Parameter List Edition 04/03

sinamics

SINAMICS G110

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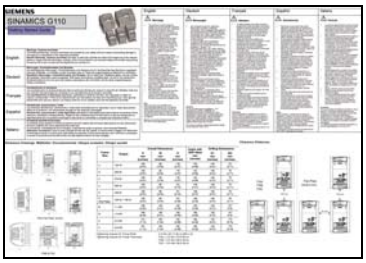
SINAMICS G110 Documentation

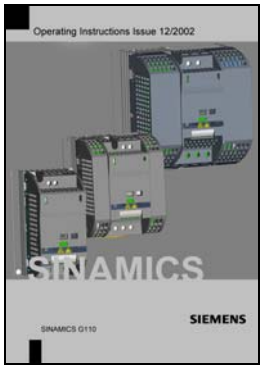
Getting Started Guide

The Getting Started Guide is designed to give the user quick access to all the basic information required to install and set-up the SINAMICS G110 for operation.



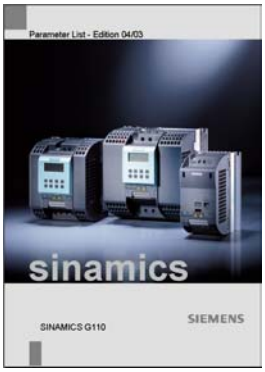
Operating Instructions

Gives information regarding the features of SINAMICS G110 including Installation, Commissioning, Control modes, System Parameter structure, Troubleshooting, Specifications and available options for the inverter.



Parameter List

The Parameter List contains a detailed description of all Parameters relating to the SINAMICS G110 and is structured in numerical order.



Catalogues

In the catalogue you will find all the necessary information to select an appropriate inverter, as well as the options for the SINAMICS G110 series.

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SINAMICS G110
120 W - 3 kW

Parameter List
User Documentation

Valid for: *Issue 04/03*

Inverter Type *Software*
SINAMICS G110 *V1.0*

Issue 04/03

Important Information

This Parameter List must only be used in conjunction with the Operating Instructions of the SINAMICS G110.

WARNING

Please pay special attention to the Warnings, Cautions, Notices and Notes contained in the Operating Instructions.

You will find the Operating Instructions on the Docu CD which can be ordered via your local Siemens department under the Order No. 6SL3271-0CA00-0AG0 or downloaded from our website http://www.siemens.com/sinamics.

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Table of Contents

1 Parameters

1.1 Introduction to SINAMICS G110 System Parameters

The layout of the parameter description is as follows.

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

1. Parameter number

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

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

2. Parameter name

Indicates the name of the relevant parameter.
The BICO system is not available with the SINAMICS G110 inverter. To allow the parameter names to be used across a variety of inverter types, the names of parameter have not been changed.

3. Cstat

Commissioning status of the parameter. Three states are possible:

- Commissioning C
- Run U
- Ready to run T

This indicates when the parameter can be changed. One, two or all three states may be specified. If all three states are specified, this means that it is possible to change this parameter setting in all three inverter states.

4. P-Group

Indicates the functional group of the particular.

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

5. Datatype

The data types available are shown in the table below.

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

6. Active

Indicates whether

- Immediately changes to the parameter values take effective immediately after they have been entered, or
- first confirm the “P” button on the basic operator panel (BOP) must be pressed before the changes take effect.

7. Unit

Indicates the unit of measure applicable to the parameter values

8. QuickComm

Indicates whether or not (Yes or No) a parameter can only be changed during quick commissioning, i.e. when P0010 (parameter groups for commissioning) is set to 1 (quick commissioning).

9. Min

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

10. Def

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

11. Max

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

12. Level

Indicates the level of user access. There are three access levels: Standard, Extended and Expert. The number of parameters that appear in each functional group depends on the access level set in P0003 (user access level).

13. Description

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

Description: Brief explanation of the parameter function.

Diagram: Where applicable, diagram to illustrate the effects of parameters on a characteristic curve, for example

Settings: List of applicable settings. These include
Possible settings, Most common settings, Index and Bitfields

Example: Optional example of the effects of a particular parameter setting.

Dependency: Any conditions that must be satisfied in connection with this parameter. Also any particular effects, which this parameter has on other parameter(s) or which other parameters have on this one.

Warning / Caution / Notice / Note:
Important information which must be observed to prevent personal injury or damage to equipment / specific information which should be observed in order to avoid problems / information which may be helpful to the user

More details: Any sources of more detailed information concerning the particular parameter.

1.2 Quick commissioning (P0010=1)

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

No	Name	Access level	Cstat
P0100	Europe / North America	1	C
P0304	Motor voltage rating	1	C
P0305	Motor current rating	1	C
P0307	Motor power rating	1	C
P0308	Motor cosPhi rating	3	C
P0309	Motor efficiency rating	3	C
P0310	Motor frequency rating	1	C
P0311	Motor speed rating	1	C
P0335	Motor cooling	3	CT
P0640	Motor overload factor [%]	3	CUT
P0700	Selection of command source	1	CT
P1000	Selection of frequency setpoint	1	CT
P1080	Min. frequency	1	CUT
P1082	Max. frequency	1	CT
P1120	Ramp-up time	1	CUT
P1121	Ramp-down time	1	CUT
P1135	OFF3 ramp-down time	3	CUT
P1300	Control mode	2	CT
P3900	End of quick commissioning	1	C

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

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

NOTE
This applies only in Quick Commissioning mode.

Reset to Factory default

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

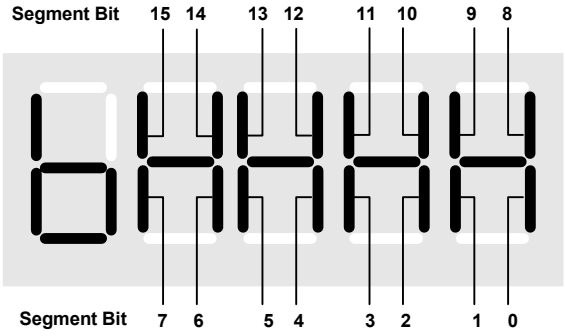
Set P0010 = 30

Set P0970 = 1

NOTE
The reset process takes approximately 10 seconds to complete.

Seven-segment display

The seven-segment display is structured as follows:



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

1.3 Parameter Description

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

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

P-Group: ALWAYS

Displays the user selected output as defined in P0005.

Note:

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

r0002 **Drive state** Level **3**

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

P-Group: COMMANDS

Displays actual drive state.

Possible Settings:

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

Dependency:

State 3 visible only while precharging DC link.

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

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

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

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

Possible Settings:

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 reserved

P0004 **Parameter filter** Level **3**

CStat: CUT **Datatype:** U16 **Unit:** - **Min:** 0 **Def:** 0 **Max:** 21

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

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

Possible Settings:

0 All parameters
2 Inverter
3 Motor
7 Commands, binary I/O
8 ADC
10 Setpoint channel / RFG
12 Drive features
13 Motor control
20 Communication
21 Alarms / warnings / monitoring

Example:

P0004 = 8 specifies that only ADC parameters will be visible.

P0005 **Display selection** Level **2**

CStat: CUT **Datatype:** U16 **Unit:** - **Min:** 2 **Def:** 21 **Max:** 4000

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

Selects display for parameter r0000 (drive display).

Common Settings:

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

Notice:

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

Details:

See relevant "rxxxx" parameter descriptions.

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

CStat: CT **Datatype:** U16 **Unit:** - **Min:** 0 **Def:** 0 **Max:** 30

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

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

Possible Settings:

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

Dependency:

Reset to 0 for inverter to run.

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

Note:

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

P0010 = 2
For service purposes only.

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

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

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

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

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

Sets the store mode for parameters. The store mode can be configured for all interfaces listed under "Index".

Possible Settings:

0 Volatile (RAM)
1 Nonvolatile (EEPROM)

Index:

P0014[0] : USS
P0014[1] : reserved
P0014[2] : reserved

Note:

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.

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

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

r0018 **Firmware version** Level **3**

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

P-Group: INVERTER

Displays version number of installed firmware.

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

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

P-Group: COMMANDS

Displays status of operator panel commands.

Bitfields:

Bit00	ON/OFF1	0	NO	1	YES
Bit01	OFF2: Electrical stop	0	YES	1	NO
Bit08	JOG right	0	NO	1	YES
Bit11	Reverse (setpoint inversion)	0	NO	1	YES
Bit13	Motor potentiometer MOP up	0	NO	1	YES
Bit14	Motor potentiometer MOP down	0	NO	1	YES

Note:

The following functions can be "connected" to individual buttons:
- ON/OFF1,
- OFF2,
- JOG,
- REVERSE,
- INCREASE,
- DECREASE

Details:

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

r0020 **CO: Freq. setpoint before RFG** Level **2**

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

P-Group: CONTROL

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

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

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

P-Group: CONTROL

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

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

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

P-Group: CONTROL

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

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

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

P-Group: CONTROL

Displays [rms] voltage applied to motor.

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

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

P-Group: INVERTER

Displays DC-link voltage.

r0027 **CO: Act. output current** Level **3**

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

P-Group: CONTROL

Displays estimated rms value of motor current [A].

r0034 **CO: Motor temperature (i2t)** Level **3**

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

P-Group: MOTOR

Displays calculated motor temperature (I2t model) as [%] of the maximum permissible value.

Note:

A value of 100 % means that the motor has reached its maximum permissible operating temperature. In this case, the motor will attempt to reduce the motor loading as defined in P0610 (motor I2t temperature reaction).

r0052	CO/BO: Act. status word 1			Min: -	Level
		Datatype: U16	Unit: -	Def: -	2
	P-Group: COMMANDS			Max: -	

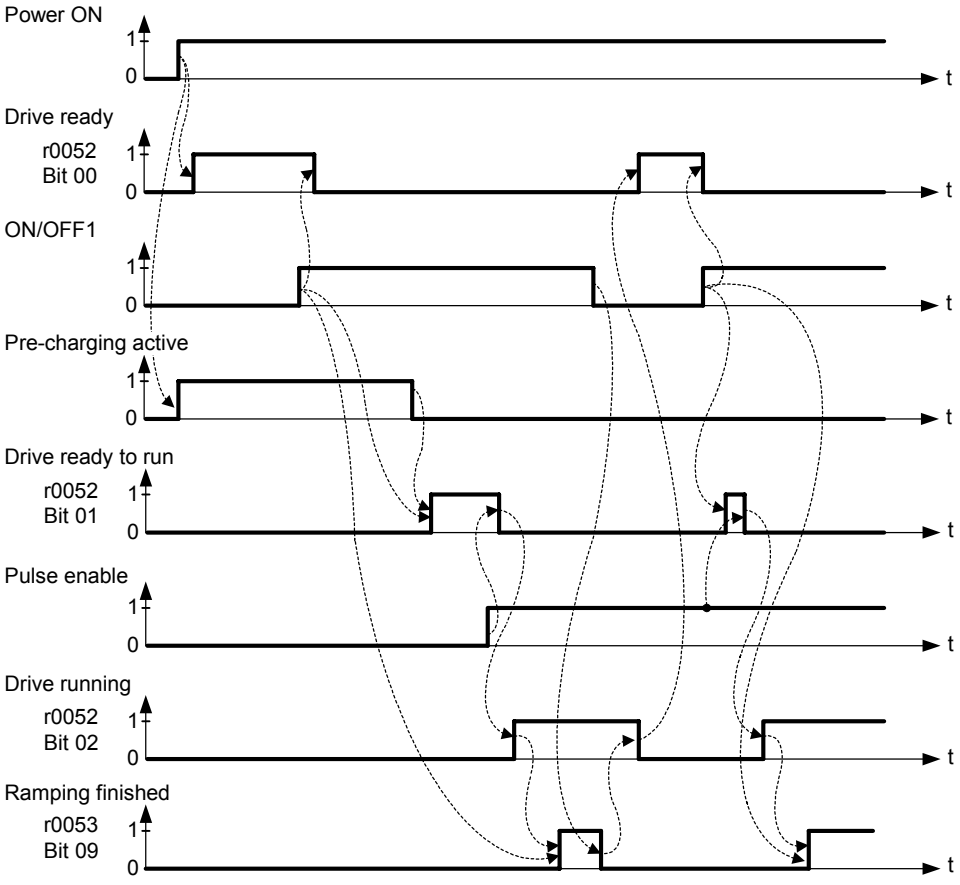
Displays first active status word of inverter (bit format) and can be used to diagnose inverter status.

Bitfields:

Bit00	Drive ready	0	NO	1	YES
Bit01	Drive ready to run	0	NO	1	YES
Bit02	Drive running	0	NO	1	YES
Bit03	Drive fault active	0	NO	1	YES
Bit04	OFF2 active	0	YES	1	NO
Bit05	OFF3 active	0	YES	1	NO
Bit06	ON inhibit active	0	NO	1	YES
Bit07	Drive warning active	0	NO	1	YES
Bit08	Deviation setpoint / act. value	0	YES	1	NO
Bit09	PZD control	0	NO	1	YES
Bit10	f_act >= P1082 (f_max)	0	NO	1	YES
Bit11	Warning: Motor current limit	0	YES	1	NO
Bit12	Motor holding brake active	0	NO	1	YES
Bit13	Motor overload	0	YES	1	NO
Bit14	Motor runs right	0	NO	1	YES
Bit15	Inverter overload	0	YES	1	NO

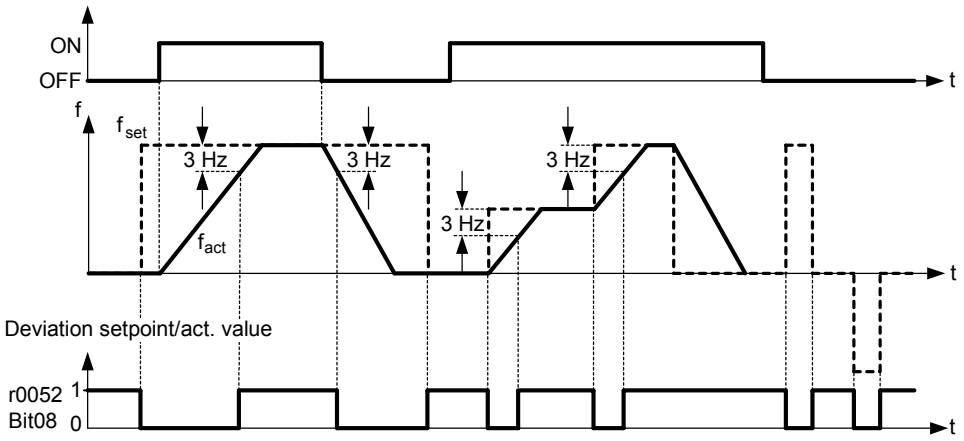
Dependency:

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



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

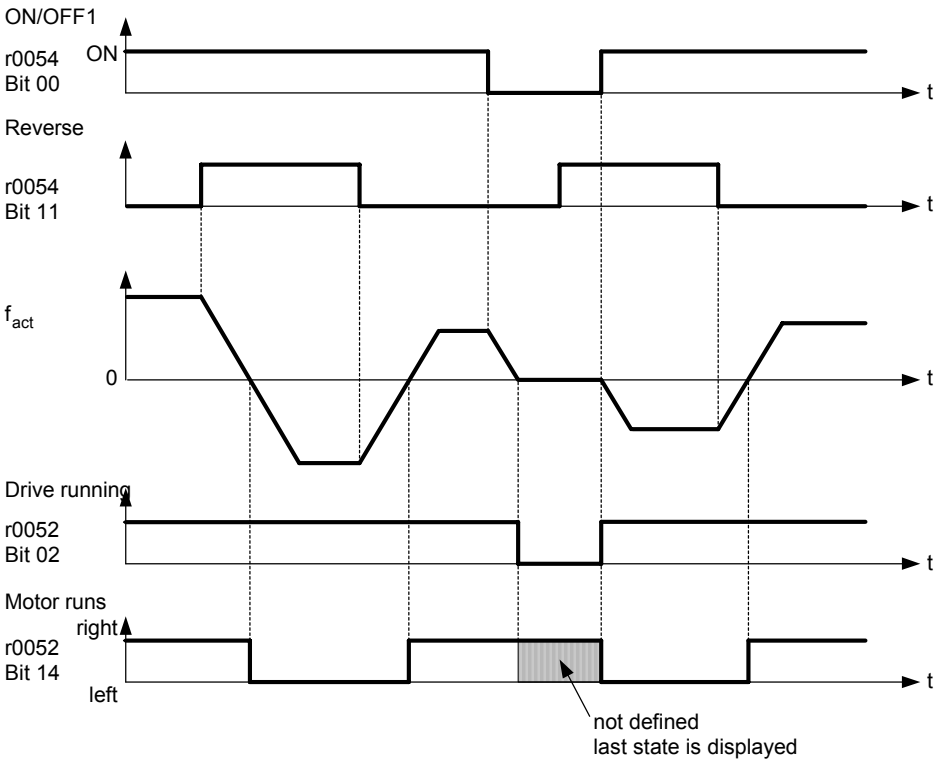
r0052 Bit08 "Deviation setpoint/act. value": ==> see below



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

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

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



Details:

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

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

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

Bitfields:

Bit00	DC brake active	0	NO	1	YES
Bit01	f_act > P2167 (f_off)	0	NO	1	YES
Bit02	f_act > P1080 (f_min)	0	NO	1	YES
Bit06	f_act >= setpoint (f_set)	0	NO	1	YES
Bit09	Ramping finished	0	NO	1	YES

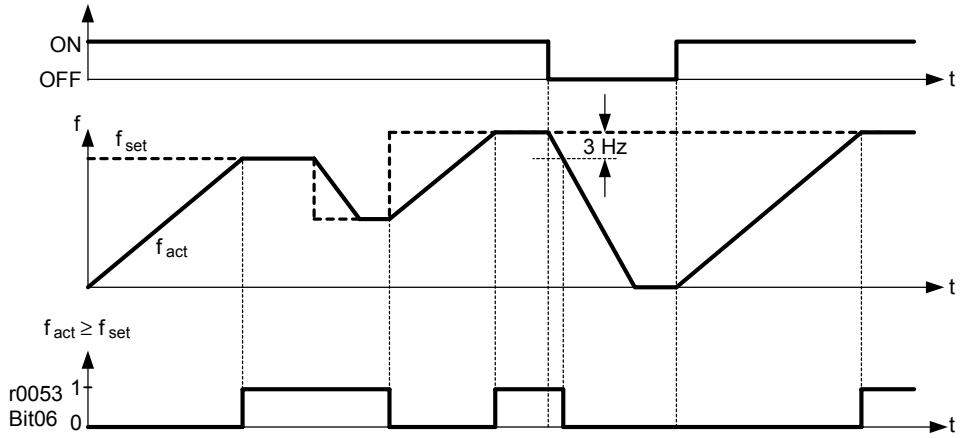
Notice:

r0053 Bit00 "DC brake active" ==> see parameter P1233

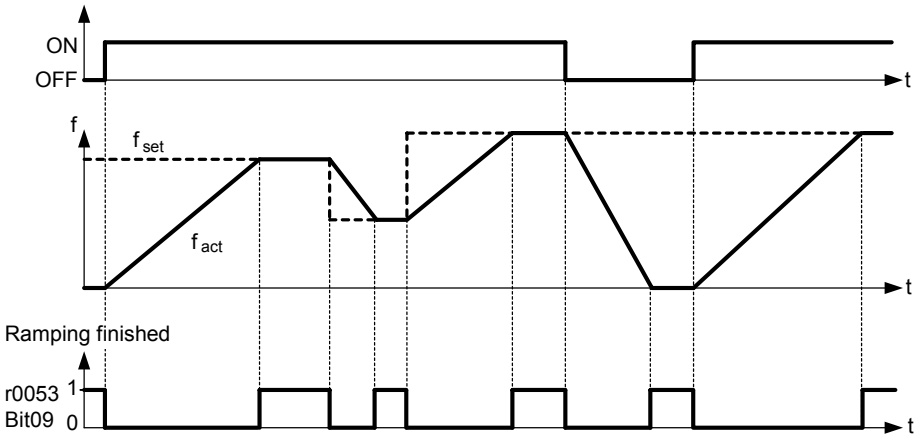
r0053 Bit01 "f_act > P2167 (f_off)" ==> see parameter P2167

r0053 Bit02 "f_act > P1080 (f_min)" ==> see parameter P1080

r0053 Bit06 "f_act >= setpoint (f_set)" ==> see below



r0053 Bit09 "Ramping finished" ==> see below



Details:

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

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

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

P-Group: COMMANDS

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

Bitfields:

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

Notice:

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

Details:

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

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

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

P-Group: COMMANDS

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

Bitfields:

Bit00	Fixed frequency Bit 0	0	NO	1	YES
Bit01	Fixed frequency Bit 1	0	NO	1	YES
Bit02	Fixed frequency Bit 2	0	NO	1	YES
Bit09	Enable DC brake	0	NO	1	YES
Bit13	External fault 1	0	YES	1	NO

Notice:

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

Details:

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

r0056 **CO/BO: Status of motor control** Level **2**

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

P-Group: CONTROL

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

Bitfields:

Bit00	Init. control finished	0	NO	1	YES
Bit01	Motor demagnetizing finished	0	NO	1	YES
Bit02	Pulses enabled	0	NO	1	YES
Bit04	Motor excitation finished	0	NO	1	YES
Bit05	Starting boost active	0	NO	1	YES
Bit06	Acceleration boost active	0	NO	1	YES
Bit07	Frequency is negative	0	NO	1	YES
Bit08	Field weakening active	0	NO	1	YES
Bit09	Volts setpoint limited	0	NO	1	YES
Bit10	Slip frequency limited	0	NO	1	YES
Bit13	I-max controller active	0	NO	1	YES
Bit14	Vdc-max controller active	0	NO	1	YES

Notice:

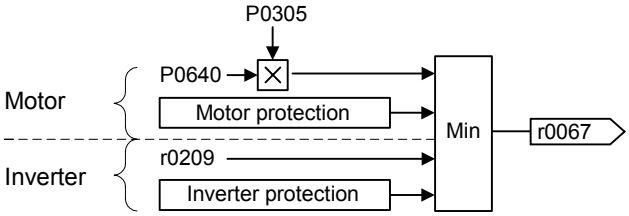
The I-max controller (r0056 Bit13) will be activated when the actual output current (r0027) exceeds the current limit in r0067.

Details:

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

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

Displays valid maximum output current of inverter.



Dependency:

This value is influenced by P0640 (Motor overload factor), the derating characteristics and the thermal motor and inverter protection.

P0610 (motor I2t temperature reaction) and P0290 (inverter overload reaction) define reaction when limit is reached.

Note:

Normally :
- current limit (r0067) = rated motor current P0305 x motor overload factor P0640.
- It is less than or equal to maximum inverter current r0209.

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

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

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

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.

Possible Settings:

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

Dependency:

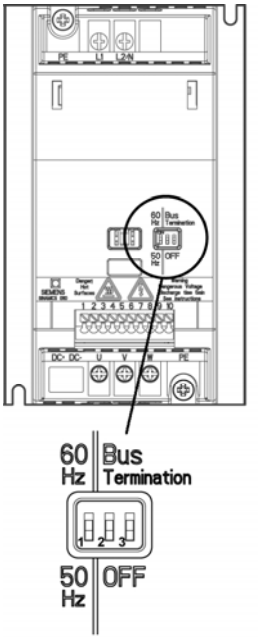
Where:

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

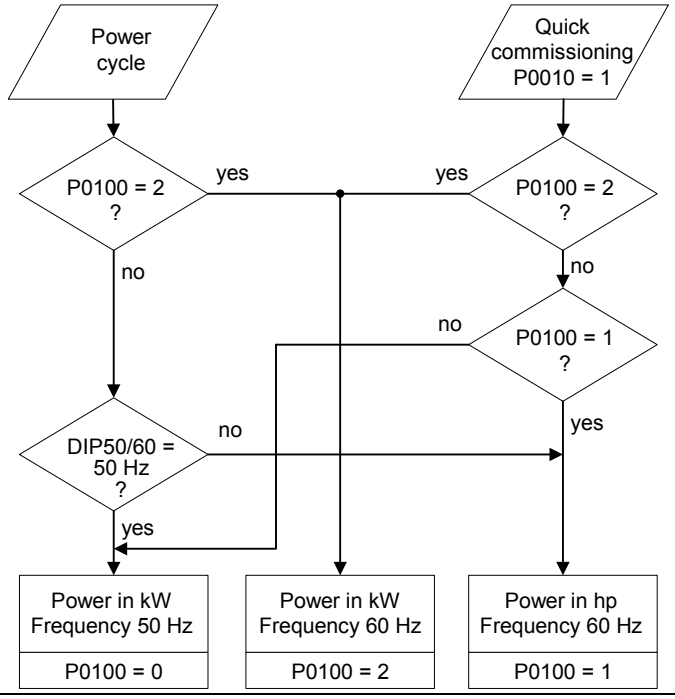
Changing P0100 overwrites the settings of the DIP50/60 switch (location shown in the diagram below):

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

DIP50/60 switch



Flow chart



Notice:

P0100 setting 2 (==> [kW], frequency default 60 [Hz]) is not overwritten by the setting of DIP50/60 switch (see diagram above).

r0127 **Analogue / USS Variant** Level **2**

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

Displays the Control Board Variant Type.

Possible Settings:

0 Analogue
1 USS

r0200 **Act. power stack code number**

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

Level **3**

P-Group: INVERTER

Identifies hardware variant as shown in table below.

Code-No.	G110 Type	G110 Type	Input Voltage & Frequency	Power kW	Internal Filter	Heat sink	Frame Size
1	6SL3211-0AB11-2UAx	AIN	1AC230V 47-63Hz	0,12	no	Y	A
2	6SL3211-0AB12-5UAx	AIN	1AC230V 47-63Hz	0,25	no	Y	A
3	6SL3211-0AB13-7UAx	AIN	1AC230V 47-63Hz	0,37	no	Y	A
4	6SL3211-0AB15-5UAx	AIN	1AC230V 47-63Hz	0,55	no	Y	A
5	6SL3211-0AB17-5UAx	AIN	1AC230V 47-63Hz	0,75	no	Y	A
6	6SL3211-0KB11-2UAx	AIN	1AC230V 47-63Hz	0,12	no	N	A
7	6SL3211-0KB12-5UAx	AIN	1AC230V 47-63Hz	0,25	no	N	A
8	6SL3211-0KB13-7UAx	AIN	1AC230V 47-63Hz	0,37	no	N	A
9	6SL3211-0KB15-5UAx	AIN	1AC230V 47-63Hz	0,55	no	N	A
10	6SL3211-0KB17-5UAx	AIN	1AC230V 47-63Hz	0,75	no	N	A
11	6SL3211-0AB21-1UAx	AIN	1AC230V 47-63Hz	1,10	no	Y	B
12	6SL3211-0AB21-5UAx	AIN	1AC230V 47-63Hz	1,50	no	Y	B
13	6SL3211-0AB22-2UAx	AIN	1AC230V 47-63Hz	2,20	no	Y	C
14	6SL3211-0AB23-0UAx	AIN	1AC230V 47-63Hz	3,00	no	Y	C
15	6SL3211-0AB11-2BAx	AIN	1AC230V 47-63Hz	0,12	Cl. A	Y	A
16	6SL3211-0AB12-5BAx	AIN	1AC230V 47-63Hz	0,25	Cl. A	Y	A
17	6SL3211-0AB13-7BAx	AIN	1AC230V 47-63Hz	0,37	Cl. A	Y	A
18	6SL3211-0AB15-5BAx	AIN	1AC230V 47-63Hz	0,55	Cl. A	Y	A
19	6SL3211-0AB17-5BAx	AIN	1AC230V 47-63Hz	0,75	Cl. A	Y	A
20	6SL3211-0KB11-2BAx	AIN	1AC230V 47-63Hz	0,12	Cl. A	N	A
21	6SL3211-0KB12-5BAx	AIN	1AC230V 47-63Hz	0,25	Cl. A	N	A
22	6SL3211-0KB13-7BAx	AIN	1AC230V 47-63Hz	0,37	Cl. A	N	A
23	6SL3211-0KB15-5BAx	AIN	1AC230V 47-63Hz	0,55	Cl. A	N	A
24	6SL3211-0KB17-5BAx	AIN	1AC230V 47-63Hz	0,75	Cl. A	N	A
25	6SL3211-0AB21-1AAx	AIN	1AC230V 47-63Hz	1,10	Cl. A	Y	B
26	6SL3211-0AB21-5AAx	AIN	1AC230V 47-63Hz	1,50	Cl. A	Y	B
27	6SL3211-0AB22-2AAx	AIN	1AC230V 47-63Hz	2,20	Cl. A	Y	C
28	6SL3211-0AB23-0AAx	AIN	1AC230V 47-63Hz	3,00	Cl. A	Y	C

Code-No.	G110 MLFB	G110 Type	Input Voltage & Frequency	Power kW	Internal Filter	Heat sink	Frame Size
29	6SL3211-0AB11-2UBx	USS	1AC230V 47-63Hz	0,12	no	Y	A
30	6SL3211-0AB12-5UBx	USS	1AC230V 47-63Hz	0,25	no	Y	A
31	6SL3211-0AB13-7UBx	USS	1AC230V 47-63Hz	0,37	no	Y	A
32	6SL3211-0AB15-5UBx	USS	1AC230V 47-63Hz	0,55	no	Y	A
33	6SL3211-0AB17-5UBx	USS	1AC230V 47-63Hz	0,75	no	Y	A
34	6SL3211-0KB11-2UBx	USS	1AC230V 47-63Hz	0,12	no	N	A
35	6SL3211-0KB12-5UBx	USS	1AC230V 47-63Hz	0,25	no	N	A
36	6SL3211-0KB13-7UBx	USS	1AC230V 47-63Hz	0,37	no	N	A
37	6SL3211-0KB15-5UBx	USS	1AC230V 47-63Hz	0,55	no	N	A
38	6SL3211-0KB17-5UBx	USS	1AC230V 47-63Hz	0,75	no	N	A
39	6SL3211-0AB21-1UBx	USS	1AC230V 47-63Hz	1,10	no	Y	B
40	6SL3211-0AB21-5UBx	USS	1AC230V 47-63Hz	1,50	no	Y	B
41	6SL3211-0AB22-2UBx	USS	1AC230V 47-63Hz	2,20	no	Y	C
42	6SL3211-0AB23-0UBx	USS	1AC230V 47-63Hz	3,00	no	Y	C
43	6SL3211-0AB11-2BBx	USS	1AC230V 47-63Hz	0,12	Cl. A	Y	A
44	6SL3211-0AB12-5BBx	USS	1AC230V 47-63Hz	0,25	Cl. A	Y	A
45	6SL3211-0AB13-7BBx	USS	1AC230V 47-63Hz	0,37	Cl. A	Y	A
46	6SL3211-0AB15-5BBx	USS	1AC230V 47-63Hz	0,55	Cl. A	Y	A
47	6SL3211-0AB17-5BBx	USS	1AC230V 47-63Hz	0,75	Cl. A	Y	A
48	6SL3211-0KB11-2BBx	USS	1AC230V 47-63Hz	0,12	Cl. A	N	A
49	6SL3211-0KB12-5BBx	USS	1AC230V 47-63Hz	0,25	Cl. A	N	A
50	6SL3211-0KB13-7BBx	USS	1AC230V 47-63Hz	0,37	Cl. A	N	A
51	6SL3211-0KB15-5BBx	USS	1AC230V 47-63Hz	0,55	Cl. A	N	A
52	6SL3211-0KB17-5BBx	USS	1AC230V 47-63Hz	0,75	Cl. A	N	A
53	6SL3211-0AB21-1ABx	USS	1AC230V 47-63Hz	1,10	Cl. A	Y	B
54	6SL3211-0AB21-5ABx	USS	1AC230V 47-63Hz	1,50	Cl. A	Y	B
55	6SL3211-0AB22-2ABx	USS	1AC230V 47-63Hz	2,20	Cl. A	Y	C
56	6SL3211-0AB23-0ABx	USS	1AC230V 47-63Hz	3,00	Cl. A	Y	C

Notice:

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

P0201 Power stack code number

Level **3**

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

Confirms actual power stack identified.

r0206 Rated inverter power [kW] / [hp]

Level **3**

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

Displays nominal rated motor power from inverter.

Dependency:

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

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

r0207[3] Rated inverter current

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

Level **3**

P-Group: INVERTER

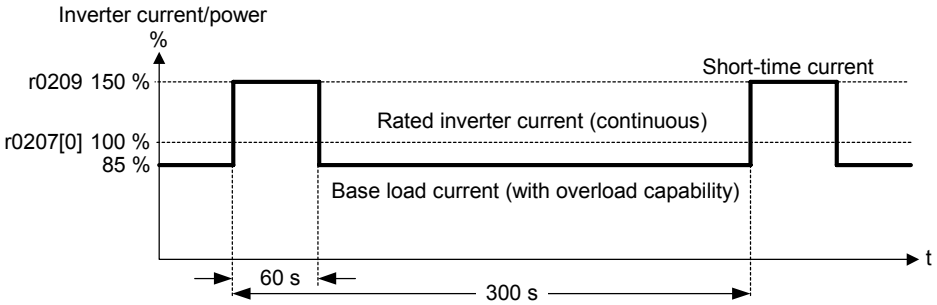
Displays rated inverter current.

Index:

r0207[0] : Rated inverter current
r0207[1] : Rated VT current
r0207[2] : Rated CT current

Note:

The rated VT current r0207[1] and rated CT current r0207[2] displays the suitable 4-pole Siemens standard motor (IEC) for the selected load cycle (see diagram). The parameters r0207[1], r0207[2] are the default value of P0305 in association with the CT/VT application (load cycle). If r0207[1] = r0207[2], than no differentiation is possible between CT/VT applications.



r0209 Maximum inverter current

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

Level **3**

P-Group: INVERTER

Displays maximum output current of inverter.

Dependency:

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

P0290 Inverter overload reaction

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

Level **3**

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

Selects reaction of inverter to an internal over-temperature.

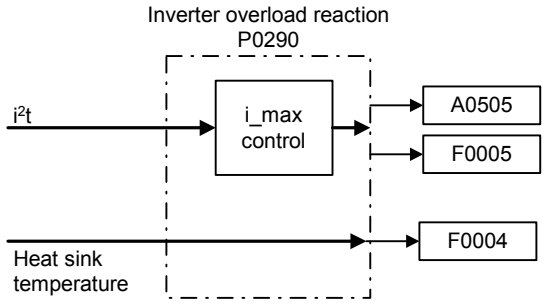
Possible Settings:

0 Reduce output frequency
1 Trip (F0004 / F0005)

Dependency:

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

- heat sink temperature
- inverter I^2t



Notice:

P0290 = 0:

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

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

P0295	**Inverter fan off delay time**			**Min:**	0	Level
	CStat: CUT	**Datatype:** U16	**Unit:** s	**Def:**	0	**3**
	P-Group: TERMINAL	**Active:** first confirm	**QuickComm.:** No	**Max:**	3600	

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

Note:

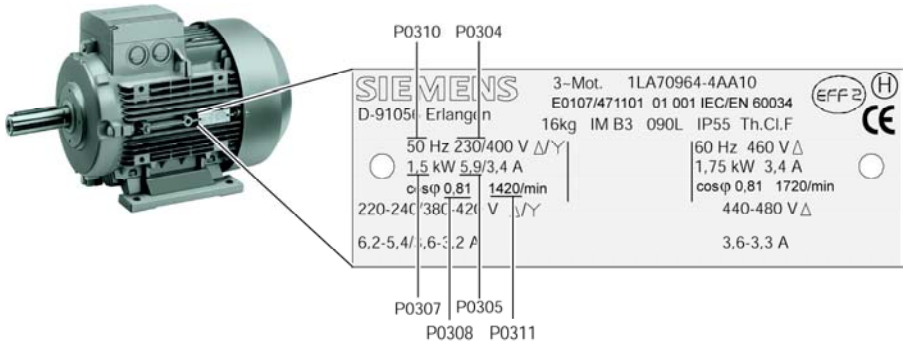
Setting to 0, inverter fan will switch off when the drive stops, that is no delay.

SINAMICS G110 FS A has no fan.

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

Nominal motor voltage [V] from rating plate.

Following diagram shows a typical rating plate with the locations of the relevant motor data.



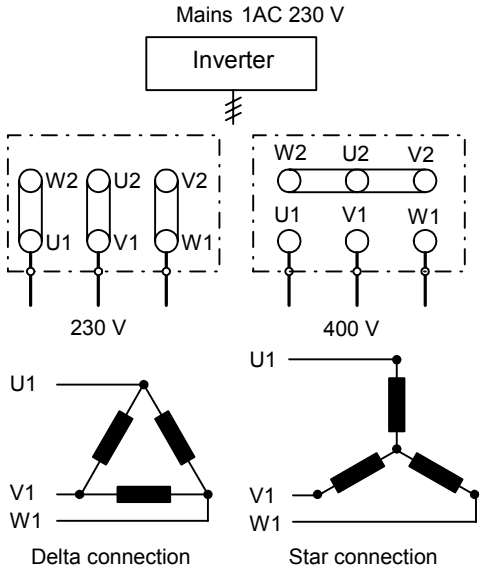
Dependency:

Changeable only when P0010 = 1 (quick commissioning).

Caution:

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

Three-phase motor connection



In the figure above the rated motor voltage (P0304) would be 230 V for delta (mesh) connection and 400 V for star (wye) connection.

Note:

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

P0305 **Rated motor current** Level **1**

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

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

Dependency:

Changeable only when P0010 = 1 (quick commissioning).

Note:

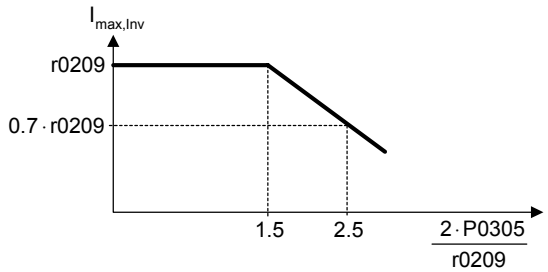
The maximum value of P0305 depends on the maximum inverter current r0209 and the motor type:

Asynchronous motor : $P0305_{max,\,asyn} = 2 \cdot r0209$

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

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

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.

P0307 **Rated motor power** Level **1**

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

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

Dependency:

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

Changeable only when P0010 = 1 (quick commissioning).

Note:

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

P0308 **Rated motor cosPhi** Level **3**

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

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

Dependency:

Changeable only when P0010 = 1 (quick commissioning).

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

Setting 0 causes internal calculation of value.

P0309 **Rated motor efficiency** Level **3**

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

Nominal motor efficiency in [%] from rating plate.

Dependency:

Changeable only when P0010 = 1 (quick commissioning).

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

Setting 0 causes internal calculation of value.

Details:

See diagram in P0304 (rating plate).

P0310 **Rated motor frequency** Level **1**

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

Nominal motor frequency [Hz] from rating plate.

Dependency:

Changeable only when P0010 = 1 (quick commissioning).

Pole pair number recalculated automatically if parameter is changed.

Details:

See diagram in P0304 (rating plate)

P0311 **Rated motor speed** Level **1**

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

Nominal motor speed [rpm] from rating plate.

Dependency:

Changeable only when P0010 = 1 (quick commissioning).

Setting 0 causes internal calculation of value.

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

Pole pair number recalculated automatically if parameter is changed.

Note:

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

Details:

See diagram in P0304 (rating plate)

r0330 **Rated motor slip** Level **3**

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

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

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

P0335 **Motor cooling** Level **3**

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

Selects motor cooling system used.

Possible Settings:

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

P0340 **Calculation of motor parameters** Level **3**

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

Calculates various motor parameters (see table below):

P0340 = 1 :
- P0346 Magnetization time
- P0347 Demagnetization time
- P0350 Stator resistance (line-to-line)
- P1316 Boost end frequency
- P2000 Reference frequency

Possible Settings:

0 No calculation
1 Complete parameterization

Note:

This parameter is required during commissioning to optimize inverter performance.

P0346 **Magnetization time** Level **3**

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

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

El tiempo de magnetización se calcula autiomaticamente de los datos del motor y corresponde a la constante de tiempo del rotor.

Note:

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

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

Notice:

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

P0347 **Demagnetization time** Level **3**

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

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

Note:

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

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

Notice:

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

Overcurrent trips will occur if the time is decreased excessively.

P0350 **Stator resistance (line-to-line)** Level **3**

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

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

There are two ways to determine the value for this parameter:

1. Calculate using
   - P0340 = 1 (data entered from rating plate) or
   - P0010 = 1, P3900 = 1,2 or 3 (end of quick commissioning).
2. Measure manually using an Ohmmeter.

Note:

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

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

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

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

Defines reaction when motor I2t reaches warning threshold.

Possible Settings:

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

Dependency:

Trip level = 110% * P0614 (P0614 = motor I2t overload warning level; see actual value in r0034)

Note:

The purpose of motor I²t is to calculate or measure the motor temperature and disable the inverter if the motor is in danger of overheating.

The motor temperature will be dependent on many factors, including the size of the motor, the ambient temperature, the previous history of the loading of the motor, and of course, the load current. (The square of the current actually determines the heating of the motor and the temperature rises with time - hence I²t).

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

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

I²t operation:
The measured motor current (r0027) is compared with the rated motor current (P0305), and other motor parameters (P0304, P0307, etc.). The temperature of the motor is then calculated. The calculation also includes the output frequency (motor speed) to account for fan cooling. If parameter P0335 is changed to indicate a forced cooled motor, the calculation is modified accordingly.

For the I2t calculation the I2t motor time constant must be adjusted using P0611.

The resulting temperature is displayed in r0034 as % of maximum temperature. When r0034 reaches the value set in P0614 (default 110%), a warning A0511 occurs. If no action is taken and the temperature reaches 110% of P0614, then the inverter trips, showing F0011. The reaction to the warning can be changed from this default using P0610; for example, the drive can react as though a current limit has occurred, or a fault forced immediately. The warning level of P0614 can also be adjusted to raise and lower the warning or trip level as required.

The reaction to the warning can be changed from this default using P0610. Parameter r0034 is particularly useful to monitor if the calculated motor temperature is rising excessively.

P0611 **Motor I2t time constant** Level **3**

CStat:	CT	**Datatype:** U16	**Unit:** s	**Min:**	0
P-Group:	MOTOR	**Active:** Immediately	**QuickComm.:** No	**Def:**	100
				Max:	16000

Thermal Time constant for the motor. The time until the thermal limit of a motor is reached, is calculated via the thermal time constant. A higher value increases the time at which the motor thermal limit is reached.

The value of P0611 is estimated according to the motor data during quick commissioning or is calculated using P0340 (Calculating of the motor parameters). When the calculation of motor parameters during quick commission is complete the stored value can be replaced by the value given by the motor manufacturer.

Example:

For a 2 pole 1LA7063 motor the value is 8 min (see table). The value for P0611 is calculated as follows:

$$P0611 = 8\,\text{min} \cdot 60\,\frac{\text{s}}{\text{min}} = 480\,\text{s}$$

For Siemens standard motors 1LA7 the thermal time constant values are given in minutes (see following table):

Type	2 pole	4 pole	6 pole	8 pole
1LA7050	13	13	-	-
1LA7053	13	13	-	-
1LA7060	8	11	-	-
1LA7063	8	13	12	-
1LA7070	8	10	12	12
1LA7073	8	10	12	12
1LA7080	8	10	12	12
1LA7083	10	10	12	12
1LA7090	5	9	12	12
1LA7096	6	11	12	14
1LA7106	8	12	12	16
1LA7107	-	12	-	16
1LA7113	14	11	13	12
1LA7130	11	10	13	10
1LA7131	11	-	-	-
1LA7133	-	10	14	10
1LA7134	-	-	16	-
1LA7163	15	19	20	12
1LA7164	15	-	-	14
1LA7166	15	19	20	14

Note:

P0611 < 99 s (I2t-calculation inactive):
To activate I2t calculation set P0611 to a value > 99 s.

P0614 **Motor I2t overload warning level** Level **3**

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	0.0
P-Group:	MOTOR	**Active:** first confirm	**QuickComm.:** No	**Def:**	110.0
				Max:	400.0

Defines the [%] value at which alarm A0511 (motor overtemperature) is generated.

Motor I2t calculation is used to estimate a maximum tolerable period (i.e. without overheating) for motor overload. The I2t calculation value is deemed = 100 % when this maximum tolerable period is reached (see r0034).

Dependency:

A motor over-temperature trip (F0011) is produced at 110 % of this level.

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

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

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

Dependency:

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

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

P0700	Selection of command source				Min:	0	Level
	CStat:	CT	Datatype: U16	Unit: -	Def:	2	1
	P-Group:	COMMANDS	Active: first confirm	QuickComm.: Yes	Max:	5	

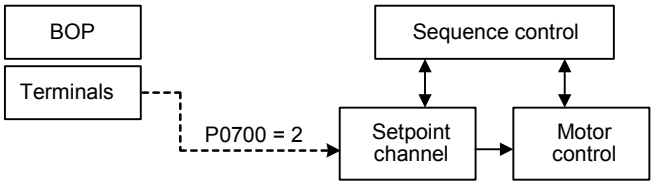
Selects digital command source.

Possible Settings:

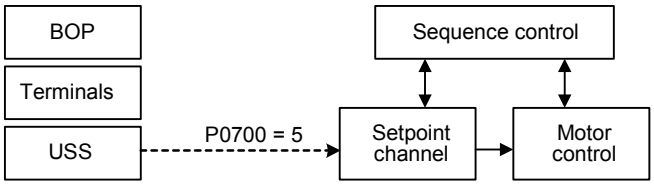
0 Factory default setting
1 BOP (keypad)
2 Terminal
5 USS

Example:

SINAMICS G110 CPM110 AIN (Default: P0700 = 2)



SINAMICS G110 CPM110 USS (Default: P0700 = 5)



Dependency:

Parameter P0719 has higher priority than P0700.

Changing this parameter from P0700 = x to P0700 = 2 resets functional settings (P0701, ...) of digital inputs to default.

P0701 **Function of digital input 0** Level **2**

CStat: CT **Datatype:** U16 **Unit:** - **Min:** 0
P-Group: COMMANDS **Active:** first confirm **QuickComm.:** No **Def:** 1
Max: 29

Selects function of digital input 0.

Possible Settings:

0 Digital input disabled
1 ON/OFF1
2 ON reverse /OFF1
3 OFF2 - coast to standstill
4 OFF3 - quick ramp-down
9 Fault acknowledge
10 JOG right
11 JOG left
12 Reverse
13 MOP up (increase frequency)
14 MOP down (decrease frequency)
15 Fixed frequency (Direct selection)
16 Fixed frequency (Direct selection + ON)
21 Local/remote
25 DC brake enable
29 External trip

Dependency:

Following settings of parameter P0701 inclusive remain effective and are not affected by the settings of P0719:

- OFF2 3
- OFF3 4
- Fault acknowledge 9
- Fixed setpoint (direct selection) 15
- Local/Remote 21
- External trip 29

Note:

"ON/OFF1" can only be selected for one digital input (e.g. P0700 = 2 and P0701 = 1). Configuring DIN1 with P0702 = 1 will disable DIN0 by setting P0701 = 0. "ON/OFF1" on a digital input can be combined with "ON reverse/OFF1" on another digital input. Only the first activated digital input serves as a command source.

Different sources of "OFF2", "OFF3" are independently selectable. For example, "OFF2" from digital input or from BOP or from USS can be issued at the same time.

Details:

JOG	==> see parameter P1058
MOP	==> see parameter r1050
Fixed frequency	==> see parameter P1001
DC brake	==> see parameter P1232

P0702 **Function of digital input 1** Level **2**

CStat: CT **Datatype:** U16 **Unit:** - **Min:** 0
P-Group: COMMANDS **Active:** first confirm **QuickComm.:** No **Def:** 12
Max: 29

Selects function of digital input 1.

Possible Settings:

0 Digital input disabled
1 ON/OFF1
2 ON reverse /OFF1
3 OFF2 - coast to standstill
4 OFF3 - quick ramp-down
9 Fault acknowledge
10 JOG right
11 JOG left
12 Reverse
13 MOP up (increase frequency)
14 MOP down (decrease frequency)
15 Fixed frequency (Direct selection)
16 Fixed frequency (Direct selection + ON)
21 Local/remote
25 DC brake enable
29 External trip

Details:

See P0701 (function of digital input0).

P0703 **Function of digital input 2** Level **2**

CStat: CT **Datatype:** U16 **Unit:** - **Min:** 0
P-Group: COMMANDS **Active:** first confirm **QuickComm.:** No **Def:** 9
Max: 29

Selects function of digital input 2.

Possible Settings:

0 Digital input disabled
1 ON/OFF1
2 ON reverse /OFF1
3 OFF2 - coast to standstill
4 OFF3 - quick ramp-down
9 Fault acknowledge
10 JOG right
11 JOG left
12 Reverse
13 MOP up (increase frequency)
14 MOP down (decrease frequency)
15 Fixed frequency (Direct selection)
16 Fixed frequency (Direct selection + ON)
21 Local/remote
25 DC brake enable
29 External trip

Details:

See P0701 (function of digital input 0).

P0704 **Function of digital input 3** Level **2**

CStat: CT **Datatype:** U16 **Unit:** - **Min:** 0
P-Group: COMMANDS **Active:** first confirm **QuickComm.:** No **Def:** 0
Max: 29

Selects function of digital input 3 (via analog input).

Possible Settings:

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

Details:

See P0701 (function of digital input 0).

P0719[2] Selection of cmd. & freq. setp. Level 3

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	0
				Max:	55

Central switch to select control command source for inverter.

Command and setpoint sources can be changed independently.

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

The two indices of this parameter are used for local/remote switching. The local/remote signal switches between these settings.

The default setting is 0 for the first index (i.e. normal parameterization is active).
The second index is for control via BOP (i.e. activating the local/remote signal will then switch to BOP).

Possible Settings:

0	Cmd = P0700	Setpoint = P1000
1	Cmd = P0700	Setpoint = MOP setpoint
2	Cmd = P0700	Setpoint = Analog setpoint
3	Cmd = P0700	Setpoint = Fixed frequency
5	Cmd = P0700	Setpoint = USS
10	Cmd = BOP	Setpoint = P1000
11	Cmd = BOP	Setpoint = MOP setpoint
12	Cmd = BOP	Setpoint = Analog setpoint
13	Cmd = BOP	Setpoint = Fixed frequency
15	Cmd = BOP	Setpoint = USS
50	Cmd = USS	Setpoint = P1000
51	Cmd = USS	Setpoint = MOP setpoint
52	Cmd = USS	Setpoint = Analog setpoint
53	Cmd = USS	Setpoint = Fixed frequency
55	Cmd = USS	Setpoint = USS

Index:

P0719[0] : 1st Control source (Remote)
P0719[1] : 2nd Control source (Local)

Dependency:

P0719 has higher priority than P0700 and P1000.

Notice:

Particularly useful when e.g. changing command source temporarily from P0700 = 2. Functional setting of digital inputs is not reset to default.

r0722 CO/BO: Binary input values Level 3

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

Displays status of digital inputs.

Bitfields:

Bit00	Digital input 0	0 OFF	1 ON
Bit01	Digital input 1	0 OFF	1 ON
Bit02	Digital input 2	0 OFF	1 ON
Bit03	Digital input 3 (via ADC)	0 OFF	1 ON

Note:

Segment is lit when signal is active.

P0724 Debounce time for digital inputs Level 3

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	COMMANDS	**Active:** Immediately	**QuickComm.:** No	**Def:**	3
				Max:	3

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

Possible Settings:

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

P0731 **Function of digital output 0** Level **3**

CStat: CUT **Datatype:** U16 **Unit:** - **Min:** 0 **Def:** 5 **Max:** 22

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

Defines source of digital output 0.

Possible Settings:

0 Not Active
1 Active
2 Drive ready
3 Drive ready to run
4 Drive running
5 Drive fault active
6 OFF2 active
7 OFF3 active
8 Switch on inhibit active
9 Drive warning active
10 Deviation value
11 PZD control
12 Maximum frequency reached
13 Warning: Motor current limit
14 Motor holding brake active
15 Motor overload
16 Motor running direction right
17 Inverter overload
18 DC brake active
19 Act. freq > P2167
20 Act. freq > P1080 (f_min)
21 Act. freq >= setpoint
22 Ramping finish

Note:

Output of fault bit 52.3 is inverted on digital output.

Details:

See parameter r0052, r0053.

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

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

P-Group: COMMANDS

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

Bitfields:

```
Bit00   Digital output 0 energized              0  NO         1  YES
```

Dependency:

Bit 0 = 0 :
Optocoupler contacts open

Bit 0 = 1 :
Optocoupler contacts closed

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

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

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

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

Bitfields:

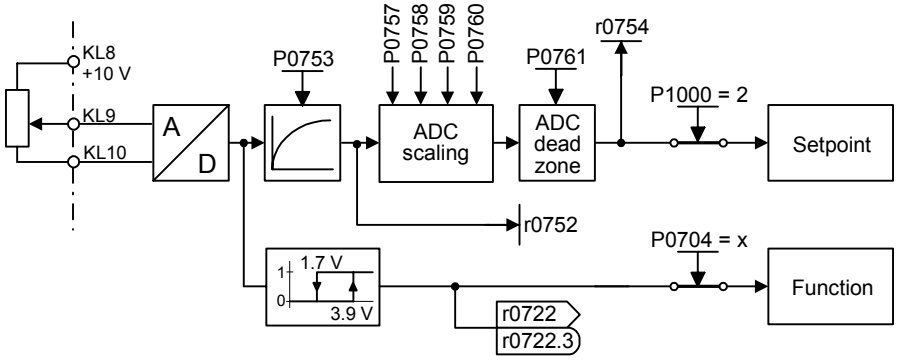
```
Bit00   Invert digital output 0                 0  NO         1  YES
```

r0752 **Act. input of ADC** Level **3**

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

P-Group: TERMINAL

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



P0753	Smooth time ADC			Min: 0	Level
	CStat: CUT	Datatype: U16	Unit: ms	Def: 3	3
	P-Group: TERMINAL	Active: first confirm	QuickComm.: No	Max: 10000	

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

Note:

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

P0753 = 0 : No filtering

r0754	Act. ADC value after scaling [%]			Min: -	Level
		Datatype: Float	Unit: %	Def: -	2
	P-Group: TERMINAL			Max: -	

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

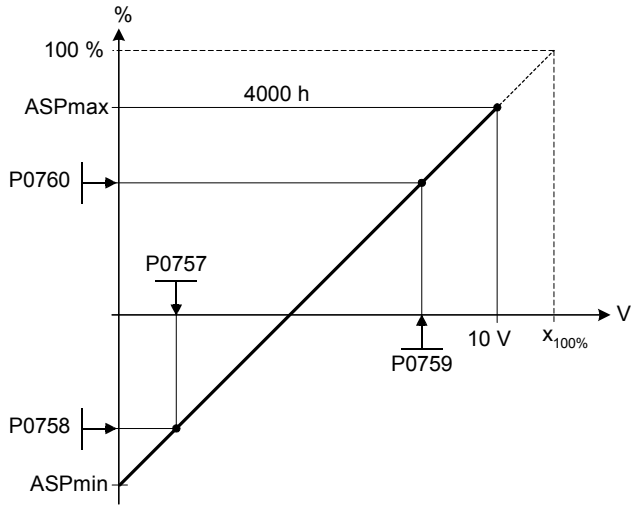
Dependency:

P0757 to P0760 define range (ADC scaling).

P0757	Value x1 of ADC scaling			Min: 0	Level
	CStat: CUT	Datatype: Float	Unit: V	Def: 0	3
	P-Group: TERMINAL	Active: first confirm	QuickComm.: No	Max: 10	

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

P0761 = 0



Where:

- Analog setpoints represent a [%] of the normalized frequency in P2000.
- Analog setpoints may be larger than 100 %.
- ASPmax represents highest analog setpoint (this may be at 10 V).
- ASPmin represents lowest analog setpoint (this may be at 0 V).
- Default values provide a scaling of 0 V = 0 %, and 10 V = 100 %.

Note:

The ADC-linear characteristic is described by 4 coordinates, based on a two-point equation:

$$\frac{y - P0758}{x - P0757} = \frac{P0760 - P0758}{P0759 - P0757}$$

For calculations the point-gradient form (offset and gradient) is more advantageous:

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

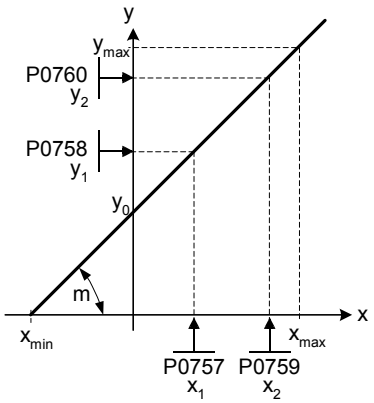
The transformation between these two forms is given by:

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

For scaling of the input the value of y_max and x_min has to be determined. This is done by the following equations:

$$x_{min} = \frac{P0760 \cdot P0757 - P0758 \cdot P0759}{P0760 - P0758}$$

$$y_{max} = (x_{max} - x_{min}) \cdot \frac{P0760 - P0758}{P0759 - P0757}$$



Notice:

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

P0758	**Value y1 of ADC scaling**			**Min:**	-99999.9	Level
	CStat: CUT	**Datatype:** Float	**Unit:** %	**Def:**	0.0	**3**
	P-Group: TERMINAL	**Active:** first confirm	**QuickComm.:** No	**Max:**	99999.9	

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

Dependency:

Affects P2000 (reference frequency).

P0759	**Value x2 of ADC scaling**			**Min:**	0	Level
	CStat: CUT	**Datatype:** Float	**Unit:** V	**Def:**	10	**3**
	P-Group: TERMINAL	**Active:** first confirm	**QuickComm.:** No	**Max:**	10	

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

Notice:

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

P0760	**Value y2 of ADC scaling**			**Min:**	-99999.9	Level
	CStat: CUT	**Datatype:** Float	**Unit:** %	**Def:**	100.0	**3**
	P-Group: TERMINAL	**Active:** first confirm	**QuickComm.:** No	**Max:**	99999.9	

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

Dependency:

Affects P2000 (reference frequency).

P0761	Width of ADC deadband				Min:	0	Level
	CStat:	CUT	Datatype: Float	Unit: V	Def:	0	3
	P-Group:	TERMINAL	Active: first confirm	QuickComm.: No	Max:	10	

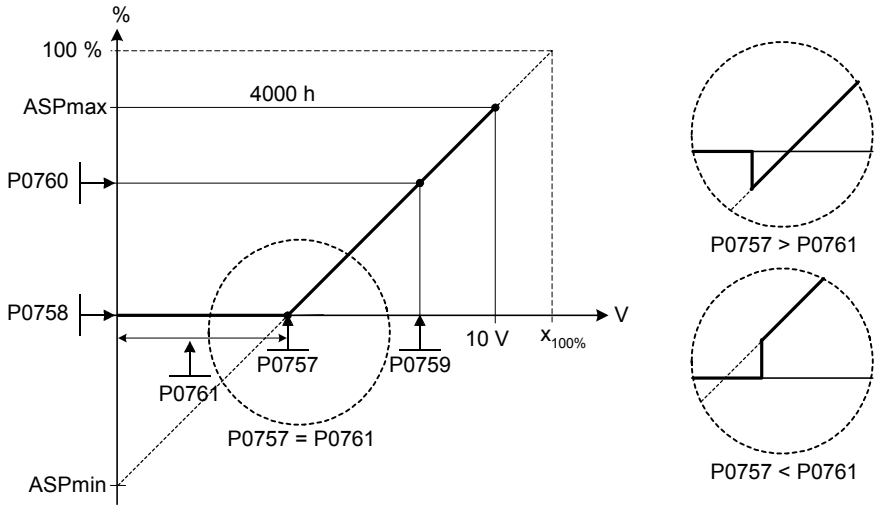
Defines width of deadband on analog input. The diagrams below explain its use.

Example:

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

- P2000 = 50 Hz
- P0759 = 8 V P0760 = 75 %
- P0757 = 2 V P0758 = 0 %
- P0761 = 2 V

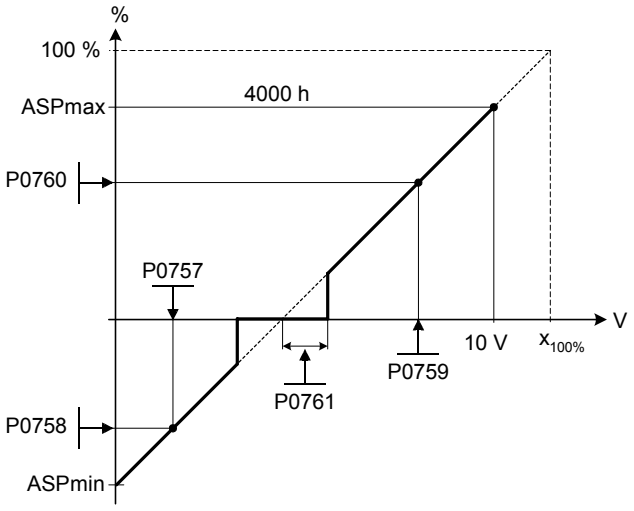
P0761 > 0 and (0 < P0758 < P0760 or 0 > P0758 > P0760)



The below example produces a 0 to 10 V analog input (-50 to +50 Hz) with center zero and a "holding point" 0.2 V wide (0.1 V to each side of center, ADC value 0 to 10 V, -50 to +50 Hz):

- P2000 = 50 Hz
- P0759 = 8 V P0760 = 75 %
- P0757 = 2 V P0758 = -75 %
- P0761 = 0.1 V

P0761 > 0 and P0758 < 0 < P0760



Note:

P0761[x] = 0 : No deadband active.

Notice:

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

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

P0802 **Transfer data to BOP** Level **3**

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

Transfers values from drive to BOP when set to 1. Parameter P0010 must be set to 30 for this to be possible.

Possible Settings:

0 Disabled
1 Start transfer

Note:

Parameter is automatically reset to 0 (default) after transfer. P0010 will be reset to 0 on successful completion.

P0803 **Transfer data from BOP** Level **3**

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

Transfers values from BOP to drive when set to 1. Parameter P0010 must be set to 30 for this to be possible.

Possible Settings:

0 Disabled
1 Start transfer

Note:

Parameter is automatically reset to 0 (default) after transfer. P0010 will be reset to 0 on successful completion.

P0810 **Source of Local/Remote** Level **3**

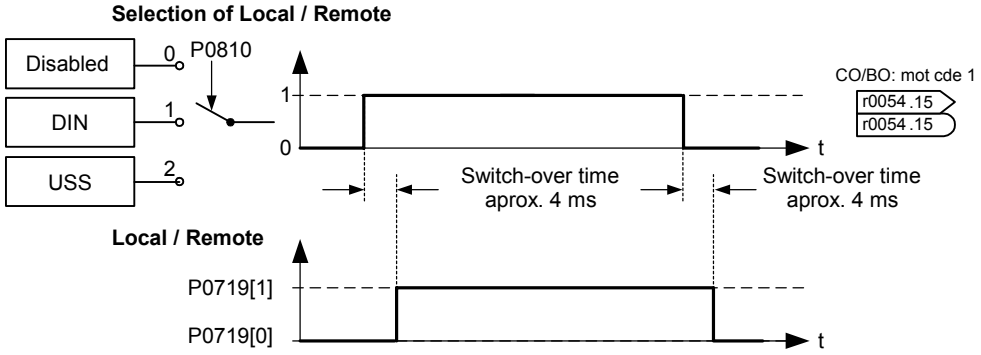
CStat:	CUT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.:** No	**Def:**	0
				Max:	2

Source of Local/Remote.

Possible Settings:

0 Disabled
1 DIN
2 USS

Example:



Dependency:

The following dependencies exist by use of the Local/Remote functionality:

1) If Local/Remote is selected via DIN the following parameters have to set:
   - P0810 = 1
   - One of P0701 to P0704 = 21
2) If P0810 is changed from 1 to 0 or 2, the parameter P0701 to P0704 = 21 are reset to 0.
3) If P0701 to P0704 are changed to 21, parameter P0810 is set to 1 automatically.
4) If P0701 to P0704 are changed from 21 to any value, P0810 is reset to 0.

P0927	Parameter changeable via			Min:	0	Level
	CStat: CUT	Datatype: U16	Unit: -	Def:	15	3
	P-Group: COMM	Active: first confirm	QuickComm.: No	Max:	15	

Specifies the interfaces which can be used to change parameters.

This parameter allows the user to easily protect the inverter from unauthorized modification of parameters.
Annotation: Parameter P0927 is not password protected.

Bitfields:

Bit00	Not used	0 NO	1 YES
Bit01	BOP	0 NO	1 YES
Bit02	Not used	0 NO	1 YES
Bit03	USS	0 NO	1 YES

Example:

Bits 0, 1, 2 and 3 set:
The default setting allows parameters to be changed via any interface. If all bits are set, the parameter is displayed on BOP as follows:

BOP:
P0927 

Bits 0, 1, 2 and 3 reset:
This setting allows no parameters to be modified via any interface with the exception of P0003 and P0927. If all bits are reset, the parameter is displayed on BOP as follows:

BOP:
P0927 

Details:

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

r0947[8] **Last fault code** Level **2**

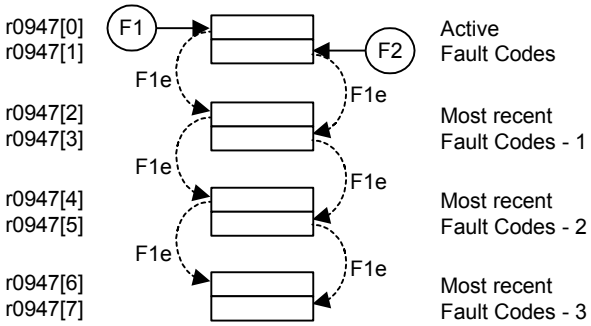
Datatype: U16 **Unit:** - **Min:** - **Def:** - **Max:** -

P-Group: ALARMS

Displays fault history according to the diagram below

where:
- "F1" is the first active fault (not yet acknowledged).
- "F2" is the second active fault (not yet acknowledged).
- "F1e" is the occurrence of the fault acknowledgement for F1 & F2.

This moves the value in the 2 indices down to the next pair of indices, where they are stored. Indices 0 & 1 contain the active faults. When faults are acknowledged, indices 0 & 1 are reset to 0.



Index:

r0947[0] : Recent fault trip --, fault 1
r0947[1] : Recent fault trip --, fault 2
r0947[2] : Recent fault trip -1, fault 3
r0947[3] : Recent fault trip -1, fault 4
r0947[4] : Recent fault trip -2, fault 5
r0947[5] : Recent fault trip -2, fault 6
r0947[6] : Recent fault trip -3, fault 7
r0947[7] : Recent fault trip -3, fault 8

Example:

If the inverter trips on undervoltage and then receives an external trip before the undervoltage is acknowledged, you will obtain:
- r0947[0] = 3 Undervoltage (F0003)
- r0947[1] = 85 External trip (F0085)

Whenever a fault in index 0 is acknowledged (F1e), the fault history shifts as indicated in the diagram above.

Dependency:

Index 1 used only if second fault occurs before first fault is acknowledged.

Details:

See "Faults and Warnings"

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

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

P-Group: ALARMS

Displays drive fault values. It is for service purposes and indicate the type of fault reported. The values are not documented. They are listed in the code where faults are reported.

Index:

r0949[0] : Recent fault trip --, fault value 1
r0949[1] : Recent fault trip --, fault value 2
r0949[2] : Recent fault trip -1, fault value 3
r0949[3] : Recent fault trip -1, fault value 4
r0949[4] : Recent fault trip -2, fault value 5
r0949[5] : Recent fault trip -2, fault value 6
r0949[6] : Recent fault trip -3, fault value 7
r0949[7] : Recent fault trip -3, fault value 8

r0964[7] Firmware version data

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

Level 3

P-Group: COMM

Firmware version data.

Index:

r0964[0] : Company (Siemens = 42)
r0964[1] : Product type
r0964[2] : Firmware version
r0964[3] : Firmware date (year)
r0964[4] : Firmware date (day/month)
r0964[5] : Number of drive objects
r0964[6] : Firmware version (patch)

Example:

No.	Value	Meaning
r0964[0]	42	SIEMENS
r0964[1]	1001	MICROMASTER 420
	1002	MICROMASTER 440
	1003	MICRO- / COMBIMASTER 411
	1004	MICROMASTER 410
	1005	reserved
	1006	MICROMASTER 440 PX
	1007	MICROMASTER 430
	5301	SINAMICS G110
r0964[2]	105	Firmware V1.05.cc.dd.
r0964[3]	2001	27.10.2001
r0964[4]	2710	
r0964[5]	1	Drive objects
r0964[6]	200	Firmware Vaa.bb.02.00

P0970 Factory reset

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

Level 1

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

P0970 = 1 resets all parameters to their default values.

Possible Settings:

0 Disabled
1 Parameter reset

Dependency:

First set P0010 = 30 (factory settings).

Stop drive (i.e. disable all pulses) before you can reset parameters to default values.

Note:

The following parameters retain their values after a factory reset:

- P0014 Store mode
- P0100 Europe / North America
- P2010 USS baud rate
- P2011 USS address

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

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

Transfers values from RAM to EEPROM when set to 1.

Possible Settings:

0 Disabled
1 Start transfer

Note:

All values in RAM are transferred to EEPROM.

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

The storage from RAM to EEPROM is accomplished via P0971. The communications are reset, if the transfer was successful. During the reset process communications will be interrupted. This creates the following conditions:

- PLC (e.g. SIMATIC S7) enters Stop mode
- Starter automatically recovers communications once they are re-established.
- BOP displays "busy"

After completion of the transfer process, the communication between the inverter and the PC-tools (e.g. Starter) or BOP is automatically re-established.

P1000 **Selection of frequency setpoint** Level **1**

CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	SETPOINT	**Active:** first confirm	**QuickComm.:** Yes	**Def:**	2
				Max:	5

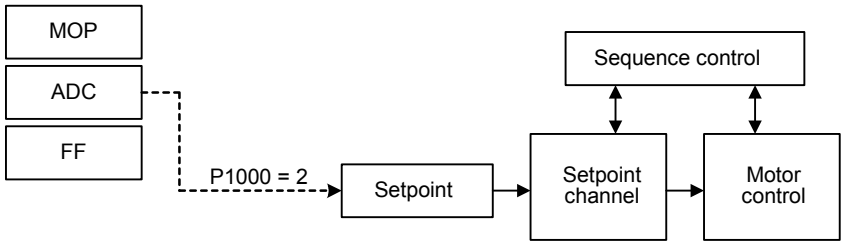
Selects frequency setpoint source.

Possible Settings:

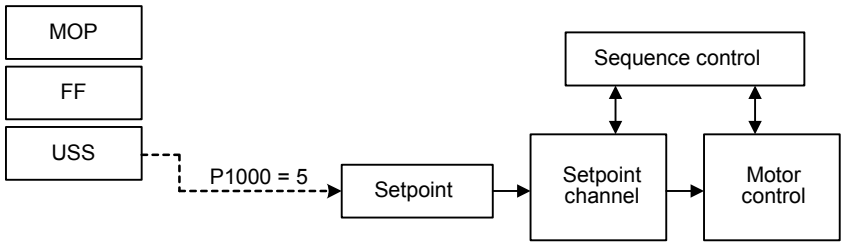
0 No main setpoint
1 MOP setpoint
2 Analog setpoint
3 Fixed frequency
5 USS

Example:

SINAMICS G110 CPM110 AIN (Default: P1000 = 2)



SINAMICS G110 CPM110 USS (Default: P1000 = 5)



Dependency:

Parameter P0719 has higher priority than P1000.

Details:

MOP ==> see parameter r1050
ADC ==> see parameter r0752
Fixed frequency ==> see parameter P1001

P1001 **Fixed frequency 1**

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

Level **2**

Defines fixed frequency setpoint 1.

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

1. Direct selection (P0701 - P0703 = 15):
   - In this mode of operation, 1 digital input selects 1 fixed frequency (e.g. if
   - P0700 = 2 and P0701 = 15, the value of P1001 is selected when the status of digital input 0 (DIN0) is ON, see also r0722).
   - If several inputs are active together, the selected frequencies are summed.
   - E.g.: r1024 = FF1 + FF3 (the status of DIN0 and DIN2 is ON and that of DIN1 is OFF)

2. Direct selection + ON command (P0701 - P0703 = 16):
   - The fixed frequency selection combines the fixed frequencies with an ON command.
   - In this mode of operation 1 digital input selects 1 fixed frequency.
   - If several inputs are active together, the selected frequencies are summed.
   - E.g.: r1024 = FF1 + FF2 + FF3 (the status of DIN0, DIN1 and DIN2 is ON)

Possible parameter settings for the selection of FF:

	Selection	P1003 (FF3)	P1002 (FF2)	P1001 (FF1)	ON
DIN	P0719=0, P0700=2, P1000=3 or P0719=3, P0700=2	P0703=15	P0702=15	P0701=15	P070x=1 or 2
		P0703=16	P0702=16	P0701=16	P070x=16
BOP	P0719=0, P0700=1, P1000=3 or P0719=3, P0700=1 or P0719=13	P0703=15	P0702=15	P0701=15	ON button of BOP
USS *)	P0719=0, P0700=5, P1000=3 or P0719=3, P0700=5 or P0719=53	P0703=15	P0702=15	P0701=15	ON via USS Ctrl. wd. 1 r0054 Bit00
		Ctrl. wd. 2**) r0055 Bit02	Ctrl. wd. 2**) r0055 Bit01	Ctrl. wd. 2**) r0055 Bit00	

*) SINAMICS G110 CPM110 USS only **) P2012 = 4

Example:

Direct selection of FF via DIN:

		DIN2	DIN1	DIN0
0 Hz	FF0	0	0	0
P1001	FF1	0	0	1
P1002	FF2	0	1	0
P1003	FF3	1	0	0
P1001+P1002	FF1+FF2	0	1	1
⋮		⋮		
P1001+P1002+P1003	FF1+FF2+FF3	1	1	1

Dependency:

Select fixed frequency operation (using P1000).

Inverter requires ON command to start in the case of direct selection (P0701 - P0703 = 15).

Note:

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

P1002 **Fixed frequency 2**

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

Level **2**

Defines fixed frequency setpoint 2.

Details:

See parameter P1001 (fixed frequency 1).

P1003 **Fixed frequency 3** Level **2**

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

Defines fixed frequency setpoint 3.

Details:

See parameter P1001 (fixed frequency 1).

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

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

Displays sum total of selected fixed frequencies.

P1031 **Setpoint memory of the MOP** Level **2**

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

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

Possible Settings:

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

Note:

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

P1032 **Inhibit reverse direction of MOP** Level **3**

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

Inhibits reverse setpoint selection.

Possible Settings:

0 Reverse direction is allowed
1 Reverse direction inhibited

Note:

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

The "reversing key" of the OP (e.g. BOP) is not affected by the settings of P1032. Use P1110 to fully prevent change of motor direction.

P1040 **Setpoint of the MOP** Level **3**

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

Determines setpoint for motor potentiometer control (P1000 = 1).

Dependency:

Motor potentiometer setpoint (P1040) must be chosen as setpoint via P1000 or P0719.

Note:

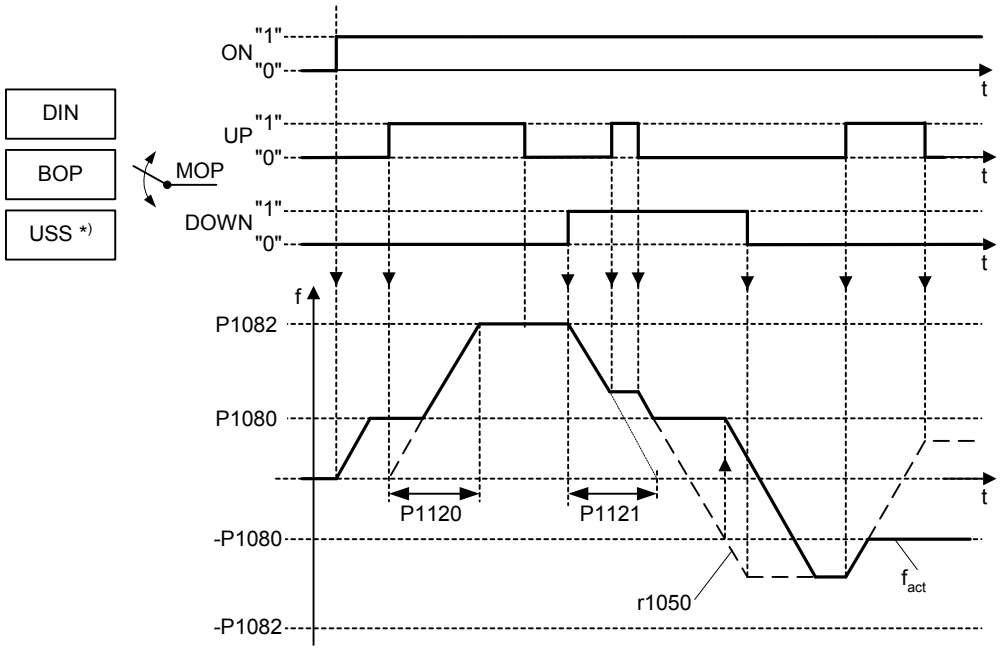
If motor potentiometer setpoint is selected, the reverse direction will be inhibited by default of P1032 (inhibit reverse direction of MOP).

To re-enable reverse direction, set P1032 = 0.

A short press of the 'up' or 'down' keys (e.g.: BOP) will change the frequency setpoint in steps of 0.1Hz. A longer press will cause an accelerated frequency setpoint change.

r1050	CO: Act. Output freq. of the MOP			Min: -	Level
		Datatype: Float	Unit: Hz	Def: -	3
	P-Group: SETPOINT			Max: -	

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



Possible parameter settings for the selection of MOP:

	Selection	MOP up	MOP down
DIN	P0719 = 0, P0700 = 2, P1000 = 1 or P0719 = 1, P0700 = 2	P0702 = 13	P0703 = 14
BOP	P0719 = 0, P0700 = 1, P1000 = 1 or P0719 = 1, P0700 = 1 or P0719 = 11	UP button	DOWN button
USS *)	P0719 = 0, P0700 = 5, P1000 = 1 or P0719 = 1, P0700 = 5 or P0719 = 51	USS control word r0054 Bit13	USS control word r0054 Bit14

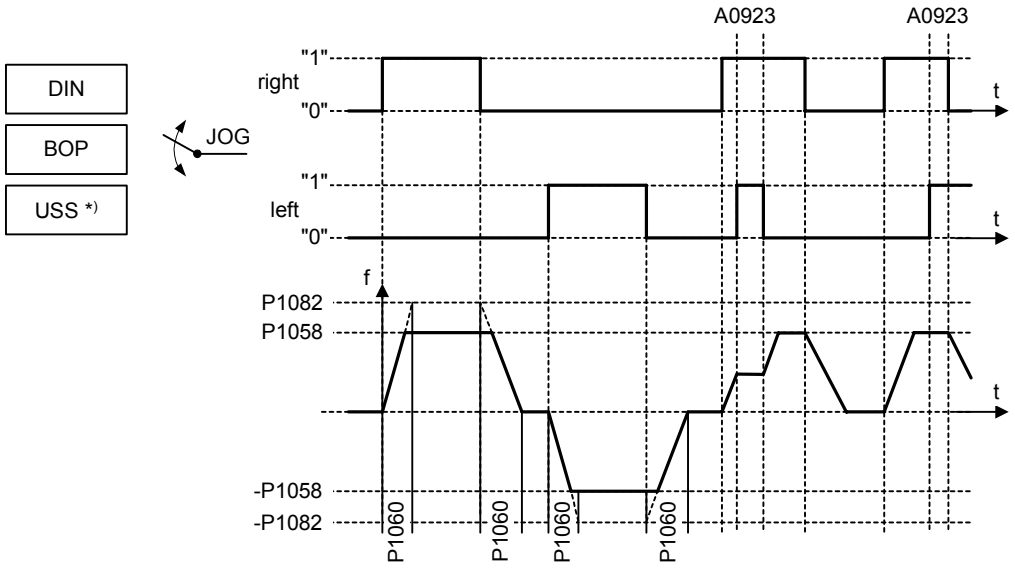
*) SINAMICS G110 CPM110 USS only

Notice:
If the MOP is enabled by short pulses of less than 1 second, the frequency is changed in steps of 0.1 Hz.

P1058	JOG frequency				Min:	0.00	Level
	CStat: CUT	Datatype: Float	Unit: Hz		Def:	5.00	3
	P-Group: SETPOINT	Active: Immediately	QuickComm.: No		Max:	650.00	

Jogging increases the motor speed by small amounts. The JOG buttons use a non-latching switch on one of the digital inputs to control the motor speed. While the JOG button is pressed, parameter P1058 determines the frequency at which the inverter will run. 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 JOG frequency (P1058) is reached.



Possible parameter settings for the selection of JOG:

	Selection	JOG right	JOG left
DIN	P0719 = 0, P0700 = 2	P0702 = 10	P0703 = 12
BOP	P0719 = 0, P0700 = 1 or P0719 = 10 ... 15	JOG button	Rev button JOG button
USS *)	P0719 = 0, P0700 = 5 or P0719 = 50 ... 55	USS control word r0054 Bit08	USS control word r0054 Bit09

*) SINAMICS G110 CPM110 USS only

Dependency:

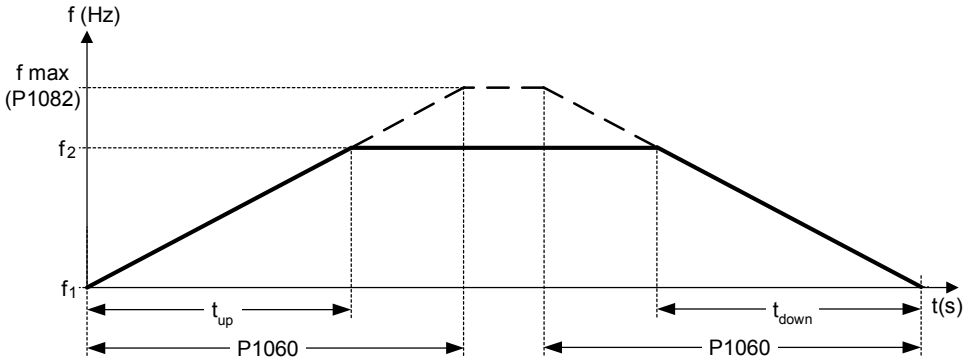
P1060 sets up ramp and down ramp times for jogging.

Rounding time (P1130), rounding type (P1134) and P2167 will also have influence on the JOG ramp.

P1060 **JOG ramp-up/down time** Level **3**

CStat:	CUT	**Datatype:** Float	**Unit:** s	**Min:**	0.00
P-Group:	SETPOINT	**Active:** first confirm	**QuickComm.:** No	**Def:**	10.00
				Max:	650.00

Sets jog ramp-up and ramp-down time. This is the ramping time used while jogging is active.



$$t_{up} = t_{down} = \frac{|f_2 - f_1|}{P1082} \cdot P1060$$

Notice:

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

The rounding of P1130 also applies to the JOG ramping.

r1078 **CO: Total frequency setpoint** Level **3**

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

Displays setpoints in [Hz].

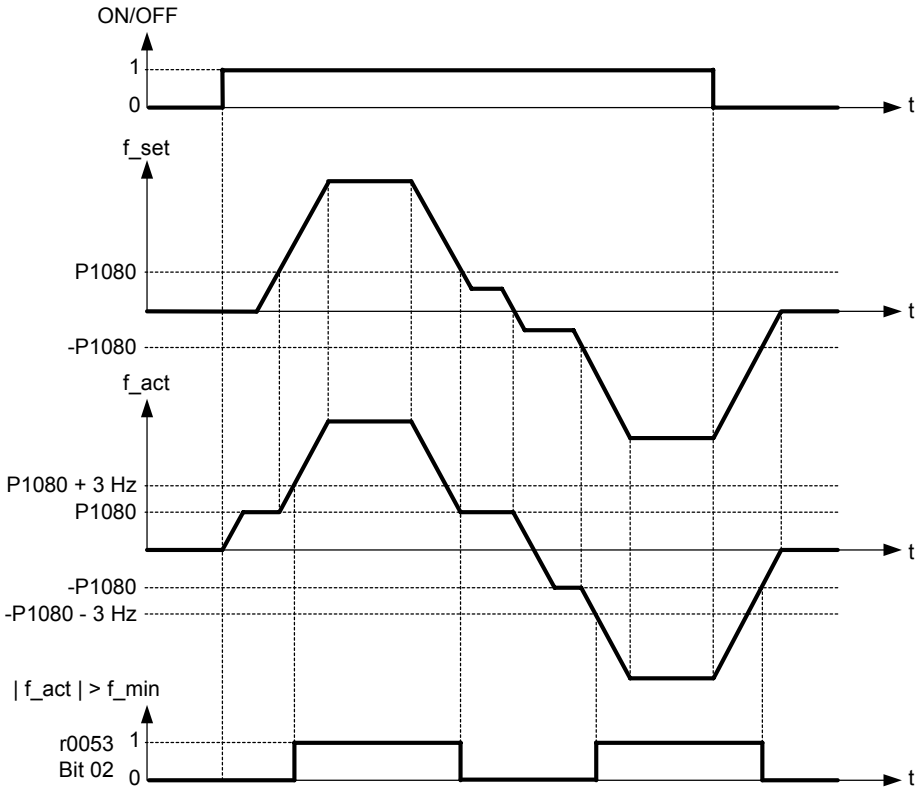
P1080	Min. frequency				Min:	0.00	Level
	CStat: CUT	Datatype: Float	Unit: Hz		Def:	0.00	1
	P-Group: SETPOINT	Active: Immediately	QuickComm.: Yes		Max:	650.00	

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

The minimum frequency P1080 represents a masking frequency of 0 Hz for all frequency target value sources (e.g. ADC, MOP, FF, USS), with the exception of the JOG target value source (analogous to P1091). Thus the frequency band +/- P1080 is run through in optimum time by means of the acceleration/deceleration ramps. Dwelling in the frequency band is not possible (see example).

Furthermore, an 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.

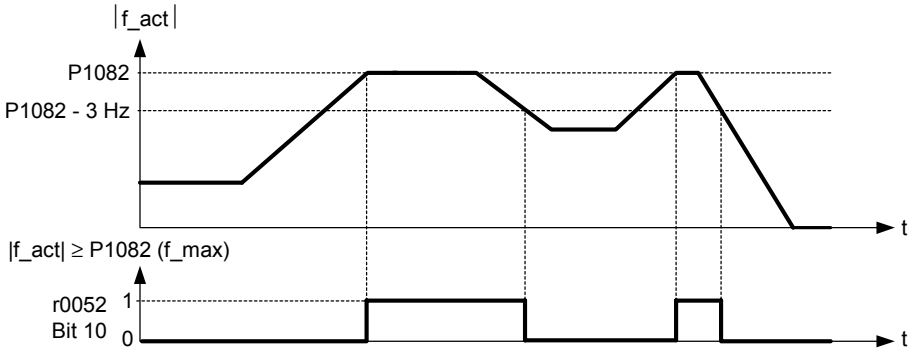
Under certain conditions (e.g. ramping, current limiting), motor can run below minimum frequency.

P1082	Max. frequency				Min:	0.00	Level
	CStat: CT	Datatype: Float	Unit: Hz		Def:	50.00	1
	P-Group: SETPOINT	Active: first confirm	QuickComm.: Yes		Max:	650.00	

Sets maximum motor frequency [Hz] at which motor will run irrespective of the frequency setpoint. The value set here is valid for both clockwise and anticlockwise rotation.

Futhermore, the monitoring function |f_act| >= P1082 (r0052 Bit10, see example below) is affected by this parameter.

Example:



Dependency:

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

	P1800			
	2 kHz	4 kHz	6 kHz	8 - 16 kHz
f_{max} P1082	0 - 133.3 Hz	0 - 266.6 Hz	0 - 400 Hz	0 - 650 Hz

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

- P1335 ≠ 0 (Slip compensation active) :

$$f_{max}(P1335) = f_{max} + f_{slip,max} = P1082 + 2.5 \cdot \frac{r0330}{100} \cdot P0310$$

- P1200 ≠ 0 (Flying restart active) :

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

Note:

When using the setpoint source

- Analog Input
- USS

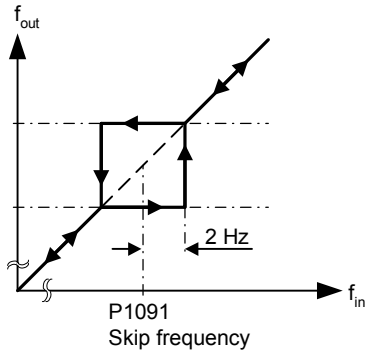
The setpoint frequency (in Hz) is cyclically calculated using a percentage value (e.g. for the analog input r0754) or a hexadecimal value (e.g. for the USS r2018[1]) and the reference frequency P2000.

If for example P1082 = 80 Hz, P2000 = 50 Hz and the analog input is parameterised with P0757 = 0 V, P0758 = 0 %, P0759 = 10 V, P0760 = 100 %, a setpoint frequency of 50 Hz will be applied at 10 V of the analog input.

P1091 **Skip frequency** Level **3**

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

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



Note:

The function is disabled if P1091 = 0.

Notice:

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

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

P1110 **Inhibit neg. freq. setpoint** Level **3**

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

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.

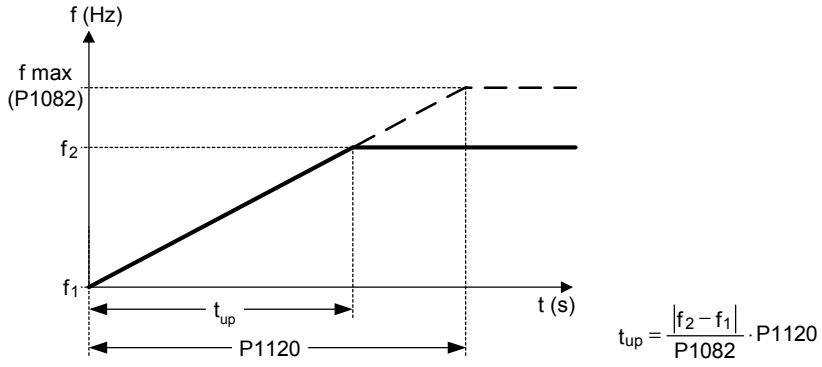
Possible Settings:

0 Disable
1 Enable

P1120 **Ramp-up time** Level **1**

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

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



Setting the ramp-up time too short can cause the inverter to trip (overcurrent F0001).

Dependency:

Rounding time (P1130) and rounding type (P1134) will also have influence on the ramp.

Note:

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

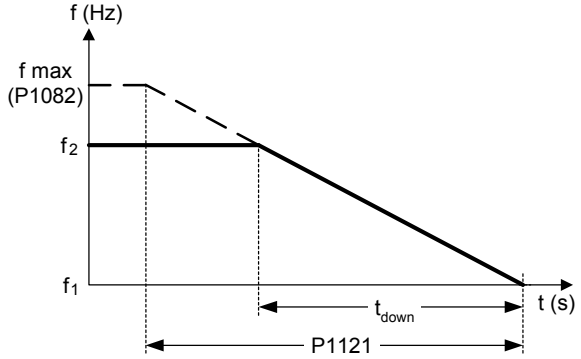
Notice:

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

P1121 **Ramp-down time** Level **1**

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

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



$$t_{down} = \frac{|f_2 - f_1|}{P1082} \cdot P1121$$

Notice:

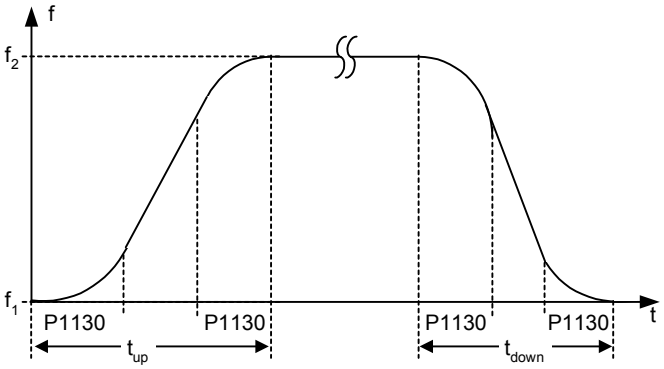
Setting the ramp-down time too short can cause the inverter to trip (overcurrent F0001 / overvoltage F0002).

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

P1130 **Ramp rounding time** Level **3**

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

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



where:

Dependency	Ramp-up time	Ramp-down time
always for (f2 - f1) = P1082	$t_{up} = P1130 + P1120$	$t_{down} = P1130 + P1121$
for P1130 > P1120	$t_{up} = (P1130 + P1120) \cdot \sqrt{\frac{f_2 - f_1}{P1082}}$	$t_{down} = (P1130 + P1121) \cdot \sqrt{\frac{f_2 - f_1}{P1082}}$
for P1130 <= P1120	$t_{up} = P1130 + P1120 \cdot \frac{f_2 - f_1}{P1082}$	$t_{down} = P1130 + P1121 \cdot \frac{f_2 - f_1}{P1082}$

Note:

If short or zero ramp times (with P1120, P1121 < P1130) are set and (f_2 - f_1) < P1082, the total ramp up time (t_up) or total ramp down time (t_down) will be a nonlinear function of P1130. See equations above for valid conditions to calculate t_up and t_down.

Notice:

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

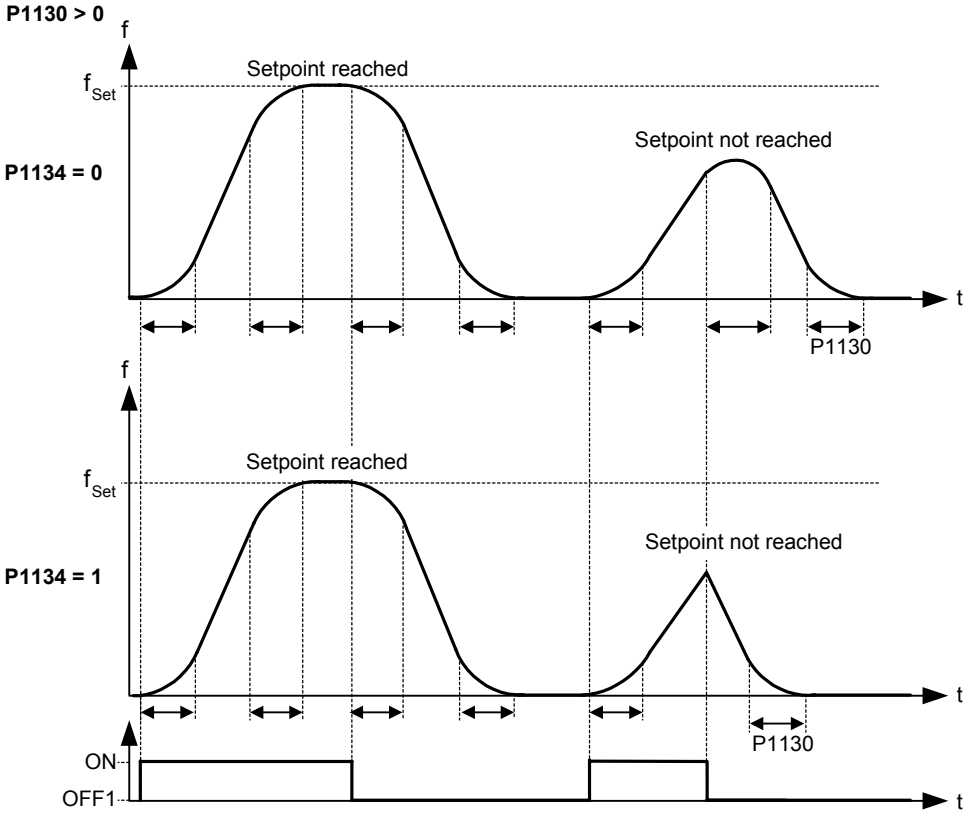
Rounding times are not recommended when analog inputs are used, since they would result in overshoot/undershoot in the inverter response.

P1134 **Rounding type** Level **3**

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

Defines the smoothing which is active by setpoint modifications during acceleration or deceleration (e.g. new setpoint, OFF1, OFF3, REV).

This smoothing is applied, if the motor is ramped-up or ramped-down and
- P1134 = 0,
- P1130 > 0 and
- the setpoint is not yet reached.



Possible Settings:

0 Continuous smoothing
1 Discontinuous smoothing

Dependency:

This parameter has no effect unless the value set in P1130 is greater than 0.

P1135 **OFF3 ramp-down time** Level **3**

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

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

Settings in P1130 and P1134 will have no effect on OFF3 ramp-down characteristic. An initial ramp-down rounding time of approaximately 10% of P1135 is however included. For the total OFF3 ramp-down time:

$t_{down,OFF3} = 1.1 \cdot P1135$

Note:

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

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

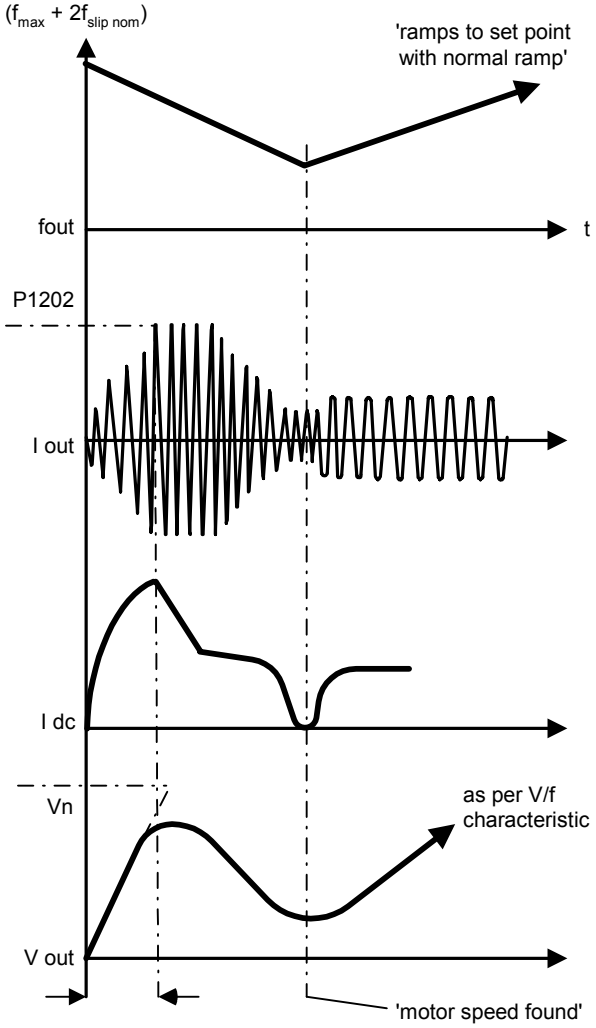
		Datatype: Float	**Unit:** Hz	**Min:**	-
P-Group:	SETPOINT			**Def:**	-
				Max:	-

Displays overall frequency setpoint after ramp generator.

P1200 **Flying start** Level **3**

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

Starts inverter onto a spinning motor by rapidly changing the output frequency of the inverter until the actual motor speed has been found. Then, the motor runs up to setpoint using the normal ramp time.



Possible Settings:

0 Flying start disabled
1 Flying start is always active, start in direction of setpoint
2 Flying start is active if power on, fault, OFF2, start in direction of setpoint
3 Flying start is active if fault, OFF2, start in direction of setpoint
4 Flying start is always active, only in direction of setpoint
5 Flying start is active if power on, fault, OFF2, only in direction of setpoint
6 Flying start is active if fault, OFF2, only in direction of setpoint

Note:

Useful for motors with high inertia loads.

Settings 1 to 3 search in both directions.
Settings 4 to 6 search only in direction of setpoint.

Notice:

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

P1202 **Motor-current: Flying start** Level **3**

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

Defines search current used for flying start.

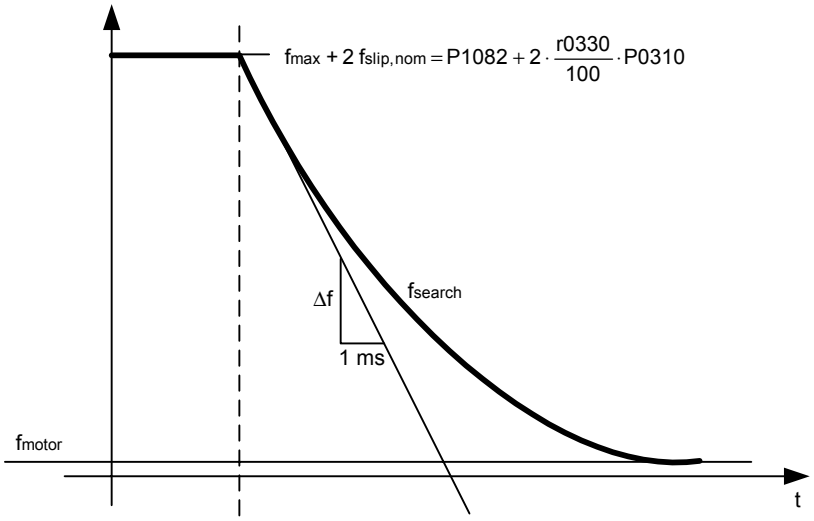
Value is in [%] based on rated motor current (P0305).

Note:

Reducing the search current may improve performance for flying start if the inertia of the system is not very high.

P1203	Search rate: Flying start			Min:	10	Level
	CStat: CUT	Datatype: U16	Unit: %	Def:	100	3
	P-Group: FUNC	Active: first confirm	QuickComm.: No	Max:	200	

Sets factor by which the output frequency changes during flying start to synchronize with turning motor. This value is entered in [%] defines the reciprocal initial gradient in the search sequence (see curve below). Parameter P1203 influences the time taken to search for the motor frequency.



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

The search time is the time taken to search through all frequencies between max. frequency P1082 + 2 x f_slip to 0 Hz.

P1203 = 100 % is defined as giving a rate of 2 % of f_slip,nom / [ms].
P1203 = 200 % would result in a rate of frequency change of 1 % of f_slip,nom / [ms].

Example:

For a motor with 50 Hz, 1350 rpm, 100 % would produce a maximum search time of 600 ms.

Note:

A higher value produces a flatter gradient and thus a longer search time.
A lower value has the opposite effect.

P1210	Automatic restart				Min: 0	Level
	CStat: CUT	Datatype: U16	Unit: -		Def: 1	2
	P-Group: FUNC	Active: first confirm	QuickComm.: No		Max: 6	

Configures automatic restart function

Possible Settings:

0 Disabled
1 Trip reset after power on
2 Restart after mains blackout
3 Restart after mains brownout or fault
4 Restart after mains brownout
5 Restart after mains blackout and fault
6 Restart after mains brown- /blackout or fault

Dependency:

Automatic restart requires constant ON command via a digital input wire link.

Caution:

P1210 > 2 can cause the motor to restart automatically without toggling the ON command !

Notice:

A "mains brownout" is where the power in interrupted and re-applied before the display on the BOP (if one is fitted to the inverter) has gone dark (a very short mains break where the DC link has not fully collapsed).

A "mains blackout" is where the display has gone dark (a long mains break where the DC link has fully collapsed) before the power is re-applied.

"Delay Time" is the time between attempts of quitting fault. The "Delay Time" of first attempt is 1 second, then it will be double every next attempt.

"Number of Restart Attempts" is the number of restarts the inverter will try to quit fault. The default for "Number of Restart Attempts" is 3 times.

When faults are quit and after 4 seconds of no fault condition, "Number of Restart Attempts" will be reset to default 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 (DIN).

P1210 = 3:
For these settings it is fundamental that the drive only restarts if it has been in a RUN state at the time of the faults (F0003, etc.). The inverter will acknowledge the fault and restarts the drive after a blackout or bronwout. It is necessary that the ON command is wired via a digital input (DIN).

P1210 = 4:
For these settings it is fundamental that the drive only restarts if it has been in a RUN state at the time of the fault (F0003). The inverter will acknowledge the fault and restarts the drive after a blackout or bronwout. It is necessary that the ON command is wired via a digital input (DIN).

P1210 = 5:
The inverter will acknowledge the faults F0003 etc. at power on after blackout and restarts the drive. It is necessary that the ON command is wired via a digital input (DIN).

P1210 = 6:
The inverter will acknowledge the faults (F0003 etc.) at power on after blackout or brownout and restarts the drive. It is necessary that the ON command is wired via a digital input (DIN). Setting 6 causes the motor to restart immediately.

Following table presents an overview of parameter P1210 and its functionality.

P1210	ON always active				ON in no-voltage condition
	Fault F0003 on		All other faults on		All faults + F0003
	Blackout	Brownout	Blackout	Brownout	
0	–	–	–	–	–
1	Fault acknowl.	–	–	–	Fault acknowl.
2	Fault acknowl. + restart	–	–	–	Fault acknowl. + restart
3	Fault acknowl. + restart	Fault acknowl. + restart	Fault acknowl. + restart	Fault acknowl. + restart	–
4	Fault acknowl. + restart	Fault acknowl. + restart	–	–	–
5	Fault acknowl. + restart	–	–	Fault acknowl. + restart	Fault acknowl. + restart
6	Fault acknowl. + restart	Fault acknowl. + restart	Fault acknowl. + restart	Fault acknowl. + restart	Fault acknowl. + restart

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

P1215 Holding brake enable

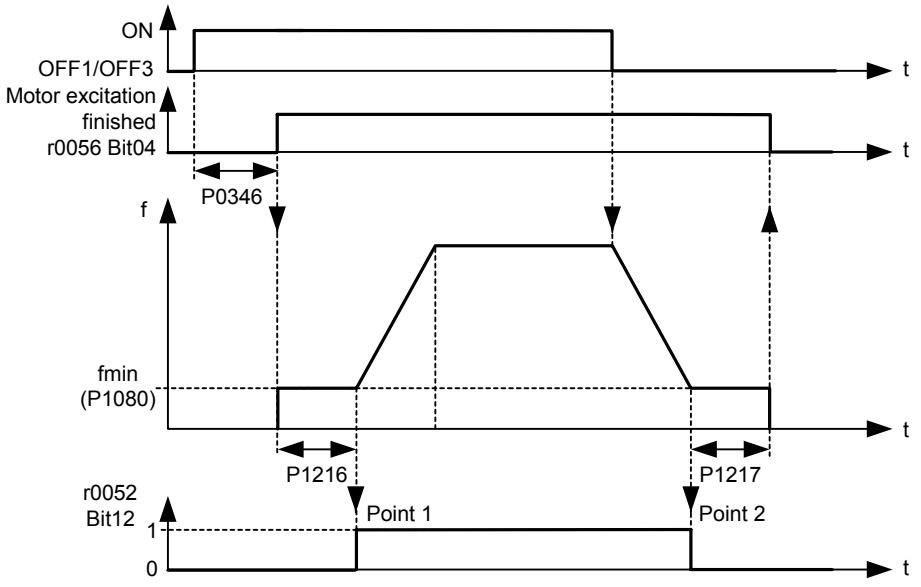
CStat: T **Datatype:** U16 **Unit:** - **Min:** 0
P-Group: FUNC **Active:** first confirm **QuickComm.:** No **Def:** 0
Max: 1

Level **3**

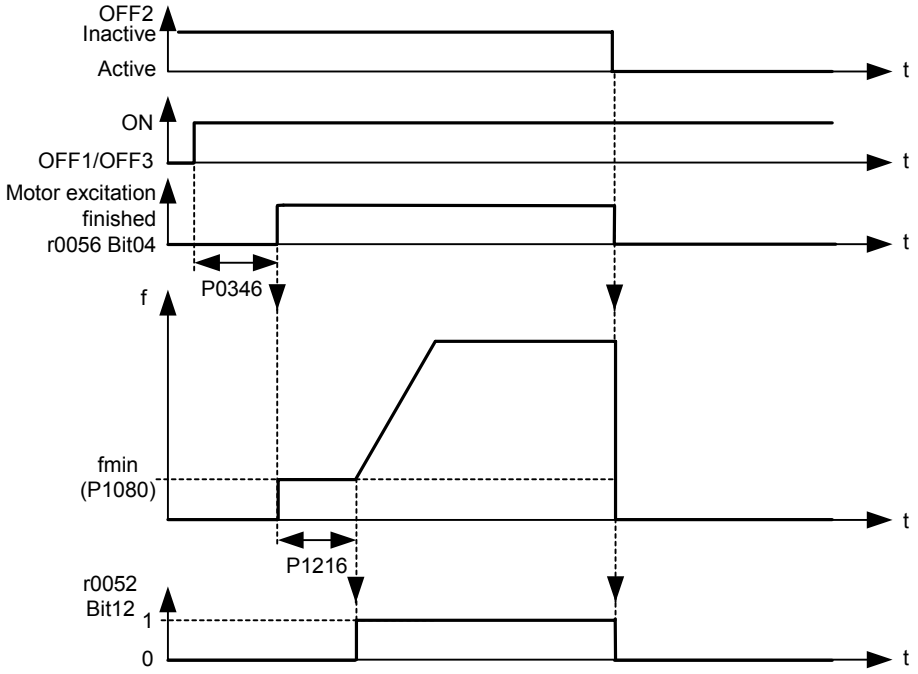
Enables/disables holding brake function.

The mechanical motor holding brake (MHB) is controlled via the signal of status word 1 r0052 Bit12 "motor holding brake ative". The brake relay opens at point 1 and closes at point 2. This signal can be issued via:
- digitial output (e.g. DOUT 0: ==> P0731 = 18)
- status word of the serial interface (e.g. USS)

ON / OFF1/OFF3:



ON / OFF2:



Possible Settings:

0 Motor holding brake disabled
1 Motor holding brake enabled

Caution:

It is not permissible to use the motor holding brake as working brake, as it is generally only designed for a limited number of emergeny braking operations.

Note:

A typical value of min. frequency P1080 for motor holding brake is the slip frequency of the motor r0330.

P1216 Holding brake release delay

						Level
CStat:	T	**Datatype:** Float	**Unit:** s	**Min:**	0.0	3
P-Group:	FUNC	**Active:** first confirm	**QuickComm.:** No	**Def:**	1.0	
				Max:	20.0	

Defines period during which inverter runs at min. frequency P1080 before ramping up at point 1 (as shown in P1215 - holding brake enable). Inverter starts at min. frequency P1080 on this profile, i.e. it does not use a ramp.

Note:

A typical value of min. frequency P1080 for this type of application is the slip frequency of the motor.

You can calculate the rated slip frequency by using the following formula:

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

Details:

See diagram P1215 (holding brake enable).

P1217 Holding time after ramp down

						Level
CStat:	T	**Datatype:** Float	**Unit:** s	**Min:**	0.0	3
P-Group:	FUNC	**Active:** first confirm	**QuickComm.:** No	**Def:**	1.0	
				Max:	20.0	

Defines time for which inverter runs at minimum frequency (P1080) after ramping down at point 2.

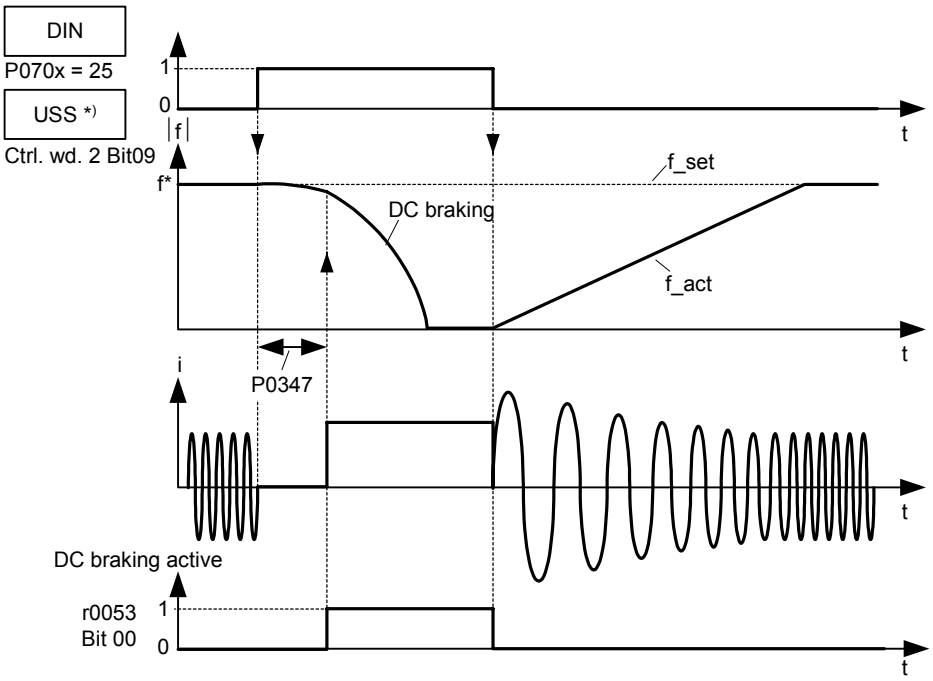
Details:

See diagram P1215 (holding brake enable).

P1232	DC braking current				Min:	0	Level
	CStat: CUT	Datatype: U16	Unit: %		Def:	100	3
	P-Group: FUNC	Active: Immediately	QuickComm.: No		Max:	250	

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

The DC Brake (DC Injection Brake) can be issued observing the following dependencies:
- OFF1 or OFF3 ==> see P1233
- DIN or USS ==> see below

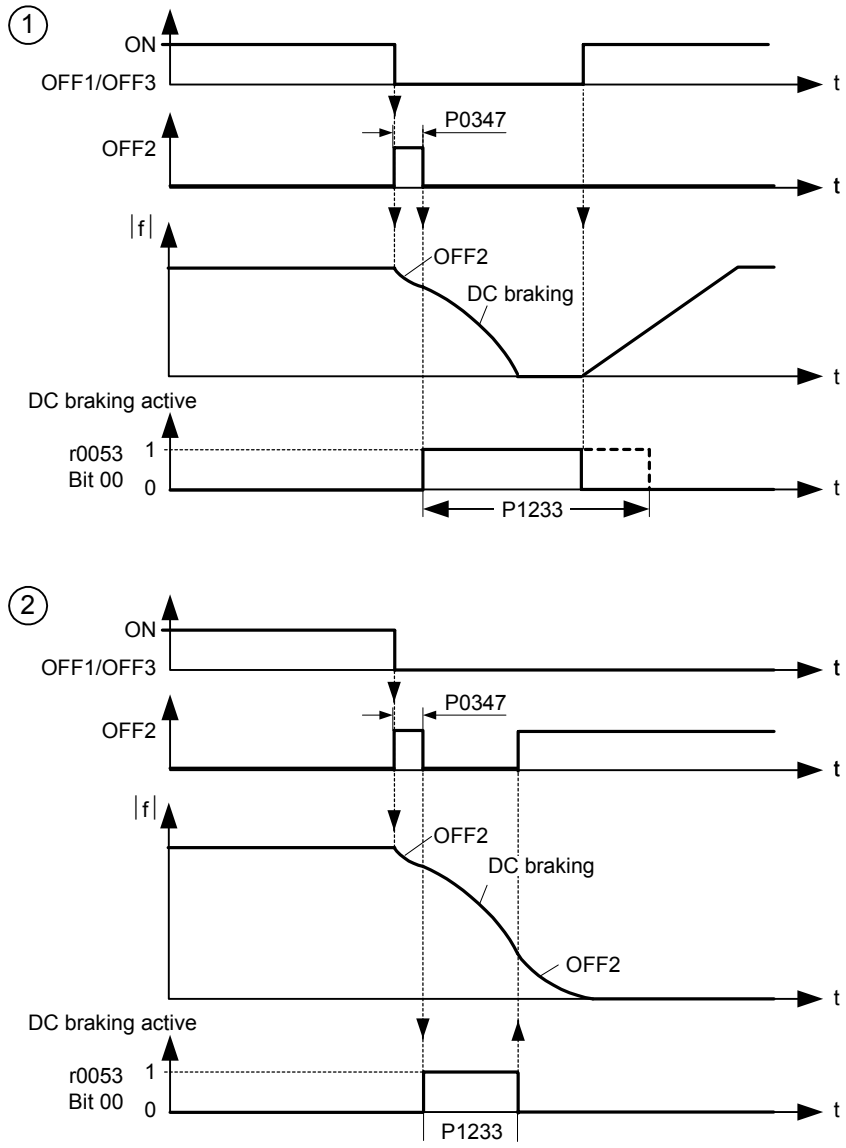


Note: DC brake can be applied in drive states r0002 = 1, 4, 5

*) SINAMICS G110 CPM110 USS only

P1233	Duration of DC braking				Min: 0	Level
	CStat: CUT	Datatype: U16	Unit: s		Def: 0	3
	P-Group: FUNC	Active: Immediately	QuickComm.: No		Max: 250	

Defines duration for which DC injection braking is to be active following an OFF1 or OFF3 command.



Parameter P1232 still controls the level of DC injection.

Value:

P1233 = 0 :
Not active.

P1233 = 1 - 250 :
Active for the specified duration.

Caution:

With the DC braking, the kinetic energy of the motor is converted into heat in the motor. The drive could overheat if the remains in this status for an exessive period of time !

Notice:

The DC braking function causes the motor to stop rapidly by applying a DC braking current. When the DC braking signal is applied, the inverter output pulses are blocked and the DC current not applied until the motor has been sufficiently demagnetized (demagnetization time is calculated automatically from motor data).

P1240 **Configuration of Vdc controller** Level **3**

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

Enables / disables Vdc controller.

The Vdc controller dynamically controls the DC link voltage to prevent overvoltage trips on high inertia systems.

Possible Settings:

0 Vdc controller disabled
1 Vdc-max controller enabled

Note:

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

P1300 **Control mode** Level **2**

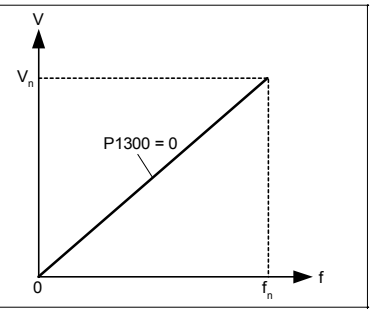
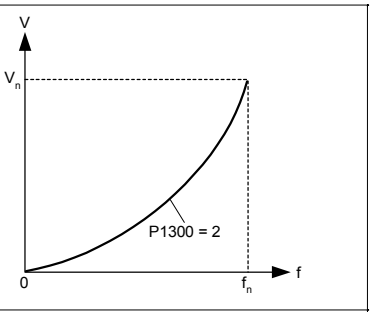
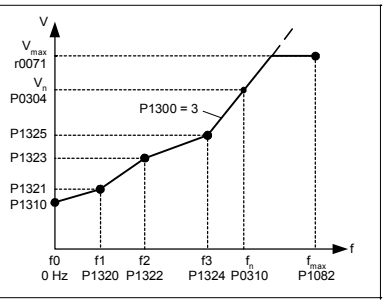
CStat:	CT	**Datatype:** U16	**Unit:** -	**Min:**	0
P-Group:	CONTROL	**Active:** first confirm	**QuickComm.:** Yes	**Def:**	0
				Max:	3

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

Possible Settings:

0 V/f with linear characteristic
2 V/f with quadratic characteristic
3 V/f with programmable characteristic

Note:

P1300 = 0	Linear characteristic	Standard	
P1300 = 2	Quadratic characteristic	Characteristics which cover the torque properties of the production machine (for example, pumps and fans). a) The voltage to frequency relationship suited for variable torque applications such as some pumps and fans. b) By utilizing lower voltages at lower output frequencies there can be significant energy savings.	
P1300 = 3	Program-mable characteristic	The freely programmable characteristics enables the best V to f relationship to be selected the motor or production maschine.	

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

ParNo.	Parameter name	Level	V/f		
			P1300 =		
			0	2	3
P1300	Control mode	2	x	x	x
P1310	Continuous boost	2	x	x	x
P1311	Acceleration boost	2	x	x	x
P1312	Starting boost	2	x	x	x
P1316	Boost end frequency	3	x	x	x
P1320	Programmable V/f freq. coord. 1	3	–	–	x
P1321	Programmable V/f volt. coord. 1	3	–	–	x
P1322	Programmable V/f freq. coord. 2	3	–	–	x
P1323	Programmable V/f volt. coord. 2	3	–	–	x
P1324	Programmable V/f freq. coord. 3	3	–	–	x
P1325	Programmable V/f volt. coord. 3	3	–	–	x
P1335	Slip compensation	2	x	x	x

P1310 Continuous boost

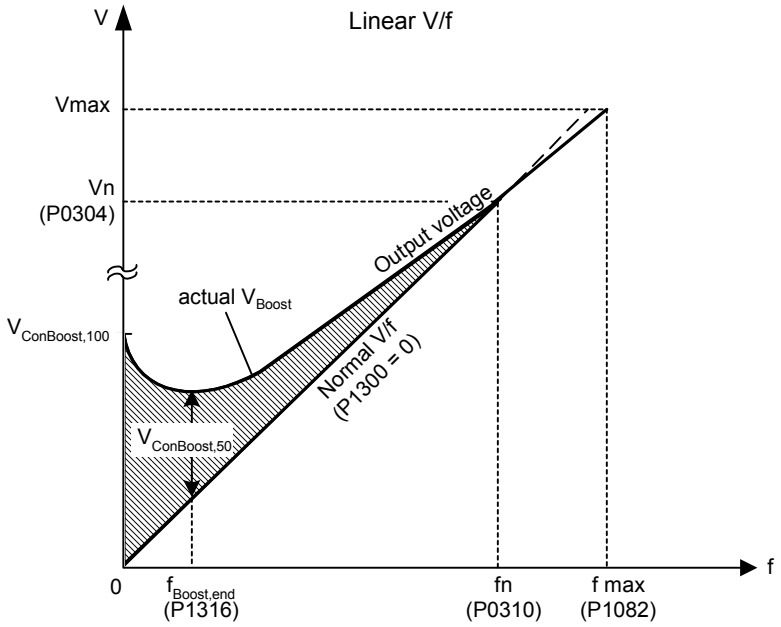
CStat: CUT **Datatype:** Float **Unit:** % **Min:** 0.0
P-Group: CONTROL **Active:** Immediately **QuickComm.:** No **Def:** 50.0
Max: 250.0

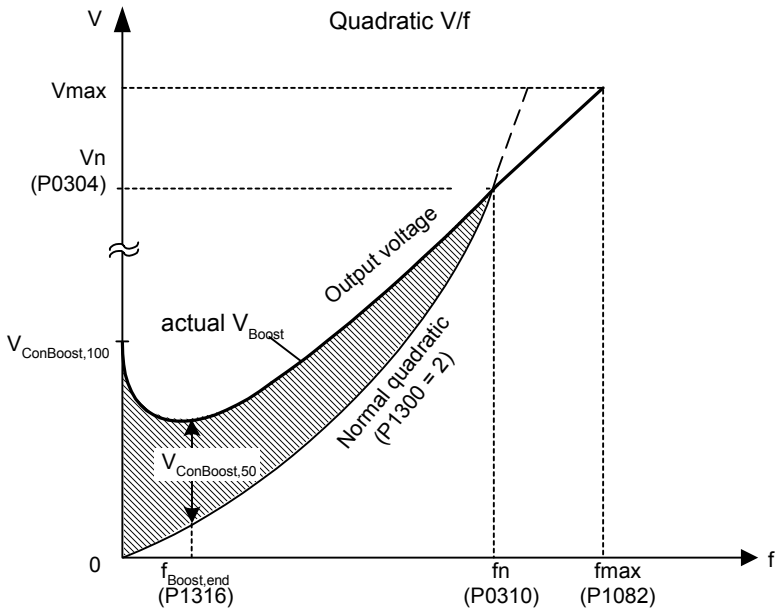
Level **2**

At low output frequencies the output voltage is low to keep the flux level constant. However, the output voltage may be too low
- for magnetisation the asynchronous motor
- to hold the load
- to overcome losses in the system. The output voltage can be increased using parameter P1310.

The inverter output voltage can be increased via P1310 for the compensation of losses, hold loads at 0 Hz or maintain the magnetization

Defines boost level in [%] relative to P0305 (rated motor current) applicable to both linear and quadratic V/f curves according to the diagram below:





where voltage values are given

$$V_{ConBoost,100} = P0305 \cdot P0350 \cdot \frac{P1310}{100}$$

$$V_{ConBoost,50} = \frac{V_{ConBoost,100}}{2}$$

Note:

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

The boost values are combined when continuous boost (P1310) used in conjunction with other boost parameters (acceleration boost P1311 and starting boost P1312).

However priorities are allocated to these parameters as follows:
P1310 > P1311 > P1312

The total boost is limited by following equation:

$$\sum V_{Boost} \leq 3 \cdot R_s \cdot I_{Mot} = 3 \cdot P0305 \cdot P0350$$

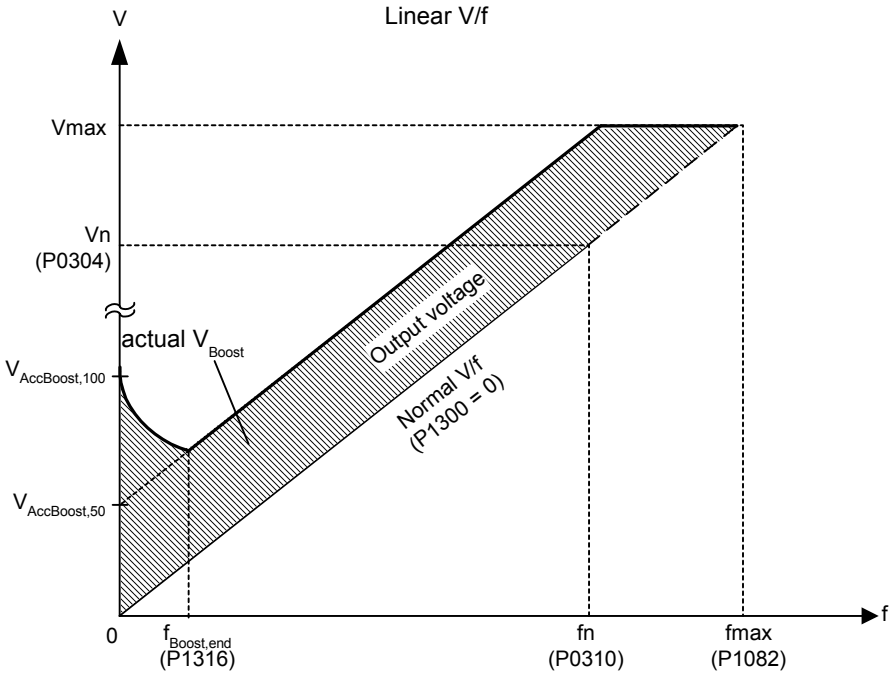
Setting in P0640 (motor overload factor [%]) limits the boost:

$$\frac{\sum V_{Boost}}{P0305 \cdot P0350} \leq \frac{P0640}{100}$$

P1311	Acceleration boost				Min:	0.0	Level
	CStat: CUT	Datatype: Float	Unit: %		Def:	0.0	3
	P-Group: CONTROL	Active: Immediately	QuickComm.: No		Max:	250.0	

P1311 will only produce boost during ramping, and is therefore useful for additional torque during acceleration and deceleration. 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, if the condition below is not violated.

Applies boost in [%] relative to P0305 (rated motor current) following a positive setpoint change and drops back out once the setpoint is reached.



where voltage values are given

$$V_{AccBoost,100} = P0305 \cdot P0350 \cdot \frac{P1311}{100}$$

$$V_{AccBoost,50} = \frac{V_{AccBoost,100}}{2}$$

Note:

See parameter P1310

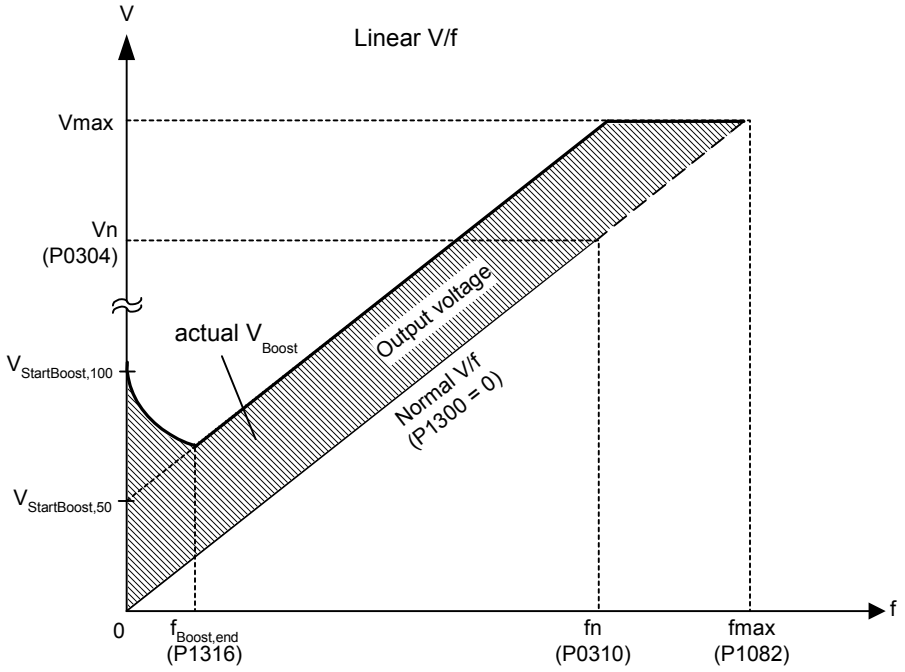
P1312 **Starting boost**

						Level
CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	0.0	**2**
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.:** No	**Def:**	0.0	
				Max:	250.0	

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

This is useful for starting loads with high inertia.

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



where voltage values are given

$$V_{StartBoost,100} = P0305 \cdot P0350 \cdot \frac{P1312}{100}$$

$$V_{StartBoost,50} = \frac{V_{StartBoost,100}}{2}$$

Example:
Setpoint = 50Hz. Ramping up with starting boost. During ramp up, setpoint changed to 20Hz. As soon as setpoint changed, starting boost removed because setpoint smaller than present ramp output.

Note:
See parameter P1310

P1316 **Boost end frequency**

						Level
CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	0.0	**3**
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.:** No	**Def:**	20.0	
				Max:	100.0	

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

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

The default frequency is defined as follows:

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

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

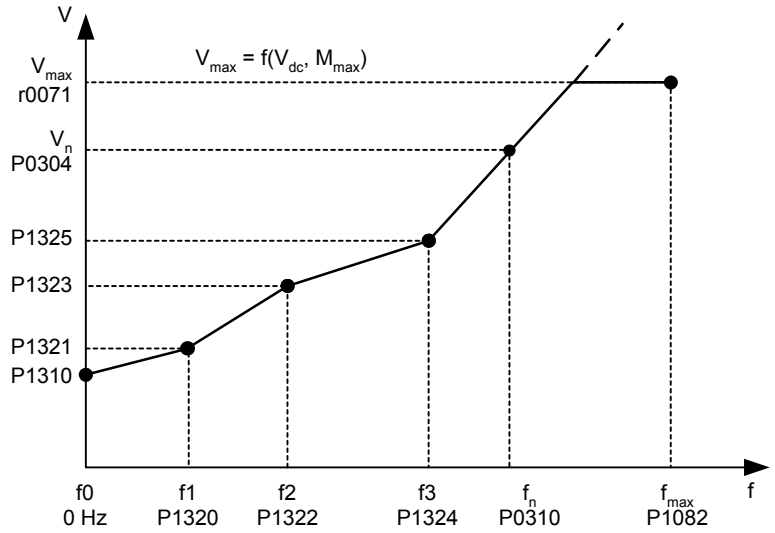
Default value is depending on inverter type and its rating data.

Details:
See diagram in P1310 (continuous boost).

P1320 **Programmable V/f freq. coord. 1** Level **3**

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

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



$$P1310[V] = \frac{P1310[\%]}{100[\%]} \cdot P0350 \cdot \sqrt{3} \cdot P0305$$

Dependency:

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

Note:

Linear interpolation will be applied between the individual data points.

V/f with programmable characteristic (P1300 = 3) has 3 programmable points. The two non-programmable points are:
- Continuous boost P1310 at zero 0 Hz
- Rated motor voltage P0304 at rated motor frequency P0310

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

P1321 **Programmable V/f volt. coord. 1** Level **3**

CStat:	CUT	**Datatype:** Float	**Unit:** V	**Min:**	0.0
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.:** No	**Def:**	0.0
				Max:	3000.0

See P1320 (programmable V/f freq. coord. 1).

P1322 **Programmable V/f freq. coord. 2** Level **3**

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

See P1320 (programmable V/f freq. coord. 1).

P1323 **Programmable V/f volt. coord. 2** Level **3**

CStat:	CUT	**Datatype:** Float	**Unit:** V	**Min:**	0.0
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.:** No	**Def:**	0.0
				Max:	3000.0

See P1320 (programmable V/f freq. coord. 1).

P1324 **Programmable V/f freq. coord. 3** Level **3**

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

See P1320 (programmable V/f freq. coord. 1).

P1325 **Programmable V/f volt. coord. 3** Level **3**

CStat:	CUT	**Datatype:** Float	**Unit:** V	**Min:**	0.0
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.:** No	**Def:**	0.0
				Max:	3000.0

See P1320 (programmable V/f freq. coord. 1).

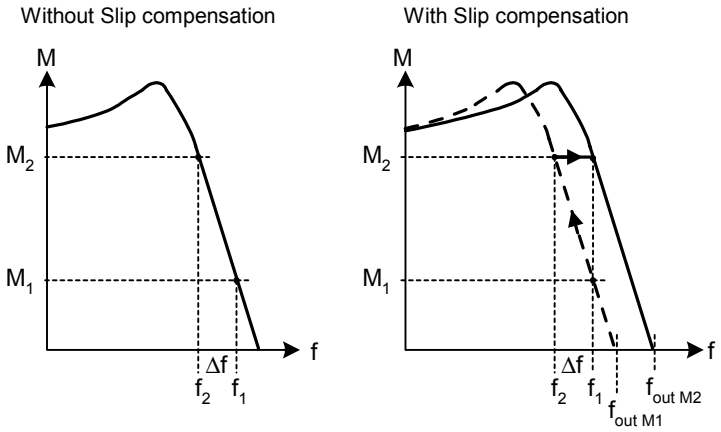
P1335 **Slip compensation** Level **3**

CStat:	CUT	**Datatype:** Float	**Unit:** %	**Min:**	0.0
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.:** No	**Def:**	0.0
				Max:	600.0

Dynamically adjusts output frequency of inverter so that motor speed is kept constant independent of motor load.

In the V/f-control, the motor speed will always be less than the command speed due to the slip speed. For a given speed command, the speed will drop as load is increased. The speed regulation of drive can be improved by the technique known as slip compensation.

Increasing the load from M1 to M2 (see diagram) will decrease the motor speed from f1 to f2, due to the slip. The inverter can compensate for this by increasing the output frequency slightly as the load increases. An increase of the output frequency from f_out_M1 to f_out_M2 will result in a motor speed at f1 for load M2. The inverter measures the current and increases the output frequency to compensate for the expected slip. P1335 can be used to enable and fine-tune the slip compensation.



Value:

P1335 = 0 % :
Slip compensation disabled.

P1335 = 50 % - 70 % :
Full slip compensation at cold motor (partial load).

P1335 = 100 % :
Full slip compensation at warm motor (full load).

Notice:

The applied value of the slip compensation (scaled by P1335) is limited by following equation:

$$f_{Slip\_comp\_max} = 2.5 \cdot r0330$$

P1340 **Imax controller prop. gain** Level **3**

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

Proportional gain of the I_max controller.

Dynamically controls the inverter if the output current exceeds the maximum motor current (r0067). It does this by first limiting the inverter output frequency (to a possible minimum of the nominal slip frequency). If this action does not successfully remove the overcurrent condition, the inverter output voltage is reduced. When the overcurrent condition has been removed successfully, frequency limiting is removed using the ramp-up time set in P1120.

P1800 **Pulse frequency** Level **3**

CStat:	CUT	**Datatype:** U16	**Unit:** kHz	**Min:**	2
P-Group:	INVERTER	**Active:** Immediately	**QuickComm.:** No	**Def:**	8
				Max:	16

Sets pulse frequency of power switches in inverter. The frequency can be changed in steps of 2 kHz.

Dependency:

Minimum pulse frequency depends on P1082 (maximum frequency) and P0310 (rated motor frequency).

The maximal frequency P1082 is limited to pulse frequency P1800 (see P1082).

Note:

If the pulse frequency is increased, max. inverter current r0209 can be reduced (derating). The derating characteristic depends on the type and power of the inverter (see manuall OPERATING INSTRUCTION).

If silent operation is not absolutely necessary, lower pulse frequencies may be selected to reduce inverter losses and radio-frequency emissions.

r1801 **CO: Act. pulse frequency** Level **3**

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

P-Group: INVERTER

Actual pulse frequency of power switches in inverter.

Notice:

Under certain conditions, the inverter changes the switching frequency from the value selected in P1800. At start-up, the pulse frequency is set to the minimum value; below an operating frequency of 2 Hz, the pulse frequency is halved.

P2000 **Reference frequency** Level **3**

CStat: CT **Datatype:** Float **Unit:** Hz **Min:** 1.00 **Def:** 50.00 **Max:** 650.00

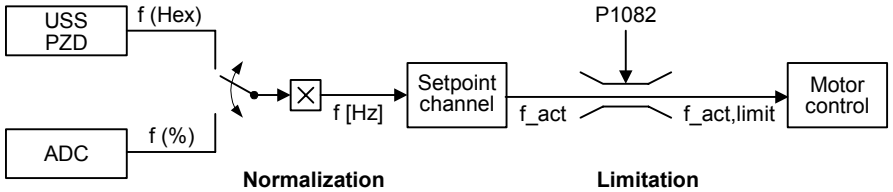
P-Group: COMM **Active:** first confirm **QuickComm.:** No

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

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

Example:

The signal of the analog input (ADC) is connected to the frequency setpoint (e.g. P1000 = 2). The actual percentage input value is cyclically converted into the absolute frequency setpoint (in Hz) via the reference frequency P2000.



$$f[Hz] = \frac{f(Hex)}{4000(Hex)} \cdot P2000 = \frac{f(\%)}{100\,\%} \cdot P2000 \qquad f\_act,limit = \min(P1082, f\_act)$$

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.

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

P2010 **USS baudrate** Level **3**

CStat: CUT **Datatype:** U16 **Unit:** - **Min:** 3 **Def:** 6 **Max:** 9

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

Sets baud rate for USS communication.

Possible Settings:

3 1200 baud
4 2400 baud
5 4800 baud
6 9600 baud
7 19200 baud
8 38400 baud
9 57600 baud

P2011 **USS address** Level **3**

CStat: CUT **Datatype:** U16 **Unit:** - **Min:** 0 **Def:** 0 **Max:** 31

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

Sets unique address for inverter.

Note:

You can connect up to a further 30 inverters via the serial link (i.e. 31 inverters in total) and control them with the USS serial bus protocol.

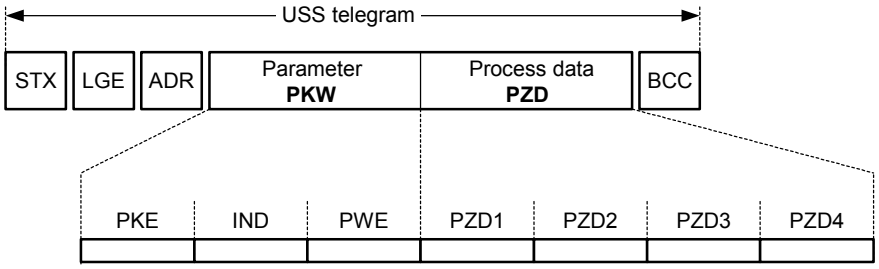
P2012	**USS PZD length**				**Min:** 0	Level
	CStat: CUT	**Datatype:** U16	**Unit:** -		**Def:** 2	**3**
	P-Group: COMM	**Active:** first confirm	**QuickComm.:** No		**Max:** 4	

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.

Notice:

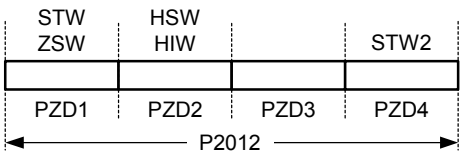
USS protocol consists of PZD and PKW which can be changed by the user via parameters P2012 and P2013 respectively.



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

PZD transmits a control word and setpoint or status word and actual values. The number of PZD-words in a USS-telegram are determined by parameter P2012, where the first two words are either:
a) control word and main setpoint or
b) status word and actual value.

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



STW	Control word	HSW	Main setpoint
ZSW	Status word	HIW	Main actual value
PZD	Process data		

P2013	USS PKW length				Min:	0	Level
	CStat: CUT	Datatype: U16	Unit: -		Def:	127	3
	P-Group: COMM	Active: first confirm	QuickComm.: No		Max:	127	

Defines the number of 16-bit words in PKW part of USS telegram. The PKW area can be varied. Depending on the particular requirement, 3-word, 4-word or variable word lengths can be parameterized. The PKW part of the USS telegram is used to read and write individual parameter values.

Possible Settings:

0 No words
3 3 words
4 4 words
127 Variable

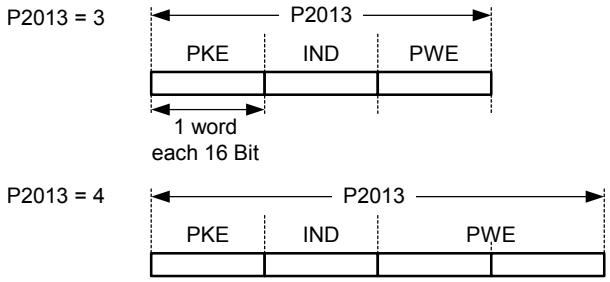
Example:

	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

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 0005	22BC 0000 0000 0005	22BC 0000 0005 0000
SINAMICS → Master	12BC 0000 0005	12BC 0000 0000 0005	12BC 0000 0005

P2014 **USS telegram off time** Level **3**

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

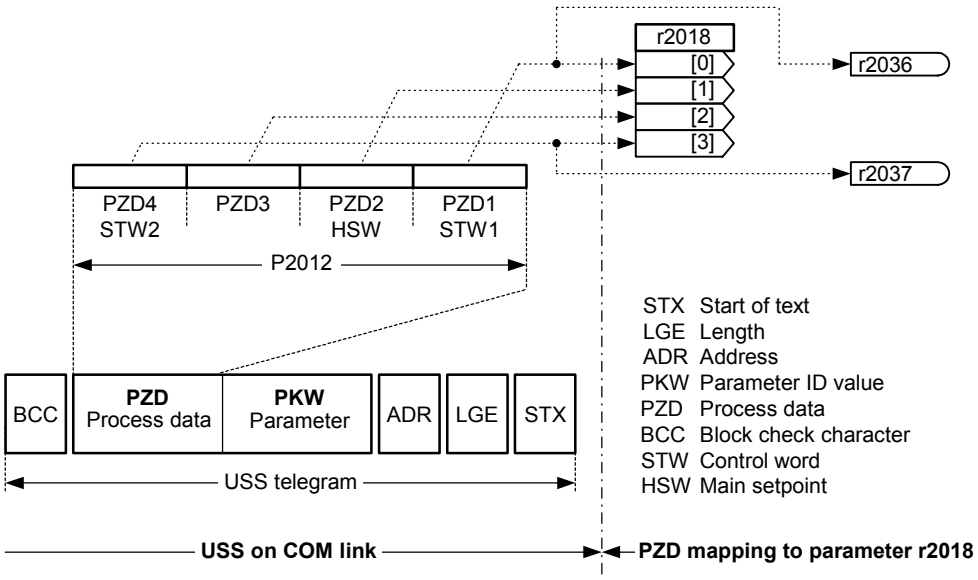
Defines a time T_off after which a fault will be generated (F0070) if no telegram is received via the USS channels.

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

r2018[4] **CO: PZD from USS** Level **3**

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

Displays process data received via USS interface.



Index:
r2018[0] : Received word 0
r2018[1] : Received word 1
r2018[2] : Received word 2
r2018[3] : Received word 3

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

r2024 **USS error-free telegrams** Level **3**

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

Displays number of error-free USS telegrams received.

r2025 **USS rejected telegrams** Level **3**

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

Displays number of USS telegrams rejected.

r2026 **USS character frame error** Level **3**

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

Displays number of USS character frame errors.

r2027 **USS overrun error** Level **3**

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

Displays number of USS telegrams with overrun error.

r2028 **USS parity error** Level **3**

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

Displays number of USS telegrams with parity error.

r2029 **USS start not identified** Level **3**

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

P-Group: COMM

Displays number of USS telegrams with unidentified start.

r2030 **USS BCC error** Level **3**

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

P-Group: COMM

Displays number of USS telegrams with BCC error.

r2031 **USS length error** Level **3**

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

P-Group: COMM

Displays number of USS telegrams with incorrect length.

r2036 **BO: CtrlWrd1 from USS** Level **3**

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

P-Group: COMM

Displays control word 1 from USS (i.e. word 1 within USS = PZD1).

Bitfields:

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

Dependency:

See parameter P2012

Note:

Sets control word r0054, if USS is selected as command source (see P0700).

To activate the bit Local/Remote we have to set parameter P0810.

Details:

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

r2037 **BO: CtrlWrd2 from USS** Level **3**

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

P-Group: COMM

Displays control word 2 from USS (i.e. word 4 within USS = PZD4).

Bitfields:

Bit00	Fixed frequency Bit 0	0	NO	1	YES
Bit01	Fixed frequency Bit 1	0	NO	1	YES
Bit02	Fixed frequency Bit 2	0	NO	1	YES
Bit09	Enable DC brake	0	NO	1	YES
Bit13	External fault 1	0	YES	1	NO

Dependency:

See parameter P2012

Note:

Sets control word r0055, if USS is selected as command source (see P0700).

To enable the external fault (r2037 Bit 13) facility via USS, the following parameters must be set:

- P2012 = 4
- P2106 = 1

Details:

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

P2106 **External fault via USS** Level **3**

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

External fault from USS Link (r2037 Bit13)

Possible Settings:

0 Disable
1 Enable

Dependency:

External fault from USS Link if PZD lenght is larger than 3 (P2012 > 3).

Note:

The source of external fault can be from digital input or from USS link.

r2110[4] **Warning number** Level **3**

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

Displays warning information.

A maximum of 2 active warnings (indices 0 and 1) and 2 historical warnings (indices 2 and 3) may be viewed.

Index:

r2110[0] : Recent Warnings --, warning 1
r2110[1] : Recent Warnings --, warning 2
r2110[2] : Recent Warnings -1, warning 3
r2110[3] : Recent Warnings -1, warning 4

Note:

The keypad will flash while a warning is active. The LED indicates the warning status in this case.

Notice:

Indices 0 and 1 are not stored.

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

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

Displays run time counter. It is the total time the drive has been powered up. When power goes value is saved, then restored on powerup.

The run time counter r2114 will be calculate as followed:
Multiply the value in r2114[0], by 65536 and then add it to the value in r2114[1]. The resultant answer will be in seconds. This means that r2114[0] is not days.

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

Index:

r2114[0] : System Time, Seconds, Upper Word
r2114[1] : System Time, Seconds, Lower Word

Example:

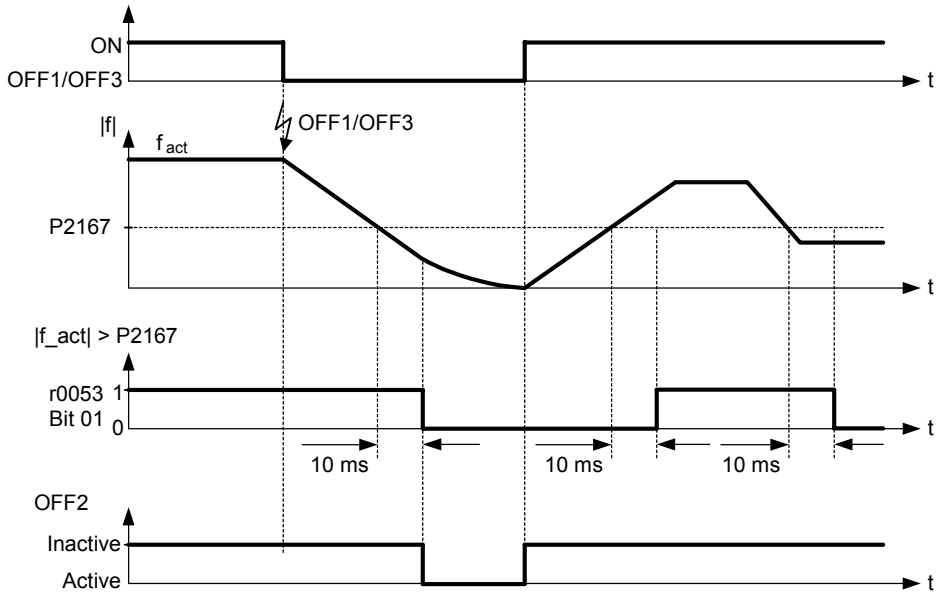
If r2114[0] = 1 & r2114[1] = 20864
We get 1 * 65536 + 20864 = 86400 seconds which equals 1 day.

P2167 **Switch-off frequency f_off** Level **3**

CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Min:**	0.00
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.:** No	**Def:**	1.00
				Max:	10.00

Defines the threshold of the monitoring function |f_act| > P2167 (f_off).

P2167 influences following functions:
- If the actual frequency falls below this threshold and the time delay has expired, bit 1 in status word 2 (r0053) is reset.
- If a OFF1 or OFF3 was applied and bit 1 is reset the inverter will disable the pulse (OFF2).



P3900 **End of quick commissioning** Level **1**

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

Performs calculations necessary for optimized motor operation.

After completion of calculation, P3900 and P0010 (parameter groups for commissioning) are automatically reset to their original value 0.

Possible Settings:

0 No quick commissioning
1 End quick commissioning with factory reset
2 End quick commissioning
3 End quick commissioning only for motor data

Dependency:

Changeable only when P0010 = 1 (quick commissioning)

Note:

P3900 = 1 :
When setting 1 is selected, only the parameter settings carried out via the commissioning menu "Quick commissioning", are retained; all other parameter changes, including the I/O settings, are lost. Motor calculations are also performed.

P3900 = 2 :
When setting 2 is selected, only those parameters, which depend on the parameters in the commissioning menu "Quick commissioning" (P0010 = 1) are calculated. The I/O settings are also reset to default and the motor calculations performed.

P3900 = 3 :
When setting 3 is selected, only the motor and controller calculations are performed. Exiting quick commissioning with this setting saves time (for example, if only motor rating plate data have been changed).

Calculates a variety of motor parameters, overwriting previous values including P2000 (reference frequency).

2 Faults and Alarms

2.1 Fault messages

In the event of a failure, the inverter switches off and a fault code appears on the display.

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

1. Cycle the power to the drive
2. Press the FN button on the BOP
3. Via Digital Input 3 (default setting)

Fault messages are stored in parameter r0947 under their code number (e.g. F0003 = 3). The associated error value is found in parameter r0949. The value 0 is entered if a fault has no error value.

F0001 Overcurrent STOP II

Quit
Reset fault memory / Stop

Cause
- Motor power (P0307) does not correspond to the inverter power (r0206)
- Motor lead short circuit
- Earth faults

Diagnosis & Remedy
Check the following:
- Motor power (P0307) must correspond to inverter power (r0206).
- Cable length limits must not be exceeded.
- Motor cable and motor must have no short-circuits or earth faults
- Motor parameters must match the motor in use
- Value of stator resistance (P0350) must be correct
- Motor must not be obstructed or overloaded
- Increase Ramp-up time (P1120)
- Reduce Starting boost level (P1312)

F0002 Overvoltage STOP II

Quit
Reset fault memory / Stop

Cause
- Main supply voltage too high
- Motor is in regenerative mode

NOTE
Regenerative mode can be caused by fast ramp downs or if the motor is driven by an active load.

Diagnosis & Remedy
Check the following:
- Supply voltage must lie within limits indicated on rating plate.
- Vdc controller must be enabled (P1240) and parameterized properly.
- Ramp-down time (P1121) must match inertia of load.
- Required braking power must lie within specified limits.

NOTE
Higher inertia requires longer ramp times.

F0003 Undervoltage STOP II

Quit
Reset fault memory / Stop

Cause
- Main supply failed.
- Shock load outside specified limits.

Diagnosis & Remedy
Check Supply voltage.

F0004 Inverter Over Temperature STOP II

Quit
Reset fault memory / Stop

Cause
- Inverter overloaded
- Ventilation inadequate
- Pulse frequency too high
- Ambient temperature too high

Diagnosis & Remedy
Check the following:
- Load or load duty cycle too high?
- Motor power (P0307) must match inverter power (r0206)
- Pulse frequency must be set to default value
- Ambient temperature too high?

F0005 Inverter I2T STOP II

Quit
Reset fault memory / Stop

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

Diagnosis & Remedy
Check the following:
- Load duty cycle must lie within specified limits.
- Motor power (P0307) must match inverter power (r0206)

F0011 Motor Over Temperature I2T STOP II

Quit
Reset fault memory / Stop

Cause
Motor overloaded

Diagnosis & Remedy
Check the following:
- Load or load duty cycle too high?
- Motor thermal time constant (P0611) must be correct
- Motor I2t warning level (P0614) must match

F0051 Parameter EEPROM Fault STOP II

Quit
Reset fault memory / Stop

Cause
Read or write failure while access to EEPROM.

Diagnosis & Remedy
- Factory Reset and new parameterization
- Change drive

F0052 Power Stack Fault STOP II

Quit
Reset fault memory / Stop

Cause
Read failure for power stack information or invalid data.

Diagnosis & Remedy
Change drive

F0055 BOP-EEPROM Fault STOP II

Quit
Reset fault memory / Stop

Cause
Read or write failure while saving non-volatile parameter to EEPROM on BOP whilst parameter cloning.

Diagnosis & Remedy
- Factory Reset and new parameterization
- Change BOP

F0056 BOP not fitted STOP II

Quit
Reset fault memory / Stop

Cause
Trying to initiate parameter cloning without BOP fitted.

Diagnosis & Remedy
Fit BOP and try again.

F0057 BOP fault STOP II

Quit
Reset fault memory / Stop

Cause
- Parameter cloning with empty BOP.
- Parameter cloning with invalid BOP.

Diagnosis & Remedy
Download to BOP or replace BOP.

F0058 BOP contents incompatible STOP II

Quit
Reset fault memory / Stop

Cause
Trying to initiate parameter cloning with BOP created on another type of drive.

Diagnosis & Remedy
Download to BOP from this type of drive.

F0060 Asic Timeout STOP II

Quit
Reset fault memory / Stop

Cause
Internal communications failure

Diagnosis & Remedy
- If fault persists, change inverter.
- Contact Service Department

F0072 USS Setpoint Fault STOP II

Quit
Reset fault memory / Stop

Cause
No setpoint values from USS during telegram off time

Diagnosis & Remedy
Check USS master

F0085 External Fault STOP II

Quit
Reset fault memory / Stop

Cause
External fault triggered via terminal inputs

Diagnosis & Remedy
Disable terminal input for fault trigger.

F0100 Watchdog Reset STOP II

Quit
Reset fault memory / Stop

Cause
Software Error

Diagnosis & Remedy
Contact Service Department

F0101 Stack Overflow STOP II

Quit
Reset fault memory / Stop

Cause
Software error or processor failure

Diagnosis & Remedy
Run self test routines

F0450 BIST Tests Failure STOP II

Quit
Reset fault memory / Stop

Cause
- Fault value r0949 = 1: Some power section tests have failed
- Fault value r0949 = 2: Some control board tests have failed
- Fault value r0949 = 4: Some functional tests have failed
- Fault value r0949 = 8: Some IO module tests have failed. (MM 420 only)
- Fault value r0949 = 16: Internal RAM failed on power-up check

Diagnosis & Remedy
- Drive may run but some features will not work properly.
- Replace drive.

2.2 Alarm Messages

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

NOTE

- Alarm messages are displayed as long as the alarm condition exists. If the alarm condition ceases, the alarm message will disappear.
- It is not possible to stop alarm messages.

A0501 Current Limit

Cause
- Motor power does not correspond to the inverter power
- Motor leads are too long
- Earth faults

Diagnosis & Remedy

Check the following:
- Motor power (P0307) must correspond to inverter power (r0206).
- Cable length limits must not be exceeded.
- Motor cable and motor must have no short-circuits or earth faults
- Motor parameters must match the motor in use
- Value of stator resistance (P0350) must be correct
- Motor must not be obstructed or overloaded
- Increase Ramp-up time (P1120)
- Reduce Starting boost level (P1312)

A0502 Overvoltage Limit

Cause

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

Diagnosis & Remedy

If this warning is displayed permanently, check drive input voltage.

A0503 Undervoltage Limit

Cause
- Main supply failed
- Main supply and consequently DC-link voltage (r0026) below specified limit.

Diagnosis & Remedy

Check main supply voltage.

A0505 Inverter I2T

Cause

Warning level exceeded, current will be reduced if parameterized (P0610 = 1)

Diagnosis & Remedy

Check that duty cycle lies within specified limits.

A0511 Motor Over Temperature I2T

Cause
- Motor overloaded.
- Load duty cycle too high.

Diagnosis & Remedy

Check the following:
- P0611 (motor I2t time constant) should be set to appropriate value
- P0614 (Motor I2t overload warning level) should be set to suitable level

A0600 RTOS Overrun Warning

Cause

Internal time slice overrun

Diagnosis & Remedy

Contact Service Department

A0910 Vdc-max Controller de-activated

Cause

Occurs
- if main supply voltage is permanently too high.
- if motor is driven by an active load, causing motor to goes into regenerative mode.
- at very high load inertias, when ramping down.

Diagnosis & Remedy

Check the following:
- Input voltage must lie within range.
- Load must be match.

A0911 Vdc-max Controller active

Cause

Vdc max controller is active; so ramp-down times will be increased automatically to keep DC-link voltage (r0026) within limits.

Diagnosis & Remedy

Check the following:
- Supply voltage must lie within limits indicated on rating plate.
- Ramp-down time (P1121) must match inertia of load.

NOTE

Higher inertia requires longer ramp times.

A0923 Both JOG Left and JOG Right are requested

Cause

Both JOG right and JOG left have been requested. This freezes the RFG output frequency at its current value.

Diagnosis & Remedy

Do not press JOG right and left simulutanously.

3 Appendix

3.1 List of Abbreviations

AC	Alternating current
AD	Analog digital converter
ADC	Analog digital converter
ADR	Address
AFM	Additional frequency modification
AG	Automation unit
AIN	Analog input
AOP	Advanced operator panel
AOUT	Analog output
ASP	Analog setpoint
ASVM	Asymmetric space vector modulation
BCC	Block check character
BCD	Binary-coded decimal code
BI	Binector input
BICO	Binector / connector
BO	Binector output
BOP	Basic operator panel
C	Commissioning
CB	Communication board
CCW	Counter-clockwise
CDS	Command data set
CI	Connector input
CM	Configuration management
CMD	Commando
CMM	Combimaster
CO	Connector output
CO/BO	Connector output / Binector output
COM	Common (terminal that is connected to NO or NC)
COM-Link	Communication link
CT	Commissining, ready to run
CT	Constant torque
CUT	Commissining, run, ready to run
CW	Clockwise
DA	Digital analog converter
DAC	Digital analog converter
DC	Direct current
DDS	Drive data set
DIN	Digital input
DIP	DIP switch
DOUT	Digital output
DS	Drive state
EEC	European Economic Community
EEPROM	Electrical erasable programmable read-only memory
ELCB	Earth leakage circuit breaker
EMC	Electro-magnetic compatibility
EMF	Electromotive force
EMI	Electro-magnetic interference
ESB	Equivalent circuit
FAQ	Frequently asked questions
FB	Function block
FCC	Flux current control
FCL	Fast current limit
FF	Fixed freqeuncy
FFB	Free function block
FOC	Field orientated control
FSA	Frame size A
GSG	Getting started guide
GUI ID	Global unique identifier
HIW	Main actual value
HSW	Main setpoint
HTL	High-threshold logic
I/O	Input and output
IBN	Commissioning
IGBT	Insulated gate bipolar transistor
IND	Sub-index
JOG	Jog
KIB	Kinetic buffering
LCD	Liguid crystal display
LED	Light emitting diode
LGE	Length
MHB	Motor holding brake
MM4	MICROMASTER 4th. Generation
MOP	Motor potentiometer
NC	Normally closed
NO	Normally open
OPI	Operating instructions
PDS	Power drive system
PID	PID controller (proportional, integral, derivative)
PKE	Parameter ID
PKW	Parameter ID value
PLC	Programmable logic controller
PLI	Parameter list
POT	Potentiometer
PPO	Parameter process data object
PTC	Positive temperature coefficient
PWE	Parameter value
PWM	Pulse-width modulation
PX	Power extension
PZD	Process data
QC	Quick commissioning
RAM	Random-access memory
RCCB	Residual current circuit breaker
RCD	Residual current device
RFG	Ramp function generator
RFI	Radio-frequency interference
RPM	Revolutions per minute
SCL	Scaling

SDP	Status display panel
SLVC	Sensorless vector control
STW	Control word
STX	Start of text
SVM	Space vector modulation
TTL	Transistor-transistor logic
USS	Universal serial interface
VC	Vector control
VT	Variable torque
ZSW	Status word
ZUSW	Additional setpoint

Suggestions and / or Corrections

To:	**Suggestions** **Corrections**
Siemens AG Automation & Drives SD SM Postfach 3269 D-91050 Erlangen Federal Republic of Germany Email: Suggestions for technical documentation	For Publication / Manual: **SINAMICS G110** **Parameter List** User Documentation
From Name: Company / Service Department Address: _____ _____ Phone: _____ / _____ Phone: _____ / _____	Order number: 6SL3298-0BA11-0BP0 Date of Issue: 04/03 Should you come across any printing errors when reading this publication, please notify us on this sheet. Suggestions for improvement are also welcome.

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