SIEMENS

MICROMASTER 440

Parameter List **Issue 08/02**

User Documentation
6SE6400-5BB00-0BP0

Available Documentation for the MICROMASTER 440

Getting Started Guide
Is for quick commissioning with SDP and BOP.

Operating Instructions
Gives information about features of the MICROMASTER440, Installation, Commissioning, Control modes, System Parameter structure, Troubleshooting, Specifications and available options of the MICROMASTER440.

Parameter List
The Parameterlist containes 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.

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MICROMASTER 440

Parameter List
User Documentation

Valid for Issue 08/02

Converter Type
MICROMASTER 440 Software Version V2.0

Parameter List 1

Function Diagrams 2

Alarms and Warnings 3

Issue 08/02

Warning

Please refer to all Definitiones 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

Approved Siemens Quality for Software and Training
is to DIN ISO 9001, Reg. No. 2160-01

Other functions not described in this document may be available. However, this fact shall not constitute an obligation to supply such functions with a new control, or when servicing.

We have checked that the contents of this document correspond to the hardware and software described. There may be discrepancies nevertheless, and no guarantee can be given that they are completely identical. The information contained in this document is reviewed regularly and any necessary changes will be included in the next edition. We welcome suggestions for improvement.

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Parameters MICROMASTER 440

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

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1 Parameters

1.1 Introduction to MICROMASTER 440 System Parameters

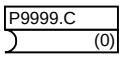
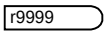
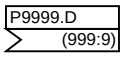
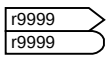
The layout of the parameter description is as follows.

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.

1.2 Quick commissioning (P0010=1)

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

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:

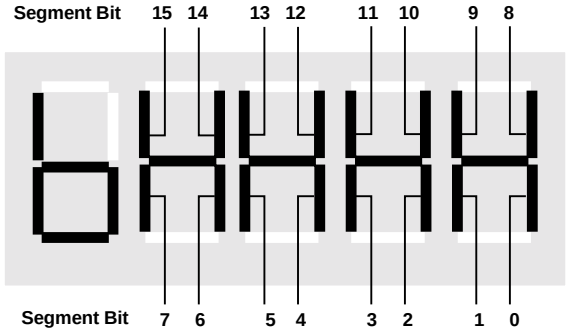
Set P0010=30.

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)

ParNr	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
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

ParNr	Parameter name
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 speed setpoint
P2152[3]	CI: Act. monitoring speed
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)

Number	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
r0370[3]	Stator resistance [%]
r0372[3]	Cable resistance [%]
r0373[3]	Rated stator resistance [%]

Number	Parameter name
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 speed signal loss
P0492[3]	Allowed speed difference
P0494[3]	Delay speed 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
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

Number	Parameter name
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
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 controller prop. gain

Number	Parameter name
P1341[3]	Imax controller integral time
P1345[3]	Imax controller prop. gain
P1346[3]	Imax controller 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.speed (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)
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 speed filter

Number	Parameter name
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 overspeed
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
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

Number	Parameter name
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-Parameter

P-Nr.	Parametername
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.

P-Nr.	Parametername
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-Parameter

P-Nr.	Parametername
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)

P-Nr.	Parametername
P2051[8]	CI: PZD to CB
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 Binektor Output-Parameter

P-Nr.	Parametername
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

P-Nr.	Parametername
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 Parameter

P-Nr.	Parametername
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. rotor speed
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 [%]
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

P-Nr.	Parametername
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
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
r2260	CO: PID setpoint after PID-RFG

P-Nr.	Parametername
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

P-Nr.	Parametername
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-Parameter

P-Nr.	Parametername
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
r0056	CO/BO: Status of motor control

P-Nr.	Parametername
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** Level: **1**

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

If P3900 is not 0 (0 is the default value), this parameter is automatically reset to 0.

P0011 **Lock for user defined parameter** Level: **3**

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

Details:

See parameter P0013 (user defined parameter)

P0012 **Key for user defined parameter** Level: **3**

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

Details:

See parameter P0013 (user defined parameter).

P0013[20]	**User defined parameter**				**Min:**	0	Level:
	CStat:	CUT	**Datatype:** U16	**Unit:** -	**Def:**	0	**3**
	P-Group:	FUNC	**Active:** first confirm	**QuickComm.** No	**Max:**	65535	

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

Instructions for use:
Step 1: Set P0003 = 3 (expert user)
Step 2: Go to P0013 indices 0 to 16 (user list)
Step 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)

Step 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:** -
P-Group: INVERTER **Def:** -
Max: -

Displays version number of installed firmware.

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

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

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:** -
P-Group: CONTROL **Def:** -
Max: -

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 (r0024) 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.

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.

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

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

P-Group: CONTROL

Displays motor power.

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 nominal current of the inverter is not exceed, 0 % utilization will be displayed.

If the current exceeds the threshold for P0294 (inverter I2t overload warning), alarm A0504 (inverter overtemperature) 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.

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 **Def:** 0 **Max:** 1

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

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:
	Datatype: U16	**Unit:** -	**Min:** - **Def:** -	**2**
	P-Group: COMMANDS		**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:
	Datatype: U16	**Unit:** -	**Min:** - **Def:** -	**2**
	P-Group: COMMANDS		**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**			**Min:** -	Level:
		Datatype: U16	**Unit:** -	**Def:** -	**2**
	P-Group: COMMANDS			**Max:** -	

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

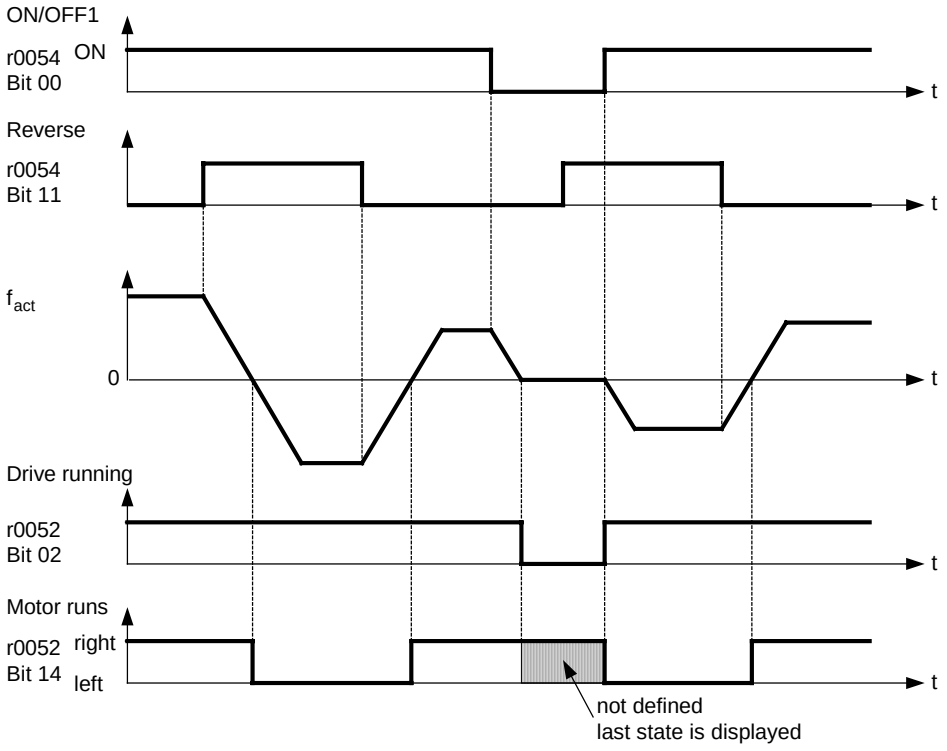
Bitfields:

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

Note:

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

r0052 Bit14 "Motor runs right"



The display segments for the status word are shown in the "Introduction to MICROMASTER System Parameters".

r0053	**CO/BO: Act. status word 2**			Level:
	Datatype: U16 **Unit:** -	**Min:** -		**2**
	P-Group: COMMANDS	**Def:** -		
		Max: -		

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	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. rotor speed** Level: **2**

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

P-Group: CONTROL

Displays current speed detected by encoder.

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

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

P-Group: CONTROL

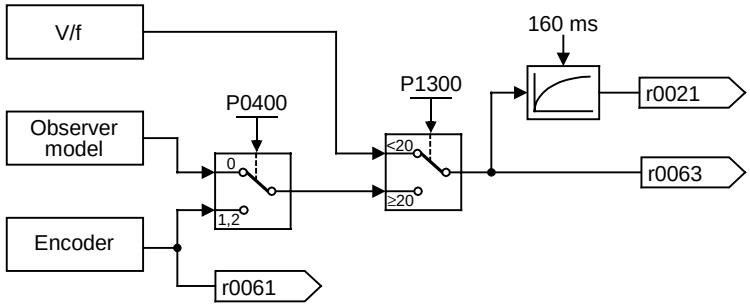
Displays speed setpoint of vector controller.

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

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

P-Group: CONTROL

Displays actual speed.



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 speed setpoint (r0062) and the actual speed (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.

This value is influenced by P0640 (max. output current), the derating characteristics and the thermal motor and inverter protection.

Dependency:

P0610 (motor I2t temperature reaction) defines reaction when limit is reached.

Note:

Normally, current limit = rated motor current (P0305) x motor current limit (P0640). It is less than or equal to maximum inverter current r0209.

The current limit may be reduced if the motor thermal model calculation indicates that overheating will occur.

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

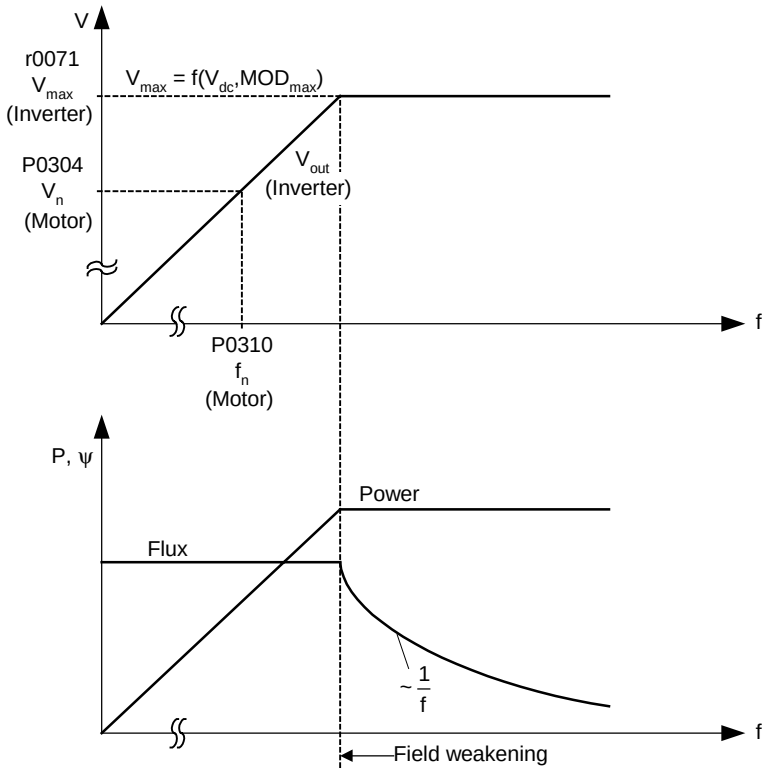
Displays (unfiltered) DC-link voltage.

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			Min: -	Level: 3
		Datatype: Float	Unit: V	Def: -	
	P-Group: CONTROL			Max: -	

Displays maximum output voltage.



Dependency:

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

r0072	CO: Act. output voltage			Min: -	Level: 3
		Datatype: Float	Unit: V	Def: -	
	P-Group: CONTROL			Max: -	

Displays output voltage.

r0074	CO: Act. modulation			Min: -	Level: 4
		Datatype: Float	Unit: %	Def: -	
	P-Group: CONTROL			Max: -	

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			Min: -	Level: 3
		Datatype: Float	Unit: A	Def: -	
	P-Group: CONTROL			Max: -	

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			Min: -	Level: 3
		Datatype: Float	Unit: A	Def: -	
	P-Group: CONTROL			Max: -	

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.

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

P-Group: CONTROL **Active:** first confirm **QuickComm.** No **Max:** 4000:0

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].

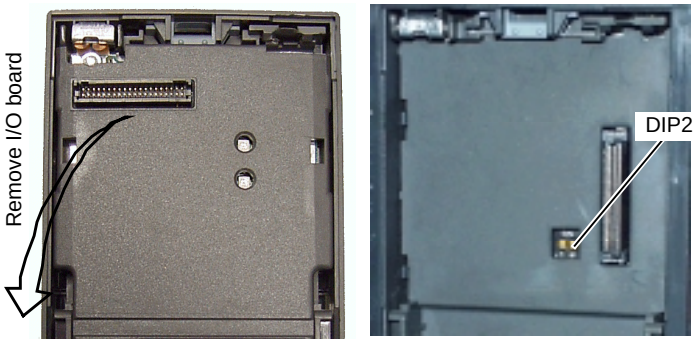
The default settings for the nominal rating plate frequency (P0310) and maximum motor frequency (P1082) are also set automatically here, in addition to reference frequency (P2000).

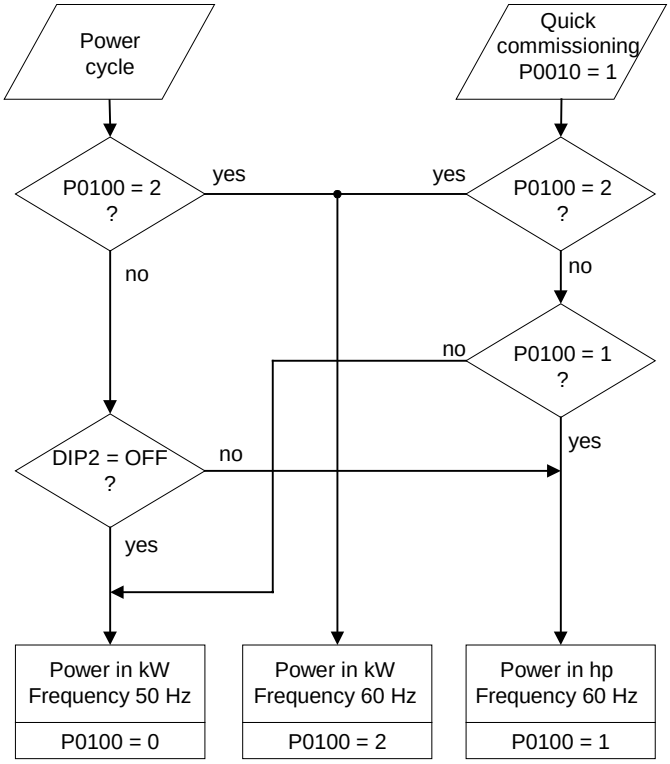
Possible Settings:

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

Dependency:

The setting of DIP switch 2 under the I/O board determines the validity of settings 0 and 1 for P0100 according to the diagram below:





Stop drive first (i.e. disable all pulses) before you change this parameter.

P0010 = 1 (commissioning mode) enables changes to be made.

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).

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**

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

Level: **3**

P-Group: INVERTER

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:** -
P-Group: INVERTER **Def:** -
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: -
P-Group: INVERTER **Max:** -

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**

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

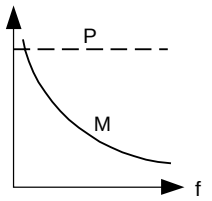
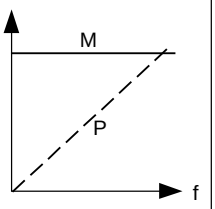
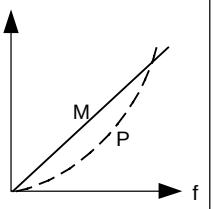
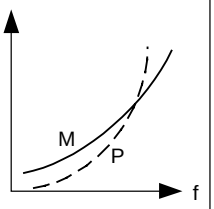
Level: **3**

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).

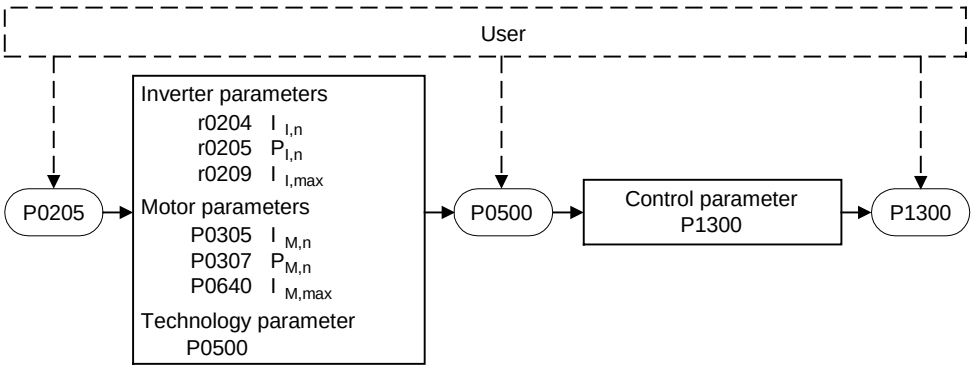
Constant torque (CT):
CT is used if the application needs a constant torque on the whole frequency range. Many loads can be considered to be constant torque loads. Typical constant torque loads are conveyors, compressors and positve displacement pumps (see diagram).

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	$M \sim f^2$
Power	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 with 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).

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

P-Group: INVERTER **Active:** Immediately **QuickComm.** No **Max:** 1000

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.

Dependency:

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.

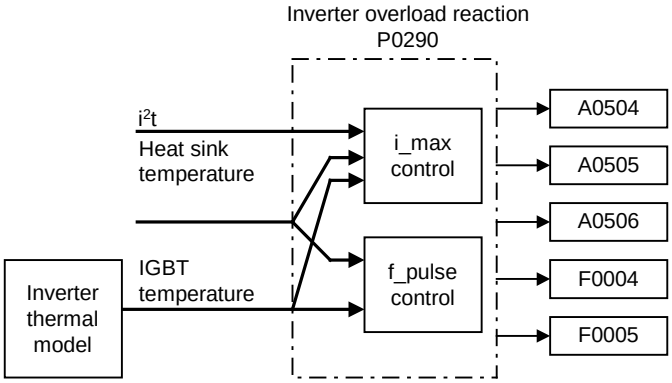
P0290 **Inverter overload reaction** Level: **3**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	INVERTER	**Active:** first confirm	**QuickComm.** No	**Def:**	2
				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 usually 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 eventually, if the action taken does not sufficiently reduce internal temperature.

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

P0291[3] **Inverter protection** Level: **4**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	INVERTER	**Active:** Immediately	**QuickComm.** No	**Def:**	1
				Max:	7

Control bit 0 for enabling/disabling automatic pulse frequency reduction at output frequencies below 2 Hz.

Bit 2 shows if phase loss dedection (input phase) of 3 phase inverters is enabled after factory reset. Default setting of phase loss is disabled for FSA - FSC. FSD and greater it is enabled.

Bitfields:

Bit00	Pulse frequency reduced below 2Hz	0	NO
		1	YES
Bit01	Reserved	0	NO
		1	YES
Bit02	Phase loss detection enable	0	NO
		1	YES

Index:

P0291[0] : 1st. Drive data set (DDS)
P0291[1] : 2nd. Drive data set (DDS)
P0291[2] : 3rd. Drive data set (DDS)

Details:

See P0290 (inverter overload reaction)

P0292 **Inverter overload warning** Level: **3**

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

Defines temperature difference (in [°C]) between inverter over-temperature trip and warning thresholds.

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 A0504 (inverter overtemperature) is generated.

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

Dependency:

Motor overload factor (P0640) reduced to 100 % at this point.

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** Level: **2**

CStat:	C	**Datatype:** U16	**Unit:** -	**Min:**	1
P-Group:	MOTOR	**Active:** first confirm	**QuickComm.** Yes	**Def:**	1
				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)

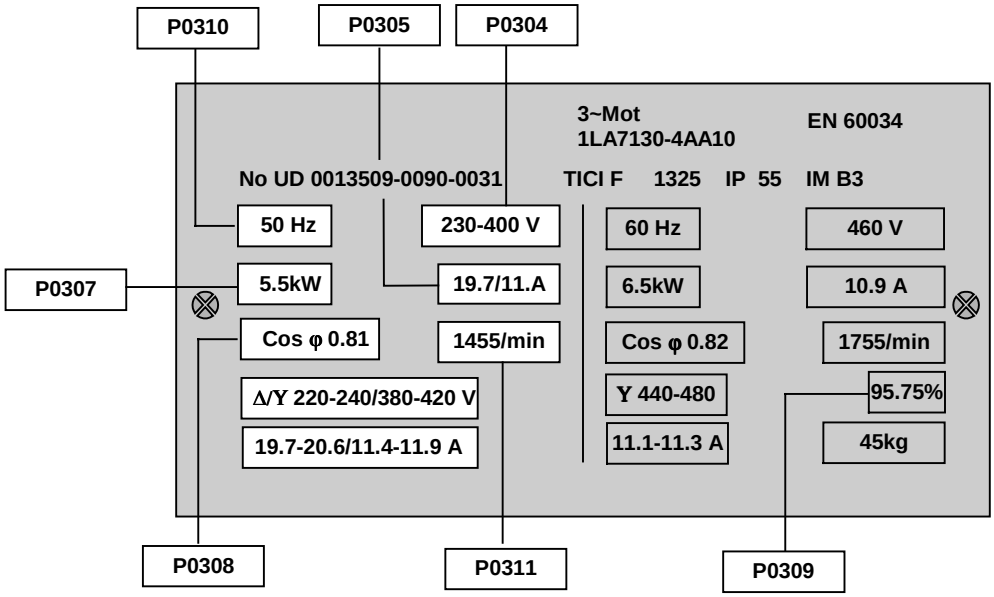
Dependency:

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)

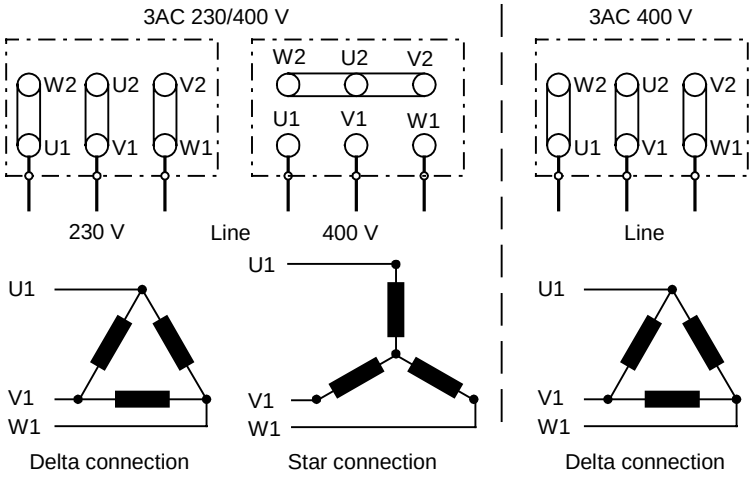
Dependency:

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:
CStat:	C	**Datatype:** Float	**Unit:** A	**Min:**	0.01	**1**
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 and FCC : $\frac{1}{8} \le \frac{P0305}{r0207}$

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

P0307[3] Rated motor power

						Level:
CStat:	C	**Datatype:** Float	**Unit:** -	**Min:**	0.01	**1**
P-Group:	MOTOR	**Active:** first confirm	**QuickComm.** Yes	**Def:**	0.75	
				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:
CStat:	C	**Datatype:** Float	**Unit:** -	**Min:**	0.000	**2**
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.

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
P-Group:	MOTOR	**Active:** Immediately	**QuickComm.** Yes	**Def:**	0.0
				Max:	99.0

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:	-
P-Group:	MOTOR			**Max:**	-

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:	-
P-Group:	MOTOR			**Max:**	-

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:	-
P-Group:	MOTOR			**Max:**	-

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**

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

P-Group: MOTOR

Level: **3**

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**

CStat: CT **Datatype:** U16 **Unit:** - **Min:** 0 **Def:** 0 **Max:** 3

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

Level: **2**

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 **Def:** 0 **Max:** 4

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

Level: **2**

Calculates various motor parameters, including:

P0344 Motor weight
P0346 Magnetization time
P0347 Demagnetization time
P0350 Stator resistance
P0611 Motor I2t time constant
P1253 Vdc-controller output limitation
P1316 Boost end frequency
P2000 Reference frequency
P2002 Reference current

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:

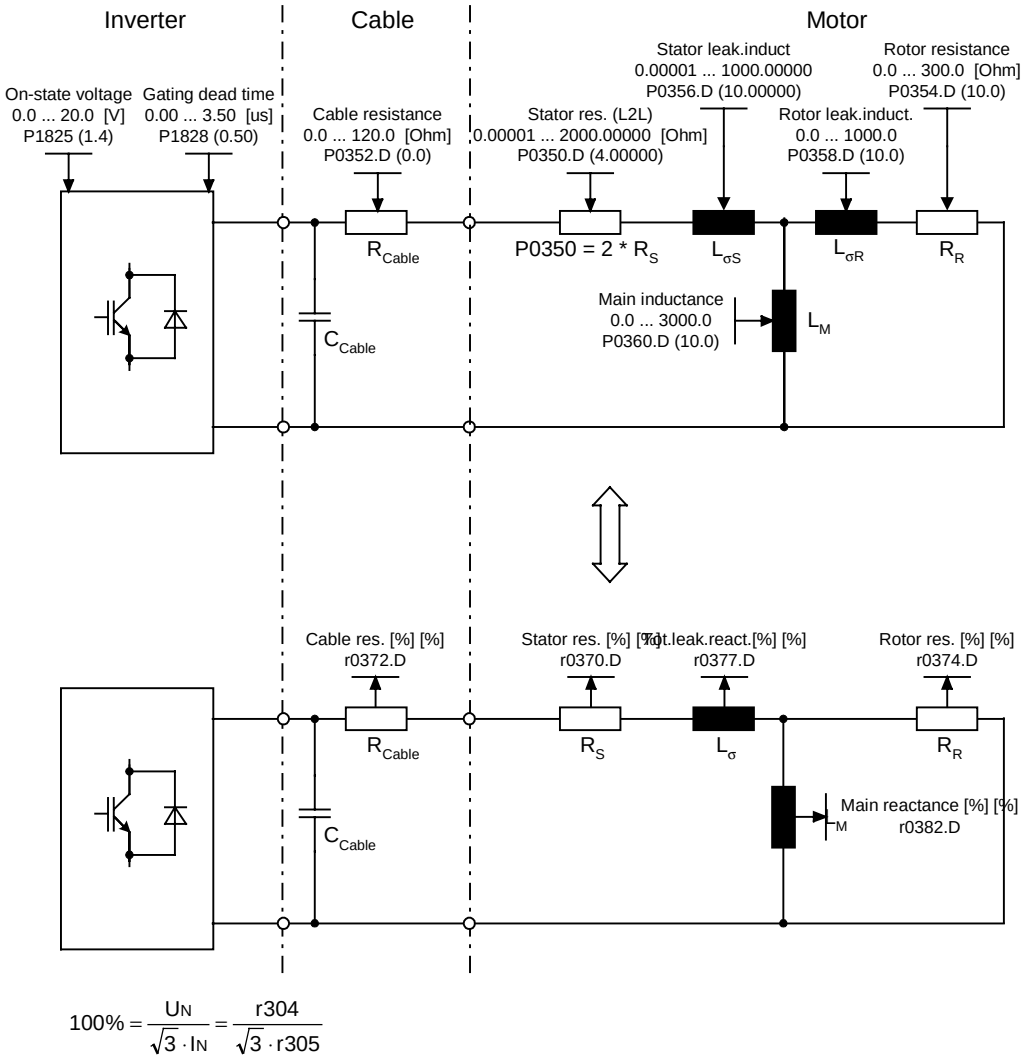
P0358[0] : 1st. Drive data set (DDS)
P0358[1] : 2nd. Drive data set (DDS)
P0358[2] : 3rd. Drive data set (DDS)

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.



$$100\% = \frac{U_N}{\sqrt{3} \cdot I_N} = \frac{r304}{\sqrt{3} \cdot r305}$$

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.

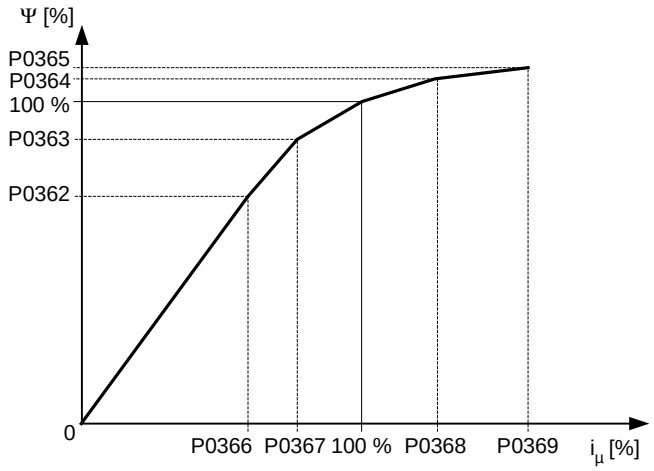
P0362[3] **Magnetizing curve flux 1**

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.



$$i_\mu[\%] = \frac{i_\mu[A]}{r0331}$$

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 [%].

Index:

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

Note:

100 % means : $Z_{ratedmot} \cdot \frac{P0304}{P0305}$

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 % means : $Z_{ratedmot} \cdot \frac{P0304}{P0305}$

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

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

P-Group: MOTOR

Level: **4**

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

Index:

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

Note:

100 % means : $Z_{ratedmot} \cdot \frac{P0304}{P0305}$

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

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

P-Group: MOTOR

Level: **4**

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

Index:

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

Note:

100 % means : $Z_{ratedmot} \cdot \frac{P0304}{P0305}$

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

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

P-Group: MOTOR

Level: **4**

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

Index:

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

Note:

100 % means : $Z_{ratedmot} \cdot \frac{P0304}{P0305}$

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

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

P-Group: MOTOR

Level: **4**

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

Index:

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

Note:

100 % means : $Z_{ratedmot} \cdot \frac{P0304}{P0305}$

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

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

P-Group: MOTOR

Level: **4**

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

Index:

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

Note:

100 % means : $Z_{ratedmot} \cdot \frac{P0304}{P0305}$

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 % means : $Z_{ratedmot} \cdot \frac{P0304}{P0305}$

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

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

Level: **3**

P-Group: MOTOR

Displays stator resistance of motor as [%] of combined stator/cable resistance.

Note:

100 % means : $Z_{ratedmot} \cdot \frac{P0304}{P0305}$

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 [%].

Note:

100 % means : $Z_{ratedmot} \cdot \frac{P0304}{P0305}$

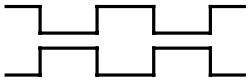
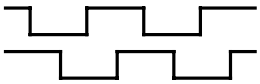
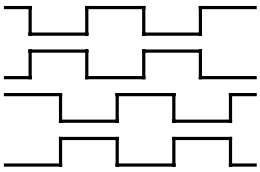
Notice:

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

P0400[3] **Select encoder type** Level: **2**

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

Selects encoder type.

Parameter	Terminal	Track	Encoder type
P0400 = 1	A		Single ended
	A AN		Differential
P0400 = 2	A B		Single ended
	A AN B BN		Differential

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)

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 !

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:** -
P-Group: COMMANDS **Def:** -
Max: -

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**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	2
P-Group:	ENCODER	**Active:** Immediately	**QuickComm.** No	**Def:**	1024
				Max:	20000

Level: **2**

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 speed signal loss**

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

Level: **2**

Selects reaction on loss of speed 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 speed difference**

CStat:	CT	**Datatype:** Float	**Unit:** Hz	**Min:**	0.00
P-Group:	ENCODER	**Active:** Immediately	**QuickComm.** No	**Def:**	10.00
				Max:	100.00

Level: **2**

Used for high speed encoder loss detection. Selects the allowable difference in calculated speed signals between samples before it is considered to have lost the speed signal feedback.

Dependency:

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

Caution:

When allowed speed difference is set to 0, both the high speed and low speed 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 speed loss reaction**

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

Level: **2**

Used for low speed encoder loss detection. If the motor shaft speed is less than the value in P0492 then encoder loss is detected using a low speed encoder loss detection algorithm. This parameter selects the delay between loss of encoder at low speed 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 speedloop optimisation is performed (P1960 = 1).

Caution:

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

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

P0500[3]	**Technological application**			**Min:**	0	Level:
	CStat: CT	**Datatype:** U16	**Unit:** -	**Def:**	0	**3**
	P-Group: TECH_APL	**Active:** first confirm	**QuickComm.** Yes	**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

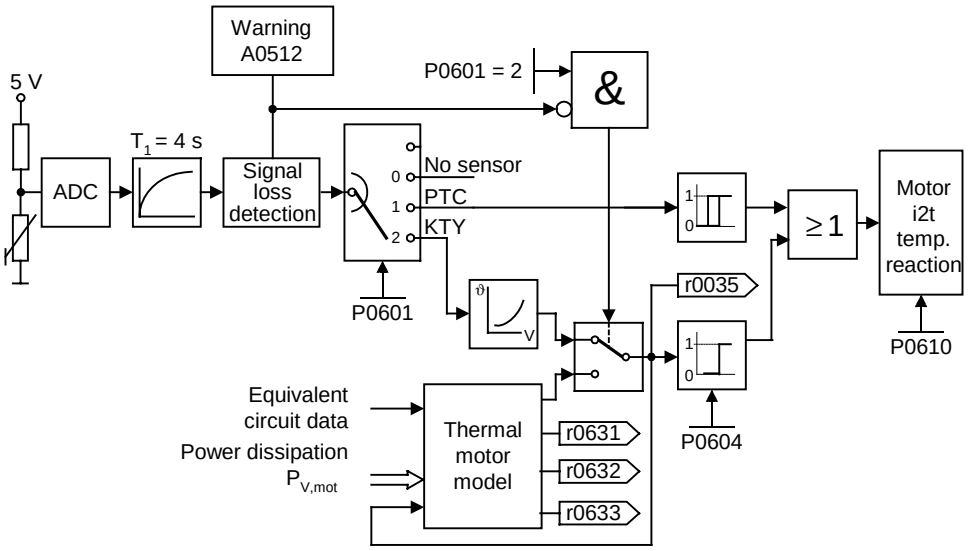
Index:

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 (Warning A0512). 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.



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 insulation class. Also refer to the table below in this context.

Insulation class	End temperature
A	100 °C
E	115 °C
B	120 °C
F	140 °C
H	165 °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 A5012 (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.

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.

$P0604 \geq P0625 + 40\ °C$

Note:

Default value depends on P0300 (select motor type).

P0610[3] **Motor I2t temperature reaction** Level: **3**

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

Defines reaction when motor temperature reaches warning threshold.

Possible Settings:

0 No reaction, warning only
1 Warning and Imax reduction (results in reduced output frequency)
2 Warning and 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:

Trip level = P0604 (motor temperature warning level) * 105 %

Note:

The purpose of motor I^2t is to calculate or measure the motor temperature and disable the inverter if the motor is in danger of overheating.

The motor temperature will be dependent on many factors, including the size of the motor, the ambient temperature, the previous history of the motor's loading, and of course, the load current. (The square of the current actually determines the heating of the motor and the temperature rises with time - hence I^2t).

Because most motors are cooled by built in fans running at motor speed, the speed of the motor is also important. Clearly a motor running at high current (maybe due to boost) and a low speed, will overheat more quickly than one running at 50 or 60 Hz, full load. The MM4 take account of these factors.

The drives also include inverter I^2t protection (i.e. overheating protection, see P0290) in order to protect the units themselves. This operates independently of the motor I^2t, and is not described here.

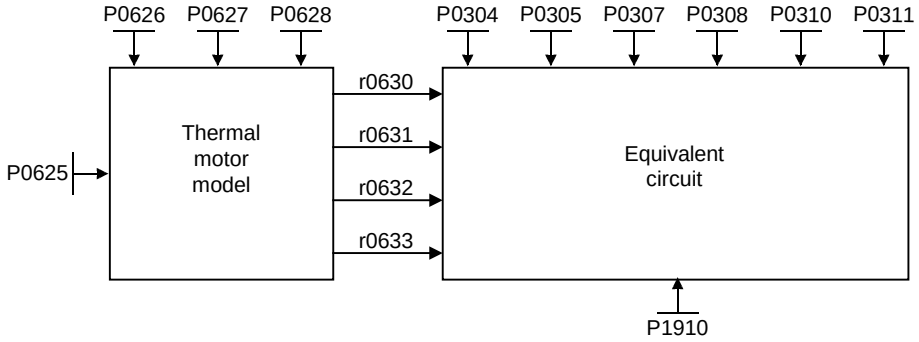
I^2t operation:
The measured motor current is displayed in r0027. The motor temperature in °C is now displayed in r0035. This temperature is derived either from a KTY84 temperature sensor mounted in the motor, or from a calculated value. The value from the KTY84 is used only when P0601 = 2; in all other cases (including loss of signal from the KTY84) the calculated figure is displayed. The MM440/MM430 uses a much more sophisticated model to calculate motor temperature than the MM410/MM411/MM420. Therefore many other parameters are involved, including, for example, P0625, the ambient temperature. Parameter P0604 can now be adjusted to set the threshold temperature in comparison with r0035.

P0610 will change the reaction as before.

P0625[3] **Ambient motor temperature** Level: **3**

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

Ambient temperature of motor at time of motor data identification.



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:

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

P0626[3] **Overtemperature stator iron** Level: **4**

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

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:** - **Def:** - **Max:** -

P-Group: MOTOR

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:** - **Def:** - **Max:** -

P-Group: MOTOR

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:** - **Def:** - **Max:** -

P-Group: MOTOR

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:** - **Def:** - **Max:** -

P-Group: MOTOR

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 [%]** Level: **2**

CStat: CUT **Datatype:** Float **Unit:** % **Min:** 10.0 **Def:** 150.0 **Max:** 400.0

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

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**			**Min:**	0	Level:
	CStat: CT	**Datatype:** U16	**Unit:** -	**Def:**	2	**1**
	P-Group: COMMANDS	**Active:** first confirm	**QuickComm.** Yes	**Max:**	6	

Selects digital command source.

Possible Settings:

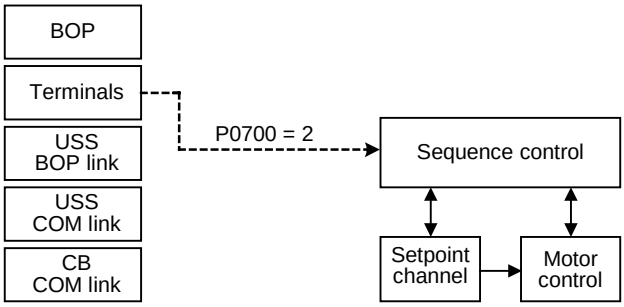
0 Factory default setting
1 BOP (keypad)
2 Terminal
4 USS on BOP link
5 USS on COM link
6 CB on COM link

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:

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**
P0840	722.0	19.0	722.0	2032.0	2036.0	2090.0
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
P0852	1.0	1.0	1.0	2032.3	2036.3	2090.3
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
P1113	722.1	19.11	722.1	2032.11	2036.11	2090.11
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
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
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

P0701[3] **Function of digital input 1** Level: **2**

CStat: CT **Datatype:** U16 **Unit:** - **Min:** 0 **Def:** 1 **Max:** 99

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

Selects function of digital input 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 **Def:** 12 **Max:** 99

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

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**

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

Level: **2**

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**

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 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** 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 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**

Min: - **Def:** - **Max:** -

Datatype: U16 **Unit:** -

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**

Min: 0 **Def:** 3 **Max:** 3

CStat: CT **Datatype:** U16 **Unit:** - **P-Group:** COMMANDS **Active:** Immediately **QuickComm.** No

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**

Min: 0 **Def:** 1 **Max:** 1

CStat: CT **Datatype:** U16 **Unit:** - **P-Group:** COMMANDS **Active:** Immediately **QuickComm.** No

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**

Min: - **Def:** - **Max:** -

Datatype: U16 **Unit:** -

P-Group: COMMANDS

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** Level: **2**

CStat:	CUT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.** No	**Def:**	52:7
				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

Note:

Other settings are possible in "Expert" mode (see P0003 - user access level).

P0733[3] **BI: Function of digital output 3** Level: **2**

CStat: CUT **Datatype:** U32 **Unit:** - **Min:** 0:0
P-Group: COMMANDS **Active:** first confirm **QuickComm.** No **Def:** 0:0
Max: 4000:0

Defines source of digital output 2.

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

Note:

Other settings are possible in "Expert" mode (see P0003 - user access level).

r0747 **CO/BO: State of digital outputs** Level: **3**

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

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
P-Group: COMMANDS **Active:** first confirm **QuickComm.** No **Def:** 0
Max: 7

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: -
P-Group: TERMINAL **Max:** -

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]**

Datatype: I16 **Unit:** - **Min:** - **Def:** - **Max:** -

Level: **2**

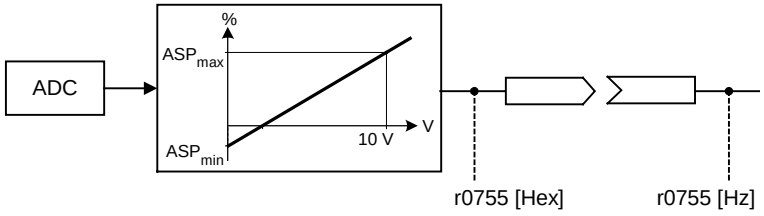
P-Group: TERMINAL

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:



$$r0755\,[Hz] = \frac{r0755\,[Hex]}{4000\,[Hex]} \cdot P2000 \cdot \frac{\max\left(\left|ASP_{max}\right|, \left|ASP_{min}\right|\right)}{100\%}$$

Index:

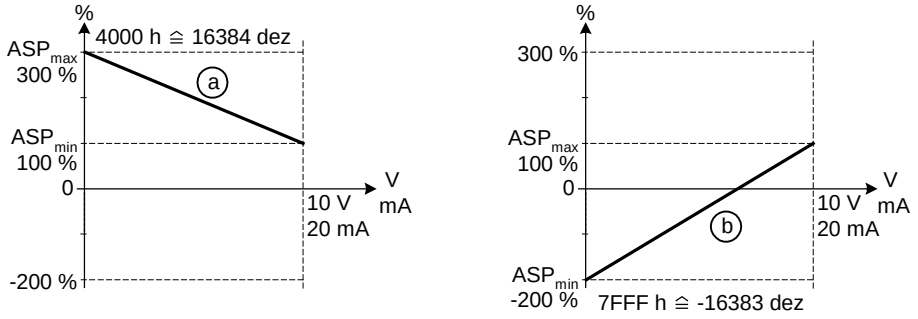
r0755[0] : Analog input 1 (ADC 1)
r0755[1] : Analog input 2 (ADC 2)

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.

$$4000\,h = \max\left(\left|ASP_{max}\right|, \left|ASP_{min}\right|\right)$$



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:

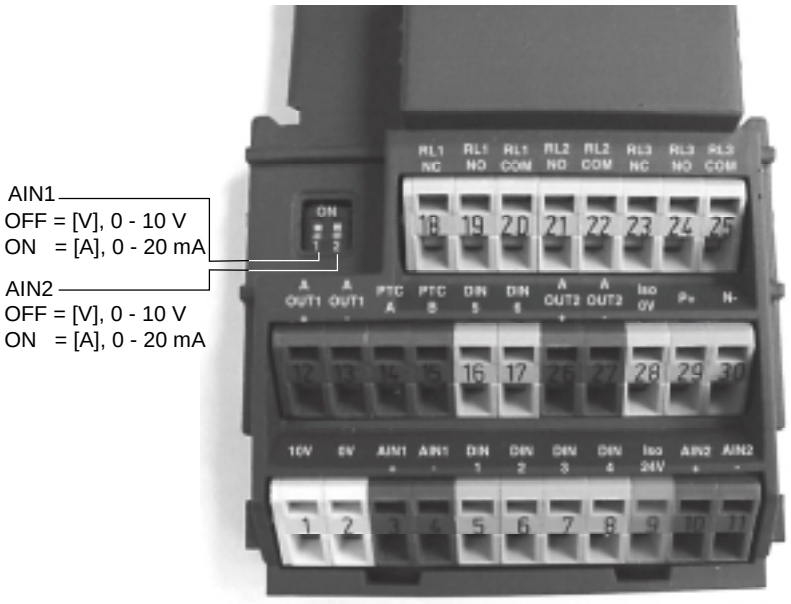
See parameters P0757 to P0760 (ADC scaling)

P0756[2]	**Type of ADC**			**Min:** 0	Level:
	CStat: CT	**Datatype:** U16	**Unit:** -	**Def:** 0	**2**
	P-Group: TERMINAL	**Active:** first confirm	**QuickComm.** No	**Max:** 4	

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)

Dependency:

Function disabled if analog scaling block programmed to output negative setpoints (see P0757 to P0760).

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).

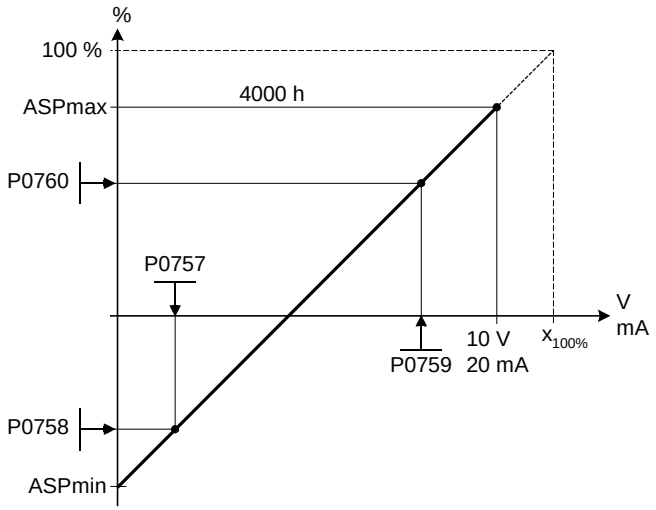
Details:

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:

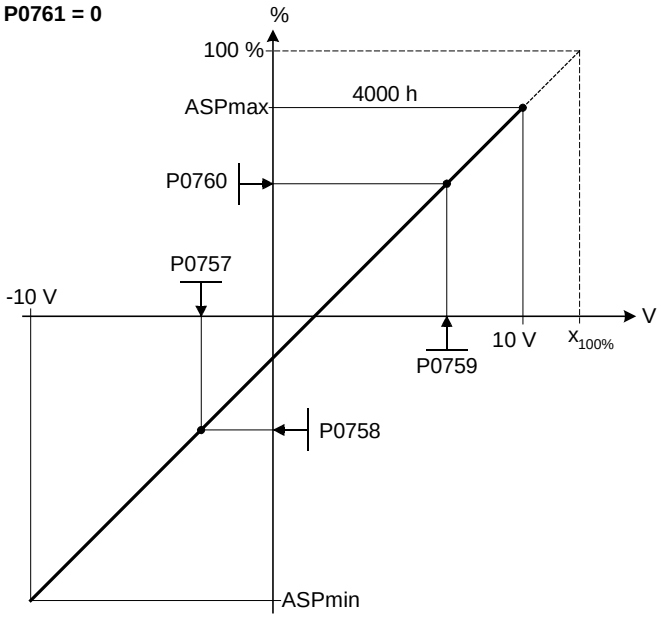
P0756 = 0 ... 3
P0761 = 0



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:

$$y = m \cdot x + y_0$$

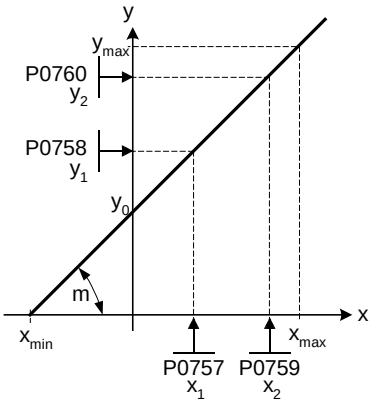
The transformation between these two forms is given by:

$$m = \frac{P0760 - P0758}{P0759 - P0757} \qquad y_0 = \frac{P0758 \cdot P0759 - P0757 \cdot P0760}{P0759 - P0757}$$

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)

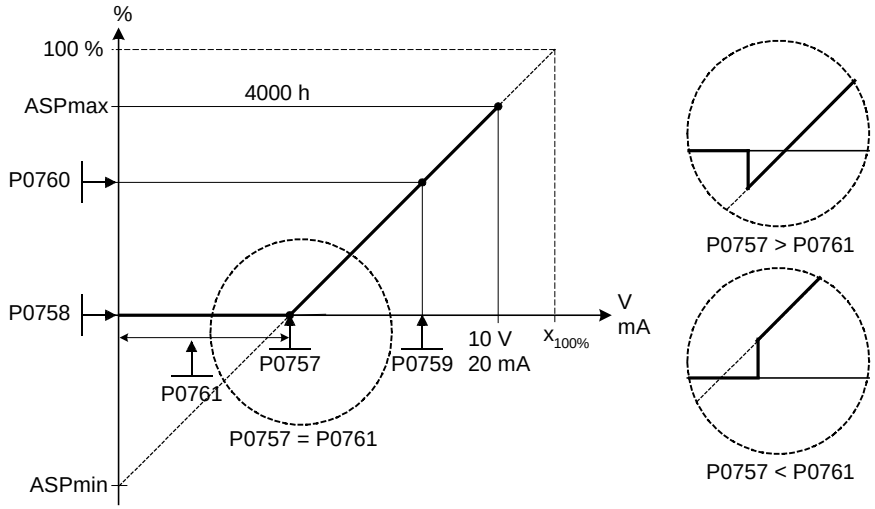
Example:

ADC value 2 to 10 V (0 to 50 Hz)
The below example produces a 2 to 10 V analog input (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

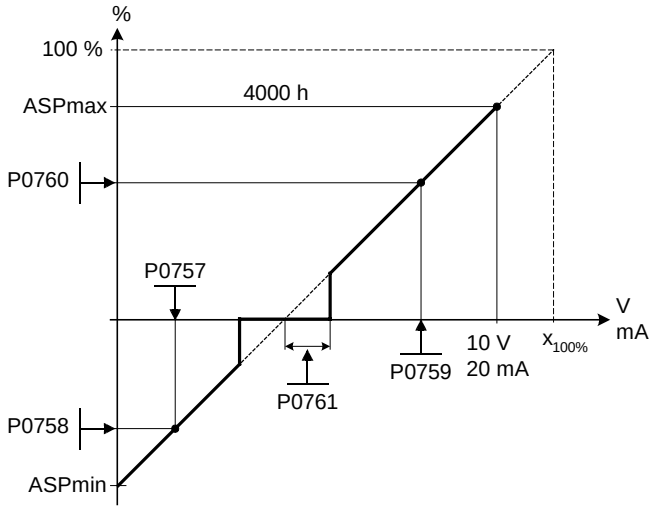
0 < P0758 < P0760 || 0 > P0758 > P0760



ADC value 0 to 10 V (-50 to +50 Hz):
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).
P2000 = 50 Hz
P0759 = 8 V P0760 = 75 %
P0757 = 2 V P0758 = -75 %
P0761 = 0.1 V

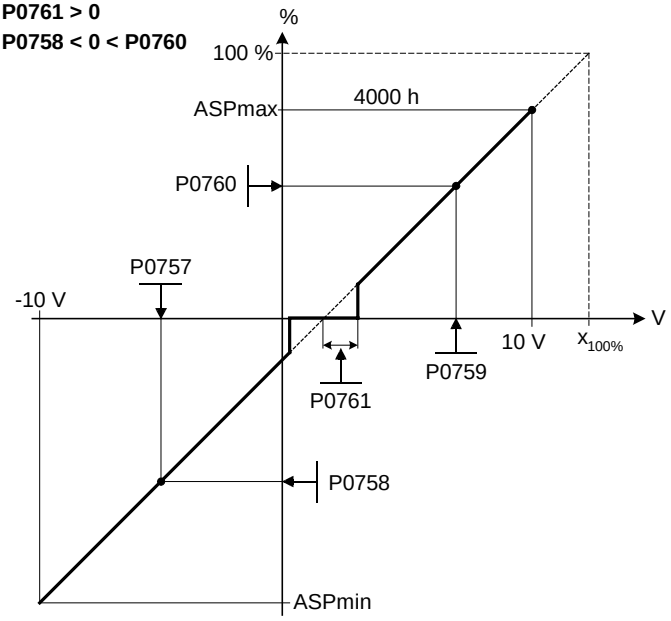
P0756 = 0 or 1

P0761 > 0
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
P0761 > 0
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

Level: **3**

CStat:	CUT	**Datatype:** U16	**Unit:** ms	**Min:**	0
P-Group:	TERMINAL	**Active:** Immediately	**QuickComm.** No	**Def:**	10
				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** Level: **3**

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

P-Group: TERMINAL

Displays number of analog outputs available.

P0771[2] **CI: DAC** Level: **2**

CStat: CUT **Datatype:** U32 **Unit:** - **Min:** 0:0 **Def:** 21:0 **Max:** 4000:0

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

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 **Def:** 2 **Max:** 1000

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

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:** - **Def:** - **Max:** -

P-Group: TERMINAL

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 **Def:** 0 **Max:** 1

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

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:

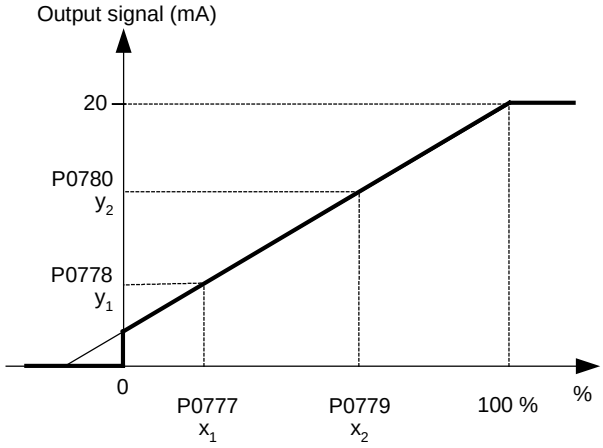
The analog output is designed as a current output with a range of 0...20 mA.

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**			**Min:**	-99999.0	Level:
	CStat: CUT	**Datatype:** Float	**Unit:** %	**Def:**	0.0	**2**
	P-Group: TERMINAL	**Active:** first confirm	**QuickComm.** No	**Max:**	99999.0	

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:

$$y = m \cdot x + y_0$$

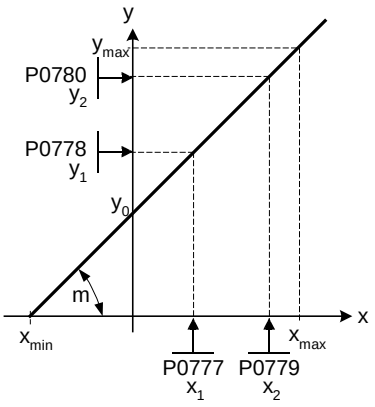
The transformation between these two forms is given by:

$$m = \frac{P0780 - P0778}{P0779 - P0777} \qquad y_0 = \frac{P0778 \cdot P0779 - P0777 \cdot P0780}{P0779 - P0777}$$

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.

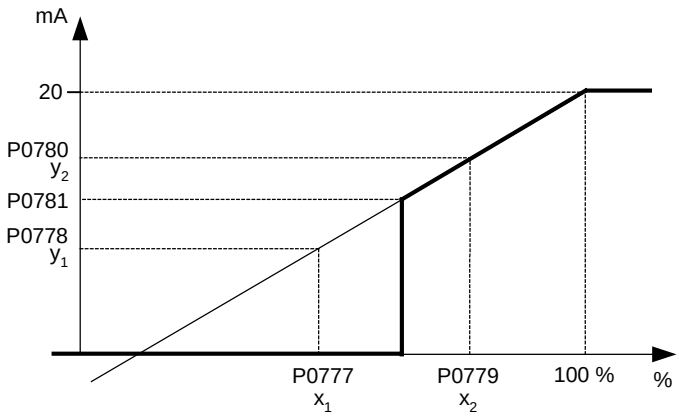
Index:

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**

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 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).

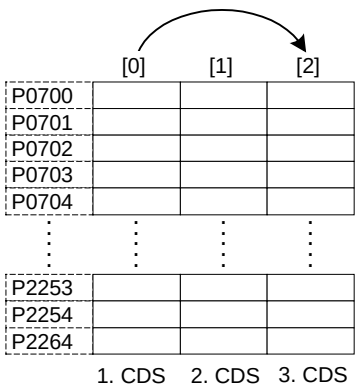
Index:

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:

P0819[0] = 0 1. CDS
P0819[1] = 2 3. CDS
P0819[2] = 1 Start copy

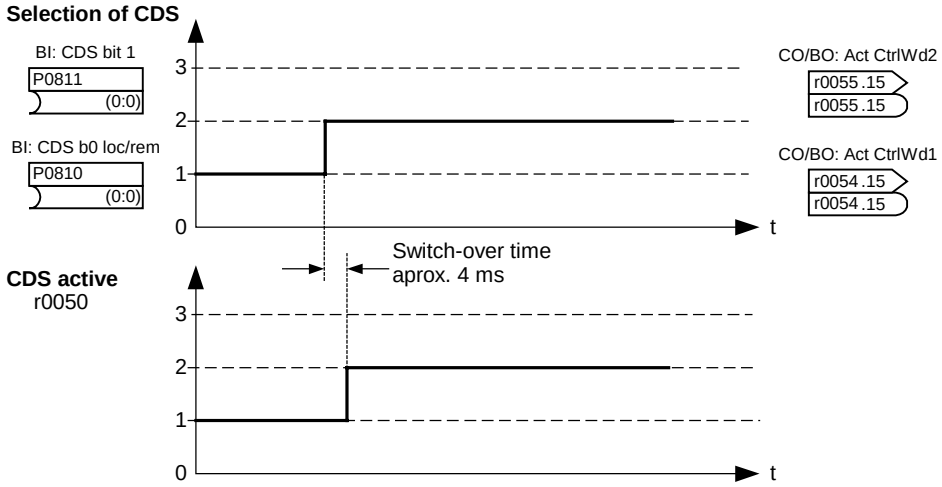


Note:

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

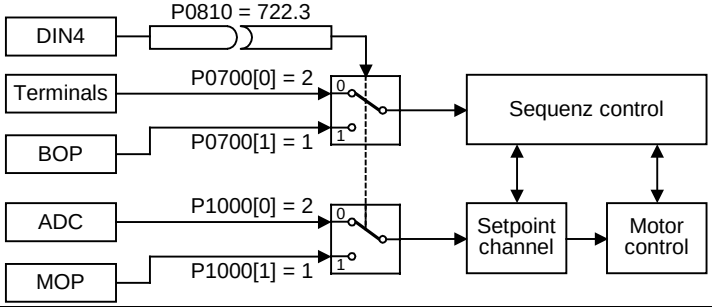
Common Settings:

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

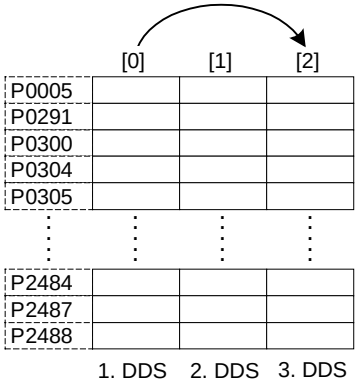
Index:

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

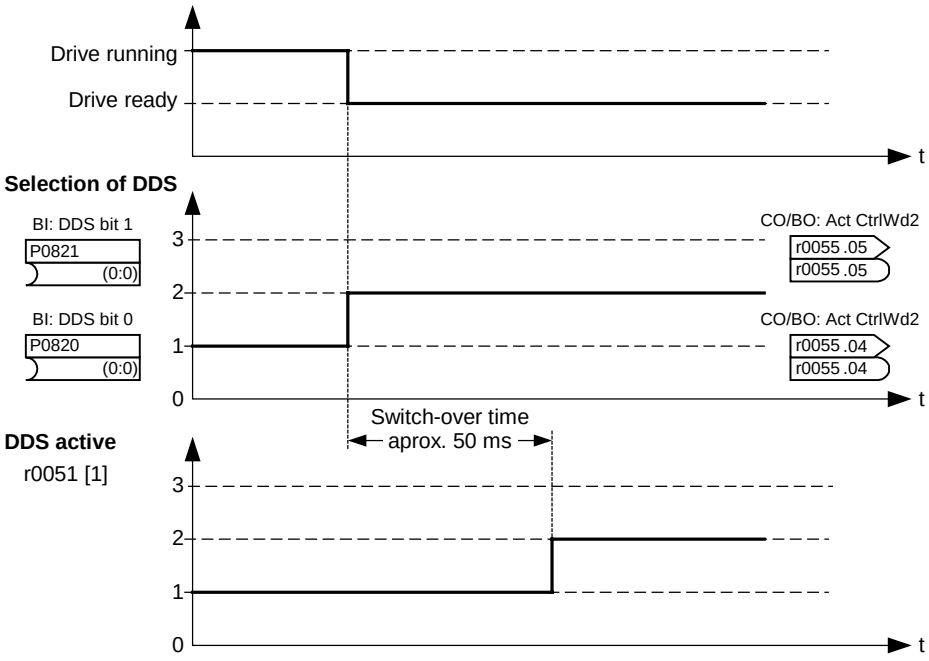


Note:

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].

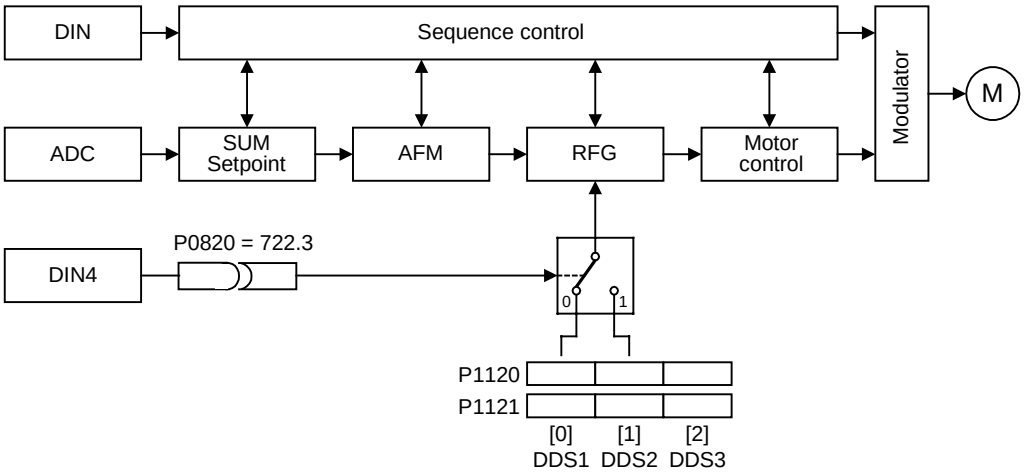
	selected DDS			active DDS
	r0055 Bit05	r0054 Bit04	r0051 [0]	r0051 [1]
1. DDS	0	0	0	0
2. DDS	0	1	1	1
3. DDS	1	0	2	2
3. DDS	1	1	2	2

Common Settings:

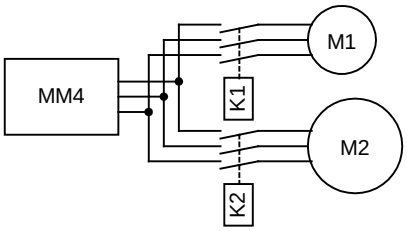
722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
722.3 = Digital input 4 (requires P0704 to be set to 99, BICO)
722.4 = Digital input 5 (requires P0705 to be set 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 steps with one motor:
1. Apply commissioning of DDS1
2. Connect P0820 (P0821 if necessary) with DDS source (e.i. via DIN 4: P0704[0] = 99, P0820 = 722.3)
3. Copy of DDS1 to DDS2 (P0819[0] = 0, P0819[1] = 1, P0819[2] = 2)
4. Adaption of DDS2 parameter (z.B. Rump-up time P1120[1] and Rump-down time P1121[1])



b) Commissioning steps with two motors (Motor 1, Motor 2):
1. Apply commissioning of Motor 1; Adaption of all other DDS1 parameter
2. Connect P0820 (P0821 if necessary) with DDS source (e.i. via DIN 4: P0704[0] = 99, P0820 = 722.3)
3. Switch-over to DDS2 (check it via r0051)
4. Apply commissioning of Motor 2; Adaption of all other DDS2 parameter



Note:

P0821 is also relevant for drive data set (DDS) selection.

P0821	**BI: DDS bit 1**			**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 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:
1 via DIP switches on the PROFIBUS module
2 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.

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:

"b - - n n" (bits 0, 1, 2 and 3 set) in the default setting means that parameters can be changed via any interface.

"b - - r n" (bits 0, 1 and 3 set) would specify that parameters can be changed via PROFIBUS/CB, BOP and USS on COM link (RS485 USS) but not via USS on BOP link (RS232).

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:** -

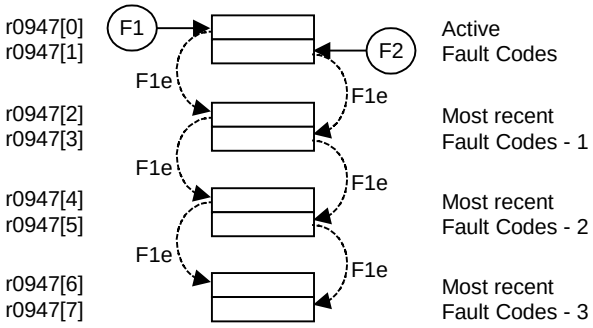
Level: **2**

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 not documented. They 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
P-Group:	PAR_RESET	**Active:** first confirm	**QuickComm.** No	**Def:**	0
				Max:	1

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** Level: **3**

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

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:

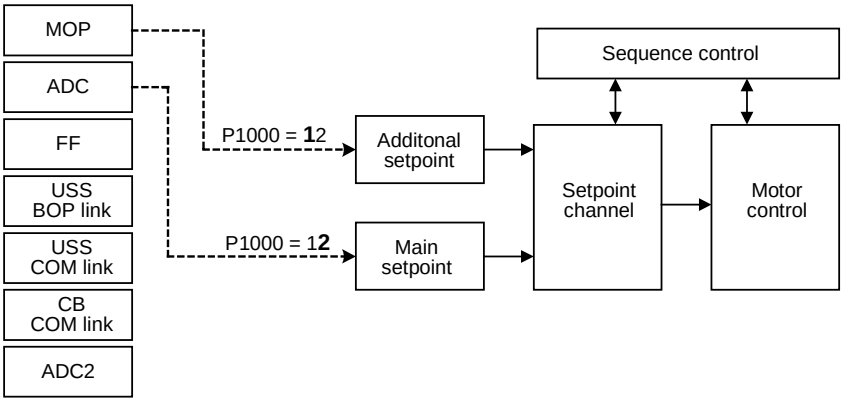
P1000[0] : 1st. Command data set (CDS)
P1000[1] : 2nd. Command data set (CDS)
P1000[2] : 3rd. Command data set (CDS)

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 CI: Main setpoint
	r0755 CO: Act. ADC after scal. [4000h]
P1000 = 1**2** P1075 = 1050	P1075 CI: Additional setpoint
	r1050 CO: Act. Output freq. of the MOP



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		P1000 = xy y = 0	y = 1	y = 2	y = 3	y = 4	y = 5	y = 6	y = 7	
P1000 = xy	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
P1076 = 1.0

P1001[3] **Fixed frequency 1**

						Level:
CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	-650.00	**2**
P-Group:	SETPOINT	**Active:** Immediately	**QuickComm.** No	**Def:**	0.00	
				Max:	650.00	

Defines fixed frequency setpoint 1.

There are 3 types of 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:

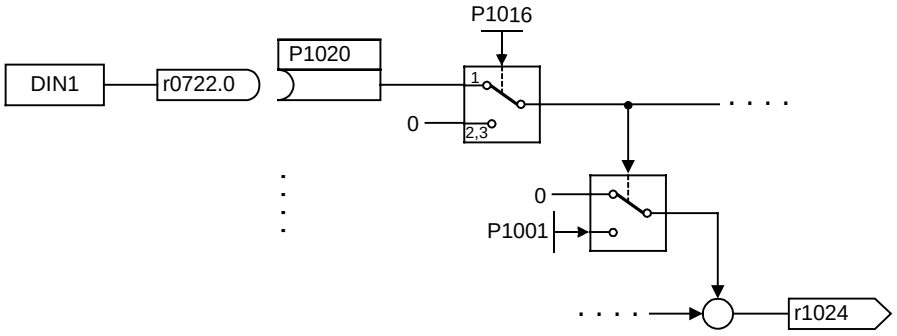
P1001[0] : 1st. Drive data set (DDS)
P1001[1] : 2nd. Drive data set (DDS)
P1001[2] : 3rd. Drive data set (DDS)

Example:

		DIN4	**DIN3**	**DIN2**	**DIN1**
	OFF	Inactive	Inactive	Inactive	Inactive
P1001	FF1	Inactive	Inactive	Inactive	**Active**
P1002	FF2	Inactive	Inactive	**Active**	Inactive
P1003	FF3	Inactive	Inactive	**Active**	**Active**
P1004	FF4	Inactive	**Active**	Inactive	Inactive
P1005	FF5	Inactive	**Active**	Inactive	**Active**
P1006	FF6	Inactive	**Active**	**Active**	Inactive
P1007	FF7	Inactive	**Active**	**Active**	**Active**
P1008	FF8	**Active**	Inactive	Inactive	Inactive
P1009	FF9	**Active**	Inactive	Inactive	**Active**
P1022	FF10	**Active**	Inactive	**Active**	Inactive
P1011	FF11	**Active**	Inactive	**Active**	**Active**
P1012	FF12	**Active**	**Active**	Inactive	Inactive
P1013	FF13	**Active**	**Active**	Inactive	**Active**
P1014	FF14	**Active**	**Active**	**Active**	Inactive
P1015	FF15	**Active**	**Active**	**Active**	**Active**

Direct selection of FF P1001 via DIN 1:

P0701 = 15
or
P0701 = 99, P1020 = 722.0, P1016 = 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

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	-650.00
P-Group:	SETPOINT	**Active:** Immediately	**QuickComm.** No	**Def:**	5.00
				Max:	650.00

Level: **2**

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

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	-650.00
P-Group:	SETPOINT	**Active:** Immediately	**QuickComm.** No	**Def:**	10.00
				Max:	650.00

Level: **2**

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

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	-650.00
P-Group:	SETPOINT	**Active:** Immediately	**QuickComm.** No	**Def:**	15.00
				Max:	650.00

Level: **2**

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

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	-650.00
P-Group:	SETPOINT	**Active:** Immediately	**QuickComm.** No	**Def:**	20.00
				Max:	650.00

Level: **2**

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**

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 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**

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 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:**	-
				Def:	-
P-Group:	SETPOINT			**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 reverse direction of MOP** Level: **2**

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

Inhibits reverse setpoint selection

Possible Settings:

0 Reverse direction is allowed
1 Reverse direction inhibited

Dependency:

Motor potentiometer (P1040) must be chosen as main setpoint or additional setpoint (using P1000).

Note:

It is possible to change motor direction using the motor potentiometer setpoint (increase / decrease frequency either by using digital inputs or BOP/AOP keypad up / down).

P1035[3] **BI: Enable MOP (UP-command)**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.** No	**Def:**	19:13
				Max:	4000:0

Level: **3**

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)**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.** No	**Def:**	19:14
				Max:	4000:0

Level: **3**

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.

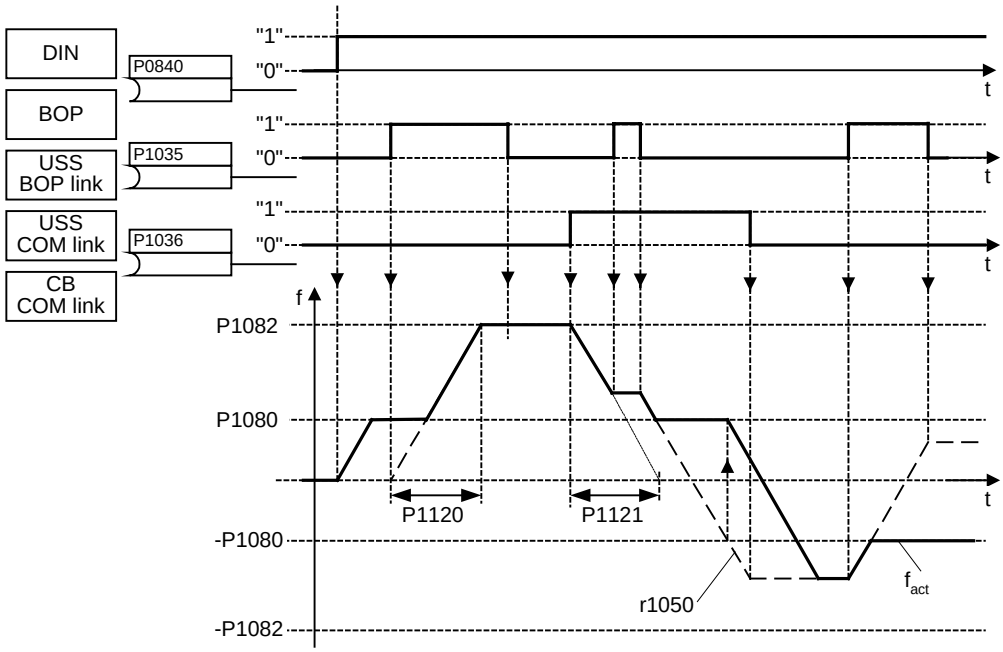
r1050 **CO: Act. Output freq. of the MOP**

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

Level: **3**

P-Group: SETPOINT

Displays output frequency of motor potentiometer setpoint ([Hz]).



P1055[3] **BI: Enable JOG right**

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

Level: **3**

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

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 **Def:** 0:0 **Max:** 4000:0

Level: **3**

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

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

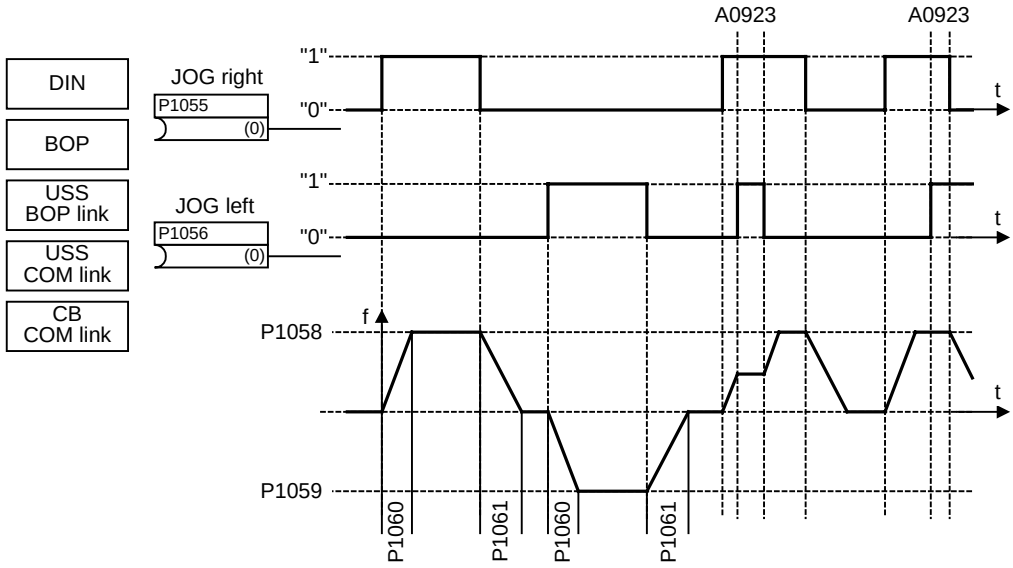
P1058[3] **JOG frequency right**

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 speed by small amounts. The JOG buttons uses a non-latching switch on one of the digital inputs to control the motor speed.

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)

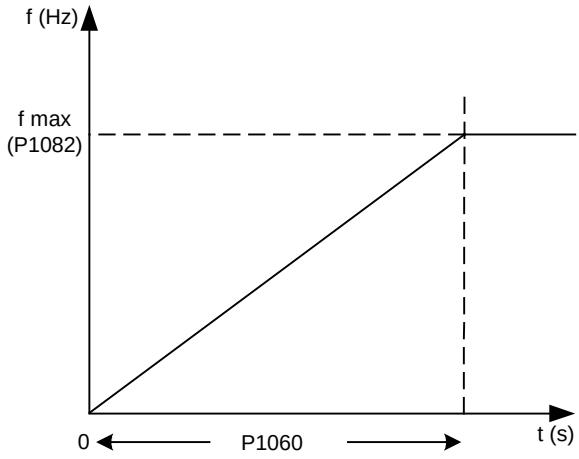
Dependency:

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.



Index:

P1060[0] : 1st. Drive data set (DDS)
P1060[1] : 2nd. Drive data set (DDS)
P1060[2] : 3rd. Drive data set (DDS)

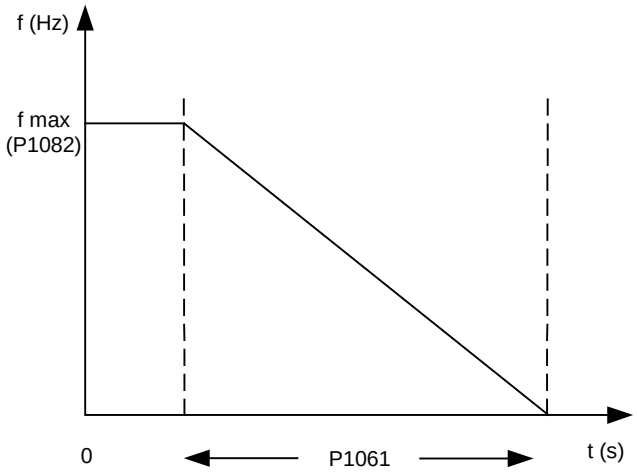
Notice:

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.



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

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	SETPOINT	**Active:** first confirm	**QuickComm.** No	**Def:**	755:0
				Max:	4000:0

Level: **3**

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

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	SETPOINT	**Active:** first confirm	**QuickComm.** No	**Def:**	1:0
				Max:	4000:0

Level: **3**

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

CStat:	CUT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.** No	**Def:**	0:0
				Max:	4000:0

Level: **3**

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

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	SETPOINT	**Active:** first confirm	**QuickComm.** No	**Def:**	0:0
				Max:	4000:0

Level: **3**

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

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	SETPOINT	**Active:** first confirm	**QuickComm.** No	**Def:**	1:0
				Max:	4000:0

Level: **3**

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:** - **Max:** -

P-Group: SETPOINT

Displays sum of main and additional setpoints in [Hz].

r1079 **CO: Selected frequency setpoint** Level: **3**

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

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** Level: **1**

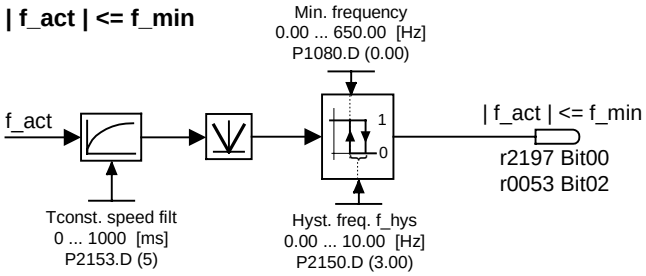
CStat: CUT **Datatype:** Float **Unit:** Hz **Min:** 0.00 **Def:** 0.00

P-Group: SETPOINT **Active:** Immediately **QuickComm.** Yes **Max:** 650.00

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).

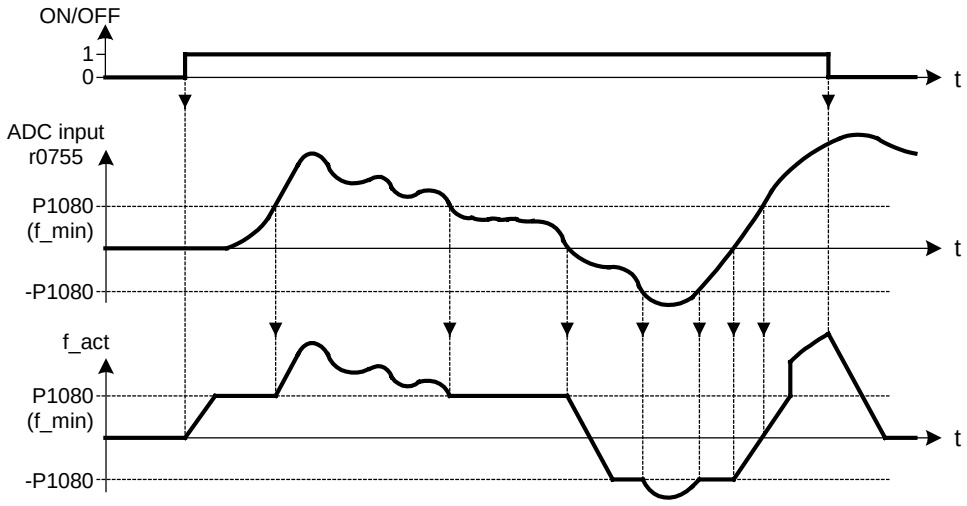
Furthermore, an undershoot of the actual frequency f_act below min. frequency P1080 is output by the following signal function.



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**			**Min:**	0.00	Level:
	CStat: CT	**Datatype:** Float	**Unit:** Hz	**Def:**	50.00	**1**
	P-Group: SETPOINT	**Active:** first confirm	**QuickComm.** Yes	**Max:**	650.00	

Sets maximum motor frequency [Hz] at which motor will run irrespective of the frequency setpoint.

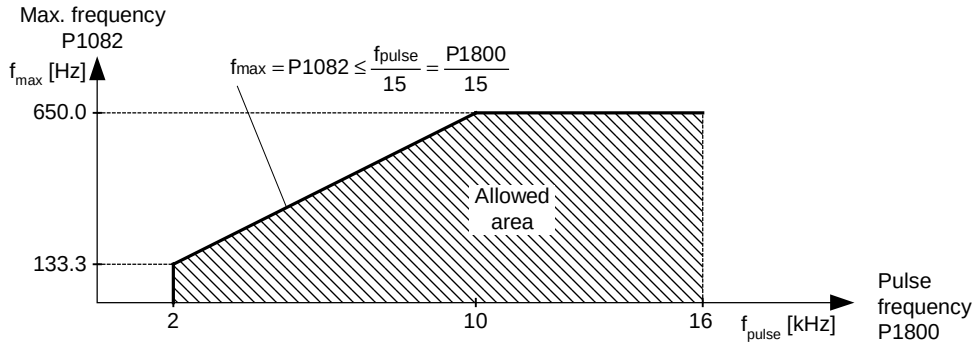
Index:

P1082[0] : 1st. Drive data set (DDS)
P1082[1] : 2nd. Drive data set (DDS)
P1082[2] : 3rd. Drive data set (DDS)

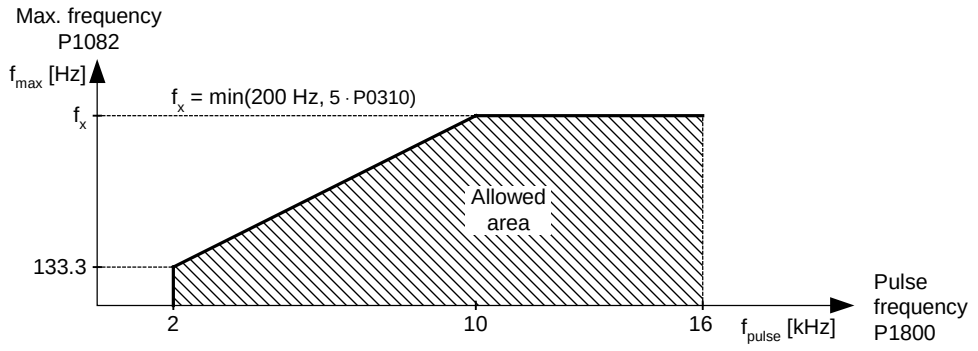
Dependency:

The maximal value of motor frequency P1082 is limited to pulse frequency P1800. P1082 is dependent on the derating characteristic as followed:

P1300 < 20:
When P1300 < 20 (control mode = VF or FCC modes) then max output frequency is limited to smallest of 650 Hz or (maximum pulse frequency / 15)



P1300 >= 20:
Limited internally to 200 Hz or 5 * rated motor frequency (P0310) when P1300 >= 20 (control mode = vector control).



The value is displayed in r1084 (maximum frequency).

Note:

The value set here is valid for both clockwise and anticlockwise rotation.

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) :

$$f_{max}(P1200) = f_{max} + 2 \cdot f_{slip,nom} = P1082 + 2 \cdot \frac{r0330}{100} \cdot P0310$$

Notice:

Maximum motor speed is subject to mechanical limitations.

r1084 **Resultant max. frequency** Level: **3**

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

P-Group: CONTROL

Displays resultant maximum frequency.

P1300 < 20:
The resultant maximum frequency r1084 for V/f is calculated by

$$r1084 = \min\left(P1082, \frac{P1800}{15}, 650.00\right)$$

P1300 >= 20:
The resultant maximum frequency for vector control is calculated by

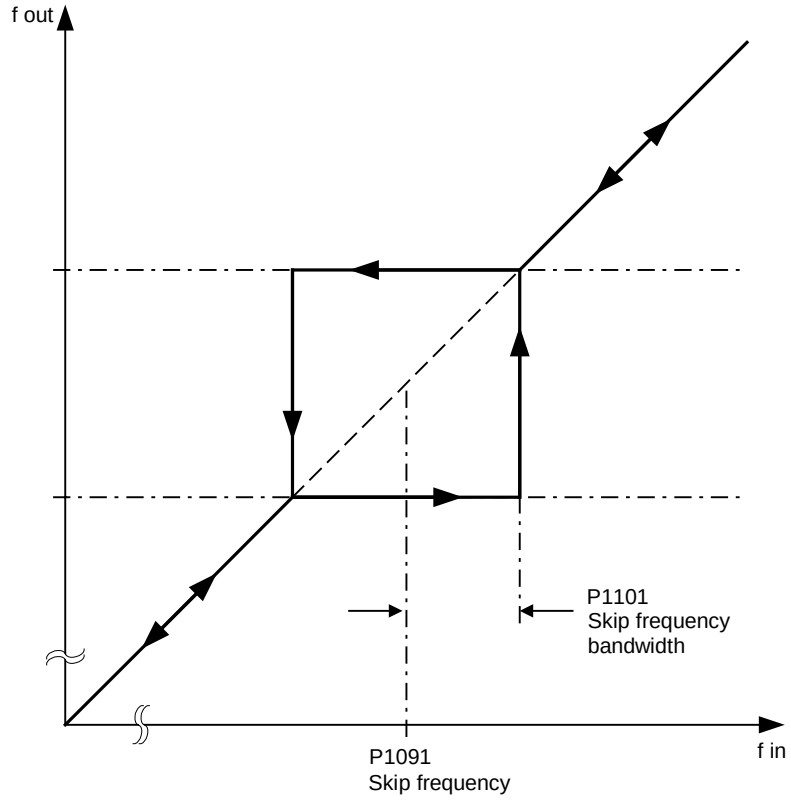
$$r1084 = \min\left(P1082, 5 \cdot P0310, 200.00\right)$$

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

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 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

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 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**

Inhibits direction reversal, thus preventing a negative setpoint from causing motor from running in reverse. Instead, it will run at minimum frequency (P1080) in the normal direction.

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

Note:

It is possible to disable all reverse commands (i.e. the command is ignored). To do this, set P0719 = 0 (remote selection of command/setpoint source) and define the command sources (P1113) individually.

Notice:

This function does not disable the "reverse" command function; rather, a reverse command causes motor to run in the normal direction as described above.

P1113[3] **BI: Reverse** Level: **3**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.** No	**Def:**	722:1
				Max:	4000:0

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.** Level: **3**

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

Displays setpoint frequency after change of direction.

r1119 **CO: Freq. setpoint before RFG** Level: **3**

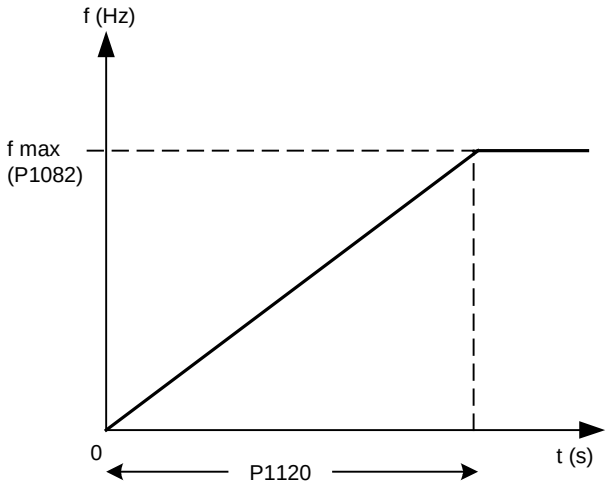
		Datatype: Float	**Unit:** Hz	**Min:**	-
				Def:	-
P-Group:	SETPOINT			**Max:**	-

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** Level: **1**

CStat:	CUT	**Datatype:** Float	**Unit:** s	**Min:**	0.00
P-Group:	SETPOINT	**Active:** first confirm	**QuickComm.** Yes	**Def:**	10.00
				Max:	650.00

Time taken for motor to accelerate from standstill up to maximum motor frequency (P1082) when no rounding is used.



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:

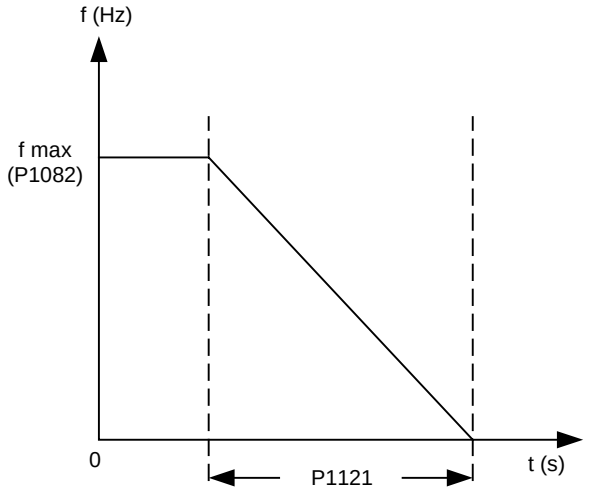
Ramp times will be used as follows:
P1060 / P1061 : JOG mode is active
P1120 / P1121 : Normal mode (ON/OFF) is active
P1060 / P1061 : Normal mode (ON/OFF) and P1124 is active

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.



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:

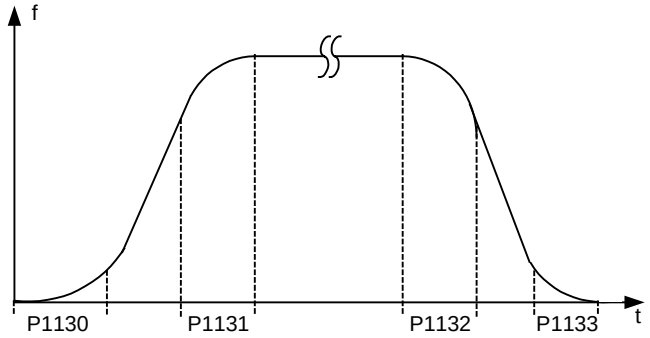
P1124 does not have any impact when JOG mode is selected. In this case, jog ramp times (P1060, P1061) will be used all the time.

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:

$$T_{up\ total} = \frac{1}{2}P1130 + X \cdot P1120 + \frac{1}{2}P1131$$

$$T_{down\ total} = \frac{1}{2}P1130 + X \cdot P1121 + \frac{1}{2}P1133$$

X is defined as: X = Δf / fmax

i.e. X is the ratio between the frequency step and fmax

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:

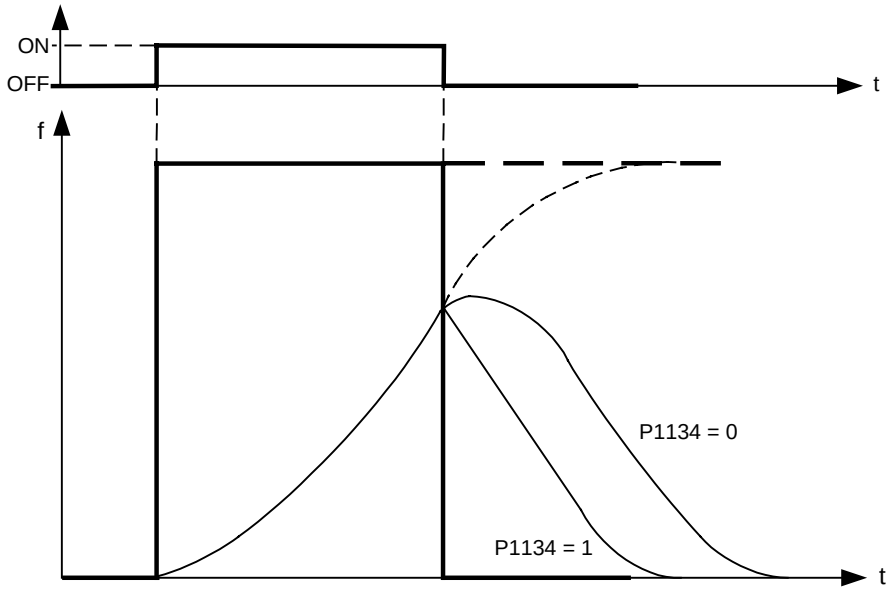
Rounding times are not recommended when analog inputs are used, since they would result in overshoot/undershoot in the inverter response.

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 smoothing response to OFF1 command or setpoint reduction.

If parameter P1134 = 0 it aviods sudden changes in setpoint frequency. Moreover, it gives smoother torque (no jerk).



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 total rounding time (P1130) > 0 s.

Notice:

P1134 = 0:
Rounding acts at all times. At a sudden reduction of the input value, overshoot can occur.

P1134 = 1:
Rounding does not act upon sudden reduction of input value during acceleration process.

Rounding times are not recommended when analog inputs are used. They would result in overshoot/undershoot in the inverter response.

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)

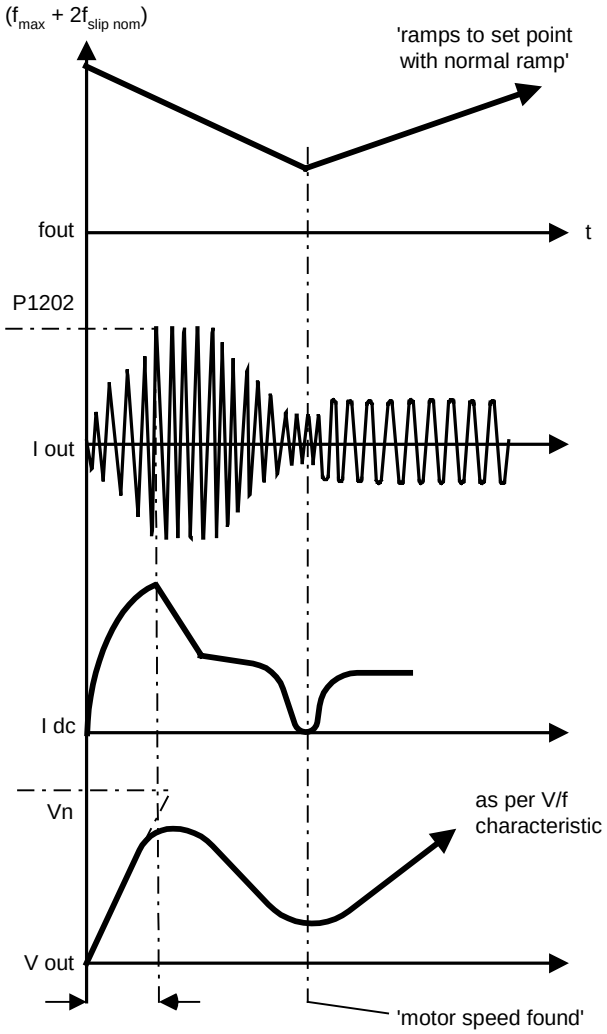
r1170 **CO: Frequency setpoint after RFG** Level: **3**

		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:

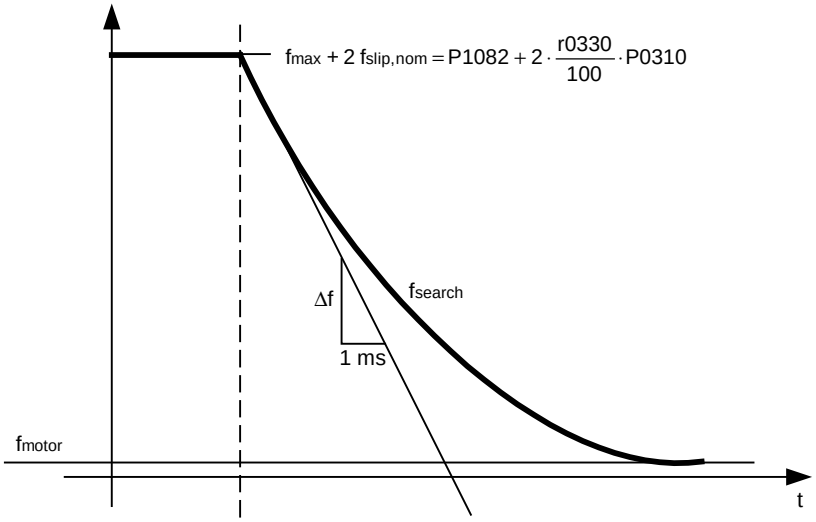
P1202[0] : 1st. Drive data set (DDS)
P1202[1] : 2nd. Drive data set (DDS)
P1202[2] : 3rd. Drive data set (DDS)

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.



$$P1203\,[\%] = \frac{\Delta t\,[ms]}{\Delta f\,[Hz]} \cdot \frac{f_{slip,nom}\,[Hz]}{1\,[ms]} \cdot 2\,[\%] \qquad \Delta f = \frac{2\,[\%]}{P1203\,[\%]} \cdot \frac{r0330}{100} \cdot P0310$$

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**

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

Level: **4**

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**

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

Level: **3**

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**			**Min:** 0	Level:
	CStat: CUT	**Datatype:** U16	**Unit:** -	**Def:** 1	**2**
	P-Group: FUNC	**Active:** first confirm	**QuickComm.** No	**Max:** 6	

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	Blackout F0003	Brownout F0003	All other faults without power cycle	All other faults with power cycle	ON command enabled during Power OFF
0	–	–	–	–	–
1	Fault acknowledge	–	–	–	Fault acknowledge
2	Fault acknowledge + restart	–	–	–	Fault acknowledge + restart
3	Fault acknowledge + restart	Fault acknowledge + restart	Fault acknowledge + restart	Fault acknowledge + restart	–
4	Fault acknowledge + restart	Fault acknowledge + restart	–	–	–
5	Fault acknowledge + restart	–	–	Fault acknowledge + restart	Fault acknowledge + restart
6	Fault acknowledge + restart	Fault acknowledge + restart	Fault acknowledge + restart	Fault acknowledge + restart	Fault acknowledge + 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).

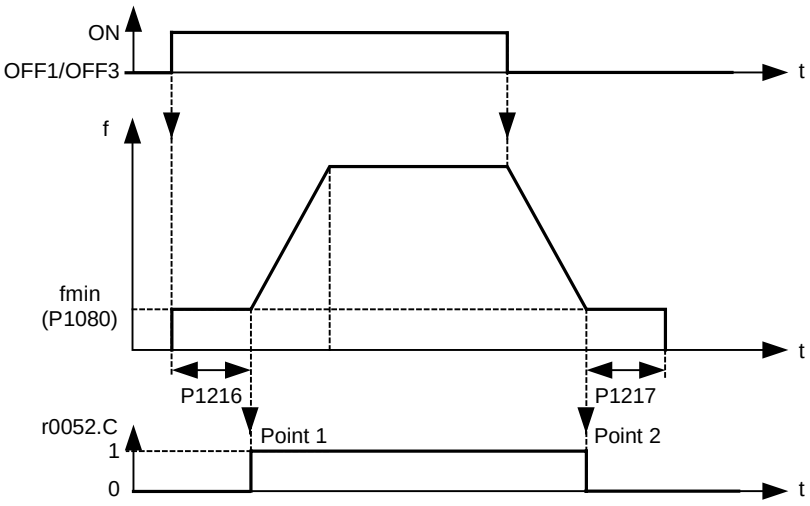
P1211	Number of restart attempts				Min:	0	Level:
	CStat:	CUT	Datatype: U16	Unit: -	Def:	3	3
	P-Group:	FUNC	Active: first confirm	QuickComm. No	Max:	10	

Specifies number of times inverter will attempt to restart if automatic restart P1210 is activated.

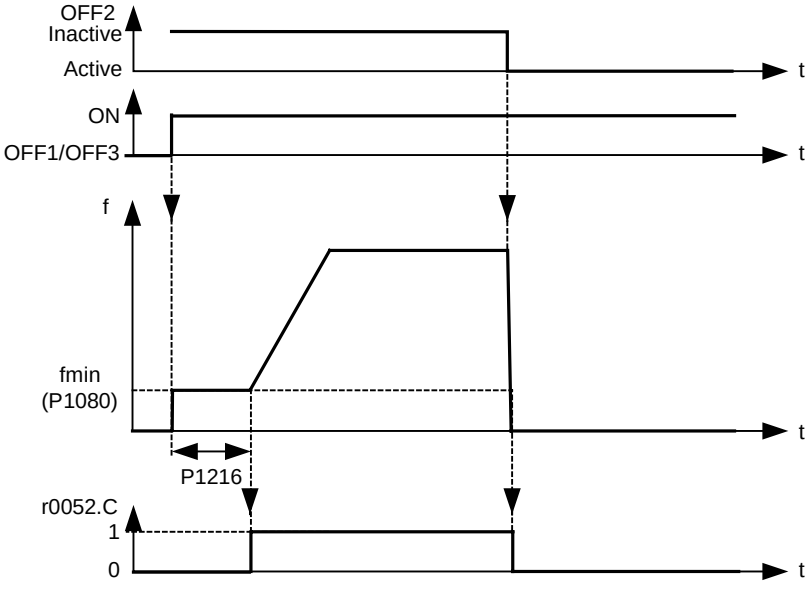
P1215	Holding brake enable				Min:	0	Level:
	CStat:	T	Datatype: U16	Unit: -	Def:	0	2
	P-Group:	FUNC	Active: first confirm	QuickComm. No	Max:	1	

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

Note:

The brake relay opens at point 1, if enabled using P0731 (function of digital output), and closes at point 2.

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.

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**

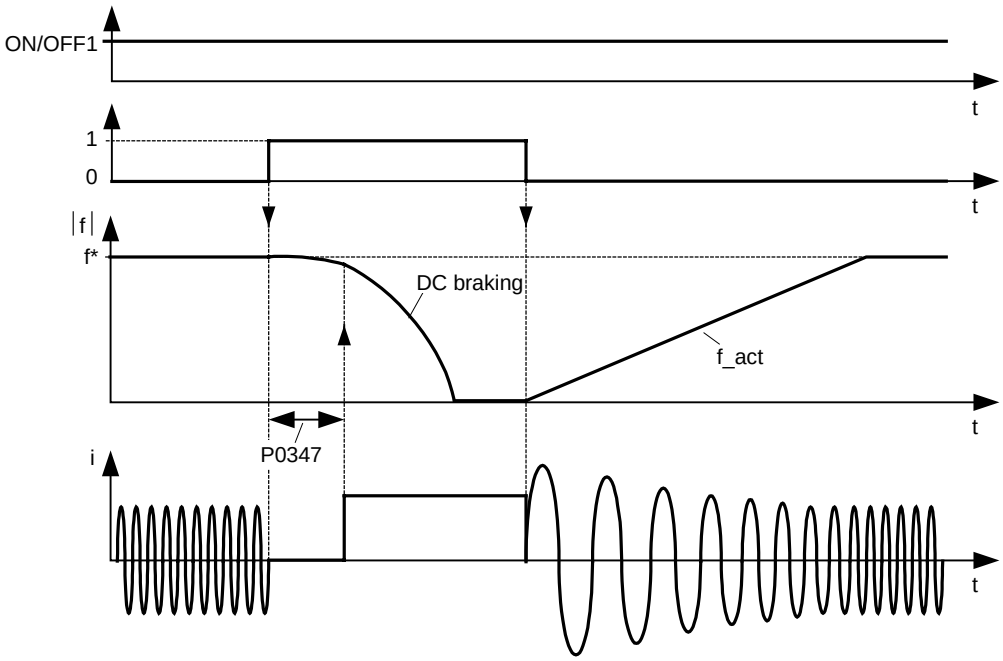
CStat:	CUT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.** No	**Def:**	0:0
				Max:	4000:0

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.



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:

Frequent use of long periods of DC braking can cause the motor to overheat.

Notice:

This delay time is set in P0347 (demagnetization time). If this delay is too short, overcurrent trips can occur.

DC braking is not possible when using a synchronous motor (i.e. P0300 = 2).

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:

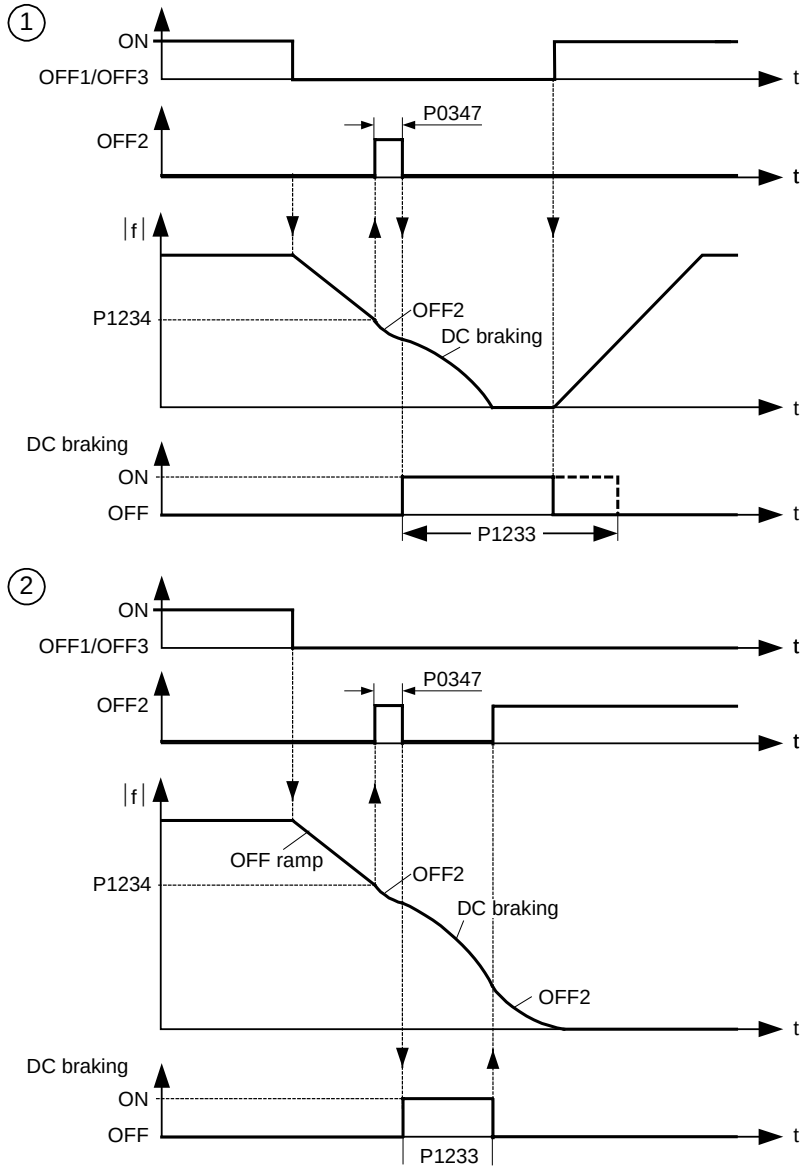
P1232[0] : 1st. Drive data set (DDS)
P1232[1] : 2nd. Drive data set (DDS)
P1232[2] : 3rd. Drive data set (DDS)

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:

Frequent use of long periods of DC braking can cause the motor to overheat.

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.
DC braking is not possible when using a synchronous motor (i.e. P0300 = 2).

P1234[3] DC braking start frequency

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	0.00
P-Group:	FUNC	**Active:** Immediately	**QuickComm.** No	**Def:**	650.00
				Max:	650.00

Level: **2**

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

CStat:	CUT	**Datatype:** U16	**Unit:** %	**Min:**	0
P-Group:	FUNC	**Active:** Immediately	**QuickComm.** No	**Def:**	0
				Max:	250

Level: **2**

Defines DC level superimposed on AC waveform after OFF1 / OFF3 command. The value is entered in [%] relative to rated motor current (P0305).

If P1254 = 0 :

Compound braking switch-on level $= 1.13 \cdot \sqrt{2} \cdot V_{mains} = 1.13 \cdot \sqrt{2} \cdot P0210$

otherwise :

Compound braking switch-on level $= 0.98 \cdot r1242$

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). This will happen on OFF1, OFF3 and any regenerative condition.

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

CStat:	CUT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	FUNC	**Active:** Immediately	**QuickComm.** No	**Def:**	0
				Max:	5

Level: **2**

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.

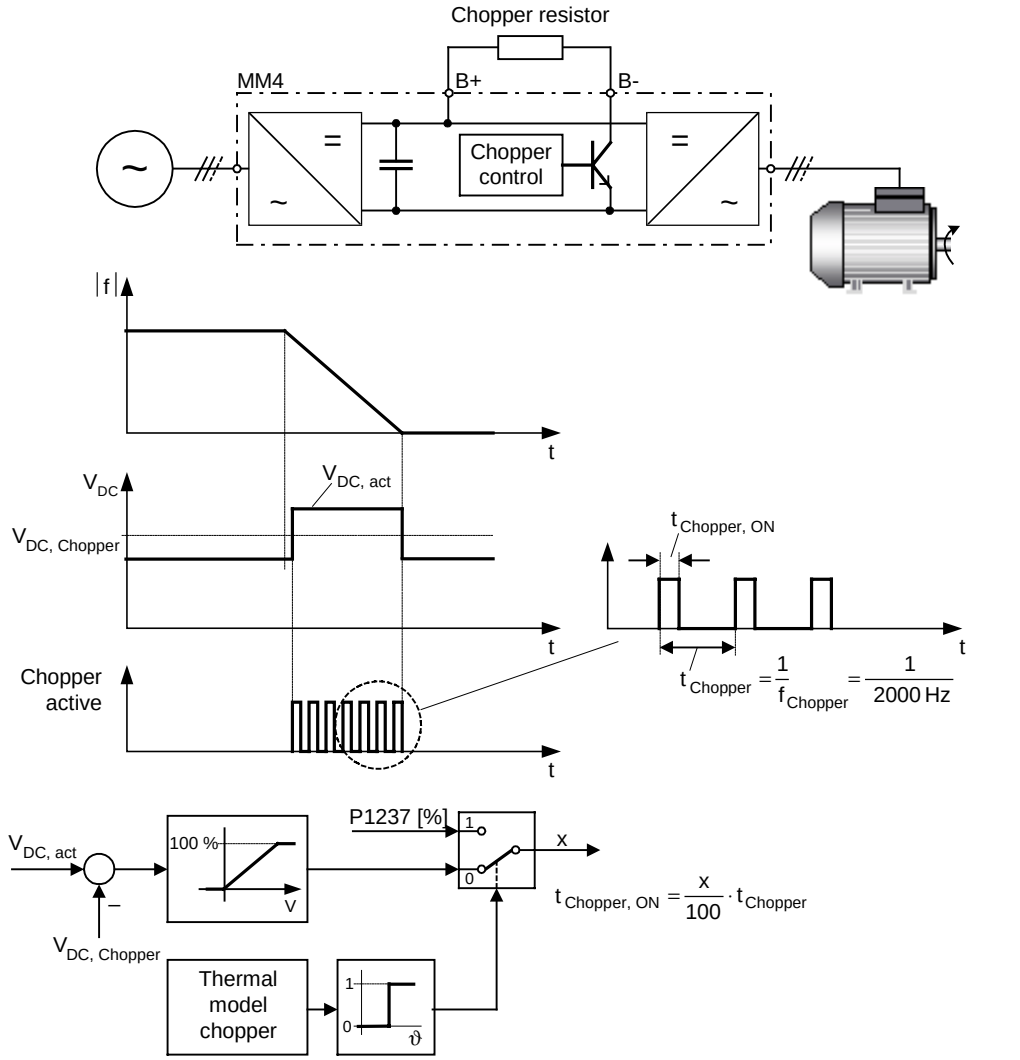
Dynamic braking switch-on level

If P1254 = 0 :

$V_{DC,Chopper} = 1.13 \cdot \sqrt{2} \cdot V_{mains} = 1.13 \cdot \sqrt{2} \cdot P0210$

otherwise :

$V_{DC,Chopper} = 0.98 \cdot r1242$



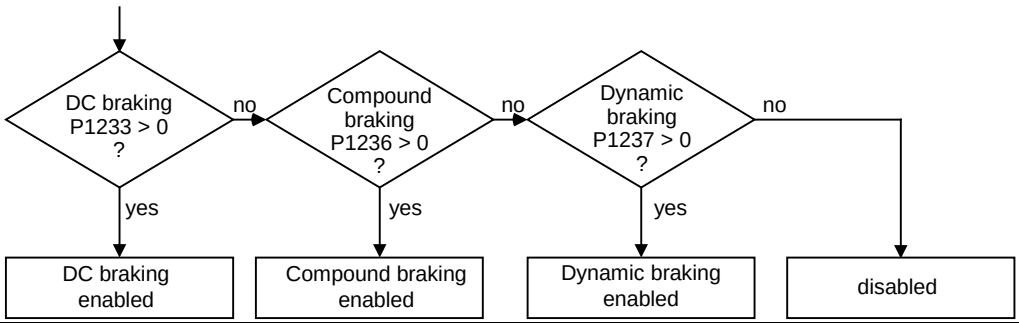
Possible Settings:

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.

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)

Note:

Vdc max controller automatically increases ramp-down times to keep the DC-link voltage (r0026) within limits (P2172).

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.

Warning: If P1245 increased too much, it may interfere with the drive normal operation.

r1242 **CO: Switch-on level of Vdc-max** Level: **3**

		Datatype: Float	**Unit:** V	**Min:**	-
P-Group:	FUNC			**Def:**	-
				Max:	-

Displays switch-on level of Vdc max controller. The formula is only valid if auto detection is not activated (P1254=0).

Following equation is only valid, if P1254 = 0 :

$$r1242 = 1.15 \cdot \sqrt{2} \cdot V_{mains} = 1.15 \cdot \sqrt{2} \cdot P0210$$

P1243[3] **Dynamic factor of Vdc-max** Level: **3**

CStat:	CUT	**Datatype:** U16	**Unit:** %	**Min:**	10
P-Group:	FUNC	**Active:** Immediately	**QuickComm.** No	**Def:**	100
				Max:	200

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
P-Group:	FUNC	**Active:** Immediately	**QuickComm.** No	**Def:**	76
				Max:	115

Enter switch-on level for kinetic buffering (KIB) in [%] relative to supply voltage (P0210).

$$P1245\,[V] = P1245\,[\%] \cdot \sqrt{2} \cdot P0210$$

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:**	-
P-Group:	FUNC			**Def:**	-
				Max:	-

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 max controller.

Possible Settings:
0 Disabled
1 Enabled

P1256[3]	**Reaction of kinetic buffering**			**Min:**	0	Level:
	CStat: CT	**Datatype:** U16	**Unit:** -	**Def:**	0	**3**
	P-Group: FUNC	**Active:** Immediately	**QuickComm.** No	**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:

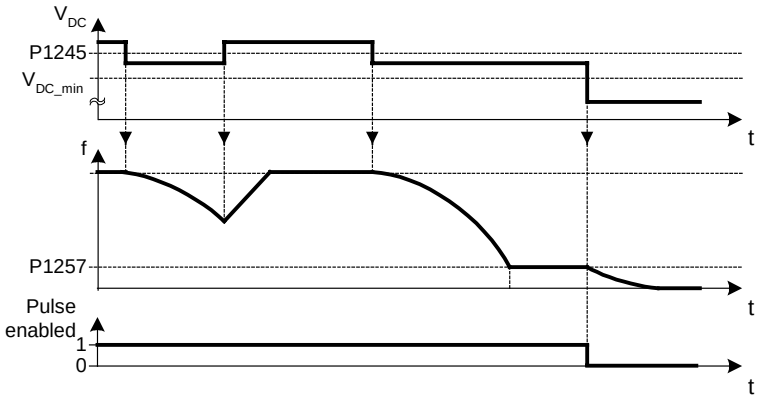
0 Maintain DC-link until trip
1 Maintain DC-link until trip / stop
2 Control stop

Index:

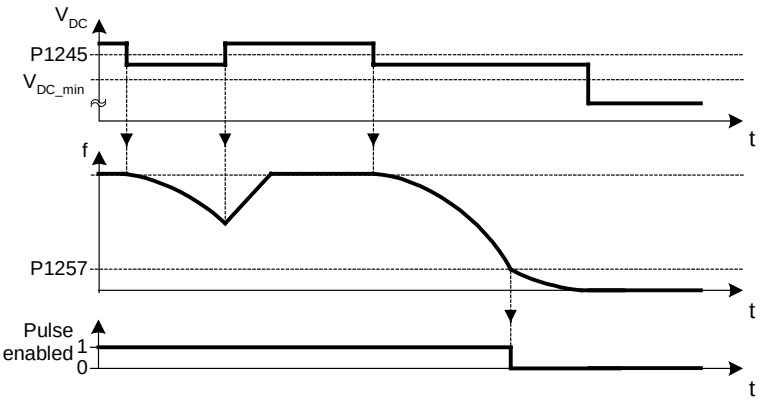
P1256[0] : 1st. Drive data set (DDS)
P1256[1] : 2nd. Drive data set (DDS)
P1256[2] : 3rd. Drive data set (DDS)

Note:

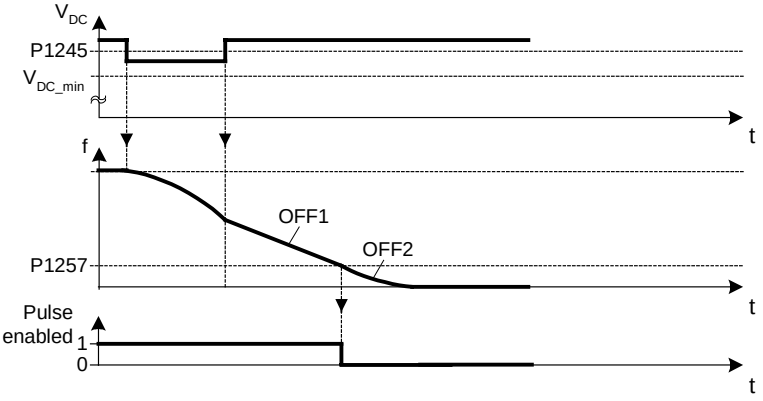
P1256 = 0:
Maintain dclink voltage until mains is returned or drive is tripped undervoltage. The frequency is kept above the frequency limit provided in P1257.



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	

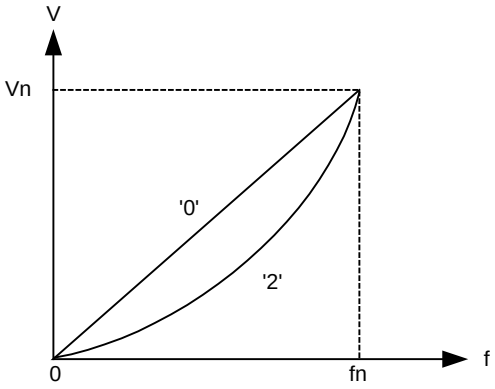
Frequency which kinetic buffering (KIB) either hold speed or disable pulses depending on P1256.

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**				**Min:**	0	Level:
	CStat:	CT	**Datatype:** U16	**Unit:** -	**Def:**	0	**2**
	P-Group:	CONTROL	**Active:** first confirm	**QuickComm.** Yes	**Max:**	23	

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:

Limited internally to 200 Hz or 5 * rated motor frequency (P0305) when P1300 >= 20 (control mode = vector control). The value is displayed in r1084 (maximum frequency).

See parameter P0205, P0500

Note:

V/f modes (P1300 < 20):
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	U/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.

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)
- P1750: Control word of motor model

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:

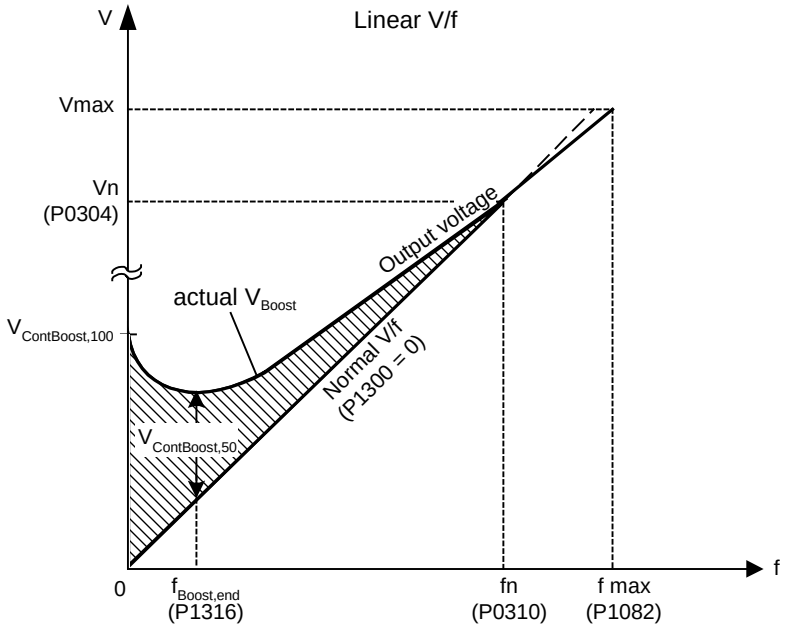
ParNo.	Parameter name	Level	U/f							SLVC		VC	
			P1300 =										
			0	1	2	3	5	6	19	20	22	21	23
P1400[3]	Configuration of speed control	3	–	–	–	–	–	–	–	–	–	x	–
P1442[3]	Filter time for act. speed	3	–	–	–	–	–	–	–	–	–	x	–
P1452[3]	Filter time for act.speed (SLVC)	3	–	–	–	–	–	–	–	x	–	–	–
P1460[3]	Gain 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

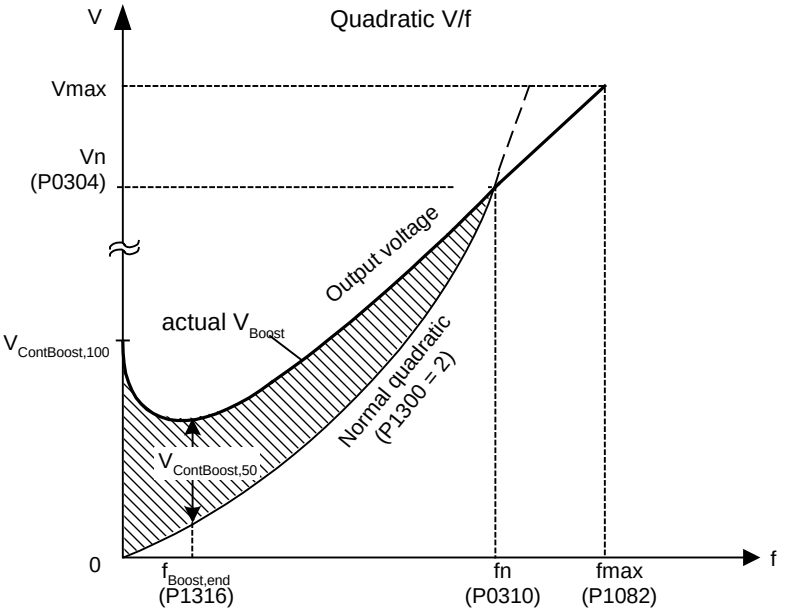
1) If the speed control (main setpoint) is selected a torque setpoint is available via the additional setpoint channel.

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 = rated motor current (P0305) * Stator resistance (P0350) * Continous boost (P1310)
V_ConBoost,50 = 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:
Setting in P0640 (motor overload factor [%]) limits the boost.

Continous boost P1310 has no effect during vector operation because the inverter calculates continously the optimum operating conditions.

Note:
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

Notice:
Increasing the boost levels increases motor heating (especially at standstill).

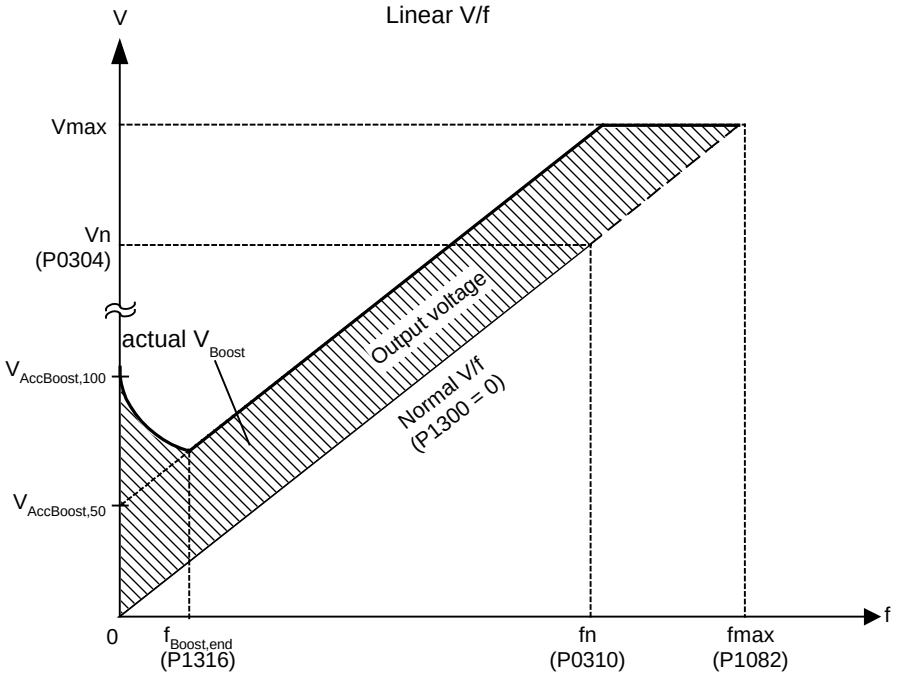
$$\text{Boosts} \leq 300 \cdot Rs \cdot Imot$$

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 = rated motor current (P0305) * Stator resistance (P0350) * Acceleration boost (P1311)
V_AccBoost,50 = 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:
Setting in P0640 (motor overload factor [%]) limits boost.

Acceleration boost P1311 has no effect during vector operation because the inverter calculates continously the optimum operating conditions.

Note:
Acceleration boost can help to improve response to small positive setpoint changes.

$$\text{Boosts} \leq 300 \cdot Rs \cdot Imot$$

Notice:
Increasing the boost level increases motor heating.

Details:
See note in P1310 for boost priorities.

P1312[3] **Starting boost**

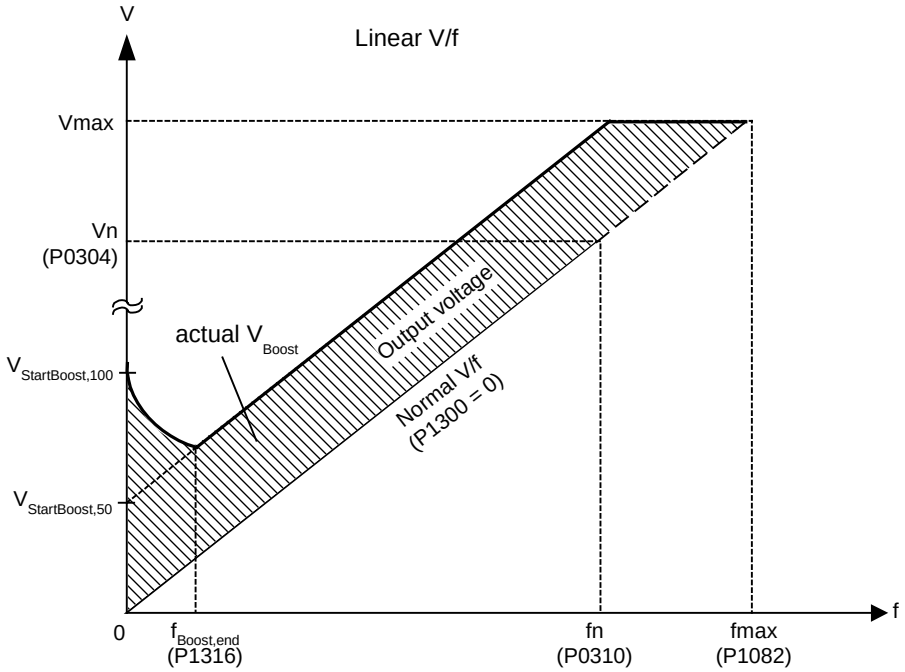
CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	0.0
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.** No	**Def:**	0.0
				Max:	250.0

Level: **2**

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 = rated motor current (P0305) * Stator resistance (P0350) * Starting boost (P1312)
V_StartBoost,50 = 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:

Setting in P0640 (motor overload factor [%]) limits boost.

Starting boost P1312 has no effect during vector operation because the inverter calculates continously the optimum operating conditions.

Notice:

Increasing the boost levels increases motor heating.

$$Boosts \leq 300 \cdot Rs \cdot Imot$$

Details:

See note in P1310 for boost priorities.

r1315 **CO: Total boost voltage**

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

Level: **4**

Displays total value of voltage boost (in volts).

P1316[3] **Boost end frequency**

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	0.0
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.** No	**Def:**	20.0
				Max:	100.0

Level: **3**

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:

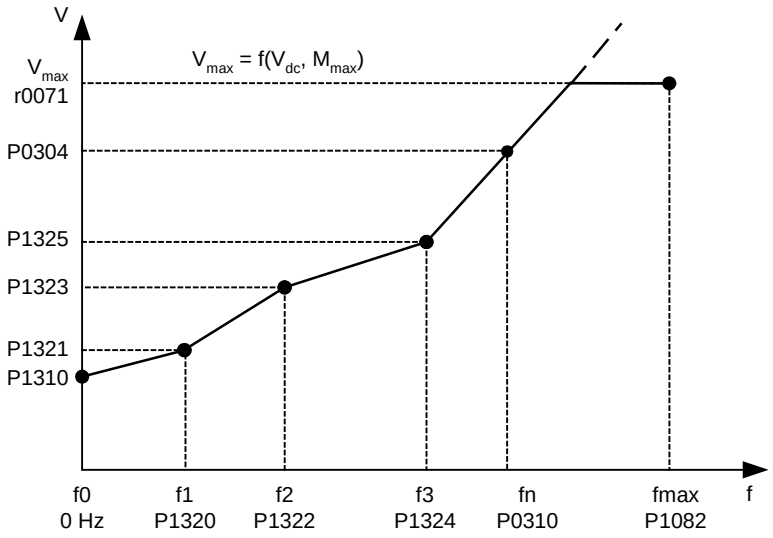
See diagram in P1310 (continuous boost).

P1320[3] **Programmable V/f freq. coord. 1**

CStat:	CT	**Datatype:** Float	**Unit:** Hz	**Min:**	0.00
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.** No	**Def:**	0.00
				Max:	650.00

Level: **3**

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)

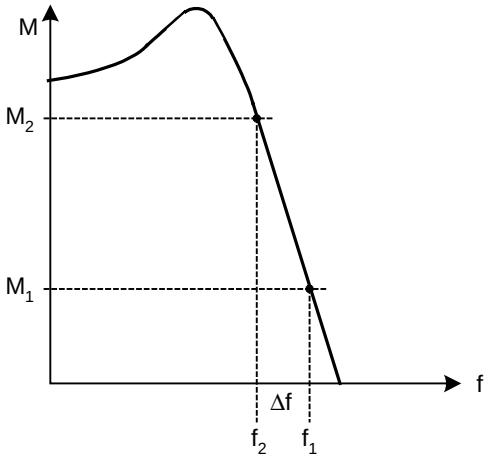
Notice:
If this value is too low, the system may become unstable.

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.

Increasing the load from md1 to md2 (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).

Note:

Gain adjustment enables fine-tuning of the actual motor speed (see P1460 - gain speed control).

100% = standard setting for warm stator.

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:	-
P-Group:	CONTROL			**Max:**	-

Displays actual compensated motor slip as [%]

Dependency:

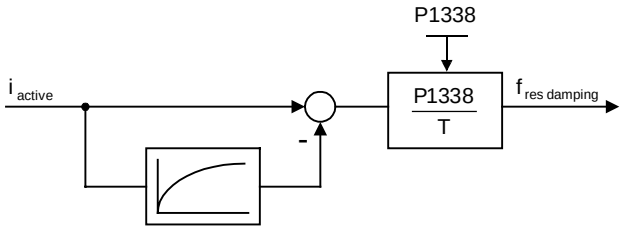
Slip compensation (P1335) active.

P1338[3] **Resonance damping gain V/f**

CStat:	CUT	**Datatype:** Float	**Unit:** -	**Min:**	0.00
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.** No	**Def:**	0.00
				Max:	10.00

Level: **3**

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**

CStat:	CUT	**Datatype:** Float	**Unit:** -	**Min:**	0.000
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.** No	**Def:**	0.000
				Max:	0.499

Level: **3**

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**

CStat:	CUT	**Datatype:** Float	**Unit:** s	**Min:**	0.000
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.** No	**Def:**	0.300
				Max:	50.000

Level: **3**

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:** - **Def:** - **Max:** -

P-Group: CONTROL

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:** - **Def:** - **Max:** -

P-Group: CONTROL

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 **Def:** 0.250 **Max:** 5.499

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

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 **Def:** 0.300 **Max:** 50.000

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

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:

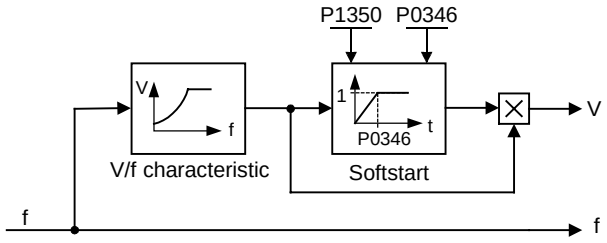
P1346[0] : 1st. Drive data set (DDS)
P1346[1] : 2nd. Drive data set (DDS)
P1346[2] : 3rd. Drive data set (DDS)

P1350[3] **Voltage soft start** Level: **3**

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

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

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 Level: **3**

CStat: CUT **Datatype:** U16 **Unit:** - **Min:** 0
P-Group: CONTROL **Active:** Immediately **QuickComm.** No **Def:** 1
Max: 3

Configuration for speed control.

Bitfields:

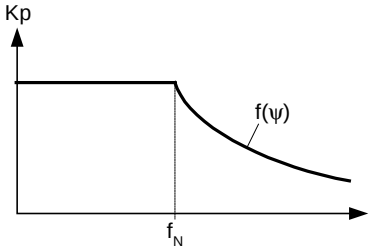
Bit00	Automatic Kp adaption	0	NO
		1	YES
Bit01	Integral freeze (SLVC)	0	NO
		1	YES

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:** -
P-Group: CONTROL **Def:** -
Max: -

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:** -
P-Group: CONTROL **Def:** -
Max: -

Displays setpoint of speed controller.

P1442[3] **Filter time for act. speed** Level: **3**

CStat:	CUT	**Datatype:** U16	**Unit:** ms	**Min:**	0
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.** No	**Def:**	4
				Max:	32000

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:	-
P-Group:	CONTROL			**Max:**	-

Displays filtered actual speed at speed controller input.

P1452[3] **Filter time for act.speed (SLVC)** Level: **3**

CStat:	CUT	**Datatype:** U16	**Unit:** ms	**Min:**	0
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.** No	**Def:**	4
				Max:	32000

Sets time constant of PT1 filter to filter the speed deviation of speed controller in operation mode SLVC (sensorless vector control).

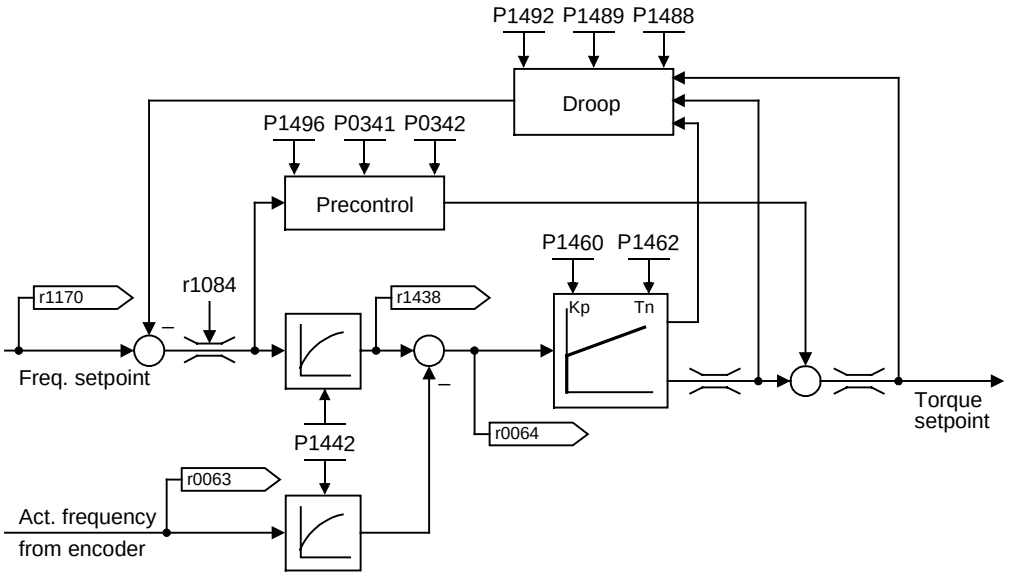
Index:

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.

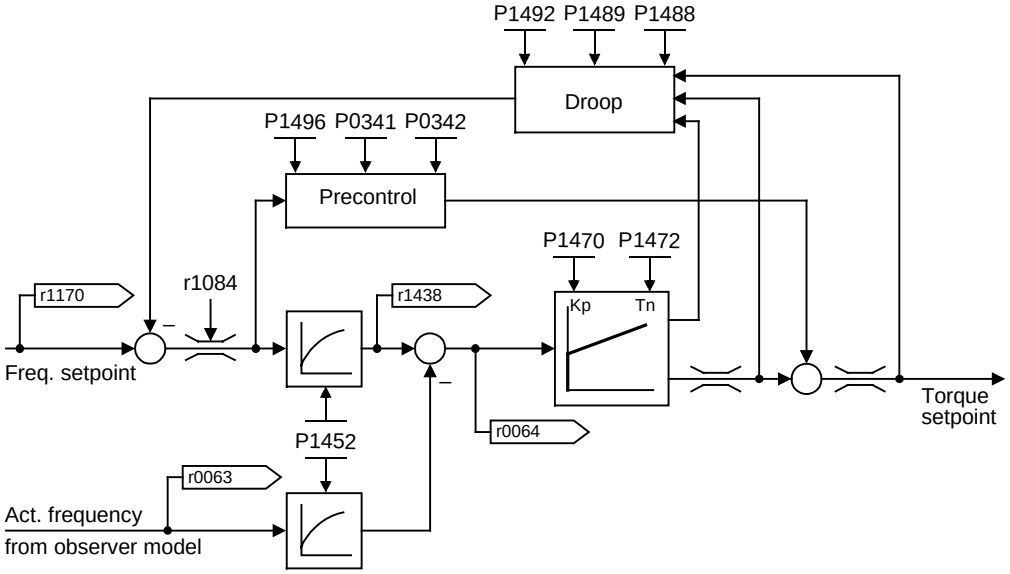
Index:

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.** Level: **3**

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

P-Group: CONTROL

Displays integral part of speed controller output.

P1488[3] **Droop input source** Level: **3**

CStat: CUT **Datatype:** U16 **Unit:** - **Min:** 0 **Def:** 0 **Max:** 3

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

Selects source of droop input signal.

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** Level: **3**

CStat: CUT **Datatype:** Float **Unit:** - **Min:** 0.00 **Def:** 0.05 **Max:** 0.50

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

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 [%].

Index:

P1496[0] : 1st. Drive data set (DDS)
P1496[1] : 2nd. Drive data set (DDS)
P1496[2] : 3rd. Drive data set (DDS)

Note:

P1496 = 100 % = standard setting

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**			**Min:**	0	Level:
	CStat: CT	**Datatype:** U16	**Unit:** -	**Def:**	0	**2**
	P-Group: CONTROL	**Active:** first confirm	**QuickComm.** Yes	**Max:**	77	

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:

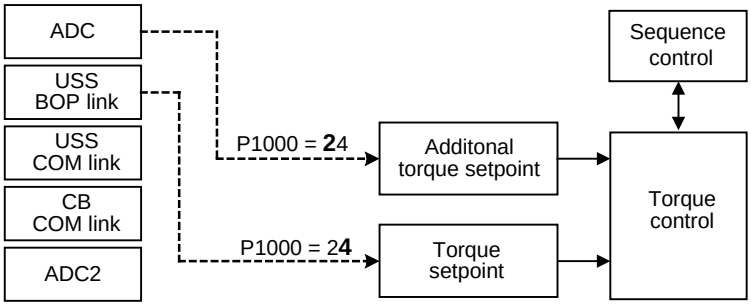
P1500[0] : 1st. Command data set (CDS)
P1500[1] : 2nd. Command data set (CDS)
P1500[2] : 3rd. Command data set (CDS)

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)



Note:

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

		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:

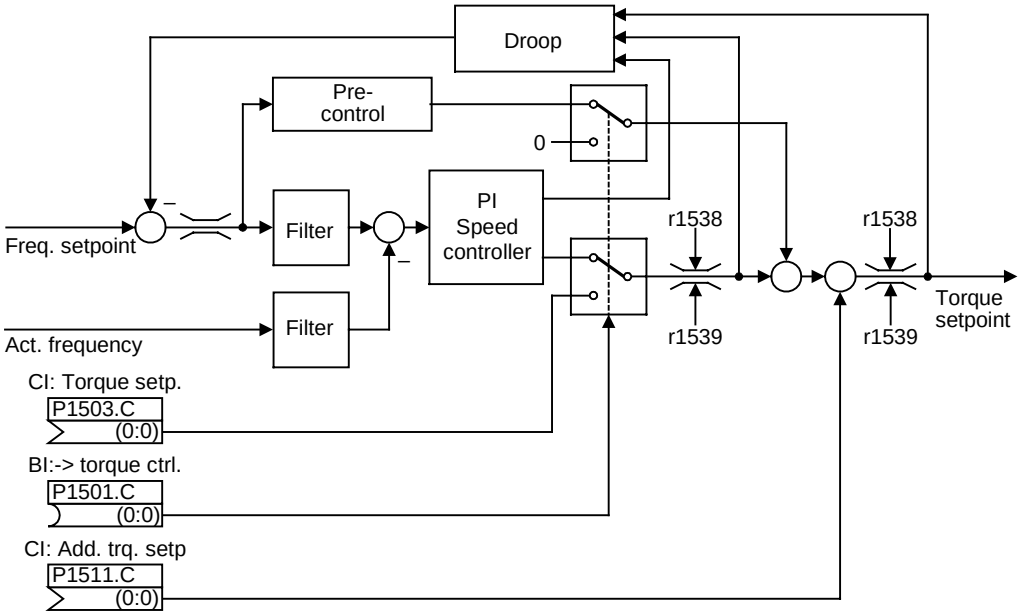
P1500 = 24 → P1503 = 2015.1
P1511 = 755.0

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).

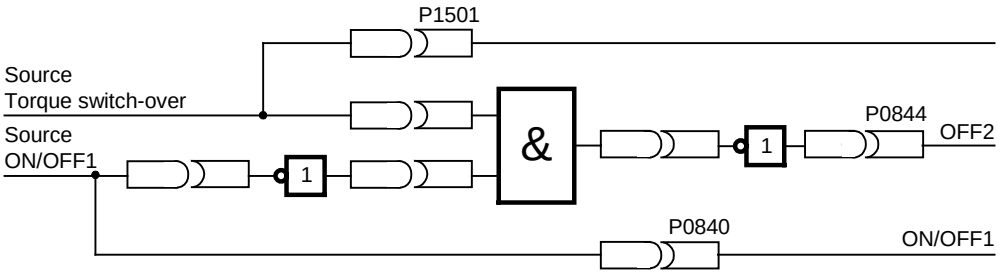


Index:

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**

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

Level: **2**

Displays torque setpoint before limitation.

P1511[3] **CI: Additional torque 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

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:**	-
P-Group:	CONTROL			**Def:**	-
				Max:	-

Displays additional torque setpoint.

r1518 **CO: Acceleration torque** Level: **3**

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

Displays acceleration torque.

P1520[3] **CO: Upper torque limit** Level: **2**

CStat:	CUT	**Datatype:** Float	**Unit:** Nm	**Min:**	-99999.00
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.** No	**Def:**	5.13
				Max:	99999.00

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
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.** No	**Def:**	-5.13
				Max:	99999.00

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
P-Group:	CONTROL	**Active:** first confirm	**QuickComm.** No	**Def:**	1520:0
				Max:	4000:0

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
P-Group:	CONTROL	**Active:** first confirm	**QuickComm.** No	**Def:**	1521:0
				Max:	4000:0

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** Level: **3**

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-400.0
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.** No	**Def:**	100.0
				Max:	400.0

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** Level: **3**

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

P-Group: CONTROL

Displays actual upper torque limitation.

r1527 **CO: Lower torque limitation** Level: **3**

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

P-Group: CONTROL

Displays actual lower torque limitation.

P1530[3] **Motoring power limitation** Level: **2**

CStat: CUT **Datatype:** Float **Unit:** - **Min:** 0.0 **Def:** 0.75 **Max:** 8000.0

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

Defines fixed value of motoring power limitation.

$P1530_{max} = 3 \cdot P0307$

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:** -8000.0 **Def:** -0.75 **Max:** 0.0

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

Enters fixed value of 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)

r1536 **CO: Max. trq. motoring current** Level: **4**

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

P-Group: CONTROL

Displays maximum torque motoring current component.

r1537 **CO: Max trq regenerative current** Level: **4**

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

P-Group: CONTROL

Displays maximum torque of the regenerative current component.

r1538 **CO: Upper torque limit (total)** Level: **2**

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

P-Group: CONTROL

Displays total upper torque limitation.

r1539 **CO: Lower torque limit (total)** Level: **2**

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

P-Group: CONTROL

Displays total lower torque limitation.

P1570[3] **CO: Fixed value flux setpoint** Level: **2**

CStat: CUT **Datatype:** Float **Unit:** % **Min:** 50.0 **Def:** 100.0 **Max:** 200.0

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

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:**	-
P-Group:	CONTROL			**Def:**	-
				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:**	-
P-Group:	CONTROL			**Def:**	-
				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:**	-
P-Group:	CONTROL			**Def:**	-
				Max:	-

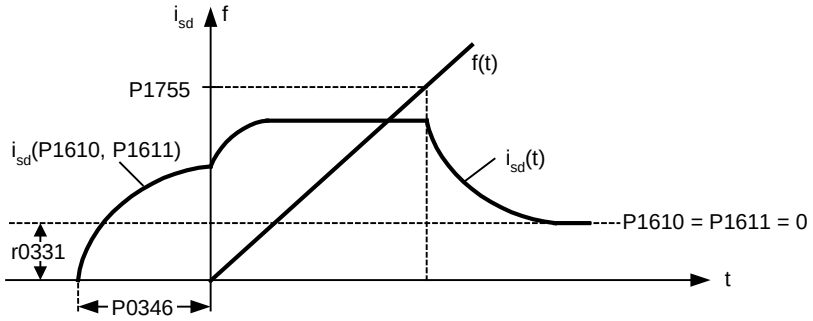
Displays total flux setpoint in [%] relative to the rated motor flux.

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 speed 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 speed 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:**	-
P-Group:	CONTROL			**Def:**	-
				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

P-Group: CONTROL **Active:** Immediately **QuickComm.** No **Max:** 10.000

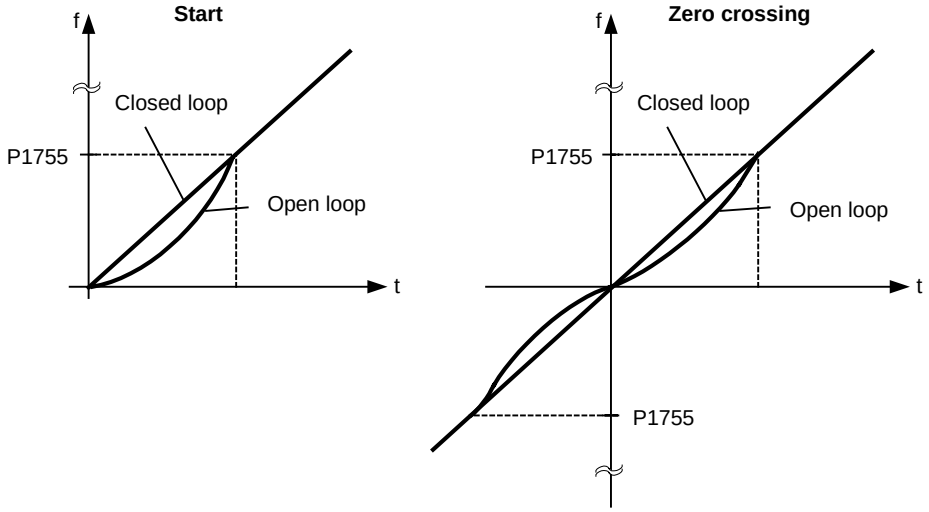
Sets oscillation damping gain for sensorless vector control at low frequencies.

P1750[3] **Control word of motor model**

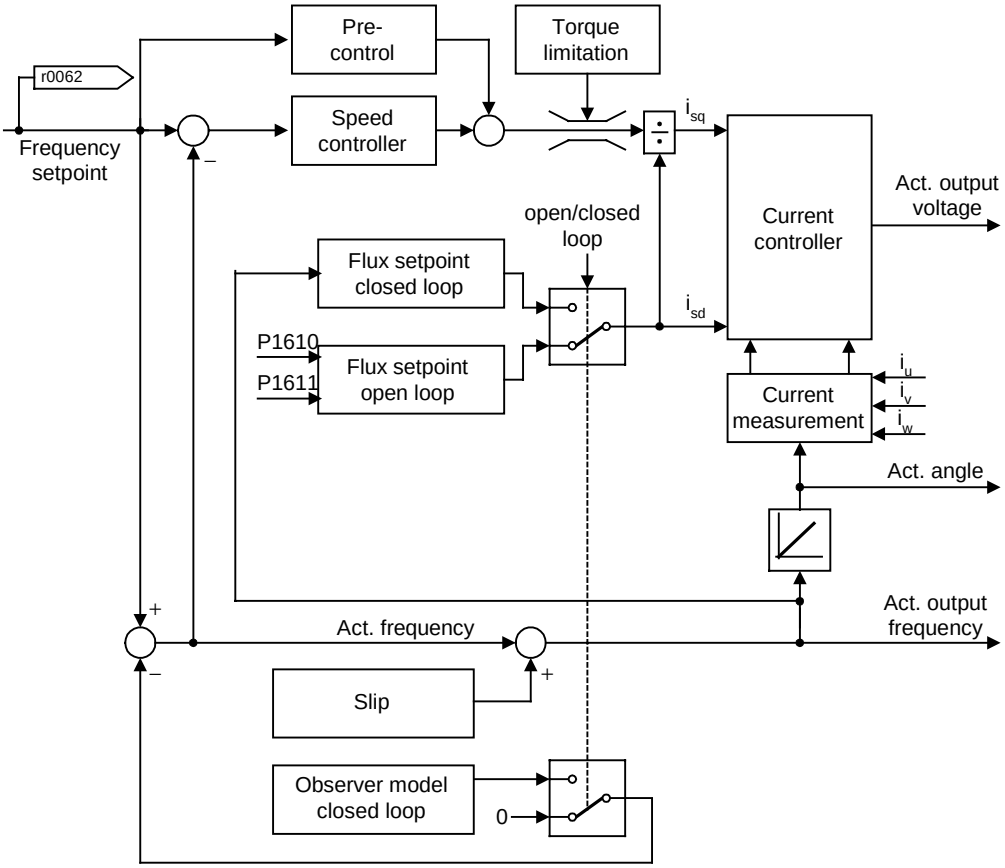
CStat:	CUT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	CONTROL	**Active:** first confirm	**QuickComm.** No	**Def:**	1
				Max:	3

Level: **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 speed 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:

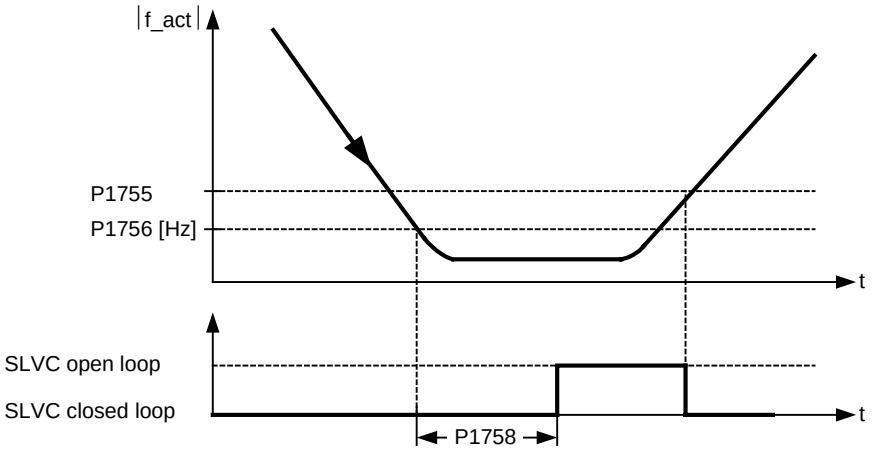
Bit00	Transit to SLVC open loop	0	NO
		1	YES
Bit01	N-adaption enabled	0	NO
		1	YES
Bit02	Transit to SLVC closed loop	0	NO
		1	YES
Bit03	Speed controller enabled	0	NO
		1	YES
Bit04	Current injection	0	NO
		1	YES
Bit05	Start flux decrease	0	NO
		1	YES
Bit14	Rs adapted	0	NO
		1	YES
Bit15	Xh adapted	0	NO
		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

Enters start frequency of sensorless vector control (SLVC).



$$P1756\,[Hz] = P1755\,[Hz] \cdot \frac{P1756\,[\%]}{100\,[\%]}$$

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 speed 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 speeds.

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 **Def:** 0 **Max:** 20
P-Group: MOTOR **Active:** first confirm **QuickComm.** Yes

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 **Def:** 3 **Max:** 3
P-Group: INVERTER **Active:** Immediately **QuickComm.** No

Selects maximum number of motor phases to be identified.

r1912[3] **Identified stator resistance** Level: **2**

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

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.** Yes

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 (P1360) and SLVC (P1370) 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**

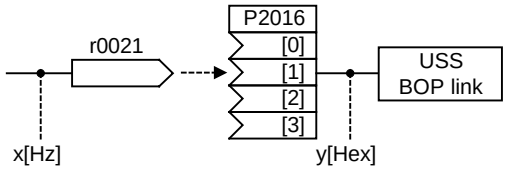
Full-scale frequency setting used by serial link (corresponds to 4000H), analog I/O and P/D controller.

Index:

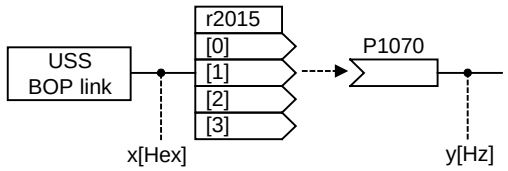
P2000[0] : 1st. Drive data set (DDS)
P2000[1] : 2nd. Drive data set (DDS)
P2000[2] : 3rd. Drive data set (DDS)

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.



$$y[Hex] = \frac{r0021[Hz]}{P2000[Hz]} \cdot 4000[Hex]$$



$$y[Hz] = \frac{r2015[1]}{4000} \cdot P2000$$

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).

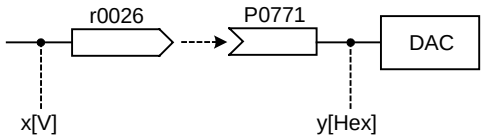
Index:

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**

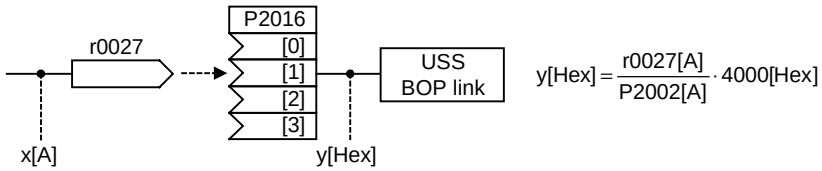
Full-scale output current used over serial link (corresponds to 4000H).

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.



P2003[3] Reference torque

CStat:	CT	**Datatype:** Float	**Unit:** Nm	**Min:**	0.10
P-Group:	COMM	**Active:** first confirm	**QuickComm.** No	**Def:**	0.75
				Max:	99999.00

Level: **3**

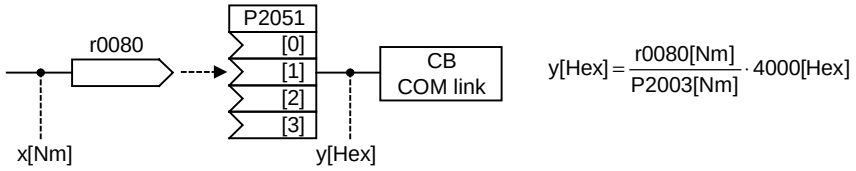
Full-scale reference torque used over the serial link (corresponds to 4000H).

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.



r2004[3] Reference power

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

Level: **3**

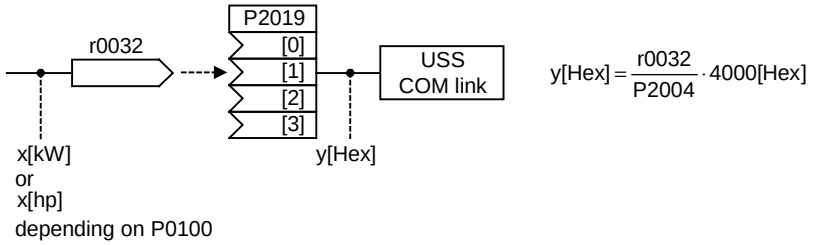
Full-scale reference power used over the serial link (corresponds to 4000H).

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 normalization

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

Level: **3**

Enables special normalization for USS.

Possible Settings:

0 Disabled
1 Enabled

Index:

P2009[0] : Serial interface COM link
P2009[1] : Serial interface BOP link

Note:

If 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).

P2010[2] USS baudrate

CStat:	CUT	**Datatype:** U16	**Unit:** -	**Min:**	4
P-Group:	COMM	**Active:** first confirm	**QuickComm.** No	**Def:**	6
				Max:	12

Level: **2**

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
P-Group:	COMM	**Active:** first confirm	**QuickComm.** No	**Def:**	0
				Max:	31

Level: **2**

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**				**Min:** 0	Level:
	CStat: CUT	**Datatype:** U16	**Unit:** -		**Def:** 2	**3**
	P-Group: COMM	**Active:** first confirm	**QuickComm.** No		**Max:** 8	

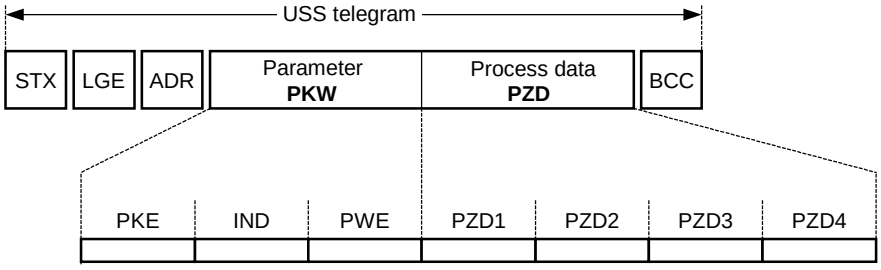
Defines the number of 16-bit words in PZD part of USS telegram. In this area, process data (PZD) are continually exchanged between the master and slaves. The PZD part of the USS telegram is used for the main setpoint, and to control the inverter.

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.

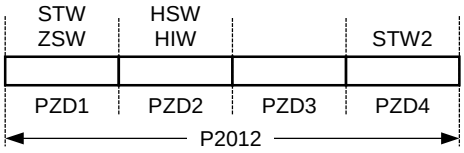


STX	Start of text	PKE	Parameter ID
LGE	Length	IND	Sub-index
ADR	Address	PWE	Parameter value
PKW	Parameter ID value		
PZD	Process data		
BCC	Block check character		

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:

a) control word and main setpoint or
b) status word and actual value.

When P2012 is greater or equal to 4 the additional control word is transferred as the 4th PZD-word (default setting).



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:

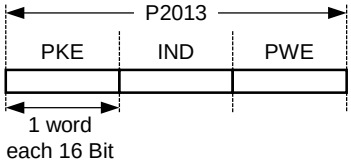
	Data type		
	U16 (16 Bit)	U32 (32 Bit)	Float (32 Bit)
P2013 = 3	✔	Parameter access fault	Parameter access fault
P2013 = 4	✔	✔	✔
P2013 = 127	✔	✔	✔

Notice:

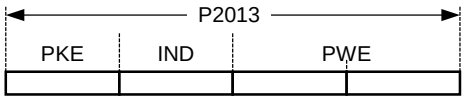
USS protocol consists of PZD and PKW which can be changed by the user via parameters P2012 and P2013 respectively.

Parameter P2013 determines the number of PKW-words in a USS-telegram. Setting P2013 = 3 or 4 will determine the number of PZD-words which are fixed during P2013 = 127, the length will be changed automatically.

P2013 = 3



P2013 = 4



PKE Parameter ID
IND Sub-index
PWE Parameter value

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

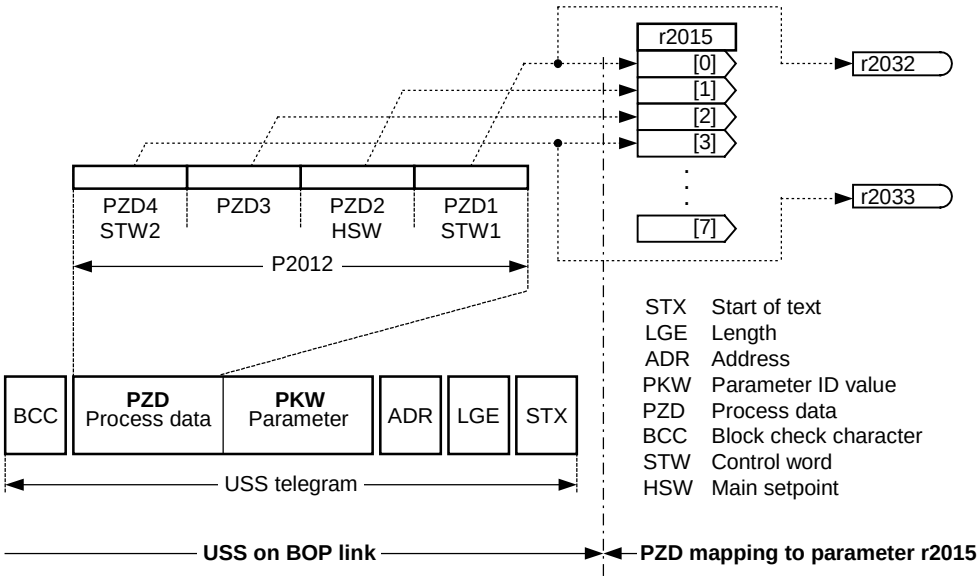
Notice:

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:

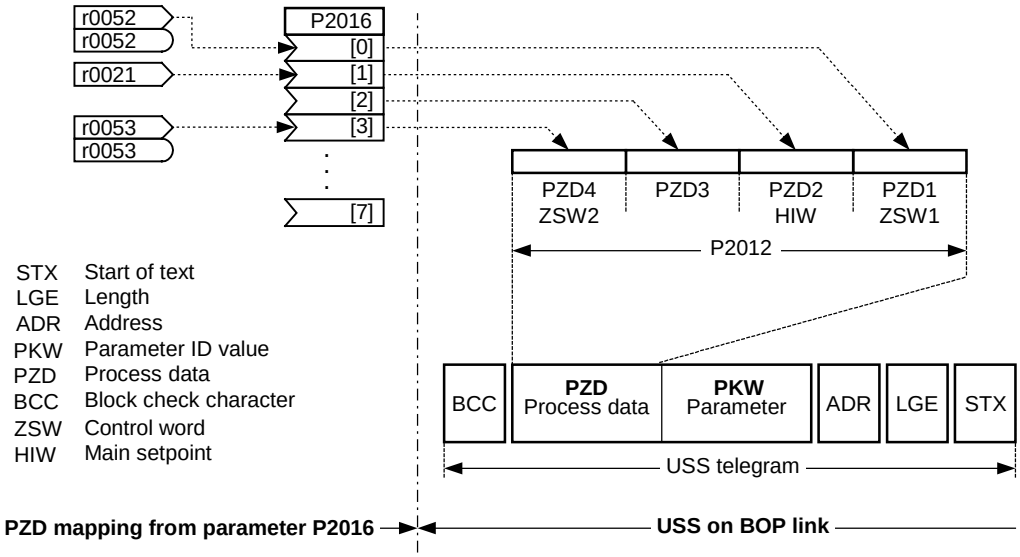
r2015[0] : Received word 0
r2015[1] : Received word 1
r2015[2] : Received word 2
r2015[3] : Received word 3
r2015[4] : Received word 4
r2015[5] : Received word 5
r2015[6] : Received word 6
r2015[7] : Received word 7

Note:

The control words can be viewed as bit parameters r2032 and r2033.

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").

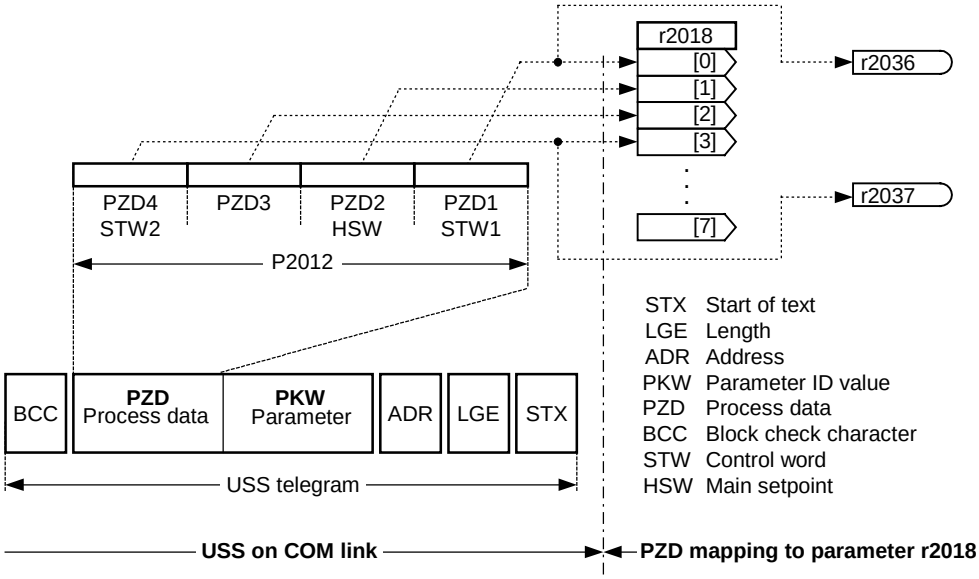
r2018[8] **CO: PZD from COM link (USS)**

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

Level: **3**

P-Group: COMM

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:

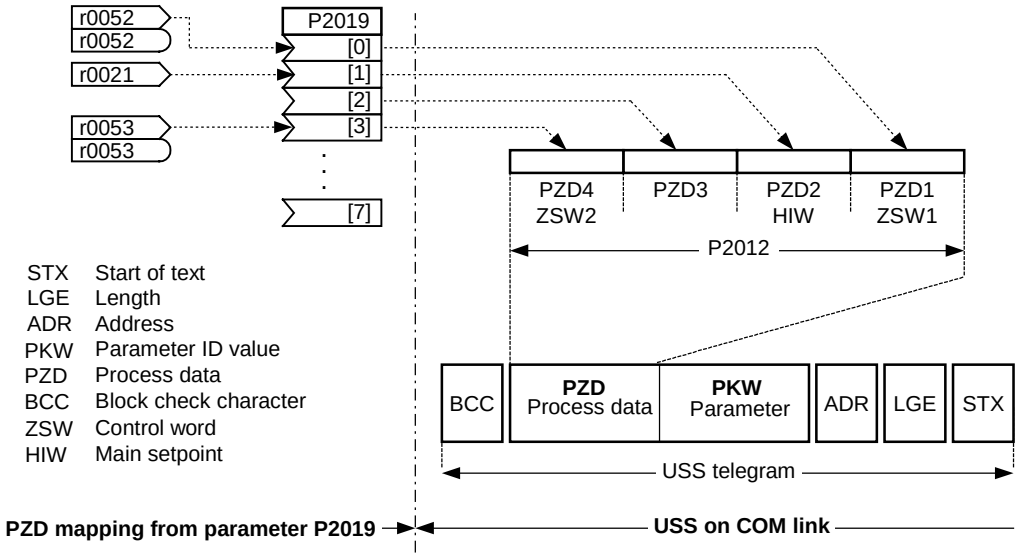
The control words can be viewed as bit parameters r2036 and r2037.

P2019[8] **CI: PZD to COM link (USS)**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMM	**Active:** Immediately	**QuickComm.** No	**Def:**	52:0
				Max:	4000:0

Level: **3**

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**

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

Level: **3**

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**

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

Level: **3**

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**

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

Level: **3**

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**

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

Level: **3**

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	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	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 **Def:** 20 **Max:** 65535

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

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 **Def:** 0 **Max:** 65535

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

Configures a communication board (CB).

Index:

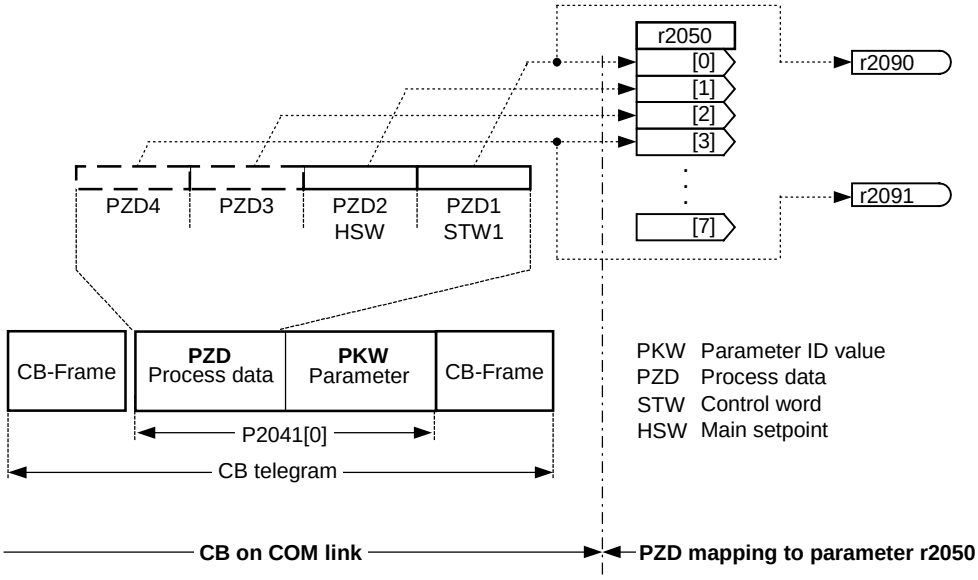
P2041[0] : CB parameter 0
P2041[1] : CB parameter 1
P2041[2] : CB parameter 2
P2041[3] : CB parameter 3
P2041[4] : CB parameter 4

Details:

See relevant communication board manual for protocol definition and appropriate settings.

r2050[8]	**CO: PZD from CB**			**Min:** -	Level:
		Datatype: U16	**Unit:** -	**Def:** -	**3**
	P-Group: COMM			**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.

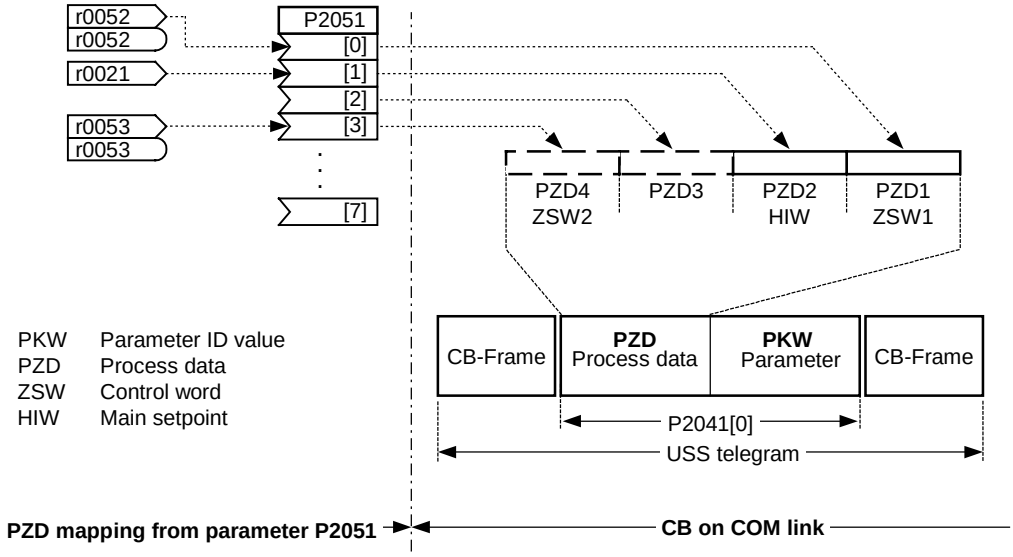
P2051[8] **CI: PZD to CB**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMM	**Active:** Immediately	**QuickComm.** No	**Def:**	52:0
				Max:	4000:0

Level: **3**

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**

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

Level: **3**

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**

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

Level: **3**

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**

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

Level: **3**

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**

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

Level: **3**

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	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**

CStat: CT **Datatype:** U16 **Unit:** - **Min:** 0 **Def:** 0 **Max:** 65535

Level: **3**

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

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**

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

Level: **3**

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

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** Level: **3**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.** No	**Def:**	1:0
				Max:	4000:0

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** Level: **2**

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

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** Level: **3**

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

Displays number of warning (up to 4) since last reset. Set to 0 to reset the warning history.

r2114[2] **Run time counter** Level: **3**

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

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** Level: **3**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.** No	**Def:**	0
				Max:	65535

Displays AOP real time.

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** Level: **4**

CStat:	CUT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.** No	**Def:**	0
				Max:	65535

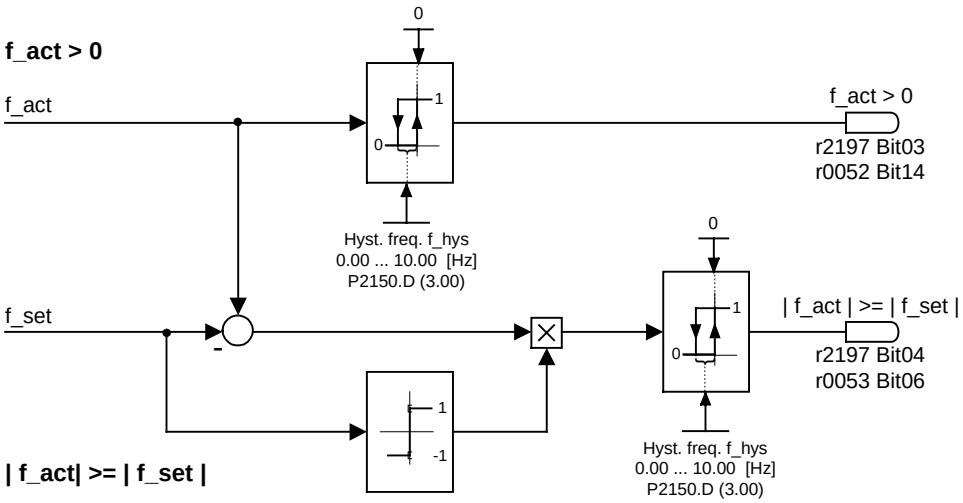
Indicates total number of alarm events. This parameter is incremented whenever an alarm event occurs. It also gets incremented when a warning is cleared or faults are cleared.

This parameter is used by the PC tools.

P2150[3] **Hysteresis frequency f_hys**

						Level:
CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	0.00	**3**
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.** No	**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 speed filter**

						Level:
CStat:	CUT	**Datatype:** U16	**Unit:** ms	**Min:**	0	**2**
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.** No	**Max:**	1000	

Specifies time constant of first-order speed filter. The filtered speed 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)

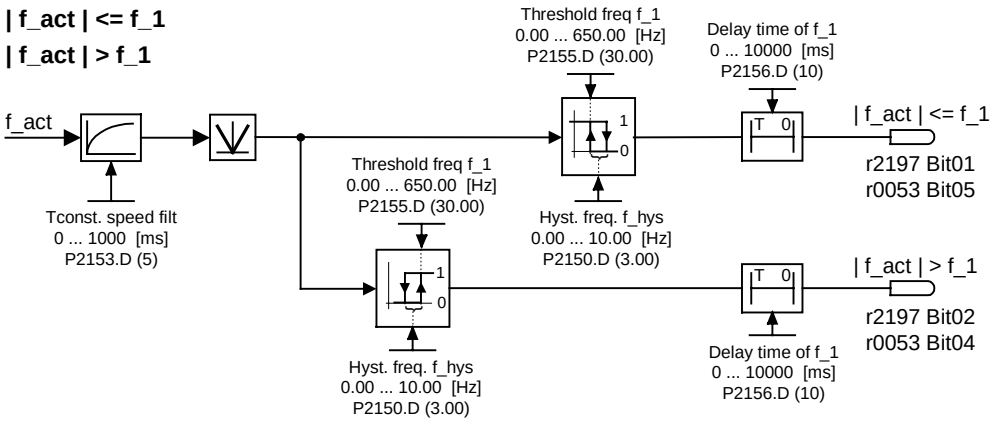
Details:

See diagram in P2155, P2157 and P2159

P2155[3] **Threshold frequency f_1**

						Level:
CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	0.00	**3**
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.** No	**Max:**	650.00	

Sets a threshold for comparing actual speed 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**

CStat:	CUT	**Datatype:** U16	**Unit:** ms	**Min:**	0
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.** No	**Def:**	10
				Max:	10000

Level: **3**

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:

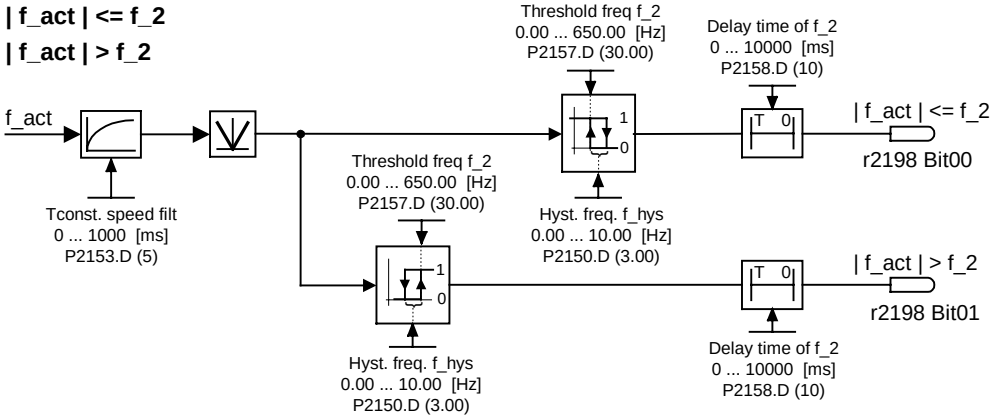
See diagram in P2155 (threshold frequency f_1)

P2157[3] **Threshold frequency f_2**

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	0.00
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.** No	**Def:**	30.00
				Max:	650.00

Level: **2**

Threshold_2 for comparing speed 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**

CStat:	CUT	**Datatype:** U16	**Unit:** ms	**Min:**	0
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.** No	**Def:**	10
				Max:	10000

Level: **2**

Delay time for comparing speed or 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)

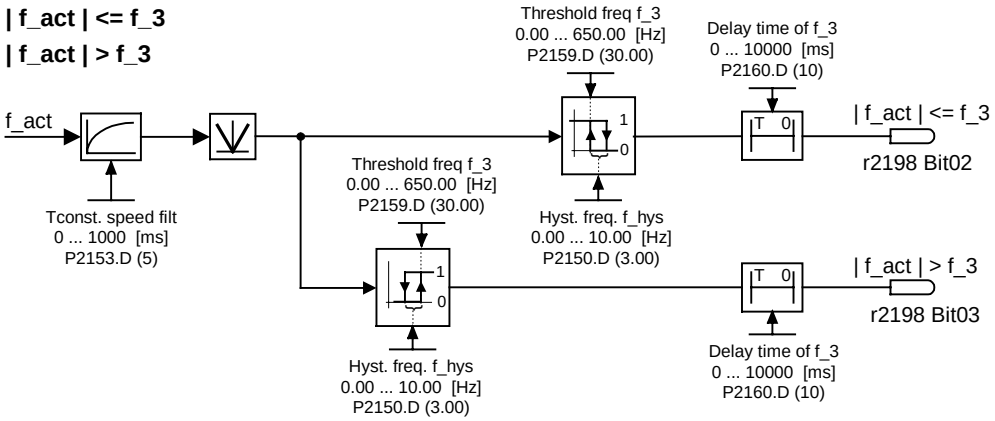
Details:

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 speed or 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 speed or 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)

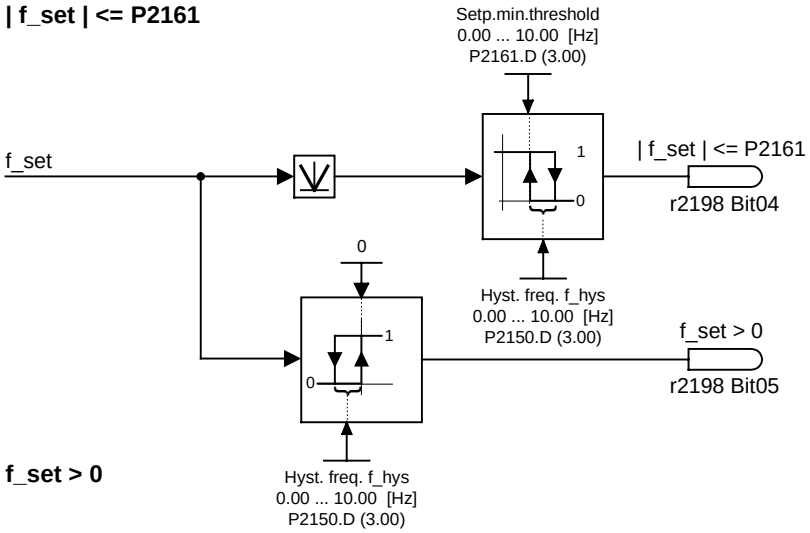
Details:

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 speed or frequency setpoint.



Index:

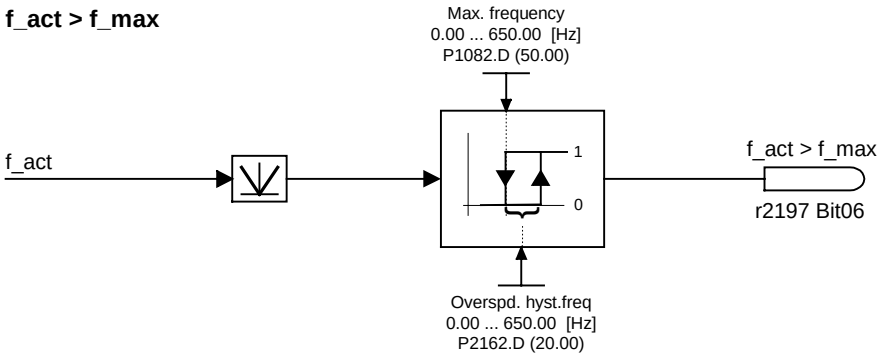
P2161[0] : 1st. Drive data set (DDS)
P2161[1] : 2nd. Drive data set (DDS)
P2161[2] : 3rd. Drive data set (DDS)

P2162[3] **Hysteresis freq. for overspeed**

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	0.00
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.** No	**Def:**	20.00
				Max:	650.00

Level: **2**

Hysteresis speed (or frequency) for overspeed-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**

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	0.00
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.** No	**Def:**	3.00
				Max:	20.00

Level: **2**

Threshold for detecting speed deviation from setpoint as illustrated in the diagram P2164.

Index:

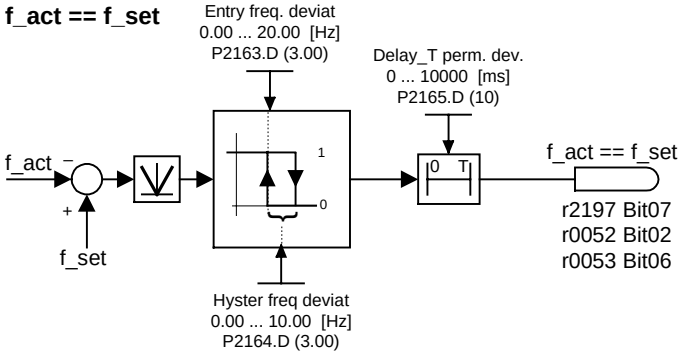
P2163[0] : 1st. Drive data set (DDS)
P2163[1] : 2nd. Drive data set (DDS)
P2163[2] : 3rd. Drive data set (DDS)

P2164[3] **Hysteresis frequency deviation**

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	0.00
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.** No	**Def:**	3.00
				Max:	10.00

Level: **3**

Hysteresis frequency for detecting permitted deviation (from setpoint) or frequency or speed. 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**

CStat:	CUT	**Datatype:** U16	**Unit:** ms	**Min:**	0
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.** No	**Def:**	10
				Max:	10000

Level: **2**

Delay time for detecting permitted deviation of speed or 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:

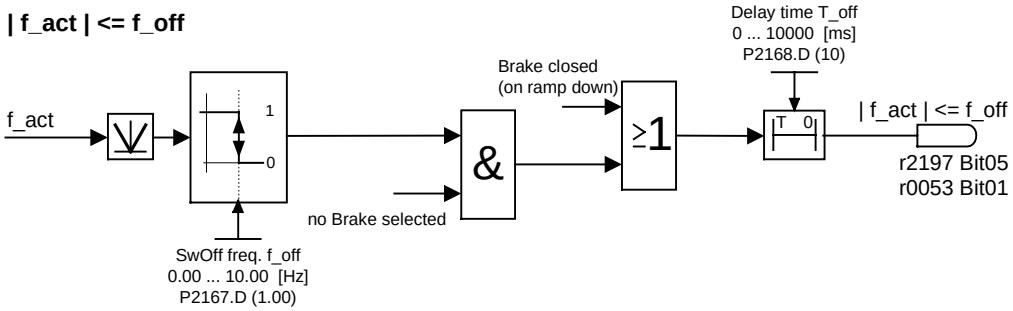
See diagram in P2174.

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

Sets frequency threshold below which inverter switches off.

If the frequency falls below this threshold, bit 1 in status word 2 (r0053)is set.



Index:

P2167[0] : 1st. Drive data set (DDS)
P2167[1] : 2nd. Drive data set (DDS)
P2167[2] : 3rd. Drive data set (DDS)

Dependency:

Switched off only if OFF1 or OFF3 active.

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:**	-

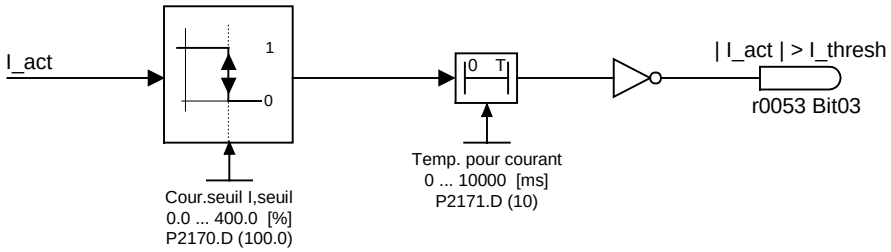
Filtered speed (or frequency) for monitoring behind first-order lowpass filter.

P2170[3] **Threshold current I_thresh** Level: **3**

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	0.0
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: **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 current comparison.

Index:

P2171[0] : 1st. Drive data set (DDS)
P2171[1] : 2nd. Drive data set (DDS)
P2171[2] : 3rd. Drive data set (DDS)

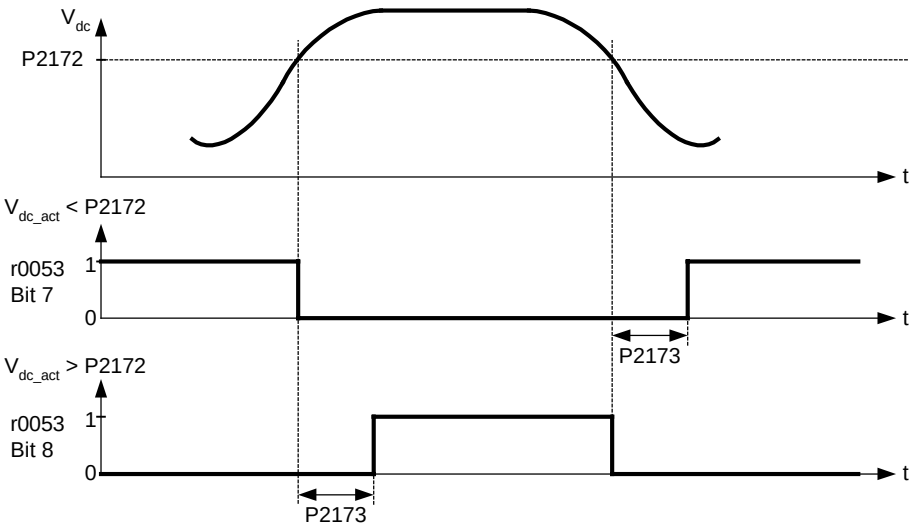
Details:

See diagram in P2170 (threshold current I_thresh)

P2172[3] **Threshold DC-link voltage** Level: **3**

CStat:	CUT	**Datatype:** U16	**Unit:** V	**Min:**	0
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**			**Min:**	0	Level:
	CStat: CUT	**Datatype:** U16	**Unit:** ms	**Def:**	10	**3**
	P-Group: ALARMS	**Active:** Immediately	**QuickComm.** No	**Max:**	10000	

Defines delay time prior to activation of threshold comparison.

Index:

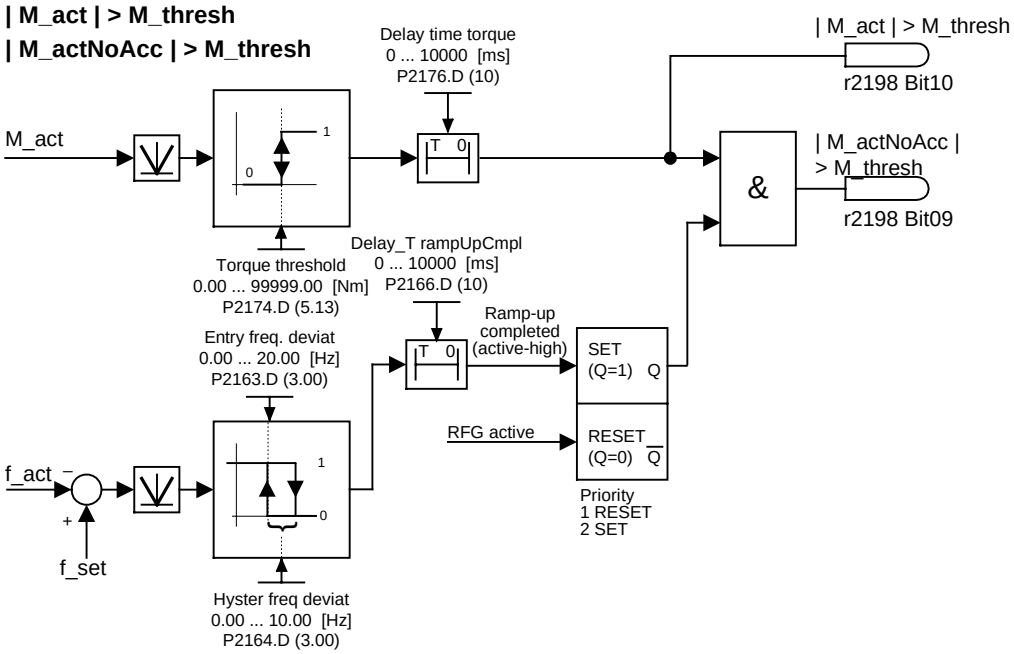
P2173[0] : 1st. Drive data set (DDS)
P2173[1] : 2nd. Drive data set (DDS)
P2173[2] : 3rd. Drive data set (DDS)

Details:

See diagram in P2172 (threshold DC-link voltage)

P2174[3]	**Torque threshold M_thresh**			**Min:**	0.00	Level:
	CStat: CUT	**Datatype:** Float	**Unit:** Nm	**Def:**	5.13	**2**
	P-Group: ALARMS	**Active:** Immediately	**QuickComm.** No	**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**			**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 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**			**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 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.

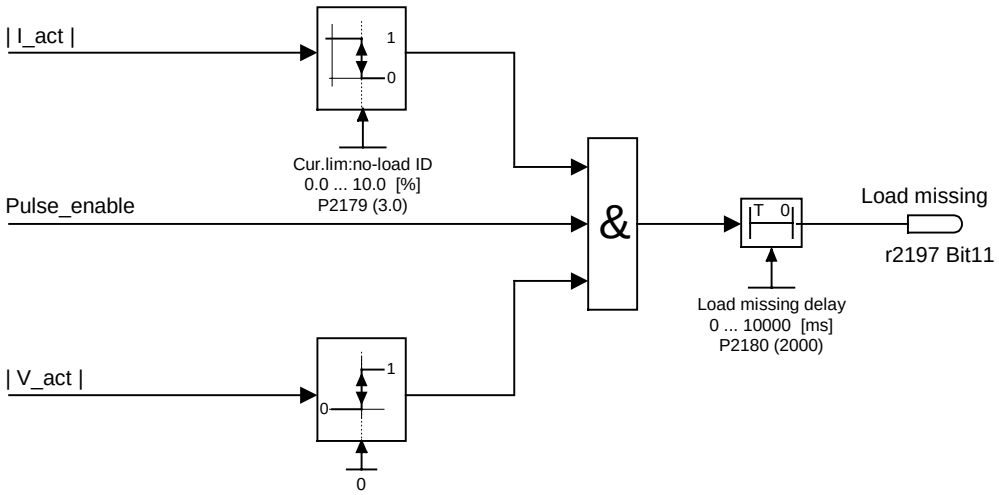
Index:

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:

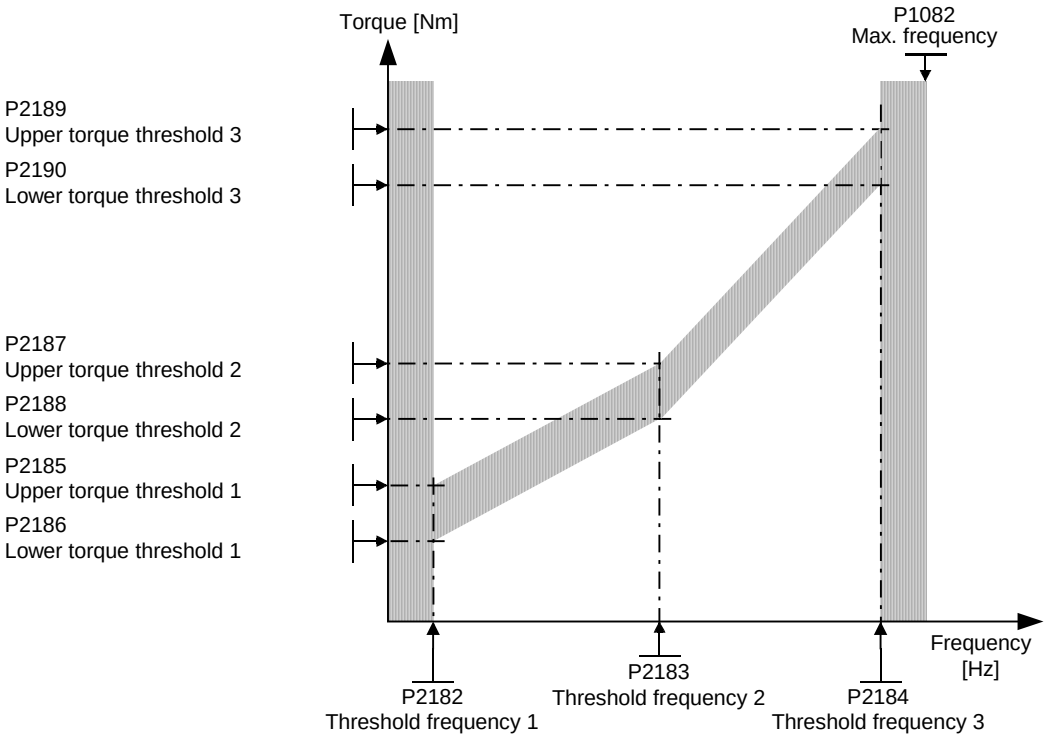
P2181[0] : 1st. Command data set (CDS)
P2181[1] : 2nd. Command data set (CDS)
P2181[2] : 3rd. Command data set (CDS)

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

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	0.00
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.** No	**Def:**	30.00
				Max:	650.00

Level: **2**

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

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	0.00
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.** No	**Def:**	50.00
				Max:	650.00

Level: **2**

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

CStat:	CUT	**Datatype:** Float	**Unit:** Nm	**Min:**	0.0
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.** No	**Def:**	99999.0
				Max:	99999.0

Level: **2**

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

CStat:	CUT	**Datatype:** Float	**Unit:** Nm	**Min:**	0.0
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.** No	**Def:**	0.0
				Max:	99999.0

Level: **2**

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

CStat:	CUT	**Datatype:** Float	**Unit:** Nm	**Min:**	0.0
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.** No	**Def:**	99999.0
				Max:	99999.0

Level: **2**

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

CStat:	CUT	**Datatype:** Float	**Unit:** Nm	**Min:**	0.0
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.** No	**Def:**	0.0
				Max:	99999.0

Level: **2**

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

CStat:	CUT	**Datatype:** Float	**Unit:** Nm	**Min:**	0.0
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.** No	**Def:**	99999.0
				Max:	99999.0

Level: **2**

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

CStat:	CUT	**Datatype:** Float	**Unit:** Nm	**Min:**	0.0
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.** No	**Def:**	0.0
				Max:	99999.0

Level: **2**

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

CStat:	CUT	**Datatype:** U16	**Unit:** s	**Min:**	0
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.** No	**Def:**	10
				Max:	65

Level: **2**

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

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

Level: **2**

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	No load condition	0	NO
		1	YES

r2198 **CO/BO: Monitoring word 2** Level: **2**

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

P-Group: ALARMS

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** Level: **2**

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

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

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**

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-200.00
P-Group:	TECH	**Active:** Immediately	**QuickComm.** No	**Def:**	0.00
				Max:	200.00

Level: **2**

Defines Fixed PID Setpoint 1

In addition, you can set any of the digital input parameters to fixed PID setpoint (FF-PID) via the digital inputs (P0701 - P0706).

There are three selection modes for the PID fixed setpoint:
1 Direct selection (P0701 = 15 or P0702 = 15, etc):
In this mode of operation, 1 digital input selects one PID fixed setpoint.

2 Direct selection with ON command (P0701 = 16 or P0702 = 16, etc.):
Description as for 1), except that this type of selection issues an ON command concurrent with any setpoint selection.

3 Binary Coded Decimal selection (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:

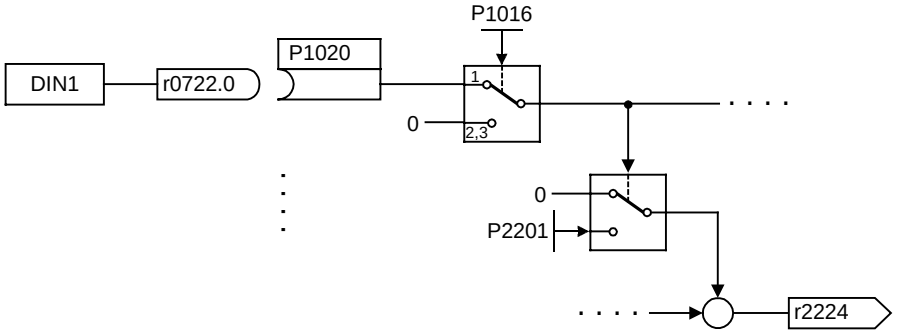
P2201[0] : 1st. Drive data set (DDS)
P2201[1] : 2nd. Drive data set (DDS)
P2201[2] : 3rd. Drive data set (DDS)

Example:

		DIN4	DIN3	DIN2	DIN1
	OFF	Inactive	Inactive	Inactive	Inactive
P2201	PID-FF1	Inactive	Inactive	Inactive	**Active**
P2202	PID-FF2	Inactive	Inactive	**Active**	Inactive
P2203	PID-FF3	Inactive	Inactive	**Active**	**Active**
P2204	PID-FF4	Inactive	**Active**	Inactive	Inactive
P2205	PID-FF5	Inactive	**Active**	Inactive	**Active**
P2206	PID-FF6	Inactive	**Active**	**Active**	Inactive
P2207	PID-FF7	Inactive	**Active**	**Active**	**Active**
P2208	PID-FF8	**Active**	Inactive	Inactive	Inactive
P2209	PID-FF9	**Active**	Inactive	Inactive	**Active**
P2210	PID-FF10	**Active**	Inactive	**Active**	Inactive
P2211	PID-FF11	**Active**	Inactive	**Active**	**Active**
P2212	PID-FF12	**Active**	**Active**	Inactive	Inactive
P2213	PID-FF13	**Active**	**Active**	Inactive	**Active**
P2214	PID-FF14	**Active**	**Active**	**Active**	Inactive
P2215	PID-FF15	**Active**	**Active**	**Active**	**Active**

Direct selection of PID-FF1 P2201 via DIN 1:

P0701 = 15
or
P0701 = 99, P1020 = 722.0, P1016 = 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 rev. direct. of PID-MOP** Level: **2**

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

Inhibits reverse setpoint selection when PID motor potentiometer is chosen either as a main setpoint or additional setpoint.

Possible Settings:

0 Reverse direction is allowed
1 Reverse direction 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 cursor

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 cursor

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**

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

Level: **2**

P-Group: TECH

Displays output setpoint of motor potentiometer in [%].

Note:

r2250 = 100 % corresponds to 4000 hex

P2251 **PID mode**

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

Level: **3**

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

Enables function of PID controller.

Possible Settings:

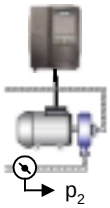
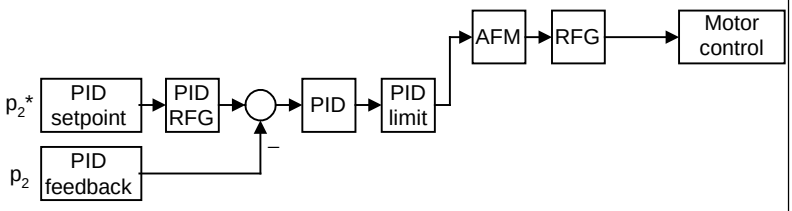
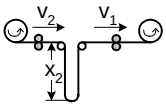
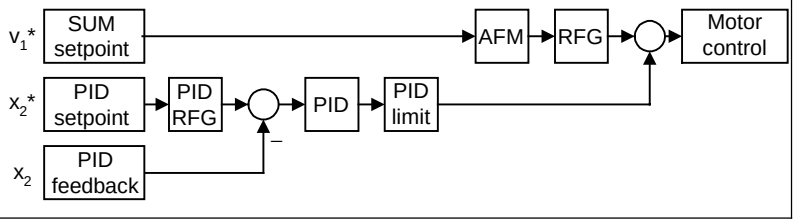
0 PID as setpoint
1 PID as trim

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		

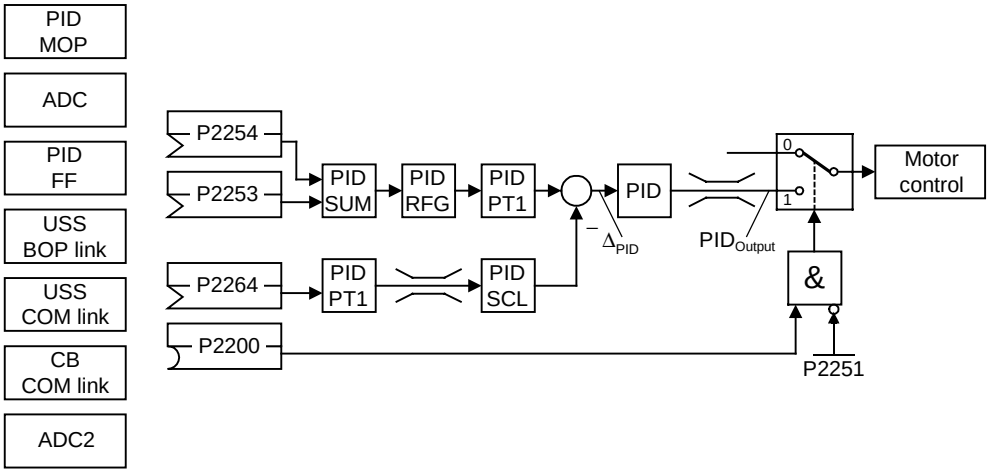
P2253[3] **CI: PID setpoint**

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

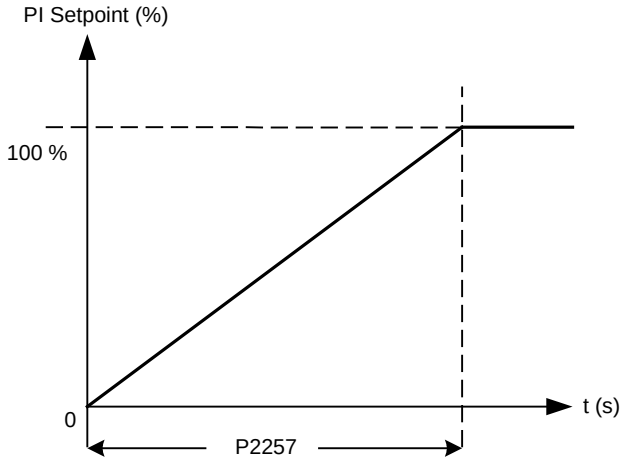
Level: **3**

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** Level: **2**

CStat:	CUT	**Datatype:** Float	**Unit:** s	**Min:**	0.00
P-Group:	TECH	**Active:** Immediately	**QuickComm.** No	**Def:**	1.00
				Max:	650.00

Sets the ramp-up time for the PID setpoint.



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 %).

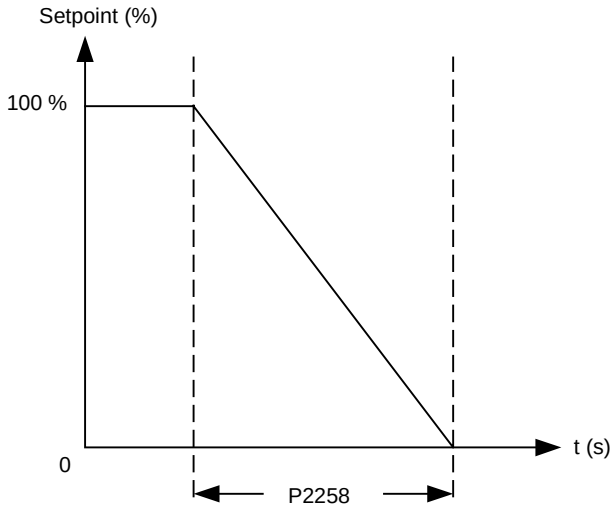
Notice:

Setting the ramp-up time too short may cause the inverter to trip, on overcurrent for example.

P2258 **Ramp-down time for PID setpoint** Level: **2**

CStat:	CUT	**Datatype:** Float	**Unit:** s	**Min:**	0.00
P-Group:	TECH	**Active:** Immediately	**QuickComm.** No	**Def:**	1.00
				Max:	650.00

Sets ramp-down time for PID setpoint.



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** Level: **2**

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

P-Group: TECH

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 **Def:** 0.00 **Max:** 60.00

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

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:** - **Def:** - **Max:** -

P-Group: TECH

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 **Def:** 0 **Max:** 1

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

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 **Def:** 755:0 **Max:** 4000:0

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

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 **Def:** 0.00 **Max:** 60.00

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

Defines time constant for PID feedback filter.

r2266 **CO: PID filtered feedback** Level: **2**

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

P-Group: TECH

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 **Def:** 100.00 **Max:** 200.00

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

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.

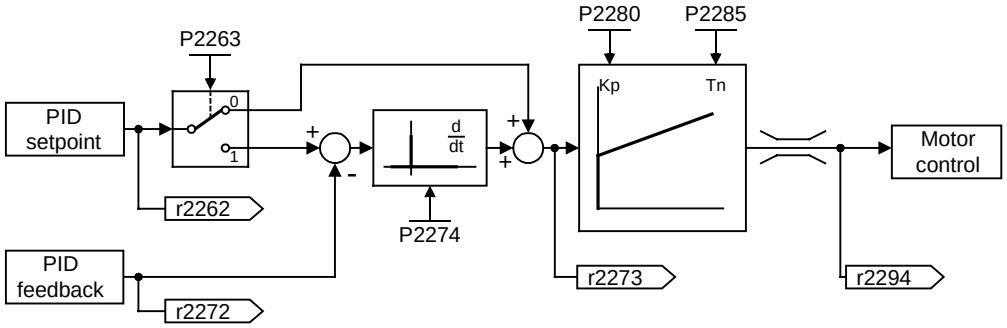
P2274 = 0:
The derivative term does not have any effect (it applies a gain of 1).

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**

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	0.00
P-Group:	TECH	**Active:** Immediately	**QuickComm.** No	**Def:**	5.00
				Max:	20.00

Level: **3**

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**

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

Level: **3**

Sets the mode for positioning mode.

Possible Settings:

1 Open loop positioning

Index:

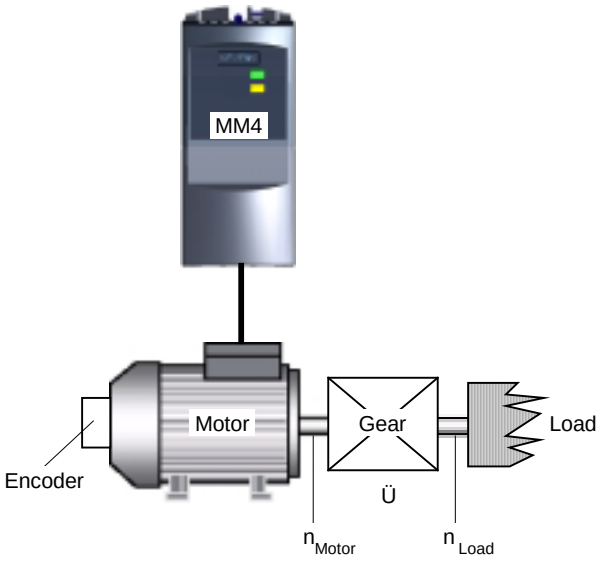
P2480[0] : 1st. Drive data set (DDS)
P2480[1] : 2nd. Drive data set (DDS)
P2480[2] : 3rd. Drive data set (DDS)

P2481[3] **Gearbox ratio input**

CStat:	CUT	**Datatype:** Float	**Unit:** -	**Min:**	0.01
P-Group:	CONTROL	**Active:** first confirm	**QuickComm.** No	**Def:**	1.00
				Max:	9999.99

Level: **3**

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**

CStat:	CUT	**Datatype:** Float	**Unit:** -	**Min:**	0.01
P-Group:	CONTROL	**Active:** first confirm	**QuickComm.** No	**Def:**	1.00
				Max:	9999.99

Level: **3**

Defines the ratio between number of motor shaft revolutions to equal one revolution of the gearbox output shaft.

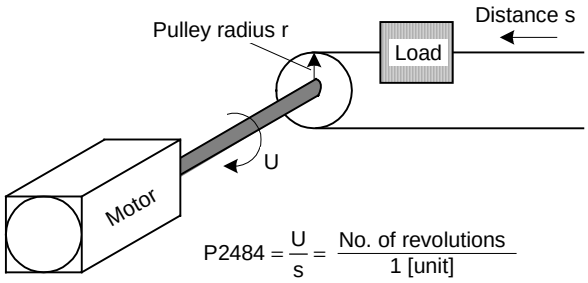
Index:

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.



$$P2484 = \frac{U}{s} = \frac{\text{No. of revolutions}}{\text{1 [unit]}}$$

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.

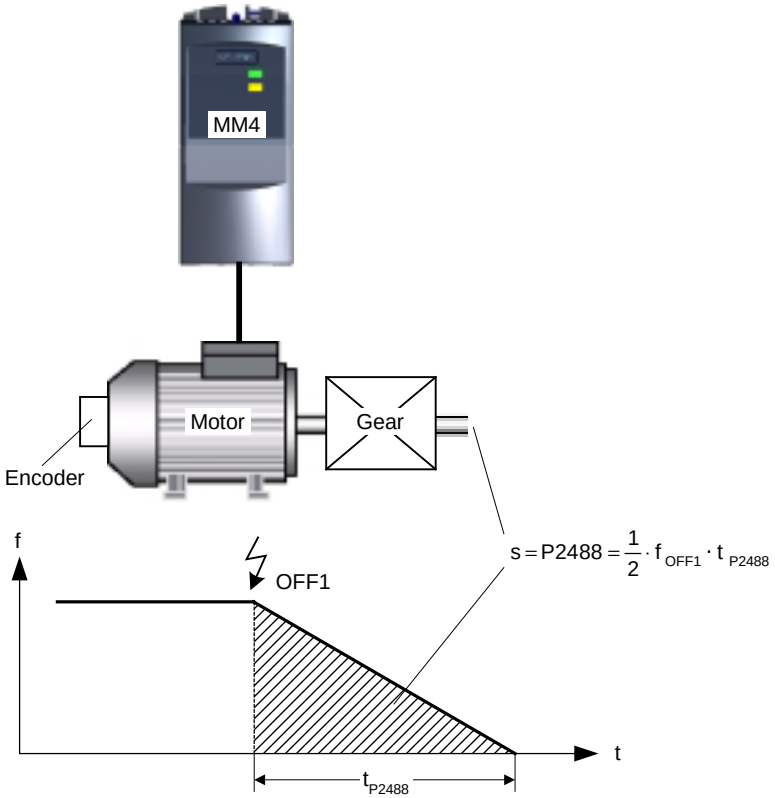
Index:

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** Level: **3**

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

CStat:	CUT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	TECH	**Active:** first confirm	**QuickComm.** No	**Def:**	0
				Max:	3

Level: **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.

	P2802 [13] CMP 2	P2802 [12] CMP 1	P2802 [11] DIV 2	P2802 [10] DIV 1	P2802 [9] MUL 2	P2802 [8] MUL 1	P2802 [7] SUB 2	P2802 [6] SUB 1	P2802 [5] ADD 2	P2802 [4] ADD 1	P2802 [3] Timer 4	P2802 [2] Timer 3	P2802 [1] Timer 2	P2802 [0] Timer 1	P2801 [16] RS-FF 3	P2801 [15] RS-FF 2	P2801 [14] RS-FF 1	P2801 [13] D-FF 2	P2801 [12] D-FF 1	P2801 [11] NOT 3	P2801 [10] NOT 2	P2801 [9] NOT 1	P2801 [8] XOR 3	P2801 [7] XOR 2	P2801 [6] XOR 1	P2801 [5] OR 3	P2801 [4] OR 2	P2801 [3] OR 1	P2801 [2] AND 3	P2801 [1] AND 2	P2801 [0] AND 1
Level 3																															
Level 2																															
Level 1																															
Not active 0																															

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

CStat:	CUT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	TECH	**Active:** first confirm	**QuickComm.** No	**Def:**	0
				Max:	3

Level: **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.

	P2802 [13] CMP 2	P2802 [12] CMP 1	P2802 [11] DIV 2	P2802 [10] DIV 1	P2802 [9] MUL 2	P2802 [8] MUL 1	P2802 [7] SUB 2	P2802 [6] SUB 1	P2802 [5] ADD 2	P2802 [4] ADD 1	P2802 [3] Timer 4	P2802 [2] Timer 3	P2802 [1] Timer 2	P2802 [0] Timer 1	P2801 [16] RS-FF 3	P2801 [15] RS-FF 2	P2801 [14] RS-FF 1	P2801 [13] D-FF 2	P2801 [12] D-FF 1	P2801 [11] NOT 3	P2801 [10] NOT 2	P2801 [9] NOT 1	P2801 [8] XOR 3	P2801 [7] XOR 2	P2801 [6] XOR 1	P2801 [5] OR 3	P2801 [4] OR 2	P2801 [3] OR 1	P2801 [2] AND 3	P2801 [1] AND 2	P2801 [0] AND 1
Level 3																															
Level 2																															
Level 1																															
Not active 0																															

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.

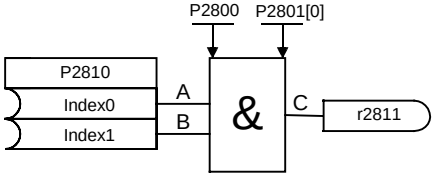
All active function blocks will be calculated in every 132 ms.

P2810[2] BI: AND 1

CStat:	CUT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	TECH	**Active:** first confirm	**QuickComm.** No	**Def:**	0:0
				Max:	4000:0

Level: **3**

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:

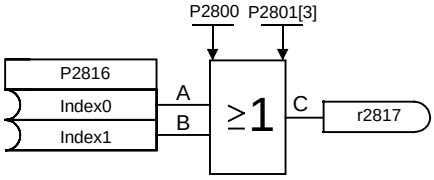
P2801[2] is active level for the AND element.

P2816[2] **BI: OR 1** Level: **3**

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

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

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** Level: **3**

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

P-Group: TECH

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** Level: **3**

CStat: CUT **Datatype:** U32 **Unit:** - **Min:** 0:0 **Def:** 0:0
P-Group: TECH **Active:** first confirm **QuickComm.** No **Max:** 4000:0

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** Level: **3**

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

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** Level: **3**

CStat: CUT **Datatype:** U32 **Unit:** - **Min:** 0:0 **Def:** 0:0
P-Group: TECH **Active:** first confirm **QuickComm.** No **Max:** 4000:0

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** Level: **3**

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

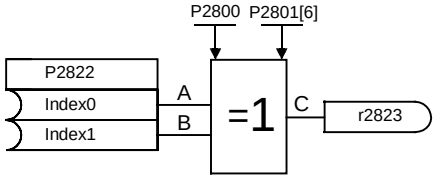
Output of OR 3 element. Displays or logic of bits defined in P2820[0], P2820[1].

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
P-Group: TECH **Active:** first confirm **QuickComm.** No **Max:** 4000:0

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:** -
P-Group: TECH **Max:** -

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
P-Group: TECH **Active:** first confirm **QuickComm.** No **Max:** 4000:0

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:

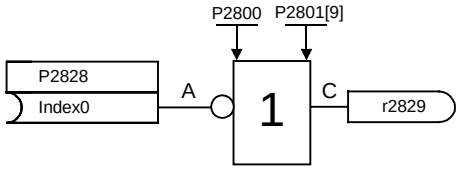
P2801[8] is active level for the XOR element.

P2828 **BI: NOT 1** Level: **3**

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

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

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:** - **Def:** - **Max:** -

P-Group: TECH

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 **Def:** 0:0 **Max:** 4000:0

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

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:** - **Def:** - **Max:** -

P-Group: TECH

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 **Def:** 0:0 **Max:** 4000:0

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

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:** - **Def:** - **Max:** -

P-Group: TECH

Output of NOT 3 element. Displays not logic of bit defined in P2832.

Dependency:

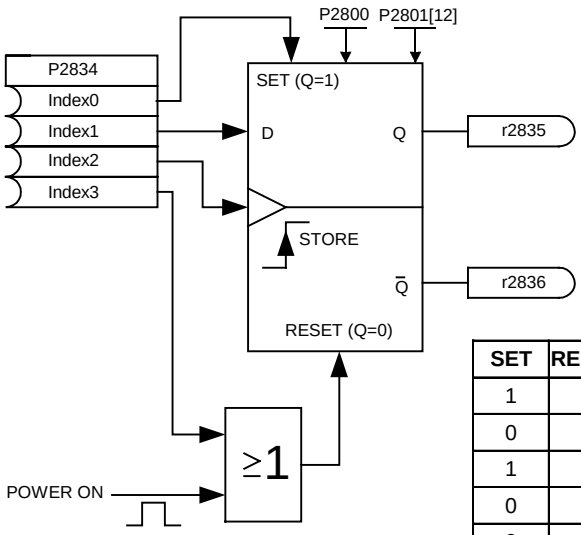
P2801[11] is active level for the NOT element.

P2834[4] **BI: D-FF 1**

CStat:	CUT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	TECH	**Active:** first confirm	**QuickComm.** No	**Def:**	0:0
				Max:	4000:0

Level: **3**

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**

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

Level: **3**

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**

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

Level: **3**

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**

CStat:	CUT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	TECH	**Active:** first confirm	**QuickComm.** No	**Def:**	0:0
				Max:	4000:0

Level: **3**

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**

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

Level: **3**

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**

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

Level: **3**

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.

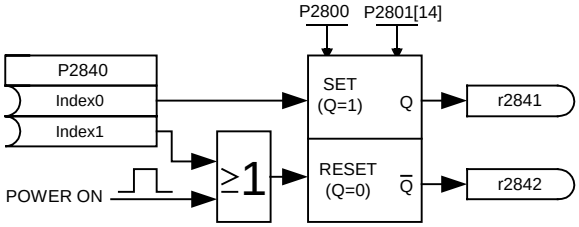
P2840[2] **BI: RS-FF 1**

CStat: CUT **Datatype:** U32 **Unit:** - **Min:** 0:0 **Def:** 0:0

P-Group: TECH **Active:** first confirm **QuickComm.** No **Max:** 4000:0

Level: **3**

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**

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

Level: **3**

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**

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

Level: **3**

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**

CStat: CUT **Datatype:** U32 **Unit:** - **Min:** 0:0 **Def:** 0:0

P-Group: TECH **Active:** first confirm **QuickComm.** No **Max:** 4000:0

Level: **3**

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**

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

Level: **3**

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**

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

Level: **3**

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** Level: **3**

CStat: CUT **Datatype:** U32 **Unit:** - **Min:** 0:0
P-Group: TECH **Active:** first confirm **QuickComm.** No **Def:** 0:0
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** Level: **3**

Datatype: U16 **Unit:** - **Min:** -
P-Group: TECH **Def:** -
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** Level: **3**

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

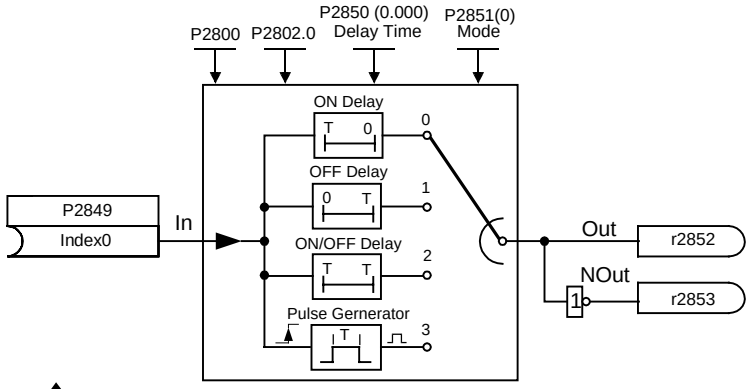
Displays Not-output of RS-FlipFlop 3, inputs are defined in P2846[0], P2846[1]

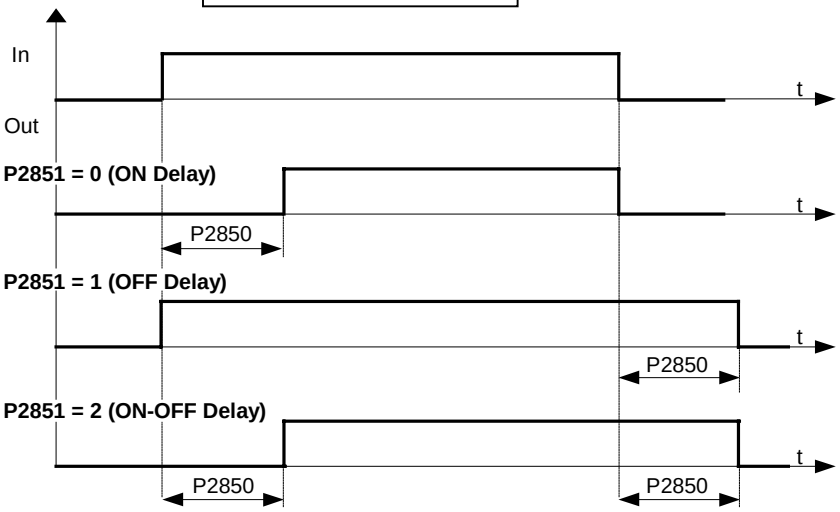
Dependency:

P2801[16] is active level for the RS-FlipFlop.

P2849	BI: Timer 1				Min:	0:0	Level:
	CStat: CUT	Datatype: U32	Unit: -		Def:	0:0	3
	P-Group: TECH	Active: first confirm	QuickComm. No		Max:	4000:0	

Define input signal of timer 1. P2849, P2850, P2851 are the inputs of the timer, outputs are P2852, P2853.





P2851 = 3 (Pulse Generator)

Dependency:

P2802[0] is active level for the timer.

P2850	Delay time of timer 1				Min:	0.0	Level:
	CStat: CUT	Datatype: Float	Unit: s		Def:	0.0	3
	P-Group: TECH	Active: first confirm	QuickComm. No		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:** -
P-Group: TECH **Def:** -
Max: -

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:** -
P-Group: TECH **Def:** -
Max: -

Displays Not-output of timer 4. P2864, P2865, P2866 are the inputs of the timer, outputs are P2867, P2868.

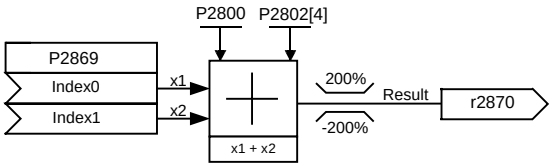
Dependency:
P2802[3] is active level for the timer.

P2869[2] **CI: ADD 1**

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 Adder 1, result is in P2870.



Result = x1 + x2

If: x1 + x2 > 200% → Result = 200%
x1 + x2 < -200% → Result = -200%

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**

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

Level: **3**

Result of Adder 1.

Dependency:
P2802[4] is active level for the Adder.

P2871[2] **CI: ADD 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 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**

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

Level: **3**

Result of Adder 2.

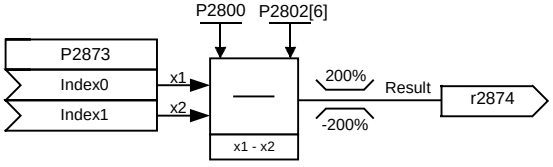
Dependency:
P2802[5] is active level for the Adder.

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:

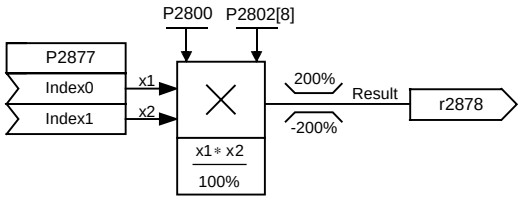
P2802[7] is active level for the Subtracter.

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.



$$\textbf{Result} = \frac{\textbf{x1} * \textbf{x2}}{\textbf{100\%}}$$

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**

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 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**

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

Level: **3**

Result of Multiplier 2.

Dependency:

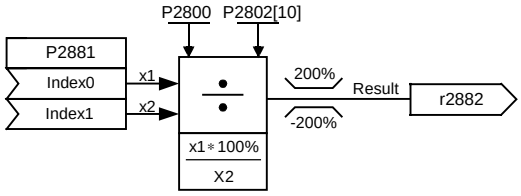
P2802[9] is active level for the Multiplier.

P2881[2] **CI: DIV 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 Divider 1, result is in P2882.



$$\text{Result} = \frac{x1 * 100\%}{x2}$$

If: $\frac{x1*100\%}{x2} > 200\% \rightarrow$ Result = 200%

$\frac{x1*100\%}{x2} < -200\% \rightarrow$ 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**

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

Level: **3**

Result of Divider 1.

Dependency:

P2802[10] is active level for the Divider.

P2883[2] **CI: DIV 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 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**

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

Level: **3**

Result of Divider 2.

Dependency:

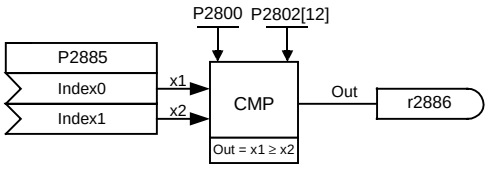
P2802[11] is active level for the Divider.

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.



$x1 \geq x2 \rightarrow$ Out = 1
$x1 < x2 \rightarrow$ Out = 0

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** Level: **3**

CStat: CUT **Datatype:** U32 **Unit:** - **Min:** 0:0
P-Group: TECH **Active:** first confirm **QuickComm.** No **Def:** 755:0
Max: 4000:0

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** Level: **3**

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

Displays result bit of Comparator 2.

Dependency:

P2802[13] is active level for the Comparator.

P2889 **CO: Fixed setpoint 1 in [%]** Level: **3**

CStat: CUT **Datatype:** Float **Unit:** % **Min:** -200.00
P-Group: TECH **Active:** first confirm **QuickComm.** No **Def:** 0.00
Max: 200.00

Fixed percent setting 1.

Connector Setting in %

P2889

P2890

Range : -200% ... 200%

P2890 **CO: Fixed setpoint 2 in [%]** Level: **3**

CStat: CUT **Datatype:** Float **Unit:** % **Min:** -200.00
P-Group: TECH **Active:** first confirm **QuickComm.** No **Def:** 0.00
Max: 200.00

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. These include P0344 (motor weight), P0350 (demagnetization time), P2000 (reference frequency), P2002 (reference current).

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

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

Level: **4**

P-Group: -

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

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

Level: **4**

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

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 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

P3981 Reset active fault

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

Level: **4**

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

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)

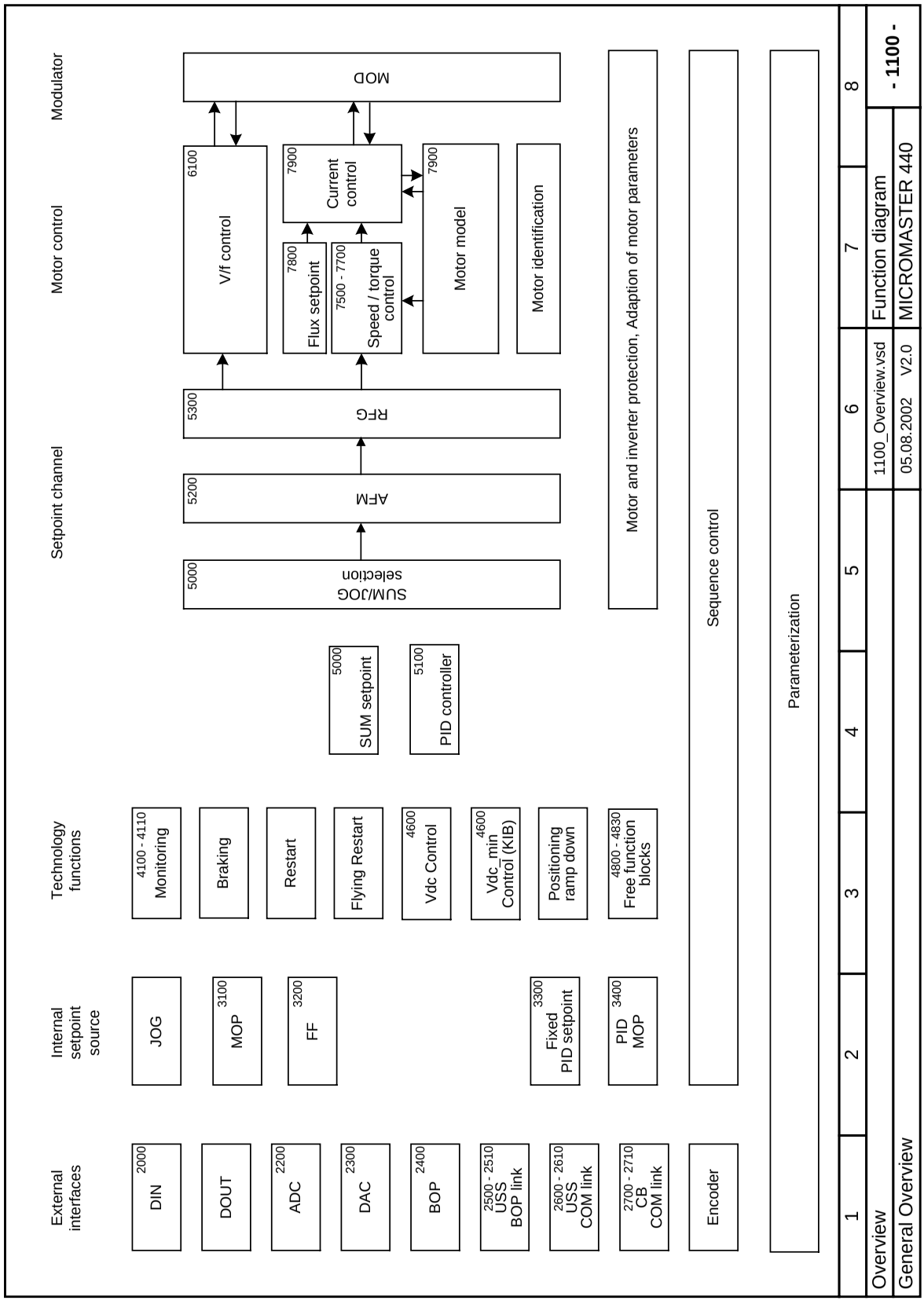
r3986[2]	**Number of parameters**			**Min:** -	Level:
		Datatype: U16	**Unit:** -	**Def:** -	**4**
	P-Group: -			**Max:** -	

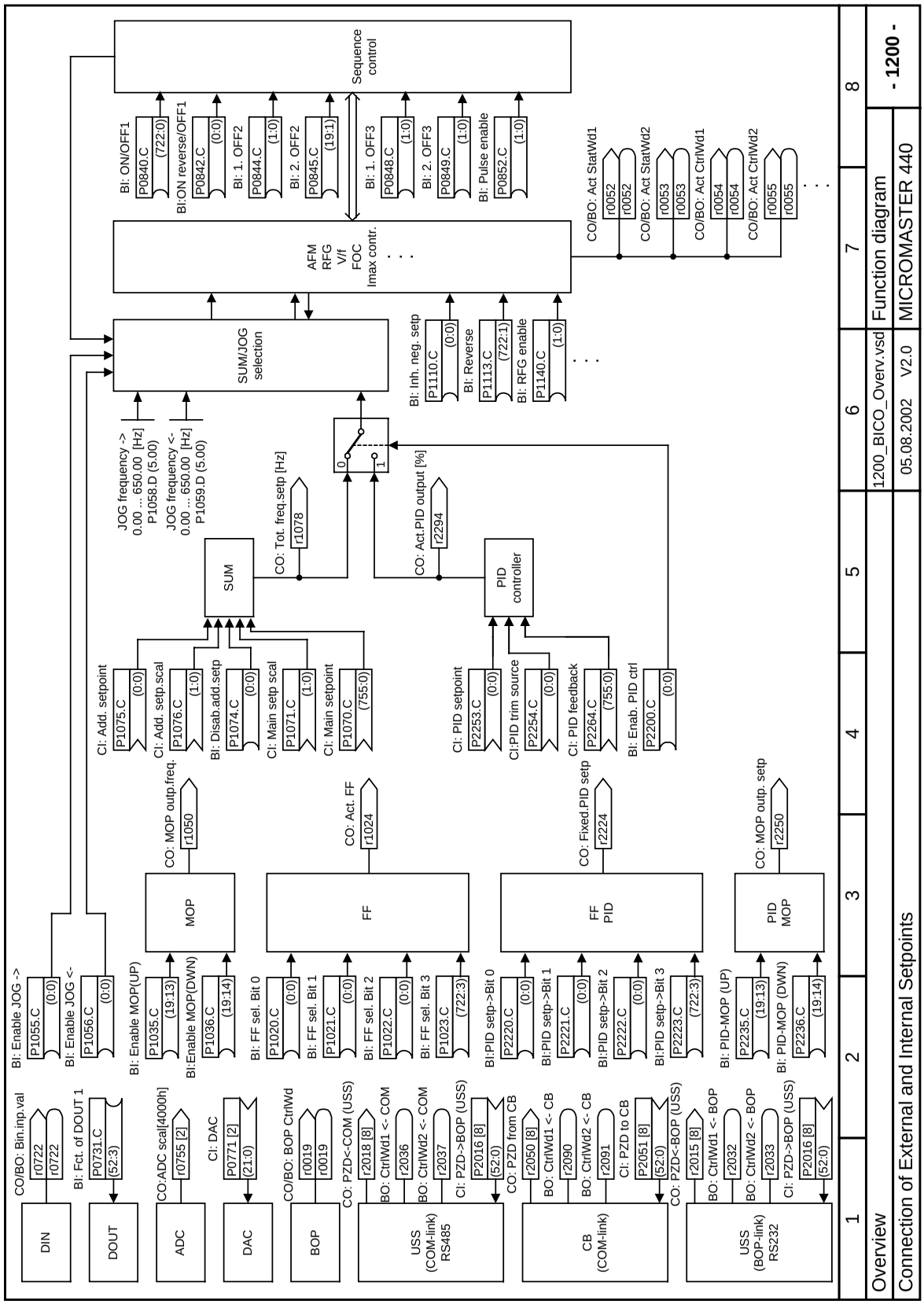
Number of parameters on the drive

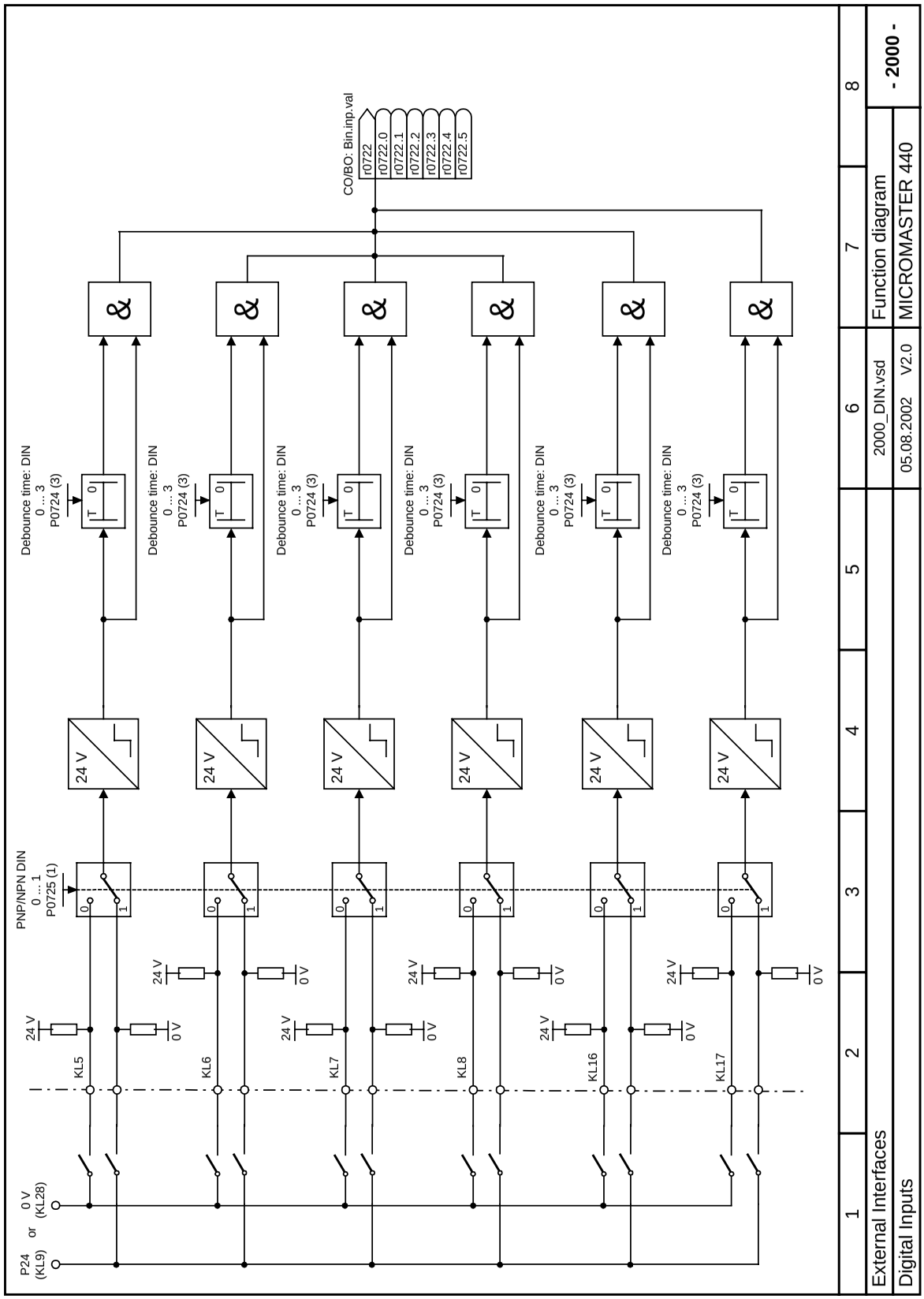
Index:

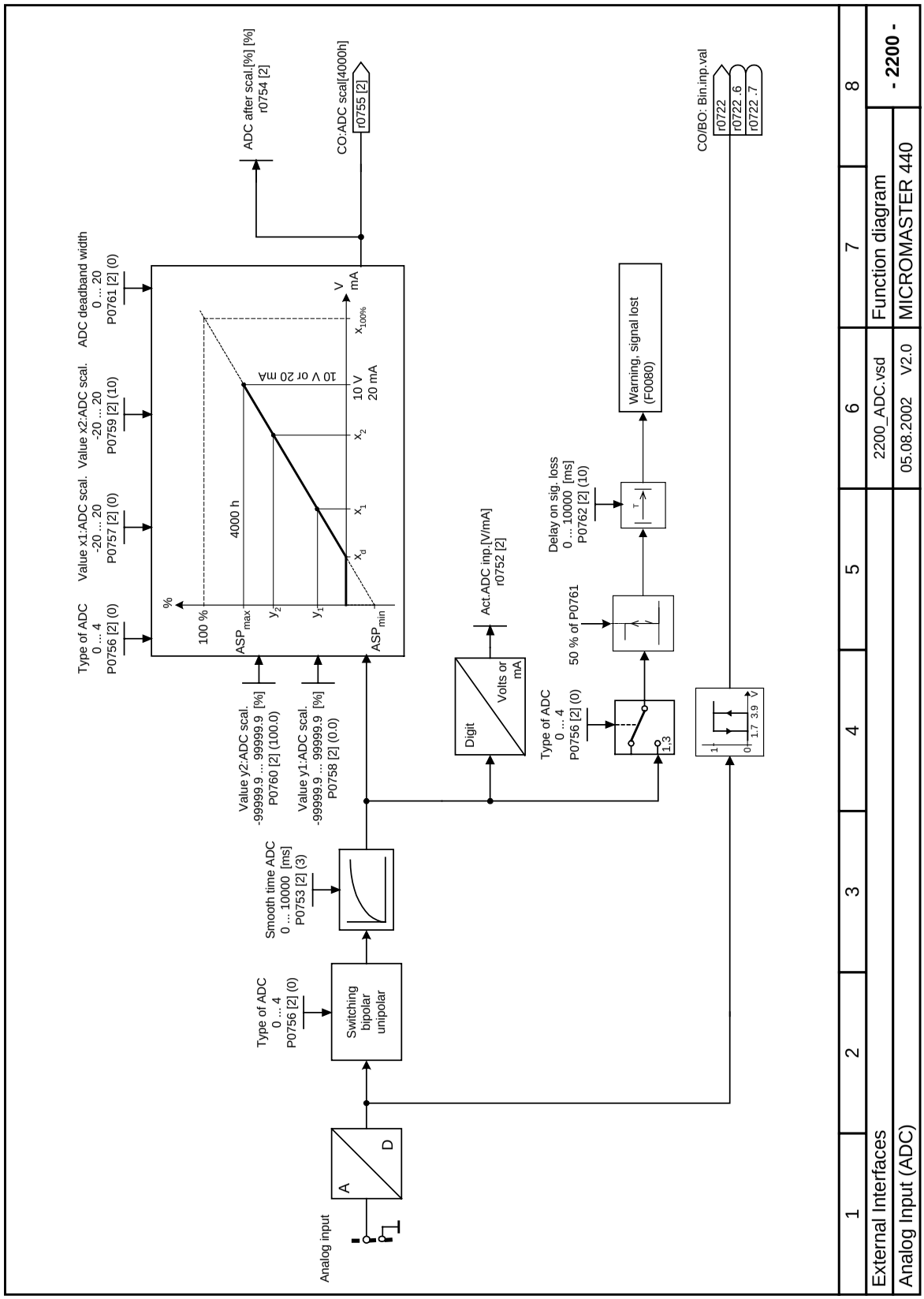
r3986[0] : Read only
r3986[1] : Read & write

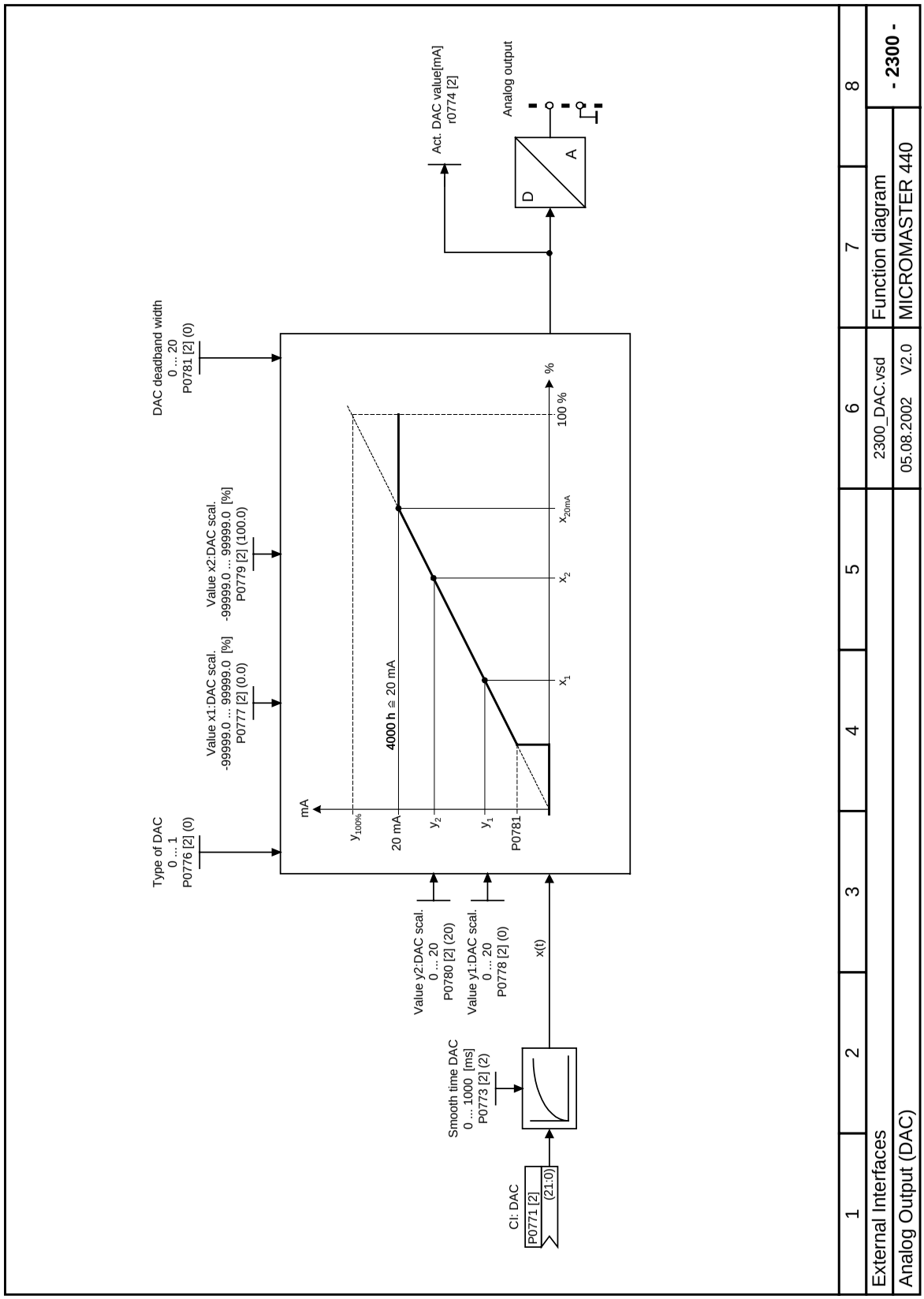
2 Function Diagrams

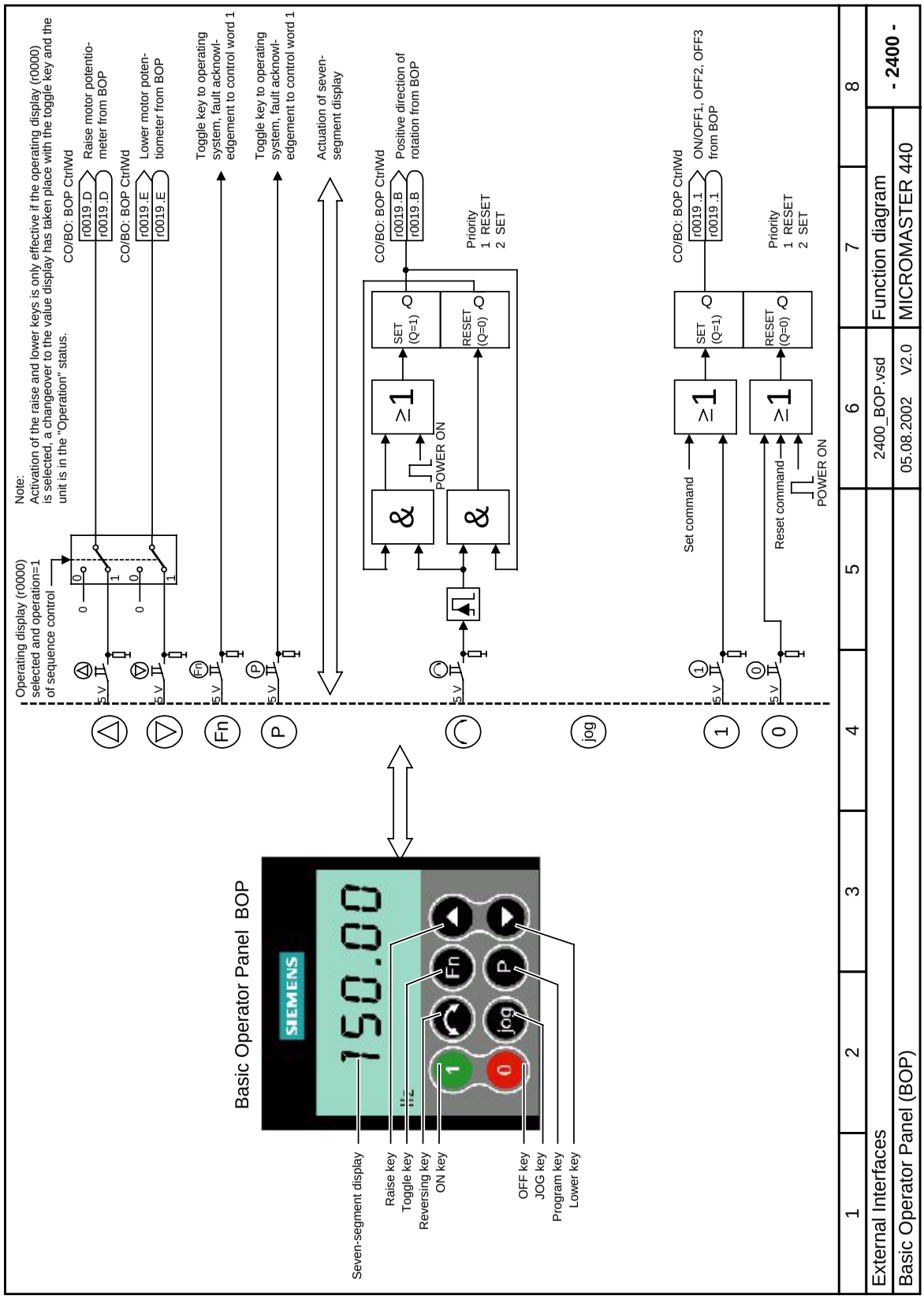


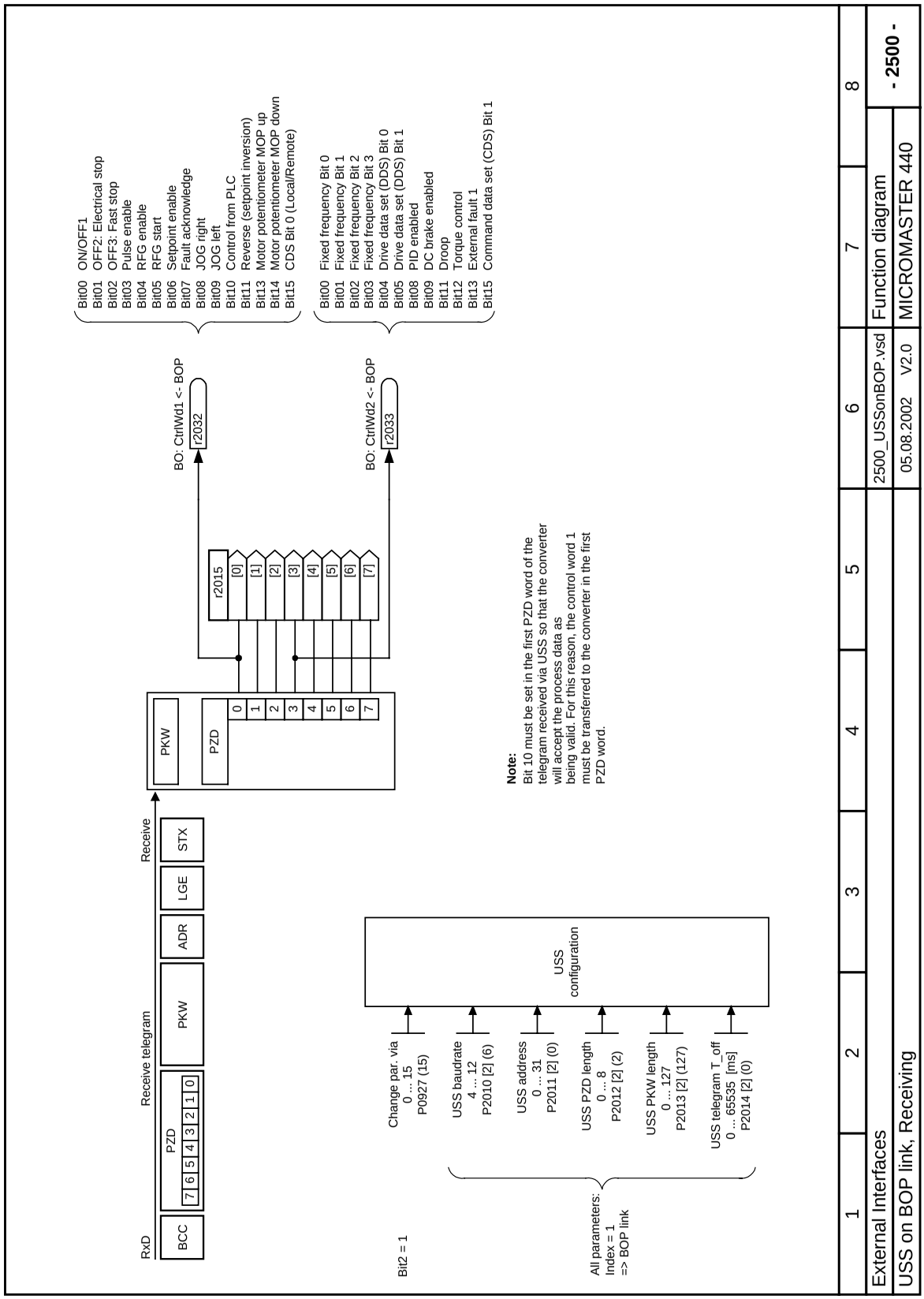

Sequence control
SUM/JOG selection
AFM
RFG
V/f
FOC
Imax contr.
SUM
PID controller
MOP
FF
FF PID
PID MOP
DIN
DOUT
ADC
DAC
BOP
USS (COM-link) RS485
CB (COM-link)
USS (BOP-link) RS232
Overview
Connection of External and Internal Setpoints
1200_BICO_Overv.vsd
05.08.2002 V2.0
Function diagram
MICROMASTER 440
- 1200 -

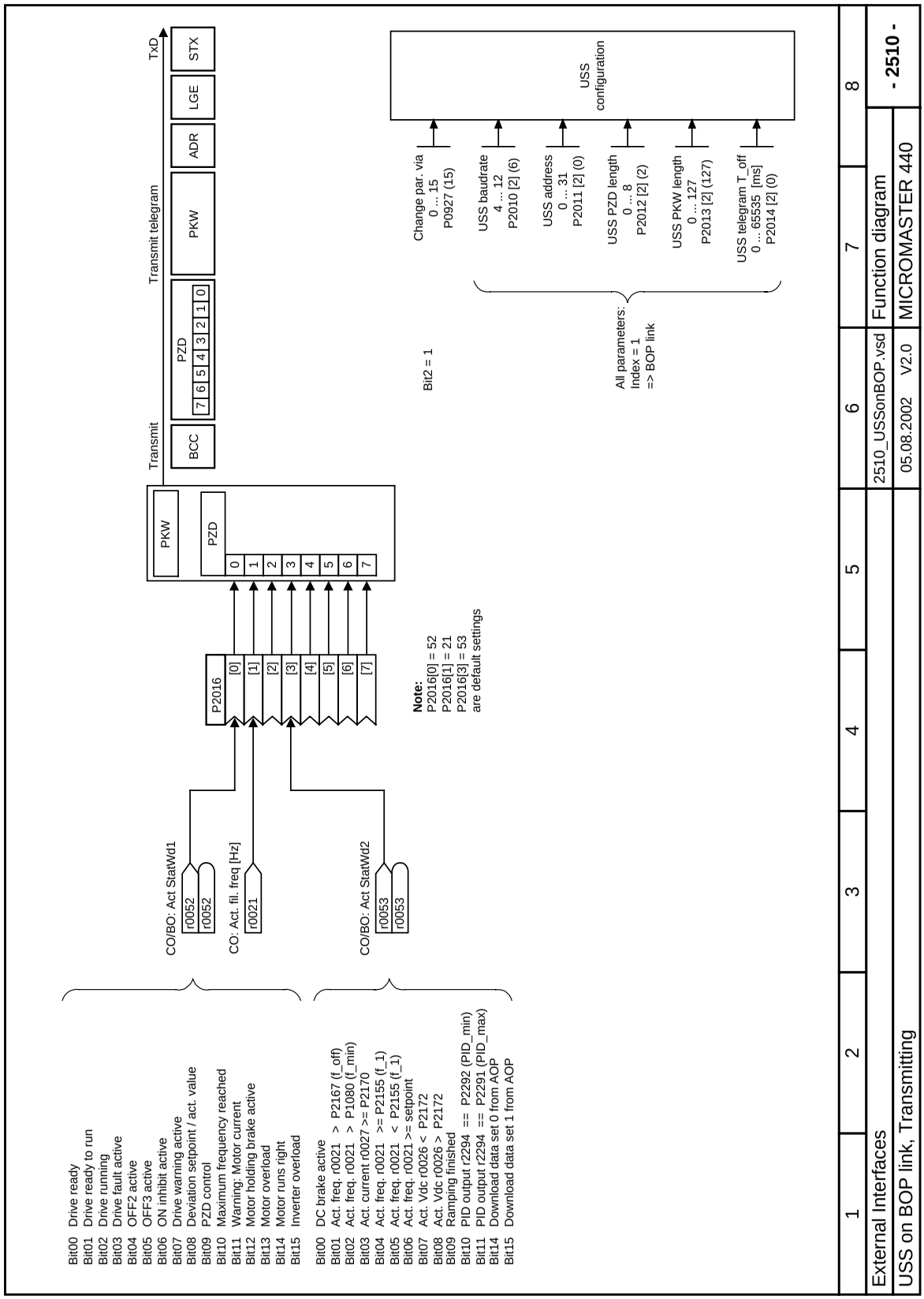

CO/BO: Bin.inp.val
r0722
r0722.0
r0722.1
r0722.2
r0722.3
r0722.4
r0722.5
Debounce time: DIN
0 ... 3
P0724 (3)
PNP/NPN DIN
0 ... 1
P0725 (1)
24 V
0 V
P24 (KL9)
or
0 V (KL28)
KL5
KL6
KL7
KL8
KL16
KL17
1 2 3 4 5 6 7 8
External Interfaces
Digital Inputs
2000_DIN.vsd
05.08.2002 V2.0
Function diagram
MICROMASTER 440
- 2000 -

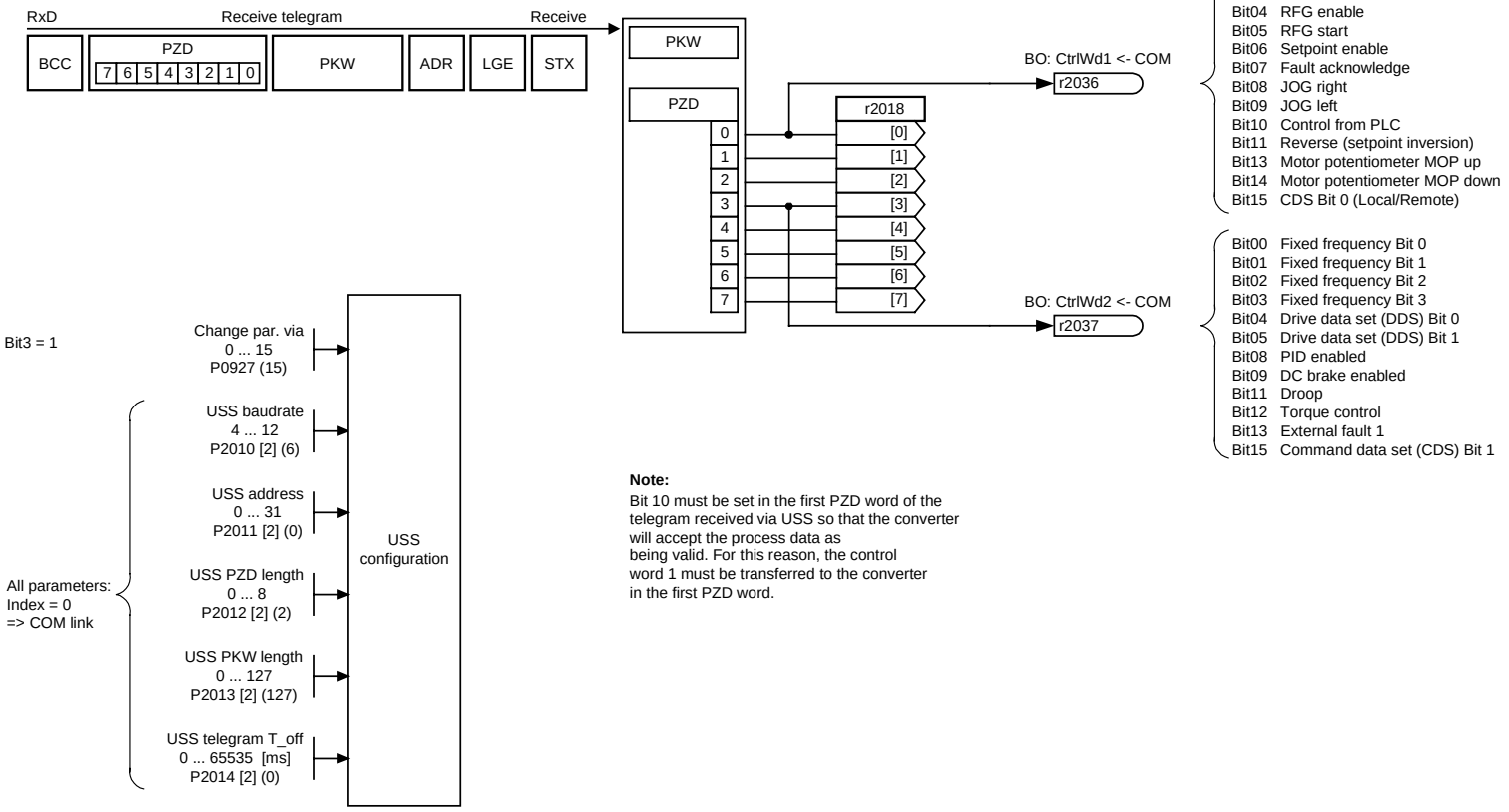

ADC after scal.[%] r0754 [2]
CO:ADC scal[4000h] r0755 [2]
CO/BO: Bin.inp.val r0722 r0722 .6 r0722 .7
ADC deadband width 0 ... 20 P0761 [2] (0)
Value x2:ADC scal. -20 ... 20 P0759 [2] (10)
Value x1:ADC scal. -20 ... 20 P0757 [2] (0)
Type of ADC 0 ... 4 P0756 [2] (0)
10 V or 20 mA
10 V 20 mA
4000 h
100 %
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
Delay on sig. loss 0 ... 10000 [ms] P0762 [2] (10)
Warning, signal lost (F0080)
50 % of P0761
Type of ADC 0 ... 4 P0756 [2] (0)
1,3
Smooth time ADC 0 ... 10000 [ms] P0753 [2] (3)
Type of ADC 0 ... 4 P0756 [2] (0)
Switching bipolar unipolar
Analog input
1.7 3.9 V
External Interfaces
Analog Input (ADC)
2200_ADC.vsd
05.08.2002 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
05.08.2002 V2.0
Function diagram
MICROMASTER 440
- 2300 -

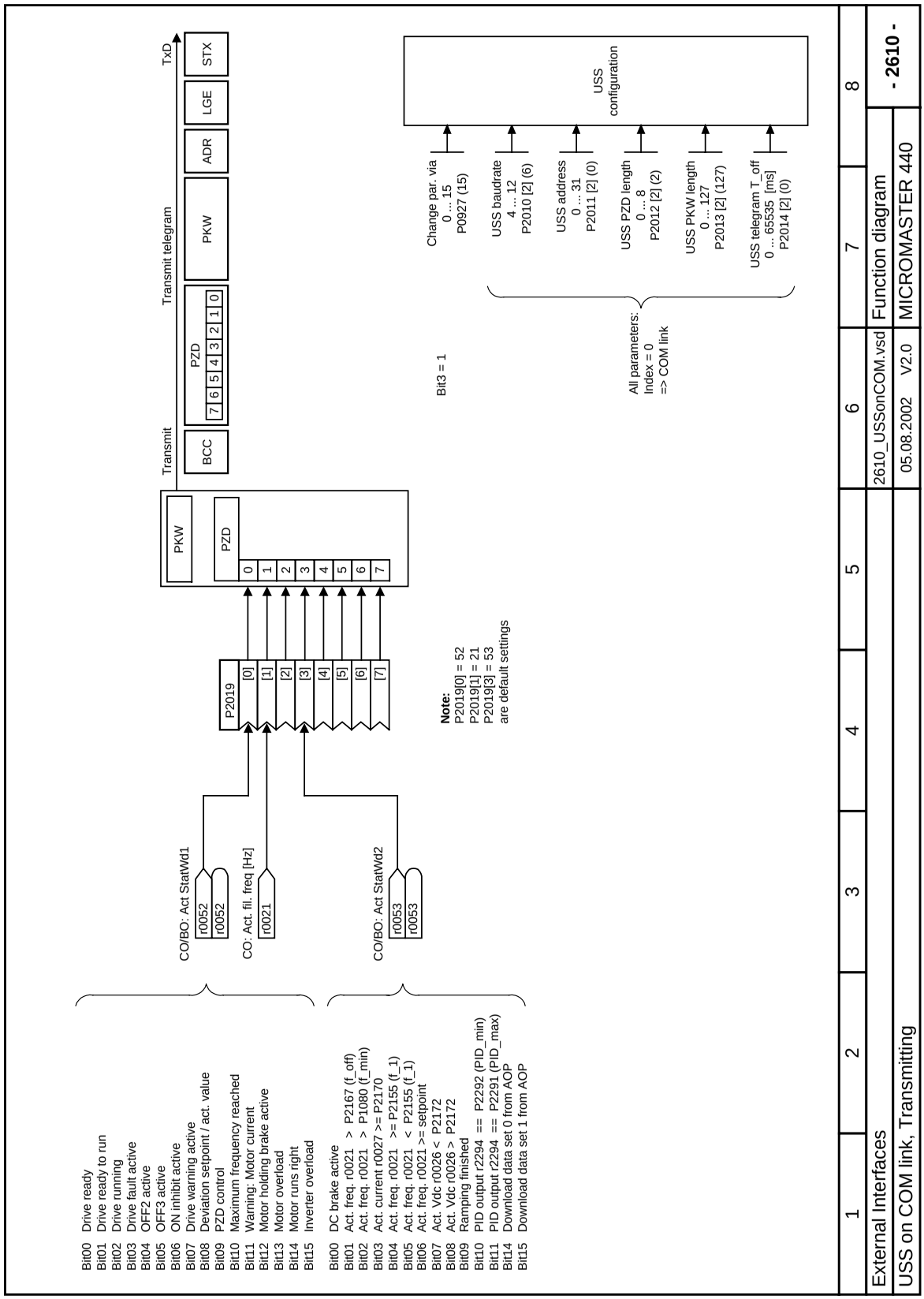

Note:
Activation of the raise and lower keys is only effective if the operating display (r0000) is selected, a changeover to the value display has taken place with the toggle key and the unit is in the "Operation" status.
Operating display (r0000) selected and operation=1 of sequence control
CO/BO: BOP 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
Priority
1 RESET
2 SET
Set command
Reset command
POWER ON
5 V
0
1
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
2400_BOP.vsd
Function diagram
- 2400 -
Basic Operator Panel (BOP)
05.08.2002 V2.0
MICROMASTER 440

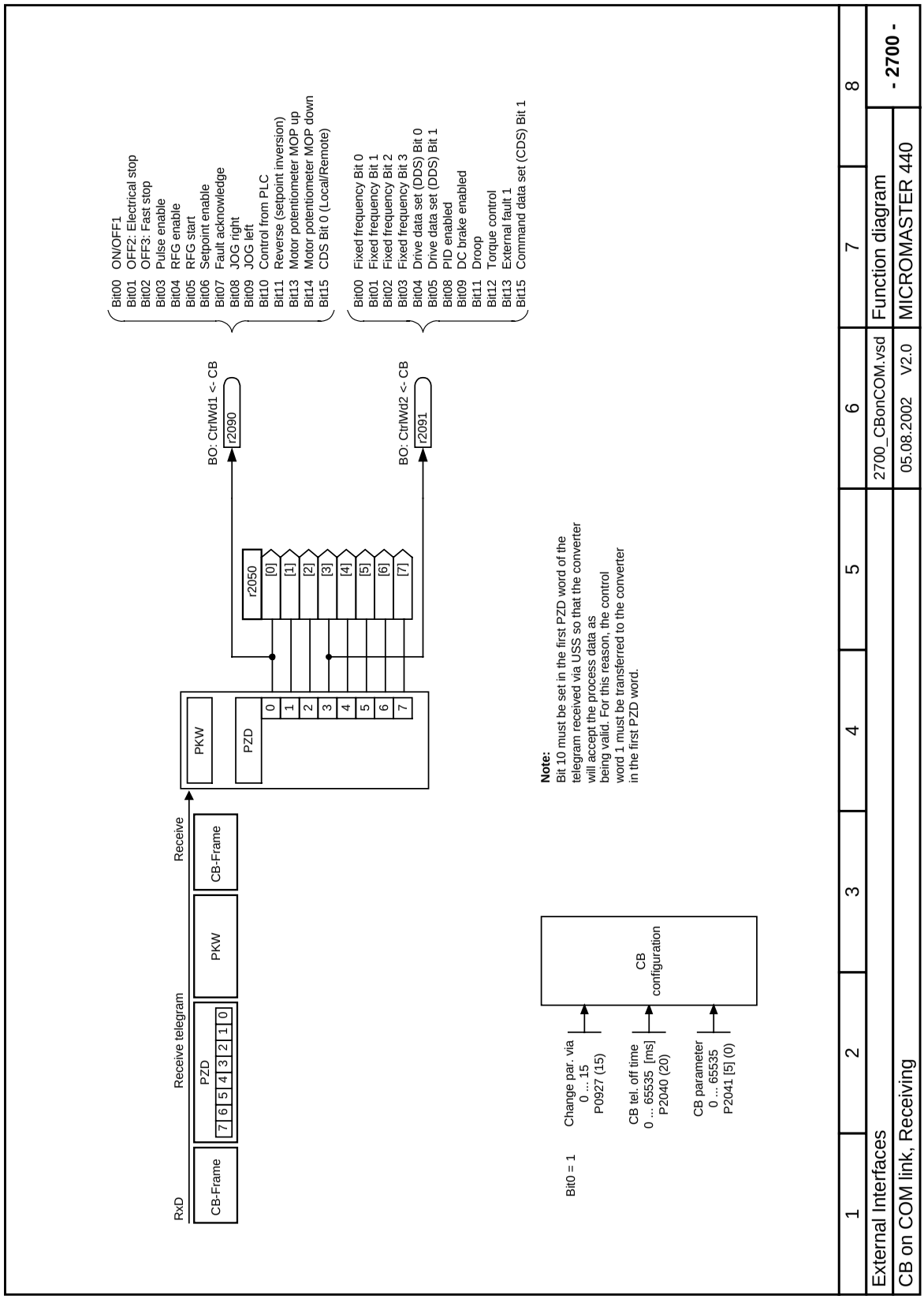

Bit00 ON/OFF1
Bit01 OFF2: Electrical stop
Bit02 OFF3: Fast stop
Bit03 Pulse enable
Bit04 RFG enable
Bit05 RFG start
Bit06 Setpoint enable
Bit07 Fault acknowledge
Bit08 JOG right
Bit09 JOG left
Bit10 Control from PLC
Bit11 Reverse (setpoint inversion)
Bit13 Motor potentiometer MOP up
Bit14 Motor potentiometer 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
BO: CtrlWd1 <- BOP
r2032
BO: CtrlWd2 <- BOP
r2033
r2015
[0]
[1]
[2]
[3]
[4]
[5]
[6]
[7]
PKW
PZD
0
1
2
3
4
5
6
7
RxD
Receive
BCC
PZD
7 6 5 4 3 2 1 0
PKW
ADR
LGE
STX
Receive telegram
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
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.
1
2
3
4
5
6
7
8
External Interfaces
2500_USSonBOP.vsd
Function diagram
- 2500 -
USS on BOP link, Receiving
05.08.2002 V2.0
MICROMASTER 440

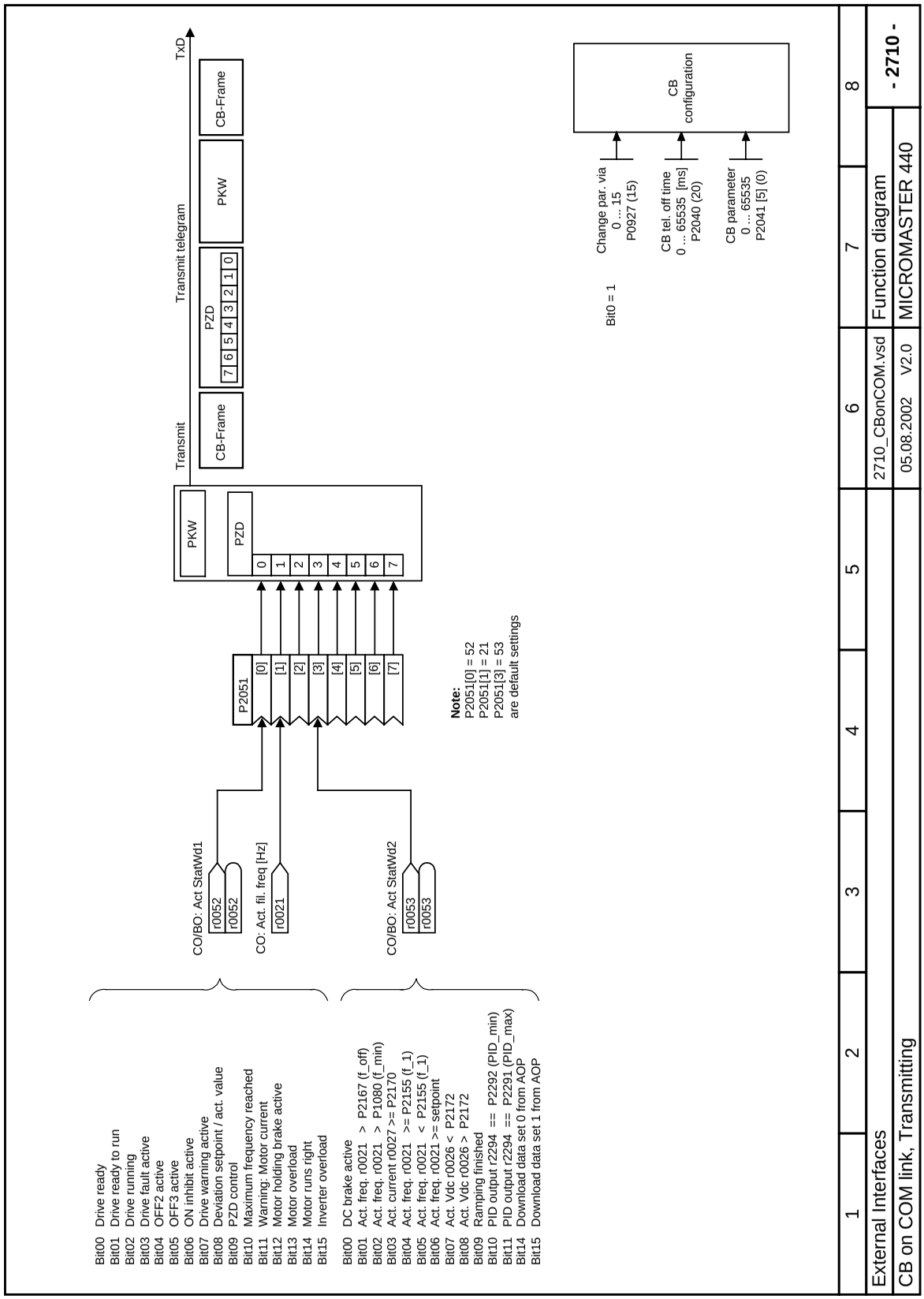

Bit00 Drive ready
Bit01 Drive ready to run
Bit02 Drive running
Bit03 Drive fault active
Bit04 OFF2 active
Bit05 OFF3 active
Bit06 ON inhibit active
Bit07 Drive warning active
Bit08 Deviation setpoint / act. value
Bit09 PZD control
Bit10 Maximum frequency reached
Bit11 Warning: Motor current
Bit12 Motor 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
05.08.2002 V2.0
MICROMASTER 440

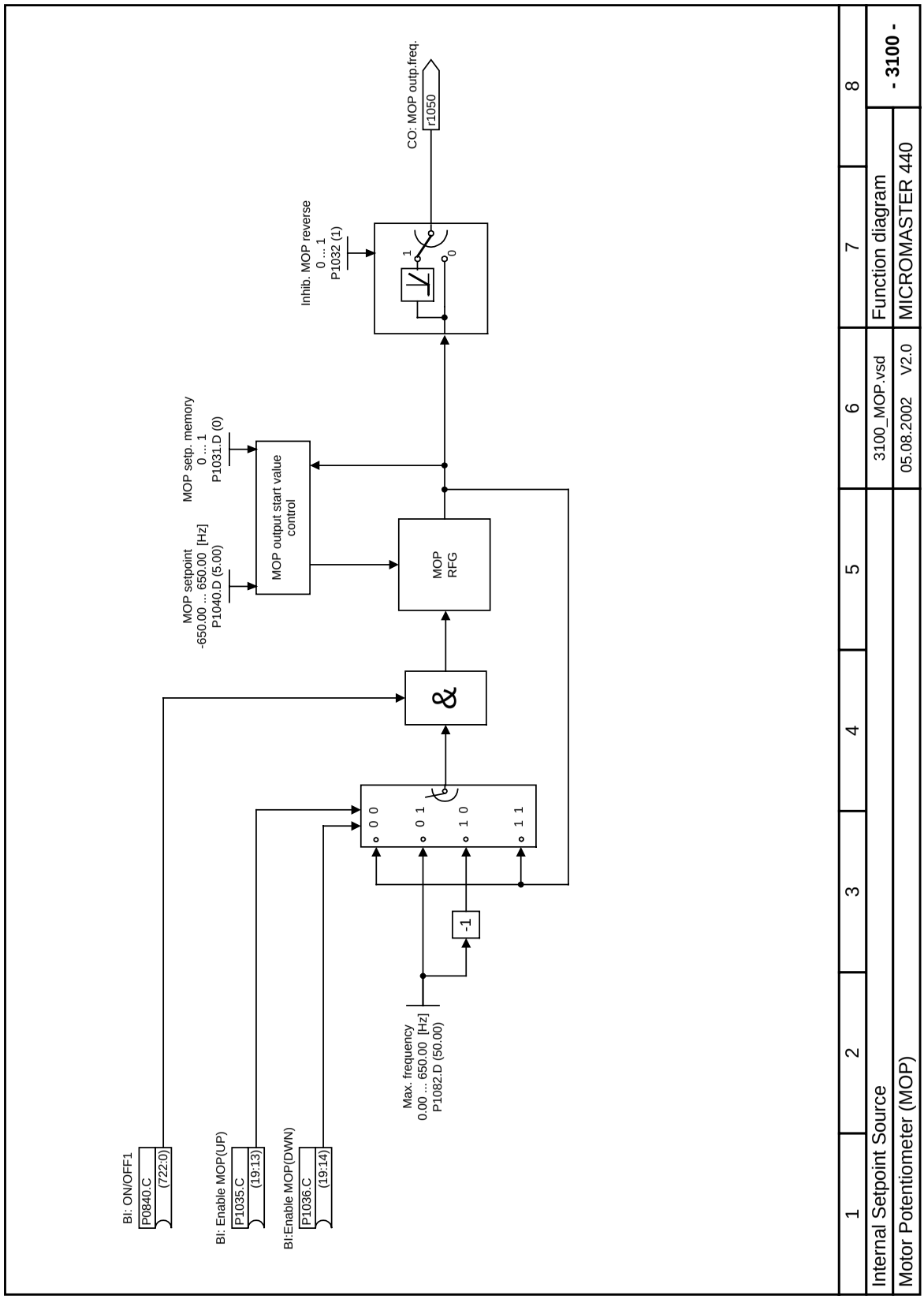


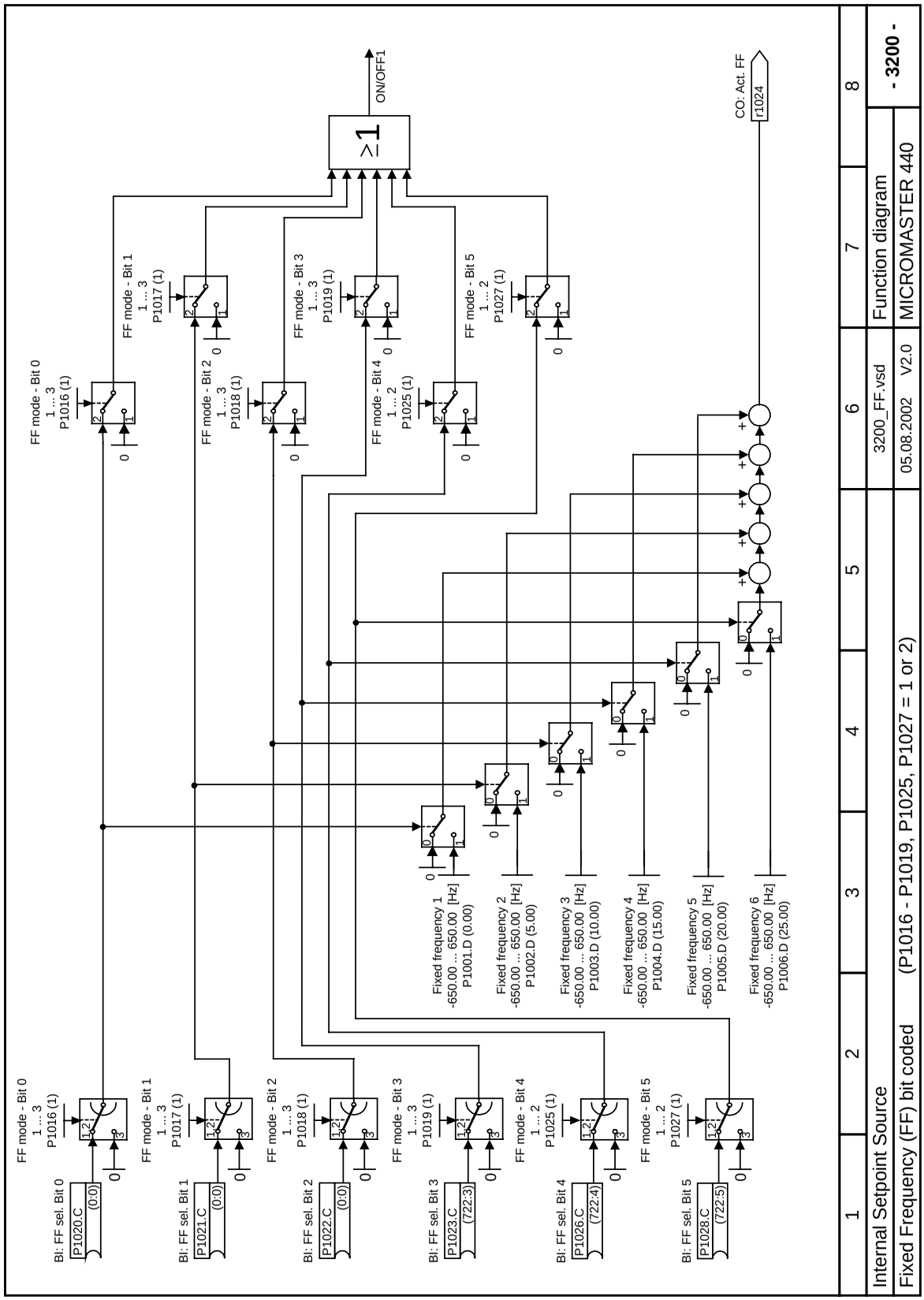
1	2	3	4	5	6	7	8
External Interfaces					2600_USSonCOM.vsd	Function diagram	- 2600 -
USS on COM link, Receiving					05.08.2002 V2.0	MICROMASTER 440	

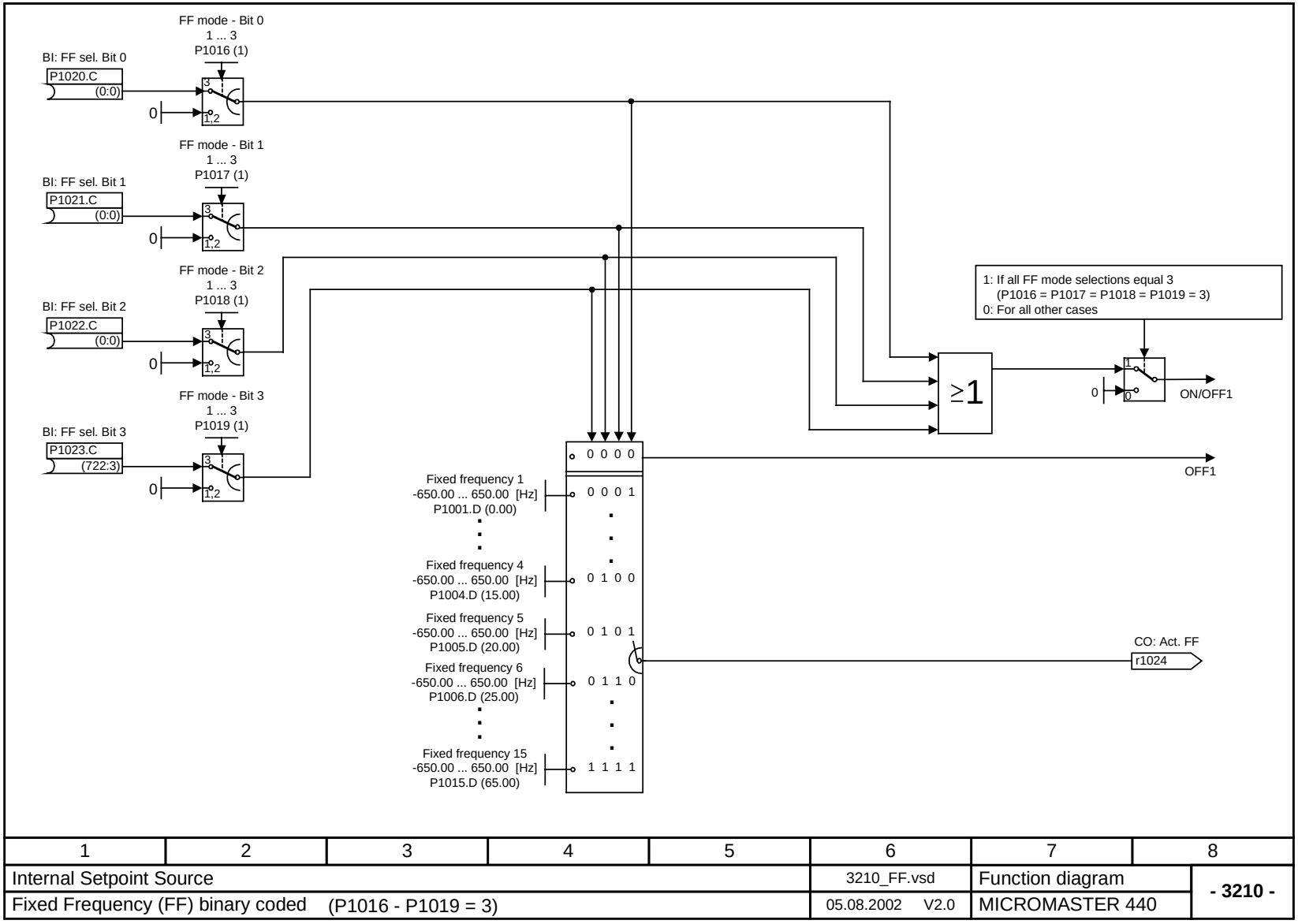

Bit00 Drive ready
Bit01 Drive ready to run
Bit02 Drive running
Bit03 Drive fault active
Bit04 OFF2 active
Bit05 OFF3 active
Bit06 ON inhibit active
Bit07 Drive warning active
Bit08 Deviation setpoint / act. value
Bit09 PZD control
Bit10 Maximum frequency reached
Bit11 Warning: Motor current
Bit12 Motor holding brake active
Bit13 Motor overload
Bit14 Motor runs right
Bit15 Inverter overload
CO/BO: Act StatWd1
r0052
r0052
CO: Act. fil. freq [Hz]
r0021
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 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
BCC
PZD
7 6 5 4 3 2 1 0
Transmit telegram
PKW
ADR
LGE
STX
TxD
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
05.08.2002 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
2700_CBonCOM.vsd
Function diagram
- 2700 -
CB on COM link, Receiving
05.08.2002 V2.0
MICROMASTER 440

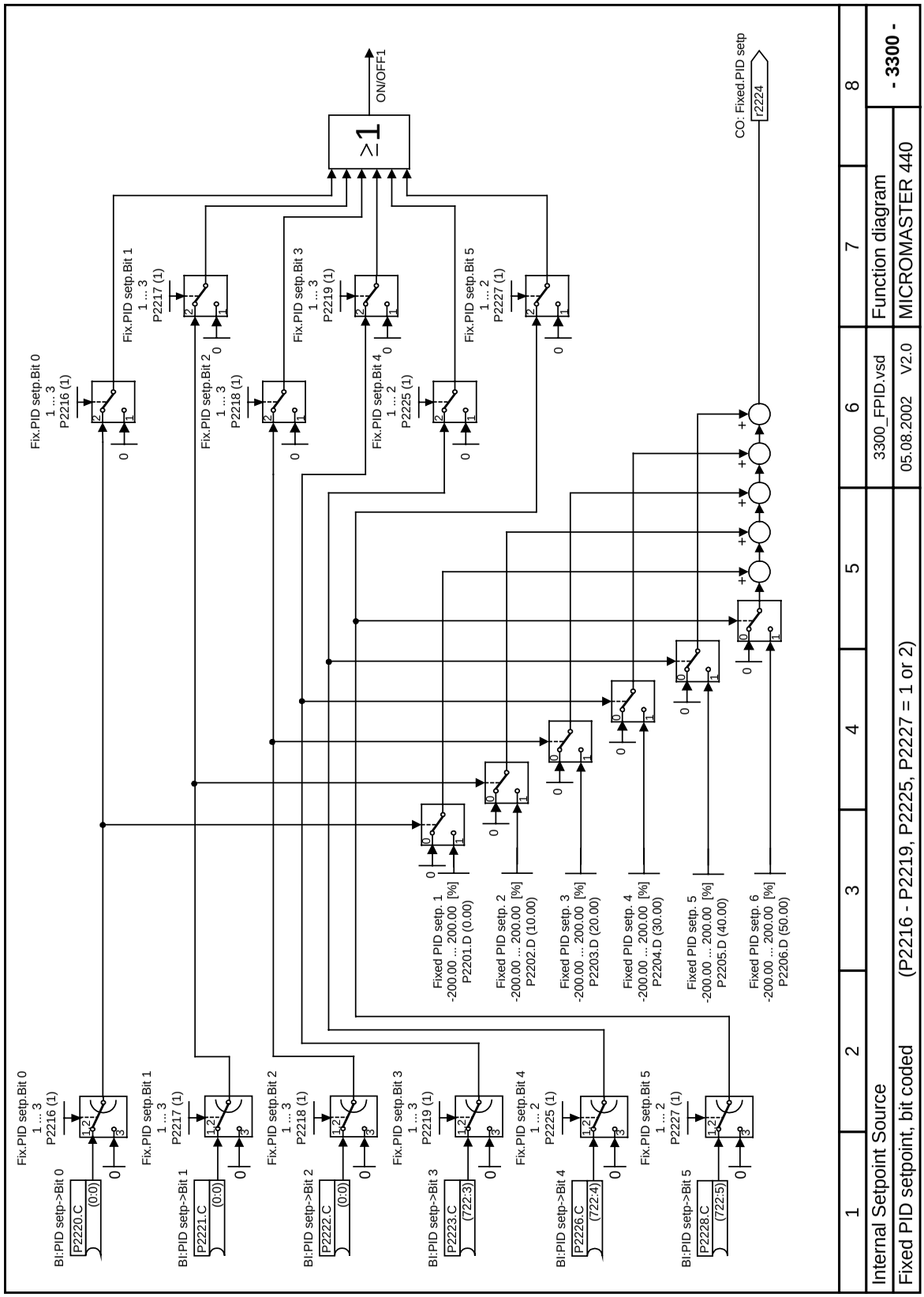

Bit00 Drive ready
Bit01 Drive ready to run
Bit02 Drive running
Bit03 Drive fault active
Bit04 OFF2 active
Bit05 OFF3 active
Bit06 ON inhibit active
Bit07 Drive warning active
Bit08 Deviation setpoint / act. value
Bit09 PZD control
Bit10 Maximum frequency reached
Bit11 Warning: Motor current
Bit12 Motor 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
P2051
[0]
[1]
[2]
[3]
[4]
[5]
[6]
[7]
Note:
P2051[0] = 52
P2051[1] = 21
P2051[3] = 53
are default settings
Transmit
Transmit telegram
TxD
CB-Frame
PZD
7 6 5 4 3 2 1 0
PKW
CB-Frame
PKW
PZD
0 1 2 3 4 5 6 7
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
05.08.2002 V2.0
MICROMASTER 440

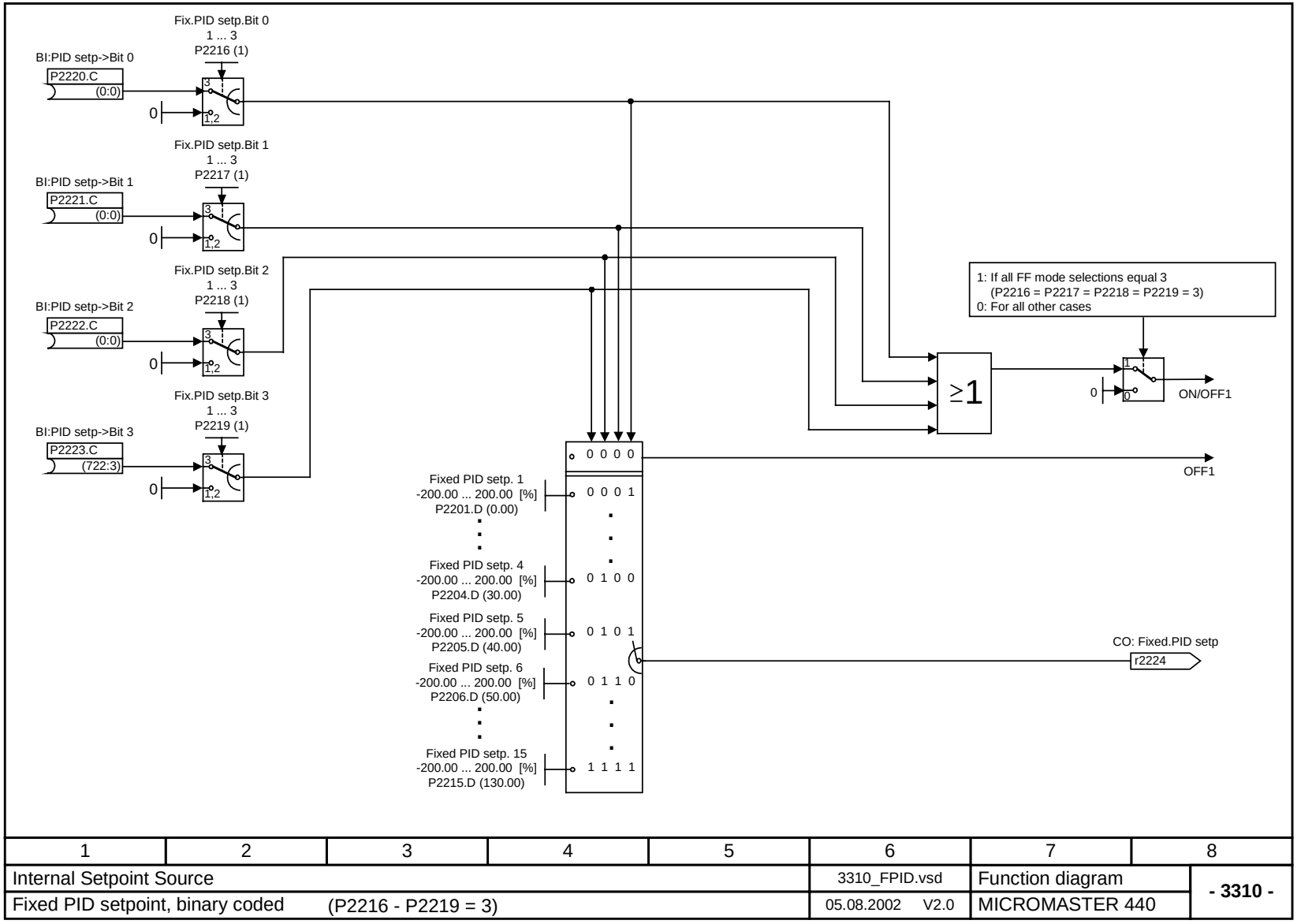

BI: ON/OFF1
P0840.C (722:0)
BI: Enable MOP(UP)
P1035.C (19:13)
BI:Enable MOP(DWN)
P1036.C (19:14)
Max. frequency
0.00 ... 650.00 [Hz]
P1082.D (50.00)
-1
0 0
0 1
1 0
1 1
&
MOP setpoint
-650.00 ... 650.00 [Hz]
P1040.D (5.00)
MOP output start value control
MOP setp. memory
0 ... 1
P1031.D (0)
MOP RFG
Inhib. MOP reverse
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
05.08.2002 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
05.08.2002 V2.0
Function diagram
MICROMASTER 440
- 3200 -
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
BI: FF sel. Bit 1
BI: FF sel. Bit 2
BI: FF sel. Bit 3
BI: FF sel. Bit 4
BI: FF sel. Bit 5
P1020.C (0:0)
P1021.C (0:0)
P1022.C (0:0)
P1023.C (722:3)
P1026.C (722:4)
P1028.C (722:5)
≥1
ON/OFF1
CO: Act. FF r1024
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)

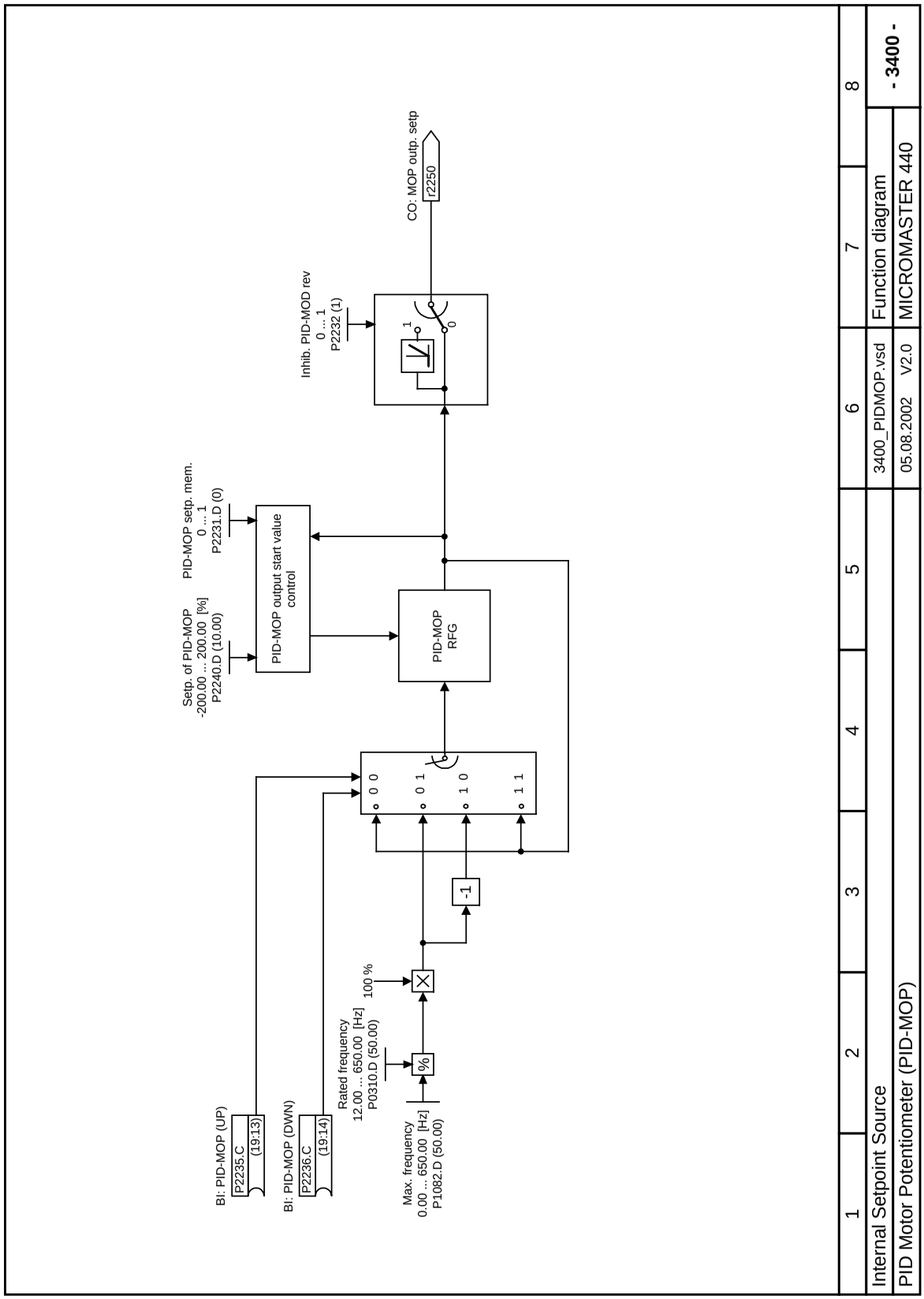


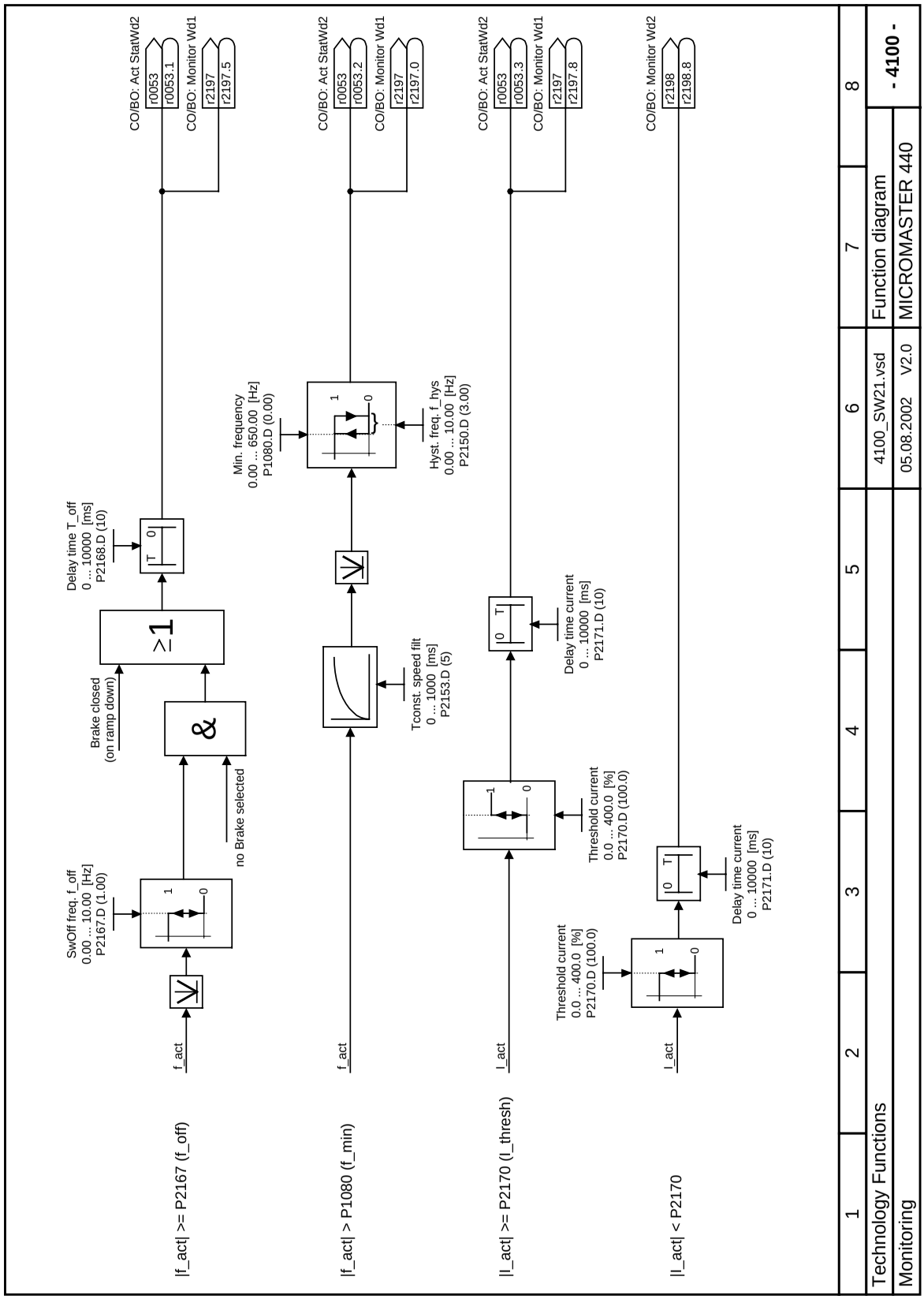
1	2	3	4	5	6	7	8
Internal Setpoint Source					3210_FF.vsd	Function diagram	- 3210 -
Fixed Frequency (FF) binary coded (P1016 - P1019 = 3)					05.08.2002 V2.0	MICROMASTER 440	

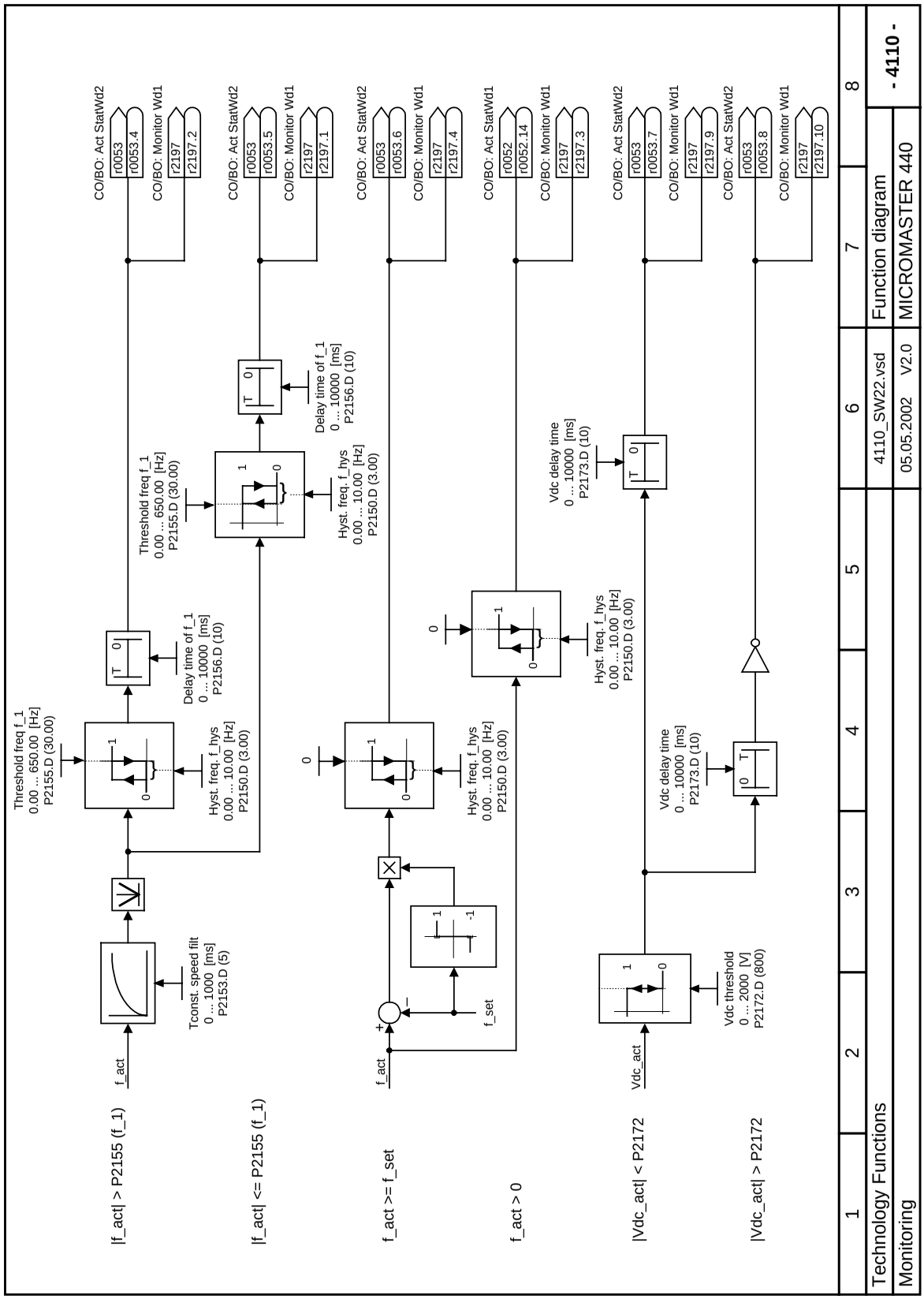

Internal Setpoint Source
Fixed PID setpoint, bit coded (P2216 - P2219, P2225, P2227 = 1 or 2)
3300_FPID.vsd V2.0 05.08.2002
Function diagram
MICROMASTER 440
- 3300 -
Fix.PID setp.Bit 0 1 ... 3 P2216 (1)
Fix.PID setp.Bit 1 1 ... 3 P2217 (1)
Fix.PID setp.Bit 2 1 ... 3 P2218 (1)
Fix.PID setp.Bit 3 1 ... 3 P2219 (1)
Fix.PID setp.Bit 4 1 ... 2 P2225 (1)
Fix.PID setp.Bit 5 1 ... 2 P2227 (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)
Bi:PID setp->Bit 4 P2226.C (722:4)
Bi:PID setp->Bit 5 P2228.C (722:5)
≥1
ON/OFF1
Fixed PID setp. 1 -200.00 ... 200.00 [%] P2201.D (0.00)
Fixed PID setp. 2 -200.00 ... 200.00 [%] P2202.D (10.00)
Fixed PID setp. 3 -200.00 ... 200.00 [%] P2203.D (20.00)
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)
CO: Fixed.PID setp r2224

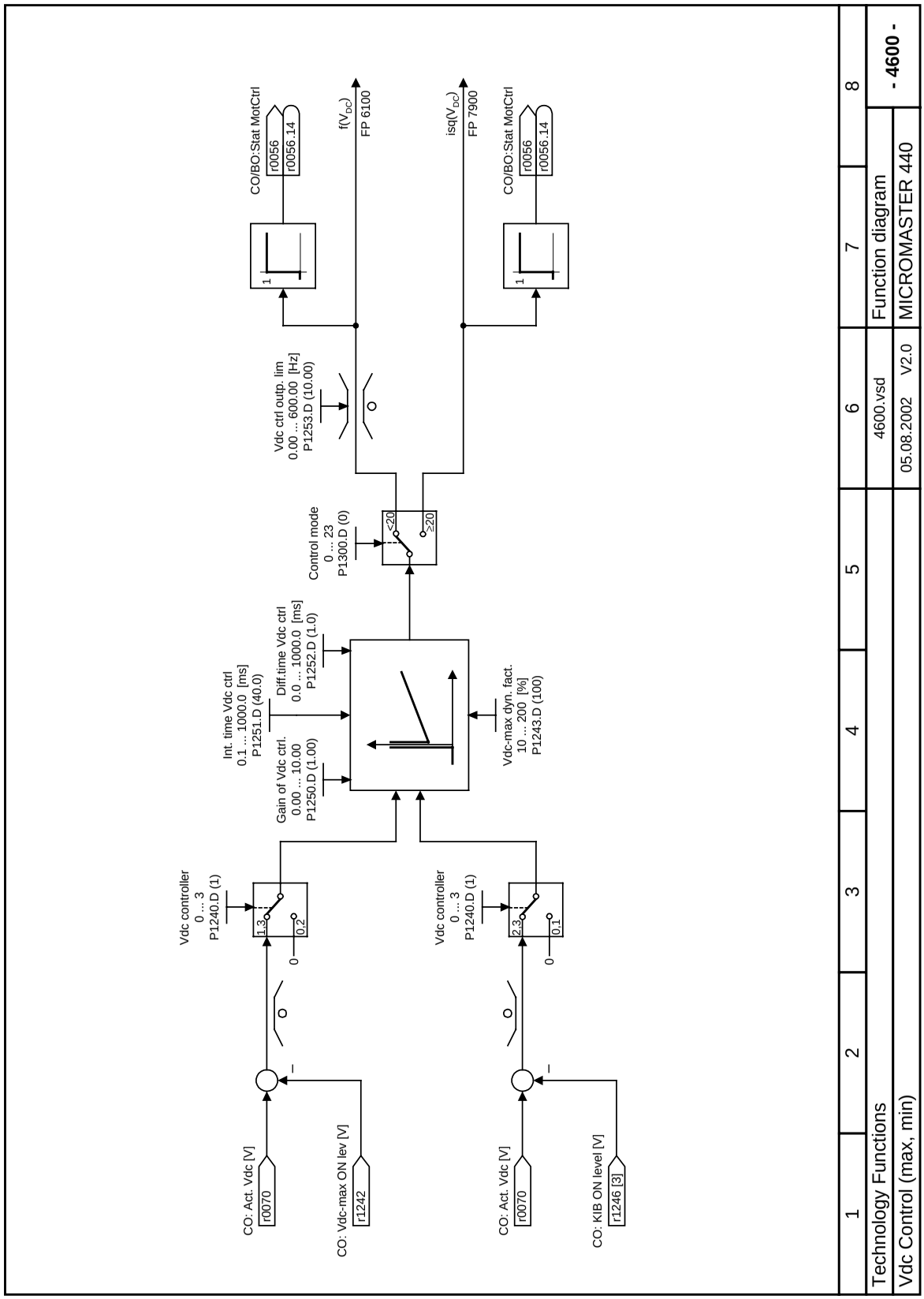


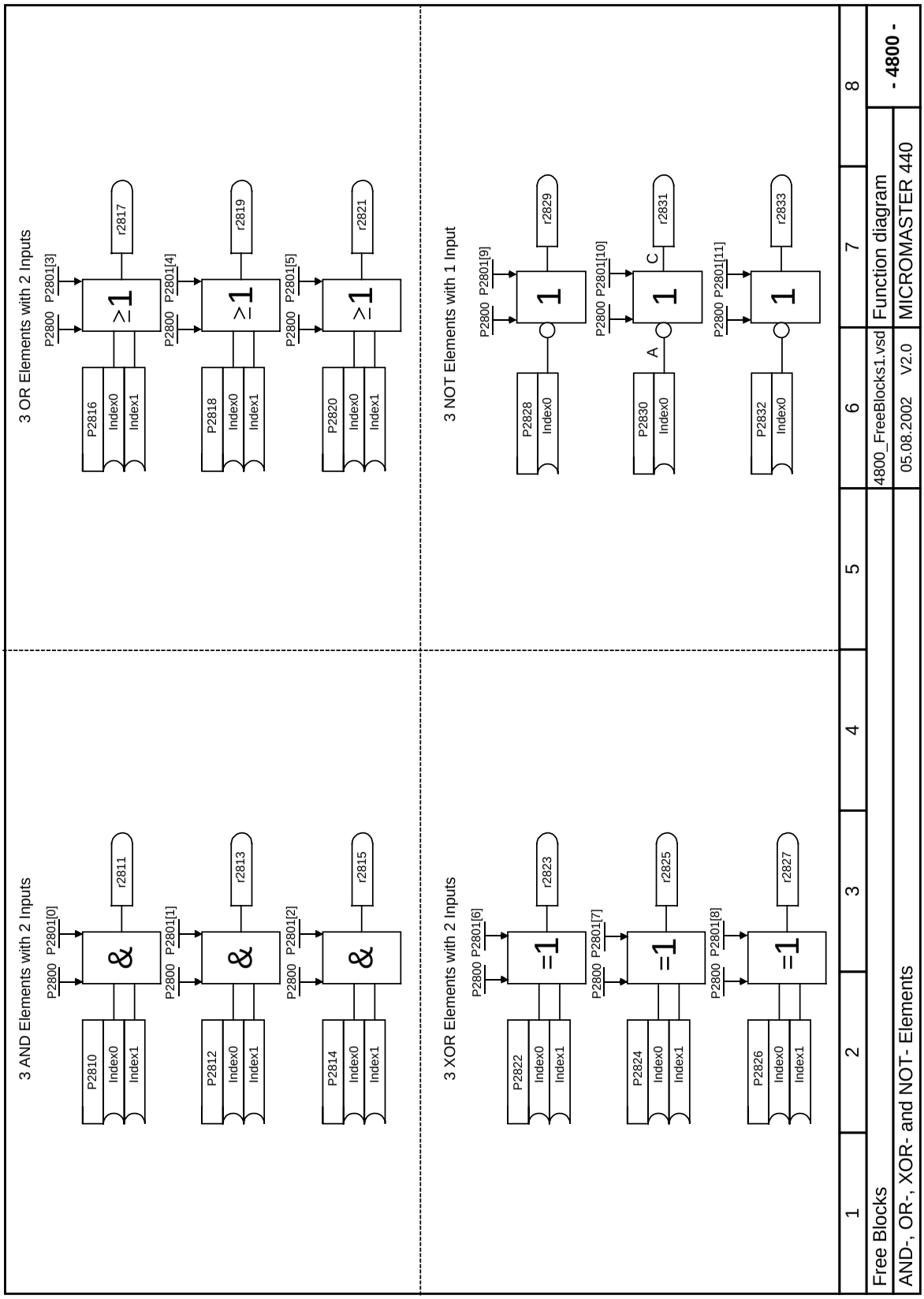
1	2	3	4	5	6	7	8
Internal Setpoint Source					3310_FPID.vsd	Function diagram	- 3310 -
Fixed PID setpoint, binary coded	(P2216 - P2219 = 3)				05.08.2002 V2.0	MICROMASTER 440	

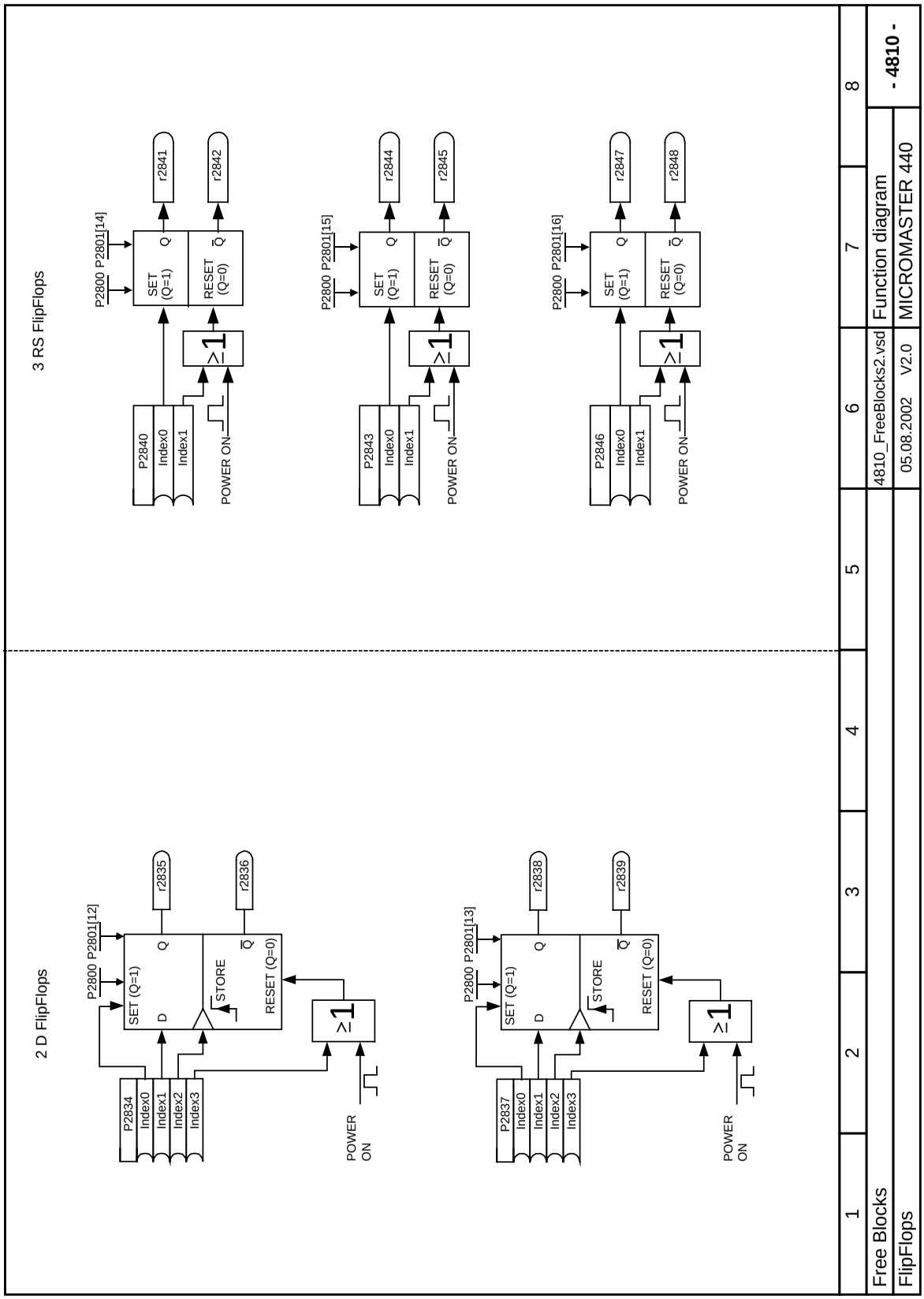

CO: MOP outp. setp
r2250
Inhib. PID-MOD rev
0 ... 1
P2232 (1)
PID-MOP setp. mem.
0 ... 1
P2231.D (0)
Setp. of PID-MOP
-200.00 ... 200.00 [%]
P2240.D (10.00)
PID-MOP output start value control
PID-MOP RFG
0 0
0 1
1 0
1 1
-1
100 %
Rated frequency
12.00 ... 650.00 [Hz]
P0310.D (50.00)
Max. frequency
0.00 ... 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
05.08.2002
V2.0
Function diagram
MICROMASTER 440
- 3400 -

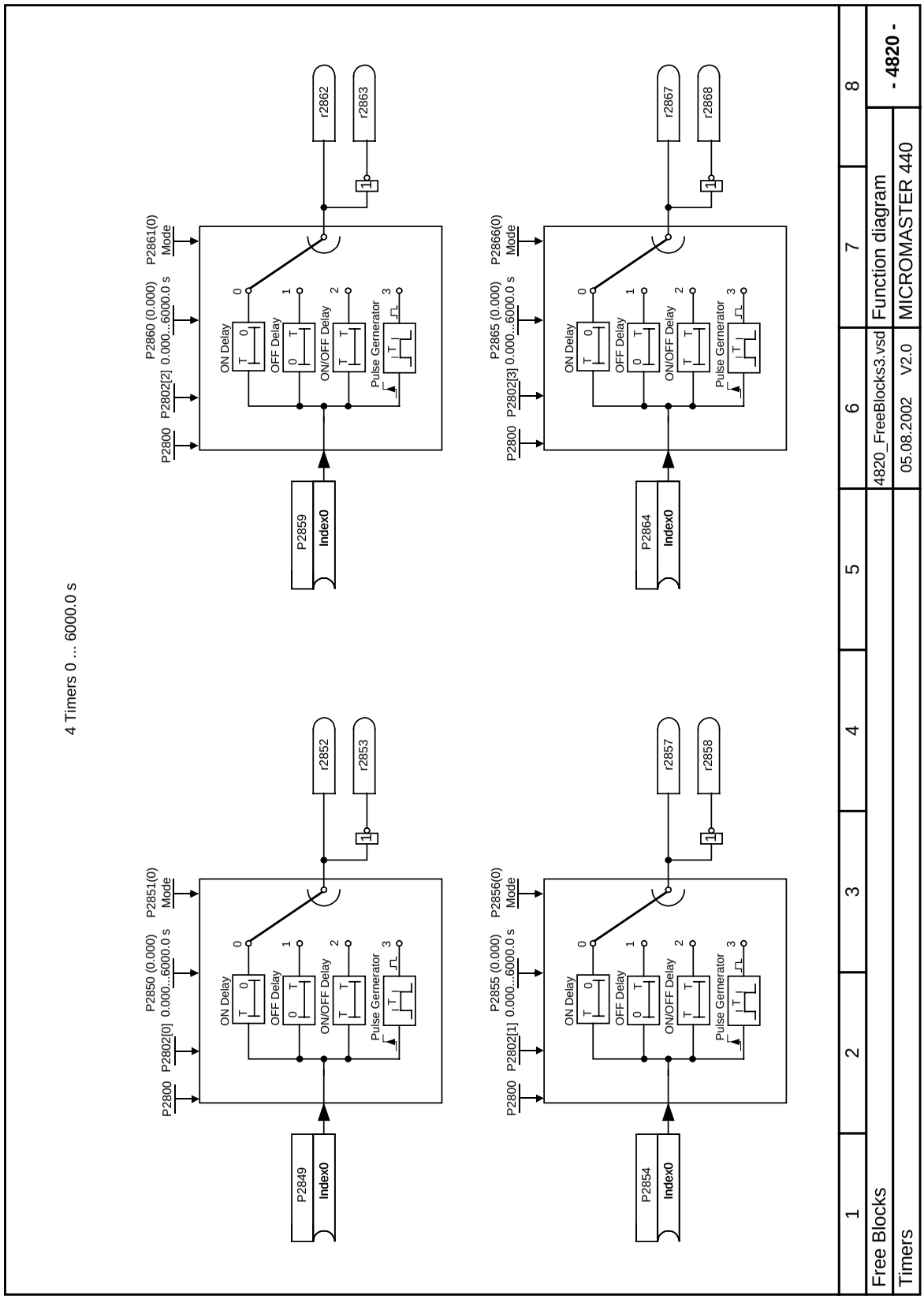

|f_act| >= P2167 (f_off)
|f_act| > P1080 (f_min)
|I_act| >= P2170 (I_thresh)
|I_act| < P2170
f_act
I_act
SwOff freq. f_off
0.00 ... 10.00 [Hz]
P2167.D (1.00)
Brake closed
(on ramp down)
no Brake selected
Delay time T_off
0 ... 10000 [ms]
P2168.D (10)
Min. frequency
0.00 ... 650.00 [Hz]
P1080.D (0.00)
Tconst. speed filt
0 ... 1000 [ms]
P2153.D (5)
Hyst. freq. f_hys
0.00 ... 10.00 [Hz]
P2150.D (3.00)
Threshold current
0.0 ... 400.0 [%]
P2170.D (100.0)
Delay time current
0 ... 10000 [ms]
P2171.D (10)
CO/BO: Act StatWd2
r0053
r0053.1
r0053.2
r0053.3
CO/BO: Monitor Wd1
r2197
r2197.5
r2197.0
r2197.8
CO/BO: Monitor Wd2
r2198
r2198.8
1
2
3
4
5
6
7
8
Technology Functions
Monitoring
4100_SW21.vsd
05.08.2002 V2.0
Function diagram
MICROMASTER 440
- 4100 -

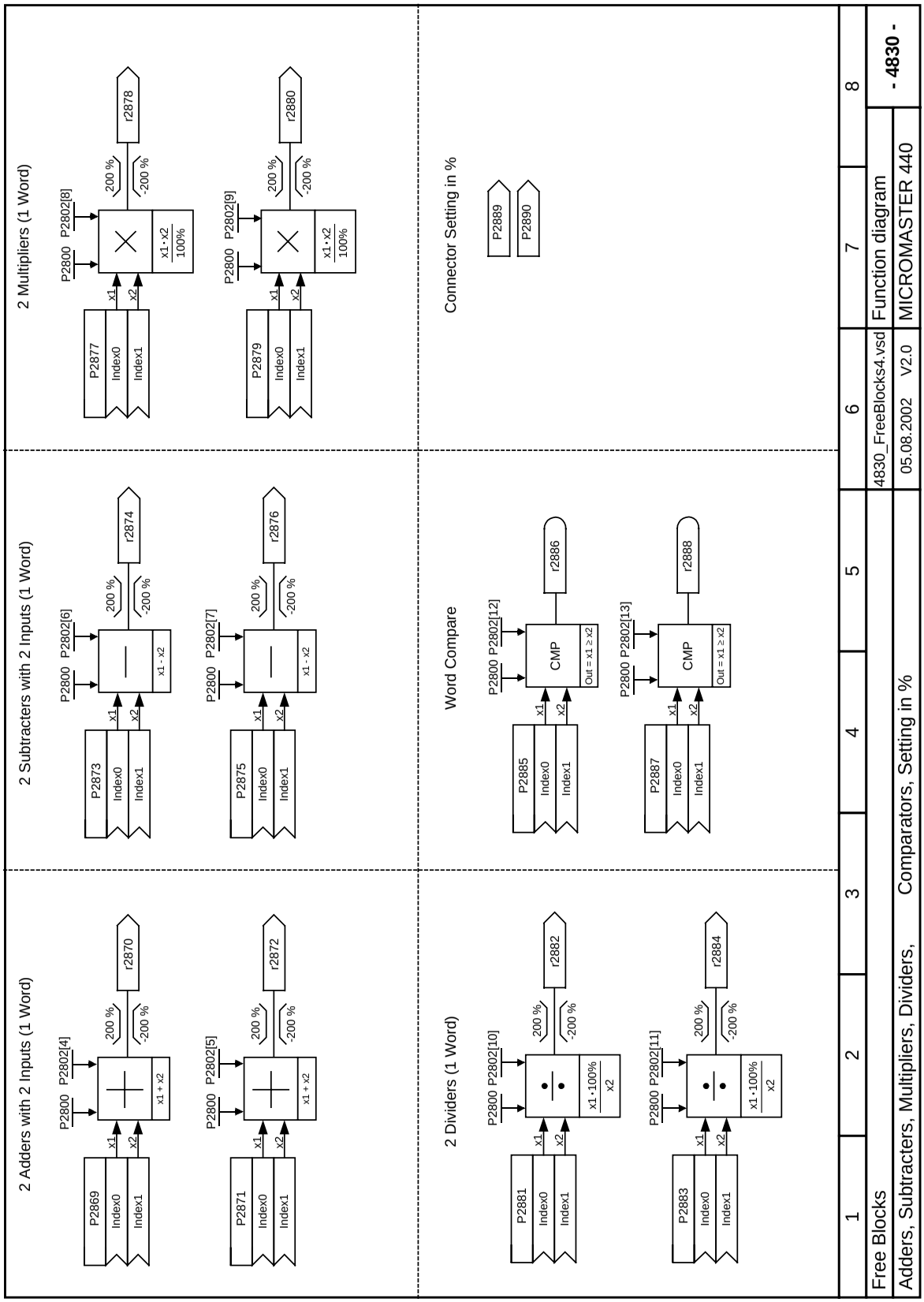

|f_act| > P2155 (f_1)
f_act
Tconst. speed filt
0 ... 1000 [ms]
P2153.D (5)
Threshold freq f_1
0.00 ... 650.00 [Hz]
P2155.D (30.00)
Hyst. freq. f_hys
0.00 ...10.00 [Hz]
P2150.D (3.00)
Delay time of f_1
0 ... 10000 [ms]
P2156.D (10)
CO/BO: Act StatWd2
r0053
r0053.4
CO/BO: Monitor Wd1
r2197
r2197.2
|f_act| <= P2155 (f_1)
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)
CO/BO: Act StatWd2
r0053
r0053.5
CO/BO: Monitor Wd1
r2197
r2197.1
f_act >= f_set
f_act
f_set
Hyst. freq. f_hys
0.00 ... 10.00 [Hz]
P2150.D (3.00)
CO/BO: Act StatWd2
r0053
r0053.6
CO/BO: Monitor Wd1
r2197
r2197.4
f_act > 0
Hyst. freq. f_hys
0.00 ...10.00 [Hz]
P2150.D (3.00)
Vdc delay time
0 ... 10000 [ms]
P2173.D (10)
CO/BO: Act StatWd1
r0052
r0052.14
CO/BO: Monitor Wd1
r2197
r2197.3
|Vdc_act| < P2172
Vdc_act
Vdc threshold
0 ... 2000 [V]
P2172.D (800)
Vdc delay time
0 ... 10000 [ms]
P2173.D (10)
CO/BO: Act StatWd2
r0053
r0053.7
CO/BO: Monitor Wd1
r2197
r2197.9
|Vdc_act| > P2172
CO/BO: Act StatWd2
r0053
r0053.8
CO/BO: Monitor Wd1
r2197
r2197.10
1
2
3
4
5
6
7
8
Technology Functions
Monitoring
4110_SW22.vsd
05.05.2002 V2.0
Function diagram
MICROMASTER 440
- 4110 -

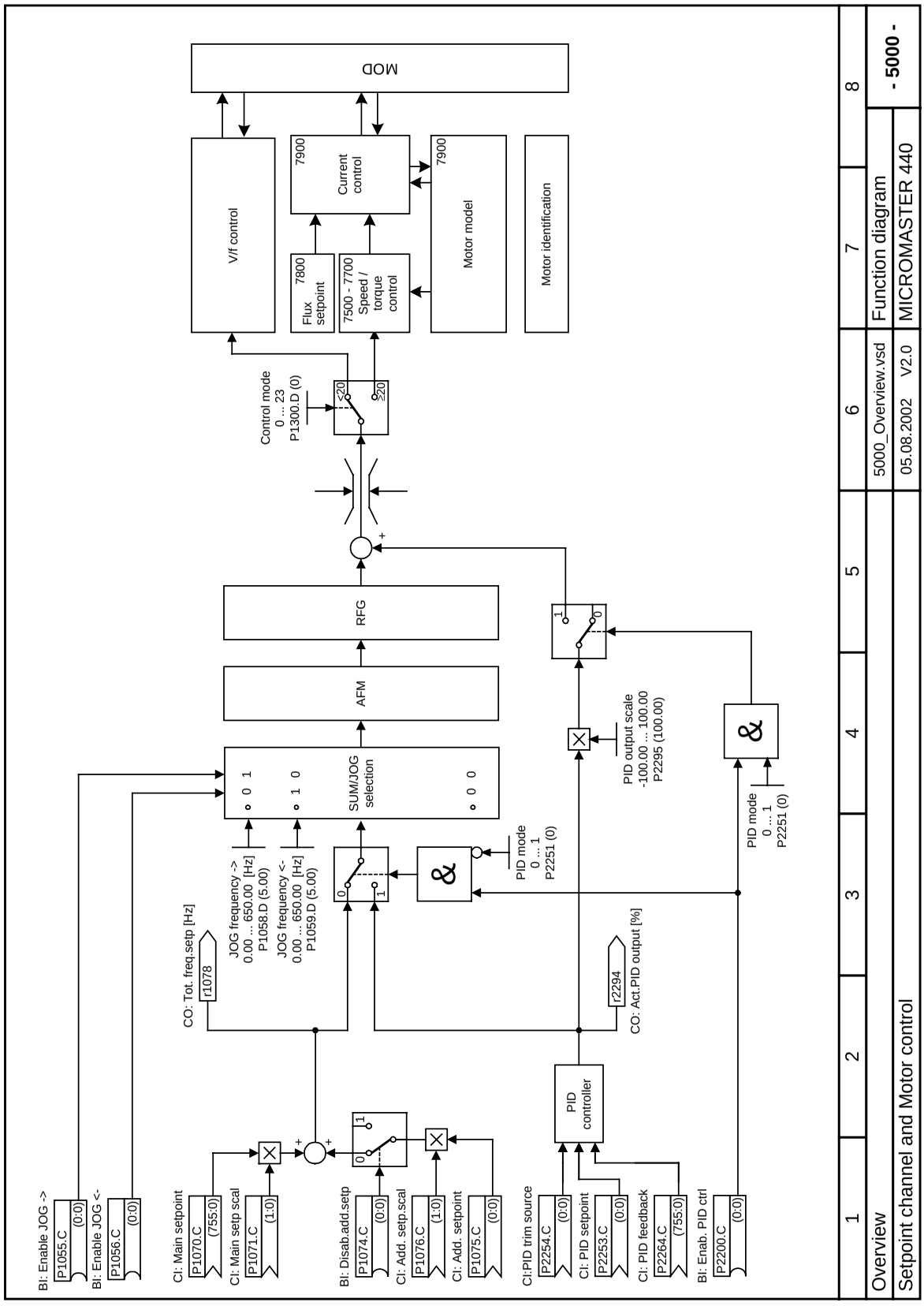

CO: Act. Vdc [V]
r0070
CO: Vdc-max ON lev [V]
r1242
CO: KIB ON level [V]
r1246 [3]
Vdc controller
0 ... 3
P1240.D (1)
Gain of Vdc ctrl.
0.00 ... 10.00
P1250.D (1.00)
Int. time Vdc ctrl
0.1 ... 1000.0 [ms]
P1251.D (40.0)
Diff.time Vdc ctrl
0.0 ... 1000.0 [ms]
P1252.D (1.0)
Vdc-max dyn. fact.
10 ... 200 [%]
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
Technology Functions
Vdc Control (max, min)
4600.vsd
05.08.2002 V2.0
Function diagram
MICROMASTER 440
- 4600 -

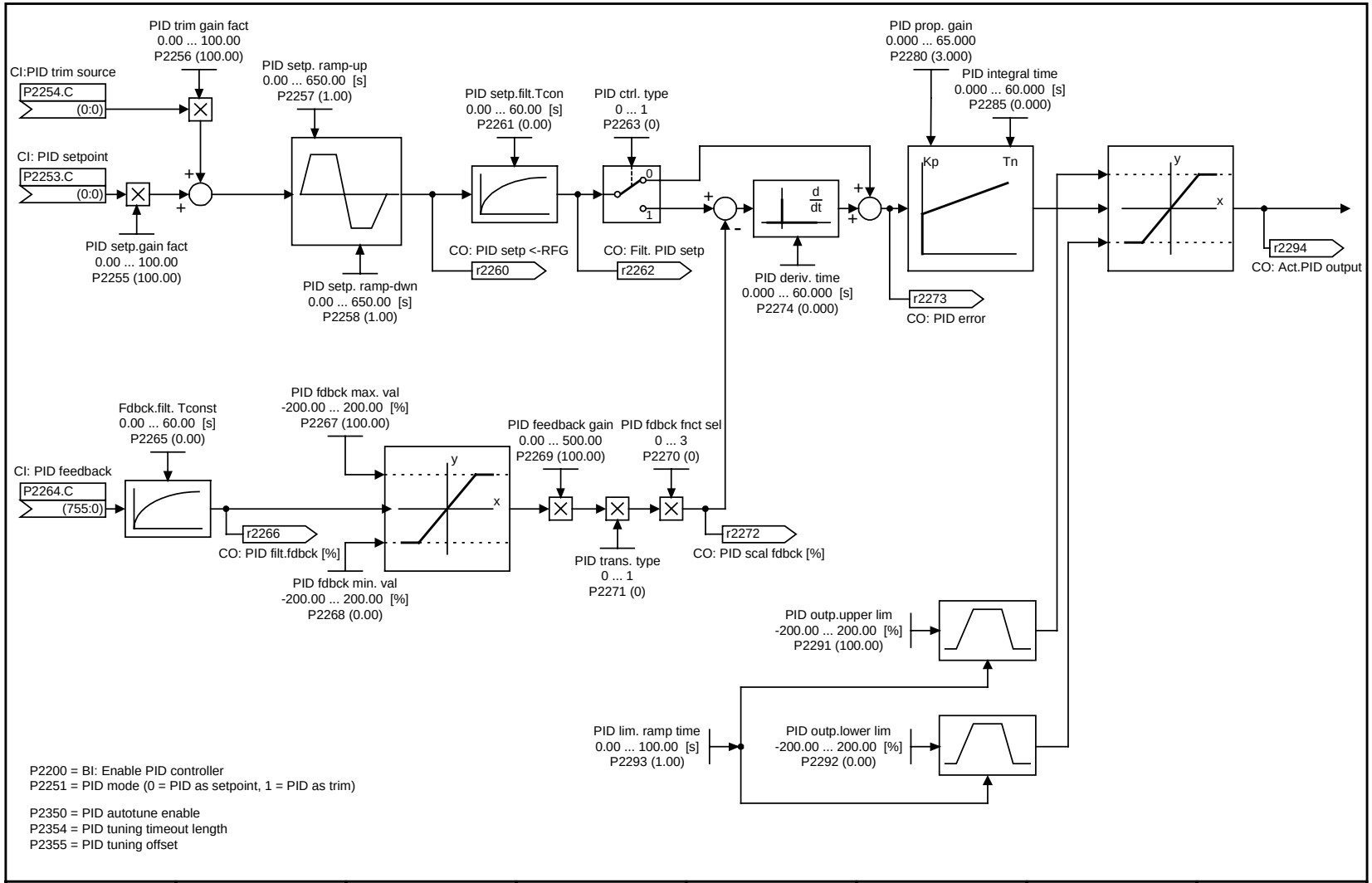

3 OR Elements with 2 Inputs
P2800 P2801[3]
≥1
r2817
P2816 Index0 Index1
P2800 P2801[4]
≥1
r2819
P2818 Index0 Index1
P2800 P2801[5]
≥1
r2821
P2820 Index0 Index1
3 NOT Elements with 1 Input
P2800 P2801[9]
1
r2829
P2828 Index0
P2800 P2801[10]
C
1
A
r2831
P2830 Index0
P2800 P2801[11]
1
r2833
P2832 Index0
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
05.08.2002 V2.0
Function diagram
MICROMASTER 440
- 4800 -


2 D FlipFlops
3 RS FlipFlops
P2800 P2801[12]
P2834
Index0
Index1
Index2
Index3
SET (Q=1)
D
STORE
RESET (Q=0)
Q
Q̄
r2835
r2836
≥1
POWER ON
P2800 P2801[13]
P2837
r2838
r2839
P2800 P2801[14]
P2840
r2841
r2842
P2800 P2801[15]
P2843
r2844
r2845
P2800 P2801[16]
P2846
r2847
r2848
SET (Q=1)
RESET (Q=0)
1
2
3
4
5
6
7
8
Free Blocks
FlipFlops
4810_FreeBlocks2.vsd
05.08.2002 V2.0
Function diagram
MICROMASTER 440
- 4810 -

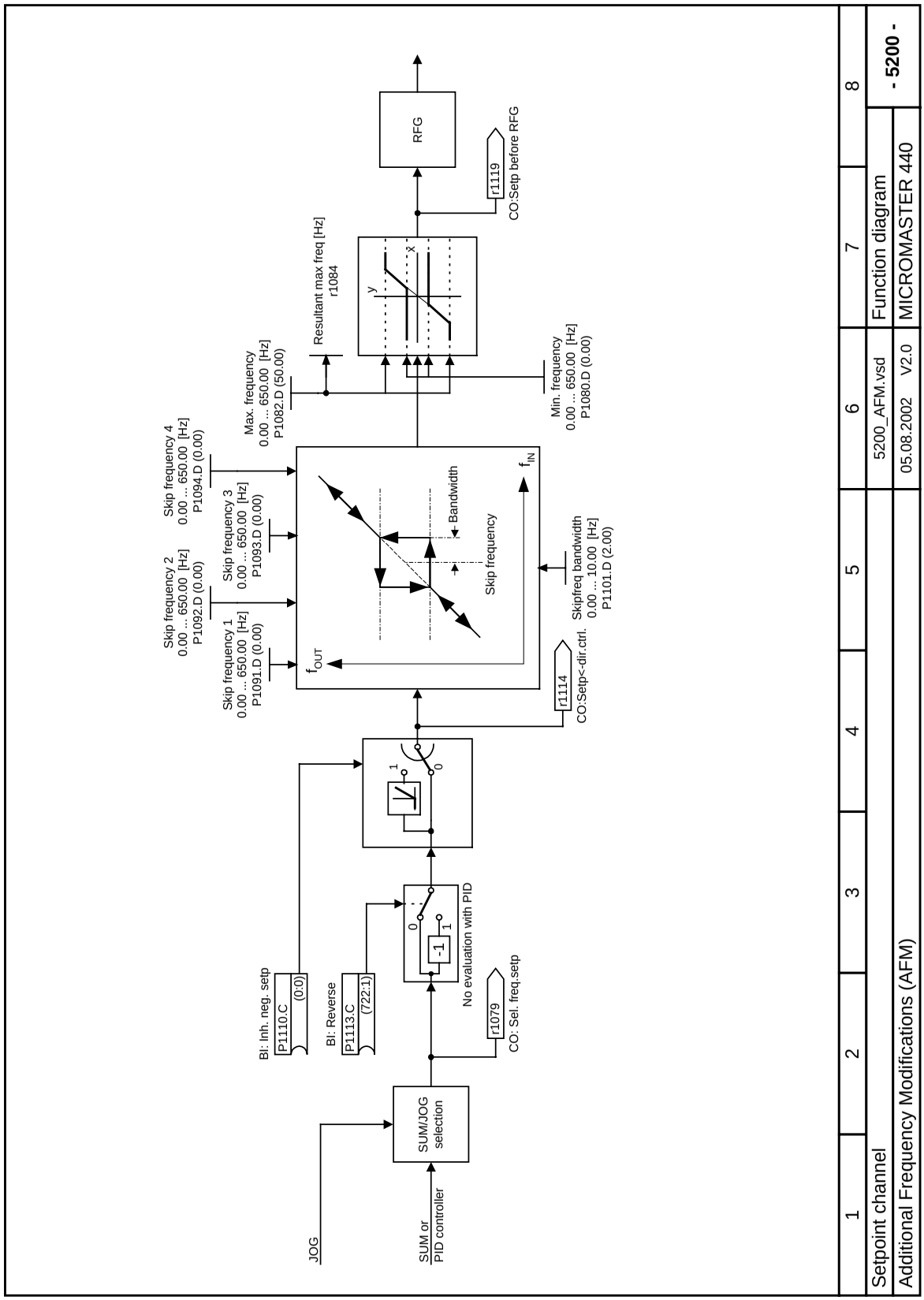

4 Timers 0 ... 6000.0 s
P2800
P2802[0]
P2850 (0.000) 0.000...6000.0 s
P2851(0) Mode
ON Delay
OFF Delay
ON/OFF Delay
Pulse Gemerator
P2849 Index0
r2852
r2853
P2800
P2802[1]
P2855 (0.000) 0.000...6000.0 s
P2856(0) Mode
P2854 Index0
r2857
r2858
P2800
P2802[2]
P2860 (0.000) 0.000...6000.0 s
P2861(0) Mode
P2859 Index0
r2862
r2863
P2800
P2802[3]
P2865 (0.000) 0.000...6000.0 s
P2866(0) Mode
P2864 Index0
r2867
r2868
1 2 3 4 5 6 7 8
Free Blocks
Timers
4820_FreeBlocks3.vsd
05.08.2002 V2.0
Function diagram
MICROMASTER 440
- 4820 -

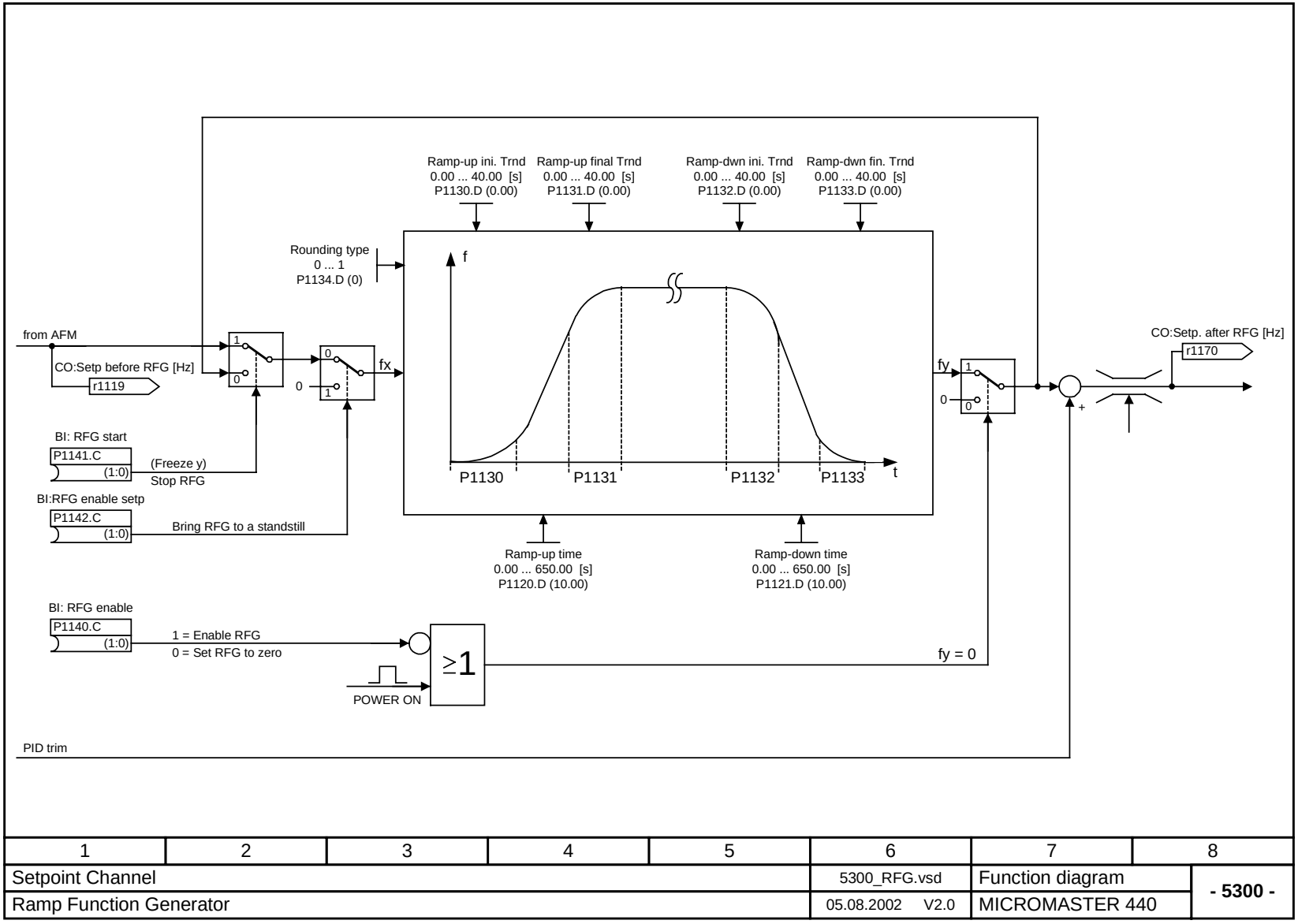

2 Adders with 2 Inputs (1 Word)
P2800
P2802[4]
P2869
Index0
Index1
x1
x2
x1 + x2
200 %
-200 %
r2870
P2800
P2802[5]
P2871
Index0
Index1
x1 + x2
200 %
-200 %
r2872
2 Subtracters with 2 Inputs (1 Word)
P2800
P2802[6]
P2873
Index0
Index1
x1 - x2
200 %
-200 %
r2874
P2800
P2802[7]
P2875
Index0
Index1
x1 - x2
200 %
-200 %
r2876
2 Multipliers (1 Word)
P2800
P2802[8]
P2877
Index0
Index1
x1 · x2 / 100%
200 %
-200 %
r2878
P2800
P2802[9]
P2879
Index0
Index1
x1 · x2 / 100%
200 %
-200 %
r2880
2 Dividers (1 Word)
P2800
P2802[10]
P2881
Index0
Index1
x1 · 100% / x2
200 %
-200 %
r2882
P2800
P2802[11]
P2883
Index0
Index1
x1 · 100% / x2
200 %
-200 %
r2884
Word Compare
P2800
P2802[12]
P2885
Index0
Index1
CMP
Out = x1 ≥ x2
r2886
P2800
P2802[13]
P2887
Index0
Index1
CMP
Out = x1 ≥ x2
r2888
Connector Setting in %
P2889
P2890
1 2 3 4 5 6 7 8
Free Blocks
Adders, Subtracters, Multipliers, Dividers, Comparators, Setting in %
4830_FreeBlocks4.vsd
05.08.2002 V2.0
Function diagram
MICROMASTER 440
- 4830 -


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
05.08.2002 V2.0
Function diagram
MICROMASTER 440
- 5000 -

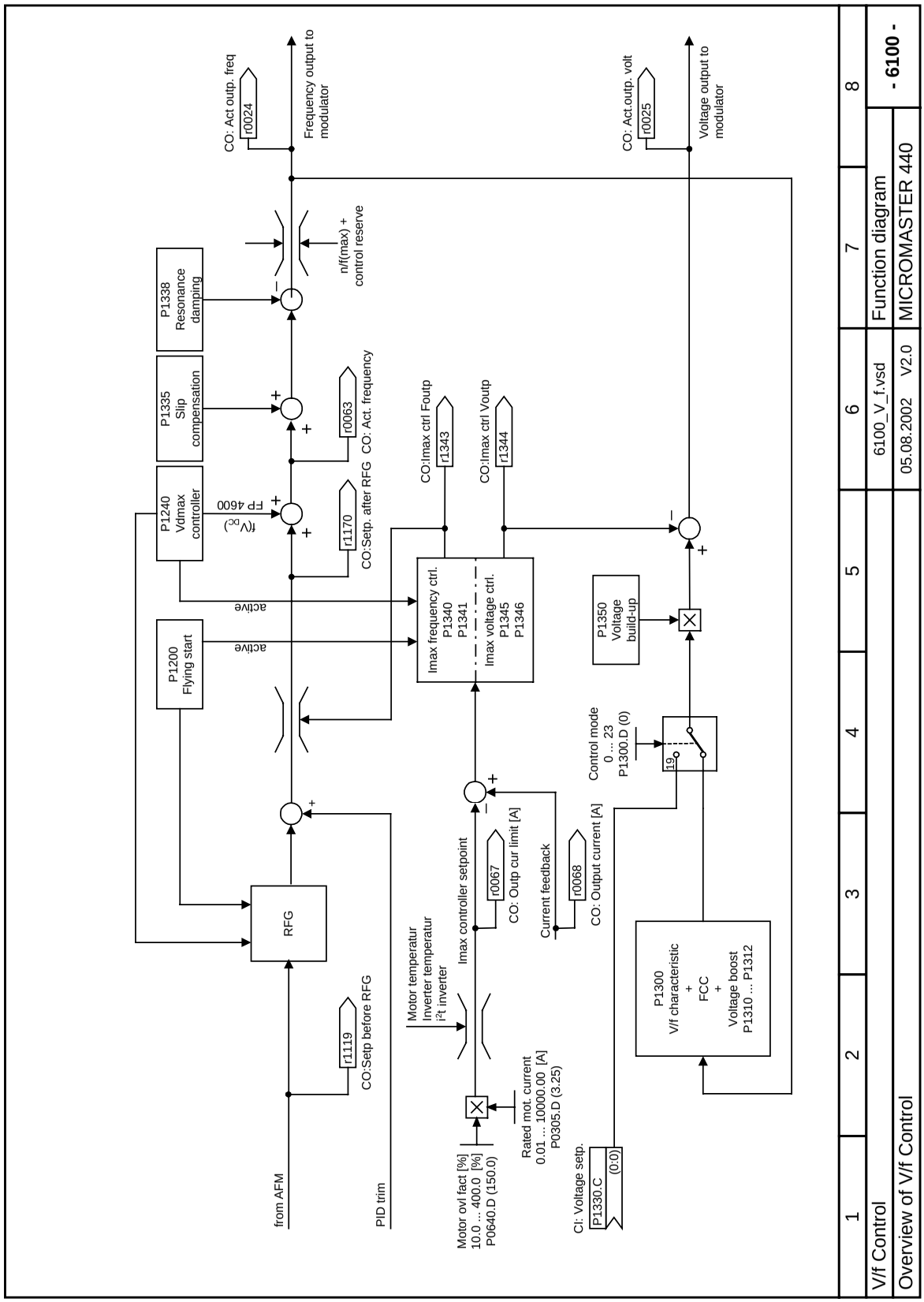


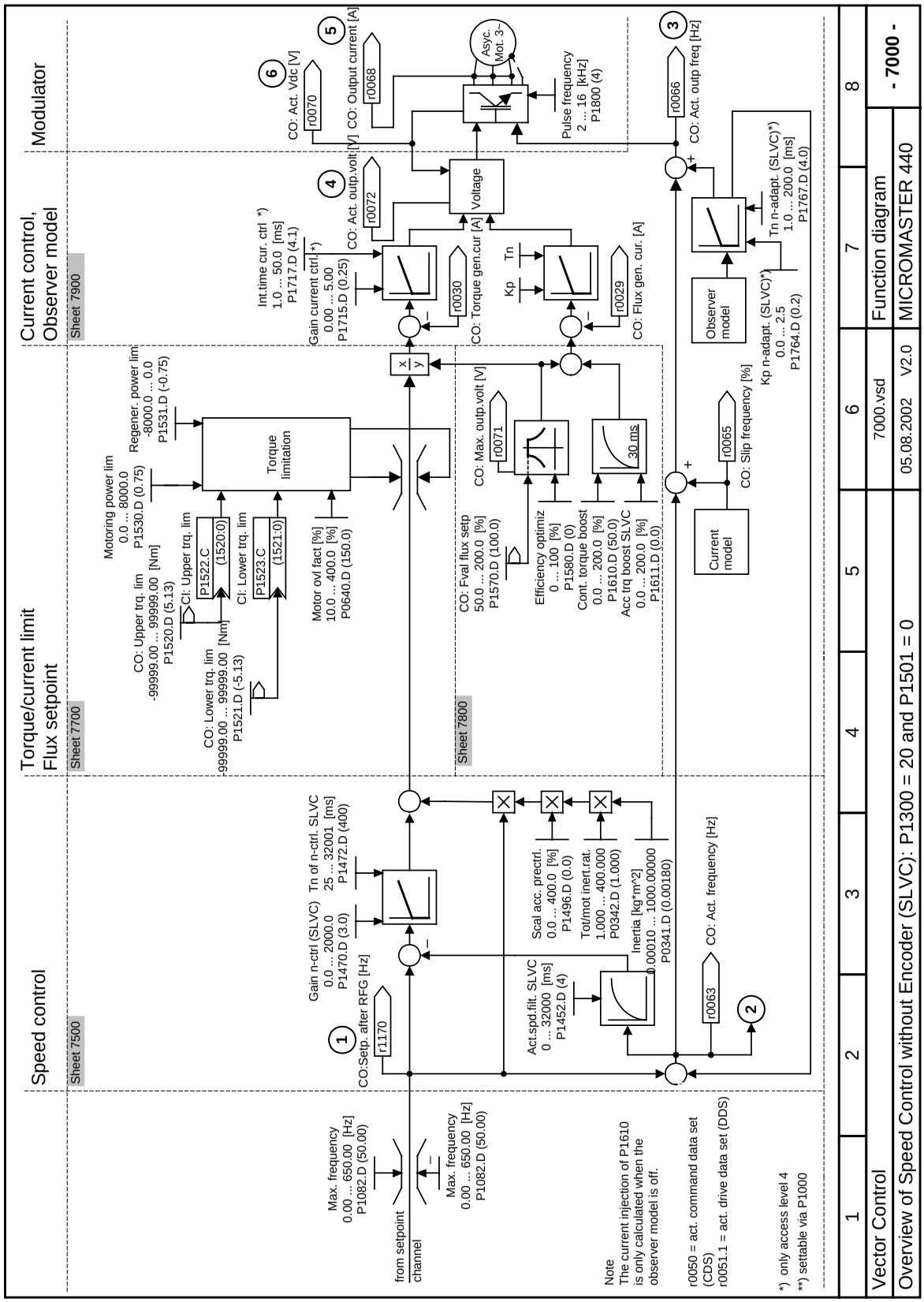
1	2	3	4	5	6	7	8
Setpoint Channel					5100_PID.vsd	Function diagram	- 5100 -
PID controller					05.08.2002 V2.0	MICROMASTER 440	

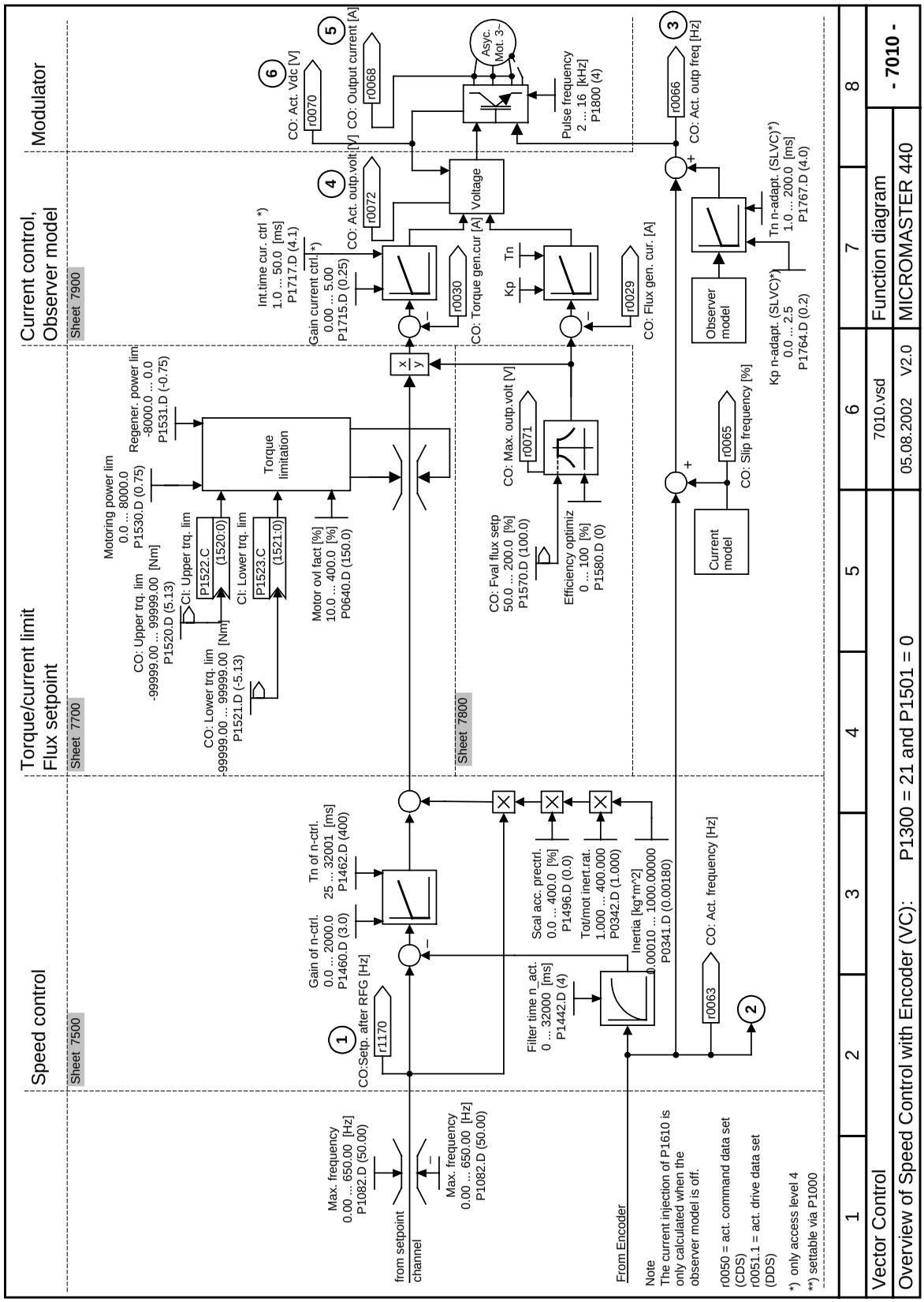

JOG
SUM or PID controller
SUM/JOG selection
BI: Inh. neg. setp
P1110.C (0:0)
BI: Reverse
P1113.C (722:1)
No evaluation with PID
r1079
CO: Sel. freq.setp
Skip frequency 1 0.00 ... 650.00 [Hz] P1091.D (0.00)
Skip frequency 2 0.00 ... 650.00 [Hz] P1092.D (0.00)
Skip frequency 3 0.00 ... 650.00 [Hz] P1093.D (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
r1114
CO:Setp<-dir.ctrl.
r1119
CO:Setp before RFG
RFG
Setpoint channel
Additional Frequency Modifications (AFM)
5200_AFM.vsd
05.08.2002 V2.0
Function diagram
MICROMASTER 440
- 5200 -

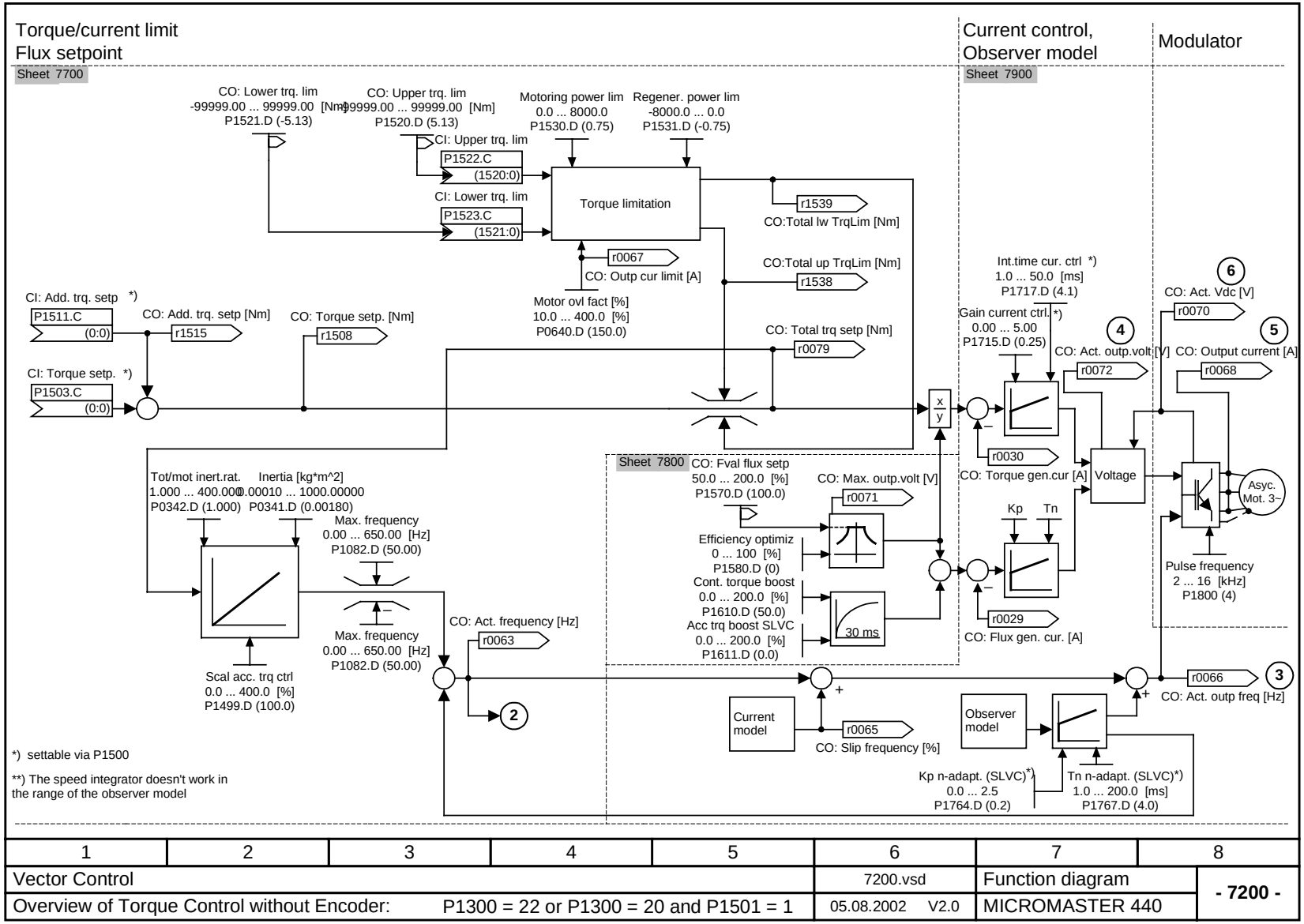


1	2	3	4	5	6	7	8
Setpoint Channel					5300_RFG.vsd	Function diagram	- 5300 -
Ramp Function Generator					05.08.2002 V2.0	MICROMASTER 440	

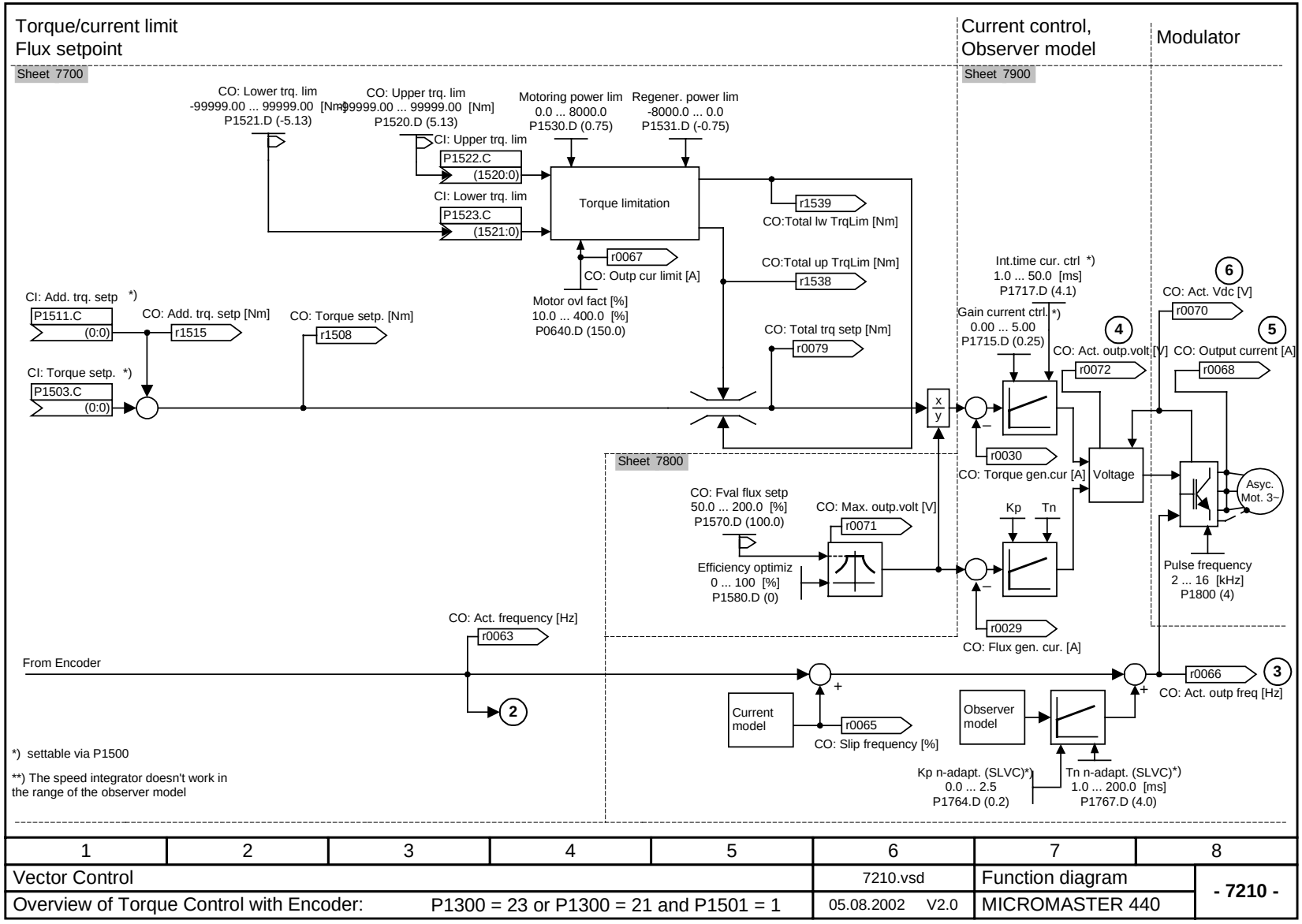

CO: Act outp. freq
r0024
Frequency output to modulator
CO: Act.outp. volt
r0025
Voltage output to modulator
n/f(max) + control reserve
P1338 Resonance damping
P1335 Slip compensation
r0063
CO: Act. frequency
P1240 Vdmax controller
FP 4600
f(V_DC)
r1170
CO:Setp. after RFG
CO:Imax ctrl Foutp
r1343
CO:Imax ctrl Voutp
r1344
P1200 Flying start
active
Imax frequency ctrl. P1340 P1341
Imax voltage ctrl. P1345 P1346
P1350 Voltage build-up
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]
Control mode 0 ... 23 P1300.D (0)
n9
P1300 V/f characteristic + FCC + Voltage boost P1310 ... P1312
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)
1 2 3 4 5 6 7 8
V/f Control
Overview of V/f Control
6100_V_f.vsd 05.08.2002 V2.0
Function diagram
MICROMASTER 440
- 6100 -


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 n-ctrl (SLVC)
0.0 ... 2000.0
P1470.D (3.0)
Tn of n-ctrl. SLVC
25 ... 32001 [ms]
P1472.D (400)
Act.spd.filt. 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
0.0 ... 8000.0
P1530.D (0.75)
Regener. power lim
-8000.0 ... 0.0
P1531.D (-0.75)
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)
CO: Max. outp.volt [V]
r0071
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
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
Asyc.
Mot. 3~
CO: Output current [A]
r0068
CO: Act. Vdc [V]
r0070
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
05.08.2002 V2.0
MICROMASTER 440

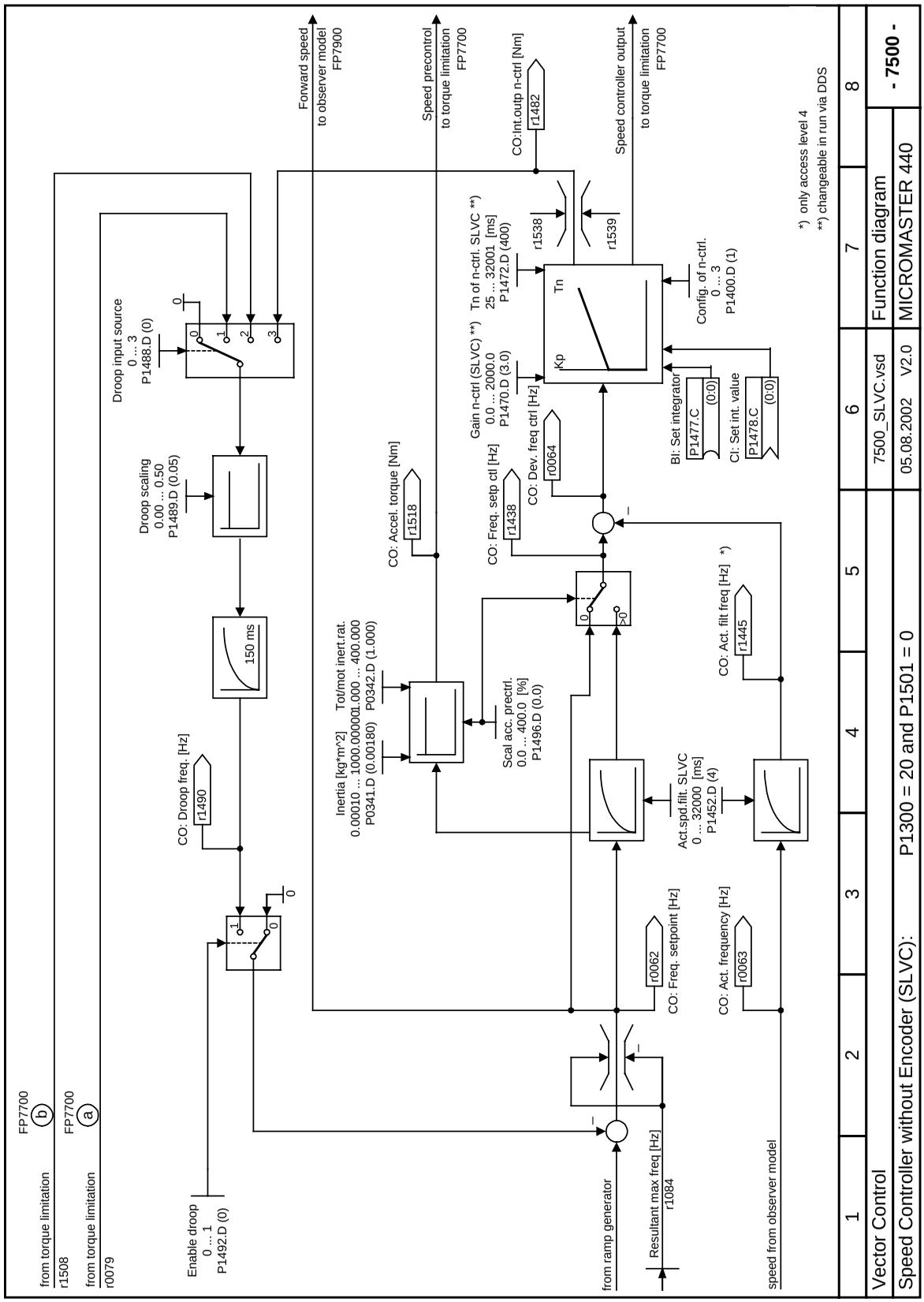

Speed control
Torque/current limit
Flux setpoint
Current control,
Observer model
Modulator
Sheet 7500
Sheet 7700
Sheet 7800
Sheet 7900
Max. frequency
0.00 ... 650.00 [Hz]
P1082.D (50.00)
from setpoint
channel
Max. frequency
0.00 ... 650.00 [Hz]
P1082.D (50.00)
CO:Setp. after RFG [Hz]
r1170
Gain of n-ctrl.
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
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
r0063
CO: Act. frequency [Hz]
Motoring power lim
0.0 ... 8000.0
P1530.D (0.75) [Nm]
Regener. power lim
-8000.0 ... 0.0
P1531.D (-0.75)
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 [%]
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
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. Vdc [V]
r0070
CO: Output current [A]
r0068
Asyc.
Mot. 3~
Pulse frequency
2 ... 16 [kHz]
P1800 (4)
CO: Act. outp freq [Hz]
r0066
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
05.08.2002 V2.0
MICROMASTER 440

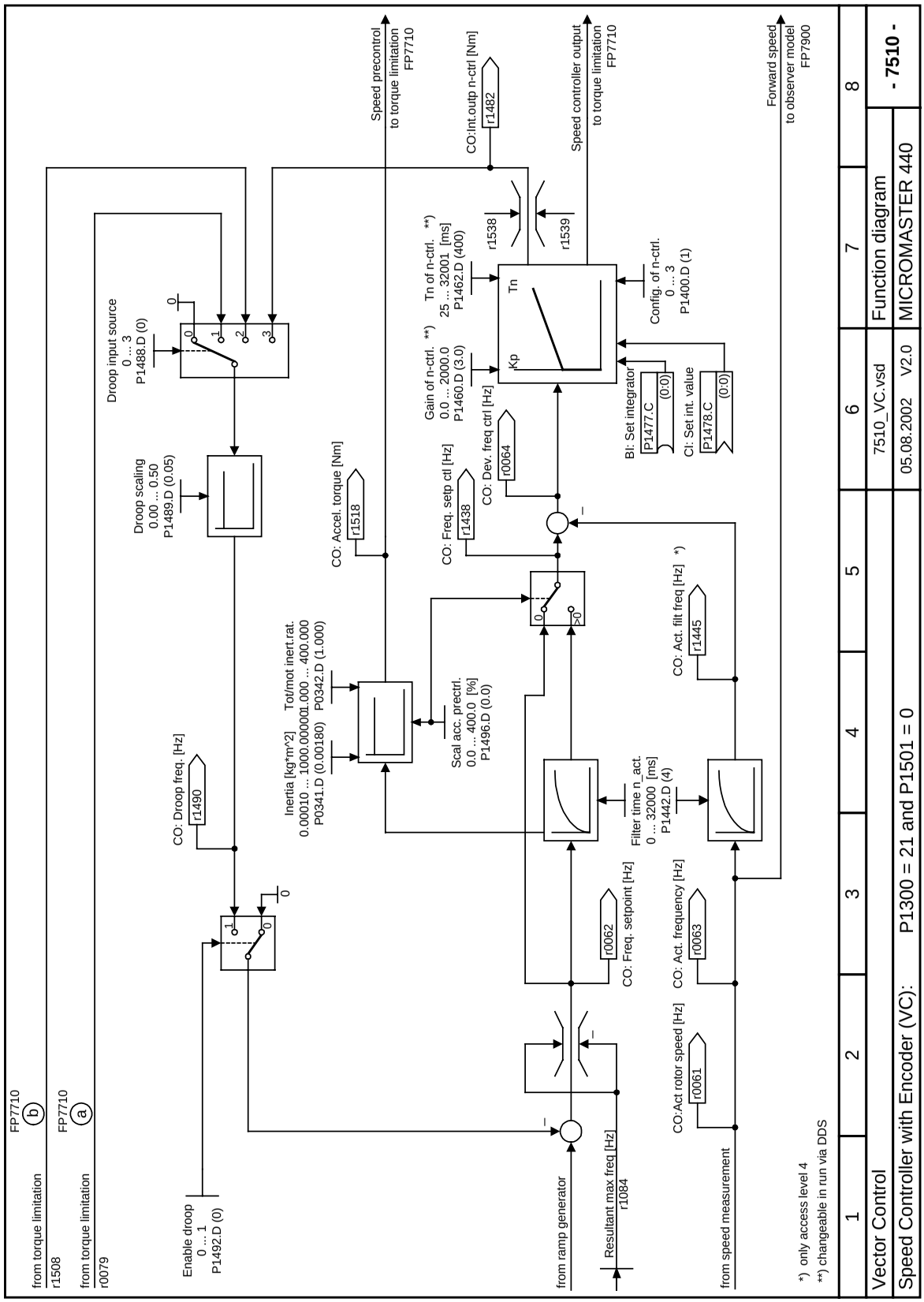


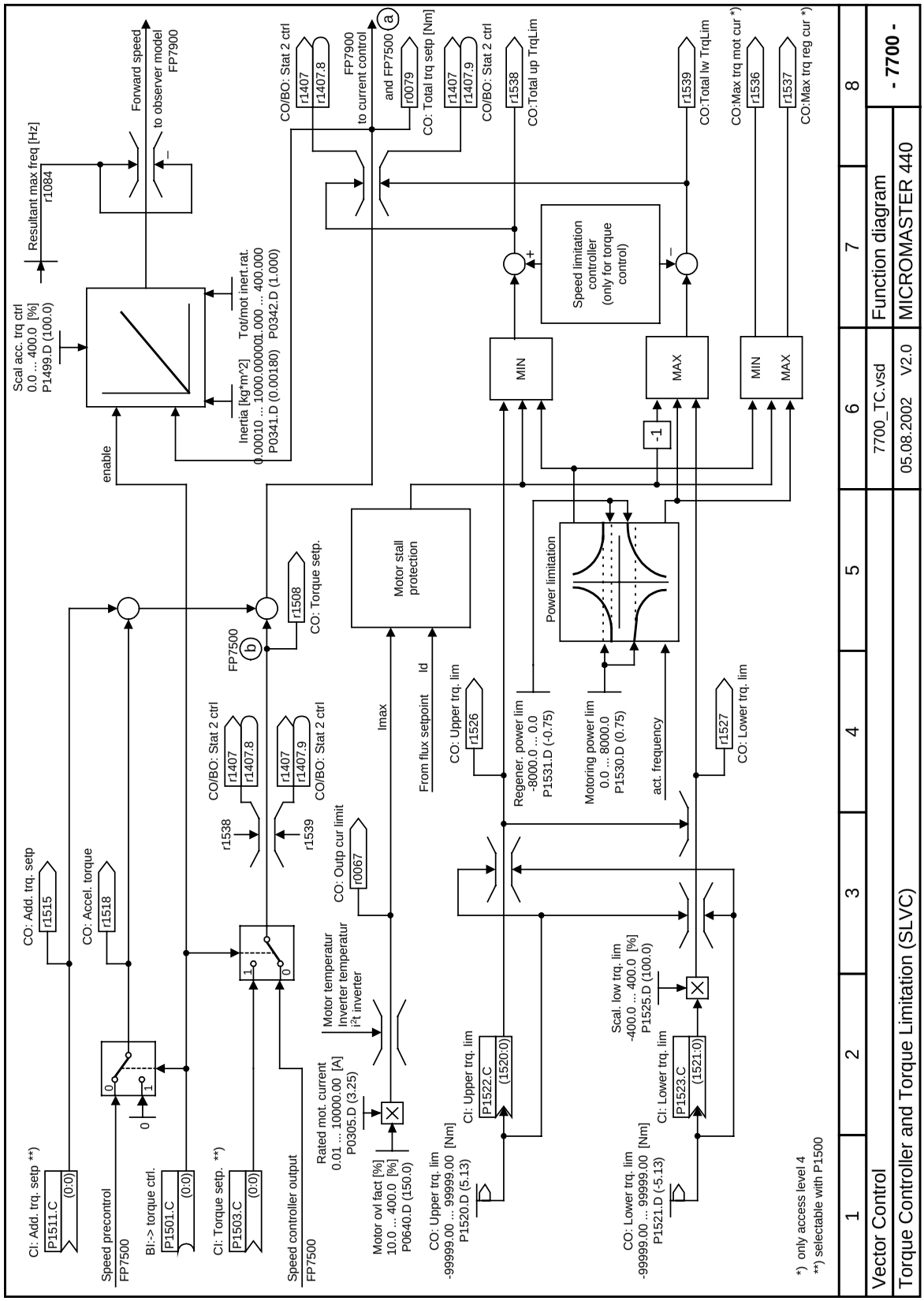
1	2	3	4	5	6	7	8
Vector Control					7200.vsd	Function diagram	- 7200 -
Overview of Torque Control without Encoder: P1300 = 22 or P1300 = 20 and P1501 = 1					05.08.2002 V2.0	MICROMASTER 440	

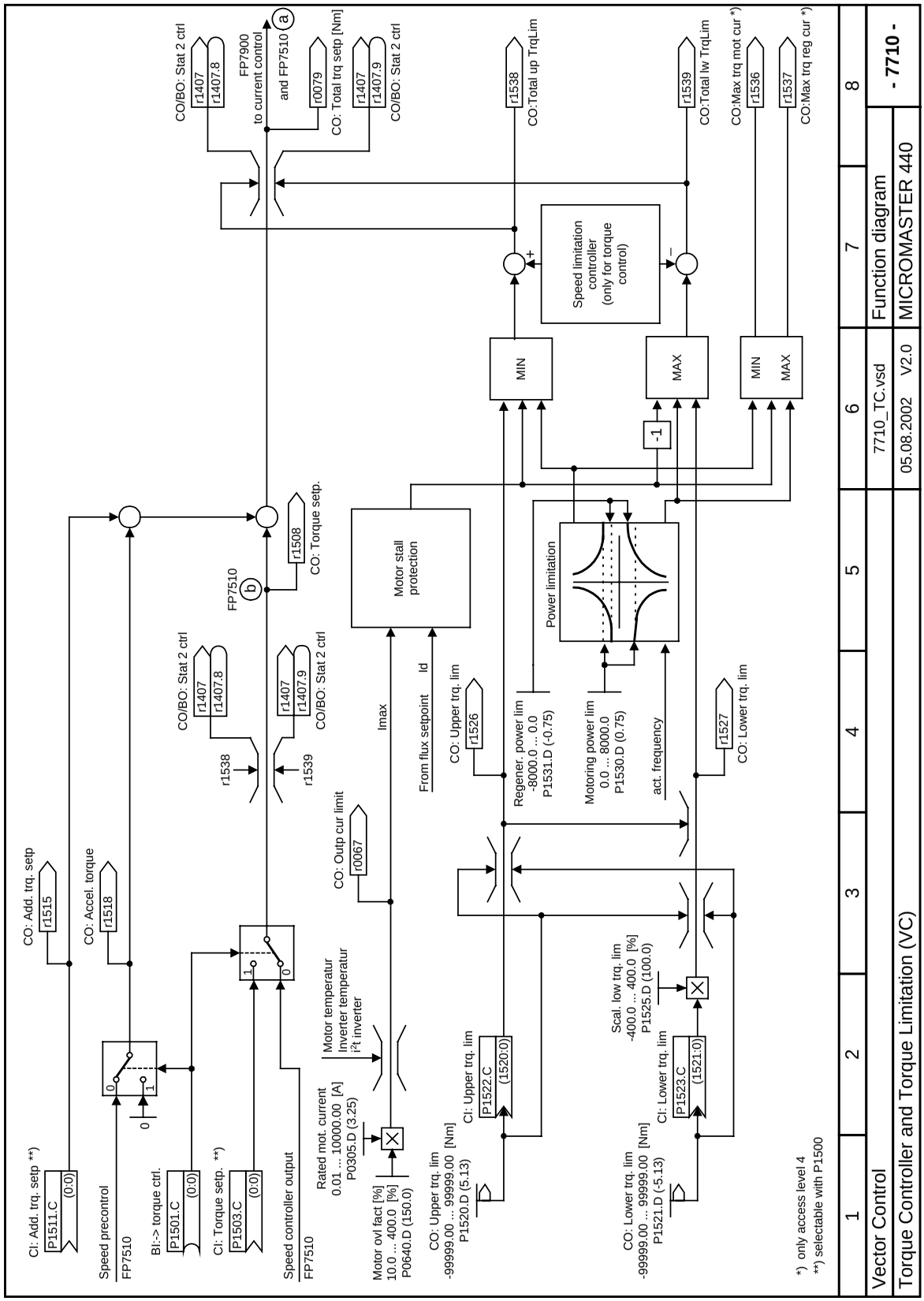


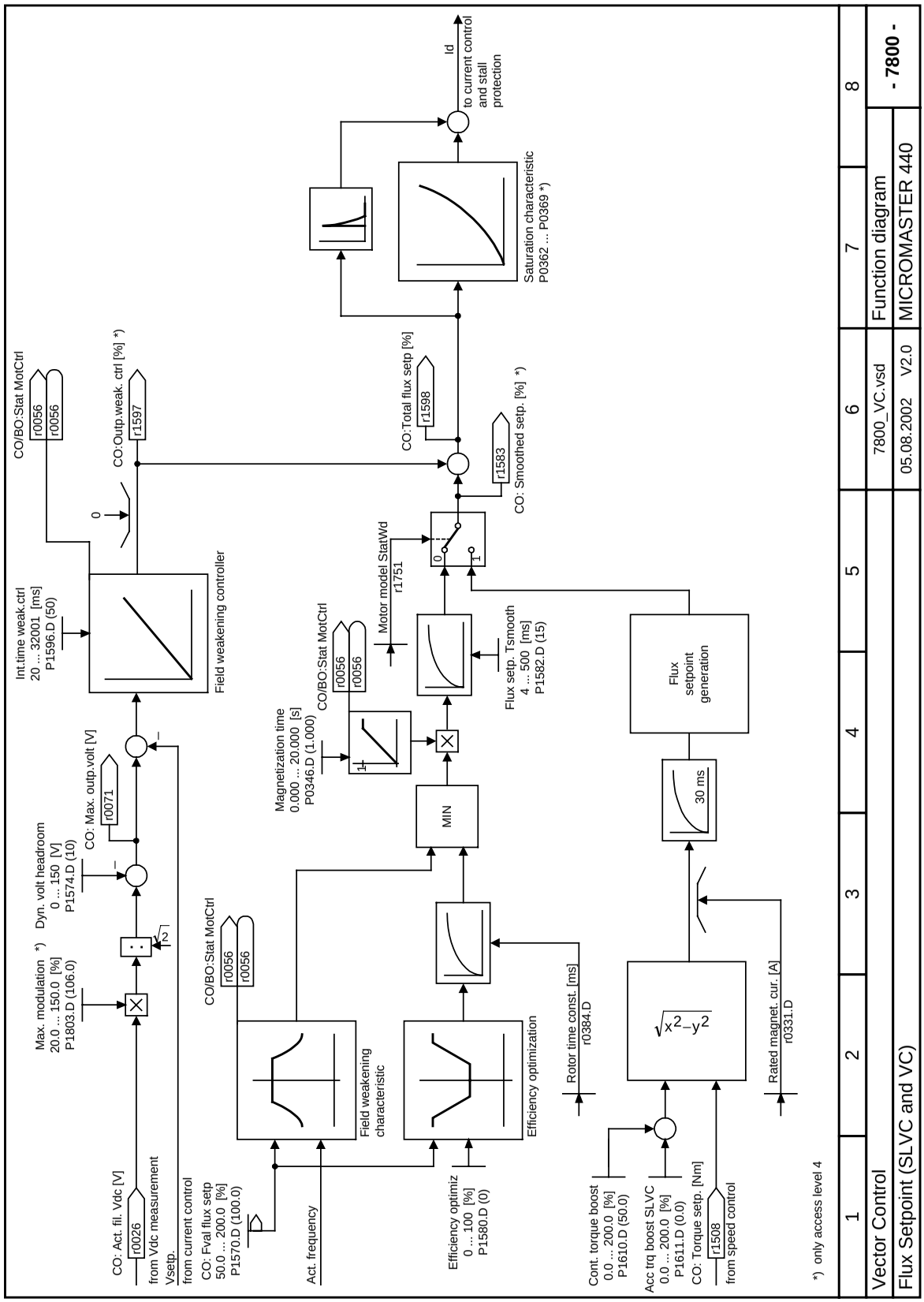
1	2	3	4	5	6	7	8
Vector Control					7210.vsd	Function diagram	- 7210 -
Overview of Torque Control with Encoder:		P1300 = 23 or P1300 = 21 and P1501 = 1			05.08.2002 V2.0	MICROMASTER 440	

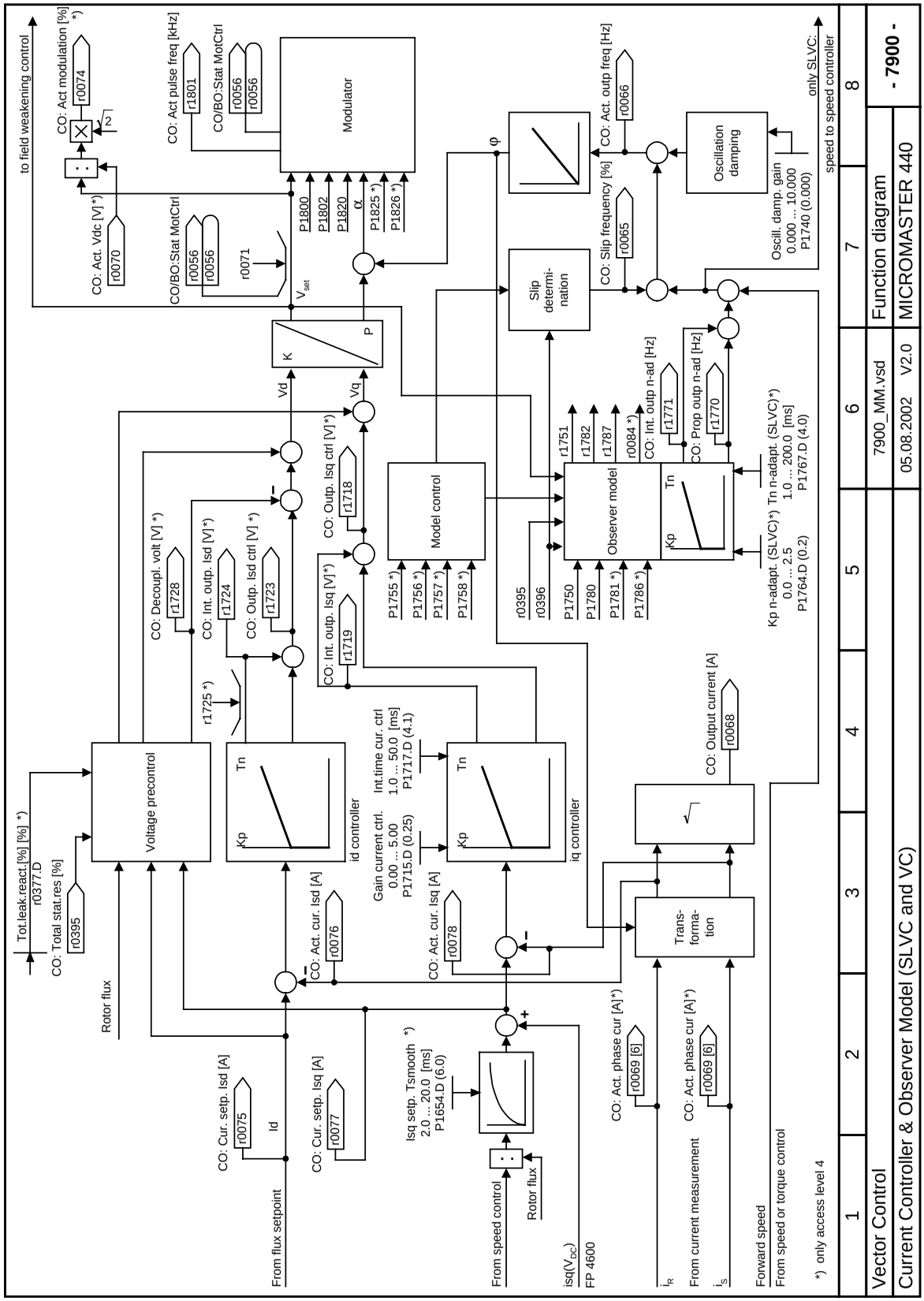

Vector Control
Speed Controller without Encoder (SLVC): P1300 = 20 and P1501 = 0
7500_SLVC.vsd 05.08.2002 V2.0
Function diagram - 7500 -
MICROMASTER 440
Forward speed to observer model FP7900
Speed precontrol to torque limitation FP7700
Speed controller output to torque limitation FP7700
CO:Int.outp n-ctrl [Nm] r1482
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
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)
Act.spd.filt. 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
FP7700 (b) from torque limitation r1508
FP7700 (a) from torque limitation r0079
*) only access level 4
**) changeable in run via DDS
1 2 3 4 5 6 7 8

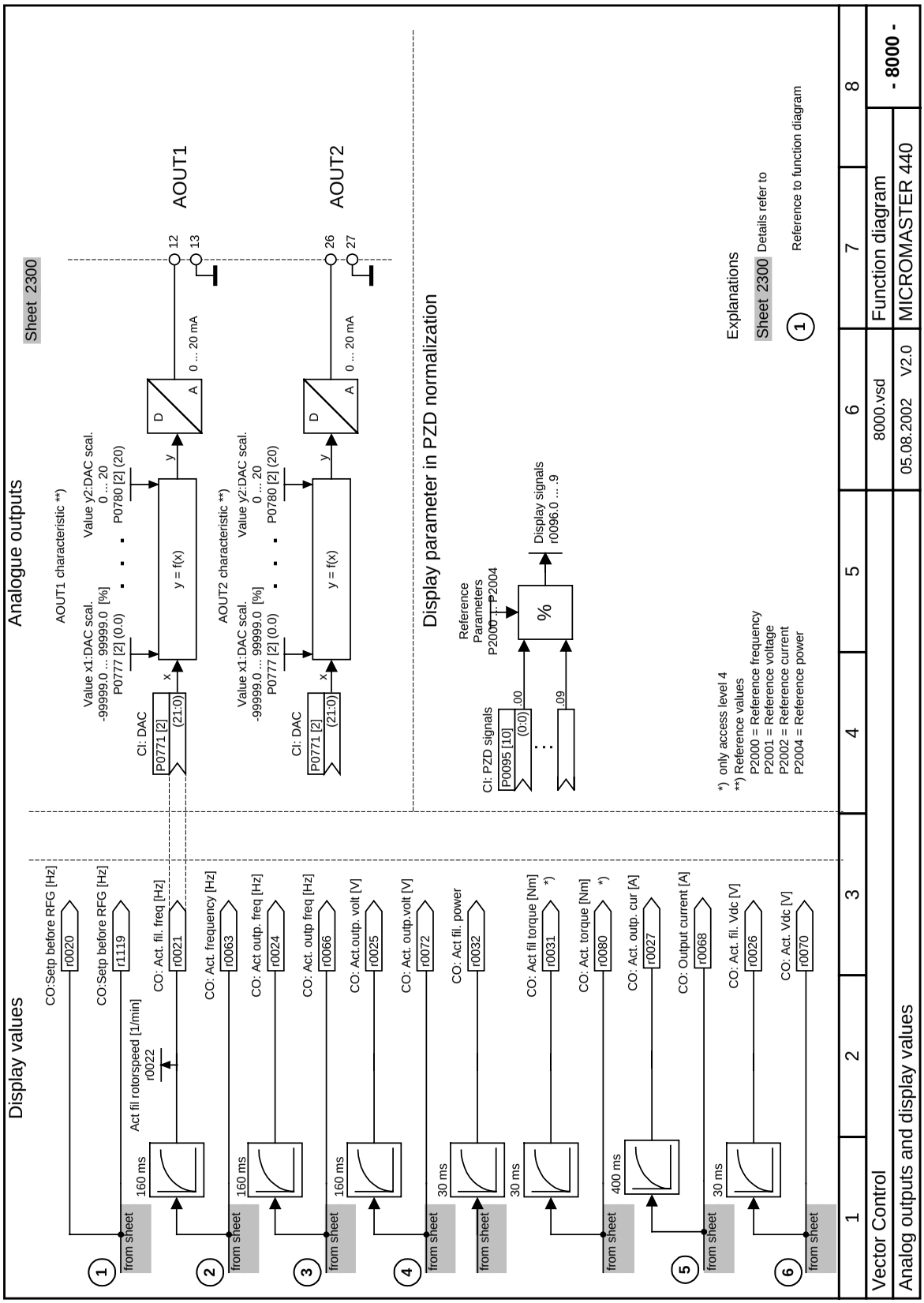

from torque limitation
r1508
FP7710 (b)
from torque limitation
r0079
FP7710 (a)
Enable droop
0 ... 1
P1492.D (0)
Droop input source
0 ... 3
P1488.D (0)
Droop scaling
0.00 ... 0.50
P1489.D (0.05)
CO: Droop freq. [Hz]
r1490
Inertia [kg*m^2]
0.00010 ... 1000.00000
P0341.D (0.00180)
Tot/mot inert.rat.
1.000 ... 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
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
Bi: Set integrator
P1477.C
(0:0)
Config. of n-ctrl.
0 ... 3
P1400.D (1)
Ci: Set int. value
P1478.C
(0:0)
CO: Act. filt freq [Hz] *)
r1445
Filter time n_act.
0 ... 32000 [ms]
P1442.D (4)
CO: Freq. setpoint [Hz]
r0062
CO: Act. frequency [Hz]
r0063
CO:Act rotor speed [Hz]
r0061
Resultant max freq [Hz]
r1084
from ramp generator
from speed measurement
*) only access level 4
**) changeable in run via DDS
1 2 3 4 5 6 7 8
Vector Control
7510_VC.vsd
Function diagram
- 7510 -
Speed Controller with Encoder (VC): P1300 = 21 and P1501 = 0
05.08.2002 V2.0
MICROMASTER 440


Vector Control
Function diagram
- 7700 -
Torque Controller and Torque Limitation (SLVC)
MICROMASTER 440
7700_TC.vsd
05.08.2002 V2.0
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 ... 1000.00000 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
CO: Add. trq. setp r1515
CO: Accel. torque r1518
CI: Add. trq. setp **) P1511.C (0:0)
Speed precontrol FP7500
BI:-> torque ctrl. P1501.C (0:0)
CI: Torque setp. **) P1503.C (0:0)
Speed controller output FP7500
FP7500 (b)
CO: Torque setp. r1508
CO/BO: Stat 2 ctrl r1407 r1407.8 r1538
CO/BO: Stat 2 ctrl r1407 r1407.9 r1539
CO: Outp cur limit r0067
Motor stall protection
Imax
From flux setpoint Id
Power limitation
CO: Upper trq. lim r1526
Regener. power lim -8000.0 ... 0.0 P1531.D (-0.75)
Motoring power lim 0.0 ... 8000.0 P1530.D (0.75)
act. frequency
CO: Lower trq. lim r1527
Rated mot. current 0.01 ... 10000.00 [A] P0305.D (3.25)
Motor temperatur Inverter temperatur i²t inverter
Motor ovl fact [%] 10.0 ... 400.0 [%] P0640.D (150.0)
CO: Upper trq. lim -99999.00 ... 99999.00 [Nm] P1520.D (5.13)
CI: Upper trq. lim P1522.C (1520:0)
Scal. low trq. lim -400.0 ... 400.0 [%] P1525.D (100.0)
CO: Lower trq. lim -99999.00 ... 99999.00 [Nm] P1521.D (-5.13)
CI: Lower trq. lim P1523.C (1521:0)
*) only access level 4
**) selectable with P1500


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
CO:Max trq mot cur *)
r1536
r1537
CO:Max trq reg cur *)
CO: Add. trq. setp
r1515
CO: Accel. torque
r1518
FP7510
b
r1508
CO: Torque setp.
Motor stall protection
Speed limitation controller (only for torque control)
MIN
MAX
-1
Power limitation
Regener. power lim
-8000.0 ... 0.0
P1531.D (-0.75)
Motoring power lim
0.0 ... 8000.0
P1530.D (0.75)
act. frequency
CO: Upper trq. lim
r1526
CO: Lower trq. lim
r1527
CO: Outp cur limit
r0067
Imax
From flux setpoint
Id
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)
CO: Upper trq. lim
-99999.00 ... 99999.00 [Nm]
P1520.D (5.13)
CI: Upper trq. lim
P1522.C
(1520:0)
Scal. low trq. lim
-400.0 ... 400.0 [%]
P1525.D (100.0)
CO: Lower trq. lim
-99999.00 ... 99999.00 [Nm]
P1521.D (-5.13)
CI: Lower trq. lim
P1523.C
(1521:0)
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
*) only access level 4
**) selectable with P1500
1
2
3
4
5
6
7
8
Vector Control
7710_TC.vsd
05.08.2002
V2.0
Function diagram
MICROMASTER 440
- 7710 -
Torque Controller and Torque Limitation (VC)


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)
Flux setpoint generation
Magnetization time
0.000 ... 20.000 [s]
P0346.D (1.000)
MIN
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)
Act. frequency
Field weakening characteristic
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
Function diagram
- 7800 -
Flux Setpoint (SLVC and VC)
05.08.2002 V2.0
MICROMASTER 440


Vector Control
Function diagram
- 7900 -
Current Controller & Observer Model (SLVC and VC)
7900_MM.vsd
05.08.2002 V2.0
MICROMASTER 440
1 2 3 4 5 6 7 8
to field weakening control
CO: Act modulation [%] *)
r0074
CO: Act. Vdc [V] *)
r0070
CO: Act pulse freq [kHz]
r1801
CO/BO:Stat MotCtrl
r0056
r0056
Modulator
P1800
P1802
P1820
P1825 *)
P1826 *)
r0071
Vset
Tot.leak.react.[%] [%] *)
r0377.D
CO: Total stat.res [%]
r0395
Rotor flux
Voltage precontrol
CO: Decoupl. volt [V] *)
r1728
CO: Int. outp. Isd [V] *)
r1724
CO: Outp. Isd ctrl [V] *)
r1723
r1725 *)
id controller
Tn
Kp
Int.time cur. ctrl
1.0 ... 50.0 [ms]
P1717.D (4.1)
Gain current ctrl.
0.00 ... 5.00
P1715.D (0.25)
iq controller
CO: Act. cur. Isd [A]
r0076
CO: Act. cur. Isq [A]
r0078
CO: Output current [A]
r0068
Trans-
forma-
tion
CO: Act. phase cur [A] *)
r0069 [6]
CO: Act. phase cur [A] *)
r0069 [6]
CO: Cur. setp. Isd [A]
r0075
Id
CO: Cur. setp. Isq [A]
r0077
Isq setp. Tsmooth *)
2.0 ... 20.0 [ms]
P1654.D (6.0)
From flux setpoint
From speed control
Rotor flux
isq(VDC)
FP 4600
iR
From current measurement
iS
Forward speed
From speed or torque control
*) only access level 4
Vd
Vq
K
P
CO: Outp. Isq ctrl [V] *)
r1718
CO: Int. outp. Isq [V] *)
r1719
Model control
P1755 *)
P1756 *)
P1757 *)
P1758 *)
r0395
r0396
Observer model
P1750
P1780
P1781 *)
P1786 *)
r1751
r1782
r1787
r0084 *)
CO: Int. outp n-ad [Hz]
r1771
CO: Prop outp n-ad [Hz]
r1770
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)
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


Display values
Analogue outputs
Sheet 2300
AOUT1 characteristic **)
AOUT2 characteristic **)
Value x1:DAC scal.
-99999.0 ... 99999.0 [%]
P0777 [2] (0.0)
Value y2:DAC scal.
0 ... 20
P0780 [2] (20)
CI: DAC
P0771 [2]
(21:0)
y = f(x)
D
A
0 ... 20 mA
AOUT1
AOUT2
12
13
26
27
Display parameter in PZD normalization
Reference Parameters
P2000 ... P2004
CI: PZD signals
P0095 [10]
(0:0)
%
Display signals
r0096.0 ... 9
Explanations
Sheet 2300 Details refer to
Reference to function diagram
*) only access level 4
**) Reference values
P2000 = Reference frequency
P2001 = Reference voltage
P2002 = Reference current
P2004 = Reference power
CO:Setp before RFG [Hz]
r0020
CO:Setp before RFG [Hz]
r1119
Act fil rotorspeed [1/min]
r0022
CO: Act. fil. freq [Hz]
r0021
160 ms
CO: Act. frequency [Hz]
r0063
CO: Act outp. freq [Hz]
r0024
CO: Act. outp freq [Hz]
r0066
CO: Act.outp. volt [V]
r0025
CO: Act. outp.volt [V]
r0072
CO: Act fil. power
r0032
30 ms
CO: Act fil torque [Nm] *)
r0031
CO: Act. torque [Nm] *)
r0080
400 ms
CO: Act. outp. cur [A]
r0027
CO: Output current [A]
r0068
CO: Act. fil. Vdc [V]
r0026
CO: Act. Vdc [V]
r0070
from sheet
1 2 3 4 5 6 7 8
Vector Control
8000.vsd
Function diagram
- 8000 -
Analog outputs and display values
05.08.2002 V2.0
MICROMASTER 440

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 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 OFF2

Possible Causes
- Motor power (P0307) does not correspond to the inverter power (r0206)
- Motor leads are too long
- Motor lead short circuit
- Earth faults

Diagnose & Remedy

Check the following:
1. Motor power (P0307) must correspond to inverter power (r0206)
2. Cable length limits must not be exceeded
3. Motor cable and motor must have no short-circuits or earth faults
4. Motor parameters must match the motor in use
5. Value of stator resistance (P0350) must be correct
6. Motor must not be obstructed or overloaded

- Increase the ramp time
- Reduce the boost level (V/f control: P1311 & P1312, Vector control: P1610 & P1611)

F0002 OverVoltage OFF2

Possible Causes
- DC-link controller disabled (P1240 = 0)
- DC-link voltage (r0026) exceeds trip level (P2172)
- Overvoltage can be caused either by too high main supply voltage or if motor is in regenerative mode. Regenerative mode can be caused by fast ramp downs or if the motor is driven from an active load.

Diagnose & Remedy

Check the following:
1. Supply voltage (P0210) must lie within limits indicated on rating plate
2. DC-link voltage controller must be enabled (P1240) and parameterized properly
3. Ramp-down time (P1121) must match inertia of load
4. Required braking power must lie within specified limits

NOTE

Higher inertia requires longer ramp times; otherwise, apply braking resistor.

F0003 UnderVoltage OFF2

Possible Causes
- Main supply failed
- Shock load outside specified limits

Diagnose & Remedy

Check the following:
1. Supply voltage (P0210) must lie within limits indicated on rating plate
2. Supply must not be susceptible to temporary failures or voltage reductions

- Enable kinetic buffering (P1240 = 2)

F0004 Inverter Over Temperature OFF2

Possible Causes
- Ventilation inadequate
- Ambient temperature is too high

Diagnose & Remedy

Check the following:
1. Load conditions and duty cycle must be appropriate
2. Fan must turn when inverter is running
3. Pulse frequency (P1800) must be set to default value
4. Ambient temperature could be higher than specified for the inverter
   Additional meaning for MM440 Frame size FX & GX:
   Fault value = 1: Rectifier overtemperature
   = 2: Ambient overtemperature
   = 3: EBOX overtemperature

F0005 Inverter I^2t OFF2

Possible Causes
- Inverter overloaded
- Duty cycle too demanding
- Motor power (P0307) exceeds inverter power capability (r0206)

Diagnose & Remedy

Check the following:
1. Load duty cycle must lie within specified limits
2. Motor power (P0307) must match inverter power (r0206)

F0011 Motor Over Temperature OFF1

Possible Causes

Motor overloaded

Diagnose & Remedy

Check the following:
1. Load duty cycle must be correct
2. Motor nominal overtemperatures (P0626-P0628) must be correct
3. Motor temperature warning level (P0604) must match

If P0601 = 0 or 1, check the following:
4. Check if name plate data are correct (if not perform quick commissioning)
5. Accurate equivalent circuit data can be found by performing motor identification (P1910=1)
6. Check if motor weight (P0344) is reasonable. Change if necessary
7. Via P0626, P0627, P0628 the standard overtemperatures can be changed, if the motor is not a Siemens standard motor

If P0601 = 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)

F0012 Inverter temp. signal lost OFF2

Possible Causes

Wire breakage of inverter temperature (heatsink) sensor

F0015 Motor temperature signal lost OFF2

Possible Causes

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 OFF2

Possible Causes

Fault occurs if one of the three input phases are missed while the pulses are enabled and drive is loaded

Diagnose & Remedy

Check the input wiring of the mains phases

F0021 Earth fault OFF2

Possible Causes

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 (Frame sizes D to F & FX, GX)

F0022 Powerstack fault OFF2

Possible Causes

That hardware fault (r0947 = 22 and r0949 = 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
- Frame sizes A to C (1),(2),(3),(4)
- Frame sizes D to E (1),(2),(4)
- Frame size 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.
MM440 Frame size FX & GX:
- UCE failure was detected, when r0947 = 22 and fault value r0949 = 12 or 13 or 14, depending on UCE.
- I2C bus read out error, when r0947 = 22 and fault value r0949 = 21 (The power has to be switched OFF/ON).

Diagnose & Remedy

Check the I/O board. It has to be fully pressed home.

F0023 Output fault OFF2

Possible Causes

One motor phase is disconnected

F0030 Fan has failed OFF2

Possible Causes

Fan no longer working

Diagnose & Remedy

1. Fault cannot be masked while options module (AOP or BOP) is connected
2. Need a new fan

F0035 Auto restart after n OFF2

Possible Causes

Auto restart attempts exceed value of P1211

F0041 Motor Data Identification Failure OFF2

Possible Causes

Motor data identification failed.
Fault value = 0: Load missing
1: Current limit level reached during identification.
2: Identified stator resistance less than 0.1 % or greater than 100 %.
3: Identified rotor resistance less than 0.1 % or greater than 100 %.
4: Identified stator reactance less than 50 % and greater than 500 %
5: Identified main reactance less than 50 % and greater than 500 %
6: Identified rotor time constant less than 10 ms or greater than 5 s
7: Identified total leakage reactance less than 5 % and greater than 50 %
8: Identified stator leakage reactance less than 25 % and greater than 250 %
9: Identified rotor leakage inductance less than 25 % and greater than 250 %
20: Identified IGBT on-voltage less than 0.5 V or greater than 10 V
30: Current controller at voltage limit
40: Inconsistency of identified data set, at least one identification failed

Percentage values based on the impedance Zb = Vmot,nom / sqrt(3) / Imot,nom

Diagnose & Remedy

- Fault value = 0: Check that the motor is connected to the inverter
- Fault value = 1-40: Check if motor data in P0304 to P0311 are correct

Check what type of motor wiring is required (star, delta).

F0042 Speed Control Optimisation Failure OFF2

Possible Causes

Speed control optimisation (P1960) failed
Fault value = 0: Time out waiting for stable speed
= 1: Inconsistent readings

F0051 Parameter EEPROM Fault OFF2

Possible Causes
Read or write failure while saving non-volatile parameter

Diagnose & Remedy
1. Factory Reset and new parameterization
2. Contact Customer Support / Service Department

F0052 Power stack Fault OFF2

Possible Causes
Read failure for power stack information or invalid data

Diagnose & Remedy
Hardware defect, contact Customer Support / Service Department

F0053 IO EEPROM Fault OFF2

Possible Causes
Read failure for IO EEPROM information or invalid data

Diagnose & Remedy
1. Check data
2. Change IO board

F0054 Wrong IO Board OFF2

Possible Causes
- Wrong IO board is connected
- No ID detected on IO board, no data

Diagnose & Remedy
1. Check data
2. Change IO board

F0060 Asic Timeout OFF2

Possible Causes
Internal communications failure

Diagnose & Remedy
1. If fault persists, change inverter
2. Contact Service Department

F0070 CB setpoint fault OFF2

Possible Causes
No setpoint values from CB (communication board) during telegram off time

Diagnose & Remedy
Check CB and communication partner

F0071 USS (BOP-link) setpoint fault OFF2

Possible Causes
No setpoint values from USS during telegram off time

Diagnose & Remedy
Check USS master

F0072 USS (COMM link) setpoint fault OFF2

Possible Causes
No setpoint values from USS during telegram off time

Diagnose & Remedy
Check USS master

F0080 ADC lost input signal OFF2

Possible Causes
- Broken wire
- Signal out of limits

F0085 External Fault OFF2

Possible Causes
External fault triggered via for example terminal inputs

Diagnose & Remedy
Disable for example terminal input for fault trigger

F0090 Encoder feedback loss OFF2

Possible Causes
Signal from Encoder lost

Diagnose & Remedy
1. Check encoder fitted. If encoder not fitted, set P0400 = 0 and select SLVC mode (P1300 = 20 or 22)
2. If encoder fitted, check correct encoder selected (check encoder set-up in P0400).
3. Check connections between encoder and inverter
4. Check encoder not faulty (select P1300 = 0, run at fixed speed, check encoder feedback signal in r0061)
5. Increase encoder loss threshold in P0492

F0101 Stack Overflow OFF2

Possible Causes
Software error or processor failure

Diagnose & Remedy
Run self test routines

F0221 PID Feedback below min. value OFF2

Possible Causes
PID Feedback below min. value P2268

Diagnose & Remedy
1. Change value of P2268
2. Adjust feedback gain

F0222 PID Feedback above max. value OFF2

Possible Causes
PID feedback above max. value P2267

Diagnose & Remedy
1. Change value of P2267
2. Adjust feedback gain

F0450 BIST Tests Failure OFF2

Possible Causes
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 board tests have failed (MM 420 only)
16: Internal RAM failed on power-up check

Diagnose & Remedy
Hardware defect, contact Customer Support / Service Department

F0452 Belt Failure Detected OFF2

Possible Causes

Load conditions on motor indicate belt failure or mechanical fault.

Diagnose & 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)

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

Possible Causes

- Motor power (P0307) does not correspond to the inverter power (P0206)
- Motor leads are too long
- Earth faults

Diagnose & Remedy

Check the following:

1. Motor power (P0307) must correspond to inverter power (r0206)
2. Cable length limits must not be exceeded
3. Motor cable and motor must have no short-circuits or earth faults
4. Motor parameters must match the motor in use
5. Value of stator resistance (P0350) must be correct
6. Motor must not be obstructed or overloaded

- Increase the ramp-up-time.
- Reduce the boost level (V/f control: P1311 & P1312, Vector control: P1610 & P1611)

A0502 Overvoltage limit

Possible Causes

- Overvoltage limit is reached
- This warning can occur during ramp down, if the dc-link controller is disabled (P1240 = 0)

Diagnose & Remedy

Check the following:

1. Supply voltage (P0210) must lie within limits indicated on rating plate
2. DC-link voltage controller must be enabled (P1240) and parameterized properly
3. Ramp-down time (P1121) must match inertia of load
4. Required braking power must lie within specified limits

A0503 UnderVoltage Limit

Possible Causes

- Main supply failed
- Main supply (P0210) and consequently DC-link voltage (r0026) below specified limit (P2172)

Diagnose & Remedy

1. Supply voltage (P0210) must lie within limits indicated on rating plate
2. Supply must not be susceptible to temporary failures or voltage reductions

- Enable kinetic buffering (P1240 = 2)

A0504 Inverter OverTemperature

Possible Causes

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)

Diagnose & Remedy

Check the following:

1. Load conditions and duty cycle must be appropriate
2. Fan must turn when inverter is running
3. Pulse frequency (P1800) must be set to default value
4. Ambient temperature could be higher than specified for the inverter

A0505 Inverter I^2t

Possible Causes

Warning level (P0294) exceeded, output frequency and/or pulse frequency will be reduced if parameterized (P0290)

Diagnose & Remedy

Check the following:

1. Load duty cycle must lie within specified limits
2. Motor power (P0307) must match inverter power (r0206)

A0511 Motor OverTemperature

Possible Causes

- Motor overloaded
- Load duty cycle too high

Diagnose & Remedy

Independently of the kind of temperature determination check the following:

1. Load duty cycle must be correct
2. Motor nominal overtemperatures (P0626-P0628) must be correct
3. Motor temperature warning level (P0604) must match

If P0601 = 0 or 1, check the following:

4. Check if name plate data are correct (if not perform quick commissioning)
5. Accurate equivalent circuit data can be found by performing motor identification (P1910=1)
6. Check if motor weight (P0344) is reasonable. Change if necessary
7. Via P0626, P0627, P0628 the standard overtemperatures can be changed, if the motor is not a Siemens standard motor

If P0601 = 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)

A0522 I2C read out timeout

Possible Causes

The cyclic access to the UCE Values and powerstack temperatures via the I2C bus (MM440 Frame size FX & GX) is disturbed

A0523 Output fault

Possible Causes

One motor phase is disconnected

A0535 Braking Resistor Hot

Diagnose & Remedy

1. Increase duty cycle P1237
2. Increase ramp down time P1121

A0541 Motor Data Identification Active

Possible Causes

Motor data identification (P1910) selected or running

A0542 Speed Control Optimisation Active

Possible Causes

Speed Control Optimisation (P1960) is selected or running

A0590 Encoder feedback loss warning

Possible Causes
Signal from Encoder lost and Inverter has switched to sensorless vector control

Diagnose & Remedy
Stop inverter and then
1. Check encoder fitted. If encoder not fitted, set P0400 = 0 and select SLVC mode (P1300 = 20 or 22)
2. If encoder fitted, check correct encoder selected (check encoder set-up in P0400).
3. Check connections between encoder and inverter
4. Check encoder not faulty (select P1300 = 0, run at fixed speed, check encoder feedback signal in r0061)
5. Increase encoder loss threshold in P0492

A0600 RTOS Overrun Warning

A0700 CB warning 1

Possible Causes
CB (communication board) specific

Diagnose & Remedy
See CB user manual

A0701 CB warning 2

Possible Causes
CB (communication board) specific

Diagnose & Remedy
See CB user manual

A0702 CB warning 3

Possible Causes
CB (communication board) specific

Diagnose & Remedy
See CB user manual

A0703 CB warning 4

Possible Causes
CB (communication board) specific

Diagnose & Remedy
See CB user manual

A0704 CB warning 5

Possible Causes
CB (communication board) specific

Diagnose & Remedy
See CB user manual

A0705 CB warning 6

Possible Causes
CB (communication board) specific

Diagnose & Remedy
See CB user manual

A0706 CB warning 7

Possible Causes
CB (communication board) specific

Diagnose & Remedy
See CB user manual

A0707 CB warning 8

Possible Causes
CB (communication board) specific

Diagnose & Remedy
See CB user manual

A0708 CB warning 9

Possible Causes
CB (communication board) specific

Diagnose & Remedy
See CB user manual

A0709 CB warning 10

Possible Causes
CB (communication board) specific

Diagnose & Remedy
See CB user manual

A0710 CB communication error

Possible Causes
Communication with CB (communication board) is lost

Diagnose & Remedy
Check CB hardware

A0711 CB configuration error

Possible Causes
CB (communication board) reports a configuration error.

Diagnose & Remedy
Check CB parameters

A0910 Vdc-max controller de-activated

Possible Causes
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 go into regenerative mode
- Occurs at very high load inertias, when ramping down

Diagnose & Remedy
Check the following:
1. Input voltage (P0210) must lie within range
2. Load must be match

A0911 Vdc-max controller active

Possible Causes
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

Possible Causes
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

Possible Causes
ADC parameters should not be set to identical values, since this would produce illogical results.
Fault value = 0: Parameter settings for output identical
1: Parameter settings for input identical
2: Parameter settings for input do not correspond to ADC type

A0921 DAC parameters not set properly

Possible Causes

DAC parameters should not be set to identical values, since this would produce illogical results.
Fault value = 0: Parameter settings for output identical
1: Parameter settings for input identical
2: Parameter settings for output do not correspond to DAC type

A0922 No load applied to inverter

Possible Causes

3. No Load is applied to the inverter.
4. As a result, some functions may not work as under normal load conditions.

A0923 Both JOG Left and JOG Right are requested

Possible Causes

Both JOG right and JOG left (P1055/P1056) have been requested. This freezes the RFG output frequency at its current value.

A0936 PID Autotuning Active

Possible Causes

PID Autotuning (P2350) selected or running

A0952 Belt Failure Warning

Possible Causes

Load conditions on motor indicate belt failure or mechanical fault.

Diagnose & 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)
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   - 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)

Suggestions and/or Corrections

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Suggestions for technical documentation

Suggestions
Corrections

For Publication/Manual:
MICROMASTER 440
Parameter List

User Documentation

From
Name:

Company/Service Department
Address: _____
_____
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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