SIEMENS

SIMOVERT Master Drives
Servo Control (SC)
Types A to D
AC-AC

Operating Instructions

Edition: **B**

Order-No.:6SE7087-6AD30

These Operating Instructions are available in the following languages:

Language	German	French	Spanish	Italian
Order-No.	6SE7080-0AD30	6SE7087-7AD30	6SE7087-8AD30	6SE7087-2AD30

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 included in subsequent editions. We are grateful for any recommendations for improvement.

SIMOVERT® Registered Trade Mark

Contents

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, committment or relationship. The sales contract contains the entire obligation of Siemens. The warranty contained in the contract between the parties is the sole warranty of Siemens. Any statements contained herein do not create new warranties or modify the existing warranty.

CAUTION

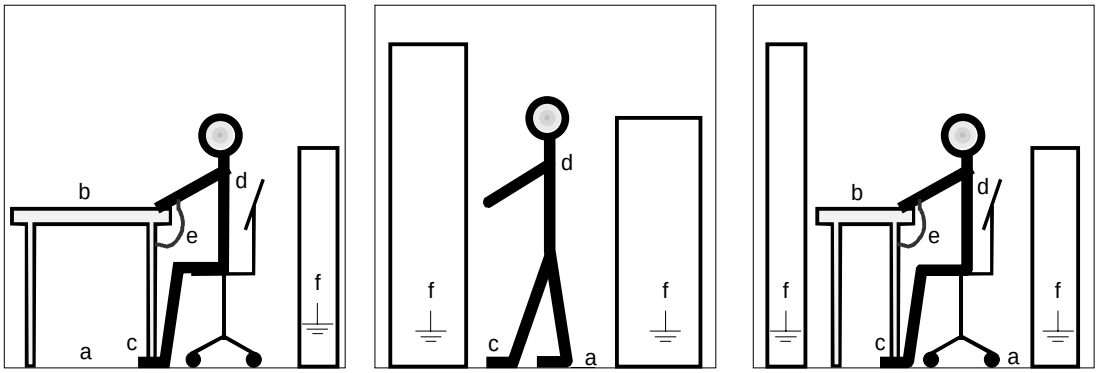
Components which can be destroyed by electrostatic discharge (ESD)

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

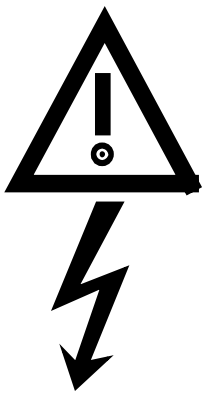
- Electronic boards should only be touched when absolutely necessary.
- The human body must be electrically discharged before touching an electronic board
- Boards must not come into contact with highly insulating materials - e.g. plastic foils, insulated desktops, articles of clothing manufactured from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

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

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



Sitting **Standing** **Standing / Siting**



WARNING

Hazardous voltages are present in this electrical equipment during operation.

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

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

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

1 Description

1.1 Applications

SIMOVERT Master Drive are power electronic units. The converters, described in this Instruction Manual generate a variable-frequency three-phase system from a three-phase supply network with fixed frequency (50/60 Hz). 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

In the basic design, SIMOVERT Master Drives can be used for two-quadrant operation. Four-quadrant operation is possible using the braking unit option. SIMOVERT Master Drives are suitable 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

The three-phase AC voltage, fed to the SIMOVERT Master Drives through the input terminals, is rectified in a B6 bridge rectifier and fed to the DC link through series resistors. The DC link is charged through two resistors, so that complete ground-fault proof operation is provided on the load side.

The converter is then ready for operation.

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

SIMOVERT 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.

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

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

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
	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. 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 personnal protective equipment. Death, severe bodily injury or significant material damage could result if these instructions are not followed. The unit must be protected against the ingress of foreign bodies as otherwise the function as well as the operational safety cannot be guaranteed.

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
	When mounting in cabinets, a clearance of above and below must be provided so that the cooling air flow is not restricted (refer to dimension drawings, Section 2.4). Dimension the cabinet cooling in line with the power loss! (technical data, Section 13)

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 13.1 and 13.2, for temperatures > 40 °C (104 °F) and installation altitudes > 1000 m.

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

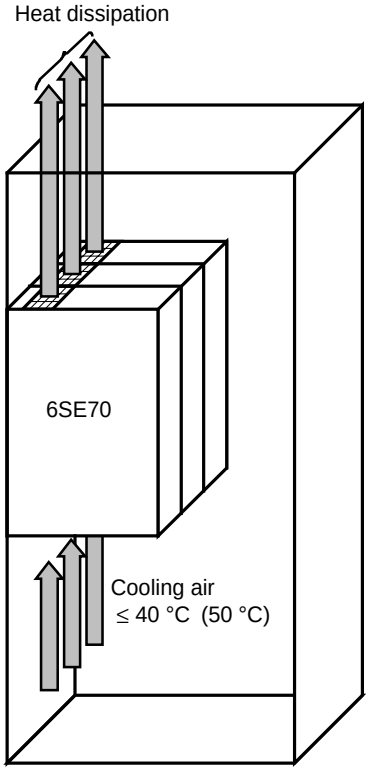


Fig. 2.1 Mounting the converters in cabinets

2.4 Dimension drawings

	a	b	c	d	e
Bauform/Type A	425	48.5	45	90	38.5
Bauform/Type B	425	47	67.5	135	37
Bauform/Type C	600	70	90	180	70

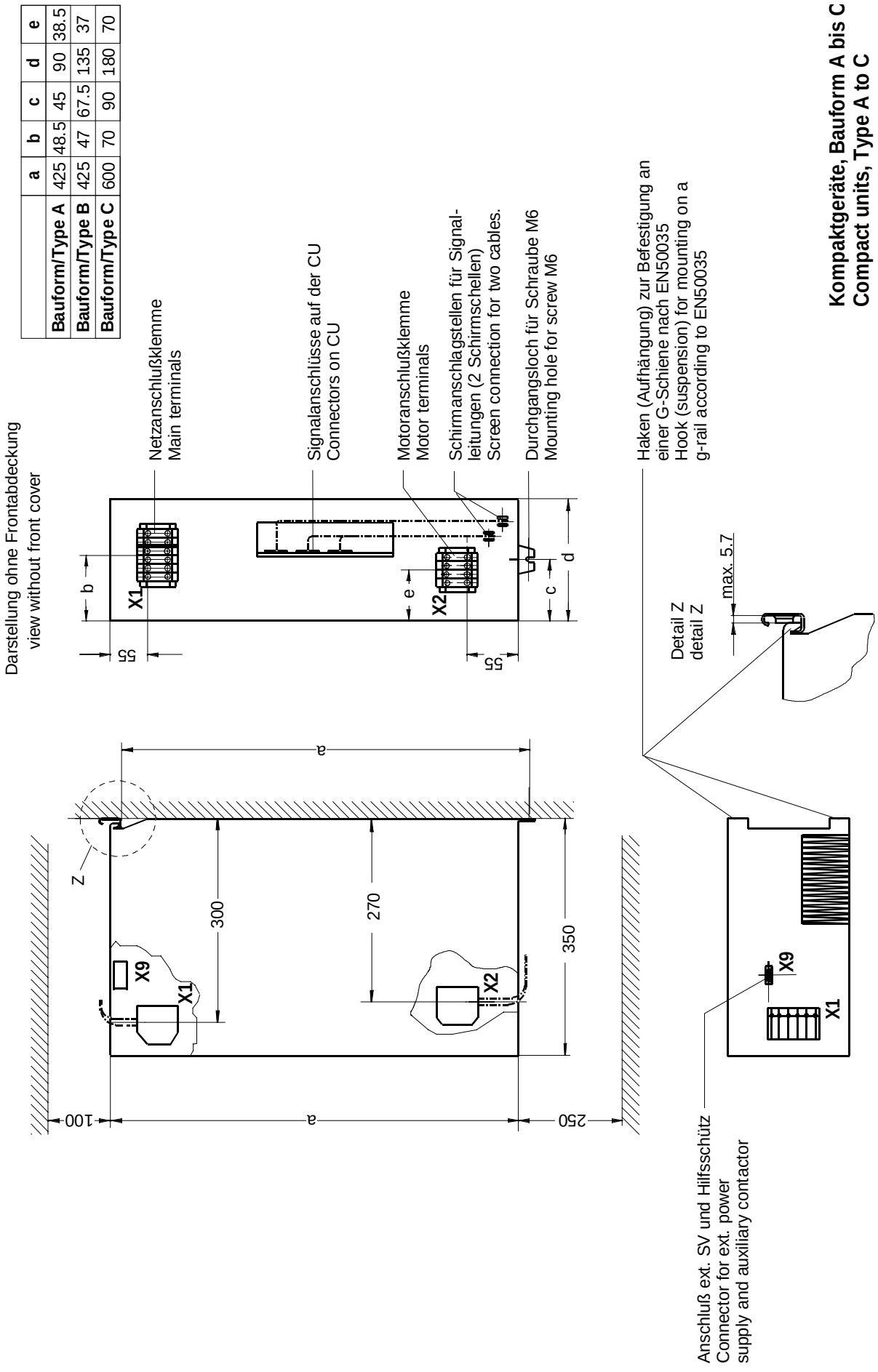


Fig. 2.2 Types A, B and C

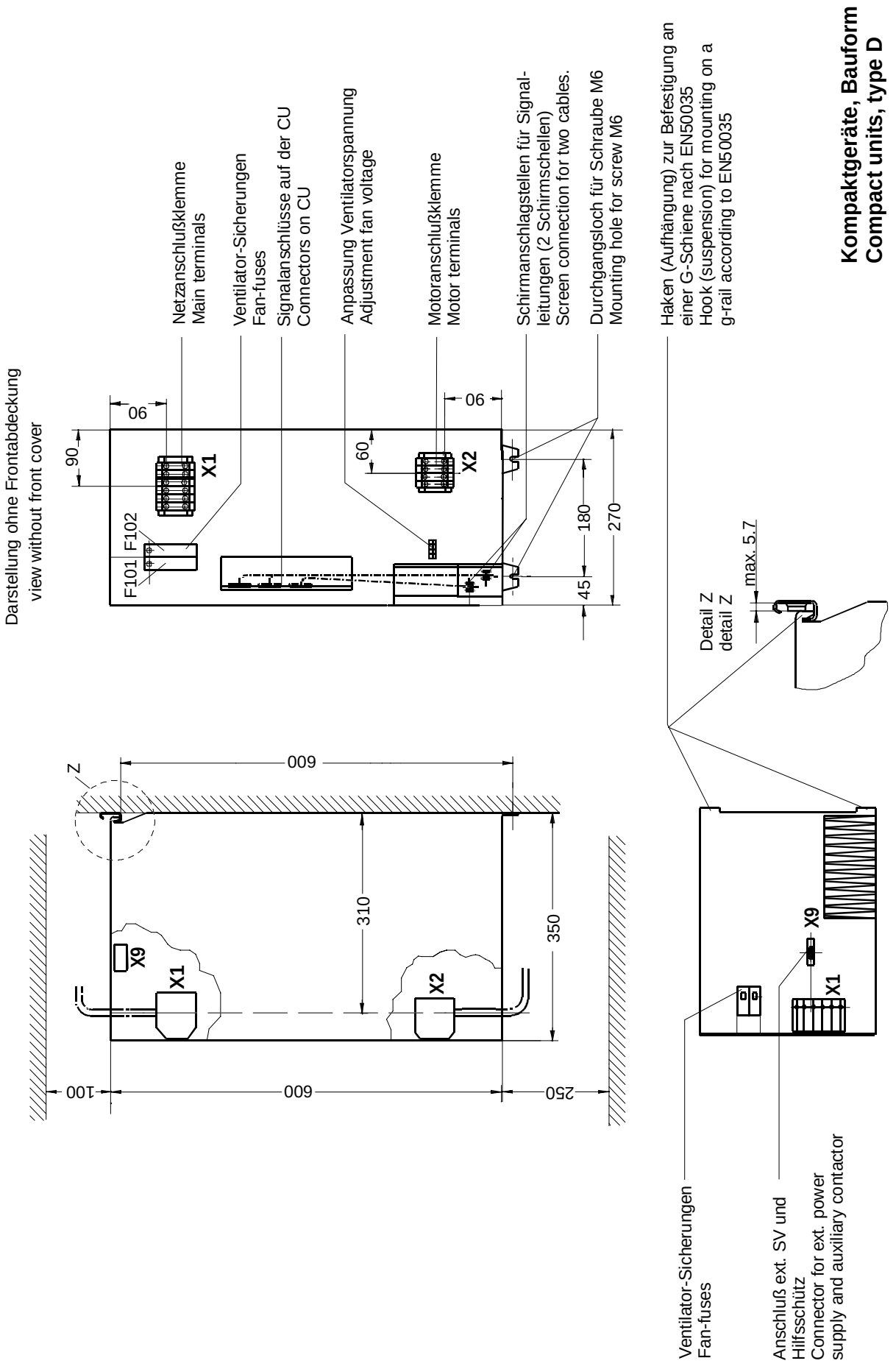
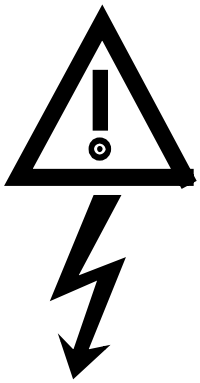

Kompaktgeräte, Bauform
Compact units, type D
Darstellung ohne Frontabdeckung
view without front cover
Netzanschlußklemme
Main terminals
Ventilator-Sicherungen
Fan-fuses
Signalanschlüsse auf der CU
Connectors on CU
Anpassung Ventilatorspannung
Adjustment fan voltage
Motoranschlußklemme
Motor terminals
Schirmanschlagstellen für Signal-leitungen (2 Schirmschellen)
Screen connection for two cables.
Durchgangsloch für Schraube M6
Mounting hole for screw M6
Haken (Aufhängung) zur Befestigung an einer G-Schiene nach EN50035
Hook (suspension) for mounting on a g-rail according to EN50035
X1
X2
X9
F101
F102
90
60
180
270
45
310
350
600
100
250
max. 5.7
Detail Z
detail Z
Ventilator-Sicherungen
Fan-fuses
Anschluß ext. SV und Hilfsschütz
Connector for ext. power supply and auxiliary contactor

Fig. 2.3 Type D

3 Connecting-up



WARNING
SIMOVERT Master Drives are operated at high voltages. The equipment must be in a no-voltage condition (disconnected from the supply) before any work is carried-out! Only professionally trained, qualified personnel must work on or with the unit. Death, severe bodily injury or significant material damage could occur if these warning instructions are not observed.
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.
The power terminals and control terminals can still be live even though the motor is stationary.
Forming the DC link capacitors: 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. Forming is described in Section 4.3.12.
When working on an opened unit, it should be observed that live components (at hazardous voltage levels) can be touched (shock hazard)
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.

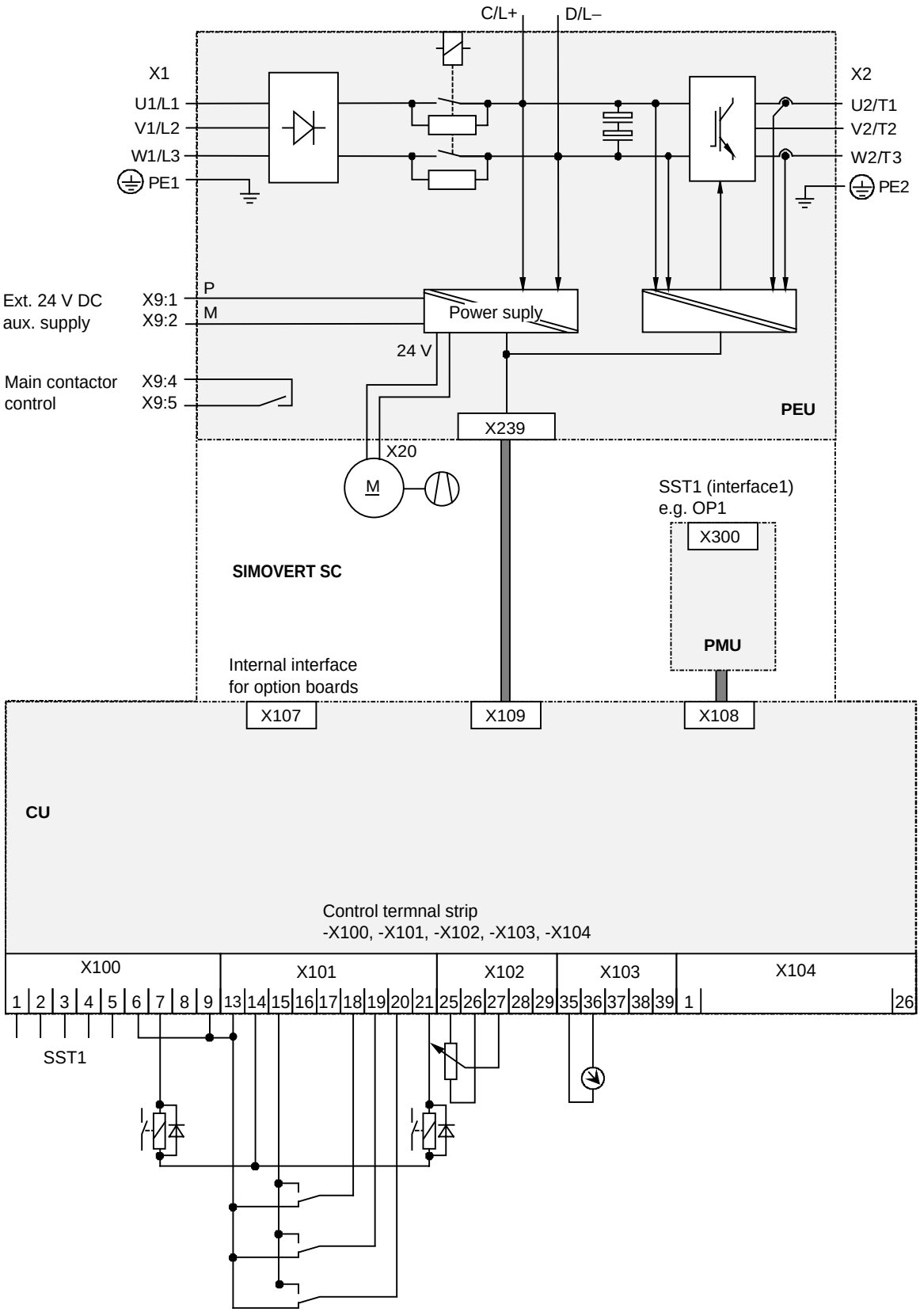


Fig. 3.1 Block diagram, types A, B, and C (24 V DC fan)

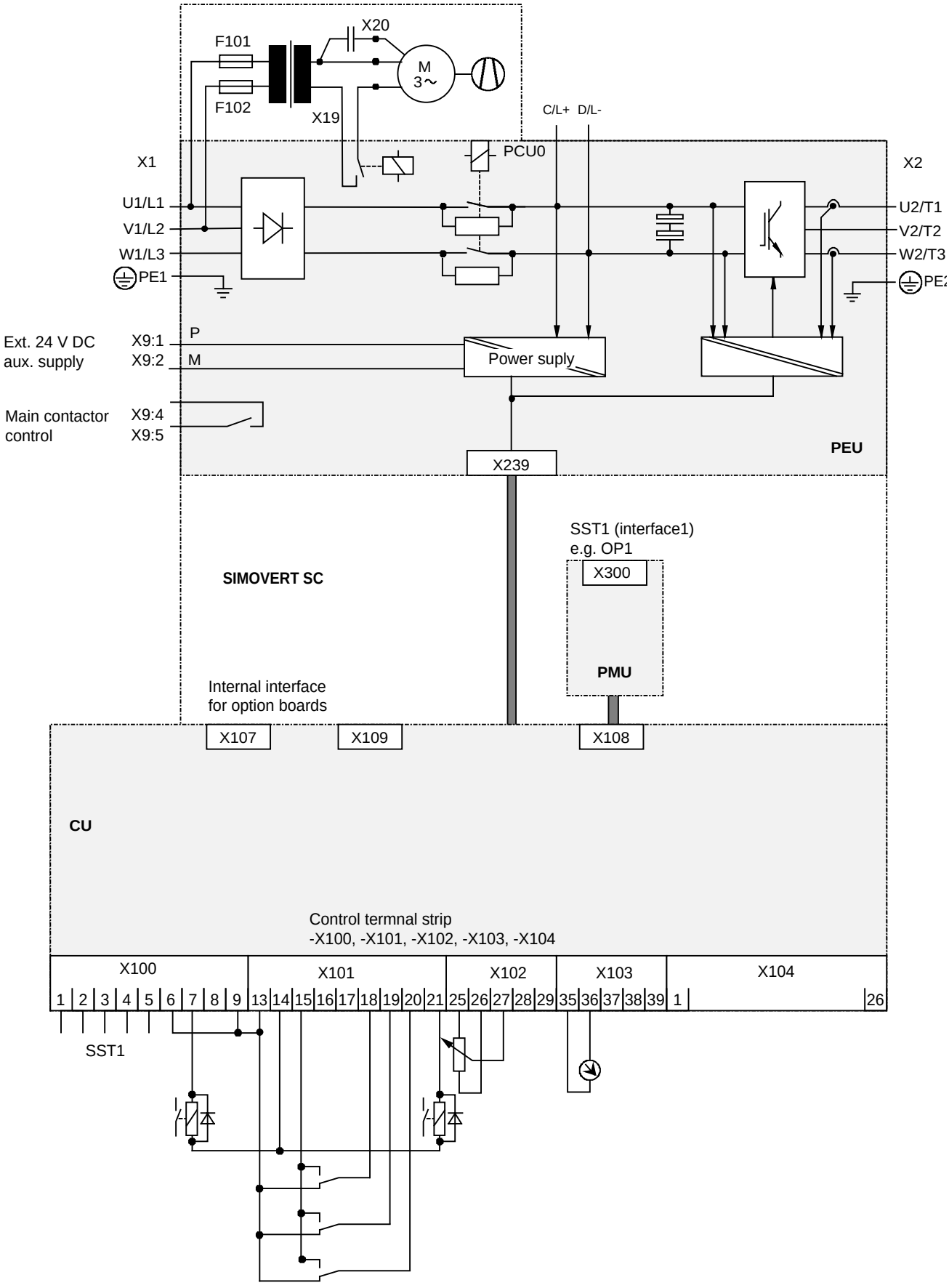


Fig. 3.2 Block diagram, types D (230 V AC fan)

3.1 Power connections

WARNING

- The unit will be destroyed if the input- and output terminals are interchanged!
- The converter will be destroyed if the DC link terminals are interchanged or short-circuited!
- The coils of contacts and relays which are connected to the same supply as the converter or are located in the vicinity of the converter, must be provided with overvoltage limiters, e.g. RC elements.
- It is not permisible that the converter is connected-up through an e.l.c.b. (ground fault circuit interrupter) (DIN VDE 0160).

The converters should be fused on the line side with fuses according to Table 3.1. In order to reduce noise and to limit the harmonics fed back into the supply a 2 % commutating reactor should be used to connect the converter to the supply. Refer to Table 3.1 for the Order Nos. for the fuses and the line commutating reactors.

Refer to Section 3.4 regarding the radio interference suppression regulations.

The connecting cable cross-sections, specified in Table 3.1 are determined for copper cable at a 40 ° C (104 ° F) ambient temperature (acc. to DIN VDE 0298 Part 4/02.88 Group 5) and the recommended cable protection according to DIN VDE 0100, Part 430.

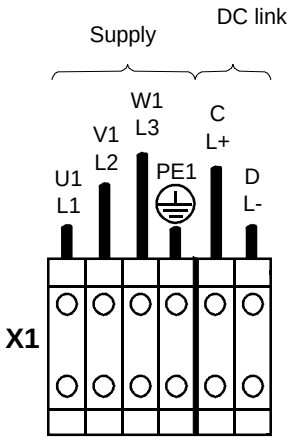


Fig. 3.3 Supply connection

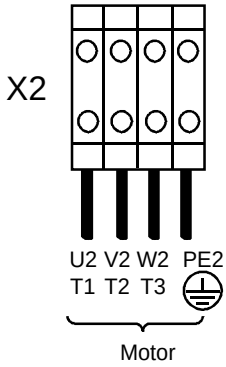


Fig.3.4 Motor connection

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

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".

NOTE
A transformer is integrated into converters, type of construction D, due to the 230 V fan. The terminals on the primary side must be connected corresponding to the rated input voltage.

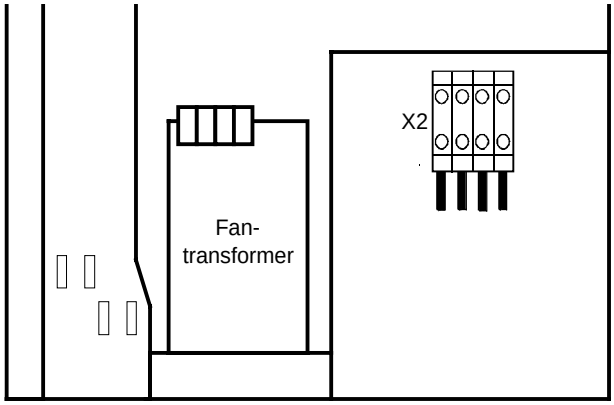


Fig. 3.5 Transformer location
(only for converters, type of construction D)

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 mm^2 cross-section is required due to the discharge currents through the noise suppression capacitors.

3.1.2 DC link connection

The– "braking unit" and "dv/dt filter" options can be connected at the DC link terminals X1 C/L+ and X1 D/L.

Order No.	Rated input		Supply connection							Motor connection	
	Voltage	Curr.	Cross-section		Recommended fuse				Line reactor	Cross-section	
					gR (SITOR)		gL NH				
	(V)	(A)	VDE (mm^2)	AWG[1)]	(A)		(A)			VDE (mm^2)	AWG
6SE70						3NE		3NA	4EP		
21-1CA30	208 to 230	10,6	2,5	14	– – –	– – –	16	3805	3400-1UK	1,5	16
21-3CA30	208 to 230	13,3	4	10	– – –	– – –	20	3807	3500-0UK	1,5	16
21-8CB30	208 to 230	17,7	6	8	25	1815-0	25	3810	3600-4UK	2,5	14
22-3CB30	208 to 230	22,9	10	6	35	1803-0	35	3814	3600-5UK	4	10
23-2CB30	208 to 230	32,2	16	4	– – –	– – –	50	3820	3700-2UK	10	6
24-4CC30	208 to 230	44,2	25	2	50	1817-0	63	3822	3800-2UK	16	4
25-4CD30	208 to 230	54	25	2	80	1820-0	80	3824	3900-2UK	25	2
27-0CD30	208 to 230	69	35	0	80	1820-0	80	3824	3900-2UK	25	2
28-1CD30	208 to 230	81	50	00	100	1021-0	100	3830	3900-2UK	35	0
16-1EA30	380 to 460	6,1	1,5	16	– – –	– – –	10	3803	3200-1UK	1,5	16
18-0EA30	380 to 460	8,0	1,5	16	– – –	– – –	16	3805	3400-2UK	1,5	16
21-0EA30	380 to 460	10,2	2,5	14	– – –	– – –	16	3805	3400-1UK	1,5	16
21-3EB30	380 to 460	13,2	2,5	14	25	1815-0	25	3810	3500-0UK	2,5	14
21-8EB30	380 to 460	17,5	4	10	25	1815-0	25	3810	3600-4UK	2,5	14
22-6EC30	380 to 460	25,5	10	6	35	1803-0	35	3814	3600-5UK	10	6
23-4EC30	380 to 460	34	16	4	– – –	– – –	50	3820	3600-5UK	10	6
23-8ED30	380 to 460	37,5	16	4	63	1818-0	63	3822	3700-5UK	16	4

Order No.	Rated input		Supply connection							Motor connection	
	Voltage	Curr.	Cross-section		Recommended fuse				Line reactor	Cross-section	
					gR (SITOR)		gL NH				
	(V)	(A)	VDE (mm^2)	AWG[1)]	(A)		(A)			VDE (mm^2)	AWG
6SE70						3NE		3NA	4EP		
24-7ED30	380 to 460	47	25	2	63	1818-0	63	3822	3800-2UK	16	4
26-0ED30	380 to 460	59	25	2	80	1820-0	100	3830	3800-2UK	16	4
27-2ED30	380 to 460	72	50	00	80	1820-0	100	3830	3900-2UK	25	2

INFORMATION AND EXPLANATIONS

The cables and semiconductors are protected using fuses with gR characteristics. Only the cables, but not the semiconductors, are protected using gL fuses.

1) American Wire Gauge

2) The specified fuses are valid for converters with a 3-ph AC 500 V input voltage. For converters with higher input voltage, fuses up to 660 V must be used. The Order Nos. of these fuses are obtained by attaching the suffix "-6" to the appropriate 500 V fuse Order No. e.g.: 3NA3803 ≙ 500 V
3NA3803-6 ≙ 660 V

Table 3.1 Power connections acc. to DIN VDE and recommended line fuses

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

The auxiliary power supply and the main 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 mm^2 to 2.5 mm^2 (AWG: 24 to 14) can be connected to X9.

The auxiliary power supply is required if the converter is fed through a main contactor and the open-loop control functions must be maintained even if the main contactor is open.

The main contactor is controlled through floating contacts -X9.4 and -X9.5 (software pre-setting). Detailed information is provided in Section 9, options.

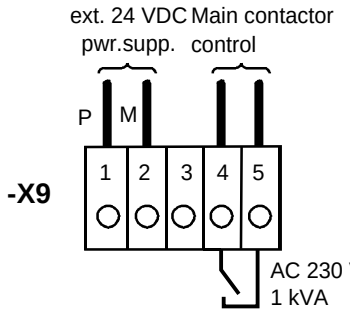


Fig. 3.6 Connecting an external auxiliary 24 V DC power supply and main contactor control

Term.	Function description
1	24 V DC external ≥ 2,1 A (dependent on the options)
2	Reference potential to DC
3	Unassigned
4	Main contactor control
5	Main contactor control

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

NOTE
The main contactor coil must be provided with overvoltage limiters, e.g. RC element (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 mm^2 to 1.5 mm^2 (AWG: 26 to 16), or 1 mm^2 (AWG: 18) can be connected, using finely stranded wire with lugs at the connector (recommended: 0.5 mm^2 (AWG: 20)). The connectors can be identified using pin numbers (Table 3.4); the connector position on the board is illustrated in Fig. 3.8.

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
X104	26-pin	1 26

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

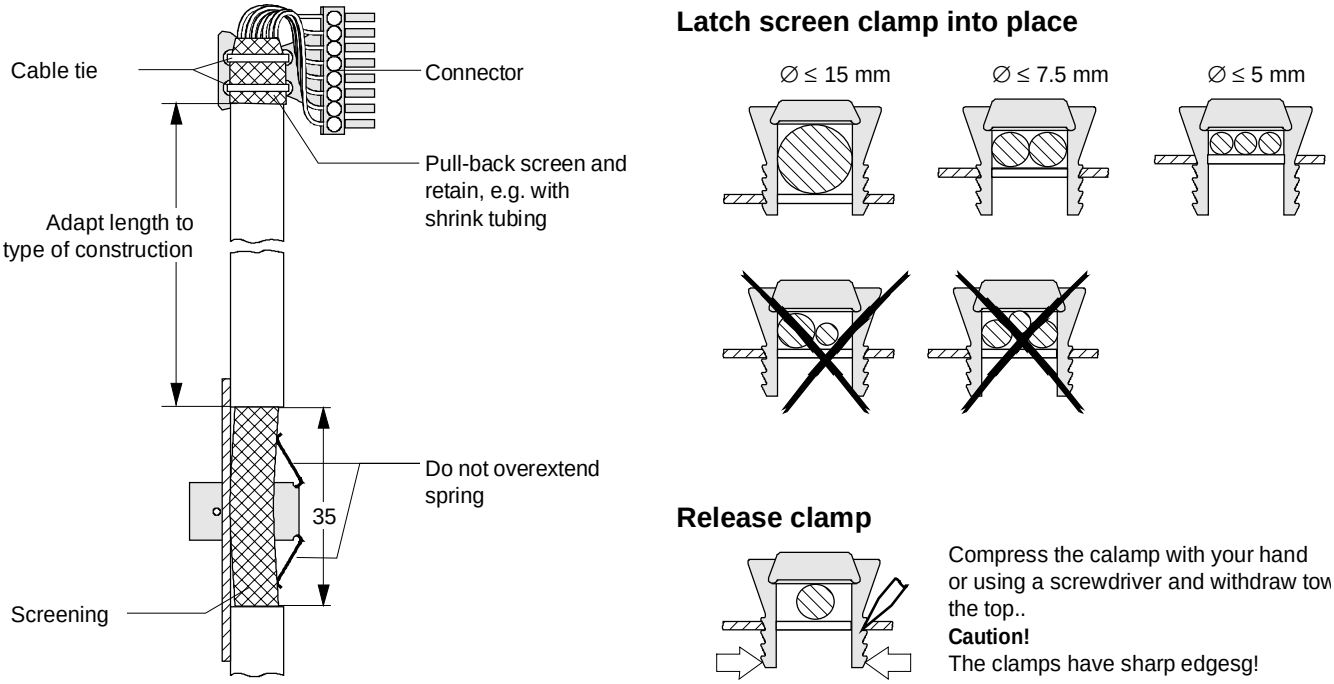


Fig. 3.7 Connecting-up the control cables and the technique for using the screen clamps

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

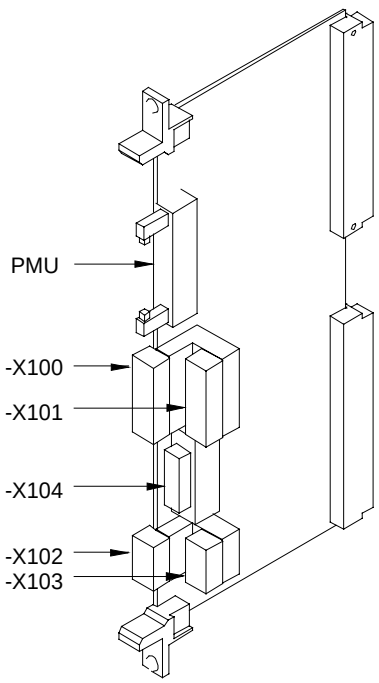


Fig. 3.8 Control terminals on CU

3.3.3 Terminal connection

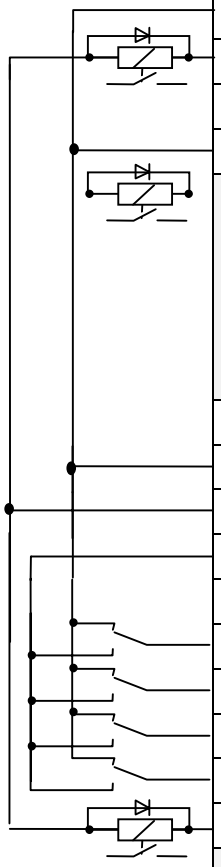
Connecting example	Term.	Function, notes
	-X100	
	1	Transmit- and receive line -RS485, differential input / -output, positive (RS485R/T+)
	2	Transmit- and receive line -RS485, differential input / -output, negative (RS485R/T–)
	3	Transmit output RS485 Standard, differential output, positive (RS485T+)
	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; refer Section 4 "Start-up".
	6	Binary output, relay 1 (changeover contact) reference contact
	7	Binary output, relay 1 (changeover contact) NO contact
	8	Binary output, relay 1 (changeover contact) NC contact
	9	Binary output, relay 2 (NO contact) reference contact
	NOTES	Load capability of the binary outputs: 60 V AC, 60 VA, cosφ = 1 60 V AC, 16 VA, cosφ = 0.4 60 V DC, 24 W Inductive loads, e.g. contactors, relays, for DC voltage loads, must be damped using a diode or varistor, and for AC loads, with a varistor or RC element.
	-X101	
	13	+24 V, 150 mA for binary inputs and outputs
	14	Ref. potential for 24 V (ground)
	15	Ref. potential for binary inputs 1 to 7 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, relay 2 (NO contact) NO contact
	NOTE	Signal sensitivity of the binary inputs: H = 24 V (13 V to 33 V) L = 0 V (–0,6 V to 3 V) I_{max} = 15.7 mA

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

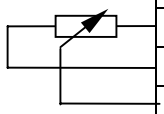
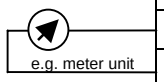
Connecting example	Term.	Function, notes
	-X102	
	25	+10 V / 5 mA, ±2 %, for setpoint pot., non-floating
	26	–10 V / 5 mA, ± 2%, for setpoint pot., non-floating
	27[1)]	Analog input 1 (0 V to ±10 V)
	28	Ref. potential, analog input 1
	29[1)]	Analog input 1 (0 mA to 20 mA or. 4 mA to 20 mA) int. load resistor 250 Ω
	NOTE	Terminals 33 and 34: To increase the noise immunity of the signals, an isolating amplifier should be connected between the analog output and measuring unit for cables > 4 m.
	-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 the measuring unit for cables > 4m.
	37	Output, track A in the HTL level
	38	Output, track B in the HTL level
	39	Output, zero pulse in the HTL level

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

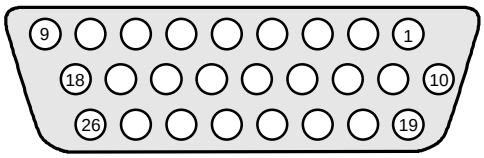


Fig. 3.9 Connecting-up example for control terminal strip -X104

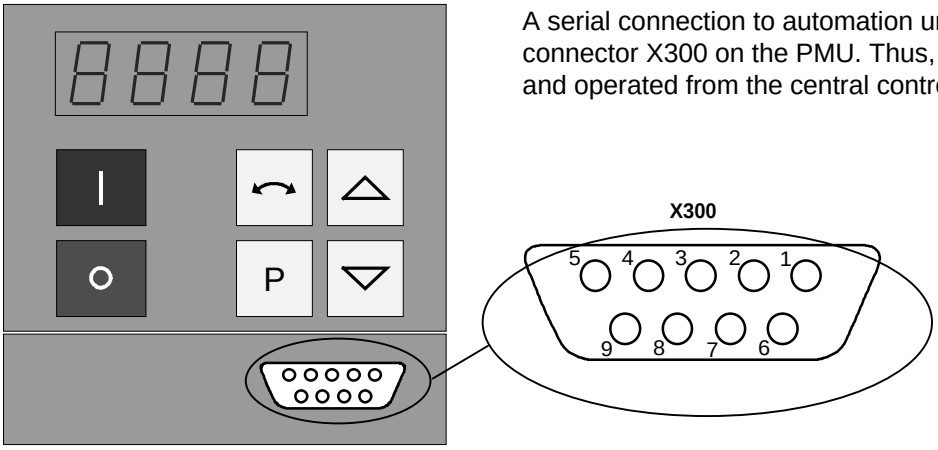
Term.	Function, notes
X104	
1	Resolver field voltage R1
2	Resolver field voltage R2
3	Track C, Sincos encoders
4	Track C\, Sincos encoders
5	Track D, Sincos encoders
6	Track D\, Sincos encoders
7	0 V sensing line for 5 V encoder
8	Ref. potential for encoder or digital tacho
9	+5 V encoder power supply
10	Output voltage $V_{S1-S3,}$ connection S1
11	Output voltage V_{S1-S3} connection S3
12	Track A, Sincos encoders
13	Track A\, Sincos encoders
14	Track B, Sincos encoders
15	Track B\, Sincos encoders

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

Term.	Function, notes
16	Zero pulse, Sincos encoders
17	Zero pulse\, Sincos encoders
18	+ 5 V sense line for 5 V encoders
19	Output voltage V_{S2-S4}, connection S2
20	Output voltage V_{S2-S4}, connection S4
21	Connection for inner screen
22	Connection for inner screen
23	Connection for inner screen
24	Connection for inner screen
25	Motor temperature input (KTY84)
26	Ref. potential for motortemperature
NOTE	Protective separation for terminals 25 and 26 must be externally guaranteed.

Table 3.7 Connecting-up 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.

Fig. 3.10 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

The following points must be observed regarding radio interference suppression regulations

- **Grounding**

  Converters generate radio interference noise. This noise should be fed back to the source through the lowest possible ohmic connection (ground connection cross-section ≥ supply connection cross-section, 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 and the converter must be mounted directly next to one another on a metal panel.

To maintain the radio interference suppression regulations, radio interference filter B1 should be used.

3.5 Recommended circuit

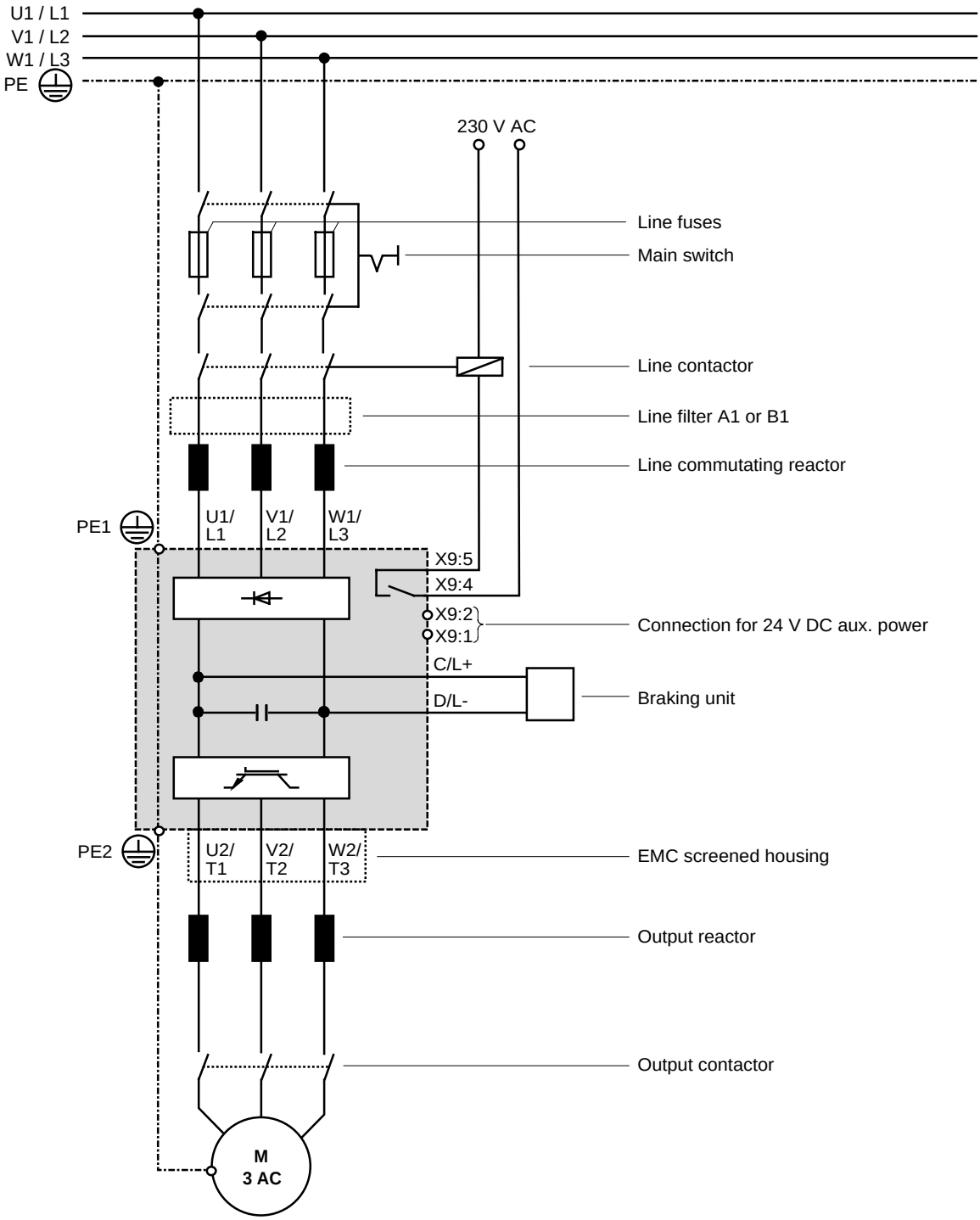


Fig. 3.11 Recommended circuit

NOTE
If the main contactor is externally controlled, the converter requires an external 24 V DC power supply.

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)

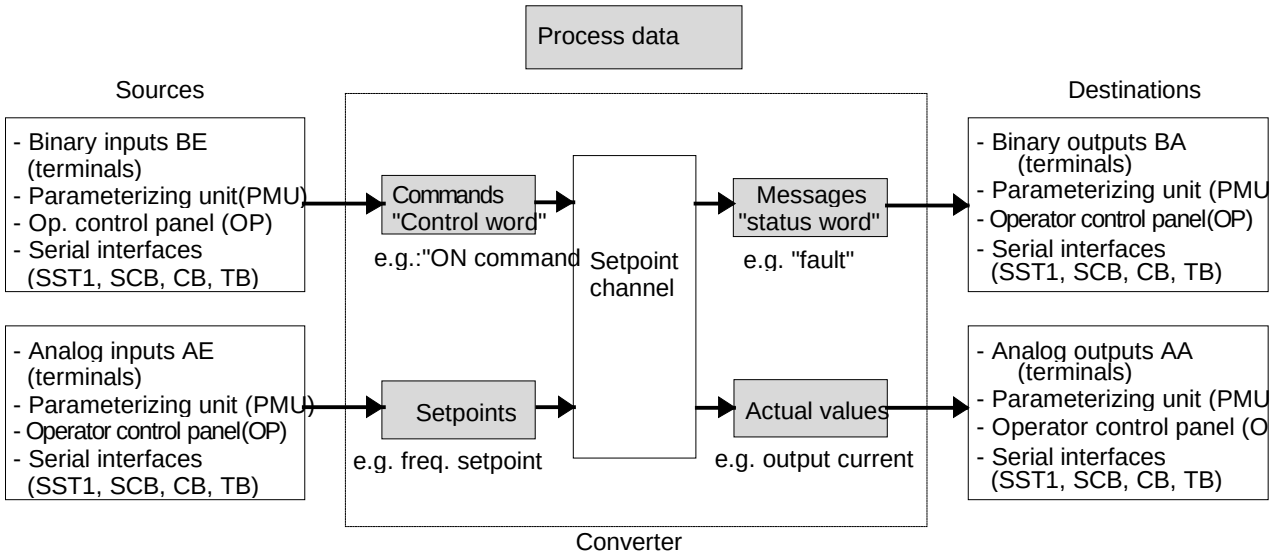
♦ Common data: Speed resolution: 0.3 RPM
Max. frequency: 400 Hz

♦ 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.

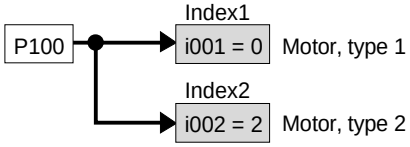


" Indexed" parameters:

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.

- Basic/reserve (basic- or reserve setting):

  e.g. for changing over between manual and automatic operation

- MDS (motor data set) 1 or 2:

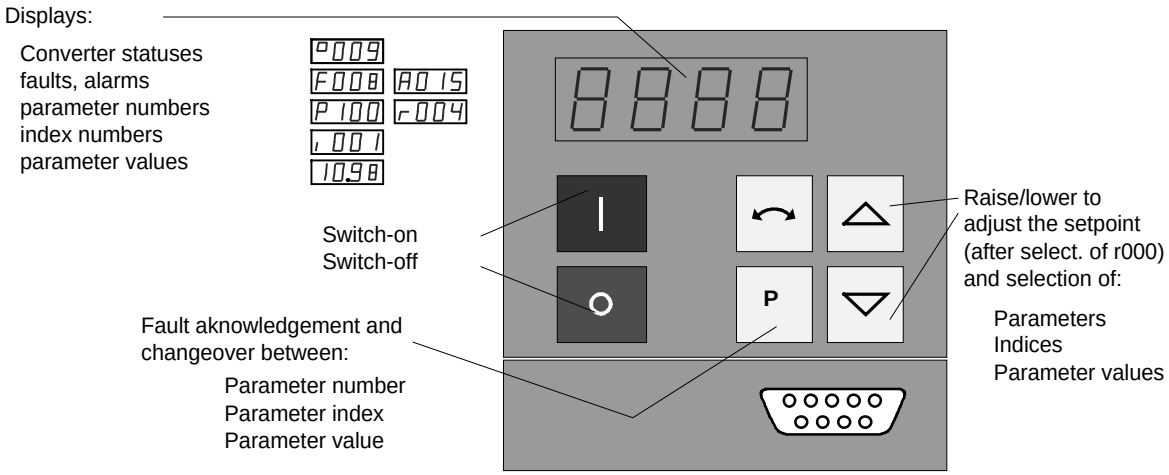
  2 motor data sets which can be changed over; e.g. for operating different motor types from one converter.

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 owered-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 realize according to Section

4.2.2 as “**Standard application with V/f characteristic without hardware options“** for simple applications with1 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

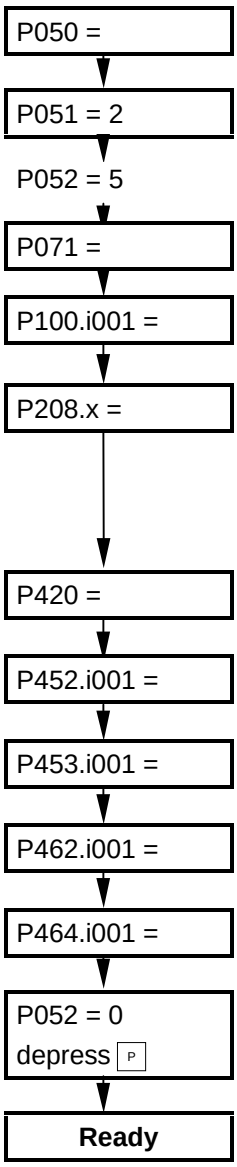
Table 4.1 Motor list

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"



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

Access “stage standard mode“

Function selection "drive setting"

Converter supply voltage [V]

Selecting a 1FT6 Siemens motor from the motor list, refer to Section 4.2.1.1

Define the encoder (refer to Section 5, Parameter list):
- 0: No encoder (not permissible)
- 1: ERN1387 encoder or compatible
- 2: Resolver with the motor pole pair number
- 3: Resolver with pole pair number 1

Rated system speed [RPM]
Rated motor speed in the Appendix

Maximum speed, clockwise phase sequence [RPM]

Maximum speed, counter-clockwise phase sequence [RPM]

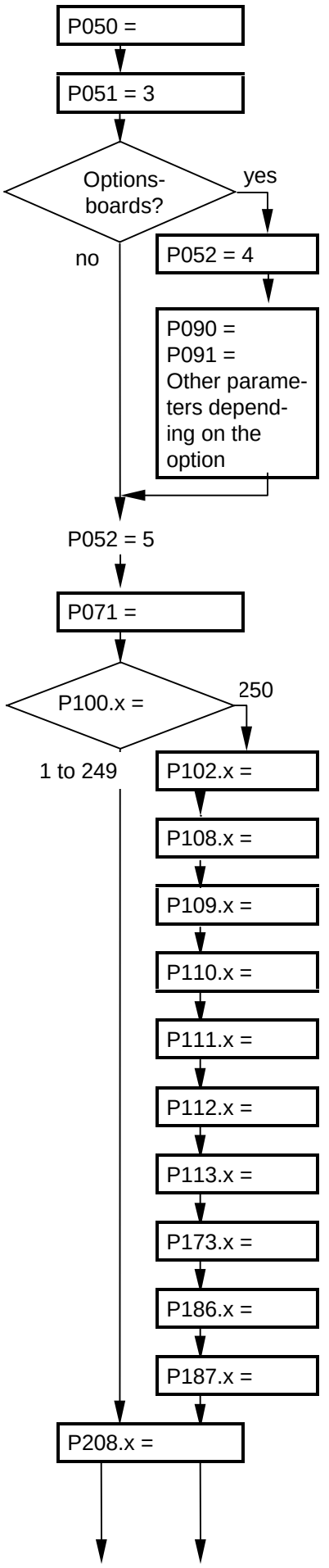
Ramp-up time [s] from standstill up to the rated system freq. (P420)

Ramp-down. time [s] from the rated system freq. (P420) down to standstill

If fault Ffxx occurs, refer to Section 7 „Fault finding“

The converter executes a motor identification run after the first power-up (refer to P330.x).

4.2.3 Parameterization "expert application"



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

Access stage "expert mode"

Possible option boards: SCB, CB, TB

Function selection "hardware configuration"

Define and parameterize the option boards:
refer to the Instruction Manuals for the option boards

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

Function selection "drive setting"
If fault "Fxxx", refer to Section 7 " Troubleshooting "

Converter supply voltage [V]

Motor type: 0: No motor
1 to 249: 1FT6 Siemens motor according to the motor list
250: Motor from another manufacturer

Rated motor current [A]

Rated motor speed [RPM]

Motor pole pair number

Motor torque constant k_T [Nm/A]

Maximum permissible deviation of torque constant k_T from the set value (P110.x) [Nm/A]

Speed limit, from where the torque constant is adapted [%]

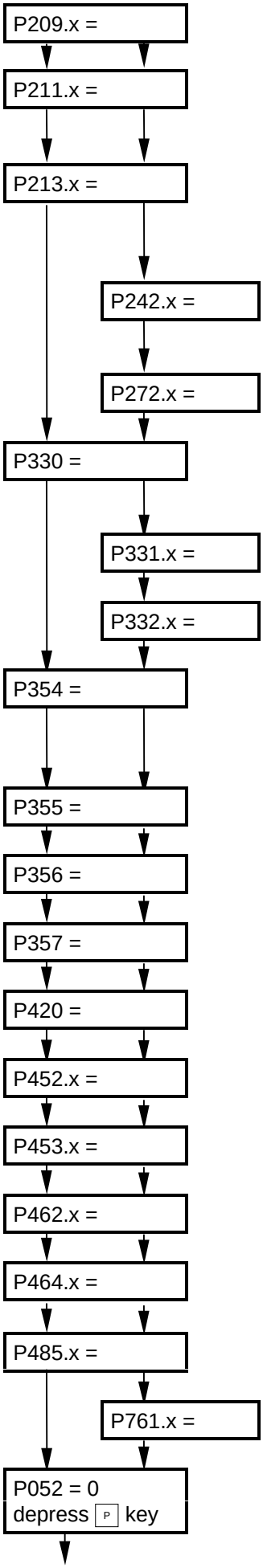
Rated motor torque [Nm]

Maximum motor current [A]

Speed-dependent torque constant [%]

Temperature-dependent torque constant [%]

Define encoder (refer to Section 5, parameter list):
0: No encoder (not permissible)
1: ERN1387 encoder or compatible
2: Resolver with the motor pole pair number
3: Resolver with pole pair number 1



Only for P208.x =1: encoder pulse number (only powers of 2 permissible)

Only for P208.x = 2.3: Resolver field:
0: Automatic adaption
1 to 7: Manual adaption

Only for P208.x =2.3: Resolver offset source:
0: Measured values
1: Value corresponding to the entry in P212.x
2: Transfer the measured value into P212.x

Starting time [s]:
Accelerating time from standstill up to the rated speed with the rated motor torque (P113.x)

Motor stator resistance [W]

Select motor identification:
0: Only after entering new motor data
1: After every ON command

Voltage amplitude for motor identification [V]

Number of measuring cycles for motor identification

Select ground-fault test:
0: No ground-fault test
1: Only after the next ON command
2: After each ON command

Test duration for the ground-fault test in phases U and W [ms]

Test duration for the ground-fault test in phase V [ms]

Current limit for the ground-fault test [A]

Rated system speed [RPM]
Rated motor speed in the system

Maximum speed, clockwise phase sequence [RPM]

Maximum speed, counter-clockwise phase sequence [RPM]

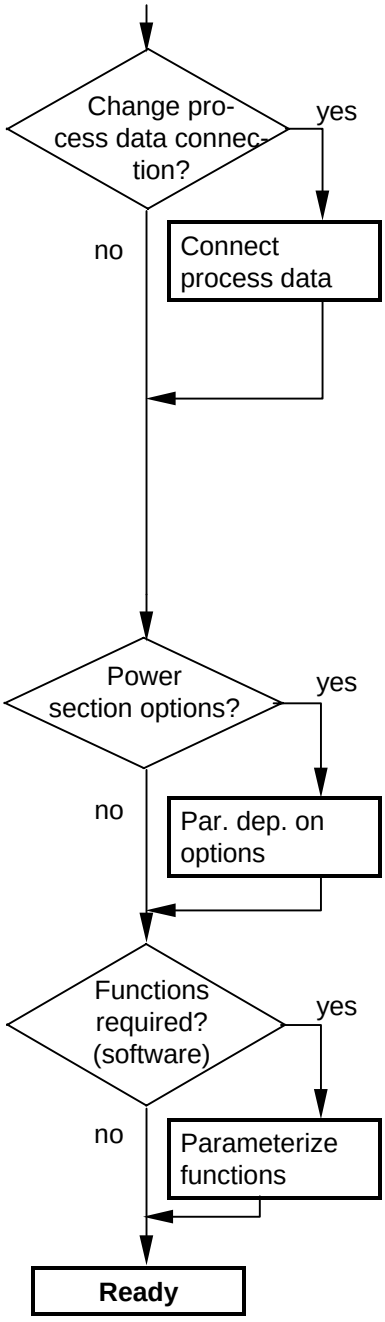
Accelerating time [s] from standstill up to the rated system speed (P420)

Deceleration time [s] from the rated system speed (P420) down to standstill

Rated system torque referred to the rated motor torque (P113.x) [%]

Pulse frequency [kHz]

If fault "Fxxx", refer to Section 7 „Troubleshooting“. The converter executes a motor identification run after the first power-up (refer to P330.x).



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

Process data: refer to Section 4.3.1
- Control word (commands)/status word (messages)
- Setpoint/actual values

Possible process data sources/destinations: (refer to Sections 4.3.2 to 4.3.6)
- Binary inputs, binary outputs
- Analog inputs, analog outputs
- Serial interface in the basic converter (SST1)
- Option boards (SCB, TSY, CB, TB)

Simple applications: Refer to Section 4.2.6

Possible options, power section:
- Main contactor,
- Output contactor,
- Braking unit

Define and parameterize power section options:
- Main contactor, output contactor (refer to Section 9 „options")
- Braking unit (refer to the Instruction Manual for the option)

Possible functions:
- Motor identification, first run,
- Restart-on-the-fly,
- Ground-fault test

Parameterize function:
Section 4.3.10 "Functions"
and Section 5 „Parameter list"

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

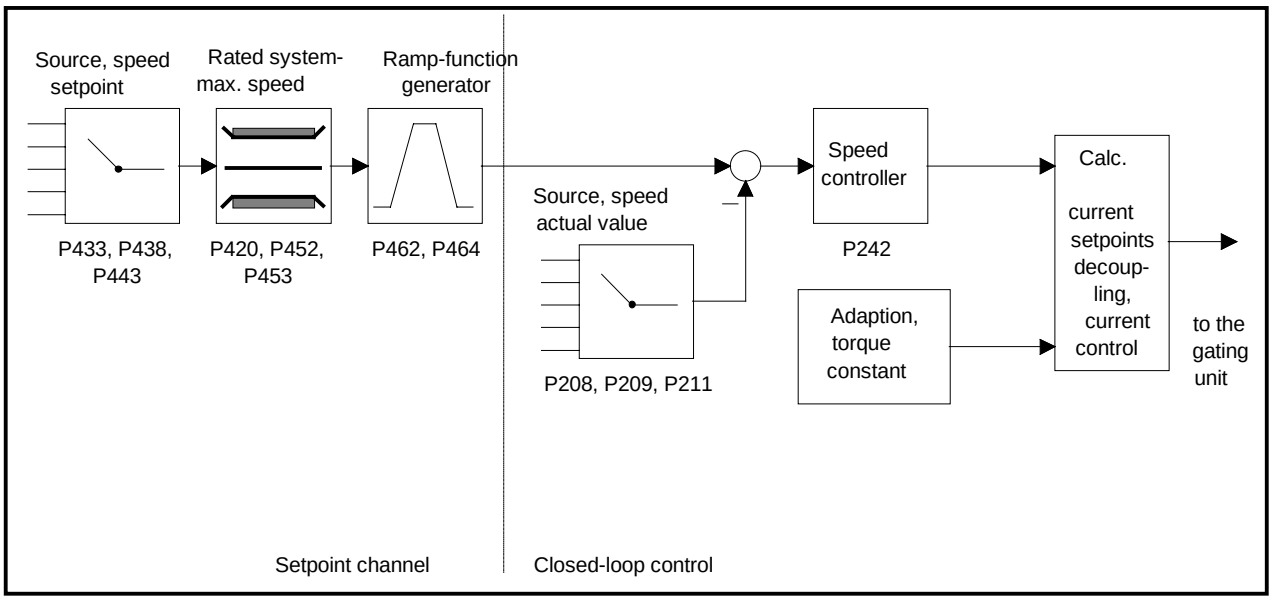


Fig. 4.1 Closed-loop speed control P163 = 4

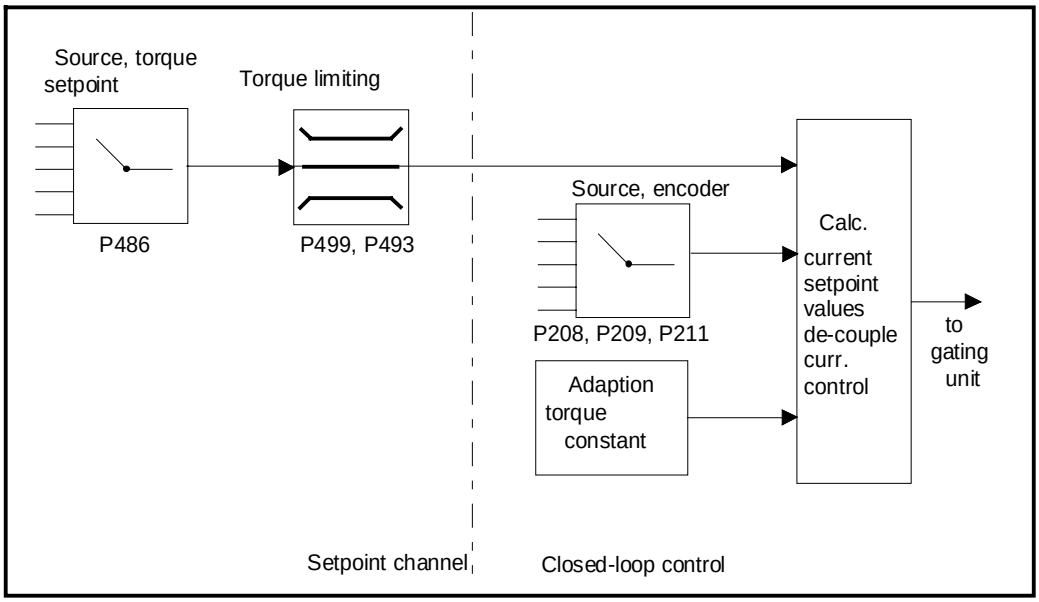


Fig. 4.2 Closed-loop torque control P163 = 5

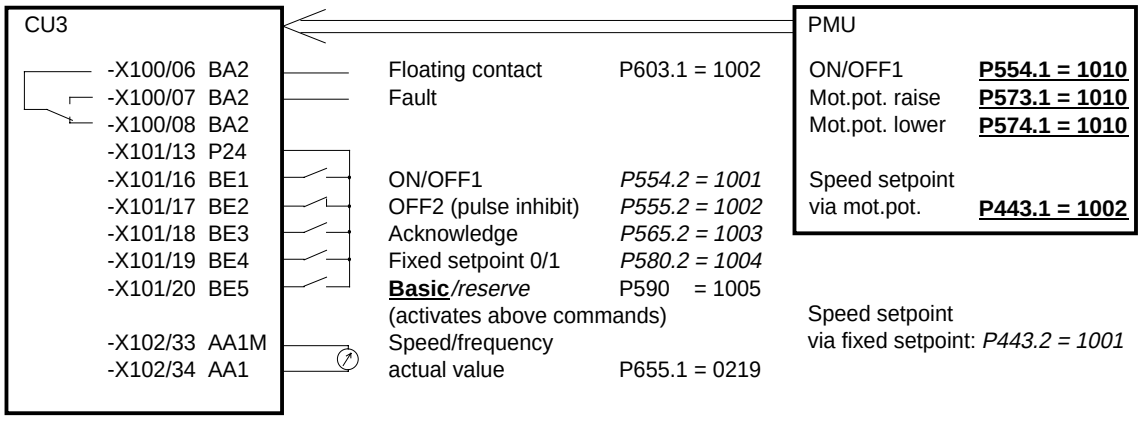
- detailed parameter description: refer to section 5 “Parameter list“
- detailed function diagrams: refer to section 4.9 “Function Diagrams“

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:

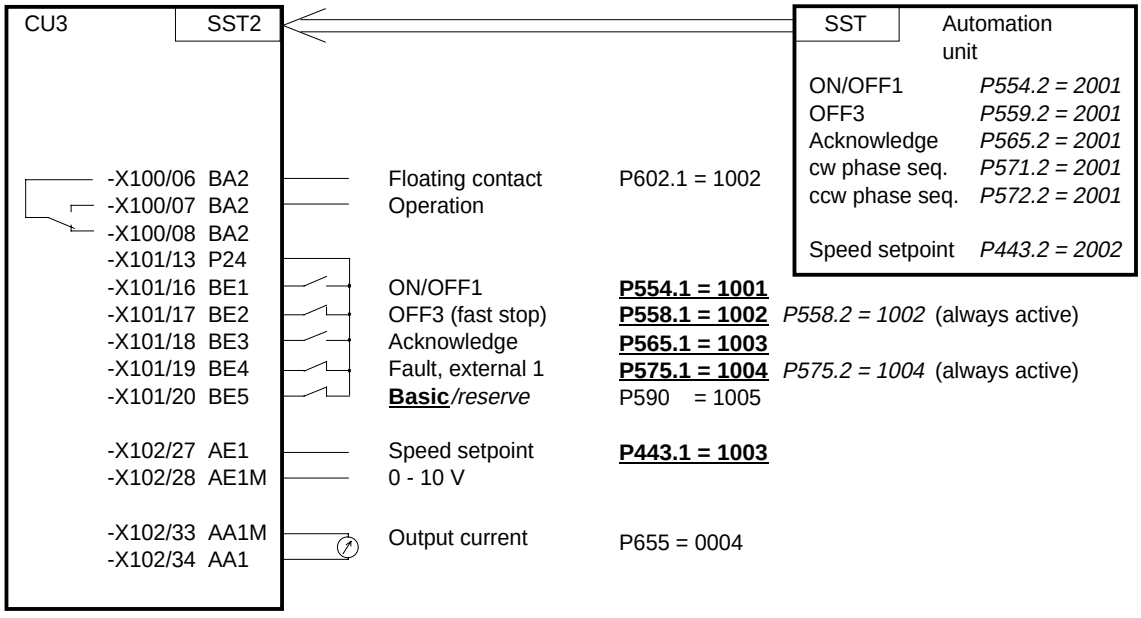
Switch-on/off as well as setpoint input via the PMU, messages and actual values via the terminal strip.
Terminal strip only operational if binary input 5 (BE5) is energized (high signal level corresponds to "reserve").



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

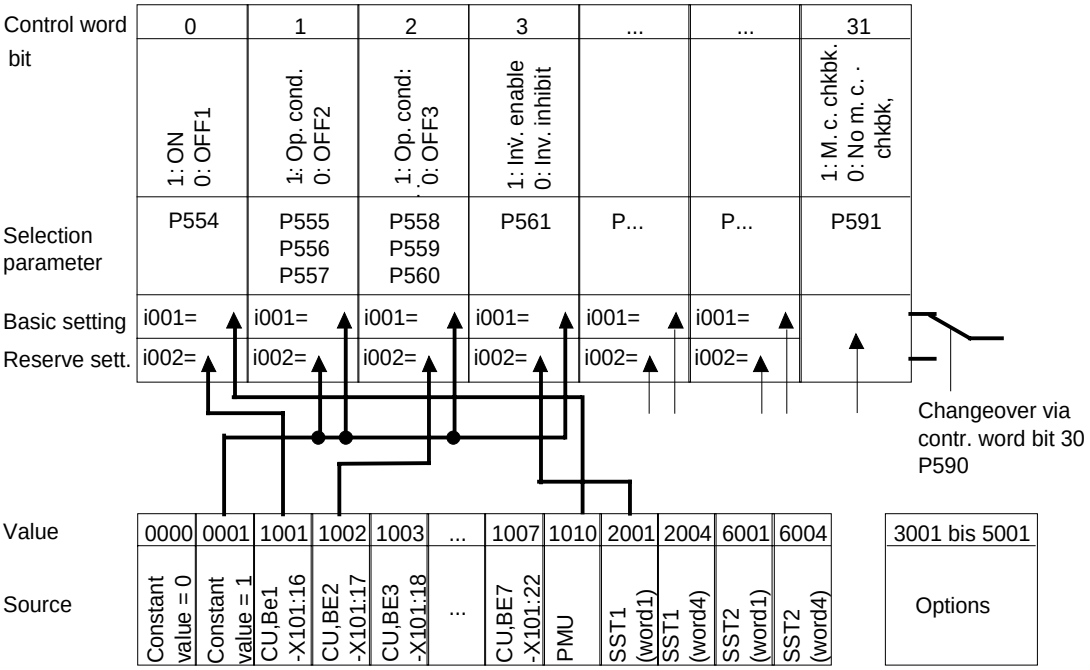
An overview of the possible sources, which are assigned fixed values (0-6004 non-consecutive), is provided in Section 4.3.1.1.3 "Selecting the control word source".

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 a defined command, when communications fail!

Application example:

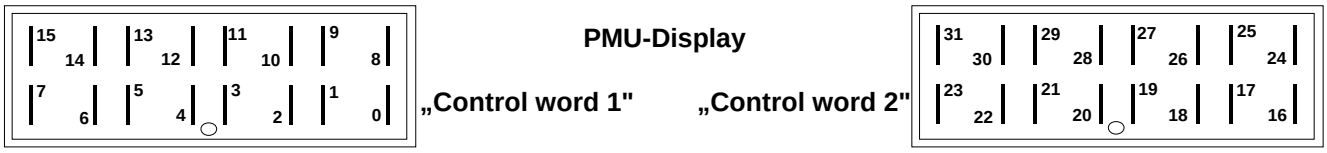


ON/OFF1:	Basic set.:	via PMU (keys I/0)	Reserve set.:	via bin. input 1 of CU
Op. cond/OFF2:	Basic set.:	Constant value= 1 = always op. cond.	Reserve set.:	Constant value = 1 = always op. cond.
Op. cond./OFF3:	Basic set.:	Constant value= 1 = always op. cond.	Reserve set.:	via bi. input 2 of CU

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

4.3.1.1.2 Overview of the control word (control word 1 and control word 2)



„Control word 1" (visualization parameter r550 oder 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	HInhibit 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 control word 1 (bits 0-7)

Bit		0	1	2	3	4	5	6	7
Selection 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
Selection 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
1006	CU, BE6, -X101:21	x	x	x	x	x	x	x	x
1007	CU, BE7, -X101:22	x	x	x	x	x	x	x	x
1010	PMU	**xG**	x	x					always
2001	SST1,PMU -X300 (word1)	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 1and2,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 1and2,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)								
5001	TSY,BE	x	x	x	x	x	x	x	x

x: Value can be assigned for the selection parameters (BE can only be assigned once in the same index of all selection parameters!)

Factory setting: **xG:** for basic setting
xR: for 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
Selection P. basic setting		568.1	569.1		571.1	572.1	573.1	574.1	575.1
Selection 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
1006	CU, BE6, -X101:21	x	x		x	x	x	x	x
1007	CU, BE7, -X101:22	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 1and2,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)								
5001	TSY,BE	x	x		x	x	x	x	x

x: Value can be assigned for the selection parameters (BE can only be assigned once in the same index of all selection parameters!)

Factory setting: **xG:** for basic setting
xR: for 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
Selection P. basic setting		576.1	577.1	578.1		580.1	581.1		583.1
Selection 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
1006	CU, BE6, -X101:21	x	x	x		x	x		x
1007	CU, BE7, -X101:22	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 1and2,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 1and2,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
5001	TSY,BE	x	x	x		x	x		x

x: Value can be assigned for the selection parameters (BE can only be assigned once in the same index of all selection parameters!)

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

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

Bit		24	25	26	27	28	29	30	31
Selection P. basic setting			585.1	586.1	587.1	588.1	589.1	590	591
Selection 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
1006	CU, BE6, -X101:21		x	x	x	x	x	x	x
1007	CU, BE7, -X101:22		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 1and2,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)								
4504	SCB-SST (USS /peer-t-peer) (word4)		x	x	x	x	x	x	
5001	TSY,BE		x	x	x	x	x	x	x

x: Value can be assigned for the selection parameters (BE can only be assigned once in the same index of all selection parameters)

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 (↑ "ON")

The command is executed with a positive edge change from L to H (L → 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
- Changevoer 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)!

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 OFF**2** > OFF**3** > OFF**1**

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 alwlays 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 automaticaly 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 potentiomenter, 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 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:

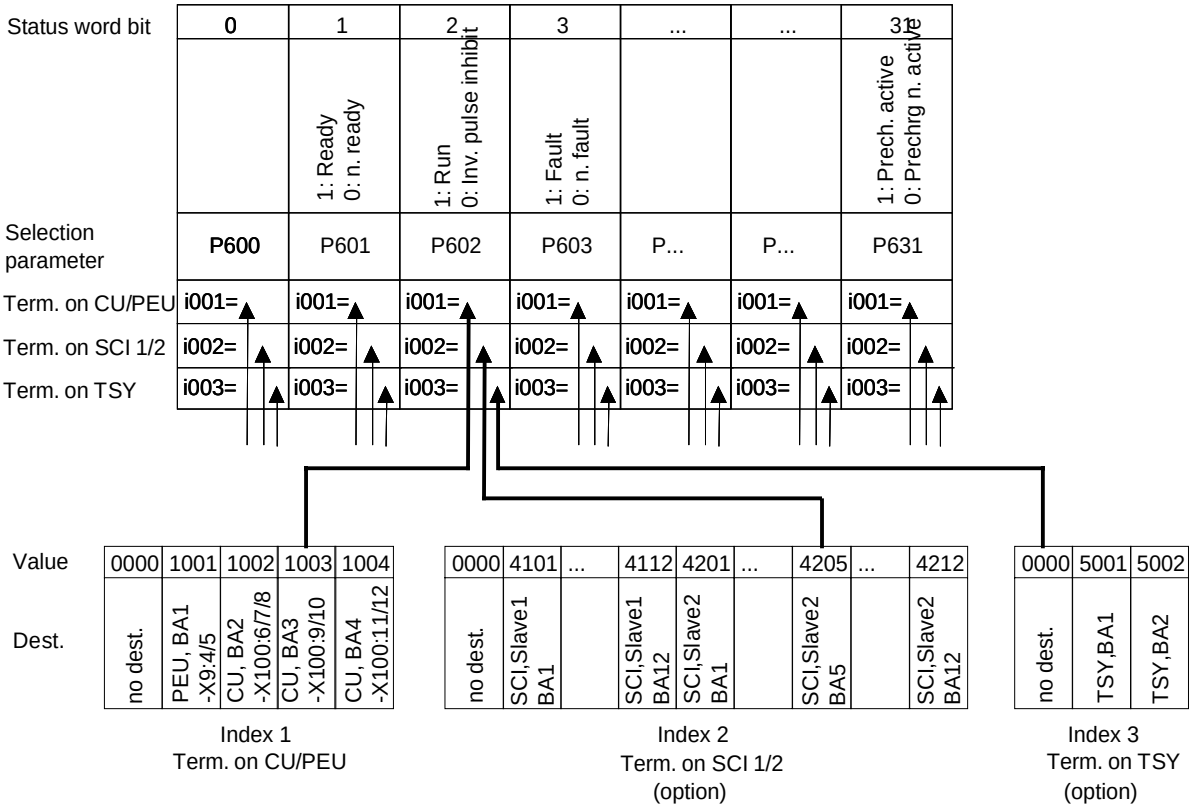
Index:	i001	Selecting a terminal on the CU / PEU board	(basic converter)
	i002	Selecting a terminal on the SCI 1/2 board	(option)
	i003	Selecting a terminal on the TSY board	(option)

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:

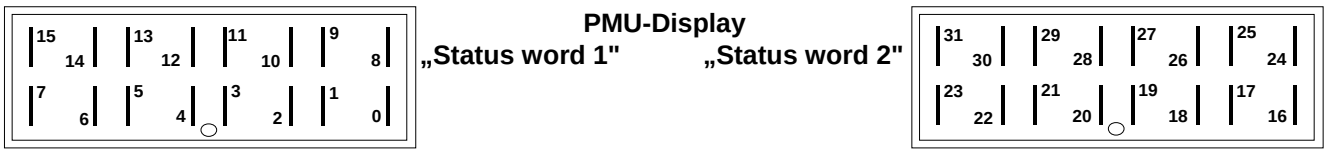


"Run" signal: -at terminal -X100:9/10 of the CU

-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)



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 < comparitive 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 SCI!	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, SCI1/2) 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, SCI1/2) 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 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 29: Signal "bypass contactor energized" (H)

With an H signal, with the appropriate wiring and parameterization, a bypass contactor (option) can be energized. Also refer to Section 9 "Options".

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)	⇐ only if word 1 is not assigned for "control word 1 with 4501 (Section 4.3.1.1)
4502	SCB-SST (USS /peer to peer) (word 2)	
4503	(word 3)	
4504	(word 4)	⇐ only if word 4 is not assigned for "control word 1 with 4504 (Section 4.3.1.1)
...	Consecutively to	
4516	(word 16)	

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:

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 I4) 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: Reserve setting	not assigned ÔN/OFF1
Binary input 2	Basic setting: Reserve setting:	not assigned OFF2 command „pulse inhibit"
Binary input 3	Basic setting: Reserve setting:	not assigned Acknowledge (control word bit 7)
Binary input 4	Basic setting: Reserve setting:	not assigned Fixed setpoint, bit 0 (control word bit 20)
Binary input 5	Basic setting: Reserve setting:	(control word bit 30) (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 "Auxilary 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:
  - ± 10 V or 0...+1 0V or +2...+10 V (can be parameterized
  - Resolution: < 10 mV (10 bit + sign)
  - Accuracy: < ± 2 %
  - Smoothing: can be parameterized (P651)
  - Offset can be parameterized (P652)
- Current inputs:
  - ± 20 mA or 0 mA...+ 20 mA or + 4 mA...+20 mA (can be parameterized)
  - Resolution: < 0,04 mA (10 bit + sign)
  - Accuracy: < ± 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%

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

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

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

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

$$\Rightarrow \quad \text{PWE in [\%]} = \frac{12.5\,\%}{\text{V}} \times (\text{AE in [V]} - 2\,\text{V} + \text{Offset in [V]})$$

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 für AE1)
- Set offset (zero point offset) for analog input 1:
  The following is valid for the selected voltage input (P650 i001 = 0): 0 V ⇔ 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 ⇔ 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: ± 10 V
- Resolution: 4.9 mV (11 bits + sign)
- Accuracy: ± 1 %
- Smoothing 20 µs
- Output current: max. ± 5 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 V / pre-setting: +10.00 V ⇔ gain of 1)

♦ Set the offset in P657 "CU-AA offset".
(setting range: -100.00 V to +100.00 V / pre-setting: +0.00 V ⇔ no offset)

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

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

Pre-assignment (gain of 1 and no offset): 100 % = 10 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 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 beented repres as V_{off1} = 0.00 V

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

♦ Define gain factor **P656** and offset **P657** for analog output

The following is obtained from the formula shown above:

$$\text{Gain factor [V]} = \frac{(U_{off1}[V] - U_{off2}[V]) \times 100\,\%}{PWE1[\%] - PWE2[\%]} = \frac{(0.00\ V - 10.00\ V) \times 100\,\%}{20\,\% - 100\,\%}$$

$$= \frac{-10.00\ V \times 100\,\%}{-80\,\%} = 12.5\ V$$

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

$$= 0\ V - \left(\frac{12.5\ V \times 20.00\,\%}{100\,\%} \right) = -2.5\ V$$

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 V
+4800 RPM → 160 % (parameter value PWE2) referred to V_{Off2} = +10.00 V

♦ Define gain factor P656 and offset P657:
The following is obtained from the formula shown above:

$$\text{Gain factor [V]} = \frac{(U_{off1}[V] - U_{off2}[V]) \times 100\,\%}{PWE_1[\%] - PWE_2[\%]} = \frac{(-10.00\ V - 10.00\ V) \times 100\,\%}{-100\,\% - 160\,\%}$$

$$= \frac{-20.00\ V \times 100\,\%}{-260\,\%} = 7.69\ V$$

$$\text{Offset [V]} = U_{off1}[V] - \left(\frac{\text{Gain factor [V]} \times PWE_1[\%]}{100\,\%} \right) = -10\ V - \left(\frac{7.69\ V \times (-100.00\,\%)}{100\,\%} \right)$$

$$= -10\ V + 7.69\ V = -2.31\ V$$

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).

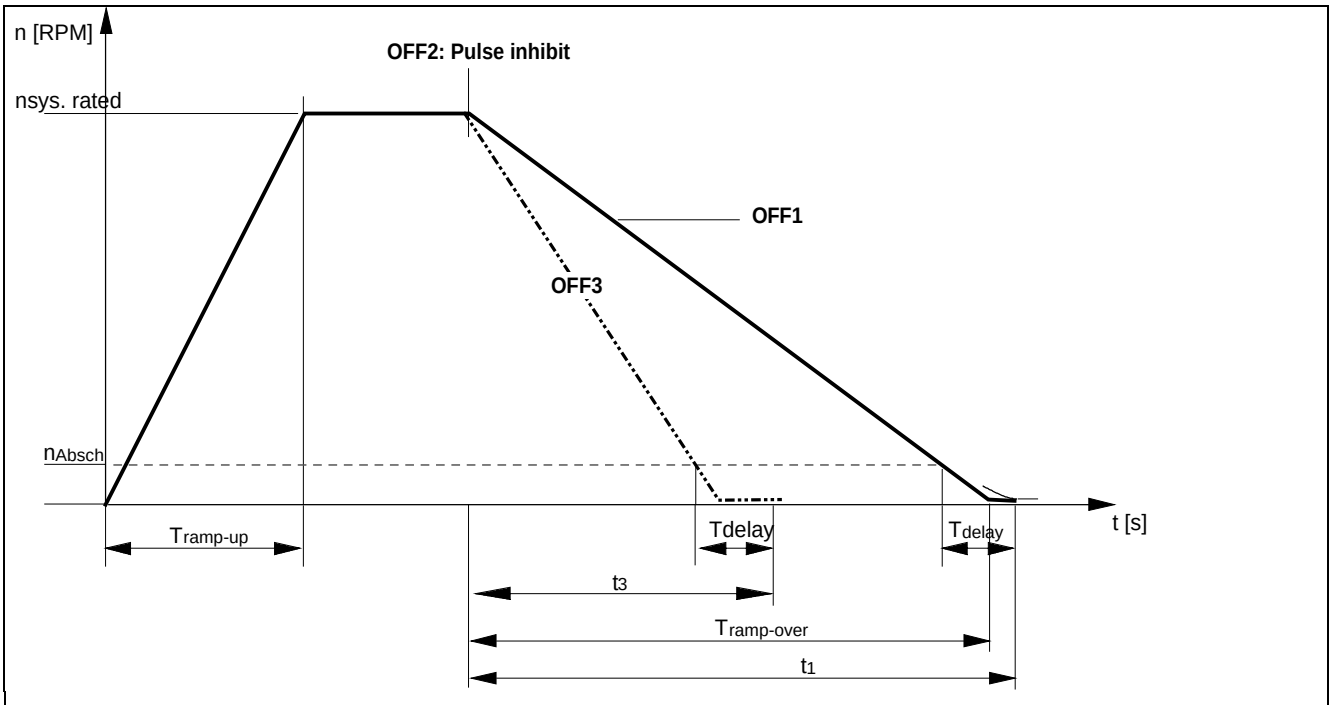
To connect possible option boards and parameterize the interface, also refer to the Section 3.5 "Recommended circuits" as well as in the appropriate Instruction Manuals to the various option boards.

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



Ramp down time for an OFF1 command: $t1 = T_{decel.} \times \frac{n_{set} - n_{off}}{n_{Anl\text{-}start}} + T_{delay}$

OFF3: 0 setpoint is input, ramp-down along the torque limit

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 ($T_{ramp-up}$)	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 ($T_{decelerate}$)	i001: SDS1 to i004: SDS4	0,00 bis 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
3	6SE7016-1EA30	6,1	3AC 380-460V	2,2	6	A
9	6SE7018-0EA30	8,0	3AC 380-460V	3	6	A
11	6SE7021-0EA30	10,2	3AC 380-460V	4	6	A
14	6SE7021-1CA30	10,6	3AC 208-230V	2,2	6	A
18	6SE7021-3EB30	13,2	3AC 380-460V	5,5	6	B
21	6SE7021-3CA30	13,3	3AC 208-230V	3	6	A
25	6SE7021-8EB30	17,5	3AC 380-460V	7,5	6	B
27	6SE7021-8CB30	17,7	3AC 208-230V	4	6	B
32	6SE7022-3CB30	22,9	3AC 208-230V	5,5	6	B
35	6SE7022-6EC30	25,5	3AC 380-460V	11	6	C
39	6SE7023-2CB30	32,2	3AC 208-230V	7,5	6	B
42	6SE7023-4EC30	34,0	3AC 380-460V	15	6	C
46	6SE7023-8ED30	37,5	3AC 380-460V	18,5	6	D
48	6SE7024-4CC30	44,2	3AC 208-230V	11	6	C
52	6SE7024-7ED30	47,0	3AC 380-460V	22	6	D
54	6SE7025-4CD30	54,0	3AC 208-230V	15	6	D
56	6SE7026-0ED30	59,0	3AC 380-460V	30	6	D
64	6SE7027-0CD30	69,0	3AC 208-230V	18,5	6	D
66	6SE7027-2ED30	72,0	3AC 380-460V	37	6	D
70	6SE7028-1CD30	81,0	3AC 208-230V	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!

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 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 my 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.

♦ 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.

4.3.9.2 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.

4.3.9.3 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 is realized by switching-in a rectifier and resistor, which is connected to the DC link. The converter supply must be disconnected (Circuit: Refer to Fig. 4.6). The forming time is dependent on the time where the converter was not operational (refer to Fig. 4.5).

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

Table 4.2 Serial number structure: A-E60147512345

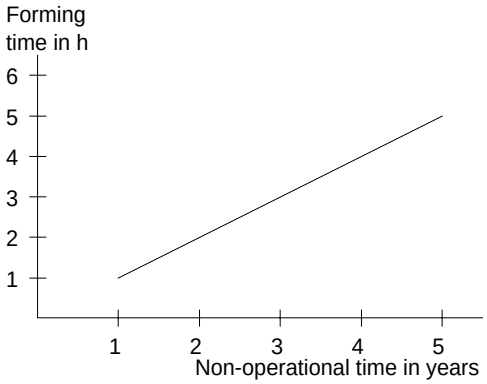
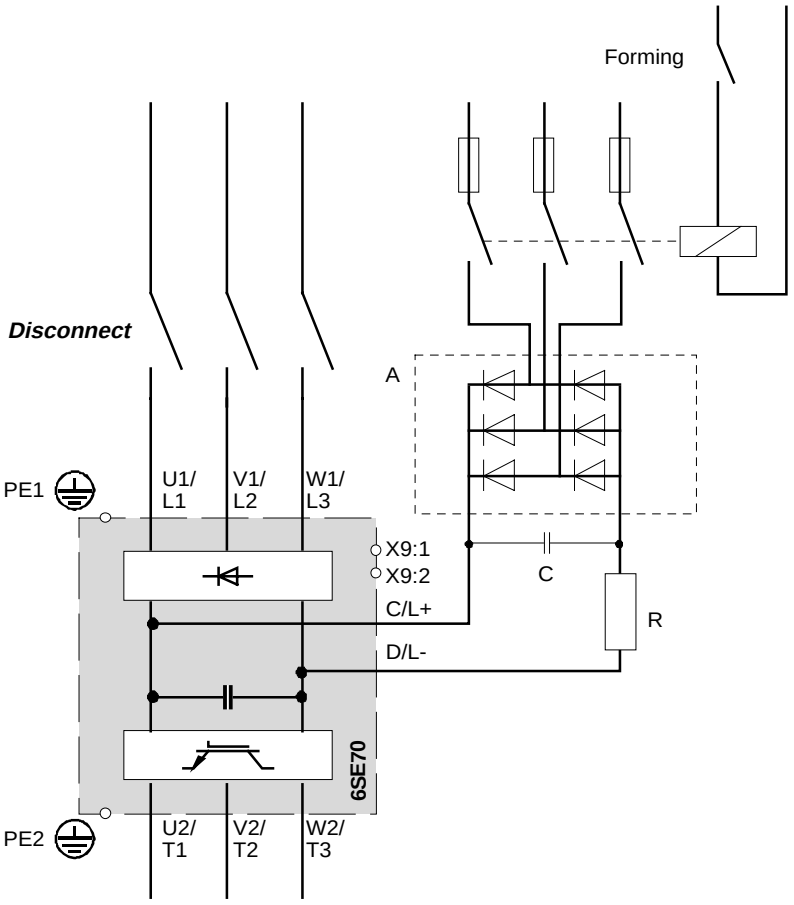


Fig. 4.5 Forming time as a function for the time which the converter was non-operational



	Recommended components		
	A	R	C
208 V < Un < 415 V	SKD 50 / 12	220 Ω / 700 W	22 nF / 1600 V
380 V < Un < 460 V	SKD 62 / 16	470 Ω / 1200 W	22 nF / 1600 V
500 V < Un < 690 V	SKD 62 / 18	680 Ω / 1700 W	22 nF / 1600 V

Fig. 4.6 Circuit for forming

4.4 Function Diagrams

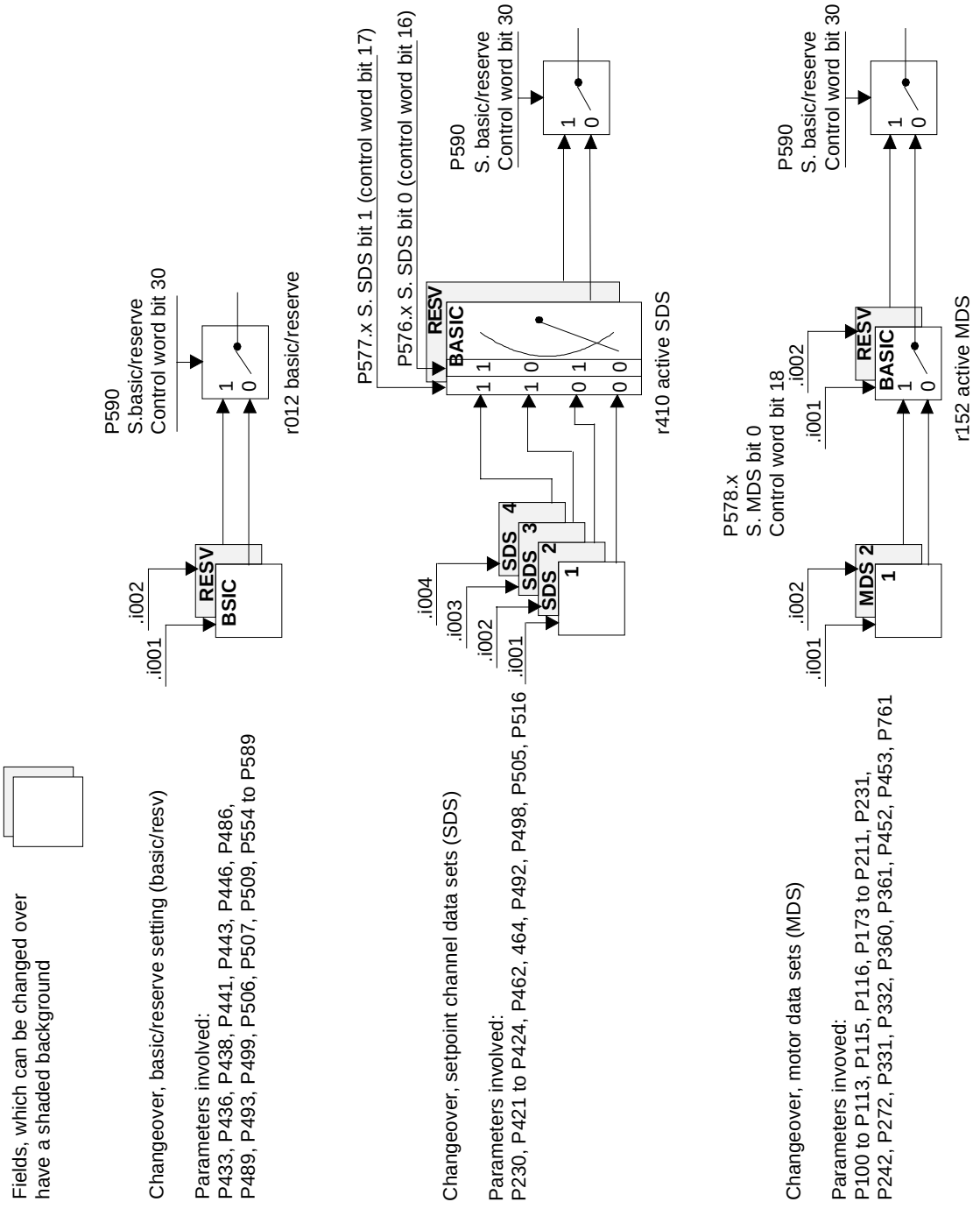


Fig. 4.7 Changeover

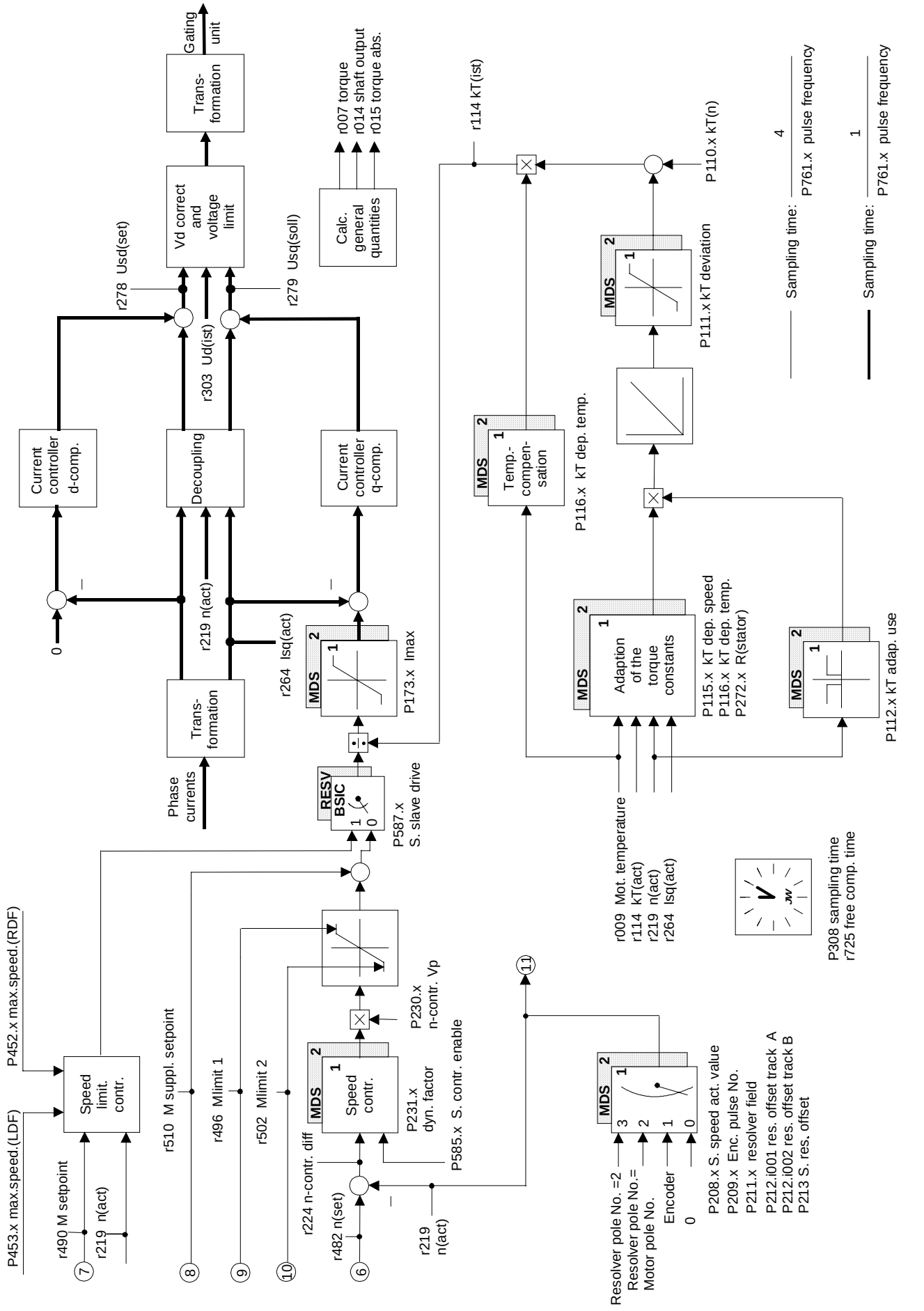


Fig. 4.8 Closed loop control

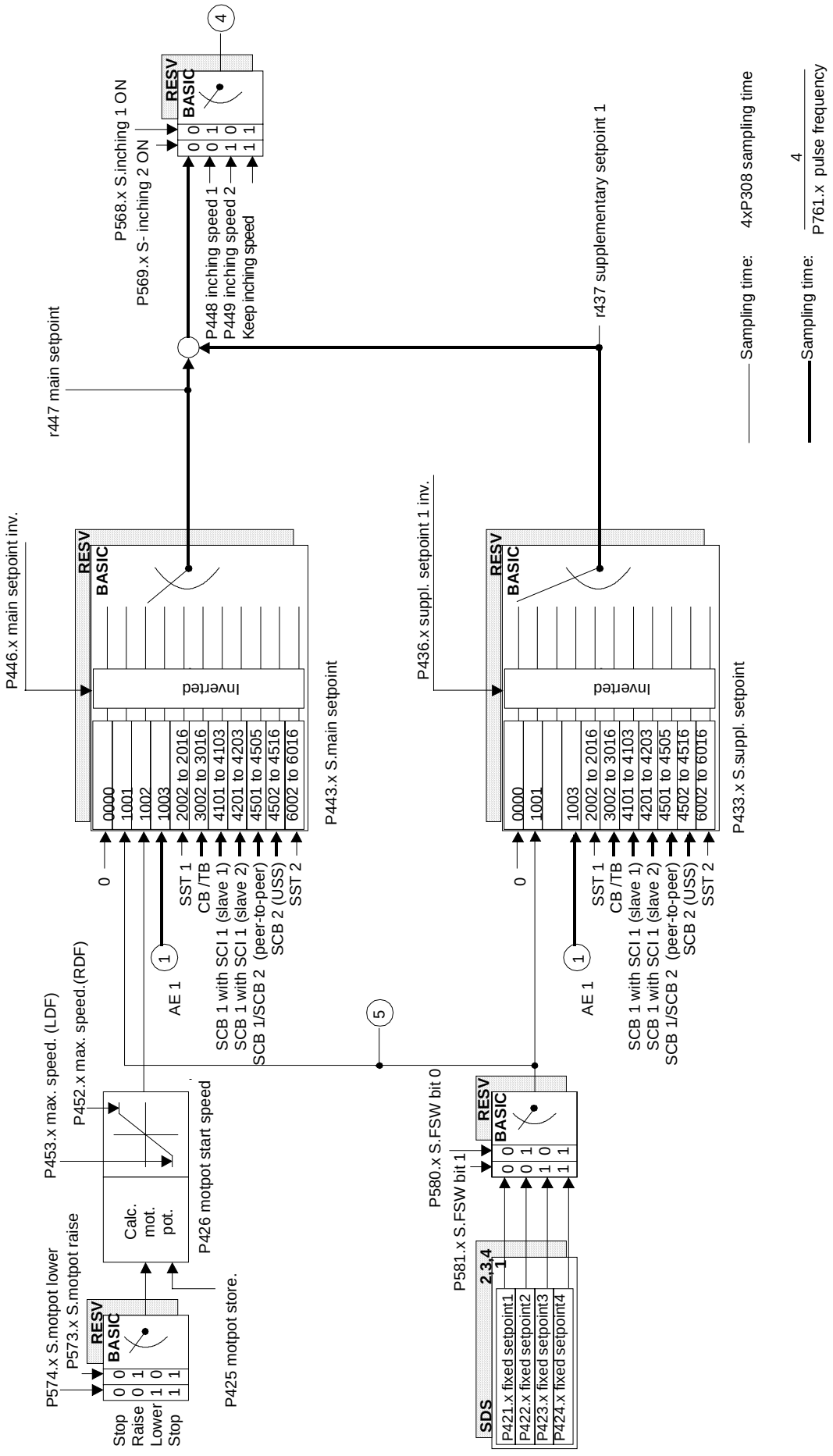


Fig. 4.9 Setpoint channel (Section 1)

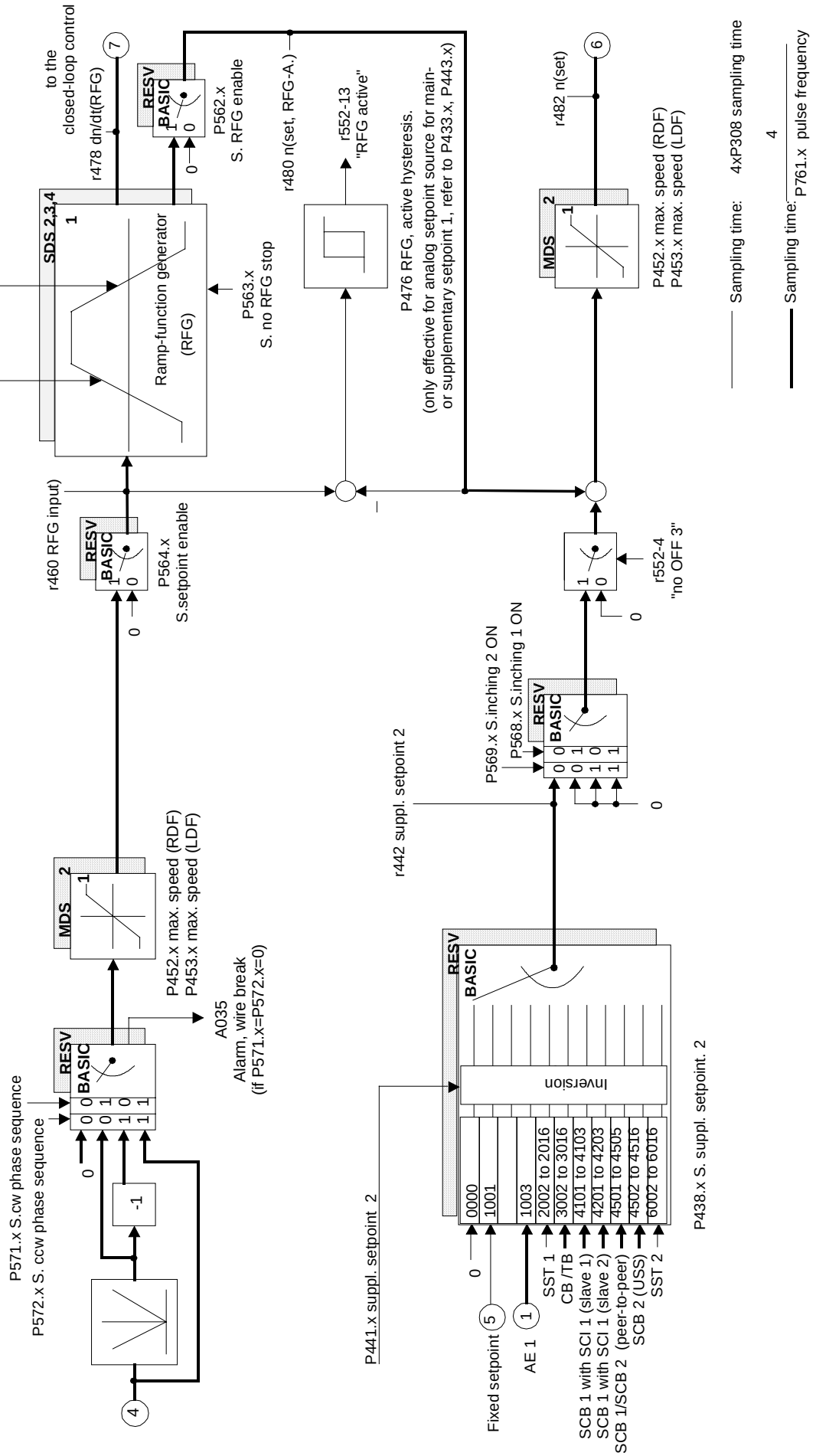


Fig. 4.10 Setpoint channel (Section 2)

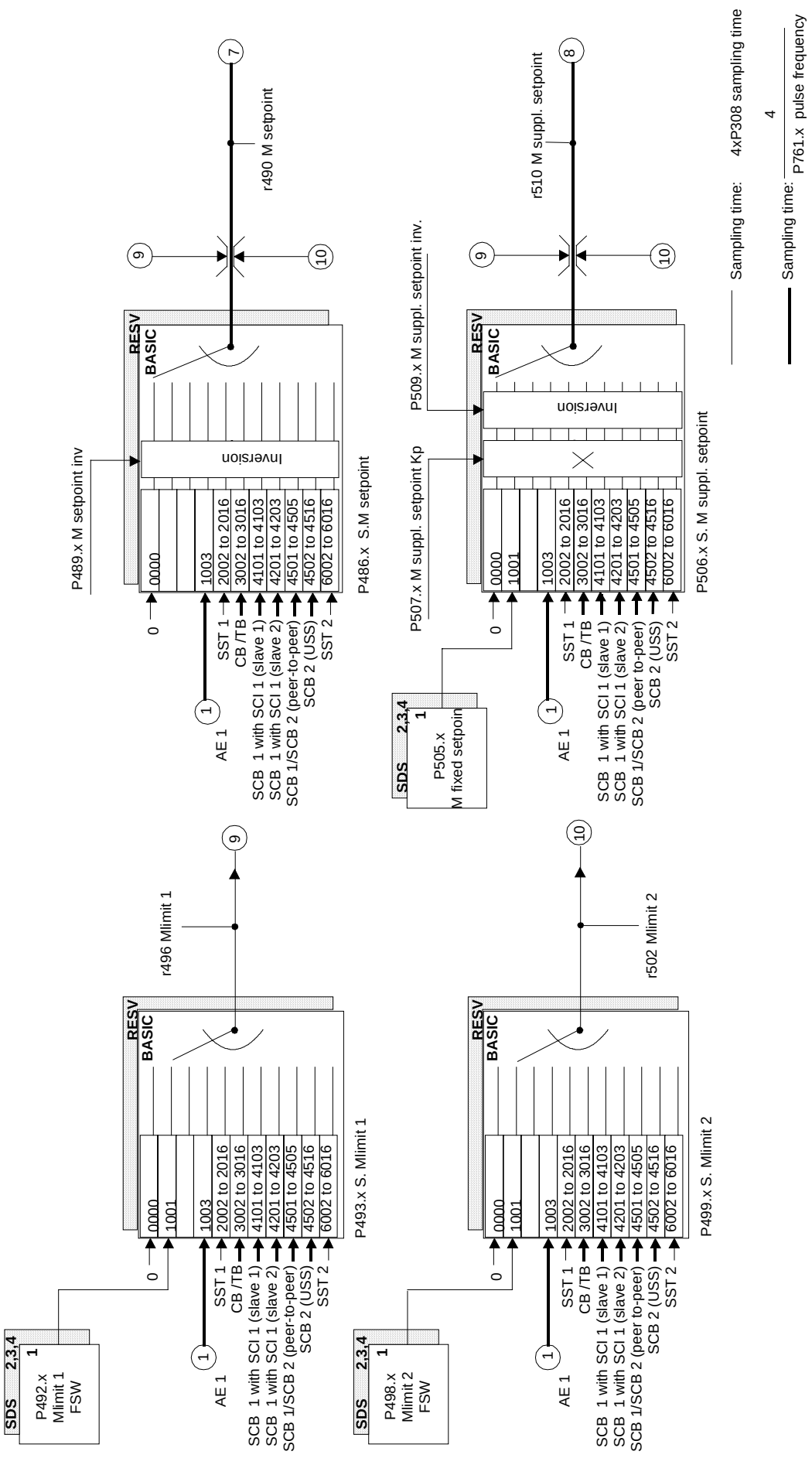


Fig. 4.11 Setpoint channel (Section 3)

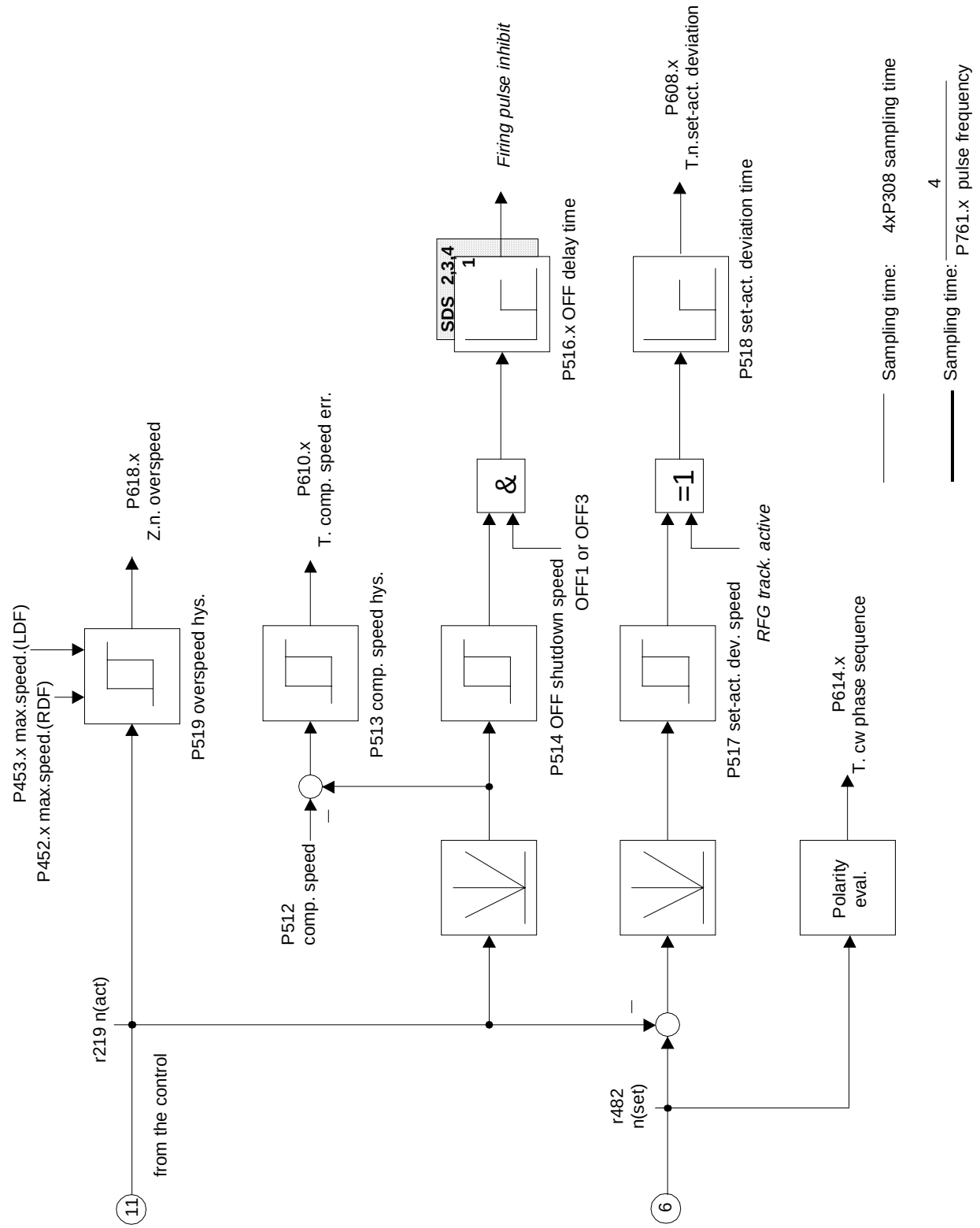


Fig. 4.12 Setpoint channel (Section 4)

5 Parameter List

Explanations on the Parameter List

Example:

PNU ***:conf-P**	**Parameter name in OP1** Description	**Range** **[Unit]**	**# of.** **Indices** **Factory Settings.**	**read: _/_** **write: _/_**
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

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

5.1 General Observation Parameters

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: _/_ write: _/_
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

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: _/_ write: _/_
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
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: _/_ write: _/_
P050 * 32Hex	**Language** Display language on the optional operation panel OP and in the PC software SIMOVIS Parameter values: 0: Deutsch 1: English 2: Espanol 3: Francais 4: Italiano 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: _/_ write: _/_
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

5.4 Hardware Configuration

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: _/_ write: _/_
r089 59Hex	**Board Position 1** PCB in position #1 (left) of the electronic box Parameter Values: 0 = none 1 = SIMOVERT FC CU Board 2 = SIMOVERT VC CU Board 3 = SIMOVERT SC CU Board Typ=O2; PKW: 1HEX=1.0 PcD Gr.: 0	0 to 3 none FC VC SC		3 / B
P090 * 5AHex	**Board Position 2** PCB in position #2 (right) of the electronic box Parameter values: 0 = no optional PCBs 1 = CB Communication Board 2 = TB Technology Board 3 = SCB Serial Communication Board 4 = TSY Digital-Tacho and Synchronization Board Description for Setting: Only the following combinations of PCBs and positions are admitted: Position #3(P091) Position #2(P090) - CB - TB - SCB - TSY SCB CB CB TB SCB TB CB SCB CB TSY TSY CB SCB TSY TSY SCB 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 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) 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
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

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: _/_ write: _/_
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: $kT = P110 * [(1 - \frac{P115 * n}{6000\ min^{-1}})^{3/2} * (1 - \frac{P116 * T}{100\ K})]$ 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

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: _/_ write: _/_
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
P213 * D5Hex	**Src.Res.Offset** Selects, if the resolver offset is taken from the motor data identification program or if the offset is manually changed. Parameter values: 0: The measured offset values are to be used 1: Offset values saved in P212 are to be used 2: The measured values will be saved in P212 Typ=O2; PKW: 1HEX=1.0 PcD Gr.: 0	0 to 2 Measure Parameter Save	- 0	3 / ABR 3 / ABR
r219 DBHex	**n(act)** Actual speed (non-smoothed mechanical speed of the motor shaft) Analog Output: 100% @ Parameter Value=P420 Typ=I4; PKW: 1HEX=0.1min-1 PcD Gr.: 1	[min-1]	-	2 / BR
r224 E0Hex	**n Deviation** Control deviation at the input of the speed regulator. Analog Output: 100% @ Parameter Value=P420 Typ=I4; PKW: 1HEX=0.1min-1 PcD Gr.: 1	[min-1]	-	3 / BR
P230 E6Hex	**n-Reg-Gain** Speed regulator gain. SDS(4) Parameter Typ=O2; PKW: 1HEX=0.001 PcD Gr.: 0	0.001 to 16.000	4 i001=1.000 i002=1.000 i003=1.000 i004=1.000	3 / BR 3 / BR
P231 E7Hex	**Dynamics** Sets the speed regulator response time between fast (7) and slow (0); resulting settling times: 0 -> approx. 40 ms 1 -> approx. 29 ms 2 -> approx. 21 ms 3 -> approx. 15 ms 4 -> approx. 11 ms 5 -> approx. 8 ms 6 -> approx. 6 ms 7 -> approx. 4 ms MDS(2) Parameter Typ=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 7	2 i001=4 i002=4	2 / BR 2 / B

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: _/_ write: _/_
P242 F2Hex	**Start-up Time** Start-up time of the drive system from standstill to rated system speed at acceleration with rated motor torque (motor without load). The parameter value is allowed for the calculation of the n/f regulator parameters. If P100 <> 250 the correct value is automatically taken from the motor data list. MDS(2) Parameter Typ=O2; PKW: 1HEX=0.001s PcD Gr.: 0	0.000 to 10.000 [s]	2 i001=0.000 i002=0.000	3 / ABR 3 / A
r264 108Hex	**Isq(act)** Actual value of the torque generating current component Analog Output: 100% @ Parameter Value=4*P102 Typ=I2; PKW: 1HEX=0.1A PcD Gr.: 0	[A]	-	3 / BR
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 discoupling 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 discoupling 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 $(\frac{P071}{1,35})$. 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: _/_ write: _/_
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
P355 163Hex	**GrdFltTest Time1** Ground fault test time 1 for phases U and W Typ=O2; PKW: 1HEX=0.1ms PcD Gr.: 0	0.0 to 1000.0 [ms]	- 20.0	3 / ABR 3 / AB
P356 164Hex	**GrdFltTest Time2** Ground fault test time 2 for phase V Typ=O2; PKW: 1HEX=0.1ms PcD Gr.: 0	0.0 to 1000.0 [ms]	- 10.0	3 / ABR 3 / AB
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^{o}C; EXd<=100^{o}C for isolation class F: <=145^{o}C; EXd<=145^{o}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

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: _/_ write: _/_
P361 169Hex	**Mot Tmp Fault** Limit for the fault message 'Motor overtemperature' (P626). Example: for isolation class B: <=110^{o}C; EXd<=100^{o}C for isolation class F: <=145^{o}C; EXd<=145^{o}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=O2; 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 anlog 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

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: _/_ write: _/_
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
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=I4; 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=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: _/_ write: _/_
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
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
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

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: _/_ write: _/_
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
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=I4; 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=I4; 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=I4; 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

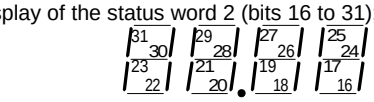
PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: _/_ write: _/_
P486 * 1E6Hex	**Src Torque Setp** Source of the torque setpoint signal Parameter values: 1001: not allowed 1002: not allowed other values: see process data wiring of the setpoint channel. 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
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

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: _/_ write: _/_
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
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

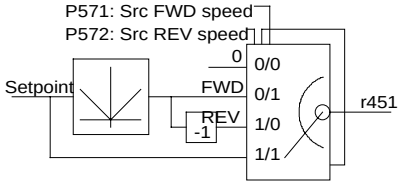
PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: _/_ write: _/_
P513 201Hex	**Comp Speed Hyst** Hysteresis for the message 'Compare speed reached' in % of the compare speed (P512) Typ=O2; PKW: 1HEX=0.1% PcD Gr.: 0	0.0 to 100.0 [%]	- 3.0	3 / BR 3 / BR
P514 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
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

5.9 Control and Status Word

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: _/_ write: _/_
r550 226Hex	**Control Word 1** Display of the control word 1 (bits 0 to 15); see section 4.3.1.1. 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 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. 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 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. 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 Typ=V2; PKW: 1HEX=1.0 PcD Gr.: 0		-	2 / BR

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: _/_ write: _/_
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 CU binary input 1 1010: PMU ON/OFF keys 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=1010 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 1001: Binary input 1 of the 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=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
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

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: _/_ write: _/_
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
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 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=0 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

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: _/_ write: _/_
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 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=0 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
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 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 i001=1 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 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 i001=1 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 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=1010 i002=0	2 / BR 2 / BR

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: _/_ write: _/_
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 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=1010 i002=0	2 / BR 2 / BR
P575 * 23FHex	**Src No Ext Fault1** Source of the message 'external fault 1' (control word 2, bit 27); L-level causes fault trip of the drive Parameter values: 0: not allowed 1: no external fault 1 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 i001=1 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

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: _/_ write: _/_
P580 * 244Hex	**Src FixSetp Bit0** Source of bit 0 to select a fixed setpoint FS (control word 2, bit 20) Parameter values: 0: FS bit 0 has value of 0 1: FS bit 0 has value of 1 other values: 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
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
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 after 200 msec 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: _/_ write: _/_
P588 * 24CHex	**Src No Ext Warn1** Source of the message 'external warning 1' (control word 2, bit 28) Parameter values: 0: not allowed 1: no external warning 1 other values: 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) 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: SCI : selection of a SCI1/2 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 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 i001=0 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: _/_ write: _/_
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: _/_ write: _/_
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: _/_ write: _/_
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
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 ... + 1: 0 V ... + 10 V 0 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 -10V...+10V 0V...+10V 4mA...20mA	- 0	2 / BR 2 / BR

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: _/_ write: _/_
P651 * 28BHex	**CU AnaInSmooth** 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: $V(out) = \frac{\text{value of displayed parameter}}{100\ \%} * P656 + P657$ 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
P660 294Hex	**SCI AnalogInConf** Configuration of the SCI analog inputs; defines the kind of the input signals Parameter values: Terminals X428 / 3, 6, 9 / Terminals X428 / 5, 8, 11 0: -10 V ... + 10 V / - 20 mA ... + 1: 0 V ... + 10 V / 0 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 P662. Indices: i001: SI11 Slave 1, analog input 1 i002: SI12 Slave 1, analog input 2 i003: SI13 Slave 1, analog input 3 i004: SI21 Slave 2, analog input 1 i005: SI22 Slave 2, analog input 2 i006: SI23 Slave 2, analog input 3 Condition: the related SCB board must be reported via P090 and P091, respectively Typ=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 2 -10V...+10V 0V...+10V 4mA...20mA	6 i001=0 i002=0 i003=0 i004=0 i005=0 i006=0	3 / BR 3 / BR
P661 295Hex	**SCI AnaInSmooth** Filter time constant of the SCI analog inputs; Formula: $T = 2\ ms * 2^{P661}$ Indices: see P660 Typ=O2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 15	6 i001=2 i002=2 i003=2 i004=2 i005=2 i006=2	3 / BR 3 / BR

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: _/_ write: _/_
P662 296Hex	**SCI AnalogInOffs** Offset scaling of the SCI analog inputs Description for setting see SCI manual Indices: see P660 Typ=I2; PKW: 1HEX=0.01V PcD: 4000HEX=160V	-20.00 to 20.00 [V]	6 i001=0.00 i002=0.00 i003=0.00 i004=0.00 i005=0.00 i006=0.00	3 / BR 3 / BR
P664 * 298Hex	**SCI AnaOutActVal** Actual value output via SCI analog outputs Description for setting: enter the parameter number of the quantities, which are to be issued; for details see SCI manual. Indices: i001: SI11 Slave 1, analog output 1 i002: SI12 Slave 1, analog output 2 i003: SI13 Slave 1, analog output 3 i004: SI21 Slave 2, analog output 1 i005: SI22 Slave 2, analog output 2 i006: SI23 Slave 2, analog output 3 Condition: the related SCB board must be reported via P090 and P091, respectively Typ=O2; PKW: 1HEX=1.0 PcD Gr.: 0	0 to 1999	6 i001=0 i002=0 i003=0 i004=0 i005=0 i006=0	3 / BR 3 / BR
P665 299Hex	**SCI AnaOut Gain** Proportional gain of the SCI analog outputs Description for setting: see SCI manual Indices: see P664 Typ=I2; PKW: 1HEX=0.01 PcD: 4000HEX=160V	-320.00 to 320.00	6 i001=10.00 i002=10.00 i003=10.00 i004=10.00 i005=10.00 i006=10.00	3 / BR 3 / BR
P666 29AHex	**SCI AnaOut Offs** Offset of the SCI analog outputs Indices: see P664 Typ=I2; PKW: 1HEX=0.01V PcD: 4000HEX=160V	-100.00 to 100.00 [V]	6 i001=0.00 i002=0.00 i003=0.00 i004=0.00 i005=0.00 i006=0.00	3 / BR 3 / BR

5.11 Communications

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: _/_ write: _/_
P680 * 2A8Hex	**SCom1 Act Value** Actual value output via serial communication SST1 Defines, which parameter is to be transferred at which telegram address. Notes: Word 1 should be set for status word 1 (r968) 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

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: _/_ write: _/_
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
P684 * 2ACHex	**SCom/SCB Baud** Serial interfaces baud rate Parameter values: 1: 300 Baud 5: 4800 Baud 2: 600 Baud 6: 9600 Baud 3: 1200 Baud 7: 19200 Baud 4: 2400 Baud 8: 38400 Baud 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 8	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

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: _/_ write: _/_
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
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

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: _/_ write: _/_
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
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

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: _/_ write: _/_
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: _/_ write: _/_
r720 2D0Hex	**SW Version** Software version of the PCBs in positions 1 to 3 of the electronic box. Indices: i001: Pos1: Software version of the PCB in position 1 (left) i002: Pos2: Software version of the PCB in position 2 (right) i003: Pos3: Software version of the PCB in position 3 (center) i004: Text: Software version of the text EPROM in position 1 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: _/_ write: _/_
r730 2DAHex	**SCB Diagnosis** SCB diagnosis (all values in HEX display). Displayed numbers have an overflow at FF. The meaning of several Indices depends of the selected SCB protocol (P682). Indices: i001: flTC Number of error-free telegrams i002: Terr Number of error telegrams i003: Voff USS: Number of Byte-Frame-errors SCI boards: number of slave power outages i004: Toff USS: Number of Overrun-errors SCI boards: number of fiber optic link interrupts i005: PnoS USS: Parity error SCI boards: number of missing answer telegrams i006: STxL USS: STX-error SCI boards: number of search telegrams to accept a slave i007: ETX ETX-error i008: BcCC USS: Block-Check-error SCI boards: number of configuration telegrams i009: L/Te USS/Peer to Peer: incorrect telegram length SCI modules: required maximum number of terminals according to process data wiring (P554 to P631) . i010: T/An USS: Timeout SCI modules: required analog inputs / outputs according to process data wiring of the setpoint channel and actual value output via SCI (P664) . i011: Res1 Reserve i012: Res2 Reserve i013: Warn SCB/DPR warning word i014: Sl1? Information, if slave 1 needed and if yes, which type 0: no slave 1 needed 1: SCI1 2: SCI2 i015: Sl2? 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 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
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

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: _/_ write: _/_
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
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

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: _/_ write: _/_
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 recorderd 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
r748 2ECHex	**Trip Time** Trip times (operating hour meter values, r013) Indices: Day / Hours / Seconds latest trip (1): i001=T1-d / i002=T1-h / i003=T1-s last reset trip(2): i004=T2-d / i005=T2-h / i006=T2-s (last+1) reset trip (3): i007=T3-d / i008=T3-h / i009=T3-s ... oldest saved trip (8): i022=T8-d / i023=T8-h / i024=T8-s Trip description by: r947 Fault number r949 Fault value r951 list of fault numbers P952 number of faults Typ=O2; PKW: 1HEX=1.0 PcD Gr.: 0		24	2 / BR

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: _/_ write: _/_
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 blcok 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

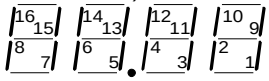
PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: _/_ write: _/_
P761 2F9Hex	**Pulse Frequency** Pulse frequency at asynchronous space vector modulation; if P100 <> 250 the correct value is automatically taken from the motor data list MDS(2) Parameter Typ=O2; PKW: 1HEX=0.1kHz PcD Gr.: 0	5.0 to 7.5 [kHz]	2 i001=5.0 i002=5.0	3 / ABR 3 / A

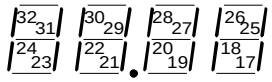
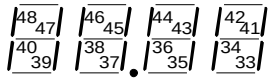
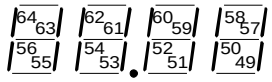
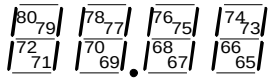
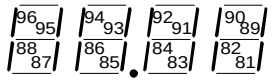
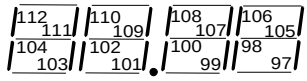
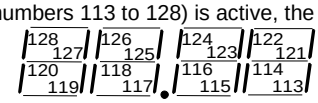
5.14 Factory Parameters

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
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. Typ=V2; PKW: 1HEX=1.0 PcD Gr.: -	0 to 15	- 0	3 / B 3 / B

5.15 Profile Parameters

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: _/_ write: _/_
P918 396Hex	**CB Bus Address** Protocol depending bus address for communication boards; see manual of these boards Note: The communication board checks, if the set value is valid. If the value is not accepted, the fault message 80 is issued with fault value 5 Condition: P090=1 or P091=1 (communication board installed) 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: _/_ write: _/_
r947 3B3Hex	**Fault Memory** Display of the faults which have occurred at the last 8 trips (r748); at every trip up to 8 faults can be saved, related to each of them a fault number (see list of faults, chapter 7) is related. For text display of the faults see r951. Indices: Fault 1 Fault 2 ... Fault 8 latest trip (1) i001=F1-1 i002=F1-2 ... i008=F1-8 last reset trip (2) i009=F2-1 i010=F2-2 ... i016=F2-8 (last+1) reset trip (3) i017=F3-1 i018=F3-2 ... i024=F3-8 ... oldest saved trip (8) i057=F8-1 i058=F8-2 ... i064=F8-8 Notes: A value of '0' means 'no fault' Number of saved trips: see P952. Example of a trip: 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 Trip time (r748): after 62 days, 1 hour, 7 sec of operation Faults (r947): Fault value (r949): 35 not defined 37 2 Typ=O2; PKW: 1HEX=1.0 PcD Gr.: 0		64	2 / BR
r949 3B5Hex	**Fault Value** Fault values of the faults; allows a more detailed diagnosis at several faults. The fault values are saved in the same indices as the related fault numbers (r947) - see example at P947. 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, i*35*): '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  Typ=V2; PKW: 1HEX=1.0 PcD Gr.: 0		-	3 / BR

PNU *:conf-P	Parameter name in OP1 Description	Range [Unit]	# of. Indices Factory Settings.	read: _/_ write: _/_
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: _/_ write: _/_
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: _/_ write: _/_
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.

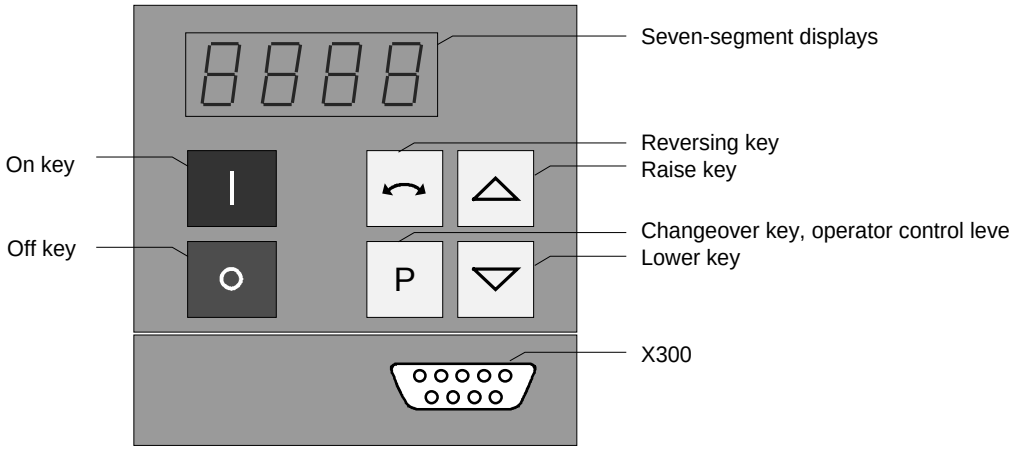


Fig. 6.1 Parameterization unit

6.1 Operator control elements

Operator control elements	Function
I	Converter switch on (standard). For faults: Return to the fault display. Command is effective when the key is released.
O	Converter shutdown depending on the parameterization of OFF1, Off2 or Off3 (P554 to P560). Command becomes effective when the key is released.
↶	Field reversal / reversing for the appropriate parameterization. Command becomes effective when the key is released.
P	Changeover from parameter number to parameter value. In conjunction with other keys, additional functions (refer to Figs. 6.2 to 6.4). Command becomes effective when the key is released.
▲, ▼	Values (raise, lower) change as long as the keys are depressed.
P + ▲ resp. P + ▼	Depress P and hold, then depress the second key. The command becomes effective when the key is released (e.g. fast changeover).

Table 6.1 Function of the operator control elements on the PMU

6.2 Displays 8.8.8.8.

		Parameter number		Index	Parameter value
		Pos. actual value e.g	Neg. actual value e.g	e.g..	e.g.
Visualization parameters	**Basic converter**	r000	r.000	___	0009
	Technology board	d000	d.000		
Setting parameters	**Basic converter**	P005	P.005	1 000	-2.08
	Technology board	H002	H.002		

Table 6.2 Displaying visualization- and setting parameters on the PMU

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

Table 6.3 Status display on the PMU

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

6.3 Structure

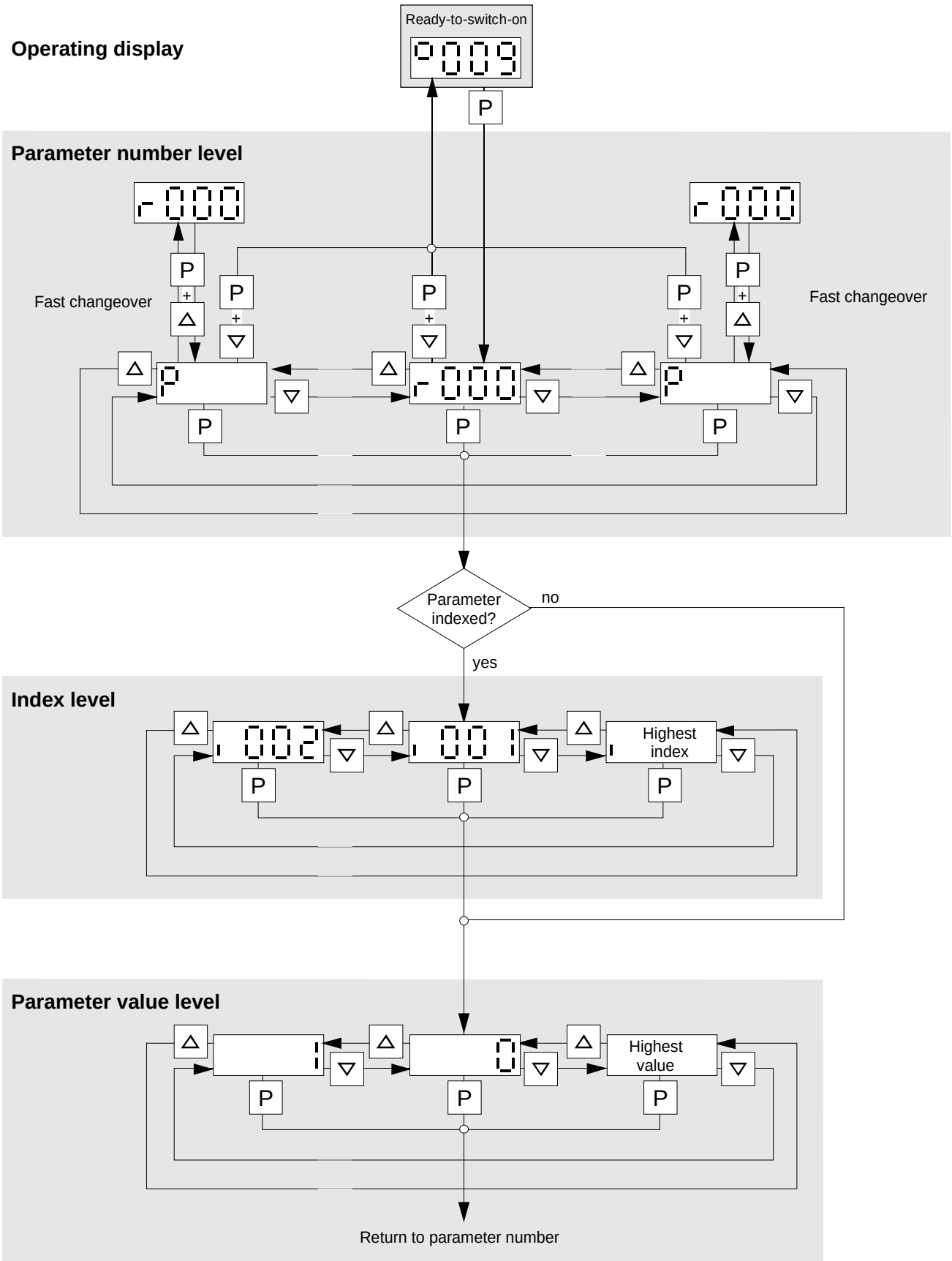
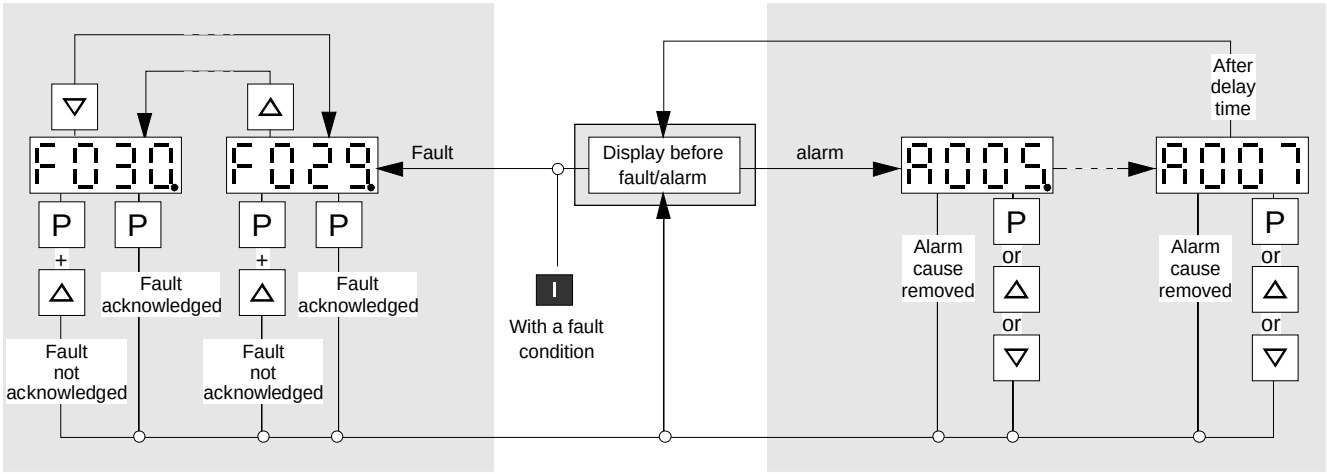


Fig. 6.2 Operator control structure using the PMU



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

Fig. 6.3 Operator control structure of the PMU for alarms and faults

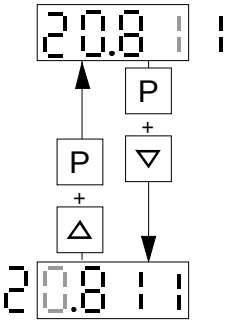


Fig. 6.4 Shifting the PMU display for parameters values with more than 4 digits

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 Conv. supply voltage** ∗ 1.34) of 80 % was not reached. The maximum pre-charging time of 3 s was exceeded.	Check the supply voltage, Compare with **P071 Conv. supply volt.**.
F006	**DC link overvoltage** The unit was shutdown due to an excessive DC link voltage. Supply voltage range | Shutdown threshold 208 V to 230 V | 412 V 380 V to 460 V | 819 V 500 V to 575 V | 1022 V 660 V to 690 V | 1220 V	Check the supply voltage, **P071 Conv. supply voltage,** The converter operates in the regenerative mode without regenerative possibility. reduce **P464 ramp-down time**, increase **P370 restart on the fly search speed**.
F008	**DC link uvolt.** The lower limit of 76 % of the DC link voltage (**P071 conv. supply voltage** ∗ 1.34) was fallen below. For enabled kinetic buffering, 61 %. DC link undervoltage in 'standard' operation (i.e. no SIMULATION). DC link undervoltage with active kinetic buffering and speed less than 10 % of the rated motor speed. It was a 'brief supply failure' which was only detected after the supply returned (WEA-flag).	Check • the supply voltage **P071 Conv. supply volt.** • of the input rectifier • of the DC link
F011	**Overcurrent** The unit was shutdown due to an overcurrent condition. The shutdown threshold was exceeded,	Check • the converter-output for short-circuit or ground fault • the load for an overload condition • whether the motor and converter are correctly matched • whether the dynamic requirements are too high.
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 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 ϑ >40 ºC. Refer to section 14.1. Check; • whether fan -E1 is connected and is rotating in the correct direction. • that the air entry and discharge openings are not restricted. • temperature sensor at -X30
F025	**UCE ph. L1** There was an UCE shutdown in phase L1.	Check; • phase L1 for short-circuit or ground fault (-X2:U2 including motor). • that the **CU** is correctly inserted.
F026	**UCE ph. L2** There was an UCE shutdown in phase L2.	Check; • phase L2 for short-circuit or ground fault (-X2:U2 including motor). • that the **CU** is correctly inserted.

Fault messages		
No.	**Fault description**	**Counter measures**
F027	**UCE ph. L3** There was an UCE-shutdown in phase L3.	Check; • phase L3 for short circuit or ground fault. (-X2:W2 -including motor). • that the **CU** is correctly inserted.
F035	**Ext. fault1** External fault 1 input, which can be parameterized, was activated.	Check; • if there is an external fault • if the cable to the appropriate binary input is interrupted • **P575 S k fault ext.1** also refer to section 4.3.2.
F036	**Ext. fault2** External fault 2 input, which can be parameterized, was activated.	Check; • if there is an external fault • if the cable to the appropriate binary input is interrupted • **P586 S.k. fault ext. 1** also refer to section 4.3.2.
F037	**Analog input.**	Check the connection to • analog input -X102:27, 28, 29. check parameters • **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 occured when storing the values in the EEPROM.	Replace the CU board (-A10)
F042	**Comp. time** Computation time problems	Reduce computation time load, increase **sampling time P308** observe **r725 , free comp time**
F043	**VeCon-FR** VeCon-error at first run-up. When starting the VeCon in the INIT status for measured value sensing, the VeCon processor could not be stopped.	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**.	
F049	**SW release** The EPROMs on the CU have different software releases. In this case, the language EPROM is compared with the CU software.	• Replace language PROM
F060	**MLFB missing** This is set, if the MLFB = 0 when INITIALIZATION is exitted (0.0 kW). MLFB = Order No.	After acknowledgement, in INITIALIZATION enter the correct MLFB in parameter **P070 MLFB (6SE70..)**. (Only possible with the appropriate access stages to both access parameters).
F061	**Incorr param.** A parameter entered when setting the drive is not in the admissible range (e.g. P107 mot. frequency (ies), P108 mot. speed (s)), P761 pulse frequency) (dependent on the control type).	Acknowledge the fault, and change the appropriate parameter value. The erroneous parameter is specified in r949 as fault value.
F065	**SST1 telegr** (USS protocol)	Check the connection CU board -X100:1 to 5. 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** • Check the SCB board to ensure that it is correctly inserted and that the slot coincides with assignment • **r723 board code ,** – **r724 board ID and** • **P090 board slot 2,** – **P091 board slot 3** **r 949 =5** error, initialization data • Check parameters **P682 and P684** **r 949=6** time-out when initializing and **r949=10** error, configuration channel • Check parameters **P090, P091, P682 and P684**
F072	**SCB heartb.** SCB no longer processes the monitoring counter (heartbeat counter)	Replace SCB Check the connection between the subrack and option board
F073	**Aninput1 SL1** 4 mA at analog input 1, slave 1 fallen below	Check the connection, signal source to the SCI 1 board (slave 1) -X428:4, 5.
F074	**Aninput2 SL1** 4 mA at analog input 2, slave 1 fallen below	Check the connection, signal source to the SCI 1 board (slave 2) -X428:7, 8.
F075	**Aninput3 SL1** 4 mA at analog input 3, slave 1 fallen below	Check the connection, signal source to the SCI 1 board (slave 3) -X428:10, 11.
F076	**Aninput1 SL2** 4 mA at analog input 1, slave 2 fallen below	Check the connection, signal source to the SCI1 (slave1) -X428:4, 5.
F077	**Aninput2 SL2** 4 mA at analog input 2, slave 2 fallen below	Check the connection, signal source to the SCI 1 board (slave 2) -X428:7,8.
F078	**Aninput3 SL2** 4 mA at analog input 3, slave 2 fallen below	Check the connection, signal source to the SCI 1 board (slave 3) -X428:10, 11.
F079	**SCB telegram** (USS, peer-to-peer, CAN)	Check the connections of the SCB1(2) boards Replace SCB1(2) board. Replace the CU2 board (-A10).
F080	**TB/CB init**. Error when initializing the board at the DPR interface	**r949 = 1** PT/CB not inserted or PT/CB board code incorrect **r949 = 2** PT not compatible **r949 = 3** CB not compatible **r949 = 4** error, initialization data Check the T300/CB board to ensure that is correctly inserted and that the slot and assignment coincide; • **P090 board slot 2,** • **P091 board slot 3** • **r723 board code,** •**r724 board ID** **r949 = 5** time-out at initialization **r949 = 10** error, configuration channel Checking the CB initialization parameters; • **P918 CB bus address,** • **696 to P705 CB parameters 1 to 10**
F081	**TB/CB heartb** TB or CB no longer processes the heartbeat counter	Replace TB or CB Check the connection between the subrack and option boards
F082	**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: • **P071 Converter voltage** • **P102 Rated motor current** • **P108 Rated speed** • **P109 Pole pair number** • **P110 Torque constant** • **P111 Torque deviation** • **P112 Torque const** • **P113 Rated torque** • **P173 Imax** • **P186 Speed-dep flux** • **P187 Temp. dep. flux** • **P242 Start. time** • **P260 Vsdmax** • **P761 Pulse frequency** • **P267 Vsqmax**

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
F092	**Par FR motP** 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
F093	**Par SR init** A parameter error occurred in the initialization at the second run-up of the VeCon processor after ready to power-up.	Check the parameter settings as under fault message F090
F094	**Par SR motK** An error occurred in the motor initialization at the second run-up of the VeCon processor after ready to power-up.	Check the parameter settings as under fault message F090
F095	**Par SR motP** An error occured in the motor initialization at the second 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.	Check motor data set
F097	**InitD MDS2** A parameter error occurred for the converter status init drive	The erroneous parameter is specified in r949 as fault value. Fault value 1005 in r949: At motor running up motor data set 1 was declared invalid.
F098	**Motdat can.** Motor data set error. Deletion setting was no able to be found in the motor table	
F099	**EEPROM org** EEPROM error	Power-down and -up again. Replace the CU board if the error re-occurs.
F100	**GRND init** During the ground fault test, a current not equal to 0 was measured, or a UCE or the overcurrent monitoring responded, although none of the valves were triggered.	The fault cause can be read-out of r358 "ground fault test result". Check the converter output for short-circuit or ground fault (-X2:U2, V2, W2 - including motor). Check that the CU board is correctly inserted. Frame sizes 1 and 2: Check the transistor modules on the PEU board -A23 for short-circuit. Frame sizes 3 and 4: Check the transistor modules -A100, -A200, -A300 for a short-circuit condition.
F101	**GRND second run mot** Ground fault test error during the second run-up before motor identification	Check the power section valves for a short-circuit, and for converters with fiber-optic gating, the gating unit wiring and the UCE checkback signals, for the correct assignment.
F102	**GRND control** Error during the ground fault test before the closed-loop control program	Check converter modules
F114	**Mess. OFF** The converter automatically aborted the automatic measurement as the time limit was exceeded up to converter power-up, or due to an OFF command during the measurement; the selection in **P052 function selection** is reset.	For **P052, function selection = 7,** restart **motor identification at standstill.** The on command must be provided within 20 s after the warning message **A078 standstill measurement appears.** Withdraw the off command and re-start the measurement.

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.	• Replace CU • Increase sampling time or reduce pulse frequency
FF02	**Watchdog error** The software monitoring has responded.	• Replace CU
FF03	**NMI error** Several NMIs have occurred one after another due to external option board accesses (busy monitoring).	• Replace CU • Replace BPL • Replace option board
FF04	**RAM error** An error was identified during the RAM memory test.	• Replace CU
FF05	**EPROM error** An error was identified during the EPROM memory test.	• Replace CU • Replace EPROMs
FF06	**Stack overflow** Stack overflow.	• Replace CU • Replace software • Increase sampling time or reduce the pulse frequency
FF07	**Stack underflow** Stack underflow	• Replace CU • Replace software
FF08	**Undefined opcode** An attempt was made to execute an invalid processor command	• Replace CU • Replace software
FF09	**Protection fault** Illegal format for a protected processor command	• Replace CU • Replace software • Replace EPROMs
FF10	**Illegal Word Operand Access** Word access to an uneven address	• Replace CU • Replace software • Replace EPROMs
FF11	**Illegal Instruction Access** Jump command to an uneven address	• Replace CU • Replace software • Replace EPROMs
FF12	**Illegal External Bus Access** Access to an unavailable external bus	• Replace CU • Replace software • Replace EPROMs
FF13	**SW error interrupt proc.** An error has occurred during interrupt processing	• Replace CU • Replace software • Replace EPROMs

7.2 Alarm messages

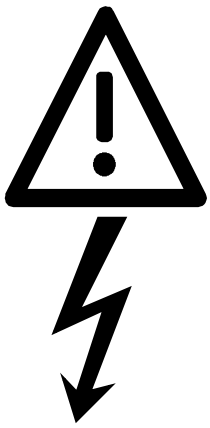
The alarm message is periodically displayed on the PMU by A=alarm and a 3-digit number. An alarm cannot be acknowledged. It is automatically deleted once the cause has been removed. Several alarms can be present. The alarms are then displayed one after another.

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**.
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.	Check measuring system!
A019	**P954** —— 2	**Match. meas. sys.** Resolver or encoder matching was erroneous at second run-up.	Check measuring system!
A022	**P954** —— 5	**Inv. temp.** The threshold for initiating an alarm, which can be parameterized, was fallen below.	Observe **r011 conv. temp.** Measure the air intake or ambient temperature. Observe the de-rating curves for ϑ >40 ºC 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 EA** The motor moved for the motor identification in the first run-up.	Lock the motor rotor
A025	**P954** —— 8	**Mot move. FR** The motor moved during motor identification at the second run-up.	Lock motor rotor
A033	**P955** —— 0	**Overspeed** Bit in **r553 status word 2** of the setpoint channel. The speed actual value has exceeded the maximum speed plus the selected hysteresis.	**P519 overspeed hys.** plus **P452 max. frequency (RDF)/ max. speed (RDF)** or **P453 max. frequency (LDF)/ max.speed (LDF)** was exceeded. Increase the parameter for the maximum frequencies, or reduce the regenerative load.
A034	**P955** —— 1	**Setpoint- act. val. diff.** Bit in the **r552 status word 2** of the setpoint channel. The absolute difference between the frequency setpoint and actual value is greater than the parameterized value and the control monitoring time has expired.	Check; - whether an excessive torque requirement is available. - whether the motor was dimensioned too small. increase **P517 setpoint-act. val. diff. frq./setp. act. diff. speed** or **P518 setp.-act. val. diff. time,**

Alarm No.	Parameter No. —— Bit No.	Description	Counter-measures
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.
A043	**P955** —— 10	**n-act. jump** The permissible rate of change of the speed encoder signal (P215) was exceeded..	Only for configured speed encoder **P208 S. speed act. val.** Check! Tacho cable for interruption. Tacho screen grounding.
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.**
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



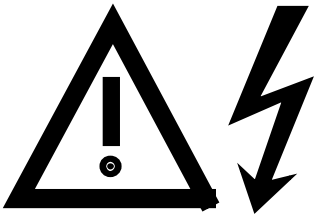
WARNING
SIMOVERT Master Drives are operated at high voltages. All work carried-out on or with the equipment must conform to all of the relevant national electrical codes (VBG4 in Germany). Maintenance and service work may only be executed by qualified personnel.
Only spare parts authorized by the manufacturer may be used. The specified maintenance intervals and also the instructions for repair and replacement must be adhered to. 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. The power- and control terminals can still be at hazardous voltage levels even though the motor is at a standstill.
If it is absolutely necessary that the drive converter must be worked on when powered-up: ♦ 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. If these warnings are not observed this can result in death, severe bodily injury or significant material damage.

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 TU = 400C. They must be replaced before their service life expires so that the drive converter availability is guaranteed.

8.2 Replacing components



WARNING

The fan may only replaced by qualified personnel.

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.

If these warnings are not observed, death, severe bodily injury or considerable material damage could occur.

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.

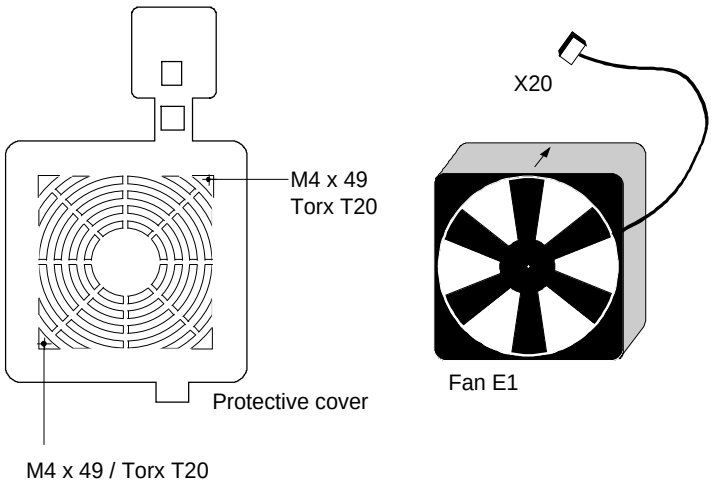


Fig. 8.1 Fan (24 V) and protective cover for housing sizes 1 to 3

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.

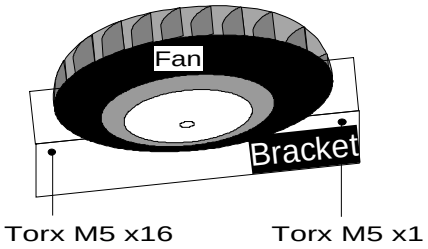


Fig. 8.2 Fan (230 V) with bracket

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.

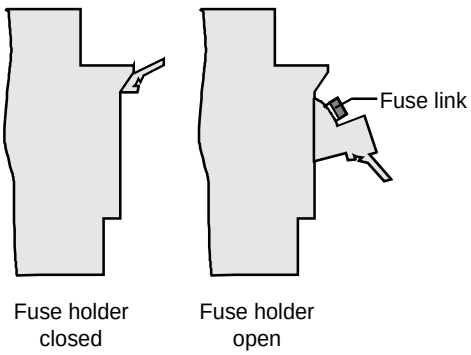
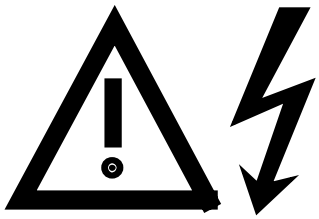


Fig. 8.3 Fuse holder (size D)

8.2.3 Replacing boards



WARNING

The boards may only be replaced by qualified personnel.

It is not permissible that the boards are withdrawn or inserted under voltage.

Death, severe bodily injury or significant materal damage might result if these instructions are not observed.

CAUTION

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).

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.

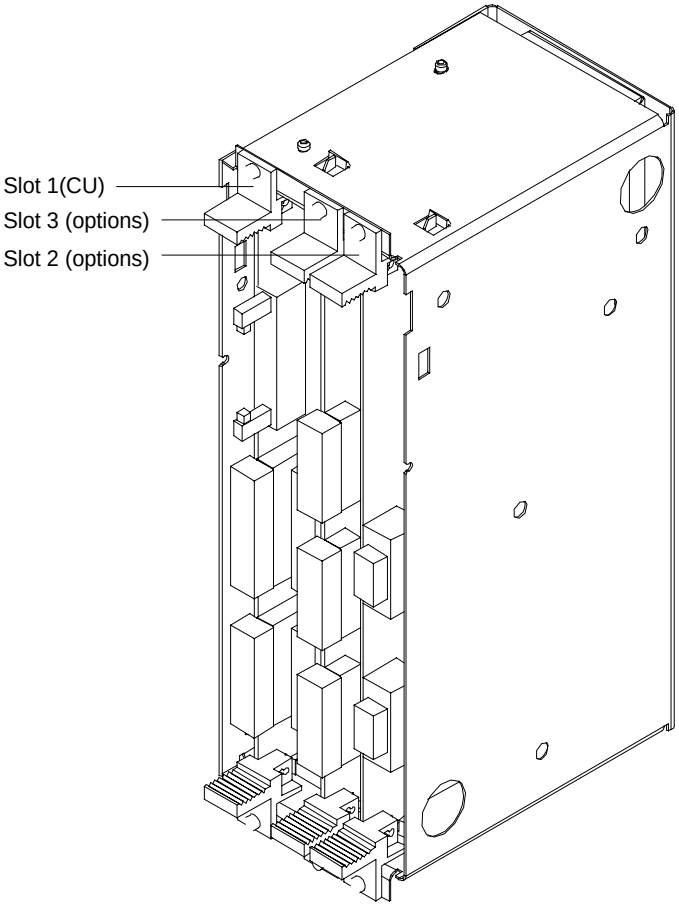


Fig. 8.4 Electronics box equipped with CU (slot 1) and options (slot 2 (left) and 3 (right))

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.

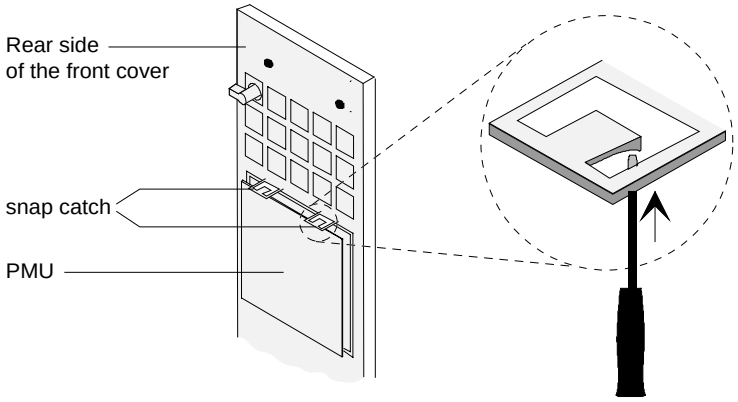


Fig. 8.5 Rear side of the front cover with PMU board

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.

Desig-nation	Description	Order No.	
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 my 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 tacho	150
T300 w/out tacho	620
Standard tacho 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.

Desig-nation	**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 3,5 A	115 V / 230 V AC - 24 V 3,5 A DC	4AV2302-2AB	Basic conv
Power supply 5 A	115 V / 230 V AC - 24 V 5 A DC	6EP1333-1SL11	Basic conv. + options

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

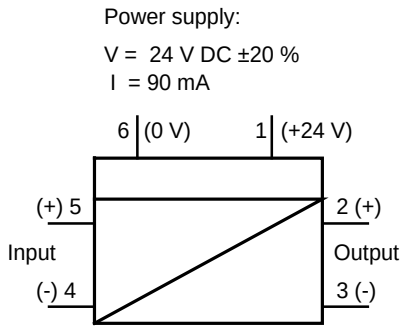


Fig. 9.1 Isolating amplifiers

9.5 Power section

Options	Description/function
Circuit-breaker	Power-up
Line fuses	Protects the motor feeder and limits the short-circuit current
Commutating reactor	Reduces harmonic feedback into the supply
Input filter, A1 or B1	Maintains the radio interference suppression level acc. to EN55011
Braking units	Converts regenerative power into heat
Braking resistors	Load resistor for the braking unit

Table 9.7 Power section options

9.5.1 Output reactor, dv/dt filter, sinusoidal filter

being prepared

9.6 Main-, output contactor

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

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

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

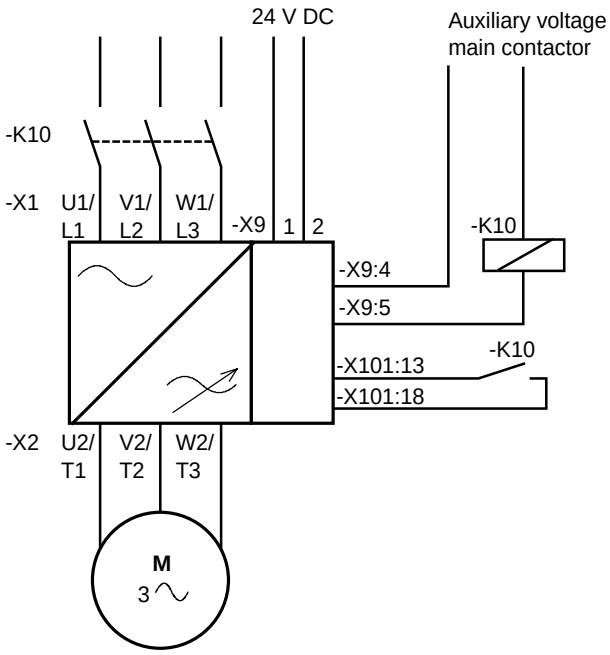


Fig. 9.2 Example for connecting an main- and input contactor

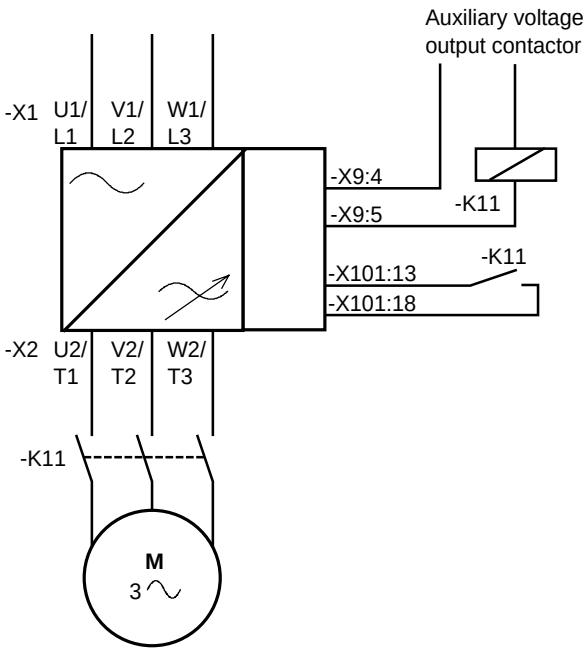


Fig. 9.3 Example for connecting an output contactor

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

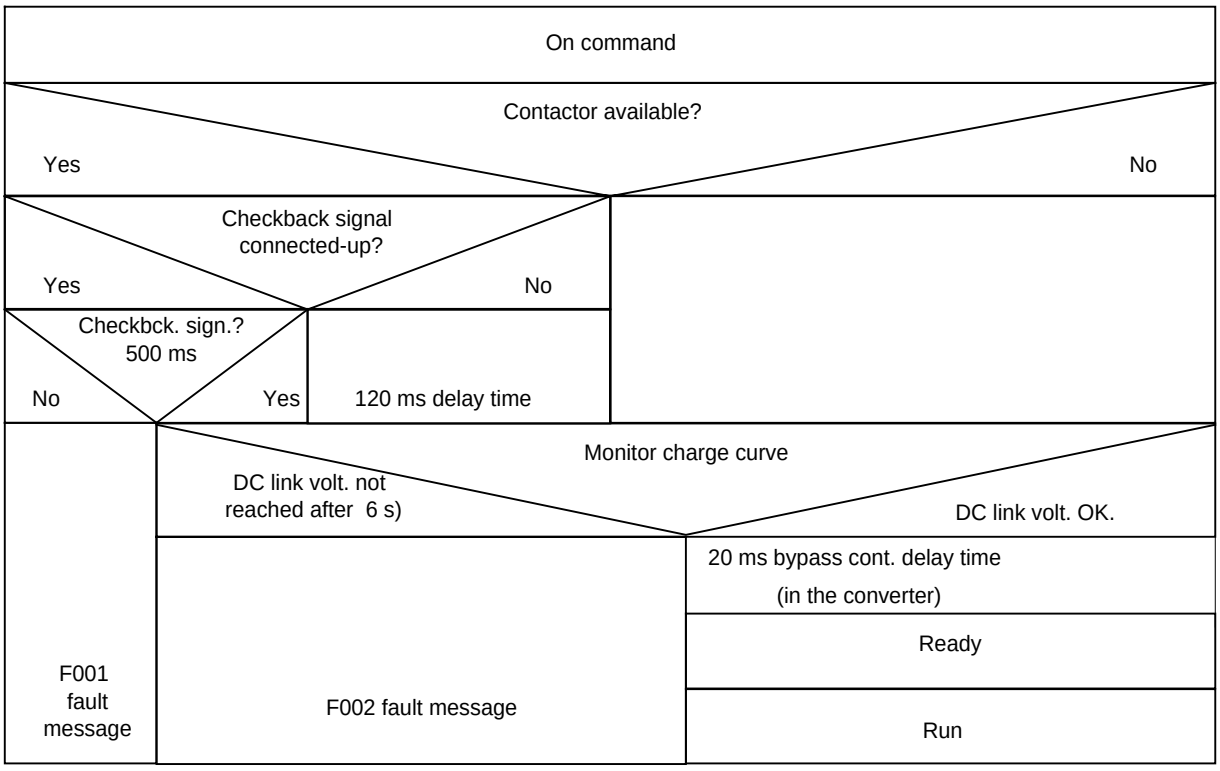


Fig. 9.4 Sequence control, on command- operation

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 9.8 Recommended parameterization for the main- and output contactors

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 9.9 Operator control options

Fig. 9.5 OP1

9.8 Mechanical design

Option	Description
EMC screened housing	For screened cables

Table 9.10 Mechanical options

9.9 Additional equipment series

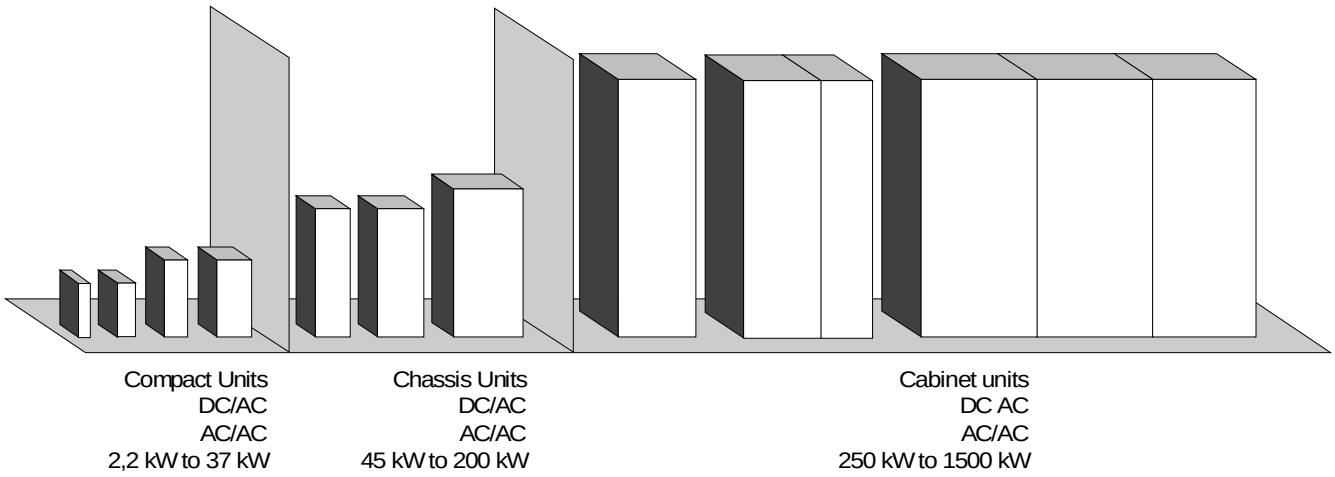


Fig. 9.6 Cabinet- and chassis units

- ♦ 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 AC 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		
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=
P163	Op/cl loop c type	4		

Par-No.	Parameter designation	Initialized value	Start-up setting	Start-up setting change
P173	Imax	i001=0.0 i002=0.0	i001= i002=	i001= i002=
P186	Speed-dep flx	i001=0.0 i002=0.0	i001= i002=	i001= i002=
P187	Tmp.-dep flx	i001=0.0 i002=0.0	i001= i002=	i001= i002=
P208	S.speed actval.	i001=0 i002=0	i001= i002=	i001= i002=
P209	Pencodpulse no	i001=0 i002=0	i001= i002=	i001= i002=
P211	Resolver exic	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=
P242	Start time	i001=0.000 i002=0.000	i001= i002=	i001= i002=
P272	R(stator)	i001=0.000 i002=0.000	i001= i002=	i001= i002=
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=
P346	Dynamic factor	i001=4 i002=4	i001= i002=	i001= i002=
P354	Ground fault test	0		
P355	Grnd test, time 1	20.0		
P356	Grnd test, time 2	10.0		
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		
P421	Fixed setpoint 1	i001=3000.0 i002=3000.0 i003=3000.0 i004=3000.0	i001= i002= i003= i004=	i001= i002= i003= i004=

Par-No.	Parameter designation	Initialized value	Start-up setting	Start-up setting change
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=
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		

Par-No.	Parameter designation	Initialized value	Start-up setting	Start-up setting change
P486	S. torque sepoint	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		
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=

Par-No.	Parameter designation	Initialized value	Start-up setting	Start-up setting change
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=
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=

Par-No.	Parameter designation	Initialized value	Start-up setting	Start-up setting change
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=
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=
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=

Par-No.	Parameter designation	Initialized value	Start-up setting	Start-up setting change
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=
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=
P615	ST. KIP active	i001=0 i002=0 i003=0	i001= i002= i003=	i001= i002= i003=
P616	ST. restrt active	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=

Par-No.	Parameter designation	Initialized value	Start-up setting	Start-up setting change
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=
P628	ST. mot. stll/lck	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=
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=

Par-No.	Parameter designation	Initialized value	Start-up setting	Start-up setting change
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=
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=

Par-No.	Parameter designation	Initialized value	Start-up setting	Start-up setting change
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=
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=

Par-No.	Parameter designation	Initialized value	Start-up setting	Start-up setting change
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=
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		

Par-No.	Parameter designation	Initialized value	Start-up setting	Start-up setting change
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=
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=

Par-No.	Parameter designation	Initialized value	Start-up setting	Start-up setting change
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=
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		

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

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

12 Environmental friendliness

Environmental aspects during the develpment

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.

PC boards can be disposed off by incinerating. The proportion of components containing dangerous substances is extremely low

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.

It is only permissible to switch off and on agiain twice in a minute.

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 Pert 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 ≙ EN 60529
Protection class	I	DIN VDE 0106 Section 1
Radio interference level – standard – option	without B1	DIN VDE 0875 Section 11 ≙ EN 55011 EN55011
Noise immunity		EN50082-1
Mechanical strength		DIN IEC 68-2-6 / 06.90

	Frequency range Hz	Constant amplitude of the deflection mm	 acceleration 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.

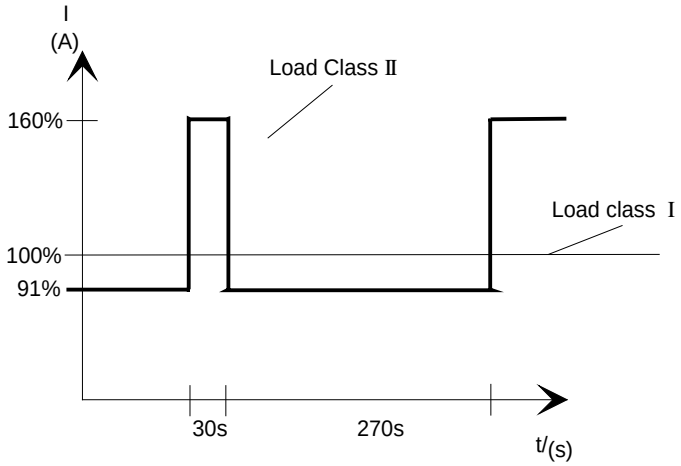


Fig. 13.1 Output according to load class II

AC → AC converters 6SE70...		21-1CA30	21-3CA30	21-8CB30	22-3CB30	23-2CB30	24-4CC30
Rated voltage, rated frequency, rated current, rated output							
Rated voltage in Vn Input Output	V	 3 AC 208 ... 230 ±15 % 3 AC 0 ... Rated input voltage					
Rated frequency fn Input Output: U/f = const U = const	Hz	 50...60 ±6 % 0 ... 100 28 ... 400					
Rated current In Input Output	A	 10,6 10,6	 13,3 13,3	 17,7 17,7	 22,9 22,9	 32,2 32,2	 44,2 44,2
DC link voltage Vdn	V	280...310					
Rated output	kVA	3,8...4,2	4,8...5,3	6,4...7,1	8,3...9,1	11,6...12,8	15,4...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 acc. 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					
Overcurrent	A	14,4	18,1	24,1	31,1	43,8	60,1
Overcurrent time	s	60					
Losses, cooling, power factor							
Power factor Supply $\cos\varphi_{1N}$ Converter $\cos\varphi_U$		 > 0,98 < 0,92 ind.	 > 0,98 < 0,92 ind.	 > 0,98 < 0,92 ind.	 > 0,98 < 0,92 ind.	 > 0,98 < 0,92 ind.	 > 0,98 < 0,92 ind.
Efficiency η – Pulse frequency 3kHz – Pulse frequency 6kHz		 0,97 0,96	 0,97 0,97	 0,97 0,96	 0,97 0,97	 0,97 0,97	 0,97 0,97
Power loss – Pulse frequency 3kHz – Pulse frequency 6kHz	kW	 0,13 0,14	 0,16 0,17	 0,20 0,21	 0,25 0,26	 0,33 0,36	 0,41 0,44
Required cooling air flow	m^3/s	0,009	0,009	0,022	0,022	0,022	0,028
Pressure drop Dp	Pa	10	10	32	32	32	30
Sound pressure level, dimensions, weights							
Sound pressure level	dB(A)	60	60	60	60	60	60
Type		A	A	B	B	B	C
Width Height Depth	mm	90 425 350	90 425 350	135 425 350	135 425 350	135 425 350	180 600 350
Weight	kg	8	8	12	12	12	24

AC → AC converters 6SE70...		**25-4CD30**	**27-0CD30**	**28-1CD30**			
Bemessungsspannung, Bemessungsfrequenz, Rated current							
Rated voltage in Vn Input Output	V	 3 AC 208 ... 230 ± 15 % 3 AC 0 ... Rated input voltage					
Rated frequency fn Input Output: U/f = const U = const	Hz	 50...60 ±6 % 0 ... 100 28 ... 400					
Rated current In Input Output	A	 54 54	 69 69	 81 81			
DC link voltage Vdn	V	280...310					
Rated output	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)					
Loading Class II acc. to EN 60146-1-1							
Rated current	A	49.1	62.8	73.7			
Base load time	s	240					
Overcurrent	A	73.4	93.8	110			
Overcurrent time	s	60					
Losses, cooling, power factor							
Power factor Supply $\cos\varphi_{1N}$ Converter $\cos\varphi_U$		 > 0.98 < 0.92 ind.	 > 0.98 < 0.92 ind.	 > 0.98 < 0.92 ind.			
Efficiency η – Pulse frequency 3kHz – Pulse frequency 6kHz		 0.97 0.97	 0.97 0.97	 0.97 0.97			
Power loss – Pulse frequency 3kHz – Pulse frequency 6kHz	kW	 0,59 0.64	 0.74 0.80	 0.81 0.88			
Required cooling air flow	m^3/s	0.054	0.054	0.054			
Pressure drop Dp	Pa	230	230	230			
Sound pressure level, dimensions, weights							
Sound pressure level	dB(A)	65	65	65			
Type		D	D	D			
Width Height Depth	mm	270 600 350	270 600 350	270 600 350			
Weight	kg	35	35	35			

AC → AC converters 6SE70...		16-1EA30	18-0EA30	21-0EA30	21-3EB30	21-8EB30	22-6EC30
Rated voltage, rated frequency, rated current, rated output							
Rated voltage in Vn Input Output	V	 3 AC 380 ... 460 ±15 % 3 AC 0 ... Rated input voltage					
Rated frequency fn Input Output: U/f = const U = const	Hz	 50...60 ±6 % 0 ... 100 28 ... 400					
Rated current In Input Output	A	 6.1 6.1	 8.0 8.0	 10.2 10.2	 13.2 13.2	 17.5 17.5	 25.5 25.5
DC link voltage Vdn	V	510...620					
Rated output	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 acc. 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					
Overcurrent	A	8.3	10.9	13.9	17.9	23.8	35
Overcurrent time	s	60					
Losses, cooling, power factor							
Power factor Supply $\cos\varphi_{1N}$ Converter $\cos\varphi_U$		 > 0.98 < 0.92 ind.	 > 0.98 < 0.92 ind.	 > 0.98 < 0.92 ind.	 > 0.98 < 0.92 ind.	 > 0.98 < 0.92 ind.	 > 0.98 < 0.92 ind.
Efficiency η – Pulse frequency 3kHz – Pulse frequency 6kHz		 0.97 0.96	 0.97 0.97	 0.97 0.97	 0.98 0.98	 0.98 0.98	 0.98 0.98
Power loss – Pulse frequency 3kHz – Pulse frequency 6kHz	kW	 0.11 0.13	 0,12 0,13	 0.19 0.21	 0,16 0,18	 0.24 0.28	 0.36 0.41
Required cooling air flow	m^3/s	0.009	0.009	0.009	0.022	0.022	0.028
Pressure drop Dp	Pa	10	10	10	32	32	30
Sound pressure level, dimensions, weights							
Sound pressure level	dB(A)	60	60	60	60	60	60
Type		A	A	A	B	B	C
Width Height Depth	mm	90 425 350	90 425 350	90 425 350	135 425 350	135 425 350	180 600 350
Weight	kg	8	8	8	12	12	24

AC → AC converters 6SE70...		**23-4EC30**	**23-8ED30**	**24-7ED30**	**26-0ED30**	**27-2ED30**	
Rated voltage, rated frequency, rated current, rated output							
Rated voltage in Vn Input Output	V	 3 AC 380 ... 460 ±15 % 3 AC 0 ... Rated input voltage					
Rated frequency fn Input Output: U/f = const U = const	Hz	 50...60 ±6 % 0 ... 100 28 ... 400					
Rated current In Input Output	A	 34 34	 37.5 37.5	 47 47	 59 59	 72 72	
DC link voltage Vdn	V	510...620					
Rated output	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)					
Loading Class II acc. to EN 60146-1-1							
Rated current	A	31	34.1	42.8	53.7	65.5	
Base load time	s	240					
Overcurrent	A	46	51.0	63.5	80.2	97.2	
Overcurrent time	s	60					
Losses, cooling, power factor							
Power factor Supply $\cos\varphi_{1N}$ Converter $\cos\varphi_U$		 > 0.98 < 0.92 ind.	 > 0.98 < 0.92 ind.	 > 0.98 < 0.92 ind.	 > 0.98 < 0.92 ind.	 > 0.98 < 0.92 ind.	
Efficiency η – Pulse frequency 3kHz – Pulse frequency 6kHz		 0.98 0.98	 0.97 0.97	 0.98 0.97	 0.98 0.97	 0.98 0.98	
Power loss – Pulse frequency 3kHz – Pulse frequency 6kHz	kW	 0.49 0.55	 0,58 0,64	 0.73 0.81	 0,86 0,97	 1.05 1.19	
Required cooling air flow	m^3/s	0.028	0.054	0.054	0.054	0.054	
Pressure drop Dp	Pa	30	230	230	230	230	
Sound pressure level, dimensions, weights							
Sound pressure level	dB(A)	60	65	65	65	65	
Type		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

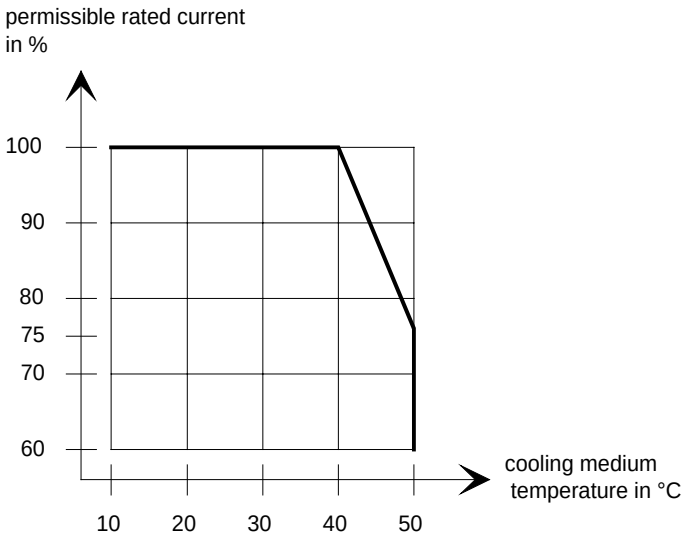


Fig. 13.2 Max. permissible rated current as a function of the cooling medium temperature

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.

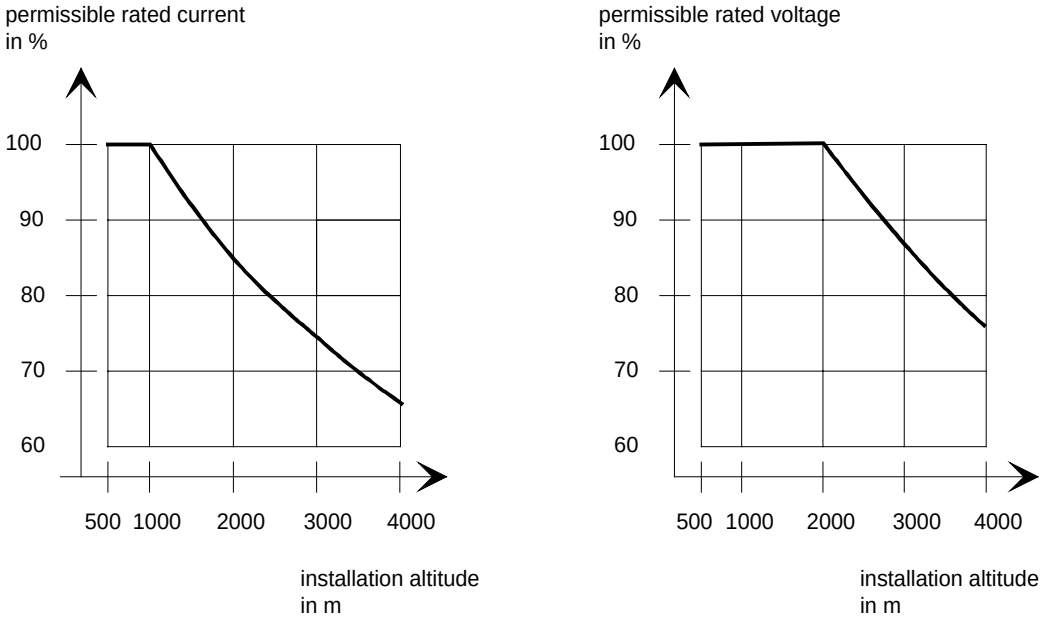


Fig. 13.3 Max. permissible rated current and rated voltage as a function of the installation altitude

13.3 De-rating as a function of the pulse frequency

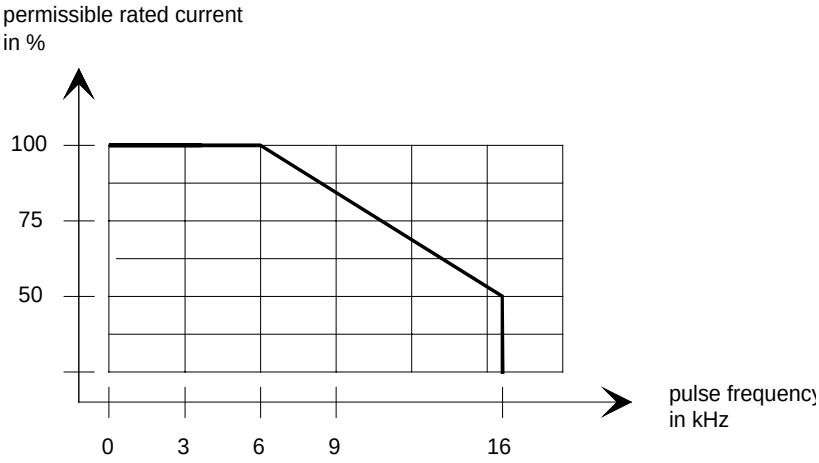


Fig. 13.4 Max. permissible rated current as a function of the pulse frequency

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Version	Internal Item number
B	475 344.4000.76 Jb-76

Version **B** consists of the following chapters

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