

Parameter Manual · Edition 06/2007

## Frequency Converters

ET 200S FC

## Control Units

ICU24

ICU24 F

Firmware version V3.0

# SIMATIC

## ET 200S FC

**SIEMENS**



# SIEMENS

## SIMATIC

### SIMATIC ET 200S FC Control Units ICU24(F)

#### Parameter Manual

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Edition 06/2007, Firmware version V3.0

## Safety Guidelines

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.



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### Danger

indicates that death or severe personal injury **will** result if proper precautions are not taken.

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### Warning

indicates that death or severe personal injury **may** result if proper precautions are not taken.

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### Caution

with a safety alert symbol, indicates that minor personal injury **can** result if proper precautions are not taken.

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### Caution

without a safety alert symbol, indicates that property damage can result if proper precautions are not taken.

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### Notice

indicates that an unintended result or situation can occur if the corresponding information is not taken into account.

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If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

## Qualified Personnel

The device/system may only be set up and used in conjunction with this documentation. Commissioning and operation of a device/system may only be performed by **qualified personnel**. Within the context of the safety notes in this documentation qualified persons are defined as persons who are authorized to commission, ground and label devices, systems and circuits in accordance with established safety practices and standards.

## Prescribed Usage

Note the following:



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### Warning

This device may only be used for the applications described in the catalog or the technical description and only in connection with devices or components from other manufacturers which have been approved or recommended by Siemens.

Correct, reliable operation of the product requires proper transport, storage, positioning and assembly as well as careful operation and maintenance.

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We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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# Parameters

# 1

## Contents

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## 1.1 Introduction to Parameters

The layout of the parameter description is as follows.

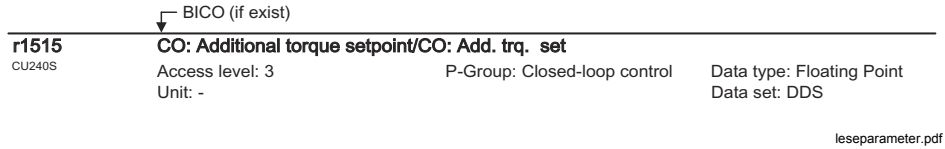


Fig. 1-1 Read-only parameter

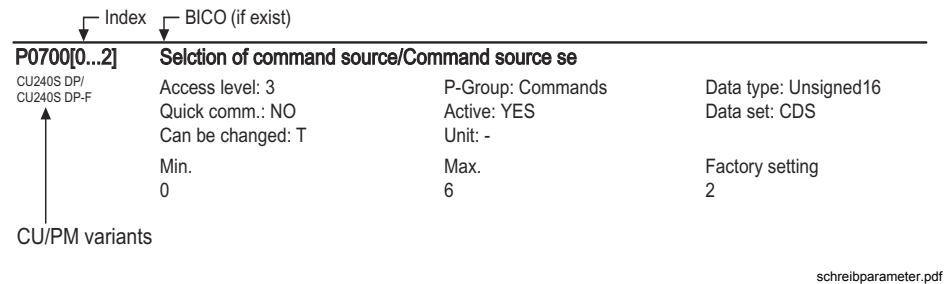


Fig. 1-2 Write parameter

### Parameter number

Indicates the relevant parameter number. The numbers used are 4-digit numbers in the range 0000 to 9999. Only for PROFINET there are a few parameters in the range of 61.000.

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.

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. If these values have a physical unit, it is shown in brackets.

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

**.0...15** indicates that the parameter has several bits, which can be evaluated or connected individually.

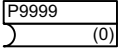
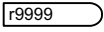
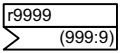
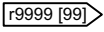
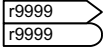


### Parameter text (Long name/Short name)

Indicates the name of the relevant parameter.

Certain parameter names include the following abbreviated prefixes: BI, BO, CI, CO and CO/BO followed by a colon.

These abbreviations have the following meanings:

BI	=		Binector input, i.e. parameter selects the source of a binary signal
BO	=		Binector output, i.e. parameter connects as a binary signal
CI	=		Connector input, i.e. parameter selects the source of an analog signal
CO	=		Connector output, i.e. parameter connects as an analog signal
CO/BO	=		Connector/Binector output, i.e. parameter connects as an analog signal and/or as a binary signal

CoBo.pdf

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 and outputs.

At BI and CI parameters the parameter number is specified under Factory setting with which this parameter is connected. In this case the Min and Max values have dashes.

### Access level

Indicates the level of user access. Does not apply to SIMATIC ET 200S FC.

### P-Group

Specifies the functional group to which the parameter belongs. Does not apply to SIMATIC ET 200S FC.

**Data type**

The data types available are shown in the table below.

Table 1-1 Available data types

Notation	Meaning
Unsigned8	8-bit unsigned
Unsigned16	16-bit unsigned
Unsigned32 (U32)	32-bit unsigned
Integer16	16-bit integer
Floating Point	Floating point

**Quick Comm**

Indicates whether or not (Yes or No) a parameter can only be changed during quick commissioning. Does not apply to SIMATIC ET 200S FC.

**Active**

Does not apply to SIMATIC ET 200S FC.

**Data set**

Parameters which are dependent on a data set are identified as follows:

- CDS (Command Data Set)
- DDS (Drive Data Set)

They are always indexed with [0...2].

For **CDS** is valid:

[0] = Command Data Set 0

[1] = Command Data Set 1

[2] = Command Data Set 2

For **DDS** is valid:

[0] = Drive Data Set 0

[1] = Drive Data Set 1

[2] = Drive Data Set 2

**Can be changed**

Inverter state in which the parameter is changeable. Three states are possible:

- Commissioning      C
- Run                      U
- Ready to runt        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.

**Unit**

Indicates the unit of measure applicable to the parameter values.

**Min**

Indicates the minimum value to which the parameter can be set.

**Max**

Indicates the maximum value to which the parameter can be set.

**Factory setting**

Indicates the default value, i.e. the value which applies if the user does not specify a particular value for the parameter.

**Description**

Explanation of the function of a parameter.

**Values**

Lists the possible values of a parameter.

**Recommendation**

Information about recommended settings.

**Index**

The name and meaning of each individual index is specified for indexed parameters, except indexed parameters which belong to a data set (see Data set)

### **Bit field**

For parameters with bit fields, the following information is provided about each bit:

- Bit number and signal name
- Meaning with signal states 0 and 1
- Function diagram (optional). The signal is shown on this function diagram.

### **Dependency**

Conditions which need to be fulfilled in connection with this parameter. Also includes special effects which can occur between this parameter and others.

## 1.2 List of Parameters

Product: ET200S, Version: 3005200, Language: eng

<b>r0000</b>	<b>Drive display / Drive display</b>		
	<b>Access level:</b> 1	<b>P-Group:</b> -	<b>Data type:</b> Unsigned16
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Displays the user selected output. This value is defined in P0005.		
<b>r0002</b>	<b>Drive state / Drive state</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Commands	<b>Data type:</b> Unsigned16
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Displays actual drive state.		
<b>Values:</b>	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) 6: Drive inhibited 7: Safety active 8: Safety reset/commissioning 9: Safety fault active		
<b>Dependency:</b>	State 3 visible only while precharging DC link.		
<b>p0003</b>	<b>User access level / User access level</b>		
	<b>Access level:</b> 1	<b>P-Group:</b> -	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> U, T		
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
	0	4	1
<b>Description:</b>	Defines user access level to parameter sets. The default setting (standard) is sufficient for most simple applications.		
<b>Values:</b>	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, password protected		
<b>Note:</b>	Only valid for control units with OP.		

<b>p0004</b>		<b>Parameter filter / Parameter filter</b>	
ICU24	<b>Access level:</b> 1	<b>P-Group:</b> -	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> U, T		
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
	0	22	0
<b>Description:</b>	Filters parameters according to functionality to enable a more focussed approach to commissioning.		
<b>Values:</b>	0: All parameters 2: Inverter 3: Motor 4: Speed sensor 7: Commands, binary I/O 10: Setpoint channel / RFG 12: Drive features 13: Motor control 19: Motor identification 20: Communication 21: Alarms / warnings / monitoring 22: Technology controller		

<b>p0004</b>		<b>Parameter filter / Parameter filter</b>	
ICU24F	<b>Access level:</b> 1	<b>P-Group:</b> -	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> U, T		
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
	0	22	0
<b>Description:</b>	Filters parameters according to functionality to enable a more focussed approach to commissioning.		
<b>Values:</b>	0: All parameters 2: Inverter 3: Motor 4: Speed sensor 7: Commands, binary I/O 10: Setpoint channel / RFG 11: Safety functions 12: Drive features 13: Motor control 19: Motor identification 20: Communication 21: Alarms / warnings / monitoring 22: Technology controller		

<b>p0010 Commissioning parameter / Commissioning par.</b>			
ICU24	<b>Access level:</b> 1	<b>P-Group:</b> -	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> T		
	<b>Min</b> 0	<b>Max</b> 95	<b>Factory setting</b> 0
<b>Description:</b>	Filters parameters so that only those related to a particular functional group are selected.		
<b>Values:</b>	0: Ready 1: Quick commissioning 2: Inverter 29: Download 30: Factory setting		
<b>Dependency:</b>	Reset to 0 for inverter to run. P0003 (user access level) also determines access to parameters.		
<b>Note:</b>	<ul style="list-style-type: none"> <li>• 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. Afterwards parameter P0010 and P3900 will be reset to zero automatically.</li> <li>• P0010 = 2 For service purposes only.</li> <li>• P0010 = 29 To transfer a parameter file via PC tool (e.g.: STARTER) parameter P0010 will be set to 29 by the PC tool. When download has been finished PC tool resets parameter P0010 to zero.</li> <li>• 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.</li> </ul>		

<b>p0010</b>	<b>Commissioning parameter / Commissioning par.</b>		
ICU24F	<b>Access level:</b> 1	<b>P-Group:</b> -	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> T		
	<b>Min</b> 0	<b>Max</b> 95	<b>Factory setting</b> 0
<b>Description:</b>	Filters parameters so that only those related to a particular functional group are selected.		
<b>Values:</b>	0: Ready 1: Quick commissioning 2: Inverter 29: Download 30: Factory setting 95: Safety commissioning (only on safety CU)		
<b>Dependency:</b>	Reset to 0 for inverter to run. P0003 (user access level) also determines access to parameters.		
<b>Note:</b>	<ul style="list-style-type: none"> <li>• 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. Afterwards parameter P0010 and P3900 will be reset to zero automatically.</li> <li>• P0010 = 2 For service purposes only.</li> <li>• P0010 = 29 To transfer a parameter file via PC tool (e.g.: STARTER) parameter P0010 will be set to 29 by the PC tool. When download has been finished PC tool resets parameter P0010 to zero.</li> <li>• 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.</li> <li>• P0010 = 95 For changing the safety parameters select access level 3 and set the safety password. Only then P0010 can be set to 95. The safety commissioning including safety dynamization will take about 2 s. For finishing the safety commissioning, see P3900.</li> </ul>		
<b>p0011</b>	<b>Lock for user defined parameter / LockUserDefinedPar</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> -	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> C, U, T		
	<b>Min</b> 0	<b>Max</b> 65535	<b>Factory setting</b> 0
<b>Note:</b>	See parameter P0013 (user defined parameter)		
<b>p0012</b>	<b>Key for user defined parameter / Key UserDefinedPar</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> -	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> C, U, T		
	<b>Min</b> 0	<b>Max</b> 65535	<b>Factory setting</b> 0
<b>Note:</b>	See parameter P0013 (user defined parameter).		



p0013[0...19]	User defined parameter / User-defined par		
	<b>Access level:</b> 3	<b>P-Group:</b> -	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> C, U, T		
	<b>Min</b> 0	<b>Max</b> 65535	<b>Factory setting</b> 0
<b>Description:</b>	Defines a limited set of parameters to which the end user will have access.		
	Instructions for use:		
	<ol style="list-style-type: none"> <li>1. Set P0003 = 3 (expert user).</li> <li>2. Go to P0013 indices 0 to 16 (user list)</li> <li>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: <ul style="list-style-type: none"> <li>- P0013 index 17 = 3 (user access level)</li> <li>- P0013 index 18 = 10 (commissioning parameter filter)</li> <li>- P0013 index 19 = 12 (key for user defined parameter)</li> </ul> </li> <li>4. Set P0003 = 0 to activate the user defined parameter.</li> </ol>		
<b>Index:</b>	<p>[0] = 1st user parameter  [1] = 2nd user parameter  [2] = 3rd user parameter  [3] = 4th user parameter  [4] = 5th user parameter  [5] = 6th user parameter  [6] = 7th user parameter  [7] = 8th user parameter  [8] = 9th user parameter  [9] = 10th user parameter  [10] = 11th user parameter  [11] = 12th user parameter  [12] = 13th user parameter  [13] = 14th user parameter  [14] = 15th user parameter  [15] = 16th user parameter  [16] = 17th user parameter  [17] = 18th user parameter  [18] = 19th user parameter  [19] = 20th user parameter</p>		
<b>Dependency:</b>	<p>First, set P0011 ("lock") to a different value then 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").</p>		
<b>Note:</b>	The default values of P0011 ("lock") and P0012 ("key") are the same.		

<b>p0014[0...2]</b>	<b>Store mode / Store mode</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> -	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0	<b>Max</b> 1	<b>Factory setting</b> 0
<b>Description:</b>	Sets the store mode for parameters. The store mode can be configured for all interfaces listed under "Index".		
<b>Values:</b>	0: Volatile (RAM) 1: Nonvolatile (EEPROM)		
<b>Index:</b>	[0] = USS on RS485 [1] = USS on RS232 [2] = Fieldbus		
<b>Note:</b>	An independent store request may be part of the serial communications (e.g. PKE bits 15-12 of USS protocol), set by a PLC or PC tools like STARTER. See the table below for an influence on the settings of P0014.		

Value of p0014[x]	Store request via USS	Result
RAM	EEPROM	EEPROM
EEPROM	EEPROM	EEPROM
RAM	RAM	RAM
EEPROM	RAM	EEPROM

1. P0014 itself will always be stored in the EEPROM.
2. P0014 will not be changed by performing a factory reset (P0010 = 30 and P0970 = 1).
3. P0014 can be transferred during a download (P0010 = 29).

When transferring parameter p0014, the inverter uses its processor to carry-out internal calculations. Communications - both via USS as well as via the Fieldbus - are interrupted for the time that it takes to make these calculations. This can result in the following error messages at the connected SIMATIC S7 control (communications via fieldbus):

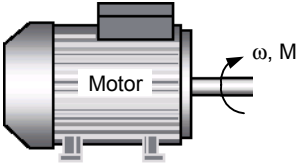
- Parameter fault 30
- Drive fault 70
- Drive fault 75

When using STARTER (USS) to commission the drive system, data cannot be entered while these calculations are being made.

The faults can be acknowledged as soon as the calculations have been completed in the frequency inverter. These calculations can take up to one minute to complete.

<b>r0018</b>	<b>Firmware version / Firmware version</b>		
	<b>Access level:</b> 1	<b>P-Group:</b> Converter	<b>Data type:</b> Floating Point
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Displays version number of installed firmware.		

<b>r0020</b>	<b>CO: Freq. setpoint before RFG / Setp before RFG</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Unit:</b> [Hz]		<b>Data set:</b> -
<b>Description:</b>	Displays actual frequency setpoint (input of ramp function generator). This value is available filtered (r0020) and unfiltered (r1119).		
<b>r0021</b>	<b>CO: Act. filtered frequency / Act. filt. freq.</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Unit:</b> [Hz]		<b>Data set:</b> -
<b>Description:</b>	Displays actual inverter output frequency (r0024) excluding slip compensation, resonance damping and frequency limitation.		
<b>r0022</b>	<b>Act. filtered rotor speed / Act fil rotorspeed</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Unit:</b> [RPM]		<b>Data set:</b> -
<b>Description:</b>	Displays calculated rotor speed based on r0021 (filtered output frequency [Hz] x 120 / number of poles). The value is updated every 128 ms.		
<b>Note:</b>	This calculation makes no allowance for load-dependent slip.		
<b>r0024</b>	<b>CO: Act. filt. output frequency / Act. outp. freq</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Unit:</b> [Hz]		<b>Data set:</b> -
<b>Description:</b>	Displays actual filtered output frequency (slip compensation, resonance damping and frequency limitation are included). See also r0021. This value is available filtered (r0024) and unfiltered (r0066).		
<b>r0025</b>	<b>CO: Act. output voltage / Act.outp. volt</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Unit:</b> [V]		<b>Data set:</b> -
<b>Description:</b>	Displays filtered [rms] voltage applied to motor. This value is available filtered (r0025) and unfiltered (r0072).		
<b>r0026[0...1]</b>	<b>CO: Act. filtered DC-link volt. / Act. fil. Vdc</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Converter	<b>Data type:</b> Floating Point
	<b>Unit:</b> [V]		<b>Data set:</b> -
<b>Description:</b>	Displays filtered DC-link voltage. This value is available filtered (r0026) and unfiltered (r0070).		
<b>Index:</b>	[0] = Compensation DC voltage Channel [1] = Measurement/Monitoring DC voltage Channel		
<b>Note:</b>	r0026[0] = Main DC-link voltage r0026[1] = Decoupled DC-link voltage for internal supply (e.g. for CU). It depends on the drive topology. If it is not available it shows the value 0.		

<b>r0027</b>	<b>CO: Act. output current / Act. outp. cur</b>	<b>Access level:</b> 2 <b>Unit:</b> [A]	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point <b>Data set:</b> -
<b>Description:</b>	Displays rms value of motor current [A]. This value is available filtered (r0027) and unfiltered (r0068).			
<b>r0029</b>	<b>CO: Flux gen. current / Flux gen. cur.</b>	<b>Access level:</b> 3 <b>Unit:</b> [A]	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point <b>Data set:</b> -
<b>Description:</b>	Displays flux-generating current component. This value is available filtered (r0029) and unfiltered (r0076). The flux-generating current component is based on the nominal flux, which is calculated from the motor parameters (P0340 - Calculation of motor parameters).			
<b>Dependency:</b>	Applies when vector control is selected in P1300 (control mode); otherwise, the display shows the value zero.			
<b>Note:</b>	The flux-generating current component is generally constant up to the base speed of the motor; above base speed, this component is weakened (field weakening) thus enabling an increase in motor speed but at reduced torque.			
<b>r0030</b>	<b>CO: Torque gen. current / Torque gen. cur</b>	<b>Access level:</b> 3 <b>Unit:</b> [A]	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point <b>Data set:</b> -
<b>Description:</b>	Displays torque-generating current component. This value is available filtered (r0030) and unfiltered (r0078). The torque-generating current component is calculated from the torque setpoint values delivered by the speed controller.			
<b>Dependency:</b>	Applies when vector control is selected in P1300 (control mode); otherwise, the display shows the value zero.			
<b>Note:</b>	For asynchronous motors, a limit is calculated for the torque generating current component (in conjunction with the maximum possible output voltage (r0071), motor leakage and current field weakening (r0377)) and this prevents motor stalling.			
<b>r0031</b>	<b>CO: Act. filtered torque / Act fil torque</b>	<b>Access level:</b> 2 <b>Unit:</b> [Nm]	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point <b>Data set:</b> -
<b>Description:</b>	Displays electrical torque. Output value will be zero at low speeds when current injection is active (r1751.4 = 1). This value is available filtered (r0031) and unfiltered (r0080).			
<b>Note:</b>	The electrical torque is not the same as the mechanical torque, which can be measured on the shaft. Due to windage and friction a part of the electrical torque is lost in the motor.			
<b>r0032</b>	<b>CO: Act. filtered power / Act fil. power</b>	<b>Access level:</b> 2 <b>Unit:</b> -	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point <b>Data set:</b> -
<b>Description:</b>	Displays motor power.			
		$P_{\text{mech}} = \omega \cdot M = 2 \cdot \pi \cdot f \cdot M$ $\Rightarrow$ $r0032 \text{ [kW]} = \frac{1}{1000} \cdot 2 \cdot \pi \cdot \frac{r0022}{60} \text{ [1/min]} \cdot r0031 \text{ [Nm]}$ $r0032 \text{ [hp]} = 0.75 \cdot r0032 \text{ [kW]}$		
<b>Dependency:</b>	Value is displayed in [kW] or [hp] depending on setting for P0100 (operation for Europe / North America).			
<b>r0035[0...2]</b>	<b>CO: Act. motor temperature / Act. mot.temp.</b>	<b>Access level:</b> 2 <b>Unit:</b> [°C]	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point <b>Data set:</b> DDS
<b>Description:</b>	Displays measured motor temperature.			

<b>r0036</b>	<b>CO: Inverter overload utilization / Invert ovl util</b>	<b>Access level:</b> 4	<b>P-Group:</b> Converter	<b>Data type:</b> Floating Point
		<b>Unit:</b> [%]		<b>Data set:</b> -
<b>Description:</b>	<p>Displays inverter overload utilization calculated via the I2t model.</p> <p>The actual I2t value relative to the max. possible I2t value supplies utilization in [%].</p> <p>If the current exceeds the threshold for P0294 (inverter I2t overload warning), alarm A0505 (inverter I2t) is generated and the output current of the inverter reduced via P0290 (inverter overload reaction).</p> <p>If 100 % utilization is exceeded, alarm F0005 (inverter I2t) is tripped.</p>			
<b>Example:</b>				
<b>Dependency:</b>	<p>r0036 &gt; 0:</p> <p>If the nominal current (see r0207) of the inverter is exceeded, utilization will be displayed, otherwise, 0 % utilization is displayed.</p>			
<b>r0037[0...1]</b>	<b>CO: Inverter temperature [°C] / Inverter temp.</b>	<b>Access level:</b> 3	<b>P-Group:</b> Converter	<b>Data type:</b> Floating Point
		<b>Unit:</b> [°C]		<b>Data set:</b> -
<b>Description:</b>	Displays measured heatsink temperature and calculated junction temperature of IGBTs based on thermal model.			
<b>Index:</b>	[0] = Measured heat sink temperature [1] = Total Chip Junction Temperature			
<b>Note:</b>	The values are updated every 128 ms.			
<b>r0038</b>	<b>CO: Fil. power factor / Fil.power fact</b>	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
		<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Displays the filtered power factor.			
<b>r0039</b>	<b>CO: Energy consumpt. meter [kWh] / Energy meter</b>	<b>Access level:</b> 2	<b>P-Group:</b> Converter	<b>Data type:</b> Floating Point
		<b>Unit:</b> [kWh]		<b>Data set:</b> -
<b>Description:</b>	Displays electrical energy used by inverter since display was last reset (see P0040 - reset energy consumption meter).			
<b>Dependency:</b>	Value is reset when P0040 = 1 (reset energy consumption meter).			

<b>p0040</b>	<b>Reset energy consumption meter / Reset energy meter</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Converter	<b>Data type:</b> Unsigned16
	<b>Quick comm. NO</b>	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> T		
	<b>Min</b> 0	<b>Max</b> 1	<b>Factory setting</b> 0
<b>Description:</b>	Resets value of parameter r0039 (energy consumption meter) to zero.		
<b>Values:</b>	0: No reset 1: Reset r0039 to 0		

<b>r0050</b>	<b>CO/BO: Active Command Dataset / Active CDS</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Commands	<b>Data type:</b> Unsigned16
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Displays currently active Command Dataset (CDS).		
<b>Values:</b>	0: Command Dataset 0 (CDS) 1: Command Dataset 1 (CDS) 2: Command Dataset 2 (CDS)		
<b>Note:</b>	See parameter P0810.		

<b>r0051[0...1]</b>	<b>CO: Active Drive Dataset (DDS) / Active DDS</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Commands	<b>Data type:</b> Unsigned16
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Displays currently selected and active Drive Dataset (DDS).		
<b>Values:</b>	0: Drive Dataset 0 (DDS0) 1: Drive Dataset 1 (DDS1) 2: Drive Dataset 2 (DDS2)		
<b>Index:</b>	[0] = Selected Drive Dataset [1] = Active Drive Dataset		
<b>Note:</b>	See parameter P0820.		

**r0052.0...15 CO/BO: Act. status word 1 / Act StatWd1****Access level:** 2**P-Group:** Commands**Data type:** Unsigned16**Unit:** -**Data set:** -**Description:**

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

**Bit field:**

Bit	Signal name	1 signal	0 signal	FP
00	Drive ready	Yes	No	-
01	Drive ready to run	Yes	No	-
02	Drive running	Yes	No	-
03	Drive fault active	Yes	No	-
04	OFF2 active	No	Yes	-
05	OFF3 active	No	Yes	-
06	ON inhibit active	Yes	No	-
07	Drive warning active	Yes	No	-
08	Deviation setpoint / act. value	No	Yes	-
09	PZD control	Yes	No	-
10	f_act >= P1082 (f_max)	Yes	No	-
11	Warning: Motor current/torque limit	No	Yes	-
12	Brake open	Yes	No	-
13	Motor overload	No	Yes	-
14	Motor runs right	Yes	No	-
15	Inverter overload	No	Yes	-

**Dependency:**

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

r0052 Bit08 "Deviation setpoint / act. value" ==&gt; see parameter P2164

r0052 Bit10 "f\_act &gt;= P1082 (f\_max)" ==&gt; see parameter P1082

r0052 Bit12 "Motor holding brake active" ==&gt; see parameter P1215

**r0053.1...9 CO/BO: Act. status word 2 / Act StatWd2****Access level:** 2**P-Group:** Commands**Data type:** Unsigned16**Unit:** -**Data set:** -**Description:**

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

**Bit field:**

Bit	Signal name	1 signal	0 signal	FP
01	f_act > P2167 (f_off)	Yes	No	-
02	f_act > P1080 (f_min)	Yes	No	-
03	Act. current r0027 >= P2170	Yes	No	-
04	f_act > P2155 (f_1)	Yes	No	-
05	f_act <= P2155 (f_1)	Yes	No	-
06	f_act >= setpoint (f_set)	Yes	No	-
09	Ramping finished	Yes	No	-

**Notice:**

r0053 Bit01 "f\_act &gt; P2167 (f\_off)" ==&gt; see parameter P2167

r0053 Bit02 "f\_act &gt; P1080 (f\_min)" ==&gt; see parameter P1080

r0053 Bit03 "Act. current r0027 &gt;= P2170" ==&gt; see parameter P2170

r0053 Bit04 "f\_act &gt; P2155 (f\_1)" ==&gt; see parameter P2155

r0053 Bit05 "f\_act &lt;= P2155 (f\_1)" ==&gt; see parameter P2155

r0053 Bit06 "f\_act &gt;= setpoint (f\_set)" ==&gt; see parameter P2150

**r0054.0...15****CO/BO: Act. control word 1 / Act CtrlWd1****Access level:** 3**P-Group:** Commands**Data type:** Unsigned16**Unit:** -**Data set:** -**Description:**

Displays first control word of inverter (in bit format) and can be used to diagnose which commands are active.

**Bit field:**

Bit	Signal name	1 signal	0 signal	FP
00	ON/OFF1	Yes	No	-
01	OFF2: Electrical stop	No	Yes	-
02	OFF3: Fast stop	No	Yes	-
03	Pulse enable	Yes	No	-
04	RFG enable	Yes	No	-
05	RFG start	Yes	No	-
06	Setpoint enable	Yes	No	-
07	Fault acknowledge	Yes	No	-
08	JOG right	Yes	No	-
09	JOG left	Yes	No	-
10	Control from PLC	Yes	No	-
11	Reverse (setpoint inversion)	Yes	No	-
15	CDS Bit 0 (Hand/Auto)	Yes	No	-

**Notice:**

r0054 is identical to r2036 if USS is selected as command source via P0700 or P0719.

**r0055.4...15****CO/BO: Act. control word 2 / Act CtrlWd2****Access level:** 3**P-Group:** Commands**Data type:** Unsigned16**Unit:** -**Data set:** -**Description:**

Displays additional control word of inverter (in bit format) and can be used to diagnose which commands are active.

**Bit field:**

Bit	Signal name	1 signal	0 signal	FP
04	Drive Dataset (DDS) Bit 0	Yes	No	-
05	Drive Dataset (DDS) Bit 1	Yes	No	-
11	Enable Droop	Yes	No	-
12	Torque control	Yes	No	-
13	External fault 1	No	Yes	-
15	Command Dataset (CDS) Bit 1	Yes	No	-

**Notice:**

r0055 is identical to r2037 if USS is selected as command source via P0700 or P0719.

**r0056.0...13****CO/BO: Status of motor control / CO/BO:Stat MotCtrl****Access level:** 3**P-Group:** Closed-loop control**Data type:** Unsigned16**Unit:** -**Data set:** -**Description:**

Displays status of motor control (in bit format), which can be used to diagnose inverter status.

**Bit field:**

Bit	Signal name	1 signal	0 signal	FP
00	Init. control finished	Yes	No	-
01	Motor demagnetizing finished	Yes	No	-
02	Pulses enabled	Yes	No	-
03	Voltage soft start select	Yes	No	-
04	Motor excitation finished	Yes	No	-
05	Starting boost active	Yes	No	-
06	Acceleration boost active	Yes	No	-
07	Frequency is negative	Yes	No	-
08	Field weakening active	Yes	No	-
09	Volts setpoint limited	Yes	No	-
10	Slip frequency limited	Yes	No	-
11	f <sub>out</sub> > f <sub>max</sub> Freq. limited	Yes	No	-
12	Phase reversal selected	Yes	No	-
13	I <sub>max</sub> controller active/torque limit reached	Yes	No	-

**Notice:**

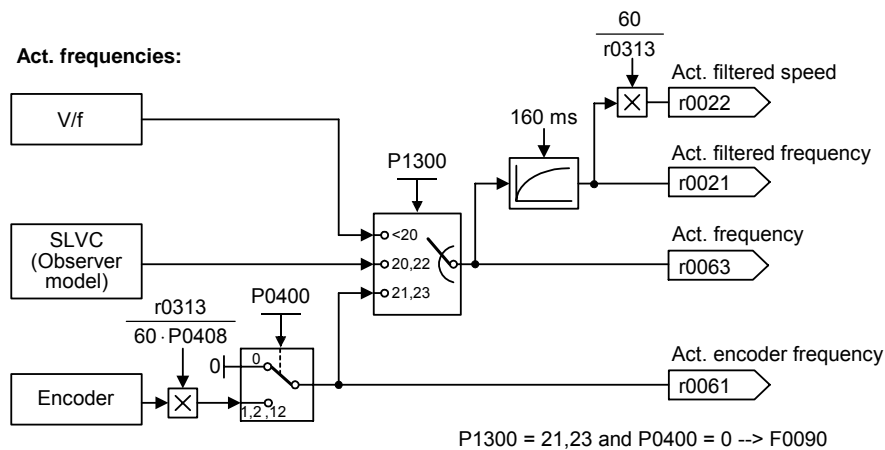
The I-max controller (r0056 Bit13) will be activated when the actual output current (r0027) exceeds the current limit in r0067.



<b>r0061</b>	<b>CO: Act. rotor speed / Act rotor speed</b>	<b>Access level:</b> 2	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
		<b>Unit:</b> [Hz]		<b>Data set:</b> -
<b>Description:</b>	Displays current speed detected by encoder.			
<b>Dependency:</b>	r0061 displays the value zero with P0400 = 0.			

<b>r0062</b>	<b>CO: Freq. setpoint / Freq. setpoint</b>	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
		<b>Unit:</b> [Hz]		<b>Data set:</b> -
<b>Description:</b>	Displays speed setpoint in Hz of vector speed controller.			
<b>Dependency:</b>	r0062 = 0 in V/f control modes (P1300 = 0...19).			

<b>r0063</b>	<b>CO: Act. frequency / Act. frequency</b>	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
		<b>Unit:</b> [Hz]		<b>Data set:</b> -
<b>Description:</b>	Displays actual motor frequency in Hz. This value is available filtered (r0021) and unfiltered (r0063).			



<b>r0064</b>	<b>CO: Dev. frequency controller / Dev. freq ctrl</b>	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
		<b>Unit:</b> [Hz]		<b>Data set:</b> -
<b>Description:</b>	Displays actual deviation of speed controller. This value is calculated from the speed setpoint (r0062) and the actual speed (r0063).			
<b>Dependency:</b>	Applies when vector control is selected in P1300 (control mode); otherwise, the display shows the value zero.			

<b>r0065</b>	<b>CO: Slip frequency / Slip frequency</b>	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
		<b>Unit:</b> [%]		<b>Data set:</b> -
<b>Description:</b>	Displays slip frequency of motor in [%] relative to the rated motor frequency (P0310).			
<b>Note:</b>	For V/f control, see also P1335 (slip compensation).			

<b>r0066</b>	<b>CO: Act. output frequency / Act. outp freq</b>	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
		<b>Unit:</b> [Hz]		<b>Data set:</b> -
<b>Description:</b>	Displays actual output frequency in Hz. This value is available filtered (r0024) and unfiltered (r0066).			
<b>Note:</b>	The output frequency is limited by the values entered in P1080 (min. frequency) and P1082 (max. frequency).			

<b>r0067</b>	<b>CO: Act. output current limit / Outp cur limit</b>	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
		<b>Unit:</b> [A]		<b>Data set:</b> -
<b>Description:</b>	Displays valid maximum output current of inverter. Parameter r0067 is influenced/determined by the following factors:			
	<ul style="list-style-type: none"> <li>• Rated motor current P0305</li> <li>• Motor overload factor P0640</li> <li>• Motor protection in dependency of P0610</li> <li>• r0067 is less than or equal to maximum inverter current r0209</li> <li>• Inverter protection in dependency of P0290</li> <li>• r0067 is affected by the regeneration power limit when regenerating</li> </ul>			
<b>Note:</b>	A reduction of r0067 may indicate an inverter overload or a motor overload.			
<b>r0068</b>	<b>CO: Output current / Output current</b>	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
		<b>Unit:</b> [A]		<b>Data set:</b> -
<b>Description:</b>	Displays unfiltered [rms] value of motor current [A]. This value is available filtered (r0027) and unfiltered (r0068).			
<b>Note:</b>	Used for process control purposes (in contrast to r0027, which is filtered and is used to display the value through USS on RS232).			
<b>r0069[0...5]</b>	<b>CO: Act. phase currents / Act. phase cur</b>	<b>Access level:</b> 4	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
		<b>Unit:</b> [A]		<b>Data set:</b> -
<b>Description:</b>	Displays measured phase currents.			
<b>Index:</b>	[0] = U_phase [1] = V_phase [2] = W_phase [3] = Offset U_phase [4] = Offset V_phase [5] = Offset W_phase			
<b>r0070</b>	<b>CO: Act. DC-link voltage / Act. Vdc</b>	<b>Access level:</b> 3	<b>P-Group:</b> Converter	<b>Data type:</b> Floating Point
		<b>Unit:</b> [V]		<b>Data set:</b> -
<b>Description:</b>	Displays DC-link voltage. This value is available filtered (r0026) and unfiltered (r0070).			
<b>Note:</b>	Used for process control purposes (in contrast to r0026 (actual DC-link voltage), which is filtered).			
<b>r0071</b>	<b>CO: Max. output voltage / Max. outp.volt</b>	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
		<b>Unit:</b> [V]		<b>Data set:</b> -
<b>Description:</b>	Displays maximum output voltage.			
<b>Dependency:</b>	Actual maximum output voltage depends on the actual input supply voltage.			
<b>r0072</b>	<b>CO: Act. output voltage / Act. outp.volt</b>	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
		<b>Unit:</b> [V]		<b>Data set:</b> -
<b>Description:</b>	Displays output voltage. This value is available filtered (r0025) and unfiltered (r0072).			

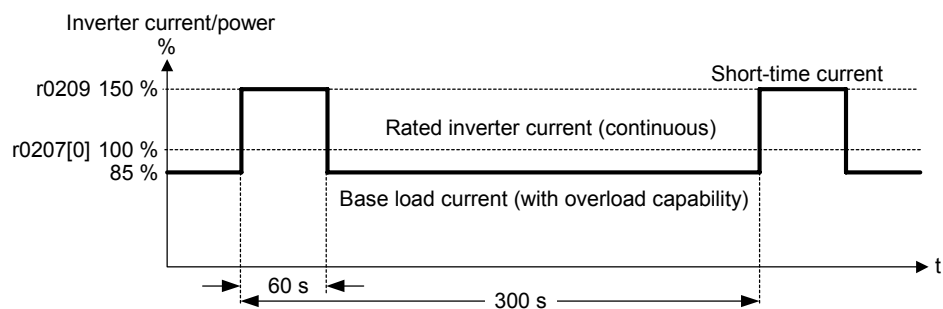
<b>r0074</b>	<b>CO: Act. modulation / Act modulation</b>	<b>Access level:</b> 4 <b>Unit:</b> [%]	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point <b>Data set:</b> -
<b>Description:</b>	Displays actual modulation index. The modulation index is defined as ratio between the magnitude of the fundamental component in the inverter phase output voltage and half of the DC-link voltage.			
<b>r0075</b>	<b>CO: Current setpoint Isd / Cur. setp. Isd</b>	<b>Access level:</b> 3 <b>Unit:</b> [A]	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point <b>Data set:</b> -
<b>Description:</b>	Displays setpoint of flux generating current component.			
<b>Dependency:</b>	Applies when vector control is selected in P1300 (control mode); otherwise, the display shows the value zero.			
<b>r0076</b>	<b>CO: Act. current Isd / Act. cur. Isd</b>	<b>Access level:</b> 3 <b>Unit:</b> [A]	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point <b>Data set:</b> -
<b>Description:</b>	Displays flux generating current component. This value is available filtered (r0029) and unfiltered (r0076).			
<b>Dependency:</b>	Applies when vector control is selected in P1300 (control mode); otherwise, the display shows the value zero.			
<b>r0077</b>	<b>CO: Current setpoint Isq / Cur. setp. Isq</b>	<b>Access level:</b> 3 <b>Unit:</b> [A]	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point <b>Data set:</b> -
<b>Description:</b>	Displays setpoint for component of torque generating current.			
<b>Dependency:</b>	Applies when vector control is selected in P1300 (control mode); otherwise, the display shows the value zero.			
<b>r0078</b>	<b>CO: Act. current Isq / Act. cur. Isq</b>	<b>Access level:</b> 3 <b>Unit:</b> [A]	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point <b>Data set:</b> -
<b>Description:</b>	Displays component of torque generating current. This value is available filtered (r0030) and unfiltered (r0078).			
<b>r0079</b>	<b>CO: Torque setpoint (total) / Total trq setp</b>	<b>Access level:</b> 3 <b>Unit:</b> [Nm]	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point <b>Data set:</b> -
<b>Description:</b>	Displays total torque setpoint after limitation.			
<b>Dependency:</b>	Applies when vector control is selected in P1300 (control mode); otherwise, the display shows the value zero.			
<b>r0080</b>	<b>CO: Act. torque / Act. torque</b>	<b>Access level:</b> 4 <b>Unit:</b> [Nm]	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point <b>Data set:</b> -
<b>Description:</b>	Displays actual torque. Output value will be zero at low speeds when current injection is active (r1751.4 = 1). This value is available filtered (r0031) and unfiltered (r0080).			
<b>r0084</b>	<b>CO: Act. air gap flux / Air gap flux</b>	<b>Access level:</b> 4 <b>Unit:</b> [%]	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point <b>Data set:</b> -
<b>Description:</b>	Displays air gap flux in [%] relative to the rated motor flux.			

<b>r0085</b>	<b>CO: Act. re-active current / Act.re-active cur</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Unit:</b> [A]		<b>Data set:</b> -
<b>Description:</b>	Displays re-active (imaginary part) of motor current.		
<b>Dependency:</b>	Applies when V/f control is selected in P1300 (control mode); otherwise, the display shows the value zero.		
<b>r0086</b>	<b>CO: Act. active current / Act.active cur</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Unit:</b> [A]		<b>Data set:</b> -
<b>Description:</b>	Displays active (real part) of motor current.		
<b>Dependency:</b>	Applies when V/f control is selected in P1300 (control mode); otherwise, the display shows the value zero.		
<b>r0087</b>	<b>CO: Act. power factor / Act.power fact</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Displays the actual power factor.		
<b>r0090</b>	<b>CO: Act. rotor angle / Act rotor angle</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Unit:</b> [°]		<b>Data set:</b> -
<b>Description:</b>	Indicates the current angle of the rotor.		
<b>r0094</b>	<b>CO: Transformation angle / Transf. angle</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Unit:</b> [°]		<b>Data set:</b> -
<b>Description:</b>	Displays the transformation angle (flux angle in VC mode or angle from frequency in Vf mode)		
<b>p0095[0...9]</b>	<b>CI: Display PZD signals / PZD signals</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> U32 / Integer16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> T		
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
	-	-	0
<b>Description:</b>	Selects source of display for PZD signals.		
<b>Index:</b>	[0] = 1st PZD signal [1] = 2nd PZD signal [2] = 3rd PZD signal [3] = 4th PZD signal [4] = 5th PZD signal [5] = 6th PZD signal [6] = 7th PZD signal [7] = 8th PZD signal [8] = 9th PZD signal [9] = 10th PZD signal		

<b>r0096[0...9]</b>	<b>PZD signals / PZD signals</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Unit:</b> [%]		<b>Data set:</b> -
<b>Description:</b>	Displays PZD signals in [%].		
<b>Index:</b>	[0] = 1st PZD signal [1] = 2nd PZD signal [2] = 3rd PZD signal [3] = 4th PZD signal [4] = 5th PZD signal [5] = 6th PZD signal [6] = 7th PZD signal [7] = 8th PZD signal [8] = 9th PZD signal [9] = 10th PZD signal		
<b>Note:</b>	r0096 = 100 % corresponds to 4000 hex.		
<b>p0100</b>	<b>Europe / North America / Europe / Nth Amer.</b>		
	<b>Access level:</b> 1	<b>P-Group:</b> -	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> YES	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> C		
	<b>Min</b> 0	<b>Max</b> 2	<b>Factory setting</b> 0
<b>Description:</b>	Determines whether power settings are expressed in [kW] or [hp] (e.g. Rated motor power P0307). The default settings for the rated motor frequency P0310 and maximum frequency P1082 are also set automatically here, in addition to reference frequency P2000.		
<b>Values:</b>	0: Europe [kW], motor base frequency is 50 Hz 1: North America [hp], motor base frequency is 60 Hz 2: North America [kW], motor base frequency is 60 Hz		
<b>Dependency:</b>	Where: <ul style="list-style-type: none"> <li>• Stop drive first (i.e. disable all pulses) before you change this parameter.</li> <li>• Parameter P0100 can only be changed with P0010 = 1 (Commissioning mode) via the respective interface (e.g. USS on RS232).</li> <li>• 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).</li> </ul>		
<b>r0191[0...2]</b>	<b>Configuration Control Unit / Config CU</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> -	<b>Data type:</b> Unsigned32
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Displays the actual HW-configuration (SZL vector) of the Control Unit.		
<b>Index:</b>	[0] = SZL Vector CU and PM combined [1] = SZL Vector CU [2] = SZL Vector PM		
<b>p0199</b>	<b>Equipment system number / Equip. system no.</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> -	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0	<b>Max</b> 255	<b>Factory setting</b> 0
<b>Description:</b>	Equipment system number. This parameter has no operation effect (only for factory purposes).		



<b>r0207[0...2]</b>	<b>Rated inverter current / Rated inverter cur</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Converter	<b>Data type:</b> Floating Point
	<b>Unit:</b> [A]		<b>Data set:</b> -
<b>Description:</b>	Displays rated inverter current.		
<b>Index:</b>	[0] = Rated inverter current [1] = Rated LO current [2] = Rated HO current		
<b>Note:</b>	The rated light overload (LO) current r0207[1] and rated high overload (HO) current r0207[2] values correspond to suitable 4-pole Siemens standard motors (IEC) for the selected load cycle (see diagram). The parameters r0207[1], r0207[2] are the default value of P0305 in association with the HO/LO application (load cycle). If r0207[1] = r0207[2], then no differentiation is possible between HO/LO applications.		



<b>r0208</b>	<b>Rated inverter voltage / Rated voltage</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Converter	<b>Data type:</b> Unsigned32
	<b>Unit:</b> [V]		<b>Data set:</b> -
<b>Description:</b>	Displays nominal AC supply voltage of inverter.		
<b>Note:</b>	r0208 = 400 : 380 - 480 V +/- 10 %		
<b>r0209</b>	<b>Maximum inverter current / Max. inverter cur</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Converter	<b>Data type:</b> Floating Point
	<b>Unit:</b> [A]		<b>Data set:</b> -
<b>Description:</b>	Displays maximum output current of inverter.		
<b>Dependency:</b>	Parameter r0209 depends on the derating which is affected by pulse frequency P1800, ambient temperature and altitude. The data of deration is given in the Operating Instructions.		
<b>r0231[0...1]</b>	<b>Max. cable length / Max. cable length</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Converter	<b>Data type:</b> Unsigned16
	<b>Unit:</b> [m]		<b>Data set:</b> -
<b>Description:</b>	Indexed parameter to display maximum allowable cable length between inverter and motor.		
<b>Index:</b>	[0] = Max. allowed unscreened cable length [1] = Max. allowed screened cable length		
<b>Notice:</b>	For full EMC compliance, the screened cable must not exceed 25 m in length when an EMC filter is fitted.		

**p0290****Inverter overload reaction / Overload reaction****Access level:** 3**P-Group:** Converter**Data type:** Unsigned16**Quick comm. NO****Active:** NO**Data set:** -**Can be changed:** T**Min**

0

**Max**

3

**Factory setting**

2

**Description:**

Selects reaction of inverter to an internal thermal overload condition.

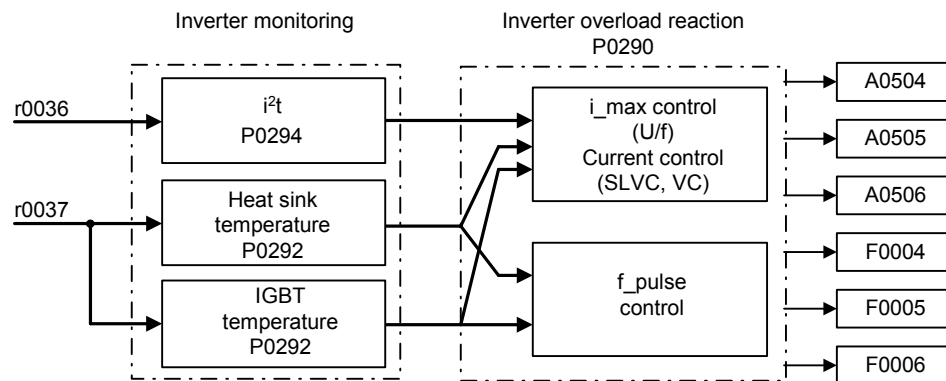
**Values:**

- 0: Reduce output frequency and output current
- 1: No reduction, trip (F0004/ 5/ 6) when thermal limits reached
- 2: Reduce pulse frequency, output current and output frequency
- 3: Reduce pulse freq. only and trip (F0006), when overload too high

**Dependency:**

Following physical values influence the inverter overload protection (see diagram):

- Heat sink temperature (r0037.0); causes A0504 and F0004.
- IGBT Junction temperature (r0037.1); causes F0004 or F0006.
- Delta temperature between heat sink and junction temperature; causes A0504 and F0006.
- Inverter I2t (r0036); causes A0505 and F0005.

**Notice:**

P0290 = 0, 2:

- Reduction of output frequency is only effective if the load is also reduced. This is for example valid for light overload applications with a quadratic torque characteristic as pumps or fans.
- For settings P0290 = 0 or 2, the I-max controller will act upon the output current limit (r0067) in case of overtemperature.

P0290 = 0:

- With pulse frequencies above nominal, pulse frequency will be reduced to nominal immediately in the event of r0027 greater than r0067 (current limit).

P0290 = 2, 3:

- The pulse frequency P1800 is reduced only if higher than 2 kHz and if the operating frequency is below 2 Hz.
- The actual pulse frequency is displayed in parameter r1801.0 and the minimal pulse frequency for reduction is displayed in r1801.1.
- Inverter I2t acts upon output current and output frequency, but not on pulse frequency.

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



<b>p0291[0...2]</b>	<b>Inverter protection / Inverter protect.</b>				
	<b>Access level:</b> 4	<b>P-Group:</b> Converter	<b>Data type:</b> Unsigned16		
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS		
	<b>Can be changed:</b> T				
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>		
	-	-	0001 bin		
<b>Description:</b>	Bit 00 for enabling/disabling automatic pulse frequency reduction at output frequencies below 2 Hz. The benefit is to reduce the noises at frequencies below 2 Hz. Bit 02 shows if phase loss detection (input phase) of 3 phase inverters is enabled after factory reset. Default setting of phase loss is disabled for FSA - FSC. FSD and greater it is enabled.				
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>	<b>0 signal</b>	<b>FP</b>
	01	reserved	Yes	No	-
	02	Phase loss detection enable	Yes	No	-
<b>Note:</b>	See P0290 (inverter overload reaction)				
<b>p0292</b>	<b>Inverter temperature warning / Inv. temp. warn.</b>				
	<b>Access level:</b> 3	<b>P-Group:</b> Converter	<b>Data type:</b> Unsigned16		
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -		
	<b>Can be changed:</b> U, T				
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>		
	0 [°C]	25 [°C]	5 [°C]		
<b>Description:</b>	Defines the temperature difference (in °C) between the overtemperature trip threshold (F0004) and the warning threshold (A0504) of the inverter. The trip threshold is stored internally by the inverter and cannot be changed by the user.				
<b>p0294</b>	<b>Inverter I2t warning / Inv. I2t warn.</b>				
	<b>Access level:</b> 4	<b>P-Group:</b> Converter	<b>Data type:</b> Floating Point		
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -		
	<b>Can be changed:</b> U, T				
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>		
	10.0 [%]	100.0 [%]	95.0 [%]		
<b>Description:</b>	Defines the [%] value at which alarm A0505 (inverter I2t) is generated. Inverter I2t calculation is used to determine a maximum tolerable period for inverter overload. The I2t calculation value is deemed = 100 % when this maximum tolerable period is reached.				
<b>Dependency:</b>	<ul style="list-style-type: none"> <li>The output current of the inverter has been reduced.</li> <li>The value of I2t does not exceed 100 %.</li> </ul>				
<b>Note:</b>	P0294 = 100 % corresponds to stationary nominal load.				
<b>p0295</b>	<b>Inverter fan off delay time / Fan delay time</b>				
	<b>Access level:</b> 3	<b>P-Group:</b> Terminals	<b>Data type:</b> Unsigned16		
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -		
	<b>Can be changed:</b> U, T				
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>		
	0 [s]	3600 [s]	0 [s]		
<b>Description:</b>	Defines inverter fan switch off delay time in seconds after drive has stopped.				
<b>Note:</b>	Setting to 0, inverter fan will switch off when the drive stops, that means no delay.				

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<b>p0300[0...2]</b>	<b>Select motor type / Select motor type</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Motor	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> YES	<b>Active:</b> NO	<b>Data set:</b> DDS
	<b>Can be changed:</b> C		
	<b>Min</b> 1	<b>Max</b> 2	<b>Factory setting</b> 1

**Description:** Selects motor type.  
 This parameter is required during commissioning to select motor type and optimize inverter performance.  
 Most motors are asynchronous; if in doubt, use the following formula .  
 $60 * P0310 / P0311$  (the ratio of rated frequency (P0310) and rated motor speed (P0311))  
 If the result is a whole number, the motor is synchronous.

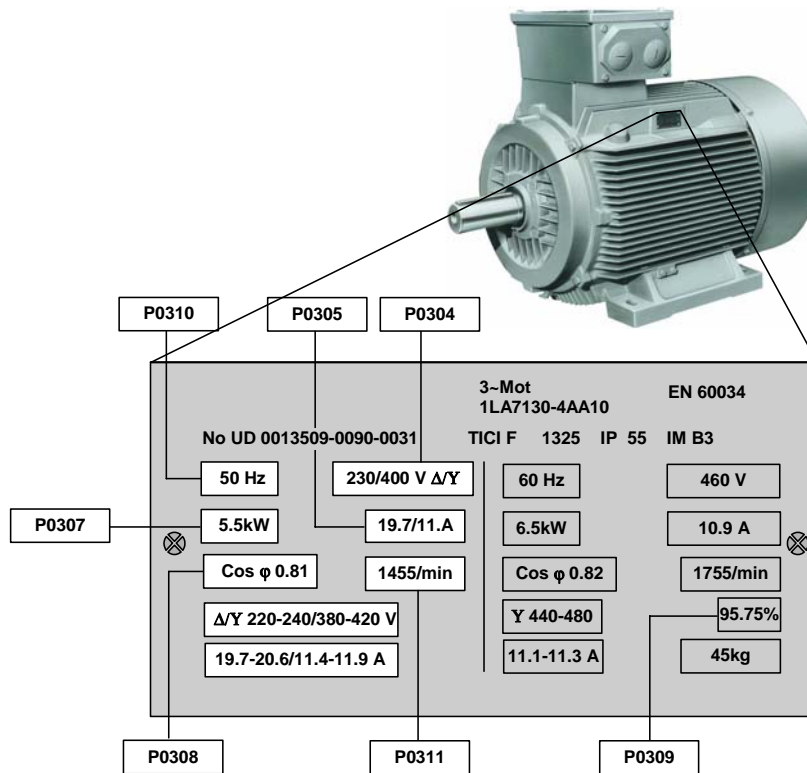
**Values:**  
 1: Asynchronous rotational motor  
 2: Synchronous rotational motor

**Dependency:** Changeable only when P0010 = 1 (quick commissioning).  
 If synchronous motor is selected, the following functions are not available:  
 P0308 Power factor  
 P0309 Motor efficiency  
 P0346 Magnetization time  
 P0347 Demagnetization time  
 P1335 Slip compensation  
 P1336 Slip limit  
 P0320 Motor magnetizing current  
 P0330 Rated motor slip  
 P0331 Rated magnetization current  
 P0332 Rated power factor  
 P0384 Rotor time constant  
 P1200, P1202, P1203 Flying start

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<b>p0304[0...2]</b>	<b>Rated motor voltage / Rated mot. voltage</b>		
	<b>Access level:</b> 1	<b>P-Group:</b> Motor	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> YES	<b>Active:</b> NO	<b>Data set:</b> DDS
	<b>Can be changed:</b> C		
	<b>Min</b> 10 [V]	<b>Max</b> 2000 [V]	<b>Factory setting</b> 400 [V]

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



**Dependency:**

Changeable only when P0010 = 1 (quick commissioning).

Default value is depending on inverter type and its rating data.

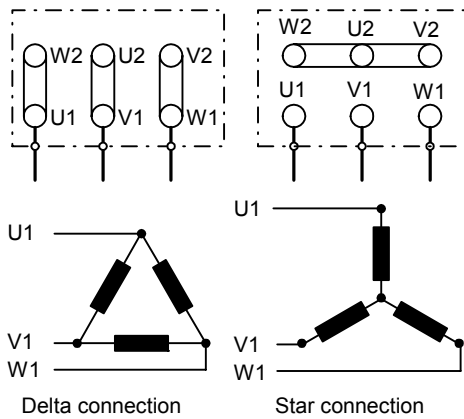
**Caution:**



The input of rating plate data must correspond with the wiring of the motor (star / delta).

This means, if delta wiring is used for the motor, delta rating plate data has to be entered.

**IEC Motor**



**Note:**

Safety Integrated: If driving loads occur in the application, the motor must be dimensioned so that its slip in super-synchronous operation always remains within the rated slip.

<b>p0305[0...2]</b>	<b>Rated motor current / Rated mot. current</b>		
	<b>Access level:</b> 1	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> YES	<b>Active:</b> NO	<b>Data set:</b> DDS
	<b>Can be changed:</b> C		

<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
0.01 [A]	10000.00 [A]	1.86 [A]

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

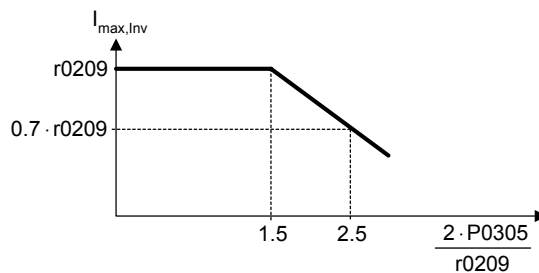
**Dependency:** Changeable only when P0010 = 1 (quick commissioning).  
Depends also on P0320 (motor magnetization current).

**Note:** The maximum value of P0305 depends on the maximum inverter current r0209 and the motor type:  
Asynchronous motor : P0305\_max = P0209  
Synchronous motor : P0305\_max = 2 \* P0209 (for HO operation) and P0305\_max = P0209 (for LO operation)  
It is recommended that the ratio of P0305 (rated motor current) and r0207 (rated inverter current) should not be lower than:

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

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

When the relation of the nominal motor current P0305 and half of the maximal inverter current (r0209) exceeds 1.5 an additional current derating is applied. This is necessary to protect the inverter from harmonic current waves.



Default value is depending on inverter type and its rating data.

<b>p0307[0...2]</b>	<b>Rated motor power / Rated motor power</b>		
	<b>Access level:</b> 1	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> YES	<b>Active:</b> NO	<b>Data set:</b> DDS
	<b>Can be changed:</b> C		

<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
0.01	2000.00	0.75

**Description:** Nominal motor power [kW/hp] from rating plate - see P0304.

**Dependency:** If P0100 = 1, values will be in [hp] - see P0304 (rating plate).  
Changeable only when P0010 = 1 (quick commissioning).

**Note:** Default value is depending on inverter type and its rating data.

<b>p0308[0...2]</b>	<b>Rated motor cosPhi / Rated mot. cosPhi</b>		
	<b>Access level:</b> 1	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> YES	<b>Active:</b> NO	<b>Data set:</b> DDS
	<b>Can be changed:</b> C		
	<b>Min</b> 0.000	<b>Max</b> 1.000	<b>Factory setting</b> 0.000
<b>Description:</b>	Nominal motor power factor (cosPhi) from rating plate - see P0304.		
<b>Dependency:</b>	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. The value is displayed in r0332.		
<b>p0309[0...2]</b>	<b>Rated motor efficiency / Rated efficiency</b>		
	<b>Access level:</b> 1	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> YES	<b>Active:</b> NO	<b>Data set:</b> DDS
	<b>Can be changed:</b> C		
	<b>Min</b> 0.0 [%]	<b>Max</b> 99.9 [%]	<b>Factory setting</b> 0.0 [%]
<b>Description:</b>	Nominal motor efficiency in [%] from rating plate - see P0304.		
<b>Dependency:</b>	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. The value is displayed in r0332.		
<b>p0310[0...2]</b>	<b>Rated motor frequency / Rated motor freq.</b>		
	<b>Access level:</b> 1	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> YES	<b>Active:</b> NO	<b>Data set:</b> DDS
	<b>Can be changed:</b> C		
	<b>Min</b> 12.00 [Hz]	<b>Max</b> 650.00 [Hz]	<b>Factory setting</b> 50.00 [Hz]
<b>Description:</b>	Nominal motor frequency [Hz] from rating plate - see P0304.		
<b>Dependency:</b>	Changeable only when P0010 = 1 (quick commissioning). Pole pair number recalculated automatically if parameter is changed.		
<b>Note:</b>	Changes to P0310 can influence the maximum motor frequency. For further information see P1082.		
<b>p0311[0...2]</b>	<b>Rated motor speed / Rated motor speed</b>		
	<b>Access level:</b> 1	<b>P-Group:</b> Motor	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> YES	<b>Active:</b> NO	<b>Data set:</b> DDS
	<b>Can be changed:</b> C		
	<b>Min</b> 0 [RPM]	<b>Max</b> 40000 [RPM]	<b>Factory setting</b> 1395 [RPM]
<b>Description:</b>	Nominal motor speed [rpm] from rating plate - see P0304.		
<b>Dependency:</b>	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.		
<b>Note:</b>	Default value is depending on inverter type and its rating data.		

<b>r0313[0...2]</b>	<b>Motor pole pairs / Motor pole pairs</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Motor	<b>Data type:</b> Unsigned16
	<b>Unit:</b> -		<b>Data set:</b> DDS
<b>Description:</b>	Displays number of motor pole pairs that the inverter is currently using for internal calculations.		
<b>Dependency:</b>	Recalculated automatically when P0310 (rated motor frequency) or P0311 (rated motor speed) is changed. r0313 = 1 : 2-pole motor r0313 = 2 : 4-pole motor etc.		
<b>p0314[0...2]</b>	<b>Motor pole pair number / Motor pole pair no</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Motor	<b>Data type:</b> Unsigned16
	<b>Quick comm. YES</b>	<b>Active:</b> NO	<b>Data set:</b> DDS
	<b>Can be changed:</b> C		
	<b>Min</b> 0	<b>Max</b> 99	<b>Factory setting</b> 0
<b>Description:</b>	Specifies number of pole pairs of motor.		
<b>Dependency:</b>	Changeable only when P0010 = 1 (quick commissioning). Setting 0 causes r0313 (calculated motor pole pairs) to be used during operation. Setting to > 0 overrides r0313. P0314 = 1 : 2-pole motor P0314 = 2 : 4-pole motor etc.		
<b>p0320[0...2]</b>	<b>Motor magnetizing current / Motor magnet. cur.</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Quick comm. YES</b>	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> C, T		
	<b>Min</b> 0.0 [%]	<b>Max</b> 99.0 [%]	<b>Factory setting</b> 0.0 [%]
<b>Description:</b>	Defines motor magnetization current in [%] relative to P0305 (rated motor current).		
<b>Dependency:</b>	Setting 0 causes calculation by P0340 = 1 (data entered from rating plate) or by P3900 = 1 - 3 (end of quick commissioning). The calculated value is displayed in parameter r0331.		
<b>r0330[0...2]</b>	<b>Rated motor slip / Rated motor slip</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Unit:</b> [%]		<b>Data set:</b> DDS
<b>Description:</b>	Displays nominal motor slip in [%] relative to P0310 (rated motor frequency) and P0311 (rated motor speed).		
	$r0330 [\%] = \frac{p0310 - \frac{p0311}{60} \cdot r0313}{p0310} \cdot 100 \%$		
<b>r0331[0...2]</b>	<b>Rated magnetization current / Rated magnet. cur.</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Unit:</b> [A]		<b>Data set:</b> DDS
<b>Description:</b>	Displays calculated magnetizing current of motor in [A].		
<b>r0332[0...2]</b>	<b>Rated power factor / Rated power factor</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Unit:</b> -		<b>Data set:</b> DDS
<b>Description:</b>	Displays power factor for motor.		
<b>Dependency:</b>	Value is calculated internally if P0308 (rated motor cosPhi) set to 0; otherwise, value entered in P0308 is displayed.		


<b>r0333[0...2]</b>	<b>Rated motor torque / Rated motor torque</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Unit:</b> [Nm]		<b>Data set:</b> DDS
<b>Description:</b>	Displays rated motor torque.		
<b>Dependency:</b>	Value is calculated from P0307 (rated motor power) and P0311 (rated motor speed).		
	$r0333[\text{Nm}] = \frac{p0307[\text{kW}] \cdot 1000}{\frac{p0311[1/\text{min}]}{60} \cdot 2\pi}$		
<b>p0335[0...2]</b>	<b>Motor cooling / Motor cooling</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Motor	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> YES	<b>Active:</b> NO	<b>Data set:</b> DDS
	<b>Can be changed:</b> C, T		
	<b>Min</b> 0	<b>Max</b> 3	<b>Factory setting</b> 0
<b>Description:</b>	Selects motor cooling system used.		
<b>Values:</b>	0: Self-cooled: Shaft mounted fan attached motor (IC410 or IC411) 1: Force-cooled: Separately powered cooling fan (IC416) 2: Self-cooled and internal fan 3: Force-cooled and internal fan		
<b>p0340[0...2]</b>	<b>Calculation of motor parameters / Calc of mot.params</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Motor	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> DDS
	<b>Can be changed:</b> T		
	<b>Min</b> 0	<b>Max</b> 4	<b>Factory setting</b> 0
<b>Description:</b>	Calculates various motor parameters (see table below):		
<b>Values:</b>	0: No calculation 1: Complete parameterization 2: Calculation of equivalent circuit data 3: Calculation of V/f and vector control data 4: Calculation of controller settings only		
<b>Note:</b>	<p>This parameter is required during commissioning to optimize inverter performance. If there is a large mismatch in Power ratings of Inverter to Motor it is possible that r0384 and r0386 may not be calculated correct. In these cases use P1910.</p> <p>When transferring parameter p0340, the frequency inverter uses its processor to carry-out internal calculations. Communications - both via USS as well as via the Fieldbus - are interrupted for the time that it takes to make these calculations.</p> <p>This can result in the following error messages at the connected SIMATIC S7 control (communications via fieldbus):</p> <ul style="list-style-type: none"> <li>• Parameter fault 30</li> <li>• Drive fault 70</li> <li>• Drive fault 75</li> </ul> <p>When using STARTER (USS) to commission the drive system, data cannot be entered while these calculations are being made.</p> <p>The faults can be acknowledged as soon as the calculations have been completed in the frequency inverter. These calculations can take up to one minute to complete.</p>		

	P0340 = 1	P0340 = 2	P0340 = 3	P0340 = 4
P0341[3] Motor inertia [kg*m <sup>2</sup> ]	x			
P0342[3] Total/motor inertia ratio	x			
P0344[3] Motor weight	x			
P0346[3] Magnetization time	x		x	
P0347[3] Demagnetization time	x		x	
P0350[3] Stator resistance (line-to-line)	x	x		
P0352[3] Cable resistance	x	x		
P0354[3] Rotor resistance	x	x		
P0356[3] Stator leakage inductance	x	x		
P0358[3] Rotor leakage inductance	x	x		
P0360[3] Main inductance	x	x		
P0362[3] Magnetizing curve flux 1	x	x		
P0363[3] Magnetizing curve flux 2	x	x		
P0364[3] Magnetizing curve flux 3	x	x		
P0365[3] Magnetizing curve flux 4	x	x		
P0366[3] Magnetizing curve imag 1	x	x		
P0367[3] Magnetizing curve imag 2	x	x		
P0368[3] Magnetizing curve imag 3	x	x		
P0369[3] Magnetizing curve imag 4	x	x		
P0492[3] Allowed speed difference	x			
P0494[3] Delay speed loss reaction	x			
P0625[3] Ambient motor temperature	x	x		
P1253[3] Vdc-controller output limitation	x		x	
P1316[3] Boost end frequency	x		x	
P1338[3] Resonance damping gain V/f	x		x	x
P1341[3] I <sub>max</sub> controller integral time	x		x	x
P1345[3] I <sub>max</sub> voltage ctrl. prop. gain	x		x	x
P1346[3] I <sub>max</sub> voltage ctrl. integral time	x		x	x
P1460[3] Gain speed controller	x		x	x
P1462[3] Integral time speed controller	x		x	x
P1470[3] Gain speed controller (SLVC)	x		x	x
P1472[3] Integral time n-ctrl. (SLVC)	x		x	x
P1520[3] CO: Upper torque limit	x			
P1521[3] CO: Lower torque limit	x			
P1530[3] Motoring power limitation	x			
P1531[3] Regenerative power limitation	x			
P1715[3] Gain current controller	x		x	x
P1717[3] Integral time current controller	x		x	x
P1764[3] K <sub>p</sub> of n-adaption (SLVC)	x		x	x
P1767[3] T <sub>n</sub> of n-adaption (SLVC)	x		x	x
P2002[3] Reference current	x			
P2003[3] Reference torque	x			
P2174[3] Torque threshold M <sub>thresh</sub>	x			
P2185[3] Upper torque threshold 1	x			
P2187[3] Upper torque threshold 2	x			
P2189[3] Upper torque threshold 3	x			



<b>p0341[0...2]</b>	<b>Motor inertia [kg*m<sup>2</sup>] / Inertia [kg*m<sup>2</sup>]</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.00010	<b>Max</b> 1000.00000	<b>Factory setting</b> 0.00180
<b>Description:</b>	Sets no-load inertia of motor. Together with P0342 (inertia ratio total/motor) and P1496 (scaling factor acceleration), this value produces the acceleration torque (r1518), which can be added to any additional torque produced from a BICO source (P1511), and incorporated in the torque control function.		
<b>Note:</b>	The result of P0341 * P0342 is included in the speed controller calculation. P0341 * P0342 (inertia ratio total/motor) = total motor inertia P1496 (scaling factor acceleration) = 100 % activates acceleration pre-control for the speed controller and calculates the torque from P0341 (motor inertia) and P0342 (inertia ratio total/motor).		
<b>p0342[0...2]</b>	<b>Total/motor inertia ratio / Tot/mot inert.rat.</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 1.000	<b>Max</b> 400.000	<b>Factory setting</b> 1.000
<b>Description:</b>	Specifies ratio between total inertia (load + motor) and motor inertia.		
<b>p0344[0...2]</b>	<b>Motor weight / Motor weight</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 1.0 [kg]	<b>Max</b> 6500.0 [kg]	<b>Factory setting</b> 9.4 [kg]
<b>Description:</b>	Specifies motor weight [kg].		
<b>Note:</b>	This value is used in the motor thermal model. It is normally calculated automatically from P0340 (motor parameters) but can also be entered manually. Default value is depending on inverter type and its rating data.		
<b>r0345[0...2]</b>	<b>Motor start-up time / Mot. start-up time</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Unit:</b> [s]		<b>Data set:</b> DDS
<b>Description:</b>	Displays motor start-up time. This time corresponds to the standardized motor inertia. The start-up time is the time taken to reach rated motor speed from standstill at acceleration with rated motor torque (r0333).		

<b>p0346[0...2]</b>	<b>Magnetization time / Magnetization time</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.000 [s]	<b>Max</b> 20.000 [s]	<b>Factory setting</b> 1.000 [s]
<b>Description:</b>	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.		
<b>Notice:</b>	An excessive reduction of this time can result in insufficient motor magnetization.		
<b>Note:</b>	If boost settings are higher than 100 %, magnetization time may be reduced. Default value is depending on inverter type and its rating data.		
<b>p0347[0...2]</b>	<b>Demagnetization time / Demagnet. time</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.000 [s]	<b>Max</b> 20.000 [s]	<b>Factory setting</b> 1.000 [s]
<b>Description:</b>	Changes time allowed after OFF2 / fault condition, before pulses can be re-enabled.		
<b>Notice:</b>	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.		
<b>Note:</b>	The demagnetization time is approximately 2.5 x rotor time constant in seconds. Default value is depending on inverter type and its rating data.		
<b>p0350[0...2]</b>	<b>Stator resistance (line) / Stator res. (L)</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.00001 [Ohm]	<b>Max</b> 2000.00000 [Ohm]	<b>Factory setting</b> 2.00000 [Ohm]
<b>Description:</b>	Stator resistance value in [Ohms] for connected motor (line value). The parameter value doesn't include the cable resistance. There are three ways to determine the value for this parameter:		
	<ol style="list-style-type: none"> <li>1. Calculate using <ul style="list-style-type: none"> <li>- P0340 = 1 (data entered from rating plate) or</li> <li>- P0010 = 1, P3900 = 1, 2 or 3 (end of quick commissioning).</li> </ul> </li> <li>2. Measure using P1900 = 2 (standard motor data identification - value for stator resistance is overwritten). Measure using P1900 = 3 (complete motor data identification - same like setting 2; additional detection of the saturation curve)</li> <li>3. Measure manually using an Ohmmeter.</li> </ol>		
<b>Note:</b>	Since the manually measured resistor is a line-to-line value, which includes the cable resistors, the measured value has to be divided by two and the cable resistor of a line has to be subtracted from that value. The value entered in P0350 (stator resistance) is the one obtained by the method last used. Default value is depending on inverter type and its rating data.		

<b>p0352[0...2]</b>	<b>Cable resistance / Cable resistance</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.0 [Ohm]	<b>Max</b> 120.0 [Ohm]	<b>Factory setting</b> 0.0 [Ohm]
<b>Description:</b>	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.		
<hr/>			
<b>p0354[0...2]</b>	<b>Rotor resistance / Rotor resistance</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.0 [Ohm]	<b>Max</b> 300.0 [Ohm]	<b>Factory setting</b> 10.0 [Ohm]
<b>Description:</b>	Sets rotor resistance of motor equivalent circuit (phase value).		
<b>Dependency:</b>	Calculated automatically using the motor model or determined using P1900 (motor identification).		
<hr/>			
<b>p0356[0...2]</b>	<b>Stator leakage inductance / Stator leak.induct</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.00001	<b>Max</b> 1000.00000	<b>Factory setting</b> 10.00000
<b>Description:</b>	Sets stator leakage inductance [mH] of motor equivalent circuit (phase value).		
<b>Dependency:</b>	Calculated automatically using the motor model or determined using P1900 (motor identification).		
<hr/>			
<b>p0358[0...2]</b>	<b>Rotor leakage inductance / Rotor leak.induct.</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.0	<b>Max</b> 1000.0	<b>Factory setting</b> 10.0
<b>Description:</b>	Sets rotor leakage inductance [mH] of motor equivalent circuit (phase value).		
<b>Dependency:</b>	Calculated automatically using the motor model or determined using P1900 (motor identification).		
<hr/>			
<b>p0360[0...2]</b>	<b>Main inductance / Main inductance</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.0	<b>Max</b> 10000.0	<b>Factory setting</b> 10.0
<b>Description:</b>	Sets main inductance [mH] of the motor equivalent circuit (phase value), see diagram below.		
<b>Dependency:</b>	Calculated automatically using the motor model or determined using P1900 (motor identification).		
<b>Caution:</b>	The data of equivalent circuit relates to the star equivalent circuit. Any data of the delta equivalent circuit available, therefore must be transformed to the star equivalent circuit before entering into the inverter.		
			

<b>p0362[0...2]</b>	<b>Magnetizing curve flux 1 / Magnet.curve flux1</b>		
	<b>Access level:</b> 4	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 20.0 [%]	<b>Max</b> 200.0 [%]	<b>Factory setting</b> 60.0 [%]
<b>Description:</b>	Specifies first flux value of saturation characteristic in [%] relative to rated motor voltage (P0304). The saturation characteristic is defined using 4 points (P0362 - P0365, P0366 - P0369). This parameter specifies the y coordinate (flux) for the first value pair of the characteristic.		
<b>Dependency:</b>	The following applies for the flux values: P0362 < P0363 < P0364 < P0365, otherwise a linear characteristic is applied internally.		
<b>Note:</b>	P0362 = 100 % corresponds to rated motor flux. Rated flux = rated EMF		
<b>p0363[0...2]</b>	<b>Magnetizing curve flux 2 / Magnet.curve flux2</b>		
	<b>Access level:</b> 4	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 20.0 [%]	<b>Max</b> 200.0 [%]	<b>Factory setting</b> 85.0 [%]
<b>Description:</b>	Specifies second flux value of saturation characteristic in [%] relative to rated motor voltage (P0304). The saturation characteristic is defined using 4 points (P0362 - P0365, P0366 - P0369). This parameter specifies the y coordinate (flux) for the second value pair of the characteristic.		
<b>Dependency:</b>	The following applies for the flux values: P0362 < P0363 < P0364 < P0365, otherwise a linear characteristic is applied internally.		
<b>Note:</b>	P0363 = 100 % corresponds to rated motor flux. Rated flux = rated EMF		
<b>p0364[0...2]</b>	<b>Magnetizing curve flux 3 / Magnet.curve flux3</b>		
	<b>Access level:</b> 4	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 20.0 [%]	<b>Max</b> 200.0 [%]	<b>Factory setting</b> 115.0 [%]
<b>Description:</b>	Specifies third flux value of saturation characteristic in [%] relative to rated motor voltage (P0304). The saturation characteristic is defined using 4 points (P0362 - P0365, P0366 - P0369). This parameter specifies the y coordinate (flux) for the third value pair of the characteristic.		
<b>Dependency:</b>	The following applies for the flux values: P0362 < P0363 < P0364 < P0365, otherwise a linear characteristic is applied internally.		
<b>Note:</b>	P0364 = 100 % corresponds to rated motor flux. Rated flux = rated EMF		
<b>p0365[0...2]</b>	<b>Magnetizing curve flux 4 / Magnet.curve flux4</b>		
	<b>Access level:</b> 4	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 20.0 [%]	<b>Max</b> 200.0 [%]	<b>Factory setting</b> 125.0 [%]
<b>Description:</b>	Specifies fourth flux value of saturation characteristic in [%] relative to rated motor voltage (P0304). The saturation characteristic is defined using 4 points (P0362 - P0365, P0366 - P0369). This parameter specifies the y coordinate (flux) for the fourth value pair of the characteristic.		
<b>Dependency:</b>	The following applies for the flux values: P0362 < P0363 < P0364 < P0365, otherwise a linear characteristic is applied internally.		
<b>Note:</b>	P0365 = 100 % corresponds to rated motor flux. Rated flux = rated EMF		

<b>p0366[0...2]</b>	<b>Magnetizing curve imag 1 / Magnet.curve imag1</b>		
	<b>Access level:</b> 4	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 20.0 [%]	<b>Max</b> 250.0 [%]	<b>Factory setting</b> 50.0 [%]
<b>Description:</b>	Specifies first magnetizing current value of the saturation characteristic in [%] relative to the rated magnetizing current (P0331). The saturation characteristic is defined using 4 points (P0362 - P0365, P0366 - P0369). This parameter specifies the x coordinate (magnetizing current) for the first value pair of the characteristic.		
<b>Dependency:</b>	Affects P0320 (motor magnetizing current). The following applies for the magnetizing currents: P0366 < P0367 < P0368 < P0369, otherwise a linear characteristic is applied internally.		
<b>p0367[0...2]</b>	<b>Magnetizing curve imag 2 / Magnet.curve imag2</b>		
	<b>Access level:</b> 4	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 20.0 [%]	<b>Max</b> 250.0 [%]	<b>Factory setting</b> 75.0 [%]
<b>Description:</b>	Specifies second magnetizing current value of saturation characteristic in [%] relative to rated magnetizing current (P0331). The saturation characteristic is defined using 4 points (P0362 - P0365, P0366 - P0369). This parameter specifies the x coordinate (magnetizing current) for the second value pair of the characteristic.		
<b>Dependency:</b>	Affects P0320 (motor magnetizing current). The following applies for the magnetizing currents: P0366 < P0367 < P0368 < P0369, otherwise a linear characteristic is applied internally.		
<b>p0368[0...2]</b>	<b>Magnetizing curve imag 3 / Magnet.curve imag3</b>		
	<b>Access level:</b> 4	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 20.0 [%]	<b>Max</b> 250.0 [%]	<b>Factory setting</b> 135.0 [%]
<b>Description:</b>	Specifies third magnetizing current value of saturation characteristic in [%] relative to rated magnetizing current (P0331). The saturation characteristic is defined using 4 points (P0362 - P0365, P0366 - P0369). This parameter specifies the x coordinate (magnetizing current) for the third value pair of the characteristic.		
<b>Dependency:</b>	Affects P0320 (motor magnetizing current). The following applies for the magnetizing currents: P0366 < P0367 < P0368 < P0369, otherwise a linear characteristic is applied internally.		

<b>p0369[0...2]</b>	<b>Magnetizing curve imag 4 / Magnet.curve imag4</b>		
	<b>Access level:</b> 4	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 20.0 [%]	<b>Max</b> 250.0 [%]	<b>Factory setting</b> 170.0 [%]
<b>Description:</b>	Specifies fourth magnetizing current value of saturation characteristic in [%] relative to rated magnetizing current (P0331). The saturation characteristic is defined using 4 points (P0362 - P0365, P0366 - P0369). This parameter specifies the x coordinate (magnetizing current) for the fourth value pair of the characteristic.		
<b>Dependency:</b>	Affects P0320 (motor magnetizing current). The following applies for the magnetizing currents: P0366 < P0367 < P0368 < P0369, otherwise a linear characteristic is applied internally.		
<b>r0370[0...2]</b>	<b>Stator resistance [%] / Stator res. [%]</b>		
	<b>Access level:</b> 4	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Unit:</b> [%]		<b>Data set:</b> DDS
<b>Description:</b>	Displays standardized stator resistance of motor equivalent circuit (phase value) in [%].		
<b>r0372[0...2]</b>	<b>Cable resistance [%] / Cable res. [%]</b>		
	<b>Access level:</b> 4	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Unit:</b> [%]		<b>Data set:</b> DDS
<b>Description:</b>	Displays standardized cable resistance of motor equivalent circuit (phase value) in [%]. It is estimated to be 20 % of the stator resistance.		
<b>r0373[0...2]</b>	<b>Rated stator resistance [%] / Rated stat.res.[%]</b>		
	<b>Access level:</b> 4	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Unit:</b> [%]		<b>Data set:</b> DDS
<b>Description:</b>	Displays rated stator resistance of the motor equivalent circuit (phase value) in [%].		
<b>r0374[0...2]</b>	<b>Rotor resistance [%] / Rotor res. [%]</b>		
	<b>Access level:</b> 4	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Unit:</b> [%]		<b>Data set:</b> DDS
<b>Description:</b>	Displays standardized rotor resistance of the motor equivalent circuit (phase value) in [%].		
<b>r0376[0...2]</b>	<b>Rated rotor resistance [%] / Rated rot. res.[%]</b>		
	<b>Access level:</b> 4	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Unit:</b> [%]		<b>Data set:</b> DDS
<b>Description:</b>	Displays rated rotor resistance of the motor equivalent circuit (phase value) in [%].		
<b>r0377[0...2]</b>	<b>Total leakage reactance [%] / Tot.leak.react.[%]</b>		
	<b>Access level:</b> 4	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Unit:</b> [%]		<b>Data set:</b> DDS
<b>Description:</b>	Displays standardized total leakage reactance of the motor equivalent circuit (phase value) in [%].		
<b>Note:</b>	Rated motor impedance: $Z_N = \frac{V_{ph}}{I_{ph}} = \frac{V_N}{\sqrt{3} \cdot I_N} = \frac{p0304}{\sqrt{3} \cdot p0305} \Leftrightarrow 100 \%$		

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<b>r0382[0...2]</b>	<b>Main reactance [%] / Main reactance [%]</b>	<b>Access level:</b> 4	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
		<b>Unit:</b> [%]		<b>Data set:</b> DDS

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

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<b>r0384[0...2]</b>	<b>Rotor time constant / Rotor time const.</b>	<b>Access level:</b> 3	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
		<b>Unit:</b> [ms]		<b>Data set:</b> DDS

**Description:** Displays calculated rotor time constant [ms].

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<b>r0386[0...2]</b>	<b>Total leakage time constant / Total leak. Tconst</b>	<b>Access level:</b> 4	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
		<b>Unit:</b> [ms]		<b>Data set:</b> DDS

**Description:** Displays total leakage time constant of motor.

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<b>r0394</b>	<b>CO: Stator resistance IGBT [%] / Stat. res.IGBT</b>	<b>Access level:</b> 4	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
		<b>Unit:</b> [%]		<b>Data set:</b> -

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

**Note:**

Rated motor impedance:

$$Z_N = \frac{V_{ph}}{I_{ph}} = \frac{V_N}{\sqrt{3} \cdot I_N} = \frac{p0304}{\sqrt{3} \cdot p0305} \Leftrightarrow 100 \%$$

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<b>r0395</b>	<b>CO: Total stator resistance [%] / Total stat.res</b>	<b>Access level:</b> 3	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
		<b>Unit:</b> [%]		<b>Data set:</b> -

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

**Note:**

Rated motor impedance:

$$Z_N = \frac{V_{ph}}{I_{ph}} = \frac{V_N}{\sqrt{3} \cdot I_N} = \frac{p0304}{\sqrt{3} \cdot p0305} \Leftrightarrow 100 \%$$

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<b>r0396</b>	<b>CO: Act. rotor resistance / Act rotor res.</b>	<b>Access level:</b> 3	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
		<b>Unit:</b> [%]		<b>Data set:</b> -

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


**Notice:** Values greater than 25 % tend to produce excessive motor slip.

Check rated motor speed [rpm] value (P0311).

**Note:**

Rated motor impedance:

$$Z_N = \frac{V_{ph}}{I_{ph}} = \frac{V_N}{\sqrt{3} \cdot I_N} = \frac{p0304}{\sqrt{3} \cdot p0305} \Leftrightarrow 100 \%$$


<b>p0400[0...2] Select encoder type / Select enc. type</b>			
<b>Access level:</b> 2	<b>P-Group:</b> Encoder	<b>Data type:</b> Unsigned16	
<b>Quick comm.</b> YES	<b>Active:</b> YES	<b>Data set:</b> DDS	
<b>Can be changed:</b> C, T			
<b>Min</b>	<b>Max</b>	<b>Factory setting</b>	
0	12	0	
<b>Description:</b>	Selects encoder type (number of encoder channels).		
<b>Values:</b>	0: Disabled 2: Quadrature encoder without zero pulse 12: Quadrature encoder with zero pulse		
<b>Caution:</b>	When using Vector Control with encoder-feedback, the direction of rotation of the encoder and motor must be the same. If this is not achieved, then the functional operation of the Vector Control will not be guaranteed (positive instead of negative feedback). Extreme care must therefore be taken with respect to the connection of the motor to the inverter as well as the correct connection of the encoder to the inverter. Motor and encoder must not be incorrectly wired up ! P0400 = 12 (quadrature encoder and zero pulse) will not detect encoder loss on Zero pulse. Zero pulse is only used to synchronise measured angle.		
			
<b>Note:</b>	If the encoder is enabled (P0400 > 0) and the motor holding brake is enabled (P1215 > 0), then the following should be observed in order to stop encoder loss trips when the brake is applied:		
	<ul style="list-style-type: none"> <li>The delay speed loss reaction should be &gt; brake holding times (i.e. P0494 &gt; P1216 and P0494 &gt; P1217 )</li> <li>The delay time for motor pulled out should be &gt; brake holding times (i.e. P2178 &gt; P1216 and P2178 &gt; P1217 )</li> <li>The allowed speed difference P0492 should be &gt; f_min P1080</li> </ul>		


<b>r0403.0...4 CO/BO: Encoder status word / Enc. StatWd</b>					
<b>Access level:</b> 2	<b>P-Group:</b> Commands	<b>Data type:</b> Unsigned16			
<b>Unit:</b> -		<b>Data set:</b> -			
<b>Description:</b>	Displays status word of encoder (in bit format).				
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>	<b>0 signal</b>	<b>FP</b>
	00	Encoder active	Yes	No	-
	01	Encoder error	Yes	No	-
	02	Signal o.k.	Yes	No	-
	03	Encoder Low Speed Loss	Yes	No	-
	04	Speed measurement using one encoder pulse edge	Yes	No	-

<b>p0405[0...2] Enables selection of pulse types / Enables pulse type</b>					
<b>Access level:</b> 2	<b>P-Group:</b> Converter	<b>Data type:</b> Unsigned16			
<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS			
<b>Can be changed:</b> T					
<b>Min</b>	<b>Max</b>	<b>Factory setting</b>			
-	-	0000 bin			
<b>Description:</b>	Enables selection of various pulse types. Only bits 04 and 05 are used.				
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>	<b>0 signal</b>	<b>FP</b>
	00	not used	Yes	No	-
	01	not used	Yes	No	-
	02	not used	Yes	No	-
	03	not used	Yes	No	-
	04	invert Z-pulse	Yes	No	-
	05	Z-pulse = Z-pulse & A-pulse & B-pulse	Yes	No	-
	06	not used	Yes	No	-
	07	not used	Yes	No	-
	08	not used	Yes	No	-



<b>p0408[0...2]</b>	<b>Encoder pulses per revolution / Enc pulses per rev</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Encoder	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> YES	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> C, T		
	<b>Min</b> 2	<b>Max</b> 20000	<b>Factory setting</b> 1024
<b>Description:</b>	Specifies the number of encoder pulses per revolution.		
<b>Note:</b>	The encoder resolution (pulses per revolution P0408) which may be entered will be limited by the max. pulse frequency of the encoder circuits ( $f_{max} = 300 \text{ kHz}$ ). The following equation calculates the encoder frequency depending on the encoder resolution and the rotational speed (rpm). The encoder frequency has to be less than the max. pulse frequency:		
	$f_{max} > f = \frac{p0408 \times rpm}{60}$		
<b>p0410[0...2]</b>	<b>Reverses internal direction sense / Rev dir sense</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Encoder	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> T		
	<b>Min</b> 0	<b>Max</b> 1	<b>Factory setting</b> 0
<b>Description:</b>	Reverses internal direction sense of the encoder signal. This does the same thing as switching the ENC_A and ENC_B signals.		
<b>Values:</b>	0: Encoder Normal Rotation 1: Encoder Reverse Rotation		
<b>r0485</b>	<b>CO: Encoder counter value / Encoder count val.</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Unsigned32
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Shows the internal counter value of the encoder pulses.		
<b>p0491[0...2]</b>	<b>Reaction on speed signal loss / Select enc. type</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Encoder	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> DDS
	<b>Can be changed:</b> T		
	<b>Min</b> 0	<b>Max</b> 1	<b>Factory setting</b> 0
<b>Description:</b>	Selects reaction on loss of speed signal.		
<b>Values:</b>	0: Trip the drive 1: Warn and switch to SLVC if in VC		

p0492[0...2]	Allowed speed difference / Allowed speed dif		
<b>Access level:</b> 2 <b>Quick comm.</b> NO <b>Can be changed:</b> T	<b>P-Group:</b> Encoder <b>Active:</b> YES	<b>Data type:</b> Floating Point <b>Data set:</b> DDS	
<b>Min</b> 0.00 [Hz]	<b>Max</b> 100.00 [Hz]	<b>Factory setting</b> 10.00 [Hz]	
<b>Description:</b>	<p>Parameter P0492 is used for low and high speed encoder loss detection (fault: F0090).</p> <p>High speed encoder loss detection:            This condition occurs when the allowed frequency and the allowed difference of the speed signals between samples, set in P0492 is exceeded.</p> <ul style="list-style-type: none"> <li>• <math>f_{act}</math> and <math>f(t_2) - f(t_1) &gt; P0492</math></li> </ul> <p>Low speed encoder loss detection:            This condition occurs when the actual frequency is <math>&lt; P0492</math> when encoder loss occurs.</p> <ul style="list-style-type: none"> <li>• Condition 1:               <ul style="list-style-type: none"> <li>- <math>r0061 = 0</math> and torque limit and then</li> <li>- <math>r0061 = 0</math> with setpoint frequency <math>&gt; 0</math> for time <math>&gt; P0494</math></li> </ul> </li> <li>• Condition 2:               <ul style="list-style-type: none"> <li>- Act. freq. <math>&lt; P0492</math> and <math>f(t_2) &lt; P0492</math> and ASIC detect channel B loss</li> </ul> </li> </ul>		
<b>Dependency:</b>	<p>This parameter is updated when motor start-up time P0345 is changed or when a speedloop optimisation is performed (P1960 = 1).</p> <p>There is a fixed delay of 40 ms before acting upon loss of encoder at high speeds.</p>		
<b>Caution:</b> 	<p>P0492 = 0 (disabled):</p> <p>When allowed speed difference is set to 0, both the high speed and low speed encoder loss detection are disabled, thus encoder loss will not be detected.</p> <p>If encoder loss detection is disabled and encoder loss occurs, then operation of the motor may become unstable. Consideration also needs to be given to drive operation when the drive is operating in vector speed control or vector torque control mode (P1300 = 21, 23) and the drive attempts to start the motor while it has a failed encoder. Under these circumstances, the drive uses parameters P1520 and P1521 (the upper and lower torque limits respectively) to decide when to trip.</p> <p>In the case of a very low frequency set point, it may take the drive a considerable period to reach this condition, during which time the drive can lose orientation.</p>		
<b>Note:</b>	<p>If the encoder is enabled (P0400 <math>&gt; 0</math>) and the motor holding brake is enabled (P1215 <math>&gt; 0</math>) then in order to stop encoder loss trips when the brake is applied, the allowed speed difference P0492 should be <math>&gt; f_{min}</math> (P1080). The Factory setting depends on motor power.</p>		

<b>p0494[0...2] Delay speed loss reaction / Dly speed loss rec</b>			
<b>Access level:</b> 2	<b>P-Group:</b> Encoder	<b>Data type:</b> Unsigned16	
<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> DDS	
<b>Can be changed:</b> U, T			
<b>Min</b> 0 [ms]	<b>Max</b> 65000 [ms]	<b>Factory setting</b> 10 [ms]	
<b>Description:</b>	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.		
<b>Dependency:</b>	This parameter is updated when motor start-up time P0345 is changed or when a speedloop optimisation is performed (P1960 = 1).		
<b>Caution:</b>	P0494 = 0 (disabled): 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.		
			
<b>Note:</b>	If the encoder is enabled (P0400 > 0) and the motor holding brake is enabled (P1215 > 0), then in order to stop encoder loss trips when the brake is applied, the delay speed loss reaction should be > brake holding times (i.e. P0494 > P1216 and P494 > P1217). The Factory setting depends on motor power.		

<b>p0601[0...2] Motor temperature sensor / Motor temp. sensor</b>			
<b>Access level:</b> 2	<b>P-Group:</b> Motor	<b>Data type:</b> Unsigned16	
<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> DDS	
<b>Can be changed:</b> U, T			
<b>Min</b> 0	<b>Max</b> 2	<b>Factory setting</b> 0	
<b>Description:</b>	Selects motor temperature sensor. No sensor (P0601 = 0) The motor temperature monitoring will be done based on the estimated value of the thermal motor model. PTC thermistor (P0601 = 1) The motor is monitored by the thermal motor model and additionally by the PTC thermistor, thus providing a redundant system for monitoring the motor temperature. Should the resistance value of 2000 Ohm be exceeded, the inverter trips with fault F0011 (motor overheating). If the resistance value is below 10 Ohm, then the fault F0015 (motor temperature signal lost) is output. This protects the motor from overheating and also from a sensor wire breakage. KTY84 (P0601 = 2) The temperature of the sensor (thus that of the motor windings) is written to parameter r0035. This motor temperature is then additionally calculated via the thermal motor model. If the electric circuit to the KTY84 sensor is open or if a short circuit occurs, fault F0015 (motor temperature signal lost) is generated.		
<b>Values:</b>	0: No sensor 1: PTC thermistor 2: KTY84		
<b>Dependency:</b>	The motor overheating warning threshold needs to be assigned with parameter P0604 (the factory setting is 130 °C). This warning threshold depends on the motor's thermal class. The motor overheating disturbance threshold is automatically set by the inverter at 10 % higher than the temperature declared in parameter P0604. In parameter P0610 is set, how the inverter reacts on overtemperature.		

<b>p0604[0...2]</b>	<b>Threshold motor temperature / Thresh. mot. temp.</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.0 [°C]	<b>Max</b> 200.0 [°C]	<b>Factory setting</b> 130.0 [°C]
<b>Description:</b>	Enters warning threshold for motor temperature protection. The trip temperature defined is always 10 % higher than the warning threshold P0604. When actual motor temperature exceeds trip temperature then inverter trips as defined in P0610.		
<b>Dependency:</b>	This value should be at least 40°C higher than the motor ambient temperature P0625.		
<b>Note:</b>	Default value depends on P0300 (select motor type).		
<b>p0610[0...2]</b>	<b>Motor I2t temperature reaction / I2t temp. reaction</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Motor	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> DDS
	<b>Can be changed:</b> T		
	<b>Min</b> 0	<b>Max</b> 2	<b>Factory setting</b> 2
<b>Description:</b>	Defines reaction when motor temperature reaches warning threshold.		
<b>Values:</b>	0: No reaction, warning only 1: Warning and I <sub>max</sub> reduction (results in reduced output frequency) 2: Warning and trip (F0011)		
<b>Dependency:</b>	Trip level = P0604 (motor temperature threshold) * 110 %		
<b>Note:</b>	The purpose of motor I2t is to calculate or measure (KTY84) the motor temperature and disable the inverter if the motor is in danger of overheating. I2t operation: The measured motor current is displayed in r0027. The motor temperature in °C is displayed in r0035. This temperature is derived either from a KTY84 temperature sensor mounted in the motor, or from a calculated value. The value from the KTY84 is used only when P0601 = 2; in all other cases (including motor temperature signal lost) the calculated value is used. The reaction to the warning can be changed from this default using P0610. Parameter r0035 is particularly useful to monitor if the calculated motor temperature is rising excessively.		
<b>p0621[0...2]</b>	<b>Motor temp. ident after restart / Mot.temp ident.</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Motor	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0	<b>Max</b> 2	<b>Factory setting</b> 0
<b>Description:</b>	Starts the motor temperature identification after power on or start up.		
<b>Values:</b>	0: No identification 1: Temperature identification only after power on 2: Temperature identification after every power on		
<b>Note:</b>	It is necessary to run the motor data identification before using the motor temperature identification. If that wasn't done the results of the motor temperature identifications are wrong.		

<b>p0622[0...2]</b>	<b>Magnetizing time for temp id after start up / Magnet. t temp id</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.000 [ms]	<b>Max</b> 20000.000 [ms]	<b>Factory setting</b> 0.000 [ms]
<b>Description:</b>	Specifies the magnetization time for stator resistance identification.		
<b>Note:</b>	This parameter will be set as a result of the motor data identification according to the identified rotor time constant r1913.		
<b>r0623[0...2]</b>	<b>CO: Display for the identified stator resistance / Act. stator resist</b>		
	<b>Access level:</b> 4	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Unit:</b> [Ohm]		<b>Data set:</b> DDS
<b>Description:</b>	Display of the actual identified stator resistance after temperature identification.		
<b>p0625[0...2]</b>	<b>Ambient motor temperature / Ambient mot. temp.</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> YES	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> C, U, T		
	<b>Min</b> -40.0 [°C]	<b>Max</b> 80.0 [°C]	<b>Factory setting</b> 20.0 [°C]
<b>Description:</b>	Ambient temperature of motor at time of motor data identification. It is only allowed to change the value when the motor is cold. A motor identification has to be made after changing the value.		
<b>p0626[0...2]</b>	<b>Overtemperature stator iron / Overtemp.stat.iron</b>		
	<b>Access level:</b> 4	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 20.0 [°C]	<b>Max</b> 200.0 [°C]	<b>Factory setting</b> 50.0 [°C]
<b>Description:</b>	Overtemperature of stator iron.		
<b>Note:</b>	Temperature rises are valid for sinusoidal operations (line supply temperature rises). Temperature rises due to converter operation (modulation losses) and output filter are also considered.		
<b>p0627[0...2]</b>	<b>Overtemperature stator winding / Overtemp.stat.wind</b>		
	<b>Access level:</b> 4	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 20.0 [°C]	<b>Max</b> 200.0 [°C]	<b>Factory setting</b> 80.0 [°C]
<b>Description:</b>	Overtemperature of the stator winding. It is only allowed to change the value when the motor is cold. A motor identification has to be made after changing the value.		
<b>Note:</b>	Temperature rises are valid for sinusoidal operations (line supply temperature rises). Temperature rises due to converter operation (modulation losses) and output filter are also considered.		

<b>p0628[0...2]</b>	<b>Overtemperature rotor winding / Overtemp.rot. wind</b>		
	<b>Access level:</b> 4	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 20.0 [°C]	<b>Max</b> 200.0 [°C]	<b>Factory setting</b> 100.0 [°C]
<b>Description:</b>	Overtemperature of the rotor winding.		
<b>Note:</b>	Temperature rises are valid for sinusoidal operations (line supply temperature rises). Temperature rises due to converter operation (modulation losses) and output filter are also considered.		
<b>r0630[0...2]</b>	<b>CO: Motor model ambient temperature / Mot. model amb. te</b>		
	<b>Access level:</b> 4	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Unit:</b> [°C]		<b>Data set:</b> DDS
<b>Description:</b>	Displays ambient temperature of motor mass model.		
<b>r0631[0...2]</b>	<b>CO: Stator iron temperature / Stat.iron temp</b>		
	<b>Access level:</b> 4	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Unit:</b> [°C]		<b>Data set:</b> DDS
<b>Description:</b>	Displays iron temperature of motor mass model.		
<b>r0632[0...2]</b>	<b>CO: Stator winding temperature / Stat.wind.temp</b>		
	<b>Access level:</b> 4	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Unit:</b> [°C]		<b>Data set:</b> DDS
<b>Description:</b>	Displays stator winding temperature of motor mass model.		
<b>r0633[0...2]</b>	<b>CO: Rotor winding temperature / Rot. wind.temp</b>		
	<b>Access level:</b> 4	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Unit:</b> [°C]		<b>Data set:</b> DDS
<b>Description:</b>	Displays rotor winding temperature of motor mass model.		
<b>p0640[0...2]</b>	<b>Motor overload factor [%] / Motor ovl fact [%]</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Motor	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> YES	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> C, U, T		
	<b>Min</b> 10.0 [%]	<b>Max</b> 400.0 [%]	<b>Factory setting</b> 200.0 [%]
<b>Description:</b>	Defines motor overload current limit in [%] relative to P0305 (rated motor current).		
<b>Dependency:</b>	Limited to maximum inverter current or to 400 % of rated motor current (P0305), whichever is the lower.		
	$p0640_{\max} = \frac{\min(r0209, 4 \cdot p0305)}{p0305} \cdot 100$		
<b>Note:</b>	Changes to P640 will be effective only after the next off state. See function diagram for current limitation.		

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<b>p0700[0...2]</b>	<b>Selection of command source / Command source sel</b>		
<b>Access level:</b> 1	<b>P-Group:</b> Commands	<b>Data type:</b> Unsigned16	
<b>Quick comm.</b> YES	<b>Active:</b> NO	<b>Data set:</b> CDS	
<b>Can be changed:</b> C, T			
<b>Min</b>	<b>Max</b>	<b>Factory setting</b>	
0	6	6	

**Description:** Selects digital command source.

**Values:**  
 0: Factory default setting  
 4: USS on RS232  
 6: Fieldbus

**Dependency:** Changing this parameter sets (to default) all settings on item selected. These are the following parameters: P0800, P0801, P0840, P0842, P0844, P0845, P0848, P0849, P0852, P1055, P1056, P1074, P1110, P1113, P1124, P1140, P1141, P1142, P1477, P1501, P2103, P2104, P2106

**Caution:** Be aware, by changing of parameter P0700 all BI parameters are reset to the default value.




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<b>p0719[0...2]</b>	<b>Selection of cmd. &amp; freq. setp. / Cmd.&amp;freq.setp.sel</b>		
<b>Access level:</b> 4	<b>P-Group:</b> Commands	<b>Data type:</b> Unsigned16	
<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> CDS	
<b>Can be changed:</b> T			
<b>Min</b>	<b>Max</b>	<b>Factory setting</b>	
0	66	0	

**Description:** 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.

**Values:**  
 0: Cmd = BICO parameter Setpoint = BICO parameter  
 4: Cmd = BICO parameter Setpoint = USS on RS232  
 6: Cmd = BICO parameter Setpoint = Fieldbus  
 40: Cmd = USS on RS232 Setpoint = BICO parameter  
 44: Cmd = USS on RS232 Setpoint = USS on RS232  
 46: Cmd = USS on RS232 Setpoint = Fieldbus  
 60: Cmd = Fieldbus Setpoint = BICO parameter  
 64: Cmd = Fieldbus Setpoint = USS on RS232  
 66: Cmd = Fieldbus Setpoint = Fieldbus

**Dependency:** P0719 has higher priority than P0700 and P1000.  
 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.  
 USS on RS485 is not supported.

<b>p0802</b>	<b>Transfer data from EEPROM / Transf.Drive-&gt;Ext</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Factory settings	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> -		
	<b>Min</b> 0	<b>Max</b> 2	<b>Factory setting</b> 0
<b>Description:</b>	Transfers values from drive to External device when none 0. Parameter P0010 must be set to 30 for this to be possible.		
<b>Values:</b>	0: Disabled 2: Start MMC Transfer		
<b>Note:</b>	Parameter is automatically reset to 0 (default) after transfer. P0010 will be reset to 0 on successful completion. Ensure that enough space exists on the MMC card before transferring data (8kb).		
<b>p0803</b>	<b>Transfer data to EEPROM / Transf.Ext-&gt;Drive</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Factory settings	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> -		
	<b>Min</b> 0	<b>Max</b> 2	<b>Factory setting</b> 0
<b>Description:</b>	Transfers values from External to drive when none 0. Parameter P0010 must be set to 30 for this to be possible.		
<b>Values:</b>	0: Disabled 2: Start MMC Transfer		
<b>Note:</b>	Parameter is automatically reset to 0 (default) after transfer. P0010 will be reset to 0 on successful completion.		
<b>p0804</b>	<b>Select Clone file / Select Clone file</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Factory settings	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> -		
	<b>Min</b> 0	<b>Max</b> 99	<b>Factory setting</b> 0
<b>Description:</b>	Select clone file to up/down load. if P0804 = 0 then file name is clone00.bin if P0804 = 1 then file name is clone01.bin etc.		
<b>p0806</b>	<b>BI: Inhibit panel access / Inhibit panel acce</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Commands	<b>Data type:</b> U32 / Binary
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> -
	<b>Can be changed:</b> U, T		
	<b>Min</b> -	<b>Max</b> -	<b>Factory setting</b> 0
<b>Description:</b>	Binector input to lock control panel access through external client.		



<b>r0807.0</b>	<b>BO: Displays client access / Displays client ac</b>			
	<b>Access level:</b> 3	<b>P-Group:</b> Commands	<b>Data type:</b> Unsigned16	
	<b>Unit:</b> -		<b>Data set:</b> -	
<b>Description:</b>	Binector output to display whether command and setpoint source is connected to an external client.			
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>	<b>0 signal</b>
	00	Master control active	Yes	No
				<b>FP</b>
				-
<b>p0809[0...2]</b>	<b>Copy Command Dataset (CDS) / Copy CDS</b>			
	<b>Access level:</b> 2	<b>P-Group:</b> Commands	<b>Data type:</b> Unsigned16	
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -	
	<b>Can be changed:</b> T			
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>	
	0	2	0	
<b>Description:</b>	Calls 'Copy Command Dataset (CDS)' function.			
	The list of all Command Datasets (CDS) parameters is shown in Section 1.3 of this Parameter List (PLI).			
<b>Example:</b>	Copying of all values from CDS0 to CDS2 can be accomplished by the following procedure:			
	P0809[0] = 0 Copy from CDS0			
	P0809[1] = 2 Copy to CDS2			
	P0809[2] = 1 Start copy			
<b>Index:</b>	[0] = Copy from CDS			
	[1] = Copy to CDS			
	[2] = Start copy			
<b>Note:</b>	Start value in index 2 is automatically reset to '0' after execution of function.			
<b>p0810</b>	<b>BI: CDS bit 0 (Hand/Auto) / CDS bit 0</b>			
	<b>Access level:</b> 2	<b>P-Group:</b> Commands	<b>Data type:</b> U32 / Binary	
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -	
	<b>Can be changed:</b> U, T			
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>	
	-	-	0	
<b>Description:</b>	Selects command source from which to read Bit 0 for selecting a Command Dataset (CDS).			
	The actual selected Command Dataset (CDS) is displayed in parameter r0054.15 (CDS bit 0) and r0055.15 (CDS bit 1).			
	The actual active Command Dataset (CDS) is displayed in parameter r0050.			
<b>Note:</b>	P0811 is also relevant for Command Dataset (CDS) set selection.			
<b>p0811</b>	<b>BI: CDS bit 1 / CDS bit 1</b>			
	<b>Access level:</b> 2	<b>P-Group:</b> Commands	<b>Data type:</b> U32 / Binary	
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -	
	<b>Can be changed:</b> U, T			
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>	
	-	-	0	
<b>Description:</b>	Selects command source from which to read Bit 1 for selecting a Command Dataset (see P0810).			
<b>Note:</b>	P0810 is also relevant for Command Dataset (CDS) selection.			

<b>p0819[0...2]</b>	<b>Copy Drive Dataset (DDS) / Copy DDS</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Commands	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> T		
	<b>Min</b> 0	<b>Max</b> 2	<b>Factory setting</b> 0
<b>Description:</b>	Calls 'Copy Drive Dataset (DDS)' function. The list of all Drive Dataset (DDS) parameters is shown in Section 1.3 of the Parameter List (PLI).		
<b>Example:</b>	Copying of all values from DDS0 to DDS2 can be accomplished by the following procedure: P0819[0] = 0 Copy from DDS0 P0819[1] = 2 Copy to DDS2 P0819[2] = 1 Start copy		
<b>Index:</b>	[0] = Copy from DDS [1] = Copy to DDS [2] = Start copy		
<b>Note:</b>	Start value in index 2 is automatically reset to '0' after execution of function.		
<b>p0820</b>	<b>BI: DDS bit 0 / DDS bit 0</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Commands	<b>Data type:</b> U32 / Binary
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> T		
	<b>Min</b> -	<b>Max</b> -	<b>Factory setting</b> 0
<b>Description:</b>	Selects command source from which to read Bit 0 for selecting a Drive Dataset (DDS). The actual selected Drive Dataset (DDS) is displayed in parameter r0051[0]. The actual active Drive Dataset (DDS) is displayed in parameter r0051[1].		
<b>Dependency:</b>	When Standard Telegram 350 and Fieldbus is selected (p0700 = 6, p0922 = 350), parameter cannot be changed.		
<b>Note:</b>	P0821 is also relevant for Drive Dataset (DDS) selection.		
<b>p0821</b>	<b>BI: DDS bit 1 / DDS bit 1</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Commands	<b>Data type:</b> U32 / Binary
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> T		
	<b>Min</b> -	<b>Max</b> -	<b>Factory setting</b> 0
<b>Description:</b>	Selects command source from which Bit 1 for selecting a Drive Dataset is to be read in (see parameter P0820).		
<b>Dependency:</b>	When Standard Telegram 350 and Fieldbus selected (p0700 = 6, p0922 = 350), parameter cannot be changed.		
<b>Note:</b>	P0820 is also relevant for Drive Dataset (DDS) selection.		
<b>p0840[0...2]</b>	<b>BI: ON/OFF1 / ON/OFF1</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Commands	<b>Data type:</b> U32 / Binary
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> CDS
	<b>Can be changed:</b> T		
	<b>Min</b> -	<b>Max</b> -	<b>Factory setting</b> 2090.0
<b>Description:</b>	Allows ON/OFF1 command source to be selected using BICO.		
<b>Dependency:</b>	When Standard Telegram selected (p0700 = 6, p0922 = Standard Telegram), parameter cannot be changed.		

<b>p0842[0...2]</b>	<b>BI: ON reverse/OFF1 / BI:ON reverse/OFF1</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Commands	<b>Data type:</b> U32 / Binary
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> CDS
	<b>Can be changed:</b> T		
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
	-	-	0
<b>Description:</b>	Allows ON/OFF1 reverse command source to be selected using BICO. In general a positive frequency setpoint is run up counterclockwise (negative frequency).		
<b>p0844[0...2]</b>	<b>BI: 1. OFF2 / 1. OFF2</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Commands	<b>Data type:</b> U32 / Binary
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> CDS
	<b>Can be changed:</b> T		
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
	-	-	2090.1
<b>Description:</b>	Defines first source of OFF2 when P0719 = 0 (BICO).		
<b>Dependency:</b>	When Standard Telegram selected (p0700 = 6, p0922 = Standard Telegram), parameter cannot be changed.		
<b>Note:</b>	OFF2 means immediate pulse-disabling; the motor is coasting. OFF2 is low-active, i.e. : 0 = Pulse disabling. 1 = Operating condition.		
<b>p0845[0...2]</b>	<b>BI: 2. OFF2 / 2. OFF2</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Commands	<b>Data type:</b> U32 / Binary
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> CDS
	<b>Can be changed:</b> T		
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
	-	-	1
<b>Description:</b>	Defines second source of OFF2.		
<b>Dependency:</b>	In contrast to P0844 (first source of OFF2), this parameter is always active, independent of P0719 (selection of command and frequency setpoint).		
<b>Note:</b>	OFF2 means immediate pulse-disabling; the motor is coasting. OFF2 is low-active, i.e. : 0 = Pulse disabling. 1 = Operating condition.		
<b>p0848[0...2]</b>	<b>BI: 1. OFF3 / 1. OFF3</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Commands	<b>Data type:</b> U32 / Binary
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> CDS
	<b>Can be changed:</b> T		
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
	-	-	2090.2
<b>Description:</b>	Defines first source of OFF3 when P0719 = 0 (BICO).		
<b>Dependency:</b>	When Standard Telegram selected (p0700 = 6, p0922 = Standard Telegram), parameter cannot be changed.		
<b>Note:</b>	OFF3 means quick ramp-down to 0. OFF3 is low-active, i.e. 0 = Quick ramp-down. 1 = Operating condition.		

<b>p0849[0...2]</b>	<b>BI: 2. OFF3 / 2. OFF3</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Commands	<b>Data type:</b> U32 / Binary
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> CDS
	<b>Can be changed:</b> T		
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
	-	-	1
<b>Description:</b>	Defines second source of OFF3.		
<b>Dependency:</b>	In contrast to P0848 (first source of OFF3), this parameter is always active, independent of P0719 (selection of command and frequency setpoint).		
<b>Note:</b>	OFF3 means quick ramp-down to 0. OFF3 is low-active, i.e. 0 = Quick ramp-down. 1 = Operating condition.		
<b>p0852[0...2]</b>	<b>BI: Pulse enable / Pulse enable</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Commands	<b>Data type:</b> U32 / Binary
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> CDS
	<b>Can be changed:</b> T		
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
	-	-	2090.3
<b>Description:</b>	Defines source of pulse enable/disable signal.		
<b>Dependency:</b>	Active only when P0719 = 0 (Auto selection of command/setpoint source). When Standard Telegram selected (p0700 = 6, p0922 = Standard Telegram), parameter cannot be changed.		
<b>p0922</b>	<b>Selection of PROFIdrive Standard Telegram / Standard Telegram</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> -	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> T		
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
	1	999	1
<b>Description:</b>	Selects the PROFIdrive Standard Telegram.		
<b>Values:</b>	1: Standard Telegram 1 999: Free BICO connection		
<b>Dependency:</b>	Setting Standard Telegram has effect only when PROFIBUS is selected.		
<b>Note:</b>	With this parameter the type of Standard Telegram is selected and the corresponding BICO connections will be freed during Standard Telegram.		

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<b>p0927</b>	<b>Parameter changeable via / Change par. via</b>			
	<b>Access level:</b> 2	<b>P-Group:</b> Communications	<b>Data type:</b> Unsigned16	
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -	
	<b>Can be changed:</b> U, T			
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>	
	-	-	1111 bin	
<b>Description:</b>	Specifies the interfaces which can be used to change parameters. This parameter allows the user to easily protect the inverter from unauthorized modification of parameters. Annotation: Parameter P0927 is not password protected.			
<b>Example:</b>	Default: All bits are set: The default setting allows parameters to be changed via any interface.			
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>	<b>0 signal</b> <b>FP</b>
	00	Fieldbus	Yes	No      -
	01	Not used	Yes	No      -
	02	USS on RS232	Yes	No      -

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<b>r0944</b>	<b>Total number of messages / Total nb Mes</b>			
	<b>Access level:</b> 3	<b>P-Group:</b> Messages	<b>Data type:</b> Unsigned16	
	<b>Unit:</b> -		<b>Data set:</b> -	
<b>Description:</b>	Displays the total number of messages available			

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<b>r0947[0...63]</b>	<b>CO: Last fault code / Last fault code</b>			
ICU24	<b>Access level:</b> 2	<b>P-Group:</b> Messages	<b>Data type:</b> Unsigned16	
	<b>Unit:</b> -		<b>Data set:</b> -	
<b>Description:</b>	Displays fault history.			
<b>Index:</b>	[0] = Recent fault trip --, fault 1 [1] = Recent fault trip --, fault 2 [2] = Recent fault trip --, fault 3 [3] = Recent fault trip --, fault 4 [4] = Recent fault trip --, fault 5 [5] = Recent fault trip --, fault 6 [6] = Recent fault trip --, fault 7 [7] = Recent fault trip --, fault 8 [8] = Recent fault trip -1, fault 1			
<b>Dependency:</b>	Index 1 used only if second fault occurs before first fault is acknowledged.			
<b>Note:</b>	See Chapter "Faults and Warnings".			

<b>r0947[0...63]</b>	<b>CO: Last fault code / Last fault code</b>		
ICU24F	<b>Access level:</b> 2	<b>P-Group:</b> Messages	<b>Data type:</b> Unsigned16
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Displays fault history.		
<b>Index:</b>	[0] = Recent fault trip --, fault 1 [1] = Recent fault trip --, fault 2 [2] = Recent fault trip --, fault 3 [3] = Recent fault trip --, fault 4 [4] = Recent fault trip --, fault 5 [5] = Recent fault trip --, fault 6 [6] = Recent fault trip --, fault 7 [7] = Recent fault trip --, fault 8 [8] = Recent fault trip -1, fault 1		
<b>Dependency:</b>	Index 1 used only if second fault occurs before first fault is acknowledged.		
<b>Notice:</b>	It is possible that this parameter is empty but a fault is still indicated by the drive. The reason for this is most likely due to a SAFE condition still existing in the system. In this situation the alarm is cleared from this parameter and it makes no sense to go back to a READY state. First remove the reason for the SAFE condition and then the drive will be able to change to a READY state. (SAFE condition example is "safety function is activated").		
<b>Note:</b>	See Chapter "Faults and Warnings".		
<b>r0948[0...63]</b>	<b>Fault time / Fault time</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Messages	<b>Data type:</b> Unsigned32
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Time stamp to indicate when a fault has occurred. P2114 (run-time counter) or P2115 (real time clock) are the possible sources of the time stamp. In case of PROFIdrive Profile 3.1 or higher configuration, P0969 (system run time counter) is used.		
<b>Example:</b>	The time is taken from P2115 if this parameter has been updated with the real time. If not, P2114 is used. If P2038 is set to PROFIdrive, P0969 is used.		
<b>Index:</b>	[0] = Recent fault trip --, fault time 1 [1] = Recent fault trip --, fault time 2 [2] = Recent fault trip --, fault time 3 [3] = Recent fault trip --, fault time 4 [4] = Recent fault trip --, fault time 5 [5] = Recent fault trip --, fault time 6 [6] = Recent fault trip --, fault time 7 [7] = Recent fault trip --, fault time 8 [8] = Recent fault trip -1, fault time 1		
<b>Note:</b>	P2115 can be updated via Starter, DriveMonitor, etc.		
<b>r0949[0...63]</b>	<b>CO: Fault value / Fault value</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Messages	<b>Data type:</b> Unsigned32
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	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.		
<b>Index:</b>	[0] = Recent fault trip --, fault value 1 [1] = Recent fault trip --, fault value 2 [2] = Recent fault trip --, fault value 3 [3] = Recent fault trip --, fault value 4 [4] = Recent fault trip --, fault value 5 [5] = Recent fault trip --, fault value 6 [6] = Recent fault trip --, fault value 7 [7] = Recent fault trip --, fault value 8 [8] = Recent fault trip -1, fault value 1		

<b>p0952</b>	<b>Total number of faults / Total faults</b>				
	<b>Access level:</b> 3	<b>P-Group:</b> Messages	<b>Data type:</b> Unsigned16		
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -		
	<b>Can be changed:</b> T				
	<b>Min</b> 0	<b>Max</b> 65535	<b>Factory setting</b> 0		
<b>Description:</b>	Displays number of faults stored in P0947 (last fault code).				
<b>Dependency:</b>	Setting 0 resets fault history. (changing to 0 also resets parameter r0948 - fault time).				
<b>r0964[0...6]</b>	<b>Firmware version data / FW version data</b>				
	<b>Access level:</b> 3	<b>P-Group:</b> Communications	<b>Data type:</b> Unsigned16		
	<b>Unit:</b> -		<b>Data set:</b> -		
<b>Description:</b>	Firmware version data.				
<b>Index:</b>	[0] = Company (Siemens = 42) [1] = Product type [2] = Firmware version [3] = Firmware date (year) [4] = Firmware date (day/month) [5] = Number of drive objects [6] = Firmware version				
<b>r0965</b>	<b>PROFdrive Profile / PROFdrive Profile</b>				
	<b>Access level:</b> 3	<b>P-Group:</b> Communications	<b>Data type:</b> Unsigned16		
	<b>Unit:</b> -		<b>Data set:</b> -		
<b>Description:</b>	Identification for PROFdrive Profile number and version.				
<b>r0967</b>	<b>Control word 1 / Control word 1</b>				
	<b>Access level:</b> 3	<b>P-Group:</b> Communications	<b>Data type:</b> Unsigned16		
	<b>Unit:</b> -		<b>Data set:</b> -		
<b>Description:</b>	Displays control word 1.				
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>	<b>0 signal</b>	<b>FP</b>
	00	ON/OFF1	Yes	No	-
	01	OFF2: Electrical stop	No	Yes	-
	02	OFF3: Fast stop	No	Yes	-
	03	Pulse enable	Yes	No	-
	04	RFG enable	Yes	No	-
	05	RFG start	Yes	No	-
	06	Setpoint enable	Yes	No	-
	07	Fault acknowledge	Yes	No	-
	08	JOG right	Yes	No	-
	09	JOG left	Yes	No	-
	10	Control from PLC	Yes	No	-
	11	Reverse (setpoint inversion)	Yes	No	-
	15	CDS Bit 0 (Hand/Auto)	Yes	No	-

<b>r0968</b>		<b>Status word 1 / Status word 1</b>			
<b>Access level:</b> 3		<b>P-Group:</b> Communications		<b>Data type:</b> Unsigned16	
<b>Unit:</b> -				<b>Data set:</b> -	
<b>Description:</b>		Displays active status word of inverter (in binary) and can be used to diagnose which commands are active.			
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>	<b>0 signal</b>	<b>FP</b>
	00	Drive ready	Yes	No	-
	01	Drive ready to run	Yes	No	-
	02	Drive running	Yes	No	-
	03	Drive fault active	Yes	No	-
	04	OFF2 active	No	Yes	-
	05	OFF3 active	No	Yes	-
	06	ON inhibit active	Yes	No	-
	07	Drive warning active	Yes	No	-
	08	Deviation setpoint / act. value	No	Yes	-
	09	PZD control	Yes	No	-
	10	f_act >= P1082 (f_max)	Yes	No	-
	11	Warning: Motor current/torque limit	No	Yes	-
	12	Brake open	Yes	No	-
	13	Motor overload	No	Yes	-
	14	Motor runs right	Yes	No	-
	15	Inverter overload	No	Yes	-

<b>p0969</b>		<b>Resetable system run time counter / Rst counter</b>		
<b>Access level:</b> 3		<b>P-Group:</b> Messages		<b>Data type:</b> Unsigned32
<b>Quick comm.</b> NO		<b>Active:</b> YES		<b>Data set:</b> -
<b>Can be changed:</b> T				
<b>Min</b>		<b>Max</b>		<b>Factory setting</b>
0		4294967295		0
<b>Description:</b>	Resetable system run time counter.			

<b>p0970</b>		<b>Factory reset / Factory reset</b>		
<b>Access level:</b> 1		<b>P-Group:</b> Factory settings		<b>Data type:</b> Unsigned16
<b>Quick comm.</b> NO		<b>Active:</b> NO		<b>Data set:</b> -
<b>Can be changed:</b> -				
<b>Min</b>		<b>Max</b>		<b>Factory setting</b>
0		10		0
<b>Description:</b>	P0970 = 1 resets all parameters to their default values.			
<b>Values:</b>	0: Disabled 1: Parameter reset 10: Safety reset			
<b>Dependency:</b>	First set P0010 = 30 (factory settings). Stop drive (i.e. disable all pulses) before you can reset parameters to default values.			
<b>Note:</b>	The following parameters retain their values after a factory reset: <ul style="list-style-type: none"> <li>• r0039 CO: Energy consumption meter [kWh]</li> <li>• P0014 Store mode</li> <li>• P0100 Europe / North America</li> <li>• P0918 PROFIBUS address</li> <li>• P2010 USS baud rate</li> <li>• P2011 USS address</li> </ul>			



When transferring parameter p0970, the frequency inverter uses its processor to carry-out internal calculations. Communications - both via USS as well as via the Fieldbus - are interrupted for the time that it takes to make these calculations.

This can result in the following error messages at the connected SIMATIC S7 control (communications via fieldbus):

- Parameter fault 30
- Drive fault 70
- Drive fault 75

When using STARTER (USS) to commission the drive system, data cannot be entered while these calculations are being made.

The faults can be acknowledged as soon as the calculations have been completed in the frequency inverter. These calculations can take up to one minute to complete.

<b>p0970</b>	<b>Factory reset / Factory reset</b>		
ICU24F	<b>Access level:</b> 1	<b>P-Group:</b> Factory settings	<b>Data type:</b> Unsigned16
	<b>Quick comm. NO</b>	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> -		
	<b>Min</b> 0	<b>Max</b> 10	<b>Factory setting</b> 0
<b>Description:</b>	P0970 = 1 resets all parameters to their default values.		
<b>Values:</b>	0: Disabled 1: Parameter reset 10: Safety reset		
<b>Dependency:</b>	First set P0010 = 30 (factory settings). Stop drive (i.e. disable all pulses) before you can reset parameters to default values.		
<b>Note:</b>	The following parameters retain their values after a factory reset: <ul style="list-style-type: none"> <li>• r0039 CO: Energy consumption meter [kWh]</li> <li>• P0014 Store mode</li> <li>• P0100 Europe / North America</li> <li>• P0918 PROFIBUS address</li> <li>• P2010 USS baud rate</li> <li>• P2011 USS address</li> </ul> On the safety module (F-CU) setting 10 is available to reset the safety parameters to their default values. Only the safety parameters will be reset. Select P0010 = 30 before and set the safety password. The reset of safety parameters including safety dynamization will take about 5 s. When transferring parameter p0970, the frequency inverter uses its processor to carry-out internal calculations. Communications - both via USS as well as via the Fieldbus - are interrupted for the time that it takes to make these calculations. This can result in the following error messages at the connected SIMATIC S7 control (communications via fieldbus): <ul style="list-style-type: none"> <li>• Parameter fault 30</li> <li>• Drive fault 70</li> <li>• Drive fault 75</li> </ul> When using STARTER (USS) to commission the drive system, data cannot be entered while these calculations are being made. The faults can be acknowledged as soon as the calculations have been completed in the frequency inverter. These calculations can take up to one minute to complete.		

<b>p0971</b>	<b>Transfer data from RAM to EEPROM / Transf.RAM-&gt;EEPROM</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Communications	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0	<b>Max</b> 1	<b>Factory setting</b> 0
<b>Description:</b>	Transfers values from RAM to EEPROM when set to 1.		
<b>Values:</b>	0: Disabled 1: Start transfer		
<b>Note:</b>	All values in RAM are transferred to EEPROM. Parameter is automatically reset to 0 (default) after successful transfer. The storage from RAM to EEPROM is accomplished via P0971. The communications are reset, if the transfer was successful. During the reset process communications will be interrupted. This creates the following conditions: <ul style="list-style-type: none"> <li>• PLC (e.g. SIMATIC S7) enters Stop mode</li> <li>• Starter automatically recovers communications once they are re-established.</li> </ul> After completion of the transfer process, the communication between the inverter and the PC-tools (e.g. STARTER) is automatically re-established.		
<b>r0980[0...99]</b>	<b>List of available parameter numbers / Parameter list</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Communications	<b>Data type:</b> Unsigned16
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Contains 100 parameter numbers index 0 - 99.		
<b>Index:</b>	[0] = Parameter 1 [1] = Parameter 2 [2] = Parameter 3 [3] = Parameter 4 [4] = Parameter 5 [5] = Parameter 6 [6] = Parameter 7 [7] = Parameter 8 [8] = Parameter 9 [9] = Parameter 10		
<b>Note:</b>	The parameter list array has 2 elements to reduce memory consumption. On each access to an element index 0-99, the individual result is determined dynamically by the 'BeforeAccess' function. The last element contains the number of the following parameter array, 0 indicates end of list		
<b>r0981[0...99]</b>	<b>List of available parameter numbers / Parameter list</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Communications	<b>Data type:</b> Unsigned16
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Contains 100 parameter numbers index 100 - 199.		
<b>Index:</b>	[0] = Parameter 1 [1] = Parameter 2 [2] = Parameter 3 [3] = Parameter 4 [4] = Parameter 5 [5] = Parameter 6 [6] = Parameter 7 [7] = Parameter 8 [8] = Parameter 9 [9] = Parameter 10		
<b>Note:</b>	The parameter list array has 2 elements to reduce memory consumption. On each access to an element index 0-99, the individual result is determined dynamically by the 'BeforeAccess' function. The last element contains the number of the following parameter array, 0 indicates end of list		

<b>r0982[0...99]</b>	<b>List of available parameter numbers / Parameter list</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Communications	<b>Data type:</b> Unsigned16
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Contains 100 parameter numbers index 200 - 299.		
<b>Index:</b>	[0] = Parameter 1 [1] = Parameter 2 [2] = Parameter 3 [3] = Parameter 4 [4] = Parameter 5 [5] = Parameter 6 [6] = Parameter 7 [7] = Parameter 8 [8] = Parameter 9 [9] = Parameter 10		
<b>Note:</b>	The parameter list array has 2 elements to reduce memory consumption. On each access to an element index 0-99, the individual result is determined dynamically by the 'BeforeAccess' function. The last element contains the number of the following parameter array, 0 indicates end of list		
<b>r0983[0...99]</b>	<b>List of available parameter numbers / Parameter list</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Communications	<b>Data type:</b> Unsigned16
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Contains 100 parameter numbers index 300 - 399.		
<b>Index:</b>	[0] = Parameter 1 [1] = Parameter 2 [2] = Parameter 3 [3] = Parameter 4 [4] = Parameter 5 [5] = Parameter 6 [6] = Parameter 7 [7] = Parameter 8 [8] = Parameter 9 [9] = Parameter 10		
<b>Note:</b>	The parameter list array has 2 elements to reduce memory consumption. On each access to an element index 0-99, the individual result is determined dynamically by the 'BeforeAccess' function. The last element contains the number of the following parameter array, 0 indicates end of list		
<b>r0984[0...99]</b>	<b>List of available parameter numbers / Parameter list</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Communications	<b>Data type:</b> Unsigned16
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Contains 100 parameter numbers index 400 - 499.		
<b>Index:</b>	[0] = Parameter 1 [1] = Parameter 2 [2] = Parameter 3 [3] = Parameter 4 [4] = Parameter 5 [5] = Parameter 6 [6] = Parameter 7 [7] = Parameter 8 [8] = Parameter 9 [9] = Parameter 10		
<b>Note:</b>	The parameter list array has 2 elements to reduce memory consumption. On each access to an element index 0-99, the individual result is determined dynamically by the 'BeforeAccess' function. The last element contains the number of the following parameter array, 0 indicates end of list		

<b>r0985[0...99]</b>	<b>List of available parameter numbers / Parameter list</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Communications	<b>Data type:</b> Unsigned16
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Contains 100 parameter numbers index 500 - 599.		
<b>Index:</b>	[0] = Parameter 1 [1] = Parameter 2 [2] = Parameter 3 [3] = Parameter 4 [4] = Parameter 5 [5] = Parameter 6 [6] = Parameter 7 [7] = Parameter 8 [8] = Parameter 9 [9] = Parameter 10		
<b>Note:</b>	The parameter list array has 2 elements to reduce memory consumption. On each access to an element index 0-99, the individual result is determined dynamically by the 'BeforeAccess' function. The last element contains the number of the following parameter array, 0 indicates end of list		
<b>r0986[0...99]</b>	<b>List of available parameter numbers / Parameter list</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Communications	<b>Data type:</b> Unsigned16
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Contains 100 parameter numbers index 600 - 699.		
<b>Index:</b>	[0] = Parameter 1 [1] = Parameter 2 [2] = Parameter 3 [3] = Parameter 4 [4] = Parameter 5 [5] = Parameter 6 [6] = Parameter 7 [7] = Parameter 8 [8] = Parameter 9 [9] = Parameter 10		
<b>Note:</b>	The parameter list array has 2 elements to reduce memory consumption. On each access to an element index 0-99, the individual result is determined dynamically by the 'BeforeAccess' function. The last element contains the number of the following parameter array, 0 indicates end of list		
<b>r0987[0...99]</b>	<b>List of available parameter numbers / Parameter list</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Communications	<b>Data type:</b> Unsigned16
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Contains 100 parameter numbers index 700 - 799.		
<b>Index:</b>	[0] = Parameter 1 [1] = Parameter 2 [2] = Parameter 3 [3] = Parameter 4 [4] = Parameter 5 [5] = Parameter 6 [6] = Parameter 7 [7] = Parameter 8 [8] = Parameter 9 [9] = Parameter 10		
<b>Note:</b>	The parameter list array has 2 elements to reduce memory consumption. On each access to an element index 0-99, the individual result is determined dynamically by the 'BeforeAccess' function. The last element contains the number of the following parameter array, 0 indicates end of list		

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<b>r0988[0...99]</b>	<b>List of available parameter numbers / Parameter list</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Communications	<b>Data type:</b> Unsigned16
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Contains 100 parameter numbers index 800 - 899.		
<b>Index:</b>	[0] = Parameter 1 [1] = Parameter 2 [2] = Parameter 3 [3] = Parameter 4 [4] = Parameter 5 [5] = Parameter 6 [6] = Parameter 7 [7] = Parameter 8 [8] = Parameter 9 [9] = Parameter 10		
<b>Note:</b>	The parameter list array has 2 elements to reduce memory consumption. On each access to an element index 0-99, the individual result is determined dynamically by the 'BeforeAccess' function. The last element contains the number of the following parameter array, 0 indicates end of list		

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<b>r0989[0...99]</b>	<b>List of available parameter numbers / Parameter list</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Communications	<b>Data type:</b> Unsigned16
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Contains 100 parameter numbers index 900 - 999.		
<b>Index:</b>	[0] = Parameter 1 [1] = Parameter 2 [2] = Parameter 3 [3] = Parameter 4 [4] = Parameter 5 [5] = Parameter 6 [6] = Parameter 7 [7] = Parameter 8 [8] = Parameter 9 [9] = Parameter 10		
<b>Note:</b>	The parameter list array has 2 elements to reduce memory consumption. On each access to an element index 0-99, the individual result is determined dynamically by the 'BeforeAccess' function. The last element contains the number of the following parameter array, 0 indicates end of list		

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<b>p1000[0...2]</b>	<b>Selection of frequency setpoint / Freq setp. select.</b>		
	<b>Access level:</b> 1	<b>P-Group:</b> Setpoints	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> YES	<b>Active:</b> NO	<b>Data set:</b> CDS
	<b>Can be changed:</b> C, T		
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
	0	66	6
<b>Values:</b>	0: No main setpoint 4: USS on RS232 6: Fieldbus 40: No main setpoint + USS on RS232 44: USS on RS232 + USS on RS232 46: Fieldbus + USS on RS232 60: No main setpoint + Fieldbus 64: USS on RS232 + Fieldbus 66: Fieldbus + Fieldbus		
<b>Caution:</b>	Changing this parameter sets (to default) all settings on item selected. These are the following parameters: P1070, P1071, P1075, P1076		



<b>p1055[0...2]</b>	<b>BI: Enable JOG right / Enable JOG -&gt;</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Commands	<b>Data type:</b> U32 / Binary
	<b>Quick comm. NO</b>	<b>Active:</b> NO	<b>Data set:</b> CDS
	<b>Can be changed:</b> T		
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
	-	-	2090.8
<b>Description:</b>	Defines source of JOG right when P0719 = 0 (Auto selection of command/setpoint source).		
<b>Dependency:</b>	When Standard Telegram selected (P0700 = 6, P0922 = Standard Telegram), parameter cannot be changed.		
<b>p1056[0...2]</b>	<b>BI: Enable JOG left / Enable JOG &lt;-</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Commands	<b>Data type:</b> U32 / Binary
	<b>Quick comm. NO</b>	<b>Active:</b> NO	<b>Data set:</b> CDS
	<b>Can be changed:</b> T		
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
	-	-	2090.9
<b>Description:</b>	Defines source of JOG left when P0719 = 0 (Auto selection of command/setpoint source).		
<b>Dependency:</b>	When Standard Telegram selected (P0700 = 6, P0922 = Standard Telegram), parameter cannot be changed.		
<b>p1057</b>	<b>JOG Enable / JOG Enable</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Commands	<b>Data type:</b> Unsigned16
	<b>Quick comm. NO</b>	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> T		
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
	0000 bin	0001 bin	0001 bin
<b>Description:</b>	While JOG Enable is '0' Jogging (p1056 and p1055) is disabled. When '1' Jogging is enabled.		
<b>p1058[0...2]</b>	<b>JOG frequency / JOG frequency</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Setpoints	<b>Data type:</b> Floating Point
	<b>Quick comm. NO</b>	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
	0.00 [Hz]	650.00 [Hz]	5.00 [Hz]
<b>Description:</b>	Jogging increases the motor speed by small amounts. The JOG mode allows the operator to perform a specific number of revolutions and position the rotor manually. The motor speed is increased as long as 'JOG left' or 'JOG right' are selected and until the left or right JOG frequency is reached.		
<b>Dependency:</b>	P1060 and P1061 set up and down ramp times respectively for jogging. Rounding times (P1130 - P1133), rounding type (P1134) and P2167 will also have influence on the JOG ramp.		
<b>p1059[0...2]</b>	<b>JOG frequency left / JOG frequency &lt;-</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Setpoints	<b>Data type:</b> Floating Point
	<b>Quick comm. NO</b>	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
	0.00 [Hz]	650.00 [Hz]	5.00 [Hz]
<b>Description:</b>	While JOG left is selected, this parameter determines the frequency at which the inverter will run.		
<b>Dependency:</b>	P1060 and P1061 set up and down ramp times respectively for jogging.		

<b>p1060[0...2]</b>	<b>JOG ramp-up time / JOG ramp-up time</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Setpoints	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.00 [s]	<b>Max</b> 650.00 [s]	<b>Factory setting</b> 10.00 [s]
<b>Description:</b>	Sets jog ramp-up time. This is the time used while jogging is active.		
<b>Notice:</b>	Ramp times will be used as follows: <ul style="list-style-type: none"> <li>• P1060 / P1061 : JOG mode is active</li> <li>• P1120 / P1121 : Normal mode (ON/OFF) is active</li> <li>• P1060 / P1061 : Normal mode (ON/OFF) and P1124 is active</li> </ul> The rounding of P1130 - P1133 also applies to the JOG ramping.		
<b>p1061[0...2]</b>	<b>JOG ramp-down time / JOG ramp-down time</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Setpoints	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.00 [s]	<b>Max</b> 650.00 [s]	<b>Factory setting</b> 10.00 [s]
<b>Description:</b>	Sets ramp-down time. This is the time used while jogging is active.		
<b>Notice:</b>	Ramp times will be used as follows: <ul style="list-style-type: none"> <li>• P1060 / P1061 : JOG mode is active</li> <li>• P1120 / P1121 : Normal mode (ON/OFF) is active</li> <li>• P1060 / P1061 : Normal mode (ON/OFF) and P1124 is active</li> </ul>		
<b>p1070[0...2]</b>	<b>CI: Main setpoint / Main setpoint</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Setpoints	<b>Data type:</b> U32 / Integer32
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> CDS
	<b>Can be changed:</b> T		
	<b>Min</b> -	<b>Max</b> -	<b>Factory setting</b> 2050[1]
<b>Description:</b>	Defines source of main setpoint.		
<b>p1071[0...2]</b>	<b>CI: Main setpoint scaling / Main setp scal</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Setpoints	<b>Data type:</b> U32 / Integer16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> CDS
	<b>Can be changed:</b> T		
	<b>Min</b> -	<b>Max</b> -	<b>Factory setting</b> 1
<b>Description:</b>	Defines source of the main setpoint scaling.		
<b>p1074[0...2]</b>	<b>BI: Disable additional setpoint / Disab.add.setp</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Commands	<b>Data type:</b> U32 / Binary
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> CDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> -	<b>Max</b> -	<b>Factory setting</b> 0
<b>Description:</b>	Disables additional setpoint		

<b>p1075[0...2]</b>	<b>CI: Additional setpoint / Add. setpoint</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Setpoints	<b>Data type:</b> U32 / Integer32
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> CDS
	<b>Can be changed:</b> T		
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
	-	-	0
<b>Description:</b>	Defines source of the additional setpoint (to be added to main setpoint).		
<b>p1076[0...2]</b>	<b>CI: Additional setpoint scaling / Add. setp.scal</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Setpoints	<b>Data type:</b> U32 / Integer16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> CDS
	<b>Can be changed:</b> T		
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
	-	-	1
<b>Description:</b>	Defines source of scaling for additional setpoint (to be added to main setpoint).		
<b>r1078</b>	<b>CO: Total frequency setpoint / Tot. freq.setp</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Setpoints	<b>Data type:</b> Floating Point
	<b>Unit:</b> [Hz]		<b>Data set:</b> -
<b>Description:</b>	Displays sum of main and additional setpoints in [Hz].		
<b>r1079</b>	<b>CO: Selected frequency setpoint / Sel. freq.setp</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Setpoints	<b>Data type:</b> Floating Point
	<b>Unit:</b> [Hz]		<b>Data set:</b> -
<b>Description:</b>	Displays selected frequency setpoint. Following frequency setpoints are displayed: <ul style="list-style-type: none"> <li>• r1078 Total frequency setpoint</li> <li>• P1058 JOG frequency right</li> <li>• P1059 JOG frequency left</li> </ul>		
<b>Dependency:</b>	P1055 (BI: Enable JOG right) or P1056 (BI: Enable JOG left) define command source of JOG right or JOG left respectively.		
<b>Note:</b>	P1055 = 0 and P1056 = 0 ==> Total frequency setpoint is selected.		



**p1080[0...2] Min. frequency / Min. frequency**

**Access level:** 1

**P-Group:** Setpoints

**Data type:** Floating Point

**Quick comm.:** YES

**Active:** YES

**Data set:** DDS

**Can be changed:** C, U, T

**Min**  
0.00 [Hz]

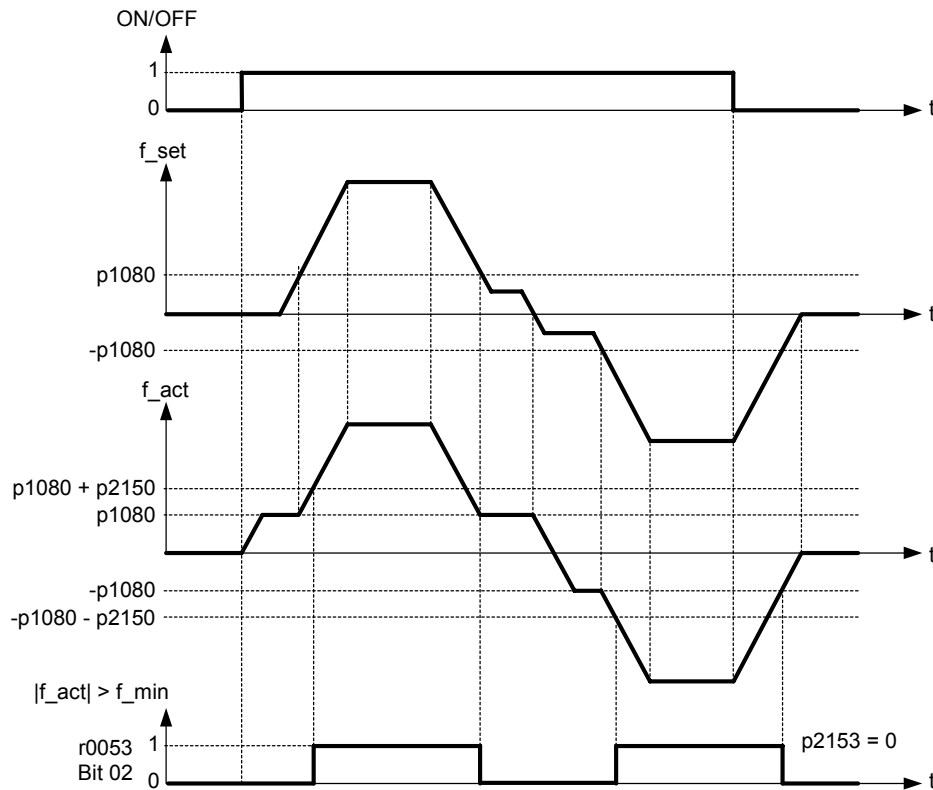
**Max**  
650.00 [Hz]

**Factory setting**  
0.00 [Hz]

**Description:**

Sets minimum motor frequency [Hz] at which motor will run irrespective of frequency setpoint. The minimum frequency P1080 represents a masking frequency of 0 Hz for all frequency target value sources e.g. USS  
Thus the frequency band +/- P1080 is run through in optimum time by means of the acceleration/deceleration ramps.  
Dwelling in the frequency band is not possible.  
Furthermore, an overshoot of the actual frequency  $f_{act}$  upper min. frequency P1080 is output by the signal function ( $|f_{act}| > f_{min}$ , see below).

**Example:**



**Note:**

Value set here is valid both for clockwise and for anticlockwise rotation.  
Under certain conditions (e.g. ramping, current limiting), motor can run below minimum frequency.

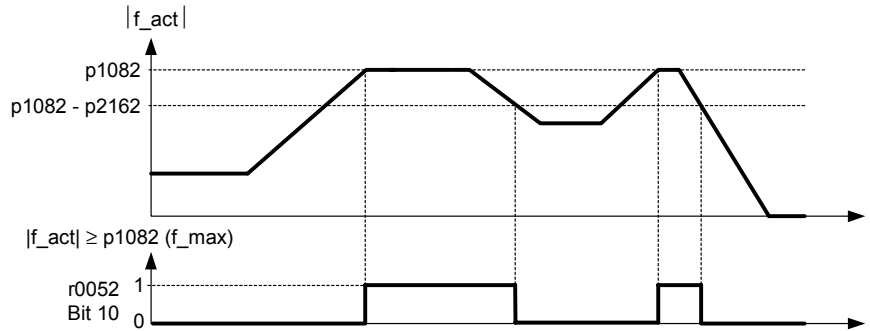
**p1082[0...2] Max. frequency / Max. frequency**

**Access level:** 1 **P-Group:** Setpoints **Data type:** Floating Point  
**Quick comm. YES** **Active:** NO **Data set:** DDS  
**Can be changed:** C, T

**Min** 0.00 [Hz] **Max** 650.00 [Hz] **Factory setting** 50.00 [Hz]

**Description:** Sets maximum motor frequency [Hz] at which motor will run irrespective of the frequency setpoint. The value set here is valid for both clockwise and anticlockwise rotation. Furthermore, the monitoring function  $|f_{act}| \geq P1082$  (r0052 Bit10, see example below) is affected by this parameter.

**Example:**



**Dependency:** The maximum value of P1082 also depends on the nominal frequency:  $\text{Max. P1082} = \min(15 \cdot P0310, 650 \text{ Hz})$ . As consequence P1082 can be affected if P0310 is changed to a smaller value. The maximum frequency and the pulse frequency depending on each other. The maximum frequency affects the pulse frequency according to the following table.

		p1800			
		2 kHz	4 kHz	6 kHz	8 - 16 kHz
f <sub>max</sub>	p1082	0 - 133.3 Hz	0 - 266.6 Hz	0 - 400 Hz	0 - 650 Hz

**Example:**

If P1082 is set to 350 Hz a pulse frequency from at least 6 kHz is necessary. If P1800 is smaller than 6 kHz the parameter is changed P1800 = 6 kHz.

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

- p1335 ≠ 0 (Slip compensation active) :

$$f_{\max}(p1335) = f_{\max} + f_{\text{slip,max}} = p1082 + \frac{p1336}{100} \cdot \frac{r0330}{100} \cdot p0310$$

- p1200 ≠ 0 (Flying restart active) :

$$f_{\max}(p1200) = f_{\max} + 2 \cdot f_{\text{slip,nom}} = p1082 + 2 \cdot \frac{r0330}{100} \cdot p0310$$

The resultant value is displayed in r1084 (resultant maximum frequency).

**Note:**

When using the setpoint source USS the setpoint frequency (in Hz) is cyclically calculated using

- a hexadecimal value (e.g. for the USS r2018[1])
- and the reference frequency P2000.

When Regenerating at Max Frequency it is possible that the Frequency will go above this value by the amount specified in P1253. If this is unacceptable change P1253 to 0, or change load so that regeneration is at acceptable limits.

Regeneration at rated frequency is only possible, when the maximum frequency (p1082) is higher than the rated frequency of the motor.

When Quick Commissioning is carried out P2000 is changed as follows: P2000 = P1082.

<b>r1084</b>	<b>Resultant max. frequency / Resultant max freq</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Unit:</b> [Hz]		<b>Data set:</b> -

**Description:** Displays resultant maximum frequency.

$P1300 < 20$

$$P1800 \leq 6 \text{ kHz} \rightarrow r1084 = \min\left(P1082, \frac{P1800}{15}, 650.00\right)$$

$$P1800 \geq 8 \text{ kHz} \rightarrow r1084 = \min(P1082, 650.00)$$

$p1300 \geq 20$

$$r1084 = \min(p1082, 5 \cdot p0310, 200.00)$$

<b>p1091[0...2]</b>	<b>Skip frequency / Skip frequency</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Setpoints	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		

**Min**

0.00 [Hz]

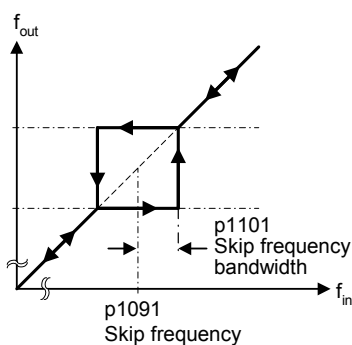
**Max**

650.00 [Hz]

**Factory setting**

0.00 [Hz]

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



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

For example, if  $P1091 = 10 \text{ Hz}$  and  $P1101 = 2 \text{ Hz}$ , it is not possible to operate continuously between  $10 \text{ Hz} \pm 2 \text{ Hz}$  (i.e. between 8 and 12 Hz).

**Note:** The function is disabled if  $P1091 = 0$ .

<b>p1092[0...2]</b>	<b>Skip frequency 2 / Skip frequency 2</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Setpoints	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		

**Min**

0.00 [Hz]

**Max**

650.00 [Hz]

**Factory setting**

0.00 [Hz]

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

**Note:** See P1091 (skip frequency 1).

<b>p1093[0...2]</b>	<b>Skip frequency 3 / Skip frequency 3</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Setpoints	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.00 [Hz]	<b>Max</b> 650.00 [Hz]	<b>Factory setting</b> 0.00 [Hz]
<b>Description:</b>	Defines skip frequency 3 which avoids effects of mechanical resonance and suppresses frequencies within +/- P1101 (skip frequency bandwidth).		
<b>Note:</b>	See P1091 (skip frequency 1).		
<b>p1094[0...2]</b>	<b>Skip frequency 4 / Skip frequency 4</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Setpoints	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.00 [Hz]	<b>Max</b> 650.00 [Hz]	<b>Factory setting</b> 0.00 [Hz]
<b>Description:</b>	Defines skip frequency 4 which avoids effects of mechanical resonance and suppresses frequencies within +/- P1101 (skip frequency bandwidth).		
<b>Note:</b>	See P1091 (skip frequency 1).		
<b>p1101[0...2]</b>	<b>Skip frequency bandwidth / Skipfreq bandwidth</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Setpoints	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.00 [Hz]	<b>Max</b> 10.00 [Hz]	<b>Factory setting</b> 2.00 [Hz]
<b>Description:</b>	Delivers frequency bandwidth to be applied to skip frequencies (in [Hz]).		
<b>Note:</b>	See P1091 (skip frequency 1).		
<b>p1110[0...2]</b>	<b>BI: Inhibit neg. freq. setpoint / Inh. neg. setp</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Commands	<b>Data type:</b> U32 / Binary
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> CDS
	<b>Can be changed:</b> T		
	<b>Min</b> -	<b>Max</b> -	<b>Factory setting</b> 0
<b>Description:</b>	This parameter suppresses negative setpoints. Therefore, modification of the motor direction is inhibited to the setpoint channel. If a min. frequency (P1080) and a negative setpoint are given, the motor is accelerated by a positive value in relationship to the min. frequency.		
<b>p1113[0...2]</b>	<b>BI: Reverse / Reverse</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Commands	<b>Data type:</b> U32 / Binary
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> CDS
	<b>Can be changed:</b> T		
	<b>Min</b> -	<b>Max</b> -	<b>Factory setting</b> 2090.11
<b>Description:</b>	Defines source of reverse command used when P0719 = 0 (Auto selection of command/setpoint source).		

<b>r1114</b>	<b>CO: Freq. setp. after dir. ctrl. / Setp&lt;-dir.ctrl.</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Setpoints	<b>Data type:</b> Floating Point
	<b>Unit:</b> [Hz]		<b>Data set:</b> -
<b>Description:</b>	Displays setpoint frequency after change of direction.		
<b>r1119</b>	<b>CO: Freq. setpoint before RFG / Setp before RFG</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Setpoints	<b>Data type:</b> Floating Point
	<b>Unit:</b> [Hz]		<b>Data set:</b> -
<b>Description:</b>	Displays frequency setpoint at the input to the ramp function generator after modification by other functions, e.g.: <ul style="list-style-type: none"> <li>• P1110 BI: Inhibit neg. freq. setpoint,</li> <li>• P1091 - P1094 skip frequencies,</li> <li>• P1080 min. frequency,</li> <li>• P1082 max. frequency,</li> </ul> This value is available filtered (r0020) and unfiltered (r1119).		
<b>p1120[0...2]</b>	<b>Ramp-up time / Ramp-up time</b>		
	<b>Access level:</b> 1	<b>P-Group:</b> Setpoints	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> YES	<b>Active:</b> NO	<b>Data set:</b> DDS
	<b>Can be changed:</b> C, U, T		
	<b>Min</b> 0.00 [s]	<b>Max</b> 650.00 [s]	<b>Factory setting</b> 10.00 [s]
<b>Description:</b>	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 F0001).		
<b>Dependency:</b>	Rounding times (P1130 - P1133) and rounding type (P1134) will also have influence on the ramp.		
<b>Notice:</b>	Ramp times will be used as follows: <ul style="list-style-type: none"> <li>• P1060 / P1061 : JOG mode is active</li> <li>• P1120 / P1121 : Normal mode (ON/OFF) is active</li> <li>• P1060 / P1061 : Normal mode (ON/OFF) and P1124 is active</li> </ul>		
<b>Note:</b>	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. Changes to P1120 will be immediately effective.		
<b>p1121[0...2]</b>	<b>Ramp-down time / Ramp-down time</b>		
	<b>Access level:</b> 1	<b>P-Group:</b> Setpoints	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> YES	<b>Active:</b> NO	<b>Data set:</b> DDS
	<b>Can be changed:</b> C, U, T		
	<b>Min</b> 0.00 [s]	<b>Max</b> 650.00 [s]	<b>Factory setting</b> 10.00 [s]
<b>Description:</b>	Time taken for motor to decelerate from maximum motor frequency (P1082) down to standstill when no rounding is used.		
<b>Notice:</b>	Setting the ramp-down time too short can cause the inverter to trip (overcurrent F0001 / overvoltage F0002). Ramp times will be used as follows: <ul style="list-style-type: none"> <li>• P1060 / P1061 : JOG mode is active</li> <li>• P1120 / P1121 : Normal mode (ON/OFF) is active</li> <li>• P1060 / P1061 : Normal mode (ON/OFF) and P1124 is active</li> </ul>		
<b>Note:</b>	Changes to P1121 will be immediately effective.		

<b>p1124[0...2]</b>	<b>BI: Enable JOG ramp times / Enable JOG ramp</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Commands	<b>Data type:</b> U32 / Binary
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> CDS
	<b>Can be changed:</b> T		
	<b>Min</b> -	<b>Max</b> -	<b>Factory setting</b> 0
<b>Description:</b>	Defines source for switching between jog ramp times (P1060, P1061) and normal ramp times (P1120, P1121) as applied to the RFG.		
	This parameter is valid for normal mode (ON/OFF) only.		
<b>Notice:</b>	P1124 does not have any impact when JOG mode is selected.		
	In this case, jog ramp times (P1060, P1061) will be used all the time.		
	Ramp times will be used as follows:		
	<ul style="list-style-type: none"> <li>• P1060 / P1061 : JOG mode is active</li> <li>• P1120 / P1121 : Normal mode (ON/OFF) is active</li> <li>• P1060 / P1061 : Normal mode (ON/OFF) and P1124 is active</li> </ul>		
<b>p1130[0...2]</b>	<b>Ramp-up initial rounding time / Ramp-up ini. Trnd</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Setpoints	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.00 [s]	<b>Max</b> 40.00 [s]	<b>Factory setting</b> 0.00 [s]
<b>Description:</b>	Defines rounding time in seconds at start of ramp-up.		
<b>Notice:</b>	Rounding times are recommended, since they prevent an abrupt response, thus avoiding detrimental effects on the mechanics.		
<b>Note:</b>	If short or zero ramp times (P1120, P1121 < P1130, P1131, P1132, P1133) are set, the total ramp up time (t <sub>up</sub> ) or ramp down time (t <sub>down</sub> ) will not depend on P1130.		
<b>p1131[0...2]</b>	<b>Ramp-up final rounding time / Ramp-up final Trnd</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Setpoints	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.00 [s]	<b>Max</b> 40.00 [s]	<b>Factory setting</b> 0.00 [s]
<b>Description:</b>	Defines rounding time at end of ramp-up.		
<b>Note:</b>	Rounding times are recommended, since they prevent an abrupt response, thus avoiding detrimental effects on the mechanics.		
<b>p1132[0...2]</b>	<b>Ramp-down initial rounding time / Ramp-dwn ini. Trnd</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Setpoints	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.00 [s]	<b>Max</b> 40.00 [s]	<b>Factory setting</b> 0.00 [s]
<b>Description:</b>	Defines rounding time at start of ramp-down.		
<b>Note:</b>	Rounding times are recommended, since they prevent an abrupt response, thus avoiding detrimental effects on the mechanics.		

<b>p1133[0...2]</b>	<b>Ramp-down final rounding time / Ramp-dwn fin. Trnd</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Setpoints	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.00 [s]	<b>Max</b> 40.00 [s]	<b>Factory setting</b> 0.00 [s]
<b>Description:</b>	Defines rounding time at end of ramp-down.		
<b>Note:</b>	Rounding times are recommended, since they prevent an abrupt response, thus avoiding detrimental effects on the mechanics.		
<b>p1134[0...2]</b>	<b>Rounding type / Rounding type</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Setpoints	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0	<b>Max</b> 1	<b>Factory setting</b> 0
<b>Description:</b>	Defines the smoothing which is active by setpoint modifications during acceleration or deceleration (e.g. new setpoint, OFF1, OFF3, REV). This smoothing is applied, if the motor is ramped-up or ramped-down and <ul style="list-style-type: none"> <li>• P1134 = 0,</li> <li>• P1132 &gt; 0, P1133 &gt; 0 and</li> <li>• the setpoint is not yet reached.</li> </ul>		
<b>Values:</b>	0: Continuous smoothing 1: Discontinuous smoothing		
<b>Dependency:</b>	Effect only when P1130 (Ramp-up initial rounding time) or P1131 (Ramp-up final rounding time) or P1132 (Ramp-down initial rounding time) or P1133 (Ramp-down final rounding time) > 0 s.		
<b>p1135[0...2]</b>	<b>OFF3 ramp-down time / OFF3 ramp-dwn time</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Setpoints	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> YES	<b>Active:</b> NO	<b>Data set:</b> DDS
	<b>Can be changed:</b> C, U, T		
	<b>Min</b> 0.00 [s]	<b>Max</b> 650.00 [s]	<b>Factory setting</b> 5.00 [s]
<b>Description:</b>	Defines ramp-down time from maximum frequency to standstill for OFF3 command.		
<b>p1140[0...2]</b>	<b>BI: RFG enable / RFG enable</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Commands	<b>Data type:</b> U32 / Binary
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> CDS
	<b>Can be changed:</b> T		
	<b>Min</b> -	<b>Max</b> -	<b>Factory setting</b> 2090.4
<b>Description:</b>	Defines command source of RFG enable command (RFG: ramp function generator). If binary input is equal to zero then the RFG output will be set immediately to 0.		
<b>Dependency:</b>	When Standard Telegram selected (P0700 = 6, P0922 = Standard Telegram), parameter cannot be changed.		

<b>p1141[0...2]</b>	<b>BI: RFG start / RFG start</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Commands	<b>Data type:</b> U32 / Binary
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> CDS
	<b>Can be changed:</b> T		
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
	-	-	2090.5
<b>Description:</b>	Defines command source of RFG start command (RFG: ramp function generator). If binary input is equal to zero then the RFG output is held at its present value.		
<b>Dependency:</b>	When Standard Telegram selected (P0700 = 6, P0922 = Standard Telegram), parameter cannot be changed.		
<b>p1142[0...2]</b>	<b>BI: RFG enable setpoint / RFG enable setp</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Commands	<b>Data type:</b> U32 / Binary
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> CDS
	<b>Can be changed:</b> T		
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
	-	-	2090.6
<b>Description:</b>	Defines command source of RFG enable setpoint command (RFG: ramp function generator). If binary input is equal to zero then the RFG input will be set to zero and the RFG output will ramp-down to zero.		
<b>Dependency:</b>	When Standard Telegram selected (P0700 = 6, P0922 = Standard Telegram), parameter cannot be changed.		
<b>r1170</b>	<b>CO: Frequency setpoint after RFG / Setp. after RFG</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Setpoints	<b>Data type:</b> Floating Point
	<b>Unit:</b> [Hz]		<b>Data set:</b> -
<b>Description:</b>	Displays overall frequency setpoint after ramp generator.		
<b>p1200</b>	<b>Flying start / Flying start</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> -	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> C, U, T		
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
	0	6	0
<b>Description:</b>	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.		
<b>Values:</b>	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 direc 3: Flying start is active if fault, OFF2, start in direction of se 4: Flying start is always active, only in direction of setpoint 5: Flying start is active if power on, fault, OFF2, only in direct 6: Flying start is active if fault, OFF2, only in direction of set		
<b>Notice:</b>	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.		
<b>Note:</b>	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.		



<b>p1202[0...2]</b>	<b>Motor-current: Flying start / Mot. cur: Flystart</b>			
	<b>Access level:</b> 3	<b>P-Group:</b> -	<b>Data type:</b> Unsigned16	
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> DDS	
	<b>Can be changed:</b> C, U, T			
	<b>Min</b> 10 [%]	<b>Max</b> 200 [%]	<b>Factory setting</b> 100 [%]	
<b>Description:</b>	Defines search current used for flying start. Value is in [%] based on rated motor current (P0305).			
<b>Note:</b>	Reducing the search current may improve performance for flying start if the inertia of the system is not very high.			
<b>p1203[0...2]</b>	<b>Search rate: Flying start / SrchRate: Flystart</b>			
	<b>Access level:</b> 3	<b>P-Group:</b> -	<b>Data type:</b> Unsigned16	
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> DDS	
	<b>Can be changed:</b> C, U, T			
	<b>Min</b> 10 [%]	<b>Max</b> 200 [%]	<b>Factory setting</b> 100 [%]	
<b>Description:</b>	Sets factor (in V/f mode only) by which the output frequency changes during flying start to synchronize with turning motor. This value is entered in [%]. It defines the reciprocal initial gradient in the search sequence. Parameter P1203 influences the time taken to search for the motor frequency.			
<b>Example:</b>	For a motor with 50 Hz, 1350 rpm, 100 % would produce a maximum search time of 600 ms.			
<b>Note:</b>	A higher value produces a flatter gradient and thus a longer search time. A lower value has the opposite effect.			
<b>r1204</b>	<b>Status word: Flying start V/f / Stat: Flystart V/f</b>			
	<b>Access level:</b> 4	<b>P-Group:</b> -	<b>Data type:</b> Unsigned16	
	<b>Unit:</b> -		<b>Data set:</b> -	
<b>Description:</b>	Bit parameter for checking and monitoring states during search, if V/f control mode is selected (P1300 < 20).			
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>	<b>0 signal</b>
	00	Current applied	Yes	No
	01	Current could not be applied	Yes	No
	02	Voltage reduced	Yes	No
	03	Slope-filter started	Yes	No
	04	Current less threshold	Yes	No
	05	Current-minimum	Yes	No
	07	Speed could not be found	Yes	No

<b>r1205</b>		<b>Status word: Flying start SLVC / Stat Flystart SLVC</b>			
	<b>Access level:</b> 3	<b>P-Group:</b> -	<b>Data type:</b> Unsigned16		
	<b>Unit:</b> -		<b>Data set:</b> -		
<b>Description:</b>	Bit parameter for checking status of flying start performed with n-adaption of observer. Parameter is only valid, if sensorless vector control (SLVC) is selected (P1300 = 20, 22).				
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>	<b>0 signal</b>	<b>FP</b>
	00	Transformation active	Yes	No	-
	01	Initialize n-adaption	Yes	No	-
	02	Current applying	Yes	No	-
	03	n-controller closed	Yes	No	-
	04	Isd-controller open	Yes	No	-
	05	RFG hold	Yes	No	-
	06	n-adaption set to zero	Yes	No	-
	07	reserved	Yes	No	-
	08	reserved	Yes	No	-
	09	reserved	Yes	No	-
	10	Direction Positive	Yes	No	-
	11	Search is started	Yes	No	-
	12	Current is applied	Yes	No	-
	13	Search is aborted	Yes	No	-
	14	Deviation is zero	Yes	No	-
	15	n-controller is active	Yes	No	-

<b>p1210</b>		<b>Automatic restart / Automatic restart</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> -	<b>Data type:</b> Unsigned16	
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -	
	<b>Can be changed:</b> C, U, T			
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>	
	0	6	1	
<b>Description:</b>	Configures automatic restart function			
<b>Values:</b>	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 enabled	
<b>Dependency:</b>	Automatic restart requires constant ON command via a digital input wire link.			
<b>Caution:</b>	P1210 > 2 can cause the motor to restart automatically without toggling the ON command !			



**Notice:** A "mains brownout" is a very short mains break, where the DC link has not fully collapsed before the power is re-applied.  
 A "mains blackout" is a long mains break, where the DC link has fully collapsed before the power is re-applied.  
 "Delay Time" is the time between attempts of quitting fault. The "Delay Time" of first attempt is 1 second, then it will be doubled every next attempt.  
 The "Number of Restart Attempts" can be set in P1211. This is the number of restarts the inverter will try to quit fault.  
 When faults are quit and after 4 seconds of no fault condition, "Number of Restart Attempts" will be reset to P1211 and "Delay Time" will be reset to 1 second.  
 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 a digital input (DI).  
 P1210 = 3:  
 For these settings it is fundamental that the drive only restarts if it has been in a RUN state at the time of the faults (F0003, etc.). The inverter will acknowledge the fault and restarts the drive after a blackout or brownout. It is necessary that the ON command is wired via a digital input (DI).  
 P1210 = 4:  
 For these settings it is fundamental that the drive only restarts if it has been in a RUN state at the time of the fault (F0003). The inverter will acknowledge the fault and restarts the drive after a blackout or brownout. It is necessary that the ON command is wired via a digital input (DI).  
 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 a digital input (DI).  
 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 a digital input (DI). Setting 6 causes the motor to restart immediately.  
 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 / Restart attempts****Access level:** 3**P-Group:** -**Data type:** Unsigned16**Quick comm.** NO**Active:** NO**Data set:** -**Can be changed:** C, U, T**Min****Max****Factory setting**


0

10

3

**Description:**

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

<b>p1215</b>	<b>Holding brake enable / MHB enable</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> -	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> C, T		
	<b>Min</b> 0	<b>Max</b> 1	<b>Factory setting</b> 0
<b>Description:</b>	<p>Enables/disables holding brake function.</p> <p>The mechanical motor holding brake (MHB) is controlled via the signal of status word 1 r0052 Bit12 "Brake open". This signal can be issued via:</p> <ul style="list-style-type: none"> <li>status word of the serial interface (e.g. USS)</li> </ul>		
<b>Values:</b>	<p>0: Motor holding brake disabled</p> <p>1: Motor holding brake enabled</p>		
<b>Caution:</b>	<p>It is not permissible to use the motor holding brake as working brake, as it is generally only designed for a limited number of emergency braking operations.</p>		
			
<b>Note:</b>	<p>In V/f control (P1300 &lt; 20) a typical value of min. frequency P1080 for motor holding brake is the slip frequency of the motor r0330.</p> $f_{\text{Slip}}[\text{Hz}] = \frac{r0330}{100} \cdot P0310 = \frac{n_{\text{syn}} - n_n}{n_{\text{syn}}} \cdot f_n$ <p>In a vector control mode (P1300 = 20 or P1300 = 21)</p> <ul style="list-style-type: none"> <li>The value of the min. Frequency P1080 should be zero.</li> <li>The delay speed loss reaction should be &gt; brake holding times (i.e. P0494 &gt; P1216 and P0494 &gt; P1217 )</li> <li>The delay time for motor pulled out should be &gt; brake holding times (i.e. P2178 &gt; P1216 and P2178 &gt; P1217 )</li> </ul> <p>Otherwise there may be encoder loss trips (F0090) when the brake is applied and pulses are enabled.</p>		
<b>p1216</b>	<b>Holding brake release delay / MHB release delay</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> -	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> C, T		
	<b>Min</b> 0.0 [s]	<b>Max</b> 20.0 [s]	<b>Factory setting</b> 1.0 [s]
<b>Description:</b>	<p>Defines period during which inverter runs at min. frequency P1080 before ramping up.</p>		
<b>p1217</b>	<b>Holding time after ramp down / Thold. &lt;- ramp-dwn</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> -	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> C, T		
	<b>Min</b> 0.0 [s]	<b>Max</b> 20.0 [s]	<b>Factory setting</b> 1.0 [s]
<b>Description:</b>	<p>Defines time for which inverter runs at minimum frequency (P1080) after ramping down.</p>		

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<b>p1227[0...2]</b>	<b>Zero speed detection monitoring time / Zero speed time</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Setpoints	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.0 [s]	<b>Max</b> 300.0 [s]	<b>Factory setting</b> 4.0 [s]
<b>Description:</b>	Sets the monitoring time for the standstill identification. When braking with OFF1 or OFF3, standstill is identified after this time has expired, after the setpoint speed has fallen below P2167. After this, the braking signal is started, the system waits for the closing time and then the pulses are cancelled.		
<b>Note:</b>	P1227 = 300.0 : function is deactivated P1227 = 0.0 : pulses are locked immediately		

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<b>p1253[0...2]</b>	<b>Vdc-controller or I-max regen controller output limitation / regen.ctl outp.lim</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> -	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> C, U, T		
	<b>Min</b> 0.00 [Hz]	<b>Max</b> 600.00 [Hz]	<b>Factory setting</b> 10.00 [Hz]
<b>Description:</b>	Limits maximum effect of vdc controller or I-max controller when regenerating.		
<b>Note:</b>	When Regenerating at nominal or maximum frequency it is possible that the output frequency will go above P1082 by the amount specified in this parameter. If this is unacceptable then the following is possible <ul style="list-style-type: none"> <li>• reduce the maximum frequency P1082 or</li> <li>• reduce P1253 to 0 or</li> <li>• make appropriate changes to the load to stop regeneration at maximum frequency.</li> </ul> The Factory setting depends on inverter power.		

**p1300[0...2] Control mode / Control mode****Access level:** 2**Quick comm. YES****Can be changed:** C, T**P-Group:** Closed-loop control**Active:** NO**Data type:** Unsigned16**Data set:** DDS**Min**

0

**Max**

23

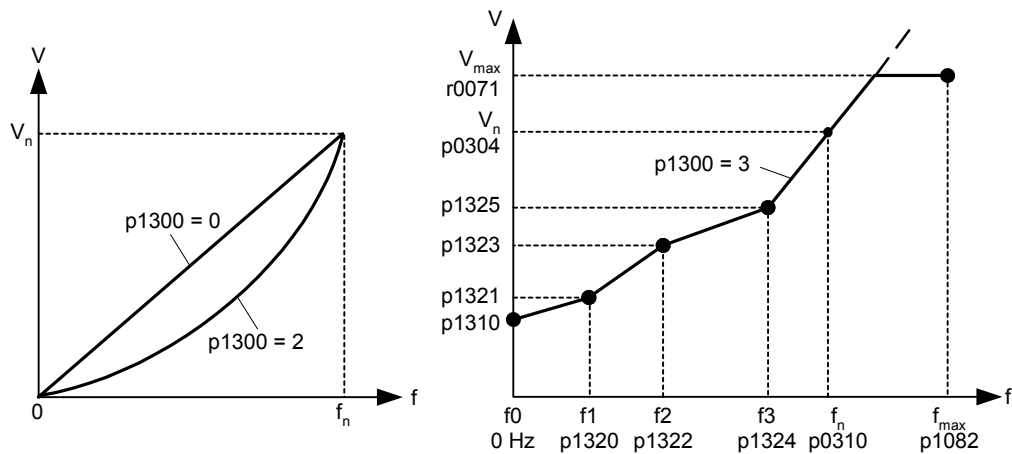
**Factory setting**

0

**Description:**

Parameter to select the control method.

Controls relationship between speed of motor and voltage supplied by inverter as illustrated in the diagram below.

**Values:**

- 0: V/f with linear characteristic
- 1: V/f with FCC
- 2: V/f with quadratic characteristic
- 3: V/f with programmable characteristic
- 4: reserved
- 5: V/f for textile applications
- 6: V/f with FCC for textile applications
- 19: V/f control with independent voltage setpoint
- 20: Sensorless vector control
- 21: Vector control with sensor
- 22: Sensorless vector torque-control
- 23: Vector torque-control with sensor

**Caution:**

When commissioning Vector Control with encoder-feedback (VC), the drive should be configured for V/f mode (see P1300) first.

Run the drive and compare r0061 with r0021 that should agree in

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

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

P0400 = 1 (single channel encoder) will only allow operation in one direction.

If operation in both directions is required, connect an encoder with 2 channels (A and B) and select setting 2.

See the Operating Instructions of the encoder module for more information.

**Note:**

P1300 = 1 : V/f with FCC (flux current control)

- Maintains motor flux current for improved efficiency.
- If FCC is chosen, linear V/f is active at low frequencies.

P1300 = 2 : V/f with a quadratic characteristic

- Suitable for centrifugal fans / pumps

P1300 = 3 : V/f with a programmable characteristic

- User defined characteristic (see P1320)
- For synchronous motors (e.g. SIEMOSYN motors)

P1300 = 5,6 : V/f for textile applications

- Slip compensation disabled.
- I<sub>max</sub> controller modifies the output voltage only.
- I<sub>max</sub> controller does not influence the output frequency.

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

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

ParNo.	Parameter name	Level	V/f							SLVC	VC		
			p1300 =										
			0	1	2	3	5	6	19	20	22	21	23
p1300[3]	Control mode	2	x	x	x	x	x	x	x	x	x	x	x
p1310[3]	Continuous boost	2	x	x	x	x	x	x	x	-	-	-	-
p1311[3]	Acceleration boost	2	x	x	x	x	x	x	x	-	-	-	-
p1312[3]	Starting boost	2	x	x	x	x	x	x	x	-	-	-	-
p1316[3]	Boost end frequency	3	x	x	x	x	x	x	x	-	-	-	-
p1320[3]	Programmable V/f freq. coord. 1	3	-	-	-	x	-	-	-	-	-	-	-
p1321[3]	Programmable V/f volt. coord. 1	3	-	-	-	x	-	-	-	-	-	-	-
p1322[3]	Programmable V/f freq. coord. 2	3	-	-	-	x	-	-	-	-	-	-	-
p1323[3]	Programmable V/f volt. coord. 2	3	-	-	-	x	-	-	-	-	-	-	-
p1324[3]	Programmable V/f freq. coord. 3	3	-	-	-	x	-	-	-	-	-	-	-
p1325[3]	Programmable V/f volt. coord. 3	3	-	-	-	x	-	-	-	-	-	-	-
p1330[3]	Cl: Voltage setpoint	3	-	-	-	-	-	-	x	-	-	-	-
p1333[3]	Start frequency for FCC	3	-	x	-	-	-	x	-	-	-	-	-
p1335[3]	Slip compensation	2	x	x	x	x	-	-	-	-	-	-	-
p1336[3]	CO: U/f Slip limit	2	x	x	x	x	-	-	-	-	-	-	-
p1338[3]	Resonance damping gain V/f	3	x	x	x	x	-	-	-	-	-	-	-
p1340[3]	I <sub>max</sub> freq. controller prop. gain	3	x	x	x	x	x	x	x	-	-	-	-
p1341[3]	I <sub>max</sub> controller integral time	3	x	x	x	x	x	x	x	-	-	-	-
p1345[3]	I <sub>max</sub> controller prop. gain	3	x	x	x	x	x	x	x	-	-	-	-
p1346[3]	I <sub>max</sub> voltage ctrl. integral time	3	x	x	x	x	x	x	x	-	-	-	-
p1350[3]	Voltage soft start	3	x	x	x	x	x	x	x	-	-	-	-

Sensorless vector control (SLVC, P1300 = 20,22) and vector control (VC, P1300 = 21,23):

SLVC can provide excellent performance for the following types of application:

- Applications which require high torque performance
- Applications which require fast respond to shock loading
- Applications which require torque holding while passing through 0 Hz
- Applications which require very accurate speed holding
- Applications which require motor pull out protection

Restrictions:

SLVC /VC is dependent on the accuracy of the motor model being used and the measurements being performed by the inverter.

There are therefore certain restrictions on the use of SLVC / VC:

- $f_{\max} = \min(200 \text{ Hz}, 5 \cdot p0310)$  (max. frequency)
- $\frac{1}{4} \leq \frac{p0305}{r0207} \leq \frac{r0209}{r0207}$  (ratio of rated motor current to rated inverter current)
- no synchronous motor

Recommended means of commissioning:

For correct operation under SLVC / VC control it is imperative that the name plate data of the motor (P0304 - P0310) is correctly entered and that the motor data identification (P1900) must be carried out on a cold motor.

It is also necessary to ensure that the motor ambient temperature is correctly entered in P0625 if this is significantly different from the default value of 20°C.

This must be done after the quick commissioning has been completed (P3900) but before the motor data identification measurements are carried out.

Optimisation:

The following parameters can be adjusted by the user to improve performance.

- P0003 = 3
- P0342: Total / motor inertia ratio

Sensorless Vector Control (SLVC):

- P1470: P gain (SLVC)
- P1472: I term (SLVC)
- P1610: Continuous torque boost (SLVC, open loop boost)
- P1750: Control word of motor model

Vector Control (VC):

- P1460: P gain
- P1462: I term

The following table presents an overview of control parameters (SLVC, VC) that can be modified in relationship to P1300 dependencies:



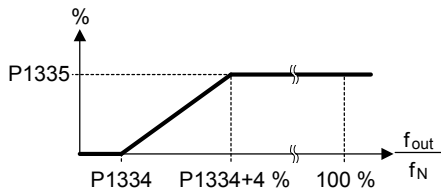
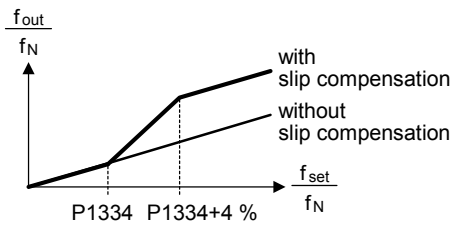
ParNo.	Parameter name	Level	V/f								SLVC		VC	
			P1300 =											
			0	1	2	3	5	6	19	20	22	21	23	
P1400[3]	Configuration of speed control	3	-	-	-	-	-	-	-	-	-	x	-	
P1442[3]	Filter time for act. speed	3	-	-	-	-	-	-	-	-	-	x	-	
P1452[3]	Filter time for act.speed (SLVC)	3	-	-	-	-	-	-	-	x	-	-	-	
P1460[3]	Gain speed controller	2	-	-	-	-	-	-	-	-	-	x	-	
P1462[3]	Integral time speed controller	2	-	-	-	-	-	-	-	-	-	x	-	
P1470[3]	Gain speed controller (SLVC)	2	-	-	-	-	-	-	-	x	-	-	-	
P1472[3]	Integral time n-ctrl. (SLVC)	2	-	-	-	-	-	-	-	x	-	-	-	
P1477[3]	Bl: Set integrator of n-ctrl.	3	-	-	-	-	-	-	-	x	-	x	-	
P1478[3]	Cl: Set integrator value n-ctrl.	3	-	-	-	-	-	-	-	x	-	x	-	
P1488[3]	Droop input source	3	-	-	-	-	-	-	-	x	-	x	-	
P1489[3]	Droop scaling	3	-	-	-	-	-	-	-	x	-	x	-	
P1492[3]	Enable droop	3	-	-	-	-	-	-	-	x	-	x	-	
P1496[3]	Scaling accel. precontrol	3	-	-	-	-	-	-	-	x	-	x	-	
P1499[3]	Scaling accel. torque control	3	-	-	-	-	-	-	-	-	x	-	-	
P1500[3]	Selection of torque setpoint	2	-	-	-	-	-	-	-	x	x	x	x	
P1501[3]	Bl: Change to torque control	3	-	-	-	-	-	-	-	x	x	x	x	
P1503[3]	Cl: Torque setpoint	3	-	-	-	-	-	-	-	-	x	-	x	
P1511[3]	Cl: Additional torque setpoint	3	-	-	-	-	-	-	-	x	x	x	x	
P1520[3]	CO: Upper torque limit	2	-	-	-	-	-	-	-	x	x	x	x	
P1521[3]	CO: Lower torque limit	2	-	-	-	-	-	-	-	x	x	x	x	
P1522[3]	Cl: Upper torque limit	3	-	-	-	-	-	-	-	x	x	x	x	
P1523[3]	Cl: Lower torque limit	3	-	-	-	-	-	-	-	x	x	x	x	
P1525[3]	Scaling lower torque limit	3	-	-	-	-	-	-	-	x	x	x	x	
P1530[3]	Motoring power limitation	2	-	-	-	-	-	-	-	x	x	x	x	
P1531[3]	Regenerative power limitation	2	-	-	-	-	-	-	-	x	x	x	x	
P1570[3]	CO: Fixed value flux setpoint	2	-	-	-	-	-	-	-	x	x	x	x	
P1574[3]	Dynamic voltage headroom	3	-	-	-	-	-	-	-	x	x	x	x	
P1580[3]	Efficiency optimization	2	-	-	-	-	-	-	-	x	x	x	x	
P1582[3]	Smooth time for flux setpoint	3	-	-	-	-	-	-	-	x	x	x	x	
P1596[3]	Int. time field weak. controller	3	-	-	-	-	-	-	-	x	x	x	x	
P1610[3]	Continuous torque boost (SLVC)	2	-	-	-	-	-	-	-	x	x	-	-	
P1611[3]	Acc. torque boost (SLVC)	2	-	-	-	-	-	-	-	x	x	-	-	
P1740	Gain for oscillation damping	3	-	-	-	-	-	-	-	x	x	-	-	
P1750[3]	Control word of motor model	3	-	-	-	-	-	-	-	x	x	x	x	
P1755[3]	Start-freq. motor model (SLVC)	3	-	-	-	-	-	-	-	x	x	-	-	
P1756[3]	Hyst.-freq. motor model (SLVC)	3	-	-	-	-	-	-	-	x	x	-	-	
P1758[3]	T(wait) transit to feed-fwd-mode	3	-	-	-	-	-	-	-	x	x	-	-	
P1759[3]	T(wait) for n-adaption to settle	3	-	-	-	-	-	-	-	x	x	-	-	
P1764[3]	Kp of n-adaption (SLVC)	3	-	-	-	-	-	-	-	x	x	-	-	
P1780[3]	Control word of Rs/Rr-adaption	3	-	-	-	-	-	-	-	x	x	-	-	
P0400[3]	Select encoder type	2	-	-	-	-	-	-	-	-	-	x	x	
P0408[3]	Encoder pulses per revolution	2	-	-	-	-	-	-	-	-	-	x	x	
P0491[3]	Reaction on speed signal loss	2	-	-	-	-	-	-	-	-	-	x	x	
P0492[3]	Allowed speed difference	2	-	-	-	-	-	-	-	-	-	x	x	
P0494[3]	Delay speed loss reaction	2	-	-	-	-	-	-	-	-	-	x	x	

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

p1310[0...2]	<b>Continuous boost / Continuous boost</b>		
	<b>Access level:</b> 2 <b>Quick comm. NO</b> <b>Can be changed:</b> U, T	<b>P-Group:</b> Closed-loop control <b>Active:</b> YES	<b>Data type:</b> Floating Point <b>Data set:</b> DDS
	<b>Min</b> 0.0 [%]	<b>Max</b> 250.0 [%]	<b>Factory setting</b> 50.0 [%]
<b>Description:</b>	<p>Defines boost level in [%] relative to P0305 (rated motor current) applicable to both linear and quadratic V/f curves. At low output frequencies the output voltage is low to keep the flux level constant. However, the output voltage may be too low for the following:</p> <ul style="list-style-type: none"> <li>magnetisation the asynchronous motor</li> <li>hold the load</li> <li>overcome losses in the system.</li> </ul> <p>The inverter output voltage can be increased via P1310 for the compensation of losses, hold loads at 0 Hz or maintain the magnetization.</p> <p>The magnitude of the boost in Volt at a frequency of zero is defined as follows:</p> $V_{\text{ConBoost},100} = p0305 \cdot p0350 \cdot \frac{p1310}{100}$		
<b>Dependency:</b>	Continous boost P1310 has no effect during vector operation.		
<b>Note:</b>	<p>Increasing the boost levels increases motor heating (especially at standstill).            Setting in P0640 (motor overload factor [%]) limits the boost:</p> $\frac{\sum V_{\text{Boost}}}{P0305 \cdot P0350} \leq \frac{P0640}{100}$ <p>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 &gt; P1311 &gt; P1312</p> <p>The total boost is limited by following equation:</p> $\sum V_{\text{Boost}} \leq 3 \cdot R_s \cdot I_{\text{Mot}} = 3 \cdot p0305 \cdot p0350$		
p1311[0...2]	<b>Acceleration boost / Acceleration boost</b>		
	<b>Access level:</b> 2 <b>Quick comm. NO</b> <b>Can be changed:</b> U, T	<b>P-Group:</b> Closed-loop control <b>Active:</b> YES	<b>Data type:</b> Floating Point <b>Data set:</b> DDS
	<b>Min</b> 0.0 [%]	<b>Max</b> 250.0 [%]	<b>Factory setting</b> 0.0 [%]
<b>Description:</b>	<p>Applies boost in [%] relative to P0305 (rated motor current) following a positive setpoint change and drops back out once the setpoint is reached.</p> <p>P1311 will only produce boost during ramping, and is therefore useful for additional torque during acceleration and deceleration.</p> <p>As opposed to parameter P1312, which is only active on the first acceleration issued after the ON command, parameter P1311 is always effect during an acceleration and deceleration when issued.</p> <p>The magnitude of the boost in Volt at a frequency of zero is defined as follows:</p> $V_{\text{AccBoost},100} = p0305 \cdot p0350 \cdot \frac{p1311}{100}$		
<b>Dependency:</b>	Acceleration boost P1311 has no effect during vector operation.		
<b>Note:</b>	See parameter P1310.		

<b>p1312[0...2]</b>	<b>Starting boost / Starting boost</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.0 [%]	<b>Max</b> 250.0 [%]	<b>Factory setting</b> 0.0 [%]
<b>Description:</b>	<p>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:</p> <ol style="list-style-type: none"> <li>ramp output reaches setpoint for the first time respectively</li> <li>setpoint is reduced to less than present ramp output</li> </ol> <p>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.</p> <p>The magnitude of the boost in Volt at a frequency of zero is defined as follows:</p> $V_{\text{StartBoost},100} = p0305 \cdot p0350 \cdot \frac{p1312}{100}$		
<b>Dependency:</b>	Starting boost P1312 has no effect during vector operation.		
<b>Note:</b>	See parameter P1310.		
<b>r1315</b>	<b>CO: Total boost voltage / Total boost V</b>		
	<b>Access level:</b> 4	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Unit:</b> [V]		<b>Data set:</b> -
<b>Description:</b>	Displays total value of voltage boost (in volts).		
<b>p1316[0...2]</b>	<b>Boost end frequency / Boost end freq.</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.0 [%]	<b>Max</b> 100.0 [%]	<b>Factory setting</b> 20.0 [%]
<b>Description:</b>	<p>Defines point at which programmed boost reaches 50 % of its value.</p> <p>This value is expressed in [%] relative to P0310 (rated motor frequency).</p> <p>The default frequency is defined as follows:</p> $f_{\text{Boost min}} = 2 \cdot \left( \frac{153}{\sqrt{P_{\text{motor}}}} + 3 \right)$		
<b>Note:</b>	<p>The expert user may change this value to alter the shape of the curve, e.g. to increase torque at a particular frequency.</p> <p>Default value is depending on inverter type and its rating data.</p>		

<b>p1320[0...2]</b>	<b>Programmable V/f freq. coord. 1 / V/f freq. coord. 1</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> T		
	<b>Min</b> 0.00 [Hz]	<b>Max</b> 650.00 [Hz]	<b>Factory setting</b> 0.00 [Hz]
<b>Description:</b>	Sets V/f coordinates (P1320/1321 to P1324/1325) to define V/f characteristic. These parameter pairs can be used to provide correct torque at correct frequency and is useful when used with synchronous motors. Parameter P1320 defines the frequency of the first point of the characteristic.		
<b>Dependency:</b>	To set parameter, select P1300 = 3 (V/f with programmable characteristic). The acceleration boost and starting boost defined in P1311 and P1312 are applied to V/f with programmable characteristic.		
<b>Note:</b>	Linear interpolation will be applied between the individual data points. V/f with programmable characteristic (P1300 = 3) has 3 programmable points and 2 non-programmable points. The 2 non-programmable points are: <ul style="list-style-type: none"> <li>• Continuous boost P1310 at 0 Hz</li> <li>• Rated motor voltage P0304 at rated motor frequency P0310</li> </ul>		
<b>p1321[0...2]</b>	<b>Programmable V/f volt. coord. 1 / V/f volt. coord. 1</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.0 [V]	<b>Max</b> 3000.0 [V]	<b>Factory setting</b> 0.0 [V]
<b>Description:</b>	See P1320 (programmable V/f freq. coord. 1).		
<b>p1322[0...2]</b>	<b>Programmable V/f freq. coord. 2 / V/f freq. coord. 2</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> T		
	<b>Min</b> 0.00 [Hz]	<b>Max</b> 650.00 [Hz]	<b>Factory setting</b> 0.00 [Hz]
<b>Description:</b>	See P1320 (programmable V/f freq. coord. 1).		
<b>p1323[0...2]</b>	<b>Programmable V/f volt. coord. 2 / V/f volt. coord. 2</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.0 [V]	<b>Max</b> 3000.0 [V]	<b>Factory setting</b> 0.0 [V]
<b>Description:</b>	See P1320 (programmable V/f freq. coord. 1).		
<b>p1324[0...2]</b>	<b>Programmable V/f freq. coord. 3 / V/f freq. coord. 3</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> T		
	<b>Min</b> 0.00 [Hz]	<b>Max</b> 650.00 [Hz]	<b>Factory setting</b> 0.00 [Hz]
<b>Description:</b>	See P1320 (programmable V/f freq. coord. 1).		

<b>p1325[0...2]</b>	<b>Programmable V/f volt. coord. 3 / V/f volt. coord. 3</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.0 [V]	<b>Max</b> 3000.0 [V]	<b>Factory setting</b> 0.0 [V]
<b>Description:</b>	See P1320 (programmable V/f freq. coord. 1).		
<b>p1330[0...2]</b>	<b>Cl: Voltage setpoint / Voltage setp.</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> U32 / FloatPoint32
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> CDS
	<b>Can be changed:</b> T		
	<b>Min</b> -	<b>Max</b> -	<b>Factory setting</b> 0
<b>Description:</b>	BICO parameter for selecting source of voltage setpoint for independent V/f control (P1300 = 19).		
<b>p1333[0...2]</b>	<b>Start frequency for FCC / Start freq for FCC</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.0 [%]	<b>Max</b> 100.0 [%]	<b>Factory setting</b> 10.0 [%]
<b>Description:</b>	Defines start frequency at which FCC (flux current control) is enabled as [%] of rated motor frequency (P0310).		
<b>Notice:</b>	If this value is too low, the system may become unstable.		
<b>p1334[0...2]</b>	<b>Slip compensation activation range / Slip c. act. range</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 1.0 [%]	<b>Max</b> 20.0 [%]	<b>Factory setting</b> 6.0 [%]
<b>Description:</b>	To set the frequency activation range for slip compensation. The percentage value of P1334 refers to the motor rated frequency P0310. The upper threshold will always stay 4 % above P1334.		
	Range of slip compensation :		
			
<b>Dependency:</b>	Slip compensation (P1335) active.		
<b>Note:</b>	See parameter P1335. The starting frequency of the slip compensation is P1334 * P0310.		

<b>p1335[0...2]</b>	<b>Slip compensation / Slip compensation</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.0 [%]	<b>Max</b> 600.0 [%]	<b>Factory setting</b> 0.0 [%]
<b>Description:</b>	Dynamically adjusts output frequency of inverter so that motor speed is kept constant independent of motor load. In the V/f-control, the motor frequency will always be less than the inverter output frequency due to the slip frequency. For a given output frequency, the motor frequency will drop as load is increased. This behavior, typical for induction motors, can be compensated using slip compensation. P1335 can be used to enable and fine-tune the slip compensation.		
<b>Dependency:</b>	Gain adjustment enables fine-tuning of the actual motor speed (see P1460 - gain speed control).		
<b>Notice:</b>	The applied value of the slip compensation (scaled by P1335) is limited by following equation:		
	$f_{\text{Slip\_comp\_max}} = \frac{P1336}{100} \cdot r0330$		
<b>Note:</b>	P1335 = 0 % : Slip compensation disabled. P1335 = 50 % - 70 % : Full slip compensation at cold motor (partial load). P1335 = 100 % (standard setting for warm stator) : Full slip compensation at warm motor (full load).		
<b>p1336[0...2]</b>	<b>Slip limit / Slip limit</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0 [%]	<b>Max</b> 600 [%]	<b>Factory setting</b> 250 [%]
<b>Description:</b>	Compensation slip limit in [%] relative to r0330 (rated motor slip), which is added to frequency setpoint.		
<b>Dependency:</b>	Slip compensation (P1335) active.		
<b>r1337</b>	<b>CO: V/f slip frequency / V/f slip freq.</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Unit:</b> [%]		<b>Data set:</b> -
<b>Description:</b>	Displays actual compensated motor slip as [%]		
<b>Dependency:</b>	Slip compensation (P1335) active.		
<b>p1338[0...2]</b>	<b>Resonance damping gain V/f / Res.damp. gain V/f</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.00	<b>Max</b> 10.00	<b>Factory setting</b> 0.00
<b>Description:</b>	Defines resonance damping gain for V/f. The di/dt of the active current will be scaled by P1338. If di/dt increases the resonance damping circuit decreases the inverter output frequency.		
<b>Note:</b>	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).		

<b>p1340[0...2]</b>	<b>I<sub>max</sub> controller prop. gain / I<sub>max</sub> ctrl prp gain</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.000	<b>Max</b> 0.499	<b>Factory setting</b> 0.000
<b>Description:</b>	<p>Proportional gain of the I<sub>max</sub> controller.</p> <p>The I<sub>max</sub> 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<sub>max</sub> controller uses both a frequency controller (see parameters P1340 and P1341) and a voltage controller (see parameters P1345 and P1346). The frequency controller seeks to reduce current by limiting the inverter output frequency (to a minimum of the two times nominal slip frequency).</p> <p>If this action does not successfully remove the overcurrent condition, the inverter output voltage is reduced using the I<sub>max</sub> voltage controller.</p> <p>When the overcurrent condition has been removed successfully, frequency limiting is removed using the ramp-up time set in P1120.</p> <p>In linear V/f for textiles, FCC for textiles, or external V/f modes only the I<sub>max</sub> voltage controller is used to reduce current (see parameters P1345 and P1346).</p>		
<b>Note:</b>	<p>The I<sub>max</sub> controller can be disabled by setting the frequency controller integral time P1341 to zero. This disables both the frequency and voltage controllers.</p> <p>Note that when disabled, the I<sub>max</sub> 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.</p>		
<b>p1341[0...2]</b>	<b>I<sub>max</sub> controller integral time / I<sub>max</sub> ctrl int time</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.000 [s]	<b>Max</b> 50.000 [s]	<b>Factory setting</b> 0.300 [s]
<b>Description:</b>	<p>Integral time constant of the I<sub>max</sub> controller.</p> <ul style="list-style-type: none"> <li>• P1341 = 0 : I<sub>max</sub> controller disabled</li> <li>• P1340 = 0 and P1341 &gt; 0 : frequency controller enhanced integral</li> <li>• P1340 &gt; 0 and P1341 &gt; 0 : frequency controller normal PI control</li> </ul>		
<b>Note:</b>	<p>See parameter P1340 for further information.</p> <p>The Factory setting depends on inverter power.</p>		
<b>r1343</b>	<b>CO: I<sub>max</sub> controller freq. output / CO:I<sub>max</sub> ctrl Foutp</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Unit:</b> [Hz]		<b>Data set:</b> -
<b>Description:</b>	Displays effective frequency limitation.		
<b>Dependency:</b>	If I <sub>max</sub> controller not in operation, parameter normally shows max. frequency P1082.		
<b>r1344</b>	<b>CO: I<sub>max</sub> controller volt. output / CO:I<sub>max</sub> ctrl Voutp</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Unit:</b> [V]		<b>Data set:</b> -
<b>Description:</b>	Displays amount by which the I <sub>max</sub> controller is reducing the inverter output voltage.		

<b>p1345[0...2]</b>	<b>I<sub>max</sub> voltage ctrl. prop. gain / I<sub>max</sub> volt prp gain</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.000	<b>Max</b> 5.499	<b>Factory setting</b> 0.250
<b>Description:</b>	If the output current (r0068) exceeds the maximum current (r0067), the frequency inverter is dynamically controlled by reducing the output voltage. This parameter sets the proportional gain of this controller.		
<b>Note:</b>	See parameter P1340 for further information. The Factory setting depends on inverter power.		
<b>p1346[0...2]</b>	<b>I<sub>max</sub> voltage ctrl. integral time / I<sub>max</sub> volt int time</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.000 [s]	<b>Max</b> 50.000 [s]	<b>Factory setting</b> 0.300 [s]
<b>Description:</b>	Integral time constant of the I <sub>max</sub> voltage controller. <ul style="list-style-type: none"> <li>• P1341 = 0 : I<sub>max</sub> controller disabled</li> <li>• P1345 = 0 and P1346 &gt; 0 : I<sub>max</sub> voltage controller enhanced integral</li> <li>• P1345 &gt; 0 and P1346 &gt; 0 : I<sub>max</sub> voltage controller normal PI control</li> </ul>		
<b>Note:</b>	See parameter P1340 for further information. The Factory setting depends on inverter power.		
<b>p1350[0...2]</b>	<b>Voltage soft start / Voltage soft start</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0	<b>Max</b> 1	<b>Factory setting</b> 0
<b>Description:</b>	Sets whether voltage is built up smoothly during magnetization time (ON) or whether it simply jumps to boost voltage (OFF).		
<b>Values:</b>	0: OFF 1: ON		
<b>Note:</b>	The settings for this parameter bring benefits and drawbacks: <ul style="list-style-type: none"> <li>• P1350 = 0: OFF (jump to boost voltage) Benefit: flux is built up quickly Drawback: motor may move</li> <li>• P1350 = 1: ON (smooth voltage build-up) Benefit: motor less likely to move Drawback: flux build-up takes longer</li> </ul>		





<b>p1400[0...2]</b>	<b>Configuration of speed control / Config. of n-ctrl.</b>			
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Unsigned16	
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS	
	<b>Can be changed:</b> U, T			
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>	
	-	-	0001 bin	
<b>Description:</b>	Configuration for speed control.			
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>	<b>0 signal</b>
	00	Automatic Kp adaption	Yes	No
	01	Integral freeze (SLVC)	Yes	No
<b>Note:</b>	P1400 Bit 00 = 1: Automatic gain adaption of speed controller (P1460 resp. P1470) is enabled. In the area of field weakening the gain is reduced in dependence on flux. P1400 Bit01 = 1: The integrator of the speed controller is frozen if Sensorless Vector Control (SLVC) is selected and the control is switched from closed-loop to open-loop operation. Advantage: The correct amount of slip compensation is calculated and applied to the open-loop function for a motor under load.			
<b>r1407.0...15</b>	<b>CO/BO: Status 2 of motor control / Stat 2 ctrl</b>			
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Unsigned16	
	<b>Unit:</b> -		<b>Data set:</b> -	
<b>Description:</b>	Displays status of motor control, which can be used to diagnose inverter status.			
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>	<b>0 signal</b>
	00	V/f control enabled	Yes	No
	01	SLVC enabled	Yes	No
	02	Torque control enabled	Yes	No
	05	Stop I-comp. speed control	Yes	No
	06	Set I-comp. speed controller	Yes	No
	08	Upper torque limit active	Yes	No
	09	Lower torque limit active	Yes	No
	10	Droop active	Yes	No
	15	DDS change active	Yes	No
<b>Note:</b>	See P0052 (CO/BO: Status word 1)			
<b>r1438</b>	<b>CO: Freq. setpoint to controller / Freq. setp ctl</b>			
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point	
	<b>Unit:</b> [Hz]		<b>Data set:</b> -	
<b>Description:</b>	Displays setpoint of speed controller.			
<b>p1442[0...2]</b>	<b>Filter time for act. speed / Filter time n_act.</b>			
	<b>Access level:</b> 2	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Unsigned16	
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS	
	<b>Can be changed:</b> U, T			
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>	
	2 [ms]	32000 [ms]	2 [ms]	
<b>Description:</b>	Sets time constant of PT1 filter to smooth actual speed of speed controller.			
<b>r1445</b>	<b>CO: Act. filtered frequency / Act. filt freq</b>			
	<b>Access level:</b> 4	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point	
	<b>Unit:</b> [Hz]		<b>Data set:</b> -	
<b>Description:</b>	Displays filtered actual speed at speed controller input.			

<b>p1452[0...2]</b>	<b>Filter time for act.speed (SLVC) / Act.spd.filt. SLVC</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 2 [ms]	<b>Max</b> 32000 [ms]	<b>Factory setting</b> 2 [ms]
<b>Description:</b>	Sets time constant of PT1 filter to filter the speed deviation of speed controller in operation mode SLVC (sensorless vector control).		
<b>p1460[0...2]</b>	<b>Gain speed controller / Gain of n-ctrl.</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.0	<b>Max</b> 2000.0	<b>Factory setting</b> 3.0
<b>Description:</b>	Enters gain of speed controller.		
<b>p1462[0...2]</b>	<b>Integral time speed controller / Tn of n-ctrl.</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 25 [ms]	<b>Max</b> 32001 [ms]	<b>Factory setting</b> 400 [ms]
<b>Description:</b>	Enters integral time of speed controller.		
<b>p1470[0...2]</b>	<b>Gain speed controller (SLVC) / Gain n-ctrl (SLVC)</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.0	<b>Max</b> 2000.0	<b>Factory setting</b> 3.0
<b>Description:</b>	Enters gain of speed controller for sensorless vector control (SLVC).		
<b>p1472[0...2]</b>	<b>Integral time n-ctrl. (SLVC) / Tn of n-ctrl. SLVC</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 25 [ms]	<b>Max</b> 32001 [ms]	<b>Factory setting</b> 400 [ms]
<b>Description:</b>	Enters integral time of speed controller for sensorless vector control (SLVC).		
<b>p1477[0...2]</b>	<b>BI: Set integrator of n-ctrl. / Set integrator</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> U32 / Binary
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> CDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> -	<b>Max</b> -	<b>Factory setting</b> 0
<b>Description:</b>	Selects command source for enabling of integrator setting.		

<b>p1478[0...2]</b>	<b>CI: Set integrator value n-ctrl. / Set int. value</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> U32 / FloatPoint32
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> CDS
	<b>Can be changed:</b> U, T		
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
	-	-	0
<b>Description:</b>	Selects source for integral part of speed controller.		
<b>Notice:</b>	Neither function works after flying start.		
<b>Note:</b>	If the P1482 (integral component of speed controller) is connected and the setting command is not connected (P1477=0), upon pulse enable the integral component of the controller is set once to the last value prior the pulse inhibit.		
<b>r1482</b>	<b>CO: Integral output of n-ctrl. / Int.outp n-ctrl</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Unit:</b> [Nm]		<b>Data set:</b> -
<b>Description:</b>	Displays integral part of speed controller output.		
<b>p1488[0...2]</b>	<b>Droop input source / Droop input source</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
	0	3	0
<b>Description:</b>	Selects source of droop input signal.		
	With mechanically coupled motors it is very important that an even load distribution is applied to each motor. The load sharing can be achieved by enabling the droop function on both inverters.		
	<ol style="list-style-type: none"> <li>1. Droop is applied as a frequency setpoint on each inverter. The droop increases the slip via the negative feedback of the torque setpoint to the frequency setpoint. In a steady-state an even load distribution can be achieved if the slip characteristics are identical. <ul style="list-style-type: none"> <li>- P1488 &gt; 0</li> <li>- P1489 &gt; 0</li> <li>- P1492 = 1</li> </ul> </li> <li>2. Droop can act as a setpoint or limitation for a group of inverters (i.e. master-slave inverters). By use of the master-slave inverter technique an even load distribution is achieved across the whole application. This is accomplished by setting the torque setpoint (r1490) on the master inverter which then controls the speed of the master inverter and all connected slave inverters. <ul style="list-style-type: none"> <li>- P1488 &gt; 0</li> <li>- P1489 &gt; 0</li> <li>- P1492 = 0</li> </ul> </li> </ol>		
<b>Values:</b>	0: Droop input disabled 1: Torque setpoint 2: Speed controller output 3: Speed controller integral output		
<b>Dependency:</b>	Droop scaling (P1489) must be > 0 for droop to be effective.		

<b>p1489[0...2]</b>	<b>Droop scaling / Droop scaling</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.00	<b>Max</b> 0.50	<b>Factory setting</b> 0.05
<b>Description:</b>	Defines amount of droop in per unit at full load in [%].		
<b>Note:</b>	If 0 is entered as value, no droop is applied. The Factory setting depends on inverter power.		
<b>r1490</b>	<b>CO: Droop frequency / Droop freq.</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Unit:</b> [Hz]		<b>Data set:</b> -
<b>Description:</b>	Displays output signal of droop function. This result of droop calculation is subtracted from the speed controller setpoint.		
<b>p1492[0...2]</b>	<b>BI: Enable droop / Enable droop</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> U32 / Binary
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> CDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> -	<b>Max</b> -	<b>Factory setting</b> 0
<b>Description:</b>	Enables droop.		
<b>Dependency:</b>	Effective only if droop scaling P1489 > 0.		
<b>p1496[0...2]</b>	<b>Scaling accel. precontrol / Scal acc. prectrl.</b>		
ICU24	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.0 [%]	<b>Max</b> 400.0 [%]	<b>Factory setting</b> 100.0 [%]
<b>Description:</b>	Enters scaling of acceleration in [%]. The response of setpoint changes for the speed control loop can be improved using the precontrol function (P1496). Precontrol is derived from the differential frequency setpoint multiplied by the mass inertia P0341; P0342 is then supplied as a torque setpoint to the current controller. If the filter (VC: P1442, SLVC: P1452) is applied in the correct manner, the derived speed controller is only required to control a small deviation in the value of the corrected variable.		
<b>Note:</b>	P1496 = 0: ==> Precontrol disabled P1496 > 0: ==> Precontrol enabled P1496 = 100: ==> Standard setting for precontrol		

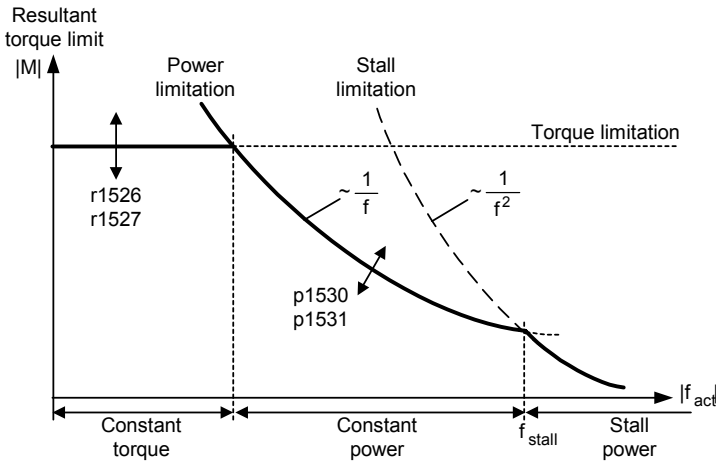
<b>p1496[0...2]</b>	<b>Scaling accel. precontrol / Scal acc. prectrl.</b>		
ICU24F	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.0 [%]	<b>Max</b> 400.0 [%]	<b>Factory setting</b> 100.0 [%]
<b>Description:</b>	<p>Enters scaling of acceleration in [%].</p> <p>The response of setpoint changes for the speed control loop can be improved using the precontrol function (P1496).</p> <p>Precontrol is derived from the differential frequency setpoint multiplied by the mass inertia P0341; P0342 is then supplied as a torque setpoint to the current controller.</p> <p>If the filter (VC: P1442, SLVC: P1452) is applied in the correct manner, the derived speed controller is only required to control a small deviation in the value of the corrected variable.</p>		
<b>Note:</b>	<p>P1496 = 0: ==&gt; Precontrol disabled (necessary for robustness of safety applications with SS1 and SLS)</p> <p>P1496 &gt; 0: ==&gt; Precontrol enabled</p> <p>P1496 = 100: ==&gt; Standard setting for precontrol</p>		
<b>p1499[0...2]</b>	<b>Scaling accel. torque control / Scal acc. trq ctrl</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.0 [%]	<b>Max</b> 400.0 [%]	<b>Factory setting</b> 100.0 [%]
<b>Description:</b>	Enters scaling of acceleration in [%] for sensorless torque control (SLVC) at low frequencies.		
<b>p1500[0...2]</b>	<b>Selection of torque setpoint / Torque setp. sel.</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> YES	<b>Active:</b> NO	<b>Data set:</b> CDS
	<b>Can be changed:</b> C, T		
	<b>Min</b> 0	<b>Max</b> 66	<b>Factory setting</b> 0
<b>Description:</b>	<p>Selects torque setpoint source.</p> <p>The selection of settings is detailed in the following table of values, in which the main setpoint is given by the least significant digit (right-hand position) and the additional setpoint is given by the most significant digit (left-hand position). Single digits denote main setpoints that have no additional setpoint.</p>		
<b>Values:</b>	<p>0: No main setpoint</p> <p>4: USS on RS232</p> <p>6: Fieldbus</p> <p>40: No main setpoint + USS on RS232</p> <p>44: USS on RS232 + USS on RS232</p> <p>46: Fieldbus + USS on RS232</p> <p>60: No main setpoint + Fieldbus</p> <p>64: USS on RS232 + Fieldbus</p> <p>66: Fieldbus + Fieldbus</p>		
<b>Caution:</b>	<p>Changing this parameter sets (to default) all settings on item selected. These are the following parameters: P1503, P1511</p>		
			

<b>p1501[0...2]</b>	<b>BI: Change to torque control / BI:-&gt; torque ctrl.</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> U32 / Binary
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> CDS
	<b>Can be changed:</b> T		
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
	-	-	0
<b>Description:</b>	Selects command source from which it is possible to change between master (speed control) and slave (torque control).		
<b>Caution:</b>	The OFF1 command is not recognized when torque control is selected indirectly (P1300 = 20, 21 and P1501 = 1). However, if direct selection of torque control is used (P1300 = 22, 23) the OFF1 command is recognized as OFF2. If indirect selection of torque control is used, it is recommended to program an OFF2 command using, for example a digital input or create a circuit using the Free Function Blocks (FFB):		
			
<b>Note:</b>	Speed control with encoder feedback see P1460. Speed control without encoder feedback see P1470.		
<b>p1503[0...2]</b>	<b>CI: Torque setpoint / Torque setp.</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> U32 / FloatPoint32
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> CDS
	<b>Can be changed:</b> T		
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
	-	-	0
<b>Description:</b>	Selects source of torque setpoint for torque control.		
<b>r1508</b>	<b>CO: Torque setpoint / Torque setp.</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Unit:</b> [Nm]		<b>Data set:</b> -
<b>Description:</b>	Displays torque setpoint before limitation.		
<b>p1511[0...2]</b>	<b>CI: Additional torque setpoint / Add. trq. setp</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> U32 / FloatPoint32
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> CDS
	<b>Can be changed:</b> T		
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
	-	-	0
<b>Description:</b>	Selects source of additional torque setpoint for torque and speed control.		
<b>r1515</b>	<b>CO: Additional torque setpoint / Add. trq. setp</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Unit:</b> [Nm]		<b>Data set:</b> -
<b>Description:</b>	Displays additional torque setpoint.		
<b>r1518</b>	<b>CO: Acceleration torque / Accel. torque</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Unit:</b> [Nm]		<b>Data set:</b> -
<b>Description:</b>	Displays acceleration torque.		

<b>p1520[0...2]</b>	<b>CO: Upper torque limit / Upper trq. lim</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> -99999.00 [Nm]	<b>Max</b> 99999.00 [Nm]	<b>Factory setting</b> 5.13 [Nm]
<b>Description:</b>	Specifies fixed value for upper torque limitation.		
	$p1520_{def} = r0333 \cdot \frac{P0640}{100\%}$ $p1520_{max} = \pm 4 \cdot r0333$		
<b>p1521[0...2]</b>	<b>CO: Lower torque limit / Lower trq. lim</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> -99999.00 [Nm]	<b>Max</b> 99999.00 [Nm]	<b>Factory setting</b> -5.13 [Nm]
<b>Description:</b>	Specifies fixed value of lower torque limitation.		
	$p1521_{def} = -r0333 \cdot \frac{P0640}{100\%}$ $p1521_{max} = \pm 4 \cdot r0333$		
<b>p1522[0...2]</b>	<b>CI: Upper torque limit / Upper trq. lim</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> U32 / FloatPoint32
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> CDS
	<b>Can be changed:</b> T		
	<b>Min</b> -	<b>Max</b> -	<b>Factory setting</b> 1520[0]
<b>Description:</b>	Selects source of upper torque limitation.		
<b>p1523[0...2]</b>	<b>CI: Lower torque limit / Lower trq. lim</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> U32 / FloatPoint32
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> CDS
	<b>Can be changed:</b> T		
	<b>Min</b> -	<b>Max</b> -	<b>Factory setting</b> 1521[0]
<b>Description:</b>	Selects source of lower torque limitation.		
<b>p1525[0...2]</b>	<b>Scaling lower torque limit / Scal. low trq. lim</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> -400.0 [%]	<b>Max</b> 400.0 [%]	<b>Factory setting</b> 100.0 [%]
<b>Description:</b>	Specifies scaling of lower torque limitation in [%].		
<b>Note:</b>	P1525 = 100 % = standard setting		

**r1526**      **CO: Upper torque limitation / Upper trq. lim**  
**Access level:** 3      **P-Group:** Closed-loop control      **Data type:** Floating Point  
**Unit:** [Nm]      **Data set:** -

**Description:** Displays actual upper torque limitation.



**Dependency:** The parameters r1526 and r1527 depend on P1520, P1521, P1522, P1523 and P1525.

**r1527**      **CO: Lower torque limitation / Lower trq. lim**  
**Access level:** 3      **P-Group:** Closed-loop control      **Data type:** Floating Point  
**Unit:** [Nm]      **Data set:** -

**Description:** Displays actual lower torque limitation.

**Note:** See parameter r1526.

**p1530[0...2]**      **Motoring power limitation / Motoring power lim**  
**Access level:** 2      **P-Group:** Closed-loop control      **Data type:** Floating Point  
**Quick comm. NO**      **Active:** YES      **Data set:** DDS  
**Can be changed:** U, T

Min	Max	Factory setting
0.0	8000.0	0.75

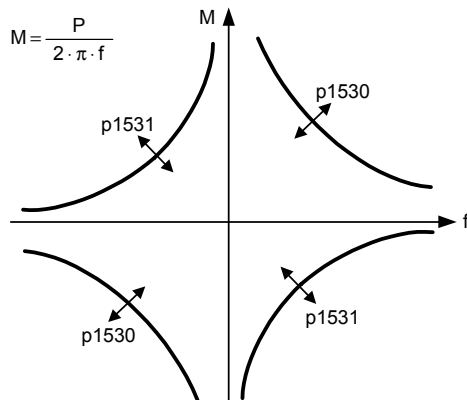
**Description:** Defines fixed value for the max. permissible motoring active power (motoring power limitation).

$$p1530_{def} = 2.5 \cdot P0307$$

$$p1530_{max} = 3 \cdot P0307$$

Parameter P1530 limits the torque in addition to the act. frequency as displayed in the following characteristic.

Power limitation (motoring, regenerative)

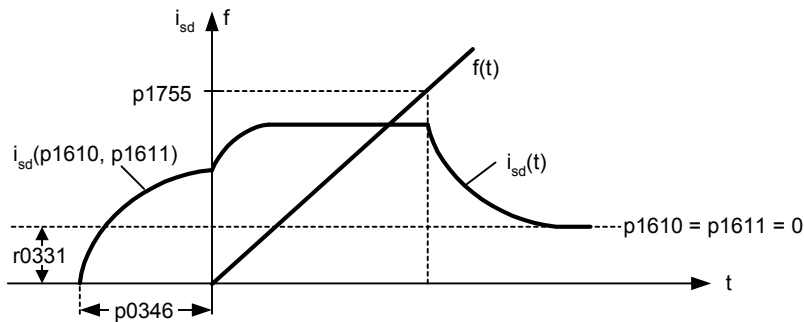




<b>p1531[0...2]</b>	<b>Regenerative power limitation / Regener. power lim</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> -8000.0	<b>Max</b> 0.0	<b>Factory setting</b> -0.75
<b>Description:</b>	Enters fixed value for the max. permissible regenerative active power (regenerative power limitation).		
	$p1531_{def} = -1 \cdot P0307$ $p1531_{min} = -1 \cdot P0307$		
<b>Note:</b>	See parameter P1530.		
<b>r1536</b>	<b>CO: Max. trq. motoring current / Max trq mot cur</b>		
	<b>Access level:</b> 4	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Unit:</b> [A]		<b>Data set:</b> -
<b>Description:</b>	Displays maximum torque motoring current component.		
<b>r1537</b>	<b>CO: Max trq regenerative current / Max trq reg cur</b>		
	<b>Access level:</b> 4	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Unit:</b> [A]		<b>Data set:</b> -
<b>Description:</b>	Displays maximum torque of the regenerative current component.		
<b>r1538</b>	<b>CO: Upper torque limit (total) / Total up TrqLim</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Unit:</b> [Nm]		<b>Data set:</b> -
<b>Description:</b>	Displays total upper torque limitation.		
<b>r1539</b>	<b>CO: Lower torque limit (total) / Total lw TrqLim</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Unit:</b> [Nm]		<b>Data set:</b> -
<b>Description:</b>	Displays total lower torque limitation.		
<b>p1570[0...2]</b>	<b>CO: Fixed value flux setpoint / Fval flux setp</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 50.0 [%]	<b>Max</b> 200.0 [%]	<b>Factory setting</b> 100.0 [%]
<b>Description:</b>	Defines fixed value of flux setpoint in [%] relative to rated motor flux.		
<b>Note:</b>	If P1570 > 100 %, the flux setpoint rises according to the load from 100 % to the value of P1570 between idling and nominal load.		
<b>p1574[0...2]</b>	<b>Dynamic voltage headroom / Dyn. volt headroom</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0 [V]	<b>Max</b> 150 [V]	<b>Factory setting</b> 10 [V]
<b>Description:</b>	Sets dynamic voltage headroom for vector control.		

<b>p1580[0...2]</b>	<b>Efficiency optimization / Efficiency optimiz</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0 [%]	<b>Max</b> 100 [%]	<b>Factory setting</b> 0 [%]
<b>Description:</b>	Sets the efficiency optimization for closed-loop vector control in [%]. When optimizing the efficiency, the flux setpoint is adapted as a function of the load.		
<b>Note:</b>	If P1580 > 0, the dynamics for speed control (P1470, P1472) are restricted to prevent vibration. When no load is applied, a value of 100 % produces full flux reduction (i.e. to 50 % of rated motor flux). When using optimization, it is necessary to increase the smoothing time of the flux setpoint (P1582).		
<b>p1582[0...2]</b>	<b>Smooth time for flux setpoint / Flux setp. Tsmooth</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 4 [ms]	<b>Max</b> 500 [ms]	<b>Factory setting</b> 15 [ms]
<b>Description:</b>	Sets time constant of PT1 filter to smooth flux setpoint.		
<b>r1583</b>	<b>CO: Flux setpoint (smoothed) / Smoothed setp.</b>		
	<b>Access level:</b> 4	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Unit:</b> [%]		<b>Data set:</b> -
<b>Description:</b>	Displays smoothed flux setpoint in [%] relative to rated motor flux.		
<b>p1596[0...2]</b>	<b>Int. time field weak. controller / Int.time weak.ctrl</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 20 [ms]	<b>Max</b> 32001 [ms]	<b>Factory setting</b> 50 [ms]
<b>Description:</b>	Sets the integral time of the field weakening controller.		
<b>r1597</b>	<b>CO: Outp. field weak. controller / Outp.weak. ctrl</b>		
	<b>Access level:</b> 4	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Unit:</b> [%]		<b>Data set:</b> -
<b>Description:</b>	Displays output signal of field weakening controller in [%] relative to rated motor flux.		
<b>r1598</b>	<b>CO: Flux setpoint (total) / Total flux setp</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Unit:</b> [%]		<b>Data set:</b> -
<b>Description:</b>	Displays total flux setpoint in [%] relative to the rated motor flux.		

<b>p1610[0...2]</b>	<b>Continuous torque boost (SLVC) / Cont. torque boost</b>		
<b>Access level:</b> 2	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point	
<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS	
<b>Can be changed:</b> U, T			
<b>Min</b> 0.0 [%]	<b>Max</b> 200.0 [%]	<b>Factory setting</b> 50.0 [%]	
<b>Description:</b>	Sets continuous torque boost in lower speed range of SLVC (sensorless vector control). Value is entered in [%] relative to rated motor torque r0333.		



**Note:** P1610 = 100 % corresponds to rated motor torque.

<b>p1611[0...2]</b>	<b>Acc. torque boost (SLVC) / Acc trq boost SLVC</b>		
<b>Access level:</b> 2	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point	
<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS	
<b>Can be changed:</b> U, T			
<b>Min</b> 0.0 [%]	<b>Max</b> 200.0 [%]	<b>Factory setting</b> 0.0 [%]	
<b>Description:</b>	Sets acceleration torque boost in lower speed range of SLVC (sensorless vector control). Value is entered in [%] relative to rated motor torque r0333.		
<b>Note:</b>	P1611 = 100 % corresponds to rated motor torque.		

<b>p1654[0...2]</b>	<b>Smooth time for Isq setpoint / Isq setp. Tsmooth</b>		
<b>Access level:</b> 4	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point	
<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS	
<b>Can be changed:</b> U, T			
<b>Min</b> 2.0 [ms]	<b>Max</b> 20.0 [ms]	<b>Factory setting</b> 6.0 [ms]	
<b>Description:</b>	Sets time constant of PT1 filter to filter setpoint of torque generating current component in field weakening range.		

<b>p1715[0...2]</b>	<b>Gain current controller / Gain current ctrl.</b>		
<b>Access level:</b> 4	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point	
<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS	
<b>Can be changed:</b> U, T			
<b>Min</b> 0.00	<b>Max</b> 5.00	<b>Factory setting</b> 0.25	
<b>Description:</b>	Enters gain of current controller.		

<b>p1717[0...2]</b>	<b>Integral time current controller / Int.time cur. ctrl</b>		
	<b>Access level:</b> 4	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 1.0 [ms]	<b>Max</b> 50.0 [ms]	<b>Factory setting</b> 4.1 [ms]
<b>Description:</b>	Enters integral time of current controller.		
<b>r1718</b>	<b>CO: Output of Isq controller / Outp. Isq ctrl</b>		
	<b>Access level:</b> 4	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Unit:</b> [V]		<b>Data set:</b> -
<b>Description:</b>	Displays actual output of Isq current (torque current) controller (PI controller). It contains the proportional and integral part of the PI controller.		
<b>r1719</b>	<b>CO: Integral output of Isq ctrl. / Int. outp. Isq</b>		
	<b>Access level:</b> 4	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Unit:</b> [V]		<b>Data set:</b> -
<b>Description:</b>	Displays integral output of Isq current (torque current) controller (PI controller).		
<b>r1723</b>	<b>CO: Output of Isd controller / Outp. Isd ctrl</b>		
	<b>Access level:</b> 4	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Unit:</b> [V]		<b>Data set:</b> -
<b>Description:</b>	Displays actual output of Isd current (flux current) controller (PI controller). It contains the proportional and integral part of the PI controller.		
<b>r1724</b>	<b>CO: Integral output of Isd ctrl. / Int. outp. Isd</b>		
	<b>Access level:</b> 4	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Unit:</b> [V]		<b>Data set:</b> -
<b>Description:</b>	Displays integral output of Isd current (flux current) controller (PI controller).		
<b>r1725</b>	<b>CO: Integral limit of Isd ctrl. / Int. limit Isd</b>		
	<b>Access level:</b> 4	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Unit:</b> [V]		<b>Data set:</b> -
<b>Description:</b>	Displays limit of integral output voltage setpoint of Isd current controller.		
<b>r1728</b>	<b>CO: Decoupling voltage / Decoupl. volt</b>		
	<b>Access level:</b> 4	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Unit:</b> [V]		<b>Data set:</b> -
<b>Description:</b>	Displays actual output voltage setpoint of cross channel decoupling.		
<b>p1740</b>	<b>Gain for oscillation damping / Oscill. damp. gain</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> -
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.000	<b>Max</b> 10.000	<b>Factory setting</b> 0.000
<b>Description:</b>	Sets oscillation damping gain for sensorless vector control at low frequencies. The oscillation damping subtracts the result of a delayed differential (DT1) from the setpoint frequency.		

<b>p1745[0...2]</b>	<b>Flux variance limit in stall / Flux var.lim.stall</b>				
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point		
	<b>Quick comm.:</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS		
	<b>Can be changed:</b> U, T				
	<b>Min</b> 0.0 [%]	<b>Max</b> 1000.0 [%]	<b>Factory setting</b> 5.0 [%]		
<b>Description:</b>	Sets the flux variance limit. With SLVC the variance between the flux setpoint and the actual flux is used to detect motor stall conditions.				
<b>Note:</b>	The function is active, with SLVC (P1300 = 20 or 22) and control in open loop mode (output frequency > P1755).				
<b>r1746</b>	<b>CO: Actual flux variance / Act. flux variance</b>				
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point		
	<b>Unit:</b> [%]		<b>Data set:</b> -		
<b>Description:</b>	Displays the present percentage of flux variance. See P1745.				
<b>p1750[0...2]</b>	<b>Control word of motor model / Motor model CtrlWd</b>				
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Unsigned16		
	<b>Quick comm.:</b> NO	<b>Active:</b> NO	<b>Data set:</b> DDS		
	<b>Can be changed:</b> U, T				
	<b>Min</b> -	<b>Max</b> -	<b>Factory setting</b> 0000 bin		
<b>Description:</b>	Control word of motor model. This parameter controls the operation of the sensorless vector control (SLVC) at very low frequencies. This therefore includes the following conditions: <ul style="list-style-type: none"> <li>• Operation directly after an ON command</li> <li>• zero crossing.</li> </ul> SLVC open loop means that the speed controller does not get any speed feedback from the observer model.				
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>	<b>0 signal</b>	<b>FP</b>
	00	Start SLVC open loop	Yes	No	-
	01	Zero crossing SLVC open loop	Yes	No	-
<b>r1751.0...15</b>	<b>CO/BO: Status word of motor model / Motor model StatWd</b>				
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Unsigned16		
	<b>Unit:</b> -		<b>Data set:</b> -		
<b>Description:</b>	Displays status of transition from feed-forward to observer-control and vice versa.				
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>	<b>0 signal</b>	<b>FP</b>
	00	Open loop operation	Yes	No	-
	01	RFG set by transition control	Yes	No	-
	02	Rs/Lh adaption stopped	Yes	No	-
	03	Observer feedback enabled	Yes	No	-
	04	Angle hold active	Yes	No	-
	05	Accelertation check enabled	Yes	No	-
	06	Sensor mode active	Yes	No	-
	14	Rs adapted	Yes	No	-
	15	Xh adapted	Yes	No	-

<b>p1752[0...2]</b>	<b>Start-freq. speed adaption (VC with encoder) / Start-freq. (VC)</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.1 [Hz]	<b>Max</b> 250.0 [Hz]	<b>Factory setting</b> 5.0 [Hz]
<b>Description:</b>	Enters start frequency of the n adaption in vector control with encoder (VC, hysteresis like P1755). The feature of speed-adaptation is an essential function to correct the torque (i.e. slip) in VC-mode. However, at low frequencies the activated n-adaptation may cause some troubles. Therefore, below the limit of $P1752 * P1756 / 100$ % this feature is switched off.		
<b>p1755[0...2]</b>	<b>Start-freq. motor model (SLVC) / Start-freq. (SLVC)</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.2 [Hz]	<b>Max</b> 250.0 [Hz]	<b>Factory setting</b> 5.0 [Hz]
<b>Description:</b>	Assigns in SLVC the frequency limit for switch over from closed-loop operation to open-loop operation and vice versa. Start frequency motor model is involved in following formulas: $f_{cl} = P1755$ - switch over frequency to closed-loop control $f_{ol} = P1755 * (P1756 / 100 \%)$ - activation frequency for P1759 $f_{ol}/2 = 0.5 * P1755 * (P1756 / 100 \%)$ - switch over frequency to open-loop control		
<b>Note:</b>	For detailed information see "Function manual", Section "Vector Control without Speed Encoder". The Factory setting depends on inverter power.		
<b>p1756[0...2]</b>	<b>Hyst.-freq. motor model (SLVC) / Hyst. freq. (SLVC)</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 10.0 [%]	<b>Max</b> 100.0 [%]	<b>Factory setting</b> 50.0 [%]
<b>Description:</b>	Enters hysteresis for open-/closed-loop control (SLVC) and activation/deactivation of speed adaption (VC).		
<b>Note:</b>	For detailed information see P1752 and P1755.		
<b>p1758[0...2]</b>	<b>T(wait) transit to open-loop / T(wait) trans.-&gt;OL</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 100 [ms]	<b>Max</b> 2000 [ms]	<b>Factory setting</b> 1000 [ms]
<b>Description:</b>	Sets waiting time for change from closed-loop to open-loop control mode.		
<b>Note:</b>	Waiting time will be ignored if the the absolute value of RFG input and the output frequency are below the absolut value $0.5 * P1755 * (P1756 / 100)$ simultaneously.		

<b>p1759[0...2]</b>	<b>T(wait) transit to closed-loop / T(wait) trans.-&gt;CL</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0 [ms]	<b>Max</b> 2000 [ms]	<b>Factory setting</b> 0 [ms]
<b>Description:</b>	Sets waiting time for change from open-loop to closed-loop control mode.		
<b>Note:</b>	Exceeds the output frequency (r66) the transition frequency to closed loop (P1755) the waiting time (P1759) will be ignored.		
<b>p1764[0...2]</b>	<b>Kp of n-adaption (SLVC) / Kp n-adapt. (SLVC)</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.0	<b>Max</b> 2.5	<b>Factory setting</b> 0.2
<b>Description:</b>	Enters gain of speed adaptation controller for sensorless vector control.		
<b>p1767[0...2]</b>	<b>Tn of n-adaption (SLVC) / Tn n-adapt. (SLVC)</b>		
	<b>Access level:</b> 4	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 1.0 [ms]	<b>Max</b> 200.0 [ms]	<b>Factory setting</b> 4.0 [ms]
<b>Description:</b>	Enters speed adaptation controller integral time.		
<b>r1770</b>	<b>CO: Prop. output of n-adaption / Prop outp n-ad</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Unit:</b> [Hz]		<b>Data set:</b> -
<b>Description:</b>	Displays proportional part of speed adaptation controller.		
<b>r1771</b>	<b>CO: Int. output of n-adaption / Int. outp n-ad</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Unit:</b> [Hz]		<b>Data set:</b> -
<b>Description:</b>	Displays integral part of speed adaptation controller.		
<b>r1778</b>	<b>CO: Flux angle difference / Flux angle diff</b>		
	<b>Access level:</b> 4	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Unit:</b> [°]		<b>Data set:</b> -
<b>Description:</b>	Displays flux angle difference between motor model and current transformation before motor model is active.		

<b>p1780[0...2]</b>	<b>Control word of Rs/Rr-adaption / CtrlWd Rs/Rr adapt</b>			
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Unsigned16	
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> DDS	
	<b>Can be changed:</b> U, T			
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>	
	-	-	0111 bin	
<b>Description:</b>	Enables thermal adaptation of stator and rotor resistance to reduce torque errors in speed/torque regulation with speed sensor, or speed errors in speed/torque regulation without speed sensor.			
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>	<b>0 signal</b>
	00	Enable thermal Rs/Rr-adapt.	Yes	No
	01	Enable observer Rs-adapt.	Yes	No
	02	Enable observer Xm-adapt.	Yes	No
<b>Note:</b>	Only stator resistance adaptation is carried out for synchronous motors.			

<b>p1781[0...2]</b>	<b>Tn of Rs-adaption / Tn of Rs-adaption</b>			
	<b>Access level:</b> 4	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Unsigned16	
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS	
	<b>Can be changed:</b> U, T			
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>	
	10 [ms]	2000 [ms]	100 [ms]	
<b>Description:</b>	Enters Rs-adaptation controller integral time.			

<b>r1782</b>	<b>CO: Output of Rs-adaptation / Output Rs-adaption</b>			
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point	
	<b>Unit:</b> [%]		<b>Data set:</b> -	
<b>Description:</b>	Displays stator resistance adaptation from controller in [%] relative to rated motor resistance.			
<b>Note:</b>	The rated motor resistance is given by the formula:			

Rated motor impedance:

$$Z_N = \frac{V_N}{\sqrt{3} \cdot I_N} = \frac{p0304}{\sqrt{3} \cdot p0305} \Leftrightarrow 100 \%$$

<b>p1786[0...2]</b>	<b>Tn of Xm-adaption / Tn of Xm-adaption</b>			
	<b>Access level:</b> 4	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Unsigned16	
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS	
	<b>Can be changed:</b> U, T			
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>	
	10 [ms]	2000 [ms]	100 [ms]	
<b>Description:</b>	Enters Xm-adaptation controller integral time.			

<b>r1787</b>	<b>CO: Output of Xm-adaption / Outp. Xm-adaption</b>			
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point	
	<b>Unit:</b> [%]		<b>Data set:</b> -	
<b>Description:</b>	Displays main reactance adaptation from controller in [%] relative to rated impedance.			
<b>Note:</b>	The rated motor resistance is given by the formula:			

Rated motor impedance:

$$Z_N = \frac{V_N}{\sqrt{3} \cdot I_N} = \frac{p0304}{\sqrt{3} \cdot p0305} \Leftrightarrow 100 \%$$



<b>p1800[0...2]</b>	<b>Pulse frequency / Pulse frequency</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Converter	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 2 [kHz]	<b>Max</b> 16 [kHz]	<b>Factory setting</b> 4 [kHz]
<b>Description:</b>	Sets pulse frequency of power switches in inverter. The frequency can be changed in steps of 2 kHz.		
<b>Dependency:</b>	The minimum/maximum/default values of the pulse frequency are determined by the used power module. Furthermore the minimum pulse frequency depends on the parametrization of P1082 (maximum frequency) and P0310 (rated motor frequency).		
<b>Note:</b>	If the pulse frequency is increased, max. inverter current r0209 can be reduced (derating). The derating characteristic depends on the type and power of the inverter. 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 pulse frequency to provide protection against overtemperature (see P0290 and P0291 Bit00).		
<b>r1801[0...1]</b>	<b>CO: Pulse frequency / Pulse frequency</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Converter	<b>Data type:</b> Unsigned16
	<b>Unit:</b> [kHz]		<b>Data set:</b> -
<b>Description:</b>	Displays informations about pulse frequency of power switches in inverter. r1801[0] Displays the actual inverter pulse frequency. r1801[1] Displays the minimum inverter pulse frequency which can be reached when the functions "motor identification" or "inverter overload reaction" are active. If no PM is plugged this parameter is set to 0 kHz.		
<b>Index:</b>	[0] = Actual pulse frequency [1] = Minimum pulse frequency		
<b>Notice:</b>	Under certain conditions (inverter overtemperature, see P0290), this can differ from the values selected in P1800 (pulse frequency).		
<b>p1802</b>	<b>Modulator mode / Modulator mode</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Converter	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> U, T		
	<b>Min</b> 1	<b>Max</b> 3	<b>Factory setting</b> 3
<b>Description:</b>	Selects inverter modulator mode.		
<b>Values:</b>	1: Asymmetric SVM 2: Space vector modulation 3: SVM/ASVM controlled mode		
<b>Notice:</b>	<ul style="list-style-type: none"> <li>Asymmetric space vector modulation (ASVM) produces lower switching losses than space vector modulation (SVM), but may cause irregular rotation at very low speeds.</li> <li>Space vector modulation (SVM) with over-modulation may produce current waveform distortion at high output voltages.</li> <li>Space vector modulation (SVM) without over-modulation will reduce maximum output voltage available to motor.</li> </ul>		

<b>p1803[0...2]</b>	<b>Max. modulation / Max. modulation</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Converter	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 20.0 [%]	<b>Max</b> 150.0 [%]	<b>Factory setting</b> 106.0 [%]
<b>Description:</b>	Sets maximum modulation index.		
<b>Note:</b>	P1803 = 100 % : Limit for over-control (for ideal inverter without switching delay). For vector control the modulation limit will be reduced automatically with 4 %.		

<b>p1810</b>	<b>Control word Vdc control / Control word vdc c</b>				
	<b>Access level:</b> 3	<b>P-Group:</b> Converter	<b>Data type:</b> Unsigned16		
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -		
	<b>Can be changed:</b> U, T				
	<b>Min</b> -	<b>Max</b> -	<b>Factory setting</b> 0010 bin		
<b>Description:</b>	Configures Vdc filtering and compensation.				
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>	<b>0 signal</b>	<b>FP</b>
	00	enable Vdc average filter	Yes	No	-
	01	enable Vdc compensation	Yes	No	-

<b>p1820[0...2]</b>	<b>Reverse output phase sequence / Rev.outp.phase seq</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Modulation	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> DDS
	<b>Can be changed:</b> T		
	<b>Min</b> 0	<b>Max</b> 1	<b>Factory setting</b> 0
<b>Description:</b>	Changes direction of motor rotation without changing setpoint polarity.		
<b>Values:</b>	0: Forward 1: Reverse the Motor		
<b>Dependency:</b>	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.		
<b>Note:</b>	See P1000 (select frequency setpoint)		

<b>p1825</b>	<b>On-state voltage of IGBT / On-state voltage</b>		
	<b>Access level:</b> 4	<b>P-Group:</b> Modulation	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> -
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.0 [V]	<b>Max</b> 20.0 [V]	<b>Factory setting</b> 0.9 [V]
<b>Description:</b>	Corrects on-state voltage of the IGBTs.		

<b>p1828</b>	<b>Gating unit dead time / Gating dead time</b>		
	<b>Access level:</b> 4	<b>P-Group:</b> Modulation	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.00 [µs]	<b>Max</b> 3.98 [µs]	<b>Factory setting</b> 0.01 [µs]
<b>Description:</b>	Sets compensation time of gating unit interlock.		

p1900

**Select motor data identification / Sel.mot.data ident****Access level:** 2**P-Group:** Motor identification**Data type:** Unsigned16**Quick comm.** YES**Active:** NO**Data set:** -**Can be changed:** C, T**Min**

0

**Max**

3

**Factory setting**

0

**Description:**

Performs a motor data identification.

**Values:**

0: Disabled

2: Identification of all parameters in standstill

3: Ident. of all param. in standstill incl. the saturation curve

**Caution:**

Motor identification should be performed on a cold motor.

However, the identification of the motor data should only be performed if the motor temperature is within 5 °C of the measured ambient temperature stored in P0625.

If the motor identification is not within the 5 °C limit then the correct functioning of Vector Control (VC, SLVC) cannot be guaranteed.

The motor rating plate information with respect to the connection of the motor windings (star or delta connection) must be correct in order to establish the correct equivalent circuit data.

The motor identification calculates this data based on a phase of a star equivalent circuit P0350 - P0360, irrespective of whether the motor is connected star or delta.

This must be considered when the motor data is inputted directly.

**Notice:**

P1910 can't be changed while the motor identification is active (P1900 = 2 or 3).

When the identification is finished P1900 and P1910 are set to 0.

**Note:**

Before selecting motor data identification, "Quick commissioning" has to be performed in advance.

Since the cable length of the applications differ in a wide range the preset resistor P0352 is only a rough estimation. Better results of the motor identification can be achieved by specifying the cable resistor before the start of the motor identification by measuring/calculating.

Once enabled (P1900 &gt; 0), A0541 generates a warning that the next ON command will initiate measurement of motor parameters.

Communications - both via USS as well as via the Fieldbus - are interrupted for the time that it takes to make internal calculations.

This can result in the following error messages at the connected SIMATIC S7 control (communications via fieldbus):

- Parameter fault 30
- Drive fault 70
- Drive fault 75

When using STARTER (USS) to commission the drive system, data cannot be entered while these calculations are being made.

The faults can be acknowledged as soon as the calculations have been completed in the frequency inverter. These calculations can take up to one minute to complete.

p1909[0...2]		Ctrl. word of motor data ident. / Ctrl.mot.data id.		
<b>Access level:</b> 4		<b>P-Group:</b> Motor identification		<b>Data type:</b> Unsigned16
<b>Quick comm.:</b> NO		<b>Active:</b> NO		<b>Data set:</b> DDS
<b>Can be changed:</b> U, T				
<b>Min</b>		<b>Max</b>		<b>Factory setting</b>
-		-		0101 1100 0000 0000 bin
<b>Description:</b>	Control word of motor data identification.			
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>	<b>0 signal</b>
	00	Estimation of Xs	Yes	No
	02	Estimation of Tr	Yes	No
	03	Estimation of Lsigma	Yes	No
	05	Det. Tr meas. with 2 freq.	Yes	No
	06	Measurement of on voltage	Yes	No
	07	Deadtime detection from Rs measurement	Yes	No
	08	MotID with hw deadtime comp activ	Yes	No
	09	No deadtime detection with 2 freq	Yes	No
	10	Detect Ls with LsBlock method	Yes	No
	11	MotID adaption of magnetizing current	Yes	No
	12	MotID adaption of main reactance	Yes	No
	13	MotID switch off saturation curve optim.	Yes	No
	14	MotID saturation curve optim. all framesizes	Yes	No
	15	MotID saturation curve optim. big frame-sizes	Yes	No

p1910		Select motor data identification extended / Sel.mot.data ident		
<b>Access level:</b> 2		<b>P-Group:</b> Motor identification		<b>Data type:</b> Unsigned16
<b>Quick comm.:</b> NO		<b>Active:</b> NO		<b>Data set:</b> -
<b>Can be changed:</b> T				
<b>Min</b>		<b>Max</b>		<b>Factory setting</b>
0		23		0
<b>Description:</b>	Performs a motor data identification with extended figures.			
<b>Values:</b>	0:	Disabled		
	1:	Identification of all parameters with parameter change		
	2:	Identification of all parameters without parameter change		
	3:	Identification of saturation curve with parameter change		
	4:	Identification of saturation curve without parameter change		
	5:	Identification of XsigDyn (r1920) without parameter change		
	6:	Identification of Tdead (r1926) without parameter change		
	7:	Identification of Rs (r1912 ) without parameter change		
	8:	Identification of Xs (r1915) without parameter change		
	9:	Identification of Tr (r1913) without parameter change		
	10:	Identification of Xsigma (r1914) without parameter change		
	20:	Set voltage vector		
	21:	Set voltage vector without filtering in P69		
	22:	Set voltage vector rectangle signal		
	23:	Set voltage vector triangle signal		

**Caution:**

Motor identification should be performed on a cold motor.

However, the identification of the motor data should only be performed if the motor temperature is within 5°C of the measured ambient temperature stored in P0625.

If the motor identification is not within the 5°C limit then the correct functioning of Vector Control (VC, SLVC) cannot be guaranteed.

The motor rating plate information with respect to the connection of the motor windings (Star or delta connection) must be correct in order to establish the correct equivalent circuit data.

The motor identification calculates this data based on a Phase of a Star equivalent circuit P0350 - P0360, irrespective of whether the motor is connected star or delta.

This must be considered when the motor data is inputted directly.

- Notice:** P1910 can't be changed while the motor identification with P1900 is active (P1900 = 2 or 3).  
When the identification is finished P1910 is set to 0.  
When choosing the setting for measurement, observe the following:
1. "with parameter change"  
means that the values are actually adopted as Pxxxx parameter settings (see common settings above) and applied to the controller as well as being shown in the read-only parameters below.
  2. "without parameter change"  
means that the values are only displayed, i.e. shown for checking purposes in the read-only parameters r1912 (identified stator resistance), r1913 (identified rotor time constant), r1914 (ident. total leakage reactance), r1915/r1916/r1917/r1918/r1919 (identified nominal stator reactance/identified stator reactance 1 to 4), r1925 (IG-BT on-state voltage) and r1926 (identified gating unit dead time). The values are not applied to the controller.
- Note:** Before selecting motor data identification, "Quick commissioning" has to be performed in advance.  
Since the cable length of the applications differ in a wide range the preset resistor P0352 is only a rough estimation. Better results of the motor identification can be achieved by specifying the cable resistor before the start of the motor identification by measuring/calculating.  
Once enabled (P1910 > 0), A0541 generates a warning that the next ON command will initiate measurement of motor parameters.  
Communications - both via USS as well as via the Fieldbus - are interrupted for the time that it takes to make internal calculations.  
This can result in the following error messages at the connected SIMATIC S7 control (communications via fieldbus):
- Parameter fault 30
  - Drive fault 70
  - Drive fault 75
- When using STARTER (USS) to commission the drive system, data cannot be entered while these calculations are being made.  
The faults can be acknowledged as soon as the calculations have been completed in the frequency inverter. These calculations can take up to one minute to complete.

p1911	No. of phase to be identified / No.of phase for id		
<b>Access level:</b> 2	<b>P-Group:</b> Motor identification	<b>Data type:</b> Unsigned16	
<b>Quick comm. NO</b>	<b>Active:</b> YES	<b>Data set:</b> -	
<b>Can be changed:</b> T			
<b>Min</b> 1	<b>Max</b> 3	<b>Factory setting</b> 1	
<b>Description:</b>	Selects maximum number of motor phases to be identified.		
<b>Note:</b>	Because of averaging (measurement inprecisseness and variations in the phase) a measurement with 3 phases delivers better results than a one phase measurement, but needs significant longer measurement time.		
r1912[0...2]	Identified stator resistance / Identif. stat. res		
<b>Access level:</b> 2	<b>P-Group:</b> Motor identification	<b>Data type:</b> Floating Point	
<b>Unit:</b> [Ohm]		<b>Data set:</b> -	
<b>Description:</b>	Displays measured stator resistance value (line-to-line) in [Ohms]. This value also includes the cable resistances.		
<b>Index:</b>	[0] = U_phase [1] = V_phase [2] = W_phase		
<b>Notice:</b>	If the value identified (Rs = stator resistance) does not lie within the range 0.1 % < Rs [p. u.] < 100 % fault message 41 (motor data identification failure) is issued. P0949 provides further information (fault value = 2 in this case).		
<b>Note:</b>	This value is measured using P1900 = 2 or 3 (P1910 = 1 or 2) , i.e., identification of all parameters with/without change.		

<b>r1913[0...2]</b>	<b>Identified rotor time constant / Identif.rot.Tconst</b>	<b>Access level:</b> 2	<b>P-Group:</b> Motor identification	<b>Data type:</b> Floating Point
		<b>Unit:</b> [ms]		<b>Data set:</b> -
<b>Description:</b>	Displays identified rotor time constant. [msec]			
<b>Index:</b>	[0] = U_phase [1] = V_phase [2] = W_phase			
<b>Notice:</b>	If the value identified ( $T_r$ = rotor time constant) does not lie within the range $10\text{ms} < T_r < 5\text{s}$ fault message 41 (motor data identification failure) is issued. P0949 provides further information (fault value = 6 in this case).			
<b>r1914[0...2]</b>	<b>Ident. total leakage inductance / Tot.leak.induct.</b>	<b>Access level:</b> 2	<b>P-Group:</b> Motor identification	<b>Data type:</b> Floating Point
		<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Displays identified total leakage inductance. [mH]			
<b>Index:</b>	[0] = U_phase [1] = V_phase [2] = W_phase			
<b>Notice:</b>	If the value identified ( $L_{\sigma}$ = leakage inductance) does not lie within the range $5\% < X_{\sigma} [\text{p. u.}] < 50\%$ fault message 41 (motor data identification failure) is issued. P0949 provides further information (fault value = 7 in this case).			
<b>r1915[0...2]</b>	<b>Ident. nom. stator inductance / Nom.stat.induct.</b>	<b>Access level:</b> 2	<b>P-Group:</b> Motor identification	<b>Data type:</b> Floating Point
		<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Displays identified stator inductance. [mH]			
<b>Index:</b>	[0] = U_phase [1] = V_phase [2] = W_phase			
<b>Notice:</b>	If the value identified ( $L_s$ = stator inductance) does not lie within the range $50\% < X_s [\text{p. u.}] < 500\%$ fault message 41 (motor data identification failure) is issued. P0949 provides further information (fault value = 4 in this case).			
<b>r1916[0...2]</b>	<b>Identified stator inductance 1 / Stator induct. 1</b>	<b>Access level:</b> 2	<b>P-Group:</b> Motor identification	<b>Data type:</b> Floating Point
		<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Displays identified stator inductance. [mH]			
<b>Index:</b>	[0] = U_phase [1] = V_phase [2] = W_phase			
<b>Note:</b>	See P1915 (identified nominal stator inductance).			
<b>r1917[0...2]</b>	<b>Identified stator inductance 2 / Stator induct. 2</b>	<b>Access level:</b> 2	<b>P-Group:</b> Motor identification	<b>Data type:</b> Floating Point
		<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Displays identified stator inductance. [mH]			
<b>Index:</b>	[0] = U_phase [1] = V_phase [2] = W_phase			
<b>Note:</b>	See P1915 (identified nominal stator inductance)			

<b>r1918[0...2]</b>	<b>Identified stator inductance 3 / Stator induct. 3</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Motor identification	<b>Data type:</b> Floating Point
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Displays identified stator inductance. [mH]		
<b>Index:</b>	[0] = U_phase [1] = V_phase [2] = W_phase		
<b>Note:</b>	See P1915 (identified nominal stator reactance)		
<b>r1919[0...2]</b>	<b>Identified stator inductance 4 / Stator induct. 4</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Motor identification	<b>Data type:</b> Floating Point
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Displays identified stator inductance. [mH]		
<b>Index:</b>	[0] = U_phase [1] = V_phase [2] = W_phase		
<b>Note:</b>	See P1915 (identified nominal stator inductance)		
<b>r1920[0...2]</b>	<b>Identified dyn. leak. inductance / Dyn. leak. induct.</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Motor identification	<b>Data type:</b> Floating Point
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Displays identified total dynamic leakage inductance.		
<b>Index:</b>	[0] = U_phase [1] = V_phase [2] = W_phase		
<b>r1925[0...2]</b>	<b>Identified on-state voltage / Id. on-state V.</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Motor identification	<b>Data type:</b> Floating Point
	<b>Unit:</b> [V]		<b>Data set:</b> -
<b>Description:</b>	Displays identified on-state voltage of IGBT. [V]		
<b>Index:</b>	[0] = U_phase [1] = V_phase [2] = W_phase		
<b>Notice:</b>	If the identified on-state voltage does not lie within the range 0.0V < 10V fault message 41 (motor data identification failure) is issued. P0949 provides further information (fault value = 20 in this case).		
<b>r1926</b>	<b>Ident. gating unit dead time / Id.gating deadtime</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Motor identification	<b>Data type:</b> Floating Point
	<b>Unit:</b> [µs]		<b>Data set:</b> -
<b>Description:</b>	Displays identified dead time of gating unit interlock. [usec]		
<b>p1930</b>	<b>Voltage setpoint for calibration / Volt setp. calibr.</b>		
	<b>Access level:</b> 4	<b>P-Group:</b> Motor identification	<b>Data type:</b> Floating Point
	<b>Quick comm. NO</b>	<b>Active:</b> YES	<b>Data set:</b> -
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0 [V]	<b>Max</b> 1000 [V]	<b>Factory setting</b> 0 [V]
<b>Description:</b>	Specifies reference voltage for generation of a test voltage vector (e.g. used for shunt calibration). [V]		

<b>p1931</b>	<b>Phase / Phase</b>		
	<b>Access level:</b> 4	<b>P-Group:</b> Motor identification	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> -
	<b>Can be changed:</b> U, T		
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
	1	12	1
<b>Description:</b>	Defines phase of voltage vector 1: u-axis 2: v-axis 3: w-axis 4: -u-axis 5: -v-axis 6: -w-axis 7: uv-axis (30°) 8: wu-axis (150°) 9: vw-axis (270°) 10: -uv-axis (210°) 11: -wu-axis (330°) 12: -vw-axis (90°)		
<b>p1960</b>	<b>Speed control optimisation / Speed control opt.</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Motor	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> YES	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> C, T		
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
	0	1	0
<b>Description:</b>	The drive should be set into a vector mode (P1300 = 20 or 21) to carry out speed controller optimisation. When speed controller optimisation is enabled (P1960 = 1) the warning A0542 will become active. When the drive is next started it will do the optimisation tests. The drive will accelerate the motor to 20 % of P0310 (rated motor frequency) using the ramp up time P1120 and then under torque control go to 50 % of P0310 (rated motor frequency). The drive will then ramp back down to 20 % using the ramp down time P1121. This procedure is repeated several times and then average time taken. From this an estimation of the inertia of the load on the motor can be derived. From this the inertia ratio parameter (P0342) and the Kp gains for VC (P1460) and SLVC (P1470) are modified to give a response suitable for the measured inertia.		
<b>Values:</b>	0: Disable 1: Enable		
<b>Notice:</b>	If there is a problem due to instability the drive may trip with an F0042 fault if a stable value has not been obtained on the ramp up within a reasonable time. The speed loop optimisation may not be suitable for some applications due to the nature of the test i.e. accelerating under torque control from 20 % to 50 %.		
<b>Note:</b>	When the test is complete P1960 will be cleared to zero. In SLVC (P1300 = 20) the drive will set the motor model to start in open loop (P1750.0 = 1) when the speed control optimisation is selected (P1960 = 1) and will be set to its old state after the end of the optimisation (P1960 = 0).		



**p2000[0...2]****Reference frequency / Reference freq.****Access level:** 2**P-Group:** Communications**Data type:** Floating Point**Quick comm. NO****Active:** NO**Data set:** DDS**Can be changed:** T**Min**

1.00 [Hz]

**Max**

650.00 [Hz]

**Factory setting**

50.00 [Hz]

**Description:**

Parameter P2000 represents the reference frequency for frequency values which are displayed/transferred as a percentage or a hexadecimal value.

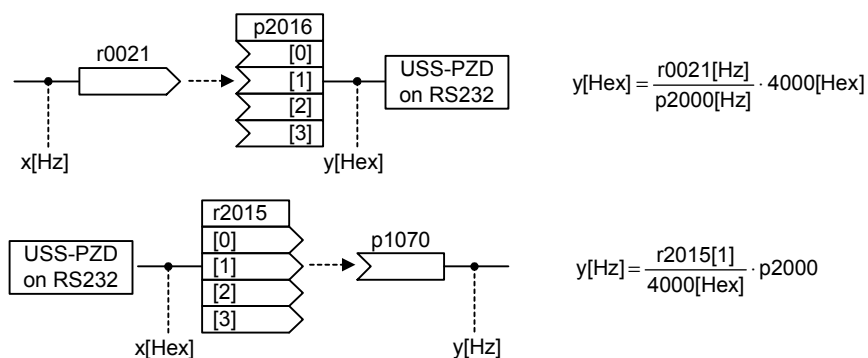
Where:

- hexadecimal 4000 H ==> P2000 (e.g.: USS-PZD)
- percentage 100 % ==> P2000 (e.g.: AI)

**Example:**

If a BICO connection is made between two parameters or alternatively using P0719 or P1000, the 'unit' of the parameters (standardized (Hex) or physical (i.e. Hz) values) may differ.

SINAMICS implicitly makes an automatic conversion to the target value.

**Dependency:**

When Quick Commissioning is carried out P2000 is changed as follows: P2000 = P1082.

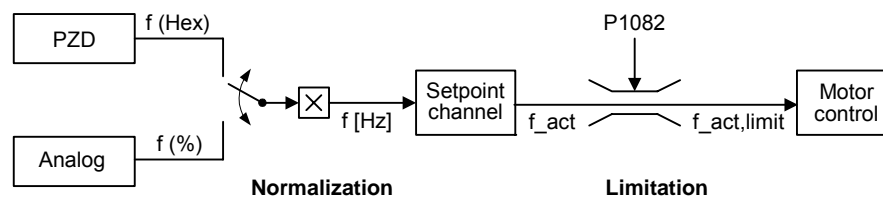
**Caution:**

Parameter P2000 represents the reference frequency of the above mentioned interfaces.

A maximum frequency setpoint of 2\*P2000 can be applied via the corresponding interface.

Unlike parameter P1082 (Max. Frequency) this limits the inverter frequency internally independent of the reference frequency.

By modification of P2000 it will also adapt the parameter to the new settings.



$$f[\text{Hz}] = \frac{f(\text{Hex})}{4000(\text{Hex})} \cdot p2000 = \frac{f(\%)}{100\%} \cdot P2000$$

$$f_{\text{act,limit}} = \min(p1082, f_{\text{act}})$$

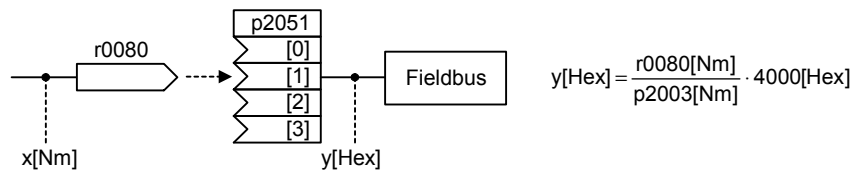
**Notice:**

Reference parameters are intended as an aid to presenting setpoint and actual value signals in a uniform manner. This also applies to fixed settings entered as a percentage.

A value of 100 % corresponds to a process data value of 4000H, or 4000 0000H in the case of double values.

In this respect, the following parameters are available:



**p2003[0...2] Reference torque / Reference torque****Access level:** 3**P-Group:** Communications**Data type:** Floating Point**Quick comm. NO****Active:** NO**Data set:** DDS**Can be changed:** T**Min**  
0.10 [Nm]**Max**  
99999.00 [Nm]**Factory setting**  
0.75 [Nm]**Description:** Full-scale reference torque used over the serial link (corresponds to 4000H).**Example:** If a BICO connection is made between two parameters or alternatively using P1500, the 'unit' of the parameters (standardized (Hex) or physical (i.e. Nm) values) may differ. In this case an automatic conversion to the target value is made.**Note:** Changes to P2003 result in a new calculation of P2004.**p2004[0...2] Reference power / Reference power****Access level:** 3**P-Group:** Communications**Data type:** Floating Point**Quick comm. NO****Active:** NO**Data set:** DDS**Can be changed:** T**Min**  
0.01**Max**  
2000.00**Factory setting**  
0.75**Description:** Full-scale reference power used over the serial link (corresponds to 4000H).**Example:** If a BICO connection is made between two parameters, the 'unit' of the parameters (standardized (Hex) or physical (i.e. kW / hp) values) may differ. In this case an automatic conversion to the target value is made.**p2010[0...1] USS baudrate / USS baudrate****Access level:** 2**P-Group:** Communications**Data type:** Unsigned16**Quick comm. NO****Active:** NO**Data set:** -**Can be changed:** U, T**Min**  
4**Max**  
12**Factory setting**  
8**Description:** Sets baud rate for USS communication.

**Values:**

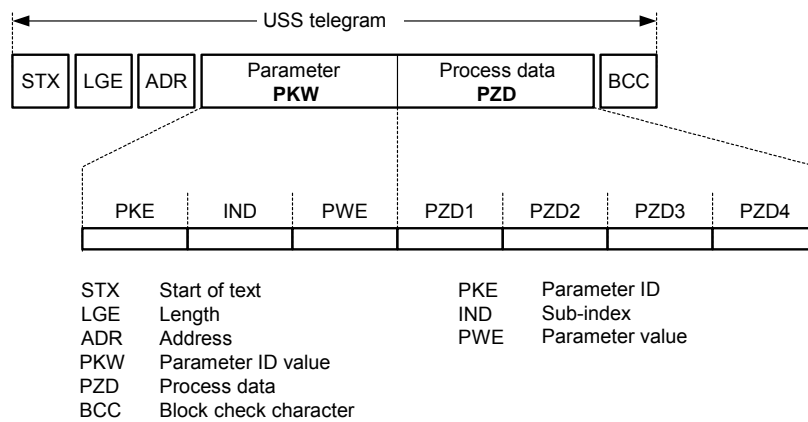
4:	2400 baud
5:	4800 baud
6:	9600 baud
7:	19200 baud
8:	38400 baud
9:	57600 baud
10:	76800 baud
11:	93750 baud
12:	115200 baud

**Index:**

[0]	= USS on RS485
[1]	= USS on RS232

<b>p2011[0...1]</b>	<b>USS address / USS address</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Communications	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0	<b>Max</b> 31	<b>Factory setting</b> 0
<b>Description:</b>	Sets unique address for inverter.		
<b>Index:</b>	[0] = USS on RS485 [1] = USS on RS232		
<b>Note:</b>	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.		

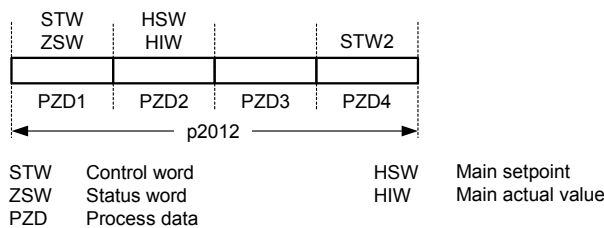
<b>p2012[0...1]</b>	<b>USS PZD length / USS PZD length</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Communications	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0	<b>Max</b> 8	<b>Factory setting</b> 2
<b>Description:</b>	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.		
<b>Index:</b>	[0] = USS on RS485 [1] = USS on RS232		
<b>Notice:</b>	USS protocol consists of PZD and PKW which can be changed by the user via parameters P2012 and P2013 respectively.		



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 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).



<b>p2013[0...1]</b>	<b>USS PKW length / USS PKW length</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Communications	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> U, T		

<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
0	127	127

**Description:** 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.

**Values:**  
0: No words  
3: 3 words  
4: 4 words  
127: Variable

**Example:**

	Data type		
	U16 (16 Bit)	U32 (32 Bit)	Float (32 Bit)
p2013 = 3	X	Parameter access fault	Parameter access fault
p2013 = 4	X	X	X
p2013 = 127	X	X	X

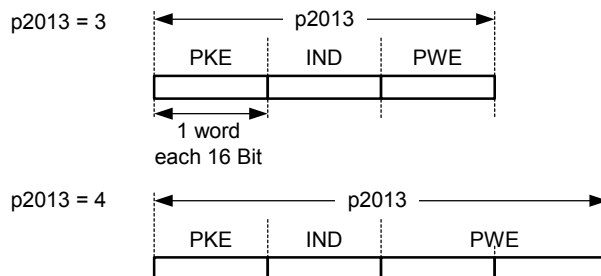
**Index:**  
[0] = USS on RS485  
[1] = USS on RS232

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

Parameter P2013 determines the number of PKW-words in a USS-telegram.

Setting P2013 to 3 or 4 determines the length of the PKW words (3 = three words and 4 = four words).

When P2013 set to 127 automatically adjusts the length of the PKW words are required.



PKE Parameter ID  
IND Sub-index  
PWE Parameter value

If a fixed PKW length is selected only one parameter value can be transferred.

In the case of indexed parameter, you must use the variable PKW length if you wish to have the values of all indices transferred in a single telegram.

In selecting the fixed PKW length, it is important to ensure the value in question can be transferred using this PKW length.

P2013 = 3, fixes PKW length, but does not allow access to many parameter values.

A parameter fault is generated when an out-of-range value is used, the value will not be accepted but the inverter state will not be affected.

Useful for applications where parameters are not changed, but MM3s are also used.

Broadcast mode is not possible with this setting.

P2013 = 4, fixes PKW length.

Allows access to all parameters, but indexed parameters can only be read one index at a time.

Word order for single word values are different to setting 3 or 127, see example below.

P2013 = 127, most useful setting.

PKW reply length varies depending on the amount of information needed.

Can read fault information and all indices of a parameter with a single telegram with this setting.

Example:

Set P0700 to value 5 (0700 = 2BC (hex))

	p2013 = 3	p2013 = 4	p2013 = 127
Master → SINAMICS	22BC 0000 0006	22BC 0000 0000 0006	22BC 0000 0006 0000
SINAMICS → Master	12BC 0000 0006	12BC 0000 0000 0006	12BC 0000 0006

#### p2014[0...1]

#### USS telegram off time / USS telegram T\_off

**Access level:** 3

**P-Group:** Communications

**Data type:** Unsigned16

**Quick comm.** NO

**Active:** YES

**Data set:** -

**Can be changed:** T

**Min**  
0 [ms]

**Max**  
65535 [ms]

**Factory setting**  
0 [ms]

**Description:**

Index 0 defines a time T\_off after which a fault will be generated ( F0072 ) if no telegram is received via the USS channel RS485.

Index 1 defines a time T\_off after which a fault will be generated ( F0071 ) if no telegram is received via the USS channel RS232.

**Index:**

[0] = USS on RS485  
[1] = USS on RS232

**Notice:**

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

r2015[0...7]

CO: PZD from USS on RS232 / PZD&lt;-USS

Access level: 3

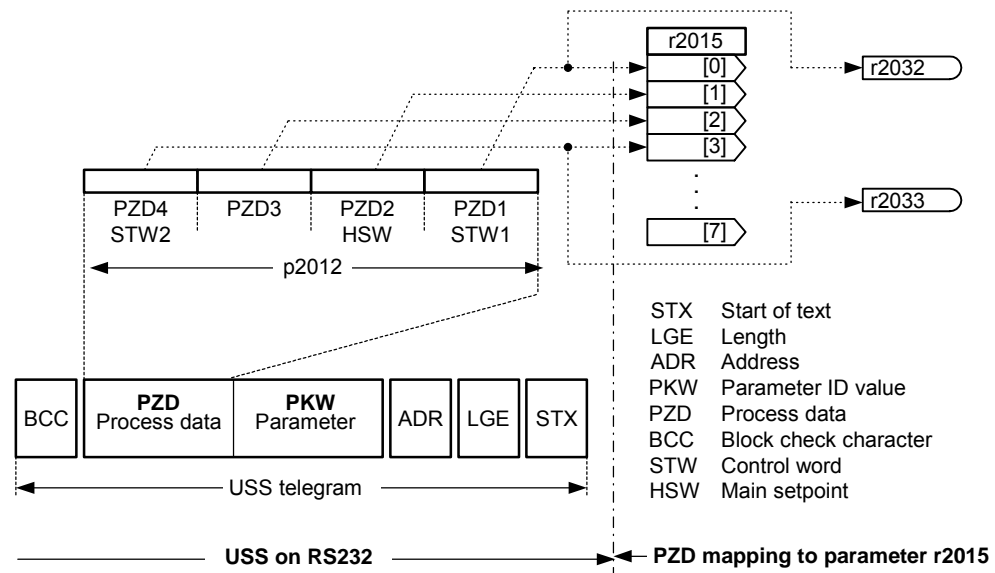
P-Group: Communications

Data type: Unsigned16

Unit: -

Data set: -

Description: Displays process data received via USS on RS232.



Index:

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

Note:

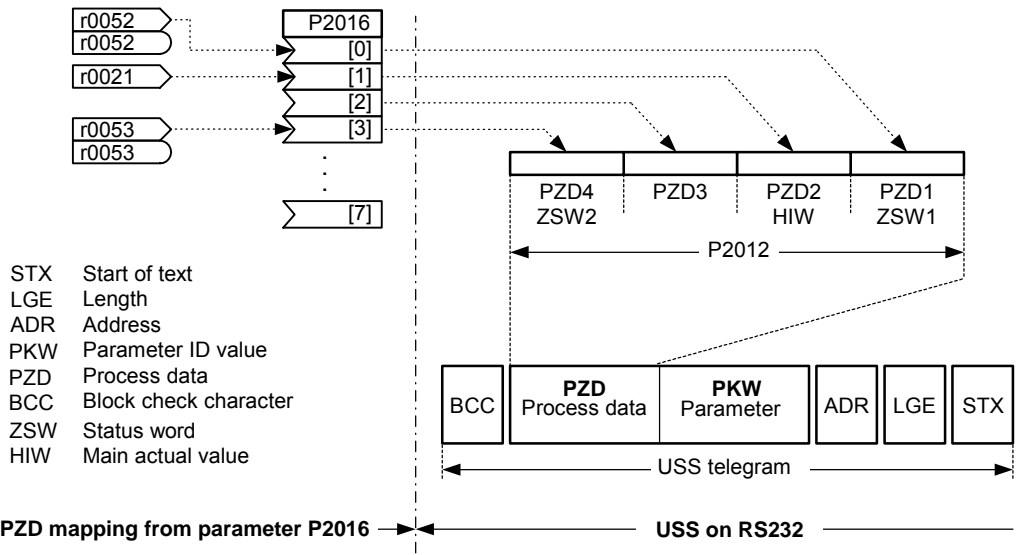
The control words can be viewed as bit parameters r2032 and r2033.

Restrictions:

- If the above serial interface controls the inverter (P0700 or P0719) then the 1st control word must be transferred in the 1st PZD-word.
- If the setpoint source is selected via P1000 or P0719, then the main setpoint must be transferred in the 2nd PZD-word,
- When P2012 is greater than or equal to 4 the additional control word (2nd control word) must transferred in the 4th PZD-word, if the above serial interface controls the inverter (P0700 or P0719).

<b>p2016[0...7]</b>	<b>CI: PZD to USS on RS232 / PZD-&gt;USS</b>	<b>P-Group:</b> Communications	<b>Data type:</b> U32 / Integer16
<b>Access level:</b> 3	<b>Quick comm. NO</b>	<b>Active:</b> NO	<b>Data set:</b> -
<b>Can be changed:</b> T	<b>Min</b> -	<b>Max</b> -	<b>Factory setting</b> 52[0]

**Description:** Selects signals to be transmitted to serial interface via USS on RS232.



This parameter allows the user to define the source of the status words and actual values for the reply PZD. Index 0 cannot be changed and contains always statusword 1.

**Example:** P2016[0] = 52.0 (default). In this case, the value of r0052 (CO/BO: Status word) is transmitted as 1st PZD to the USS on RS232.

**Index:**  
 [0] = Transmitted word 0  
 [1] = Transmitted word 1  
 [2] = Transmitted word 2  
 [3] = Transmitted word 3  
 [4] = Transmitted word 4  
 [5] = Transmitted word 5  
 [6] = Transmitted word 6  
 [7] = Transmitted word 7

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



<b>r2024[0...1]</b>	<b>USS error-free telegrams / USS error-free tel</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Communications	<b>Data type:</b> Unsigned16
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Displays number of error-free USS telegrams received.		
<b>Index:</b>	[0] = USS on RS485 [1] = USS on RS232		
<b>r2025[0...1]</b>	<b>USS rejected telegrams / USS rejected tel.</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Communications	<b>Data type:</b> Unsigned16
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Displays number of USS telegrams rejected.		
<b>Index:</b>	[0] = USS on RS485 [1] = USS on RS232		
<b>r2026[0...1]</b>	<b>USS character frame error / USS char.frame err</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Communications	<b>Data type:</b> Unsigned16
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Displays number of USS character frame errors.		
<b>Index:</b>	[0] = USS on RS485 [1] = USS on RS232		
<b>r2027[0...1]</b>	<b>USS overrun error / USS overrun error</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Communications	<b>Data type:</b> Unsigned16
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Displays number of USS telegrams with overrun error.		
<b>Index:</b>	[0] = USS on RS485 [1] = USS on RS232		
<b>r2028[0...1]</b>	<b>USS parity error / USS parity error</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Communications	<b>Data type:</b> Unsigned16
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Displays number of USS telegrams with parity error.		
<b>Index:</b>	[0] = USS on RS485 [1] = USS on RS232		
<b>r2029[0...1]</b>	<b>USS start not identified / USS start unident.</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Communications	<b>Data type:</b> Unsigned16
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Displays number of USS telegrams with unidentified start.		
<b>Index:</b>	[0] = USS on RS485 [1] = USS on RS232		
<b>r2030[0...1]</b>	<b>USS BCC error / USS BCC error</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Communications	<b>Data type:</b> Unsigned16
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Displays number of USS telegrams with BCC error.		
<b>Index:</b>	[0] = USS on RS485 [1] = USS on RS232		

<b>r2031[0...1]</b>	<b>USS length error / USS length error</b>				
	<b>Access level:</b> 3	<b>P-Group:</b> Communications	<b>Data type:</b> Unsigned16		
	<b>Unit:</b> -		<b>Data set:</b> -		
<b>Description:</b>	Displays number of USS telegrams with incorrect length.				
<b>Index:</b>	[0] = USS on RS485 [1] = USS on RS232				
<b>r2032.0...15</b>	<b>BO: CtrlWrd1 from USS on RS232 / CtrlWd1 &lt;- USS</b>				
	<b>Access level:</b> 3	<b>P-Group:</b> Communications	<b>Data type:</b> Unsigned16		
	<b>Unit:</b> -		<b>Data set:</b> -		
<b>Description:</b>	Displays control word 1 from USS on RS232 (word 1 within USS).				
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>	<b>0 signal</b>	<b>FP</b>
	00	ON/OFF1	Yes	No	-
	01	OFF2: Electrical stop	No	Yes	-
	02	OFF3: Fast stop	No	Yes	-
	03	Pulse enable	Yes	No	-
	04	RFG enable	Yes	No	-
	05	RFG start	Yes	No	-
	06	Setpoint enable	Yes	No	-
	07	Fault acknowledge	Yes	No	-
	08	JOG right	Yes	No	-
	09	JOG left	Yes	No	-
	10	Control from PLC	Yes	No	-
	11	Reverse (setpoint inversion)	Yes	No	-
	15	CDS Bit 0 (Hand/Auto)	Yes	No	-
<b>r2033.4...15</b>	<b>BO: CtrlWrd2 from USS on RS232 / CtrlWd2 &lt;- USS</b>				
	<b>Access level:</b> 3	<b>P-Group:</b> Communications	<b>Data type:</b> Unsigned16		
	<b>Unit:</b> -		<b>Data set:</b> -		
<b>Description:</b>	Displays control word 2 from USS on RS232 (i.e. word 4 within USS).				
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>	<b>0 signal</b>	<b>FP</b>
	04	Drive Dataset (DDS) Bit 0	Yes	No	-
	05	Drive Dataset (DDS) Bit 1	Yes	No	-
	11	Enable Droop	Yes	No	-
	12	Torque control	Yes	No	-
	13	External fault 1	No	Yes	-
	15	Command Dataset (CDS) Bit 1	Yes	No	-
<b>Dependency:</b>	P0700 = 4 (USS on RS232) and P0719 = 0 (Cmd / Setpoint = BICO parameter).				
<b>p2038</b>	<b>Selection of actual profile / Actual profile</b>				
	<b>Access level:</b> 3	<b>P-Group:</b> Communications	<b>Data type:</b> Unsigned16		
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -		
	<b>Can be changed:</b> T				
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>		
	0	3	0		
<b>Description:</b>	Selects the communication profile.				
<b>Values:</b>	0: PROFIdrive Profile 2: Namur 3: reserved				

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<b>p2040</b>	<b>Fieldbus telegram off time / FB tel. off time</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Communications	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> -
	<b>Can be changed:</b> T		
	<b>Min</b> 0 [ms]	<b>Max</b> 65535 [ms]	<b>Factory setting</b> 500 [ms]
<b>Description:</b>	Defines time after which a fault will be generated (F0070) if no telegram is received via the link.		
<b>Dependency:</b>	Setting 0 = watchdog disabled		

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<b>p2041[0...15]</b>	<b>FB parameter / FB parameter</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Communications	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> T		
	<b>Min</b> 0	<b>Max</b> 65535	<b>Factory setting</b> 0
<b>Description:</b>	Configures the communication. 2041.0: ever 0 (readonly) 2041.1: FB parameter volatile write access on S7 service (0 = non volatile) 2041.2: ever 0 (readonly) 2041.3: selection of diagnose page 2041.4: ever 0 (readonly)		
<b>Index:</b>	[0] = FB parameter 0 [1] = S7 OP volatile [2] = FB parameter 2 [3] = Diagnose page [4] = FB parameter 4		
<b>Note:</b>	See relevant communication board manual for protocol definition and appropriate settings.		

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<b>p2042</b>	<b>Selection of ident number / Ident nb</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> -	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> T		
	<b>Min</b> 0	<b>Max</b> 1	<b>Factory setting</b> 0
<b>Description:</b>	Selects if native ident number (0) or NAMUR ident number (1) is send to the PLC.		
<b>Values:</b>	0: Native 1: Namur		
<b>Note:</b>	After changing P2042, a power cycle must be done to have changes take effect. See also : Switching to / from Namur in the description of parameter P0922.		

**r2050[0...7]**

**CO: PZD from Fieldbus / PZD from FB**

**Access level:** 3

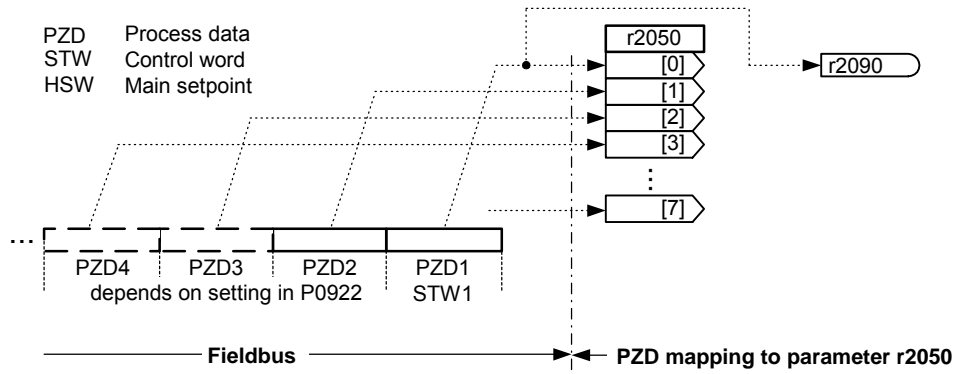
**P-Group:** Communications

**Data type:** Unsigned16

**Unit:** -

**Data set:** -

**Description:** Displays PZD received from Fieldbus.

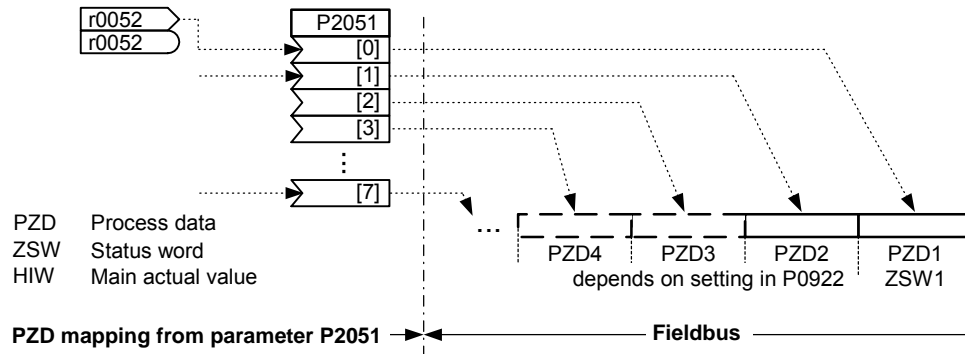


- Index:**
- [0] = Received word 0
  - [1] = Received word 1
  - [2] = Received word 2
  - [3] = Received word 3
  - [4] = Received word 4
  - [5] = Received word 5
  - [6] = Received word 6
  - [7] = Received word 7

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

<b>p2051[0...7]</b>	<b>CI: PZD to Fieldbus / PZD to FB</b>		
<b>Access level:</b> 3	<b>P-Group:</b> Communications	<b>Data type:</b> U32 / Integer16	
<b>Quick comm. NO</b>	<b>Active:</b> YES	<b>Data set:</b> -	
<b>Can be changed:</b> T			
<b>Min</b>	<b>Max</b>	<b>Factory setting</b>	
-	-	52[0]	

**Description:** Connects PZD to Fieldbus.  
This parameter allows the user to define the source of status words and actual values for the reply PZD.



**Index:**

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

**Dependency:** When Standard Telegram selected (p0922) and Control from PROFIBUS, parameter cannot be changed except Standard Telegram 20, index 5.

r2053[0...7]	FB identification / FB identification		
	<b>Access level:</b> 3	<b>P-Group:</b> Communications	<b>Data type:</b> Unsigned16
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	<p>Displays identification data of the communication.</p> <p>2053[0]: = 0 = No communication option available</p> <p>2053[0]: = 1 = PROFIBUS DP</p> <p>2053[0]: = 2 = DeviceNet</p> <p>2053[0]: = 3 = CAN</p> <p>2053[0]: = 4 = AS-i</p> <p>2053[0]: = 5 = LON</p> <p>2053[0]: = 6 = Modbus</p> <p>2053[0]: = 10 = PROFINET IO</p> <p>2053[0]: = 11 = ES bus (ET200pro)</p> <p>2053[0]: = 4660 = ES bus (ET200s)</p> <p>2053[0]: = 65535 = not defined</p> <p>2053[1]: firmware version (major and minor each with 2 digits)</p> <p>2053[2]: firmware version detail (release and build each with 2 digits)</p> <p>2053[3]: firmware date (year with century)</p> <p>2053[4]: firmware date (day and month each with 2 digits)</p> <p>2053[5]: datastructure version</p> <p>2053[6]: driver version</p> <p>2053[7]: company ID (42 = SIEMENS)</p>		
<b>Index:</b>	<p>[0] = Fieldbus type (PROFIBUS = 1)</p> <p>[1] = Firmware version</p> <p>[2] = Firmware version detail</p> <p>[3] = Firmware date (year)</p> <p>[4] = Firmware date (day/month)</p> <p>[5] = datastructure version</p> <p>[6] = driver version</p> <p>[7] = company ID</p>		

r2054[0...15]	FB diagnosis / FB diagnosis		
	Access level: 3	P-Group: Communications	Data type: Unsigned16
	Unit: -		Data set: -
<b>Description:</b>	Displays diagnostic information of communication.		
<b>Index:</b>	[0] = FB diagnosis 0 [1] = FB diagnosis 1 [2] = FB diagnosis 2 [3] = FB diagnosis 3 [4] = FB diagnosis 4 [5] = FB diagnosis 5 [6] = FB diagnosis 6 [7] = FB diagnosis 7 [8] = FB diagnosis 8 [9] = FB diagnosis 9 [10] = FB diagnosis 10 [11] = FB diagnosis 11 [12] = FB diagnosis 12 [13] = FB diagnosis 13 [14] = FB diagnosis 14 [15] = FB diagnosis 15		
<b>Note:</b>	Diagnose entries 2054[0]: state of PROFIBUS: 0=off, 1=baud search; 2=baud found; 3=data exchange 2054[1]: C0 master configuration info for cyclic data, combination of 5 digits pxyy (decimal) p : 0 no additional cyclic data (no PKW and no PROFIsafe) 1 PKW data configured (4 words input and 4 words output) 2 PROFIsafe data configured (3 words input and 3 words output) 3 PKW and PROFIsafe data configured 4..9 wrong configuration xx: PZD input length (reference values) yy: PZD output length (actual values) The values for PZD input and output length (xx and yy) do not contain any additional data length. 2054[2]: count of C2 connections 0..2 2054[3]: parameter access error: internal error number 2054[4]: parameter access error: parameter number 2054[5]: parameter access error: subindex 2054[6]: remote publisher count and remote publisher ok (example: 11114, 4 publisher, each is ok) 2054[7]: address of remote publisher 1 2054[8]: address of remote publisher 2 2054[9]: address of remote publisher 3 2054[10]: address of remote publisher 4 2054[11]: empty (=0) 2054[12]: empty (=0) 2054[13]: empty (=0) 2054[14]: empty (=0) 2054[15]: empty (=0)		

<b>r2058[0...15]</b>	<b>FB rev config / FB rev config</b>				
	<b>Access level:</b> 3	<b>P-Group:</b> Communications	<b>Data type:</b> Unsigned16		
	<b>Unit:</b> -		<b>Data set:</b> -		
<b>Description:</b>	Displays reverse config data display communication.				
<b>Index:</b>	[0] = FB diagnosis 0 [1] = FB diagnosis 1 [2] = FB diagnosis 2 [3] = FB diagnosis 3 [4] = FB diagnosis 4 [5] = FB diagnosis 5 [6] = FB diagnosis 6 [7] = FB diagnosis 7 [8] = FB diagnosis 8 [9] = FB diagnosis 9 [10] = FB diagnosis 10 [11] = FB diagnosis 11 [12] = FB diagnosis 12 [13] = FB diagnosis 13 [14] = FB diagnosis 14 [15] = FB diagnosis 15				
<b>r2059[0...4]</b>	<b>CO: Displays SOL link stats for Sol Master. / Disp SOL stats</b>				
	<b>Access level:</b> 4	<b>P-Group:</b> Communications	<b>Data type:</b> Unsigned16		
	<b>Unit:</b> -		<b>Data set:</b> -		
<b>Index:</b>	[0] = messages txd [1] = valid messages rxd [2] = crc errors [3] = stx errors [4] = reconfigurations				
<b>r2090.0...15</b>	<b>BO: Control word 1 from Fieldbus / CtrlWd1 &lt;- FB</b>				
	<b>Access level:</b> 3	<b>P-Group:</b> Communications	<b>Data type:</b> Unsigned16		
	<b>Unit:</b> -		<b>Data set:</b> -		
<b>Description:</b>	Displays control word 1 received from Fieldbus.				
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>	<b>0 signal</b>	<b>FP</b>
	00	ON/OFF1	Yes	No	-
	01	OFF2: Electrical stop	No	Yes	-
	02	OFF3: Fast stop	No	Yes	-
	03	Pulse enable	Yes	No	-
	04	RFG enable	Yes	No	-
	05	RFG start	Yes	No	-
	06	Setpoint enable	Yes	No	-
	07	Fault acknowledge	Yes	No	-
	08	JOG right	Yes	No	-
	09	JOG left	Yes	No	-
	10	Control from PLC	Yes	No	-
	11	Reverse (setpoint inversion)	Yes	No	-
	15	CDS Bit 0 (Hand/Auto)	Yes	No	-
<b>Note:</b>	If P0700 = 6 (PROFIBUS) then P810 must be set to 2090.15 for correct operation. This will not be cleared automatically when P0700 is no longer equal to 6.				



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<b>r2091.4...15</b>	<b>BO: Control word 2 from Fieldbus / CtrlWd2 &lt;- FB</b>				
	<b>Access level:</b> 3	<b>P-Group:</b> Communications	<b>Data type:</b> Unsigned16		
	<b>Unit:</b> -		<b>Data set:</b> -		
<b>Description:</b>	Displays control word 2 received from Fieldbus.				
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>	<b>0 signal</b>	<b>FP</b>
	04	Drive Dataset (DDS) Bit 0	Yes	No	-
	05	Drive Dataset (DDS) Bit 1	Yes	No	-
	11	Enable Droop	Yes	No	-
	12	Torque control	Yes	No	-
	13	External fault 1	No	Yes	-
	15	Command Dataset (CDS) Bit 1	Yes	No	-

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<b>p2100[0...2]</b>	<b>Alarm number selection / Alarm No selection</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Messages	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> T		
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
	0	65535	0
<b>Description:</b>	Selects up to 3 faults or warnings for non-default reactions.		
<b>Example:</b>	If, for example, an OFF3 is to be carried out instead of an OFF2 for a fault, the fault number has to be entered in P2100 and the desired reaction selected in P2101 (in this case (OFF3) P2101 = 3).		
<b>Index:</b>	[0] = Fault Number 1 [1] = Fault Number 2 [2] = Fault Number 3		
<b>Note:</b>	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.		

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<b>p2101[0...2]</b>	<b>Stop reaction value / Stop reaction val.</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Messages	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> T		
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
	0	4	0
<b>Description:</b>	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.		
<b>Values:</b>	0: No reaction, no display 1: OFF1 stop reaction 2: OFF2 stop reaction 3: OFF3 stop reaction 4: No reaction warning only		
<b>Index:</b>	[0] = Stop reaction value 1 [1] = Stop reaction value 2 [2] = Stop reaction value 3		
<b>Note:</b>	Settings 1 - 3 are only available for fault codes. Setting 4 is only available for warnings. Index 0 (P2101) refers to fault/warning in index 0 (P2100).		

<b>p2103[0...2]</b>	<b>BI: 1. Faults acknowledgement / 1. Faults ackn</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Commands	<b>Data type:</b> U32 / Binary
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> CDS
	<b>Can be changed:</b> T		
	<b>Min</b> -	<b>Max</b> -	<b>Factory setting</b> 0
<b>Description:</b>	Defines first source of fault acknowledgement.		
<b>p2104[0...2]</b>	<b>BI: 2. Faults acknowledgement / 2. Faults ackn</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Commands	<b>Data type:</b> U32 / Binary
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> CDS
	<b>Can be changed:</b> T		
	<b>Min</b> -	<b>Max</b> -	<b>Factory setting</b> 2090.7
<b>Description:</b>	Selects second source of fault acknowledgement.		
<b>Dependency:</b>	When Standard Telegram selected (P0700 = 6, P0922 = Standard Telegram), parameter cannot be changed.		
<b>p2106[0...2]</b>	<b>BI: External fault / External fault</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Commands	<b>Data type:</b> U32 / Binary
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> CDS
	<b>Can be changed:</b> T		
	<b>Min</b> -	<b>Max</b> -	<b>Factory setting</b> 1
<b>Description:</b>	Selects source of external faults.		
<b>Dependency:</b>	When Standard Telegram 350 and PROFIBUS selected (P0700 = 6, P0922 = 350), parameter cannot be changed.		
<b>r2110[0...3]</b>	<b>CO: Warning number / Warning number</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Messages	<b>Data type:</b> Unsigned16
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Displays warning information. A maximum of 2 active warnings (indices 0 and 1) and 2 historical warnings (indices 2 and 3) may be viewed.		
<b>Index:</b>	[0] = Recent Warnings --, warning 1 [1] = Recent Warnings --, warning 2 [2] = Recent Warnings -1, warning 3 [3] = Recent Warnings -1, warning 4		
<b>Notice:</b>	Indices 0 and 1 are not stored.		
<b>Note:</b>	The LED indicates the warning status in this case.		
<b>p2111</b>	<b>Total number of warnings / Total no. warnings</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Messages	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> T		
	<b>Min</b> 0	<b>Max</b> 4	<b>Factory setting</b> 0
<b>Description:</b>	Displays number of warning (up to 4) since last reset. Set to 0 to reset the warning history.		

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<b>r2114[0...1]</b>	<b>Run time counter / Run time counter</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Messages	<b>Data type:</b> Unsigned16
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	<p>Displays run time counter.</p> <p>It is the total time the drive has been powered up. When power is switched off, the value is saved, then restored on powerup.</p> <p>The run time counter will be calculate as followed:</p> <p>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.</p> <p>This means that r2114[0] is not days.</p> <p>Total powerup time = 65536 * r2114[0] + r2114[1] seconds.</p>		
<b>Example:</b>	<p>If r2114[0] = 1 and r2114[1] = 20864</p> <p>We get 1 * 65536 + 20864 = 86400 seconds which equals 1 day.</p>		
<b>Index:</b>	<p>[0] = System Time, Seconds, Upper Word</p> <p>[1] = System Time, Seconds, Lower Word</p>		
<b>Note:</b>	<p>When the real time is not given in P2115, the time in this parameter is used by r0948 to indicate when a fault has occurred.</p> <p>See r0948 (fault time).</p>		

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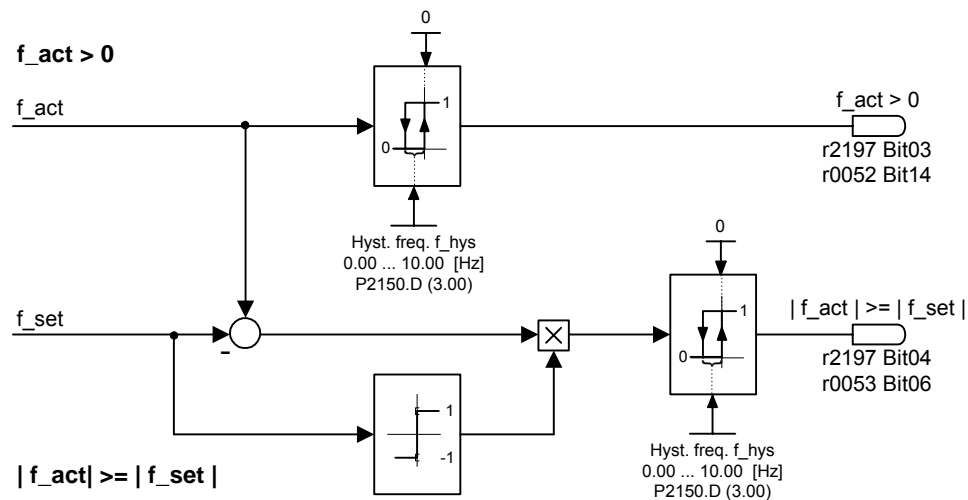
<b>p2115[0...2]</b>	<b>Real time clock / Real time clk</b>														
	<b>Access level:</b> 4	<b>P-Group:</b> Messages	<b>Data type:</b> Unsigned16												
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> -												
	<b>Can be changed:</b> T														
	<b>Min</b> 0	<b>Max</b> 65535	<b>Factory setting</b> 257												
<b>Description:</b>	<p>Displays real time.</p> <p>All inverters require an on-board clock function with which fault conditions may be timestamped and logged. However, they have no battery backed Real Time Clock (RTC). Inverters may support a software driven RTC which requires synchronisation with the RTC supplied via a serial interface.</p> <p>The time is stored in a word array parameter P2115. The time will be set by USS Protocol standard "word array parameter write" telegrams. Once the last word is received in index 2, the software will start running the timer itself using internal running 1 millisecond tic. Hence becoming like RTC.</p> <p>If powercycle takes place, then the real time must be sent again to the inverter.</p> <p>Time is maintained in a word array parameter and encoded as follows - the same format will be used in fault report logs.</p>														
	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="width: 15%;">Index</th> <th style="width: 35%;">High Byte (MSB)</th> <th style="width: 35%;">Low Byte (LSB)</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Seconds (0 - 59)</td> <td>Minutes (0 - 59)</td> </tr> <tr> <td>1</td> <td>Hours (0 - 23)</td> <td>Days (1 - 31)</td> </tr> <tr> <td>2</td> <td>Month (1 - 12)</td> <td>Years (00 - 250)</td> </tr> </tbody> </table>			Index	High Byte (MSB)	Low Byte (LSB)	0	Seconds (0 - 59)	Minutes (0 - 59)	1	Hours (0 - 23)	Days (1 - 31)	2	Month (1 - 12)	Years (00 - 250)
Index	High Byte (MSB)	Low Byte (LSB)													
0	Seconds (0 - 59)	Minutes (0 - 59)													
1	Hours (0 - 23)	Days (1 - 31)													
2	Month (1 - 12)	Years (00 - 250)													
	<p>The values are in binary form.</p>														
<b>Index:</b>	<p>[0] = Real Time, Seconds+Minutes</p> <p>[1] = Real Time, Hours+Days</p> <p>[2] = Real Time, Month+Year</p>														
<b>Note:</b>	<p>See r0948 (fault time).</p>														

<b>p2120</b>	<b>Indication counter / Indication counter</b>		
<b>Access level:</b> 4	<b>P-Group:</b> Messages	<b>Data type:</b> Unsigned16	
<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> -	
<b>Can be changed:</b> U, T			
<b>Min</b> 0	<b>Max</b> 65535	<b>Factory setting</b> 0	
<b>Description:</b>	Indicates total number of alarm events. This parameter is incremented whenever an alarm event occurs. It also gets incremented when a warning is cleared or faults are cleared. This parameter is used by the PC tools.		

<b>r2131</b>	<b>CO: Last fault number code / Last fault code</b>		
<b>Access level:</b> 2	<b>P-Group:</b> Messages	<b>Data type:</b> Unsigned16	
<b>Unit:</b> -		<b>Data set:</b> -	

<b>r2132</b>	<b>CO: First warning number code / First warning code</b>		
<b>Access level:</b> 2	<b>P-Group:</b> Messages	<b>Data type:</b> Unsigned16	
<b>Unit:</b> -		<b>Data set:</b> -	

<b>p2150[0...2]</b>	<b>Hysteresis frequency f_hys / Hyst. freq. f_hys</b>		
<b>Access level:</b> 3	<b>P-Group:</b> Messages	<b>Data type:</b> Floating Point	
<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS	
<b>Can be changed:</b> U, T			
<b>Min</b> 0.00 [Hz]	<b>Max</b> 10.00 [Hz]	<b>Factory setting</b> 3.00 [Hz]	
<b>Description:</b>	Defines hysteresis level applied for comparing frequency and speed to threshold as illustrated in the diagram below.		

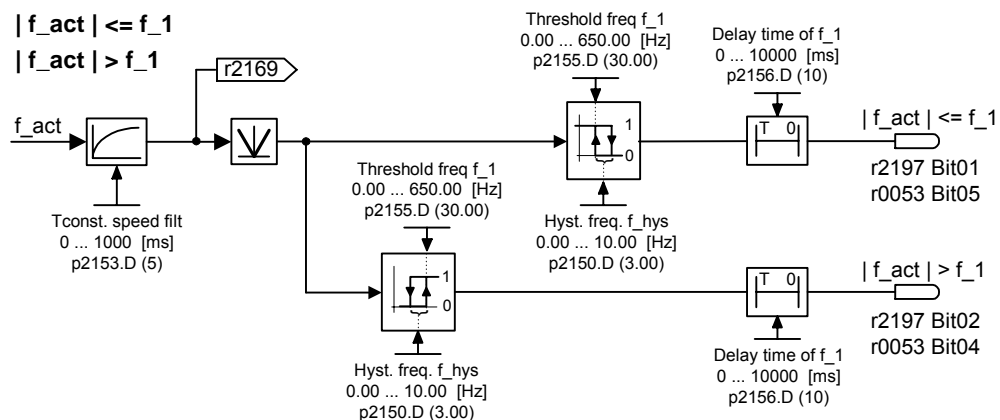


<b>p2151[0...2]</b>	<b>Cl: Speed setpoint for messages / n-Set for msg</b>		
<b>Access level:</b> 2	<b>P-Group:</b> Messages	<b>Data type:</b> U32 / Integer32	
<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS	
<b>Can be changed:</b> U, T			
<b>Min</b>	<b>Max</b>	<b>Factory setting</b>	
-	-	1170[0]	
<b>Description:</b>	Selects the source of setpoint frequency, actual frequency is compared with this frequency to detect frequency deviation (see monitoring bit r2197.7).		

<b>p2152[0...2]</b>	<b>Delay time of f&gt;fmax / Delay f&gt;fmax</b>		
<b>Access level:</b> 2	<b>P-Group:</b> Messages	<b>Data type:</b> Unsigned16	
<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS	
<b>Can be changed:</b> U, T			
<b>Min</b>	<b>Max</b>	<b>Factory setting</b>	
0 [ms]	10000 [ms]	200 [ms]	
<b>Description:</b>	Selects the delay time if actual frequency above maximum frequency.		

<b>p2153[0...2]</b>	<b>Time-constant speed filter / Tconst. speed filt</b>		
<b>Access level:</b> 2	<b>P-Group:</b> Messages	<b>Data type:</b> Unsigned16	
<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS	
<b>Can be changed:</b> U, T			
<b>Min</b>	<b>Max</b>	<b>Factory setting</b>	
0 [ms]	1000 [ms]	5 [ms]	
<b>Description:</b>	Specifies time constant of first-order speed filter. The filtered speed is then compared to the thresholds.		
<b>Note:</b>	See diagram in P2155, P2157 and P2159		

<b>p2155[0...2]</b>	<b>Threshold frequency f_1 / Threshold freq f_1</b>		
<b>Access level:</b> 3	<b>P-Group:</b> Messages	<b>Data type:</b> Floating Point	
<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS	
<b>Can be changed:</b> U, T			
<b>Min</b>	<b>Max</b>	<b>Factory setting</b>	
0.00 [Hz]	650.00 [Hz]	30.00 [Hz]	
<b>Description:</b>	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).		



**p2156[0...2]      Delay time of threshold freq f\_1 / Delay time of f\_1**

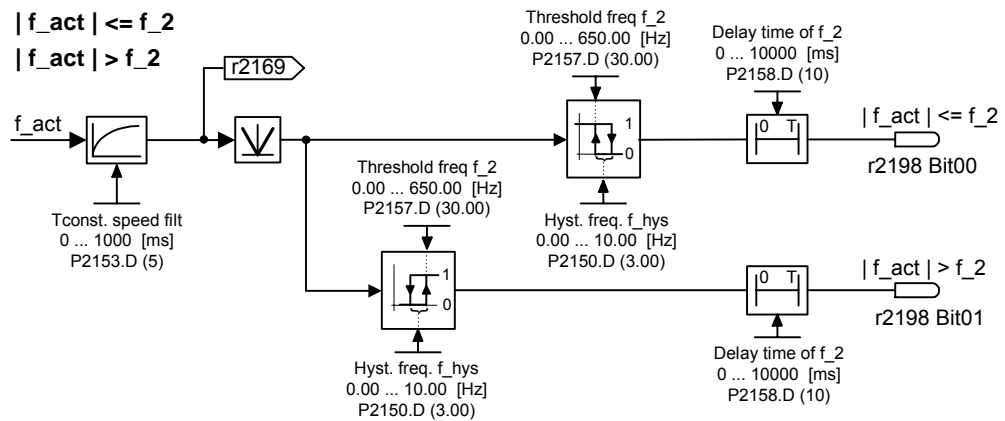
<b>Access level:</b> 3	<b>P-Group:</b> Messages	<b>Data type:</b> Unsigned16
<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
<b>Can be changed:</b> U, T		
<b>Min</b> 0 [ms]	<b>Max</b> 10000 [ms]	<b>Factory setting</b> 10 [ms]

**Description:** Sets delay time prior to threshold frequency f\_1 comparison (P2155).  
**Note:** See diagram in P2155 (threshold frequency f\_1)

**p2157[0...2]      Threshold frequency f\_2 / Threshold freq f\_2**

<b>Access level:</b> 2	<b>P-Group:</b> Messages	<b>Data type:</b> Floating Point
<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
<b>Can be changed:</b> U, T		
<b>Min</b> 0.00 [Hz]	<b>Max</b> 650.00 [Hz]	<b>Factory setting</b> 30.00 [Hz]

**Description:** Threshold\_2 for comparing speed or frequency to thresholds as illustrated in the diagram below.

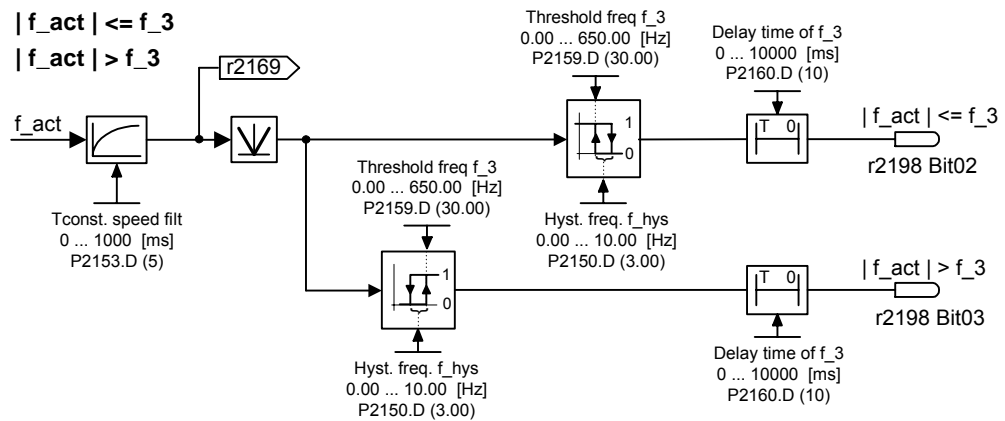


**p2158[0...2]      Delay time of threshold freq f\_2 / Delay time of f\_2**

<b>Access level:</b> 2	<b>P-Group:</b> Messages	<b>Data type:</b> Unsigned16
<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
<b>Can be changed:</b> U, T		
<b>Min</b> 0 [ms]	<b>Max</b> 10000 [ms]	<b>Factory setting</b> 10 [ms]

**Description:** When comparing speed or frequency to threshold f\_2 (P2157). This is the time delay before status bits are cleared.  
**Note:** See diagram in P2157 (threshold frequency f\_2)

<b>p2159[0...2]</b>	<b>Threshold frequency f<sub>3</sub> / Threshold freq f<sub>3</sub></b>		
<b>Access level:</b> 2	<b>P-Group:</b> Messages	<b>Data type:</b> Floating Point	
<b>Quick comm. NO</b>	<b>Active:</b> YES	<b>Data set:</b> DDS	
<b>Can be changed:</b> U, T			
<b>Min</b> 0.00 [Hz]	<b>Max</b> 650.00 [Hz]	<b>Factory setting</b> 30.00 [Hz]	
<b>Description:</b>	Threshold <sub>3</sub> for comparing speed or frequency to thresholds.		

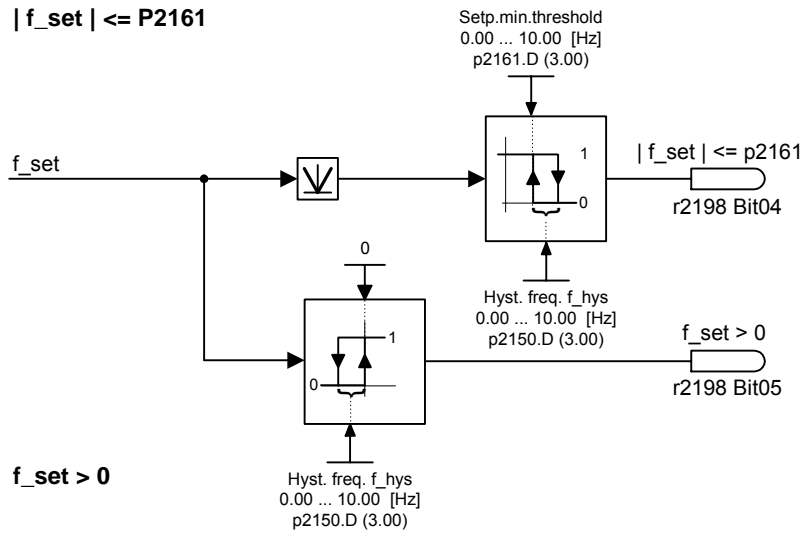


<b>p2160[0...2]</b>	<b>Delay time of threshold freq f<sub>3</sub> / Delay time of f<sub>3</sub></b>		
<b>Access level:</b> 2	<b>P-Group:</b> Messages	<b>Data type:</b> Unsigned16	
<b>Quick comm. NO</b>	<b>Active:</b> YES	<b>Data set:</b> DDS	
<b>Can be changed:</b> U, T			
<b>Min</b> 0 [ms]	<b>Max</b> 10000 [ms]	<b>Factory setting</b> 10 [ms]	
<b>Description:</b>	When comparing speed or frequency to threshold f <sub>3</sub> (P2159). This is the time delay before status bits are set.		
<b>Note:</b>	See diagram in P2159 (threshold frequency f <sub>3</sub> )		

**p2161[0...2]      Min. threshold for freq. setp. / Setp.min.threshold**

<b>Access level:</b> 2	<b>P-Group:</b> Messages	<b>Data type:</b> Floating Point
<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
<b>Can be changed:</b> U, T		
<b>Min</b> 0.00 [Hz]	<b>Max</b> 10.00 [Hz]	<b>Factory setting</b> 3.00 [Hz]

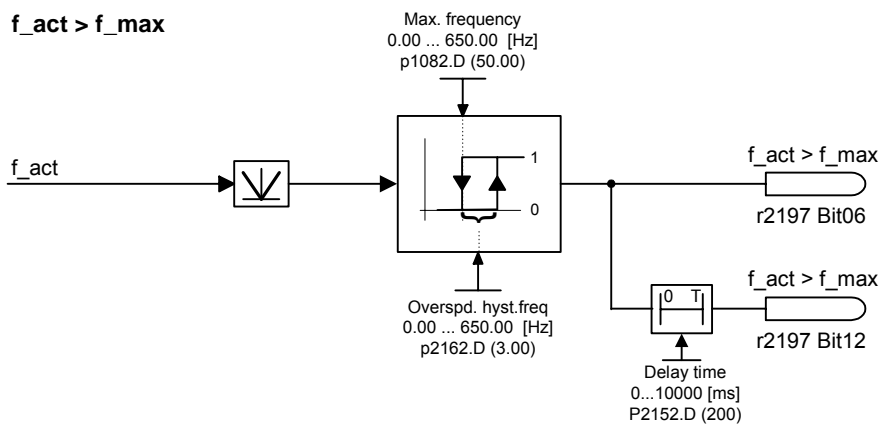
**Description:** Minimum threshold value for comparing speed or frequency setpoint.



**p2162[0...2]      Hysteresis freq. for overspeed / Overspd. hyst.freq**

<b>Access level:</b> 2	<b>P-Group:</b> Messages	<b>Data type:</b> Floating Point
<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
<b>Can be changed:</b> U, T		
<b>Min</b> 0.00 [Hz]	<b>Max</b> 25.00 [Hz]	<b>Factory setting</b> 3.00 [Hz]

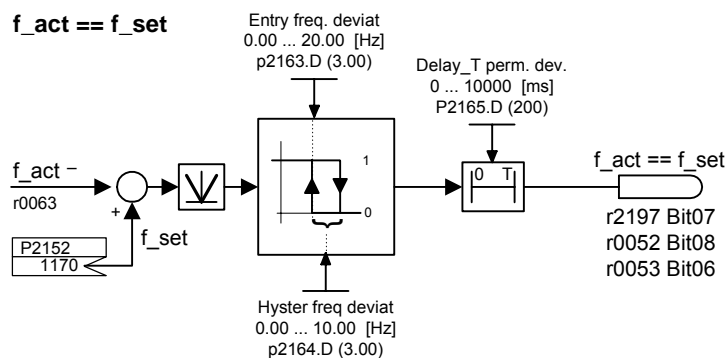
**Description:** Hysteresis speed (frequency) for overspeed-detection.  
 For vector control modes (P1300 = 20 - 23), the hysteresis acts above the max. frequency as illustrated in the diagram below.  
 For v/f control modes (P1300 = 0 - 6), the hysteresis acts below the max. frequency.





<b>p2163[0...2]</b>	<b>Entry freq. for perm. deviation / Entry freq. deviat</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Messages	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.00 [Hz]	<b>Max</b> 20.00 [Hz]	<b>Factory setting</b> 3.00 [Hz]
<b>Description:</b>	Threshold for detecting speed deviation from setpoint.		
<b>Note:</b>	See diagram in P2164.		

<b>p2164[0...2]</b>	<b>Hysteresis frequency deviation / Hyster freq deviat</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Messages	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.00 [Hz]	<b>Max</b> 10.00 [Hz]	<b>Factory setting</b> 3.00 [Hz]
<b>Description:</b>	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).		



<b>p2165[0...2]</b>	<b>Delay time permitted deviation / Delay_T perm. dev.</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Messages	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0 [ms]	<b>Max</b> 10000 [ms]	<b>Factory setting</b> 200 [ms]
<b>Description:</b>	Delay time for detecting permitted deviation of speed or frequency from setpoint.		
<b>Note:</b>	See diagram in P2164.		

<b>p2166[0...2]</b>	<b>Delay time ramp up completed / Delay_T rampUpCmpl</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Messages	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0 [ms]	<b>Max</b> 10000 [ms]	<b>Factory setting</b> 10 [ms]
<b>Description:</b>	Delay time for signal that indicates completion of ramp-up.		
<b>Note:</b>	See diagram in P2174.		

<b>p2167[0...2]</b>	<b>Switch-off frequency <math>f_{\text{off}}</math> / SwOff freq. <math>f_{\text{off}}</math></b>		
<b>Access level:</b> 3	<b>P-Group:</b> Messages	<b>Data type:</b> Floating Point	
<b>Quick comm. NO</b>	<b>Active:</b> YES	<b>Data set:</b> DDS	
<b>Can be changed:</b> U, T			

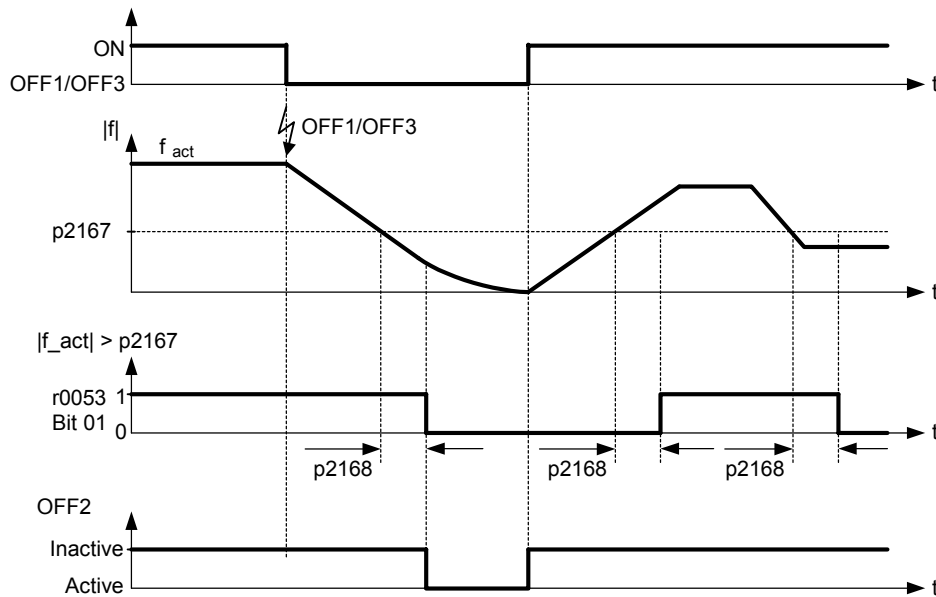
<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
0.00 [Hz]	10.00 [Hz]	1.00 [Hz]

**Description:**

Defines the threshold of the monitoring function  $|f_{\text{act}}| > P2167 (f_{\text{off}})$ .

P2167 influences following functions:

- If the actual frequency falls below this threshold and the time delay has expired, bit 1 in status word 2 (r0053) is reset.
- If a OFF1 or OFF3 was applied and bit 1 is reset the inverter will disable the pulse (OFF2).



<b>p2168[0...2]</b>	<b>Delay time <math>T_{\text{off}}</math> / Delay time <math>T_{\text{off}}</math></b>		
<b>Access level:</b> 3	<b>P-Group:</b> Messages	<b>Data type:</b> Unsigned16	
<b>Quick comm. NO</b>	<b>Active:</b> YES	<b>Data set:</b> DDS	
<b>Can be changed:</b> U, T			

<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
0 [ms]	10000 [ms]	10 [ms]

**Description:**

Defines time for which the inverter may operate below switch-off frequency (P2167) before switch off occurs.

**Dependency:**

Active if holding brake (P1215) not parameterized.

**Note:**

See diagram in P2167 (switch-off frequency)

<b>r2169</b>	<b>CO: Act. filtered frequency / CO:Act. filt. freq</b>		
<b>Access level:</b> 2	<b>P-Group:</b> Messages	<b>Data type:</b> Floating Point	
<b>Unit:</b> [Hz]		<b>Data set:</b> -	

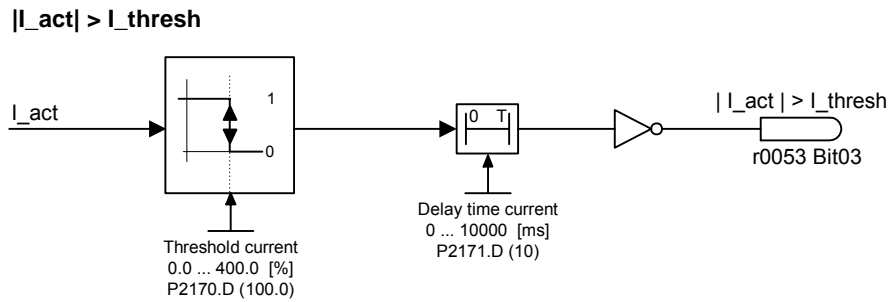
**Description:**

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

<b>p2170[0...2]</b>	<b>Threshold current I_thresh / Threshold current</b>	<b>Access level:</b> 3	<b>P-Group:</b> Messages	<b>Data type:</b> Floating Point
		<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
		<b>Can be changed:</b> U, T		

<b>Min</b> 0.0 [%]	<b>Max</b> 400.0 [%]	<b>Factory setting</b> 100.0 [%]
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**Description:** 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.



**Note:** This threshold controls bit 3 in status word 3 (r0053).

<b>p2171[0...2]</b>	<b>Delay time current / Delay time current</b>	<b>Access level:</b> 3	<b>P-Group:</b> Messages	<b>Data type:</b> Unsigned16
		<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
		<b>Can be changed:</b> U, T		

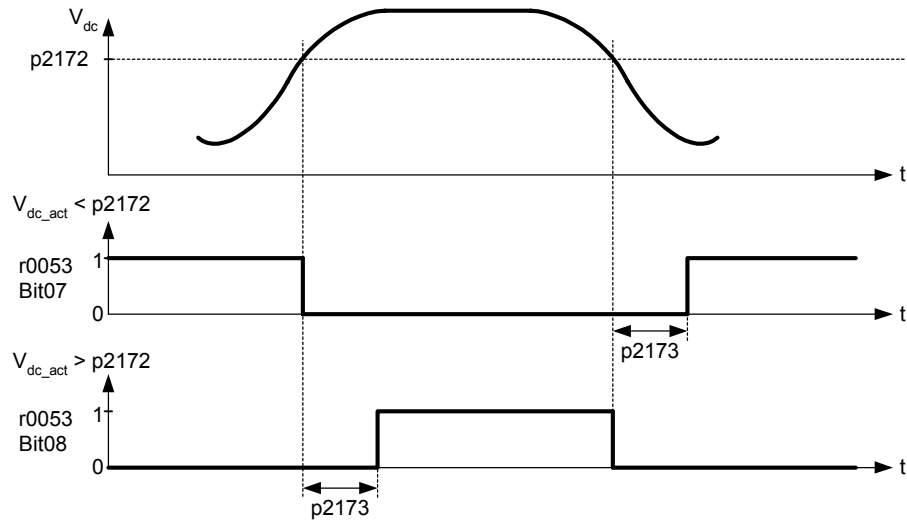
<b>Min</b> 0 [ms]	<b>Max</b> 10000 [ms]	<b>Factory setting</b> 10 [ms]
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**Description:** Defines delay time prior to activation of current comparison.

**Note:** See diagram in P2170 (threshold current I\_thresh)

<b>p2172[0...2]</b>	<b>Threshold DC-link voltage / Vdc threshold</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Messages	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0 [V]	<b>Max</b> 2000 [V]	<b>Factory setting</b> 800 [V]

**Description:** Defines DC link voltage to be compared to actual voltage as illustrated in the diagram below.



**Note:** This voltage controls bits 7 and 8 in status word 3 (r0053).

<b>p2173[0...2]</b>	<b>Delay time DC-link voltage / Vdc delay time</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Messages	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0 [ms]	<b>Max</b> 10000 [ms]	<b>Factory setting</b> 10 [ms]

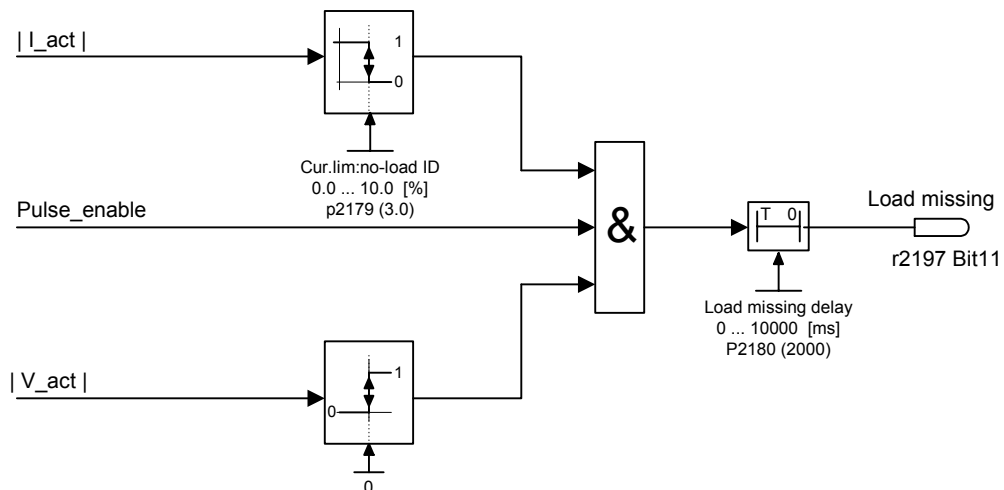
**Description:** Defines delay time prior to activation of threshold comparison.

**Note:** See diagram in P2172 (threshold DC-link voltage)



<b>p2178[0...2]</b>	<b>Delay time for motor pulled out / Delay_T MotPullOut</b>		
<b>Access level:</b> 2	<b>P-Group:</b> Messages	<b>Data type:</b> Unsigned16	
<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS	
<b>Can be changed:</b> U, T			
<b>Min</b> 0 [ms]	<b>Max</b> 10000 [ms]	<b>Factory setting</b> 10 [ms]	
<b>Description:</b>	Delay time for identification that motor is pulled out.		
<b>Note:</b>	If the Encoder is enabled (P0400 > 0) and the Motor Holding Brake is enabled (P1215 > 0), then in order to stop encoder loss trips when the brake is applied, the delay time for motor pulled out should be > brake holding times (i.e. P2178 > P1216 and P2178 > P1217).		

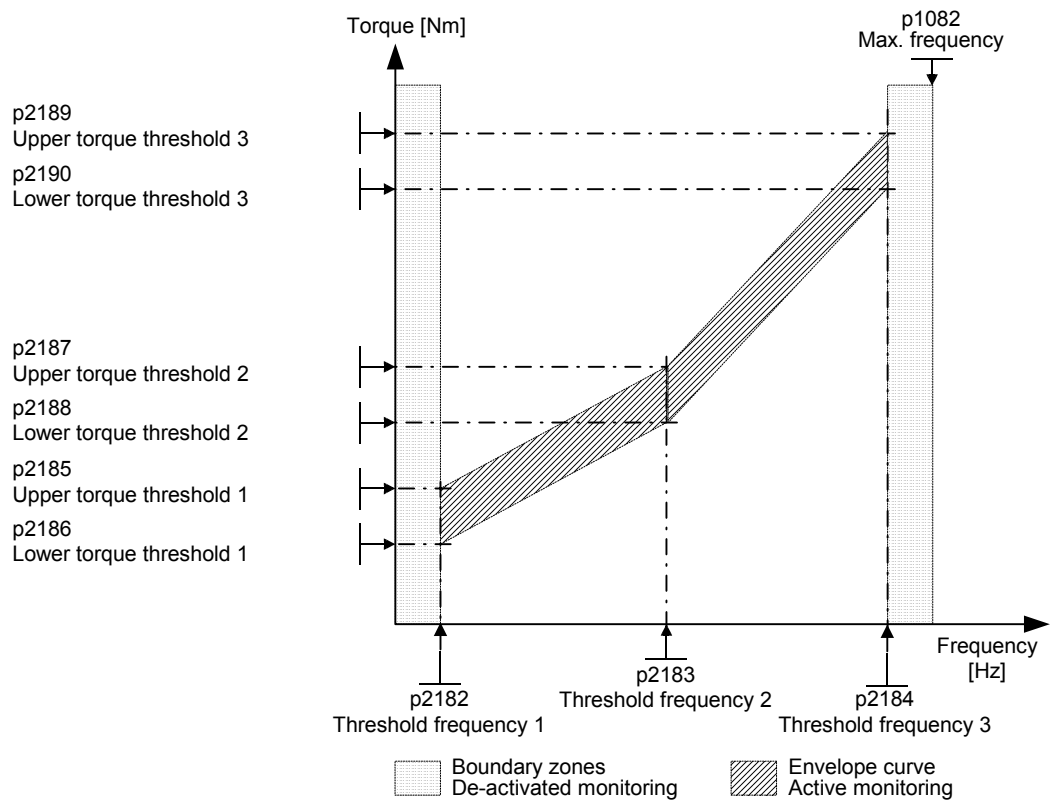
<b>p2179</b>	<b>Current limit for no load ident. / Cur.lim:no-load ID</b>		
<b>Access level:</b> 3	<b>P-Group:</b> Messages	<b>Data type:</b> Floating Point	
<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> -	
<b>Can be changed:</b> U, T			
<b>Min</b> 0.0 [%]	<b>Max</b> 10.0 [%]	<b>Factory setting</b> 3.0 [%]	
<b>Description:</b>	Threshold current for A0922 (load missing) in [%] relative to P0305 (rated motor current) as illustrated in the diagram below.		

**Load missing**

<b>Notice:</b>	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.
<b>Note:</b>	It may be that the motor is not connected (load missing) or a phase could be missing.

<b>p2180</b>	<b>Delay time for load missing / Load missing delay</b>		
<b>Access level:</b> 3	<b>P-Group:</b> Messages	<b>Data type:</b> Unsigned16	
<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> -	
<b>Can be changed:</b> U, T			
<b>Min</b> 0 [ms]	<b>Max</b> 10000 [ms]	<b>Factory setting</b> 2000 [ms]	
<b>Description:</b>	Delay time load missing		
<b>Notice:</b>	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.		
<b>Note:</b>	It may be that the motor is not connected (load missing) or a phase could be missing. See diagram in P2179 (current limit for no load identification).		

p2181[0...2]	<b>Belt failure detection mode / Belt fail detect</b>		
	<b>Access level:</b> 2 <b>Quick comm.</b> NO <b>Can be changed:</b> T	<b>P-Group:</b> Messages <b>Active:</b> NO	<b>Data type:</b> Unsigned16 <b>Data set:</b> DDS
	<b>Min</b> 0	<b>Max</b> 6	<b>Factory setting</b> 0
<b>Description:</b>	<p>Sets belt failure detection mode.</p> <p>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. Parameters P2182-2190 are set to default when this parameter is changed from 0.</p> <p>This is achieved by comparing the actual frequency/torque curve with a programmed envelope (see P2182 - P2190).</p> <p>If the curve falls outside the envelope, a warning or trip is generated.</p>		
<b>Values:</b>	<p>0: Belt failure detection disabled</p> <p>1: Warning: Low torque / speed</p> <p>2: Warning: High torque / speed</p> <p>3: Warning: High / low torque / speed</p> <p>4: Trip: Low torque / speed</p> <p>5: Trip: High torque / speed</p> <p>6: Trip: High / low torque / speed</p>		
p2182[0...2]	<b>Belt threshold frequency 1 / Belt threshold f_1</b>		
	<b>Access level:</b> 3 <b>Quick comm.</b> NO <b>Can be changed:</b> U, T	<b>P-Group:</b> Messages <b>Active:</b> YES	<b>Data type:</b> Floating Point <b>Data set:</b> DDS
	<b>Min</b> 0.00 [Hz]	<b>Max</b> 650.00 [Hz]	<b>Factory setting</b> 5.00 [Hz]
<b>Description:</b>	<p>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).</p>		



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).

**Note:** Below the the threshold in p2182 and above the threshold in p2184, belt failure detection mode is not active. In this case the values for normal operation with the torque limits given in p1521 and p1520 are valid.

**p2183[0...2] Belt threshold frequency 2 / Belt threshold f\_2**

**Access level:** 2 **P-Group:** Messages **Data type:** Floating Point  
**Quick comm. NO** **Active:** YES **Data set:** DDS  
**Can be changed:** U, T

**Min** 0.00 [Hz] **Max** 650.00 [Hz] **Factory setting** 30.00 [Hz]

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

**Note:** See P2182 (belt threshold frequency 1).

**p2184[0...2] Belt threshold frequency 3 / Belt threshold f\_3**

**Access level:** 2 **P-Group:** Messages **Data type:** Floating Point  
**Quick comm. NO** **Active:** YES **Data set:** DDS  
**Can be changed:** U, T

**Min** 0.00 [Hz] **Max** 650.00 [Hz] **Factory setting** 50.00 [Hz]

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

**Note:** See P2182 (belt threshold frequency 1).



<b>p2185[0...2]</b>	<b>Upper torque threshold 1 / Upper trq. thresh1</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Messages	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.0 [Nm]	<b>Max</b> 99999.0 [Nm]	<b>Factory setting</b> 99999.0 [Nm]
<b>Description:</b>	Upper limit threshold value 1 for comparing actual torque.		
<b>Note:</b>	See P2182 (belt threshold frequency 1).		
<b>p2186[0...2]</b>	<b>Lower torque threshold 1 / Lower trq. thresh1</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Messages	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.0 [Nm]	<b>Max</b> 99999.0 [Nm]	<b>Factory setting</b> 0.0 [Nm]
<b>Description:</b>	Lower limit threshold value 1 for comparing actual torque.		
<b>Note:</b>	See P2182 (belt threshold frequency 1).		
<b>p2187[0...2]</b>	<b>Upper torque threshold 2 / Upper trq. thresh2</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Messages	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.0 [Nm]	<b>Max</b> 99999.0 [Nm]	<b>Factory setting</b> 99999.0 [Nm]
<b>Description:</b>	Upper limit threshold value 2 for comparing actual torque.		
<b>Note:</b>	See P2182 (belt threshold frequency 1).		
<b>p2188[0...2]</b>	<b>Lower torque threshold 2 / Lower trq. thresh2</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Messages	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.0 [Nm]	<b>Max</b> 99999.0 [Nm]	<b>Factory setting</b> 0.0 [Nm]
<b>Description:</b>	Lower limit threshold value 2 for comparing actual torque.		
<b>Note:</b>	See P2182 (belt threshold frequency 1).		
<b>p2189[0...2]</b>	<b>Upper torque threshold 3 / Upper trq. thresh3</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Messages	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.0 [Nm]	<b>Max</b> 99999.0 [Nm]	<b>Factory setting</b> 99999.0 [Nm]
<b>Description:</b>	Upper limit threshold value 3 for comparing actual torque.		
<b>Note:</b>	See P2182 (belt threshold frequency 1).		

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<b>p2190[0...2]</b>	<b>Lower torque threshold 3 / Lower trq. thresh3</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Messages	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.0 [Nm]	<b>Max</b> 99999.0 [Nm]	<b>Factory setting</b> 0.0 [Nm]
<b>Description:</b>	Lower limit threshold value 3 for comparing actual torque.		
<b>Note:</b>	See P2182 (belt threshold frequency 1).		

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<b>p2192[0...2]</b>	<b>Time delay for belt failure / Belt fail delay_T</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Messages	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0 [s]	<b>Max</b> 65 [s]	<b>Factory setting</b> 10 [s]
<b>Description:</b>	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.		

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<b>r2197.0...12</b>	<b>CO/BO: Monitoring word 1 / Monitor Wd1</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Messages	<b>Data type:</b> Unsigned16
	<b>Unit:</b> -		<b>Data set:</b> -

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

<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>	<b>0 signal</b>	<b>FP</b>
	00	f_act <= P1080 (f_min)	Yes	No	-
	01	f_act <= P2155 (f_1)	Yes	No	-
	02	f_act > P2155 (f_1)	Yes	No	-
	03	f_act > zero	Yes	No	-
	04	f_act >= setp. (f_set)	Yes	No	-
	05	f_act <= P2167 (f_off)	Yes	No	-
	06	f_act >= P1082 (f_max)	Yes	No	-
	07	f_act == setp. (f_set)	Yes	No	-
	08	Act. current r0068 <= P2170	Yes	No	-
	11	Load missing	Yes	No	-
	12	f_act > P1082 with delay	Yes	No	-

<b>r2198.0...12</b>	<b>CO/BO: Monitoring word 2 / Monitor Wd2</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Messages	<b>Data type:</b> Unsigned16
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Monitoring word 2 which indicates the state of monitor functions. Each bit represents one monitor function.		
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b> <b>0 signal</b> <b>FP</b>
	00	f_act  <= P2157 (f_2)	Yes      No      -
	01	f_act  > P2157 (f_2)	Yes      No      -
	02	f_act  <= P2159 (f_3)	Yes      No      -
	03	f_act  > P2159 (f_3)	Yes      No      -
	04	f_set  < P2161 (f_min_set)	Yes      No      -
	05	f_set > 0	Yes      No      -
	06	Motor blocked	Yes      No      -
	07	Motor pulled out	Yes      No      -
	08	l_act r0068   < P2170	Yes      No      -
	09	m_act   > P2174 & setpoint reached	Yes      No      -
	10	m_act   > P2174	Yes      No      -
	11	Belt failure warning	Yes      No      -
	12	Belt failure trip	Yes      No      -
<b>p2470[0...2]</b>	<b>Encoder speed scaling factor / Encod speed scal</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Encoder	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> DDS
	<b>Can be changed:</b> T		
	<b>Min</b> 0.00	<b>Max</b> 9999.99	<b>Factory setting</b> 1.00
<b>Description:</b>	Scaling factor to be applied to the measured encoder speed.		
<b>r2477</b>	<b>CO: Act. scaled encoder speed / Act scal enc speed</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Encoder	<b>Data type:</b> Floating Point
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Scaled readout of the encoder speed.		
<b>r2478</b>	<b>CO: Act. scaled encoder frequency / Act scal enc freq</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point
	<b>Unit:</b> [Hz]		<b>Data set:</b> -
<b>Description:</b>	Scaled readout of the encoder frequency (Hz).		
<b>p2480[0...2]</b>	<b>BI: Enable positioning ramp down / Enable positioning</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> U32 / Binary
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> CDS
	<b>Can be changed:</b> U, T		
	<b>Min</b> -	<b>Max</b> -	<b>Factory setting</b> 0
<b>Description:</b>	Defines the source signal for enabling/disabling positioning.		

**p2481[0...2] Gearbox ratio input / Gearbox ratio in****Access level:** 3**P-Group:** Closed-loop control**Data type:** Floating Point**Quick comm. NO****Active:** NO**Data set:** DDS**Can be changed:** U, T**Min**

0.01

**Max**

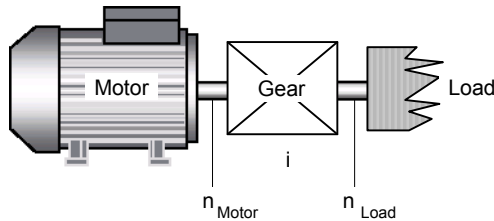
9999.99

**Factory setting**

1.00

**Description:**

P2481 and P2482 define the gear box ratio for the positioning ramp down functionality. P2481 sets the motor shaft side (gear box input).



$$i = \frac{\text{Motor revolutions}}{\text{Load revolutions}} = \frac{P2481}{P2482}$$

**p2482[0...2] Gearbox ratio output / Gearbox ratio out****Access level:** 3**P-Group:** Closed-loop control**Data type:** Floating Point**Quick comm. NO****Active:** NO**Data set:** DDS**Can be changed:** U, T**Min**

0.01

**Max**

9999.99

**Factory setting**

1.00

**Description:**

P2481 and P2482 define the gear box ratio for the positioning ramp down functionality. P2482 sets the load side (gear box output).

**p2484[0...2] No. of shaft turns = 1 Unit / Position ref. unit****Access level:** 3**P-Group:** Closed-loop control**Data type:** Floating Point**Quick comm. NO****Active:** NO**Data set:** DDS**Can be changed:** U, T**Min**

0.01

**Max**

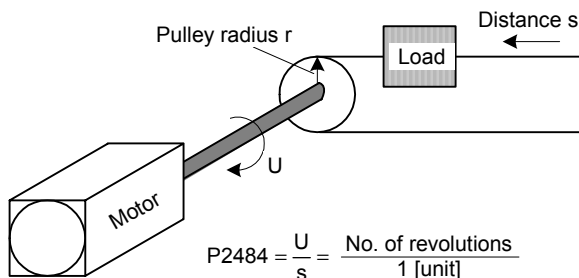
9999.99

**Factory setting**

1.00

**Description:**

Sets the number of rotations of the motor shaft required to represent 1 unit of user selected units.



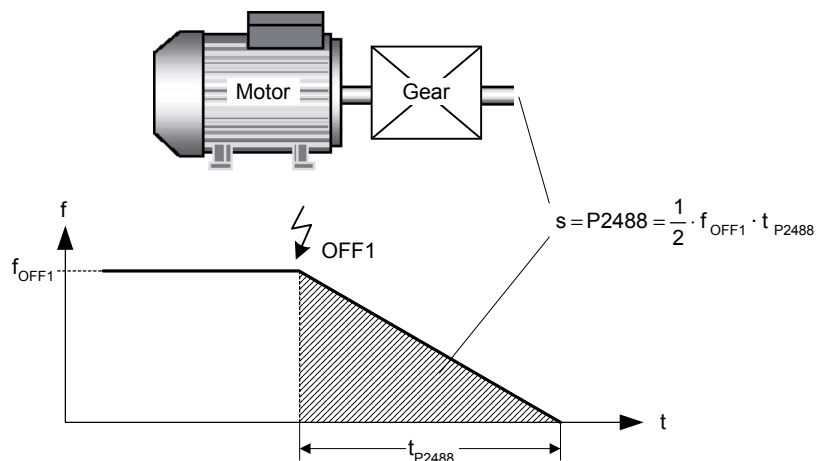
$$P2484 = \frac{U}{s} = \frac{\text{No. of revolutions}}{1 \text{ [unit]}}$$

The following equation determines the number of motor shaft revolutions to stop:

$$\text{Revolutions}_{\text{Motor}} = P2488 \cdot P2484 \cdot \frac{P2481}{P2482}$$

<b>p2487[0...2]</b>	<b>Positional error trim value / Positional trim / Positional error</b>		
<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point	
<b>Quick comm. NO</b>	<b>Active:</b> NO	<b>Data set:</b> DDS	
<b>Can be changed:</b> U, T			
<b>Min</b> -99.00	<b>Max</b> 200.00	<b>Factory setting</b> 0.00	
<b>Description:</b>	This parameter can be used to optimise the positioning ramp down.		
	Offset errors due to mechanical errors or other reasons can so be corrected. The value is in measures of P2488. Negative value entered when final position is before required end point. Positive value entered when final position is after the required end point.		

<b>p2488[0...2]</b>	<b>Distance / No. of revolutions / Distance / No. rev</b>		
<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point	
<b>Quick comm. NO</b>	<b>Active:</b> NO	<b>Data set:</b> DDS	
<b>Can be changed:</b> U, T			
<b>Min</b> 0.01	<b>Max</b> 99999999.99	<b>Factory setting</b> 1.00	
<b>Description:</b>	Sets the required distance or number of revolutions (see P2484).		



<b>r2489[0...2]</b>	<b>CO: Tracking parameter / Track / Tracking parameter</b>		
<b>Access level:</b> 3	<b>P-Group:</b> Closed-loop control	<b>Data type:</b> Floating Point	
<b>Unit:</b> -		<b>Data set:</b> -	
<b>Description:</b>	This parameter displays tracking values of the positioning ramp down functionality.		
<b>Index:</b>	[0] = Remaining number of shaft rotations since trigger. [1] = Accumulated shaft rotations during the positioning ramp down. [2] = Accumulated encoder increments during the positioning ramp down		
<b>Note:</b>	Index [0]: The displayed value is in measures of P2488. Due to the open loop control mode of the positioning ramp down, the value may show a residual difference between calculated and actually performed motor rotations. P2487 can be used for trimming. Index [1] reserved: Index [2] reserved:		





**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]

**Index:**  
 [0] = Enable timer 1  
 [1] = Enable timer 2  
 [2] = Enable timer 3  
 [3] = Enable timer 4  
 [4] = Enable ADD 1  
 [5] = Enable ADD 2  
 [6] = Enable SUB 1  
 [7] = Enable SUB 2  
 [8] = Enable MUL 1  
 [9] = Enable MUL 2  
 [10] = Enable DIV 1  
 [11] = Enable DIV 2  
 [12] = Enable CMP 1  
 [13] = Enable CMP 2

**Dependency:** Set P2800 to 1 to enable function blocks.  
 All active function blocks will be calculated in every 132 ms.

**p2803[0...2] Enable FastFFBs / Enable FastFFBs**

**Access level:** 3 **P-Group:** Technology **Data type:** Unsigned16  
**Quick comm. NO** **Active:** NO **Data set:** CDS  
**Can be changed:** U, T

**Min** 0 **Max** 1 **Factory setting** 0

**Description:** Fast free function blocks (FFB) are enabled in two steps.  
 1. Parameter P2803 enables all fast free function blocks, normally (P2803 = 1).  
 2. Parameters P2801 and P2802 respectively, enable each fast free function block individually (7 > P2801[x] > 3 or 7 > P2802[x] > 3).

**Values:**  
 0: Disable  
 1: Enable

**Dependency:** All active function blocks will be calculated in every 8 ms.

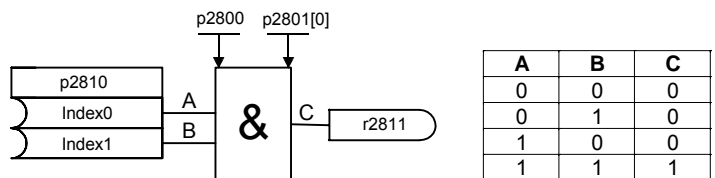
**Note:** Attention: p2200 and p2803 are locked parameter against each other. PID and FFB of the same dataset cannot be active at same time.

**p2810[0...1] BI: AND 1 / AND 1**

**Access level:** 3 **P-Group:** Technology **Data type:** U32 / Binary  
**Quick comm. NO** **Active:** NO **Data set:** -  
**Can be changed:** U, T

**Min** - **Max** - **Factory setting** 0

**Description:** P2810[0], P2810[1] define inputs of AND 1 element, output is P2811.



**Index:**  
 [0] = Binector input 0 (BI 0)  
 [1] = Binector input 1 (BI 1)

**Dependency:** P2801[0] is active level for the AND element.



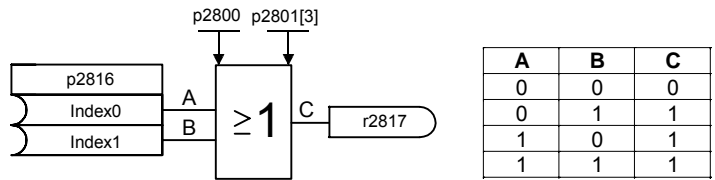
<b>r2811.0</b>	<b>BO: AND 1 / AND 1</b>			
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> Unsigned16	
	<b>Unit:</b> -		<b>Data set:</b> -	
<b>Description:</b>	Output of AND 1 element. Displays and logic of bits defined in P2810[0], P2810[1].			
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>	<b>0 signal</b>
	00	Output of BO	Yes	No
<b>Dependency:</b>	P2801[0] is active level for the AND element.			
<b>p2812[0...1]</b>	<b>BI: AND 2 / AND 2</b>			
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> U32 / Binary	
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -	
	<b>Can be changed:</b> U, T			
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>	
	-	-	0	
<b>Description:</b>	P2812[0], 2812[1] define inputs of AND 2 element, output is P2813.			
<b>Index:</b>	[0] = Binector input 0 (BI 0) [1] = Binector input 1 (BI 1)			
<b>Dependency:</b>	P2801[1] is active level for the AND element.			
<b>r2813.0</b>	<b>BO: AND 2 / AND 2</b>			
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> Unsigned16	
	<b>Unit:</b> -		<b>Data set:</b> -	
<b>Description:</b>	Output of AND 2 element. Displays and logic of bits defined in P2812[0], P2812[1].			
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>	<b>0 signal</b>
	00	Output of BO	Yes	No
<b>Dependency:</b>	P2801[1] is active level for the AND element.			
<b>p2814[0...1]</b>	<b>BI: AND 3 / AND 3</b>			
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> U32 / Binary	
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -	
	<b>Can be changed:</b> U, T			
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>	
	-	-	0	
<b>Description:</b>	P2814[0], P2814[1] define inputs of AND 3 element, output is P2815.			
<b>Index:</b>	[0] = Binector input 0 (BI 0) [1] = Binector input 1 (BI 1)			
<b>Dependency:</b>	P2801[2] is active level for the AND element.			
<b>r2815.0</b>	<b>BO: AND 3 / AND 3</b>			
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> Unsigned16	
	<b>Unit:</b> -		<b>Data set:</b> -	
<b>Description:</b>	Output of AND 3 element. Displays and logic of bits defined in P2814[0], P2814[1].			
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>	<b>0 signal</b>
	00	Output of BO	Yes	No
<b>Dependency:</b>	P2801[2] is active level for the AND element.			

**p2816[0...1]**     **BI: OR 1 / OR 1**

**Access level:** 3     **P-Group:** Technology     **Data type:** U32 / Binary  
**Quick comm. NO**     **Active:** NO     **Data set:** -  
**Can be changed:** U, T

**Min**     **Max**     **Factory setting**  
 -     -     0

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



**Index:** [0] = Binector input 0 (BI 0)  
 [1] = Binector input 1 (BI 1)

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

**r2817.0**     **BO: OR 1 / OR 1**

**Access level:** 3     **P-Group:** Technology     **Data type:** Unsigned16  
**Unit:** -     **Data set:** -

**Description:** Output of OR 1 element.  
 Displays or logic of bits defined in P2816[0], P2816[1].

**Bit field:**

Bit	Signal name	1 signal	0 signal	FP
00	Output of BO	Yes	No	-

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

**p2818[0...1]**     **BI: OR 2 / OR 2**

**Access level:** 3     **P-Group:** Technology     **Data type:** U32 / Binary  
**Quick comm. NO**     **Active:** NO     **Data set:** -  
**Can be changed:** U, T

**Min**     **Max**     **Factory setting**  
 -     -     0

**Description:** P2818[0], P2818[1] define inputs of OR 2 element, output is P2819.

**Index:** [0] = Binector input 0 (BI 0)  
 [1] = Binector input 1 (BI 1)

**Dependency:** P2801[4] is active level for the OR element.

**r2819.0**     **BO: OR 2 / OR 2**

**Access level:** 3     **P-Group:** Technology     **Data type:** Unsigned16  
**Unit:** -     **Data set:** -

**Description:** Output of OR 2 element.  
 Displays or logic of bits defined in P2818[0], P2818[1].

**Bit field:**

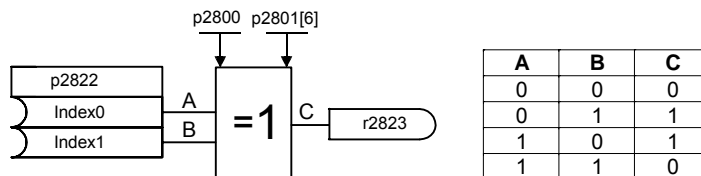
Bit	Signal name	1 signal	0 signal	FP
00	Output of BO	Yes	No	-

**Dependency:** P2801[4] is active level for the OR element.

<b>p2820[0...1]</b>	<b>BI: OR 3 / OR 3</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> U32 / Binary
	<b>Quick comm. NO</b>	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> U, T		
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
	-	-	0
<b>Description:</b>	P2820[0], P2820[1] define inputs of OR 3 element, output is P2821.		
<b>Index:</b>	[0] = Binector input 0 (BI 0) [1] = Binector input 1 (BI 1)		
<b>Dependency:</b>	P2801[5] is active level for the OR element.		

<b>r2821.0</b>	<b>BO: OR 3 / OR 3</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> Unsigned16
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Output of OR 3 element. Displays or logic of bits defined in P2820[0], P2820[1].		
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>
	00	Output of BO	Yes
			<b>0 signal</b>
			No
			<b>FP</b>
			-
<b>Dependency:</b>	P2801[5] is active level for the OR element.		

<b>p2822[0...1]</b>	<b>BI: XOR 1 / XOR 1</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> U32 / Binary
	<b>Quick comm. NO</b>	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> U, T		
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
	-	-	0
<b>Description:</b>	P2822[0], P2822[1] define inputs of XOR 1 element, output is P2823.		



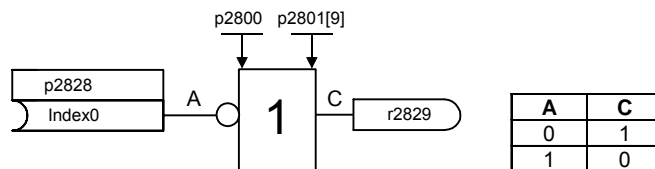
<b>Index:</b>	[0] = Binector input 0 (BI 0) [1] = Binector input 1 (BI 1)
<b>Dependency:</b>	P2801[6] is active level for the XOR element.

<b>r2823.0</b>	<b>BO: XOR 1 / XOR 1</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> Unsigned16
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Output of XOR 1 element. Displays exclusive-or logic of bits defined in P2822[0], P2822[1].		
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>
	00	Output of BO	Yes
			<b>0 signal</b>
			No
			<b>FP</b>
			-
<b>Dependency:</b>	P2801[6] is active level for the XOR element.		

<b>p2824[0...1]</b>	<b>BI: XOR 2 / XOR 2</b>			
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> U32 / Binary	
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -	
	<b>Can be changed:</b> U, T			
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>	
	-	-	0	
<b>Description:</b>	P2824[0], P2824[1] define inputs of XOR 2 element, output is P2825.			
<b>Index:</b>	[0] = Binector input 0 (BI 0) [1] = Binector input 1 (BI 1)			
<b>Dependency:</b>	P2801[7] is active level for the XOR element.			
<b>r2825.0</b>	<b>BO: XOR 2 / XOR 2</b>			
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> Unsigned16	
	<b>Unit:</b> -		<b>Data set:</b> -	
<b>Description:</b>	Output of XOR 2 element. Displays exclusive-or logic of bits defined in P2824[0], P2824[1].			
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>	<b>0 signal</b>
	00	Output of BO	Yes	No
				<b>FP</b>
				-
<b>Dependency:</b>	P2801[7] is active level for the XOR element.			
<b>p2826[0...1]</b>	<b>BI: XOR 3 / XOR 3</b>			
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> U32 / Binary	
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -	
	<b>Can be changed:</b> U, T			
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>	
	-	-	0	
<b>Description:</b>	P2826[0], P2826[1] define inputs of XOR 3 element, output is P2827.			
<b>Index:</b>	[0] = Binector input 0 (BI 0) [1] = Binector input 1 (BI 1)			
<b>Dependency:</b>	P2801[8] is active level for the XOR element.			
<b>r2827.0</b>	<b>BO: XOR 3 / XOR 3</b>			
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> Unsigned16	
	<b>Unit:</b> -		<b>Data set:</b> -	
<b>Description:</b>	Output of XOR 3 element. Displays exclusive-or logic of bits defined in P2826[0], P2826[1].			
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>	<b>0 signal</b>
	00	Output of BO	Yes	No
				<b>FP</b>
				-
<b>Dependency:</b>	P2801[8] is active level for the XOR element.			

<b>p2828</b>	<b>BI: NOT 1 / NOT 1</b>	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> U32 / Binary
		<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
		<b>Can be changed:</b> U, T		
		<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
		-	-	0

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



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

<b>r2829.0</b>	<b>BO: NOT 1 / NOT 1</b>	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> Unsigned16
		<b>Unit:</b> -		<b>Data set:</b> -

**Description:** Output of NOT 1 element.  
Displays not logic of bit defined in P2828.

<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>	<b>0 signal</b>	<b>FP</b>
	00	Output of BO	Yes	No	-

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

<b>p2830</b>	<b>BI: NOT 2 / NOT 2</b>	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> U32 / Binary
		<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
		<b>Can be changed:</b> U, T		
		<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
		-	-	0

**Description:** P2830 defines input of NOT 2 element, output is P2831.

**Dependency:** P2801[10] is active level for the NOT element.

<b>r2831.0</b>	<b>BO: NOT 2 / NOT 2</b>	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> Unsigned16
		<b>Unit:</b> -		<b>Data set:</b> -

**Description:** Output of NOT 2 element.  
Displays not logic of bit defined in P2830.

<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>	<b>0 signal</b>	<b>FP</b>
	00	Output of BO	Yes	No	-

**Dependency:** P2801[10] is active level for the NOT element.

<b>p2832</b>	<b>BI: NOT 3 / NOT 3</b>	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> U32 / Binary
		<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
		<b>Can be changed:</b> U, T		
		<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
		-	-	0

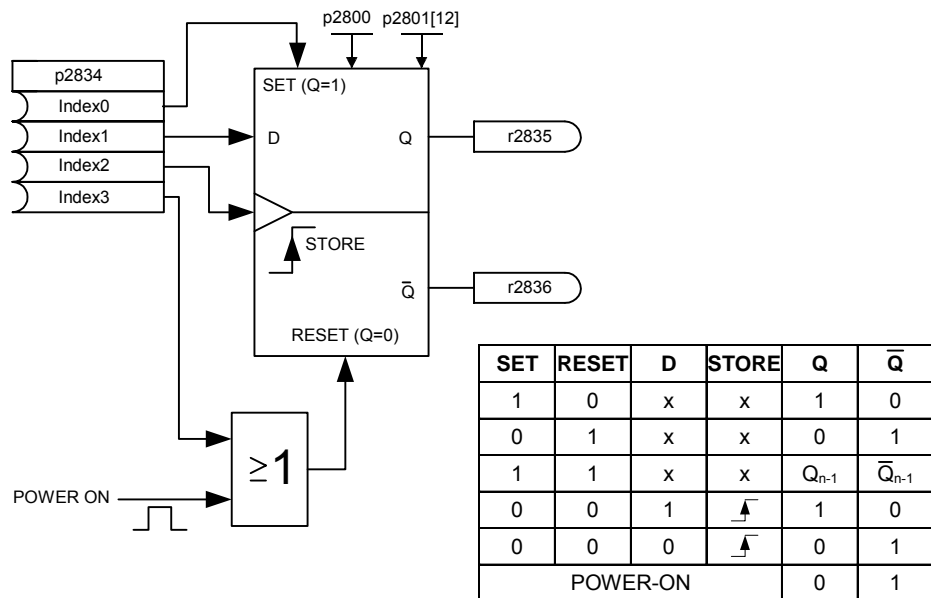
**Description:** P2832 defines input of NOT 3 element, output is P2833.

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

**r2833.0**      **BO: NOT 3 / NOT 3**  
**Access level:** 3      **P-Group:** Technology      **Data type:** Unsigned16  
**Unit:** -      **Data set:** -  
**Description:** Output of NOT 3 element.  
 Displays not logic of bit defined in P2832.  
**Bit field:**      **Bit**      **Signal name**      **1 signal**      **0 signal**      **FP**  
 00      Output of BO      Yes      No      -  
**Dependency:** P2801[11] is active level for the NOT element.

**p2834[0...3]**      **BI: D-FF 1 / D-FF 1**  
**Access level:** 3      **P-Group:** Technology      **Data type:** U32 / Binary  
**Quick comm.** NO      **Active:** NO      **Data set:** -  
**Can be changed:** U, T  
**Min**      **Max**      **Factory setting**  
 -      -      0

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



**Index:** [0] = Binector input: Set  
 [1] = Binector input: D input  
 [2] = Binector input: Store pulse  
 [3] = Binector input: Reset

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

**r2835.0**      **BO: Q D-FF 1 / Q D-FF 1**  
**Access level:** 3      **P-Group:** Technology      **Data type:** Unsigned16  
**Unit:** -      **Data set:** -  
**Description:** Displays output of D-FlipFlop 1, inputs are defined in P2834[0], P2834[1], P2834[2], P2834[3]  
**Bit field:**      **Bit**      **Signal name**      **1 signal**      **0 signal**      **FP**  
 00      Output of BO      Yes      No      -  
**Dependency:** P2801[12] is active level for the D-FlipFlop.

<b>r2836.0</b>	<b>BO: NOT-Q D-FF 1 / NOT-Q D-FF 1</b>			
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> Unsigned16	
	<b>Unit:</b> -		<b>Data set:</b> -	
<b>Description:</b>	Displays Not-output of D-FlipFlop 1, inputs are defined in P2834[0], P2834[1], P2834[2], P2834[3]			
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>	<b>0 signal</b>
	00	Output of BO	Yes	No
<b>Dependency:</b>	P2801[12] is active level for the D-FlipFlop.			
<b>p2837[0...3]</b>	<b>BI: D-FF 2 / D-FF 2</b>			
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> U32 / Binary	
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -	
	<b>Can be changed:</b> U, T			
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>	
	-	-	0	
<b>Description:</b>	P2837[0], P2837[1], P2837[2], P2837[3] define inputs of D-FlipFlop 2, outputs are P2838, 2839.			
<b>Index:</b>	[0] = Binector input: Set [1] = Binector input: D input [2] = Binector input: Store pulse [3] = Binector input: Reset			
<b>Dependency:</b>	P2801[13] is active level for the D-FlipFlop.			
<b>r2838.0</b>	<b>BO: Q D-FF 2 / Q D-FF 2</b>			
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> Unsigned16	
	<b>Unit:</b> -		<b>Data set:</b> -	
<b>Description:</b>	Displays output of D-FlipFlop 2, inputs are defined in P2837[0], P2837[1], P2837[2], P2837[3]			
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>	<b>0 signal</b>
	00	Output of BO	Yes	No
<b>Dependency:</b>	P2801[13] is active level for the D-FlipFlop.			
<b>r2839.0</b>	<b>BO: NOT-Q D-FF 2 / NOT-Q D-FF 2</b>			
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> Unsigned16	
	<b>Unit:</b> -		<b>Data set:</b> -	
<b>Description:</b>	Displays Not-output of D-FlipFlop 2, inputs are defined in P2837[0], P2837[1], P2837[2], P2837[3]			
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>	<b>0 signal</b>
	00	Output of BO	Yes	No
<b>Dependency:</b>	P2801[13] is active level for the D-FlipFlop.			

**p2840[0...1]**      **BI: RS-FF 1 / RS-FF 1**

**Access level:** 3      **P-Group:** Technology      **Data type:** U32 / Binary

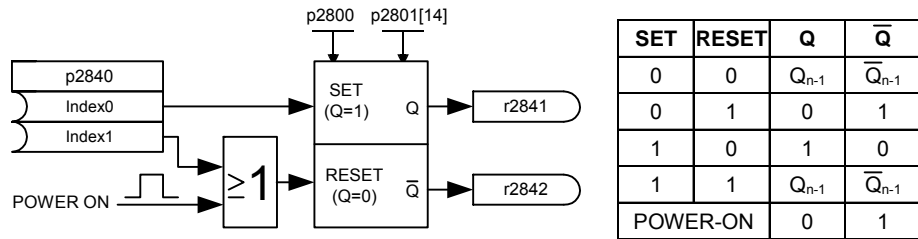
**Quick comm. NO**      **Active:** NO      **Data set:** -

**Can be changed:** U, T

**Min**      **Max**      **Factory setting**

-      -      0

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



**Index:** [0] = Binector input: Set  
[1] = Binector input: Reset

**Dependency:** P2801[14] is active level for the RS-FlipFlop.

**r2841.0**      **BO: Q RS-FF 1 / Q RS-FF 1**

**Access level:** 3      **P-Group:** Technology      **Data type:** Unsigned16

**Unit:** -      **Data set:** -

**Description:** Displays output of RS-FlipFlop 1, inputs are defined in P2840[0], P2840[1]

**Bit field:**

Bit	Signal name	1 signal	0 signal	FP
00	Output of BO	Yes	No	-

**Dependency:** P2801[14] is active level for the RS-FlipFlop.

**r2842.0**      **BO: NOT-Q RS-FF 1 / NOT-Q RS-FF 1**

**Access level:** 3      **P-Group:** Technology      **Data type:** Unsigned16

**Unit:** -      **Data set:** -

**Description:** Displays Not-output of RS-FlipFlop 1, inputs are defined in P2840[0], P2840[1]

**Bit field:**

Bit	Signal name	1 signal	0 signal	FP
00	Output of BO	Yes	No	-

**Dependency:** P2801[14] is active level for the RS-FlipFlop.

**p2843[0...1]**      **BI: RS-FF 2 / RS-FF 2**

**Access level:** 3      **P-Group:** Technology      **Data type:** U32 / Binary

**Quick comm. NO**      **Active:** NO      **Data set:** -

**Can be changed:** U, T

**Min**      **Max**      **Factory setting**

-      -      0

**Description:** P2843[0], P2843[1] define inputs of RS-FlipFlop 2, outputs are P2844, P2845.

**Index:** [0] = Binector input: Set  
[1] = Binector input: Reset

**Dependency:** P2801[15] is active level for the RS-FlipFlop.



<b>r2844.0</b>	<b>BO: Q RS-FF 2 / Q RS-FF 2</b>			
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> Unsigned16	
	<b>Unit:</b> -		<b>Data set:</b> -	
<b>Description:</b>	Displays output of RS-FlipFlop 2, inputs are defined in P2843[0], P2843[1]			
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>	<b>0 signal</b>
	00	Output of BO	Yes	No
<b>Dependency:</b>	P2801[15] is active level for the RS-FlipFlop.			
<b>r2845.0</b>	<b>BO: NOT-Q RS-FF 2 / NOT-Q RS-FF 2</b>			
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> Unsigned16	
	<b>Unit:</b> -		<b>Data set:</b> -	
<b>Description:</b>	Displays Not-output of RS-FlipFlop 2, inputs are defined in P2843[0], P2843[1]			
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>	<b>0 signal</b>
	00	Output of BO	Yes	No
<b>Dependency:</b>	P2801[15] is active level for the RS-FlipFlop.			
<b>p2846[0...1]</b>	<b>BI: RS-FF 3 / RS-FF 3</b>			
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> U32 / Binary	
	<b>Quick comm. NO</b>	<b>Active:</b> NO	<b>Data set:</b> -	
	<b>Can be changed:</b> U, T			
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>	
	-	-	0	
<b>Description:</b>	P2846[0], P2846[1] define inputs of RS-FlipFlop 3, outputs are P2847, P2848.			
<b>Index:</b>	[0] = Binector input: Set [1] = Binector input: Reset			
<b>Dependency:</b>	P2801[16] is active level for the RS-FlipFlop.			
<b>r2847.0</b>	<b>BO: Q RS-FF 3 / Q RS-FF 3</b>			
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> Unsigned16	
	<b>Unit:</b> -		<b>Data set:</b> -	
<b>Description:</b>	Displays output of RS-FlipFlop 3, inputs are defined in P2846[0], P2846[1]			
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>	<b>0 signal</b>
	00	Output of BO	Yes	No
<b>Dependency:</b>	P2801[16] is active level for the RS-FlipFlop.			
<b>r2848.0</b>	<b>BO: NOT-Q RS-FF 3 / NOT-Q RS-FF 3</b>			
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> Unsigned16	
	<b>Unit:</b> -		<b>Data set:</b> -	
<b>Description:</b>	Displays Not-output of RS-FlipFlop 3, inputs are defined in P2846[0], P2846[1]			
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>	<b>0 signal</b>
	00	Output of BO	Yes	No
<b>Dependency:</b>	P2801[16] is active level for the RS-FlipFlop.			

**p2849**

**BI: Timer 1 / Timer 1**

Access level: 3

Quick comm. NO

Can be changed: U, T

P-Group: Technology

Active: NO

Data type: U32 / Binary

Data set: -

Min

-

Max

-

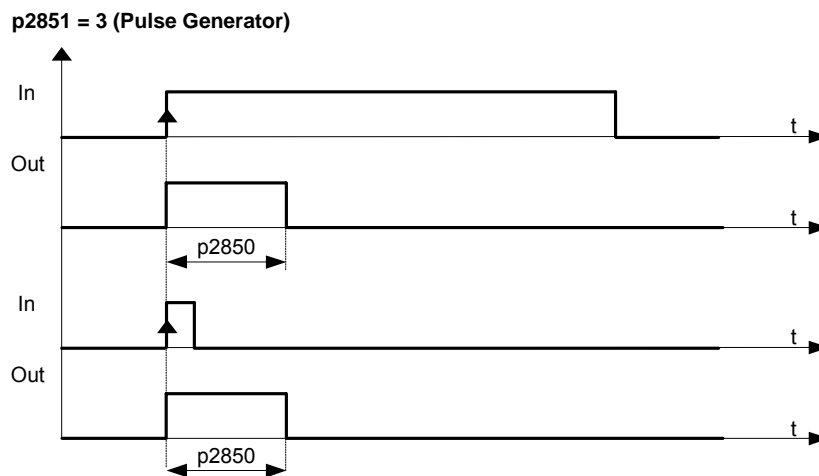
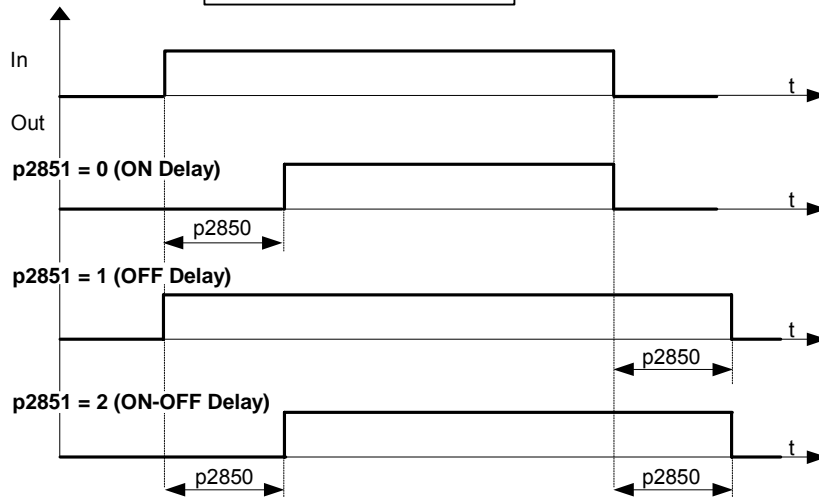
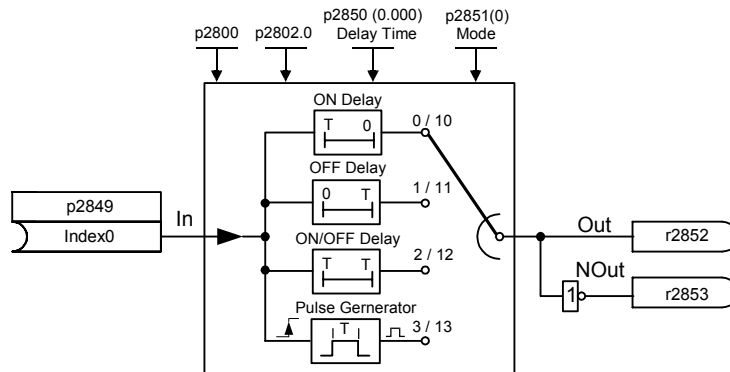
Factory setting

0

**Description:**

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.

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<b>p2850</b>	<b>Delay time of timer 1 / Delay time timer 1</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> Floating Point
	<b>Quick comm. NO</b>	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.0 [s]	<b>Max</b> 9999.9 [s]	<b>Factory setting</b> 0.0 [s]
<b>Description:</b>	Defines delay time of timer 1. P2849, P2850, P2851 are the inputs of the timer, outputs are P2852, P2853.		
<b>Dependency:</b>	P2802[0] is active level for the timer.		

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<b>p2851</b>	<b>Mode timer 1 / Mode timer 1</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> Unsigned16
	<b>Quick comm. NO</b>	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0	<b>Max</b> 13	<b>Factory setting</b> 0
<b>Description:</b>	Selects mode of timer 1. P2849, P2850, P2851 are the inputs of the timer, outputs are P2852, P2853.		
<b>Values:</b>	0: ON delay (seconds) 1: OFF delay (seconds) 2: ON/OFF delay (seconds) 3: Pulse generator (seconds) 10: ON delay (minutes) 11: OFF delay (minutes) 12: ON/OFF delay (minutes) 13: Pulse generator (minutes)		
<b>Dependency:</b>	P2802[0] is active level for the timer.		

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<b>r2852.0</b>	<b>BO: Timer 1 / Timer 1</b>												
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> Unsigned16										
	<b>Unit:</b> -		<b>Data set:</b> -										
<b>Description:</b>	Displays output of timer 1. P2849, P2850, P2851 are the inputs of the timer, outputs are P2852, P2853.												
<b>Bit field:</b>	<table border="0"> <tr> <td><b>Bit</b></td> <td><b>Signal name</b></td> <td><b>1 signal</b></td> <td><b>0 signal</b></td> <td><b>FP</b></td> </tr> <tr> <td>00</td> <td>Output of BO</td> <td>Yes</td> <td>No</td> <td>-</td> </tr> </table>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>	<b>0 signal</b>	<b>FP</b>	00	Output of BO	Yes	No	-		
<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>	<b>0 signal</b>	<b>FP</b>									
00	Output of BO	Yes	No	-									
<b>Dependency:</b>	P2802[0] is active level for the timer.												

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<b>r2853.0</b>	<b>BO: Nout timer 1 / Nout timer 1</b>												
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> Unsigned16										
	<b>Unit:</b> -		<b>Data set:</b> -										
<b>Description:</b>	Displays Not-output of timer 1. P2849, P2850, P2851 are the inputs of the timer, outputs are P2852, P2853.												
<b>Bit field:</b>	<table border="0"> <tr> <td><b>Bit</b></td> <td><b>Signal name</b></td> <td><b>1 signal</b></td> <td><b>0 signal</b></td> <td><b>FP</b></td> </tr> <tr> <td>00</td> <td>Output of BO</td> <td>Yes</td> <td>No</td> <td>-</td> </tr> </table>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>	<b>0 signal</b>	<b>FP</b>	00	Output of BO	Yes	No	-		
<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>	<b>0 signal</b>	<b>FP</b>									
00	Output of BO	Yes	No	-									
<b>Dependency:</b>	P2802[0] is active level for the timer.												

<b>p2854</b>	<b>BI: Timer 2 / Timer 2</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> U32 / Binary
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> U, T		
	<b>Min</b> -	<b>Max</b> -	<b>Factory setting</b> 0
<b>Description:</b>	Define input signal of timer 2. P2854, P2855, P2856 are the inputs of the timer, outputs are P2857, P2858.		
<b>Dependency:</b>	P2802[1] is active level for the timer.		
<b>p2855</b>	<b>Delay time of timer 2 / Delay time timer 2</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0.0 [s]	<b>Max</b> 9999.9 [s]	<b>Factory setting</b> 0.0 [s]
<b>Description:</b>	Defines delay time of timer 2. P2854, P2855, P2856 are the inputs of the timer, outputs are P2857, P2858.		
<b>Dependency:</b>	P2802[1] is active level for the timer.		
<b>p2856</b>	<b>Mode timer 2 / Mode timer 2</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0	<b>Max</b> 13	<b>Factory setting</b> 0
<b>Description:</b>	Selects mode of timer 2. P2854, P2855, P2856 are the inputs of the timer, outputs are P2857, P2858.		
<b>Values:</b>	0: ON delay (seconds) 1: OFF delay (seconds) 2: ON/OFF delay (seconds) 3: Pulse generator (seconds) 10: ON delay (minutes) 11: OFF delay (minutes) 12: ON/OFF delay (minutes) 13: Pulse generator (minutes)		
<b>Dependency:</b>	P2802[1] is active level for the timer.		
<b>r2857.0</b>	<b>BO: Timer 2 / Timer 2</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> Unsigned16
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Displays output of timer 2. P2854, P2855, P2856 are the inputs of the timer, outputs are P2857, P2858.		
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b> <b>0 signal</b> <b>FP</b>
	00	Output of BO	Yes      No      -
<b>Dependency:</b>	P2802[1] is active level for the timer.		

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<b>r2858.0</b>	<b>BO: Nout timer 2 / Nout timer 2</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> Unsigned16
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Displays Not-output of timer 2 P2854, P2855, P2856 are the inputs of the timer, outputs are P2857, P2858.		
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b> <b>0 signal</b> <b>FP</b>
	00	Output of BO	Yes              No              -
<b>Dependency:</b>	P2802[1] is active level for the timer.		

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<b>p2859</b>	<b>BI: Timer 3 / Timer 3</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> U32 / Binary
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> U, T		
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
	-	-	0
<b>Description:</b>	Define input signal of timer 3. P2859, P2860, P2861 are the inputs of the timer, outputs are P2862, P2863.		
<b>Dependency:</b>	P2802[2] is active level for the timer.		

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<b>p2860</b>	<b>Delay time of timer 3 / Delay time timer 3</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> U, T		
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
	0.0 [s]	9999.9 [s]	0.0 [s]
<b>Description:</b>	Defines delay time of timer 3. P2859, P2860, P2861 are the inputs of the timer, outputs are P2862, P2863.		
<b>Dependency:</b>	P2802[2] is active level for the timer.		

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<b>p2861</b>	<b>Mode timer 3 / Mode timer 3</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> U, T		
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
	0	13	0
<b>Description:</b>	Selects mode of timer 3. P2859, P2860, P2861 are the inputs of the timer, outputs are P2862, P2863.		
<b>Values:</b>	0: ON delay (seconds) 1: OFF delay (seconds) 2: ON/OFF delay (seconds) 3: Pulse generator (seconds) 10: ON delay (minutes) 11: OFF delay (minutes) 12: ON/OFF delay (minutes) 13: Pulse generator (minutes)		
<b>Dependency:</b>	P2802[2] is active level for the timer.		

<b>r2862.0</b>	<b>BO: Timer 3 / Timer 3</b>			
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> Unsigned16	
	<b>Unit:</b> -		<b>Data set:</b> -	
<b>Description:</b>	Displays output of timer 3. P2859, P2860, P2861 are the inputs of the timer, outputs are P2862, P2863.			
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>	<b>0 signal</b>
	00	Output of BO	Yes	No
<b>Dependency:</b>	P2802[2] is active level for the timer.			
<b>r2863.0</b>	<b>BO: Nout timer 3 / Nout timer 3</b>			
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> Unsigned16	
	<b>Unit:</b> -		<b>Data set:</b> -	
<b>Description:</b>	Displays Not-output of timer 3. P2859, P2860, P2861 are the inputs of the timer, outputs are P2862, P2863.			
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>	<b>0 signal</b>
	00	Output of BO	Yes	No
<b>Dependency:</b>	P2802[2] is active level for the timer.			
<b>p2864</b>	<b>BI: Timer 4 / Timer 4</b>			
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> U32 / Binary	
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -	
	<b>Can be changed:</b> U, T			
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>	
	-	-	0	
<b>Description:</b>	Define input signal of timer 4. P2864, P2865, P2866 are the inputs of the timer, outputs are P2867, P2868.			
<b>Dependency:</b>	P2802[3] is active level for the timer.			
<b>p2865</b>	<b>Delay time of timer 4 / Delay time timer 4</b>			
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> Floating Point	
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -	
	<b>Can be changed:</b> U, T			
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>	
	0.0 [s]	9999.9 [s]	0.0 [s]	
<b>Description:</b>	Defines delay time of timer 4. P2864, P2865, P2866 are the inputs of the timer, outputs are P2867, P2868.			
<b>Dependency:</b>	P2802[3] is active level for the timer.			

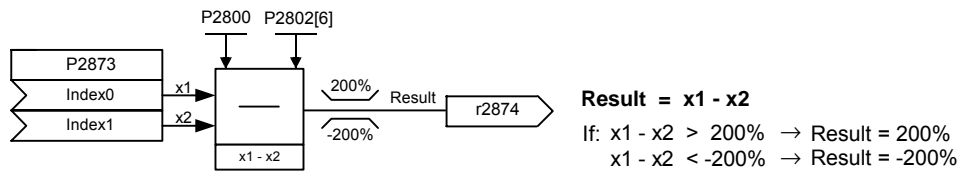
<b>p2866</b>	<b>Mode timer 4 / Mode timer 4</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> Unsigned16
	<b>Quick comm. NO</b>	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0	<b>Max</b> 13	<b>Factory setting</b> 0
<b>Description:</b>	Selects mode of timer 4. P2864, P2865, P2866 are the inputs of the timer, outputs are P2867, P2868.		
<b>Values:</b>	0: ON delay (seconds) 1: OFF delay (seconds) 2: ON/OFF delay (seconds) 3: Pulse generator (seconds) 10: ON delay (minutes) 11: OFF delay (minutes) 12: ON/OFF delay (minutes) 13: Pulse generator (minutes)		
<b>Dependency:</b>	P2802[3] is active level for the timer.		
<b>r2867.0</b>	<b>BO: Timer 4 / Timer 4</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> Unsigned16
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Displays output of timer 4. P2864, P2865, P2866 are the inputs of the timer, outputs are P2867, P2868.		
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b> <b>0 signal</b> <b>FP</b>
	00	Output of BO	Yes      No      -
<b>Dependency:</b>	P2802[3] is active level for the timer.		
<b>r2868.0</b>	<b>BO: Nout timer 4 / Nout timer 4</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> Unsigned16
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Displays Not-output of timer 4. P2864, P2865, P2866 are the inputs of the timer, outputs are P2867, P2868.		
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b> <b>0 signal</b> <b>FP</b>
	00	Output of BO	Yes      No      -
<b>Dependency:</b>	P2802[3] is active level for the timer.		
<b>p2869[0...1]</b>	<b>CI: ADD 1 / ADD 1</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> U32 / Integer16
	<b>Quick comm. NO</b>	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> U, T		
	<b>Min</b> -	<b>Max</b> -	<b>Factory setting</b> 0
<b>Description:</b>	Define inputs of Adder 1, result is in P2870.		
	<p>The diagram shows a block labeled 'p2869' with two inputs: 'Index0' (outputting 'x1') and 'Index1' (outputting 'x2'). These inputs feed into an adder block containing a plus sign and the expression 'x1 + x2'. Above the adder block, two inputs are shown: 'p2800' and 'p2802[4]'. The output of the adder block is labeled 'Result' and is connected to a block labeled 'r2870'. The output line has two saturation limits: '200%' and '-200%'.</p>		
	<b>Result = <math>x1 + x2</math></b> If: $x1 + x2 > 200\% \rightarrow \text{Result} = 200\%$ $x1 + x2 < -200\% \rightarrow \text{Result} = -200\%$		
<b>Index:</b>	[0] = Connector input 0 (CI 0) [1] = Connector input 1 (CI 1)		
<b>Dependency:</b>	P2802[4] is the active level for the Adder.		

**r2870**      **CO: ADD 1 / ADD 1**  
**Access level:** 3      **P-Group:** Technology      **Data type:** Floating Point  
**Unit:** [%]      **Data set:** -  
**Description:** Result of Adder 1.  
**Dependency:** P2802[4] is active level for the Adder.

**p2871[0...1]**      **CI: ADD 2 / ADD 2**  
**Access level:** 3      **P-Group:** Technology      **Data type:** U32 / Integer16  
**Quick comm.** NO      **Active:** NO      **Data set:** -  
**Can be changed:** U, T  
**Min**      **Max**      **Factory setting**  
 -      -      0  
**Description:** Define inputs of Adder 2, result is in P2872.  
**Index:** [0] = Connector input 0 (CI 0)  
 [1] = Connector input 1 (CI 1)  
**Dependency:** P2802[5] is active level for the Adder.

**r2872**      **CO: ADD 2 / ADD 2**  
**Access level:** 3      **P-Group:** Technology      **Data type:** Floating Point  
**Unit:** [%]      **Data set:** -  
**Description:** Result of Adder 2.  
**Dependency:** P2802[5] is active level for the Adder.

**p2873[0...1]**      **CI: SUB 1 / SUB 1**  
**Access level:** 3      **P-Group:** Technology      **Data type:** U32 / Integer16  
**Quick comm.** NO      **Active:** NO      **Data set:** -  
**Can be changed:** U, T  
**Min**      **Max**      **Factory setting**  
 -      -      0  
**Description:** Define inputs of Subtractor 1, result is in P2874.



**Index:** [0] = Connector input 0 (CI 0)  
 [1] = Connector input 1 (CI 1)  
**Dependency:** P2802[6] is active level for the Subtractor.

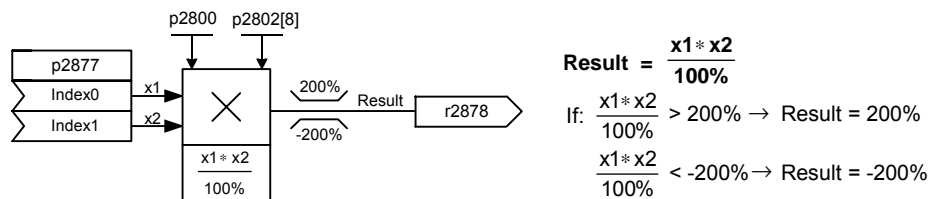
**r2874**      **CO: SUB 1 / SUB 1**  
**Access level:** 3      **P-Group:** Technology      **Data type:** Floating Point  
**Unit:** [%]      **Data set:** -  
**Description:** Result of Subtractor 1.  
**Dependency:** P2802[6] is active level for the Subtractor.



<b>p2875[0...1]</b>	<b>CI: SUB 2 / SUB 2</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> U32 / Integer16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> U, T		
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
	-	-	0
<b>Description:</b>	Define inputs of Subtractor 2, result is in P2876.		
<b>Index:</b>	[0] = Connector input 0 (CI 0) [1] = Connector input 1 (CI 1)		
<b>Dependency:</b>	P2802[7] is active level for the Subtractor.		

<b>r2876</b>	<b>CO: SUB 2 / SUB 2</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> Floating Point
	<b>Unit:</b> [%]		<b>Data set:</b> -
<b>Description:</b>	Result of Subtractor 2.		
<b>Dependency:</b>	P2802[7] is active level for the Subtractor.		

<b>p2877[0...1]</b>	<b>CI: MUL 1 / MUL 1</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> U32 / Integer16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> U, T		
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
	-	-	0
<b>Description:</b>	Define inputs of Multiplier 1, result is in P2878.		



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

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

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

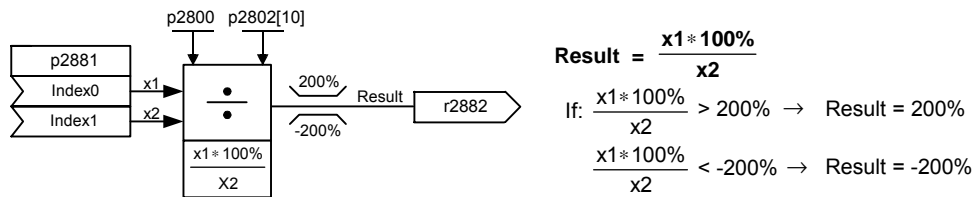
<b>Index:</b>	[0] = Connector input 0 (CI 0) [1] = Connector input 1 (CI 1)
<b>Dependency:</b>	P2802[8] is active level for the Multiplier.

<b>r2878</b>	<b>CO: MUL 1 / MUL 1</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> Floating Point
	<b>Unit:</b> [%]		<b>Data set:</b> -
<b>Description:</b>	Result of Multiplier 1.		
<b>Dependency:</b>	P2802[8] is active level for the Multiplier.		

<b>p2879[0...1]</b>	<b>CI: MUL 2 / MUL 2</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> U32 / Integer16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> U, T		
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
	-	-	0
<b>Description:</b>	Define inputs of Multiplier 2, result is in P2880.		
<b>Index:</b>	[0] = Connector input 0 (CI 0) [1] = Connector input 1 (CI 1)		
<b>Dependency:</b>	P2802[9] is active level for the Multiplier.		

<b>r2880</b>	<b>CO: MUL 2 / MUL 2</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> Floating Point
	<b>Unit:</b> [%]		<b>Data set:</b> -
<b>Description:</b>	Result of Multiplier 2.		
<b>Dependency:</b>	P2802[9] is active level for the Multiplier.		

<b>p2881[0...1]</b>	<b>CI: DIV 1 / DIV 1</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> U32 / Integer16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> U, T		
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
	-	-	0
<b>Description:</b>	Define inputs of Divider 1, result is in P2882.		



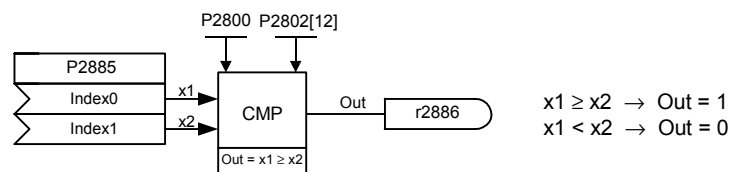
<b>Index:</b>	[0] = Connector input 0 (CI 0) [1] = Connector input 1 (CI 1)
<b>Dependency:</b>	P2802[10] is active level for the Divider.

<b>r2882</b>	<b>CO: DIV 1 / DIV 1</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> Floating Point
	<b>Unit:</b> [%]		<b>Data set:</b> -
<b>Description:</b>	Result of Divider 1.		
<b>Dependency:</b>	P2802[10] is active level for the Divider.		

<b>p2883[0...1]</b>	<b>CI: DIV 2 / DIV 2</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> U32 / Integer16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> U, T		
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
	-	-	0
<b>Description:</b>	Define inputs of Divider 2, result is in P2884.		
<b>Index:</b>	[0] = Connector input 0 (CI 0) [1] = Connector input 1 (CI 1)		
<b>Dependency:</b>	P2802[11] is active level for the Divider.		

<b>r2884</b>	<b>CO: DIV 2 / DIV 2</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> Floating Point
	<b>Unit:</b> [%]		<b>Data set:</b> -
<b>Description:</b>	Result of Divider 2.		
<b>Dependency:</b>	P2802[11] is active level for the Divider.		

<b>p2885[0...1]</b>	<b>CI: CMP 1 / CMP 1</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> U32 / Integer16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> U, T		
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
	-	-	0
<b>Description:</b>	Defines inputs of Comparator 1, output is P2886.		



<b>Index:</b>	[0] = Connector input 0 (CI 0) [1] = Connector input 1 (CI 1)
<b>Dependency:</b>	P2802[12] is active level for the Comparator.

<b>r2886.0</b>	<b>BO: CMP 1 / CMP 1</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> Unsigned16
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Displays result bit of Comparator 1.		
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>
	00	Output of BO	Yes
			<b>0 signal</b>
			No
			<b>FP</b>
			-
<b>Dependency:</b>	P2802[12] is active level for the Comparator.		

<b>p2887[0...1]</b>	<b>CI: CMP 2 / CMP 2</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> U32 / Integer16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> U, T		
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
	-	-	0
<b>Description:</b>	Defines inputs of Comparator 2, output is P2888.		
<b>Index:</b>	[0] = Connector input 0 (CI 0) [1] = Connector input 1 (CI 1)		
<b>Dependency:</b>	P2802[13] is active level for the Comparator.		

<b>r2888.0</b>	<b>BO: CMP 2 / CMP 2</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> Unsigned16
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Displays result bit of Comparator 2.		
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>
	00	Output of BO	Yes
			<b>0 signal</b>
			No
			<b>FP</b>
			-
<b>Dependency:</b>	P2802[13] is active level for the Comparator.		

<b>p2889</b>	<b>CO: Fixed setpoint 1 in [%] / Fixed setp 1 %</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> U, T		
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
	-200.00 [%]	200.00 [%]	0.00 [%]
<b>Description:</b>	Fixed percent setting 1.		
	Connector Setting in %		
	<pre> graph TD     p2889 --&gt; Range     p2890 --&gt; Range     subgraph Range [-200% ... 200%]     end </pre>		
	Range : -200% ... 200%		

<b>p2890</b>	<b>CO: Fixed setpoint 2 in [%] / Fixed setp 2 %</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Technology	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> U, T		
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
	-200.00 [%]	200.00 [%]	0.00 [%]
<b>Description:</b>	Fixed percent setting 2.		

<b>p2940</b>	<b>BI: Release Wobble function / Rel Wobble</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> Technology	<b>Data type:</b> U32 / Binary
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> T		
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
	-	-	0
<b>Description:</b>	Defines the source to release the wobble function.		

<b>p2945</b>	<b>Wobble signal frequency / Wobble sig freq</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> -	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> -
	<b>Can be changed:</b> T		
	<b>Min</b> 0.001 [Hz]	<b>Max</b> 10.000 [Hz]	<b>Factory setting</b> 1.000 [Hz]
<b>Description:</b>	Sets the frequency of the wobble signal.		
<b>p2946</b>	<b>Wobble signal amplitude / Wobble sig amp</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> -	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> -
	<b>Can be changed:</b> T		
	<b>Min</b> 0.000 [%]	<b>Max</b> 0.200 [%]	<b>Factory setting</b> 0.000 [%]
<b>Description:</b>	Sets the value for the amplitude of the wobble-signal as a proportion of the present Ramp Function Generator (RFG) output. The value of P2946 is multiplied by the output value of the RFG then added to RFG output. For example, if the RFG output is 10Hz, and P2946 has a value of 0.100, the wobble signal amplitude will be 0.100 * 10 = 1Hz. This means that the RFG output will therefore wobble between 9Hz and 11Hz.		
<b>p2947</b>	<b>Wobble negative pulse jump / Neg. pulse jump</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> -	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> -
	<b>Can be changed:</b> T		
	<b>Min</b> 0.000	<b>Max</b> 1.000	<b>Factory setting</b> 0.000
<b>Description:</b>	Sets the value for decrement step at the end of the positive signal period. The amplitude of the step is dependant upon the signal amplitude as follows: Amplitude of signal decrement step = P2947 * P2946		
<b>p2948</b>	<b>Wobble positive pulse jump / Pos. pulse jump</b>		
	<b>Access level:</b> 2	<b>P-Group:</b> -	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> -
	<b>Can be changed:</b> T		
	<b>Min</b> 0.000	<b>Max</b> 1.000	<b>Factory setting</b> 0.000
<b>Description:</b>	Sets the value for the increment step at the end of the negative signal period. The amplitude of the increment step is dependant upon the signal amplitude as follows: Amplitude of signal increment step = P2948 * P2946		

<b>p2949</b>	<b>Wobble signal pulse width / Wobble pul width</b>				
	<b>Access level:</b> 2	<b>P-Group:</b> -	<b>Data type:</b> Unsigned16		
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> -		
	<b>Can be changed:</b> T				
	<b>Min</b> 0 [%]	<b>Max</b> 100 [%]	<b>Factory setting</b> 50 [%]		
<b>Description:</b>	Sets the relative widths of the rising and falling pulses. The value in P2949 sets the proportion of the wobble period (determined by P2945) allocated to the rising pulse, the remainder of the time is allocation to the falling pulse. A value of 60% in P2949 means that 60% of the wobble period the wobble output will be rising. For the remaining 40% of the wobble period the wobble output will be falling.				
<b>r2955</b>	<b>CO: Wobble signal output / Wobble output</b>				
	<b>Access level:</b> 2	<b>P-Group:</b> Setpoints	<b>Data type:</b> Floating Point		
	<b>Unit:</b> [%]		<b>Data set:</b> -		
<b>Description:</b>	Displays the output of the wobble function.				
<b>r3113.0...15</b>	<b>CO/BO: Fault Bit Array / Fault Bit Array</b>				
	<b>Access level:</b> 1	<b>P-Group:</b> Messages	<b>Data type:</b> Unsigned16		
	<b>Unit:</b> -		<b>Data set:</b> -		
<b>Description:</b>	Gives information about actual fault.				
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>	<b>0 signal</b>	<b>FP</b>
	00	Inverter error	Yes	No	-
	01	Power line failure	Yes	No	-
	02	Intermediate circuit power voltage	Yes	No	-
	03	Error power electronics	Yes	No	-
	04	Convertor over temperature	Yes	No	-
	05	Earth leakage	Yes	No	-
	06	Motor overload	Yes	No	-
	07	Bus fault	Yes	No	-
	08	External safety failure	Yes	No	-
	09	Fault motor sensor	Yes	No	-
	10	Fault internal communication	Yes	No	-
	11	Motor current limit	Yes	No	-
	12	Supply failure	Yes	No	-
	13	Reserved	Yes	No	-
	14	Reserved	Yes	No	-
	15	Other error	Yes	No	-

<b>p3900 End of quick commissioning / Quick commiss. end</b>			
ICU24	<b>Access level:</b> 1 <b>Quick comm.</b> YES <b>Can be changed:</b> C	<b>P-Group:</b> Safety Integrated <b>Active:</b> NO	<b>Data type:</b> Unsigned16 <b>Data set:</b> -
	<b>Min</b> 0	<b>Max</b> 11	<b>Factory setting</b> 0
<b>Description:</b>	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.		
<b>Values:</b>	0: No quick commissioning 1: End quick commissioning with factory reset 2: End quick commissioning 3: End quick commissioning only for motor data 10: Accept safety changes (only on safety CU) 11: Cancel safety changes (only on safety CU)		
<b>Dependency:</b>	Changeable only when P0010 = 1 (quick commissioning).		
<b>Note:</b>	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). When transferring parameter p3900, the frequency inverter uses its processor to carry-out internal calculations. Communications - both via USS as well as via the Fieldbus - are interrupted for the time that it takes to make these calculations. This can result in the following error messages at the connected SIMATIC S7 control (communications via fieldbus): <ul style="list-style-type: none"> <li>• Parameter fault 30</li> <li>• Drive fault 70</li> <li>• Drive fault 75</li> </ul> When using STARTER (USS) to commission the drive system, data cannot be entered while these calculations are being made. The faults can be acknowledged as soon as the calculations have been completed in the frequency inverter. These calculations can take up to one minute to complete.		

<b>p3900 End of quick commissioning / Quick commiss. end</b>			
ICU24F	<b>Access level:</b> 1 <b>Quick comm.</b> YES <b>Can be changed:</b> C	<b>P-Group:</b> Safety Integrated <b>Active:</b> NO	<b>Data type:</b> Unsigned16 <b>Data set:</b> -
	<b>Min</b> 0	<b>Max</b> 11	<b>Factory setting</b> 0
<b>Description:</b>	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.		
<b>Values:</b>	0: No quick commissioning 1: End quick commissioning with factory reset 2: End quick commissioning 3: End quick commissioning only for motor data 10: Accept safety changes (only on safety CU) 11: Cancel safety changes (only on safety CU)		
<b>Dependency:</b>	Changeable only when P0010 = 1 (quick commissioning). Or for safety commissioning P0010 = 95.		
<b>Note:</b>	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). P3900 = 10 (only on safety CU) Finishes the safety commissioning by accepting the safety changes. The safety commissioning including safety dynamization will take about 5 s.  P3900 = 11 (only on safety CU) Finishes the safety commissioning by discarding the safety changes. The safety settings that were active before the safety commissioning are reloaded. The safety commissioning including safety dynamization will take about 5 s. When transferring parameter p3900, the frequency inverter uses its processor to carry-out internal calculations. Communications - both via USS as well as via the Fieldbus - are interrupted for the time that it takes to make these calculations. This can result in the following error messages at the connected SIMATIC S7 control (communications via fieldbus): <ul style="list-style-type: none"> <li>• Parameter fault 30</li> <li>• Drive fault 70</li> <li>• Drive fault 75</li> </ul> When using STARTER (USS) to commission the drive system, data cannot be entered while these calculations are being made. The faults can be acknowledged as soon as the calculations have been completed in the frequency inverter. These calculations can take up to one minute to complete.		



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<b>r3930[0...4]</b>	<b>PS Data version / PS Data version</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> -	<b>Data type:</b> Unsigned16
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Displays the A5E number and the ps data versions		
<b>Index:</b>	[0] = A5E 1st 4 digits [1] = A5E 2nd 4 digits [2] = Logistic Version [3] = Fixed Data Version [4] = Calib Data Version		

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<b>p3950</b>	<b>Access of hidden parameters / Access hidden par</b>		
	<b>Access level:</b> 4	<b>P-Group:</b> -	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> U, T		
	<b>Min</b> 0	<b>Max</b> 255	<b>Factory setting</b> 0
<b>Description:</b>	Accesses special parameters for development (expert only) and factory functionality (calibration parameter).		

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<b>r3954[0...12]</b>	<b>CM info and GUI ID / CC info GUI ID</b>		
	<b>Access level:</b> 4	<b>P-Group:</b> -	<b>Data type:</b> Unsigned16
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Used to classify firmware (only for SIEMENS internal purposes).		
<b>Index:</b>	[0] = CM label (increment/branch) [1] = CM label (counter) [2] = CM label [3] = GUI ID [4] = GUI ID [5] = GUI ID [6] = GUI ID [7] = GUI ID [8] = GUI ID [9] = GUI ID [10] = GUI ID [11] = GUI ID major release [12] = GUI ID minor release		

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<b>r3955</b>	<b>Version for DriveMonitor / DriveMon. version</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> -	<b>Data type:</b> Unsigned16
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Displays the version for DriveMonitor.		

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<b>r3978</b>	<b>BICO counter / BICO counter</b>		
	<b>Access level:</b> 4	<b>P-Group:</b> -	<b>Data type:</b> Unsigned32
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Counts the number of changed BICO links		

<b>p3981</b>	<b>Reset active fault / Reset active fault</b>		
	<b>Access level:</b> 4	<b>P-Group:</b> Messages	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> T		
	<b>Min</b> 0	<b>Max</b> 1	<b>Factory setting</b> 0
<b>Description:</b>	Resets active faults when changed from 0 to 1.		
<b>Values:</b>	0: No fault reset 1: Reset fault		
<b>Note:</b>	See P0947 (last fault code) Automatically reset to 0.		
<b>p3984</b>	<b>Client telegram off time / Client tel. off ti</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Communications	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> -
	<b>Can be changed:</b> T		
	<b>Min</b> 100 [ms]	<b>Max</b> 10000 [ms]	<b>Factory setting</b> 1000 [ms]
<b>Description:</b>	Defines time after which a fault will be generated (7220) if no telegram is received from the client.		
<b>Dependency:</b>	Setting 0 = watchdog disabled		
<b>r3986[0...1]</b>	<b>Number of parameters / No. of parameters</b>		
	<b>Access level:</b> 4	<b>P-Group:</b> -	<b>Data type:</b> Unsigned16
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Number of parameters on the drive.		
<b>Index:</b>	[0] = Read only [1] = Read & write		
<b>p7841[0...5]</b>	<b>PM serial no hot swap check / PM Serialno</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> Converter	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> -
	<b>Can be changed:</b> T		
	<b>Min</b> 0	<b>Max</b> 65535	<b>Factory setting</b> 0
<b>Description:</b>	Reads the power module serial number, which is stored in the control unit. At power up these serial number are verified, if any swapping of the CU or the PM had been taken place.		
<b>Index:</b>	[0] = Production site [1] = Production year after 2000 [2] = Production month [3] = Production day [4] = Production number per day [5] = Type - not used on all drives		
<b>Note:</b>	The parameter cannot be changed.		

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<b>p7844</b>	<b>Acceptance Test, Confirmation / Ack Accept. Test</b>		
	<b>Access level:</b> 3	<b>P-Group:</b> -	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> -
	<b>Can be changed:</b> T		
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>
	0	2	0
<b>Description:</b>	<p>After a CU/PM swap or a startup clone this parameter will be automatically set to 1. Also a fault F0395 will be set. By setting this parameter to 0 the acceptance test can be acknowledged. An Acceptance Test Log needs to be done.</p> <p>By setting this parameter to 2 the parameter clone will be undone and the previously stored parameters will be enabled.</p> <p>After reverting to the previous parameterset the drive will reset F0395 and P7844 = 0. In this case an Acceptance Test Log is still required.</p>		
<b>Values:</b>	<p>0: No Acceptance / Confirmation pending  1: Ack of Acceptance Test / Confirmation is pending  2: Undo Clone</p>		
<b>Note:</b>	<p>If no MMC clone has been performed during startup the setting 2 is not possible.</p> <p>On a safety board it is necessary to set the safety password before changing this parameter.  P0010 = 30  P9761 = password</p>		

<b>p8452</b>	<b>Dia Lock / Dia Lock</b>			
	<b>Access level:</b> 3	<b>P-Group:</b> Communications	<b>Data type:</b> Unsigned16	
	<b>Quick comm.</b> NO	<b>Active:</b> YES	<b>Data set:</b> -	
	<b>Can be changed:</b> T			
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>	
	-	-	0	
<b>Description:</b>	Disables or enables diagnostic alarm on Simatic S7.			
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>	<b>0 signal</b>
	00	Diagnosis lock	Yes	No
	01	Para fault lock	Yes	No
<b>Note:</b>	The parameter is only read after power cycle on.			
<b>p8455</b>	<b>Application ID / Application ID</b>			
	<b>Access level:</b> 3	<b>P-Group:</b> -	<b>Data type:</b> Integer32	
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -	
	<b>Can be changed:</b> U, T			
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>	
	-1	65535	-1	
<b>Description:</b>	The Application ID is sent to the drive by the PLC via the PRM telegram. It is stored in the Control Unit after an Acceptance Test / Confirmation has been performed (see F0395 / P7844). If the Application ID sent from the PLC is different to the stored one the drive will trip with F0395. The Application ID is used to prevent the drive accidentally being swapped to a different slot and therefore connected to a different motor.			
<b>Note:</b>	On a Safety Unit the Application ID can only be changed with the Safety Password being set (P0010 = 30, P9761 = safety password). P0010 must be reset to 0 after changing the Application ID			
<b>p8458</b>	<b>Clone Control / Clone Control</b>			
	<b>Access level:</b> 3	<b>P-Group:</b> Factory settings	<b>Data type:</b> Unsigned16	
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -	
	<b>Can be changed:</b> T			
	<b>Min</b>	<b>Max</b>	<b>Factory setting</b>	
	0	2	1	
<b>Description:</b>	This parameter specifies whether a cloning at startup will be performed. The File clone00.bin will be used. If no MMC is inserted there will be a normal startup.			
<b>Values:</b>	0:	No Startup Clone		
	1:	Once Startup Clone		
	2:	Always Startup Clone		
<b>Note:</b>	If a MMC is inserted without a valid file the drive will set a fault F0061 / F0063 / F0064 which can only be cleared by a powercycle.			

<b>p9601</b>		<b>SI enable parameter / SI enable</b>			
ICU24F	<b>Access level:</b> 3 <b>Quick comm.</b> NO <b>Can be changed:</b> -	<b>P-Group:</b> Safety Integrated <b>Active:</b> NO	<b>Data type:</b> Unsigned16 <b>Data set:</b> -		
	<b>Min</b> -	<b>Max</b> -	<b>Factory setting</b> 0010 bin		
<b>Description:</b>	<p>Safety parameter for enabling the individual safety control functions.</p> <ul style="list-style-type: none"> <li>Bit01 activates the forced dynamisation and processor selftest on selection of the STO. Warning A1699 can only be acknowledged when Bit01 is set. The switch-on of pulses is inhibited during the test (i.e. r0052 Bit06 = 1) for approximately 3.1 seconds.</li> </ul>				
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>	<b>0 signal</b>	<b>FP</b>
	00	reserved	Yes	No	-
	01	Enable forced dynamisation (self test) after STO	Yes	No	-
<b>Notice:</b>	The switch-off circuitry of the mechanical brake is tested during the forced dynamisation. For short periods (2 ms - 16 ms) the brake is controlled to open. In general the mechanical brake will require command signals longer than 20 ms. Care should be taken if a brake is used that has a reaction time of less than 20 ms.				
<b>p9603</b>		<b>SI Selection of Safety Source / SI Source select</b>			
ICU24F	<b>Access level:</b> 3 <b>Quick comm.</b> NO <b>Can be changed:</b> -	<b>P-Group:</b> Safety Integrated <b>Active:</b> NO	<b>Data type:</b> Unsigned16 <b>Data set:</b> -		
	<b>Min</b> -	<b>Max</b> -	<b>Factory setting</b> 0000 bin		
<b>Description:</b>	Safety parameter for selection of the safe rails. Each rail can be assigned to the safety functions "safe torque off (STO)", "safe stop 1 (SS1)" or "safely-limited speed (SLS)".				

<b>p9604</b>	<b>SI safety group select for SG1..5 / SI group select</b>		
ICU24F	<b>Access level:</b> 3 <b>Quick comm.</b> NO <b>Can be changed:</b> -	<b>P-Group:</b> Safety Integrated <b>Active:</b> NO	<b>Data type:</b> Unsigned16 <b>Data set:</b> -
	<b>Min</b> 1	<b>Max</b> 5	<b>Factory setting</b> 1
<b>Description:</b>	<p>Selection of the safety group via a safety multiplexer. Five safety groups are available and the ICU24F must be assigned to one group.</p> <p>The safety group determines which safety rail is configured to activate the safety function. The signal logic of the safety rails is low-active (24 V = inactive, 0 V = active).</p> <p>E.g. if safety rail 2 is configured with p9604 = p9804 = 2, the drive will ignore a 0 V (low-level) signal on safety rails G1, G3, G4 and G5. Only if safety rail 2 is at 0 V (low level), the request for activating the safety function is recognised.</p> <p>If a safety rail is configured but inactive the respective LED is lit. The respective LED flashes, if the safety rail is configured and active (i.e. at 0 V). The LED is off if the respective safety rail is not configured.</p>		
<b>Note:</b>	Safety rail 6 (G6) can be used for selecting a further safety function.		
<b>p9659</b>	<b>SI max time until forced dynam. / SI forc dynam time</b>		
ICU24F	<b>Access level:</b> 3 <b>Quick comm.</b> NO <b>Can be changed:</b> -	<b>P-Group:</b> Safety Integrated <b>Active:</b> NO	<b>Data type:</b> Floating Point <b>Data set:</b> -
	<b>Min</b> 0.1 [h]	<b>Max</b> 8760.0 [h]	<b>Factory setting</b> 8.0 [h]
<b>Description:</b>	<p>The time interval between forced dynamisation procedures is specified. The remaining time until a forced dynamisation is required is shown in r9660. When r9660 reaches zero, the time interval has expired and warning A1699 is activated.</p> <p>The warning solely informs that a forced dynamisation is required. The user should activate a forced dynamisation on the next occasion. The drive functionality will not be affected by the warning.</p> <p>The forced dynamisation is activated in the following cases:</p> <ul style="list-style-type: none"> <li>• after each power-up,</li> <li>• on de-selecting the STO when p9601 = p9801 = 2,</li> <li>• when leaving the passivated safe torque off (passivated STO).</li> <li>• when leaving safety commissioning,</li> </ul> <p>During forced dynamisation all shutdown paths are tested and a processor selftest is carried out.</p> <p>The timer for the forced dynamisation (see r9660) is reset to the value in p9659 and warning A1699 is cleared if the forced dynamisation was carried out successfully:</p>		
<b>r9660</b>	<b>CO: SI remain time until forc dynam / SI remaining time</b>		
ICU24F	<b>Access level:</b> 3 <b>Unit:</b> [h]	<b>P-Group:</b> Safety Integrated	<b>Data type:</b> Floating Point <b>Data set:</b> -
<b>Description:</b>	Parameter r9660 displays the remaining time until a forced dynamisation is required. When r9660 reaches zero, warning A1699 is issued and status Bit06 in parameter r9772 is set.		
<b>Note:</b>	<p>The warning A1699 and Bit06 of r9772 are only cleared when the dynamisation has been completed (see description of p9659).</p> <p>The resetting of r9660 to the value in p9659 will take place once the dynamisation has finished.</p> <p>The resolution of r9660 is 0.1 hour or 6 minutes.</p>		

<b>p9680</b>	<b>SI braking ramp delay / SI braking delay</b>		
ICU24F	<b>Access level:</b> 3 <b>Quick comm.</b> NO <b>Can be changed:</b> -	<b>P-Group:</b> Safety Integrated <b>Active:</b> NO	<b>Data type:</b> Unsigned32 <b>Data set:</b> -
	<b>Min</b> 10 [ms]	<b>Max</b> 99000 [ms]	<b>Factory setting</b> 250 [ms]
<b>Description:</b>	Time [in ms] between selecting the safe stop 1 and the activation of the monitoring ramp. The actual frequency is compared to the frequency of the monitoring ramp when the SS1 is active. If the actual frequency exceeds that of the monitoring ramp, a passivated safe torque off (passivated STO) is generated. For applications with changing loads, an increase of p9680/p9880 or p9691/p9891 is recommended. A larger deviation of the actual frequency from the reference is then acceptable.		
<b>Note:</b>	A value of 99000 deactivates the SS1 monitoring. Set p9880 accordingly. The ramping on selection of SLS or SS1 will however still follow the ramping time in p9681/p9881.		
<b>p9681</b>	<b>SI braking ramp down time / SI braking down ti</b>		
ICU24F	<b>Access level:</b> 3 <b>Quick comm.</b> NO <b>Can be changed:</b> -	<b>P-Group:</b> Safety Integrated <b>Active:</b> NO	<b>Data type:</b> Unsigned32 <b>Data set:</b> -
	<b>Min</b> 100 [ms]	<b>Max</b> 99000 [ms]	<b>Factory setting</b> 10000 [ms]
<b>Description:</b>	Defines the braking ramp down time for the safe stop 1 (SS1) in milliseconds. The ramp down time is used for the SS1 and the monitoring ramp. The total braking time $T_x$ can be derived where $f_x$ is the current frequency according to the following formulas: a) For activation of the SLS: $T_x = p9681 * (f_x - p9690) / 200 \text{ Hz}$ b) For activation of SS1: $T_x = p9681 * (f_x - p9682) / 200 \text{ Hz}$		
<b>Note:</b>	In contrast to other ramping times (e.g. p1120, p1121), the safety braking time is referred to 200 Hz and not to p1082. See formulas above.		
<b>p9682</b>	<b>SI minimum frequency for standstill detection / SI min standstill</b>		
ICU24F	<b>Access level:</b> 3 <b>Quick comm.</b> NO <b>Can be changed:</b> -	<b>P-Group:</b> Safety Integrated <b>Active:</b> NO	<b>Data type:</b> Floating Point <b>Data set:</b> -
	<b>Min</b> 2.0 [Hz]	<b>Max</b> 20.0 [Hz]	<b>Factory setting</b> 5.0 [Hz]
<b>Description:</b>	A frequency below the threshold of p9682/p9882 is considered standstill. If the SS1 has been selected, the safe torque off (STO) will be activated.		
<b>p9690</b>	<b>SI setpoint for SLS / SI setpoint SLS</b>		
ICU24F	<b>Access level:</b> 3 <b>Quick comm.</b> NO <b>Can be changed:</b> -	<b>P-Group:</b> Safety Integrated <b>Active:</b> NO	<b>Data type:</b> Floating Point <b>Data set:</b> -
	<b>Min</b> 2.0 [Hz]	<b>Max</b> 300.0 [Hz]	<b>Factory setting</b> 10.0 [Hz]
<b>Description:</b>	Frequency setpoint that is used when the safely limited speed (SLS) is selected. Depending on the setting in p9692/p9892 the frequency of p9690/p9890 may also serve as a frequency threshold instead of a setpoint. (see p9692)		
<b>Note:</b>	For applications with changing loads, an increase of p9680/p9880 or p9691/p9891 is recommended. If the "safely limited speed" (SLS) is selected while the output frequency is below the setpoint value, Bit04 and Bit05 will be set simultaneously in r9772.		

<b>p9691 SI tolerance for SLS / SI tolerance SLS</b>			
ICU24F	<b>Access level:</b> 3	<b>P-Group:</b> Safety Integrated	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> -		
	<b>Min</b> 5.0 [Hz]	<b>Max</b> 303.0 [Hz]	<b>Factory setting</b> 13.0 [Hz]
<b>Description:</b>	Upper tolerance margin for the SLS. If the actual frequency at initiation of the safely limited speed lies below the value of p9691/p9891 and later on exceeds that value a passivated safe torque off (passivated STO) is generated. The tolerance defined by the difference p9691 - p9690 (or p9891 - p9890) is also used for the monitoring ramp when the SS1 is active. For applications with changing loads it is recommended to increase p9691/p9891.		
<b>Note:</b>	The value in p9691 needs to be larger than the value in p9690. This condition is checked when leaving the safety commissioning.		
<b>p9692 SI response to selecting SLS / SI SLS response</b>			
ICU24F	<b>Access level:</b> 3	<b>P-Group:</b> Safety Integrated	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> -		
	<b>Min</b> 0	<b>Max</b> 2	<b>Factory setting</b> 1
<b>Description:</b>	Defines the response after the initiation of the safely limited speed (SLS).  p9692 = p9892 = 0 (mode 0): The fact that the output frequency at initiation of the safely limited speed exceeds the safe limit value parameterised in p9691/p9891 is interpreted as fault, wherefore a safe stop 1 followed by a passivated safe torque off is initiated. If, however, the output frequency at initiation of the safely limited speed lies below the upper limit parameterised in p9691/p9891 the drives frequency control channel is blocked, wherefore the actual drive frequency cannot be controlled by an external control (e.g. PLC, MotorPoti, USS, etc.) anymore. The drive will then be locked at the current frequency.  p9692 = p9892 = 1 (mode 1): The fact that the output frequency at initiation of the safely limited speed exceeds the safe limit value is not interpreted as fault, wherefore the safe stop 1 function is initiated automatically. The target frequency is not zero (as it usually is at SS1) but rather a parameterisable value (p9690/p9890) just below the tolerance value parameterised in p9691/p9891. If the output frequency lies below the parameterised frequency (p9690/p9890) the brake ramp does not need to be activated and the output frequency does not need to be changed, thus the behaviour would be the same as safely limited speed mode 0. After initiating the function safely limited speed and braking the drive down to the parameterised frequency (p9690/p9890) by using the safe stop 1 the drives frequency control channel is blocked, wherefore the actual drive frequency cannot be controlled by an external control (e.g. PLC, MotorPoti, USS, etc.) anymore. The drive will then be locked at a constant frequency, which is parameterised in p9690/p9890.  p9692 = p9892 = 2 (mode 2): After initiating the safely limited speed function only the monitoring ramp will be activated. The safe stop 1 will not be activated, therefore, it would be the responsibility of the customer to ramp the drive down to or below the SLS setpoint (p9690/p9890), before activating SLS. The drive frequency is then controlled by the external control (e.g. PLC, MotorPoti, USS, etc.). Now, setting the control channel to a frequency, which exceeds the parameterised limit in p9691/p9891, is interpreted as fault condition, wherefore a passivated safe torque off is initiated immediately.		
<b>Values:</b>	0: Initiate STO with braking ramp and drive fault when $f > f_{SLS}$ 1: Activate braking ramp while $f > f_{SLS}$ 2: Initiate STO without braking ramp and with drive fault while $f$		



<b>r9760</b>	<b>SI internal password / SI intern password</b>		
ICU24F	<b>Access level:</b> 3 <b>Unit:</b> -	<b>P-Group:</b> Safety Integrated	<b>Data type:</b> Unsigned32 <b>Data set:</b> -
<b>Description:</b>	<p>Contains the current safety password. For safety commissioning or safety reset the value of r9760 has to be entered into p9761.</p> <p>If the password in p9761 is not set correctly to the value in r9760, none of the safety parameters can be written and a fault F1659 is generated.</p> <p>This parameter is changed automatically to the password in p9763 when the new value of p9762 is identical to the confirmation password in p9763.</p>		
<b>p9761</b>	<b>SI input password / SI input password</b>		
ICU24F	<b>Access level:</b> 3 <b>Quick comm.</b> NO <b>Can be changed:</b> -	<b>P-Group:</b> Safety Integrated <b>Active:</b> NO	<b>Data type:</b> Unsigned32 <b>Data set:</b> -
	<b>Min</b> 1000	<b>Max</b> 99999	<b>Factory setting</b> 1000
<b>Description:</b>	<p>The safety password of r9760 is entered in this parameter to get access to changing the safety parameters. If p9761 is not identical to r9760 a fault F1659 is generated.</p>		
<b>Note:</b>	<p>The default value of this parameter is 0. This indicates that no password has been set.</p> <p>The range of the password values are 1000 to 99999.</p>		
<b>p9762</b>	<b>SI change password / SI change password</b>		
ICU24F	<b>Access level:</b> 3 <b>Quick comm.</b> NO <b>Can be changed:</b> -	<b>P-Group:</b> Safety Integrated <b>Active:</b> NO	<b>Data type:</b> Unsigned32 <b>Data set:</b> -
	<b>Min</b> 1000	<b>Max</b> 99999	<b>Factory setting</b> 1000
<b>Description:</b>	<p>Parameter to change the safety password. The new safety password is entered in p9762 and then confirmed by entering same value in p9763.</p>		
<b>Note:</b>	<p>The default value of this parameter is 0. This indicates that no password has been set.</p> <p>The range of the password values are 1000 to 99999.</p> <p>The values in p9762 and p9763 are set to zero automatically when the new password is accepted.</p>		
<b>p9763</b>	<b>SI change password confirmation / SI passwd. confirm</b>		
ICU24F	<b>Access level:</b> 3 <b>Quick comm.</b> NO <b>Can be changed:</b> -	<b>P-Group:</b> Safety Integrated <b>Active:</b> NO	<b>Data type:</b> Unsigned32 <b>Data set:</b> -
	<b>Min</b> 1000	<b>Max</b> 99999	<b>Factory setting</b> 1000
<b>Description:</b>	<p>Confirm a safety password change. Parameter needs to be set to the same value as p9762. Only then then password change of p9762 is stored in r9760 as new password. If p9763 is not identical to p9762, both values are cleared and r9760 is not updated.</p>		
<b>Note:</b>	<p>The default value of this parameter is 0. This indicates that no password has been set.</p> <p>The range of the password values are 1000 to 99999.</p> <p>The values in p9762 and p9763 are set to zero automatically when the new password is accepted.</p>		

<b>r9770[0...2]</b>	<b>SI Firmware version / SI FW version</b>				
ICU24F	<b>Access level:</b> 3	<b>P-Group:</b> Safety Integrated	<b>Data type:</b> Unsigned16		
	<b>Unit:</b> -		<b>Data set:</b> -		
<b>Description:</b>	Displays the Safety Integrated and PROFIsafe version.				
<b>Example:</b>	r9770[0] = 2, r9770[1] = 1, r9770[2] = 3 is for safety version V02.01.0003 r9770[3] = 2, r9770[4] = 1, r9770[5] = 3 is for PROFIsafe version V02.01.0003				
<b>Index:</b>	[0] = Safety major release [1] = Safety minor release [2] = Safety baselevel (patch)				
<b>r9771.0...1</b>	<b>CO/BO: SI hardware functions / SI hw functions</b>				
ICU24F	<b>Access level:</b> 3	<b>P-Group:</b> Safety Integrated	<b>Data type:</b> Unsigned16		
	<b>Unit:</b> -		<b>Data set:</b> -		
<b>Description:</b>	Displays the available safety functions of the drive (bit coded).				
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>	<b>0 signal</b>	<b>FP</b>
	00	Safe shutdown path available	Yes	No	-
	01	Sensorless safety speed monitoring available	Yes	No	-
<b>Note:</b>					
<b>r9772.0...15</b>	<b>CO/BO: SI status word / SI StatWd</b>				
ICU24F	<b>Access level:</b> 3	<b>P-Group:</b> Safety Integrated	<b>Data type:</b> Unsigned16		
	<b>Unit:</b> -		<b>Data set:</b> -		
<b>Description:</b>	Displays the status of safety integrated.				
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>	<b>0 signal</b>	<b>FP</b>
	00	Safe torque off (STO) selected	Yes	No	-
	01	Safe torque off (STO) activated	Yes	No	-
	02	Safe stop 1 (SS1) selected	Yes	No	-
	03	Safety monitoring ramp active	Yes	No	-
	04	Safely limited speed (SLS) selected	Yes	No	-
	05	SLS limit reached	Yes	No	-
	06	reserved	Yes	No	-
	07	reserved	Yes	No	-
	08	Passivated STO active, drive fault	Yes	No	-
	14	Safe Brake closed	Yes	No	-
	15	Dynamisation required	Yes	No	-
<b>Note:</b>	For further informations to the meaning of the bits see the descriptions of the safety functions STO, SS1 and SLS in the manual.				
<b>r9798</b>	<b>SI display checksum / SI act. checksum</b>				
ICU24F	<b>Access level:</b> 3	<b>P-Group:</b> Safety Integrated	<b>Data type:</b> Unsigned16		
	<b>Unit:</b> -		<b>Data set:</b> -		
<b>Description:</b>	Display of safety checksum for P1. The checksum changes when CRC-relevant safety parameters of P1 are changed (parameter range p9600 - p9699, except p9659).				
<b>Note:</b>	This checksum must be identical to the value in r9898 before the safety commissioning can be finished via p3900 = 10. If r9798 differs from r9898 the CRC-relevant safety parameters of P1 differ from that of P2. Check the parameters of P1 against that of P2 and correct the mistake. When r9798 and r9898 differ, the safety commissioning can always be left via p3900 = 11, thus discarding the last changes.				

<b>p9799</b>	<b>SI parameter checksum / SI checksum</b>			
ICU24F	<b>Access level:</b> 3 <b>Quick comm.</b> NO <b>Can be changed:</b> -	<b>P-Group:</b> Safety Integrated <b>Active:</b> NO	<b>Data type:</b> Unsigned16 <b>Data set:</b> -	
	<b>Min</b> 0000 hex	<b>Max</b> FFFF hex	<b>Factory setting</b> E21D hex	
<b>Description:</b>	Confirm checksum of the P1 safety parameters. The correct value has to be entered before leaving the safety commissioning with p3900 = 10. Only if r9798, r9898, p9799 and p9899 are all identical, the commissioning can be finished.			
<b>Note:</b>	Enter the reading of r9798 or r9898 into p9799 once no more safety parameters need to be changed.			
<b>p9801</b>	<b>SI enable parameter / SI enable param.</b>			
ICU24F	<b>Access level:</b> 3 <b>Quick comm.</b> NO <b>Can be changed:</b> -	<b>P-Group:</b> Safety Integrated <b>Active:</b> NO	<b>Data type:</b> Unsigned16 <b>Data set:</b> -	
	<b>Min</b> -	<b>Max</b> -	<b>Factory setting</b> 0010 bin	
<b>Description:</b>	Double of parameter p9601. See there.			
<b>Bit field:</b>	<b>Bit</b>	<b>Signal name</b>	<b>1 signal</b>	<b>0 signal</b>
	00	reserved	Yes	No
	01	Enable forced dynamisation (self test) after STO	Yes	No
<b>Note:</b>	On non-safety hardware units, p9801 is zero by default.			
<b>p9803</b>	<b>SI Selection of Safety Source / SI Source select</b>			
ICU24F	<b>Access level:</b> 3 <b>Quick comm.</b> NO <b>Can be changed:</b> -	<b>P-Group:</b> Safety Integrated <b>Active:</b> NO	<b>Data type:</b> Unsigned16 <b>Data set:</b> -	
	<b>Min</b> -	<b>Max</b> -	<b>Factory setting</b> 0000 bin	
<b>Description:</b>	Double of parameter p9603. See there.			
<b>p9804</b>	<b>SI safety group select SG1..5 / SI group select</b>			
ICU24F	<b>Access level:</b> 3 <b>Quick comm.</b> NO <b>Can be changed:</b> -	<b>P-Group:</b> Safety Integrated <b>Active:</b> NO	<b>Data type:</b> Unsigned16 <b>Data set:</b> -	
	<b>Min</b> 1	<b>Max</b> 5	<b>Factory setting</b> 1	
<b>Description:</b>	Double of parameter p9604. See there.			
<b>p9880</b>	<b>SI braking ramp delay / SI braking delay</b>			
ICU24F	<b>Access level:</b> 3 <b>Quick comm.</b> NO <b>Can be changed:</b> -	<b>P-Group:</b> Safety Integrated <b>Active:</b> NO	<b>Data type:</b> Floating Point <b>Data set:</b> -	
	<b>Min</b> 0.010 [s]	<b>Max</b> 99.000 [s]	<b>Factory setting</b> 0.250 [s]	
<b>Description:</b>	Double of parameter p9680. See there.			
<b>Note:</b>	The delay time in p9880 is entered in seconds!			

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<b>p9881</b>	<b>SI braking ramp down time / SI ramp down time</b>		
ICU24F	<b>Access level:</b> 3	<b>P-Group:</b> Safety Integrated	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> -		
	<b>Min</b> 0.100 [s]	<b>Max</b> 99.000 [s]	<b>Factory setting</b> 10.000 [s]
<b>Description:</b>	Double of parameter p9681. See there.		
<b>Note:</b>	The ramp down time in p9881 is entered in seconds!		

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<b>p9882</b>	<b>SI minimum frequency for standstill detection / SI min standstill</b>		
ICU24F	<b>Access level:</b> 3	<b>P-Group:</b> Safety Integrated	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> -		
	<b>Min</b> 0.0020 [kHz]	<b>Max</b> 0.0200 [kHz]	<b>Factory setting</b> 0.0050 [kHz]
<b>Description:</b>	Double of parameter p9682. See there.		
<b>Note:</b>	The standstill detection frequency in p9882 is entered in kHz!		

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<b>p9890</b>	<b>SI setpoint for SLS / SI setpoint SLS</b>		
ICU24F	<b>Access level:</b> 3	<b>P-Group:</b> Safety Integrated	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> -		
	<b>Min</b> 0.0020 [kHz]	<b>Max</b> 0.3000 [kHz]	<b>Factory setting</b> 0.0100 [kHz]
<b>Description:</b>	Double of parameter p9690. See there.		
<b>Note:</b>	The setpoint in p9890 is entered in kHz!		

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<b>p9891</b>	<b>SI tolerance for SLS / SI tolerance SLS</b>		
ICU24F	<b>Access level:</b> 3	<b>P-Group:</b> Safety Integrated	<b>Data type:</b> Floating Point
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> -		
	<b>Min</b> 0.0050 [kHz]	<b>Max</b> 0.303 [kHz]	<b>Factory setting</b> 0.0130 [kHz]
<b>Description:</b>	Double of parameter p9691. See there.		
<b>Note:</b>	The tolerance in p9891 is entered in kHz!		

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<b>p9892</b>	<b>SI response to selecting SLS / SI SLS response</b>		
ICU24F	<b>Access level:</b> 3	<b>P-Group:</b> Safety Integrated	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> -		
	<b>Min</b> 0	<b>Max</b> 2	<b>Factory setting</b> 1
<b>Description:</b>	Double of parameter p9692. See there.		
<b>Values:</b>	0: Initiate STO with braking ramp and drive fault when $f > f_{SLS}$ 1: Activate braking ramp while $f > f_{SLS}$ 2: Initiate STO without braking ramp and with drive fault while $f$		

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<b>r9898</b>	<b>SI display checksum / SI act. checksum</b>		
ICU24F	<b>Access level:</b> 3	<b>P-Group:</b> Safety Integrated	<b>Data type:</b> Unsigned16
	<b>Unit:</b> -		<b>Data set:</b> -
<b>Description:</b>	Display of safety checksum for P2 parameters. The checksum changes when safety parameters for P2 are changed (parameter range p9800 - p9892).		
<b>Note:</b>	This checksum must be identical to the value in r9798 before the safety commissioning can be finished via p3900 = 10. If r9898 differs from r9798, the safety parameters on P2 differ from the safety parameters on P1. Check the safety parameters and correct the mistake. The safety commissioning can always be left via p3900 = 11, thus discarding the last changes.		

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<b>p9899</b>	<b>SI parameter checksum / SI checksum</b>		
ICU24F	<b>Access level:</b> 3	<b>P-Group:</b> Safety Integrated	<b>Data type:</b> Unsigned16
	<b>Quick comm.</b> NO	<b>Active:</b> NO	<b>Data set:</b> -
	<b>Can be changed:</b> -		
	<b>Min</b> 0000 hex	<b>Max</b> FFFF hex	<b>Factory setting</b> E21D hex
<b>Description:</b>	Confirm checksum of the safety parameters.		
<b>Note:</b>	Enter the reading of r9798 or r9898 into p9899 once the safety parametrisation is complete.		

## 1.3 Command and Drive Data Sets – Overview

### 1.3.1 Command Data Sets (CDS)

Product: ET200S, Version: 3005200, Language: eng

p0700[0...2]	Selection of command source / Command source sel
p0719[0...2]	Selection of cmd. & freq. setp. / Cmd.&freq.setp.sel
p0840[0...2]	BI: ON/OFF1 / ON/OFF1
p0842[0...2]	BI: ON reverse/OFF1 / BI:ON reverse/OFF1
p0844[0...2]	BI: 1. OFF2 / 1. OFF2
p0845[0...2]	BI: 2. OFF2 / 2. OFF2
p0848[0...2]	BI: 1. OFF3 / 1. OFF3
p0849[0...2]	BI: 2. OFF3 / 2. OFF3
p0852[0...2]	BI: Pulse enable / Pulse enable
p1000[0...2]	Selection of frequency setpoint / Freq setp. select.
p1055[0...2]	BI: Enable JOG right / Enable JOG ->
p1056[0...2]	BI: Enable JOG left / Enable JOG <-
p1070[0...2]	CI: Main setpoint / Main setpoint
p1071[0...2]	CI: Main setpoint scaling / Main setp scal
p1074[0...2]	BI: Disable additional setpoint / Disab.add.setp
p1075[0...2]	CI: Additional setpoint / Add. setpoint
p1076[0...2]	CI: Additional setpoint scaling / Add. setp.scal
p1110[0...2]	BI: Inhibit neg. freq. setpoint / Inh. neg. setp
p1113[0...2]	BI: Reverse / Reverse
p1124[0...2]	BI: Enable JOG ramp times / Enable JOG ramp
p1140[0...2]	BI: RFG enable / RFG enable
p1141[0...2]	BI: RFG start / RFG start
p1142[0...2]	BI: RFG enable setpoint / RFG enable setp
p1330[0...2]	CI: Voltage setpoint / Voltage setp.
p1477[0...2]	BI: Set integrator of n-ctrl. / Set integrator
p1478[0...2]	CI: Set integrator value n-ctrl. / Set int. value
p1492[0...2]	BI: Enable droop / Enable droop
p1500[0...2]	Selection of torque setpoint / Torque setp. sel.
p1501[0...2]	BI: Change to torque control / BI:-> torque ctrl.
p1503[0...2]	CI: Torque setpoint / Torque setp.
p1511[0...2]	CI: Additional torque setpoint / Add. trq. setp
p1522[0...2]	CI: Upper torque limit / Upper trq. lim
p1523[0...2]	CI: Lower torque limit / Lower trq. lim
p2103[0...2]	BI: 1. Faults acknowledgement / 1. Faults ackn
p2104[0...2]	BI: 2. Faults acknowledgement / 2. Faults ackn
p2106[0...2]	BI: External fault / External fault
p2480[0...2]	BI: Enable positioning ramp down / Enable positioning
p2803[0...2]	Enable FastFFBs / Enable FastFFBs

Parameters P0800, P0801, P1522, P1523, P2200 will be altered in the state "Ready" only, all other parameters will be altered during data set switchover (CDS) in the state "Run".

### 1.3.2 Drive Data Sets (DDS)

Product: ET200S, Version: 3005200, Language: eng

r0035[0...2]	CO: Act. motor temperature / Act. mot.temp.
p0291[0...2]	Inverter protection / Inverter protect.
p0300[0...2]	Select motor type / Select motor type
p0304[0...2]	Rated motor voltage / Rated mot. voltage
p0305[0...2]	Rated motor current / Rated mot. current
p0307[0...2]	Rated motor power / Rated motor power
p0308[0...2]	Rated motor cosPhi / Rated mot. cosPhi
p0309[0...2]	Rated motor efficiency / Rated efficiency
p0310[0...2]	Rated motor frequency / Rated motor freq.
p0311[0...2]	Rated motor speed / Rated motor speed
r0313[0...2]	Motor pole pairs / Motor pole pairs
p0314[0...2]	Motor pole pair number / Motor pole pair no
p0320[0...2]	Motor magnetizing current / Motor magnet. cur.
r0330[0...2]	Rated motor slip / Rated motor slip
r0331[0...2]	Rated magnetization current / Rated magnet. cur.
r0332[0...2]	Rated power factor / Rated power factor
r0333[0...2]	Rated motor torque / Rated motor torque
p0335[0...2]	Motor cooling / Motor cooling
p0340[0...2]	Calculation of motor parameters / Calc of mot.params
p0341[0...2]	Motor inertia [kg*m <sup>2</sup> ] / Inertia [kg*m <sup>2</sup> ]
p0342[0...2]	Total/motor inertia ratio / Tot/mot inert.rat.
p0344[0...2]	Motor weight / Motor weight
r0345[0...2]	Motor start-up time / Mot. start-up time
p0346[0...2]	Magnetization time / Magnetization time
p0347[0...2]	Demagnetization time / Demagnet. time
p0350[0...2]	Stator resistance (line) / Stator res. (L)
p0352[0...2]	Cable resistance / Cable resistance
p0354[0...2]	Rotor resistance / Rotor resistance
p0356[0...2]	Stator leakage inductance / Stator leak.induct
p0358[0...2]	Rotor leakage inductance / Rotor leak.induct.
p0360[0...2]	Main inductance / Main inductance
p0362[0...2]	Magnetizing curve flux 1 / Magnet.curve flux1
p0363[0...2]	Magnetizing curve flux 2 / Magnet.curve flux2
p0364[0...2]	Magnetizing curve flux 3 / Magnet.curve flux3
p0365[0...2]	Magnetizing curve flux 4 / Magnet.curve flux4
p0366[0...2]	Magnetizing curve imag 1 / Magnet.curve imag1
p0367[0...2]	Magnetizing curve imag 2 / Magnet.curve imag2
p0368[0...2]	Magnetizing curve imag 3 / Magnet.curve imag3
p0369[0...2]	Magnetizing curve imag 4 / Magnet.curve imag4
r0370[0...2]	Stator resistance [%] / Stator res. [%]
r0372[0...2]	Cable resistance [%] / Cable res. [%]
r0373[0...2]	Rated stator resistance [%] / Rated stat.res.[%]
r0374[0...2]	Rotor resistance [%] / Rotor res. [%]
r0376[0...2]	Rated rotor resistance [%] / Rated rot. res.[%]
r0377[0...2]	Total leakage reactance [%] / Tot.leak.react.[%]
r0382[0...2]	Main reactance [%] / Main reactance [%]
r0384[0...2]	Rotor time constant / Rotor time const.
r0386[0...2]	Total leakage time constant / Total leak. Tconst
p0400[0...2]	Select encoder type / Select enc. type
p0405[0...2]	Enables selection of pulse types / Enables pulse type

p0408[0...2]	Encoder pulses per revolution / Enc pulses per rev
p0410[0...2]	Reverses internal direction sense / Rev dir sense
p0491[0...2]	Reaction on speed signal loss / Select enc. type
p0492[0...2]	Allowed speed difference / Allowed speed dif
p0494[0...2]	Delay speed loss reaction / Dly speed loss rec
p0601[0...2]	Motor temperature sensor / Motor temp. sensor
p0604[0...2]	Threshold motor temperature / Thresh. mot. temp.
p0610[0...2]	Motor I2t temperature reaction / I2t temp. reaction
p0621[0...2]	Motor temp. ident after restart / Mot.temp ident.
p0622[0...2]	Magnetizing time for temp id after start up / Magnet. t temp id
r0623[0...2]	CO: Display for the identified stator resistance / Act. stator resist
p0625[0...2]	Ambient motor temperature / Ambient mot. temp.
p0626[0...2]	Overtemperature stator iron / Overtemp.stat.iron
p0627[0...2]	Overtemperature stator winding / Overtemp.stat.wind
p0628[0...2]	Overtemperature rotor winding / Overtemp.rot. wind
r0630[0...2]	CO: Motor model ambient temperature / Mot. model amb. te
r0631[0...2]	CO: Stator iron temperature / Stat.iron temp
r0632[0...2]	CO: Stator winding temperature / Stat.wind.temp
r0633[0...2]	CO: Rotor winding temperature / Rot. wind.temp
p0640[0...2]	Motor overload factor [%] / Motor ovl fact [%]
p1058[0...2]	JOG frequency / JOG frequency
p1059[0...2]	JOG frequency left / JOG frequency <-
p1060[0...2]	JOG ramp-up time / JOG ramp-up time
p1061[0...2]	JOG ramp-down time / JOG ramp-down time
p1080[0...2]	Min. frequency / Min. frequency
p1082[0...2]	Max. frequency / Max. frequency
p1091[0...2]	Skip frequency / Skip frequency
p1092[0...2]	Skip frequency 2 / Skip frequency 2
p1093[0...2]	Skip frequency 3 / Skip frequency 3
p1094[0...2]	Skip frequency 4 / Skip frequency 4
p1101[0...2]	Skip frequency bandwidth / Skipfreq bandwidth
p1120[0...2]	Ramp-up time / Ramp-up time
p1121[0...2]	Ramp-down time / Ramp-down time
p1130[0...2]	Ramp-up initial rounding time / Ramp-up ini. Trnd
p1131[0...2]	Ramp-up final rounding time / Ramp-up final Trnd
p1132[0...2]	Ramp-down initial rounding time / Ramp-dwn ini. Trnd
p1133[0...2]	Ramp-down final rounding time / Ramp-dwn fin. Trnd
p1134[0...2]	Rounding type / Rounding type
p1135[0...2]	OFF3 ramp-down time / OFF3 ramp-dwn time
p1202[0...2]	Motor-current: Flying start / Mot. cur: Flystart
p1203[0...2]	Search rate: Flying start / SrchRate: Flystart
p1227[0...2]	Zero speed detection monitoring time / Zero speed time
p1253[0...2]	Vdc-controller or I-max regen controller output limitation / regen.ctl outp.lim
p1300[0...2]	Control mode / Control mode
p1310[0...2]	Continuous boost / Continuous boost
p1311[0...2]	Acceleration boost / Acceleration boost
p1312[0...2]	Starting boost / Starting boost
p1316[0...2]	Boost end frequency / Boost end freq.
p1320[0...2]	Programmable V/f freq. coord. 1 / V/f freq. coord. 1
p1321[0...2]	Programmable V/f volt. coord. 1 / V/f volt. coord. 1
p1322[0...2]	Programmable V/f freq. coord. 2 / V/f freq. coord. 2
p1323[0...2]	Programmable V/f volt. coord. 2 / V/f volt. coord. 2
p1324[0...2]	Programmable V/f freq. coord. 3 / V/f freq. coord. 3



p1325[0...2]	Programmable V/f volt. coord. 3 / V/f volt. coord. 3
p1333[0...2]	Start frequency for FCC / Start freq for FCC
p1334[0...2]	Slip compensation activation range / Slip c. act. range
p1335[0...2]	Slip compensation / Slip compensation
p1336[0...2]	Slip limit / Slip limit
p1338[0...2]	Resonance damping gain V/f / Res.damp. gain V/f
p1340[0...2]	I <sub>max</sub> controller prop. gain / I <sub>max</sub> ctrl prp gain
p1341[0...2]	I <sub>max</sub> controller integral time / I <sub>max</sub> ctrl int time
p1345[0...2]	I <sub>max</sub> voltage ctrl. prop. gain / I <sub>max</sub> volt prp gain
p1346[0...2]	I <sub>max</sub> voltage ctrl. integral time / I <sub>max</sub> volt int time
p1350[0...2]	Voltage soft start / Voltage soft start
p1400[0...2]	Configuration of speed control / Config. of n-ctrl.
p1442[0...2]	Filter time for act. speed / Filter time n_act.
p1452[0...2]	Filter time for act.speed (SLVC) / Act.spd.filt. SLVC
p1460[0...2]	Gain speed controller / Gain of n-ctrl.
p1462[0...2]	Integral time speed controller / T <sub>n</sub> of n-ctrl.
p1470[0...2]	Gain speed controller (SLVC) / Gain n-ctrl (SLVC)
p1472[0...2]	Integral time n-ctrl. (SLVC) / T <sub>n</sub> of n-ctrl. SLVC
p1488[0...2]	Droop input source / Droop input source
p1489[0...2]	Droop scaling / Droop scaling
p1496[0...2]	Scaling accel. precontrol / Scal acc. prectrl.
p1499[0...2]	Scaling accel. torque control / Scal acc. trq ctrl
p1520[0...2]	CO: Upper torque limit / Upper trq. lim
p1521[0...2]	CO: Lower torque limit / Lower trq. lim
p1525[0...2]	Scaling lower torque limit / Scal. low trq. lim
p1530[0...2]	Motoring power limitation / Motoring power lim
p1531[0...2]	Regenerative power limitation / Regener. power lim
p1570[0...2]	CO: Fixed value flux setpoint / Fval flux setp
p1574[0...2]	Dynamic voltage headroom / Dyn. volt headroom
p1580[0...2]	Efficiency optimization / Efficiency optimiz
p1582[0...2]	Smooth time for flux setpoint / Flux setp. Tsmooth
p1596[0...2]	Int. time field weak. controller / Int.time weak.ctrl
p1610[0...2]	Continuous torque boost (SLVC) / Cont. torque boost
p1611[0...2]	Acc. torque boost (SLVC) / Acc trq boost SLVC
p1654[0...2]	Smooth time for I <sub>sq</sub> setpoint / I <sub>sq</sub> setp. Tsmooth
p1715[0...2]	Gain current controller / Gain current ctrl.
p1717[0...2]	Integral time current controller / Int.time cur. ctrl
p1745[0...2]	Flux variance limit in stall / Flux var.lim.stall
p1750[0...2]	Control word of motor model / Motor model CtrlWd
p1752[0...2]	Start-freq. speed adaption (VC with encoder) / Start-freq. (VC)
p1755[0...2]	Start-freq. motor model (SLVC) / Start-freq. (SLVC)
p1756[0...2]	Hyst.-freq. motor model (SLVC) / Hyst. freq. (SLVC)
p1758[0...2]	T(wait) transit to open-loop / T(wait) trans.->OL
p1759[0...2]	T(wait) transit to closed-loop / T(wait) trans.->CL
p1764[0...2]	K <sub>p</sub> of n-adaption (SLVC) / K <sub>p</sub> n-adapt. (SLVC)
p1767[0...2]	T <sub>n</sub> of n-adaption (SLVC) / T <sub>n</sub> n-adapt. (SLVC)
p1780[0...2]	Control word of R <sub>s</sub> /R <sub>r</sub> -adaption / CtrlWd R <sub>s</sub> /R <sub>r</sub> adapt
p1781[0...2]	T <sub>n</sub> of R <sub>s</sub> -adaption / T <sub>n</sub> of R <sub>s</sub> -adaption
p1786[0...2]	T <sub>n</sub> of X <sub>m</sub> -adaption / T <sub>n</sub> of X <sub>m</sub> -adaption
p1800[0...2]	Pulse frequency / Pulse frequency
p1803[0...2]	Max. modulation / Max. modulation
p1820[0...2]	Reverse output phase sequence / Rev.outp.phase seq
p1909[0...2]	Ctrl. word of motor data ident. / Ctrl.mot.data id.

p2000[0...2]	Reference frequency / Reference freq.
p2001[0...2]	Reference voltage / Reference voltage
p2002[0...2]	Reference current / Reference current
p2003[0...2]	Reference torque / Reference torque
p2004[0...2]	Reference power / Reference power
p2150[0...2]	Hysteresis frequency f_hys / Hyst. freq. f_hys
p2151[0...2]	CI: Speed setpoint for messages / n-Set for msg
p2152[0...2]	Delay time of f>fmax / Delay f>fmax
p2153[0...2]	Time-constant speed filter / Tconst. speed filt
p2155[0...2]	Threshold frequency f_1 / Threshold freq f_1
p2156[0...2]	Delay time of threshold freq f_1 / Delay time of f_1
p2157[0...2]	Threshold frequency f_2 / Threshold freq f_2
p2158[0...2]	Delay time of threshold freq f_2 / Delay time of f_2
p2159[0...2]	Threshold frequency f_3 / Threshold freq f_3
p2160[0...2]	Delay time of threshold freq f_3 / Delay time of f_3
p2161[0...2]	Min. threshold for freq. setp. / Setp.min.threshold
p2162[0...2]	Hysteresis freq. for overspeed / Overspd. hyst.freq
p2163[0...2]	Entry freq. for perm. deviation / Entry freq. deviat
p2164[0...2]	Hysteresis frequency deviation / Hyster freq deviat
p2165[0...2]	Delay time permitted deviation / Delay_T perm. dev.
p2166[0...2]	Delay time ramp up completed / Delay_T rampUpCmpl
p2167[0...2]	Switch-off frequency f_off / SwOff freq. f_off
p2168[0...2]	Delay time T_off / Delay time T_off
p2170[0...2]	Threshold current I_thresh / Threshold current
p2171[0...2]	Delay time current / Delay time current
p2172[0...2]	Threshold DC-link voltage / Vdc threshold
p2173[0...2]	Delay time DC-link voltage / Vdc delay time
p2174[0...2]	Torque threshold M_thresh / Torque threshold
p2176[0...2]	Delay time for torque threshold / Delay time torque
p2177[0...2]	Delay time for motor is blocked / Delay_T MotBlocked
p2178[0...2]	Delay time for motor pulled out / Delay_T MotPullOut
p2181[0...2]	Belt failure detection mode / Belt fail detect
p2182[0...2]	Belt threshold frequency 1 / Belt threshold f_1
p2183[0...2]	Belt threshold frequency 2 / Belt threshold f_2
p2184[0...2]	Belt threshold frequency 3 / Belt threshold f_3
p2185[0...2]	Upper torque threshold 1 / Upper trq. thresh1
p2186[0...2]	Lower torque threshold 1 / Lower trq. thresh1
p2187[0...2]	Upper torque threshold 2 / Upper trq. thresh2
p2188[0...2]	Lower torque threshold 2 / Lower trq. thresh2
p2189[0...2]	Upper torque threshold 3 / Upper trq. thresh3
p2190[0...2]	Lower torque threshold 3 / Lower trq. thresh3
p2192[0...2]	Time delay for belt failure / Belt fail delay_T
p2470[0...2]	Encoder speed scaling factor / Encod speed scal
p2481[0...2]	Gearbox ratio input / Gearbox ratio in
p2482[0...2]	Gearbox ratio output / Gearbox ratio out
p2484[0...2]	No. of shaft turns = 1 Unit / Position ref. unit
p2487[0...2]	Positional error trim value / Positional trim / Positional error
p2488[0...2]	Distance / No. of revolutions / Distance / No. rev

## 1.4 Connector/Binector (BICO)-Parameters

### 1.4.1 Binector Input Parameters

Product: ET200S, Version: 3005200, Language: eng

p0806	BI: Inhibit panel access / Inhibit panel acce
p0810	BI: CDS bit 0 (Hand/Auto) / CDS bit 0
p0811	BI: CDS bit 1 / CDS bit 1
p0820	BI: DDS bit 0 / DDS bit 0
p0821	BI: DDS bit 1 / DDS bit 1
p0840[0...2]	BI: ON/OFF1 / ON/OFF1
p0842[0...2]	BI: ON reverse/OFF1 / BI:ON reverse/OFF1
p0844[0...2]	BI: 1. OFF2 / 1. OFF2
p0845[0...2]	BI: 2. OFF2 / 2. OFF2
p0848[0...2]	BI: 1. OFF3 / 1. OFF3
p0849[0...2]	BI: 2. OFF3 / 2. OFF3
p0852[0...2]	BI: Pulse enable / Pulse enable
p1055[0...2]	BI: Enable JOG right / Enable JOG ->
p1056[0...2]	BI: Enable JOG left / Enable JOG <-
p1074[0...2]	BI: Disable additional setpoint / Disab.add.setp
p1110[0...2]	BI: Inhibit neg. freq. setpoint / Inh. neg. setp
p1113[0...2]	BI: Reverse / Reverse
p1124[0...2]	BI: Enable JOG ramp times / Enable JOG ramp
p1140[0...2]	BI: RFG enable / RFG enable
p1141[0...2]	BI: RFG start / RFG start
p1142[0...2]	BI: RFG enable setpoint / RFG enable setp
p1477[0...2]	BI: Set integrator of n-ctrl. / Set integrator
p1492[0...2]	BI: Enable droop / Enable droop
p1501[0...2]	BI: Change to torque control / BI:-> torque ctrl.
p2103[0...2]	BI: 1. Faults acknowledgement / 1. Faults ackn
p2104[0...2]	BI: 2. Faults acknowledgement / 2. Faults ackn
p2106[0...2]	BI: External fault / External fault
p2480[0...2]	BI: Enable positioning ramp down / Enable positioning
p2810[0...1]	BI: AND 1 / AND 1
p2812[0...1]	BI: AND 2 / AND 2
p2814[0...1]	BI: AND 3 / AND 3
p2816[0...1]	BI: OR 1 / OR 1
p2818[0...1]	BI: OR 2 / OR 2
p2820[0...1]	BI: OR 3 / OR 3
p2822[0...1]	BI: XOR 1 / XOR 1
p2824[0...1]	BI: XOR 2 / XOR 2
p2826[0...1]	BI: XOR 3 / XOR 3
p2828	BI: NOT 1 / NOT 1
p2830	BI: NOT 2 / NOT 2
p2832	BI: NOT 3 / NOT 3
p2834[0...3]	BI: D-FF 1 / D-FF 1
p2837[0...3]	BI: D-FF 2 / D-FF 2
p2840[0...1]	BI: RS-FF 1 / RS-FF 1
p2843[0...1]	BI: RS-FF 2 / RS-FF 2
p2846[0...1]	BI: RS-FF 3 / RS-FF 3
p2849	BI: Timer 1 / Timer 1
p2854	BI: Timer 2 / Timer 2
p2859	BI: Timer 3 / Timer 3
p2864	BI: Timer 4 / Timer 4
p2940	BI: Release Wobble function / Rel Wobble

## 1.4.2 Connector Input Parameters

Product: ET200S, Version: 3005200, Language: eng

p0095[0...9]	CI: Display PZD signals / PZD signals
p1070[0...2]	CI: Main setpoint / Main setpoint
p1071[0...2]	CI: Main setpoint scaling / Main setp scal
p1075[0...2]	CI: Additional setpoint / Add. setpoint
p1076[0...2]	CI: Additional setpoint scaling / Add. setp.scal
p1330[0...2]	CI: Voltage setpoint / Voltage setp.
p1478[0...2]	CI: Set integrator value n-ctrl. / Set int. value
p1503[0...2]	CI: Torque setpoint / Torque setp.
p1511[0...2]	CI: Additional torque setpoint / Add. trq. setp
p1522[0...2]	CI: Upper torque limit / Upper trq. lim
p1523[0...2]	CI: Lower torque limit / Lower trq. lim
p2016[0...7]	CI: PZD to USS on RS232 / PZD->USS
p2051[0...7]	CI: PZD to Fieldbus / PZD to FB
p2151[0...2]	CI: Speed setpoint for messages / n-Set for msg
p2869[0...1]	CI: ADD 1 / ADD 1
p2871[0...1]	CI: ADD 2 / ADD 2
p2873[0...1]	CI: SUB 1 / SUB 1
p2875[0...1]	CI: SUB 2 / SUB 2
p2877[0...1]	CI: MUL 1 / MUL 1
p2879[0...1]	CI: MUL 2 / MUL 2
p2881[0...1]	CI: DIV 1 / DIV 1
p2883[0...1]	CI: DIV 2 / DIV 2
p2885[0...1]	CI: CMP 1 / CMP 1
p2887[0...1]	CI: CMP 2 / CMP 2

### 1.4.3 Binector Output Parameters

Product: ET200S, Version: 3005200, Language: eng

r0807.0	BO: Displays client access / Displays client ac
r2032.0...15	BO: CtrlWrd1 from USS on RS232 / CtrlWd1 <- USS
r2033.4...15	BO: CtrlWrd2 from USS on RS232 / CtrlWd2 <- USS
r2090.0...15	BO: Control word 1 from Fieldbus / CtrlWd1 <- FB
r2091.4...15	BO: Control word 2 from Fieldbus / CtrlWd2 <- FB
r2811.0	BO: AND 1 / AND 1
r2813.0	BO: AND 2 / AND 2
r2815.0	BO: AND 3 / AND 3
r2817.0	BO: OR 1 / OR 1
r2819.0	BO: OR 2 / OR 2
r2821.0	BO: OR 3 / OR 3
r2823.0	BO: XOR 1 / XOR 1
r2825.0	BO: XOR 2 / XOR 2
r2827.0	BO: XOR 3 / XOR 3
r2829.0	BO: NOT 1 / NOT 1
r2831.0	BO: NOT 2 / NOT 2
r2833.0	BO: NOT 3 / NOT 3
r2835.0	BO: Q D-FF 1 / Q D-FF 1
r2836.0	BO: NOT-Q D-FF 1 / NOT-Q D-FF 1
r2838.0	BO: Q D-FF 2 / Q D-FF 2
r2839.0	BO: NOT-Q D-FF 2 / NOT-Q D-FF 2
r2841.0	BO: Q RS-FF 1 / Q RS-FF 1
r2842.0	BO: NOT-Q RS-FF 1 / NOT-Q RS-FF 1
r2844.0	BO: Q RS-FF 2 / Q RS-FF 2
r2845.0	BO: NOT-Q RS-FF 2 / NOT-Q RS-FF 2
r2847.0	BO: Q RS-FF 3 / Q RS-FF 3
r2848.0	BO: NOT-Q RS-FF 3 / NOT-Q RS-FF 3
r2852.0	BO: Timer 1 / Timer 1
r2853.0	BO: Nout timer 1 / Nout timer 1
r2857.0	BO: Timer 2 / Timer 2
r2858.0	BO: Nout timer 2 / Nout timer 2
r2862.0	BO: Timer 3 / Timer 3
r2863.0	BO: Nout timer 3 / Nout timer 3
r2867.0	BO: Timer 4 / Timer 4
r2868.0	BO: Nout timer 4 / Nout timer 4
r2886.0	BO: CMP 1 / CMP 1
r2888.0	BO: CMP 2 / CMP 2

### 1.4.4 Connector Output Parameters

Product: ET200S, Version: 3005200, Language: eng

r0020	CO: Freq. setpoint before RFG / Setp before RFG
r0021	CO: Act. filtered frequency / Act. filt. freq.
r0024	CO: Act. filt. output frequency / Act. outp. freq
r0025	CO: Act. output voltage / Act.outp. volt
r0026[0...1]	CO: Act. filtered DC-link volt. / Act. fil. Vdc
r0027	CO: Act. output current / Act. outp. cur
r0029	CO: Flux gen. current / Flux gen. cur.
r0030	CO: Torque gen. current / Torque gen.cur
r0031	CO: Act. filtered torque / Act fil torque
r0032	CO: Act. filtered power / Act fil. power
r0035[0...2]	CO: Act. motor temperature / Act. mot.temp.
r0036	CO: Inverter overload utilization / Invert ovl util
r0037[0...1]	CO: Inverter temperature [°C] / Inverter temp.
r0038	CO: Fil. power factor / Fil.power fact
r0039	CO: Energy consumpt. meter [kWh] / Energy meter
r0051[0...1]	CO: Active Drive Dataset (DDS) / Active DDS
r0061	CO: Act. rotor speed / Act rotor speed
r0062	CO: Freq. setpoint / Freq. setpoint
r0063	CO: Act. frequency / Act. frequency
r0064	CO: Dev. frequency controller / Dev. freq ctrl
r0065	CO: Slip frequency / Slip frequency
r0066	CO: Act. output frequency / Act. outp freq
r0067	CO: Act. output current limit / Outp cur limit
r0068	CO: Output current / Output current
r0069[0...5]	CO: Act. phase currents / Act. phase cur
r0070	CO: Act. DC-link voltage / Act. Vdc
r0071	CO: Max. output voltage / Max. outp.volt
r0072	CO: Act. output voltage / Act. outp.volt
r0074	CO: Act. modulation / Act modulation
r0075	CO: Current setpoint Isd / Cur. setp. Isd
r0076	CO: Act. current Isd / Act. cur. Isd
r0077	CO: Current setpoint Isq / Cur. setp. Isq
r0078	CO: Act. current Isq / Act. cur. Isq
r0079	CO: Torque setpoint (total) / Total trq setp
r0080	CO: Act. torque / Act. torque
r0084	CO: Act. air gap flux / Air gap flux
r0085	CO: Act. re-active current / Act.re-active cur
r0086	CO: Act. active current / Act.active cur
r0087	CO: Act. power factor / Act.power fact
r0090	CO: Act. rotor angle / Act rotor angle
r0094	CO: Transformation angle / Transf. angle
r0394	CO: Stator resistance IGBT [%] / Stat. res.IGBT
r0395	CO: Total stator resistance [%] / Total stat.res
r0396	CO: Act. rotor resistance / Act rotor res.
r0485	CO: Encoder counter value / Encoder count val.
r0623[0...2]	CO: Display for the identified stator resistance / Act. stator resist
r0630[0...2]	CO: Motor model ambient temperature / Mot. model amb. te
r0631[0...2]	CO: Stator iron temperature / Stat.iron temp
r0632[0...2]	CO: Stator winding temperature / Stat.wind.temp
r0633[0...2]	CO: Rotor winding temperature / Rot. wind.temp

r0947[0...63]	CO: Last fault code / Last fault code
r0949[0...63]	CO: Fault value / Fault value
r1078	CO: Total frequency setpoint / Tot. freq.setp
r1079	CO: Selected frequency setpoint / Sel. freq.setp
r1114	CO: Freq. setp. after dir. ctrl. / Setp<-dir.ctrl.
r1119	CO: Freq. setpoint before RFG / Setp before RFG
r1170	CO: Frequency setpoint after RFG / Setp. after RFG
r1315	CO: Total boost voltage / Total boost V
r1337	CO: V/f slip frequency / V/f slip freq.
r1343	CO: I <sub>max</sub> controller freq. output / CO:I <sub>max</sub> ctrl Foutp
r1344	CO: I <sub>max</sub> controller volt. output / CO:I <sub>max</sub> ctrl Voutp
r1438	CO: Freq. setpoint to controller / Freq. setp ctl
r1445	CO: Act. filtered frequency / Act. filt freq
r1482	CO: Integral output of n-ctrl. / Int.outp n-ctrl
r1490	CO: Droop frequency / Droop freq.
r1508	CO: Torque setpoint / Torque setp.
r1515	CO: Additional torque setpoint / Add. trq. setp
r1518	CO: Acceleration torque / Accel. torque
p1520[0...2]	CO: Upper torque limit / Upper trq. lim
p1521[0...2]	CO: Lower torque limit / Lower trq. lim
r1526	CO: Upper torque limitation / Upper trq. lim
r1527	CO: Lower torque limitation / Lower trq. lim
r1536	CO: Max. trq. motoring current / Max trq mot cur
r1537	CO: Max trq regenerative current / Max trq reg cur
r1538	CO: Upper torque limit (total) / Total up TrqLim
r1539	CO: Lower torque limit (total) / Total lw TrqLim
p1570[0...2]	CO: Fixed value flux setpoint / Fval flux setp
r1583	CO: Flux setpoint (smoothed) / Smoothed setp.
r1597	CO: Outp. field weak. controller / Outp.weak. ctrl
r1598	CO: Flux setpoint (total) / Total flux setp
r1718	CO: Output of Isq controller / Outp. Isq ctrl
r1719	CO: Integral output of Isq ctrl. / Int. outp. Isq
r1723	CO: Output of Isd controller / Outp. Isd ctrl
r1724	CO: Integral output of Isd ctrl. / Int. outp. Isd
r1725	CO: Integral limit of Isd ctrl. / Int. limit Isd
r1728	CO: Decoupling voltage / Decoupl. volt
r1746	CO: Actual flux variance / Act. flux variance
r1770	CO: Prop. output of n-adaption / Prop outp n-ad
r1771	CO: Int. output of n-adaption / Int. outp n-ad
r1778	CO: Flux angle difference / Flux angle diff
r1782	CO: Output of Rs-adaptation / Output Rs-adaption
r1787	CO: Output of Xm-adaption / Outp. Xm-adaption
r1801[0...1]	CO: Pulse frequency / Pulse frequency
r2015[0...7]	CO: PZD from USS on RS232 / PZD<-USS
r2050[0...7]	CO: PZD from Fieldbus / PZD from FB
r2059[0...4]	CO: Displays SOL link stats for Sol Master. / Disp SOL stats
r2110[0...3]	CO: Warning number / Warning number
r2131	CO: Last fault number code / Last fault code
r2132	CO: First warning number code / First warning code
r2169	CO: Act. filtered frequency / CO:Act. filt. freq
r2477	CO: Act. scaled encoder speed / Act scal enc speed
r2478	CO: Act. scaled encoder frequency / Act scal enc freq
r2489[0...2]	CO: Tracking parameter / Track / Tracking parameter

r2870	CO: ADD 1 / ADD 1
r2872	CO: ADD 2 / ADD 2
r2874	CO: SUB 1 / SUB 1
r2876	CO: SUB 2 / SUB 2
r2878	CO: MUL 1 / MUL 1
r2880	CO: MUL 2 / MUL 2
r2882	CO: DIV 1 / DIV 1
r2884	CO: DIV 2 / DIV 2
p2889	CO: Fixed setpoint 1 in [%] / Fixed setp 1 %
p2890	CO: Fixed setpoint 2 in [%] / Fixed setp 2 %
r2955	CO: Wobble signal output / Wobble output
r9660	CO: SI remain time until forc dynam / SI remaining time

## 1.4.5 Connector/Binector Output Parameters

Product: ET200S, Version: 3005200, Language: eng

r0050	CO/BO: Active Command Dataset / Active CDS
r0052.0...15	CO/BO: Act. status word 1 / Act StatWd1
r0053.1...9	CO/BO: Act. status word 2 / Act StatWd2
r0054.0...15	CO/BO: Act. control word 1 / Act CtrlWd1
r0055.4...15	CO/BO: Act. control word 2 / Act CtrlWd2
r0056.0...13	CO/BO: Status of motor control / CO/BO:Stat MotCtrl
r0403.0...4	CO/BO: Encoder status word / Enc. StatWd
r1407.0...15	CO/BO: Status 2 of motor control / Stat 2 ctrl
r1751.0...15	CO/BO: Status word of motor model / Motor model StatWd
r2197.0...12	CO/BO: Monitoring word 1 / Monitor Wd1
r2198.0...12	CO/BO: Monitoring word 2 / Monitor Wd2
r3113.0...15	CO/BO: Fault Bit Array / Fault Bit Array
r9771.0...1	CO/BO: SI hardware functions / SI hw functions
r9772.0...15	CO/BO: SI status word / SI StatWd



# Function diagrams

# 2

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## **2.2 Symbols in funktion diagrams**

### **Function diagrams**

---

0010 – Symbols in funktion diagrams

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---

Fig. 2-1 0010 – Symbols in funktion diagrams

Explanation of symbols used in the function diagrams

**Setting parameters**

ParName Parameter text  
 Min ... Max [Dim] Minimum ... Maximum value [Unit]  
 PNumber.C/D [3] (Default) Parameter number.Command/Drive data set [Number indexes] (Default)

**Monitoring parameters**

ParName [Dim] Parameter text [Unit]  
 PNumber.C/D [3] Parameter number.Command/Drive data set [Number indexes]

**BICO parameters**

**Binector input (Setting parameter)**

ParName [Dim] Parameter text [Unit]  
 PNum.C/D Parameter number.Command/Drive data set  
 (Default) (Default)

**Binector output (Monitoring parameter)**

ParName Parameter text  
 PNum Parameter number

**Connector input (Setting parameter)**

ParName Parameter text  
 PNum.C/D [3] Parameter number.Command/Drive data set [Number indexes]  
 (Default) (Default)

**Connector output (Monitoring parameter)**

ParName [Hz] Parameter text [Unit]  
 PNum [3] Parameter number [Number indexes]

**Connector/Binector output (Monitoring parameter)**

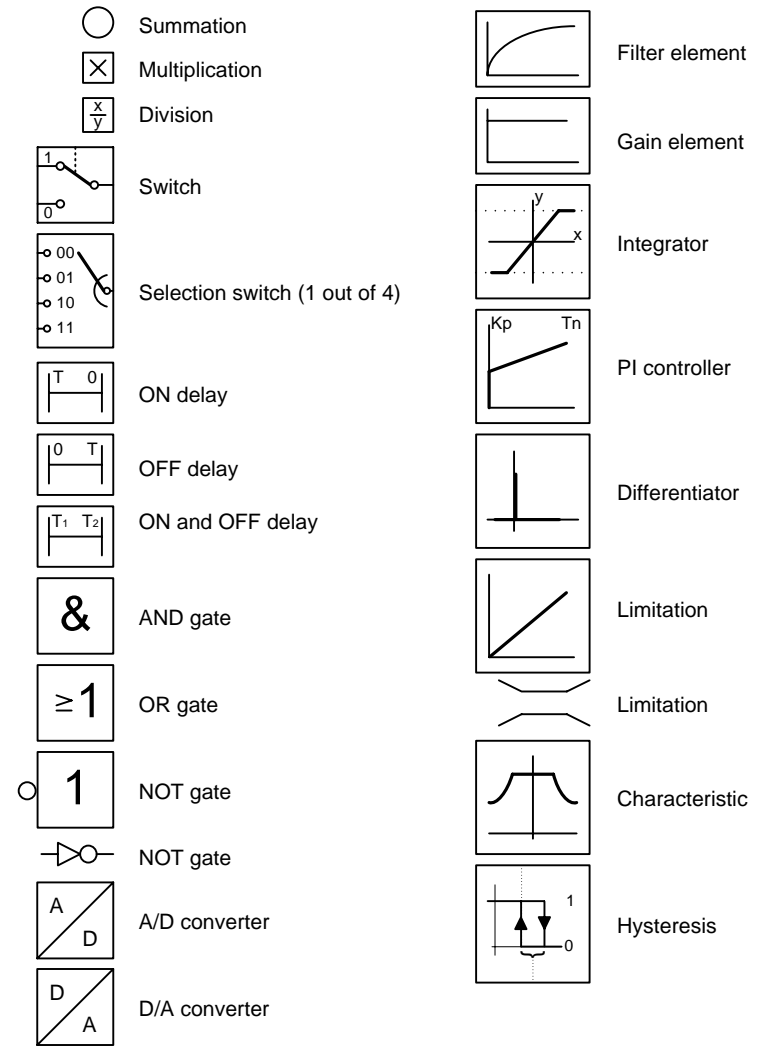
ParName Parameter text  
 PNum Parameter number  
 PNum

Sheet 2300

Details refer to

1

Reference to function diagram



1	2	3	4	5	6	7	8
					0010_Symbols.vsd	Function diagram	
Symbols in funktion diagrams					02.04.2007 V3.0	ET 200S FC	
							- 10 -

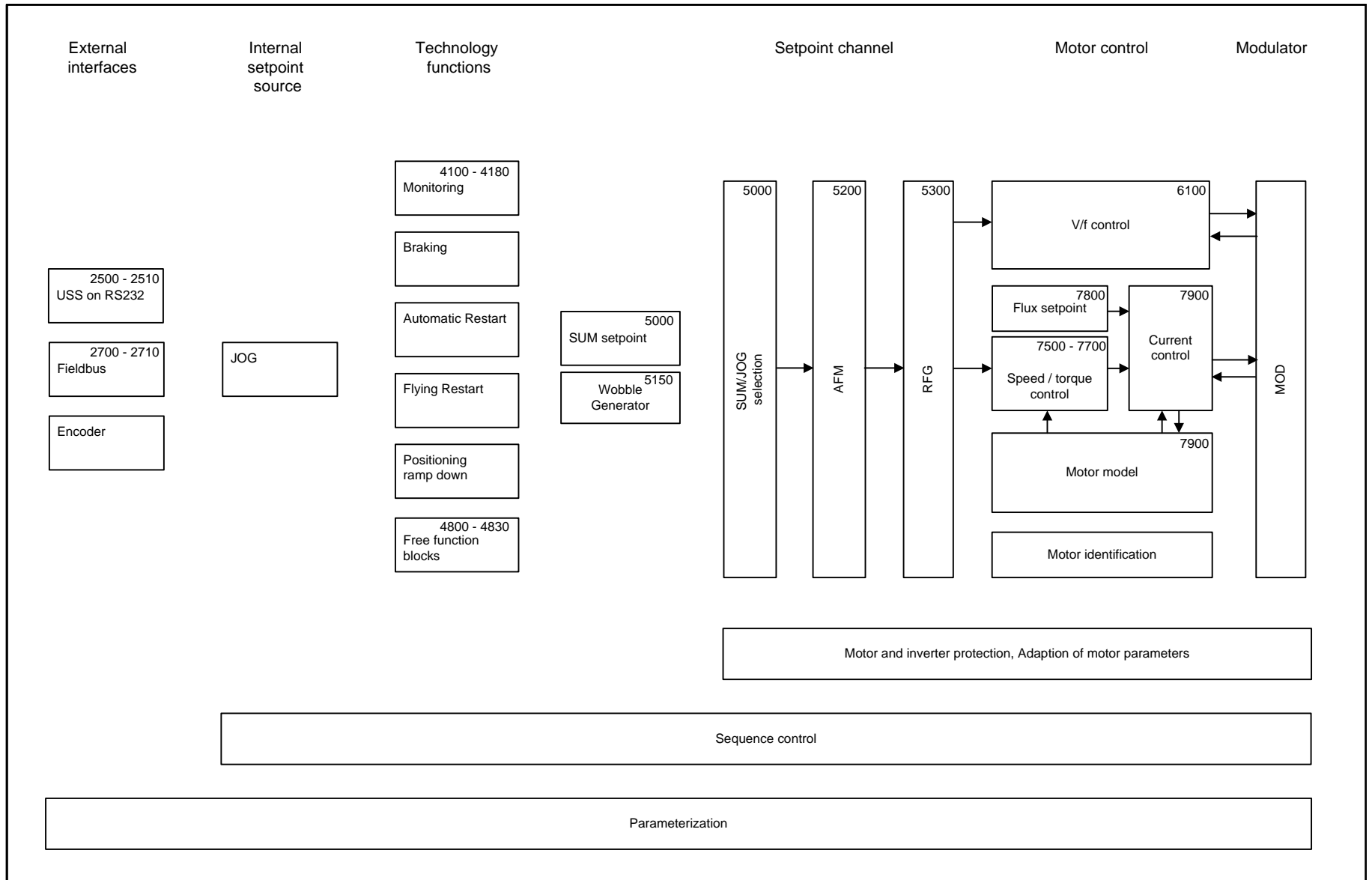
## 2.3 Overview

### Function plans

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---



1	2	3	4	5	6	7	8
Overview					1100_Overview.vsd	Function diagram	
General Overview					02.04.2007 V3.0	ET 200S FC	
<b>- 1100 -</b>							

Fig. 2-2 1100 – General Overview

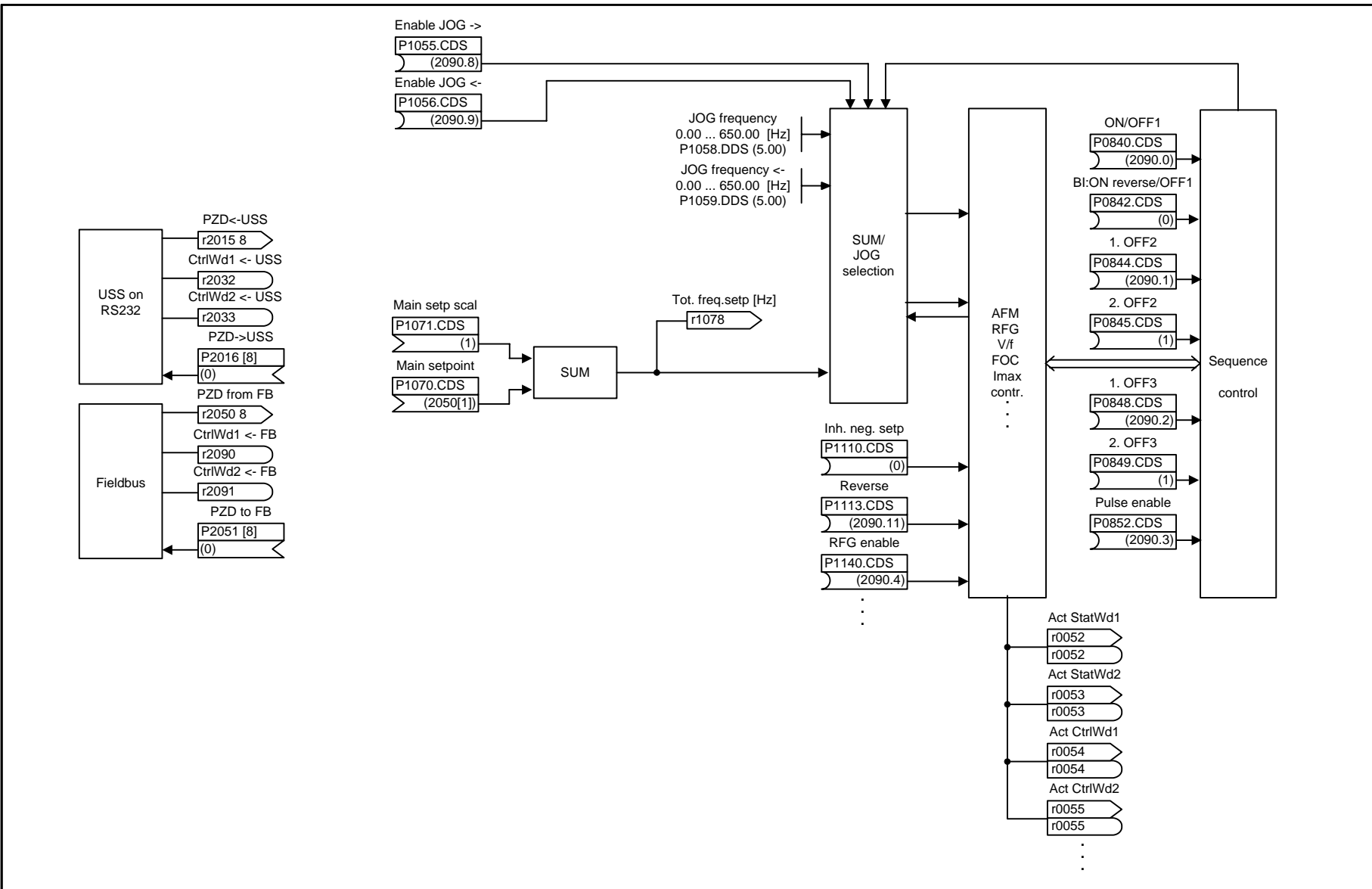


Fig. 2-3 1200 – Connection of External and Internal Setpoints

1	2	3	4	5	6	7	8
Overview					1200_BICO_Overv.vsd	Function diagram	
Connection of External and Internal Setpoints					02.04.2007 V3.0	ET 200S FC	
- 1200 -							



## 2.4 External Interfaces

### Function diagrams

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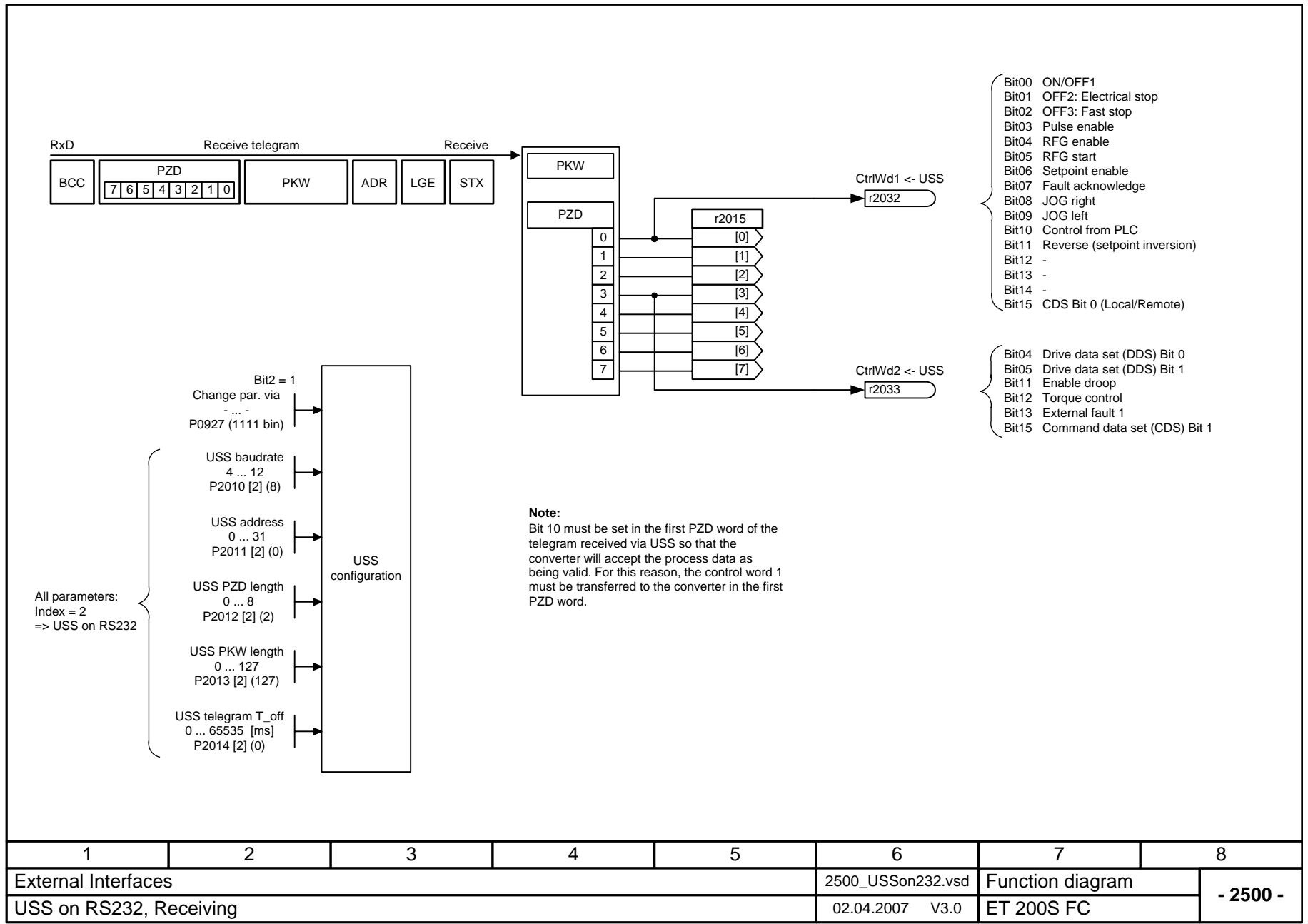


Fig. 2-4 2500 – USS on RS232, Receiving

1	2	3	4	5	6	7	8
External Interfaces					2500_USSon232.vsd	Function diagram	
USS on RS232, Receiving					02.04.2007 V3.0	ET 200S FC	
- 2500 -							

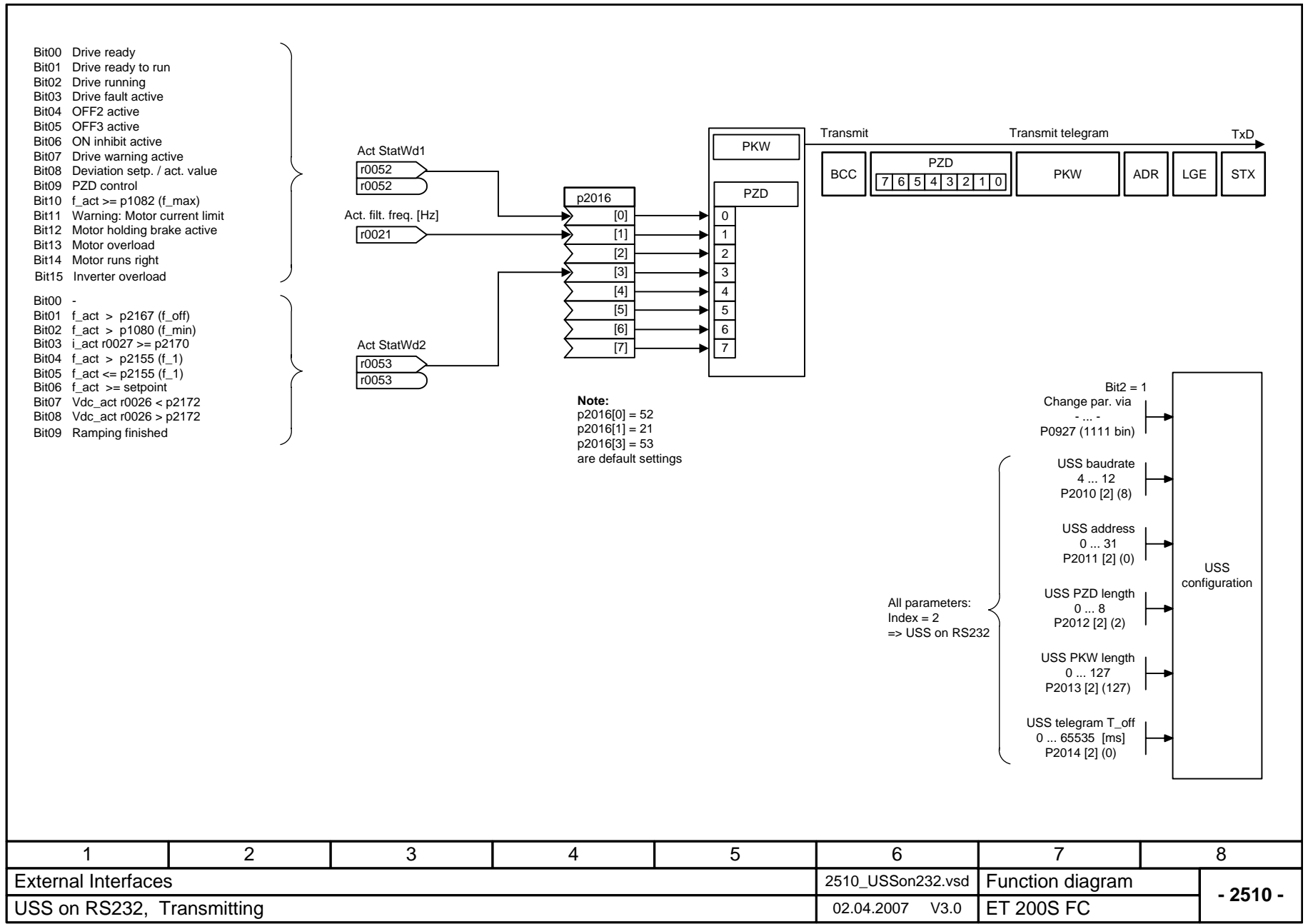


Fig. 2-5 2510 – USS on RS232, Transmitting

1	2	3	4	5	6	7	8
External Interfaces					2510_USSon232.vsd	Function diagram	
USS on RS232, Transmitting					02.04.2007 V3.0	ET 200S FC	
							<b>- 2510 -</b>

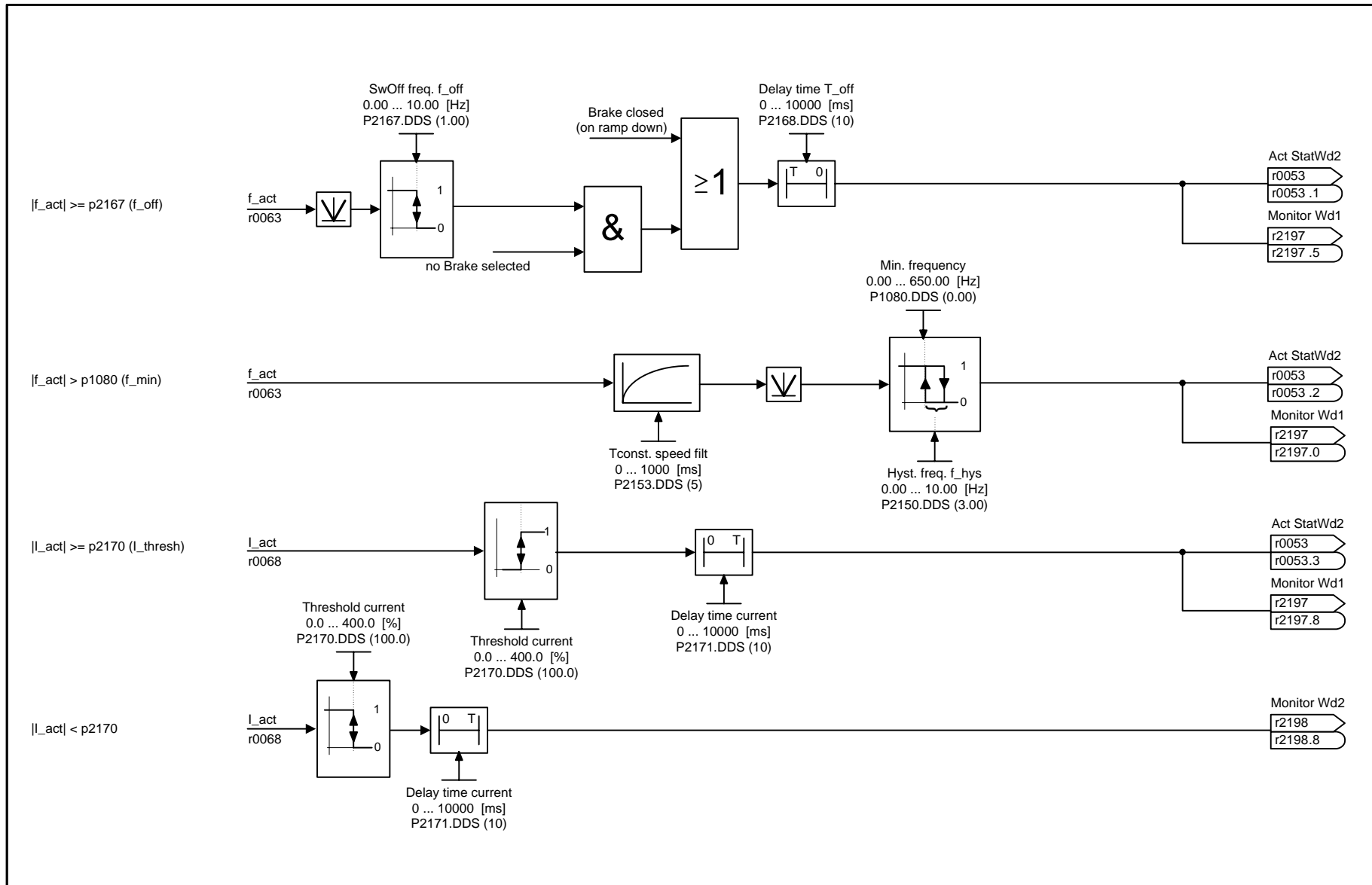
## 2.5 Technology Functions

### Function diagrams

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4110 – Monitoring	2-222
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4160 – Control word 2 (r0055)	2-224
4170 – Status word 1 (r0052)	2-225
4180 – Status word 2 (r0053)	2-226

---



1	2	3	4	5	6	7	8
Technology Functions					4100_SW21.vsd	Function diagram	
Monitoring					02.04.2007 V3.0	ET 200S FC	

- 4100 -

Fig. 2-6 4100 – Monitoring

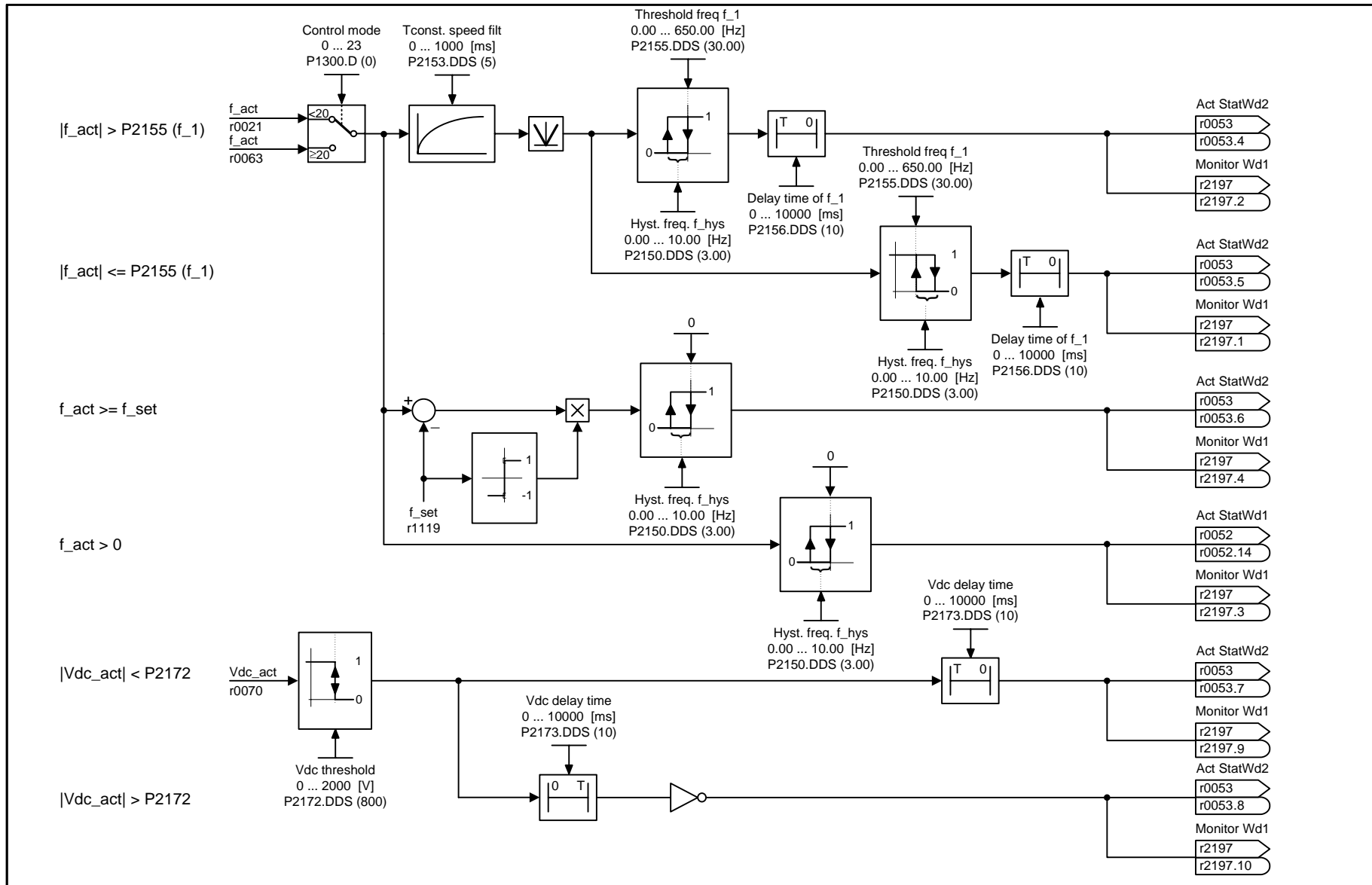
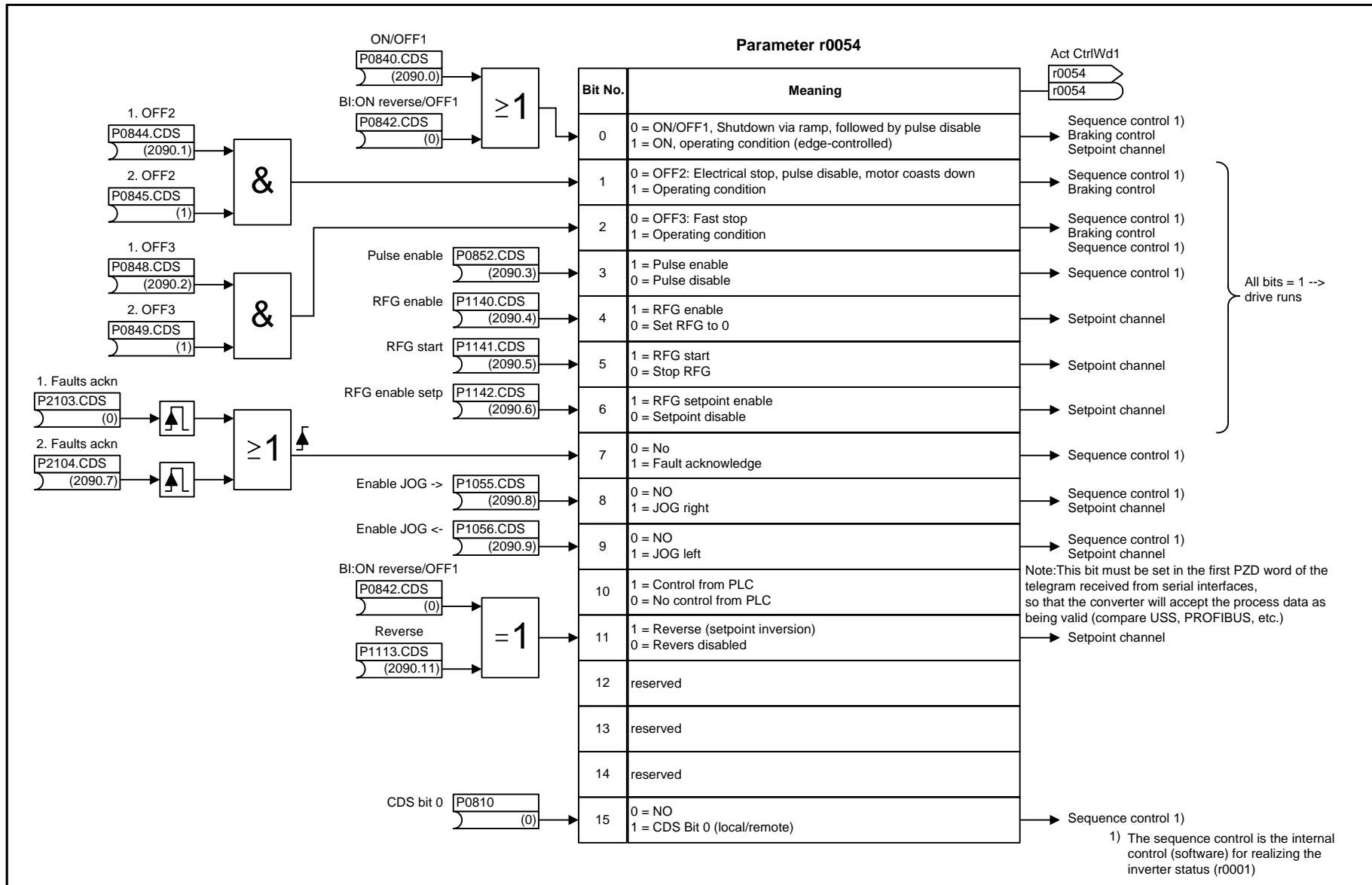


Fig. 2-7 4110 – Monitoring

1	2	3	4	5	6	7	8
Technology Functions					4110_SW22.vsd	Function diagram	
Monitoring					02.04.2007 V3.0	ET 200S FC	



1	2	3	4	5	6	7	8
Technology Functions					4150_STW1.vsd	Function diagram	
Control word 1 (r0054)					02.04.2007 V3.0	ET 200S FC	
							<b>- 4150 -</b>

Fig. 2-8 4150 – Control word 1 (r0054)

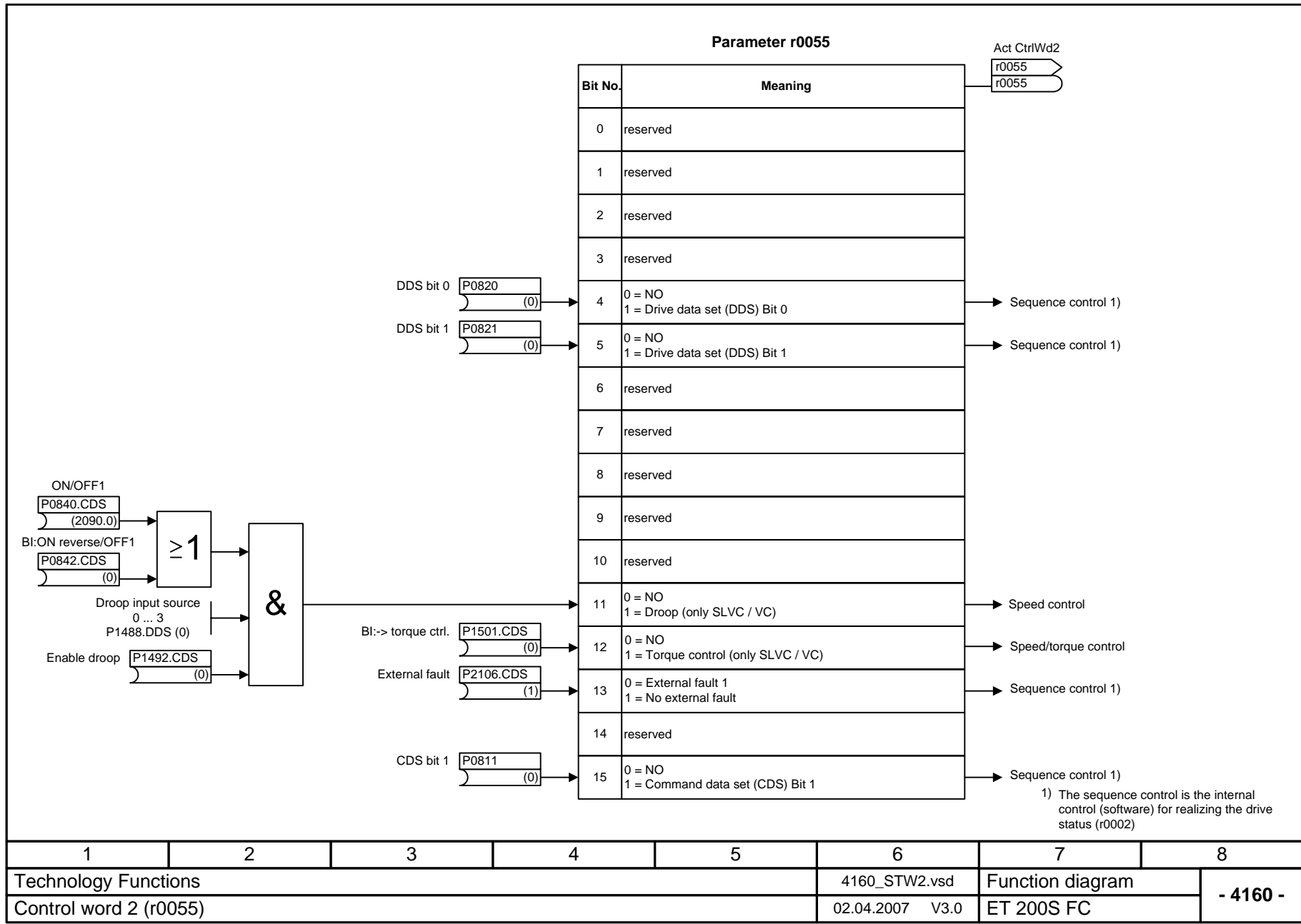


Fig. 2-9 4160 – Control word 2 (r0055)

1	2	3	4	5	6	7	8
Technology Functions					4160_STW2.vsd	Function diagram	
Control word 2 (r0055)					02.04.2007 V3.0	ET 200S FC	
							<b>- 4160 -</b>



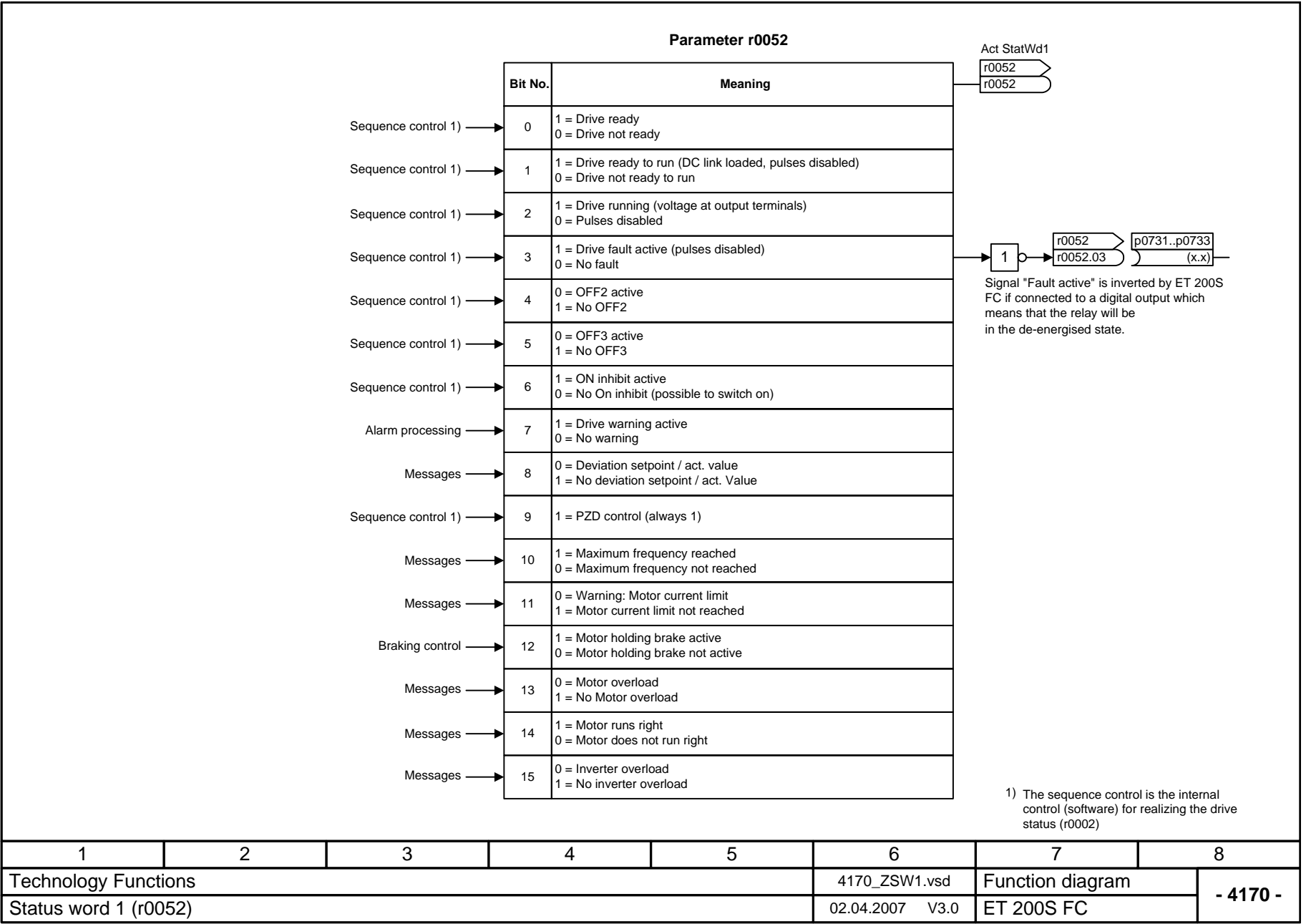


Fig. 2-10 4170 – Status word 1 (r0052)

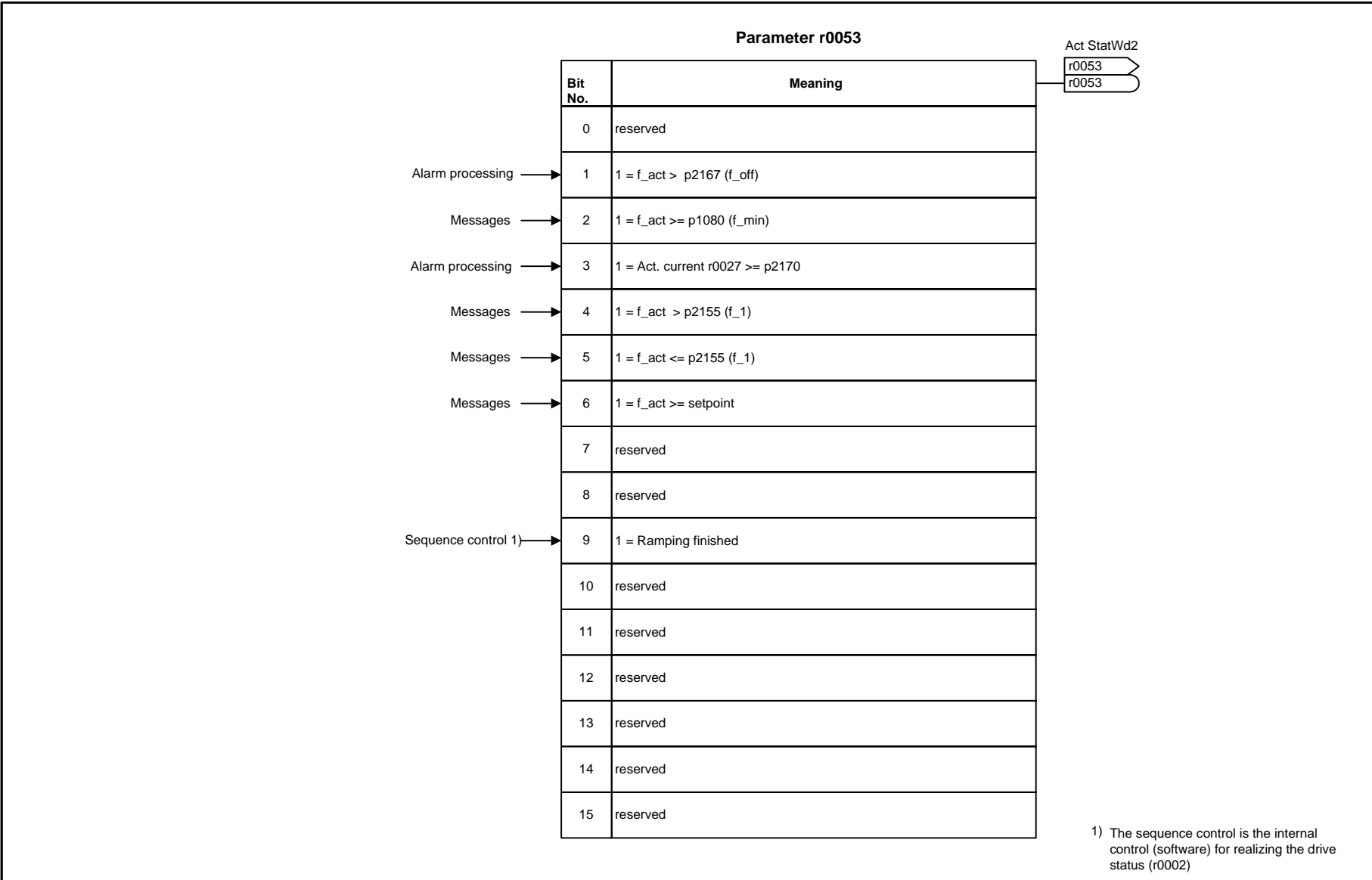


Fig. 2-11 4180 – Status word 2 (r0053)

1	2	3	4	5	6	7	8
Technology Functions					4180_ZSW2.vsd	Function diagram	
Status word 2 (r0053)					02.04.2007 V3.0	ET 200S FC	

## 2.6 Free Function Blocks

### Function diagrams

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4810 – FlipFlops	2-229
4820 – Timers	2-230
4830 – Adders, Subtracters, Multipliers, Dividers, Comparators, Setting in %	2-231

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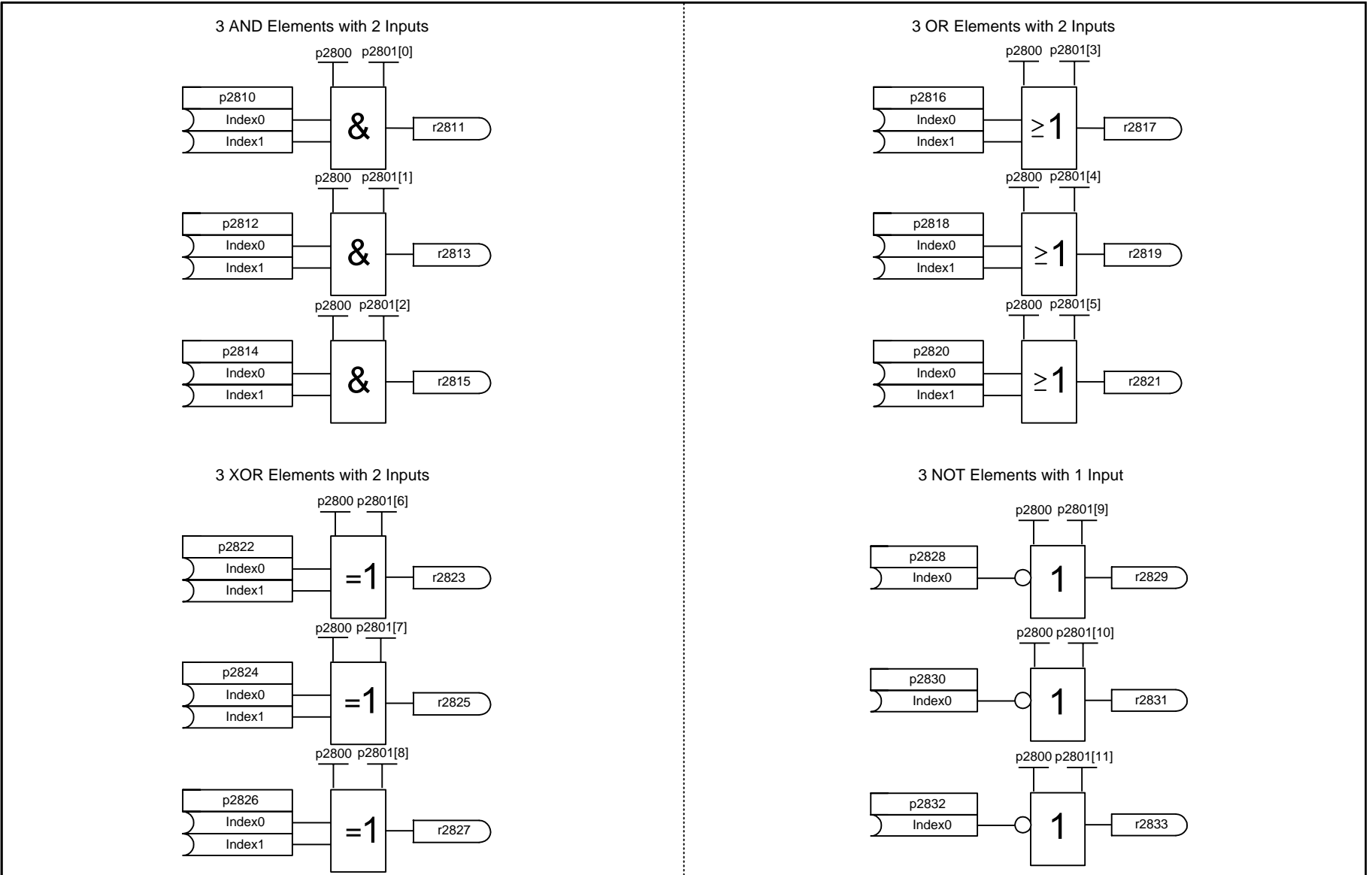


Fig. 2-12 4800 – AND-, OR-, XOR- and NOT- Elements

2-228

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1	2	3	4	5	6	7	8
Free Blocks					4800_FreeBlocks1.vsd	Function diagram	
AND-, OR-, XOR- and NOT- Elements					02.04.2007 V3.0	ET 200S FC	
<b>- 4800 -</b>							

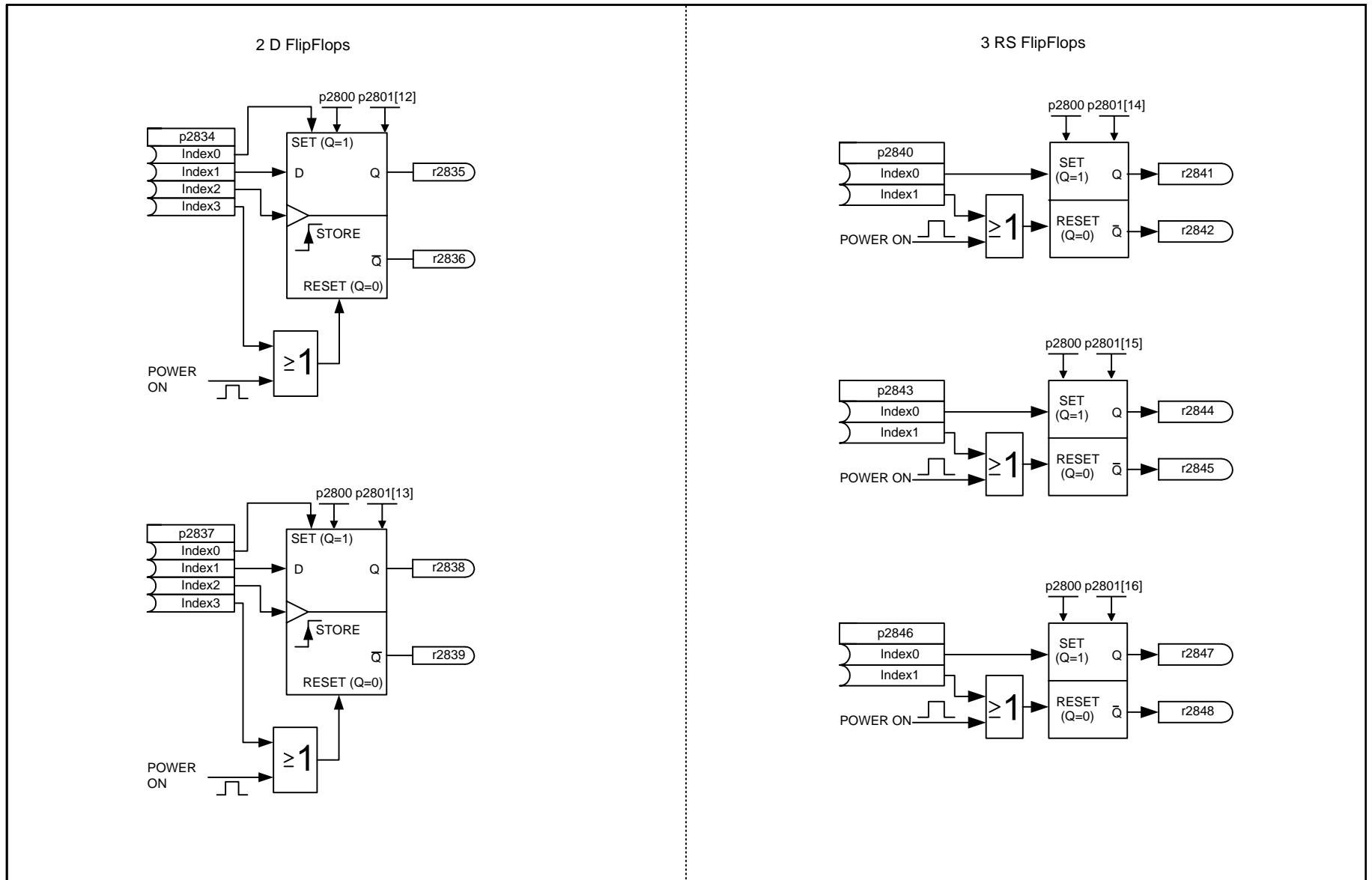
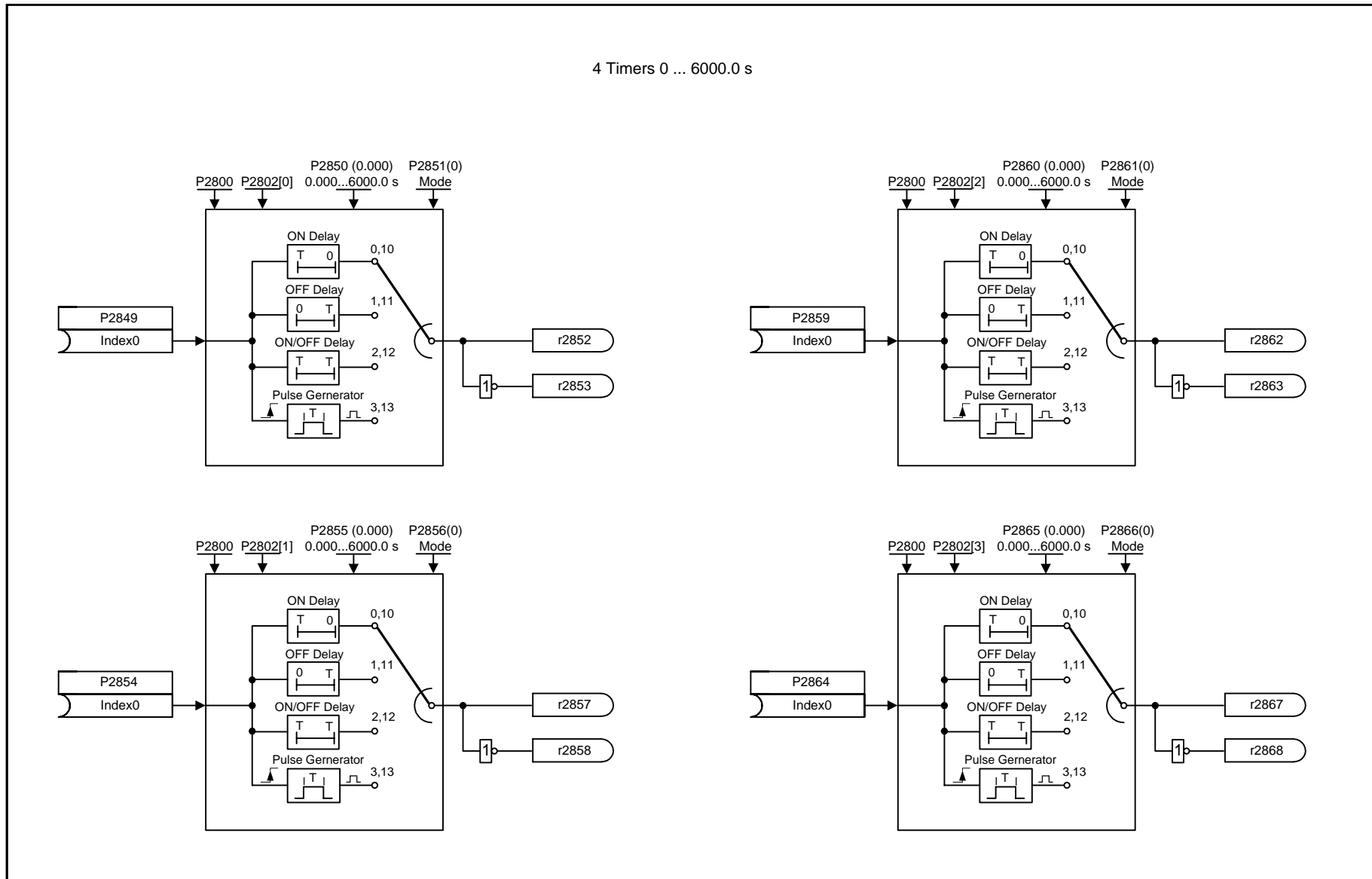


Fig. 2-13 4810 – FlipFlops

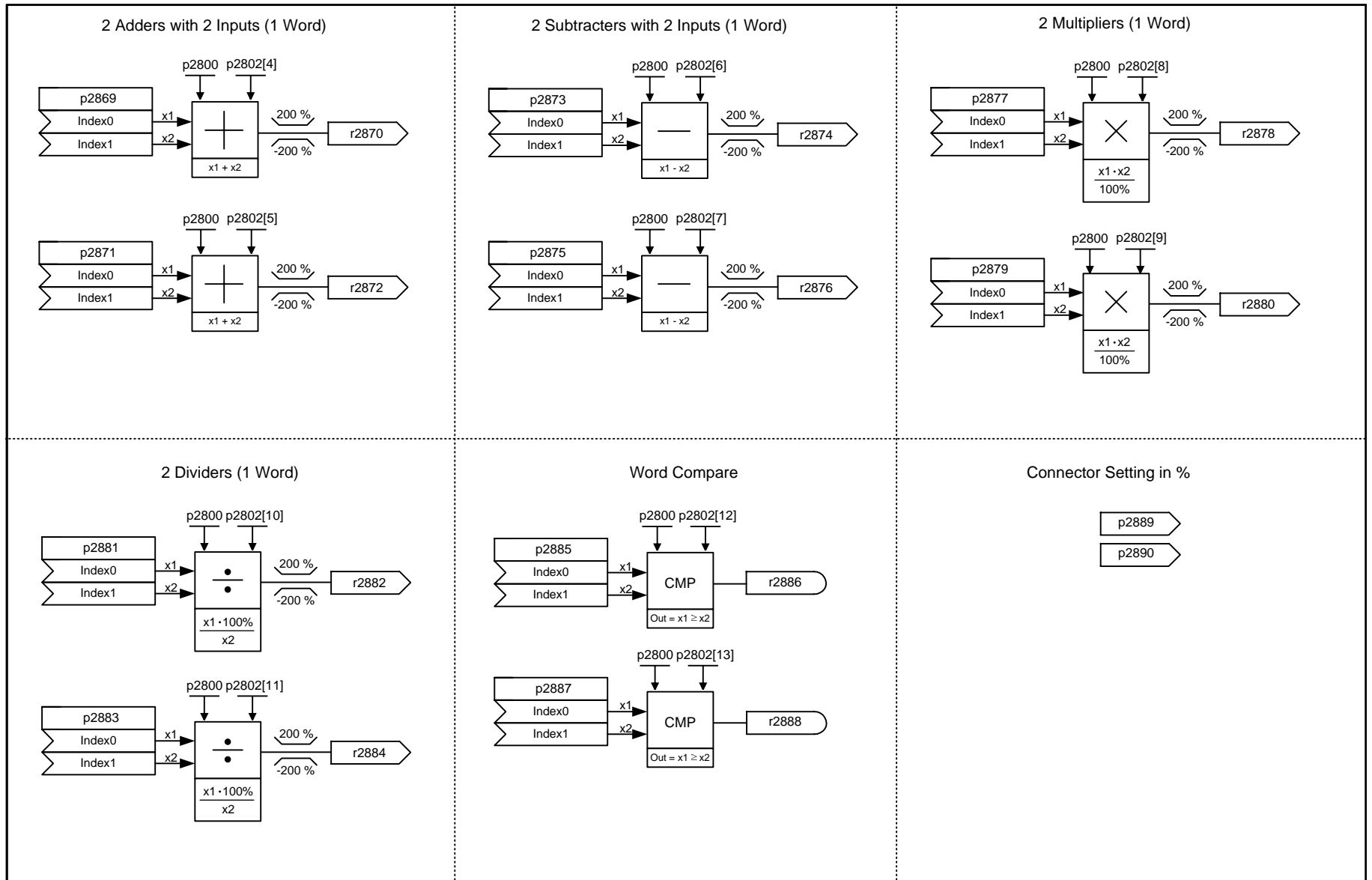
1	2	3	4	5	6	7	8
Free Blocks					4810_FreeBlocks2.vsd	Function diagram	
FlipFlops					02.04.2007 V3.0	ET 200S FC	

- 4810 -



1	2	3	4	5	6	7	8
Free Blocks					4820_FreeBlocks3.vsd	Function diagram	
Timers					02.04.2007 V3.0	ET 200S FC	

Fig. 2-14 4820 – Timers



1	2	3	4	5	6	7	8
Free Blocks					4830_FreeBlocks4.vsd	Function diagram	
Adders, Subtractors, Multipliers, Dividers,					02.04.2007 V3.0	ET 200S FC	
<b>- 4830 -</b>							

Fig. 2-15 4830 – Adders, Subtractors, Multipliers, Dividers, Comparators, Setting in %

## 2.7 Setpoint Channel

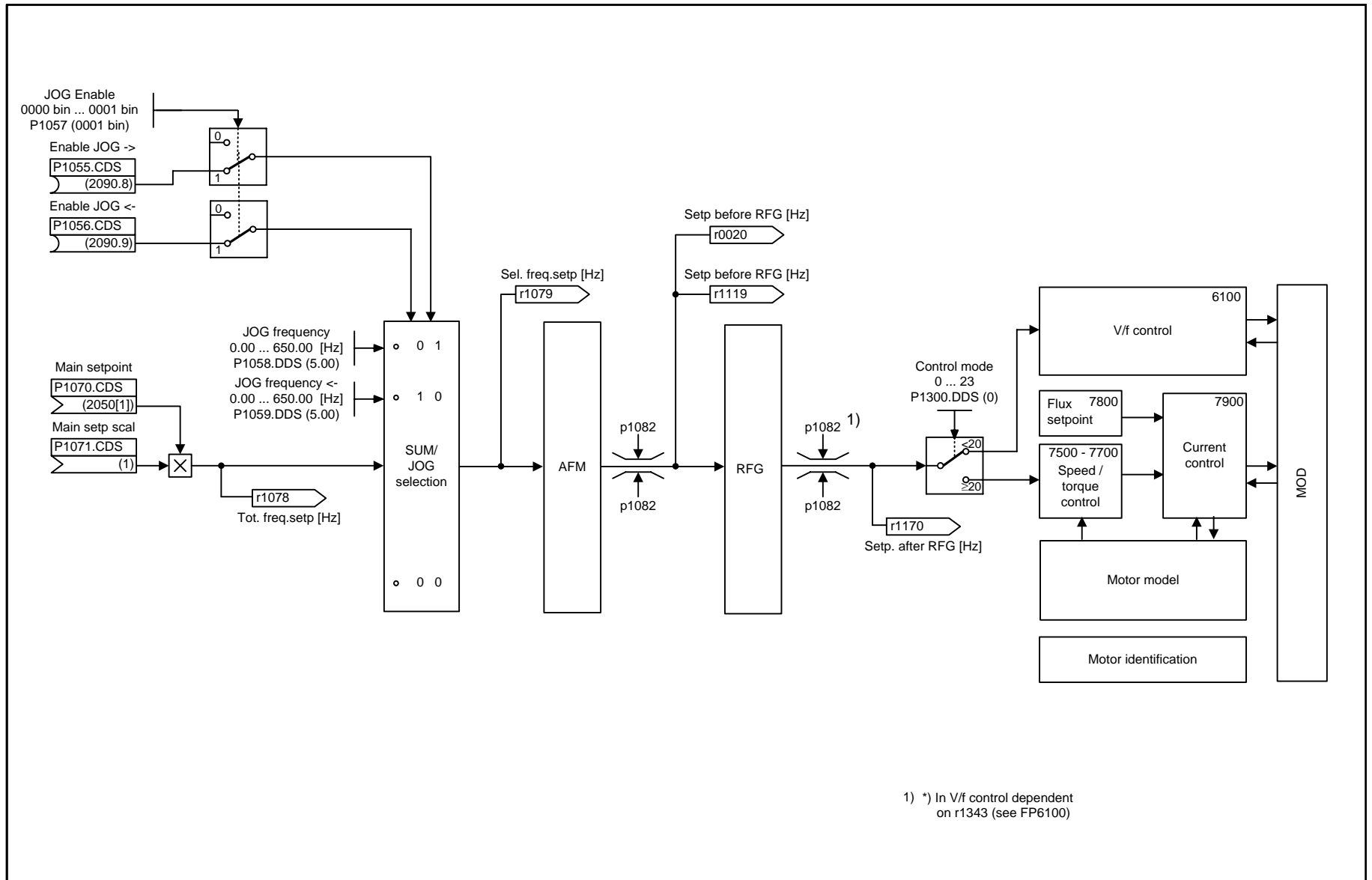
### Function diagrams

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5000 – Setpoint channel and Motor control	2-233
5150 – Wobble Generator	2-234
5200 – Additional Frequency Modifications (AFM)	2-235
5300 – Ramp Function Generator	2-236

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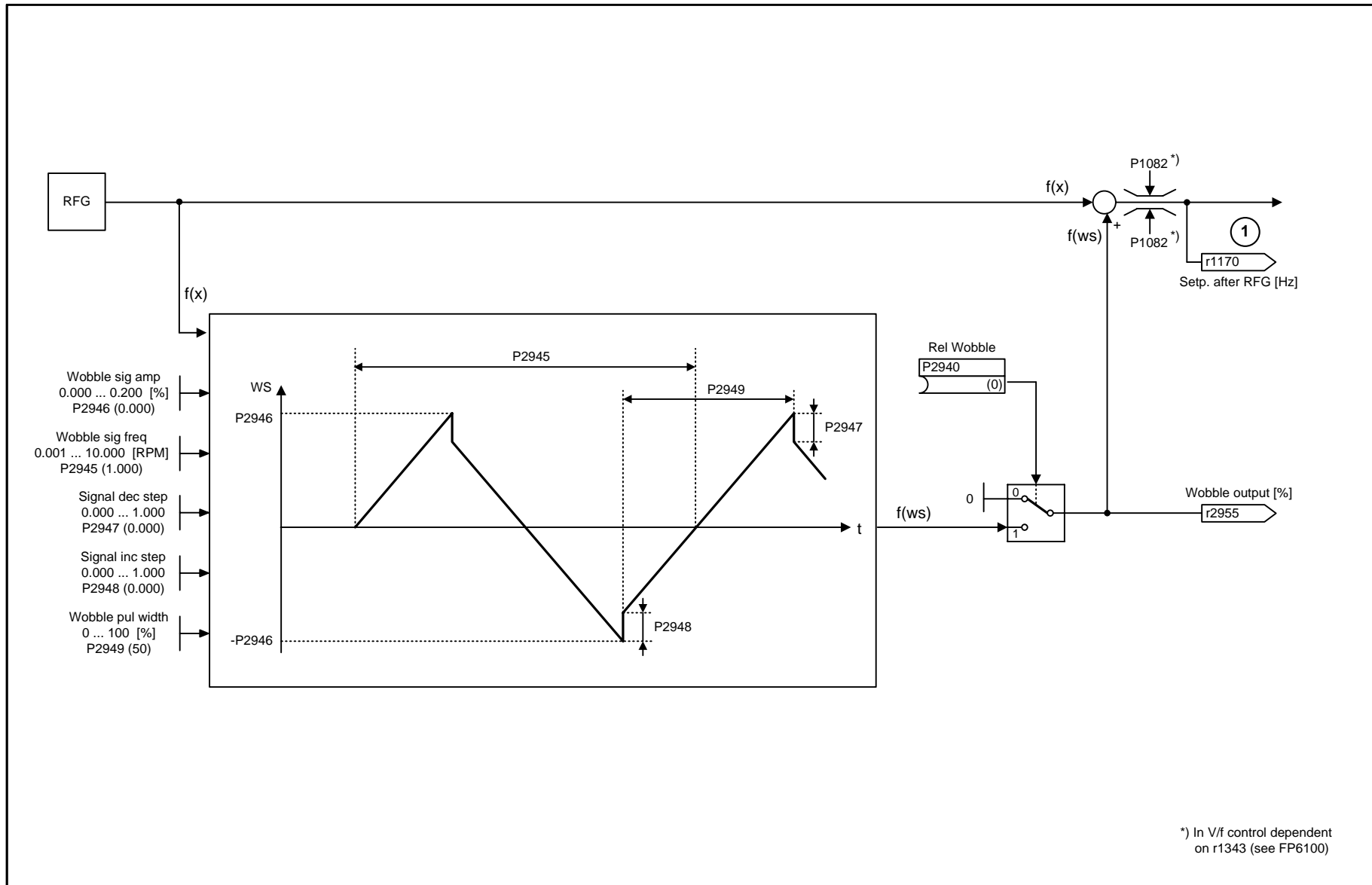




1) \*) In V/f control dependent on r1343 (see FP6100)

1	2	3	4	5	6	7	8
Overview					5000_Overview.vsd	Function diagram	
Setpoint channel and Motor control					02.04.2007 V3.0	ET 200S FC	
							<b>- 5000 -</b>

Fig. 2-16 5000 – Setpoint channel and Motor control



1	2	3	4	5	6	7	8
Setpoint Channel					5150_Wobble.vsd	Function diagram	
Wobble Generator					15.03.2007 V3.0	ET 200S FC	
							<b>- 5150 -</b>

Fig. 2-17 5150 – Wobble Generator

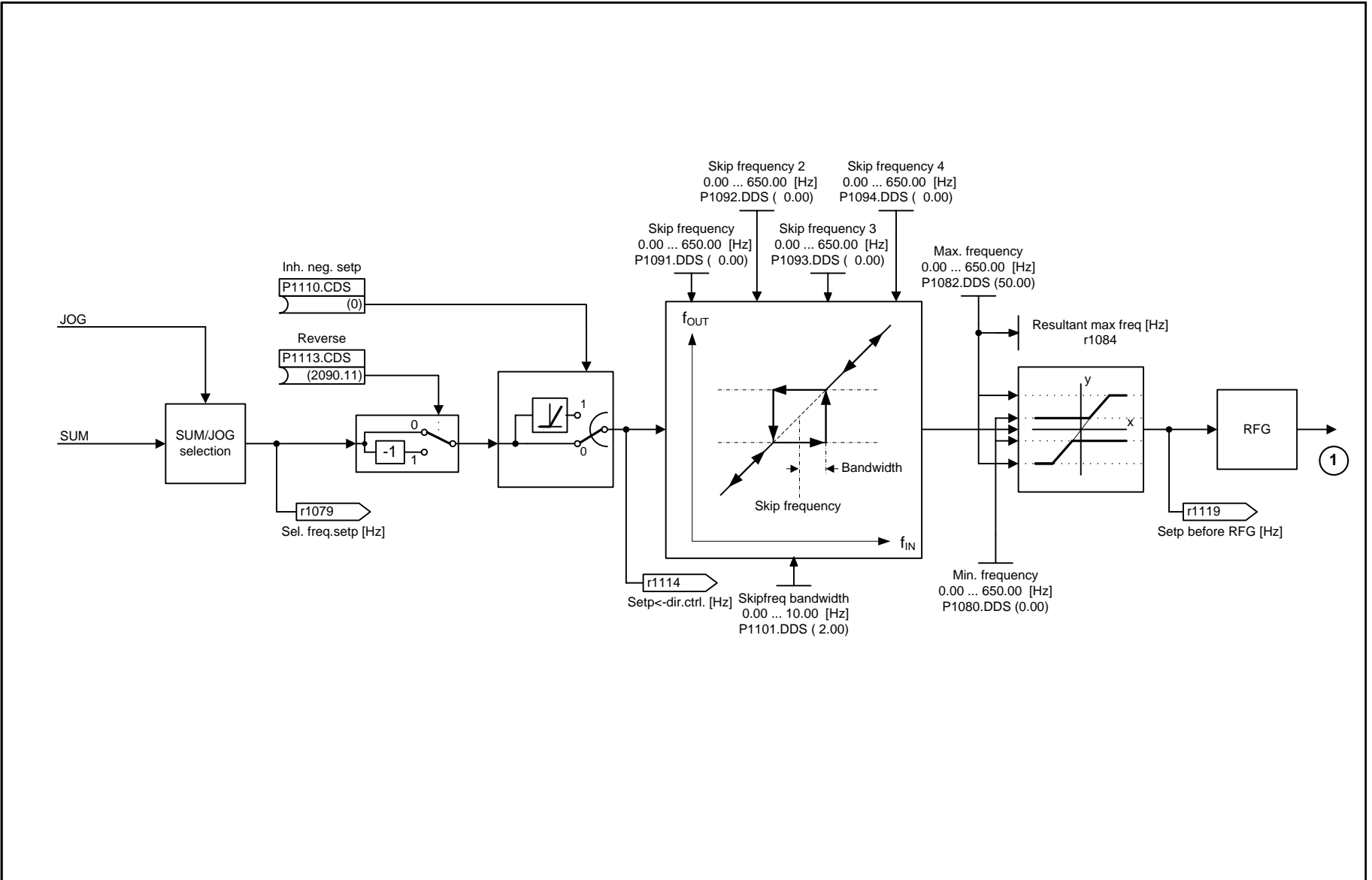


Fig. 2-18 5200 – Additional Frequency Modifications (AFM)

1	2	3	4	5	6	7	8
Setpoint channel					5200_AFM.vsd	Function diagram	
Additional Frequency Modifications (AFM)					02.04.2007 V3.0	ET 200S FC	
							<b>- 5200 -</b>

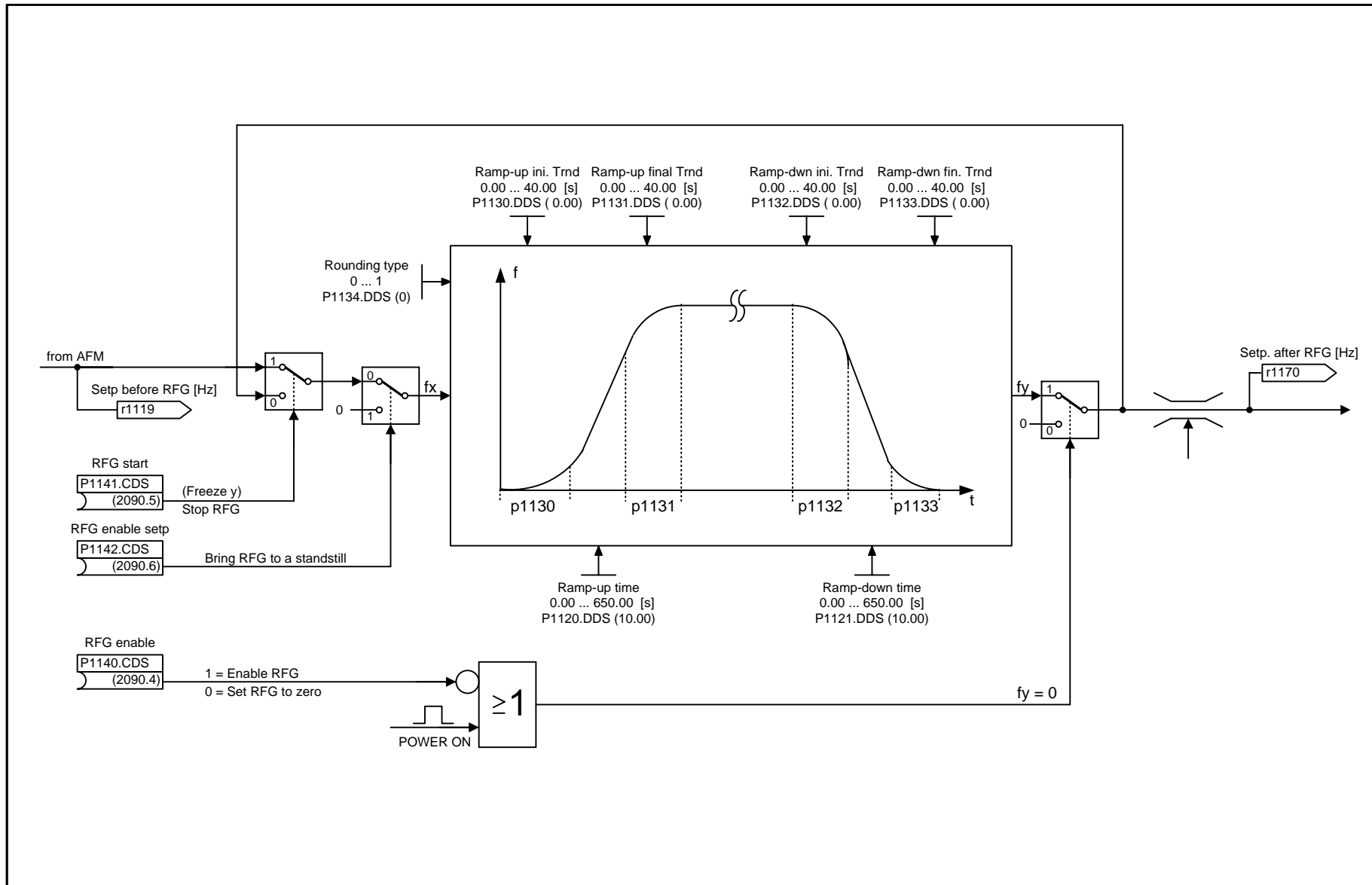


Fig. 2-19 5300 – Ramp Function Generator

1	2	3	4	5	6	7	8
Setpoint Channel					5300_RFG.vsd	Function diagram	
Ramp Function Generator					02.04.2007 V3.0	ET 200S FC	
- 5300 -							

## 2.8 V/f Control

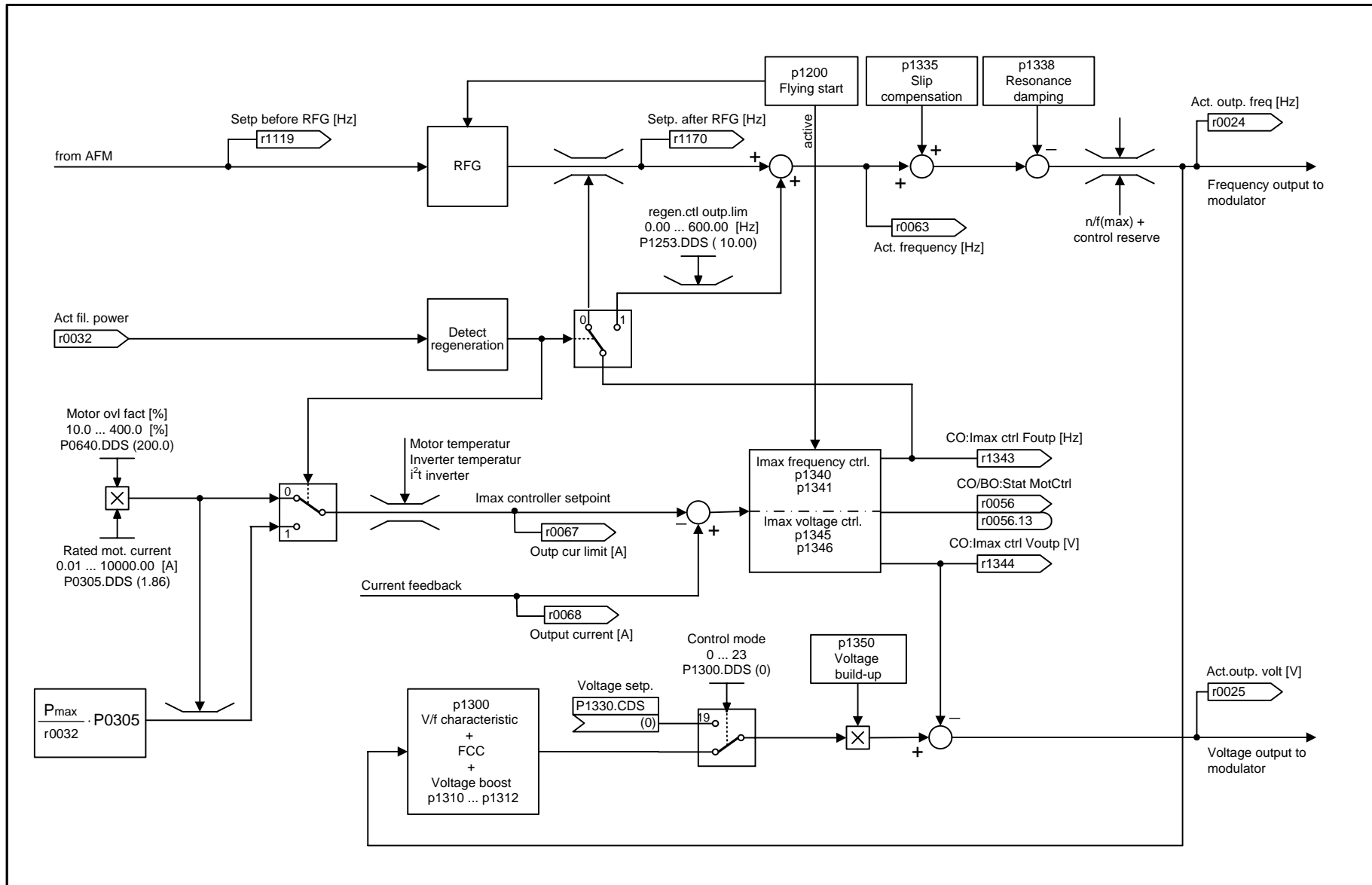
### Function diagrams

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6100 – Overview of V/f Control

2-238

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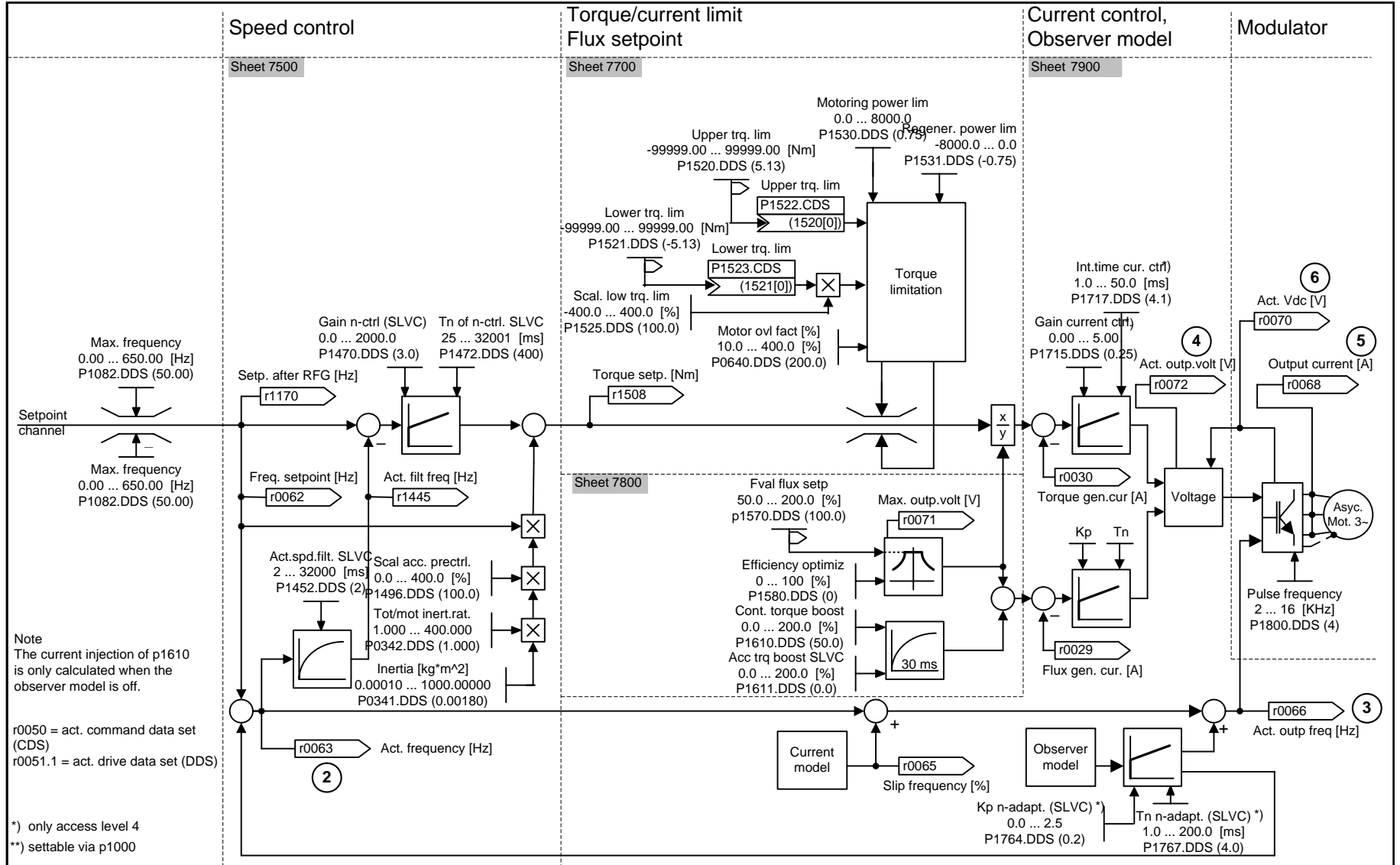
1	2	3	4	5	6	7	8
V/f Control					6100_v_f.vsd	Function diagram	
Overview of V/f Control					02.04.2007 V3.0	ET 200S FC	
<b>- 6100 -</b>							

Fig. 2-20 6100 – Overview of V/f Control

## 2.9 Vector Control

### Function diagrams

7000 – Overview of Speed Control without Encoder (SLVC): P1300 = 20 & P1501 = 0	2-240
7010 – Overview of Speed Control with Encoder (VC): P1300 = 21 & P1501 = 0	2-241
7200 – Overview of Torque Control without Encoder (SLVC): P1300 = 22/20 & P1501 = 1	2-242
7210 – Overview of Torque Control with Encoder (VC): P1300 = 23/21 & P1501 = 1	2-243
7500 – Speed Controller without Encoder (SLVC): P1300 = 20 & P1501 = 0	2-244
7510 – Speed Controller with Encoder (VC): P1300 = 21 & P1501 = 0	2-245
7700 – Torque Controller and Torque Limitation without Encoder (SLVC)	2-246
7710 – Torque Controller and Torque Limitation with Encoder (VC)	2-247
7800 – Flux Setpoint (SLVC and VC)	2-248
7900 – Current Controller & Observer Model without Encoder (SLVC)	2-249
7910 – Current Controller & Observer Model with Encoder (VC)	2-250
8000 – Display values	2-251

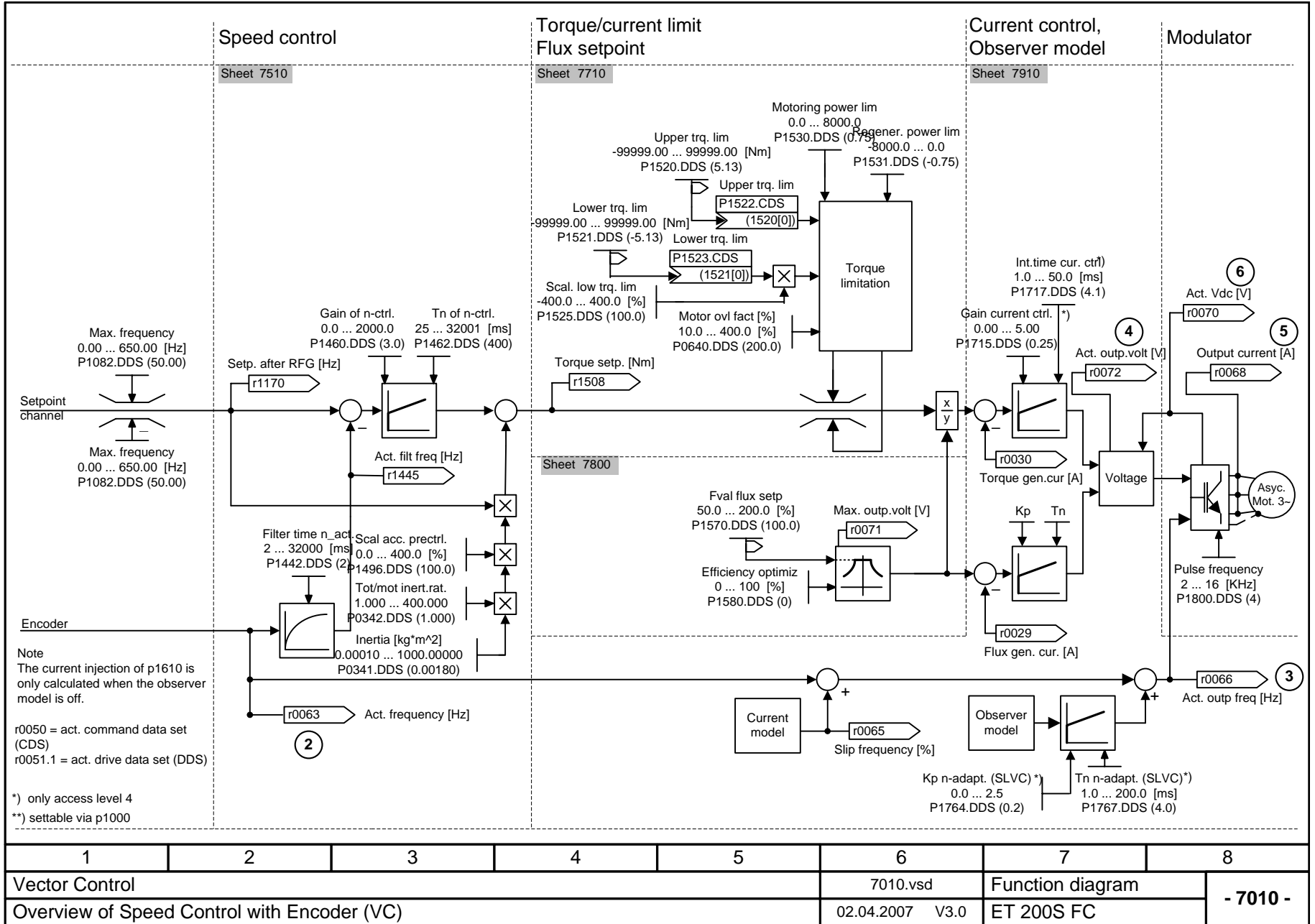


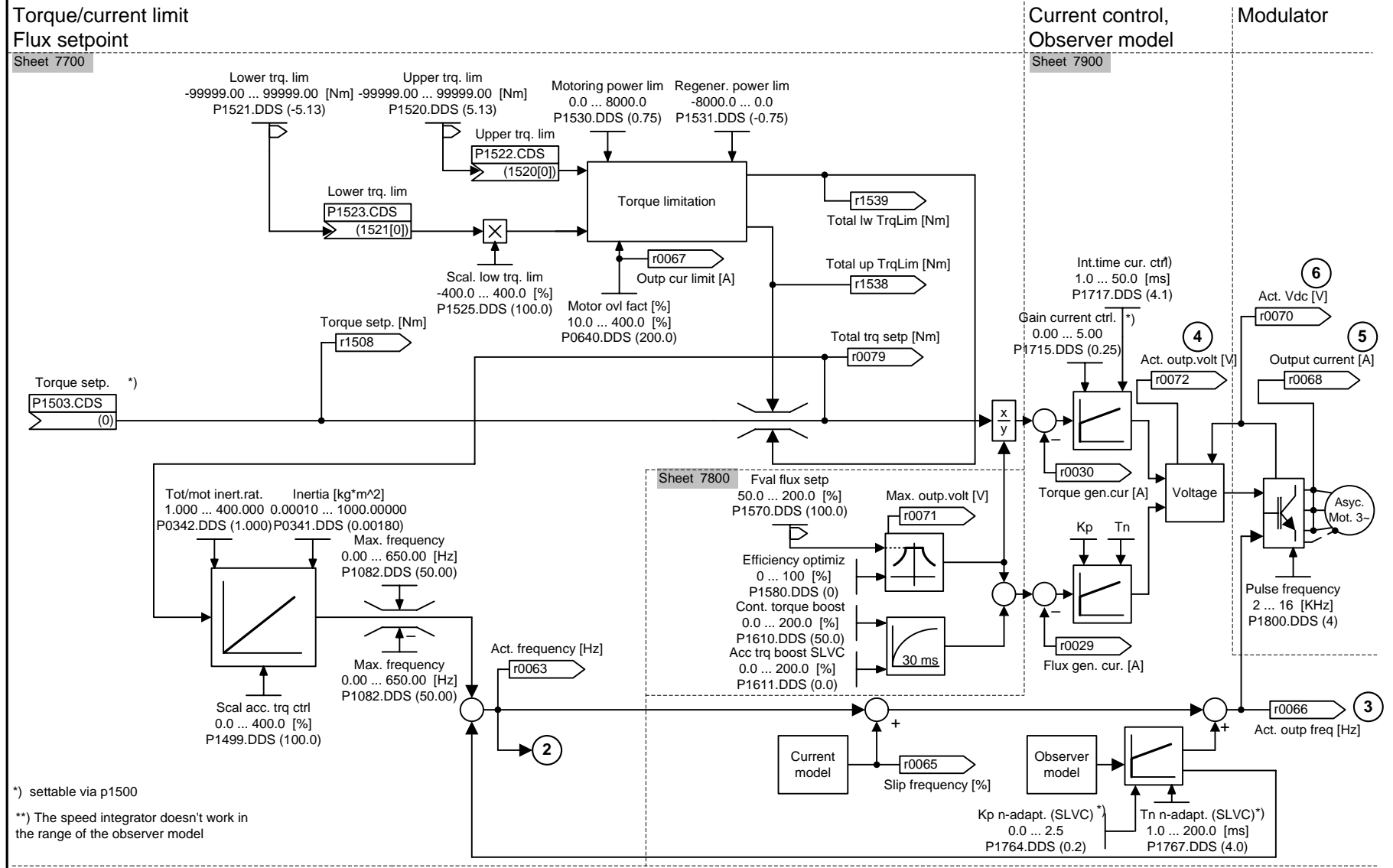
1	2	3	4	5	6	7	8
Vector Control					7000.vsd	Function diagram	
Overview of Speed Control without Encoder (SLVC)					02.04.2007 V3.0	ET 200S FC	
							<b>- 7000 -</b>

Fig. 2-21 7000 – Overview of Speed Control without Encoder (SLVC): P1300 = 20 & P1501 = 0



Fig. 2-22 7010 – Overview of Speed Control with Encoder (VC): P1300 = 21 & P1501 = 0





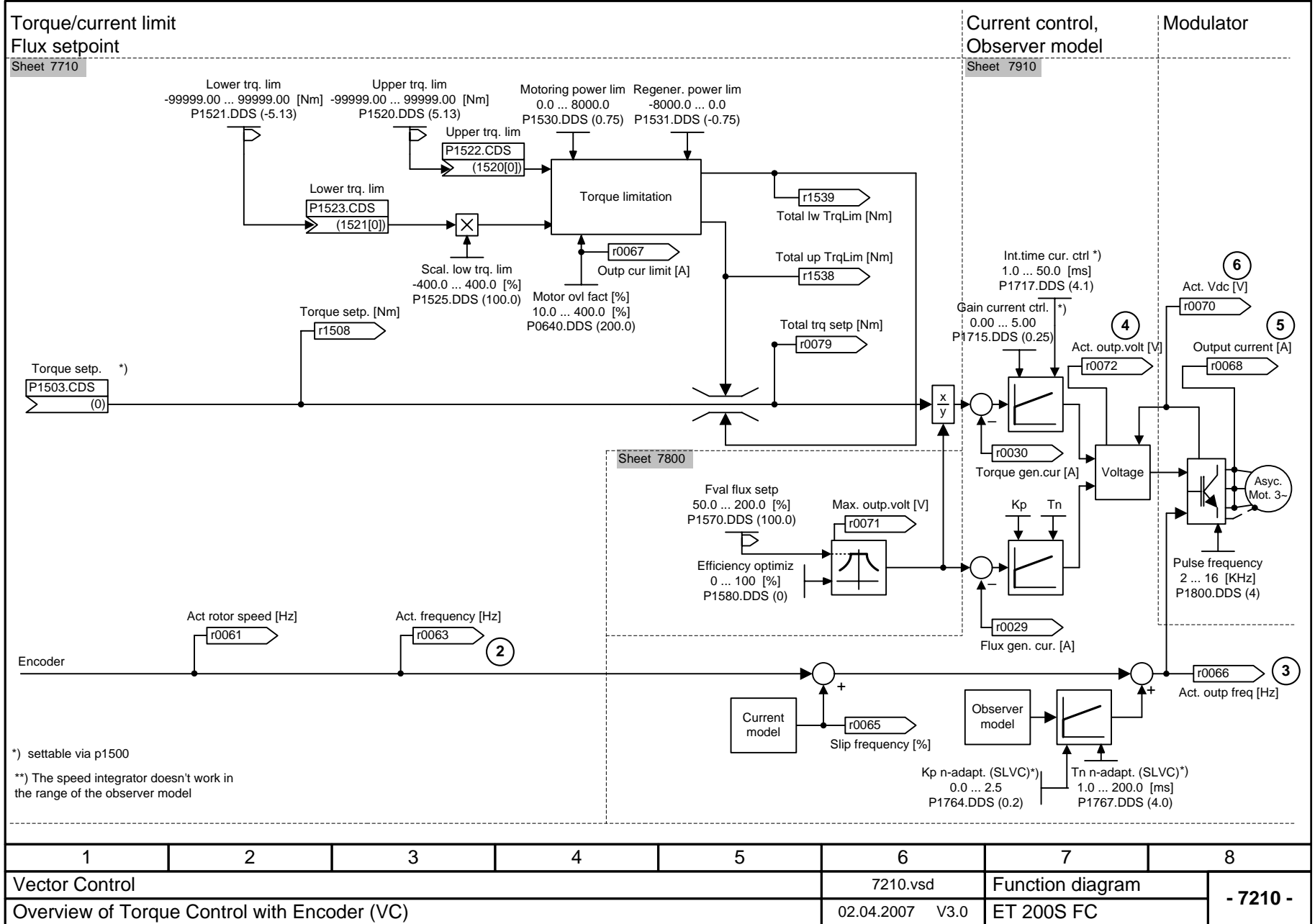
\*) settable via p1500  
 \*\*) The speed integrator doesn't work in the range of the observer model

1	2	3	4	5	6	7	8
Vector Control					7200.vsd	Function diagram	
Overview of Torque Control without Encoder (SLVC)					02.04.2007 V3.0	ET 200S FC	
							<b>- 7200 -</b>

Fig. 2-23 7200 – Overview of Torque Control without Encoder (SLVC): P1300 = 22/20 & P1501 = 1

Fig. 2-24

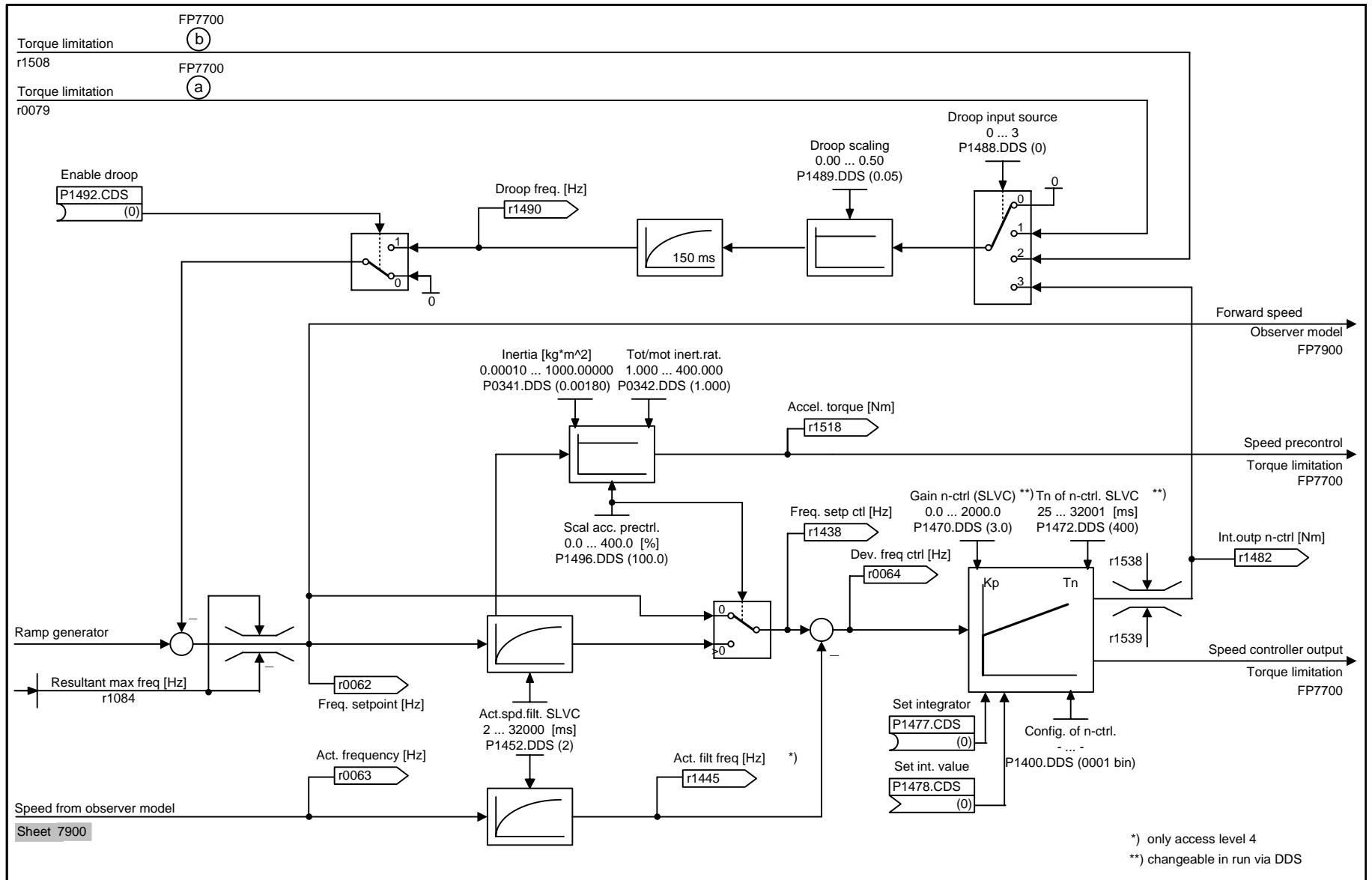
7210 – Overview of Torque Control with Encoder (VC): P1300 = 23/21 & P1501 = 1



\*) settable via p1500

\*\*) The speed integrator doesn't work in the range of the observer model

1	2	3	4	5	6	7	8
Vector Control					7210.vsd	Function diagram	
Overview of Torque Control with Encoder (VC)					02.04.2007 V3.0	ET 200S FC	
							<b>- 7210 -</b>

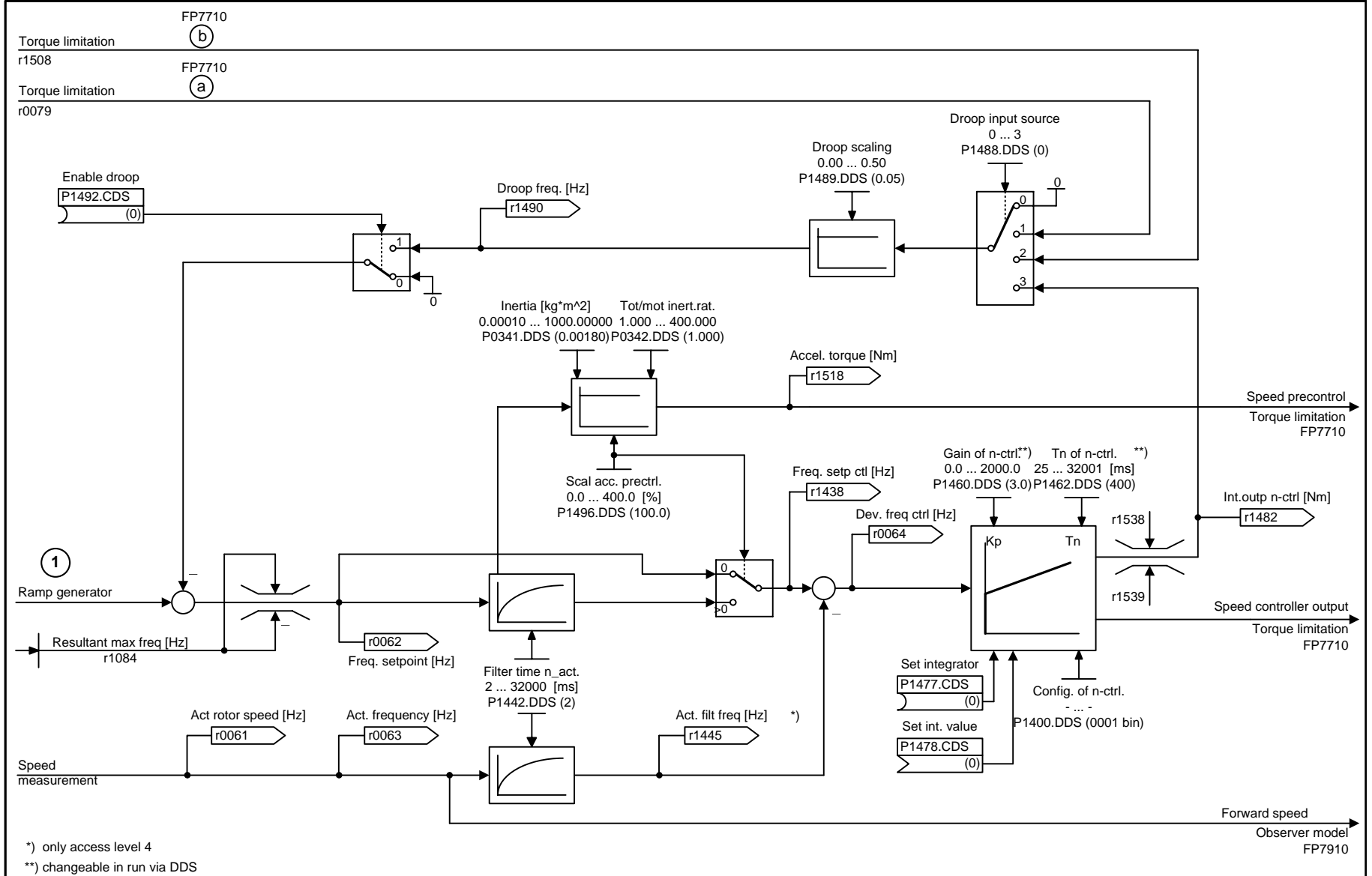


\*) only access level 4  
\*\*) changeable in run via DDS

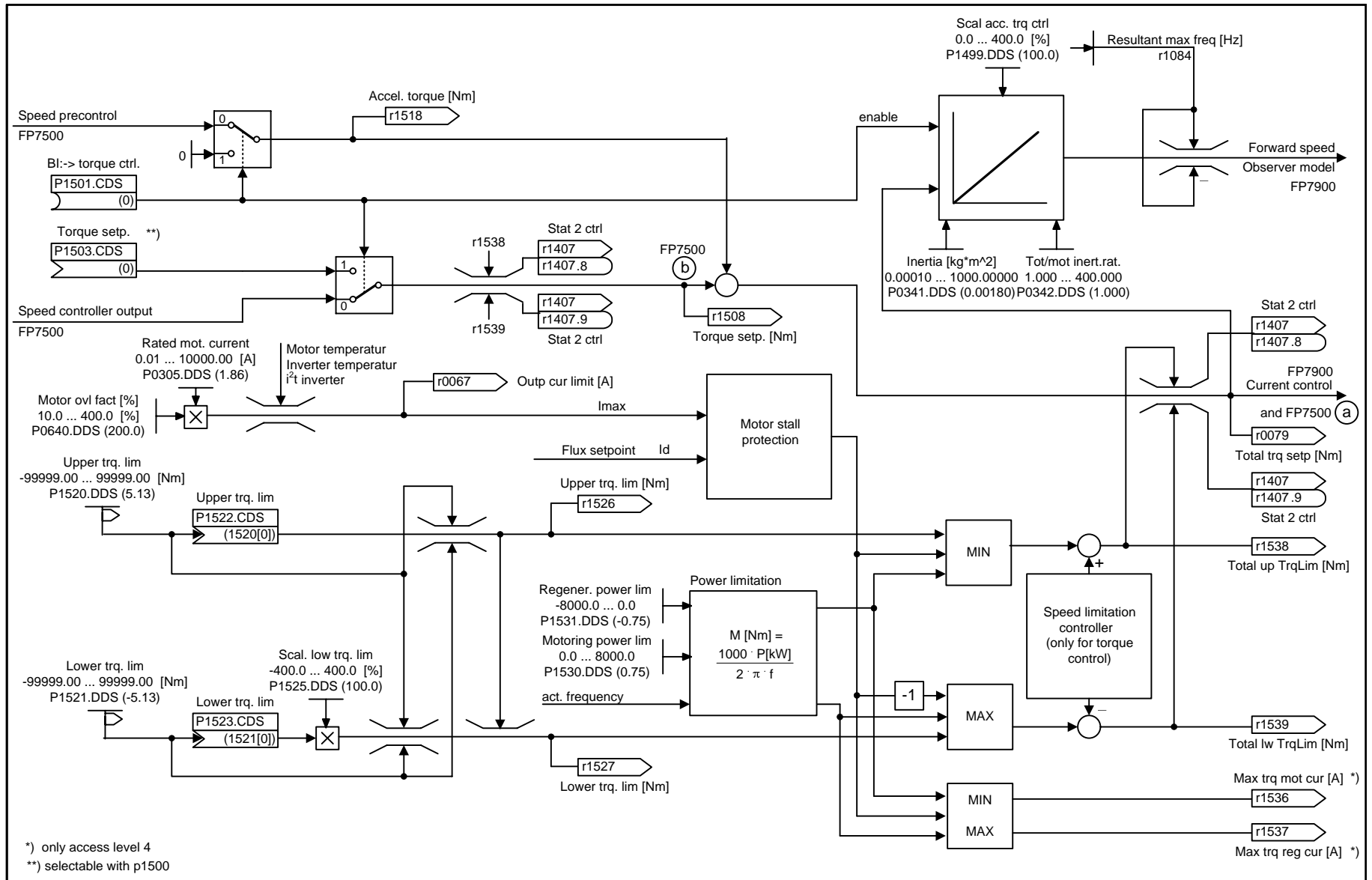
1	2	3	4	5	6	7	8
Vector Control					7500_SLVC.vsd	Function diagram	
Speed Controller without Encoder (SLVC)					02.04.2007 V3.0	ET 200S FC	
							<b>- 7500 -</b>

Fig. 2-25 7500 – Speed Controller without Encoder (SLVC): P1300 = 20 & P1501 = 0

Fig. 2-26 7510 – Speed Controller with Encoder (VC): P1300 = 21 & P1501 = 0



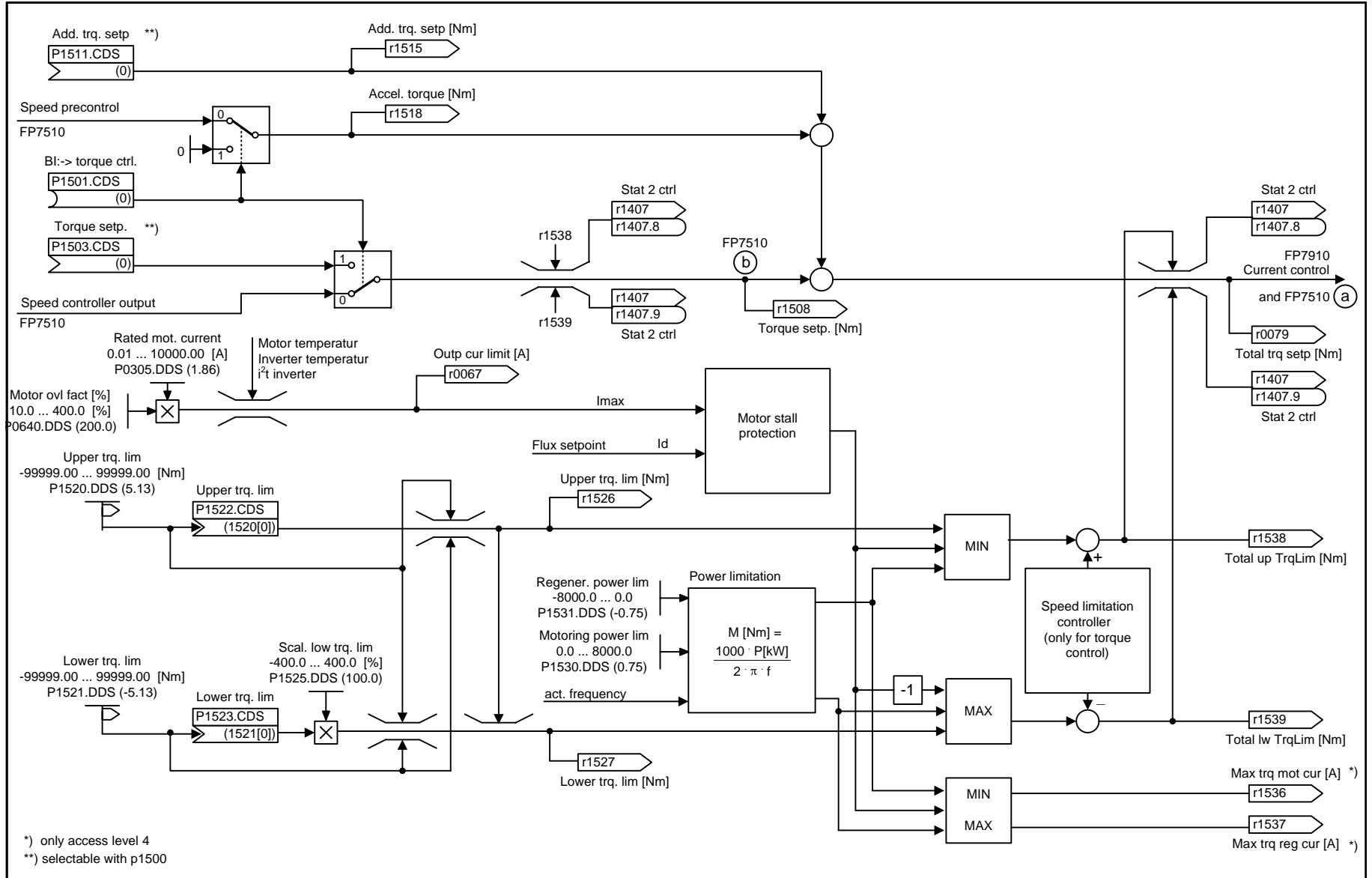
1	2	3	4	5	6	7	8
Vector Control					7510_VC.vsd	Function diagram	
Speed Controller with Encoder (VC)					02.04.2007 V3.0	ET 200S FC	
							<b>- 7510 -</b>



1	2	3	4	5	6	7	8
Vector Control					7700_TC.vsd	Function diagram	
Torque Control & Limitation without Encoder (SLVC)					02.04.2007 V3.0	ET 200S FC	
							<b>- 7700 -</b>

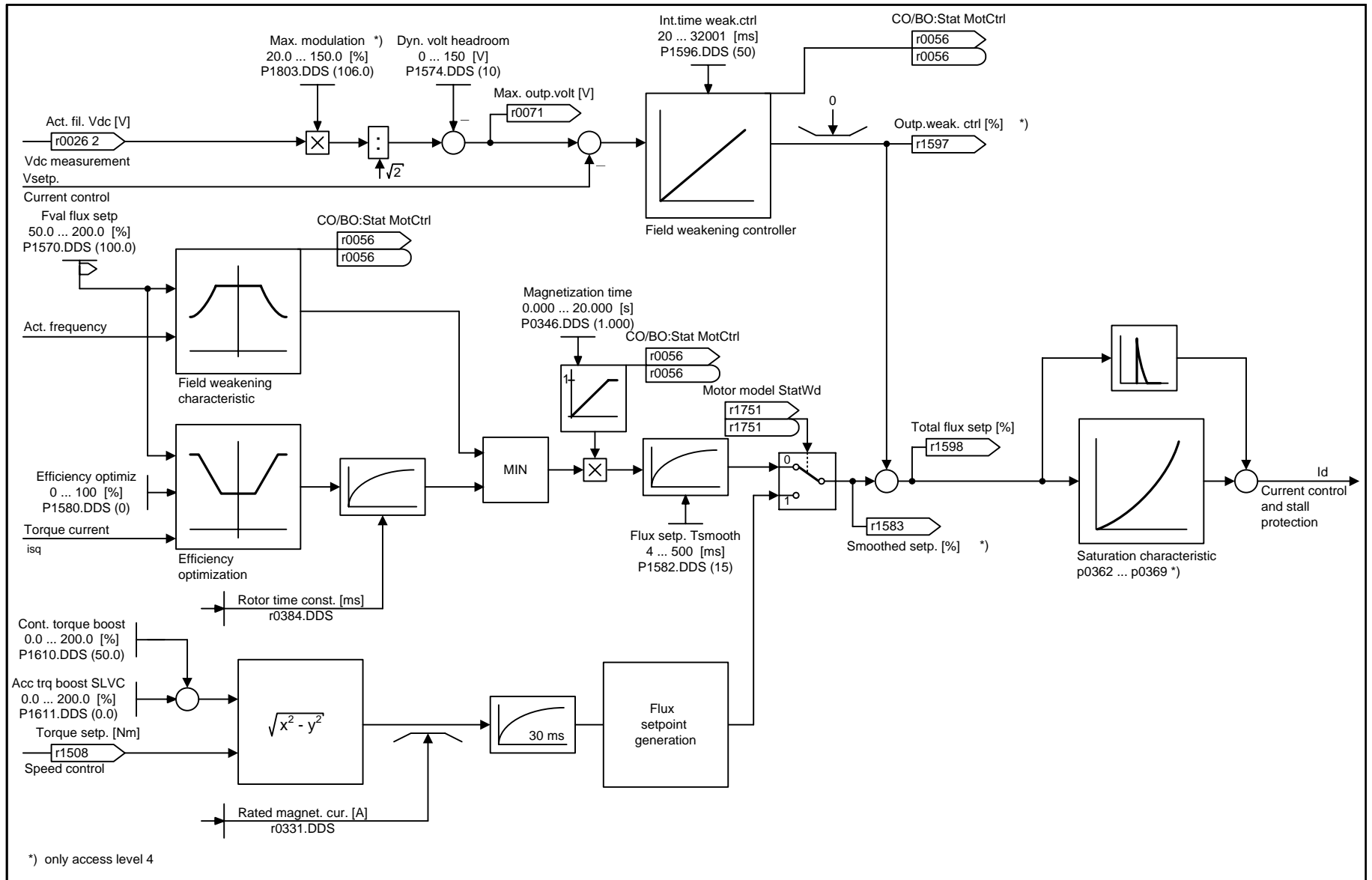
Fig. 2-27 7700 – Torque Controller and Torque Limitation without Encoder (SLVC)

Fig. 2-28 7710 – Torque Controller and Torque Limitation with Encoder (VC)



\*) only access level 4  
 \*\*) selectable with p1500

1	2	3	4	5	6	7	8
Vector Control					7710_TC.vsd	Function diagram	
Torque Control & Limitation with Encoder (VC)					02.04.2007 V3.0	ET 200S FC	
							<b>- 7710 -</b>



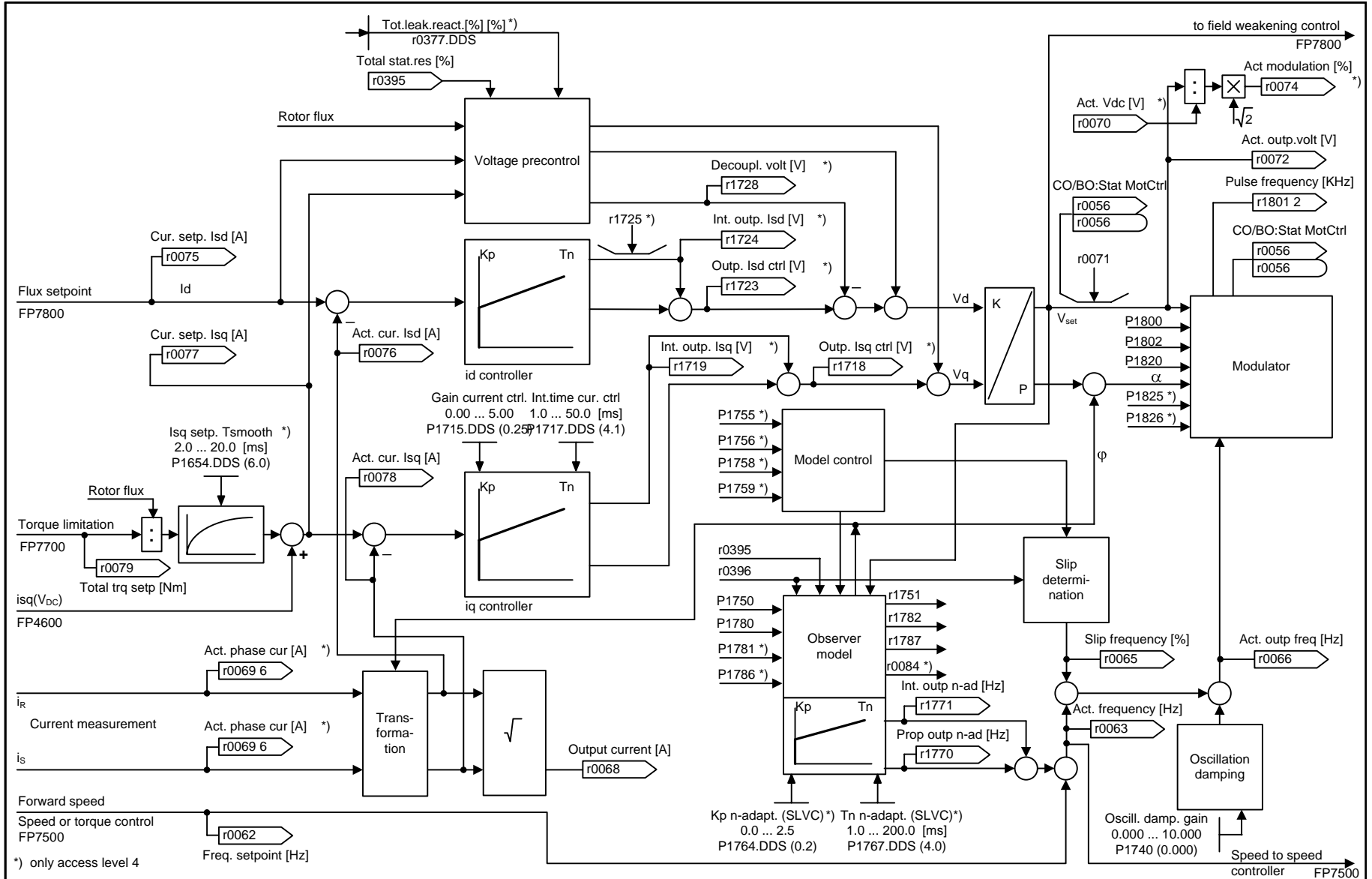
\*) only access level 4

1	2	3	4	5	6	7	8
Vector Control					7800_VC.vsd	Function diagram	
Flux Setpoint (SLVC and VC)					02.04.2007 V3.0	ET 200S FC	
<b>- 7800 -</b>							

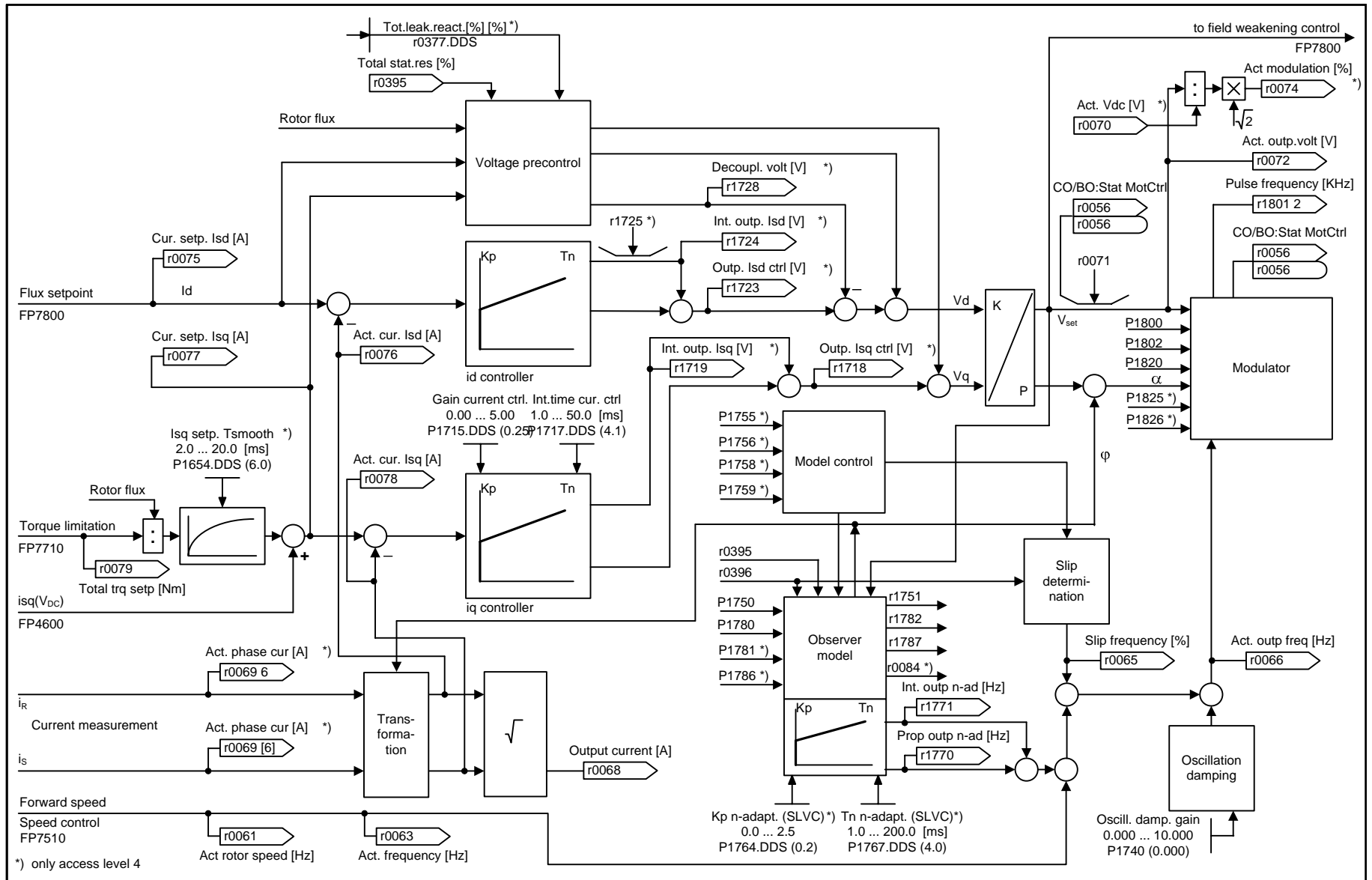
Fig. 2-29 7800 – Flux Setpoint (SLVC and VC)



Fig. 2-30 7900 – Current Controller & Observer Model without Encoder (SLVC)



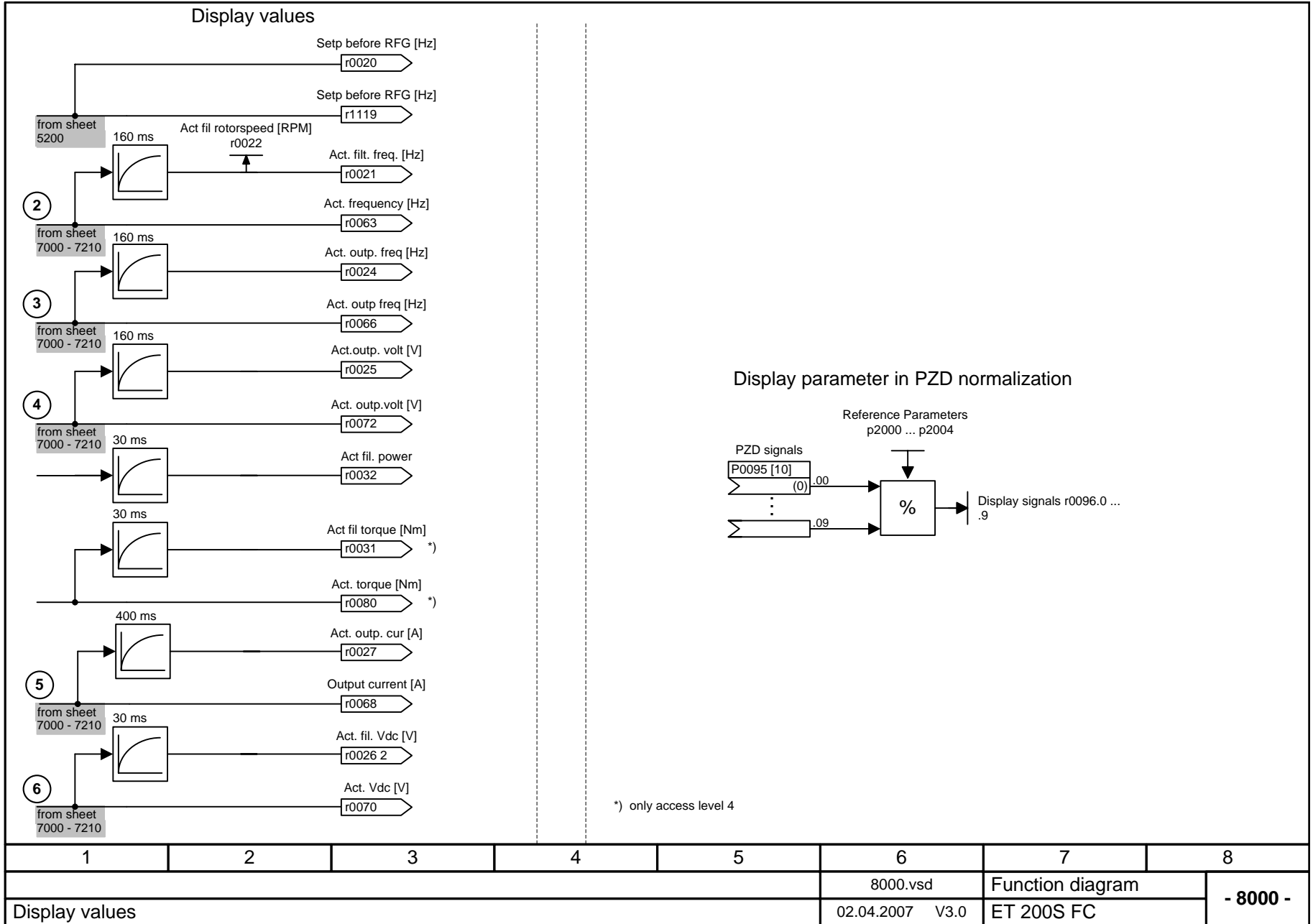
1	2	3	4	5	6	7	8
Vector Control					7900_MM.vsd	Function diagram	
Current Controller & Observer Model without Encoder (SLVC)					02.04.2007 V3.0	ET 200S FC	
							<b>- 7900 -</b>



1	2	3	4	5	6	7	8
Vector Control					7910_MM.vsd	Function diagram	
Current Controller & Observer Model with Encoder (VC)					02.04.2007 V3.0	ET 200S FC	
<b>- 7910 -</b>							

Fig. 2-31 7910 – Current Controller & Observer Model with Encoder (VC)

Fig. 2-32 8000 – Display values





# Faults and Alarms

# 3

## Contents

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3.2	List of Fault and Alarm messages	3-255

## 3.1 Faults and Alarms – Overview

### Fault messages

In the event of a failure, the inverter switches off.

---

#### Note

To reset the fault, one of the methods listed below can be used:

1. Cycle the power to the drive
  2. Via control word 1
- 

Fault messages are stored in parameter r0947 under their code number (e.g. F0003 = 3). The associated error value is found in parameter r0949. The value 0 is entered if a fault has no error value. It is furthermore possible to read out the point in time that a fault occurred (r0948) and the number of fault messages (P0952) stored in Parameter r0947.

### Alarm messages

Alarm messages are stored in parameter r2110 under their code number (e.g. A0503 = 503) and can be read out from there.

## 3.2 List of Fault and Alarm messages

Product: ET200S, Version: 3005200, Language: eng

---

<b>F00001 (N)</b>	<b>Overcurrent</b>
<b>Reaction:</b>	OFF 2
<b>Acknowledge:</b>	Quit fault eg. via DI2
<b>Cause:</b>	<ul style="list-style-type: none"> <li>• Motor power (p0307) does not correspond to the inverter power (r0206)</li> <li>• Motor lead short circuit</li> <li>• Earth faults</li> </ul>
<b>Remedy:</b>	<p>Check the following:</p> <ul style="list-style-type: none"> <li>• Motor power (p0307) must correspond to inverter power (r0206).</li> <li>• Cable length limits must not be exceeded.</li> <li>• Motor cable and motor must have no short-circuits or earth faults</li> <li>• Motor parameters must match the motor in use</li> <li>• Value of stator resistance (p0350) must be correct</li> <li>• Motor must not be obstructed or overloaded</li> <li>• Increase Ramp-up time (p1120)</li> <li>• Reduce Starting boost level (p1312)</li> </ul>
<b>Note:</b>	<ul style="list-style-type: none"> <li>• r0949 = 0: HW reported</li> <li>• r0949 = 1: SW reported</li> </ul>

---

<b>F00002</b>	<b>Overvoltage</b>
<b>Reaction:</b>	OFF 2
<b>Acknowledge:</b>	Quit fault eg. via DI2
<b>Cause:</b>	<ul style="list-style-type: none"> <li>• Main supply voltage too high</li> <li>• Motor is in regenerative mode</li> </ul>
<b>Remedy:</b>	<p>Check the following:</p> <ul style="list-style-type: none"> <li>• Supply voltage must lie within limits indicated on rating plate.</li> <li>• Vdc controller must be enabled (p1240) and parameterized properly.</li> <li>• Ramp-down time (p1121) must match inertia of load.</li> <li>• Required braking power must lie within specified limits.</li> </ul>
<b>Note:</b>	<p>Regenerative mode can be caused by fast ramp downs or if the motor is driven by an active load.</p> <ul style="list-style-type: none"> <li>• r0949 = 0: HW reported</li> <li>• r0949 = 1 or 2: SW reported</li> </ul> <p>Higher inertia requires longer ramp times; otherwise, apply braking resistor.</p>

---

<b>F00003</b>	<b>Undervoltage</b>
<b>Reaction:</b>	OFF 2
<b>Acknowledge:</b>	Quit fault eg. via DI2
<b>Cause:</b>	<ul style="list-style-type: none"> <li>• Main supply failed.</li> <li>• Shock load outside specified limits.</li> </ul>
<b>Remedy:</b>	Check Supply voltage.
<b>Note:</b>	<ul style="list-style-type: none"> <li>• r0949 = 0: HW reported</li> <li>• r0949 = 1 or 2: SW reported</li> </ul>

---

**F00004 Inverter Over Temperature**

**Reaction:** OFF 2

**Acknowledge:** Quit fault eg. via DI2

- Cause:**
- Inverter overloaded
  - Ventilation inadequate
  - Pulse frequency too high
  - Ambient temperature too high
  - Fan inoperative

- Remedy:** Check the following:
- Load or load cycle too high?
  - Motor power (p0307) must match inverter power (r0206)
  - Pulse frequency must be set to default value
  - Ambient temperature too high?
  - Fan must turn when inverter is running
- 

**F00005 Inverter I2T**

**Reaction:** OFF 2

**Acknowledge:** Quit fault eg. via DI2

- Cause:**
- Inverter overloaded.
  - Load cycle too demanding.
  - Motor power (p0307) exceeds inverter power capability (r0206).

- Remedy:** Check the following:
- Load cycle must lie within specified limits.
  - Motor power (p0307) must match inverter power (r0206)
- 

**F00006 Chip temperature rise exceeds critical levels.**

**Reaction:** OFF 2

**Acknowledge:** Quit fault eg. via DI2

- Cause:**
- Load at start-up is too high
  - Load step is too high
  - Ramp-up rate is too fast

- Remedy:** Check the following:
- Load or load step too high?
  - Reduce ramp-up time (P1120).
  - Motor power (p0307) must match inverter power (r0206).
  - Use setting P0290 = 0 or 2 for preventing F00006.
- 

**F00011 Motor Over Temperature**

**Reaction:** OFF 2 (OFF 3)

**Acknowledge:** Quit fault eg. via DI2

**Cause:** Motor overloaded

- Remedy:** Check the following:
- Load or load step too high?
  - Motor nominal overtemperatures (p0626 - p0628) must be correct
  - Motor temperature warning level (p0604) must match



---

<b>F00015</b>	<b>Motor temperature signal lost</b>
<b>Reaction:</b>	OFF 2 (OFF 3)
<b>Acknowledge:</b>	Quit fault eg. via DI2
<b>Cause:</b>	Open or short circuit of motor temperature sensor. If signal loss is detected, temperature monitoring switches over to monitoring with the motor thermal model.
<b>Remedy:</b>	Check the following: <ul style="list-style-type: none"> <li>• the connection of the motor temperature sensor to the control unit</li> <li>• the setting of p0601</li> </ul>

---

<b>F00020</b>	<b>Mains Phase Missing</b>
<b>Reaction:</b>	OFF 2 (OFF 3)
<b>Acknowledge:</b>	Quit fault eg. via DI2
<b>Cause:</b>	Fault occurs if one of the three input phases are missed and the pulses are enabled and drive is loaded
<b>Remedy:</b>	Check the input wiring of the mains phases

---

<b>F00021</b>	<b>Earth fault</b>
<b>Reaction:</b>	OFF 2
<b>Acknowledge:</b>	Quit fault eg. via DI2
<b>Cause:</b>	Fault occurs if the sum of the phase currents is higher than 5 % of the nominal inverter current.
<b>Note:</b>	Framesizes D to F: this fault only occurs on inverters that have 3 current sensors.

---

<b>F00022</b>	<b>Powerstack fault</b>
<b>Reaction:</b>	OFF 2
<b>Acknowledge:</b>	Quit fault eg. via DI2
<b>Cause:</b>	This hardware fault caused by the following events: <ul style="list-style-type: none"> <li>• DC-link overcurrent = short circuit of IGBT</li> </ul>
<b>Remedy:</b>	Contact Service Department. Change inverter power module

---

<b>F00023</b>	<b>Output phase fault</b>
<b>Reaction:</b>	OFF 2 (OFF 3)
<b>Acknowledge:</b>	Quit fault eg. via DI2
<b>Cause:</b>	One output phase is disconnected.
<b>Remedy:</b>	Check motor connection.

---

<b>F00025</b>	<b>F3E Dclink Ripple</b>
<b>Reaction:</b>	OFF 2 (OFF 3)
<b>Acknowledge:</b>	Quit fault eg. via DI2
<b>Cause:</b>	Large ripples on the dclink.
<b>Remedy:</b>	Contact Service Department.

---

<b>F00026</b>	<b>Supply to Gate Driver Not Enabled</b>
<b>Reaction:</b>	OFF 2
<b>Acknowledge:</b>	Quit fault eg. via DI2
<b>Cause:</b>	Gate driver not enabled. Can be caused also by a synchronization error of the safety state machines.
<b>Remedy:</b>	Contact Service Department.

---

---

**F00027      Overcurrent on W phase**

**Reaction:** OFF 2  
**Acknowledge:** Quit fault eg. via DI2  
**Cause:** This hardware fault caused by the following events:

- Over current trip on W phase
- Earth Fault

**Remedy:** Check Inverter and Motor wiring

---

**F00028      Power limit exceeded during regeneration**

**Reaction:** OFF 2  
**Acknowledge:** Quit fault eg. via DI2  
**Cause:** Occurs if motor is driven by an active load, causing motor to go into excessive regeneration. Occurs at very high load inertias, when ramping down.

**Remedy:**

- Reduce regeneration from active load
- Reduce ramp down rate
- Increase I<sub>max</sub> regeneration limit in p1253

---

**F00029      EM brake overcurrent**

**Reaction:** OFF 2  
**Acknowledge:** Quit fault eg. via DI2

---

**F00035      Auto restart after n**

**Reaction:** OFF 2 (OFF 3)  
**Acknowledge:** Power on  
**Cause:** Auto restart attempts exceed value of p1211.

---

**F00041      Motor Data Identification Failure**

**Reaction:** OFF 2  
**Acknowledge:** Quit fault eg. via DI2  
**Cause:** Motor data identification failed.

- r0949 = 0: Load missing
- r0949 = 1: Current limit level reached during identification.
- r0949 = 2: Identified stator resistance less than 0.1% or greater than 100%.
- r0949 = 3: Identified rotor resistance less than 0.1% or greater than 100%.
- r0949 = 4: Identified stator reactance less than 50% and greater than 500%
- r0949 = 5: Identified main reactance less than 50% and greater than 500%
- r0949 = 6: Identified rotor time constant less than 10ms or greater than 5s
- r0949 = 7: Identified total leakage reactance less than 5% and greater than 50%
- r0949 = 20: Identified IGBT on-voltage less than 0.5 V or greater than 10 V
- r0949 = 30: Current controller at voltage limit
- r0949 = 40: Inconsistence of identified dataset, at least one identification failed
- r0949 = 41: Writing of calculated magnetizing current P0320 failed
- r0949 = 42: Writing of identified stator resistance failed
- r0949 = 43: Writing of identified rotor resistance P0354 failed
- r0949 = 44: Writing of identified rotor time constant P0622 failed
- r0949 = 45: Writing of identified mutual reactance P0360 failed
- r0949 = 46: Writing of identified stator leakage reactance P0356 failed
- r0949 = 47: Writing of identified rotor leakage reactance P0358 failed
- r0949 = 48: Writing of identified on voltage P1825 failed.
- r0949 = 49: Writing of the identified dead time compensation P1828 failed

Percentage values based on the impedance  $Z_b = V_{mot,nom} / \sqrt{3} / I_{mot,nom}$

**Remedy:** Check the following:

- r0949 = 0: is the motor connected to the inverter.
- r0949 = 1-49: are the motor data in p0304 - p0311 correct.
- Check what type of motor wiring is required (star, delta).

---

**F00042 Speed Control Optimisation Failure**

<b>Reaction:</b>	OFF 2
<b>Acknowledge:</b>	Quit fault eg. via DI2
<b>Cause:</b>	Motor data identification failed. <ul style="list-style-type: none"> <li>• r0949 = 0: Time out waiting for stable speed</li> <li>• r0949 = 1: Inconsistent readings</li> </ul>
<b>Remedy:</b>	Make sure motor has data been entered correctly. Motor data identification needs to have been done.

---

**F00051 Parameter EEPROM Fault**

<b>Reaction:</b>	OFF 2
<b>Acknowledge:</b>	Quit fault eg. via DI2
<b>Cause:</b>	Read or write failure while access to EEPROM.  This can also be caused by the EEPROM being full, too many parameters have been changed.
<b>Remedy:</b>	<ul style="list-style-type: none"> <li>• Must be Power Cycled to cancel this bug as some parameters may not be read correct.</li> <li>• Factory Reset and new parameterization, if power cycle does not remove fault</li> <li>• Change inverter control unit</li> <li>• Change some parameters back to default values if the EEPROM is full, then power cycle</li> </ul>
<b>Note:</b>	<ul style="list-style-type: none"> <li>• r0949 = 1: EEPROM Full</li> <li>• r0949 = 1000 + Block No: Reading data block failed</li> <li>• r0949 = 2000 + Block No: Reading data block timeout</li> <li>• r0949 = 3000 + Block No: Reading data block CRC failed</li> <li>• r0949 = 4000 + Block No: Writing data block failed</li> <li>• r0949 = 5000 + Block No: Writing data block timeout</li> <li>• r0949 = 6000 + Block No: writing data block verify failed</li> <li>• r0949 = 7000 + Block No: Reading data block at wrong time</li> <li>• r0949 = 8000 + Block No: writing data block at wrong time</li> <li>• r0949 = 9000 + Block No: Factory Reset did not work because restart or power failure</li> </ul>

**F00052 Power stack Fault**

**Reaction:** OFF 2

**Acknowledge:** Quit fault eg. via DI2

**Cause:** Read failure for power stack information or invalid data.

- Remedy:**
- Check connection between inverter power module and inverter control unit
  - Powercycle inverter Control Unit.
  - Change inverter Power Module.
  - Change inverter Control Unit.

- Note:**
- r0949 = 1: Failed reading PS identity
  - r0949 = 2: PS identity wrong
  - r0949 = 3: Failed reading PS version
  - r0949 = 4: PS version wrong
  - r0949 = 5: Start of Part 1 PS data wrong
  - r0949 = 6: PS number of temp. sensor wrong
  - r0949 = 7: PS number of application wrong
  - r0949 = 8: Start of Part 3 PS data wrong
  - r0949 = 9: Reading PS data string wrong
  - r0949 = 10: PS CRC failed
  - r0949 = 11: PS is blank
  - r0949 = 15: Failed CRC of PS block 0
  - r0949 = 16: Failed CRC of PS block 1
  - r0949 = 17: Failed CRC of PS block 2
  - r0949 = 20: PS invalid
  - r0949 = 30: Directory size wrong
  - r0949 = 31: Directory ID wrong
  - r0949 = 32: Invalid block
  - r0949 = 33: File size wrong
  - r0949 = 34: Data section size wrong
  - r0949 = 35: Block section size wrong
  - r0949 = 36: RAM size exceeded
  - r0949 = 37: Parameter size wrong
  - r0949 = 38: Device header wrong
  - r0949 = 39: Invalid file file pointer
  - r0949 = 40: Scaling block version wrong
  - r0949 = 41: Calibration block version wrong
  - r0949 = 50: Wrong serial number format
  - r0949 = 51: Wromg serial number format start
  - r0949 = 52: Wromg serial number format end
  - r0949 = 53: Wromg serial number format month
  - r0949 = 54: Wromg serial number format day
  - r0949 = 1000 + addr: PS read data failed
  - r0949 = 2000 + addr: PS write data failed
  - r0949 = 3000 + addr: PS read data wrong time
  - r0949 = 4000 + addr: PS write data wrong time
  - r0949 = 5000 + addr: PS read data invalid
  - r0949 = 6000 + addr: PS read data invalid

---

<b>F00060</b>	<b>Asic Timeout</b>
<b>Reaction:</b>	OFF 2
<b>Acknowledge:</b>	Quit fault eg. via DI2
<b>Cause:</b>	Internal communications failure <ul style="list-style-type: none"> <li>• r0949 = 0: HW reported Link Fail</li> <li>• r0949 = 1: SW reported Link Fail</li> </ul>
<b>Remedy:</b>	Check connection between inverter power module and inverter control unit Fault appears sporadically: <ul style="list-style-type: none"> <li>• Communication failure due to EMC problems</li> <li>• Check - and if necessary - improve EMC</li> <li>• Use EMC filter</li> </ul> Fault appears immediately when mains voltage is applied and an ON command is given. <ul style="list-style-type: none"> <li>• If fault persists, change inverter.</li> <li>• Contact Service Department.</li> </ul>

---

<b>F00061</b>	<b>Par Cl. MMC-PS not fitted Fault</b>
<b>Reaction:</b>	OFF 2
<b>Acknowledge:</b>	Quit fault eg. via DI2
<b>Cause:</b>	MMC-PS Cloning Failed. <ul style="list-style-type: none"> <li>• r0949 = 0: MMC-PS Not Connected or incorrect MMC-PS Type</li> <li>• r0949 = 1: MMC-PS cannot write to MMC</li> <li>• r0949 = 2: MMC-PS File not available</li> <li>• r0949 = 3: MMC-PS cannot read the file</li> <li>• r0949 = 4: MMC-PS problems in the clone File ( e.g CRC )</li> </ul>
<b>Remedy:</b>	<ul style="list-style-type: none"> <li>• r0949 = 0: Use MMC-PS with FAT12 or FAT16 format or correct MMC-PS Type, or fit an MMC-PS to Drive.</li> <li>• r0949 = 1: Check MMC ( e.g is MMC full ) - Format MMC again to FAT16</li> <li>• r0949 = 2: Put the correct named file in the correct directory /USER/SINAMICS/DATA.</li> <li>• r0949 = 3: Make sure File is accesable. Recreate File if possible</li> <li>• r0949 = 4: File has been changed - Recreate File</li> </ul>

---

<b>F00062</b>	<b>Par Cl. MMC-PS contents invalid</b>
<b>Reaction:</b>	OFF 2
<b>Acknowledge:</b>	Quit fault eg. via DI2
<b>Cause:</b>	File exists but the contents are not valid Control Word Corruption.
<b>Remedy:</b>	Recopy and ensure operation completes.

---

<b>F00063</b>	<b>Par Cl. MMC-PS contents incompatible</b>
<b>Reaction:</b>	OFF 2
<b>Acknowledge:</b>	Quit fault eg. via DI2
<b>Cause:</b>	File exists but was not the correct drive type.
<b>Remedy:</b>	Ensure clone from compatiabile drive type.

---

<b>F00064</b>	<b>Drive attempted to do an automatic clone during startup.</b>
<b>Reaction:</b>	OFF 2
<b>Acknowledge:</b>	Quit fault eg. via DI2
<b>Cause:</b>	No Clone00.bin File in the correct directory /USER/SINAMICS/DATA.
<b>Remedy:</b>	If a automatic clone is required: <ul style="list-style-type: none"> <li>- Insert MMC with correct File anc power cycle.</li> </ul> If no automatic clone is required: <ul style="list-style-type: none"> <li>- Remove MMC if not needed and power cycle.</li> <li>- Reset P8458 = 0 and power cycle.</li> </ul>

---

**F00070      PLC setpoint fault**

**Reaction:**            OFF 2 (OFF 3)  
**Acknowledge:**        Quit fault eg. via DI2  
**Cause:**                No setpoint values from PLC during telegram off time  
**Remedy:**

- Check and improve - if necessary - the value in p2040
- Acknowledge fault
- if fault persists, change inverter control unit

---

**F00071      USS setpoint fault**

**Reaction:**            OFF 2 (OFF 3)  
**Acknowledge:**        Quit fault eg. via DI2  
**Cause:**                No setpoint values from USS during telegram off time  
**Remedy:**              Check and if necessary improve the monitoring time in the STARTER SW while getting the command source.  
Check USS master

---

**F00072      USS Setpoint Fault**

**Reaction:**            OFF 2 (OFF 3)  
**Acknowledge:**        Quit fault eg. via DI2  
**Cause:**                No setpoint values from USS during telegram off time  
**Remedy:**              Check USS master

---

**F00073      Control Panel setpoint fault**

**Reaction:**            OFF 2 (OFF 3)  
**Acknowledge:**        Quit fault eg. via DI2  
**Cause:**                No setpoint values from Control Panel during telegram off time  
**Remedy:**

- Check and improve - if necessary - the value in p3984
- Acknowledge fault
- if fault persists, change inverter control unit

---

**F00085      External Fault**

**Reaction:**            OFF 2 (OFF 3)  
**Acknowledge:**        Quit fault eg. via DI2  
**Cause:**                External fault triggered via command input via control word 2, bit 13, resp. FB100 parameter CTRL, Signal "external fault 1"  
**Remedy:**

- Check P2106.
- Disable control word 2 bit 13 as command source.
- Disable terminal input for fault trigger.

---

<b>F00090</b>	<b>Encoder feedback loss</b>
<b>Reaction:</b>	OFF 2
<b>Acknowledge:</b>	Quit fault eg. via DI2
<b>Cause:</b>	Signal from Encoder lost (check fault value r0949): <ul style="list-style-type: none"> <li>• r0949 = 0: Encoder signal lost.</li> <li>• r0949 = 1: Encoder loss detected due to sudden speed change (i.e. speed change detected on encoder in a single scan &gt; value in P0492).</li> <li>• r0949 = 2: Encoder signal lost whilst running at low speed.</li> <li>• r0949 = 5: Encoder not configured in p0400, but required for sensed control (p1300 = 21 or 23).</li> <li>• r0949 = 6: Encoder not found, but configured in p0400.</li> <li>• r0949 = 7: Encoder loss detected due to motor stalled .</li> </ul>
<b>Remedy:</b>	Stop the inverter. <ul style="list-style-type: none"> <li>• r0949 = 2, Increase value of p0494 or reduce value of p1120 and p1121.</li> <li>• r0949 = 5, select encoder type via p0400.</li> <li>• r0949 = 5, select SLVC mode (p1300 = 20 or 22).</li> <li>• r0949 = 7, select SLVC mode (p1300 = 20 or 22).</li> <li>• Check connections between encoder and inverter.</li> <li>• Check that encoder not faulty (select p1300 = 0, run at fixed speed, check encoder feedback signal in r0061)</li> <li>• Increase encoder loss threshold in p0492.</li> </ul>

---

<b>F00100</b>	<b>Watchdog Reset</b>
<b>Reaction:</b>	OFF 2
<b>Acknowledge:</b>	Quit fault eg. via DI2
<b>Cause:</b>	Software Error
<b>Remedy:</b>	Contact Service Department. Change inverter control unit.

---

<b>F00101 (N)</b>	<b>Stack Overflow</b>
<b>Reaction:</b>	OFF 2
<b>Acknowledge:</b>	Quit fault eg. via DI2
<b>Cause:</b>	Software error or processor failure.
<b>Remedy:</b>	Contact Service Department. Change inverter control unit

---

<b>F00350</b>	<b>Configuration vector for the drive failed</b>
<b>Reaction:</b>	OFF 2
<b>Acknowledge:</b>	Quit fault eg. via DI2
<b>Cause:</b>	During startup the drive checks if the configuration vector (SZL vector) has been programmed correctly and if hw matches the programmed vector. If not the drive will trip. <ul style="list-style-type: none"> <li>• r0949 = 1: Internal Failure - No HW Configuration Vector available.</li> <li>• r0949 = 2: Internal Failure - No SW Configuration Vector available.</li> <li>• r0949 = 11: Internal Failure - CU Code not supported.</li> <li>• r0949 = 12: Internal Failure - SW Vector not possible.</li> <li>• r0949 = 13: Wrong power module fitted.</li> <li>• r0949 &gt; 1000: Internal failure - Wrong IO Board fitted.</li> </ul>
<b>Remedy:</b>	Internal Failures can not be fixed. r0949 = 13 - Make sure the right power module is fitted
<b>Note:</b>	Fault needs power cycle to be acknowledged.

---

**F00395**      **Acceptance Test / Confirmation pending**

**Reaction:**      OFF 2

**Acknowledge:**      Quit fault eg. via DI2

**Cause:**      This fault occurs after a Powermodul (PM) / Control Unit (CU) Swap or a Startup Clone. It can also be caused by a faulty read from the EEPROM, see F0051 for more details.

The parameterset after a CU swap or a startup clone could have changed and might not match the application.

This parameterset needs to be checked before the drive can start a motor.

- r0949 = 3 / 4: Swap of PM/CU
- r0949 = 5: Startup Clone via MMC has been performed
- r0949 = 10: Before the last power up an acceptance test was pending due to a swap or a startup clone.

**Remedy:**      Safety Units:

An Acceptance Test needs to be performed. Follow the the steps of the Acceptance Log which is part of the Operating Instructions.

After performing the acceptance test the fault can be acknowledged by the following procedure:

P0010 = 30

P9761 = Safety password

P7844 = 0

The fault will be cleared automatically and P0010 will be set back to 0

Non Safety Units:

The current parameterset needs to be checked and confirmed by clearing the fault or setting P7844 = 0.

---

**F00400 (N)**      **PROFIBUS: DS101/DB101 (control pannel) failure**

**Reaction:**      OFF 2

**Acknowledge:**      Quit fault eg. via DI2

**Cause:**      Timeout, trigger fault,...

**Remedy:**      Restart C2 connection.

---

**F00401 (N)**      **Wrong telegram configured in P0922**

**Reaction:**      OFF 2

**Acknowledge:**      Quit fault eg. via DI2

**Cause:**      Different configuration in master and slave.

**Remedy:**      r0949 = 0: Check p0922 and/or PROFIBUS master configuration.



---

<b>F00452</b>	<b>Belt Failure</b>
<b>Reaction:</b>	OFF 2 (OFF 3)
<b>Acknowledge:</b>	Quit fault eg. via DI2
<b>Cause:</b>	Load conditions on motor indicate belt failure or mechanical fault. <ul style="list-style-type: none"> <li>• r0949 = 0: trip low torque/speed</li> <li>• r0949 = 1: trip high torque/speed</li> </ul>
<b>Remedy:</b>	Check the following: <ul style="list-style-type: none"> <li>• No breakage, seizure or obstruction of drive train.</li> <li>• If using an external speed sensor, check the following parameters for correct function:</li> <li>• If using the torque envelope, check parameters:</li> <li>• Apply lubrication if required.</li> </ul>

---

<b>F00453</b>	<b>Motor Stalled</b>
<b>Reaction:</b>	OFF 2
<b>Acknowledge:</b>	Quit fault eg. via DI2
<b>Cause:</b>	<ul style="list-style-type: none"> <li>• In SLVC or VC (p1300 greater than 20) and Ramp rate too fast</li> <li>• In SLVC or VC (p1300 greater than 20) and done OFF2 and RUN onto a spinning motor without Flying start enabled</li> <li>• In SLVC (p1300 = 20 or 21) and load too large at very low frequency</li> <li>• In SLVC or VC (p1300 greater than 20) and no motor connected or motor too small for inverter</li> <li>• In VC, the motor cable phase sequence (U-V-W) and the encoder cable wiring may be wired up incorrectly.</li> <li>• The speed controller settings are not optimised to the application. This can cause instabilities.</li> </ul>
<b>Remedy:</b>	<ul style="list-style-type: none"> <li>• Reduce ramp rate in p1120</li> <li>• Enable flying start (p1200 equal to 1)</li> <li>• Increase boost in p1611</li> <li>• Connect motor or use larger motor for this inverter or use VF mode (p1300 less than 20).</li> <li>• Correct the wiring to the motor and / or the encoder as required. Confirm the rotation direction in V/f control mode and compare parameters r0061 and r0021.</li> <li>• Optimise the speed controller settings (gain and integration time).</li> </ul>

---

<b>A00501</b>	<b>Current Limit</b>
<b>Reaction:</b>	NONE
<b>Acknowledge:</b>	NONE
<b>Cause:</b>	<ul style="list-style-type: none"> <li>• Motor power does not correspond to the inverter power</li> <li>• Motor leads are too long</li> <li>• Earth faults</li> </ul>
<b>Remedy:</b>	Check the following: <ul style="list-style-type: none"> <li>• Motor power (P0307) must correspond to inverter power (r0206).</li> <li>• Cable length limits must not be exceeded.</li> <li>• Motor cable and motor must have no short-circuits or earth faults</li> <li>• Motor parameters must match the motor in use</li> <li>• Value of stator resistance (P0350) must be correct</li> <li>• Motor must not be obstructed or overloaded</li> <li>• Increase Ramp-up time (P1120)</li> <li>• Reduce Starting boost level (P1312)</li> </ul>

---

<b>A00502</b>	<b>Overvoltage limit</b>
<b>Reaction:</b>	NONE
<b>Acknowledge:</b>	NONE
<b>Cause:</b>	Overvoltage limit is reached. This warning can occur during ramp down, if the Vdc controller is disabled (P1240 = 0).
<b>Remedy:</b>	If this warning is displayed permanently, check drive input voltage.

---

**A00503 UnderVoltage Limit**

**Reaction:** NONE

**Acknowledge:** NONE

**Cause:**

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

**Remedy:** Check main supply voltage.

---

**A00504 Inverter OverTemperature**

**Reaction:** NONE

**Acknowledge:** NONE

**Cause:** Warning level of inverter heat sink temperature, warning level of chip junction temperature, or allowed change in temperature on chip junction is exceeded, resulting in pulse frequency reduction and/or output frequency reduction (depending on parameterization in P0290).

**Remedy:** Note:  
r0037 = 0: Heat sink temperature  
r0037 = 1: Chip junction temperature (includes heat sink)  
Check the following:

- Ambient temperature must lie within specified limits
- Load conditions and load steps must be appropriate
- Fan must turn when drive is running

---

**A00505 Inverter I2T**

**Reaction:** NONE

**Acknowledge:** NONE

**Cause:** Warning level exceeded, current will be reduced if parameterized (P0610 = 1)

**Remedy:** Check that load cycle lies within specified limits.

---

**A00506 IGBT junction temperature rise warning**

**Reaction:** NONE

**Acknowledge:** NONE

**Cause:** Overload warning. Difference between heat sink and IGBT junction temperature exceeds warning limits.

**Remedy:** Check that load steps and shock loads lie within specified limits.

---

**A00507 Inverter temp. signal lost**

**Reaction:** NONE

**Acknowledge:** NONE

**Cause:** Inverter temperature signal loss

**Remedy:** Check the following:

- the connection of the motor temperature sensor to the control unit
- the setting of p0601

---

**A00511 Motor OverTemperature I2T**

**Reaction:** NONE

**Acknowledge:** NONE

**Cause:**

- Motor overloaded.
- Load cycles or load steps too high.

**Remedy:** Independently of the kind of temperature determination check:

- P0604 motor temperature warning threshold
- P0625 motor ambient temperature

If P0601 = 0 or 1, check the following:

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

If P0601 = 2, Check the following:

- Check if temperature shown in r0035 is reasonable.
- Check if the sensor is a KTY84 (other sensors are not supported)

---

**A00523 Output fault**

**Reaction:** NONE

**Acknowledge:** NONE

**Cause:** One phase of output is disconnected.

**Remedy:** Check motor connection.

---

**A00525 F3E Dclink Ripple**

**Reaction:** NONE

**Acknowledge:** NONE

**Cause:** Large dclink ripple

Large dclink ripple detected

**Remedy:**

---

**A00541 Motor Data Identification Active**

**Reaction:** NONE

**Acknowledge:** NONE

**Cause:** Motor data identification (P1910) selected or running.

**Remedy:**

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**A00542 Speed Control Optimisation Active**

**Reaction:** NONE

**Acknowledge:** NONE

**Cause:** Speed Control Optimisation (P1960) is selected or running.

**Remedy:**

---

**A00544 Speed deviation**

**Reaction:** NONE

**Acknowledge:** NONE

**Cause:** The actual speed has exceeded the maximal speed (status bit r2197.12) or the speed deviation is larger than specified (status bit 2197.7).

**Remedy:** The motoring or regenerative load is too large.

<b>A00564</b>	<b>MMC Plugged During Operation</b>
Reaction:	NONE
Acknowledge:	NONE
Cause:	MMC-PS Plugged During Operation and none was present at startup. Therefore, possible corruption of current dataset on next power cycle from Automatic Cloning at Startup.
Remedy:	Remove MMC-PS from drive.
<b>A00590</b>	<b>Encoder feedback loss warning</b>
Reaction:	NONE
Acknowledge:	NONE
Cause:	Signal from Encoder lost; Inverter might have switched to sensorless vector control. Check also alarm value r0947: <ul style="list-style-type: none"> <li>• r0949 = 0: Encoder signal lost.</li> <li>• r0949 = 5: Encoder not configured in P0400, but required for sensed control (P1300 = 21 or 23).</li> </ul>
Remedy:	Stop inverter and then <ul style="list-style-type: none"> <li>• Check encoder fitted. If encoder fitted and r0949 = 5, select encoder type via P0400.</li> <li>• If encoder fitted and r0949 = 6, check connections between encoder module and inverter.</li> <li>• If encoder not fitted and r0949 = 5, select SLVC mode (P1300 = 20 or 22).</li> <li>• If encoder not fitted and r0949 = 6, set P0400 = 0.</li> <li>• If encoder fitted, check correct encoder selected (check encoder setup in P0400).</li> <li>• Check connections between encoder and inverter.</li> <li>• Check that encoder not faulty (select P1300 = 0, run at fixed speed, check encoder feedback signal in r0061).</li> <li>• Increase encoder loss threshold in P0492.</li> </ul>
<b>A00600</b>	<b>RTOS Overrun Warning</b>
Reaction:	NONE
Acknowledge:	NONE
Cause:	Internal time slice overrun
Remedy:	Contact Service Department
<b>A00700</b>	<b>PROFIBUS: Parameter or configuration error</b>
Reaction:	NONE
Acknowledge:	NONE
Cause:	wrong parameter and/or configuration telegram
Remedy:	check parameter and/or configuration telegram
<b>A00701</b>	<b>PROFIBUS: DoubleWord error</b>
Reaction:	NONE
Acknowledge:	NONE
Cause:	error in double word reference table
Remedy:	power cycle
<b>A00702</b>	<b>PROFIBUS: no bus detection</b>
Reaction:	NONE
Acknowledge:	NONE
Cause:	connection error, no bus initialization (no master), no clear bus signal, ...
Remedy:	check the cables and the bus hardware
<b>A00703</b>	<b>PROFIBUS: no reference values</b>
Reaction:	NONE
Acknowledge:	NONE
Cause:	no or empty control word 1 received
Remedy:	check bus transmission

---

<b>A00704</b>	<b>PROFIBUS: loose of links</b>
Reaction:	NONE
Acknowledge:	NONE
Cause:	lost subscriber information
Remedy:	temporary, if permanent the fault detection is activated

---

<b>A00705</b>	<b>PROFIBUS: timeout actual value</b>
Reaction:	NONE
Acknowledge:	NONE
Cause:	no actual data from CUP
Remedy:	temporary, if permanent the fault detection is activated

---

<b>A00706</b>	<b>PROFIBUS: fatal SW error (e.g. hardware check, communication, V</b>
Reaction:	NONE
Acknowledge:	NONE
Cause:	e.g. hardware check, communication, V1SL stack, ...
Remedy:	if permanent power cycle, reload firmware

---

<b>A00707</b>	<b>PROFIBUS: wrong PB address at startup</b>
Reaction:	NONE
Acknowledge:	NONE
Cause:	wrong DIP switch or parameter settings for PROFIBUS address
Remedy:	check DIP switch and/or P0918

---

<b>A00708</b>	<b>--- not used ---</b>
Reaction:	NONE
Acknowledge:	NONE
Cause:	
Remedy:	

---

<b>A00709</b>	<b>--- not used ---</b>
Reaction:	NONE
Acknowledge:	NONE
Cause:	
Remedy:	

---

<b>A00710</b>	<b>CB communication error</b>
Reaction:	NONE
Acknowledge:	NONE
Cause:	Communication with CB (communication board) is lost.
Remedy:	Check CB hardware

---

<b>A00711</b>	<b>CB configuration error</b>
Reaction:	NONE
Acknowledge:	NONE
Cause:	CB (communication board) reports a configuration error.
Remedy:	Check CB parameters

---

**A00910 Vdc-max controller de-activated**

**Reaction:** NONE

**Acknowledge:** NONE

**Cause:** Occurs

- if main supply voltage is permanently too high.
- if motor is driven by an active load, causing motor to go into regenerative mode.
- at very high load inertias, when ramping down.

**Remedy:** Check the following:

- Input voltage must lie within range.
- Load must be match.

---

**A00922 No load applied to inverter**

**Reaction:** NONE

**Acknowledge:** NONE

**Cause:** No Load is applied to the inverter.

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

**Remedy:** Check that motor is connected to inverter.

---

**A00923 Both JOG Left and JOG Right are requested**

**Reaction:** NONE

**Acknowledge:** NONE

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

**Remedy:** Do not press JOG right and left simultaneously.

---

**A00952 Belt Failure Detected**

**Reaction:** NONE

**Acknowledge:** NONE

**Cause:** Load conditions on motor indicate belt failure or mechanical fault.

**Remedy:** Check the following:

- No breakage, seizure or obstruction of drive train.
- If using an external speed sensor, check the following parameters for correct function.
- If using the torque envelope, check parameters:
- Apply lubrication if required.

**F01600 passivated STO with drive fault****Reaction:** OFF 2 (OFF 3)**Acknowledge:** Quit fault eg. via DI2**Cause:** A passivated safe torque off (passivated STO) has been initiated by hardware due to a drive fault:

- r0949 = 33: passivated STO acknowledge after a drive fault requires the OFF first and then an acknowledge (ACK) to remove the safety fault! If however ACK is given first and then the OFF command, the alarm handler clears the fault but the passivated STO is still active.
- r0949 = 100: The signals for the STO signal are not consistent on P1.
- r0949 = 101: Maximum speed exceeded on P1 during activation of the SS1. The estimated speed deviates from the SBR monitoring ramp. When the drive is in VECTOR mode (with p1300 > 19):
- r0949 = 104: Communication timeout of processor P2 during forced dynamisation. The handshaking via hardware lines has failed.
- r0949 = 106: Error in the mechanical brake or in the brake feedback path of P1.
- r0949 = 107: Error in the gate driver or feedback path of P1. Can happen when either the hardware measurement circuit on the PM is faulty or when P1 and P2 are not synchronised.
- r0949 = 108: Signal debounce error on P2.
- r0949 = 109: Hardware detection fault on P1. The hardware type (safety or non-safety module) has not been recognised correctly.
- r0949 = 200: The STO signals are not consistent on P2. Avoid fast periodic activation and deactivation of the STO.
- r0949 = 201: Maximum frequency exceeded on activation of SS1 on P2.
- r0949 = 202: Maximum frequency exceeded on activation of SLS in P2.
- r0949 = 204: Communication timeout of processor P2 during forced dynamisation. The handshaking via hardware lines has failed.
- r0949 = 206: Error in the mechanical brake or in the brake feedback path of P2
- r0949 = 207: Error in gate driver or feedback path on P2.
- r0949 = 208: Signal debounce error on P2.
- r0949 = 209: Hardware type could not be detected correctly on P2.

**Remedy:**

- r0949 = 100 or 200  
Increase the ramping times p1120/p1121 or the safety tolerance p9691/p9891, check the motor parameters (p0394 - p0311) or run the motor identification (p1910) again. Decrease the rate of switching the safety signals or lower the cycle time of the PLC.
- r0949 = 101 or 201  
Increase the ramping times p1120/p1121 or the safety tolerance p9691/p9891, check the motor parameters (p0394 - p0311) or run the motor identification (p1910) again.
- r0949 = 102 or 202  
Increase the ramping times (p1120, p1121) so that deviation between reference and actual frequency is minimized.  
Increase the safety tolerance p9691/p9891 or run the motor identification (p1910) again for better tuning of the observer and controllers.
- r0949 = 104 or 204  
Acknowledge the fault once more  
Power cycle the CU
- r0949 = 106 or 206  
Check connection with safe brake module and mechanical brake  
Check the 24 V power supply for safe brake module
- r0949 = 107 or 207  
Check connection between CU and power module  
Power cycle the CU
- r0949 = , 108, or 208  
Decrease the rate of switching the safety rails.
- r0949 = 109 or 209  
Power cycle the CU  
Change CU

<b>F01601</b>	<b>System startup error</b>
<b>Reaction:</b>	OFF 2 (OFF 3)
<b>Acknowledge:</b>	Power on
<b>Cause:</b>	<p>System startup error. Error during the startup initialisation after a PowerCycle or HotSwap. This error is critical and cannot be acknowledged. A restart (hotswap or power cycle) of the drive is required!</p> <ul style="list-style-type: none"> <li>• r0949 = 0: Handshaking error on P1. Either an unexpected reboot by P1 or a synchronisation error during startup. Please power-cycle the inverter module again or perform a hotswap.</li> <li>• r0949 = 1: Handshaking error on P2. Either a faulty reboot by P2 or a synchronisation error during startup. Please power-cycle the inverter module or perform a hotswap.</li> <li>• r0949 = 100: Version error detected by P1. The safety version number is not identical on P1 and P2.</li> <li>• r0949 = 101: Startup semaphore is wrong on P1. Can happen if commissioning was not finished properly before performing a power cycle. There might also be a problem of the EEPROM.</li> <li>• r0949 = 102: Error with semaphore on P1. The drive loads default parameters instead of the user settings.</li> <li>• r0949 = 103: Error with initial and first hardware type detection on P1. The hardware type (standard or safety module) could not be identified. Either the control board is faulty or affected by EMC.</li> <li>• r0949 = 104: Timeout error on P1 while waiting for communication with P2.</li> <li>• r0949 = 105: Error on P1 during hardware exchange phase. Processors have not agreed on same type of hardware platform.</li> <li>• r0949 = 106: Timeout error on P1 in hardware detection state. Handshaking with P2 failed.</li> <li>• r0949 = 107: Checksum error on P1. The safety parameters are not consistent in EEPROM.</li> <li>• r0949 = 108: Error on P1 during parameter transfer to P2. The correct safety parameters are not available on P2 due to a communication problem.</li> <li>• r0949 = 109: Timeout error on P1 during parameter transfer to P2 due to different safety checksums on P1 and P2. The parameter transfer to P2 has failed.</li> <li>• r0949 = 110: Timeout error on P1 during forced dynamisation and processor self test.</li> <li>• r0949 = 111: Timeout error on P1 when leaving the safety commissioning at startup.</li> <li>• r0949 = 112: Checksum error on P1 during processor initialisation.</li> <li>• r0949 = 200: Version error detected by P2. The safety version number (see r9770) is not identical on P1 and P2.</li> <li>• r0949 = 201: Startup semaphore is wrong on P2. Can happen if commissioning was not finished properly before performing a power cycle. There might also be a problem of the EEPROM.</li> <li>• r0949 = 202: Error with semaphore on P2. The drive loads default parameters instead of the user settings.</li> <li>• r0949 = 203: Error on P2 with initial and first hardware detection. The hardware type (standard or safety module) could not be identified. Either the control board is faulty or affected by EMC.</li> <li>• r0949 = 204: Timeout error on P1 while waiting for communication with P2.</li> <li>• r0949 = 205: Error on P1 during hardware exchange phase. Processors have not agreed on same type of hardware platform.</li> <li>• r0949 = 206: Timeout error on P2 during hardware detection. Handshaking with P1 failed.</li> <li>• r0949 = 207: Checksum error on P2. The safety parameters on P2 are not consistent.</li> <li>• r0949 = 208: Error on P2 during parameter transfer from P1. The safety parameters on P2 are not valid due to a communication problem.</li> <li>• r0949 = 209: Timeout error on P2 during parameter transfer from P1. Possibly due to different checksums on P1 and P2.</li> <li>• r0949 = 210: Timeout error on P2 in startup dynamisation phase. The communication failed.</li> <li>• r0949 = 211: Timeout error on P2 when leaving the initial safety commissioning.</li> <li>• r0949 = 212: Checksum error on P2 during processor initialisation.</li> </ul>
<b>Remedy:</b>	<ul style="list-style-type: none"> <li>• Power-cycle the inverter module (since fault F1601 cannot be acknowledged).</li> <li>• Make sure that control unit is connected correctly.</li> <li>• Check backplane bus termination (see rightmost or last terminal module).</li> <li>• Reduce EMC.</li> <li>• r0949 = 104 or 204</li> </ul>



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<b>F01610</b>	<b>EEPROM inconsistent</b>
<b>Reaction:</b>	OFF 2 (OFF 3)
<b>Acknowledge:</b>	Quit fault eg. via DI2
<b>Cause:</b>	EEPROM data inconsistency error: <ul style="list-style-type: none"> <li>• r0949 = 100: Safety parameters have not been written correctly to EEPROM on P1. Try to load parameters again.</li> <li>• r0949 = 200: EEPROM data inconsistency error on P2.</li> <li>• r0949 = 2011: Safety parameters have not been written correctly to EEPROM.</li> </ul>
<b>Remedy:</b>	Load safety parameters again.

---

<b>F01611</b>	<b>Defect in cross comparis.</b>
<b>Reaction:</b>	OFF 2 (OFF 3)
<b>Acknowledge:</b>	Quit fault eg. via DI2
<b>Cause:</b>	Data exchange error between processors: <ul style="list-style-type: none"> <li>• r0949 = 100: P2 has entered the safe torque off due to a drive fault on P2 or a subsequent fault of F1600/F1630</li> <li>• r0949 = 102: Dynamic checksums are different on P1. Cross comparison fault or problem with processor communication.</li> <li>• r0949 = 103: Derived frequency is different on both processors. Cross comparison fault or problem with processor communication.</li> <li>• r0949 = 104: Frequency error on P1 caused by VFM.</li> <li>• r0949 = 201: Frequency check with error on P2.</li> <li>• r0949 = 202: Dynamic checksums are different on P2. Cross comparison fault or problem with processor communication.</li> </ul>
<b>Remedy:</b>	<ul style="list-style-type: none"> <li>• Reduce EMC.</li> <li>• Perform a forced dynamisation</li> </ul>

---

<b>F01612</b>	<b>Diff. in hardw. detection</b>
<b>Reaction:</b>	OFF 2 (OFF 3)
<b>Acknowledge:</b>	Quit fault eg. via DI2
<b>Cause:</b>	The hardware (safety or non-safety hardware) could no be identified. <ul style="list-style-type: none"> <li>• r0949 = 100: Identification error during startup on P1.</li> <li>• r0949 = 101: Runtime detection error on P1.</li> <li>• r0949 = 102: Hardware or software configuration error on P1.</li> <li>• r0949 = 200: Startup error on P2.</li> <li>• r0949 = 201: Runtime detection error on P2.</li> <li>• r0949 = 202: Hardware or software configuration error on P2.</li> </ul>
<b>Remedy:</b>	<ul style="list-style-type: none"> <li>• Inverter hardware is faulty or problem in processor communication. Perform a power cycle.</li> </ul>

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<b>F01613</b>	<b>Maximum frequency exceeded</b>
<b>Reaction:</b>	OFF 2 (OFF 3)
<b>Acknowledge:</b>	Quit fault eg. via DI2
<b>Cause:</b>	The maximum frequency has been exceeded. <ul style="list-style-type: none"> <li>• r0949 = 100: Frequency error on P1, maximum frequency exceeded.</li> <li>• r0949 = 200: Maximum frequency exceeded on P2.</li> </ul>
<b>Remedy:</b>	<ul style="list-style-type: none"> <li>• Check application or increase safety threshold p9691/p9891.</li> <li>• See also remedies for F1614.</li> </ul>

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**F01614**      **Frequency consistency fault**

**Reaction:**      OFF 2 (OFF 3)

**Acknowledge:**      Quit fault eg. via DI2

**Cause:**      Error in frequency detection of the frequency estimation circuit (voltage frequency measurement (VFM) module):

- r0949 = 100: Difference in frequency comparison on P1.
- r0949 = 101: VFM estimated frequency too high on P1.
- r0949 = 102: VFM estimated frequency too low on P1.
- r0949 = 103: Estimated frequency of VFM module was not detected on P1.
- r0949 = 104: Error in cycle-time on P1.
- r0949 = 200: Frequency deviation on P2.
- r0949 = 201: VFM estimated frequency too high on P2.
- r0949 = 202: VFM estimated frequency too low on P2.
- r0949 = 203: Estimated VFM frequency was not detected on P2.
- r0949 = 204: Error in cycle-time on P2.

Error can occur with small ramping times. When the VC or SLVC mode is configured (see p1300) the cause can be the same as for fault F0453.

- Remedy:**
- Increase ramping times p1120 and p1121.
  - Make sure that drive is not at current limit when starting.
  - See remedies for F0453.
  - Check hardware speed estimation circuit.

---

**F01615**      **Error in hardw. environm.**

**Reaction:**      OFF 2 (OFF 3)

**Acknowledge:**      Quit fault eg. via DI2

- Cause:**
- r0949 = 100: Error in supply voltage 3.3 V or 24 V on the control board.
  - r0949 = 101: Temperature of control board exceeds the limits.

- Remedy:**
- r0949 = 100:
    - Check supply voltage.
    - Reduce EMC.
  - r0949 = 101:
    - Check ambient temperature.

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**F01616**      **Processor selftest faulty**

**Reaction:**      OFF 2 (OFF 3)

**Acknowledge:**      Quit fault eg. via DI2

**Cause:**      The processor selftest has uncovered an error:

- r0949 = 100: General error on P1.
- r0949 = 101: Error in RAM test on P1.
- r0949 = 102: Error in ROM test on P1.
- r0949 = 103: Error in processor function test on P1.
- r0949 = 200: Error in processor self-test on P2.

The selftest is started together with the forced dynamisation and must be enabled by setting p9601.1 and p9801.1.

- Remedy:**
- Run self-test again (set bit 1 in p9601 and p9801 and enter the STO mode, then leave the STO mode again).

---

<b>F01625</b>	<b>Consecutive no. incorr.</b>
<b>Reaction:</b>	OFF 2 (OFF 3)
<b>Acknowledge:</b>	Quit fault eg. via DI2
<b>Cause:</b>	The consecutive counter checks the consistency of the communication between P1 and P2: <ul style="list-style-type: none"> <li>• r0949 = 100: The consecutive monitoring counter has an error on P1.</li> <li>• r0949 = 101: Processors are out of synchronism.</li> <li>• r0949 = 102: Processor communication has failed.</li> <li>• r0949 = 103: Processor communication has failed or processors are out of synchronism.</li> <li>• r0949 = 200: The consecutive counter has an error on P2.</li> </ul>
<b>Remedy:</b>	<ul style="list-style-type: none"> <li>• Acknowledge safety fault.</li> <li>• Restart inverter module or check EMC levels on accumulated faults.</li> </ul>

---

<b>F01630</b>	<b>Driver mech. brake faulty</b>
<b>Reaction:</b>	OFF 2 (OFF 3)
<b>Acknowledge:</b>	Quit fault eg. via DI2
<b>Cause:</b>	An error has been detected with the mechanical brake feedback. <ul style="list-style-type: none"> <li>• r0949 = 0: Problem with the mechanical brake.</li> </ul>
<b>Remedy:</b>	<ul style="list-style-type: none"> <li>• Exchange brake module.</li> </ul>

---

<b>F01649</b>	<b>Internal software error</b>
<b>Reaction:</b>	OFF 2 (OFF 3)
<b>Acknowledge:</b>	Quit fault eg. via DI2
<b>Cause:</b>	<ul style="list-style-type: none"> <li>• r0949 = 1: Buffer overflow on checksum calculation for P1 parameter access functions.</li> <li>• r0949 = 2: Buffer overflow on checksum calculation for P2 parameter access functions.</li> <li>• r0949 = 3: Endless safety loop on P1.</li> <li>• r0949 = 4: Endless safety loop on P2.</li> <li>• r0949 &gt; 100: Signal an internal or unexpected software fault.</li> </ul> <p>Only for Siemens internal diagnostics.</p>
<b>Remedy:</b>	Contact hotline.

---

<b>F01650</b>	<b>Fault in safety parametr.</b>
<b>Reaction:</b>	OFF 2 (OFF 3)
<b>Acknowledge:</b>	Quit fault eg. via DI2
<b>Cause:</b>	Error during startup or safety commissioning/reset: <ul style="list-style-type: none"> <li>• r0949 = 0: Error during safety commissioning/reset.</li> <li>• r0949 = 1: Checksum error during safety commissioning or safety reset.</li> <li>• r0949 = 2: Error during internal parameter transfer.</li> <li>• r0949 = 3: Error finalizing the buffer transfer.</li> <li>• r0949 = 4: Failure during saving of parameters to EEPROM.</li> <li>• r0949 = 5: Error in safety parameter transfer during safety reset.</li> <li>• r0949 = 11: Communication channel between processors not ready.</li> <li>• r0949 = 2000: Safety commissioning can only be finished by setting parameter p3900.</li> </ul>
<b>Remedy:</b>	<ul style="list-style-type: none"> <li>• Perform safety commissioning.</li> <li>• Try leaving via p3900 = 11.</li> </ul>

---

<b>F01655</b>	<b>Fault at processor reset</b>
<b>Reaction:</b>	OFF 2 (OFF 3)
<b>Acknowledge:</b>	Quit fault eg. via DI2
<b>Cause:</b>	<ul style="list-style-type: none"> <li>• r0949 = 100: Safety reset timeout on P1.</li> <li>• r0949 = 200: Safety reset timeout on P2.</li> </ul>
<b>Remedy:</b>	<ul style="list-style-type: none"> <li>• Retrigger the safety reset (perform a hot swap of the inverter module).</li> </ul>

---

<b>F01659</b>	<b>Denial of paramet. change</b>
<b>Reaction:</b>	OFF 2 (OFF 3)
<b>Acknowledge:</b>	Quit fault eg. via DI2
<b>Cause:</b>	A write request for one or more safety parameters was rejected: <ul style="list-style-type: none"> <li>• r0949 = 0: Problem during finalization of safety parameters. Drive has reloaded the old data.</li> <li>• r0949 = 1: Safety password not set correctly.</li> <li>• r0949 = 3: Tolerance too small (p9691 &lt; p9690). Increase tolerance p9691!</li> <li>• r0949 = 203: Tolerance too small (p9891 &lt; p9890). Increase tolerance!</li> </ul>
<b>Remedy:</b>	<ul style="list-style-type: none"> <li>• Acknowledge fault and enter safety commissioning again. If not possible, leave the safety commissioning with p3900 = 11 and operate the drive with the old safety settings.</li> </ul>
<b>F01660</b>	<b>Wrong safety checksum</b>
<b>Reaction:</b>	OFF 2 (OFF 3)
<b>Acknowledge:</b>	Quit fault eg. via DI2
<b>Cause:</b>	<ul style="list-style-type: none"> <li>• r0949 = 0: Attempt to leave safety commissioning with r9798 != p9799.</li> <li>• r0949 = 1: Attempt to leave safety commissioning with r9898 != p9899.</li> <li>• r0949 = 2: Attempt to leave safety commissioning with r9798 != r9898.</li> </ul>
<b>Remedy:</b>	<ul style="list-style-type: none"> <li>• Make sure that checksums in p9798 and p9898 are identical. If not, ensure that parametrisation is identical (p96xx = p98xx).</li> <li>• Set checksum in p9799 or p9899 correctly.</li> <li>• If setting the checksums not successful, leave safety commissioning via p3900 = 11 (cancel commissioning).</li> </ul>
<b>A01690</b>	<b>Safety parameter changed</b>
<b>Reaction:</b>	NONE
<b>Acknowledge:</b>	NONE
<b>Cause:</b>	The warning indicates that at least one parameter has been changed in the safety commissioning or safety reset.
<b>Remedy:</b>	Finish safety commissioning by setting p3900 = 10 or p3900 = 11 or wait until safety reset is complete.
<b>A01691</b>	<b>SLS signal inconsistency</b>
<b>Reaction:</b>	NONE
<b>Acknowledge:</b>	NONE
<b>Cause:</b>	Problem with the consistency of the safety input signals. The drive reduces the frequency according to the settings of the SS1. When zero frequency is reached, the passivated STO is entered and a drive fault is issued.
<b>Remedy:</b>	Check consistency of safety input signals and acknowledge the following safe torque off due to a drive fault.
<b>A01692</b>	<b>Speed for SLS exceeded</b>
<b>Reaction:</b>	NONE
<b>Acknowledge:</b>	NONE
<b>Cause:</b>	<p>a) Output frequency when entering the SLS is higher than p9690 and p9692 is configured to trigger a passivated STO with a drive fault.</p> <p>b) Output frequency exceeds the SLS tolerance p9691.</p> <p>In both cases, the frequency is reduced according to the settings for the SS1, then the passivated STO state is entered and a fault is generated.</p>
<b>Remedy:</b>	<p>ad a) Reduce speed before entering the SLS or change the setting in p9692.</p> <p>ad b) increase the tolerance in p9691/p9891 compared to p9690/p9890.</p> <p>In both cases the passivated STO will be entered once zero frequency is reached. Acknowledge the passivated STO and the drive fault.</p>
<b>A01696</b>	<b>Switch-on is inhibited</b>
<b>Reaction:</b>	NONE
<b>Acknowledge:</b>	NONE
<b>Cause:</b>	Switching on of the drive not possible and the drive will therefore remain in the READY state (see r0002).
<b>Remedy:</b>	Check if a deactivated gate driver or the current safety mode (STO, SS1, SLS) is inhibiting the start. Check the inhibit bit (r0052.6).

---

**A01697      Wrong safety param. data****Reaction:** NONE**Acknowledge:** NONE**Cause:** Semaphore problem at startup. Cannot load last safety parameters. Loading default values instead.**Remedy:** Restart drive (perform power cycle) to load correct safety data.

---

**A01698      Safety commis./reset act.****Reaction:** NONE**Acknowledge:** NONE**Cause:** The safety reset or the safety commissioning are currently active (selected via p0010 = 95).**Remedy:** Finish commissioning with p3900 = 10 (accept changed) or p3900 = 11 (discard changes) or wait until safety reset is complete.

---

**A01699      Forced dynamis. required****Reaction:** NONE**Acknowledge:** NONE**Cause:** Dynamisation timer (see r9660) has expired. A new dynamisation test is required.**Remedy:** Select and then de-select STO (p9601.bit1 and p9801.bit1 must be set).



# ASCII-Table

# A

The following table contains the decimal and hexadecimal notation of selected ASCII indications.

Table A-1 ASCII-Table (in part)

Indication	Decimal	Hexadecimal	Indication	Dezimal	Hexadecimal
Leerzeichen	32	20	H	72	48
-	45	2D	I	73	49
0	48	30	J	74	4A
1	49	31	K	75	4B
2	50	32	L	76	4C
3	51	33	M	77	4D
4	52	34	N	78	4E
5	53	35	O	79	4F
6	54	36	P	80	50
7	55	37	Q	81	51
8	56	38	R	82	52
9	57	39	S	83	53
A	65	41	T	84	54
B	66	42	U	85	55
C	67	43	V	86	56
D	68	44	W	87	57
E	69	45	X	88	58
F	70	46	Y	89	59
G	71	47	Z	90	5A





## List of Abbreviations

<b>Abbreviation</b>	<b>Meaning</b>
<b>A</b>	
AC	Alternating current
A/D	Analog digital converter
ADR	Address
AFM	Additional frequency modification
AG	Automation unit
AI	Analog input
AK	Request identifier
AO	Analog output
AOP	Advanced operator panel
ASIC	Application specific integrated circuit
ASP	Analog setpoint
ASVM	Asymmetric space vector modulation
<b>B</b>	
BCC	Block check character
BCD	Binary-coded decimal code
BI	Binector input
BIA	Berufsgenossenschaftliches Institut für Arbeitssicherheit
BICO	Binector/connector
BO	Binector output
<b>C</b>	
C	Commissioning
CB	Communication board
CCW	Counter-clockwise
CDS	Command data set
CI	connector input
CM	Configuration management
CMD	Command
CO	Cconnector output
CO/BO	Connector output/Binector output
COM	Common (terminal is connected to NO or NC)
CT	Commissioning, ready to run
CU	Control unit

<b>Abbreviation</b>	<b>Meaning</b>
CUT	Commissioning, run, ready to run
CW	Clockwise
<b>D</b>	
D/A	Digital analog converter
DC	Digital analog converter
DDS	Drive data set
DI	Digital input
DIP	DIP switch
DO	Digital output
DP	Distributed I/Os
DS	Drive state
<b>E</b>	
ECD	Equivalent circuit diagram
EEC	European Economic Community
EEPROM	Electrical erasable programmable read-only memory
ELCB	Earth leakage circuit breaker
EMC	Electromagnetic compatibility
EMF	Electromagnetic force
ES	Engineering System
<b>F</b>	
FAQ	Frequently asked question
FB	Function block
FFB	Freely Assignable Function block
FCC	Flux current control
FCL	Fast current limiting
FF	Fixed frequency
FFB	Free function block
FOC	Field orientated control
FREQ	Frequency
FSA	Frame size A
FSB	Frame size B
FSC	Frame size C
FSD	Frame size D
FSE	Frame size E
FSF	Frame size F
<b>G</b>	
GSD	Device data file (Geräte Stamm Datei)
GSG	Getting started guide
GUI ID	Global unique identifier
<b>H</b>	
HIW	Main actual value

<b>Abbreviation</b>	<b>Meaning</b>
HMI	Human machine interface
HO	High Overload (Constant Torque)
HSW	Main setpoint
HTL	High-voltage transistor logic
<b>I</b>	
I/O	In-/output
IBN	Commissioning
IGBT	Insulated gate bipolar transistor
IND	Sub-index
<b>J</b>	
JOG	JOG
<b>K</b>	
KIB	Kinetic buffering
<b>L</b>	
LCD	Liquid crystal display
LED	Light emitting diode
LGE	Length
LO	Light Overload (Variable Torque)
LWL	Fiber Optic conductor
<b>M</b>	
MHB	Motor holding brake
MLP	Multi-Language Pack
MOP	Motor operated potentiometer
<b>N</b>	
NC	Normally closed
NEMA	National Electrical Manufacturers Association
NO	Normally open
<b>O</b>	
OLM	Optical Link Module
OLP	Optical Link Plug
OP	Operator Panel
OPI	Operating Instructions
<b>P</b>	
PID	Proportional, integral, derivative controller
PKE	Parameter ID
PKW	Parameter ID value area (Parameterkennung Wert)
PLC	Programmable logic control
PM	Power module
PM-IF	Power module interface
PNU	Parameter Number
PPO	Parameter process data object

<b>Abbreviation</b>	<b>Meaning</b>
PTC	Positive temperature coefficient
PWE	Parameter value
PWM	Pulse-width modulation
Pxxxx	Write parameter
PZD	Process data area (Prozessdaten)
<b>Q</b>	
QC	Quick commissioning
<b>R</b>	
RAM	Random-access memory
RCCB	Residual current circuit breaker
RCD	Residual current device
RFG	Ramp-function generator
RFI	Radio frequency interference
ROM	Read-only memory
RPM	Revolutions per minute
rxxxx	read-only parameters of analogue signals
<b>S</b>	
SBC	Safe Break Control
SLVC	Sensorless vector control
SLS	Safe-Limited Speed
SOL	Serial option link
SS1	Safe stop 1
STO	Safe torque off
STW	Control word
STX	Start of text
SVM	Space vector modulation
<b>T</b>	
TTL	Transistor-transistor logic
<b>U</b>	
USS	Universal serial interface
<b>V</b>	
V/f	Voltage/frequency
VC	Vector control
VT	Variable torque
<b>W</b>	
WEA	Automatic restart
<b>Z</b>	
ZSW	Status word
ZUSW	Additional setpoint

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# C

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