

IndraControl

L25, L45, L65, L75 and L85
Controls

Operating Instructions
R911336525

Edition 02



Change Record

Edition	Release Date	Notes
Edition 01	2014-01	First edition
Edition 02	2015-10	L75 supplemented

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Editorial Department

Development Automation Systems Control Hardware ToLu (MaKo/MePe)

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1 About this documentation

Overview on target groups and product phases

In the following illustration, the framed activities, product phases and target groups refer to the present documentation.

Example: In the product phase "Mounting (assembly/installation)", the target group "mechanic/electrician" can execute the activity "install" using this documentation.

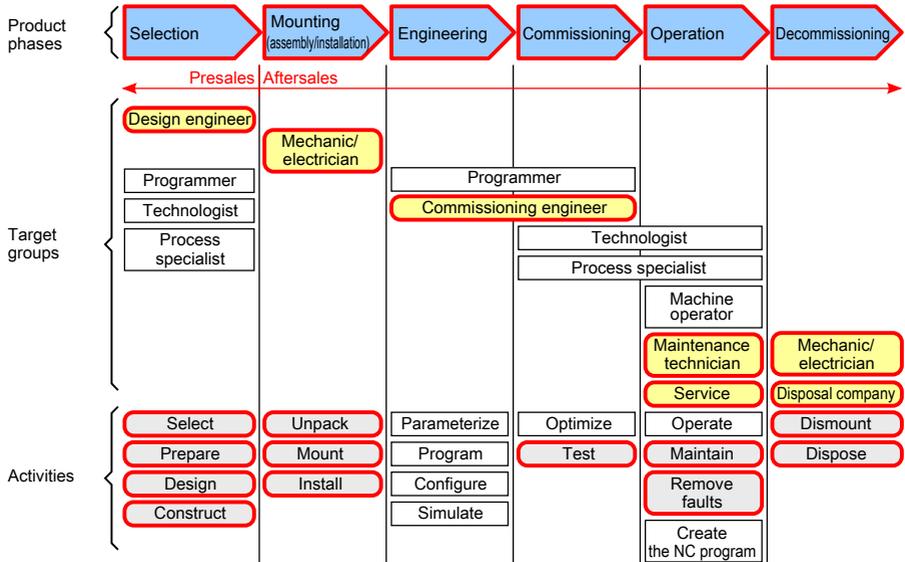


Fig. 1-1: Assigning the present documentation to the target groups, product phases and activities of the target group

This document instructs the technical staff of the machine manufacturer on how to safely perform the mechanic and electrical installation and on how to commission the device.

Required qualifications: Individual who is able to assess the tasks assigned and to identify possible safety risks owing to qualification in the subject, knowledge and experience. The individual should also be familiar with the standards and regulations.

Scope

This operating instructions is valid for all variants of the control, whose type codes start with:

CML25.1...

CML45.1...

CML65.1...

CML75.1...

CML85.1...

The type code specifications are located on the type plate of the device. Also refer to [chapter 2 "Product identification and scope of delivery"](#) on page 3.

Related documents

Title	Part number and document type
PLC Programming with Rexroth IndraLogic 1.0 Rexroth IndraLogic 1.0	R911170806 Operating and Programming Instructions
RECO Inline Profibus DP	R911289597 Application Description
RECO Inline Profibus DP Terminal and Module Supply	R911170806 Functional Description
Rexroth IndraWorks 10VRS Engineering	R911170806 Operating and Programming Instructions
Automation Terminals of the Product Family Rexroth Inline	R911317021 Application Description
Rexroth IndraControl L Function Modules	R911326408 Project Planning Manual
Rexroth IndraWorks xxVRS IndraLogic 2G PLC Programming System	R911170806 Application Description
Rexroth IndraControl L25	R911170806 Project Planning Manual
Rexroth IndraControl L45, L65, L85	R911170806 Project Planning Manual
Rexroth IndraControl VAP 01 Power Supply Unit	R911336576 Operating Instructions

An Lx5 control is required to operate an MLC, IndraLogic, MTX, MLC, XLC or an IndraLogic component. Thus, also refer to the descriptions of the respective system.

Tab. 1-1: Related documentation

For further documents, please enter the specified part number under "Documentation and Downloads" in the "Rexroth Media Directory" at <http://www.boschrexroth.com>.

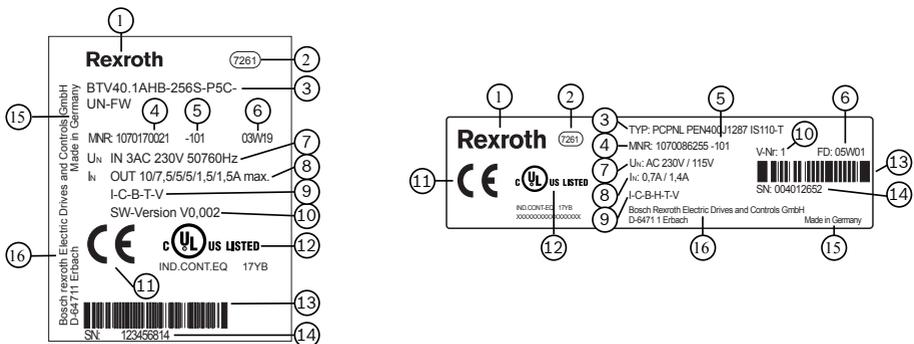
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2 Product identification and scope of delivery

2.1 Product identification

The type plate is located on the back side.



- 1 Logo type
- 2 Division or plant number
- 3 Type code
- 4 Part number
- 5 State of revision
- 6 Date of manufacture (yyWww)
- 7 Nominal voltage
- 8 Nominal current

- 9 Test marking
- 10 Version number
- 11 CE marking
- 12 Underwriters Laboratories Inc. mark
- 13 Barcode
- 14 Serial number
- 15 Designation of origin
- 16 Company address

Fig. 2-1: Type plates, example

2.2 Scope of delivery

- Control
- Instructions
- Fan (only included in the scope of delivery of control L85)
- Power connector (only included in the scope of delivery of control L25)
- End clamp¹⁾
- EMI shielding¹⁾

- Female connector strip (already mounted)¹⁾
- Antistatic bag¹⁾
- Lithium battery (already inserted)²⁾

3 Use of the safety instructions

3.1 Structure of the safety instructions

The safety instructions are structured as follows:

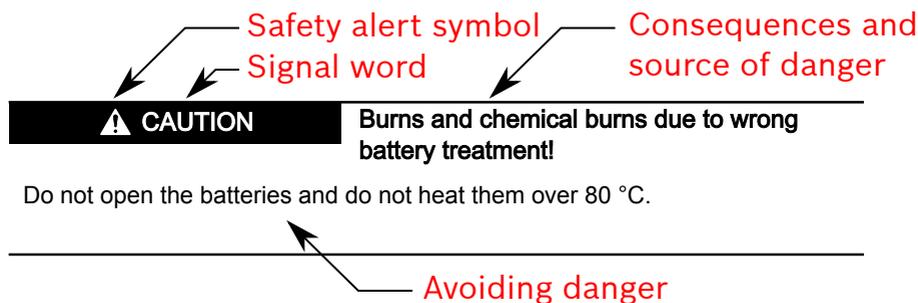


Fig. 3-1: Structure of the safety instructions

3.2 Explaining signal words and safety alert symbol

The safety instructions in this documentation contain specific signal words (danger, warning, caution, notice) and, if necessary, a safety alert symbol (according to ANSI Z535.6-2006).

The signal word is used to draw attention to the safety instruction and also provides information on the severity of the hazard.

The safety alert symbol (a triangle with an exclamation point), which precedes the signal words danger, warning and caution is used to alert the reader to personal injury hazards.



In the event of non-compliance with this safety instruction, death or serious injury **will** occur.

¹⁾ Not included in the scope of delivery of the controls with parts numbers R911170827 and R911170899.

²⁾ Only included in the scope of delivery of control L85 and the controls with part numbers R911170827 and R911170899.

⚠ WARNING

In the event of non-compliance with this safety instruction, death or serious injury **will** occur.

⚠ CAUTION

In the event of non-compliance with this safety instruction, minor or moderate injury can occur.

NOTICE

In the event of non-compliance with this safety instruction, material damage can occur.

3.3 Symbols used

Hints are represented as follows:



This is an information.

Tips are represented as follows:



This is a tip.

3.4 Signal graphic explanation on the device



Prior to the installation and commissioning of the device, refer to the device documentation.

4 Intended use

NOTICE

Danger of destruction of the device if not expressly stated accessories, mounting parts and other components, cables, lines, software and firmware are used.

The control may only be used with the accessories and mounting parts listed in this documentation. Components that are not expressly mentioned must neither be attached nor connected. The same is valid for cables and lines.

Operation must only be carried out with the hardware component configurations and combinations that are expressly specified and with the software and firmware indicated and specified in the respective documentation and functional descriptions.

Typical fields of use of the controls are:

- Handling systems and assembly systems
- Packaging and food processing machines
- Printing machines and paper converting machines
- Machine tools
- Woodworking machines

The controls may only be operated under the mounting and installation conditions, the position, and the ambient conditions (temperature, degree of protection, humidity, EMC etc.) specified in this documentation.

5 Spare parts, accessories and wear parts

5.1 Connector set for the control

Ordering code	Part number	Description
R-IB IL CML S01 PLSET	R911299856	2 input connectors, 2 output connectors and 1 power connector
R-IB IL CML S04 PLSET	R911172193	2 input connectors, 2 output connectors and 1 power connector, continuously numbered

Tab. 5-1: Connector set for the controls L45, L65, L75 and L85

5.2 Connector set for the control L25

Ordering code	Part number	Description
R-IB IL SCN-PWR IN PWR	R911171765	-

Tab. 5-2: Power connector for the control L25

5.3 Fan for the controls L45, L65, L75 and L85

Ordering code	Part number	Description
CAL01.1-F2	R911171153	-

Tab. 5-3: Fan for the controls L45, L65 and L85

5.4 Battery for the controls L45, L65, L75 and L85

Ordering code	Part number	Description
CAPO1.1-B2	R911170806	3 V lithium battery for onboard SRAM

Tab. 5-4: Battery for the controls L45, L65 and L85

5.5 Display set

Ordering code	Part number	Description
CAL03.1-D1	R911172142	Display exchange set for controls

Tab. 5-5: Display set for the control

5.6 Cap for Compact Flash slot

Ordering code	Part number	Description
CAL02.1-S1	R911171617	Cap for Compact Flash slot

Tab. 5-6: Cap for Compact Flash slot

5.7 Power supply unit

Ordering code	Part number	Description
VAP01.1H-W23-024-010-NN	R911171065	24 V power supply unit

Tab. 5-7: Power supply unit

5.8 Wear parts

Wear parts are not subject to any warranty.

Display

The service life of the display is limited. After the service life has been exceeded, readability reduces.

Service life:

- 60,000 hours at a temperature of 23°C (\pm 5°C) and a relative air humidity of 60% RH (\pm 20% RH)

3 V lithium battery

Service life: At least five years.

Fans

Fans are mechanical wear components. Their service life is extremely temperature-dependent.

Service life of the fan:

- 95,000 hours at 24°C

The fan operating hours counter can be requested via the control.

6 Ambient conditions

	In operation	Transport	Storage
Max. ambient temperature	+5°C to +55°C	-25°C to +70°C	-25°C to +70°C
Relative humidity	RH -2; 5 % to 95 % acc. DIN EN 61131-2, Condensing not permitted.	RH -2; 5 % to 95 % acc. DIN EN 61131-2, Condensing not permitted.	RH -2; 5 % to 95 % acc. DIN EN 61131-2, Condensing not permitted.
Air pressure	Up to 2700 m above sea level acc. to DIN 60204. Above 2700 m above sea level, see chapter 10.7.8 "Information on the control use above 2,700 m above sea level" on page 37.	Up to 3,000 m above sea level acc. to DIN 60204. Above 2700 m above sea level, see chapter 10.7.8 "Information on the control use above 2,700 m above sea level" on page 37.	Up to 3,000 m above sea level acc. to DIN 60204. Above 2700 m above sea level, see chapter 10.7.8 "Information on the control use above 2,700 m above sea level" on page 37.
Mechanical strength	Max. vibration: Frequency range: 10 Hz to 150 Hz Excursion: 0.075 mm at 10 Hz to 57 Hz Acceleration: 1 g at 57 Hz to 150 Hz Acc. to EN 60068-2-6	Max. shock: 15 g acc. to EN 60 068-2-27, no disturbance of the function.	Max. shock: 15 g acc. to EN 60 068-2-27, no disturbance of the function.

Tab. 6-1: Ambient conditions



The ambient air must not contain acids, alkaline solutions, corrosive agents, salts, metal vapors and other electrically conductive contaminants in high concentrations.

The ambient air must be free of dust. Housing and installation compartments must at least comply with the degree of protection IP 54 acc. to DIN VDE 0470-1.



The device is not resistant to gas jeopardizing the function [sulphur dioxide (SO₂), hydrogen sulphide (H₂S)].

NOTICE**Control failure due to overheating**

Operation is allowed up to 55°C if the air circulates. If the air does not circulate, use the fan.

If the internal temperature is 70 °C or higher (87°C for the L25), the display indicates the "Temp !!!" warning.

If the internal temperature reaches approx. 80°C (92°C for the L25), the control switches off automatically.

Use the "IH_Temperature" function to read out the internal control temperature in the "RIH_CMLx.library" library of the "IndraWorks" application program (from version 11), see also the documentation Rexroth IndraWorks 12VRS Basic Libraries IndraLogic 2G (DOK-IL*2G*-BASLIB**V12-LI01-EN-P, [R911336285](#)).



For the IndraControl L85 control, the fan is included upon delivery and is mandatory for its operation. For further information on the fan mounting, refer to [chapter 10.4 "Mounting the fan \(if necessary\)" on page 25](#).

7 Technical data

7.1 General technical data

Processor	Control L25: Renesas SH7785 with 576 MHz (CPU CLK) Control L45: AMD LX800 with 500 MHz Control L65: Intel Celeron M with 1.0 GHz Control L75: Intel Atom E3827 DualCore with 1.75 GHz Control L85: Intel Core2 Duo with 1.2 GHz
RAM	Controls L45, L65, L75 and L85: Min. 256 MB DRAM and min. 256 kB RDS ¹⁾ Optional: <ul style="list-style-type: none"> 8 or 16 MB SRAM battery-buffered Control L25: Min. 128 MB DRAM and min. 256 kB RDS ¹⁾
Interfaces:	
Interface to function modules	<ul style="list-style-type: none"> Rexroth PC104^{Plus}
Interface to I/O terminals	<ul style="list-style-type: none"> Rexroth Inline interface
Communication interfaces (on L45, L65, L75 and L85)	<ul style="list-style-type: none"> 1 × Ethernet connection (RJ 45, 10Base-T, 100Base-TX) Optional: <ul style="list-style-type: none"> 1 × third generation Sercos master-slave interface Optional: <ul style="list-style-type: none"> 1 × Profibus DP master-slave interface 2 × Ethernet connection (RJ 45, 10Base-T, 100 Base-TX) for TCP/IP or RT Ethernet (Profinet RT or Ethernet/IP)
Communication interfaces (On L25)	<ul style="list-style-type: none"> 1 × Ethernet connection (RJ 45, 10/100 base-T) 1 × third generation Sercos master-slave interface Alternative option to the Sercos master-slave interface <ul style="list-style-type: none"> 1 × Profibus DP master/slave interface or 2 × Ethernet connection (RJ 45, 10Base-T, 100 Base-TX) for TCP/IP or RT Ethernet (Profinet RT or Ethernet/IP)
Ready contact	<ul style="list-style-type: none"> 1 × single-pin Ready contact

¹⁾ RDS = Remanent Data Storage

Remanent data is automatically written to the Compact Flash card after loss of voltage and is restored after control reboot.

Digital inputs and outputs (only on L45, L65, L75 and L85)	<ul style="list-style-type: none"> ● 8 × electrically isolated digital inputs ● 8 × electrically isolated digital outputs
Weight	1.8 kg
Degree of protection	IP 20
Dimensions	Refer to chapter 10.2 "Housing dimensions" on page 17

Tab. 7-1: Technical data

7.2 Voltage supply and current and power consumption

The control is supplied with 24 V. The following values apply to the operating voltage acc. to DIN EN 61131-2:

Nominal voltage	24 V DC
Tolerance	-15 %, +20 % (without residual ripple)
Residual ripple	±5 %
U_{\max}	30 V
U_{\min}	19.2 V
Power consumption of the controls from U_{LS} at nominal voltage and all connected function modules and Inline terminals	Control L25: Max. 2 A Control L45: Max. 2.6 A Control L65: Max. 3.0 A Control L75: Max. 2.9 A Control L85: Max. 3.0 A
Current consumption of the controls from U_M and U_S	Max. 8 A in total
Power consumption (typically) of the controls (without connected I/O and function modules)	Control L25: 8.7 W Control L45: 14 W Control L65: 18 W Control L75: 17 W Control L85: 21 W

Tab. 7-2: Operating voltage and current as well as power consumption

Three operating voltages (segment voltage U_S , the supply voltage U_{LS} and the main voltage U_M) are to be applied to the control, see also [chapter 10.7.4 "24 V voltage supply"](#) on page 32.

NOTICE

Possible production failures caused by backward feeding

Ensure that a ground terminal is always connected. Thus, malfunctions caused by backward feeding via I/O signals can be avoided.

8 Standards

8.1 Standards used

Standard	Meaning
DIN EN 60 204-1	Safety of machinery - Electrical equipment of machines
DIN EN 61 131-2	Programmable logic controllers Equipment and test requirements
DIN EN 60 529	Degrees of protection (including housings and installation compartments)
UL 508	Industrial Control Equipment

Tab. 8-1: Standards used

8.2 CE marking

8.2.1 Declaration of conformity



The electronic products described in the present operating instructions comply with the requirements and the target of the following EU directive and with the following harmonized European standards:

EMC directive 2004/108/EC

The electronic products described in the present operating instructions are intended for use in industrial environments and comply with the following requirements:

Standard	Title	Edition
DIN EN 61000-6-4 (VDE 0839-6-4)	Electromagnetic compatibility (EMC) Part 6-4: Generic standards – Emission standard for industrial environments (IEC 61000-6-4:2006)	September 2007
DIN EN 61000-6-2 (VDE 0839-6-2)	Electromagnetic compatibility (EMC) Part 6-2: Generic standards – Noise immunity for industrial environments (IEC 61000-6-2:2005)	March 2006

Tab. 8-2: Standards for electromagnetic compatibility (EMC)



Loss of CE conformity due to modifications at the device.

CE marking applies only to the device upon delivery. After modifying the device, verify CE conformity.

8.3 UL/CSA certified



The devices are certified according to

- **UL508** (Industrial Control Equipment) and
- **C22.2 No. 142-M1987** (CSA)

However, there can be combinations or extension stages with a limited or missing certification. Thus, verify the registration according to the UL marking on the device.



Loss of UL/CSA conformity due to modifications at the device.

UL and CSA marking applies only to the device upon delivery. After modifying the device, verify UL and CSA conformity.

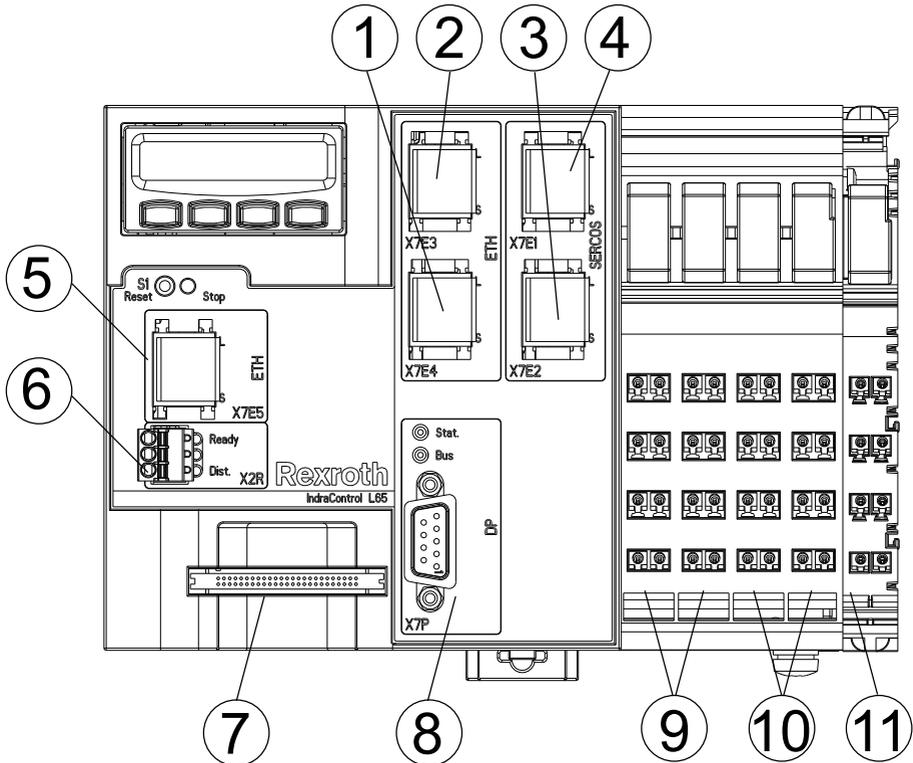


To guarantee an UL/CSA-compliant operation, the following conditions have to be fulfilled:

- Use only insulated copper wires suitable for at least 60/75°C.
-

9 Interfaces

9.1 Interface view



① to ⑩ Refer to [tab. 9-1 "Control interfaces"](#) on page 15

⑦ Slot for Compact Flash card
⑩ PWR IN voltage supply

Fig. 9-1: Control interfaces

NOTICE

Destruction of the components due to the mounting of the control, module, Inline terminals or connectors under voltage!

- Before mounting or demounting components, disconnect the control - including its components - from the voltage
- Connect the voltage only after the control and its components have been set up

9.2 Overview

Name at housing (no. in graphic)	Connection type	Connector type (Integrated)	Mating connector and cable (From outside)	Note on device variants
X7E4 (①)	Ethernet (TCP/IP, RT Ethernet)	RJ45 socket 8-pin	RJ45 plug (Twisted pair, 4-/8-wire)	Availability: <ul style="list-style-type: none"> ● L25: Only on the device variant CML...PN... ● L45, L65, L75, L85: On all device variants
X7E3 (②)	Ethernet (TCP/IP, RT Ethernet)	RJ45 socket 8-pin	RJ45 plug (Twisted pair, 4-/8-wire)	Availability: <ul style="list-style-type: none"> ● L25: Only on the device variant CML...PN... ● L45, L65, L75, L85: On all device variants
X7E2 (③)	Ethernet (Sercos)	RJ45 socket 8-pin	RJ45 plug (Twisted pair, 8-wire)	Availability: <ul style="list-style-type: none"> ● L25: Only on the device variant CML...3N... ● L45, L65, L75, L85: On all device variants
X7E1 (④)	Ethernet (Sercos)	RJ45 socket 8-pin	RJ45 plug (Twisted pair, 8-wire)	Availability: <ul style="list-style-type: none"> ● L25: Only on the device variant CML...3N... ● L45, L65, L75, L85: On all device variants
X7E5 (⑤)	Ethernet (TCP/IP, programming device)	RJ45 socket 8-pin	RJ45 plug (Twisted pair, 8-wire)	-
X2R (⑥)	Ready contact	Connector strip 3-pin, 3.5 mm	3-pin female connector strip, spring force, 3.5 mm (upon delivery)	-
(⑦)	Slot for Compact Flash card	Not specified	Not Specified	-
X7P (⑧)	RS485 (Profibus DP)	D-SUB socket 9-pin	D-Sub bus connector, IP 20, 9-pin	Availability: <ul style="list-style-type: none"> ● L25: Only on the device variant CML...PN... ● L45, L65, L75, L85: On all device variants
(⑨)	8 digital inputs	Inline plug 8-pin	Inline socket 8-pin	Availability: <ul style="list-style-type: none"> ● L25: Not available ● L45, L65, L75, L85: On all device variants
(⑩)	8 digital outputs	Inline plug 8-pin	Inline socket 8-pin	Availability: <ul style="list-style-type: none"> ● L25: Not available ● L45, L65, L75, L85: On all device variants
(⑪)	PWR IN voltage supply	Inline plug 8-pin	Inline socket 8-pin	-

Tab. 9-1: Control interfaces

10 Mounting, demounting and electric installation

10.1 Installation notes

- Do not lay the cables in parallel to motor cables or other strong sources of interference over longer distances as otherwise interferences could be coupled in
- Keep as much distance as possible to noise sources
- The LED displays on the operating panel must not be covered
- Lay all connecting cables in loops. Use strain reliefs for all cables
- Keep as much distance as possible to noise sources
- Install the control only horizontally in a control cabinet.
- Provide the following minimum distances for sufficient cooling:

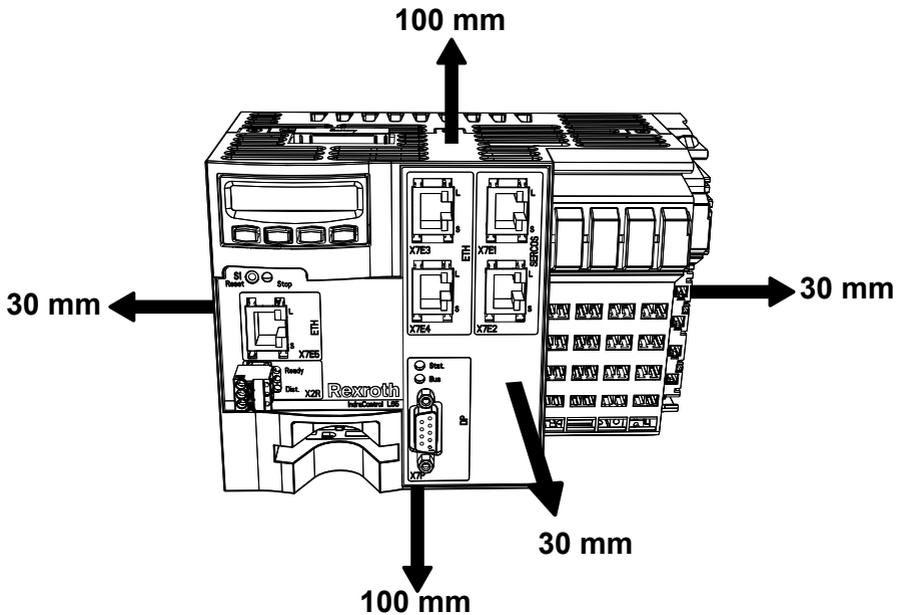


Fig. 10-1: Minimum distances for the circulation of ambient air

In case of a several line design, the supply air has to be measured under each line and its limit value has to be observed. For information on the ambient temperature, refer to [chapter 6 "Ambient conditions"](#) on page 8.

- Additionally, provide sufficient distance for mounting, demounting, connectors and cable length

10.2 Housing dimensions

10.2.1 Housing dimensions of the L45, L65, L75 and L85

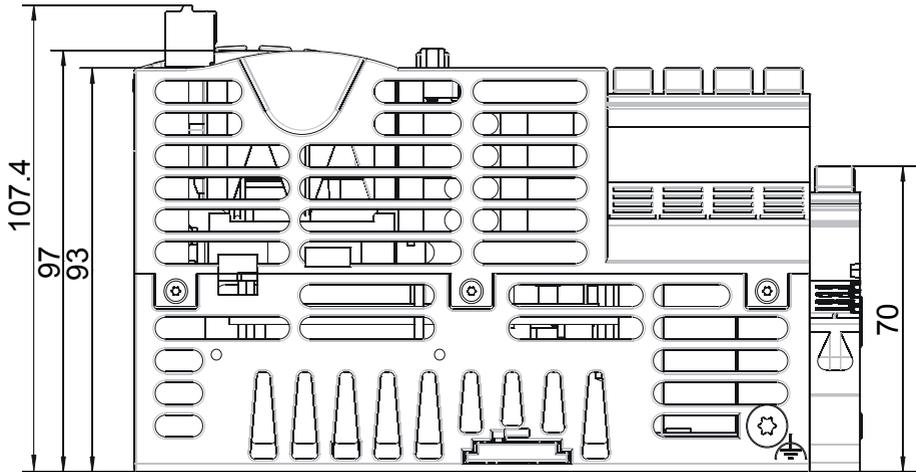


Fig. 10-2: L45, L65, L75 and L85, bottom view (in mm)

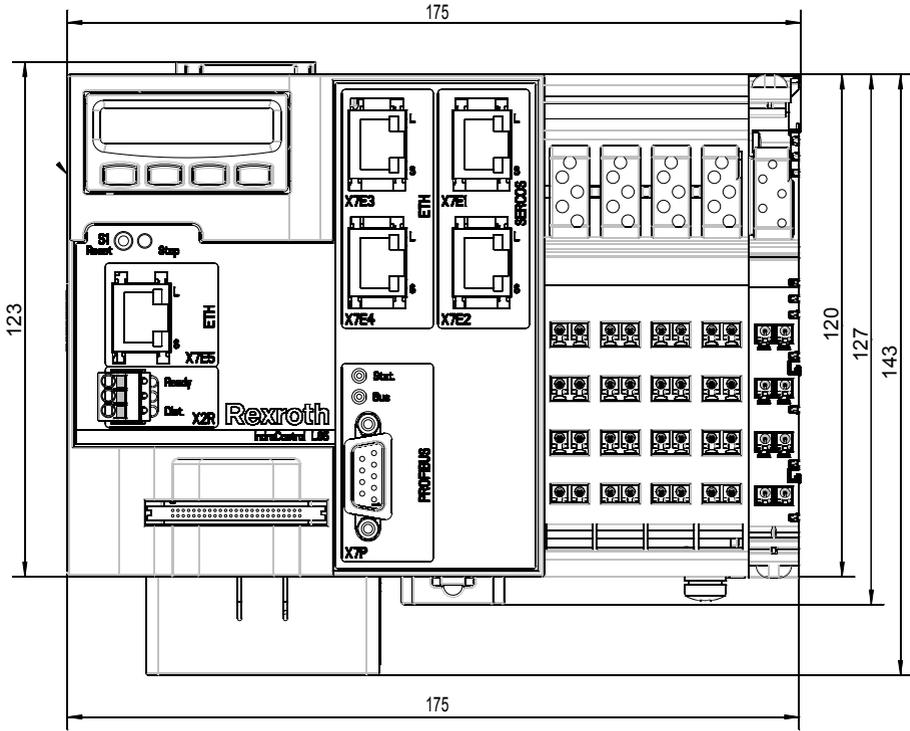


Fig. 10-3: L45, L65, L75 and L85, with fan, front view (in mm)

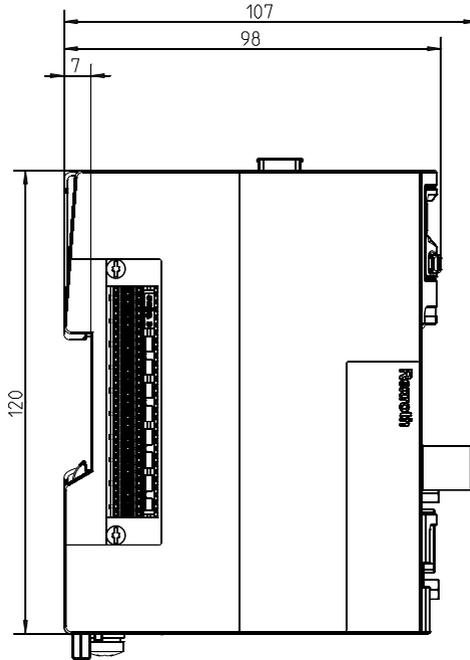


Fig. 10-4: L45, L65 and 75 (without fan), left view (in mm), the cut-out for the top-hat rail is arranged centrally

10.2.2 Housing dimensions L25

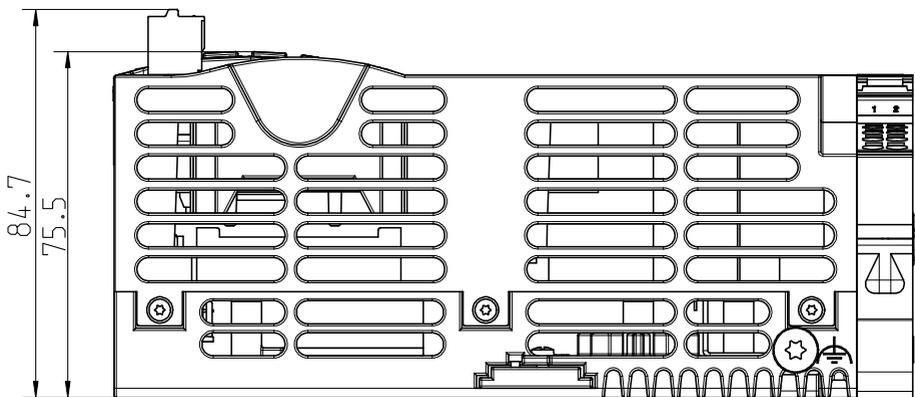


Fig. 10-5: L25, bottom view (in mm)

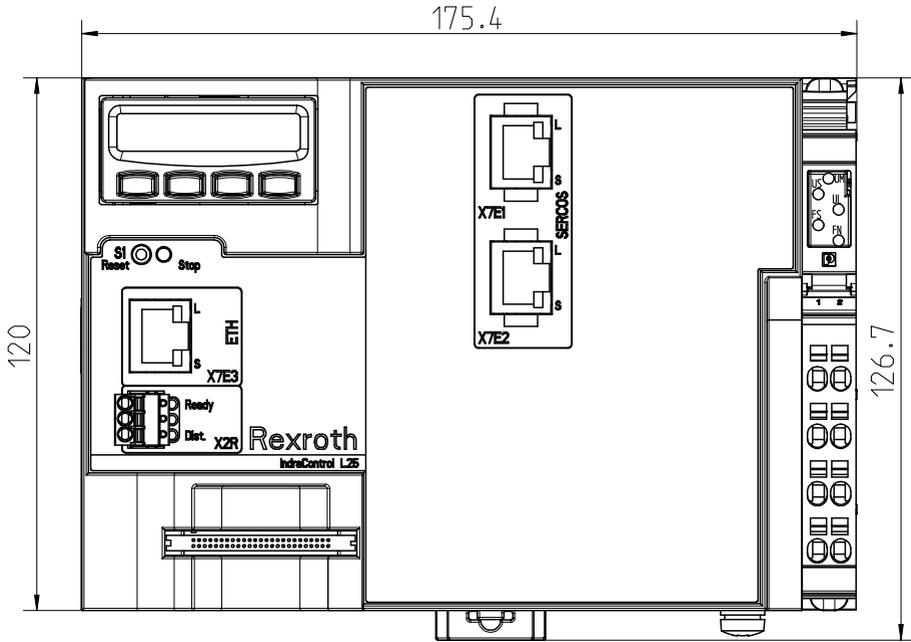


Fig. 10-6: L25, front view (in mm)

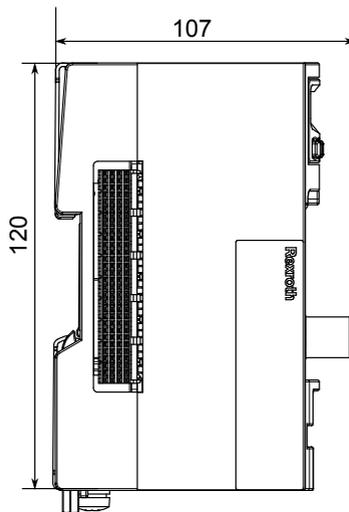


Fig. 10-7: L25, left view (in mm), the cut-out for the top-hat rail is arranged centrally

10.2.3 Housing dimensions of the fan

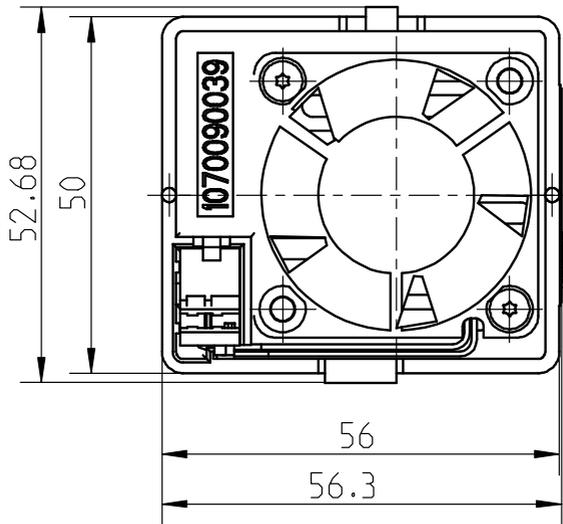


Fig. 10-8: Fan, front view (in mm)

10.3 Mounting the control

10.3.1 General information

NOTICE

Destruction of the components due to the mounting of the control, module, Inline terminals or connectors under voltage!

- Before mounting or demounting components, disconnect the control - including its components - from the voltage
- Connect the voltage only after the control and its components have been set up

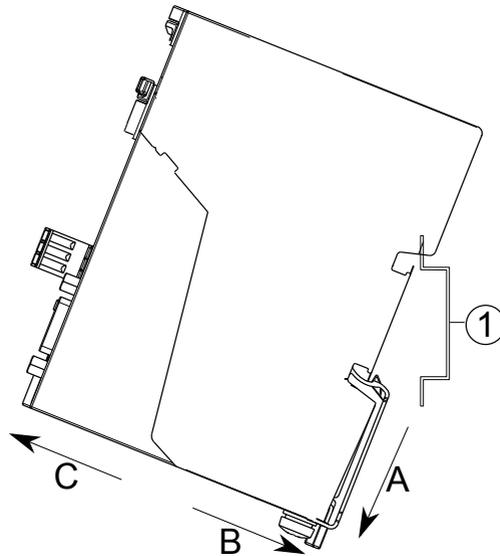
NOTICE

Possible damage to property due to improper mounting of the top-hat rail

- Fasten the top-hat rail adequately
- Connect the top-hat rail to a functional ground
- Mount the control on the top-hat rail, as the top-hat rail is among other things used for heat dissipation and grounding
- Install the control in a control cabinet or an appropriate housing

10.3.2 Mounting the control on the top-hat rail

1. Hang the control into the top-hat rail from top (A in figure 10-9).
2. Then, engage the control by exerting slight pressure on the bottom part of the housing (B in figure 10-9).



① Top-hat rail

Fig. 10-9: Mounting the control on the top-hat rail (A and B)

Observe the minimum distances to cool the control, see [chapter 10.1 "Installation notes"](#) on page 16.

10.3.3 Mounting Rexroth Inline terminals (optional) in series

1. If necessary, mount the Rexroth Inline terminals in series (see also "Automation Terminals of the Product Family Rexroth Inline" DOK-CONTRL-ILSY-SINS***-AWxx-, part number: "R911317021").

2. First snap on the terminal required to set up the station perpendicularly to the top-hat rail (A in figure 10-10).

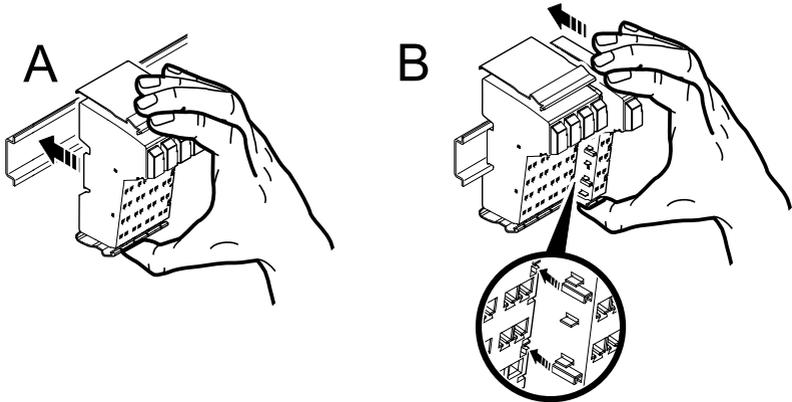


Fig. 10-10: Snapping on the terminal on the top-hat rail



Ensure that **all** tongues and grooves of neighboring terminals are interlocked (B in figure 10-10).

The tongue and groove joint connects neighboring modules with each other. After snapping on the terminal on the top-hat rail, continue as follows:

3. Attach the connectors onto the respective terminal.

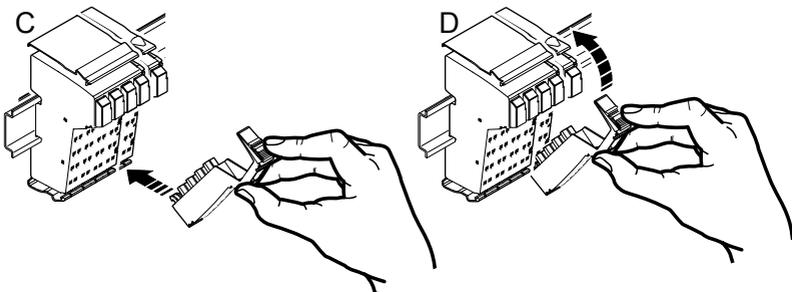


Fig. 10-11: Fastening the connectors

4. First fit the front connector shaft latching into the front release mechanism (C in figure 10-11).
5. Press the connector towards the terminal until it clicks into the rear release mechanism (D in figure 10-11).



The grooves in the terminal are not continued in the connector. A terminal can only be snapped on if there is no connector to the left. If necessary, remove the connector.

Once the station has been set up, individual terminals can be replaced subsequently by being pulled out or plugged in without any additional tools.

10.3.4 Mounting the shielding plate

1. The shielding plate has to form the mechanical end to the right of the control, irrespective of whether Rexroth Inline terminals have been mounted in series.

NOTICE

Control failure due to missing shielding plate

Mount the shielding plate at the right end of the control to protect the control from ESD pulses.

⚠ CAUTION

Dangerous contact voltages possible due to missing shielding plate.

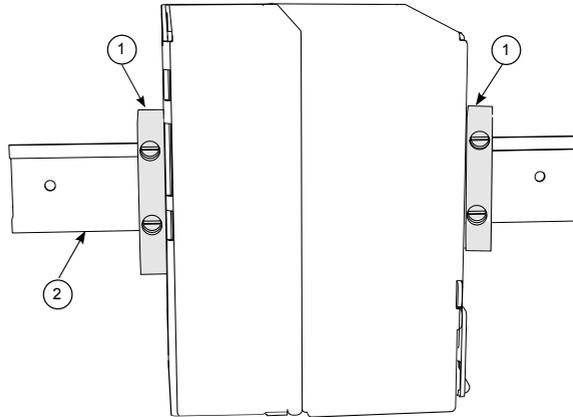
Mount the shielding plate at the right end of the control.

10.3.5 Mounting function modules (optional)

1. Subsequently, place the function modules on the top-hat rail to the left of the control.
2. Slide the function modules along the top-hat rail up to the left side of the control until a secure connection is established via the PCI^{PLUS} bus.

10.3.6 Mounting the end clamp

1. To correctly connect the control on the top-hat rail, finally attach end clamps at both sides of the Inline station.

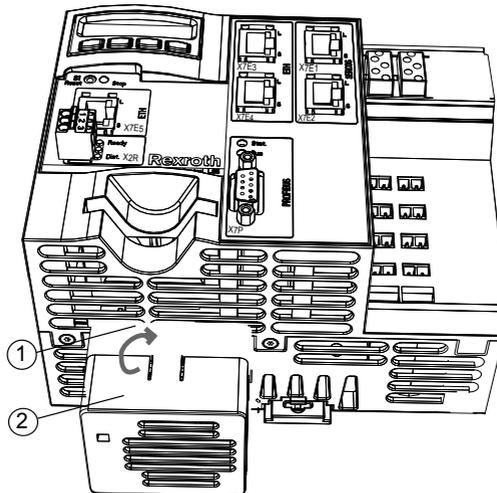


- ① End clamps
- ② Top-hat rail

Fig. 10-12: End clamps

The end clamps are used as lateral termination elements.

10.4 Mounting the fan (if necessary)



- ① Bottom side of the control
- ② Fan

Fig. 10-13: Mounting the fan

1. Put the fan ② onto the control ①, see figure 10-13.

2. Engage the fan by exerting slight pressure.
3. Remove the control from the top-hat rail.

10.5 Demounting the control

10.5.1 Separating function modules from the control (if function modules were mounted)

1. Remove the left end clamp first.
2. Slide the function modules along the top-hat rail to the left until the plug connection of the PCI^{PLUS} bus is separated.

10.5.2 Removing the first Rexroth Inline terminal (if Inline terminals were mounted)

1. Start with the first Inline terminal mounted to the right of the control.



All connectors of the terminal have to be removed.

2. Remove the labeling field if present (A1 in 10-14).
3. Lever the connector of the terminal to be removed by pressing on the rear connector shaft latching (A2 in 10-14).

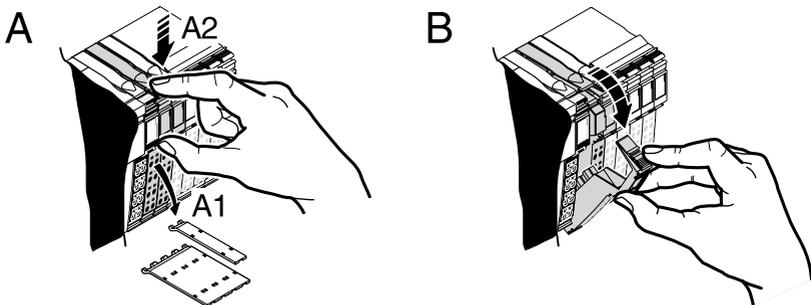


Fig. 10-14: Removing the labeling field and connectors

4. Remove the connectors (B in 10-14).
5. Remove the power connector from the control.

This ensures that the tongues of the voltage jumping and the tongue and groove joints are not damaged. Moreover, the terminal can be accessed more easily.

6. Push the release mechanism (1 in 10-15). Then, remove the terminal perpendicularly to the top-hat rail (2 in 10-15).

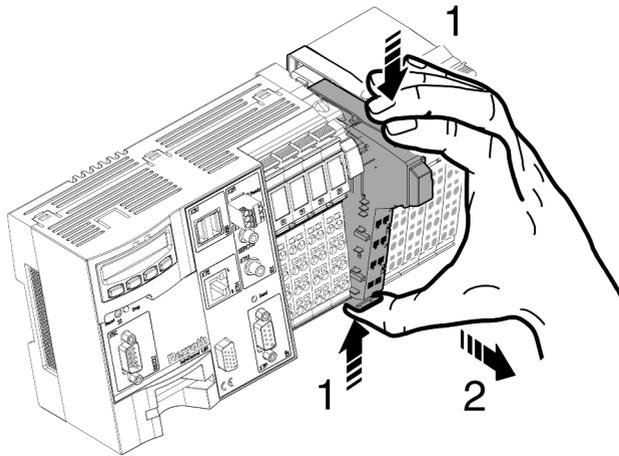
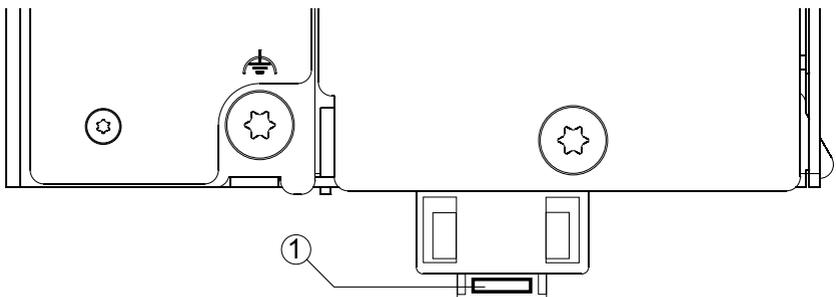


Fig. 10-15: Before demounting the control, remove the first Rexroth Inline terminal

10.5.3 Removing control from top-hat rail

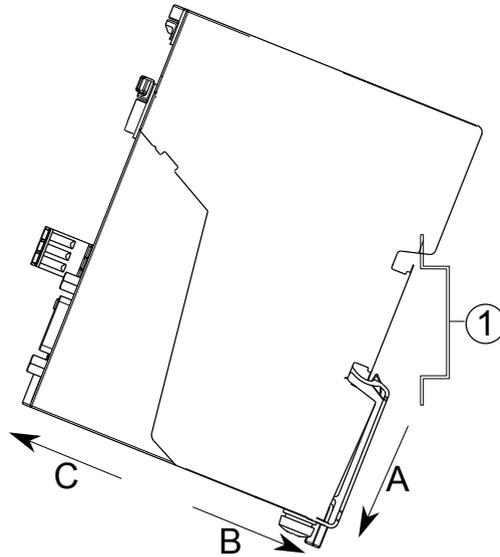
1. Loosen the release levers mounted at the bottom side by pulling the release lever downwards using a screwdriver.



① Release lever

Fig. 10-16: Position of the release lever

2. Tilt the control upwards (C in figure 10-17).



① Top-hat rail

Fig. 10-17: Demount the control from top-hat rail (C)

3. Remove the control by pulling it diagonally upwards.

10.6 Demounting and changing the Inline terminals

10.6.1 Removing an Inline terminal

1. Remove the labeling field if present (A1 in figure 10-18).



Remove all connectors of the terminal. The sections below describe how to remove a 2-slot terminal.

2. Lever the connector of the terminal to be removed by pressing on the rear connector shaft latching (A2 in figure 10-18).

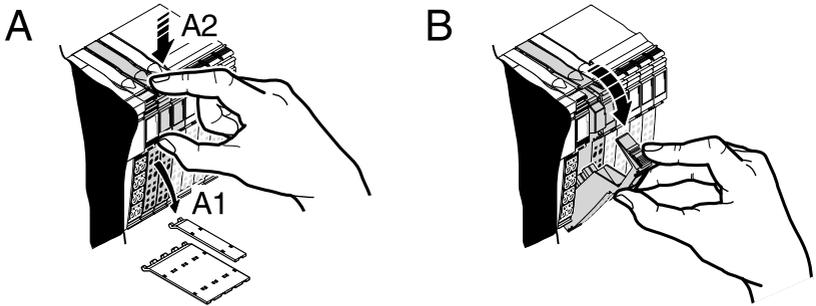


Fig. 10-18: Removing the labeling field and connectors

3. Remove the connector (B in figure 10-18).
4. Remove the adjacent connectors of the neighboring terminals (C in figure 10-19).

This ensures that the tongues of the voltage jumping and the tongue and groove joints are not damaged. Moreover, the terminal can be accessed more easily.

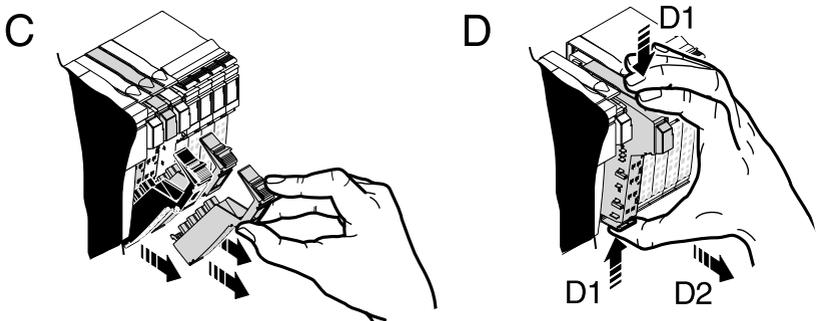


Fig. 10-19: Removing the terminal

5. Push the release mechanism (D1 in figure 10-19).
6. Remove the terminal perpendicularly to the top-hat rail (D2 in figure 10-19).

To protect the tongues of the voltage jumping and the tongue and groove joint, the connector of the neighboring terminal to the left becomes loose if it has not already been loosened.

10.6.2 Changing an Inline terminal

1. Remove the new terminal (see preceding section).

2. Do not yet snap on the adjacent connector of the neighboring terminal to the left.
3. Fit the new terminal.
4. Subsequently, attach all connectors again.

10.7 Electric installation

10.7.1 General information

WARNING

Risk of injury due to incorrect mounting or electric installation!

- Any dangerous system states, which might cause personal injury, must be prevented!
- Protection upon direct and indirect contact must be ensured by the specified measures (connection to protective conductor, insulation, etc.).

10.7.2 External power supply unit

All control components are supplied from 24 V voltage supplies.

Use the Bosch Rexroth power supply unit VAP01.1H-W23-024-010-NN, part number R911171065, for the logic supply. For further information on the external power supply unit and on the creation of overvoltage categories, refer to the documentation of the power supply unit.

All lines of the 24 V voltage supply have to be wired separately from lines carrying higher voltages.

All peripherals, such as digital sensors or actuators connected to the interfaces of the control, also have to comply with the criteria of safety-separated circuits.

10.7.3 Voltage supply for the control

General information

The control as well as any connected function modules and Inline terminals are supplied with power via the black power connector on the right side of the control.



Connect the power connector with cables with a conductor cross-section of AWG 16-22 (0.34 mm² - 1.5 mm²).



Observe the color-coding of the plugs.

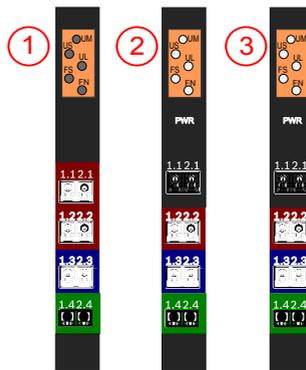


For the control L25: To connect the supply voltage, only the power connector (R-IB IL SCN-PWR IN-PWR) may be used for the control L25.

For the controls L45, L65, L75 and L85: To connect the supply voltage, only the power connector (R-IB IL SCN-PWR IN-PWR) may be used.

The connector R-IB IL SCN-PWR IN-CP, which is available for other power terminals, is not allowed for the control!

Power connectors for the controls



- ① Power connector for the controls L45, L65, L75 and L85 from the connector set "R-IB IL CML S01-PLSET"
- ② Power connector for the controls L45, L65, L75 and L85 from the connector set "R-IB IL CML S04-PLSET"

- ③ Power connector for the control L25 from the connector set "R-IB IL SCN-PWR IN-PWR"

Fig. 10-20: Power connector for the control

Connector contact	Signal (control L25)	Signal (control L45, L65, L75, L85)
1.1	+24 V DC segment voltage (U_S)	+24 V DC segment voltage (U_S)
1.2	+24 V DC supply voltage (U_{LS})	+24 V DC supply voltage (U_{LS})
1.3	GND (U_{LS}) (ground supply voltage)	GND (U_{LS}) (ground supply voltage)
1.4 and 2.4	FE (functional earth)	FE (functional earth)
2.1	+24 V DC main voltage (U_M)	+24 V DC uninterruptable power supply (UPS) is currently not supported
2.2	+24 V DC main voltage (U_M)	+24 V DC main voltage (U_M)
2.3	GND (U_S, U_M) (ground main and segment voltage)	GND (U_S, U_M) (ground main and segment voltage)

Tab. 10-1: Pin assignment of the power terminal of the control

For further information on the connection, please refer to the project planning manual of the relevant control.

NOTICE

Possible malfunction if the contacts 2.1 and 2.2 are interchanged

For the controls L45, L65, L75 and L85 with a device index smaller than 201 (see also [chapter 2.1 "Product identification" on page 3](#)), the contacts 2.1 and 2.2 are interchanged.

For further information on the connection, refer to the respective project planning manual of the controls.

10.7.4 24 V voltage supply

General information

The voltage of 24 V can be supplied with or without electrical isolation.

Setup without electrical isolation

An easy connection method is the setup without an electrical isolation between the internal logic and the peripheral supply.

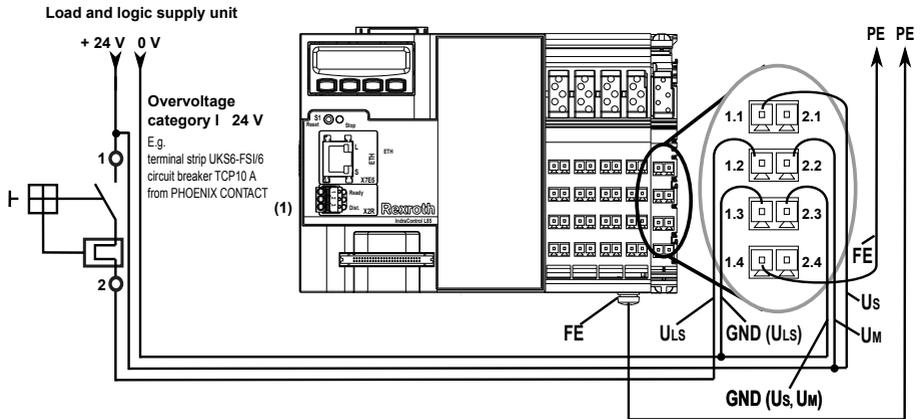
In this case, a power supply unit is sufficient to supply the control.



The power output must not exceed 240 W!



The GND (U_{LS}) is grounded in the device!



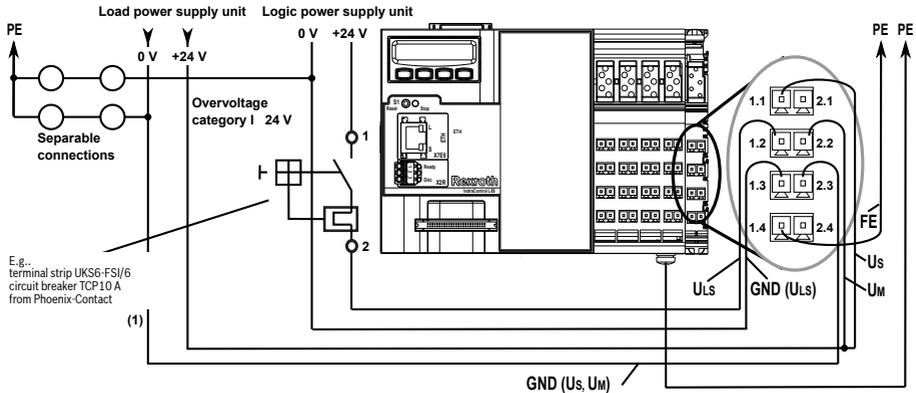
- 1 Polarity reversal can result in device destruction (fire hazard) if no additional external protection is provided. The reason for the risk of destruction is the simultaneous grounding of the GND (U_{LS}) in the device and of the GND (U_{LS}) load (PELV) at the power supply unit. Install the external fuse.

Fig. 10-21: Setup without electrical isolation

Reference conductor connected to the protective conductor and set up with electrical isolation

Provide electrical isolation between the logic of the central processing unit and the I/O interfaces of the peripheral devices acc. to DIN EN 60204-1. The voltage U_{LS} (24 V logic voltage) is electrically isolated from the voltages U_S (24 V segment voltage) and U_M (24 V main voltage) at the control.

If the reference conductor GND U_{LS} is connected to the protective conductor system, this connection has to be arranged at a central place (e. g. at the load power supply unit). Hence, the supply current circuit is a PELV circuit.



- 1 Polarity reversal can result in device destruction (fire hazard) if no additional external protection is provided. The reason for the risk of destruction is the simultaneous grounding of the GND (U_{LS}) in the device and of the GND (U_{LS}) load (PELV) at the power supply unit. Install the external fuse.

Fig. 10-22: Reference conductor connected to protective conductor

Dimensioning the voltage supply

Observe the maximum currents when dimensioning the voltage supply. A voltage between 20.4 V and 28.8 V has to be applied directly at the device.

The voltage must also be observed in the following cases:

- In case of fluctuations in the line voltage caused by different network loads for example
- In case of different load states, such as short-circuit, normal load, lamp load or no load

The maximum conductor cross-section for the voltage supply is 1.5 mm².

10.7.5 Grounding

General information

NOTICE

Control failure due to insufficient grounding

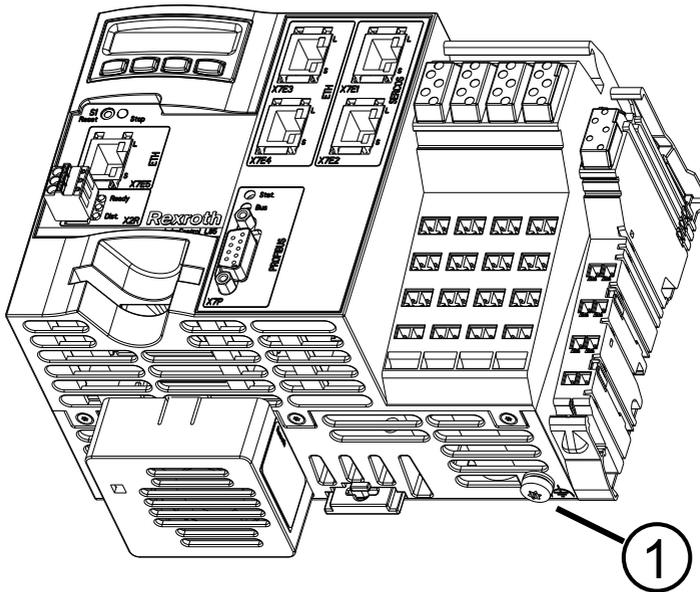
Ensure grounding. An optimum grounding is required to keep away possible interferences from the control and from the Rexroth Inline terminals and to discharge them to the ground.

Functional earth

The top-hat rail, on which the control is mounted, has to be mounted to a grounded metal carrier, e. g. the rear panel of the control cabinet.

Grounding screw

A functional grounding via the grounding screw is required to ensure optimum noise immunity. The grounding screw is positioned below the control (see figure 10-23). Connect the functional earthing via a cable, which is as short as possible or, better, via a ground strap.



① Grounding screw

Fig. 10-23: Position of the grounding screw

Recommended value: Length: Max. 1 m, cross-section 6 mm².

The functional earth (FE) is used to discharge interferences. The functional earth is not provided as a protection against electric shock for persons.

Voltage jumper

Starting at the control, the FE (functional earth) voltage jumper is routed through all connected Rexroth Inline terminals. This ensures that these terminals are grounded, once the control, the supply terminals and the top-hat rail were grounded properly.

Potential equalization

Potential equalization acc. to DIN VDE 0100 part 540 has to be provided between the system parts and the voltage supply.

Information on the protective conductor system

All system components have to be connected to the PE protective conductor system at the connectors marked accordingly.

10.7.6 Shielding

NOTICE

Production failure possible due to control failure resulting from insufficient shielding.

Provide sufficient shielding.

The shielding reduces any effects of interferences on the system.

Observe the following when shielding:

- Fasten the shielding as extensively as possible
- Ensure proper contact between connector and terminal



Lay all power cables and data cables in separate cable channels.

10.7.7 Connecting lines (for digital onboard inputs, outputs and voltage supply) to tension spring connection points

General information

Connect the lines for digital onboard inputs, onboard outputs and the voltage supply to the control at the tension spring connection points.

Lines with an average conductor cross-section of 0.2 mm² to 1.5 mm² (AWG 16 to 24) can be connected.

Unshielded lines:

Use unshielded lines for the digital inputs and outputs as well as for the voltage supply.

Connecting unshielded lines

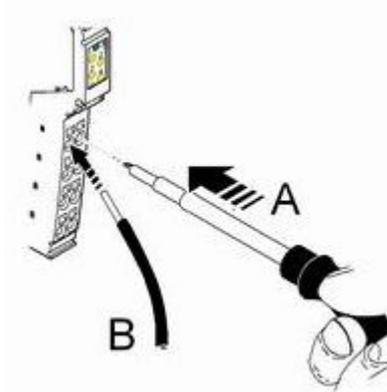


Fig. 10-24: Connecting lines to tension spring connectors

Proceed as follows to connect unshielded lines to the tension spring connector:

1. Wire the connectors as required for the application.
2. Strip the line to a length of 8 mm.
Wiring is provided without wire end sleeves. If wire end sleeves are still to be used, ensure that the wire end sleeves are properly crimped.
3. Put a screwdriver into the actuation slot of the corresponding terminal point (A in figure 10-24) so that the wire can be inserted into the opening of the tongue.
4. Insert the wire (B in figure 10-24).
5. Pull the screwdriver out of the opening. This fixes the wire.



For further information on the connection method, please refer to the Rexroth Inline Profibus DP; Application Description (also refer to ["Related documents" on page 2](#)).

10.7.8 Information on the control use above 2,700 m above sea level

General information

The control is designed for usage up to 2,700 m above sea level acc. to DIN 60204 (see also [chapter 6 "Ambient conditions" on page 8](#)).



If it is used above 2700 m above seal level, Bosch Rexroth does assume any warranty. Therefore, the user assumes the responsibility if used above 2,700 m above sea level.

To actually use it above 2,700 m above sea level, take appropriate measures. Ensure the tracking resistance in particular. For a use up to 4000 m above sea level, Bosch Rexroth recommends the following actions:

- Use an isolating transformer between the 400 V AC and 230 V AC mains
- Use the Bosch Rexroth power supply unit "VAP01.1H-W23 024-010-NN", part number R911171065, to generate the 24 V DC supply voltage

Circuitry proposal

For more detailed information on the wiring, refer to the documentation of the power supply unit.

 DANGER

Danger of lethal injury due to hazardous electric voltage

- Connect power supply units generating protective extra-low voltage (24 V) only to supply voltages designed for these power supply units. Note the over-voltage categories (refer to the documentation of the power supply unit VAP [R911336576](#))
 - Do not apply the supply voltage to the protective extra-low voltage
-

10.7.9 Digital onboard inputs on the controls L45, L65, L75 and L85

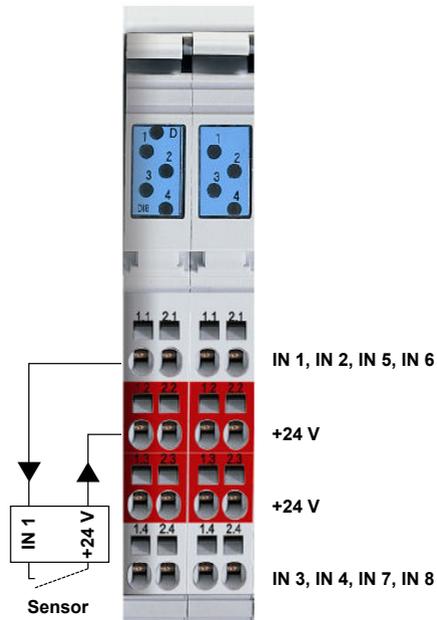


Fig. 10-25: L45, L65, L75 and L85: Digital inputs at the connector set "R-IB IL CML S01-PLSET"



Observe the color-coding of the plugs!

The input terminals are provided with LEDs displaying the respective state of the inputs.

For further information, please refer to the project planning manual of the controls L45/L65/L85 ([R911332116](#)).

10.7.10 Digital onboard outputs on the controls L45, L65, L75 and L85

Eight digital outputs are arranged on the slots 3 and 4 between the digital inputs and the power terminals.

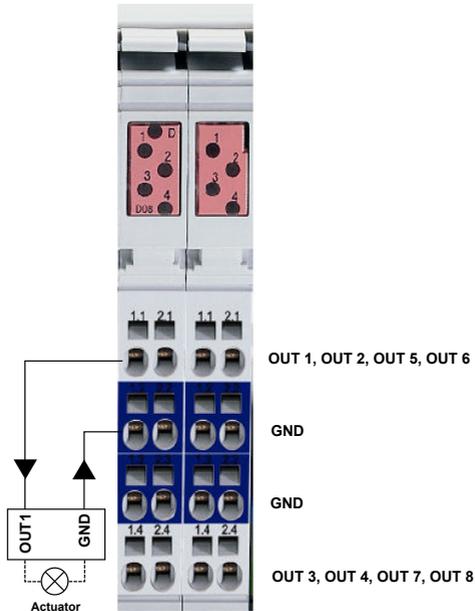


Fig. 10-26: L45, L65, L75 and L85: Digital inputs at the connector set "R-IB IL CML S01-PLSET"



Observe the color-coding of the plugs!

The output terminals are provided with LEDs displaying the respective state of the outputs.

For further information, please refer to the project planning manual of the controls L45/L65/L85.

NOTICE

Destruction of the component group due to improper connection

- Avoid polarity reversal with simultaneous short circuit of the output lines
- Avoid polarity reversal with simultaneous connection of externally polarized suppressor diodes
- Avoid applying an external voltage greater than the segment voltage U_S at the digital output

NOTICE

If the 2-pin connection is incorrect, there is no protection from GND breakage anymore.

The 0 V reference of the connected loads has to be returned to the 0 V connection of the control. I.e. a two-pin connection has to be ensured. Otherwise, protection from GND breakage is not ensured.

10.7.11 Further interfaces

Further interfaces (Ethernet, Profibus DP, Sercos, Ready contact, Compact Flash card, Inline bus and function modules) are described in the project planning manuals of the controls Rexroth IndraControl L45/L65/L75/L85 and Rexroth IndraControl L25, see also ["Related documents" on page 2](#).



Connect the Ready contact (X2R) using cables with a conductor cross-section of AWG 16-24.

11 Commissioning

11.1 General information

NOTICE

Uncontrolled machine movement caused by operation without Compact Flash card or by removal of the Compact Flash card during operation.

Do not remove the Compact Flash card when the control is running!

11.2 Commissioning steps

To commission the control, further parameterization or programming is necessary.

To commission the device, proceed as follows:

1. Mount the control.
(For details, refer to [chapter 10 "Mounting, demounting and electric installation" on page 16](#)).
2. Insert the Compact Flash card with approved firmware.
3. Connect the power supply via the connectors from the connector set.
For details, please refer to [chapter 10.7.3 "Voltage supply for the control" on page 30](#) and the relevant project planning manuals.
4. Switch on the control

NOTICE

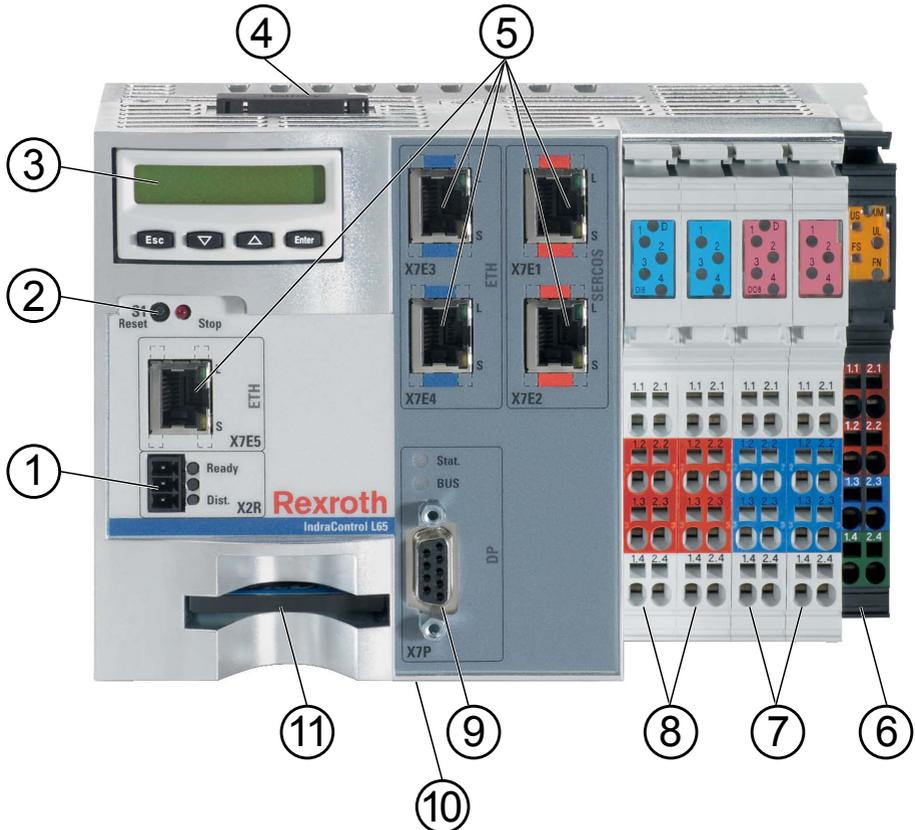
Malfunctions of the control if the control is switched off while updating.

Ensure that, depending on the software variant, "HW init" is displayed after switching on the control. Wait until the procedure is completed (approx. 20 seconds). Do **not** switch off the control. Within this period, an update is running. This procedure has to be completed. Subsequently, continue commissioning.

5. If necessary, use a lithium battery for the optional SRAM memory, see also [chapter 5 "Spare parts, accessories and wear parts" on page 6](#) and [chapter 14.4 "Lithium battery" on page 45](#)
6. If necessary, make other settings (IP address, subnet mask, gateway address, ...) at the display. For further information, please refer to the description of the relevant system (MLC, IndraLogic, MTX, MLC, XLC).

12 Device description

12.1 General information



- | | |
|------------------------------------|-------------------------------|
| ① Ready contact | ⑦ Digital outputs |
| ② Reset button and stop LED | ⑧ Digital inputs |
| ③ Display with four operating keys | ⑨ RS485 |
| ④ Battery | ⑩ Fan if available |
| ⑤ Ethernet interfaces | ⑪ Slot for Compact Flash card |
| ⑥ Voltage supply | |

Fig. 12-1: Front view of a control (here: L65)

13 Error causes and troubleshooting



Repairs at the device by the customer are not permitted. Exceptions are maintenance works listed in the chapter "Maintenance".

For further information in the event of repair, please contact the Bosch Rexroth Service.

"System is booting" and "No Compact Flash" displays

The "System is booting" and "No Compact Flash" displays directly refer to the control while other displays are system-specific. Initiate the actions listed in the following table if the LED indicates an error or a notice.

Further operating and error displays and remedies - "Stop" LED

The "Stop" LED is located on the front side of the control. The LED states are described in the following table.

Display	Meaning (Firmware-dependent)	Action
Off	Normal state	-
Lights red	STOP, system error	The errors and corresponding actions are system-specific. E.g.: <ul style="list-style-type: none">• No display plugged in. Connect the display.• No Compact Flash. Insert the Compact Flash card.
Flashes red	Outputs are blocked	-

Tab. 13-1: Operating and error displays on the control front: "Stop" LED
Further operating and error displays are located on the individual modules and terminals. For the meaning of the further displays, please refer to the relevant documentation, see also "[Related documents](#)" on page 2.

14 Maintenance

14.1 General information



Only the maintenance works at the device listed in this chapter are permitted.

For further information in the event of repair, please contact the Bosch Rexroth Service.

14.2 Regular maintenance tasks

Include the following measures into the maintenance schedule:

- Check all plug and terminal connections of the components for proper tightness and possible damage at least once a year

- Ensure that cables are not broken or crushed
- Replace damaged parts immediately

14.3 Display (LCD)

If the readability of the display deteriorates, it might have to be replaced. For further information, please contact the Bosch Rexroth Service, see also [chapter 17 "Service and support" on page 48](#).

Only use the display set specified in [chapter 5.5 "Display set" on page 7](#). Description of the display exchange is included in the scope of delivery of the display set.

14.4 Lithium battery

The controls L45, L65, L75 and L85¹⁾ with SRAM contain a lithium battery to buffer the SRAM memory. If this battery is empty or weak, data is lost in the SRAM. The system firmware checks the battery state and reports on time when to replace the battery.

Battery exchange



Only use the Bosch Rexroth battery specified in [chapter 5 "Spare parts, accessories and wear parts" on page 6](#).

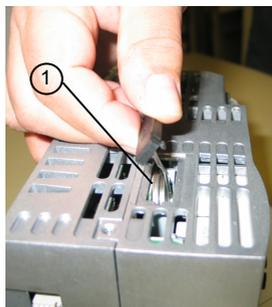


Data loss when the control is switched off!

Ensure that the control is switched on during battery exchange.

Proceed as follows to exchange the battery:

1. While the control is switched on, open the battery case (see figure 14-1).

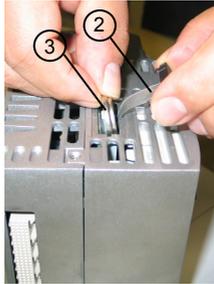


① Battery case at the control

Fig. 14-1:

1) The battery is included in the scope of delivery of the L85 control. The battery has to be ordered separately for the L45 and L65 controls.

2. Pull the battery with the plastic strap out of the housing.
3. To insert a new battery, pull the battery cover forward using the plastic strap attached (see ② in figure 14-2).



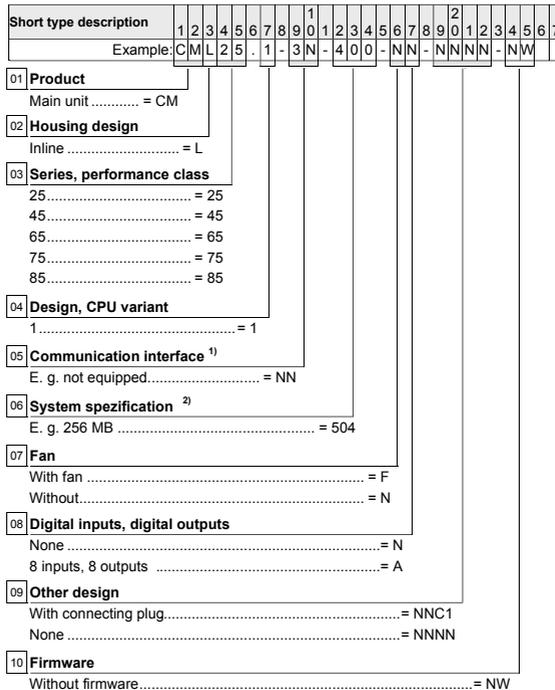
- ② Battery cover with plastic strap
- ③ Battery

Fig. 14-2: Inserting the new battery

4. Insert the new battery with the negative terminal in the direction of the device front into the battery holder (see ③ in figure 14-2).
5. Afterwards, engage the battery cover at the control housing.

15 Ordering information

15.1 Type code Lx5



Note:

1) Table of communication interface combinations

Interface 1	Short text column 9	Interface 2	Short text column 10
Not equipped	N	Not equipped	N
Sercos III	3	Sercos III	3
Profibus	P	Profibus	P

2) Table of system specification combinations

DRAM (MB)	Short text column 12	NvRAM (kB)	Short text column 13	SRAM (MB)	Short text column 14
128	4	Without	0	8	4
256	5	Without	0	16	5
512	6	Without	0	Without	0
1024	7	Without	0	Without	0
2048	8	Without	0	Without	0
4096	9	Without	0	Without	0

Fig. 15-1: Type code Lx5

15.2 Accessories and spare parts

For ordering information on accessories and spare parts, refer to [chapter 5 "Spare parts, accessories and wear parts"](#) on page 6.

16 Disposal

16.1 General information

Dispose the products according to the respective valid national standard.

16.2 Return

For disposal, our products can be returned free of charge. However, the products must be free of remains like oil and grease or other impurities.

Furthermore, the products returned for disposal must not contain any undue foreign substances or components.

Send the products free of charge to the following address:

Bosch Rexroth AG
Electric Drives and Controls
Bürgermeister-Dr.-Nebel-Straße 2
D-97816 Lohr am Main, Germany

16.3 Packaging

The packaging material consists of cardboard, plastics, wood or styrofoam. Packaging material can be recycled anywhere.

For ecological reasons, please do not return empty packages.

16.4 Batteries and accumulators

Batteries and accumulators can be labelled with this symbol.



The symbol indicating "separate collection" for all batteries and accumulators is the crossed-out wheeled bin.

The end user within the EU is legally obligated to return used batteries. Outside the validity of the EU Directive 2006/66/EC keep the stipulated directives.

Used batteries can contain hazardous substances, which can harm the environment or the people's health when they are improperly stored or disposed of.

After use, the batteries or accumulators contained in Rexroth products have to be disposed of according to the country-specific collection system.

17 Service and support

Our worldwide service network provides an optimized and efficient support. Our experts offer you advice and assistance should you have any queries. You can contact us **24/7**.

Service Germany

Our technology-oriented Competence Center in Lohr, Germany, is responsible for all your service-related queries for electric drive and controls.

Contact the **Service Hotline** and **Service Helpdesk** under:

Phone: **+49 9352 40 5060**
Fax: **+49 9352 18 4941**
E-mail: service.svc@boschrexroth.de
Internet: <http://www.boschrexroth.com/>

Additional information on service, repair (e.g. delivery addresses) and training can be found on our internet sites.

Service worldwide

Outside Germany, please contact your local service office first. For hotline numbers, refer to the sales office addresses on the internet.

Preparing information

To be able to help you more quickly and efficiently, please have the following information ready:

- Detailed description of malfunction and circumstances
- Type plate specifications of the affected products, in particular type codes and serial numbers
- Your contact data (phone and fax number as well as your e-mail address)

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Notes

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