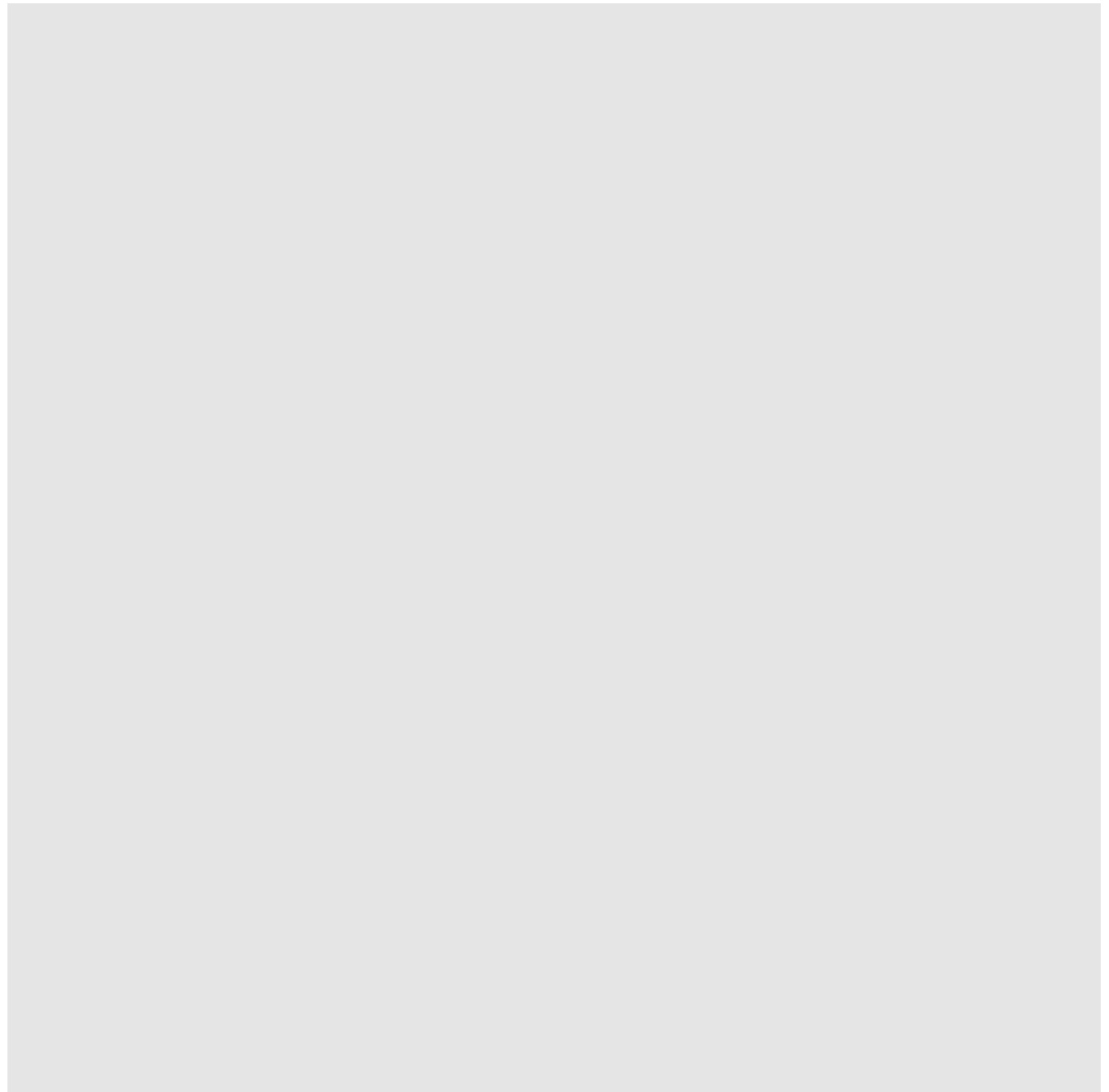


SIEMENS

SIMOVERT MASTER DRIVES Servo Control (SC) Types A to D DC-AC

Operating Instructions



These Operating Instructions are available in the following languages:

Language	German	French	Spanish	Italian
Order-No.	6SE7080-0BD30	6SE7087-7BD30	6SE7087-8BD30	6SE7087-2BD30

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We have checked the contents of this document to ensure that they coincide with the described hardware and software. However, differences cannot be completely excluded, so that we do not accept any guarantee for complete conformance. However, the information in this document is regularly checked and necessary corrections will be included in subsequent editions. We are grateful for any recommendations for improvement.

SIMOVERT® Registered Trade Mark

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0 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, commitment 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

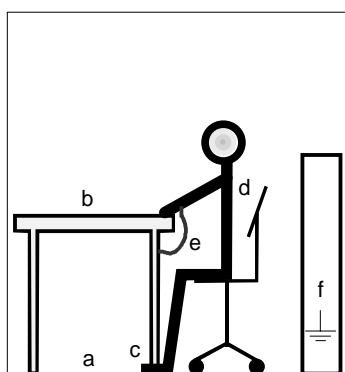
d = ESD overall

b = ESD table

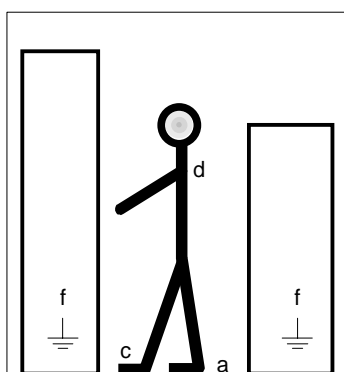
e = ESD chain

c = ESD shoes

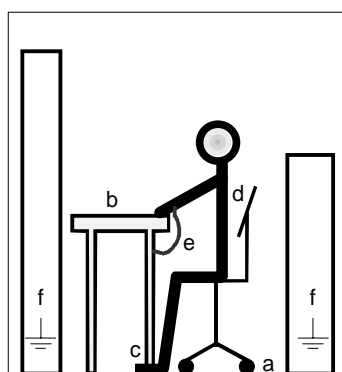
f = Cubicle ground connection



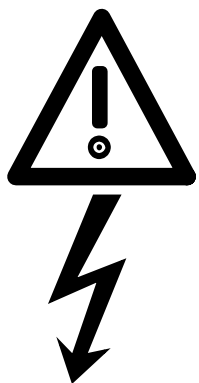
Sitting



Standing



Standing / Sitting



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.

1 Description

1.1 Applications

SIMOVERT 6SE70 converters are power electronic units. The converters, described in this Instruction Manual generate a variable-frequency three-phase system for the motor from a DC supply. This allows AC motors to be continuously speed controlled. There are three different versions depending on the particular application:

- ◆ Frequency control FC simple applications (e.g. pumps and fans)
- ◆ Vector control VC high demands regarding dynamic performance and accuracy
- ◆ Servo control SC servo drives

SIMOVERT Master Drives can be used with a common DC link, as well as for single-motor and multi-motor drives.

Expanded functions for certain technological requirements are possible via defined power section interfaces.

1.2 Mode of operation

Converters with DC current input are suitable for coupling several converters to a common DC link bus. This permits energy transfer between drives in the motoring and generating modes which in turn means energy savings.

The DC converter must be connected to the DC bus through an E unit (rectifier unit) due to the pre-charging of the DC link capacitors. If an I/R unit (rectifier and regenerative feedback unit) is used instead of the E unit, power is fed back into the supply if the regenerative output for several drives is greater than the motor power required.

The converter is ready for operation after the DC link capacitors have been pre-charged

The inverter, configured using IGBT modules, generates a three-phase system from the DC link voltage to feed the motor

The inverter open-loop control uses a microprocessor with field-oriented vector control, with a very fast secondary closed-loop current control. High drive dynamic performance is achieved as a result of the field oriented vector control. When the unit is shipped, the pulse frequency is preset to 5 kHz. It can be set in the range from 5 kHz to 7.5 kHz.

SIMOVERT SC is suitable for:

- ◆ Single-motor drives with permanent-field 1FT6 motors

Some of the applications are, for example

- ◆ Winder drives,
- ◆ Foil machines,
- ◆ Packaging machines

After power-up, only the motor must be selected and the drive can then be enabled. The drive can be matched to the load moment of inertia and optimized by changing a closed-loop control parameter.

The converter operates with motor identification (MOTID). The maximum stator frequency is 400 Hz.

The following operating modes can be selected:

- ◆ Closed-loop speed control
- ◆ Closed-loop torque control

The following encoders can be used:

- ◆ ERN 1387 encoders
- ◆ Encoders which are compatible to ERN 1387
- ◆ Resolvers

The converter can be controlled via

- ◆ the parameterization unit (PMU)
- ◆ an optional operator control panel (OP1)
- ◆ terminal strip
- ◆ a serial interface.

When networked with automation systems, the converter open-loop control is realized via optional interfaces and technology boards.

2 Transport, Unpacking, Installation

2.1 Transport and unpacking

SIMOVER Master Drives are packed in the manufacturing plant corresponding to that specified when ordered. A product packing label is provided on the carton.

Vibration and jolts must be avoided during transport, e.g. when setting the unit down.

Please observe the instructions on the packaging for transport, storage and professional handling.


The converter can be installed after it has been unpacked and checked to ensure that everything is complete and that the converter is not damaged.

The packaging comprises board and corrugated paper. It can be disposed of corresponding to the appropriate local regulations for the disposal of board products.

If the converter is damaged you must inform your shipping company immediately.

2.2 Storage


The converters must be stored in clean dry rooms. Temperatures between – 25 °C (–13 °F) and + 70 °C (158 °F) are permissible. Temperature fluctuations > 20 K per hour are not permissible.

	WARNING
	The equipment should not be stored for longer than one year. If it is stored for longer periods of time, the converter DC link capacitors must be formed at start-up. Forming is described in Section 4.3.12.

2.3 Mounting

The following are required for mounting:


- ♦ G busbar according to EN50035 with screws for mounting
- ♦ One M6 screw for types of construction A to C; two M6 screws for type of construction D
- ♦ Dimension drawing (Fig. 2.2 for types of construction A, B and C, Fig. 2.3 for type of construction D).

	WARNING
	<p>Safe converter operation requires that the equipment is mounted and commissioned by qualified personnel taking into account the warning information provided in this Instruction Manual.</p> <p>The general and domestic installation and safety regulations for work on electrical power equipment (e.g. VDE) must be observed as well as the professional handling of tools and the use of personal protective equipment.</p> <p>Death, severe bodily injury or significant material damage could result if these instructions are not followed.</p> <p>The unit must be protected against the ingress of foreign bodies as otherwise the function as well as the operational safety cannot be guaranteed.</p>

Requirements at the point of installation:

The local guidelines and regulations must be observed when mounting and installing the equipment.

Equipment rooms must be dry and dust-free. Ambient and cooling air must not contain any electrically conductive gases, vapors and dusts which could diminish the functionality. Dust-laden air must be filtered.

	WARNING
	<p>Dimension the cabinet cooling in line with the power loss! (technical data, Section 14)</p>

The converter ambient climate in operating rooms may not exceed the values of code F according to DIN 40040. The drive converter must be de-rated, corresponding to Sections 14.1 and 14.2, for temperatures > 40 °C (104 °F) and installation altitudes > 1000 m.

The unit is mounted corresponding to the dimension drawings in Section 2.4.

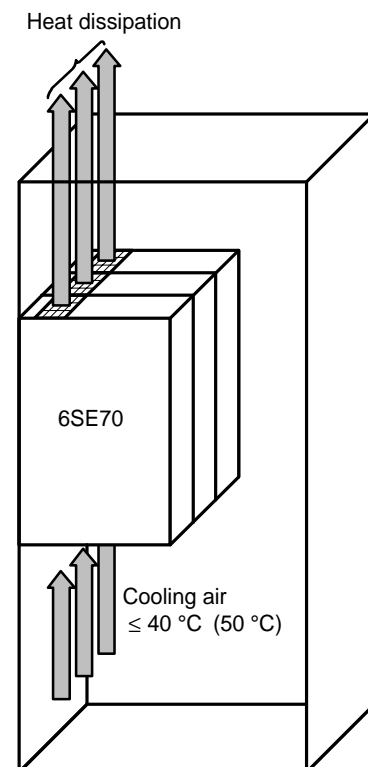


Fig. 2.1 Mounting the converters in cabinets

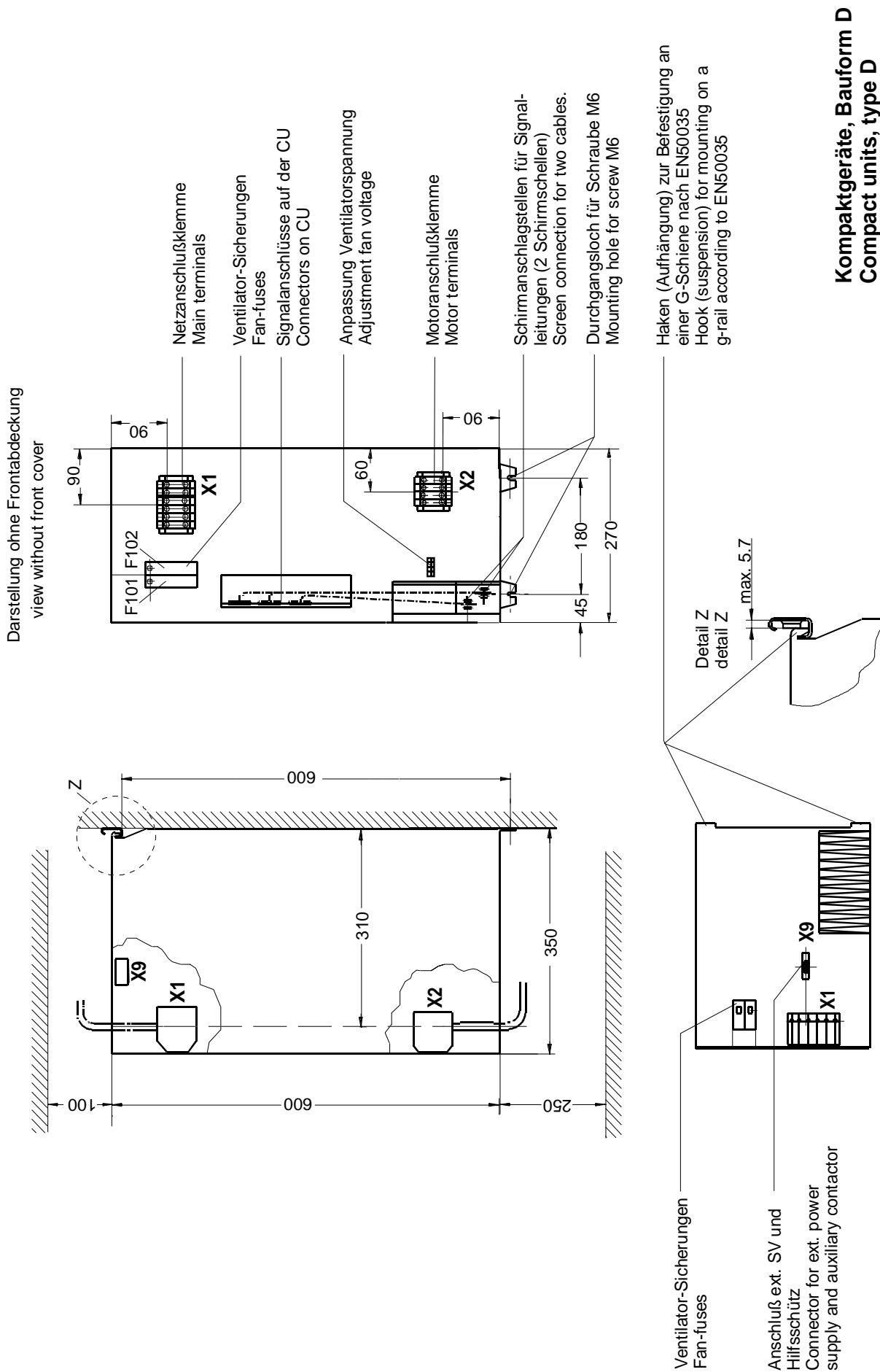
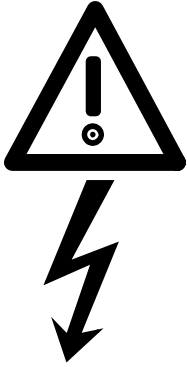


Fig. 2.3 Type D

3 Connecting-up

	WARNING
	<p>SIMOVERT Master Drives are operated at high voltages.</p> <p>The equipment must be in a no-voltage condition (disconnected from the supply) before any work is carried-out!</p> <p>Only professionally trained, qualified personnel must work on or with the unit.</p> <p>Death, severe bodily injury or significant material damage could occur if these warning instructions are not observed.</p>
	<p>Hazardous voltages are still present in the unit up to 5 minutes after it has been powered-down due to the DC link capacitors. Thus, the appropriate delay time must be observed before opening-up the unit.</p>
	<p>The power terminals and control terminals can still be live even though the motor is stationary.</p>
	<p>Forming the DC link capacitors:</p> <p>The storage time should not exceed one year. The converter DC link capacitors must be formed at start-up if the unit has been stored for a longer period of time.</p> <p>Forming is described in Section 4.3.12.</p>
	<p>When working on an opened unit, it should be observed that live components (at hazardous voltage levels) can be touched (shock hazard)</p>
	<p>The user is responsible, that the motor, converter and any other associated devices or units are installed and connected-up according to all of the recognized regulations in that particular country as well as other regionally valid regulations. Cable dimensioning, fusing, grounding, shutdown, isolation and overcurrent protection should be especially observed.</p>

NOTES	
◆ Connection rating:	The drive converter is suitable for connection to a line supply with a fault level (line supply) $\leq 100 \times$ rated output (drive converter).
◆ Cabling:	The connecting cables must be dimensioned according to the local regulations and according to Table 3.1. The insulation should be suitable for a temperature of 75 °C.

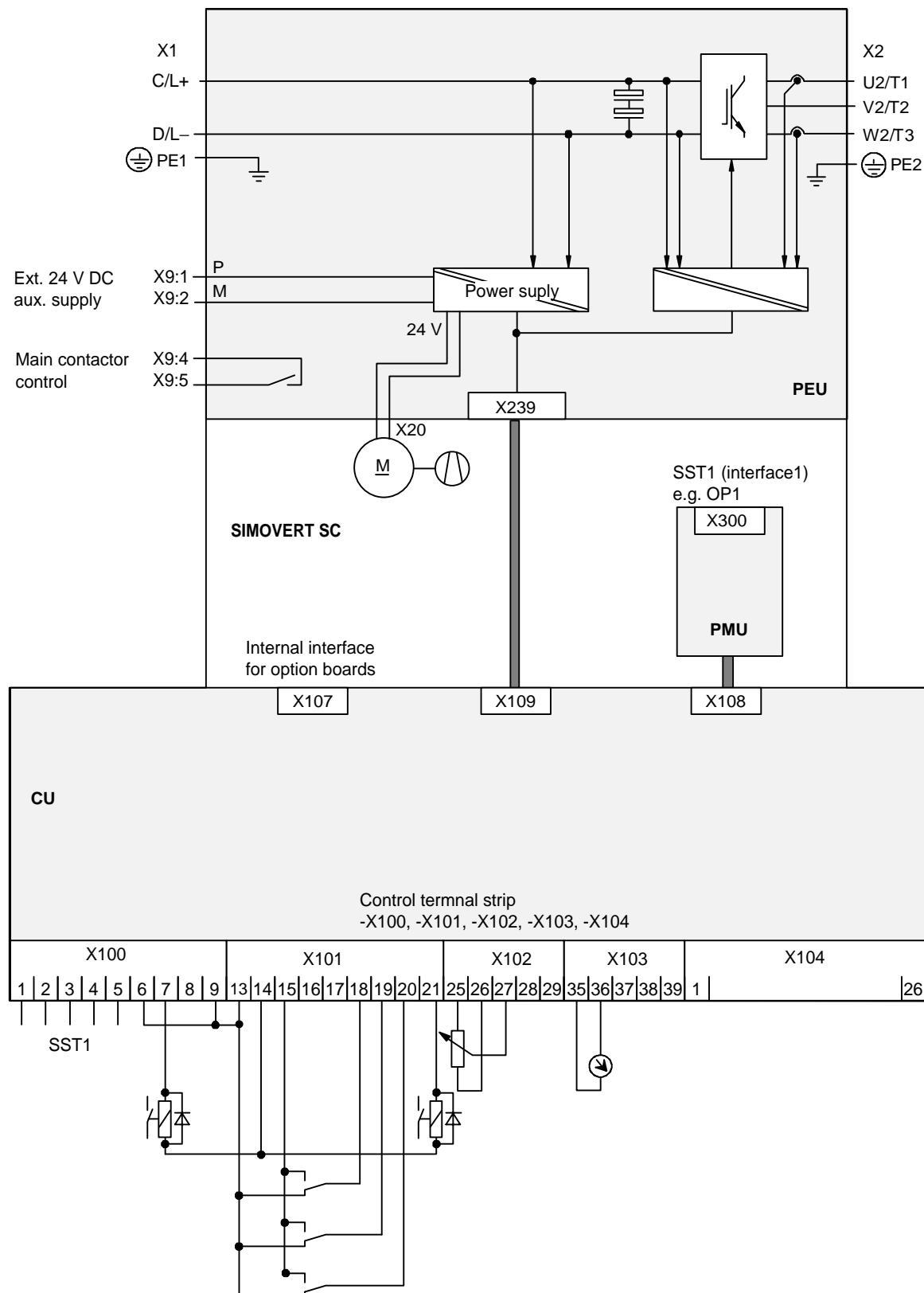


Fig. 3.1 Block diagram, types A, B, and C (24 V DC fan)

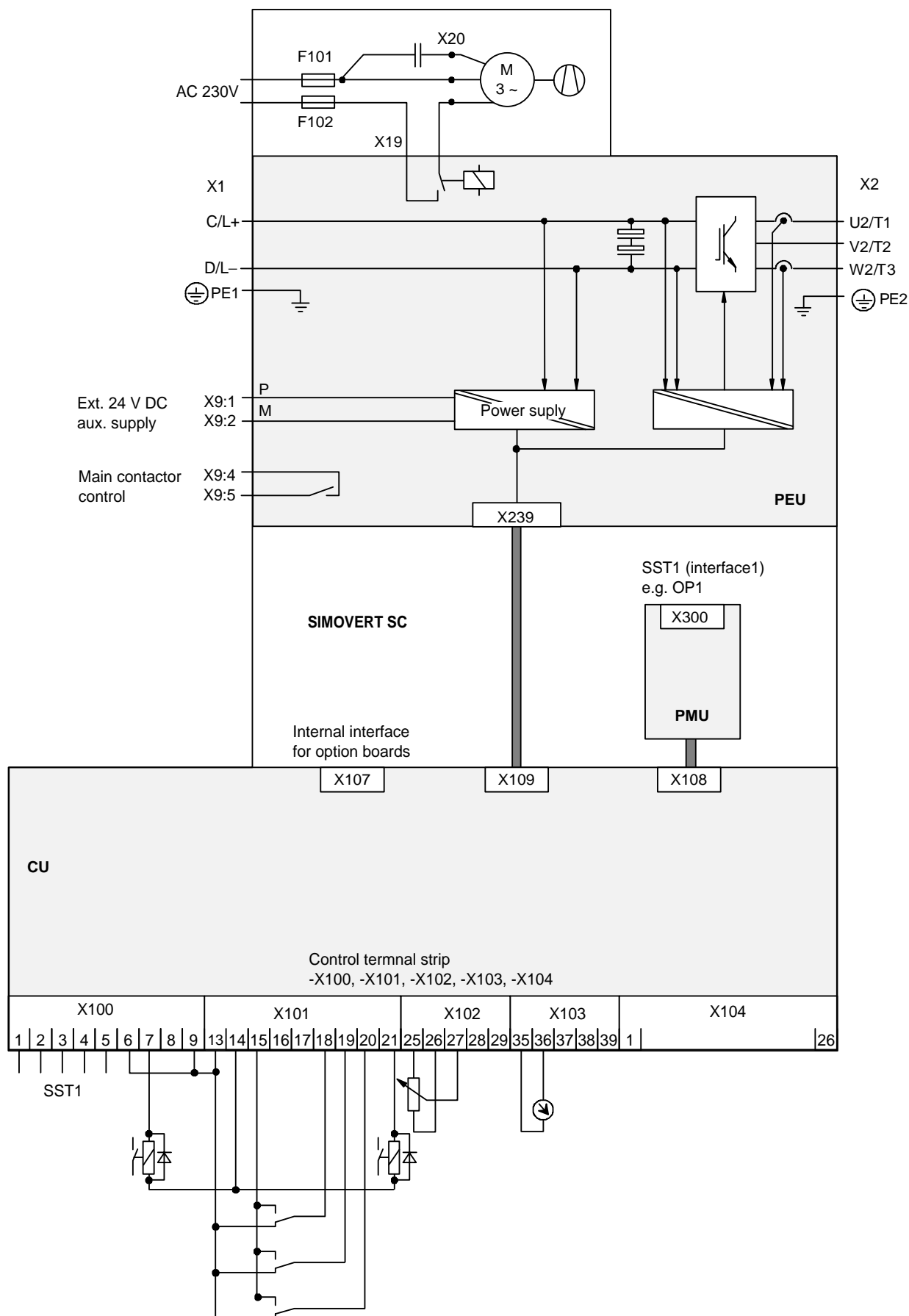



Fig. 3.2 Block diagram, types D (230 V AC fan)

3.1 Power connections

	<p style="text-align: center;">WARNING</p> <ul style="list-style-type: none"> ◆ The drive converter or the rectifier unit could be destroyed if the input terminals are interchanged! ◆ The coils of contactors and relays, which are connected to the same line supply as the drive converter, or are located close to the drive converter, must be provided with overvoltage limiters), e.g. RC elements.
---	--

The connecting cable cross-sections, specified in Table 3.1 are determined for copper cable at 40 °C (104 °F) ambient temperature (acc. to DIN VDE 0298 Part 4/02.88 Group 5).

The cross sections, specified in Table 3.2 are the connection cross-sections which are possible with the particular terminal size.

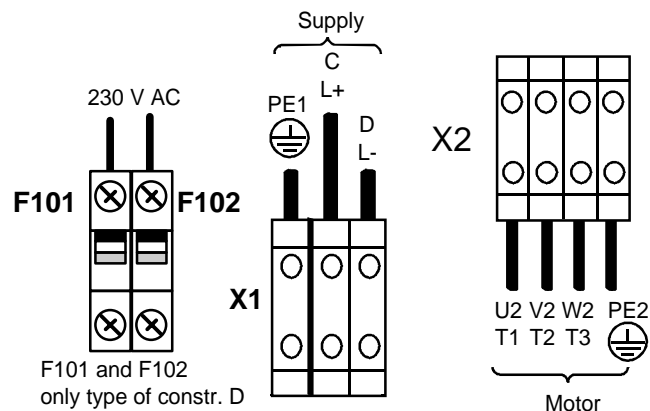


Fig. 3.3 Supply connection

Fig. 3.4 Motor connection

NOTE

For type of construction D, an external 230 V AC auxiliary voltage must be connected at F101 and F102. This auxiliary voltage is required for the unit fan.

NOTE

Depending on the motor insulation strength and the length of the motor feeder cable, it may be necessary to install one of the following options between the motor and the converter:

- ◆ Output reactor
- ◆ dv/dt-filter
- ◆ Sinusoidal filter

Information regarding selection and dimensioning is provided in Section 9, "Options".

3.1.1 Protective conductor connection

The protective conductor should be connected-up on both the supply- and motor sides. It should be dimensioned according to the power connections. A minimum 10 mm² cross-section is required due to the discharge currents through the noise suppression capacitors.

Order-No.	Supply side			Recommended fuse					Motor side			
	Rated DC-Current (A)	Cross-section		(A)	Type	North America			Rated output-voltage (V)	Current (A)	Cross-section	
		VDE (mm ²)	AWG ¹⁾			Type	(V)	(A)			VDE (mm ²)	AWG
6SE70					3NE	170M						
Rated DC voltage 280 V to 310 V												
21-1RA30	10,6	1,5	16	25	8 015	1564	660	50	0 to 230	10,6	1,5	16
21-3RA30	13,3	2,5	14	35	8 003	1564	660	50	0 to 230	13,3	1,5	16
21-8RB30	17,7	4	10	50	8 017	1564	660	50	0 to 230	17,7	2,5	14
22-3RB30	22,9	6	8	80	8 020	1584	660	50	0 to 230	22,9	4	10
23-2RB30	32,2	10	6	100	8 021	1568	660	125	0 to 230	32,2	10	6
24-4RC30	44,2	16	4	125	8 022	1568	660	125	0 to 230	44,2	16	4
25-4RD30	54,0	35	2	160	8 024	1570	660	200	0 to 230	54,0	25	2
27-0RD30	69,0	35	2	160	8 024	1570	660	200	0 to 230	69	25	2
28-1RD30	81,0	50	0	160	4 124	1570	660	200	0 to 230	81	35	0
Rated DC voltage 510 V to 620 V												
16-1TA30	6,1	1,5	16	25	8 015	1561	660	25	0 to 460	6,1	1,5	16
18-0TA30	8,0	1,5	16	25	8 015	1561	660	25	0 to 460	8,0	1,5	16
21-0TA30	10,2	1,5	16	25	8 015	1564	660	50	0 to 460	10,2	1,5	16
21-3TB30	13,2	4	10	50	8 017	1564	660	50	0 to 460	13,2	2,5	14
21-8TB30	17,5	4	10	50	8 017	1564	660	50	0 to 460	17,5	2,5	14
22-6TC30	25,5	10	6	80	8 020	1568	660	125	0 to 460	25,5	6	8
23-4TC30	34,0	10	6	80	8 020	1568	660	125	0 to 460	34	10	6
23-8TD30	37,5	16	4	125	8 022	1568	660	125	0 to 460	37,5	16	4
24-7TD30	47,0	25	2	125	8 022	1568	660	125	0 to 460	47	16	4
26-0TD30	59,0	35	0	160	8 024	1570	660	200	0 to 460	59	25	2
27-2TD30	72,0	35	0	160	8 024	1570	660	200	0 to 460	72	25	2
INFORMATION AND EXPLANATIONS												
1) American Wire Gauge												

Table 3.1 Supply values

Type	Order No.	Possible connection cross-section			
		Finely stranded		Multi-stranded/solid	
		(mm ²)	AWG	(mm ²)	AWG
A	6SE702_-_-_-30	2,5 to 10	12 to 6	2,5 to 16	12 to 4
B	6SE702_-_-_-30	2,5 to 10	12 to 6	2,5 to 16	12 to 4
C	6SE702_-_-_-30	1 to 16	16 to 4	10 to 25	6 to 2
D	6SE702_-_-_-30	2,5 to 35	12 to 2	10 to 50	6 to 0

Table 3.2 Possible connection cross-sections

3.2 Auxiliary power supply/main contactor or bypass contactor

The auxiliary power supply and the main- or bypass contactor are connected through the 5-pin connector X9.

Connector X9 with the plugs for the control terminal strip are supplied together (loose) with the equipment. 0.2 mm² to 2.5 mm² (AWG: 24 to 14) can be connected to X9.

The auxiliary power supply is required if the drive converter is supplied via a main- or bypass contactor, and the control functions should be maintained, even if the main- or bypass contactor is opened.

The main- or bypass contactor are controlled via the floating contacts X9.4 and –X9.5 (software default). Additional data are provided in Section 9 Options.

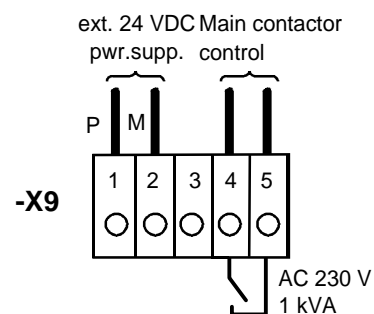


Fig. 3.5 Connecting an external auxiliary 24 V DC power supply and main contactor control


Terminal	Function description
1	24 V DC external $\geq 2,1$ A (max. 4 A dependent on the options)
2	Reference potential to DC
3	Not assigned
4	Main contactor control
5	Main contactor control

Table 3.3 Connector assignment for –X9, auxiliary power supply and main contactor connection

NOTES

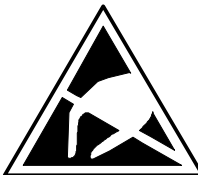
The coil of the main contactor must be provided with overvoltage limiters, e.g. RC elements (Section 9).

3.3 Control terminal strip and serial interface

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

The converter can be controlled via the following interfaces:

- ◆ Control terminal strip -X101 to -X104 on the electronics board CU
- ◆ RS 485 serial interface; control terminal strip -X100 on the electronics board CU
- ◆ OP operator control panel (refer to Section 9, Options)
- ◆ RS485 and RS232 serial interfaces on the PMU -X300

	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.

3.3.1 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 mm² to 1.5 mm² (AWG: 26 to 16), or 1 mm² (AWG: 18) can be connected, using finely stranded wire with lugs at the connector (recommended: 0.5 mm² (AWG: 20)). The connectors can be identified using pin numbers (Table 3.4); the connector position on the board is illustrated in Fig. 3.7.

Connector		Labeling									
X100	9-pin, coded	1	2	3	CU3	6	7	8	9		
X101	9-pin, coded	13	14	15	CU3	18	19	20	21		
X102	5-pin	25	26	27	28	29					
X103	5-pin	35	36	37	38	39					

Table 3.4 Connectors for the control terminal strip are supplied loose

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 (refer to Section 3.2 „Auxiliary power supply/main contactor“).

3.3.2 Connecting-up the control cables

NOTE

The control cables must be screened and should be routed away from the power cables with a minimum clearance of 20 cm. The screen should be connected at both ends. The screen is connected to the converter housing using screen clamps - as illustrated in Fig. 3.6.

Control- and cables must cross each other at an angle of 90 °.

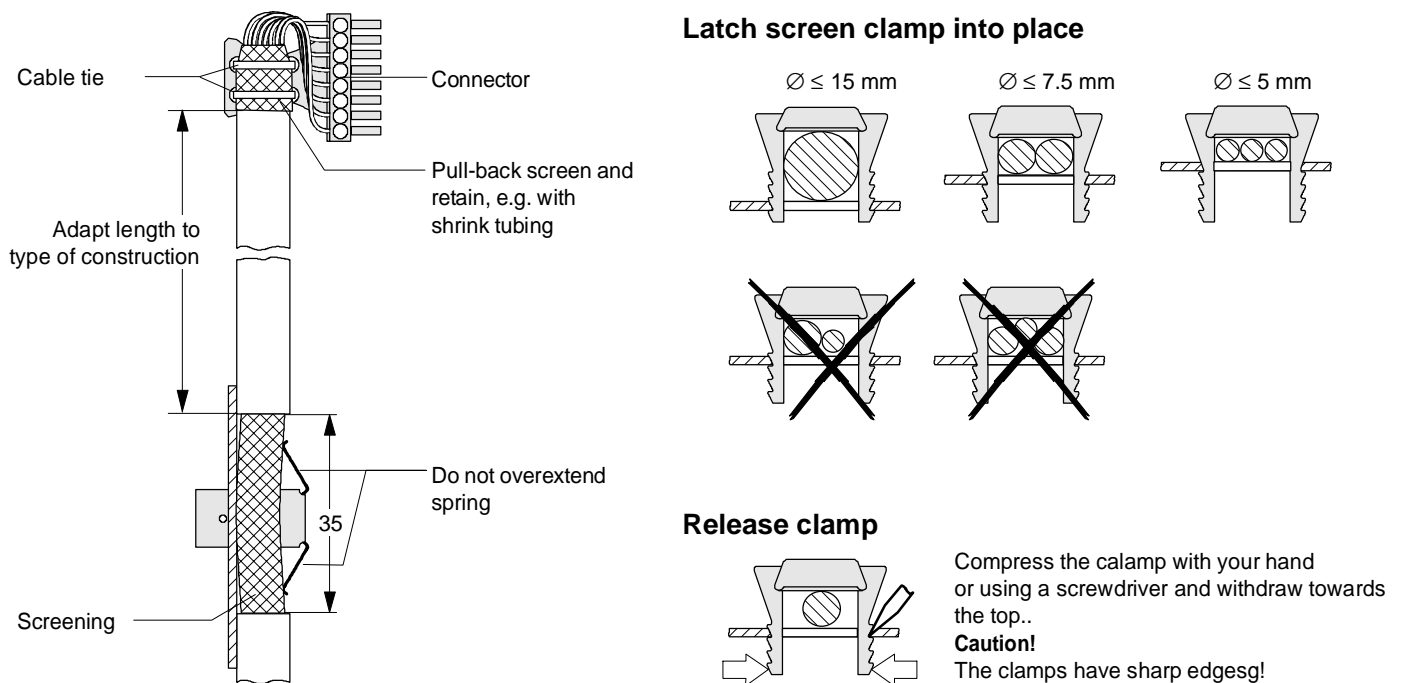
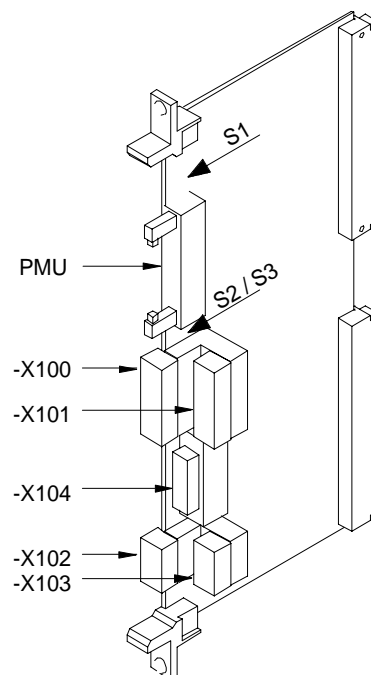


Fig. 3.6 Connecting-up the control cables and the technique for using the screen clamps

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



S1 bis S3 werden im Kapitel 4.3.6 beschrieben.

S1 to S3 are described in Section 4.3.6

Fig. 3.7 Control terminals on CU

3.3.3 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	In addition to the GSST_2 interface on -X100, a GSST_1 interface -X300 is available on the parameterization unit; see Chapter 4.3.6 „Start-up“.
	6	Binary output 2 relais 1 (changeover contact) reference contact
	7	Binary output 2 relais 1 (changeover contact) NO contact
	8	Binary output 3, relais 1 (changeover contact) NO contact
	9	Binary output 3, relais 2 (NO contact) reference contact
	NOTE	Load capability of the binary outputs: 60 V AC, 60 VA, $\cos\varphi = 1$ 60 V AC, 16 VA, $\cos\varphi = 0.4$ 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, 75 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
	21	Binary output 3, relais 2 (NO contact) NO contact
	NOTE	Signal sensitivity of the binary inputs: H = 24 V (13 V to 33 V) $I_{\max} = 15.7 \text{ mA}$ L = 0 V (-0.6 V to 3 V)

Table 3.5 Connecting example for control terminal strips -X100 and -X101

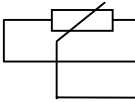
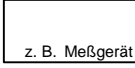
Connecting example	Term.	Function, notes
	-X102	
	25	+10 V / 5 mA, $\pm 2\%$, for setpoint pot., non-floating
	26	-10 V / 5 mA, $\pm 2\%$, for setpoint pot., non-floating
	27 ¹⁾	Analog input 1 (0 V to ± 10 V)
	28	Ref. potential, analog input 1
	29 ¹⁾	Analog input 1 (0 mA to 20 mA or. 4 mA to 20 mA) int. load resistor 250 Ω
	-X103	
	35	Analog output 1 ≤ 5 mA
	36	Ref. potential, analog output 1
	NOTE Terminals 35 and 36: 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.	
 z. B. Meßgerät	37	Output of track B, HTL signal level (2048 increments/revolution), max load is 3 mA
	38	Output of track A, HTL signal level (2048 increments/revolution), max load is 3 mA
	39	Output of the zero pulse, HTL signal level (2048 increments/revolution), max load is 3 mA

Table 3.6 Connecting-up example for the control terminal strip -X102 and -X103

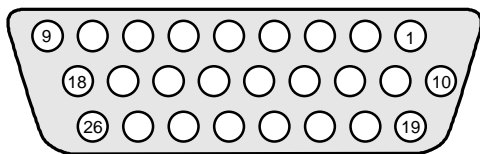


Fig. 3.8 Connection example for the control terminal strip -X104

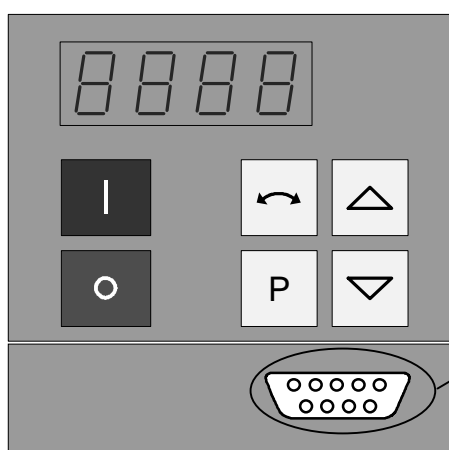
Terminal	Function, information
X104	
1	Resolver excitation voltage R3
2	Resolver-excitation voltage R1
3	Track C+ of encoders
4	Track C- of encoders
5	Track D+ of encoders
6	Track D- of encoders
7	Sense line 0 V for encoder
8	Reference potential for encoder
9	+5 V power supply for encoder
10	Resolver output voltage, connection S1
11	Resolver output voltage, connection S3
12	Track A+ of encoders
13	Track A- of encoders
14	Track B+ of encoders
15	Track B- of encoders

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

Terminal	Function, information
16	+ zero pulse from the encoder
17	- zero pulse from the encoder
18	Sense line + 5 V for encoders
19	Resolver output voltage, connection S2
20	Resolver output voltage, connection S4
21	Connection for the inner screen
22	Connection for the inner screen
23	Connection for the inner screen
24	Connection for the inner screen
25	Input for the motor temperature (KTY84)
26	Reference potential for the motor temperature (KTY84)
NOTE Safe separation for terminals 25 and 26 must be externally ensured.	

Table 3.7 Connection example for control terminal strip -X104

3.3.4 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 converter 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 panel must be removed (release two retaining screws on the inside of the door) to connect a PC or an automation unit at X300.

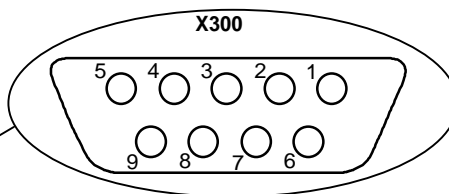


Fig. 3.9 Parameterizing unit (PMU)

PMU -X300	Description
1	Housing ground
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 3.8 Connector assignment for interface -X300

3.4 Measures to maintain the radio interference suppression regulations

B1 suppression filters must be used to maintain the relevant radio interference suppression regulations.

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 \geq supply connection cross-section, also refer to Section 3.1.2)

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

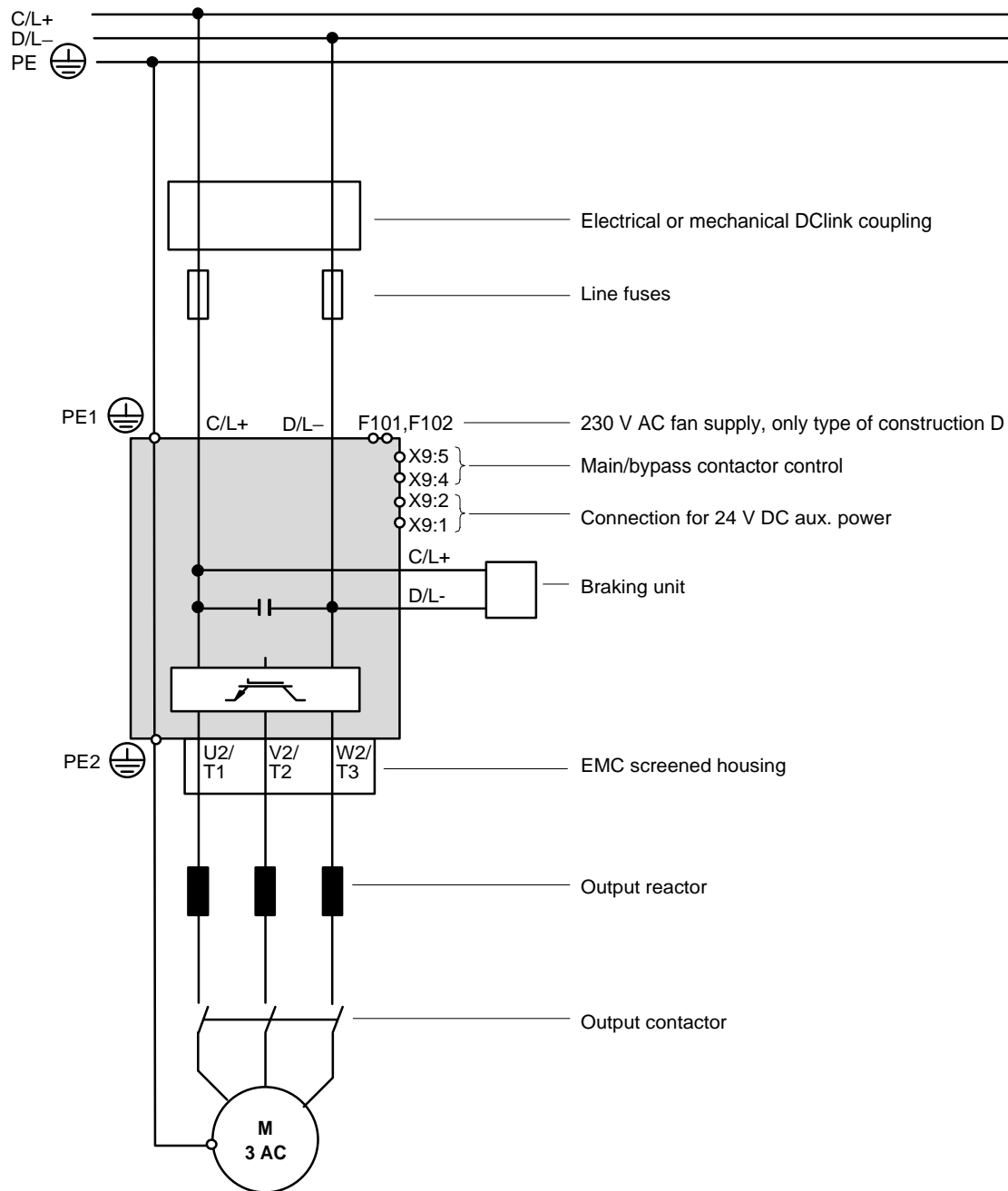
- screened cables should be used between the converter output and motor
- screen control cables must be used.

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

◆ **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.

3.5 Recommended circuit



4 Start-up

4.1 Introduction and handling start-up

4.1.1 Handling the start-up instructions

NOTE

- ◆ Section 4.2 First start-up:
First start-up of the converter
- ◆ Section 4.3 Start-up aids:
Index-type reference for start-up and use of the converter, which must only be used when actually required!
- ◆ Section 4.4 Function diagrams:
Graphical overview of the setpoint channel, open-loop/closed-loop control, analog inputs/outputs, and the converter data sets

4.1.2 General explanation of the terminology and functional scope of the converter

Abbreviations:

- ◆ Abbreviations used: Refer to Section 15 "Information, notes"

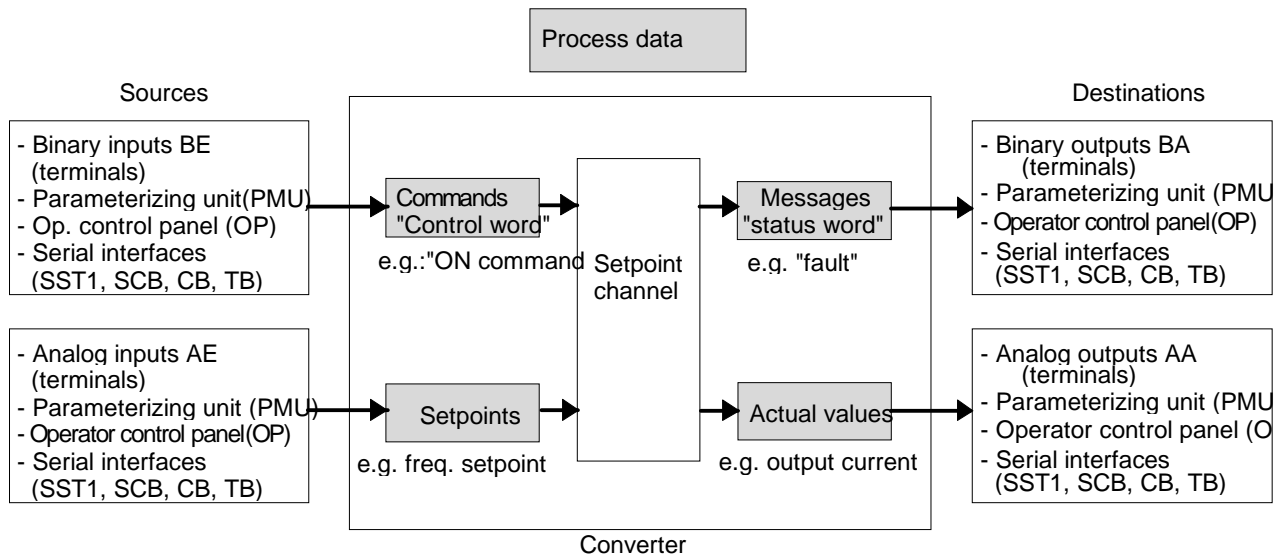
Converter closed-loop control

- ◆ Simplified block diagrams in Section 4.2.4
(Detailed "function diagrams, open-loop/closed-loop control": refer to Section 4.4)
- ◆ Common data:

Speed resolution:	0.3 RPM
Max. frequency:	400 Hz
- ◆ Applications: Permanent-magnet synchronous-motor drives, e.g. for actuator drives, winders, etc.
- ◆ Control versions:
 - Closed-loop speed control
 - Closed-loop torque control (entering the torque-generating current).

" Process data ":

- ◆ "Process data" are commands and setpoints from "outside" fed into the converter as well as signals and actual values which are output from the converter.

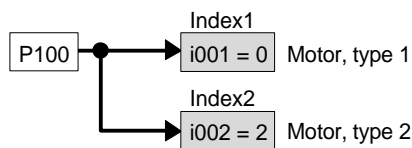


" Indexed" parameters:

i.e. the parameter number is sub-divided into various "indices" (briefly: i001, i002, etc.), in which the particular parameter value can be entered.

The significance of the "indices" of the particular parameter (parameter number) can be taken from the parameter list, in Section 5.

Example:



" Data sets ":

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

The appropriate data set is selected using a command, via the "control word".

Refer to "function diagram, data set" in Section 4.4.

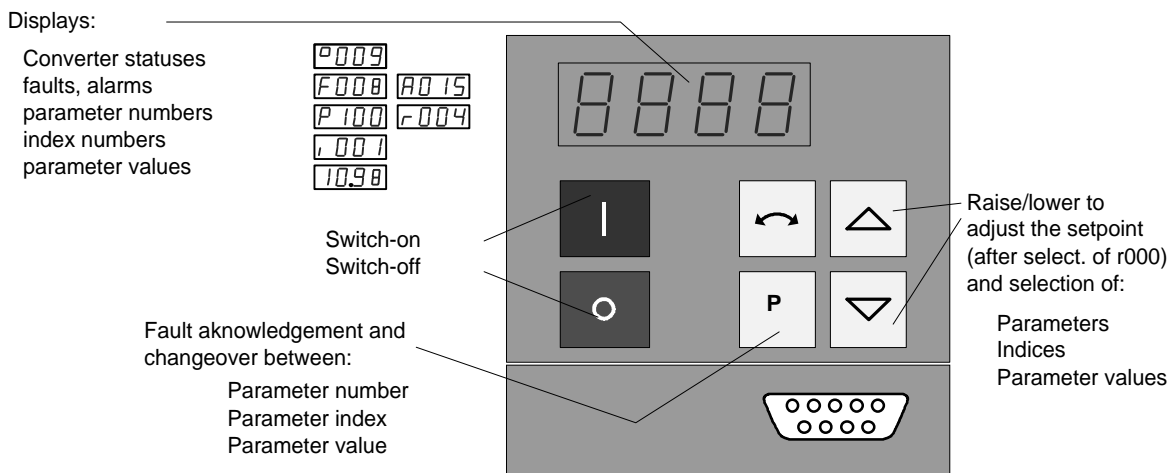
- ◆ SDS (setpoint channel data set) 1 to 4:
4 setpoint channel data sets which can be changed over; e.g. for production-related different drive ramp-up and ramp-down times.
- ◆ SDS (setpoint channel data set) 1 to 4:
4 setpoint channel data sets which can be changed over; e.g. for production-related 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 or 2:
2 motor data sets which can be changed over; e.g. for operating different motor types from one converter.

4.2 First start-up

4.2.1 Preparatory measures

- ◆ Transporting, unpacking, assembling: refer to Section 2
- ◆ Connecting-up: Refer to Section 3
- ◆ Read "Introduction and handling the start-up instructions ": Section 4.1
 - ◆ Forming the capacitors: If the converter has been continuously shutdown for longer than one year, or was not connected, then the DC link capacitors must be formed. Also refer to Section 4.3.12
- ◆ Connect-up the supply and electronics power supply of the converter with the front panel closed.

When supplied, the converter is controlled and parameterized by the parameterizing unit (PMU) located on the front side of the converter.



A detailed description of the displays as well as the parameterizing and operator control possibilities of the converter via the PMU, is provided in Section 6 "operator control".

The converter is supplied with the "factory setting" (refer to Section 5 "Parameter list") and access stage 2 (standard mode). After the drive converter has been powered-up for the first time, it goes into status 005 "drive settings" (P052 = 005). This status can be exited after entering valid motor data (refer to Sections 4.2.2 and 4.2.3) (P052 = 000) and the drive can then be powered-up

Parameterization is realized according to Section

4.2.2 as "**Standard application with V/f characteristic without hardware options**" for simple applications with 1 FT6 motors.

or **4.2.3** as "**Expert application**" when using motors from other manufacturers, sophisticated applications (e.g.: Close-loop control, data set changeover, interface operation, etc.) or if hardware options are available.

4.2.1.1 Motor list

Settings for motor type P100. The tabulated data for torque, current and output, are nominal values and are valid for a 3-ph. 380 V AC to 460 V AC converter supply voltage. Other motor data (e.g. also data for 3-ph. 208 V to 230 V AC supplies) are provided in the Engineering Manual „1FT6 three-phase servomotors“, Section 2.3.3 (motor overview).

PWE	Motor MLFB	Speed n_n [RPM]	Torque M_n [Nm]	Current I_n [A]	Output P_n [kW]	Cooling
1	1FT6031-4AK7_	6000	0.8	1.2	0.47	Self
2	1FT6034-4AK7_	6000	1.4	2.1	0.88	Self
3	1FT6041-4AF7_	3000	2.2	1.7	0.68	Self
4	1FT6041-4AK7_	6000	1.7	2.4	1.1	Self
5	1FT6044-4AF7_	3000	4.3	2.9	1.3	Self
6	1FT6044-4AK7_	6000	3.0	4.1	1.9	Self
7	1FT6061-6AC7_	2000	3.7	1.9	0.77	Self
8	1FT6061-6AF7_	3000	3.5	2.6	1.1	Self
9	1FT6061-6AH7_	4500	2.9	3.4	1.4	Self
10	1FT6061-6AK7_	6000	2.1	3.1	1.3	Self
11	1FT6062-6AC7_	2000	5.2	2.6	1.1	Self
12	1FT6062-6AF7_	3000	4.6	3.4	1.4	Self
13	1FT6062-6AH7_	4500	3.6	3.9	1.7	Self
14	1FT6062-6AK7_	6000	2.1	3.2	1.3	Self
15	1FT6064-6AC7_	2000	9.0	3.8	1.7	Self
16	1FT6064-6AF7_	3000	7.0	4.9	2.2	Self
17	1FT6064-6AH7_	4500	4.8	5.5	2.3	Self
18	1FT6064-6AK7_	6000	2.1	3.5	1.3	Self
19	1FT6081-8AC7_	2000	7.5	4.1	1.6	Self
20	1FT6081-8AF7_	3000	6.9	5.6	2.2	Self
21	1FT6081-8AH7_	4500	5.8	7.3	2.7	Self
22	1FT6081-8AK7_	6000	4.6	7.7	2.9	Self
23	1FT6082-8AC7_	2000	11.4	6.6	2.4	Self
24	1FT6082-8AF7_	3000	10.3	8.7	3.2	Self
25	1FT6082-8AH7_	4500	8.5	11	4.0	Self
26	1FT6082-8AK7_	6000	5.5	9.1	3.5	Self
27	1FT6084-8AC7_	2000	16.9	8.3	3.5	Self
28	1FT6084-8AF7_	3000	14.7	11	4.6	Self
29	1FT6084-8AH7_	4500	10.1	12	4.8	Self
30	1FT6084-8AK7_	6000	4.0	5.8	2.5	Self
31	1FT6084-8SC7_	2000	23.5	12.5	4.9	External
32	1FT6084-8SF7_	3000	22	17	6.9	External
33	1FT6084-8SH7_	4500	20	24.5	9.4	External
34	1FT6084-8SK7_	6000	17	25.5	10.7	External
35	1FT6086-8AC7_	2000	23	10.9	4.8	Self
36	1FT6086-8AF7_	3000	18.5	13	5.8	Self
37	1FT6086-8AH7_	4500	12.0	12.6	5.6	Self
38	1FT6086-8SC7_	2000	33	17.5	6.9	External
39	1FT6086-8SF7_	3000	31	24.5	9.7	External
40	1FT6086-8SH7_	4500	27	31.5	12.7	External
41	1FT6086-8SK7_	6000	22	29	13.8	External
42	1FT6102-8AB7_	1500	24.5	8.4	3.9	Self
43	1FT6102-8AC7_	2000	23	11.0	4.8	Self

PWE	Motor MLFB	Speed n_n [RPM]	Torque M_n [Nm]	Current I_n [A]	Output P_n [kW]	Cooling
44	1FT6102-8AF7_	3000	19.5	13.2	6.1	Self
45	1FT6102-8AH7_	4500	12.0	12	5.6	Self
46	1FT6105-8AB7_	1500	42	14.5	6.6	Self
47	1FT6105-8AC7_	2000	38	17.6	7.9	Self
48	1FT6105-8AF7_	3000	31	22.5	9.7	Self
49	1FT6105-8SB7_	1500	57	21.5	9	External
50	1FT6105-8SC7_	2000	55	28	11.5	External
51	1FT6105-8SF7_	3000	49	35	15.4	External
52	1FT6108-8AB7_	1500	61	20.5	9.6	Self
53	1FT6108-8AC7_	2000	55	24.5	11.5	Self
54	1FT6108-8SB7_	1500	83	31	13	External
55	1FT6108-8SC7_	2000	80	39	16.7	External
56	1FT6132-6AB7_	1500	62	19	9.7	Self
57	1FT6132-6AC7_	2000	55	23	11.5	Self
58	1FT6132-6AF7_	3000	36	23	11.3	Self
59	1FT6132-6SB7_	1500	100	36	15.2	External
60	1FT6132-6SC7_	2000	98	46	20.5	Self
61	1FT6132-6SF7_	3000	90	62	28.3	External
62	1FT6134-6AB7_	1500	75	24	11.8	Self
63	1FT6134-6AC7_	2000	65	27	13.6	Self
64	1FT6134-6SB7_	1500	130	45	20.4	External
65	1FT6134-6SC7_	2000	125	57	26.2	External
66	1FT6134-6SF7_	3000	110	72	34.5	External
67	1FT6136-6AB7_	1500	88	27	13.8	Self
68	1FT6136-6AC7_	2000	74	30	15.5	Self
69	1FT6136-6SB7_	1500	160	55	25	External
70	1FT6136-6SC7_	2000	150	72	31.4	External
71	1FT6034-1AK71-3A.0	6000	1.4	2.1	0.88	Self
72	1FT6044-1AF71-3A.0	3000	4.3	2.9	1.3	Self
73	1FT6061-1AF71-3A.0	3000	3.5	2.6	1.1	Self
74	1FT6062-1AF71-3A.0	3000	4.6	3.4	1.4	Self
75	1FT6064-1AF71-3A.0	3000	7.0	4.9	2.2	Self
76	1FT6082-1AF71-1A.0	3000	10.3	8.7	3.2	Self
77	1FT6084-1AF71-1A.0	3000	14.7	11	4.6	Self
78	1FT6086-1AF71-1A.0	3000	18.5	13	5.8	Self
79	1FT6102-1AC71-1A.0	2000	23	11.0	4.8	Self
80	1FT6105-1AC71-1A.0	2000	38	17.6	7.9	Self

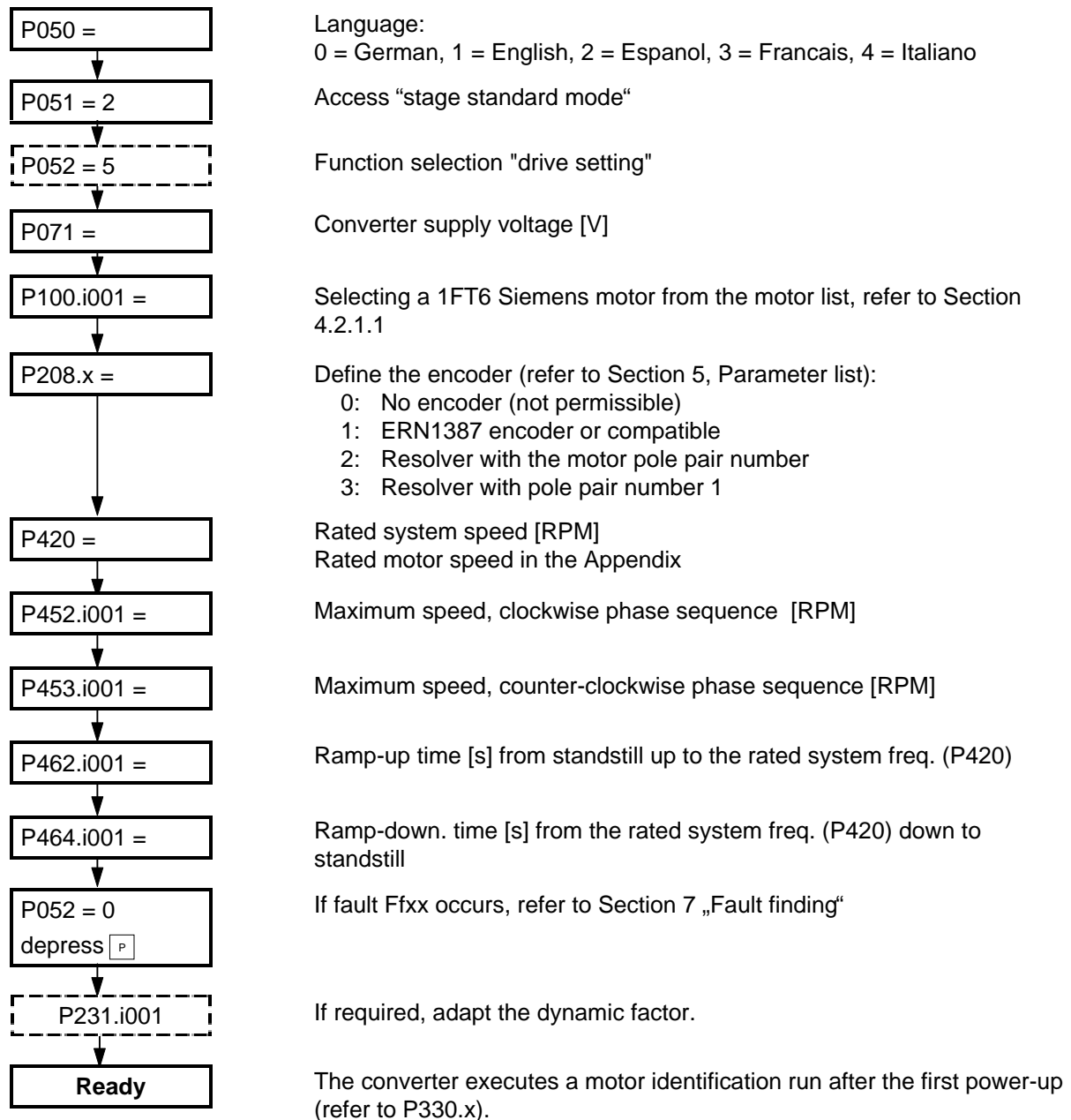
Table 4.1 Motor list

NOTE

It is possible to jump into the appropriate sequence step if incorrect entries have been made, taking into account the access stage (P051) and a function selection (P052) which may be required.

It is recommended that the following parameters and function steps after the jump-in position are re-checked and executed due to the background calculations !

4.2.2 Parameterization "Standard application with V/f characteristic without hardware options"



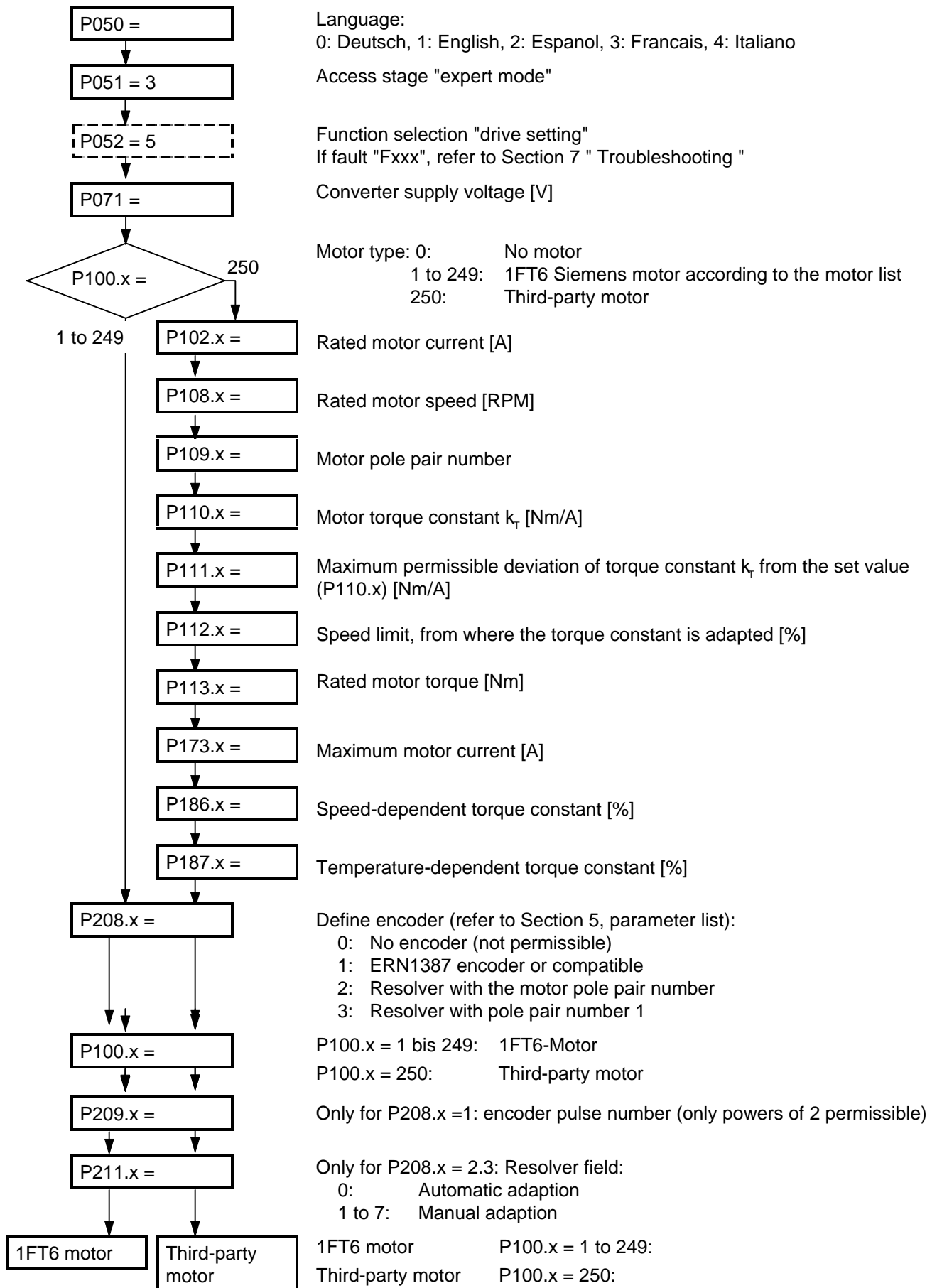
NOTE

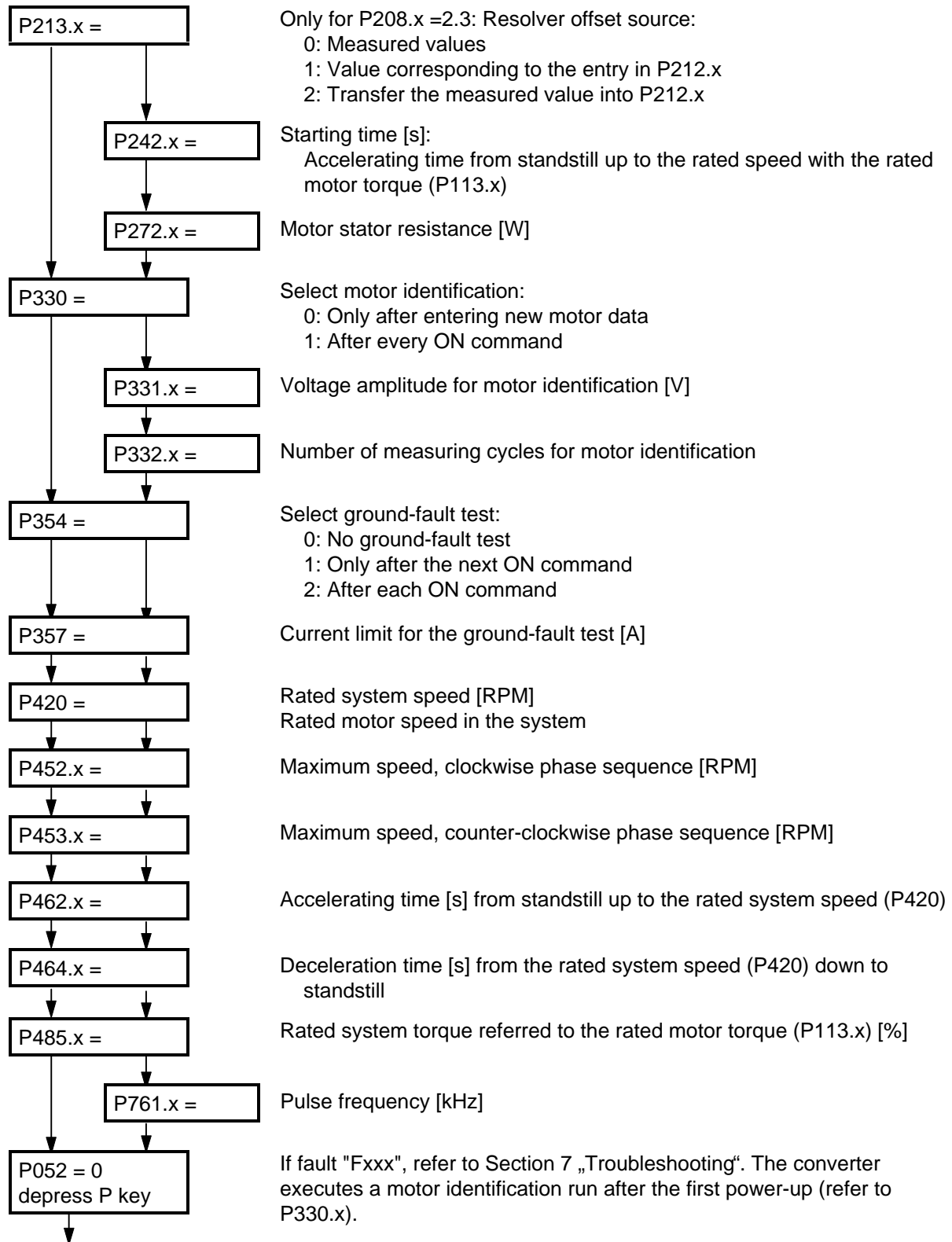
If the motor does not start to run after it has been commissioned and a speed setpoint has been entered then the following faults could be present:

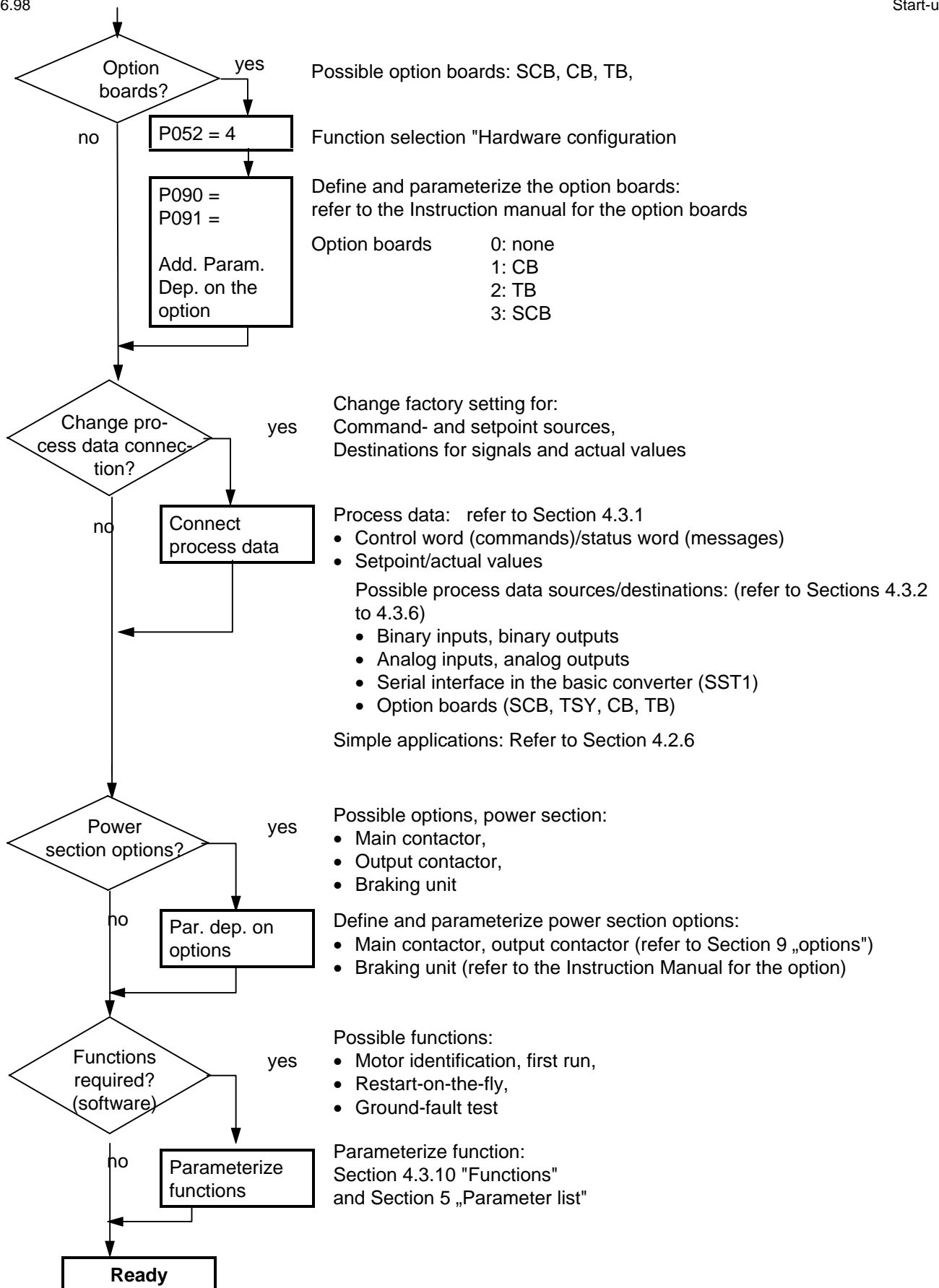
1. The phase connection has been interchanged in the power cable between the drive converter and the motor
2. The incorrect encoder type has been parameterized (P208)
3. The incorrect motor type has been parameterized and P208=3
4. The encoder has been incorrectly adjusted
5. The motor brake does not or has not released.

Faults, types 1 or 3 can also cause the motor to accelerate to a fixed speed independent of the speed setpoint after the drive is powered-up.

4.2.3 Parameterization "expert application"







NOTE

If the motor does not start to run after it has been commissioned and a speed setpoint has been entered then the following faults could be present:

1. The phase has been interchanged in the power cable between the drive converter and the motor
2. The incorrect encoder type has been parameterized (P208)
3. The incorrect motor type has been parameterized and P208=3
4. The encoder has been incorrectly adjusted
5. The motor brake does not or has not released.

Faults, types 1 or 3 can also cause the motor to accelerate to a fixed speed independent of the speed setpoint after the drive is powered-up.

4.2.4 Simplified block diagrams for setpoint channel and closed-loop control

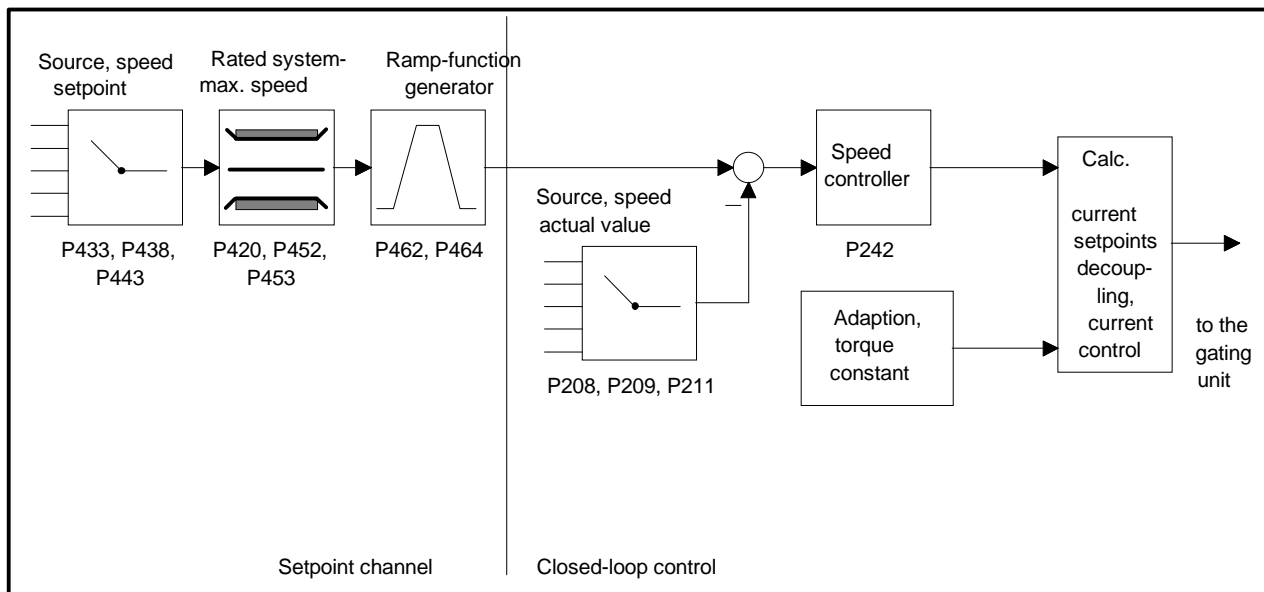


Fig. 4.1 Closed-loop speed control P163 = 4

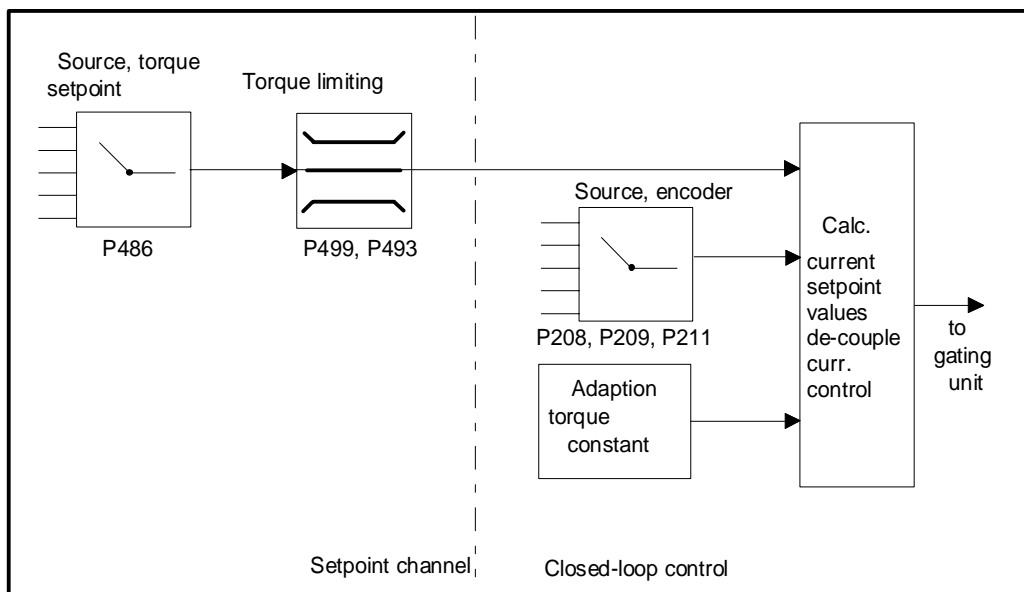


Fig. 4.2 Closed-loop torque control P163 = 5

- ◆ detailed parameter description: refer to section 5 "Parameter list"
- ◆ detailed function diagrams: refer to section 4.9 "Function Diagrams"

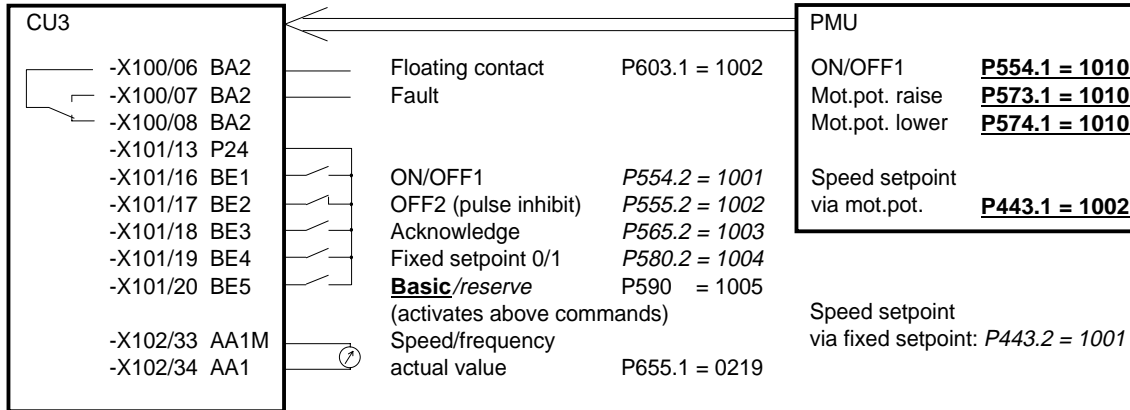
4.2.5 Simple application examples for connecting process data with connection assignment

Connecting-up: Refer to Section 3.3 "Control terminal strip"

Factory setting:

Switch-on/off as well as setpoint input via the PMU, messages and actual values via the terminal strip.

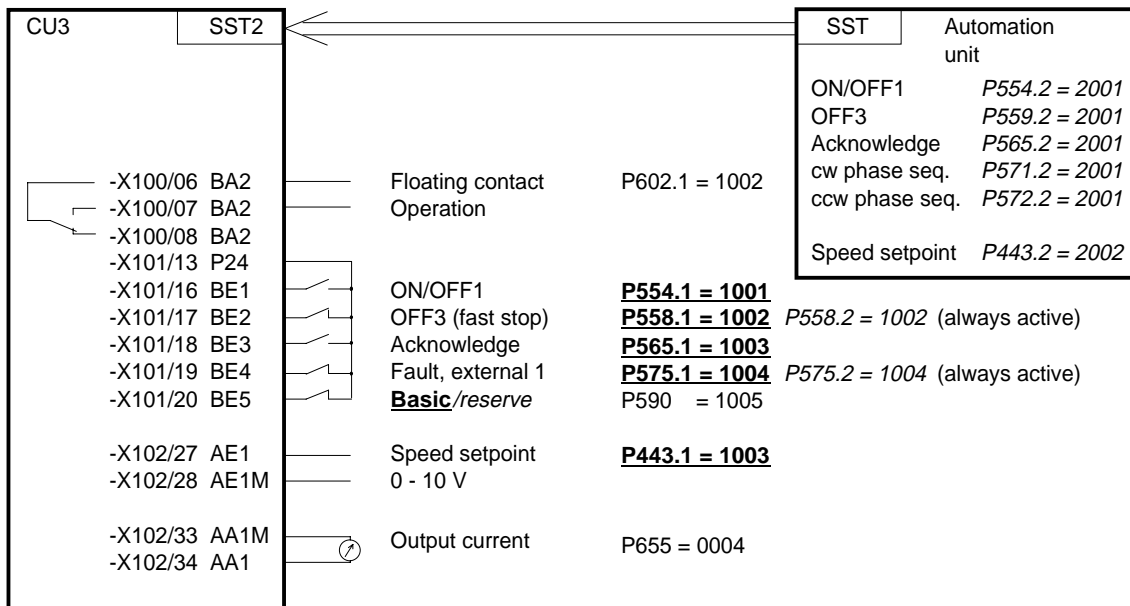
Terminal strip only operational if binary input 5 (BE5) is energized (high signal level corresponds to "reserve").



Manual/automatic operation:

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

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



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.

4.3 Start-up aids

4.3.1 Process data

Process data are commands and setpoints which are entered into the converter from "outside" as well as signals and actual values which the converter outputs.

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

4.3.1.1.1 Introduction and application example

The two control words 1 (bits 0 to 15) and 2 (bits 16 to 31) output commands and external signals (messages) to the converter. Their status can be read-out via parameter r550 or r967 (control 1) and r551 (control word 2).

An overview is provided in Section 4.3.1.1.2 "Overview of the control word".

The significance of the possible commands and signals, entered externally, is described in Section 4.3.1.1.4 "Significance of the control word commands".

Every control word bit is assigned a selection parameter, which defines from which source(s) this bit can be changed (refer to Section 4.3.1.1.2, righthand column).

The selection parameters for the sources are, with the exception of P590 (source selection for control word bit 30 "basic/reserve setting") and P591 (source selection for control word bit 31 "HS checkback signal") are indexed 2x as follows:

Index	i001	Basic setting
	i002	Reserve setting

An overview of the possible sources, which are assigned fixed values (0-6004 non-consecutive), is provided in Section 4.3.1.1.3 "Selecting the control word source".

Values 0 and 1 are an exception in this overview; here, no sources are selected, but the bits are permanently set to 0 (LOW) or 1 (HIGH) (also refer to select parameters P554 to P591 in Section 5 "Parameter list").

If a value, which is assigned a terminal (binary input BI) (1001 to 1007, 4101 to 4116, 4201 to 4216, 5001), is assigned once in a select parameter for the source, then it is no longer available in the same index of another select parameter, as a terminal is only suitable for entering a control word bit.

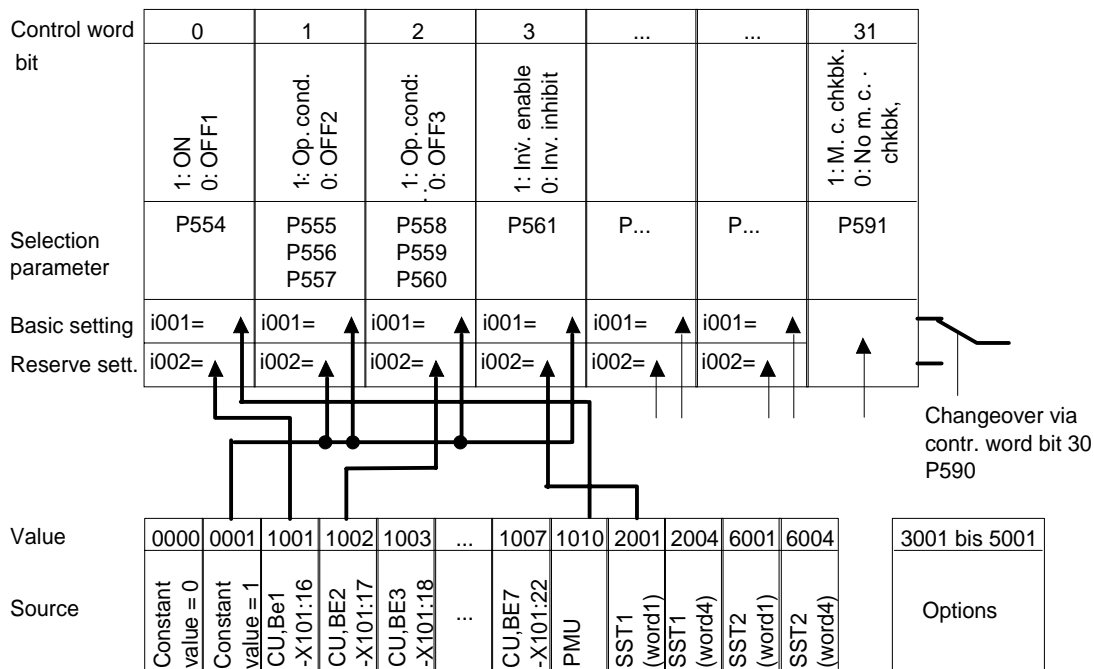
NOTES

The control word commands "OFF2" (bit1), "OFF3" (bit2) and "acknowledge" (bit7) are always simultaneously effective from 3 sources (can be parameterized) !

"Acknowledge" (bit7) is also always effective from the PMU !

If the "on" command (bit 0) is connected to a serial interface (SST1, 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 defined command, when communications fail!

Application example:

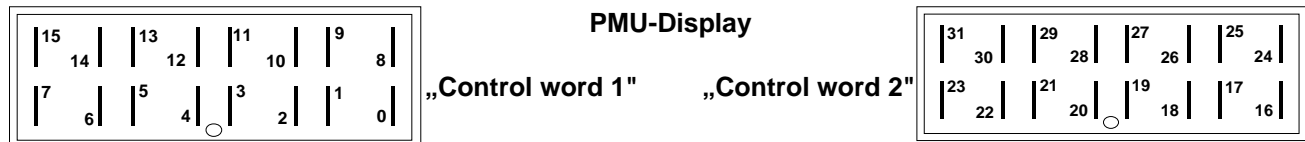
ON/OFF1:	Basic set.:	via PMU (keys I/O)	Reserve set.:	via bin. input 1 of CU
Op. cond/OFF2:	Basic set.:	Constant value= 1 = always op. cond.	Reserve set.:	Constant value = 1 = always op. cond.
Op. cond./OFF3:	Basic set.:	Constant value= 1 = always op. cond.	Reserve set.:	via bi. input 2 of CU

NOTE

For OFF2 and OFF3, 3 selection parameters can be assigned differently in the same index!

Inv. enable/inhibit:	Basic set.:	Constant value = 1 = always inv. enable.	Reserve set.:	via serial interface SST1 of the CU
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4.3.1.1.2 Overview of the control word (control word 1 and control word 2)



„Control word 1“ (visualization parameter r550 or r967)				Source selection
Bit	High	Low	Comments	
0	ON	OFF1 (stop)	(Priority OFF 2/3/1)	P554
1	Operating condition	OFF2 (electrical)	3 sources simultaneously effective; (Priority OFF 2/3/1)	P555 P556 P557
2	Operating condition	OFF3 (fast stop)	3 sources simultaneously effective; (Priority OFF 2/3/1)	P558 P559 P560
3	Inverter enable	Inhibit inverter	Inverter enable	P561
4	RFG enable	Inhibit RFG	Ramp-function gen. enable	P562
5	Start RFG	RFG stop	Hold ramp-function generator	P563
6	Setpoint enable	Inhibit setpoint		P564
7	Acknowledge		Simultaneously effective from 3 sources and PMU; Positive edge evaluation	P565 P566 P567
8	Inching 1 ON	Inching 1 OFF		P568
9	Inching 2 ON	Inching 2 OFF		P569
10	Control from the PLC	No control	Only effective via CB, TB, SST1, SST/SCB	
11	Clockwise phase sequence		Logic op. with bit 12	P571
12	Counter-clockwise phase sequence		Logic op. with bit 11	P572
13	Mot. Potentiometer, raise		Logic op. with bit 14	P573
14	Mot. Potentiometer, lower		Logic op. with bit 13	P574
15	No fault, external 1	Fault, external 1		P575
„Control word 2“ (visualization parameter r551)				
16	SDS bit 0 (LSB)		Setpoint channel data set	P576
17	SDS bit 1 (MSB)		Logic op. with bit 16	P577
18	MDS bit 0 (LSB)		Motor data set	P578
19			Reserved	
20	FSW bit 0 (LSB)		Logic operation with bit 21	P580
21	FSW bit 1 (MSB)		Logic operation with bit 20	P581
22			Reserved	
23	Enable restart-on-the-fly	Restart-on-the-fly inhibited		P583
24			Reserved	
25	Controller enable	Controller inhibited		P585
26	No fault, external 2	Fault, external 2		P586
27	slave drive	master drive		P587
28	No alarm, external 1	Alarm, external 1		P588
29	No alarm, external 2	Alarm, external 2		P589
30	Reserve setting for setpoints and control word	Basic setting for setpoints and control word		P590
31	HS checkback signal	No HS checkback signal	Can only connected at the converter term. strip or SCB	P591

4.3.1.1.3 Selecting the source for the control word 1 (Bit 0-7)

Bit		0	1	2	3	4	5	6	7
Select-P.- basic setting .		554.1	555 to 557.1	558 to 560.1	561.1	562.1	563.1	564.1	565 to 567.1
Select-P.- reserve setting .		554.2	555 to 557.2	558 to 560.2	561.2	562.2	563.2	564.2	565 to 567.2
Value	Source								
0000	Constant value = 0	X			x	x	x	x	xG/R
0001	Constant value = 1		xG/R	xG/R	xG/R	xG/R	xG/R	xG/R	
1001	CU, BE1, -X101:16	XR	x	x	x	x	x	x	x
1002	CU, BE2, -X101:17	X	xR for 555	x	x	x	x	x	x
1003	CU, BE3, -X101:18	X	x	x	x	x	x	x	xR for 565
1004	CU, BE4, -X101:19	X	x	x	x	x	x	x	x
1005	CU, BE5, -X101:20	X	x	x	x	x	x	x	x
1010	PMU	XG	x	x					always
2001	SST1,PMU -X300 (word)	X	x	x	x	x	x	x	x
2004	SST1,PMU -X300 (word4)								
6001	SST2,-X100:1...5 (word1)	X	x	x	x	x	x	x	x
6004	SST2,-X100:1...5 (word4)								
OPTIONS									
3001	CB/TB (word1)	X	x	x	x	x	x	x	x
3004	CB/TB (word4)							x	
4101	SCI 1 and 2,slave1, BE1	X	x	x	x	x	x	x	x
4102	BE2	X	x	x	x	x	x	x	x
...	Consecutively to	X	x	x	x	x	x	x	x
4110	BE10	X	x	x	x	x	x	x	x
4111	only SCI 2,Slave 1,BE11	X	x	x	x	x	x	x	x
4112	BE12	X	x	x	x	x	x	x	x
...	Consecutively to	X	x	x	x	x	x	x	x
4116	BE16	x	x	x	x	x	x	x	x
4201	SCI 1and 2,Slave2,BE1	x	x	x	x	x	x	x	x
4202	BE2	x	x	x	x	x	x	x	x
...	Consecutively to	x	x	x	x	x	x	x	x
4210	BE10	x	x	x	x	x	x	x	x
4211	only SCI 2,Slave 2,BE11	x	x	x	x	x	x	x	x
4212	BE12	x	x	x	x	x	x	x	x
...	Consecutively to	x	x	x	x	x	x	x	x
4216	BE16	x	x	x	x	x	x	x	x
4501	SCB-SST (USS /Peer-t-Peer) (word1)	x	x	x	x	x	x	x	x
4504	SCB-SST (USS /Peer-t-Peer) (word4)								

x: Value for select par. can be assigned! (BE can only be assigned once in the same index of all select par.)

Factory setting: **xG:** for the basic setting
 xR: for the reserve setting

4.3.1.1.4 Selecting the source for control word 1 (bits 8-15)

Bit		8	9	10	11	12	13	14	15
Select P.-basic setting		568.1	569.1		571.1	572.1	573.1	574.1	575.1
Select P.-reserve setting		568.2	569.2		571.2	572.2	573.2	574.2	575.2
Value	Source								
0000	Constant value = 0	xG/R	xG/R		x	x	xR	xR	xG/R
0001	Constant value = 1				xG/R	xG/R			x
1001	CU, BE1, -X101:16	x	x		x	x	x	x	x
1002	CU, BE2, -X101:17	x	x		x	x	x	x	x
1003	CU, BE3, -X101:18	x	x		x	x	x	x	x
1004	CU, BE4, -X101:19	x	x		x	x	x	x	x
1005	CU, BE5, -X101:20	x	x		x	x	x	x	x
1010	PMU				x	x	xG	xG	
2001	SST1,PMU -X300 (word1)	x	x		x	x	x	x	x
2004	SST1,PMU -X300 (word4)								
6001	SST2,-X100:1...5 (word1)	x	x		x	x	x	x	x
6004	SST2,-X100:1...5 (word4)								
OPTIONS									
3001	CB/TB (word1)	x	x		x	x	x	x	x
3004	CB/TB (word4)								
4101	SCI 1 and 2,slave1,BE1	x	x		x	x	x	x	x
4102	BE2	x	x		x	x	x	x	x
...	Consecutively to	x	x		x	x	x	x	x
4110	BE10	x	x		x	x	x	x	x
4111	only SCI 2,slave 1,BE11	x	x		x	x	x	x	x
4112	BE12	x	x		x	x	x	x	x
...	Consecutively to	x	x		x	x	x	x	x
4116	BE16	x	x		x	x	x	x	x
4201	SCI 1and2,slave2,BE1	x	x		x	x	x	x	x
4202	BE2	x	x		x	x	x	x	x
...	Consecutively to	x	x		x	x	x	x	x
4210	BE10	x	x		x	x	x	x	x
4211	only SCI 2,slave 2,BE11	x	x		x	x	x	x	x
4212	BE12	x	x		x	x	x	x	x
...	Consecutively to	x	x		x	x	x	x	x
4216	BE16	x	x		x	x	x	x	x
4501	SCB-SST (USS /Peer-t- Peer) (word1)	x	x		x	x	x	x	x
4504	SCB-SST (USS /Peer-t- Peer) (word4)								

x: Value for select par. can be assigned! (BE can only be assigned once in the same index of all select par.)

Factory setting: **xG:** for the basic setting
 xR: for the reserve setting

4.3.1.1.5 Selecting the source for control word 2 (Bit 16-23)

Bit		16	17	18	19	20	21	22	23
Select P.-basic setting		576.1	577.1	578.1		580.1	581.1		583.1
Select P.-reserve setting		576.2	577.2	578.2		580.2	581.2		583.2
Value	Source								
0000	Constant value = 0	xG/R	xG/R	xG/R		xG	xG/R		xG/R
0001	Constant value = 1	x	x	x		x	x		x
1001	CU, BE1, -X101:16	x	x	x		x	x		x
1002	CU, BE2, -X101:17	x	x	x		x	x		x
1003	CU, BE3, -X101:18	x	x	x		x	x		x
1004	CU, BE4, -X101:19	x	x	x		xR	x		x
1005	CU, BE5, -X101:20	x	x	x		x	x		x
1010	PMU								
2001	SST1,PMU -X300 (word1)								
2004	SST1,PMU -X300 (Wort4)	x	x	x		x	x		x
6001	SST2,-X100:1...5 (word1)								
6004	SST2,-X100:1...5 (word4)	x	x	x		x	x		x
OPTIONS									
3001	CB/TB (word1)								
3004	CB/TB (word4)	x	x	x		x	x		x
4101	SCI 1 and 2,slave1,BE1	x	x	x		x	x		x
4102	BE2	x	x	x		x	x		x
...	Consecutively to	x	x	x		x	x		x
4110	BE10	x	x	x		x	x		x
4111	only SCI 2,Slave 1,BE11	x	x	x		x	x		x
4112	BE12	x	x	x		x	x		x
...	Consecutively to	x	x	x		x	x		x
4116	BE16	x	x	x		x	x		x
4201	SCI 1and 2,slave2,BE1	x	x	x		x	x		x
4202	BE2	x	x	x		x	x		x
...	Consecutively to	x	x	x		x	x		x
4210	BE10	x	x	x		x	x		x
4211	only SCI 2,Slave 2,BE11	x	x	x		x	x		x
4212	BE12	x	x	x		x	x		x
...	Consecutively to	x	x	x		x	x		x
4216	BE16	x	x	x		x	x		x
4501	SCB-SST (USS /Peer-t-Peer) (word1)								
4504	SCB-SST (USS /Peer-t-Peer) (word4)	x	x	x		x	x		x

x: Value for select par. can be assigned! (BE can only be assigned once in the same index of all select par.)

Factory setting: **xG:** for the basic setting
 xR: for the reserve setting

4.3.1.1.6 Selecting the source for control word 2 (Bit 24-31)

Bit		24	25	26	27	28	29	30	31
Select P.-basic setting			585.1	586.1	587.1	588.1	589.1	590	591
Select P.-reserve setting			585.2	586.2	587.2	588.2	589.2	590	591
Value	Source								
0000	Constant value = 0		x		xG/R			x	
0001	Constant value = 1		xG/R	xG/R	x	xG/R	xG/R	x	x
1001	CU, BE1, -X101:16		x	x	x	x	x	x	x
1002	CU, BE2, -X101:17		x	x	x	x	x	x	x
1003	CU, BE3, -X101:18		x	x	x	x	x	x	x
1004	CU, BE4, -X101:19		x	x	x	x	x	x	x
1005	CU, BE5, -X101:20		x	x	x	x	x	x	x
1010	PMU								
2001	SST1,PMU -X300 (word1)								
2004	SST1,PMU -X300 (word4)		x	x	x	x	x	x	
6001	SST2,-X100:1...5 (word1)								
6004	SST2,-X100:1...5 (word4)		x	x	x	x	x	x	
OPTIONS									
3001	CB/TB (word1)								
3004	CB/TB (word4)		x	x	x	x	x	x	
4101	SCI 1and 2,slave1,BE1		x	x	x	x	x	x	x
4102	BE2		x	x	x	x	x	x	x
...	Consecutively to		x	x	x	x	x	x	x
4110	BE10		x	x	x	x	x	x	x
4111	only SCI 2,Slave 1,BE11		x	x	x	x	x	x	x
4112	BE12		x	x	x	x	x	x	x
...	Consecutively to		x	x	x	x	x	x	x
4116	BE16		x	x	x	x	x	x	x
4201	SCI 1and 2,Slave2,BE1		x	x	x	x	x	x	x
4202	BE2		x	x	x	x	x	x	x
...	Consecutively to		x	x	x	x	x	x	x
4210	BE10		x	x	x	x	x	x	x
4211	only SCI 2,slave 2,BE11		x	x	x	x	x	x	x
4212	BE12		x	x	x	x	x	x	x
...	Consecutively to		x	x	x	x	x	x	x
4216	BE16		x	x	x	x	x	x	x
4501	SCB-SST (USS /Peer-t-Peer) (word)								
4504	SCB-SST (USS /Peer-t-Peer) (word)		x	x	x	x	x	x	

x: Value for select par. can be assigned! (BE can only be assigned once in the same index of all select par.)

Factory setting: x: for P590 / P591
 xG: for the basic setting
 xR: for the reserve setting

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

The converters statuses can be read in the operating display r000: e.g. READY-TO-SWITCH-ON r000=009

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

Bit 0: ON command (\uparrow "ON")

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

After the command has been accepted:

- ◆ Changeover into the status PRE-CHARGING (010)
Main contactor/bypass contactor (option) are switched-in, if present
Pre-charging is realized
- ◆ Changeover into the RUN status (011)
- ◆ Changeover into the RUN status (014)

Bit 0: OFF1 command (L "OFF1")

The OFF1 command (stop) is executed with an L signal.

After the command has been accepted:

- ◆ Changeover into the status OFF 1 (015), if the inverter is in an enabled status.
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 shutdown frequency has been reached, and the OFF delay time has expired (P516), the inverter pulses are inhibited and the main contactor, if available, is opened (also refer to "ramp-function generator" Section 4.3.7).
If the OFF 1 command is again removed during ramp-down (ON command), ramp-down is terminated and the drive again goes into the RUN status (014).
- ◆ If one of the statuses PRE-CHARGING (010),
 READY (011),
is present, the inverter pulses are inhibited and the main contactor, if available, is opened.
- ◆ Changeover into the status SWITCH-ON INHIBIT (008)
- ◆ If neither an OFF2 nor OFF3 command is present:
Then the READY-TO-SWITCH-ON status is entered (009)
- ◆ For the slave drive, the drive remains active, until a speed is reached, below the OFF shutdown speed P514, as a result of a lower torque reference from the master drive.

Bit 1: OFF2 command (L "OFF2")

The OFF2 command (electrical) is realized with an L signal.

After the command has been accepted:

- ◆ The inverter pulses are inhibited, and the main contactor/bypass contactor (option) is opened
- ◆ Changeover into the SWITCH-ON INHIBIT status (008)

NOTE

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

The OFF2 command should always be used if the drive converter is used in the slave drive status (closed-loop torque control).

Bit 2: OFF3 command (L "OFF3")

The OFF3 command (fast stop) is executed with the L signal.

After the command has been accepted:

- ◆ Changeover into the status OFF3 (016), if the drive is in a status with the inverter enabled
 - The setpoint at the RFG input is inhibited (setpoint = 0), so that the drive decelerates along the torque limit down to the OFF shutdown speed (P514).
After the off shutdown speed has been reached and after the OFF delay time (P516) has expired, the inverter pulses are inhibited, and the main/bypass contactor, if available, is opened. Deceleration is still continued if the OFF3 command is withdrawn while the drive is decelerating.
(also refer to „ramp-function generator“, Section 4.3.7)

- ◆ If one of the statuses PRECHARGING (010),
READY (011),

is present:

The inverter pulses are inhibited, and the main contactor/bypass contactor, if available, is opened.

- ◆ Changeover into the SWITCH-ON INHIBIT status (008)

NOTE

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

Bit 3: Inverter enable command (H "inverter enable")

The INVERTER ENABLE command (inverter enable) is executed with an H signal.

After the command has been accepted:

- ◆ If the drive is in the READY status (011), the system changes into the RUN status (014), and the inverter pulses are enabled.

Bit 3: INVERTER inhibit command (L "inverter inhibit").

The INVERTER INHIBIT command (inverter inhibit) is executed with an (L signal)

After the command has been accepted:

- ◆ If the status RUN (014)
is available:

The drive goes into the RUN STATUS (011) and the inverter pulses are inhibited.

- ◆ If the drive is in the OFF1 status (015/stop):
The inverter pulses are inhibited, the main contactor, if available, is opened, and the drive goes into the SWITCH-ON inhibit status (008).
- ◆ If the status OFF3 (016 / fast stop) is available,
the command, inverter inhibit is ignored, and fast stop continues.

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

The RAMP-FUNCTION GENERATOR INHIBIT command (inhibit ramp-function generator) is executed for the setpoint with an L signal, only in the RUN status (014).

After the command has been accepted:

- ◆ The ramp-function generator output is set to setpoint = 0.

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

The **ramp-function generator stop** command (hold ramp-function generator), is executed for the setpoint, with an L signal, only in the RUN status (014).

After the command has been accepted:

- ◆ The actual setpoint is frozen at the ramp-function generator output.

Bit 6: Setpoint enable command (H "setpoint enable")

The command is executed with an H signal.

After the command has been accepted:

- ◆ The setpoint at the ramp-function generator input is enabled.

Bit 7: Acknowledge command (↑ "Acknowledge")

The command is executed with a positive edge change from L to H (L → H) only in the FAULT status (007).

After the command has been accepted:

- ◆ All actual faults are deleted after having been previously transferred into the diagnostics memory
- ◆ If no faults are present:
The drive changes into the status SWITCH-ON INHIBIT (008)
- ◆ If actual faults are present:
The drive remains in the FAULT status (007).

NOTE

The acknowledge command is simultaneously effective from three sources (P565, P566 and P567) and always from the PMU!

Bit 8: Inching 1 ON command (↑ "Inching 1 ON")

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

After the command has been accepted

- ◆ an ON command is automatically executed (description, refer to control word bit 0) and inching frequency 1 P448 is enabled in the setpoint channel.
The ON/OFF1 command (bit 0) is ignored for active inching operation.

Bit 8: Inching 1 OFF command (L "inching 1 OFF")

The command is executed with an L signal.

After the command has been accepted:

- ◆ An OFF 1 command is automatically executed (description, refer to control word bit 0).

Bit 9: Inching 2 ON command (↑ "inching 2 ON")

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

After the command has been accepted

- ◆ an ON command (description, refer to control word bit 0) is automatically executed, and inching frequency 2 P449 is enabled in the setpoint channel.
The ON/OFF1 command (bit 0) is ignored for active inching.

Bit 9: Inching 2 OFF command (L "inching 2 OFF")

The command is executed with the L signal.

After the command has been accepted:

- ◆ an OFF1 command (description, refer to control word bit 0) is automatically executed.

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

The command is executed with an H 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.

- ◆ 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.

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")

The command is executed with an H signal.

After the command has been accepted, the setpoint is influenced depending on the assignment of bit 12 "counter-clockwise phase sequence".

Refer to Section 4.4 "Function diagram, setpoint channel CU (Section 2)"!

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

The command is executed with an H signal.

After the command has been accepted, the setpoint is influenced depending on the assignment of bit 11 "clockwise phase sequence".

Refer to Section 4.4 "Function diagram, setpoint channel CU (Section 2)"!

NOTE

The **counter-clockwise phases sequence-** and **clockwise phase sequence** commands have no influence on supplementary setpoint 2, which is added after the ramp-function generator!

Bit 13: Motorized potentiometer, raise command (H "raise motorized potentiometer")

The command is executed with an H signal.

The motorized potentiometer in the setpoint channel is increased after the command has been accepted.

Refer to Section 4.4 "Function diagram, setpoint channel CU (Part 1)"!

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

The command is executed with an H signal.

After the command has been accepted, the motorized potentiometer is lowered in the setpoint channel.

Refer to section 4.4 „Function diagram, setpoint channel CU (Section 1)"!

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

The command is executed with an L signal.

After the command has been accepted:

The drive goes into the FAULT status (007) (fault F035)

The inverter pulses are inhibited and the main contactor, if available, is opened (also refer to Section 7 "Troubleshooting")

Bit 16: Setpoint channel data set SDS bit 0 command

In conjunction with bit 17 "SDS BIT 1" the command allows toggling between four possible setpoint channel data sets.

Refer to Section 4.4 "Function diagram, setpoint channel CU (Part 1) / data sets"!

Bit 17: Setpoint channel data set SDS bit 1 command

In conjunction with bit 16 "SDS BIT 0" this command allows toggling between four possible setpoint channel data sets.

Refer to Section 4.4 "Function diagram, setpoint channel CU (Part 1) / data sets"!

Bit 18: Motor data set MDS bit 0 command

The commands permits toggling between two motor data sets, and is only in the statuses

READY-TO-SWITCH-ON	(009)
PRE-CHARGING	(010)
READY	(011).

Refer to Section 4.4 "Function diagram, data sets"!

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

The command, in conjunction with bit 21 "FSW BIT 1" permits one of the four possible fixed setpoints to be selected.

Refer to Section 4.4 "Function diagram, setpoint channel CU (Section 1) / data sets"!

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

The command, in conjunction with bit 20 "FSW BIT 0" permits one of the four possible fixed setpoints to be selected.

Refer to Section 4.4 "Function diagram, setpoint channel CU (Section 1) / data sets"!

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

This command enables the restart-on-the-fly function.

Bit 24: Technological controller (H "Technological controller enable")

The command activates the technological controller if the inverter pulses are enabled and the energization time has expired. The technological controller can be parameterized using parameters P525 to P545.

Refer to „Function diagrams, closed-loop control“ Section 4.4 and the „Parameter list“ Section 5.

Bit 25: Controller enable command (H „controller enable“)

The command enables the speed controller if the converter inverter pulses are enabled.

Refer to „control function diagrams“, Section 4.4 .

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

The command is identified with an L signal, and is only active after pre-charging has been completed from READY status (011) onwards and an additional 200 ms delay.

After the command has been accepted

- ◆ The drive goes into the FAULT status (007) (fault F036)
The inverter pulses are inhibited, the main contactor, if available, is opened (also refer to Section 7 "Troubleshooting").

Bit 27: Master/slave drive command (H "slave drive"/L "master drive")

The commands switches between speed control (master drive) and torque control (slave drive). For speed controls, the speed setpoint is injected into the control via the setpoint channel as well as the supplementary torque setpoint. For torque control, the main torque setpoint is used as input quantity.

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

The command is executed with an L signal.

After the command has been accepted

- ◆ The operating status is retained. An alarm message (A015) is output (also refer to Section 7 "Troubleshooting")

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

The command is executed with an L signal.

After the command has been accepted:

- ◆ The operating status is retained.
An alarm message (A016) is output (also refer to Section 7 "Troubleshooting").

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

The command activates the BASIC SETTING with an L signal and the RESERVE SETTING with an H signal.

After the command has been accepted:

- ◆ The parameter settings of the basic- or reserve setting for the control word itself, the setpoint channel, and the closed-loop control are activated (refer to Section 4.4 "Function diagrams, data sets").

Bit 31: HS checkback signal command (H "HS checkback signal")

The command is only processed when the appropriate connections have been made and the main contactor has been parameterized (option) (refer to "Options" in Section 9).

4.3.1.2 Status word (status word 1 and status word 2)**4.3.1.2.1 Introduction and application example**

Status words 1 (bits 0 to 15) and 2 (bits 16 to 31) issue messages and commands from the converter to external destinations.

Their particular status can be read-out via parameters r552 or r968 (status word 1) and r553 (status word 2).

An overview is provided in Section 4.3.1.2.2 "Overview of the status word".

The significance of the possible messages and commands to the outside is described in Section 4.3.1.2.4 "Significance of the status word messages".

Each status word bit is assigned a selection parameter, which defines, to which destination this bit is sent (refer to Section 4.3.1.2.2, righthand column).

The selection parameters for the destinations are indexed 3 times as follows:

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

An overview of the possible destinations, which are assigned fixed values, is provided in Section 4.3.1.2.3 "Selecting the destinations for the status word".

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

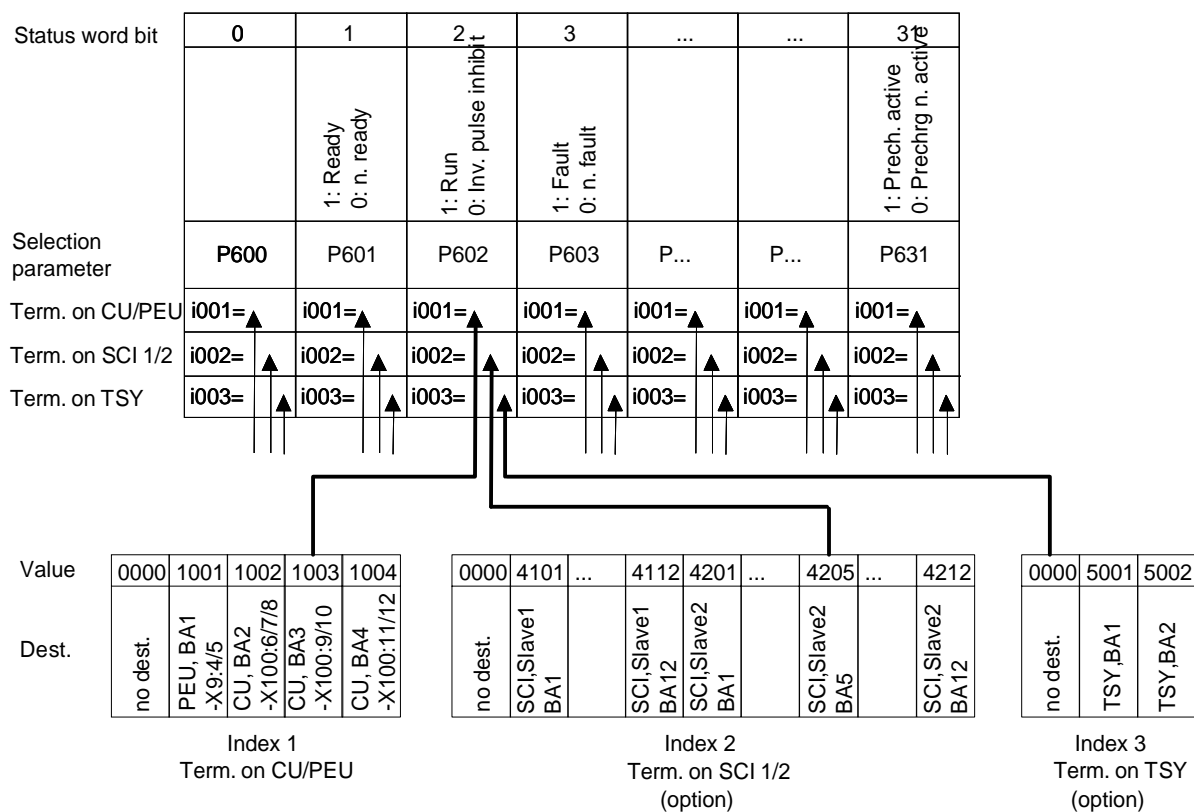
NOTE

For the output of faults, alarms and switch-on inhibit of the status word (**HIGH active**) via the terminal strip, then these are LOW active at the terminals (binary outputs) (i.e.: the relay drops out)!

This is also true for possible option boards!

Also refer to Section 4.3.3 "Binary outputs"

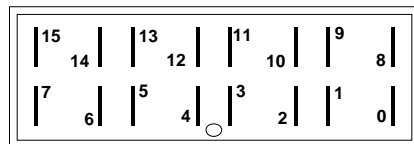
EXAMPLE:



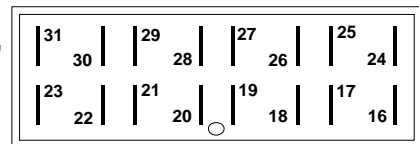
"Run" signal:

- at terminal -X100:9/10 of the CU
- at the terminal of binary output 5 of the SCI (option), which is coded as slave 2
- no signal at the TSY terminal (option)

4.3.1.2.2 Overview of the status word (status word 1 and status word 2)



PMU-Display
 „Status word 1“ „Status word 2“



Bit	High	Low	Comments	Dest. selection
"Status word 1" (visualization parameter r552 or r968)				
0	Ready-to-switch-on	Not ready to switch on		P600
1	Ready	Not ready		P601
2	Run	Inverter pulses inhibited		P602
3	Fault	No fault	Inverted for terminal strips!	P603
4	No OFF 2	OFF2		P604
5	No OFF 3	OFF3		P605
6	Switch-on inhibit	No switch-on inhibit	Inverted for terminal strips!	P606
7	Alarm	No alarm	Inverted for terminal strips!	P607
8	No setpt. act. val. Deviation	Setpt. act. value deviation	Can be parameterized	P608
9	PZD control requested		Always "High" (for CB,TB,SST1,SST/SCB)	
10	Comparison speed reached	Actual value < comparative speed	Can be parameterized	P610
11	Fault, undervoltage	No undervoltage fault	Inverted for terminal strips!	P611
12	Main contactor energized	Main contactor not energized	Can only be connector for terminals CU1 or SC!!	P612
13	HLG active	Ramp-function generator not active		P613
14	Clockwise phase sequence	Counter-clockwise phase sequence		P614
15			Reserved	
"Status word 2" (visualization parameter r553)				
16			Reserved	
17			Reserved	
18	No overspeed	Overspeed		P618
19	Fault, external 1	No fault, external 1	Inverted for terminal strips!	P619
20	Fault, external 2	No fault, external 2	Inverted for terminal strips!	P620
21	Alarm, external	No alarm, external	Inverted for terminal strips!	P621
22			Reserved	
23	Fault, overtemp., converter	No fault, overtemp. conv.	Inverted for terminal strips!	P623
24	Alarm, overtemp., conv.	No alarm, overtemp., conv.	Inverted for terminal strips!	P624
25	Alarm, motor overtemp.	No alarm, overtemp. mot.	Inverted for terminal strips!	P625
26	Fault, motor overtemp.	No fault, overtemp. mot.	Inverted for terminal strips!	P626
27			Reserved	
28			Reserved	
29	Bypass contactor energized	Bypass contactor not energized	Bypass contactor	P629
30			Reserved	
31	Pre-charging active	Pre-charging not active		P631

4.3.1.2.3 Selecting the destinations for the status word (bits 0 - 31)

For the selection parameters **P600 to P631**, in which the destination of the appropriate bit can be specified, then the indices are uniformly assigned as follows:

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

Index i001 Selecting a terminal on the CU / PEU board (basic converter)

Value	Destination	
0000	No destination	Factory setting, except P602,P603 and P612
1001	PEU, BA1, -X9:4/5,	Factory setting for P612
1002	CU, BA2, -X100:6/7/8	Factory setting for P603
1003	CU, BA3, -X100:9/10	Factory setting for P602
1004	CU, BA4, -X100:11/12	

Index i002 Selecting a terminal on the SCI 1/2 board (option)

Value	Destination	
0000	No destination	Factory setting
4101	SCI 1 and 2,slave 1, BA1	
4102	BA2	
4103	BA3	
4104	BA4	
4105	BA5	
4106	BA6	
4107	BA7	
4108	BA8	
4109	Only SCI 2,slave 1, BA9	
4110	BA10	
4111	BA11	
4112	BA12	
4201	SCI 1 and 2,slave 2, BA1	
4202	BA2	
4203	BA3	
4204	BA4	
4205	BA5	
4206	BA6	
4207	BA7	
4208	BA8	
4209	Only SCI 2,slave 2, BA9	
4210	BA10	
4211	BA11	
4212	BA12	

Index i003 Selecting a terminal on the TSY board (option)

Value	Destination	
0000	No destination	Factory setting P617 and P630
5001	TSY, BA1	Factory setting P617
5002	TSY, BA2	Factory setting P630

4.3.1.2.4 Significance of the status word messages

NOTE

When faults, alarms and switch-on inhibit of the status word are output (**HIGH active**) via the terminal strip, then these are LOW active at the terminal strips (binary outputs) (i.e.: relay drops out)!
This is also valid for possible option boards!
Also refer to Section 4.3.3 "Binary outputs"

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

An H signal indicates that the operating status SWITCH-ON INHIBIT (008) or READY-TO-SWITCH-ON (009) is available. 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)

An H signal, indicates that the operating status READY (011) or PRE-CHARGING (010) is available. The power supply, and the open-loop and closed-loop control are operational. The converter is switched-on, pre-charging has been completed (is executed), and the DC link (is being) run-up to full voltage. The inverter pulses are still inhibited.

Bit 2: Signal, "run" (H)

An H signal indicates that the operating status RUN (014), RESTART-ON-THE-FLY (013), OFF1 (015) or OFF3 (016) is available. The converter is functioning, i.e. the inverter pulses are enabled and voltage is available at the output terminals.

Bit 3: Signal, "Fault" (H)

An H signal indicates that the operating status FAULT (007) is available. If the fault is output at a terminal strip (PEU, CU1, TSY, SC11/2) an L signal appears there for this fault message.

Bit 4: Signal, "OFF2" (L)

An L signal indicates that an OFF2 command is present via the control word (bit 1).

Bit 5: Signal, "OFF3" (L)

An L signal indicates that an OFF 3 command is available, or/and the operating status OFF3 (016) is(are) available via the control word (bit 2).

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

An H signal indicates that the operating status SWITCH-ON INHIBIT (008) is present. 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).

If the message is output at a terminal strip (PEU, CU1, SCB1) an L signal appears there for this message.

Bit 7: Signal "alarm" (H)

An H signal indicates that an alarm (Axxx) is present. If the alarm is output at the terminal strip (PEU, CU1, SCB1), an L signal appears there for this alarm.

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

An L signal indicates, that the setpoint-actual value deviation" alarm is present (A034). This occurs as soon as the absolute value of the difference between the speed setpoint and speed actual value is greater than or equal to a deviation which can be parameterized (P517 „setpoint- actual value deviation, speed) for a time longer than the „setpoint-actual value deviation time“ (P518) The bit is again set to an H as soon as the absolute value of the difference between the speed setpoint and the speed actual value is less than the deviation (P517).

Bit 9: Signal, "PZD control requested" (H)

An H signal is always present.

Bit 10: Signal „comparison speed reached" (H)

An H signal indicates that the absolute value of the speed actual value is greater than or equal to the parameterized comparison speed (P512). The bit is again set to L, as soon as the actual absolute speed value falls below the comparison speed (P512), minus the parameterized comparison speed hysteresis (P513 in % referred to the comparison speed (P512)).

Bit 11: Signal, "fault, undervoltage" (H)

An H signal indicates that the "undervoltage in the DC link" fault is present (F008). Also refer to Section 7 "troubleshooting". If the fault is output at a terminal strip (PEU, CU1, TSY, SC11/2) an L signal appears there for this fault signal.

Bit 12: Signal, "main contactor energized" (H)

A main contactor (option) can be energized with an H signal when the appropriate connections have been made and the appropriate parameterization. Also refer to Section 9 "Option".

Bit 13: Signal, "RFG active" (H)

An H signal indicates the difference between the RFG input (r460) and the RFG output (r480) exceeds the hysteresis which has been parameterized (P476 as a % of the rated system speed P420).

Bit 14: Signal, "clockwise phase sequence" (H)

An H signal indicates that the speed setpoint for the closed-loop control (n -setpoint, r482) is greater than or equal to 0.

Signal, "counter-clockwise phase sequence" (L)

An L signal indicates that the frequency setpoint for the closed-loop control (n/f setpoint, r482) is less than 0.

Bit 18: Signal, "overspeed" (L)

An L signal indicates that the „overspeed“ alarm (A033) is present. This is realized as soon as the absolute speed actual value exceeds the absolute value of the parameterized maximum speed (P452 for a clockwise phase sequence or P453 for a counter-clockwise phase sequence) in addition to the absolute value of the parameterized hysteresis (P519 in % referred to the appropriate maximum speed). The bit is again set to an H signal as soon as the absolute speed actual value is less than or equal to the absolute value of the corresponding maximum speed.

Bit 19: Signal, "fault, external 1" (H)

An H signal indicates that a "fault, external 1" is present in control word bit 15. If this fault is output at a terminal strip (PEU, CU, SCB1), an L signal appears there for this fault signal.

Bit 20: Signal, "fault, external 2" (H)

An H signal indicates that a "fault, external 2" is present in control word bit 26. If this fault is output at a terminal strip (PEU, CU, SCB1), an L signal appears there for this fault signal.

Bit 21: Signal, "external alarm" (H)

An H signal indicates that an "alarm, external 1" is present in control word bit 28, or an "alarm, external 2" in control word, bit 29.

If this fault is output at a terminal strip (PEU, CU, SCB1), an L signal appears there for this fault signal.

Bit 22: Message "Warning i²t drive converter" (H)

An H signal indicates that the "i²t alarm inverter" (A025) is present. Also refer to Section 7 „Fault and alarm signals“.

If the alarm is output at a terminal strip (PEU, CU, SCB1), an L signal appears there for this alarm message.

Bit 23: Signal "Overtemperature fault signal UMR- (H)"

An H signal indicates that an "inverter temperature too high" fault (F023) is present. Also refer to Section 7 "Troubleshooting".

If this fault is output at a terminal strip (PEU, CU, SCB1), an L signal appears there for this fault signal.

Bit 24: Signal "overtemperature alarm UMR" (H)

An H signal indicates that the "inverter temperature too high" alarm (A022) is present. Also refer to Section 7 "Troubleshooting". If this fault is output at a terminal strip (PEU, CU, SCB1), an L signal appears there for this fault signal.

Bit 25: Signal, "motor overtemperature alarm" (H)

An H signal: Parameterized alarm threshold (P360) was exceeded (also refer to Section 7 „Troubleshooting“). When output at a terminal strip (PEU, CU, SCB1), an L signal appears there.

Bit 26: Signal " motor overtemperature fault" (H)

H signal: Parameterized fault threshold (P361) was exceeded, "motor thermal overload" fault (F021) present (also refer to Section 7 „troubleshooting“).

When output at a terminal strip (PEU, CU, SCB1) an L signal appears there.

Bit 27: Message „Technological controller actual value is greater than the technological controller setpoint“ (H)

An H signal indicates that the technological controller actual value (r534) is greater than the technological controller setpoint (r529). If the technological controller actual value then again drops below the technological controller setpoint, a hysteresis is also taken into account (P535)

Bit 29: Signal "bypass contactor energized" (H)

Reflects the internal bit to control the pre-charging bypass contactor.

Bit 31: Signal "precharging active" (H)

An H signal indicates that the drive is in the PRECHARGING (010) status after an ON command.

4.3.1.3 Setpoints

The setpoint parameters, in which values or sources can be specified, can be taken from the "function diagrams, setpoint channel and closed-loop control" Section 4.4.
(Additional resources: Section 5 "Parameter list").

Dependent on the setpoint parameter, it is possible to changeover the control word commands:
"Basic- and reserve setting", "setpoint channel data set", "motor data set" and "fixed setpoints".

Refer to Section 4.4 "Function diagrams, data sets"

Special feature: P433 "source, supplementary setpoint 1", P438 "source, supplementary setpoint 2", P443 "source, main setpoint", P486 "source, torque setpoint", P493 "source, torque limit 1", P499 "source, torque limit 2", P506 "source, supplementary torque setpoint".

In the parameters, setpoint sources are defined using values:

Value entry in	Index1	i001	active when "basic setting" selected"	(control word)
	Index2	i002	active when "reserve setting" selected"	(control word)

Value assignment for P433, P438, P443, P486, P493, P499 and P506:

Value	Source	
0000	Constant setpoint = 0	Factory setting: P433, P438, P486, P506 i001 and i002
1001	Fixed setpoint - for source P433, P438 and P443: P421 to P424 - for source P493: P492 - for source P499: P498 - for source P506: P505	⇐ cannot be selected for torque setpoint P486 Factory setting: P493,P499 i001 and i002 P443 i002
1002	Motorized potentiometer	⇐ only for main setpoint P443 Factory setting: P443 i001
1003	CU1, Analog input AE1, -X102	
2002	SST1(PMU -X300) (word2)	
2003	(word 3)	
2004	(word4)	⇐ only if word 4 is not assigned for "control word 1 with 2004 (Section 4.3.1.1)
...	Consecutively to	
2016	(word16)	
6002	SST2(-X100:1...5) (word2)	
6003	(word3)	
6004	(word4)	⇐ only if word4 is <u>not</u> assigned for "control word2" with 6004 (Section 4.3.1.1)
...	Consecutively to	
6016	(word16)	
OPTIONS		
3002	CB/TB (word 2)	
3003	(word 3)	
3004	(word 4)	⇐ only if word 4 is not assigned for "control word 1 with 3004 (Section 4.3.1.1)
...	Consecutively to	
3016	(word 16)	
4101	SCB1 with SCI 1,slave1,analog input AE1	
4102	AE2	
4103	AE3	
4201	SCB1 with SCI 1,slave2,analog input AE1	
4202	AE2	

4203	AE3
4501	SCB-SST (peer to peer) (word 1)
4502	SCB-SST (USS /peer to peer) (word 2)
4503	(word 3)
4504	(word 4)
...	Consecutively to
4516	(word 16)

⇐ only if word 1 is not assigned for "control word 1 with 4501 (Section 4.3.1.1)

⇐ only if word 4 is not assigned for "control word 1 with 4504 (Section 4.3.1.1)

4.3.1.4 Actual values

All available parameter numbers (0 to 999) can be entered into the actual value parameters, sorted according to destinations (refer to the following).

The parameter value of the entered parameter number is output at the selected destination.

- Note:
- When specifying parameter numbers, which are indexed, the value of the first index (.i001) is always output!
 - When specifying "0", no output is made to the appropriate destination!

Destinations:

P530 "T.Reg.ActVal"

Output at the tech. Controller actual value input

Indices: i001 Value 1 for the technological controller actual value input (P531 = 1100)
i002 Value 2 for the technological controller actual value input (P531 = 1200)
(refer to Section 4.4 "Function diagrams, closed-loop control")

P655 "CU AnaOut Act Val"

Output via the CU control terminal strip (Section 3.3)

Analog output (-X102:34 / reference potential -X102:33)
(refer to Section 4.3.5 "analog outputs")

P680 "SCom1 Act Value"

P681 "SCom2 Act Value"

Output via the basic converter interfaces SST1 and/or SST2

Indices: i001 word 01 of the telegram (PZD)

↓ ↓

i016 word 16 of the telegram (PZD)

(refer to Section 4.3.6.1 "basic converter interfaces SST1 and SST2")

Destination, options:

P664 "SCI-AA actual values"

Output via the SCB1 interface with SCI1

(also refer to the 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
 (also refer to the 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
 (also refer to the Instruction Manual for the option boards and Sections 4.3.6.2 "DPR")
 Indices: i001 Destination: Word 01 of the telegram (PZD)
 ↓ ↓
 i016 Destination: Word 16 of the telegram (PZD)

NOTE

For telegram transfer (P680,P681,P690,P694):

- ◆ Generally, it is necessary/practical to assign "word 01 of the telegram (PZD)" with the status word 1 (r968 or r552)!
- ◆ If double-word parameters (type l4) are to be transferred as actual values, the associated parameter number must be entered in 2 consecutive words (indices), as otherwise only the most significant word will be transferred!

4.3.2 Binary inputs

5 binary inputs (24V) which can be parameterized at the control terminal strip (board CU, -X101) to enter commands, external faults/alarms as well as a checkback signal to the converter control word.

Connecting-up: Refer to Section 3.3 "Control terminal strip"

Parameterization: Refer to Section 4.3.1.1 "Control word" .

Factory setting: „pulse inhibit" OFF 2 command

Binary input 1	Basic setting:	not assigned
	Reserve setting	ON/OFF1
Binary input 2	Basic setting:	not assigned
	Reserve setting:	OFF2 command „pulse inhibit"
Binary input 3	Basic setting:	not assigned
	Reserve setting:	Acknowledge (control word bit 7)
Binary input 4	Basic setting:	not assigned
	Reserve setting:	Fixed setpoint, bit 0 (control word bit 20)
Binary input 5	Basic setting:	(control word bit 30)
	Reserve setting:	(control word bit 30)

4.3.3 Binary outputs

2 binary outputs, which can be parameterized, for the output of signals and external commands of the converter status word

Connecting-up: Binary output 1 on the PEU (connector - X9):
Refer to Section 3.1.1 "Auxiliary power supply / main contactor"
Binary output 2 on the CU control terminal strip (connector X100 / changeover contact):
Refer to Section 3.3 "Control terminal strip"

Parameterization: Refer to Section 4.3.1.2 "Status word"

Factory setting:

Binary output 1 -X9 on the PEU	Main contactor energized (status word bit 12)
Binary output 2 -X100 on the CU	Fault (status word bit 3)
NOTE	
When faults, alarms and switch-on inhibit of the status word (HIGH active) are output via the terminal strip, these are LOW active at the terminal strip (binary outputs) (i.e. relay drops out)! Also refer to Section 4.3.1.2 "Status word"	

4.3.4 Analog input

An analog input, which can be parameterized, at the control terminal strip (CU, -X102 / Section 3.3) as voltage- or current input for setpoint input.

- ◆ Voltage inputs:
 - ◆ $\pm 10\text{ V}$ or $0\dots+1\text{ 0V}$ or $+2\dots+10\text{ V}$ (can be parameterized)
 - ◆ Resolution: $< 10\text{ mV}$ (10 bit + sign)
 - ◆ Accuracy: $< \pm 2\%$
 - ◆ Smoothing: can be parameterized (P651)
 - ◆ Offset can be parameterized (P652)
- ◆ Current inputs:
 - ◆ $\pm 20\text{ mA}$ or $0\text{ mA}\dots+20\text{ mA}$ or $+4\text{ mA}\dots+20\text{ mA}$ (can be parameterized)
 - ◆ Resolution: $< 0,04\text{ mA}$ (10 bit + sign)
 - ◆ Accuracy: $< \pm 2\%$
 - ◆ Smoothing: can be parameterized (P651)
 - ◆ Offset can be parameterized(P652)

Connecting-up: Refer to "Control terminal strip", Section 3.3

Parameterization: Also refer to the "Function diagrams, analog inputs CU", Section 4.4!

1. Parameterization as setpoint input:

- ◆ Connect-up AE as setpoint input in **P443** "main setpoint source" or **P428** "supplementary setpoint source 1" (refer to "Function diagrams, setpoint channel CU (Section 1)" Section 4.4 / "Setpoints", Section 4.3.1.3):

Enter the value to identify the analog input:

1003 > analog input 1 (AE1)

- ◆ Specify the required voltage- and current range in **P650** "CU-AE configuration":

P650 i001 (AE1) = 0 ±10 V , ±20 mA (factory setting)
i002 (AE2) or = 1 0...+10 V, 0...+20 mA
 or = 2 +2...+10 V, +4...+20 mA (with wire breakage monitoring)

- ◆ The smoothing time constant should be set in **P651** "CU-AE smoothing".
 (Setting range: 0ms to 1000 ms / factory setting: 4 ms)

P652 i001 (AE1)

- ◆ Set the smoothing time constant in Set the offset (zero point calibration) in **P652** "CU-AE offset".
 (Setting range: -20,000 V to +20,000 V / factory setting: +0.000 V ⇔ no offset)

P652 i001 (AE1)

- ◆ The input signals of the setpoint channel can be influenced as follows:

Supplementary setpoint 1	P436	(invert)
Supplementary setpoint 2	P441	(invert)
Main setpoint	P446	(invert)
Suppl. torque setpoint	P506	(invert, gain)
Main torque setpoint	P486	(invert)
Limit 1	P493	(not)
Limit 2	P499	(not)

Refer to „function diagrams, setpoint channel CU3 (Part 1)" Section 4.4

For the calculation:

Main setpoint (P443) and supplementary setpoint (P428) are entered as percentage quantities

The following is valid: ◆ 100% = rated system speed in [RPM] (P420).
 ◆ Max. range: -200% to +199.99%

P650 = 0 ±10V , ±20mA ⇔ ±100%

$$\Rightarrow \text{PWE in [\%]} = \frac{10\%}{V} \times (\text{AE in [V]} + \text{Offset in [V]})$$

P650 = 1 0...+10V , 0...+20mA ⇔ 0% to +100%

$$\Rightarrow \text{PWE in [\%]} = \frac{10\%}{V} \times (\text{AE in [V]} + \text{Offset in [V]})$$

P650 = 2 +2V...+10V , +4...+20mA ⇔ 0% to +100%
 < 2mA (1V) wire breakage signal

$$\Rightarrow \text{PWE in [\%]} = \frac{12,5\%}{V} \times (\text{AE in [V]} - 2V + \text{Offset in [V]})$$

Configuring example - using an analog input as setpoint input:1st example:

Available: ♦ Rated system speed P420 = 3000 [RPM]

Required: ♦ Voltage input: ± 10 V (or current input ± 20 mA) via analog input 1 for the main setpoint
 ♦ Control range: -10 V to $+10$ V corresponds to -3000 RPM to $+3000$ RPM in the setpoint channel

- ♦ Analog input 1 connected-up as main setpoint:

Enter 1003 in P443 "main setpoint source": P443 (i001: basic setting./i002: reserve setting.) = 1003

- ♦ Parameterize analog input 1 as voltage input ± 10 V (or current input ± 20 mA):

P650 i001 = 0 ± 10 V for AE1)

- ♦ Set offset (zero point offset) for analog input 1:

The following is valid for the selected voltage input (P650 i001 = 0): 0 V $\Leftrightarrow 0$ RPM

Monitoring parameter: r447 "main setpoint"

e.g.: P652 i001 = 0V offset (ideal case: No zero point drift)

- ♦ The main setpoint control range in the setpoint channel can be influenced:

Inversion for supplementary torque setpoint:

Additional gain: Refer to „function diagrams, setpoint channel CU (Part 1)" Section 4.4

2nd example:

Available: ♦ Rated system speed P420 = 3000 [RPM]

Required: ♦ Current input + 4...20 mA (or voltage input + 2...10 V) via the analog input for the supplementary setpoint

♦ Control range: + 4...20 mA corresponding to 0 to +3000 RPM to the setpoint channel

- ♦ Connect-up the analog input at supplementary setpoint 1:

Enter the value to identify the analog input in P428 "supplementary setpoint source" P428 (i001: basic setting./i002: reserve setting.) = 1003

- ♦ Parameterize the analog input as current input + 4...20 mA (or voltage input + 2...10 V):

P650 i002 = 2 (+ 4...20 mA for analog input with wire breakage signal at < 2 mA)

- ♦ Set the offset (zero point offset) for the analog input:

The following is valid for the selected current input P650: 4 mA $\Leftrightarrow 0$ RPM

Monitoring parameter: r431 "supplementary setpoint"

e.g.: P652 i002 = 0 V offset (ideal case: no zero point trip)

- ♦ The supplementary setpoint can be inverted within the setpoint channel via parameter P46=1:

Refer to „function diagrams, setpoint channel CU (Section 1)" Section 4.4

4.3.5 Analog output

1 analog output, which can be parameterized, at the control terminal strip (board CU, -X102 / Section 3.3) to output actual values and other internal converter quantities.

- Analog output:
- Voltage range: $\pm 10\text{ V}$
 - Resolution: 4.9 mV (11 bits + sign)
 - Accuracy: $\pm 1\%$
 - Smoothing $20\text{ }\mu\text{s}$
 - Output current: max. $\pm 5\text{ mA}$
 - Short-circuit proof and non-floating

Connecting-up: Refer to "Control terminal strip", Section 3.3

Parameterization: Also observe "Function diagram, analog output CU", Section 4.4!

- ◆ Enter the parameter number (0 to 999) whose value is to output, in P655 "CU-AA actual values".
- ◆ Set the analog output gain factor in P656 "CU-AA gain".
(setting range: -320.00 V to $+320.00\text{ V}$ / pre-setting: $+10.00\text{ V} \Leftrightarrow$ gain of 1)
- ◆ Set the offset in P657 "CU-AA offset".
(setting range: -100.00 V to $+100.00\text{ V}$ / pre-setting: $+0.00\text{ V} \Leftrightarrow$ no offset)

The following is obtained for the calculation from the "function diagram, analog output CU":

$$= \left(\frac{\text{Parameter value in } [\%]}{100 [\%]} \times \text{Gain in } [\text{V}] \right) + \text{Offset in } [\text{V}]$$

Pre-assignment (gain of 1 and no offset): $100\% = 10\text{ V}$

The parameter value in [%] for the appropriate parameter number can be taken from the parameter list, Section 5!

Configuring examples:

- Example 1:
- Available: P102 (rated motor current = 40.0 A)
 - Required: Output current r004 is to be represented in the range from 32 A to 160 A as 0.00 V to +10.00 V at the analog output

- ◆ Connect-up parameter R004 at the analog output

P655 "CU-AA actual values" = 004

- ◆ Converter the required output range in [%]:

r004 should be taken from the parameter list, Section 5:

Analog output: 100% = 4xP102 (in this case: 4x40.0A = 160A)

Thus, the following is obtained for the range to be represented:

32A → 20% (parameter value PWE1) to be represented as $V_{\text{off1}} = 0.00 \text{ V}$

160A → 100% (parameter value PWE2) to be represented as $V_{\text{off2}} = +10.00 \text{ V}$

- ◆ Define gain factor **P656** and offset **P657** for analog output

The following is obtained from the formula shown above:

$$\begin{aligned} \text{Gain factor [V]} &= \frac{(U_{\text{off1}} [\text{V}] - U_{\text{off2}} [\text{V}]) \times 100 \%}{\text{PWE1} [\%] - \text{PWE2} [\%]} = \frac{(0.00 \text{ V} - 10.00 \text{ V}) \times 100 \%}{20 \% - 100 \%} \\ &= \frac{-10 \text{ V} \times 100 \%}{-80 \%} = 12.5 \text{ V} \end{aligned}$$

$$\begin{aligned} \text{Offset [V]} &= U_{\text{off1}} [\text{V}] - \left(\frac{\text{Gain factor [V]} \times \text{PWE1} [\%]}{100 \%} \right) = 0 \text{ V} - \left(\frac{12.5 \text{ V} \times 20.00 \%}{100 \%} \right) \\ &= 0 \text{ V} - 2.5 \text{ V} = -2.5 \text{ V} \end{aligned}$$

To be adjusted:

Gain:	P656 = +12.50V
Offset:	P657 = -2.50V

Example 2:

- Available: P420 (rated system speed) = 3000 RPM
- Required: Speed/frequency actual value r219 in the range from –10.00 V to +10.00 V, simulated at the analog output

- ◆ Connect parameter r218 to the analog output:

P655 "CU-AA actual values" = 218

- ◆ Convert the required output range in [%]:

r218 should be taken from the parameter list, Section 5:

Analog output: 100 % = P420 (in this case: = 3000 RPM)

Thus, following is obtained for the range to be represented:

–3000 RPM → –100 % (parameter value PWE1) referred to $V_{Off1} = -10.00 \text{ V}$
 +4800 RPM → 160 % (parameter value PWE2) referred to $V_{Off2} = +10.00 \text{ V}$

- ◆ Define gain factor P656 and offset P657:

The following is obtained from the formula shown above:

$$\begin{aligned} \text{Gain factor [V]} &= \frac{(U_{Off1} [\text{V}] - U_{Off2} [\text{V}]) \times 100 \%}{\text{PWE1} [\%] - \text{PWE2} [\%]} = \frac{(-10.00 \text{ V} - 10.00 \text{ V}) \times 100 \%}{100 \% - 160 \%} \\ &= \frac{-20 \text{ V} \times 100 \%}{-260 \%} = 7.69 \text{ V} \\ \text{Offset [V]} &= U_{Off1} [\text{V}] - \left(\frac{\text{Gain factor [V]} \times \text{PWE1} [\%]}{100 \%} \right) = 0 \text{ V} - \left(\frac{7.69 \text{ V} \times 100 \%}{100 \%} \right) \\ &= 10 \text{ V} + 7.69 \text{ V} = -2.31 \text{ V} \end{aligned}$$

To be adjusted: Gain **P656 = +7.69 V**
 Offset **P657 = -2.31 V**

4.3.6 Serial interfaces

4.3.6.1 Basic converter interfaces SST1 and SST2

The USS protocol (universal serial interface) is implemented at the basic converter interfaces SST1 and SST2.

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:

SIMOVERT Master Drives
SIMOVIS Instruction Manual
Order No.: 6SE7087-6CX87-4KA0

- ◆ 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: Also refer to "control terminal strip" Section 3.3

SST1: 9-pin SUB D connector -X300 on the PMU parameterizing unit
SST2: Connector -X100 on the CU control terminal strip

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).

- SST1: Close jumpers S1.1 and S1.2 of DIP-FIX S1 on the CU
- SST2: Close jumpers S2.1 and S2.2 of DIP-FIX S2 on the CU

- ◆ Parameterization:

- Parameterization: **P683 to P687**
- Define the process data (control word, status word, setpoints, actual values) for the interface:
Refer to "Process data" Section 4.3.1
- Enabling parameterization: **P053 or P927**

NOTE

The factory setting (refer to "parameter list" Section 5) can be used if the SST1 and/or SST2 basic converter interfaces are not used!

4.3.6.2 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, also refer to the Section 3.5 "Recommended circuits" as well as in the appropriate Instruction Manuals to the various option boards.

Additional information can be taken from Sections 4.3.1.1 to 4.3.1.4 "Control word, status word, setpoints, actual values".

4.3.7 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 CU1 (Sections 1 to 3)", Section 4.4

4.3.7.1 Ramp-function generator, RFG

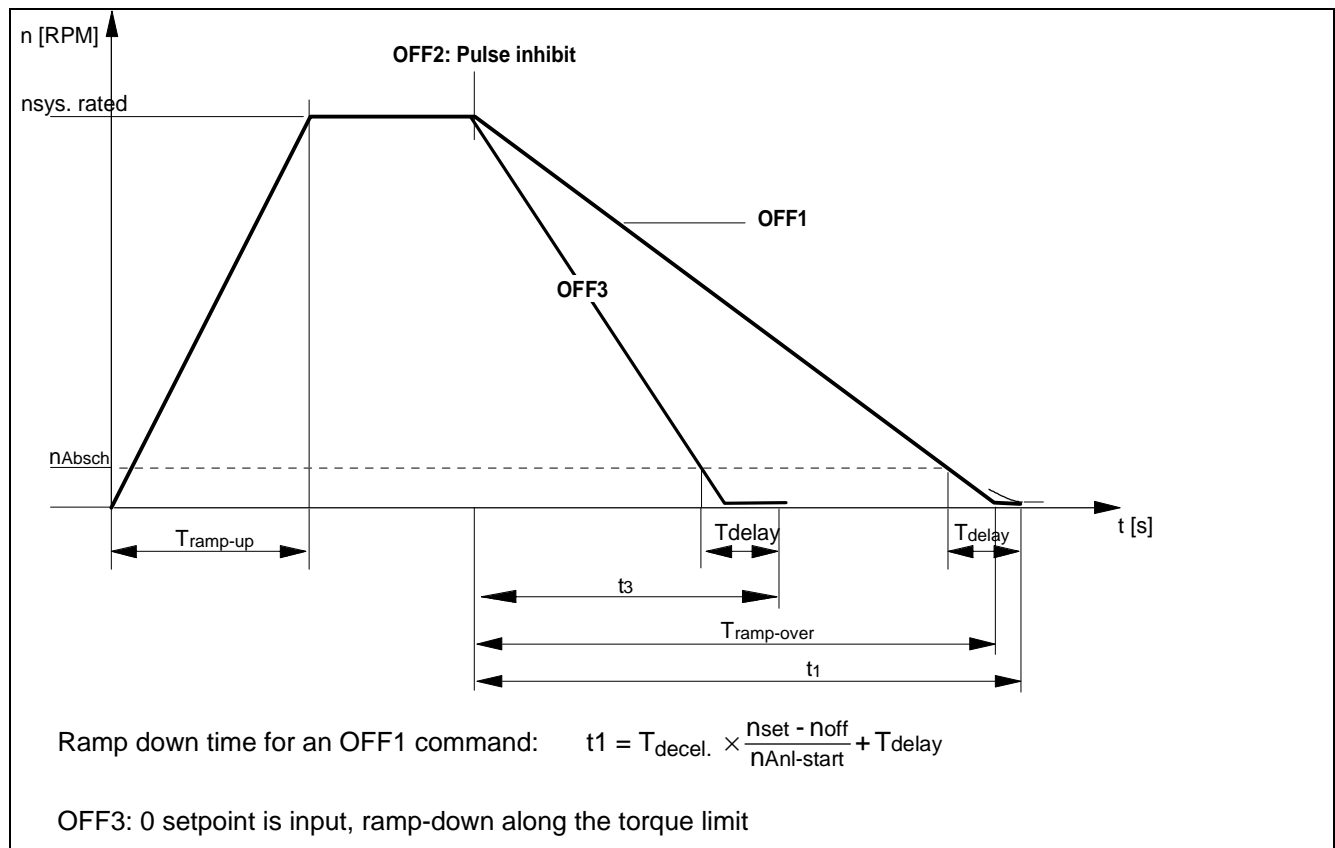


Fig. 4.3 Ramp-function generator

For a detailed description of the OFF1-, OFF2- and OFF3 commands, refer to Section 4.3.1.1 "Control word"

Parameters for setting the acceleration time

P420	Rated system speed	1 RPM to 9000 RPM	
P462	Acceleration time ($T_{\text{ramp-up}}$)	i001: SDS1 to i004: SDS4	0,00 to 99,99 s
Acceleration time in s from standstill up to the rated system frequency, P420			
P464	Deceleration time ($T_{\text{decelerate}}$)	i001: SDS1 to i004: SDS4	0,00 to 99,99 s
Deceleration time in s from the rated system frequency (P420) down to standstill			
P514	OFF shutdown speed (n_{off})	i001: SDS1 to i004: SDS4	0.00 to 9000.0 [RPM]
The OFF delay time P516 starts to run as soon as the „speed actual value“, r219 reaches the OFF shutdown speed, P514, when the drive is decelerating (OFF1 or OFF3).			
P516	OFF delay time (T_{delay})	i001: SDS1 to i004: SDS4	0.0 s to 60.0 s
Delay time for OFF1 and OFF3 in s. ♦ The OFF delay time starts to run, as soon as the „speed actual value“, r219 reaches the OFF shutdown speed, P514 when the drive decelerates. The inverter pulses are then inhibited.			

Further, it is still possible to inhibit or hold the ramp-function generator via the "control word" (Section 4.3.1.1).

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

P452	Max. speed (RDF) Clockwise phase sequence	i001 MDS1 i002 MDS2	-9000.0 [RPM] to +9000.0 [RPM]
Max. setpoint frequency for a clockwise phase sequence			
P453	Maxi. speed (LDF) Counter-clockwise phase sequence	i001 MDS1 i002 MDS2	-9000.0 [RPM] to +9000.0 [RPM]
Max. setpoint speed for counter-clockwise phase sequence			

When changing-over from the IBS converter status drive 005 to ready-to-switch-on 009, it is checked as to whether the maximum speed LDF is less than the maximum speed RDF.

4.3.8 Function selection (P052)

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

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)

The „factory setting“ function is automatically reset after completion, i.e. P052 = 0 ("return"). The remaining functions must be manually reset!

4.3.8.1 Factory setting (P052 = 1)

This function is used to establish the factory setting for all of the parameters according to the "parameter list" (Section 5).

In this case, some converter data are set, as a function of the converter type (MLFB-dependent/P070)).

"Factory setting" can be selected in the following statuses: "switch-on inhibit" (008), "ready-to-switch-on" (009) or "fault" (007).

Procedure:

⇓ P052 = 1 Function selection, "factory setting"

⇓ P key The operating display appears (001), and the following parameters can be re-assigned:

- ◆ Factory setting for all parameters according to the parameter list (Section 5)
(also the board configuration P090/P091)
- ◆ Converter data (taken from the converter MLFB (P070))
 - P071 Converter supply voltage
 - P072 Converter current (n)

⇓ The operating display "switch-on inhibit" (008) or "ready-to-switch-on" (009) appears after the factory setting has been completed (initialization).

4.3.8.2 Initialization (P052 = 2)

This function is used to change the converter MLFB (converter type) and the factory setting is only partially established when changing the MLFB (status when the converter is supplied), dependent on the new MLFB.

"Initialization" can be selected in the following statuses: "Switch-on inhibit" (008), "ready-to-switch-on" (009) or "fault" (007).

Procedure:

- ↓ P051 = 3 Access stage Expert mode (used to change P070)
- ↓ P052 = 2 Function selection Initialization
- ↓ P070 MLFB Specifies the converter MLFB
(Rating plate data on the unit or after an upgrade (retrofit), the new MLFB assigned by the factory)
When parameterizing via the PMU, corresponding to the code number (PWE): Refer to the following table:

Table of the SIMOVERT Master-Drives

Brief description of the table columns:

PWE Parameter value (to be entered at initialization / PMU / P070)

I(n) Rated converter current in A (P072)

U-Kl. Voltage class, voltage range

P(n) Rated converter active output in kW (P073)

f_{Der 1} De-rating frequency 1 in kHz: De-rating not required up to this pulse frequency (de-rating, refer to Section 14.3)

BF Type

PWE	Order No.	I(n)	U-Kl.	P(n)	fDer1	BF
4	6SE7016-1TA30	6,1	DC 510-620V	2,2	6	A
10	6SE7018-0TA30	8,0	DC 510-620V	3	6	A
12	6SE7021-0TA30	10,2	DC 510-620V	4	6	A
15	6SE7021-1RA30	10,6	DC 280-310V	2,2	6	A
19	6SE7021-3TB30	13,2	DC 510-620V	5,5	6	B
22	6SE7021-3RA30	13,3	DC 280-310V	3	6	A
26	6SE7021-8TB30	17,5	DC 510-620V	7,5	6	B
28	6SE7021-8RB30	17,7	DC 280-310V	4	6	B
33	6SE7022-3RB30	22,9	DC 280-310V	5,5	6	B
36	6SE7022-6TC30	25,5	DC 510-620V	11	6	C
40	6SE7023-2RB30	32,2	DC 280-310V	7,5	6	B
43	6SE7023-4TC30	34,0	DC 510-620V	15	6	C
47	6SE7023-8TD30	37,5	DC 510-620V	18,5	6	D
49	6SE7024-4RC30	44,2	DC 280-310V	11	6	C
53	6SE7024-7TD30	47,0	DC 510-620V	22	6	D
55	6SE7025-4RD30	54,0	DC 280-310V	15	6	D
57	6SE7026-0TD30	59,0	DC 510-620V	30	6	D
65	6SE7027-0RD30	69,0	DC 280-310V	18,5	6	D
67	6SE7027-2TD30	72,0	DC 510-620V	37	6	D
71	6SE7028-1RD30	81,0	DC 280-310V	22	6	D

- ↓ P052 = 0 Function selection Return

- ↓ P key The operating display appears, and the following parameters are re-assigned once the MLFB has been changed:
- ◆ Converter data (determined from the converter MLFB (P070)). Data sets as for function selection „factory setting“ (refer to Section 4.3.9.1); not all of the parameters are reset to the factor settings according to the parameter list!
- ↓ The operating display „drive start-up“ is displayed after initialization has been completed (005)

4.3.8.3 Download (P052 = 3)

This function is used to read and change all parameters using a PC at the basic converter interfaces SST1 or SST2.

"Download" can be selected in the following statuses: "Switch-on inhibit" (008), "ready-to-switch-on" (009) or "fault" (007).

Procedure:

- ↓ P052 = 3 Function selection Download
- ↓ P key The operating display appears (021)
- ◆ Using a PC at the basic converter interface SST1 or SST2 and an appropriate application program (e.g.: SIMOVIS), all parameters can now be read and changed independently of the access stage (P051) and function selection (P052)
- ↓ P052 = 0 Function selection Return
- ↓ P key
- ↓ After return, the operating display appears, "switch-on inhibit" (008) or "ready-to-switch-on" (009)

4.3.8.4 Hardware configuration (P052 = 4)

This function is used to define option boards (SCB, TSY, CB, TB) in the converter electronics box.

Further, the LBA bus coupling (Local Bus Adapter) is required for the electronics box!

In order to be able to install the option boards in the electronics box, the LBA (Local Bus Adapter) must be mounted in the box.

Mounting in the LBA – bus expansion:

- ◆ Remove the CU board using the handles (lefthand slot in the electronics box) after releasing the connecting cable to the PMU and the two retaining screws
- ◆ Insert the LBA bus expansion into the electronics box until it latches into place (refer to the diagram for the position)
- ◆ Insert the CU board back into the lefthand slot. Tighten-up the retaining screws at the handles, insert the connecting cable to the PMU
- ◆ Insert the option board in slot 2 (right) or slot 3 (center) of the electronics box and screw into place. Every specific option board may be inserted only once in the electronic box. If there is only one option board then this is always inserted in slot 2 (right).

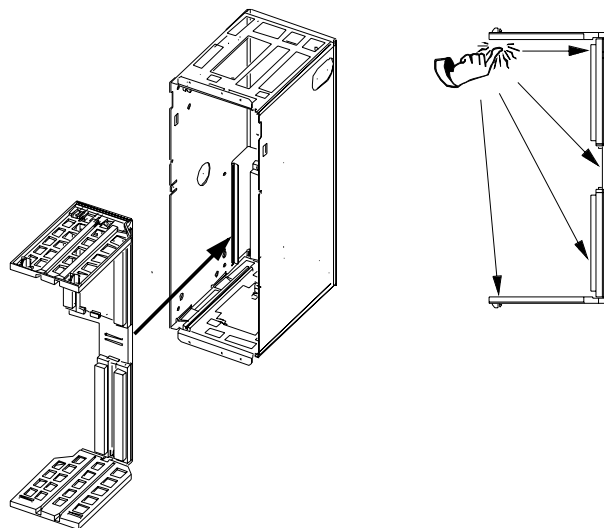


Fig. 4.3 Installing the Local Bus adapter

Examples of possible arrangements

Slot 1	Slot 3	Slot 2
CU	---	SCB
CU	SCB	Tx00
CU	CBx	SCB
CU	TSY	SCB

All parameters, which can be written into the "hardware configuration" status ("H", refer to the righthand column in the "parameter list", Section 5), can be changed.

The "hardware configuration" selection can be realized in the "switch-on inhibit", "ready-to-switch" or "fault" status.

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 (In 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 T300)
Right	Slots 2 (options)	CB1 / SCB1 / SCB2 / TSY / TB

NOTE

Only one of each option board type may be inserted in the electronics box.

TB (technology boards, e.g. T300) must always be inserted at slot 2. When a TB board is used, a TSY board may not be inserted.

If only one option board is used it must always be inserted at slot 2.

Option board Order Nos. and their descriptions are found in Section 9 "Options".

⇓ Additional parameters, depending on the option boards (refer to the associated Instruction Manuals or parameter list / Section 5)

⇓ Make a selection:

⇓ P052 = 5 Function selection, "drive setting" (refer to Section 4.3.9.5)

or ⇓ P052 = 0 Return

⇓ P key The operating display (r000) appears, while, depending on the function selection, parameters and internal quantities can be re-assigned

◆ The hardware is initialized

If fault message F050/F070/F080 appears: Refer to Section 7 "Troubleshooting"

⇓ After the selected function selection has been completed, the "switch-on inhibit" (008) or "ready-to-switch-on" (009) operating display appears.

4.3.8.5 Drive setting (P052 = 5)

This function is used to change the drive setting (converter/motor data, system data).

This includes all parameters, which can be written into the "drive setting" status ("A" refer to the righthand column in the "parameter list" Section 5).

Procedure:

⇓

◆ 1FT6 motor: Enter the motor number in P100

◆ Other motors Enter „250“ in P100 and the motor parameter values.

⇓ P208 encoder type,
possibly rated system speed and system torque

⇓ P052 = 0 Switch-on inhibit (008) or ready-to-switch-on (009)

Precise procedure, refer to Section 4.2.2.

4.3.9 Functions (software)

4.3.9.1 Motor identification

- P330 Motid = 0: Motor identification is automatic, if there is no motor data available for start-up drive parameters were changed.
 = 1: Motor identification after each ON command.

4.3.9.2 Ground-fault test:

- P354 = 0: No ground fault test.
 = 1: Ground fault test only with the next ON command; parameter is then reset to 0.
 = 2: Ground fault test after every ON command.
- P357 Ground fault test limit = switch off current

4.3.9.3 Restart-on-the-fly

Restart-on-the-fly“ is set via the following parameters:

Control word bit 23 "restart-on-the-fly enable"

The control word bit must be set to enable the restart-on-the-fly function

Source selection parameter for control word bit: P583

Refer to Section 4.3.1.1 "control word"

Restart-on-the-fly inactive (control word bit):

The drive waits until the motor has come to a standstill before it goes into run.

Restart-on-the-fly active:

Synchronization to a running motor.

4.3.9.4 Technology controller

The technological controller function can be used for simple higher-level control systems, without having to use an additional technological board (TB) (function diagram „Technological controller“, refer to section 4.4).

The sampling time of the technological controller is 8xP308 (default 8 ms).

The technological controller computes in the PZD notation, i.e. 100% corresponds to 40000H.

The technological controller setpoint can be entered and changed via the following parameters:

- ◆ **P525** Technological setpoint (active for P526 = 1001)
- ◆ **P526** Source of the technological setpoint (possible settings, refer to 4.3.1.3)
- ◆ **P527** Technological setpoint gain (–300 % to 300 % corresponds to the factor -3 to 3)
- ◆ **P528** Setpoint smoothing (to prevent setpoint steps)

Parameters P525 to P527 are basic/reserve parameters with **i001** for the basic setting
i002 for the reserve setting

The actual technological setpoint can be visualized using parameters r529.

The technological actual value can be entered and changed via the following parameters:

- ◆ **P530** internal source for the technological actual values. The parameter numbers of the internal drive converter quantities is specified here, which are to be used as technological actual value. This parameter has two indices. The quantity in i001 is selected with P531=1100, that in i002, with P531=1200.
- ◆ **P531** Source of the technological actual value (possible settings, refer to 4.3.1.3)
- ◆ **P532** Technological actual value gain (–300 % to 300 % corresponds to the factor -3 to 3)
- ◆ **P533** Actual value smoothing

Parameters P532 and P533 are basic/reserve parameters with **i001** for the basic setting
i002 for the reserve setting

The actual technological actual value can be visualized with parameter r534.

A binary status bit can be generated from the comparison of the technological setpoint and the technological actual value (status word **P627** „DE.T.Reg.Set.ex“).

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

The actual technological controller is a PID controller.

The input signal is the difference between the technological setpoint and the technological actual value (monitoring parameter r536).

The P component of the PID controller can be adjusted via parameters P537 „DE Reg Kp“, the I component via parameter P538 „DE Reg Tn“ and the D component via parameter P539 „DE Reg.Tv“. The I component can be completely disabled, by setting parameter P538 to 0. The same is true for the D component, which can be disabled by P539=0. This means, that when required, the controller can be used as pure P controller, as PD controller, as PI controller or as PID controller.

The controller output signal can be monitored via parameter r540. the controller is then active, if the inverter impulses are enabled and the technological controller is enabled (control word, bit 24=1, wiring via P584).

The technological controller output can still be limited via two freely adjustable limit values. The upper limit can be defined with parameter P541. This limit may not be exceeded. The lower limit, which also may not be exceeded, is defined using parameter P542.

In order that the technological controller can be smoothly switched-in, a ramp can be set for the upper limit via parameter P543, and a ramp for the lower limit via parameter P544. The limited output value can be checked via parameter r545. If the limiting is active, the I component of the PI controller is held, in order to be able to quickly move away from the limit.

The technological controller output can be wired to the following parameters with word 1020 and parameter **P433:"Src AddSetpoint1", P438 "Src AddSetpoint2", P443 "Src MainSetpoint", P486 "Src Torque Setp", P493 "Src FixTorque1", P499 "Src FixTorque2" and P506 "Src T FixAddSet".**

Additional applications of the technological controller:

1. Using P526 and r529 and parameters)531 and r534, process data can be transferred from one interface to the next.

Example:

Setpoints for the TB are to be entered in word05 and word06 via SST1. In order to permit this, the following parameterization must be made:

P526.01 = 2005 (word 05 from SST1)

P527.01 = 100.00% (no gain)

P528 = 0.0s (no smoothing)

P531.01 = 2006 (word 06 from SST1)

P532.01 = 100.00% (no gain)

P533 = 0.0s (no smoothing)

P694.02 = 529 (actual value W02 for TB is therefore word 05 from SST1)

P694.03 = 534 (actual value W03 for TB is therefore word 06 from SST1)

The technological controller does not have to be activated for this function(P584 = 0000).

2. The status bit 27 can be used as any comparator, by entering a comparison value via P525 and P526, and a comparison quantity via P530 and P531.

The technological controller does not have to be activated for this function(P584 = 0000).

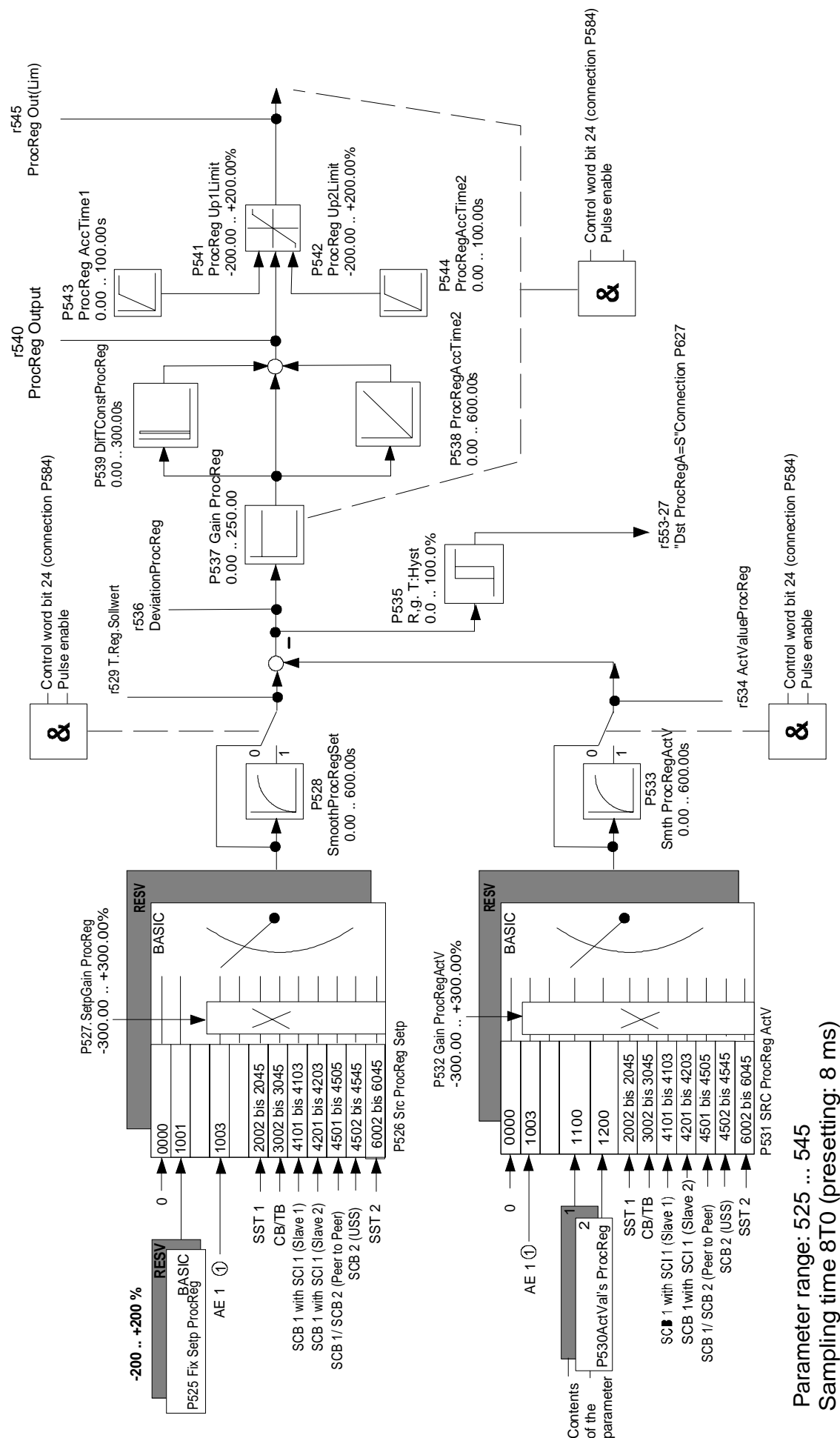


Fig. 4.4

Technology controller SIMOVERT SC

4.3.9.5 Tracer

The tracer is used to quickly trace drive converter quantities (e.g. current, voltage, speed) in the drive converter. This tracer has 8 channels, whereby all of the channels can work independently of one and another. All quantities are possible as trigger- and trace quantities, which are accessible as parameter in the drive converter. It is not possible to trace the parameters of a technological board (TB) (parameter Nos. greater than 1000 or d- or H parameters).

The trace memory includes a total of approximately 3 kbyte which are dynamically distributed, i.e. if 3 channels are activated, 1 kbyte RAM memory is available for each channel.

4.3.9.5.1 Parameterizing the tracer

As the tracer supports 8 independent channels, the parameters required for parameterization are indexed 8 times, whereby the channel number corresponds with the index number..

The **trigger event** is specified using the parameters

- **P735 "TRC Trigger par."**
- **P736 "TRC Trigger value"**
- **P737 "TRC Trigger cond."**

0	Value of the trigger parameter < trigger value
1	Value of the trigger parameter = trigger value
2	Value of the trigger parameter > trigger value
3	Drive converter goes into a fault condition
4	Value of the trigger parameter ≠ trigger value

Example: P735.01 = 1 (drive converter, r001)
 P736.01 = 16 (off with fast stop)
 P737.01 = 1 (same)
 Channel 1 of the tracer is triggered for fast stop active (off 3).

The **trace record function** is parameterized with:

- **P738 "TRC actual values"** Parameters which are to be recorded by the trace channel
- **P739 "TRC sampling time"** sampling time of the trace channel (as a multiple of the basic sampling time) 4,8,12,..., as the monitoring parameters are only updated in steps of 4 x P308.)
- **P740 "TRC Pretrigger"** Percentage of the data in the trace memory before the trigger event

Example: P738.01 = 219 (speed actual value)
 P739.01 = 4 (trace sampling time)
 P737.01 = 40 (pretrigger)
 The speed actual value is sampled with 4xT0 (T0 =P308) whereby 40% of the data in the traced memory are before the trigger event.

A trace channel can be started (1) and stopped (2) with **P741 "TRC start"**. The parameter is automatically reset to 0 if the trace channel has triggered and the trace has been completed.

Reading the trace data:

It is possible to the trace data via all of the interfaces of the drive converter. In this case a differentiation must be made between digital and analog output.

◆ Digitales Auslesen der Tracedaten über eine serielle Schnittstelle:

To read-out the trace data, parameters **r751 "TRC data channel1"** to **r758 "TRC data channel8"** are used for trace channels 1 to 8. These parameters are indexed with 116 indices (001 to 116). The complete parameter contents (116 words) can be read –out via the interfaces **SST1**, **SST2** and **SCB-SST** via the USS protocol with one telegram. The trace data themselves are then in indices i002 to i116; index i001 is used to control the trace data transfer. As the trace memory is greater than 116 words, a data block number can be specified over **P750 "TRC data block"**. If the value 0 is in parameter P750.01, trace data 1 to 115 (corresponds to data block 0) of channel1 can be read-out via parameter r751; if P750.01 = 1, trace data 116 to 230 (corresponds to data block 1) can be read-out via r751, etc.

In order to accelerate data read out, when the complete parameter contents are requested from one of the parameters r751 to r758, the associated data block in P750.0x is automatically incremented by one, so that the master reading out the data only has to request the trace data, without having to adjust the data block number.

The index i001 of the trace data parameters r751 to r758 is used to secure data and as end identification for trace data,. The data block No of the block returned is coded in the high byte of the i001, and in the low byte, the No. of valid trace data. If the No. of valid traced data is less than 115, the last traced data block has been reached, and the trace channel data have been read.

In order to read-out the traced data in the fashion described, USS with variable PKW length must be set as protocol (P685.0x=127). Only one trace data word can be read-out via the USS with fixed PKW length or via PROFIBUS-DP (board CB1), so that the read out time is correspondingly extended.

◆ Analog output via analog outputs:

The parameter numbers of the trace data parameter (r751 to r758) can be entered in the actual value parameters of the analog output. (**P655 "CU-AA actual values"** and **P664 "SCI-AA actual values"**) Trace data output are cyclically output at the relevant analog output. In this case, a trace data parameter cannot be simultaneously output by several analog outputs.

Normalizing the trigger value and the trace data:

Generally, the associated PZD normalization is valid for entering the trigger value (P736) and for the traced data which have been read. This means, that the trigger value in the PZD normalization of the trigger parameter (P735) must be entered. The trace data is also output in the PZD normalization of the traced parameter (P738). When a trace channel is output as analog signal the same conditions are valid as if the parameters recorded by the trace were to be directly output at the analog output.

Example:

The trace channel 2 should trigger if the speed actual value (r214) is greater than 2000 RPM. The frequency setpoint is recorded (r482). The rated analog frequency (P420) is 2000 RPM.

Trigger parameter: P735.02 = 219

Trigger value: P736.02 = 16384 (r219 = 100 %, if r219 = P420; 100 % = 4000H =16384)

Trigger condition: P737.02 = 2 (>)

Trace actual value. P738.02 = 482

reading-out the trace data r752 (for channel 2). The trace data is available in the normalization of r482 (100 % = 4000H = P420).

NOTE

- ◆ The trigger conditions (**greater** and **smaller**) are compared without sign. This must be taken into account if signed parameters are to be triggered for negative trigger values.
- ◆ As a result of the dynamic distribution of the trace memory, a previously inactive trace channel should not be parameterized or started, if another trace channel has triggered, or if the data of a trace channel still has to be read-out. If a trace channel is activated, it will be necessary to re-distribute the trace memory. This means that all of the data in the trace memory become invalid
- ◆ Only the most significant word is always traced for double-word parameters (type I4).
- ◆ For each activated trace channel, approximately 1% of the computation time is required, i.e. if several trace channels are activated, it may be necessary to increase the sampling time (**P308**).

4.3.9.6 Pulse encoder simulation

A pulse encoder interface is also available on the CU for a higher-level technology board control (e.g. T300). If an encoder is connected (P208 = 1), then the track signals of the encoder are output at this interface. For the recommended ERN1387, this is 2048 pulses in two tracks, displaced through 90°, as well as a zero pulse at each revolution. If a resolver is connected (P208 = 2,3) then, independent of the resolver type, there is always a simulation with 2048 pulses per mechanical revolution as well as a zero pulse.

The pulse encoder simulation can be accessed:

⇒ as TTL signal at connector X107 (for DORAM interface T300)

⇒ as HTL signal at customer terminals X102:

Zero pulse	terminal 39
Track A	terminal 37
Track B	terminal 38

4.3.10 Start-up after first start-up including subsequent enabling of software functions and hardware options

When starting-up the drive after a first start-up, the procedure (sequence) of the first start-up should be taken into account:

- Standard application; refer to Section 4.2.2
- Expert application: refer to Section 4.2.3
- ◆ 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 4.2.2): Changing motor data

- ◆ P051 = 2 Access stage
- ◆ P052 = 5 Function selection, "drive setting"
- ◆ Change motor data
- ◆ Check subsequent parameters
 - ◆ P052 = 7 Function selection "motor identification at standstill" (background calculations using new motor data)
- ◆ P051 = 1 Access stage

Description of the "function selection" (P052): Additional information in Section 4.3.9

Subsequent enabling of "functions": Additional information in Section 4.3.10

Subsequent enabling of "hardware options":

Additional information regarding the appropriate options is provided in the Instruction Manuals.

4.3.11 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.

Forming can be realized in one of the following ways:

- Version 1** Slowly increase the DC line voltage up to the rated converter input voltage in a forming time which is a function of the time that the converter was not operational (refer to Fig. 4.5).
- Version 2** Connect-up a rectifier and resistor to the DC link (Circuit: refer to Fig 4.6). The rectifier is connected-up for a time which is a function of the time that the converter was not operational (refer to Fig. 4.5).

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

Table 4.2 Serial number structure: A-E60147512345

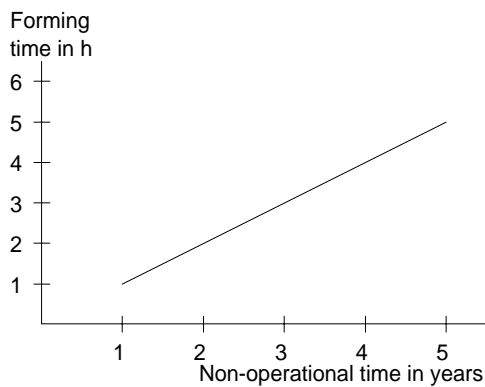
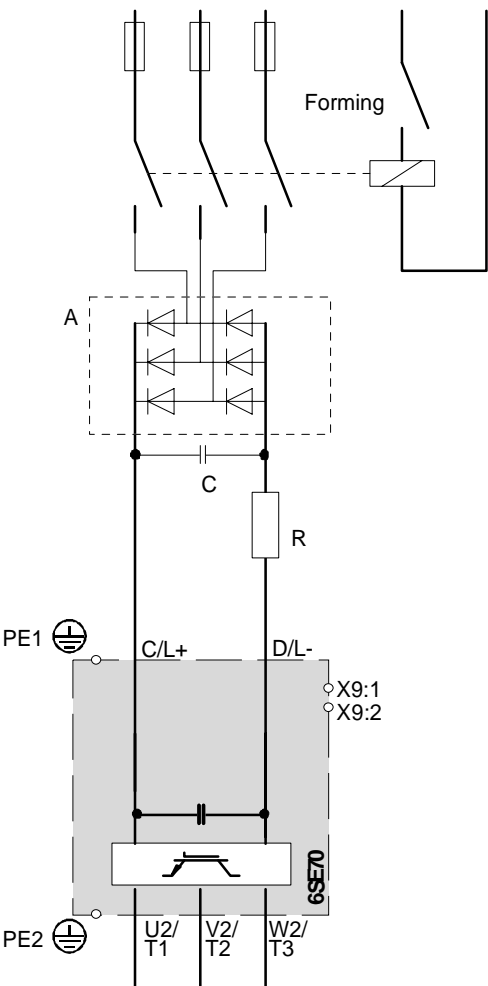


Fig. 4.5 Forming time as a function for the time which the converter was non-operational

	Recommended components		
	A	R	C
280 V < Un < 310 V	SKD 50 / 12	220 Ω / 700 W	22 nF / 1600 V
510 V < Un < 620 V	SKD 62 / 16	470 Ω / 1200 W	22 nF / 1600 V
675 V < Un < 930 V	SKD 62 / 18	680 Ω / 1700 W	22 nF / 1600 V

Fig 4.6 Circuit for forming, Version 2

4.4 Function Diagrams

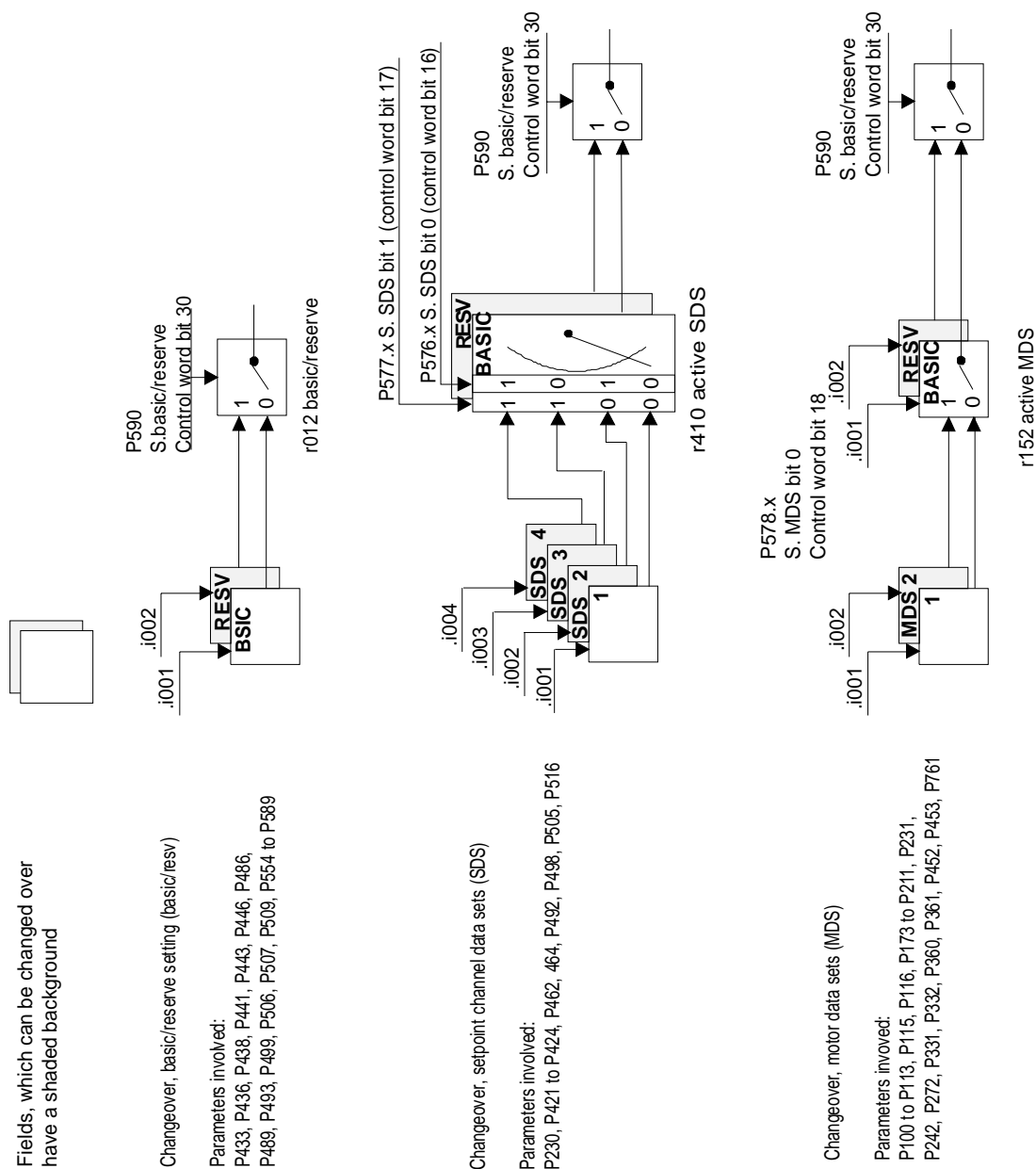


Fig. 4.7 Changeover basic/reserve setting

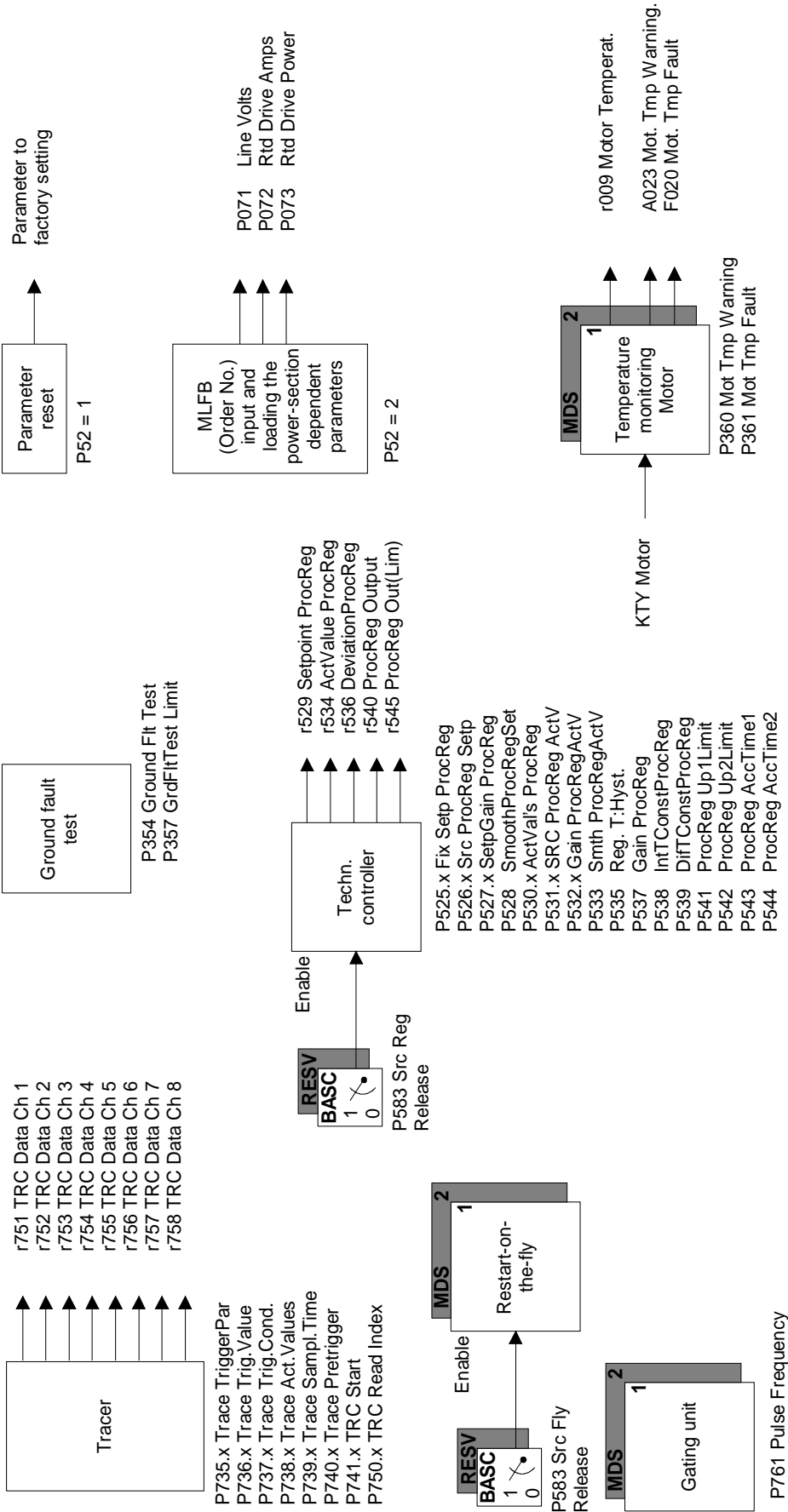


Fig. 4.8 Functions

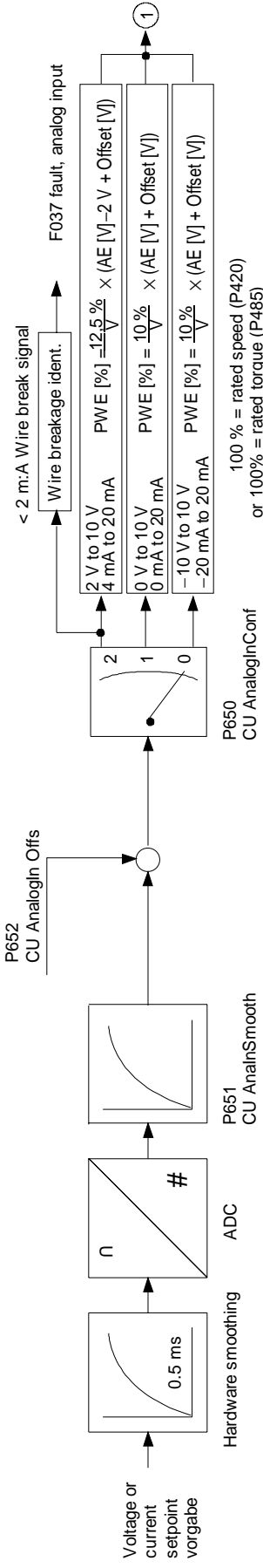


Fig. 4.9 Analog input

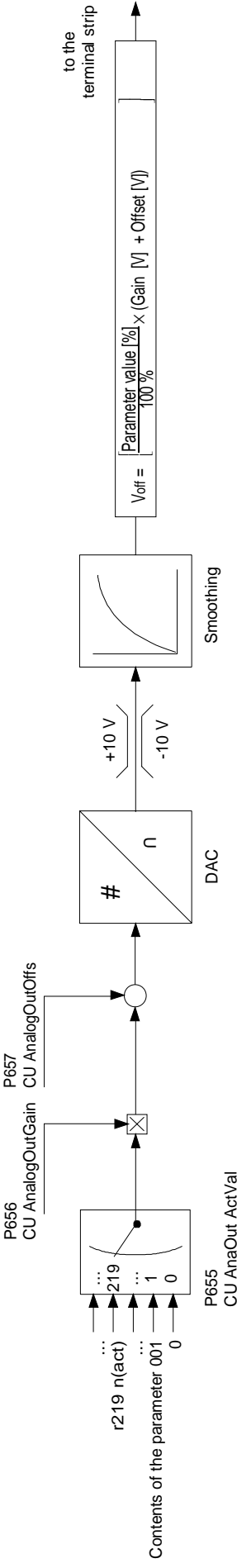


Fig. 4.10 Analog output

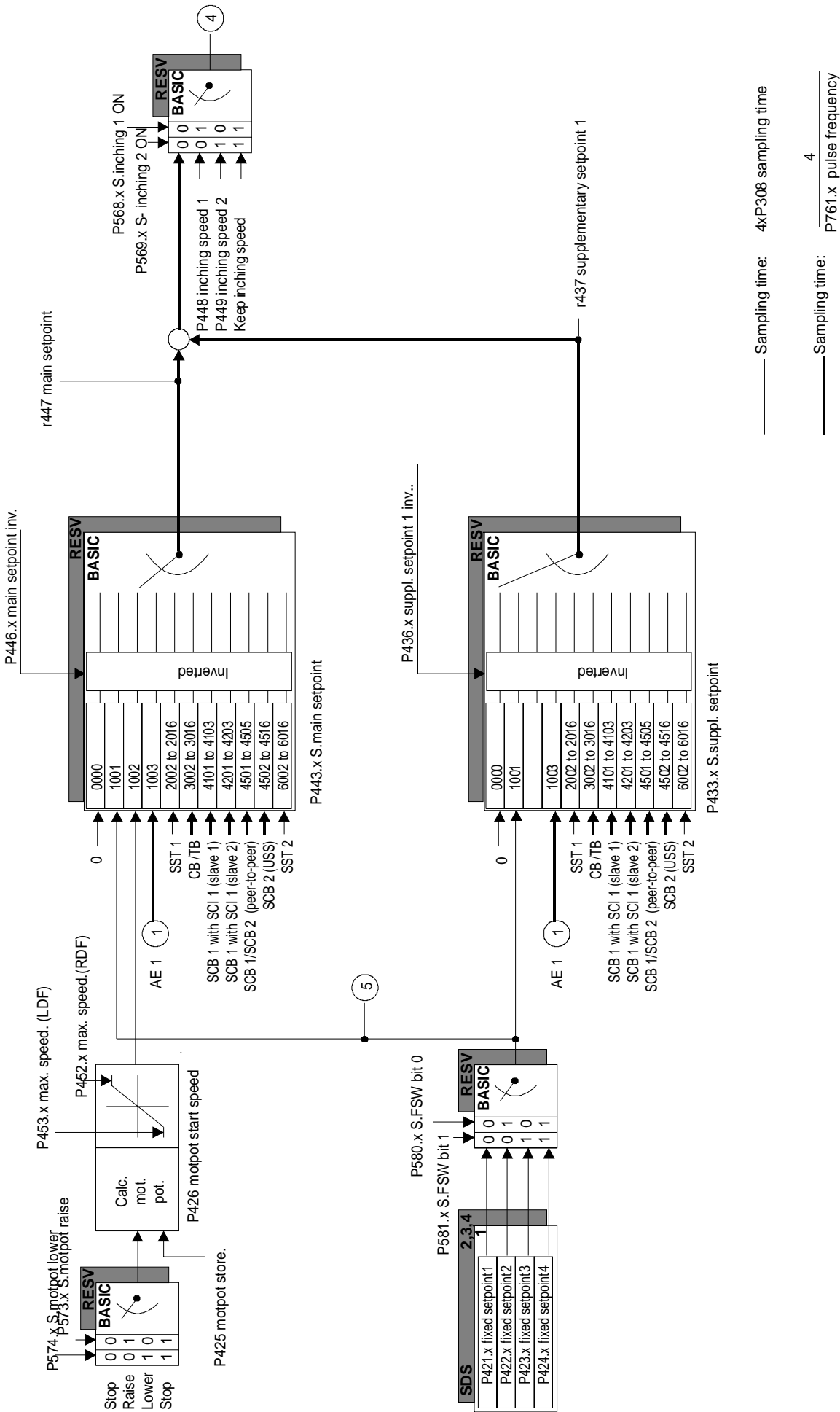


Fig. 4.11 Setpoint channel (Section 1)

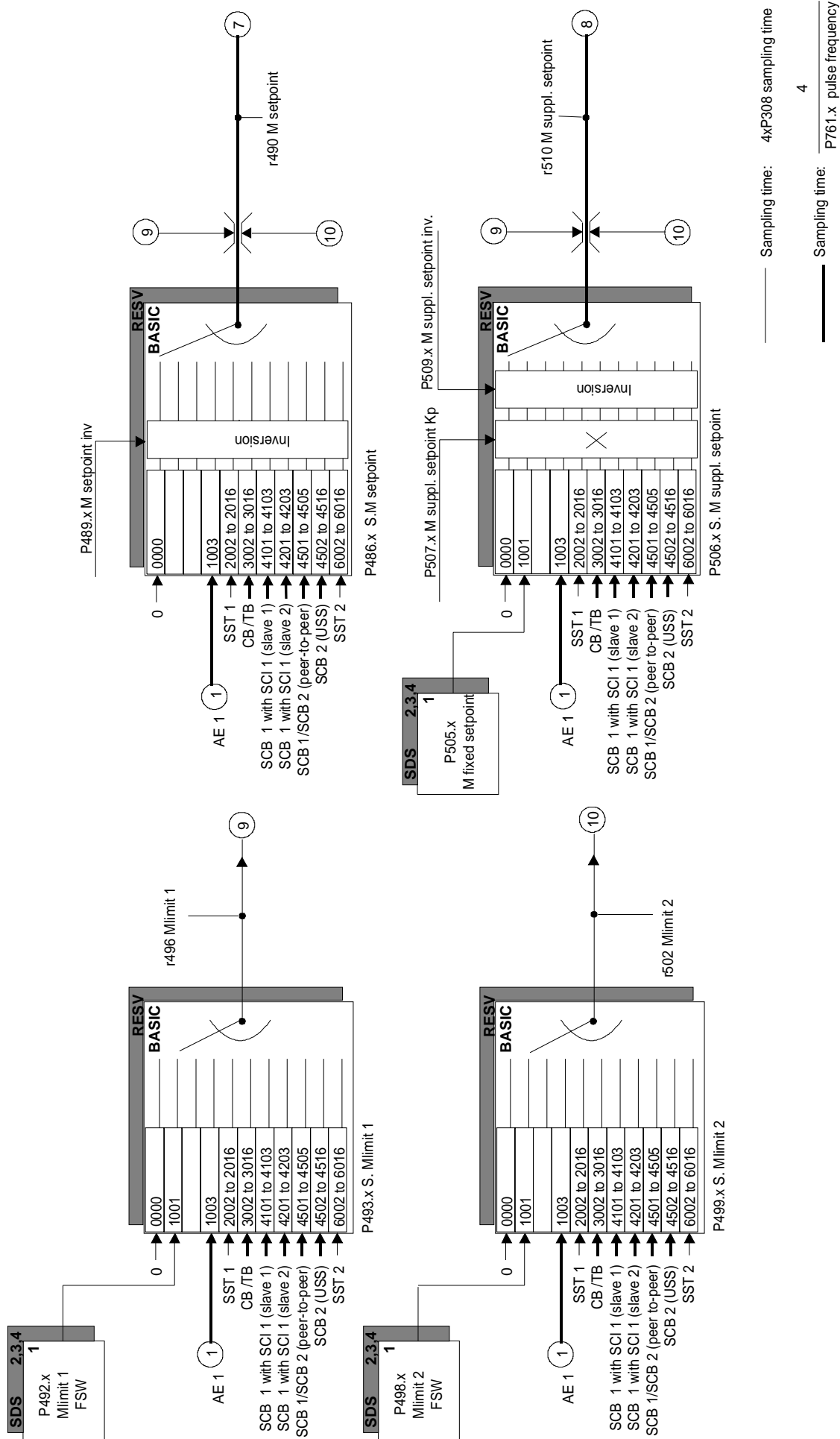


Fig. 4.13 Setpoint channel (Section 3)

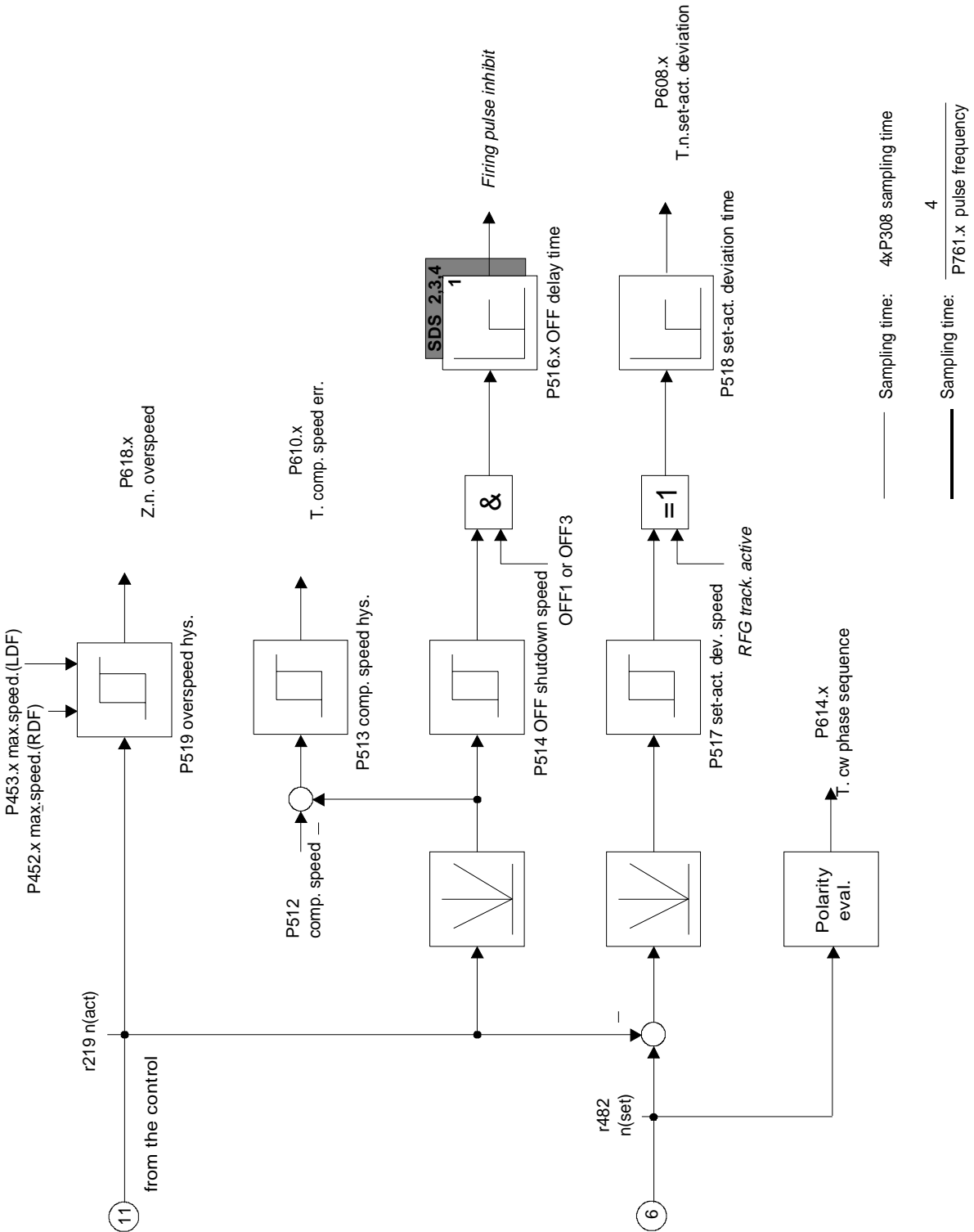


Fig. 4.14 Setpoint channel (Section 4)

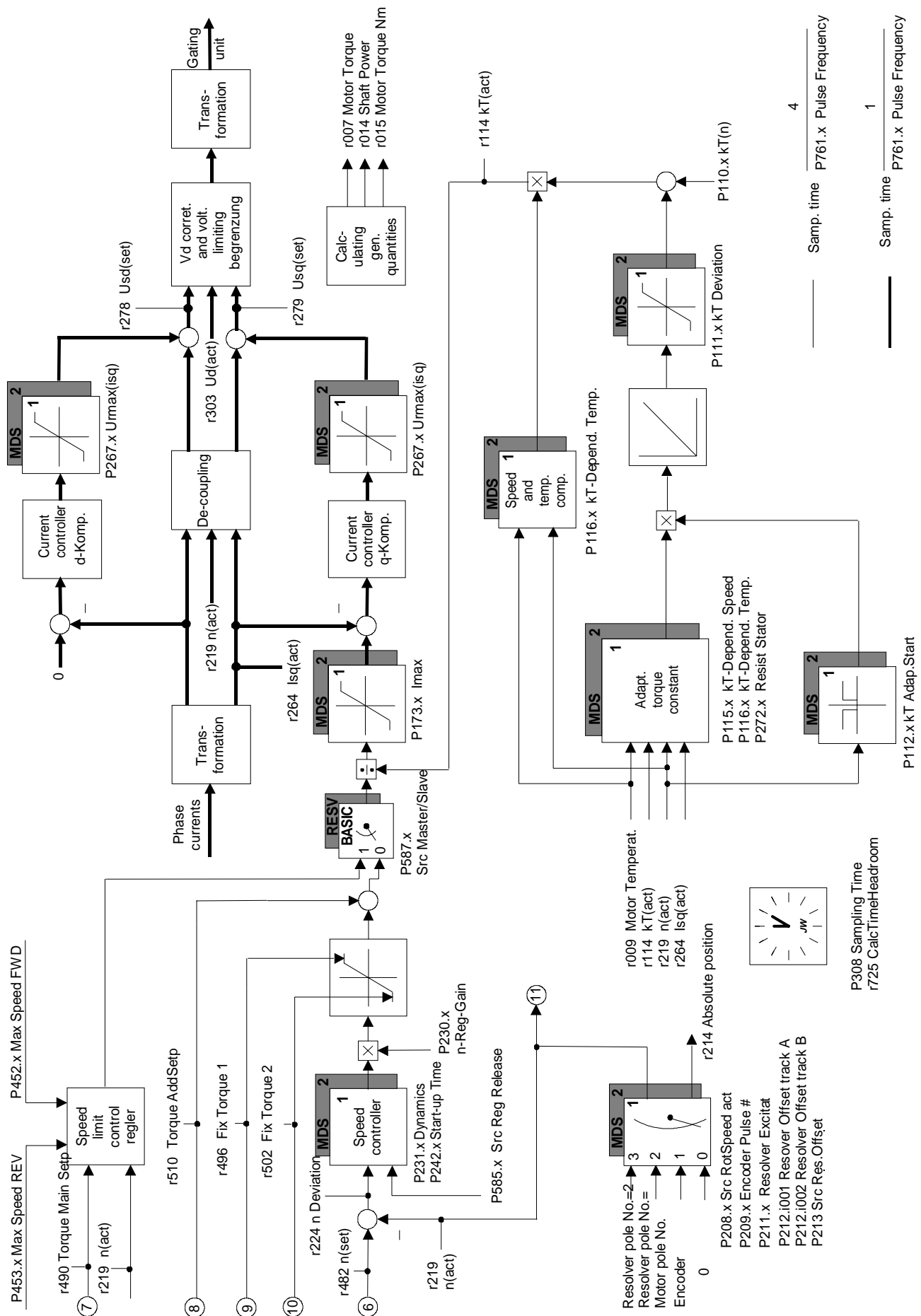


Fig. 4.15 Closed loop control

5 Parameter List

General Observation Parameters	to r013	Control and Status Word	from r550
General Parameters	from P050	Analog Input/Output	from P650
Drive Data	from P070	Communications	from P680
Hardware Configuration	from r089	Diagnosis	from r720
Motor Data	from P100	Modulator	from P761
Control	from r150	Factory Parameters	from P789
		Special Parameters	from 800
Functions	from r333	Profile Parameters	from P918
Setpoint Channel	from r410	Tech Board Parameters	from 1000

Explanations on the Parameter List

Example:

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: <u> </u> write: <u> </u>
P999 *1) 3E7Hex	Parameter name in OP1 Description Typ=I2; ²⁾ PKW: 1Hex=0.01Hz; Process Data Group.: 0 ³⁾	-300.00 to 300.00 [Hz]	2 i001=50.00 i002=50.00	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

I4 32 Bit Value with sign

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)
- 5 4000Hex = P485 Rated system Torque

4) Drive status:

- U MLFB Input
- H Hardware-Konfiguration
- A Hardware Setting
- B Ready (Including Fault)
- R (Run) Operation (including Fly Restart, Power Ride Thru, Flexible Response)

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 or 4 Indices, to be changed via Control Word 2, Bits 16 and 17
- MDS(2) Motor Data Set Parameter with 2 or 4 Indices, to be changed via Control Word 2, Bits 18 und 19
- 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.

5.1 General Observation Parameters

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: _/_ write: _/_
r000	Operation Display Displays Drive Status, Fault Messages and Warnings; see section 6		-	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 regulator optimization 20 = Synchronization active 21 = Download of parameter settings Analog Output: 100% Parameter Value=16384 Typ=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
r002 2Hex	Rot Speed Rotational Speed of the motor Analog Output: 100% @ Parameter Value=P420 Typ=I4; PKW: 1HEX=0.1min-1 PcD Gr.: 1	[min-1]	-	2 / BR
r003 3Hex	Output Volts Drive output voltage (Fundamental rms) Analog Output: 100% @ Parameter Value=4*P101 Typ=O2; PKW: 1HEX=0.1V PcD Gr.: 0	[V]	-	2 / BR
r004 4Hex	Output Amps Drive output current (Fundamental rms) Analog Output: 100% @ Parameter Value=1638.4A Typ=O2; PKW: 1HEX=0.1A PcD Gr.: 0	[A]	-	2 / BR
r006 6Hex	DC Bus Volts DC Bus voltage (actual value to be displayed on PMU and OP) Analog Output: 100% @ Parameter Value=16384V Typ=I2; PKW: 1HEX=1.0V PcD Gr.: 0	[V]	-	2 / BR
r007 7Hex	Motor Torque Calculated torque in % of rated motor torque P113 Analog Output: 100% @ Parameter Value=400.0% Typ=I2; PKW: 1HEX=0.1% PcD: 4000HEX=400%	[%]	-	2 / BR
r009 9Hex	Motor Temperat. The motor temperature is measured via a temperature sensor inside the motor (KTY84). Analog Output: 100% @ Parameter Value=16384°C Typ=I2; PKW: 1HEX=1.0°C PcD Gr.: 0	[°C]	-	2 / BR

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: <u> </u> / <u> </u> write: <u> </u> / <u> </u>
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 Typ=O2; PKW: 1HEX=1.0 PcD Gr.: 0	Base Reserve	-	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) Typ=O2; PKW: 1HEX=1.0 PcD Gr.: 0		3	2 / BR
r014 EHex	Shaft Power Shaft Power of the Motor Analog Output: 100% @ Parameter Value=1638.4kW Typ=I2; PKW: 1HEX=0.1kW PcD Gr.: 0	[kW]	-	2 / BR
r015 FHex	Motor Torque Nm Calculated Torque Analog Output: 100% @ Parameter Value=1638.4Nm Typ=I2; PKW: 1HEX=0.1Nm PcD Gr.: 0	[Nm]	-	2 / BR

5.2 General Parameters

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: <input type="checkbox"/> write: <input type="checkbox"/>
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 Typ=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 Typ=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 the parameter must be reset to 0. Typ=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 5 Return Par. Reset Set MLFB Download H/W Setting System Set.	- 0	2 /UHABR 2 /UHAB

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: <u>/</u> write: <u>/</u>
P053 * 35Hex	Parameter Access Release of interfaces for the 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) 32: BASE SERIAL2 (SST2) (SST2) 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. Typ=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 63	- 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 Typ=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 1 always ON dur.operat.	- 0	3 / BR 3 / BR

5.3 Drive Data

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: / write: /
P070 * 46Hex	MLFB (6SE70..) MLFB (order number) of the base drive Parameter values: see section 4.3.9.2 Typ=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 113	- 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] regulator (e. g. undervoltage failure limit). Typ=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 Typ=O2; PKW: 1HEX=0.1A PcD Gr.: 0	5.0 to 200.0 [A]	- ←	2 / U BR 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, P558, P568, P571, P572, P573, P574, P575, P588, P602, P607 3: With this setting, with respect to 0, the following parameters are initialized differently: P554, P558, P565, P575, P588, P602, P607 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	Baugr. Steckpl.1 Baugruppe auf Steckplatz 1 (links) in der Elektronikbox Parameterwerte: 0 = keine (nur formal notwendig) 1 = CU-Baugruppe für FC 2 = CU-Baugruppe für VC 3 = CU-Baugruppe für SC Type=O2; PKW: 1HEX=1.0 PZD-Gr.: 0	0 bis 3 keine FC VC SC		3 / B

5.4 Hardware Configuration

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# 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: <div style="display: flex; justify-content: space-between;"> <div> Position #3(P091) - - - - SCB CB SCB CB CB TSY SCB TSY </div> <div> Position #2(P090) CB TB SCB TSY CB TB SCB TSY CB TSY SCB SCB </div> </div> Typ=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 Typ=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 4	- 0	3 / H BR 3 / H

5.5 Motor Data

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: / write: /
P100 * 64Hex	Type of Motor Automatic parameterization of the drive for a Siemens 1FT6 type motor. The number provided with the documentation of the motor must be entered. If other motors are used the parameter must be set to 250 (P051=3). In this case the motor dependent parameters must be set manually (see 4.2.1) Parameter values 1...249 reserved for SIEMENS 1FT6 (see 4.2.1) 250 other synchronous servo motors MDS(2) Parameter Typ=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 250	2 i001=0 i002=0	2 / ABR 2 / A
P102 66Hex	Motor Rtd Amps Rated motor current, if P100 <> 250 the correct value is automatically taken from the motor data list. MDS(2) Parameter Typ=O2; PKW: 1HEX=0.1A PcD Gr.: 0	0.0 to 200.0 [A]	2 i001=0.0 i002=0.0	3 / ABR 3 / A
P108 6CHex	Motor Rtd Speed Rated motor speed; if P100 <> 250 the correct value is automatically taken from the motor data list MDS(2) Parameter Typ=O2; PKW: 1HEX=1.0min-1 PcD Gr.: 0	0 to 9000 [min-1]	2 i001=0 i002=0	3 / ABR 3 / A
P109 6DHex	Motor #PolePairs Number of pole pairs; if P100 <> 250 the correct value is automatically taken from the motor data list MDS(2) Parameter Typ=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 10	2 i001=0 i002=0	3 / ABR 3 / A
P110 6EHex	Rtd kT Torque / current ratio constant; if P100 <> 250 the correct value is automatically taken from the motor data list MDS (2) Parameter Typ=O2; PKW: 1HEX=0.01Nm/A PcD Gr.: 0	0.00 to 4.99 [Nm/A]	2 i001=0.00 i002=0.00	3 / ABR 3 / A
P111 6FHex	kT Deviation Maximum possible deviation between the adapted torque constant and the value of P110; if P100 <> 250 the correct value is automatically taken from the motor data list MDS (2) Parameter Typ=O2; PKW: 1HEX=0.01Nm/A PcD Gr.: 0	0.00 to 1.00 [Nm/A]	2 i001=0.00 i002=0.00	3 / ABR 3 / A
P112 70Hex	kT Adap.Start Speed limit above which the torque constant is adapted in % of rated motor speed; below this speed the torque constant is open loop controlled; if P100 <> 250 the correct value is automatically taken from the motor data list MDS (2) Parameter Typ=O2; PKW: 1HEX=1.0% PcD Gr.: 0	0 to 100 [%]	2 i001=0 i002=0	3 / ABR 3 / A
P113 71Hex	Motor Rtd Torque Rated motor torque, if P100 <> 250 the correct value is automatically taken from the motor data list MDS (2) Parameter Typ=O2; PKW: 1HEX=0.1Nm PcD Gr.: 0	0.0 to 1000.0 [Nm]	2 i001=0.0 i002=0.0	3 / ABR 3 / A

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: <u>/</u> write: <u>/</u>
r114 72Hex	kT(act) Actual value of the adapted torque constant Analog Output: 100% @ Parameter Value=163.84Nm/A Typ=O2; PKW: 1HEX=0.01Nm/A PcD Gr.: 0	[Nm/A]	-	2 R
P115 73Hex	kT-Depend. Speed Proportional factor between kT and the speed. If P100 <> 250 the correct value is automatically taken from the motor data list. The torque constant depends on speed and temperature: $kT = P110 * [(1 - \frac{P115 * n}{6000 \text{ min}^{-1}})^{3/2} * (1 - \frac{P116 * T}{100 \text{ K}})]$ MDS(2) Parameter Typ=O2; PKW: 1HEX=0.1% PcD Gr.: 0	0.0 to 25.0 [%]	2 i001=0.0 i002=0.0	3 / ABR 3 / A
P116 74Hex	kT-Depend. Temp. Proportional factor between kT and the motor temperature. If P100 <> 250 the correct value is automatically taken from the motor data list. For details see also P115. MDS(2) Parameter Typ=O2; PKW: 1HEX=0.1% PcD Gr.: 0	0.0 to 25.0 [%]	2 i001=0.0 i002=0.0	3 / ABR 3 / A

5.6 Control

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: / write: /
r152 98Hex	act. MotDataSet Displays the active motor data set; Parameter values: 0: motor data set 1 1: motor data set 2 2: motor data set 3 3: motor data set 4 Typ=O2; PKW: 1HEX=1.0 PcD Gr.: 0	MotDataSet1 MotDataSet2 MotDataSet3 MotDataSet4	-	3 / ABR
P163 A3Hex	Control Mode Parameter values: 4: Speed regulation 5: Torque regulation Control word 2 Bit 27 (master / slave) switches between these values. Typ=O2; PKW: 1HEX=1.0 PcD Gr.: -	4 to 5 n Regulat. T Regulat.	4	3 / ABR 3 /
P173 ADHex	Imax Maximum current (Fundamental rms) Setpoint signal for the current limit to protect the motor and the drive, respectively. If P100 <> 250 the correct value is automatically taken from the motor data list MDS(2) Parameter Typ=O2; PKW: 1HEX=0.1A PcD Gr.: 0	0.0 to 2000.0 [A]	2 i001=0.0 i002=0.0	3 / ABR 3 / AB
P208 D0Hex	Src RotSpeed act Type of tachometer Parameter values: 0: not allowed 1: Encoder ERN 1387 or compatible encoder 2: Resolver with same # of pole pairs as the motor 3: Resolver with # of pole pairs '1' MDS(2) Parameter Typ=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 3 none Encoder Resol#p mot Resolv #p=1	2 i001=0 i002=0	2 / ABR 2 / A
P209 D1Hex	Encoder Pulse # Number of pulses of the encoder (only for P208=1); the parameter value must be a power of 2; if P100 <> 250 the correct value is automatically taken from the motor data list. MDS(2) Parameter Typ=O2; PKW: 1HEX=1.0 PcD Gr.: 0	0 to 8192	2 i001=0 i002=0	3 / ABR 3 / A
P211 D3Hex	Resolver Excitat For the adaptation to different types of resolvers or different cable lengths the amplitude of the excitation of the resolver can be adjusted in 7 steps Parameter values: 0: automatic adjustment 1 ... 7: manual adjustment of the amplitude (amplitude is P211 * 3.4 V) If P100 <> 250 the correct value is automatically taken from the motor data list. MDS(2) Parameter Typ=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 7	2 i001=0 i002=0	3 / ABR 3 / A
P212 D4Hex	Resolver Offset Offset of the resolver evaluating circuit on the CU board. The offset is automatically measured during motor data identification; see also P213. When P211=0 (automatic excitation adjustment) a value of '1' equates approximately 0.05% of the amplitude. Indices: i001 = Tr A: Offset of resolver track A i002 = Tr B: Offset of resolver track B Typ=I2; PKW: 1HEX=1.0 PcD Gr.: 0	-2048 to 2048	2 i001=0 i002=0	3 / BR 3 / BR

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: write: _/_
P267 10BHex	VRegMax(isq) Maximum output voltage of the Iq current controller; if P100 <> 250 the correct value is automatically taken from the motor data list. MDS(2) Parameter Analog Output: 100% @ Parameter Value=1638.4V Type=O2; PKW: 1HEX=0.1V PcD Gr.: 0	0.0 to 999.9 [V]	2 i001=100.0 i002=100.0	3 / ABR 3 / A
P272 110Hex	ResistStator+Cab Stator resistance of the motor; if P100 <> 250 the correct value is automatically taken from the motor data list. MDS(2) Parameter Typ=O2; PKW: 1HEX=0.001Ohm PcD Gr.: 0	0.000 to 60.000 [Ohm]	2 i001=0.000 i002=0.000	3 / ABR 3 / AB
r278 116Hex	Usd(set) Flux generating voltage component (total of current regulator output signal and decoupling circuit output). Analog Output: 100% @ Parameter Value=1638.4V Typ=I2; PKW: 1HEX=0.1V PcD Gr.: 0	[V]	-	3 R
r279 117Hex	Usq(set) Torque generating voltage component (total of current regulator output signal and decoupling circuit output). Analog Output: 100% @ Parameter Value=1638.4V Typ=I2; PKW: 1HEX=0.1V PcD Gr.: 0	[V]	-	3 R
r303 12FHex	DC BusVolt (act) unfiltered actual value of the DC link bus voltage Analog Output: 100% @ Parameter Value=1638.4V Typ=I2; PKW: 1HEX=0.1V PcD Gr.: 0	[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 entered in P071 $\left(\frac{P071}{1,35}\right)$. Analog Output: 100% @ Parameter Value=1638.4V Typ=O2; PKW: 1HEX=0.1V PcD Gr.: 0	[V]	-	3 / BR
P308 134Hex	Sampling Time Shortest sampling time of the operation system 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). Typ=O2; PKW: 1HEX=0.1ms PcD Gr.: 0	0.3 to 4.0 [ms]	- 1.0	3 / ABR 3 / A

5.7 Functions

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: <input type="checkbox"/> write: <input type="checkbox"/>
P330 14AHex	Mot ID Selection of the motor data identification program Parameter values: 0: Motor data identification only to be performed after a new motor has been selected (new index value in P100) 1: Motor data identification after every ON command Typ=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 1 First ON every ON	- 0	3 / ABR 3 / A
P331 14BHex	Mot ID Amplitude Voltage amplitude for the motor data identification; if P100 <> 250 the correct value is automatically taken from the motor data list MDS(2) Parameter Typ=O2; PKW: 1HEX=0.1V PcD Gr.: 0	0.0 to 100.0 [V]	2 i001=0.0 i002=0.0	3 / ABR 3 / A
P332 14CHex	Mot ID #ofCycles Number of measurement cycles in the motor data identification program; if P100 <> 250 the correct value is automatically taken from the motor data list MDS(2) Parameter Typ=O2; PKW: 1HEX=1.0 PcD Gr.: 0	0 to 10000	2 i001=0 i002=0	3 / ABR 3 / A
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 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 Typ=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 2 not active next ON every ON	- 0	3 / ABR 3 / ABR
P357 165Hex	GrdFltTest Limit Current limit for recognizing a ground fault within the times defined in P355 and P356. Typ=O2; PKW: 1HEX=0.1A PcD Gr.: 0	0.0 to 5.0 [A]	- 1.0	3 / ABR 3 / AB
P360 168Hex	Mot Tmp Warning Limit for the warning message 'Motor overtemperature' (P625). Example: for isolation class B: <=110°C; EXd<=100°C for isolation class F: <=145°C; EXd<=145°C Description for setting: a parameter value > 0 activates this function. MDS(2) Parameter Typ=I2; PKW: 1HEX=1.0°C PcD Gr.: -	0 to 160 [°C]	2 i001=80 i002=80	2 / BR 2 / BR
P361 169Hex	Mot Tmp Fault Limit for the fault message 'Motor overtemperature' (P626). Example: for isolation class B: <=110°C; EXd<=100°C for isolation class F: <=145°C; EXd<=145°C Description for setting: a parameter value > 0 activates this function. MDS(2) Parameter Typ=I2; PKW: 1HEX=1.0°C PcD Gr.: 0	0 to 300 [°C]	2 i001=110 i002=110	2 / BR 2 / BR

5.8 Setpoint Channel

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# 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 2: setpoint data set 3 3: setpoint data set 4 Analog Output: 100% @ Parameter Value=16384 Typ=Q2; PKW: 1HEX=1.0 PcD Gr.: 0	SDS 1 SDS 2 SDS 3 SDS 4	-	3 / BR
P420 1A4Hex	System Rtd Speed Rated system speed Reference quantity for acceleration time (P462), deceleration time (P464), hysteresis for 'ramp generator active' message (P476), base setpoint (P445) and for speed / frequency actual values which are issued via analog outputs or serial communications. Via an analog output actual values up to rated system speed can be issued, via automation system up to double rated system speed. Typ=I4; PKW: 1HEX=0.1min-1 PcD Gr.: 1	1.0 to 9000.0 [min-1]	- 3000.0	2 / ABR 2 / AB
P421 1A5Hex	Fixed Freq1(set) Note: By setting the correlated bits of the control word (r551) the fixed setpoint is activated from the source defined in P580 / P581. Maximum value: double rated system speed. SDS(4) Parameter Typ=I4; PKW: 1HEX=0.1min-1 PcD Gr.: 1	-9000.0 to 9000.0 [min-1]	4 i001=3000.0 i002=3000.0 i003=3000.0 i004=3000.0	2 / BR 2 / BR
P422 1A6Hex	Fixed Freq2(set) Note: By setting the correlated bits of the control word (r551) the fixed setpoint is activated from the source defined in P580 / P581. Maximum value: double rated system speed. SDS(4) Parameter Typ=I4; PKW: 1HEX=0.1min-1 PcD Gr.: 1	-9000.0 to 9000.0 [min-1]	4 i001=- 3000.0 i002=- 3000.0 i003=- 3000.0 i004=- 3000.0	2 / BR 2 / BR
P423 1A7Hex	Fixed Freq3(set) Note: By setting the correlated bits of the control word (r551) the fixed setpoint is activated from the source defined in P580 / P581. Maximum value: double rated system speed. SDS(4) Parameter Typ=I4; PKW: 1HEX=0.1min-1 PcD Gr.: 1	-9000.0 to 9000.0 [min-1]	4 i001=1000.0 i002=1000.0 i003=1000.0 i004=1000.0	2 / BR 2 / BR
P424 1A8Hex	Fixed Freq4(set) Note: By setting the correlated bits of the control word (r551) the fixed setpoint is activated from the source defined in P580 / P581. Maximum value: double rated system speed. SDS(4) Parameter Typ=I4; PKW: 1HEX=0.1min-1 PcD Gr.: 1	-9000.0 to 9000.0 [min-1]	4 i001=250.0 i002=250.0 i003=250.0 i004=250.0	2 / BR 2 / BR

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: <u> </u> write: <u> </u>
P425 1A9Hex	MotPot Storing 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, the MOP start frequency is cleared after an OFF command or a power outage. Parameter values: 0: MOP setpoint is not saved 1: MOP setpoint is saved Typ=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 1 OFF ON	- 0	2 / BR 2 / BR
P426 1AAHex	MOP start speed Start speed of the motor operated potentiometer (MOP) Description for Setting: This value may also be changed via bits of the control word (P573 (MOP up), P574 (MOP down)). Depending on P425 the actual parameter value is saved or cleared after turn OFF or a power outage. Typ=l4; PKW: 1HEX=0.1min-1 PcD Gr.: 1	-9000.0 to 9000.0 [min-1]	- 0.0	3 / BR 3 / BR
P433 * 1B1Hex	Src AddSetpoint1 Source of the additional setpoint signal 1 (in front of 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 Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 6045	2 i001=0 i002=0	3 / BR 3 / BR
P436 1B4Hex	Invert Add Setp1 Inverting of the additional setpoint signal 1 Parameter values: 0: additional setpoint 1 not inverted 1: additional setpoint 1 inverted B/R Parameter Typ=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 1 not invert. inverted	2 i001=0 i002=0	3 / BR 3 / BR
r437 1B5Hex	n Add Setpoint 1 Actual additional speed setpoint 1 (in front of the ramp generator) Analog Output: 100% @ Parameter Value=P420 Typ=l4; PKW: 1HEX=0.1min-1 PcD Gr.: 1	[min-1]	-	3 / BR
P438 * 1B6Hex	Src AddSetpoint2 Source of the additional setpoint signal 2 (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 Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 6045	2 i001=0 i002=0	3 / BR 3 / BR
P441 1B9Hex	Invert Add Setp2 Inverting of the additional setpoint signal 2 Parameter values: 0: Additional setpoint 2 not inverted 1: Additional setpoint 2 inverted B/R Parameter Typ=O2; PKW: 1HEX=1.0 PcD Gr.: 0	0 to 1 not invert. inverted	2 i001=0 i002=0	3 / BR 3 / BR



PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: <u>/</u> write: <u>/</u>
r442 1BAHex	n Add Setpoint 2 Actual additional setpoint 2 (behind the ramp generator) Analog Output: 100% @ Parameter Value=P420 Typ=I4; PKW: 1HEX=0.1min-1 PcD Gr.: 1	[min-1]	-	3 / BR
P443 * 1BBHex	Src MainSetpoint Source of the 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 Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 6045	2 i001=1002 i002=1001	2 / BR 2 / BR
P446 1BEHex	Invert Main Setp Inverting of the main setpoint signal Parameter values: 0: Main setpoint not inverted 1: Main setpoint inverted B/R Parameter Typ=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 1 not invert. inverted	2 i001=0 i002=0	2 / BR 2 / BR
r447 1BFHex	n Main Setpoint Actual speed main setpoint Analog Output: 100% @ Parameter Value=P420 Typ=I4; PKW: 1HEX=0.1min-1 PcD Gr.: 1	[min-1]	-	2 / BR
P448 1C0Hex	Jog Speed 1 Jog speed 1 Typ=I4; PKW: 1HEX=0.1min-1 PcD Gr.: 1	-9000.0 to 9000.0 [min-1]	- 200.0	2 / BR 2 / BR
P449 1C1Hex	Jog Speed 2 Jog speed 2 Typ=I4; PKW: 1HEX=0.1min-1 PcD Gr.: 1	-9000.0 to 9000.0 [min-1]	- 1000.0	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=I4; PKW: 1HEX=0.001Hz PcD Gr.: 1	[Hz]	-	3 / BR
P452 1C4Hex	Max Speed FWD Maximum forward speed; if P100 <> 250 the correct value is automatically taken from the motor data list MDS(2) Parameter Typ=I4; PKW: 1HEX=0.1min-1 PcD Gr.: 1	-9000.0 to 9000.0 [min-1]	2 i001=0.0 i002=0.0	2 / ABR 2 / AB
P453 1C5Hex	Max Speed REV Maximum reverse speed; if P100 <> 250 the correct value is automatically taken from the motor data list MDS(2) Parameter Typ=I4; PKW: 1HEX=0.1min-1 PcD Gr.: 1	-9000.0 to 9000.0 [min-1]	2 i001=0.0 i002=0.0	2 / ABR 2 / AB
r460 1CCHex	n (set,Ramp IN) Speed setpoint signal at ramp generator input Analog Output: 100% @ Parameter Value=P420 Typ=I4; PKW: 1HEX=0.1min-1 PcD Gr.: 1	[min-1]	-	3 / BR

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: <u>/</u> write: <u>/</u>
P462 1CEHex	Accel. Time Ramp generator acceleration time for acceleration from 0 to rated system speed (P420). SDS(4) Parameter Typ=O2; PKW: 1HEX=0.01s PcD Gr.: 0	0.00 to 99.99 [s]	4 i001=10.00 i002=10.00 i003=0.01 i004=0.01	2 / ABR 2 / ABR
P464 1D0Hex	Decel. Time Ramp generator deceleration time for deceleration from rated system speed (P420) to standstill SDS(4) Parameter Typ=O2; PKW: 1HEX=0.01s PcD Gr.: 0	0.00 to 99.99 [s]	4 i001=20.00 i002=20.00 i003=0.01 i004=0.01	2 / ABR 2 / ABR
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) Typ=O2; PKW: 1HEX=0.1% PcD Gr.: -	0.0 to 20.0 [%]	- 1.0	3 / BR 3 / BR
r478 1DEHex	dn/dt(ramp gen) Change of speed of the ramp generator per sampling period (4 * base sampling period (P308)) in min ⁻¹ / sec. Analog Output: 100% @ Parameter Value=P420 Typ=l4; PKW: 1HEX=0.1 PcD Gr.: 1		-	3 / BR
r480 1E0Hex	n/f(set,rampOUT) Speed setpoint at the output of the ramp generator Analog Output: 100% @ Parameter Value=P420 Typ=l4; PKW: 1HEX=0.1min-1 PcD Gr.: 1	[min-1]	-	3 / BR
r482 1E2Hex	n (set) Speed setpoint at the input of the control circuit Analog Output: 100% @ Parameter Value=P420 Typ=l4; PKW: 1HEX=0.1min-1 PcD Gr.: 1	[min-1]	-	2 / BR
P485 1E5Hex	System RtdTorque Rated system torque in % of rated motor torque Scaling reference for torque setpoint signals which are entered via the admitted sources of the setpoint wiring (see process data wiring of the setpoint channel) This scaling is also valid for torque actual values which are issued via output channels (analog outputs, serial communications). Actual values up to P485 * rated motor torque can be issued via analog outputs, up to 2 * P485 * rated motor torque via automation interfaces. Typ=O2; PKW: 1HEX=0.1% PcD: 4000HEX=400%	0.1 to 800.0 [%]	- 100.0	3 / ABR 3 / AB
P486 * 1E6Hex	Src Torque Setp Source of the torque setpoint signal Parameter values: 1001: not allowed 1002: not allowed other values: see process data wiring of the setpoint channel. B/R Parameter Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 6045	2 i001=0 i002=0	3 / BR 3 / BR

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: write: _/_
P489 1E9Hex	Torq setp.Invert Inverts of the torque setpoint Parameter values: 0: Torque setpoint not inverted 1: Torque setpoint inverted B/R Parameter Typ=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 1 not invert. inverted	2 i001=0 i002=0	3 / BR 3 / BR
r490 1EAHex	Torque MainSetp Actual torque setpoint in % of rated motor torque (P113) Analog Output: 100% @ Parameter Value=P485 Typ=I2; PKW: 1HEX=0.1% PcD Gr.: 5	[%]	-	3 / BR
P492 1ECHex	FixTorque 1 Set Fixed upper limit of the torque setpoint in % of the rated motor torque. Note: P492 is also the upper torque limit during an external setpoint (P493 <> 1001) SDS(4) Parameter Typ=I2; PKW: 1HEX=0.1% PcD: 4000HEX=400%	-400.0 to 400.0 [%]	4 i001=100.0 i002=100.0 i003=100.0 i004=100.0	3 / BR 3 / BR
P493 * 1EDHex	Src FixTorque 1 Source of the upper torque limit. Parameter values: 1001: internal upper fixed torque limit (P492) 1002: not allowed other values: see process data wiring of the setpoint channel. Note: The torque limit can only be changed within the range specified by the upper limit for the torque setpoint (P492). B/R Parameter Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 6045	2 i001=1001 i002=1001	3 / BR 3 / BR
r496 1F0Hex	Fix Torque 1 Maximum value of the upper torque limit in % of rated motor torque Display parameter of the output of the upper torque limit (P493) Analog Output: 100% @ Parameter Value=P485 Typ=I2; PKW: 1HEX=0.1% PcD Gr.: 5	[%]	-	3 / BR
P498 1F2Hex	FixTorq 2 Set Fixed lower torque limit in % of the rated motor torque. Note: P498 is also the lower torque limit during an external setpoint (P499 <> 1001) SDS(4) Parameter Typ=I2; PKW: 1HEX=0.1% PcD: 4000HEX=400%	-400.0 to 400.0 [%]	4 i001=-100.0 i002=-100.0 i003=-100.0 i004=-100.0	3 / BR 3 / BR
P499 * 1F3Hex	Src FixTorq 2 Source of the lower torque limit. Parameter values: 1001: upper limit for the torque setpoint (P498) 1002: not allowed other values: see process data wiring of the setpoint channel. Note: The lower torque limit can only be changed within the range specified by the limit for the regenerative operation torque setpoint (P498). B/R Parameter Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 6045	2 i001=1001 i002=1001	3 / BR 3 / BR

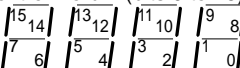
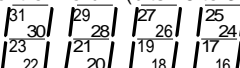
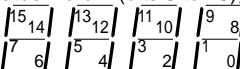
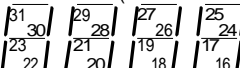
PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: <u> </u> write: <u> </u>
r502 1F6Hex	Fix Torque 2 Maximum value of the lower torque limit in % of rated motor torque. Display parameter of the output of the source of the lower torque limit (P499) Analog Output: 100% @ Parameter Value=P485 Typ=I2; PKW: 1HEX=0.1% PcD Gr.: 5	[%]	-	3 / BR
P505 1F9Hex	Torque Fix Set Fixed setpoint for the additional torque % of the rated motor torque (P113).. SDS(4) Parameter Typ=I2; PKW: 1HEX=0.1% PcD: 4000HEX=400%	-150.0 to 150.0 [%]	4 i001=5.0 i002=5.0 i003=5.0 i004=5.0	3 / BR 3 / BR
P506 * 1FAHex	Src T FixAdd Set Source of the additional torque setpoint. Parameter values: 1001: Fixed torque setpoint (P505) 1002: not allowed other values: see process data wiring of the setpoint channel. B/R Parameter Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 6045	2 i001=0 i002=0	3 / BR 3 / BR
P507 1FBHex	T FixAddSet Gain Proportional gain of the additional torque setpoint B/R Parameter Typ=I2; PKW: 1HEX=0.01 PcD Gr.: 0	0.00 to 128.00	2 i001=1.00 i002=1.00	3 / BR 3 / BR
P509 1FDHex	InvertFixAddTorq Inverts of the additional torque setpoint Parameter values: 0: not inverted 1: inverted B/R Parameter Typ=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 1 not invert. inverted	2 i001=0 i002=0	3 / BR 3 / BR
r510 1FEHex	Torque AddSetp Additional torque setpoint in % of rated motor torque; display parameter of the output of the source for the additional torque setpoint (P506) Analog Output: 100% @ Parameter Value=P485 Typ=I2; PKW: 1HEX=0.1% PcD Gr.: 5	[%]	-	3 / BR
P512 200Hex	Compare Speed Compare speed for the message 'Compare speed reached' (status word 1, bit 10 (r552); see also P513 (Hysteresis) Typ=I4; PKW: 1HEX=0.1min-1 PcD Gr.: 1	0.0 to 9000.0 [min-1]	- 3000.0	3 / BR 3 / BR
P513 201Hex	Comp Speed Hyst Hysteresis for the message 'Compare speed reached' in % of the compare speed (P512) Typ=O2; PKW: 1HEX=0.1% PcD Gr.: 0	0.0 to 100.0 [%]	- 3.0	3 / BR 3 / BR
P514 202Hex	OFF Speed Pulse block speed at turn OFF If after an OFF command (OFF1, OFF3) the actual value of the speed (r219) comes below this value, the pulses are blocked after the OFF wait time (P516). Typ=I4; PKW: 1HEX=0.1min-1 PcD Gr.: 1	0.0 to 9000.0 [min-1]	- 100.0	3 / BR 3 / BR

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: write: _/_
P516 204Hex	OFF Wait Time Wait time between reaching of the pulse block speed / frequency (P514) and pulse blocking; only for turn OFF via OFF1 or OFF3. SDS(4) Parameter Typ=O2; PKW: 1HEX=0.1s PcD Gr.: 0	0.0 to 60.0 [s]	4 i001=0.0 i002=0.0 i003=0.0 i004=0.0	3 / BR 3 / BR
P517 205Hex	Deviation Speed Deviation speed 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) Typ=I4; PKW: 1HEX=0.1min-1 PcD Gr.: 1	0.0 to 9000.0 [min-1]	- 300.0	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)) Typ=O2; PKW: 1HEX=0.1s PcD Gr.: -	0.0 to 10.0 [s]	- 3.0	3 / BR 3 / BR
P519 207Hex	Overspeed Hyst Hysteresis of the message 'overspeed' (status word 2, bit 18 (r553)) Scaling quantity: reference values of P452 (Maximum forward frequency) and P453 (Maximum reverse frequency) Typ=O2; PKW: 1HEX=0.1% PcD Gr.: -	0.0 to 20.0 [%]	- 10.0	2 / BR 2 / BR
P525 20DHex	Fix Setp ProcReg Fixed setpoints for the technology controller B/R parameter Type=I4; PKW: 1HEX=0.001 % PcD: 4000_0000HEX=100.00 %	-200.000 to 200.000 [%]	2 i001=0.000 i002=0.000	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 6045	2 i001=0 i002=0	3 / BR 3 / BR
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=100.000 % Type=I2; PKW: 1HEX=0.001 % PcD: 4000_0000HEX=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

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read:  write: 
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 6045	2 i001=0 i002=0	3 / BR 3 / BR
P532 * 214Hex	Gain ProcRegActV Technology controller actual value gain. B/R parameter Type=L2; PKW: 1HEX=0.01 % PcD Gr.: 0	-300.00 to 300.00 [%]	2 i001=100.00 i002=100.00	3 / BR 3 / BR
P533 * 215Hex	Smth ProcRegActV Smoothing time constant of the technology controller actual value. The smoothing is only active if the technology controller has been activated (control word2 bit 24 = 1 and status RUN). Type=O2; PKW: 1HEX=0.01 s PcD Gr.: 0	0.00 to 600.00 [s]	- 0.00	3 / BR 3 / BR
r534 216Hex	ActValue ProcReg Actual technological actual value Analog output: 100 % at PWE=100.000 % Type=L2; PKW: 1HEX=0.001 % PcD: 4000_0000HEX=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=L4; PKW: 1HEX=0.001 % PcD: 4000_0000HEX=100.00 %	[%]	-	3 / BR
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
P539 21BHex	DifTConstProcReg Technology controller derivative action time (D component). Setting information: The technology controller D component is disabled with the value 0.00. Type=O2; PKW: 1HEX=0.01 s PcD Gr.: 0	0.00 to 300.00 [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=L4; PKW: 1HEX=0.001 % PcD: 4000_0000HEX=100.000 %	[%]	-	3 / BR
P541 21DHex	ProcReg Up1Limit Upper limit of the technology controller output. Type=L4; PKW: 1HEX=0.001 % PcD: 4000_0000HEX=100.000 %	-200.000 to 200.000 [%]	- 200.000	3 / BR 3 / BR

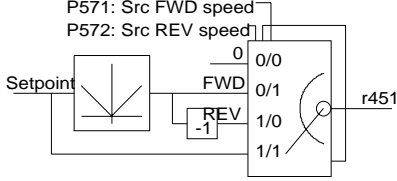
PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: / write: /
P542 21EHex	ProcReg Up2Limit Lower limit of the technology controller output. Type=l4; PKW:1HEX=0.001 % PcD: 4000_0000HEX=100.000 %	–200.000 to 200.000 [%]	– 200.000	3 / BR 3 / BR
P543 * 21FHex	ProcReg AccTime1 Ramp-function generator for the upper limit value of the technology controller output. Type=O2; PKW:1HEX=0.01 s PcD Gr.: 0	0.00 to 100.00 [s]	– 0.00	3 / BR 3 / BR
P544 * 220Hex	ProcRegAccTime2 Ramp-function generator for the lower limit value of the technology controller output. Type=O2; PKW:1HEX=0.01 s PcD Gr.: 0	0.00 to 100.00 [s]	– 0.00	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=l4; PKW: 1HEX=0.001 % PcD: 4000_0000HEX=100.000 %	[%]	–	3 / BR

5.9 Control and Status Word

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: <u> </u> / <u> </u> write: <u> </u> / <u> </u>
r550 226Hex	Control Word 1 Display of the control word 1 (bits 0 to 15); see section 4.3.1.1.  Typ=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 4.3.1.1.  Typ=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 4.3.1.1.  Typ=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 4.3.1.1.  Typ=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 4.3.1.1 Parameter values: 0: OFF1 1: not allowed 1001: Binary input 1 of the CU board 1003: Binary input 3 of the CU board 1010: PMU ON/OFF keys 2001: SST1, word 1, bit 0 other values: see allowed settings in section 4.3.1.1 (process data wiring of the control word) Note: For use with the serial IO-system (SCB) the values 4101 or 4201 are recommended. B/R Parameter Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0		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 4.3.1.1 Parameter values: 0: not allowed 1: condition for operation 1002: Binary input 2 of the CU board other values: see allowed settings in section 4.3.1.1 (process data wiring of the control word) B/R Parameter Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	1 to 6001	2 i001=1 i002=1002	2 / BR 2 / BR
P556 * 22CHex	Src2 OFF2(coast) Source 2 of the 'OFF2' command (Coasting; control word 1, bit 1) Description see P555 B/R Parameter Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	1 to 6001	2 i001=1 i002=1	2 / BR 2 / BR

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: <u>/</u> write: <u>/</u>
P557 * 22DHex	Src3 OFF2(coast) Source 3 of the 'OFF2' command (Coasting; control word 1, bit 1) Description see P555 B/R Parameter Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	1 to 6001	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 4.3.1.1 Parameter values: 0: not allowed 1: condition for operation 1002 binary input 2 of CU board 1010: PMU OFF key other values: see allowed settings in section 4.3.1.1 (process data wiring of the control word) B/R Parameter Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	1 to 6001	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 Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	1 to 6001	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 Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	1 to 6001	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 4.3.1.1 Parameter values: 0: Inverter blocked 1: automatic release after wait times other values: see allowed settings in section 4.3.1.1 (process data wiring of the control word) B/R Parameter Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 6001	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 4.3.1.1 Parameter values: 0: Ramp generator blocked 1: automatic release after wait times other values: see allowed settings in section 4.3.1.1 (process data wiring of the control word) B/R Parameter Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 6001	2 i001=1 i002=1	3 / BR 3 / BR
P563 * 233Hex	Src RampGen Stop Source of the 'ramp generator stop' command (control word 1, bit 5) Details see section 4.3.1.1 Parameter values: 0: ramp generator stopped 1: ramp generator released other values: see allowed settings in section 4.3.1.1 (process data wiring of the control word) B/R Parameter Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 6001	2 i001=1 i002=1	3 / BR 3 / BR

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: <u> </u> write: <u> </u>
P564 * 234Hex	Src Setp Release Source of the 'setpoint release' command (control word 1, bit 6) Details see section 4.3.1.1 Parameter values: 0: Ramp generator input is set to '0' 1: Setpoint at ramp generator input other values: see allowed settings in section 4.3.1.1 (process data wiring of the control word) B/R Parameter Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 6001	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 4.3.1.1 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: see allowed settings in section 4.3.1.1 (process data wiring of the control word) Note: The fault reset command is edge triggered B/R Parameter Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 6001	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 Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 6001	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 Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 6001	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 4.3.1.1 Parameter values: 0: no Jog operation 1: not allowed 2001: SST1, word 1, bit 8 other values: see allowed settings in section 4.3.1.1 (process data wiring of the control word) B/R Parameter Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 6001	2 P077=0,3 i001=0 i002=0 P077=1,2 i001=2001 i002=0	2 / BR 2 / BR
P569 * 239Hex	Src Jog2 ON Source of the 'Jog 2' command (control word 1, bit 9) Description see P568 B/R Parameter Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 6001	2 i001=0 i002=0	2 / BR 2 / BR

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: <i>/</i> write: <i>/</i>
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: see allowed settings in section 4.3.1.1 (process data wiring 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 Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 6001	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: see allowed settings in section 4.3.1.1 (process data wiring of the control word) Note: Both parameters P571 and P572 or the sources defined by them define which of the directions are really released; see figure at P571 B/R Parameter Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 6001	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: see allowed settings in section 4.3.1.1 (process data wiring of the control word) B/R Parameter Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 6001	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: see allowed settings in section 4.3.1.1 (process data wiring of the control word) B/R Parameter Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 6001	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]	# of. Indices Factory Settings.	read: <u>/</u> write: <u>/</u>
P575 * 23FHex	Src No Ext Fault1 Source of the message 'external fault 1' (control word 1, bit 15); L-level causes fault trip of the drive Parameter values: 0: not allowed 1: no external fault 1 1003: Binary input 3 of CU board other values: see allowed settings in section 4.3.1.1 (process data wiring of the control word) B/R Parameter Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	1 to 6001	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: see allowed settings in section 4.3.1.1 (process data wiring of the control word) B/R Parameter Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 6004	2 i001=0 i002=0	3 / BR 3 / BR
P577 * 241Hex	Src SetpDSetBit1 Source of bit 1 for the selection of the setpoint channel data set (SDS; control word 2, bit 17) Parameter values: 0: SDS bit 1 has value of 0 1: SDS bit 1 has value of 1 other values: see allowed settings in section 4.3.1.1 (process data wiring of the control word) B/R Parameter Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 6004	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: see allowed settings in section 4.3.1.1 (process data wiring 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 Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 6004	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 1004: Binary input 4 of CU board other values: see allowed settings in section 4.3.1.1 (process data wiring of the control word) B/R Parameter Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 6004	2 i001=0 i002=1004	2 / BR 2 / BR

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: <u> </u> / <u> </u> write: <u> </u> / <u> </u>
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: see allowed settings in section 4.3.1.1 (process data wiring of the control word) B/R Parameter Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 6004	2 i001=0 i002=0	2 / BR 2 / BR
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: see allowed settings in section 4.3.1.1 (process data wiring of the control word) Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 6004	2 i001=0 i002=0	2 / BR 2 / BR
P584 * 248Hex	Src.TReg.Enable Source for the control command, technology 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 6004	2 i001=0 i002=0	3 / BR 3 / BR
P585 * 249Hex	Src Reg Release Source of the command 'release of the n/f regulator' (control word 2, bit 25) Parameter values: 0: regulator blocked 1: regulator is released with pulse release other values: see allowed settings in section 4.3.1.1 (process data wiring of the control word) B/R Parameter Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 6004	2 i001=1 i002=1	3 / BR 3 / BR
P586 * 24AHex	Src No ExtFault2 Source of the message 'external fault 2' (control word 2, bit 26) If an ON command is active, L-level causes fault trip if drive status >10 and 200 msec after precharging. Parameter values: 0: not allowed 1: no external fault 2 1004: CU binary input 4 other values: see allowed settings in section 4.3.1.1 (process data wiring of the control word) B/R Parameter Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	1 to 6004	2 i001=1 i002=1	2 / BR 2 / BR
P587 * 24BHex	Src Master/Slave Source of the switching command 'master / slave drive' (control word 2, bit 15) Parameter values: 0: Master drive: the control circuit operates with internal speed / frequency setpoints (n/f regulation) 1: Slave drive: the control circuit operates with torque setpoints (T regulation, see P486) other values: see allowed settings in section 4.3.1.1 (process data wiring of the control word) B/R Parameter Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 6004	2 i001=0 i002=0	3 / BR 3 / BR

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: <u> </u> write: <u> </u>
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 1002: CU binary input 2 other values: see allowed settings in section 4.3.1.1 (process data wiring of the control word) B/R Parameter Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	1 to 6004	2 i001=1 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 other values: see allowed settings in section 4.3.1.1 (process data wiring of the control word) B/R Parameter Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	1 to 6004	2 i001=1 i002=1	3 / BR 3 / BR
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: see allowed settings in section 4.3.1.1 (process data wiring of the control word) B/R Parameter Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 6004	- 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 Typ=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 4.3.1.2 (process data wiring of the status word) may be selected. Indices: i001: BD: selection of a base drive terminal i002: SC1: selection of a SC11/2 terminal i003: TSY: selection of a TSY terminal Typ=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. Typ=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]	# of. Indices Factory Settings.	read: / write: /
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 Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5002	3 P077=0,1 i001=1003 i002=0 i003=0 P077=2,3 i001=0 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 Typ=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 Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5002	3 i001=0 i002=0 i003=0	3 / BR 3 / BR
P605 * 25DHex	Dst NO OFF3 Destination of the status bit 'no OFF3 command' (status word 1, bit 5) Parameter values, Indices: as P600 Typ=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 Typ=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 Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5002	3 P077=0,1 i001=0 i002=0 i003=0 P077=2,3 i001=1003 i002=0 i003=0	2 / BR 2 / BR
P608 * 260Hex	Trg Bit Deviat. Destination of the status bit 'set frequency = act. frequency' (status word 1, bit 8) - see P517; for details see section 4.3.1.2 Parameter values, Indices: as P600 Typ=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 CompareSpeed Destination of the status bit 'compare speed reached' (status word 1, bit 10) - see P512; for details see section 4.3.1.2 Parameter values, Indices: as P600 Typ=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]	# of. Indices Factory Settings.	read: <u> </u> write: <u> </u>
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 Typ=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 9.6) Parameter values, Indices: as P600 Typ=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 Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5002	3 i001=0 i002=0 i003=0	3 / BR 3 / BR
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 Typ=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	Z.KIP aktiv Destination of the status bit 'power ride thru (PRT) active' (status word 1, bit 15) --- is not activated at SIMOVERT SC --- Parameter values, Indices: as P600 Typ=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' (status word 2, bit 16) Parameter values, Indices: as P600 Typ=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 Typ=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 Typ=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]	# of. Indices Factory Settings.	read: <u>/</u> write: <u>/</u>
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 Typ=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 Typ=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 Typ=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); see r011 (drive temperature) 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 Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5002	3 i001=0 i002=0 i003=0	3 / BR 3 / BR
P624 * 270Hex	Dst TmpWarnDrive Destination of the status bit 'warning drive overtemperature' (status word 2, bit 24); see r011 (drive temperature) 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 Typ=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	Trg BitWarTmpMot Destination of the status bit 'warning motor overtemperature' (status word 2, bit 25); Reason: The condition for the warning is met KTY84 sensor monitoring (see r009 (motor temperature), P360 (motor temperature warning)). 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 Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5002	3 i001=0 i002=0 i003=0	2 / BR 2 / BR

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: <u>/</u> write: <u>/</u>
P626 * 272Hex	Trg BitFltTmpMot Destination of the status bit 'fault motor overtemperature' (status word 2, bit 26); Reason: The condition for the fault is met KTY84 sensor monitoring (see r009 (motor temperature), P360 (motor temperature warning)). 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 Typ=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). --- is not activated at SIMOVERT SC --- Parameter values, Indices: as P600 Typ=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 Typ=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 Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 5002	3 i001=0 i002=0 i003=0	3 / BR 3 / BR

5.10 Analog Input/Output

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# 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 Terminal 27 Terminal 29 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. Typ=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 2	- 0	2 / BR 2 / BR
P651 * 28BHex	CU AnalnSmooth Filter time constant of the CU analog inputs. Typ=O2; PKW: 1HEX=1.0ms PcD Gr.: 0	0 to 1000 [ms]	- 4	2 / BR 2 / BR
P652 28CHex	CU AnalogIn Offs Offset scaling of the CU analog inputs Description for setting see section 4.3.4 Typ=I2; PKW: 1HEX=0.001V PcD Gr.: 0	-20.000 to 20.000 [V]	- 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. Typ=O2; PKW: 1HEX=1.0 PcD Gr.: 0	0 to 999	- 219	2 / BR 2 / BR
P656 290Hex	CU AnalogOutGain Proportional gain of the CU analog output, see section 4.3.5 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: $V(\text{out}) = \frac{\text{value of displayed parameter}}{100 \%} * P656 + P657$ Note: Maximum value of the output voltage: +/- 10 V Typ=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 Typ=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]	# of. Indices Factory Settings.	read: <u> </u> / <u> </u> write: <u> </u> / <u> </u>
P666 29AHex	SCI AnaOut Offs Offset of the SCI analog outputs Indices: see P664 Typ=l2; 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

5.11 Communications

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: <input type="checkbox"/> write: <input type="checkbox"/>
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) For double word parameters (type I4) the related parameter number must be entered at two subsequent words; otherwise only the most significant word will be transferred The length (number of words) of the process data part of the telegram is set by P685, i001 Indices: i001=WD01: Word 01 of the (process data part of the) telegram i002=WD02: Word 02 of the (process data part of the) telegram ... i016=WD16: Word 16 of the (process data part of the) telegram Typ=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
P681 * 2A9Hex	SCom2 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) For double word parameters (type I4) the related parameter number must be entered at two subsequent words; otherwise only the most significant word will be transferred The length (number of words) of the process data part of the telegram is set by P685, i001 Indices: i001=WD01: Word 01 of the (process data part of the) telegram i002=WD02: Word 02 of the (process data part of the) telegram ... i016=WD16: Word 16 of the (process data part of the) telegram Typ=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 Typ=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 4.3.6.1) Indices: i001 = SCo1: bus address of serial comm. interface 1 (CU) i002 = SCB: SCB bus address, if P682=1, 2 i003=SCo2: bus address of serial comm. interface 2 (CU) Typ=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 31	3 i001=0 i002=0 i003=0	3 / BR 3 / BR

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: <u>/</u> write: <u>/</u>
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 Notes: Maximum baud rate for SST1 (i001) 38400 for SST2 (i003) 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 i003 = SCo2: baud rate of serial comm. interface 2 (CU) Typ=O2; PKW: 1HEX=1.0 PcD Gr.: -	1 to 13	3 i001=6 i002=6 i003=6	3 / BR 3 / BR
P685 * 2ADHex	SCom/SCB PCV Number of words (16 bit) of the parameter data part in the net data block of the telegram. 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 i003 = SCo2: serial comm. interface 2 (CU) Typ=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 127	3 i001=127 i002=3 i003=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. Indices: i001 = SCo1: serial comm. interface 1 (CU) i002 = SCB: SCB, if P682=1, 2, 3 i003 = SCo2: serial comm. interface 2 (CU) Typ=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 16	3 i001=2 i002=2 i003=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. Indices: i001 = SCo1: serial comm. interface 1 (CU) i002 = SCB: SCB, if P682=1, 2, 3 i003 = SCo2: serial comm. interface 2 (CU) Typ=O2; PKW: 1HEX=1.0ms PcD: 4000HEX=1638.4ms	0 to 6500 [ms]	3 i001=0 i002=0 i003=0	3 / BR 3 / BR

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: <input type="checkbox"/> write: <input type="checkbox"/>
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 = WD01: Word 01 of the (process data part of the) telegram i002 = WD02: Word 02 of the (process data part of the) telegram ... i016 = WD16: Word 16 of the (process data part of the) telegram Condition: P688 = 3 (peer to peer protocol) Typ=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
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) For double word parameters (type I4) the related parameter number must be entered at two subsequent words; otherwise only the most significant word will be transferred The length (number of words) of the process data part of the telegram is set by P685, i002 Indices: i001=WD01: Word 01 of the (process data part of the) telegram i002=WD02: Word 02 of the (process data part of the) telegram ... i016=WD16: 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 Typ=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
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) For double word parameters (type I4) the related parameter number must be entered at two subsequent words; otherwise only the most significant word will be transferred Indices: i001=WD01: Word 01 of the (process data part of the) telegram i002=WD02: Word 02 of the (process data part of the) telegram ... i016=WD16: Word 16 of the (process data part of the) telegram Typ=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. Typ=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]	# of. Indices Factory Settings.	read: <i>/</i> write: <i>/</i>
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 Typ=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; see P696 Typ=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; see P696 Typ=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; see P696 Typ=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; see P696 Typ=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; see P696 Typ=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; see P696 Typ=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; see P696 Typ=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; see P696 Typ=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; see P696 Typ=O2; PKW: 1HEX=1.0 PcD Gr.: 0	0 to 65535	- 0	3 / H BR 3 / H

5.12 Diagnosis

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: <input type="checkbox"/> write: <input type="checkbox"/>
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 Typ=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 Typ=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 1 (right) i003: Pos3: Software code of the PCB in position 1 (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' Typ=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 Typ=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 pulse frequency (P761) and sampling time (P308). Analog Output: 100% @ Parameter Value=16384% Typ=O2; PKW: 1HEX=1.0% PcD Gr.: 0	[%]	-	3 / BR

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: <u>/</u> write: <u>/</u>
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: fITC 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 i017: SBJa Year of generation, SCB software (only for SCB SW release > 1.2, otherwise undefined) i018: SBTM Day and month of generation of the SCB software (only for SCB SW release > 1.2, otherwise undefined) i019: SI1V SCI slave1 SW release (only for SCB- and SCI SW release > 1.2, otherwise undefined) i020: SI1J Year of generation, SCI slave1 software (only for SCB- and SCI SW release > 1.2, otherwise undefined) i021: SI1T Day and month of generation of the SCI slave1 software (only for SCB- and SCI SW release > 1.2, otherwise undefined) i022: SI2V SCI slave2 software release (only for SCB- and SCI SW release > 1.2, otherwise undefined) i023: SI2J Year of generation, SCI slave2 software (only for SCB- and SCI SW release > 1.2, otherwise undefined) i024: SI2T Day and month of generation of the SCI slave2 software (only for SCB- and SCI SW release > 1.2, otherwise undefined) Typ=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. Typ=L2; PKW: 1HEX=1.0 PcD Gr.: 0		32	3 / H BR

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: <u> </u> write: <u> </u>
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 Typ=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 1 off on	- 0	3 / BR 3 / B
P735 * 2DFHex	Trace TriggerPar Parameter number of the signal which is to trigger the trace function; this function is realized with 8 channels. The tracer (TRC) can record internal quantities of the drive starting or ending with a certain condition. Related parameters: P735 to P737: trigger condition P738 to P739: trace quantity Indices: i001=Cha1: parameter number of the trigger signal, channel 1 i002=Cha2: parameter number of the trigger signal, channel 2 i003=Cha3: parameter number of the trigger signal, channel 3 i004=Cha4: parameter number of the trigger signal, channel 4 i005=Cha5: parameter number of the trigger signal, channel 5 i006=Cha6: parameter number of the trigger signal, channel 6 i007=Cha7: parameter number of the trigger signal, channel 7 i008=Cha8: parameter number of the trigger signal, channel 8 Typ=O2; PKW: 1HEX=1.0 PcD Gr.: 0	0 to 999	8 i001=0 i002=0 i003=0 i004=0 i005=0 i006=0 i007=0 i008=0	3 / BR 3 / BR
P736 * 2E0Hex	Trace Trig.Value Parameter value for the trigger condition. Parameter value of the trigger signal which will start or stop the trace function Indices: i001=Cha1: parameter value of the trigger signal, channel 1 i002=Cha2: parameter value of the trigger signal, channel 2 i003=Cha3: parameter value of the trigger signal, channel 3 i004=Cha4: parameter value of the trigger signal, channel 4 i005=Cha5: parameter value of the trigger signal, channel 5 i006=Cha6: parameter value of the trigger signal, channel 6 i007=Cha7: parameter value of the trigger signal, channel 7 i008=Cha8: parameter value of the trigger signal, channel 8 Typ=O2; PKW: 1HEX=1.0 PcD Gr.: 0	0 to 65535	8 i001=0 i002=0 i003=0 i004=0 i005=0 i006=0 i007=0 i008=0	3 / BR 3 / BR
P737 * 2E1Hex	Trace Trig.Cond. Trigger condition for the trace function. Parameter values: 0: Trigger, when the value of the trigger parameter is < 736.x 1: Trigger, when the value of the trigger parameter is = 736.x 2: Trigger, when the value of the trigger parameter is > 736.x 3: Trigger with a fault trip 4: Trigger, when the value of the trigger parameter is <> 736.x Indices: i001=Cha1: trigger condition for channel 1 i002=Cha2: trigger condition for channel 2 i003=Cha3: trigger condition for channel 3 i004=Cha4: trigger condition for channel 4 i005=Cha5: trigger condition for channel 5 i006=Cha6: trigger condition for channel 6 i007=Cha7: trigger condition for channel 7 i008=Cha8: trigger condition for channel 8 Typ=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 4 TRC off TRC Start== TRC Stop== TRC Start>= TRC Stop>= TRC Start<= TRC Stop<=	8 i001=0 i002=0 i003=0 i004=0 i005=0 i006=0 i007=0 i008=0	3 / BR 3 / BR

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: write: _/_
P738 * 2E2Hex	Trace Act.Values Parameter number of the signal, which is to be recorded by the trace function Indices: i001=Cha1: trace parameter channel 1 i002=Cha2: trace parameter channel 2 i003=Cha3: trace parameter channel 3 i004=Cha4: trace parameter channel 4 i005=Cha5: trace parameter channel 5 i006=Cha6: trace parameter channel 6 i007=Cha7: trace parameter channel 7 i008=Cha8: trace parameter channel 8 Typ=O2; PKW: 1HEX=1.0 PcD Gr.: 0	0 to 999	8 i001=0 i002=0 i003=0 i004=0 i005=0 i006=0 i007=0 i008=0	3 / BR 3 / BR
P739 * 2E3Hex	Trace Sampl.Time Sampling time for recording the trace values in multiples of the base sampling time (P308); this function is realized with 4 channels. Description for Setting: the sampling time is P739 * P308 Indices: i001=Cha1: sampling time channel 1 i002=Cha2: sampling time channel 2 i003=Cha3: sampling time channel 3 i004=Cha4: sampling time channel 4 i005=Cha5: sampling time channel 5 i006=Cha6: sampling time channel 6 i007=Cha7: sampling time channel 7 i008=Cha8: sampling time channel 8 Typ=O2; PKW: 1HEX=1.0 PcD Gr.: -	1 to 200	8 i001=1 i002=1 i003=1 i004=1 i005=1 i006=1 i007=1 i008=1	3 / BR 3 / BR
P740 * 2E4Hex	Trace Pretrigger Defines the number of data recorded before and after the trigger condition. Example: a value of 40% means, that 40% of the data have been recorded before and 60% after the trigger condition. Indices: i001=Cha1: sampling time channel 1 Indices: i002=Cha2: sampling time channel 2 Indices: i003=Cha3: sampling time channel 3 Indices: i004=Cha4: sampling time channel 4 Indices: i005=Cha5: sampling time channel 5 Indices: i006=Cha6: sampling time channel 6 Indices: i007=Cha7: sampling time channel 7 Indices: i008=Cha8: sampling time channel 8 Typ=O2; PKW: 1HEX=1.0% PcD Gr.: -	0 to 100 [%]	8 i001=0 i002=0 i003=0 i004=0 i005=0 i006=0 i007=0 i008=0	3 / BR 3 / BR
P741 * 2E5Hex	TRC Start Start command for trace function. A trace channel can only be started after completion of setting of ots parameters (P735 to P740 must have valid values). After the trace recording has been finished, the parameter is automatically reset. Parameter values: 0: trace channel stopped 1: trace channel has started Indices: i001=Cha1: start channel 1 Indices: i002=Cha2: start channel 2 Indices: i003=Cha3: start channel 3 Indices: i004=Cha4: start channel 4 Indices: i005=Cha5: start channel 5 Indices: i006=Cha6: start channel 6 Indices: i007=Cha7: start channel 7 Indices: i008=Cha8: start channel 8 Typ=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 1	8 i001=0 i002=0 i003=0 i004=0 i005=0 i006=0 i007=0 i008=0	3 / BR 3 / BR

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: <u>/</u> write: <u>/</u>																																				
r748 2EChex	Trip Time Trip times (operating hour meter values, r013) Indices: <table><tr><td></td><td>Day</td><td>Hours</td><td>Seconds</td></tr><tr><td>latest trip (1)</td><td>i001=T1-d</td><td>i002=T1-h</td><td>i003=T1-s</td></tr><tr><td>last reset trip(2)</td><td>i004=T2-d</td><td>i005=T2-h</td><td>i006=T2-s</td></tr><tr><td>(last+1) reset trip (3)</td><td>i007=T3-d</td><td>i008=T3-h</td><td>i009=T3-s</td></tr><tr><td>...</td><td></td><td></td><td></td></tr><tr><td>oldest saved trip (8)</td><td>i022=T8-d</td><td>i023=T8-h</td><td>i024=T8-s</td></tr></table> <table><tr><td>Trip description by:</td><td>r947</td><td>Fault number</td></tr><tr><td></td><td>r949</td><td>Fault value</td></tr><tr><td></td><td>r951</td><td>list of fault numbers</td></tr><tr><td></td><td>P952</td><td>number of faults</td></tr></table> Typ=O2; PKW: 1HEX=1.0 PcD Gr.: 0		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		24	2 / BR
	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																																						
P750 * 2EEHex	TRC Read Index Number of the trace data block for each trace channel, whcih can be read via r751 to r758. Indices: i001=Cha1: data block number channel 1 i002=Cha2: data block number channel 2 i003=Cha3: data block number channel 3 i004=Cha4: data block number channel 4 i005=Cha5: data block number channel 5 i006=Cha6: data block number channel 6 i007=Cha7: data block number channel 7 i008=Cha8: data block number channel 8 Typ=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 255	8 i001=0 i002=0 i003=0 i004=0 i005=0 i006=0 i007=0 i008=0	3 / BR 3 / BR																																				
r751 2EFHex	TRC Data Ch 1 Displays teh trace data of channel 1. The block number of the trace data is set in P750. If all data of an array are requested via an automation interface in one order, P750.1 is automatically increased by 1 during the output. This allows an optimized reading of trace data. Typ=O2; PKW: 1HEX=1.0 PcD Gr.: 0		116	3 / BR 3 / BR																																				
r752 2F0Hex	TRC Data Ch 2 See r751 Typ=O2; PKW: 1HEX=1.0 PcD Gr.: 0		116	3 / BR 3 / BR																																				
r753 2F1Hex	TRC Data Ch 3 See r751 Typ=O2; PKW: 1HEX=1.0 PcD Gr.: 0		116	3 / BR 3 / BR																																				
r754 2F2Hex	TRC Data Ch 4 See r751 Typ=O2; PKW: 1HEX=1.0 PcD Gr.: 0		116	3 / BR 3 / BR																																				
r755 2F3ex	TRC Data Ch 5 See r751 Typ=O2; PKW: 1HEX=1.0 PcD Gr.: 0		116	3 / BR 3 / BR																																				
r756 2F4Hex	TRC Data Ch 6 See r751 Typ=O2; PKW: 1HEX=1.0 PcD Gr.: 0		116	3 / BR 3 / BR																																				
r757 2F5ex	TRC Data Ch 7 See r751 Typ=O2; PKW: 1HEX=1.0 PcD Gr.: 0		116	3 / BR 3 / BR																																				
r758 2F6Hex	TRC Data Ch 8 See r751 Typ=O2; PKW: 1HEX=1.0 PcD Gr.: 0		116	3 / BR 3 / BR																																				

5.13 Modulator

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: / write: /
P761 2F9Hex	Pulse Frequency Pulse frequency at asynchronous space vector modulation; if P100 <> 250 the correct value is automatically taken from the motor data list Note: The base sampling time (P308) should be increased to 1.5 ms in order to prevent a computation time overflow, if: <ul style="list-style-type: none"> • pulse frequency > 7 kHz and • option board (T100, T300, CB or SCB) is used and • a serial interface is used, e.g. OP1 MDS(2) Parameter Typ=O2; PKW: 1HEX=0.1kHz PcD Gr.: 0	5.0 to 7.5 [kHz]	2 i001=5.0 i002=5.0	3 / ABR 3 / A

5.14 Factory Parameters

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: / write: /
P789 315Hex	RAM Access Value Value of the memory cell (RAM) which has been addressed by P788 Typ=L2; PKW: 1HEX=1.0 PcD Gr.: 0	0 to 65535	- 0	3 / BR 4 / BR
P799 * 31FHex	Special Access Parameter for special access Typ=O2; PKW: 1HEX=1.0 PcD Gr.: 0	0 to 65535	- 0	3 / U BR 3 / U BR

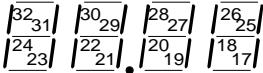
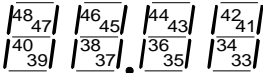
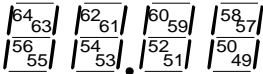
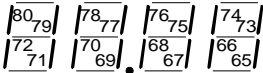
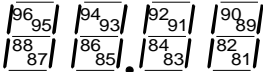
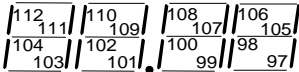
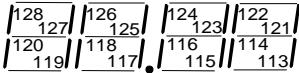
5.15 Special Parameters

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

5.16 Profile Parameters

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: <u> </u> / <u> </u> write: <u> </u> / <u> </u>
P917 * 395Hex	Change rePorts Defines the interfaces, where active parameters are reported if they are changed. Parameter values: 0: none 1: output via dual port RAM (TB, CB) 2: output via serial comm. interface 1 (SCom1) 4: output via SCB with USS protocol 8: Output via serial comm. interface 2 (SCom2) Description for setting: enter the total of the figures which are related to the interfaces, which are to issue the message. Type=V2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 15	- 0	3 / B 3 / B
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) Typ=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. Typ=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 63	- 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 Typ=L2; PKW: PKW-Format(HEX)=Par Value PcD Gr.: 0	0 to 6004	- 1005	3 / BR 3 / BR

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: <u>/</u> write: <u>/</u>																																																																														
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: <table><tr><td></td><td>Fault 1</td><td>Fault 2</td><td>...</td><td>Fault 8</td></tr><tr><td>latest trip (1)</td><td>i001=F1-1</td><td>i002=F1-2</td><td>...</td><td>i008=F1-8</td></tr><tr><td>last reset trip (2)</td><td>i009=F2-1</td><td>i010=F2-2</td><td>...</td><td>i016=F2-8</td></tr><tr><td>(last+1) reset trip (3)</td><td>i017=F3-1</td><td>i018=F3-2</td><td>...</td><td>i024=F3-8</td></tr><tr><td>...</td><td></td><td></td><td></td><td></td></tr><tr><td>oldest saved trip (8)</td><td>i057=F8-1</td><td>i058=F8-2</td><td>...</td><td>i064=F8-8</td></tr></table> Notes: A value of '0' means 'no fault' Number of saved trips: see P952. Example of a trip: <table><tr><td colspan="4">last reset trip (2)</td></tr><tr><td>Index</td><td>r947</td><td>r949</td><td>Index</td><td>r748</td></tr><tr><td>9</td><td>35</td><td>0</td><td>4</td><td>62</td></tr><tr><td>10</td><td>37</td><td>2</td><td>5</td><td>1</td></tr><tr><td>11</td><td>0</td><td>0</td><td>6</td><td>7</td></tr><tr><td>12</td><td></td><td></td><td></td><td></td></tr><tr><td>13</td><td></td><td></td><td></td><td></td></tr><tr><td>14</td><td></td><td></td><td></td><td></td></tr><tr><td>15</td><td></td><td></td><td></td><td></td></tr><tr><td>16</td><td></td><td></td><td></td><td></td></tr></table> Trip time (r748): after 62 days, 1 hour, 7 sec of operation Faults (r947): 35 37 Fault value (r949): not defined 2 Typ=O2; PKW: 1HEX=1.0 PcD Gr.: 0		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	last reset trip (2)				Index	r947	r949	Index	r748	9	35	0	4	62	10	37	2	5	1	11	0	0	6	7	12					13					14					15					16					64	2 / BR
	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																																																																														
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16																																																																																		
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. Typ=O2; PKW: 1HEX=1.0 PcD Gr.: 0		64	3 / BR																																																																														
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, i35): 'Ext. Fault1'. Typ=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. Typ=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 <table><tr><td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td></tr><tr><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr></table> Typ=V2; PKW: 1HEX=1.0 PcD Gr.: 0	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1		-	3 / BR																																																														
16	15	14	13	12	11	10	9																																																																											
8	7	6	5	4	3	2	1																																																																											

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: <u> </u> write: <u> </u>
r954 3BAHex	Warning Param2 If a warning (numbers 17 to 32) is active, the related bar in the display is ON  Typ=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  Typ=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  Typ=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  Typ=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  Typ=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  Typ=V2; PKW: 1HEX=1.0 PcD Gr.: 0		-	3 / BR
r960 3C0Hex	Warning Param8 If a warning (numbers 113 to 128) is active, the related bar in the display is ON  Typ=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). Parameter values: 2 Bytes: ID#: 8022Hex 24 Byte: model name according to the drive type: SIMOVERT SC Note: the parameter is not accessible via PMU or OP. Typ=VS; PKW: 1HEX=1.0 PcD Gr.: 0		-	3 / BR

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: <u>/</u> write: <u>/</u>
r965 3C5Hex	Profile # PROFIBUS specific parameter Note: the parameter is not accessible via PMU or OP. Typ=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) Typ=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) Typ=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. Typ=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. Parameter values: 0: no saving of parameter values 1: a transition from 0 to 1 saves the RAM values to the EEPROM Typ=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 1	- 0	3 / BR 3 / BR
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. Typ=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. Typ=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. Typ=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. Typ=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. Typ=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. Typ=O2; PKW: 1HEX=1.0 PcD Gr.: 0		116	3 / BR

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: <u>/</u> write: <u>/</u>
r986 3DAHex	Par # List pt7 List of the available parameter numbers; part 7; see r980. Typ=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. Typ=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. Typ=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. Typ=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. Typ=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. Typ=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. Typ=O2; PKW: 1HEX=1.0 PcD Gr.: 0	116	116	3 / BR

6 Operator control

The converter can be controlled via:

- ◆ the PMU (Parameterization Unit)
- ◆ the control terminal strip on the CU (section 3.3 “Control terminal strip”)
- ◆ the OP1 operator control panel (section 9 “Options”)
- ◆ the RS485 and RS232 serial interface on PMU-X300

Operator control using the PMU is described in this section.

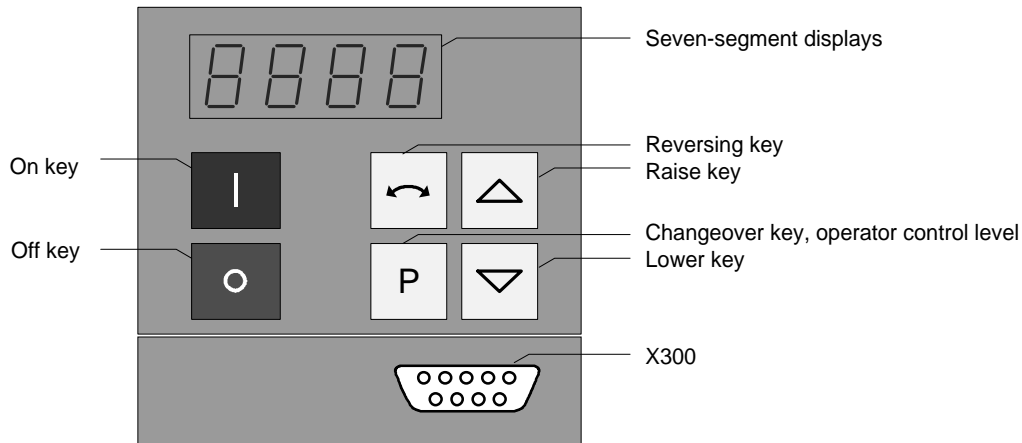


Fig. 6.1 Parameterization unit

6.1 Operator control elements

Operator control elements	Function
	Converter switch on (standard). For faults: Return to the fault display. Command is effective when the key is released.
	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. Command becomes effective when the key is released.
	Changeover from parameter number to parameter value. In conjunction with other keys, additional functions (refer to Figs. 6.2 to 6.4). Command becomes effective when the key is released.
	Values (raise, lower) change as long as the keys are depressed.
	Depress P and hold, then depress the second key. The command becomes effective when the key is released (e.g. fast changeover).

Table 6.1 Function of the operator control elements on the PMU

6.2 Displays








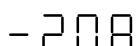
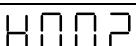

		Parameter number		Index e.g..	Parameter value e.g.
		Pos. actual value e.g	Neg. actual value e.g		
Visualization parameters	Basic converter			---	
	Technology board				
Setting parameters	Basic converter			, 000	
	Technology board				

Table 6.2 Displaying visualization- and setting parameters on the PMU

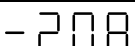

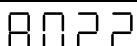

	Actual value	Parameter value not possible	Alarm	Fault
Display				

Table 6.3 Status display on the PMU

Note
The parameter description is provided in section 5 "Parameter list".

6.3 Structure

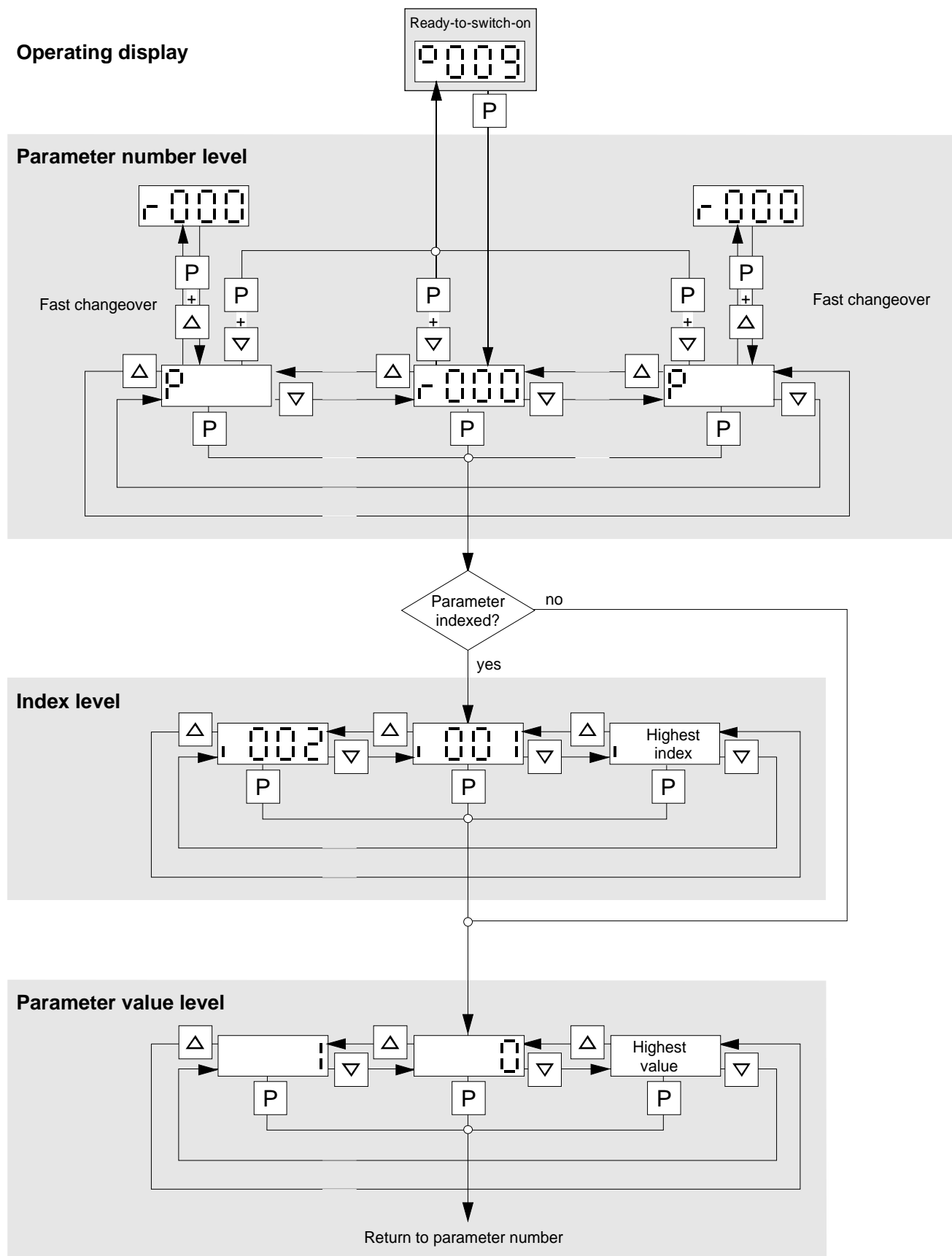
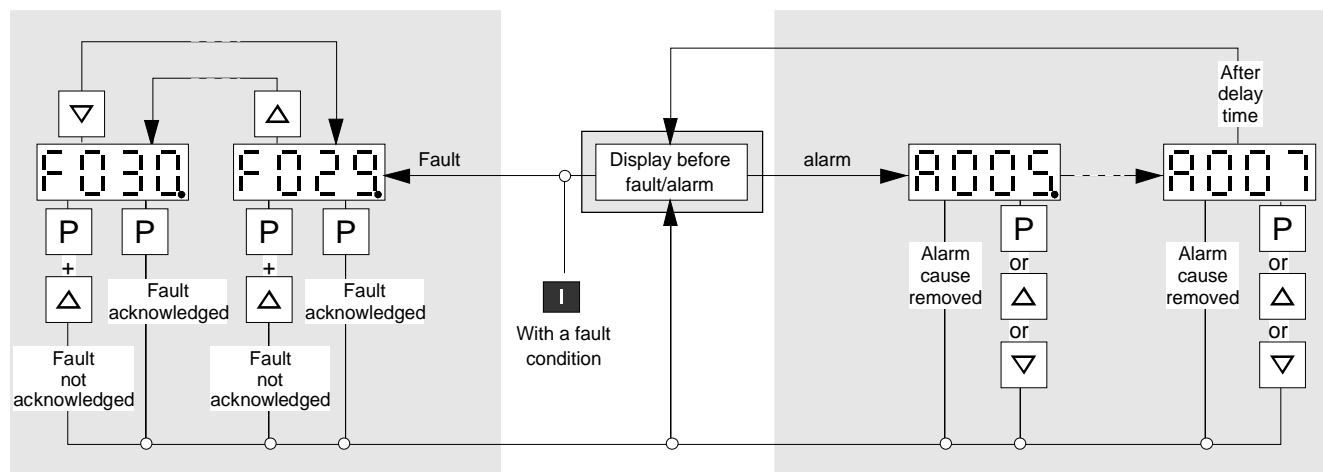


Bild 6.2 Operator control structure using the PMU



The point for fault- or alarm messages is omitted if there is only one alarm or fault.

Figure 6.3 Operator control structure of the PMU for alarms and faults

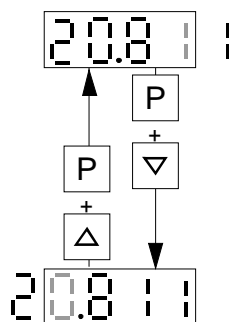


Figure 6.4 Shifting the PMU display for parameters values with more than 4 digits

7 Fault and Alarm Messages

7.1 Fault messages

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. Also refer to section 9.6.						
F002	Pre-charging When pre-charging, the minimum DC link voltage P071 Con. supply voltage of 80 % was not reached. The maximum pre-charging time of 3 s was exceeded.	Check the input DC voltage, Compare with P071 Conv. supply volt..						
F006	DC link overvoltage Due to an excessive DC link voltage, the unit was shutdown. <table><tr><td>DC voltage range</td><td>Shutdown threshold</td></tr><tr><td>280 V to 310 V</td><td>412 V</td></tr><tr><td>510 V to 620 V</td><td>819 V</td></tr></table>	DC voltage range	Shutdown threshold	280 V to 310 V	412 V	510 V to 620 V	819 V	Check the input DC voltage, The converter operates in the regenerative mode without regenerative possibility. Possibly; reduce P464 ramp-down time,
DC voltage range	Shutdown threshold							
280 V to 310 V	412 V							
510 V to 620 V	819 V							
F008	DC link uvolt. The lower limit of 76 % of the DC link voltage (P071 conv. supply voltage) was fallen below. For enabled kinetic buffering, 61 %. DC link undervoltage in 'standard' operation (i.e. no SIMULATION).	Check <ul style="list-style-type: none">the DC input voltage -of the DC link						
F011	Overcurrent The unit was shutdown due to an overcurrent condition. The shutdown threshold was exceeded,	Check <ul style="list-style-type: none">the converter-output for short-circuit or ground faultthe load for an overload conditionwhether the motor and converter are correctly matchedwhether the dynamic requirements are too high.						
F020	Motor temp. The motor limiting temperature has been exceeded.	Check the motor (load, ventilation, etc.). The actual motor temperature can be read in r009 Motor_temp. Check P361 Mot Tmp Fault Check the KTY84-input at connector -X104:25,26 for a short-circuit.						
F023	Inverter temp. The inverter limiting temperature has been exceeded.	Measure the air intake and ambient temperature. Please observe the derating curves“ for $\vartheta > 40\text{ }^{\circ}\text{C}$. Refer to section 14.1. Check; <ul style="list-style-type: none">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; <ul style="list-style-type: none">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; <ul style="list-style-type: none">phase L2 for short-circuit or ground fault (-X2:U2 including motor).that the CU is correctly inserted.						
F027	UCE ph. L3 There was an UCE-shutdown in phase L3.	Check; <ul style="list-style-type: none">phase L3 for short circuit or ground fault. (-X2:W2 -including motor).that the CU is correctly inserted.						

Fault messages		
No.	Fault description	Counter measures
F035	Ext. fault1 External fault 1 input, which can be parameterized, was activated.	Check; <ul style="list-style-type: none"> • if there is an external fault • if the cable to the appropriate binary input is interrupted • P575 S k fault ext.1 also refer to section 4.3.2.
F036	Ext. fault2 External fault 2 input, which can be parameterized, was activated.	Check; <ul style="list-style-type: none"> • if there is an external fault • if the cable to the appropriate binary input is interrupted • P586 S.k. fault ext. 1 also refer to section 4.3.2.
F037	Analog input.	Check the connection to check parameters <ul style="list-style-type: none"> • analog input -X102:27, 28, 29. • P650 CU-AE configuration • P651 CU-AE smoothing • P652 CU-AE offset also refer to section 3.3.
F040	AS internal Incorrect operating status.	Replace the CU board (-A10)
F041	EEProm fault A fault occurred 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	VeCon-FR VeCon-error at first run-up.	Replace CU3 board (-A10)
F044	VeCon-SR Internal coupling error, operating system to VeCon during second run-up	Replace CU3 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	VeCon fatal	Replace CU board (-A10).
F048	VeCon-int.	Power the converter off and up again. Replace CU board (-A10).
F049	SW release The EPROMs on the CU have different software releases. In this case, the language EPROM is compared with the CU software.	<ul style="list-style-type: none"> • Replace language PROM
F051	Speed encod. Speed encoder is faulted.	Check parameters; <ul style="list-style-type: none"> • P208 Src RotSpeed act, • P209 Encoder Pulse #, • P211 Resolver Excitat • P212 Resolver Offset • P213 Src.Res.Offset Check the connection to the encoder. Replace CU.
F060	MLFB missing This is set, if the MLFB = 0 when INITIALIZATION is exited (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).
F065	SST1 telegr (USS protocol)	Check the connection PMU board -X300. Replace the CU board (-A10).
F066	SST2 telegr (USS protocol)	Check the connection CU board -X100:1 to 5. Replace the CU board (-A10).

Fault messages		
No.	Fault description	Counter measures
F070	SCB init. Error when initializing the SCB board	r 949 =1 or 2 <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> Check parameters P682 and P684 r 949=6 time-out when initializing and r949=10 error, configuration channel <ul style="list-style-type: none"> 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 (USS, peer-to-peer, CAN)	Check the connections of the SCB1(2) boards Replace SCB1(2) board.
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; <ul style="list-style-type: none"> 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; <ul style="list-style-type: none"> 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	DPR telegram fail.	Check the connections of the CB/TB boards. Replace the CB board. Replace the TB board.
F090	Par start init Incorrect parameter at first start-up, initialization program	Check the values of the following parameters: <ul style="list-style-type: none"> P071 Converter voltage P102 Rated motor current P108 Rated speed P110 Torque constant P112 Torque const P173 I_{max} P115 kT-Depend.Speed P260 Vsd_{max} P267 Vs_{qmax} P109 Pole pair number P111 Torque deviation P113 Rated torque P116 kT-Depend.Temp. P242 Start. time P761 Pulse frequency

Fault messages		
No.	Fault description	Counter measures
F091	Par FR motK An error occurred in the motor initialization at the first run-up of the VeCon processor after ready to power-up.	Check the parameter settings as under fault message F090
F096	InitD MDS1 A parameter error occurred for the converter status init drive.	Acknowledge fault. The erroneous parameter is specified in r949 as fault value. Correct Parameter and leave drive system settings (P052=0)
F097	InitD MDS2 A parameter error occurred for the converter status init drive	Acknowledge fault. The erroneous parameter is specified in r949 as fault value. Correct Parameter and leave drive system settings (P052=0)
F098	Motdat can. Motor data set error. Deletion setting was no able to be found in the motor table	Parameter reset to factory settings (P052=1) Replace the CU board (-A10) if error reoccurs.
F099	EEPROM org EEPROM error	Power-down and -up again. Replace the CU board if the error re-occurs.
F102	GRND control Error during the ground fault test before the closed-loop control program	The fault value (r949) indicates the module in which the error occurred: 1 ⇒ phase U, upper valve 15 ⇒ phase U, lower valve 2 ⇒ phase V, upper valve 31 ⇒ phase V, lower valve 3 ⇒ phase W, upper valve 63 ⇒ phase W, lower valve
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 fatal time sector overflow was identified in the high-priority time sectors.	<ul style="list-style-type: none"> • Replace CU • Increase sampling time or reduce pulse frequency
FF02	Watchdog error The software monitoring has responded.	<ul style="list-style-type: none"> • Replace CU
FF03	NMI error Several NMIs have occurred one after another due to external option board accesses (busy monitoring).	<ul style="list-style-type: none"> • Replace CU • Replace BPL • Replace option board
FF04	RAM error An error was identified during the RAM memory test.	<ul style="list-style-type: none"> • Replace CU
FF05	EPROM error An error was identified during the EPROM memory test.	<ul style="list-style-type: none"> • Replace CU • Replace EPROMs
FF06	Stack overflow Stack overflow.	<ul style="list-style-type: none"> • Replace CU • Replace software • Increase sampling time or reduce the pulse frequency
FF07	Stack underflow Stack underflow	<ul style="list-style-type: none"> • Replace CU • Replace software
FF08	Undefined opcode An attempt was made to execute an invalid processor command	<ul style="list-style-type: none"> • Replace CU • Replace software
FF09	Protection fault Illegal format for a protected processor command	<ul style="list-style-type: none"> • Replace CU • Replace software • Replace EPROMs
FF10	Illegal Word Operand Access Word access to an uneven address	<ul style="list-style-type: none"> • Replace CU • Replace software • Replace EPROMs
FF11	Illegal Instruction Access Jump command to an uneven address	<ul style="list-style-type: none"> • Replace CU • Replace software • Replace EPROMs
FF12	Illegal External Bus Access Access to an unavailable external bus	<ul style="list-style-type: none"> • Replace CU • Replace software • Replace EPROMs
FF13	SW error interrupt proc. An error has occurred during interrupt processing	<ul style="list-style-type: none"> • Replace CU • Replace software • Replace EPROMs

7.2 Alarm messages

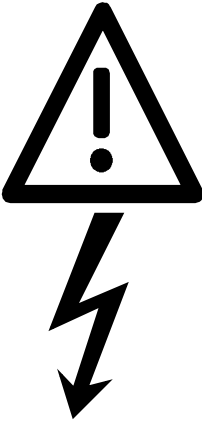
The alarm message is periodically displayed on the PMU by A=alarm and a 3-digit number. An alarm cannot be acknowledged. It is automatically deleted once the cause has been removed. Several alarms can be present. The alarms are then displayed one after another.

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 reduce P761 pulse frequency .
A014	P953 —— 13	Simulation The DC link voltage is not equal to zero when the simulation mode is selected (P733 = 1).	<ul style="list-style-type: none"> • 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 . Also refer to Section 4.3.2.
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 . Also refer to Section 4.3.2.
A018	P954 —— 1	Match. meas. sys. Resolver or encoder matching was erroneous at first run-up. This alarm indicates a wrong amplitude of the encoder signal (too low or too big). With resolver parameterized (P208=2,3) and automatic excitation adjustment (P211=0) this alarm indicates that the highest or lowest amplification factor is selected.	Check measuring system! Wrong encoder type ? Cable length ? Shielding ?
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 $\vartheta > 40^\circ\text{C}$ Refer to Section 14.1. 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.
A024	P954 —— 7	Mot. Move FR The motor moved for the motor identification in the first run-up.	Lock the motor rotor
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
A033	P955 —— 0	Overspeed Bit in r553 status word 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.

Alarm No.	Parameter No. —— Bit No.	Description	Counter-measures
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. Also refer to Section 4.3.2.
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.
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
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	

8 Maintenance

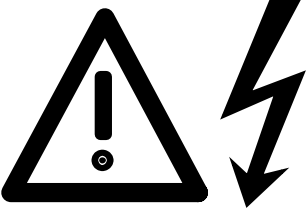
	WARNING
	<p>SIMOVERT Master Drives are operated at high voltages.</p> <p>All work carried-out on or with the equipment must conform to all of the relevant national electrical codes (VBG4 in Germany).</p> <p>Maintenance and service work may only be executed by qualified personnel.</p>
	<p>Only spare parts authorized by the manufacturer may be used.</p> <p>The specified maintenance intervals and also the instructions for repair and replacement must be adhered to.</p> <p>The drive units have hazardous voltage levels up to 5 min after the converter has been powered-down due to the DC link capacitors so that the unit must only be opened after an appropriate delay time.</p> <p>The power- and control terminals can still be at hazardous voltage levels even though the motor is at a standstill.</p>
	<p>If it is absolutely necessary that the drive converter must be worked on when powered-up:</p> <ul style="list-style-type: none"> ◆ never touch any live components. ◆ only use the appropriate measuring and test equipment and protective clothing. ◆ always stand on an ungrounded, isolated and ESD-compatible pad. <p>If these warnings are not observed this can result in death, severe bodily injury or significant material damage.</p>

Always have your Master Drive converter Order No. and serial No. available when contacting the service department. These numbers and other important data are located on the drive converter rating plate.

8.1 Maintenance requirements

The fans are designed for a service life of 35000 hours at an ambient temperature of $T_U = 400^{\circ}\text{C}$. They must be replaced before their service life expires so that the drive converter availability is guaranteed.

8.2 Replacing components

	WARNING
	<p>The fan may only be replaced by qualified personnel.</p> <p>The drive converters are still at hazardous voltage levels up to 5 min. after the unit has been powered-down as a result of the DC link capacitors.</p> <p>If these warnings are not observed, death, severe bodily injury or considerable material damage could occur.</p>

8.2.1 Relacing the fan

Housing sizes A to C

The fan is located under the converter

- ◆ Remove the M4 x 49 Torx screws
- ◆ Remove the protective cover
- ◆ Remove the fan towards the bottom and withdraw connector X20
- ◆ Install the new fan in the inverse sequence
- ◆ Before commissioning the drive check that the fan can run freely and the air flow direction (arrow towards the top). The air must be blown upwards out of the unit.

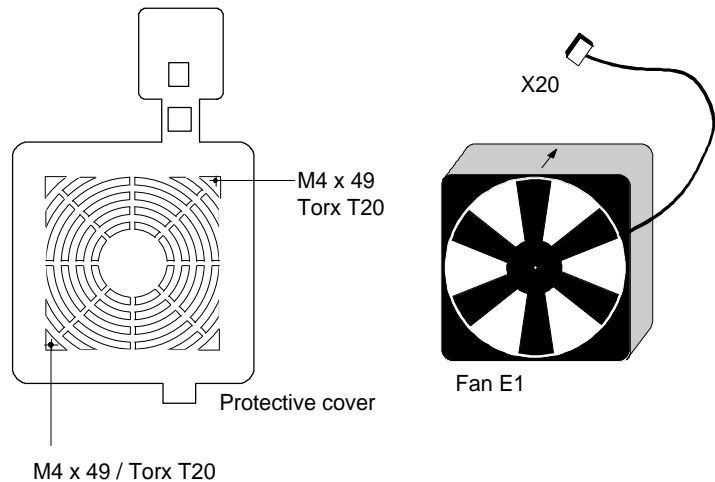


Fig. 8.1 Fan (24 V) and protective cover for housing sizes 1 to 3

Size D

The fan is screwed to a bracket which is located in the lower section of the drive converter.

- ◆ Withdraw connector X20
- ◆ Remove both M5 x 16 Torx screws on the lower part of the converter
- ◆ Withdraw the fan with bracket out of the unit from the bottom
- ◆ Install the new fan in the inverse sequence (the fan is already mounted on the bracket).
- ◆ Before commissioning the drive, check that the fan can rotate freely.

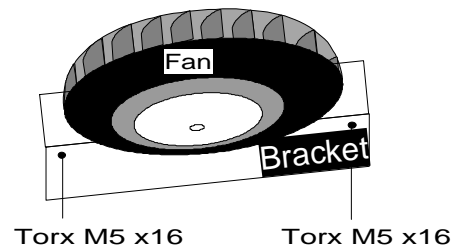
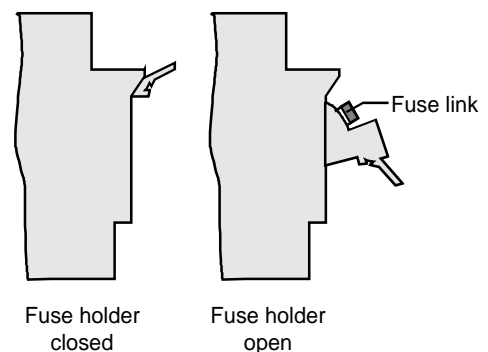


Fig. 8.2 Fan (230 V) with bracket

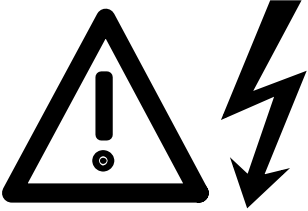
8.2.2 Replacing the fuses (size D)


The fuses are located in the upper section of the converter in a fuse holder. The fuse holder must be opened to remove the fuses.

Fig. 8.3 Fuse holder (size D)



8.2.3 Replacing boards

	<p style="text-align: center;">WARNING</p> <p>The boards may only be replaced by qualified personnel.</p> <p>It is not permissible that the boards are withdrawn or inserted under voltage.</p> <p>Death, severe bodily injury or significant material damage might result if these instructions are not observed.</p>
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	<p style="text-align: center;">CAUTION</p> <p>Boards contain components which could be damaged by electrostatic discharge. The human body must be discharged immediately before an electronics board is touched. This can be simply done by touching a conductive, grounded object immediately beforehand (e.g. bare metal cubicle components).</p>
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8.2.3.1 Replacing boards in the electronics box

- ◆ Loosen the board retaining screws above and below the handles for inserting/withdrawing the boards
- ◆ Carefully remove the board using these handles making sure that the board doesn't catch on anything
- ◆ Carefully locate the new board on the guide rails and insert it completely into the electronics box
- ◆ Tighten the retaining screws above and below the handles.

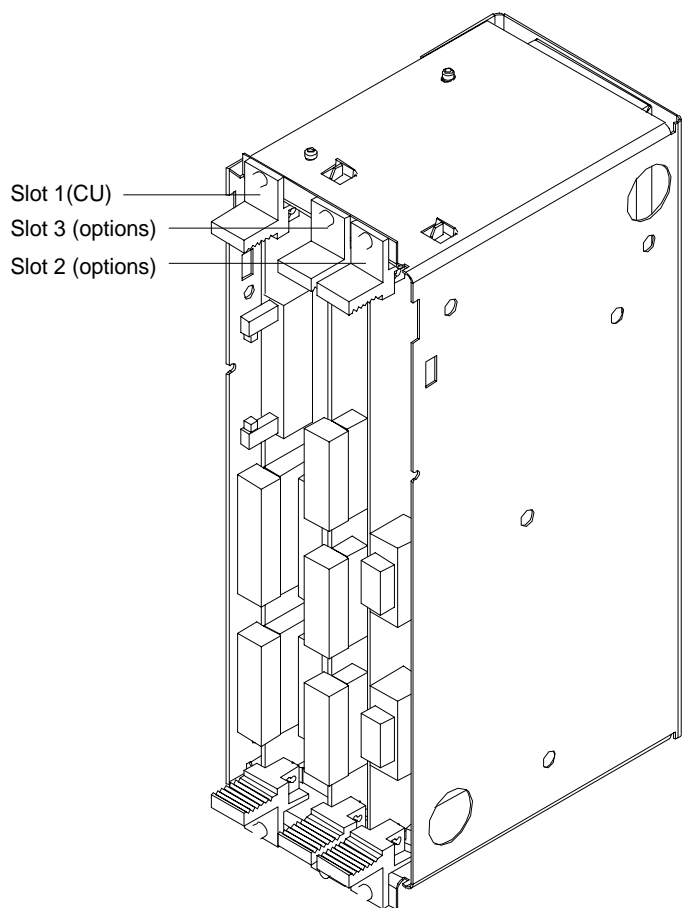


Fig. 8.4 Electronics box equipped with CU (slot 1) and options (slot 2 (left) and 3 (right))

Replacing the PMU

- ◆ Release the snaps on the front cover
- ◆ Open-up the front cover
- ◆ Withdraw connector X108 on the CU
- ◆ Carefully depress the latch upwards on the inner side of the front cover using a screwdriver
- ◆ Remove the PMU board
- ◆ Install the new PMU board in the inverse sequence.

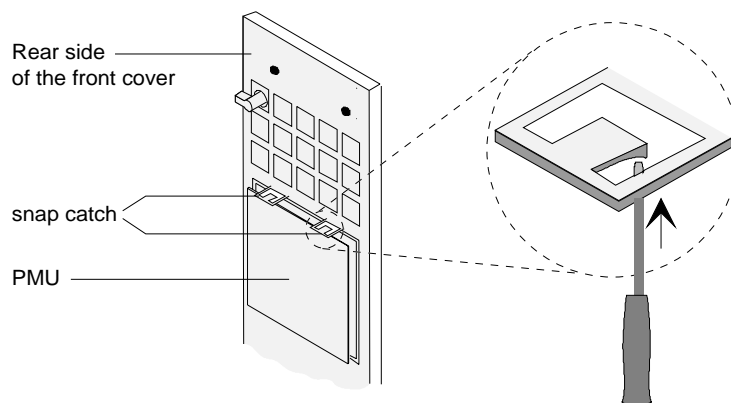


Fig. 8.6 Rear side of the front cover with PMU board

9 Options

9.1 Options which can be integrated into the electronics box

One or two option boards, listed in Table 9.1, can be inserted in the electronics box using the LBA option (local bus adapter).

The options are supplied with the option description.

Designation	Description	Order No.	
		Board description	
LBA	Local bus adapter for the electronics box. This is required for installing T300, CB1, TSY, SCB1 and SCB2	Board description	6SE7090-0XX84-4HA0 6SE7080-0CX84-4HA0
T300	Technology board for controlling technological processes	Board description	6SE7090-0XX84-0AH0 6SE7080-0CX84-0AH0
SCB1	Serial communications board with fiber-optic cable for serial I/O system and peer-to-peer connection	Board description	6SE7090-0XX84-0BC0 6SE7080-0CX84-0BC0
SCB2	Serial communications board for peer-to-peer connection and USS protocol via RS485	Board description	6SE7090-0XX84-0BD0 6SE7080-0CX84-0BD0
	Use of the serial interface with USS protocol	Application description	6SE7087-6CX87-4KB0
CB1	Communications board with interface for SINEC- L2-DP, (Profibus)	Board description	6SE7090-0XX84-0AK0 6SE7087-0CX84-0AK0
	Use of the PROFIBUS DP interface	Application description	6SE7087-6CX87-0AK0

Table 9.1 Option boards and bus adapter

Slots in the electronics box		Boards
Left	Slot 1 (CU)	CU
Center	Slot 3 (options)	CB1 / SCB1 / SCB2 / (TSY, not for T300)
Right	Slots 2 (options)	CB1 / SCB1 / SCB2 / TSY / TB
NOTE		
Only one of each option board type may inserted in the electronics box.		
TB (technology boards, e.g. T300) must always be inserted at slot 2. When a TB board is used, a TSY board may not be inserted.		
If only one option board is used it must always be inserted at slot 2.		

Table 9.2 Slots in the electronics box

If the converter is supplied through an external main contactor, the option board in the electronics box must be supplied from an external power supply, according to Table 9.3.

These values are required in addition to the current drawn by the basic converter (refer to section 13 "Technical Data").

Board	Current drain (mA)
CB1	190
SCB1	50
SCB2	150
TSY w/out tachometer	150
T300 w/out tachometer	620
Standard tachometer Type: 1PX 8001-1	I ₀ 95 (190 at 6000 RPM)

Table 9.3 Current drain of the option boards

9.2 Interface boards

The boards, listed in the following table must be externally mounted and wired-up on the external system side.

Designation	Description	Order No.	
SCI1	Serial I/O board (only in conjunction with SCB1). Analog and binary input and outputs for coupling to the SCB1 via fiber-optic cable	Board description	6SE7090-0XX84-3EA0 6SE7080-0CX84-0BC0
SCI2	Serial I/O board (only in conjunction with SCB1) Binary inputs and outputs for coupling to the SCB1 via fiber-optic cable.	Board description	6SE7090-0XX84-3EF0 6SE7080-0CX84-0BC0

Table 9.4 Interface boards

9.3 Power supplies

Designation	Description	Order number Option	Use with
Power supply 1 A	115 V / 230 V AC - 24 V 1 A DC	6SX7010-0AC15	e.g.: 1 x SCI
Power supply 5 A	115 V / 230 V AC - 24 V 5 A DC	6EP1333-1SL11	Basic converter

Table 9.5 Recommended power supply

NOTE
The external auxiliary power supply must have protective separation according to DIN VDE 0160, otherwise protective separation for the converter control voltage is no longer provided.

9.4 Isolating amplifiers

Input	Output	Order number Option
Input isolating amplifiers for analog inputs		
-10 V to +10 V	-10 V to +10 V	6SX7010-0AC00
-20 mA to +20 mA	-10 V to +10 V	6SX7010-0AC02
4 mA to +20 mA	4 mA to +20 mA	6SX7010-0AC01
Output isolating amplifiers for analog outputs		
-10 V to +10 V	-10 V to +10 V	6SX7010-0AC01
-10 V to +10 V	-20 mA to +20 mA	6SX7010-0AC03
0 V to +10 V	4 mA to +20 mA	6SX7010-0AC04

Table 9.6 Overview of isolating amplifiers

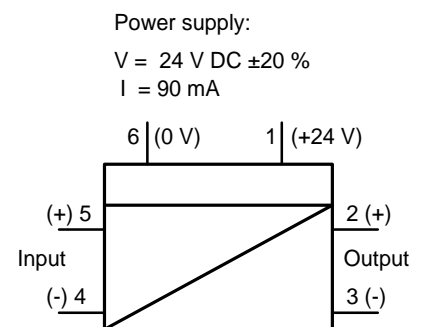


Fig. 9.1 Isolating amplifiers

9.5 Power section

Options	Description/function
Braking unit	For converting the regenerative energy into heat
Braking resistors	Load resistor for the braking unit
Electrical DC link coupling	Switching the DC-AC converter in and out under load
Mechanical DC link coupling	Switching the DC-AC converter in and out in a no-voltage condition
Input rectifier	Input rectifier for one or several DC-AC converters
Input rectifier with line-commutated feedback	Supply rectifier for one or several DC-AC converters for motor or generator operation

Table 9.7 Power section options

9.5.1 Sinusoidal filter

is being prepared

9.5.2 Output reactor, dv/dt filter, sinusoidal filter

The output reactor

- ◆ reduces the voltage gradient dv/dt at the motor terminals
- ◆ reduces the charge current spikes for long motor cables.

They do not reduce the magnitude of the transient voltage spikes at the motor terminals.

A ferrite reactor must be used as output reactor for SIMOVERT MASTER DRIVES SC.

The pulse frequency may not exceed 6 kHz.

9.6 Bypass- and output contactor

9.6.1 Bypass contactor (electrical DC link coupling)

Using the electrical DC link coupling, it is possible, for a multi-motor group with common DC bus, to connect or disconnect a converter with DC supply input to the DC bus.

This option is used when an inverter section has to be replaced.

Binary output -X9:4,5 is provided to control the contactor.

9.6.1.1 Bypass contactor without I/R unit

Parameterization for operation with bypass contactor:

Parameter-			Terminal
No.	Name	Value	
P612, i001	ST. MC energized	0000	X9: 4,5
P629, i001	ST.BC energized	1001	X9: 4,5

Table 9.8 Parameterization for the bypass contactor (electrical DC link coupling)

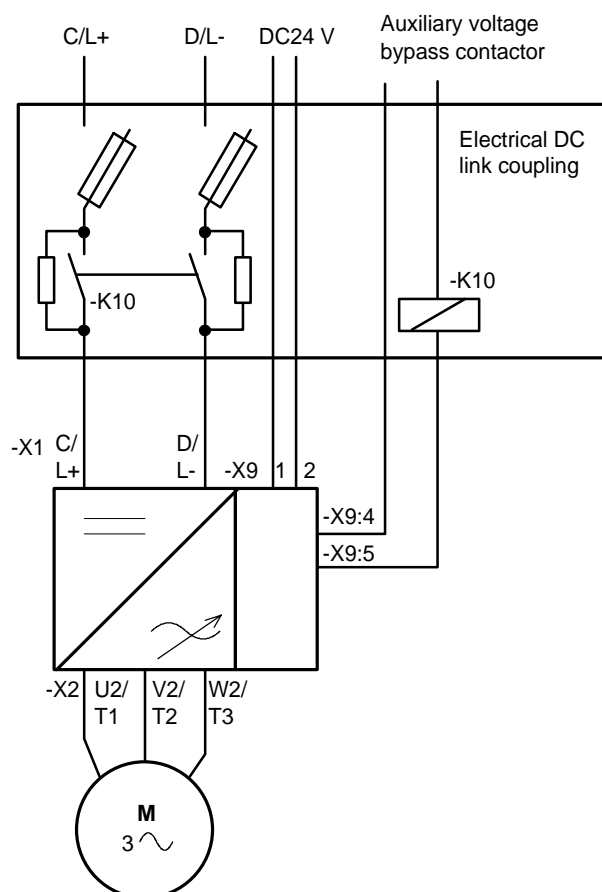


Fig. 9.2 Example for connecting a bypass contactor

9.6.1.2 Bypass contactor with I/R unit

NOTE

If individual inverters have to be isolated when the DC busbar is supplied through an input/regenerative feedback unit, the appropriate parameter sets of the infeed/regenerative feedback unit must be simultaneously switched-over using the binary input. An optimization run for each required constellation must be executed to determine the appropriate parameters. A maximum of four parameter sets can be selected.

If the DC busbar is to be fed from an infeed/regenerative feedback unit, the control parameter values must be determined for this infeed/regenerative feedback unit. During commissioning, the following steps are required:

- ◆ Re-parameterization for the optimization run:

Parameter-			Terminal	Information
No.	Name	Value		
P629, i001	ST.BC energized	0000	X9: 4,5	
P612, i001	ST.BC energized	1001	X9: 4,5	
P600, i001	ST. ready to switch-on	1001	X9: 4,5	Bypass contactor closes

Table 9.9 Parameterization for the optimization run

- ♦ Execute the optimization run to determine the values for the closed-loop control parameters for the infeed/regenerative feedback unit (refer to the Instruction Manual, infeed/regenerative feedback unit).
- ♦ Re-parameterize for operation with the bypass contactor:

Parameter-			Terminal	Information
No.	Name	Value		
P600, i001	ST.ready-to-switch-on	0000	X9: 4,5	
P629, i001	ST.BC energiz.	1001	X9: 4,5	
NOTE				
In this case, the converter must be externally supplied with 24 V DC (connector -X9: 1,2)				

Table 9.10 Parameterization for the bypass contactor (electrical DC link coupling)

9.6.1.3 Connecting and disconnecting individual converters to the DC bus

Sequence control	
Switch the converter to the DC bus	Isolate the converter from the DC bus
Close the fuse disconnect switch	Output an off command
DC link is pre-charged through the pre-charging resistors	Bypass contactor drops out
Enter an on command	Open the fuse disconnect switch
Bypass contactor is closed	Converter is electrically isolated from the DC bus
	Wait until the DC link capacitors have completely discharged

Table 9.11 Sequence control for connecting/disconnecting individual converters to the bus

9.6.2 Output contactor

It is not necessary that the converter is operated with output contactor.

If the converter is operated with output contactor, binary output -X9:4,5 is provided for contactor control (re-assignment).

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

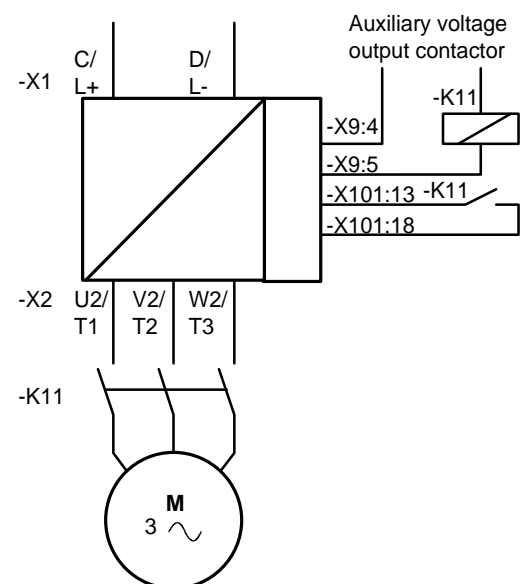


Fig. 9.3 Example for connecting-up a output contactor

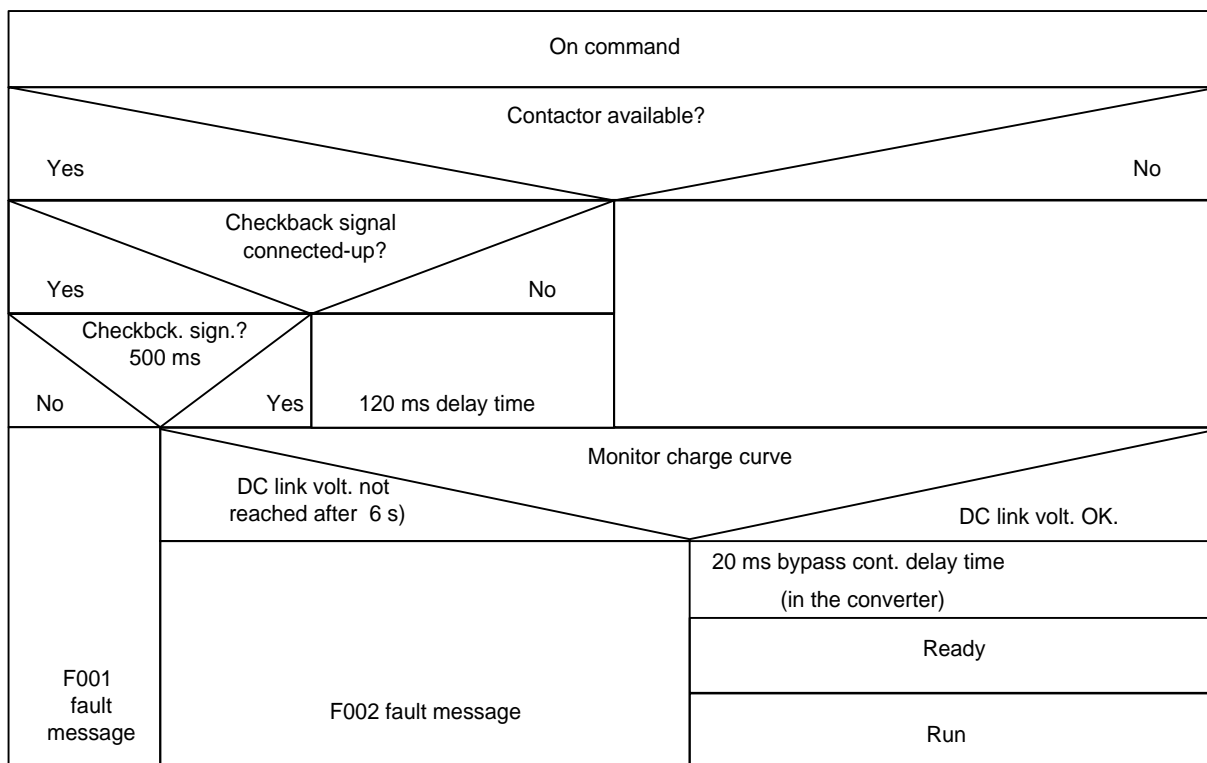
Sequence control, on command-operation (effect on the bypass-or output contactor)

Fig. 9.4 Sequence control, on command- operation

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

Table 9.12 Recommended parameterization for the main- and output contactors

NOTES
For the special case, where a customer wishes to connect-up both an electrical DC link coupling as well as an output contactor, then one of the two must be energized through a binary output. For higher ratings, an additional auxiliary contactor must be provided due to the 230 V AC required (contactor coil).

9.7 Operator control

Option	Description
OP1	User-friendly operator control panel with plain text display
SIMOVIS	Floppy disk with program for operator control via PC

Table 9.13 Operator control options

9.8 Mechanical design

Option	Description
EMC screened housing	For screened cables

Table 9.14 Mechanical options

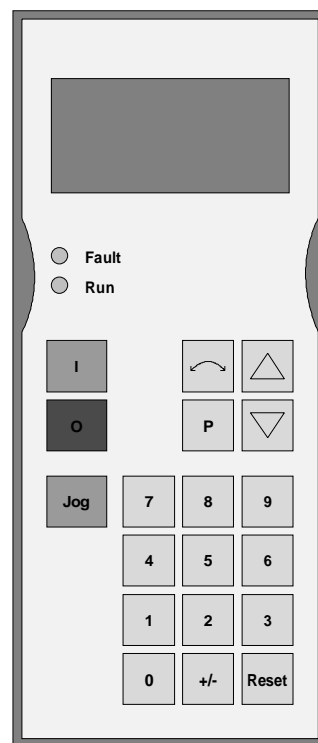


Fig. 9.5 OP1

9.9 Additional equipment series

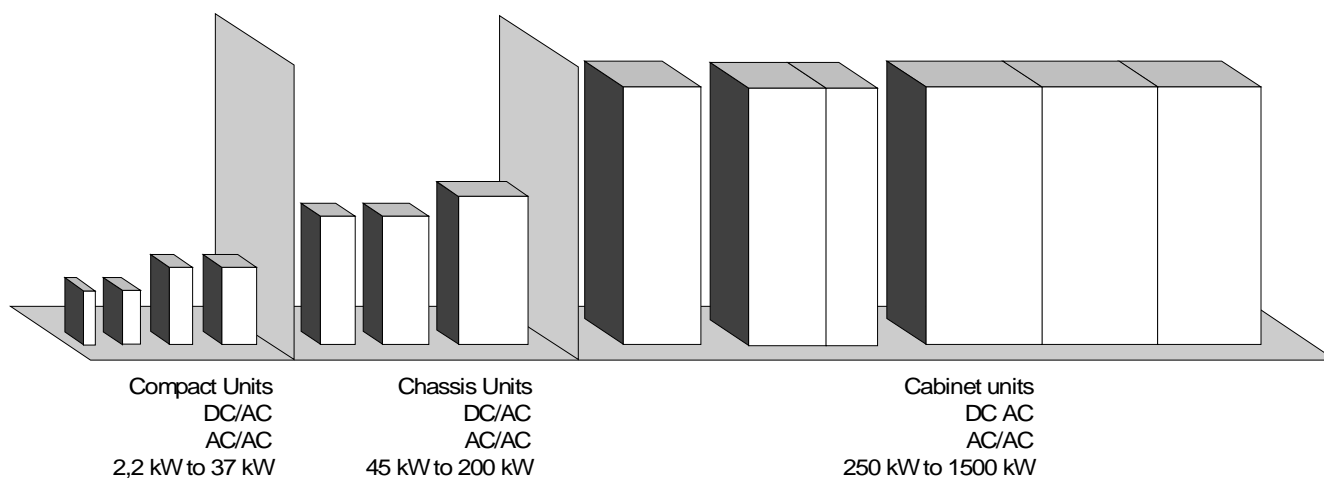


Fig. 9.6 Cabinet- and chassis units

- ◆ AC-AC converters FC, VC and SC
- ◆ DC-AC converters FC, VC and SC
 - with associated input rectifier
 - with associated input rectifier and line-commutated regenerative feedback

10 Spare Parts

Component code	Designation	Order number	Used in
-A10	CU3	6SE7090-0XX84-0AG0	6SE70__-__30
-A30	PMU	6SE7090-0XX84-2FA0	6SE70__-__A30 6SE70__-__B30
-A30	PMU	6SE7090-0XX84-2FB0	6SE70__-__C30 6SE70__-__D30
-E1	24 V DC fan	6SY7000-0AA48	6SE70__-__A30
-E1	24 V DC fan	6SY7000-0AA50	6SE70__-__B30 6SE70__-__C30
-E1	230 V DC fan	6SY7000-0AA80	6SE70__-__D30
-F101, -F102	2 A, fuse, 600 V	6SY7000-0AA24	6SE70__-__D30

Table 10.1 Spare parts

11 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.

Location:			Unit Order No.:	
			Serial No.:	
	Date	Name	Department	Signature
Start-up settings				
Start-up settings change				
Par-No.	Parameter designation	Initialized value	Start-up setting	Start-up setting change
P050	Language	0		
P051	Access stge	2		
P052	Function select.	0		
P053	Param. enable	6		
P054	OP bckgrnd lit	0		
P070	MLFB(6SE70..)	0		
P071	Conv. supp. volt.	400.0		
P072	Conv. current(s)	6.1		
P073	Rtd Drive Power	2.2		
P090	Subrack slot 2	0		
P091	Subrack slot 3	0		
P100	Motor type	i001=0 i002=0	i001= i002=	i001= i002=
P102	Motor type(s)	i001=0.0 i002=0.0	i001= i002=	i001= i002=
P108	Mot. current(s)	i001=0 i002=0	i001= i002=	i001= i002=
P109	Mot. popair no.	i001=0 i002=0	i001= i002=	i001= i002=
P110	kT(n)	i001=0.00 i002=0.00	i001= i002=	i001= i002=
P111	kT deviation	i001=0.00 i002=0.00	i001= i002=	i001= i002=
P112	kT adap.start	i001=0 i002=0	i001= i002=	i001= i002=
P113	Torque(s)	i001=0.0 i002=0.0	i001= i002=	i001= i002=
P115	kT-Depend. Speed	i001=0.0 i002=0.0	i001= i002=	i001= i002=

Par-No.	Parameter designation	Initialized value	Start-up setting	Start-up setting change
P116	kT-Depend. Temp.	i001=0.0 i002=0.0	i001= i002=	i001= i002=
P163	Op/cl loop c type	4		
P173	Imax	i001=0.0 i002=0.0	i001= i002=	i001= i002=
P208	S.speed actual.	i001=0 i002=0	i001= i002=	i001= i002=
P209	Pencodpulse no	i001=0 i002=0	i001= i002=	i001= i002=
P211	Resolver exc	i001=0 i002=0	i001= i002=	i001= i002=
P212	Resolver offset	i001=0 i002=0	i001= i002=	i001= i002=
P213	S. res. offset	0		
P230	n cont. vp	i001=1.000 i002=1.000 i003=1.000 i004=1.000	i001= i002= i003= i004=	i001= i002= i003= i004=
P231	Dynamics	i001=4 i002=4	i001= i002=	i001= i002=
P242	Start time	i001=0.000 i002=0.000	i001= i002=	i001= i002=
P260	U _{rmax} (isd)	i001=100.0 i002=100.0	i001= i002=	i001= i002=
P267	U _{rmax} (isq)	i001=100.0 i002=100.0	i001= i002=	i001= i002=
P272	R(stator)	i001=0.000 i002=0.000	i001= i002=	i001= i002=
P308	Sampling Time	1.0		
P330	MotId	0		
P331	MotId amplitude	i001=0.0 i002=0.0	i001= i002=	i001= i002=
P332	MotId cycles	i001=0 i002=0	i001= i002=	i001= i002=
P354	Ground fault test	0		
P357	Grnd test limit	1.0		
P360	Mot.tmp.alarm	i001=80 i002=80	i001= i002=	i001= i002=
P361	Mot.tmp.fault	i001=110 i002=110	i001= i002=	i001= i002=
P420	Sys. rat. freq.	3000.0		

Par-No.	Parameter designation	Initialized value	Start-up setting	Start-up setting change
P421	Fixed setpoint 1	i001=3000.0 i002=3000.0 i003=3000.0 i004=3000.0	i001= i002= i003= i004=	i001= i002= i003= i004=
P422	Fixed setpoint 2	i001=-3000.0 i002=-3000.0 i003=-3000.0 i004=-3000.0	i001= i002= i003= i004=	i001= i002= i003= i004=
P423	Fixed setpoint 3	i001=1000.0 i002=1000.0 i003=1000.0 i004=1000.0	i001= i002= i003= i004=	i001= i002= i003= i004=
P424	Fixed setpoint 4	i001=250.0 i002=250.0 i003=250.0 i004=250.0	i001= i002= i003= i004=	i001= i002= i003= i004=
P425	Motpot. stor.	0		
P426	Motpot. strt. sp.	0.0		
P433	S. suppl. setp. 1	i001=0 i002=0	i001= i002=	i001= i002=
P436	Suppl.setp 1 inv.	i001=0 i002=0	i001= i002=	i001= i002=
P438	S. suppl. setp. 2	i001=0 i002=0	i001= i002=	i001= i002=
P441	Suppl. setp. 2 inv.	i001=0 i002=0	i001= i002=	i001= i002=
P443	S. main setp.	i001=1002 i002=1001	i001= i002=	i001= i002=
P446	Main setp. inv.	i001=0 i002=0	i001= i002=	i001= i002=
P448	Inch speed 1	200.0		
P449	Inch speed 2	1000.0		
P452	Max. speed (RDF)	i001=0.0 i002=0.0	i001= i002=	i001= i002=
P453	Max. speed (LDF)	i001=0.0 i002=0.0	i001= i002=	i001= i002=
P462	Ramp-up time	i001=10.00 i002=10.00 i003=0.01 i004=0.01	i001= i002= i003= i004=	i001= i002= i003= i004=

Par-No.	Parameter designation	Initialized value	Start-up setting	Start-up setting change
P464	Ramp-down time	i001=20.00 i002=20.00 i003=0.01 i004=0.01	i001= i002= i003= i004=	i001= i002= i003= i004=
P476	RFG active hys.	1.0		
P485	Rated system M	100.0		
P486	S. torque setpoint	i001=0 i002=0	i001= i002=	i001= i002=
P489	Torque setpoint inv.	i001=0 i002=0	i001= i002=	i001= i002=
P492	M limit (mot) FSW	i001=100.0 i002=100.0 i003=100.0 i004=100.0	i001= i002= i003= i004=	i001= i002= i003= i004=
P493	S. M lim. (mot)	i001=1001 i002=1001	i001= i002=	i001= i002=
P498	M lim. (gen) FSW	i001=-100.0 i002=-100.0 i003=-100.0 i004=-100.0	i001= i002= i003= i004=	i001= i002= i003= i004=
P499	S. M lim (gen)	i001=1001 i002=1001	i001= i002=	i001= i002=
P505	M fixed setpoint	i001=5.0 i002=5.0 i003=5.0 i004=5.0	i001= i002= i003= i004=	i001= i002= i003= i004=
P506	S. suppl. torque setp.	i001=0 i002=0	i001= i002=	i001= i002=
P507	M suppl. setp. Kp	i001=1.00 i002=1.00	i001= i002=	i001= i002=
P509	M suppl. setp. inv.	i001=0 i002=0	i001= i002=	i001= i002=
P512	Comp. speed	3000.0		
P513	Comp. speed hys.	3.0		
P514	OFF shutdown speed	100.0		
P516	OFF delay time	i001=0.0 i002=0.0 i003=0.0 i004=0.0	i001= i002= i003= i004=	i001= i002= i003= i004=
P517	Sp.-act. dev. frq.	300.0		
P518	Sp. act. dev. time	3.0		
P519	Overspeed hys.	10.0		

Par-No.	Parameter designation	Initialized value	Start-up setting	Start-up setting change
P525	Fix Setp ProcReg	i001=0.00 i002=0.00	i001= i002=	i001= i002=
P526	Src ProcReg Setp	i001=0 i002=0	i001= i002=	i001= i002=
P527	SetpGain ProcReg	i001=100.00 i002=100.00	i001= i002=	i001= i002=
P528	SmoothProcRegSet	0.00		
P530	ActVal's ProcReg	i001=0 i002=0	i001= i002=	i001= i002=
P531	SRC ProcReg ActV	i001=0 i002=0	i001= i002=	i001= i002=
P532	Gain ProcRegActV T	i001=100.00 i002=100.00	i001= i002=	i001= i002=
P533	Smth ProcRegActV	0.00		
P535	R,g. T:Hyst.	3.0		
P537	Gain ProcReg	1.00		
P538	IntTConstProcReg	0.00		
P539	DifTConstProcReg	0.00		
P541	ProcReg Up1Limit	200.00		
P542	ProcReg Up2Limit	-200.00		
P543	ProcReg AccTime1	0.00		
P544	ProcRegAccTime2	0.00		
P554	S. ON/OFF1	i001=1010 i002=1001	i001= i002=	i001= i002=
P555	S. 1OFF2 (elec.)	i001=1 i002=1002	i001= i002=	i001= i002=
P556	S.2 OFF2(elec.)	i001=1 i002=1	i001= i002=	i001= i002=
P557	S.3 OFF2 (elec.)	i001=1 i002=1	i001= i002=	i001= i002=
P558	S.1 OFF3 (fst stp)	i001=1 i002=1	i001= i002=	i001= i002=
P559	S.2 OFF3 (fst stp)	i001=1 i002=1	i001= i002=	i001= i002=
P560	S.3 OFF3 (fst stp)	i001=1 i002=1	i001= i002=	i001= i002=
P561	S. inv. enable	i001=1 i002=1	i001= i002=	i001= i002=
P562	S. RFG enable	i001=1 i002=1	i001= i002=	i001= i002=
P563	S. no RFG stop	i001=1 i002=1	i001= i002=	i001= i002=

Par-No.	Parameter designation	Initialized value	Start-up setting	Start-up setting change
P564	S.setp. enable	i001=1 i002=1	i001= i002=	i001= i002=
P565	S.1 acknow.	i001=0 i002=1003	i001= i002=	i001= i002=
P566	S.2 acknow.	i001=0 i002=0	i001= i002=	i001= i002=
P567	S.3 acknow.	i001=2001 i002=2001	i001= i002=	i001= i002=
P568	S.inch1 ON	i001=0 i002=0	i001= i002=	i001= i002=
P569	S.inch2 ON	i001=0 i002=0	i001= i002=	i001= i002=
P571	S.CWphseseq	i001=1 i002=1	i001= i002=	i001= i002=
P572	S.CCWphseseq	i001=1 i002=1	i001= i002=	i001= i002=
P573	S.motpot. raise	i001=1010 i002=0	i001= i002=	i001= i002=
P574	S.motpot. low	i001=1010 i002=0	i001= i002=	i001= i002=
P575	S.no fault ext.1	i001=1 i002=1	i001= i002=	i001= i002=
P576	S.SDS bit 0	i001=0 i002=0	i001= i002=	i001= i002=
P577	S.SDS bit 1	i001=0 i002=0	i001= i002=	i001= i002=
P578	S.MDS bit 0	i001=0 i002=0	i001= i002=	i001= i002=
P580	S.FSW bit 0	i001=0 i002=1004	i001= i002=	i001= i002=
P581	S.FSW bit 1	i001=0 i002=0	i001= i002=	i001= i002=
P583	S.restart enable	i001=0 i002=0	i001= i002=	i001= i002=
P584	Src.TReg.Enable	i001=0 i002=0	i001= i002=	i001= i002=
P585	S. con enable	i001=1 i002=1	i001= i002=	i001= i002=
P586	S. n flt ext 2	i001=1 i002=1	i001= i002=	i001= i002=
P587	S. slave drive	i001=0 i002=0	i001= i002=	i001= i002=

Par-No.	Parameter designation	Initialized value	Start-up setting	Start-up setting change
P588	S. no alrm ext. 1	i001=1 i002=1	i001= i002=	i001= i002=
P589	S. no alrm ext. 2	i001=1 i002=1	i001= i002=	i001= i002=
P590	S.base/res	1005		
P591	S.MCchckbcksig	1		
P600	ST. rdytswitch-on	i001=0 i002=0 i003=0	i001= i002= i003=	i001= i002= i003=
P601	ST. ready	i001=0 i002=0 i003=0	i001= i002= i003=	i001= i002= i003=
P602	ST. run	i001=0 i002=0 i003=0	i001= i002= i003=	i001= i002= i003=
P603	ST. fault	i001=1002 i002=0 i003=0	i001= i002= i003=	i001= i002= i003=
P604	ST. no off 2	i001=0 i002=0 i003=0	i001= i002= i003=	i001= i002= i003=
P605	ST. no off 3	i001=0 i002=0 i003=0	i001= i002= i003=	i001= i002= i003=
P606	ST. swtch-on inhib.	i001=0 i002=0 i003=0	i001= i002= i003=	i001= i002= i003=
P607	ST. alarm	i001=0 i002=0 i003=0	i001= i002= i003=	i001= i002= i003=
P608	ST. n sp.-act dev.	i001=0 i002=0 i003=0	i001= i002= i003=	i001= i002= i003=
P610	ST. comp frq. err.	i001=0 i002=0 i003=0	i001= i002= i003=	i001= i002= i003=
P611	ST. undervolt.	i001=0 i002=0 i003=0	i001= i002= i003=	i001= i002= i003=
P612	ST. MC energized	i001=1001 i002=0 i003=0	i001= i002= i003=	i001= i002= i003=

Par-No.	Parameter designation	Initialized value	Start-up setting	Start-up setting change
P613	ST. RFG active	i001=0 i002=0 i003=0	i001= i002= i003=	i001= i002= i003=
P614	ST. CW phseseq.	i001=0 i002=0 i003=0	i001= i002= i003=	i001= i002= i003=
P618	ST. no oversp.	i001=0 i002=0 i003=0	i001= i002= i003=	i001= i002= i003=
P619	ST. fault, ext. 1	i001=0 i002=0 i003=0	i001= i002= i003=	i001= i002= i003=
P620	ST. fault, ext. 2	i001=0 i002=0 i003=0	i001= i002= i003=	i001= i002= i003=
P621	ST. alarm ext.	i001=0 i002=0 i003=0	i001= i002= i003=	i001= i002= i003=
P622	ST. alarm i2t conv.	i001=0 i002=0 i003=0	i001= i002= i003=	i001= i002= i003=
P623	ST. flt. otmp cv.	i001=0 i002=0 i003=0	i001= i002= i003=	i001= i002= i003=
P624	ST. alrm ot. cv.	i001=0 i002=0 i003=0	i001= i002= i003=	i001= i002= i003=
P625	ST. alrm. ot. mt.	i001=0 i002=0 i003=0	i001= i002= i003=	i001= i002= i003=
P626	ST. flt ot. mt.	i001=0 i002=0 i003=0	i001= i002= i003=	i001= i002= i003=
P627	Dst ProcReg A=S	i001=0 i002=0 i003=0	i001= i002= i003=	i001= i002= i003=
P628	Dst PullOut/Blck	i001=0 i002=0 i003=0	i001= i002= i003=	i001= i002= i003=
P629	ST. BC energize	i001=0 i002=0 i003=0	i001= i002= i003=	i001= i002= i003=

Par-No.	Parameter designation	Initialized value	Start-up setting	Start-up setting change
P631	ST. pre-chrg act.	i001=0 i002=0 i003=0	i001= i002= i003=	i001= i002= i003=
P650	CU-AE config.	0		
P651	CU-AE smooth.	4		
P652	CU-AE offset	0.000		
P655	CU-AA actual values	219		
P656	CU-AA gain	10.00		
P657	CU-AA offset	0.00		
P660	SCI-AE config.	i001=0 i002=0 i003=0 i004=0 i005=0 i006=0	i001= i002= i003= i004= i005= i006=	i001= i002= i003= i004= i005= i006=
P661	SCI-AE smooth.	i001=2 i002=2 i003=2 i004=2 i005=2 i006=2	i001= i002= i003= i004= i005= i006=	i001= i002= i003= i004= i005= i006=
P662	SCI-AE offset	i001=0.00 i002=0.00 i003=0.00 i004=0.00 i005=0.00 i006=0.00	i001= i002= i003= i004= i005= i006=	i001= i002= i003= i004= i005= i006=
P664	SCI-AA actual values	i001=0 i002=0 i003=0 i004=0 i005=0 i006=0	i001= i002= i003= i004= i005= i006=	i001= i002= i003= i004= i005= i006=
P665	SCI-AA gain	i001=10.00 i002=10.00 i003=10.00 i004=10.00 i005=10.00 i006=10.00	i001= i002= i003= i004= i005= i006=	i001= i002= i003= i004= i005= i006=

Par-No.	Parameter designation	Initialized value	Start-up setting	Start-up setting change
P666	SCI-AA offset	i001=0.00 i002=0.00 i003=0.00 i004=0.00 i005=0.00 i006=0.00	i001= i002= i003= i004= i005= i006=	i001= i002= i003= i004= i005= i006=
P680	SST1 act. vals	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	i001= i002= i003= i004= i005= i006= i007= i008= i009= i010= i011= i012= i013= i014= i015= i016=	i001= i002= i003= i004= i005= i006= i007= i008= i009= i010= i011= i012= i013= i014= i015= i016=
P681	SST2 act. vals	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	i001= i002= i003= i004= i005= i006= i007= i008= i009= i010= i011= i012= i013= i014= i015= i016=	i001= i002= i003= i004= i005= i006= i007= i008= i009= i010= i011= i012= i013= i014= i015= i016=
P682	SCB protocol	0		
P683	SST/SCB bus addr.	i001=0 i002=0 i003=0	i001= i002= i003=	i001= i002= i003=

Par-No.	Parameter designation	Initialized value	Start-up setting	Start-up setting change
P684	SST/SCB bd rts	i001=6 i002=6 i003=6	i001= i002= i003=	i001= i002= i003=
P685	SST/SCB PKW No.	i001=127 i002=3 i003=3	i001= i002= i003=	i001= i002= i003=
P686	SST/SCB PZD No.	i001=2 i002=2 i003=2	i001= i002= i003=	i001= i002= i003=
P687	SST/SCB TLG rec.	i001=0 i002=0 i003=0	i001= i002= i003=	i001= i002= i003=
P689	SCB peer exp.	i001=0 i002=0 i003=0 i004=0 i005=0	i001= i002= i003= i004= i005=	i001= i002= i003= i004= i005=
P690	SCB act. values	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	i001= i002= i003= i004= i005= i006= i007= i008= i009= i010= i011= i012= i013= i014= i015= i016=	i001= i002= i003= i004= i005= i006= i007= i008= i009= i010= i011= i012= i013= i014= i015= i016=

Par-No.	Parameter designation	Initialized value	Start-up setting	Start-up setting change
P694	CB/TB act. values	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	i001= i002= i003= i004= i005= i006= i007= i008= i009= i010= i011= i012= i013= i014= i015= i016=	i001= i002= i003= i004= i005= i006= i007= i008= i009= i010= i011= i012= i013= i014= i015= i016=
P695	CB/TB TLG rec.	1000		
P696	CB parameter 1	0		
P697	CB parameter 2	0		
P698	CB parameter 3	0		
P699	CB parameter 4	0		
P700	CB parameter 5	0		
P701	CB parameter 6	0		
P702	CB parameter 7	0		
P703	CB parameter 8	0		
P704	CB parameter 9	0		
P705	CB parameter 10	0		
P733	Simulations op.	0		
P735	TRC trigger par.	i001=0 i002=0 i003=0 i004=0 i005=0 i006=0 i007=0 i008=0	i001= i002= i003= i004= i005= i006= i007= i008=	i001= i002= i003= i004= i005= i006= i007= i008=
P736	TRC trigger val.	i001=0 i002=0 i003=0 i004=0 i005=0 i006=0 i007=0 i008=0	i001= i002= i003= i004= i005= i006= i007= i008=	i001= i002= i003= i004= i005= i006= i007= i008=

Par-No.	Parameter designation	Initialized value	Start-up setting	Start-up setting change
P737	TRC trigger cond.	i001=0 i002=0 i003=0 i004=0 i005=0 i006=0 i007=0 i008=0	i001= i002= i003= i004= i005= i006= i007= i008=	i001= i002= i003= i004= i005= i006= i007= i008=
P738	TRC act. values	i001=0 i002=0 i003=0 i004=0 i005=0 i006=0 i007=0 i008=0	i001= i002= i003= i004= i005= i006= i007= i008=	i001= i002= i003= i004= i005= i006= i007= i008=
P739	TRC sample time	i001=1 i002=1 i003=1 i004=1 i005=1 i006=1 i007=1 i008=1	i001= i002= i003= i004= i005= i006= i007= i008=	i001= i002= i003= i004= i005= i006= i007= i008=
P740	TRC pre-trig.	i001=0 i002=0 i003=0 i004=0 i005=0 i006=0 i007=0 i008=0	i001= i002= i003= i004= i005= i006= i007= i008=	i001= i002= i003= i004= i005= i006= i007= i008=
P741	TRC start	i001=0 i002=0 i003=0 i004=0 i005=0 i006=0 i007=0 i008=0	i001= i002= i003= i004= i005= i006= i007= i008=	i001= i002= i003= i004= i005= i006= i007= i008=

Par-No.	Parameter designation	Initialized value	Start-up setting	Start-up setting change
P750	TRC read index	i001=0 i002=0 i003=0 i004=0 i005=0 i006=0 i007=0 i008=0	i001= i002= i003= i004= i005= i006= i007= i008=	i001= i002= i003= i004= i005= i006= i007= i008=
P761	Pulse freq.	i001=5.000 i002=5.000	i001= i002=	i001= i002=
P789	RAM accss val	0		
P799	SF	0		
P917	Par. chnge rep.	0		
P918	CB bus addr.	3		
P927	Param. enable	6		
P928	S.base/res.	1005		
P952	No. of faults	0		
P970	Factory setting	1		
P971	EEPROM transfer	0		

[illegible]

[illegible]

12 Environmental friendliness

Environmental aspects during the development

The number of components has been significantly reduced over earlier converter series by the use of highly integrated components and the modular design of the complete series. Thus, the energy requirement during production has been reduced.

Special significance was placed on the reduction of the volume, weight and variety of metal and plastic components.

Plastic components:	ABS:	Front cover Fan cover PMU support panel
	PP:	Hinges Insulating panel Grip recess Bus retrofit
	PA6:	Insulating foils Terminal housing

Halogen-containing flame retardants were, for all essential components, replaced by environmentally-friendly flame retardants.

Environmental compatibility was an important criterium when selecting the supplied components.

Environmental aspects during production

Purchased components are generally supplied in recyclable packaging materials (board).

Surface finishes and coatings were eliminated with the exception of the galvanized sheet steel side panels.

ASIC devices and SMD devices were used on the boards.

The product is emission-free.

Environmental aspects for disposal

The unit can be broken-down into recyclable mechanical components as a result of the easily releasable screw- and snap connections.

The plastic components and moulded housing are to DIN 54840 and have a recycling symbol.

Units can be disposed of through certified disposal companies. Addresses are available from your local Siemens partner.

13 Technical Data

If you have other application conditions other than those listed in this section, please contact your local Siemens office.

Cooling medium temperature		0 °C to +40 °C
Storage temperature		– 25 °C to +70 °C
Transport temperature		– 25 °C to +70 °C
Environmental class	3K3	DIN IEC 721-3-3 Moisture condensation not permissible
Pollution level	2	DIN VDE 0110 Part 1
Overvoltage category	III	DIN VDE 0110 Part 2
Overvoltage property class	1	E DIN VDE 0160
Degree of protection		
– Standard	IP20	DIN VDE 0470 Section 1 Δ EN 60529
Protection class	I	DIN VDE 0106 Section 1
Radio interference level		DIN VDE 0875 Section 11 Δ EN 55011
– standard	without	
– option	B1	EN55011
Noise immunity		EN50082-1
Mechanical strength		DIN IEC 68-2-6 / 06.90

	Frequency range	Constant amplitude of the deflection	acceleration
	Hz	mm	m/s ² (g)
– when stationary (in op.)	10 to 58	0.075	
	above 58 to 500		9.8 (1)
– during transport	5 to 9	3.5	
	above 9 to 500		9.8 (1)

The converters can also be operated in load class II. The permissible values must be taken from the following tables.

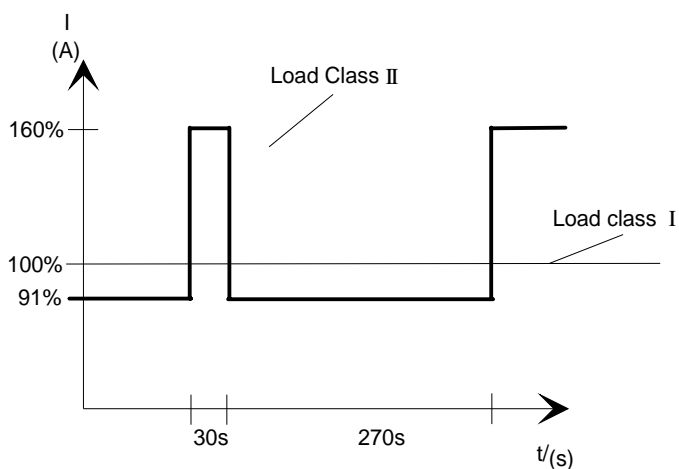


Fig. 13.1 Output according to load class II

DC-AC Converter	6SE70...	21-1RA30	21-3RA30	21-8RB30	22-3RB30	23-2RB30	24-4RC30
Rated voltage, rated frequency, rated current, rated power							
Rated voltage U _n Input Output	V	DC 280 to 310 ±15 % 3 AC 0 to rated D.C. voltage/ 1.35					
Rated frequency f _n Output:	Hz	0 ... 400					
Rated current I _n Input Output	A	12,6 10,6	15,8 13,3	21,1 17,7	27,3 22,9	38,3 32,2	52,6 44,2
DC Link U _{dn}	V	= Rated D.C. voltage					
Rated power	kVA	3,8...4,2	4,8...5,3	6,4...7,1	8,3...9,1	11,6...12,8	15,9...17,6
Auxiliary power supply	V	DC 24 (20-30) (2,0 A without Options; with Options refer to Section 9.1)					
Loading class II according to EN 60146-1-1							
Rated current	A	9,6	12,1	16,1	20,8	29,3	40,2
Base load time	s	240					
Over current	A	14,4	18,1	24,1	31,1	43,8	60,1
Over current time	s	60					
Losses, Cooling, Power factor							
Power factor Converter cosφ _U		<0,92 ind.	<0,92 ind.	<0,92 ind.	<0,92 ind.	<0,92 ind.	<0,92 ind.
Efficiency η – Pulse frequency 6 kHz		0,97	0,97	0,98	0,98	0,98	0,98
Power loss – Pulse frequency 6 kHz	kW	0,11	0,13	0,15	0,18	0,24	0,31
Air cooling requirements	m³/s	0,009	0,009	0,022	0,022	0,022	0,028
Pressure drop Δp	Pa	10	10	32	32	32	30
Sound pressure level, Size, Weight							
Sound pressure level	dB(A)	60	60	60	60	60	60
Housing size		A	A	B	B	B	C
Width	mm	90	90	135	135	135	180
Height		425	425	425	425	425	600
Depth		350	350	350	350	350	350
Weight	kg	8	8	12	12	12	24

DC-AC Converter	6SE70...	25-4RD30	27-0RD30	28-1RD30			
Rated voltage, rated frequency, rated current, rated power							
Rated voltage U _n Input Output	V	DC 280 to 310 ±15 % 3 AC 0 to rated D.C. voltage/ 1,35					
Rated frequency f _n Output:	Hz	0 ... 400					
Rated current I _n Input Output	A	64,3 54,0	82,1 69,0	96,4 81,0			
DC Link U _{dn}	V	= Rated D.C. voltage					
Rated power	kVA	19,5...21,5	24,9...27,5	29,2...32,3			
Auxiliary power supply	V	DC 24 (20-30) (2,0 A without Options; with Options refer to Section 9.1)					
Auxiliary power supply	V	AC 230 ±15% (0,4 A)					
Loading class II according to EN 60146-1-1							
Rated current	A	64,3	62,8	73,7			
Base load time	s	240					
Over current	A	54,0	93,8	110			
Over current time	s	60					
Losses, Cooling, Power factor							
Power factor Converter cosφ _U		<0,92 ind.	<0,92 ind.	<0,92 ind.			
Efficiency η – Pulse frequency 6 kHz		0,98	0,98	0,98			
Power loss – Pulse frequency 6 kHz	kW	0,49	0,61	0,67			
Air cooling requirements	m ³ /s	0,054	0,054	0,054			
Pressure drop Δp	Pa	230	230	230			
Sound pressure level, Size, Weight							
Sound pressure level	dB(A)	65	65	65			
Housing size		D	D	D			
Width Height Depth	mm	270 600 350	270 600 350	270 600 350			
Weight	kg	35	35	35			

DC-AC Converter	6SE70...	16-1TA30	18-0TA30	21-0TA30	21-3TB30	21-8TB30	22-6TC30
Rated voltage, rated frequency, rated current, rated power							
Rated voltage U _n Input Output	V	DC 510 to 620 ±15 % 3 AC 0 to rated D.C. voltage/ 1,35					
Rated frequency f _n Output:	Hz	0 ... 400					
Rated current I _n Input Output	A	7,3 6,1	9,5 8,0	12,1 10,2	15,7 13,2	20,8 17,5	30,4 25,5
DC Link U _{dn}	V	= Rated D.C. voltage					
Rated power	kVA	4...4,9	5,3...6,4	6,7...8,1	8,7...10,5	11,5...13,9	16,8...20,3
Auxiliary power supply	V	DC 24 (20-30) (2,0 A without Options; with Options refer to Section 9.1)					
Loading class II according to EN 60146-1-1							
Rated current	A	5,6	7,3	9,3	12,0	15,9	23,2
Base load time	s	240					
Over current	A	8,3	10,9	13,9	17,9	23,8	35,0
Over current time	s	60					
Losses, Cooling, Power factor							
Power factor Converter cosφ _U		<0,92 ind.	<0,92 ind.	<0,92 ind.	<0,92 ind.	<0,92 ind.	<0,92 ind.
Efficiency η – Pulse frequency 6 kHz		0,97	0,98	0,98	0,98	0,98	0,98
Power loss – Pulse frequency 6 kHz	kW	0,10	0,11	0,13	0,15	0,19	0,31
Air cooling requirements	m ³ /s	0,009	0,009	0,009	0,022	0,022	0,028
Pressure drop Δp	Pa	10	10	10	32	32	30
Sound pressure level, Size, Weight							
Sound pressure level	dB(A)	60	60	60	60	60	60
Housing size		A	A	A	B	B	C
Width	mm	90	90	90	135	135	180
Height		425	425	425	425	425	600
Depth		350	350	350	350	350	350
Weight	kg	8	8	8	12	12	24

DC-AC Converter	6SE70...	23-4TC30	23-8TD30	24-7TD30	26-0TD30	27-2TD30	
Rated voltage, rated frequency, rated current, rated power							
Rated voltage U _n Input Output	V	DC 510 to 620 ±15 % 3 AC 0 to rated D.C. voltage/ 1,35					
Rated frequency f _n Input Output: U/f = constant U = constant	Hz	0 ... 100 28 ... 400					
Rated current I _n Input Output	A	40,5 34,0	44,6 37,5	55,9 47,0	70,2 59	85,7 72,0	
DC Link U _{dn}	V	= Rated D.C. voltage					
Rated power	kVA	22,4...27,1	24,7...29,9	30,9...37,4	38,8...47,0	47,4...57,4	
Auxiliary power supply	V	DC 24 (20-30) (2,0 A without Options; with Options refer to Section 9.1)					
Auxiliary power supply	V		AC 230 ±15% (0,4 A)				
Loading class II according to EN 60146-1-1							
Rated current	A	31,0	34,1	42,8	53,6	65,5	
Base load time	s	240					
Over current	A	46,0	51	63,5	80,2	97,2	
Over current time	s	60					
Losses, Cooling, Power factor							
Power factor Converter cosφ _U		<0,92 ind.	<0,92 ind.	<0,92 ind.	<0,92 ind.	<0,92 ind.	
Efficiency η (In operation with rated data , f _n = 50/60 Hz)		0,98 0,98	0,98 0,98	0,98 0,98	0,98 0,98	0,98 0,98	
Power loss – at rated current f _n = 50/60 Hz	kW	0,37 0,43	0,49 0,55	0,58 0,67	0,70 0,79	0,86 0,97	
Air cooling requirements	m ³ /s	0,028	0,054	0,054	0,054	0,054	
Pressure drop Δp	Pa	30	230	230	230	230	
Sound pressure level, Size, Weight							
Sound pressure level	dB(A)	60	65	65	65	65	
Housing size		C	D	D	D	D	
Width Height Depth	mm	180 600 350	270 600 350	270 600 350	270 600 350	270 600 350	
Weight	kg	24	35	35	35	35	

13.1 De-rating for an increased cooling medium temperature

permissible rated current
in %

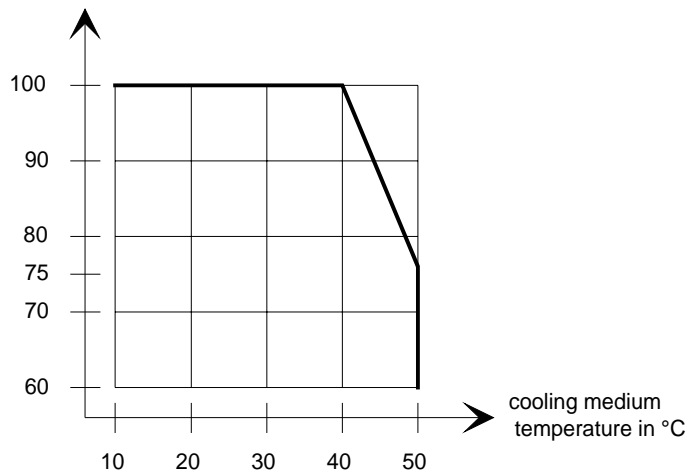
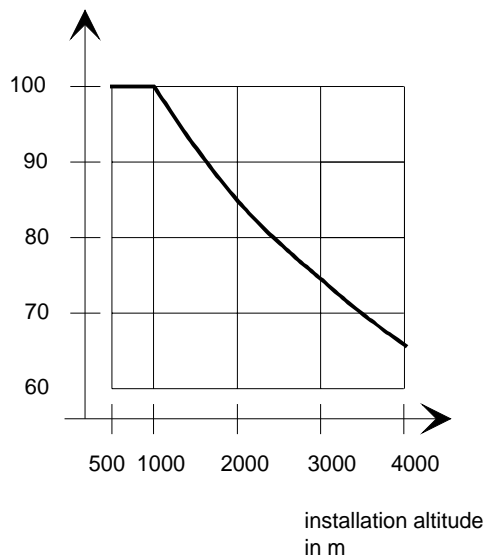


Fig. 13.2 Max. permissible rated current as a function of the cooling medium temperature

13.2 De-rating at installation altitudes > 1000 m above sea level

For installation altitudes > 1000 m above sea level, the rated current must be reduced. For installation altitudes > 2000 m above sea level, the rated voltage must be reduced (see Fig. 13.3). Installation altitudes > 4000 m above sea level are not permissible.

permissible rated current
in %



permissible rated voltage
in %

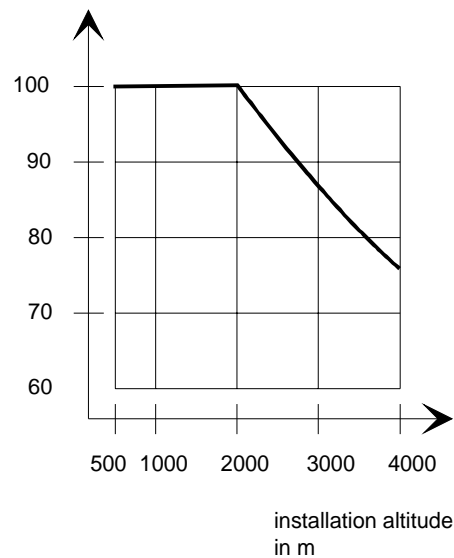


Fig. 13.3 Max. permissible rated current and rated voltage as a function of the installation altitude

13.3 De-rating as a function of the pulse frequency

permissible rated current
in %

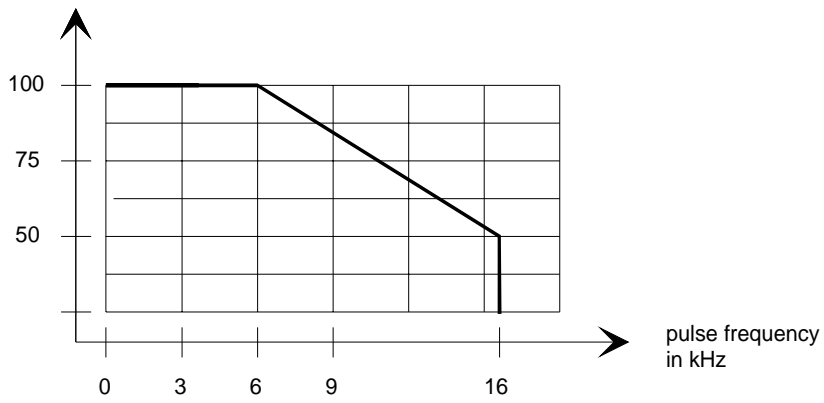


Fig. 13.4 Max. permissible rated current as a function of the pulse frequency

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Being prepared

15 Adressess

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16 Certificates

SIEMENS

Drives and Standard Products Group

Test certificate

Erlangen, 01.07.1995

Equipment

- Type

AC drive

**SIMOVERT
MASTER DRIVES**

- Order No.:

6SE70... ¹⁾

The routine testing according to these test instructions

475 100.9000.00 QP for size A - D
476 100.9000.00 QP for size E - H
476 200.9000.00 QP for size J - M

Tests performed: I. Product check

- checking of presence of all components acc. to parts list

II. Isolation test

- DIN VDE 0160 draft 04.91, par. 7.6.1
- CSA 22.2-14.M91, par. 6.8

III. Functional test
acc. to DIN VDE 0558,
part1

- power supply
- customer terminals and interfaces
- power conversion section
- protective and monitoring functions

IV. RUN-IN

- Ambient temperature 55 °C cycled
- Duration 24 up to 72 hours
- Scamplng 10 % to 100 %

The equipment complied with the test requirements.

Test results are documented within the production data file.

1) For complete type, serial number and technical data please see rating plate.

ASI 1 PE D F



Schlögel



SIEMENS

Drives and Standard Products Group

Confirmation

Erlangen, 01.07.1995

This confirms that

Equipment	AC drive
• Type	SIMOVERT MASTER DRIVES
• Order No.:	6SE70...

is manufactured in conformance with DIN VDE 0558, Part 2 and DIN VDE 0113, Part 6.2.

This equipment fulfills the shock hazard protection requirements according to DIN VDE 0106, Part 100 when the following safety rules are observed:

- Service work in operation is only permissible at the electronics box
- The converter must be switched into a no-voltage condition and isolated from the supply when replacing any part/component
- All panels must be closed during operation.

Thus, this equipment conforms to the appropriate regulations in Germany according to VBG 4 §2 (2) (VBG is a German regulatory body for safety-related issues).

The local operating regulations (e.g. DIN VDE 0105) must be observed when operating the equipment.

ASI 1 PE D T



Dr. Link



ASI 1
System-Based
Drive Technology

SIEMENS

EG-Herstellererklärung

(nach Art. 4 Abs. 2 der EG-Richtlinie 89/392/EWG MSR)

4SE.475 000 0000.00 HE

Hersteller: Siemens Aktiengesellschaft
Bereich Antriebs-, Schalt- und Installationstechnik
Geschäftsgebiet Antriebstechnik
Geschäftszweig Drehzahlveränderbare Antriebe
Anschrift: Postfach 3269
D-91050 Erlangen
Produktbezeichnung: SIMOVERT
Typ 6 SE 70 Kompaktgeräte AC-AC und DC-AC

Das bezeichnete Produkt ist ausschließlich zum Einbau in eine andere Maschine bestimmt. Die Inbetriebnahme ist solange untersagt, bis die Konformität des Endproduktes mit der Richtlinie 89/392/EWG des Rates, festgestellt ist.

Wir bestätigen die Konformität des oben bezeichneten Produktes mit den Normen:

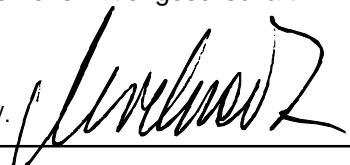
EN 60204-1 (DIN EN 60204 Teil 1 / VDE 0113 Teil 1)

VDE 0160

VDE 0558 Teil 1

Erlangen, den 10. 02. 1995

Siemens Aktiengesellschaft

i. V. 

H. Mickal
Leiter der Produktionseinheit
Drehzahlveränderbare Antriebe

i. V. 

G. Löw
Leiter der kaufmännischen Abteilung
Drehzahlveränderbare Antriebe

usicherung von Eigenschaften.
Die Sicherheitshinweise der mitgelieferten Produktdokumentation sind zu beachten.

The following versions have appeared so far:

Version	Internal Item number
AC	475 344.4100.76 J

Version AC consists of the following chapters

Chapters	Changes	Pages	Version date
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