

Positioning and
Sequence Control Unit for
3-phase Stepping Motors

WDP3-01X with OED3

Doc. no. 214.157/DGB 08.97

Ident. no.: 00441110002

Edition: a000 August 97

Software version: 03.1XX

Safety instructions

Please read the following safety instructions prior to installation, operation, maintenance and repair of the device.

- The intended use of the device under is described “Purpose” and must be observed.
- Installation, maintenance and repair of the device shall be performed by a qualified electrician. National regulations concerning
 - accident prevention
 - installation of electrical and mechanical systems
 - radio interference suppressionshall be observed.
- The technical data of the device, particularly the ambient conditions, shall be observed.
- The device shall only be operated by trained personnel.
- The warranty is invalidated in case of unauthorized modification or opening of the device.
- Please ask your technical consultant prior to installing accessories not listed under “Accessories”.
- The safety symbols and notes on the device and in the manual shall be observed.

Explanation of symbols



ATTENTION

Reference to a danger for the device or components, possibly resulting in the endangering of human life.

DANGER

Reference to a direct endangering of human life.



DANGER

High voltage at component, do not touch.



DANGER

High temperature at component, do not touch.



ATTENTION

Warning against electrostatic discharge (ESD).

Only touch the PC-board or component in an electrostatically-protected environment.



NOTE

Important or additional information concerning the device or the manual.

SIG Positec BERGERLAHR GmbH&Co.KG

Breslauer Str. 7
Postfach 1180

D-77901 Lahr

**Proposals
Improvements**

WDP3-01X with OED3

Edition: a000 August 97
Doc. no. 214.157/DGB 08.97

Sender:

Name:

Company/department:

Address:

Telephone no.:

Please inform us, using this form, if
you have discovered any errors
when reading this document.
We should also appreciate any new
ideas and proposals.

Proposal and/or improvements:

Table of contents

	Page
1 General description	1-1
1.1 Structure and characteristics	1-1
1.2 Function	1-2
1.2.1 Hardware components	1-2
1.2.2 Operating modes	1-4
1.3 Technical data	1-6
1.3.1 General data	1-6
1.3.2 Electrical data	1-6
1.3.3 Mechanical data	1-8
1.3.4 Ambient conditions	1-8
1.3.5 Regulations	1-9
1.3.6 Approvals	1-9
2 Installation	2-1
2.1 Scope of supply	2-1
2.2 Accessories	2-2
2.3 Assembly	2-3
2.4 Wiring	2-5
2.4.1 Mains connection	2-7
2.4.2 Motor connection	2-8
2.4.3 Signal interface	2-9
2.4.3.1 Signal connection pin assignment	2-10
2.4.4 RS 232 serial interface (OPT.1)	2-12
2.4.5 RS 485 serial interface (OPT.1)	2-14
2.4.6 Encoder interface (OPT.2)	2-16
2.5 Setup	2-19
2.5.1 Defaults	2-19
2.5.2 Motor test	2-21

Table of contents

	Page
3 Operation	3-1
3.1 Controller operating modes	3-1
3.2 Switching ON	3-2
3.3 Controller STOP	3-4
3.4 Editing mode	3-4
3.5 Setting the motor phase current	3-5
3.6 Manual mode via front panel	3-6
3.7 Automatic mode	3-7
3.8 Programming	3-8
3.9 Switching OFF	3-8
4 Malfunctions	4-1
4.1 Status indicators	4-1
4.2 Troubleshooting tables	4-2
4.3 Repair work	4-5
4.4 Storage, shipment	4-5
5 Customer service	5-1

6	Appendix	Page 6-1
6.1	Device variants	6-1
6.2	Description of accessories	6-2
6.2.1	Fan	6-4
6.2.2	Mains filter	6-5
6.2.3	MP 923 interface converter	6-6
6.2.3.1	General description	6-6
6.2.3.2	Technical data	6-6
6.2.3.3	Setup	6-7
6.2.3.4	Status indicators	6-7
6.2.4	Additional bleed resistor	6-9
6.3	Glossary	6-10
6.4	Abbreviations	6-13
7	Index	7-1
8	Corrections and additions	8-1

1 General description

1.1 Structure and characteristics

Purpose The WDP3-01X positioning and sequence control unit, which comprises the OED3 operating system, can be used for controlling the following SIG BERGER LAHR 3-phase stepping motors:

- with WDP3-014, motors of type size 90, (VRDM 39xx/50 LW.)
- with WDP3-018, motors of type size 110, (VRDM 311xx/50 LW.)

Each unit is used for controlling one axis. The difference between the positioning and sequence control units WDP3-014 and WDP3-018 consists in their power ratings.

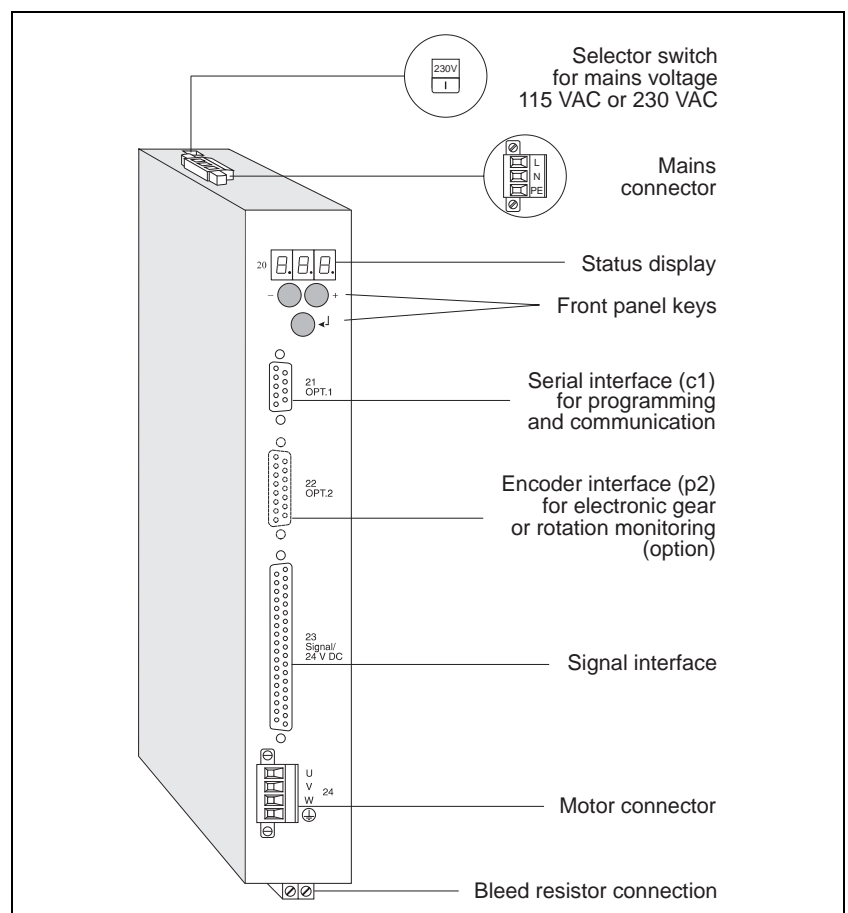
The controller can be freely programmed using a PC and the ProOED3 programming software. A PLC with integrated movement programming is possible.

An electronic gear or rotation monitoring can be implemented via the optional encoder interface.

Documentation This documentation describes installation and operation via the front panel keys, the inputs/outputs of the signal interface and the encoder interface.

Programming of the device is described in the documentation of the ProOED3 programming software.

Fig. 1-1 WDP3-01X positioning and sequence control unit with OED3



General description

1.2 Function

1.2.1 Hardware components

A built-in PC board in Eurocard format type size 6 HU accommodates the processor unit, the power controller and the power supply unit. The most important function blocks of the unit are evident in the block diagram (fig. 1-2).

Power supply unit

The power supply unit is a high-performance AC/DC converter which can be connected to 115 VAC or 230 VAC supply voltages. The energy recovered by a motor during braking can be temporarily stored up to a certain extent. To dissipate a higher amount of braking energy, an external bleed resistor must be connected.

External bleed resistor

DC/DC power supply unit

A DC/DC power supply unit generates various voltage levels for supplying the internal electronic circuits of the processor unit from the 24 VDC voltage supply.



NOTE

The electronic circuitry of the processor unit consists of PELV circuits as defined in the DIN standard VDE 0160.

Interface configuration

Various interface configurations are possible according to the actual requirements.



NOTE

The interfaces installed in the device are indicated on the type plate. The following abbreviations are used:

RS 232	Serial interface RS 232
RS 485 LS	Serial interface RS 485
LRS 422 IN	Encoder interface RS 422

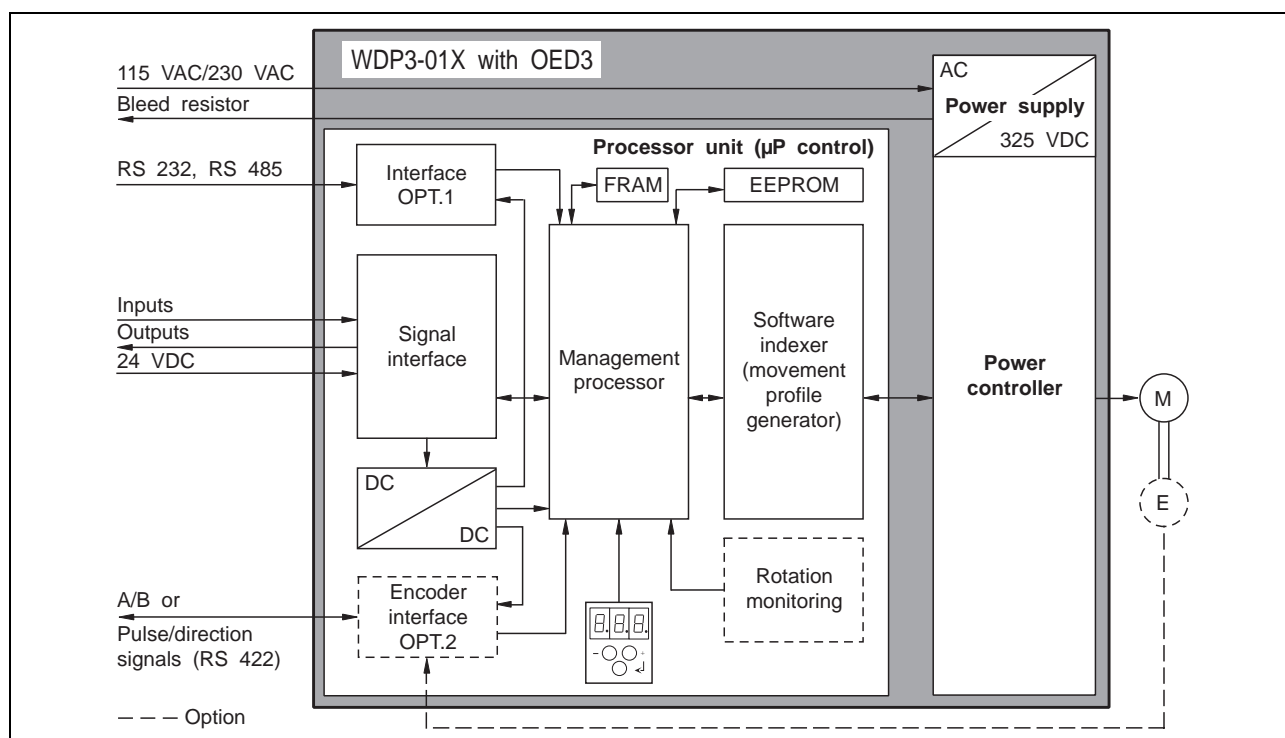


Fig. 1-2 Block diagram

<i>Signal interface</i>	The signal interface carries the input and output signals as well as the 24 VDC signal voltage.
<i>Encoder interface</i>	The encoder interface RS 422 (OPT.2) can be used for implementing an electronic gear or for rotation monitoring.
<i>Serial interface</i>	The RS 232 or RS 485 serial interface can be used for programming the controller (in editing mode) using a PC and the ProOED3 programming software. In addition, programmed communication, e.g. with an operating terminal, can be implemented via the serial interface (in automatic mode).
<i>Management processor</i>	The management processor is used in controller automatic mode for editing the application program and addressing the corresponding interfaces. In order to retain the application program on the controller after disconnecting the supply voltage, it must be written to the controller's EEPROM using a PC and the ProOED3 programming software. In the controller's FRAM, 3 variables can be stored to be retained even in case of power failure.
<i>Status display</i>	Three seven-segment displays indicate operating states and any malfunctions.
<i>Keys</i>	Three keys are provided on the front panel for operation and error acknowledgement.
<i>Indexer</i>	The indexer (movement profile generator) generates a pulse sequence from the current movement parameters (travel, speed and acceleration). This pulse sequence is passed on to the power controller.
<i>Power controller</i>	The power controller converts the pulse sequence received from the indexer into a current pattern for controlling the 3-phase stepping motor. The motor phase current can be set on the front panel; see chapter 3.5.

General description

1.2.2 Operating modes

The following operating modes can be set on the front panel.

- Manual mode via front panel
- Automatic mode
- Editing mode

Manual mode via front panel

In manual mode via front panel, you can move the motor to the left or right using the front panel keys.



NOTE

In controller automatic mode, manual mode and teach-in mode is possible via the signal inputs of the controller if the corresponding application program was loaded into the controller; see ProOED3 documentation.

Automatic mode

In automatic mode, you can start an application program which is loaded in the controller. The application program must previously have been created using a PC and the ProOED3 programming software and loaded into the controller (download).



NOTE

Since the controller does not have a battery-buffered main memory, the application program must be written to the controller's EEPROM after downloading. When switching on the controller, the application program is automatically loaded from the EEPROM into the main memory of the controller.

Editing mode

In controller editing mode, you can load an application program created with the PC and the ProOED3 programming software on the controller and test it in on-line mode.

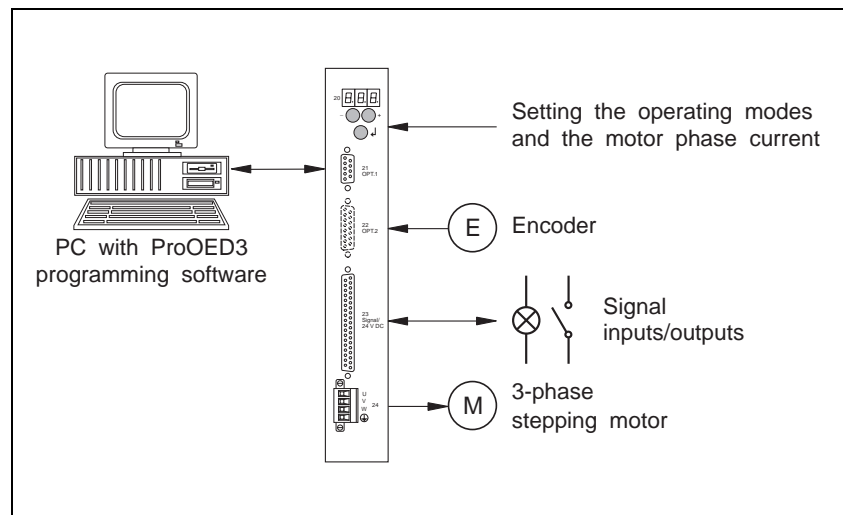


Fig. 1-3 System environment

Axis operating modes

In controller automatic mode, you can use the ProOED3 command "mode" in the application program to activate the following axis operating modes:

- Point-to-point mode
Positioning the axis from a given point A to a given point B at a programmed acceleration, speed and travel. Positioning can be effected with absolute values (relative to a reference point) or with incremental values (relative to the current position).
- Position following mode (electronic gear)
In position following mode, you can implement an electronic gear via the encoder interface of the controller or a variable. The pulses fed to the encoder interface or stored in the variable are multiplied with a gear ratio and used for controlling the stepping motor.

Rotation monitoring

If the controller is equipped with an encoder interface (RS 422 IN), you can activate motor rotation monitoring from the application program; see ProOED3 documentation. For rotation monitoring, the motor must be fitted with an encoder. The rotation monitoring feature compares the set and actual positions of the motor and reports a rotation monitoring error if the difference between set and actual position exceeds a certain limit value (19 steps).

General description

1.3 Technical data

1.3.1 General data

Power fail safe application program memory	EEPROM
Power fail safe memory for 3 variables	FRAM



ATTENTION

After power-off, the contents of the FRAM variables is retained only for a certain period:

- **at an ambient temperature of 30°C: approx. 250 days**
- **at an ambient temperature of 50°C: approx. 60 days**

Memory space for sequence program	2000 instructions
Memory space for PLC program	1000 instructions
Time for a PLC instruction	approx. 1.5 ms

1.3.2 Electrical data

Supply voltage, selectable	115 VAC
	230 VAC to 240 VAC

Mains connection

Power loss	
WDP3-014	60 W max.
WDP3-018	110 W max.
Mains frequency	50 to 60 Hz
Mains error protection	one period
Overvoltage stability acc. to DIN VDE 0160	Class 1
Nominal power consumption	
WDP3-014	3.6 A at 115 VAC
	2.0 A at 230 VAC
WDP3-018	6.5 A at 115 VAC
	3.5 A at 230 VAC
Starting current	70 A max.
Leakage currents	< 3 mA
External fuse	6 A at 230 VAC
	10 A at 115 VAC
	("K" characteristic)



NOTE

The devices may only be operated with fuse protection as specified above.

If necessary, use r.c.c.b. protection according to DIN VDE 0664, part 1/10.85.

System supply via signal interface

Supply voltage	20 VDC to 30 VDC
Power consumption	1 A max.
Ripple voltage	< 2 V _{pp}



NOTE

The 24 V voltage supply must meet the specifications of the DIN standard VDE 0160 on safety extra-low voltage.

<i>Motor connection</i>	Phase current	
	WDP3-014	0.1 A to 2.5 A
	WDP3-018	0.1 A to 6.8 A
	No. of steps	1000 steps per revolution
	Pulse rate	40 kHz max.
	Motor voltage	3 x 325 VDC (connected to mains)
	Motor cable (observe EN 60204 standard)	
	Length	maximum 50 m
	Cross-section	$\geq 0.75 \text{ mm}^2$ at cable length $\leq 30 \text{ m}$ $\geq 1.5 \text{ mm}^2$ at cable length $> 30 \text{ m}$
	Shield connection	On both ends

Signal interface **Electrical characteristics of the inputs**

Polarity reversal protection, hardware debounce (settling time
0.8 ms to 1.5 ms)

Signal voltage U_{high} 15 VDC to 30 VDC

Signal voltage U_{low} $< 3 \text{ VDC}$

Input current at 24 VDC 7 mA

Electrical characteristics of the outputs

Short-circuit protected, inductive loadability

Maximum output voltage 30 VDC

Maximum switching current on output Q0 400 mA

Voltage drop at 400 mA $< 2 \text{ VDC}$

Maximum switching current on outputs Q1 to Q3 50 mA

Voltage drop at 50 mA $< 2 \text{ VDC}$



DANGER

The signal inputs and the 24 VDC supply voltages on the signal connection must be definitely isolated from mains. The maximum voltage towards ground must not exceed 60 VDC or 25 VAC.

Serial interfaces **RS 232 interface (option)**

Internal leakage resistance towards ground 1 Mohm

RS 485 four-wire interface (option)

Short-circuit protected 150 mA max. at short-circuit

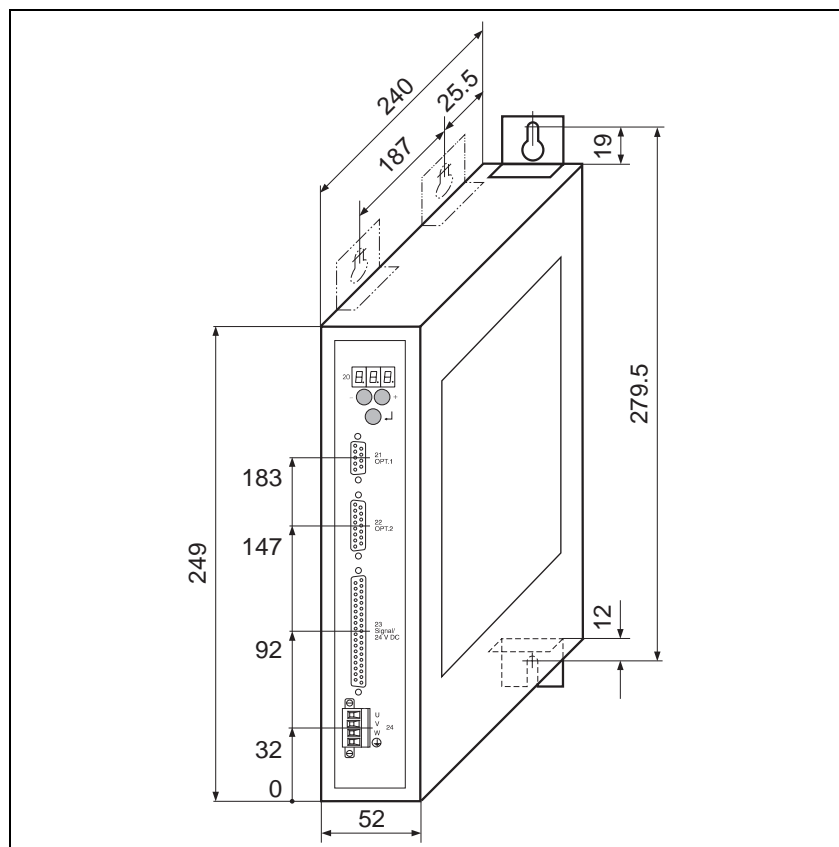
Internal leakage resistance towards ground 1 Mohm

Supply voltage output 12 VDC
for MP 923 (10 VDC min., 18 VDC max.)

General description

<i>Encoder interface</i>	RS 422 IN signal level (option)	
	Short-circuit protected	
	Internal leakage resistance towards ground	1 Mohm
	Maximum cable length	100 m
	Wire cross-section	2 x 0.5 mm ² and 10 x 0.25 mm ²
	Shield connection	On both ends
	Supply voltage output	5 VDC \pm 5% (300 mA max.) or 12 VDC, 10 VDC min./18 VDC max. (200 mA max.)
<i>Device protection</i>	Protection and monitoring circuits: Power amplifier overtemperature, short-circuit between motor leads (no ground fault protection), under-voltage and overvoltage	
	Type of protection	IP 20 acc. to EN 60529: 1991
1.3.3 Mechanical data	Dimensions (fig. 1-4)	249 x 240 x 52 mm
	Weight	approx. 3200 g
1.3.4 Ambient conditions	Ambient temperature	0°C to +50°C
	Storage temperature	-25°C to +70°C
	Relative humidity	15% to 85% (non-condensing)

Fig. 1-4 Dimensions



1.3.5 Regulations

Machinery directive

Insofar as the other equipment complies with the machinery directive 89/392/EEG and the configuration meets the EMC testing requirements of SIG BERGER LAHR, conformity with the machinery directive is hereby certified.

EMC directive

In a configuration which meets the EMC testing requirements of SIG BERGER LAHR, conformity with the following standards can be certified in accordance with the EMC directive 89/336/EEG:

Radio interference suppression according to EN 50081-2: 1993
(when using a mains filter, see Accessories)

Static discharge according to EN 60801-2: 1993, class 3

Burst according to IEC 801-4: 1988, class 4

SIG BERGER LAHR EMC testing requirements

- Use motor leads supplied by SIG BERGER LAHR. Motor lead length is 10 m.
- Insert a mains filter supplied by SIG BERGER LAHR into the mains power supply line.
- Install the unit in a switch cabinet.
- Use signal lines supplied by SIG BERGER LAHR and wire according to the documentation.
- Run signal, mains and motor cables separately (non-parallel) and establish a large surface area contact between the cable shield and ground/earth.
- Install the mains filter directly at the unit. If this is not possible, use a shielded connection cable (1 m max.) between the filter and the unit.
- Establish a large surface area contact between filter/device and ground (mount on a grounded metal plate or on the switch cabinet rear wall or use a ground strap).

Low-voltage equipment directive

Pursuant to the low-voltage equipment directive 73/23/EEC, the products are in conformity with the following standards:

Protection class 1 acc. to prEN 50178: 1994

Overvoltage Category III acc. to prEN 50178: 1994

Contamination Grade 2 acc. to prEN 50178: 1994

1.3.6 Approvals

prEN 50178 classification VDE 0160/11.94

EN 60950 classification VDE 0805: 1993 + A2: 1994

UL 508 file no. 153 659

2 Installation

2.1 Scope of supply

Check that the delivery is complete.

The scope of supply (fig. 2-1) comprises:

Qty.	Designation
1	Positioning and sequence control unit WDP3-014 with OED3 or WDP3-018 with OED3
1	Documentation for WDP3-01X with OED3
1	Ground strap
4	Mounting bracket
1	Fan for WDP3-018 with OED3

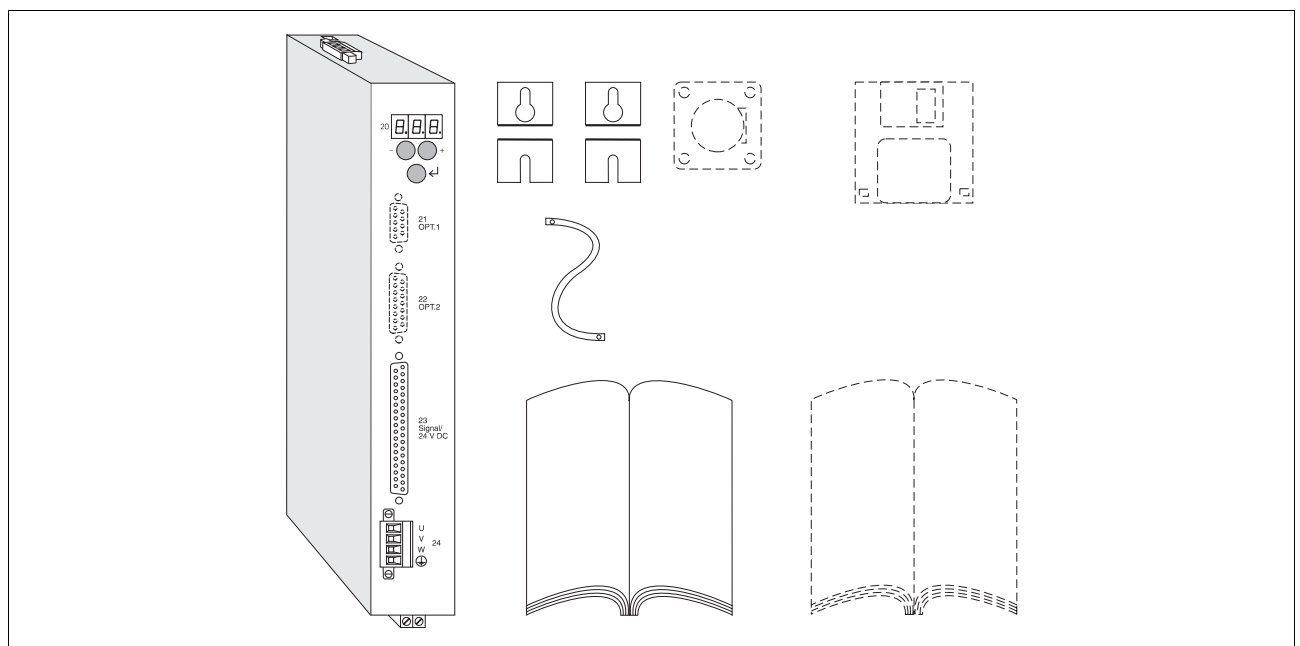


Fig. 2-1 Scope of supply

2.2 Accessories

The following accessories are available and must be ordered separately (for a description of accessories, see chapter 6.2):

- ProOED3 programming software (documentation with diskettes)
- 3-phase stepping motor
- Cable for encoder
- Fan for WDP3-018
- Motor cable 3 x 1.5 mm and 2 x 1.0 mm
- Motor cable 3 x 2.5 mm and 2 x 1.5 mm
- Mains filter
- MP 923 interface converter RS 232/RS 485
- RS 232/PC signal cable
- RS 422 IN/customer signal cable
- MP 924 interface distributor RS 485
- RS 485 LS/MP 923 signal cable
- Signal connection/customer signal cable
- Signal connection cable
- Signal cable for adapter slot option 1
- Signal cable (encoder) for adapter slot option 2
- Signal cable (pulse, direction) for adapter slot option 2
- Set of connectors (all sub-D connectors)
- Additional bleed resistor
- Electronic gear cable



NOTE

Refer to the sales documentation for the positioning and sequence control unit WDP3-01X with OED3 for the accessory order numbers.

2.3 Assembly



DANGER

The supply voltage must be disconnected whenever assembly work is carried out.



NOTE

When installing the unit, a minimum clearance of 10 cm must be ensured above and below the unit or to the adjacent unit. Leave 15 cm free in front of the unit to give room for fitting the cable connections.

The unit should be installed vertically in a switch cabinet and it may be necessary to provide external ventilation (see fig. 2-3).

You can use the mounting brackets to install the unit on the rear or on the left (fig. 2-2).

Fasten the ground strap supplied at the bottom front of the unit with screws and connect it to a grounded part of the switch cabinet.



ATTENTION

Clean air supply must be ensured in the switch cabinet.

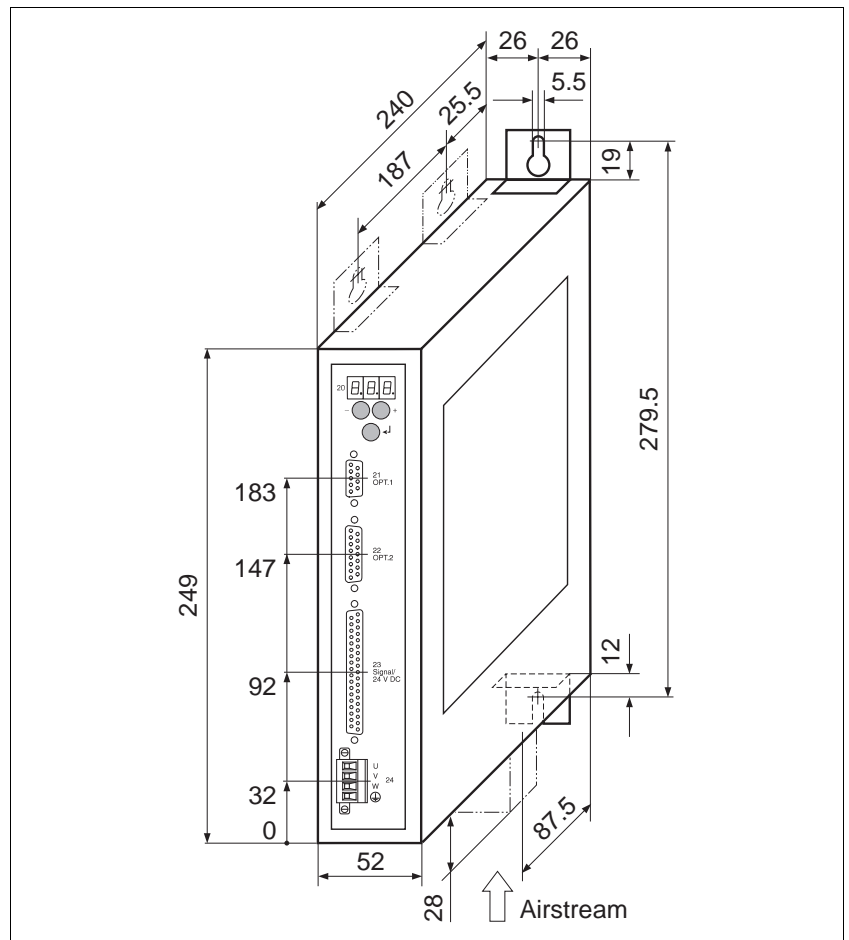


Fig. 2-2 Installation

Ventilation The positioning and sequence control unit WDP3-014 with OED3 can be operated without ventilation, if the minimum clearances (10 cm) are observed.

The positioning and sequence control unit WDP3-018 with OED3 can be operated without ventilation up to a phase current of 3.7 A and an ambient temperature of 50°C.

If these values are exceeded or if the status display "07" repeatedly indicates overtemperature, the unit must be ventilated externally (fig. 2-3).

Accessory fan The fan on the WDP3-018 unit with OED3 must be mounted at the bottom. The airstream must pass through the unit from bottom up (see fig. 2-2). The arrow on the fan indicates the direction of the airstream if the fan is connected correctly (red = 24 VDC, black = 24 VGND). Fasten the fan with four screws at the bottom of the unit after having cut out the grille (see chapter 6.2.1). Connect the fan to the external 24 VDC voltage supply.



NOTE

Ensure that the airstream in and around the unit is unobstructed.

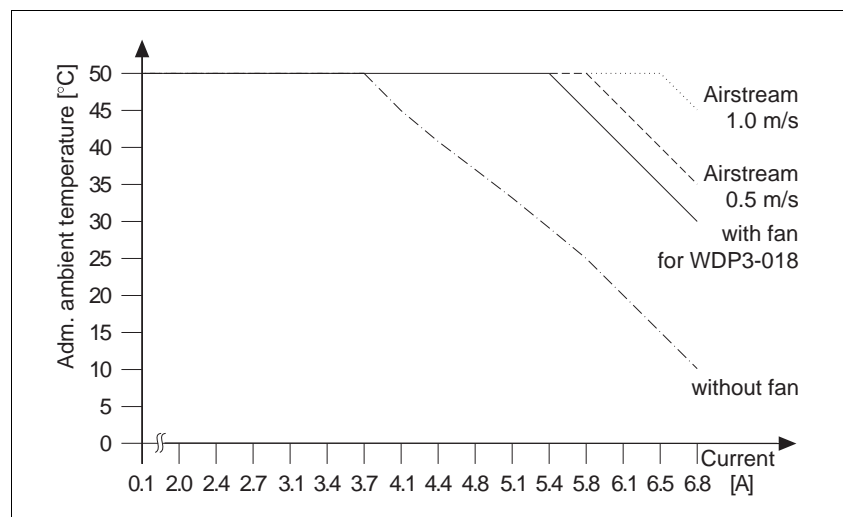


Fig. 2-3 Temperature – phase current – ventilation

2.4 Wiring



DANGER

The supply voltage must be disconnected whenever wiring work is carried out.



DANGER

The motor connection is internally linked to the supply connection (325 V).



ATTENTION

Wiring work may only be carried out in accordance with the DIN standard VDE 0105 by trained personnel.



ATTENTION

Run and shield power, motor and signal cables separately.



ATTENTION

Free, unassigned pins must not be wired.



ATTENTION

The unit must have external fuse protection (see chapter 1.3).



ATTENTION

Good heat dissipation must be ensured when installing a bleed resistor (accessory).



NOTE

See chapter 1.3 for the technical data of the individual connections and interfaces.



NOTE

The interfaces installed in the device are indicated on the type plate.



NOTE

The ground connections of the interfaces in adapter slots 21 and 22 are internally interconnected.



NOTE

Shield connection on both ends ensures optimum protection against interference for digital systems. However, it should be noted that differential potentials (in particular in case of supply from different sources) may cause inadmissible currents in the shields. Such interfering currents can be avoided by using suitable bonding conductors. The following cross-sections should be used for bonding lines:

16 mm² Cu for bonding lines up to 200 m

25 mm² Cu for bonding lines longer than 200 m

Wiring layout

Figure 2-4 illustrates the wiring layout of the positioning and sequence control unit with the available interfaces.

Communication between PC and positioning and sequence control unit is effected either through the RS 232 or the RS 485 interface, depending on the actual interface configuration.



NOTE

If the controller is provided with an RS 485 interface and the PC with an RS 232 interface, an interface converter (e.g. MP 923, see chapter 6.2.3) must be used.

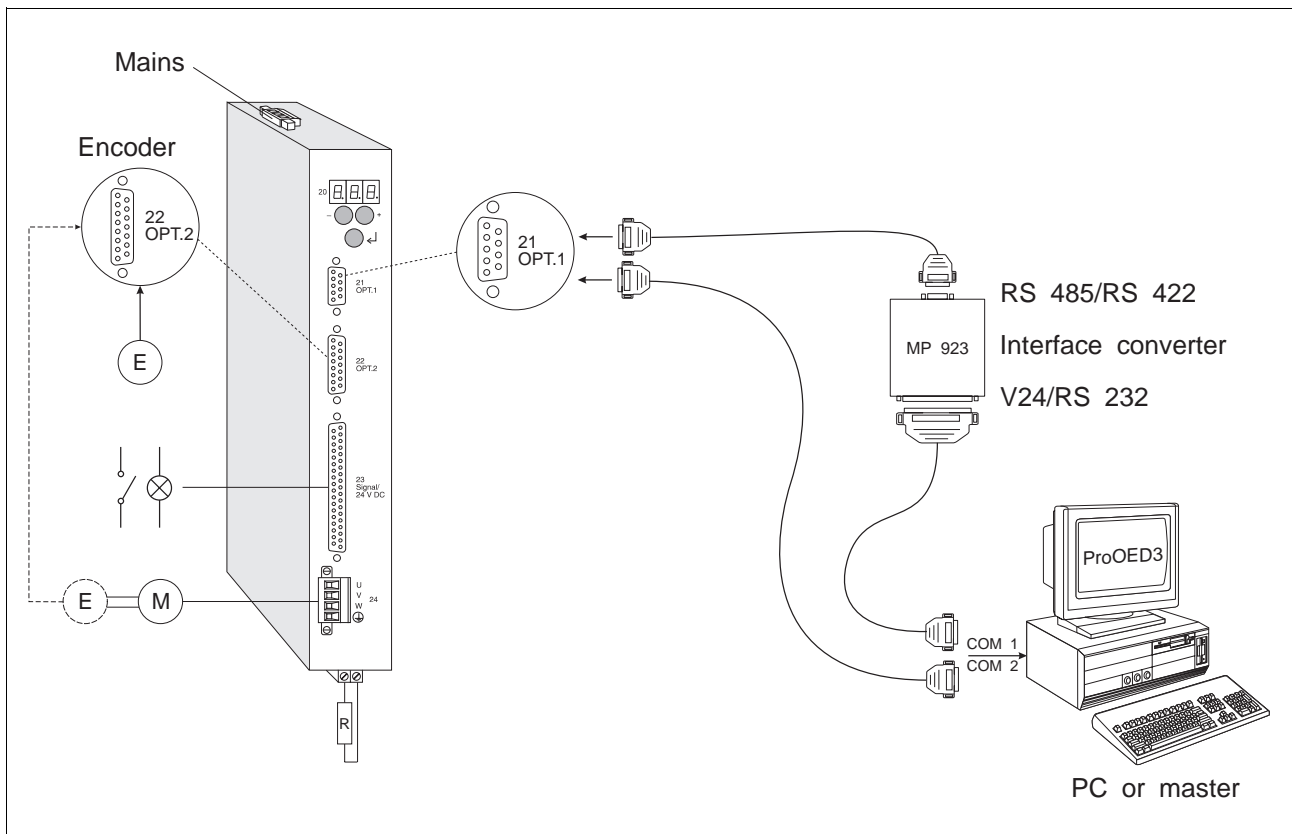


Fig. 2-4 Wiring diagram

2.4.1 Mains connection



1. Set the 115 V or 230 V mains voltage on the selector switch at the unit top.

ATTENTION

The setting must correspond to the actual mains voltage available.

2. Mount wire end ferrules on the device end of the mains power cable.
3. Fasten three litz wires (fig. 2-5) with screws:

L	Phase (115 VAC or 230 VAC)
N	Neutral
PE	Protective conductor



NOTE

A mains filter can be inserted in order to shield the unit against interference (see chapter 6.2.2).

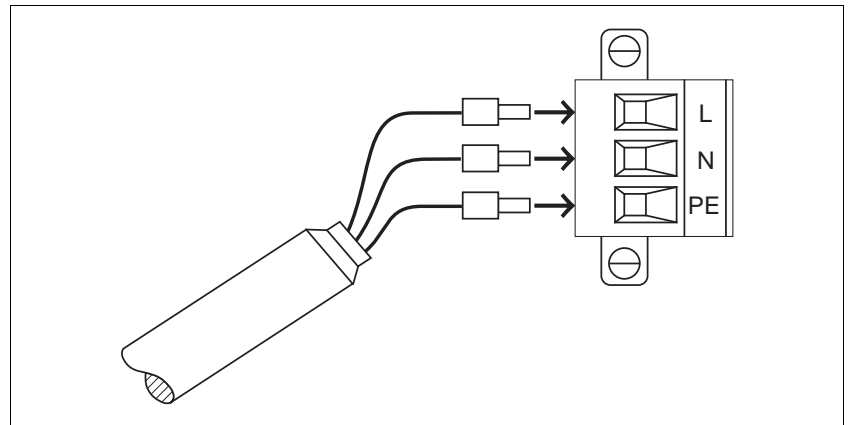


Fig. 2-5 Mains connection – device end

2.4.2 Motor connection

1. Release the two screws of the motor connector and remove the connector (fig. 2-6) from the unit.
2. Mount wire end ferrules on the device end of the motor cable.
3. Fasten the litz wires with screws.
4. Fasten the connector to the front panel (item 24) with screws.



ATTENTION

Connect the shield on both the motor end and the device end.



NOTE

An additional bleed resistor can be used for dissipating a higher amount of braking energy (see chapter 6.2.4).



NOTE

The sense of rotation of the motor can be changed by inverting the motor lines. If you do this, you also have to interchange the limit switch inputs LIMP and LIMN as well as the signals A and A̅ of any connected encoder for rotation monitoring.

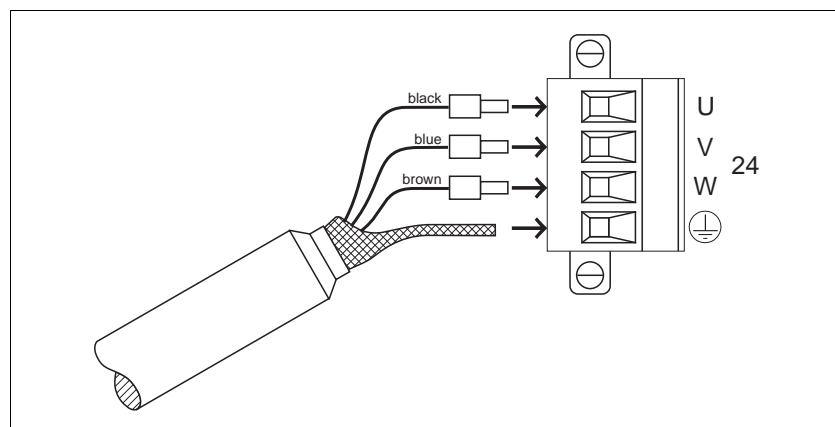


Fig. 2-6 Motor connection

2.4.3 Signal interface

The signal inputs I 16 to I 20 are pre-assigned ex works. The other signal inputs and outputs can be freely assigned.

1. Solder the litz wires to the connector according to the signal connection pin assignment table.



ATTENTION

Free, unassigned pins must not be wired.



NOTE

Connect system supply voltage ground to protective ground.

2. Push the shield back and fix with a cable tie.
3. Insert two bolts (fig. 2-7) into the connector shell.
4. Place the connector into the connector shell.
5. Fasten the cable and the shield to the connector shell by clamping it with the strain relief bracket.



ATTENTION

Ensure good electrical contact between the shield and the connector shell.

Connect the shield on both ends.

6. Assemble the two parts of the connector shell with two screws.
7. Fasten the connector to the front panel (item 23) with the bolts.



DANGER

All signal connections must be definitely isolated from mains. The voltage towards ground must not exceed 60 VDC or 25 VAC. All signal circuits are internally grounded via a 1 Mohm bleed resistor.

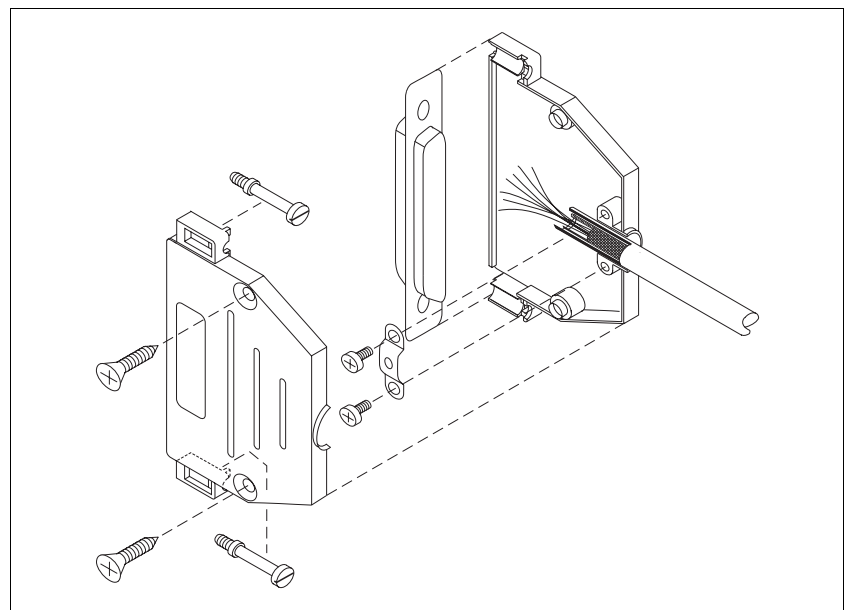


Fig. 2-7 Signal connector assembly – device end

Installation

2.4.3.1 Signal connection pin assignment

The following table shows the pin assignment of the signal connection.

Pin		Assignment
1*	I 13: $\overline{\text{LIMN}}$	Negative limit switch I/O supply voltage ←
2	–	–
3	–	–
4	I 11	←
5	I 10	←
6*	I 14: $\overline{\text{REF}}$	Reference switch ←
7	I 7	←
8	I 5	←
9	I 3	←
10	I 1	←
11	–	–
12	–	–
13	–	–
14	Q 3	→
15	Q 1	→
16*	24VDC	System supply voltage ←
17*	24VDC	System supply voltage ←
18*	IO24VDC	I/O supply voltage ←
19*	IO24VDC	I/O supply voltage ←
20*	I 12: $\overline{\text{LIMP}}$	Positive limit switch I/O supply voltage ←
21	–	–
22	–	–
23*	I 15: $\overline{\text{STOP}}$	Stop ←
24	–	–
25	I 8	←
26	I 6	←
27	I 4	←
28	I 2	←
29	I 0	←
30	–	–
31	–	–
32	–	–
33	Q 2	→
34	Q 0	→
35*	GND	System and I/O supply voltage ground ←
36*	GND	System and I/O supply voltage ground ←
37	–	–

* Minimum wiring requirement for starting up via front panel (e.g. manual movement mode).

$\overline{\text{Signal}}$ = active low I = Input Q = Output

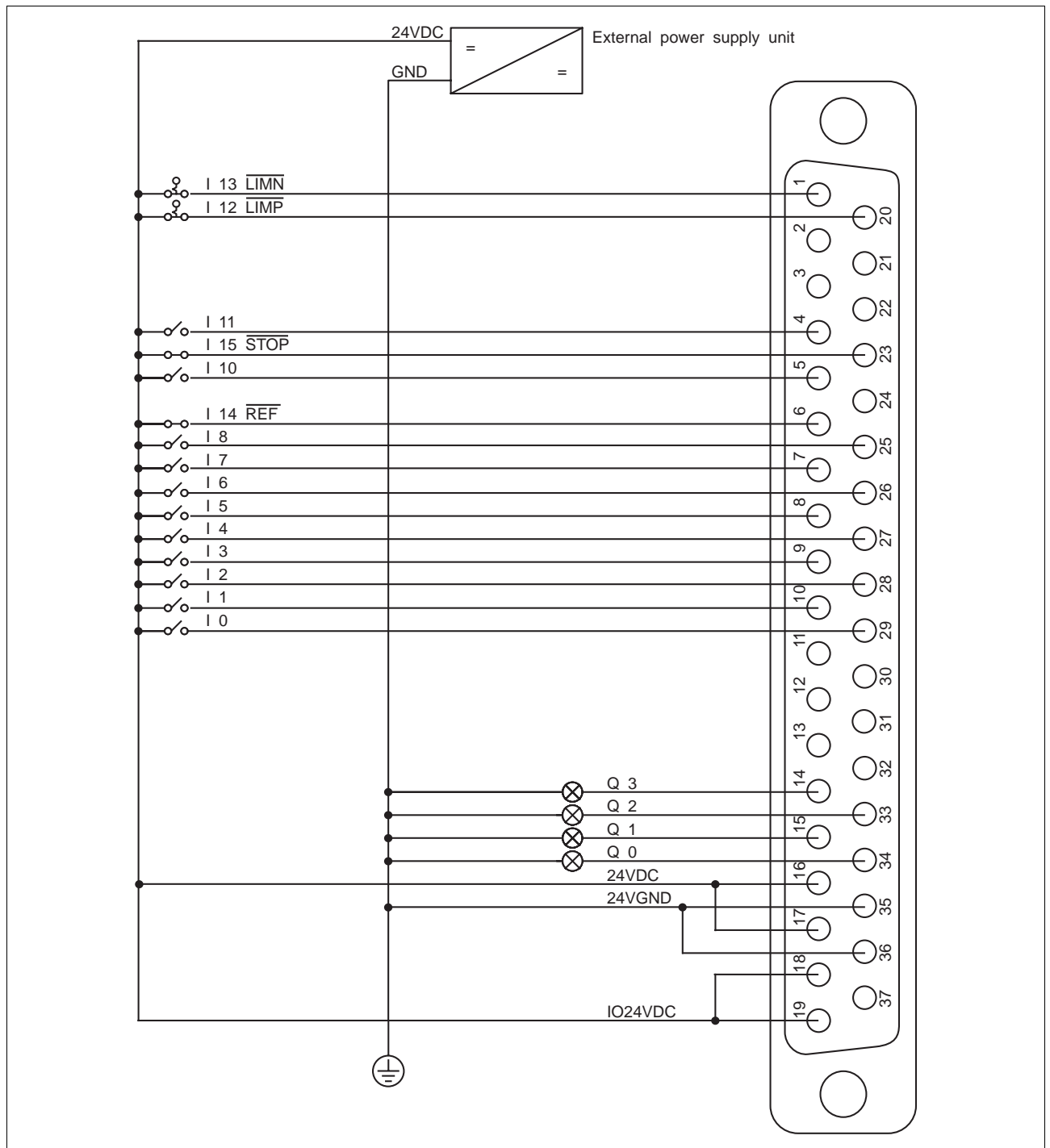
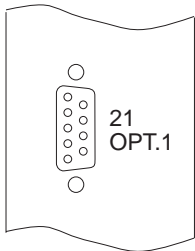


Fig. 2-8 Wiring example

2.4.4 RS 232 serial interface (OPT.1)



NOTE
The RS 232 serial interface is installed in adapter slot 21; see type plate.



1. Solder the litz wires to the connector in accordance with fig. 2-9 and fig. 2-10.

Pin	Signal	Description
1	–	–
2	RXD	Received data ←
3	TXD	Transmitted data →
4	–	–
5	GND	Ground
6	–	–
7	–	–
8	–	–
9	–	–

← Input → Output

2. Push the shield back and fix with a cable tie.
3. Insert two bolts (see fig. 2-11) into the connector shell.
4. Place the connector into the connector shell.
5. Fasten the cable and the shield to the connector shell by clamping it with the strain relief bracket.



ATTENTION
Ensure good electrical contact between the shield and the connector shell.
Connect the shield on both ends.

6. Assemble the two parts of the connector shell with two screws.
7. Fasten the connector to the front panel (item 21) with the bolts.



ATTENTION
For reasons of noise immunity, the RS 232 cable should be as short as possible (15 m max.)!



NOTE
The attachment screws of the connector shells must have M3 thread on the device end and UNC thread on the PC end.



NOTE
With an RS 232 interface, networking is not possible.

Fig. 2-9 Interface connection – device end

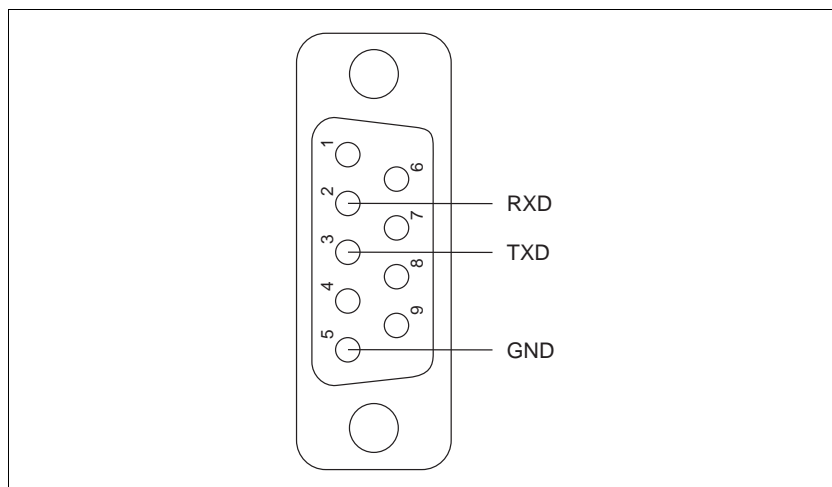


Fig. 2-10 Controller/PC wiring

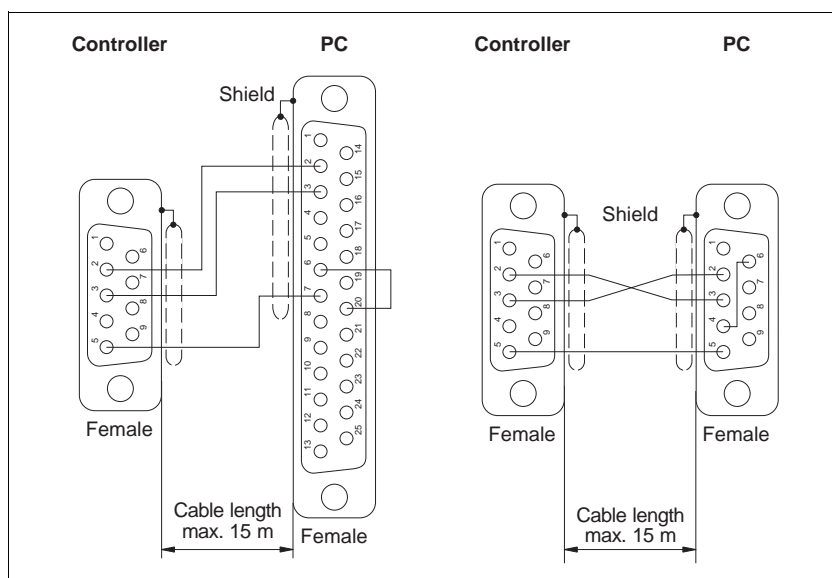
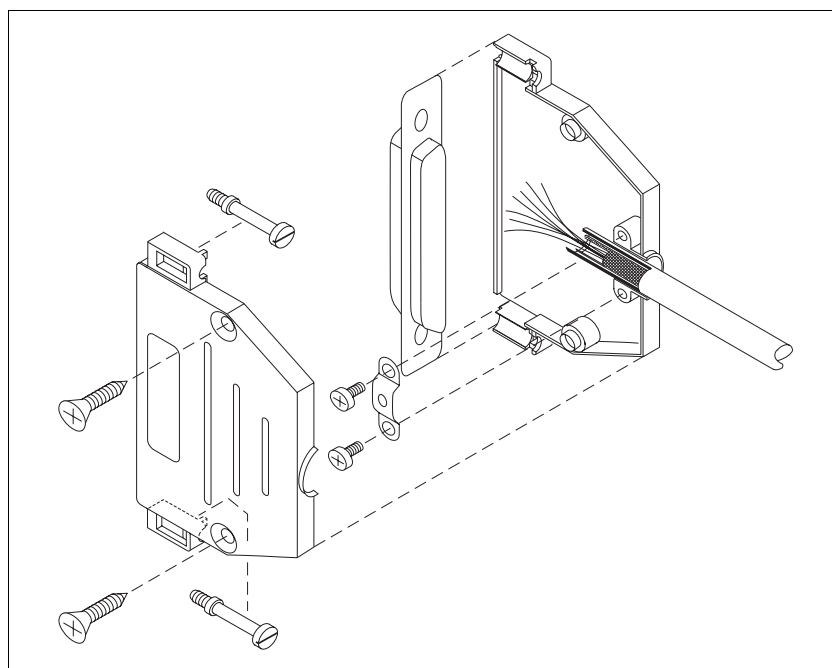
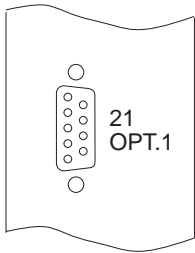


Fig. 2-11 Interface connector assembly – device end



2.4.5 RS 485 serial interface (OPT.1)



NOTE
The RS 485 serial interface is installed in adapter slot 21; see type plate.



NOTE
The serial interface is a four-wire interface.

1. Solder the litz wires to the connector as illustrated in fig. 2-12.

Pin	Signal	Description
1, 6	12VDC	MP 923 supply voltage →
2, 7	GND	MP 923 supply voltage ground →
3	$\overline{\text{TXD}}$	Inverted transmitted data →
4	$\overline{\text{RXD}}$	Inverted received data ←
5	SGND	Signal ground
8	TXD	Transmitted data →
9	RXD	Received data ←

← Input → Output

2. Push the shield back and fix with a cable tie.
3. Insert two bolts (see fig. 2-13) into the connector shell.
4. Place the connector into the connector shell.
5. Fasten the cable and the shield to the connector shell by clamping it with the strain relief bracket.



ATTENTION
Ensure good electrical contact between the shield and the connector shell.
Connect the shield on both ends.

6. Assemble the two parts of the connector shell with two screws.
7. Fasten the connector to the front panel (item 21) with the bolts.



NOTE
For a PC with RS 232 interface, the MP 923 interface converter can be used (see chapter 6.2.3).

Fig. 2-12 Interface connection – device end

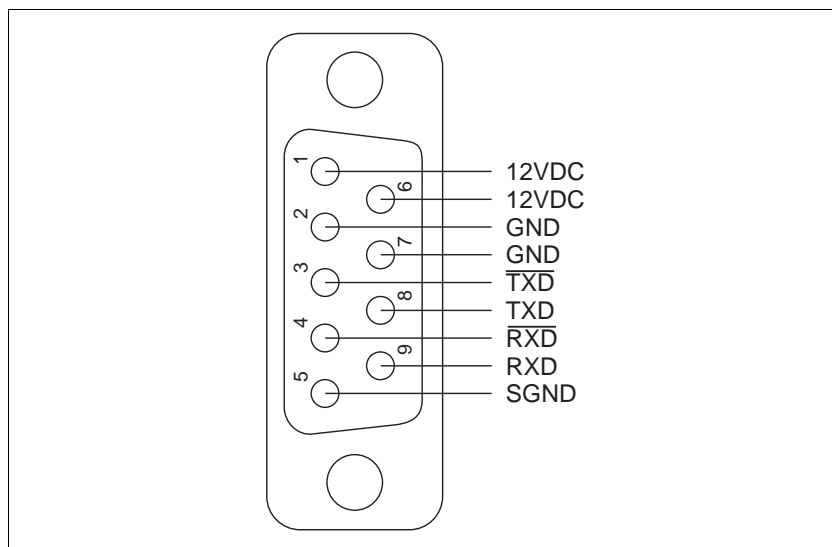
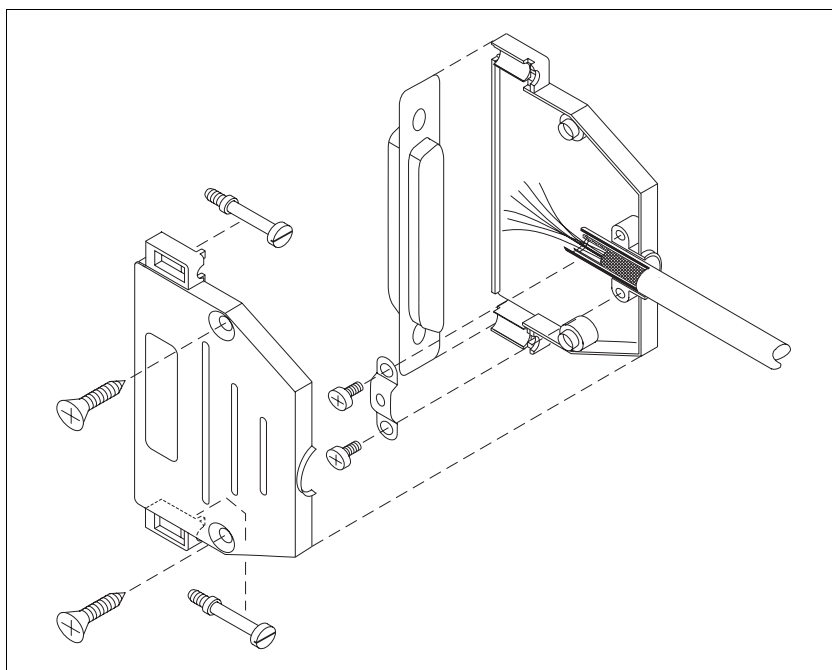
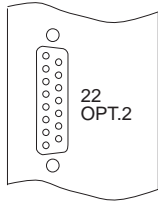


Fig. 2-13 Interface connector assembly – device end



2.4.6 Encoder interface (OPT.2)



NOTE

The encoder interface is installed in adapter slot 22; see type plate.

Wiring

1. Solder the litz wires to the connector as described below.
2. Push the shield back and fix with a cable tie.
3. Insert two bolts (fig. 2-14) into the connector shell.
4. Place the connector into the connector shell.
5. Fasten the cable and the shield to the connector shell by clamping it with the strain relief bracket.



ATTENTION

Ensure good electrical contact between the shield and the connector shell.

Connect the shield on both ends.

6. Assemble the two parts of the connector shell with two screws.
7. Fasten the connector to the front panel (item 22) with the bolts.
8. Twist the encoder cable wires in pairs.
9. Establish the connection on the motor end.



ATTENTION

When using 5 V encoders, –SENSE must be connected to 5VGND and +SENSE to 5VDC on the encoder end of the cable.



NOTE

The encoder signal type (pulse/direction or A/B signals) and the internal evaluation (single, double or quadruple) must be selected for an electronic gear (see chapter 6 in the ProOED3 documentation).

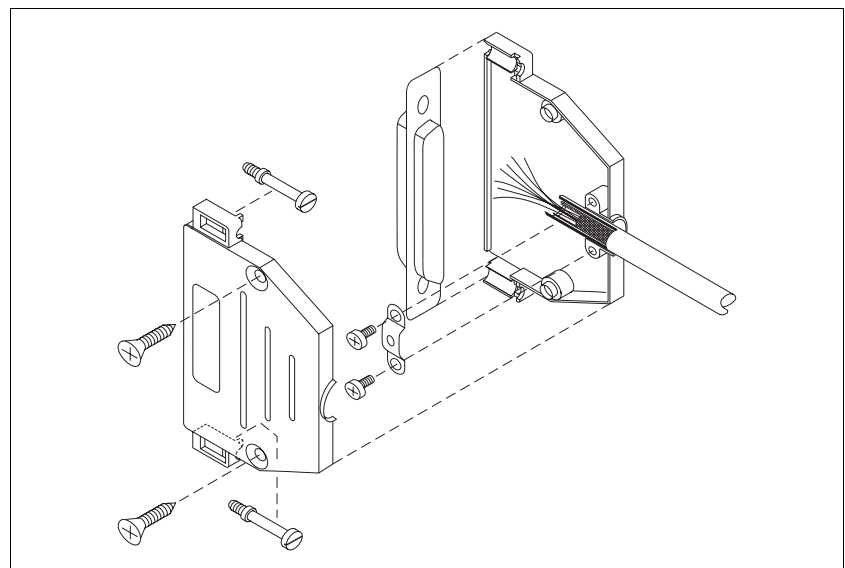
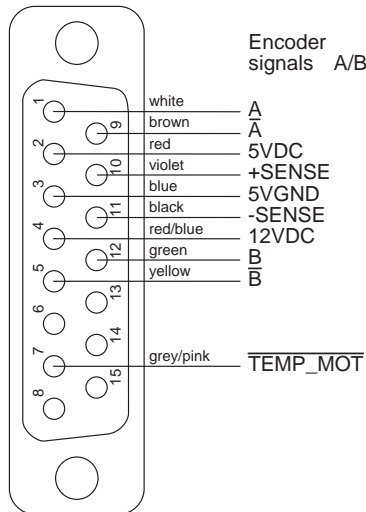


Fig. 2-14 Encoder connector assembly – device end

Encoder interface: Encoder signal type A/B



Pin	Signal	Description
1	A	Encoder signal A ←
2	5VDC	Sensor supply voltage →
3	5VGND	Sensor supply voltage ground →
4	12VDC	Sensor supply voltage →
5	\bar{B}	Encoder signal B ←
6	—	—
7	$\overline{\text{TEMP_MOT}}$	Line interruption ←
8	—	—
9	\bar{A}	Encoder signal A ←
10	+SENSE	Sense regulator 5VDC ←
11	-SENSE	Sense regulator 5VGND ←
12	B	Encoder signal B ←
13	—	—
14	—	—
15	—	—

$\overline{\text{Signal}}$ = active low ← Input → Output

The encoder can be supplied with 12 V or from a 5 V sense regulator.



ATTENTION

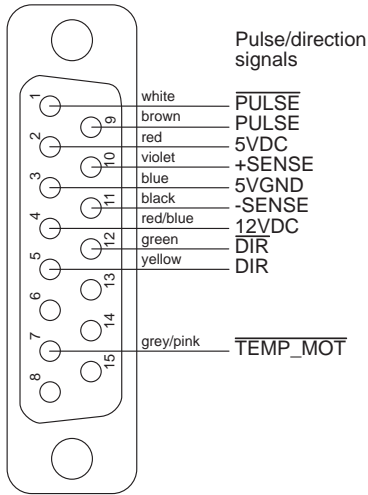
When using 5 V encoders, -SENSE must be connected to 5VGND and +SENSE to 5VDC on the encoder end of the cable.



ATTENTION

The $\overline{\text{TEMP_MOT}}$ input is used for detecting a line interruption. For this purpose, $\overline{\text{TEMP_MOT}}$ must be connected to 5VDC on the encoder.

Encoder interface: Pulse/direction signal type



Pin	Signal	Description
1	$\overline{\text{PULSE}}$	Pulse ←
2	5VDC	Sensor supply voltage →
3	5VGND	Sensor supply voltage ground →
4	12VDC	Sensor supply voltage →
5	DIR	Direction ←
6	—	—
7	$\overline{\text{TEMP_MOT}}$	Line interruption ←
8	—	—
9	PULSE	Pulse ←
10	+SENSE	Sense regulator 5VDC ←
11	-SENSE	Sense regulator 5VGND ←
12	$\overline{\text{DIR}}$	Direction ←
13	—	—
14	—	—
15	—	—

Signal = active low ← Input → Output

The encoder can be supplied with 12 V or from a 5 V sense regulator.



ATTENTION

When using 5 V encoders, -SENSE must be connected to 5VGND and +SENSE to 5VDC on the encoder end of the cable.



ATTENTION

The TEMP_MOT input is used for detecting a line interruption. For this purpose, TEMP_MOT must be connected to 5VDC on the encoder.

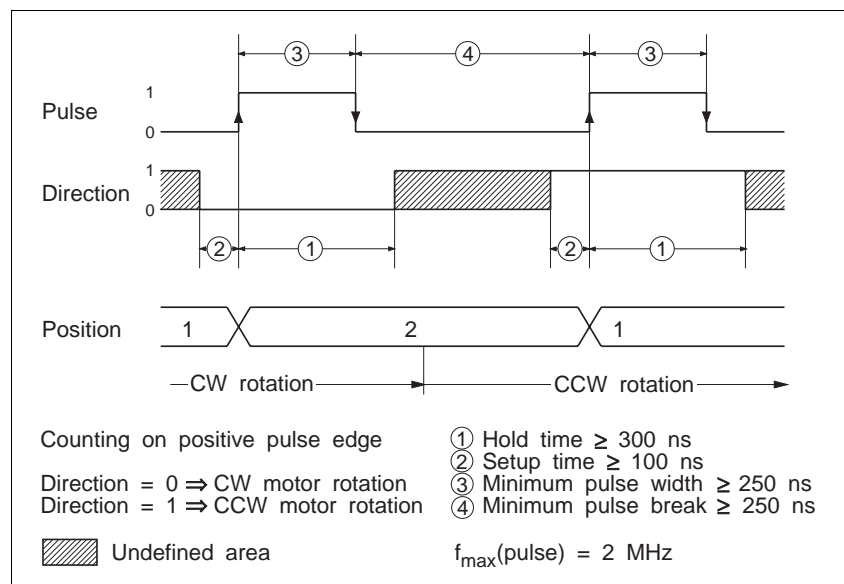


Fig. 2-15 Pulse/direction timing diagram

2.5 Setup

2.5.1 Defaults

After switching on, and after program start, the unit is set to the following default parameters:

Parameter	Default
Axis operating mode	Point-to-point
Motor position	0
Number of steps	1000 steps per revolution
Maximum system speed	32768 Hz
Set speed	1000 Hz
Start/stop speed	100 Hz
Safety distance for reference movement	0 steps
Acceleration	125 Hz/ms (linear ramp)
Signal evaluation	Positive and negative limit switch, stop
Normalizing factors for position	Numerator 1000; Denominator 1000
Gear ratio for electronic gear	Numerator 0; Denominator 1; Gear ratio 0
Motor current (can be set via front panel)	WDP3-014 = 0.5 A WDP3-018 = 1.0 A as a percentage of front panel setting when stopped 50% when accelerating/decelerating 100% at constant speed 80%
Rotation monitoring	inactive



NOTE

For other control parameters, see ProOED3 documentation.



NOTE

Before starting up the unit for the first time, check that the connected motor is suitable for the respective device variant (see chapter 6.1) and that the controller has been wired correctly (see chapter 2.4). For starting up via the front panel, the minimum wiring requirements for the signal interface must be observed (see chapter 2.4.3.1).



ATTENTION

The mains power supply and the 24 V supply voltage of the unit must be switched off.











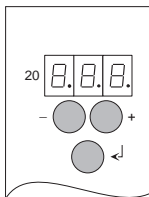
1. Set the mains voltage to 115 V or 230 V, as appropriate, with the selector switch on the unit top.



ATTENTION

The setting must correspond to the actual mains voltage available.

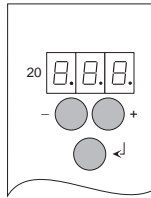
2. Check that all connectors are properly connected.
3. Switch on the power supply for the power controller.
4. Switch on the 24 V supply voltage for the processor unit. (Mains voltage and 24 V supply voltage may also be switched on simultaneously.)
5. Press the  key until "01" is displayed. The controller is now in STOP status.
6. Set the motor phase current in accordance with the motor type plate:
 - Press the  key until "01" starts flashing in the display.
 - Press and hold the  key and press the  key several times until "11" is displayed.
 - Release the  key. The latest selection appears flashing in the seven-segment display:
Display = Motor phase current (in A)
 - Use the  and  keys to set the motor phase current according to the motor type plate.
 - Confirm and input the set value by pressing the  key.



ATTENTION

The set phase current must be equal to or less than the nominal phase current specified on the motor type plate (the lower the set phase current, the lower the motor torque).

2.5.2 Motor test



A manual movement should be executed in order to check the motor wiring and the current settings:

- Press the key until “01” starts flashing in the display.
- Press and hold the key and press the key several times until “91” is displayed.
- Release the key. An “M” starts flashing in the seven-segment display.
- Move the motor in single step or continuous running mode by pressing and as appropriate:
 - key Clockwise rotation
 - key Counterclockwise rotation
(as seen from front towards the motor shaft)
- Exit manual mode by pressing the key.

Single step:

If you press the key only briefly, the motor performs a single step.

Continuous operation:

If you keep the key pressed, the motor starts at a speed of 100 Hz. As long as you keep the key pressed, the speed increases up to 4 kHz in 5 speed steps.



NOTE

The sense of rotation of the motor can be changed by inverting the motor lines. If you do this, you also have to interchange the limit switch inputs LIMP and LIMN as well as the signals A and A of any connected encoder for rotation monitoring.

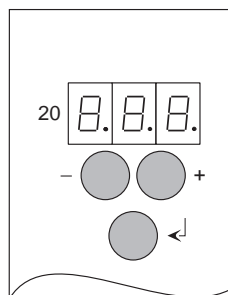


NOTE

Further tests, e.g. I/O test, are available in the ProOED3 programming software; see ProOED3 documentation.

3 Operation

3.1 Controller operating modes



Processor unit status displays	Operating mode	Description	Reference
	Controller STOP	Program execution stopped	See chapter 3.3
	Editing mode	Programming with ProOED3 software	See ProOED3 documentation
	Set motor current	Setting the motor phase current according to motor type plate	See chapter 3.5
 	Manual mode	Moving the motor manually via front panel keys during drive setup and testing	See chapter 3.6
	Automatic mode	Automatic program execution	See chapter 3.7

The following figure shows the major mode transitions:

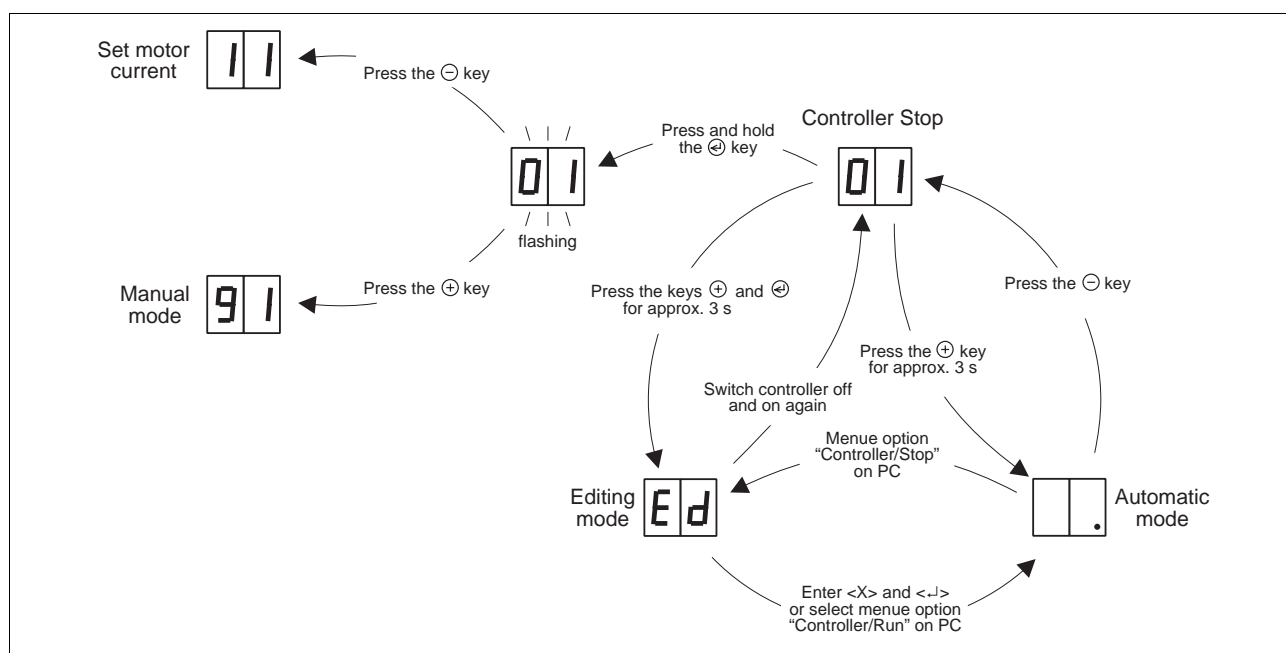


Fig. 3-1 Mode transitions

3.2 Switching ON

**ATTENTION**

The mains voltage set on the selector switch must correspond to the required supply voltage (see type plate).

**DANGER**

Persons or electrically conductive objects must never touch live parts of the device or equipment.

**DANGER**

The movement range of the equipment must be kept clear of persons and objects.

**ATTENTION**

The unit must be grounded with a protective conductor.

**ATTENTION**

The basic settings of the unit must conform to the actual requirements; see chapter 2.5.

The following requirements must be fulfilled before switching on the unit:

Requirement	Reference
Ambient conditions in line with the technical data?	See chapter 1.3
Sufficient space for ventilation available?	See chapter 1.3
Wiring of the unit (in particular signal inputs for limit switches, reference switch and stop) carried out properly?	See chapter 2.4
Mains voltage set correctly on the selector switch?	See chapter 2.5
Motor phase current set correctly?	See chapter 2.5

1. Switch on the power supply for the power controller.

**ATTENTION**

If a program was loaded into the controller's EEPROM with the ProOED3 programming software, the program starts automatically after power-on.

You can prevent this by pressing the  key while switching on.

2. Switch on the supply voltage for the processor unit (24 VDC).
After power-on, the controller performs a self-test with the hardware and software components. Fig. 3-2 shows the power-on sequence of the controller.

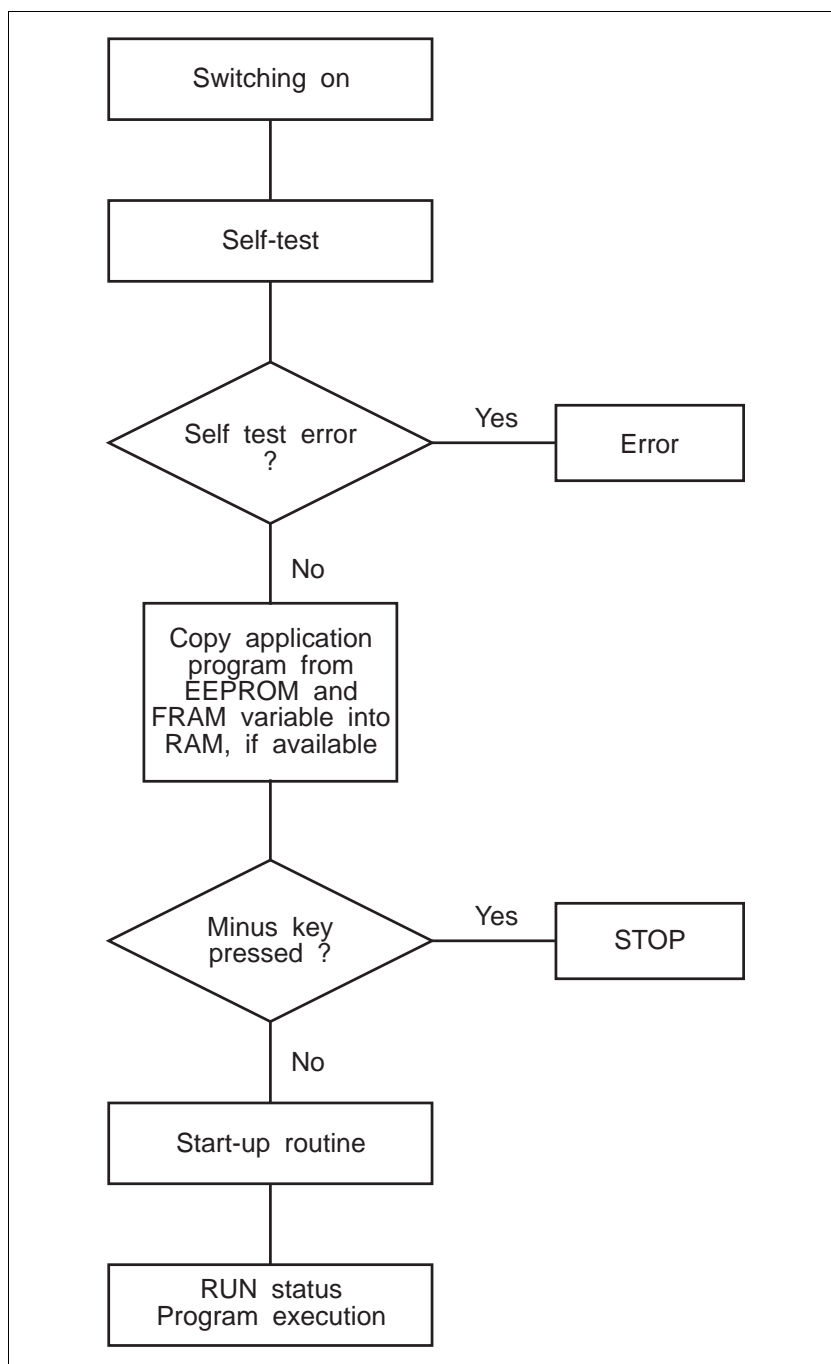
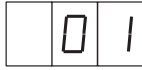


Fig. 3-2 Power-on sequence

3.3 Controller STOP



The application program is stopped. To change to this status, press the \ominus key until "01" is displayed.

From this status, you can call various functions:

- Editing mode for programming the controller with the ProOED3 programming software.
- Setting the motor phase current.
- Manual movement of the motor with the \oplus and \ominus keys on the front panel.

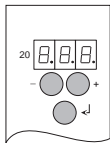
When you set the controller to automatic mode by pressing the \oplus key, the program always starts at the beginning.

3.4 Editing mode



This operating mode is used for programming and operation with ProOED3.

Activate editing mode as follows:



1. Press the \ominus key until "01" is displayed. The controller is now in STOP status.
2. Press and hold the \leftarrow key and press the \oplus key several times until "Ed" is displayed.

You can now program the controller with a PC and the ProOED3 software.



NOTE

For more information, refer to the ProOED3 documentation.

3.5 Setting the motor phase current

Since it is possible to connect various motor types to the controller, the maximum phase current must be adjusted to the motor actually connected.



1. Press the \ominus key until "01" is displayed. The controller is now in STOP status.
2. Press the \leftarrow key until "01" starts flashing in the display.
3. Press and hold the \leftarrow key and press the \oplus key several times until "11" is displayed.
4. Release the \leftarrow key. The latest selection appears flashing in the seven-segment display: Display = Motor phase current (in A).
5. Use the \oplus and \ominus keys to set the motor phase current according to the motor type plate. Confirm and input the set value by pressing the \leftarrow key.



ATTENTION

The set phase current must be equal to or less than the nominal phase current specified on the motor type plate (the lower the set phase current, the lower the motor torque).

3.6 Manual mode via front panel



Before calling manual mode, you must set the correct motor phase current first; see chapter 3.5.

In manual mode, you can move the stepping motor manually using the controller front panel keys. You can do this either in single steps or in continuous running mode.

Proceed as follows:

1. Press the \ominus key until "01" is displayed. The controller is now in STOP status.
2. Press and hold the \leftarrow key and press the \oplus key several times until "91" is displayed.
3. Release the \leftarrow key. An "M" starts flashing in the seven-segment display.
4. Move the motor in single step or continuous running mode by pressing \oplus and \ominus as appropriate:
 \oplus key Clockwise rotation
 \ominus key Counterclockwise rotation
 (as seen from front towards motor shaft)



Single step:

If you press the key only briefly, the motor performs a single step.

Continuous operation:

If you keep the key pressed, the motor starts at a speed of 100 Hz. As long as you keep the key pressed, the speed increases up to 4 kHz in 5 speed steps.

5. Exit manual mode by pressing the \leftarrow key.



NOTE

The sense of rotation of the motor can be changed by inverting the motor lines. If you do this, you also have to interchange the limit switch inputs \overline{LIMP} and \overline{LIMN} as well as the signals A and \overline{A} of any connected encoder for rotation monitoring.



NOTE

In manual mode, all limit switches are monitored.

3.7 Automatic mode



Before calling automatic mode, you must set the correct motor phase current first; see chapter 3.5.

In this mode, an application program developed with the ProOED3 programming software can be executed.

Program start

As a prerequisite, an application program must have been loaded into the controller and written to the controller's EEPROM with the ProOED3 programming software.

Automatic mode is automatically activated after controller power-on.

In controller STOP status, the \oplus key must be pressed for approx. 3 sec. to activate automatic mode.



NOTE

An application program can also be started, stopped or tested ("debugged") from the programming device ("on-line").



- The program is always executed from program start.
→ A dot is displayed in the status displays.



NOTE

For more information, see ProOED3 documentation.

3.8 Programming

Programming of the unit is effected in editing mode (see chapter 3.4) using the ProOED3 programming software and a PC.

Documentation note

Programming an application program with ProOED3 is described in the ProOED3 documentation.

3.9 Switching OFF

Switch off the supply voltages for the power controller and the processor unit.

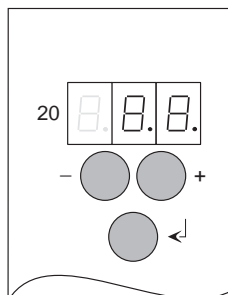


ATTENTION

The connected motor is deenergized after disconnecting the power controller supply voltage, i.e. it does not have any holding torque. Before disconnecting the supply voltage, ensure that any vertical loads are prevented from falling down (e.g. use motor with brake).

4 Malfunctions

4.1 Status indicators



Processor unit status displays

The two seven-segment displays on the right (item 20) indicate operating states, malfunctions on the processor unit and power controller (see chapter 4.2 for a troubleshooting table).


The displays show the following operating modes:

Processor unit status displays	Operating mode	Description
	Controller STOP	Program execution stopped; see chapter 3.3
	Editing mode	Programming with the ProOED3 software; see chapter 3.4
	Set motor current	Setting the motor phase current according to the motor type plate; see chapter 3.5
	Manual mode	Moving the motor manually using the front panel keys during drive setup and testing; see chapter 3.6
	Automatic mode	Automatic program execution; see chapter 3.7

4.2 Troubleshooting tables

The following table lists the possible malfunctions indicated with an error code in the status display (item 20), their possible causes and methods for rectification.

If several errors occur, the corresponding error codes are stored in the controller.

The error codes can be displayed one after the other by pressing the  key.

Display	Cause	Rectification
A ...	Self-test error	Call SIG POS/TEC, Technical Services department, phone: (07821) 946-257.
03	Motor lead short-circuit	Check the motor wiring.
04	Power controller not ready	Switch on the supply voltage.
	Line interruption	Disconnect the unit and check the cable.
05	Overvoltage on power controller	Connect a bleed resistor; see chapter 6.2.4.
07	Power controller overtemperature	Let the power controller cool down while the motor is at a standstill.
		Install a fan set; see chapter 6.2.1.
08	Error on encoder for electronic gear; line broken	Check encoder wiring; see chapter 2.4.6.
09	Motor overtemperature	Reduce the phase current; see chapter 3.5.
		Reduce the load.
11	Power controller undervoltage (<200 V)	Check the voltage supply.
12	Rotation monitoring active, contouring error	Check mechanical components for ease of movement.
14	Power controller without voltage supply	Check voltage supply. Switch on the voltage supply for the power controller first before switching on the voltage supply for the processor unit.
	Internal power controller defective	If switching on is not possible, call SIG POS/TEC, Technical Services department, phone: (07821) 946-257.
16	Short-circuit on an output q	Check signal connector wiring; see chapter 2.4.3.
20	Incorrect limit switch LIMP or limit switch malfunction	Check wiring and function of the limit switch or the sense of rotation of the motor; see chapter 2.4.3.1. LIMP must be approached with CW rotation of the motor.
21	Incorrect limit switch LIMN or limit switch malfunction	Check wiring and function of the limit switch or the sense of rotation of the motor; see controller manual. LIMN must be approached with CCW rotation of the motor.
22	CW limit switch LIMP actuated	Move out of the limit switch range in manual mode; see chapter 3.6.
23	CCW limit switch LIMN actuated	Move out of the limit switch range in manual mode; see chapter 3.6.

Display	Cause	Rectification
26	Reference switch defective or disconnected	Check the reference switch.
30	STOP input active	Deactivate the STOP input.
40 41 42	Internal errors: 40 = Error during initialization 41 = Error in SEQUENCE component 42 = Error in PLC component	Controller errors, call SIG POS/TEC, Technical Services department, phone: (07821) 946-257.
48	OED3 operating system not found on controller	Call SIG POS/TEC, Technical Services department, phone: (07821) 946-257.
56	No EEPROM available	Call SIG POS/TEC, Technical Services department, phone (07821) 946-257.
57	EEPROM write error	Call SIG POS/TEC, Technical Services department, phone (07821) 946-257.
98	Error handling by application program	Eliminate the error by application program; see ProOED3 documentation. Change the control parameter "Error handling by user" in ProOED3; see ProOED3 documentation.
99	Error display by ProOED3 error menu	Display error with ProOED3 error menu and eliminate it; see ProOED3 documentation.



DANGER

The mains supply voltage must be disconnected for any check on the mains, motor, or bleed resistor wiring.



NOTE

If error handling is not effected by the application program, errors can be acknowledged via the front panel keys.

Malfunctions

Other malfunctions

The following table lists possible malfunctions which are not displayed.

Malfunction	Cause	Rectification
Motor does not move even with current available	Motor is mechanically blocked	Release motor brake, if available.
No motor torque	One or more motor leads interrupted	Check motor wiring; see chapter 2.4.2.
Motor does not move		
Motor does not follow control	Motor leads interchanged or one or more motor leads interrupted	Use the appropriate motor type; see chapter 6.1.
	Motor and positioning and sequence control unit do not match	



DANGER

The mains supply voltage must be disconnected for any check on the mains, motor, or bleed resistor wiring.

4.3 Repair work



ATTENTION

Any necessary repair work must not be carried out except by SIG BERGER LAHR!

Mark all connections whenever disassembling the unit.

The set parameters and the mounting location number of the old unit must be transferred to the new one when replacing a unit.

4.4 Storage, shipment

The following requirements apply when storing units or PC boards:

- The maximum air humidity must not be exceeded (see chapter 1.3).
- The storage temperature specification must be observed (see chapter 1.3).
- Stored parts must be protected from dust and dirt.
- Units or PC boards marked with the symbol



may only be unpacked, stored and installed in an electrostatically protected environment.

- The original packing material should be kept for later use.

The following requirements apply when shipping units or PC boards:

- Units or PC boards must be shipped in their original packing material.
- PC boards without batteries or accumulators must be packed in wrapping which is electrically conductive on both sides (use original wrapping, if possible).
- PC boards with batteries or accumulators must be packed in wrapping which is electrically conductive on the outside and antistatic on the inside (use original wrapping, if possible).
- Units or PC boards marked with the symbol



may only be packed in an electrostatically protected environment.

5 Customer service

The Technical Services department of SIG POS/TEC offer the following services under the phone numbers given:

- **Spare part information** by direct line
Phone (07821) 946-606
Express spare part shipment from Lahr;
reaches most destinations in Europe within 24 hours.
- **Technical advice in case of failures** by direct line
Phone (07821) 946-257
- **Fax hot-line** via
Fax (07821) 946-202

Of course, the Technical Services department also offer the following services:

- **On-site maintenance** and
- **direct communication with your service specialist.**

6 Appendix

6.1 Device variants

The following device variants are available, depending on the 3-phase stepping motors with a motor voltage of 325 V which can be used and depending on the interface configuration:

Unit	For use with motor type
WDP3-014 with OED3	Type size 90 VRDM 39xx/50 LW.
WDP3-018 with OED3	Type size 110 VRDM 311xx/50 LW.

Interface (adapter slot 21 OPT.1)	Encoder interface (adapter slot 22 OPT.2)	
RS 232	Not installed	LRS 422 IN
RS 485 LS	Not installed	LRS 422 IN



NOTE

The interfaces installed in the device are indicated on the type plate. The following abbreviations are used:

RS 232	Serial interface RS 232
RS 485 LS	Serial interface RS 485
LRS 422 IN	Encoder interface RS 422

6.2 Description of accessories

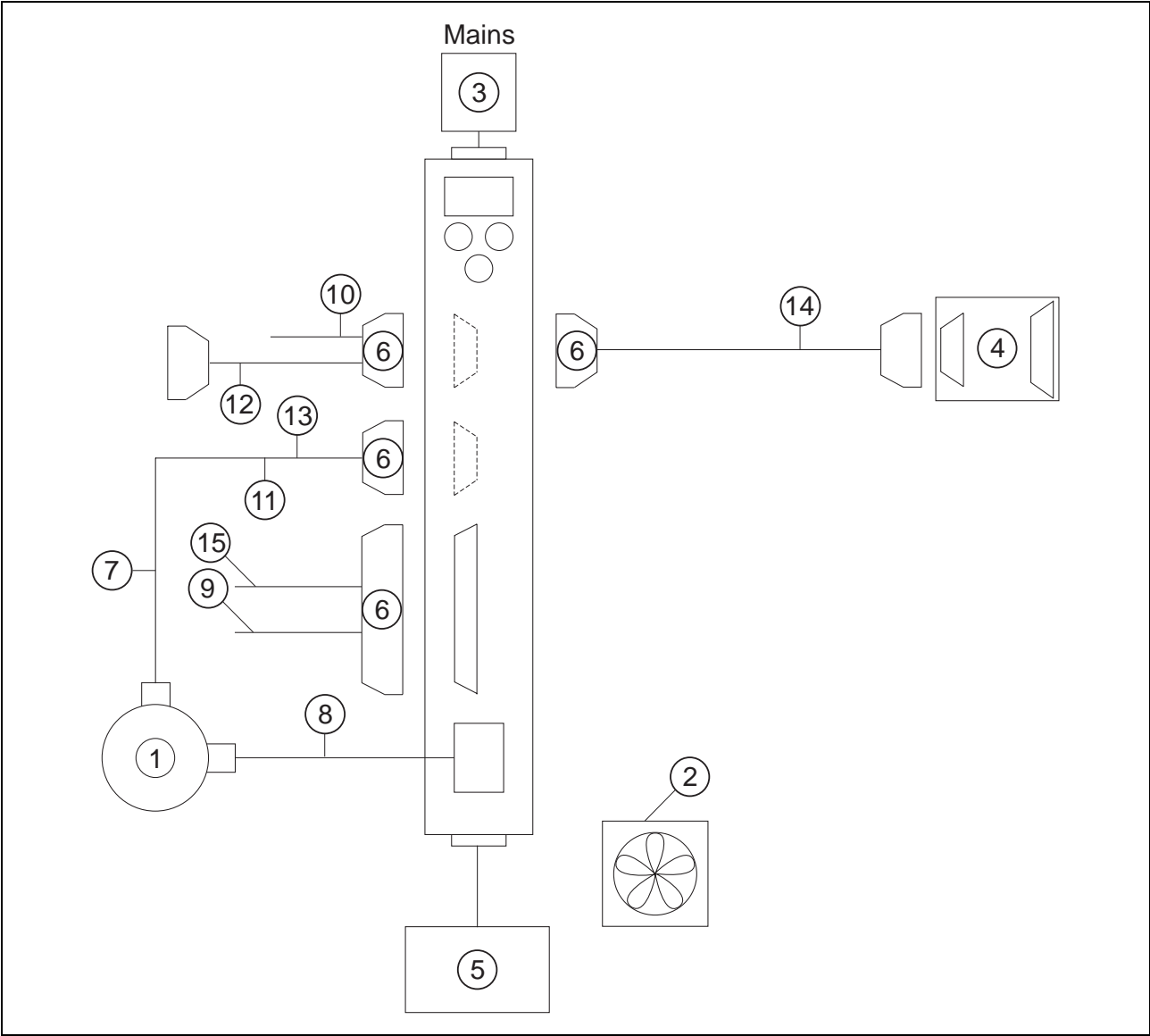


Fig. 6-1 Accessories

The following accessories may be ordered separately (see fig. 6-1):

Item no.	Designation	Reference
1	3-phase stepping motor with or without encoder	See chapter 6.1 and 3-phase stepping motor drives catalogue
2	Fan for WDP3-014	See chapter 6.2.1.
3	Mains filter	See chapter 6.2.2.
4	MP 923 interface converter RS 232/RS 485	See chapter 6.2.3.
5	Additional bleed resistor	See chapter 6.2.4.
6	Set of connectors (all sub-D connectors)	See sales documentation
	Non-terminated cables	
7	Cable for encoder	
8	Motor cable 3 x 1.5 mm and 2 x 1.0 mm Motor cable 3 x 2.5 mm and 2 x 1.5 mm	
9	Signal cable for signal connection	
10	Signal cable for serial interface	
11	Motor encoder cable	
	Ready-made cables	
12	RS 232/PC signal cable, terminated on both ends	
13	RS 422 IN/customer signal cable, terminated on device end	
14	RS 485 LS/MP 923 signal cable, terminated on both ends	
15	Signal connection/customer signal cable, terminated on device end	

Non-terminated cables are available in the following lengths:

5 m 10 m 15 m 20 m 25 m 30 m 50 m 75 m 100 m 200 m

Ready-made cables are available in the following lengths:

1.5 m 2 m 3 m 5 m



NOTE

Refer to the sales documentation for the positioning and sequence control unit WDP3-01X with OED3 for the accessory order numbers.

6.2.1 Fan

The unit can be provided with a fan in order to improve heat dissipation (see chapter 2.3).

The fan (fig. 6-2) must be mounted at the bottom of the unit. The airstream must pass through the unit from bottom up (see fig. 2-2). The arrow on the fan indicates the direction of the airstream if the fan is connected correctly (red = 24 VDC, black = 24 VGND).

1. Cut out the grille on the unit.
2. Fasten the fan to the bottom of the unit with four screws.
3. Connect the fan to the external 24 VDC voltage supply.



NOTE

Ensure that the airstream in and around the unit is unobstructed.

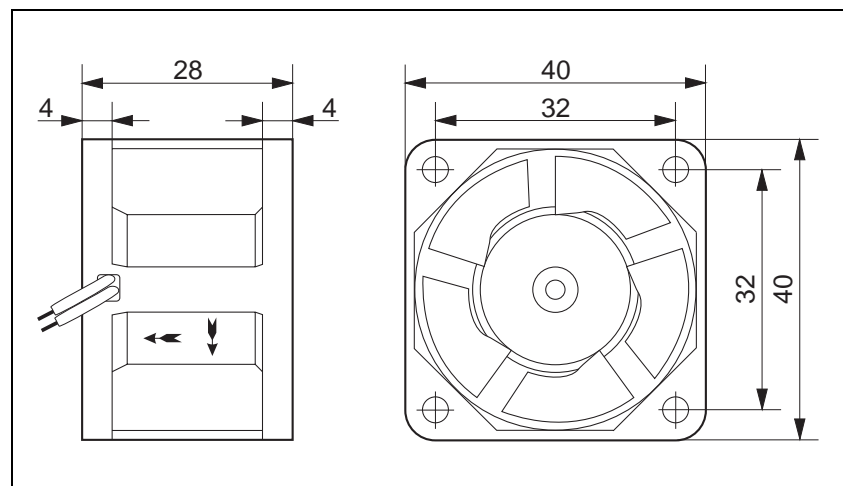


Fig. 6-2 Fan

6.2.2 Mains filter

A mains filter (fig. 6-3) can be inserted into the mains supply line for radio interference suppression.



NOTE

When connecting the mains filter, the EMC testing specifications of SIG BERGER LAHR must be observed.

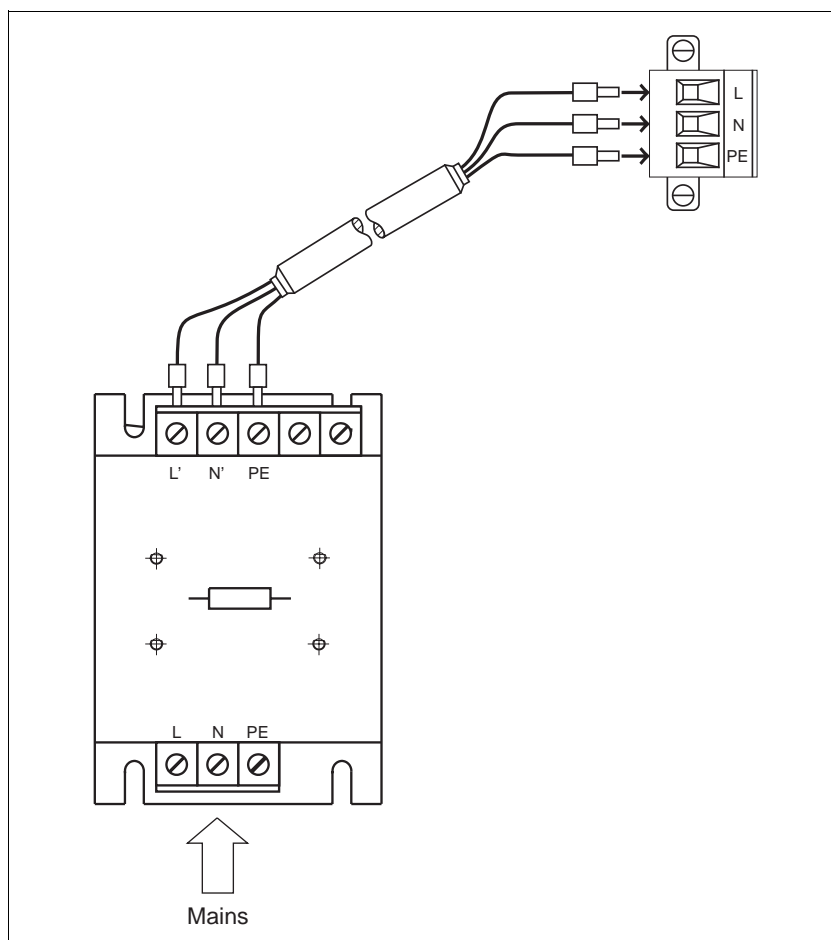


Fig. 6-3 Mains filter

Ambient conditions

Storage temperature	-25°C to +70°C
Operating temperature	0°C to +55°C
Humidity class	F acc. to DIN 40040
Humidity class, tested to IEC 68 part 2-3 at:	
Air temperature	+40°C, +2°C
Relative humidity	93%, +2%, -3%
non-condensing	

6.2.3 MP 923 interface converter

6.2.3.1 General description

The MP 923 interface converter is used for data transmission from an RS 485 LS (RS 422) interface to a V24 (RS 232) interface and vice versa.

The interface converter must be powered either via the power supply unit connection (2-pin female diode connector) or via the RS 485 (RS 422) connector with 12 VDC. With SIG BERGER LAHR positioning units (e.g. WDP3), power is supplied via the RS 485 (RS 422) connection.

6.2.3.2 Technical data

Electrical data

Voltage supply	9.6 to 15 VDC/150 mA
Interfaces	RS 485 LS (RS 422) V24 (RS 232)

Mechanical data

Dimensions	97 x 65 x 30 mm
Weight	approx. 130 g

Ambient conditions

Storage temperature	-25°C to +70°C
Operating temperature	0°C to +55°C
Humidity class	F acc. to DIN 40040
Humidity class, tested to IEC 68 part 2-3 at:	
Air temperature	+40°C, +2°C
Relative humidity	93%, +2%, -3%
non-condensing	

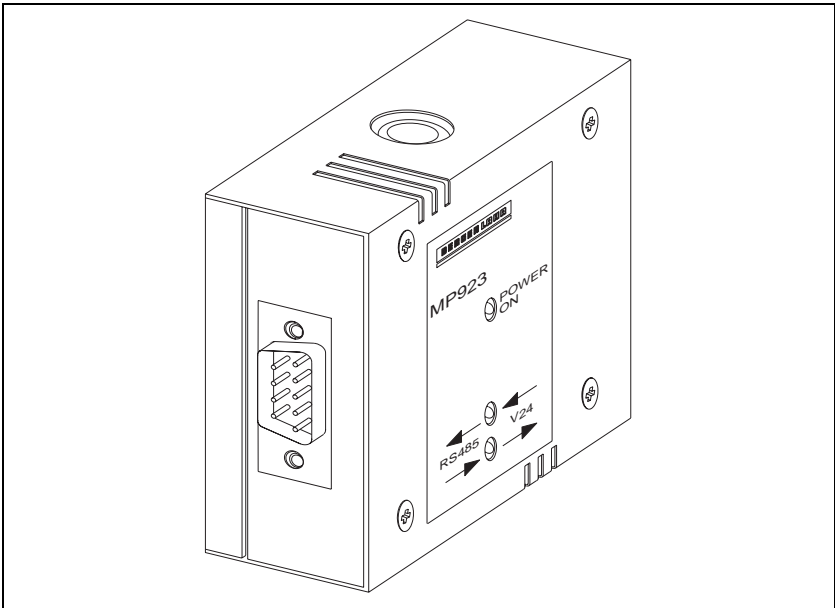


Fig. 6-4 MP 923 interface converter

6.2.3.3 Setup

1. Wire the MP 923 interface converter in accordance with fig. 6-5.



NOTE

The MP 923 is supplied with 12 VDC power via the RS 485 (RS 422) connector of the SIG BERGER LAHR controller.



ATTENTION

The interface cables must be shielded on both ends via the connector shells!



ATTENTION

For reasons of noise immunity, the V24 (RS 232) cable should be as short as possible (15 m max.)!

2. Switch on the mains voltage.
→ The LED "POWER ON" lights up. The two other LEDs remain dark.
3. Start data transmission.
→ Depending on the sense of the data transmission, either the LED marked "RS 485 → V24" or the LED marked "RS 485 ← V24" lights up.

6.2.3.4 Status indicators

The status indicators show the operating status or any malfunction.

LED	Lit	Not lit	Flashing
"POWER ON"	Supply voltage available	Supply voltage not available	
"RS 485 → V24"	RS 485 (RS 422) interface incorrectly wired (signal lines Tx \overline{D} and Rx \overline{D} interchanged)	No data transmission from RS 485 (RS 422) to V24 (RS 232)	Data transmission from RS 485 (RS 422) to V24 (RS 232) enabled
"RS 485 ← V24"	V24 (RS 232) interface incorrectly wired (pins 2 and 3 interchanged)	No data transmission from V24 (RS 232) to RS 485 (RS 422)	Data transmission from V24 (RS 232) to RS 485 (RS 422) enabled

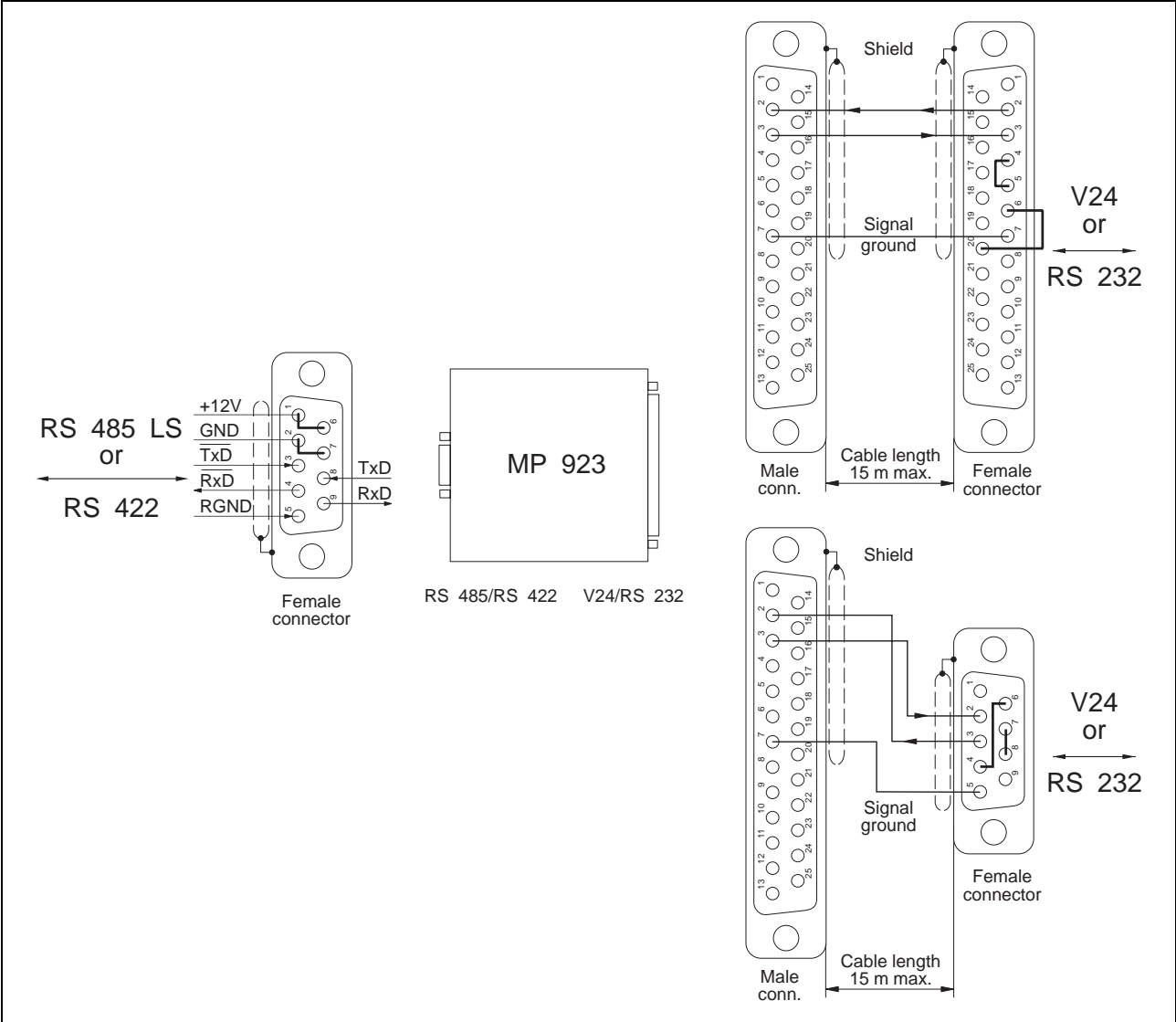


Fig. 6-5 MP 923 interface converter setup

6.2.4 Additional bleed resistor

The additional bleed resistor FZP 200 (180 ohms, 150 W) can be used for dissipating a major amount of braking energy (fig. 6-6).



DANGER

High voltages are present at the bleed resistor connections (approx. 325 VDC).



DANGER

The bleed resistor heats up when a great amount of braking energy is produced.



ATTENTION

Good heat dissipation must be ensured when installing the bleed resistor.

1. Switch the mains voltage OFF.
2. Provide the two bleed resistor leads with wire end ferrules on the device end.
3. Connect the two litz wires to the terminals at the bottom of the unit.

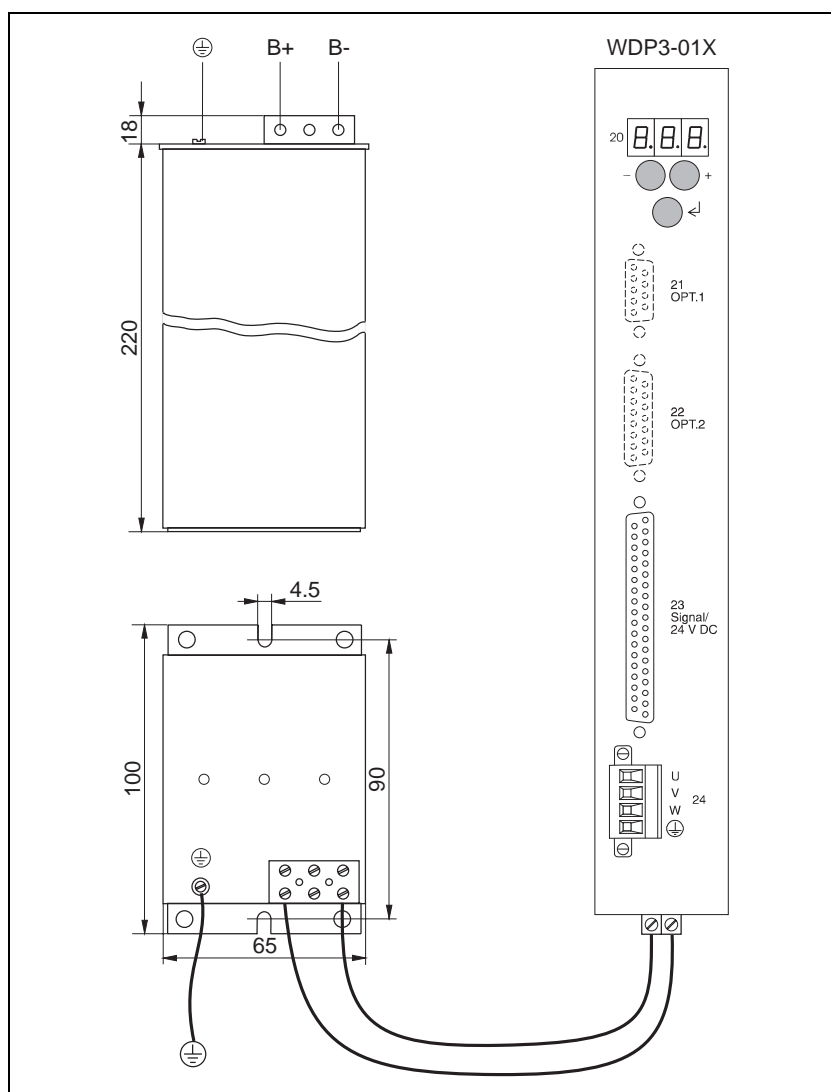


Fig. 6-6 Additional bleed resistor

6.3 Glossary

Absolute dimensions

Refers to a system of dimensions for positioning operations. The reference point for positioning is the reference point of the system.

Absolute positioning

For absolute positioning, the position value refers to the zero point of the axis.

CCW rotation

Sense of rotation of the motor in a counterclockwise direction (as seen from front towards the motor shaft).

Commands

The functions of a controller are accessed using commands. Commands are sent from the master to a controller (slave). The controller interprets and executes the commands.

CW rotation

Sense of rotation of the motor in a clockwise direction (as seen from front towards the motor shaft).

Download

With the download function, data are loaded into the controller from a master computer.

Electronic gear

Externally supplied pulses are counted as A/B encoder signals or pulse/direction signals and multiplied with a gear ratio. These pulses are used as the reference variable for stepping motor positioning.

Encoder

Sensor for motor position detection (actual position detection).

Encoder signals A/B

Pulse signals of an encoder. For one motor revolution, a defined number of pulse signals (e.g. 1000) is generated by the encoder. The encoder signals are subjected to single, double or quadruple evaluation.

Gear ratio

Multiplication factor for positioning operations, which is composed of a numerator and a denominator (step-down gearing or step-up gearing).

Incremental (relative) dimensions

Refers to a system of dimensions for the positioning unit. The reference point for positioning is the current position.

Inputs/outputs

The controller is provided with a certain number of inputs and outputs through which sequential operations are controlled.

Limit switch

Switch for limiting the travel and for reference movements.

Master/slave principle

Principle of communication in a network.

Only the master is permitted to send commands. Slaves only receive and execute commands.

Negative limit switch

Limit switch in CCW (counterclockwise) direction. Motor rotation in a counterclockwise sense as seen from front towards the motor shaft.

Network mode

An operating mode used for a network of positioning units. Several units are connected to a host via a physical link. Selection of the units to be addressed is effected by a device polling command.

Positive limit switch

Limit switch in CW (clockwise) direction. Motor rotation in a clockwise sense as seen from front towards the motor shaft.

Power controller

A motor is controlled by a power controller. The power controller converts positioning signals from the processor control into signals for motor control.

Pulse/direction signals

Signals for reference variable input for an electronic gear.

Reference movement

Motor movement towards the CCW or CW limit switch or a reference switch for setting a reference point for the system of dimensions.

Reference point

Position value after a reference movement or after setting the reference point.

Reference speed

The reference speed is the speed at which the axis moves away from a limit switch.

Reference switch

A switch which can be approached from either direction for a reference movement.

Relative positioning

For incremental positioning, the position value refers to the current position of the axis.

Rotation monitoring

Rotation monitoring is used for detecting positional deviations of motor movements. The actual position is detected by an encoder and then compared with the setpoint. If the difference between actual and set position exceeds a preset value, a contouring error is reported and the motor is decelerated.

RS 485 interface

Serial interface for a network configuration.

Teach-in

The teach-in function is used for storing positions which have been approached by manual control.

Upload

The upload function is used for reading data from the controller.

6.4 Abbreviations

AC	Alternating Current
ASCII	American Standard Code for Information Interchange
DC	Direct Current
Doc. no.	Documentation number
DP	Decentralized peripheral equipment
E	Encoder
FI	Fault current
HU	Height Unit
I	Input
I/O	Input/Output
IBS	Interbus-S interface
LED	Light Emitting Diode
M	Motor
PBDP	Profibus-DP interface
PC	Personal Computer
PELV	Protected Extra Low Voltage
PLC	Programmable Logic Controller
Q	Output

7 Index

A

Acceleration	2-19
Accessories	2-2, 6-2
Application mode	3-7
Application program	3-7
Automatic mode	1-4
Axis operating modes	
Point-to-point mode	1-5
Position following mode	1-5

C

Connections	
Encoder interface	1-8, 2-16
Mains connection	1-6, 2-7
Motor connection	1-7, 2-8
RS 232 serial interface	1-7, 2-12
RS 485 serial interface	1-7, 2-14
Signal interface	1-7, 2-9

D

Defaults	2-19
Displays	
Luminous displays	4-1

E

Editing mode	1-4
Encoder signal type	
A/B signals	2-17
Pulse/direction	2-18
Error code	4-2

F

Front panel	1-1
-------------	-----

M

Malfunctions	4-2
Manual mode	1-4
via front panel	1-4
Motor current reduction	2-19

N

Normalizing factors	2-19
Number of steps	2-19

O

Operating modes	3-1
-----------------	-----

R

Rotation monitoring	1-5
---------------------	-----

S

Set speed	2-19
Start speed	2-19
System speed	2-19

T

Timing diagram	
Encoder signals A/B	2-17
Pulse/direction	2-18

V

Ventilation	2-4
-------------	-----

W

Wiring layout	2-6
---------------	-----

8 Corrections and additions

At present there are no corrections or additions.

