SIEMENS

MICROMASTER 430

Parameter List **Issue 03/02**



User Documentation
6SE6400-5AF00-0BP0

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



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



SIEMENS

MICROMASTER 430

Parameter List
User Documentation

Valid for Issue 03/02

Converter Type
MICROMASTER 430 Software V2.0

Issue 03/02

Parameter List 1

Function Diagrams 2

Alarms and Warnings 3



Warning

Please refer to all Definitiones and Warnings contained in the Operating Instructions. You will find the Operating Instructions on the Docu CD delivered with your inverter. If the CD is lost, it can be ordered via your local Siemens department under the Order No. 6SE6400-5FA00-1AG00.

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**			**9 Min:**	12 Level: **2**
	3 CStat:	**5 Datatype**	**7 Unit:**	**10 Def:**	
	4 P-Group:	**6 active:**	**8 Quick Comm:**	**11 Max:**	
	13 Description:				

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

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

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

   BI = P9999.C (0) — Binector input, i.e. parameter selects the source of a binary signal

   BO = r9999 — Binector output, i.e. parameter connects as a binary signal

   CI = P9999.D (999:9) — Connector input, i.e. parameter selects the source of an analog signal

   CO = r9999 [99] — Connector output, i.e. parameter connects as an analog signal

   CO/BO = r9999 / r9999 — 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
   Ready to run U
   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 necesarry for quick commissioning (P0010=1).

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

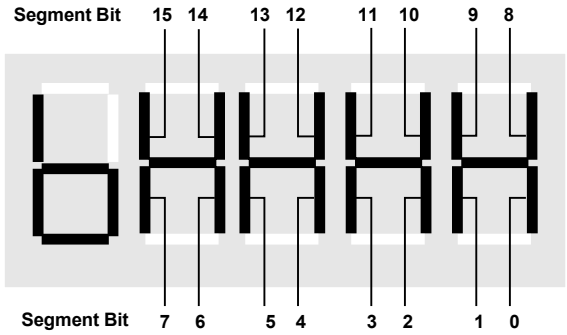
Set P0010=30.

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 Parameter Description

r0000 **Drive display** Level: 1

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

P-Group: ALWAYS

Displays the user selected output as defined in P0005.

Note:

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

r0002 **Drive state** Level: 3

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

P-Group: COMMANDS

Displays actual drive state.

Settings:

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

Dependency:

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

P0003 **User access level** Level: 1

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

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

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

Settings:

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

P0004 **Parameter filter** Level: 1

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

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

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

Example:

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

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)

Dependency:

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

Note:

The inverter will start with any setting of P0004.

P0005[3] **Display selection**

CStat:	CUT	**Datatype:** U16	**Unit:** -	**Min:**	2
P-Group:	FUNC	**Active:** first confirm	**QuickComm.** No	**Def:**	21
				Max:	2890

Level: **2**

Selects display for parameter r0000 (drive display).

Settings:

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

Index:

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

Notice:

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

Details:

See relevant "rxxxx" parameter descriptions.

P0006 **Display mode**

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

Level: **3**

Defines mode of display for r0000 (drive display).

Settings:

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

Note:

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

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

P0007 **Backlight delay time**

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

Level: **3**

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

Value:

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

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

P0010 **Commissioning parameter** Level: **1**

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

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

Settings:

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

Dependency:

Reset to 0 for inverter to run.

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

Note:

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

P0010 = 2
For service purposes only.

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

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

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

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

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

Details:

See parameter P0013 (user defined parameter)

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

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

Details:

See parameter P0013 (user defined parameter).

P0013[20] **User defined parameter** Level: **3**

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

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

Displays version number of installed firmware.

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

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

P-Group: COMMANDS

Displays status of operator panel commands.

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

Bitfields:

Bit00	ON/OFF1	0	NO
		1	YES
Bit01	OFF2: Electrical stop	0	YES
		1	NO
Bit08	JOG right	0	NO
		1	YES
Bit11	Reverse (setpoint inversion)	0	NO
		1	YES
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: Act. frequency setpoint** Level: **3**

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

P-Group: CONTROL

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

r0021 **CO: Act. frequency** Level: **3**

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

P-Group: CONTROL

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

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

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

P-Group: CONTROL

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

Note:

This calculation makes no allowance for load-dependent slip.

r0024 **CO: Act. output frequency** Level: **3**

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

P-Group: CONTROL

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

r0025 **CO: Act. output voltage** Level: **3**

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

P-Group: CONTROL

Displays [rms] voltage applied to motor.

r0026 **CO: Act. DC-link voltage** Level: **3**

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

P-Group: INVERTER

Displays DC-link voltage.

r0027 **CO: Act. output current** Level: **3**
Datatype: Float **Unit:** A **Min:** - **Def:** - **Max:** -
P-Group: CONTROL

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

r0031 **CO: Act. filtered torque** Level: **3**
Datatype: Float **Unit:** Nm **Min:** - **Def:** - **Max:** -
P-Group: CONTROL

Displays motor torque.

r0032 **CO: Act. power** Level: **3**
Datatype: Float **Unit:** - **Min:** - **Def:** - **Max:** -
P-Group: CONTROL

Displays motor power.

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

r0035[3] **CO: Act. motor temperature** Level: **3**
Datatype: Float **Unit:** °C **Min:** - **Def:** - **Max:** -
P-Group: MOTOR

Displays measured motor temperature.

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

r0037[2] **CO: Inverter temperature [°C]** Level: **3**
Datatype: Float **Unit:** °C **Min:** - **Def:** - **Max:** -
P-Group: INVERTER

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

Index:
r0037[0] : Measured heat sink temperature
r0037[1] : Chip temperature

r0038 **CO: Act. power factor** Level: **3**
Datatype: Float **Unit:** - **Min:** - **Def:** - **Max:** -
P-Group: CONTROL

Displays actual power factor.

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

r0039 **CO: Energy consumpt. meter [kWh]** Level: **3**
Datatype: Float **Unit:** kWh **Min:** - **Def:** - **Max:** -
P-Group: INVERTER

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

Dependency:
Value is reset when
- P0010 = 1, P3900 = 1 -3 quick commissioning,
- P0010 = 30, P0970 = 1 factory reset or
- P0040 = 1 reset energy consumption meter.

P0040 **Reset energy consumption meter** Level: **3**
CStat: CT **Datatype:** U16 **Unit:** - **Min:** 0 **Def:** 0 **Max:** 1
P-Group: INVERTER **Active:** first confirm **QuickComm.** No

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

Settings:
0 No reset
1 Reset r0039 to 0

Dependency:
No reset until "P" is pressed.

r0050 **CO: Active command data set** Level: **2**
Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -
P-Group: COMMANDS

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

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

Level: **2**

P-Group: COMMANDS

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

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

Level: **3**

P-Group: COMMANDS

Displays first active status word of inverter (bit format) and can be used to diagnose inverter status. The display segments for the status word are shown in the "Introduction to MICROMASTER System Parameters".

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:

Output of Bit3 (Fault) will be inverted on digital output (Low = Fault, High = No Fault).

r0053 **CO/BO: Act. status word 2** Level: **3**

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

P-Group: COMMANDS

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

Bitfields:

Bit00	DC brake active	0	NO
		1	YES
Bit01	Act. freq. r0021 > P2167 (f_off)	0	NO
		1	YES
Bit02	Act. freq. r0021 > P1080 (f_min)	0	NO
		1	YES
Bit03	Act. current r0027 >= P2170	0	NO
		1	YES
Bit04	Act. freq. r0021 >= P2155 (f_1)	0	NO
		1	YES
Bit05	Act. freq. r0021 < P2155 (f_1)	0	NO
		1	YES
Bit06	Act. freq. r0021 >= setpoint	0	NO
		1	YES
Bit07	Act. Vdc r0026 < P2172	0	NO
		1	YES
Bit08	Act. Vdc r0026 > P2172	0	NO
		1	YES
Bit09	Ramping finished	0	NO
		1	YES
Bit10	PID output r2294 == P2292 (PID_min)	0	NO
		1	YES
Bit11	PID output r2294 == P2291 (PID_max)	0	NO
		1	YES
Bit14	Download data set 0 from AOP	0	NO
		1	YES
Bit15	Download data set 1 from AOP	0	NO
		1	YES

Details:

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

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

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

P-Group: COMMANDS

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

Bitfields:

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

Details:

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

r0055 **CO/BO: Add. act. control word** Level: **3**

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

P-Group: COMMANDS

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

Bitfields:

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

Details:

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

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

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

P-Group: CONTROL

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

Bitfields:

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

Details:

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

r0061 **CO: Act. rotor speed** Level: **3**

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

P-Group: CONTROL

Displays current speed detected by encoder.

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

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

P-Group: CONTROL

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

Details:

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

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

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

P-Group: CONTROL

Displays valid maximum output current of inverter.

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

Dependency:

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

Note:

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

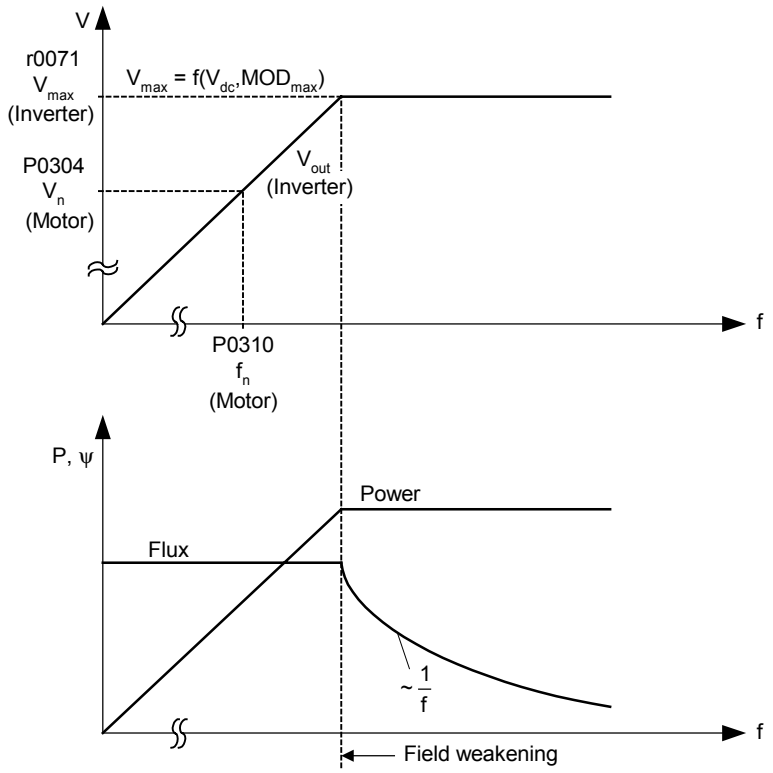
The current limit may be reduced if the motor thermal model calculation indicates that overheating will occur.

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

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

P-Group: CONTROL

Displays maximum output voltage.



Dependency:

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

r0080 **CO: Actual torque** Level: **3**

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

P-Group: CONTROL

Displays actual torque.

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

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

P-Group: CONTROL

Displays active (real part) of motor current.

Dependency:

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

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

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

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

Selects source of display for PZD signals.

Index:

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

r0096[10] **PZD signals** Level: **3**

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

P-Group: CONTROL

Displays PZD signals in [%].

Index:

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

Note:

r0096 = 100 % corresponds to 4000 hex.

P0100 **Europe / North America** Level: **1**

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

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

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

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

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 table below:

DIP2 setting	Meaning		P0100 setting	Meaning
OFF	Power [kW] frequency default 50 [Hz]	**overwrites**	1	Power [hp] frequency default 60 [Hz]
ON	Power [hp] frequency default 60 [Hz]	**overwrites**	0	Power [kW] frequency default 50 [Hz]

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 table above).

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

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

Equipment system number. This parameter has no operation effect.

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

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

Identifies hardware variant as shown in table below.

Code-No.	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

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

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

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

Confirms actual power stack identified.

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

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

Type number of actual power stack identified.

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

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

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

Displays hardware features of power stack.

Bitfields:

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

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

r0206 **Rated inverter power [kW] / [hp]** Level: 3

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

P-Group: INVERTER

Displays nominal rated motor power from inverter.

Dependency:

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

r0207 **Rated inverter current** Level: 3

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

P-Group: INVERTER

Displays maximum continuous output current of inverter.

r0208 **Rated inverter voltage** Level: 3

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

P-Group: INVERTER

Displays nominal AC supply voltage of inverter.

Value:

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

r0209 **Maximum inverter current** Level: 3

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

P-Group: INVERTER

Displays maximum output current of inverter.

P0210 **Supply voltage** Level: 3

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

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** Level: 3

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

P-Group: INVERTER

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

Index:

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

Notice:

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

P0290 **Inverter overload reaction** Level: 3

CStat: CT **Datatype:** U16 **Unit:** - **Min:** 0 **Def:** 2 **Max:** 3

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

Selects reaction of inverter to an internal over-temperature.

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 is normally reduced only if higher than 2 kHz (see P0291 - configuration of inverter protection).

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

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

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

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

Bitfields:

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

Index:

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

Details:

See P0290 (inverter overload reaction)

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

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

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

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

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

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

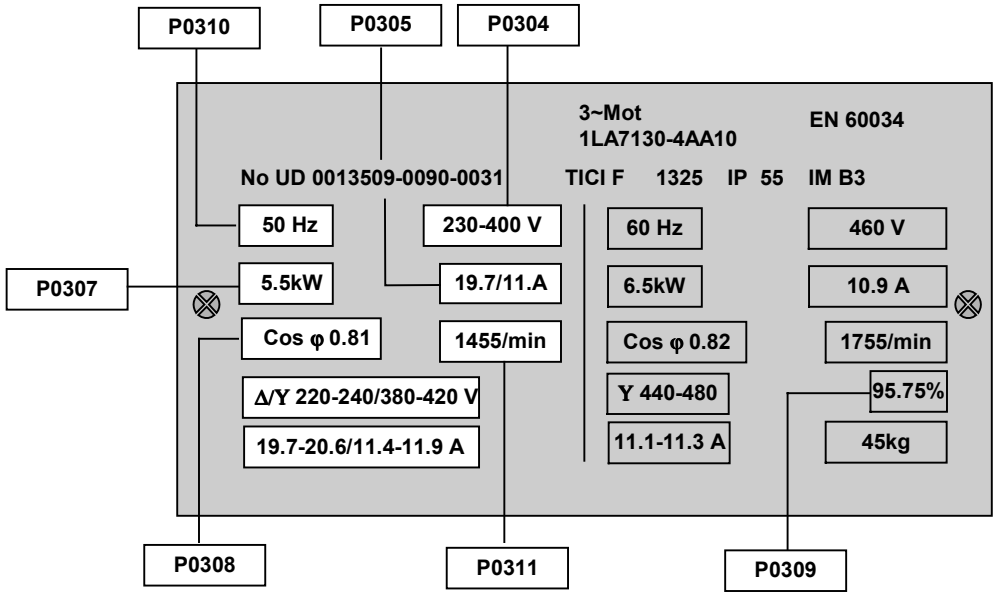
Note:

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

P0304[3] **Rated motor voltage** Level: **1**

CStat:	C	**Datatype:** U16	**Unit:** V	**Min:**	10
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).

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

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

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

Index:

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

Dependency:

Changeable only when P0010 = 1 (quick commissioning).

Depends also on P0320 (motor magnetization current).

Note:

For asynchronous motors, the maximum value is defined as the maximum inverter current (r0209).

For synchronous motors, the maximum value is defined as twice the maximum inverter current (r0209).

The minimum value is defined as 1/32 times inverter rated current (r0207).

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

CStat:	C	**Datatype:** Float	**Unit:** -	**Min:**	0.01
P-Group:	MOTOR	**Active:** first confirm	**QuickComm.** Yes	**Def:**	0.75
				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 ([kW],frequency default 50 Hz), values will be in [hp] - see diagram P0304 (rating plate).

Changeable only when P0010 = 1 (quick commissioning).

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

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

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

Index:

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

Dependency:

Changeable only when P0010 = 1 (quick commissioning).

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

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

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

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

Nominal motor efficiency in [%] from rating plate.

Index:

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

Dependency:

Changeable only when P0010 = 1 (quick commissioning).

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

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

Note:

P0309 = 100 % corresponds to superconducting.

Details:

See diagram in P0304 (rating plate).

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

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

Nominal motor frequency [Hz] from rating plate.

Index:

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

Dependency:

Changeable only when P0010 = 1 (quick commissioning).

Pole pair number recalculated automatically if parameter is changed.

Details:

See diagram in P0304 (rating plate)

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

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

Nominal motor speed [rpm] from rating plate.

Index:

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

Dependency:

Changeable only when P0010 = 1 (quick commissioning).

Setting 0 causes internal calculation of value.

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

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

Pole pair number recalculated automatically if parameter is changed.

Details:

See diagram in P0304 (rating plate)

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

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

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

Value:

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

Index:

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

Dependency:

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

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

CStat:	CT	**Datatype:** Float	**Unit:** %	**Min:**	0.0
P-Group:	MOTOR	**Active:** Immediately	**QuickComm.** Yes	**Def:**	0.0
				Max:	99.0

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

Index:

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

Dependency:

Affected by P0366 - P0369 (magnetizing curve imag. 1 - 4): Setting 0 causes calculation by P0340 = 1 (data entered from rating plate) or by P3900 = 1 - 3 (end of quick commissioning).

r0330[3] Rated motor slip

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

P-Group: MOTOR

Level: **3**

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:** -

P-Group: MOTOR

Level: **3**

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:** -

P-Group: MOTOR

Level: **3**

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

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

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

Level: **3**

Selects motor cooling system used.

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)

Notice:

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

P0340[3] Calculation of motor parameters

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

Level: **3**

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

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

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

Level: **3**

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

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

Level: **3**

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

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

Level: **3**

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

Index:

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

Note:

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

Notice:

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

Overcurrent trips will occur if the time is decreased excessively.

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

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

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

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

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

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

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

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

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

Describes cable resistance between inverter and motor for one phase.

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

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

r0384[3] **Rotor time constant** Level: **3**

		Datatype: Float	**Unit:** ms	**Min:**	-
				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 [%]** Level: **3**

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

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

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

r0396 **CO: Act. rotor resistance** Level: **3**

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

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

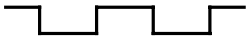
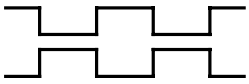
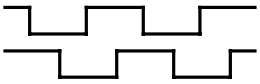
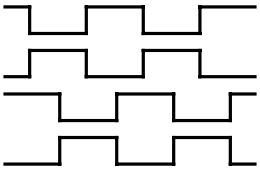
Note:
100 % means : $Z_{ratedmot} \cdot \frac{P0304}{P0305}$

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

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

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

Selects encoder type.

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

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** Level: **3**

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

Displays status word of encoder (in bit format).

Bitfields:

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

Details:

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

P0408[3] Encoder pulses per revolution

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

Level: **3**

Specifies the number of encoder pulses per revolution.

Index:

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

Note:

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

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

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

P0492[3] Allowed speed difference

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

Level: **3**

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.

Caution1:

When allowed speed difference is set to 0, both the high speed and low speed encoder loss detection is disabled, thus encoder loss will not be detected.

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

P0494[3] Delay speed loss reaction

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

Level: **3**

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).

Caution1:

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

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

Level: **3**

Selects technological application. Sets control mode (P1300).

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)

P0601[3] Motor temperature sensor

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

Level: **3**

Selects motor temperature sensor.

Settings:

0 No sensor
1 PTC thermistor
2 KTY84

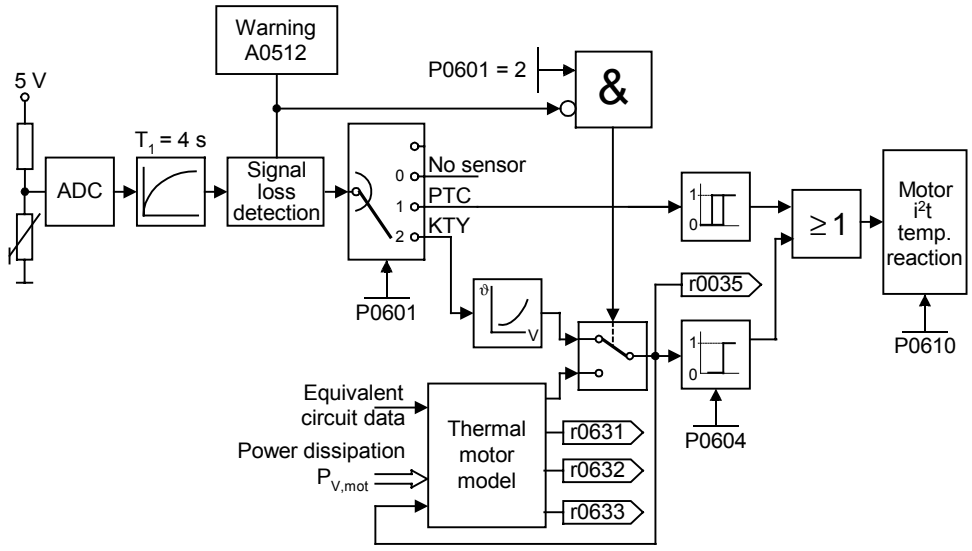
Index:

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.



P0604[3] Threshold motor temperature

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

Level: **2**

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

Index:

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

Note:

Default value depends on P0300 (select motor type).

P0610[3] Motor I2t temperature reaction

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

Level: **3**

Defines reaction when motor temperature reaches warning threshold.

Settings:

0 No reaction, warning only
1 Warning and Imax reduction (results in reduced output frequency)
2 Warning and trip (F0011)

Index:

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

Dependency:

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

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

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

Measures ambient temperature of motor at time of motor data identification.

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 [%]** Level: **3**

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	10.0
P-Group:	MOTOR	**Active:** Immediately	**QuickComm.** Yes	**Def:**	110.0
				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.

Details:

See function diagram for current limitation.

P0700[3] **Selection of command source** Level: **1**

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

Selects digital command source.

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)

Note:

Changing this parameter resets (to default) all settings on item selected. For example: Changing form 1 to 2 resets all digital inputs to default settings.

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

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

Selects function of digital input 1.

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	Enable Essential Service
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** Level: **2**

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

Selects function of digital input 2.

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	Enable Essential Service
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** Level: **2**

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

Selects function of digital input 3.

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	Enable Essential Service
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** Level: **2**

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

Selects function of digital input 4.

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	Enable Essential Service
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**

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

Level: **2**

Selects function of digital input 5 (via analog input).

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	Enable Essential Service
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**

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

Level: **2**

Selects function of digital input 6 (via analog input)

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	Enable Essential Service
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** Level: **3**

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

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

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	Enable Essential Service
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** Level: **3**

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

Selects function of digital input 8 (via analog input)

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	Enable Essential Service
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.

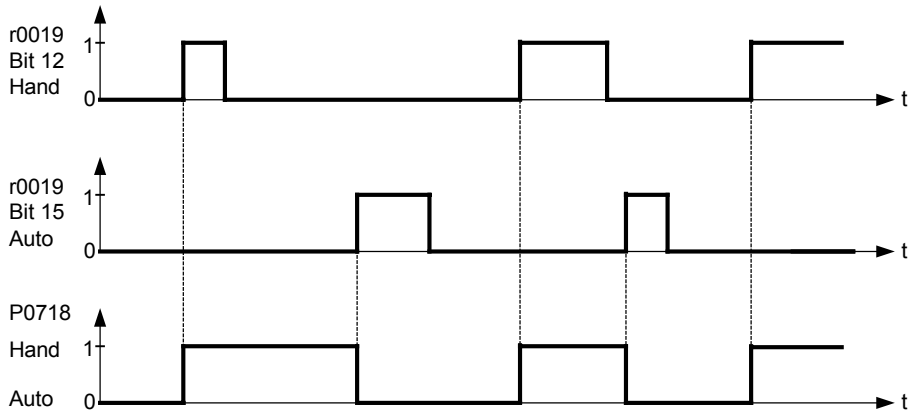
Details:

See P0701 (function of digital input 1).

P0718	CO/BO: Hand / Auto			Min: 0	Level:
	CStat: CUT	Datatype: U16	Unit: -	Def: 0	3
	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:
Changeing CDS values will effect the operation of Hand / Auto

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

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

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

Central switch to select control command source for inverter.

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

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

Settings:

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

Index:

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

Note:

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

BICO connections made previously remain unchanged.

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

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

P-Group: COMMANDS

Displays number of digital inputs.

r0722 **CO/BO: Binary input values** Level: **3**

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

P-Group: COMMANDS

Displays status of digital inputs.

Bitfields:

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

Note:

Segment is lit when signal is active.

P0724 **Debounce time for digital inputs** Level: **3**

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

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

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

Settings:

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

P0725 **PNP / NPN digital inputs** Level: **3**

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

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

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

The following is valid by using the internal supply:

Value:

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

Settings:

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

r0730 **Number of digital outputs** Level: **3**

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

P-Group: COMMANDS

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.

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. r0021 > P2167 (f_off)	0 Closed
53.2	Act. freq. r0021 > P1080 (f_min)	0 Closed
53.3	Act. current r0027 >= P2170	0 Closed
53.4	Act. freq. r0021 >= P2155 (f_1)	0 Closed
53.5	Act. freq. r0021 < P2155 (f_1)	0 Closed
53.6	Act. freq. r0021 >= 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

Index:

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

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.

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. r0021 > P2167 (f_off)	0 Closed
53.2	Act. freq. r0021 > P1080 (f_min)	0 Closed
53.3	Act. current r0027 >= P2170	0 Closed
53.4	Act. freq. r0021 >= P2155 (f_1)	0 Closed
53.5	Act. freq. r0021 < P2155 (f_1)	0 Closed
53.6	Act. freq. r0021 >= 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

Index:

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

Note:

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

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

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

Defines source of digital output 2.

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. r0021 > P2167 (f_off)	0 Closed
53.2	Act. freq. r0021 > P1080 (f_min)	0 Closed
53.3	Act. current r0027 >= P2170	0 Closed
53.4	Act. freq. r0021 >= P2155 (f_1)	0 Closed
53.5	Act. freq. r0021 < P2155 (f_1)	0 Closed
53.6	Act. freq. r0021 >= 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

Index:

P0733[0] : 1st. Command data set (CDS)
P0733[1] : 2nd. Command data set (CDS)
P0733[2] : 3rd. Command data set (CDS)

Note:

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

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

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

Displays status of digital outputs (also includes inversion of digital outputs via P0748).

Bitfields:

Bit00	Digital output 1 energized	0	NO
		1	YES
Bit01	Digital output 2 energized	0	NO
		1	YES
Bit02	Digital output 3 energized	0	NO
		1	YES

Dependency:

Bit 0 = 0 :
Relay de-energized / contacts open

Bit 0 = 1 :
Relay energized / contacts closed

P0748 **Invert digital outputs** Level: **3**

CStat: CUT **Datatype:** U16 **Unit:** - **Min:** 0
P-Group: COMMANDS **Active:** first confirm **QuickComm.** No **Def:** 0
Max: 7

Defines high and low states of relay for a given function.

Bitfields:

Bit00	Invert digital output 1	0	NO
		1	YES
Bit01	Invert digital output 2	0	NO
		1	YES
Bit02	Invert digital output 3	0	NO
		1	YES

r0750 **Number of ADCs** Level: **3**

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

Displays number of analog inputs available.

r0752[2] **Act. input of ADC [V] or [mA]**

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

Level: **2**

P-Group: TERMINAL

Displays smoothed analog input value in volts before the characteristic block.

Index:

r0752[0] : Analog input 1 (ADC 1)
r0752[1] : Analog input 2 (ADC 2)

P0753[2] **Smooth time ADC**

CStat: CUT **Datatype:** U16 **Unit:** ms **Min:** 0 **Def:** 3 **Max:** 10000

Level: **3**

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

Defines filter time (PT1 filter) in [ms] for analog input.

Index:

P0753[0] : Analog input 1 (ADC 1)
P0753[1] : Analog input 2 (ADC 2)

Note:

Increasing this time (smooth) reduces jitter but slows down response to the analog input.

P0753 = 0 : No filtering

r0754[2] **Act. ADC value after scaling [%]**

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

Level: **2**

P-Group: TERMINAL

Shows smoothed value of analog input in [%] after scaling block.

Index:

r0754[0] : Analog input 1 (ADC 1)
r0754[1] : Analog input 2 (ADC 2)

Dependency:

P0757 to P0760 define range (ADC scaling).

r0755[2] **CO: Act. ADC after scal. [4000h]**

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

Level: **3**

P-Group: TERMINAL

Displays analog input, scaled using ASPmin and ASPmax.

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

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

Example:

ASPmin = 300 %, ASPmax = 100 % then 16384 represents 300 %.
This parameter will vary from 5461 to 16364

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

Index:

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

Note:

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

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

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

Details:

See parameters P0757 to P0760 (ADC scaling)

P0756[2] **Type of ADC**

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

Level: **2**

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

To switch over from voltage to current analog input it is not sufficient to merely modify parameter P0756. Rather, the DIPs on the terminal board must also be set to the correct position. The DIP settings are as follows:
- OFF = voltage input (10 V)
- ON = current input (20 mA)

Allocation of DIPs to analog inputs is as follows:
- DIP on left (DIP 1) = Analog input 1
- DIP on right (DIP 2) = Analog input 2

Settings:

0	Unipolar voltage input (0 to +10 V)
1	Unipolar voltage input with monitoring (0 to 10 V)
2	Unipolar current input (0 to 20 mA)
3	Unipolar current input with monitoring (0 to 20 mA)
4	Bipolar voltage input (-10 V to +10 V)

Index:

P0756[0] : Analog input 1 (ADC 1)
P0756[1] : Analog input 2 (ADC 2)

Dependency:

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

Notice:

When monitoring is enabled and a deadband defined (P0761), a fault condition will be generated (F0080) if the analog input voltage falls below 50 % of the deadband voltage.

On account of h/w restirction it is not possible to select the bipolar voltage (see Enum declaration) for analog input 2 (P0756[1] = 4).

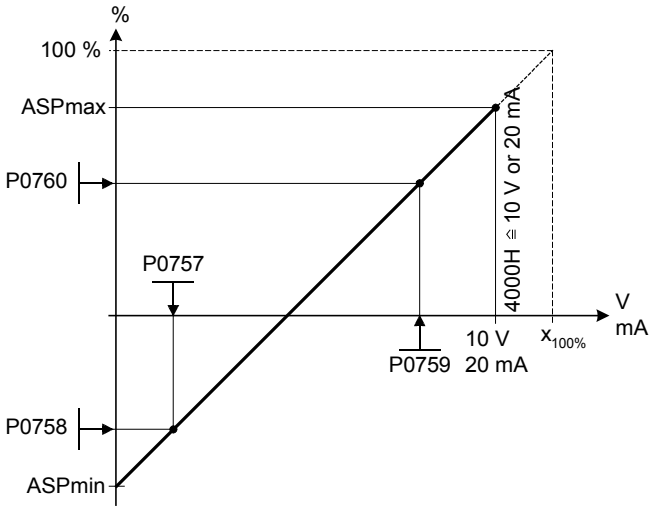
Details:

See P0757 to P0760 (ADC scaling).

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

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

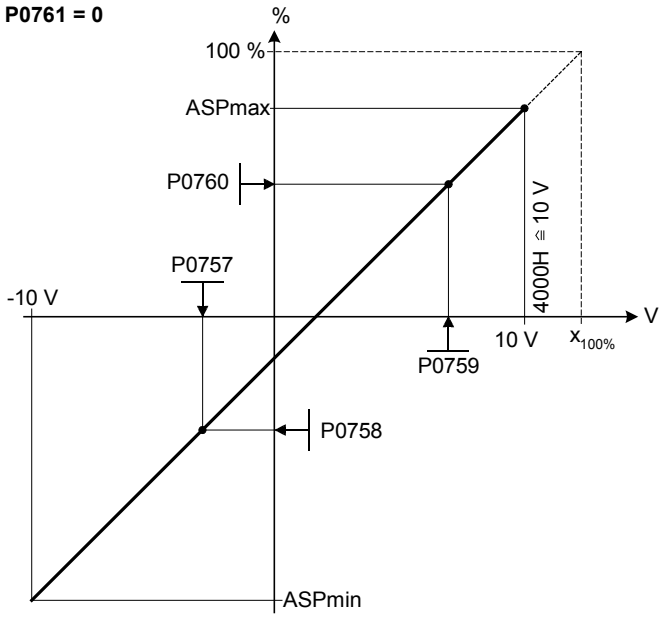
P0756 = 0 ... 3
P0761 = 0



Where:
Analog setpoints represent a [%] of the normalized frequency in P2000.
Analog setpoints may be larger than 100 %.
ASPmax represents highest analog setpoint (this may be at 10 V or 20 mA).
ASPmin represents lowest analog setpoint (this may be at 0 V or 20 mA).

Default values provide a scaling of 0 V or 0 mA = 0 %, and 10 V or 20 mA = 100 %.

P0756 = 4
P0761 = 0



Index:

P0757[0] : Analog input 1 (ADC 1)
P0757[1] : Analog input 2 (ADC 2)

Notice:

The value x2 of ADC scaling P0759 must be greater than the value x1 of ADC scaling P0757.

P0758[2] Value y1 of ADC scaling Level: **2**

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-99999.9
P-Group:	TERMINAL	**Active:** first confirm	**QuickComm.** No	**Def:**	0.0
				Max:	99999.9

Sets value of Y1 in [%] as described in P0757 (ADC scaling)

Index:

P0758[0] : Analog input 1 (ADC 1)
P0758[1] : Analog input 2 (ADC 2)

Dependency:

Affects P2000 to P2003 (reference frequency, voltage, current or torque) depending on which setpoint is to be generated.

P0759[2] Value x2 of ADC scaling [V / mA] Level: **2**

CStat:	CUT	**Datatype:** Float	**Unit:** -	**Min:**	-20
P-Group:	TERMINAL	**Active:** first confirm	**QuickComm.** No	**Def:**	10
				Max:	20

Sets value of X2 as described in P0757 (ADC scaling).

Index:

P0759[0] : Analog input 1 (ADC 1)
P0759[1] : Analog input 2 (ADC 2)

Notice:

The value x2 of ADC scaling P0759 must be greater than the value x1 of ADC scaling P0757.

P0760[2] Value y2 of ADC scaling Level: **2**

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-99999.9
P-Group:	TERMINAL	**Active:** first confirm	**QuickComm.** No	**Def:**	100.0
				Max:	99999.9

Sets value of Y2 in [%] as described in P0757 (ADC scaling).

Index:

P0760[0] : Analog input 1 (ADC 1)
P0760[1] : Analog input 2 (ADC 2)

Dependency:

Affects P2000 to P2003 (reference frequency, voltage, current or torque) depending on which setpoint is to be generated.

P0761[2]	Width of ADC deadband [V / mA]				Min:	0	Level:
	CStat:	UT	Datatype: Float	Unit: -	Def:	0	3
	P-Group:	TERMINAL	Active: first confirm	QuickComm. No	Max:	20	

Defines width of deadband on analog input. The diagrams below explain its use.

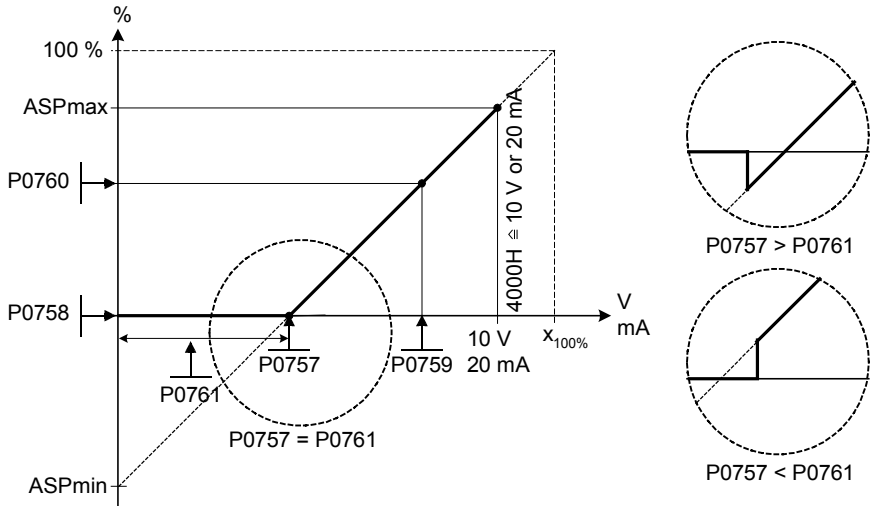
Example:

ADC value 2 to 10 V (0 to 50 Hz)
The below example produces a 2 to 10 V analog input (0 to 50 Hz):
P2000 = 50 Hz
P0759 = 8 V P0760 = 75 %
P0757 = 2 V P0758 = 0 %
P0761 = 2 V

P0756 = 0 or 1

P0761 > 0

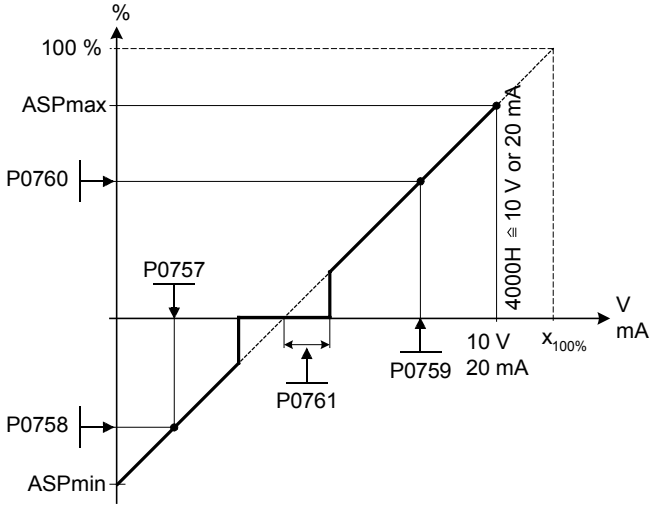
0 < P0758 < P0760 || 0 > P0758 > P0760



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

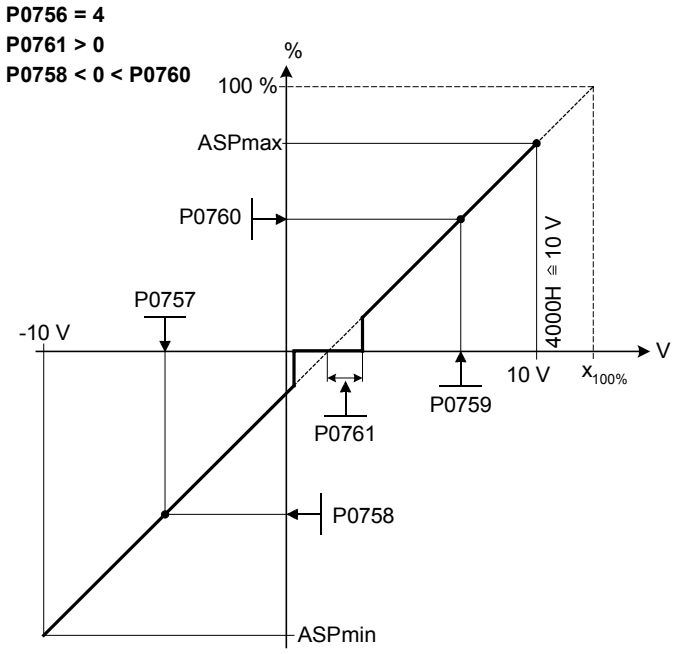
P0756 = 0 or 1

P0761 > 0
P0758 < 0 < P0760



ADC value -10 to +10 V (-50 to +50 Hz):

The below example produces a -10 to +10 V analog input (-50 to +50 Hz) with center zero and a "holding point" 0.2 V wide (0.1 V to each side of center).



Index:

P0761[0] : Analog input 1 (ADC 1)
P0761[1] : Analog input 2 (ADC 2)

Note:

P0761[x] = 0 : No deadband active.

Notice:

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

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

P0762[2] Delay for loss of signal action — Level: **3**

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

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

Index:

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

Note:

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

---

r0770 Number of DACs — Level: **3**

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

Displays number of analog outputs available.

P0771[2] CI: DAC — Level: **2**

CStat:	CUT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	TERMINAL	**Active:** first confirm	**QuickComm.** No	**Def:**	21:0
				Max:	4000:0

Defines function of the 0 - 20 mA analog output.

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)

Index:

P0771[0] : Analog output 1 (DAC 1)
P0771[1] : Analog output 2 (DAC 2)

P0773[2] **Smooth time DAC** Level: **3**

CStat:	CUT	**Datatype:** U16	**Unit:** ms	**Min:**	0
P-Group:	TERMINAL	**Active:** first confirm	**QuickComm.** No	**Def:**	2
				Max:	1000

Defines smoothing time [ms] for analog output signal. This parameter enables smoothing for DAC input 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 [V] or [mA]** Level: **3**

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

Shows value of analog output in [V] or [mA] after filtering and scaling.

Index:

r0774[0] : Analog output 1 (DAC 1)
r0774[1] : Analog output 2 (DAC 2)

P0776[2] **Type of DAC** Level: **2**

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

Defines type of analog output.

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.

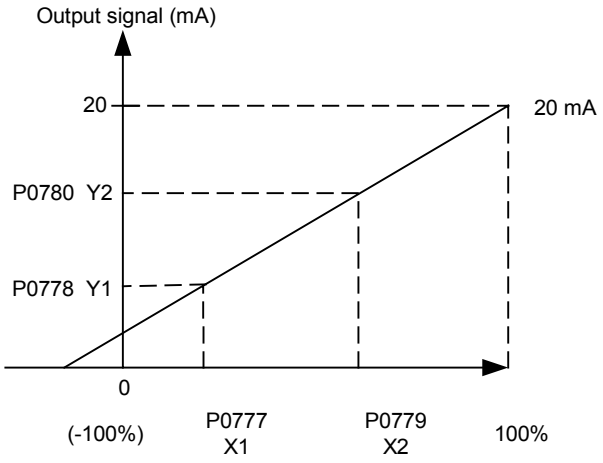
For a voltage output with a range of 0...10 V an external resistor of 500 Ohms has to be connected at the terminals (12/13 or 26/27).

P0777[2] **Value x1 of DAC scaling** Level: **2**

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

Example:
The default values of the scaling block provides a scaling of:
P1: 0.0 % = 0 mA or 0 V and
P2: 100.0 % = 20 mA or 20 V.

Index:
P0777[0] : Analog output 1 (DAC 1)
P0777[1] : Analog output 2 (DAC 2)

Dependency:
Affects P2000 to P2003 (referency frequency, voltage, current or torque) depending on which setpoint is to be generated.

P0778[2] **Value y1 of DAC scaling** Level: **2**

CStat:	CUT	**Datatype:** Float	**Unit:** -	**Min:**	0
P-Group:	TERMINAL	**Active:** first confirm	**QuickComm.** No	**Def:**	0
				Max:	20

Defines y1 of output characteristic.

Index:
P0778[0] : Analog output 1 (DAC 1)
P0778[1] : Analog output 2 (DAC 2)

P0779[2] **Value x2 of DAC scaling** Level: **2**

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-99999.0
P-Group:	TERMINAL	**Active:** first confirm	**QuickComm.** No	**Def:**	100.0
				Max:	99999.0

Defines x2 of output characteristic in [%].

Index:
P0779[0] : Analog output 1 (DAC 1)
P0779[1] : Analog output 2 (DAC 2)

Dependency:
Affects P2000 to P2003 (referency frequency, voltage, current or torque) depending on which setpoint is to be generated.

P0780[2] **Value y2 of DAC scaling** Level: **2**

CStat:	CUT	**Datatype:** Float	**Unit:** -	**Min:**	0
P-Group:	TERMINAL	**Active:** first confirm	**QuickComm.** No	**Def:**	20
				Max:	20

Defines y2 of output characteristic.

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

P0781[2] Width of DAC deadband Level: **3**

CStat:	CUT	**Datatype:** Float	**Unit:** -	**Min:**	0
P-Group:	TERMINAL	**Active:** first confirm	**QuickComm.** No	**Def:**	0
				Max:	20

Sets width of dead-band in [mA] or [V] for analog output.

Index:

P0781[0] : Analog output 1 (DAC 1)
P0781[1] : Analog output 2 (DAC 2)

P0800[3] BI: Download parameter set 0 Level: **3**

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

Defines source of command to start download of parameter set 0 from attached AOP. The first three digits describe the parameter number of the command source, the last digit refers to the bit setting for that parameter.

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)

Index:

P0800[0] : 1st. Command data set (CDS)
P0800[1] : 2nd. Command data set (CDS)
P0800[2] : 3rd. Command data set (CDS)

Note:

Signal of digital input:
0 = No download
1 = Start download parameter set 0 from AOP.

P0801[3] BI: Download parameter set 1 Level: **3**

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

Defines 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.

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)

Index:

P0801[0] : 1st. Command data set (CDS)
P0801[1] : 2nd. Command data set (CDS)
P0801[2] : 3rd. Command data set (CDS)

Note:

Signal of digital input:
0 = No download
1 = Start download parameter set 1 from AOP.

P0809[3] Copy command data set (CDS) Level: **3**

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

Calls 'Copy command data set' function.

Index:

P0809[0] : Copy from CDS
P0809[1] : Copy to CDS
P0809[2] : Start copy

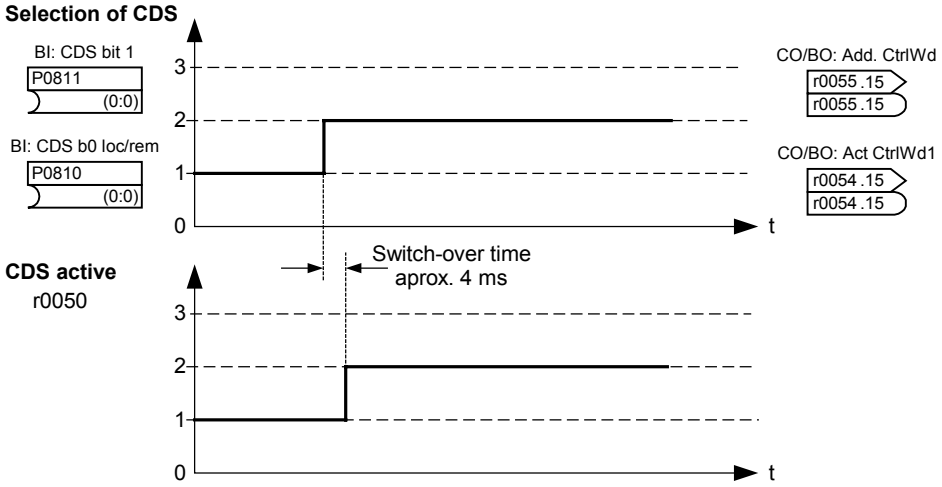
Note:

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

P0810 **BI: CDS bit 0 (Local / Remote)** Level: **3**

CStat:	CUT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.** No	**Def:**	718:0
				Max:	4095:0

Selects command source from which to read Bit 0 for selecting a command data set (CDS).



The actual active command data set (CDS) is displayed in parameter r0050.

	selected CDS		active CDS
	r0055 Bit15	r0054 Bit15	r0050
1. CDS	0	0	0
2. CDS	0	1	1
3. CDS	1	0	2
3. CDS	1	1	2

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:

P0811 is also relevant for command data set (CDS) set selection.

P0811 **BI: CDS bit 1** Level: **2**

CStat:	CUT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.** No	**Def:**	0:0
				Max:	4095:0

Selects command source from which to read Bit 1 for selecting a command data set (see P0810).

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)** Level: **2**

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

Calls 'Copy drive data set' function.

Index:

P0819[0] : Copy from DDS
P0819[1] : Copy to DDS
P0819[2] : Start copy

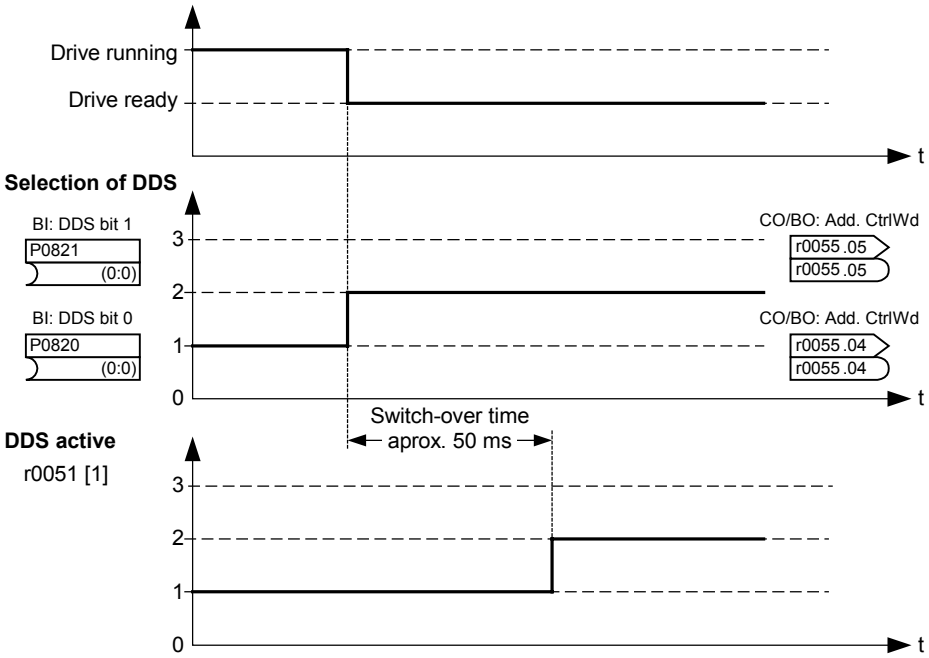
Note:

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

P0820 **BI: DDS bit 0** Level: **3**

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

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:

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

P0821 **BI: DDS bit 1**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.** No	**Def:**	0:0
				Max:	4095:0

Level: **3**

Selects command source from which Bit 1 for selecting a drive data set is to be read in (see parameter P0820).

Settings:

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

Note:

P0820 is also relevant for drive data set (DDS) selection.

P0840[3] **BI: ON/OFF1**

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

Level: **3**

Allows ON/OFF1 command source to be selected using BICO. The first three digits describe the parameter number of the command source; the last digit denotes the bit setting for that parameter.

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

Index:

P0840[0] : 1st. Command data set (CDS)
P0840[1] : 2nd. Command data set (CDS)
P0840[2] : 3rd. Command data set (CDS)

Dependency:

Active only when P0719 = 0 (remote selection of command/setpoint source).

BICO requires P0700 set to 2 (enable BICO).

The default setting (ON right) is digital input 1 (722.0). Alternative source possible only when function of digital input 1 is changed (via P0701) before changing value of P0840.

P0842[3] **BI: ON reverse/OFF1**

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

Level: **3**

Allows ON/OFF1 reverse command source to be selected using BICO. The first three digits describe the parameter number of the command source and the last digit denotes the bit setting for that parameter.

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

Index:

P0842[0] : 1st. Command data set (CDS)
P0842[1] : 2nd. Command data set (CDS)
P0842[2] : 3rd. Command data set (CDS)

Dependency:

Active only when P0719 = 0 (remote selection of command/setpoint source).

P0844[3] **BI: 1. OFF2**

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

Level: **3**

Defines first source of OFF2 when P0719 = 0 (BICO). The first three digits describe the parameter number of the command source and the last digit denotes the bit setting for that parameter.

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

Index:

P0844[0] : 1st. Command data set (CDS)
P0844[1] : 2nd. Command data set (CDS)
P0844[2] : 3rd. Command data set (CDS)

Dependency:

Active only when P0719 = 0 (remote selection of command/setpoint source).

If one of the digital inputs is selected for OFF2, the inverter will not run unless the digital input is active.

Note:

OFF2 means immediate pulse-disabling; the motor is coasting.

OFF2 is low-active, i.e. :
0 = Pulse disabling.
1 = Operating condition.

P0845[3] **BI: 2. OFF2**

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

Level: **3**

Defines second source of OFF2. The first three digits describe the parameter number of the command source and the last digit denotes the bit setting for that parameter.

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

Index:

P0845[0] : 1st. Command data set (CDS)
P0845[1] : 2nd. Command data set (CDS)
P0845[2] : 3rd. Command data set (CDS)

Dependency:

In contrast to P0844 (first source of OFF2), this parameter is always active, independent of P0719 (selection of command and frequency setpoint).

If one of the digital inputs is selected for OFF2, the inverter will not run unless the digital input is active.

Note:

OFF2 means immediate pulse-disabling; the motor is coasting.

OFF2 is low-active, i.e. :
0 = Pulse disabling.
1 = Operating condition.

P0848[3] **BI: 1. OFF3**

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

Level: **3**

Defines first source of OFF3 when P0719 = 0 (BICO). The first three digits describe the parameter number of the command source and the last digit denotes the bit setting for that parameter.

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

Index:

P0848[0] : 1st. Command data set (CDS)
P0848[1] : 2nd. Command data set (CDS)
P0848[2] : 3rd. Command data set (CDS)

Dependency:

Active only when P0719 = 0 (remote selection of command/setpoint source).

If one of the digital inputs is selected for OFF3, the inverter will not run unless the digital input is active.

Note:

OFF3 means fast ramp-down to 0.

OFF3 is low-active, i.e.
0 = Ramp-down.
1 = Operating condition.

P0849[3] **BI: 2. OFF3**

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

Level: **3**

Defines second source of OFF3. The first three digits describe the parameter number of the command source and the last digit denotes the bit setting for that parameter.

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

Index:

P0849[0] : 1st. Command data set (CDS)
P0849[1] : 2nd. Command data set (CDS)
P0849[2] : 3rd. Command data set (CDS)

Dependency:

In contrast to P0848 (first source of OFF3), this parameter is always active, independent of P0719 (selection of command and frequency setpoint).

If one of the digital inputs is selected for OFF3, the inverter will not run unless the digital input is active.

Note:

OFF3 means fast ramp-down to 0.

OFF3 is low-active, i.e.
0 = Ramp-down.
1 = Operating condition.

P0852[3] **BI: Pulse enable** Level: **3**

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

Defines source of pulse enable/disable signal.

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)

Index:

P0852[0] : 1st. Command data set (CDS)
P0852[1] : 2nd. Command data set (CDS)
P0852[2] : 3rd. Command data set (CDS)

Dependency:

Active only when P0719 = 0 (remote selection of command/setpoint source).

P0918 **CB address** Level: **2**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	COMM	**Active:** first confirm	**QuickComm.** No	**Def:**	3
				Max:	65535

Defines address of CB (communication board) or address of the other option modules.

There are two ways to set the bus address:
1 via DIP switches on the PROFIBUS module
2 via a user-entered value

Note:

Possible PROFIBUS settings:
1 ... 125
0, 126, 127 are not allowed

The following applies when a PROFIBUS module is used:
DIP switch = 0 Address defined in P0918 (CB address) is valid
DIP switch not = 0 DIP switch setting has priority and P0918 indicates DIP switch setting.

P0927 **Parameter changeable via** Level: **3**

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

Specifies the interfaces which can be used to change parameters.

Example:

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

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

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

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:** - **P-Group:** ALARMS

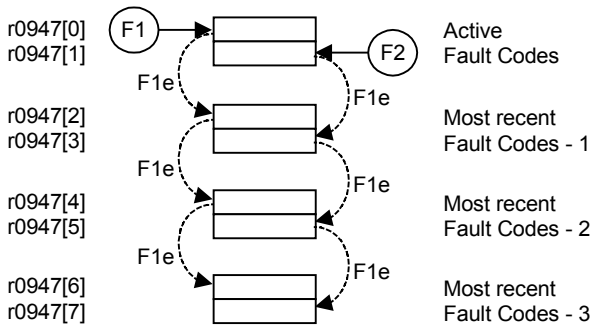
Min: - **Def:** - **Max:** -

Level: **3**

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.



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.

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

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:** - **P-Group:** ALARMS

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

Level: **3**

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.

Example:

The time is taken from P2115 if this parameter has been updated with the real time. If not, P2114 is used.

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

Note:

P2115 can be updated via AOP, Starter, DriveMonitor, etc.

r0949[8] **Fault value** Level: **3**

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

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** Level: **3**

CStat: CT **Datatype:** U16 **Unit:** - **Min:** 0 **Def:** 0 **Max:** 8

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** Level: **3**

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

P-Group: COMM

Firmware version data.

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	

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)

r0965 **Profibus profile** Level: **3**

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

P-Group: COMM

Identification for PROFIDrive. Profile number and version.

r0967 **Control word 1** Level: **3**

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

P-Group: COMM

Displays control word 1.

Bitfields:

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

r0968 **Status word 1** Level: **3**

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

P-Group: COMM

Displays active status word of inverter (in binary) and can be used to diagnose which commands are active.

Bitfields:

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

P0970 **Factory reset** Level: **1**

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

P0970 = 1 resets all parameters to their default values.

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:

P0918 CB address
P2010 USS baud rate
P2011 USS address

P0971 **Transfer data from RAM to EEPROM** Level: **3**

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

Transfers values from RAM to EEPROM when set to 1.

Settings:

0 Disabled
1 Start transfer

Note:

All values in RAM are transferred to EEPROM.

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

P1000[3]	**Selection of frequency setpoint**			**Min:**	0	Level:
	CStat: CT	**Datatype:** U16	**Unit:** -	**Def:**	2	**1**
	P-Group: SETPOINT	**Active:** first confirm	**QuickComm.** Yes	**Max:**	77	

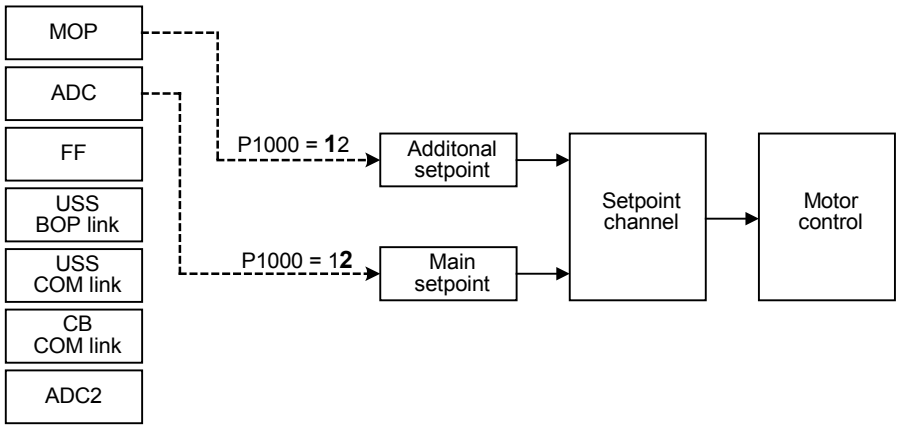
Selects frequency setpoint source. In the table of possible settings below, the main setpoint is selected from the least significant digit (i.e., 0 to 7) and any additional setpoint from the most significant digit (i.e., x0 through to x7).

Example:

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

Example P1000 = 12 :

P1000 = **1**2 P1070 = 755	P1070 CI: Main setpoint
	r0755 CO: Act. ADC after scal. [4000h]
P1000 = 1**2** P1075 = 1050	P1075 CI: Additional setpoint
	r1050 CO: Act. Output freq. of the MOP



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)

Note:

Single digits denote main setpoints that have no additional setpoint.

P1001[3] Fixed frequency 1

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

Defines fixed frequency setpoint 1.

There are 3 types of fixed frequencies:
1. Direct selection
2. Direct selection + ON command
3. Binary coded selection + ON command

1. Direct selection (P0701 - P0706 = 15):
In this mode of operation 1 digital input selects 1 fixed frequency.
If several inputs are active together, the selected frequencies are summed.
E.g.: FF1 + FF2 + FF3 + FF4 + FF5 + FF6.

2. Direct selection + ON command (P0701 - P0706 = 16):
The fixed frequency selection combines the fixed frequencies with an ON command.
In this mode of operation 1 digital input selects 1 fixed frequency.
If several inputs are active together, the selected frequencies are summed.
E.g.: FF1 + FF2 + FF3 + FF4 + FF5 + FF6.

3. Binary coded selection + ON command (P0701 - P0706 = 17):
Up to 16 fixed frequencies can be selected using this method.
The fixed frequencies are selected according to the following table:

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**

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

Dependency:
Select fixed frequency operation (using P1000).

Inverter requires ON command to start in the case of direct selection (P0701 - P0706 = 15).

Note:
Fixed frequencies can be selected using the digital inputs, and can also be combined with an ON command.

P1002[3] Fixed frequency 2

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

Defines fixed frequency setpoint 2.

Index:
P1002[0] : 1st. Drive data set (DDS)
P1002[1] : 2nd. Drive data set (DDS)
P1002[2] : 3rd. Drive data set (DDS)

Details:
See parameter P1001 (fixed frequency 1).

P1003[3] Fixed frequency 3

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

Level: **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

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

Level: **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

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

Level: **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

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	-650.00
P-Group:	SETPOINT	**Active:** Immediately	**QuickComm.** No	**Def:**	25.00
				Max:	650.00

Level: **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

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

Level: **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

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	-650.00
P-Group:	SETPOINT	**Active:** Immediately	**QuickComm.** No	**Def:**	35.00
				Max:	650.00

Level: **3**

Defines fixed frequency setpoint 8.

Index:

P1008[0] : 1st. Drive data set (DDS)
P1008[1] : 2nd. Drive data set (DDS)
P1008[2] : 3rd. Drive data set (DDS)

Details:

See parameter P1001 (fixed frequency 1).

P1009[3] Fixed frequency 9

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	-650.00
P-Group:	SETPOINT	**Active:** Immediately	**QuickComm.** No	**Def:**	40.00
				Max:	650.00

Level: **3**

Defines fixed frequency setpoint 9.

Index:

P1009[0] : 1st. Drive data set (DDS)
P1009[1] : 2nd. Drive data set (DDS)
P1009[2] : 3rd. Drive data set (DDS)

Details:

See parameter P1001 (fixed frequency 1).

P1010[3] Fixed frequency 10

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	-650.00
P-Group:	SETPOINT	**Active:** Immediately	**QuickComm.** No	**Def:**	45.00
				Max:	650.00

Level: **3**

Defines fixed frequency setpoint 10.

Index:

P1010[0] : 1st. Drive data set (DDS)
P1010[1] : 2nd. Drive data set (DDS)
P1010[2] : 3rd. Drive data set (DDS)

Details:

See parameter P1001 (fixed frequency 1).

P1011[3] Fixed frequency 11

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

Level: **3**

Defines fixed frequency setpoint 11.

Index:

P1011[0] : 1st. Drive data set (DDS)
P1011[1] : 2nd. Drive data set (DDS)
P1011[2] : 3rd. Drive data set (DDS)

Details:

See parameter P1001 (fixed frequency 1).

P1012[3] Fixed frequency 12

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	-650.00
P-Group:	SETPOINT	**Active:** Immediately	**QuickComm.** No	**Def:**	55.00
				Max:	650.00

Level: **3**

Defines fixed frequency setpoint 12.

Index:

P1012[0] : 1st. Drive data set (DDS)
P1012[1] : 2nd. Drive data set (DDS)
P1012[2] : 3rd. Drive data set (DDS)

Details:

See parameter P1001 (fixed frequency 1).

P1013[3] Fixed frequency 13

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	-650.00
P-Group:	SETPOINT	**Active:** Immediately	**QuickComm.** No	**Def:**	60.00
				Max:	650.00

Level: **3**

Defines fixed frequency setpoint 13.

Index:

P1013[0] : 1st. Drive data set (DDS)
P1013[1] : 2nd. Drive data set (DDS)
P1013[2] : 3rd. Drive data set (DDS)

Details:

See parameter P1001 (fixed frequency 1).

P1014[3] Fixed frequency 14

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	-650.00
P-Group:	SETPOINT	**Active:** Immediately	**QuickComm.** No	**Def:**	65.00
				Max:	650.00

Level: **3**

Defines fixed frequency setpoint 14.

Index:

P1014[0] : 1st. Drive data set (DDS)
P1014[1] : 2nd. Drive data set (DDS)
P1014[2] : 3rd. Drive data set (DDS)

Details:

See parameter P1001 (fixed frequency 1).

P1015[3] **Fixed frequency 15**

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	-650.00
P-Group:	SETPOINT	**Active:** Immediately	**QuickComm.** No	**Def:**	65.00
				Max:	650.00

Level: **3**

Defines fixed frequency setpoint 15.

Index:

P1015[0] : 1st. Drive data set (DDS)
P1015[1] : 2nd. Drive data set (DDS)
P1015[2] : 3rd. Drive data set (DDS)

Details:

See parameter P1001 (fixed frequency 1).

P1016 **Fixed frequency mode - Bit 0**

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

Level: **3**

Fixed frequencies can be selected in three different modes. Parameter P1016 defines the mode of selection Bit 0.

Settings:

1 Direct selection
2 Direct selection + ON command
3 Binary coded selection + ON command

Details:

See table in P1001 (fixed frequency 1) for description of how to use fixed frequencies.

P1017 **Fixed frequency mode - Bit 1**

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

Level: **3**

Fixed frequencies can be selected in three different modes. Parameter P1017 defines the mode of selection Bit 1.

Settings:

1 Direct selection
2 Direct selection + ON command
3 Binary coded selection + ON command

Details:

See table in P1001 (fixed frequency 1) for description of how to use fixed frequencies.

P1018 **Fixed frequency mode - Bit 2**

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

Level: **3**

Fixed frequencies can be selected in three different modes. Parameter P1018 defines the mode of selection Bit 2.

Settings:

1 Direct selection
2 Direct selection + ON command
3 Binary coded selection + ON command

Details:

See table in P1001 (fixed frequency 1) for description of how to use fixed frequencies.

P1019 **Fixed frequency mode - Bit 3**

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

Level: **3**

Fixed frequencies can be selected in three different modes. Parameter P1019 defines the mode of selection Bit 3.

Settings:

1 Direct selection
2 Direct selection + ON command
3 Binary coded selection + ON command

Details:

See table in P1001 (fixed frequency 1) for description of how to use fixed frequencies.

P1020[3] **BI: Fixed freq. selection Bit 0** Level: **3**

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

Defines origin of fixed frequency selection.

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

Index:

P1020[0] : 1st. Command data set (CDS)
P1020[1] : 2nd. Command data set (CDS)
P1020[2] : 3rd. Command data set (CDS)

Dependency:

Accessible only if P0701 - P0706 = 99 (function of digital inputs = BICO)

P1021[3] **BI: Fixed freq. selection Bit 1** Level: **3**

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

Defines origin of fixed frequency selection.

Index:

P1021[0] : 1st. Command data set (CDS)
P1021[1] : 2nd. Command data set (CDS)
P1021[2] : 3rd. Command data set (CDS)

Dependency:

Accessible only if P0701 - P0706 = 99 (function of digital inputs = BICO)

Details:

See P1020 (fixed frequency selection Bit 0) for most common settings

P1022[3] **BI: Fixed freq. selection Bit 2** Level: **3**

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

Defines origin of fixed frequency selection.

Index:

P1022[0] : 1st. Command data set (CDS)
P1022[1] : 2nd. Command data set (CDS)
P1022[2] : 3rd. Command data set (CDS)

Dependency:

Accessible only if P0701 - P0706 = 99 (function of digital inputs = BICO)

Details:

See P1020 (fixed frequency selection Bit 0) for most common settings

P1023[3] **BI: Fixed freq. selection Bit 3** Level: **3**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.** No	**Def:**	722:3
				Max:	4000:0

Defines origin of fixed frequency selection.

Index:

P1023[0] : 1st. Command data set (CDS)
P1023[1] : 2nd. Command data set (CDS)
P1023[2] : 3rd. Command data set (CDS)

Dependency:

Accessible only if P0701 - P0706 = 99 (function of digital inputs = BICO)

Details:

See P1020 (fixed frequency selection Bit 0) for most common settings

r1024 **CO: Act. fixed frequency** Level: **3**

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

Displays sum total of selected fixed frequencies.

P1025 **Fixed frequency mode - Bit 4** Level: **3**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	1
P-Group:	SETPOINT	**Active:** first confirm	**QuickComm.** No	**Def:**	1
				Max:	2

Direct selection or direct selection + ON for bit 4

Settings:

1 Direct selection
2 Direct selection + ON command

Details:

See parameter P1001 for description of how to use fixed frequencies.

P1026[3] BI: Fixed freq. selection Bit 4 Level: 3

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.** No	**Def:**	722:4
				Max:	4000:0

Defines origin of fixed frequency selection.

Index:

P1026[0] : 1st. Command data set (CDS)
P1026[1] : 2nd. Command data set (CDS)
P1026[2] : 3rd. Command data set (CDS)

Dependency:

Accessible only if P0701 - P0706 = 99 (function of digital inputs = BICO).

Details:

See P1020 (fixed frequency selection Bit 0) for most common settings.

P1027 Fixed frequency mode - Bit 5 Level: 3

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	1
P-Group:	SETPOINT	**Active:** first confirm	**QuickComm.** No	**Def:**	1
				Max:	2

direct selection or direct selection + ON for bit 5

Settings:

1 Direct selection
2 Direct selection + ON command

Details:

See parameter P1001 for description of how to use fixed frequencies.

P1028[3] BI: Fixed freq. selection Bit 5 Level: 3

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.** No	**Def:**	722:5
				Max:	4000:0

Defines origin of fixed frequency selection.

Index:

P1028[0] : 1st. Command data set (CDS)
P1028[1] : 2nd. Command data set (CDS)
P1028[2] : 3rd. Command data set (CDS)

Dependency:

Accessible only if P0701 - P0706 = 99 (function of digital inputs = BICO).

Details:

See P1020 (fixed frequency selection Bit 0) for most common settings.

P1031[3] Setpoint memory of the MOP Level: 3

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

Saves last motor potentiometer setpoint (MOP) that was active before OFF command or power down.

Settings:

0 MOP setpoint will not be stored
1 MOP setpoint will be stored (P1040 is updated)

Index:

P1031[0] : 1st. Drive data set (DDS)
P1031[1] : 2nd. Drive data set (DDS)
P1031[2] : 3rd. Drive data set (DDS)

Note:

On next ON command, motor potentiometer setpoint will be the saved value in parameter P1040 (setpoint of the MOP).

P1032 Inhibit reverse direction of MOP Level: 3

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

Inhibits reverse setpoint selection

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)** Level: **3**

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

Defines source for motor potentiometer setpoint increase frequency.

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

Index:

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

P1036[3] **BI: Enable MOP (DOWN-command)** Level: **3**

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

Defines source for motor potentiometer setpoint decrease frequency.

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

Index:

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

P1040[3] **Setpoint of the MOP** Level: **2**

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	-650.00
P-Group:	SETPOINT	**Active:** Immediately	**QuickComm.** No	**Def:**	5.00
				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** Level: **3**

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

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

P1070[3] **CI: Main setpoint** Level: **3**

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

Defines source of main setpoint.

Settings:

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

Index:

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

P1071[3] **CI: Main setpoint scaling**

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

Level: **3**

Defines source of the main setpoint scaling.

Settings:

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

Index:

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

P1074[3] **BI: Disable additional setpoint**

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

Level: **3**

Disables additional setpoint

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))

Index:

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

P1075[3] **CI: Additional setpoint**

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

Level: **3**

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

Settings:

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

Index:

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

P1076[3] **CI: Additional setpoint scaling**

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

Level: **3**

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

Settings:

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

Index:

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

r1078 **CO: Total frequency setpoint**

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

Level: **3**

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

P1080[3] **Min. frequency**

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	0.00
P-Group:	SETPOINT	**Active:** Immediately	**QuickComm.** Yes	**Def:**	0.00
				Max:	650.00

Level: **1**

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

Index:

P1080[0] : 1st. Drive data set (DDS)
P1080[1] : 2nd. Drive data set (DDS)
P1080[2] : 3rd. Drive data set (DDS)

Note:

Value set here is valid both for clockwise and for anticlockwise rotation.

Under certain conditions (e.g. ramping, current limiting), motor can run below minimum frequency.

P1082[3] **Max. frequency**

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

Level: **1**

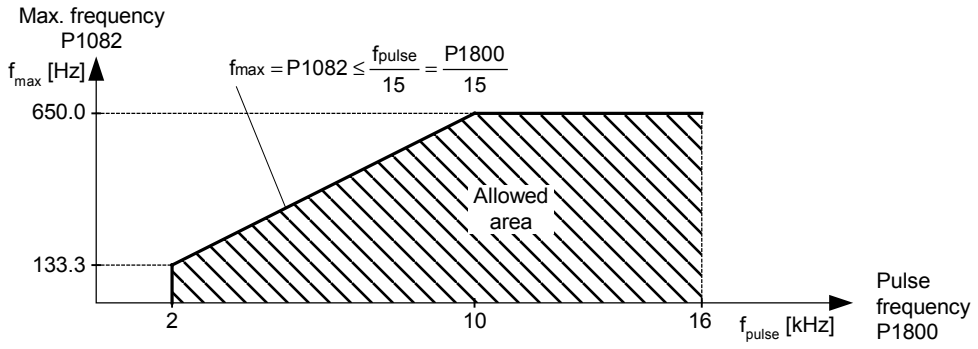
Sets maximum motor frequency [Hz] at which motor will run irrespective of the frequency setpoint.

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:



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)

The value is displayed in r0209 (maximum frequency).

Note:

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

The maximum output frequency of inverter can be exceeded if one of the following is active:

Slip compensation $= f_{max} + f_{slipcomp\,max}$
or
Flying restart $= f_{max} + f_{slipnom}$

Notice:

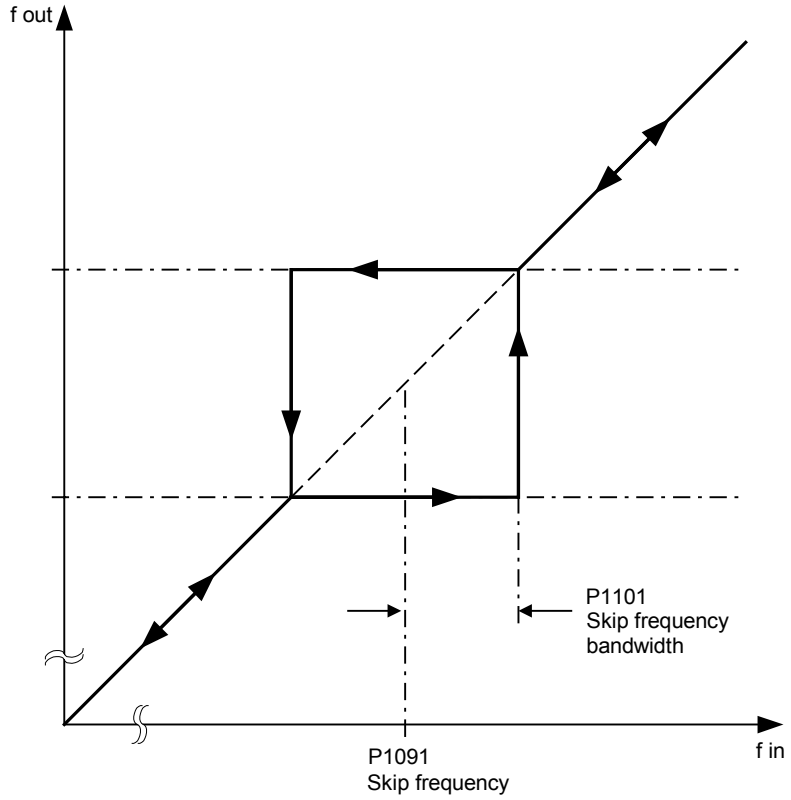
Maximum motor speed is subject to mechanical limitations.

P1091[3] **Skip frequency 1**

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

Level: **3**

Defines skip frequency 1 which avoids effects of mechanical resonance and suppresses frequencies within +/- P1101 (skip frequency bandwidth).



Index:

P1091[0] : 1st. Drive data set (DDS)
P1091[1] : 2nd. Drive data set (DDS)
P1091[2] : 3rd. Drive data set (DDS)

Notice:

Stationary operation is not possible within the suppressed frequency range; the range is merely passed through (on the ramp).

For example, if P1091 = 10 Hz and P1101 = 2 Hz, it is not possible to operate continuously between 10 Hz +/- 2 Hz (i.e. between 8 and 12 Hz).

P1092[3] **Skip frequency 2**

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

Level: **3**

Defines skip frequency 2 which avoids effects of mechanical resonance and suppresses frequencies within +/- P1101 (skip frequency bandwidth).

Index:

P1092[0] : 1st. Drive data set (DDS)
P1092[1] : 2nd. Drive data set (DDS)
P1092[2] : 3rd. Drive data set (DDS)

Details:

See P1091 (skip frequency 1).

P1093[3] **Skip frequency 3**

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

Level: **3**

Defines skip frequency 3 which avoids effects of mechanical resonance and suppresses frequencies within +/- P1101 (skip frequency bandwidth).

Index:

P1093[0] : 1st. Drive data set (DDS)
P1093[1] : 2nd. Drive data set (DDS)
P1093[2] : 3rd. Drive data set (DDS)

Details:

See P1091 (skip frequency 1).

P1094[3] Skip frequency 4

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

Level: **3**

Defines skip frequency 4 which avoids effects of mechanical resonance and suppresses frequencies within +/- P1101 (skip frequency bandwidth).

Index:

P1094[0] : 1st. Drive data set (DDS)
P1094[1] : 2nd. Drive data set (DDS)
P1094[2] : 3rd. Drive data set (DDS)

Details:

See P1091 (skip frequency 1).

P1101[3] Skip frequency bandwidth

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	0.00
P-Group:	SETPOINT	**Active:** Immediately	**QuickComm.** No	**Def:**	2.00
				Max:	10.00

Level: **3**

Delivers frequency bandwidth to be applied to skip frequencies (in [Hz]).

Index:

P1101[0] : 1st. Drive data set (DDS)
P1101[1] : 2nd. Drive data set (DDS)
P1101[2] : 3rd. Drive data set (DDS)

Details:

See P1091 (skip frequency 1).

P1110[3] BI: Inhibit neg. freq. setpoint

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

Level: **3**

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

Settings:

0 = Disabled
1 = Enabled

Index:

P1110[0] : 1st. Command data set (CDS)
P1110[1] : 2nd. Command data set (CDS)
P1110[2] : 3rd. Command data set (CDS)

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

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

Level: **3**

Defines source of reverse command used when P0719 = 0 (remote selection of command/setpoint source).

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

Index:

P1113[0] : 1st. Command data set (CDS)
P1113[1] : 2nd. Command data set (CDS)
P1113[2] : 3rd. Command data set (CDS)

r1114 CO: Freq. setp. after dir. ctrl.

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

Level: **3**

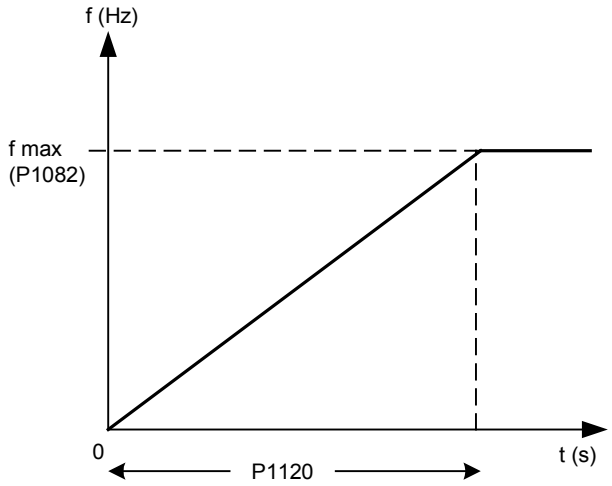
Displays setpoint frequency after change of direction.

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

Displays output frequency after modification by other functions, e.g.:
* P1110 BI: Inhibit neg. freq. setpoint,
* P1091 - P1094 skip frequencies,
* P1080 Min. frequency,
* P1082 Max. frequency,
* limitations,
* etc.

P1120[3]	Ramp-up time			Min: 0.00	Level: 1
	CStat: CUT	Datatype: Float	Unit: s	Def: 10.00	
	P-Group: SETPOINT	Active: first confirm	QuickComm. Yes	Max: 650.00	

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



Setting the ramp-up time too short can cause the inverter to trip (overcurrent).

Index:

P1120[0] : 1st. Drive data set (DDS)
P1120[1] : 2nd. Drive data set (DDS)
P1120[2] : 3rd. Drive data set (DDS)

Note:

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

Notice:

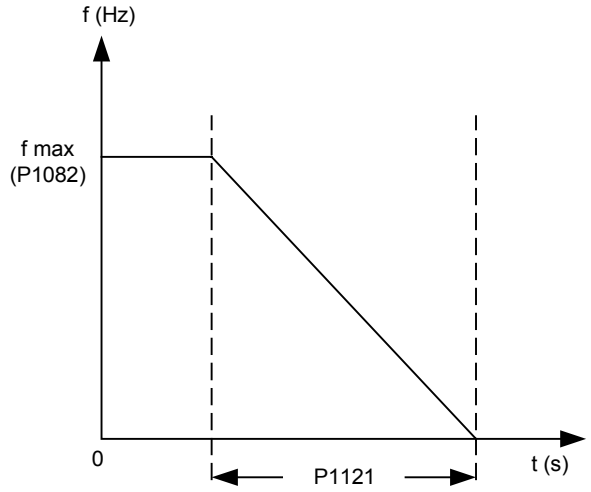
Ramp times will be used as follows:
P1060 / P1061 : JOG mode is active
P1120 / P1121 : Normal mode (ON/OFF) is active
P1060 / P1061 : Normal mode (ON/OFF) and P1124 is active

P1121[3] **Ramp-down time**

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

Level: **1**

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



Index:

P1121[0] : 1st. Drive data set (DDS)
P1121[1] : 2nd. Drive data set (DDS)
P1121[2] : 3rd. Drive data set (DDS)

Notice:

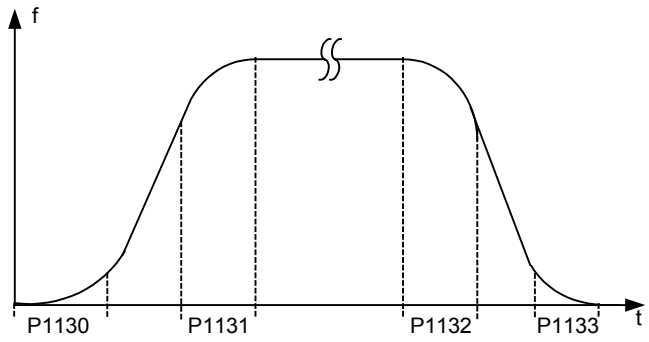
Setting the ramp-down time too short can cause the inverter to trip (overcurrent (F0001) / overvoltage (F0002)).

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

P1130[3] **Ramp-up initial rounding time** Level: **2**

CStat:	CUT	**Datatype:** Float	**Unit:** s	**Min:**	0.00
P-Group:	SETPOINT	**Active:** first confirm	**QuickComm.** No	**Def:**	0.00
				Max:	40.00

Defines initial rounding time in seconds as shown on the diagram below.



where:

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

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

X is defined as: X = Δf / fmax

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

Index:

P1130[0] : 1st. Drive data set (DDS)
P1130[1] : 2nd. Drive data set (DDS)
P1130[2] : 3rd. Drive data set (DDS)

Note:

Rounding times are recommended, since they prevent an abrupt response, thus avoiding detrimental effects on the mechanics.

Notice:

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

P1131[3] **Ramp-up final rounding time** Level: **2**

CStat:	CUT	**Datatype:** Float	**Unit:** s	**Min:**	0.00
P-Group:	SETPOINT	**Active:** first confirm	**QuickComm.** No	**Def:**	0.00
				Max:	40.00

Defines rounding time at end of ramp-up as shown in P1130 (ramp-up initial rounding time).

Index:

P1131[0] : 1st. Drive data set (DDS)
P1131[1] : 2nd. Drive data set (DDS)
P1131[2] : 3rd. Drive data set (DDS)

Note:

Rounding times are recommended, since they prevent an abrupt response, thus avoiding detrimental effects on the mechanics.

Notice:

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

P1132[3] **Ramp-down initial rounding time** Level: **2**

CStat:	CUT	**Datatype:** Float	**Unit:** s	**Min:**	0.00
P-Group:	SETPOINT	**Active:** first confirm	**QuickComm.** No	**Def:**	0.00
				Max:	40.00

Defines rounding time at start of ramp-down as shown in P1130 (ramp-up initial rounding time).

Index:

P1132[0] : 1st. Drive data set (DDS)
P1132[1] : 2nd. Drive data set (DDS)
P1132[2] : 3rd. Drive data set (DDS)

Note:

Rounding times are recommended, since they prevent an abrupt response, thus avoiding detrimental effects on the mechanics.

Notice:

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

P1133[3] **Ramp-down final rounding time** Level: **2**

CStat:	CUT	**Datatype:** Float	**Unit:** s	**Min:**	0.00
P-Group:	SETPOINT	**Active:** first confirm	**QuickComm.** No	**Def:**	0.00
				Max:	40.00

Defines rounding time at end of ramp-down as shown in P1130 (ramp-up initial rounding time).

Index:

P1133[0] : 1st. Drive data set (DDS)
P1133[1] : 2nd. Drive data set (DDS)
P1133[2] : 3rd. Drive data set (DDS)

Note:

Rounding times are recommended, since they prevent an abrupt response, thus avoiding detrimental effects on the mechanics.

Notice:

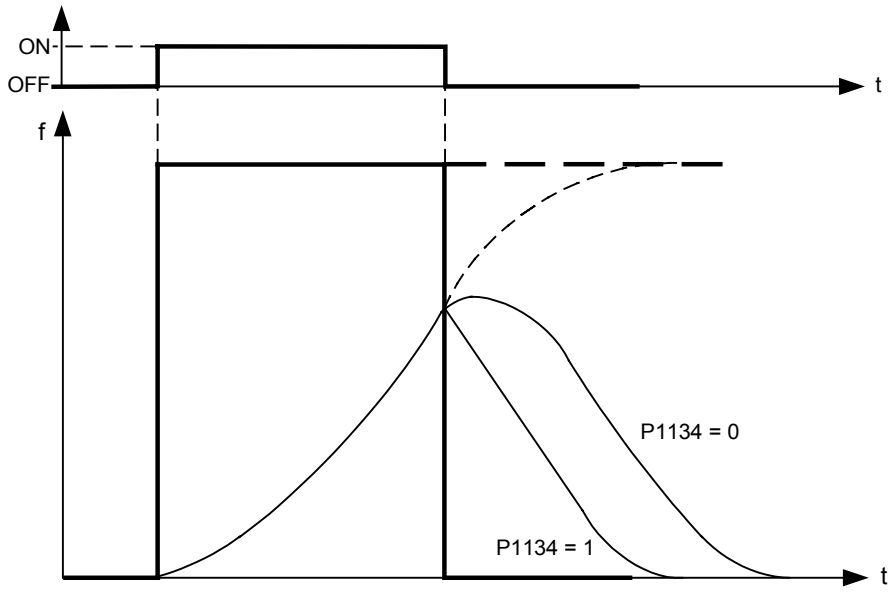
Rounding times are not recommended when analog inputs are used, since they would result in overshoot/undershoot in the inverter response.

P1134[3] **Rounding type** Level: **2**

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

Defines smoothing response to OFF1 command or setpoint reduction.

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



Settings:

0 Continuous smoothing
1 Discontinuous smoothing

Index:

P1134[0] : 1st. Drive data set (DDS)
P1134[1] : 2nd. Drive data set (DDS)
P1134[2] : 3rd. Drive data set (DDS)

Dependency:

No effect until total rounding time (P1130) > 0 s.

Notice:

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

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

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

P1135[3] **OFF3 ramp-down time** Level: **2**

CStat:	CUT	**Datatype:** Float	**Unit:** s	**Min:**	0.00
P-Group:	SETPOINT	**Active:** first confirm	**QuickComm.** Yes	**Def:**	5.00
				Max:	650.00

Defines ramp-down time from maximum frequency to standstill for OFF3 command.

Index:

P1135[0] : 1st. Drive data set (DDS)
P1135[1] : 2nd. Drive data set (DDS)
P1135[2] : 3rd. Drive data set (DDS)

Note:

This time may be exceeded if the VDC_max. level is reached.

P1140[3] **BI: RFG enable** Level: **3**

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

Defines command source of RFG enable command (RFG: ramp function generator). If binary input is equal to zero than the RFG output will be set immediately to 0.

Index:

P1140[0] : 1st. Command data set (CDS)
P1140[1] : 2nd. Command data set (CDS)
P1140[2] : 3rd. Command data set (CDS)

P1141[3] **BI: RFG start** Level: **3**

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

Defines command source of RFG start command (RFG: ramp function generator). If binary input is equal to zero than the RFG output is held at it present value.

Index:

P1141[0] : 1st. Command data set (CDS)
P1141[1] : 2nd. Command data set (CDS)
P1141[2] : 3rd. Command data set (CDS)

P1142[3] **BI: RFG enable setpoint** Level: **3**

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

Defines command source of RFG enable setpoint command (RFG: ramp function generator). If binary input is equal to zero than the RFG input will be set to zero and the RFG output will be ramp-down to zero.

Index:

P1142[0] : 1st. Command data set (CDS)
P1142[1] : 2nd. Command data set (CDS)
P1142[2] : 3rd. Command data set (CDS)

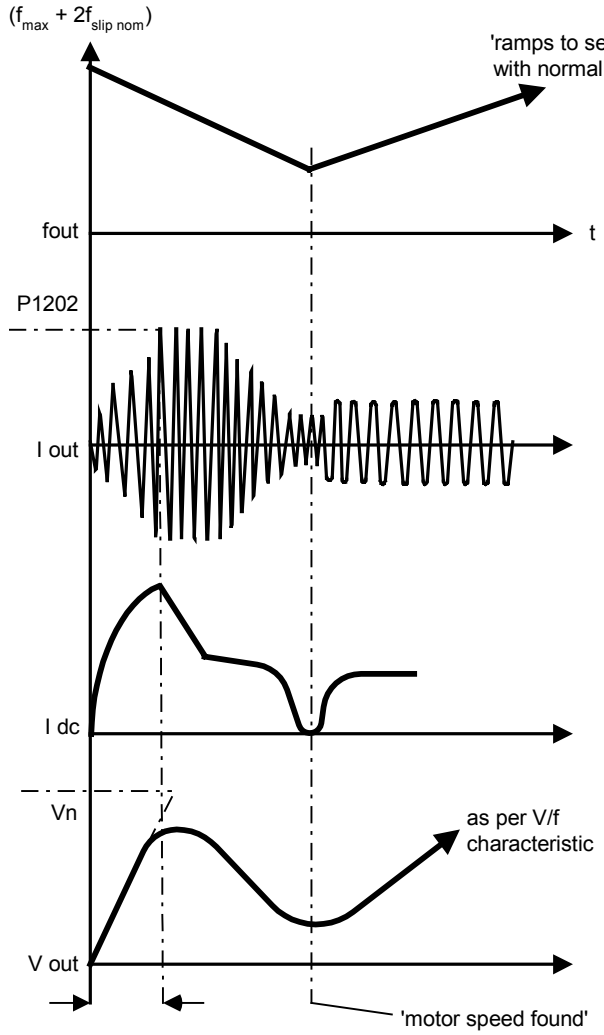
r1170 **CO: Frequency setpoint after RFG** Level: **3**

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

Displays overall frequency setpoint after ramp generator.

P1200	**Flying start**			**Min:** 0	Level:
	CStat: CUT	**Datatype:** U16	**Unit:** -	**Def:** 0	**3**
	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.



Settings:

0	Flying start disabled
1	Flying start is always active, start in direction of setpoint
2	Flying start is active if power on, fault, OFF2, start in direction of setpoint
3	Flying start is active if fault, OFF2, start in direction of setpoint
4	Flying start is always active, only in direction of setpoint
5	Flying start is active if power on, fault, OFF2, only in direction of setpoint
6	Flying start is active if fault, OFF2, only in direction of setpoint

Note:

Useful for motors with high inertia loads.

Settings 1 to 3 search in both directions.
Settings 4 to 6 search only in direction of setpoint.

Notice:

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

P1202[3]	**Motor-current: Flying start**				**Min:**	10	Level:
	CStat:	CUT	**Datatype:** U16	**Unit:** %	**Def:**	100	**3**
	P-Group:	FUNC	**Active:** first confirm	**QuickComm.** No	**Max:**	200	

Defines search current used for flying start.

Value is in [%] based on rated motor current (P0305).

Index:

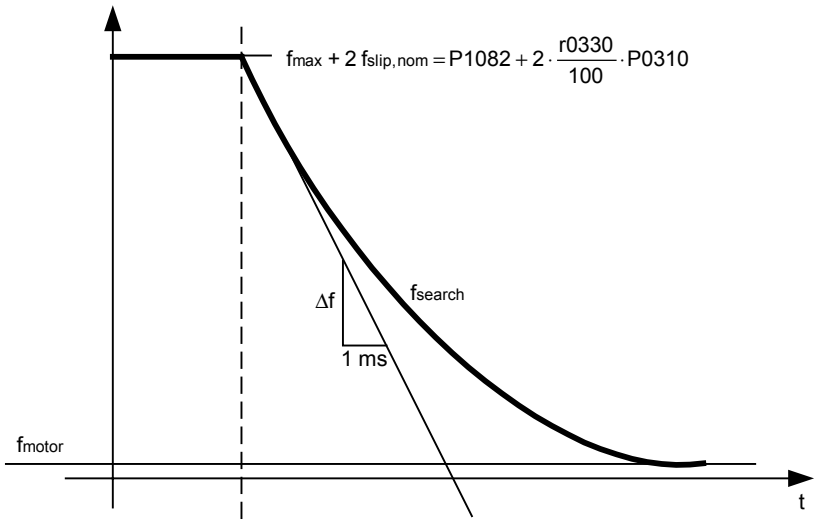
P1202[0] : 1st. Drive data set (DDS)
P1202[1] : 2nd. Drive data set (DDS)
P1202[2] : 3rd. Drive data set (DDS)

Note:

Reducing the search current may improve performance for flying start if the inertia of the system is not very high.

P1203[3]	**Search rate: Flying start**				**Min:**	10	Level:
	CStat:	CUT	**Datatype:** U16	**Unit:** %	**Def:**	100	**3**
	P-Group:	FUNC	**Active:** first confirm	**QuickComm.** No	**Max:**	200	

Sets factor by which the output frequency changes during flying start to synchronize with turning motor. This value is entered in [%] defines the reciprocal initial gradient in the search sequence (see curve below). Parameter P1203 influences the time taken to search for the motor frequency.



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

The search time is the time taken to search through all frequencies between max. frequency P1082 + 2 x f_slip to 0 Hz.

P1203 = 100 % is defined as giving a rate of 2 % of f_slip,nom / [ms].
P1203 = 200 % would result in a rate of frequency change of 1 % of f_slip,nom / [ms].

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.

Index:

P1203[0] : 1st. Drive data set (DDS)
P1203[1] : 2nd. Drive data set (DDS)
P1203[2] : 3rd. Drive data set (DDS)

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:
	CStat: CUT	**Datatype:** U16	**Unit:** -	**Def:** 1	**3**
	P-Group: FUNC	**Active:** first confirm	**QuickComm.** No	**Max:** 6	

Configures automatic restart function

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.

Caution1:

P1210 > 2 can cause the motor to restart automatically without toggling the ON command !

Notice:

A "mains brownout" is where the power in interrupted and re-applied before the display on the BOP (if one is fitted to the inverter) has gone dark (a very short mains break where the DC link has not fully collapsed).

A "mains blackout" is where the display has gone dark (a long mains break where the DC link has fully collapsed) before the power is re-applied.

P1210 = 0:
Automatic restart is disabled.

P1210 = 1:
The inverter will acknowledge (reset) faults i.e. it will reset a fault when the is re-applied. This means the inverter must be fully powered down, a brownout is not sufficed. The inverter will not run until the ON command has been toggled.

P1210 = 2:
The inverter will acknowledge the fault F0003 at power on after blackout and restarts the drive. It is necessary that the ON command is wired via digital input (DIN).

P1210 = 3:
For these settings it is fundamental that the drive only restarts if it has been in a RUN state at the time of the faults (F0003, etc.). The inverter will acknowledge the fault and restarts the drive after a blackout or bronwout. It is necessary that the ON command is wired via digital input (DIN).

P1210 = 4:
For these settings it is fundamental that the drive only restarts if it has been in a RUN state at the time of the fault (F0003). The inverter will acknowledge the fault and restarts the drive after a blackout or bronwout. It is necessary that the ON command is wired via digital input (DIN).

P1210 = 5:
The inverter will acknowledge the faults F0003 etc. at power on after blackout and restarts the drive. It is necessary that the ON command is wired via digital input (DIN).

P1210 = 6:
The inverter will acknowledge the faults (F0003 etc.) at power on after blackout or brownout and restarts the drive. It is necessary that the ON command is wired via digital input (DIN). Setting 6 causes the motor to restart immediately.

Following table presents an overview of parameter P1210 and its functionality.

P1210	Blackout F0003	Brownout F0003	All other faults without power cycle	All other faults with power cycle	ON command enabled during Power OFF
0	–	–	–	–	–
1	Fault acknowledge	–	–	–	Fault acknowledge
2	Fault acknowledge + restart	–	–	–	Fault acknowledge + restart
3	Fault acknowledge + restart	Fault acknowledge + restart	Fault acknowledge + restart	Fault acknowledge + restart	–
4	Fault acknowledge + restart	Fault acknowledge + restart	–	–	–
5	Fault acknowledge + restart	–	–	Fault acknowledge + restart	Fault acknowledge + restart
6	Fault acknowledge + restart	Fault acknowledge + restart	Fault acknowledge + restart	Fault acknowledge + restart	Fault acknowledge + restart

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

P1211 Number of restart attempts Level: **3**

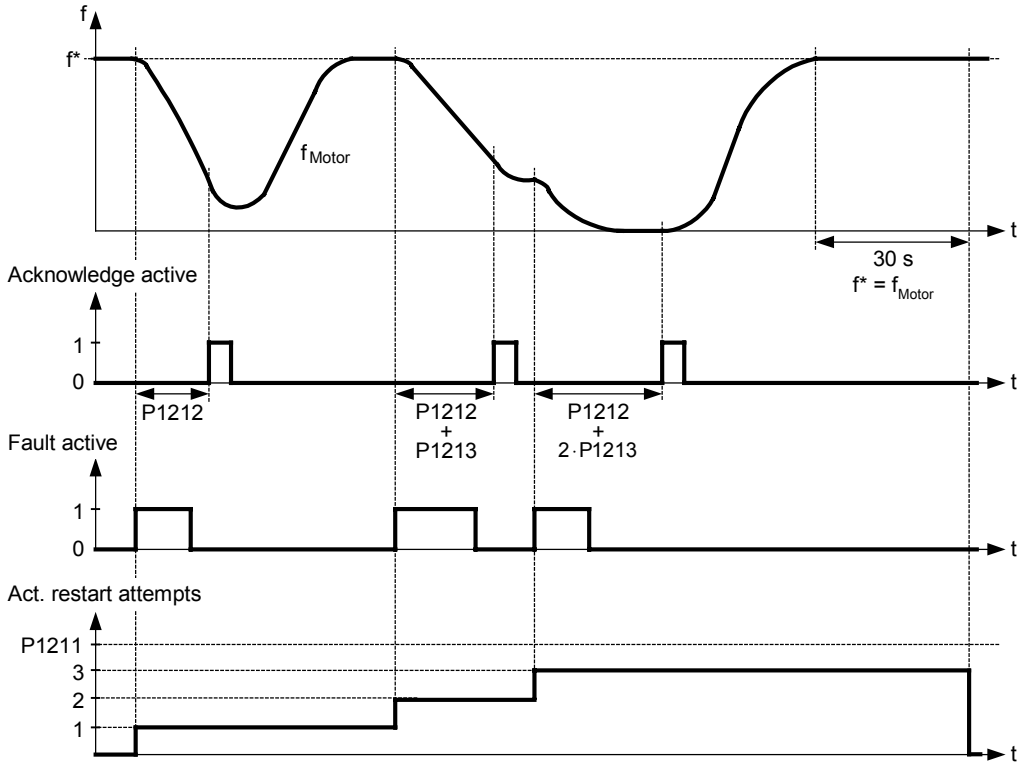
CStat: CUT **Datatype:** U16 **Unit:** - **Min:** 0
P-Group: FUNC **Active:** first confirm **QuickComm.** No **Def:** 3
Max: 10

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

P1212 Time to first restart Level: **3**

CStat: CUT **Datatype:** U16 **Unit:** s **Min:** 0
P-Group: FUNC **Active:** first confirm **QuickComm.** No **Def:** 30
Max: 1000

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



P1213 Restart time increment Level: **3**

CStat: CUT **Datatype:** U16 **Unit:** s **Min:** 0
P-Group: FUNC **Active:** first confirm **QuickComm.** No **Def:** 30
Max: 1000

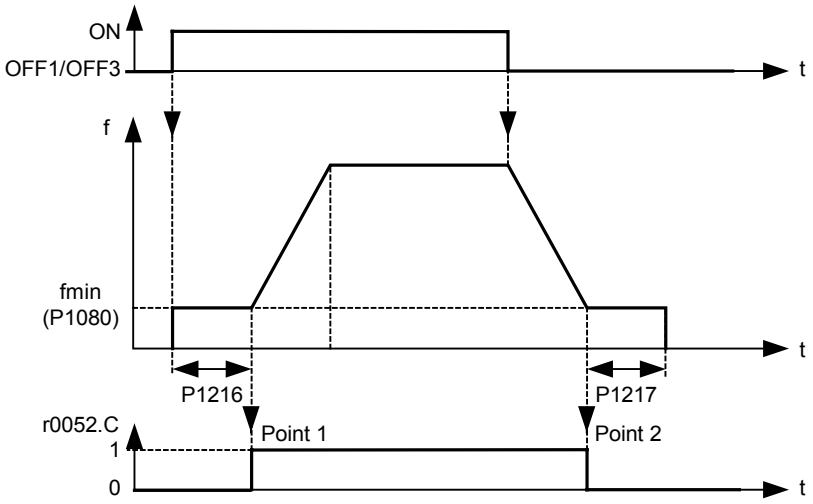
Selects the amount the restart time is increment for each restart of the inverter if automatic restart P1210 is activated.

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

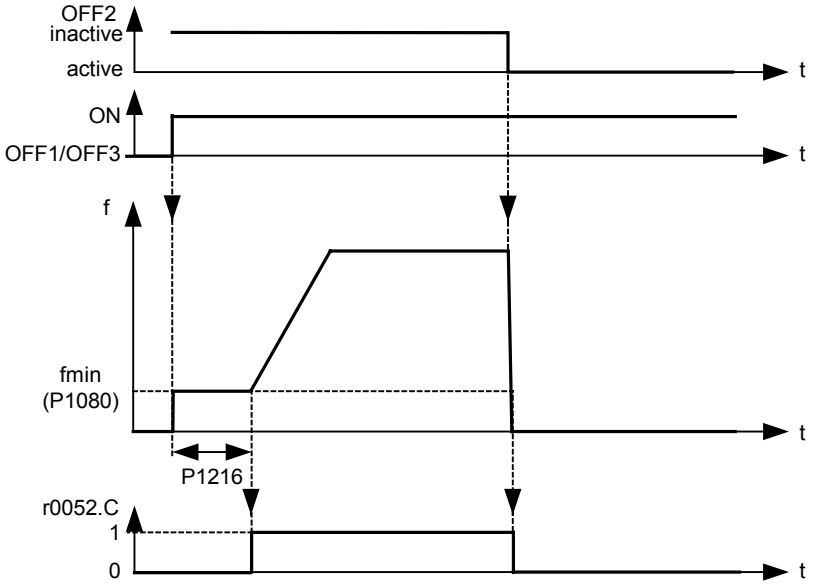
Enables/disables holding brake function. This function applies the following profile to the inverter:

Relay switching is also possible at point 1 and point 2 (if programmed in P0731 = 52.C) to control a brake.

ON / OFF1/OFF3:



ON / OFF2:



Settings:

0	Motor holding brake disabled
1	Motor holding brake enabled

Note:

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

P1216 **Holding brake release delay** Level: **2**

CStat:	T	**Datatype:** Float	**Unit:** s	**Min:**	0.0
P-Group:	FUNC	**Active:** first confirm	**QuickComm.** No	**Def:**	1.0
				Max:	20.0

Defines period during which inverter runs at min. frequency P1080 before ramping up at point 1 (as shown in P1215 - holding brake enable). Inverter starts at min. frequency P1080 on this profile, i.e. it does not use a ramp.

Note:

A typical value of min. frequency P1080 for this type of application is the slip frequency of the motor.

You can calculate the rated slip frequency by using the following formula:

$$\frac{n_{syn} - n_n}{n_{syn}} \cdot f_n$$

Notice:

If used to hold the motor at a certain frequency against a mechanical brake (i.e. you are using a relay to control mechanical brake), it is important that min. frequency P1080 < 5 Hz; otherwise, the current drawn may be too high and the relay may not open.

P1217 **Holding time after ramp down** Level: **2**

CStat:	T	**Datatype:** Float	**Unit:** s	**Min:**	0.0
P-Group:	FUNC	**Active:** first confirm	**QuickComm.** No	**Def:**	1.0
				Max:	20.0

Defines time for which inverter runs at minimum frequency (P1080) after ramping down at point 2.

Details:

See diagram P1215 (holding brake enable).

P1230[3] **BI: Enable DC braking** Level: **3**

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

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)

Index:

P1230[0] : 1st. Command data set (CDS)
P1230[1] : 2nd. Command data set (CDS)
P1230[2] : 3rd. Command data set (CDS)

Caution2:

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** Level: **3**

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

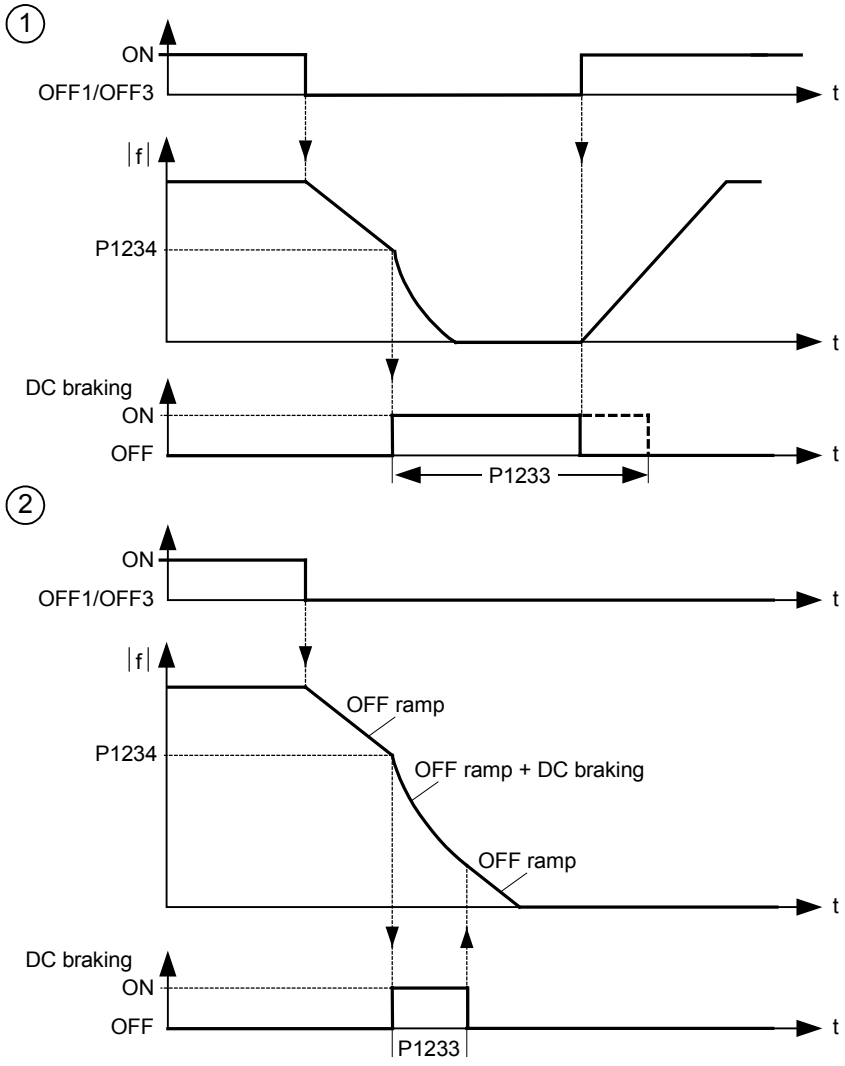
Defines level of DC current in [%] relative to rated motor current (P0305).

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

Value:

P1233 = 0 :
Not active following OFF1 / OFF3.

P1233 = 1 - 250 :
Active for the specified duration.

Index:

P1233[0] : 1st. Drive data set (DDS)
P1233[1] : 2nd. Drive data set (DDS)
P1233[2] : 3rd. Drive data set (DDS)

Caution2:

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

Notice:

The DC braking function causes the motor to stop rapidly by applying a DC braking current (the current applied also holds the shaft stationary). When the DC braking signal is applied, the inverter output pulses are blocked and the DC current not applied until the motor has been sufficiently demagnetized (demagnetization time is calculated automatically from motor data).

The inverter will not restart if an ON-command is given during this period.

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

P1234[3] DC braking start frequency

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

Level: **3**

Sets start frequency for DC braking.

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

Index:

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

Details:

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

P1236[3] Compound braking current

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

Level: **3**

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

If P1254 = 0 :

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

otherwise :

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

Value:

P1236 = 0 :
Compound braking disabled.

P1236 = 1 - 250 :
Level of DC braking current defined as a [%] of rated motor current (P0305).

Index:

P1236[0] : 1st. Drive data set (DDS)
P1236[1] : 2nd. Drive data set (DDS)
P1236[2] : 3rd. Drive data set (DDS)

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 brake enabled as well compound braking will take priority. If used with the Vdc max controller enabled the drive behaviour whilst braking may be worsened paticularly with high values of compound braking.

P1240[3] Configuration of Vdc controller

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

Level: **3**

Enables / disables Vdc controller.

The Vdc controller dynamically controls the DC link voltage to prevent overvoltage trips on high inertia systems.

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

Level: **3**

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:** %	**Min:**	10
P-Group:	FUNC	**Active:** Immediately	**QuickComm.** No	**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	**Min:**	0.00
P-Group:	FUNC	**Active:** Immediately	**QuickComm.** No	**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:** -	**Min:**	0
P-Group:	FUNC	**Active:** Immediately	**QuickComm.** No	**Def:**	1
				Max:	1

Level: **3**

Enables/disables auto-detection of switch-on levels for Vdc max controller.

Settings:

0 Disabled
1 Enabled

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

Selects the possible sources for contactor changeover control.

Settings:

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

Index:

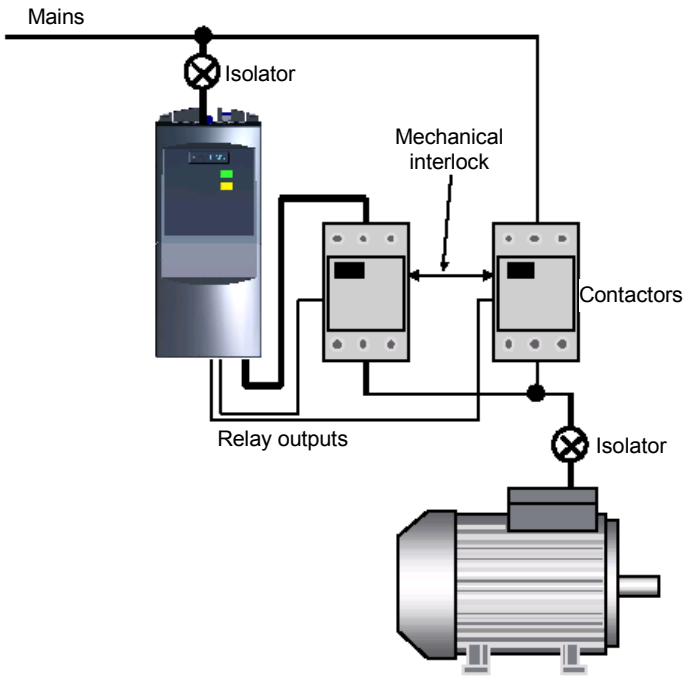
P1260[0] : 1st. Drive data set (DDS)
P1260[1] : 2nd. Drive data set (DDS)
P1260[2] : 3rd. Drive data set (DDS)

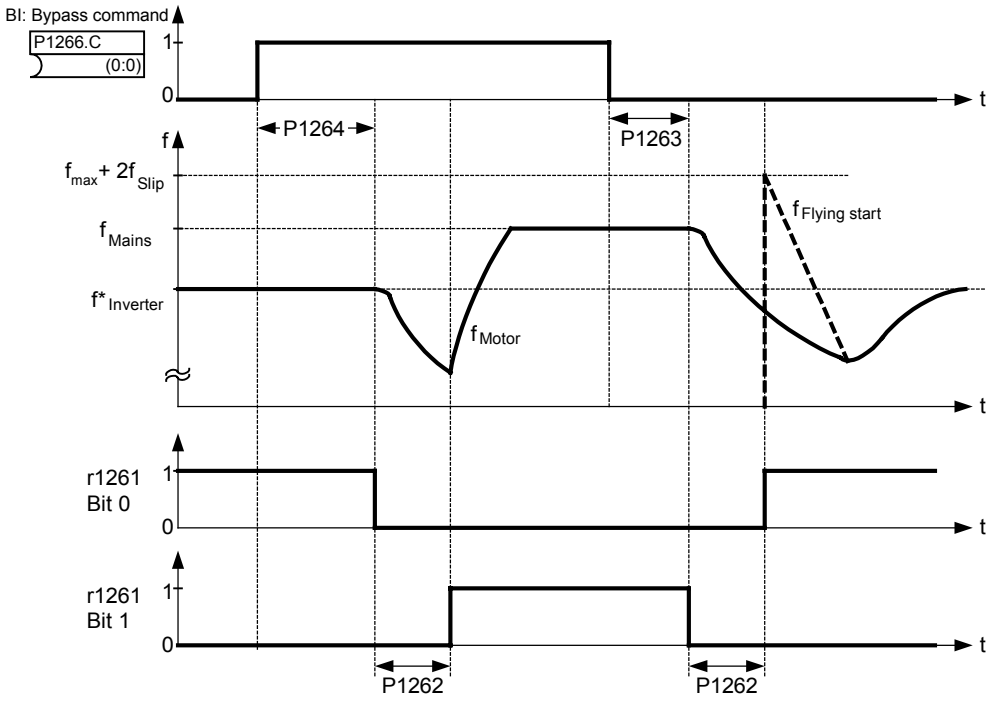
Dependency:

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** Level: **2**

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

P-Group: FUNC

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** Level: **2**

CStat: CUT **Datatype:** Float **Unit:** s **Min:** 0 **Def:** 1.000 **Max:** 20.000

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

P1262 is the interlock time between switching one contator 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** Level: **2**

CStat: CUT **Datatype:** Float **Unit:** s **Min:** 0 **Def:** 1.0 **Max:** 300.0

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

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** Level: **2**

CStat: CUT **Datatype:** Float **Unit:** s **Min:** 0 **Def:** 1.0 **Max:** 300.0

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

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** Level: **2**

CStat:	CT	**Datatype:** Float	**Unit:** Hz	**Min:**	12.00
P-Group:	FUNC	**Active:** first confirm	**QuickComm.** No	**Def:**	50.00
				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** Level: **2**

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

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)

Index:

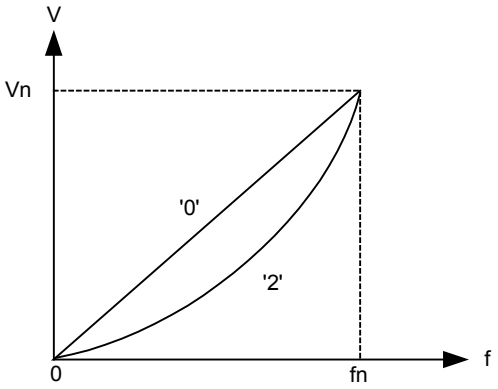
P1266[0] : 1st. Command data set (CDS)
P1266[1] : 2nd. Command data set (CDS)
P1266[2] : 3rd. Command data set (CDS)

P1300[3] **Control mode**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	CONTROL	**Active:** first confirm	**QuickComm.** Yes	**Def:**	1
				Max:	23

Level: **3**

Controls relationship between speed of motor and voltage supplied by inverter as illustrated in the diagram below.



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)

Note:

V/f mode:
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 curve
* Suitable for centrifugal fans / pumps

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

ParNo.	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]	CI: Voltage setpoint	3	–	–	–	–	–	–	x
P1333[3]	Start frequency for FCC	3	–	x	–	–	–	x	–
P1335[3]	Slip compensation	2	x	x	x	x	–	–	–
P1336[3]	Slip limit	2	x	x	x	x	–	–	–
P1338[3]	Resonance damping gain V/f	3	x	x	x	x	–	–	–
P1340[3]	Imax controller prop. gain	3	x	x	x	x	x	x	x
P1341[3]	Imax controller integral time	3	x	x	x	x	x	x	x
P1345[3]	Imax controller prop. gain	3	x	x	x	x	x	x	x
P1346[3]	Imax controller integral time	3	x	x	x	x	x	x	x
P1350[3]	Voltage soft start	3	x	x	x	x	x	x	x

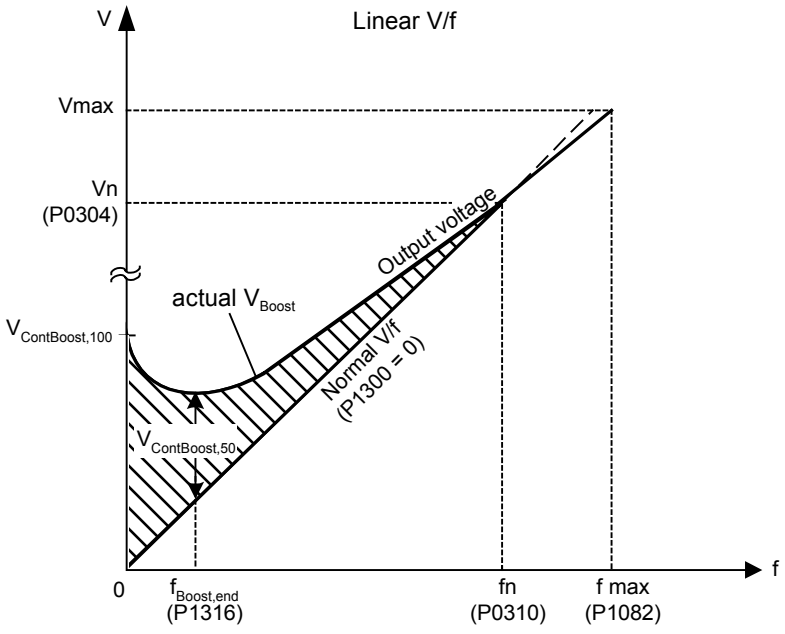
P1310[3] Continuous boost

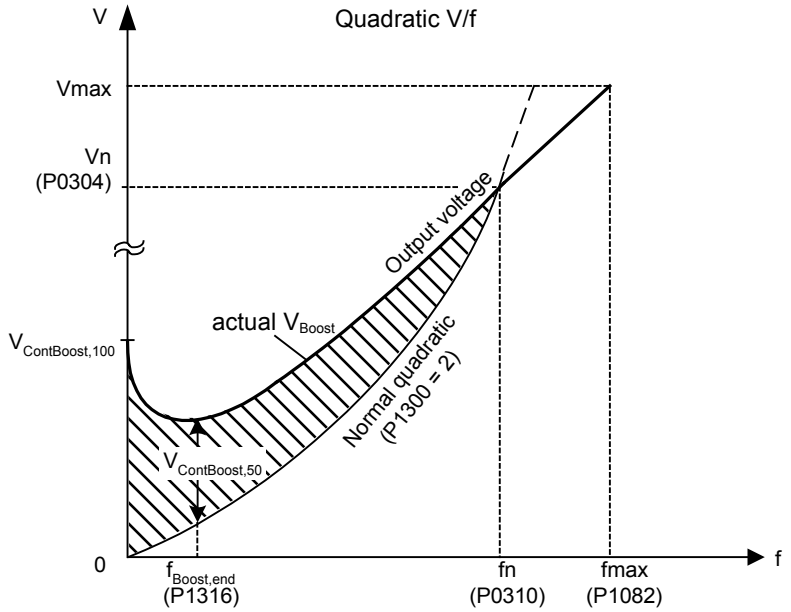
CStat: CUT **Datatype:** Float **Unit:** % **Min:** 0.0
P-Group: CONTROL **Active:** Immediately **QuickComm.** No **Def:** 50.0
Max: 250.0

Level: **3**

At low output frequencies the output voltage is low to keep the flux level constant. However, the output voltage may be too low
- for magnetisation the asynchronous motor
- to hold the load
- to overcome losses in the system. The output voltage can be increased using parameter P1310.

Defines boost level in [%] relative to P0305 (rated motor current) applicable to both linear and quadratic V/f curves according to the diagram below:





where voltage values are given

V_ConBoost,100 = rated motor current (P0305) * Stator resistance (P0350) * Continous boost (P1310)
V_ConBoost,50 = V_ConBoost,100 / 2

Index:

P1310[0] : 1st. Drive data set (DDS)
P1310[1] : 2nd. Drive data set (DDS)
P1310[2] : 3rd. Drive data set (DDS)

Dependency:

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

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:

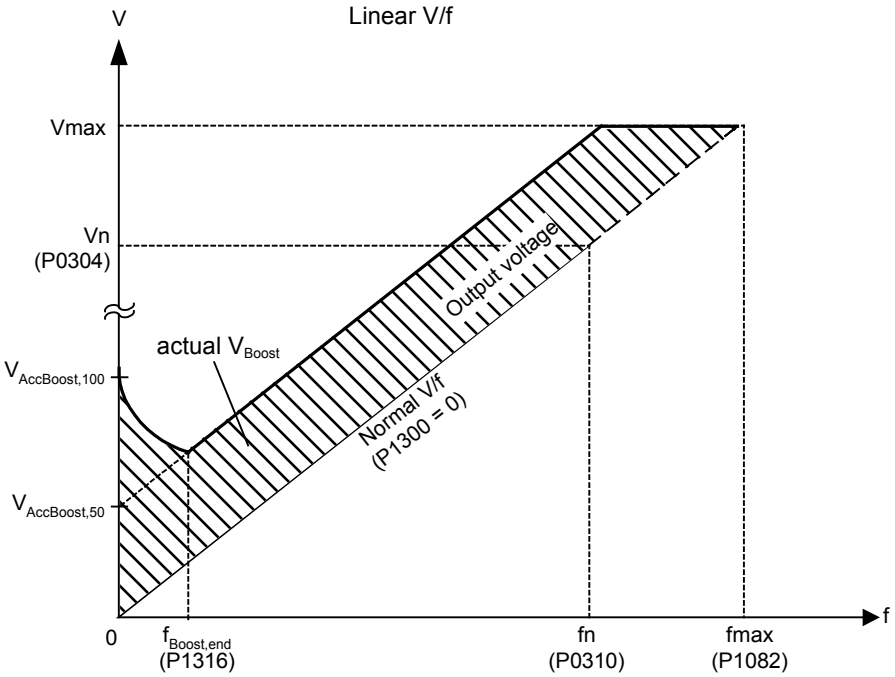
Increasing the boost levels increases motor heating (especially at standstill).

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

P1311[3]	Acceleration boost				Min:	0.0	Level:
	CStat: CUT	Datatype: Float	Unit: %		Def:	0.0	3
	P-Group: CONTROL	Active: Immediately	QuickComm. No		Max:	250.0	

P1311 will only produce boost during ramping, and is therefore useful for additional torque during acceleration.

Applies boost in [%] relative to P0305 (rated motor current) following a positive setpoint change and drops back out once the setpoint is reached.



where voltage values are given

V_AccBoost,100 = rated motor current (P0305) * Stator resistance (P0350) * Acceleration boost (P1311)
V_AccBoost,50 = V_AccBoost,100 / 2

Index:

P1311[0] : 1st. Drive data set (DDS)
P1311[1] : 2nd. Drive data set (DDS)
P1311[2] : 3rd. Drive data set (DDS)

Dependency:

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

Note:

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

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

Notice:

Increasing the boost level increases motor heating.

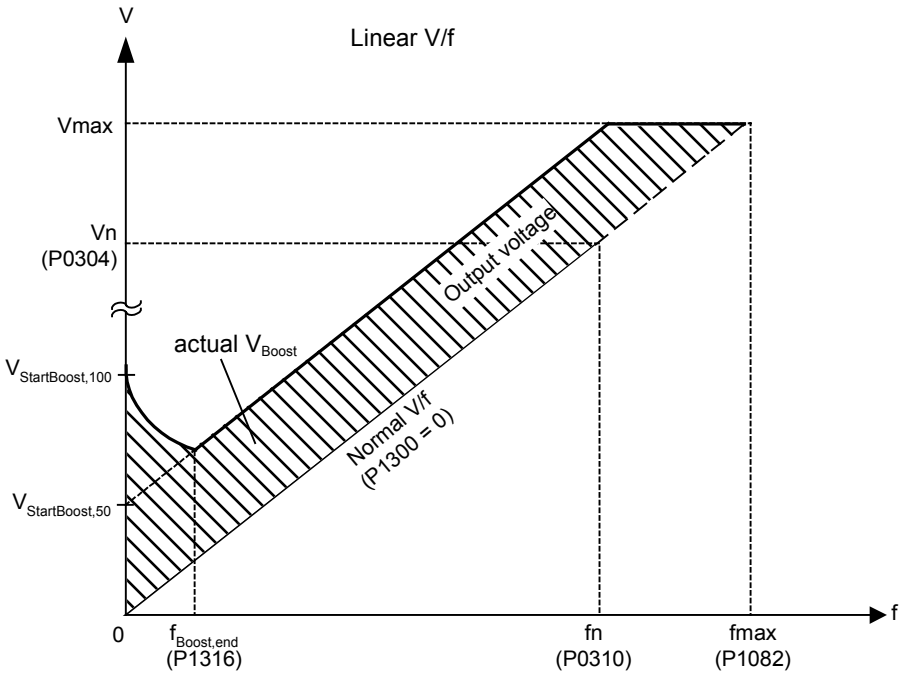
Details:

See note in P1310 for boost priorities.

P1312[3]	**Starting boost**			**Min:**	0.0	Level:
	CStat: CUT	**Datatype:** Float	**Unit:** %	**Def:**	0.0	**3**
	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 setpoint is reached for the first time. This is useful for starting loads with high inertia.

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



where voltage values are given

V_StartBoost,100 = rated motor current (P0305) * Stator resistance (P0350) * Starting boost (P1312)
V_StartBoost,50 = V_StartBoost,100 / 2

Index:

P1312[0] : 1st. Drive data set (DDS)
P1312[1] : 2nd. Drive data set (DDS)
P1312[2] : 3rd. Drive data set (DDS)

Dependency:

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

Notice:

Increasing the boost levels increases motor heating.

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

Details:

See note in P1310 for boost priorities.

P1316[3] Boost end frequency

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

Level: **3**

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

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

The default frequency is defined as follows:

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

Index:

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

Note:

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

Details:

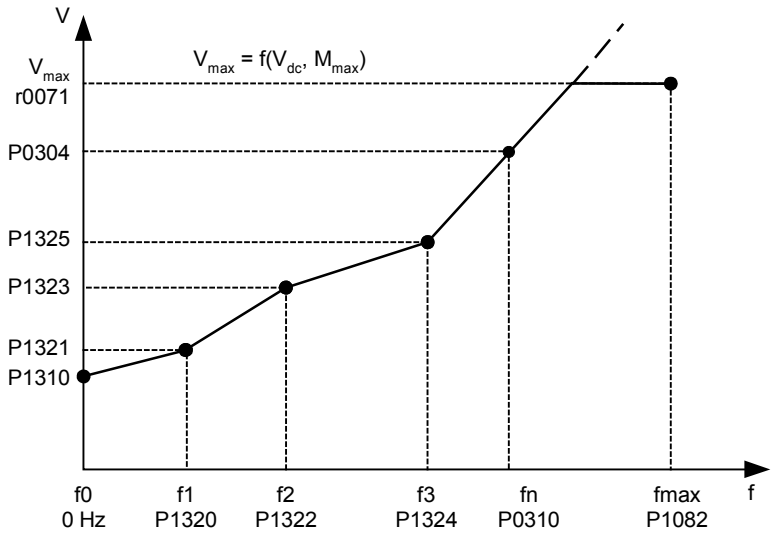
See diagram in P1310 (continuous boost).

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

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

Level: **3**

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



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

Example:

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

Index:

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

Dependency:

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

Note:

Linear interpolation will be applied between the individual data points.

V/f with programmable characteristic (P1300 = 3) has 3 programmable points. The two non-programmable points are:
- Continuous boost P1310 at zero 0 Hz
- Rated motor voltage P0304 at rated motor frequency P0310

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

P1321[3] **Programmable V/f volt. coord. 1** Level: **3**

CStat:	CUT	**Datatype:** Float	**Unit:** V	**Min:**	0.0
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.** No	**Def:**	0.0
				Max:	3000.0

See P1320 (programmable V/f freq. coord. 1).

Index:
P1321[0] : 1st. Drive data set (DDS)
P1321[1] : 2nd. Drive data set (DDS)
P1321[2] : 3rd. Drive data set (DDS)

P1322[3] **Programmable V/f freq. coord. 2** Level: **3**

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

See P1320 (programmable V/f freq. coord. 1).

Index:
P1322[0] : 1st. Drive data set (DDS)
P1322[1] : 2nd. Drive data set (DDS)
P1322[2] : 3rd. Drive data set (DDS)

P1323[3] **Programmable V/f volt. coord. 2** Level: **3**

CStat:	CUT	**Datatype:** Float	**Unit:** V	**Min:**	0.0
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.** No	**Def:**	0.0
				Max:	3000.0

See P1320 (programmable V/f freq. coord. 1).

Index:
P1323[0] : 1st. Drive data set (DDS)
P1323[1] : 2nd. Drive data set (DDS)
P1323[2] : 3rd. Drive data set (DDS)

P1324[3] **Programmable V/f freq. coord. 3** Level: **3**

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

See P1320 (programmable V/f freq. coord. 1).

Index:
P1324[0] : 1st. Drive data set (DDS)
P1324[1] : 2nd. Drive data set (DDS)
P1324[2] : 3rd. Drive data set (DDS)

P1325[3] **Programmable V/f volt. coord. 3** Level: **3**

CStat:	CUT	**Datatype:** Float	**Unit:** V	**Min:**	0.0
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.** No	**Def:**	0.0
				Max:	3000.0

See P1320 (programmable V/f freq. coord. 1).

Index:
P1325[0] : 1st. Drive data set (DDS)
P1325[1] : 2nd. Drive data set (DDS)
P1325[2] : 3rd. Drive data set (DDS)

P1330[3] **CI: Voltage setpoint** Level: **3**

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

BICO parameter for selecting source of voltage setpoint for independent V/f control.

Index:
P1330[0] : 1st. Command data set (CDS)
P1330[1] : 2nd. Command data set (CDS)
P1330[2] : 3rd. Command data set (CDS)

P1333[3] **Start frequency for FCC** Level: **3**

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	0.0
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.** No	**Def:**	10.0
				Max:	100.0

Defines start frequency at which FCC (flux current control) is enabled as [%] of rated motor frequency (P0310).

Index:
P1333[0] : 1st. Drive data set (DDS)
P1333[1] : 2nd. Drive data set (DDS)
P1333[2] : 3rd. Drive data set (DDS)

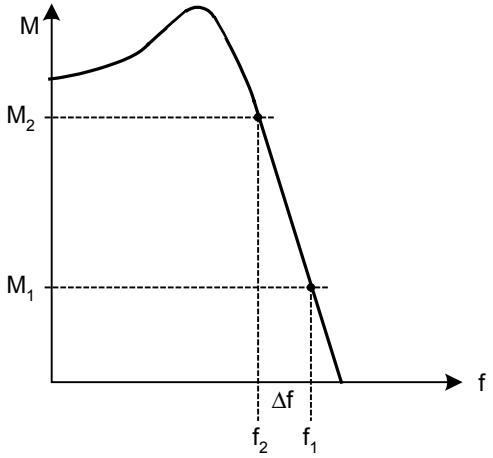
Notice:
If this value is too low, the system may become unstable.

P1335[3] Slip compensation Level: **3**

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	0.0
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.** No	**Def:**	0.0
				Max:	600.0

Dynamically adjusts output frequency of inverter so that motor speed is kept constant independent of motor load.

Increasing the load from md1 to md2 (see diagram) will decrease the motor speed from f1 to f2, due to the slip. The inverter can compensate for this by increasing the output frequency slightly as the load increases. The inverter measures the current and increases the output frequency to compensate for the expected slip.



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).

Slip compensation uses the motor data and motor model to add the rated slip frequency rated motor speed and rated motor current.

Index:

P1335[0] : 1st. Drive data set (DDS)
P1335[1] : 2nd. Drive data set (DDS)
P1335[2] : 3rd. Drive data set (DDS)

Note:

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

100% = standard setting for warm stator.

P1336[3] Slip limit Level: **3**

CStat:	CUT	**Datatype:** U16	**Unit:** %	**Min:**	0
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.** No	**Def:**	250
				Max:	600

Compensation slip limit in [%] relative to r0330 (rated motor slip), which is added to frequency setpoint.

Index:

P1336[0] : 1st. Drive data set (DDS)
P1336[1] : 2nd. Drive data set (DDS)
P1336[2] : 3rd. Drive data set (DDS)

Dependency:

Slip compensation (P1335) active.

r1337 CO: V/f slip frequency Level: **3**

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

Displays actual compensated motor slip as [%]

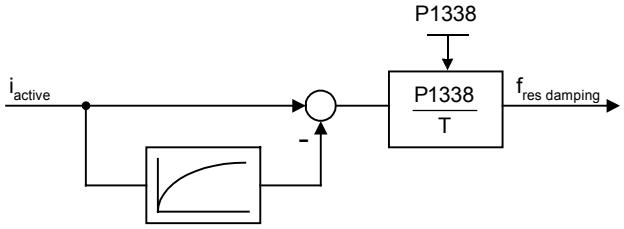
Dependency:

Slip compensation (P1335) active.

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

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

Defines resonance damping gain for V/f. Here, di/dt of the acitve current will be scaled by P1338 (see diagram below). If di/dt increases the resonance damping circuit decreases the inverter output frequency.



Index:
P1338[0] : 1st. Drive data set (DDS)
P1338[1] : 2nd. Drive data set (DDS)
P1338[2] : 3rd. Drive data set (DDS)

Note:
The resonance circuit damps oscillations of the active current which frequently occur during no-load operation.

In V/f modes (see P1300), the resonance damping circuit is active in a range from approx. 6 % to 80 % of rated motor frequency (P0310).

If the value of P1338 is too high, this will cause instability (forward control effect).

P1340[3] **Imax controller prop. gain** Level: **3**

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

Proportional gain of the I_max frequency controller.

The Imax controller reduces inverter current if the output current exceeds the maximum motor current (r0067).

In linear V/f, parabolic V/f, FCC, and programmable V/f modes the I_max controller uses both a frequency controller (see parameters P1340 and P1341) and a voltage controller (see parameters P1344 and P1345). The frequency controller seeks to reduce current by limiting the inverter output frequency (to a minimum of the two times nominal slip frequency). If this action does not successfully remove the overcurrent condition, the inverter output voltage is reduced using the I_max voltage controller. When the overcurrent condition has been removed successfully, frequency limiting is removed using the ramp-up time set in P1120.

In linear V/f for textiles, FCC for textiles, or external V/f modes only the I_max voltage controller is used to reduce current (See parameters P1345 and P1346).

Index:
P1340[0] : 1st. Drive data set (DDS)
P1340[1] : 2nd. Drive data set (DDS)
P1340[2] : 3rd. Drive data set (DDS)

Note:
The I_max controller can be disabled by setting the frequency controller integral time P1341 to zero. This disables both the frequency and voltage controllers. Note that when disabled, the I_max controller will take no action to reduce current but overcurrent warnings will still be generated, and the Drive will trip in excessive overcurrent or overload conditions.

P1341[3] **Imax controller integral time** Level: **3**

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

Integral time constant of the I_max frequency controller.
P1341 = 0 : I_max frequency and voltage controllers disabled
P1340 = 0 and P1341 > 0 : frequency controller enhanced integral
P1340 > 0 and P1341 > 0 : frequency controller normal PI control

See description in parameter P1340 for further information.

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

r1343 **CO: Imax controller freq. output** Level: 3

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

P-Group: CONTROL

Displays effective frequency limitation.

Dependency:

If I_max controller not in operation, parameter normally shows max. frequency P1082.

r1344 **CO: Imax controller volt. output** Level: 3

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

P-Group: CONTROL

Displays amount by which the I_max controller is reducing the inverter output voltage.

P1345[3] **Imax controller prop. gain** Level: 3

CStat: CUT **Datatype:** Float **Unit:** - **Min:** 0.000 **Def:** 0.250 **Max:** 5.499

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

Proportional gain of the I_max voltage controller. See parameter P1340 for further information.

Index:

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

P1346[3] **Imax controller integral time** Level: 3

CStat: CUT **Datatype:** Float **Unit:** s **Min:** 0.000 **Def:** 0.300 **Max:** 50.000

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

Integral time constant of the I_max voltage controller.
P1341 = 0 : I_max frequency and voltage controllers disabled
P1345 = 0 and P1346 > 0 : I_max voltage controller enhanced integral
P1345 > 0 and P1346 > 0 : I_max voltage controller normal PI control

See description in parameter P1340 for further information.

Index:

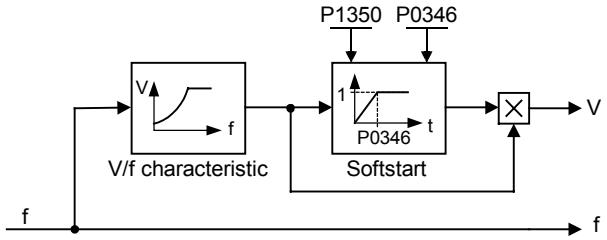
P1346[0] : 1st. Drive data set (DDS)
P1346[1] : 2nd. Drive data set (DDS)
P1346[2] : 3rd. Drive data set (DDS)

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

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

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

Sets whether voltage is built up smoothly during magnetization time (ON) or whether it simply jumps to boost voltage (OFF).



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** Level: **2**

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

Sets pulse frequency of power switches in inverter. The frequency can be changed in steps of 2 kHz.

Pulse frequencies > 4 kHz selected on 380-480 V units reduce the maximum continuous motor current.

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:

At 4 kHz, full output current is obtained up to 50 degrees C (CT mode); over 50 degrees C, full output may be obtained at 8 kHz.

If silent operation is not absolutely necessary, lower pulse frequencies may be selected to reduce inverter losses and radio-frequency emissions.

Under certain circumstances, the inverter may reduce the switching frequency to provide protection against over-temperature (see P0290).

r1801 **CO: Act. pulse frequency** Level: **3**

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

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

Selects inverter modulator mode.

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** Level: **3**

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

Changes direction of motor rotation without changing setpoint polarity.

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** Level: **3**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	MOTOR	**Active:** first confirm	**QuickComm.** Yes	**Def:**	0
				Max:	20

Performs a motor data identification.

Performs stator resistance measuring.

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** Level: **3**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	1
P-Group:	INVERTER	**Active:** Immediately	**QuickComm.** No	**Def:**	3
				Max:	3

Selects maximum number of motor phases to be identified.

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

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

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

Index:

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

Note:

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

r1925 **Identified on-state voltage** Level: **3**

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

Displays identified on-state voltage of IGBT.

r1926 **Ident. gating unit dead time** Level: **3**

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

Displays identified dead time of gating unit interlock.

P2000[3] **Reference frequency**

CStat:	CT	**Datatype:** Float	**Unit:** Hz	**Min:**	1.00
P-Group:	COMM	**Active:** first confirm	**QuickComm.** No	**Def:**	50.00
				Max:	650.00

Level: **2**

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

Index:

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

Notice:

Reference variables are intended as an aid to presenting setpoint and actual value signals in a uniform manner. This also applies to fixed settings entered as a precentage. A value of 100 % correspondes to a process data value of 4000H, or 4000 0000H in the case of double values.

In this respect, the following parameters are available:

P2000	Reference frequency	Hz
P2001	Reference voltage	V
P2002	Reference current	A
P2003	Reference torque	Nm
P2004	Reference power	kW hp — f(P0100)

P2001[3] **Reference voltage**

CStat:	CT	**Datatype:** U16	**Unit:** V	**Min:**	10
P-Group:	COMM	**Active:** first confirm	**QuickComm.** No	**Def:**	1000
				Max:	2000

Level: **3**

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

Example:

P2001 = 230 specifies that 4000H received via USS denotes 230 V.

Index:

P2001[0] : 1st. Drive data set (DDS)
P2001[1] : 2nd. Drive data set (DDS)
P2001[2] : 3rd. Drive data set (DDS)

P2002[3] **Reference current**

CStat:	CT	**Datatype:** Float	**Unit:** A	**Min:**	0.10
P-Group:	COMM	**Active:** first confirm	**QuickComm.** No	**Def:**	0.10
				Max:	10000.00

Level: **3**

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

Index:

P2002[0] : 1st. Drive data set (DDS)
P2002[1] : 2nd. Drive data set (DDS)
P2002[2] : 3rd. Drive data set (DDS)

P2003[3] **Reference torque**

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

Level: **3**

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

Index:

P2003[0] : 1st. Drive data set (DDS)
P2003[1] : 2nd. Drive data set (DDS)
P2003[2] : 3rd. Drive data set (DDS)

r2004[3] **Reference power**

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

Level: **3**

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

Index:

r2004[0] : 1st. Drive data set (DDS)
r2004[1] : 2nd. Drive data set (DDS)
r2004[2] : 3rd. Drive data set (DDS)

P2009[2] USS normalization Level: 3

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

Enables special normalization for USS.

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 Level: 3

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

Sets baud rate for USS communication.

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 Level: 3

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

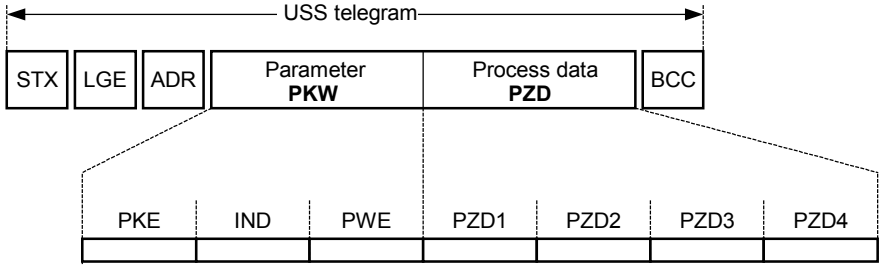
Defines the number of 16-bit words in PZD part of USS telegram. In this area, process data (PZD) are continually exchanged between the master and slaves. The PZD part of the USS telegram is used for the main setpoint, and to control the inverter.

Index:

P2012[0] : Serial interface COM link
P2012[1] : Serial interface BOP link

Notice:

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

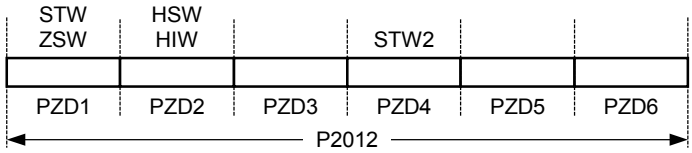


STX	Start of text	PKE	Parameter ID
LGE	Length	IND	Sub-index
ADR	Address	PWE	Parameter value
PKW	Parameter ID value		
PZD	Process data		
BCC	Block check character		

PZD transmits a control word and setpoint or status word and actual values. The number of PZD-words in a USS-telegram are determined by parameter P2012, where the first two words (P2012 >= 2) are either:

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

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



STW	Control word	HSW	Main setpoint
ZSW	Status word	HIW	Main actual value
PZD	Process data		

P2013[2]	USS PKW length				Min:	0	Level:
	CStat:	CUT	Datatype: U16	Unit: -	Def:	127	3
	P-Group:	COMM	Active: first confirm	QuickComm. No	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.

Example:

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

Settings:

0 No words
3 3 words
4 4 words
127 Variable

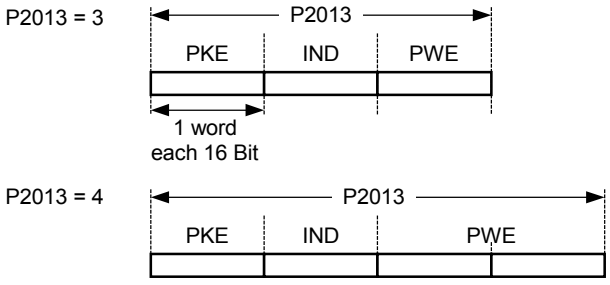
Index:

P2013[0] : Serial interface COM link
P2013[1] : Serial interface BOP link

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.



PKE Parameter ID
IND Sub-index
PWE Parameter value

P2013 = 3, fixes PKW length, but does not allow access to many parameter values. A parameter fault is generated when an out-of-range value is used, the value will not be accepted but the inverter state will not be affected. Useful for applications where parameters are not changed, but MM3s are also used. Broadcast mode is not possible with this setting.

P2013 = 4, fixes PKW length. Allows access to all parameters, but indexed parameters can only be read one index at a time. Word order for single word values are different to setting 3 or 127, see example below.

P2013 = 127, most useful setting. PKW reply length varies depending on the amount of information needed. Can read fault information and all indices of a parameter with a single telegram with this setting.

Example:
Set P0700 to value 5 (0700 = 2BC (hex))

	P2013 = 3	P2013 = 4	P2013 = 127
Master → MM4	22BC 0000 0005	22BC 0000 0000 0005	22BC 0000 0005 0000
MM4 → Master	12BC 0000 0005	12BC 0000 0000 0005	12BC 0000 0005

P2014[2] **USS telegram off time** Level: **3**

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

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

Index:

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

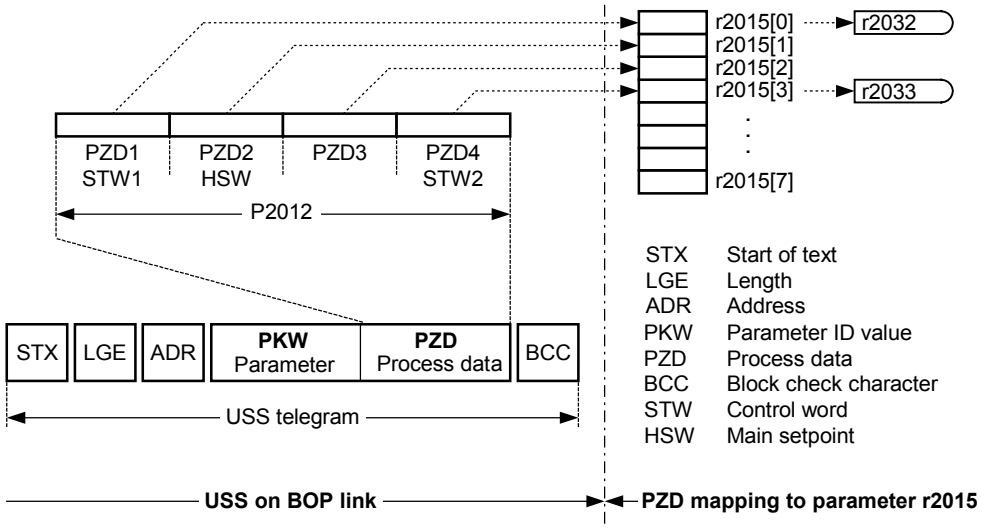
Notice:

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

r2015[8] **CO: PZD from BOP link (USS)** Level: **3**

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

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



Index:

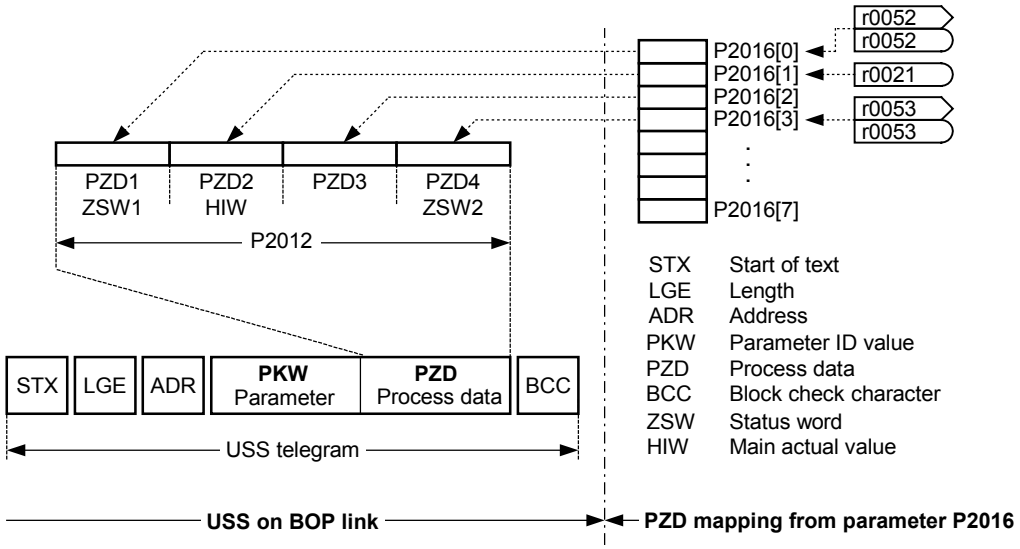
r2015[0] : Received word 0
r2015[1] : Received word 1
r2015[2] : Received word 2
r2015[3] : Received word 3
r2015[4] : Received word 4
r2015[5] : Received word 5
r2015[6] : Received word 6
r2015[7] : Received word 7

Note:

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

P2016[8]	CI: PZD to BOP link (USS)				Min:	0:0	Level:
	CStat:	CT	Datatype: U32	Unit: -	Def:	52:0	3
	P-Group:	COMM	Active: Immediately	QuickComm. No	Max:	4000:0	

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



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.

Index:

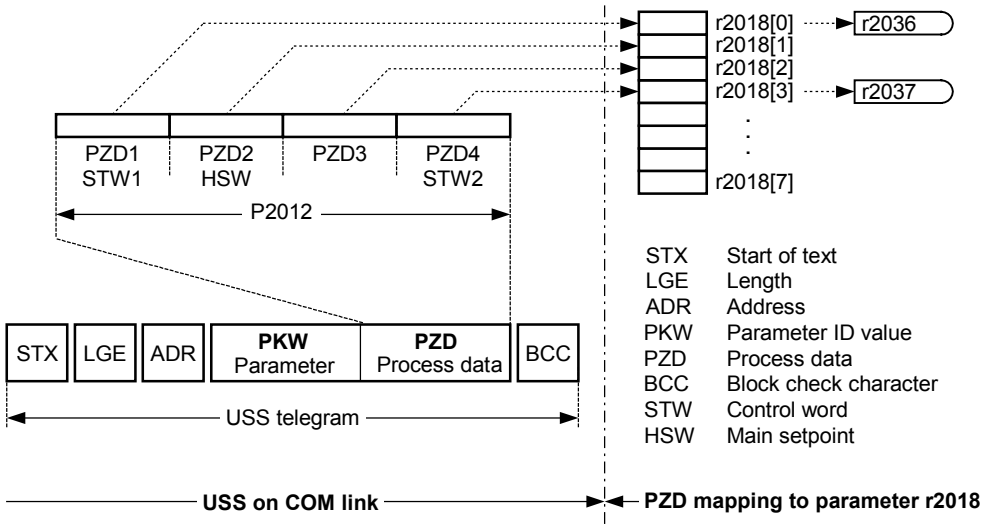
P2016[0] : Transmitted word 0
P2016[1] : Transmitted word 1
P2016[2] : Transmitted word 2
P2016[3] : Transmitted word 3
P2016[4] : Transmitted word 4
P2016[5] : Transmitted word 5
P2016[6] : Transmitted word 6
P2016[7] : Transmitted word 7

Note:

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

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

Displays process data received via USS on COM link.



Index:

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

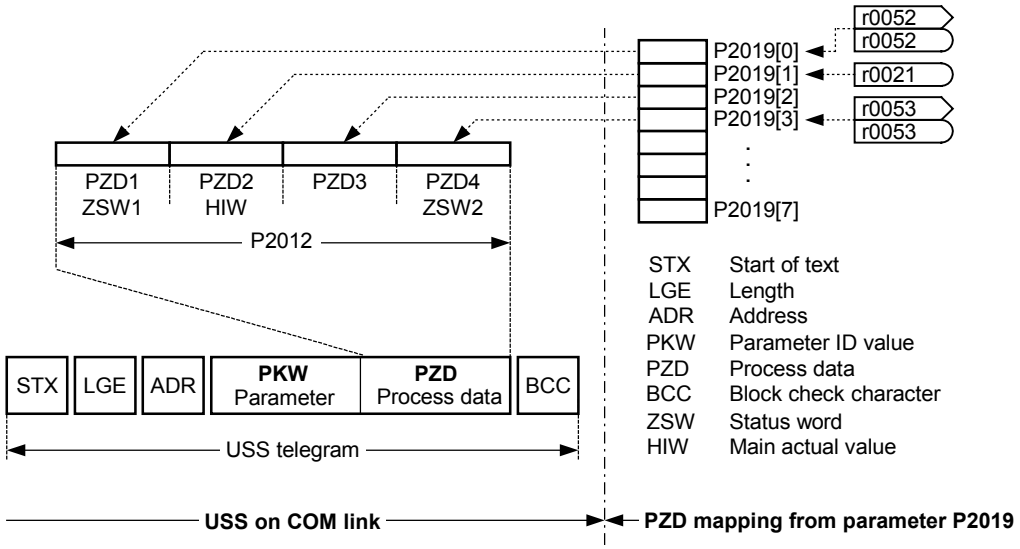
Note:

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

P2019[8] **CI: PZD to COM link (USS)** Level: **3**

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

Displays process data received via USS on COM link.



Index:
P2019[0] : Transmitted word 0
P2019[1] : Transmitted word 1
P2019[2] : Transmitted word 2
P2019[3] : Transmitted word 3
P2019[4] : Transmitted word 4
P2019[5] : Transmitted word 5
P2019[6] : Transmitted word 6
P2019[7] : Transmitted word 7

Details:
See r2016 (PZD to BOP link)

r2024[2] **USS error-free telegrams** Level: **3**

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

Displays number of error-free USS telegrams received.

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

r2025[2] **USS rejected telegrams** Level: **3**

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

Displays number of USS telegrams rejected.

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

r2026[2] **USS character frame error** Level: **3**

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

Displays number of USS character frame errors.

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

r2027[2] **USS overrun error** Level: **3**

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

Displays number of USS telegrams with overrun error.

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

r2028[2] **USS parity error** Level: **3**

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

P-Group: COMM

Displays number of USS telegrams with parity error.

Index:
r2028[0] : Serial interface COM link
r2028[1] : Serial interface BOP link

r2029[2] **USS start not identified** Level: **3**

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

P-Group: COMM

Displays number of USS telegrams with unidentified start.

Index:
r2029[0] : Serial interface COM link
r2029[1] : Serial interface BOP link

r2030[2] **USS BCC error** Level: **3**

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

P-Group: COMM

Displays number of USS telegrams with BCC error.

Index:
r2030[0] : Serial interface COM link
r2030[1] : Serial interface BOP link

r2031[2] **USS length error** Level: **3**

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

P-Group: COMM

Displays number of USS telegrams with incorrect length.

Index:
r2031[0] : Serial interface COM link
r2031[1] : Serial interface BOP link

r2032 **BO: CtrlWrd1 from BOP link (USS)** Level: **3**

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

P-Group: COMM

Displays control word 1 from BOP link (word 1 within USS).

Bitfields:

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

r2033 **BO: CtrlWrd2 from BOP link (USS)** Level: **3**

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

P-Group: COMM

Displays control word 2 from BOP link (i.e. word 4 within USS).

Bitfields:

Bit00	Fixed frequency Bit 0	0	NO
		1	YES
Bit01	Fixed frequency Bit 1	0	NO
		1	YES
Bit02	Fixed frequency Bit 2	0	NO
		1	YES
Bit03	Fixed frequency Bit 3	0	NO
		1	YES
Bit04	Drive data set (DDS) Bit 0	0	NO
		1	YES
Bit05	Drive data set (DDS) Bit 1	0	NO
		1	YES
Bit08	PID enabled	0	NO
		1	YES
Bit09	DC brake enabled	0	NO
		1	YES
Bit11	Droop	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 = 5 (USS on COM link) and P0719 = 0 (Cmd / Setpoint = BICO parameter).

r2036 **BO: CtrlWrd1 from COM link (USS)** Level: **3**

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

P-Group: COMM

Displays control word 1 from COM link (i.e. word 1 within USS).

Bitfields:

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

Details:

See r2033 (control word 2 from BOP link).

r2037 **BO: CtrlWrd2 from COM link (USS)** Level: **3**

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

P-Group: COMM

Displays control word 2 from COM link (i.e. word 4 within USS).

Bitfields:

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

Details:

See r2033 (control word 2 from BOP link).

P2040 **CB telegram off time** Level: **3**

CStat: CT **Datatype:** U16 **Unit:** ms **Min:** 0 **Def:** 20 **Max:** 65535

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

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

Dependency:

Setting 0 = watchdog disabled

P2041[5] **CB parameter** Level: **3**

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

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

Configures a communication board (CB).

Index:

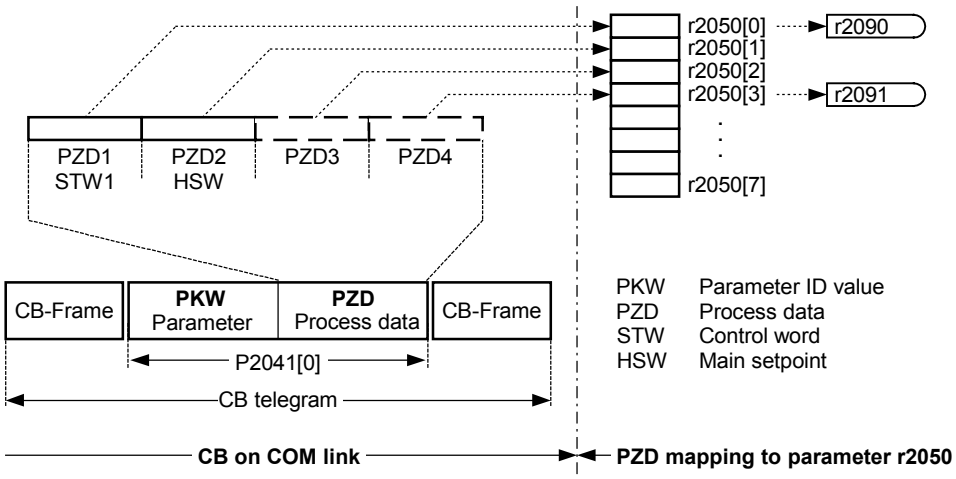
P2041[0] : CB parameter 0
P2041[1] : CB parameter 1
P2041[2] : CB parameter 2
P2041[3] : CB parameter 3
P2041[4] : CB parameter 4

Details:

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

r2050[8]	CO: PZD from CB	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:

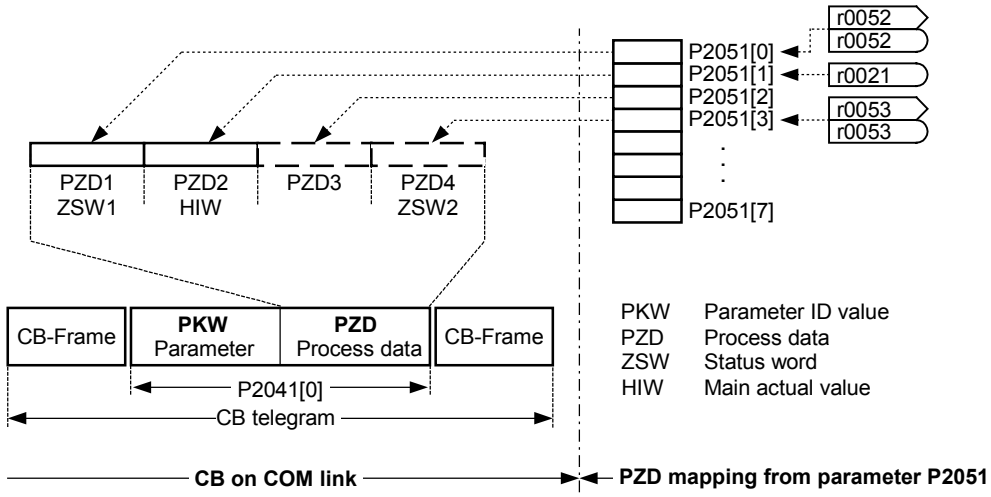
The control words can be viewed as bit parameters r2090 and r2091.

P2051[8] **CI: PZD to CB** Level: **3**

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



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

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

r2053[5] **CB identification** Level: **3**

Datatype: U16 **Unit:** - **Min:** -
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.

Settings:

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

Index:

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

r2054[7] **CB diagnosis** Level: **3**

Datatype: U16 **Unit:** - **Min:** -
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** Level: **3**

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

P-Group: COMM

Displays control word 1 received from communication board (CB).

Bitfields:

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

Details:

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

r2091 **BO: Control word 2 from CB** Level: **3**

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

P-Group: COMM

Displays control word 2 received from communication board (CB).

Bitfields:

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

Details:

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

P2100[3] Alarm number selection Level: **3**

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

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

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).

Index:

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

Note:

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

P2101[3] Stop reaction value Level: **3**

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

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 Level: **3**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.** No	**Def:**	722:2
				Max:	4000:0

Defines source of fault acknowledgement, e.g. keypad/DIN, etc. (depending on setting).

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)

Index:

P2103[0] : 1st. Command data set (CDS)
P2103[1] : 2nd. Command data set (CDS)
P2103[2] : 3rd. Command data set (CDS)

P2104[3] BI: 2. Faults acknowledgement Level: 3

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

Selects second source of fault acknowledgement.

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)

Index:

P2104[0] : 1st. Command data set (CDS)
P2104[1] : 2nd. Command data set (CDS)
P2104[2] : 3rd. Command data set (CDS)

P2106[3] BI: External fault Level: 3

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

Selects source of external faults.

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)

Index:

P2106[0] : 1st. Command data set (CDS)
P2106[1] : 2nd. Command data set (CDS)
P2106[2] : 3rd. Command data set (CDS)

r2110[4] Warning number Level: 3

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

Displays warning information.

A maximum of 2 active warnings (indices 0 and 1) and 2 historical warnings (indices 2 and 3) may be viewed.

Index:

r2110[0] : Recent Warnings --, warning 1
r2110[1] : Recent Warnings --, warning 2
r2110[2] : Recent Warnings -1, warning 3
r2110[3] : Recent Warnings -1, warning 4

Note:

The keypad will flash while a warning is active. The LEDs indicate the warning status in this case.

If an AOP is in use, the display will show number and text of the active warning.

Notice:

Indices 0 and 1 are not stored.

P2111 Total number of warnings Level: 3

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

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

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

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

P-Group: ALARMS

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 occured.

Example:

If r2114[0] = 1 & r2114[1] = 20864
We get 1 * 65536 + 20864 = 86400 seconds which equals 1 day.

Index:

r2114[0] : System Time, Seconds, Upper Word
r2114[1] : System Time, Seconds, Lower Word

Details:

See r0948 (fault time)

P2115[3] **AOP real time clock** Level: **3**

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

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

Displays AOP real time.

Index:

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

Details:

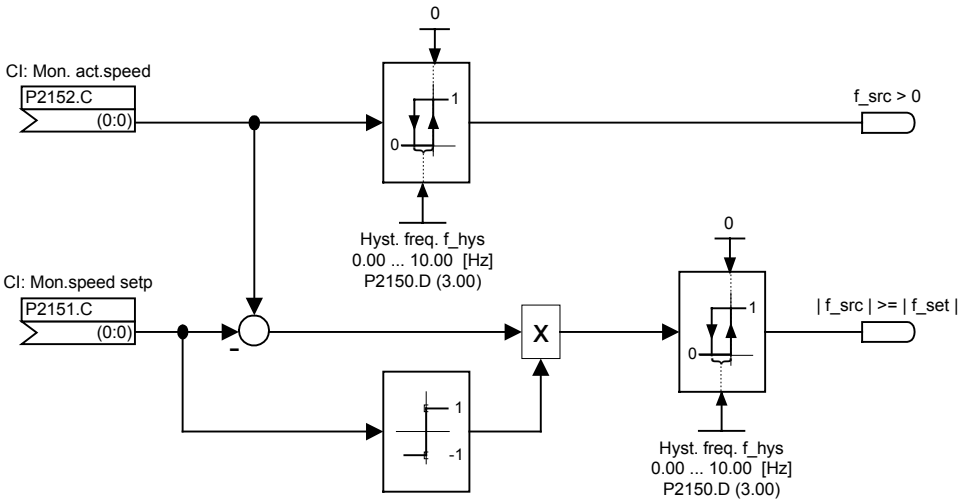
See r0948 (fault time).

P2150[3] **Hysteresis frequency f_hys** Level: **3**

CStat: CUT **Datatype:** Float **Unit:** Hz **Min:** 0.00 **Def:** 3.00 **Max:** 10.00

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

Defines hysteresis level applied for comparing frequency and speed to threshold as illustrated in the diagram below.



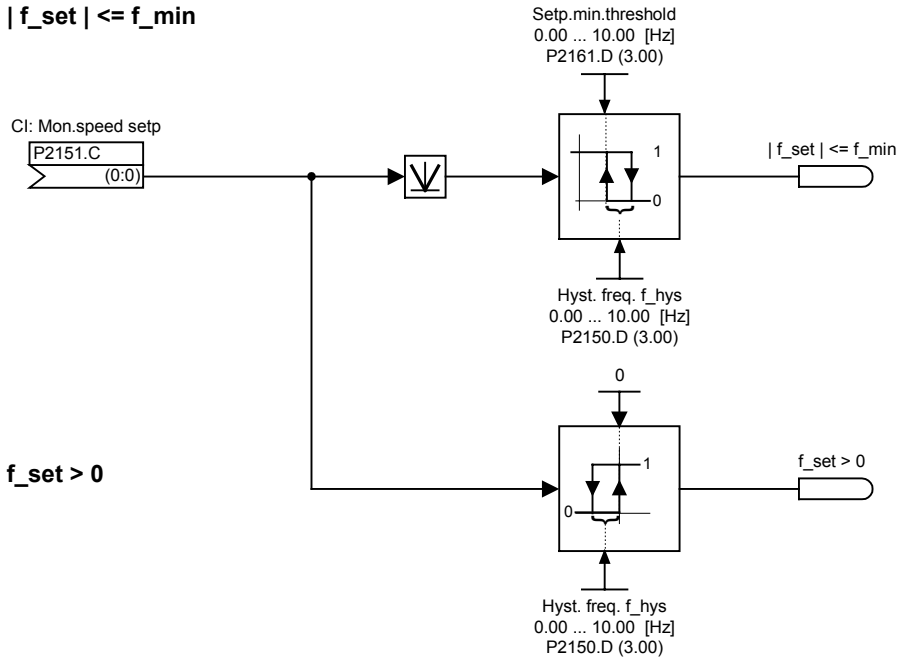
Index:

P2150[0] : 1st. Drive data set (DDS)
P2150[1] : 2nd. Drive data set (DDS)
P2150[2] : 3rd. Drive data set (DDS)

P2151[3] **CI: Monitoring speed setpoint** Level: **3**

CStat:	CUT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.** No	**Def:**	0:0
				Max:	4000:0

Selects (speed) setpoint signal to be compared to threshold as illustrated in the diagram below.



Index:

P2151[0] : 1st. Command data set (CDS)
P2151[1] : 2nd. Command data set (CDS)
P2151[2] : 3rd. Command data set (CDS)

Details:

See also diagram in P2150 (hysteresis frequency f_hys)

P2152[3] **CI: Act. monitoring speed** Level: **3**

CStat:	CUT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.** No	**Def:**	0:0
				Max:	4000:0

Selects (speed) signal to be compared to threshold.

Index:

P2152[0] : 1st. Command data set (CDS)
P2152[1] : 2nd. Command data set (CDS)
P2152[2] : 3rd. Command data set (CDS)

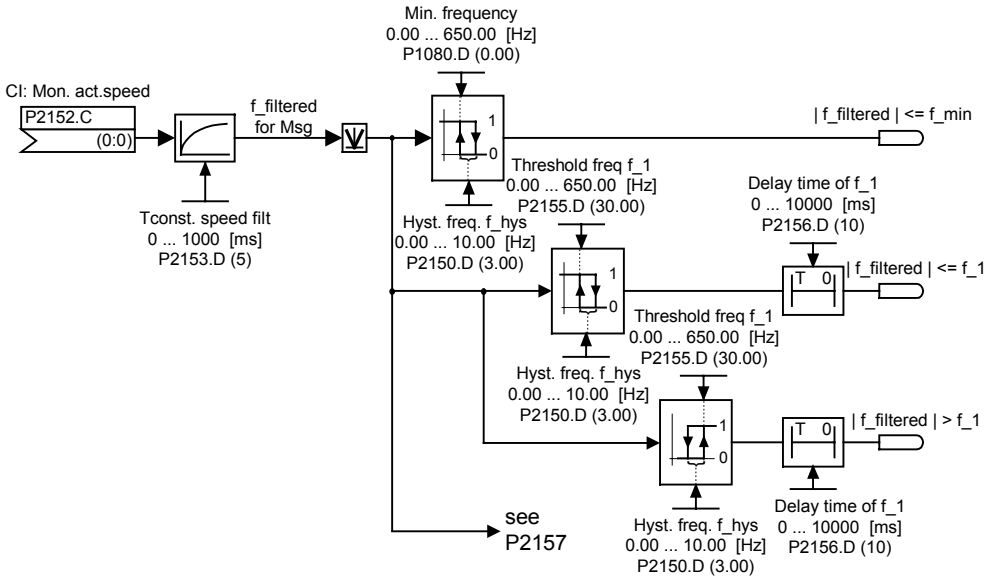
Details:

See diagrams in P2150 (hysteresis frequency f_hys) and P2151 (speed setpoint for monitoring).

P2153[3] **Time-constant speed filter** Level: **3**

CStat:	CUT	**Datatype:** U16	**Unit:** ms	**Min:**	0
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.** No	**Def:**	5
				Max:	1000

Specifies time constant of first-order speed filter. The filtered speed is then compared to the thresholds as illustrated in the diagram below.



Index:

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

Details:

See also diagram in P2157 (threshold frequency f_2)

P2155[3] **Threshold frequency f_1** Level: **3**

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

Sets a threshold for comparing actual speed or frequency to threshold values f_1.
This threshold controls status bits 4 and 5 in status word 2 (r0053).

Index:

P2155[0] : 1st. Drive data set (DDS)
P2155[1] : 2nd. Drive data set (DDS)
P2155[2] : 3rd. Drive data set (DDS)

Details:

See diagram in P2153 (time-constant speed filter)

P2156[3] **Delay time of threshold freq f_1** Level: **3**

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

Sets delay time prior to threshold frequency f_1 comparison (P2155).

Index:

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

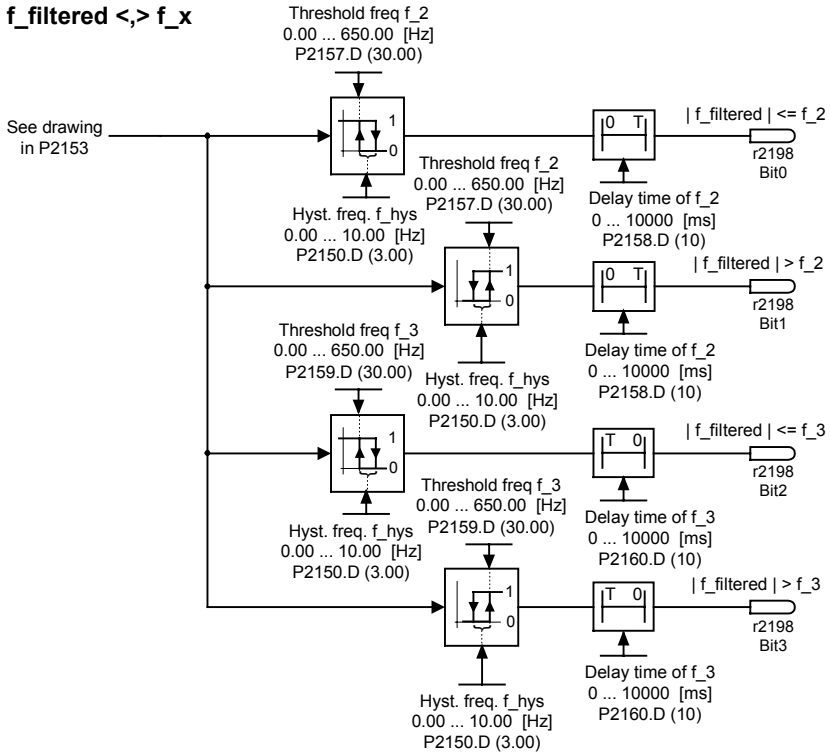
Details:

See diagram in P2153 (time-constant speed filter)

P2157[3] **Threshold frequency f_2**

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

Details:

See also diagram in P2153 (time-constant speed filter)

P2158[3] **Delay time of threshold freq f_2**

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

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

Threshold_3 for comparing speed or frequency to thresholds.

Index:

P2159[0] : 1st. Drive data set (DDS)
P2159[1] : 2nd. Drive data set (DDS)
P2159[2] : 3rd. Drive data set (DDS)

Details:

See diagram in P2157 (threshold frequency f_2)

P2160[3] **Delay time of threshold freq f_3** Level: **3**

CStat:	CUT	**Datatype:** U16	**Unit:** ms	**Min:**	0
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.** No	**Def:**	10
				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 P2157 (threshold frequency f_2)

P2161[3] **Min. threshold for freq. setp.** Level: **3**

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

Minimum threshold value for comparing speed or frequency setpoint.

Index:

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

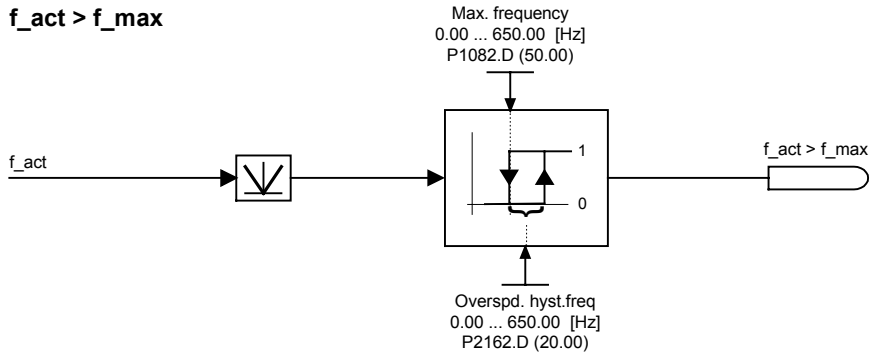
Details:

See diagram in P2151 (speed setpoint for monitoring)

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

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

Hysteresis speed (or frequency) for overspeed-detection as illustrated in the diagram below.



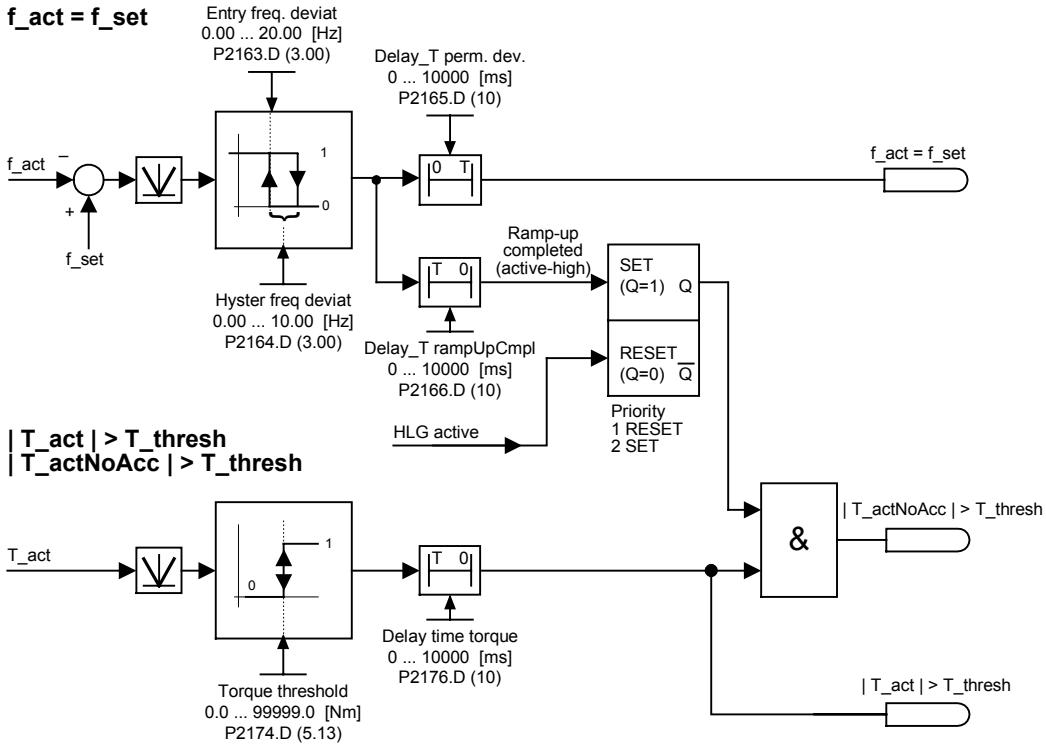
Index:

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 Level: **3**

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

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



Index:

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

P2164[3] Hysteresis frequency deviation Level: **3**

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

Hysteresis frequency for detecting permitted deviation (from setpoint) 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)

Details:

See diagram in P2163 (entry frequency for permissible deviation).

P2165[3] Delay time permitted deviation Level: **3**

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

Delay time for detecting permitted deviation of 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 P2163 (entry frequency for permissible deviation).

P2166[3] Delay time ramp up completed Level: **3**

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

Delay time for signal that indicates completion of ramp-up.

Index:

P2166[0] : 1st. Drive data set (DDS)
P2166[1] : 2nd. Drive data set (DDS)
P2166[2] : 3rd. Drive data set (DDS)

Details:

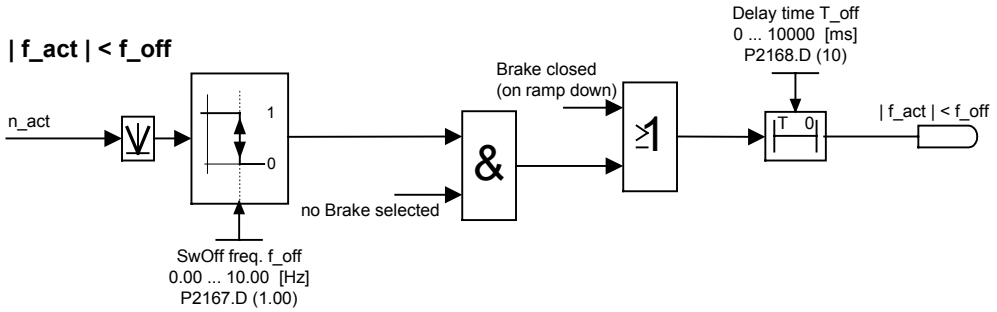
See diagram in P2163 (entry frequency for permissible deviation).

P2167[3] **Switch-off frequency f_off** Level: **3**

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	0.00
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.** No	**Def:**	1.00
				Max:	10.00

Sets frequency threshold below which inverter switches off.

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



Index:

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

Dependency:

Switched off only if OFF1 or OFF3 active.

P2168[3] **Delay time T_off** Level: **3**

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

Defines time for which the inverter may operate below switch-off frequency (P2167) before switch off occurs.

Index:

P2168[0] : 1st. Drive data set (DDS)
P2168[1] : 2nd. Drive data set (DDS)
P2168[2] : 3rd. Drive data set (DDS)

Dependency:

Active if holding brake (P1215) not parameterized.

Details:

See diagram in P2167 (switch-off frequency)

r2169 **CO: Act. filtered frequency** Level: **3**

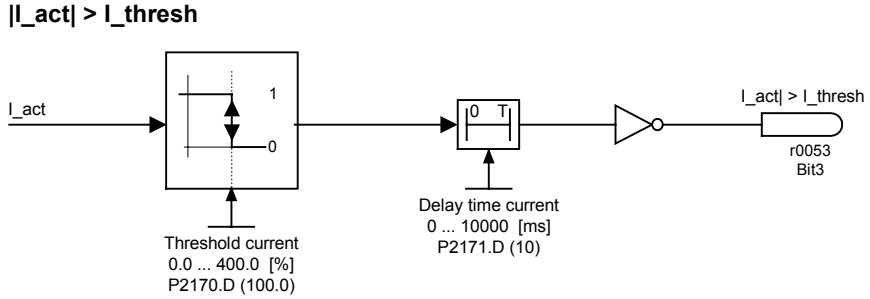
		Datatype: Float	**Unit:** Hz	**Min:**	-
				Def:	-
P-Group:	ALARMS			**Max:**	-

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

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

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	0.0
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.** No	**Def:**	100.0
				Max:	400.0

Defines threshold current in [%] relative to P0305 (rated motor current) to be used in comparisons of I_act and I_Thresh as illustrated in the diagram below.



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

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

Level: **3**

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:

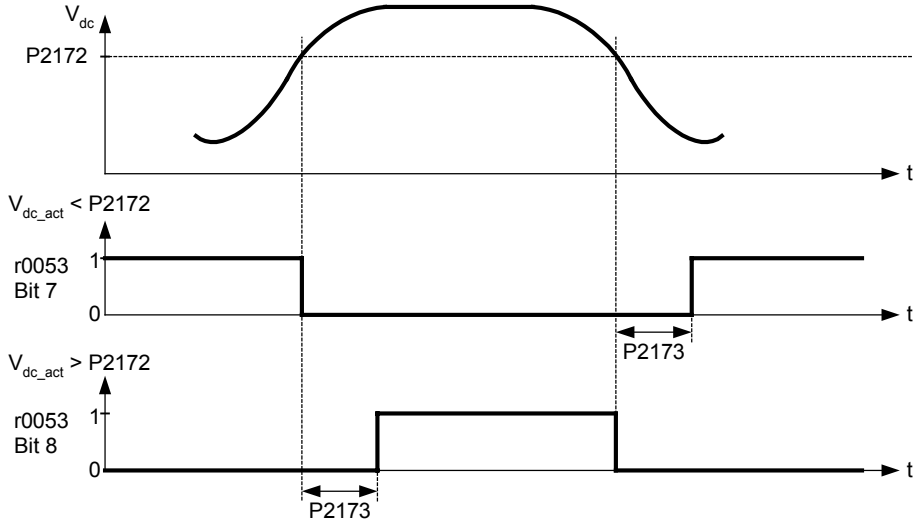
See diagram in P2170 (threshold current I_thresh)

P2172[3] Threshold DC-link voltage

CStat:	CUT	**Datatype:** U16	**Unit:** V	**Min:**	0
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.** No	**Def:**	800
				Max:	2000

Level: **3**

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

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

Level: **3**

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 T_thresh

CStat:	CUT	**Datatype:** Float	**Unit:** Nm	**Min:**	0.00
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.** No	**Def:**	5.13
				Max:	99999.00

Level: **3**

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

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

Level: **3**

Delay time for comparing actual torque to threshold.

Index:

P2176[0] : 1st. Drive data set (DDS)
P2176[1] : 2nd. Drive data set (DDS)
P2176[2] : 3rd. Drive data set (DDS)

P2177[3]	Delay time for motor is blocked			Min:	0	Level:
	CStat: CUT	Datatype: U16	Unit: ms	Def:	10	3
	P-Group: ALARMS	Active: Immediately	QuickComm. No	Max:	10000	

Delay time for identification that motor is blocked.

Index:

P2177[0] : 1st. Drive data set (DDS)
P2177[1] : 2nd. Drive data set (DDS)
P2177[2] : 3rd. Drive data set (DDS)

P2178[3]	Delay time for motor pulled out			Min:	0	Level:
	CStat: CUT	Datatype: U16	Unit: ms	Def:	10	3
	P-Group: ALARMS	Active: Immediately	QuickComm. No	Max:	10000	

Delay time for identification that motor is pulled out.

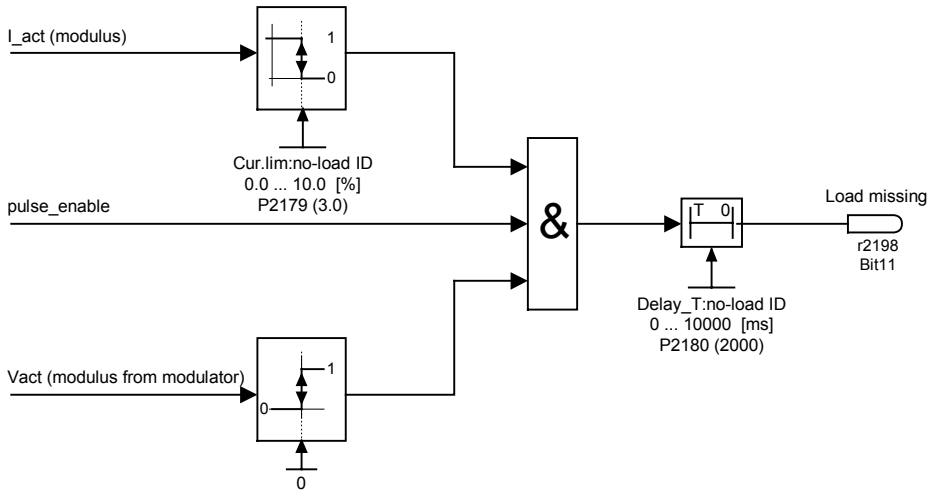
Index:

P2178[0] : 1st. Drive data set (DDS)
P2178[1] : 2nd. Drive data set (DDS)
P2178[2] : 3rd. Drive data set (DDS)

P2179	Current limit for no load ident.			Min:	0.0	Level:
	CStat: CUT	Datatype: Float	Unit: %	Def:	3.0	3
	P-Group: ALARMS	Active: Immediately	QuickComm. No	Max:	10.0	

Threshold current for A0922 (load missing) in [%] relative to P0305 (rated motor current) as illustrated in the diagram below.

Load missing



Note:

It may be that the motor is not connected (load missing) or a phase could be missing.

Notice:

If a motor setpoint cannot be entered and the current limit (P2179) is not exceeded, Alarm A0922 (no load applied) is issued when delay time (P2180) expires.

P2180	Delay time for load missing			Min:	0	Level:
	CStat: CUT	Datatype: U16	Unit: ms	Def:	2000	3
	P-Group: ALARMS	Active: Immediately	QuickComm. No	Max:	10000	

Delay time load missing

Note:

It may be that the motor is not connected (load missing) or a phase could be missing.

Notice:

If a motor setpoint cannot be entered and the current limit (P2179) is not exceeded, alarm A0922 (no load applied) is issued when delay time (P2180) expires.

Details:

See diagram in P2179 (current limit for no load identification).

P2181[3]	**Belt failure detection mode**			**Min:**	0	Level:
	CStat: CT	**Datatype:** U16	**Unit:** -	**Def:**	0	**3**
	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 fist 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.

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)

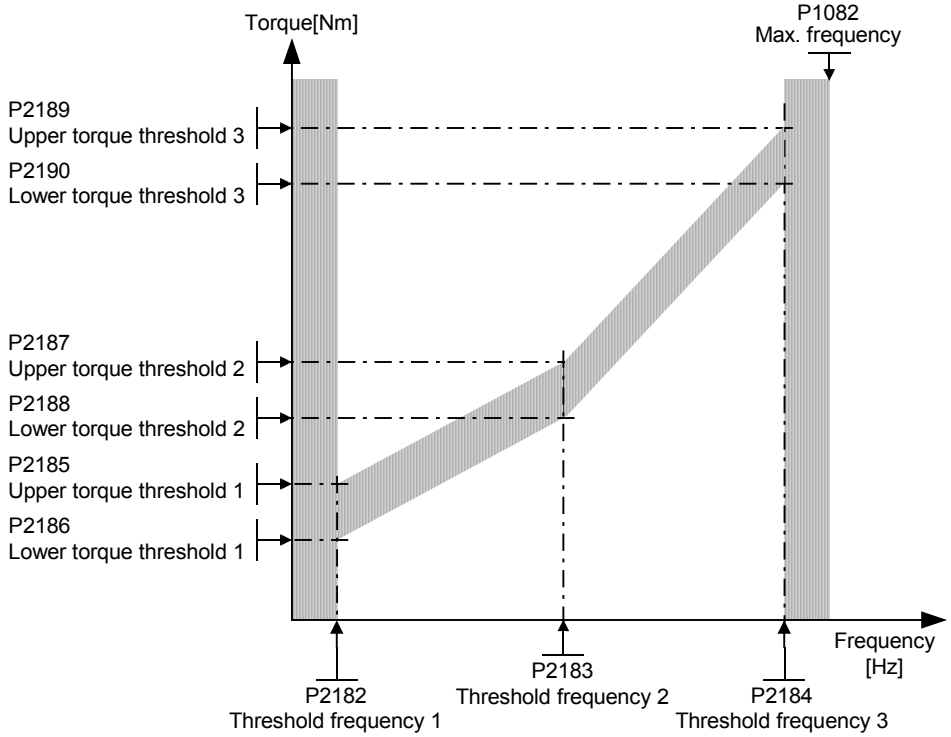
P2182[3] **Belt threshold frequency 1**

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

Level: **3**

Sets a frequency threshold 1 for comparing actual torque to torque the envelope for belt failure detection.

The frequency torque envelope is defined by 9 parameters - 3 are frequency parameters (P2182 - P2184), and the other 6 define the low and high torque limits (P2185 - P2190) for each frequency (see diagram below).



The allowed frequency/torque region is defined by the shaded area. When the torque falls outside the area shown, a trip or warning occurs (see parameter P2181).

Index:

P2182[0] : 1st. Drive data set (DDS)
P2182[1] : 2nd. Drive data set (DDS)
P2182[2] : 3rd. Drive data set (DDS)

Note:

The torque is unlimited below P2182, and above P2184. Normally P2182 <= lower torque limit (P1521), and P2184 > = upper torque limit (P1520).

P2183[3] **Belt threshold frequency 2**

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

Level: **3**

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

Index:

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

Details:

See P2182 (belt threshold frequency 1).

P2184[3] **Belt threshold frequency 3**

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

Level: **3**

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

Index:

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

Details:

See P2182 (belt threshold frequency 1).

P2185[3] **Upper torque threshold 1** Level: **3**

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

Upper limit threshold value 1 for comparing actual torque.

Index:

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

Details:

See P2182 (belt threshold frequency 1).

P2186[3] **Lower torque threshold 1** Level: **3**

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

Lower limit threshold value 1 for comparing actual torque.

Index:

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

Details:

See P2182 (belt threshold frequency 1).

P2187[3] **Upper torque threshold 2** Level: **3**

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

Upper limit threshold value 2 for comparing actual torque.

Index:

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

Details:

See P2182 (belt threshold frequency 1).

P2188[3] **Lower torque threshold 2** Level: **3**

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

Lower limit threshold value 2 for comparing actual torque.

Index:

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

Details:

See P2182 (belt threshold frequency 1).

P2189[3] **Upper torque threshold 3** Level: **3**

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

Upper limit threshold value 3 for comparing actual torque.

Index:

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

Details:

See P2182 (belt threshold frequency 1).

P2190[3] **Lower torque threshold 3** Level: **3**

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

Lower limit threshold value 3 for comparing actual torque.

Index:

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

Details:

See P2182 (belt threshold frequency 1).

P2192[3] **Time delay for belt failure** Level: **3**

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

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

Index:

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

r2197 **CO/BO: Monitoring word 1** Level: **3**

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

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

Bitfields:

Bit00	Act. freq. r0021 <= P1080 (f_min)	0	NO
		1	YES
Bit01	Act. freq. r0021 <= P2155 (f_1)	0	NO
		1	YES
Bit02	Act. freq. r0021 > P2155 (f_1)	0	NO
		1	YES
Bit03	Act. freq. r0021 > zero	0	NO
		1	YES
Bit04	Act. freq. r0021 >= setp.	0	NO
		1	YES
Bit05	Act. freq. r0021 <= P2167 (f_off)	0	NO
		1	YES
Bit06	Act. freq. r0021 >= P1082 (f_max)	0	NO
		1	YES
Bit07	Act. freq. r0021 == setp.	0	NO
		1	YES
Bit08	Act. current r0068 >= P2170	0	NO
		1	YES
Bit09	Act. unfilt. Vdc < P2172	0	NO
		1	YES
Bit10	Act. unfilt. Vdc > P2172	0	NO
		1	YES
Bit11	No load condition	0	NO
		1	YES

r2198 **CO/BO: Monitoring word 2** Level: **3**

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

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

Bitfields:

Bit00	| n,filtered r2169 | < P2157	0	NO
		1	YES
Bit01	| n,filtered r2169 | > P2157	0	NO
		1	YES
Bit02	| n,filtered r2169 | < P2159	0	NO
		1	YES
Bit03	| n,filtered r2169 | > P2159	0	NO
		1	YES
Bit04	| n,set | < P2161	0	NO
		1	YES
Bit05	n,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	|T,act| > P2174 & setpoint reached	0	NO
		1	YES
Bit10	| T,act | > P2174	0	NO
		1	YES
Bit11	Belt failure warning	0	NO
		1	YES
Bit12	Belt failure trip	0	NO
		1	YES

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

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

Index:

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

Dependency:

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

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

Note:

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

In level 3, the PID controller source enable can also come from the digital inputs in settings 722.0 to 722.2 for DIN1 to DIN3 or from any other BiCo source.

Notice:

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

P2201[3] Fixed PID setpoint 1

						Level:
CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-200.00	**3**
P-Group:	TECH	**Active:** Immediately	**QuickComm.** No	**Def:**	0.00	
				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:

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**

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

Dependency:
P2000 = 1 required in user access level 2 to enable setpoint source.

In mode 1 (above):
ON command required to start motor (enable pulses).

In mode 2 (above):
If inputs programmed to PID fixed setpoint and selected together, the selected setpoints are summed.

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

						Level:
CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-200.00	**3**
P-Group:	TECH	**Active:** Immediately	**QuickComm.** No	**Def:**	10.00	
				Max:	200.00	

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 Level: 3

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-200.00
P-Group:	TECH	**Active:** Immediately	**QuickComm.** No	**Def:**	20.00
				Max:	200.00

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 Level: 3

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-200.00
P-Group:	TECH	**Active:** Immediately	**QuickComm.** No	**Def:**	30.00
				Max:	200.00

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 Level: 3

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-200.00
P-Group:	TECH	**Active:** Immediately	**QuickComm.** No	**Def:**	40.00
				Max:	200.00

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 Level: 3

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-200.00
P-Group:	TECH	**Active:** Immediately	**QuickComm.** No	**Def:**	50.00
				Max:	200.00

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 Level: 3

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-200.00
P-Group:	TECH	**Active:** Immediately	**QuickComm.** No	**Def:**	60.00
				Max:	200.00

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 Level: 3

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-200.00
P-Group:	TECH	**Active:** Immediately	**QuickComm.** No	**Def:**	70.00
				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

						Level:
CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-200.00	**3**
P-Group:	TECH	**Active:** Immediately	**QuickComm.** No	**Def:**	80.00	
				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

						Level:
CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-200.00	**3**
P-Group:	TECH	**Active:** Immediately	**QuickComm.** No	**Def:**	90.00	
				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

						Level:
CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-200.00	**3**
P-Group:	TECH	**Active:** Immediately	**QuickComm.** No	**Def:**	100.00	
				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

						Level:
CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-200.00	**3**
P-Group:	TECH	**Active:** Immediately	**QuickComm.** No	**Def:**	110.00	
				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

						Level:
CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-200.00	**3**
P-Group:	TECH	**Active:** Immediately	**QuickComm.** No	**Def:**	120.00	
				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

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

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

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

Fixed frequencies for PID setpoint can be selected in three different modes. Parameter P1016 defines the mode of selection Bit 0.

Settings:

1 Direct selection
2 Direct selection + ON command
3 Binary coded selection + ON command

P2217 Fixed PID setpoint mode - Bit 1 — Level: 3

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

BCD or direct selection Bit 1 for PID setpoint.

Settings:

1 Direct selection
2 Direct selection + ON command
3 Binary coded selection + ON command

P2218 Fixed PID setpoint mode - Bit 2 — Level: 3

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

BCD or direct selection Bit 2 for PID setpoint.

Settings:

1 Direct selection
2 Direct selection + ON command
3 Binary coded selection + ON command

P2219 Fixed PID setpoint mode - Bit 3 — Level: 3

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

BCD or direct selection Bit 3 for PID setpoint.

Settings:

1 Direct selection
2 Direct selection + ON command
3 Binary coded selection + ON command

P2220[3] BI: Fixed PID setp. select Bit 0 — Level: 3

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

Defines command source of fixed PID setpoint selection Bit 0

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)

Index:

P2220[0] : 1st. Command data set (CDS)
P2220[1] : 2nd. Command data set (CDS)
P2220[2] : 3rd. Command data set (CDS)

P2221[3] **BI: Fixed PID setp. select Bit 1** Level: **3**

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

Defines command source of fixed PID setpoint selection Bit 1.

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)

Index:

P2221[0] : 1st. Command data set (CDS)
P2221[1] : 2nd. Command data set (CDS)
P2221[2] : 3rd. Command data set (CDS)

P2222[3] **BI: Fixed PID setp. select Bit 2** Level: **3**

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

Defines command source of fixed PID setpoint selection Bit 2

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)

Index:

P2222[0] : 1st. Command data set (CDS)
P2222[1] : 2nd. Command data set (CDS)
P2222[2] : 3rd. Command data set (CDS)

P2223[3] **BI: Fixed PID setp. select Bit 3** Level: **3**

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.** No	**Def:**	722:3
				Max:	4000:0

Defines command source of fixed PID setpoint selection Bit 3

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)

Index:

P2223[0] : 1st. Command data set (CDS)
P2223[1] : 2nd. Command data set (CDS)
P2223[2] : 3rd. Command data set (CDS)

r2224 **CO: Act. fixed PID setpoint** Level: **3**

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

Displays total output of PID fixed setpoint selection.

Note:

r2224 = 100 % corresponds to 4000 hex

P2225 **Fixed PID setpoint mode - Bit 4** Level: **3**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	1
P-Group:	TECH	**Active:** first confirm	**QuickComm.** No	**Def:**	1
				Max:	2

Direct selection or direct selection + ON Bit 4 for PID setpoint.

Settings:

1 Direct selection
2 Direct selection + ON command

P2226[3] BI: Fixed PID setp. select Bit 4

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.** No	**Def:**	722:4
				Max:	4000:0

Level: **3**

Defines command source of fixed PID setpoint selection Bit 4

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)

Index:

P2226[0] : 1st. Command data set (CDS)
P2226[1] : 2nd. Command data set (CDS)
P2226[2] : 3rd. Command data set (CDS)

P2227 Fixed PID setpoint mode - Bit 5

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	1
P-Group:	TECH	**Active:** first confirm	**QuickComm.** No	**Def:**	1
				Max:	2

Level: **3**

Direct selection / direct selection + ON Bit 5 for PID setpoint.

Settings:

1 Direct selection
2 Direct selection + ON command

P2228[3] BI: Fixed PID setp. select Bit 5

CStat:	CT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.** No	**Def:**	722:5
				Max:	4000:0

Level: **3**

Defines command source of fixed PID setpoint selection Bit 5

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)

Index:

P2228[0] : 1st. Command data set (CDS)
P2228[1] : 2nd. Command data set (CDS)
P2228[2] : 3rd. Command data set (CDS)

P2231[3] Setpoint memory of PID-MOP

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

Level: **3**

Setpoint memory

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

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

Level: **3**

Inhibits reverse setpoint selection when PID motor potentiometer is chosen either as a main setpoint of additional setpoint (using P1000)

Settings:

0 Reverse direction is allowed
1 Reverse direction inhibited

Note:

Setting 0 enables a change of motor direction using the motor potentiometer setpoint (increase/decrease frequency either by using digital inputs or motor potentiometer up/down buttons.

P2235[3] **BI: Enable PID-MOP (UP-cmd)** Level: **3**

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

Defines source of UP command.

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

Index:

P2235[0] : 1st. Command data set (CDS)
P2235[1] : 2nd. Command data set (CDS)
P2235[2] : 3rd. Command data set (CDS)

Dependency:

To change setpoint:
1. Use UP / DOWN key on BOP or
2. Set P0702/P0703 = 13/14 (function of digital inputs 2 and 3)

P2236[3] **BI: Enable PID-MOP (DOWN-cmd)** Level: **3**

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

Defines source of DOWN command.

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

Index:

P2236[0] : 1st. Command data set (CDS)
P2236[1] : 2nd. Command data set (CDS)
P2236[2] : 3rd. Command data set (CDS)

Dependency:

To change setpoint:
1. Use UP / DOWN key on BOP or
2. Set P0702/P0703 = 13/14 (function of digital inputs 2 and 3)

P2240[3] **Setpoint of PID-MOP** Level: **3**

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-200.00
P-Group:	TECH	**Active:** Immediately	**QuickComm.** No	**Def:**	10.00
				Max:	200.00

Setpoint of the motor potentiometer.

Allows user to set a digital PID setpoint in [%].

Index:

P2240[0] : 1st. Drive data set (DDS)
P2240[1] : 2nd. Drive data set (DDS)
P2240[2] : 3rd. Drive data set (DDS)

Note:

P2240 = 100 % corresponds to 4000 hex

r2250 **CO: Output setpoint of PID-MOP** Level: **3**

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

Displays output setpoint of motor potentiometer in [%].

Note:

r2250 = 100 % corresponds to 4000 hex

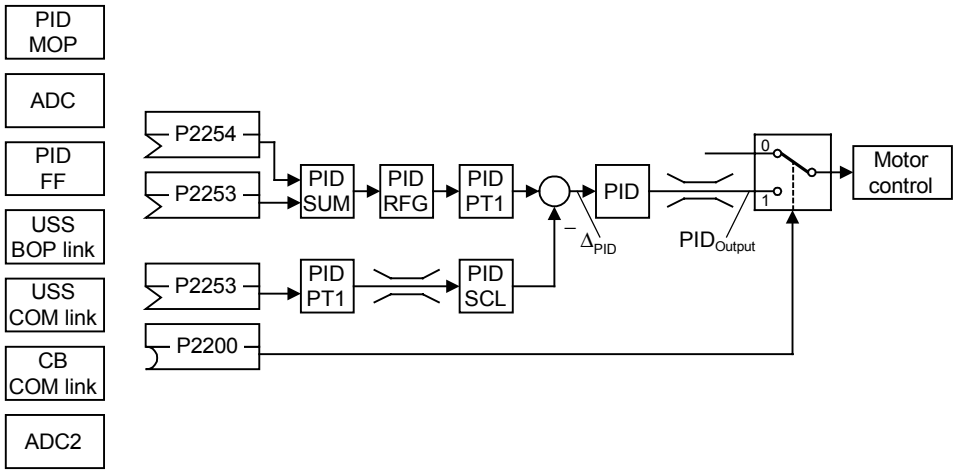
P2253[3] **CI: PID setpoint**

CStat:	CUT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	TECH	**Active:** first confirm	**QuickComm.** No	**Def:**	2250:0
				Max:	4000:0

Level: **2**

Defines setpoint source for PID setpoint input.

This parameter allows the user to select the source of the PID setpoint. Normally, a digital setpoint is selected either using a fixed PID setpoint or an active setpoint.



Settings:

755 = Analog input 1
2224 = Fixed PI setpoint (see P2201 to P2207)
2250 = Active PI setpoint (see P2240)

Index:

P2253[0] : 1st. Command data set (CDS)
P2253[1] : 2nd. Command data set (CDS)
P2253[2] : 3rd. Command data set (CDS)

P2254[3] **CI: PID trim source**

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

Level: **3**

Selects trim source for PID setpoint. This signal is multiplied by the trim gain and added to the PID setpoint.

Settings:

755 = Analog input 1
2224 = Fixed PI setpoint (see P2201 to P2207)
2250 = Active PI setpoint (see P2240)

Index:

P2254[0] : 1st. Command data set (CDS)
P2254[1] : 2nd. Command data set (CDS)
P2254[2] : 3rd. Command data set (CDS)

P2255 **PID setpoint gain factor**

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

Level: **3**

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

P2256 **PID trim gain factor**

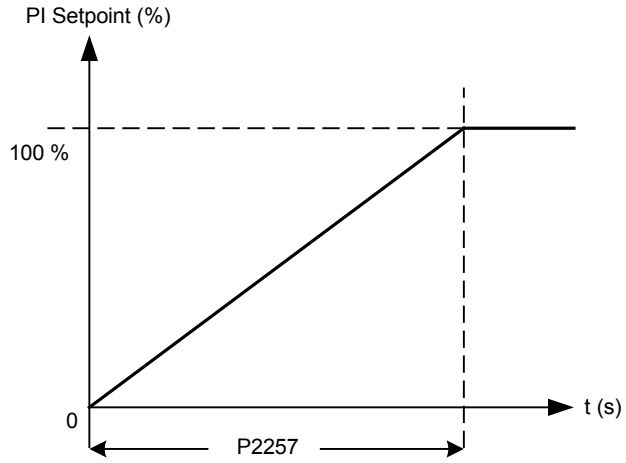
CStat:	CUT	**Datatype:** Float	**Unit:** -	**Min:**	0.00
P-Group:	TECH	**Active:** Immediately	**QuickComm.** No	**Def:**	100.00
				Max:	100.00

Level: **3**

Gain factor for PID trim. This gain factor scales the trim signal, which is added to the main PID setpoint.

P2257	Ramp-up time for PID setpoint				Min:	0.00	Level:
	CStat: CUT	Datatype: Float	Unit: s		Def:	1.00	2
	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).

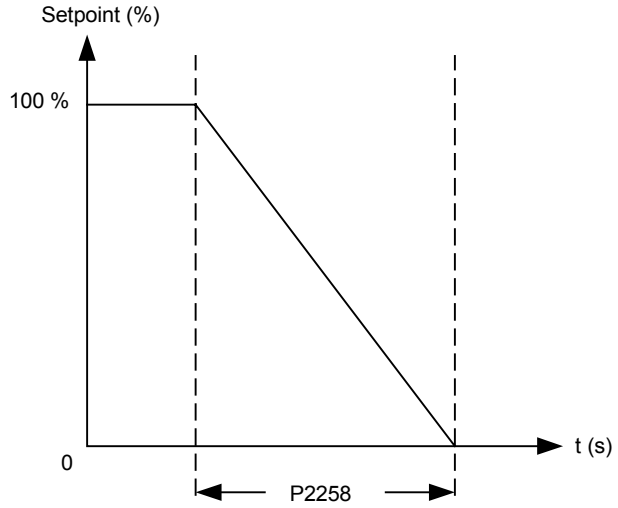
PID ramp time effective only on PID setpoint and only active when PID setpoint is changed or when RUN command is given (when PID uses this ramp to reach its value from 0 %).

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:
	CStat: CUT	Datatype: Float	Unit: s		Def:	1.00	2
	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 OFF2 respectively.

Notice:

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

r2260 **CO: PID setpoint after PID-RFG** Level: 2

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

P-Group: TECH

Displays total active PID setpoint after PID-RFG in [%].

Note:
r2260 = 100 % corresponds to 4000 hex

P2261 **PID setpoint filter timeconstant** Level: 3

CStat: CUT **Datatype:** Float **Unit:** s **Min:** 0.00 **Def:** 0.00 **Max:** 60.00

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

Sets a time constant for smoothing the PID setpoint.

Note:
0 = no smoothing

r2262 **CO: Filtered PID setp. after RFG** Level: 3

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

P-Group: TECH

Displays filtered PID setpoint after PID-RFG in [%].

Note:
r2262 = 100 % corresponds to 4000 hex

P2263 **PID controller type** Level: 3

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

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

Sets the PID controller type.

Settings:
0 D component on feedback signal
1 D component on error signal

P2264[3] **CI: PID feedback** Level: 2

CStat: CUT **Datatype:** U32 **Unit:** - **Min:** 0:0 **Def:** 755:1 **Max:** 4000:0

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

Selects the source of the PID feedback signal.

Settings:
755 = Analog input 2 setpoint
2224 = Fixed PID setpoint
2250 = Output setpoint of PID-MOP

Index:
P2264[0] : 1st. Command data set (CDS)
P2264[1] : 2nd. Command data set (CDS)
P2264[2] : 3rd. Command data set (CDS)

Note:
When analog input is selected, offset and gain can be implemented using parameters P0756 to P0760 (ADC scaling).

P2265 **PID feedback filter timeconstant** Level: 2

CStat: CUT **Datatype:** Float **Unit:** s **Min:** 0.00 **Def:** 0.00 **Max:** 60.00

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

Defines time constant for PID feedback filter.

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

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

P-Group: TECH

Displays PID feedback signal in [%].

Note:
r2266 = 100 % corresponds to 4000 hex

P2267 **Max. value for PID feedback** Level: 3

CStat: CUT **Datatype:** Float **Unit:** % **Min:** -200.00 **Def:** 100.00 **Max:** 200.00

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

Sets the upper limit for the value of the feedback signal in [%].

Note:
P2267 = 100 % corresponds to 4000 hex

Notice:
When PID is enabled (P2200 = 1) and the signal rises above this value, the inverter will trip with F0222 .

P2268 **Min. value for PID feedback** Level: **3**

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

Sets lower limit for value of feedback signal in [%].

Note:
P2268 = 100 % corresponds to 4000 hex

Notice:
When PID is enabled (P2200 = 1) and the signal rises below this value, the inverter will trip with F0221.

P2269 **Gain applied to PID feedback** Level: **3**

CStat:	CUT	**Datatype:** Float	**Unit:** -	**Min:**	0.00
P-Group:	TECH	**Active:** Immediately	**QuickComm.** No	**Def:**	100.00
				Max:	500.00

Allows the user to scale the PID feedback as a percentage value [%].

A gain of 100.0 % means that feedback signal has not changed from its default value.

P2270 **PID feedback function selector** Level: **3**

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

Applies mathematical functions to the PID feedback signal, allowing multiplication of the result by P2269 (gain applied to PID feedback).

Settings:

0	Disabled
1	Square root (root(x))
2	Square (x*x)
3	Cube (x*x*x)

P2271 **PID transducer type** Level: **2**

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

Allows the user to select the transducer type for the PID feedback signal.

Value:
P2271 = 0 : [default]
If the feedback signal is less than the PID setpoint, the PID controller will increase motor speed to correct this.

P2271 = 1 :
If the feedback signal is greater than the PID setpoint, the PID controller will reduce motor speed to correct this.

Settings:

0	Disabled
1	Inversion of PID feedback signal

Notice:
It is essential that you select the correct tranducer type.

If you are unsure whether 0 or 1 is applicable, you can determine the correct type as follows:
1. Disable the PID function (P2200 = 0).
2. Increase the motor frequency while measuring the feedback signal.
3. If the feedback signal increases with an increase in motor frequency, the PID transducer type should be 0.
4. If the feedback signal decreases with an increase in motor frequency the PID transducer type should be set to 1.

r2272 **CO: PID scaled feedback** Level: **2**

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

Displays PID scaled feedback signal in [%].

Note:
r2272 = 100 % corresponds to 4000 hex

r2273 **CO: PID error** Level: **2**

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

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

Note:
r2273 = 100 % corresponds to 4000 hex

P2274 **PID derivative time** Level: **2**

CStat:	CUT	**Datatype:** Float	**Unit:** s	**Min:**	0.000
P-Group:	TECH	**Active:** Immediately	**QuickComm.** No	**Def:**	0.000
				Max:	60.000

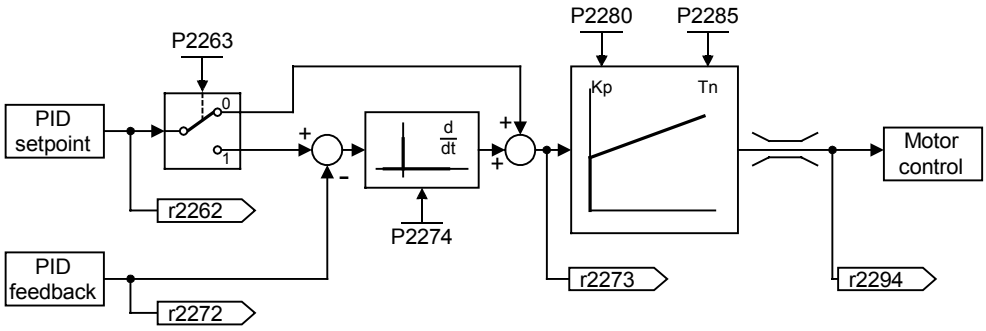
Sets PID derivative time.

P2280 **PID proportional gain** Level: **2**

CStat:	CUT	**Datatype:** Float	**Unit:** -	**Min:**	0.000
P-Group:	TECH	**Active:** Immediately	**QuickComm.** No	**Def:**	3.000
				Max:	65.000

Allows user to set proportional gain for PID controller.

The PID controller is implemented using the standard model.



For best results, enable both P and I terms.

Dependency:

If P term = 0, I term acts on the square of the error signal. If I term = 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.

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.

Notice:

The D term should be used carefully, since it can cause the controller output to fluctuate as every change in the feedback signal is amplified by the controller derivative action.

P2285 **PID integral time** Level: **2**

CStat:	CUT	**Datatype:** Float	**Unit:** s	**Min:**	0.000
P-Group:	TECH	**Active:** Immediately	**QuickComm.** No	**Def:**	0.000
				Max:	60.000

Sets integral time constant for PID controller.

Details:

See P2280 (PID proportional gain).

P2291 **PID output upper limit** Level: **2**

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-200.00
P-Group:	TECH	**Active:** Immediately	**QuickComm.** No	**Def:**	100.00
				Max:	200.00

Sets upper limit for PID controller output in [%].

Dependency:

If F max (P1082) is greater than P2000 (reference frequency), either P2000 or P2291 (PID output upper limit) must be changed to achieve F max.

Note:

P2291 = 100 % corresponds to 4000 hex (as defined by P2000 (reference frequency)).

P2292 **PID output lower limit** Level: **2**

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

Sets lower limit for the PID controller output in [%].

Dependency:

A negative value allows bipolar operation of PID controller.

Note:

P2292 = 100 % corresponds to 4000 hex

P2293 **Ramp-up /-down time of PID limit** Level: **3**

CStat:	CUT	**Datatype:** Float	**Unit:** s	**Min:**	0.00
P-Group:	TECH	**Active:** Immediately	**QuickComm.** No	**Def:**	1.00
				Max:	100.00

Sets maximum ramp rate on output of PID.

When PI is enabled, the output limits are ramped up from 0 to the limits set in P2291 (PID output upper limit) and P2292 (PID output lower limit). Limits prevent large step changes appearing on the output of the PID when the inverter is started. Once the limits have been reached, the PID controller output is instantaneous.

These ramp times are used whenever a RUN command is issued.

Note:

If an OFF1 or OFF 3 are issued, the inverter output frequency ramps down as set in P1121 (ramp-down time) or P1135 (OFF3 ramp-down time).

r2294 **CO: Act. PID output** Level: **2**

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

Displays PID output in [%]

Note:

r2294 = 100 % corresponds to 4000 hex

P2370[3] **Motor staging stop mode** Level: **3**

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

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

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:
	CStat: CT	Datatype: U16	Unit: -	Def: 0	3
	P-Group: TECH	Active: Immediately	QuickComm. No	Max: 8	

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

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:

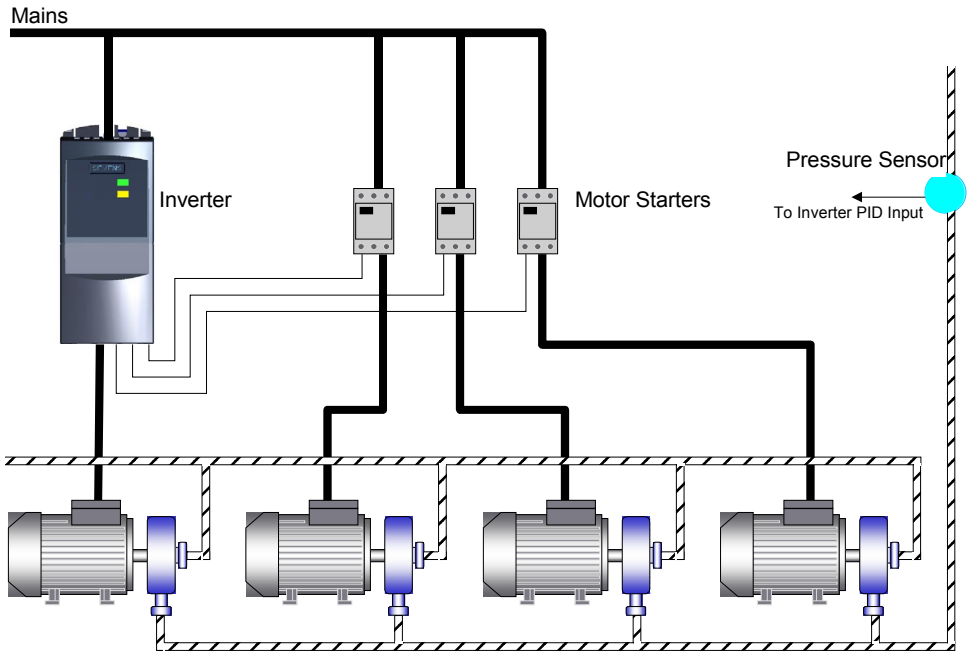
P2371[0] : 1st. Drive data set (DDS)
P2371[1] : 2nd. Drive data set (DDS)
P2371[2] : 3rd. Drive data set (DDS)

Caution1:

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 startes are controlled from relay outputs (DOUT). In the text below, the following terminology will be used:

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

Switch-on

		1.	2.	3.	4.	5.	6.	7. → t
P2371 =	0	-	-	-	-	-	-	-
	1	-	M1	M1	M1	M1	M1	M1
	2	-	M1	M1+M2	M1+M2	M1+M2	M1+M2	M1+M2
	3	-	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
	5	-	M1	M3	M1+M3	M1+M2+M3	M1+M2+M3	M1+M2+M3
	6	-	M1	M2	M1+M2	M2+M3	M1+M2+M3	M1+M2+M3
	7	-	M1	M1+M2	M3	M1+M3	M1+M2+M3	M1+M2+M3
	8	-	M1	M2	M3	M1+M3	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)

Switch-off

		1.	2.	3.	4.	5.	6.	7. → t
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

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

Level: **3**

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.

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

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	0.0
P-Group:	TECH	**Active:** Immediately	**QuickComm.** No	**Def:**	20.0
				Max:	200.0

Level: **3**

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

CStat:	CUT	**Datatype:** U16	**Unit:** s	**Min:**	0
P-Group:	TECH	**Active:** Immediately	**QuickComm.** No	**Def:**	30
				Max:	650

Level: **3**

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

CStat:	CUT	**Datatype:** U16	**Unit:** s	**Min:**	0
P-Group:	TECH	**Active:** Immediately	**QuickComm.** No	**Def:**	30
				Max:	650

Level: **3**

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

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	0.0
P-Group:	TECH	**Active:** Immediately	**QuickComm.** No	**Def:**	25.0
				Max:	200.0

Level: **3**

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

CStat:	CUT	**Datatype:** U16	**Unit:** s	**Min:**	0
P-Group:	TECH	**Active:** Immediately	**QuickComm.** No	**Def:**	30
				Max:	650

Level: **3**

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)

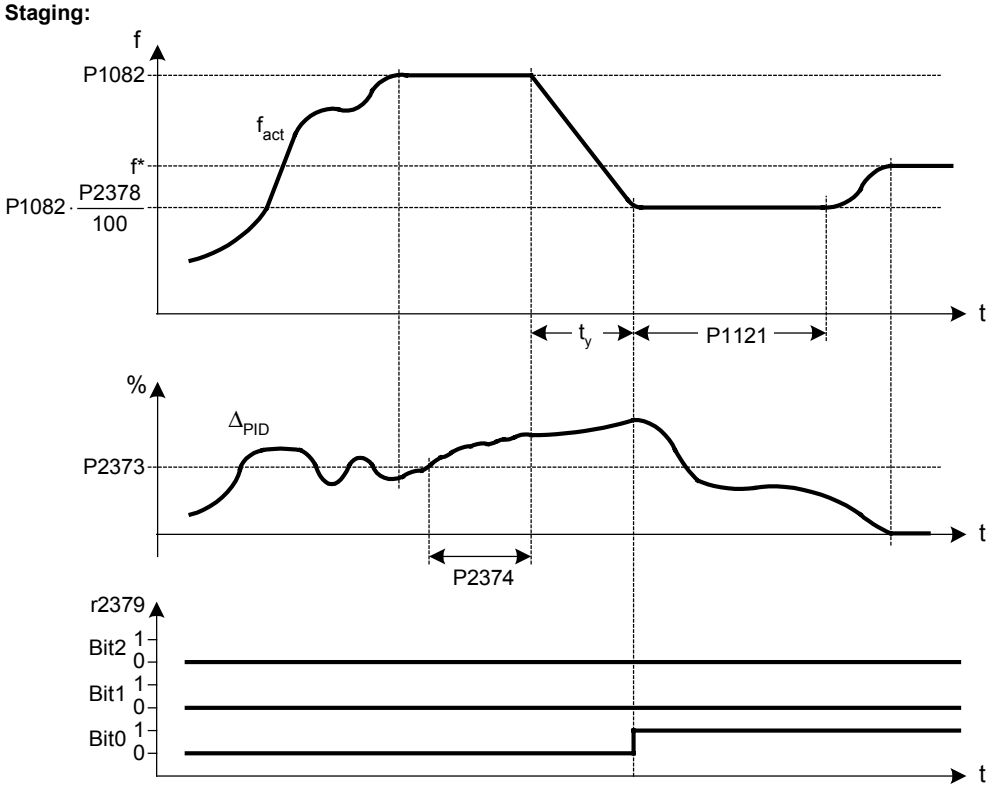
Note:

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

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

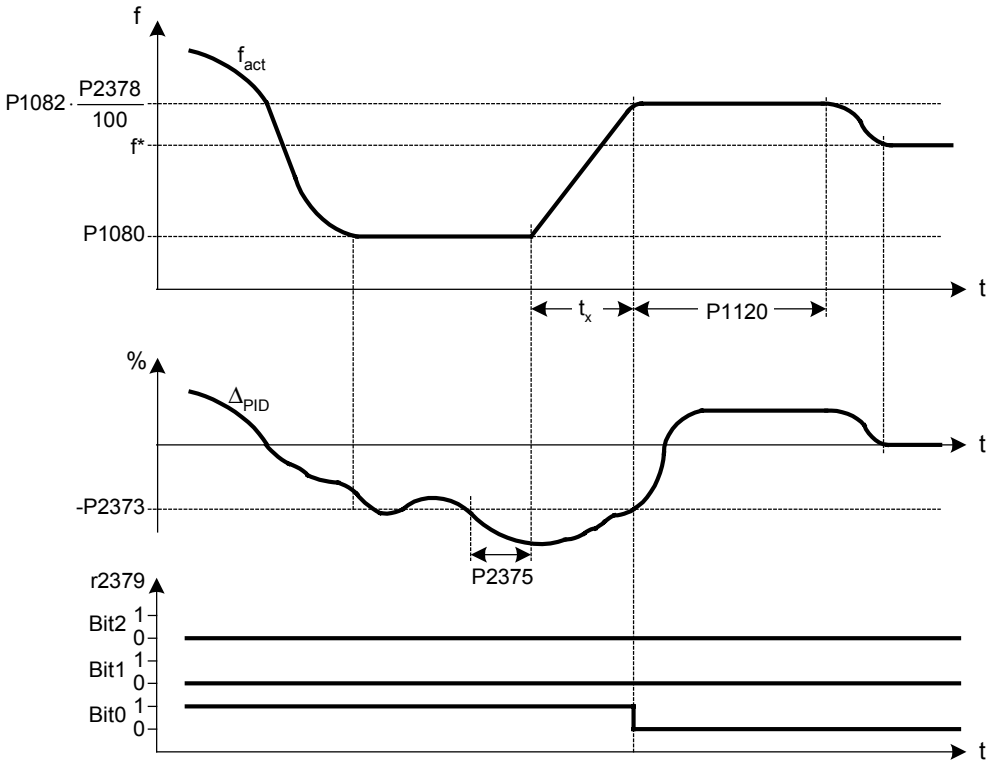


Condition for staging:

ⓐ f_{act} ≥ P1082
ⓑ Δ_{PID} ≥ P2373
ⓒ $t_{ⓐⓑ}$ > P2374

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

Destaging:



Condition for destaging:

ⓐ f_{act} ≤ P1080
ⓑ Δ_{PID} ≤ -P2373
ⓒ $t_{ⓐⓑ}$ > 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** Level: **3**

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

P-Group: TECH

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** Level: **3**

CStat: CUT **Datatype:** Float **Unit:** h **Min:** 0.0 **Def:** 0.0 **Max:** 0.0

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

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

Example:

P2380 = 0.1 ==> 6 min

P2380 = 1.0 ==> 60 min = 1 h

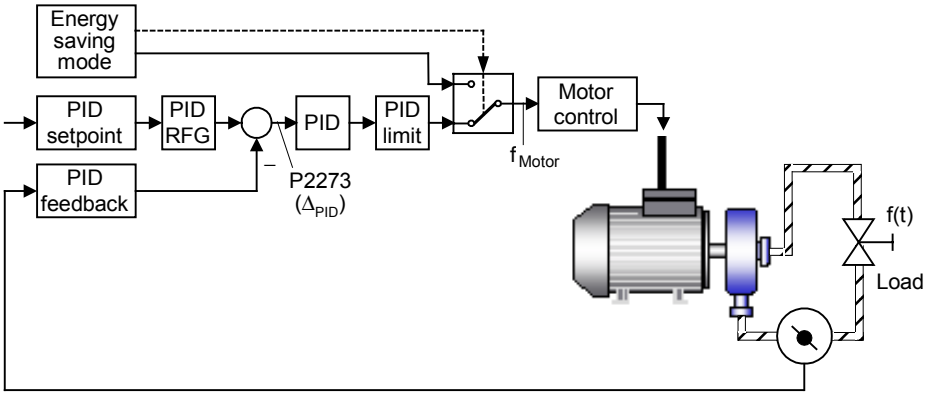
Index:

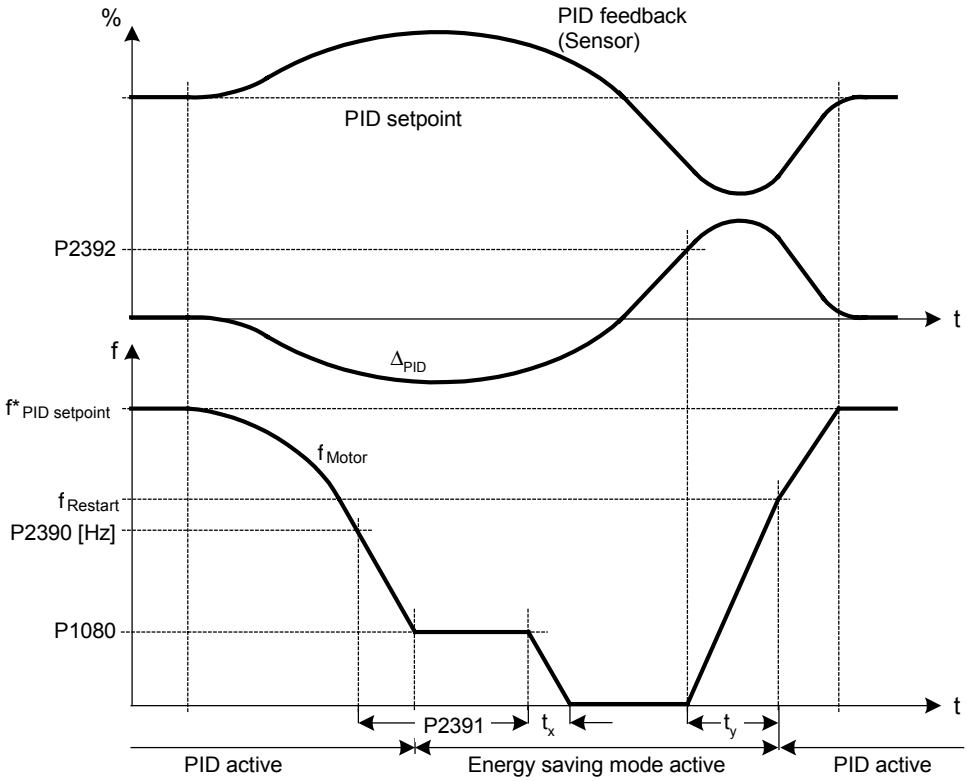
P2380[0] : Motor 1 hrs run
P2380[1] : Motor 2 hrs run
P2380[2] : Motor 3 hrs run

P2390 **Energy saving setpoint** Level: **3**

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-200.00
P-Group:	TECH	**Active:** Immediately	**QuickComm.** No	**Def:**	0
				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).





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

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

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

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

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** Level: **3**

CStat:	CT	**Datatype:** U16	**Unit:** s	**Min:**	0
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** Level: 3

CStat:	CT	**Datatype:** Float	**Unit:** %	**Min:**	-200.00
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** Level: 3

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

Free function blocks (FFB) are enabled in two steps.

1. Parameter P2800 enables all free function blocks , normally (P2800 = 1).
2. Parameters P2801 and P2802 respectively, enable each free function block individually (P2801[x] > 0 oder P2802[x] > 0).

Settings:

0 Disable
1 Enable

Dependency:

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

P2801[17] Activate FFBs

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

Level: **3**

Free function blocks (FFB) are enabled in two steps.

1. Parameter P2800 enables all free function blocks , normally (P2800 = 1)
2. Parameters P2801 and P2802 respectively, enable each free function block individually (P2801[x] > 0 oder P2802[x] > 0)

In addition, Parameters P2801 and P2802 determine the chronological order of each function block. The following table shows that the priority increases from left to right and from bottom to top.

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

Example:

P2801[3] = 2, P2801[4] = 2, P2802[3] = 3, P2802[4] = 2
FFBs will be calculated in following order:
P2802[3], P2801[3] , P2801[4], P2802[4]

Settings:

0 Not Active
1 Level 1
2 Level 2
3 Level 3

Index:

P2801[0] : Enable AND 1
P2801[1] : Enable AND 2
P2801[2] : Enable AND 3
P2801[3] : Enable OR 1
P2801[4] : Enable OR 2
P2801[5] : Enable OR 3
P2801[6] : Enable XOR 1
P2801[7] : Enable XOR 2
P2801[8] : Enable XOR 3
P2801[9] : Enable NOT 1
P2801[10] : Enable NOT 2
P2801[11] : Enable NOT 3
P2801[12] : Enable D-FF 1
P2801[13] : Enable D-FF 2
P2801[14] : Enable RS-FF 1
P2801[15] : Enable RS-FF 2
P2801[16] : Enable RS-FF 3

Dependency:

Set P2800 to 1 to enable function blocks.

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

P2802[14] Activate FFBs

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

Level: **3**

Free function blocks (FFB) are enabled in two steps.
1. Parameter P2800 enables all free function blocks , normally (P2800 = 1)
2. Parameters P2801 and P2802 respectively, enable each free function block individually (P2801[x] > 0 oder P2802[x] > 0)

In addition, Parameters P2801 and P2802 determine the chronological order of each function block. The following table shows that the priority increases from left to right and from bottom to top.

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

Example:
P2801[3] = 2, P2801[4] = 2, P2802[3] = 3, P2802[4] = 2
FFBs will be calculated in following order:
P2802[3], P2801[3] , P2801[4], P2802[4]

Settings:
0 Not Active
1 Level 1
2 Level 2
3 Level 3

Index:
P2802[0] : Enable timer 1
P2802[1] : Enable timer 2
P2802[2] : Enable timer 3
P2802[3] : Enable timer 4
P2802[4] : Enable ADD 1
P2802[5] : Enable ADD 2
P2802[6] : Enable SUB 1
P2802[7] : Enable SUB 2
P2802[8] : Enable MUL 1
P2802[9] : Enable MUL 2
P2802[10] : Enable DIV 1
P2802[11] : Enable DIV 2
P2802[12] : Enable CMP 1
P2802[13] : Enable CMP 2

Dependency:
Set P2800 to 1 to enable function blocks.

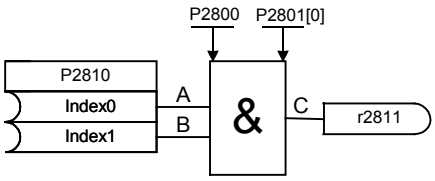
All active function blocks will be calculated in every 132 ms.

P2810[2] BI: AND 1

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

Level: **3**

P2810[0], P2810[1] define inputs of AND 1 element, output is P2811.



A	B	C
0	0	0
0	1	0
1	0	0
1	1	1

Index:
P2810[0] : Binector input 0 (BI 0)
P2810[1] : Binector input 1 (BI 1)

Dependency:
P2801[0] is active level for the AND element.

r2811 **BO: AND 1** Level: **3**

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

P-Group: TECH

Output of AND 1 element. Displays and logic of bits defined in P2810[0], P2810[1].

Dependency:

P2801[0] is active level for the AND element.

P2812[2] **BI: AND 2** Level: **3**

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

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

P2812[0], 2812[1] define inputs of AND 2 element, output is P2813.

Index:

P2812[0] : Binector input 0 (BI 0)
P2812[1] : Binector input 1 (BI 1)

Dependency:

P2801[1] is active level for the AND element.

r2813 **BO: AND 2** Level: **3**

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

P-Group: TECH

Output of AND 2 element. Displays and logic of bits defined in P2812[0], P2812[1].

Dependency:

P2801[1] is active level for the AND element.

P2814[2] **BI: AND 3** Level: **3**

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

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

P2814[0], P2814[1] define inputs of AND 3 element, output is P2815.

Index:

P2814[0] : Binector input 0 (BI 0)
P2814[1] : Binector input 1 (BI 1)

Dependency:

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

r2815 **BO: AND 3** Level: **3**

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

P-Group: TECH

Output of AND 3 element. Displays and logic of bits defined in P2814[0], P2814[1].

Dependency:

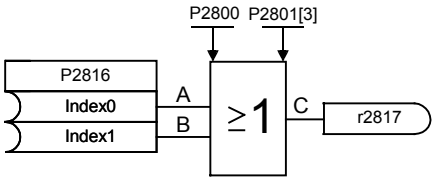
P2801[2] is active level for the AND element.

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

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

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

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



A	B	C
0	0	0
0	1	1
1	0	1
1	1	1

Index:

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

Dependency:

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

r2817 **BO: OR 1** Level: **3**

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

P-Group: TECH

Output of OR 1 element. Displays or logic of bits defined in P2816[0], P2816[1].

Dependency:

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

P2818[2] **BI: OR 2** Level: **3**

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

P2818[0], P2818[1] define inputs of OR 2 element, output is P2819.

Index:
P2818[0] : Binector input 0 (BI 0)
P2818[1] : Binector input 1 (BI 1)

Dependency:
P2801[4] is active level for the OR element.

r2819 **BO: OR 2** Level: **3**

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

Output of OR 2 element. Displays or logic of bits defined in P2818[0], P2818[1].

Dependency:
P2801[4] is active level for the OR element.

P2820[2] **BI: OR 3** Level: **3**

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

P2820[0], P2820[1] define inputs of OR 3 element, output is P2821.

Index:
P2820[0] : Binector input 0 (BI 0)
P2820[1] : Binector input 1 (BI 1)

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

r2821 **BO: OR 3** Level: **3**

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

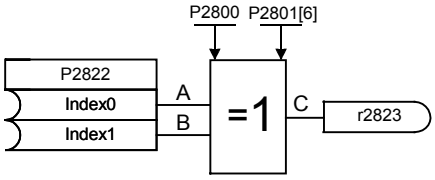
Output of OR 3 element. Displays or logic of bits defined in P2820[0], P2820[1].

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

P2822[2] **BI: XOR 1** Level: **3**

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

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



A	B	C
0	0	0
0	1	1
1	0	1
1	1	0

Index:
P2822[0] : Binector input 0 (BI 0)
P2822[1] : Binector input 1 (BI 1)

Dependency:
P2801[6] is active level for the XOR element.

r2823 **BO: XOR 1** Level: **3**

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

Output of XOR 1 element. Displays exclusive-or logic of bits defined in P2822[0], P2822[1].

Dependency:
P2801[6] is active level for the XOR element.

P2824[2] **BI: XOR 2** Level: **3**

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

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

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

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

r2825 **BO: XOR 2** Level: 3

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

P-Group: TECH

Output of XOR 2 element. Displays exclusive-or logic of bits defined in P2824[0], P2824[1].

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

P2826[2] **BI: XOR 3** Level: 3

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

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

P2826[0], P2826[1] define inputs of XOR 3 element, output is P2827.

Index:
P2826[0] : Binector input 0 (BI 0)
P2826[1] : Binector input 1 (BI 1)

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

r2827 **BO: XOR 3** Level: 3

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

P-Group: TECH

Output of XOR 3 element. Displays exclusive-or logic of bits defined in P2826[0], P2826[1].

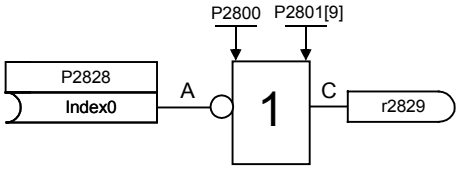
Dependency:
P2801[8] is active level for the XOR element.

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

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

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

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



A	C
0	1
1	0

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

r2829 **BO: NOT 1** Level: 3

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

P-Group: TECH

Output of NOT 1 element. Displays not logic of bit defined in P2828.

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

P2830 **BI: NOT 2** Level: 3

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

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

P2830 defines input of NOT 2 element, output is P2831.

Dependency:
P2801[10] is active level for the NOT element.

r2831 **BO: NOT 2** Level: 3

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

P-Group: TECH

Output of NOT 2 element. Displays not logic of bit defined in P2830.

Dependency:
P2801[10] is active level for the NOT element.

P2832 **BI: NOT 3** Level: 3

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

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

P2832 defines input of NOT 3 element, output is P2833.

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

r2833 **BO: NOT 3** Level: 3

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

P-Group: TECH

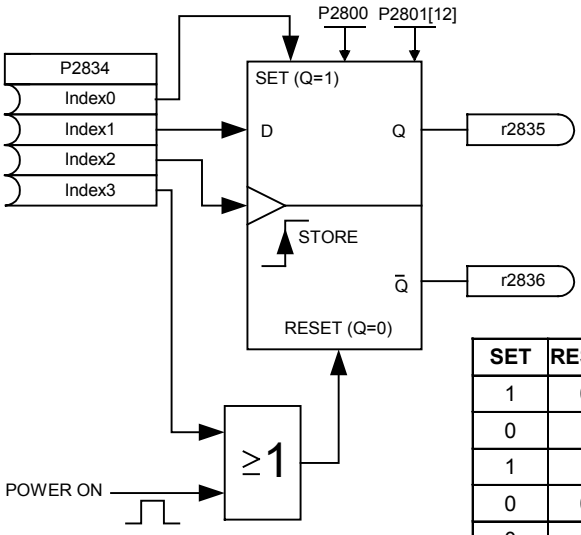
Output of NOT 3 element. Displays not logic of bit defined in P2832.

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

P2834[4] **BI: D-FF 1** Level: **3**

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

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



SET	RESET	D	STORE	Q	$\overline{Q}$
1	0	x	x	1	0
0	1	x	x	0	1
1	1	x	x	Q_{n-1}	$\overline{Q}_{n-1}$
0	0	1	↑	1	0
0	0	0	↑	0	1
POWER-ON				0	1

Index:
P2834[0] : Binector input: Set
P2834[1] : Binector input: D input
P2834[2] : Binector input: Store pulse
P2834[3] : Binector input: Reset

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

r2835 **BO: Q D-FF 1** Level: **3**

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

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

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

r2836 **BO: NOT-Q D-FF 1** Level: **3**

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

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

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

P2837[4] **BI: D-FF 2** Level: **3**

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

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

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

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

r2838 **BO: Q D-FF 2** Level: **3**

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

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

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

r2839 **BO: NOT-Q D-FF 2** Level: 3

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

P-Group: TECH

Displays Not-output of D-FlipFlop 2, inputs are defined in P2837[0], P2837[1], P2837[2], P2837[3]

Dependency:

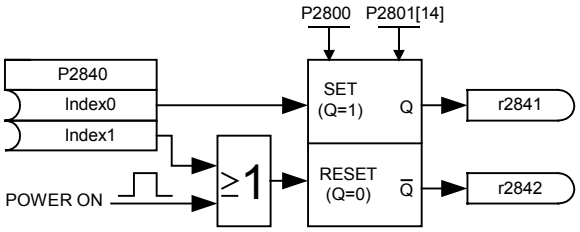
P2801[13] is active level for the D-FlipFlop.

P2840[2] **BI: RS-FF 1** Level: 3

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

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

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



SET	RESET	Q	$\overline{Q}$
0	0	Q_{n-1}	$\overline{Q}_{n-1}$
0	1	0	1
1	0	1	0
1	1	Q_{n-1}	$\overline{Q}_{n-1}$
POWER-ON		0	1

Index:

P2840[0] : Binector input: Set
P2840[1] : Binector input: Reset

Dependency:

P2801[14] is active level for the RS-FlipFlop.

r2841 **BO: Q RS-FF 1** Level: 3

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

P-Group: TECH

Displays output of RS-FlipFlop 1, inputs are defined in P2840[0], P2840[1]

Dependency:

P2801[14] is active level for the RS-FlipFlop.

r2842 **BO: NOT-Q RS-FF 1** Level: 3

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

P-Group: TECH

Displays Not-output of RS-FlipFlop 1, inputs are defined in P2840[0], P2840[1]

Dependency:

P2801[14] is active level for the RS-FlipFlop.

P2843[2] **BI: RS-FF 2** Level: 3

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

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

P2843[0], P2843[1] define inputs of RS-FlipFlop 2, outputs are P2844, P2845.

Index:

P2843[0] : Binector input: Set
P2843[1] : Binector input: Reset

Dependency:

P2801[15] is active level for the RS-FlipFlop.

r2844 **BO: Q RS-FF 2** Level: 3

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: TECH

Displays output of RS-FlipFlop 2, inputs are defined in P2843[0], P2843[1]

Dependency:

P2801[15] is active level for the RS-FlipFlop.

r2845 **BO: NOT-Q RS-FF 2** Level: 3

Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: TECH

Displays Not-output of RS-FlipFlop 2, inputs are defined in P2843[0], P2843[1]

Dependency:

P2801[15] is active level for the RS-FlipFlop.

P2846[2] **BI: RS-FF 3**

CStat:	CUT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	TECH	**Active:** first confirm	**QuickComm.** No	**Def:**	0:0
				Max:	4000:0

Level: **3**

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**

		Datatype: U16	**Unit:** -	**Min:**	-
				Def:	-
P-Group:	TECH			**Max:**	-

Level: **3**

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**

		Datatype: U16	**Unit:** -	**Min:**	-
				Def:	-
P-Group:	TECH			**Max:**	-

Level: **3**

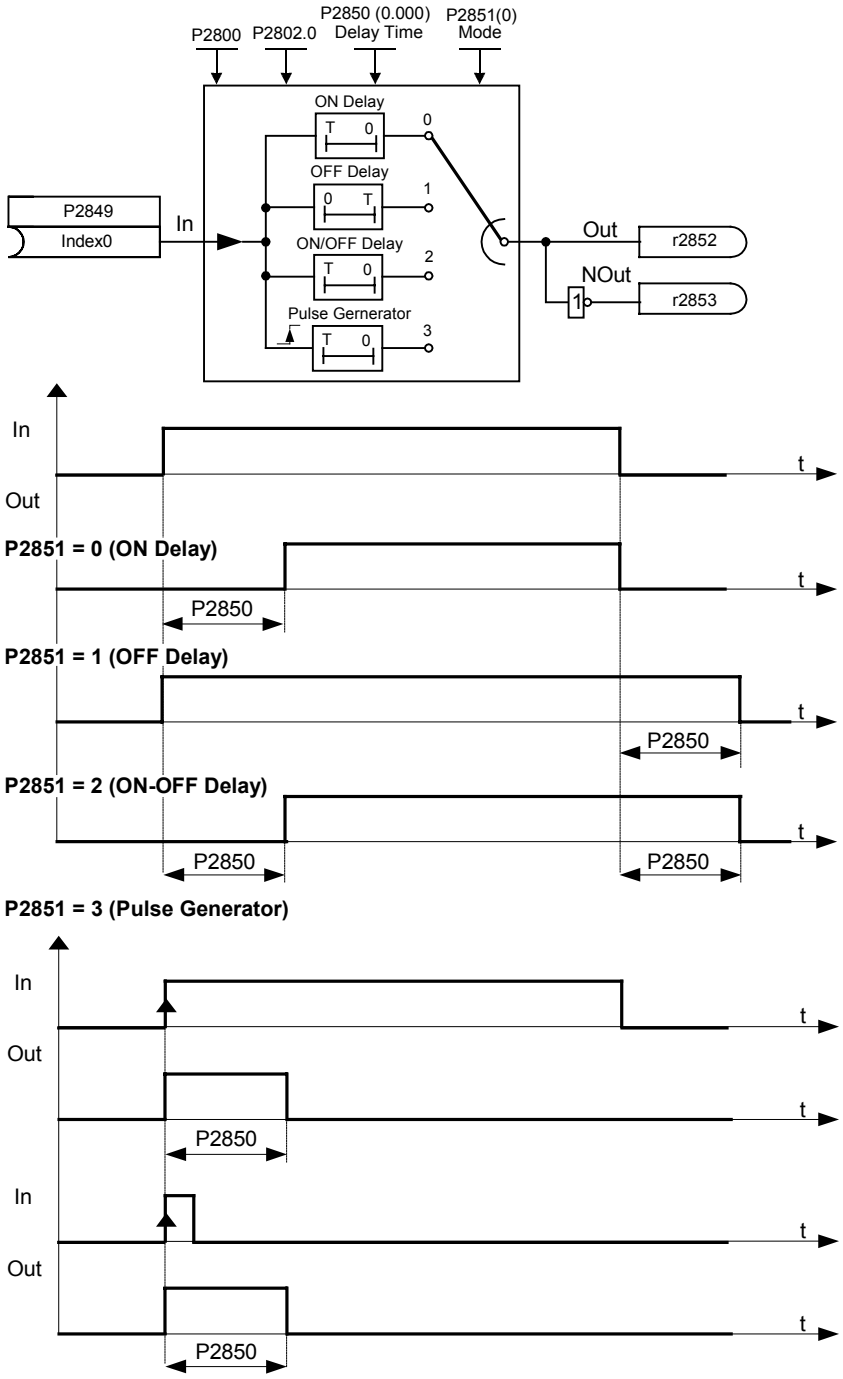
Displays Not-output of RS-FlipFlop 3, inputs are defined in P2846[0], P2846[1]

Dependency:

P2801[16] is active level for the RS-FlipFlop.

P2849	**BI: Timer 1**						Level:
	CStat: CUT	**Datatype:** U32	**Unit:** -	**Min:**	0:0		**3**
	P-Group: TECH	**Active:** first confirm	**QuickComm.** No	**Def:**	0:0		
				Max:	4000:0		

Define input signal of timer 1. P2849, P2850, P2851 are the inputs of the timer, outputs are P2852, P2853.



Dependency:
P2802[0] is active level for the timer.

P2850	**Delay time of timer 1**						Level:
	CStat: CUT	**Datatype:** Float	**Unit:** -	**Min:**	0.0		**3**
	P-Group: TECH	**Active:** first confirm	**QuickComm.** No	**Def:**	0.0		
				Max:	6000.0		

Defines delay time of timer 1. P2849, P2850, P2851 are the inputs of the timer, outputs are P2852, P2853.

Dependency:
P2802[0] is active level for the timer.

P2851 **Mode timer 1** Level: 3

CStat: CUT **Datatype:** U16 **Unit:** - **Min:** 0
P-Group: TECH **Active:** first confirm **QuickComm.** No **Def:** 0
Max: 3

Selects mode of timer 1. P2849, P2850, P2851 are the inputs of the timer, outputs are P2852, P2853.

Settings:

0 ON delay
1 OFF delay
2 ON/OFF delay
3 Pulse generator

Dependency:

P2802[0] is active level for the timer.

r2852 **BO: Timer 1** Level: 3

Datatype: U16 **Unit:** - **Min:** -
P-Group: TECH **Def:** -
Max: -

Displays output of timer 1. P2849, P2850, P2851 are the inputs of the timer, outputs are P2852, P2853.

Dependency:

P2802[0] is active level for the timer.

r2853 **BO: Nout timer 1** Level: 3

Datatype: U16 **Unit:** - **Min:** -
P-Group: TECH **Def:** -
Max: -

Displays Not-output of timer 1. P2849, P2850, P2851 are the inputs of the timer, outputs are P2852, P2853.

Dependency:

P2802[0] is active level for the timer.

P2854 **BI: Timer 2** Level: 3

CStat: CUT **Datatype:** U32 **Unit:** - **Min:** 0:0
P-Group: TECH **Active:** first confirm **QuickComm.** No **Def:** 0:0
Max: 4000:0

Define input signal of timer 2. P2854, P2855, P2856 are the inputs of the timer, outputs are P2857, P2858.

Dependency:

P2802[1] is active level for the timer.

P2855 **Delay time of timer 2** Level: 3

CStat: CUT **Datatype:** Float **Unit:** - **Min:** 0.0
P-Group: TECH **Active:** first confirm **QuickComm.** No **Def:** 0.0
Max: 6000.0

Defines delay time of timer 2. P2854, P2855, P2856 are the inputs of the timer, outputs are P2857, P2858.

Dependency:

P2802[1] is active level for the timer.

P2856 **Mode timer 2** Level: 3

CStat: CUT **Datatype:** U16 **Unit:** - **Min:** 0
P-Group: TECH **Active:** first confirm **QuickComm.** No **Def:** 0
Max: 3

Selects mode of timer 2. P2854, P2855, P2856 are the inputs of the timer, outputs are P2857, P2858.

Settings:

0 ON delay
1 OFF delay
2 ON/OFF delay
3 Pulse generator

Dependency:

P2802[1] is active level for the timer.

r2857 **BO: Timer 2** Level: 3

Datatype: U16 **Unit:** - **Min:** -
P-Group: TECH **Def:** -
Max: -

Displays output of timer 2. P2854, P2855, P2856 are the inputs of the timer, outputs are P2857, P2858.

Dependency:

P2802[1] is active level for the timer.

r2858 **BO: Nout timer 2** Level: 3

Datatype: U16 **Unit:** - **Min:** -
P-Group: TECH **Def:** -
Max: -

Displays Not-output of timer 2 P2854, P2855, P2856 are the inputs of the timer, outputs are P2857, P2858.

Dependency:

P2802[1] is active level for the timer.

P2859 **BI: Timer 3** Level: 3

CStat: CUT **Datatype:** U32 **Unit:** - **Min:** 0:0
P-Group: TECH **Active:** first confirm **QuickComm.** No **Def:** 0:0
Max: 4000:0

Define input signal of timer 3. P2859, P2860, P2861 are the inputs of the timer, outputs are P2862, P2863.

Dependency:

P2802[2] is active level for the timer.

P2860 **Delay time of timer 3** Level: **3**

CStat: CUT **Datatype:** Float **Unit:** - **Min:** 0.0 **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** Level: **3**

CStat: CUT **Datatype:** U16 **Unit:** - **Min:** 0 **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.

Settings:
0 ON delay
1 OFF delay
2 ON/OFF delay
3 Pulse generator

Dependency:
P2802[2] is active level for the timer.

r2862 **BO: Timer 3** Level: **3**

Datatype: U16 **Unit:** - **Min:** - **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** Level: **3**

Datatype: U16 **Unit:** - **Min:** - **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** Level: **3**

CStat: CUT **Datatype:** U32 **Unit:** - **Min:** 0:0 **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** Level: **3**

CStat: CUT **Datatype:** Float **Unit:** - **Min:** 0.0 **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** Level: **3**

CStat: CUT **Datatype:** U16 **Unit:** - **Min:** 0 **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.

Settings:
0 ON delay
1 OFF delay
2 ON/OFF delay
3 Pulse generator

Dependency:
P2802[3] is active level for the timer.

r2867 **BO: Timer 4** Level: **3**

Datatype: U16 **Unit:** - **Min:** - **Def:** -
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** Level: **3**

Datatype: U16 **Unit:** - **Min:** - **Def:** -
P-Group: TECH **Max:** -

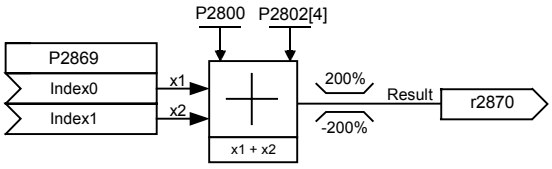
Displays Not-output of timer 4. P2864, P2865, P2866 are the inputs of the timer, outputs are P2867, P2868.

Dependency:
P2802[3] is active level for the timer.

P2869[2] **CI: ADD 1** Level: **3**

CStat: CUT **Datatype:** U32 **Unit:** - **Min:** 0:0
P-Group: TECH **Active:** first confirm **QuickComm.** No **Def:** 755:0
Max: 4000:0

Define inputs of Adder 1, result is in P2870.



Result = x1 + x2
If: x1 + x2 > 200% → Result = 200%
x1 + x2 < -200% → Result = -200%

Index:
P2869[0] : Connector input 0 (CI 0)
P2869[1] : Connector input 1 (CI 1)

Dependency:
P2802[4] is the active level for the Adder.

r2870 **CO: ADD 1** Level: **3**

Datatype: Float **Unit:** % **Min:** -
Def: -
P-Group: TECH **Max:** -

Result of Adder 1.

Dependency:
P2802[4] is active level for the Adder.

P2871[2] **CI: ADD 2** Level: **3**

CStat: CUT **Datatype:** U32 **Unit:** - **Min:** 0:0
P-Group: TECH **Active:** first confirm **QuickComm.** No **Def:** 755:0
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** Level: **3**

Datatype: Float **Unit:** % **Min:** -
Def: -
P-Group: TECH **Max:** -

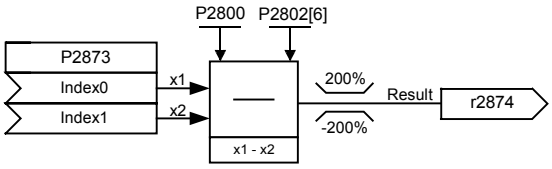
Result of Adder 2.

Dependency:
P2802[5] is active level for the Adder.

P2873[2] **CI: SUB 1** Level: **3**

CStat: CUT **Datatype:** U32 **Unit:** - **Min:** 0:0
P-Group: TECH **Active:** first confirm **QuickComm.** No **Def:** 755:0
Max: 4000:0

Define inputs of Subtracter 1, result is in P2874.



Result = x1 - x2
If: x1 - x2 > 200% → Result = 200%
x1 - x2 < -200% → Result = -200%

Index:
P2873[0] : Connector input 0 (CI 0)
P2873[1] : Connector input 1 (CI 1)

Dependency:
P2802[6] is active level for the Subtracter.

r2874 **CO: SUB 1** Level: **3**

Datatype: Float **Unit:** % **Min:** -
Def: -
P-Group: TECH **Max:** -

Result of Subtracter 1.

Dependency:
P2802[6] is active level for the Subtracter.

P2875[2] **CI: SUB 2**

CStat:	CUT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	TECH	**Active:** first confirm	**QuickComm.** No	**Def:**	755:0
				Max:	4000:0

Level: **3**

Define inputs of Subtracter 2, result is in P2876.

Index:

P2875[0] : Connector input 0 (CI 0)
P2875[1] : Connector input 1 (CI 1)

Dependency:

P2802[7] is active level for the Subtracter.

r2876 **CO: SUB 2**

		Datatype: Float	**Unit:** %	**Min:**	-
P-Group:	TECH			**Def:**	-
				Max:	-

Level: **3**

Result of Subtracter 2.

Dependency:

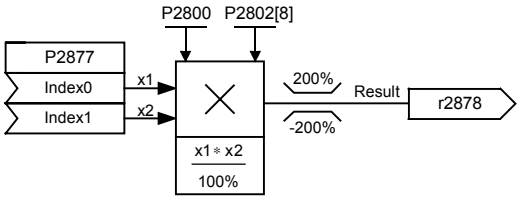
P2802[7] is active level for the Subtracter.

P2877[2] **CI: MUL 1**

CStat:	CUT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	TECH	**Active:** first confirm	**QuickComm.** No	**Def:**	755:0
				Max:	4000:0

Level: **3**

Define inputs of Multiplier 1, result is in P2878.



$$\textbf{Result} = \frac{\textbf{x1} * \textbf{x2}}{\textbf{100\%}}$$

If: $\frac{x1 * x2}{100\%} > 200\% \rightarrow$ Result = 200%

$\frac{x1 * x2}{100\%} < -200\% \rightarrow$ Result = -200%

Index:

P2877[0] : Connector input 0 (CI 0)
P2877[1] : Connector input 1 (CI 1)

Dependency:

P2802[8] is active level for the Multiplier.

r2878 **CO: MUL 1**

		Datatype: Float	**Unit:** %	**Min:**	-
P-Group:	TECH			**Def:**	-
				Max:	-

Level: **3**

Result of Multiplier 1.

Dependency:

P2802[8] is active level for the Multiplier.

P2879[2] **CI: MUL 2**

CStat:	CUT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	TECH	**Active:** first confirm	**QuickComm.** No	**Def:**	755:0
				Max:	4000:0

Level: **3**

Define inputs of Multiplier 2, result is in P2880.

Index:

P2879[0] : Connector input 0 (CI 0)
P2879[1] : Connector input 1 (CI 1)

Dependency:

P2802[9] is active level for the Multiplier.

r2880 **CO: MUL 2**

		Datatype: Float	**Unit:** %	**Min:**	-
P-Group:	TECH			**Def:**	-
				Max:	-

Level: **3**

Result of Multiplier 2.

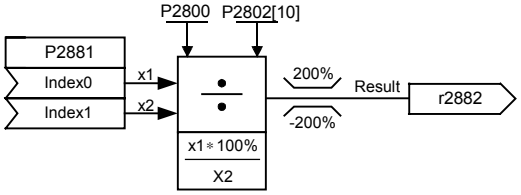
Dependency:

P2802[9] is active level for the Multiplier.

P2881[2] **CI: DIV 1** Level: **3**

CStat:	CUT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	TECH	**Active:** first confirm	**QuickComm.** No	**Def:**	755:0
				Max:	4000:0

Define inputs of Divider 1, result is in P2882.



$$\text{Result} = \frac{x1 * 100\%}{x2}$$

If: $\frac{x1 * 100\%}{x2} > 200\% \rightarrow$ Result = 200%

$\frac{x1 * 100\%}{x2} < -200\% \rightarrow$ Result = -200%

Index:
P2881[0] : Connector input 0 (CI 0)
P2881[1] : Connector input 1 (CI 1)

Dependency:
P2802[10] is active level for the Divider.

r2882 **CO: DIV 1** Level: **3**

		Datatype: Float	**Unit:** %	**Min:**	-
				Def:	-
P-Group:	TECH			**Max:**	-

Result of Divider 1.

Dependency:
P2802[10] is active level for the Divider.

P2883[2] **CI: DIV 2** Level: **3**

CStat:	CUT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	TECH	**Active:** first confirm	**QuickComm.** No	**Def:**	755:0
				Max:	4000:0

Define inputs of Divider 2, result is in P2884.

Index:
P2883[0] : Connector input 0 (CI 0)
P2883[1] : Connector input 1 (CI 1)

Dependency:
P2802[11] is active level for the Divider.

r2884 **CO: DIV 2** Level: **3**

		Datatype: Float	**Unit:** %	**Min:**	-
				Def:	-
P-Group:	TECH			**Max:**	-

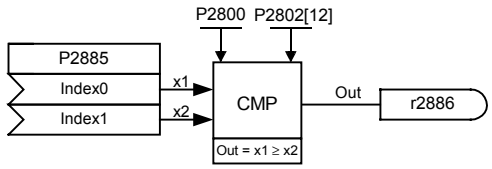
Result of Divider 2.

Dependency:
P2802[11] is active level for the Divider.

P2885[2] **CI: CMP 1** Level: **3**

CStat:	CUT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	TECH	**Active:** first confirm	**QuickComm.** No	**Def:**	755:0
				Max:	4000:0

Defines inputs of Comparator 1, output is P2886.



$x1 \geq x2 \rightarrow$ Out = 1
$x1 < x2 \rightarrow$ Out = 0

Index:
P2885[0] : Connector input 0 (CI 0)
P2885[1] : Connector input 1 (CI 1)

Dependency:
P2802[12] is active level for the Comparator.

r2886 **BO: CMP 1** Level: **3**

		Datatype: U16	**Unit:** -	**Min:**	-
				Def:	-
P-Group:	TECH			**Max:**	-

Displays result bit of Comparator 1.

Dependency:
P2802[12] is active level for the Comparator.

P2887[2] **CI: CMP 2** Level: **3**

CStat:	CUT	**Datatype:** U32	**Unit:** -	**Min:**	0:0
P-Group:	TECH	**Active:** first confirm	**QuickComm.** No	**Def:**	755:0
				Max:	4000:0

Defines inputs of Comparator 2, output is P2888.

Index:

P2887[0] : Connector input 0 (CI 0)
P2887[1] : Connector input 1 (CI 1)

Dependency:

P2802[13] is active level for the Comparator.

r2888 **BO: CMP 2** Level: **3**

		Datatype: U16	**Unit:** -	**Min:**	-
P-Group:	TECH			**Def:**	-
				Max:	-

Displays result bit of Comparator 2.

Dependency:

P2802[13] is active level for the Comparator.

P2889 **CO: Fixed setpoint 1 in [%]** Level: **3**

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-200.00
P-Group:	TECH	**Active:** first confirm	**QuickComm.** No	**Def:**	0.00
				Max:	200.00

Fixed percent setting 1.

Connector Setting in %

P2889

P2890

Range : -200% ... 200%

P2890 **CO: Fixed setpoint 2 in [%]** Level: **3**

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	-200.00
P-Group:	TECH	**Active:** first confirm	**QuickComm.** No	**Def:**	0.00
				Max:	200.00

Fixed percent setting 2.

P3900 **End of quick commissioning** Level: **1**

CStat:	C	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	QUICK	**Active:** first confirm	**QuickComm.** Yes	**Def:**	0
				Max:	3

Performs calculations necessary for optimized motor operation.

After completion of calculation, P3900 and P0010 (parameter groups for commissioning) are automatically reset to their original value 0.

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:

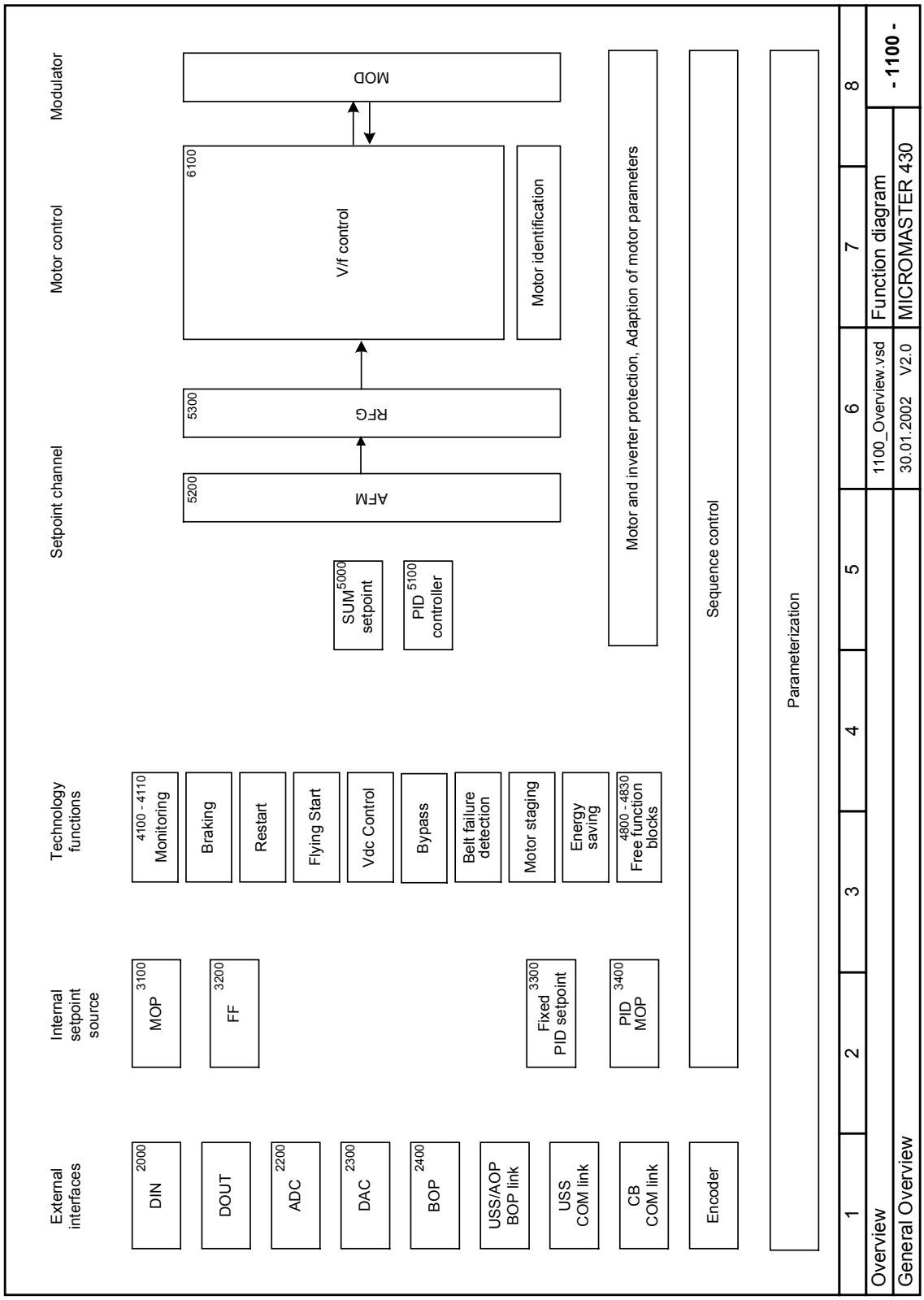
P3900 = 1 :
When setting 1 is selected, only the parameter settings carried out via the commissioning menu "Quick commissioning", are retained; all other parameter changes, including the I/O settings, are lost. Motor calculations are also performed.

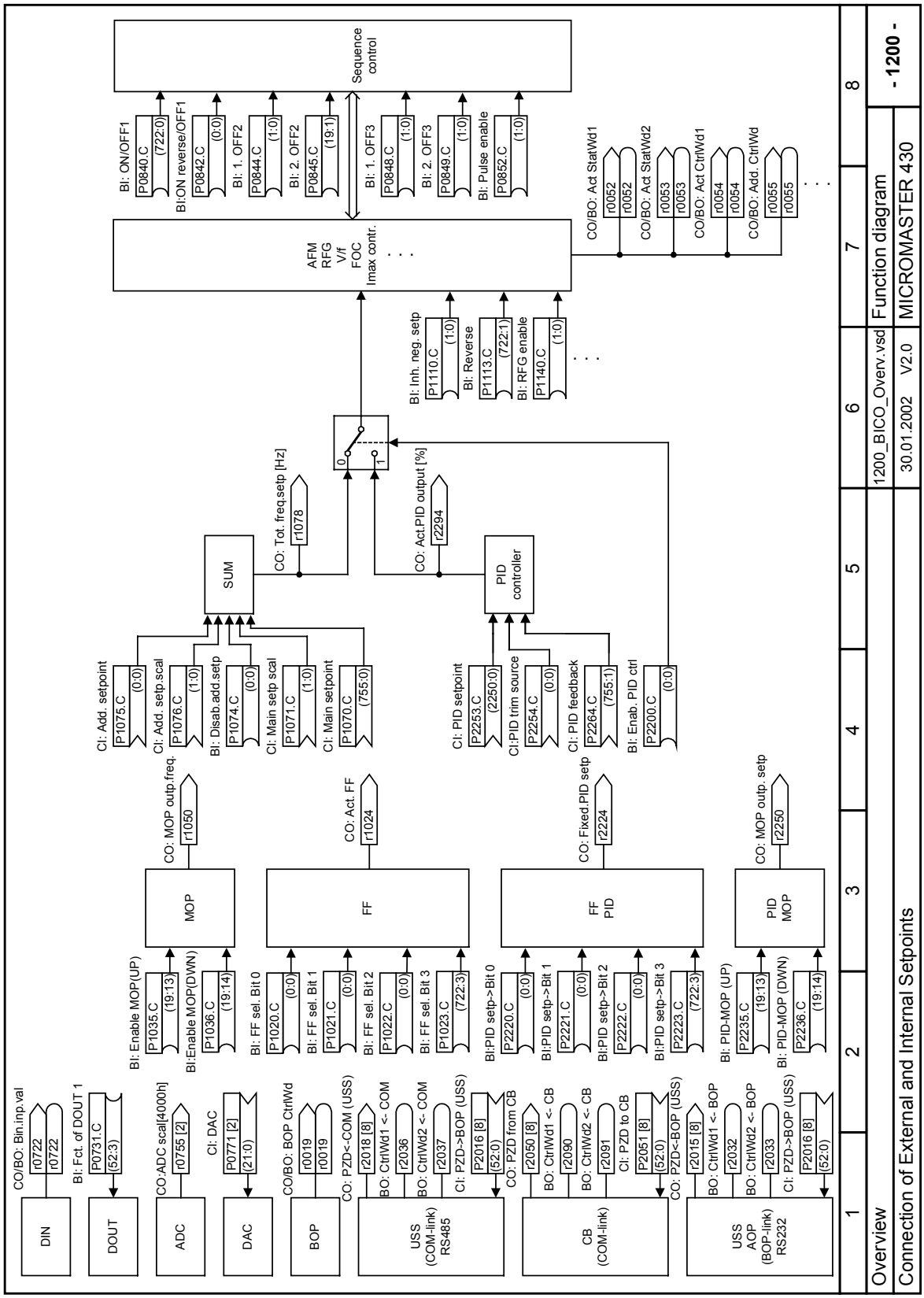
P3900 = 2 :
When setting 2 is selected, only those parameters, which depend on the parameters in the commissioning menu "Quick commissioning" (P0010 = 1) are calculated. The I/O settings are also reset to default and the motor calculations performed.

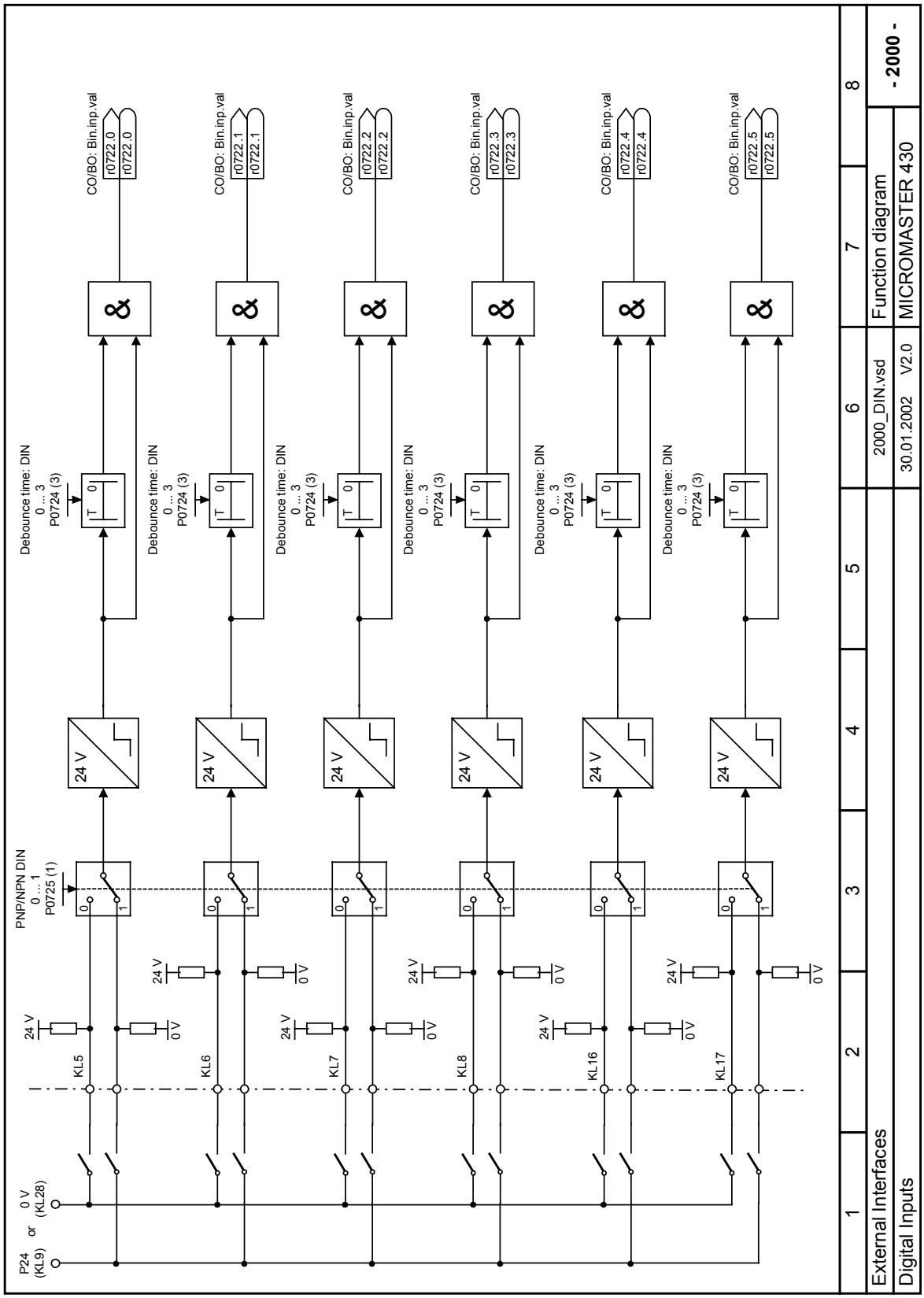
P3900 = 3 :
When setting 3 is selected, only the motor and controller calculations are performed. Exiting quick commissioning with this setting saves time (for example, if only motor rating plate data have been changed).

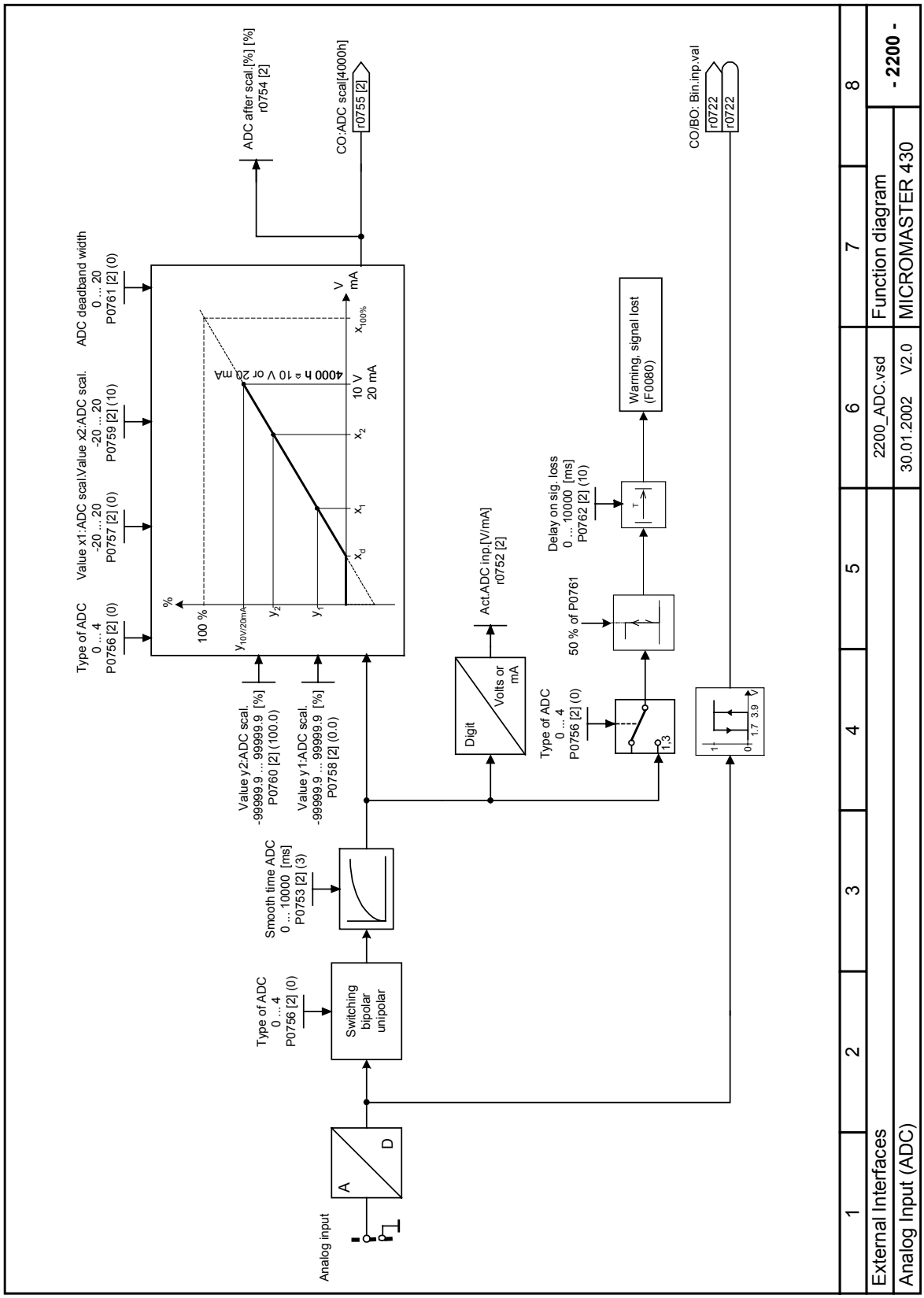
Calculates a variety of motor parameters, overwriting previous values. These include P0344 (motor weight), P0350 (demagnetization time), P2000 (reference frequency), P2002 (reference current).

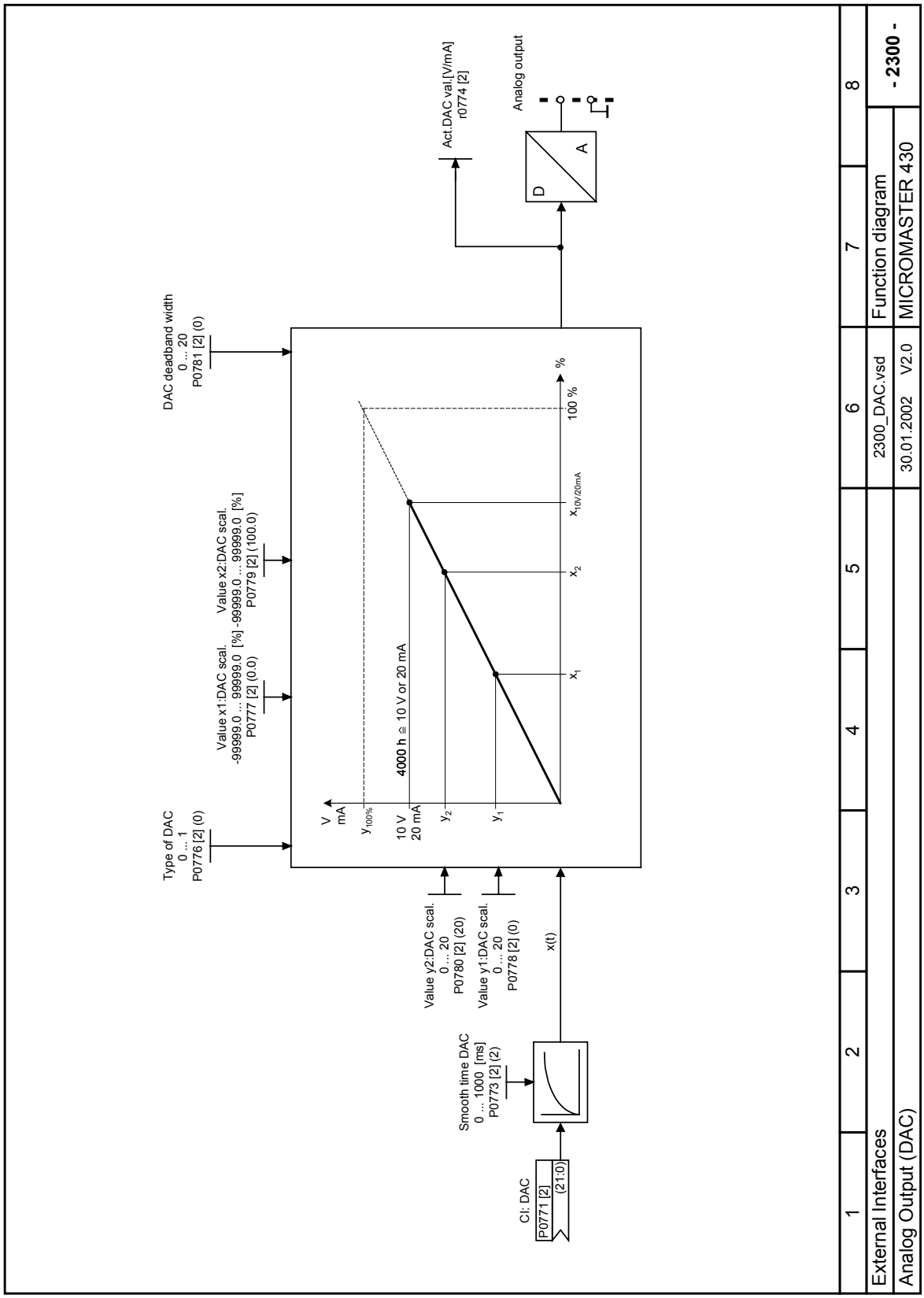
2 Function Diagrams

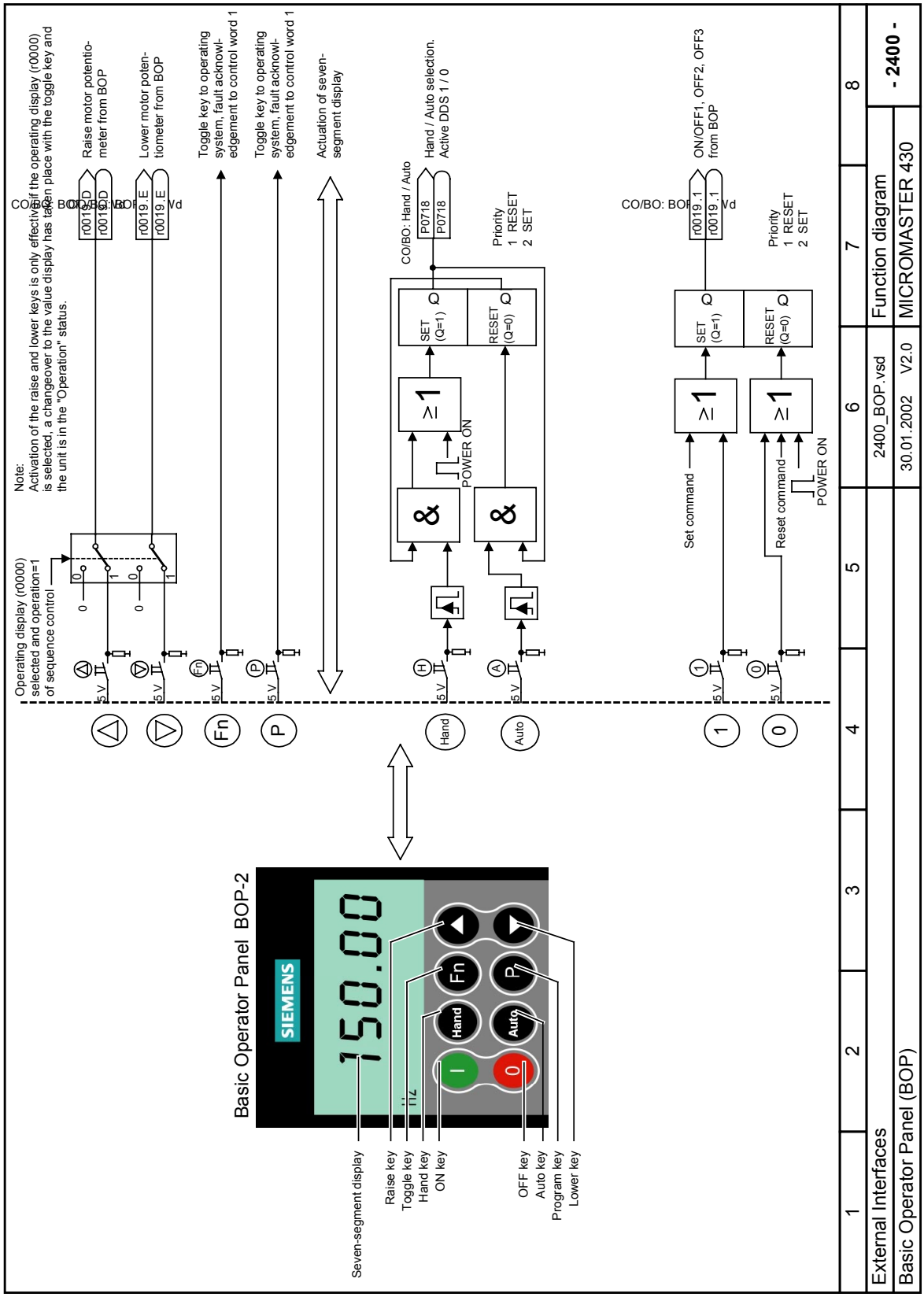


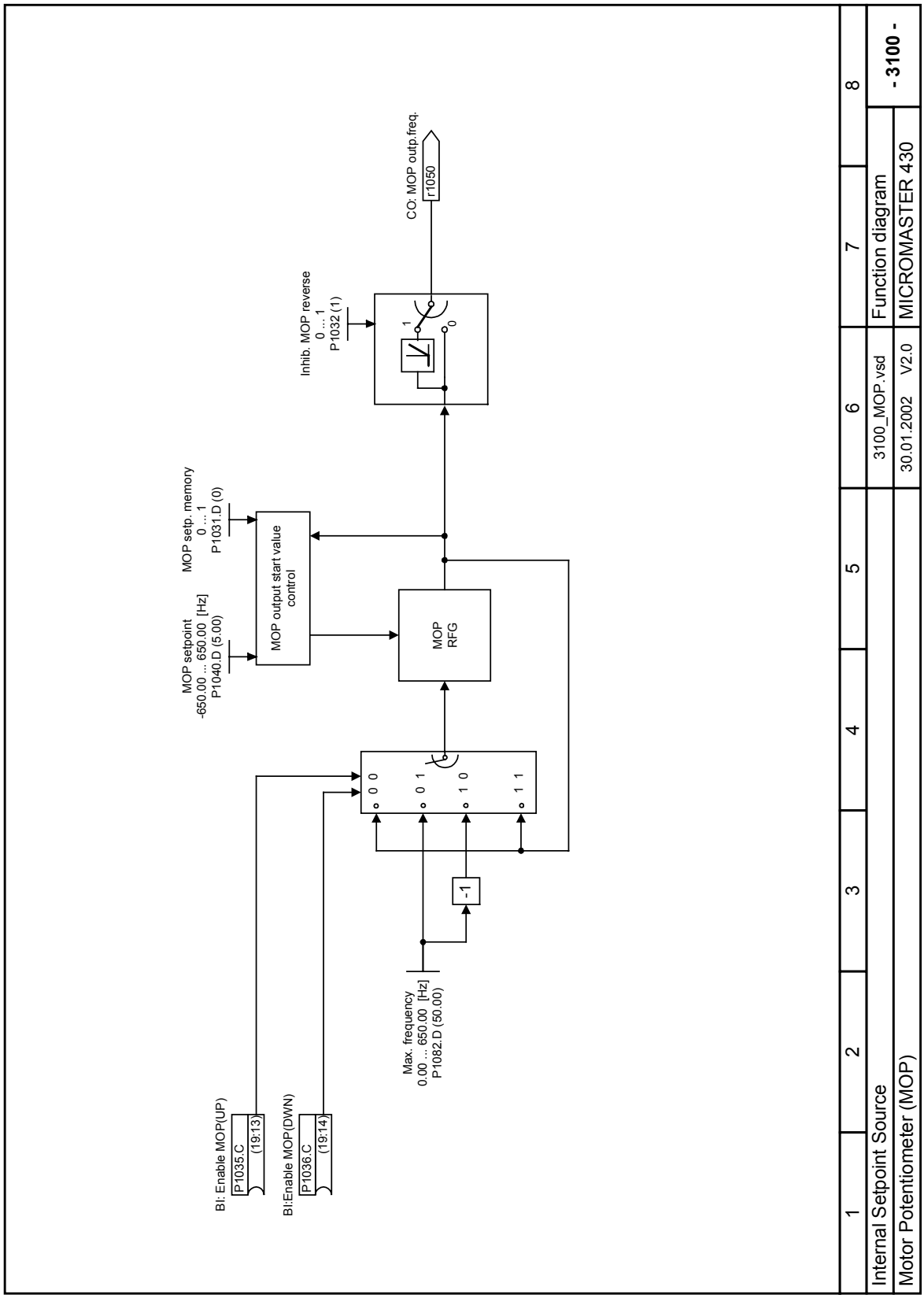

Overview
Connection of External and Internal Setpoints
1200_BICO_Overv.vsd
30.01.2002 V2.0
Function diagram
MICROMASTER 430
- 1200 -
DIN
DOUT
ADC
DAC
BOP
USS (COM-link) RS485
CB (COM-link)
USS AOP (BOP-link) RS232
MOP
FF
FF PID
PID MOP
SUM
PID controller
Sequence control
AFM RFG V/f FOC Imax contr.
CO/BO: Bin.inp.val
BI: Fct. of DOUT 1
CO:ADC scal[4000h]
CI: DAC
CO/BO: BOP CtrlWd
CO: PZD<-COM (USS)
BO: CtrlWd1 <- COM
BO: CtrlWd2 <- COM
CI: PZD->BOP (USS)
CO: PZD from CB
BO: CtrlWd1 <- CB
BO: CtrlWd2 <- CB
CI: PZD to CB
CO: PZD<-BOP (USS)
BO: CtrlWd1 <- BOP
BO: CtrlWd2 <- BOP
CI: PZD->BOP (USS)
BI: Enable MOP(UP)
BI:Enable MOP(DWN)
CO: MOP outp.freq.
BI: FF sel. Bit 0
BI: FF sel. Bit 1
BI: FF sel. Bit 2
BI: FF sel. Bit 3
CO: Act. FF
BI:PID setp->Bit 0
BI:PID setp->Bit 1
BI:PID setp->Bit 2
BI:PID setp->Bit 3
CO: Fixed.PID setp
BI: PID-MOP (UP)
BI: PID-MOP (DWN)
CO: MOP outp. setp
CI: Add. setpoint
CI: Add. setp.scal
BI: Disab.add.setp
CI: Main setp scal
CI: Main setpoint
CO: Tot. freq.setp [Hz]
CI: PID setpoint
CI:PID trim source
CI: PID feedback
BI: Enab. PID ctrl
CO: Act.PID output [%]
BI: ON/OFF1
BI:ON reverse/OFF1
BI: 1. OFF2
BI: 2. OFF2
BI: 1. OFF3
BI: 2. OFF3
BI: Pulse enable
BI: Inh. neg. setp
BI: Reverse
BI: RFG enable
CO/BO: Act StatWd1
CO/BO: Act StatWd2
CO/BO: Act CtrlWd1
CO/BO: Add. CtrlWd

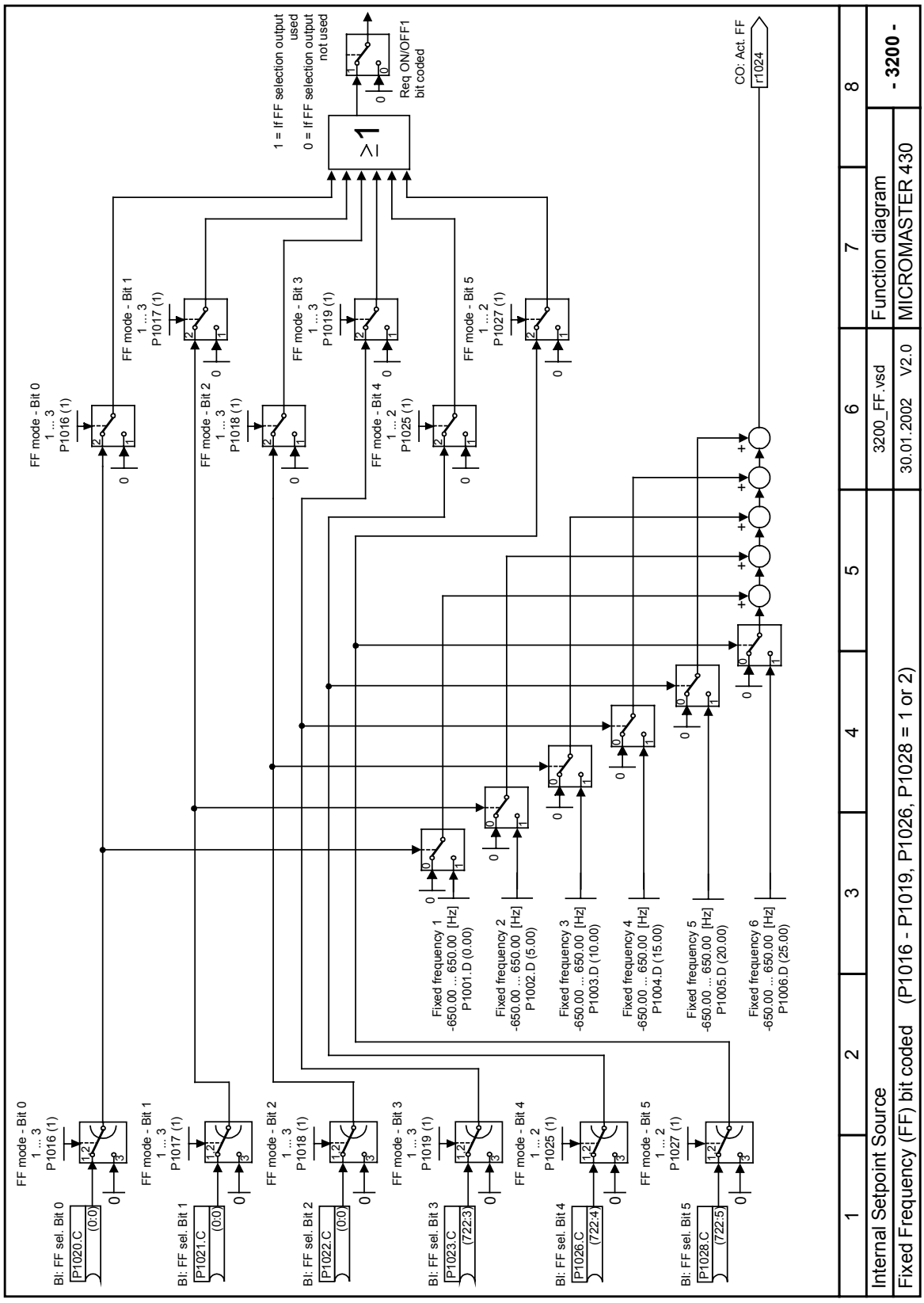

PNP/NPN DIN
0 ... 1
P0725 (1)
Debounce time: DIN
0 ... 3
P0724 (3)
24 V
0 V
P24 (KL9)
or
0 V (KL28)
KL5
KL6
KL7
KL8
KL16
KL17
CO/BO: Bin.inp.val
r0722.0
r0722.1
r0722.2
r0722.3
r0722.4
r0722.5
1
2
3
4
5
6
7
8
External Interfaces
Digital Inputs
2000_DIN.vsd
30.01.2002 V2.0
Function diagram
MICROMASTER 430
- 2000 -

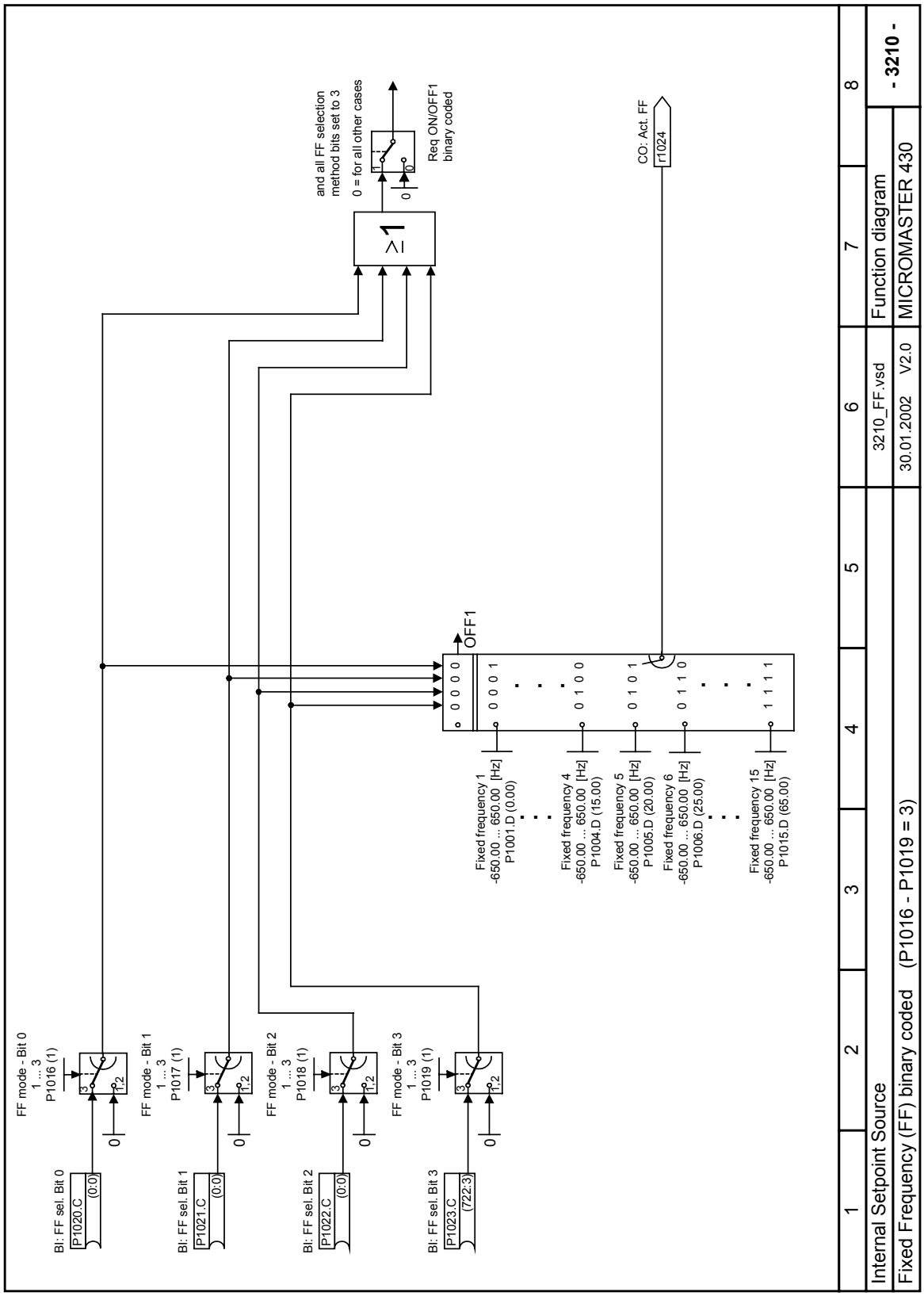

ADC after scal.[%] [%]
r0754 [2]
CO:ADC scal[4000h]
r0755 [2]
CO/BO: Bin.inp.val
r0722
r0722
ADC deadband width
0 ... 20
P0761 [2] (0)
Value x1:ADC scal
-20 ... 20
P0757 [2] (0)
Value x2:ADC scal.
-20 ... 20
P0759 [2] (10)
Type of ADC
0 ... 4
P0756 [2] (0)
4000 h = 10 V or 20 mA
10 V
20 mA
100 %
Value y2:ADC scal.
-99999.9 ... 99999.9 [%]
P0760 [2] (100.0)
Value y1:ADC scal.
-99999.9 ... 99999.9 [%]
P0758 [2] (0.0)
Act.ADC inp.[V/mA]
r0752 [2]
Digit
Volts or mA
Delay on sig. loss
0 ... 10000 [ms]
P0762 [2] (10)
Warning, signal lost
(F0080)
50 % of P0761
Smooth time ADC
0 ... 10000 [ms]
P0753 [2] (3)
Switching
bipolar
unipolar
Analog input
A
D
1,3
1,7 3,9
1 2 3 4 5 6 7 8
External Interfaces
Analog Input (ADC)
2200_ADC.vsd
30.01.2002 V2.0
Function diagram
MICROMASTER 430
- 2200 -

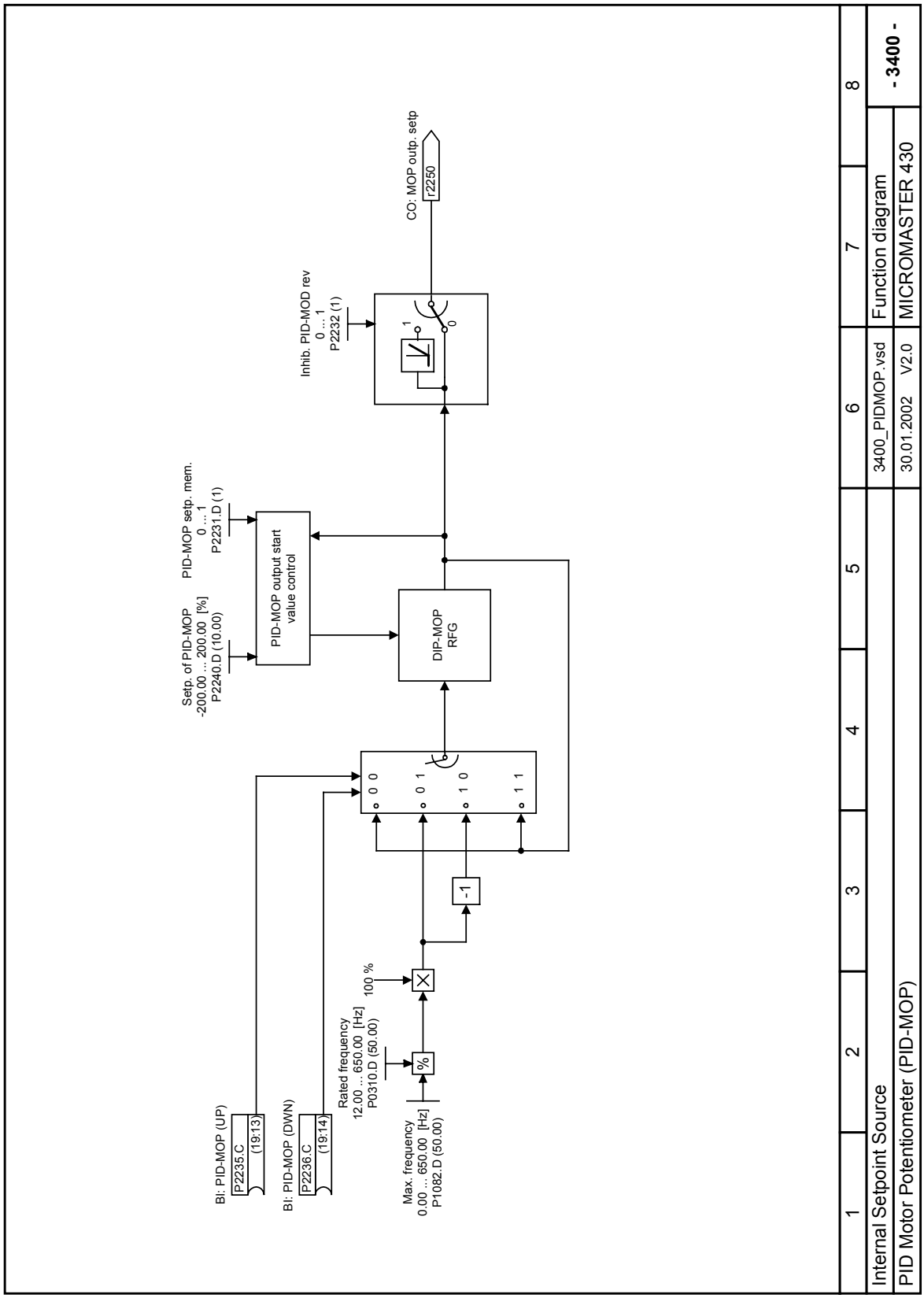

Act.DAC val.[V/mA]
r0774 [2]
Analog output
D
A
DAC deadband width
0 ... 20
P0781 [2] (0)
Value x2:DAC scal.
-99999.0 ... 99999.0 [%]
P0779 [2] (100.0)
Value x1:DAC scal.
-99999.0 ... 99999.0 [%]
P0777 [2] (0.0)
Type of DAC
0 ... 1
P0776 [2] (0)
V
mA
$y_{100\%}$
10 V
20 mA
4000 h ≙ 10 V or 20 mA
y_2
y_1
%
100 %
$x_{10V/20mA}$
x_2
x_1
Value y2:DAC scal.
0 ... 20
P0780 [2] (20)
Value y1:DAC scal.
0 ... 20
P0778 [2] (0)
x(t)
Smooth time DAC
0 ... 1000 [ms]
P0773 [2] (2)
CI: DAC
P0771 [2]
(21:0)
1
2
3
4
5
6
7
8
External Interfaces
Analog Output (DAC)
2300_DAC.vsd
30.01.2002 V2.0
Function diagram
MICROMASTER 430
- 2300 -

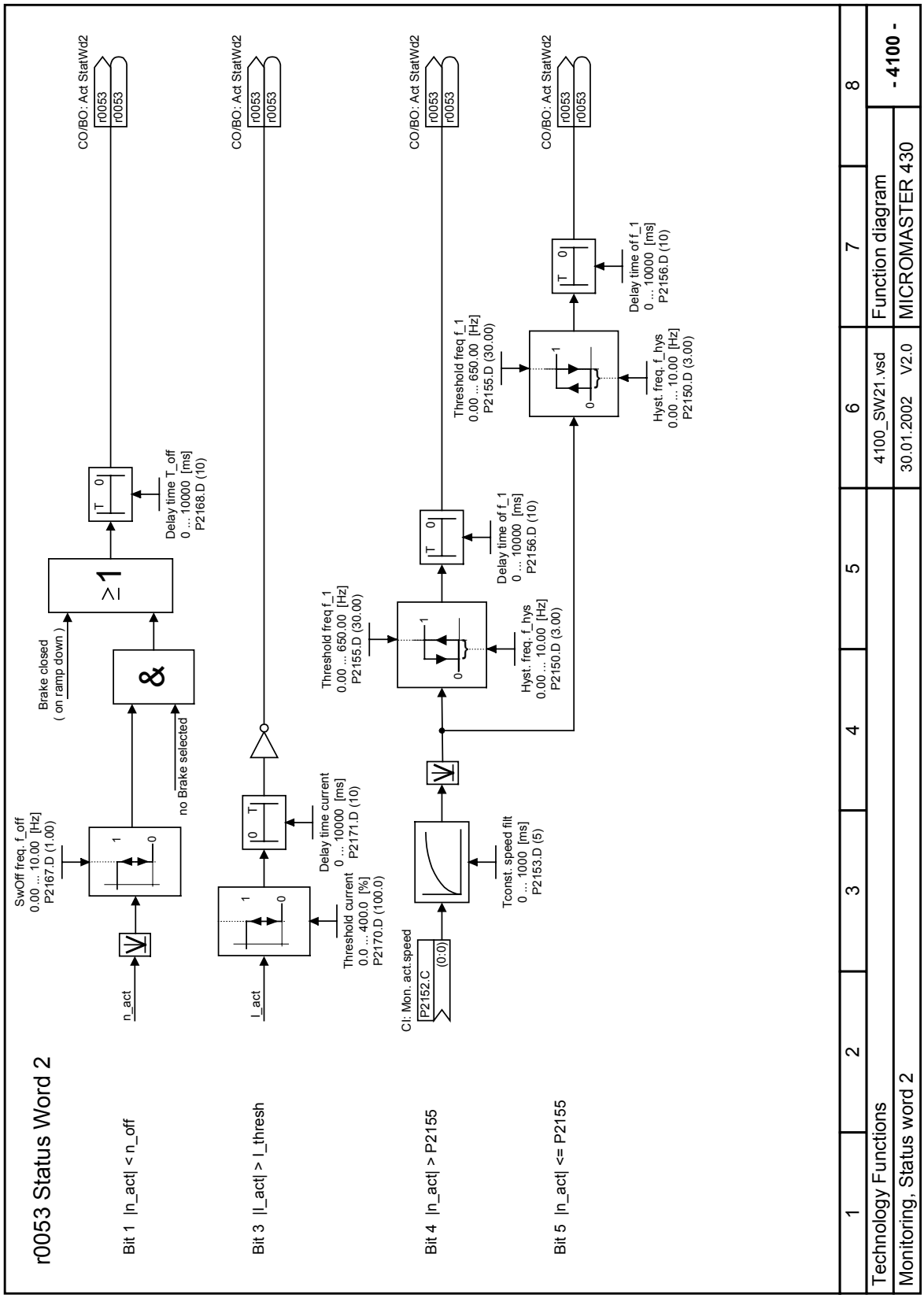

Basic Operator Panel BOP-2
SIEMENS
150.00
Hand
Auto
Fn
P
Seven-segment display
Raise key
Toggle key
Hand key
ON key
OFF key
Auto key
Program key
Lower key
Note:
Activation of the raise and lower keys is only effective if the operating display (r0000) is selected, a changeover to the value display has taken place with the toggle key and the unit is in the "Operation" status.
Operating display (r0000) selected and operation=1 of sequence control
Raise motor potentio-meter from BOP
Lower motor poten-tiometer from BOP
Toggle key to operating system, fault acknowl-edgement to control word 1
Toggle key to operating system, fault acknowl-edgement to control word 1
Actuation of seven-segment display
CO/BO: Hand / Auto
Hand / Auto selection. Active DDS 1 / 0
Priority 1 RESET 2 SET
POWER ON
CO/BO: BOP
ON/OFF1, OFF2, OFF3 from BOP
Priority 1 RESET 2 SET
Set command
Reset command
POWER ON
External Interfaces
Basic Operator Panel (BOP)
2400_BOP.vsd
30.01.2002 V2.0
Function diagram
MICROMASTER 430
- 2400 -

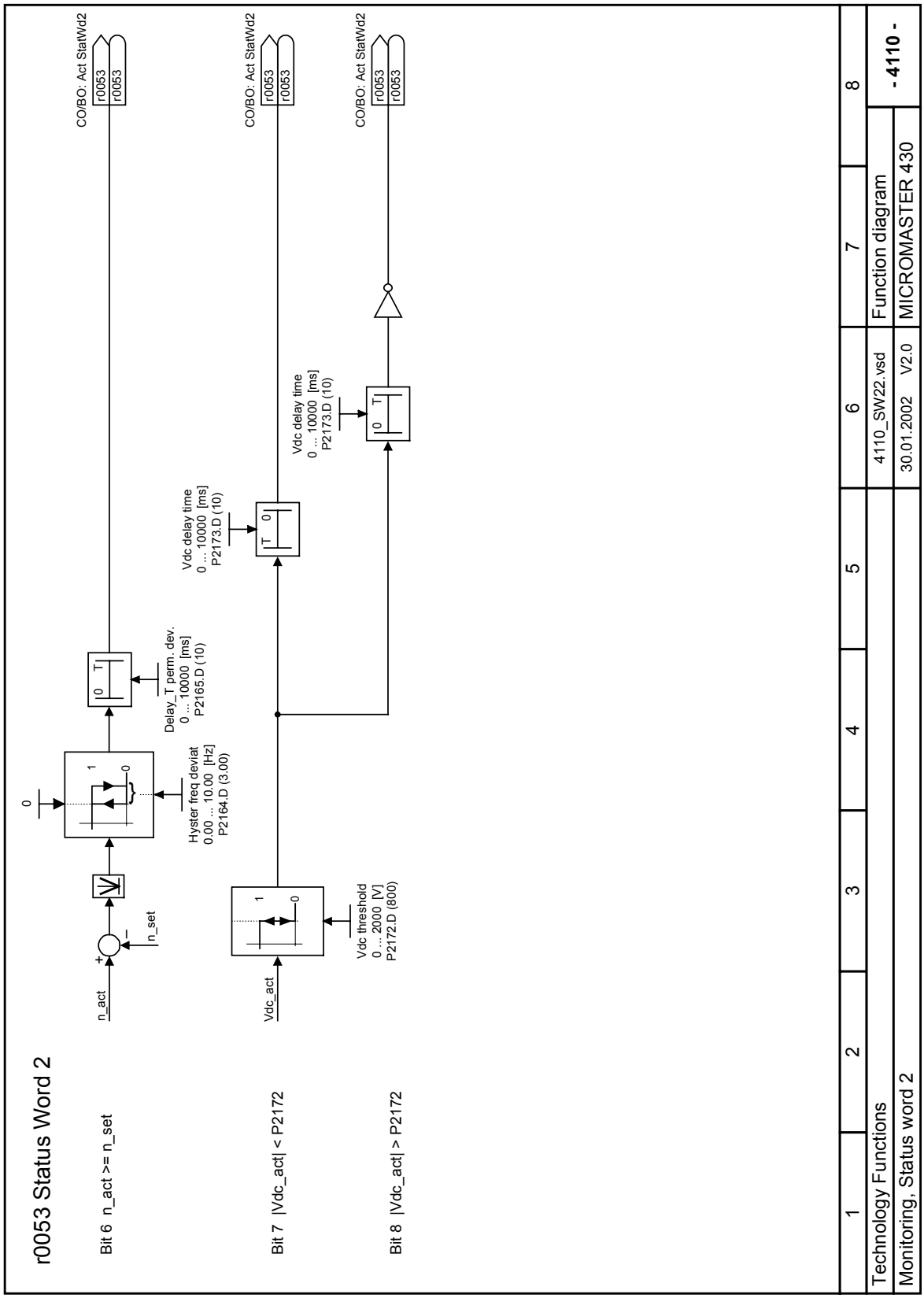

CO: MOP outp.freq.
r1050
Inhib. MOP reverse
0 ... 1
P1032 (1)
MOP setp. memory
0 ... 1
P1031.D (0)
MOP setpoint
-650.00 ... 650.00 [Hz]
P1040.D (5.00)
MOP output start value control
MOP RFG
0 0
0 1
1 0
1 1
-1
Max. frequency
0.00 ... 650.00 [Hz]
P1082.D (50.00)
BI: Enable MOP(UP)
P1035.C
(19:13)
BI:Enable MOP(DWN)
P1036.C
(19:14)
1
2
3
4
5
6
7
8
Internal Setpoint Source
Motor Potentiometer (MOP)
3100_MOP.vsd
30.01.2002 V2.0
Function diagram
MICROMASTER 430
- 3100 -

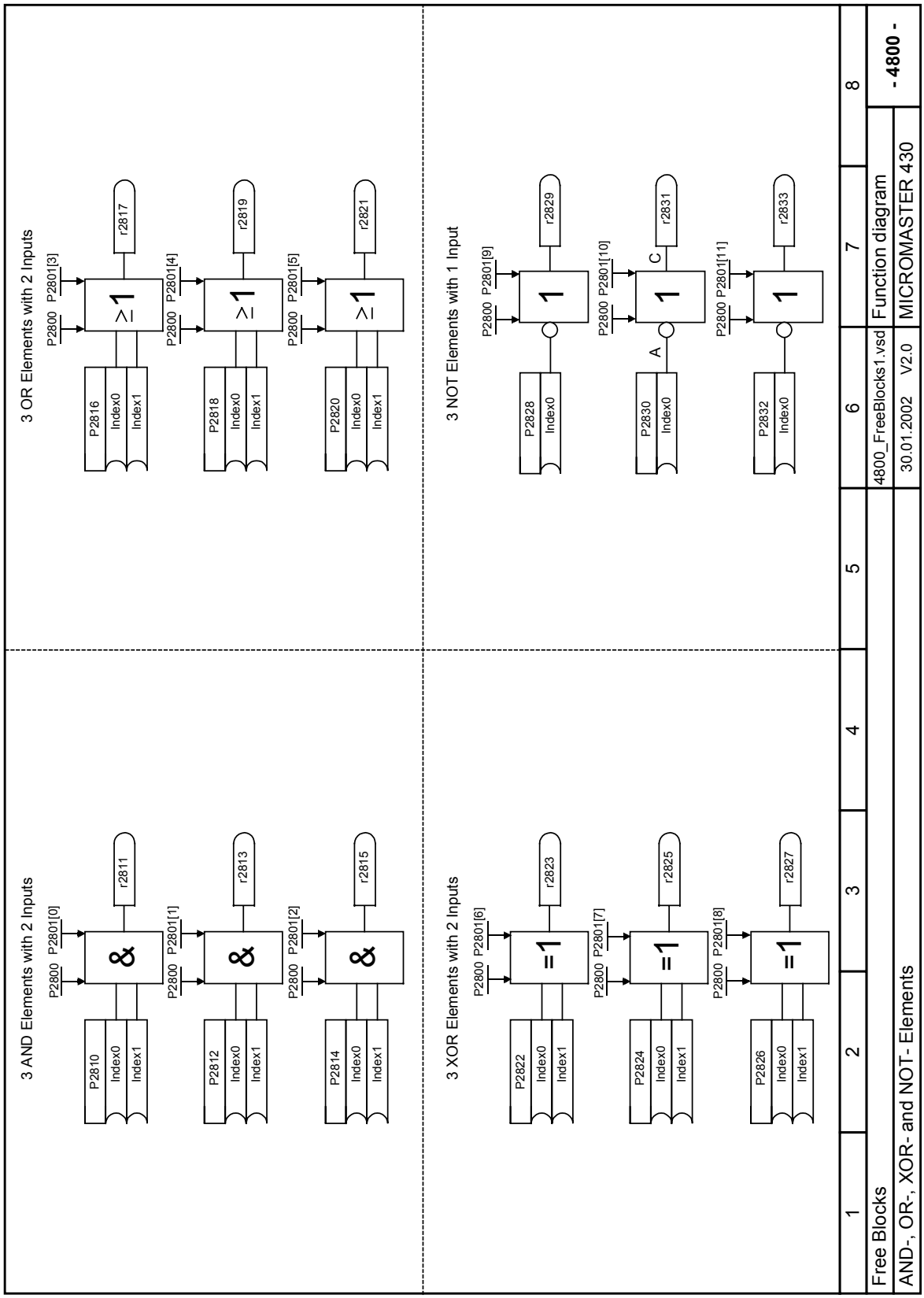

Internal Setpoint Source
Fixed Frequency (FF) bit coded (P1016 - P1019, P1026, P1028 = 1 or 2)
3200_FF.vsd
30.01.2002 V2.0
Function diagram
MICROMASTER 430
- 3200 -
FF mode - Bit 0 1 ... 3 P1016 (1)
FF mode - Bit 1 1 ... 3 P1017 (1)
FF mode - Bit 2 1 ... 3 P1018 (1)
FF mode - Bit 3 1 ... 3 P1019 (1)
FF mode - Bit 4 1 ... 2 P1025 (1)
FF mode - Bit 5 1 ... 2 P1027 (1)
BI: FF sel. Bit 0 P1020.C (0:0)
BI: FF sel. Bit 1 P1021.C (0:0)
BI: FF sel. Bit 2 P1022.C (0:0)
BI: FF sel. Bit 3 P1023.C (722:3)
BI: FF sel. Bit 4 P1026.C (722:4)
BI: FF sel. Bit 5 P1028.C (722:5)
Fixed frequency 1 -650.00 ... 650.00 [Hz] P1001.D (0.00)
Fixed frequency 2 -650.00 ... 650.00 [Hz] P1002.D (5.00)
Fixed frequency 3 -650.00 ... 650.00 [Hz] P1003.D (10.00)
Fixed frequency 4 -650.00 ... 650.00 [Hz] P1004.D (15.00)
Fixed frequency 5 -650.00 ... 650.00 [Hz] P1005.D (20.00)
Fixed frequency 6 -650.00 ... 650.00 [Hz] P1006.D (25.00)
1 = If FF selection output used
0 = If FF selection output not used
Req ON/OFF1 bit coded
CO: Act. FF r1024

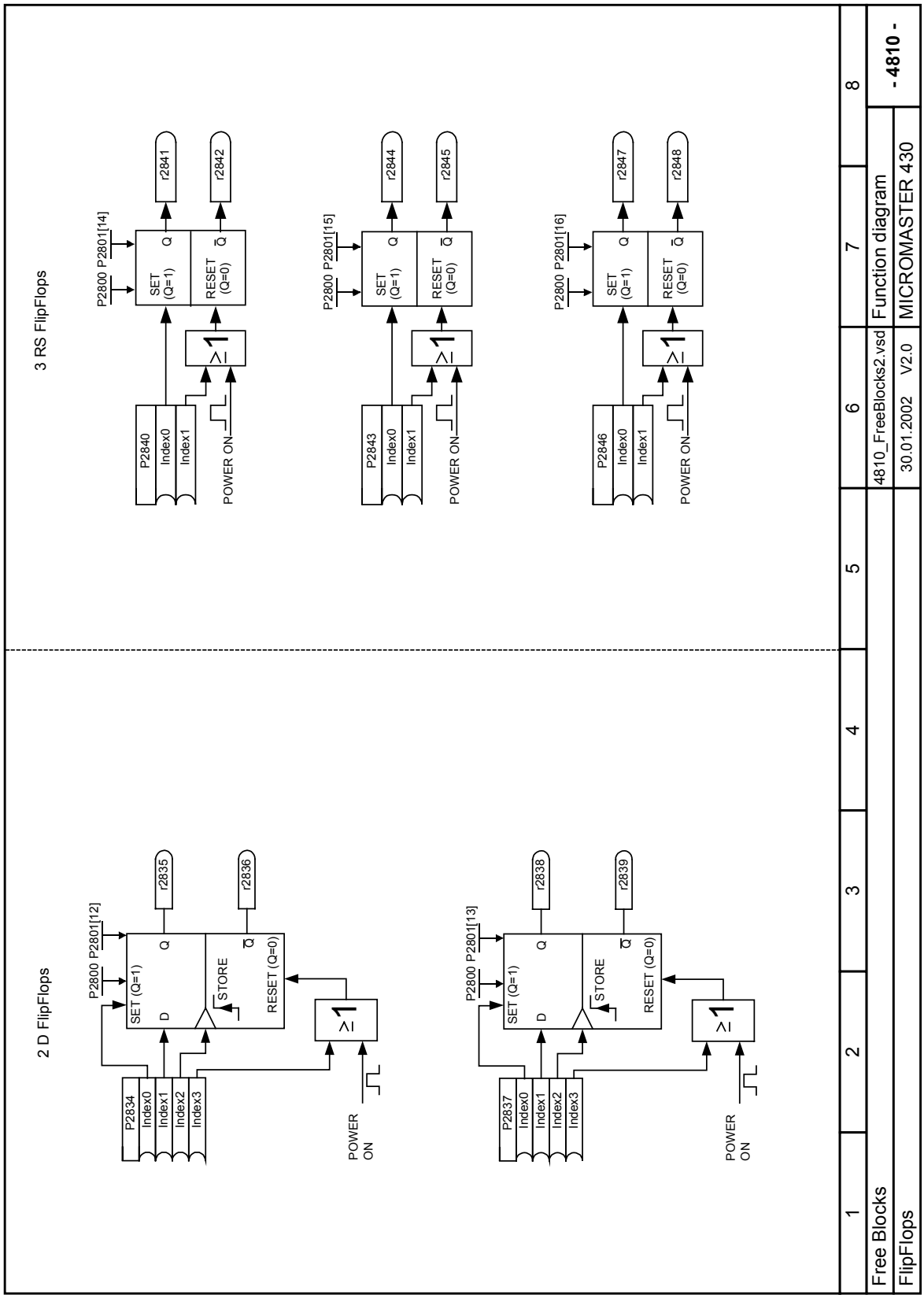

FF mode - Bit 0
1 ... 3
P1016 (1)
FF mode - Bit 1
1 ... 3
P1017 (1)
FF mode - Bit 2
1 ... 3
P1018 (1)
FF mode - Bit 3
1 ... 3
P1019 (1)
BI: FF sel. Bit 0
P1020.C
(0:0)
BI: FF sel. Bit 1
P1021.C
(0:0)
BI: FF sel. Bit 2
P1022.C
(0:0)
BI: FF sel. Bit 3
P1023.C
(722:3)
and all FF selection method bits set to 3
0 = for all other cases
Req ON/OFF1 binary coded
≥1
OFF1
CO: Act. FF
r1024
Fixed frequency 1
-650.00 ... 650.00 [Hz]
P1001.D (0.00)
Fixed frequency 4
-650.00 ... 650.00 [Hz]
P1004.D (15.00)
Fixed frequency 5
-650.00 ... 650.00 [Hz]
P1005.D (20.00)
Fixed frequency 6
-650.00 ... 650.00 [Hz]
P1006.D (25.00)
Fixed frequency 15
-650.00 ... 650.00 [Hz]
P1015.D (65.00)
Internal Setpoint Source
Fixed Frequency (FF) binary coded (P1016 - P1019 = 3)
3210_FF.vsd
30.01.2002 V2.0
Function diagram
MICROMASTER 430
- 3210 -

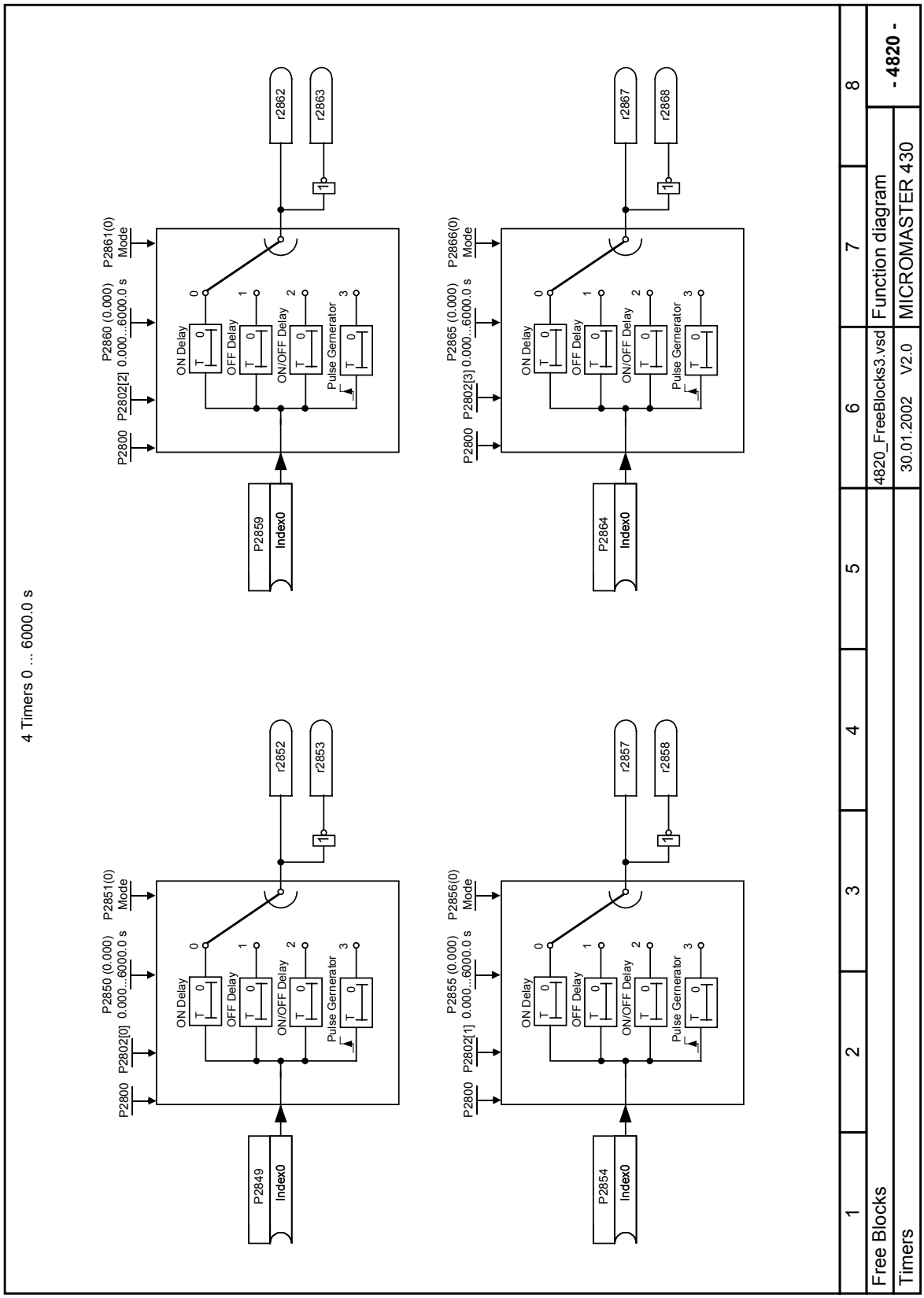

BI: PID-MOP (UP)
P2235.C
(19:13)
BI: PID-MOP (DWN)
P2236.C
(19:14)
Rated frequency
12.00 ... 650.00 [Hz]
P0310.D (50.00)
Max. frequency
0.00 ... 650.00 [Hz]
P1082.D (50.00)
100 %
%
-1
0 0
0 1
1 0
1 1
DIP-MOP
RFG
Setp. of PID-MOP
-200.00 ... 200.00 [%]
P2240.D (10.00)
PID-MOP setp. mem.
0 ... 1
P2231.D (1)
PID-MOP output start
value control
Inhib. PID-MOD rev
0 ... 1
P2232 (1)
1
0
CO: MOP outp. setp
r2250
1
2
3
4
5
6
7
8
Internal Setpoint Source
PID Motor Potentiometer (PID-MOP)
3400_PIDMOP.vsd
30.01.2002
V2.0
Function diagram
MICROMASTER 430
- 3400 -

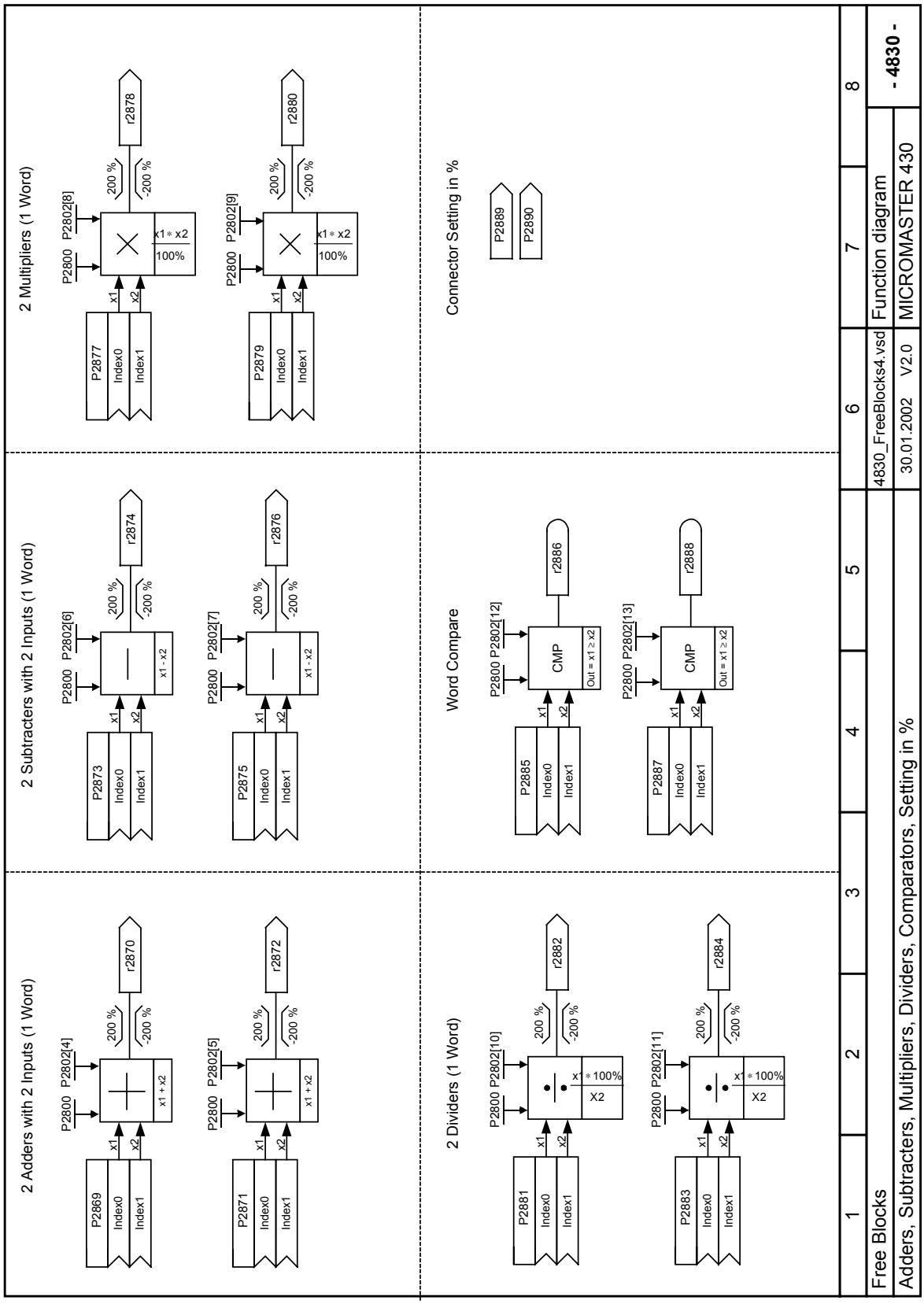

r0053 Status Word 2
Bit 1 |n_act| < n_off
Bit 3 |l_act| > l_thresh
Bit 4 |n_act| > P2155
Bit 5 |n_act| <= P2155
n_act
l_act
SwOff freq. f_off
0.00 ... 10.00 [Hz]
P2167.D (1.00)
Brake closed
(on ramp down)
no Brake selected
Delay time T_off
0 ... 10000 [ms]
P2168.D (10)
Threshold current
0.0 ... 400.0 [%]
P2170.D (100.0)
Delay time current
0 ... 10000 [ms]
P2171.D (10)
Ci: Mon. act.speed
P2152.C
(0:0)
Tconst. speed filt
0 ... 1000 [ms]
P2153.D (5)
Threshold freq f_1
0.00 ... 650.00 [Hz]
P2155.D (30.00)
Hyst. freq. f_hys
0.00 ... 10.00 [Hz]
P2150.D (3.00)
Delay time of f_1
0 ... 10000 [ms]
P2156.D (10)
CO/BO: Act StatWd2
r0053
r0053
Technology Functions
Monitoring, Status word 2
4100_SW21.vsd
30.01.2002 V2.0
Function diagram
MICROMASTER 430
- 4100 -

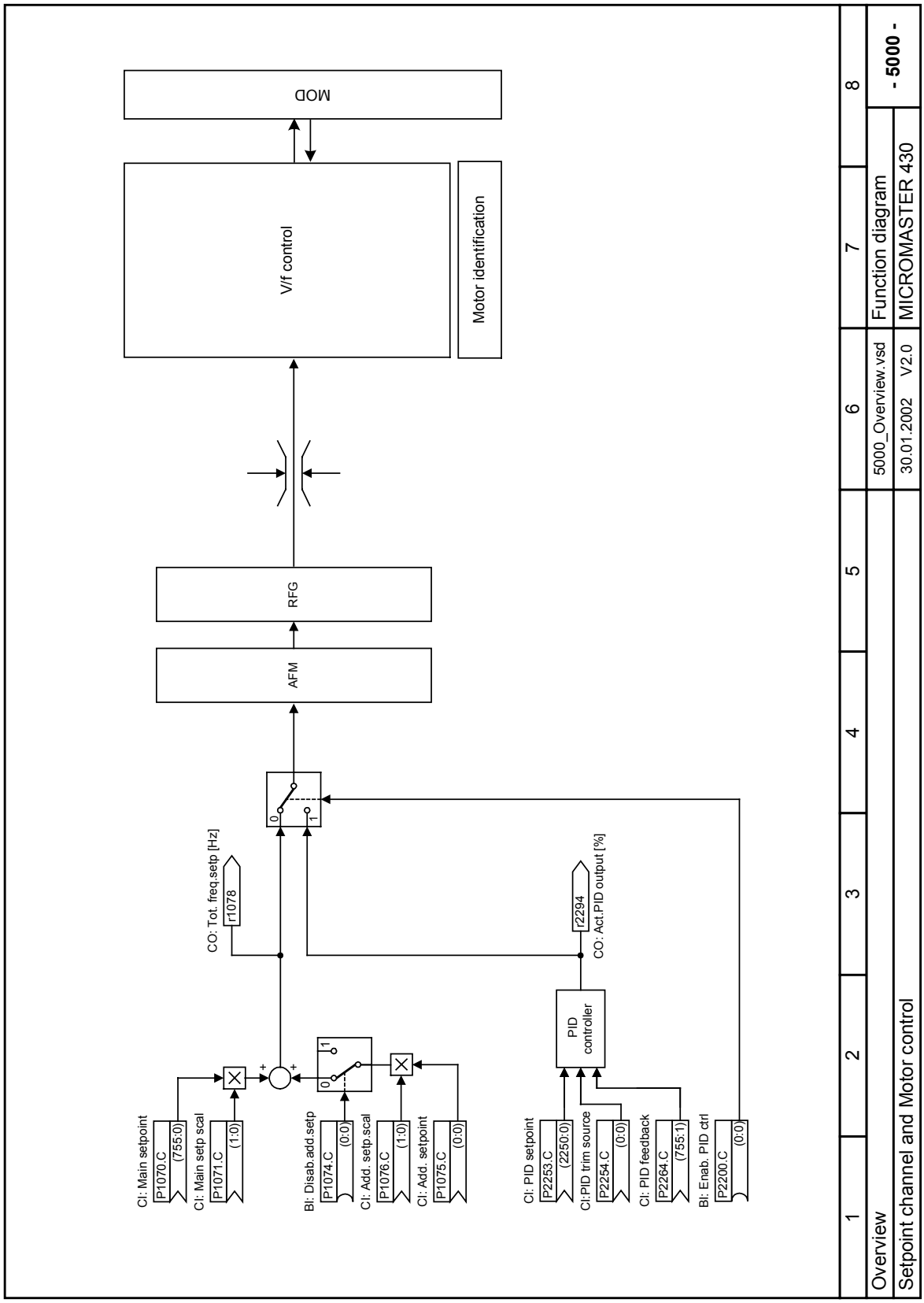

r0053 Status Word 2
Bit 6 n_act >= n_set
Bit 7 |Vdc_act| < P2172
Bit 8 |Vdc_act| > P2172
n_act
n_set
Vdc_act
Hyster freq deviat
0.00 ... 10.00 [Hz]
P2164.D (3.00)
Delay_T perm. dev.
0 ... 10000 [ms]
P2165.D (10)
Vdc threshold
0 ... 2000 [V]
P2172.D (800)
Vdc delay time
0 ... 10000 [ms]
P2173.D (10)
Vdc delay time
0 ... 10000 [ms]
P2173.D (10)
CO/BO: Act StatWd2
r0053
r0053
CO/BO: Act StatWd2
r0053
r0053
CO/BO: Act StatWd2
r0053
r0053
1
2
3
4
5
6
7
8
Technology Functions
Monitoring, Status word 2
4110_SW22.vsd
30.01.2002 V2.0
Function diagram
MICROMASTER 430
- 4110 -

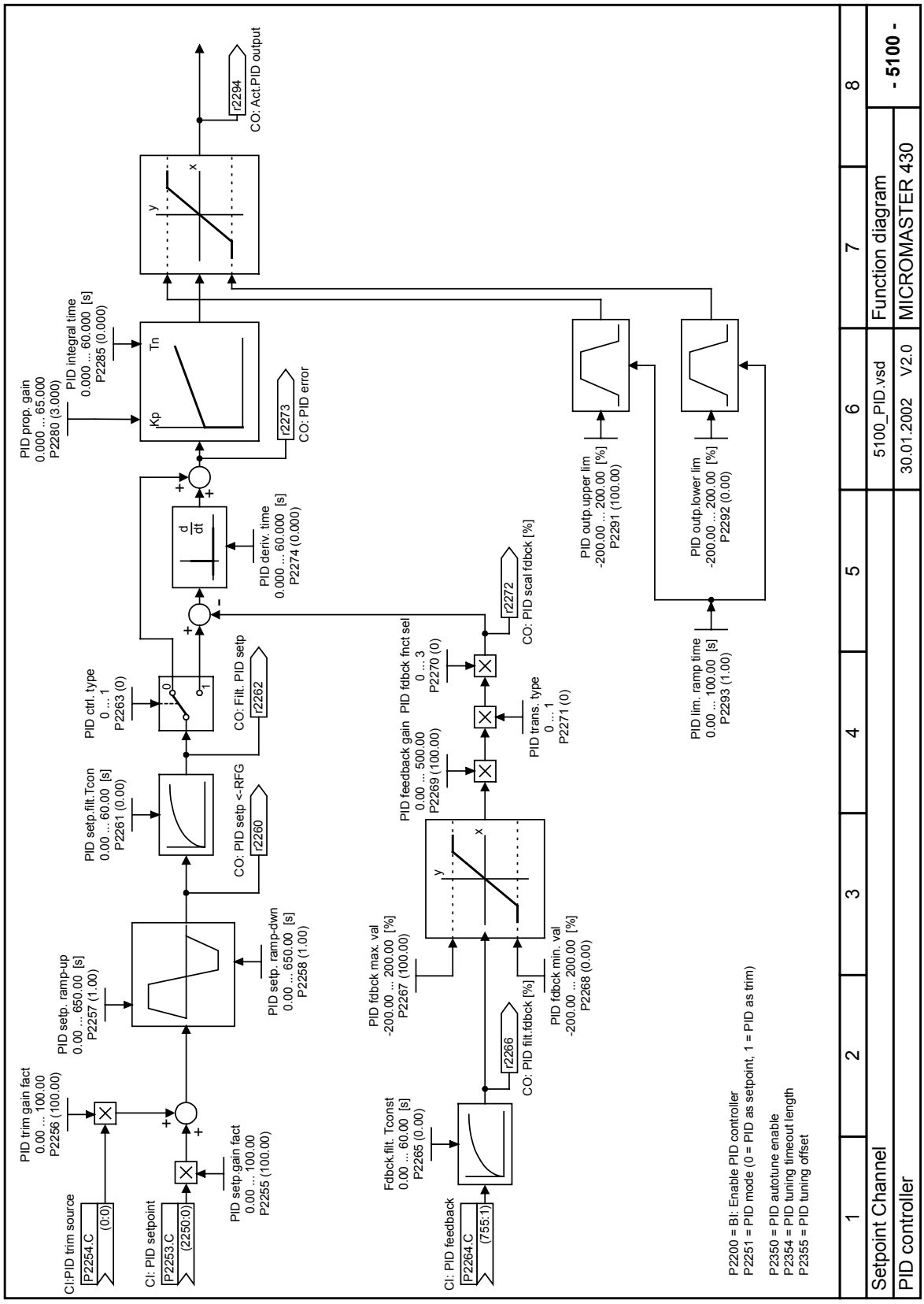

3 OR Elements with 2 Inputs
P2800 P2801[3]
≥1
r2817
P2816 Index0 Index1
P2800 P2801[4]
≥1
r2819
P2818 Index0 Index1
P2800 P2801[5]
≥1
r2821
P2820 Index0 Index1
3 NOT Elements with 1 Input
P2800 P2801[9]
1
r2829
P2828 Index0
P2800 P2801[10]
C
1
A
r2831
P2830 Index0
P2800 P2801[11]
1
r2833
P2832 Index0
3 AND Elements with 2 Inputs
P2800 P2801[0]
&
r2811
P2810 Index0 Index1
P2800 P2801[1]
&
r2813
P2812 Index0 Index1
P2800 P2801[2]
&
r2815
P2814 Index0 Index1
3 XOR Elements with 2 Inputs
P2800 P2801[6]
=1
r2823
P2822 Index0 Index1
P2800 P2801[7]
=1
r2825
P2824 Index0 Index1
P2800 P2801[8]
=1
r2827
P2826 Index0 Index1
1 2 3 4 5 6 7 8
Free Blocks
AND-, OR-, XOR- and NOT- Elements
4800_FreeBlocks1.vsd
30.01.2002 V2.0
Function diagram
MICROMASTER 430
- 4800 -

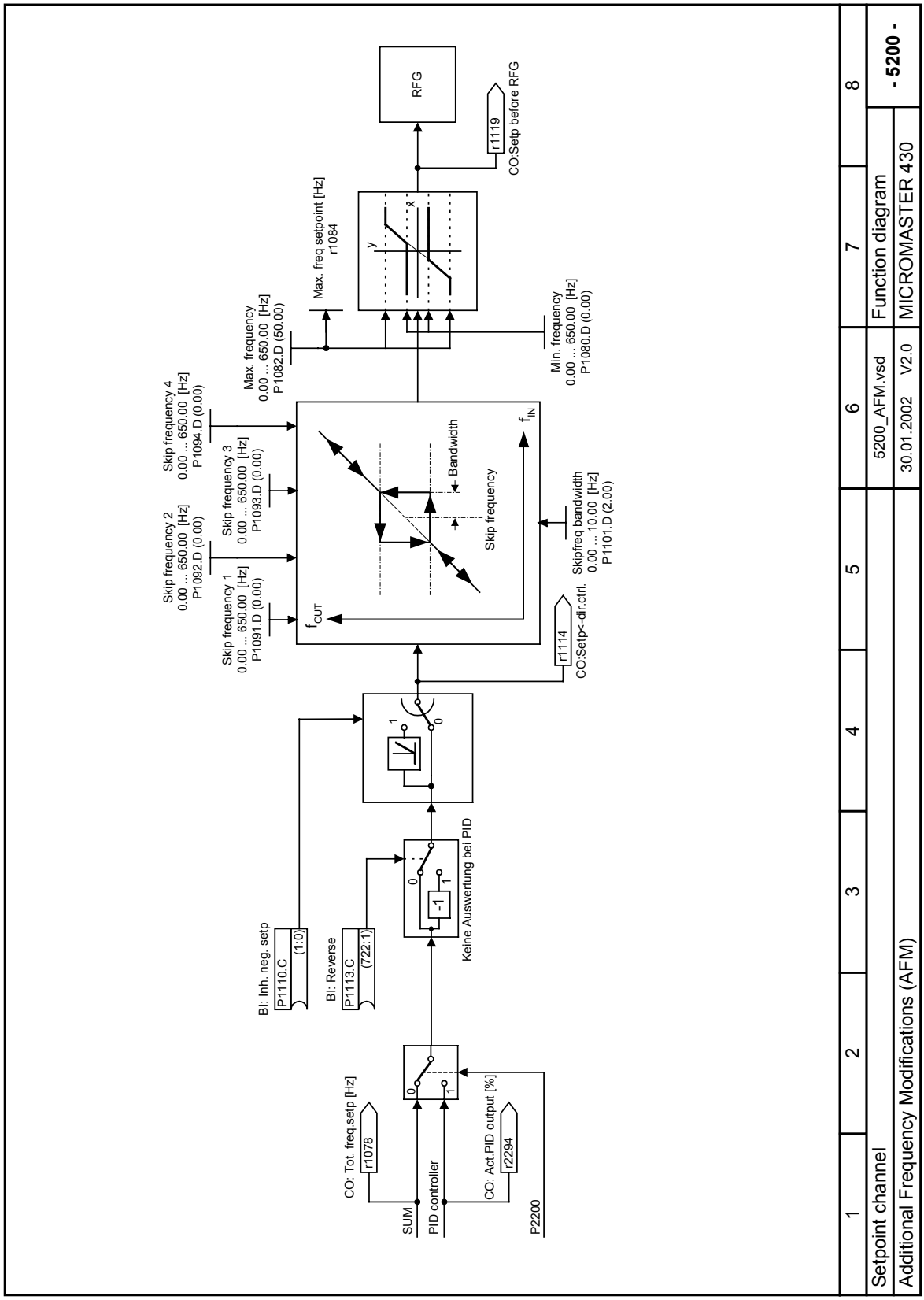

2 D FlipFlops
3 RS FlipFlops
P2800 P2801[12]
SET (Q=1)
D
Q
STORE
RESET (Q=0)
r2835
r2836
P2834
Index0
Index1
Index2
Index3
POWER ON
P2800 P2801[13]
r2838
r2839
P2837
P2800 P2801[14]
r2841
r2842
P2840
P2800 P2801[15]
r2844
r2845
P2843
P2800 P2801[16]
r2847
r2848
P2846
RESET (Q=0)
≥1
1 2 3 4 5 6 7 8
Free Blocks
FlipFlops
4810_FreeBlocks2.vsd
30.01.2002 V2.0
Function diagram
MICROMASTER 430
- 4810 -

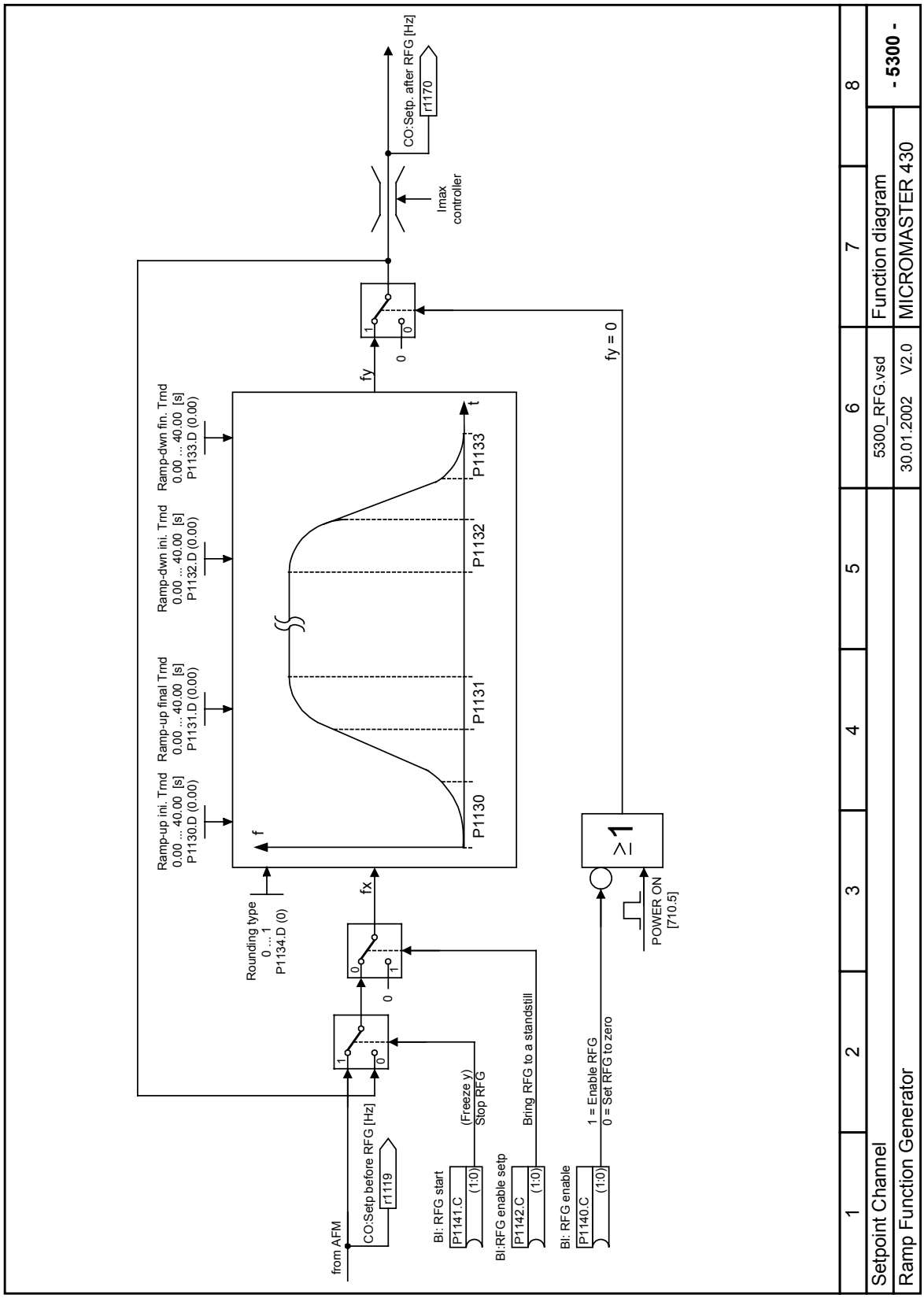

4 Timers 0 ... 6000.0 s
P2849
Index0
P2854
Index0
P2859
Index0
P2864
Index0
P2800
P2802[0]
P2850 (0.000) 0.000...6000.0 s
P2851(0) Mode
P2802[1]
P2855 (0.000) 0.000...6000.0 s
P2856(0) Mode
P2802[2]
P2860 (0.000) 0.000...6000.0 s
P2861(0) Mode
P2802[3]
P2865 (0.000) 0.000...6000.0 s
P2866(0) Mode
ON Delay
OFF Delay
ON/OFF Delay
Pulse Generator
r2852
r2853
r2857
r2858
r2862
r2863
r2867
r2868
1
2
3
4
5
6
7
8
Free Blocks
Timers
4820_FreeBlocks3.vsd
30.01.2002 V2.0
Function diagram
MICROMASTER 430
- 4820 -

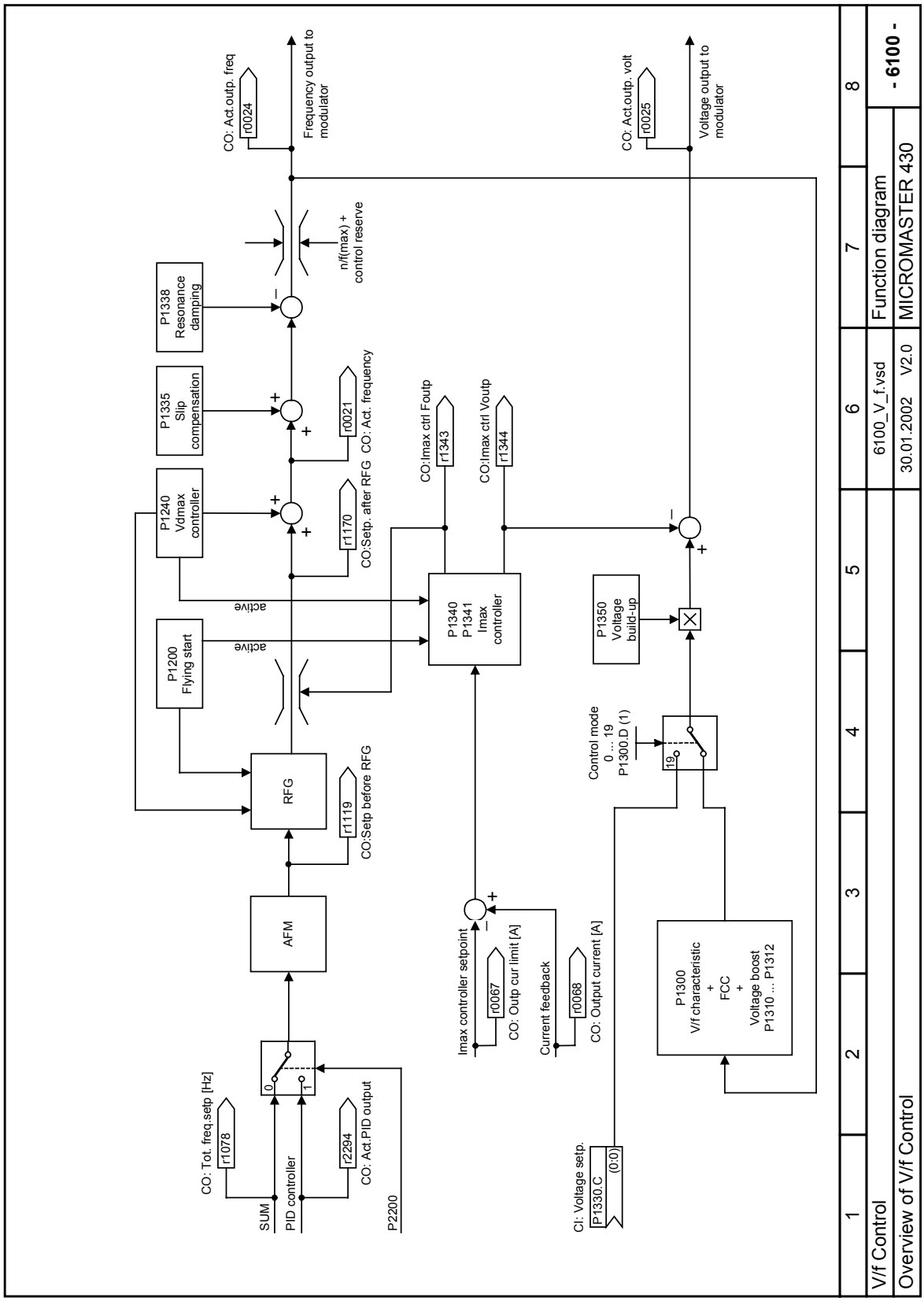

2 Adders with 2 Inputs (1 Word)
P2800
P2802[4]
P2869
Index0
Index1
x1
x2
200 %
-200 %
r2870
x1 + x2
P2800
P2802[5]
P2871
Index0
Index1
x1
x2
200 %
-200 %
r2872
x1 + x2
2 Subtracters with 2 Inputs (1 Word)
P2800
P2802[6]
P2873
Index0
Index1
x1
x2
200 %
-200 %
r2874
x1 - x2
P2800
P2802[7]
P2875
Index0
Index1
x1
x2
200 %
-200 %
r2876
x1 - x2
2 Multipliers (1 Word)
P2800
P2802[8]
P2877
Index0
Index1
x1
x2
200 %
-200 %
r2878
x1 * x2
100%
P2800
P2802[9]
P2879
Index0
Index1
x1
x2
200 %
-200 %
r2880
x1 * x2
100%
2 Dividers (1 Word)
P2800
P2802[10]
P2881
Index0
Index1
x1
x2
200 %
-200 %
r2882
x1 * 100%
X2
P2800
P2802[11]
P2883
Index0
Index1
x1
x2
200 %
-200 %
r2884
x1 * 100%
X2
Word Compare
P2800
P2802[12]
P2885
Index0
Index1
x1
x2
CMP
Out = x1 > x2
r2886
P2800
P2802[13]
P2887
Index0
Index1
x1
x2
CMP
Out = x1 > x2
r2888
Connector Setting in %
P2889
P2890
1
2
3
4
5
6
7
8
Free Blocks
4830_FreeBlocks4.vsd
Function diagram
- 4830 -
Adders, Subtracters, Multipliers, Dividers, Comparators, Setting in %
30.01.2002 V2.0
MICROMASTER 430


MOD
V/f control
Motor identification
RFG
AFM
CO: Tot. freq.setp [Hz]
r1078
CO : Act.PID output [%]
r2294
PID controller
CI: Main setpoint
P1070.C
(755:0)
CI: Main setp scal
P1071.C
(1:0)
BI: Disab.add.setp
P1074.C
(0:0)
CI: Add. setp.scal
P1076.C
(1:0)
CI: Add. setpoint
P1075.C
(0:0)
CI: PID setpoint
P2253.C
(2250:0)
CI:PID trim source
P2254.C
(0:0)
CI: PID feedback
P2264.C
(755:1)
BI: Enab. PID ctrl
P2200.C
(0:0)
1 2 3 4 5 6 7 8
Overview
Setpoint channel and Motor control
5000_Overview.vsd
30.01.2002 V2.0
Function diagram
MICROMASTER 430
- 5000 -


PID trim gain fact
0.00 ... 100.00
P2256 (100.00)
CI:PID trim source
P2254.C
(0:0)
PID setp. ramp-up
0.00 ... 650.00 [s]
P2257 (1.00)
PID setp. ramp-dwn
0.00 ... 650.00 [s]
P2258 (1.00)
PID setp.filt.Tcon
0.00 ... 60.00 [s]
P2261 (0.00)
CO: PID setp <-RFG
r2260
PID ctrl. type
0 ... 1
P2263 (0)
CO: Filt. PID setp
r2262
CI: PID setpoint
P2253.C
(2250:0)
PID setp.gain fact
0.00 ... 100.00
P2255 (100.00)
PID prop. gain
0.000 ... 65.000
P2280 (3.000)
PID integral time
0.000 ... 60.000 [s]
P2285 (0.000)
r2294
CO: Act.PID output
r2273
CO: PID error
PID deriv. time
0.000 ... 60.000 [s]
P2274 (0.000)
CO: PID scal fdbck [%]
r2272
PID feedback gain
0.00 ... 500.00
P2269 (100.00)
PID fdbck fnct sel
0 ... 3
P2270 (0)
PID trans. type
0 ... 1
P2271 (0)
PID fdbck max. val
-200.00 ... 200.00 [%]
P2267 (100.00)
PID fdbck min. val
-200.00 ... 200.00 [%]
P2268 (0.00)
Fdbck.filt. Tconst
0.00 ... 60.00 [s]
P2265 (0.00)
CO: PID filt.fdbck [%]
r2266
CI: PID feedback
P2264.C
(755:1)
PID outp.upper lim
-200.00 ... 200.00 [%]
P2291 (100.00)
PID outp.lower lim
-200.00 ... 200.00 [%]
P2292 (0.00)
PID lim. ramp time
0.00 ... 100.00 [s]
P2293 (1.00)
P2200 = BI: Enable PID controller
P2251 = PID mode (0 = PID as setpoint, 1 = PID as trim)
P2350 = PID autotune enable
P2354 = PID tuning timeout length
P2355 = PID tuning offset
1 2 3 4 5 6 7 8
Setpoint Channel
PID controller
5100_PID.vsd V2.0
30.01.2002
Function diagram
MICROMASTER 430
- 5100 -


RFG
r1119
CO:Setp before RFG
Max. freq setpoint [Hz]
r1084
Max. frequency
0.00 ... 650.00 [Hz]
P1082.D (50.00)
Min. frequency
0.00 ... 650.00 [Hz]
P1080.D (0.00)
Skip frequency 4
0.00 ... 650.00 [Hz]
P1094.D (0.00)
Skip frequency 3
0.00 ... 650.00 [Hz]
P1093.D (0.00)
Skip frequency 2
0.00 ... 650.00 [Hz]
P1092.D (0.00)
Skip frequency 1
0.00 ... 650.00 [Hz]
P1091.D (0.00)
Skipfreq bandwidth
0.00 ... 10.00 [Hz]
P1101.D (2.00)
Bandwidth
Skip frequency
f_OUT
f_IN
r1114
CO:Setp<-dir.ctrl.
BI: Inh. neg. setp
P1110.C
(1:0)
BI: Reverse
P1113.C
(722:1)
Keine Auswertung bei PID
CO: Tot. freq.setp [Hz]
r1078
CO: Act.PID output [%]
r2294
SUM
PID controller
P2200
1
2
3
4
5
6
7
8
Setpoint channel
5200_AFM.vsd
Function diagram
- 5200 -
Additional Frequency Modifications (AFM)
30.01.2002
V2.0
MICROMASTER 430


CO:Setp. after RFG [Hz]
r1170
Imax controller
fy
fy = 0
Ramp-up ini. Trnd 0.00 ... 40.00 [s] P1130.D (0.00)
Ramp-up final Trnd 0.00 ... 40.00 [s] P1131.D (0.00)
Ramp-dwn ini. Trnd 0.00 ... 40.00 [s] P1132.D (0.00)
Ramp-dwn fin. Trnd 0.00 ... 40.00 [s] P1133.D (0.00)
P1130
P1131
P1132
P1133
f
t
Rounding type 0 ... 1 P1134.D (0)
fx
≥1
POWER ON [710.5]
from AFM
CO:Setp before RFG [Hz]
r1119
BI: RFG start
P1141.C
(1:0)
(Freeze y)
Stop RFG
BI:RFG enable setp
P1142.C
(1:0)
Bring RFG to a standstill
BI: RFG enable
P1140.C
(1:0)
1 = Enable RFG
0 = Set RFG to zero
1
2
3
4
5
6
7
8
Setpoint Channel
Ramp Function Generator
5300_RFG.vsd
30.01.2002 V2.0
Function diagram
MICROMASTER 430
- 5300 -


CO: Act.outp. freq
r0024
Frequency output to modulator
CO: Act.outp. volt
r0025
Voltage output to modulator
n/f(max) + control reserve
P1338 Resonance damping
P1335 Slip compensation
r0021
CO: Act. frequency
P1240 Vdmax controller
r1170
CO:Setp. after RFG
CO:Imax ctrl Foutp
r1343
CO:Imax ctrl Voutp
r1344
active
P1200 Flying start
active
P1340 P1341 Imax controller
P1350 Voltage build-up
RFG
r1119
CO:Setp before RFG
Control mode 0 ... 19 P1300.D (1)
AFM
Imax controller setpoint
r0067
CO: Outp cur limit [A]
Current feedback
r0068
CO: Output current [A]
P1300 V/f characteristic + FCC + Voltage boost P1310 ... P1312
CO: Tot. freq.setp [Hz]
r1078
SUM
PID controller
r2294
CO: Act.PID output
P2200
CI: Voltage setp.
P1330.C
(0:0)
1
2
3
4
5
6
7
8
V/f Control
6100_V_f.vsd
Function diagram
- 6100 -
Overview of V/f Control
30.01.2002 V2.0
MICROMASTER 430

3 Faults and Alarms

3.1 Fault messages

In the event of a failure, the inverter switches off and a fault code appears on the display.

NOTE

To reset the fault code, one of three methods listed below can be used:

1. Cycle the power to the drive.
2. Press the Fn button on the BOP or AOP.
3. Via Digital Input 3 (default setting)

Fault	Possible Causes	Diagnose & Remedy	Reaction
F0001 OverCurrent	➢ Motor power (P0307) does not correspond to the inverter power (r0206) ➢ Motor lead short circuit ➢ Earth faults	Check the following: 1. Motor power (P0307) must correspond to inverter power (r0206). 2. Cable length limits must not be exceeded. 3. Motor cable and motor must have no short-circuits or earth faults 4. Motor parameters must match the motor in use 5. Value of stator resistance (P0350) must be correct 6. Motor must not be obstructed or overloaded Increase the ramp time Reduce the boost level	Off1
F0002 OverVoltage	➢ 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 cause by fast ramp downs or if the motor is driven from an active load.	Check the following: 1. Supply voltage (P0210) must lie within limits indicated on rating plate . 2. DC-link voltage controller must be enabled (P1240) and parameterized properly. 3. Ramp-down time (P1121) must match inertia of load. 4. Required braking power must lie within specified limits. NOTE Higher inertia requires longer ramp times; otherwise, apply braking resistor.	Off1
F0003 UnderVoltage	➢ Main supply failed. ➢ Shock load outside specified limits.	Check the following: 1. Supply voltage (P0210) must lie within limits indicated on rating plate. 2. Supply must not be susceptible to temporary failures or voltage reductions.	Off1
F0004 Inverter Over Temperature	➢ Ventilation inadequate ➢ Ambient temperature is too high.	Check the following: 1. Fan must turn when inverter is running 2. Pulse frequency must be set to default value 3. Ambient temperature could be higher than specified for the inverter	Off1
F0005 Inverter I2T	Inverter overloaded. Duty cycle too demanding. Motor power (P0307) exceeds inverter power capability (r0206).	Check the following: 1. Load duty cycle must lie within specified limits. 2. Motor power (P0307) must match inverter power (r0206)	Off1
F0011	Motor overloaded	Check the following:	Off1

Fault	Possible Causes	Diagnose & Remedy	Reaction
Motor Over Temperature		1. Load duty cycle must be correct 2. Motor nominal overtemperatures (P0626-P0628) must be correct 3. Motor temperature warning level (P0604) must match	
F0012 Inverter temp. signal lost	Wire breakage of inverter temperature (heatsink) sensor		Off1
F0015 Motor temperature signal lost	Open or short circuit of motor temperature sensor. If signal loss is detected, temperature monitoring switches over to monitoring with the motor thermal model.		Off1
F0020 Mains Phase Missing	Fault occurs if one of the three input phases are missed and the pulses are enabled and drive is loaded	check the input wiring of the mains phases	Off1
F0021 Earth fault	Fault occurs if the sum of the phase currents is higher than 5 % of the nominal inverter current. NOTE This fault only occurs on inverters that have 3 current sensors. Framesizes D to F		Off1
F0022 Powerstack fault	That hardware fault (P0947 = 22 and P0949 = 1) caused by the following events: (1) DC-link overcurrent = short circuit of IGBT (2) (2) Short circuit of chopper (3) (3) Earth fault (4) (4) I/O board is not poperly inserted.Framesizes A to C (1),(2),(3),(4) ➢ Framesizes D to E (1),(2),(4) ➢ FramesizeF(2),(4) ➢ Since all these faults are assigned to one signal on the power stack, it is notpossible to establish which one actually occurred. ➢ UCE failure was detected, when P0947 = 22 and fault value P0949 =12 or 13 or 14, depending on UCE. ➢ I2C-Bus read out error, when P0947 = 22 and fault value P0949 = 21.(The power has to be switched off/on). ➢ This two faults (UCE and I2C) occur for MegaMaster only.	Check the I/O board. It has to be fully pressed home.	Off1
F0023 Output fault	Fault caused by the following events: One phase of output is disconnected		Off1
F0024 Rectifier Over Temperature	➢ Ventilation inadequate ➢ Fan inoperative ➢ Ambient temperature is too high.	Check the following: 1. Fan must turn when inverter is running 2. Pulse frequency must be set to default value 3. Ambient temperature could be higher than specified for the inverter	Off1
F0030 Fan has failed	Fan no longer working	Fault cannot be masked while options module (AOP or BOP) is connected. Need a new fan.	Off1
F0035	Auto restart fault after n-restart try		Off1

Fault	Possible Causes	Diagnose & Remedy	Reaction
Auto restart after n			
F0040 Automatic Calibration Failure	MM 440 only		Off1
F0041 Motor Data Identification Failure	Motor data identification failed. ➢ Alarm value =0: Load missing ➢ Alarm value =1: Current limit level reached during identification. ➢ Alarm value =2: Identified stator resistance less than 0.1% or greater than 100%. ➢ Alarm value =3: Identified rotorresistance less than 0.1% or greater than 100%. ➢ Alarm value =4: Identified stator reactance less than 50% and greater than 500% ➢ Alarm value =5: Identified main reactance less than 50% and greater than 500% ➢ Alarm value =6: Identified rotor time constant less than 10ms or greater than 5s ➢ Alarm value =7: Identified total leakage reactance less than 5% and greater than 50% ➢ Alarm value =8: Identified stator leakage reactance less than 25% and greater than 250% ➢ Alarm value =9: Identified rotor leakage inductance less than 25% and greater than 250% ➢ Alarm value = 20: Identified IGBT on-voltage less than 0.5 or greater than 10V ➢ Alarm value = 30: Current controller at voltage limit ➢ Alarm value = 40: Inconsistence of identified data set, at least one identification failed Percentage values based on the impedance Zb = Vmot,nom / sqrt(3) / Imot,nom	0: Check that the motor is connected to the inverter. 1-40: Check if motor data in P304-311 are correct. Check what type of motor wiring is required (star, delta).	Off1
F0051 Parameter EEPROM Fault	Read or write failure while saving non-volatile parameter.	Factory Reset and new parameterization Change drive	Off1
F0052 power stack Fault	Read failure for power stack information or invalid data.	Change drive	Off1
F0053 IO Eeprom Fault	Read failure for IO EEPROM information or invalid data.	➢ Check data ➢ Change IO module	Off1
F0054 Wrong IO Board	1. Wrong IO board is connected. 2. No ID detected on IO board, No data.	➢ Check data ➢ Change IO module	Off1
F0060 Asic Timeout	Internal communications failure	If fault persists, change inverter, contact Service Department	Off1

Fault	Possible Causes	Diagnose & Remedy	Reaction
F0070 CB setpoint fault	No setpoint values from CB (communication board) during telegram off time	Check CB and communication partner	Off1
F0071 USS (BOP-link) setpoint fault	No setpoint values from USS during telegram off time	Check USS master	Off1
F0072 USS (COMM link) setpoint fault	No setpoint values from USS during telegram off time	Check USS master	Off1
F0080 ADC lost input signal	➢ Broken wire ➢ Signal out of limits		Off1
F0085 External Fault	External fault triggered via terminal inputs	Disable terminal input for fault trigger.	Off1
F0090 Encoder feedback loss	Signal from Encoder lost	1. Check encoder fitted. If encoder not fitted, set P400 = 0 and select SLVC mode (P1300 = 20 or 22) 2. Check connections between encoder and inverter 3. Check encoder not faulty (select P1300 = 0, run at fixed speed, check encoder feedback signal in P66) 4. Increase encoder loss threshold in P492	Off1
F0101 Stack Overflow	Software error or processor failure	Run self test routines	Off1
F0221 PID Feedback below min. value	PID Feedback below min. value P2268.	Change value of P2268. Adjust feedback gain.	Off1
F0222 PID Feedback above max. value	PID feedback above max. value P2267.	Change value of P2267. Adjust feedback gain.	Off1
F0450 BIST Tests Failure	Fault value: 1. Some power section tests have failed 2. Some control board tests have failed 4. Some functional tests have failed 8. Some IO module tests have failed. (MM 420 only) 16. Internal RAM failed on power-up check	Drive may run but some features will not work properly. Replace drive.	Off1

Fault	Possible Causes	Diagnose & Remedy	Reaction
F0452 Belt Failure Detected	Load conditions on motor indicate belt failure or mechanical fault.	Check the following: 1. No breakage, seizure or obstruction of drive train. 2. If using an external speed sensor, check for correct function.Check parameters:P0409 (pulse per min at rated speed).P2191 (Belt failure speed tolerance).P2192 (delay time for permitted deviation) 3. If using the torque envelope, check parameters: P2182 (threshold frequency f1) P2183 (threshold frequency f2) P2184 (threshold frequency f3) P2185 (upper torque threshold 1) P2186 (lower torque threshold 1) P2187 (upper torque threshold 2) P2188 (lower torque threshold 2) P2189 (upper torque threshold 3) P2190 (lower torque threshold 3) P2192 (delay time for permitted deviation) 4. Apply lubrication if required.	Off1

3.2 Alarm messages

Fault	Possible Causes	Diagnose & Remedy	Reaction
A0501 Current Limit	➢ Motor power does not correspond to the inverter power ➢ Motor leads are too long ➢ Earth faults	Check the following: 1. Motor power (P0307) must correspond to inverter power (r0206). 2. Cable length limits must not be exceeded. 3. Motor cable and motor must have no short-circuits or earth faults 4. Motor parameters must match the motor in use 5. Value of stator resistance (P0350) must be correct 6. Motor must not be obstructed or overloaded ➢ Increase the ramp-up-time. ➢ Reduce the boost.	Off1
A0502 Overvoltage limit	➢ Overvoltage limit is reached. ➢ This warning can occur during ramp down, if the dc-link controller is disabled (P1240 = 0).	If this warning is displayed permanently, check drive input voltage .	Off1
A0503 UnderVoltage Limit	➢ Main supply failed ➢ Main supply (P0210) and consequently DC-link voltage (R0026) below specified limit (P2172).	Check main supply voltage (P0210).	Off1
A0504 Inverter OverTemperature	Warning level of inverter heat-sink temperature (P0614) is exceeded, resulting in pulse frequency reduction and/or output frequency reduction (depending on parametrization in (P0610)	Check the following: 1. Ambient temperature must lie within specified limits 2. Load conditions and duty cycle must be appropriate	Off1
A0505 Inverter I2T	Warning level exceeded, current will be reduced if parameterized (P0610 = 1)	Check that duty cycle lies within specified limits	Off1
A0506 Inverter duty cycle	Difference between heatsink and IGBT junction temperature exceeds warning limits	Check that duty cycle and shock loads lie within specified limits	Off1

A0511 Motor OverTemperature I2T	➢ Motor overloaded.
	➢ Load duty cycle too high.
		Independently of the kind of temperature determination check:
		1. P0604 motor temperature warning threshold
		2. P0625 motor ambient temperature
		If (P601 = 0 or 1) Check the following:
		1. Check if name plate data are correct (if not perform quick commissioning)
		2. Accurate equivalent circuit data can be found by performing motor identification (P1910=1).
		3. Check if motor weight (P344) is reasonable. Change if neccesary.
		4. Via P626, P627, P628 the standard overtemperatures can be changed, if the motor is nota Siemens standard motor.
		If (P601 = 2) Check the following:
		1. Check if temperature shown in r35 is reasonable.
		2. Check if the sensor is a KTY84 (other sensors are not supported)
			Off1

A0512 Motor temperature signal lost	Wire break to motor temperature sensor. If a wire breakage is be detected, temperature monitoring switches over to monitoring with the motor thermal model.		Off1

Fault	Possible Causes	Diagnose & Remedy	Reaction
A0520 Rectifier OverTemperature	Warning level of rectifier heat-sink temperature (P) is exceeded	Check the following: 1. Ambient temperature must lie within specified limits 2. Load conditions and duty cycle must be appropriate 3. Fan must turn when drive is running	Off1
A0521 Ambient OverTemperature	Warning level of ambient temperature (P) is exceeded	Check the following: 1. Ambient temperature must lie within specified limits 2. Fan must turn when drive is running 3. fan intake air has to be without any resistance	Off1
A0523 Output fault	One phase of output is disconnected	Warning can be masked.	Off1
A0541 Motor Data Identification Active	Motor data identification (P1910) selected or running		Off1
A0590 Encoder feedback loss warning	Signal from Encoder lost and Inverter has switched to sensorless vector control	Stop inverter and then 1. Check encoder fitted. If encoder not fitted, set P400 = 0 and select SLVC mode (P1300 = 20 or 22) 2. Check connections between encoder and inverter 3. Check encoder not faulty (select P1300 = 0, run at fixed speed, check encoder feedback signal in P66) 4. Increase encoder loss threshold in P492	Off1
A0600 RTOS Overrun Warning			Off1
A0700 CB warning 1 see CB manual for details.	CB (communication board) specific	See CB user manual	Off1
A0701 CB warning 2 see CB manual for details.	CB (communication board) specific	See CB user manual	Off1
A0702 CB warning 3 see CB manual for details.	CB (communication board) specific	See CB user manual	Off1
A0703 CB warning 4 see CB manual for details.	CB (communication board) specific	See CB user manual	Off1
A0704 CB warning 5 see CB manual for details.	CB (communication board) specific	See CB user manual	Off1
A0705 CB warning 6 see CB manual for details.	CB (communication board) specific	See CB user manual	Off1

Fault	Possible Causes	Diagnose & Remedy	Reaction
A0706 CB warning 7 see CB manual for details.	CB (communication board) specific	See CB user manual	Off1
A0707 CB warning 8 see CB manual for details.	CB (communication board) specific	See CB user manual	Off1
A0708 CB warning 9 see CB manual for details.	CB (communication board) specific	See CB user manual	Off1
A0709 CB warning 10 see CB manual for details.	CB (communication board) specific	See CB user manual	Off1
A0710 CB communication error	Communication with CB (communication board) is lost	Check CB hardware	Off1
A0711 CB configuration error	CB (communication board) reports a configuration error.	Check CB parameters	Off1
A0910 Vdc-max controller de-activated	➢ Vdc max controller has been de-activated, since controller is not capable of keeping DC-link voltage (r0026) within limits (P2172). ➢ Occurs if main supply voltage (P0210) is permanently too high. ➢ Occurs if motor is driven by an active load, causing motor to goes into regenerative mode. ➢ Occurs at very high load inertias, when ramping down.	Check the following: 1. Input voltage (P0210) must lie within range. 2. Load must be match.	Off1
A0911 Vdc-max controller active	Vdc max controller is active; so ramp-down times will be increased automatically to keep DC-link voltage (r0026) within limits (P2172).		Off1
A0912 Vdc-min controller active	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.		Off1

Fault	Possible Causes	Diagnose & Remedy	Reaction
A0920 ADC parameters not set properly.	ADC parameters should not be set to identical values, since this would produce illogical results. Index 0: Parameter settings for output identical Index 1: Parameter settings for input identical Index 2: Parameter settings for input do not correspond to ADC type		Off1
A0921 DAC parameters not set properly.	DAC parameters should not be set to identical values, since this would produce illogical results. Index 0: Parameter settings for output identical Index 1: Parameter settings for input identical Index 2: Parameter settings for output do not correspond to DAC type		Off1
A0922 No load applied to inverter	➢ No Load is applied to the inverter. ➢ As a result, some functions may not work as under normal load conditions.		Off1
A0923 Both JOG Left and JOG Right are requested	Both JOG right and JOG left (P1055/P1056) have been requested. This freezes the RFG output frequency at its current value.		Off1
A0952 Belt Failure Detected	Load conditions on motor indicate belt failure or mechanical fault.	Apply lubrication if required. Check the following: 1. No breakage, seizure or obstruction of drive train. 2.If using an external speed sensor, check for correct function.Check parameters:P0409 (pulse per min at rated speed).P2191 (Belt failure speed tolerance).P2192 (delay time for permitted deviation) 3. If using the torque envelope, check parameters:P2182 (threshold frequency f1)P2183 (threshold frequency f2)P2184 (threshold frequency f3)P2185 (upper torque threshold 1)P2186 (lower torque threshold 1)P2187 (upper torque threshold 2)P2188 (lower torque threshold 2)P2189 (upper torque threshold 3)P2190 (lower torque threshold 3)P2192 (delay time for permitted deviation) 4. Apply lubrication if required.	Off1

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
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Should you come across any printing errors when reading this publication, please notify us on this sheet.

Suggestions for improvement are also welcome.

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