

SIEMENS

MICROMASTER 430

Parameter List

Issue 12/02



Getting Started Guide

Is for quick commissioning with SDP and BOP-2.



Operating Instructions

Gives information about features of the MICROMASTER 430, Installation, Commissioning, Control modes, System Parameter structure, Troubleshooting, Specifications and available options of the MICROMASTER 430



Parameter List

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



Catalogues

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





Warning

Please refer to all Definitions and Warnings contained in the Operating Instructions. You will find the Operating Instructions on the Docu CD delivered with your inverter. If the CD is lost, it can be ordered via your local Siemens department under the Order No. 6SE6400-5AE00-1AP0.

Further information can be obtained from Internet website:

<http://www.siemens.de/micromaster>

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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 430

This Parameter List must only be used together with the Operating Instructions or the Reference Manual of the MICROMASTER 430. 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 430 System Parameters

The layout of the parameter description is as follows.

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

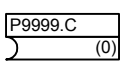
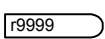
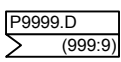
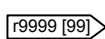
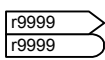
All other parameters are prefixed with a “P”. The values of these parameters can be changed directly in the range indicated by the “Min” and “Max” settings in the header.

[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
 - ◆ first 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 necessary 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
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

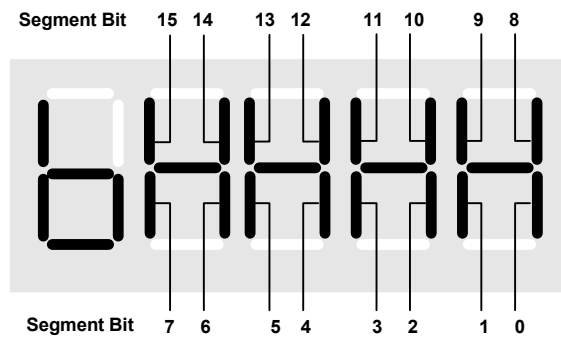
Set P0970 = 1

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	ParNr	Parameter name
P0700[3]	Selection of command source	P1076[3]	CI: Additional setpoint scaling
P0701[3]	Function of digital input 1	P1110[3]	BI: Inhibit neg. freq. setpoint
P0702[3]	Function of digital input 2	P1113[3]	BI: Reverse
P0703[3]	Function of digital input 3	P1124[3]	BI: Enable JOG ramp times
P0704[3]	Function of digital input 4	P1140[3]	BI: RFG enable
P0705[3]	Function of digital input 5	P1141[3]	BI: RFG start
P0706[3]	Function of digital input 6	P1142[3]	BI: RFG enable setpoint
P0707[3]	Function of digital input 7	P1230[3]	BI: Enable DC braking
P0708[3]	Function of digital input 8	P1266[3]	BI: Bypass command
P0719[3]	Selection of cmd. & freq. setp.	P1270[3]	BI: Enable essential service
P0731[3]	BI: Function of digital output 1	P1330[3]	CI: Voltage setpoint
P0732[3]	BI: Function of digital output 2	P1477[3]	BI: Set integrator of n-ctrl.
P0733[3]	BI: Function of digital output 3	P1478[3]	CI: Set integrator value n-ctrl.
P0800[3]	BI: Download parameter set 0	P1500[3]	Selection of torque setpoint
P0801[3]	BI: Download parameter set 1	P1501[3]	BI: Change to torque control
P0840[3]	BI: ON/OFF1	P1503[3]	CI: Torque setpoint
P0842[3]	BI: ON reverse/OFF1	P1511[3]	CI: Additional torque setpoint
P0844[3]	BI: 1. OFF2	P1522[3]	CI: Upper torque limit
P0845[3]	BI: 2. OFF2	P1523[3]	CI: Lower torque limit
P0848[3]	BI: 1. OFF3	P2103[3]	BI: 1. Faults acknowledgement
P0849[3]	BI: 2. OFF3	P2104[3]	BI: 2. Faults acknowledgement
P0852[3]	BI: Pulse enable	P2106[3]	BI: External fault
P1000[3]	Selection of frequency setpoint	P2151[3]	CI: Monitoring speed setpoint
P1020[3]	BI: Fixed freq. selection Bit 0	P2152[3]	CI: Act. monitoring speed
P1021[3]	BI: Fixed freq. selection Bit 1	P2200[3]	BI: Enable PID controller
P1022[3]	BI: Fixed freq. selection Bit 2	P2220[3]	BI: Fixed PID setp. select Bit 0
P1023[3]	BI: Fixed freq. selection Bit 3	P2221[3]	BI: Fixed PID setp. select Bit 1
P1026[3]	BI: Fixed freq. selection Bit 4	P2222[3]	BI: Fixed PID setp. select Bit 2
P1028[3]	BI: Fixed freq. selection Bit 5	P2223[3]	BI: Fixed PID setp. select Bit 3
P1035[3]	BI: Enable MOP (UP-command)	P2226[3]	BI: Fixed PID setp. select Bit 4
P1036[3]	BI: Enable MOP (DOWN-command)	P2228[3]	BI: Fixed PID setp. select Bit 5
P1055[3]	BI: Enable JOG right	P2235[3]	BI: Enable PID-MOP (UP-cmd)
P1056[3]	BI: Enable JOG left	P2236[3]	BI: Enable PID-MOP (DOWN-cmd)
P1070[3]	CI: Main setpoint	P2253[3]	CI: PID setpoint
P1071[3]	CI: Main setpoint scaling	P2254[3]	CI: PID trim source
P1074[3]	BI: Disable additional setpoint	P2264[3]	CI: PID feedback
P1075[3]	CI: Additional setpoint		

Drive Datasets (DDS)

ParNr	Parameter name	ParNr	Parameter name
P0005[3]	Display selection	r0374[3]	Rotor resistance [%]
r0035[3]	CO: Act. motor temperature	r0376[3]	Rated rotor resistance [%]
P0291[3]	Inverter protection	r0377[3]	Total leakage reactance [%]
P0300[3]	Select motor type	r0382[3]	Main reactance [%]
P0304[3]	Rated motor voltage	r0384[3]	Rotor time constant
P0305[3]	Rated motor current	r0386[3]	Total leakage time constant
P0307[3]	Rated motor power	P0400[3]	Select encoder type
P0308[3]	Rated motor cosPhi	P0408[3]	Encoder pulses per revolution
P0309[3]	Rated motor efficiency	P0491[3]	Reaction on speed signal loss
P0310[3]	Rated motor frequency	P0492[3]	Allowed speed difference
P0311[3]	Rated motor speed	P0494[3]	Delay speed loss reaction
r0313[3]	Motor pole pairs	P0500[3]	Technological application
P0314[3]	Motor pole pair number	P0601[3]	Motor temperature sensor
P0320[3]	Motor magnetizing current	P0604[3]	Threshold motor temperature
r0330[3]	Rated motor slip	P0625[3]	Ambient motor temperature
r0331[3]	Rated magnetization current	P0626[3]	Overtemperature stator iron
r0332[3]	Rated power factor	P0627[3]	Overtemperature stator winding
r0333[3]	Rated motor torque	P0628[3]	Overtemperature rotor winding
P0335[3]	Motor cooling	r0630[3]	CO: Ambient temperature
P0340[3]	Calculation of motor parameters	r0631[3]	CO: Stator iron temperature
P0341[3]	Motor inertia [kg*m ²]	r0632[3]	CO: Stator winding temperature
P0342[3]	Total/motor inertia ratio	r0633[3]	CO: Rotor winding temperature
P0344[3]	Motor weight	P0640[3]	Motor overload factor [%]
r0345[3]	Motor start-up time	P1001[3]	Fixed frequency 1
P0346[3]	Magnetization time	P1002[3]	Fixed frequency 2
P0347[3]	Demagnetization time	P1003[3]	Fixed frequency 3
P0350[3]	Stator resistance (line-to-line)	P1004[3]	Fixed frequency 4
P0352[3]	Cable resistance	P1005[3]	Fixed frequency 5
P0354[3]	Rotor resistance	P1006[3]	Fixed frequency 6
P0356[3]	Stator leakage inductance	P1007[3]	Fixed frequency 7
P0358[3]	Rotor leakage inductance	P1008[3]	Fixed frequency 8
P0360[3]	Main inductance	P1009[3]	Fixed frequency 9
P0362[3]	Magnetizing curve flux 1	P1010[3]	Fixed frequency 10
P0363[3]	Magnetizing curve flux 2	P1011[3]	Fixed frequency 11
P0364[3]	Magnetizing curve flux 3	P1012[3]	Fixed frequency 12
P0365[3]	Magnetizing curve flux 4	P1013[3]	Fixed frequency 13
P0366[3]	Magnetizing curve imag 1	P1014[3]	Fixed frequency 14
P0367[3]	Magnetizing curve imag 2	P1015[3]	Fixed frequency 15
P0368[3]	Magnetizing curve imag 3	P1031[3]	Setpoint memory of the MOP
P0369[3]	Magnetizing curve imag 4	P1040[3]	Setpoint of the MOP
r0370[3]	Stator resistance [%]	P1058[3]	JOG frequency right
r0372[3]	Cable resistance [%]	P1059[3]	JOG frequency left
r0373[3]	Rated stator resistance [%]	P1060[3]	JOG ramp-up time

ParNr	Parameter name	ParNr	Parameter name
P1061[3]	JOG ramp-down time	P1346[3]	Imax voltage ctrl. integral time
P1080[3]	Min. frequency	P1350[3]	Voltage soft start
P1082[3]	Max. frequency	P1400[3]	Configuration of speed control
P1091[3]	Skip frequency 1	P1442[3]	Filter time for act. speed
P1092[3]	Skip frequency 2	P1452[3]	Filter time for act.speed (SLVC)
P1093[3]	Skip frequency 3	P1460[3]	Gain speed controller
P1094[3]	Skip frequency 4	P1462[3]	Integral time speed controller
P1101[3]	Skip frequency bandwidth	P1470[3]	Gain speed controller (SLVC)
P1120[3]	Ramp-up time	P1472[3]	Integral time n-ctrl. (SLVC)
P1121[3]	Ramp-down time	P1488[3]	Droop input source
P1130[3]	Ramp-up initial rounding time	P1489[3]	Droop scaling
P1131[3]	Ramp-up final rounding time	P1492[3]	Enable droop
P1132[3]	Ramp-down initial rounding time	P1496[3]	Scaling accel. precontrol
P1133[3]	Ramp-down final rounding time	P1499[3]	Scaling accel. torque control
P1134[3]	Rounding type	P1520[3]	CO: Upper torque limit
P1135[3]	OFF3 ramp-down time	P1521[3]	CO: Lower torque limit
P1202[3]	Motor-current: Flying start	P1525[3]	Scaling lower torque limit
P1203[3]	Search rate: Flying start	P1530[3]	Motoring power limitation
P1232[3]	DC braking current	P1531[3]	Regenerative power limitation
P1233[3]	Duration of DC braking	P1654[3]	Smooth time for Isq setpoint
P1234[3]	DC braking start frequency	P1715[3]	Gain current controller
P1236[3]	Compound braking current	P1717[3]	Integral time current controller
P1240[3]	Configuration of Vdc controller	P1803[3]	Max. modulation
P1243[3]	Dynamic factor of Vdc-max	P1820[3]	Reverse output phase sequence
P1250[3]	Gain of Vdc-controller	P2000[3]	Reference frequency
P1251[3]	Integration time Vdc-controller	P2001[3]	Reference voltage
P1252[3]	Differential time Vdc-controller	P2002[3]	Reference current
P1253[3]	Vdc-controller output limitation	P2003[3]	Reference torque
P1260[3]	Bypass control	r2004[3]	Reference power
P1262[3]	Bypass dead time	P2150[3]	Hysteresis frequency f_hys
P1263[3]	De-Bypass time	P2153[3]	Time-constant speed filter
P1264[3]	Bypass time	P2155[3]	Threshold frequency f_1
P1265[3]	Bypass frequency	P2156[3]	Delay time of threshold freq f_1
P1300[3]	Control mode	P2157[3]	Threshold frequency f_2
P1310[3]	Continuous boost	P2158[3]	Delay time of threshold freq f_2
P1311[3]	Acceleration boost	P2159[3]	Threshold frequency f_3
P1312[3]	Starting boost	P2160[3]	Delay time of threshold freq f_3
P1316[3]	Boost end frequency	P2161[3]	Min. threshold for freq. setp.
P1320[3]	Programmable V/f freq. coord. 1	P2162[3]	Hysteresis freq. for overspeed
P1321[3]	Programmable V/f volt. coord. 1	P2163[3]	Entry freq. for perm. deviation
P1322[3]	Programmable V/f freq. coord. 2	P2164[3]	Hysteresis frequency deviation
P1323[3]	Programmable V/f volt. coord. 2	P2165[3]	Delay time permitted deviation
P1324[3]	Programmable V/f freq. coord. 3	P2166[3]	Delay time ramp up completed
P1325[3]	Programmable V/f volt. coord. 3	P2167[3]	Switch-off frequency f_off
P1333[3]	Start frequency for FCC	P2168[3]	Delay time T_off
P1335[3]	Slip compensation	P2170[3]	Threshold current I_thresh
P1336[3]	Slip limit	P2171[3]	Delay time current
P1338[3]	Resonance damping gain V/f	P2172[3]	Threshold DC-link voltage
P1340[3]	Imax freq. controller prop. gain	P2173[3]	Delay time DC-link voltage
P1341[3]	Imax freq. ctrl. integral time	P2174[3]	Torque threshold M_thresh
P1345[3]	Imax voltage ctrl. prop. gain	P2176[3]	Delay time for torque threshold

ParNr	Parameter name
P2177[3]	Delay time for motor is blocked
P2178[3]	Delay time for motor pulled out
P2181[3]	Belt failure detection mode
P2182[3]	Belt threshold frequency 1
P2183[3]	Belt threshold frequency 2
P2184[3]	Belt threshold frequency 3
P2185[3]	Upper torque threshold 1
P2186[3]	Lower torque threshold 1
P2187[3]	Upper torque threshold 2
P2188[3]	Lower torque threshold 2
P2189[3]	Upper torque threshold 3
P2190[3]	Lower torque threshold 3
P2192[3]	Time delay for belt failure
P2201[3]	Fixed PID setpoint 1
P2202[3]	Fixed PID setpoint 2
P2203[3]	Fixed PID setpoint 3
P2204[3]	Fixed PID setpoint 4
P2205[3]	Fixed PID setpoint 5
P2206[3]	Fixed PID setpoint 6
P2207[3]	Fixed PID setpoint 7

ParNr	Parameter name
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
P2370[3]	Motor staging stop mode
P2371[3]	Motor staging configuration
P2372[3]	Motor staging cycling
P2373[3]	Motor staging hysteresis
P2374[3]	Motor staging delay
P2375[3]	Motor destaging delay
P2376[3]	Motor staging delay override
P2377[3]	Motor staging lockout timer
P2378[3]	Motor staging frequency f_st [%]

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)
P1074[3]	BI: Disable additional setpoint
P1110[3]	BI: Inhibit neg. freq. setpoint
P1113[3]	BI: Reverse
P1140[3]	BI: RFG enable
P1141[3]	BI: RFG start
P1142[3]	BI: RFG enable setpoint
P1230[3]	BI: Enable DC braking
P1266[3]	BI: Bypass command
P2103[3]	BI: 1. Faults acknowledgement

P-Nr.	Parametername
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
P2016[8]	CI: PZD to BOP link (USS)
P2019[8]	CI: PZD to COM link (USS)
P2051[8]	CI: PZD to CB
P2253[3]	CI: PID setpoint
P2254[3]	CI: PID trim source

P-Nr.	Parametername
P2264[3]	CI: PID feedback
P2869[2]	CI: ADD 1
P2871[2]	CI: ADD 2
P2873[2]	CI: SUB 1
P2875[2]	CI: SUB 2
P2877[2]	CI: MUL 1
P2879[2]	CI: MUL 2
P2881[2]	CI: DIV 1
P2883[2]	CI: DIV 2
P2885[2]	CI: CMP 1
P2887[2]	CI: CMP 2

1.6 Binector Output-Parameter

P-Nr.	Parametername
r1261	BO: Bypass status word
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
r0031	CO: Act. filtered torque
r0032	CO: Act. filtered power
r0035[3]	CO: Act. motor temperature
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
r0063	CO: Act. frequency
r0065	CO: Slip frequency
r0067	CO: Act. output current limit
r0071	CO: Max. output voltage
r0080	CO: Act. torque
r0086	CO: Act. active current
r0395	CO: Total stator resistance [%]
r0396	CO: Act. rotor resistance
r0755[2]	CO: Act. ADC after scal. [4000h]
r1024	CO: Act. fixed frequency
r1050	CO: Act. Output freq. of the MOP
r1078	CO: Total frequency setpoint
r1114	CO: Freq. setp. after dir. ctrl.
r1119	CO: Freq. setpoint before RFG

P-Nr.	Parametername
r1170	CO: Frequency setpoint after RFG
r1242	CO: Switch-on level of Vdc-max
r1337	CO: V/f slip frequency
r1343	CO: I _{max} controller freq. output
r1344	CO: I _{max} controller volt. output
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
r2262	CO: Filtered PID setp. after RFG
r2266	CO: PID filtered feedback
r2272	CO: PID scaled feedback
r2273	CO: PID error
r2294	CO: Act. PID output
r2870	CO: ADD 1
r2872	CO: ADD 2
r2874	CO: SUB 1
r2876	CO: SUB 2
r2878	CO: MUL 1
r2880	CO: MUL 2
r2882	CO: DIV 1
r2884	CO: DIV 2
P2889	CO: Fixed setpoint 1 in [%]
P2890	CO: Fixed setpoint 2 in [%]

1.8 Connector/Binector Output-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
r0403	CO/BO: Encoder status word

P-Nr.	Parametername
P0718	CO/BO: Hand / Auto
r0722	CO/BO: Binary input values
r0747	CO/BO: State of digital outputs
r2197	CO/BO: Monitoring word 1
r2198	CO/BO: Monitoring word 2
r2379	CO/BO: Motor staging status word

1.9 Parameter Description

Note:

Level 4 Parameters are not visible with BOP or AOP.

r0000	Drive display	Datatype: U16	Unit: -	Min: -	Def: -	Level: 1
	P-Group: ALWAYS			Max: -		
	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	Datatype: U16	Unit: -	Min: -	Def: -	Level: 3
	P-Group: COMMANDS			Max: -		
	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			Min: 0		Level: 1
	CStat: CUT	Datatype: U16	Unit: -	Def: 1		
	P-Group: ALWAYS	Active: first confirm	QuickComm. No	Max: 4		
	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			Min: 0		Level: 1
	CStat: CUT	Datatype: U16	Unit: -	Def: 0		
	P-Group: ALWAYS	Active: first confirm	QuickComm. No	Max: 22		
	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	Datatype: U16	Unit: -	Min: 2	Level: 2
	CStat: CUT	Active: first confirm	QuickComm. No	Def: 21	
	P-Group: FUNC			Max: 4000	

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	Datatype: U16	Unit: -	Min: 0	Level: 3
	CStat: CUT	Active: first confirm	QuickComm. No	Def: 2	
	P-Group: FUNC			Max: 4	

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	Datatype: U16	Unit: -	Min: 0	Level: 3
	CStat: CUT	Active: first confirm	QuickComm. No	Def: 0	
	P-Group: FUNC			Max: 2000	

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	Datatype: U16	Unit: -	Min: 0	Level: 1
	CStat: CT	Active: first confirm	QuickComm. No	Def: 0	
	P-Group: ALWAYS			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				Min: 0	Level: 3
	CStat: CUT	Datatype: U16	Unit: -	Def: 0		
	P-Group: FUNC	Active: first confirm	QuickComm. No	Max: 65535		

Details:

See parameter P0013 (user defined parameter)

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

Details:

See parameter P0013 (user defined parameter).

P0013[20]	User defined parameter				Min: 0	Level: 3
	CStat: CUT	Datatype: U16	Unit: -	Def: 0		
	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.

r0018	Firmware version	Datatype: Float	Unit: -	Min: -	Def: -	Max: -	Level:
	P-Group: INVERTER						3

Displays version number of installed firmware.

r0019	CO/BO: BOP control word	Datatype: U16	Unit: -	Min: -	Def: -	Max: -	Level:
	P-Group: COMMANDS						3

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
Bit12	Hand Operation	0	NO
		1	YES
Bit13	Motor potentiometer MOP up	0	NO
		1	YES
Bit14	Motor potentiometer MOP down	0	NO
		1	YES
Bit15	Auto Operation	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	Datatype: Float	Unit: Hz	Min: -	Def: -	Max: -	Level:
	P-Group: CONTROL						3

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

r0021	CO: Act. filtered frequency	Datatype: Float	Unit: Hz	Min: -	Def: -	Max: -	Level:
	P-Group: CONTROL						3

Displays actual inverter output frequency (r0024) excluding slip compensation, resonance damping and frequency limitation.

r0022	Act. filtered rotor speed	Datatype: Float	Unit: 1/min	Min: -	Def: -	Max: -	Level:
	P-Group: CONTROL						3

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

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

r0025	CO: Act. filtered output voltage	Datatype: Float	Unit: V	Min: -	Def: -	Max: -	Level:
	P-Group: CONTROL						3

Displays [rms] voltage applied to motor.

r0026	CO: Act. filtered DC-link volt. Datatype: Float Unit: V P-Group: INVERTER	Min: - Def: - Max: -	Level: 3
	Displays DC-link voltage.		
r0027	CO: Act. filtered output current Datatype: Float Unit: A P-Group: CONTROL	Min: - Def: - Max: -	Level: 3
	Displays [rms] value of motor current [A].		
r0031	CO: Act. filtered torque Datatype: Float Unit: Nm P-Group: CONTROL	Min: - Def: - Max: -	Level: 3
	Displays motor torque.		
r0032	CO: Act. filtered power Datatype: Float Unit: - P-Group: CONTROL	Min: - Def: - Max: -	Level: 3
	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 Datatype: Float Unit: °C P-Group: MOTOR	Min: - Def: - Max: -	Level: 3
	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)		
r0037[5]	CO: Inverter temperature [°C] Datatype: Float Unit: °C P-Group: INVERTER	Min: - Def: - Max: -	Level: 3
	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 Datatype: Float Unit: - P-Group: CONTROL	Min: - Def: - Max: -	Level: 3
	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] Datatype: Float Unit: kWh P-Group: INVERTER	Min: - Def: - Max: -	Level: 3
	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 CStat: CT Datatype: U16 Unit: - P-Group: INVERTER Active: first confirm QuickComm. No	Min: 0 Def: 0 Max: 1	Level: 3
	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	Datatype: U16	Unit: -	Min: -	Level: 2
	P-Group: COMMANDS			Def: - Max: -	

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

Possible Settings:

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

Details:

See parameter P0810.

r0051[2]	CO: Active drive data set (DDS)	Datatype: U16	Unit: -	Min: -	Level: 2
	P-Group: COMMANDS			Def: - Max: -	

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

Possible Settings:

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

Index:

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

Details:

See parameter P0820.

r0052	CO/BO: Act. status word 1	Datatype: U16	Unit: -	Min: -	Level: 3
	P-Group: COMMANDS			Def: - Max: -	

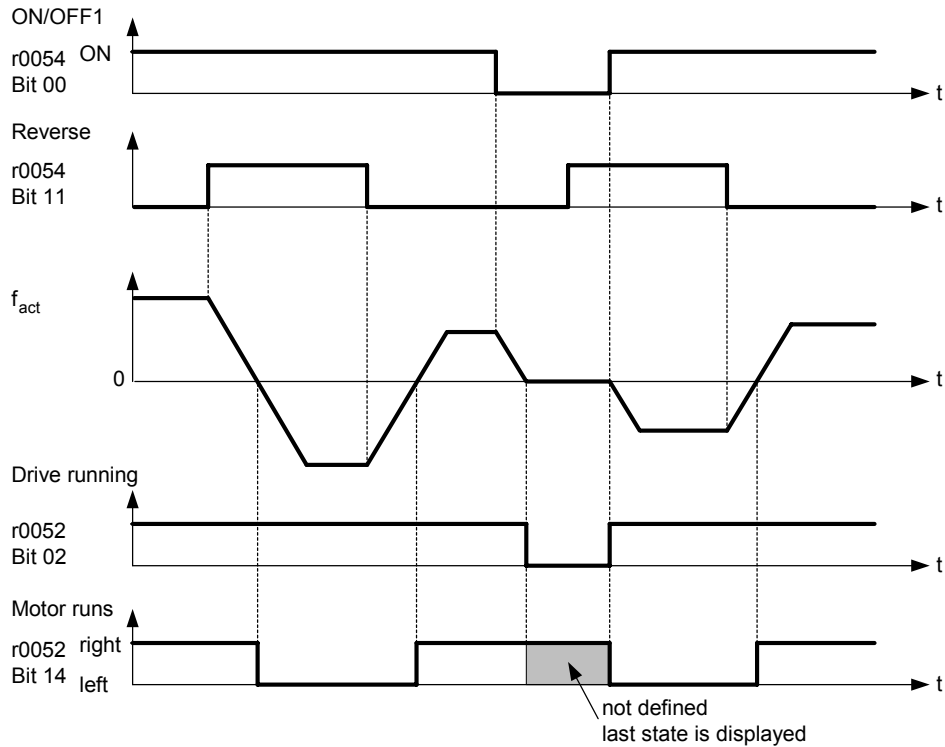
Displays first active status word of inverter (bit format) and can be used to diagnose inverter status.

Bitfields:

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

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	Datatype: U16	Unit: -	Min: -	Def: -	Max: -	Level:
	P-Group: COMMANDS						3
	Displays second status word of inverter (in bit format).						

Bitfields:

Bit00	DC brake active	0	NO
Bit01	$f_{act} > P2167 (f_{off})$	1	YES
Bit02	$f_{act} \geq P1080 (f_{min})$	0	NO
Bit03	Act. current r0027 $\geq P2170$	1	YES
Bit04	$f_{act} > P2155 (f_1)$	0	NO
Bit05	$f_{act} \leq P2155 (f_1)$	1	YES
Bit06	$f_{act} \geq \text{setpoint}$	0	NO
Bit07	Act. Vdc r0026 $< P2172$	1	YES
Bit08	Act. Vdc r0026 $> P2172$	0	NO
Bit09	Ramping finished	1	YES
Bit10	PID output r2294 $== P2292 (PID_{min})$	0	NO
Bit11	PID output r2294 $== P2291 (PID_{max})$	1	YES
Bit14	Download data set 0 from AOP	0	NO
Bit15	Download data set 1 from AOP	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	Min: -	Level: 3	
	Datatype: U16	Unit: -		Def: -
	P-Group: COMMANDS			Max: -

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	Min: -	Level: 3	
	Datatype: U16	Unit: -		Def: -
	P-Group: COMMANDS			Max: -

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	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level: 3
	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	Datatype: Float	Unit: Hz	Min: - Def: - Max: -	Level: 3
	P-Group: CONTROL				

Displays current speed detected by encoder.

r0063	CO: Act. frequency	Datatype: Float	Unit: Hz	Min: - Def: - Max: -	Level: 3
	P-Group: CONTROL				

Displays actual speed.

r0065	CO: Slip frequency	Datatype: Float	Unit: %	Min: - Def: - Max: -	Level: 3
	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).

r0067	CO: Act. output current limit	Datatype: Float	Unit: A	Min: - Def: - Max: -	Level: 3
	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.

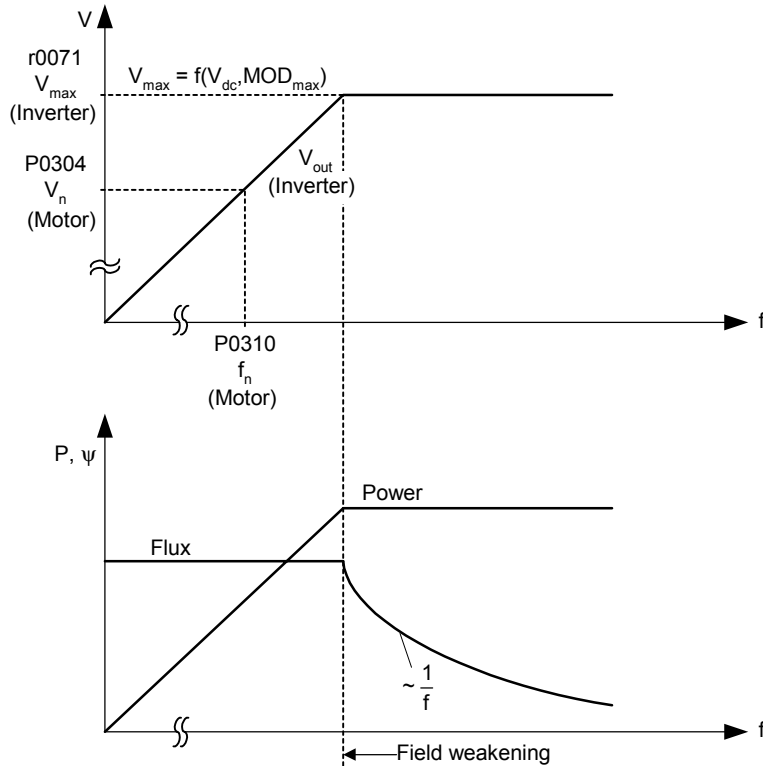
Note:

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.

r0071	CO: Max. output voltage	Datatype: Float	Unit: V	Min: -	Level: 3
	P-Group: CONTROL			Def: - Max: -	

Displays maximum output voltage.



Dependency:

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

r0080	CO: Act. torque	Datatype: Float	Unit: Nm	Min: -	Level: 3
	P-Group: CONTROL			Def: - Max: -	

Displays actual torque.

r0086	CO: Act. active current	Datatype: Float	Unit: A	Min: -	Level: 3
	P-Group: CONTROL			Def: - Max: -	

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.

P0095[10]	CI: Display PZD signals	Datatype: U32	Unit: -	Min: 0:0	Level: 3
	CStat: CT	Active: first confirm	QuickComm. No	Def: 0:0	
	P-Group: CONTROL			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: -	Level: 3
	P-Group: CONTROL			Def: - Max: -	

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	Datatype: U16	Unit: -	Min: 0	Level: 1
	CStat: C	Active: first confirm	QuickComm. Yes	Def: 0	
	P-Group: QUICK			Max: 2	

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

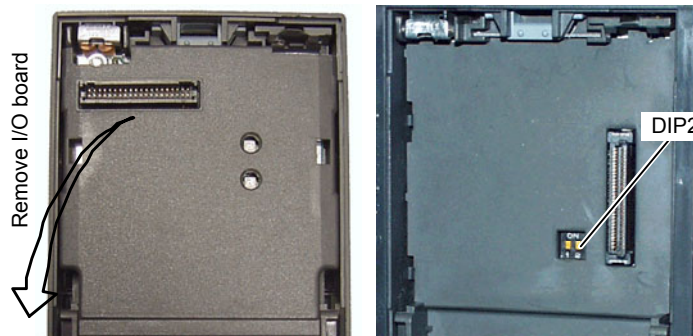
The default settings for the nominal rating plate frequency (P0310) and maximum motor frequency (P1082) are also set automatically here, in addition to reference frequency (P2000).

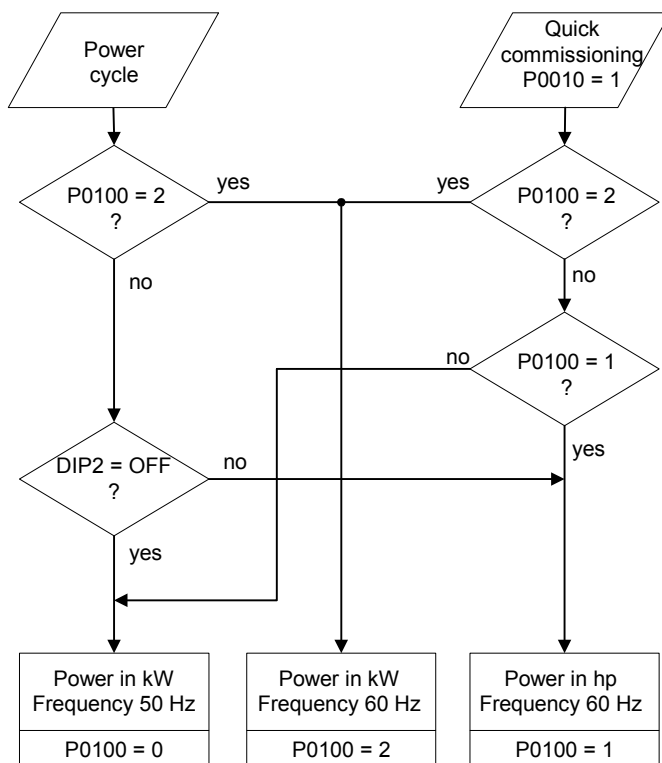
Possible Settings:

- 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				Min: 0	Level: 2
	CStat: UT	Datatype: U16	Unit: -	Def: 0		
	P-Group: -	Active: first confirm	QuickComm. No	Max: 255		

Equipment system number. This parameter has no operation effect.

r0200	Act. power stack code number	Min: -	Level: 3	
	Datatype: U32	Unit: -		Def: -
	P-Group: INVERTER			Max: -

Identifies hardware variant as shown in table below.

Code- No.	MM430 MLFB	Input Voltage & Frequency	VT Power kW	Internal Filter	Protection Degree	Frame Size
271	6SE6430-2UD27-5CA0	3AC380-480V +10% -10% 47-63Hz	7,5	no	IP20	C
272	6SE6430-2UD31-1CA0	3AC380-480V +10% -10% 47-63Hz	11	no	IP20	C
273	6SE6430-2UD31-5CA0	3AC380-480V +10% -10% 47-63Hz	15	no	IP20	C
274	6SE6430-2AD27-5CA0	3AC380-480V +10% -10% 47-63Hz	7,5	Cl. A	IP20	C
275	6SE6430-2AD31-1CA0	3AC380-480V +10% -10% 47-63Hz	11	Cl. A	IP20	C
276	6SE6430-2AD31-5CA0	3AC380-480V +10% -10% 47-63Hz	15	Cl. A	IP20	C
277	6SE6430-2UD31-8DA0	3AC380-480V +10% -10% 47-63Hz	18,5	no	IP20	D
278	6SE6430-2UD32-2DA0	3AC380-480V +10% -10% 47-63Hz	22	no	IP20	D
279	6SE6430-2UD33-0DA0	3AC380-480V +10% -10% 47-63Hz	30	no	IP20	D
280	6SE6430-2AD31-8DA0	3AC380-480V +10% -10% 47-63Hz	18,5	Cl. A	IP20	D
281	6SE6430-2AD32-2DA0	3AC380-480V +10% -10% 47-63Hz	22	Cl. A	IP20	D
282	6SE6430-2AD33-0DA0	3AC380-480V +10% -10% 47-63Hz	30	Cl. A	IP20	D
283	6SE6430-2UD33-7EA0	3AC380-480V +10% -10% 47-63Hz	37	no	IP20	E
284	6SE6430-2UD34-5EA0	3AC380-480V +10% -10% 47-63Hz	45	no	IP20	E
285	6SE6430-2AD33-7EA0	3AC380-480V +10% -10% 47-63Hz	37	Cl. A	IP20	E
286	6SE6430-2AD34-5EA0	3AC380-480V +10% -10% 47-63Hz	45	Cl. A	IP20	E
287	6SE6430-2UD35-5FA0	3AC380-480V +10% -10% 47-63Hz	55	no	IP20	F
288	6SE6430-2UD37-5FA0	3AC380-480V +10% -10% 47-63Hz	75	no	IP20	F
289	6SE6430-2UD38-8FA0	3AC380-480V +10% -10% 47-63Hz	90	no	IP20	F
290	6SE6430-2AD35-5FA0	3AC380-480V +10% -10% 47-63Hz	55	Cl. A	IP20	F
291	6SE6430-2AD37-5FA0	3AC380-480V +10% -10% 47-63Hz	75	Cl. A	IP20	F
292	6SE6430-2AD38-8FA0	3AC380-480V +10% -10% 47-63Hz	90	Cl. A	IP20	F
1201	6SE6430-2UD41-1FA0	3AC380-480V +10% -10% 47-63Hz	110	no	IP20	FX
1202	6SE6430-2UD41-3FA0	3AC380-480V +10% -10% 47-63Hz	132	no	IP20	FX
1203	6SE6430-2UD41-6GA0	3AC380-480V +10% -10% 47-63Hz	160	no	IP20	GX
1204	6SE6430-2UD42-0GA0	3AC380-480V +10% -10% 47-63Hz	200	no	IP20	GX
1205	6SE6430-2UD42-5GA0	3AC380-480V +10% -10% 47-63Hz	250	no	IP20	GX

Notice:

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

P0201	Power stack code number	Min: 0	Level: 3	
	CStat: C	Datatype: U16		Unit: -
	P-Group: INVERTER	Active: first confirm		QuickComm. No

Confirms actual power stack identified.

r0203	Act. inverter type	Min: -	Level: 3	
	Datatype: U16	Unit: -		Def: -
	P-Group: INVERTER			Max: -

Type number of actual inverter identified.

Possible Settings:

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

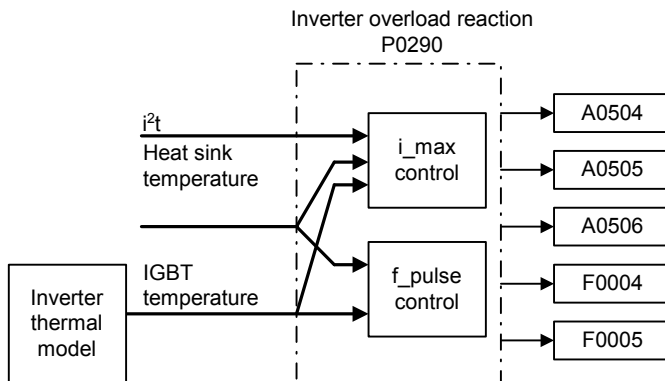
r0204	Power stack features	Datatype: U32	Unit: -	Min: - Def: - Max: -	Level: 3
	P-Group: INVERTER				
	Displays hardware features of power stack.				
	Bitfields:				
	Bit00	DC input voltage	0	NO	
			1	YES	
	Bit01	RFI filter	0	NO	
			1	YES	
	Note:	Parameter r0204 = 0 indicates that no power stack has been identified.			
r0206	Rated inverter power [kW] / [hp]	Datatype: Float	Unit: -	Min: - Def: - Max: -	Level: 3
	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	Datatype: Float	Unit: A	Min: - Def: - Max: -	Level: 3
	P-Group: INVERTER				
	Displays maximum continuous output current of inverter.				
r0208	Rated inverter voltage	Datatype: U32	Unit: V	Min: - Def: - Max: -	Level: 3
	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	Datatype: Float	Unit: A	Min: - Def: - Max: -	Level: 3
	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 INSTRUCTION.			
P0210	Supply voltage	Datatype: U16	Unit: V	Min: 0 Def: 230 Max: 1000	Level: 3
	CStat: CT P-Group: INVERTER Active: Immediately QuickComm. No				
	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_max switch-on level	$= 1.15 \cdot \sqrt{2} \cdot P0210$		
		Compound 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	Datatype: U16	Unit: m	Min: - Def: - Max: -	Level: 3
	P-Group: INVERTER				
	Indexed parameter to display maximum allowable cable length between inverter and motor.				
	Index:	r0231[0] : Max. allowed unscreened cable length r0231[1] : Max. allowed screened cable length			
	Notice:	For full EMC compliance, the screened cable must not exceed 25 m in length when an EMC filter is fitted.			

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

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	Min: 0	Level: 3	
	CStat: CT	Datatype: U16		Unit: -
	P-Group: INVERTER	Active: Immediately		QuickComm. No

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

Bit 2 shows if phase loss detection (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	Min: 0	Level: 3	
	CStat: CUT	Datatype: U16		Unit: °C
	P-Group: INVERTER	Active: first confirm		QuickComm. No

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

P0295	Inverter fan off delay time	Min: 0	Level: 3	
	CStat: CUT	Datatype: U16		Unit: s
	P-Group: TERMINAL	Active: first confirm		QuickComm. No

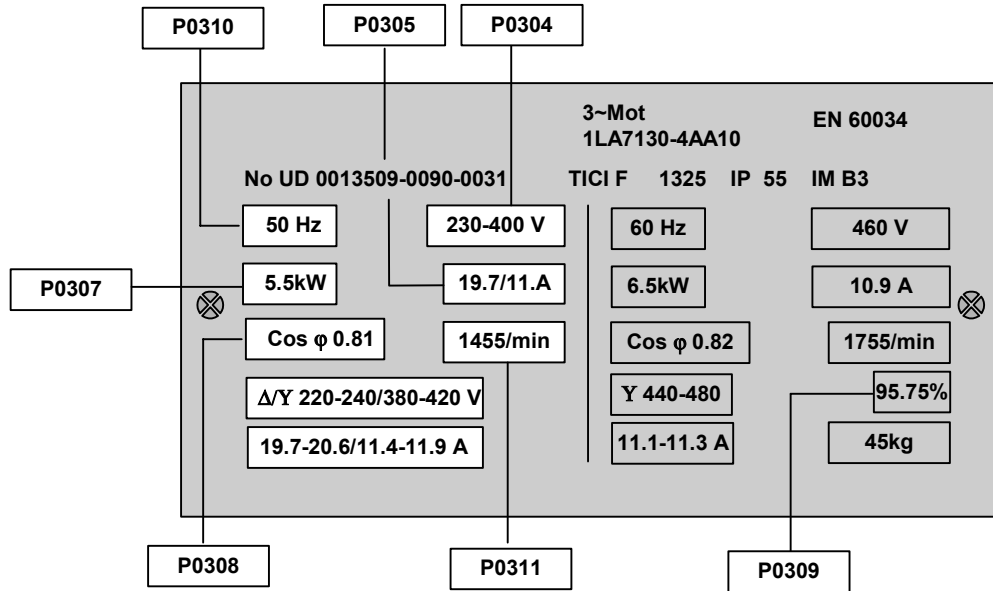
Defines inverter fan switch off delay time in seconds after drive has stopped.

Note:

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

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

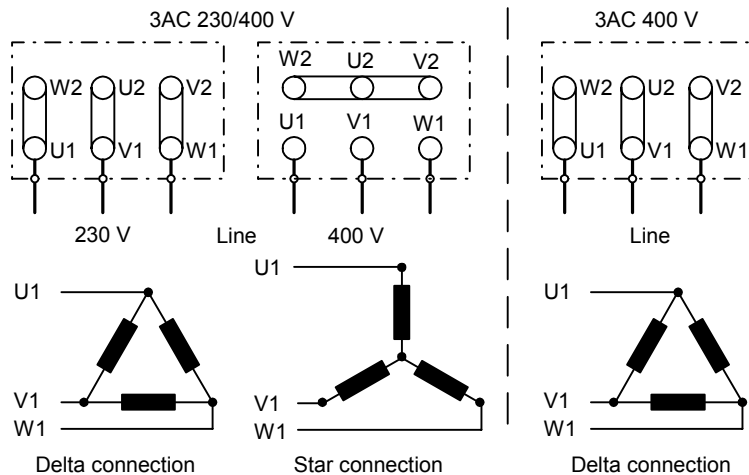
Changeable only when P0010 = 1 (quick commissioning).



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	Min: 0.01	Level: 1	
	CStat: C	Datatype: Float		Unit: A
	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 recommended that the ratio of P0305 (rated motor current) and r0207 (rated inverter current) should not be lower than:

$$U/f \text{ and } FCC : \frac{1}{8} \leq \frac{P0305}{r0207}$$

P0307[3]	Rated motor power	Min: 0.01	Level: 1	
	CStat: C	Datatype: Float		Unit: -
	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	Min: 0.000	Level: 3	
	CStat: C	Datatype: Float		Unit: -
	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	Min: 0.0	Level: 3	
	CStat: C	Datatype: Float		Unit: %
	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	Min: 12.00	Level: 1	
	CStat: C	Datatype: Float		Unit: Hz
	P-Group: MOTOR	Active: first confirm		Def: 50.00
		QuickComm. Yes		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	Min: 0	Level: 1	
	CStat: C	Datatype: U16		Unit: 1/min
	P-Group: MOTOR	Active: first confirm		Def: 0
		QuickComm. Yes		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	Min: -	Level: 3	
		Datatype: U16		Unit: -
	P-Group: MOTOR			Def: -
				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.

P0320[3]	Motor magnetizing current	Min: 0.0	Level: 3	
	CStat: CT	Datatype: Float		Unit: %
	P-Group: MOTOR	Active: Immediately		Def: 0.0
		QuickComm. Yes		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	Datatype: Float	Unit: %	Min: - Def: - Max: -	Level: 3
	P-Group: MOTOR				

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

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

Index:

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

r0331[3]	Rated magnetization current	Datatype: Float	Unit: A	Min: - Def: - Max: -	Level: 3
	P-Group: MOTOR				

Displays calculated magnetizing current of motor in [A].

Index:

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

r0332[3]	Rated power factor	Datatype: Float	Unit: -	Min: - Def: - Max: -	Level: 3
	P-Group: MOTOR				

Displays power factor for motor

Index:

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

Dependency:

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

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

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 leads 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				Min: 0	Level: 3
	CStat: CT	Datatype: U16	Unit: -	Def: 0		
	P-Group: MOTOR	Active: first confirm	QuickComm. No	Max: 4		

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 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.

P0344[3]	Motor weight				Min: 1.0	Level: 3
	CStat: CUT	Datatype: Float	Unit: kg	Def: 9.4		
	P-Group: MOTOR	Active: Immediately	QuickComm. No	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.

P0346[3]	Magnetization time				Min: 0.000	Level: 3
	CStat: CUT	Datatype: Float	Unit: s	Def: 1.000		
	P-Group: MOTOR	Active: Immediately	QuickComm. No	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				Min: 0.000	Level: 3
	CStat: CUT	Datatype: Float	Unit: s	Def: 1.000		
	P-Group: MOTOR	Active: Immediately	QuickComm. No	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)	Min: 0.00001	Level: 3
	CStat: CUT Datatype: Float Unit: Ohm Def: 4.00000		
	P-Group: MOTOR Active: Immediately QuickComm. No 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	Min: 0.0	Level: 3
	CStat: CUT Datatype: Float Unit: Ohm Def: 0.0		
	P-Group: MOTOR Active: Immediately QuickComm. No 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)

r0384[3]	Rotor time constant	Min: -	Level: 3
	Datatype: Float Unit: ms Def: -		
	P-Group: MOTOR Max: -		

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)

r0395	CO: Total stator resistance [%]	Min: -	Level: 3
	Datatype: Float Unit: % Def: -		
	P-Group: MOTOR Max: -		

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

Note:

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

r0396	CO: Act. rotor resistance	Min: -	Level: 3
	Datatype: Float Unit: % Def: -		
	P-Group: MOTOR Max: -		

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

Note:

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

Notice:

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

P0400[3]	Select encoder type	Datatype: U16	Unit: -	Min: 0	Level: 3
	CStat: CT	Active: Immediately	QuickComm. No	Def: 0	
	P-Group: ENCODER			Max: 2	

Selects encoder type.

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

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)

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	Datatype: U16	Unit: -	Min: -	Level: 3
	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				Min: 2	Level: 3
	CStat: CT	Datatype: U16	Unit: -	Def: 1024		
	P-Group: ENCODER	Active: Immediately	QuickComm. No	Max: 20000		

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 resolution and the rotational speed (rpm). The encoder frequency has to be less than the max. pulse frequency:

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

P0492[3]	Allowed speed difference				Min: 0.00	Level: 3
	CStat: CT	Datatype: Float	Unit: Hz	Def: 10.00		
	P-Group: ENCODER	Active: Immediately	QuickComm. No	Max: 100.00		

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				Min: 0	Level: 3
	CStat: CUT	Datatype: U16	Unit: ms	Def: 10		
	P-Group: ENCODER	Active: first confirm	QuickComm. No	Max: 65000		

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: 3
	CStat: CT	Datatype: U16	Unit: -	Def: 0		
	P-Group: TECH_APL	Active: first confirm	QuickComm. Yes	Max: 1		

Selects technological application. Sets control mode (P1300).

Possible Settings:

- 0 Constant torque
- 1 Pumps and fans

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: 3	
	CStat: CUT	Datatype: U16		Unit: -
	P-Group: MOTOR	Active: first confirm		QuickComm. No
		Def: 0		
		Max: 2		

Selects motor temperature sensor.

Possible Settings:

- 0 No sensor
- 1 PTC thermistor
- 2 KTY84

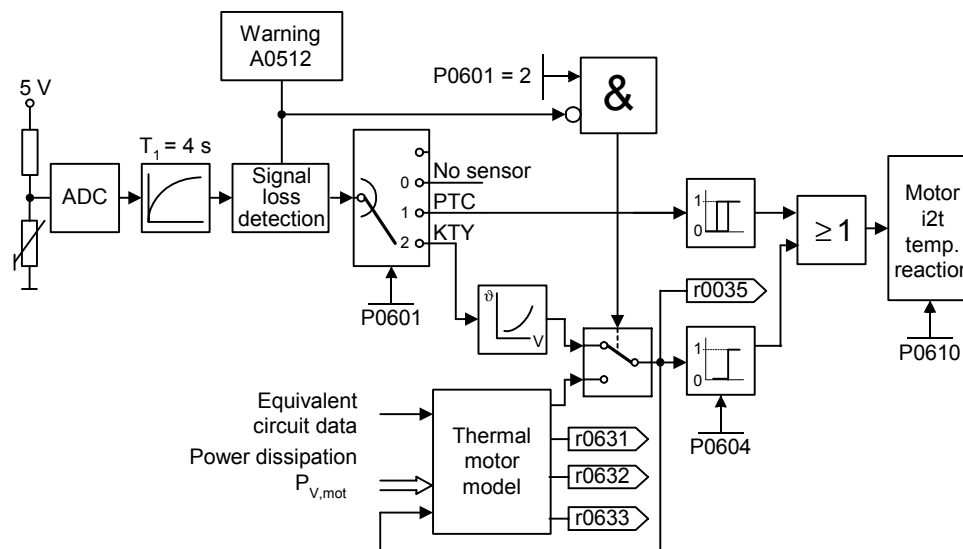
Index:

- 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	Min: 0.0	Level:
	CStat: CUT	Datatype: Float	Def: 130.0
	P-Group: MOTOR	Active: Immediately	QuickComm. No 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 exceeds 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.

$$P0604 \geq P0625 + 40 \text{ °C}$$

Note:

Default value depends on P0300 (select motor type).

P0610[3]	Motor I²t temperature reaction				Min: 0	Level: 3
	CStat: CT	Datatype: U16	Unit: -	Def: 2		
	P-Group: MOTOR	Active: first confirm	QuickComm. No	Max: 2		

Defines reaction when motor temperature reaches warning threshold.

Possible Settings:

- 0 No reaction, warning only
- 1 Warning and I_{max} 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 I²t 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 I²t).

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 I²t protection (i.e. overheating protection, see P0290) in order to protect the units themselves. This operates independently of the motor I²t, and is not described here.

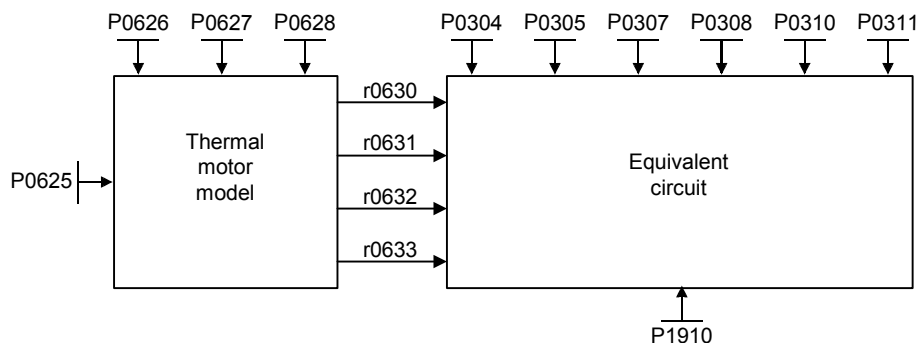
I²t operation:

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				Min: -40.0	Level: 3
	CStat: CUT	Datatype: Float	Unit: °C	Def: 20.0		
	P-Group: MOTOR	Active: Immediately	QuickComm. No	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)

P0640[3]	Motor overload factor [%]				Min: 10.0	Level: 3
	CStat: CUT	Datatype: Float	Unit: %	Def: 110.0		
	P-Group: MOTOR	Active: Immediately	QuickComm. Yes	Max: 400.0		

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

Selects digital command source.

Possible Settings:

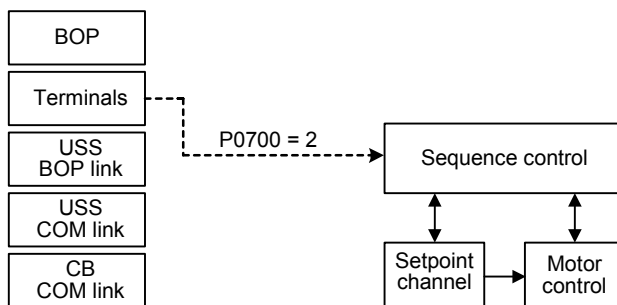
- 0 Factory default setting
- 1 BOP (keypad)
- 2 Terminal
- 4 USS on BOP link
- 5 USS on COM link
- 6 CB on COM link

Index:

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

Example:

Changing from 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				Min: 0	Level: 2
	CStat: CT	Datatype: U16	Unit: -	Def: 1		
	P-Group: COMMANDS	Active: first confirm	QuickComm. No	Max: 99		

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 reserved
- 11 reserved
- 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
- 26 reserved
- 27 Enable PID
- 28 Bypass mode command input
- 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				Min: 0	Level: 2
	CStat: CT	Datatype: U16	Unit: -	Def: 12		
	P-Group: COMMANDS	Active: first confirm	QuickComm. No	Max: 99		

Selects function of digital input 2.

Possible Settings:

- 0 Digital input disabled
- 1 ON/OFF1
- 2 ON reverse /OFF1
- 3 OFF2 - coast to standstill
- 4 OFF3 - quick ramp-down
- 9 Fault acknowledge
- 10 reserved
- 11 reserved
- 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
- 26 reserved
- 27 Enable PID
- 28 Bypass mode command input
- 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				Min: 0	Level: 2
	CStat: CT	Datatype: U16	Unit: -	Def: 9		
	P-Group: COMMANDS	Active: first confirm	QuickComm. No	Max: 99		

Selects function of digital input 3.

Possible Settings:

0	Digital input disabled
1	ON/OFF1
2	ON reverse /OFF1
3	OFF2 - coast to standstill
4	OFF3 - quick ramp-down
9	Fault acknowledge
10	reserved
11	reserved
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
26	reserved
27	Enable PID
28	Bypass mode command input
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				Min: 0	Level: 2
	CStat: CT	Datatype: U16	Unit: -	Def: 15		
	P-Group: COMMANDS	Active: first confirm	QuickComm. No	Max: 99		

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	reserved
11	reserved
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
26	reserved
27	Enable PID
28	Bypass mode command input
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				Min: 0	Level: 2
	CStat: CT	Datatype: U16	Unit: -	Def: 15		
	P-Group: COMMANDS	Active: first confirm	QuickComm. No	Max: 99		

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 reserved
- 11 reserved
- 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
- 26 reserved
- 27 Enable PID
- 28 Bypass mode command input
- 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				Min: 0	Level: 2
	CStat: CT	Datatype: U16	Unit: -	Def: 15		
	P-Group: COMMANDS	Active: first confirm	QuickComm. No	Max: 99		

Selects function of digital input 6.

Possible Settings:

- 0 Digital input disabled
- 1 ON/OFF1
- 2 ON reverse /OFF1
- 3 OFF2 - coast to standstill
- 4 OFF3 - quick ramp-down
- 9 Fault acknowledge
- 10 reserved
- 11 reserved
- 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
- 26 reserved
- 27 Enable PID
- 28 Bypass mode command input
- 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				Min: 0	Level: 3
	CStat: CT	Datatype: U16	Unit: -	Def: 0		
	P-Group: COMMANDS	Active: first confirm	QuickComm. No	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	reserved
11	reserved
12	Reverse
13	MOP up (increase freq.)
14	MOP down (decrease freq.)
25	DC brake enable
26	reserved
28	Bypass mode command input
29	External trip
33	Disable additional freq setpoint
99	Enable BICO parameterization

Index:

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

Note:

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

Details:

See P0701 (function of digital input 1).

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

Selects function of digital input 8 (via analog input)

Possible Settings:

0	Digital input disabled
1	ON/OFF1
2	ON reverse /OFF1
3	OFF2 - coast to standstill
4	OFF3 - quick ramp-down
9	Fault acknowledge
10	reserved
11	reserved
12	Reverse
13	MOP up (increase freq.)
14	MOP down (decrease freq.)
25	DC brake enable
26	reserved
28	Bypass mode command input
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:

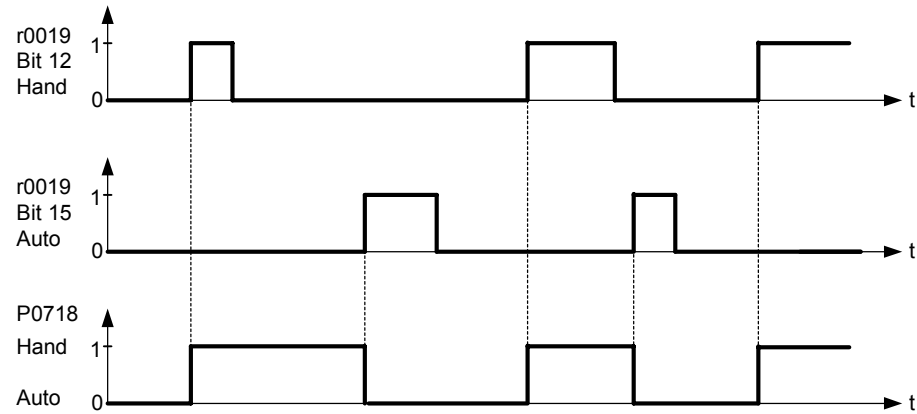
See P0701 (function of digital input 1).

P0718	CO/BO: Hand / Auto			Min: 0	Level: 3
	CStat: CUT	Datatype: U16	Unit: -	Def: 0	
	P-Group: COMMANDS	Active: Immediately	QuickComm. No	Max: 1	

From a defaulted drive

0 = Auto operation i.e. the control from the analogue and digital inputs
 1 = Hand operation i.e. the control comes from the BOP

Using the Hand / Auto buttons on the BOP will change this parameter.



Default:

P0810 = 718:0 ⇒ Hand/Auto ⇔ CDS1/CDS2

P0718 = 0 : P0700[0] = 2 (Terminal)
 P1000[0] = 2 (ADC)

P0718 = 1 : P0700[1] = 1 (BOP)
 P1000[1] = 1 (MOP)

Note:

Changing CDS values will effect the operation of Hand / Auto

P0719[3]	Selection of cmd. & freq. setp.				Min: 0	Level: 3
	CStat: CT	Datatype: U16	Unit: -	Def: 0		
	P-Group: COMMANDS	Active: first confirm	QuickComm. No	Max: 66		

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				Min: -	Level: 3
			Datatype: U16	Unit: -	Def: -	
	P-Group: COMMANDS				Max: -	

Displays number of digital inputs.

r0722	CO/BO: Binary input values	Datatype: U16	Unit: -	Min: -	Level: 3
	P-Group: COMMANDS			Def: - Max: -	

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	Datatype: U16	Unit: -	Min: 0	Level: 3
	CStat: CT	Active: Immediately	QuickComm. No	Def: 3 Max: 3	

Defines debounce time (filtering time) used for digital inputs.

Possible Settings:

0	No debounce time
1	2.5 ms debounce time
2	8.2 ms debounce time
3	12.3 ms debounce time

P0725	PNP / NPN digital inputs	Datatype: U16	Unit: -	Min: 0	Level: 3
	CStat: CT	Active: Immediately	QuickComm. No	Def: 1 Max: 1	

Switches between active high (PNP) and active low (NPN). This is valid for all digital inputs simultaneously.

The following is valid by using the internal supply:

Possible Settings:

0	NPN mode ==> low active
1	PNP mode ==> high active

Value:

NPN: Terminals 5/6/7/8/16/17 must be connected via terminal 28 (0 V).
PNP: Terminals 5/6/7/8/16/17 must be connected via terminal 9 (24 V).

r0730	Number of digital outputs	Datatype: U16	Unit: -	Min: -	Level: 3
	P-Group: COMMANDS			Def: - Max: -	

Displays number of digital outputs (relays).

P0731[3]	BI: Function of digital output 1				Min: 0:0	Level: 2
	CStat: CUT	Datatype: U32	Unit: -	Def: 52:3		
	P-Group: COMMANDS	Active: first confirm	QuickComm. No	Max: 4000:0		

Defines source of digital output 1.

Index:

P0731[0] : 1st. Command data set (CDS)
P0731[1] : 2nd. Command data set (CDS)
P0731[2] : 3rd. Command data set (CDS)

Common Settings:

52.0	Drive ready	0	Closed
52.1	Drive ready to run	0	Closed
52.2	Drive running	0	Closed
52.3	Drive fault active	0	Closed
52.4	OFF2 active	1	Closed
52.5	OFF3 active	1	Closed
52.6	Switch on inhibit active	0	Closed
52.7	Drive warning active	0	Closed
52.8	Deviation setpoint/actual value	1	Closed
52.9	PZD control (Process Data Control)	0	Closed
52.A	Maximum frequency reached	0	Closed
52.B	Warning: Motor current limit	1	Closed
52.C	Motor holding brake (MHB) active	0	Closed
52.D	Motor overload	1	Closed
52.E	Motor running direction right	0	Closed
52.F	Inverter overload	1	Closed
53.0	DC brake active	0	Closed
53.1	Act. freq. f_act > P2167 (f_off)	0	Closed
53.2	Act. freq. f_act >= P1080 (f_min)	0	Closed
53.3	Act. current r0027 >= P2170	0	Closed
53.4	Act. freq. f_act > P2155 (f_1)	0	Closed
53.5	Act. freq. f_act <= P2155 (f_1)	0	Closed
53.6	Act. freq. f_act >= setpoint	0	Closed
53.7	Act. Vdc r0026 < P2172	0	Closed
53.8	Act. Vdc r0026 > P2172	0	Closed
53.A	PID output r2294 == P2292 (PID_min)	0	Closed
53.B	PID output r2294 == P2291 (PID_max)	0	Closed

P0732[3]	BI: Function of digital output 2				Min: 0:0	Level: 2
	CStat: CUT	Datatype: U32	Unit: -	Def: 52:7		
	P-Group: COMMANDS	Active: first confirm	QuickComm. No	Max: 4000:0		

Defines source of digital output 2.

Index:

P0732[0] : 1st. Command data set (CDS)
P0732[1] : 2nd. Command data set (CDS)
P0732[2] : 3rd. Command data set (CDS)

Common Settings:

52.0	Drive ready	0	Closed
52.1	Drive ready to run	0	Closed
52.2	Drive running	0	Closed
52.3	Drive fault active	0	Closed
52.4	OFF2 active	1	Closed
52.5	OFF3 active	1	Closed
52.6	Switch on inhibit active	0	Closed
52.7	Drive warning active	0	Closed
52.8	Deviation setpoint/actual value	1	Closed
52.9	PZD control (Process Data Control)	0	Closed
52.A	Maximum frequency reached	0	Closed
52.B	Warning: Motor current limit	1	Closed
52.C	Motor holding brake (MHB) active	0	Closed
52.D	Motor overload	1	Closed
52.E	Motor running direction right	0	Closed
52.F	Inverter overload	1	Closed
53.0	DC brake active	0	Closed
53.1	Act. freq. f_act > P2167 (f_off)	0	Closed
53.2	Act. freq. f_act >= P1080 (f_min)	0	Closed
53.3	Act. current r0027 >= P2170	0	Closed
53.4	Act. freq. f_act > P2155 (f_1)	0	Closed
53.5	Act. freq. f_act <= P2155 (f_1)	0	Closed
53.6	Act. freq. f_act >= setpoint	0	Closed
53.7	Act. Vdc r0026 < P2172	0	Closed
53.8	Act. Vdc r0026 > P2172	0	Closed
53.A	PID output r2294 == P2292 (PID_min)	0	Closed
53.B	PID output r2294 == P2291 (PID_max)	0	Closed

Note:

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

P0733[3]	BI: Function of digital output 3			Min: 0:0	Level: 2
	CStat: CUT	Datatype: U32	Unit: -	Def: 0:0	
	P-Group: COMMANDS	Active: first confirm	QuickComm. No	Max: 4000:0	

Defines source of digital output 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			Min: -	Level: 3
		Datatype: U16	Unit: -	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			Min: 0	Level: 3
	CStat: CUT	Datatype: U16	Unit: -	Def: 0	
	P-Group: COMMANDS	Active: first confirm	QuickComm. No	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			Min: -	Level: 3
		Datatype: U16	Unit: -	Def: -	
	P-Group: TERMINAL			Max: -	

Displays number of analog inputs available.

r0752[2]	Act. input of ADC [V] or [mA]	Datatype: Float	Unit: -	Min: -	Level: 2
	P-Group: TERMINAL			Def: - Max: -	

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	Datatype: U16	Unit: ms	Min: 0	Level: 3
	CStat: CUT	Active: first confirm	QuickComm. No	Def: 3 Max: 10000	

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 [%]	Datatype: Float	Unit: %	Min: -	Level: 2
	P-Group: TERMINAL			Def: - Max: -	

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).

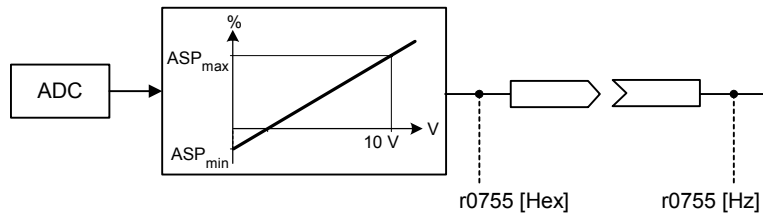
r0755[2]	CO: Act. ADC after scal. [4000h]	Min: -	Level: 3
	Datatype: l16	Unit: -	
P-Group: TERMINAL		Max: -	

Displays analog input, scaled using ASPmin and ASPmax.

Analog setpoint (ASP) from the analog scaling block can vary from min. analog setpoint (ASPmin) to a max. analog setpoint (ASPmax) as shown in P0757 (ADC scaling).

The largest magnitude (value without sign) of ASPmin and ASPmax defines the scaling of 16384.

By associating parameter r0755 with an internal value (e.g. frequency setpoint), a scaled value is calculated internally by the MM4. The frequency value is calculated using the following equation:



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

Index:

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

Example:

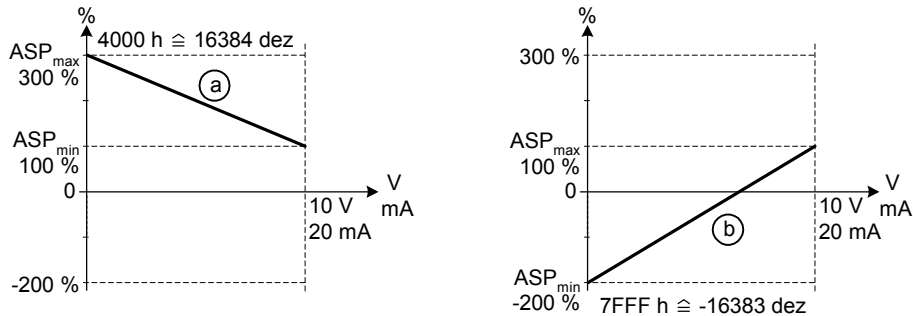
Case a:

ASPmin = 300 %, ASPmax = 100 % then 16384 represents 300 %.
This parameter will vary from 5461 to 16384.

Case b:

ASPmin = -200 %, ASPmax = 100 % then 16384 represents 200 %.
This parameter will vary from -16384 to +8192.

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



Note:

This value is used as an input to analog BICO connectors.

ASPmax represents the highest analog setpoint (this may be at 10 V).

ASPmin represents the lowest analog setpoint (this may be at 0 V).

Details:

See parameters P0757 to P0760 (ADC scaling)

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

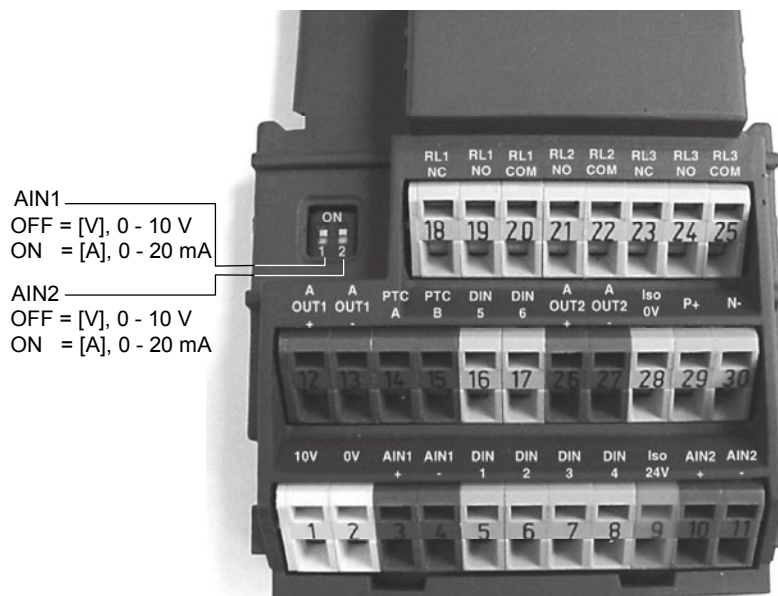
Defines type of analog input and also enables analog input monitoring.

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 restriction it is not possible to select the bipolar voltage (see Enum declaration) for analog input 2 (P0756[1] = 4).

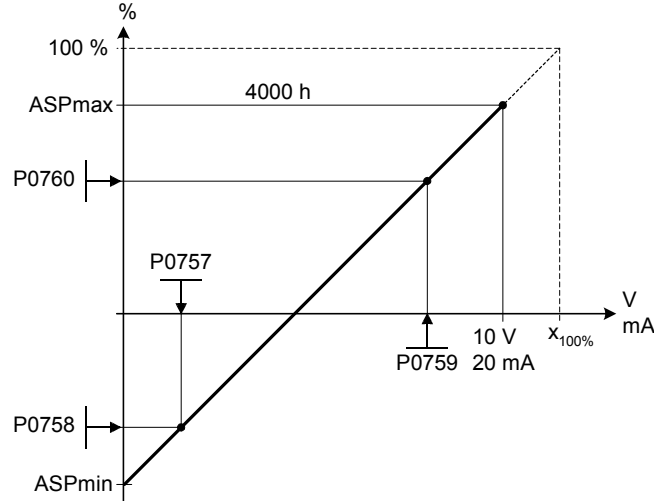
Details:

See P0757 to P0760 (ADC scaling).

P0757[2]	Value x1 of ADC scaling [V / mA]	Min: -20	Level: 2	
	CStat: CUT	Datatype: Float		Unit: -
	P-Group: TERMINAL	Active: first confirm		QuickComm. No
		Def: 0		
		Max: 20		

Parameters P0757 - P0760 configure the input scaling as shown in the diagram:

P0756 = 0 ... 3
P0761 = 0



Where:

Analogue setpoints represent a [%] of the normalized frequency in P2000.

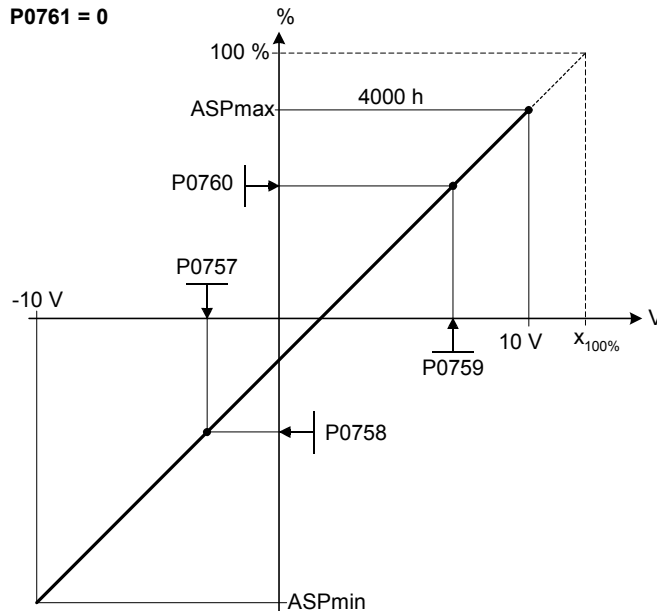
Analogue setpoints may be larger than 100 %.

ASPmax represents highest analogue setpoint (this may be at 10 V or 20 mA).

ASPmin represents lowest analogue 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:

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

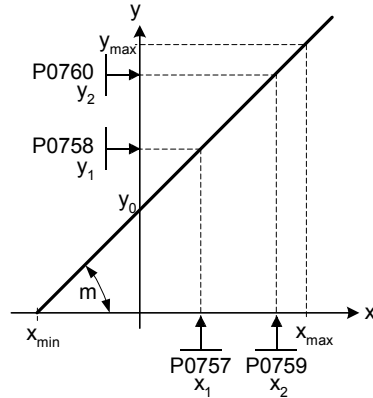
The transformation between these two forms is given by:

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

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 x_2 of ADC scaling P0759 must be greater than the value x_1 of ADC scaling P0757.

P0758[2]	Value y_1 of ADC scaling	Min: -99999.9	Level:
	CStat: CUT	Datatype: Float	Unit: %
	P-Group: TERMINAL	Active: first confirm	QuickComm. No
		Def: 0.0	2
		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 x_2 of ADC scaling [V / mA]	Min: -20	Level:
	CStat: CUT	Datatype: Float	Unit: -
	P-Group: TERMINAL	Active: first confirm	QuickComm. No
		Def: 10	2
		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 x_2 of ADC scaling P0759 must be greater than the value x_1 of ADC scaling P0757.

P0760[2]	Value y_2 of ADC scaling	Min: -99999.9	Level:
	CStat: CUT	Datatype: Float	Unit: %
	P-Group: TERMINAL	Active: first confirm	QuickComm. No
		Def: 100.0	2
		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: 3
	CStat: UT	Datatype: Float	Unit: -	Def: 0	
	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)

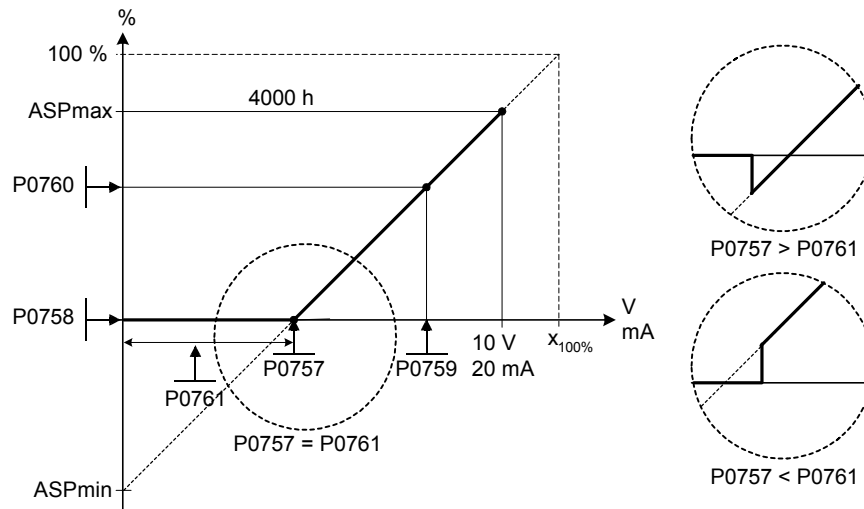
Example:

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

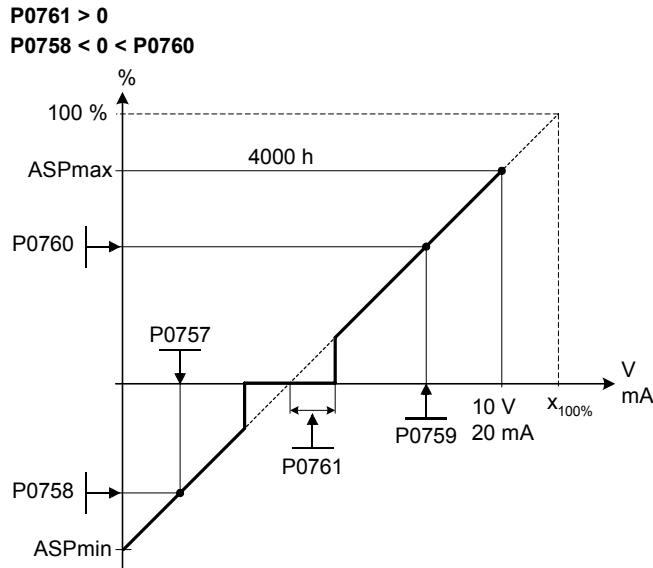
P0761 > 0

$0 < P0758 < P0760 \parallel 0 > P0758 > P0760$

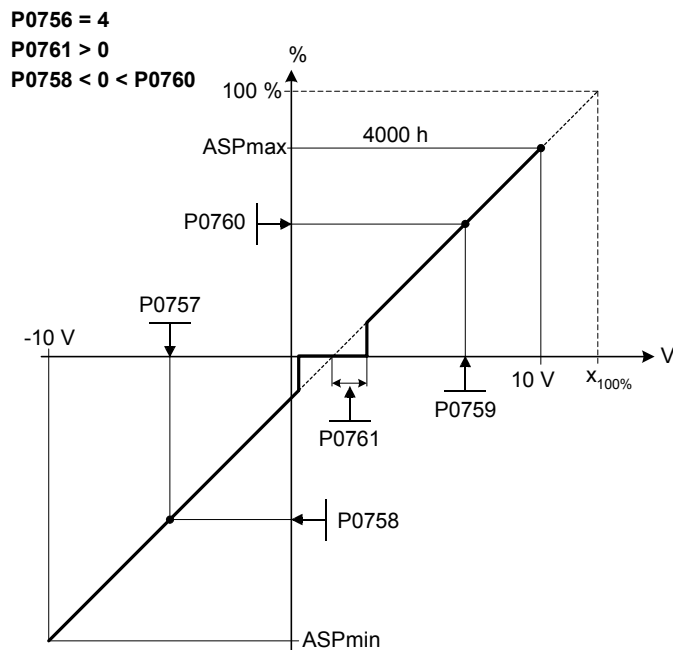


ADC value 0 to 10 V (-50 to +50 Hz):
 The below example produces a 0 to 10 V analog input (-50 to +50 Hz) with center zero and a "holding point" 0.2 V wide (0.1 V to each side of center).
 P2000 = 50 Hz
 P0759 = 8 V P0760 = 75 %
 P0757 = 2 V P0758 = -75 %
 P0761 = 0.1 V

 P0756 = 0 or 1



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).



Note: P0761[x] = 0 : No deadband active.

Notice: Deadband starts from 0 V to value of P0761, if both values of P0758 and P0760 (y coordinates of ADC scaling) are positive or negative respectively. However, deadband is active in both directions from point of intersection (x axis with ADC scaling curve), if sign of P0758 and P0760 are opposite.

Min. frequency P1080 should be zero when using center zero setup. There is no hysteresis at the end of the deadband.

P0762[2]	Delay for loss of signal action			Min: 0	Level: 3
	CStat: CUT	Datatype: U16	Unit: ms	Def: 10	
	P-Group: TERMINAL	Active: Immediately	QuickComm. No	Max: 10000	

Defines time delay between loss of analog setpoint and appearance of fault code F0080.

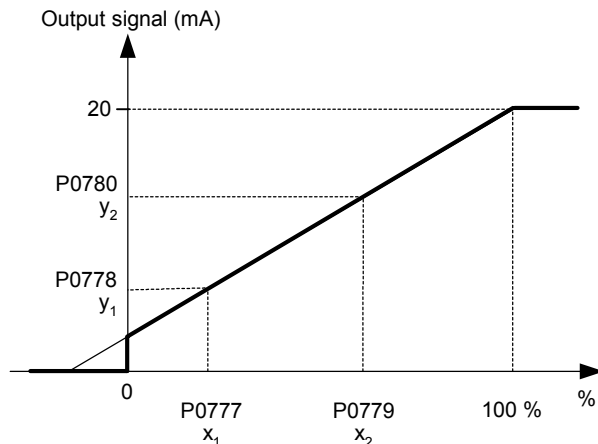
Index:
 P0762[0] : Analog input 1 (ADC 1)
 P0762[1] : Analog input 2 (ADC 2)

Note: Expert users can choose the desired reaction to F0080 (default is OFF2).

r0770	Number of DACs	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level: 3
	P-Group: TERMINAL				
	Displays number of analog outputs available.				
P0771[2]	CI: DAC	Datatype: U32	Unit: -	Min: 0:0 Def: 21:0 Max: 4000:0	Level: 2
	CStat: CUT				
	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	Datatype: U16	Unit: ms	Min: 0 Def: 2 Max: 1000	Level: 3
	CStat: CUT				
	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]	Datatype: Float	Unit: -	Min: - Def: - Max: -	Level: 3
	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	Datatype: U16	Unit: -	Min: 0 Def: 0 Max: 1	Level: 2
	CStat: CT				
	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: 2
	CStat: CUT	Datatype: Float	Unit: %	Def: 0.0		
	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 (reference 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:

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

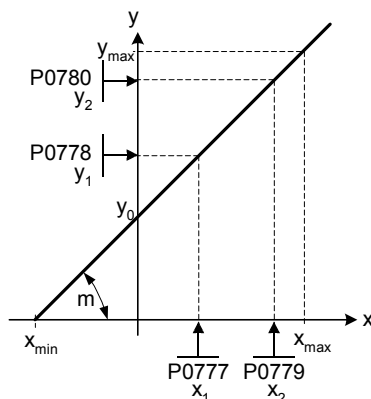
The transformation between these two forms is given by:

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

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				Min: 0	Level: 2
	CStat: CUT	Datatype: Float	Unit: -	Def: 0		
	P-Group: TERMINAL	Active: first confirm	QuickComm. No	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	Min: -99999.0	Level: 2	
	CStat: CUT	Datatype: Float		Unit: %
	P-Group: TERMINAL	Active: first confirm		QuickComm. No

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 (reference frequency, voltage, current or torque) depending on which setpoint is to be generated.

P0780[2]	Value y2 of DAC scaling	Min: 0	Level: 2	
	CStat: CUT	Datatype: Float		Unit: -
	P-Group: TERMINAL	Active: first confirm		QuickComm. No

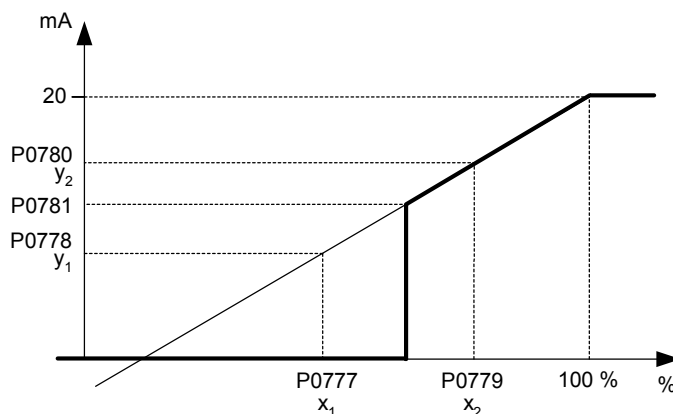
Defines y2 of output characteristic.

Index:

P0780[0] : Analog output 1 (DAC 1)
P0780[1] : Analog output 2 (DAC 2)

P0781[2]	Width of DAC deadband	Min: 0	Level: 3	
	CStat: CUT	Datatype: Float		Unit: -
	P-Group: TERMINAL	Active: first confirm		QuickComm. No

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	Min: 0:0	Level: 3	
	CStat: CT	Datatype: U32		Unit: -
	P-Group: COMMANDS	Active: first confirm		QuickComm. No

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				Min: 0:0	Level: 3
	CStat: CT	Datatype: U32	Unit: -	Def: 0:0		
	P-Group: COMMANDS	Active: first confirm	QuickComm. No	Max: 4000:0		

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)				Min: 0	Level: 3
	CStat: CT	Datatype: U16	Unit: -	Def: 0		
	P-Group: COMMANDS	Active: first confirm	QuickComm. No	Max: 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).

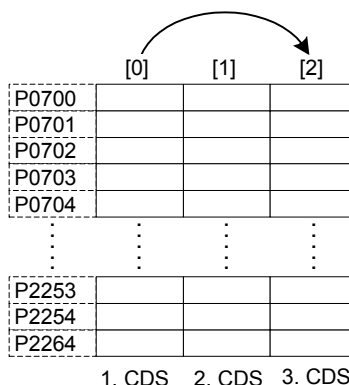
Index:

- 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

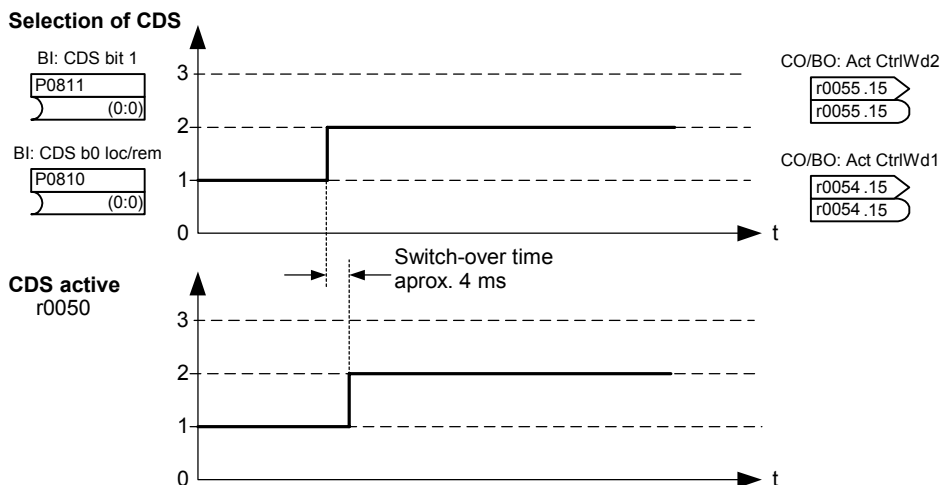


Note:

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: 3	
	CStat: CUT	Datatype: U32		Def: 718:0
	P-Group: COMMANDS	Active: first confirm		Unit: -

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)

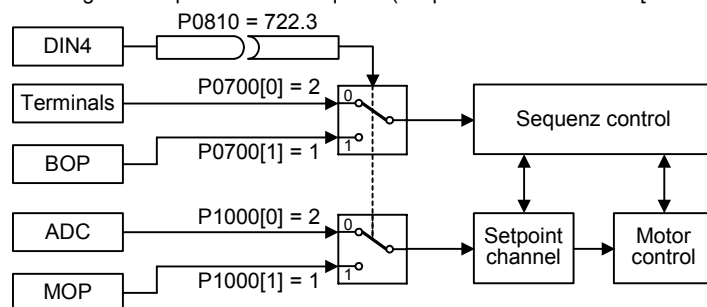
Example:

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: 2
	CStat: CUT	Datatype: U32	Unit: -	Def: 0:0	
	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: 2
	CStat: CT	Datatype: U16	Unit: -	Def: 0	
	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).

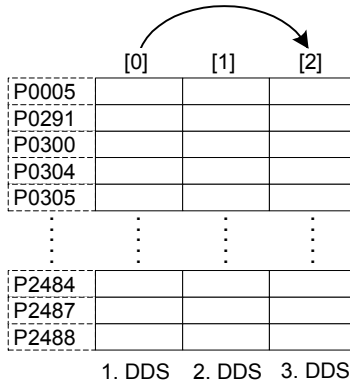
Index:

- 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

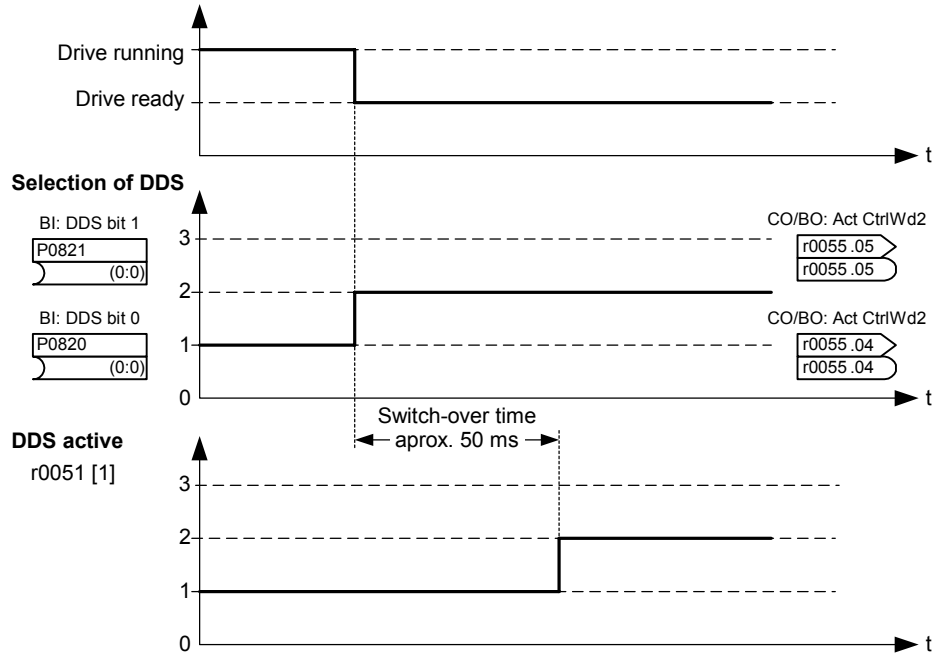


Note:

Start value in index 2 is automatically reset to '0' after execution of function.

P0820	BI: DDS bit 0	Datatype: U32	Unit: -	Min: 0:0	Level: 3
	CStat: CT	Active: first confirm	QuickComm. No	Def: 0:0	
	P-Group: COMMANDS			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].

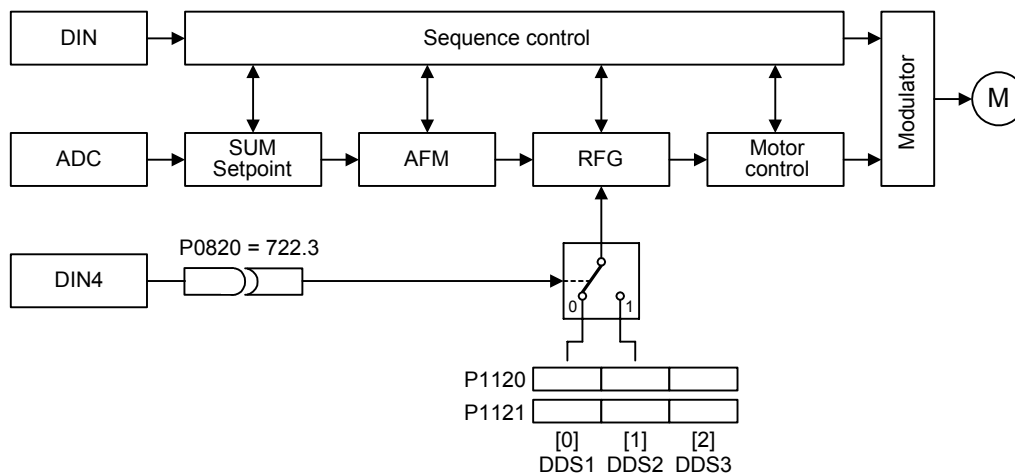
	selected DDS			active DDS
	r0055 Bit05	r0054 Bit04	r0051 [0]	r0051 [1]
1. DDS	0	0	0	0
2. DDS	0	1	1	1
3. DDS	1	0	2	2
3. DDS	1	1	2	2

Common Settings:

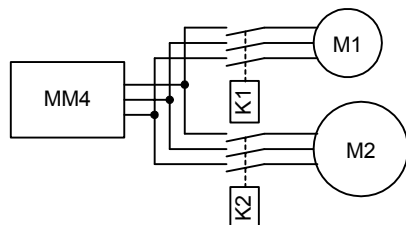
- 722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
- 722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
- 722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
- 722.3 = Digital input 4 (requires P0704 to be set to 99, BICO)
- 722.4 = Digital input 5 (requires P0705 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.g. 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. Adaptation of DDS2 parameter (e.g. 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; Adaptation of all other DDS1 parameter
 2. Connect P0820 (P0821 if necessary) with DDS source (e.g. via DIN 4: P0704[0] = 99, P0820 = 722.3)
 3. Switch-over to DDS2 (check it via r0051)
 4. Apply commissioning of Motor 2; Adaptation of all other DDS2 parameter



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

P0821	BI: DDS bit 1	Datatype: U32	Unit: -	Min: 0:0	Level: 3
	CStat: CT	Active: first confirm	QuickComm. No	Def: 0:0	
	P-Group: COMMANDS			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			Min: 0:0	Level: 3
	CStat: CT	Datatype: U32	Unit: -	Def: 722:0	
	P-Group: COMMANDS	Active: first confirm	QuickComm. No	Max: 4000:0	

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			Min: 0:0	Level: 3
	CStat: CT	Datatype: U32	Unit: -	Def: 0:0	
	P-Group: COMMANDS	Active: first confirm	QuickComm. No	Max: 4000:0	

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			Min: 0:0	Level: 3
	CStat: CT	Datatype: U32	Unit: -	Def: 1:0	
	P-Group: COMMANDS	Active: first confirm	QuickComm. No	Max: 4000:0	

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			Min: 0:0	Level: 3
	CStat: CT	Datatype: U32	Unit: -	Def: 19:1	
	P-Group: COMMANDS	Active: first confirm	QuickComm. No	Max: 4000:0	

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			Min: 0:0	Level: 3
	CStat: CT	Datatype: U32	Unit: -	Def: 1:0	
	P-Group: COMMANDS	Active: first confirm	QuickComm. No	Max: 4000:0	

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			Min: 0:0	Level: 3
	CStat: CT	Datatype: U32	Unit: -	Def: 1:0	
	P-Group: COMMANDS	Active: first confirm	QuickComm. No	Max: 4000:0	

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			Min: 0:0	Level: 3
	CStat: CT	Datatype: U32	Unit: -	Def: 1:0	
	P-Group: COMMANDS	Active: first confirm	QuickComm. No	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			Min: 0	Level: 2
	CStat: CT	Datatype: U16	Unit: -	Def: 3	
	P-Group: COMM	Active: first confirm	QuickComm. No	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			Min: 0	Level: 3
	CStat: CUT	Datatype: U16	Unit: -	Def: 15	
	P-Group: COMM	Active: first confirm	QuickComm. No	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" (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: 3
	P-Group: ALARMS				

Displays fault history according to the diagram below

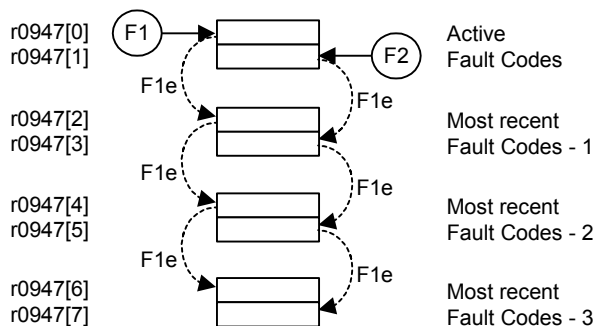
where:

"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	Datatype: U16	Unit: -	Min: 0 Def: 0 Max: 8	Level: 3
	CStat: CT 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	Datatype: U16	Unit: -	Min: -	Level: 3
	P-Group: COMM			Def: -	
				Max: -	

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	Datatype: U16	Unit: -	Min: -	Level: 3
	P-Group: COMM			Def: -	
				Max: -	

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			Min: 0	Level: 1
	CStat: C	Datatype: U16	Unit: -	Def: 0	
	P-Group: PAR_RESET	Active: first confirm	QuickComm. No	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:

r0039 CO: Energy consumption meter [kWh]
P0100 Europe / North America
P0918 CB address
P2010 USS baud rate
P2011 USS address

P0971	Transfer data from RAM to EEPROM			Min: 0	Level: 3
	CStat: CUT	Datatype: U16	Unit: -	Def: 0	
	P-Group: COMM	Active: first confirm	QuickComm. No	Max: 1	

Transfers values from RAM to EEPROM when set to 1.

Possible Settings:

0 Disabled
1 Start transfer

Note:

All values in RAM are transferred to EEPROM.

Parameter is automatically reset to 0 (default) after successful transfer.

P1000[3]	Selection of frequency setpoint				Min: 0	Level: 1
	CStat: CT	Datatype: U16	Unit: -	Def: 2		
	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:

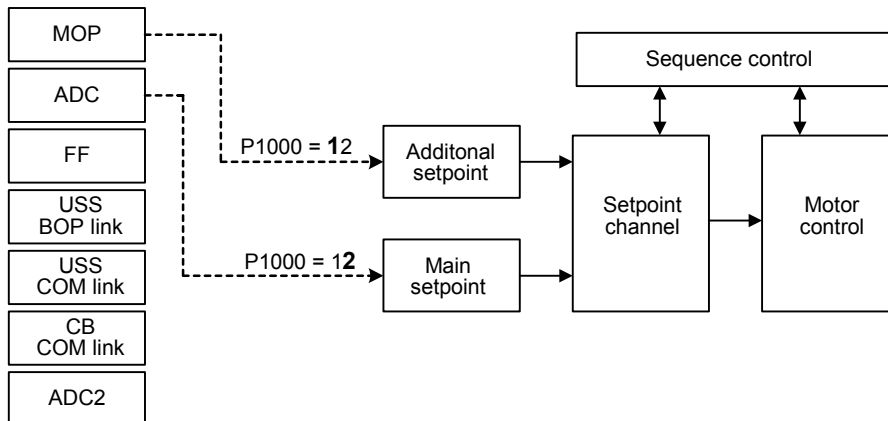
- P1000[0] : 1st. Command data set (CDS)
- P1000[1] : 2nd. Command data set (CDS)
- P1000[2] : 3rd. Command data set (CDS)

Example:

Setting 12 selects main setpoint (2) derived from analog input with additional setpoint (1) taken from the motor potentiometer.

Example P1000 = 12 :

P1000 = 12 ⇒ P1070 = 755	P1070 CI: Main setpoint
	r0755 CO: Act. ADC after scal. [4000h]
P1000 = 12 ⇒ 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								
		y = 0	y = 1	y = 2	y = 3	y = 4	y = 5	y = 6	y = 7	
x = 0	P1000 = xy	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	P1000 = xy	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	P1000 = xy	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	P1000 = xy	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	P1000 = xy	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	P1000 = xy	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	P1000 = xy	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	P1000 = xy	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			Min: -650.00	Level: 3
	CStat: CUT	Datatype: Float	Unit: Hz	Def: 0.00	
	P-Group: SETPOINT	Active: Immediately	QuickComm. No	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:

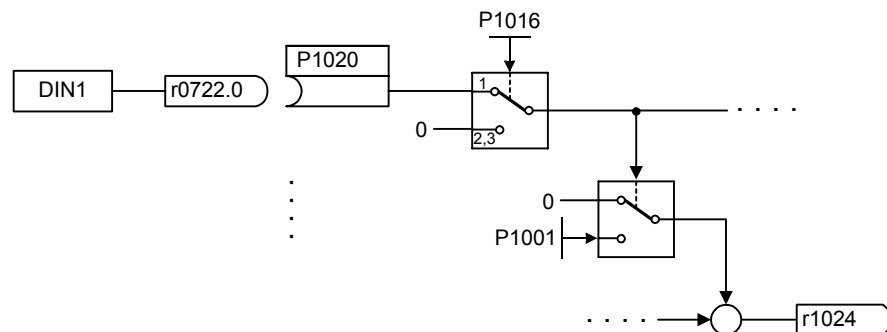
- P1001[0] : 1st. Drive data set (DDS)
- P1001[1] : 2nd. Drive data set (DDS)
- P1001[2] : 3rd. Drive data set (DDS)

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	Min: -650.00	Level:
	CStat: CUT P-Group: SETPOINT	Datatype: Float Active: Immediately	Unit: Hz QuickComm. No
		Def: 5.00 Max: 650.00	3
	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	Min: -650.00	Level:
	CStat: CUT P-Group: SETPOINT	Datatype: Float Active: Immediately	Unit: Hz QuickComm. No
		Def: 10.00 Max: 650.00	3
	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	Min: -650.00	Level:
	CStat: CUT P-Group: SETPOINT	Datatype: Float Active: Immediately	Unit: Hz QuickComm. No
		Def: 15.00 Max: 650.00	3
	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	Min: -650.00	Level:
	CStat: CUT P-Group: SETPOINT	Datatype: Float Active: Immediately	Unit: Hz QuickComm. No
		Def: 20.00 Max: 650.00	3
	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	Min: -650.00	Level:
	CStat: CUT P-Group: SETPOINT	Datatype: Float Active: Immediately	Unit: Hz QuickComm. No
		Def: 25.00 Max: 650.00	3
	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	Min: -650.00	Level:
	CStat: CUT P-Group: SETPOINT	Datatype: Float Active: Immediately	Unit: Hz QuickComm. No
		Def: 30.00 Max: 650.00	3
	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	Min: -650.00	Level:
	CStat: CUT Datatype: Float Unit: Hz Def: 35.00	3	
	P-Group: SETPOINT Active: Immediately QuickComm. No Max: 650.00		
	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	Min: -650.00	Level:
	CStat: CUT Datatype: Float Unit: Hz Def: 40.00	3	
	P-Group: SETPOINT Active: Immediately QuickComm. No Max: 650.00		
	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	Min: -650.00	Level:
	CStat: CUT Datatype: Float Unit: Hz Def: 45.00	3	
	P-Group: SETPOINT Active: Immediately QuickComm. No Max: 650.00		
	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	Min: -650.00	Level:
	CStat: CUT Datatype: Float Unit: Hz Def: 50.00	3	
	P-Group: SETPOINT Active: Immediately QuickComm. No Max: 650.00		
	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	Min: -650.00	Level:
	CStat: CUT Datatype: Float Unit: Hz Def: 55.00	3	
	P-Group: SETPOINT Active: Immediately QuickComm. No Max: 650.00		
	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	Min: -650.00	Level:
	CStat: CUT Datatype: Float Unit: Hz Def: 60.00	3	
	P-Group: SETPOINT Active: Immediately QuickComm. No Max: 650.00		
	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	Min: -650.00	Level:
	CStat: CUT Datatype: Float Unit: Hz Def: 65.00		3
	P-Group: SETPOINT Active: Immediately QuickComm. No Max: 650.00		
	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	Min: -650.00	Level:
	CStat: CUT Datatype: Float Unit: Hz Def: 65.00		3
	P-Group: SETPOINT Active: Immediately QuickComm. No Max: 650.00		
	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	Min: 1	Level:
	CStat: CT Datatype: U16 Unit: - Def: 1		3
	P-Group: SETPOINT Active: first confirm QuickComm. No Max: 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	Min: 1	Level:
	CStat: CT Datatype: U16 Unit: - Def: 1		3
	P-Group: SETPOINT Active: first confirm QuickComm. No Max: 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	Min: 1	Level:
	CStat: CT Datatype: U16 Unit: - Def: 1		3
	P-Group: SETPOINT Active: first confirm QuickComm. No Max: 3		
	Fixed frequencies can be selected in three different modes. Parameter P1018 defines the mode of selection Bit 2.		
Possible Settings:	1 Direct selection 2 Direct selection + ON command 3 Binary coded selection + ON command		
Details:	See table in P1001 (fixed frequency 1) for description of how to use fixed frequencies.		
P1019	Fixed frequency mode - Bit 3	Min: 1	Level:
	CStat: CT Datatype: U16 Unit: - Def: 1		3
	P-Group: SETPOINT Active: first confirm QuickComm. No Max: 3		
	Fixed frequencies can be selected in three different modes. Parameter P1019 defines the mode of selection Bit 3.		
Possible Settings:	1 Direct selection 2 Direct selection + ON command 3 Binary coded selection + ON command		
Details:	See table in P1001 (fixed frequency 1) for description of how to use fixed frequencies.		

P1020[3]	BI: Fixed freq. selection Bit 0	Min: 0:0	Level: 3
	CStat: CT Datatype: U32 Unit: - Def: 0:0		
	P-Group: COMMANDS Active: first confirm QuickComm. No 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	Min: 0:0	Level: 3
	CStat: CT Datatype: U32 Unit: - Def: 0:0		
	P-Group: COMMANDS Active: first confirm QuickComm. No 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	Min: 0:0	Level: 3
	CStat: CT Datatype: U32 Unit: - Def: 0:0		
	P-Group: COMMANDS Active: first confirm QuickComm. No 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	Min: 0:0	Level: 3
	CStat: CT Datatype: U32 Unit: - Def: 722:3		
	P-Group: COMMANDS Active: first confirm QuickComm. No 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	Min: -	Level: 3
	Datatype: Float Unit: Hz Def: -		
	P-Group: SETPOINT Max: -		

Displays sum total of selected fixed frequencies.

P1025	Fixed frequency mode - Bit 4	Min: 1	Level: 3
	CStat: CT Datatype: U16 Unit: - Def: 1		
	P-Group: SETPOINT Active: first confirm QuickComm. No 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	Min: 0:0	Level:
CStat: CT	Datatype: U32	Def: 722:4	3
P-Group: COMMANDS	Active: first confirm	QuickComm. No	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	Min: 1	Level:
CStat: CT	Datatype: U16	Def: 1	3
P-Group: SETPOINT	Active: first confirm	QuickComm. No	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	Min: 0:0	Level:
CStat: CT	Datatype: U32	Def: 722:5	3
P-Group: COMMANDS	Active: first confirm	QuickComm. No	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	Min: 0	Level:
CStat: CUT	Datatype: U16	Def: 0	3
P-Group: SETPOINT	Active: Immediately	QuickComm. No	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	Min: 0	Level:
CStat: CT	Datatype: U16	Def: 1	3
P-Group: SETPOINT	Active: first confirm	QuickComm. No	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)				Min: 0:0	Level: 3
	CStat: CT	Datatype: U32	Unit: -	Def: 19:13		
	P-Group: COMMANDS	Active: first confirm	QuickComm. No	Max: 4000:0		

Defines source for motor potentiometer setpoint increase frequency.

Index:

- P1035[0] : 1st. Command data set (CDS)
- P1035[1] : 2nd. Command data set (CDS)
- P1035[2] : 3rd. Command data set (CDS)

Common Settings:

- 722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
- 722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
- 722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
- 722.3 = Digital input 4 (requires P0704 to be set to 99, BICO)
- 722.4 = Digital input 5 (requires P0705 to be set to 99, BICO)
- 722.5 = Digital input 6 (requires P0706 to be set to 99, BICO)
- 722.6 = Digital input 7 (via analog input 1, requires P0707 to be set to 99)
- 722.7 = Digital input 8 (via analog input 2, requires P0708 to be set to 99)

19.D = MOP up via BOP

P1036[3]	BI: Enable MOP (DOWN-command)				Min: 0:0	Level: 3
	CStat: CT	Datatype: U32	Unit: -	Def: 19:14		
	P-Group: COMMANDS	Active: first confirm	QuickComm. No	Max: 4000:0		

Defines source for motor potentiometer setpoint decrease frequency.

Index:

- P1036[0] : 1st. Command data set (CDS)
- P1036[1] : 2nd. Command data set (CDS)
- P1036[2] : 3rd. Command data set (CDS)

Common Settings:

- 722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
- 722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
- 722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
- 722.3 = Digital input 4 (requires P0704 to be set to 99, BICO)
- 722.4 = Digital input 5 (requires P0705 to be set to 99, BICO)
- 722.5 = Digital input 6 (requires P0706 to be set to 99, BICO)
- 722.6 = Digital input 7 (via analog input 1, requires P0707 to be set to 99)
- 722.7 = Digital input 8 (via analog input 2, requires P0708 to be set to 99)

19.E = MOP down via BOP

P1040[3]	Setpoint of the MOP				Min: -650.00	Level: 2
	CStat: CUT	Datatype: Float	Unit: Hz	Def: 5.00		
	P-Group: SETPOINT	Active: Immediately	QuickComm. No	Max: 650.00		

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)

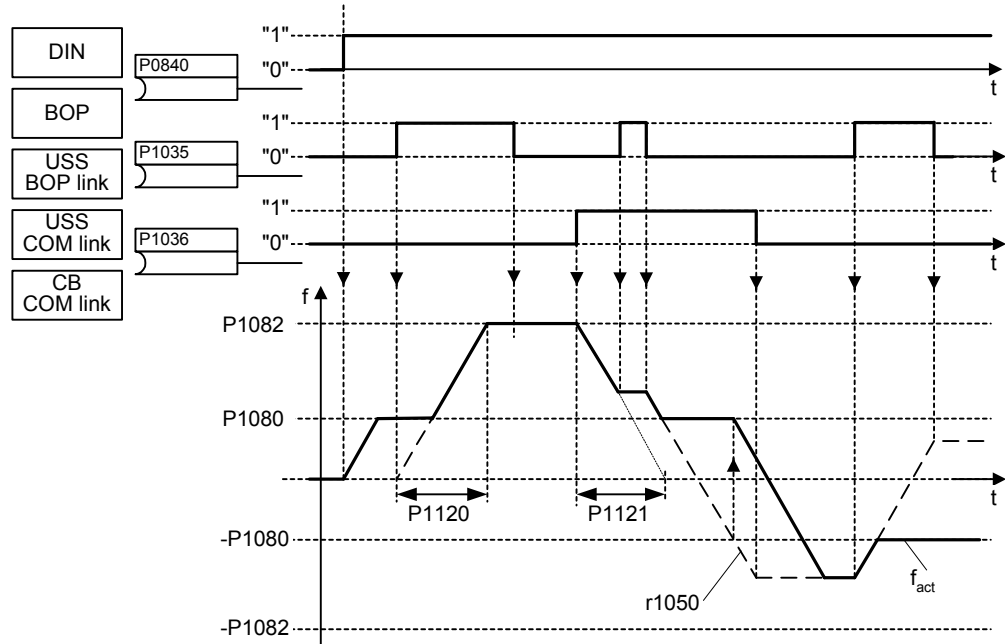
Note:

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	Min: -	Level:
	Datatype: Float Unit: Hz	Def: -	3
P-Group: SETPOINT		Max: -	

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



P1070[3]	CI: Main setpoint	Min: 0:0	Level:
	CStat: CT Datatype: U32 Unit: -	Def: 755:0	3
P-Group: SETPOINT Active: first confirm QuickComm. No		Max: 4000:0	

Defines source of main setpoint.

Index:

- P1070[0] : 1st. Command data set (CDS)
- P1070[1] : 2nd. Command data set (CDS)
- P1070[2] : 3rd. Command data set (CDS)

Common Settings:

- 755 = Analog input 1 setpoint
- 1024 = Fixed frequency setpoint
- 1050 = Motor potentiometer (MOP) setpoint

P1071[3]	CI: Main setpoint scaling	Min: 0:0	Level:
	CStat: CT Datatype: U32 Unit: -	Def: 1:0	3
P-Group: SETPOINT Active: first confirm QuickComm. No		Max: 4000:0	

Defines source of the main setpoint scaling.

Index:

- P1071[0] : 1st. Command data set (CDS)
- P1071[1] : 2nd. Command data set (CDS)
- P1071[2] : 3rd. Command data set (CDS)

Common Settings:

- 755 = Analog input 1 setpoint
- 1024 = Fixed frequency setpoint
- 1050 = Motor potentiometer (MOP) setpoint

P1074[3]	BI: Disable additional setpoint	Min: 0:0	Level: 3
	CStat: CUT Datatype: U32 Unit: - Def: 0:0		
	P-Group: COMMANDS Active: first confirm QuickComm. No Max: 4000:0		

Disables additional setpoint

Index:

- P1074[0] : 1st. Command data set (CDS)
- P1074[1] : 2nd. Command data set (CDS)
- P1074[2] : 3rd. Command data set (CDS)

Common Settings:

- 722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
- 722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
- 722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
- 722.3 = Digital input 4 (requires P0704 to be set to 99, BICO)
- 722.4 = Digital input 5 (requires P0705 to be set to 99, BICO)
- 722.5 = Digital input 6 (requires P0706 to be set to 99, BICO)
- 722.6 = Digital input 7 (via analog input 1, requires P0707 to be set to 99)
- 722.7 = Digital input 8 (via analog input 2, requires P0708 to be set to 99)

P1075[3]	CI: Additional setpoint	Min: 0:0	Level: 3
	CStat: CT Datatype: U32 Unit: - Def: 0:0		
	P-Group: SETPOINT Active: first confirm QuickComm. No Max: 4000:0		

Defines source of the additional setpoint (to be added to main setpoint).

Index:

- P1075[0] : 1st. Command data set (CDS)
- P1075[1] : 2nd. Command data set (CDS)
- P1075[2] : 3rd. Command data set (CDS)

Common Settings:

- 755 = Analog input 1 setpoint
- 1024 = Fixed frequency setpoint
- 1050 = Motor potentiometer (MOP) setpoint

P1076[3]	CI: Additional setpoint scaling	Min: 0:0	Level: 3
	CStat: CT Datatype: U32 Unit: - Def: 1:0		
	P-Group: SETPOINT Active: first confirm QuickComm. No Max: 4000:0		

Defines source of scaling for additional setpoint (to be added to main setpoint).

Index:

- P1076[0] : 1st. Command data set (CDS)
- P1076[1] : 2nd. Command data set (CDS)
- P1076[2] : 3rd. Command data set (CDS)

Common Settings:

- 1 = Scaling of 1.0 (100%)
- 755 = Analog input 1 Setpoint
- 1024 = Fixed Frequency Setpoint
- 1050 = MOP Setpoint

r1078	CO: Total frequency setpoint	Min: -	Level: 3
	Datatype: Float Unit: Hz Def: -		
	P-Group: SETPOINT Max: -		

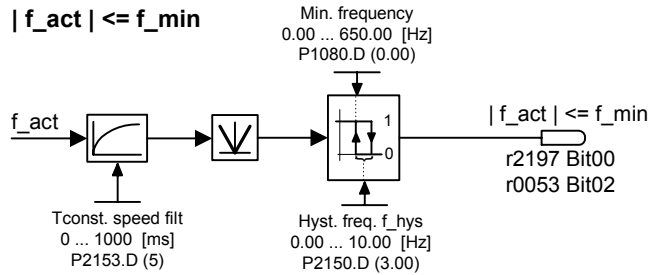
Displays sum of main and additional setpoints in [Hz].

P1080[3]	Min. frequency			Min: 0.00	Level: 1
	CStat: CUT	Datatype: Float	Unit: Hz	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).

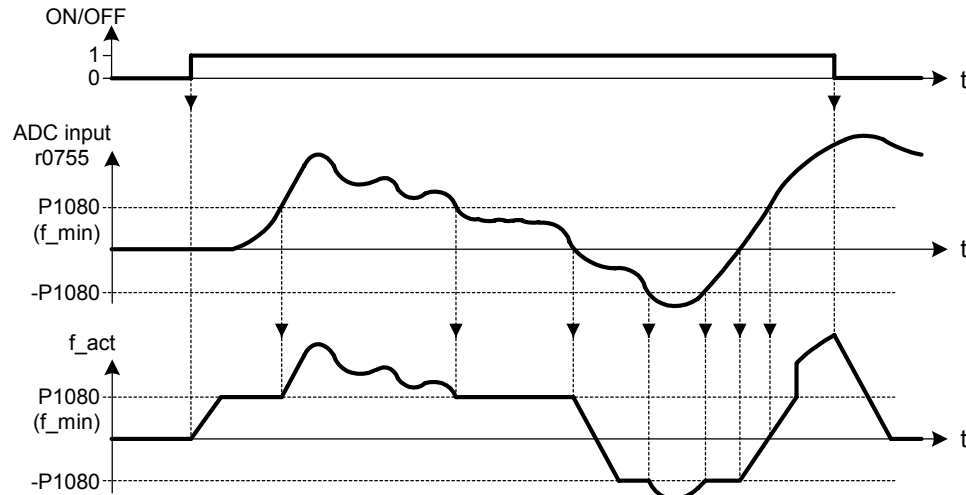
Furthermore, an undershoot of the actual frequency f_{act} below min. frequency P1080 is output by the following signal function.



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: 1
	CStat: CT	Datatype: Float	Unit: Hz	Def: 50.00	
	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:

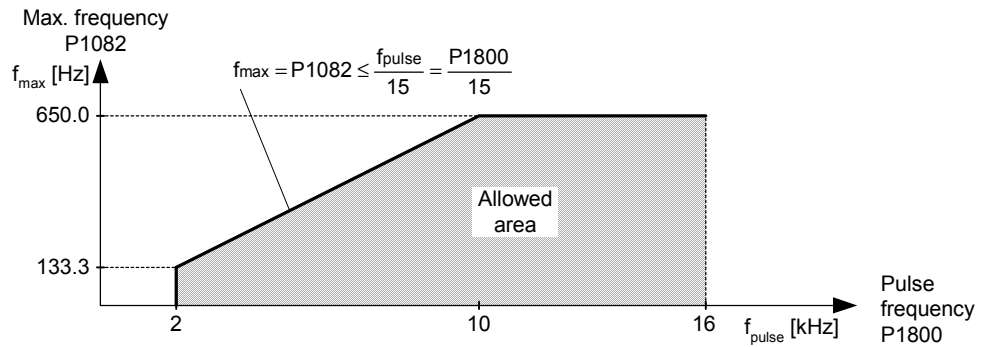
- P1082[0] : 1st. Drive data set (DDS)
- P1082[1] : 2nd. Drive data set (DDS)
- P1082[2] : 3rd. Drive data set (DDS)

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)



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) :

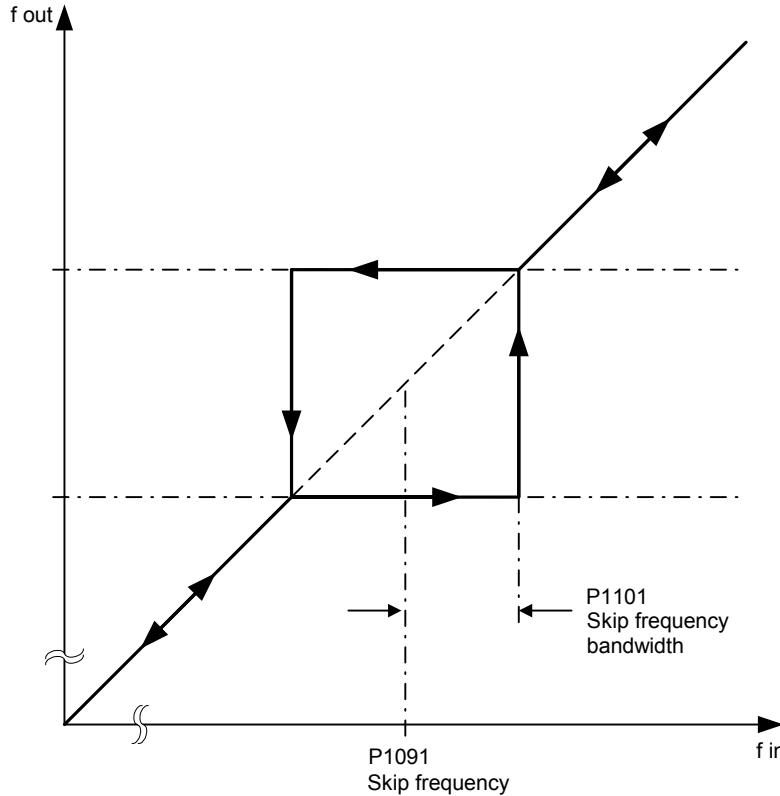
$$f_{max}(P1200) = f_{max} + 2 \cdot f_{slip,nom} = P1082 + 2 \cdot \frac{r0330}{100} \cdot P0310$$

Notice:

Maximum motor speed is subject to mechanical limitations.

P1091[3]	Skip frequency 1			Min: 0.00	Level: 3
	CStat: CUT	Datatype: Float	Unit: Hz	Def: 0.00	
	P-Group: SETPOINT	Active: Immediately	QuickComm. No	Max: 650.00	

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

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

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	Min: 0.00	Level: 3	
	CStat: CUT	Datatype: Float		Unit: Hz
	P-Group: SETPOINT	Active: Immediately		QuickComm. No

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	Min: 0.00	Level: 3	
	CStat: CUT	Datatype: Float		Unit: Hz
	P-Group: SETPOINT	Active: Immediately		QuickComm. No

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	Min: 0:0	Level: 3	
	CStat: CT	Datatype: U32		Unit: -
	P-Group: COMMANDS	Active: first confirm		QuickComm. No

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	Min: 0:0	Level: 3	
	CStat: CT	Datatype: U32		Unit: -
	P-Group: COMMANDS	Active: first confirm		QuickComm. No

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.	Min: -	Level: 3	
		Datatype: Float		Unit: Hz
	P-Group: SETPOINT			Def: -

Displays setpoint frequency after change of direction.

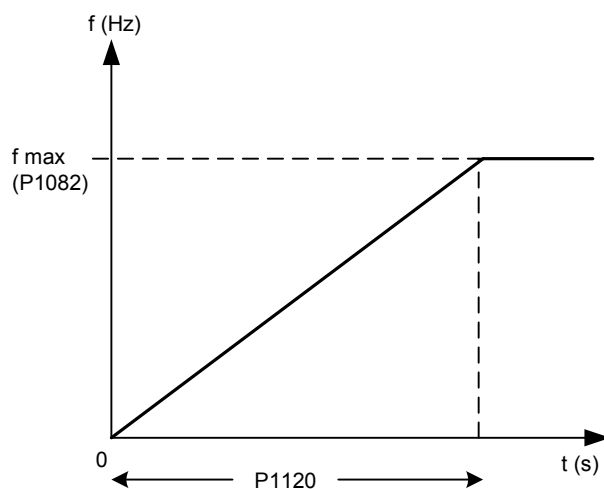
r1119	CO: Freq. setpoint before RFG	Datatype: Float	Unit: Hz	Min: -	Level: 3
	P-Group: SETPOINT			Def: - Max: -	

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	Datatype: Float	Unit: s	Min: 0.00	Level: 1
	CStat: CUT	Active: first confirm	QuickComm. Yes	Def: 10.00	
	P-Group: SETPOINT			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:

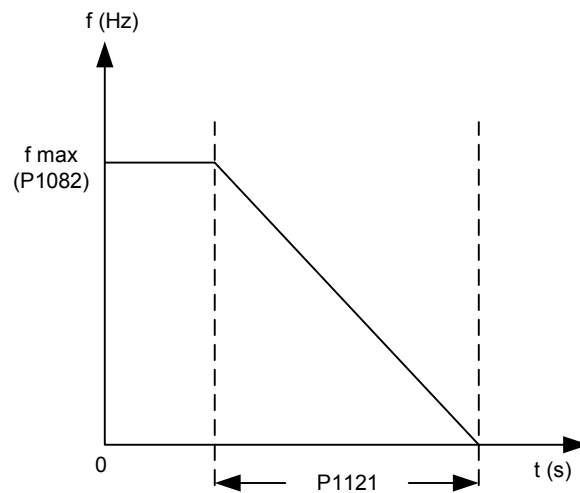
If an external frequency setpoint with set ramp rates is used (e.g. from a PLC). The best way to achieve optimum drive performance is to set ramp times in P1120 and P1121 slightly shorter than those of the PLC.

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			Min: 0.00	Level: 1
	CStat: CUT	Datatype: Float	Unit: s	Def: 30.00	
	P-Group: SETPOINT	Active: first confirm	QuickComm. Yes	Max: 650.00	

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:

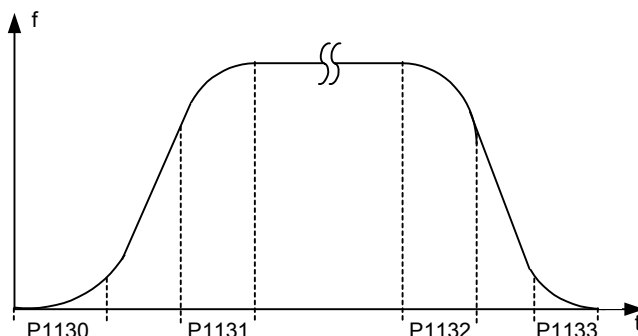
Setting the ramp-down time too short can cause the inverter to trip (overcurrent (F0001) / overvoltage (F0002)).

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

P1130[3]	Ramp-up initial rounding time				Min: 0.00	Level: 2
	CStat: CUT	Datatype: Float	Unit: s	Def: 0.00		
	P-Group: SETPOINT	Active: first confirm	QuickComm. No	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: $X = \Delta f / f_{max}$

i.e. X is the ratio between the frequency step and f_{max}

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				Min: 0.00	Level: 2
	CStat: CUT	Datatype: Float	Unit: s	Def: 0.00		
	P-Group: SETPOINT	Active: first confirm	QuickComm. No	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				Min: 0.00	Level: 2
	CStat: CUT	Datatype: Float	Unit: s	Def: 0.00		
	P-Group: SETPOINT	Active: first confirm	QuickComm. No	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				Min: 0.00	Level: 2
	CStat: CUT	Datatype: Float	Unit: s	Def: 0.00		
	P-Group: SETPOINT	Active: first confirm	QuickComm. No	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.

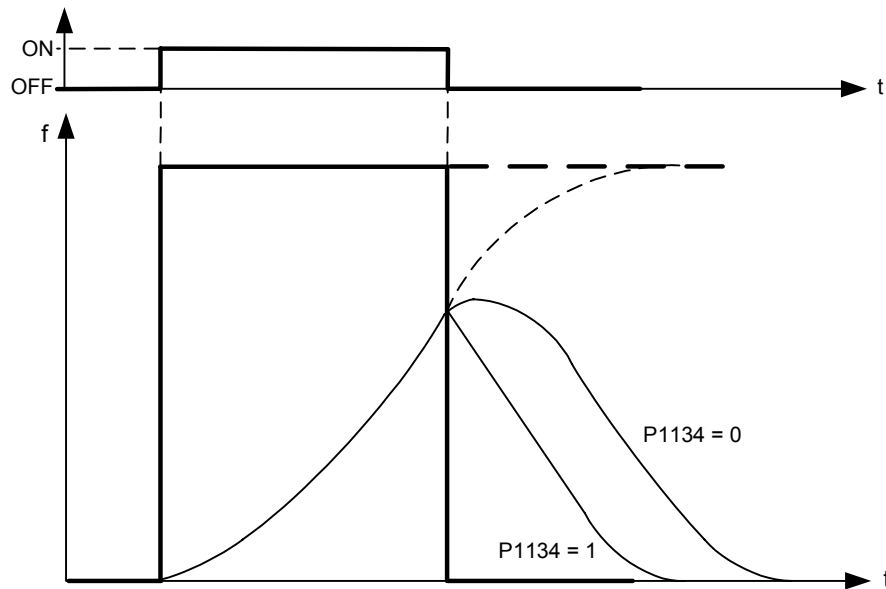
Notice:

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				Min: 0	Level: 2
	CStat: CUT	Datatype: U16	Unit: -	Def: 0		
	P-Group: SETPOINT	Active: Immediately	QuickComm. No	Max: 1		

Defines smoothing response to OFF1 command or setpoint reduction.

If parameter P1134 = 0 it avoids 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.

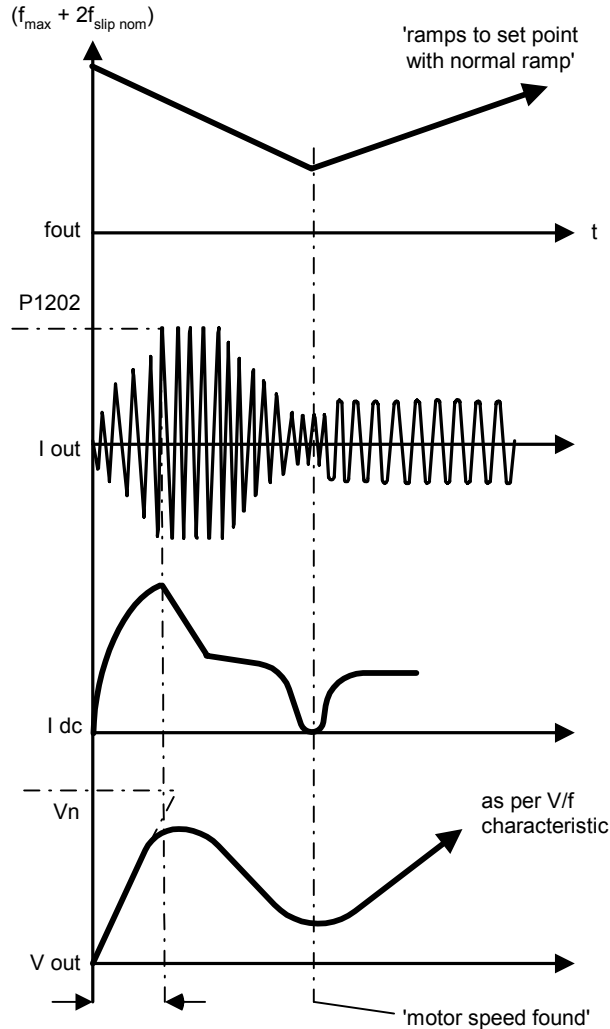
P1134 = 1:
Rounding does not act upon sudden reduction of input value during acceleration process.

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	Min: 0.00	Level:
	CStat: CUT Datatype: Float Unit: s Def: 5.00 P-Group: SETPOINT Active: first confirm QuickComm. Yes Max: 650.00		2
	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	Min: 0:0	Level:
	CStat: CT Datatype: U32 Unit: - Def: 1:0 P-Group: COMMANDS Active: first confirm QuickComm. No Max: 4000:0		3
	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	Min: 0:0	Level:
	CStat: CT Datatype: U32 Unit: - Def: 1:0 P-Group: COMMANDS Active: first confirm QuickComm. No Max: 4000:0		3
	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	Min: 0:0	Level:
	CStat: CT Datatype: U32 Unit: - Def: 1:0 P-Group: COMMANDS Active: first confirm QuickComm. No Max: 4000:0		3
	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	Min: -	Level:
	Datatype: Float Unit: Hz Def: - P-Group: SETPOINT Max: -		3
	Displays overall frequency setpoint after ramp generator.		

P1200	Flying start			Min: 0	Level: 3
	CStat: CUT	Datatype: U16	Unit: -	Def: 0	
	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: 3
	CStat: CUT	Datatype: U16	Unit: %	Def: 100		
	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:

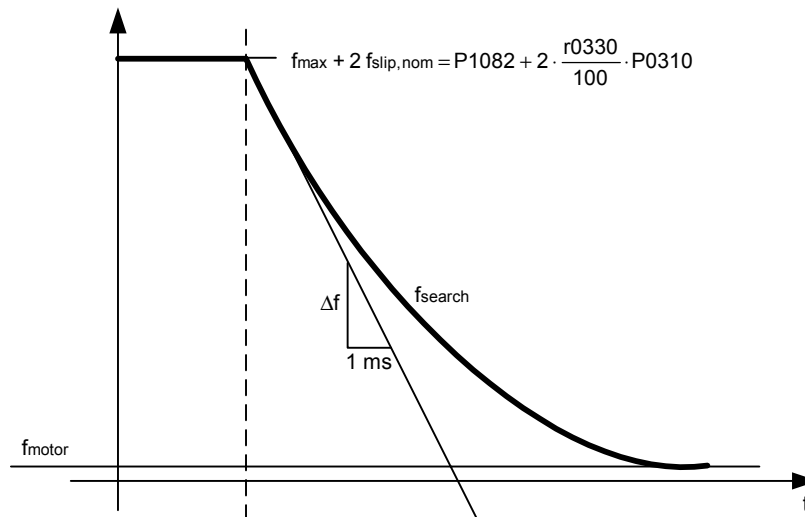
P1202[0] : 1st. Drive data set (DDS)
P1202[1] : 2nd. Drive data set (DDS)
P1202[2] : 3rd. Drive data set (DDS)

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: 3
	CStat: CUT	Datatype: U16	Unit: %	Def: 100		
	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.



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

The search time is the time taken to search through all frequencies between max. frequency $P1082 + 2 \times f_{\text{slip}}$ to 0 Hz.

P1203 = 100 % is defined as giving a rate of 2 % of $f_{\text{slip,nom}} / [\text{ms}]$.

P1203 = 200 % would result in a rate of frequency change of 1 % of $f_{\text{slip,nom}} / [\text{ms}]$.

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.

P1210	Automatic restart			Min: 0	Level: 3
	CStat: CUT	Datatype: U16	Unit: -	Def: 1	
	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 is 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 brownout. 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 brownout. 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

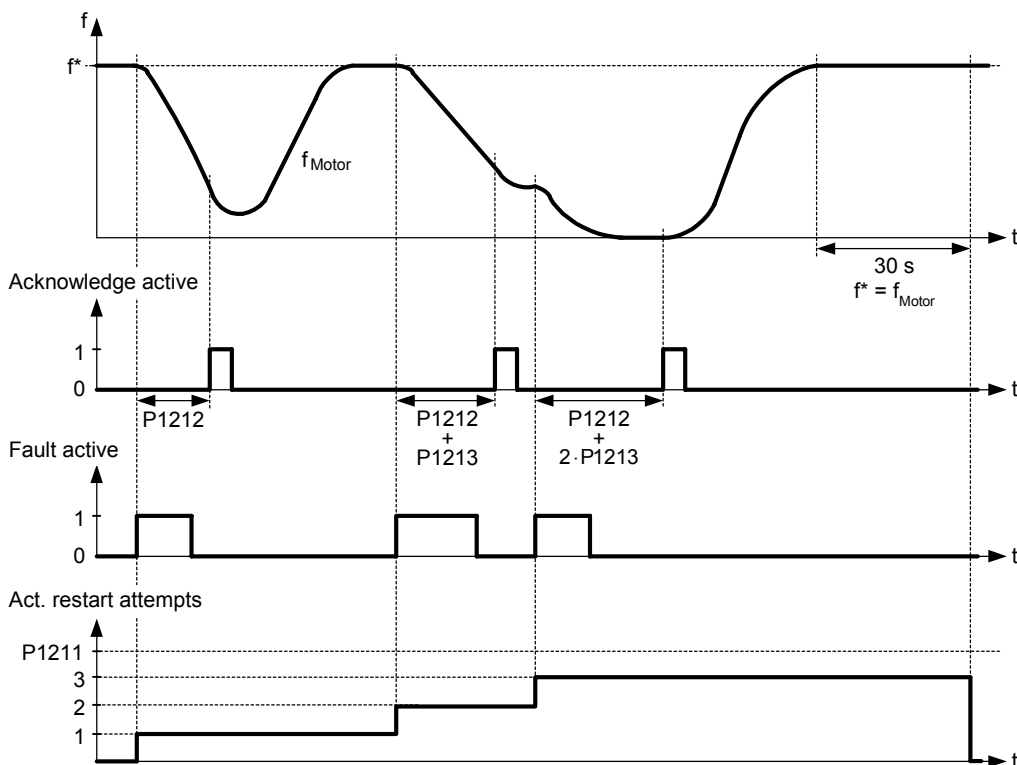
Flying start must be used in cases where the motor may still be turning (e.g. after a short mains break) or can be driven by the load (P1200).

P1211	Number of restart attempts	Min: 0	Level:
	CStat: CUT	Datatype: U16	Def: 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.

P1212	Time to first restart	Min: 0	Level:
	CStat: CUT	Datatype: U16	Def: 30
	P-Group: FUNC	Active: first confirm	QuickComm. No Max: 1000

Selects the time before the inverter is restarted for the first time if automatic restart P1210 is activated.



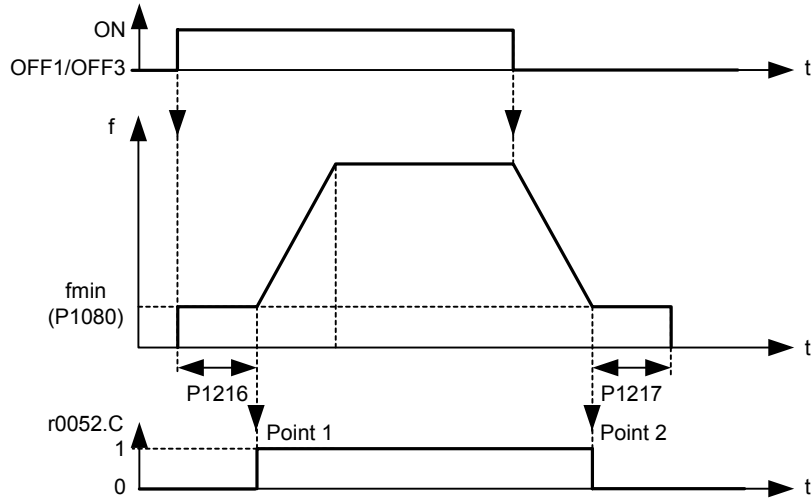
P1213	Restart time increment	Min: 0	Level:
	CStat: CUT	Datatype: U16	Def: 30
	P-Group: FUNC	Active: first confirm	QuickComm. No Max: 1000

Selects the amount the restart time is increment for each restart of the inverter if automatic restart P1210 is activated.

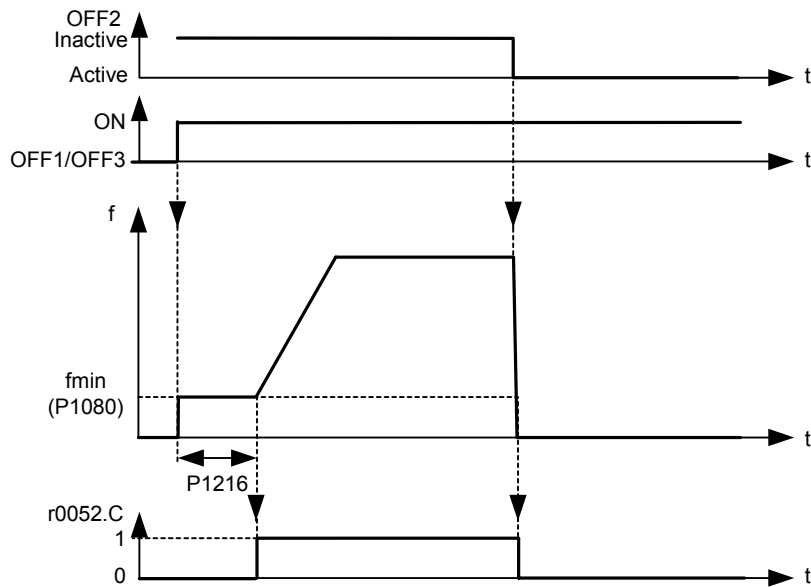
P1215	Holding brake enable	Datatype: U16	Unit: -	Min: 0	Level: 2
	CStat: T	Active: first confirm	QuickComm. No	Def: 0	
	P-Group: FUNC			Max: 1	

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	Min: 0.0	Level: 2	
	CStat: T	Datatype: Float		Unit: s
	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:

$$f_{\text{slip}}[\text{Hz}] = \frac{r0330}{100} \cdot P0310 = \frac{n_{\text{syn}} - n_n}{n_{\text{syn}}} \cdot f_n$$

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	Min: 0.0	Level: 2	
	CStat: T	Datatype: Float		Unit: s
	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:

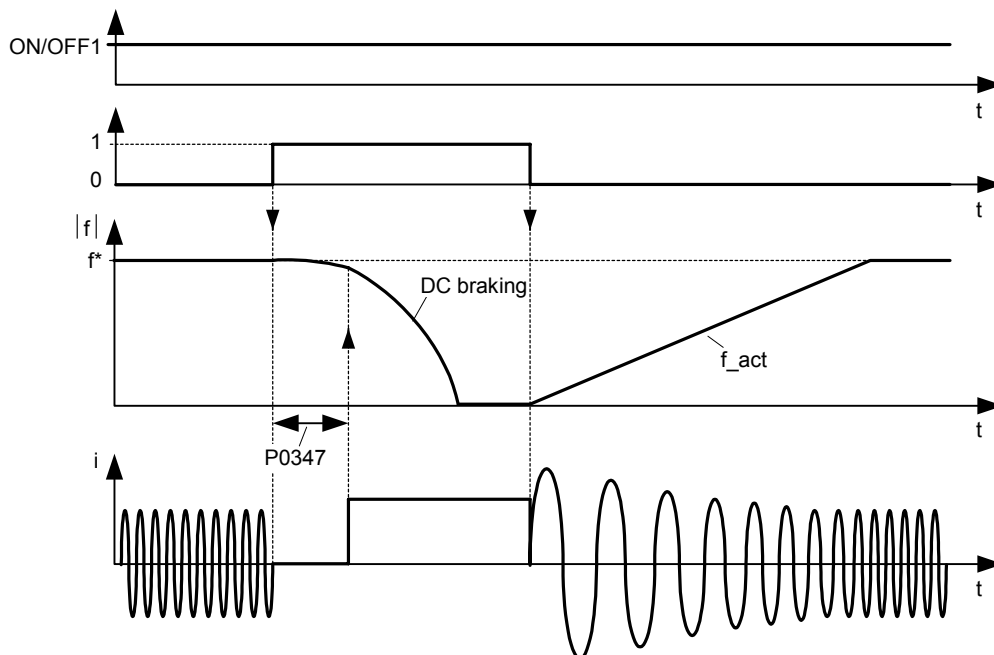
See diagram P1215 (holding brake enable).

P1230[3]	BI: Enable DC braking	Min: 0:0	Level:
	CStat: CUT	Datatype: U32	Def: 0:0
	P-Group: COMMANDS	Active: first confirm	QuickComm. No Max: 4000:0

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	Min: 0	Level:
	CStat: CUT	Datatype: U16	Def: 100
	P-Group: FUNC	Active: Immediately	QuickComm. No Max: 250

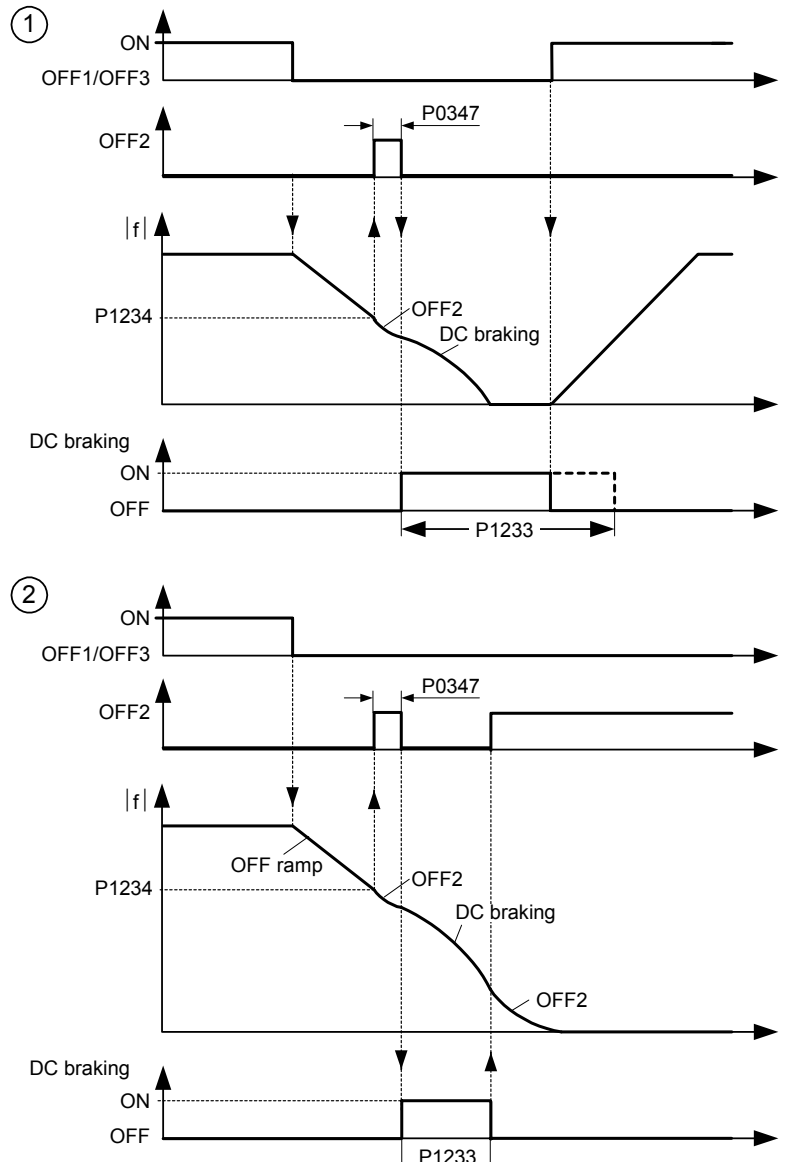
Defines level of DC current in [%] relative to rated motor current (P0305).

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	Datatype: U16	Unit: s	Min: 0	Level: 3
	CStat: CUT	Active: Immediately	QuickComm. No	Def: 0	
	P-Group: FUNC			Max: 250	

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	Min: 0.00	Level: 3	
	CStat: CUT	Datatype: Float		Unit: Hz
	P-Group: FUNC	Active: Immediately		QuickComm. No

Sets start frequency for DC braking.

When an OFF1 or OFF3 command is received by the drive, the output frequency starts to ramp to 0 Hz. When the output frequency reaches the value set in start frequency of DC braking P1234, the drive injects a DC braking current P1232 for the time duration set in P1233.

Index:

- P1234[0] : 1st. Drive data set (DDS)
- P1234[1] : 2nd. Drive data set (DDS)
- P1234[2] : 3rd. Drive data set (DDS)

Details:

See P1232 (DC braking current) and P1233 (duration of DC braking)

P1236[3]	Compound braking current	Min: 0	Level: 3	
	CStat: CUT	Datatype: U16		Unit: %
	P-Group: FUNC	Active: Immediately		QuickComm. No

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 :

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

otherwise :

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

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

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 deteriorated particularly with high values of compound braking.

P1240[3]	Configuration of Vdc controller	Min: 0	Level: 3	
	CStat: CT	Datatype: U16		Unit: -
	P-Group: FUNC	Active: Immediately		QuickComm. No

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

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).

r1242	CO: Switch-on level of Vdc-max Datatype: Float Unit: V	Min: - Def: - Max: -	Level: 3
P-Group: FUNC			
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 CStat: CUT Datatype: U16 Unit: % P-Group: FUNC Active: Immediately QuickComm. No	Min: 10 Def: 100 Max: 200	Level: 3
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.			
P1253[3]	Vdc-controller output limitation CStat: CUT Datatype: Float Unit: Hz P-Group: FUNC Active: Immediately QuickComm. No	Min: 0.00 Def: 10.00 Max: 600.00	Level: 3
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 CStat: CT Datatype: U16 Unit: - P-Group: FUNC Active: Immediately QuickComm. No	Min: 0 Def: 1 Max: 1	Level: 3
Enables/disables auto-detection of switch-on levels for Vdc max controller.			
Possible Settings: 0 Disabled 1 Enabled			

P1260[3]	Bypass control			Min: 0	Level: 2
	CStat: CT	Datatype: U16	Unit: -	Def: 0	
	P-Group: FUNC	Active: first confirm	QuickComm. No	Max: 7	

Selects the possible sources for contactor changeover control.

Possible Settings:

- 0 Bypass disabled
- 1 Controlled by inverter trip
- 2 Controlled by P1266
- 3 Controlled by P1266 or inverter trip
- 4 Controlled by act. frequency = P1265
- 5 Controlled by act. frequency = P1265 or inverter trip
- 6 Controlled by act. frequency = P1265 or P1266
- 7 Controlled by act. frequency = P1265 or P1266 or inverter trip

Index:

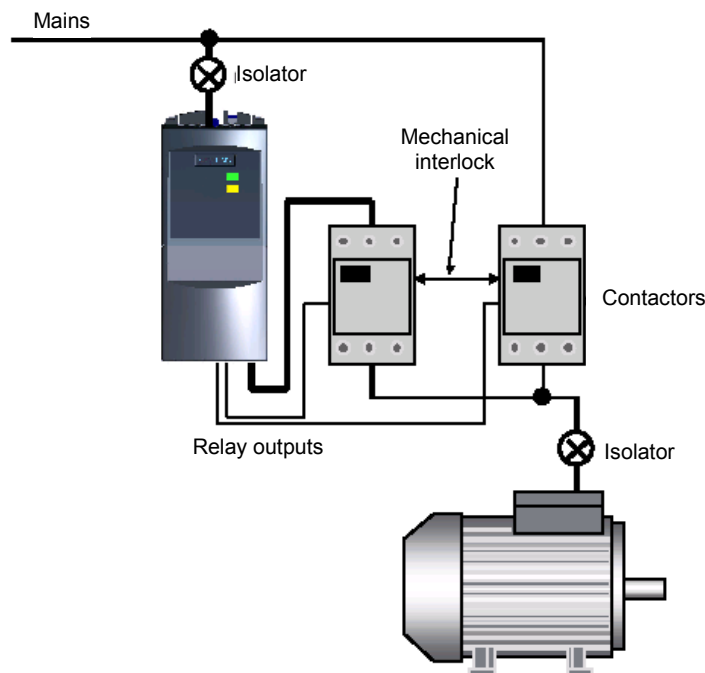
- P1260[0] : 1st. Drive data set (DDS)
- P1260[1] : 2nd. Drive data set (DDS)
- P1260[2] : 3rd. Drive data set (DDS)

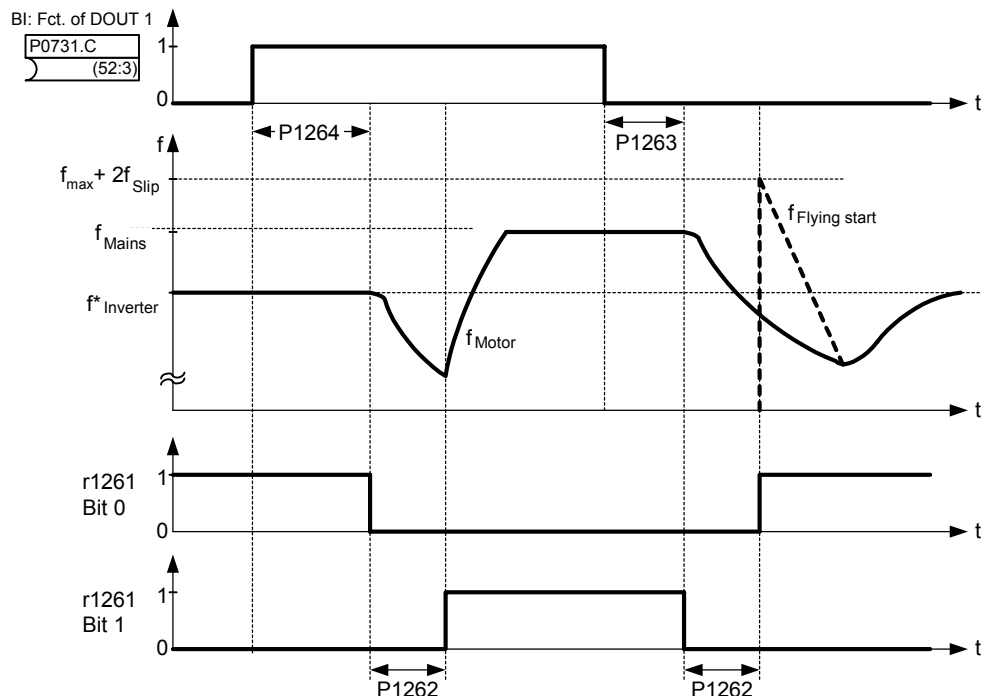
Dependency:

Bypass is used to described the condition when a motor is ran alternatively between a mains supply and the inverter.

For example, the bypass circuit can be used to switch over from the inverter to a mains supply when the inverter is faulty. This function can also be used to ramp-up a large rotation mass using the inverter and then, at the correct speed, switching over to the mains supply.

An example of a bypass circuit is given in the following diagram:





Note:

Flying start P1200 should be enabled in cases where the motor may still be turning after switch-over from bypass-mode to inverter-mode.

r1261	BO: Bypass status word	Datatype: U16	Unit: -	Min: -	Def: -	Max: -	Level:
	P-Group: FUNC						2

Output word from the bypass feature that allows external connections to be made.

Bitfields:

Bit00	Motor supplied by inverter	0	NO
		1	YES
Bit01	Motor supplied by mains	0	NO
		1	YES

P1262[3]	Bypass dead time	Datatype: Float	Unit: s	Min: 0	Def: 1.000	Max: 20.000	Level:
	CStat: CUT	Active: first confirm	QuickComm. No				2

P1262 is the interlock time between switching one contactor OFF, and the other ON. Its minimum value should not be smaller than the motor demagnetisation time P0347.

Index:

- P1262[0] : 1st. Drive data set (DDS)
- P1262[1] : 2nd. Drive data set (DDS)
- P1262[2] : 3rd. Drive data set (DDS)

P1263[3]	De-Bypass time	Datatype: Float	Unit: s	Min: 0	Def: 1.0	Max: 300.0	Level:
	CStat: CUT	Active: first confirm	QuickComm. No				2

This delay timer is used as a delay for all sources of switchover from bypass to inverter control.

If the condition for switching from bypass is removed then this timer is reset, and must run through again before bypass will occur.

Index:

- P1263[0] : 1st. Drive data set (DDS)
- P1263[1] : 2nd. Drive data set (DDS)
- P1263[2] : 3rd. Drive data set (DDS)

P1264[3]	Bypass time			Min: 0	Level: 2
	CStat: CUT	Datatype: Float	Unit: s	Def: 1.0	
	P-Group: FUNC	Active: first confirm	QuickComm. No	Max: 300.0	

This delay timer is used as a delay for all sources of switchover from inverter control to bypass.

If the condition for switching to bypass is removed then this timer is reset, and must run through again before bypass will occur.

Index:

- P1264[0] : 1st. Drive data set (DDS)
- P1264[1] : 2nd. Drive data set (DDS)
- P1264[2] : 3rd. Drive data set (DDS)

P1265[3]	Bypass frequency			Min: 12.00	Level: 2
	CStat: CT	Datatype: Float	Unit: Hz	Def: 50.00	
	P-Group: FUNC	Active: first confirm	QuickComm. No	Max: 650.00	

Bypass frequency.

Index:

- P1265[0] : 1st. Drive data set (DDS)
- P1265[1] : 2nd. Drive data set (DDS)
- P1265[2] : 3rd. Drive data set (DDS)

P1266[3]	BI: Bypass command			Min: 0:0	Level: 2
	CStat: CT	Datatype: U32	Unit: -	Def: 0:0	
	P-Group: FUNC	Active: first confirm	QuickComm. No	Max: 4000:0	

Bypass Control P1260 can be controlled by an external switch which is connected to the inverter. The P1266 BI: Bypass command selects the interface (e.g. DIN, USS or CB) from which the signal originates.

Index:

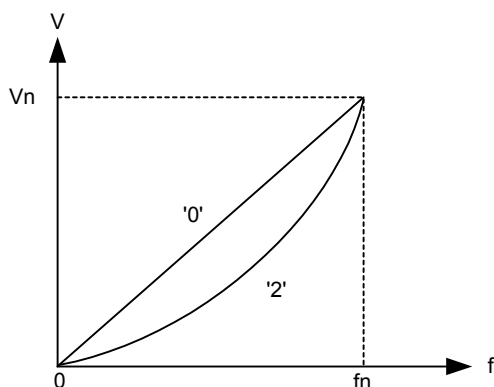
- P1266[0] : 1st. Command data set (CDS)
- P1266[1] : 2nd. Command data set (CDS)
- P1266[2] : 3rd. Command data set (CDS)

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)

P1300[3]	Control mode			Min: 0	Level: 3
	CStat: CT	Datatype: U16	Unit: -	Def: 1	
	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	reserved
21	reserved
22	reserved
23	reserved

Index:

P1300[0]	: 1st. Drive data set (DDS)
P1300[1]	: 2nd. Drive data set (DDS)
P1300[2]	: 3rd. Drive data set (DDS)

Dependency:

See parameter P0205, P0500

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 textile applications
 * Slip compensation disabled.
 * I_{max} controller modifies the output voltage only.
 * I_{max} controller does not influence the output frequency.

P1300 = 19 : V/f control with independent voltage setpoint

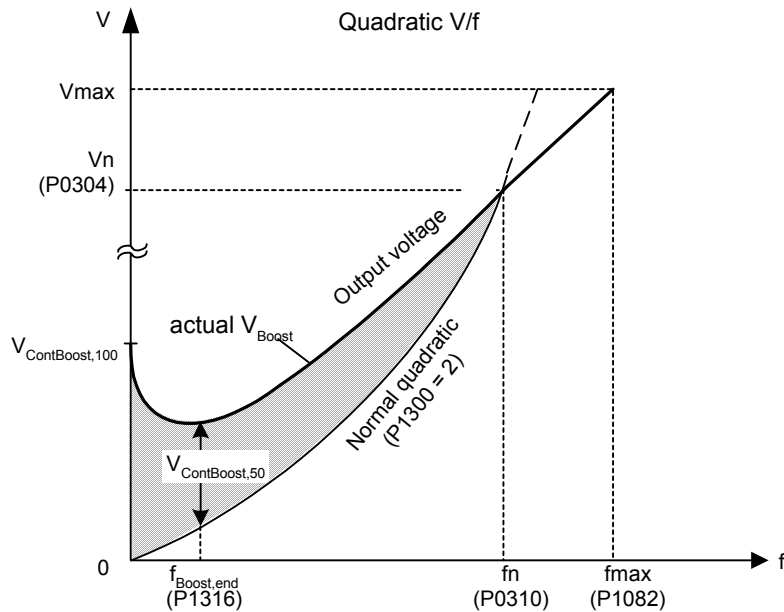
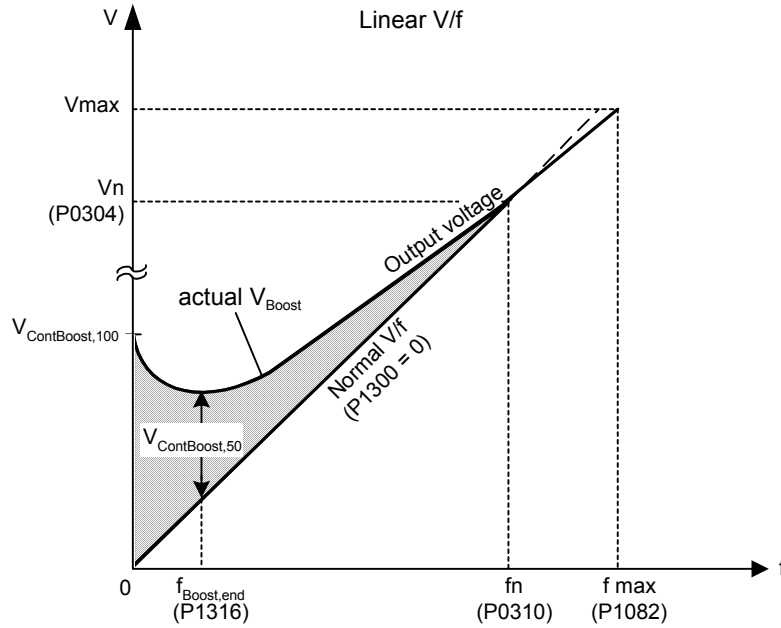
The following table presents an overview of control parameters (V/f) that can be modify in relationship to P1300 dependencies:

Par No.	ParText	Level	U/f						
			P1300 =						
			0	1	2	3	5	6	19
P1300[3]	Control mode	2	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]	Cl: voltage setpoint	3	-	-	-	-	-	-	x
P1333[3]	Start frequency for FCC	3	-	x	-	-	-	x	-
P1335[3]	Slip compensation	2	x	x	x	x	-	-	-
P1336[3]	Slip limit	2	x	x	x	x	-	-	-
P1338[3]	Resonance damping gain V/f	3	x	x	x	x	-	-	-
P1340[3]	I _{max} controller prop. gain	3	x	x	x	x	x	x	x
P1341[3]	I _{max} controller integral time	3	x	x	x	x	x	x	x
P1345[3]	I _{max} controller prop. gain	3	x	x	x	x	x	x	x
P1346[3]	I _{max} controller integral time	3	x	x	x	x	x	x	x
P1350[3]	Voltage soft start	3	x	x	x	x	x	x	x

P1310[3]	Continuous boost	Datatype: Float	Unit: %	Min: 0.0	Level: 3
	CStat: CUT	Active: Immediately	QuickComm. No	Def: 50.0	
	P-Group: CONTROL			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

$$V_ConBoost,100 = \text{rated motor current (P0305)} * \text{Stator resistance (P0350)} * \text{Continuous boost (P1310)}$$

$$V_ConBoost,50 = V_ConBoost,100 / 2$$

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.

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:

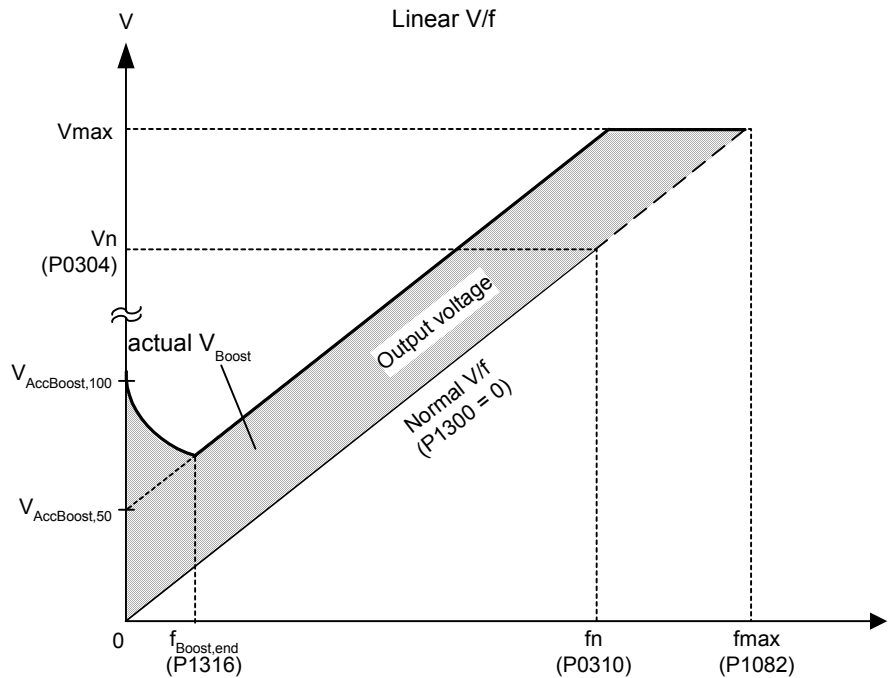
Increasing the boost levels increases motor heating (especially at standstill).

$$\sum \text{Boosts} \leq 300 \cdot R_s \cdot I_{\text{mot}}$$

P1311[3]	Acceleration boost	Datatype: Float	Unit: %	Min: 0.0	Level: 3
	CStat: CUT 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

$$V_{\text{AccBoost},100} = \text{rated motor current (P0305)} \cdot \text{Stator resistance (P0350)} \cdot \text{Acceleration boost (P1311)}$$

$$V_{\text{AccBoost},50} = V_{\text{AccBoost},100} / 2$$

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.

Note:

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

$$\sum \text{Boosts} \leq 300 \cdot R_s \cdot I_{\text{mot}}$$

Notice:

Increasing the boost level increases motor heating.

Details:

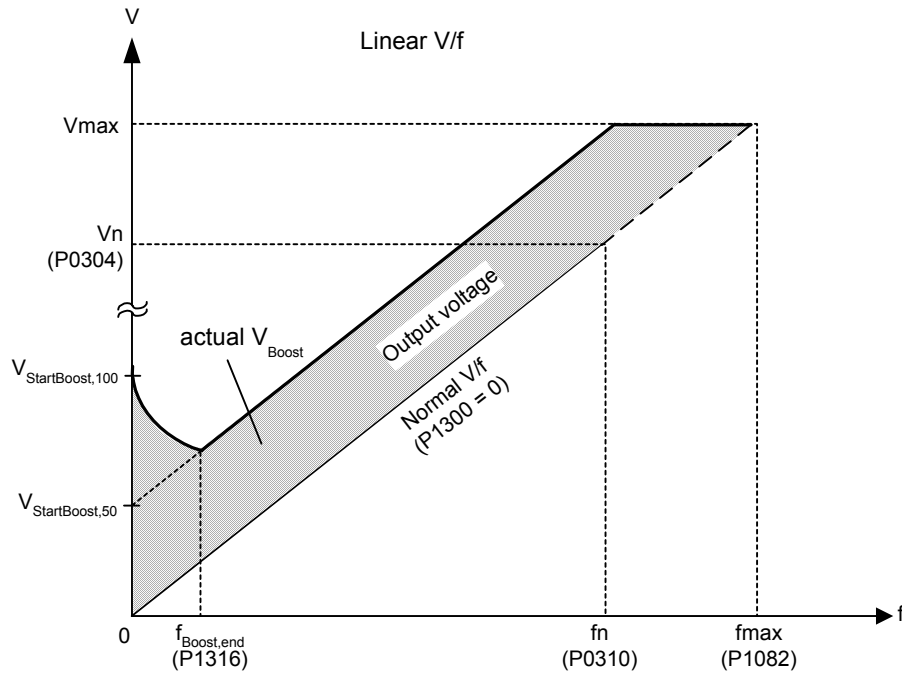
See note in P1310 for boost priorities.

P1312[3]	Starting boost			Min: 0.0	Level: 3
	CStat: CUT	Datatype: Float	Unit: %	Def: 0.0	
	P-Group: CONTROL	Active: Immediately	QuickComm. No	Max: 250.0	

Applies a constant linear offset (in [%] relative to P0305 (rated motor current)) to active V/f curve (either linear or quadratic) after an ON command and is active until
 1) ramp output reaches setpoint for the first time respectively
 2) setpoint is reduced to less than present ramp output

This is useful for starting loads with high inertia.

Setting the starting boost (P1312) too high will cause the inverter to limit the current, which will in turn restrict the output frequency to below the setpoint frequency.



where voltage values are given

$$V_StartBoost,100 = \text{rated motor current (P0305)} \cdot \text{Stator resistance (P0350)} \cdot \text{Starting boost (P1312)}$$

$$V_StartBoost,50 = V_StartBoost,100 / 2$$

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.

Notice:

Increasing the boost levels increases motor heating.

$$\sum \text{Boosts} \leq 300 \cdot R_s \cdot I_{mot}$$

Details:

See note in P1310 for boost priorities.

P1316[3]	Boost end frequency	Datatype: Float	Unit: %	Min: 0.0	Level: 3
	CStat: CUT	Active: Immediately	QuickComm. No	Def: 20.0	
	P-Group: CONTROL			Max: 100.0	

Defines point at which programmed boost reaches 50 % of its value.

This value is expressed in [%] relative to P0310 (rated motor frequency).

The default frequency is defined as follows:

$$f_{\text{Boost min}} = 2 \cdot \left(\frac{153}{\sqrt{P_{\text{motor}}}} + 3 \right)$$

Index:

- P1316[0] : 1st. Drive data set (DDS)
- P1316[1] : 2nd. Drive data set (DDS)
- P1316[2] : 3rd. Drive data set (DDS)

Note:

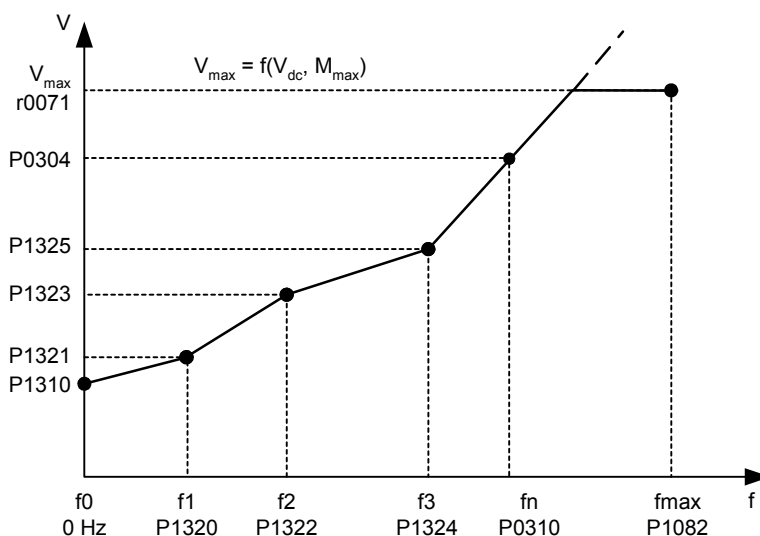
The expert user may change this value to alter the shape of the curve, e.g. to increase torque at a particular frequency.

Details:

See diagram in P1310 (continuous boost).

P1320[3]	Programmable V/f freq. coord. 1	Datatype: Float	Unit: Hz	Min: 0.00	Level: 3
	CStat: CT	Active: Immediately	QuickComm. No	Def: 0.00	
	P-Group: CONTROL			Max: 650.00	

Sets V/f coordinates (P1320/1321 to P1324/1325) to define V/f characteristic.



$$P1310[V] = \frac{P1310[\%]}{100[\%]} \cdot \frac{r0395[\%]}{100[\%]} \cdot P0304[V]$$

Index:

- P1320[0] : 1st. Drive data set (DDS)
- P1320[1] : 2nd. Drive data set (DDS)
- P1320[2] : 3rd. Drive data set (DDS)

Example:

This parameter can be used to provide correct torque at correct frequency and is useful when used with synchronous motors.

Dependency:

To set parameter, select P1300 = 3 (V/f with programmable characteristic).

Note:

Linear interpolation will be applied between the individual data points.

V/f with programmable characteristic (P1300 = 3) has 3 programmable points. The two non-programmable points are:

- Continuous boost P1310 at zero 0 Hz
- Rated motor voltage P0304 at rated motor frequency P0310

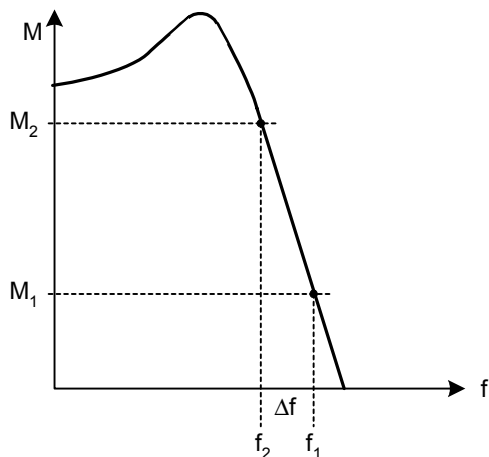
The acceleration boost and starting boost defined in P1311 and P1312 are applied to V/f with programmable characteristic.

P1321[3]	Programmable V/f volt. coord. 1	Min: 0.0	Level:
	CStat: CUT Datatype: Float Unit: V Def: 0.0 P-Group: CONTROL Active: Immediately QuickComm. No Max: 3000.0		3
	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	Min: 0.00	Level:
	CStat: CT Datatype: Float Unit: Hz Def: 0.00 P-Group: CONTROL Active: Immediately QuickComm. No Max: 650.00		3
	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	Min: 0.0	Level:
	CStat: CUT Datatype: Float Unit: V Def: 0.0 P-Group: CONTROL Active: Immediately QuickComm. No Max: 3000.0		3
	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	Min: 0.00	Level:
	CStat: CT Datatype: Float Unit: Hz Def: 0.00 P-Group: CONTROL Active: Immediately QuickComm. No Max: 650.00		3
	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	Min: 0.0	Level:
	CStat: CUT Datatype: Float Unit: V Def: 0.0 P-Group: CONTROL Active: Immediately QuickComm. No Max: 3000.0		3
	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]	Cl: Voltage setpoint	Min: 0:0	Level:
	CStat: T Datatype: U32 Unit: - Def: 0:0 P-Group: CONTROL Active: first confirm QuickComm. No Max: 4000:0		3
	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	Min: 0.0	Level:
	CStat: CUT Datatype: Float Unit: % Def: 10.0 P-Group: CONTROL Active: Immediately QuickComm. No Max: 100.0		3
	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	Datatype: Float	Unit: %	Min: 0.0	Level: 3
	CStat: CUT	Active: Immediately	QuickComm. No	Def: 0.0	
	P-Group: CONTROL			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	Datatype: U16	Unit: %	Min: 0	Level: 3
	CStat: CUT	Active: Immediately	QuickComm. No	Def: 250	
	P-Group: CONTROL			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	Datatype: Float	Unit: %	Min: -	Level: 3
	P-Group: CONTROL			Def: -	
				Max: -	

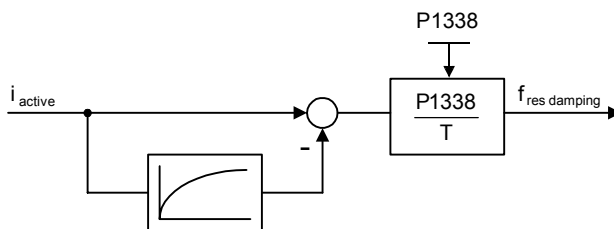
Displays actual compensated motor slip as [%]

Dependency:

Slip compensation (P1335) active.

P1338[3]	Resonance damping gain V/f				Min: 0.00	Level: 3
	CStat: CUT	Datatype: Float	Unit: -	Def: 0.00		
	P-Group: CONTROL	Active: Immediately	QuickComm. No	Max: 10.00		

Defines resonance damping gain for V/f. Here, di/dt of the active 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]	I_{max} freq. controller prop. gain				Min: 0.000	Level: 3
	CStat: CUT	Datatype: Float	Unit: -	Def: 0.000		
	P-Group: CONTROL	Active: Immediately	QuickComm. No	Max: 0.499		

Proportional gain of the I_{max} frequency controller.

The I_{max} 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]	I_{max} freq. ctrl. integral time				Min: 0.000	Level: 3
	CStat: CUT	Datatype: Float	Unit: s	Def: 0.300		
	P-Group: CONTROL	Active: Immediately	QuickComm. No	Max: 50.000		

Integral time constant of the I_{max} controller.

P1341 = 0 :
I_{max} frequency and voltage controllers disabled

P1340 = 0 and P1341 > 0 :
frequency controller enhanced integral

P1340 > 0 and P1341 > 0 :
frequency controller normal PI control

See description in parameter P1340 for further information.

Index:

- P1341[0] : 1st. Drive data set (DDS)
- P1341[1] : 2nd. Drive data set (DDS)
- P1341[2] : 3rd. Drive data set (DDS)

r1343	CO: I_{max} controller freq. output	Datatype: Float	Unit: Hz	Min: -	Level: 3
	P-Group: CONTROL			Def: - Max: -	

Displays effective frequency limitation.

Dependency:

If I_{max} controller not in operation, parameter normally shows max. frequency P1082.

r1344	CO: I_{max} controller volt. output	Datatype: Float	Unit: V	Min: -	Level: 3
	P-Group: CONTROL			Def: - Max: -	

Displays amount by which the I_{max} controller is reducing the inverter output voltage.

P1345[3]	I_{max} voltage ctrl. prop. gain	Datatype: Float	Unit: -	Min: 0.000	Level: 3
	CStat: CUT			Def: 0.250	
	P-Group: CONTROL	Active: Immediately	QuickComm. No	Max: 5.499	

Proportional gain of the I_{max} voltage controller. See parameter P1340 for further information.

Index:

P1345[0] : 1st. Drive data set (DDS)
P1345[1] : 2nd. Drive data set (DDS)
P1345[2] : 3rd. Drive data set (DDS)

P1346[3]	I_{max} voltage ctrl. integral time	Datatype: Float	Unit: s	Min: 0.000	Level: 3
	CStat: CUT			Def: 0.300	
	P-Group: CONTROL	Active: Immediately	QuickComm. No	Max: 50.000	

Integral time constant of the I_{max} voltage controller.

P1341 = 0 :

I_{max} frequency and voltage controllers disabled.

P1345 = 0 and P1346 > 0 :

I_{max} voltage controller enhanced integral

P1345 > 0 and P1346 > 0 :

I_{max} voltage controller normal PI control

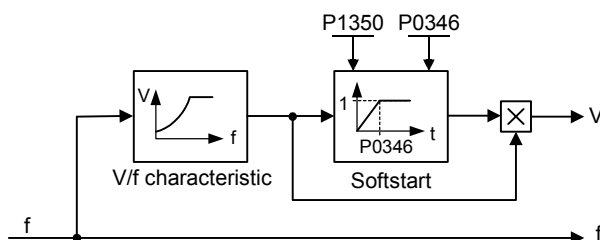
See description in parameter P1340 for further information.

Index:

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

P1350[3]	Voltage soft start	Datatype: U16	Unit: -	Min: 0	Level: 3
	CStat: CUT			Def: 0	
	P-Group: CONTROL	Active: first confirm	QuickComm. No	Max: 1	

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

P1800	Pulse frequency			Min: 2	Level: 2
	CStat: CUT	Datatype: U16	Unit: kHz	Def: 4	
	P-Group: INVERTER	Active: Immediately	QuickComm. No	Max: 16	

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 manual 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			Min: -	Level: 3
		Datatype: U16	Unit: kHz	Def: -	
	P-Group: INVERTER			Max: -	

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

Selects inverter modulator mode.

Possible Settings:

- 0 SVM/ASVM automatic mode
- 1 Asymmetric SVM
- 2 Space vector modulation
- 3 SVM/ASVM controlled mode

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.

P1820[3]	Reverse output phase sequence			Min: 0	Level: 3
	CStat: CT	Datatype: U16	Unit: -	Def: 0	
	P-Group: INVERTER	Active: first confirm	QuickComm. No	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)

P1910	Select motor data identification				Min: 0	Level: 3
	CStat: CT	Datatype: U16	Unit: -	Def: 0		
	P-Group: MOTOR	Active: first confirm	QuickComm. Yes	Max: 20		

Performs a motor data identification.

Performs stator resistance measuring.

Possible Settings:

- 0 Disabled
- 1 Identification of Rs with parameter change
- 2 Identification of Rs without parameter change
- 20 Set voltage vector

Dependency:

No measurement if motor data incorrect.

P1910 = 1 : Calculated value for stator resistance (see P0350) is overwritten.

P1910 = 2 : Values already calculated are not overwritten.

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 value is actually adopted as P0350 parameter setting and applied to the control as well as being shown in the read-only parameters below.
2. "without parameter change"
means that the value is only displayed, i.e. shown for checking purposes in the read-only parameter r1912 (identified stator resistance). The value is not applied to the control.

P1911	No. of phase to be identified				Min: 1	Level: 3
	CStat: CT	Datatype: U16	Unit: -	Def: 3		
	P-Group: INVERTER	Active: Immediately	QuickComm. No	Max: 3		

Selects maximum number of motor phases to be identified.

r1912[3]	Identified stator resistance				Min: -	Level: 3
			Datatype: Float	Unit: Ohm	Def: -	
	P-Group: MOTOR				Max: -	

Displays measured stator resistance value (line-to-line) in [Ohms]

Index:

- r1912[0] : U_phase
- r1912[1] : V_phase
- r1912[2] : W_phase

Note:

This value is measured using P1910 = 1 or 2 , i.e., identification of all parameters with/without change.

r1925	Identified on-state voltage				Min: -	Level: 3
			Datatype: Float	Unit: V	Def: -	
	P-Group: INVERTER				Max: -	

Displays identified on-state voltage of IGBT.

r1926	Ident. gating unit dead time				Min: -	Level: 3
			Datatype: Float	Unit: us	Def: -	
	P-Group: INVERTER				Max: -	

Displays identified dead time of gating unit interlock.

P2000[3]	Reference frequency	Datatype: Float	Unit: Hz	Min: 1.00	Level: 2
	CStat: CT	Active: first confirm	QuickComm. No	Def: 50.00	
	P-Group: COMM			Max: 650.00	

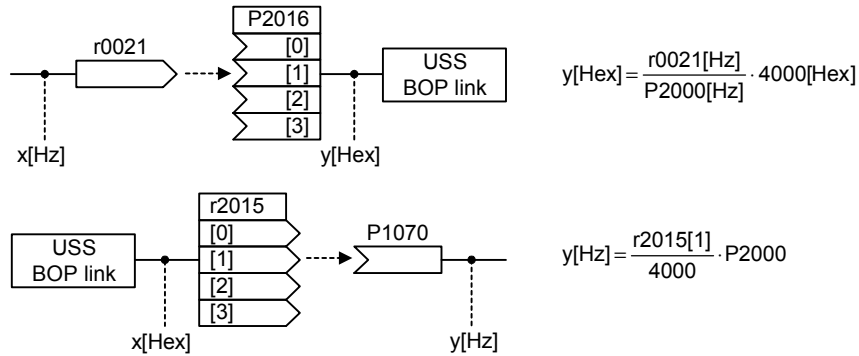
Full-scale frequency setting used by serial link (corresponds to 4000H), analog I/O and P/D controller.

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.



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 percentage. A value of 100 % (USS / CB) corresponds 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	Datatype: U16	Unit: V	Min: 10	Level: 3
	CStat: CT	Active: first confirm	QuickComm. No	Def: 1000	
	P-Group: COMM			Max: 2000	

Full-scale output voltage (i.e. 100 %) used over serial link (corresponds to 4000H).

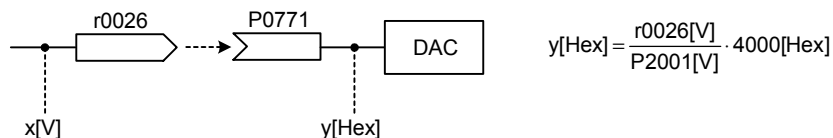
Index:

- 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.



P2002[3]	Reference current	Min: 0.10	Level: 3	
	CStat: CT	Datatype: Float		Unit: A
	P-Group: COMM	Active: first confirm		QuickComm. No
		Def: 0.10		
		Max: 10000.00		

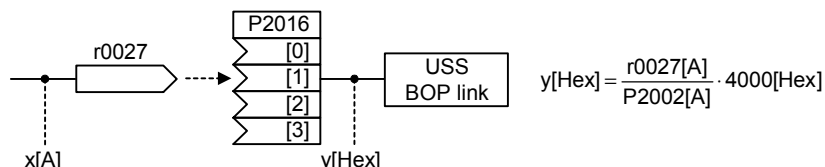
Full-scale output current used over serial link (corresponds to 4000H).

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	Min: 0.10	Level: 3	
	CStat: CT	Datatype: Float		Unit: Nm
	P-Group: COMM	Active: first confirm		QuickComm. No
		Def: 0.75		
		Max: 99999.00		

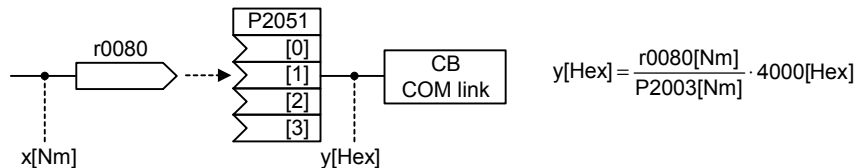
Full-scale reference torque used over the serial link (corresponds to 4000H).

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

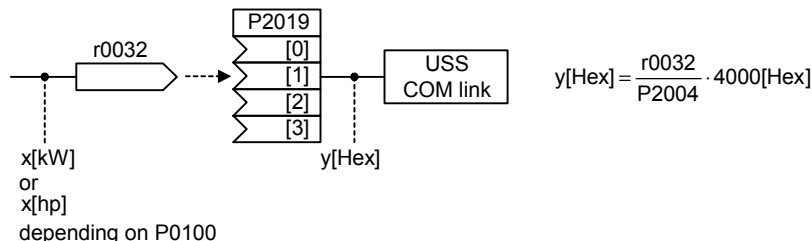
Full-scale reference power used over the serial link (corresponds to 4000H).

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	Min: 0	Level: 3	
	CStat: CT	Datatype: U16		Unit: -
	P-Group: COMM	Active: first confirm		QuickComm. No

Def: 0
Max: 1

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	Min: 4	Level: 3	
	CStat: CUT	Datatype: U16		Unit: -
	P-Group: COMM	Active: first confirm		QuickComm. No

Def: 6
Max: 12

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

Def: 0
Max: 31

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: 3	
	CStat: CUT	Datatype: U16		Unit: -
	P-Group: COMM	Active: first confirm		QuickComm. No Max: 8

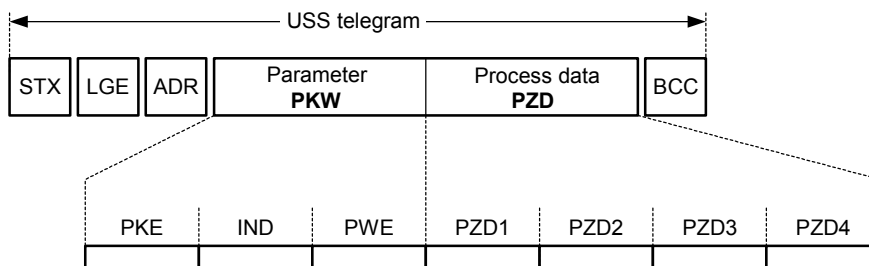
Defines the number of 16-bit words in PZD part of USS telegram. In this area, process data (PZD) are continually exchanged between the master and slaves. The PZD part of the USS telegram is used for the main setpoint, and to control the inverter.

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.

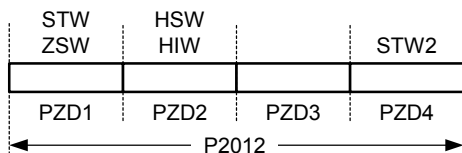


- | | | | |
|-----|-----------------------|-----|-----------------|
| STX | Start of text | PKE | Parameter ID |
| LGE | Length | IND | Sub-index |
| ADR | Address | PWE | Parameter value |
| PKW | Parameter ID value | | |
| PZD | Process data | | |
| BCC | Block check character | | |

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	Datatype: U16	Unit: -	Min: 0	Level: 3
	CStat: CUT	Active: first confirm	QuickComm. No	Def: 127	
	P-Group: COMM			Max: 127	

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

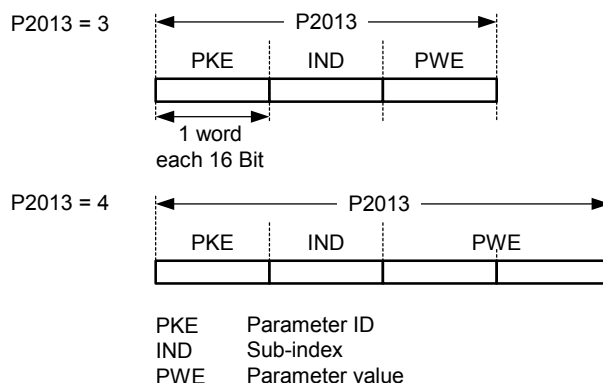
Example:

	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, 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	Min: 0	Level:
	CStat: CT Datatype: U16 Unit: ms Def: 0		3
	P-Group: COMM Active: Immediately QuickComm. No 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:

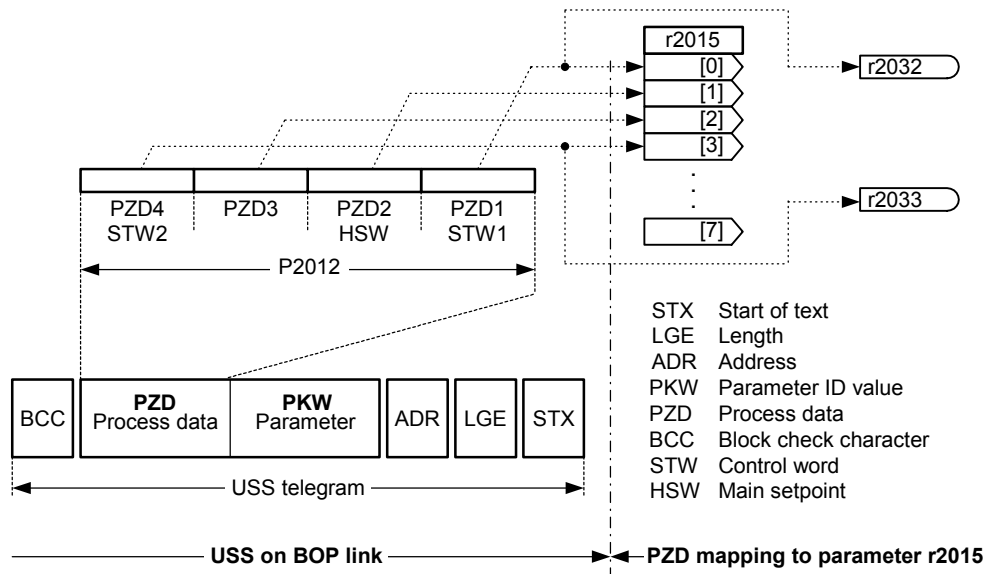
- P2014[0] : Serial interface COM link
- P2014[1] : Serial interface BOP link

Notice:

By default (time set to 0), no fault is generated (i.e. watchdog disabled).

r2015[8]	CO: PZD from BOP link (USS)	Min: -	Level:
	Datatype: U16 Unit: - Def: -		3
	P-Group: COMM Max: -		

Displays process data received via USS on BOP link (RS232 USS).



Index:

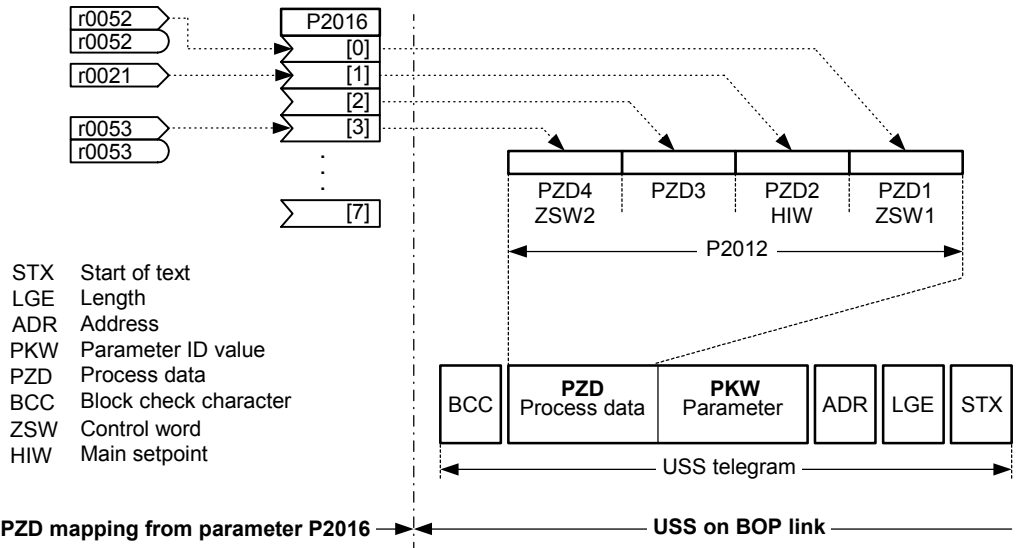
- r2015[0] : Received word 0
- r2015[1] : Received word 1
- r2015[2] : Received word 2
- r2015[3] : Received word 3
- r2015[4] : Received word 4
- r2015[5] : Received word 5
- r2015[6] : Received word 6
- r2015[7] : Received word 7

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: 3
	CStat: CT	Datatype: U32	Unit: -	Def: 52:0		
	P-Group: COMM	Active: Immediately	QuickComm. No	Max: 4000:0		

Selects signals to be transmitted to serial interface via BOP link.



Index:

- P2016[0] : Transmitted word 0
- P2016[1] : Transmitted word 1
- P2016[2] : Transmitted word 2
- P2016[3] : Transmitted word 3
- P2016[4] : Transmitted word 4
- P2016[5] : Transmitted word 5
- P2016[6] : Transmitted word 6
- P2016[7] : Transmitted word 7

Example:

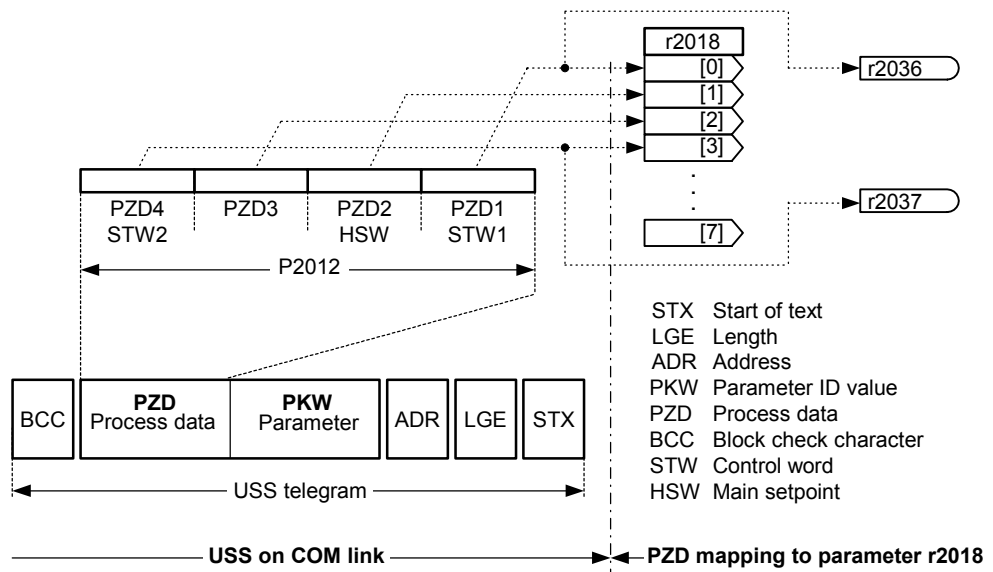
P2016[0] = 52.0 (default). In this case, the value of r0052[0] (CO/BO: Status word) is transmitted as 1st PZD to the BOP link.

Note:

If r0052 not indexed, display does not show an index ("0").

r2018[8]	CO: PZD from COM link (USS)	Min: -	Level:
	Datatype: U16 Unit: -	Def: -	3
P-Group: COMM		Max: -	

Displays process data received via USS on COM link.



Index:

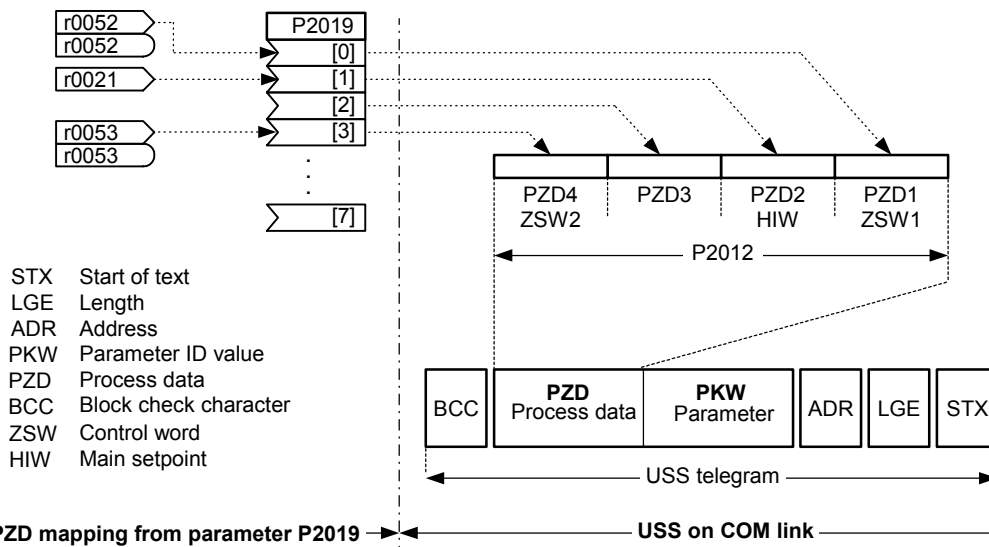
- r2018[0] : Received word 0
- r2018[1] : Received word 1
- r2018[2] : Received word 2
- r2018[3] : Received word 3
- r2018[4] : Received word 4
- r2018[5] : Received word 5
- r2018[6] : Received word 6
- r2018[7] : Received word 7

Note:

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

P2019[8]	CI: PZD to COM 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		

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	Min: -	Level:
	Datatype: U16 Unit: - Def: -		3
	P-Group: COMM Max: -		

Displays number of error-free USS telegrams received.

Index:

- r2024[0] : Serial interface COM link
- r2024[1] : Serial interface BOP link

r2025[2]	USS rejected telegrams	Min: -	Level:
	Datatype: U16 Unit: - Def: -		3
	P-Group: COMM Max: -		

Displays number of USS telegrams rejected.

Index:

- r2025[0] : Serial interface COM link
- r2025[1] : Serial interface BOP link

r2026[2]	USS character frame error	Min: -	Level:
	Datatype: U16 Unit: - Def: -		3
	P-Group: COMM Max: -		

Displays number of USS character frame errors.

Index:

- r2026[0] : Serial interface COM link
- r2026[1] : Serial interface BOP link

r2027[2]	USS overrun error	Min: -	Level:
	Datatype: U16 Unit: - Def: -		3
	P-Group: COMM Max: -		

Displays number of USS telegrams with overrun error.

Index:

- r2027[0] : Serial interface COM link
- r2027[1] : Serial interface BOP link

r2028[2]	USS parity error	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level: 3
	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	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level: 3
	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	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level: 3
	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	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level: 3
	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)	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level: 3
	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)	Min: -	Level: 3
	Datatype: U16	Def: -	
	Unit: -	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)	Min: -	Level: 3
	Datatype: U16	Def: -	
	Unit: -	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)	Datatype: U16	Unit: -	Min: -	Level: 3
	P-Group: COMM			Def: - Max: -	

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	Datatype: U16	Unit: ms	Min: 0	Level: 3
	CStat: CT	Active: Immediately	QuickComm. No	Def: 20 Max: 65535	

Defines time after which a fault will be generated (F0070) if no telegram is received via the link.

Dependency:

Setting 0 = watchdog disabled

P2041[5]	CB parameter	Datatype: U16	Unit: -	Min: 0	Level: 3
	CStat: CT	Active: first confirm	QuickComm. No	Def: 0 Max: 65535	

Configures a communication board (CB).

Index:

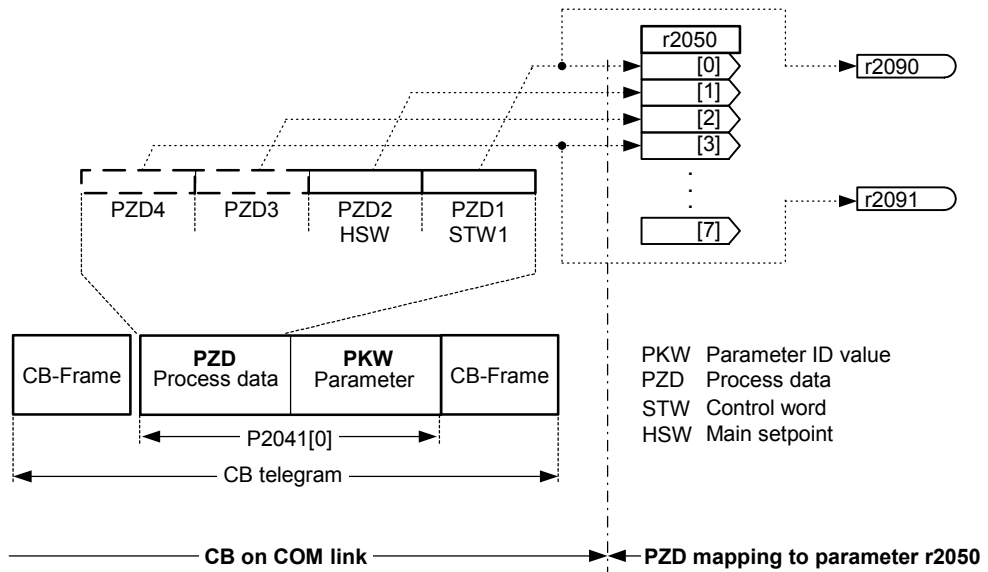
P2041[0]	: CB parameter 0
P2041[1]	: CB parameter 1
P2041[2]	: CB parameter 2
P2041[3]	: CB parameter 3
P2041[4]	: CB parameter 4

Details:

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

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

Displays PZD received from communication board (CB).



Index:

- r2050[0] : Received word 0
- r2050[1] : Received word 1
- r2050[2] : Received word 2
- r2050[3] : Received word 3
- r2050[4] : Received word 4
- r2050[5] : Received word 5
- r2050[6] : Received word 6
- r2050[7] : Received word 7

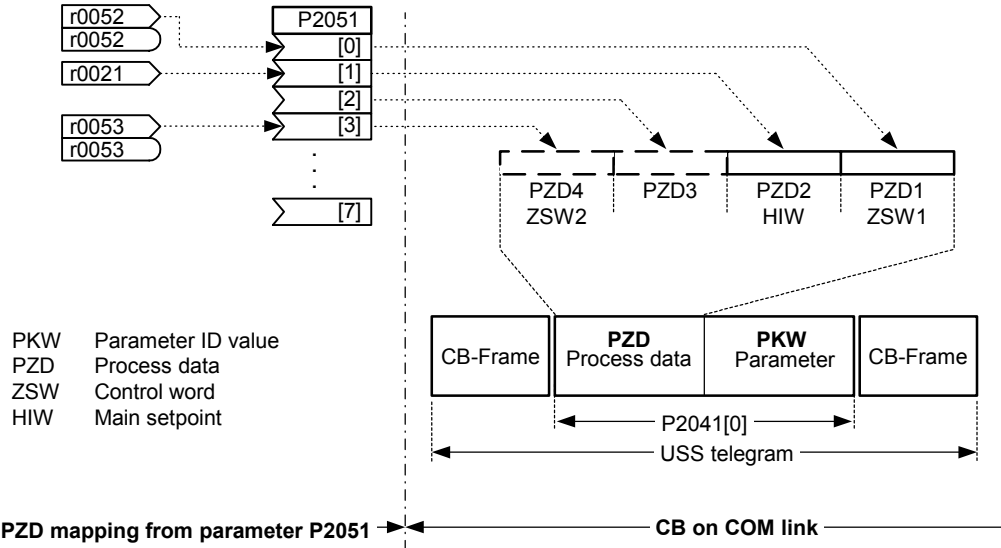
Note:

The control words can be viewed as bit parameters r2090 and r2091.

P2051[8]	CI: PZD to CB	Datatype: U32	Unit: -	Min: 0:0	Level: 3
	CStat: CT	Active: Immediately	QuickComm. No	Def: 52:0	
	P-Group: COMM			Max: 4000:0	

Connects PZD to CB.

This parameter allows the user to define the source of status words and actual values for the reply PZD.



Index:

- P2051[0] : Transmitted word 0
- P2051[1] : Transmitted word 1
- P2051[2] : Transmitted word 2
- P2051[3] : Transmitted word 3
- P2051[4] : Transmitted word 4
- P2051[5] : Transmitted word 5
- P2051[6] : Transmitted word 6
- P2051[7] : Transmitted word 7

Common Settings:

- Status word 1 = 52 CO/BO: Act. status word 1 (see r0052)
- Actual value 1 = 21 inverter output frequency (see r0021)

Other BICO settings are possible

r2053[5]	CB identification	Datatype: U16	Unit: -	Min: -	Level: 3
	P-Group: COMM			Def: -	
				Max: -	

Displays identification data of the communication board (CB). The different CB types (r2053[0]) are given in the Enum declaration.

Possible Settings:

- 0 No CB option board
- 1 PROFIBUS DP
- 2 DeviceNet
- 256 not defined

Index:

- r2053[0] : CB type (PROFIBUS = 1)
- r2053[1] : Firmware version
- r2053[2] : Firmware version detail
- r2053[3] : Firmware date (year)
- r2053[4] : Firmware date (day/month)

r2054[7]	CB diagnosis	Datatype: U16	Unit: -	Min: -	Level: 3
	P-Group: COMM			Def: -	
				Max: -	

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: -	Level: 3
	P-Group: COMM			Def: -	
				Max: -	

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: -	Level: 3
	P-Group: COMM			Def: - Max: -	

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	Datatype: U16	Unit: -	Min: 0	Level: 3
	CStat: CT	Active: first confirm	QuickComm. No	Def: 0 Max: 65535	

Selects up to 3 faults or warnings for non-default reactions.

Index:

P2100[0] : Fault Number 1
P2100[1] : Fault Number 2
P2100[2] : Fault Number 3

Example:

If you want F0005 to perform an OFF3 instead of an OFF2, set P2100[0] = 5, then select the desired reaction in P2101[0] (in this case, set P2101[0] = 3).

Note:

All fault codes have a default reaction to OFF2. Some fault codes caused by hardware trips (e.g. overcurrent) cannot be changed from the default reactions.

P2101[3]	Stop reaction value	Datatype: U16	Unit: -	Min: 0	Level: 3
	CStat: CT	Active: first confirm	QuickComm. No	Def: 0 Max: 5	

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
5	Goto fixed frequency 15

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.

Setting 5 is only available for the following fault codes: -
70, 71, 72, 80. It is used when a source of setpoint is lost, allowing the drive to run to fixed frequency 15.

Index 0 (P2101) refers to fault/warning in index 0 (P2100).

P2103[3]	BI: 1. Faults acknowledgement	Min: 0:0	Level: 3
	CStat: CT Datatype: U32 Unit: - Def: 722:2		
	P-Group: COMMANDS Active: first confirm QuickComm. No 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	Min: 0:0	Level: 3
	CStat: CT Datatype: U32 Unit: - Def: 0:0		
	P-Group: COMMANDS Active: first confirm QuickComm. No 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	Min: 0:0	Level: 3
	CStat: CT Datatype: U32 Unit: - Def: 1:0		
	P-Group: COMMANDS Active: first confirm QuickComm. No 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	Min: -	Level: 3
	Datatype: U16 Unit: - 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	Min: 0	Level:
	CStat: CT Datatype: U16 Unit: - Def: 0		3
	P-Group: ALARMS Active: first confirm QuickComm. No 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	Min: -	Level:
	Datatype: U16 Unit: - Def: -		3
	P-Group: ALARMS 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.

Total powerup time= 65536*r2114[0]+r2114[1] Secs.

When AOP is not connected, the time in this parameter is used by r0948 to indicate when a fault has occurred.

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	Min: 0	Level:
	CStat: CT Datatype: U16 Unit: - Def: 0		3
	P-Group: ALARMS Active: Immediately QuickComm. No Max: 65535		

Displays AOP real time.

Index:

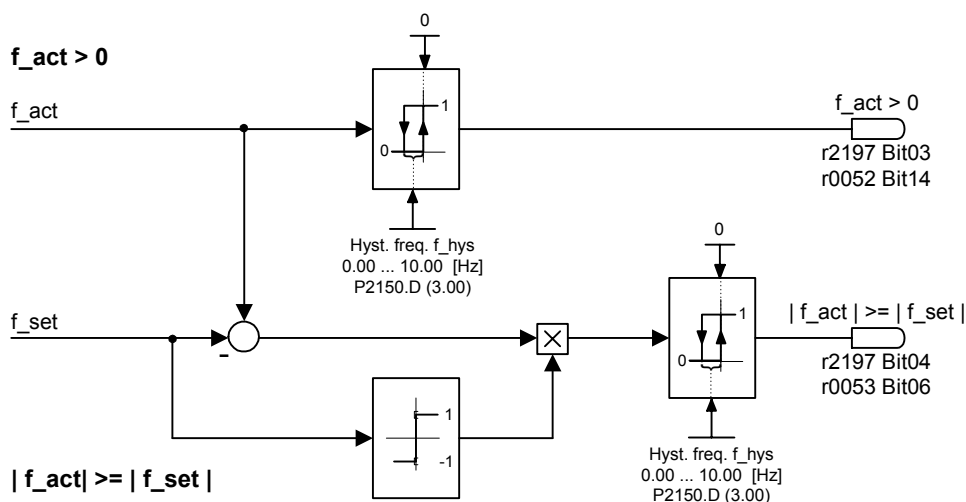
P2115[0] : Real Time, Seconds+Minutes
P2115[1] : Real Time, Hours+Days
P2115[2] : Real Time, Month+Year

Details:

See r0948 (fault time).

P2150[3]	Hysteresis frequency f_hys	Min: 0.00	Level:
	CStat: CUT Datatype: Float Unit: Hz Def: 3.00		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	Min: 0	Level:
	CStat: CUT	Datatype: U16	Def: 5
	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:

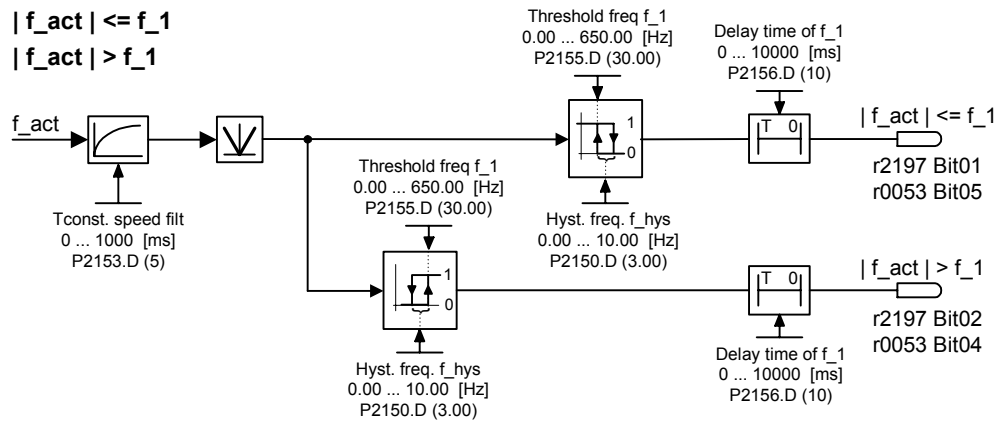
- P2153[0] : 1st. Drive data set (DDS)
- P2153[1] : 2nd. Drive data set (DDS)
- P2153[2] : 3rd. Drive data set (DDS)

Details:

See diagram in P2155, P2157 and P2159

P2155[3]	Threshold frequency f₁	Min: 0.00	Level:
	CStat: CUT	Datatype: Float	Def: 30.00
	P-Group: ALARMS	Active: Immediately	QuickComm. No Max: 650.00

Sets a threshold for comparing actual speed or frequency to threshold values f₁. 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 f₁	Min: 0	Level:
	CStat: CUT	Datatype: U16	Def: 10
	P-Group: ALARMS	Active: Immediately	QuickComm. No Max: 10000

Sets delay time prior to threshold frequency f₁ comparison (P2155).

Index:

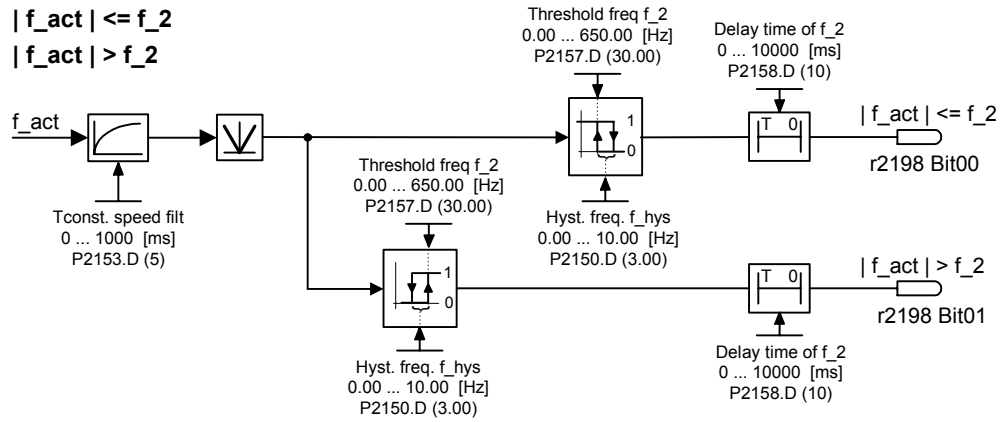
- P2156[0] : 1st. Drive data set (DDS)
- P2156[1] : 2nd. Drive data set (DDS)
- P2156[2] : 3rd. Drive data set (DDS)

Details:

See diagram in P2155 (threshold frequency f₁)

P2157[3]	Threshold frequency f_2			Min: 0.00	Level: 3
	CStat: CUT	Datatype: Float	Unit: Hz	Def: 30.00	
	P-Group: ALARMS	Active: Immediately	QuickComm. No	Max: 650.00	

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

When comparing speed or frequency to threshold f_2 (P2157). This is the time delay before status bits are cleared.

Index:

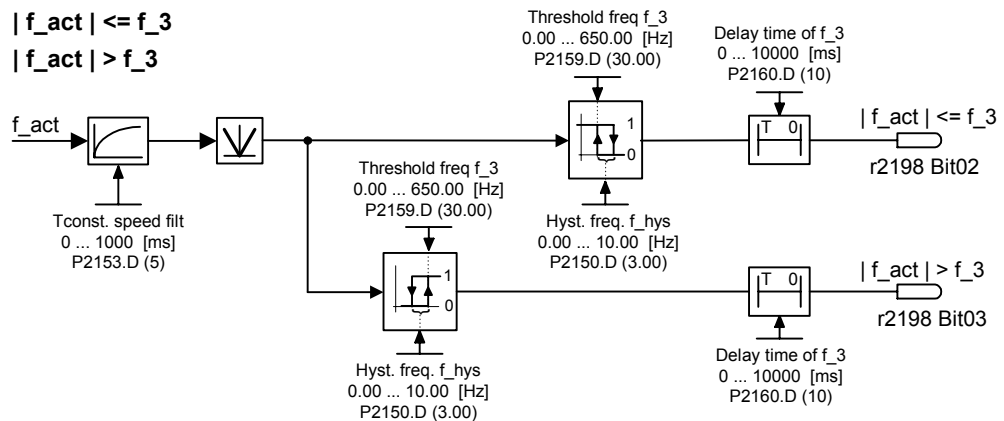
- P2158[0] : 1st. Drive data set (DDS)
- P2158[1] : 2nd. Drive data set (DDS)
- P2158[2] : 3rd. Drive data set (DDS)

Details:

See diagram in P2157 (threshold frequency f_2)

P2159[3]	Threshold frequency f_3			Min: 0.00	Level: 3
	CStat: CUT	Datatype: Float	Unit: Hz	Def: 30.00	
	P-Group: ALARMS	Active: Immediately	QuickComm. No	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	Min: 0	Level:
	CStat: CUT	Datatype: U16	Def: 10
	P-Group: ALARMS	Active: Immediately	QuickComm. No Max: 10000

When comparing speed or frequency to threshold f_3 (P2159). This is the time delay before status bits are set.

Index:

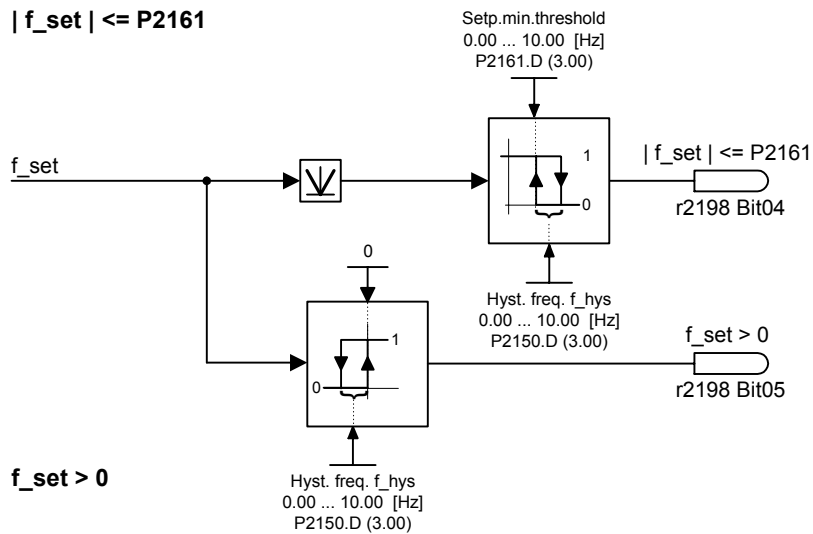
- P2160[0] : 1st. Drive data set (DDS)
- P2160[1] : 2nd. Drive data set (DDS)
- P2160[2] : 3rd. Drive data set (DDS)

Details:

See diagram in P2159 (threshold frequency f_3)

P2161[3]	Min. threshold for freq. setp.	Min: 0.00	Level:
	CStat: CUT	Datatype: Float	Def: 3.00
	P-Group: ALARMS	Active: Immediately	QuickComm. No Max: 10.00

Minimum threshold value for comparing speed or frequency setpoint.

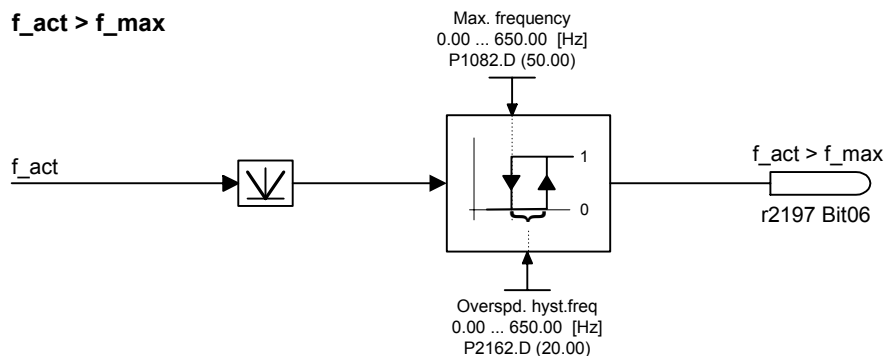


Index:

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

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

Def: 3.00
Max: 20.00

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

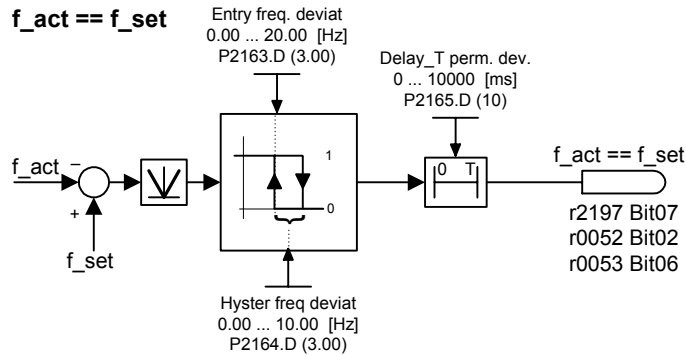
Index:

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

Def: 3.00
Max: 10.00

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	Min: 0	Level: 3	
	CStat: CUT	Datatype: U16		Unit: ms
	P-Group: ALARMS	Active: Immediately		QuickComm. No

Def: 10
Max: 10000

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	Min: 0	Level: 3	
	CStat: CUT	Datatype: U16		Unit: ms
	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)

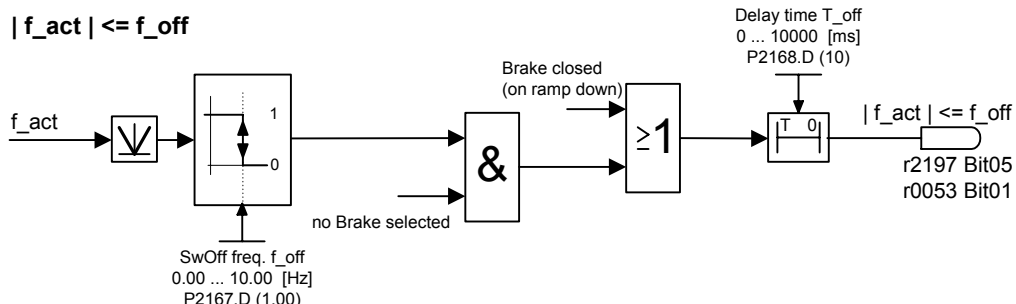
Details:

See diagram in P2174.

P2167[3]	Switch-off frequency f_{off}	Min: 0.00	Level:
	CStat: CUT	Datatype: Float	Unit: Hz
	P-Group: ALARMS	Active: Immediately	QuickComm. No
		Def: 1.00	3
		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}	Min: 0	Level:
	CStat: CUT	Datatype: U16	Unit: ms
	P-Group: ALARMS	Active: Immediately	QuickComm. No
		Def: 10	3
		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:

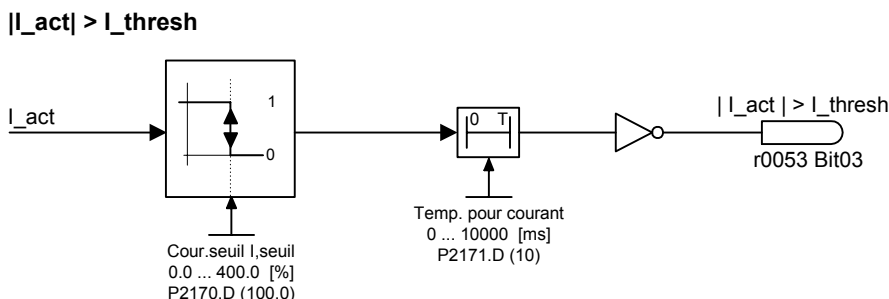
See diagram in P2167 (switch-off frequency)

r2169	CO: Act. filtered frequency	Min: -	Level:
		Datatype: Float	Unit: Hz
	P-Group: ALARMS		QuickComm. No
		Def: -	3
		Max: -	

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

P2170[3]	Threshold current I_{thresh}	Min: 0.0	Level:
	CStat: CUT	Datatype: Float	Unit: %
	P-Group: ALARMS	Active: Immediately	QuickComm. No
		Def: 100.0	3
		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.



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

Defines delay time prior to activation of current comparison.

Index:

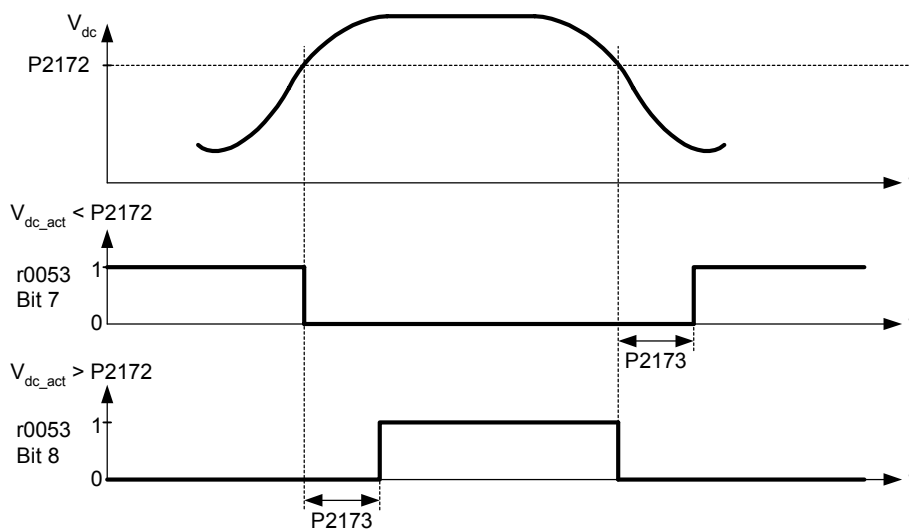
- P2171[0] : 1st. Drive data set (DDS)
- P2171[1] : 2nd. Drive data set (DDS)
- P2171[2] : 3rd. Drive data set (DDS)

Details:

See diagram in P2170 (threshold current I_thresh)

P2172[3]	Threshold DC-link voltage	Min: 0	Level: 3	
	CStat: CUT	Datatype: U16		Unit: V
	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: 3	
	CStat: CUT	Datatype: U16		Unit: ms
	P-Group: ALARMS	Active: Immediately		QuickComm. No Def: 10 Max: 10000

Defines delay time prior to activation of threshold comparison.

Index:

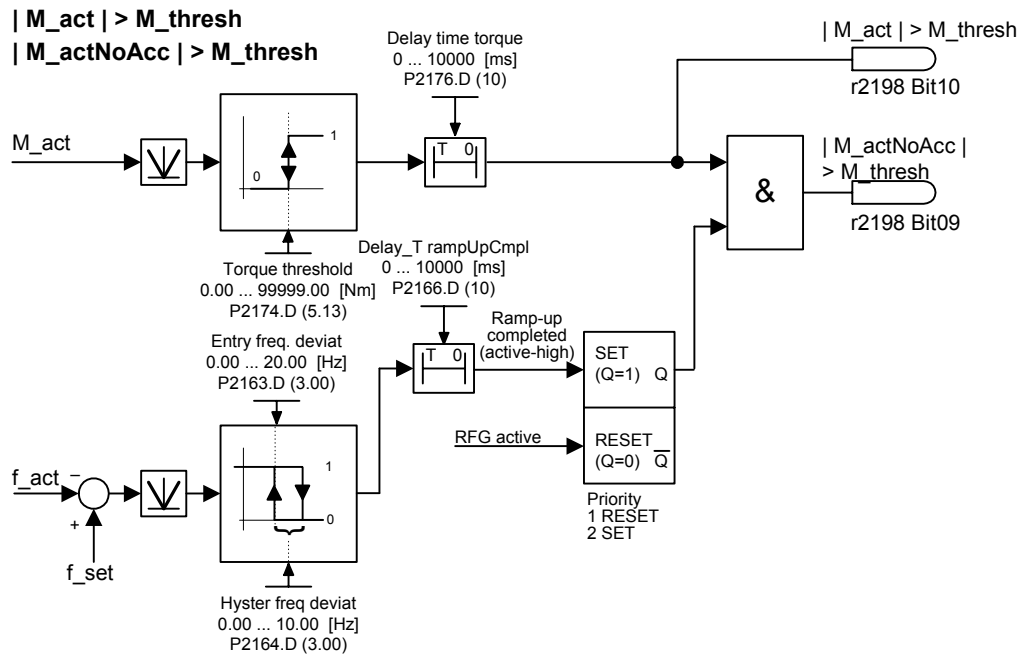
- P2173[0] : 1st. Drive data set (DDS)
- P2173[1] : 2nd. Drive data set (DDS)
- P2173[2] : 3rd. Drive data set (DDS)

Details:

See diagram in P2172 (threshold DC-link voltage)

P2174[3]	Torque threshold M_thresh	Min: 0.00	Level:
	CStat: CUT	Datatype: Float	Def: 5.13
	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	Def: 10
	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	Def: 10
	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	Def: 10
	P-Group: ALARMS	Active: Immediately	QuickComm. No Max: 10000

Delay time for identification that motor is pulled out.

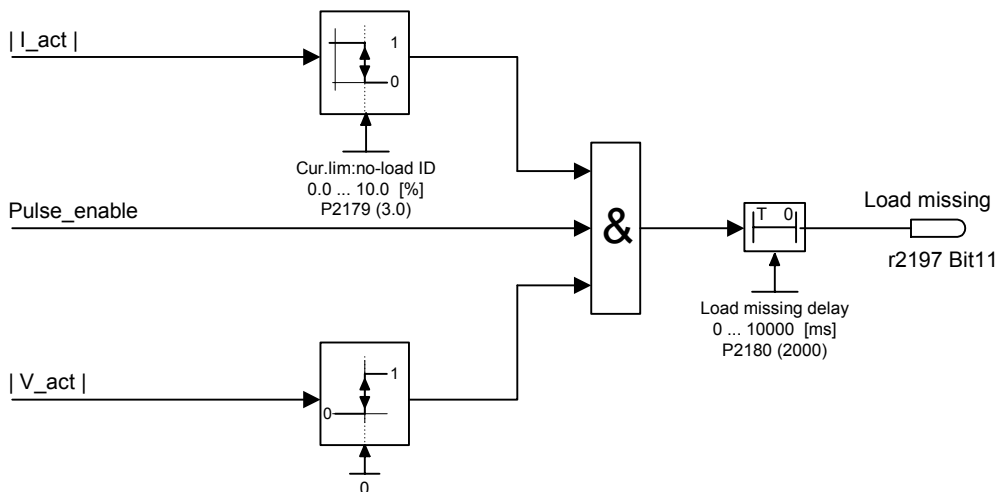
Index:

- 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	Def: 3.0
	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	Def: 2000
	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	Min: 0	Level:
	CStat: CT	Datatype: U16	Def: 0
	P-Group: ALARMS	Active: first confirm	QuickComm. No 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.

Two methods are provided of detecting the failure.

The first 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.

The second uses a pulse train from a simple sensor on the driven machine connected to the encoder circuit within the drive ASIC via a digital input. The pulse train, normally detecting one pulse per revolution of the drive machine, is converted to a frequency reference and compared with the actual inverter output frequency.

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

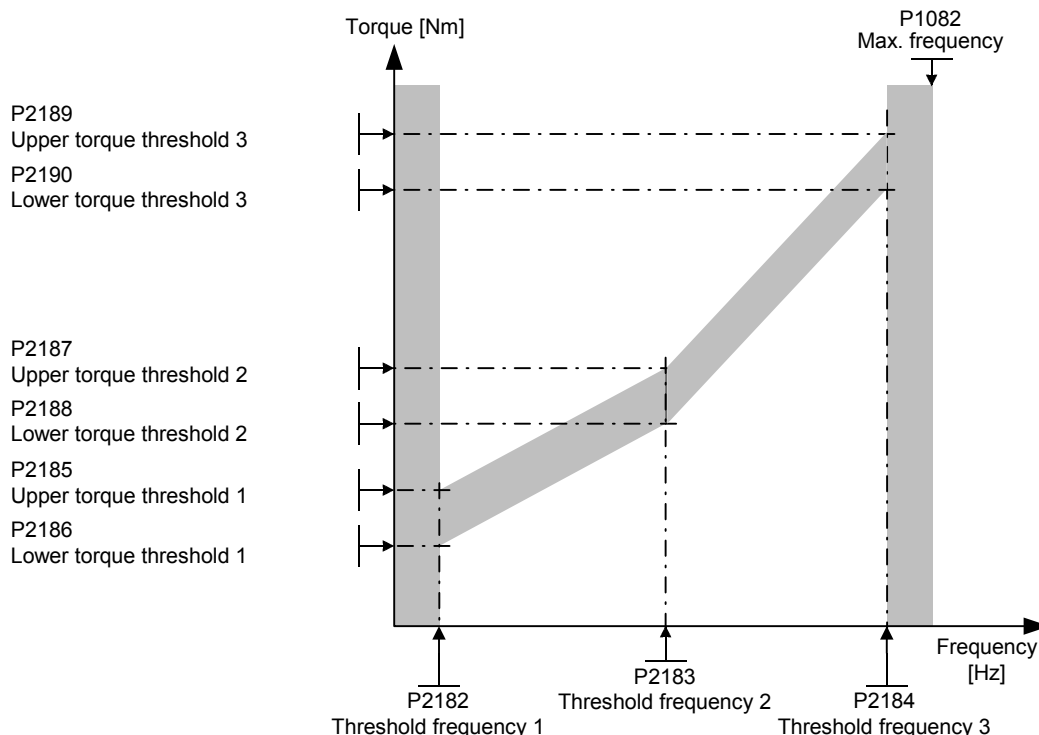
Index:

- 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	Min: 0.00	Level:
	CStat: CUT	Datatype: Float	Unit: Hz
	P-Group: ALARMS	Active: Immediately	QuickComm. No
		Def: 5.00	3
		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	Min: 0.00	Level:
	CStat: CUT	Datatype: Float	Unit: Hz
	P-Group: ALARMS	Active: Immediately	QuickComm. No
		Def: 30.00	3
		Max: 650.00	

Sets a threshold F2 for comparing actual torque to torque the envelope for belt failure detection.

Index:

- P2183[0] : 1st. Drive data set (DDS)
- P2183[1] : 2nd. Drive data set (DDS)
- P2183[2] : 3rd. Drive data set (DDS)

Details:

See P2182 (belt threshold frequency 1).

P2184[3]	Belt threshold frequency 3	Min: 0.00	Level:
	CStat: CUT	Datatype: Float	Unit: Hz
	P-Group: ALARMS	Active: Immediately	QuickComm. No
		Def: 50.00	3
		Max: 650.00	

Sets a threshold F3 for comparing actual torque to torque the envelope for belt failure detection.

Index:

- P2184[0] : 1st. Drive data set (DDS)
- P2184[1] : 2nd. Drive data set (DDS)
- P2184[2] : 3rd. Drive data set (DDS)

Details:

See P2182 (belt threshold frequency 1).

P2185[3]	Upper torque threshold 1	Min: 0.0	Level: 3	
	CStat: CUT	Datatype: Float		Unit: Nm
	P-Group: ALARMS	Active: Immediately		QuickComm. No
		Def: 99999.0		
		Max: 99999.0		

Upper limit threshold value 1 for comparing actual torque.

Index:

P2185[0] : 1st. Drive data set (DDS)
P2185[1] : 2nd. Drive data set (DDS)
P2185[2] : 3rd. Drive data set (DDS)

Details:

See P2182 (belt threshold frequency 1).

P2186[3]	Lower torque threshold 1	Min: 0.0	Level: 3	
	CStat: CUT	Datatype: Float		Unit: Nm
	P-Group: ALARMS	Active: Immediately		QuickComm. No
		Def: 0.0		
		Max: 99999.0		

Lower limit threshold value 1 for comparing actual torque.

Index:

P2186[0] : 1st. Drive data set (DDS)
P2186[1] : 2nd. Drive data set (DDS)
P2186[2] : 3rd. Drive data set (DDS)

Details:

See P2182 (belt threshold frequency 1).

P2187[3]	Upper torque threshold 2	Min: 0.0	Level: 3	
	CStat: CUT	Datatype: Float		Unit: Nm
	P-Group: ALARMS	Active: Immediately		QuickComm. No
		Def: 99999.0		
		Max: 99999.0		

Upper limit threshold value 2 for comparing actual torque.

Index:

P2187[0] : 1st. Drive data set (DDS)
P2187[1] : 2nd. Drive data set (DDS)
P2187[2] : 3rd. Drive data set (DDS)

Details:

See P2182 (belt threshold frequency 1).

P2188[3]	Lower torque threshold 2	Min: 0.0	Level: 3	
	CStat: CUT	Datatype: Float		Unit: Nm
	P-Group: ALARMS	Active: Immediately		QuickComm. No
		Def: 0.0		
		Max: 99999.0		

Lower limit threshold value 2 for comparing actual torque.

Index:

P2188[0] : 1st. Drive data set (DDS)
P2188[1] : 2nd. Drive data set (DDS)
P2188[2] : 3rd. Drive data set (DDS)

Details:

See P2182 (belt threshold frequency 1).

P2189[3]	Upper torque threshold 3	Min: 0.0	Level: 3	
	CStat: CUT	Datatype: Float		Unit: Nm
	P-Group: ALARMS	Active: Immediately		QuickComm. No
		Def: 99999.0		
		Max: 99999.0		

Upper limit threshold value 3 for comparing actual torque.

Index:

P2189[0] : 1st. Drive data set (DDS)
P2189[1] : 2nd. Drive data set (DDS)
P2189[2] : 3rd. Drive data set (DDS)

Details:

See P2182 (belt threshold frequency 1).

P2190[3]	Lower torque threshold 3	Min: 0.0	Level: 3	
	CStat: CUT	Datatype: Float		Unit: Nm
	P-Group: ALARMS	Active: Immediately		QuickComm. No
		Def: 0.0		
		Max: 99999.0		

Lower limit threshold value 3 for comparing actual torque.

Index:

P2190[0] : 1st. Drive data set (DDS)
P2190[1] : 2nd. Drive data set (DDS)
P2190[2] : 3rd. Drive data set (DDS)

Details:

See P2182 (belt threshold frequency 1).

P2192[3]	Time delay for belt failure	Min: 0	Level: 3	
	CStat: CUT	Datatype: U16		Unit: s
	P-Group: ALARMS	Active: Immediately		QuickComm. No
		Def: 10		
		Max: 65		

P2192 defines a delay before warning/trip becomes active. It is used to eliminate events caused by transient conditions. It is used for both methods of fault detection.

Index:

- P2192[0] : 1st. Drive data set (DDS)
- P2192[1] : 2nd. Drive data set (DDS)
- P2192[2] : 3rd. Drive data set (DDS)

r2197	CO/BO: Monitoring word 1	Min: -	Level: 3	
		Datatype: U16		Unit: -
	P-Group: ALARMS			Def: -
		Max: -		

Monitoring word 1 which indicates the state of monitor functions. Each bit represents one monitor function.

Bitfields:

Bit00	f_act >= P1080 (f_min)	0	NO
		1	YES
Bit01	f_act <= P2155 (f_1)	0	NO
		1	YES
Bit02	f_act > P2155 (f_1)	0	NO
		1	YES
Bit03	f_act > zero	0	NO
		1	YES
Bit04	f_act >= setp. (f_set)	0	NO
		1	YES
Bit05	f_act <= P2167 (f_off)	0	NO
		1	YES
Bit06	f_act > P1082 (f_max)	0	NO
		1	YES
Bit07	f_act == setp. (f_set)	0	NO
		1	YES
Bit08	Act. current r0068 >= P2170	0	NO
		1	YES
Bit09	Act. unfilt. Vdc < P2172	0	NO
		1	YES
Bit10	Act. unfilt. Vdc > P2172	0	NO
		1	YES
Bit11	No load condition	0	NO
		1	YES

r2198	CO/BO: Monitoring word 2	Min: -	Level: 3	
		Datatype: U16		Unit: -
	P-Group: ALARMS			Def: -
		Max: -		

Monitoring word 2 which indicates the state of monitor functions. Each bit represents one monitor function.

Bitfields:

Bit00	f_act <= P2157 (f_2)	0	NO
		1	YES
Bit01	f_act > P2157 (f_2)	0	NO
		1	YES
Bit02	f_act <= P2159 (f_3)	0	NO
		1	YES
Bit03	f_act > P2159 (f_3)	0	NO
		1	YES
Bit04	f_set < P2161 (f_min_set)	0	NO
		1	YES
Bit05	f_set > 0	0	NO
		1	YES
Bit06	Motor blocked	0	NO
		1	YES
Bit07	Motor pulled out	0	NO
		1	YES
Bit08	I_act r0068 < P2170	0	NO
		1	YES
Bit09	m_act > P2174 & setpoint reached	0	NO
		1	YES
Bit10	m_act > P2174	0	NO
		1	YES
Bit11	Belt failure warning	0	NO
		1	YES
Bit12	Belt failure trip	0	NO
		1	YES

P2200[3]	BI: Enable PID controller				Min: 0:0	Level: 2
	CStat: CUT	Datatype: U32	Unit: -	Def: 0:0		
	P-Group: TECH	Active: first confirm	QuickComm. No	Max: 4000:0		

PID mode Allows user to enable/disable the PID controller. Setting to 1 enables the PID closed-loop controller.

Index:

P2200[0] : 1st. Command data set (CDS)
P2200[1] : 2nd. Command data set (CDS)
P2200[2] : 3rd. Command data set (CDS)

Dependency:

Setting 1 automatically disables normal ramp times set in P1120 and P1121 and the normal frequency setpoints.

Following an OFF1 or OFF3 command, however, the inverter frequency will ramp down to zero using the ramp time set in P1121 (P1135 for OFF3).

Note:

The PID setpoint source is selected using P2253. The PID setpoint and the PID feedback signal are interpreted as [%] values (not [Hz]). The output of the PID controller is displayed as [%] and then normalized into [Hz] through P2000 (reference frequency) when PID is enabled.

In level 3, the PID controller source enable can also come from the digital inputs in settings 722.0 to 722.5 for DIN1 to DIN6 or from any other BiCo source.

Notice:

The minimum and maximum motor frequencies (P1080 and P1082) as well as the skip frequencies (P1091 to P1094) remain active on the inverter output. However, enabling skip frequencies with PID control can produce instabilities.

P2201[3]	Fixed PID setpoint 1	Datatype: Float	Unit: %	Min: -200.00	Level: 3
	CStat: CUT	Active: Immediately	QuickComm. No	Def: 0.00	
	P-Group: TECH			Max: 200.00	

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:

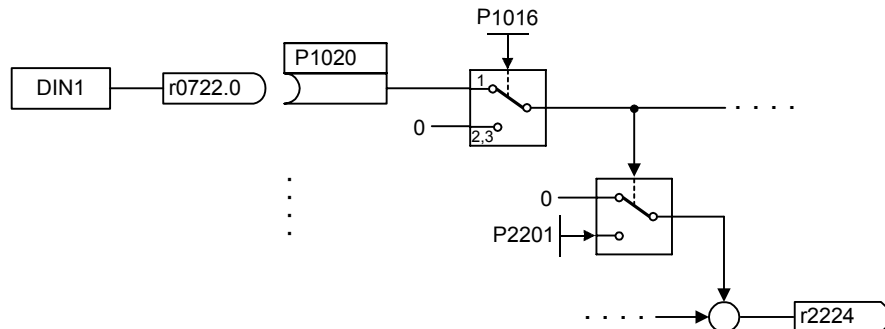
		DIN4	DIN3	DIN2	DIN1
	OFF	Inactive	Inactive	Inactive	Inactive
P2201	PID-FF1	Inactive	Inactive	Inactive	Active
P2202	PID-FF2	Inactive	Inactive	Active	Inactive
P2203	PID-FF3	Inactive	Inactive	Active	Active
P2204	PID-FF4	Inactive	Active	Inactive	Inactive
P2205	PID-FF5	Inactive	Active	Inactive	Active
P2206	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	Min: -200.00	Level:
CStat: CUT	Datatype: Float	Unit: %	Def: 10.00
P-Group: TECH	Active: Immediately	QuickComm. No	Max: 200.00
			3
	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	Min: -200.00	Level:
CStat: CUT	Datatype: Float	Unit: %	Def: 20.00
P-Group: TECH	Active: Immediately	QuickComm. No	Max: 200.00
			3
	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	Min: -200.00	Level:
CStat: CUT	Datatype: Float	Unit: %	Def: 30.00
P-Group: TECH	Active: Immediately	QuickComm. No	Max: 200.00
			3
	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	Min: -200.00	Level:
CStat: CUT	Datatype: Float	Unit: %	Def: 40.00
P-Group: TECH	Active: Immediately	QuickComm. No	Max: 200.00
			3
	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	Min: -200.00	Level:
CStat: CUT	Datatype: Float	Unit: %	Def: 50.00
P-Group: TECH	Active: Immediately	QuickComm. No	Max: 200.00
			3
	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	Min: -200.00	Level:
CStat: CUT	Datatype: Float	Unit: %	Def: 60.00
P-Group: TECH	Active: Immediately	QuickComm. No	Max: 200.00
			3
	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	Min: -200.00	Level:
	CStat: CUT Datatype: Float Unit: % Def: 70.00		3
	P-Group: TECH Active: Immediately QuickComm. No Max: 200.00		
	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	Min: -200.00	Level:
	CStat: CUT Datatype: Float Unit: % Def: 80.00		3
	P-Group: TECH Active: Immediately QuickComm. No Max: 200.00		
	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	Min: -200.00	Level:
	CStat: CUT Datatype: Float Unit: % Def: 90.00		3
	P-Group: TECH Active: Immediately QuickComm. No Max: 200.00		
	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	Min: -200.00	Level:
	CStat: CUT Datatype: Float Unit: % Def: 100.00		3
	P-Group: TECH Active: Immediately QuickComm. No Max: 200.00		
	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	Min: -200.00	Level:
	CStat: CUT Datatype: Float Unit: % Def: 110.00		3
	P-Group: TECH Active: Immediately QuickComm. No Max: 200.00		
	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	Min: -200.00	Level:
	CStat: CUT Datatype: Float Unit: % Def: 120.00		3
	P-Group: TECH Active: Immediately QuickComm. No Max: 200.00		
	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	Min: -200.00	Level:
	CStat: CUT	Datatype: Float	Unit: %
	P-Group: TECH	Active: Immediately	QuickComm. No
		Def: 130.00	3
		Max: 200.00	

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	Min: -200.00	Level:
	CStat: CUT	Datatype: Float	Unit: %
	P-Group: TECH	Active: Immediately	QuickComm. No
		Def: 130.00	3
		Max: 200.00	

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	Min: 1	Level:
	CStat: CT	Datatype: U16	Unit: -
	P-Group: TECH	Active: first confirm	QuickComm. No
		Def: 1	3
		Max: 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	Min: 1	Level:
	CStat: CT	Datatype: U16	Unit: -
	P-Group: TECH	Active: first confirm	QuickComm. No
		Def: 1	3
		Max: 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	Min: 1	Level:
	CStat: CT	Datatype: U16	Unit: -
	P-Group: TECH	Active: first confirm	QuickComm. No
		Def: 1	3
		Max: 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	Min: 1	Level:
	CStat: CT	Datatype: U16	Unit: -
	P-Group: TECH	Active: first confirm	QuickComm. No
		Def: 1	3
		Max: 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	Min: 0:0	Level: 3
	CStat: CT Datatype: U32 Unit: -	Def: 0:0	
	P-Group: COMMANDS Active: first confirm QuickComm. No	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	Min: 0:0	Level: 3
	CStat: CT Datatype: U32 Unit: -	Def: 0:0	
	P-Group: COMMANDS Active: first confirm QuickComm. No	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	Min: 0:0	Level: 3
	CStat: CT Datatype: U32 Unit: -	Def: 0:0	
	P-Group: COMMANDS Active: first confirm QuickComm. No	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	Min: 0:0	Level: 3
	CStat: CT Datatype: U32 Unit: -	Def: 722:3	
	P-Group: COMMANDS Active: first confirm QuickComm. No	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	Min: -	Level: 3
	Datatype: Float Unit: %	Def: -	
	P-Group: TECH	Max: -	

Displays total output of PID fixed setpoint selection.

Note:

r2224 = 100 % corresponds to 4000 hex

P2225	Fixed PID setpoint mode - Bit 4	Min: 1	Level:
CStat: CT	Datatype: U16	Unit: -	Def: 1
P-Group: TECH	Active: first confirm	QuickComm. No	Max: 2
3			
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	Min: 0:0	Level:
CStat: CT	Datatype: U32	Unit: -	Def: 722:4
P-Group: COMMANDS	Active: first confirm	QuickComm. No	Max: 4000:0
3			
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	Min: 1	Level:
CStat: CT	Datatype: U16	Unit: -	Def: 1
P-Group: TECH	Active: first confirm	QuickComm. No	Max: 2
3			
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	Min: 0:0	Level:
CStat: CT	Datatype: U32	Unit: -	Def: 722:5
P-Group: COMMANDS	Active: first confirm	QuickComm. No	Max: 4000:0
3			
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	Min: 0	Level:
CStat: CUT	Datatype: U16	Unit: -	Def: 1
P-Group: TECH	Active: Immediately	QuickComm. No	Max: 1
3			
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				Min: 0	Level: 3
	CStat: CT	Datatype: U16	Unit: -	Def: 1		
	P-Group: TECH	Active: first confirm	QuickComm. No	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)				Min: 0:0	Level: 3
	CStat: CT	Datatype: U32	Unit: -	Def: 19:13		
	P-Group: COMMANDS	Active: first confirm	QuickComm. No	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)				Min: 0:0	Level: 3
	CStat: CT	Datatype: U32	Unit: -	Def: 19:14		
	P-Group: COMMANDS	Active: first confirm	QuickComm. No	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				Min: -200.00	Level: 3
	CStat: CUT	Datatype: Float	Unit: %	Def: 10.00		
	P-Group: TECH	Active: Immediately	QuickComm. No	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: -	Level: 3
	P-Group: TECH			Def: -	
				Max: -	

Displays output setpoint of motor potentiometer in [%].

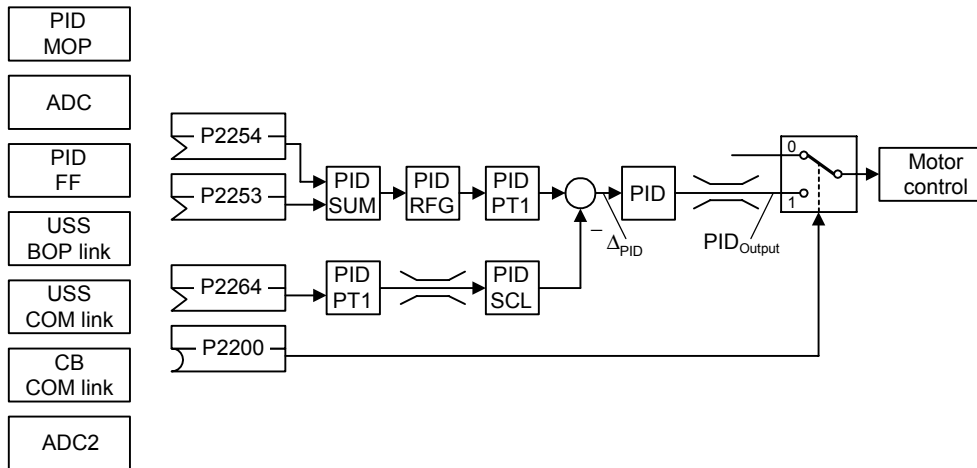
Note:

r2250 = 100 % corresponds to 4000 hex

P2253[3]	CI: PID setpoint	Datatype: U32	Unit: -	Min: 0:0	Level: 2
	CStat: CUT	Active: first confirm	QuickComm. No	Def: 2250:0	
	P-Group: TECH			Max: 4000:0	

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

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	Datatype: Float	Unit: -	Min: 0.00	Level: 3
	CStat: CUT	Active: Immediately	QuickComm. No	Def: 100.00	
	P-Group: TECH			Max: 100.00	

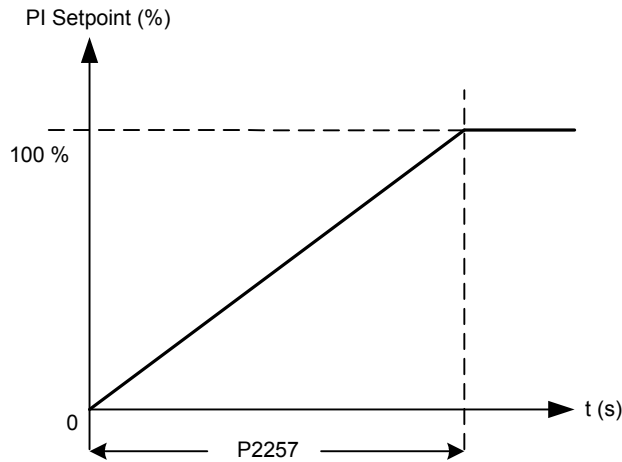
Gain factor for PID setpoint. The PID setpoint input is multiplied by this gain factor to produce a suitable ratio between setpoint and trim.

P2256	PID trim gain factor	Datatype: Float	Unit: -	Min: 0.00	Level: 3
	CStat: CUT	Active: Immediately	QuickComm. No	Def: 100.00	
	P-Group: TECH			Max: 100.00	

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			Min: 0.00	Level: 2
	CStat: CUT	Datatype: Float	Unit: s	Def: 1.00	
	P-Group: TECH	Active: Immediately	QuickComm. No	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).

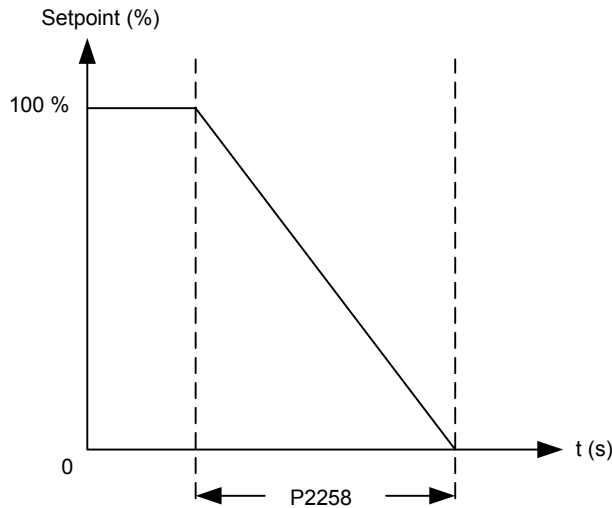
PID ramp time effective only on PID setpoint and only active when PID setpoint is changed or when RUN command is given (when PID setpoint uses this ramp to reach its value from 0 %).

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			Min: 0.00	Level: 2
	CStat: CUT	Datatype: Float	Unit: s	Def: 1.00	
	P-Group: TECH	Active: Immediately	QuickComm. No	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 Datatype: Float Unit: % P-Group: TECH	Min: - Def: - Max: -	Level: 2
Displays total active PID setpoint after PID-RFG in [%].			
Note: r2260 = 100 % corresponds to 4000 hex			
P2261	PID setpoint filter timeconstant CStat: CUT Datatype: Float Unit: s P-Group: TECH Active: Immediately QuickComm. No	Min: 0.00 Def: 0.00 Max: 60.00	Level: 3
Sets a time constant for smoothing the PID setpoint.			
Note: 0 = no smoothing			
r2262	CO: Filtered PID setp. after RFG Datatype: Float Unit: % P-Group: TECH	Min: - Def: - Max: -	Level: 3
Displays filtered PID setpoint after PID-RFG in [%].			
Note: r2262 = 100 % corresponds to 4000 hex			
P2263	PID controller type CStat: T Datatype: U16 Unit: - P-Group: TECH Active: Immediately QuickComm. No	Min: 0 Def: 0 Max: 1	Level: 3
Sets the PID controller type.			
Possible Settings: 0 D component on feedback signal 1 D component on error signal			
P2264[3]	CI: PID feedback CStat: CUT Datatype: U32 Unit: - P-Group: TECH Active: first confirm QuickComm. No	Min: 0:0 Def: 755:1 Max: 4000:0	Level: 2
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 2 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 CStat: CUT Datatype: Float Unit: s P-Group: TECH Active: Immediately QuickComm. No	Min: 0.00 Def: 0.00 Max: 60.00	Level: 2
Defines time constant for PID feedback filter.			
r2266	CO: PID filtered feedback Datatype: Float Unit: % P-Group: TECH	Min: - Def: - Max: -	Level: 2
Displays PID feedback signal in [%].			
Note: r2266 = 100 % corresponds to 4000 hex			
P2267	Max. value for PID feedback CStat: CUT Datatype: Float Unit: % P-Group: TECH Active: Immediately QuickComm. No	Min: -200.00 Def: 100.00 Max: 200.00	Level: 3
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	Min: -200.00	Level: 3	
	CStat: CUT	Datatype: Float		Unit: %
	P-Group: TECH	Active: Immediately		QuickComm. No

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	Min: 0.00	Level: 3	
	CStat: CUT	Datatype: Float		Unit: -
	P-Group: TECH	Active: Immediately		QuickComm. No

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	Min: 0	Level: 3	
	CStat: CUT	Datatype: U16		Unit: -
	P-Group: TECH	Active: Immediately		QuickComm. No

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	Min: 0	Level: 2	
	CStat: CUT	Datatype: U16		Unit: -
	P-Group: TECH	Active: Immediately		QuickComm. No

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 transducer 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	Min: -	Level: 2	
	Datatype: Float	Unit: %		Def: -
	P-Group: TECH	Active: Immediately		QuickComm. No

Displays PID scaled feedback signal in [%].

Note:

r2272 = 100 % corresponds to 4000 hex

r2273	CO: PID error	Min: -	Level: 2	
	Datatype: Float	Unit: %		Def: -
	P-Group: TECH	Active: Immediately		QuickComm. No

Displays PID error (difference) signal between setpoint and feedback signals in [%].

Note:

r2273 = 100 % corresponds to 4000 hex

P2274	PID derivative time	Min: 0.000	Level: 2	
	CStat: CUT	Datatype: Float		Unit: s
	P-Group: TECH	Active: Immediately		QuickComm. No

Sets PID derivative time.

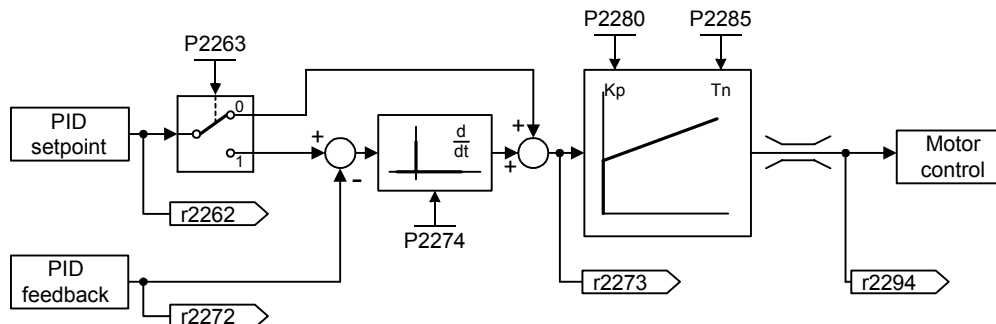
P2274 = 0:

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

P2280	PID proportional gain	Datatype: Float	Unit: -	Min: 0.000	Level: 2
	CStat: CUT	Active: Immediately	QuickComm. No	Def: 3.000	
	P-Group: TECH			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	Datatype: Float	Unit: s	Min: 0.000	Level: 2
	CStat: CUT	Active: Immediately	QuickComm. No	Def: 0.000	
	P-Group: TECH			Max: 60.000	

Sets integral time constant for PID controller.

Details:

See P2280 (PID proportional gain).

P2291	PID output upper limit	Datatype: Float	Unit: %	Min: -200.00	Level: 2
	CStat: CUT	Active: Immediately	QuickComm. No	Def: 100.00	
	P-Group: TECH			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	Datatype: Float	Unit: %	Min: -200.00	Level: 2
	CStat: CUT	Active: Immediately	QuickComm. No	Def: 0.00	
	P-Group: TECH			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	Min: 0.00	Level: 3	
	CStat: CUT	Datatype: Float		Unit: s
	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	Min: -	Level: 2	
		Datatype: Float		Unit: %
	P-Group: TECH			Def: -
		Max: -		

Displays PID output in [%]

Note:

r2294 = 100 % corresponds to 4000 hex

P2370[3]	Motor staging stop mode	Min: 0	Level: 3	
	CStat: CT	Datatype: U16		Unit: -
	P-Group: TECH	Active: Immediately		QuickComm. No
		Def: 0		
		Max: 1		

Selects stop mode for external motors when motor staging is in use.

Possible Settings:

- 0 Normal stop
- 1 Sequence stop

Index:

- P2370[0] : 1st. Drive data set (DDS)
- P2370[1] : 2nd. Drive data set (DDS)
- P2370[2] : 3rd. Drive data set (DDS)

P2371[3]	Motor staging configuration	Min: 0	Level: 3	
	CStat: CT	Datatype: U16		Unit: -
	P-Group: TECH	Active: Immediately		QuickComm. No
		Def: 0		
		Max: 8		

Selects configuration of external motors (M1, M2, M3) used for motor staging feature.

Possible Settings:

- 0 Motor staging disabled
- 1 M1 = 1X, M2 = , M3 =
- 2 M1 = 1X, M2 = 1X, M3 =
- 3 M1 = 1X, M2 = 2X, M3 =
- 4 M1 = 1X, M2 = 1X, M3 = 1X
- 5 M1 = 1X, M2 = 1X, M3 = 2X
- 6 M1 = 1X, M2 = 2X, M3 = 3X
- 7 M1 = 1X, M2 = 1X, M3 = 3X
- 8 M1 = 1X, M2 = 2X, M3 = 3X

Index:

- P2371[0] : 1st. Drive data set (DDS)
- P2371[1] : 2nd. Drive data set (DDS)
- P2371[2] : 3rd. Drive data set (DDS)

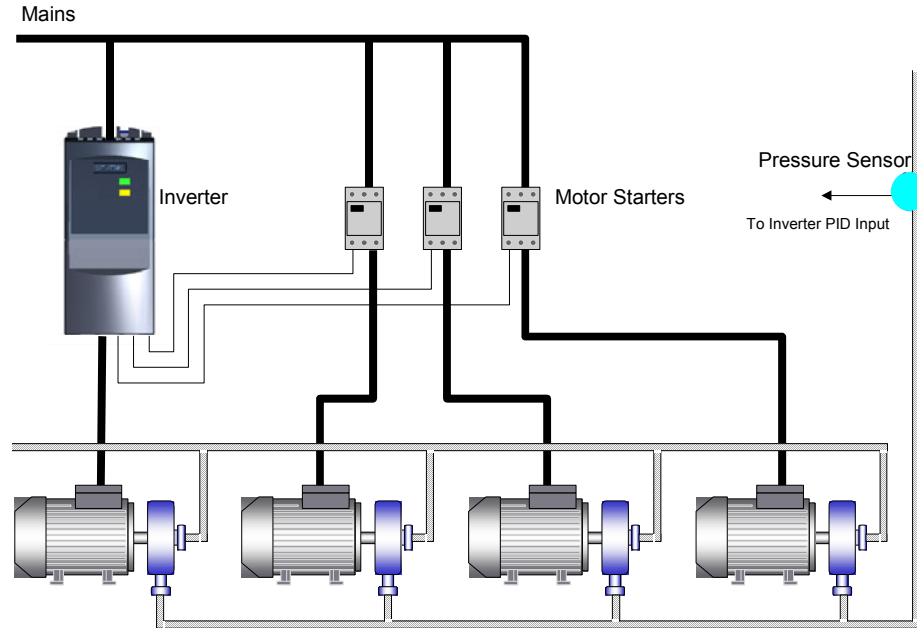


Caution:

For this kind of motor application it is mandatory to disable negative frequency setpoint!

Details:

Motor staging allows the control of up to 3 additional staged pumps or fans, based on a PID control system. The complete system consists of one pump controlled by the inverter with up to 3 further pumps / fans controlled from contactors or motor starters. The contactors or motor starter are controlled by outputs from the inverter. The diagram below shows a typical pumping system. A similar system could be set up using fans and air ducts, instead of pumps and pipes.



By default the motor starts are controlled from relay outputs (DOU). In the text below, the following terminology will be used:

- MV - Variable speed (Inverter controlled motor)
- M1 - Motor switched with relay 1 (DOU 1)
- M2 - Motor switched with relay 2 (DOU 2)
- M3 - Motor switched with relay 3 (DOU 3)

Staging: The process of starting one of the fixed speed motors.
 De-staging: The process of stopping one of the fixed speed motors.

When the inverter is running at maximum frequency, and the PID feedback indicates that a higher speed is required, the inverter switches on (stages) one of the relay controlled motors M1 to M3. At the same time, to keep the controlled variable as constant as possible, the inverter must ramp down to minimum frequency. Therefore, during the staging process, PID control must be suspended (see P2378 and diagram below).

Staging of external motors (M1, M2, M3)

		1.	2.	3.	4.	5.	6.	7.	Switch-on
P2371 =	0	-	-	-	-	-	-	-	-
	1	-	M1	M1	M1	M1	M1	M1	M1
	2	-	M1	M1+M2	M1+M2	M1+M2	M1+M2	M1+M2	M1+M2
	3	-	M1	M2	M1+M2	M1+M2	M1+M2	M1+M2	M1+M2
	4	-	M1	M1+M2	M1+M2+M3	M1+M2+M3	M1+M2+M3	M1+M2+M3	M1+M2+M3
	5	-	M1	M3	M1+M3	M1+M2+M3	M1+M2+M3	M1+M2+M3	M1+M2+M3
	6	-	M1	M2	M1+M2	M2+M3	M1+M2+M3	M1+M2+M3	M1+M2+M3
	7	-	M1	M1+M2	M3	M1+M3	M1+M2+M3	M1+M2+M3	M1+M2+M3
	8	-	M1	M2	M3	M1+M3	M2+M3	M1+M2+M3	M1+M2+M3

When the inverter is running at minimum frequency, and the PID feedback indicates that a lower speed is required, the inverter switches off (de-stages) one of the relay controlled motors M1 to M3. In this case, the inverter must ramp from minimum frequency to maximum frequency outside of PID control (see P2378 and diagram below).

Destaging of external motors (M1, M2, M3)

		1.	2.	3.	4.	5.	6.	7.	Switch-off
P2371 =	0	-	-	-	-	-	-	-	-
	1	M1	-	-	-	-	-	-	-
	2	M1+M2	M1	-	-	-	-	-	-
	3	M1+M2	M2	M1	-	-	-	-	-
	4	M1+M2+M3	M2+M1	M1	-	-	-	-	-
	5	M1+M2+M3	M3+M1	M3	M1	-	-	-	-
	6	M1+M2+M3	M3+M2	M2+M1	M2	M1	-	-	-
	7	M1+M2+M3	M3+M1	M3	M2+M1	M1	-	-	-
	8	M1+M2+M3	M3+M2	M3+M1	M3	M2	M1	-	-

P2372[3]	Motor staging cycling	Min: 0	Level: 3	
	CStat: CT	Datatype: U16		Unit: -
	P-Group: TECH	Active: first confirm		QuickComm. No

Enables motor cycling for the motor staging feature.

When enabled, the motor selected for staging/destaging is based on the hours run counter P2380. When staging, the motor with the least hours is switched on. When destaging, the motor with most hours is switched off.

If staged motors are different sizes the the choice of motor is first based on required motor size, and then if there is still a choice, on hours run.

Possible Settings:

- 0 Disabled
- 1 Enabled

Index:

- P2372[0] : 1st. Drive data set (DDS)
- P2372[1] : 2nd. Drive data set (DDS)
- P2372[2] : 3rd. Drive data set (DDS)

P2373[3]	Motor staging hysteresis	Min: 0.0	Level: 3	
	CStat: CUT	Datatype: Float		Unit: %
	P-Group: TECH	Active: Immediately		QuickComm. No

P2373 as a percentage of PID setpoint that PID error P2273 must be exceeded before staging delay starts.

Index:

- P2373[0] : 1st. Drive data set (DDS)
- P2373[1] : 2nd. Drive data set (DDS)
- P2373[2] : 3rd. Drive data set (DDS)

Note:

The value of this parameter must always be smaller than delay override lockout timer P2377.

P2374[3]	Motor staging delay	Min: 0	Level: 3	
	CStat: CUT	Datatype: U16		Unit: s
	P-Group: TECH	Active: Immediately		QuickComm. No

Time that PID error P2273 must exceed motor staging hysteresis P2373 before staging occurs.

Index:

- P2374[0] : 1st. Drive data set (DDS)
- P2374[1] : 2nd. Drive data set (DDS)
- P2374[2] : 3rd. Drive data set (DDS)

P2375[3]	Motor destaging delay	Min: 0	Level: 3	
	CStat: CUT	Datatype: U16		Unit: s
	P-Group: TECH	Active: Immediately		QuickComm. No

Time that PID error P2273 must exceed motor staging hysteresis P2373 before destaging occurs.

Index:

- P2375[0] : 1st. Drive data set (DDS)
- P2375[1] : 2nd. Drive data set (DDS)
- P2375[2] : 3rd. Drive data set (DDS)

P2376[3]	Motor staging delay override	Min: 0.0	Level: 3	
	CStat: CUT	Datatype: Float		Unit: %
	P-Group: TECH	Active: Immediately		QuickComm. No

P2376 as a percentage of PID setpoint. When the PID error P2273 exceeds this value, a motor is staged / destaged irrespective of the delay timers.

Index:

- P2376[0] : 1st. Drive data set (DDS)
- P2376[1] : 2nd. Drive data set (DDS)
- P2376[2] : 3rd. Drive data set (DDS)

P2377[3]	Motor staging lockout timer	Min: 0	Level: 3	
	CStat: CUT	Datatype: U16		Unit: s
	P-Group: TECH	Active: Immediately		QuickComm. No

Time for which delay override is prevented after a motor has been staged or destaged.

This prevents a second staging event immediately after a first, being caused by the transient conditions after the first staging event.

Index:

- P2377[0] : 1st. Drive data set (DDS)
- P2377[1] : 2nd. Drive data set (DDS)
- P2377[2] : 3rd. Drive data set (DDS)

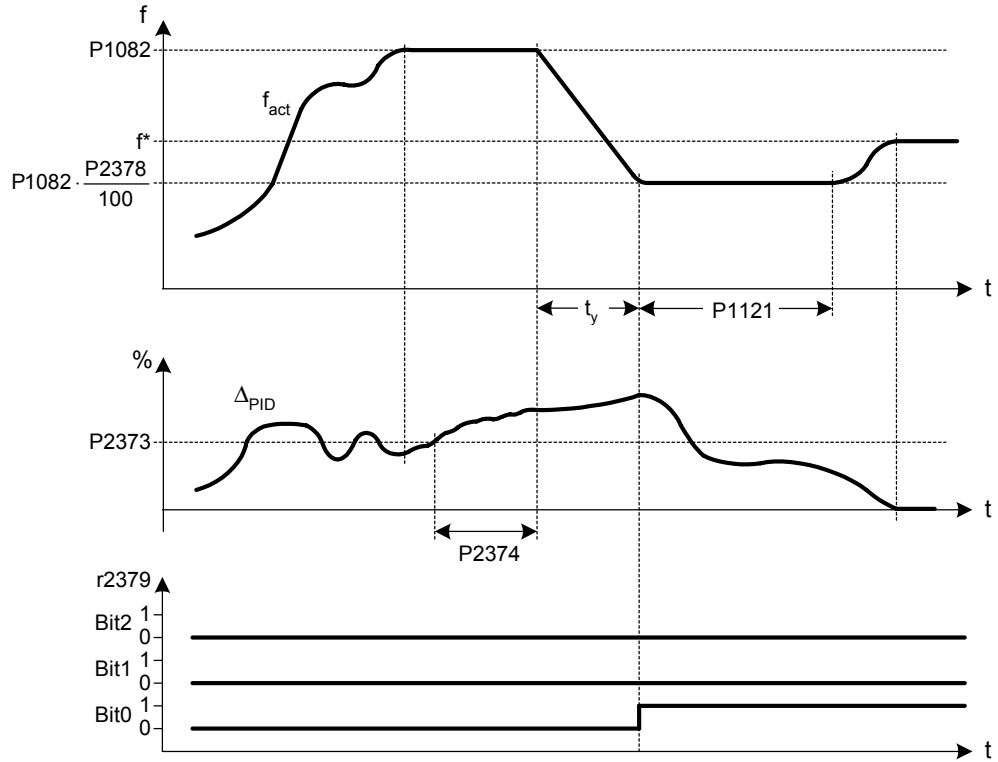
Note:

The value of this parameter must always be larger than staging hysteresis P2373.

P2378[3]	Motor staging frequency f_{st} [%]	Min: 0.0	Level: 3	
	CStat: CUT	Datatype: Float		Unit: %
	P-Group: TECH	Active: Immediately		QuickComm. No
		Def: 50.0		
		Max: 120.0		

The frequency as a percentage of max. frequency. During a (de) staging event, as the inverter ramps from maximum to minimum frequency (or vice versa) this is the frequency at which the relay (DOUT) is switched. This is illustrated by the following diagrams.

Staging:

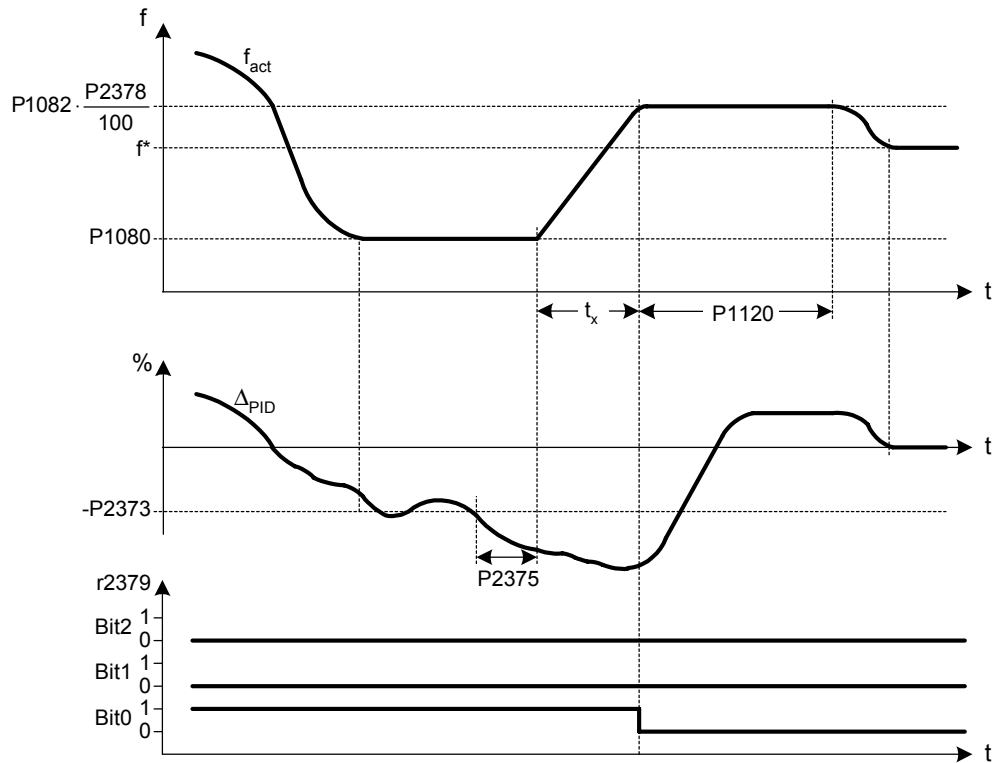


Condition for staging:

- (a) $f_{act} \geq P1082$
- (b) $\Delta_{PID} \geq P2373$
- (c) $t_{(a)(b)} > P2374$

$$t_y = \left(1 - \frac{P2378}{100}\right) \cdot P1121$$

Destaging:



Condition for destaging:

- Ⓐ $f_{act} \leq P1080$
- Ⓑ $\Delta_{PID} \leq -P2373$
- Ⓒ $t_{\text{ⒶⒷ}} > P2375$

$$t_x = \left(\frac{P2378}{100} - \frac{P1080}{P1082} \right) \cdot P1120$$

Index:

- P2378[0] : 1st. Drive data set (DDS)
- P2378[1] : 2nd. Drive data set (DDS)
- P2378[2] : 3rd. Drive data set (DDS)

r2379	CO/BO: Motor staging status word	Min: -	Level:
	Datatype: U16 Unit: -	Def: -	3
	P-Group: TECH	Max: -	

Output word from the motor staging feature that allows external connections to be made. Bit 0 switches on Motor 1. Bit 1 switches on Motor 2. Bit 2 switches on Motor 3.

Bitfields:

Bit00	Start motor 1	0	NO
		1	YES
Bit01	Start motor 2	0	NO
		1	YES
Bit02	Start motor 3	0	NO
		1	YES

P2380[3]	Motor staging hours run	Min: 0.0	Level:
	CStat: CUT Datatype: Float Unit: h	Def: 0.0	3
	P-Group: TECH Active: first confirm QuickComm. No	Max: 0.0	

Displays hours run for external motors. To reset the running hours, set the value to zero, any other value is ignored.

Index:

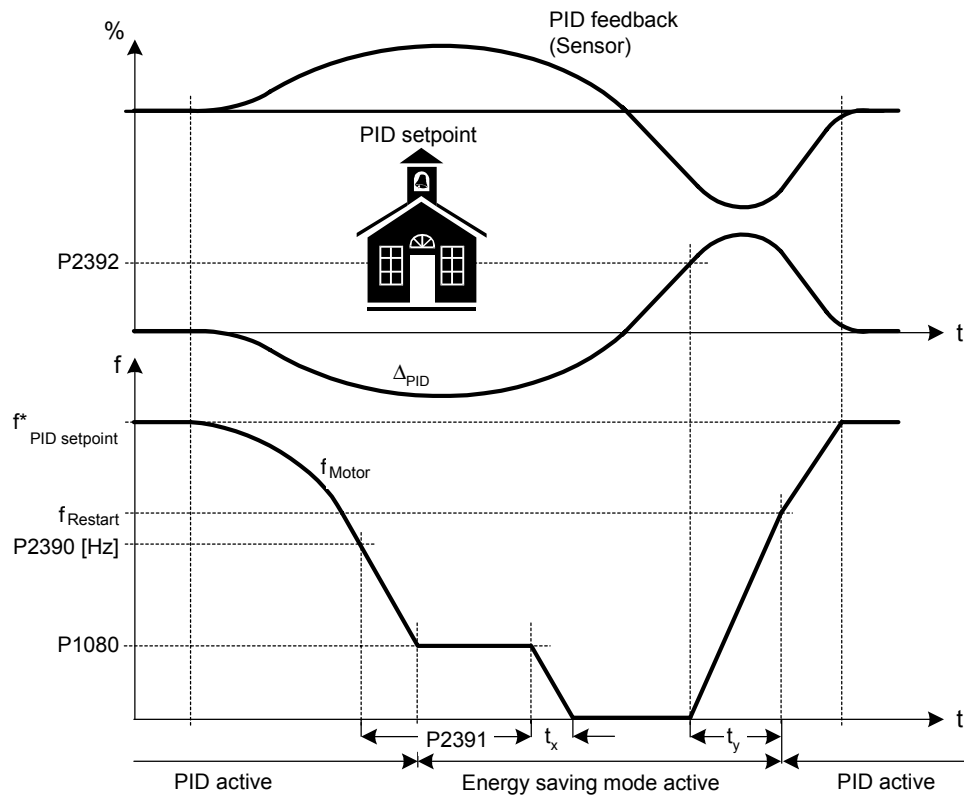
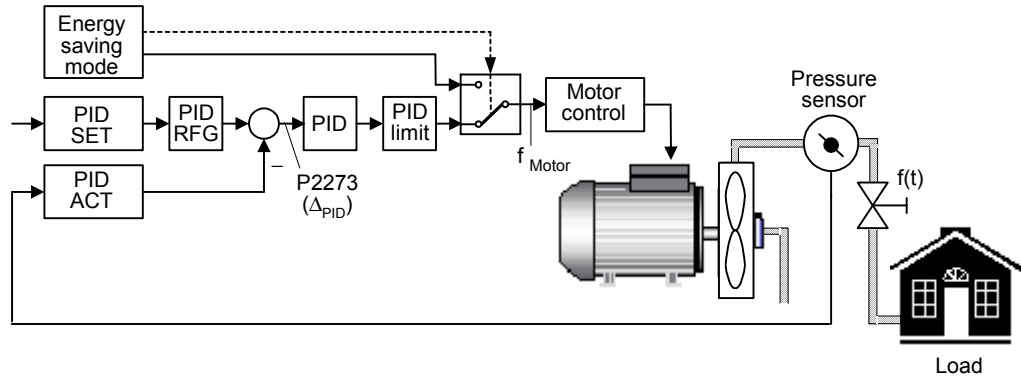
- P2380[0] : Motor 1 hrs run
- P2380[1] : Motor 2 hrs run
- P2380[2] : Motor 3 hrs run

Example:

- P2380 = 0.1 ==> 6 min
- P2380 = 1.0 ==> 60 min = 1 h

P2390	Energy saving setpoint	Min: -200.00	Level:
	CStat: CUT	Datatype: Float	Unit: %
	P-Group: TECH	Active: Immediately	QuickComm. No
		Def: 0	3
		Max: 200.00	

When the inverter under PID control drops below energy saving setpoint, the energy saving timer P2391 is started. When the energy saving timer has expired, the inverter is ramped down to stop and enters energy saving mode (see diagram below).



$$f_{Restart} = P2000 \cdot \frac{P2390 + 5\%}{100\%}$$

$$t_x = \frac{P1080}{P1082} \cdot P1121$$

$$P2390 \text{ [Hz]} = P2000 \cdot \frac{P2390}{100\%}$$

$$t_y = \frac{f_{Restart}}{P1082} \cdot P1120$$

Note:

If energy saving setpoint is 0, the energy saving function is disabled.

Notice:

Energy saving mode is an added feature to enhance PID functionality, and switches of the motor when the inverter is running at low setpoint.

Note that this is an independent function from staging, although it can be used together with staging.

P2391	Energy saving timer	Min: 0	Level: 3	
	CStat: CT	Datatype: U16		Unit: s
	P-Group: TECH	Active: Immediately		QuickComm. No
		Def: 0		
		Max: 254		

When the energy saving timer P2391 has expired, the inverter is ramped down to stop and enters energy saving mode (see description and diagram of P2390).

P2392	Energy saving restart setpoint	Min: -200.00	Level: 3	
	CStat: CT	Datatype: Float		Unit: %
	P-Group: TECH	Active: Immediately		QuickComm. No
		Def: 0		
		Max: 200.00		

While in energy saving mode, the PID controller continues to generate the error P2273 - once this reaches the restart point P2392 the inverter immediately ramps to the setpoint calculated by the PID controller (see description and diagram of P2390).

P2800	Enable FFBs	Min: 0	Level: 3	
	CStat: CUT	Datatype: U16		Unit: -
	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 or P2802[x] > 0).

Possible Settings:

- 0 Disable
- 1 Enable

Dependency:

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

r2811	BO: AND 1	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level: 3
	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	Datatype: U32	Unit: -	Min: 0:0 Def: 0:0 Max: 4000:0	Level: 3
	CStat: CUT P-Group: TECH	Active: first confirm	QuickComm. No		

P2812[0], P2812[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	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level: 3
	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	Datatype: U32	Unit: -	Min: 0:0 Def: 0:0 Max: 4000:0	Level: 3
	CStat: CUT 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.

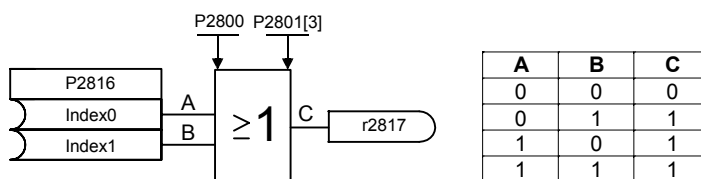
r2815	BO: AND 3	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level: 3
	P-Group: TECH				

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

P2816[0], P2816[1] define inputs of OR 1 element, output is P2817.



Index:
P2816[0] : Binector input 0 (BI 0)
P2816[1] : Binector input 1 (BI 1)

Dependency:
P2801[3] is active level for the OR element.

r2817	BO: OR 1	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level: 3
	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	Min: 0:0	Level: 3	
	CStat: CUT	Datatype: U32		Def: 0:0
	P-Group: TECH	Active: first confirm		QuickComm. No

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	Min: -	Level: 3	
	Datatype: U16	Unit: -		Def: -
	P-Group: TECH	Active: first confirm		QuickComm. No

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

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	Min: -	Level: 3	
	Datatype: U16	Unit: -		Def: -
	P-Group: TECH	Active: first confirm		QuickComm. No

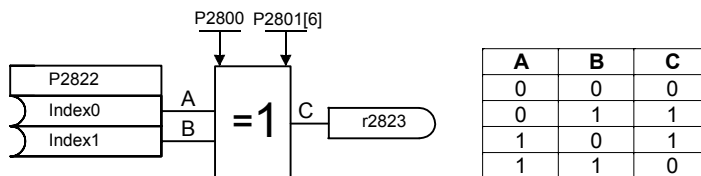
Output of OR 3 element. Displays or logic of bits defined in P2820[0], P2820[1].

Dependency:

P2801[5] is active level for the OR element.

P2822[2]	BI: XOR 1	Min: 0:0	Level: 3	
	CStat: CUT	Datatype: U32		Def: 0:0
	P-Group: TECH	Active: first confirm		QuickComm. No

P2822[0], P2822[1] define inputs of XOR 1 element, output is P2823.



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	Min: -	Level: 3	
	Datatype: U16	Unit: -		Def: -
	P-Group: TECH	Active: first confirm		QuickComm. No

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

P2824[0], P2824[1] define inputs of XOR 2 element, output is P2825.

Index:

P2824[0] : Binector input 0 (BI 0)
P2824[1] : Binector input 1 (BI 1)

Dependency:

P2801[7] is active level for the XOR element.

r2825	BO: XOR 2	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level: 3
	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	Datatype: U32	Unit: -	Min: 0:0 Def: 0:0 Max: 4000:0	Level: 3
	CStat: CUT 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.

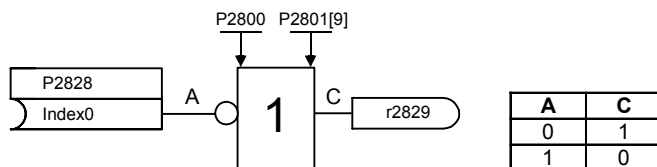
r2827	BO: XOR 3	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level: 3
	P-Group: TECH				

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

P2828 defines input of NOT 1 element, output is P2829.



Dependency:
P2801[9] is active level for the NOT element.

r2829	BO: NOT 1	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level: 3
	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	Datatype: U32	Unit: -	Min: 0:0 Def: 0:0 Max: 4000:0	Level: 3
	CStat: CUT 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	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level: 3
	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	Datatype: U32	Unit: -	Min: 0:0 Def: 0:0 Max: 4000:0	Level: 3
	CStat: CUT 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.

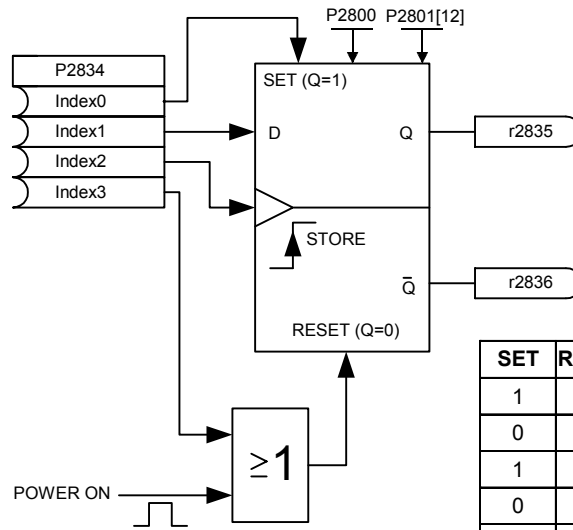
r2833	BO: NOT 3	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level: 3
	P-Group: TECH				

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

P2834[0], P2834[1], P2834[2], P2834[3] define inputs of D-FlipFlop 1, outputs are P2835, P2836.



SET	RESET	D	STORE	Q	Q̄
1	0	x	x	1	0
0	1	x	x	0	1
1	1	x	x	Q _{n-1}	Q̄ _{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: -	Level: 3
	P-Group: TECH			Def: -	
				Max: -	

Displays output of D-FlipFlop 1, inputs are defined in P2834[0], P2834[1], P2834[2], P2834[3]

Dependency:

P2801[12] is active level for the D-FlipFlop.

r2836	BO: NOT-Q D-FF 1	Datatype: U16	Unit: -	Min: -	Level: 3
	P-Group: TECH			Def: -	
				Max: -	

Displays Not-output of D-FlipFlop 1, inputs are defined in P2834[0], P2834[1], P2834[2], P2834[3]

Dependency:

P2801[12] is active level for the D-FlipFlop.

P2837[4]	BI: D-FF 2	Datatype: U32	Unit: -	Min: 0:0	Level: 3
	CStat: CUT	Active: first confirm	QuickComm. No	Def: 0:0	
	P-Group: TECH			Max: 4000:0	

P2837[0], P2837[1], P2837[2], P2837[3] define inputs of D-FlipFlop 2, outputs are P2838, 2839.

Index:

- P2837[0] : Binector input: Set
- P2837[1] : Binector input: D input
- P2837[2] : Binector input: Store pulse
- P2837[3] : Binector input: Reset

Dependency:

P2801[13] is active level for the D-FlipFlop.

r2838	BO: Q D-FF 2	Datatype: U16	Unit: -	Min: -	Level: 3
	P-Group: TECH			Def: -	
				Max: -	

Displays output of D-FlipFlop 2, inputs are defined in P2837[0], P2837[1], P2837[2], P2837[3]

Dependency:

P2801[13] is active level for the D-FlipFlop.

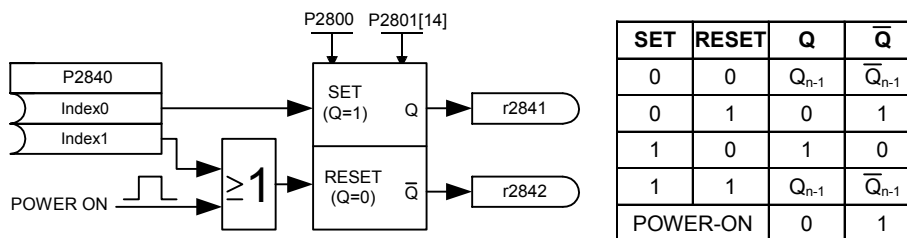
r2839	BO: NOT-Q D-FF 2	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level: 3
	P-Group: TECH				

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

P2840[0], P2840[1] define inputs of RS-FlipFlop 1, outputs are P2841, P2842.



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

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

P2846[0], P2846[1] define inputs of RS-FlipFlop 3, outputs are P2847, P2848.

Index:

P2846[0] : Binector input: Set
 P2846[1] : Binector input: Reset

Dependency:

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

r2847	BO: Q RS-FF 3			Min: -	Level: 3
		Datatype: U16	Unit: -	Def: -	
	P-Group: TECH			Max: -	

Displays output of RS-FlipFlop 3, inputs are defined in P2846[0], P2846[1]

Dependency:

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

r2848	BO: NOT-Q RS-FF 3			Min: -	Level: 3
		Datatype: U16	Unit: -	Def: -	
	P-Group: TECH			Max: -	

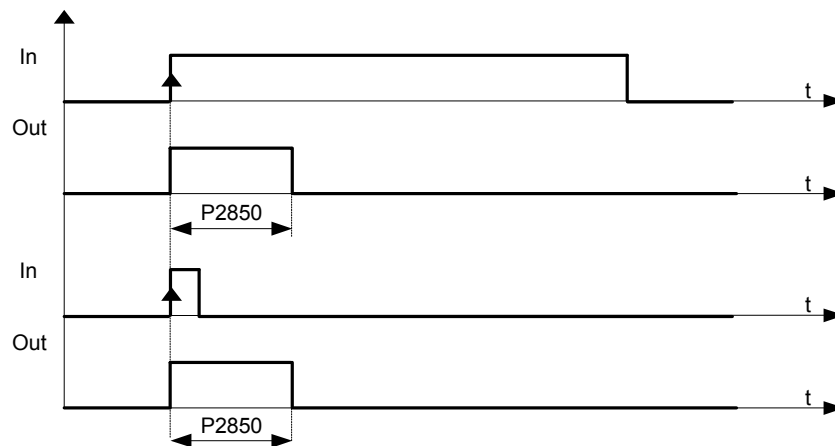
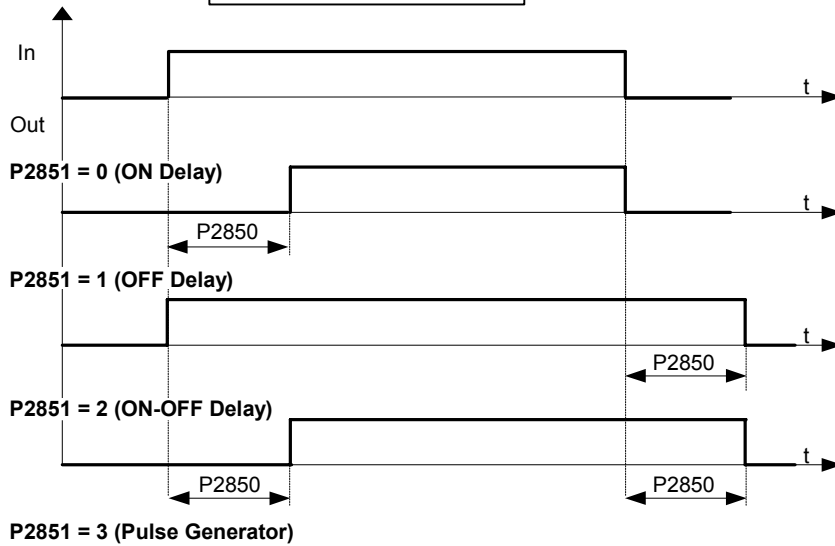
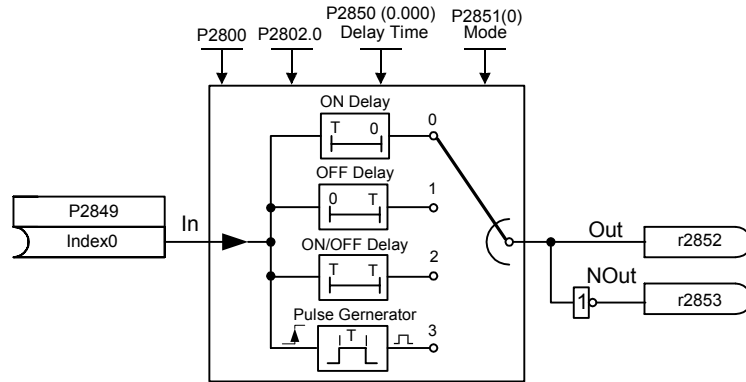
Displays Not-output of RS-FlipFlop 3, inputs are defined in P2846[0], P2846[1]

Dependency:

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

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

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



Dependency:
P2802[0] is active level for the timer.

P2850	Delay time of timer 1	Datatype: Float	Unit: s	Min: 0.0	Level: 3
	CStat: CUT	Active: first confirm	QuickComm. No	Def: 0.0	
	P-Group: TECH			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 CStat: CUT P-Group: TECH	Datatype: U16 Active: first confirm	Unit: - QuickComm. No	Min: 0 Def: 0 Max: 3	Level: 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 P-Group: TECH	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level: 3
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 P-Group: TECH	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level: 3
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 CStat: CUT P-Group: TECH	Datatype: U32 Active: first confirm	Unit: - QuickComm. No	Min: 0:0 Def: 0:0 Max: 4000:0	Level: 3
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 CStat: CUT P-Group: TECH	Datatype: Float Active: first confirm	Unit: s QuickComm. No	Min: 0.0 Def: 0.0 Max: 6000.0	Level: 3
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 CStat: CUT P-Group: TECH	Datatype: U16 Active: first confirm	Unit: - QuickComm. No	Min: 0 Def: 0 Max: 3	Level: 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 P-Group: TECH	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level: 3
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 P-Group: TECH	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level: 3
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 CStat: CUT P-Group: TECH	Datatype: U32 Active: first confirm	Unit: - QuickComm. No	Min: 0:0 Def: 0:0 Max: 4000:0	Level: 3
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			Min: 0.0	Level: 3
	CStat: CUT	Datatype: Float	Unit: s	Def: 0.0	
	P-Group: TECH	Active: first confirm	QuickComm. No	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			Min: 0	Level: 3
	CStat: CUT	Datatype: U16	Unit: -	Def: 0	
	P-Group: TECH	Active: first confirm	QuickComm. No	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			Min: -	Level: 3
		Datatype: U16	Unit: -	Def: -	
	P-Group: TECH			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			Min: -	Level: 3
		Datatype: U16	Unit: -	Def: -	
	P-Group: TECH			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			Min: 0:0	Level: 3
	CStat: CUT	Datatype: U32	Unit: -	Def: 0:0	
	P-Group: TECH	Active: first confirm	QuickComm. No	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			Min: 0.0	Level: 3
	CStat: CUT	Datatype: Float	Unit: s	Def: 0.0	
	P-Group: TECH	Active: first confirm	QuickComm. No	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			Min: 0	Level: 3
	CStat: CUT	Datatype: U16	Unit: -	Def: 0	
	P-Group: TECH	Active: first confirm	QuickComm. No	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			Min: -	Level: 3
		Datatype: U16	Unit: -	Def: -	
	P-Group: TECH			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			Min: -	Level: 3
		Datatype: U16	Unit: -	Def: -	
	P-Group: TECH			Max: -	

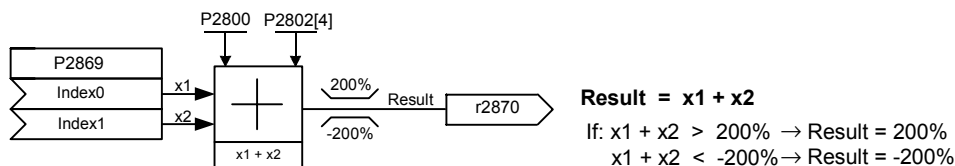
Displays Not-output of timer 4. P2864, P2865, P2866 are the inputs of the timer, outputs are P2867, P2868.

Dependency:

P2802[3] is active level for the timer.

P2869[2]	CI: ADD 1	Datatype: U32	Unit: -	Min: 0:0	Level: 3
	CStat: CUT	Active: first confirm	QuickComm. No	Def: 755:0	
	P-Group: TECH			Max: 4000:0	

Define inputs of Adder 1, result is in P2870.



Index:

P2869[0] : Connector input 0 (CI 0)
 P2869[1] : Connector input 1 (CI 1)

Dependency:

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

r2870	CO: ADD 1	Datatype: Float	Unit: %	Min: -	Level: 3
	P-Group: TECH			Def: -	
				Max: -	

Result of Adder 1.

Dependency:

P2802[4] is active level for the Adder.

P2871[2]	CI: ADD 2	Datatype: U32	Unit: -	Min: 0:0	Level: 3
	CStat: CUT	Active: first confirm	QuickComm. No	Def: 755:0	
	P-Group: TECH			Max: 4000:0	

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: -	Level: 3
	P-Group: TECH			Def: -	
				Max: -	

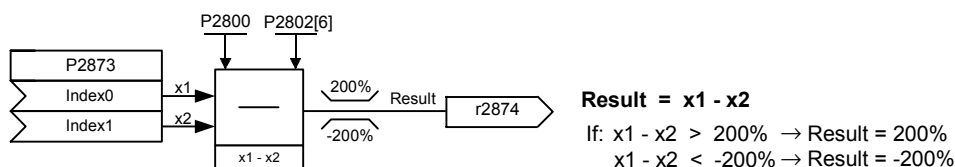
Result of Adder 2.

Dependency:

P2802[5] is active level for the Adder.

P2873[2]	CI: SUB 1	Datatype: U32	Unit: -	Min: 0:0	Level: 3
	CStat: CUT	Active: first confirm	QuickComm. No	Def: 755:0	
	P-Group: TECH			Max: 4000:0	

Define inputs of Subtractor 1, result is in P2874.



Index:

P2873[0] : Connector input 0 (CI 0)
 P2873[1] : Connector input 1 (CI 1)

Dependency:

P2802[6] is active level for the Subtractor.

r2874	CO: SUB 1	Datatype: Float	Unit: %	Min: -	Level: 3
	P-Group: TECH			Def: -	
				Max: -	

Result of Subtractor 1.

Dependency:

P2802[6] is active level for the Subtractor.

P2875[2]	CI: SUB 2	Min: 0:0	Level: 3	
	CStat: CUT	Datatype: U32		Def: 755:0
	P-Group: TECH	Active: first confirm		QuickComm. No Max: 4000:0

Define inputs of Subtractor 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 Subtractor.

r2876	CO: SUB 2	Min: -	Level: 3	
	Datatype: Float	Unit: %		Def: -
	P-Group: TECH	Max: -		

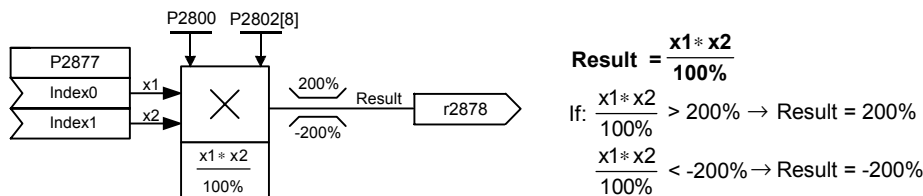
Result of Subtractor 2.

Dependency:

P2802[7] is active level for the Subtractor.

P2877[2]	CI: MUL 1	Min: 0:0	Level: 3	
	CStat: CUT	Datatype: U32		Def: 755:0
	P-Group: TECH	Active: first confirm		QuickComm. No Max: 4000:0

Define inputs of Multiplier 1, result is in P2878.



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	Min: -	Level: 3	
	Datatype: Float	Unit: %		Def: -
	P-Group: TECH	Max: -		

Result of Multiplier 1.

Dependency:

P2802[8] is active level for the Multiplier.

P2879[2]	CI: MUL 2	Min: 0:0	Level: 3	
	CStat: CUT	Datatype: U32		Def: 755:0
	P-Group: TECH	Active: first confirm		QuickComm. No Max: 4000:0

Define inputs of Multiplier 2, result is in P2880.

Index:

P2879[0] : Connector input 0 (CI 0)
P2879[1] : Connector input 1 (CI 1)

Dependency:

P2802[9] is active level for the Multiplier.

r2880	CO: MUL 2	Min: -	Level: 3	
	Datatype: Float	Unit: %		Def: -
	P-Group: TECH	Max: -		

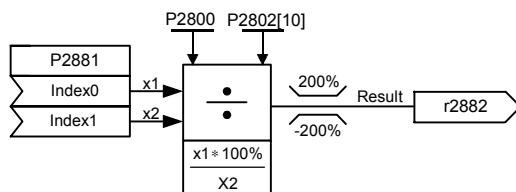
Result of Multiplier 2.

Dependency:

P2802[9] is active level for the Multiplier.

P2881[2]	CI: DIV 1	Datatype: U32	Unit: -	Min: 0:0	Level: 3
	CStat: CUT	Active: first confirm	QuickComm. No	Def: 755:0	
	P-Group: TECH			Max: 4000:0	

Define inputs of Divider 1, result is in P2882.



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

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

Index:

P2881[0] : Connector input 0 (CI 0)
 P2881[1] : Connector input 1 (CI 1)

Dependency:

P2802[10] is active level for the Divider.

r2882	CO: DIV 1	Datatype: Float	Unit: %	Min: -	Level: 3
	P-Group: TECH			Def: -	
				Max: -	

Result of Divider 1.

Dependency:

P2802[10] is active level for the Divider.

P2883[2]	CI: DIV 2	Datatype: U32	Unit: -	Min: 0:0	Level: 3
	CStat: CUT	Active: first confirm	QuickComm. No	Def: 755:0	
	P-Group: TECH			Max: 4000:0	

Define inputs of Divider 2, result is in P2884.

Index:

P2883[0] : Connector input 0 (CI 0)
 P2883[1] : Connector input 1 (CI 1)

Dependency:

P2802[11] is active level for the Divider.

r2884	CO: DIV 2	Datatype: Float	Unit: %	Min: -	Level: 3
	P-Group: TECH			Def: -	
				Max: -	

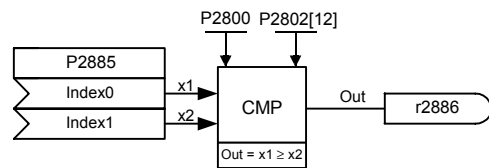
Result of Divider 2.

Dependency:

P2802[11] is active level for the Divider.

P2885[2]	CI: CMP 1	Datatype: U32	Unit: -	Min: 0:0	Level: 3
	CStat: CUT	Active: first confirm	QuickComm. No	Def: 755:0	
	P-Group: TECH			Max: 4000:0	

Defines inputs of Comparator 1, output is P2886.



$x1 \geq x2 \rightarrow \text{Out} = 1$
 $x1 < x2 \rightarrow \text{Out} = 0$

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: -	Level: 3
	P-Group: TECH			Def: -	
				Max: -	

Displays result bit of Comparator 1.

Dependency:

P2802[12] is active level for the Comparator.

P2887[2]	CI: CMP 2			Min: 0:0	Level: 3
	CStat: CUT	Datatype: U32	Unit: -	Def: 755:0	
	P-Group: TECH	Active: first confirm	QuickComm. No	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			Min: -	Level: 3
		Datatype: U16	Unit: -	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 [%]			Min: -200.00	Level: 3
	CStat: CUT	Datatype: Float	Unit: %	Def: 0.00	
	P-Group: TECH	Active: first confirm	QuickComm. No	Max: 200.00	

Fixed percent setting 1.

Connector Setting in %

P2889

P2890

Range : -200% ... 200%

P2890	CO: Fixed setpoint 2 in [%]			Min: -200.00	Level: 3
	CStat: CUT	Datatype: Float	Unit: %	Def: 0.00	
	P-Group: TECH	Active: first confirm	QuickComm. No	Max: 200.00	

Fixed percent setting 2.

P3900	End of quick commissioning			Min: 0	Level: 1
	CStat: C	Datatype: U16	Unit: -	Def: 0	
	P-Group: QUICK	Active: first confirm	QuickComm. Yes	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 :

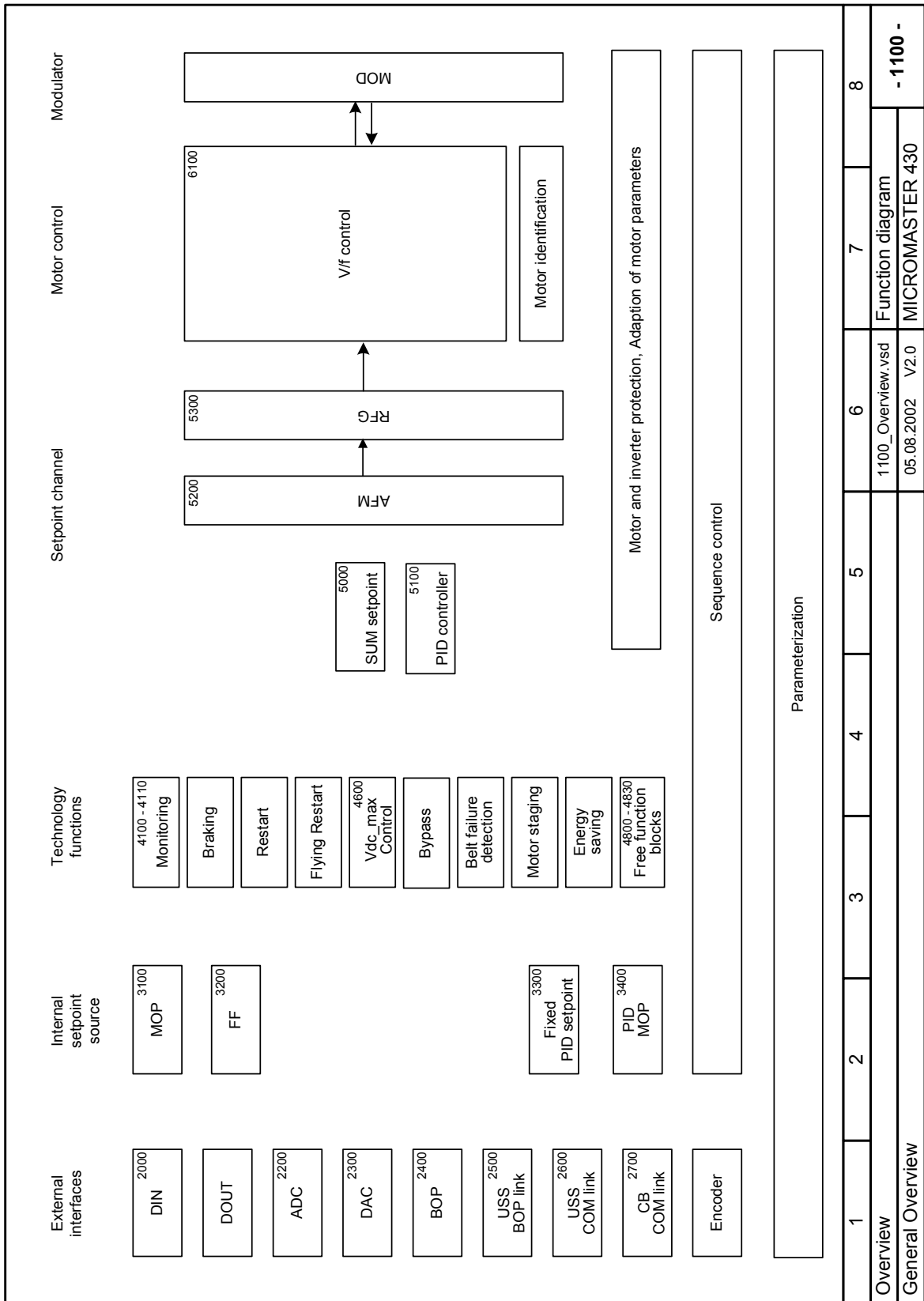
When setting 2 is selected, only those parameters, which depend on the parameters in the commissioning menu "Quick commissioning" (P0010 = 1) are calculated. The I/O settings are also reset to default and the motor calculations performed.

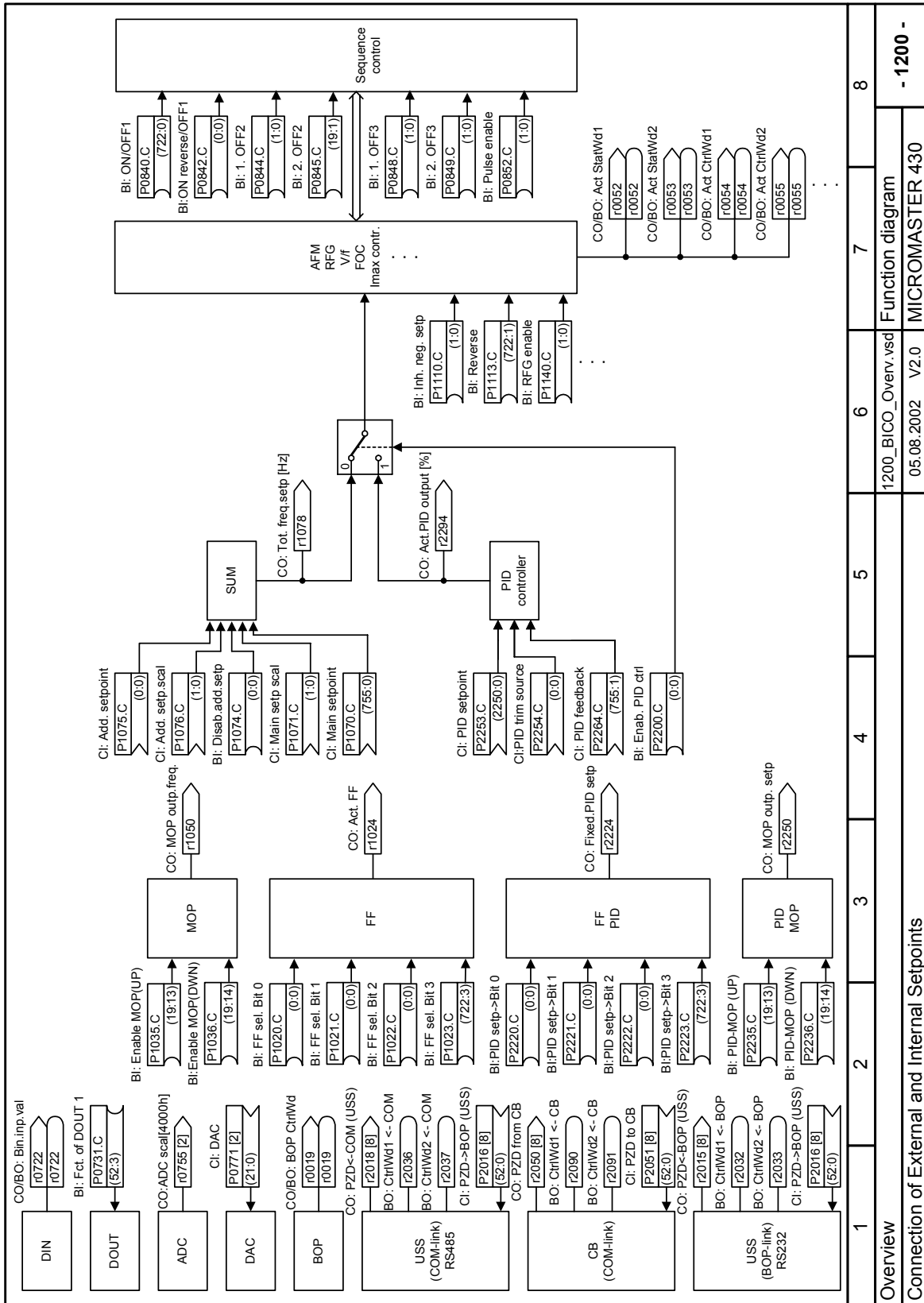
P3900 = 3 :

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).

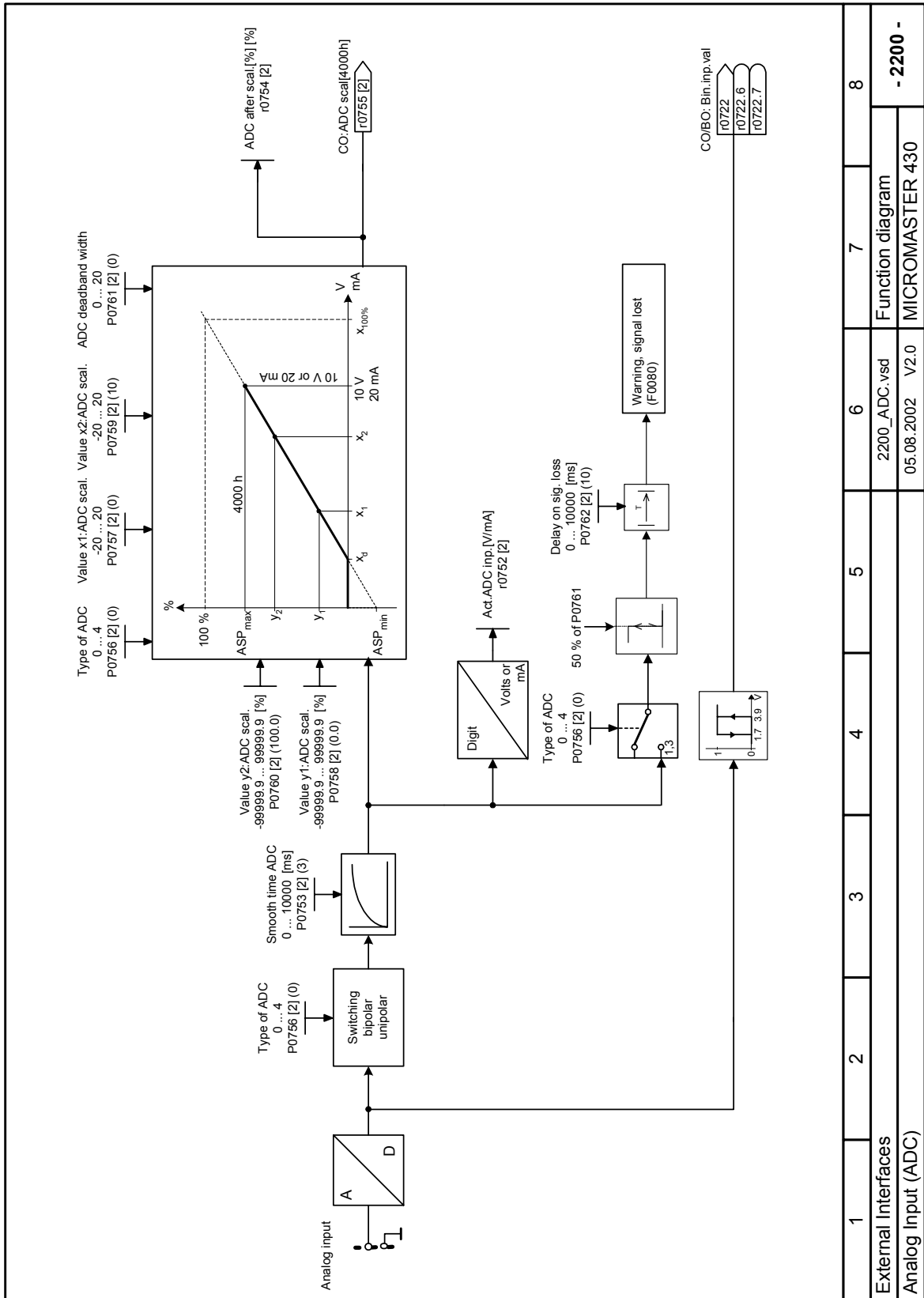
2 Function Diagrams

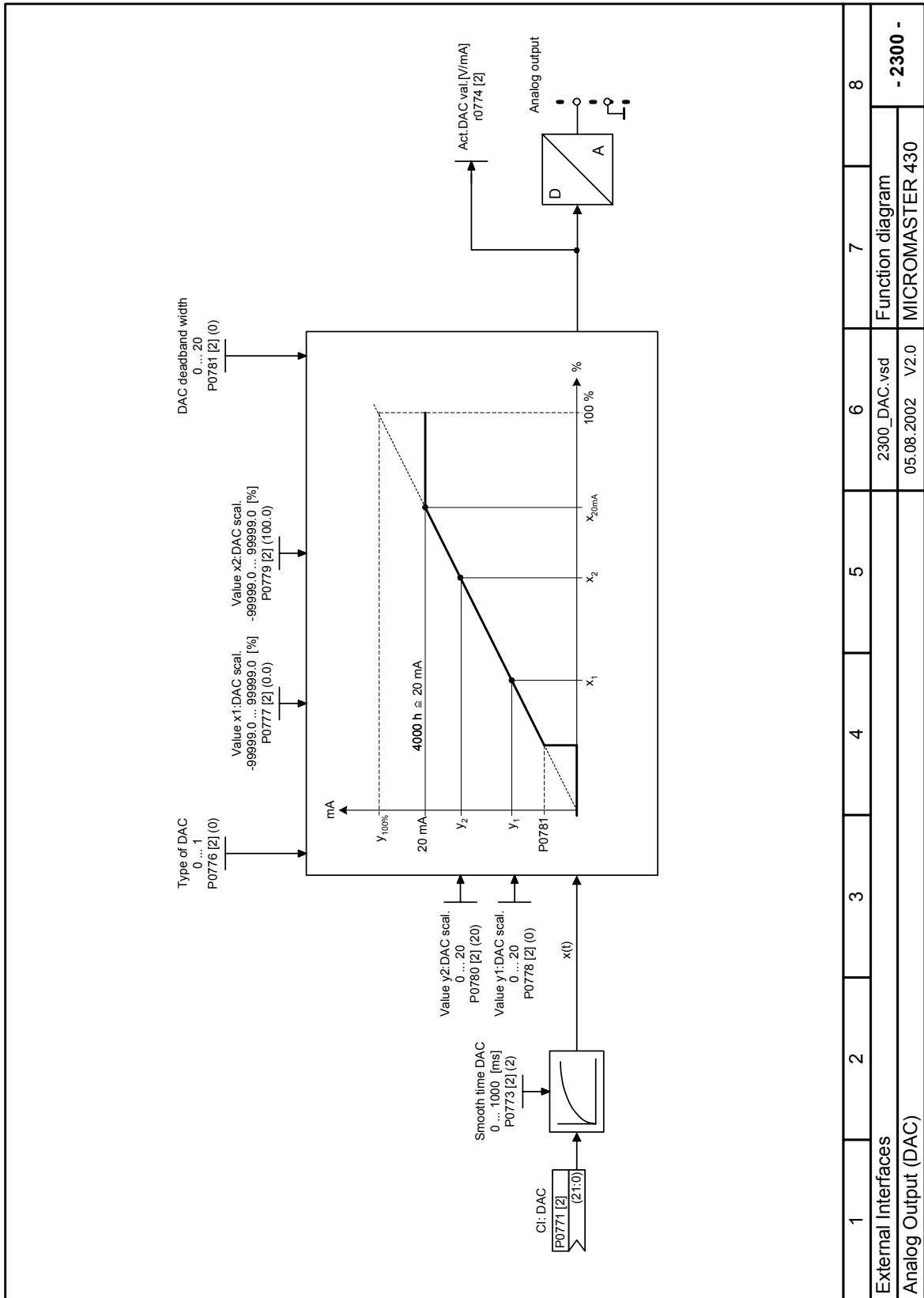




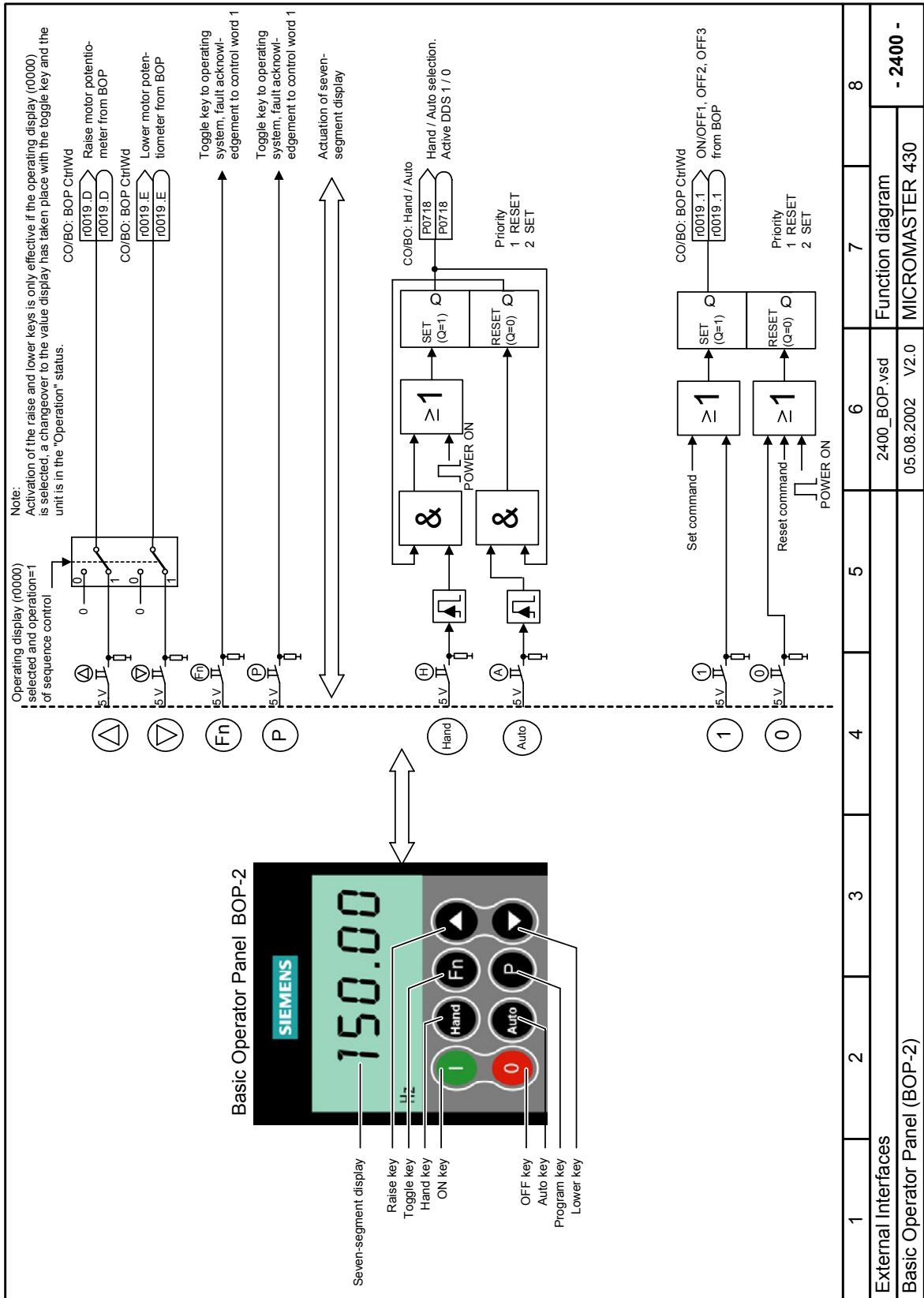
1	2	3	4	5	6	7	8
Connection of External and Internal Setpoints							
1200_BICO_Overv.vsd						Function diagram	
05.08.2002 V2.0						MICROMASTER 430	

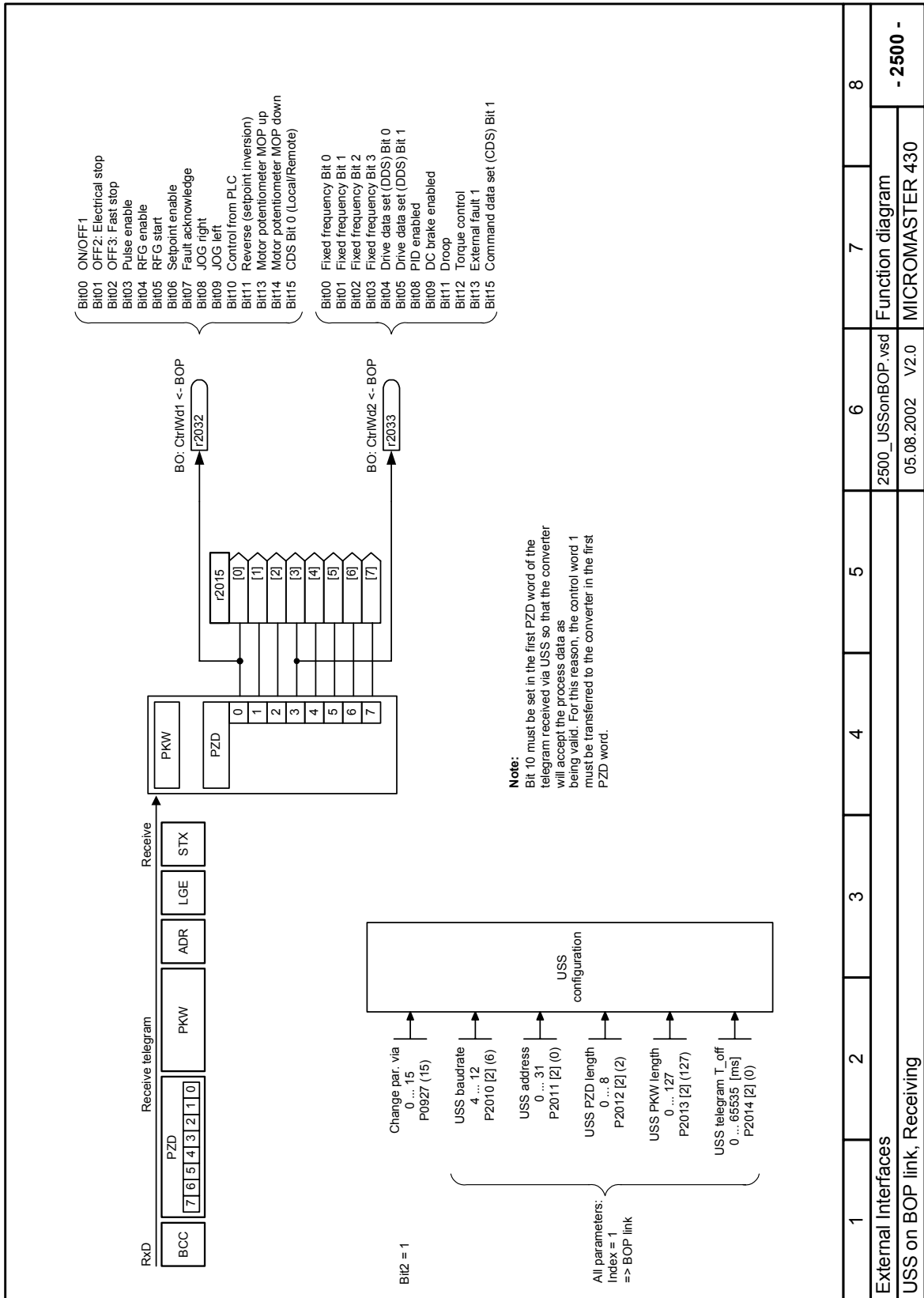
- 1200 -



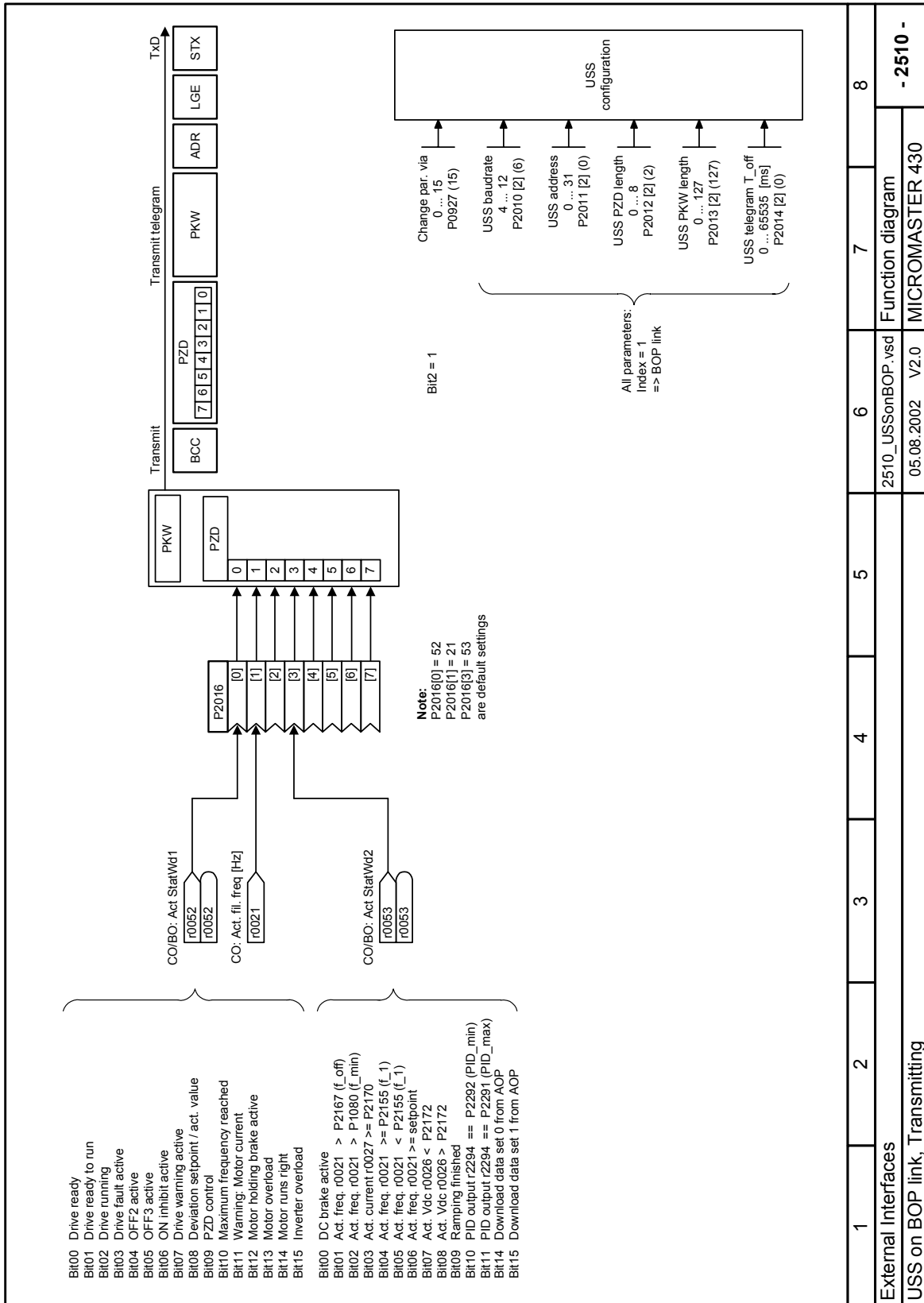


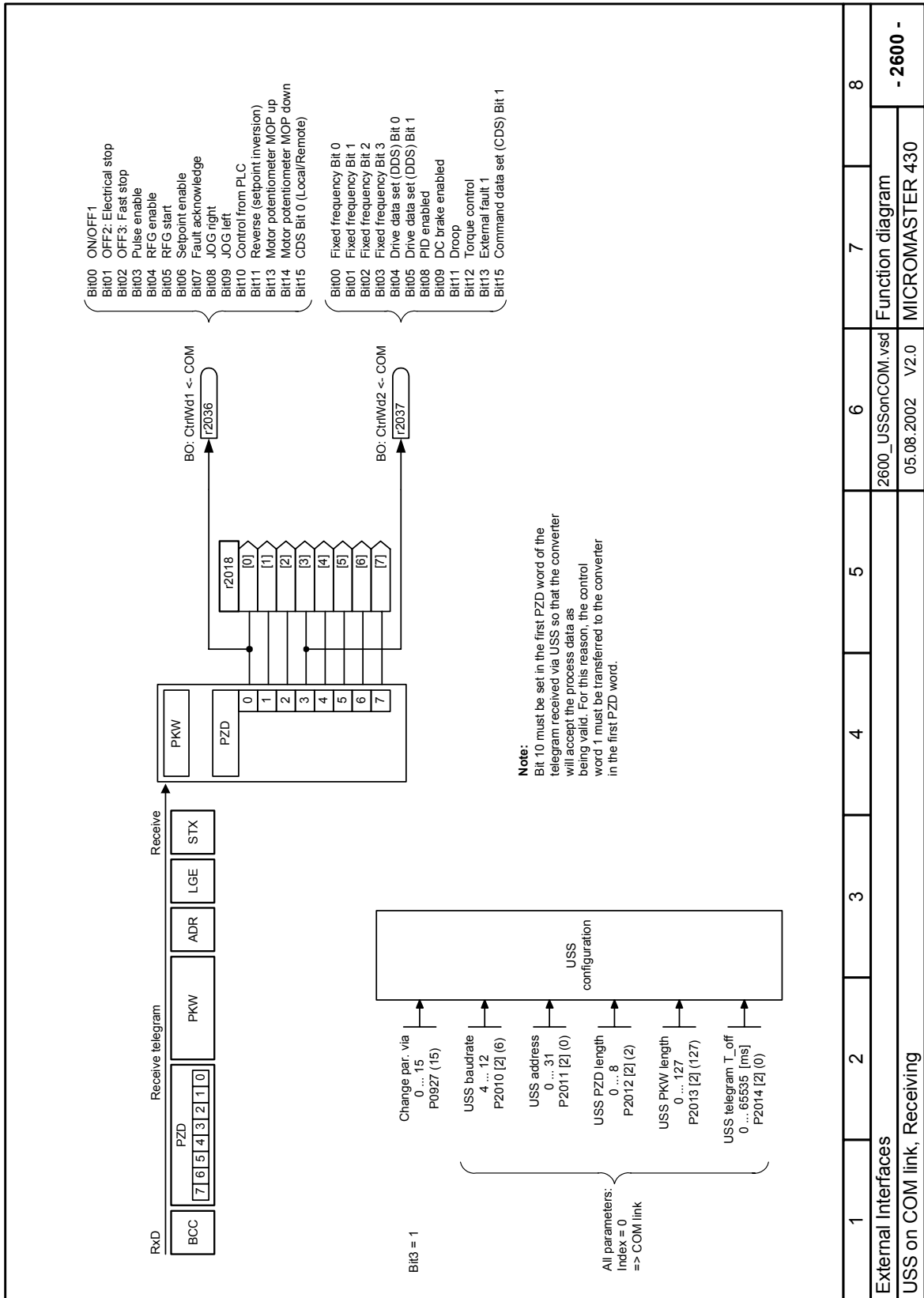
1	2	3	4	5	6	7	8
External Interfaces							
Analog Output (DAC)							
2300_DAC.vsd						Function diagram	
05.08.2002 V2.0						MICROMASTER 430	
- 2300 -							

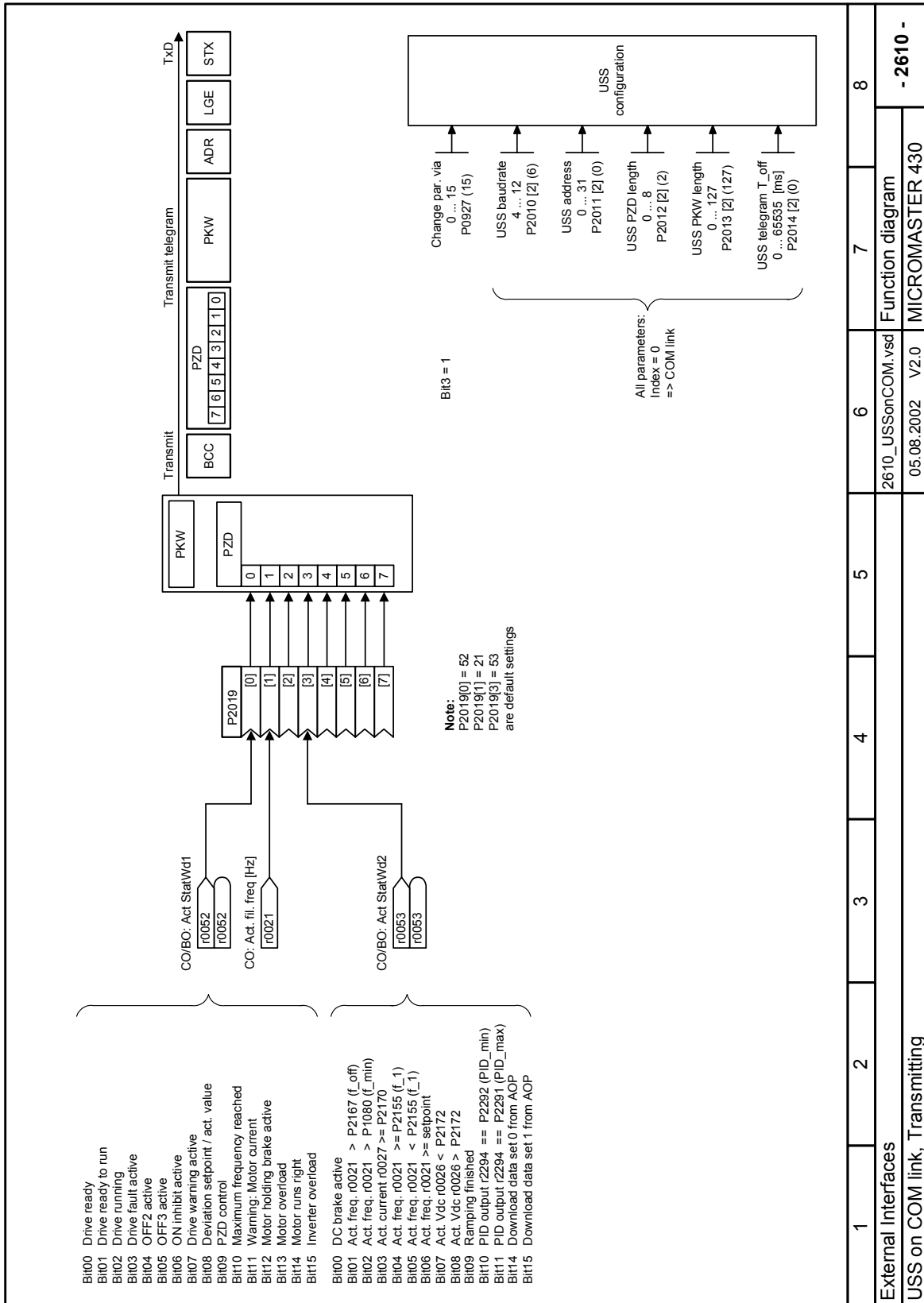




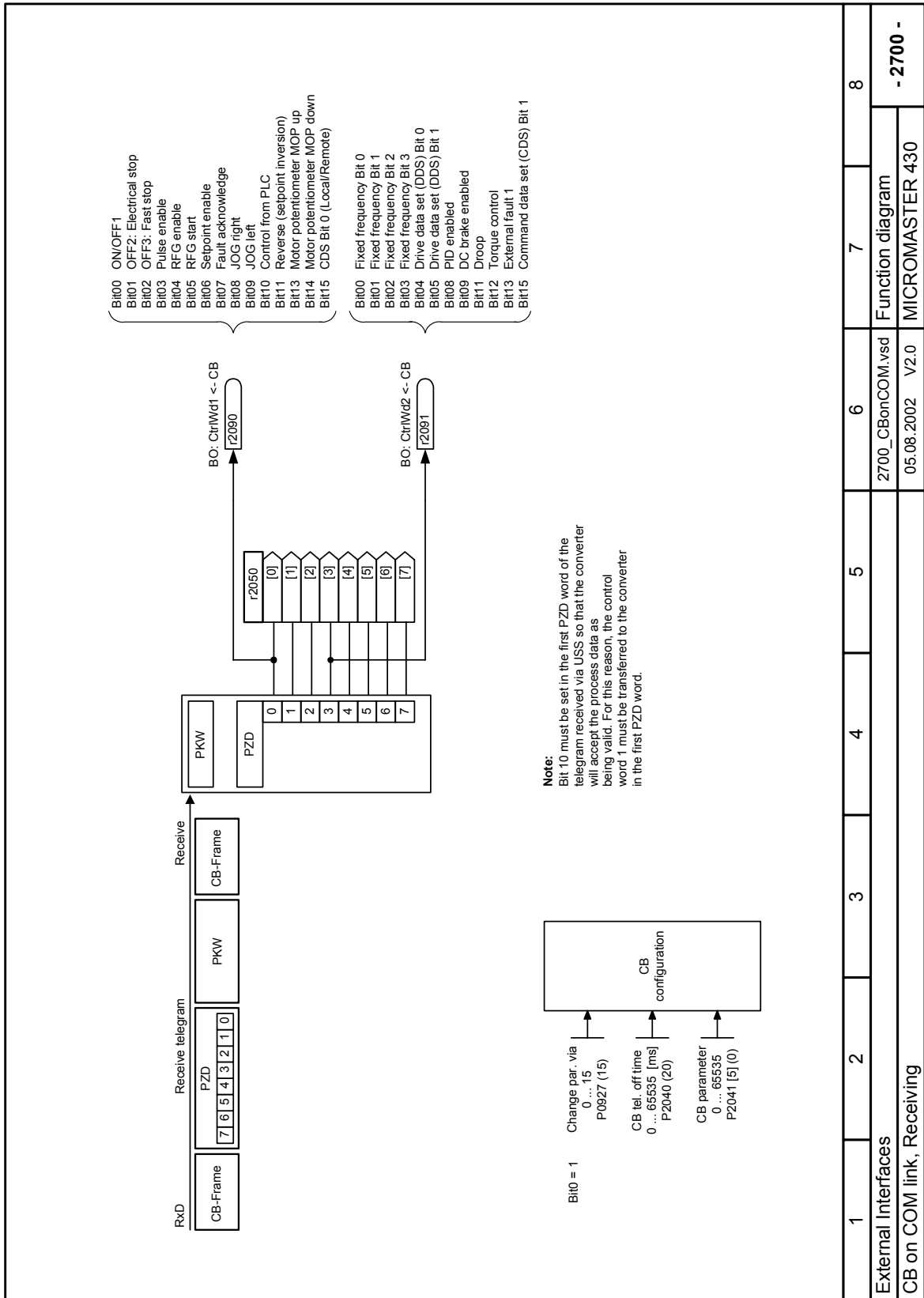
1	2	3	4	5	6	7	8
External Interfaces							
USS on BOP link, Receiving					2500_USSonBOP.vsd	Function diagram	
					05.08.2002	MICROMASTER 430	
					V2.0	- 2500 -	



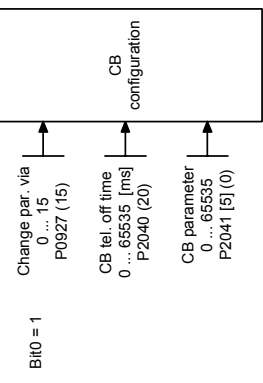
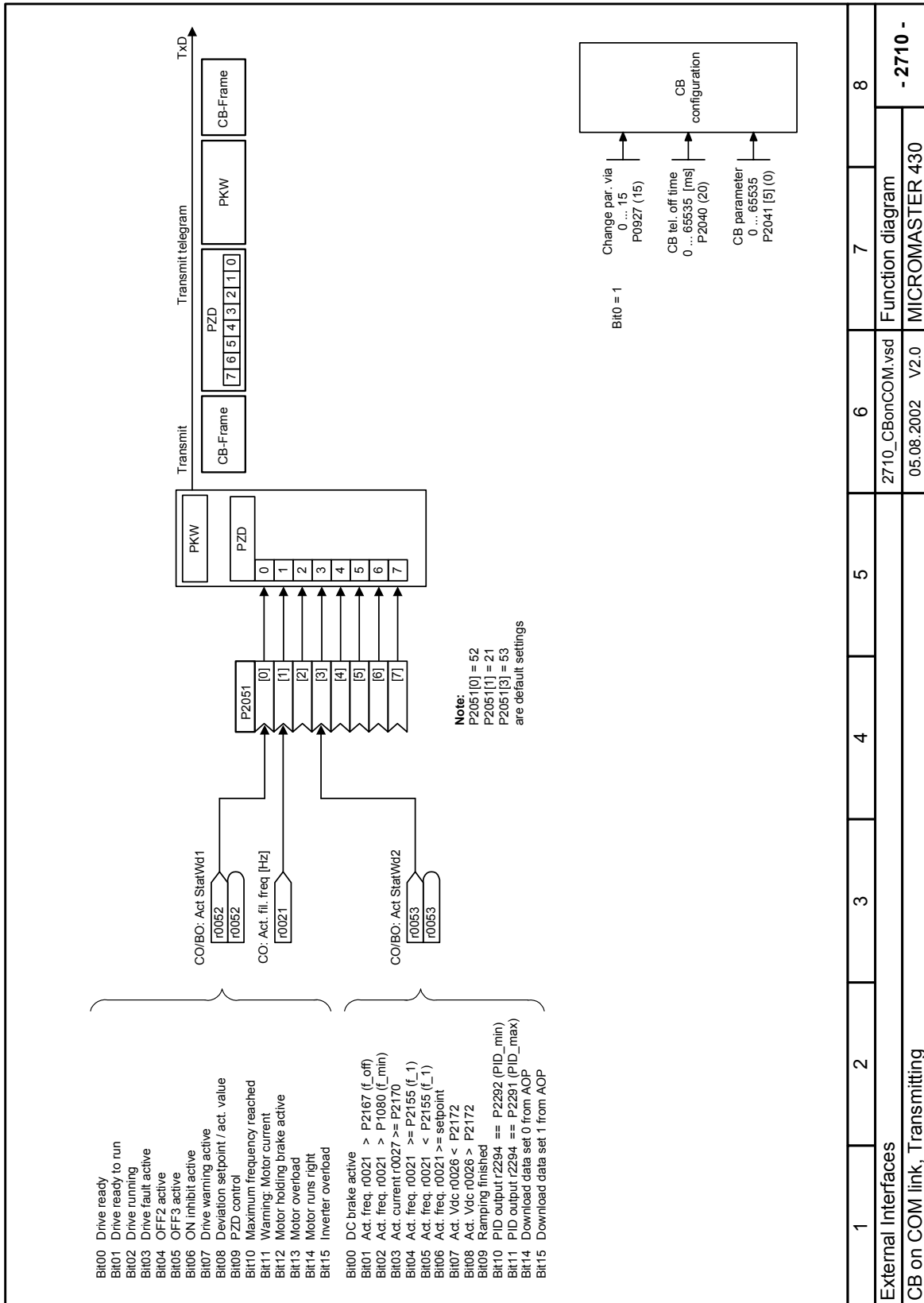




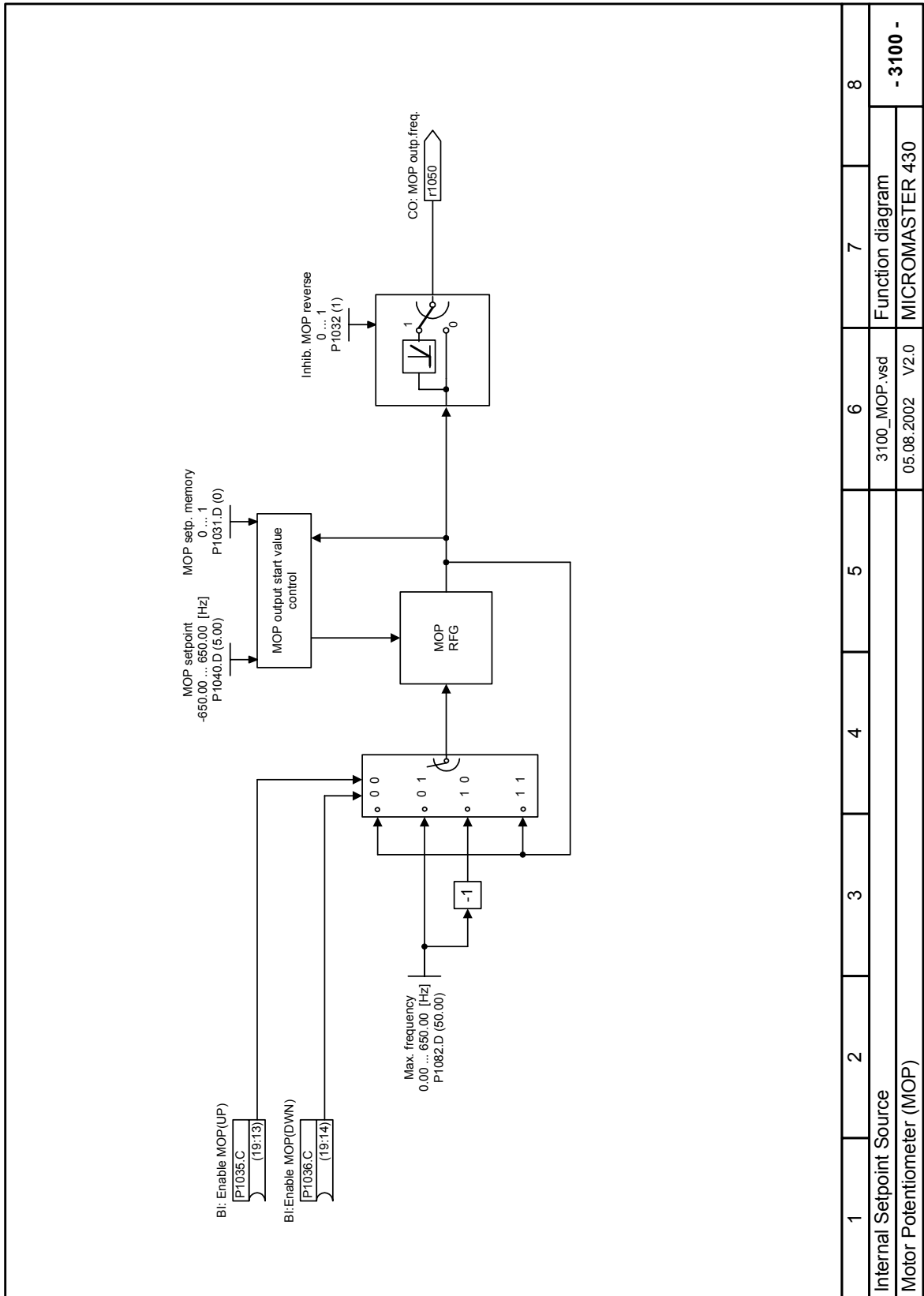
1	2	3	4	5	6	7	8
External Interfaces							
USS on COM link, Transmitting							
2610_USSonCOM.vsd						Function diagram	
05.08.2002 V2.0						MICROMASTER 430	
- 2610 -							



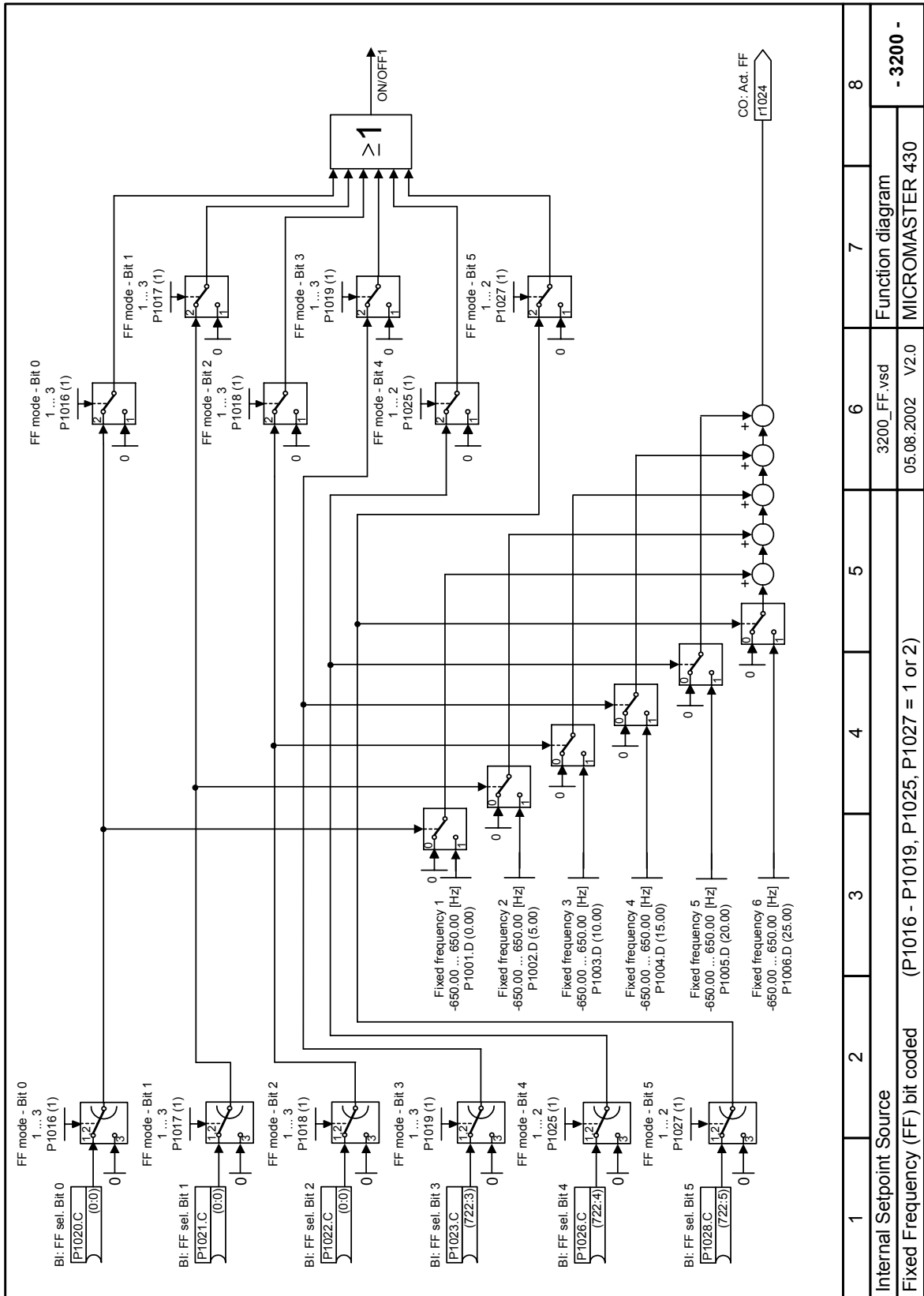
1	2	3	4	5	6	7	8
External Interfaces							
CB on COM link, Receiving				2700_CBonCOM.vsd		Function diagram	
				05.08.2002 V2.0		MICROMASTER 430	
- 2700 -							



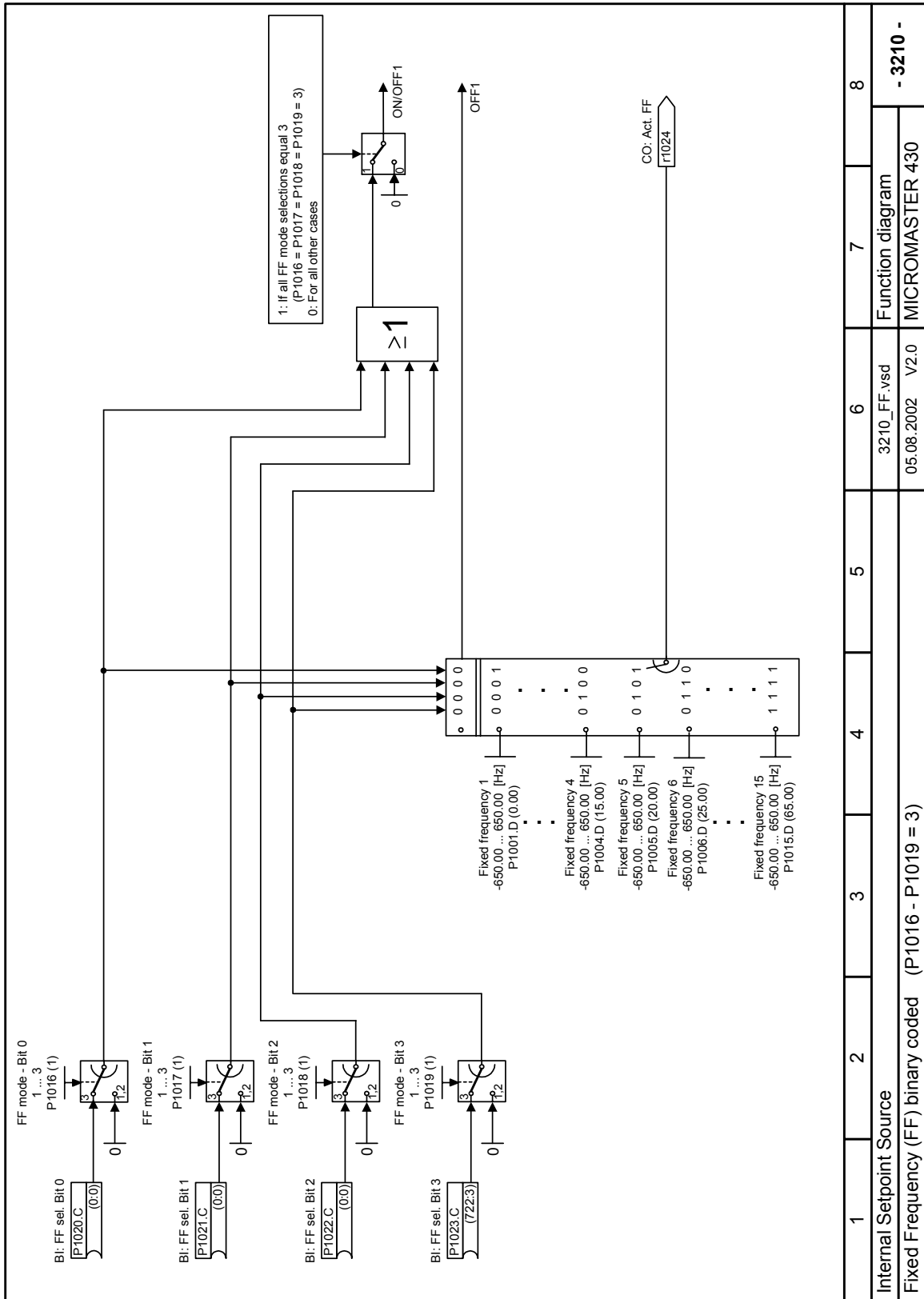
1	2	3	4	5	6	7	8
External Interfaces							
2710_CBonCOM.vsd							
Function diagram							
05.08.2002 V2.0							
MICROMASTER 430							
- 2710 -							

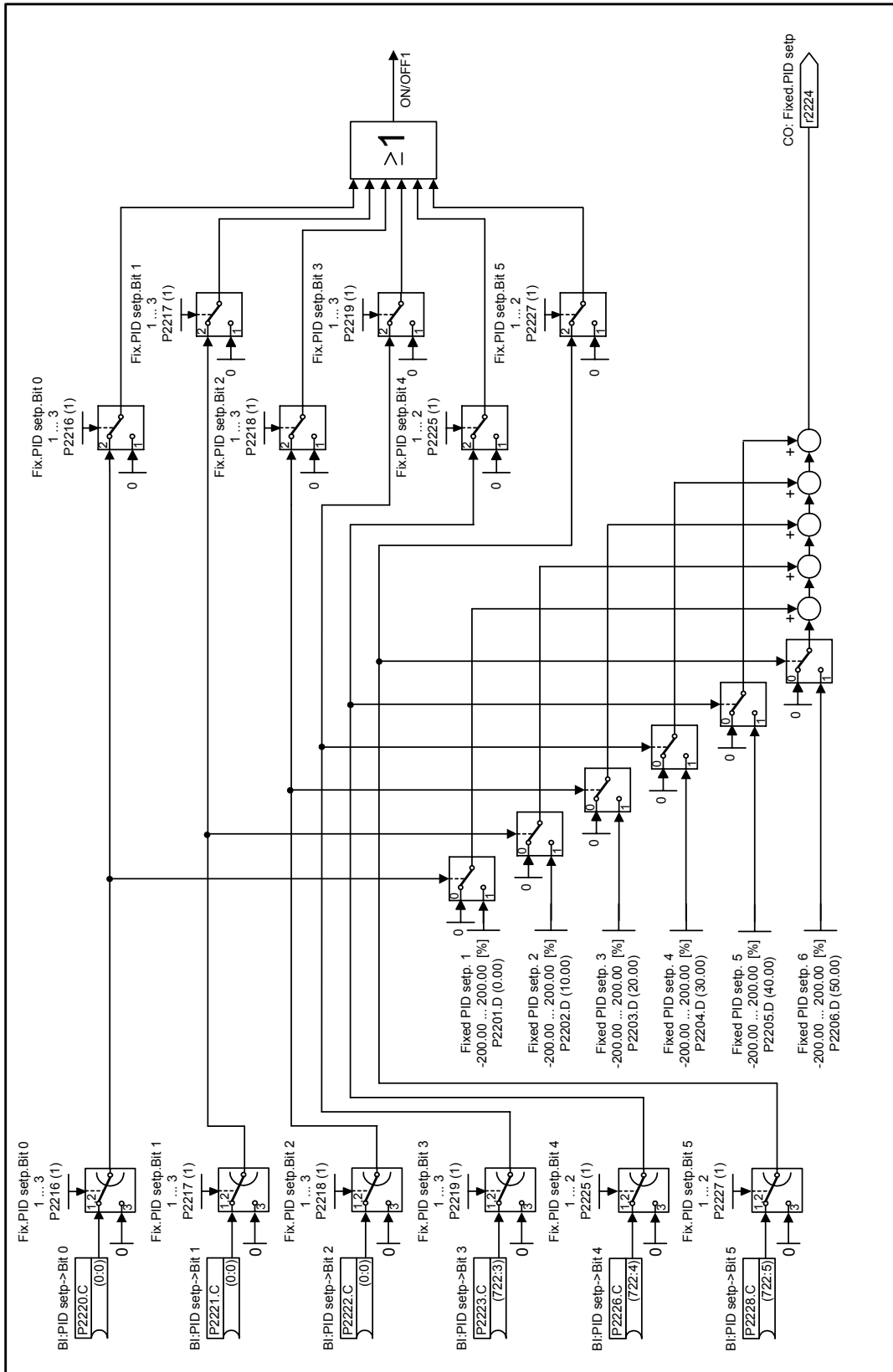


1	2	3	4	5	6	7	8
Internal Setpoint Source					3100_MOP.vsd		Function diagram
Motor Potentiometer (MOP)					05.08.2002 V2.0		MICROMASTER 430
							- 3100 -

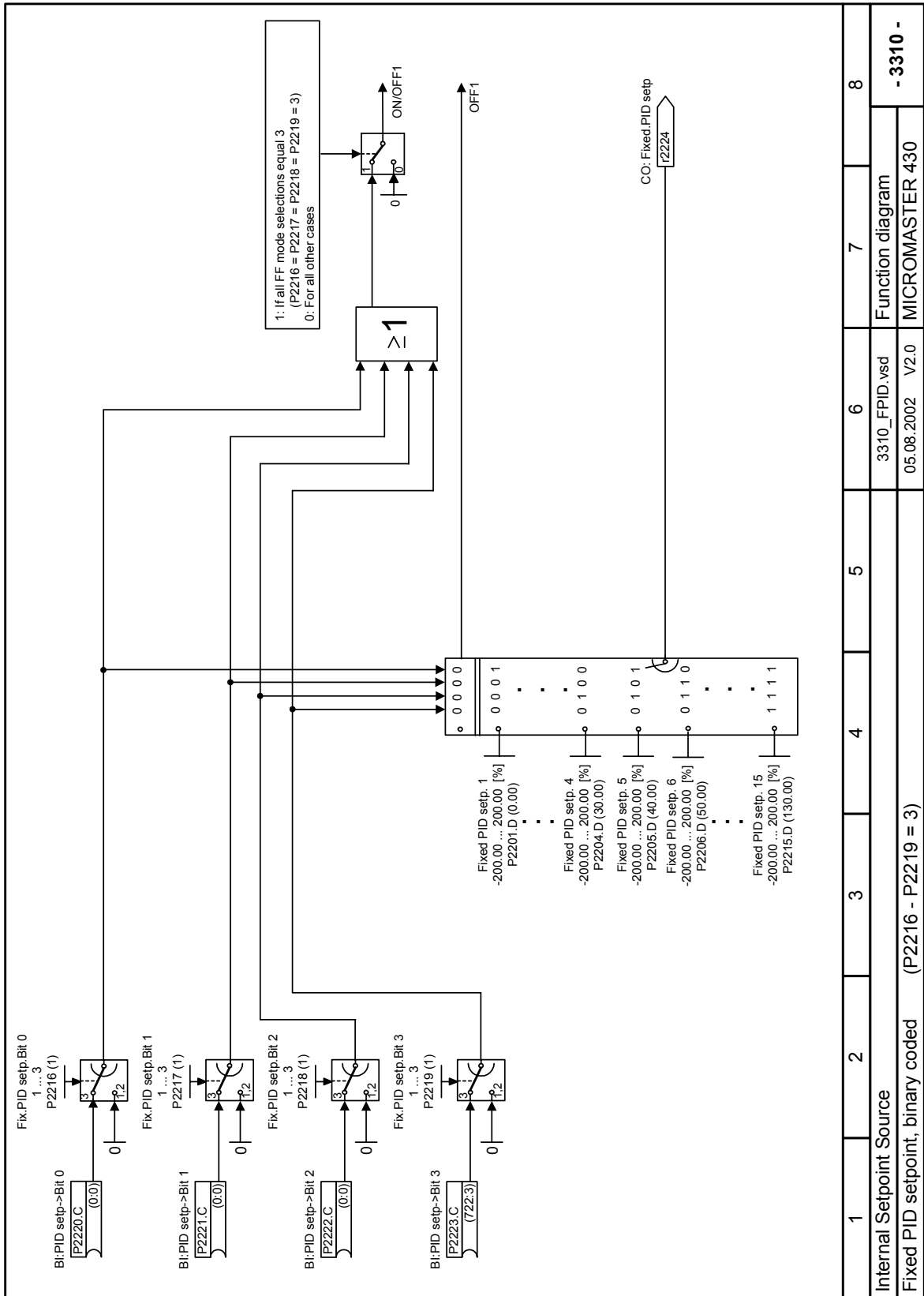


1	2	3	4	5	6	7	8
Internal Setpoint Source							
Fixed Frequency (FF) bit coded (P1016 - P1019, P1025, P1027 = 1 or 2)							
3200_FF.vsd						Function diagram	
05.08.2002 V2.0						MICROMASTER 430	
- 3200 -							

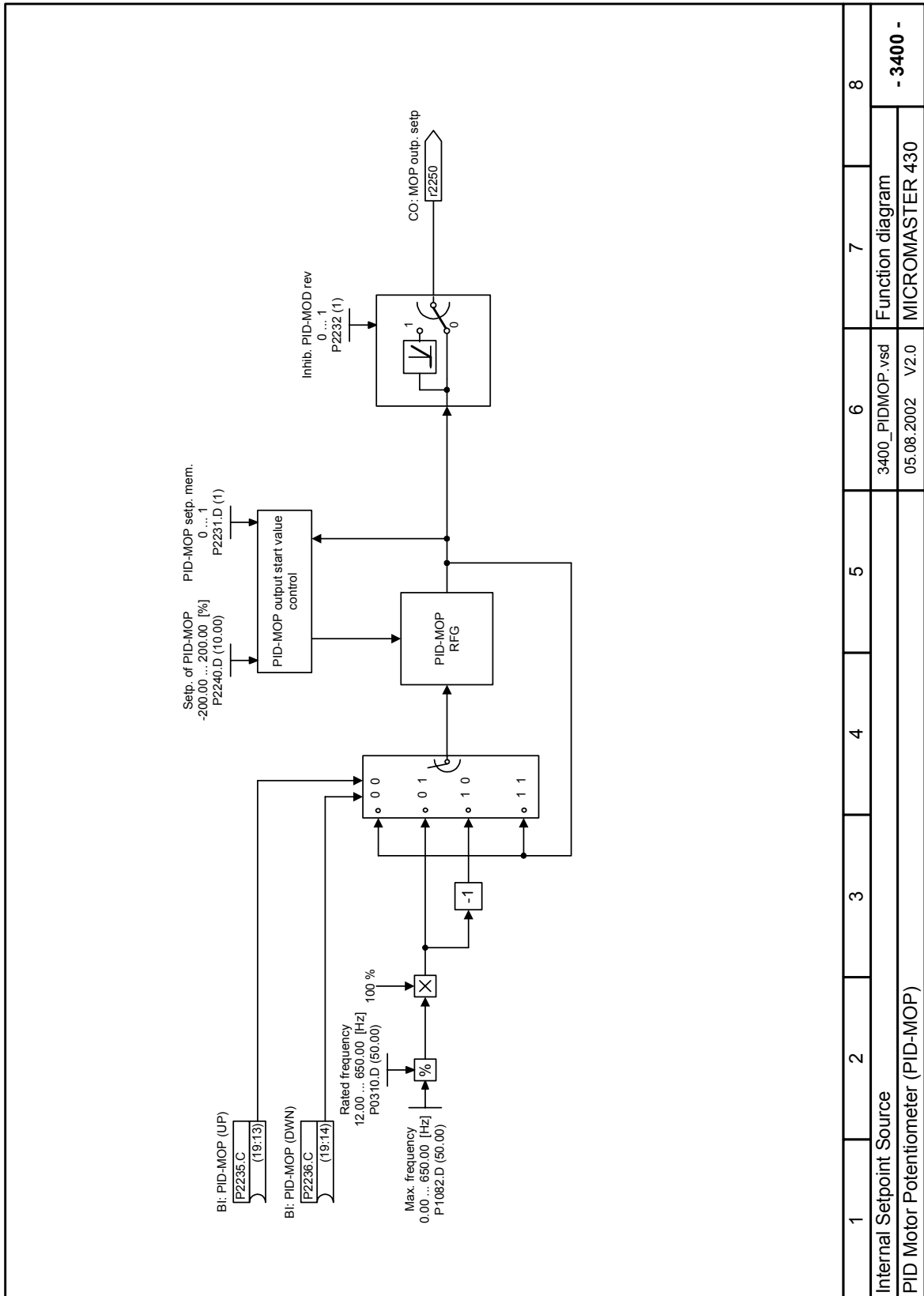




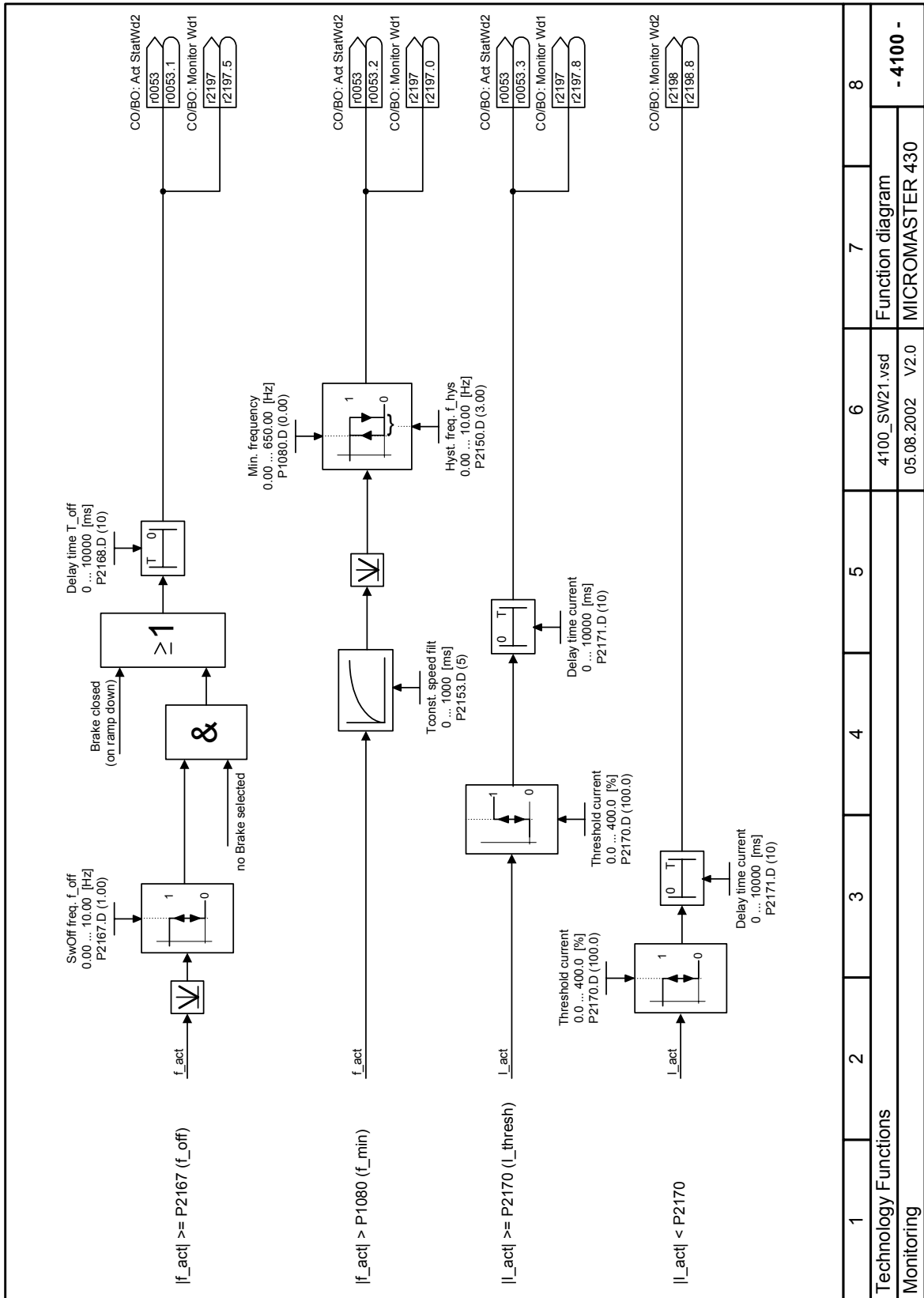
1	2	3	4	5	6	7	8
Internal Setpoint Source							
3300_FPID.vsd							
05.08.2002 V2.0							
Fixed PID setpoint, bit coded (P2216 - P2219, P2225, P2227 = 1 or 2)						Function diagram	
MICROMASTER 430						- 3300 -	



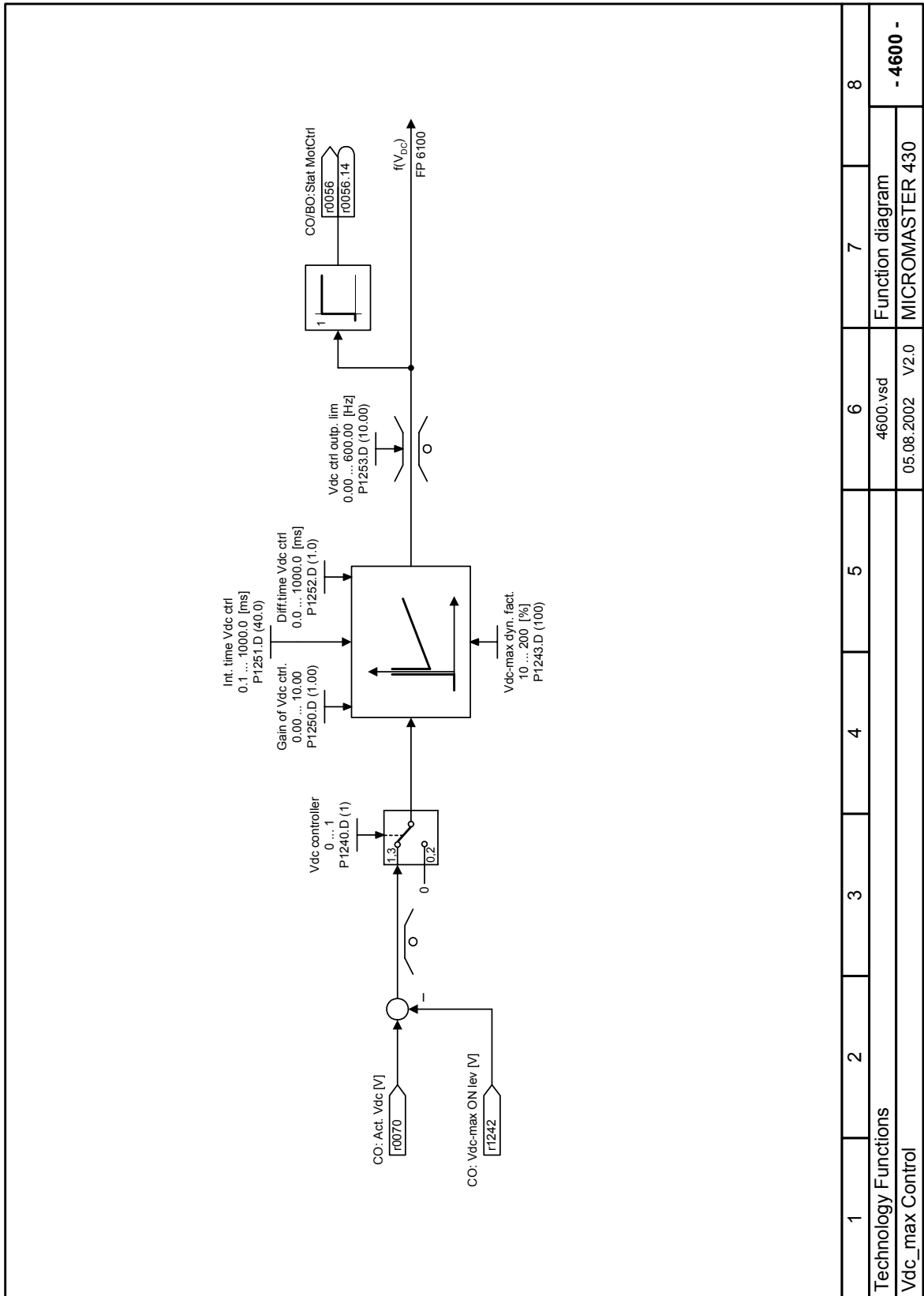
1	2	3	4	5	6	7	8
Internal Setpoint Source							
Fixed PID setpoint, binary coded (P2216 - P2219 = 3)							
3310_FPID.vsd						Function diagram	
05.08.2002 V2.0						MICROMASTER 430	
- 3310 -							



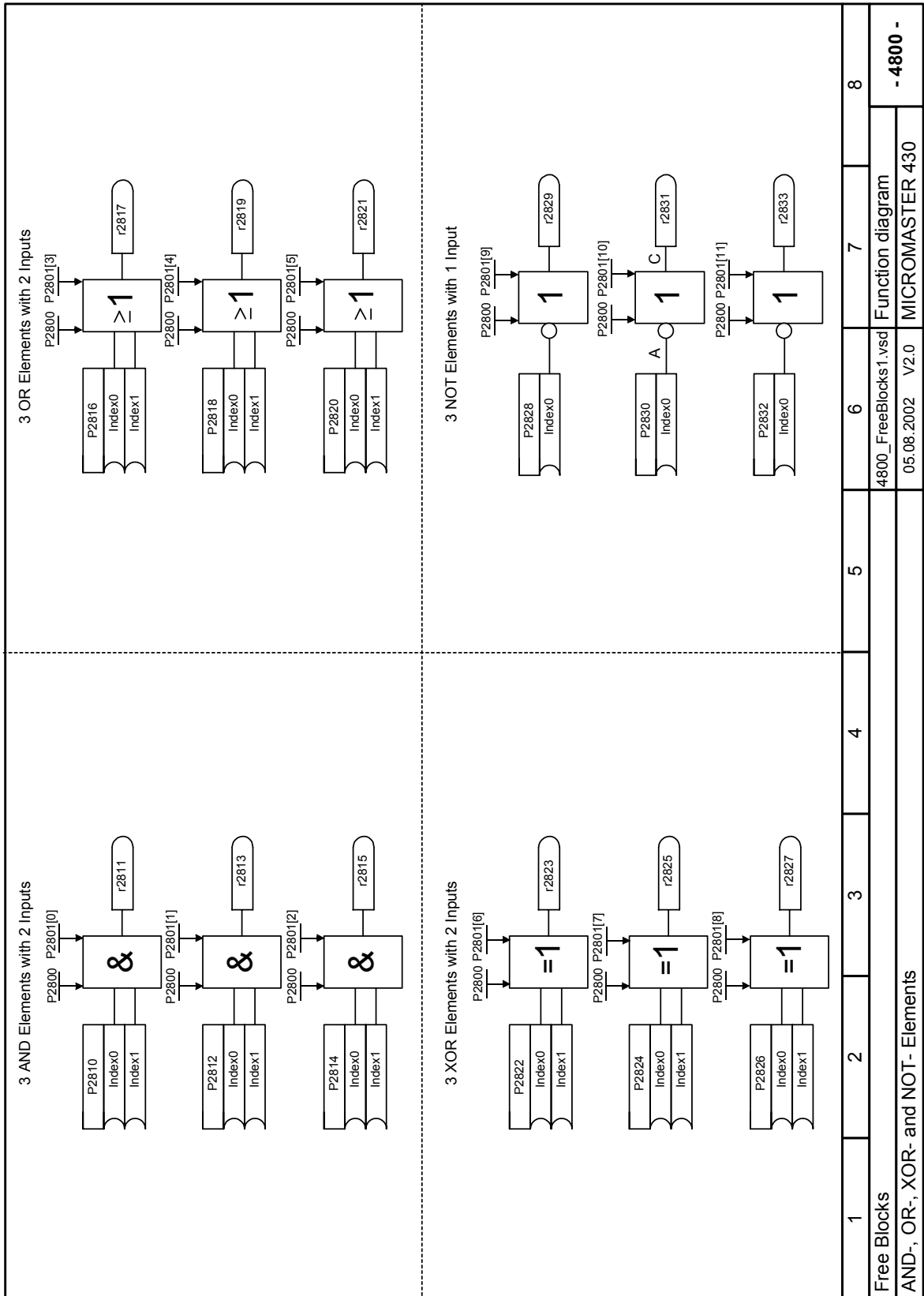
1	2	3	4	5	6	7	8
Internal Setpoint Source							
PID Motor Potentiometer (PID-MOP)							
3400_PIDMOP.vsd						Function diagram	
05.08.2002 V2.0						MICROMASTER 430	
- 3400 -							



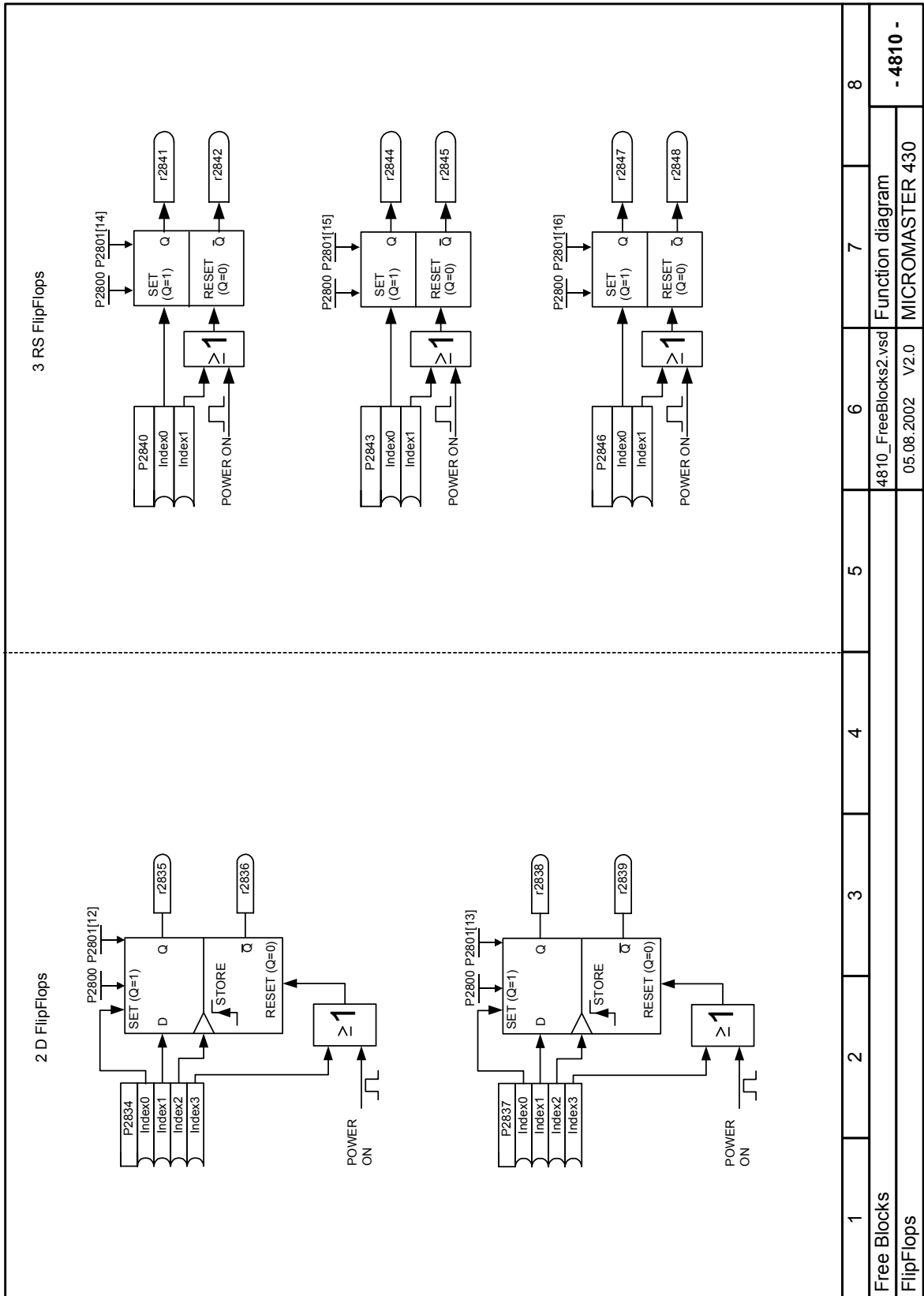
1	2	3	4	5	6	7	8
Technology Functions							
Monitoring							
4100_SW21.vsd				05.08.2002		V2.0	
Function diagram						- 4100 -	
MICROMASTER 430							



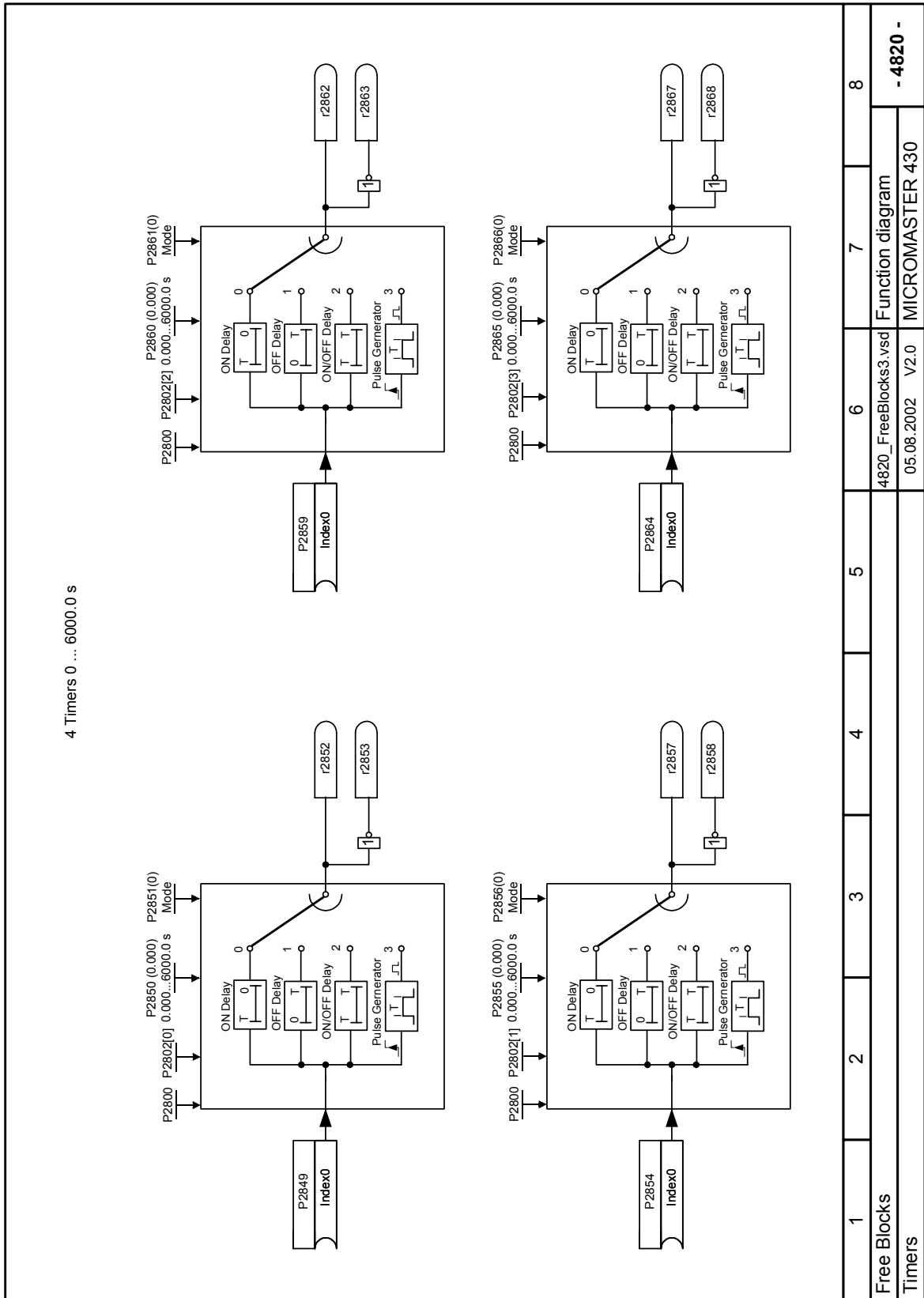
1	2	3	4	5	6	7	8
Technology Functions							
Vdc_max Control							
				4600.vsd		Function diagram	
				05.08.2002 V2.0		MICROMASTER 430	
- 4600 -							

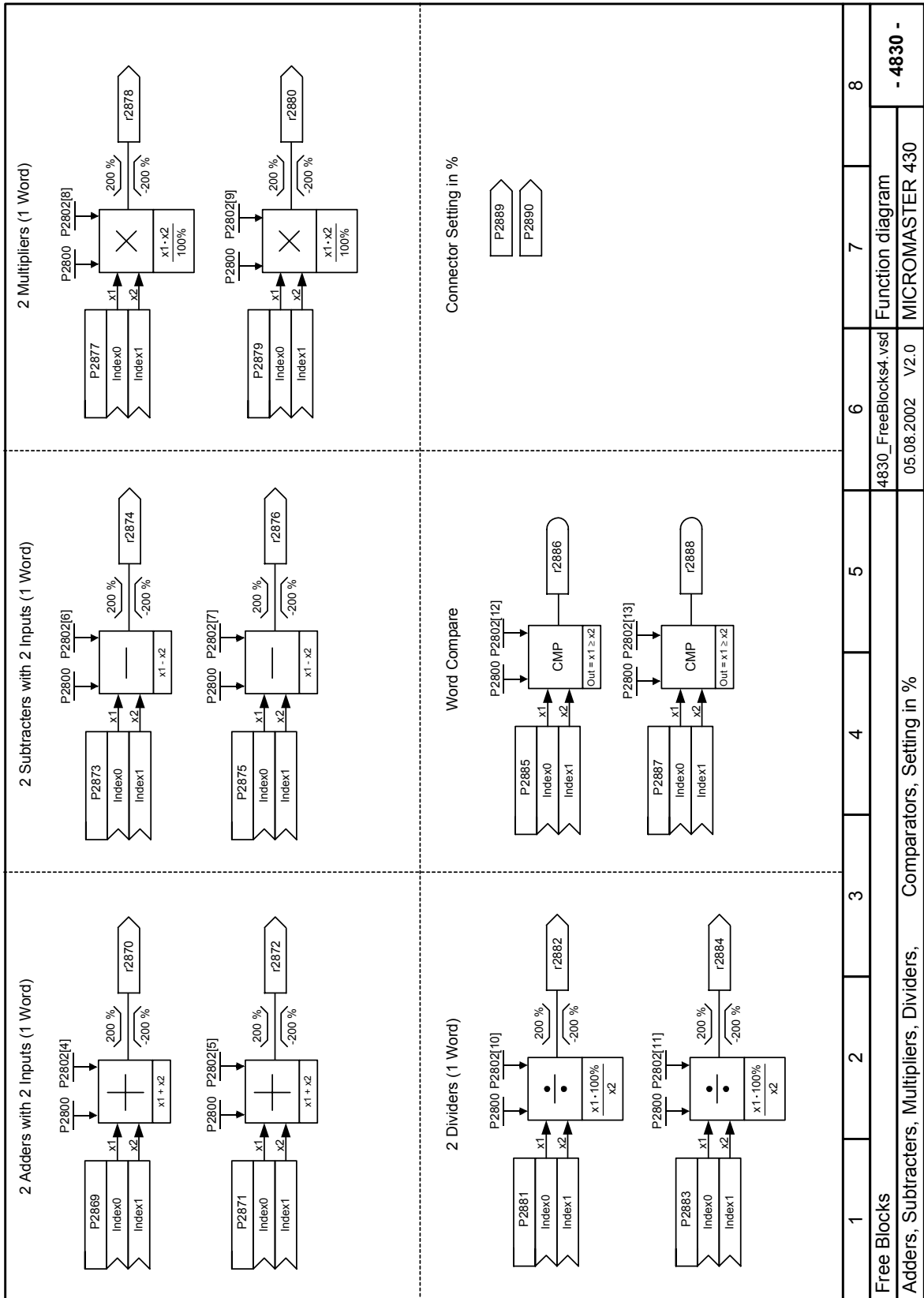


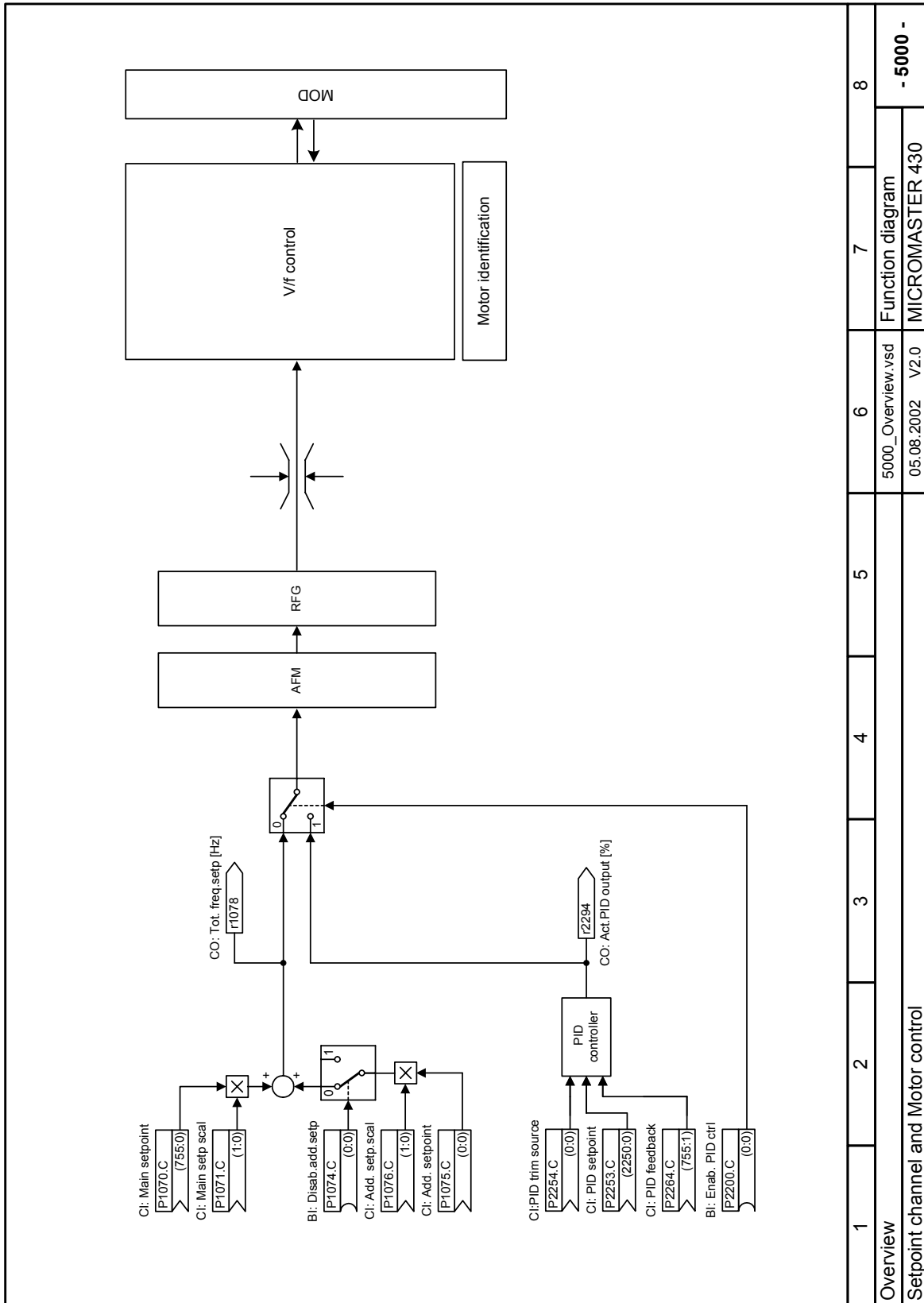
1	2	3	4	5	6	7	8
Free Blocks							
4800_FreeBlocks1.vsd							
Function diagram							
MICROMASTER 430							
- 4800 -							



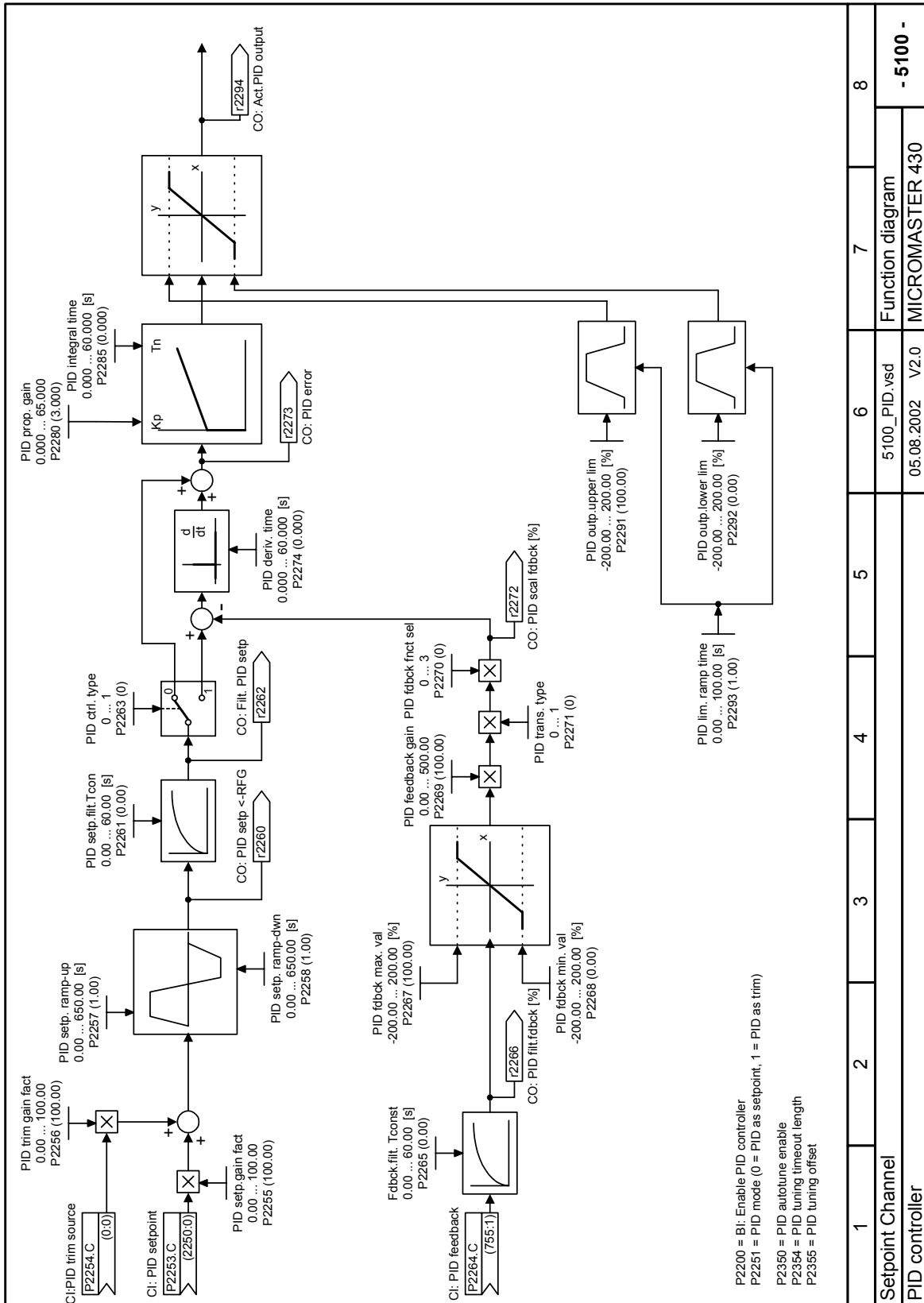
1	2	3	4	5	6	7	8
Free Blocks							
4810_FreeBlocks2.vsd							
05.08.2002 V2.0							
Function diagram						- 4810 -	
FlipFlops						MICROMASTER 430	



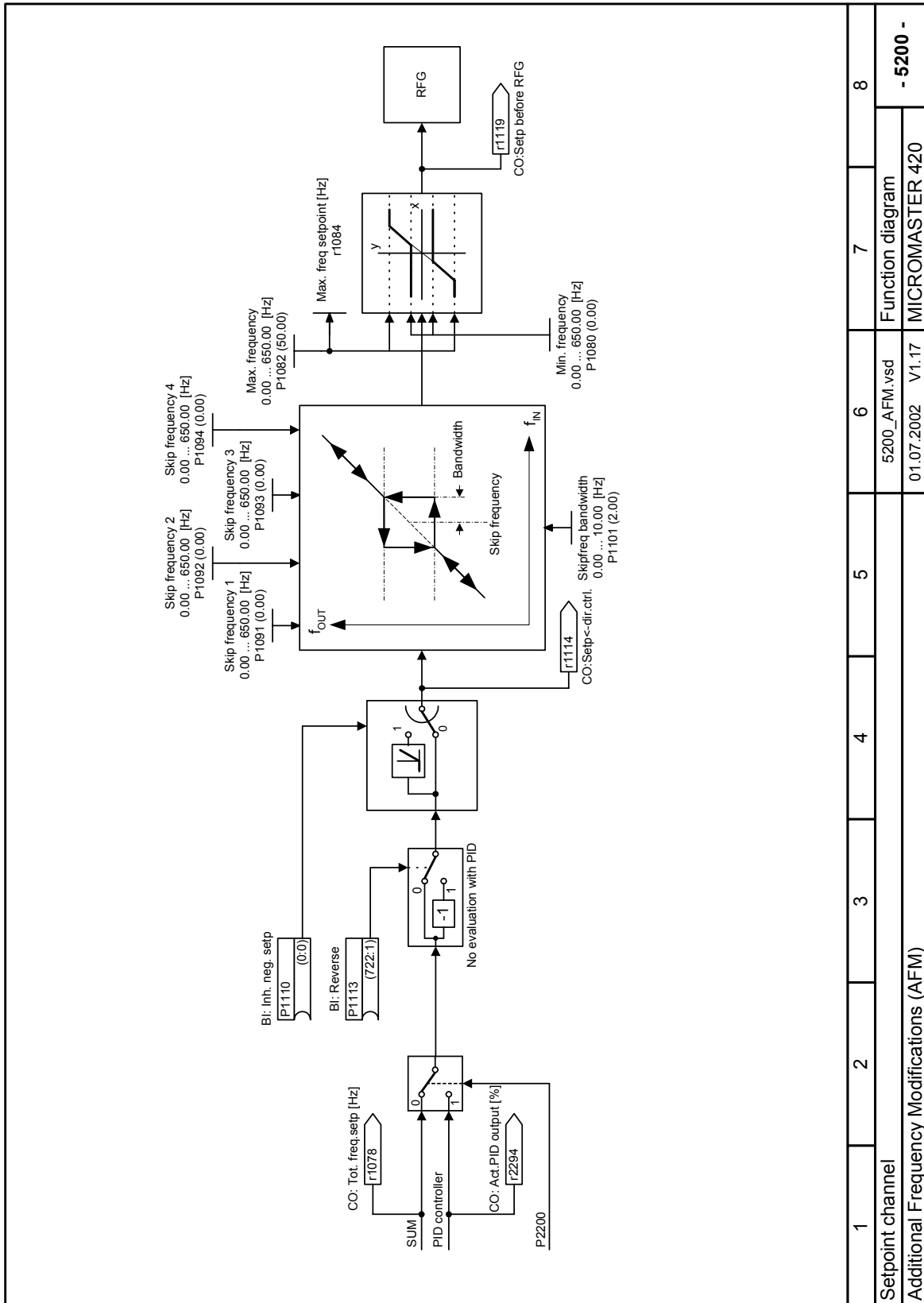




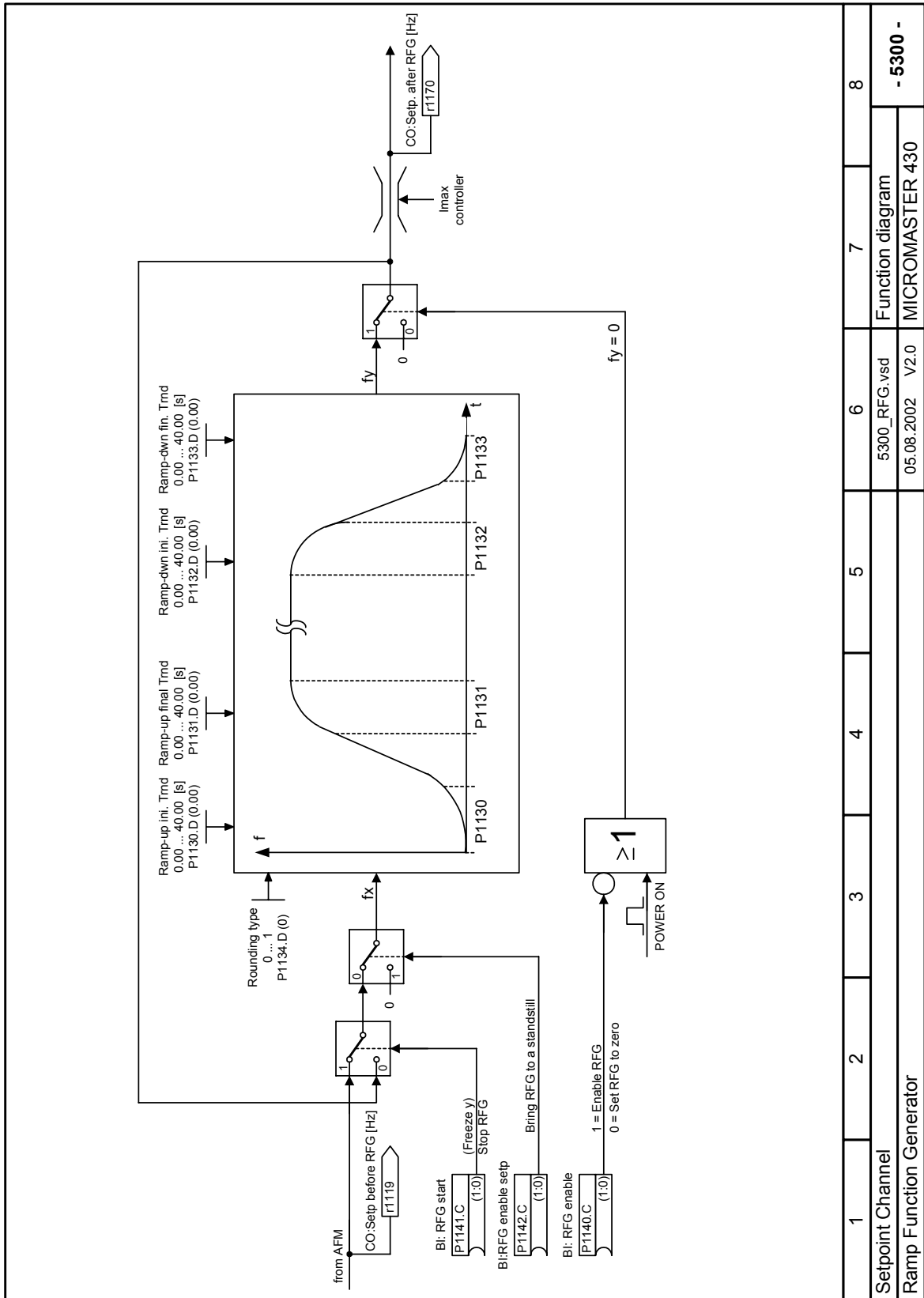
1	2	3	4	5	6	7	8
Overview							
Setpoint channel and Motor control							
5000_Overview.vsd						Function diagram	
05.08.2002 V2.0						MICROMASTER 430	
- 5000 -							



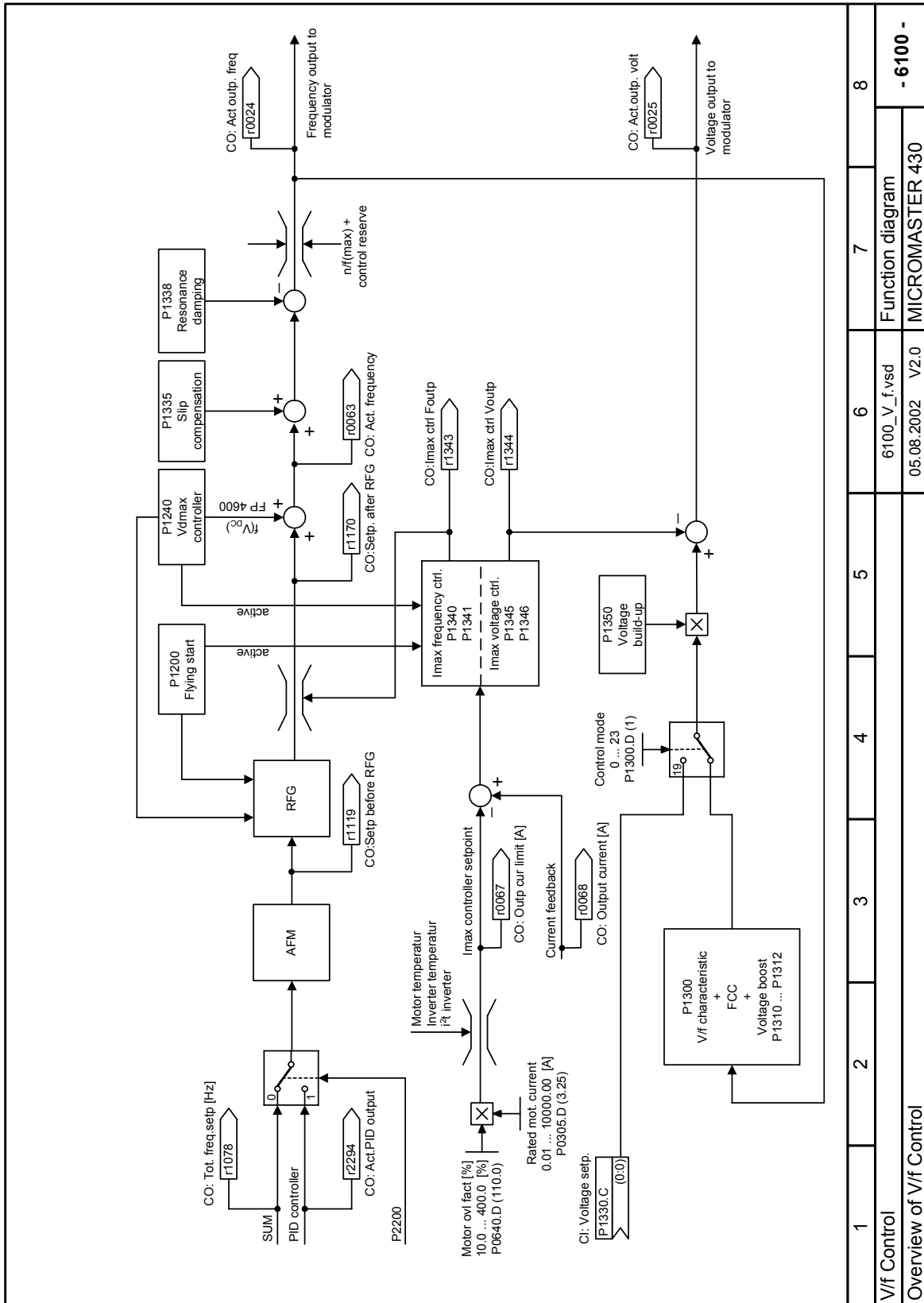
1	2	3	4	5	6	7	8
Setpoint Channel							
Function diagram							
MICROMASTER 430							
5100_PID.vsd							
05.08.2002 V2.0							
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1	2	3	4	5	6	7	8
Setpoint channel							
Additional Frequency Modifications (AFM)							
					5200_AFM.vsd	Function diagram	
					01.07.2002	MICROMASTER 420	
					V.1.17	- 5200 -	



1	2	3	4	5	6	7	8
Setpoint Channel							
Ramp Function Generator							
5300_RFG.vsd						Function diagram	
05.08.2002 V2.0						MICROMASTER 430	
- 5300 -							




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:

- Motor power (P0307) must correspond to inverter power (r0206)
- Cable length limits must not be exceeded
- Motor cable and motor must have no short-circuits or earth faults
- Motor parameters must match the motor in use
- Value of stator resistance (P0350) must be correct
- Motor must not be obstructed or overloaded
- Increase the ramp time
- Reduce the boost level (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:

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

NOTE

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

F0003 UnderVoltage OFF2

Possible Causes

- Main supply failed
- Shock load outside specified limits

Diagnose & Remedy

Check the following:

- Supply voltage (P0210) must lie within limits indicated on rating plate
- Supply must not be susceptible to temporary failures or voltage reductions
- Enable kinetic buffering (P1240 = 2)

F0004 Inverter Over Temperature OFF2

Possible Causes

- Ventilation inadequate
- Ambient temperature is too high

Diagnose & Remedy

Check the following:

- Load conditions and duty cycle must be appropriate
- Fan must turn when inverter is running
- Pulse frequency (P1800) must be set to default value
- 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 I²t OFF2

Possible Causes

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

Diagnose & Remedy

Check the following:

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

F0011 Motor Over Temperature OFF1

Possible Causes

Motor overloaded

Diagnose & Remedy

Check the following:

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

If P0601 = 0 or 1, check the following:

- Check if name plate data are correct (if not perform quick commissioning)
- Accurate equivalent circuit data can be found by performing motor identification (P1910=1)
- Check if motor weight (P0344) is reasonable. Change if necessary
- 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:

- Check if temperature shown in r0035 is reasonable
- 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

- Fault cannot be masked while options module (AOP or BOP) is connected
- 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 $Z_b = V_{mot,nom} / \sqrt{3} / I_{mot,nom}$

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

- Factory Reset and new parameterization
- 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

- Check data
- 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

- Check data
- Change IO board

F0060 Asic Timeout OFF2**Possible Causes**

Internal communications failure

Diagnose & Remedy

- If fault persists, change inverter
- 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

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

F0101 Stack Overflow 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

- Change value of P2268
- Adjust feedback gain

F0222 PID Feedback above max. value OFF2**Possible Causes**

PID feedback above max. value P2267

Diagnose & Remedy

- Change value of P2267
- 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:

No breakage, seizure or obstruction of drive train.

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:

- Motor power (P0307) must correspond to inverter power (r0206)
- Cable length limits must not be exceeded
- Motor cable and motor must have no short-circuits or earth faults
- Motor parameters must match the motor in use
- Value of stator resistance (P0350) must be correct
- Motor must not be obstructed or overloaded
- Increase the ramp-up-time.
- Reduce the boost 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:

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

A0503 UnderVoltage Limit

Possible Causes

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

Diagnose & Remedy

- Supply voltage (P0210) must lie within limits indicated on rating plate
- 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:

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

A0505 Inverter I²t

Possible Causes

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

Diagnose & Remedy

Check the following:

- Load duty cycle must lie within specified limits
- 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:

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

If P0601 = 0 or 1, check the following:

- Check if name plate data are correct (if not perform quick commissioning)
- Accurate equivalent circuit data can be found by performing motor identification (P1910=1)
- Check if motor weight (P0344) is reasonable. Change if necessary
- 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:

- Check if temperature shown in r0035 is reasonable
- 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**

- Increase duty cycle P1237
- 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

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

A0600 RTOS Overrun Warning**A0700 CB warning 1****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:

- Input voltage (P0210) must lie within range
- 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**

No Load is applied to the inverter.

As a result, some functions may not work as under normal load conditions.

A0923 Both JOG Left and JOG Right are requested**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:

No breakage, seizure or obstruction of drive train.

If using an external speed sensor, check for correct function. Check parameters:

P2192 (delay time for permitted deviation)

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)

Suggestions and / or Corrections

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[Suggestions for technical documentation](#)

**Suggestions
Corrections**

For Publication / Manual:
MICROMASTER 430
Parameter List

User Documentation

From

Name: _____

Company / Service Department

Address: _____

Phone: _____ / _____

Fax: _____ / _____

Order number: 6SE6400-5AF00-0BP0

Date of Issue: 12/02

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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Standard Drives (SD) Division
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