SIEMENS

SIMOVERT MASTER DRIVES
Frequency Control (FC)

Operating Instructions
Part 2

Edition: AA

Order-No.: 6SE7087-6XX10

Overview of the MASTER DRIVES Operating Instructions:

Operating Instructions	consists of	
	Part 1	**Part 2**
6SE708_-_AD10	6SE708_-_AD70	6SE708_-_XX10
6SE708_-_AD20	6SE708_-_AD70	6SE708_-_XX20
6SE708_-_AD30	6SE708_-_AD70	6SE708_-_XX30
6SE708_-_BD10	6SE708_-_BD70	6SE708_-_XX10
6SE708_-_BD20	6SE708_-_BD70	6SE708_-_XX20
6SE708_-_BD30	6SE708_-_BD70	6SE708_-_XX30
6SE708_-_AH10	6SE708_-_AH70	6SE708_-_XX10
6SE708_-_AH20	6SE708_-_AH70	6SE708_-_XX20
6SE708_-_AH30	6SE708_-_AH70	6SE708_-_XX30
6SE708_-_BH10	6SE708_-_BH70	6SE708_-_XX10
6SE708_-_BH20	6SE708_-_BH70	6SE708_-_XX20
6SE708_-_BH30	6SE708_-_BH70	6SE708_-_XX30
6SE708_-_BM20	6SE708_-_BM70	6SE708_-_XX20

→ You will receive Parts 1 and 2 of the Operating Instructions when you use this Order No. Parts 1 and 2 can be individually ordered by specifying the particular Order No.

_-_ stands for the language code, e.g. 0-0 for German Editions.

The following foreign language Editions of these Operating Instructions are available:

Language	English	French	Spanish	Italian
Language code	7-6	7-7	7-8	7-2

These Operating Instructions are valid for software release V1.3.

Contents

Definitions

- QUALIFIED PERSONAL

  For the purpose of these instructions and product labels, a "Qualified person" is someone who is familiar with the installation, mounting, start-up and operation of the equipment and the hazards involved. He or she must have the following qualifications:

  1. Trained and authorized to energize, de-energize, clear, ground and tag circuits and equipment in accordance with established safety procedures.
  2. Trained in the proper care and use of protective equipment in accordance with established safety procedures.
  3. Trained in rendering first aid.

- DANGER

  For the purpose of these instructions and product labels, "Danger" indicates death, severe personal injury or substantial property damage will result if proper precautions are not taken.

- WARNING

  For the purpose of these instructions and product labels, "Warning" indicates death, severe personal injury or property damage can result if proper precautions are not taken.

- CAUTION

  For the purpose of these instructions and product labels, "Caution" indicates that minor personal injury or material damage can result if proper precautions are not taken.

- NOTE

  For the purpose of these instructions, "Note" indicates information about the product or the respective part of the Instruction Manual which is essential to highlight.

NOTE
These instructions do not purport to cover all details or variations in equipment, nor to provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to the local Siemens sales office. The contents of this Instruction Manual shall not become part of or modify any prior or existing agreement, committment or relationship. The sales contract contains the entire obligation of Siemens. The warranty contained in the contract between the parties is the sole warranty of Siemens. Any statements contained herein do not create new warranties or modify the existing warranty.

CAUTION

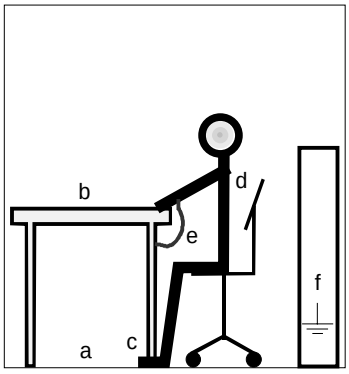
Components which can be destroyed by electrostatic discharge (ESD)

The converters contain components which can be destroyed by electrostatic discharge. These components can be easily destroyed if not carefully handled. If you have to handle electronic boards please observe the following:

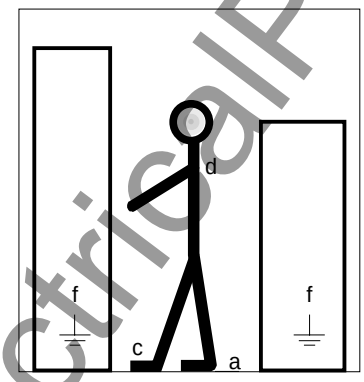
- Electronic boards should only be touched when absolutely necessary.
- The human body must be electrically discharged before touching an electronic board
- Boards must not come into contact with highly insulating materials - e.g. plastic foils, insulated desktops, articles of clothing manufactured from man-made fibers
- Boards must only be placed on conductive surfaces
- When soldering, the soldering iron tip must be grounded
- Boards and components should only be stored and transported in conductive packaging (e.g. metalized plastic boxes, metal containers)
- If the packing material is not conductive, the boards must be wrapped with a conductive packaging material, e.g. conductive foam rubber or household aluminum foil.

The necessary ECB protective measures are clearly shown in the following diagram:

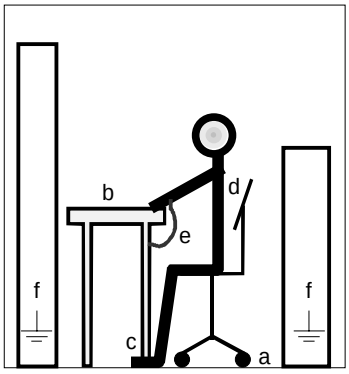
a	=	Conductive floor surface	d	=	ESD overall
b	=	ESD table	e	=	ESD chain
c	=	ESD shoes	f	=	Cubicle ground connection



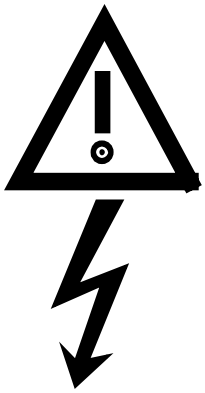
Sitting



Standing



Standing / Siting



WARNING

Hazardous voltages are present in this electrical equipment during operation.

Non-observance of the safety instructions can result in severe personal injury or property damage.

Only qualified personnel should work on or around the equipment after first becoming thoroughly familiar with all warning and safety notices and maintenance procedures contained herein.

The successful and safe operation of this equipment is dependent on proper handling, installation, operation and maintenance.

Safety and operating instructions for drive converters

Safety and operating instructions for drive converters

(in conformity with the low-voltage directive 73/23/EEC)

1. General

In operation, drive converters, depending on their degree of protection, may have live, uninsulated, and possibly also moving or rotating parts, as well as hot surfaces.

In case of inadmissible removal of the required covers, of improper use, wrong installation or maloperation, there is the danger of serious personal injury and damage to property.

For further information, see documentation.

All operations serving transport, installation and commissioning as well as maintenance are to be carried out **by skilled technical personnel** (Observe IEC 364 or CENELEC HD 384 or DIN VDE 0100 and IEC 664 or DIN/VDE 0110 and national accident prevention rules!).

For the purposes of these basic safety instructions, "skilled technical personnel" means persons who are familiar with the installation, mounting, commissioning and operation of the product and have the qualifications needed for the performance of their functions.

2. Intended use

Drive converters are components designed for inclusion in electrical installations or machinery.

In case of installation in machinery, commissioning of the drive converter (i.e. the starting of normal operation) is prohibited until the machinery has been proved to conform to the provisions of the directive 89/392/EEC (Machinery Safety Directive - MSD). Account is to be taken of EN 60204.

Commissioning (i.e. the starting of normal opertion) is admissible only where conformity with the EMC directive (89/336/EEC) has been established.

The drive converters meet the requirements of the low-voltage directive 73/23/EEC. They are subject to the harmonized standards of the series prEN 50178/DIN VDE 0160 in conjunction with EN 60439-1/ VDE 0660, part 500, and EN 60146/ VDE 0558.

The technical data as well as information concerning the supply conditions shall be taken from the rating plate and from the documentation and shall be strictly observed.

3. Transport, storage

The instructions for transport, storage and proper use shall be complied with.

The climatic conditions shall be in conformity with prEN 50178.

4. Installation

The installation and cooling of the appliances shall be in accordance with the specifications in the pertinent documentation.

The drive converters shall be protected against excessive strains. In particular, no components must be bent or isolating distances altered in the course of transportation or handling. No contact shall be made with electronic components and contacts.

Drive converters contain electrostatic sensitive components which are liable to damage through improper use. Electric components must not be mechanically damaged or destroyed (potential health risks).

5. Electrical connection

When working on live drive converters, the applicable national accident prevention rules (e.g. VBG 4) must be complied with.

The electrical installation shall be carried out in accordance with the relevant requirements (e.g. cross-sectional areas of conductors, fusing, PE connection). For further information, see documentation.

Instructions for the installation in accordance with EMC requirements, like screening, earthing, location of filters and wiring, are contained in the drive converter documentation. They must always be complied with, also for drive converters bearing a CE marking. Observance of the limit values required by EMC law is the responsibility of the manufacturer of the installation or machine.

6. Operation

Installations which include drive converters shall be equipped with additional control and protective devices in accordance with the relevant applicable safety requirements, e.g. Act respecting technical equipment, accident prevention rules etc. Changes to the drive converters by means of the operating software are admissible.

After disconnection of the drive converter from the voltage supply, live appliance parts and power terminals must not be touched immediately because of possibly energized capacitors. In this respect, the corresponding signs and markings on the drive converter must be respected.

During operation, all covers and doors shall be kept closed.

7. Maintenance and servicing

The manufacturer's documentation shall be followed.

Keep safety instructions in a safe place!

1 Control terminal strip and serial interface

WARNING

The unit must be disconnected and locked-out before control cables are connected to the CU.

The unit can be controlled via the following interfaces:

- Control terminal strip -X101 and -X102 on the electronics board CU
- RS485 serial interface (SST1); control terminal strip -X100 on the electronics board CU
- OP operator control panel (Chapter "Options" in the Operating Instructions, Part 1)
- RS485 and RS232 serial interfaces (SST1) on the PMU -X300
- RS485 (SST2) serial interfaces; control terminal strip -X100 on the electronics board CU.

CAUTION

The CU board contains components which can be destroyed by electrostatic discharge. These components can be very easily destroyed if not handled with caution.

Also refer to the ECB cautionary measures in the Section, General Information.

1.1 Connectors for the control terminal strip

The connectors for the control terminal strip are supplied (loose) with the unit. Cables with cross-sections from 0.14 mm^2 to 1.5 mm^2 (AWG: 26 to 16), or 1 mm^2 (AWG: 18) can be connected using stranded wire with lugs at the connector (recommended: 0.5 mm^2 (AWG: 20)). The connectors can be identified using the pin numbers (Table 1.1); the connector position on the board is illustrated in Fig. 1.1. Two screen clamps and four cable ties are required from the loose components supplied to connect the control cables.

The remaining connector X9, included loose with the equipment, is required to control a main contactor and for connecting an external power supply (Section „Auxiliary power supply/main contactor“ in the Operating Instructions, Part 1).

Connector		**Labeling**								
X100	eight-pin, coded	1	2	3	CU1	6	7	8		
X101	eight-pin, coded	13	14	15	CU1	18	19	20		
X102	ten-pin	25	26	27	28	CU1	31	32	33	34

Table 1.1 Connectors for the control terminal strip are supplied loose

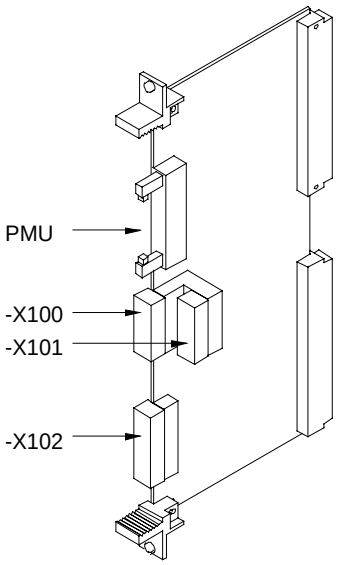


Fig. 1.1 Control terminals on CU

1.1.1 Connecting-up the control cables

NOTE
As a general rule, it is recommended that shielded control wiring be used for signals connected directly to the chassis, in order to achieve maximum noise immunity. The shield must be grounded at both ends. To avoid noise coupling, control wires which are directly connected to the chassis should be separated from power wiring by a minimum distance of 20 cm. For drives wired in approved factories, internal wiring practices which achieve acceptable noise immunity results may be used for drive connections. Control- and cables must cross each other at an angle of 90°.

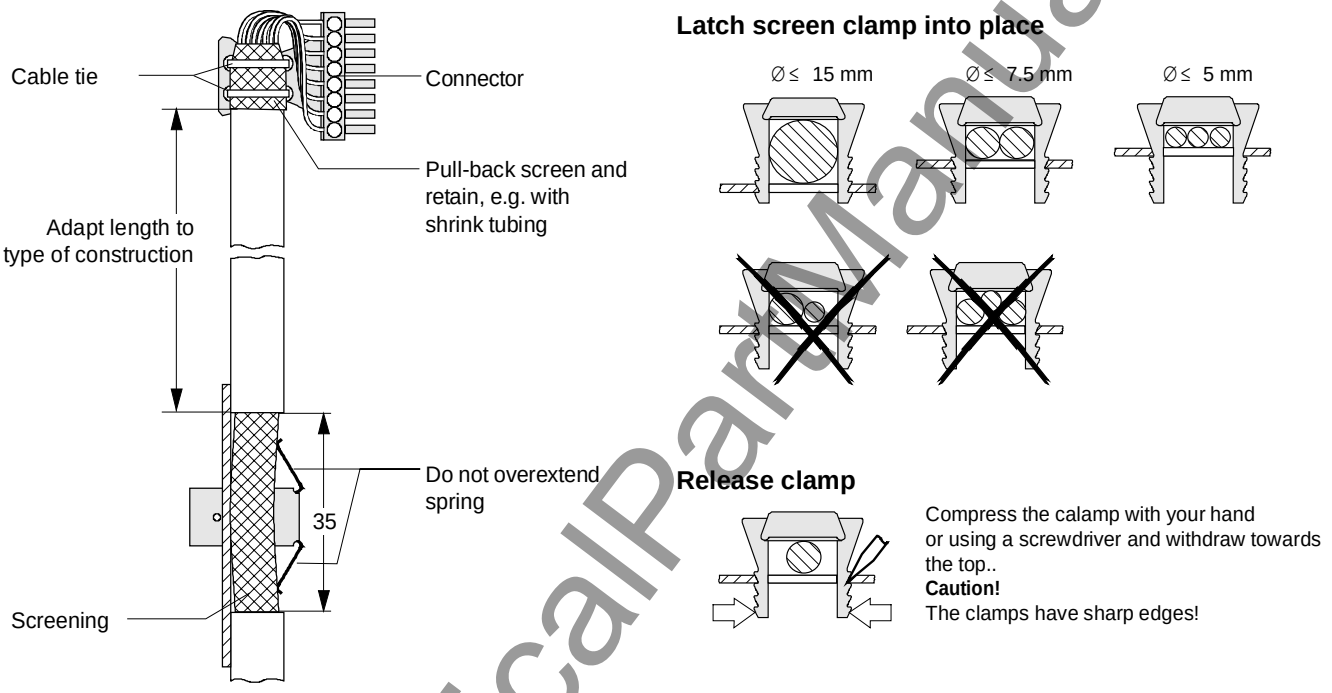


Fig. 1.2 Connecting-up the control cables and the technique for using the screen clamps

The "EMC screened housing" option should be used if so many control cables are required that two screen clamps are not sufficient.

Order No.:

- Type A 6SE7090-0XA87-3CA0
- Type B 6SE7090-0XB87-3CA0
- Type C 6SE7090-0XC87-3CA0
- Type D 6SE7090-0XD87-3CA0

1.2 Terminal connection

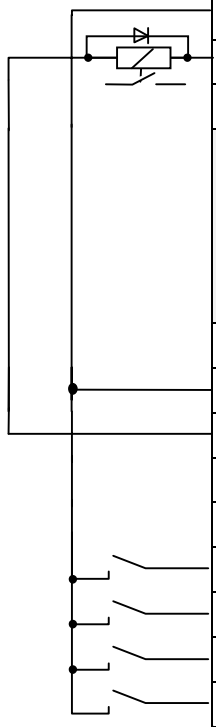
Connecting example	Term.	Function, notes
	-X100	
	1	Transmit- and receive line -RS485, differential input / -output, positive (RS485R/T+)
	2	Transmit- and receive line -RS485, differential input / -output, negative (RS485R/T–)
	3	Transmit output RS485 Standard, differential output, positive (RS485T+)
	4	Transmit output RS485 Standard, differential output, negative (RS485T–)
	5	Reference potential, RS485 interface
	NOTE	The interface at connector -X100 is available again in the -X300 parameterizing unit. Only one of the two interfaces may be used, ☞ Chapter 4 „Start-up“).
	NOTE	Binary output 1 is connected at -X9:4,5 main contactor control
	6	Binary output 2 (changeover contact) reference contact
	7	Binary output 2 (changeover contact) NO contact
	8	Binary output 2 (changeover contact) NC contact
	NOTE	Load capability of the binary outputs: 60 V AC, 60 VA, cosφ = 1 60 V AC, 16 VA, cosφ = 0.4 60 V DC, 24 W Inductive loads, e.g. contactors, relays, for DC voltage loads, must be damped using a diode or varistor, and for AC loads, with a varistor or RC element.
	-X101	
	13	+24 V, 150 mA for binary inputs and outputs
	14	Ref. potential for 24 V (ground)
	15	Ref. potential for binary inputs 1 to 5 for ext. signal voltage
	16	Binary input 1
	17	Binary input 2
	18	Binary input 3
	19	Binary input 4
	20	Binary input 5
	NOTE	Signal sensitivity of the binary inputs: H = 24 V (13 V to 33 V) L = 0 V (–0.6 V to 3 V) I_{max} = 15.7 mA

Table 1.2 Connecting example for control terminal strips -X100 and -X101

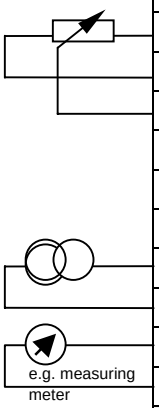
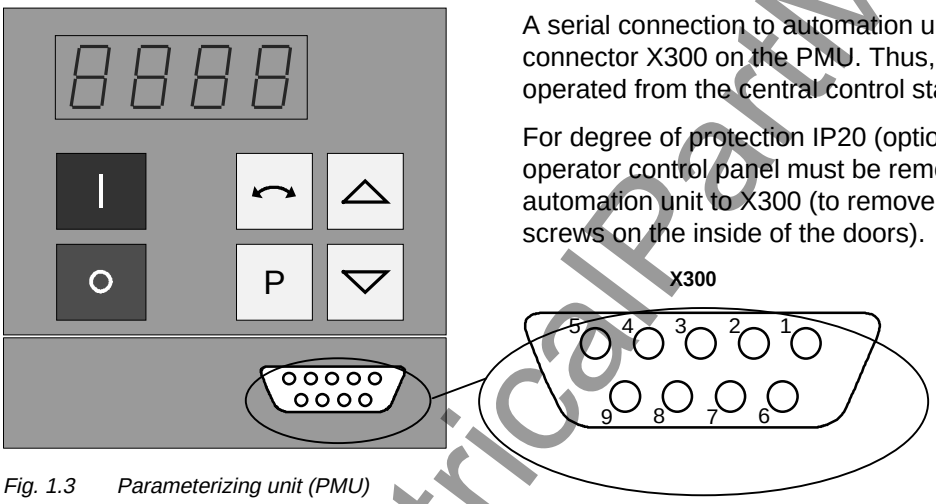
Connecting example	Term.	Function, notes
	-X102	
	25	+10 V / 5 mA, ±2 %, for setpoint pot., non-floating
	26	–10 V / 5 mA, ± 2%, for setpoint pot., non-floating
	27 **1)**	Analog input 1 (0 V to ±10 V)
	28	Ref. potential, analog input 1
	29 1)	Analog input 1 (0 mA to 20 mA or. 4 mA to 20 mA) int. load resistor 250 Ω
	30 2)	Analog input 2 (0 V to ±10 V)
	31	Ref. potential, analog input 2
	32 2)	Analog input 2 (0 mA to 20 mA or 4 mA to 20 mA) int. load resistor 250 Ω
	33	Ref. potential, analog output 1
	34	Analog output 1 (0 V to 10 V) permissible load ≤ 5 mA ≙ > 2 kΩ
	NOTE	Terminals 33 and 34: To increase the noise immunity of the signals, an isolating amplifier should be connected between the analog output and measuring unit for cables > 4 m.

Table 1.3 Connecting-up example for the control terminal strip -X102

1.2.1 Connecting-up the parameterizing unit (PMU)



A serial connection to automation unit or a PC can be realized via connector X300 on the PMU. Thus, the unit can be controlled and operated from the central control station or control room.

For degree of protection IP20 (option), there is no PMU. The OP1 operator control panel must be removed to connect a PC or an automation unit to X300 (to remove OP1, release the 2 mounting screws on the inside of the doors).

Fig. 1.3 Parameterizing unit (PMU)

PMU -X300	Description
1	Not assigned
2	Receive line, RS232 standard (V.24)
3	Transmit- and receive line, RS485, two-wire, positive differential input/output
4	RTS (request to send)
5	Ref. potential (ground)
6	5 V power supply for OP
7	Transmit line, RS232 standard (V.24)
8	Transmit- and receive line RS485, two-wire, negative differential input/output
9	Ref. potential for RS232- or RS485 interface (EMC suppressed).

Table 1.4 Connector assignment for interface -X300

1) Only one of the two terminals, 27 or 29, may be assigned
2) Only one of the two terminals, 30 or 32, may be assigned

1.3 Measures to maintain the radio interference suppression regulations

The drives must be installed and mounted according to the „Installation Instructions for EMC-correct installation and mounting of drives“ (Order No. 6SE7087-6CX87-8CE0).

The limit values for industrial environments can be maintained without radio interference suppression filter. B1 radio interference suppression filters must be used for environments other than industrial environments.

The following points must be observed regarding radio interference suppression regulations:

- **Grounding**

  Converters generate radio interference noise. This noise should be fed back to the source through the lowest possible ohmic connection (ground connection cross-section ≥ supply connection cross-section).

  Use the best grounding possibility (e.g. mounting panel, grounding cable, grounding bar) when installing converters and optional radio interference suppression filters. Connect all connector housings together through the largest possible surface area.

  For radio interference suppression, the cross-section (observe the safety regulations under fault conditions), is not so important, but the contact surface, as high-frequency noise currents do not flow through the complete cross-section, but essentially on the outside surface of a conductor (skin effect).

- **Screening**

  In order to reduce noise and maintain the radio interference suppression level, the following should be maintained

  - screened cables should be used between the converter output and motor
  - screen control cables must be used.
  - route control- and power cables separately; min. clearance, 20 cm.

  The screen must be connected to ground potential at both ends.

- Control cables and power cables may only cross at an angle of 90 °.

- **Filter**

  The radio interference suppression filter must be connected directly in front of the rectifier- or rectifier and regenerative feedback unit. The housings must be connected electrically with one another.

2 Operator control

The converter can be controlled via:

- the PMU (Parameterization Unit)
- the control terminal strip on the CU (Chapter 1 „Control terminal strip“)
- the OP1 operator control panel (Chapter „Options“ in the Operating Instructions, Part 1)
- the RS485 and RS232 serial interface on PMU -X300

When the equipment is shipped, the drive converter is controlled and parameterized by the parameterizing unit (PMU) on the front side of the unit.

For option M20 (degree of protection IP20), the unit is controlled and parameterized via the OP1.

Operator control using the PMU is described in this section.

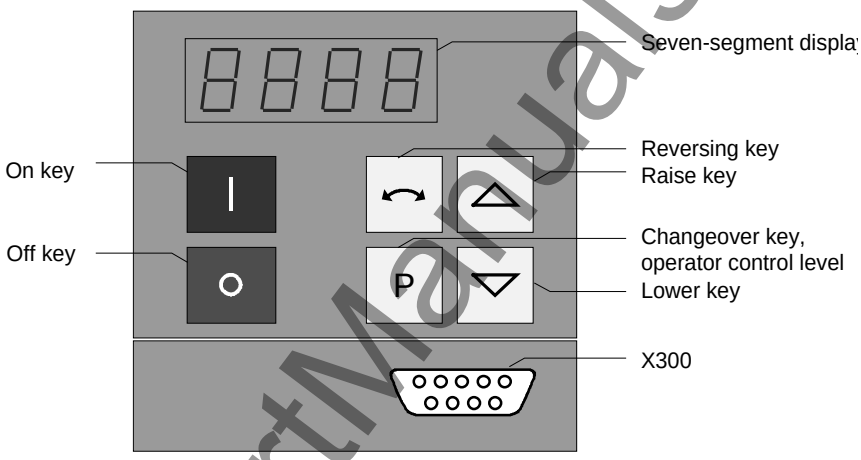


Fig. 2.1 Parameterization unit

2.1 Operator control elements

Operator control elements	Function
I	Converter switch on (standard). For faults: Return to the fault display. Command is effective when the key is released.
O	Converter shutdown depending on the parameterization of OFF1, OFF2 or OFF3 (P554 to P560). Command becomes effective when the key is released.
	Field reversal / reversing for the appropriate parameterization (P571 and P572). Command becomes effective when the key is released.
P	Changeover from parameter number to parameter value. In conjunction with other keys, additional functions (refer to Figs. 2.2 to 2.5). Command becomes effective when the key is released.
,	Values (raise, lower) change as long as the keys are depressed.
P + resp. P +	Depress P and hold, then depress the second key. The command becomes effective when the key is released (e.g. fast changeover).

Table 2.1 Function of the operator control elements on the PMU

2.2 Displays 8.8.8.8.

		Parameter number		Index	Parameter value
		Pos. actual value e.g	Neg. actual value e.g	e.g..	e.g.
Visualization parameters	**Basic converter**	r000	r.000	---	009
	Technology board	d000	d.000		
Setting parameters	**Basic converter**	P005	P.005	1 000	-2.08
	Technology board	H002	H.002		

Table 2.2 Displaying visualization- and setting parameters on the PMU

	Actual value	Parameter value not possible	Alarm	Fault
Display	-2.08	----	A022	F006

Table 2.3 Status display on the PMU

NOTE
The parameter description is provided in Chapter 11 „Parameter list“.

2.3 Structure

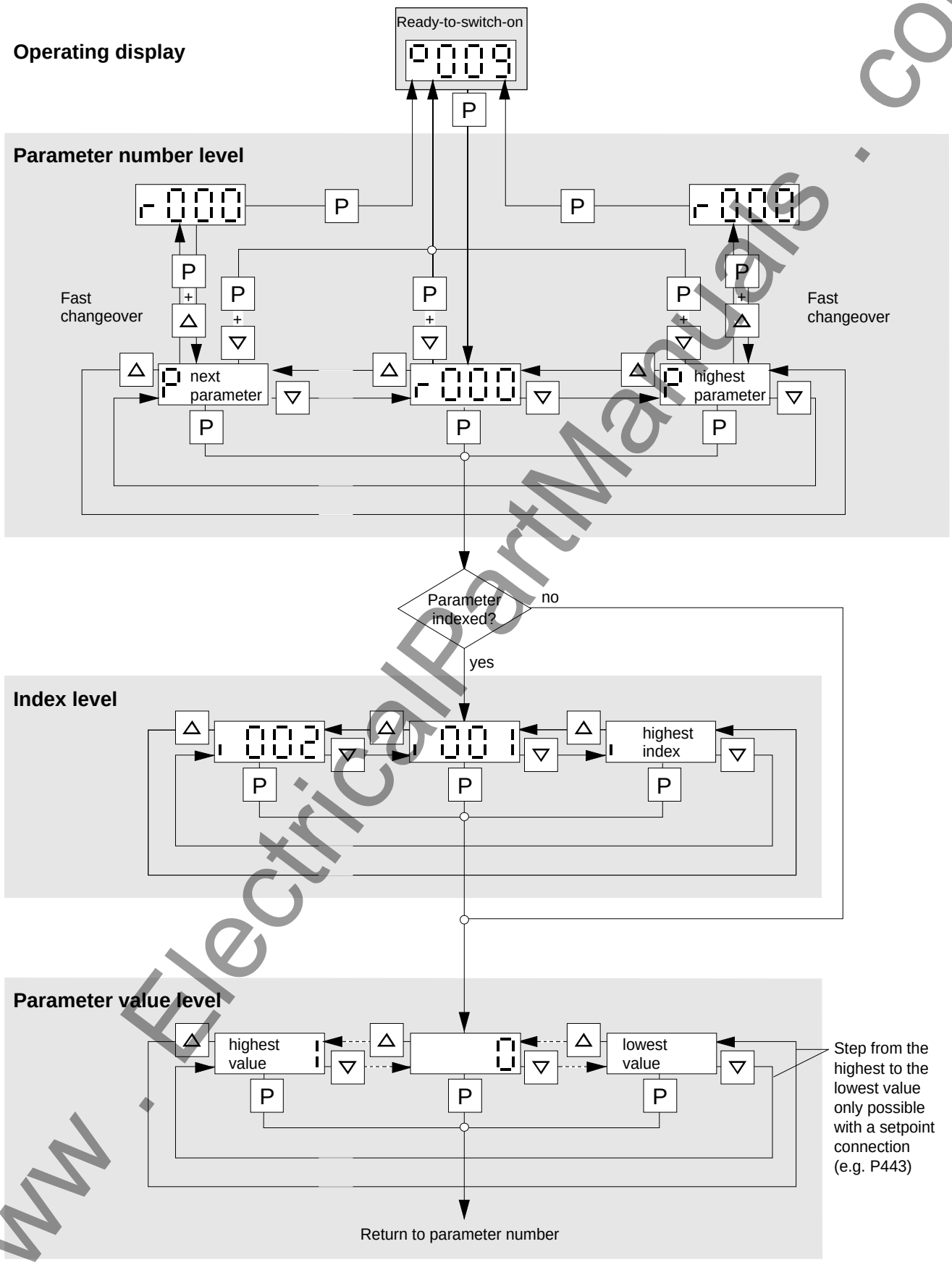
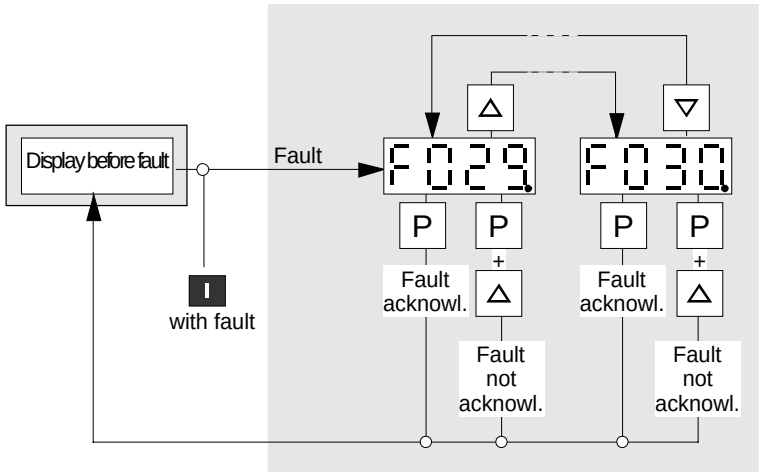


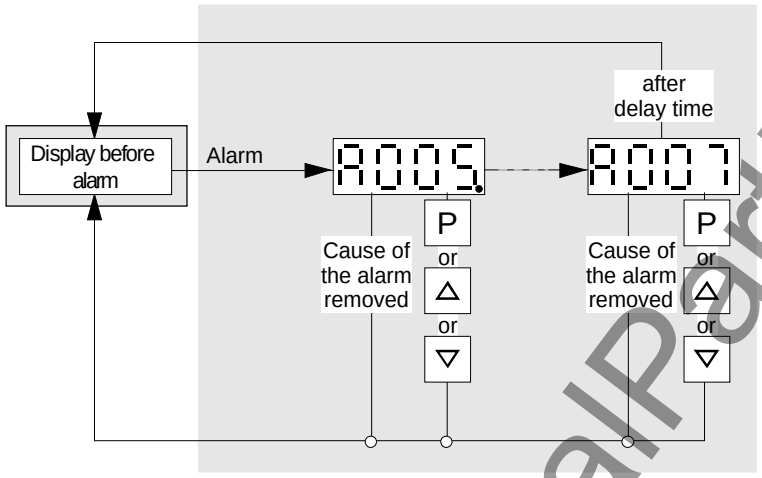
Fig. 2.2 Operator control structure using the PMU



If several fault exist, the particular fault can be selected using the △▽ keys.

P- + △ key: Jump into the parameterizing level, if, e.g., fault acknowledgement is not possible.

Fig. 2.3 Operator control structure of the PMU for faults

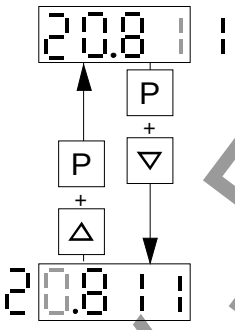


If several alarms are present, then display automatically switches to the higher alarm.

P- + △- or ▽ key: Jump into the parameterizing level independent of the alarms which are present

Fig. 2.4 Operator control structure of the PMU for alarms

If several faults or alarms exist, a point appears at the right in the display 8888.



The shift is only possible in the parameter value level.

Fig. 2.5 Shifting the PMU display for parameter values with more than 4 digits

3 General explanation of the terminology and functional scope of the unit

Abbreviations:

- Abbreviations used: ☞ Chapter 14 „Index and Abbreviations“

3.1 Converter open-loop/closed-loop control versions

- Open-loop control versions (also suitable for multi-motor drives):
  - V/f characteristic:
    Open-loop frequency control with constant voltage/frequency ratio, or a voltage/frequency ratio entered via a characteristic
  - V/f characteristic, for textile applications:
    as for the V/f characteristic, however certain functions where the frequency setpoint (☞ function diagrams) is inhibited for textile machine applications.
- Closed-loop control version:
  - V/f + closed-loop speed control (V/f characteristic with higher-level closed-loop speed control):
    In addition to the specified V/f characterstic, in order to achieve an especially high speed accuracy, the motor speed, measured using a tachometer, is fed to a higher-level speed controller.

Tip: For digital tachos and for certain analog tachos, option boards are required!

3.2 Process data

The following is understood under process data:

- **Setpoints** and **control commands**, which „directly“ influence the drive operating status,
- **Actual values** and **status messages**, which are „directly“ output from the drive.

„Directly“ means: Each process data change is realized immediately and without any acknowledgement - or handshake mechanisms.
Only then can fast process responses be achieved

Contrary to the process data, a parameter value change is subject to a specified mechanism, and consists of task and checkback signal.

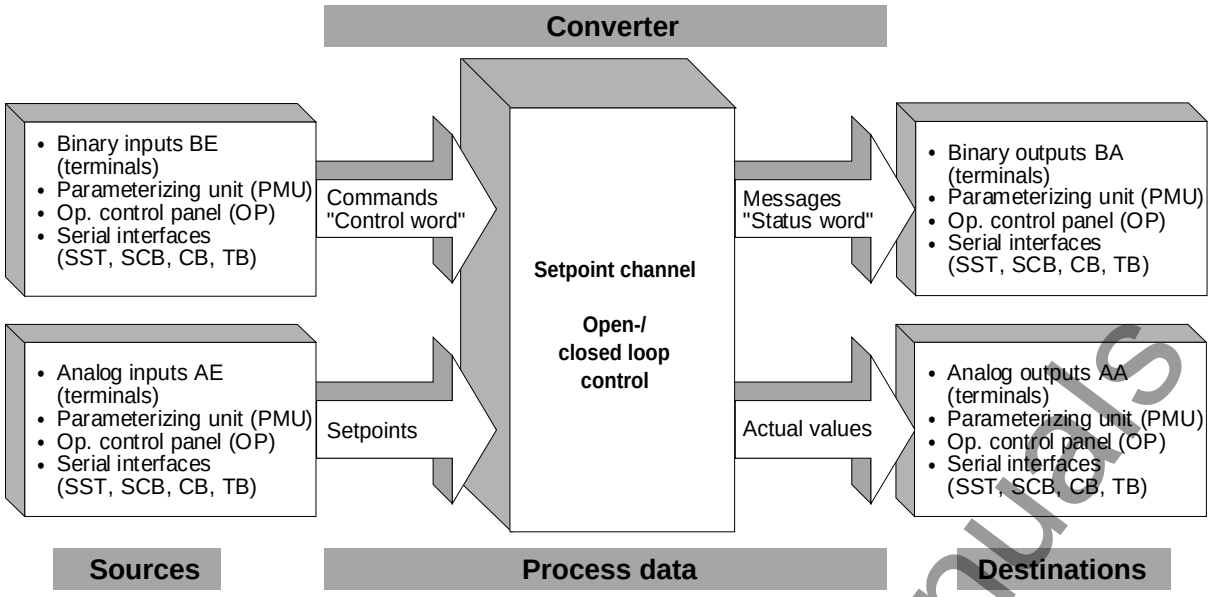


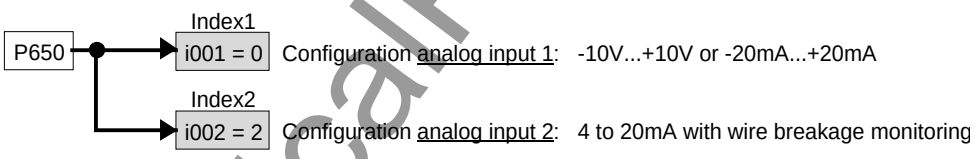
Fig. 3.1 Process data

3.3 Indexed parameters

Indexed parameters are sub-divided into various „indices“ (briefly: i001, i002, etc.), in which the particular parameter values can be entered.

The significance of the „indices“ of the particular parameter (parameter number) can be taken from the chapter 11 „Parameter list“.

Example:



3.4 Data sets

„Indexed“ parameters can be sub-divided according to data sets (indexed).

There are three kinds of data sets:

- SDS (setpoint channel data set) 1 and 2:
  2 setpoint channel data sets which can be changed over; e.g. for production-related different drive ramp-up and ramp-down times.
- Basic/reserve (basic- or reserve setting):
  e.g. for changing over between manual and automatic operation
- MDS (motor data set) 1 and 2:
  2 motor data sets which can be changed over; e.g. for operating different motor types from one converter.

The data sets are selected via the „control word“, and are read-out in r410, r012 and r152.

☞ Chapter 10 „Function diagrams“

4 Start-up

The drive converter must be ready. This means, that it must be installed and connected-up according to the information in the hardware description.

NOTE	
Forming:	If the drive converter was continuously shutdown for longer than a year, or not connected, then the DC link capacitors must be formed.

4.1 Capacitor forming

The DC link capacitors must be re-formed if the converter has been non-operational for more than one year. If the converter was started-up within one year after having been shipped (serial number on the rating plate), it is not necessary to re-form the DC link capacitors

For AC-AC, as well as for DC-AC drive converters, forming is realized by switching-in a rectifier and resistor, which are connected to the DC link (circuit configuration: refer to Figs. Fig. 4.2 and Fig. 4.3). The drive converter feed in this case must be shutdown (disconnected)!
A second possibility exists for DC-AC units. The DC busbar voltage is slowly increased up to the rated drive converter input voltage during the forming time.
The forming time is dependent on the time for which the drive converter stood. (refer to Fig. 4.1)

Position	Example	
1 and 2	A-	Manufacturing location
3	E F H	1994 1995 1996
4	1 to 9 O N D	January to September October November December
5 to 14		Not relevant for forming

Table 4.1 Serial number structure: A-E60147512345

	Recommended components		
	A	R	C
3AC 208 V to 415 V	SKD 50 / 12	220 Ω / 100 W	22 nF / 1600 V
DC 280 V to 310 V			
3AC 510 V to 620 V	SKD 62 / 16	470 Ω / 100 W	22 nF / 1600 V
DC 380 V to 460 V			
3AC 675 V to 930 V	SKD 62 / 18	680 Ω / 100 W	22 nF / 1600 V
DC 500 V to 690 V			

Table 4.2 Recommended components for circuits acc. to Fig. 4.2 and Fig. 4.3

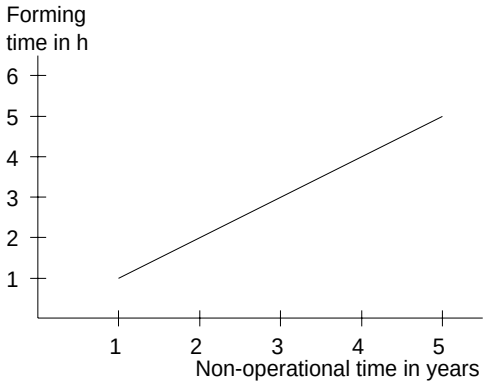


Fig. 4.1 Forming time as a function for the time which the converter was non-operational

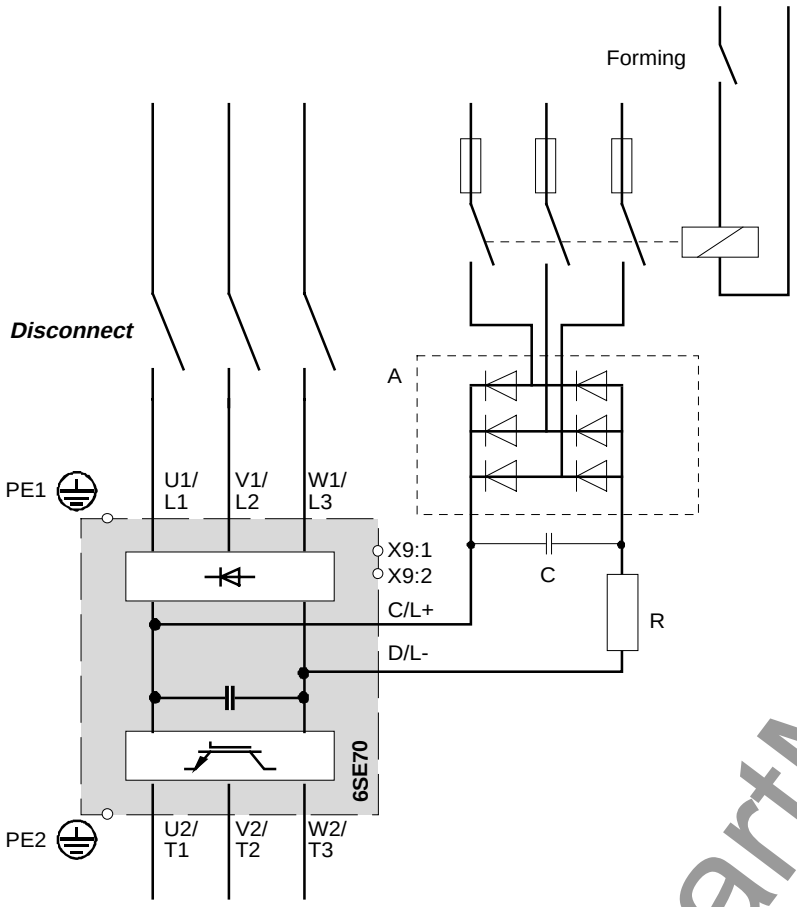


Fig. 4.2 Circuit to form AC-AC units

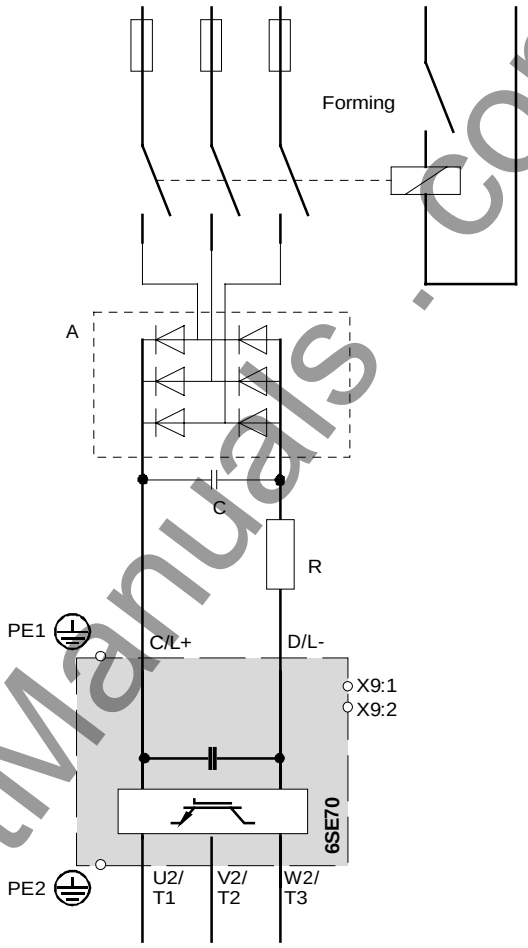


Fig. 4.3 Circuit to form DC-AC units

4.2 First start-up

The converter is supplied with the „Factory setting“ (☞ Chapter 11 „Parameter list“) and access stage 2 (standard mode). That means:

- The converter data correspond to the converter type, MLFB (Order No.) (converter initialized).
- A 50 Hz induction motor, adapted to the converter type, is parameterized, which is operated using the V/f control (open-loop).

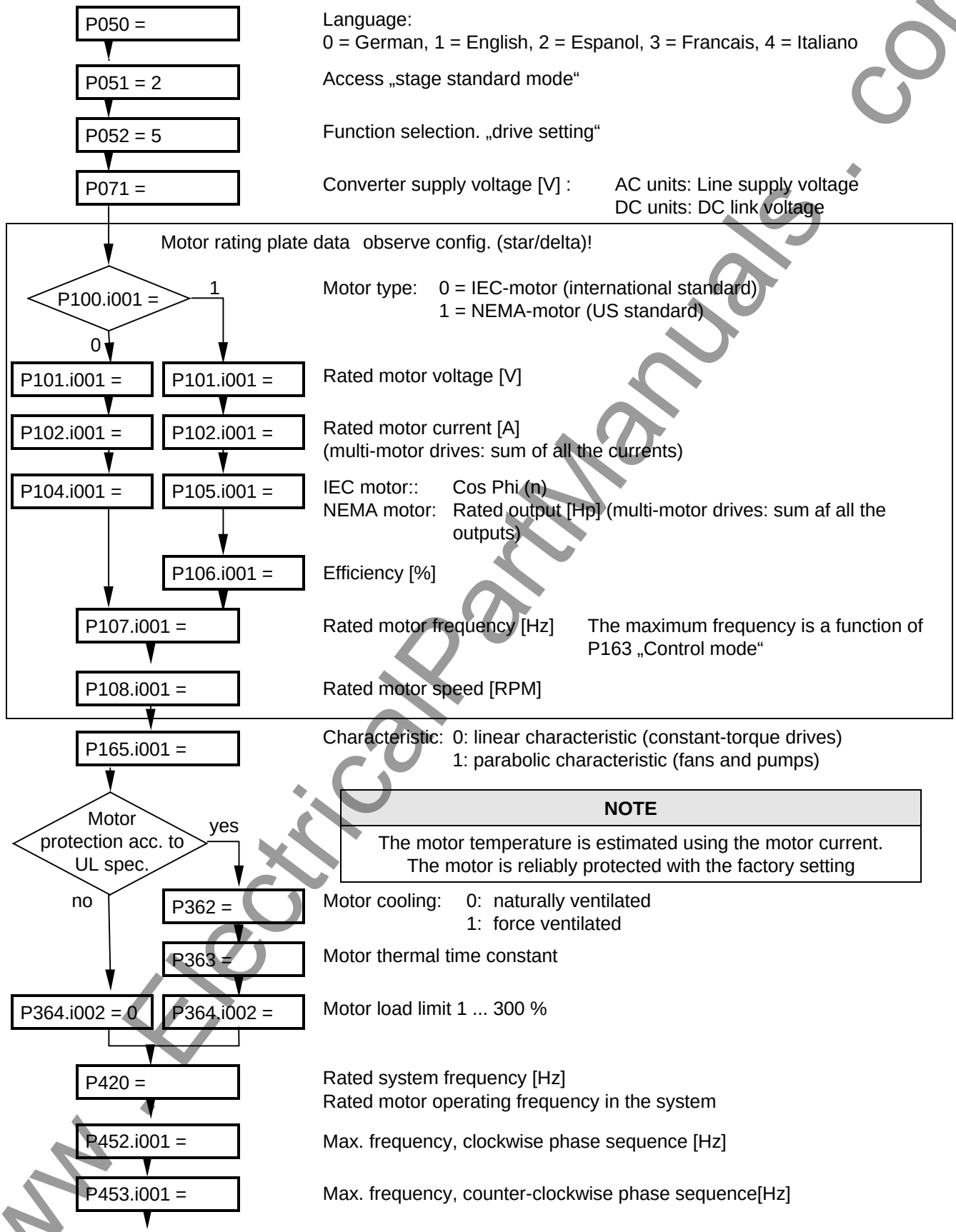
If the required converter functions are already realized with the factory setting, the converter can be immediately switched-on and operated. Further parameterization is not required.

Parameterization is realized according to the following sections:

4.2.1 As „**Standard application with V/f characteristic without hardware options**“ for simple applications.

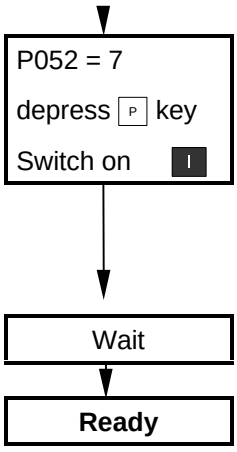
or **4.2.2** As **„Expert application**“ for sophisticated applications (e.g.: Closed-loop control, data set changeover, interface operation, etc.) of if hardware options are available.

4.2.1 Parameterization „Standard application“



NOTE

The motor temperature is estimated using the motor current. The motor is reliably protected with the factory setting



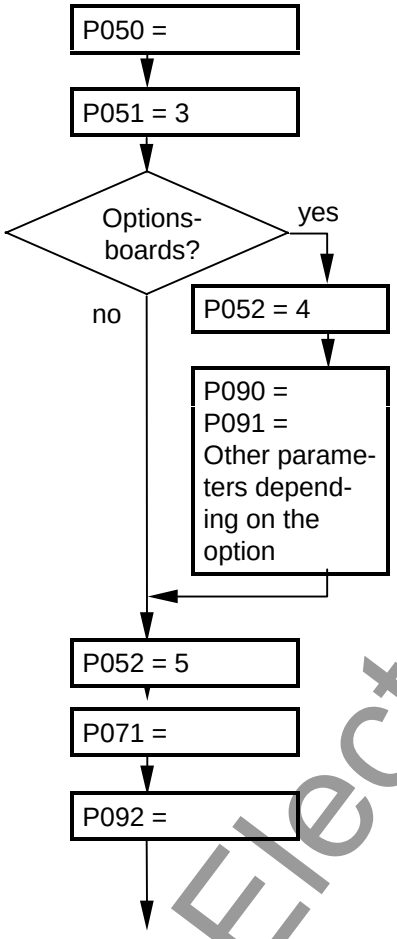
Function selection „motor identification at standstill“
(includes „ground fault test“ and „automatic parameterization“)

NOTE
Current flows in the motor and the rotor can align itself

Alarm „A078“ appears after the P key is depressed.The converter must be switched-on within 20 s.

Wait until the converter shuts down!
If fault Ffxx occurs, ☞ Chapter 12 „Fault and alarm messages“

4.2.2 Parameterization „Expert application“



Language:
0: Deutsch, 1: English, 2: Espanol, 3: Francais, 4: Italiano

Access stage „expert mode“

Possible option boards: SCB, TSY, CB, TB

Function selection „hardware configuration“

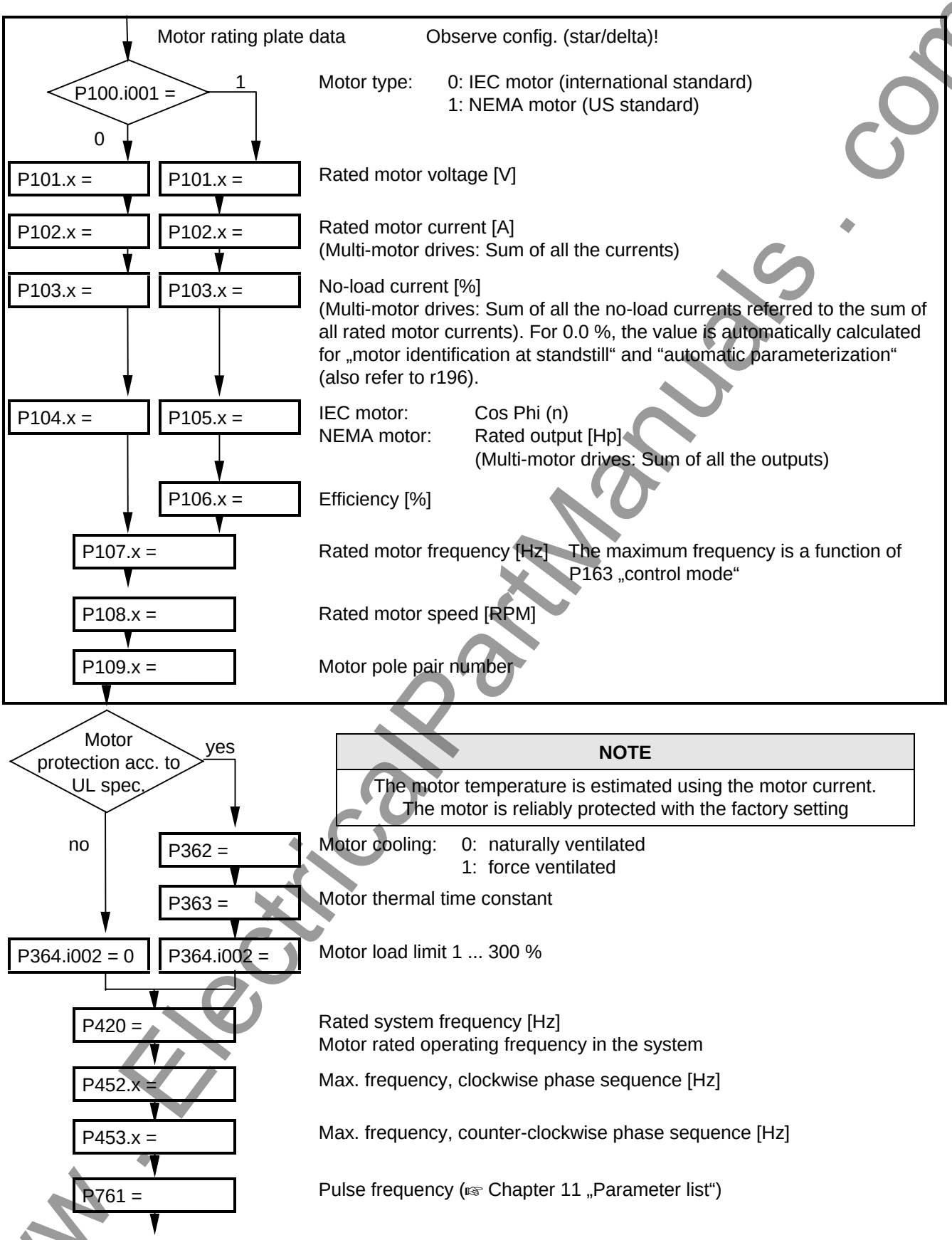
Define and parameterize the option boards:
☞ Instruction Manuals for the option boards

Option boards:
0: none
1: CB
2: TB
3: SCB
4: TSY

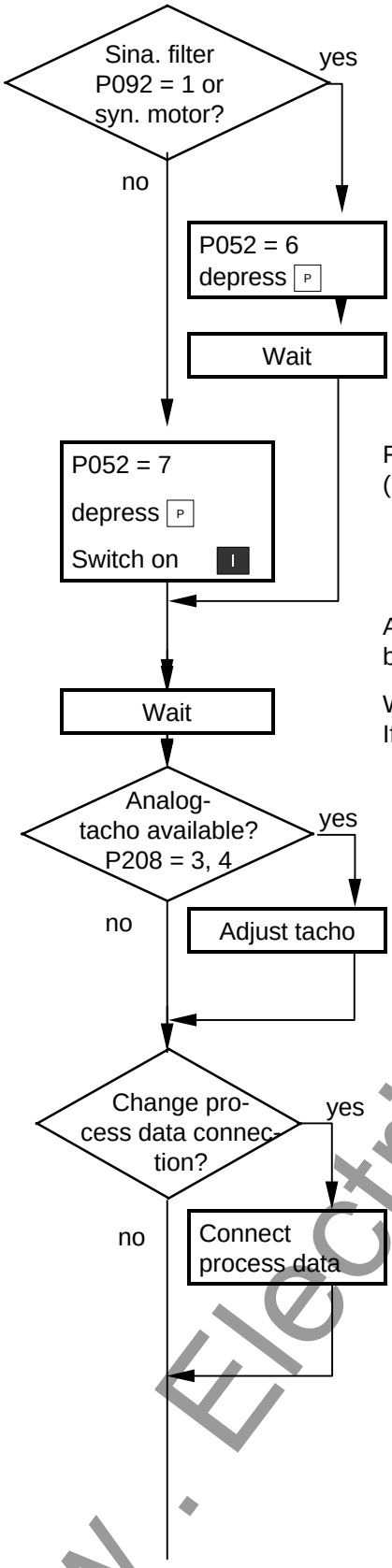
Function selection „drive setting“
If fault „Fxxx“, ☞ Chapter 12 „Fault and alarm messages“

Converter supply voltage [V]
AC units: Line supply voltage
DC units: DC link voltage

Select output filter:
0: without sinusoidal filter
1: with sinusoidal filter
2: with dv/dt filter



NOTE
The motor temperature is estimated using the motor current. The motor is reliably protected with the factory setting



Function selection „automatic parameterizationl“

Wait until the converter is ready to switch on! (PMU display: 009)
If fault „Fxxx“ occurs ☞ Chapter 12 „Fault and alarm messages“

Function selection „motor identification at standstill“
(includes „ground fault test“ and „automatic parameterization“)

NOTE
Current flows in the motor and the rotor can align itself!

Alarm „A078“ appears after the P key is depressed. The converter must be switched-on within 20s!

Wait until the converter shuts down!
If fault „Fxxx“ occurs ☞ Chapter 12 „Fault and alarm messages“

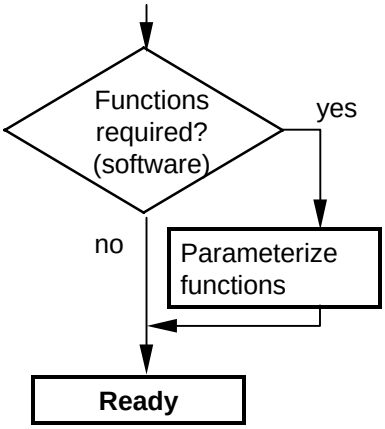
Adjust tacho:
- Tacho at ATI: refer to the ATI Instruction Manual
- Tacho at terminal strip CU:
  ☞ Section 6.3 „Analog inputs“

Change factory setting for:
Command- and setpoint sources,
Destinations for signals and actual values

Process data: (☞ Chapter 5 „Process data“)
- Control word (commands)/status word (messages)
- Setpoint/actual values

  Possible process data sources/destinations: (Sections 5.1 to 5.3)
  - Binary inputs, binary outputs
  - Analog inputs, analog outputs
  - Serial interface in the basic converter (SST1, SST2)
  - Option boards (SCB, TSY, CB, TB)

Simple applications: ☞ Section 4.6



Possible functions:
KIP, WEA, restart-on-the-fly, DC braking, selectivity, Vd-max. controller

Parameterize function:
Chapter 9 „Functions“
and Chapter 11 „Parameter list“

- detailed parameter description: ☞ Chapter 11 „Parameter list“
- detailed function diagrams: ☞ Chapter 10 „Function diagrams“

4.3 Drive start-up when the drive converter is controlled through an external main contactor

It is not absolutely necessary that the converter is operated with a main- or output contactor. If the converter control functions have to be maintained with the main contactor open, an external 24 V DC power is required.

Binary output 1 (-X9:4,5) is provided to control the contact (pre-assigned P612).

The checkback signal can be wired to a binary input (e.g. binary input 3).

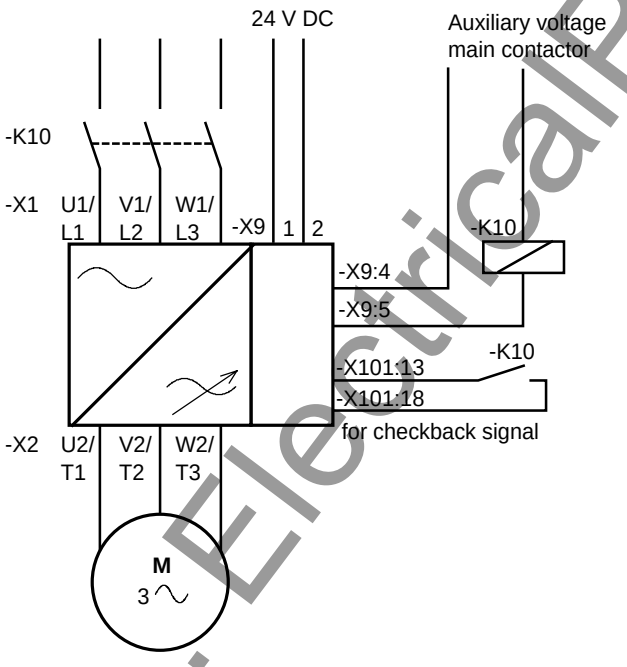


Fig. 4.4 Example for connecting an main- and input contactor

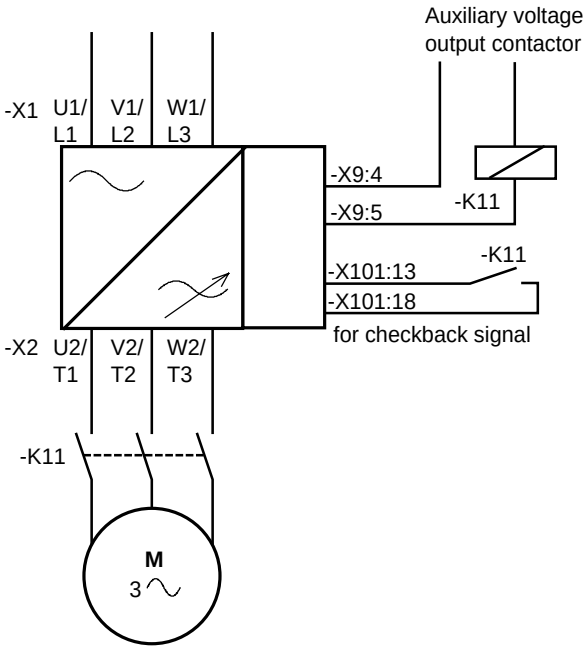


Fig. 4.5 Example for connecting an output contactor

Sequence control, on command-operation (effect on the main- or output contactor).

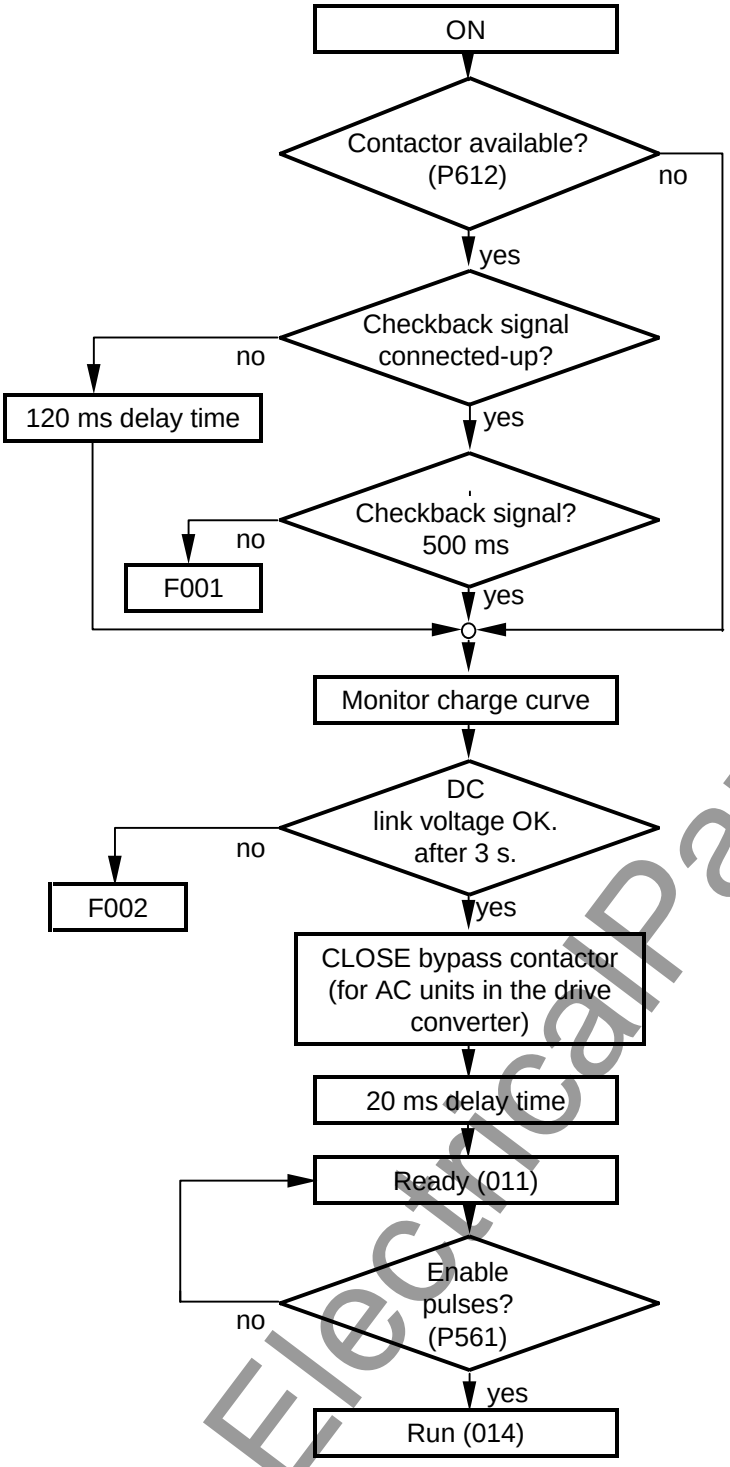


Fig. 4.6 Sequence control, on command- operation

Parameter-No.	Name	Index	Parameter-value	Terminal	With contactor(s)	Contactor(s) with checkback signals
P612	Dst.MC energized	i001	1001	X9: 4,5	X	X
P591	Src MC chckbck sig. binary input 3	-	1003	X101:18		X

Table 4.3 Recommended parameterization for the main- and output contactors

4.4 Drive start-up after enabling additional software functions or hardware options

If new software functions were enabled in the drive converter or hardware options installed, start-up must be repeated. This must be realized using the same steps as for first start-up:

- Standard application; ☞ refer to Section 4.2.1
- Expert application: ☞ refer to Section 4.2.2

NOTES
♦ Depending on the required change and taking into account the access stage (P051), and a possibly necessary function selection (P052), a jump can be made to the appropriate step. ♦ Due to background calculations, it is recommended that the following parameters and functions selections are checked/executed after the position jumped to!

For example:

Standard application (Section 4.2.1): Changing motor data

- ♦ P051 = 2 Access stage
- ♦ P052 = 5 Function selection, „drive setting“
- ♦ Change motor data
- ♦ Check subsequent parameters
- ♦ P052 = 0 Return from function selection
- ♦ P051 = 1 Access stage

Description of the „function selection“ (P052) and „motor identification at standstill“ (P052 = 7), ☞ Sections 8.1.4 and 8.1.6.

Subsequent enabling of „functions“: ☞ Chapter 9

Subsequent enabling of „hardware options“, Additional information regarding the appropriate options is provided in the Instruction Manuals.

4.5 Simple application examples for connecting process data with connection assignment

Connecting-up: ☞ Chapter 1 „Control terminal strip“

Multiple use of control word bits and source connections are permitted.

Caution: This excludes undesirable connections; e.g. factory setting basic/reserve changeover connected at binary input 5 (P590 = 1005)

4.5.1 Factory setting

Switch-on/off as well as setpoint input via the PMU, messages and actual values via the terminal strip.
Terminal strip only operational if binary input 5 (BE5) is energized (high signal level corresponds to „reserve“).
If BE5 is open (low signal level), then operator control is realized via the PMU.
The factory setting shown is not valid for cabinet units (compare P077)

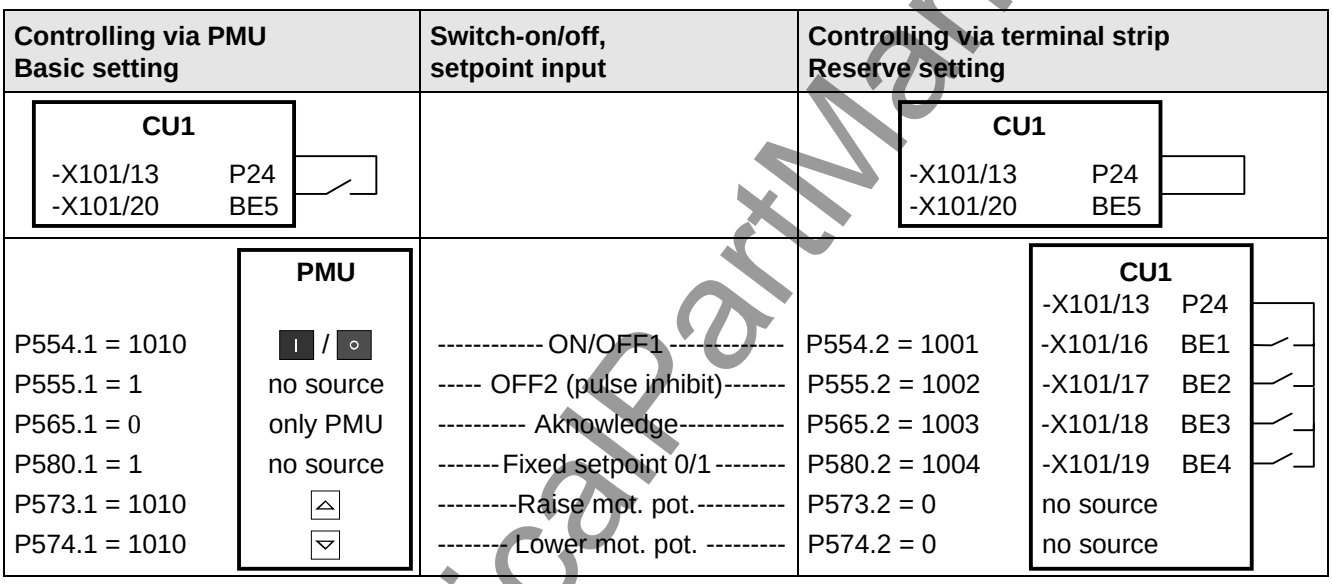


Fig. 4.7 Factory setting: Switsch-on/off as well as setpoint input

Examples of output connections:

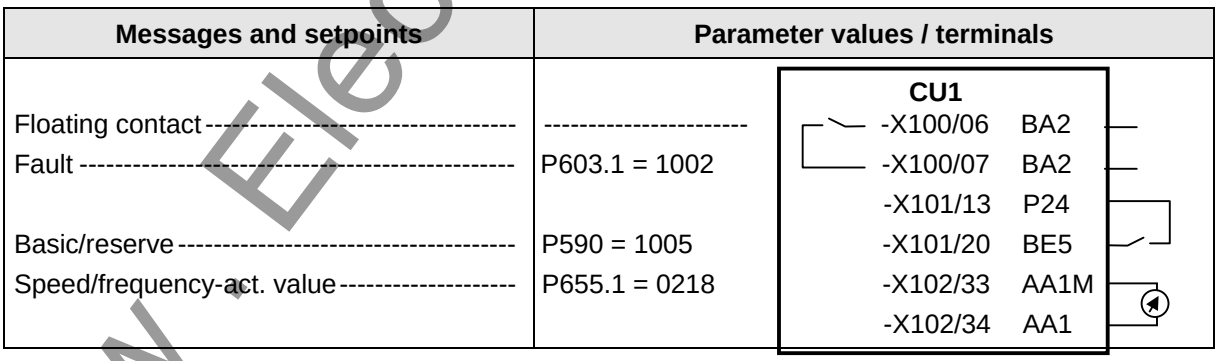


Fig. 4.8 Factory setting: Messages and setpoints

4.5.2 Manual/automatic operation (Basic/reserve changeover)

Manual operation (BE5 low signal level): Setpoint- and command input via the terminal strip.

Automatic operation (BE5 high signal level): Setpoint-and command input from the automation unt via serial interface (SST1), OFF3 and the monitoring of external faults via a terminal strip also possible.

Recommended parameterization:

Manual operation, Controlling via terminal strip			**Setpoint- and command input**	**Automatic operation**	
CU1				**CU1**	
-X101/13	P24			-X101/13	P24
-X101/20	BE5			-X101/20	BE5
	SST2				
	-X101/13	P24			
P554.1 = 1001	-X101/16	BE1	---------- ON/OFF1 ----------	P554.2 = 2001	SST2 control word
P558.1 = 1002	-X101/17	BE2	--------OFF3 (fast stop)-------	P559.2 = 2001	
P565.1 = 1003	-X101/18	BE3	---------- Aknowledge----------	P565.2 = 2001	
P575.1 = 1004	-X101/19	BE4	-------- Fault external 1 -------		
			--------- cw phase seq. --------	P571.2 = 2001	
			-------- ccw phase seq. -------	P572.2 = 2001	
P443.1 = 1003	-X102/27	AE1	----------Main setpoint---------	P443.2 = 2002	SST2 word 2
	-X102/28	AE1M			

Fig. 4.9 Manual / automatic: switsch-on/off as well as setpoint input

Examples of output connections:

Messages and setpoints	**Parameter values / terminals**
Floating contact----------	----------
Operation----------	P602.1 = 1002
Basic/reserve----------	P590 = 1005
Output current----------	P655.1 = 0004

CU1

-X100/06	BA2
-X100/07	BA2
-X101/13	P24
-X101/20	BE5
-X102/33	AA1M
-X102/34	AA1

Fig. 4.10 Manual / automatic: Messages and setpoints

Tip: If a terminal cannot be connected-up as source or destination, it should be checked as to whether it has already been used for other signals.

5 Process data

5.1 Control word (control word 1 and control word 2)

Introduction and application example

An individual source can be parameterized for every control command, from where the control command may be output (fixed values, binary inputs, PMU, PZD part of the telegram from the automation devices).

The selection parameters for the sources are, with the exception of P590 and P591 are indexed 2x as follows:

Index i001: Basic setting (GRD)
Index i002: Reserve setting (RES)

One parameter is available to „connect-up“ the source(s) for the control commands.

Example for connecting-up the sources:

The basic setting for the ON command (control word bit 0, control word 1), should be „connected-up“ to binary input 1 of the CU (terminal -X101:16):

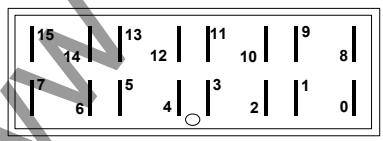
- From control word 1 table, one can identify that the factory setting of parameter P554.1 is 1010 for the basic setting of the ON command source.
- In Table A for the possible sources of the ON-command, one can see that 1010 corresponds to the „PMU operator control panel“ source.
- The parameter value for the required source is searched for in Tables X and A. For binary input 1 (BE1) of the CU, the result is found in table X, it is 1001.
- This parameter value must now be entered into parameter P554.1.

Command	Parameter	Possible sources	Parameter value	Required source connection
ON/OFF1 (GRD)	P554.1	Tab. X,A	1001	BE1 terminal -X101:16

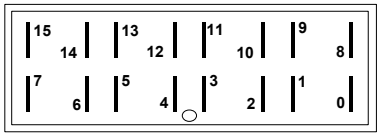
A high signal at terminal -X101:16 powers-up the drive converter; a low signal powers-down the drive converter.

INFORMATION
♦ Multiple wiring is permitted! ♦ The control word commands „OFF2“ (bit 1), „OFF3“ (bit 2) and „acknowledge“ (bit 7) are always simultaneously effective from 3 sources (can be parameterized)! ♦ „Acknowledge“ (bit7) is additionally always effective from the PMU! ♦ If the „on“ command (bit 0) is connected to a serial interface (SST, CB/TB, SCB-SST), then the following must be observed for safety-related reasons: Additionally, an „OFF2“ or „OFF3“ command must be parameterized at the terminal strip/PMU, as otherwise the converter cannot be shutdown with a a defined command, when communications fail!

5.1.1 Control word display using the 7-segment display on the PMU



Control word 1



Control word 2

5.1.2 Control word 1 (Visualization parameter r550 or r967)

The factory setting is only valid for P077 = 0.

Designation Bit No. (Significance)	Value High / Low (1 = High, 0 = Low)				Parameter No. BAS (RES)	Fact. setting. BAS (RES) (P077 = 0)	Source selection see 5.1.4
ON / OFF1 (Stop)	ON		OFF1				
0	1		0		P554.1 (2)	1010 (1001)	Tab. X,A
OFF2 (electrical)	ON		OFF2				
1	1		0		& P555.1 (2)	0001 (1002)	Tab. X,B
					& P556.1 (2)	0001 (0001)	Tab. X,B
					& P557.1 (2)	0001 (0001)	Tab. X,B
OFF3 (fast stop)	ON		OFF3				
2	1		0		& P558.1 (2)	0001 (0001)	Tab. X,B
					& P559.1 (2)	0001 (0001)	Tab. X,B
					& P560.1 (2)	0001 (0001)	Tab. X,B
Inverter enable	Inverter enable		Inhibit inverter				
3	1		0		P561.1 (2)	0001 (0001)	Tab. X,F
RFG enable	RFG enable		Inhibit RFG				
4	1		0		P562.1 (2)	0001 (0001)	Tab. X,F
Start RFG	Start RFG		RFG stop				
5	1		0		P563.1 (2)	0001 (0001)	Tab. X,F
Setpoint enable	Setpoint enable		Inhibit setpoint				
6	1		0		P564.1 (2)	0001 (0001)	Tab. X,F
Acknowledge	ON						
7	0 → 1				P565.1 (2)	0000 (1003)	Tab. X,C
					P566.1 (2)	0000 (0000)	Tab. X,C
					P567.1 (2)	2001 (2001)	Tab. X,C
						1010 (fixed)	
Inching 1	Inching 1 ON		Inching 1 OFF				
8	1		0		P568.1 (2)	0000 (0000)	Tab. X,C
9	Reserve						
Control from the PLC	Control		no control				
10	1		0		≥1 SST1/2		
					≥1 CB / TB		
					≥1 SCB 2		
Enable ph. seq.	Both enab.	ccw ph seq	cw ph. seq	No ph seq			
11	1	0	1	0	P571.1 (2)	0001 (0001)	Tab. X,E
12	1	1	0	0	P572.1 (2)	0001 (0001)	Tab. X,E
Motor potentiometer	Stop	Raise	Lower	Stop			
13	0	1	0	1	P573.1 (2)	1010 (0000)	Tab. X,A
14	0	0	1	1	P574.1 (2)	1010 (0000)	Tab. X,A
Fault, external 1	no fault		Fault, external 1				
15	1		0		P575.1 (2)	0001 (0001)	Tab. X,D

5.1.3 Control word 2 (Visualization parameter r551)

The factory setting is only valid for P077 = 0

Designation Bit No. (Significance)	Value High / Low (1 = High, 0 = Low)				Parameter No. BAS (RES)	Fact. setting. BAS (RES) (P077 = 0)	Source selection see 5.1.4
Setpoint data set	SDS 2		SDS 1				
16	1		0		P576.1 (2)	0000 (0000)	Tab. X,I
17	Reserve						
Motor data set	MDS 2		MDS 1				
18	1		0		P578.1 (2)	0000 (0000)	Tab. X,I
19	Reserve						
Fixed setpoint	FS 4	FS 3	FS 2	FS 1			
20	1	0	1	0	P580.1 (2)	0000 (1004)	Tab. X,I
21	1	1	0	0	P581.1 (2)	0000 (0000)	Tab. X,I
22	Reserve						
Restart-on-the-fly	Enable		Inhibit				
23	1		0		P583.1 (2)	0000 (0000)	Tab. X,I
Technology	Enable		Inhibit				
24	1		0		P584.1 (2)	0000 (0000)	Tab. X,I
25	Reserve						
Fault, external 2	No fault		Fault, external 2				
26	1		0		P586.1 (2)	0001 (0001)	Tab. X,G
27	Reserve						
Alarm, external 1	No alarm		Alarm, external 1				
28	1		0		P588.1 (2)	0001 (0001)	Tab. X,G
Alarm, external 2	No alarm		Alarm, external 2				
29	1		0		P589.1 (2)	0001 (0001)	Tab. X,G
Basic/reserve	Reserve setting		Basic setting				
30	1		0		P590	1005	Tab. X,I
HS checkback sig.	HS checkback sig.		No HS checkb. sig.				
31	1		0		P591	0001	Tab. X,H

5.1.4 Selecting the source for control words 1 and 2

Table X (external pins)

1001	BE1 Pin -X101:16
1002	BE2 Pin -X101:17
1003	BE3 Pin -X101:18
1004	BE4 Pin -X101:19
1005	BE5 Pin -X101:20
4101	SCI, Slave1, Pin 01
4102	SCI, Slave1, Pin 02
4103	SCI, Slave1, Pin 03
4104	SCI, Slave1, Pin 04
4105	SCI, Slave1, Pin 05
4106	SCI, Slave1, Pin 06
4107	SCI, Slave1, Pin 07
4108	SCI, Slave1, Pin 08
4109	SCI, Slave1, Pin 09
4110	SCI, Slave1, Pin 10
4111	SCI, Slave1, Pin 11
4112	SCI, Slave1, Pin 12
4113	SCI, Slave1, Pin 13
4114	SCI, Slave1, Pin 14
4115	SCI, Slave1, Pin 15
4116	SCI, Slave1, Pin 16
4201	SCI, Slave2, Pin 01
4202	SCI, Slave2, Pin 02
4203	SCI, Slave2, Pin 03
4204	SCI, Slave2, Pin 04
4205	SCI, Slave2, Pin 05
4206	SCI, Slave2, Pin 06
4207	SCI, Slave2, Pin 07
4208	SCI, Slave2, Pin 08
4209	SCI, Slave2, Pin 09
4210	SCI, Slave2, Pin 10
4211	SCI, Slave2, Pin 11
4212	SCI, Slave2, Pin 12
4213	SCI, Slave2, Pin 13
4214	SCI, Slave2, Pin 14
4215	SCI, Slave2, Pin 15
4216	SCI, Slave2, Pin 16
5001	TSY, Pin 1

Table A

0000	constant value 0
1010	PMU
2001	SST1 word 1
3001	CB/TB word 1
4501	SCB1/2 peer-to-peer, SCB2 USS, word 1
4502	SCB1/2 peer-to-peer, word 2
4503	SCB1/2 peer-to-peer, word 3
4504	SCB1/2 peer-to-peer, word 4
4505	SCB1/2 peer-to-peer, word 5

Table B

0001	constant value 1
1010	PMU
2001	SST1 word 1
3001	CB/TB word 1
4501	SCB1/2 peer-to-peer, SCB2 USS, word 1
4502	SCB1/2 peer-to-peer, word 2
4503	SCB1/2 peer-to-peer, word 3
4504	SCB1/2 peer-to-peer, word 4
4505	SCB1/2 peer-to-peer, word 5

Table C

0000	constant value 0
2001	SST1 word 1
3001	CB/TB word 1
4501	SCB1/2 peer-to-peer, SCB2 USS, word 1
4502	SCB1/2 peer-to-peer, word 2
4503	SCB1/2 peer-to-peer, word 3
4504	SCB1/2 peer-to-peer, word 4
4505	SCB1/2 peer-to-peer, word 5

Table D

0001	constant value 1
2001	SST1 word 1
3001	CB/TB word 1
4501	SCB1/2 peer-to-peer, SCB2 USS, word 1
4502	SCB1/2 peer-to-peer, word 2
4503	SCB1/2 peer-to-peer, word 3
4504	SCB1/2 peer-to-peer, word 4
4505	SCB1/2 peer-to-peer, word 5

Table E

0000	constant value 0
0001	constant value 1
1010	PMU
2001	SST1 word 1
3001	CB/TB word 1
4501	SCB1/2 peer-to-peer, SCB2 USS, word 1
4502	SCB1/2 peer-to-peer, word 2
4503	SCB1/2 peer-to-peer, word 3
4504	SCB1/2 peer-to-peer, word 4
4505	SCB1/2 peer-to-peer, word 5

Table F

0000	constant value 0
0001	constant value 1
2001	SST1 word 1
3001	CB/TB word 1
4501	SCB1/2 peer-to-peer, SCB2 USS, word 1
4502	SCB1/2 peer-to-peer, word 2
4503	SCB1/2 peer-to-peer, word 3
4504	SCB1/2 peer-to-peer, word 4
4505	SCB1/2 peer-to-peer, word 5

Table G

0001	constant value 1
2004	SST1 word 4
3004	CB/TB word 4
4501	SCB1/2 peer-to-peer, word 1
4502	SCB1/2 peer-to-peer, word 2
4503	SCB1/2 peer-to-peer, word 3
4504	SCB1/2 peer-to-peer, SCB2 USS, word 4
4505	SCB1/2 peer-to-peer, word 5

Table H

0001	No HS checkback sig.
4501	SCB1/2 peer-to-peer, word 1
4502	SCB1/2 peer-to-peer, word 2
4503	SCB1/2 peer-to-peer, word 3
4504	SCB1/2 peer-to-peer, word 4
4505	SCB1/2 peer-to-peer, word 5

Table I

0000	constant value 0
0001	constant value 1
2004	SST1 word 4
3004	CB/TB word 4
4501	SCB1/2 peer-to-peer, word 1
4502	SCB1/2 peer-to-peer, word 2
4503	SCB1/2 peer-to-peer, word 3
4504	SCB1/2 peer-to-peer, SCB2 USS, word 4
4505	SCB1/2 peer-to-peer, word 5

5.1.5 Significance of control word- (1 and 2) commands

The operating statuses can be read in monitoring parameter r001: e.g. READY-TO-POWER-UP: r001=009.

The function sequences are described in the sequence in which they are realized.

Bit 0: ON / OFF1 command (↑ „ON“) / (L „OFF1“)

The command is executed with a positive edge change from L to H (L → H) only in the READY-TO-SWITCH-ON (009).

Folge:
- PRE-CHARGING (010)
  Main contactor/bypass contactor (option) are switched-in, if present
  Pre-charging is realized
- READY STATUS (011)
  If the unit was last powered don using „OFF2“, the drive converter only changes over into the next status after the de-energization time (P371) since the last shutdown instant.
- GROUND FAULT TEST (012), only for selected ground-fault test (P354).
- RESTART-ON-THE-FLY (013), if restart-on-the-fly (control word bit 23 via P583) is enabled**.**
- READY (014).

LOW-Signal

Result:
- OFF1 (015), if the unit is in a status with inverter enable.

  The setpoint is inhibited at the ramp-function generator input (setpoint=0), so that the drive is decelerated along the parameterized deceleration ramp (P464) down to the OFF shutdown frequency (P514).

  After the OFF delay time has expired (P516), the inverter pulses are inhibited, and the main contactor, if available, is opened. If the OFF1 command is again withdrawn during ramp-down (e.g. using an ON command), deceleration is interrupted, and the drive goes into the „RUN (014) status.
- The inverter pulses are inhibited, and the main contactor, if available, opened for PRECHARGING (010), READY (011), RESTART-ON-THE-FLY (013) or MOT-ID STANDSTILL (018).
- SWITCH-ON INHIBIT (008)
- SWITCH-ON INHIBIT (009), if „OFF2“ or „OFF3“ is not present.

Bit 1: OFF2 command (L „OFF2“) (electrical)

LOW signal

Result:
- The inverter pulses are inhibited, and the main contact, if available, opened.
- SWITCH-ON INHIBIT (008), until the command is withdrawn.

NOTE
The **OFF2** command is simultaneously effective from three sources (P555, P556 and P557)!

Bit 2: OFF3 command (L „OFF3“) (fast stop)

LOW signal

Result:
- ♦ This command has two possible effects:
  - DC braking is enabled (P372 = 1):
    DC braking (017)
    The drive decelerates along the parameterized down ramp for OFF3 (P466), until it reaches the start of DC braking frequency (P375).
    The inverter pulses are then inhibited for the duration of the de-energization time (P371).
    DC current braking is then realized with an adjustable braking current (P373) with a braking time which can be parameterized (P374).
    The inverter pulses are then inhibited, and the main contactor, if available, is opened.
  - DC braking is not enabled (P372 = 0):
    The setpoint is inhibited at the ramp-function generator input (setpoint = 0), so that the drive decelerates along the parameterized downramp for OFF3 (P466) to the OFF shutdown frequency (P514).
    After the OFF delay time (P516) has expired, the inverter pulses are inhibited, and the main/bypass contactor, if available, is opened.
    If the OFF 3 command is again withdrawn during deceleration, the drive still continues to decelerate.
    🗍 Section 6.6 „Ramp-function generator“
- ♦ The inverter pulses are inhibited, and the main/bypass contactor, if available, is opened for PRECHARGING (010), READY (011), RESTART-ON-THE-FLY (013) or MOT-ID STANDSTILL (018).
- ♦ If the drive operates as slave drive, then it automatically switches-over to master drive, for an OFF3 command.
- ♦ SWITCH-ON INHIBIT (008), until the command is withdrawn.

NOTE
♦ The **OFF 3** command is simultaneously effective from three sources (P558, P559 und P560)!
♦ Priority of the **OFF** commands: **OFF2** > **OFF3** > **OFF1**

Bit 3: Inverter enable command (H „inverter enable“) / (L „inverter inhibit“)

HIGH signal, READY (011) and expiration of the de-energization time (P371) since the last shutdown instant.

Result:
- ♦ RUN (014)
  The inverter pulses are enabled, and the setpoint is approached via the ramp-function generator.

LOW signal

Result:
- ♦ For RESTART-ON-THE-FLY (013), RUN (014) or KINETIC BUFFERING with pulse enable:
  Changeover into the READY (011) status, the inverter pulses are inhibited.
- ♦ For OFF1 (015 / stop), the inverter pulses are inhibited, the main contact, if available, opens, and the drive converter changes over into the SWITCH-ON INHIBIT status (008).
- ♦ For OFF3 (016 / fast stop), the inverter inhibit command is ignored, and fast stop is continued.

Bit 4: Ramp-function generator inhibit command (L „inhibit ramp-function generator“)

LOW signal in the RUN (014) status.

Result: ♦ The ramp-function generator output is set to setpoint = 0.

Bit 5: Ramp-function generator stop command (L „ramp-function generator stop“)

LOW signal in the RUN status (014).

Result: ♦ The actual setpoint is frozen at the ramp-function generator output.

Bit 6: Setpoint enable command (H „setpoint enable“)

HIGH signal and expiration of the de-energization time (P189).

Result: ♦ The setpoint at the ramp-function generator input is enabled.

Bit 7: Acknowledge command (↑ „Acknowledge“)

Positive edge change from (L → H) in the FAULT status (007).

Result: ♦ All of the actual faults are deleted after they have been previously transferred into the diagnostics memory.

♦ SWITCH-ON INHIBIT (008), if no actual faults exist.

♦ FAULT (007), if additional actual faults exist.

NOTE
The **acknowledge** command is simultaneously effective from three sources (P565, P566 und P567) and alwlays from the PMU!

Bit 8: Inching 1 ON command (↑ „Inching 1 ON“) / (L „Inching 1 OFF“)

Positive edge change from L to H (L → H) in the READY TO SWITCH-ON status (009).

Result: ♦ An ON command (refer to control word, bit 0) is issued, and the inching frequency 1 (P448) is enabled in the setpoint channel.
The ON/OFF1 command (bit 0) is ignored for active inching operation.

LOW signal

Result: ♦ An OFF1 command (refer to control word bit 0) is automatically issued.

Bit 9: Reserved

Bit 10: Control from the PLC command (H „control from the PLC“)

HIGH signal; Process data PZD (control word, setpoints) which were sent via the SST1 interface of CU, the CB/TB interface (option) and the SST/SCB interface (option), are only evaluated if the command was accepted.

Result:
- If several interfaces are operational, only the process data of the interfaces are evaluated, which transmit the H signal.
- For an L signal, the last values are retained in the appropriate dual port RAM of the interface.

NOTE
An H signal appears in the visualization parameter r550 „control word 1“, if **one** of the interfaces transmits an H signal!

Bit 11: Clockwise phase sequence command (H „clockwise phase sequence“)

HIGH signal

Result:
- The setpoint is influenced in conjunction with bit 12 „counter-clockwise rotating field“.

Chapter 10 „Function diagram, setpoint channel CU (Section 2)“

Bit 12: Counter-clockwise phase sequence command (H „counter-clockwise phase sequence“)

HIGH signal

Result:
- The setpoint is influenced in conjunction with bit 11 „clockwise rotating field“.

Chapter 10 „Function diagram, setpoint channel CU (Section 2)“

NOTE
The **counter-clockwise phase sequence**- and **clockwise phase sequence** commands have no influence on the supplementary setpoint, if this is added after the ramp-function generator via P432=0 (factory setting 1)!

Bit 13: Motorized potentiomenter, raise command (H „raise motorized potentiometer“)

HIGH signal

Result:
- The motorized potentiometer in the setpoint channel is energized in conjunction with bit 14 „motorized potentiometer, lower“.

Chapter 10 „Function diagram, setpoint channel CU (Section 1)“

Bit 14: Motorized potentiometer, lower command (H „motorized potentiometer, lower)

HIGH signal

Result:
- The motorized potentiometer in the setpoint channel is energized in conjunction with bit 13 „motorized potentiometer, raise“.

Chapter 10 „Function diagram, setpoint channel CU (Section 1)“

Bit 15: Fault, external 1 command (L „fault, external 1“)

LOW signal

Result: ♦ FAULT (007) and fault message (F035).
The inverter pulses are inhibited and the main contactor, if available, is opened.

Chapter 12 „Fault and alarm messages“

Bit 16: Setpoint channel data set SDS bit 0 command (H „SDS2“) / (L „SDS1“)

HIGH signal activates SDS2, LOW signal, SDS1.

Result: ♦ The parameter settings of the appropriate data set are activated in the setpoint channel.

Chapter 10 „Function diagram, setpoint channel CU (Part 1) / data sets“

Bit 17: Reserved

Bit 18: Motor data set MDS bit 0 command (H „MDS2“) / (L „MDS1“)

READY-TO-SWITCH-ON (009), PRECHARGING (010) or READY (011)

HIGH signal activates MDS2, LOW signal, MDS1.

Result: ♦ The parameter settings of the appropriate motor data set in the setpoint channel and in the open-loop/closed-loop control are activated.

Chapter 10 „Function diagram, data sets“

Bit 19: Reserved

Bit 20: Fixed setpoint FSW bit 0 (LSB command)

Result: ♦ One of the four possible fixed setpoints is controlled in conjunction with bit 21 „FSW BIT 1“.

Chapter 10 „Function diagram, setpoint channel CU (Section 1) / data sets“

Bit 21: Fixed setpoint FSW bit 1 (MSB) command

Result: ♦ One of the four possible fixed setpoints is controlled in conjunction with bit 20 „FSW BIT 0“.

Chapter 10 „Function diagram, setpoint channel CU (Section 1) / data sets“

Bit 22: Reserved

Bit 23: Restart-on-the-fly enable command (H „enable restart-on-the-fly“)

HIGH-Signal

Folge: ♦ This command enables the restart-on-the-fly function.

Chapter 9 „Functions (software)"

Bit 24: Technology controller enable command (H „technology controller enable“)

HIGH-Signal

Folge: ♦ The command activates the technology controller if the inverter pulses are enabled and the excitation time has expired. The technology controller can be parameterized using parameters P525 to P545.

Chapter 10 „Function diagrams, closed-loop control“ and Chapter 11 „Parameter list“

Bit 25: Reserved

Bit 26: Fault, external 2 command (L „fault, external 2“)

LOW signal; only activated from the READY status (011) with an additional time delay of 200 ms.

Result: ♦ FAULT (007) and fault message (F036).
The inverter pulses are inhibited, the main contactor, if available, is opened.

Chapter 12 „Fault and alarm messages“

Bit 27: Reserved

Bit 28: Alarm, external 1 command (L „alarm, external 1“)

LOW signal

Result: ♦ The operating status is retained. An alarm message (A015) is output.

Chapter 12 „Fault and alarm messages“

Bit 29: Alarm, external 2 command (L „alarm, external 2“)

LOW-Signal

Result: ♦ The operating status is retained. An alarm message (A016) is output.

Chapter 12 „Fault and alarm messages“

Bit 30: Selection, reserve/basic setting command (H „reserve setting“) / (L „basic setting“)

HIGH signal

Folge: ♦ The parameter settings of the reserve setting for the control word itself, the setpoint channel, and the closed-loop control are activated.

LOW signal

Result: ♦ The parameter settings of the basic setting for the control word itself, the setpoint channel, and the closed-loop control are activated.

Chapter 10 „Function diagrams, data sets“

Bit 31: HS checkback signal command (H „HS checkback signal“)

HIGH signal, corresponding to the configuration (wiring) and parameterization of the main contactor (option).

Result: ♦ Checkback signal, „main contactor energized“.

Chapter „Options“ in Operating Instructions, Part 1

5.2 Status word

Introduction and application example

Status words are process data in the sense of the explanation in Section 3.2.

A „destination“ can be parameterized for every bit of a status word, which can be identified by the bit status (binary outputs of the CU, SCI 1/2 terminals, TSY terminals).

A parameter is available to „connect-up“ the destination for each status bit.

The selection parameters are indexed three times as follows:

Index i001 Selecting a terminal on the CU / PEU board (basic drive converter)
Index i002 Selecting a terminal on the SCI 1/2 board (option)
Index i003 Selecting a terminal on the TSY board (option)

Example for connecting-up the destination:

The „ramp-function generator active“ signal (status word 1, bit 13), is to be connected-up as high-active signal at binary output 2 (BA2) of CU (terminal -X100:6/7) :

- The status bit „connection“ to binary output of the CU is parameterized via index i001.
- From the status word 1 table, it can be identified that the „ramp-function generator active“ signal is assigned to parameter P613.
- The parameter value for the required destination is searched for in the same table. The result is 1002 for binary output 2 of the CU.
- This parameter value must now be entered into parameter P613.1.

Bit #	Significance	Parameter	Parameter value	Required destination connection
Bit 13	Ramp-function generator active	P613.1	1002	BA2 terminal -X100:6/7

For a high signal at terminal -X100:6/7, the ramp-function generator is active; it is inactive for a low signal.

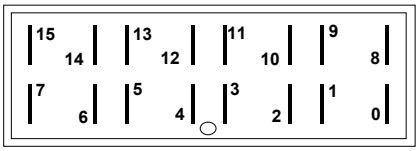
If a value, which is assigned a terminal (binary output BA), is assigned once in a select parameter for a destination, then it is no longer available in the same index of another select parameter, as a terminal is only suitable to output one status bit.

INFORMATION
Faults, alarms and **power-on inhibit (HIGH active),** are displayed via the terminal strip (binary outputs) as **LOW active**. This is also valid for possible option boards! Section 6.2 „Binary outputs“

5.2.1 Status word 1 (visualization parameter r552 or r968)

PMU display

„Status word 1“



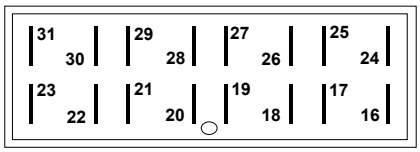
Bit #	Value	1 = High 0 = Low	Select dest.
Bit 0	1	Ready-to-switch-on	P600.x
	0	Not ready to switch on	
Bit 1	1	Ready	P601.x
	0	Not ready	
Bit 2	1	Run	P602.x
	0	Inverter pulses inhibited	
Bit 3	1	Fault	P603.x
	0	No fault	
Bit 4	1	No OFF 2	P604.x
	0	OFF2	
Bit 5	1	No OFF 3	P605.x
	0	OFF3	
Bit 6	1	Switch-on inhibit	P606.x
	0	No switch-on inhibit	
Bit 7	1	Alarm	P607.x
	0	No alarm	
Bit 8	1	No setpt. act. val. deviation	P608.x
	0	Setpt. act. value deviation	
Bit 9	1	PZD control requested	always 1
	0	(not permissible)	
Bit 10	1	Comparison freq. reached	P610.x
	0	Actual val. < comparitive freq.	
Bit 11	1	Fault, undervoltage	P611.x
	0	No undervoltage fault	
Bit 12	1	Main contactor energized	P612.x
	0	Main contactor not energized	
Bit 13	1	HLG active	P613.x
	0	HLG not active	
Bit 14	1	Clockwise phase sequence	P614.x
	0	Counter-clockwise phase seq.	
Bit 15	1	KIP/FLN active	P615.x
	0	KIP/FLN not active	

	Value	Destination
x = 1	0000	No destination
	1001	BA1, -X9:4/5
	1002	BA2, -X100:6/7/8
x = 2	0000	No destination
	4101	SCI 1/2, slave 1, BA1
	4102	SCI 1/2, slave 1, BA2
	4103	SCI 1/2, slave 1, BA3
	4104	SCI 1/2, slave 1, BA4
	4105	SCI 1/2, slave 1, BA5
	4106	SCI 1/2, slave 1, BA6
	4107	SCI 1/2, slave 1, BA7
	4108	SCI 1/2, slave 1, BA8
	4109	only SCI 2, slave 1, BA9
	4110	only SCI 2, slave 1, BA10
	4111	only SCI 2, slave 1, BA11
	4112	only SCI 2, slave 1, BA12
	4201	SCI 1/2, slave 2, BA1
	4202	SCI 1/2, slave 2, BA2
	4203	SCI 1/2, slave 2, BA3
	4204	SCI 1/2, slave 2, BA4
	4205	SCI 1/2, slave 2, BA5
	4206	SCI 1/2, slave 2, BA6
	4207	SCI 1/2, slave 2, BA7
	4208	SCI 1/2, slave 2, BA8
	4209	only SCI 2, slave 2, BA9
	4210	only SCI 2, slave 2, BA10
	4211	only SCI 2, slave 2, BA11
	4212	only SCI 2, slave 2, BA12
x = 3	0000	No destination
	5001	TSY, BA1
	5002	TSY, BA2

5.2.2 Status word 2 (visualization parameter r553)

PMU display

„Status word 2“



Bit #	Value	1 = High 0 = Low	Select dest.
Bit 16	1	Restart on the fly active	P616.x
	0	Restart-on-the-fly not active	
Bit 17		Reserved	
Bit 18	1	No overspeed	P618.x
	0	Overspeed	
Bit 19	1	Fault, external 1	P619.x
	0	No fault, external 1	
Bit 20	1	Fault, external 2	P620.x
	0	No fault, external 2	
Bit 21	1	Alarm, external	P621.x
	0	No alarm, external	
Bit 22	1	Alarm i2t converter	P622.x
	0	No alarm, i2t converter	
Bit 23	1	Fault, overtemp., converter	P623.x
	0	No fault, overtemp. conv.	
Bit 24	1	Alarm, overtemp., conv.	P624.x
	0	No alarm, overtemp., conv.	
Bit 25	1	Alarm, motor overtemp.	P625.x
	0	No alarm, overtemp. mot.	
Bit 26	1	Fault, motor overtemp.	P626.x
	0	No fault, overtemp. mot.	
Bit 27	1	T. contr. act. val.>T. contr. setp.	P627.x
	0	T. contr. act. val.<T. contr. setp.	
Bit 28	1	Fault, motor stall/lock	P628.x
	0	No fault motor stall/lock	
Bit 29	1	Bypass contactor energized	P629.x
	0	Bypass contactor not	
Bit 30		Reserved	
Bit 31	1	Pre-charging active	P631.x
	0	Pre-charging not active	

	Value	Destination
x = 1	0000	No destination
	1001	BA1, -X9:4/5
	1002	BA2, -X100:6/7/8
x = 2	0000	No destination
	4101	SCI 1/2, slave 1, BA1
	4102	SCI 1/2, slave 1, BA2
	4103	SCI 1/2, slave 1, BA3
	4104	SCI 1/2, slave 1, BA4
	4105	SCI 1/2, slave 1, BA5
	4106	SCI 1/2, slave 1, BA6
	4107	SCI 1/2, slave 1, BA7
	4108	SCI 1/2, slave 1, BA8
	4109	only SCI 2, slave 1, BA9
	4110	only SCI 2, slave 1, BA10
	4111	only SCI 2, slave 1, BA11
	4112	only SCI 2, slave 1, BA12
	4201	SCI 1/2, slave 2, BA1
	4202	SCI 1/2, slave 2, BA2
	4203	SCI 1/2, slave 2, BA3
	4204	SCI 1/2, slave 2, BA4
	4205	SCI 1/2, slave 2, BA5
	4206	SCI 1/2, slave 2, BA6
	4207	SCI 1/2, slave 2, BA7
	4208	SCI 1/2, slave 2, BA8
	4209	only SCI 2, slave 2, BA9
	4210	only SCI 2, slave 2, BA10
	4211	only SCI 2, slave 2, BA11
	4212	only SCI 2, slave 2, BA12
x = 3	0000	No destination
	5001	TSY, BA1
	5002	TSY, BA2

5.2.3 Significance of the status word messages

Bit 0: Signal, „Ready to switch-on“ (H)

HIGH signal: SWITCH-ON INHIBIT (008) or READY-TO-SWITCH-ON (009) status

Significance
- The power supply, the open-loop and closed-loop control are operational.
- The inverter impulses are inhibited.
- If an external power supply and a main contactor (option) are available, it is possible that the DC link can be brought into a no-voltage condition in this converter status!

Bit 1: Signal, „ready“ (H)

HIGH signal: PRE-CHARGING (010) or READY (011) status

Significance
- The power supply, the open-loop and closed-loop control are operational.
- The converter is switched-on.
- Pre-charging is executed (has been completed).
- The DC link is ramped-up to the full voltage (has attained full voltage).
- The inverter pulses are still inhibited.

Bit 2: Signal, „run“ (H)

HIGH signal: RESTART-ON-THE-FLY (013), RUN (014), OFF1 (015) or OFF3 (016) status

Significance
- The converter is functioning.
- The inverter pulses are enabled.
- The output terminals are live.

Bit 3: Signal, „Fault“ (H)

HIGH signal: FAULT (007) status

Significance
- A fault has occured.

Output at the terminal strip (PEU, CU, TSY, SCI1/2) with L signal.

Bit 4: Signal, „OFF2“ (L)

LOW signal: OFF2 command present

Significance
- The OFF2 command (control word bit 1) was output.

Bit 5: Signal, „OFF3“ (L)

LOW signal : OFF3 (016) status, and/or OFF3 command available

Significance
- The OFF3 command (control word bit 2) was output.

Bit 6: Signal, „switch-on inhibit“ (H)

HIGH signal: SWITCH-ON INHIBIT (008) status

Significance
- The power supply, open- and closed-loop control are operational.
- If an external power supply and a main contactor (option) are available, it is possible that the DC link is in a no-voltage condition in this converter status!
- The message is continuously available as long as an OFF2 command is present via the control word bit1; or/and an OFF3 command is available via the control word bit 2 after the setpoint has been reduced; or/and an ON command is still available via the control word bit 0 (edge evaluation).

Output at the terminal strip (PEU, CU, TSY, SCI1/2) with L signal.

Bit 7: Signal, „alarm“ (H)

HIGH signal: Alarm (Axxx)

Significance
- An alarm has occured.
- The signal remains until the cause has been removed.

Output at the terminal strip (PEU, CU, TSY, SCI1/2) with L signal.

Bit 8: Signal, „setpoint-actual value deviation“ (L)

LOW signal: Alarm „setpoint-actual value deviation“ (A034)

Significance
- The frequency actual value - frequency setpoint deviation is greater than P517 (Deviation Freq.) and remains for longer than the time parameterized in P518 (Deviation Time).
- The bit is again set to an H signal if the deviation is less than the parameter value P517.

Bit 9: Signal, „PZD control requested“ (H)

HIGH signal: It is always present.

Bit 10: Signal, „comparison frequency reached“ (H)

HIGH signal: The parameterized comparison frequency has been reached.

Significance
- The absolute frequency actual value is greater than or the same as the parameterized comparison frequency (P512).
- The bit is again set to L, as soon as the actual absolute frequency value falls below the comparison frequency (P512), minus the parameterized comparison frequency hysteresis (P513 in % referred to the comparison frequency (P512)).

Bit 11: Signal, „fault, undervoltage“ (H)

HIGH signal: Fault „undervoltage in the DC link“ (F008)

Significance
- The DC link voltage has fallen below the permissible limit value.
  Chapter 12 „Fault and alarm messages“

Output at the terminal strip (PEU, CU, TSY, SCI1/2) with L signal.

Bit 12: Signal, „main contactor energized“ (H)

HIGH signal: The main contactor is energized.

Significance ♦ A main contactor (option) can be controlled with the appropriate „wiring“ and parameterization.
Chapter „Options“ in the Operating Instructions, Part 1

Bit 13: Signal, „RFG active“ (H)

HIGH signal: Ramp-function generator active

Significance ♦ The ramp-function generator output value (r480) is not equal to the ramp-function input value (r460).
A hysteresis, which can be parameterized, (P476 in %, referred to the rated system frequency P420) can only be taken into account for an analog setpoint input.

Bit 14: Signal, „clockwise phase sequence“ (H)/“ counter-clockwise phase sequence“ (L)

HIGH signal: Clockwise phase sequence

Significance ♦ The frequency setpoint for the closed-loop control (n/f setpoint, r482), is greater than or equal to 0).

LOW signal: Counter-clockwise phase sequence

Significance ♦ The frequency setpoint for the closed-loop control (n/f setpoint, r482) is less than 0.

Bit 15: Signal, „KIP/FLN active“ (H)

HIGH signal: The kinetic buffering (KIP) function or the flexible response (FLN) function is active.

Significance ♦ KIP: A brief supply failure is buffered using the kinetic energy of the machine.
♦ FLN: The drive converter can be operated down to a minimum DC link voltage of 50% of the rated value.
Chapter „Functions“

Bit 16: Signal, „restart-on-the-fly active“ (H)

HIGH signal: The restart-on-the-fly function is active or the excitation time (P189) is running.

Significance ♦ The drive converter has been switched to a motor which is still rotating.
♦ An overcurrent condition is prevented using the restart-on-the-fly function.
Chapter 9 „Functions“
♦ The energization time is active.

Bit 17: Reserved

Bit 18: Signal, „overspeed“ (L)

LOW signal: Alarm „overspeed“ (A033)

Significance
- The frequency actual value is either:
  - greater than the maximum frequency for a clockwise phase sequence (P452), plus a hysteresis (P519 in %, referred to P452) or
  - is less than the maximum frequency for the counter-clockwise phase sequence (P453) plus a hysteresis (P519 in %, referred to P453).
- The bit is again set to an H, as soon as the absolute frequency actual value is less than or equal to the absolute value of the appropriate maximum frequency.

Bit 19: Signal, „fault, external 1“ (H)

HIGH signal: „Fault, external 1“

Significance
- A „fault, external 1“ is present in control word bit 15.

Output at the terminal strip (PEU, CU, TSY, SCI1/2) with L signal.

Bit 20: Signal, „fault, external 2“ (H)

HIGH signal: „Fault, external 2“

Significance
- A „fault, external 2“ is present in control word bit 26.

Output at the terminal strip (PEU, CU, TSY, SCI1/2) with L signal.

Bit 21: Signal, „external alarm“ (H)

HIGH signal: „External alarm“

Significance
- An „external alarm 1“ is present in control word bit 28, or an „external alarm 2“ in control word bit 29.

Output at the terminal strip (PEU, CU, TSY, SCI1/2) with L signal.

Bit 22: Signal, „alarm i^2t inv.“ (H)

HIGH signal: Alarm „i^2t-Inv.“ (A025)

Significance
- If the instantaneous load status remains the same, then the drive converter will be thermally overloaded.
  - Chapter 12 „Fault and alarm messages“

Output at the terminal strip (PEU, CU, TSY, SCI1/2) with L signal.

Bit 23: Signal, „Overtemperature fault signal UMR“ (H)

HIGH signal: „Inverter temperature too high“ fault (F023)

Significance
- The inverter temperature limit value was exceeded.
  - Chapter 12 „Fault and alarm messages“

Output at the terminal strip (PEU, CU, TSY, SCI1/2) with L signal.

Bit 24: Signal, „motor overtemperature alarm“ (H)

HIGH signal: Alarm „inverter temperature too high“ (A022)

Significance
- Alarm temperature threshold of the inverter was exceeded.
  - Chapter 12 „Fault and alarm messages“

Output at the terminal strip (PEU, CU, TSY, SCI1/2) with L signal.

Bit 25: Signal, „motor overtemperature alarm“ (H)

HIGH signal: „Motor overtemperature“ alarm

Significance
- It involves „motor I^2t alarm“ (A029).
- The prerequisite for the alarm is fulfilled by calculating the motor load (r008).
- Parameters used in the calculation: P362 (Motor cooling), P363 (Mot.ThermT-Const), P364 (Mot. Load Limits).

Chapter 12 „Fault and alarm messages“

Output at the terminal strip (PEU, CU, TSY, SCI1/2) with L signal.

Bit 26: Signal, „motor overtemperature fault“ (H)

HIGH signal: High signal: „motor overtemperature“ fault

Significance
- It involves a „motor I^2t fault“ (F021).

Chapter 12 „Fault and alarm messages“

Output at the terminal strip (PEU, CU, TSY, SCI1/2) with L signal.

Bit 27: Signal, „technology controller actual value greater than technology controller setpoint“ (H)

HIGH signal: The technology controller actual value (r534) is greater than the technology controller setpoint (r529).

Significance
- The signal is set when the technology controller setpoint is exceeded.
- If the technology controller actual value becomes less than the technology controller setpoint, a hysteresis (P535) is also taken into account.

Bit 28: Signal, „motor stall“ (H)

HIGH signal: „Motor stalled or locked rotor“ fault (F015)

Significance
- The drive has either stalled or the rotor is locked.

Chapter 12 „Fault and alarm messages“

Output at the terminal strip (PEU, CU, TSY, SCI1/2) with L signal.

Bit 29: Signal, „bypass contactor energized“ (H)

HIGH signal: The bypass (pre-charging) contactor is energized (closed).

Significance
- A bypass contactor (option) can be energized (closed) with the appropriate wiring and parameterization.

Chapter „Options“ in the Operating Instructions, Part 1

Bit 30: Reserved

Bit 31: „Pre-charging active“ signal (H)

HIGH signal: PRE-CHARGING (010) status

Significance
- Pre-charging is executed after an ON command.

5.3 Setpoints

Introduction and application example

The setpoints are process data in the sense of the explanation in Section 3.2.

An individual source can be parameterized for every setpoint, from which the setpoint may be entered (fixed values, analog inputs, PMU, PZD part of the telegram from automation units).

The select parameters for the sources are indexed twice:

Index i001: Basic setting (BASE)
Index i002: Reserve setting (RES)

One parameter is available for the setpoints to „connect“ the source(s).

Example for connecting-up the sources:

The main setpoint should be „connected“ to analog input 1 of the CU (terminal -X102:27,28) as voltage input in the basic setting:

- From the setpoint table, it is possible to identify that the factory setting of parameter P443.1 of the main setpoint value is 1002
- In table B for the possible sources of the main setpoint, it can be seen that 1002 corresponds to the „motorized potentiometer“ source.
- In the setpoint table, it can be seen that the possible sources for the main setpoint are written into tables X, Y and B.
- The parameter value for the required source is searched for in tables X, Y and B. For analog input 1 of the CU, the value is found in Table X. The result is 1003.
- This parameter value must now be entered into parameter P443.1.

Designation	Parameter	Possible sources	Parameter value	Required source wiring
Main setpoint (GRD)	P443.1	Tab.X,Y,B	1003	AE1 terminal -X102:27,28,29

An amplification factor (P444.1) is available for parameter P443.1, which can be set as required.

		Gain	Normalization	Visualization
Supplementary setpoint	P428	P429	4000Hex = P420	r431
Main setpoint	P443	P444	4000Hex = P420	r447
Technology controller setpoint	P526	P527	4000Hex = 100 %	r529
Technology controller actual value	P531	P532	4000Hex = 100 %	r534

Table 5.1 Interdependecies of the parameters for gain, normalization and visualization

5.3.1 Overview of the setpoints

Designation	Param. No. BAS (RES)	Fac. setting BAS (RES)	Possible sources	Gain BAS (RES)	Fac. set. BAS+RES
Supplementary setpoint 1	P428.1 (2)	0 (0)	Tab.X, A	P429.1 (2)	100.00
Main setpoint	P443.1 (2)	1002 (1001)	Tab.X, B	P444.1 (2)	100.00
Technology controller setpoint	P526.1 (2)	0 (0)	Tab.X, A	P527.1 (2)	100.00
Technology controller actual value	P531.1 (2)	0 (0)	Tab.X, C	P532.1 (2)	100.00

Table 5.2 Setpoints

5.3.2 Selecting the possible setpoint sources

Table X

CU BOARD	
Value	**Source**
0000	Constant setpoint 0
1003	Analog input 1
1004	Analog input 2
2002	SST1 word 2
2003	SST1 word 3
2004	SST1 word 4 1)
…	Consecutively to
2016	SST1 word 16
OPTIONS	
Value	**Source**
3002	PT/CB word 2
3003	PT/CB word 3
3004	PT/CB word 4 3)
…	Consecutively to
3016	PT/CB word 16
4101	SCI1, slave1, AE1
4102	SCI1, slave1, AE2
4103	SCI1, slave1, AE3
4201	SCI1, slave2, AE1
4202	SCI1, slave2, AE2
4203	SCI1, slave2, AE3
4501	SCB1/2 (peer to peer) word 1 4)
4502	SCB1/2 (peer to peer, USS) word 2
4503	SCB1/2 (peer to peer, USS) word 3
4504	SCB1/2 (peer to peer, USS) word 4 5)
…	Consecutively to
4505	SCB1/2 (peer to peer, USS) word 5
4506	SCB2 (USS) word 6
…	Consecutively to
4516	SCB2 (USS) word 16

Table A

Value	Source
1001	Fixed setpoint – for source P428: P421 to P424 – for source P526: P525
1020	Technology controller output

Table B

Value	Source
1001	Fixed setpoint (P421 to P424)
1002	Motorized potentiometer
1020	Technology controller output

Table C

Value	Source
1100	Technology controller actual value 1: P530.1
1200	Technology controller actual value 2: P530.2

1) only when word4 is not assigned for „control word2“ with 2004 (Section 5.1)
2) only if word4 is not assigned for „control word2“ with 6004 (Section 5.1)
3) only if word4 is not assigned for „control word2“ with 3004 (Section 5.1)
4) only if word1 is not assigned for „control word2“ with 4501 (Section 5.1)
5) only if word4 is not assigned for „control word2“ with 4504 (Section 5.1)

5.4 Actual values

Actual values are process data in the sense of the explanation in Section 3.2.

Three destinations are available in the basic version to output actual values.
Three additional output devices can be parameterized via option boards.

The contents of all available parameters of the basic drive converter can be selected as output values.

In order to connect a parameter to a destination, its parameter number must be entered in the selected destination parameter.

NOTES
♦ When selecting an indexed parameter, the value of the first index is always output! ♦ When entering a „0“ instead of a parameter number, an output is not made to the appropriate destination!

Destinations:

P530 „ActVal's ProcReg“
Output at the technology controller actual value input
Indices: i001 Value 1 for the technology controller actual value input (P531 = 1100)
i002 Value 2 for the technology controller actual value input (P531 = 1200)
Chapter 10 „Function diagrams, closed-loop control“

P655 „CU-AA actual values“
Output via the CU control terminal strip (Chapter 1)
Analog output (-X102:34 / reference potential -X102:33)
Section 6.4 „Analog output“

P680 „SCom1 Act Value“
Output via the basic converter interface SST1
Indices: i001 Word 01 of the telegram (PZD)
⇓ ⇓
i016 Word 16 of the telegram (PZD)
Section 6.5 „Basic converter interface SST1“

Destination, options:

P664 „SCI-AA actual values“
Output via the SCB1 interface with SCI1
🗍 Instruction Manual for the option boards
Indexes i001 Destination: Analog output 1 from slave 1
i002 Destination: Analog output 2 from slave 1
i003 Destination: Analog output 3 from slave 1
i004 Destination: Analog output 1 from slave 2
i005 Destination: Analog output 2 from slave 2
i006 Destination: Analog output 3 from slave 2

P690 „SCB actual values“
Output via the SCB1 interface with peer-to-peer protocol or SCB2
🗍 Instruction Manual for the option boards
Indexes: i001 Destination: Word 01 of the telegram (PZD)
⇓ ⇓
i016 Destination: Word 16 of the telegram (PZD)

P694 „CB/TB actual values“
Output via the CB or TB interface
🗍 Instruction Manual for the option boards and Sections 6.5.2 „DPR“
Indices: i001 Destination: Word 01 of the telegram (PZD)
⇓ ⇓
i016 Destination: Word 16 of the telegram (PZD)

NOTE
For telegram data transfer (P680, P690, P694), it is generally necessary/practical to assign „word 01 of the telegram (PZD)“ with status word 1 (r968 or r552)!

Normalization:

The values of the parameters to be output are weighted with the normalization relationship specified in the parameter list.
For example, r004 (output current) is referred to 4 x P102 (Mot.curr(n)), i.e. 100 % corresponds to 400 % rated motor current.

Examples:

1) Technology controller

The output power (r005) of the control should be fed to the technology controller as second actual value.

P530.02 = 005

P531.01 = 1200 (basic setting)

6 Interfaces

6.1 Binary inputs

Five binary inputs (24 V) **which can be parameterized** are available at the control terminal strip of board CU (-X101). These inputs can be used to input commands, external faults/alarms as well as checkback signal at the control word of the drive converter.

Connecting-up: ☞ Chapter 1 „Control terminal strip“.

Parameterization: ☞ Section 5.1 „Control word“.

Factory setting (valid for standby operation)**:**

Binary input	Command HIGH	Command LOW	Control word bit	Parameter
1	ON	OFF1	0	P554.2 = 1001 (reserve)
2	ON	OFF2 (electrical)	1	P555.2 = 1002 (reserve)
3	Acknowledge		7	P565.2 = 1003 (reserve)
4	FSW-Bit 0 = 1	FSW-Bit 0 = 0	20	P580.2 = 1004 (reserve)
5	Reserve setting	Basic setting	30	P590 = 1005

Table 6.1 Binary inputs

6.2 Binary outputs

There are **two binary outputs which can be parameterized**.
These outputs can be used to output signals and external commands of the drive converter status word.

Connecting-up: Binary output 1 at the basic drive converter (connector -X9):
☞ Section „Auxilary power supply / main contactor“ in Operating Instructions, Part 1
Binary output 2 on the control terminal strip of board CU (connector -X100):
☞ Chapter 1 „Control terminal strip“

Parameterization: ☞ Section 5.2 „Status word“.

Factory setting (not valid for cabinet units)**:**

Binary output	Connector, location	Signal HIGH	Signal LOW	Status-word bit	Parameter
1	-X9	Main contactor energized	Main contactor not energized	12	P612.1 = 1001
2	-X100 on the CU	Fault	No fault	3	P603.1 = 1002

Table 6.2 Binary outputs

NOTE
Faults, alarms and power-on inhibit (HIGH active) are displayed as **LOW active via the terminal strip (binary outputs)** ☞ Section 5.2 „Status word“.

6.3 Analog inputs

Control board CU has 2 analog inputs (AI), which can be used to input setpoints via voltage- or current signals or as speed actual value input (Connection ☞ Chapter 1).

Technical data:

Setpoint input via voltage	Setpoint via current	Speed actual value input
♦ Input voltage range: • –10 V to +10 V • 0 V to +10 V • + 2 V to +10 V ♦ Resolution 20 mV (9 bit + sign) ♦ Accuracy ± 0,6 % ♦ Stability at ΔT = 10 K: 0,2% ♦ Smoothing 3.5 ms	♦ Input current range: • –20 mA to +20 mA • 0 mA to 20 mA • 4 mA to 20 mA ♦ Resolution 0,04 mA (9 bit + sign) ♦ Accuracy ± 0,7 % ♦ Stability at ΔT = 10 K: 0,2% ♦ Smoothing 3.5 ms	♦ Input voltage range: ♦ –10 V to +10 V (use the ATI board for higher tachometer voltages!) ♦ Use a shielded cable and connect at one end to the drive converter.

Table 6.3 Technical data of the analog inputs

Using P208.x, it can be defined as to whether the analog input should be used as tachometer input (refer to Section 6.3.2).

P208.x	Analog input AE1	Analog input AE2
3	Analog tach. input	
4		Analog tach. input

Table 6.4 Speed feedback

6.3.1 Analog input as setpoint input

Signal flow for any setpoint; the overview of the possible setpoints is located in Section 5.3.1. (☞ Function diagrams „Analog inputs“, Chapter 10):

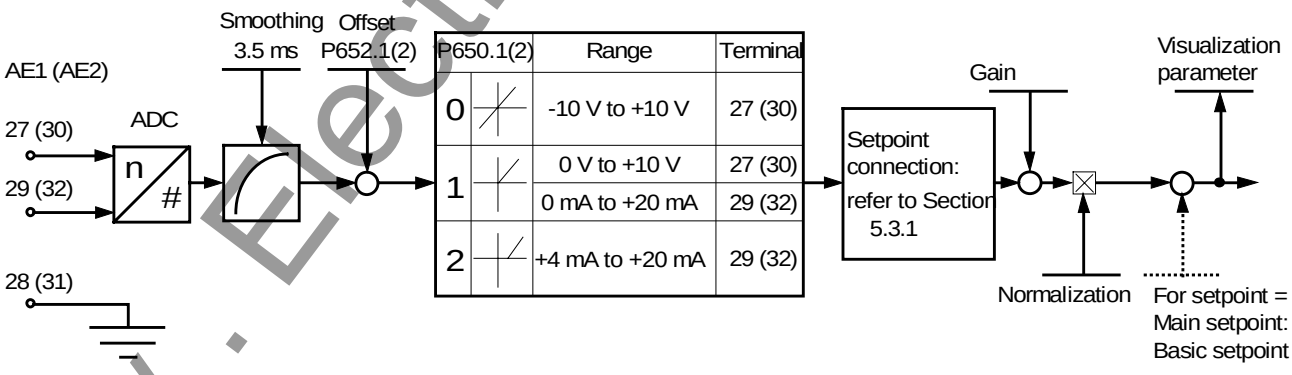


Fig. 6.1 Analog input as setpoint input

Parameters for gain, normalization and visualization belonging to a specific setpoint connection:

		Gain	Normalization	Visualization
Supplementary setpoint	P428	P429	10 V = P420	r431
Main setpoint	P443	P444	10 V = P420	r447
Technology controller setpoint	P526	P527	10 V = 100 %	r529
Technology controller actual value	P531	P532	10 V = 100 %	r534

Table 6.5 Inter-relationships between parameters for gain, normalization and visualization

Parameterization:

- Connect the setpoint to the required analog input
  (e.g.: P443.1 = 1003: The main setpoint is connected to analog input 1 (basic setting)).
- P650.1(2) = Defines the input signal for analog input 1(2)
  (± 10 V, 0 to 10 V / 0 to 20 mA, 4 to 20 mA).

NOTE
For P650 = 2 (4 to 20 mA), setpoints < 2 mA result in a fault trip (wire breakage monitoring function)

- When required, adjust the zero point (offset adjustment) for setpoint input '0'.
  In this case, P652.1(2) is changed until the setpoint visualization parameter (corresponding to Table 6.5) is '0', e.g. r447.
- When required, set the gain (parameter according to Table 6.5) e.g. P444.

Calculating the gain using as an example, the main setpoint (including the basic setpoint):

Values X_1 to X_2 at the analog input should be represented at setpoints Y_1 to Y_2.

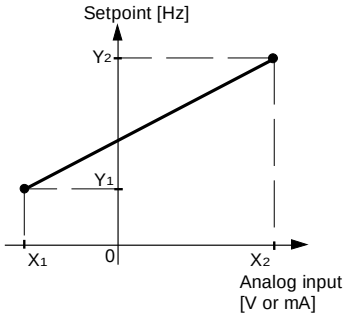


Fig. 6.2 Gain

- ±10 V and 0 to 10 V:

$$P444.x = \frac{10\ V}{X_2 - X_1} \times \frac{Y_2 - Y_1}{P420} \times 100\%$$

$$P445.x = \frac{X_2 Y_1 - X_1 Y_2}{X_2 - X_1} \times \frac{1}{P420} \times 100\%$$

- 4 mA to 20 mA:

$$P444.x = \frac{16\ mA}{X_2 - X_1} \times \frac{Y_2 - Y_1}{P420} \times 100\%$$

$$P445.x = \frac{(X_2 - 4\ mA) \times Y_1 - (X_1 - 4\ mA) \times Y_2}{X_2 - X_1} \times \frac{1}{P420} \times 100\%$$

Example of setpoint input via analog input:

In the basic setting, the main setpoint for motor data set 1 should be entered via analog input 1.

Setting range: 0 to 10 V should correspond to + 15 Hz to + 50 Hz.

Rated system frequency P420 = 50 Hz.

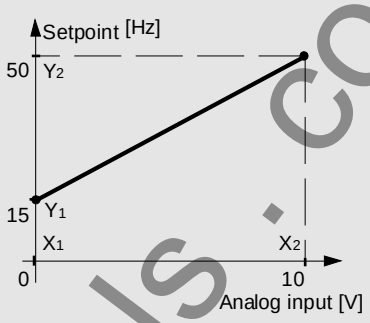


Fig. 6.3 Setpoint input via analog input

Parameterization:

- P443.1 = 1003 The basic setting for the main setpoint is connected to analog input 1.
- P650.1 = 1 The input voltage range for AE1 is set to 0 to 10 V
- P651.1 = 4 The smoothing time constant of AE1 is 4 ms (if required, change).
- P652.1 = 0.000 AE 1 does not have a zero point deviation. When required, change P652.1 until the main setpoint, r447=0, for setpoint input '0'.
- Set gain P444.1 and basic setpoint P445.1:

$$P444.1 = \frac{10\,V}{10\,V - 0\,V} \times \frac{50\,Hz - 15\,Hz}{50\,Hz} \times 100\,\% = 70\,\%$$

$$P445.1 = \frac{10\,V \times 15\,Hz - 0\,V \times 50\,Hz}{10\,V - 0\,V} \times \frac{1}{50\,Hz} \times 100\,\% = 30\,\%$$

Example without offset (P420 = 50 Hz):

- P445 = 0
- Setting range ± 10 V ≙ ± 50 Hz : P444 = 100 %
  ± 10 V ≙ ± 100 Hz : P444 = 200 %

6.3.2 Analog input as speed actual value input

For drive converter output frequencies up to 100 Hz, an analog tachometer can be used for speed sensing. Generally, the ATI option is used as interface between the tachometer and board CU.

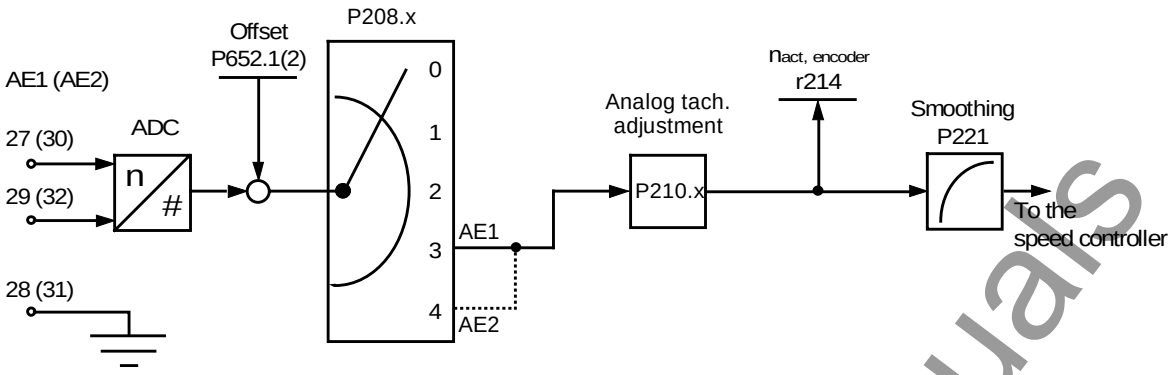


Fig. 6.4 Analog input as speed actual value input

Parameterization:

- P052 = 5 „Drive setting“ function
- P053 = 3 „Expert mode“ access stage
- P208.x = 3 The speed actual value is received via analog input 1,
  or 4 speed actual value is received via analog input 2.
- P210.x = Enter the maximum occuring speed (in RPM) (it is absolutely necessary that the speed overshoot is taken into account - typical value: 10 %!).
  An input signal of 10 V at the analog input corresponds to the speed set here.
- P163.x = 1 control with V/Hz characteristic
- P052 = 0 Return from the „drive setting“ function
- With the motor stationary, select r214 (n(act, encoder)), and if required, adjust the zero point using P652.1(2).
- If possible, de-couple the motor from the load.
- Power-up the unit and operate the drive at various speeds. Measure the speed, for example, using a hand-held tachometer, and adjust the potentiometer on the ATI board so that the measured value coincdies with the display in r214.
- If the motor is operated under no load (no-load operation), it is adjusted, if the setpoint and actual value speeds are the same (r482 = r214).
- P651.1(2) smoothing time constant ineffective, use P221 for smoothing.
- P052 = 5 „Drive setting“ function
- P163.x = 0 V/Hz+speed control
- P052 = 0 Return from „drive setting“
- When required, the speed actual value can be smoothed via P221, and a maximum value for the permissible speed change entered using P215 (☞ the function diagrams in Chapter 10).

Special case: The tachometer voltage at the maximum occuring speed is < 10 V.

- Connect the tachometer voltage directly at the analog input.
- Set P210.x to that speed, where the tachometer voltage is 10 V (the value can exceed the maximum occuring speed).

Example for using the analog input as speed actual value input:

The speed actual value is to be fed in via analog input 2.

Tachometer and system data: Analog tachometer with 30 V / 1000 RPM
Speed at the maximum setpoint: 1700 RPM

Parameterization:

- Ground the tachometer cable shield at 1 end, at the drive converter.
  If noise is coupled-in, connect a 100 nF capacitor to the motor housing.
- P052 = 5 „Drive setting“ function
- P053 = 3 „Expert mode“ access stage
- P208.1 = 4 Connect the speed actual value to analog input 2.
- P210.x = Enter the maximum occuring speed (in RPM):
  1700 RPM + e.g. 8 % for overshoot → 1836 RPM.
- Tachometer voltage at the maximum speed: 55 V -> the ATI board is required.
- P163.1 = 1 Control with V/Hz characteristic
- P052 = 0 return from the „drive setting“
- With the motor stationary, select r214, and if required, adjust the zero point using P652.2.
- Power-up the unit and operate the drive at various speeds (e.g. 500, 1000 and 1500 RPM). Measure the speed, for example, using a handheld tachometer, and adjust the potentiometer on the ATI board so that the measured value coincides with the display in r214 (the display is realized in Hz).
- Specify additional steps as above.

6.4 Analog output

The CU control board has 1 analog output (AO) to output actual values and other internal quantities of the drive converter (Connection ☞ Chapter 1).

Technical data:

- Output voltage range –10 V to +10 V
- 40 mV resolution (8 bits + sign)
- Accuracy ± 2 %
- Output current, max. ± 5 mA
- Short-circuit proof
- Not floating

  Additional details, ☞ Function diagram „Analog output“, Chapter 10.

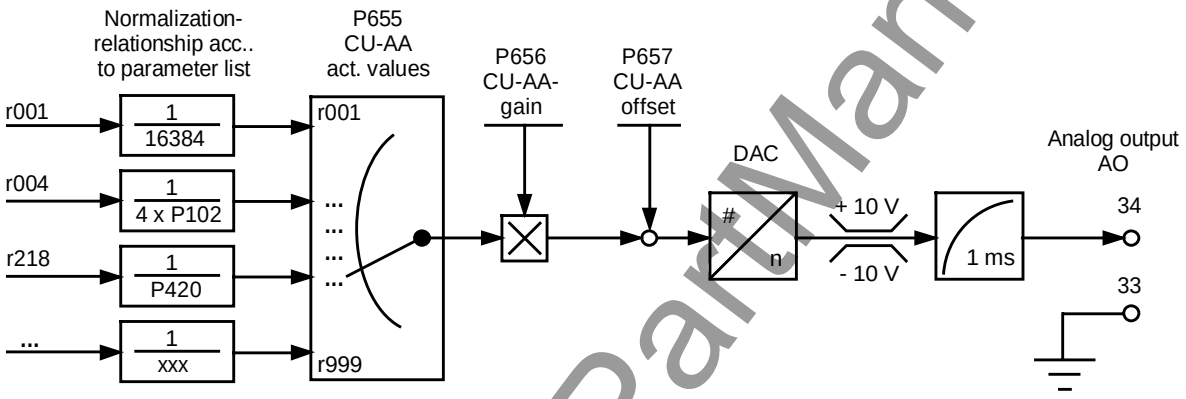


Fig. 6.5 Analog output

Normalization:

The values of the parameters to be output are weighted with the normalization relationships specified in the parameter list (e.g. r004 (output current) referred to 4 x p102 (rated motor current).

Example:

P656 = 10 V
Analog output = 10 V, if r004 = 4 x P102

P656 = 40 V
Analog output = 10 V, if r004 = P102

Parameterization:

- The number of the parameter, whose value is to be output at the analog output, is entered in P655 (CU-AA actual values).
  - Corresponding to points X_2,Y_2 and X_1,Y_1, the required analog output characteristics are defined, set gain P656 and offset P657:

$$P656 = \frac{Y_2 - Y_1}{(X_2 - X_1) \ / \ \text{ref. quantity}}$$

$$P657 = \frac{(Y_1 X_2) - (Y_2 X_1)}{X_2 - X_1}$$

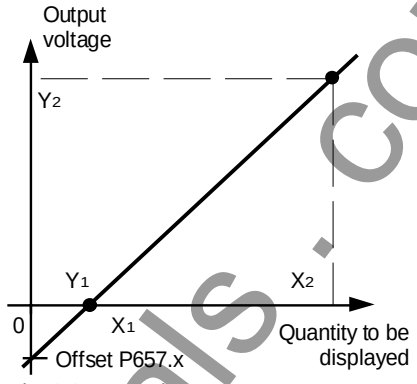


Fig. 6.6 Analog output

1. The output current (r004) should be represented as 0 V to +10 V at the analog output, in the range 32 A to 160 A.
   The rated motor current (P102) is 40.0 A.

Parameterization:

- P655 = 004 The output current is connected to the analog output.
- The reference quantity for r004 is taken from the parameter list. It is 4 x P102.

Set the gain and offset:

- $P656 = \frac{10\ V - 0\ V}{(160\ A - 32\ A) \ / \ (4 \times 40\ A)} = 12.5\ V$

$$P657 = \frac{(0\ V \times 160\ A) - (10\ V \times 32\ A)}{160\ A - 32\ A} = -2.50\ V$$

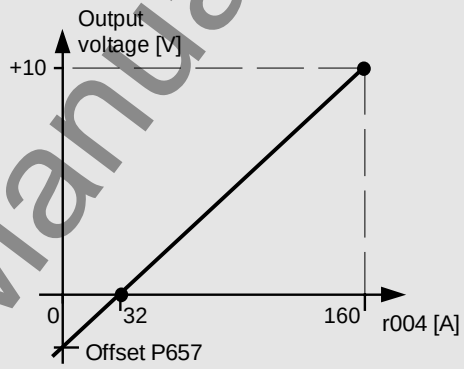


Fig. 6.7 Example, output current at the analog output

2. The frequency actual value (r218) is to be represented from -10 V to +10 V at the analog output from –2 Hz to + 5 Hz.

The rated system frequency (P420) is 100 Hz.

Parameterization:

- P655 = 218 The frequency actual value is connected to the analog output.
- Take the reference quantity for r218 from the parameter list. It is P420.
- Set the gain and offset:

$$P656 = \frac{10\ V + 10\ V}{(5\ Hz + 2\ Hz) \ / \ 100\ Hz} = 285.71\ V$$

$$P657 = \frac{(-10\ V \times 5\ Hz) - (10\ V \times (-2\ Hz))}{5\ Hz + 2\ Hz} = -4.29\ V$$

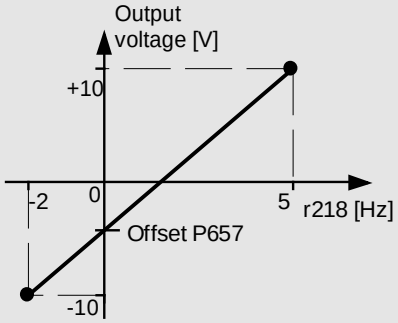


Fig. 6.8 Example, frequency actual value at the analog output

6.5 Serial interfaces

6.5.1 Basic converter interface SST1

The USS protocol (universal serial interface) is implemented at the basic converter interface SST1.

The following documentation is available depending on the particular application of the SST1 basic converter interface:

- Connecting a PC / PG with SIMOVIS software for start-up / service operator control:
  The documentation is provided on SIMOVIS floppy disks in files BEDANLTG.TXT (ASCII format) and BEDANLTG.WRI (WRITE format).
- Connecting higher-level PLCs with the USS protocol:
  SIMOVERT MASTER DRIVES
  Using the serial interfaces with USS protocol
  Order No.: 6SE7087-6CX87-4KB0

Additional general comments regarding connecting-up and parameterization:

- **Connecting-up:** ☞ Chapter 1 „Control terminal strip“

NOTE
Communications can either be realized via the terminal strip of CU -X100 (RS485 standard) **or** the interface connector on PMU -X300 (9-pin SUB D connector / RS485 or RS232 (V24)). **Only one of the two possible connections may be used!**

When connecting SST2 via the terminal strip (-X100), of the CU, a four-wire connection can be implemented. The changeover between two- and four-wire connection is realized automatically.

NOTE
The bus terminating resistors (total 150 Ω) must be switched-in at the last bus node (slave). ☞ Fig. 6.9 for the position of the jumpers S1. • SST1: Close jumpers S1.1 and S1.2 of DIP-FIX S1 on the CU

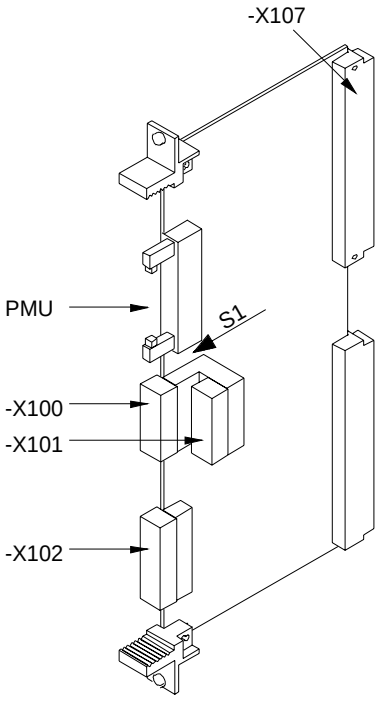


Fig. 6.9 CU

Parameterization:

- Define the process data: **P683 bis P687**
- Connect process data (control word, status word, setpoints, actual values) to the interfaces
  ☞ Chapter 5 „Process data“
- Enabling parameterization: **P053 oder P927**

6.5.2 Dual port RAM (DPR for SCB, TSY, CB, TB)

The dual port RAM is the internal interface on the CU (-X107) to connect possible option boards via the LBA (Local Bus Adapter, option) of the electronics box.

Possible option boards:

- TSY (tachometer- and synchronization board),
- TB (Technology board),
- SCB (serial communications board),
- CB (Communications board).

To connect possible option boards and parameterize the interface, ☞ Chapter „Options“ in the Operating Instructions, Part 1 as well as the Operating Instructions of the option boards.

Additional information, ☞ Chapter 5 „Process data“.

6.6 Ramp-function generator (RFG) and limiting stage in front of the ramp-function generator

A detailed description as supplement to the „Function diagrams, setpoint channel CU“, Chapter 10

6.6.1 Ramp-function generator, RFG

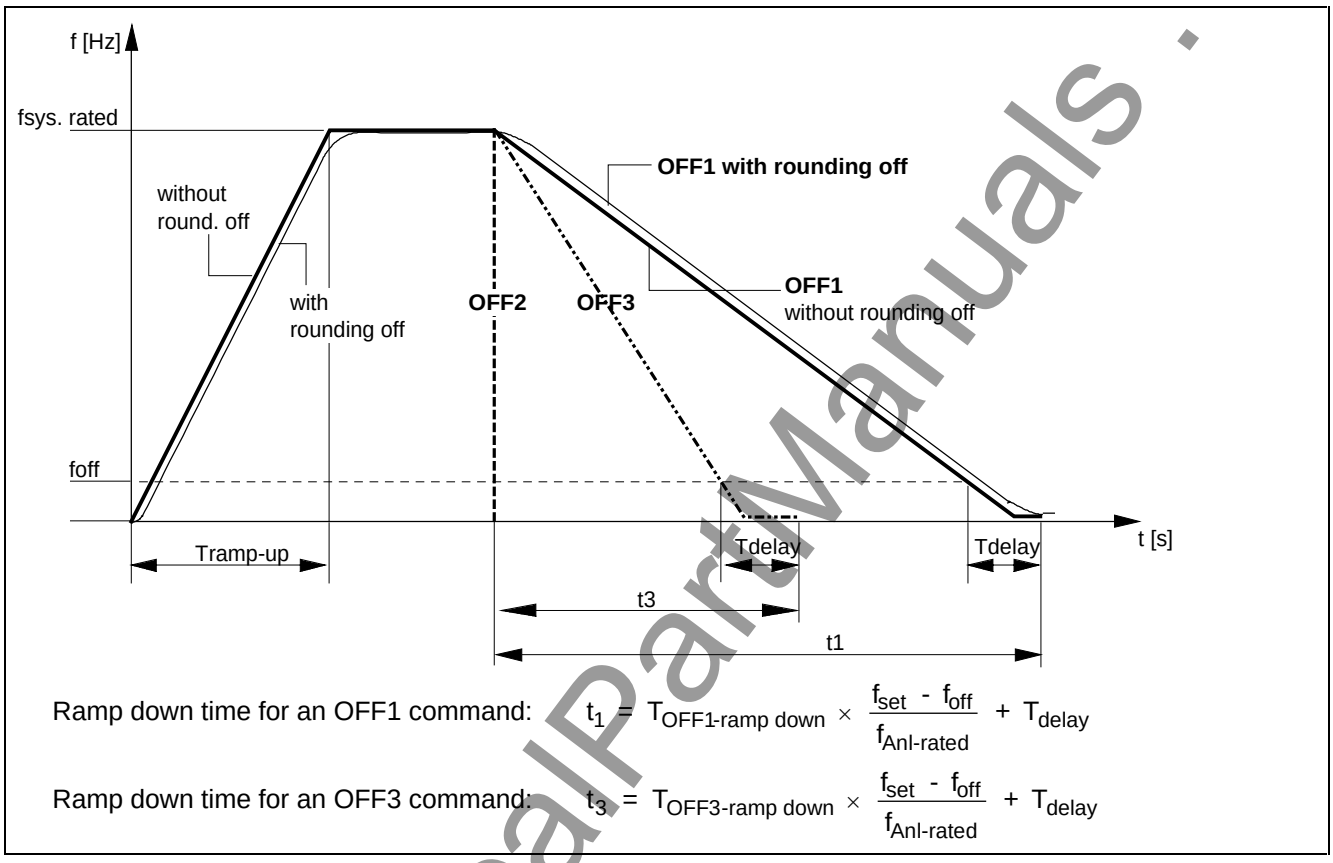


Fig. 6.10 Ramp-function generator

For a detailed description of the OFF1-, OFF2- and OFF3 commands, refer to Section 5.1.2 „Control word 1“

Parameters for setting the acceleration time

P420	Rated system frequency ($f_{rated\ system}$)		1.00 Hz to 300.00 Hz

P462	Acceleration time ($T_{ramp\text{-}up}$)	i001 i002	SDS1 SDS2	0.1 s to 999.9 s
Acceleration time from standstill up to rated system frequency (P420)				

P464	Deceleration time ($T_{deceleration}$)	i001 i002	SDS1 SDS2	0.1 s to 999.9 s
Deceleration time in s from the rated system frequency (P420) down to standstill				

P466	OFF3 deceleration time ($T_{off\ 3\ deceleration}$)	0.1 s to 999.9 s
Deceleration time for the OFF3 command (if DC braking, P372 is not selected) in s from the rated system frequency (P420) down to standstill. Rounding-off (P468) is de-activated.		

P467	Protective ramp-up Kp	i001 SDS1 i002 SDS2	1.0 to 100.0

Factor from 1.0 to 100.0 referred to the acceleration time, P462 to enter a protective ramp-up time.

Using the protective ramp-up, the acceleration time up to 15% of the rated motor frequency (P107) can be extended (☞ Fig. 6.11 „Protective ramp-up“).

Protective ramp-up is not activated for 1.0.

The total run-up (acceleration time) can be calculated according to

$$\text{total run-up} = P462 + P462 \times \frac{15}{100} \times \frac{P107}{P420} \times (P462 - 1)$$

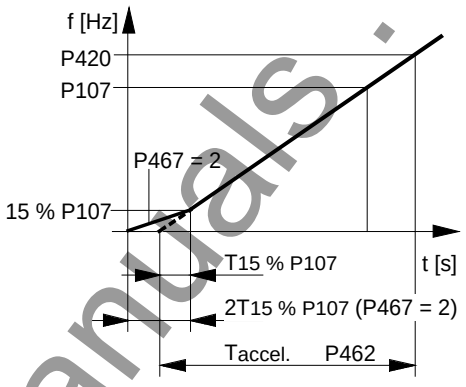


Fig. 6.11 Protective ramp-up

P468	Rounding-off	i001 SDS1 i002 SDS2	0 % to 50 %

Rounding-off in % referred to the acceleration time, P462 when accelerating or the deceleration time, P464, when decelerating.

- Example: Acceleration time P462, = 10 s rounding-off = 10 %. Thus, a rounding-off time of 1s is obtained.
  The same is valid for the deceleration time.
- If the motorized potentiometer is active (control word bits 13 and 14 set, ☞ Section 5.1), rounding-off is not realized.

P514	OFF shutdown frequency (f_{off})	0.00 Hz to 300.0 Hz
As soon as the „speed/frequency actual value“ r218 reaches the OFF shutdown frequency, P14 when the drive decelerates (OFF1 or OFF3 without DC braking, P372), then the OFF delay time P516, starts to run. After this, the inverter pulses are inhibited.		

P516	OFF delay time (T_{delay})	i001 SDS1 i002 SDS2	0.0 s to 60.0 s
Delay time for OFF1 and OFF3 (if no DC braking, P372 is selected for OFF3) in s. As soon as the „speed/frequency actual value“ (r218) reaches the OFF shutdown frequency (P514) when the drive decelerates, the OFF delay time starts to run. The inverter pulses are then inhibited.			

Further, it is still possible to inhibit or hold the ramp-function generator via the „Control word“ (Section 5.1).

6.6.2 Limit value stage in front of the ramp-function generator

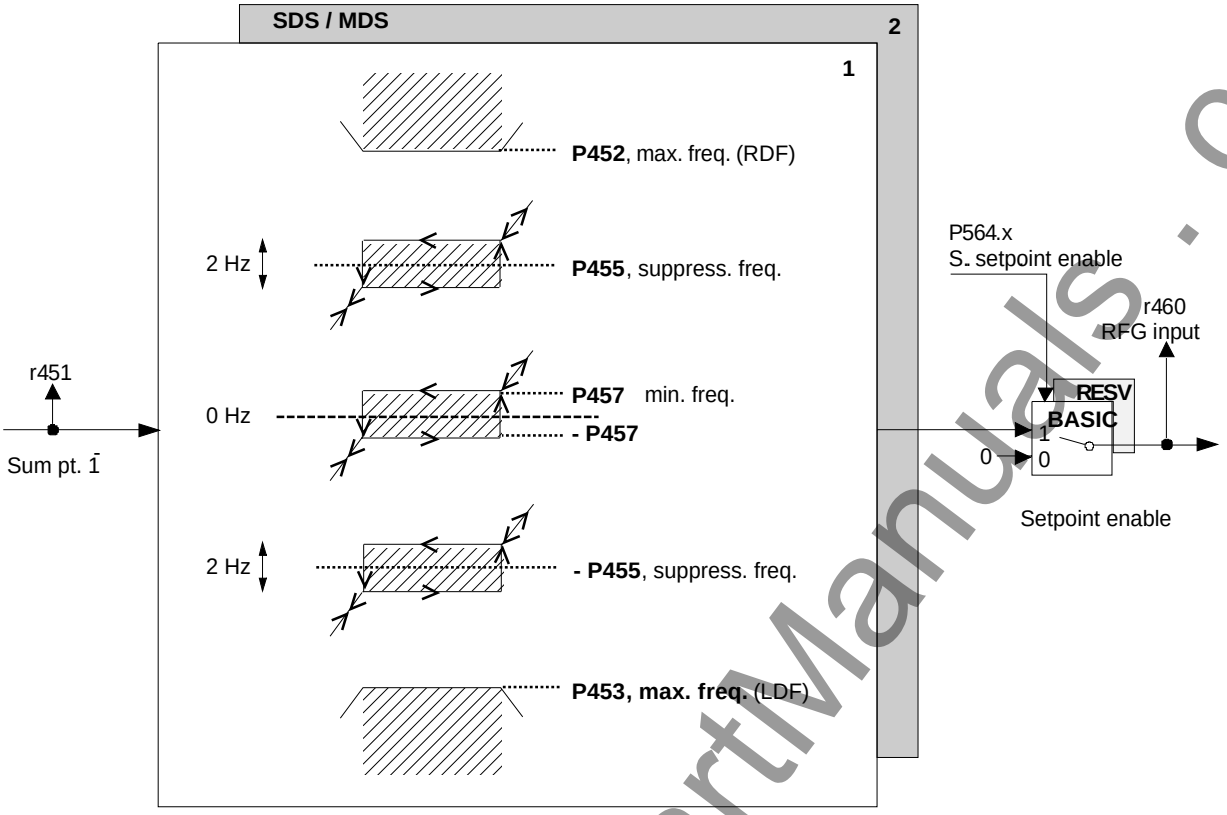


Fig. 6.12 Limit value stage before the ramp-function generator

P452	Max. frequency (RDF) Clockwise phase sequence	i001 i002	MDS1 MDS2	0.0 Hz to 300.0 Hz
Max. setpoint frequency for a clockwise phase sequence				

P453	Max. frequency (LDF) Counter-clockwise phase sequence	i001 i002	MDS1 MDS2	– 300.0 Hz to 0.0 Hz
Max. setpoint frequency for a counter-clockwise phase sequence				

P455	Suppression frequency	i001 i002	SDS1 SDS2	0.0 Hz to 300.0 Hz

Frequency suppression of ± 1 Hz on each side of the parameterized suppression frequency (is valid for positive and negative setpoints), in order to prevent steady-state drive operation at possible resonant frequencies.

- Steady-state operation in a parameterized 2 Hz suppression bandwidth is therefore not possible; the range can only be run-through.
- For a setpoint at summation point 1 in front of the ramp-function generator, r451, which lies within the suppression bandwidth, the setpoint, increasing from below is held at the lower limit, and the setpoint decreasing from above, is held at the upper limit.
- The suppression bandwidth is **not** activated when a suppression frequency of 0.0 to 1.0 Hz is entered.

P457	Min. frequency	i001 i002	SDS1 SDS2	–300.0 Hz to 300.0 Hz ≤ Max. frequency LDF/RDF

It is possible to realize a 0 Hz frequency suppression using the minimum frequency.

- Steady-state operation in the range 0 Hz ± minimum frequency is therefore not possible; the range can only be run-through.
- After the drive has been switched-on, and for a setpoint at summation point 1 in front of the ramp-function generator, r451, in the range from 0 Hz up to the positive minimum frequency, the positive minimum frequency is approached, and in the range 0 Hz to the negative minimum frequency, the negative minimum frequency.
- In operation, and for a setpoint at summation point 1 in front of the ramp-function generator, r451, in the suppression bandwidth (0 Hz ± minimum frequency), the setpoint, increasing from below is held at the lower limit, and the setpoint decreasing from above, is held at the upper limit.
- The drive can be reversed by entering a setpoint (reference) frequency at summation point 1, which lies outside the suppression bandwidth.

7 Open-loop and closed-loop control types

7.1 V/f characteristic

A detailed description as supplement to the „Function diagrams, V/f characteristic“, Section 4.4

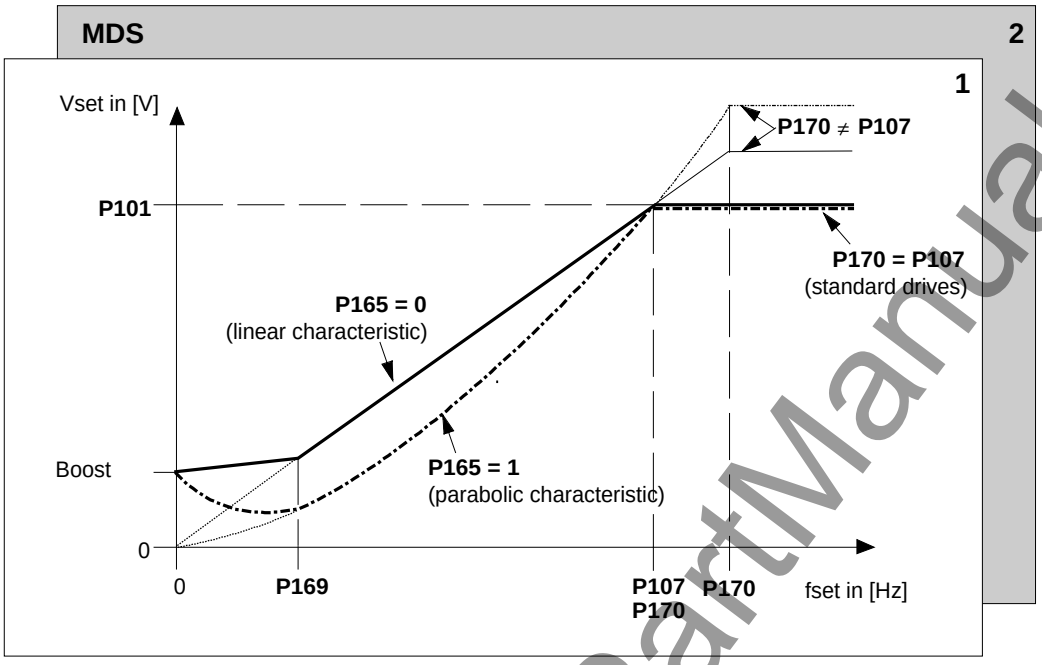


Fig. 7.1 V/f characteristic

Boost:
- P166 = 0: current reference: P167 (taking into account P272)
- P166 = 1: voltage reference: P168
- P171: Acceleration current

P101	Motor voltage (n)	i001: MDS1 i002: MDS2	115.0 V to 1600.0 V
Rating plate value of the rated motor voltage (observe whether the motor is connected in star or delta!) For SIMOSYN motors: Voltage at the rated drive frequency			

P107	Motor frequency (n)	i001: MDS1 i002: MDS2	8.0 Hz to 300.0 Hz
Rating plate value of the rated motor frequency			

P165	Characterisic	i001: MDS1 i002: MDS2	0 and 1
V/f characteristic type: 0: Linear characteristic (constant-torque drives) 1: Parabolic characteristic (fans and pumps)			

P166	Boost	i001: MDS1 i002: MDS2	0 and 1

Select the boost reference type (for high-inertia starting and compensating the ohmic voltage drops across the motor feeder/stator winding of the drives at low frequencies):

0: Current reference via P167
Voltage for f = 0 Hz for the starting current (conversion using P272 (R (stator + feeder cable))

1: Voltage reference via P168
Voltage for f = 0 Hz

P167	Boost current	i001: MDS1 i002: MDS2	10.0 % to 400.0 %

Only valid for current reference: (P166 = 0)

Boost current for f=0 Hz as a % referred to the rated motor current (P102)

- The boost current is reduced to 0 when the boost end frequency (P169) is reached.
- The boost current is converted into a voltage boost taking into account (P272 (R (stator + feeder cable)).

NOTE

P272 (R(stator + feeder cable)) should be calculated or measured using „Automatic parameterization“ or even better, using „motor identification“ (function selection P052, ☞ Section 8.1)!

P168	Boost voltage	i001: MDS1 i002: MDS2	10.00 % to 25.00 %

Only valid for voltage reference: (P166 = 1)

Boost voltage at f = 0 Hz as a % referred to the rated motor voltage (P101)

- The boost voltage is reduced to 0 when the „boost end frequency“ (P169) is reached.
- P168 is calculated during „automatic parameterization“ or „motor identification“ (function selection P052, ☞ Section 8.1).

P169	Boost end frequency	i001: MDS1 i002: MDS2	0.0 Hz to 300.0 Hz

In the range from 0 Hz up to the boost end frequency, the voltage boost value (P167 or P168) is reduced to 0

- Special case:
  For P169 = 0.0 Hz and specified voltage boost (P167 ≠ 0 % or P168 ≠ 0 %), the voltage from 0 Hz up to the intersection point of the non-boosted V/f characteristic is kept constant to the value corresponding to the reference entered using P167 or P168 (horizontal boost).
- P169 is set to 20% of the rated motor frequency (P107) using the „automatic parameterization“ (function selection P052, ☞ Section 8.1).

P170	Field weakening frequency	i001: MDS1 i002: MDS2	8.0 Hz to 300.0 Hz

Frequency at the start of field weakening

- The voltage is kept constant above this frequency limit. When the conveter voltage limit (r181) is reached before this frequency, field weakening is started appropriately earlier. The actual field-weakening frequency can be read from parameter r182 (field weakfrq(act)).
- P170 is set to the rated motor frequency (P107) (standard drives) during „automatic parameterization“ (function selection P052, ☞ Section 8.1).

P171	Acceleration current	i001: MDS1 i002: MDS2	0.0 % to 799.9 %
Acceleration current (supplementary boost current) for active acceleration for high-inertia starting as a [%] referred to the rated motor current (P102) ♦ The acceleration current is only switched-in up to the „boost end frequency“ (P169). ♦ The acceleration current is converted into a voltage boost taking into account P272 (R(stator total)).			
NOTE			
P272 „R(stator, total)“ should be calculated or measured using „automatic parameterization“ or even better using „motor identification“ (function selection P052, ☞ Section 8.1!			

Further, it is possible,

- to set load-dependent voltage injection to compensate for voltage drops across the motor feede cables using P172 „IxR compensation Kp“.
- to set soft starting P190 (to ramp-up the characteristic voltage when powering-up within the excitation time P189).

8 Start-up functions

8.1 Function selection (P052)

Function selection is activated via parameter **P052** and permits various special functions during the start-up phase.

Condition: Access stage 2 (**P051 = 2**) must be enabled and the converter may only be in the „Run“ (R) status.

The following functions are available:

- Return from function selection (P052 = 0)
- Factory setting (P052 = 1)
- Initialization (P052 = 2)
- Download (P052 = 3)
- Hardware configuration (P052 = 4)
- Drive setting (P052 = 5)
- Automatic parameterization (P052 = 6)
- Motor identification at standstill (P052 = 7)

The „factory setting“, „automatic parameterization“, and „motor identification at standstill“ functions are automatically reset after completion, i.e. P052=0 („return“).

The other functions must be manually reset!

P052 = 5 can be exited using P052 = 0, 6, 7, 8, 11.

P052 = 6 can only be selected from the "drive setting" (P052 = 5).

8.1.1 Factory setting (P052 = 1)

Function: This function is used to establish the factory setting (the same as when the unit was shipped) for all of the parameters (☞ Chapter 11 „Parameter list“). Observe the pre-setting of P077!

Condition: The „factory setting“ can be realized in the status DRIVE SETTING (005), FAULT (007), SWITCH-ON INHIBIT (008) or READY TO SWITCH-ON (009).

Result: In this case, several drive converter- and motor data as well as several open-loop/closed-loop control parameters („automatic parameterization“) are set according to the drive converter type (MLFB dependent / P070).

Procedure:

⇓ P052 = 1 Function selection „Factory setting“

⇓ P key The numbers of the newly-assigned parameters are consecutively displayed:

- Factory setting of **all** parameters according to the parameter list (Chapter 11) (also the board configuration P090/P091)
- Drive converter data (determined from the MLFB of the drive converter (P070)
  P071 Drive converter supply voltage
  P072 Drive converter current (n)
  P073 Drive converter output (n)
- Motor data (determined from the MLFB of the drive converter (P070))
  P101 Motor voltage (n)
  P102 Motor current (n)
  P104 Motor cos phi (n)
  P105 Motor output (n)
  P106 Motor efficiency (n)
  P109 Motor pole pair number
  P173 Imax (max. current)
- Open-loop/closed-loop control parameter
  „Automatic parameterization“ is executed (☞ Section 8.1.5). **All** motor data sets are re-assigned.

⇓ After the factory setting has been completed, SWITCH-ON INHIBIT (008) or READY TO SWITCH-ON (009) are displayed

8.1.2 Initialization (MLFB input) (P052 = 2)

Function: This function is used to change the model No. (unit type).

Condition: „Initialization“ can be realized in the DRIVE SETTING (005), FAULT (007), SWITCH-ON INHIBIT (008) or READY TO SWITCH-ON (009).

Result: When the Model No. **is changed** the factory setting is only **partially** established (as when the unit is shipped), depending on the new model No. The process data connection retained.

Procedure:

⇓ P051 = 3 access stage „Expert mode“ (in order to change P070)

⇓ P052 = 2 function selection „Initialization“

⇓ P070 = MLFB (specifies the MLFB (machine-readable product designation = model No.) of the drive converter (☞ type plate).
When changing the CU, the MLFB corresponding to the drive converter must be input.
When parameterizing via the PMU, the appropriate identification number (PWE) must be specfied in accordance with the following table:

Table of SIMOVERT MASTER-DRIVES

minimum pulse frequency = 1.5 kHz
rated pulse frequency = 3.0 kHz

Brief description of the table columns:

PWE parameter value (enter for initialization / PMU / P070)

I(n) rated drive converter current in A (P072)

V cl. voltage class, voltage range

PWE	Model No.	I(n)	U-Kl.
1	6SE7014-5FB10	4,5	3AC 500-575
2	6SE7014-5UB10	4,5	DC 675-780
3	6SE7016-1EA10	6,1	3AC 380-460
4	6SE7016-1TA10	6,1	DC 510-620
5	6SE7016-2FB10	6,2	3AC 500-575
6	6SE7016-2UB10	6,2	DC 675-780
7	6SE7017-8FB10	7,8	3AC 500-575
8	6SE7017-8UB10	7,8	DC 675-780
9	6SE7018-0EA10	8,0	3AC 380-460
10	6SE7018-0TA10	8,0	DC 510-620
11	6SE7021-0EA10	10,2	3AC 380-460
12	6SE7021-0TA10	10,2	DC 510-620
14	6SE7021-1CA10	10,6	3AC 208-230
15	6SE7021-1RA10	10,6	DC 280-310
16	6SE7021-1FB10	11,0	3AC 500-575
17	6SE7021-1UB10	11,0	DC 675-780
18	6SE7021-3EB10	13,2	3AC 380-460
19	6SE7021-3TB10	13,2	DC 510-620
21	6SE7021-3CA10	13,3	3AC 208-230
22	6SE7021-3RA10	13,3	DC 280-310
23	6SE7021-5FB10	15,1	3AC 500-575
24	6SE7021-5UB10	15,1	DC 675-780
25	6SE7021-8EB10	17,5	3AC 380-460
26	6SE7021-8TB10	17,5	DC 510-620
27	6SE7021-8CB10	17,7	3AC 208-230
28	6SE7021-8RB10	17,7	DC 280-310
30	6SE7022-2FC10	22,0	3AC 500-575
31	6SE7022-2UC10	22,0	DC 675-780
32	6SE7022-3CB10	22,9	3AC 208-230
33	6SE7022-3RB10	22,9	DC 280-310
35	6SE7022-6EC10	25,5	3AC 380-460
36	6SE7022-6TC10	25,5	DC 510-620
37	6SE7023-0FD10	29,0	3AC 500-575
38	6SE7023-0UD10	29,0	DC 675-780
39	6SE7023-2CB10	32,2	3AC 208-230
40	6SE7023-2RB10	32,2	DC 280-310
42	6SE7023-4EC10	34,0	3AC 380-460
43	6SE7023-4TC10	34,0	DC 510-620
44	6SE7023-4FD10	34,0	3AC 500-575
45	6SE7023-4UD10	34,0	DC 675-780
46	6SE7023-8ED10	37,5	3AC 380-460
47	6SE7023-8TD10	37,5	DC 510-620
48	6SE7024-4CC10	44,2	3AC 208-230
49	6SE7024-4RC10	44,2	DC 280-310
50	6SE7024-7FD10	46,5	3AC 500-575
51	6SE7024-7UD10	46,5	DC 675-780

PWE	Model No.	I(n)	U-Kl.
52	6SE7024-7ED10	47,0	3AC 380-460
53	6SE7024-7TD10	47,0	DC 510-620
54	6SE7025-4CD10	54,0	3AC 208-230
55	6SE7025-4RD10	54,0	DC 280-310
56	6SE7026-0ED10	59,0	3AC 380-460
57	6SE7026-0TD10	59,0	DC 510-620
58	6SE7026-0HF10	60	3AC 660-690
59	6SE7026-0WF10	60	DC 890-930
60	6SE7026-1FE10	61	3AC 500-575
61	6SE7026-1UE10	61	DC 675-780
62	6SE7026-6FF10	66	3AC 500-575
63	6SE7026-6UF10	66	DC 675-780
64	6SE7027-0CD10	69,0	3AC 208-230
65	6SE7027-0RD10	69,0	DC 280-310
66	6SE7027-2ED10	72,0	3AC 380-460
67	6SE7027-2TD10	72,0	DC 510-620
68	6SE7028-0FF10	79,0	3AC 500-575
69	6SE7028-0UF10	79,0	DC 675-780
70	6SE7028-1CD10	81,0	3AC 208-230
71	6SE7028-1RD10	81,0	DC 280-310
72	6SE7028-2HF10	82,0	3AC 660-690
73	6SE7028-2WF10	82,0	DC 890-930
74	6SE7031-0EE10	92,0	3AC 380-460
75	6SE7031-0TE10	92,0	DC 510-620
76	6SE7031-0HG10	97,0	3AC 660-690
77	6SE7031-0WG10	97,0	DC 890-930
78	6SE7031-1FG10	108,0	3AC 500-575
79	6SE7031-1UG10	108,0	DC 675-780
80	6SE7031-2HG10	118,0	3AC 660-690
81	6SE7031-2WG10	118,0	DC 890-930
82	6SE7031-2EF10	124,0	3AC 380-460
83	6SE7031-2TF10	124,0	DC 510-620
84	6SE7031-3FG10	128,0	3AC 500-575
85	6SE7031-3UG-10	128,0	DC 675-780
88	6SE7031-5HG10	145,0	3AC 660-690
89	6SE7031-5WG10	145,0	DC 890-930
90	6SE7031-5EF10	146,0	3AC 380-460
91	6SE7031-5TF10	146,0	DC 510-620
94	6SE7031-6FG10	156,0	3AC 500-575
95	6SE7031-6UG10	156,0	DC 675-780
96	6SE7031-7HG10	171,0	3AC 660-690
97	6SE7031-7WG10	171,0	DC 890-930
98	6SE7031-8EF10	186,0	3AC 380-460
99	6SE7031-8TF10	186,0	DC 510-620
100	6SE7032-0FH10	192,0	3AC 500-575
101	6SE7032-0UH10	192,0	DC 675-780

PWE	Model No.	I(n)	U-Kl.
102	6SE7032-1EG10	210,0	3AC 380-460
103	6SE7032-1TG10	210,0	DC 510-620
104	6SE7032-3FH10	225,0	3AC 500-575
105	6SE7032-3UH10	225,0	DC 675-780
108	6SE7032-6EG10	260,0	3AC 380-460

PWE	Model No.	I(n)	U-Kl.
109	6SE7032-6TG10	260,0	DC 510-620
112	6SE7033-2EG10	315,0	3AC 380-460
113	6SE7033-2TG10	315,0	DC 510-620
117	6SE7033-7TH10	370,0	DC 510-620

⇓ P052 = 0 Function selection „return“

⇓ P key The operating display appears, and when the MLFB has been changed, the following parameters are re-assigned:

- Equipment data and motor data (from the MLFB of the equipment (P070) determine), as well open-loop/closed-loop control parameters („automatic parameterization“ over **all** data sets as for function selection „factory setting“ (☞ Section 8.1.1)).
  The process data connections (e.g. analog inputs/outputs are retaineid).

⇓ SWITCH-ON INHIBIT (008) or READY TO SWITCH-ON (009) are displayed after initialization has been completed.

8.1.2.1 Download (P052 = 3)

Function: It is used to read and change all parameters using a PC at the basic drive converter interface SST1.

Condition: „Download“ is possible in the FAULT (007), SWITCH-ON INHIBIT (008) or READY TO SWITCH-ON (009) statuses.

Procedure:

⇓ P052 = 3 Function selection „Download“

⇓ P key Operating display (021).

- All of the parameters can now be read and changed, independently of the selected control type etc. using a PC connected at the basic drive converter interface SST1.

⇓ P052 = 0 Function selection „Return“

⇓ P key

⇓ After return, the SWITCH-ON INHIBIT (008) or READY TO SWITCH-ON (009) is displayed.

8.1.3 Hardware configuration (P052 = 4)

Function: It is used to define option boards (SCB, TSY, CB, TB) in the electronics box of the drive converter.

Condition: The „hardware configuration“ is possible in the FAULT (007), SWITCH-ON INHIBIT (008) or READY TO SWITCH-ON (009) status.
Further, the bus coupling LBA (Local Bus Adapter) is required for the electronics box!
☞ Chapter „Options“ in the Operating Instructions, Part 1

Result: All parameters, which can be written into the „hardware configuration“ status („H“, ☞ righthand column in the „parameter list“, Chapter 11), can be changed.

Procedure:

⇓ P052 = 4 Function selection „Hardware-configuration“

⇓ P051 = 3 Access stage Expert mode (to change the following parameters)

⇓ P090 = Board, slot 2 (To the **RIGHT** in the electronics box!!)
P091 = Board, slot 3 (To the **CENTER** in the electronics box!!)

Parameter values for P090/P091:
0: No option board
1: CB Communications board
2: TB Technology board (only P090)
3: SCB Serial communications board
4: TSY Digital tachometer and synchronization board

Slots in the electronics box		**Boards**
Left	Slot 1 (CU)	CU
Center	Slot 3 (options)	CB1 / SCB1 / SCB2 / (TSY, not for TB)
Right	Slots 2 (options)	CB1 / SCB1 / SCB2 / TSY / TB

NOTE

- Only one of each option board type may inserted in the electronics box.
- Technology boards (e.g. T300) must always be inserted at slot 2. When a TB board is used, a TSY board my not be inserted.
- If only one option board is used it must always be inserted at slot 2.
- Order numbers for option boards and their descriptions, are provided in the Chapter „Options“ in the Operating Instructions, Part 1.

⇓ Additional parameters, depending on the option boards
(☞ associated Operating Instructions and parameter list, Chapter 11)

⇓ Select one of the following:

⇓ P052 = 5 Function selection „drive setting“ (☞ Section 8.1.4)
or ⇓ P052 = 0 return

⇓ P key
- The operational display (r000) appears during which parameters and internal quantities are re-assigned depending on the function selection.
- The hardware is initialized.
If a fault message F050/F070/F080 appears, ☞ Chapter 12 „Fault and alarm messages“.

⇓ After the selected function has been completed, the SWITCH-ON INHIBIT (008) or READY TO SWITCH-ON (009) display appears.

8.1.4 Drive setting (P052 = 5)

Function: It is used to change the drive setting (drive converter/motor data, system data).

Condition: The „drive setting“ is possible in the FAULT (007), SWITCH-ON INHIBIT (008) or READY TO SWITCH-ON (009) status.

Result:
- All parameters, which can be written in the „drive setting“ status („A“, ☞ righthand column in the parameter list, Chapter 11) can be changed.
- After the drive setting has been completed, it can be decided as to whether the „automatic parameterization“ (P052 = 6) or „motor identification at standstill“ (P052 = 7) functions should be executed, or if the status (P052 = 0) is just reset with a calculation of the internal quantities.
- If fault F061 occurs when exiting the drive setting, the parameter number, which caused the fault, can be read in fault value r949.

Procedure:

⇓ P052 = 5 Function selection „drive setting“

⇓ P051 = 3 Access stage „expert mode“ (if parameters are to be changed, which require the expert mode)

⇓ Change the selected parameters, which can be written into the drive setting status.

⇓ Make a selection between the following:

either ⇓ P052 = 6 Function selection „automatic parameterization“ (☞ Section 8.1.5)

or ⇓ P052 = 7 Function selection „motor identification at standstill“ (☞ Section 8.1.6)

oder ⇓ P052 = 0 Function selection „return“

⇓ P key The operating display (r000) appears while parameters and internal quantities are re-assigned depending on the particular function selection.

⇓ After the selected function has been completed, the SWITCH-ON INHIBIT (008) or READY TO SWITCH-ON (009) function is displayed.

8.1.5 Automatic parameterization (P052 = 6)

Function: It is used to pre-assign open-loop/closed-loop control parameters, dependent on the selected drive setting (drive converter- and motor data) and open-loop/closed-loop control type (P163).

Condition: „Automatic parameterization“ can only be selected from the „drive setting“ status (P052=5).

Result: Only the parameters of the **currently** selected motor data set MDS can be pre-assigned!

Procedure:

⇓ P052 = 5 Function selection „drive setting“

⇓ P051 = 3 Access stage „expert mode“ (if parameters are to be changed, which require the expert mode)

⇓ P052 = 6 Function selection „automatic parameterization“

⇓P key The operating display appears, while the following parameters are re-assigned:

If parameter P103 (no-load motor current) has the value 0.0%, the rated magnetizing current is calculated, and can be subsequently read via r196. Otherwise, the value is retained.

P169 Boost end frequency
P170 Field weakening frequency
P172 IxR compensation Kp
P173 Imax (max. current value)
P189 Energization time
P215 Delta n(act, permissible)
P221 Smothing n/f (act)
P225 n/f controller Kp
P229 n/f controllerTn
P261 Smoothing Isq
P272 R(stator + cable)
P294 Slip compensation Kp
P299 Resonant damping Kp
P369 Restart-on-the-fly, search current
P371 De-energization time

⇓ After „automatic parameterization“ has been completed, the SWITCH-ON INHIBIT (008) or READY TO SWITCH-ON (009) operating display appears.

8.1.6 Motor identification at standstill (P052 = 7)

Function: This function executes a ground-fault test, and then activates „automatic parameterization“ (☞ Section 8.1.5), and then carries-out a resistance measurement to improve the control characteristics.
In so doing, certain control parameters are re-assigned.

Condition: The „motor identification at standstill“ can be selected from the „drive setting“ (P052 = 5) or READY TO SWITCH-ON (009).

Result:
- Only the parameters of the **currently** selected motor data set MDS are pre-assigned!
- The „motor identification at standstill“ can be interrupted at any time using an OFF command. In this case, fault message F114 „measurement aborted“ is output.
- To display the actual measuring segment of the „motor identification at standstill“ the visualization parameter (display parameter) r333 „measurement section“ is available.
- If a fault/error occurs during measurement, the test is terminated with a fault message. The fault message (r947) is stored together with the fault value (r949) in the fault memory. The fault cause is described in detail in the fault value. The fault messages, fault values and alarm messages are described in Chapter 12 „Fault- and alarm messages“.

NOTE
The "motor identification at standstill" is not possible when operating the drive converter with an input voltage range of 500 V to 575 V with sinusoidal filter (option)!

Procedure:

⇓ P052 = 7 Function selection, „motor identification at standstill“

⇓ P key The operating display appears:

The alarm message A078 „standstill measurement follows“ is output, and the drive converter must be powered-up within 20 s. Otherwise, F114 fault trip „measurement aborted“ is output.

⇓ Power-up the drive converter
Alarm message A078 „standstill measurement follows“ is reset.

NOTE
The inverter is enabled, current flows through the motor and the rotor can align itself!

⇓ The operational display appears, while the following steps are automatically executed:

- „Automatic parameterization“ is called-up (☞ Section 8.1.5).
- Ground-fault test:

  When the drive converter is operated from a grounded line network, a ground fault in the connected motor (including feeder cables) is identified, if the ground fault current > 5 % $\hat{I}_{rated\ (drive\ converter)}$.

  Further, defective transistors, which are still conductive, are identified in the inverter.

  The tests consists of 7 steps. No transistor is fired in the 1st step, and in additional steps, precisely one transistor is fired.

  In each step, the actual values of the output currents, phases U and W, the UCE checkback signals of the 3 phases, the overcurrent comparator, and the overvoltage comparator monitored.

  The visualization parameter r358 (ground fault test result) is available, from which the measurement result which caused the fault, can be read-out.

  Comment: The ground fault test can also be separately called-up using parameter 354 (ground-fault test).

- Resistance measurement and the resulting parameter change:
  The resistance measurement defines the total resistance P272 (consisting of the motor stator resistance and the feeder resistance), as well as the setting of the „deadtime compensation“.
  The measurement consists of 5 measuring segments.
  The deadtime compensation is determined in measuring segments 1 and 2.
  Measurements in measurement segments 3 to 5 is realized using a constant DC current with a magnitude of the peak value of the rated motor current (≤ rated drive converter output current) at different pulse frequencies.
  Two resistance values are calculated in each of the three measuring segments. An average value, which is limited to max. 49.9 % is generated from these 6 individual results.

  Measured/calculated parameter values:
  P272R (stator + cable)
  “deadtime compensation“

⇓ The READY TO SWITCH-ON (009) operating display appears after the selected function has been completed.

9 Functions (software)

9.1 WEA (automatic restart)

Description:

The automatic restart function can be used for automatic fault acknowledgement and automatic power-up after a power failure (F008 „DC link undervoltage“) as well as to permanently activate the restart-on-the-fly function without operating personnel having to intervene.

For fault message F008 „DC link undervoltage“ (power failure): ☞ Section 12 „Fault and Alarm Messages“

Parameter to set the automatic restart function:

P366	WEA selection	i001: MDS1 i002: MDS2	0 to 3

P366 = 0 (inhibited):

WEA is inhibited.

P366 = 1 (power failure acknowlegement after the power returns):

Fault message F008 „DC link undervoltage“(power failure) is acknowledged, if this did not occur for an OFF- or INCHING command for motor identification MOTID.

The converter is **not** automatically switched-in by the WEA.

P366 = 2 (Drive restart after the power returns):

Fault message F008 „DC link undervoltage“ (power failure), is acknowledged, if this did not occur for an OFF or inching command or for motor identification MOTID.

If it has been acknowledged, a delay time P367 in (s), which can be parameterized has to expire in the status SWITCH-ON INHIBIT (008), until the drive is automatically restarted by WEA.

If the restart-on-the-fly function is activated via control word bit 23 (Section 5.1), delay time P367 is ignored.

The unit is only switched-in again if the ON command (control word bit 0) is still present after the power returns.
Thus, the WEA function is not possible with a parameterized ON command (control word bit 0) via PMU or OP1!

P366 = 3 (drive is always powered-up with automatic restart-on-the-fly circuit):

As for P366 = 2, however, the restart-on-the-fly function is always activated, independent of control word bit 23 (Section 5.1).

Delay time (P367) is ignored.

The restart-on-the fly function is activated each time the drive is powered-up, even if the power had not previously failed!
A description of the additionally necessary settings for the restart-on-the-fly function is provided in Section „Restart-on-the-fly“.

P367	WEA delay time	i001: MDS1 i002: MDS2	0 s to 650 s

Delay time between the supply return and when the drive converter is restarted with the WEA function activated.

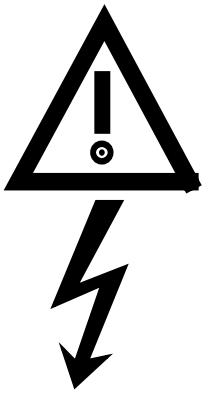
The delay time is not effective for P366 = 3 or when control word bit 23 is set.

Alarm A065 (Automatic restart function active):

- The alarm is set by WEA after switch-on, and is reset after precharging has been completed.
- When the drive is started by he WEA, the pre-charging time is not monitored, so that fault F002 „DC link precharging fault“ can not occur.
- The converter can be manually shutdown with an OFF command during this switch-on phase.
  ☞ Chapter 12 „Fault and Alarm Messages“.

Special cases:

- ♦ If the conveter has an external auxiliary supply, a fault is acknowledged and the drive re-started although the supply is still faulted, dependent on parameter P366!
  Alarm A065 „automatic restart active“ is continuously present until the supply returns!
- ♦ If additional faults/errors have simultaneously occurred in addition to fault message F008 „DC link undervoltage“ (power failure), these are also acknowledged, dependent on parameter P366 !
- ♦ If the kinetic buffering function is also activated, when the power fails, this is first executed, before fault trip F008 occurs and the WEA intervenes.



WARNING

During power failures and activated WEA (P366 = 2, 3), the converter can automatically restart when the supply returns and after delay time P367 has expired (not valid when the restart-on-the-fly function is activated).

Thus, the drive could be at a standstill for a longer period of time which could be accidentally mistaken for being switched-off.

If the drive area is approached when in this status, severe bodily injury or material damage could occur.

NOTE

If the restart-on-the-fly function is not activated, and **P366 = 2,** overcurrent trip F011 could occur or the motor could be suddenly braked, when the converter is restarted and the motor is still rotating !
Thus, delay time **P367** must be selected high enough, so that it is guaranteed that the motor comes to a standstill before the switch-on command!

9.2 KIP (Kinetic buffering)

Description:

The KIP function allows brief power supply failures to be buffered by utilizing the kinetic energy, i.e. inertia of the connected load.

In this case, the frequency is controlled (closed-loop), so that the system losses are covered by the over-synchronous motor operation.

As the losses remain during the power failure, the converter output frequency has to be lower. The thus reduced speed reduction must be taken into account.

When the supply returns, power is fed in from the supply, and the converter output frequency returns to the selected reference frequency via a ramp-function generator function (RFG).

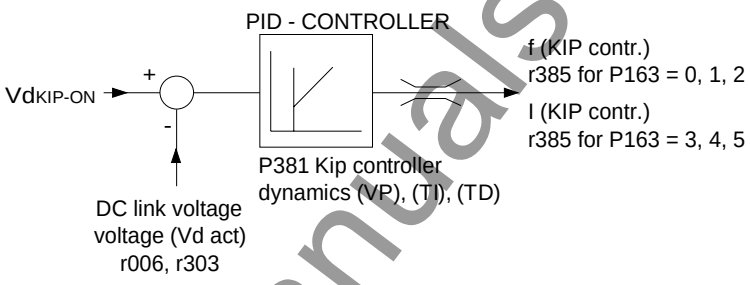


Fig. 9.1 Kinetic buffering

As long as the KIP function is switched-in, the „**KIP active**“ signal is set via **status word bit 15** (☞ Section 5.2).

Parameter to set the kinetic buffering function:

P379	KIP on/off	i001: MDS1 i002: MDS2	0 to 3
0: Kinetic buffering is not enabled. 1: Kinetic buffering is enabled. 2: Flexible response is enabled with V/f = const. 3: Flexible response is enabled with f = const			

P380	KIP initiation point	i001: MDS1 i002: MDS2	65 % to 115 %
The kinetic buffering threshold can be set between 65 % and 115 % using this parameter. The switch-off threshold is 5 % above the switch-on threshold (☞ Chapter 10 „Function diagrams“).			
NOTE			
For kinetic buffering, values for P380 > 90 % are only practical, if an active front end (AFE) is used as rectifier/regenerative feedback unit.			

P381	KIP controller dynamic	i001: MDS1 i002: MDS2	0 % to 200 %
The characteristics of the PIB controller can be influenced using this parameter. The factory setting is 50 %. At 0 %, the kinetic buffering function is disabled. The controller output can be visualized via parameter **r385**.			

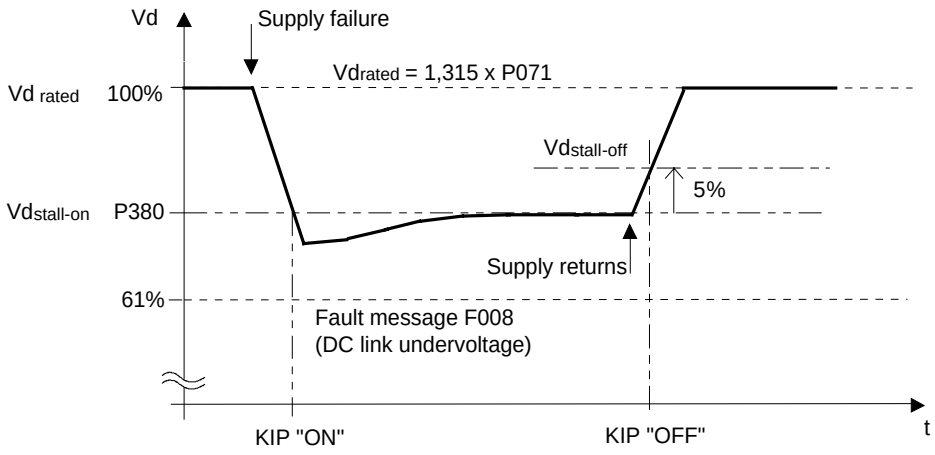


Fig. 9.2 Switch-on/switch-off threshold

$V_{d\ KIP\ ON} = P380 \times V_{d\ rated}$ Pre-assign: P380 = 76 %

$V_{d\ KIP\text{-}OFF} = (P380 + 5\ \%) \times V_{d\ rated}$ Pre-assign: bei P380 = 76 % ⇒ 81 %

$V_{d\ rated} = 1{,}315 \times P071$

9.3 Flexible response

Description:

The „flexible response“ function allows the converter to still operate during supply dips up to a minimum DC link voltage of 50% of the rated value. The maximum converter output is decreased corresponding to the actual line supply voltage. If the „flexible response“ function is enabled, the firing level is limited to the range of the asynchronous vector modulation (reduction of the max. output voltage).

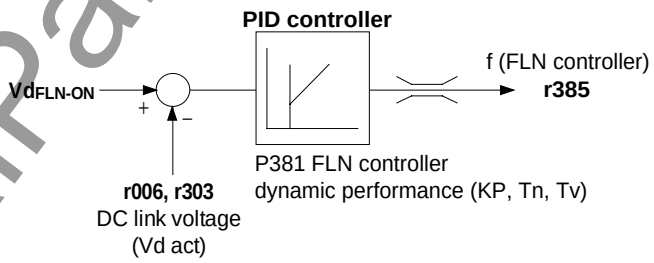


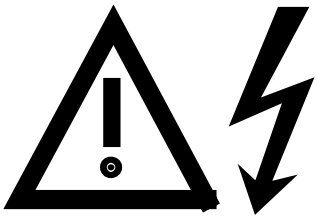
Fig. 9.3 Flexible response

NOTE
The maximum firing level can be taken from parameter r180. The maximum output voltage at the particular operating point can be read-out at parameter r181.

The „FLR active“ signal is set via the **status word bit 15**, (☞ Section 5.2) as long as the „**flexible response**“ function is active.

Conditions:

- A line commutating reactor von 4 % must be provided.
- The electronics power supply must be realized using an external 24 V supply at connector X9 (☞ Chapter "Connecting-up" in the Operating Instructions, Part 1).
- It must be ensured, that if there is an external main contactor, this does not drop-out during the supply dip.
- When the line voltage supply returns, it is not permissible that the voltage increases 50% to 100% in less than 5 ms.
- A maximum of 10 dips/hour are permissible with a minimum 10 s time between them.



WARNING

If these conditions/instructions are not observed, this can result in erronous function or the drive converter being destroyed.

During a supply dip, the available induction motor output is reduced over-proportionally for operation with one of the V/f operating modes (P163 = 0,1,2)

Parameter to set the flexible response function:

P379	FLR on/off	i001: MDS1 i002: MDS2	0 to 3

0: Flexible response is not enabled.
1: Kinetic buffering is enabled.
2: Flexible response is enabled with V/f = const.
3: Flexible response is enabled with f = const. (only for v/f operation P163 = 0, 1, 2).

P380	FLR initiation point	i001: MDS1 i002: MDS2	65 % to 115 %

The FLN threshold can be set to between 65% and 115% using this parameter.
The switch-off threshold is 5% above the switch-on threshold (☞ Section 10 „Function diagrams“).

NOTE

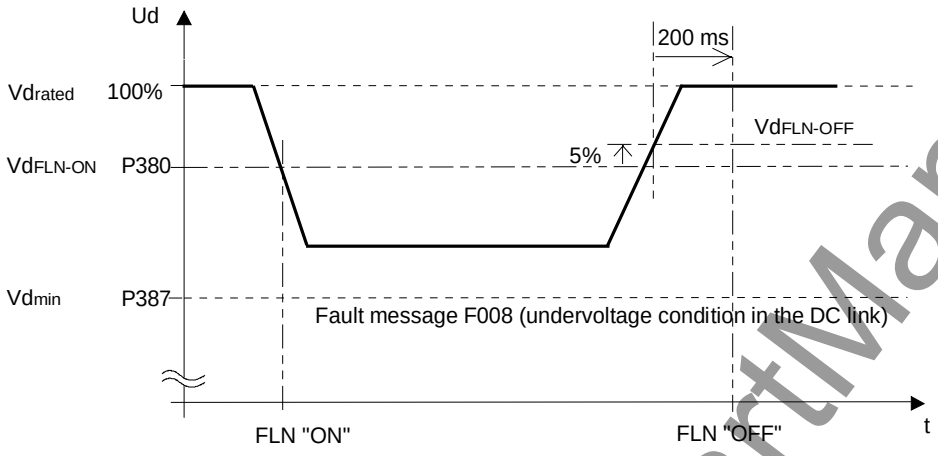
For flexible response, values of P380 > 90 % are not practical, as otherwise the function may not be able to be switched-out. When using an active front end (AFE) as rectifier/regenerative feedback unit, the FLN function is automatically included in the AFE.

P381	FLN controller dynamic performance	i001: MDS1 i002: MDS2	0 % to 200 %

The characteristics of the PID controller can be changed using this parameter.
The FLN controller is only enabled for P379 = 2.
The controller ensures that the v/f ratio remains constant. For supply dips/interruptions (power outages), the drive converter output frequency and therefore the motor speed can decrease.
The factory setting is 50 %.
The controller output can be visualized via parameter **r385**.

P387	FLN Vdmin	i001: MDS1 i002: MDS2	50 % to 76 %
Using this parameter, the voltage threshold of the fault message F008 (DC link undervoltage) can be reduced from 76 % (factory setting!) to 50 % (☞ Section 10 „Function diagrams“).			

P189	Energization time	i001: MDS1 i002: MDS2	0.01 s to 10.00 s
If field weakening is reached during voltage dips, then, for V/Hz open-loop control types (P163 = 0, 1, 2), when the voltage returns, the output voltage is ramped-up which corresponds to twice the excitation time. The excitation time is calculated during automatic parameterization (P052 = 6) and motor identification (P052 = 7, 8).			



$V_{d\ FLN\ ON} = P380 \times V_{d\ rated}$ Pre-assigned: P380 = 76 %

$V_{d\ FLN\ OFF} = (P380 + 5\ \%) \times V_{d\ rated}$ Pre-assigned: for P380 = 76 % ⇒ 81 %

$V_{d\ min} = P387 \times V_{d\ rated}$

$V_{d\ rated} = 1.315 \times P071$

Fig. 9.4 Flexible response

9.4 Vdmax closed-loop control

Description:

The Vdmax closed-loop control function allows briefly occurring regenerative loading to be handled without the unit shutting down with fault F006 (DC link overvoltage). In this case, the frequency is controled (closed-loop), so that the motor does not excessively enter over-synchronous operation.

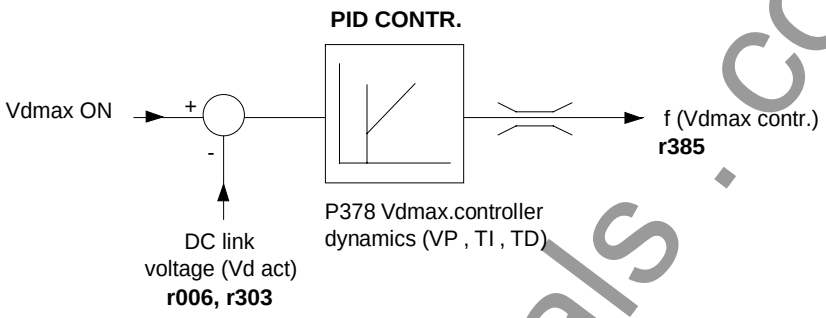


Fig. 9.5 Vdmax closed-loop control

For a steady-state load, the converter output frequency must increase. If a regenerative load excists for too long, the unit is shutdown with F006 when the maximum frequency is reached (P452, P453). If regenerative loading occurs when the machine is decelerating too quickly (P464), then this is automatically reduced, so that the converter is operated at the voltage limit.

The Vdmax control is also optimally suited for regenerative operation, which can occur when the speed stabilizes at the end of ramp-up.

Parameters to set the Vdmax closed-loop control:

P377	Vdmax controller on/off	i001: MDS1 i002: MDS2	0 to 1
0: The Vdmax controller is inhibited. 1: The Vdmax controller is enabled.			

P378	Dynamic performance of the Vdmax controller	i001: MDS1 i002: MDS2	0 % to 200 %
The characteristics of the PID controller can be influenced using this parameter. For 0 %, the Vdmax controller is disabled. The factory setting is 50 %. The controller output can be visualized via parameter r385.			

Alarm A041 „Vdmax controller inhibited“:

The line supply voltage is too high or the drive converter supply voltage (P071) is incorrectly parameterized. The Vdmax controller is inhibited in spite of the fact that the parameter is enabled (P377 = 1), as otherwise, the motor would immediately accelerate to the maximum frequency in operation.

The response threshold when inhibiting the Vdmax controller is calculated as follows:

$$V_{d\,max\text{-}ON} = 119\,\% \times \sqrt{2} \times V_{supply,\,rated} = 168\,\%\, V_{supply,\,rated}$$

$V_{supply,\,rated}$ = P071 for AC - AC drive converters and

$$V_{supply,\,rated} = \frac{P071}{1.315} \text{ for DC - AC drive converters}$$

9.5 DC current brake

Description:

The DC brake function allows the drive to be brought to a standstill in the shortest possible time. To realize this, a DC current is impressed in the motor windings, which, for an induction motor, results in a very high braking torque.

NOTE
The „DC current braking“ function is only practical for induction motors! With the „DC current braking“ function, the kinetic energy of the motor is converted into heat **in the motor**. The drive could overheat if it remains in this status for an excessive period of time!

Parameters to adjust the DC current brake:

P371	Motor de-energization time	i001: MDS1 i002: MDS2	0,01 s to 10,00 s
The minimum delay time between pulse inhibit and pulse enable is set using the parameter. Thus, it should be ensured that the motor is at least de-magnetized to 90% when the pulses are enabled. The parameter is pre-assigned during automatic parameterization and motor identification.			

P372	DC brake on/off	i001: MDS1 i002: MDS2	0 to 1
0: DC brake on/off. 1: The DC brake is not activated for an OFF3 command (fast stop), the unit is DC current braked.			

P373	DC braking current	i001: MDS1 i002: MDS2	20 % to 400 %
The current setpoint (as a %, referred to the rated motor current) is set using this parameter, which is impressed for DC current braking			

P374	DC braking duration	i001: MDS1 i002: MDS2	0.1 s to 99.9 s
The DC current braking duration is selected using this parameter.			

P375	Frequency at the start of DC braking	i001: MDS1 i002: MDS2	0.1 Hz to 300.0 Hz
For an OFF3 command, DC current braking is realized from this frequency.			

Procedure:

- The DC brake is activated using the OFF3 command.
- The drive converter decelerates along the parameterized OFF3 ramp (P466) down to the frequency for the start of DC braking (P375). Thus, the motor kinetic energy can be reduced without endangering the drive. However, if the OFF3 ramp-down time (P466) is selected to be too low, there is a potential danger that a fault could occur due to DC link overvoltage (F006).
- The inverter pulses are inhibited for the duration of the de-energization time (P371).
- The required current (P373) is then impressed for the selected braking duration (P374).
- The drive converter changes into the SWITCH-ON INHIBIT (008) or READY TO SWITCH-ON (009) status.

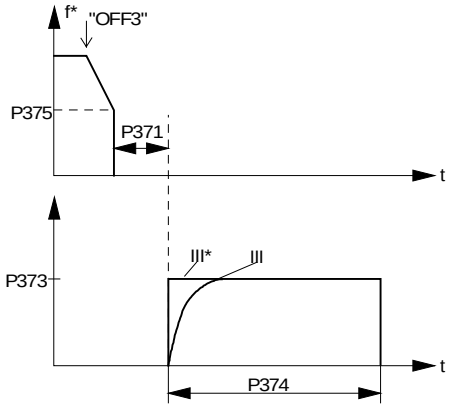


Fig. 9.6 DC current braking

9.6 Restart-on-the-fly

Description:

The restart-on-the-fly function allows the converter to be connected to a motor which is still rotating. If the converter was to be switched-on without the restart-on-the-fly function, an overcurrent condition would occur, as the flux in the motor has to first be built-up, and the open-loop/closed-loop control must be appropriately set.

NOTE
It is not possible to implement a restart-on-the-fly function for multi-motor drives, as the motors have different run-down characteristics!

The following is executed, depending on whether a tachometer is enabled:

Restart-on-the-fly without tachometer (with search) (P208 = 0):

NOTE
„Restart-on-the-fly without tachometer“ (searching) is only practical for induction motors! For „restart-on-the-fly without tachometer“, the „Standstill test“ generates a braking torque which can cause drives with low moments of inertia to be braked to a standstill.

- A standstill test (a DC current is briefly impressed) is executed after the de-energization time (P371) has expired after the supply returns, with WEA (☞ Section 9.1) active, or since the last shutdown time with „OFF 2“ command (inverter inhibit).
- If it is identified that the motor is at standstill, energization and acceleration are started as for a standard start
- If motor standstill has not been identified, searching is started with the maximum frequency, clockwise phase sequence (P452); if only a COUNTER-CLOCKWISE phase sequence is selected (☞ Section 5.1 „Control word“), searching starts with the maximum frequency, clockwise rotating phase sequence (P453).
- The search frequency is linearly reduced down to 0 Hz, and more specifically by the search speed which can be parameterized **P370** (in Hz, referred to 1 second). In this case the search current **P369**, which can be parameterized, is impressed.
  The setpoint output voltage of the drive converter, required for the search current, is compared with the voltage value of the V/f characteristic corresponding to the search frequency. If the motor frequency is found using this evaluation, the search frequency is kept constant and the output voltage is changed to the voltage value of the V/f characteristic with the energization time constant (dependent on the energization time (P189)).
  The ramp-function generator is then set to the search frequency.
  If it is not possible to set the ramp-function generator, as the supplementary setpoint is too high, then the unit is shutdown with **Fault F018** „ramp-function generator could not be set at restart on the fly“. Otherwise the RESTART-ON-THE-FLY status (013) is exited and the motor (via the ramp-function generator) is ramped up to the actual setpoint frequency.
- If the motor was not found, at 0 Hz search frequency, a standstill test is again executed and a search run made in the appropriate direction of rotation when the phase sequence in the other direction of rotation is enabled. The motor is switched-in at 0 Hz even if the search was not successful.

Example: Restart-on-the-fly without tachometer (search)

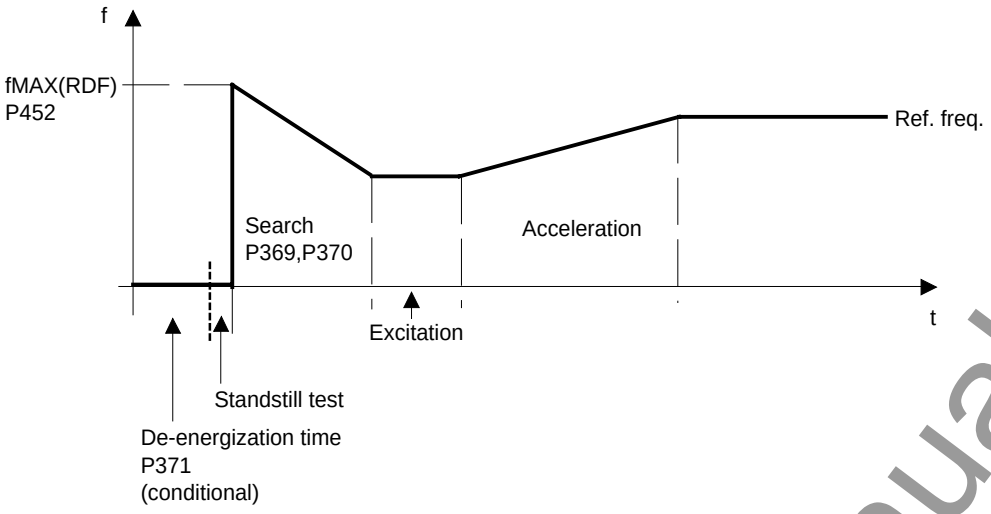


Fig. 9.7 Restart-on-the-fly

Restart-on-the-fly with tachometer (P208 ≠ 0):

- After the de-energization time (P371) expires after the supply returns with activated WEA (Section 4.3.10.1), or since the last shutdown with „OFF2“ command (inverter inhibit), the converter output voltage is linearly increased from 0 to the V/f characteristic value (detemined from the measured, smooth speed actual value), within the excitation time P189).
- After the energization time (P189 has expired, the ramp-function generator is set to the smoothed speed actual value.
  If it is not possible to set the ramp-function generator, because the supplementary setpoint is too high, then the unit is shutdown with **Fault F018** „ramp-function generator was not able to be set for restart-on-the-fly“.
- Otherwise, RESTART-ON-THE-FLY status (013) is exited, and the motor is ramp-up to the actual setpoint frequency (via the ramp-function generator.
- For closed-loop torque control (P163 = 5) or a slave drive (refer to P587), the drive continues with the actual torque setpoint

Parameter to select the restart-on-the-fly function:

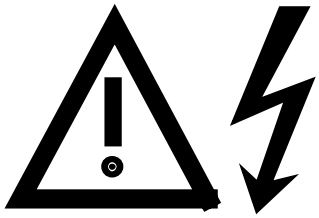
P583 Control word bit 23	Restart-on-the-fly enable	i001: BASIC i002: RES	0 to 1
0: Restart-on-the-fly is not enabled. 1: Restart-on-the-fly is enabled at each on command. Source selection parameter for control word bit: P583 ☞ Section 5.1 „Control word“. **Exception: P366 = 3** The **automatic restart** (☞ Section 9.1) **and restart-on-the-fly** (without taking into account the control word command „restart-on-the-fly enable“ (bit 23)) functions are always activated.			

Only for restart-on-the-fly without tachometer (with search) (P208 = 0):

P369	Restart-on-the-fly search current	i001: MDS1 i002: MDS2	10 % to 400 %
Setpoint of the impressed current when searching for the motor (as a %, referred to the rated motor current (P102)) Presetting during „automatic parameterization“ to „no-load motor current“ (r196)			

P370	Restart-on-the-fly search speed	i001: MDS1 i002: MDS2	0.1 Hz to 100.0 Hz
Ramp gradient with which the search frequency can be changed (in Hz, referred to 1 second).			

As long as the restart-on-the-fly function is active, the **„restart-on-the-fly active“ message** is set via the **status word bit 16** (☞ Section 5.2).



WARNING

With the „restart-on-the-fly without tachometer“ activated (P366 = 3 with WEA or control word bit 23), the drive may suddenly accelerate as a result of the search current in spite of the fact that the drive is at a standstill and a 0 Hz setpoint !

Death, severe bodily injury or material damage can occur if the drive area is entered!

9.7 Technology controller

Description:

The technology controller function can be used for simple, higher-level closed-loop control functions without requiring an additional technology board (TB)

A freely connectable setpoint is compared with a freely connectable actual value, and the output is tracked via a parameterizable controller characteristic.

The technology controller sampling time is 8×P308 (pre-setting, 16 ms).

The technology controller computes in the PZD notation, i.e. 100 % corresponds to 4000H.

The function diagram of the technology controller is provided is Section 10.

Parameters to set the technology controller:

- **Enable:**

P584 Control word bit 24	Source, technology controller enable	i001: BASIC i002: RES	0 to 4505
Value 0: Technology controller is not enabled Value 1: Technology controller is enabled, if P526 or P531 ≠ 0 additional possible settings, ☞ Section 5.1			

- **Technological setpoint:**

P525	Fixed technological setpoint	i001: BASIC i002: RES	–200 % to 200 %
This value is active for P526 = 1001			

P526	Technological setpoint source	i001: GRD i002: RES	0 to 4545
Source of the technological setpoint (possible settings, refer to Section 5.3)			

P527	Technological setpoint gain	i001: BASIC i002: RES	–300 % to 300 %
Is not valid for technological controller setpoint input via a fixed setpoint (P526 = 1001)			

P528	Setpoint smoothing	0.00 s to 600.00 s
Smoothing time constant of the setpoint (to prevent setpoint steps)		

r529	Actual technological setpoint
Visualization parameter for the actual technological setpoint in %.	

♦ **Technological actual value:**

P530	Technological actual value	i001: Value 1 i002: Value 2	0 to 999
Internal sources for the technological actual values. The parameter number of the internal drive converter quantity is specified here, which is to be used as technological actual value.			

P531	Source, technological actual value	i001: BASIC i002: RES	0 to 4545
P531 = 1100: Internal technological actual value 1 (= contents of P530.1) P531 = 1200: Internal technlogical actual value 2 (= contents of P530.2) Additional possible settings, refer to Section 5.3			

P532	Gain, technological actual value	i001: BASIC i002: RES	-300 % to 300 %
Gain of the technology controller actual value			

r534	Actual technological actual value
Visualization parameter for the actual technological actual value in %.	

♦ **Setpoint/actual value comparison:**

A binary status bit is generated from the comparison between the technological setpoint and the technological actual value; this can be visualized in status word 2, bit 27.
The status „connection“ is realized via parameter P627.

	Technological setpoint, positive	Technological setpoint, negative
HIGH	Techn. actual value > technological setpoint	Techn. actual value < technological setpoint
LOW	Techn. actual value < techn. setpoint – hysteresis (P535)	Techn. actual value > techn. setpoint + hysteresis (P535)

P535	Hysteresis of the comparison	0.0 % to 100.0 %
Hysteresis for the „technological setpoint reached“ message. The hysteresis is only effective if the message is withdrawn.		

r536	Technological controller error signal
Control error signal at the input of the technological controller in %.	

- **PI controller:**
  Depending on the particular application, the controller can be operated as a pure PC controller or as PI controller.
  The controller is active, if the inverter pulses are enabled, the energization time (P189) has expired, and the technological controller has been enabled (control word bit 24=1, „connection“ via P584).

P537	Technological controller gain (P component)	0.00 to 250.00

P538	Technological controller integral action time (I component)	0.00 s to 600.00 s
The I component can be disabled using the value „0“.		

r540	Technological controller output signal
Output signal of the technological controller before the limit value stage in %.	

P541	Technological controller limit 1	-200.000 % to 200.000 %
Upper limit of the controller output signals.		

P542	Technological controller limit 2	-200.000 % to 200.000 %
Lower limit of the controller output signal.		

r545	Limited technological controller output signal
Output signal of the technological controller after the limit value stage in %. If limiting is active, the I component of the PI controller is held, in order to permit that the controller quickly leaves the limit.	

The technology controller output can then be connected with value 1020 to parameters **P428 (S.suppl.setpoint)** and **P443 (S.main setpoint)**.

Additional applications of the technology controller:

1. Using parameters P526 and r529 as well as P531 and r534, process data can be transferred from analog inputs or serial interfaces to supplementary boards.

   Example:

   Setpoints for a technological board are to entered in word 05 and word 06 via SST1. In order to permit this, the parameterization must be as follows:

   P526.1 = 2005 (word 05 from SST1)

   P527.1 = 100.00 % (no gain)

   P528 = 0.0 s (no smoothing)

   P531.1 = 2006 (word 06 from SST1)

   P532.1 = 100.00 % (no gain)

   P694.2 = 529 (the actual value W02 for TB is thus word 05 from SST1)

   P694.3 = 534 (actual value W03 for TB is thus word 06 from SST1)

   The technological controller must not be activated for this function (P584 = 0).

2. Status bit 27 can be used as any comparitor, by entering a comparison value via parameters P525 and P526, and a comparison quantitiy via P530 and P531.

   The technological controller does not have to be activated for this function (P584 = 0).

10 Function diagrams

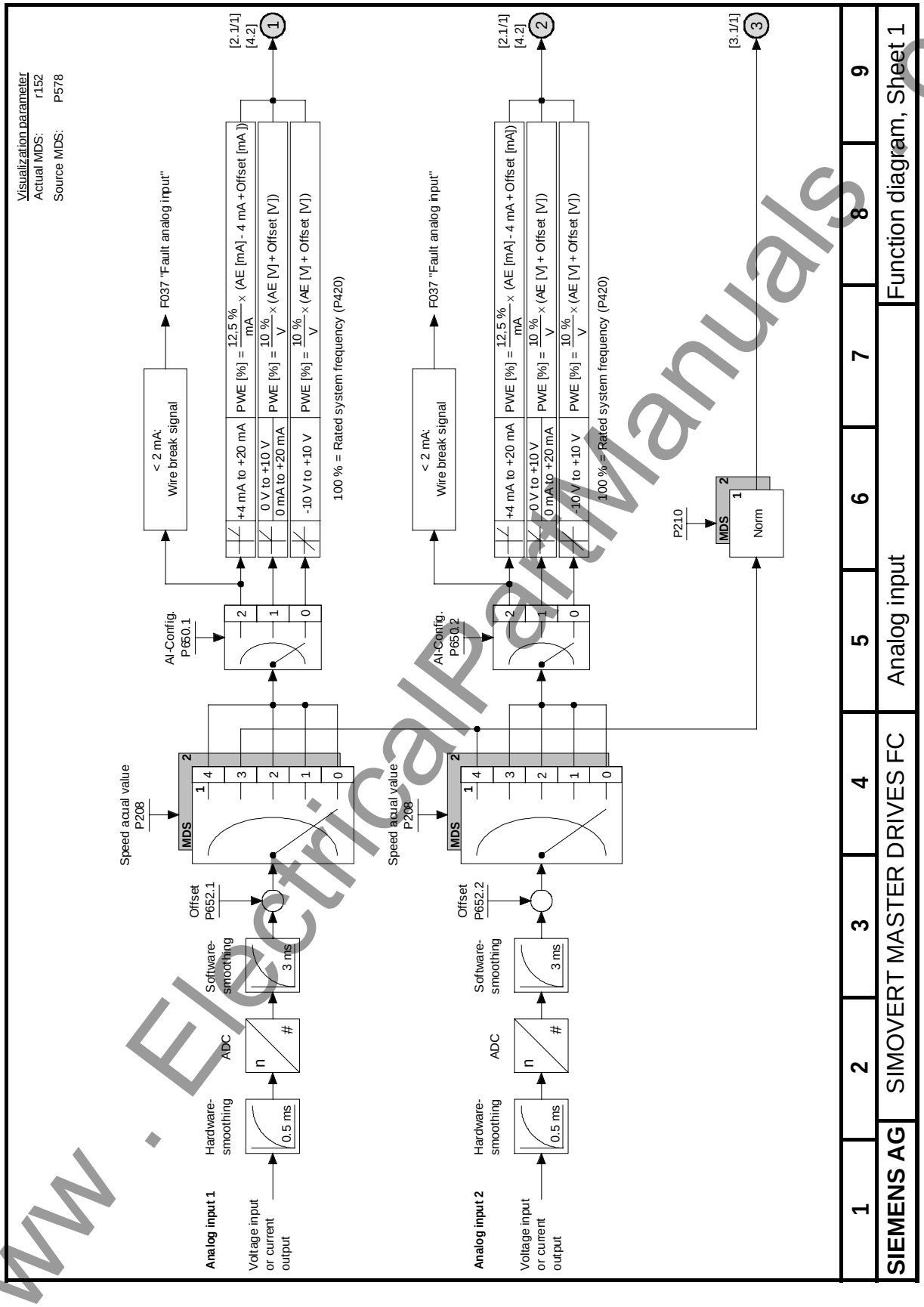


Fig. 10.1 Analog input

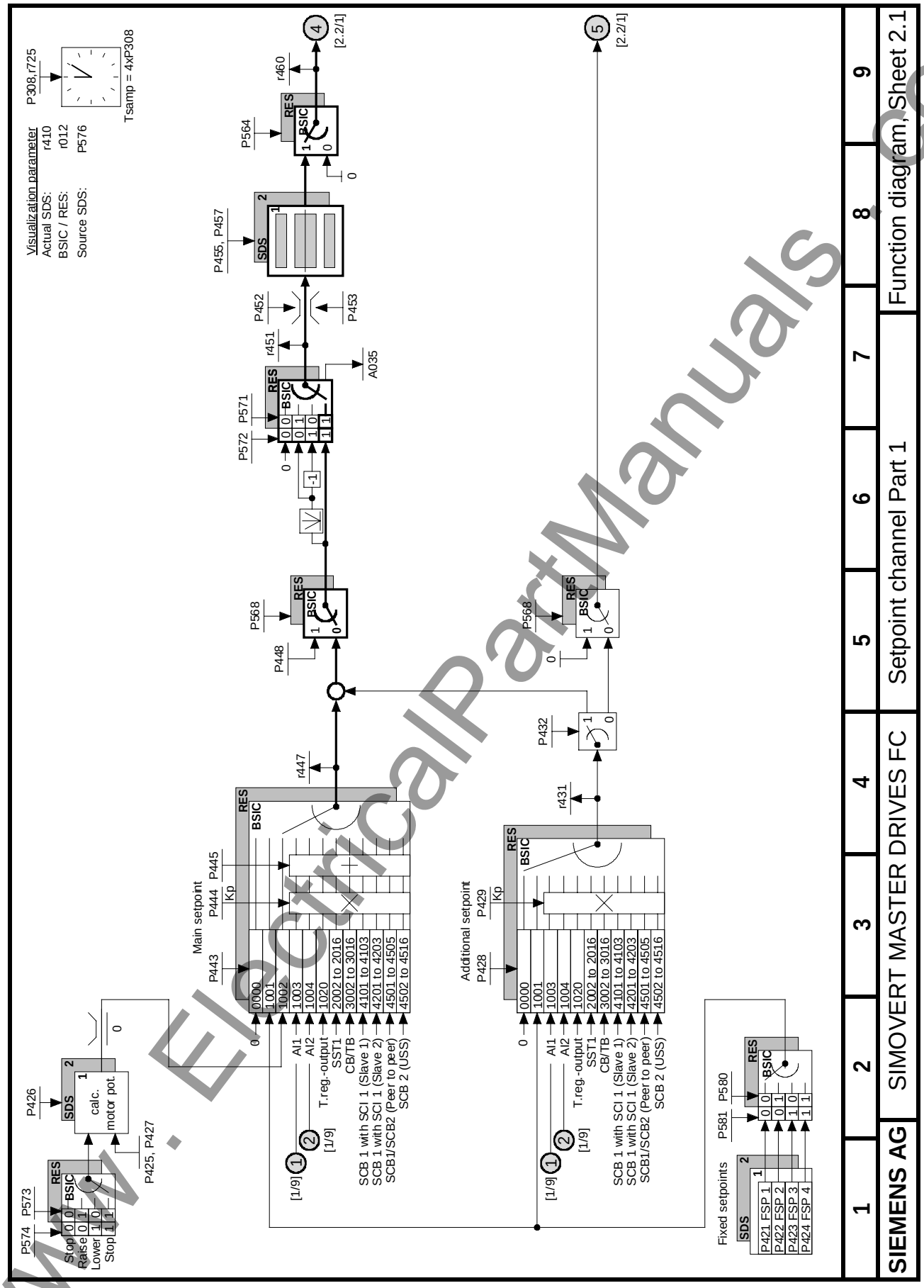


Fig. 10.2 Setpoint channel, Part 1

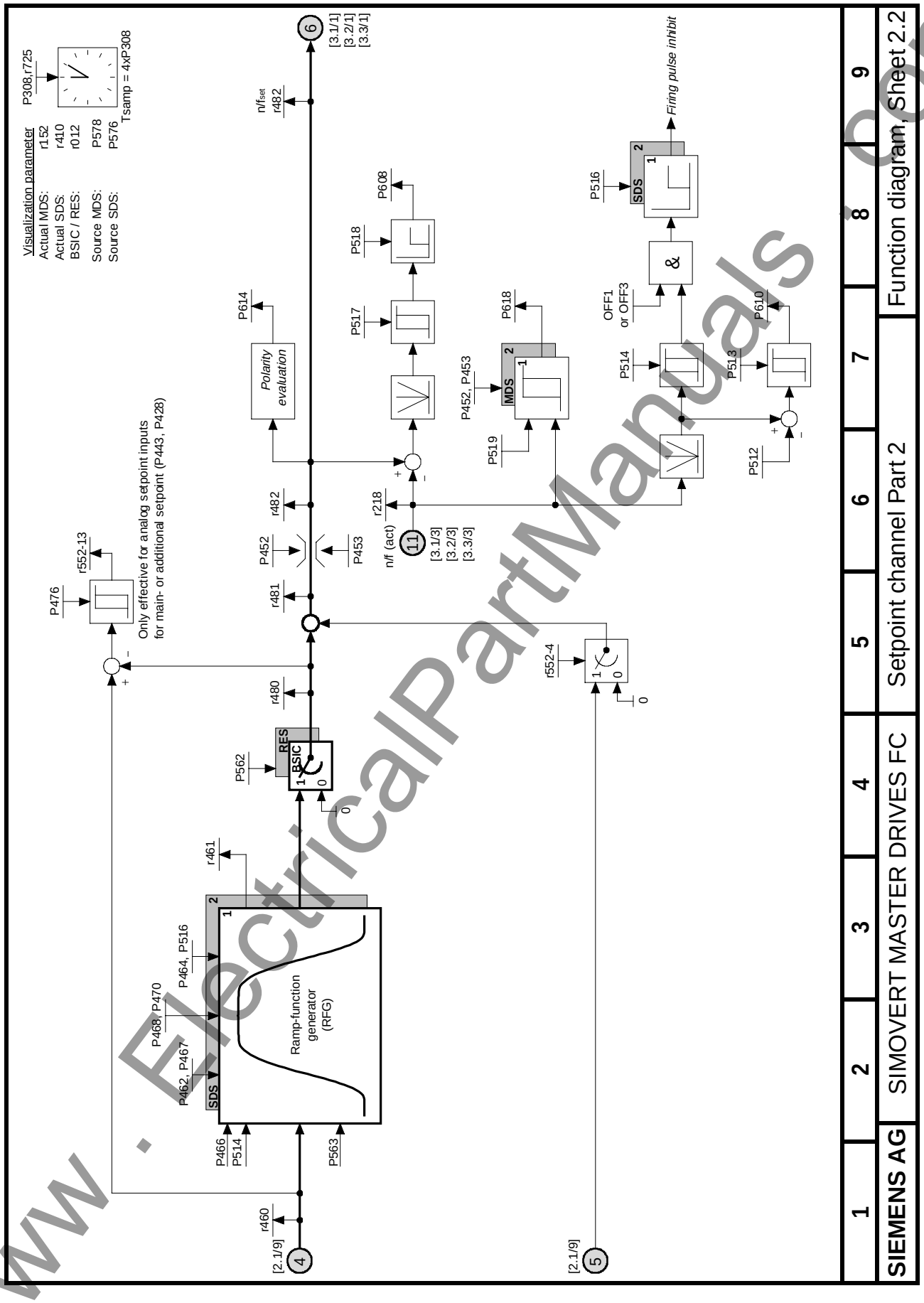


Fig. 10.3 Setpoint channel, Part 2

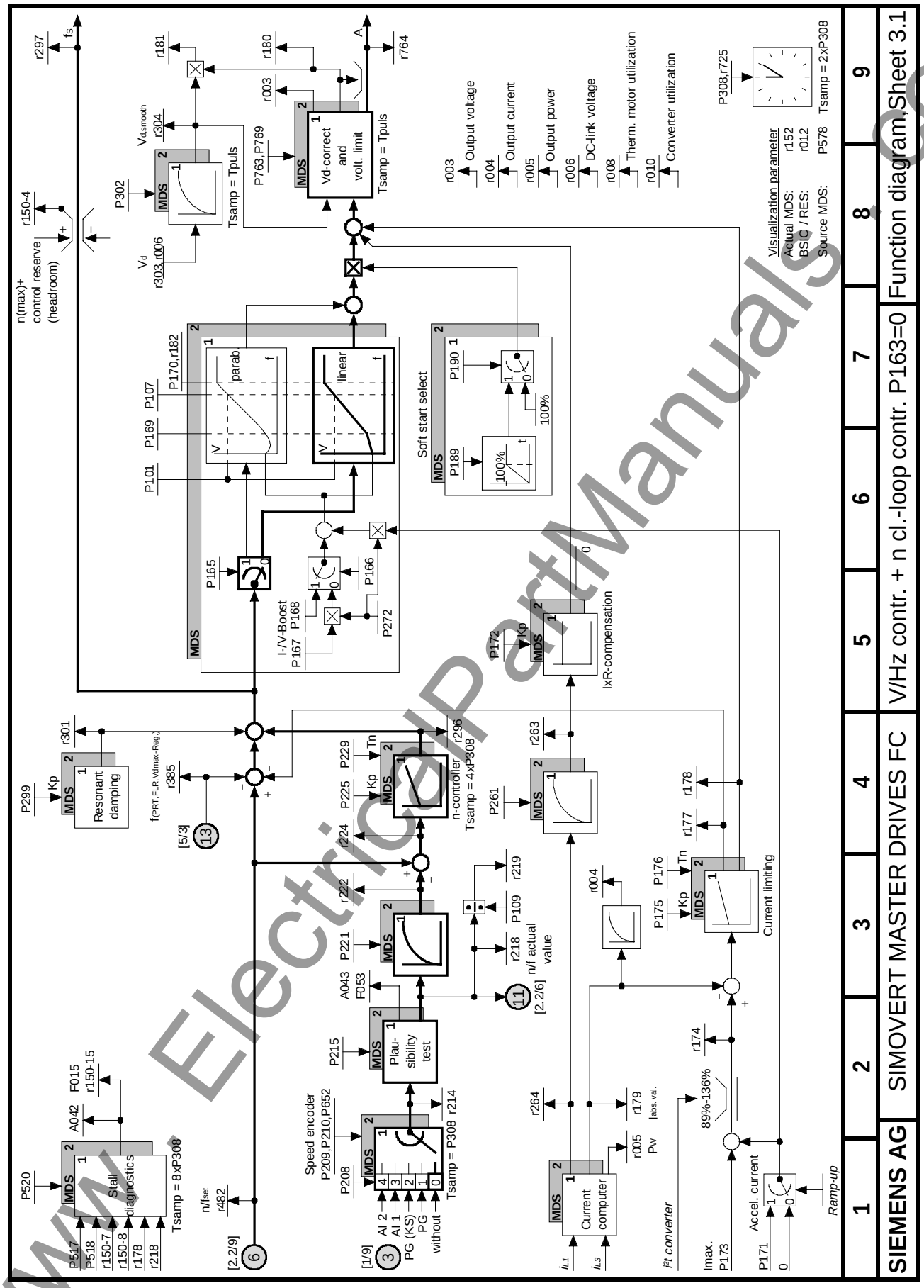


Fig. 10.4 V/Hz control + n closed loop control (P163 = 0)

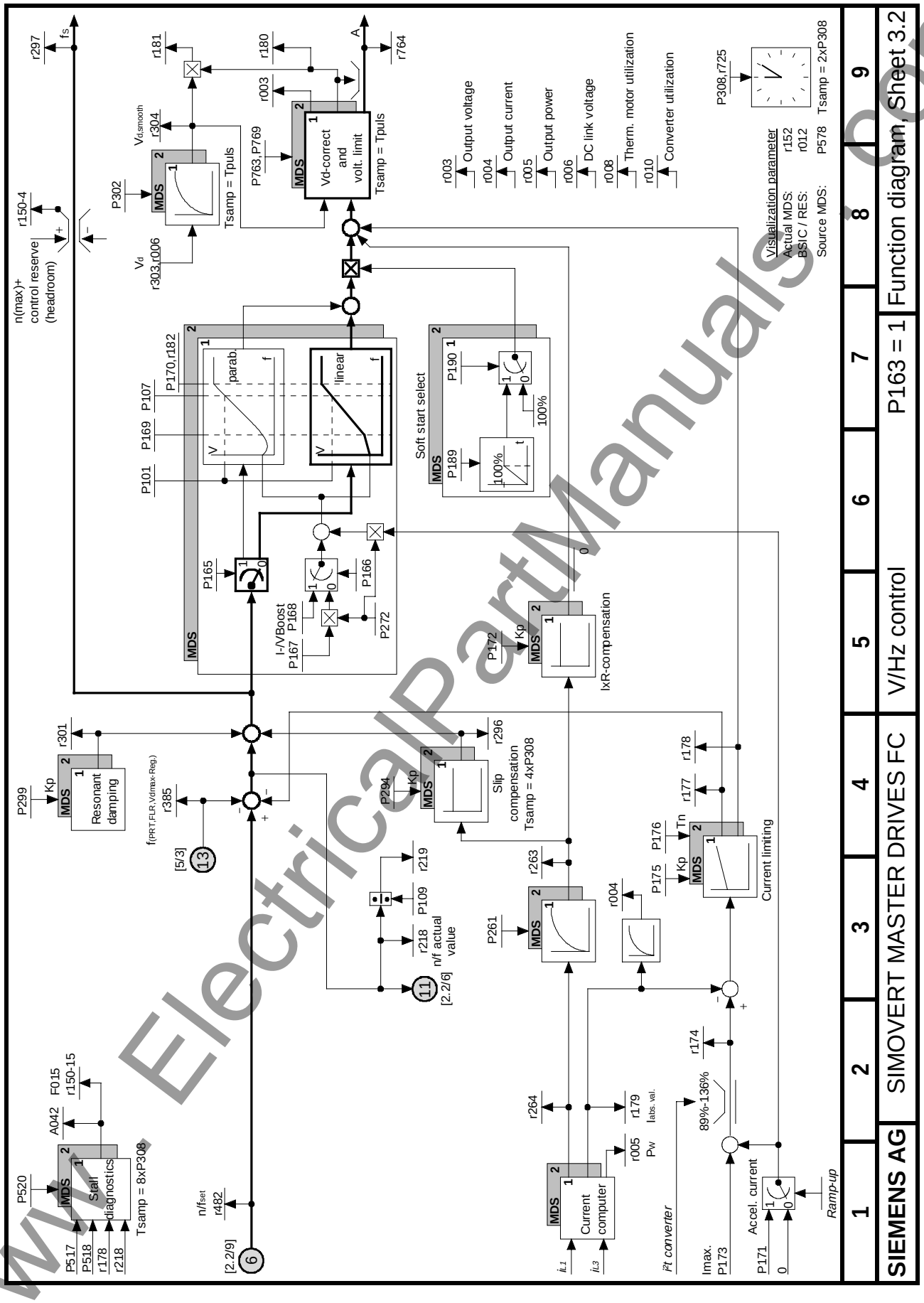


Fig. 10.5 V/Hz control (P163 = 1)

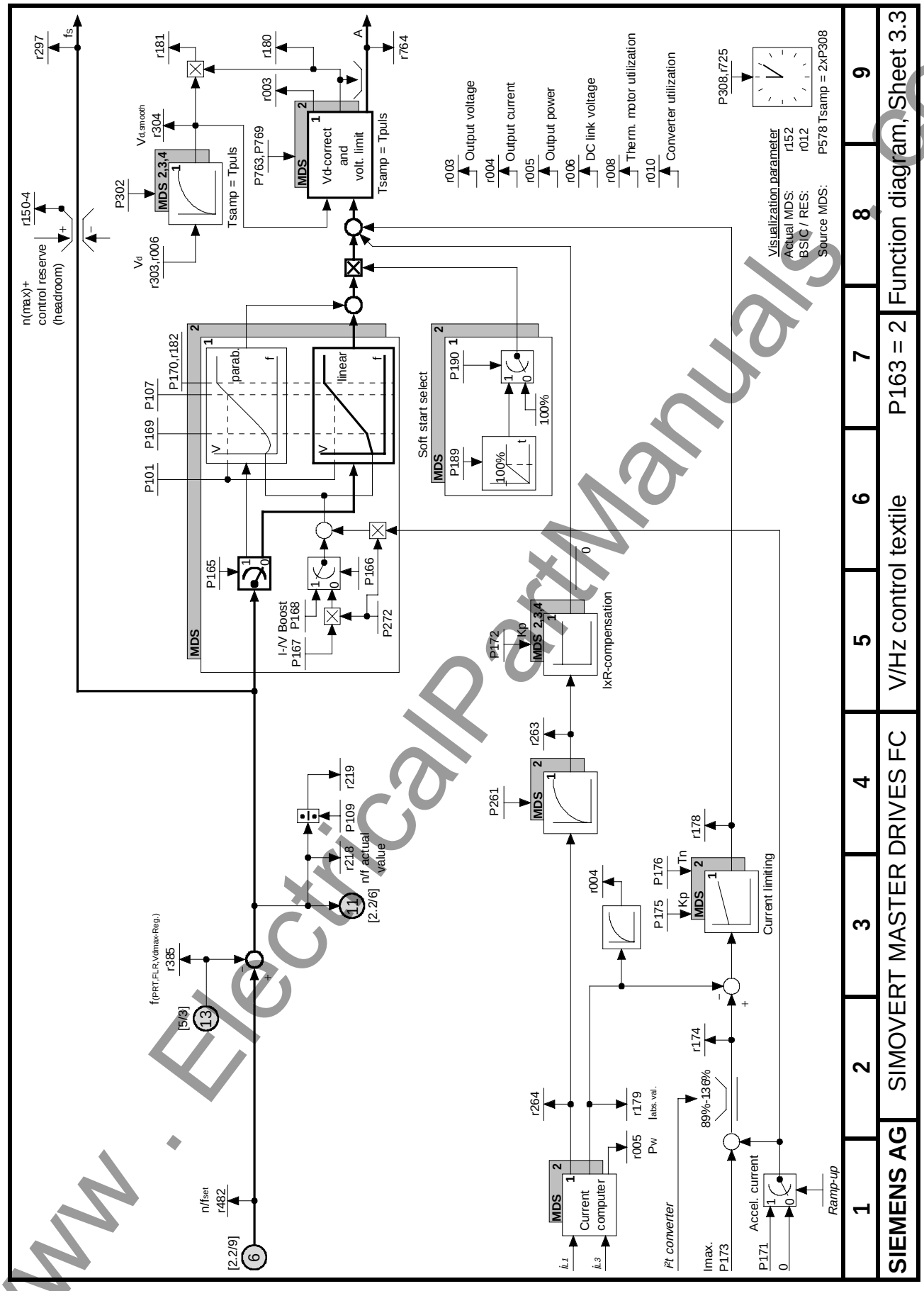


Fig. 10.6 V/Hz control textile (P163 = 2)

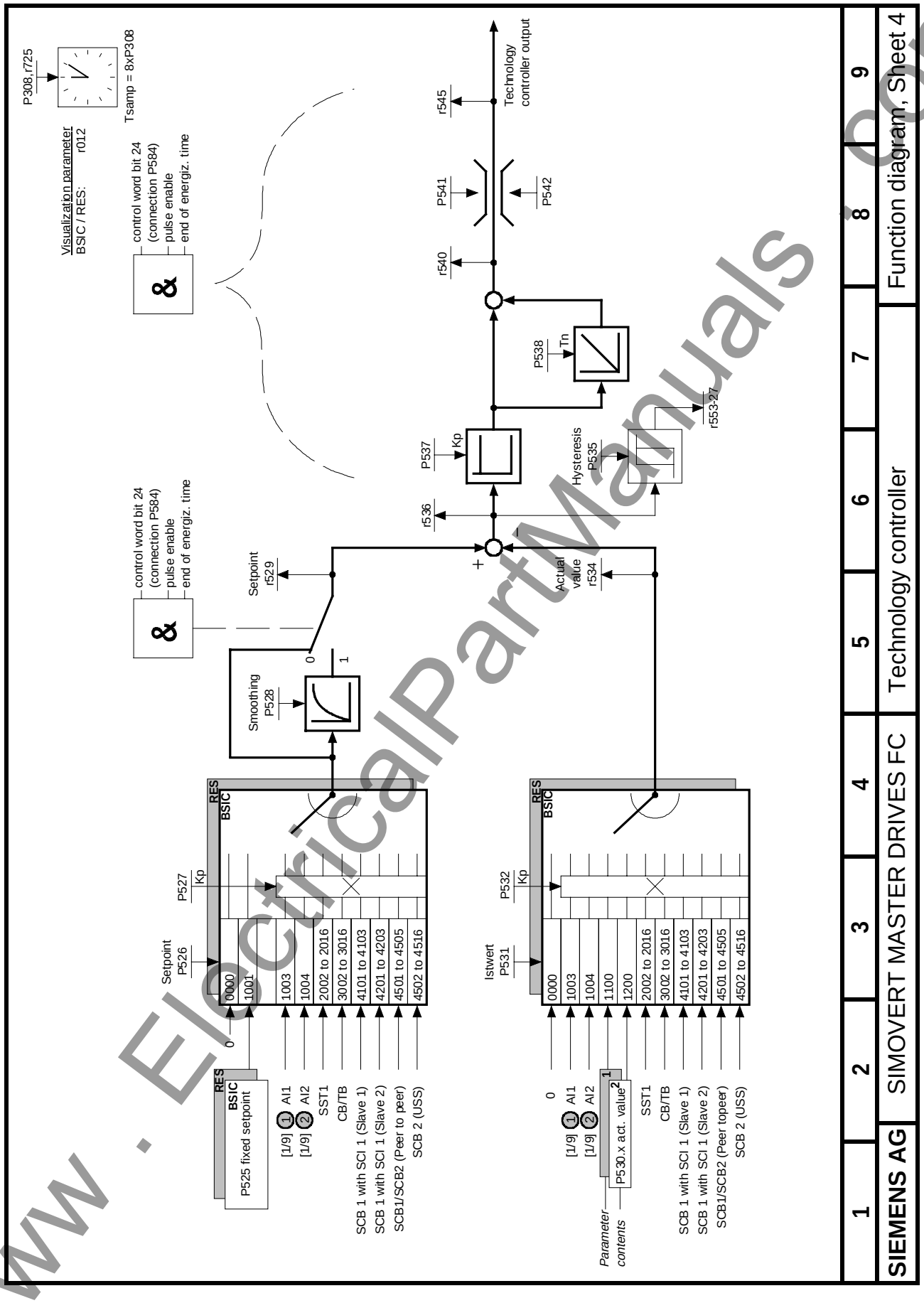


Fig. 10.7 Technology controller

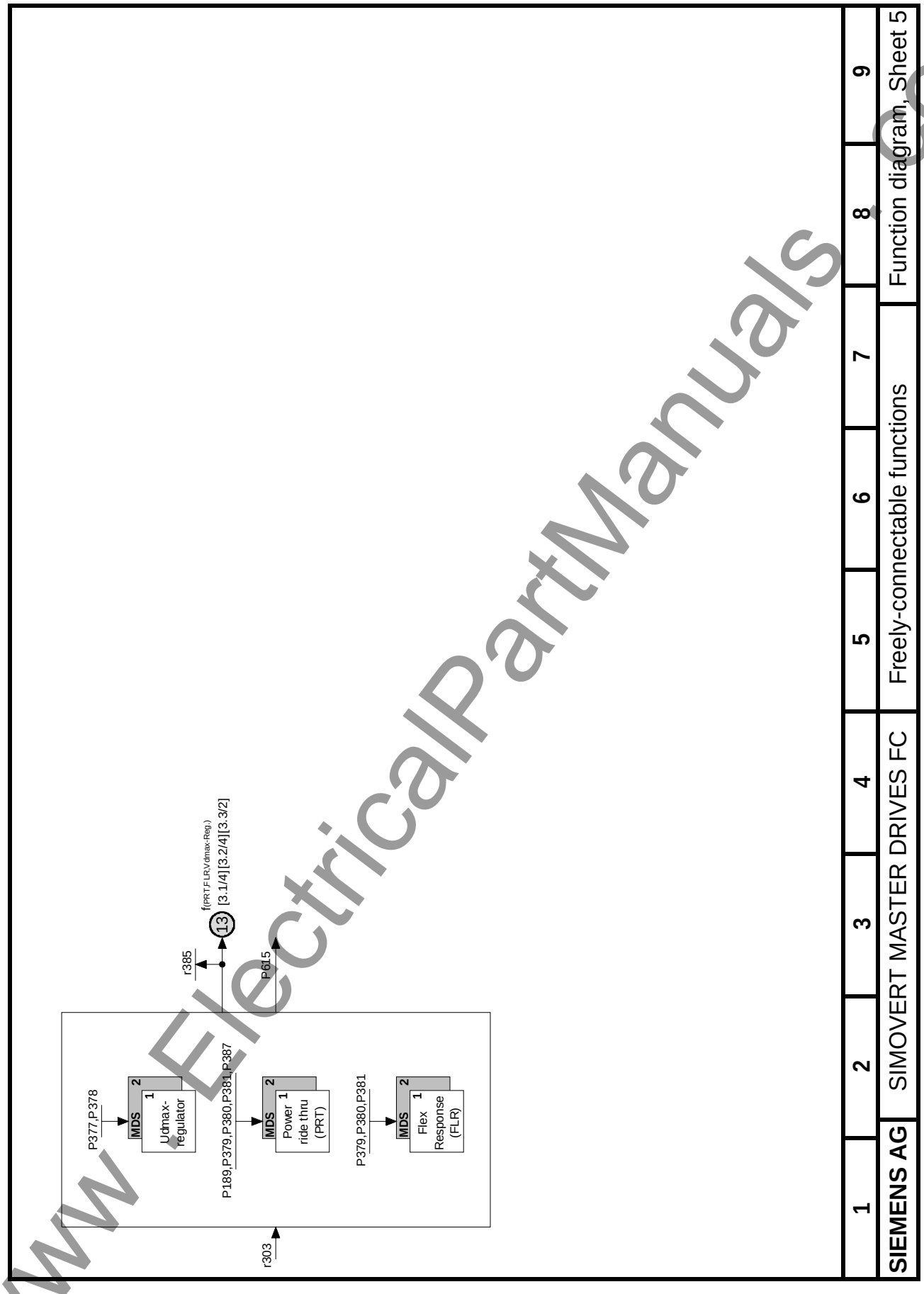


Fig. 10.8 Freely-connectable functions

11 Parameter list

Explanations on the Parameter List

Example:

PNU ***:conf-P**	**Parameter Name in OP1** **Description**	**Range [Unit]** **Value texts**	**# of. Indices** **Factory Settings.**	**read: _/_** **write: _/_**
P999 ***1)** 3E7Hex	**Parameter Name in OP1** Description SDS(2)-Parameter**6)** Type=I2; **2)** PKW: 1Hex=0.01Hz; Process Data Group.: 0**3)**	-300.00 to 300.00 [Hz]	2 i001=50.00 i002=50.00 or: ←**7)**	2**5)**/ BR**4)** 2**5)**/ BR**4)**

1) Confirmation Parameter: not active before pressing the P-key

2) Parameter Type
- O2 16 Bit Value without sign
- I2 16 Bit Value with sign
- L2 Nibble coded Quantity
- V2 Bit coded Quantity

3) Normalization Group for Process Data (PcD)

Process Data Group	Process Data Normalization
0	as Parameter Value Normalization
1	4000Hex = P420 Rated System Frequency
2	1000Hex = P102 Rated Motor Amps
3	1000Hex = P101 Rated Motor Volts
4	1000Hex = r307 Line Volts (AC)

4) Drive status:
- U MLFB Input
- H Hardware Configuration
- A Hardware Setting
- B Ready (Including Fault)
- R (Run) Operation (including Fly Restart, Power Ride Thru)

5) Access Level which is minimum needed to display or change a Parameter
- 1 Operation
- 2 Standard Mode
- 3 Expert Mode

6) Abbreviations for Index Parameters
- SDS(2) Setpoint Channel Data Set Parameter with 2 Indices, to be changed via Control Word 2, Bit 16
- MDS(2) Motor Data Set Parameter with 2 Indices, to be changed via Control Word 2, Bit 18
- B/R Parameter which can be changed between Base and Reserve setting via Control Word 2, Bit 30

7) Parameter value is pre-assigned after initialization dependent on the MLFB drive converter.

11.1 General Observation Parameters

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
r000	**Operation Display** Displays Drive Status, Fault Messages and Warnings; Description, refer to Section 6 operator control „Operator control“ in the Operating Instructions, Part 2.		-	1 /UHABR
r001 1Hex	**Drive Status** Displays the actual drive status Parameter Values: 0 = Drive MLFB input 1 = Drive initialization 2 = Hardware initialization 3 = Drive system initialization 4 = Hardware settings 5 = Drive system settings 6 = Selection on several drive test functions 7 = Fault 8 = Restart inhibition 9 = Ready for turn-ON 10 = Pre-charging of the DC link bus 11 = Ready for operation 12 = Ground fault test 13 = Flying Restart is active 14 = Drive is operating 15 = Ramp generator decelerating (OFF1) 16 = Quick Stop (OFF3) 17 = DC braking 18 = Motor data identification (standstill test) 19 = Speed controller optimization 20 = Synchronization active 21 = Download of parameter settings Analog Output: 100% Parameter Value=16384 Type=O2; PKW: 1HEX=1.0 PcD Gr.: 0	MLFB Input Drive Init H/W Init System Init H/W Setting System Set. Test Fault ON locked Rdy ON Precharging Rdy Operat. Grd Flt TST Fly Restart Operation OFF 1 OFF 2 DC Brake Mot ID Stop n Reg Opt. Synchronize Download	-	2 /UHABR
r003 3Hex	**Output Volts** Drive output voltage (Fundamental rms) Analog Output: 100% @ Parameter Value=4*P101 Type=O2; PKW: 1HEX=0.1V PcD Gr.: 3	[V]	-	2 / BR
r004 4Hex	**Output Amps** Drive output current (Fundamental rms) Analog Output: 100% @ Parameter Value=4*P102 Type=O2; PKW: 1HEX=0.1A PcD Gr.: 2	[A]	-	2 / BR
r005 5Hex	**Output Power** Output active power (calculated value) in % of rated motor power Analog Output: 100% @ Parameter Value=400.0% Type=I2; PKW: 1HEX=0.1% PcD: 4000HEX=400%	[%]	-	2 / BR
r006 6Hex	**DC Bus Volts** DC Bus voltage (actual value to be displayed on PMU and OP) Analog Output: 100% @ Parameter Value=4*r307 Type=I2; PKW: 1HEX=1.0V PcD Gr.: 4	[V]	-	2 / BR
r008 8Hex	**Motor Utilizat.** Thermal motor utilization (calculated value) ATTENTION: for an overload protection of the motor which is derived from this parameter sufficient cooling of the motor must be guaranteed. Condition: P363 >= 100 s Analog Output: 100% @ Parameter Value=16384% Type=O2; PKW: 1HEX=1.0% PcD Gr.: 0	[%]	-	2 / BR

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
r010 AHex	**Drive Utilizat.** Drive utilization Thermal drive utilization as a result of an i^2t calculation of the output current. Maximum load of the drive will have the following reaction: • after 30 sec. a warning message (P622) and • after 60 sec. a reduction of the output current to 91% of the rated drive current. Analog Output: 100% @ Parameter Value=16384% Type=O2; PKW: 1HEX=1.0% PcD Gr.: 0	[%]	-	2 / BR
r012 CHex	**Base / Reserve** Base / reserve settings of the process data wiring for setpoint signals and for control word bits Parameter values: 0: Base setting 1: Reserve setting Analog Output: 100% @ Parameter Value=16384 Type=O2; PKW: 1HEX=1.0 PcD Gr.: 0	Base Reserve	0 to 1	2 / BR
r013 DHex	**Operat. Hours** Operation hours with released inverter pulses (drive status 'operation'). Indices: i001 = Days: days (0...9999) i002 = Hour: hours (0...24) i003 = Sec: seconds (0...3600) Type=O2; PKW: 1HEX=1.0 PcD Gr.: 0		3	2 / BR

11.2 General Parameters

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
P050 * 32Hex	**Language** Display language on the optional operation panel OP and in the PC software SIMOVIS Parameter values: 0: Deutsch 1: English 2: Espanol 3: Francais 4: Italiano Type=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 5 Deutsch English Espanol Francais Italiano	- 0	2 /UHABR 2 /UHABR
P051 * 33Hex	**Access Level** Setting of access levels; with higher access levels more parameters can be read and/or written. Parameter values: 1: Operating via PMU or OP with motor operated potentiometer function 2: Standard mode 3: Expert mode Type=O2; PKW: 1HEX=1.0 PcD Gr.: -	1 to 3 Operation Standard Expert	- 2	1 /UHABR 1 /UHABR
P052 * 34Hex	**Function Select** Selection of several commissioning steps and special functions. Parameter values: 0 = Return into the former drive status from one of the further described functions. 1 = Parameter-Reset: all parameters are reset to their original settings (factory settings). According to the Profibus profile for variable speed drives this function is also accessible via parameter P970. After finishing this function the parameter is automatically reset to 0. 2 = Release for MLFB setting (changing into the drive status 'Drive MLFB input'). To exit this function the parameter must be reset to 0. 3 = Download/Upread (Changing into the drive status 'Download'). To exit this function the parameter must be reset to 0. 4 = Hardware configuration (Changing into the drive status 'Hardware settings'). To exit this function the parameter must be reset to 0. 5 = Drive system settings (Changing into the drive status 'Drive system settings' to parameterize the motor data). To exit this function without internal parameter adaptions, P052 must again be set to 0 (reset). If the motor data or pulse frequency were changed, the function should be exited with P052 = 6, 7 or 8. 6 = Automatic parameterization: sets the control system parameters based on the motor name plate data and the gating unit configuration (e.g. P761, pulse frequency). Automatic parameter setting (parameterization) can only be called-up from the drive setting (P052 = 5). 7 = Motor data identification at standstill: sets the control system parameters (except speed controller) based on measured motor data; this function contains ground fault test and function #6. Type=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 7 Return Par. Reset Set MLFB Download H/W Setting System Set. Auto Param. Mot ID Stop	- 0	2 /UHABR 2 /UHAB

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
P053 * 35Hex	**Parameter Access** Release of interfaces for parameterization. At any time all interfaces have write access to this parameter. Parameter values: 0: none 1: COM BOARD (CB) 2: BASE KEYPAD (PMU) 4: BASE SERIAL (SST1) (SST1) 8: Serial I/O (SCB with USS) (SCB) 16: TECH BOARD (TB) Description for Setting: • Every interface is coded by a number. • Input of the number or the total of several numbers which are related to interfaces, gives parameterization access to these interfaces. Example: The factory setting '6' means, that BASE KEYPAD (PMU) and BASE SERIAL (SST1) have parameterization access. Type=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 31	- 6	1 /UHABR 1 /UHABR
P054 36Hex	**OP Backlight** Backlight for the optional operation panel OP Parameter values: 0 = Backlight always ON 1 = Backlight only ON during operation Type=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 1 always ON dur.operat.	- 0	3 / BR 3 / BR

11.3 Drive Data

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
P070 * 46Hex	**MLFB (6SE70..)** MLFB (model number) of the base drive Parameter values: see section „Initialization“ in the Operating Insructions, Part 2 Type=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 117	- 0	3 /U BR 3 /U
P071 47Hex	**Line Volts** Line voltage of the drive Rated voltage of the feeding AC or DC mains; this parameter is used to calculate the rated DC bus voltage as a basis for the voltage limits of the Vd(max) and the Vd(min) [Power ride thru] controller (e. g. undervoltage failure limit). Type=O2; PKW: 1HEX=0.1V PcD Gr.: 0	90.0 to 1320.0 [V]	- ←	2 / ABR 2 / A
P072 48Hex	**Rtd Drive Amps** Rated drive output current Type=O2; PKW: 1HEX=0.1A PcD Gr.: 0	4.5 to 6540.0 [A]	- ←	2 /U ABR 4 /U
P073 49Hex	**Rtd Drive Power** Rated drive output power Type=O2; PKW: 1HEX=0.1kW PcD Gr.: 0	2.2 to 1800.0 [kW]	- ←	3 /U BR 4 /U
P077 * 4DHex	**FactSettingType** Selective factory setting. The parameter can be changed in the status „MLFB input“ (P052 = 2). If an MLFB still hasn’t been entered, after the MLFB number has been entered and the „MLFB input“ has been left (P052 = 0) then the selected factory setting-type is immediately valid. A selective factory setting can be executed via „Par. reset“ (P052 = 1 or P970 = 0). This parameter value is not changed. Parameter values: 0: Factory setting as before. 1: With this setting, with respect to 0, the following parameters are initialized differently: P554, P568, P571, P572, P573, P574 2: With this setting, with respect to 0, the following parameters are initialized differently: P554, P568, P571, P572, P573, P574, P575, P588 3: With this setting, with respect to 0, the following parameters are initialized differently: P554, P565, P575, P588 Type:O2; PKW: 1 HEX=1.0 PcD Gr.: -	0 to 3 – Normal OP1 OP1 cabinet unit Cabinet terminal	– 0	3 /U BR 3 /U
r089 59Hex	**Board Position 1** PCB in position #1 (left) of the electronic box Parameter Values: 0 = none 1 = SIMOVERT FC CU Board 2 = SIMOVERT VC CU Board 3 = SIMOVERT SC CU Board Type=O2; PKW: 1HEX=1.0 PcD Gr.: 0	0 to 3 none FC VC SC		3 / B

11.4 Hardware Configuration

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
P090 * 5AHex	**Board Position 2** PCB in position #2 (right) of the electronic box Parameter values: 0 = no optional PCBs 1 = CB Communication Board 2 = TB Technology Board 3 = SCB Serial Communication Board 4 = TSY Digital-Tacho and Synchronization Board Description for Setting: Only the following combinations of PCBs and positions are admitted: Position #3 (P091) Position #2 (P090) - CB - TB - SCB - TSY SCB CB CB TB SCB TB CB SCB CB TSY TSY CB SCB TSY TSY SCB Type=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 4 none CB TB SCB TSY	- 0	3 / H BR 3 / H
P091 * 5BHex	**Board Position 3** PCB in position #3 (center) of the electronic box Description see P090 Type=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 4	- 0	3 / H BR 3 / H
P092 5CHex	**Output Filter** Defines connected Output Filter Parameter values: 0 = no output filter 1 = sine wave output filter 2 = dV/dt filter Value '1' limits the depth of modulation to the range of space vector modulation (see also P763, maximum depth of modulation). After leaving drive settings (see P052 = 5) the pulse frequency (P761) is adapted to the sine wave filter requirements. Notes: • For closed-loop speed/frequency/torque control, the sinusoidal filter for the drive converter is taken into account. • Parameter value 2 limits the adjustable pulse frequency P761 to 3 kHz. Type=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 2 none sine wave dV/dt	- 0	3 / ABR 3 / A

11.5 Motor Data

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
P100 64Hex	**Type of Motor** Changes between international (IEC) and US (NEMA) motor data parameterization modes. Input data are for IEC motors: power factor cos(PHI) for NEMA motors: efficiency and rated motor power Parameter values: 0: IEC 1: NEMA MDS(2) Parameter Type=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 1 IEC NEMA	2 i001=0 i002=0	2 / ABR 2 / A
P101 * 65Hex	**Motor Rtd Volts** Rated motor voltage Name plate value of the rated motor voltage; the valid kind of connection (star / delta) must be regarded. Input for Siemosyn motors is the rated voltage at rated motor frequency. MDS(2) Parameter Type=O2; PKW: 1HEX=0.1V PcD Gr.: -	115.0 to 1600.0 [V]	2 ←	2 / ABR 2 / A
P102 66Hex	**Motor Rtd Amps** Rated motor current; name plate value for the valid kind of connection (star / delta. MDS(2) Parameter Type=O2; PKW: 1HEX=0.1A PcD Gr.:0	0.6 to 3000.0 [A]	2 ←	2 / ABR 2 / A
P103 * 67Hex	**Mot No Load Amps** Motor no load current (rated magnetizing current, data sheet value) in % of rated motor Amps. A correct input improves the calculation of motor data and results in a more accurate active current calculation. Pre-set during automatic parameterization (P052 = 7) Note: for 0 % < P103 < 10 % the value of P196 is set to 10 %. MDS(2) Parameter Type=O2; PKW: 1HEX=0.1% PcD: 4000HEX=400%	0.0 to 95.0 [%]	2 i001=0.0 i002=0.0	3 / ABR 3 / A
P104 * 68Hex	**MotPwrFactor** Power factor cos(PHI) of the motor (name plate value) Condition: P100 = 0 (IEC-Motor) MDS(2) Parameter Type=O2; PKW: 1HEX=0.001 PcD: 4000HEX=0.25	0.500 to 0.999	2 ←	2 / ABR 2 / A
P105 * 69Hex	**Motor Rtd Power** Rated motor power (name plate value) Condition: P100 = 1 (NEMA-Motor) MDS(2) Parameter Type=O2; PKW: 1HEX=0.1hp PcD Gr.: 0	0.1 to 2000.0 [hp]	2 ←	2 / ABR 2 / A
P106 * 6AHex	**Motor Rtd Effic.** Rated motor efficiency (name plate value) Condition: P100 = 1 (NEMA-Motor) MDS(2) Parameter Type=O2; PKW: 1HEX=0.1% PcD: 4000HEX=25%	50.0 to 99.9 [%]	2 ←	2 / ABR 2 / A

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
P107 6BHex	**Motor Rtd Freq** Rated motor frequency Name plate value of the rated synchronous frequency of the motor. ATTENTION: Changing this parameter may also change the pulse frequency (P761). Notes: • For P163 = 0, 1 (V/Hz control and V/Hz control with speed control): maximum value is 200 Hz • For P163 = 2 (Textile applications): maximum value is 300Hz The pole pair number (P109) is calculated when parameters are changed For induction motors, a slip (r295) must exist to P108 * P109/60, if the slip compensation function is to operate correctly. MDS(2) Parameter Type=O2; PKW: 1HEX=0.1Hz PcD Gr.: 1	8.0 to 300.0 [Hz]	2 i001=50.0 i002=50.0	2 / ABR 2 / A
P108 * 6CHex	**Motor Rtd Speed** Rated motor speed (name plate value) Note: P163 = 0 (V/Hz control with speed control) is only available with this information The pole pair number (P109) is calculated when parameters are changed For induction motors, a slip (r295) must exist to P107/ P109*60, if the slip compensation function is to operate correctly. MDS(2) Parameter Type=O2; PKW: 1HEX=1.0min-1 PcD Gr.: 0	0 to 18000 [min-1]	2 i001=0 i002=0	2 / ABR 2 / A
P109 * 6DHex	**Motor #PolePairs** Number of motor pole pairs (calculated from rated frequency (P107) and rated motor speed (P108)); may be checked and - if needed - corrected. ATTENTION: As the pole pair number is automatically calculated when entering the rated motor frequency and speed (P107, P108), it is always necessary to check P109. P109 must be written into when downloading (P052 = 3) For motors with rated data for regenerative operation, the automatically calculated pole pair number must be increased by 1. MDS(2) Parameter Type=O2; PKW: 1HEX=1.0 PcD Gr.: -	1 to 10	2 ←	3 / ABR 3 / A

11.6 Control

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
r150 96Hex	**Control Status** Status word of the control circuit Parameter values: Bit00 = 1: Ramp generator set command is active Bit01 = 1: Drive is operated in field weakening mode Bit02 = 1: Ud(min) controller is active (power ride thru) Bit03 = 1: Ud(max) controller is active Bit04 = 1: Frequency limitation is active Bit05 = 0: Ramp generator: acceleration lock is active Bit06 = 0: Ramp generator: deceleration lock is active Bit07 = 1: Speed controller output at upper limit Bit08 = 1: Speed controller output at lower limit Bit09 = 1: Ramp generator in protective mode Bit10 = 1: i(max) controller active Bit11 = 1: Initialization of the control circuit is finished Bit12 = 1: Speed controller: Output set command is active Bit13 = not used Bit14 = not used Bit15 = 1: Motor pulled out or blocked Coding of bits on the PMU display: 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 Type=V2; PKW: 1HEX=1.0 PcD Gr.: 0		-	3 / BR
r152 98Hex	**act. MotDataSet** Displays the active motor data set Parameter values: 0: motor data set 1 1: motor data set 2 Type=O2; PKW: 1HEX=1.0 PcD-Gr.: 0	MotDataSet1 MotDataSet2	–	3 / ABR
P163 A3Hex	**Control Mode** Parameter values: 0: V/Hz control with superposed speed control 1: V/Hz control 2: V/Hz control for textile applications; allows no frequency corrections e. g. by the current limitation controller MDS(2) Parameter Type=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 2 V/Hz+ nReg V/Hz V/Hz Textil	2 i001=1 i002=1	3 / ABR 3 / A
P165 A5Hex	**V/Hz Mode** V/Hz mode Parameter values: 0: linear characteristic (for constant torque drives) 1: parabolic characteristic (for pumps, fans, etc.) See section „V/Hz mode“ in the Operating Instructions, Part 2 MDS(2) Parameter Type=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 1 linear parabolic	2 i001=0 i002=0	2 / ABR 2 / A
P166 A6Hex	**Boost Mode** Boost mode at f = 0 Hz Parameter values: 0: Current boost: a voltage boost is calculated by means of a starting current (P167) allowing for the measured stator resistance. 1: Voltage boost: the voltage boost of the V/Hz curve is directly entered via P168. See section „V/Hz mode“ in the Operating Instructions, Part 2 MDS(2) Parameter Type=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 1 Curr.Boost Volt.Boost	2 i001=1 i002=1	2 / BR 2 / B

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
P167 A7Hex	**Boost Amps** Current boost in % of rated motor current is the basis for the voltage boost at f = 0 Hz, allowing for the measured stator resistance. See section „V/Hz mode“ in the Operating Instructions, Part 2 Condition: P166 = 0 (Current boost) MDS(2) Parameter Type=O2; PKW: 1HEX=0.1% PcD: 4000HEX=400%	10.0 to 400.0 [%]	2 i001=100.0 i002=100.0	2 / BR 2 / BR
P168 A8Hex	**Boost Volts** Voltage boost at f = 0 in % of rated motor voltage (P101) The value is pre-assigned for automatic parameter setting (P052 = 6, 7) See section „V/Hz mode“ in the Operating Instructions, Part 2 Condition: P166 = 1 (Voltage boost) MDS(2) Parameter Type=O2; PKW: 1HEX=0.01% PcD: 4000HEX=400%	0.00 to 25.00 [%]	2 i001=2.00 i002=2.00	2 / BR 2 / BR
P169 A9Hex	**Boost End Freq** End frequency of voltage boost In the range from 0 Hz to the end frequency the voltage boost is reduced to 0. Special case: A value of 0 Hz causes the output voltage to stay constant until crossing the normal V/Hz curve ('horizontal boost'). The value is pre-set during automatic parameterization (P052 = 6, 7). See section „V/Hz mode“ in the Operating Instructions, Part 2 MDS(2) Parameter Type=O2; PKW: 1HEX=0.1Hz PcD Gr.: 1	0.0 to 300.0 [Hz]	2 i001=10.0 i002=10.0	2 / BR 2 / BR
P170 AAHex	**Field Weak Freq** Start frequency for field weakening At higher frequencies the output voltage is kept constant. If the voltage limit is reached below this value, field weakening starts at a lower frequency. See section „V/Hz mode“ in the Operating Instructions, Part 2 Note: r182 (real frequency at start of field weakening) The maximum value is limited to 2 * P107 (rated motor frequency). MDS(2) Parameter Type=O2; PKW: 1HEX=0.1Hz PcD Gr.: 1	8.0 to 300.0 [Hz]	2 i001=50.0 i002=50.0	2 / BR 2 / B
P171 ABHex	**Accel Amps** Additional acceleration current in % of rated motor current Additional current setpoint signal for high acceleration torque at low speed. The acceleration current is only active during acceleration and up to the end frequency (P169) of the voltage boost. It may be used to generate a break off torque. See section „V/Hz mode“ in the Operating Instructions, Part 2 MDS(2) Parameter yp=O2; PKW: 1HEX=0.1% PcD: 4000HEX=400%	0.0 to 799.9 [%]	2 i001=0.0 i002=0.0	3 / BR 3 / BR
P172 ACHex	**IxR Compens Gain** Compensation of voltage drops on long motor cables in % of the rated motor impedance. Depending on the actual torque generating current component the output voltage is increased . See section „V/Hz mode“ in the Operating Instructions, Part 2 MDS(2) Parameter Type=O2; PKW: 1HEX=0.01% PcD: 4000HEX=25%	0.00 to 40.00 [%]	2 i001=0.00 i002=0.00	2 / BR 2 / BR

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
P173 ADHex	**Imax** Maximum current (Fundamental rms) Setpoint signal for the current limit (Imax controller) to protect the motor and the drive, respectively. Setting range: 0.125 to 4.00*rated motor current (P102), but maximum 1,36* rated drive current (P072). After the automatic parameterization (P052 = 6, 7) the parameter is pre-set to 1,5 * rated motor current (P102). Reaction (derating) may result from the pulse frequency parameter (P761). Related display parameter: r174: realized maximum current setpoint signal; allows for other influences MDS(2) Parameter Type=O2; PKW: 1HEX=0.1A PcD Gr.: 2	0.1 to 3000.0 [A]	2 ←	2 / BR 2 / BR
r174 AEHex	**Imax(set)** Maximum current (realized setpoint signal) for the Imax controller allows for the influences of the I^2t calculation and the acceleration current (P171) Dependent Parameter: P173 (maximum current, parameterized value) MDS(2) Parameter Analog Output: 100% @ Parameter Value=4*P102 Type=O2; PKW: 1HEX=0.1A PcD Gr.: 2	[A]	-	3 / BR
P175 AFHex	**Imax Reg. Gain** Gain of the current limiting PI controller (Imax controller). The parameter is pre-set during automatic parameterization (P052 = 6). MDS(2) Parameter Type=O2; PKW: 1HEX=0.01 PcD: 4000HEX=0.25	0.01 to 0.49	2 i001=0.05 i002=0.05	3 / BR 3 / BR
P176 B0Hex	**Imax Reg. Time** Integral time constant of the current limiting PI controller (Imax controller). MDS(2) Parameter Type=O2; PKW: 1HEX=1.0ms PcD Gr.: 0	4 to 32001 [ms]	2 i001=100 i002=100	3 / BR 3 / BR
r177 B1Hex	**f(Imax-Reg.)** Frequency output of the Imax controller. The sign depends of the sign of the torque generating current component. Note: P163 = 0, 1 (V/Hz modes except textile applications) Analog Output: 100 % @ Parameter Value=163.84Hz Type=I2; PKW: 1HEX=0.1Hz PcD Gr.: 1	[Hz]	-	3 / BR
r178 B2Hex	**V(Imax-Reg.)** Output voltage of the Imax controller to reduce the drive setpoint voltage. Notes: P163 = 0, 1 (V/Hz modes except textile applications): Only active, when the stator frequency setpoint signal is less than the rated slip frequency (r295). P163 = 2 (Textile applications): Active in the complete frequency range but no frequency correction (r177). Analog Output: 100% @ Parameter Value=4*P101 Type=I2; PKW: 1HEX=0.1V PcD Gr.: 3	[V]	-	3 / BR
r179 B3Hex	**Output Amps(rms)** Output current (fundamental rms); fast actual value for automation purposes. Analog Output: 100% @ Parameter Value=4*P102 Type=O2; PKW: 1HEX=0.1A PcD Gr.: 2	[A]	-	3 / BR

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
r180 B4Hex	**Mod Depth Limit** The modulation depth limit is mainly influenced by the modulator, it is always equal or less than the value of P763 (e. g. when a sine wave filter is present (P091 = 1) or when edge modulation is off (P769 > 0)) Note: The maximum possible control limit (approx. 93 %) of the gating unit at frequencies less than 28 Hz, is only taken into account in r181. Analog Output: 100% @ Parameter Value=400% Type=O2; PKW: 1HEX=0.1% PcD: 4000HEX=400%	[%]	-	3 / BR
r181 B5Hex	**Max Output Volts** Maximum possible output voltage; calculated of the maximum depth of modulation (r180) and the actual value of the DC bus voltage (r304). Analog Output: 100% @ Parameter Value=4*P101 Type=O2; PKW: 1HEX=0.1V PcD Gr.: 3	[V]	-	3 / BR
r182 B6Hex	**FieldWeakFrq-act** Frequency at start of field weakening; compared to P170 the available voltage headroom is allowed for. In combination with the actual value of the frequency (r297) this parameter is used to calculate a field weakening curve for the adaptation of the slip in the field weakening range. Analog Output: 100% @ Parameter Value=163.84Hz Type=O2; PKW: 1HEX=0.01Hz PcD Gr.: 1	[Hz]	-	3 / BR
P189 BDHex	**Excitation Time** Motor excitation time Wait time between pulse release and ramp generator release. Within this period the magnetization of the induction motor is built up. The value is pre-set during automatic parameterization (P052 = 6, 7). Notes: • The magnetization is built up at a frequency of 0 Hz with the selected V/Hz curve voltage (see P167 and P168, respectively) • If smooth start mode (P190 = 1) is selected, the voltage is built up ramp-like instead of step-like. • The „restart-on-the-fly active“ status bit (refer to P616) is set during the motor excitation time. MDS(2) Parameter Type=O2; PKW: 1HEX=0.01s PcD Gr.: 0	0.01 to 10.00 [s]	2 i001=1.00 i002=1.00	3 / BR 3 / BR
P190 BEHex	**Smooth Accel** For smooth starting, the flux in the motor is established with some delay. This is to ensure, that even with residual magnetization, the motor only rotates in the required direction of rotation. If smooth acceleration mode is selected, at turn on the output voltage increases ramp like to the V/Hz curve voltage within the excitation time (P189). Parameter values: 0 = off 1 = on Condition: P100 = 0, 1 (motor type = IEC, NEMA) MDS(2) Parameter Type=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 1 0: off 1: on	2 i001=0 i002=0	3 / BR 3 / BR
r196 C4Hex	**No Load Amps** Rated magnetizing current (see P103, motor no load current) if P103 = 0.0%: r196 is automatically calculated if 0.0% < P103 < 10.0%: r196 = 0.1 * P102 (rated motor current) if P103 >= 10%: r196 = P103 * P102 Analog Output: 100% @ Parameter Value=4*P102 Type=O2; PKW: 1HEX=0.1A PcD Gr.: 2	[A]	-	3 / BR

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
r200 C8Hex	**Rotor Time Const** Rotor time constant of the motor (calculated) Analog Output: 100% @ Parameter Value=16384ms Type=O2; PKW: 1HEX=1.0ms PcD Gr.: 0	[ms]	-	3 / BR
P208 * D0Hex	**Src RotSpeed act** Type of tachometer and type of its connection (for speed control (P163=0) a tachometer must be reported). Parameter values: 0 = no tachometer 1 = Encoder 2 = Encoder with control track 3 = Analog tachometer via analog input #1 4 = Analog tachometer via analog input #2 Notes P208 = 1, 2 (Encoder): • The encoder evaluation requires the TSY board in position 2 or 3 (P090, P091) of the electronic box. • Only encoders with a phase shift of 90° between the 2 tracks can be used. • For settings '2' or a low level signal or disconnecting of the control track terminal of the TSY board will cause the fault message F052 in order to report a broken wire. • Set P209 to the number of pulses of the encoder. Please refer to the manual of your encoder or to the TSY manual for details. P208 = 3, 4 (Analog tachometer): • Scale the analog tachometer input via P210 • If the output voltage of the analog tachometer is > 10 V, the analog tachometer interface (ATI) must be used. Related display parameter: r214 (Actual speed measured by the tachometer) Conditions: P163 = 0 (V/Hz modes with speed control) with encoder: P090, P091, TSY board with analog tachometer: ATI board if needed MDS(2) Parameter Type=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 4 none Encoder Enc+CtTrack AnalogTach1 AnalogTach2	2 i001=0 i002=0	3 / ABR 3 / A
P209 D1Hex	**Encoder Pulse #** Number of pulses of the encoder Description for setting: Parameter is only needed if an encoder is reported (P208 = 1 or 2). Related display parameter: r214 (Actual speed measured by the tachometer) Condition: 208 = 1, 2, 5, 6 (pulse encoder) MDS(2) Parameter Type=O2; PKW: 1HEX=1.0 PcD Gr.: 0	60 to 5000	2 i001=1024 i002=1024	3 / ABR 3 / A

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
P210 D2Hex	**AnalogTachScale** Analog tachometer scaling Speed which causes 10 V input signal at the analog input (see P208). The gain setting board ATI is required to connect the analog tachometer to the drive if the tachometer voltage may exceed 10 V. ATTENTION: The parameter value is at same time the limit of the speed measurement range. Speed overshoots must be allowed for. Analog tachometers can be used up to drive output frequencies of max. 100 Hz. Description for Setting: Example: Maximum speed is 3000 rpm plus a 10 % overshot, an ATI board is used 1 P210 must be set to 3300 rpm (3000 rpm + 10 %), 2 in V/Hz mode (P163 = 1) the motor must be operated at 3300 rpm (e. g. to be measured with an external rpm meter) ATTENTION: The analog input where the ATI board is connected to must not be parameterized to be a setpoint input! 3. the output voltage of the ATI board, connected to the selected analog input terminal (P208) must be adjusted to 10.00 V. Dependent parameter: The offset of the analog input must be adjusted (P652). Condition: P208 = 3, 4 (analog tachometer) MDS(2) Parameter Type=O2; PKW: 1HEX=1.0min-1 PcD Gr.: 0	500 to 6000 [min-1]	2 i001=3000 i002=3000	3 / ABR 3 / ABR
r214 D6Hex	**Meas'd Rot.Speed** Actual speed value, measured via a tachometer (P208). Analog Output: 100% @ Parameter Value=P420 Type=I2; PKW: 1HEX=0.01Hz PcD Gr.: 1	[Hz]	-	3 / BR
P215 D7Hex	**max. dn/dt** Maximum allowed change of the measured speed actual value in % of rated motor speed (P108) during one sampling period of the control system (P308). The function may identify noise or interrupted speed signals e. g. caused by defective cable shielding or tachometer coupling. ATTENTION: This function limits the rate of change in speed of the drive. If a warning message is reported during acceleration or at load changes it may be needed to increase the parameter value. Pre-set during automatic parameterization (P052 = 6, 7) . Related display parameter: r218 (Actual speed value) Condition: P208 <> 0 (Source of actual speed value) MDS(2) Parameter Type=O2; PKW: 1HEX=0.1% PcD: 4000HEX=400%	0.1 to 199.9 [%]	2 i001=10.0 i002=10.0	3 / BR 3 / BR
r218 DAHex	**n/f(act)** Actual value of speed / frequency P163 = 0 (V/Hz modes with speed control): actual speed multiplied with the number of pole pairs of the motor (P109) P163 = 1, 2 (V/Hz mode, V/Hz mode for textile applications) @ slip compensation P294 = 0 %: stator frequency P163 = 1 (V/Hz mode) and slip compensation (P294) active: actual speed multiplied with the number of pole pairs of the motor (P109) Analog Output: 100% @ Parameter Value=P420 Type=I2; PKW: 1HEX=0.01Hz PcD Gr.: 1	[Hz]	-	3 / BR

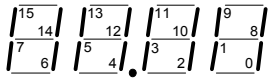
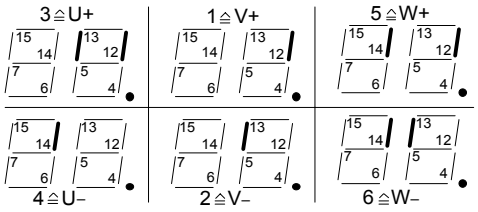
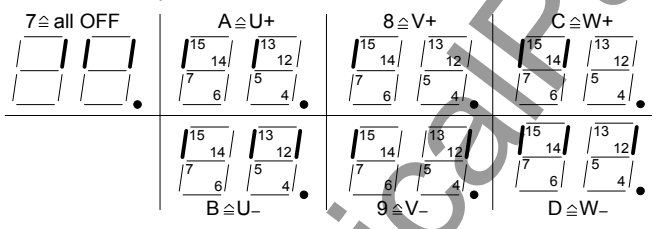
PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
r219 DBHex	**n(act)** Actual speed P163 = 0 (V/Hz modes with speed control): actual speed of the motor P163 = 1, 2 (V/Hz mode, V/Hz mode for textile applications) @ slip compensation P294 = 0 %: stator frequency divided by the number of pole pairs of the motor (P109) P163 = 1 (V/Hz mode) and slip compensation (P294) active: actual speed Analog Output: 100% @ Parameter Value=P420 Type=I2; PKW: 1HEX=0.01Hz PcD Gr.: 1	[Hz]	-	2 / BR
P221 DDHex	**Smooth n/f(act)** Smoothing time constant of the actual n/f value for the speed controller (e. g. for gear box looseness. Related display parameter: r222 (smoothed n/f actual value) Condition: P163 = 0 (V/Hz mode with speed control) MDS(2) Parameter Type=O2; PKW: 1HEX=1.0ms PcD Gr.: 0	0 to 2000 [ms]	2 i001=0 i002=0	2 / BR 2 / BR
r222 DEHex	**n/f(act,smo'd)** Smoothed n/f actual value at the input of the speed controller Dependent parameter: P221 (Smoothing of the n/f actual value) Condition: P163 = 0 (V/Hz mode with speed control) Analog Output: 100% @ Parameter Value=P420 Type=I2; PKW: 1HEX=0.01Hz PcD Gr.: 1	[Hz]	-	2 / BR
r224 E0Hex	**n/f Deviation** Control deviation at the input of the speed controller. Condition: P163 = 0 (V/Hz mode with speed control) Analog Output: 100% @ Parameter Value=P420 Type=I2; PKW: 1HEX=0.01Hz PcD Gr.: 1	[Hz]	-	3 / BR
P225 E1Hex	**n/f Reg. Gain** Proportional gain of the n/f controller. Pre-set during automatic parameterization (P052 = 6). Condition: P163 = 0 (V/Hz mode with speed control) MDS(2) Parameter Type=O2; PKW: 1HEX=0.01 PcD: 4000HEX=64	0.00 to 250.00	2 i001=3.00 i002=3.00	2 / BR 2 / BR
P229 E5Hex	**n/f Reg Time** Integral time constant of the speed controller pre-set during automatic parameterization (P052 = 6, 7). Description for setting: With a value of 32001 ms the integral part of the controller is turned off, the controller operates as a P controller. Related display parameter: r237 (integral part of the n/f controller) Condition: P163 = 0 (V/Hz mode with speed control) MDS(2) Parameter Type=O2; PKW: 1HEX=1.0ms PcD Gr.: 0	25 to 32001 [ms]	2 i001=400 i002=400	2 / BR 2 / BR
P261 105Hex	**Smooth Isq** Time constant for smoothing the torque generating current component (r264). Pre-set during automatic parameterization (P052 = 6, 7). Related display parameter: r263 (Isq(set, smo'd)) MDS(2) Parameter Type=O2; PKW: 1HEX=1.0ms PcD Gr.: 0	0 to 3200 [ms]	2 i001=2000 i002=2000	3 / BR 3 / BR

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
r263 107Hex	**Isq(set,smo'd)** Smoothed actual value of the torque generating current component; is used for the slip compensation. Dependent parameter: P261 (Smoothing of Isq) Condition: P163 = 1 (V/Hz mode) Analog Output: 100% @ Parameter Value=4*P102 Type=I2; PKW: 1HEX=0.1A PcD Gr.: 2	[A]	-	3 / BR
r264 108Hex	**Isq(act)** Actual value of the torque generating current component Analog Output: 100% @ Parameter Value=4*P102 Type=I2; PKW: 1HEX=0.1A PcD Gr.: 2	[A]	-	3 / BR
P272 110Hex	**ResistStator+Cab** Total of the stator resistance of the motor and the cable resistance in % of rated motor impedance. Pre-set during automatic parameterization (P052 = 6) and during motor data identification(P052 = 7). MDS(2) Parameter Type=O2; PKW: 1HEX=0.01% PcD: 4000HEX=25%	0.00 to 49.99 [%]	2 i001=3.00 i002=3.00	2 / BR 2 / BR
P294 126Hex	**Slip Comp Gain** Proportional gain of the slip compensation (also allowing for the rotor temperature) Description for Setting: 0.0%: Slip compensation off 50 - 70%: Full slip compensation at cool motor (partial load) 100%: Full slip compensation at warm motor (full load) ATTENTION: Name plate data for rated motor current (P102), speed (P108) and frequency (P107) must be entered correctly and completely. Condition: P163 = 1 (V/Hz mode) MDS(2) Parameter Type=O2; PKW: 1HEX=0.1% PcD: 4000HEX=400%	0.0 to 400.0 [%]	2 i001=0.0 i002=0.0	2 / BR 2 / BR
r295 127Hex	**Motor Rtd Slip** Rated motor slip in % of rated motor frequency (P108). Analog Output: 100% @ Parameter Value=25.0% Type=O2; PKW: 1HEX=0.01% PcD: 4000HEX=25%	[%]	-	3 / BR
r296 128Hex	**Slip Frequency** Actual slip frequency of the motor P163 = 0 (V/Hz mode with speed control): Output signal of the speed controller. P163 = 1 (V/Hz mode): Output signal of the slip compensation. Dependent parameters: P294 (Kp of the slip compensation) for P163 = 0 V/f class Analog Output: 100% @ Parameter Value=25.0% Type=I2; PKW: 1HEX=0.01% PcD: 4000HEX=25%	[%]	-	3 / BR
r297 129Hex	**f(set,stator)** Stator frequency setpoint signal Analog Output: 100% @ Parameter Value=P420 Type=I2; PKW: 1HEX=0.01Hz PcD Gr.: 1	[Hz]	-	3 / BR

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
P299 12BHex	**Reson Damp Gain** Proportional gain of the resonance damping circuit The resonant damping circuit is effective in a range from about 5 % to 70 % of rated motor frequency. Description for setting: Too high parameter values cause instability (forward control effect). Note: The resonance damping circuit damps oscillations of the active current. These oscillationa mainly happen during no load operation. The parameter can not be used to optimize the response behavior of V/Hz mode with speed control (P163 = 0). Related display parameters: r264 (Isq(act)) r301 (f (Resonance damping)). Condition: P163 = 0, 1 (V/Hz modes except textile applications) MDS(2) Parameter Type=O2; PKW: 1HEX=0.01 PcD Gr.: 0	0.00 to 0.99	2 i001=0.00 i002=0.00	3 / BR 3 / BR
r301 12DHex	**f(Reson Damp)** Output frequency of the resonance damping circuit Analog Output: 100% @ Parameter Value=P420 Type=I2; PKW: 1HEX=0.1Hz PcD Gr.: 1	[Hz]	-	3 / BR
P302 12EHex	**SmoothDCBusVolts** Time constant for smoothing the DC link bus voltage (r304) for use in the Vd correction circuit. The smoothing is exponentially related to the parameter value. $T_{smooth} \sim 2^{Parameter\ value}$ Related display parameter: r304 (Vd(act,smooth)) Note: if P302 = 16, P304 displays the DC bus voltage calculated from P071 (Line Voltage) MDS(2) Parameter Type=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 16	2 i001=9 i002=9	3 / BR 3 / BR
r303 12FHex	**DC BusVolts(act)** unfiltered actual value of the DC link bus voltage Analog Output: 100% @ Parameter Value=4*r307 Type=I2; PKW: 1HEX=1.0V PcD Gr.: 4	[V]	-	3 / BR
r304 130Hex	**DCBusVolt(smo'd)** Smoothed actual value of the DC bus voltage, smoothing see P302 Analog Output: 100% @ Parameter Value=4*r307 Type=O2; PKW: 1HEX=0.1V PcD Gr.: 4	[V]	-	3 / BR
r307 133Hex	**Line Volts (AC)** Rated line voltage For AC drives: Rated drive input voltage (P071). For DC inverters: fictive AC input voltage which would cause the DC voltage ($\frac{P071}{1,35}$). Analog Output: 100% @ Parameter Value=1638.4V Type=O2; PKW: 1HEX=0.1V PcD Gr.: 0	[V]	-	3 / BR
P308 134Hex	**Sampling Time** Base sampling time T0 of the V/Hz control. Description for Setting: • Before reducing the sampling time the calculation time headroom should be checked (r725). A minimum headroom of 5 % should always be guaranteed to prevent the operation program from a slow reaction. • If fault message #42 'Calculation time' occurs, the sampling time must be increased. • The calculation time loading also depends on the pulse frequency (P761). Type=O2; PKW: 1HEX=0.1ms PcD Gr.: 0	0.8 to 4.0 [ms]	- 2.0	3 / ABR 3 / A

11.7 Functions

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
r333 14DHex	**Mot ID Status** Displays the actual measuring step of the motor data identification; see also section „Function selection“ in the Operating Instructions, Part 2 The '100' digit displays the type of measurement: 0xx: not active 1xx: ground fault test 4xx: DC measurement The '10' digit separates the measurement into several steps; the detailed meaning depends of the '100' digit: 10x: ground fault test selected 11x: no transistor ON 12x: transistor V+ ON 13x: transistor V- ON 14x: transistor U+ ON 15x: transistor U- ON 16x: transistor W+ ON 17x: transistor W- ON The '1' digit displays more details of the steps: 4x0: DC current measurement selected 4x1: Measurement in phase direction U 4x2: Measurement in phase direction V 4x3: Measurement in phase direction W 4x4: Parameter written into Type=O2; PKW: 1HEX=1.0 PcD Gr.: 0		-	2 / BR
P354 162Hex	**Ground Flt Test** Ground fault test; this is not a protective function according to any standard. Parameter values: 0 = no ground fault test to be performed except during parameter identification 1 = ground fault test will be performed after the next ON command; afterwards the parameter is reset to '0' 2 = ground fault test to be performed after every ON command 3 = ground fault test is always OFF, even during parameter identification Note: During motor data identification (P052 = 7) a ground fault test is performed if P354 = 0, 1, or 2. Type=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 3 not active next ON every ON OFF	- 1	3 / BR 3 / BR

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
r358 166Hex	**GrdFltTestResult** Results of the ground fault test Bit-coded display of the reason which has caused the break of the test.  Parameter values: Bit 0 =1: VCE phase W Bit 1 =1: VCE phase V Bit 2 =1: VCE phase U Bit 3 =1: overcurrent Bit 8 =1: negative Iw Bit 9 =1: positive Iw Bit 10 =1: negative Iu Bit 11 =1: positive Iu ATTENTION! The semiconductor which was triggered or where the fault occurred is coded using Bits 12 to 14 or the highest value nibble on the OP1. Individual converter or Inverter 1 in the parallel circuit:  Bits 12 to 14 all OFF: no semiconductor was in ON-state. Inverter 2 in the parallel circuit:  Type=V2; PKW: 1HEX=1.0 PcD Gr.: 0		–	3 / BR
P362 * 16AHex	**Motor Cooling** Motor cooling The kind of cooling of the motor influences the calculation of the allowed duty cycle. Because the cooling of self cooled motors depends on the speed, the admissible load decreases with lower speed. Motors with forced cooling don't have these restrictions. Parameter values: 0: self cooled 1: forced cooling MDS(2) Parameter Type=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 1 self cooled forced vent	2 i001=0 i002=0	2 / BR 2 / BR

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
P363 16BHex	**Mot ThermT-Const** Thermal time constant of the motor Description for Setting: The i^2t calculation is activated by a parameter value >= 100 sec Example: For a 2-pole 1LA5063 motor, the value should be set to: 8 min (from the table)*60 s/min = 480 s Typical thermal time constants for Siemens motors (in min.):	0 to 16000 [s]	2 i001=100 i002=100	2 / BR 2 / BR

Type	**2-pole**	**4-pole**	**6-pole**	**8-pole**	**10-pole**	**12-pole**
1LA5063	8	13	-	-	-	-
1LA5070	8	10	12	-	-	-
1LA5073	8	10	12	-	-	-
1LA5080	8	10	12	-	-	-
1LA5083	10	10	12	-	-	-
1LA5090	5	9	12	12	-	-
1LA5096	6	11	12	14	-	-
1LA5106	8	12	12	16	-	-
1LA5107	-	12	-	16	-	-
1LA5113	14	11	13	12	-	-
1LA5130	11	10	13	10	-	-
1LA5131	11	10	-	-	-	-
1LA5133	-	10	14	10	-	-
1LA5134	-	-	16	-	-	-
1LA5163	15	19	20	12	-	-
1LA5164	15	-	-	-	-	-
1LA5166	15	19	20	14	-	-
1LA5183	25	30	-	-	-	-
1LA5186	-	30	40	45	-	-
1LA5206	30	-	45	-	-	-
1LA5207	30	35	45	50	-	-
1LA6220	-	40	-	55	-	-
1LA6223	35	40	50	55	-	-
1LA6253	40	45	50	60	-	-
1LA6280	40	50	55	65	-	-
1LA6283	40	50	55	65	-	-
1LA6310	45	55	60	75	-	-
1LA6313	-	55	60	75	-	-
1LA831.	35	40	45	45	50	50
1LA835.	40	45	50	50	55	55
1LA840.	45	50	55	55	60	60
1LA845.	55	55	60	60	70	70
1LL831.	25	25	30	30	35	35
1LL835.	30	30	35	35	40	40
1LL840.	35	35	35	35	40	40
1LL845.	40	35	40	40	45	45
1LA135.	30	35	40	-	-	-
1LA140.	35	40	45	45	-	-
1LA145.	40	45	50	50	55	55
1LA150.	50	50	55	55	65	65
1LA156.	60	55	60	60	70	70
1LL135.	20	20	25	-	-	-
1LL140.	25	25	30	30	-	-
1LL145.	30	30	30	30	35	35
1LL150.	35	30	35	35	40	40
1LL156.	40	35	35	35	40	40

Type n_n=	3000	2000	1500	1000	500	1/min
1PH610.	25	25	25	20	-	
1PH613.	30	30	30	30	-	
1PH616.	-	35	35	35	-	
1PH618.	40	40	40	40	40	
1PH620.	40	40	40	40	40	
1PH622.	40	40	40	40	40	

MDS(2) Parameter

Type=O2; PKW: 1HEX=1.0s PcD Gr.: 0

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
P364 * 16CHex	**Mot Load Limits** Messages of the duty cycle monitor for the motor (in % of rated motor power) The parameter is valid for all motor data sets. Index i001 = WARN: When the entered load value is reached a warning message is edited via P625. Index i002 = FLT: When the entered load value is reached a fault message is edited via P626. Description for Setting: 0: no evaluation Related display parameter: r008 (Motor loading) Type=O2; PKW: 1HEX=1.0% PcD Gr.: 0	0 to 300 [%]	2 i001=100 i002=100	2 / BR 2 / BR
P366 16EHex	**Auto Restart** Auto restart after power outage Parameter values: 0 = blocked 1 = only power outage fault reset after power return (-> status Ready for turn-ON) 2 = When power returns the drive turns on again after the wait time (P367) 3 = Immediately after power return the drive turns on and performs the function 'Flying Restart'. Note: independently of the status of the bit 'release of Flying Restart' of the control word the 'Flying Restart' function is active at every turn ON if P366 = 3. ATTENTION: it must be guaranteed by external safety means that the drive can not start without intention at parameter settings P366 = 2, 3 MDS(2) Parameter Type=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 3 none Flt Reset Auto Start Fly Auto St	2 i001=0 i002=0	2 / BR 2 / BR
P367 16FHex	**AutoRestart Wait** Wait time between return of power and automatic drive restart if auto restart is on (P366=2). Note: The wait time is not valid if the Flying Restart function is active: (P366 = 3 (auto restart with flying restart), P583 (source for release of flying restart) or if bit 'Flying Restart' of the control word is set). Description for setting: the wait time should be in the range of the coasting time of the drive system. MDS(2) Parameter Type=O2; PKW: 1HEX=1.0s PcD Gr.: 0	0 to 650 [s]	2 i001=0 i002=0	2 / BR 2 / BR
P369 171Hex	**Fly Search Amps** Search current used for flying restart if no tachometer is used in % of rated motor current (P102) Conditions: P163 = 1 (V/Hz mode) Flying restart function must be released by the control bit (source see P583) or flying restart function must be released via P366 = 3 (auto restart) MDS(2) Parameter Type=O2; PKW: 1HEX=1.0% PcD: 4000HEX=400%	10 to 400 [%]	2 i001=50 i002=50	2 / BR 2 / BR
P370 172Hex	**Fly Search Speed** Search speed Frequency range which is to be passed during flying restart within 1 sec. Note: Conditions as for P369 MDS(2) Parameter Type=O2; PKW: 1HEX=0.1Hz PcD Gr.: 1	0.1 to 100.0 [Hz]	2 i001=1.0 i002=1.0	2 / BR 2 / BR

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
P371 173Hex	**De-magnetizeTime** De-excitation time of the motor Minimum wait time between pulse blocking and pulse release. The induction motor de-magnetizes during this period. Pre-set during automatic parameterization (P052 = 6, 7). Description for setting: About 2.3*rotor time constant (r200), but not more than 3.0 s. This setting guarantees that the motor is de-magnetized for at least 90 % when pulses are released. ATTENTION: After OFF1, OFF3 and JOG commands the de-excitation time is not active MDS(2) Parameter Type=O2; PKW: 1HEX=0.01s PcD Gr.: 0	0.01 to 10.00 [s]	2 i001=1.00 i002=1.00	2 / BR 2 / BR
P372 174Hex	**DC Braking** DC injection braking of the motor to brake a motor without optional braking equipment (chopper, regenerative front end) ATTENTION: All loss energy concentrates in the motor, the danger of a local overheating in the motor exists! Note: Only for induction motors Overcurrent interventions (alarm A02) can occur for over-dimensioned motors (P102 > P072) when starting the DC brake. In this case, the de-energization time (P371) must be increased. Parameter values: 0: DC injection braking OFF 1: DC injection braking active with OFF3 command ('quick stop'). MDS(2) Parameter Type=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 1 off on	2 i001=0 i002=0	2 / BR 2 / BR
P373 175Hex	**DC Braking Amps** Setpoint for the DC injection braking current in % of rated motor current Condition: P372 = 1 (DC injection braking) MDS(2) Parameter Type=O2; PKW: 1HEX=1.0% PcD: 4000HEX=400%	20 to 400 [%]	2 i001=100 i002=100	2 / BR 2 / BR
P374 176Hex	**DC Braking Time** DC injection braking time Condition: P372 = 1 (DC injection braking) MDS(2) Parameter Type=O2; PKW: 1HEX=0.1s PcD: 4000HEX=163.84s	0.1 to 99.9 [s]	2 i001=5.0 i002=5.0	2 / BR 2 / BR
P375 177Hex	**DC Braking Freq** Start frequency for DC injection braking; if OFF3 command is active DC injection braking is performed below this frequency Condition: P372 = 1 (DC injection braking) MDS(2) Parameter Type=O2; PKW: 1HEX=0.1Hz PcD Gr.: 1	0.1 to 300.0 [Hz]	2 i001=300.0 i002=300.0	2 / BR 2 / BR

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
P377 179Hex	**DC Bus Volts Reg** Limitation controller for the DC link bus voltage; limits the DC link bus voltage during regenerative operation (e. g. fast deceleration) to the maximum allowed value. Note: • This function can not replace braking or regenerating equipment when the load actively regenerates energy! • The Vdmax controller should be blocked when braking or regenerating equipment is connected . Parameter values: 0: blocked 1: Vdmax controller released Dependent parameter: P378 (Vdmax controller dynamic behavior): the Vdmax controller is OFF at a controller dynamics setting of 0 %. Related display parameter: r385 (Output signal of the Vdmax controller) MDS(2) Parameter Type=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 1 off on	2 i001=0 i002=0	3 / BR 3 / B
P378 17AHex	**DC Bus Volts Dyn** Vdmax controller dynamic behavior Description for setting: Vdmax controller is OFF at a 0 % setting. Condition: P377 = 1 (Vdmax controller) MDS(2) Parameter Type=O2; PKW: 1HEX=1.0% PcD Gr.: -	0 to 200 [%]	2 i001=50 i002=50	3 / BR 3 / BR
P379 17BHex	**PRT/FLR** Power ride thru (PRT) / Flexible response (FLR) Power ride thru: Operation may be continued during short power outages by regenerating energy from the load / motor to the drive. Loads with high inertia and high speed allow longer sustaining periods. Dependency: P381 (PRT/FLR controller speed) Related display parameter: r385 (PRT controller output) Flexible response: The flexible response function allows converter operation for short power outages. The available output power is reduced according to the actual supply voltage and the rated converter current (P072). The firing angle which can be realized when the function is released (P379 = 2, 3) is limited to the vector modulation range. Note: For the flexible response function, the electronics power supply must be buffered using an external auxiliary power supply. Dependent parameters: P380 (PRT/FLR LowVolts) P381 (PRT/FLR controller speed) P387 (FLR Vdmin) Visualization parameter: r385 (FLR controller output) Parameter values: 0: PRT and FLR blocked 1: PRT released 2: FLR released with V/f = const. 3: FLN released with f = const. MDS(2) Parameter Type=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 3 OFF PwrRideThru FLR V/f = const. FLR f = const.	2 i001=0 i002=0	3 / BR 3 / B
P380 17CHex	**PRT/FLR LowVolts** Point at which the PRT control or the FLR is activated. DC link voltage which when fallen below, the PRT or FLR is activated (reference quantity: rated DC link voltage; for AC drive converters P071*1.32, for DC converters, P071). Condition: P379 = 1 (select PRT) or P379 = 2, 3 (select FLR) MDS(2) Parameter Type=O2; PKW: 1HEX=1.0% PcD Gr.: -	70 to 115 [%]	2 i001=76 i002=76	3 / BR 3 / BR

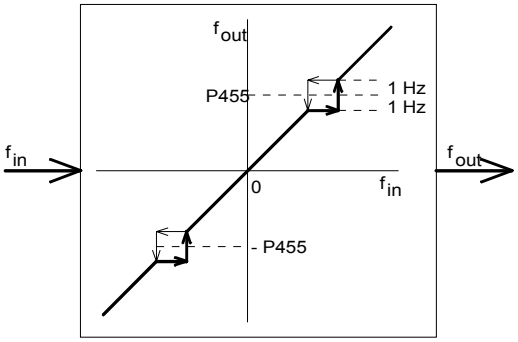
PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
P381 17DHex	**PRT/FLR Reg Dyn** Controller dynamic behavior for kinetic buffering (P379 = 1) for all control types and flexible response (P379 = 2, V/f = const.) A parameter value of 0% turns OFF the function. Condition: P379 = 1 (select PRT) or P379 = 2 (select FLR, V/f = const.) MDS(2) Parameter Type=O2; PKW: 1HEX=1.0% PcD Gr.: -	0 to 200 [%]	2 i001=50 i002=50	3 / BR 3 / BR
r385 181Hex	**f(PRT/VdmaxReg)** Output signal of the Vdmax / PRT controller; this frequency is added to the frequency setpoint (r482). Analog Output: 100% @ Parameter Value=P420 Type=I2; PKW: 1HEX=0.01Hz PcD Gr.: 1	[Hz]	-	3 / BR
P387 183Hex	**FLR Vd min** Minimum DC link bus voltage in % of the rated DC link bus voltage (for AC drives: P071 * 1.32, for DC inverters: P071); lower voltages trip the inverter and an DC link bus undervoltage fault. Condition: P379 = 2, 3 (FLR released) MDS(2) Parameter Type=O2; PKW: 1HEX=1.0% PcD Gr.: -	50 to 76 [%]	2 i001=76 i002=76	3 / BR 3 / B
P395 18BHex	**Selectivity** In configurations, where one drive is feeding a number of paralleled motors in the case of a failure (short circuit, ground fault, motor blocked) one of these motors may be disconnected from the drive by blowing its fuses. ATTENTION: If the selectivity function is selected, there is no protection available against a terminal short circuit; the overcurrent protection is still active. Parameter values: 0: Selectivity OFF 1: Selectivity ON Type=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 1 OFF ON	- 0	3 / BR 3 / B

11.8 Setpoint Channel

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
r410 19AHex	**act. SetpDataSet** Active setpoint channel data set Parameter values: 0 = setpoint data set 1 1 = setpoint data set 2 Analog Output: 100% @ Parameter Value=16384 Type=O2; PKW: 1HEX=1.0 PcD Gr.: 0	 SDS 1 SDS 2	-	3 / BR
P420 1A4Hex	**System Rtd Freq** Rated system frequency / speed Reference quantity for acceleration time (P462), deceleration time (P464), hysteresis for 'ramp generator active' message (P476), base setpoint (P445) and for speed / frequency setpoint and actual values which are transfered via analog inputs and outputs or serial communications. Type=O2; PKW: 1HEX=0.01Hz PcD Gr.: 1	1.00 to 300.00 [Hz]	- 50.00	2 / ABR 2 / AB
P421 1A5Hex	**Fixed Freq1(set)** By setting the correlated bits of the control word (r551) the fixed setpoint is activated from the source defined in P580 / P581. SDS(2) Parameter Type=I2; PKW: 1HEX=0.01Hz PcD Gr.: 1	-300.00 to 300.00 [Hz]	2 i001=50.00 i002=50.00	2 / BR 2 / BR
P422 1A6Hex	**Fixed Freq2(set)** By setting the correlated bits of the control word (r551) the fixed setpoint is activated from the source defined in P580 / P581. SDS(2) Parameter Type=I2; PKW: 1HEX=0.01Hz PcD Gr.: 1	-300.00 to 300.00 [Hz]	2 i001=-50.00 i002=-50.00	2 / BR 2 / BR
P423 1A7Hex	**Fixed Freq3(set)** By setting the correlated bits of the control word (r551) the fixed setpoint is activated from the source defined in P580 / P581. SDS(2) Parameter Type=I2; PKW: 1HEX=0.01Hz PcD Gr.: 1	-300.00 to 300.00 [Hz]	2 i001=20.00 i002=20.00	2 / BR 2 / BR
P424 1A8Hex	**Fixed Freq4(set)** By setting the correlated bits of the control word (r551) the fixed setpoint is activated from the source defined in P580 / P581. SDS(2) Parameter Type=I2; PKW: 1HEX=0.01Hz PcD Gr.: 1	-300.00 to 300.00 [Hz]	2 i001=5.00 i002=5.00	2 / BR 2 / BR
P425 1A9Hex	**MOP saving** Saving of the setpoint which has come from the motor operated potentiometer (MOP) at turn OFF / power outage The saved setpoint signal is active again after a new ON command (P443 = 1002, main setpoint from MOP). If saving of the MOP setpoint is not active (P425 = 0, 2), the MOP start frequency (P426) is cleared after an OFF command or a power outage. The „internal motorized potentiometer rounding-off“ (necessary to precisely set a frequency) can be cancelled if the motorized potentiometer (MOP) is to ramp-up extremely quickly. Parameter values: 0: without save with ‘internal MOP rounding-off’ 1 : with save with ‘internal MOP rounding-off’ 2: without save without ‘internal MOP rounding-off’ 3: with save without ‘internal MOP rounding-off’ Type=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 3 OFF ON OFF ON	- 0	2 / BR 2 / BR

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
P426 1AAHex	**MOP start frequ** Start frequency of the motor operated potentiometer (MOP) The motorized potentiometer setpoint is set to this start frequency if storage is not active (P425 = 0, 2), in the drive converter statuses, switch-on inhibit (r001 = °008), and ready to power-up (r001 =°009). As the motorized potentiometer setpoint can only have positive values, the sign must be specified via the direction of rotation bits (P571, P572). SDS(2) parameter Type=I2; PKW: 1HEX=0.01Hz PcD Gr.: 1	-300.00 to 300.00 [Hz]	2 i001=0.00 i002=0.00	3 / BR 3 / BR
P427 1ABHex	**Set MOP** The motorized potentiometer is set to the absolute value of the main setpoint. The motorized potentiometer setpoint is set to the absolute value of the main setpoint (r447) when changing-over the main setpoint source to a motorized potentiometer (P443 = 1002; e.g. for basic/reserved changeover). Thus, a continuous transition can be achieved when changing-over from automatic- to manual operation. As the motorized potentiometer setpoint can only be positive, the sign must be specified via the direction of rotation bits (P571, P572). Parameter values: 0: no storage 1: with storage Type=I2; PKW: 1HEX = 0.01 Hz PcD Gr.:1	0 to 1 OFF ON	- 0	2 / BR 2 / BR
P428 * 1ACHex	**Src Add Setpoint** Source of the additional setpoint signal. Depending on P432 the additional setpoint is added in front or behind the ramp generator Parameter values: 1001: Fixed setpoints (P421 to P424) other values: according to the process data wiring of the setpoint channel data set. B/R Parameter Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 4545	2 i001=0 i002=0	3 / BR 3 / BR
P429 1ADHex	**AddSetpoint Gain** Proportional gain of the additional setpoint Not effective if the additional setpoint is a fixed setpoint (P428 = 1001). B/R Parameter Type=I2; PKW: 1HEX=0.01% PcD Gr.: 0	-300.00 to 300.00 [%]	2 i001=100.00 i002=100.00	3 / BR 3 / BR
r431 1AFHex	**AddSetpoint(act)** Actual additional setpoint signal Analog Output: 100% @ Parameter Value=P420 Type=I2; PKW: 1HEX=0.01Hz PcD Gr.: 1	 [Hz]	-	3 / BR
P432 1B0Hex	**AddSetpoint Dest** Access location of the additional setpoint signal Parameter values: 0 = behind of ramp generator 1 = in front of ramp generator Type=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 1 Bef RampGen Aft RampGen	- 1	3 / BR 3 / BR
P443 * 1BBHex	**Src MainSetpoint** Source of the (frequency / speed) main setpoint signal. Parameter values: 1002: Motor operated potentiometer (MOP) other values: according to the process data wiring of the setpoint channel data set. B/R Parameter Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 4545	2 i001=1002 i002=1001	2 / BR 2 / BR

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
P444 1BCHex	**GainMainSetpoint** Proportional gain of the main setpoint signal Not effective if the setpoint is a fixed setpoint or comes from the MOP (P443 = 1001, 1002). B/R Parameter Type=I2; PKW: 1HEX=0.01% PcD Gr.: 0	-300.00 to 300.00 [%]	2 i001=100.00 i002=100.00	2 / BR 2 / BR
P445 1BDHex	**Base Setpoint** Base setpoint of the main setpoint channel in % of rated system frequency (P420); is added to the main setpoint signal. Not effective if the setpoint is a fixed setpoint or comes from the MOP (P443 =1001, 1002). B/R Parameter Type=I2; PKW: 1HEX=0.1% PcD Gr.: 0	-100.0 to 100.0 [%]	2 i001=0.0 i002=0.0	3 / BR 3 / BR
r447 1BFHex	**Main Setp.(act)** Actual main setpoint Analog Output: 100% @ Parameter Value=P420 Type=I2; PKW: 1HEX=0.01Hz PcD Gr.: 1	[Hz]	-	2 / BR
P448 1C0Hex	**Jog Frequency** Jog frequency Type=I2; PKW: 1HEX=0.01Hz PcD Gr.: 1	-300.00 to 300.00 [Hz]	- 5.00	2 / BR 2 / BR
r451 1C3Hex	**n/f(set,total1)** Frequency setpoint signal at the addition point in front of the ramp generator Analog Output: 100% @ Parameter Value=P420 Type=I2; PKW: 1HEX=0.01Hz PcD Gr.: 1	[Hz]	-	3 / BR
P452 1C4Hex	**Max Freq FWD** Maximum frequency at forward speed Limited by: • double rated motor frequency (P107) • pulse frequency (P761) MDS(2) Parameter Type=I2; PKW: 1HEX=0.1Hz PcD Gr.: 1	0.0 to 300.0 [Hz]	2 i001=55.0 i002=55.0	2 / ABR 2 / AB
P453 1C5Hex	**Max Freq REV** Maximum frequency at reverse speed Limited by: • double rated motor frequency (P107) • pulse frequency (P761) MDS(2) Parameter Type=I2; PKW: 1HEX=0.1Hz PcD Gr.: 1	-300.0 to 0.0 [Hz]	2 i001=-55.0 i002=-55.0	2 / ABR 2 / AB

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
P455 1C7Hex	**Skip Frequency** Skip frequency for the frequency setpoint in front of the ramp generator. Steady state operation is not possible in the range of the positive and the negative value of the skip frequency.  Note: Frequency skipping is OFF at parameter values between 0.0 and 1.0 Hz SDS(2) Parameter Type=O2; PKW: 1HEX=0.1Hz PcD Gr.: 1	0.0 to 300.0 [Hz]	2 i001=0.0 i002=0.0	2 / BR 2 / BR
P457 1C9Hex	**Min Frequency** Minimum frequency f_{min} (amount) of the drive; same as frequency skipping around 0 Hz with a bandwidth of 2 * f_{min}, effective for the setpoint signal in front of the ramp generator Given setpoint f_{set}: realized setpoint • $-f_{min} < f_{set}$ (coming from lower values) $< f_{min}$ $-f_{min}$ • $-f_{min} < f_{set}$ (coming from higher values) $< f_{min}$ $+f_{min}$ • $0 <= f_{set}$ (after turn ON) $< f_{min}$ $+f_{min}$ • $-f_{min} < f_{set}$ (after turn ON) < 0 $-f_{min}$ • $f_{set} > f_{min}$ f_{set} • $f_{set} < -f_{min}$ f_{set} Note: The bits for forward / reverse operation (see P571, P572) are allowed for. SDS(2) Parameter Type=O2; PKW: 1HEX=0.1Hz PcD Gr.: 1	0.0 to 300.0 [Hz]	2 i001=0.0 i002=0.0	2 / BR 2 / BR
r460 1CCHex	**n/f(set,Ramp IN)** Frequency setpoint signal at ramp generator input Analog Output: 100% @ Parameter Value=P420 Type=I2; PKW: 1HEX=0.01Hz PcD Gr.: 1	[Hz]	-	3 / BR
r461 1CDHex	**Ramp Gen Status** Status of the ramp generator Parameter values: 0: ramp generator blocked 1: ramp generator released 2: ramp generator stopped 4: ramp generator set Analog Output: 100% @ Parameter Value=16384 Type=O2; PKW: 1HEX=1.0 PcD Gr.: 0	Locked Released STOP Set	-	3 / BR
P462 1CEHex	**Accel. Time** Ramp generator acceleration time for acceleration from 0 to rated system frequency (P420). SDS(2) Parameter Type=O2; PKW: 1HEX=0.1s PcD Gr.: 0	0.1 to 999.9 [s]	2 i001=10.0 i002=10.0	2 / ABR 2 / ABR

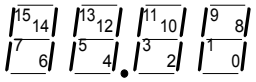
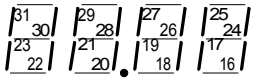
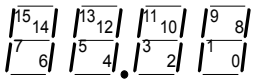
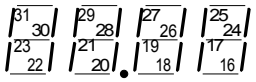
PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
P464 1D0Hex	**Decel. Time** Ramp generator deceleration time for deceleration from rated system frequency (P420) to standstill SDS(2) Parameter Type=O2; PKW: 1HEX=0.1s PcD Gr.: 0	0.1 to 999.9 [s]	2 i001=20.0 i002=20.0	2 / ABR 2 / ABR
P466 1D2Hex	**Decel. Time OFF3** OFF3 deceleration time (quick stop) for deceleration from rated system frequency (P420) to standstill Note: Rounding (P468) is not active during OFF3. Description for setting: The parameter value must be high enough to prevent an overvoltage fault. Type=O2; PKW: 1HEX=0.1s PcD Gr.: 0	0.1 to 999.9 [s]	- 2.0	2 / BR 2 / BR
P467 1D3Hex	**ProtRampGen Gain** Protective ramp generator: factor, which extends the acceleration time (P462). The protective ramp generator is active up to 15 % of rated motor frequency (P107); see section „Ramp-function generator RFG“ in the Operating Instructions, Part 2 Description for setting: Parameter value 1,0 turns OFF the protective ramp generator. SDS(2) Parameter Type=O2; PKW: 1HEX=0.1 PcD Gr.: 0	1.0 to 100.0	2 i001=1.0 i002=1.0	3 / BR 3 / BR
P468 1D4Hex	**Ramp Smoothing** Rounding of the ramp generator in % of the acceleration (P462) and deceleration times (P464). At accelerating from 0 to rated system frequency (P420) the real acceleration time will increase to $P462 \cdot \left(1 + \frac{P468}{100\ \%}\right)$. Description for Setting: The parameter value is symmetrically shared to start and end roundings. SDS(2) Parameter Type=O2; PKW: 1HEX=1.0% PcD Gr.: -	0 to 50 [%]	2 i001=20 i002=20	2 / BR 2 / BR
P476 1DCHex	**RampGen Act Hyst** Hysteresis for the message 'ramp generator active' The message 'ramp generator active' is issued, if |ramp generator input - ramp generator output| >= P476 * P420 . Condition: analog frequency setpoint in front of the ramp generator (see P428 and P443) Type=O2; PKW: 1HEX=0.1% PcD Gr.: -	0.0 to 20.0 [%]	- 1.0	3 / BR 3 / BR
r480 1E0Hex	**n/f(set,rampOUT)** Frequency setpoint at the output of the ramp generator Analog Output: 100% @ Parameter Value=P420 Type=I2; PKW: 1HEX=0.01Hz PcD Gr.: 1	[Hz]	-	3 / BR
r481 1E1Hex	**n/f(set,total2)** Frequency setpoint at the addition point behind the ramp generator Analog Output: 100% @ Parameter Value=P420 Type=I2; PKW: 1HEX=0.01Hz PcD Gr.: 1	[Hz]	-	3 / BR
r482 1E2Hex	**n/f(set)** Frequency setpoint at the input of the V/Hz control circuit Analog Output: 100% @ Parameter Value=P420 Type=I2; PKW: 1HEX=0.01Hz PcD Gr.: 1	[Hz]	-	2 / BR

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
P512 200Hex	**Compare Freq** Compare frequency for the message 'Compare frequency reached' (status word 1, bit 10 (r552)); see also P513 (Hysteresis) Type=O2; PKW: 1HEX=0.01Hz PcD Gr.: 1	0.00 to 320.00 [Hz]	- 50.00	3 / BR 3 / BR
P513 201Hex	**Comp Freq. Hyst** Hysteresis for the message 'Compare frequency reached' in % of the compare frequency (P512) Type=O2; PKW: 1HEX=0.1% PcD Gr.: 0	0.0 to 100.0 [%]	- 3.0	3 / BR 3 / BR
P514 202Hex	**OFF Frequency** Pulse block frequency at turn OFF If after an OFF command (OFF1, OFF3) the actual value of the frequency (r218) comes below this value, the pulses are blocked after the OFF wait time (P516). Type=O2; PKW: 1HEX=0.01Hz PcD Gr.: 1	0.00 to 300.00 [Hz]	- 0.10	3 / BR 3 / BR
P516 204Hex	**OFF Wait Time** Wait time between reaching of the pulse block frequency (P514) and pulse blocking; only for turn OFF via OFF1 or OFF3. SDS(2) Parameter Type=O2; PKW: 1HEX=0.1s PcD Gr.: 0	0.0 to 60.0 [s]	2 i001=0.0 i002=0.0	3 / BR 3 / BR
P517 205Hex	**Deviation Freq** Deviation frequency for the message 'Set/Actual deviation' (status word 1, bit 8 (r552)); the message is issued if the deviation is higher than the parameter value; see also P518 (deviation time) Depending items: P520 (pull out / blocking wait time) Type=O2; PKW: 1HEX=0.01Hz PcD Gr.: 1	0.00 to 300.00 [Hz]	- 3.00	3 / BR 3 / BR
P518 206Hex	**Deviation Time** Minimum time of the Set/Actual deviation; after this minimum time a Set/Actual deviation (P517) issues the message 'Set/Actual deviation' (status word 1, bit 8 (r552)) Depending items: P520 (pull out / blocking wait time) Type=O2; PKW: 1HEX=0.1s PcD Gr.: -	0.0 to 10.0 [s]	- 3.0	3 / BR 3 / BR
P520 208Hex	**PullOut/BlckTime** Wait time between the message 'motor puled out/blocked' and issuing a fault message Dependent parameters: P517 (speed of the set/actual deviation), P518 (set/actual deviation time) MDS(2) Parameter Type=O2; PKW: 1HEX=0.01s PcD Gr.: 0	0.00 to 100.00 [s]	2 i001=50.00 i002=50.00	3 / BR 3 / BR
P525 20DHex	**Fix Setp ProcReg** Fixed setpoints for the technology controller B/R parameter Type=I2; PKW: 1HEX=0.01 % PcD: 4000HEX=100.00 %	−200.00 to 200.00 [%]	2 i001=0.00 i002=0.00	3 / BR 3 / BR
P526 * 20EHex	**Src ProcReg Setp** Source for the technology controller setpoint. Parameter values: 1001: Technology setpoint (P525) 1002: Not permissible Additional value: According to PcD wiring of the setpoint channel B/R parameter Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 4545	2 i001=0 i002=0	3 / BR 3 / BR

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/. write: _/.
P527 20FHex	**SetpGain ProcReg** Technology controller setpoint gain. Not effective for technology setpoint input via fixed setpoint (P526 = 1001). B/R parameter Type=O2; PKW:1HEX=0.01 % PcD Gr.: 0	–300.00 to 300.00 [%]	2 i001=100.00 i002=100.00	3 / BR 3 / BR
P528 * 210Hex	**SmoothProcRegSet** Technology controller setpoint smoothing time constant. The smoothing first becomes active when the technology controller is activated (control word 2 bit 24 = 1 and RUN status). Type=O2; PKW:1HEX=0.01 s PcD Gr.: 0	0.00 to 600.00 [s]	- 0.00	3 / BR 3 / BR
r529 211Hex	**Setpoint ProcReg** Actual technological setpoint Analog output: 100 % for PWE=100.00 % Type=I4; PKW: 1HEX=0.01 % PcD: 4000HEX=100.00 %	[%]	–	3 / BR
P530 * 212Hex	**ActVal's ProcReg** Actual values for the technology controller actual value input. Defines which parameter are used as actual values for the technology controller. Indices: i001 = W01: Value1 for technology controller i002 = W02: Value2 for technology controller Type=O2; PKW: 1HEX=1.0 PcD Gr.: 0	0 to 999	2 i001=0.0 i002=0.0	3 / BR 3 / BR
P531 * 213Hex	**SRC ProcReg ActV** Source of the technology controller actual value. Parameter values: 1001: Illegal 1002: Illegal 1020: Illegal 1100: Internal technology controller actual value 1 (= contents of P530 index i001) 1200: Internal technology controller actual value 2 (= contents of P530 index i002) Additional values: According to the PcD wiring of the setpoint channel B/R parameter Type=L2; PKW: PKW format(HEX)=Par Value PcD Gr.: 0	0 to 4545	2 i001=0 i002=0	3 / BR 3 / BR
P532 * 214Hex	**Gain ProcRegActV** Technology controller actual value gain. B/R parameter Type=I2; PKW: 1HEX=0.01 % PcD Gr.: 0	–300.00 to 300.00 [%]	2 i001=100.00 i002=100.00	3 / BR 3 / BR
r534 216Hex	**ActValueProcReg** Technological actual value Analog output: 100 % at PWE=100.00 % Type=I2; PKW: 1HEX=0.01 % PcD: 4000HEX=100.000 %	[%]	–	3 / BR
P535 * 217Hex	**R,g. T:Hyst.** Hysteresis for the signal - technological setpoint reached. This signal is output, if the technological actual value (r534) is greater than the technological setpoint (r529). The hysteresis is only effective when this signal is withdrawn Type=O2; PKW:1HEX=0.1 % PcD: 4000HEX=100.0 %	0.0 to 100.0 [%]	– 3.0	3 / BR 3 / BR
r536 218Hex	**DeviationProcReg** Control deviation at the input of the technology controller. Analog output: 100 % at PWE=100.00 % Type=I4; PKW: 1HEX=0.01 % PcD: 4000HEX=100.00 %	[%]	–	3 / BR

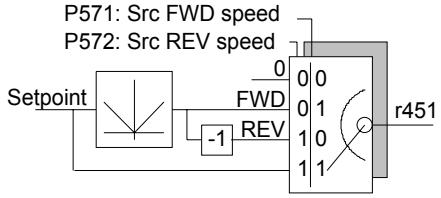
PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
P537 219Hex	**Gain ProcReg** Technology controller gain. Type=O2; PKW:1HEX=0.01 PcD: 4000HEX=64.00	0.00 to 250.00	– 1.00	3 / BR 3 / BR
P538 21AHex	**IntTConstProcReg** Technology controller integral action time (I component). Setting information: The technology controller I component is disabled with the value 0.00. Type=O2; PKW:1HEX=0.01 s PcD Gr.: 0	0.00 to 600.00 [s]	– 0.00	3 / BR 3 / BR
r540 21CHex	**ProcReg Output** Technology controller output before the limit value stage (P541, P542). Analog output: 100 % at PWE=100.00 % Type=I2; PKW: 1HEX=0.01 % PcD: 4000HEX=100.00 %	[%]		3 / BR
P541 21DHex	**ProcReg Up1Limit** Upper limit of the technology controller output. Type=I2; PKW:1HEX=0.01 % PcD: 4000HEX=100.00 %	–200.00 to 200.00 [%]	– 200.00	3 / BR 3 / BR
P542 21EHex	**ProcReg Up2Limit** Lower limit of the technology controller output. Type=I2; PKW:1HEX=0.01 % PcD: 4000HEX=100.00 %	–200.00 to 200.00 [%]	– 200.00	3 / BR 3 / BR
r545 221Hex	**ProcReg Out(Lim)** Limited technology controller output (after the limit value stage). Analog output: 100 % at PWE=100.00 % Type=I2; PKW: 1HEX=0.01 % PcD: 4000HEX=100.00 %	[%]	–	3 / BR

11.9 Control and Status Word

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
r550 226Hex	**Control Word 1** Display of the control word 1 (bits 0 to 15); see section „Control word“ in the Operating Instructions, Part 2  Type=V2; PKW: 1HEX=1.0 PcD Gr.: 0		-	2 / BR
r551 227Hex	**Control Word 2** Display of the control word 2 (bits 16 to 31); see section „Control word“ in the Operating Instructions, Part 2.  Type=V2; PKW: 1HEX=1.0 PcD Gr.: 0		-	2 / BR
r552 228Hex	**Status Word 1** Display of the status word 1 (bits 0 to 15); see section „Control word“ in the Operating Instructions, Part 2.  Type=V2; PKW: 1HEX=1.0 PcD Gr.: 0		-	2 / BR
r553 229Hex	**Status Word 2** Display of the status word 2 (bits 16 to 31); see section „Control word“ in the Operating Instructions, Part 2.  Type=V2; PKW: 1HEX=1.0 PcD Gr.: 0		-	2 / BR
P554 * 22AHex	**Src ON/OFF1** Source of the 'ON/OFF1' command (Control word 1, bit 0) Details see section „Control word“ in the Operating Instructions, Part 2 Parameter values: 0: OFF1 1: not allowed 1001 CU binary input 1 1003: CU binary input 3 1010: PMU ON/OFF keys 2001: SST1, Word 1,Bit 0 other values: refer to permissible settings in Section „Control word“ in the Operating Instructions, Part 2 (PcD connection of the control word) Note: When using the inputs of the serial IO system, values 4101 or 4201 are recommended. B/R Parameter Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5001	2 P077=0 i001=1010 i002=1001 P077=1,2 i001=2001 i002=1001 P077=3 i001=1003 i002=1001	2 / BR 2 / BR
P555 * 22BHex	**Src1 OFF2(coast)** Source 1 of the 'OFF2' command (Coasting; control word 1, bit 1) Details see section „Control word“ in the Operating Instructions, Part 2 Parameter values: 0: not allowed 1: condition for operation 1002: CU binary input 2 other values: refer to permissible settings in Section „Control word“ in the Operating Instructions, Part 2 (PcD connection of the control word) B/R Parameter Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	1 to 5001	2 i001=1 i002=1002	2 / BR 2 / BR

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
P556 * 22CHex	**Src2 OFF2(coast)** Source 2 of the 'OFF2' command (Coasting; control word 1, bit 1) Description see P555 B/R Parameter Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	1 to 5001	2 i001=1 i002=1	2 / BR 2 / BR
P557 * 22DHex	**Src3 OFF2(coast)** Source 3 of the 'OFF2' command (Coasting; control word 1, bit 1) Description see P555 B/R Parameter Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	1 to 5001	2 i001=1 i002=1	2 / BR 2 / BR
P558 * 22EHex	**Src1 OFF3(QStop)** Source 1 of the 'OFF3' command (quick stop; control word 1, bit 2) Details see section „Control word“ in the Operating Instructions, Part 2 Parameter values: 0: not allowed 1: condition for operation 1002 binary input 2 of CU board 1010: PMU OFF key other values: refer to permissible settings in Section „Control word“ in the Operating Instructions, Part 2 (PcD connection of the control word) B/R Parameter Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	1 to 5001	2 i001=1 i002=1	2 / BR 2 / BR
P559 * 22FHex	**Src2 OFF3(QStop)** Source 2 of the 'OFF3' command (quick stop; control word 1, bit 2) Description see P558 B/R Parameter Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	1 to 5001	2 i001=1 i002=1	2 / BR 2 / BR
P560 * 230Hex	**Src3 OFF3(QStop)** Source 3 of the 'OFF3' command (quick stop; control word 1, bit 2) Description see P558 B/R Parameter Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	1 to 5001	2 i001=1 i002=1	2 / BR 2 / BR
P561 * 231Hex	**Src InvRelease** Source of the 'inverter release' command (control word 1, bit 3) Details see section „Control word“ in the Operating Instructions, Part 2 Parameter values: 0: Inverter blocked 1: automatic release after wait times other values: refer to permissible settings in Section „Control word“ in the Operating Instructions, Part 2 (PcD connection of the control word) B/R Parameter Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5001	2 i001=1 i002=1	3 / BR 3 / BR
P562 * 232Hex	**Src RampGen Rel** Source of the 'ramp generator release' command (control word 1, bit 4) Details see section„Control word“ in the Operating Instructions, Part 2 Parameter values: 0: Ramp generator blocked 1: automatic release after wait times other values: refer to permissible settings in Section „Control word“ in the Operating Instructions, Part 2 (PcD connection of the control word) B/R Parameter Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5001	2 i001=1 i002=1	3 / BR 3 / BR

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
P563 * 233Hex	**Src RampGen Stop** Source of the 'ramp generator stop' command (control word 1, bit 5) Details see section „Control word“ in the Operating Instructions, Part 2 Parameter values: 0: ramp generator stopped 1: ramp generator released other values: refer to permissible settings in Section „Control word“ in the Operating Instructions, Part 2 (PcD connection of the control word) B/R Parameter Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5001	2 i001=1 i002=1	3 / BR 3 / BR
P564 * 234Hex	**Src Setp Release** Source of the 'setpoint release' command (control word 1, bit 6) Details see section „Control word“ in the Operating Instructions, Part 2 Parameter values: 0: Ramp generator input is set to '0' 1: Setpoint at ramp generator input other values: refer to permissible settings in Section „Control word“ in the Operating Instructions, Part 2 (PcD connection of the control word) B/R Parameter Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5001	2 i001=1 i002=1	3 / BR 3 / BR
P565 * 235Hex	**Src1 Fault Reset** Source 1 of the 'reset' command (control word 1, bit 7) Details see section „Control word“ in the Operating Instructions, Part 2 Parameter values: 0: no source selected for reset 1: not allowed 1003 Binary input 3 of the CU board 1004: Binary input 4 of the CU board other values: refer to permissible settings in Section „Control word“ in the Operating Instructions, Part 2 (PcD connection of the control word) Note: The control command ‘acknowledge’ is edge triggered. B/R Parameter Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5001	2 P077=0,1,2 i001=0 i002=1003 P077=3 i001=1004 i002=1003	2 / BR 2 / BR
P566 * 236Hex	**Src2 Fault Reset** Source 2 of the 'reset' command (control word 1, bit 7) Description see P565 B/R Parameter Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5001	2 i001=0 i002=0	2 / BR 2 / BR
P567 * 237Hex	**Src3 Fault Reset** Source 3 of the 'reset' command (control word 1, bit 7) Description see P565 B/R Parameter Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5001	2 i001=2001 i002=2001	2 / BR 2 / BR
P568 * 238Hex	**Src Jog1 ON** Source of the 'Jog 1' command (control word 1, bit 8) Details see section „Control word“ in the Operating Instructions, Part 2 Parameter values: 0: no Jog operation 1: not allowed 2001: SST1, Word 1, Bit 8 other values: refer to permissible settings in Section „Control word“ in the Operating Instructions, Part 2 (PcD connection of the control word) B/R Parameter Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5001	2 P077=0,3 i001=0 i002=0 P077=1,2 i001=2001 i002=0	2 / BR 2 / BR

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
P571 * 23BHex	**Src FWD speed** Source of the 'forward speed' command (control word 1, bit 11) Parameter values: 0: forward speed blocked 1: forward speed released 1010: PMU forward/reverse key 2001: SST1, Word 1, Bit 11 other values: refer to permissible settings in Section „Control word“ in the Operating Instructions, Part 2 (PcD connection of the control word) Note: Both parameters P571 and P572 or the sources defined by them define which of the directions are really released:  B/R Parameter Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5001	2 P077=0,3 i001=1 i002=1 P077=1,2 i001=2001 i002=1	2 / BR 2 / BR
P572 * 23CHex	**Src REV speed** Source of the 'reverse speed' command (control word 1, bit 12) Parameter values: 0: reverse speed blocked 1: reverse speed released 1010: PMU forward/reverse key 2001: SST1, Word 1, Bit 12 other values: refer to permissible settings in Section „Control word“ in the Operating Instructions, Part 2 (PcD connection of the control word) Note: The two parameters P571 and P572 or the values which are supplied from the sources defined for these parameters, defines which direction of rotation is actually enabled; refer to P571. B/R Parameter Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5001	2 P077=0,3 i001=1 i002=1 P077=1,2 i001=2001 i002=1	2 / BR 2 / BR
P573 * 23DHex	**Src MOP UP** Source of the command 'motor operated potentiometer (MOP) UP' (control word 1, bit 13) Parameter values: 0: not active 1: not allowed 1010: PMU UP key 2001: SST1, Word 1, Bit 13 other values: refer to permissible settings in Section „Control word“ in the Operating Instructions, Part 2 (PcD connection of the control word) B/R Parameter Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5001	2 P077=0,3 i001=1010 i002=0 P077=1,2 i001=2001 i002=0	2 / BR 2 / BR
P574 * 23EHex	**Src MOP DOWN** Source of the command 'motor operated potentiometer (MOP) DOWN' (control word 1, bit 14) Parameter values: 0: not active 1: not allowed 1010: PMU DOWN key 2001: SST1, Word 1, Bit 14 other values: refer to permissible settings in Section „Control word“ in the Operating Instructions, Part 2 (PcD connection of the control word) B/R Parameter Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5001	2 P077=0,3 i001=1010 i002=0 P077=1,2 i001=2001 i002=0	2 / BR 2 / BR

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
P575 * 23FHex	**Src No ExtFault1** Source of the message 'external fault 1' (control word 2, bit 27); L-level causes fault trip of the drive Parameter values: 0: not allowed 1: no external fault 1 1001: Binary input 1 of CU board other values: refer to permissible settings in Section „Control word“ in the Operating Instructions, Part 2 (PcD connection of the control word) B/R Parameter Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	1 to 5001	2 P077=0,1 i001=1 i002=1 P077=2,3 i001=1001 i002=1	2 / BR 2 / BR
P576 * 240Hex	**Src SetpDSetBit0** Source of bit 0 for the selection of the setpoint channel data set (SDS; control word 2, bit 16) Parameter values: 0: SDS bit 0 has value of 0 1: SDS bit 0 has value of 1 other values: refer to permissible settings in Section „Control word“ in the Operating Instructions, Part 2 (PcD connection of the control word) B/R Parameter Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5001	2 i001=0 i002=0	3 / BR 3 / BR
P578 * 242Hex	**Src MotDSet Bit0** Source of bit 0 for the selection of motor data set (MDS; control word 2, bit 18) Parameter values: 0: MDS bit 0 has value of 0 1: MDS bit 0 has value of 1 other values: refer to permissible settings in Section „Control word“ in the Operating Instructions, Part 2 (PcD connection of the control word) Note: The motor data set can not be changed during operation; a change of this bit will only become effective in the ready state. B/R Parameter Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5001	2 i001=0 i002=0	3 / BR 3 / BR
P580 * 244Hex	**Src FixSetp Bit0** Source of bit 0 to select a fixed setpoint FS (control word 2, bit 20) Parameter values: 0: FS bit 0 has value of 0 1: FS bit 0 has value of 1 other values: refer to permissible settings in Section „Control word“ in the Operating Instructions, Part 2 (PcD connection of the control word) B/R Parameter Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5001	2 i001=0 i002=1004	2 / BR 2 / BR
P581 * 245Hex	**Src FixSetp Bit1** Source of bit 1 to select a fixed setpoint FS (control word 2, bit 21) Parameter values: 0: FS bit 1 has value of 0 1: FS bit 1 has value of 1 other values: refer to permissible settings in Section „Control word“ in the Operating Instructions, Part 2 (PcD connection of the control word) B/R Parameter Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5001	2 i001=0 i002=0	2 / BR 2 / BR

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
P583 * 247Hex	**Src Fly Release** Source of the command 'release of flying restart' (control word 2, bit 23) Parameter values: 0: Flying restart not released 1: Flying restart released with every ON command other values: refer to permissible settings in Section „Control word“ in the Operating Instructions, Part 2 (PcD connection of the control word) Dependent parameter: Special behavior in combination with the auto restart function see P366 (auto restart). B/R Parameter Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5001	2 i001=0 i002=0	2 / BR 2 / BR
P584 * 248Hex	**Src.TReg.Enable** Source for the control command, technolgoy controller enable (control word2, bit24) Parameter values: 0: Technology controller not enabled 1: Technology controller enabled other values refer to permissible settings in Section „Control word“ in the Operating Instructions, Part 2 (PcD connection of the control word) B/R Parameter Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5001	2 i001=0 i002=0	3 / BR 3 / BR
P586 * 24AHex	**Src No ExtFault2** Source of the message 'external fault 2' (control word 2, bit 26) L signal fault trips the unit if • precharging has been completed (drive converter status > 10) • and the 200 ms delay time after precharging has expired Parameter values: 0: not allowed 1: no external fault 2 1004: CU binary input 4 other values: refer to permissible settings in Section „Control word“ in the Operating Instructions, Part 2 (PcD connection of the control word) B/R Parameter Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	1 to 5001	2 i001=1 i002=1	2 / BR 2 / BR
P588 * 24CHex	**Src No Ext Warn1** Source of the message 'external warning 1' (control word 2, bit 28) Parameter values: 0: not allowed 1: no external warning 1 other values: refer to permissible settings in Section „Control word“ in the Operating Instructions, Part 2 (PcD connection of the control word) B/R Parameter Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	1 to 5001	2 P077=0,1 i001=1 i002=1 P077=2,3 i001=1002 i002=1	3 / BR 3 / BR
P589 * 24DHex	**Src No Ext Warn2** Source of the message 'external warning 2' (control word 2, bit 29) Parameter values: 0: not allowed 1: no external warning 1 1002: CU binary input 2 other values: refer to permissible settings in Section „Control word“ in the Operating Instructions, Part 2 (PcD connection of the control word) B/R Parameter Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	1 to 5001	2 i001=1 i002=1	3 / BR 3 / BR

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
P590 * 24EHex	**Src Base/Reserve** Source of the switching command 'base / reserve settings' (control word 2, bit 30) Parameter values: 0: base setting 1: reserve setting 1005: Binary input 5 of the CU board other values: refer to permissible settings in Section „Control word“ in the Operating Instructions, Part 2 (PcD connection of the control word) Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5001	- 1005	3 / BR 3 / BR
P591 * 24FHex	**Src ContactorMsg** Source of the message 'main contactor energized' (control word 2, bit 31) Parameter values: 0: not allowed 1: no message; main contactor must be energized within 120 msec after the related command 1001 to 1005: CU terminals 4101 to 4116: SCB-SCI1 terminals (serial I/O) 4201 to 4216: SCB-SCI2 terminals (serial I/O) 5001: TSY terminal 1 Notes: If the function is active, pulses are released as soon as the message is available. No base / reserve settings possible Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	1 to 5001	- 1	3 / BR 3 / BR
P600 * 258Hex	**Dst Ready for ON** Destination of the status bit 'ready for turn ON' (status word 1, bit 0) Power is ON, the drive may be turned on. Parameter values: Depending on the selected index all settings according to section „Status word“ in the Operating Instructions, Part 2 (PcD connection of the status word) may be selected. Indices: i001: BD: selection of a base drive terminal i002: SCI : selection of a SCI1/2 terminal i003: TSY : selection of a TSY terminal Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5002	3 i001=0 i002=0 i003=0	3 / BR 3 / BR
P601 * 259Hex	**Dst Rdy for Oper** Destination of the status bit 'ready for operation' (status word 1, bit 1) The DC bus is charged, pulses may be released. Parameter values, indices: as P600. Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5002	3 i001=0 i002=0 i003=0	3 / BR 3 / BR
P602 * 25AHex	**Dst Operation** Destination of the status bit 'operation' (status word 1, bit 2) The drive is in operation. Parameter values, Indices: as P600 Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5002	3 i001=1003 i002=0 i003=0	2 / BR 2 / BR
P603 * 25BHex	**Dst Fault** Destination of the status bit 'fault' (status word 1, Bit 3) Note: for issuing the fault message via a terminal the active status (bit has H-level) is inverted (broken wire proof). Parameter values, Indices: as P600 Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5002	3 i001=1002 i002=0 i003=0	2 / BR 2 / BR
P604 * 25CHex	**Dst NO OFF2** Destination of the status bit 'no OFF2 command' (status word 1, bit 4) Parameter values, Indices: as P600 Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5002	3 i001=0 i002=0 i003=0	3 / BR 3 / BR

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
P605 * 25DHex	**Dst NO OFF3** Destination of the status bit 'no OFF3 command' (status word 1, bit 5) Parameter values, Indices: as P600 Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5002	3 i001=0 i002=0 i003=0	3 / BR 3 / BR
P606 * 25EHex	**Dst ON blocked** Destination of the status bit 'turn-ON locked' (status word 1, bit 6) Note: for issuing the message via a terminal the active status (bit has H-level) is inverted (broken wire proof). Parameter values, Indices: as P600 Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5002	3 i001=0 i002=0 i003=0	3 / BR 3 / BR
P607 * 25FHex	**Dst Warning** Destination of the status bit 'warning' (status word 1, bit 7) Note: for issuing the message via a terminal the active status (bit has H-level) is inverted (broken wire proof). Parameter values, Indices: as P600 Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5002	3 i001=0 i002=0 i003=0	2 / BR 2 / BR
P608 * 260Hex	**Dst Deviation** Destination of the status bit 'set frequency = act. frequency' (status word 1, bit 8) - see P517; for details see section „Status word“ in Operating Instructions, Part 2 Parameter values, Indices: as P600 Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5002	3 i001=0 i002=0 i003=0	3 / BR 3 / BR
P610 * 262Hex	**Dst CompareFreq** Destination of the status bit 'compare frequency reached' (status word 1, bit 10) - see P512; for details see section „Status word“ in Operating Instructions, Part 2 Parameter values, Indices: as P600 Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5002	3 i001=0 i002=0 i003=0	3 / BR 3 / BR
P611 * 263Hex	**Dst Low Voltage** Destination of the status bit 'undervoltage' (status word 1, bit 11) Note: for issuing the message via a terminal the active status (bit has H-level) is inverted (broken wire proof). Parameter values, Indices: as P600 Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5002	3 i001=0 i002=0 i003=0	3 / BR 3 / BR
P612 * 264Hex	**Dst Contactor** Destination of the bit 'energize main contactor' (status word 1, bit 12) H-level: energize contactor! Note: If the message 'main contactor energized' is not selected (P591 = 1), the main contactor must be energized within 120 ms after the bit 'energize main contactor' is set. ATTENTION: For switching voltages between 50 and 230 V AC only the following relays may be used: - relay on the PEU or the PSU board (driven via binary output 1) or - the relays of the optional SCI boards, which are specified for 230 V AC (see section „Bypass- and output contactor“ in the Operating Instructions, Part 1) Parameter values, Indices: as P600 Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5002	3 i001=1001 i002=0 i003=0	3 / BR 3 / BR
P613 * 265Hex	**Dst RampGen act** Destination of the status bit 'ramp generator active' (status word 1, bit 13) Parameter values, Indices: as P600 Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5002	3 i001=0 i002=0 i003=0	3 / BR 3 / BR

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
P614 * 266Hex	**Dst FWD speed** Destination of the status bit 'speed direction' (status word 1, bit 14) Meanings: H-level: forward L-level: reverse Parameter values, Indices: as P600 Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5002	3 i001=0 i002=0 i003=0	2 / BR 2 / BR
P615 * 267Hex	**PRT active** Destination of the status bit 'power ride thru (PRT) active' (status word 1, bit 15) Parameter values, Indices: as P600 Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5002	3 i001=0 i002=0 i003=0	3 / BR 3 / BR
P616 * 268Hex	**Dst Fly Restart** Destination of the status bit 'flying restart active' and 'energization time running' (status word 2, bit 16) (refer to P189) Parameter values, Indices: as P600 Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5002	3 i001=0 i002=0 i003=0	3 / BR 3 / BR
P618 * 26AHex	**Dst No Overspeed** Destination of the status bit 'no overspeed' (status word 2, bit 18) Parameter values, Indices: as P600 Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5002	3 i001=0 i002=0 i003=0	3 / BR 3 / BR
P619 * 26BHex	**Dst Ext Fault 1** Destination of the status bit 'external fault 1' (status word 2, bit 19) Note: for issuing the message via a terminal the active status (bit has H-level) is inverted (broken wire proof). Parameter values, Indices: as P600 Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5002	3 i001=0 i002=0 i003=0	3 / BR 3 / BR
P620 * 26CHex	**Dst Ext Fault 2** Destination of the status bit 'external fault 2' (status word 2, bit 20) Note: • for issuing the message via a terminal the active status (bit has H-level) is inverted (broken wire proof). • If an ON command is active, L-level causes fault trip after 200 msec. Parameter values, Indices: as P600 Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5002	3 i001=0 i002=0 i003=0	3 / BR 3 / BR
P621 * 26DHex	**Dst Ext Warning** Destination of the status bit 'external warning' (status word 2, bit 21) Note: for issuing the message via a terminal the active status (bit has H-level) is inverted (broken wire proof). Parameter values, Indices: as P600 Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5002	3 i001=0 i002=0 i003=0	3 / BR 3 / BR
P622 * 26EHex	**Dst i2t Drive** Destination of the status bit 'warning drive overload' (status word 2, bit 22); see r010 (drive utilization) Note: for issuing the message via a terminal the active status (bit has H-level) is inverted (broken wire proof). Parameter values, Indices: as P600 Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5002	3 i001=0 i002=0 i003=0	3 / BR 3 / BR
P623 * 26FHex	**Dst TmpFlt Drive** Destination of the status bit 'fault drive overtemperature' (status word 2, bit 23) Note: for issuing the message via a terminal the active status (bit has H-level) is inverted (broken wire proof). Parameter values, Indices: as P600 Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5002	3 i001=0 i002=0 i003=0	3 / BR 3 / BR

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
P624 * 270Hex	**Dst TmpWarnDrive** Destination of the status bit 'warning drive overtemperature' (status word 2, bit 24) Note: for issuing the message via a terminal the active status (bit has H-level) is inverted (broken wire proof). Parameter values, Indices: as P600 Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5002	3 i001=0 i002=0 i003=0	3 / BR 3 / BR
P625 * 271Hex	**Dst TmpWarnMotor** Destination of the status bit 'warning motor overtemperature' (status word 2, bit 25) Reason: The condition for the warning is met via the motor utilization calculation (see r008 (motor utilization), P362 (motor cooling), P363 (thermal time constant of the motor), P364 (duty cycle monitoring)). Note: for issuing the message via a terminal the active status (bit has H-level) is inverted (broken wire proof). Parameter values, Indices: as P600 Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5002	3 i001=0 i002=0 i003=0	2 / BR 2 / BR
P626 * 272Hex	**Dst TmpFlt Motor** Destination of the status bit 'fault motor overtemperature' (status word 2, bit 26) Reason: The condition for the fault is met via the motor utilization calculation (see r008 (motor utilization), P362 (motor cooling), P363 (thermal time constant of the motor), P364 (duty cycle monitoring)). Note: for issuing the message via a terminal the active status (bit has H-level) is inverted (broken wire proof). Parameter values, Indices: as P600 Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5002	3 i001=0 i002=0 i003=0	2 / BR 2 / BR
P627 * 273Hex	**Dst ProcReg A=S** Destination connection of the status bit „technological setpoint reached“ (status word 2, bit27) Parameter values, indices: As for P600 Type=L2; PKW: PKW format(HEX)=Par Value PcD Gr.: 0	0 to 5002	3 i001=0 i002=0 i003=0	3 / BR 3 / BR
P628 * 274Hex	**Dst PullOut/Blck** Destination of the status bit 'fault motor pulled out / blocked' (status word 2, bit 28) Note: for issuing the message via a terminal the active status (bit has H-level) is inverted (broken wire proof). Parameter values, Indices: as P600 Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5002	3 i001=0 i002=0 i003=0	3 / BR 3 / BR
P629 * 275Hex	**Dst ChrgRelay ON** Destination of the status bit 'charging relay energized' (status word 2, bit 29) Note: for issuing the message via a terminal the active status (bit has H-level) is inverted (broken wire proof). Parameter values, Indices: as P600 Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5002	3 i001=0 i002=0 i003=0	3 / BR 3 / BR
P631 * 277Hex	**Dst Pre-Charging** Destination of the status bit 'charging active' (status word 2, bit 31) Parameter values, Indices: as P600 Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5002	3 i001=0 i002=0 i003=0	3 / BR 3 / BR

11.10 Analog Input/Output

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
P650 * 28AHex	**CU AnalogInConf** Configuration of the CU analog inputs; defines the kind of the analog input signals Parameter values: Terminals 27 and 30 / Terminals 29 and 32 0: -10 V ... + 10 V / - 20 mA ... + 20 mA 1: 0 V ... + 10 V / 0 mA ... + 20 mA 2: / + 4 mA ... + 20 mA Notes: • Only one signal can be wired per input; alternatively voltage or current signals can be evaluated. • Voltage and current signals must be connected to different terminals. • Settings 1 and 2 only allow unipolar signals, i. e. the internal process data are also unipolar. • At setting 2 an input current < 2 mA causes a fault trip (broken wire proof) • The offset scaling of the analog inputs is done via P652. Indices: i001: CU-1: configuration of analog terminal 1 i002: CU-2: configuration of analog terminal 2 Type=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 2 -10V...+10V 0V...+10V 4mA...20mA	2 i001=0 i002=0	2 / BR 2 / BR
P652 28CHex	**CU AnalogIn Offs** Offset scaling of the CU analog inputs Description for setting see section „Analog inputs“ in the Operating Instructions, Part 2 Indices: i001: CU-1: offset of analog input 1 i002: CU-2 offset of analog input 2 Type=I2; PKW: 1HEX=0.001V PcD Gr.: 0	-20.000 to 20.000 [V]	2 i001=0.000 i002=0.000	2 / BR 2 / BR
P655 * 28FHex	**CU AnaOut ActVal** Actual value output via the CU analog output Description for setting: enter the parameter number of the quantity, which is to be issued. Type=O2; PKW: 1HEX=1.0 PcD Gr.: 0	0 to 999	- 218	2 / BR 2 / BR
P656 290Hex	**CU AnalogOutGain** Proportional gain of the CU analog output, see section „Analog inputs“ in the Operating Instructions, Part 2 Parameter values: P656= calculated output voltage at when the displayed parameter has a value of 100% The output voltage V(out) is calculated according to: **Fehler!** Note: Maximum value of the output voltage: +/- 10 V Type=I2; PKW: 1HEX=0.01V PcD Gr.: 0	-320.00 to 320.00 [V]	- 10.00	2 / BR 2 / BR
P657 291Hex	**CU AnalogOutOffs** Offset of the CU analog output; see P656 Type=I2; PKW: 1HEX=0.01V PcD Gr.: 0	-100.00 to 100.00 [V]	- 0.00	2 / BR 2 / BR

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
P660 294Hex	**SCI AnalogInConf** Configuration of the SCI analog inputs; defines the kind of the input signals Parameter values 0: -10 V ... + 10 V / - 20 mA ... + 20 mA 1: 0 V ... + 10 V / 0 mA ... + 20 mA 2: 4 mA ... + 20 mA Terminals X428 / 3, 6, 9 Terminals X428 / 5, 8, 11 Notes: • Only one signal can be wired per input; alternatively voltage or current signals can be evaluated. • Voltage and current signals must be connected to different terminals. • Settings 1 and 2 only allow unipolar signals, i. e. the internal process data are also unipolar. • At setting 2 an input current < 2 mA causes a fault trip (broken wire proof) • The offset scaling of the analog inputs is done via P662. Indices: i001: SI11 Slave 1, analog input 1 i002: SI12 Slave 1, analog input 2 i003: SI13 Slave 1, analog input 3 i004: SI21 Slave 2, analog input 1 i005: SI22 Slave 2, analog input 2 i006: SI23 Slave 2, analog input 3 Condition: the related SCB board must be reported via P090 and P091, respectively Type=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 2 -10V...+10V 0V...+10V 4mA...20mA	6 i001=0 i002=0 i003=0 i004=0 i005=0 i006=0	3 / BR 3 / BR
P661 295Hex	**SCI AnaInSmooth** Filter time constant of the SCI analog inputs; Formula: T = 2 ms * 2^{P661} Indices: see P660 Type=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 15	6 i001=2 i002=2 i003=2 i004=2 i005=2 i006=2	3 / BR 3 / BR
P662 296Hex	**SCI AnalogInOffs** Offset scaling of the SCI analog inputs Description for setting see SCI manual Indices: see P660 Type=I2; PKW: 1HEX=0.01V PcD: 4000HEX=160V	-20.00 to 20.00 [V]	6 i001=0.00 i002=0.00 i003=0.00 i004=0.00 i005=0.00 i006=0.00	3 / BR 3 / BR
P664 * 298Hex	**SCI AnaOutActVal** Actual value output via SCI analog outputs Description for setting: Enter the parameter number of the quantities, which are to be issued; for details see SCI manual. Indices: i001: SI11 Slave 1, analog output 1 i002: SI12 Slave 1, analog output 2 i003: SI13 Slave 1, analog output 3 i004: SI21 Slave 2, analog output 1 i005: SI22 Slave 2, analog output 2 i006: SI23 Slave 2, analog output 3 Condition: the related SCB board must be reported via P090 and P091, respectively Type=O2; PKW: 1HEX=1.0 PcD Gr.: 0	0 to 1999	6 i001=0 i002=0 i003=0 i004=0 i005=0 i006=0	3 / BR 3 / BR
P665 299Hex	**SCI AnaOut Gain** Proportional gain of the SCI analog outputs Description for setting: see SCI manual Indices: see P664 Type=I2; PKW: 1HEX=0.01 PcD: 4000HEX=160V	-320.00 to 320.00	6 i001=10.00 i002=10.00 i003=10.00 i004=10.00 i005=10.00 i006=10.00	3 / BR 3 / BR

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
P666 29AHex	**SCI AnaOut Offs** Offset of the SCI analog outputs Indices: see P664 Type=I2; PKW: 1HEX=0.01V PcD: 4000HEX=160V	-100.00 to 100.00 [V]	6 i001=0.00 i002=0.00 i003=0.00 i004=0.00 i005=0.00 i006=0.00	3 / BR 3 / BR

11.11 Communications

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
P680 * 2A8Hex	**SCom1 Act Value** Actual value output via serial communication SST1 Defines, which parameter is to be transferred at which telegram address. Notes: • Word 1 should be set for status word 1 (r968) • The length (number of words) of the process data part of the telegram is set by P685, i001 Indices: i001 = W01: Word 01 of the (process data part of the) telegram i002 = W02: Word 02 of the (process data part of the) telegram ... i016 = W16: Word 16 of the (process data part of the) telegram Type=O2; PKW: 1HEX=1.0 PcD Gr.: 0	0 to 999	16 i001=968 i002=0 i003=0 i004=0 i005=0 i006=0 i007=0 i008=0 i009=0 i010=0 i011=0 i012=0 i013=0 i014=0 i015=0 i016=0	3 / BR 3 / BR
P682 2AAHex	**SCB Protocol** SCB can be operated as • master for the SCI boards or as • serial communications board (see SCB manual). Parameter values: 0 = Master for SCI boards 1 = 4 wire USS 2 = 2 wire USS 3 = Peer to Peer 4 = not used 5 = not used Condition: SCB board must be reported via P090 and 0P91, respectively Type=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 5 SCI Module 4 wire USS 2 wire USS Peer 2 Peer Option 1 Option 2	- 0	3 / H BR 3 / H
P683 * 2ABHex	**SCom/SCB BusAddr** Bus address of the serial communication interfaces (see section „Serial interfaces“ in the Operating Instructions, Part 2) Indices: i001 = SCo1: bus address of serial comm. interface 1 (CU) i002 = SCB: SCB bus address, if P682 = 1, 2 Type=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 31	2 i001=0 i002=0	3 / BR 3 / BR
P684 * 2ACHex	**SCom/SCB Baud** Serial interfaces baud rate Parameter values: 1: 300 Baud 8: 38400 Baud 2: 600 Baud 9: 57600 Baud 3: 1200 Baud 10: 76800 Baud 4: 2400 Baud 11: 93750 Baud 5: 4800 Baud 12: 115200 Baud 6: 9600 Baud 13: 187500 Baud 7: 19200 Baud Note: Maximum baud rate for SST1 (i001): 38400 for SCB: dependent on the version and selected protocol, refer to the SCB operating instructions) Indices: i001 = SCo1: baud rate of serial comm. interface 1 (CU) i002 = SCB: SCB baud rate, if P682 = 1, 2, 3 Type=O2; PKW: 1HEX=1.0 PcD Gr.: -	1 to 13	2 i001=6 i002=6	3 / BR 3 / BR

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/. write: _/.
P685 * 2ADHex	**SCom/SCB PCV** Number of words (16 bit) of the parameter data part in the net data block of the telegram. (see section „Serial interfaces“ in the Operating Instructions, Part 2) Parameter values: 0: no parameter data part in the telegram 3, 4 parameter data part is 3 (parameter identifier, Ind, parameter value), 4 words long 127 variable parameter data length for the transfer of parameter description and texts. Indices: i001 = SCo1: serial comm. interface 1 (CU) i002 = SCB: SCB, if P682 = 1, 2, 3 Type=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 127	2 i001=127 i002=3	3 / BR 3 / BR
P686 * 2AEHex	**SCom/SCB # PrDat** Number of words (16 bit) of the process data part in the net data block of the telegram. (see section „Serial interfaces“ in the Operating Instructions, Part 2) Indices: i001 = SCo1: serial comm. interface 1 (CU) i002 = SCB: SCB, if P682 = 1, 2, 3 Type=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 16	2 i001=2 i002=2	3 / BR 3 / BR
P687 * 2AFHex	**SCom/SCB TlgOFF** Telegram OFF time of CU and SCB If no correct telegram is received within the parameterized time a fault trip is set. Description for setting: • Value 0: no monitoring, no fault trip; must be parameterized for sporadic (a-cyclic) telegrams, e. g. operator panel OP at serial comm. interface 1. • If a TB is inserted in slot 2, and an SCB in slot 3, then the value in i002 is ineffective Indices: i001 = SCo1: serial comm. interface 1 (CU) i002 = SCB: SCB, if P682 = 1, 2, 3 Type=O2; PKW: 1HEX=1.0ms PcD: 4000HEX=1638.4ms	0 to 6500 [ms]	2 i001=0 i002=0	3 / BR 3 / BR
P689 2B1Hex	**SCB Peer2PeerExt** Immediate transfer on of data received via the peer to peer protocol of SCB. Mark of these words of the received peer to peer telegram which are to be transferred on immediately. Parameter values: 0: no immediate transfer (only to CU) 1: immediate transfer (and passing to CU) Indices: i001 = W01: Word 01 of the (process data part of the) telegram i002 = W02: Word 02 of the (process data part of the) telegram ... i016 = W16: Word 16 of the (process data part of the) telegram Condition: P688 = 3 (peer to peer protocol) Type=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 1 CU only Transfer	5 i001=0 i002=0 i003=0 i004=0 i005=0	3 / BR 3 / BR

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
P690 * 2B2Hex	**SCB Act Values** Actual value output via the serial communications interface of the SCB board; defines, which parameter is to be transferred at which telegram address. Notes: • Word 1 should be set for status word 1 (r968) • The length (number of words) of the process data part of the telegram is set by P685, index i002 Indices: i001 = W01: Word 01 of the (process data part of the) telegram i002 = W02: Word 02 of the (process data part of the) telegram ... i016 = W16: Word 16 of the (process data part of the) telegram ATTENTION: if P682 = 3 (peer to peer protocol) a maximum of 5 words (i001 to i005) can be transferred Type=O2; PKW: 1HEX=1.0 PcD Gr.: 0	0 to 999	16 i001=0 i002=0 i003=0 i004=0 i005=0 i006=0 i007=0 i008=0 i009=0 i010=0 i011=0 i012=0 i013=0 i014=0 i015=0 i016=0	3 / BR 3 / BR
P692 * 2B4Hex	**ResPonseTLGfail** Defines how the unit responds when a telegram fails. Parameter values: 0: Immediate fault trip 1: OFF3 (fast stop) and subsequent fault trip Note: This parameter is valid for all interfaces, where a telegram monitoring time is defined (SST1, CB/TB, SCB, SST2) Condition: The particular program monitoring time must be active. (P687 or P695 > 0) Type=O2; PKW: 1HEX=1.0 PcD Gr.: 0	0 to 1 Fault OFF3(fast stop)	- -	3 / BR 3 / BR
P694 * 2B6Hex	**CB/TB Act Values** Output of analog values via CB or TB defines, which parameter is to be transferred at which telegram address. Notes: • Word 1 should be set for status word 1 (r968) Indices: i001 = W01: Word 01 of the (process data part of the) telegram i002 = W02: Word 02 of the (process data part of the) telegram ... i016 = W16: Word 16 of the (process data part of the) telegram Type=O2; PKW: 1HEX=1.0 PcD Gr.: 0	0 to 999	16 i001=968 i002=0 i003=0 i004=0 i005=0 i006=0 i007=0 i008=0 i009=0 i010=0 i011=0 i012=0 i013=0 i014=0 i015=0 i016=0	3 / BR 3 / BR
P695 * 2B7Hex	**CB/TB TlgOFFTime** Telegram lag time of CB and TB If no correct telegram is received within the parameterized time a fault trip is set. Description for setting: Value 0: no monitoring, no fault trip; must be parameterized for sporadic (non-cyclic) telegrams, e. g. operator panel OP at serial comm. interface 1. Type=O2; PKW: 1HEX=1.0ms PcD: 4000HEX=1638.4ms	0 to 6500 [ms]	- 10	3 / BR 3 / BR

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/. write: _/.
P696 2B8Hex	**CB Parameter 1** Communication Board parameter 1; see manual of the used communication board Description for setting: • Parameter is only needed if a communication board is reported (P090 or P091 = 1) • The communication board checks, if the set value is valid. • If the value is not accepted, the fault message 80 is issued with fault value 5 Type=O2; PKW: 1HEX=1.0 PcD Gr.: 0	0 to 65535	- 0	3 / H BR 3 / H
P697 2B9Hex	**CB Parameter 2** Communication Board parameter 2; refer to P696 Type=O2; PKW: 1HEX=1.0 PcD Gr.: 0	0 to 65535	- 0	3 / H BR 3 / H
P698 2BAHex	**CB Parameter 3** Communication Board parameter 3; refer to P696 Type=O2; PKW: 1HEX=1.0 PcD Gr.: 0	0 to 65535	- 0	3 / H BR 3 / H
P699 2BBHex	**CB Parameter 4** Communication Board parameter 4; refer to P696 Type=O2; PKW: 1HEX=1.0 PcD Gr.: 0	0 to 65535	- 0	3 / H BR 3 / H
P700 2BCHex	**CB Parameter 5** Communication Board parameter 5; refer to P696 Type=O2; PKW: 1HEX=1.0 PcD Gr.: 0	0 to 65535	- 0	3 / H BR 3 / H
P701 2BDHex	**CB Parameter 6** Communication Board parameter 6; refer to P696 Type=O2; PKW: 1HEX=1.0 PcD Gr.: 0	0 to 65535	- 0	3 / H BR 3 / H
P702 2BEHex	**CB Parameter 7** Communication Board parameter 7; refer to P696 Type=O2; PKW: 1HEX=1.0 PcD Gr.: 0	0 to 65535	- 0	3 / H BR 3 / H
P703 2BFHex	**CB Parameter 8** Communication Board parameter 8; refer to P696 Type=O2; PKW: 1HEX=1.0 PcD Gr.: 0	0 to 65535	- 0	3 / H BR 3 / H
P704 2C0Hex	**CB Parameter 9** Communication Board parameter 9; refer to P696 Type=O2; PKW: 1HEX=1.0 PcD Gr.: 0	0 to 65535	- 0	3 / H BR 3 / H
P705 2C1Hex	**CB Parameter 10** Communication Board parameter 10; refer to P696 Type=O2; PKW: 1HEX=1.0 PcD Gr.: 0	0 to 65535	- 0	3 / H BR 3 / H
P706 2C3Hex	**CB Parameter 11** Communication Board parameter 11 Indices: i001 - i005 Refer to P696 Type=O2; PKW: 1HEX=1.0 PcD Gr.: 0	0 to 65535	5 i001=0 i002=0 i003=0 i004=0 i005=0	3 / H BR 3 / H

11.12 Diagnosis

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
r720 2D0Hex	**SW Version** Software version of the PCBs in positions 1 to 3 of the electronic box. Indices: i001: Pos1: Software version of the PCB in position 1 (left) i002: Pos2: Software version of the PCB in position 2 (right) i003: Pos3: Software version of the PCB in position 3 (center) i004: Text: Software version of the text EPROM in position 1 Note: The TSY board has no software code; the reported code is always '0.0' Type=O2; PKW: 1HEX=0.1 PcD Gr.: 0		4	3 /U BR
r721 2D1Hex	**SW Generat.Date** Software generation date of the CU board. Indices: i001= Year: Year i002= Mon.: Month i003= Day: Day Type=O2; PKW: 1HEX=1.0 PcD Gr.: 0		3	3 /U BR
r722 2D2Hex	**SW ID** Expanded software version code of the PCBs in positions 1 to 3 of the electronic box. Indices: i001: Pos1: Software code of the PCB in position 1 (left) i002: Pos2: Software code of the PCB in position 2 (right) i003: Pos3: Software code of the PCB in position 3 (center) i004: Text: Software code of the text EPROM in position 1 Note: The TSY board has no software code; the reported code is always '0.0' Type=O2; PKW: 1HEX=0.1 PcD Gr.: 0		4	3 /U BR
r723 2D3Hex	**PCB Code** Identification code of the PCBs in positions 1 to 3 of the electronic box. Indices: i001: Pos1: PCB code of the PCB in position 1 (left) i002: Pos2: PCB code of the PCB in position 2 (right) i003: Pos3: PCB code of the PCB in position 3 (center) PCB codes: CU: 100 - 109 CB: 140 - 149 TB: 130 - 139 SCB: 120 - 129 TSY: 110 - 119 Type=O2; PKW: 1HEX=1.0 PcD Gr.: 0		3	3 /U BR
r725 2D5Hex	**CalcTimeHeadroom** Calculation time headroom of the CU board CPU in % of the computing power; influenced by sampling time (P308) and pulse frequency (P761) (not vor VC), as well as the number activated unit functions. Analog Output: 100% @ Parameter Value=16384% Type=O2; PKW: 1HEX=1.0% PcD Gr.: 0	[%]	-	3 / BR

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/. write: _/.
r730 2DAHex	**SCB Diagnosis** SCB diagnosis (all values in HEX display). Displayed numbers have an overflow at FF. The meaning of several Indices depends of the selected SCB protocol (P682). Indices: i001: flTC Number of error-free telegrams i002: Terr Number of error telegrams i003: Voff USS: Number of Byte-Frame-errors SCI boards: number of slave power outages i004: Toff USS: Number of Overrun-errors SCI boards: number of fiber optic link interrupts i005: PnoS USS: Parity error SCI boards: number of missing answer telegrams i006: STxL USS: STX-error SCI boards: number of search telegrams to accept a slave i007: ETX ETX-error i008: BcCC USS: Block-Check-error SCI boards: number of configuration telegrams i009: L/Te USS/Peer to Peer: incorrect telegram length SCI modules: required maximum number of terminals according to process data wiring (P554 to P631) . i010: T/An USS: Timeout SCI modules: required analog inputs / outputs according to process data wiring of the setpoint channel and actual value output via SCI (P664) . i011: Res1 Reserve i012: Res2 Reserve i013: Warn SCB/DPR warning word i014: SI1? Information, if slave 1 needed and if yes, which type 0: no slave 1 needed 1: SCI1 2: SCI2 i015: SI2? Information, if slave 2 needed and if yes, which type 0: no slave 2 needed 1: SCI1 2: SCI2 i016: IniF: with 'SCI modules': initialization fault Type=L2; PKW: 1HEX=1.0 PcD Gr.: 0		16	3 / H BR
r731 2DBHex	**CB/TB Diagnosis** For detailed information see manuals of the used communication or technology boards. Type=L2; PKW: 1HEX=1.0 PcD Gr.: 0		32	3 / H BR
P733 * 2DDHex	**Simulated OPerat** Simulated operation, allows test operation of the drive with de-energized DC bus. Parameter values: 0: no simulated operation 1: simulated operation Conditions: • 24 V auxiliary power supply must be provided • Drive must be connected to the mains via a main contactor, which is driven by the drive (see P612) Note: Simulated operation can only be selected, when the DC bus voltage (r006) is less than 5% of the rated DC bus voltage Type=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 1 off on	- 0	3 / BR 3 / B
r743 2E7Hex	**Fault n/f(act)** Frequency / speed actual value (r218) at time of tripping Type=I2; PKW: 1HEX=0.01Hz PcD Gr.: 1	[Hz]	-	2 / BR
r744 2E8Hex	**Fault dn/dt** Change of frequency / speed per sec at time of tripping Type=I2; PKW: 1HEX=0.01Hz PcD Gr.: 1	[Hz]	-	2 / BR

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
r745 2E9Hex	**Fault Isq(act)** Actual value of the torque generating current component (r264) at time of tripping Type=I2; PKW: 1HEX=0.1A PcD Gr.: 2	[A]	-	2 / BR
r746 2EAHex	**Fault Out Volts** Actual value of the drive output voltage (r003) at time of tripping Type=O2; PKW: 1HEX=0.1V PcD Gr.: 3	[V]	-	2 / BR
r747 2EBHex	**Fault CtrlStatus** Status of the control circuit (r150) at time of tripping Type=V2; PKW: 1HEX=1.0 PcD Gr.: 0		-	2 / BR
r748 2ECHex	**TriP Time** Trip times (operating hour meter values, r013) Indices: Day Hours Seconds latest trip (1) i001=T1-d i002=T1-h i003=T1-s last reset trip(2) i004=T2-d i005=T2-h i006=T2-s (last+1) reset trip (3) i007=T3-d i008=T3-h i009=T3-s ... oldest saved trip (8) i022=T8-d i023=T8-h i024=T8-s Trip description by: r947 Fault number r949 Fault value r951 list of fault numbers P952 number of faults Type=O2; PKW: 1HEX=1.0 PcD Gr.: 0		24	2 / BR

11.13 Modulator

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
P761 2F9Hex	**Pulse Frequency** Pulse frequency at asynchronous space vector modulation Description for setting: The setting range of the pulse frequency depends of the type of the drive ATTTENTION: if the pulse frequency is increased, the maximum current (P173) may be reduced. If afterwards the pulse frequency is reduced again, the value of P173 will not be changed back. Note: the setting range of this parameter is also influenced by P092 (output filter). For active noise damping (P762 > 0), the pulse frequency is limited to min. 45*rated motor frequency (P107), otherwise to 30*P107. MDS(2) Parameter Type=O2; PKW: 1HEX=0.1kHz PcD: 4000HEX=16.384kHz	1.5 to 16.0 [kHz]	2 i001=3.0 i002=3.0	3 / ABR 3 / A
P762 2FAHex	**SIMO Sound** changes the noise characteristics of the motor; at low pulse frequencies this may result in a noise reduction As a result of increased harmonics, when this function is activated, a minimum pulse frequency P761 must be set to 45*rated motor frequency. Only then can SIMO-Sound be enabled. Description for setting: the motor noise is significantly influenced by mechanical oscillations of the drive system; for that reason several settings must be tested. Parameter values: 0: not active 1: sound steps 1 2: sound steps 2 3: sound steps 3 4: sound steps 4 MDS(2) Parameter Type=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 4 OFF Sound 1 Sound 2 Sound 3 Sound 4	2 i001=0 i002=0	3 / BR 3 / BR
P763 2FBHex	**Max ModulatDePth** Maximum depth of modulation of the modulator; defines the maximum possible output voltage Description for Setting: • High output voltages can be reached by using the edge modulation mode at a high depth of modulation. Low parameter values prevent the change from space vector to edge modulation mode, the reachable output voltage is lower. • The depth of modulation at the change from space vector to edge modulation mode depends of the type of the drive. • Typical values @ 3 kHz are: for a rated drive current <= 186 A: about 87% for a rated drive current > 186 A: about 84%. • The change to edge modulation can be prevented via P769. Note: if a sine wave output filter is used (P092 = 1) the maximum depth of modulation is so far reduced, that the modulator only operates in space vector modulation mode. The effective modulation depth limit is displayed in P180. MDS(2) Parameter Type=O2; PKW: 1HEX=0.1% PcD: 4000HEX=400%	20.0 to 96.0 [%]	2 i001=96.0 i002=96.0	3 / BR 3 / BR
r764 2FCHex	**Modulation DePth** Depth of modulation of the modulator Analog Output: 100% @ Parameter Value=1638.4% Type=O2; PKW: 1HEX=0.1% PcD: 4000HEX=400%	[%]	-	3 / BR

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
P769 301Hex	**ModSystemRelease** Releases edge modulation systems. Parameter values: 0: all systems 1: edge modulation systems above 60 Hz 2: adge modulation systems above 100 Hz 3: no edge modulation systems Note: If needed the modulation depth limit (P763) is automatically reduced if edge modulation is de-selected. MDS(2) Parameter Type=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 3 all syst. FLM from 60 Hz FLM from 100 Hz no FLM	2 i001=0 i002=0	3 / ABR 3 / A
P770 302Hex	**Deadtime comp.** Selects the deadtime compensation in the gating unit. The deadtime compensation eliminates voltage errors, which are obtained by the interlock times in the gating unit. Compensation is enabled/disabled during automatic parameter setting (P052 = 6) and during automatic motor identification (P052 = 7, 8). Parameter values: 0: No deadtime compensation in the gating unit 1: Deadtime compensation enabled in the gating unit Setting instructions: • For high pulse frequencies, for motors with low stator time constant (r274, positioning drives) and for long feeder cables, it may be practical to disable the compensation in order to improve the smooth running characteristics at low speeds. • In order to compensate the steady-state error in the stator resistance, for vector control types (P163 = 3, 4, 5), an addition transistor voltage is automatically internally added. The current controller dynamic performance is simultaneously increased. For frequency control (P163 = 3), the resonant damping P300 could also be additionally reduced. Type=O2; PKW: 1HEX: = 0.01 µs PcD Gr.: 0	0 to 1 off on	- 1	3 / BR 3 / BR

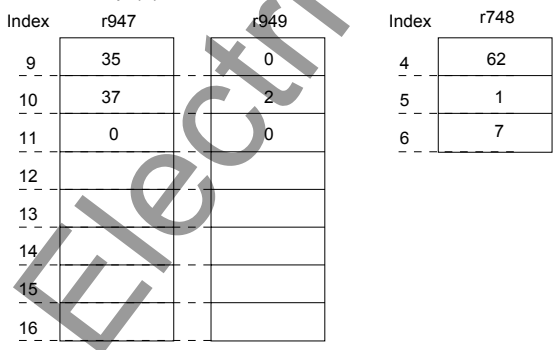
11.14 Factory Parameters

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
P789 315Hex	**RAM Access Value** Value of the memory cell of the CU Type=L2; PKW: 1HEX=1.0 PcD Gr.: 0	0 to 65535	- 0	3 / BR 4 / BR
P799 * 31FHex	**SPecial Access** Parameter for special access Type=O2; PKW: 1HEX=1.0 PcD Gr.: 0	0 to 65535	- 0	3 / BR 3 / BR

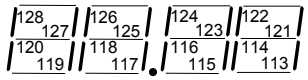
11.15 Special Parameters

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
P899 383Hex	**OP setting** Is used to set the drive converter address when several drive converters are controlled from one OP. Note: The parameter can only be displayed at the OP.		–	1 /UHABR 1 /UHABR

11.16 Profile Parameters

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
P918 396Hex	**CB Bus Address** Protocol depending bus address for communication boards; see manual of these boards Note: The communication board checks, if the set value is valid. If the value is not accepted, the fault message 80 is issued with fault value 5 Condition: P090 = 1 or P091 = 1 (communication board installed) Type=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 126	- 3	3 / H BR 3 / H
P927 * 39FHex	**Parameter Access** Release of interfaces for the parameterization; description see P053. Type=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 31	- 6	3 / BR 3 / BR
P928 * 3A0Hex	**Src Base/Reserve** Source of the switching command 'base / reserve settings' (control word 2, bit 30); parameter is identical with P590 - description there Type=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5001	- 1005	3 / BR 3 / BR
r947 3B3Hex	**Fault Memory** Display of the faults which have occurred at the last 8 trips (r748); at every trip up to 8 faults can be saved, related to each of them a fault number (see list of faults, chapter 7) is related. For text display of the faults see r951. Indices: Fault 1 Fault 2 ... Fault 8 latest trip (1) i001=F1-1 i002=F1-2 ... i008=F1-8 last reset trip (2) i009=F2-1 i010=F2-2 ... i016=F2-8 (last+1) reset trip (3) i017=F3-1 i018=F3-2 ... i024=F3-8 ... oldest saved trip (8) i057=F8-1 i058=F8-2 ... i064=F8-8 Notes: A value of '0' means 'no fault' During a power outage only the actual and the last reset trips are saved. Indices 17 to 64 are reset to '0'. Number of saved trips: see P952. Example of a trip: last reset trip (2)  Trip time (r748): after 62 days, 1 hour, 7 sec of operation Faults (r947): Fault value (r949): 35 not defined 37 2 Type=O2; PKW: 1HEX=1.0 PcD Gr.: 0		64	2 / BR
r949 3B5Hex	**Fault Value** Fault values of the faults; allows a more detailed diagnosis at several faults. The fault values are saved in the same indices as the related fault numbers (r947) - see example at P947. Type=O2; PKW: 1HEX=1.0 PcD Gr.: 0		64	3 / BR

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
r951 3B7Hex	**Fault Texts** List of fault texts; every fault text is saved in the index equivalent to its fault number. Example (see P947): Value of P947, i09 is '*35*'. The related fault was (P951, i*35*): 'Ext. Fault1'. Type=O2; PKW: 1HEX=1.0 PcD Gr.: 0		116	2 / BR
P952 * 3B8Hex	**# of Faults** Number of saved trips (max. 8). If the parameter is set to '0', the diagnosis memory (r748 - trip times, r947 - fault number, r949 fault value) is cleared. Type=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 8	- 0	2 / BR 2 / BR
r953 3B9Hex	**Warning Param1** If a warning (numbers 1 to 16) is active, the related bar in the display is ON 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 Type=V2; PKW: 1HEX=1.0 PcD Gr.: 0		-	3 / BR
r954 3BAHex	**Warning Param2** If a warning (numbers 17 to 32) is active, the related bar in the display is ON 32 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 Type=V2; PKW: 1HEX=1.0 PcD Gr.: 0		-	3 / BR
r955 3BBHex	**Warning Param3** If a warning (numbers 33 to 48) is active, the related bar in the display is ON 48 47 46 45 44 43 42 41 40 39 38 37 36 35 34 33 Type=V2; PKW: 1HEX=1.0 PcD Gr.: 0		-	3 / BR
r956 3BCHex	**Warning Param4** If a warning (numbers 49 to 64) is active, the related bar in the display is ON 64 63 62 61 60 59 58 57 56 55 54 53 52 51 50 49 Type=V2; PKW: 1HEX=1.0 PcD Gr.: 0		-	3 / BR
r957 3BDHex	**Warning Param5** If a warning (numbers 65 to 80) is active, the related bar in the display is ON 80 79 78 77 76 75 74 73 72 71 70 69 68 67 66 65 Type=V2; PKW: 1HEX=1.0 PcD Gr.: 0		-	3 / BR
r958 3BEHex	**Warning Param6** If a warning (numbers 81 to 96) is active, the related bar in the display is ON 96 95 94 93 92 91 90 89 88 87 86 85 84 83 82 81 Type=V2; PKW: 1HEX=1.0 PcD Gr.: 0		-	3 / BR
r959 3BFHex	**Warning Param7** If a warning (numbers 97 to 112 is active, the related bar in the display is ON 112 111 110 109 108 107 106 105 104 103 102 101 100 99 98 97 Type=V2; PKW: 1HEX=1.0 PcD Gr.: 0		-	3 / BR

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
r960 3C0Hex	**Warning Param8** If a warning (numbers 113 to 128) is active, the related bar in the display is ON  Type=V2; PKW: 1HEX=1.0 PcD Gr.: 0		-	3 / BR
r964 3C4Hex	**Drive ID** Drive ID Text string; contains information about the ID# (first 2 bytes of the string, used to identify the drive by Profibus) and about the drive type name (last 24 bytes of the string, used for display in visualization systems). A further 24 characters contain the software release and the date the software was generated Parameter values: 2 Bytes: ID#: 8022Hex 24 Byte: model name according to the drive type: MASTER DRIVES FC 24 Byte: Software release and date that the software was generated V1.3 day.month.year Note: The parameter cannot be selected at the PMU; for OP, the value cannot be displayed. Type=VS; PKW: 1HEX=1.0 PcD Gr.: 0		-	3 / BR
r965 3C5Hex	**Profile #** PROFIBUS specific parameter Note: The parameter cannot be selected at the PMU; for OP, the value cannot be displayed. Type=OS; PKW: 1HEX=1.0 PcD Gr.: 0		-	3 / BR
r967 3C7Hex	**Control Word 1** Display parameter of control word 1 (bit 0-15) Identical with r550 (control word 1) Type=V2; PKW: 1HEX=1.0 PcD Gr.: 0		-	2 / BR
r968 3C8Hex	**Status Word 1** Display parameter of status word 1 (bit 0 - 15) Identical with r552 (status word 1) Type=V2; PKW: 1HEX=1.0 PcD Gr.: 0		-	2 / BR
P970 * 3CAHex	**Factory Settings** Parameter reset to factory settings Parameter values: 0: Parameter reset: all parameters are reset to their original values (factory settings); after this the parameter is reset to '1'. 1: no parameter reset Note: This function can also be selected via P052=1. Type=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 1 FactSetting Return	- 1	3 / B 3 / B
P971 * 3CBHex	**EEPROM Saving** Saves parameter values in the EEPROM with a transition of the parameter value from 0 to 1. The parameter must be manually reset to '0'. Parameter values: 0: no saving of parameter values 1: a transition from 0 to 1 saves the RAM values to the EEPROM Type=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 1	- 0	3 / BR 3 / BR

PNU *:conf-P	Parameter Name in OP1 Description	Range [Unit] Value texts	# of. Indices Factory Settings.	read: _/_ write: _/_
r980 3D4Hex	**Par # List Pt1** List of the available parameter numbers; part 1 The parameter numbers are listed in a positive sequence. The first existing '0' shows, that no more parameter numbers are available. Index range: 1 to 116. As special function the value of i116 is the number of the parameter which contains the next following part of the list. If i116 has a value of '0' then there are no more parts of the list. Type=O2; PKW: 1HEX=1.0 PcD Gr.: 0		116	3 / BR
r981 3D5Hex	**Par # List Pt2** List of the available parameter numbers; part 2; see r980. Type=O2; PKW: 1HEX=1.0 PcD Gr.: 0		116	3 / BR
r982 3D6Hex	**Par # List Pt3** List of the available parameter numbers; part 3; see r980. Type=O2; PKW: 1HEX=1.0 PcD Gr.: 0		116	3 / BR
r983 3D7Hex	**Par # List Pt4** List of the available parameter numbers; part 4; see r980. Type=O2; PKW: 1HEX=1.0 PcD Gr.: 0		116	3 / BR
r984 3D8Hex	**Par # List Pt5** List of the available parameter numbers; part 5; see r980. Type=O2; PKW: 1HEX=1.0 PcD Gr.: 0		116	3 / BR
r985 3D9Hex	**Par # List Pt6** List of the available parameter numbers; part 6; see r980. Type=O2; PKW: 1HEX=1.0 PcD Gr.: 0		116	3 / BR
r986 3DAHex	**Par # List Pt7** List of the available parameter numbers; part 7; see r980. Type=O2; PKW: 1HEX=1.0 PcD Gr.: 0		116	3 / BR
r987 3DBHex	**Par # List Pt8** List of the available parameter numbers; part 8; see r980. Type=O2; PKW: 1HEX=1.0 PcD Gr.: 0		116	3 / BR
r988 3DCHex	**Par # List Pt9** List of the available parameter numbers; part 9; see r980. Type=O2; PKW: 1HEX=1.0 PcD Gr.: 0		116	3 / BR
r989 3DDHex	**Par # List Pt10** List of the available parameter numbers; part 10; see r980. Type=O2; PKW: 1HEX=1.0 PcD Gr.: 0		116	3 / BR
r990 3DEHex	**Par # List chg1** List of the changed parameters; part 1 The parameter numbers are listed in a positive sequence. The first existing '0' shows, that no more parameter numbers are available. Index range: 1 to 116. As special function the value of i116 is the number of the parameter which contains the next following part of the list. If i116 has a value of '0' then there are no more parts of the list. Type=O2; PKW: 1HEX=1.0 PcD Gr.: 0		116	3 / BR
r991 3DFHex	**Par # List chg2** List of the changed parameters; part 2; see r990. Type=O2; PKW: 1HEX=1.0 PcD Gr.: 0		116	3 / BR
r992 3E0Hex	**Par # List chg3** List of the changed parameters; part 3; see r990. Type=O2; PKW: 1HEX=1.0 PcD Gr.: 0	116	116	3 / BR

12 Fault and alarm messages

12.1 Fault messages

For each fault the following information is available:

Parameter	r947	Fault number
	r949	Fault value
	r951	Fault list
	P952	Number of faults
	r748	Fault time

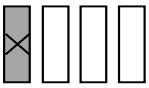
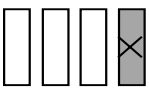
If a fault code is not reset before the electronic supply is switched off, then the fault code will be present again, when the electronic supply is switched on again. The unit cannot be operated without resetting the fault message. (Exeption: Automatic restart has been selected, see P366).

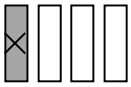
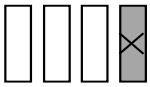
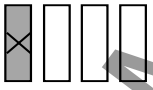
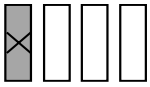
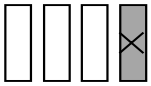
Fault messages		
No.	**Fault description**	**Counter measures**
F001	**Contact. chckbck.** If a main contactor checkback signal is configured, a checkback signal was not received within 500 ms after the power-up command.	**P591 S.MC chckbck. sign.**, The parameter value must match the main contactor checkback signal connection. Check the main contactor checkback signal circuit. ☞ Section "Connecting-up" in the Operating Instructions, Part 1.
F002	**Pre-charging** When pre-charging, the minimum DC link voltage (**P071 Conv. supply voltage** ∗ 1.34) of 80 % was not reached. The maximum pre-charging time of 3 s was exceeded.	Check the supply voltage, Compare with **P071 Conv. supply volt.**.
F006	**DC link overvoltage** The unit was shutdown due to an excessive DC link voltage. Supply voltage - I DC voltage range I Shutdown threshold 208 V - 230 V I 280 V - 310 V I 412 V 380 V - 460 V I 510 V - 620 V I 819 V 500 V - 575 V I 675 V - 780 V I 1022 V 660 V - 690 V I 890 V - 930 V I 1220 V	Check the supply voltage or the input DC voltage The converter operates in the regenerative mode without regenerative possibility. If the converter supply voltage is at the upper tolerance limit and it is operating under full load conditions, F006 can also be initiated when a line phase fails. Possibly; • **P464** increase decelaration time**,** • **P377** activate the V(d,max)-Controller (first check P071) • **P370** decrease the speed catch speed.
F008	**DC link uvolt.** The lower limit of 76 % of the DC link voltage (**P071 Line Volts** ∗ 1.34) was fallen below. For enabled kinetic buffering, 61 %. DC link undervoltage in 'standard' operation (i.e. no SIMULATION). DC link undervoltage with active kinetic buffering and speed less than 10 % of the rated motor speed. It was a 'brief supply failure' which was only detected after the supply returned (WEA-flag).	Check • the supply voltage **P071 Line Volts** • of the input rectifier • of the DC link
F011	**Overcurrent** The unit was shutdown due to an overcurrent condition. The shutdown threshold was exceeded,	Check • the converter-output for short-circuit or ground fault • the load for an overload condition • whether the motor and converter are correctly matched • whether the dynamic requirements are too high.

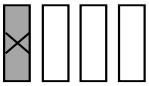
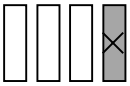
Fault messages		
No.	**Fault description**	**Counter measures**
F015	**Motor stall.** Motor has stalled or is locked: as a result of excessive ramp- or ramp-down times, a load change which was too fast and too high, or an excessive steady-state load. The fault is only generated after a time, entered in P520. The identification as to whether the drive has been locked or stalled, is dependent on P517 (setpoint-actual value deviation) and P518. For V/f control, the I(max) regulator must be activated (P175). For closed-loop speed regulation, a condition is that the speed controller limit has been reached (r150 bit7, bit8) before this fault is initiated.	reduce the load release the brake increase the current limit increase P520 stall time Increase P517 response threshold for the setpoint-actual value deviation ♦ only for V/f control with speed regulator: (P163 = 0) • check for interrupted tachometer cable • check the pulse encoder pulse number • check the analog tachometer normalization
F017	**Motor not found** Motor was not found (for restart on the fly with tachometer).	Power-up - after coast down. If required, increase **P369, Restart search current**
F018	**F set restart** The found set-frequency was not able to be implemented, as the supplementary setpoint is too high.	Check the supplementary setpoint. Power-up after the motor has coasted to a stop.
F021	**Motor I2t** Parameterized limit value of the I^2t-monitoring for the motor was exceeded.	Check: **P363 Mot. temp.T1**
F023	**Inverter temp.** The temperature limit of the inverter has been exceeded. **r949 = 1** The temperature limit of the inverter has been exceeded. **r949 = 2** Sensor 1: Wire break in the sensor wire or sensor is defect **r949 = 18** Sensor 2: Wire break in the sensor wire or sensor is defect **r949 = 34** Sensor 3: Wire break in the sensor wire or sensor is defect **r949 = 50** Sensor 4: Wire break in the sensor wire or sensor is defect	Measure the air intake and ambient temperature. Please observe the derating curves“ for ϑ >40 ºC. ☞ Section "Technical data" in the Operating Instructions, Part 1 Check; • whether fan -E1 is connected and is rotating in the correct direction. • that the air entry and discharge openings are not restricted. • temperature sensor at -X30
F025	**UCE ph. L1** There was an UCE shutdown in phase L1.	Check; • phase L1 for short-circuit or ground fault (-X2:U2 including motor). • that the **CU** is correctly inserted.
F026	**UCE ph. L2** There was an UCE shutdown in phase L2.	Check; • phase L2 for short-circuit or ground fault (-X2:V2 including motor). • that the **CU** is correctly inserted.
F027	**UCE ph. L3** There was an UCE-shutdown in phase L3.	Check; • phase L3 for short circuit or ground fault. (-X2:W2 -including motor). • that the **CU** is correctly inserted.
F028	**Supply phase** The frequency and amplitude of the DC link ripple indicates a single phase supply failure.	Check the supply voltage

Fault messages		
No.	**Fault description**	**Counter measures**
F029	**Meas. val. sens.** The measured value sensing system has developed a fault. • **(r949 = 1)** Offset adjustment not possible in phase L1. • **(r949 = 2)** Offset adjustment not possible in phase L3. • **(r949 = 3)** Offset adjustment not possible in phases L1and L3.	Defective measured value sensing Defective power section(valve cannot block)
F035	**Ext. fault1** External fault 1 input, which can be parameterized, was activated.	Check; • if there is an external fault • if the cable to the appropriate binary input is interrupted • **P575 S k fault ext.1** ☞ Section "Binary inputs" in the Operating Instructions, Part 2
F036	**Ext. fault2** External fault 2 input, which can be parameterized, was activated.	Check; • if there is an external fault • if the cable to the appropriate binary input is interrupted • **P586 S.k. fault ext. 1** ☞ Section „Binary inputs" in the Operating Instructions, Part 2
F037	**Analog input.**	Check the connection to • analog input -X102:27, 28, 29. • analog input 2 -X102:30 ,31, 32. check parameters • **P650 CU-AE configuration** • **P651 CU-AE smoothing** • **P652 CU-AE offset** ☞ Section "Control terminal strip and serial interface" in the Operating Instructions, Part 2
F040	**AS internal** Incorrect operating status.	Replace the CU board (-A10)
F041	**EEprom fault** A fault occured when storing the values in the EEPROM.	Replace the CU board (-A10)
F042	**Comp. time** Computation time problems	Reduce computation time load, increase **sampling time P308** observe **r725 , free comp time**
F043	**Coupling, int.** Internal coupling error. One of the two coupling partners does not respond	Replace the CU board (-A10)
F045	**Opt.brd HW** A hardware fault occurred when accessing the option board	Replace CU Check the connection between the subrack and option boards
F046	**Par. con.**	Power the converter off and up again. Replace CU board (-A10).
F047	**Int. comp. time**	Replace CU board (-A10).
F048	**Int. pulse fr.**	Change **P761 pulse frequency**.
F049	**SW release** The EPROMs on the CU have different software releases. In this case, the language EPROM is compared with the CU software.	• Replace language PROM

Fault messages		
No.	**Fault description**	**Counter measures**
F050	**TSY init.** Error when initializing the TSY board	Check; • is the TSY board correctly inserted • does the parameter setting coincide with the boards used **P090 board, slot 2 - P091 board, slot 3** **r723 board code - 724 board ID**
F053	**Tacho dn/dt** The permissible change value of the speed encoder signal **P215 dn(actual, permissible)** was exceeded.	Check the tacho feeder cables to ensure that they are intact. Check the tachometer screen ground. If required, change **P215**
F060	**MLFB missing** This is set, if the MLFB = 0 when INITIALIZATION is exitted (0.0 kW). MLFB = Order No.	After acknowledgement, in INITIALIZATION enter the correct MLFB in parameter **P070 MLFB (6SE70..)**. (Only possible with the appropriate access stages to both access parameters).
F061	**Incorr param.** A parameter entered when setting the drive is not in the admissible range (e.g. P107 mot. frequency (ies), P108 mot. speed (s)), P761 pulse frequency) (dependent on the control type).	Acknowledge the fault, and change the appropriate parameter value. The erroneous parameter is specified in r949 as fault value.
F065	**INT1 telegram** A telegram was not received at interface 1 (SST1/USS protocol) during the telegram failure time	• Check the connection CU -X100:1 to 5. and check the connection PMU -X300. • Check **P687.01"SST/SCB TLG-fail"** • Replace CU (-A10).
F070	**SCB init.** Error when initializing the SCB board	**r 949 =1 or 2** • Check the SCB board to ensure that it is correctly inserted and that the slot coincides with assignment • **r723 board code ,** – **r724 board ID and** • **P090 board slot 2,** – **P091 board slot 3** **r 949 =5** error, initialization data • Check parameters **P682 and P684** **r 949=6** time-out when initializing and **r949=10** error, configuration channel • Check parameters **P090, P091, P682 and P684**
F072	**SCB heartb.** SCB no longer processes the monitoring counter (heartbeat counter)	Replace SCB Check the connection between the subrack and option board
F073	**Aninput1 SL1** 4 mA at analog input 1, slave 1 fallen below	Check the connection, signal source to the SCI 1 board (slave 1) -X428:4, 5.
F074	**Aninput2 SL1** 4 mA at analog input 2, slave 1 fallen below	Check the connection, signal source to the SCI 1 board (slave 2) -X428:7, 8.
F075	**Aninput3 SL1** 4 mA at analog input 3, slave 1 fallen below	Check the connection, signal source to the SCI 1 board (slave 3) -X428:10, 11.
F076	**Aninput1 SL2** 4 mA at analog input 1, slave 2 fallen below	Check the connection, signal source to the SCI1 (slave1) -X428:4, 5.
F077	**Aninput2 SL2** 4 mA at analog input 2, slave 2 fallen below	Check the connection, signal source to the SCI 1 board (slave 2) -X428:7,8.
F078	**Aninput3 SL2** 4 mA at analog input 3, slave 2 fallen below	Check the connection, signal source to the SCI 1 board (slave 3) -X428:10, 11.
F079	**SCB telegram** A telegram was not received from the SCB (USS, peer-to-peer, SCI) during the telegram failure time.	• Check the connections of SCB1(2). • Check **P687.01"SST/SCB TLG-fail".** • Replace SCB1(2). • Replace CU (-A10).

Fault messages		
No.	**Fault description**	**Counter measures**
F080	**TB/CB init.** Error when initializing the board at the DPR interface	**r949 = 1** PT/CB not inserted or PT/CB board code incorrect **r949 = 2** PT not compatible **r949 = 3** CB not compatible **r949 = 4** error, initialization data Check the T300/CB board to ensure that is correctly inserted and that the slot and assignment coincide; • **P090 board slot 2, • P091 board slot 3** • **r723 board code, •r724 board ID** **r949 = 5** time-out at initialization **r949 = 10** error, configuration channel Checking the CB initialization parameters; • **P918 CB bus address,** • **696 to P705 CB parameters 1 to 10**
F081	**TB/CB heartb** TB or CB no longer processes the heartbeat counter	Replace TB or CB Check the connection between the subrack and option boards
F082	**TB/CB Tlgr.** No new process data were received from TB or CB during the telegram failure. .	• Check the connections of the CB/TB. • Check **P695 "CB/TB TLG-fail".** • Replace CB. • Replace TB.
F100	**GRND init** During the ground fault test, a current not equal to 0 was measured, or a UCE or the overcurrent monitoring responded, although none of the valves were triggered.	The fault cause can be read-out of r358 "ground fault test result". Check the converter output for short-circuit or ground fault (-X2:U2, V2, W2 - including motor). Check that the CU board is correctly inserted. Frame sizes 1 and 2: Check the transistor modules on the PEU board -A23 for short-circuit. Frame sizes 3 and 4: Check the transistor modules -A100, -A200, -A300 for a short-circuit condition.
F101	**GRND UCE** During the ground fault test a UCE monitoring function responded in a phase in which no valve was triggered	Check the power section valves for a short-circuit, and for converters with fiber-optic gating, the gating unit wiring and the UCE checkback signals, for the correct assignment. **r358** can be interrogated to indicate which UCE monitoring has responded.
F102	**GRND phase** During the ground fault test, current flowed in one phase where none of the valves were triggered, or the UCE monitoring in the phase responded in which the valve was triggered.	Read-out the fault value from R949. The digit of the xth position indicates the valve, where the fault occured at power-up.  Digit x = 1 = L2+ x = 2 = L2– x = 3 = L1+ x = 4 = L1– x = 5 = L3+ x = 6 = L3– The digit of the xth position defines the phase, in which I *f* is 0, and thus a valve is defective (always conductive)  Digit x = 1 = Phase 1 Digit x = 3 = Phase 3 Digit x = 4 = Phase 1 and 3 Check the phase assembly for defective valves (always conductive)

Fault messages		
No.	**Fault description**	**Counter measures**
F103	**Ground fault** An earth fault or a fault in the power section is present. During the ground fault test, a current flows from the phase in which a valve was triggered, the overcurrent comparitor responded, or a UCE monitoring in a phase has responded in which a valve was triggered.	Read-out the fault value from r949. The digit of the xth position specifies the valve, which, when triggered, manifested the fault.  x = 1 = V+ x = 2 = V- x = 3 = U+ x = 4 = U- x = 5 = W+ x = 6 =W- Check the motor including feeder cable for ground faults. If there is no ground fault, check the power section for defective valves which remain conductive. The digit of the xth position defines the phase in which I *f* is 0, and therefore a valve must be defective (always conductive).  1 = Current in phase 1 (2 = UCE in phase 2 (V) 3 = Current in phase 3 (4 = Only overcurrent The motor speed should be less than 10 % of the rated speed during the ground fault test! 1) A ground fault is present in phase V, or there is a defective valve (always conductive).
F104	**Mess. I pol.** For the resistance measurement, the average current value in a phase has the incorrect polarity.	Read-out the fault value from r949. The digit of the xth position specifies the valve, which, when triggered, manifested the fault.  x = 1 = 100 x = 2 =010 x = 3 = 001 Specifies the phase current with the incorrect polarity.  x = 1 = Phase 1 (U) x = 3 = Phase 3 (W) x = 4 = Phase 1 (U) and 3 Check that the output current is flowing through the CT in the correct direction, and whether the CT signal cables are connected with the correct polarity to the electronics. The CT could be defective.
F105	**Mess. I too large** Phase current deviates by more than 15 % from the setpoint.	Read-out the fault value from r949. The digit of the xth position specifies the voltage direction when the fault occurred.  x = 1 = 100 x = 2 =010 x = 3 = 001 The digit of the xth position specifies the phase current, which is higher than can be expected for this particular current setpoint.  x = 1 = Phase 1 (U) x = 3 = Phase 3 (W) x = 4 = Phase 1 (U) and 3 Check whether the motor-converter feeder cable or the motor winding in phase 2 are interrupted, and that <u>both</u> CTs represent the actual value with the correct gain.
F106	**Mess. I dev.** Phase current deviates by more than 15 % from the setpoint.	Check whether the motor-converter feeder cable or the motor winding in phase 2 are interrupted, and that <u>both</u> CTs represent the actual value with the correct gain. The referred stator- and feeder resistances are possibly >50 %. For the resistance measurement, the measured phase current was more than 15 % of the value for this particular setpoint

Fault messages		
No.	**Fault description**	**Counter measures**
F107	**Mess. I = 0** During the resistance measurement, current was not measured in one phase, although the inverter was enabled.	Read-out the fault value from r949. The digit of the xth position specifies the voltage direction at which the fault occurred.  x = 1 = 100 x = 2 =010 x = 3 = 001 The digit of the xth position indicates the phase, in which no current was measured.  x = 1 = Phase 1 (U) x = 2 = Phase 2 (V) x = 3 = Phase 3 (W) x = 4 = Phase 1 (U) and 3 (W) Check that all three motor feeder cables and motor windings are not interrupted. Check the connections between the CT and electronics. Check that the correct rating plate data have been entered for the motor data set valid during the measurement.
F108	**Mess. unsym** At least one of the six individual values from Rg deviate by more than 10 % from the average value. The motor winding is significantly non-symmetrical.	Check the motor feeder cables and motor winding.
F114	**Mess. OFF** The converter automatically aborted the automatic measurement as the time limit was exceeded up to converter power-up, or due to an OFF command during the measurement; the selection in **P052 function selection** is reset.	For **P052, function selection = 7,** restart **motor identification at standstill.** The on command must be provided within 20 s after the warning message **A078 standstill measurement appears.** Withdraw the off command and re-start the measurement.
F115	**KF internal**	Power-down the converter and electronics and power-up again.
F255	Fault in the NOVRAM	Power-down the converter and electronics and power-up again. If the fault occurs again, change the CU.

Fatal errors (FF):

Fatal errors are those hardware or software errors which no longer permit normal converter operation. They only appear on the PMU in the form "FF<Nr>". The software is re-booted by actuating any PMU key.

FFxx	**Error message**	**Power-down the converter and power-up again. Call the responsible service department if a fatal error message is re-displayed.**
FF01	**Time sector overflow** A non-removable time sector overflow was identified in the higher priority time sectors.	• Increase the sampling time **(P308)** or reduce the pulse frequency **(P761)** • replace CU
FF03	**Access error, option board** A fatal error occured when accessing the external option boards (CB, TB, SCB, TSY ..)	• replace CU • replace LBA • replace option board
FF06	**Stack-Overflow** Stack overflow.	• Increase the sampling time **(P308)** or reduce the pulse frequency **(P761)** • replace CU
FFxx	**Other fatal errors.**	• replace CU

12.2 Alarm messages

The alarm message is periodically displayed on the PMU by A=alarm and a 3-digit number. An alarm cannot be acknowledged. It is automatically deleted once the cause has been removed. Several alarms can be present. The alarms are then displayed one after another.

When the converter is operated with the OP1 operator control panel, the alarm is indicated in the lowest operating display line. The red LED additionally flashes (refer to the OP1 Instruction Manual).

Alarm No.	Parameter No. —— Bit No.	Description	Counter-measures
A001	**P953** —— 0	**Comp. time** CU board comp. time utilization too high	observe **r725 free computation time** increase **P308, sampling time** or
A014	**P953** —— 13	**Simulation** The DC link voltage is not equal to zero when the simulation mode is selected (P733 = 1).	• set P733 to zero • drop the DC link voltage (remove the inverter from the mains)
A015	**P953** —— 14	**Ext. alarm 1** External alarm input 1, which can be parameterized, was activated	External alarm! check whether the cable to the appropriate binary input is interrupted. Check **parameter P588 S alarm ext. 1.** ☞ Section "Binary inputs" in the Operating Instructions, Part 2
A016	**P953** —— 15	**Ext. alarm 2** External alarm input 2, which can be parameterized, was activated	External alarm! check whether the cable to the appropriate binary input is interrupted. Check **parameter P589 S alarm ext. 2.** ☞ Section "Binary inputs" in the Operating Instructions, Part 2
A020	**P954** —— 3	**Overcurrent** An overcurrent condition has occurred.	Check the driven load for an overload condition. - are the motor and converter matched - are the dynamic performance requirements exceeded.
A021	**P954** —— 4	**Overvoltage** A DC link overvoltage condition has occurred.	Check the supply voltage. Converter regenerates without regeneration possibility.
A022	**P954** —— 5	**Inv. temp.** The threshold for initiating an alarm, which can be parameterized, was fallen below.	Observe **r011 conv. temp.** Measure the air intake or ambient temperature. Observe the de-rating curves for ϑ >40 ºC ☞ Section "Technical data" in the Operating Instructions, Part 1 Check: - whether fan -E1 is connected and is rotating in the correct direction. - the air intake and discharge openings for blockage. - the temperature sensor at -X30.
A023	**P954** —— 6	**Mot temp** The threshold to initialize an alarm, which can be parameterized, was exceeded.	Check the motor (load, ventilation etc.). Read-out the actual temperature in **r009 mot.temp.** Check the KTY84 input at connector -X104:25,26 for a short-circuit condition.
A025	**P954** —— 8	**I2t- inv.** If the instantaneous load condition is maintained, then the inverter will be thermally overloaded.	Check whether the rated output current or the peak current (operating class II) is (was) too high. View **r010 conv. load**
A029	**P954** —— 12	**I2t motor** The parameterized limit value for the motor I2t monitoring was exceeded.	Motor duty cycle is exceeded! Check parameters: **P362 motor cooling** **P363 mot. temp. T1** **P364 mot. load limits**

Alarm No.	Parameter No. —— Bit No.	Description	Counter-measures
A033	**P955** —— 0	**Overspeed** Bit in **r553 status word 2** of the setpoint channel. The speed actual value has exceeded the maximum speed plus the selected hysteresis.	**P519 overspeed hys.** plus **P452 max. frequency (RDF)/ max. speed (RDF)** or **P453 max. frequency (LDF)/ max.speed (LDF)** was exceeded. Increase the parameter for the maximum frequencies, or reduce the regenerative load.
A034	**P955** —— 1	**Setpoint- act. val. diff.** Bit in the **r552 status word 2** of the setpoint channel. The absolute difference between the frequency setpoint and actual value is greater than the parameterized value and the control monitoring time has expired.	Check; - whether an excessive torque requirement is available. - whether the motor was dimensioned too small. increase **P517 setpoint-act. val. diff. frq./setp. act. diff. speed** or **P518 setp.-act. val. diff. time,**
A035	**P955** —— 2	**Wire breakage** Clockwise and/or counter-clockwise rotating field is not enabled, or a wire is interrupted (both control word bits are zero)	Check, whether the cable(s) to the appropriate binary input(s), **P572 S. clockwise phase sequence/P571 S. counter-clockwise phase sequence** is (are) interrupted or withdrawn. ☞ Section "Binary inputs" in the Operating Instructions, Part 2
A041	**P955** —— 8	**DC link overv.** The supply voltage is too high or the converter supply voltage (P071) is incorrectly parameterized. The Vd_max. controller is inhibited, as otherwise the motor would immediataly accelerate in operation up to the maximum frequency.	Check: - the supply voltage. - **P071 conv. supply volt**.
A042	**P955** —— 9	**Mot. stall/lock** Motor has stalled or is locked.	Reduce load. Check: - whether the drive is locked. - whether the drive has stalled.
A043	**P955** —— 10	**n-act. jump** The permissible rate of change of the speed encoder signal (P215) was exceeded.	Only for configured speed encoder **P208 S. speed act. val.** Check! Tacho cable for interruption. Tacho screen grounding.
A049	**P956** —— **0**	**No slave** For serial I/O (SCB1 with SCI1/2), no slave is connected, opto-cable interrupted or slaves have no power.	**P660 SCI AE config.** • Check slave • Check cable
A050	**P956** —— **1**	**Slave incorrect** For serial I/O, the slaves required according to the parameterized configuration are not present (slave number or slave type).	Check **P660 SCI AE config.**
A051	**P956** —— 2	**Peer bdrate** The peer-to-peer connection is too high or different baud rates have been selected.	Adapt the baud rate in conjunction with the SCB boards, **P684 SST/SCB baud rate**
A052	**P956** —— 3	**Peer PZD-L** for peer-to-peer connection, PZD length selected too high (>5).	Reduce the number of words **P686 SST/SCB PZD No.**
A053	**P956** —— 4	**Peer lng f.** For peer-to-peer connection, the PZD length of sender and receiver do not match.	Adapt the word length for sender and receiver **P686 SST/SCB PZD No.**

Alarm No.	Parameter No. —— Bit No.	Description	Counter-measures
A057	**P956** —— 8	**TB-Param** Technology Board Parameter occurs when a technology board is present, but parameterisation commands from the PMU, SST1 or SST2 are not answered by the technology board within 6 seconds	Change TB software
A065	**P957** —— 0	**WEA active** The WEA option **(P366)** always restarts the drive. A possibly parameterized power-up delay time **(P367)** expires, if restart-on-the-fly is not selected. For DC link pre-charging, there is **no** time monitoring, i.e. with an external electronics power supply, it is also switched-in again.	 **CAUTION** Personnel could be endangered when the drive automatically restarts. Please check as to whether WEA (automatic restart) is reeally required. If required, change **P366 WEA**.
A070	**P957** —— 5	**Sync. error** This alarm is output, if the phase difference goes outside the synchronizing window **(P 391)** after synchronization.	The alarm can only be deleted after synchronization has been exited
A076	**P957** —— 11	**t-comp lim.** The determined compensation time was limited to 0.5µs - 1.5µs.	Converter and motor outputs are too different. Check motor data entries **P100 to P109**.
A077	**P957** —— 12	**r-g limit** The measured resistance is limited to the max. value of 49%.	Converter and motor outputs are too different. Check motor data entries **P100 to P109**.
A078	**P957** —— 13	**Stands.meas** The standstill measurement is executed when the converter is powered-up. With this measurement, the motor can align itself several times in any direction of rotation.	If the standstill measurement can be executed without any danger: Power-up the converter.
A081.. A096	**r958** —— 0...15	**CB alarm** Refer to the User Manual, CB board	
A097.. A112	**r959** —— 0...15	**TB alarm 1** Refer to the User Manual, TB board	
A113.. A128	**r960** —— 0...15	**TB alarm 2** Refer to the User Manual, TB board	

13 Logbook

The logbook must be kept up-to-date by the operating personnel

All service- and maintenance work carried-out on the converter should be briefly entered into the logbook.

Continuous entries are important for maintenance and could be significant when it comes to warranty claims.

The logbook is available as file on the SIMOVIS floppy disk supplied, and it can be printed-out at any time.

Format	**File name**
WINWORD 6.0	LOG_FC.DOC
WRITE	LOG_FC.WRI

Location:			Unit Order No.: Serial No.:	
	Date	Name	Department	Signature
Start-up settings				
Start-up settings change				

No.	Date/time	Name/department	Fault- and diagnostic messages	Measures

14 Index and Abbreviations

14.1 Index

14.2 List of abbreviations

A	Alarm
AA	Analog output
AC	Alternating current
AE	Analog input
AFE	Active front end
AS	Sequence control
ASIC	Application specific integrated circuit
ASM	Asynchronous motor
ATI	Beliebig sinnvoll/sinnloser Kommentar
AWG	American wire gauge
BA	Binary output
BC	Bypass contactor
BE	Binary input
BF	Type of construction
CAN	Controller area network
CB	Communication board (option)
CU	Control unit
CUA	Control unit AFE (control unit of AFE)
DC	Direct current
DPR	Dual-port-RAM
DPRAM	Dual-port-RAM
EA	First run-up
EEPROM	Electrically erasable programmable read-only memory
EMC	Electromagnetic compatibility
EMF	Electromotive force
EPROM	Erasable programmable read-only memory
ESD	Electrostatic sensitive devices
F	Fault
FC	Frequency control (control version of SIMOVERT MASTER DRIVES)
FF	Fatal fault
FI	Fault current
FSW	Fixed setpoint
G/R	Basic/reserve
GSST(1/2)	Basic drive converter serial interface (1/2)
H	High (binary signal level)
HLG	Ramp-function generator
HTL	High-voltage transistor logic

HW	Hardware
I/O	Input/output
IGBT	Insulated gate bipolar transistor
IGD	IGBT gate drive
IVI	Inverter interface
KIP	Kinetic buffering
L	Low (binary signal level)
LBA	Local bus adapter (option)
LED	Light emitting diode
LSB	Least significant bit
MC	Main contactor
MDS	Motor data set
MLFB	Machine-readable product designation (machine-readable designation)
MSB	Most significant bit
NN	Sea level
OP(1)	Operation panel (1)
Par	Parameter
PC	Personal computer
PEU	Power electronic unit
PG	Programming unit (programmer)
PKW	Parameter ID value
PMU	Parameterization unit
PROFIBUS	Process field bus
PS	Power supply
PSU	Power supply unit
PWE	Parameter value
PZD	Process data
Q	Source
RC	Combination, resistor ® and capacitor (C)
RDS	Reserve data set
RFG	Ramp-function generator
SC	Servo control (control version of SIMOVERT MASTER DRIVES)
SCB(1/2)	Serial communication board (option)
SCI(1/2)	Serial communication Interface (1/2)
SDS	Setpoint data set
SL	Slave
SM	Synchronous motor
SMD	Surface mounted device

SML	Snubber module low
SMU	Snubber module up
SST1/2	Serial interface 1/2
SW	Software
TB	Technology board (option)
TLG	Telegram
TRC	Trace
TSY	Tacho and synchronization (option)
TTL	Transistor-Transistor-Logic
UCE	Voltage (V) collector->emitter (desaturation signal of the transistors)
UMR	Drive converter
USS	Universal serial interface
VC	Vector control (control version of SIMOVERT MASTER DRIVES)
VDU	Voltage-dividing-unit
VS	Precharging contactor
Vsa	Line supply voltage components in the a axis
Vsb	Line supply voltage components in the b axis
VSB	voltage sensing board (line supply voltage sensing board)
WEA	Automatic restart function
WR	Inverter
X9	Terminal strip on the PEU (types A to D), PSU1 (types E to H) and PSU2 (types J to M)
ZK	DC link

The following editions have been published so far:

Edition	Internal Item Number
AA	475 100.4000.76 J AA-76

Version AA consists of the following chapters:

Chapter		Changes	Pages	Version date
0	General	First edition	10	08.96
1	Control terminal strip and serial interface	First edition	5	08.96
2	Operator control	First edition	4	08.96
3	General explanation of the terminology and functional scope of the unit	First edition	2	08.96
4	Start-up	First edition	11	08.96
5	Process data	First edition	23	08.96
6	Interfaces	First edition	14	08.96
7	Open-loop and closed-loop control types	First edition	3	08.96
8	Start-up functions	First edition	8	08.96
9	Functions (software)	First edition	13	08.96
10	Function diagrams	First edition	8	08.96
11	Parameter list	First edition	59	08.96
12	Fault and alarm messages	First edition	10	08.96
13	Logbook	First edition	1	08.96
14	Index and abbreviations	First edition	5	08.96

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