <- BOP
r2033
Bit00 ON/OFF1
Bit01 OFF2: Electrical stop
Bit02 OFF3: Fast stop
Bit03 Pulse enable
Bit04 RFG enable
Bit05 RFG start
Bit06 Setpoint enable
Bit07 Fault acknowledge
Bit08 JOG right
Bit09 JOG left
Bit10 Control from PLC
Bit11 Reverse (setpoint inversion)
Bit13 Motor potentiometer MOP up
Bit14 Motor potentiometer MOP down
Bit15 CDS Bit 0 (Local/Remote)
Bit00 Fixed frequency Bit 0
Bit01 Fixed frequency Bit 1
Bit02 Fixed frequency Bit 2
Bit03 Fixed frequency Bit 3
Bit04 Drive data set (DDS) Bit 0
Bit05 Drive data set (DDS) Bit 1
Bit08 PID enabled
Bit09 DC brake enabled
Bit11 Droop
Bit12 Torque control
Bit13 External fault 1
Bit15 Command data set (CDS) Bit 1
Note:
Bit 10 must be set in the first PZD word of the telegram received via USS so that the converter will accept the process data as being valid. For this reason, the control word 1 must be transferred to the converter in the first PZD word.
Bit2 = 1
All parameters:
Index = 1
=> BOP link
Change par. via
0 ... 15
P0927 (15)
USS baudrate
4 ... 12
P2010 [2] (6)
USS address
0 ... 31
P2011 [2] (0)
USS PZD length
0 ... 8
P2012 [2] (2)
USS PKW length
0 ... 127
P2013 [2] (127)
USS telegram T_off
0 ... 65535 [ms]
P2014 [2] (0)
USS configuration
1 2 3 4 5 6 7 8
External Interfaces
2500_USSonBOP.vsd
Function diagram
- 2500 -
USS on BOP link, Receiving
03.09.2003 V2.0
MICROMASTER 440

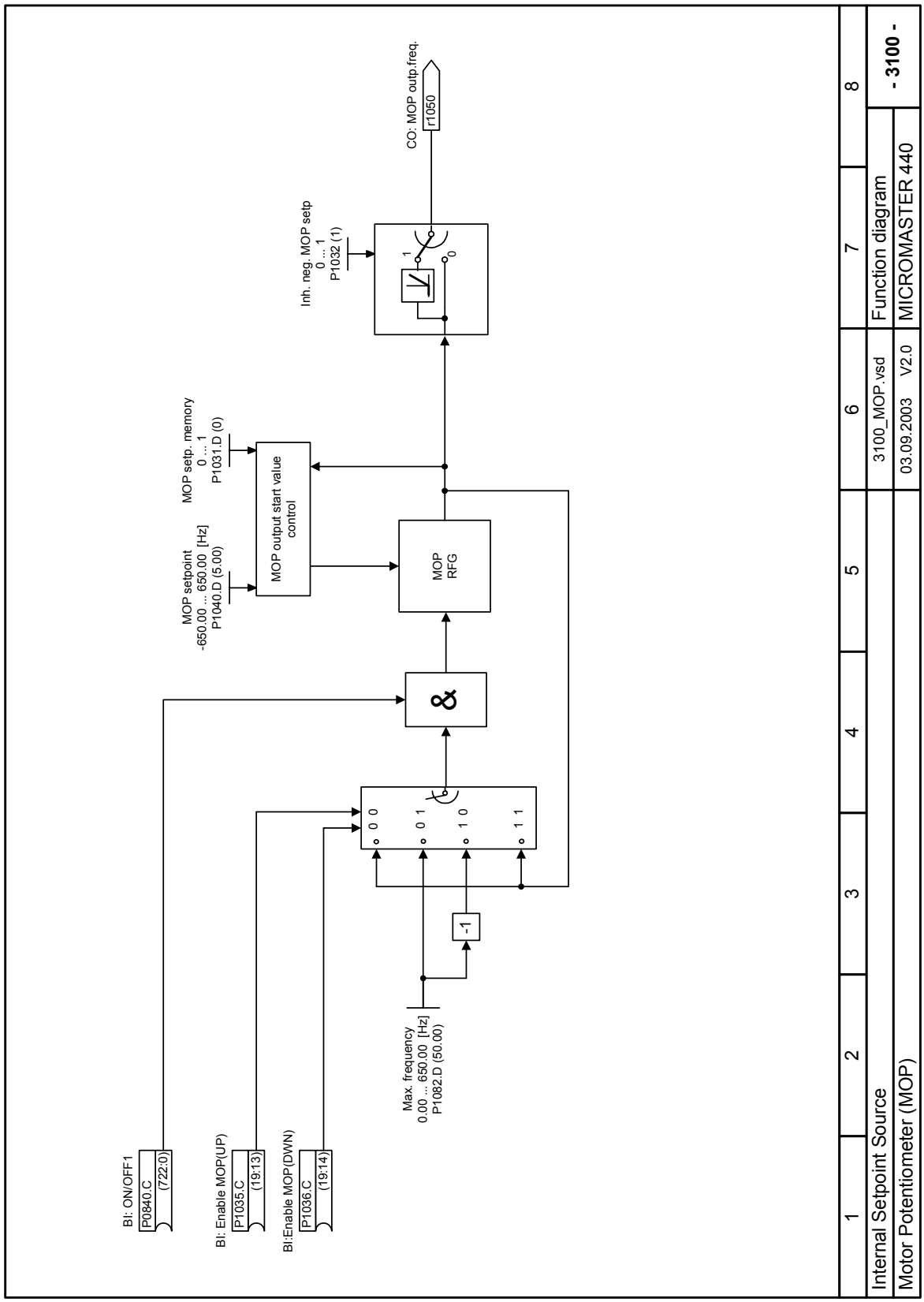

Bit00 Drive ready
Bit01 Drive ready to run
Bit02 Drive running
Bit03 Drive fault active
Bit04 OFF2 active
Bit05 OFF3 active
Bit06 ON inhibit active
Bit07 Drive warning active
Bit08 Deviation setpoint / act. value
Bit09 PZD control
Bit10 Maximum frequency reached
Bit11 Warning: Motor current
Bit12 Motor holding brake active
Bit13 Motor overload
Bit14 Motor runs right
Bit15 Inverter overload
Bit00 DC brake active
Bit01 Act. freq. r0021 > P2167 (f_off)
Bit02 Act. freq. r0021 > P1080 (f_min)
Bit03 Act. current r0027 >= P2170
Bit04 Act. freq. r0021 >= P2155 (f_1)
Bit05 Act. freq. r0021 < P2155 (f_1)
Bit06 Act. freq. r0021 >= setpoint
Bit07 Act. Vdc r0026 < P2172
Bit08 Act. Vdc r0026 > P2172
Bit09 Ramping finished
Bit10 PID output r2294 == P2292 (PID_min)
Bit11 PID output r2294 == P2291 (PID_max)
Bit14 Download data set 0 from AOP
Bit15 Download data set 1 from AOP
CO/BO: Act StatWd1
r0052
r0052
CO: Act. fil. freq [Hz]
r0021
CO/BO: Act StatWd2
r0053
r0053
P2016
[0]
[1]
[2]
[3]
[4]
[5]
[6]
[7]
PKW
PZD
0
1
2
3
4
5
6
7
Transmit
Transmit telegram
TxD
BCC
PZD
7 6 5 4 3 2 1 0
PKW
ADR
LGE
STX
Note:
P2016[0] = 52
P2016[1] = 21
P2016[3] = 53
are default settings
Bit2 = 1
Change par. via
0 ... 15
P0927 (15)
USS baudrate
4 ... 12
P2010 [2] (6)
USS address
0 ... 31
P2011 [2] (0)
USS PZD length
0 ... 8
P2012 [2] (2)
USS PKW length
0 ... 127
P2013 [2] (127)
USS telegram T_off
0 ... 65535 [ms]
P2014 [2] (0)
USS configuration
All parameters:
Index = 1
=> BOP link
1
2
3
4
5
6
7
8
External Interfaces
2510_USSonBOP.vsd
Function diagram
- 2510 -
USS on BOP link, Transmitting
03.09.2003 V2.0
MICROMASTER 440

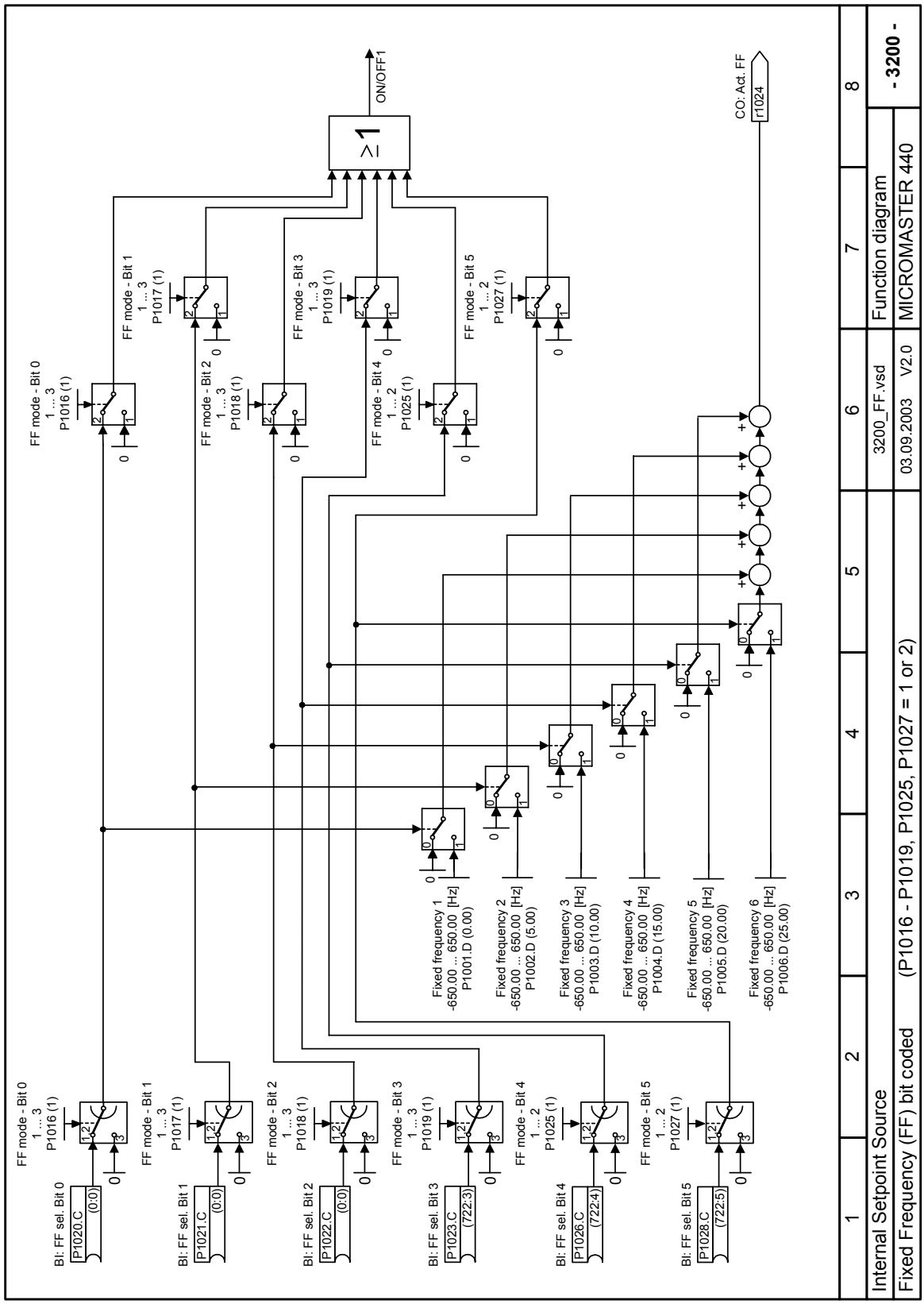

RxD
BCC
PZD
7 6 5 4 3 2 1 0
PKW
ADR
LGE
STX
Receive telegram
Receive
PKW
PZD
0 1 2 3 4 5 6 7
r2018
[0] [1] [2] [3] [4] [5] [6] [7]
BO: CtrlWd1 <- COM
r2036
BO: CtrlWd2 <- COM
r2037
Bit00 ON/OFF1
Bit01 OFF2: Electrical stop
Bit02 OFF3: Fast stop
Bit03 Pulse enable
Bit04 RFG enable
Bit05 RFG start
Bit06 Setpoint enable
Bit07 Fault acknowledge
Bit08 JOG right
Bit09 JOG left
Bit10 Control from PLC
Bit11 Reverse (setpoint inversion)
Bit13 Motor potentiometer MOP up
Bit14 Motor potentiometer MOP down
Bit15 CDS Bit 0 (Local/Remote)
Bit00 Fixed frequency Bit 0
Bit01 Fixed frequency Bit 1
Bit02 Fixed frequency Bit 2
Bit03 Fixed frequency Bit 3
Bit04 Drive data set (DDS) Bit 0
Bit05 Drive data set (DDS) Bit 1
Bit08 PID enabled
Bit09 DC brake enabled
Bit11 Droop
Bit12 Torque control
Bit13 External fault 1
Bit15 Command data set (CDS) Bit 1
Note:
Bit 10 must be set in the first PZD word of the telegram received via USS so that the converter will accept the process data as being valid. For this reason, the control word 1 must be transferred to the converter in the first PZD word.
Bit3 = 1
All parameters:
Index = 0
=> COM link
Change par. via
0 ... 15
P0927 (15)
USS baudrate
4 ... 12
P2010 [2] (6)
USS address
0 ... 31
P2011 [2] (0)
USS PZD length
0 ... 8
P2012 [2] (2)
USS PKW length
0 ... 127
P2013 [2] (127)
USS telegram T_off
0 ... 65535 [ms]
P2014 [2] (0)
USS configuration
1 2 3 4 5 6 7 8
External Interfaces
2600_USSonCOM.vsd
Function diagram
- 2600 -
USS on COM link, Receiving
03.09.2003 V2.0
MICROMASTER 440

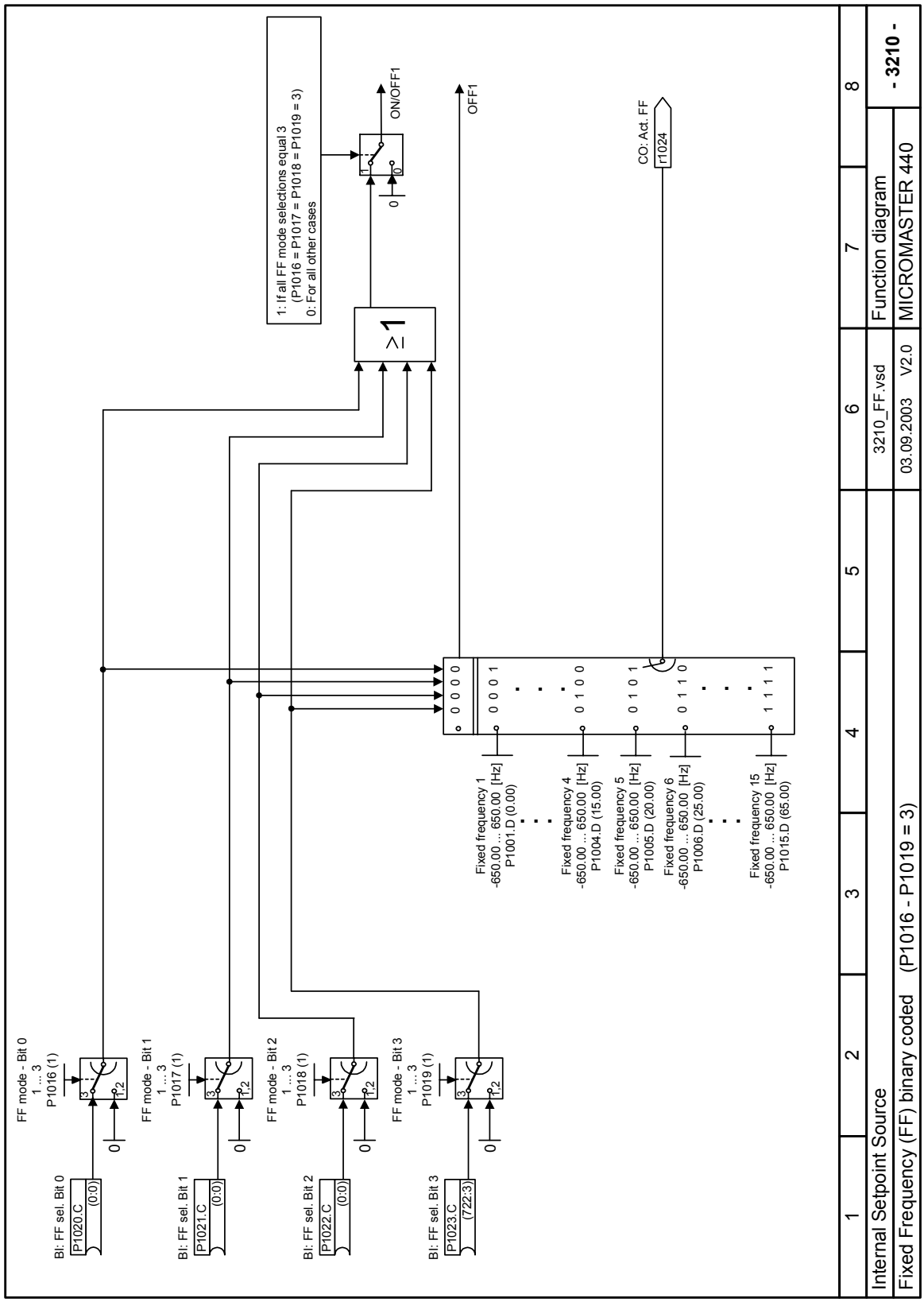

Bit00 Drive ready
Bit01 Drive ready to run
Bit02 Drive running
Bit03 Drive fault active
Bit04 OFF2 active
Bit05 OFF3 active
Bit06 ON inhibit active
Bit07 Drive warning active
Bit08 Deviation setpoint / act. value
Bit09 PZD control
Bit10 Maximum frequency reached
Bit11 Warning: Motor current
Bit12 Motor holding brake active
Bit13 Motor overload
Bit14 Motor runs right
Bit15 Inverter overload
Bit00 DC brake active
Bit01 Act. freq. r0021 > P2167 (f_off)
Bit02 Act. freq. r0021 > P1080 (f_min)
Bit03 Act. current r0027 >= P2170
Bit04 Act. freq. r0021 >= P2155 (f_1)
Bit05 Act. freq. r0021 < P2155 (f_1)
Bit06 Act. freq. r0021 >= setpoint
Bit07 Act. Vdc r0026 < P2172
Bit08 Act. Vdc r0026 > P2172
Bit09 Ramping finished
Bit10 PID output r2294 == P2292 (PID_min)
Bit11 PID output r2294 == P2291 (PID_max)
Bit14 Download data set 0 from AOP
Bit15 Download data set 1 from AOP
CO/BO: Act StatWd1
r0052
r0052
CO: Act. fil. freq [Hz]
r0021
CO/BO: Act StatWd2
r0053
r0053
P2019
[0]
[1]
[2]
[3]
[4]
[5]
[6]
[7]
Note:
P2019[0] = 52
P2019[1] = 21
P2019[3] = 53
are default settings
PKW
PZD
0
1
2
3
4
5
6
7
Transmit
Transmit telegram
TxD
BCC
PZD
7 6 5 4 3 2 1 0
PKW
ADR
LGE
STX
Bit3 = 1
All parameters:
Index = 0
=> COM link
Change par. via
0 ... 15
P0927 (15)
USS baudrate
4 ... 12
P2010 [2] (6)
USS address
0 ... 31
P2011 [2] (0)
USS PZD length
0 ... 8
P2012 [2] (2)
USS PKW length
0 ... 127
P2013 [2] (127)
USS telegram T_off
0 ... 65535 [ms]
P2014 [2] (0)
USS configuration
1
2
3
4
5
6
7
8
External Interfaces
2610_USSonCOM.vsd
Function diagram
- 2610 -
USS on COM link, Transmitting
03.09.2003 V2.0
MICROMASTER 440

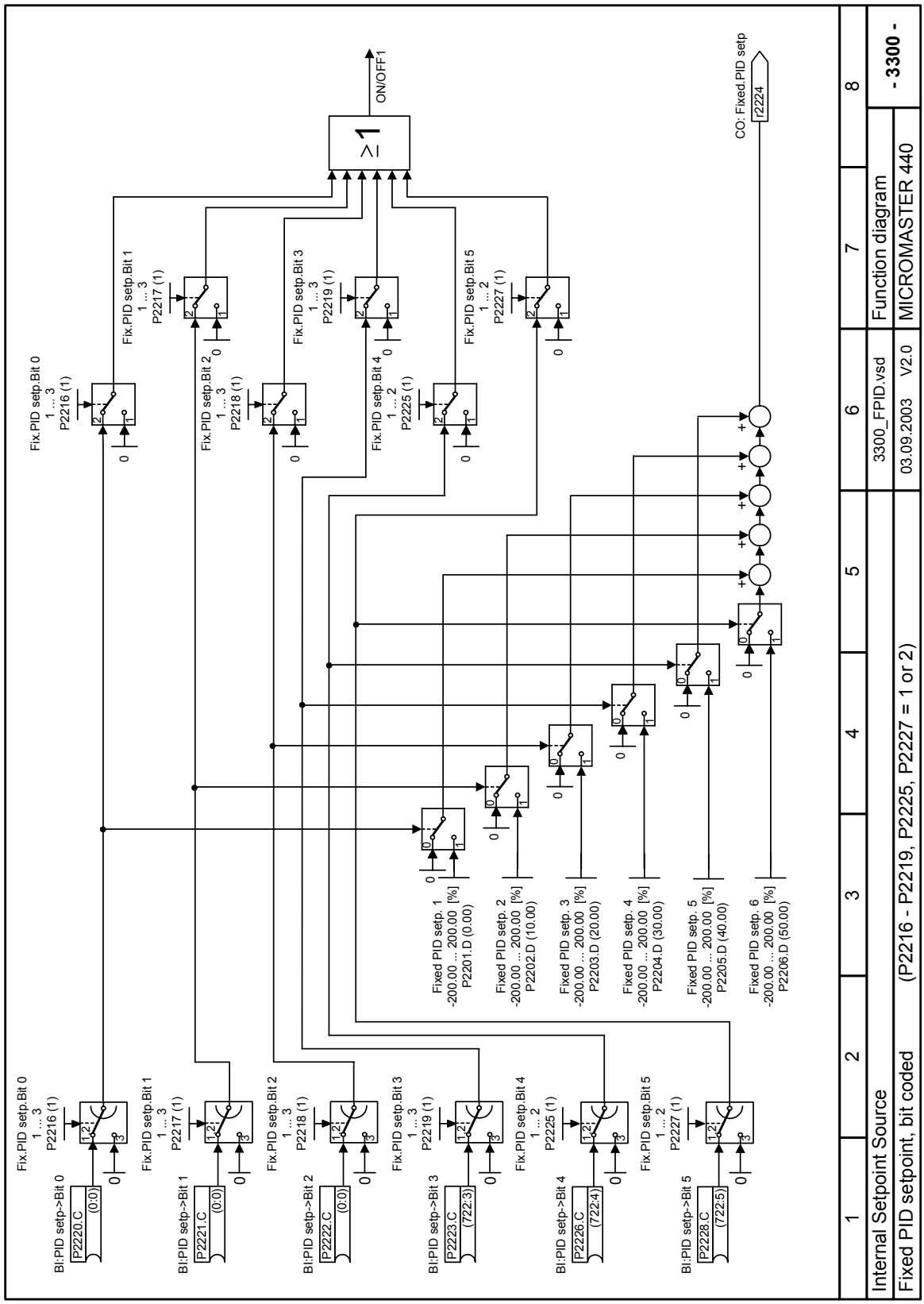

RxD
CB-Frame
Receive telegram
PZD
7 6 5 4 3 2 1 0
PKW
CB-Frame
Receive
PKW
PZD
0 1 2 3 4 5 6 7
r2050
[0] [1] [2] [3] [4] [5] [6] [7]
BO: CtrlWd1 <- CB
r2090
BO: CtrlWd2 <- CB
r2091
Bit00 ON/OFF1
Bit01 OFF2: Electrical stop
Bit02 OFF3: Fast stop
Bit03 Pulse enable
Bit04 RFG enable
Bit05 RFG start
Bit06 Setpoint enable
Bit07 Fault acknowledge
Bit08 JOG right
Bit09 JOG left
Bit10 Control from PLC
Bit11 Reverse (setpoint inversion)
Bit13 Motor potentiometer MOP up
Bit14 Motor potentiometer MOP down
Bit15 CDS Bit 0 (Local/Remote)
Bit00 Fixed frequency Bit 0
Bit01 Fixed frequency Bit 1
Bit02 Fixed frequency Bit 2
Bit03 Fixed frequency Bit 3
Bit04 Drive data set (DDS) Bit 0
Bit05 Drive data set (DDS) Bit 1
Bit08 PID enabled
Bit09 DC brake enabled
Bit11 Droop
Bit12 Torque control
Bit13 External fault 1
Bit15 Command data set (CDS) Bit 1
Note:
Bit 10 must be set in the first PZD word of the telegram received via USS so that the converter will accept the process data as being valid. For this reason, the control word 1 must be transferred to the converter in the first PZD word.
Bit0 = 1
Change par. via 0 ... 15 P0927 (15)
CB tel. off time 0 ... 65535 [ms] P2040 (20)
CB parameter 0 ... 65535 P2041 [5] (0)
CB configuration
1 2 3 4 5 6 7 8
External Interfaces
CB on COM link, Receiving
2700_CBonCOM.vsd
03.09.2003 V2.0
Function diagram
MICROMASTER 440
- 2700 -

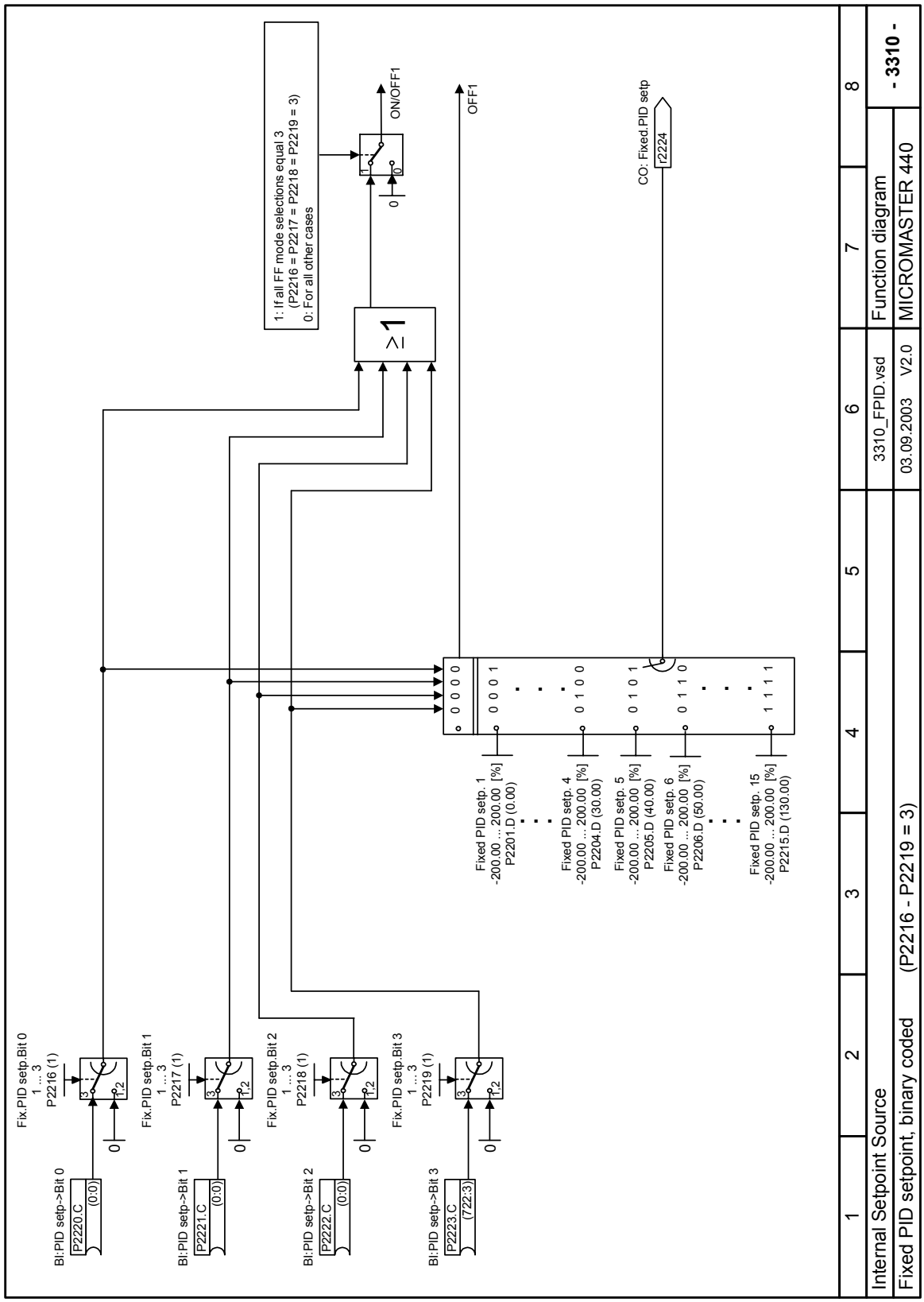

Bit00 Drive ready
Bit01 Drive ready to run
Bit02 Drive running
Bit03 Drive fault active
Bit04 OFF2 active
Bit05 OFF3 active
Bit06 ON inhibit active
Bit07 Drive warning active
Bit08 Deviation setpoint / act. value
Bit09 PZD control
Bit10 Maximum frequency reached
Bit11 Warning: Motor current
Bit12 Motor holding brake active
Bit13 Motor overload
Bit14 Motor runs right
Bit15 Inverter overload
Bit00 DC brake active
Bit01 Act. freq. r0021 > P2167 (f_off)
Bit02 Act. freq. r0021 > P1080 (f_min)
Bit03 Act. current r0027 >= P2170
Bit04 Act. freq. r0021 >= P2155 (f_1)
Bit05 Act. freq. r0021 < P2155 (f_1)
Bit06 Act. freq. r0021 >= setpoint
Bit07 Act. Vdc r0026 < P2172
Bit08 Act. Vdc r0026 > P2172
Bit09 Ramping finished
Bit10 PID output r2294 == P2292 (PID_min)
Bit11 PID output r2294 == P2291 (PID_max)
Bit14 Download data set 0 from AOP
Bit15 Download data set 1 from AOP
CO/BO: Act StatWd1
r0052
r0052
CO: Act. fil. freq [Hz]
r0021
CO/BO: Act StatWd2
r0053
r0053
P2051
[0]
[1]
[2]
[3]
[4]
[5]
[6]
[7]
Note:
P2051[0] = 52
P2051[1] = 21
P2051[3] = 53
are default settings
PKW
PZD
0
1
2
3
4
5
6
7
Transmit
Transmit telegram
TxD
CB-Frame
PZD
7 6 5 4 3 2 1 0
PKW
CB-Frame
Bit0 = 1
Change par. via
0 ... 15
P0927 (15)
CB tel. off time
0 ... 65535 [ms]
P2040 (20)
CB parameter
0 ... 65535
P2041 [5] (0)
CB
configuration
1
2
3
4
5
6
7
8
External Interfaces
2710_CBonCOM.vsd
Function diagram
- 2710 -
CB on COM link, Transmitting
03.09.2003 V2.0
MICROMASTER 440

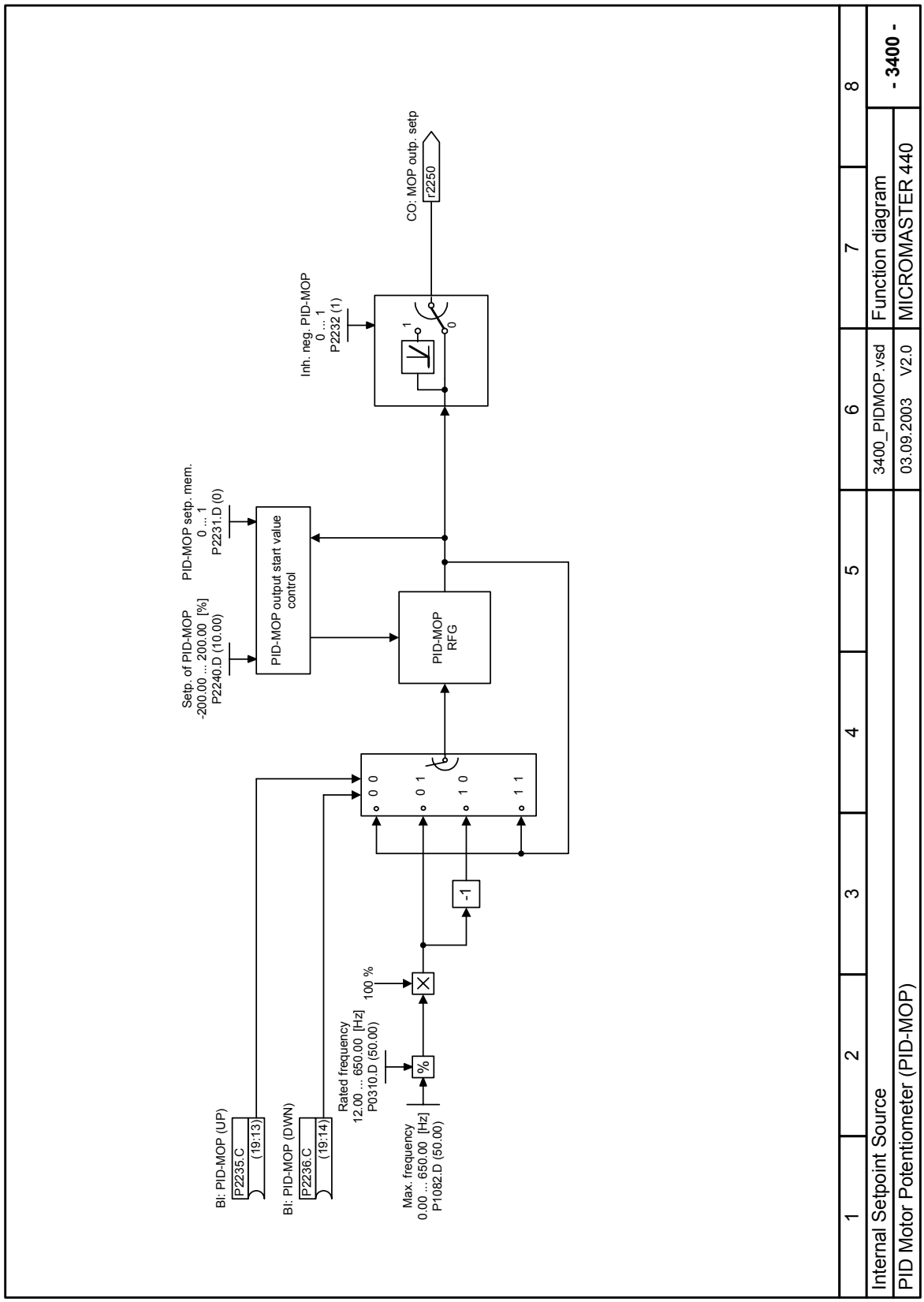

BI: ON/OFF1
P0840.C
(722:0)
BI: Enable MOP(UP)
P1035.C
(19:13)
BI:Enable MOP(DWN)
P1036.C
(19:14)
Max. frequency
0.00 ... 650.00 [Hz]
P1082.D (50.00)
-1
0 0
0 1
1 0
1 1
&
MOP setpoint
-650.00 ... 650.00 [Hz]
P1040.D (5.00)
MOP output start value control
MOP setp. memory
0 ... 1
P1031.D (0)
MOP
RFG
Inh. neg. MOP setp
0 ... 1
P1032 (1)
1
0
CO: MOP outp.freq.
r1050
1
2
3
4
5
6
7
8
Internal Setpoint Source
Motor Potentiometer (MOP)
3100_MOP.vsd
03.09.2003 V2.0
Function diagram
MICROMASTER 440
- 3100 -

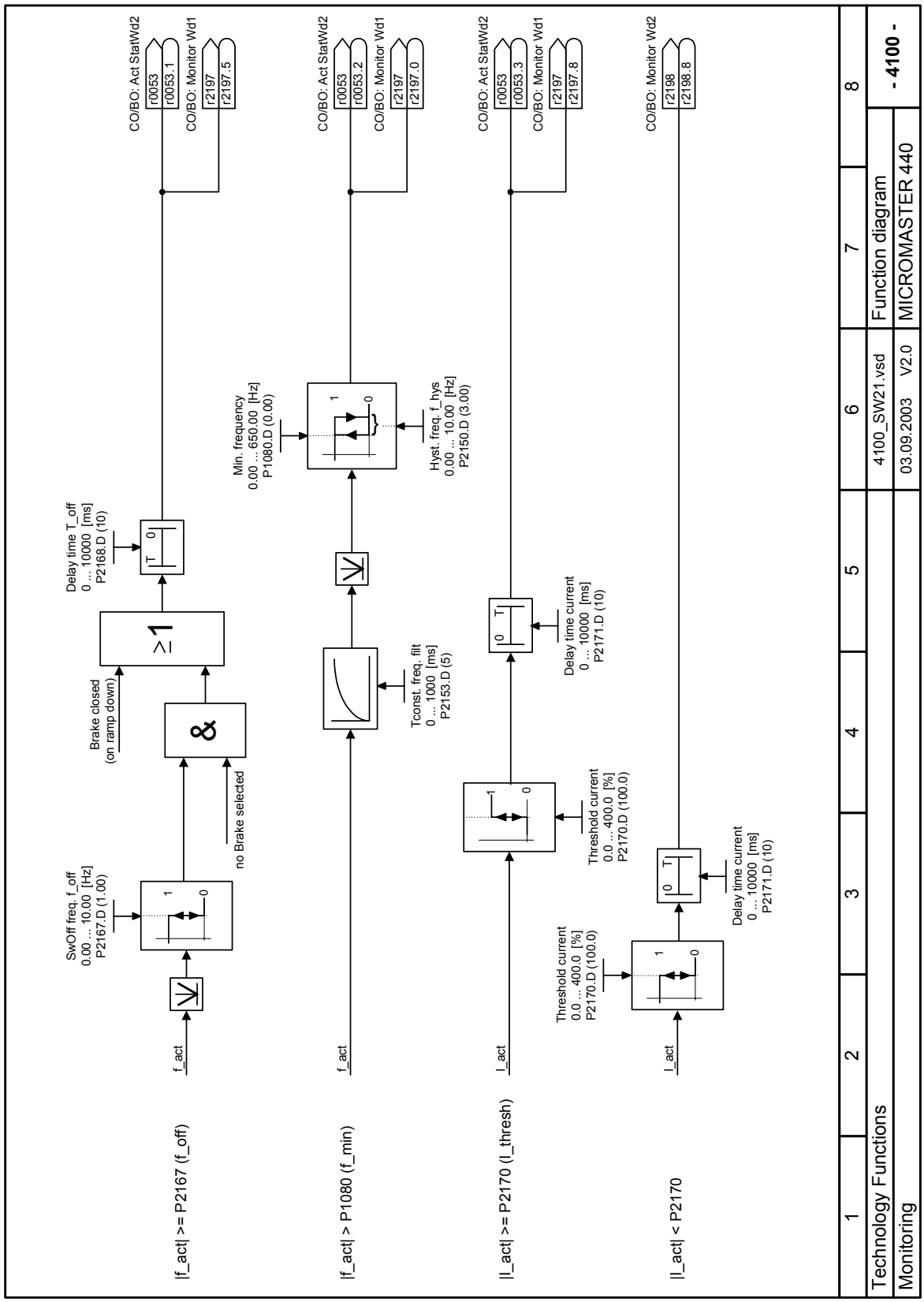

Internal Setpoint Source
Fixed Frequency (FF) bit coded (P1016 - P1019, P1025, P1027 = 1 or 2)
3200_FF.vsd
03.09.2003 V2.0
Function diagram
MICROMASTER 440
- 3200 -
ON/OFF1
CO: Act. FF r1024
FF mode - Bit 0 1 ... 3 P1016 (1)
FF mode - Bit 1 1 ... 3 P1017 (1)
FF mode - Bit 2 1 ... 3 P1018 (1)
FF mode - Bit 3 1 ... 3 P1019 (1)
FF mode - Bit 4 1 ... 2 P1025 (1)
FF mode - Bit 5 1 ... 2 P1027 (1)
BI: FF sel. Bit 0 P1020.C (0:0)
BI: FF sel. Bit 1 P1021.C (0:0)
BI: FF sel. Bit 2 P1022.C (0:0)
BI: FF sel. Bit 3 P1023.C (722:3)
BI: FF sel. Bit 4 P1026.C (722:4)
BI: FF sel. Bit 5 P1028.C (722:5)
Fixed frequency 1 -650.00 ... 650.00 [Hz] P1001.D (0.00)
Fixed frequency 2 -650.00 ... 650.00 [Hz] P1002.D (5.00)
Fixed frequency 3 -650.00 ... 650.00 [Hz] P1003.D (10.00)
Fixed frequency 4 -650.00 ... 650.00 [Hz] P1004.D (15.00)
Fixed frequency 5 -650.00 ... 650.00 [Hz] P1005.D (20.00)
Fixed frequency 6 -650.00 ... 650.00 [Hz] P1006.D (25.00)

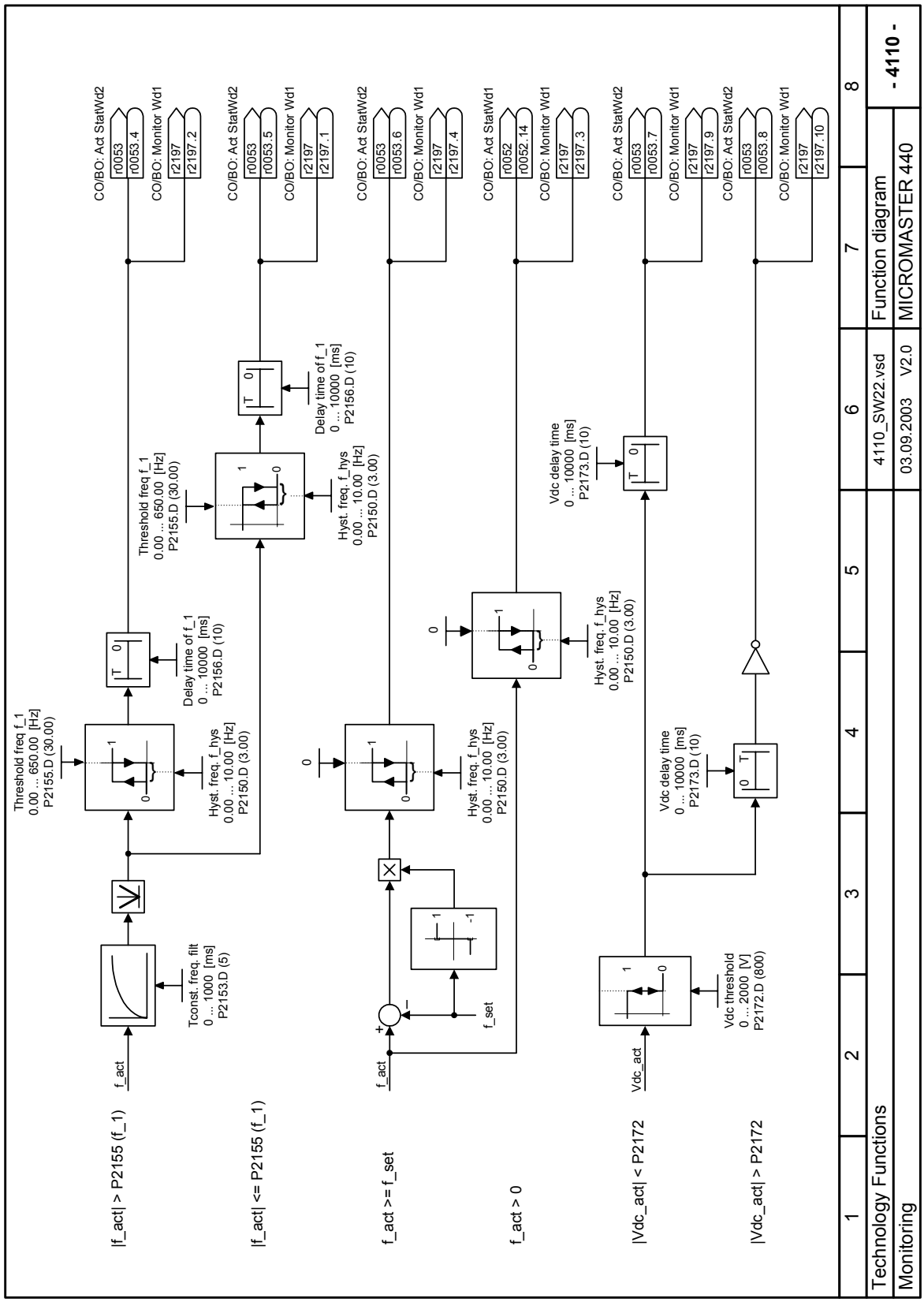

1: If all FF mode selections equal 3
(P1016 = P1017 = P1018 = P1019 = 3)
0: For all other cases
ON/OFF1
OFF1
CO: Act. FF
r1024
FF mode - Bit 0
1 ... 3
P1016 (1)
FF mode - Bit 1
1 ... 3
P1017 (1)
FF mode - Bit 2
1 ... 3
P1018 (1)
FF mode - Bit 3
1 ... 3
P1019 (1)
BI: FF sel. Bit 0
P1020.C
(0:0)
BI: FF sel. Bit 1
P1021.C
(0:0)
BI: FF sel. Bit 2
P1022.C
(0:0)
BI: FF sel. Bit 3
P1023.C
(722:3)
0 0 0 0
0 0 0 1
0 1 0 0
0 1 0 1
0 1 1 0
1 1 1 1
Fixed frequency 1
-650.00 ... 650.00 [Hz]
P1001.D (0.00)
Fixed frequency 4
-650.00 ... 650.00 [Hz]
P1004.D (15.00)
Fixed frequency 5
-650.00 ... 650.00 [Hz]
P1005.D (20.00)
Fixed frequency 6
-650.00 ... 650.00 [Hz]
P1006.D (25.00)
Fixed frequency 15
-650.00 ... 650.00 [Hz]
P1015.D (65.00)
1
2
3
4
5
6
7
8
Internal Setpoint Source
3210_FF.vsd
Function diagram
- 3210 -
Fixed Frequency (FF) binary coded (P1016 - P1019 = 3)
03.09.2003 V2.0
MICROMASTER 440

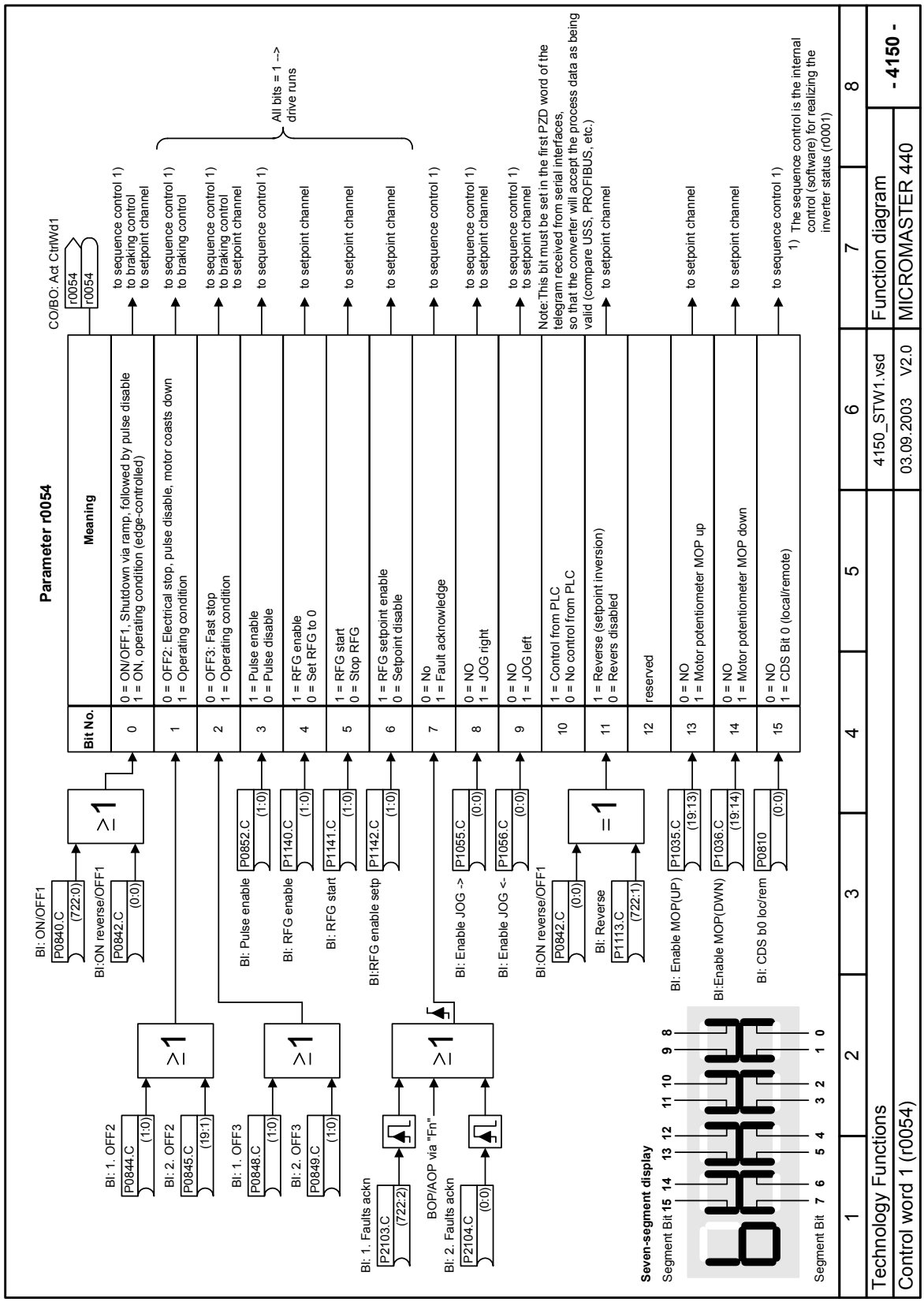

Internal Setpoint Source
Fixed PID setpoint, bit coded (P2216 - P2219, P2225, P2227 = 1 or 2)
3300_FPID.vsd
03.09.2003 V2.0
Function diagram
MICROMASTER 440
- 3300 -
ON/OFF1
CO: Fixed.PID setp
r2224
Fix.PID setp.Bit 0
Fix.PID setp.Bit 1
Fix.PID setp.Bit 2
Fix.PID setp.Bit 3
Fix.PID setp.Bit 4
Fix.PID setp.Bit 5
Bi:PID setp->Bit 0
Bi:PID setp->Bit 1
Bi:PID setp->Bit 2
Bi:PID setp->Bit 3
Bi:PID setp->Bit 4
Bi:PID setp->Bit 5
Fixed PID setp. 1
Fixed PID setp. 2
Fixed PID setp. 3
Fixed PID setp. 4
Fixed PID setp. 5
Fixed PID setp. 6

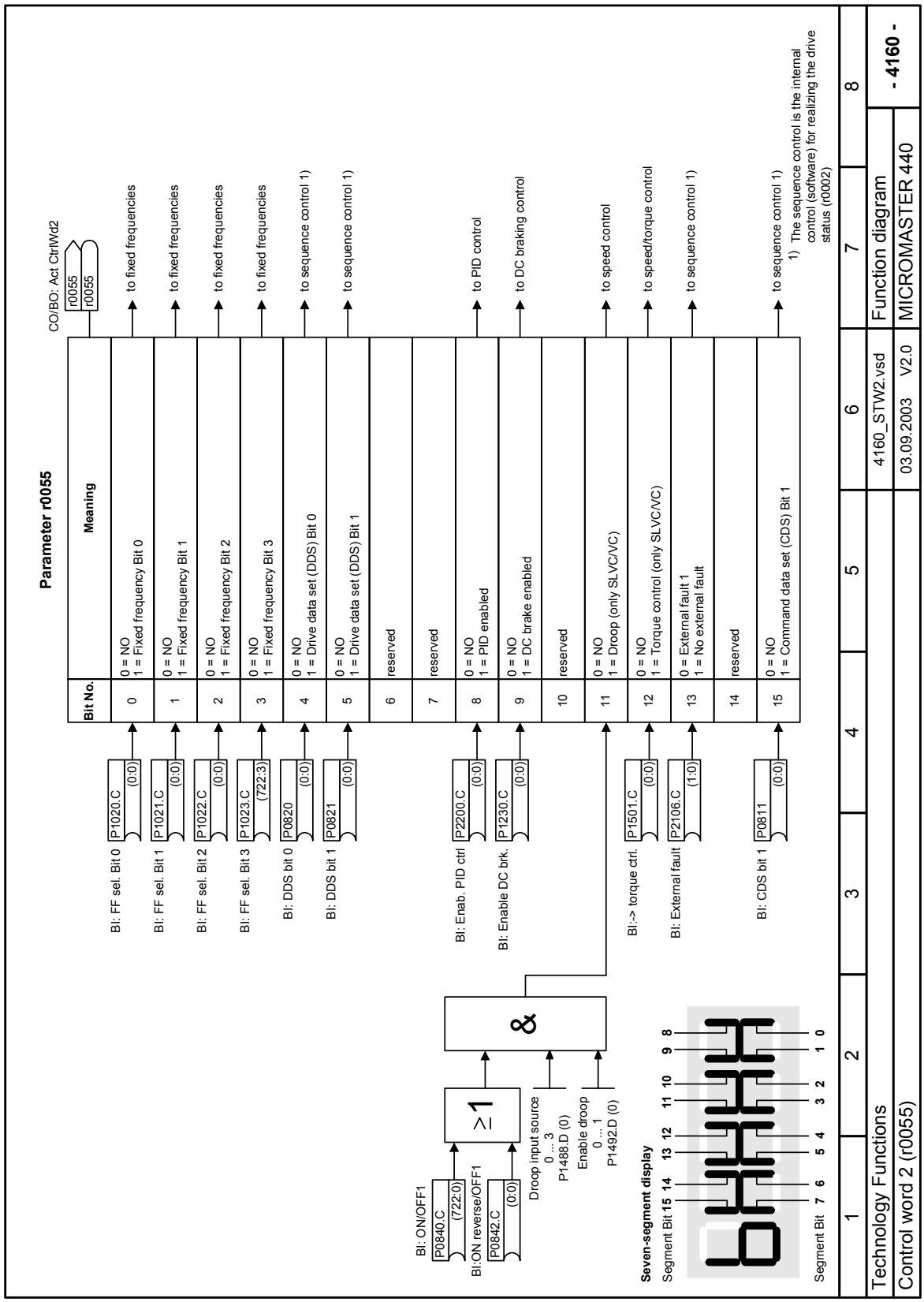

1: If all FF mode selections equal 3
(P2216 = P2217 = P2218 = P2219 = 3)
0: For all other cases
ON/OFF1
OFF1
CO: Fixed.PID setp
r2224
≥1
Fix.PID setp.Bit 0
1 ... 3
P2216 (1)
Fix.PID setp.Bit 1
1 ... 3
P2217 (1)
Fix.PID setp.Bit 2
1 ... 3
P2218 (1)
Fix.PID setp.Bit 3
1 ... 3
P2219 (1)
BI:PID setp->Bit 0
P2220.C
(0:0)
BI:PID setp->Bit 1
P2221.C
(0:0)
BI:PID setp->Bit 2
P2222.C
(0:0)
BI:PID setp->Bit 3
P2223.C
(722:3)
0 0 0 0
0 0 0 1
0 1 0 0
0 1 0 1
0 1 1 0
1 1 1 1
Fixed PID setp. 1
-200.00 ... 200.00 [%]
P2201.D (0.00)
Fixed PID setp. 4
-200.00 ... 200.00 [%]
P2204.D (30.00)
Fixed PID setp. 5
-200.00 ... 200.00 [%]
P2205.D (40.00)
Fixed PID setp. 6
-200.00 ... 200.00 [%]
P2206.D (50.00)
Fixed PID setp. 15
-200.00 ... 200.00 [%]
P2215.D (130.00)
1
2
3
4
5
6
7
8
Internal Setpoint Source
3310_FPID.vsd
Function diagram
- 3310 -
Fixed PID setpoint, binary coded (P2216 - P2219 = 3)
03.09.2003 V2.0
MICROMASTER 440

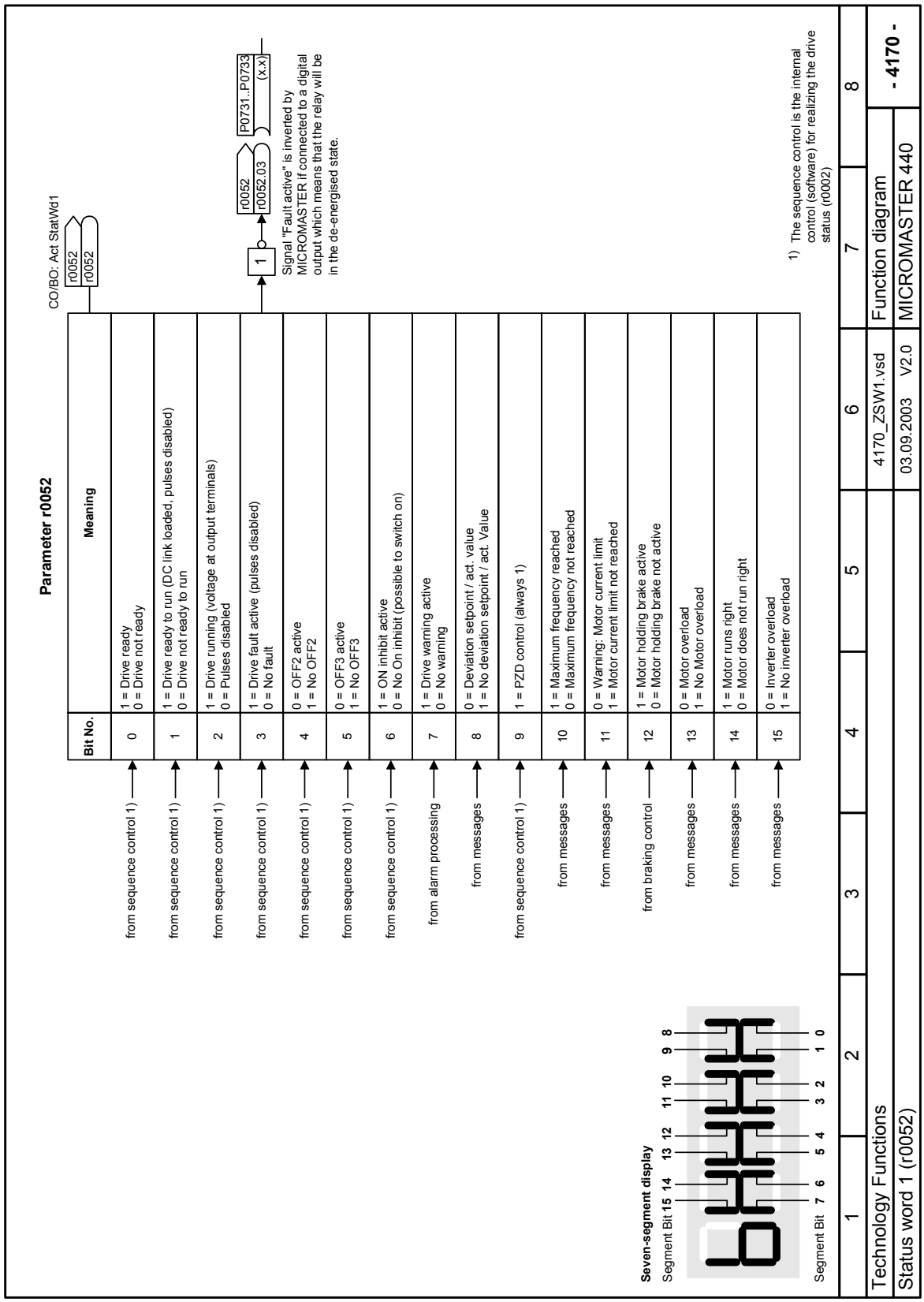

CO: MOP outp. setp
r2250
Inh. neg. PID-MOP
0 ... 1
P2232 (1)
PID-MOP setp. mem.
0 ... 1
P2231.D (0)
Setp. of PID-MOP
-200.00 ... 200.00 [%]
P2240.D (10.00)
PID-MOP output start value control
PID-MOP RFG
0 0
0 1
1 0
1 1
-1
100 %
Rated frequency
12.00 ... 650.00 [Hz]
P0310.D (50.00)
Max. frequency
0.00 ... 650.00 [Hz]
P1082.D (50.00)
BI: PID-MOP (UP)
P2235.C
(19:13)
BI: PID-MOP (DWN)
P2236.C
(19:14)
1
2
3
4
5
6
7
8
Internal Setpoint Source
PID Motor Potentiometer (PID-MOP)
3400_PIDMOP.vsd
03.09.2003 V2.0
Function diagram
MICROMASTER 440
- 3400 -

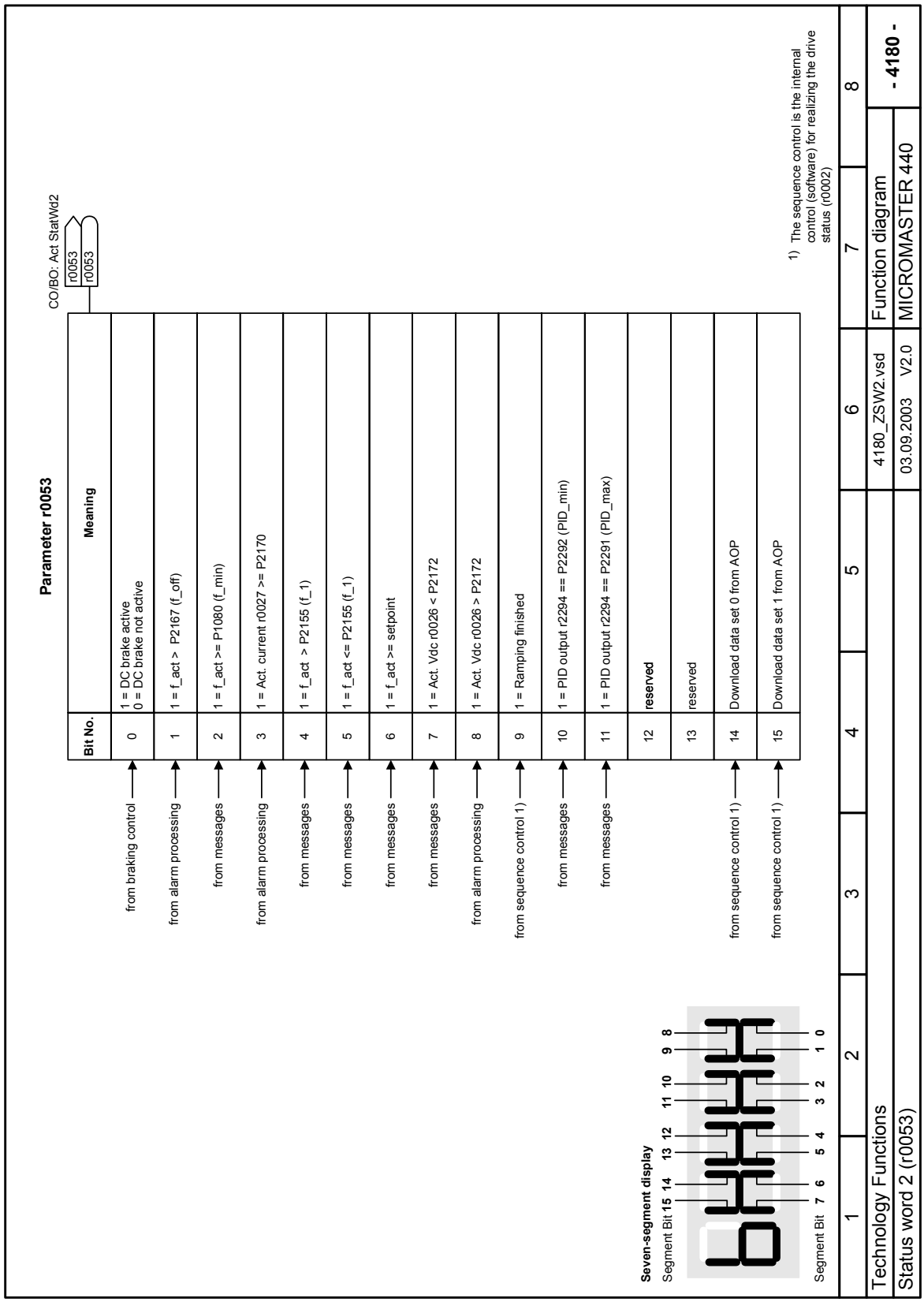

|f_act| >= P2167 (f_off)
f_act
SwOff freq, f_off
0.00 ... 10.00 [Hz]
P2167.D (1.00)
no Brake selected
Brake closed
(on ramp down)
Delay time T_off
0 ... 10000 [ms]
P2168.D (10)
CO/BO: Act StatWd2
r0053
r0053.1
CO/BO: Monitor Wd1
r2197
r2197.5
|f_act| > P1080 (f_min)
f_act
Tconst. freq. filt
0 ... 1000 [ms]
P2153.D (5)
Min. frequency
0.00 ... 650.00 [Hz]
P1080.D (0.00)
Hyst. freq, f_hys
0.00 ... 10.00 [Hz]
P2150.D (3.00)
CO/BO: Act StatWd2
r0053
r0053.2
CO/BO: Monitor Wd1
r2197
r2197.0
|I_act| >= P2170 (I_thresh)
I_act
Threshold current
0.0 ... 400.0 [%]
P2170.D (100.0)
Delay time current
0 ... 10000 [ms]
P2171.D (10)
CO/BO: Act StatWd2
r0053
r0053.3
CO/BO: Monitor Wd1
r2197
r2197.8
|I_act| < P2170
I_act
Threshold current
0.0 ... 400.0 [%]
P2170.D (100.0)
Delay time current
0 ... 10000 [ms]
P2171.D (10)
CO/BO: Monitor Wd2
r2198
r2198.8
1 2 3 4 5 6 7 8
Technology Functions
Monitoring
4100_SW21.vsd
03.09.2003 V2.0
Function diagram
MICROMASTER 440
- 4100 -

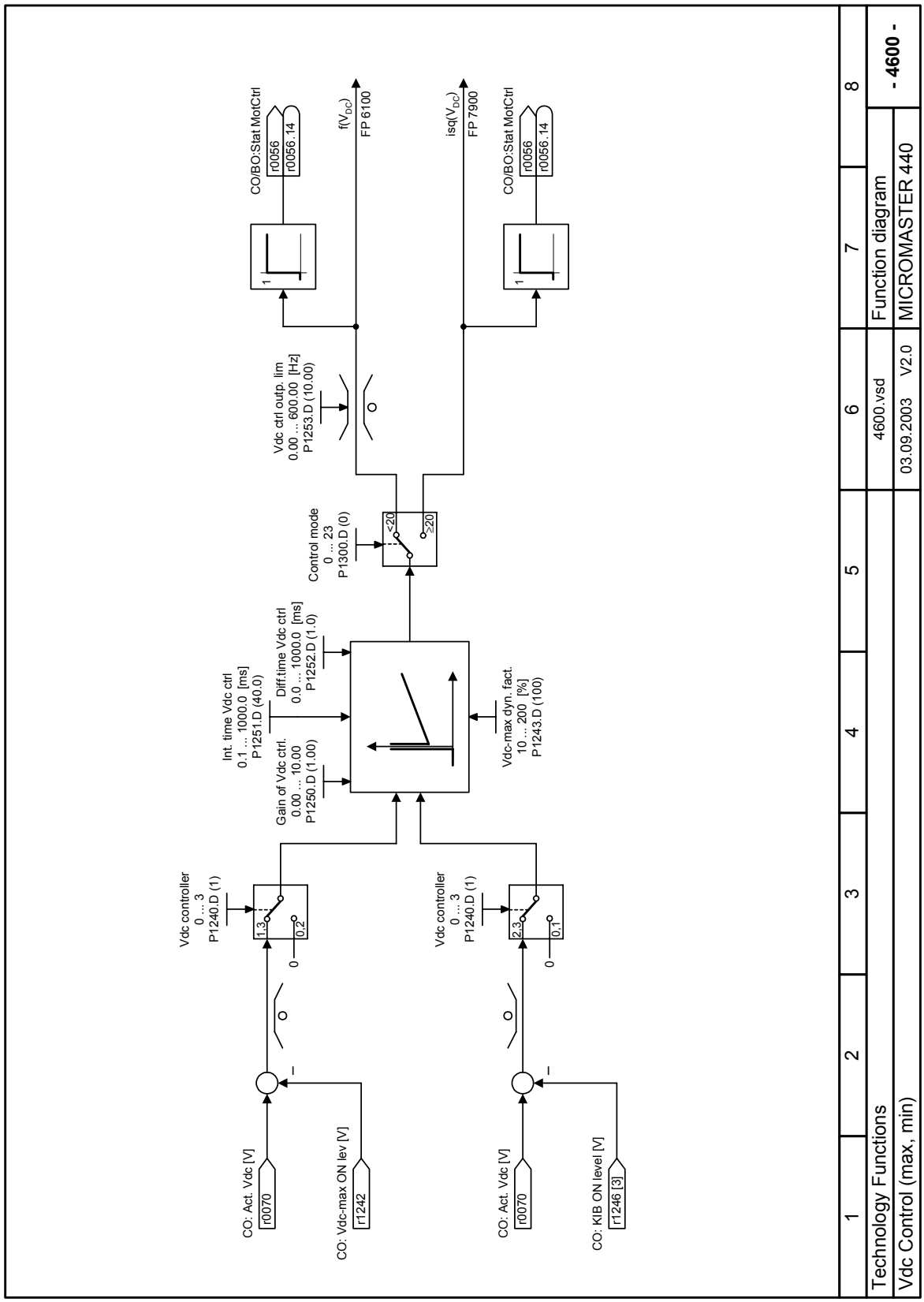

|f_act| > P2155 (f_1)
|f_act| <= P2155 (f_1)
f_act >= f_set
f_act > 0
|Vdc_act| < P2172
|Vdc_act| > P2172
f_act
Vdc_act
f_set
Tconst. freq. filt
0 ... 1000 [ms]
P2153.D (5)
Threshold freq f_1
0.00 ... 650.00 [Hz]
P2155.D (30.00)
Hyst. freq. f_hys
0.00 ... 10.00 [Hz]
P2150.D (3.00)
Delay time of f_1
0 ... 10000 [ms]
P2156.D (10)
Vdc delay time
0 ... 10000 [ms]
P2173.D (10)
Vdc threshold
0 ... 2000 [V]
P2172.D (800)
CO/BO: Act StatWd2
r0053
r0053.4
r0053.5
r0053.6
r0053.7
r0053.8
r0052
r0052.14
CO/BO: Monitor Wd1
r2197
r2197.2
r2197.1
r2197.4
r2197.3
r2197.9
r2197.10
1
2
3
4
5
6
7
8
Technology Functions
Monitoring
4110_SW22.vsd
03.09.2003 V2.0
Function diagram
MICROMASTER 440
- 4110 -

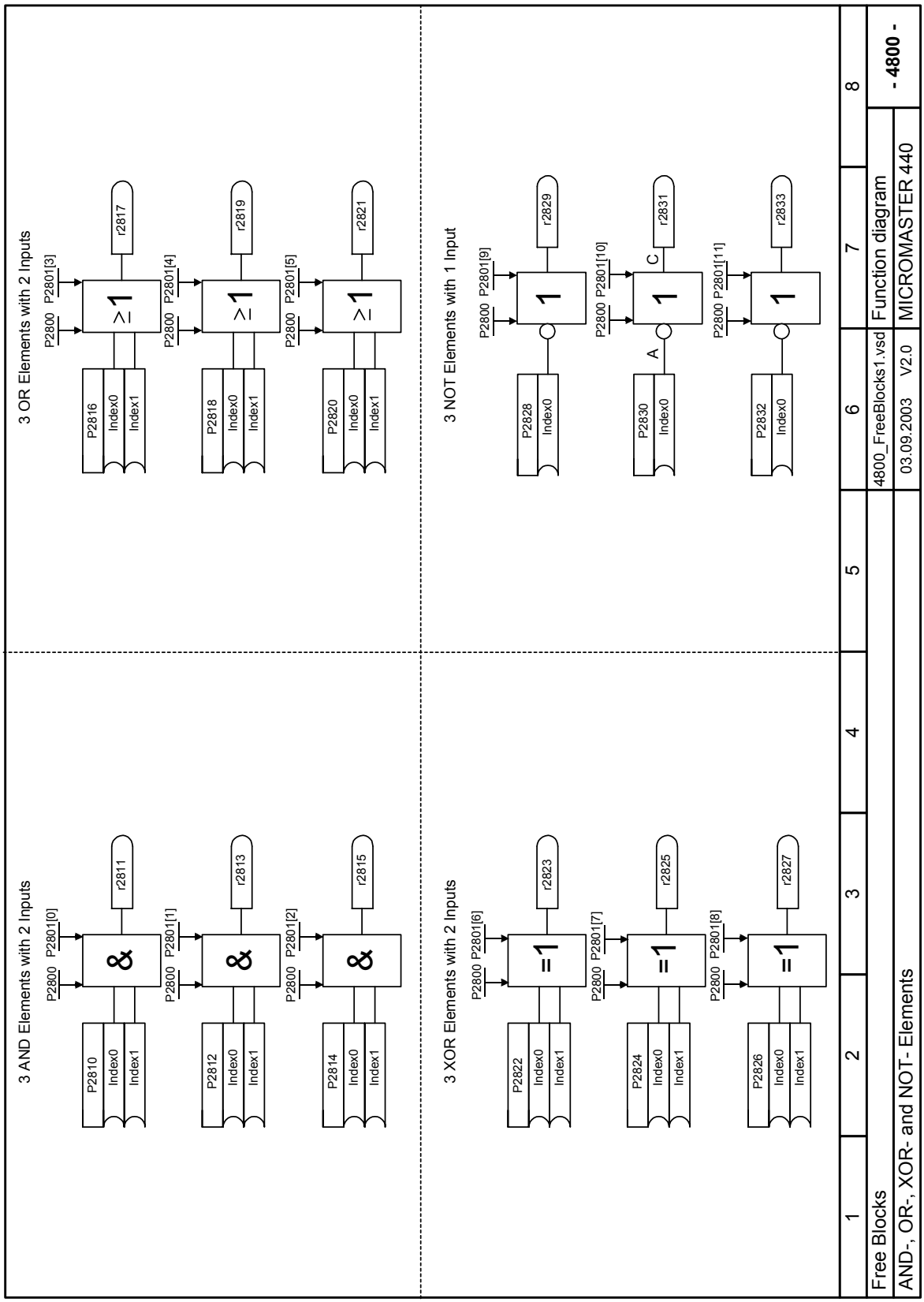

Parameter r0054
Bit No.
Meaning
CO/BO: Act CtrlWd1
r0054
r0054
0 = ON/OFF1, Shutdown via ramp, followed by pulse disable
1 = ON, operating condition (edge-controlled)
0 = OFF2: Electrical stop, pulse disable, motor coasts down
1 = Operating condition
0 = OFF3: Fast stop
1 = Operating condition
1 = Pulse enable
0 = Pulse disable
1 = RFG enable
0 = Set RFG to 0
1 = RFG start
0 = Stop RFG
1 = RFG setpoint enable
0 = Setpoint disable
0 = No
1 = Fault acknowledge
0 = NO
1 = JOG right
0 = NO
1 = JOG left
1 = Control from PLC
0 = No control from PLC
1 = Reverse (setpoint inversion)
0 = Revers disabled
reserved
0 = NO
1 = Motor potentiometer MOP up
0 = NO
1 = Motor potentiometer MOP down
0 = NO
1 = CDS Bit 0 (local/remote)
to sequence control 1)
to braking control
to setpoint channel
All bits = 1 --> drive runs
to setpoint channel
Note:This bit must be set in the first PZD word of the telegram received from serial interfaces, so that the converter will accept the process data as being valid (compare USS, PROFIBUS, etc.)
1) The sequence control is the internal control (software) for realizing the inverter status (r0001)
BI: ON/OFF1
P0840.C (722:0)
BI:ON reverse/OFF1
P0842.C (0:0)
BI: 1. OFF2
P0844.C (1:0)
BI: 2. OFF2
P0845.C (19:1)
BI: 1. OFF3
P0848.C (1:0)
BI: 2. OFF3
P0849.C (1:0)
BI: 1. Faults ackn
P2103.C (722:2)
BOP/AOP via "Fn"
BI: 2. Faults ackn
P2104.C (0:0)
BI: Pulse enable
P0852.C (1:0)
BI: RFG enable
P1140.C (1:0)
BI: RFG start
P1141.C (1:0)
BI:RFG enable setp
P1142.C (1:0)
BI: Enable JOG ->
P1055.C (0:0)
BI: Enable JOG <-
P1056.C (0:0)
BI:ON reverse/OFF1
P0842.C (0:0)
BI: Reverse
P1113.C (722:1)
BI: Enable MOP(UP)
P1035.C (19:13)
BI:Enable MOP(DWN)
P1036.C (19:14)
BI: CDS b0 loc/rem
P0810 (0:0)
Seven-segment display
Segment Bit 15 14 13 12 11 10 9 8
Segment Bit 7 6 5 4 3 2 1 0
1 2 3 4 5 6 7 8
Technology Functions
4150_STW1.vsd
Function diagram
- 4150 -
Control word 1 (r0054)
03.09.2003 V2.0
MICROMASTER 440

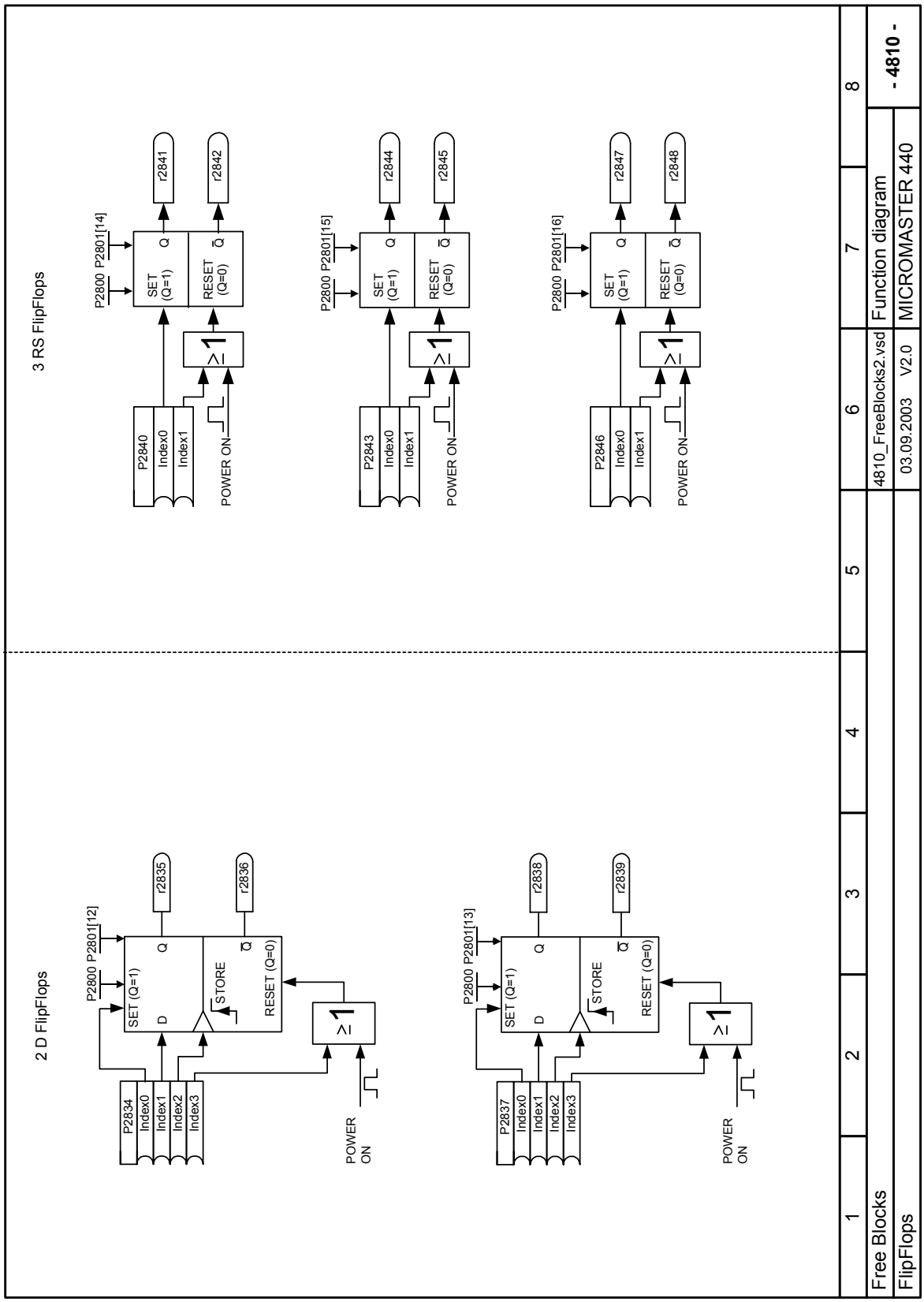

Parameter r0055
Bit No.
Meaning
CO/BO: Act CtrlWd2
r0055
r0055
0 = NO
1 = Fixed frequency Bit 0
to fixed frequencies
0 = NO
1 = Fixed frequency Bit 1
to fixed frequencies
0 = NO
1 = Fixed frequency Bit 2
to fixed frequencies
0 = NO
1 = Fixed frequency Bit 3
to fixed frequencies
0 = NO
1 = Drive data set (DDS) Bit 0
to sequence control 1)
0 = NO
1 = Drive data set (DDS) Bit 1
to sequence control 1)
reserved
reserved
0 = NO
1 = PID enabled
to PID control
0 = NO
1 = DC brake enabled
to DC braking control
reserved
0 = NO
1 = Droop (only SLVC/VC)
to speed control
0 = NO
1 = Torque control (only SLVC/VC)
to speed/torque control
0 = External fault 1
1 = No external fault
to sequence control 1)
reserved
0 = NO
1 = Command data set (CDS) Bit 1
to sequence control 1)
1) The sequence control is the internal control (software) for realizing the drive status (r0002)
BI: FF sel. Bit 0
P1020.C (0:0)
BI: FF sel. Bit 1
P1021.C (0:0)
BI: FF sel. Bit 2
P1022.C (0:0)
BI: FF sel. Bit 3
P1023.C (722:3)
BI: DDS bit 0
P0820 (0:0)
BI: DDS bit 1
P0821 (0:0)
BI: Enab. PID ctrl
P2200.C (0:0)
BI: Enable DC brk.
P1230.C (0:0)
BI:-> torque ctrl.
P1501.C (0:0)
BI: External fault
P2106.C (1:0)
BI: CDS bit 1
P0811 (0:0)
BI: ON/OFF1
P0840.C (722:0)
BI:ON reverse/OFF1
P0842.C (0:0)
≥1
&
Droop input source
0 ... 3
P1488.D (0)
Enable droop
0 ... 1
P1492.D (0)
Seven-segment display
Segment Bit 15 14 13 12 11 10 9 8
Segment Bit 7 6 5 4 3 2 1 0
1 2 3 4 5 6 7 8
Technology Functions
4160_STW2.vsd
Function diagram
- 4160 -
Control word 2 (r0055)
03.09.2003 V2.0
MICROMASTER 440

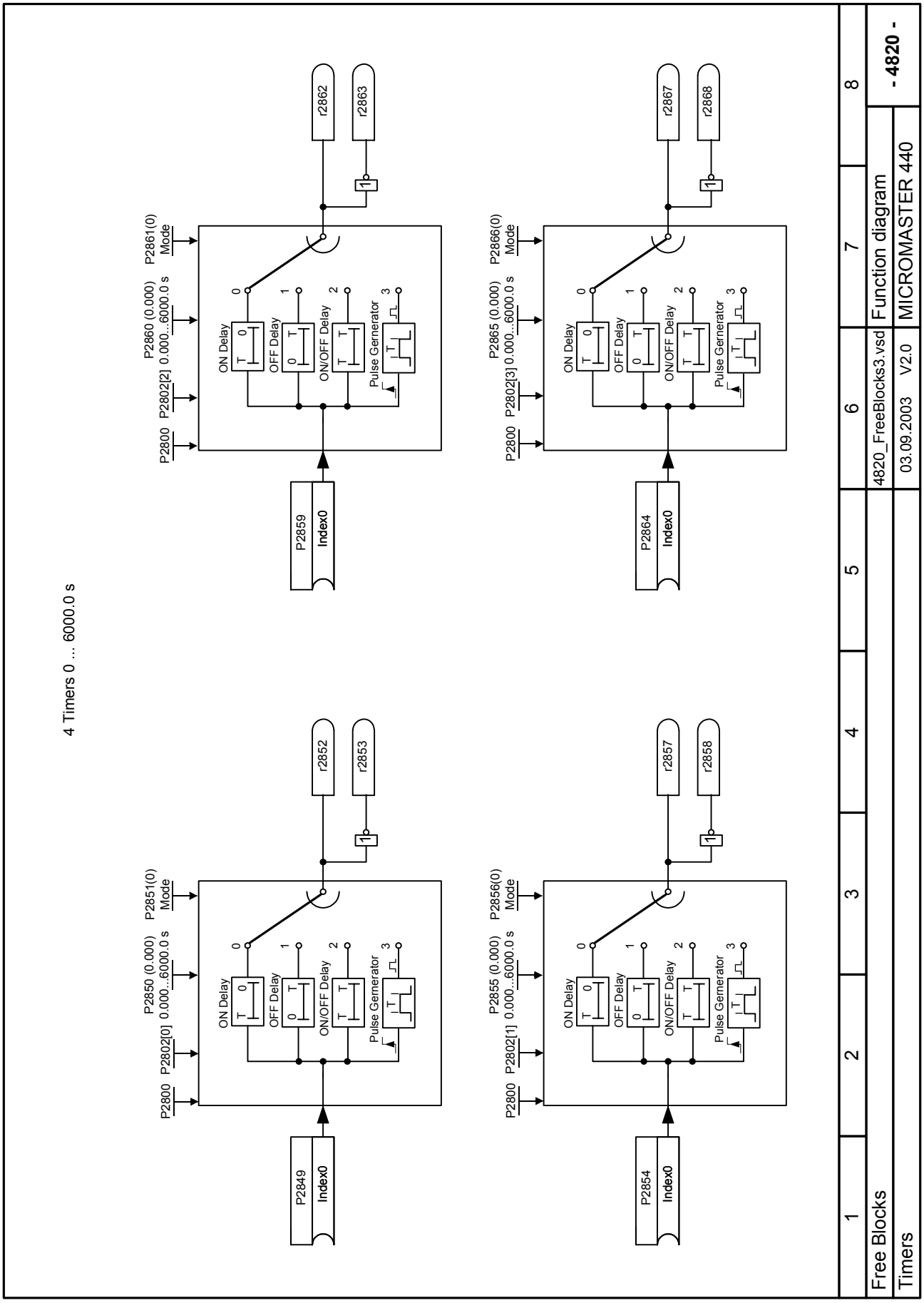

Parameter r0052
CO/BO: Act StatWd1
r0052
r0052
Bit No.
Meaning
from sequence control 1)
0
1 = Drive ready
0 = Drive not ready
from sequence control 1)
1
1 = Drive ready to run (DC link loaded, pulses disabled)
0 = Drive not ready to run
from sequence control 1)
2
1 = Drive running (voltage at output terminals)
0 = Pulses disabled
from sequence control 1)
3
1 = Drive fault active (pulses disabled)
0 = No fault
from sequence control 1)
4
0 = OFF2 active
1 = No OFF2
from sequence control 1)
5
0 = OFF3 active
1 = No OFF3
from sequence control 1)
6
1 = ON inhibit active
0 = No On inhibit (possible to switch on)
from alarm processing
7
1 = Drive warning active
0 = No warning
from messages
8
0 = Deviation setpoint / act. value
1 = No deviation setpoint / act. Value
from sequence control 1)
9
1 = PZD control (always 1)
from messages
10
1 = Maximum frequency reached
0 = Maximum frequency not reached
from messages
11
0 = Warning: Motor current limit
1 = Motor current limit not reached
from braking control
12
1 = Motor holding brake active
0 = Motor holding brake not active
from messages
13
0 = Motor overload
1 = No Motor overload
from messages
14
1 = Motor runs right
0 = Motor does not run right
from messages
15
0 = Inverter overload
1 = No inverter overload
r0052
r0052.03
1
P0731..P0733
(x.x)
Signal "Fault active" is inverted by MICROMASTER if connected to a digital output which means that the relay will be in the de-energised state.
1) The sequence control is the internal control (software) for realizing the drive status (r0002)
Seven-segment display
Segment Bit 15 14 13 12 11 10 9 8
Segment Bit 7 6 5 4 3 2 1 0
1 2 3 4 5 6 7 8
Technology Functions
4170_ZSW1.vsd
Function diagram
- 4170 -
Status word 1 (r0052)
03.09.2003 V2.0
MICROMASTER 440

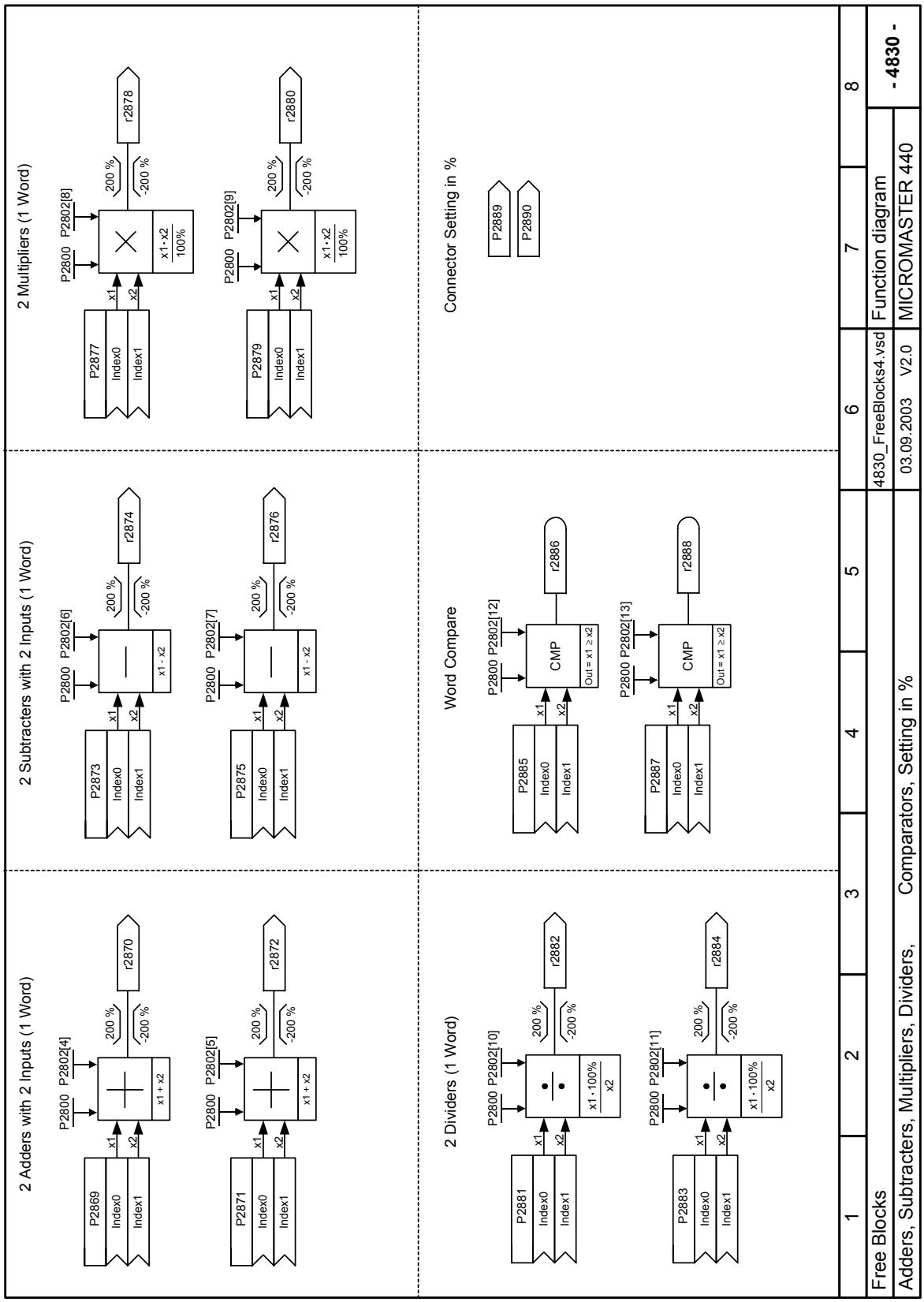

Parameter r0053
CO/BO: Act StatWd2
r0053
r0053
Bit No.
Meaning
0 1 = DC brake active 0 = DC brake not active
1 1 = f_act > P2167 (f_off)
2 1 = f_act >= P1080 (f_min)
3 1 = Act. current r0027 >= P2170
4 1 = f_act > P2155 (f_1)
5 1 = f_act <= P2155 (f_1)
6 1 = f_act >= setpoint
7 1 = Act. Vdc r0026 < P2172
8 1 = Act. Vdc r0026 > P2172
9 1 = Ramping finished
10 1 = PID output r2294 == P2292 (PID_min)
11 1 = PID output r2294 == P2291 (PID_max)
12 reserved
13 reserved
14 Download data set 0 from AOP
15 Download data set 1 from AOP
from braking control
from alarm processing
from messages
from alarm processing
from messages
from messages
from messages
from messages
from alarm processing
from sequence control 1)
from messages
from messages
from sequence control 1)
from sequence control 1)
1) The sequence control is the internal control (software) for realizing the drive status (r0002)
Seven-segment display
Segment Bit 15 14 13 12 11 10 9 8
Segment Bit 7 6 5 4 3 2 1 0
1 2 3 4 5 6 7 8
Technology Functions
4180_ZSW2.vsd
Function diagram
- 4180 -
Status word 2 (r0053)
03.09.2003 V2.0
MICROMASTER 440

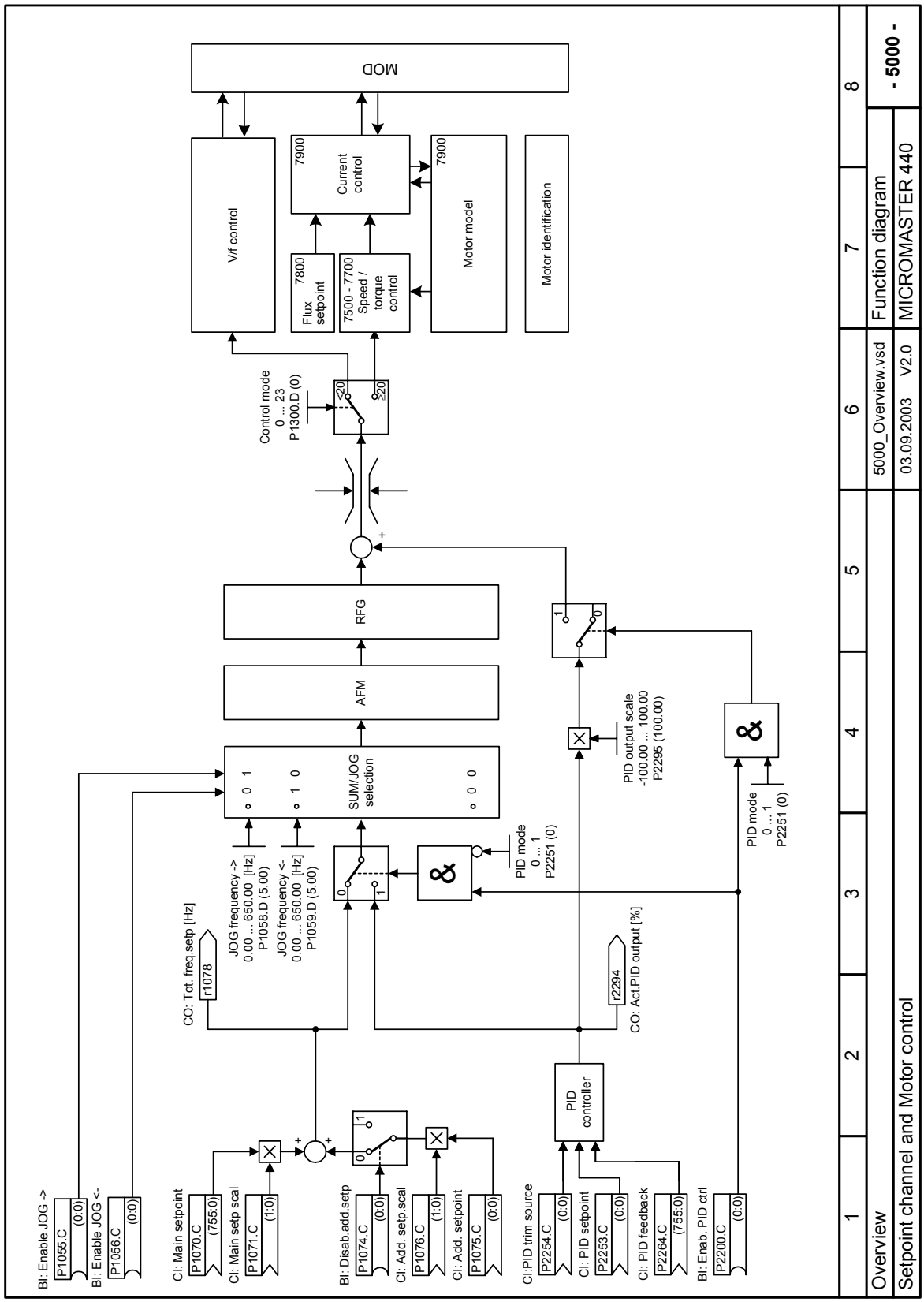

CO: Act. Vdc [V]
r0070
CO: Vdc-max ON lev [V]
r1242
Vdc controller
0 ... 3
P1240.D (1)
1,3
0,2
0
Gain of Vdc ctrl.
0.00 ... 10.00
P1250.D (1.00)
Int. time Vdc ctrl
0.1 ... 1000.0 [ms]
P1251.D (40.0)
Diff.time Vdc ctrl
0.0 ... 1000.0 [ms]
P1252.D (1.0)
Vdc-max dyn. fact.
10 ... 200 [%]
P1243.D (100)
Control mode
0 ... 23
P1300.D (0)
<20
≥20
Vdc ctrl outp. lim
0.00 ... 600.00 [Hz]
P1253.D (10.00)
f(VDC)
FP 6100
isq(VDC)
FP 7900
CO/BO:Stat MotCtrl
r0056
r0056.14
CO: Act. Vdc [V]
r0070
CO: KIB ON level [V]
r1246 [3]
Vdc controller
0 ... 3
P1240.D (1)
2,3
0,1
0
1
2
3
4
5
6
7
8
Technology Functions
Vdc Control (max, min)
4600.vsd
03.09.2003 V2.0
Function diagram
MICROMASTER 440
- 4600 -

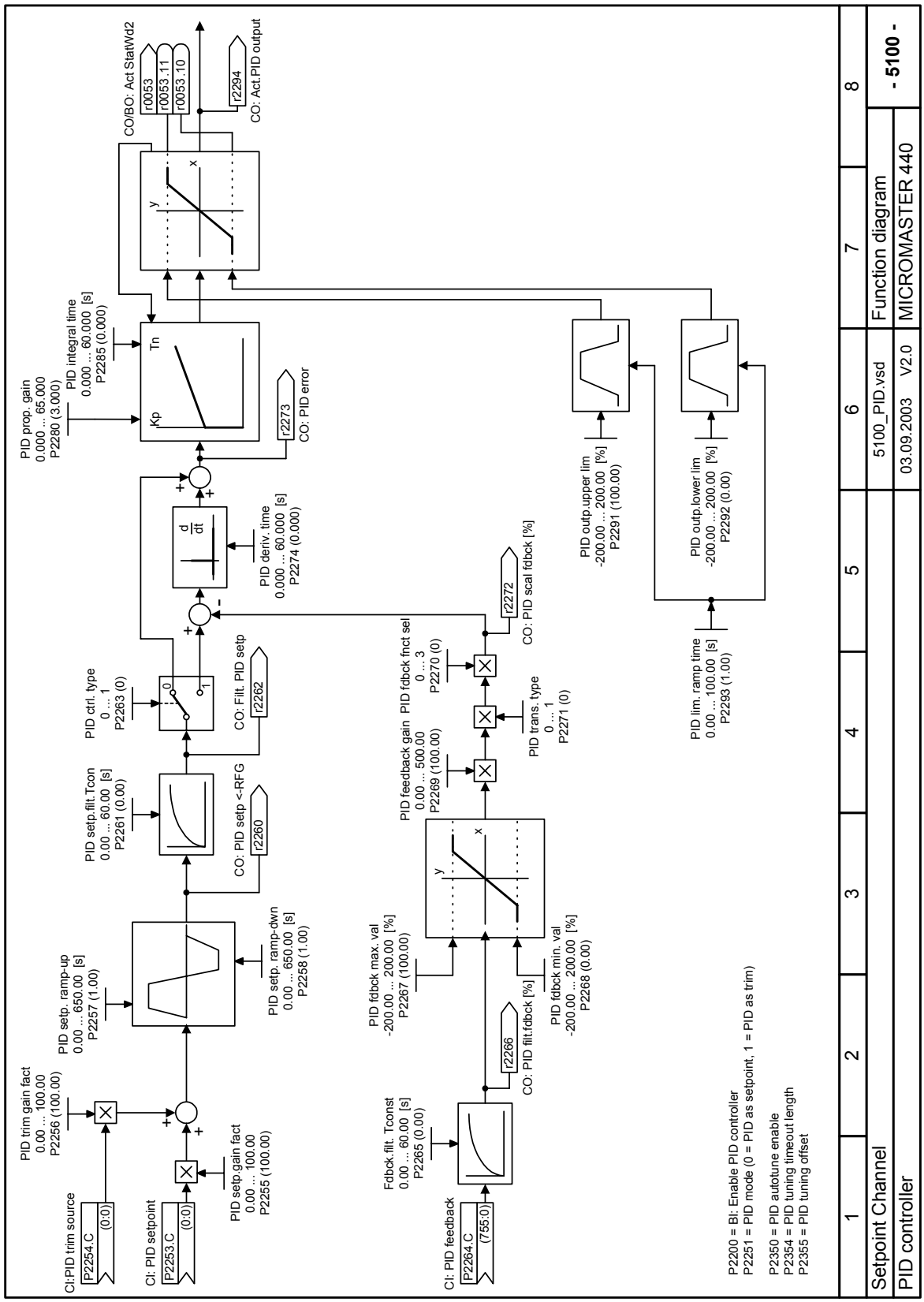

3 OR Elements with 2 Inputs
P2800 P2801[3]
≥1
r2817
P2816 Index0 Index1
P2800 P2801[4]
≥1
r2819
P2818 Index0 Index1
P2800 P2801[5]
≥1
r2821
P2820 Index0 Index1
3 NOT Elements with 1 Input
P2800 P2801[9]
1
r2829
P2828 Index0
P2800 P2801[10]
C
1
A
r2831
P2830 Index0
P2800 P2801[11]
1
r2833
P2832 Index0
3 AND Elements with 2 Inputs
P2800 P2801[0]
&
r2811
P2810 Index0 Index1
P2800 P2801[1]
&
r2813
P2812 Index0 Index1
P2800 P2801[2]
&
r2815
P2814 Index0 Index1
3 XOR Elements with 2 Inputs
P2800 P2801[6]
=1
r2823
P2822 Index0 Index1
P2800 P2801[7]
=1
r2825
P2824 Index0 Index1
P2800 P2801[8]
=1
r2827
P2826 Index0 Index1
1 2 3 4 5 6 7 8
Free Blocks
AND-, OR-, XOR- and NOT- Elements
4800_FreeBlocks1.vsd
03.09.2003 V2.0
Function diagram
MICROMASTER 440
- 4800 -

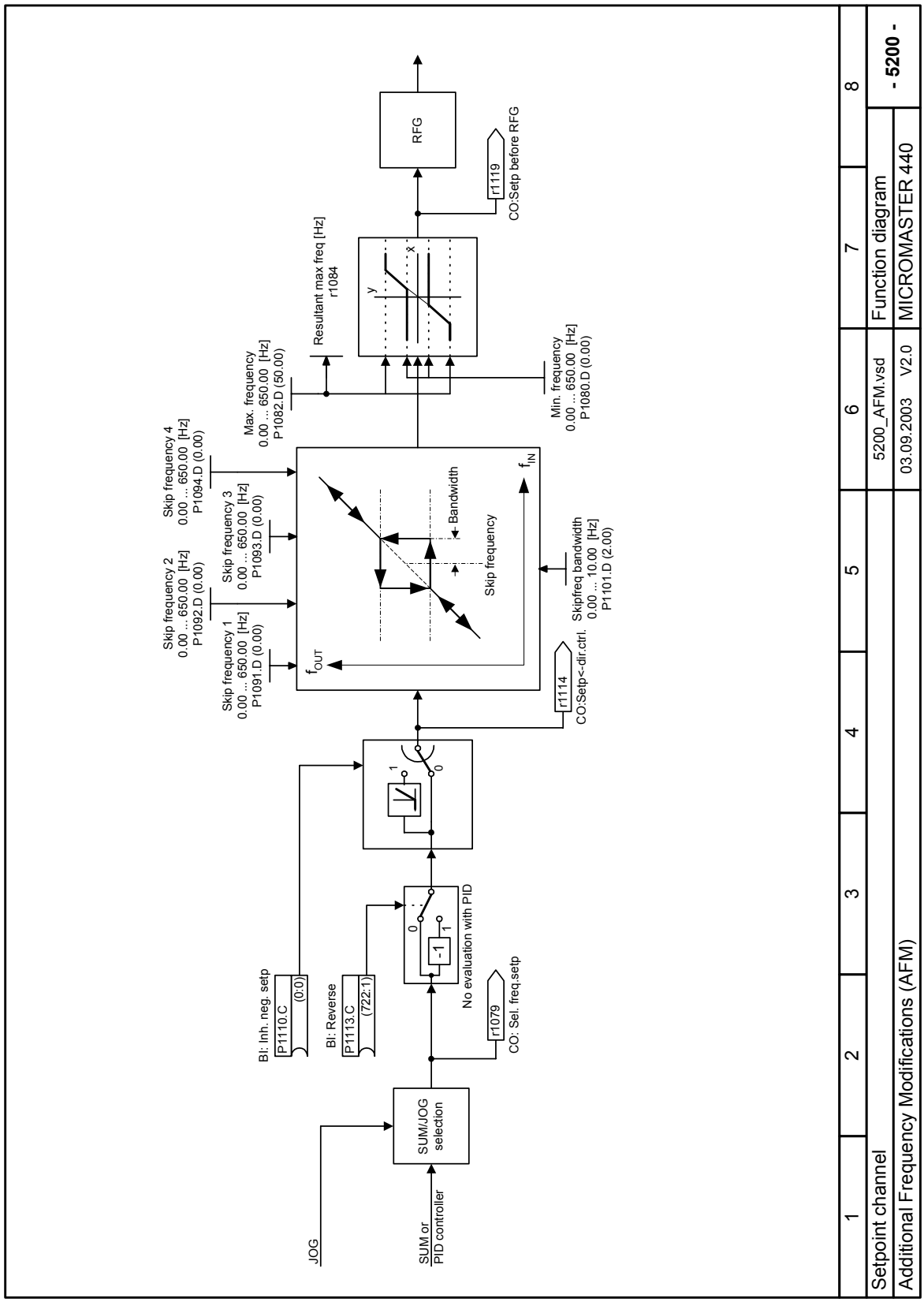

3 RS FlipFlops
P2800 P2801[14]
SET (Q=1)
RESET (Q=0)
Q
Q̄
r2841
r2842
P2840
Index0
Index1
POWER ON
≥1
P2800 P2801[15]
r2844
r2845
P2843
P2800 P2801[16]
r2847
r2848
P2846
2 D FlipFlops
P2800 P2801[12]
D
STORE
r2835
r2836
P2834
Index2
Index3
POWER ON
P2800 P2801[13]
r2838
r2839
P2837
1
2
3
4
5
6
7
8
Free Blocks
FlipFlops
4810_FreeBlocks2.vsd
03.09.2003 V2.0
Function diagram
MICROMASTER 440
- 4810 -

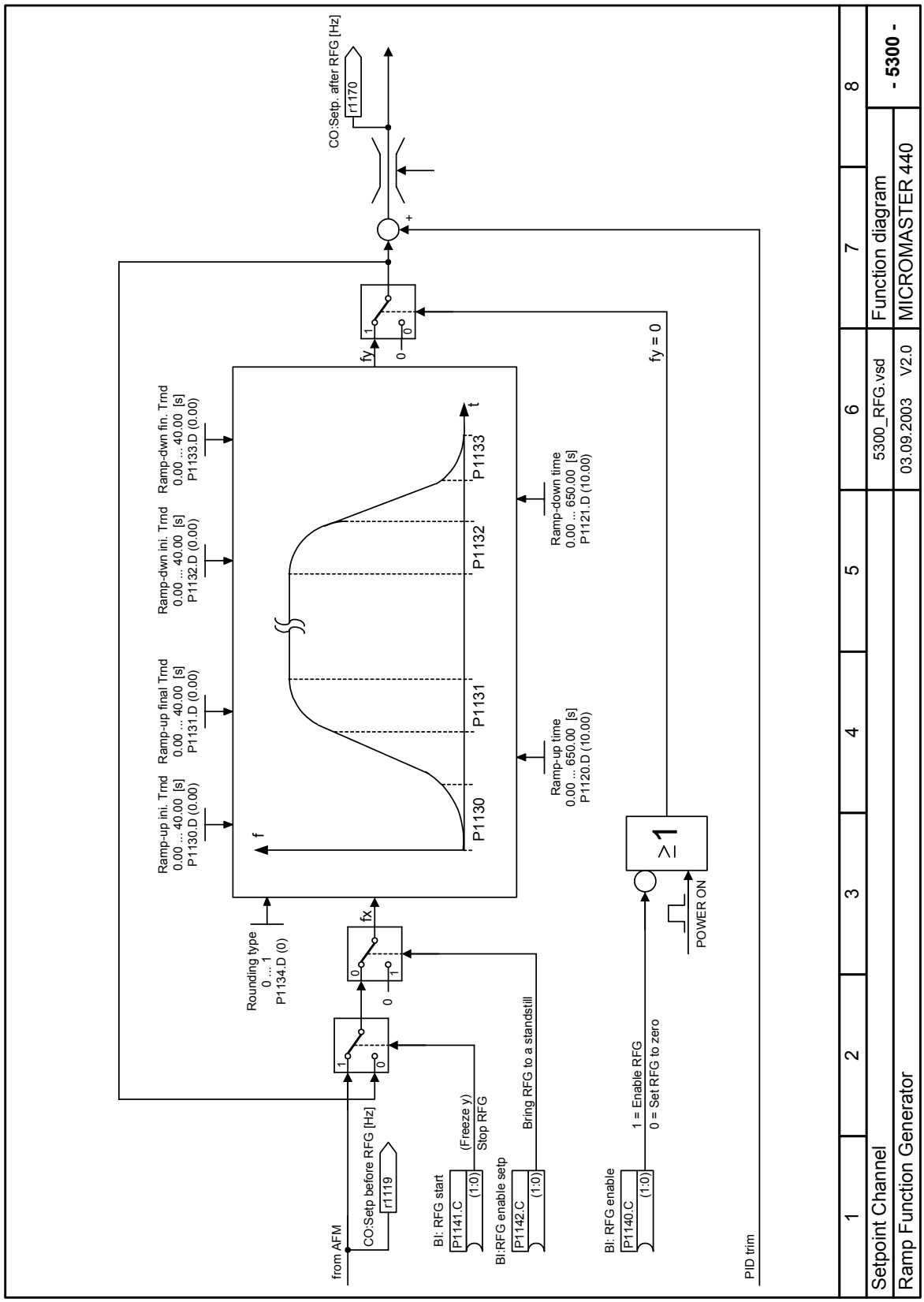

4 Timers 0 ... 6000.0 s
P2849
Index0
P2854
Index0
P2859
Index0
P2864
Index0
P2800
P2802[0]
P2802[1]
P2802[2]
P2802[3]
P2850 (0.000) 0.000...6000.0 s
P2855 (0.000) 0.000...6000.0 s
P2860 (0.000) 0.000...6000.0 s
P2865 (0.000) 0.000...6000.0 s
P2851(0) Mode
P2856(0) Mode
P2861(0) Mode
P2866(0) Mode
ON Delay
OFF Delay
ON/OFF Delay
Pulse Gernerator
r2852
r2853
r2857
r2858
r2862
r2863
r2867
r2868
Free Blocks
Timers
4820_FreeBlocks3.vsd
03.09.2003 V2.0
Function diagram
MICROMASTER 440
- 4820 -

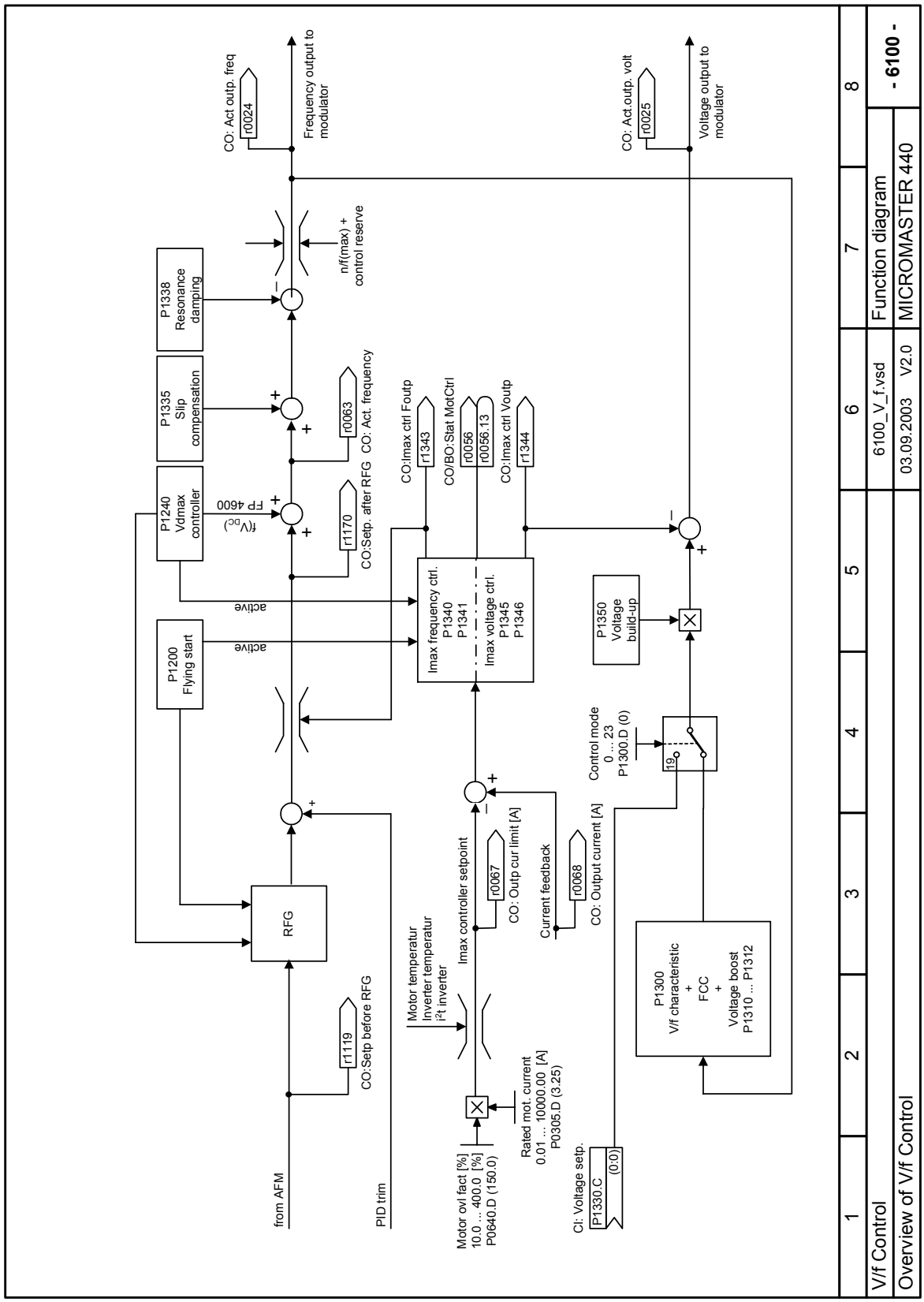

2 Adders with 2 Inputs (1 Word)
2 Subtracters with 2 Inputs (1 Word)
2 Multipliers (1 Word)
2 Dividers (1 Word)
Word Compare
Connector Setting in %
P2800
P2802[4]
P2802[5]
P2802[6]
P2802[7]
P2802[8]
P2802[9]
P2802[10]
P2802[11]
P2802[12]
P2802[13]
P2869
P2871
P2873
P2875
P2877
P2879
P2881
P2883
P2885
P2887
r2870
r2872
r2874
r2876
r2878
r2880
r2882
r2884
r2886
r2888
P2889
P2890
Index0
Index1
x1
x2
200 %
-200 %
x1 + x2
x1 - x2
x1 · x2 / 100%
x1 · 100% / x2
CMP
Out = x1 ≥ x2
1
2
3
4
5
6
7
8
Free Blocks
4830_FreeBlocks4.vsd
Function diagram
- 4830 -
Adders, Subtracters, Multipliers, Dividers, Comparators, Setting in %
03.09.2003 V2.0
MICROMASTER 440

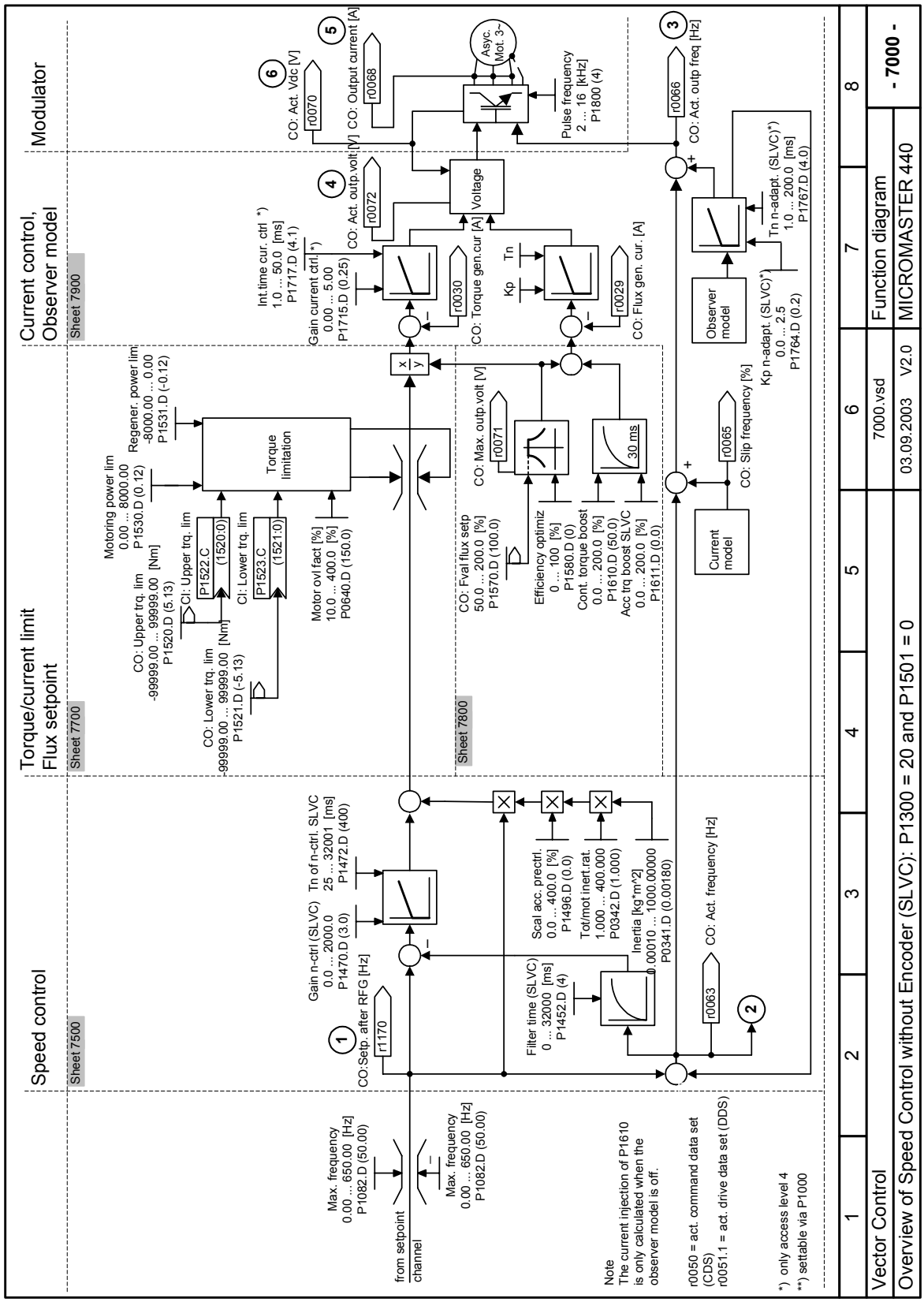

MOD
V/f control
7900
Current control
7900
Motor model
Motor identification
7800
Flux setpoint
7500 - 7700
Speed / torque control
Control mode
0 ... 23
P1300.D (0)
<20
≥20
RFG
AFM
SUM/JOG selection
JOG frequency ->
0.00 ... 650.00 [Hz]
P1058.D (5.00)
JOG frequency <-
0.00 ... 650.00 [Hz]
P1059.D (5.00)
PID mode
0 ... 1
P2251 (0)
PID output scale
-100.00 ... 100.00
P2295 (100.00)
PID mode
0 ... 1
P2251 (0)
CO: Tot. freq.setp [Hz]
r1078
CO: Act.PID output [%]
r2294
PID controller
BI: Enable JOG ->
P1055.C (0:0)
BI: Enable JOG <-
P1056.C (0:0)
CI: Main setpoint
P1070.C (755:0)
CI: Main setp scal
P1071.C (1:0)
BI: Disab.add.setp
P1074.C (0:0)
CI: Add. setp.scal
P1076.C (1:0)
CI: Add. setpoint
P1075.C (0:0)
CI:PID trim source
P2254.C (0:0)
CI: PID setpoint
P2253.C (0:0)
CI: PID feedback
P2264.C (755:0)
BI: Enab. PID ctrl
P2200.C (0:0)
1 2 3 4 5 6 7 8
Overview
Setpoint channel and Motor control
5000_Overview.vsd
03.09.2003 V2.0
Function diagram
MICROMASTER 440
- 5000 -

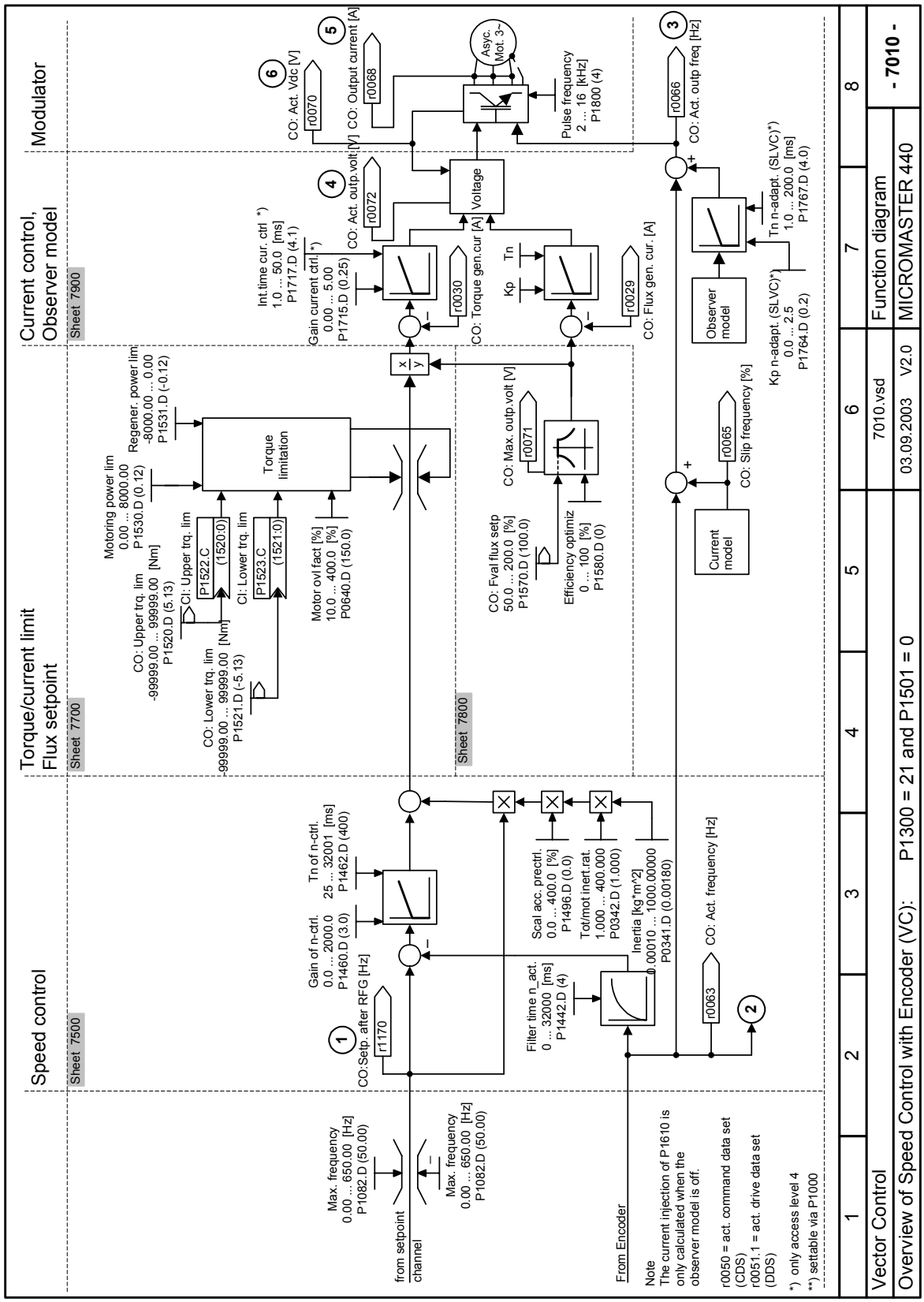

CO/BO: Act StatWd2
r0053
r0053.11
r0053.10
r2294
CO: Act.PID output
PID prop. gain
0.000 ... 65.000
P2280 (3.000)
PID integral time
0.000 ... 60.000 [s]
P2285 (0.000)
Tn
Kp
r2273
CO: PID error
PID deriv. time
0.000 ... 60.000 [s]
P2274 (0.000)
PID ctrl. type
0 ... 1
P2263 (0)
CO: Filt. PID setp
r2262
PID setp.filt.Tcon
0.00 ... 60.00 [s]
P2261 (0.00)
CO: PID setp <-RFG
r2260
PID setp. ramp-up
0.00 ... 650.00 [s]
P2257 (1.00)
PID setp. ramp-dwn
0.00 ... 650.00 [s]
P2258 (1.00)
PID trim gain fact
0.00 ... 100.00
P2256 (100.00)
CI:PID trim source
P2254.C
(0:0)
CI: PID setpoint
P2253.C
(0:0)
PID setp.gain fact
0.00 ... 100.00
P2255 (100.00)
PID fdbck max. val
-200.00 ... 200.00 [%]
P2267 (100.00)
PID fdbck min. val
-200.00 ... 200.00 [%]
P2268 (0.00)
PID feedback gain
0.00 ... 500.00
P2269 (100.00)
PID fdbck fnct sel
0 ... 3
P2270 (0)
PID trans. type
0 ... 1
P2271 (0)
r2272
CO: PID scal fdbck [%]
Fdbck.filt. Tconst
0.00 ... 60.00 [s]
P2265 (0.00)
r2266
CO: PID filt.fdbck [%]
CI: PID feedback
P2264.C
(755:0)
PID outp.upper lim
-200.00 ... 200.00 [%]
P2291 (100.00)
PID outp.lower lim
-200.00 ... 200.00 [%]
P2292 (0.00)
PID lim. ramp time
0.00 ... 100.00 [s]
P2293 (1.00)
P2200 = BI: Enable PID controller
P2251 = PID mode (0 = PID as setpoint, 1 = PID as trim)
P2350 = PID autotune enable
P2354 = PID tuning timeout length
P2355 = PID tuning offset
1
2
3
4
5
6
7
8
Setpoint Channel
PID controller
5100_PID.vsd
03.09.2003 V2.0
Function diagram
MICROMASTER 440
- 5100 -

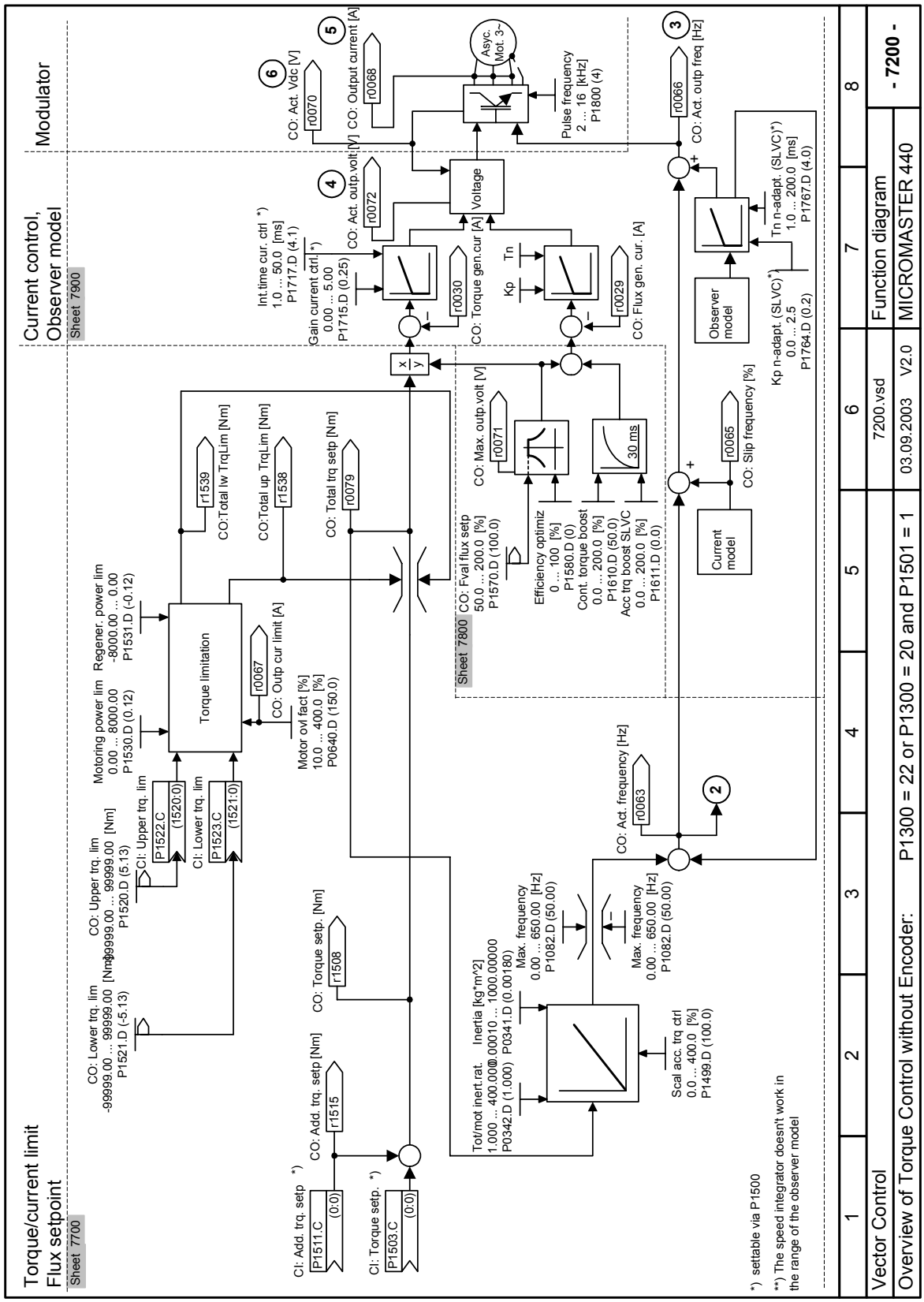

JOG
SUM or PID controller
SUM/JOG selection
Bl: Inh. neg. setp
P1110.C (0:0)
Bl: Reverse
P1113.C (722:1)
No evaluation with PID
r1079
CO: Sel. freq.setp
Skip frequency 1 0.00 ... 650.00 [Hz] P1091.D (0.00)
Skip frequency 2 0.00 ... 650.00 [Hz] P1092.D (0.00)
Skip frequency 3 0.00 ... 650.00 [Hz] P1093.D (0.00)
Skip frequency 4 0.00 ... 650.00 [Hz] P1094.D (0.00)
Max. frequency 0.00 ... 650.00 [Hz] P1082.D (50.00)
Resultant max freq [Hz] r1084
Min. frequency 0.00 ... 650.00 [Hz] P1080.D (0.00)
Skipfreq bandwidth 0.00 ... 10.00 [Hz] P1101.D (2.00)
Bandwidth
Skip frequency
f_OUT
f_IN
r1114 CO:Setp<-dir.ctrl.
RFG
r1119 CO:Setp before RFG
1 2 3 4 5 6 7 8
Setpoint channel
Additional Frequency Modifications (AFM)
5200_AFM.vsd 03.09.2003 V2.0
Function diagram
MICROMASTER 440
- 5200 -

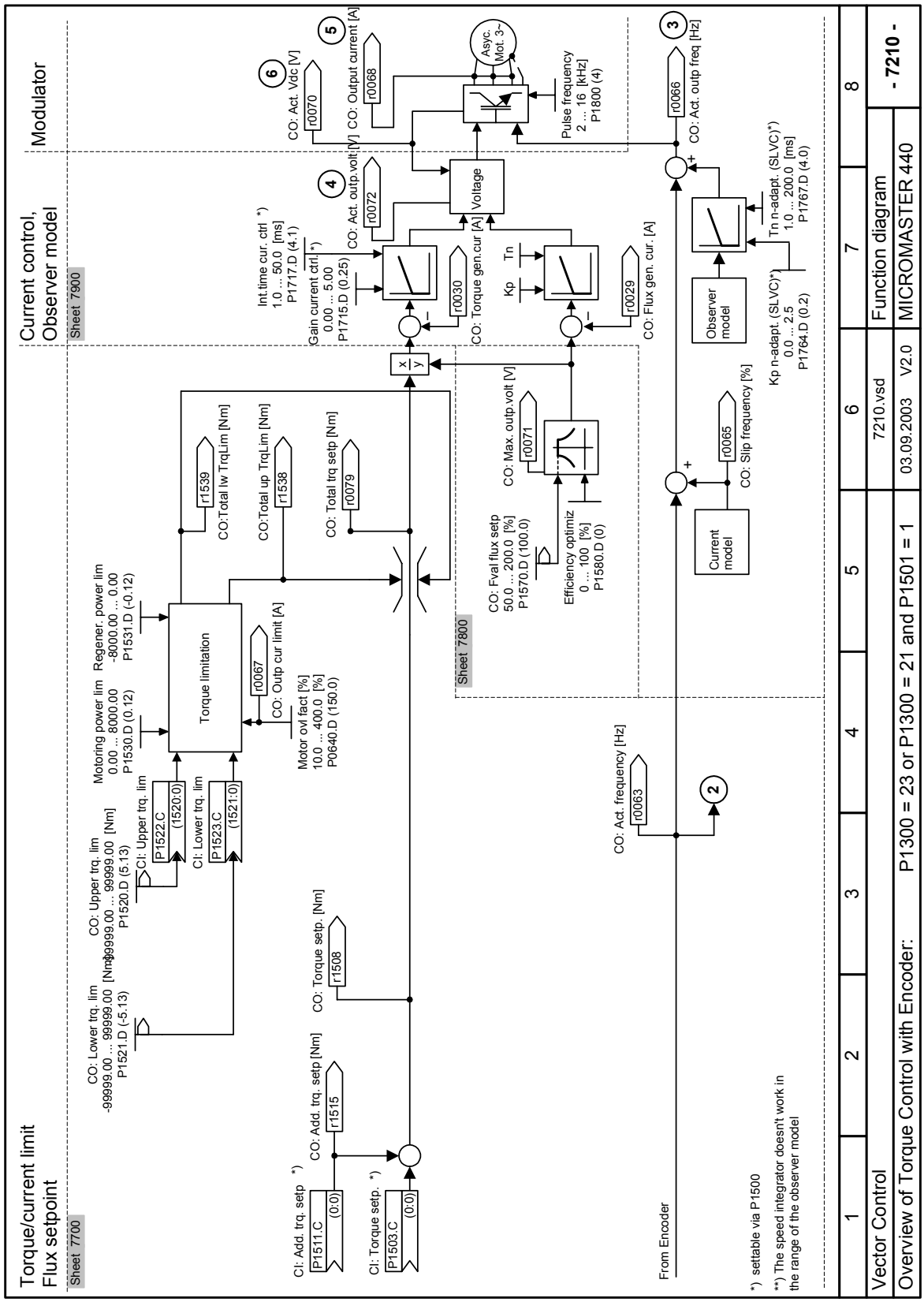

CO:Setp. after RFG [Hz]
r1170
fy
fy = 0
Ramp-up ini. Trnd 0.00 ... 40.00 [s] P1130.D (0.00)
Ramp-up final Trnd 0.00 ... 40.00 [s] P1131.D (0.00)
Ramp-dwn ini. Trnd 0.00 ... 40.00 [s] P1132.D (0.00)
Ramp-dwn fin. Trnd 0.00 ... 40.00 [s] P1133.D (0.00)
Ramp-up time 0.00 ... 650.00 [s] P1120.D (10.00)
Ramp-down time 0.00 ... 650.00 [s] P1121.D (10.00)
P1130
P1131
P1132
P1133
f
t
Rounding type 0 ... 1 P1134.D (0)
fx
from AFM
CO:Setp before RFG [Hz]
r1119
BI: RFG start
P1141.C
(1:0)
(Freeze y)
Stop RFG
BI:RFG enable setp
P1142.C
(1:0)
Bring RFG to a standstill
BI: RFG enable
P1140.C
(1:0)
1 = Enable RFG
0 = Set RFG to zero
≥1
POWER ON
PID trim
1 2 3 4 5 6 7 8
Setpoint Channel
Ramp Function Generator
5300_RFG.vsd
03.09.2003 V2.0
Function diagram
MICROMASTER 440
- 5300 -

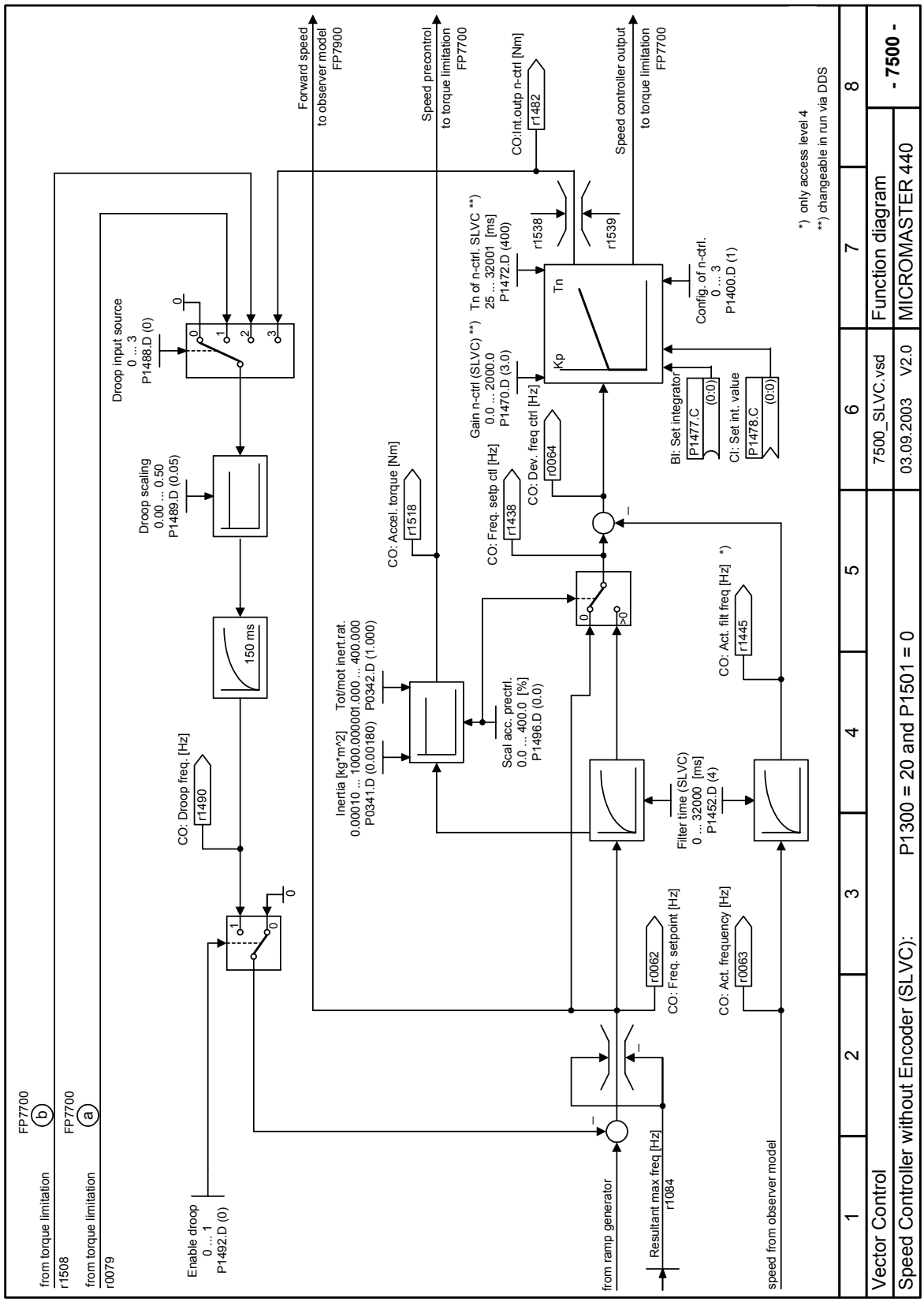

CO: Act outp. freq
r0024
Frequency output to modulator
CO: Act.outp. volt
r0025
Voltage output to modulator
n/f(max) + control reserve
P1338 Resonance damping
P1335 Slip compensation
P1240 Vdmax controller
FP 4600
f(V_DC)
P1200 Flying start
active
active
r0063
CO: Act. frequency
r1170
CO:Setp. after RFG
CO:Imax ctrl Foutp
r1343
CO/BO:Stat MotCtrl
r0056
r0056.13
CO:Imax ctrl Voutp
r1344
Imax frequency ctrl.
P1340
P1341
Imax voltage ctrl.
P1345
P1346
P1350 Voltage build-up
Control mode
0 ... 23
P1300.D (0)
f19
RFG
r1119
CO:Setp before RFG
from AFM
PID trim
Motor temperatur
Inverter temperatur
i²t inverter
Imax controller setpoint
r0067
CO: Outp cur limit [A]
Current feedback
r0068
CO: Output current [A]
Motor ovl fact [%]
10.0 ... 400.0 [%]
P0640.D (150.0)
Rated mot. current
0.01 ... 10000.00 [A]
P0305.D (3.25)
CI: Voltage setp.
P1330.C
(0:0)
P1300
V/f characteristic
+
FCC
+
Voltage boost
P1310 ... P1312
1
2
3
4
5
6
7
8
V/f Control
6100_V_f.vsd
Function diagram
- 6100 -
Overview of V/f Control
03.09.2003 V2.0
MICROMASTER 440

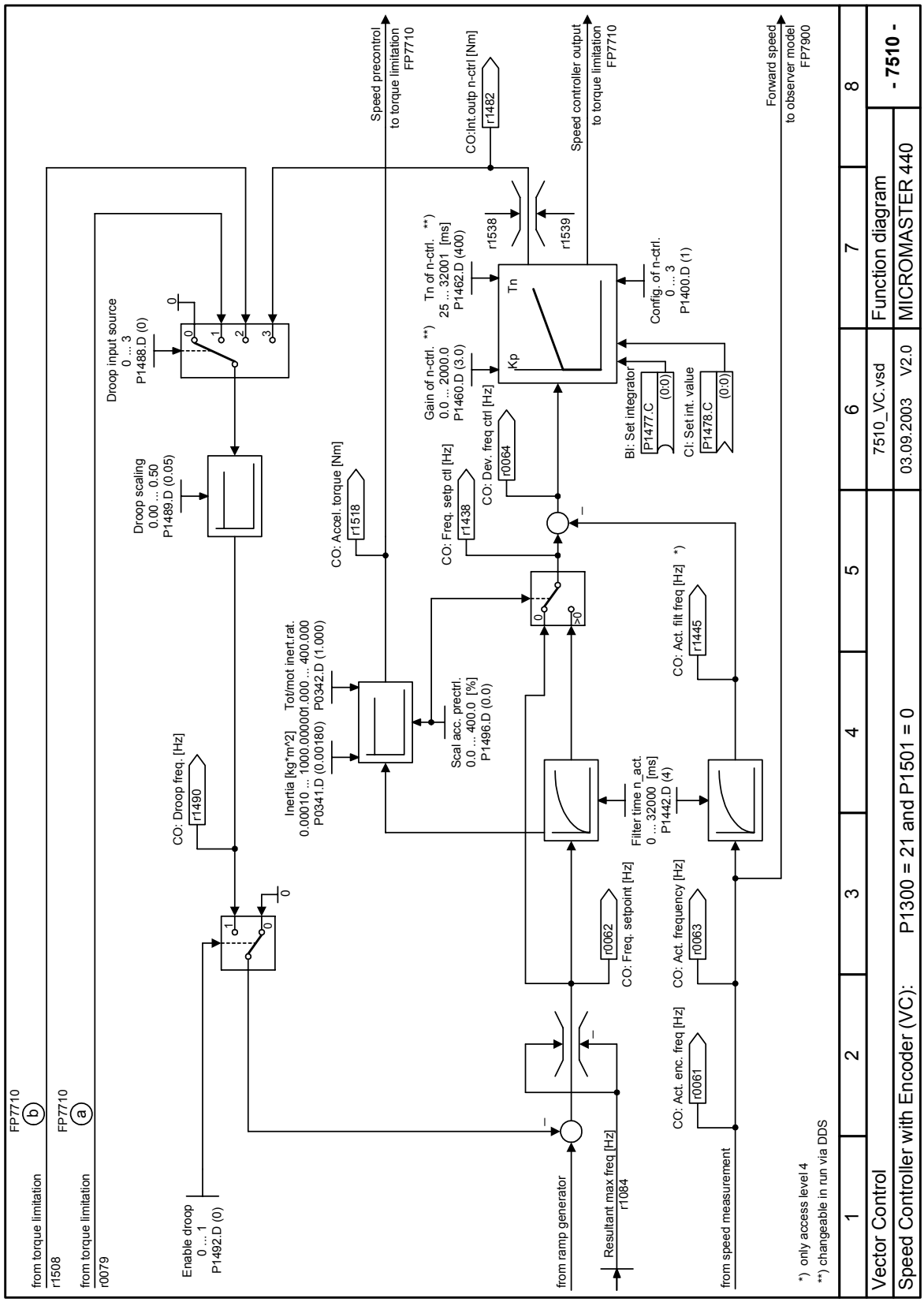

Speed control
Torque/current limit
Flux setpoint
Current control,
Observer model
Modulator
Sheet 7500
Sheet 7700
Sheet 7900
Sheet 7800
Max. frequency
0.00 ... 650.00 [Hz]
P1082.D (50.00)
from setpoint
channel
Max. frequency
0.00 ... 650.00 [Hz]
P1082.D (50.00)
CO:Setp. after RFG [Hz]
r1170
Gain n-ctrl (SLVC)
0.0 ... 2000.0
P1470.D (3.0)
Tn of n-ctrl. SLVC
25 ... 32001 [ms]
P1472.D (400)
Filter time (SLVC)
0 ... 32000 [ms]
P1452.D (4)
Scal acc. prectrl.
0.0 ... 400.0 [%]
P1496.D (0.0)
Tot/mot inert.rat.
1.000 ... 400.000
P0342.D (1.000)
Inertia [kg*m^2]
0.00010 ... 1000.00000
P0341.D (0.00180)
CO: Act. frequency [Hz]
r0063
Note
The current injection of P1610
is only calculated when the
observer model is off.
r0050 = act. command data set
(CDS)
r0051.1 = act. drive data set (DDS)
*) only access level 4
**) settable via P1000
Motoring power lim
0.00 ... 8000.00
P1530.D (0.12)
Regener. power lim
-8000.00 ... 0.00
P1531.D (-0.12)
CO: Upper trq. lim
-99999.00 ... 99999.00 [Nm]
P1520.D (5.13)
CI: Upper trq. lim
P1522.C
(1520:0)
CO: Lower trq. lim
-99999.00 ... 99999.00 [Nm]
P1521.D (-5.13)
CI: Lower trq. lim
P1523.C
(1521:0)
Torque
limitation
Motor ovl fact [%]
10.0 ... 400.0 [%]
P0640.D (150.0)
CO: Fval flux setp
50.0 ... 200.0 [%]
P1570.D (100.0)
Efficiency optimiz
0 ... 100 [%]
P1580.D (0)
Cont. torque boost
0.0 ... 200.0 [%]
P1610.D (50.0)
Acc trq boost SLVC
0.0 ... 200.0 [%]
P1611.D (0.0)
CO: Max. outp.volt [V]
r0071
30 ms
Current
model
CO: Slip frequency [%]
r0065
Kp n-adapt. (SLVC)*)
0.0 ... 2.5
P1764.D (0.2)
Observer
model
Tn n-adapt. (SLVC)*)
1.0 ... 200.0 [ms]
P1767.D (4.0)
CO: Act. outp freq [Hz]
r0066
Int.time cur. ctrl *)
1.0 ... 50.0 [ms]
P1717.D (4.1)
Gain current ctrl *)
0.00 ... 5.00
P1715.D (0.25)
CO: Act. outp.volt [V]
r0072
CO: Torque gen.cur [A]
r0030
Kp
Tn
CO: Flux gen. cur. [A]
r0029
Voltage
CO: Act. Vdc [V]
r0070
CO: Output current [A]
r0068
Asyc.
Mot. 3~
Pulse frequency
2 ... 16 [kHz]
P1800 (4)
1 2 3 4 5 6 7 8
Vector Control
7000.vsd
Function diagram
- 7000 -
Overview of Speed Control without Encoder (SLVC): P1300 = 20 and P1501 = 0
03.09.2003 V2.0
MICROMASTER 440

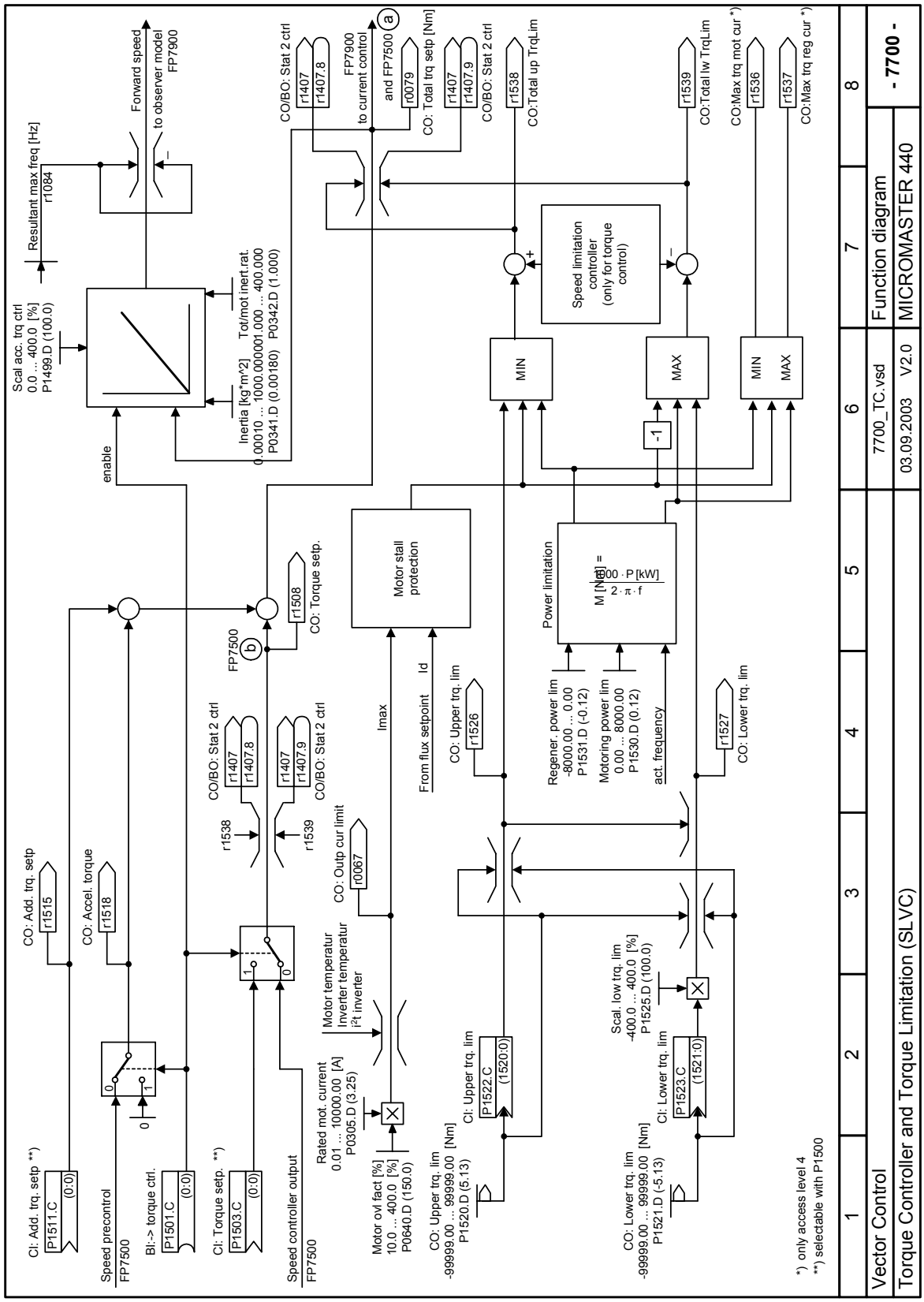

Speed control
Sheet 7500
Torque/current limit
Flux setpoint
Sheet 7700
Sheet 7800
Current control,
Observer model
Sheet 7900
Modulator
Max. frequency
0.00 ... 650.00 [Hz]
P1082.D (50.00)
from setpoint
channel
Max. frequency
0.00 ... 650.00 [Hz]
P1082.D (50.00)
CO:Setp. after RFG [Hz]
r1170
Gain of n-ctrl.
0.0 ... 2000.0
P1460.D (3.0)
Tn of n-ctrl.
25 ... 32001 [ms]
P1462.D (400)
Filter time n_act.
0 ... 32000 [ms]
P1442.D (4)
Scal acc. prectrl.
0.0 ... 400.0 [%]
P1496.D (0.0)
Tot/mot inert.rat.
1.000 ... 400.000
P0342.D (1.000)
Inertia [kg*m^2]
0.00010 ... 1000.00000
P0341.D (0.00180)
From Encoder
r0063
CO: Act. frequency [Hz]
Note
The current injection of P1610 is
only calculated when the
observer model is off.
r0050 = act. command data set
(CDS)
r0051.1 = act. drive data set
(DDS)
*) only access level 4
**) settable via P1000
Motoring power lim
0.00 ... 8000.00
P1530.D (0.12)
Regener. power lim
-8000.00 ... 0.00
P1531.D (-0.12)
CO: Upper trq. lim
-99999.00 ... 99999.00 [Nm]
P1520.D (5.13)
CI: Upper trq. lim
P1522.C
(1520:0)
CO: Lower trq. lim
-99999.00 ... 99999.00 [Nm]
P1521.D (-5.13)
CI: Lower trq. lim
P1523.C
(1521:0)
Torque
limitation
Motor ovl fact [%]
10.0 ... 400.0 [%]
P0640.D (150.0)
CO: Fval flux setp
50.0 ... 200.0 [%]
P1570.D (100.0)
Efficiency optimiz
0 ... 100 [%]
P1580.D (0)
CO: Max. outp.volt [V]
r0071
Current
model
r0065
CO: Slip frequency [%]
Kp n-adapt. (SLVC)*)
0.0 ... 2.5
P1764.D (0.2)
Observer
model
Tn n-adapt. (SLVC)*)
1.0 ... 200.0 [ms]
P1767.D (4.0)
Int.time cur. ctrl *)
1.0 ... 50.0 [ms]
P1717.D (4.1)
Gain current ctrl.*)
0.00 ... 5.00
P1715.D (0.25)
CO: Act. outp.volt [V]
r0072
Kp
Tn
r0030
CO: Torque gen.cur [A]
r0029
CO: Flux gen. cur. [A]
Voltage
CO: Act. Vdc [V]
r0070
CO: Output current [A]
r0068
Asyc.
Mot. 3~
Pulse frequency
2 ... 16 [kHz]
P1800 (4)
r0066
CO: Act. outp freq [Hz]
1
2
3
4
5
6
7
8
Vector Control
7010.vsd
Function diagram
- 7010 -
Overview of Speed Control with Encoder (VC): P1300 = 21 and P1501 = 0
03.09.2003 V2.0
MICROMASTER 440

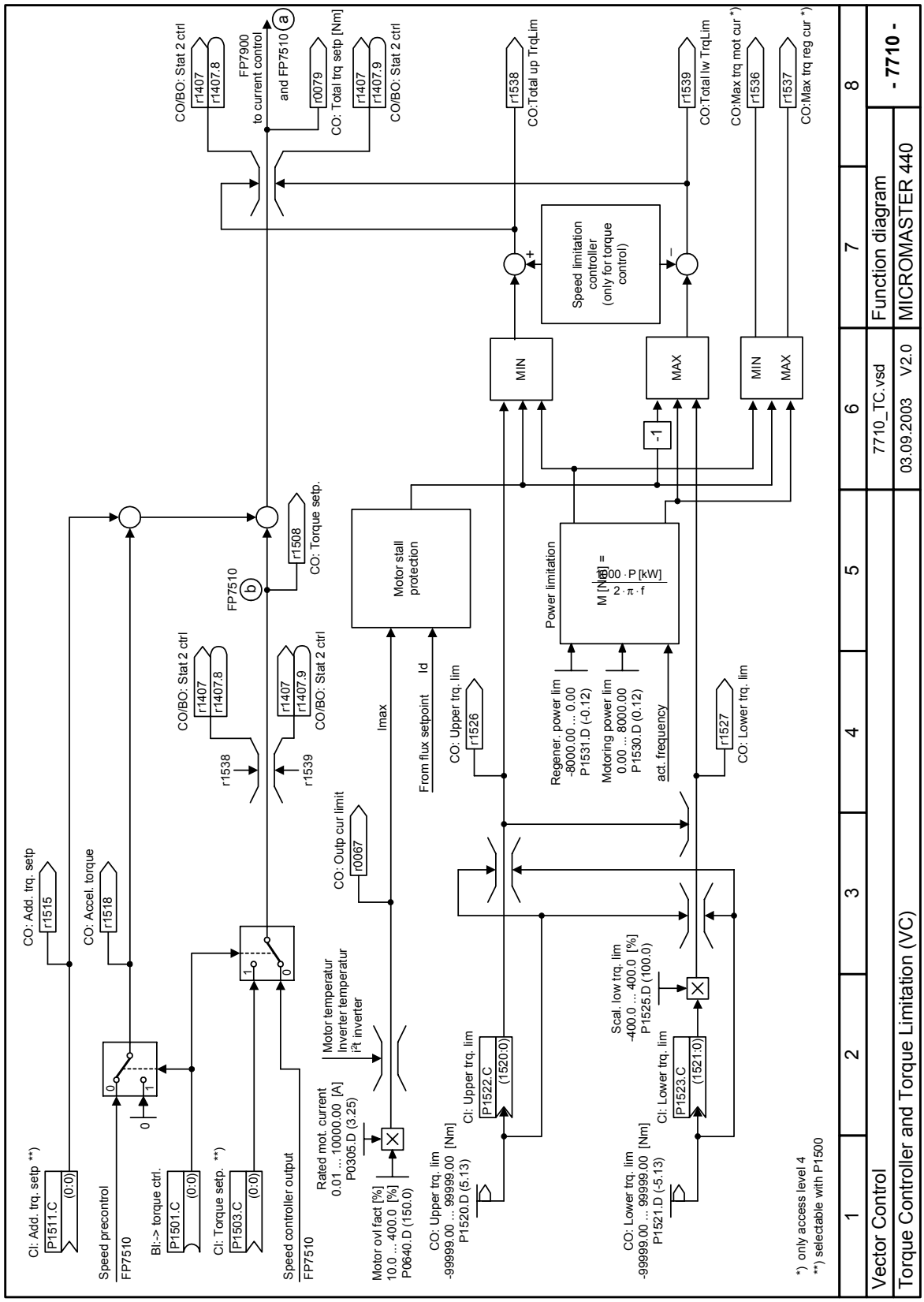

Torque/current limit
Flux setpoint
Sheet 7700
Current control,
Observer model
Sheet 7900
Modulator
Sheet 7800
Torque limitation
CO: Upper trq. lim
-99999.00 ... 99999.00 [Nm]
P1521.D (-5.13)
CO: Lower trq. lim
-99999.00 ... 99999.00 [Nm]
P1520.D (5.13)
CI: Upper trq. lim
P1522.C
(1520:0)
CI: Lower trq. lim
P1523.C
(1521:0)
Motoring power lim
0.00 ... 8000.00
P1530.D (0.12)
Regener. power lim
-8000.00 ... 0.00
P1531.D (-0.12)
CO:Total lw TrqLim [Nm]
r1539
CO:Total up TrqLim [Nm]
r1538
CO: Total trq setp [Nm]
r0079
CO: Outp cur limit [A]
r0067
Motor ovl fact [%]
10.0 ... 400.0 [%]
P0640.D (150.0)
CO: Add. trq. setp [Nm]
r1515
CI: Add. trq. setp *)
P1511.C
(0:0)
CO: Torque setp. [Nm]
r1508
CI: Torque setp. *)
P1503.C
(0:0)
Tot/mot inert.rat.
1.000 ... 400.000
P0342.D (1.000)
Inertia [kg*m^2]
0.00010 ... 1000.00000
P0341.D (0.00180)
Scal acc. trq ctrl
0.0 ... 400.0 [%]
P1499.D (100.0)
Max. frequency
0.00 ... 650.00 [Hz]
P1082.D (50.00)
CO: Act. frequency [Hz]
r0063
CO: Max. outp.volt [V]
r0071
CO: Fval flux setp
50.0 ... 200.0 [%]
P1570.D (100.0)
Efficiency optimiz
0 ... 100 [%]
P1580.D (0)
Cont. torque boost
0.0 ... 200.0 [%]
P1610.D (50.0)
Acc trq boost SLVC
0.0 ... 200.0 [%]
P1611.D (0.0)
30 ms
Current model
CO: Slip frequency [%]
r0065
Observer model
Kp n-adapt. (SLVC) *)
0.0 ... 2.5
P1764.D (0.2)
Tn n-adapt. (SLVC) *)
1.0 ... 200.0 [ms]
P1767.D (4.0)
CO: Act. outp freq [Hz]
r0066
Int.time cur. ctrl *)
1.0 ... 50.0 [ms]
P1717.D (4.1)
Gain current ctrl *)
0.00 ... 5.00
P1715.D (0.25)
CO: Act. outp.volt [V]
r0072
Kp
Tn
CO: Torque gen.cur [A]
r0030
CO: Flux gen. cur. [A]
r0029
Voltage
CO: Act. Vdc [V]
r0070
CO: Output current [A]
r0068
Asyc. Mot. 3~
Pulse frequency
2 ... 16 [kHz]
P1800 (4)
*) settable via P1500
**) The speed integrator doesn't work in the range of the observer model
1 2 3 4 5 6 7 8
Vector Control
7200.vsd
Function diagram
- 7200 -
Overview of Torque Control without Encoder: P1300 = 22 or P1300 = 20 and P1501 = 1
03.09.2003 V2.0
MICROMASTER 440

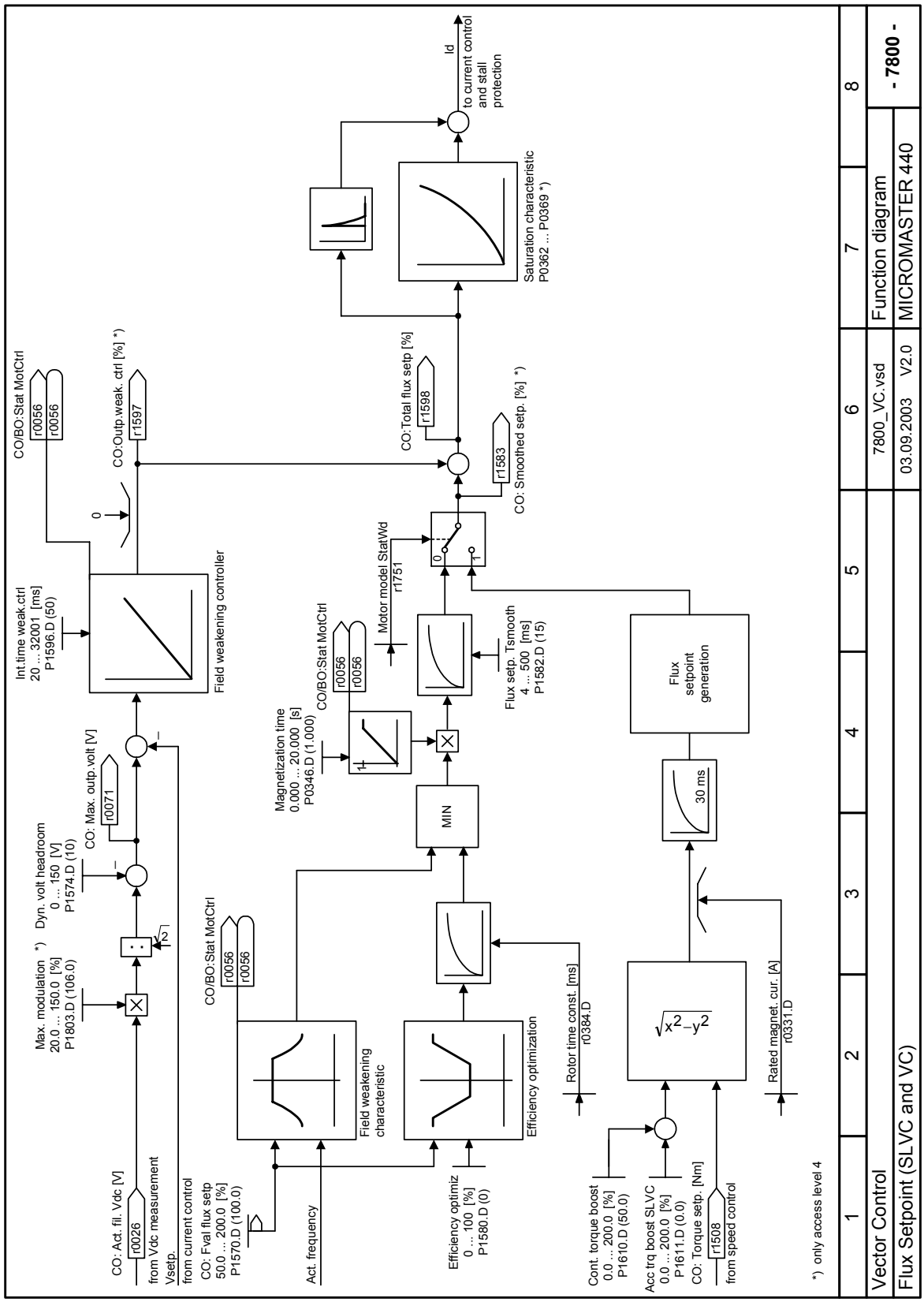

Torque/current limit
Flux setpoint
Sheet 7700
Current control,
Observer model
Sheet 7900
Modulator
Sheet 7800
Torque limitation
CO: Lower trq. lim
-99999.00 ... 99999.00 [Nm]
P1521.D (-5.13)
CO: Upper trq. lim
-99999.00 ... 99999.00 [Nm]
P1520.D (5.13)
Motoring power lim
0.00 ... 8000.00
P1530.D (0.12)
Regener. power lim
-8000.00 ... 0.00
P1531.D (-0.12)
CI: Upper trq. lim
P1522.C
(1520:0)
CI: Lower trq. lim
P1523.C
(1521:0)
CO: Total lw TrqLim [Nm]
r1539
CO:Total up TrqLim [Nm]
r1538
CO: Total trq setp [Nm]
r0079
CO: Outp cur limit [A]
r0067
Motor ovl fact [%]
10.0 ... 400.0 [%]
P0640.D (150.0)
CO: Torque setp. [Nm]
r1508
CO: Add. trq. setp [Nm]
r1515
CI: Add. trq. setp *)
P1511.C
(0:0)
CI: Torque setp. *)
P1503.C
(0:0)
CO: Act. frequency [Hz]
r0063
From Encoder
CO: Max. outp.volt [V]
r0071
CO: Fval flux setp
50.0 ... 200.0 [%]
P1570.D (100.0)
Efficiency optimiz
0 ... 100 [%]
P1580.D (0)
CO: Flux gen. cur. [A]
r0029
Kp
Tn
CO: Torque gen.cur [A]
r0030
Int.time cur. ctrl *)
1.0 ... 50.0 [ms]
P1717.D (4.1)
Gain current ctrl. *)
0.00 ... 5.00
P1715.D (0.25)
CO: Act. outp.volt [V]
r0072
Voltage
CO: Output current [A]
r0068
CO: Act. Vdc [V]
r0070
Asyc.
Mot. 3~
Pulse frequency
2 ... 16 [kHz]
P1800 (4)
CO: Act. outp freq [Hz]
r0066
Observer model
Tn n-adapt. (SLVC)*)
1.0 ... 200.0 [ms]
P1767.D (4.0)
Kp n-adapt. (SLVC)*)
0.0 ... 2.5
P1764.D (0.2)
Current model
CO: Slip frequency [%]
r0065
*) settable via P1500
**) The speed integrator doesn't work in the range of the observer model
1 2 3 4 5 6 7 8
Vector Control
7210.vsd
Function diagram
- 7210 -
Overview of Torque Control with Encoder:
P1300 = 23 or P1300 = 21 and P1501 = 1
03.09.2003 V2.0
MICROMASTER 440

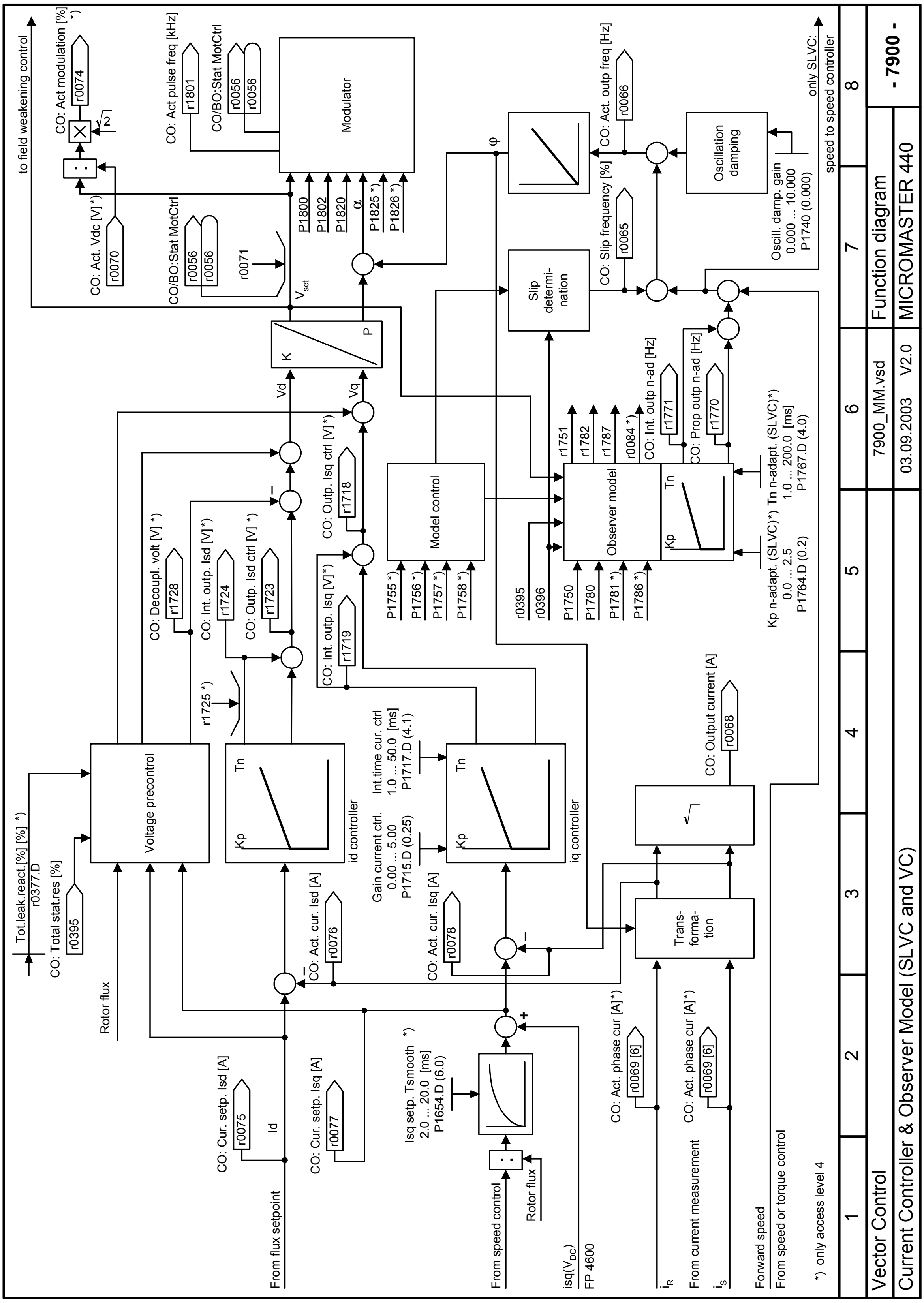

FP7700
from torque limitation
r1508
FP7700
from torque limitation
r0079
Droop input source
0 ... 3
P1488.D (0)
Droop scaling
0.00 ... 0.50
P1489.D (0.05)
150 ms
CO: Droop freq. [Hz]
r1490
Enable droop
0 ... 1
P1492.D (0)
Inertia [kg*m^2]
0.00010 ... 1000.00000
P0341.D (0.00180)
Tot/mot inert.rat.
1.000 ... 400.000
P0342.D (1.000)
Scal acc. prectrl.
0.0 ... 400.0 [%]
P1496.D (0.0)
CO: Accel. torque [Nm]
r1518
CO: Freq. setp ctl [Hz]
r1438
CO: Dev. freq ctrl [Hz]
r0064
Gain n-ctrl (SLVC) **)
0.0 ... 2000.0
P1470.D (3.0)
Tn of n-ctrl. SLVC **)
25 ... 32001 [ms]
P1472.D (400)
Kp
Tn
Config. of n-ctrl.
0 ... 3
P1400.D (1)
Bi: Set integrator
P1477.C
(0:0)
Ci: Set int. value
P1478.C
(0:0)
CO:Int.outp n-ctrl [Nm]
r1482
r1538
r1539
Forward speed
to observer model
FP7900
Speed precontrol
to torque limitation
FP7700
Speed controller output
to torque limitation
FP7700
*) only access level 4
**) changeable in run via DDS
Filter time (SLVC)
0 ... 32000 [ms]
P1452.D (4)
CO: Act. filt freq [Hz] *)
r1445
CO: Freq. setpoint [Hz]
r0062
CO: Act. frequency [Hz]
r0063
Resultant max freq [Hz]
r1084
from ramp generator
speed from observer model
1
2
3
4
5
6
7
8
Vector Control
7500_SLVC.vsd
Function diagram
- 7500 -
Speed Controller without Encoder (SLVC):
P1300 = 20 and P1501 = 0
03.09.2003 V2.0
MICROMASTER 440


Vector Control
Function diagram
- 7510 -
Speed Controller with Encoder (VC): P1300 = 21 and P1501 = 0
7510_VC.vsd
03.09.2003 V2.0
MICROMASTER 440
from torque limitation
r1508
from torque limitation
r0079
FP7710
Droop input source
0 ... 3
P1488.D (0)
Droop scaling
0.00 ... 0.50
P1489.D (0.05)
Enable droop
0 ... 1
P1492.D (0)
CO: Droop freq. [Hz]
r1490
Inertia [kg*m^2]
0.00010 ... 1000.00000
P0341.D (0.00180)
Tot/mot inert.rat.
1.000 ... 400.000
P0342.D (1.000)
Scal acc. prectrl.
0.0 ... 400.0 [%]
P1496.D (0.0)
CO: Accel. torque [Nm]
r1518
CO: Freq. setp ctl [Hz]
r1438
CO: Dev. freq ctrl [Hz]
r0064
Gain of n-ctrl. **)
0.0 ... 2000.0
P1460.D (3.0)
Tn of n-ctrl. **)
25 ... 32001 [ms]
P1462.D (400)
Kp
Tn
r1538
r1539
Config. of n-ctrl.
0 ... 3
P1400.D (1)
BI: Set integrator
P1477.C
(0:0)
CI: Set int. value
P1478.C
(0:0)
CO:Int.outp n-ctrl [Nm]
r1482
Speed precontrol
to torque limitation
FP7710
Speed controller output
to torque limitation
FP7710
Forward speed
to observer model
FP7900
CO: Act. filt freq [Hz] *)
r1445
Filter time n_act.
0 ... 32000 [ms]
P1442.D (4)
CO: Act. enc. freq [Hz]
r0061
CO: Act. frequency [Hz]
r0063
CO: Freq. setpoint [Hz]
r0062
Resultant max freq [Hz]
r1084
from ramp generator
from speed measurement
*) only access level 4
**) changeable in run via DDS


Vector Control
Torque Controller and Torque Limitation (SLVC)
7700_TC.vsd
03.09.2003 V2.0
Function diagram
MICROMASTER 440
- 7700 -
Forward speed to observer model FP7900
Resultant max freq [Hz] r1084
Scal acc. trq ctrl 0.0 ... 400.0 [%] P1499.D (100.0)
Inertia [kg*m^2] 0.00010 ... 1000.000 P0341.D (0.00180)
Tot/mot inert.rat. 1.000 ... 400.000 P0342.D (1.000)
enable
CO/BO: Stat 2 ctrl r1407 r1407.8
FP7900 to current control and FP7500 (a)
CO: Total trq setp [Nm] r0079
CO/BO: Stat 2 ctrl r1407 r1407.9
CO:Total up TrqLim r1538
CO:Total lw TrqLim r1539
CO:Max trq mot cur *) r1536
CO:Max trq reg cur *) r1537
Speed limitation controller (only for torque control)
MIN
MAX
-1
Motor stall protection
Power limitation
M [Nm] = 9550 · P [kW] / 2 · π · f
Regener. power lim -8000.00 ... 0.00 P1531.D (-0.12)
Motoring power lim 0.00 ... 8000.00 P1530.D (0.12)
act. frequency
From flux setpoint Id
Imax
CO: Upper trq. lim r1526
CO: Lower trq. lim r1527
CO: Outp cur limit r0067
FP7500 (b)
r1508 CO: Torque setp.
CO/BO: Stat 2 ctrl r1407 r1407.8
CO/BO: Stat 2 ctrl r1407 r1407.9
r1538
r1539
CO: Add. trq. setp r1515
CO: Accel. torque r1518
Motor temperatur
Inverter temperatur
i²t inverter
Rated mot. current 0.01 ... 10000.00 [A] P0305.D (3.25)
Motor ovl fact [%] 10.0 ... 400.0 [%] P0640.D (150.0)
Speed precontrol FP7500
Cl: Add. trq. setp **) P1511.C (0:0)
Bl:-> torque ctrl. P1501.C (0:0)
Cl: Torque setp. **) P1503.C (0:0)
Speed controller output FP7500
Cl: Upper trq. lim P1522.C (1520:0)
CO: Upper trq. lim -99999.00 ... 99999.00 [Nm] P1520.D (5.13)
Scal. low trq. lim -400.0 ... 400.0 [%] P1525.D (100.0)
Cl: Lower trq. lim P1523.C (1521:0)
CO: Lower trq. lim -99999.00 ... 99999.00 [Nm] P1521.D (-5.13)
*) only access level 4
**) selectable with P1500


Vector Control
Torque Controller and Torque Limitation (VC)
Function diagram
MICROMASTER 440
- 7710 -
7710_TC.vsd
03.09.2003 V2.0
CO: Add. trq. setp
r1515
CO: Accel. torque
r1518
CI: Add. trq. setp **)
P1511.C
(0:0)
Speed precontrol
FP7510
BI:-> torque ctrl.
P1501.C
(0:0)
CI: Torque setp. **)
P1503.C
(0:0)
Speed controller output
FP7510
Rated mot. current
0.01 ... 10000.00 [A]
P0305.D (3.25)
Motor ovl fact [%]
10.0 ... 400.0 [%]
P0640.D (150.0)
Motor temperatur
Inverter temperatur
i²t inverter
CO: Outp cur limit
r0067
Imax
From flux setpoint
Id
Motor stall protection
FP7510
r1508
CO: Torque setp.
CO/BO: Stat 2 ctrl
r1407
r1407.8
r1538
CO/BO: Stat 2 ctrl
r1407
r1407.9
r1539
CO: Upper trq. lim
r1526
CI: Upper trq. lim
P1522.C
(1520:0)
CO: Upper trq. lim
-99999.00 ... 99999.00 [Nm]
P1520.D (5.13)
Regener. power lim
-8000.00 ... 0.00
P1531.D (-0.12)
Motoring power lim
0.00 ... 8000.00
P1530.D (0.12)
act. frequency
Power limitation
M [Nm] = 9550 · P [kW] / 2 · π · f
CO: Lower trq. lim
r1527
Scal. low trq. lim
-400.0 ... 400.0 [%]
P1525.D (100.0)
CI: Lower trq. lim
P1523.C
(1521:0)
CO: Lower trq. lim
-99999.00 ... 99999.00 [Nm]
P1521.D (-5.13)
CO/BO: Stat 2 ctrl
r1407
r1407.8
FP7900
to current control
and FP7510
r0079
CO: Total trq setp [Nm]
r1407
r1407.9
CO/BO: Stat 2 ctrl
r1538
CO:Total up TrqLim
r1539
CO:Total lw TrqLim
r1536
CO:Max trq mot cur *)
r1537
CO:Max trq reg cur *)
MIN
MAX
-1
MIN
MAX
Speed limitation controller (only for torque control)
+
–
*) only access level 4
**) selectable with P1500


CO/BO:Stat MotCtrl
r0056
r0056
CO:Outp.weak. ctrl [%] *)
r1597
Int.time weak.ctrl
20 ... 32001 [ms]
P1596.D (50)
Field weakening controller
Id
to current control and stall protection
Saturation characteristic
P0362 ... P0369 *)
CO:Total flux setp [%]
r1598
CO: Smoothed setp. [%] *)
r1583
Motor model StatWd
r1751
Flux setp. Tsmooth
4 ... 500 [ms]
P1582.D (15)
Magnetization time
0.000 ... 20.000 [s]
P0346.D (1.000)
CO/BO:Stat MotCtrl
r0056
r0056
MIN
Flux setpoint generation
30 ms
Max. modulation *)
20.0 ... 150.0 [%]
P1803.D (106.0)
Dyn. volt headroom
0 ... 150 [V]
P1574.D (10)
CO: Max. outp.volt [V]
r0071
CO: Act. fil. Vdc [V]
r0026
from Vdc measurement
Vsetp.
from current control
CO: Fval flux setp
50.0 ... 200.0 [%]
P1570.D (100.0)
CO/BO:Stat MotCtrl
r0056
r0056
Field weakening characteristic
Act. frequency
Efficiency optimiz
0 ... 100 [%]
P1580.D (0)
Efficiency optimization
Rotor time const. [ms]
r0384.D
Cont. torque boost
0.0 ... 200.0 [%]
P1610.D (50.0)
Acc.trq boost SLVC
0.0 ... 200.0 [%]
P1611.D (0.0)
CO: Torque setp. [Nm]
r1508
from speed control
Rated magnet. cur. [A]
r0331.D
*) only access level 4
1 2 3 4 5 6 7 8
Vector Control
7800_VC.vsd
03.09.2003 V2.0
Function diagram
MICROMASTER 440
- 7800 -
Flux Setpoint (SLVC and VC)


Vector Control
Current Controller & Observer Model (SLVC and VC)
Function diagram
7900_MM.vsd
03.09.2003 V2.0
MICROMASTER 440
- 7900 -
1
2
3
4
5
6
7
8
From flux setpoint
CO: Cur. setp. Isd [A]
r0075
Id
From speed control
Rotor flux
CO: Cur. setp. Isq [A]
r0077
Isq setp. Tsmooth *)
2.0 ... 20.0 [ms]
P1654.D (6.0)
isq(V_DC)
FP 4600
iR
From current measurement
iS
CO: Act. phase cur [A]*)
r0069 [6]
Forward speed
From speed or torque control
*) only access level 4
Rotor flux
CO: Total stat.res [%]
r0395
Tot.leak.react.[%] [%] *)
r0377.D
Voltage precontrol
CO: Act. cur. Isd [A]
r0076
CO: Act. cur. Isq [A]
r0078
Trans-
forma-
tion
id controller
Gain current ctrl.
0.00 ... 5.00
P1715.D (0.25)
Int.time cur. ctrl
1.0 ... 50.0 [ms]
P1717.D (4.1)
iq controller
Kp
Tn
CO: Output current [A]
r0068
r1725 *)
CO: Decoupl. volt [V] *)
r1728
CO: Int. outp. Isd [V]*)
r1724
CO: Outp. Isd ctrl [V] *)
r1723
CO: Int. outp. Isq [V]*)
r1719
CO: Outp. Isq ctrl [V]*)
r1718
Model control
P1755 *)
P1756 *)
P1757 *)
P1758 *)
r0395
r0396
P1750
P1780
P1781 *)
P1786 *)
Observer model
Kp n-adapt. (SLVC)*)
0.0 ... 2.5
P1764.D (0.2)
Tn n-adapt. (SLVC)*)
1.0 ... 200.0 [ms]
P1767.D (4.0)
r1751
r1782
r1787
r0084 *)
CO: Int. outp n-ad [Hz]
r1771
CO: Prop outp n-ad [Hz]
r1770
Vd
Vq
K
P
Vset
to field weakening control
CO: Act. Vdc [V]*)
r0070
CO: Act modulation [%] *)
r0074
CO/BO:Stat MotCtrl
r0056
r0071
P1800
P1802
P1820
α
P1825 *)
P1826 *)
CO: Act pulse freq [kHz]
r1801
Modulator
φ
Slip
determi-
nation
CO: Slip frequency [%]
r0065
CO: Act. outp freq [Hz]
r0066
Oscillation
damping
Oscill. damp. gain
0.000 ... 10.000
P1740 (0.000)
only SLVC:
speed to speed controller

3 Faults and Alarms

3.1 Fault messages

In the event of a failure, the inverter switches off and a fault code appears on the display.

NOTE
To reset the fault code, one of three methods listed below can be used:

1. Cycle the power to the drive.
2. Press the Fn button on the BOP or AOP.
3. Via Digital Input 3 (default setting)

Fault messages are stored in parameter r0947 under their code number (e.g. F0003 = 3). The associated error value is found in parameter r0949. The value 0 is entered if a fault has no error value. It is furthermore possible to read out the point in time that a fault occurred (r0948) and the number of fault messages (P0952) stored in Parameter r0947.

F0001 OverCurrent STOP II

Cause
Motor power (P0307) does not correspond to the inverter power (r0206)
- Motor lead short circuit
- Earth faults

Diagnosis & Remedy
Check the following:
- Motor power (P0307) must correspond to inverter power (r0206).
- Cable length limits must not be exceeded.
- Motor cable and motor must have no short-circuits or earth faults
- Motor parameters must match the motor in use
- Value of stator resistance (P0350) must be correct
- Motor must not be obstructed or overloaded
- Increase the ramp time
- Reduce the boost level

F0002 OverVoltage STOP II

Cause
DC-link voltage (r0026) exceeds trip level (P2172)

NOTE
Overvoltage can be caused either by too high main supply voltage or if motor is in regenerative mode. Regenerative mode can be cause by fast ramp downs or if the motor is driven from an active load.

Diagnosis & Remedy
Check the following:
- Supply voltage (P0210) must lie within limits indicated on rating plate .
- DC-link voltage controller must be enabled (P1240) and parameterized properly.
- Ramp-down time (P1121) must match inertia of load.
- Required braking power must lie within specified limits.

NOTE
Higher inertia requires longer ramp times; otherwise, apply braking resistor.

F0003 UnderVoltage STOP II

Cause
- Main supply failed.
- Shock load outside specified limits.

Diagnosis & Remedy

Check the following:
- Supply voltage (P0210) must lie within limits indicated on rating plate.
- Supply must not be susceptible to temporary failures or voltage reductions.

F0004 Inverter Over Temperature STOP II

Cause
- Ventilation inadequate
- Ambient temperature is too high.

Diagnosis & Remedy

Check the following:
- Fan must turn when inverter is running
- Pulse frequency must be set to default value
- Ambient temperature could be higher than specified for the inverter

Additional meaning for Mega Master:
- P949 = 1: Rectifier overtemperature
- P949 = 2: Ambient overtemperature
- P949 = 3: EBOX overtemperature

F0005 Inverter I2T STOP II

Cause
- Inverter overloaded.
- Duty cycle too demanding.
- Motor power (P0307) exceeds inverter power capability (r0206).

Diagnosis & Remedy

Check the following:
- Load duty cycle must lie within specified limits.
- Motor power (P0307) must match inverter power (r0206)

F0011 Motor Over Temperature STOP II

Cause

Motor overloaded

Diagnosis & Remedy

Check the following:
- Load duty cycle must be correct
- Motor nominal overtemperatures (P0626-P0628) must be correct
- Motor temperature warning level (P0604) must match

F0012 Inverter temp. signal lost STOP I

Cause

Wire breakage of inverter temperature (heatsink) sensor

F0015 Motor temperature signal lost STOP II

Cause

Open or short circuit of motor temperature sensor. If signal loss is detected, temperature monitoring switches over to monitoring with the motor thermal model.

F0020 Mains Phase Missing STOP II

Cause

Fault occurs if one of the three input phases are missed and the pulses are enabled and drive is loaded

Diagnosis & Remedy

check the input wiring of the mains phases

F0021 Earth fault STOP II

Cause

Fault occurs if the sum of the phase currents is higher than
5 % of the nominal inverter current.

NOTE

This fault only occurs on inverters
that have 3 current sensors. Framesizes D to F

F0022 HW monitoring active STOP II

Cause

That hardware fault (P0947 = 22 and P0949 = 1) caused by the following events:
(1) DC-link overcurrent = short circuit of IGBT
(2) Short circuit of chopper
(3) Earth fault
(4) I/O board is not properly inserted.

- Framesizes A to C (1),(2),(3),(4)
- Framesizes D to E (1),(2),(4)
- Framesize F (2),(4)

Since all these faults are assigned to one signal on the power stack, it is not possible to establish which one actually occurred.
The following faults (UCE and I2C) occur for frame size FX / GX only:

- UCE failure was detected, when P0947 = 22 and fault value P0949 = 12 or 13 or 14, depending on UCE.
- I2C-Bus read out error, when P0947 = 22 and fault value P0949 = 21 (The power has to be switched off/on).

Diagnosis & Remedy

First you must see if the fault is permanent (i.e. the inverter cannot be started without the fault occurring) or sporadic (occurs occasionally or in certain defined operating conditions).
Permanent F0022 fault:

- Check the I/O board. It has to be fully pressed home.
- Is there an earth fault or short circuit on the output of the inverter or in an IGBT ? Disconnecting the motor cables will establish which of these.
  In the case where the fault occurs permanently when all external wiring (apart from mains) is disconnected, then the unit almost certainly has a defect and should be repaired.

Sporadic F0022 fault:
This should be treated as "overcurrent". The following may cause the sporadic occurrence of F0022:

- Sudden load changes or mechanical blockages.
- Very short ramp times.
- If the Sensorless Vector Control is badly optimised.
- If an incorrect braking resistor of too low a resistance is fitted.

F0023 Output fault STOP II

Cause

One phase of output is disconnected

F0024 Rectifier Over Temperature STOP II

Cause
- Ventilation inadequate
- Fan inoperative
- Ambient temperature is too high.

Diagnosis & Remedy

Check the following:
- Fan must turn when inverter is running
- Pulse frequency must be set to default value
- Ambient temperature could be higher than specified for the inverter

F0030 Fan has failed STOP II

Cause

Fan no longer working

Diagnosis & Remedy
- Fault cannot be masked while options module (AOP or BOP) is connected.
- Need a new fan.

F0035 Auto restart after n STOP II

Cause

Auto restart attempts exceed value of P1211.

F0040 Automatic Calibration Failure STOP II

Cause

MM 440 only

F0041 Motor Data Identification Failure STOP II

Cause

Motor data identification failed.
Alarm value = 0: Load missing
Alarm value = 1: Current limit level reached during identification.
Alarm value = 2: Identified stator resistance less than 0.1% or greater than 100%.
Alarm value = 3: Identified rotor resistance less than 0.1% or greater than 100%.
Alarm value = 4: Identified stator reactance less than 50% and greater than 500%
Alarm value = 5: Identified main reactance less than 50% and greater than 500%
Alarm value = 6: Identified rotor time constant less than 10ms or greater than 5s
Alarm value = 7: Identified total leakage reactance less than 5% and greater than 50%
Alarm value = 8: Identified stator leakage reactance less than 25% and greater than 250%
Alarm value = 9: Identified rotor leakage inductance less than 25% and greater than 250%
Alarm value = 20: Identified IGBT on-voltage less than 0.5 or greater than 10V
Alarm value = 30: Current controller at voltage limit
Alarm value = 40: Inconsistence of identified data set, at least one identification failed
Percentage values based on the impedance Zb = Vmot,nom / sqrt(3) / Imot,nom

Diagnosis & Remedy

Check the following:
- 0: Check that the motor is connected to the inverter.
- 1-40: Check if motor data in P0304 P0311 are correct.
- Check what type of motor wiring is required (star, delta).

F0042 Speed Control Optimisation Failure STOP II

Cause
- Motor data identification failed.
- Alarm value = 0: Time out waiting for stable speed
- Alarm value = 1: Inconsistent readings

F0051 Parameter EEPROM Fault STOP II

Cause
Read or write failure while saving non-volatile parameter.

Diagnosis & Remedy
- Factory Reset and new parameterization
- Change drive

F0052 power stack Fault STOP II

Cause
Read failure for power stack information or invalid data.

Diagnosis & Remedy
Change drive

F0053 IO Eeprom Fault STOP II

Cause
Read failure for IO EEPROM information or invalid data.

Diagnosis & Remedy
- Check data
- Change IO module

F0054 Wrong IO Board STOP II

Cause
- Wrong IO board is connected.
- No ID detected on IO board, No data.

Diagnosis & Remedy
- Check data
- Change IO module

F0060 Asic Timeout STOP II

Cause
Internal communications failure

Diagnosis & Remedy
- If fault persists, change inverter
- Contact Service Department

F0070 CB setpoint fault STOP II

Cause
No setpoint values from CB (communication board) during telegram off time
Diagnosis & Remedy
Check CB and communication partner

F0071 USS (BOP-link) setpoint fault STOP II

Cause
No setpoint values from USS during telegram off time
Diagnosis & Remedy
Check USS master

F0072 USS (COMM link) setpoint fault STOP II

Cause
No setpoint values from USS during telegram off time
Diagnosis & Remedy
Check USS master

F0080 ADC lost input signal STOP II

Cause
- Broken wire
- Signal out of limits

F0085 External Fault STOP II

Cause
External fault triggered via terminal inputs
Diagnosis & Remedy
Disable terminal input for fault trigger.

F0090 Encoder feedback loss STOP II

Cause
Signal from Encoder lost (check alarm value r0949):
Diagnosis & Remedy
- Alarm value = 0: Encoder signal lost.
- Alarm value = 5: Encoder not configured in P0400, but required for sensored control (P1300 = 21 or 23).
- Alarm value = 6: Encoder module not found, but configured in P0400.
- Check connections between encoder and inverter. Check that encoder not faulty (select P1300 = 0, run at fixed speed, check encoder feedback signal in r0061)
- Increase encoder loss threshold in P0492

F0101 Stack Overflow STOP II

Cause
Software error or processor failure

Diagnosis & Remedy
Run self test routines

F0221 PID Feedback below min. value STOP II

Cause
PID Feedback below min. value P2268.

Diagnosis & Remedy
- Change value of P2268.
- Adjust feedback gain.

F0222 PID Feedback above max. value STOP II

Cause
PID feedback above max. value P2267.

Diagnosis & Remedy
- Change value of P2267.
- Adjust feedback gain.

F0450 BIST Tests Failure STOP II

Cause
Fault value:
1. Some power section tests have failed
2. Some control board tests have failed
4. Some functional tests have failed
8. Some IO module tests have failed. (MM 420 only)
16. Internal RAM failed on power-up check

Diagnosis & Remedy
Drive may run but some features will not work properly. Replace drive.

F0452 Belt Failure Detected STOP II

Cause
Load conditions on motor indicate belt failure or mechanical fault.

Diagnosis & Remedy
Check the following:
1. No breakage, seizure or obstruction of drive train.
2. If using an external speed sensor, check for correct function. Check parameters:
   - P2192 (delay time for permitted deviation)
3. If using the torque envelope, check parameters:
   - P2182 (threshold frequency f1)
   - P2183 (threshold frequency f2)
   - P2184 (threshold frequency f3)
   - P2185 (upper torque threshold 1)
   - P2186 (lower torque threshold 1)
   - P2187 (upper torque threshold 2)
   - P2188 (lower torque threshold 2)
   - P2189 (upper torque threshold 3)
   - P2190 (lower torque threshold 3)
   - P2192 (delay time for permitted deviation)
4. Apply lubrication if required.

3.2 Alarm Messages

Alarm messages are stored in parameter r2110 under their code number (e.g. A0503 = 503) and can be read out from there.

A0501 Current Limit

Cause
- Motor power does not correspond to the inverter power
- Motor leads are too long
- Earth faults

Diagnosis & Remedy

Check the following:
- Motor power (P0307) must correspond to inverter power (r0206).
- Cable length limits must not be exceeded.
- Motor cable and motor must have no short-circuits or earth faults
- Motor parameters must match the motor in use
- Value of stator resistance (P0350) must be correct
- Motor must not be obstructed or overloaded
- Increase the ramp-up-time.
- Reduce the boost.

A0502 Overvoltage limit

Cause

Overvoltage limit is reached.

This warning is generated,
- if the dc-link controller is disabled (P1240 = 0).
- if pulses are enabled
- if actual dc voltage r0026 > r1242.

Diagnosis & Remedy

If this warning is displayed permanently, check drive input voltage .

A0503 UnderVoltage Limit

Cause
- Main supply failed
- Main supply (P0210) and consequently DC-link voltage (R0026) below specified limit (P2172).

Overvoltage can be caused either by too high main supply voltage or if motor is in regenerative mode.

Diagnosis & Remedy

Check main supply voltage (P0210).

A0504 Inverter OverTemperature

Cause

Warning level of inverter heat-sink temperature (P0614) is exceeded, resulting in pulse frequency reduction and/or output frequency reduction (depending on parameterization in (P0610)

Diagnosis & Remedy

Check the following:
- Ambient temperature must lie within specified limits
- Load conditions and duty cycle must be appropriate

A0505 Inverter I2T

Cause

Warning level exceeded, current will be reduced if parameterized (P0610 = 1)

Diagnosis & Remedy

Check that duty cycle lies within specified limits

A0506 Inverter duty cycle

Cause

Difference between heatsink and IGBT junction temperature exceeds warning limits

Diagnosis & Remedy

Check that duty cycle and shock loads lie within specified limits

A0511 Motor Over Temperature

Cause
- Motor overloaded.
- Load duty cycle too high.

Diagnosis & Remedy

Independently of the kind of temperature determination check:
- P0604 motor temperature warning threshold
- P0625 motor ambient temperature
- If (P0601 = 0 or 1) Check the following:
  1. Check if name plate data are correct (if not perform quick commissioning)
  2. Accurate equivalent circuit data can be found by performing motor identification (P1910=1).
  3. Check if motor weight (P0344) is reasonable. Change if necessary.
  4. Via P0626, P0627, P0628 the standard overtemperatures can be changed, if the motor is not a Siemens standard motor.
- If (P601 = 2) Check the following:
  1. Check if temperature shown in r0035 is reasonable.
  2. Check if the sensor is a KTY84 (other sensors are not supported)

A0512 Motor temperature signal lost

Cause

Wire break to motor temperature sensor. If a wire breakage is be detected, temperature monitoring switches over to monitoring with the motor thermal model.

A0520 Rectifier OverTemperature

Cause

Warning level of rectifier heat-sink temperature (P) is exceeded

Diagnosis & Remedy

Check the following:
- Ambient temperature must lie within specified limits
- Load conditions and duty cycle must be appropriate
- Fan must turn when drive is running

A0521 Ambient OverTemperature

Cause

Warning level of ambient temperature (P) is exceeded

Diagnosis & Remedy

Check the following:
- Ambient temperature must lie within specified limits
- Fan must turn when drive is running
- Fan intake air has to be without any resistance

A0522 I2C read out timeout

Cause

the cyclic access to the UCE Values and powerstack temperatures via the i2c bus (Mega Master) is disturbed

A0523 Output fault

Cause

One phase of output is disconnected

Diagnosis & Remedy

Warning can be masked.

A0535 Braking Resistor Hot

A0541 Motor Data Identification Active

Cause

Motor data identification (P1910) selected or running

A0542 Speed Control Optimisation Active

Cause
Speed Control Optimisation (P1960) is selected or running

A0590 Encoder feedback loss warning

Cause
Signal from Encoder lost; Inverter might have switched to sensorless vector control(check also alarm value r0949):

Diagnosis & Remedy
Stop inverter and then
- Check encoder fitted. If encoder fitted and r0949 = 5, select encoder type via P0400.
- If encoder fitted and r0949 = 6, check connections between encoder module and inverter.
- If encoder not fitted and r0949 = 5, select SLVC mode (P1300 = 20 or 22).
- If encoder not fitted and r0949 = 6, set P0400 = 0.
- Check connections between encoder and inverter
- Check that encoder not faulty (select P1300 = 0, run at fixed speed, check encoder feedback signal in r0061)
- Increase encoder loss threshold in P0492

A0600 RTOS Overrun Warning

A0700 CB warning 1 see CB manual for details.

A0701 CB warning 2 see CB manual for details.

A0702 CB warning 3 see CB manual for details.

A0703 CB warning 4 see CB manual for details.

A0704 CB warning 5 see CB manual for details.

A0705 CB warning 6 see CB manual for details.

A0706 CB warning 7 see CB manual for details.

A0707 CB warning 8 see CB manual for details.

A0708 CB warning 9 see CB manual for details.

A0709 CB warning 10 see CB manual for details.

A0710 CB communication error

Cause
Communication with CB (communication board) is lost

Diagnosis & Remedy
Check CB hardware

A0711 CB configuration error

Cause
CB (communication board) reports a configuration error.

Diagnosis & Remedy
Check CB parameters

A0910 Vdc-max controller de-activated

Cause

Vdc max controller has been de-activated, since controller is not capable of keeping DC-link voltage (r0026) within limits (P2172).

- Occurs if main supply voltage (P0210) is permanently too high.
- Occurs if motor is driven by an active load, causing motor to goes into regenerative mode.
- Occurs at very high load inertias, when ramping down.

Diagnosis & Remedy

Check the following:

- Input voltage (P0210) must lie within range.
- Load must be match.

A0911 Vdc-max controller active

Cause

Vdc max controller is active; so ramp-down times will be increased automatically to keep DC-link voltage (r0026) within limits (P2172).

A0912 Vdc-min controller active

Cause

- Vdc min controller will be activated if DC-link voltage (r0026) falls below minimum level (P2172).
- The kinetic energy of the motor is used to buffer the DC-link voltage, thus causing deceleration of the drive!
- So short mains failures do not necessarily lead to an undervoltage trip.

A0920 ADC parameters not set properly.

Cause

ADC parameters should not be set to identical values, since this would produce illogical results.

- Index 0: Parameter settings for output identical
- Index 1: Parameter settings for input identical
- Index 2: Parameter settings for input do not correspond to ADC type

A0921 DAC parameters not set properly.

Cause

DAC parameters should not be set to identical values, since this would produce illogical results.

- Index 0: Parameter settings for output identical
- Index 1: Parameter settings for input identical
- Index 2: Parameter settings for output do not correspond to DAC type

A0922 No load applied to inverter

Cause

No Load is applied to the inverter. As a result, some functions may not work as under normal load conditions.

A0923 Both JOG Left and JOG Right are requested

Cause

Both JOG right and JOG left (P1055/P1056) have been requested. This freezes the RFG output frequency at its current value.

Diagnosis & Remedy

Do not press JOG right and left simulutanously.

A0952 Belt Failure Detected

Cause

Load conditions on motor indicate belt failure or mechanical fault.

Diagnosis & Remedy

Check the following:

1. No breakage, seizure or obstruction of drive train.
2. If using an external speed sensor, check for correct function. Check parameters:
   - P0409 (pulse per min at rated speed).
   - P2191 (Belt failure speed tolerance).
   - P2192 (delay time for permitted deviation)
3. If using the torque envelope, check parameters:
   - P2182 (threshold frequency f1)
   - P2183 (threshold frequency f2)
   - P2184 (threshold frequency f3)
   - P2185 (upper torque threshold 1)
   - P2186 (lower torque threshold 1)
   - P2187 (upper torque threshold 2)
   - P2188 (lower torque threshold 2)
   - P2189 (upper torque threshold 3)
   - P2190 (lower torque threshold 3)
   - P2192 (delay time for permitted deviation)
4. Apply lubrication if required.

A0936 PID Autotuning Active

Cause

PID Autotuning (P2350) selected or running

4 Abbreviations

AC	Alternating current
AD	Analog digital converter
ADC	Analog digital converter
ADR	Address
AFM	Additional frequency modification
AG	Automation unit
AIN	Analog input
AOP	Advanced operator panel
AOUT	Analog output
ASIC	Application-specific integrated circuit
ASP	Analog setpoint
ASVM	Asymmetric space vector modulation
BCC	Block check character
BCD	Binary-coded decimal code
BI	Binector input
BICO	Binector / connector
BO	Binector output
BOP	Basic operator panel
C	Commissioning
CB	Communication board
CCW	Counter-clockwise
CDS	Command data set
CI	Connector input
CM	Configuration management
CMD	Commando
CMM	Combimaster
CO	Connector output
CO/BO	Connector output / Binector output
COM	Common (terminal that is connected to NO or NC)
COM-Link	Communication link
CT	Commissining, ready to run
CT	Constant torque
CUT	Commissining, run, ready to run
CW	Clockwise
DA	Digital analog converter
DAC	Digital analog converter
DC	Direct current
DDS	Drive data set
DIN	Digital input
DIP	DIP switch
DOUT	Digital output
DS	Drive state
EEC	European Economic Community
EEPROM	Electrical erasable programmable read-only memory
ELCB	Earth leakage circuit breaker

EMC	Electro-magnetic compatibility
EMF	Electromotive force
EMI	Electro-magnetic interference
ESB	Equivalent circuit
FAQ	Frequently asked questions
FB	Function block
FCC	Flux current control
FCL	Fast current limit
FF	Fixed freqeuncy
FFB	Free function block
FOC	Field orientated control
FSA	Frame size A
GSG	Getting started guide
GUI ID	Global unique identifier
HIW	Main actual value
HSW	Main setpoint
HTL	High-threshold logic
I/O	Input and output
IBN	Commissioning
IGBT	Insulated gate bipolar transistor
IND	Sub-index
JOG	Jog
KIB	Kinetic buffering
LCD	Liguid crystal display
LED	Light emitting diode
LGE	Length
MHB	Motor holding brake
MM4	MICROMASTER 4th. Generation
MOP	Motor potentiometer
NC	Normally closed
NO	Normally open
NPN	Negative positive negative
OPI	Operating instructions
PDS	Power drive system
PID	PID controller (proportional, integral, derivative)
PKE	Parameter ID
PKW	Parameter ID value
PLC	Programmable logic controller
PLI	Parameter list
PNP	Positive negative positive
POT	Potentiometer
PPO	Parameter process data object
PTC	Positive temperature coefficient
PWE	Parameter value
PWM	Pulse-width modulation
PX	Power extension
PZD	Process data
QC	Quick commissioning
RAM	Random-access memory

RCCB	Residual current circuit breaker
RCD	Residual current device
RFG	Ramp function generator
RFI	Radio-frequency interference
RPM	Revolutions per minute
SCL	Scaling
SDP	Status display panel
SLVC	Sensorless vector control
STW	Control word
STX	Start of text
SVM	Space vector modulation
TTL	Transistor-transistor logic
USS	Universal serial interface
VC	Vector control
Vdc	DC-link voltage
VT	Variable torque
ZSW	Status word
ZUSW	Additional setpoint

Suggestions and/or Corrections

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Suggestions
Corrections

For Publication/Manual:
MICROMASTER 440
Parameter List

User Documentation

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Phone: _____ / _____
Fax: _____ / _____

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Should you come across any printing errors when reading this publication, please notify us on this sheet.

Suggestions for improvement are also welcome.

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