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Rexroth
Bosch Group

CS351/ CC-CS351

3 609 929 B45

AD/09.2014
DE/EN

Contents

The data specified above only serves to describe the product. No statements concerning a certain condition or suitability for a certain application can be derived from our information. The information given does not release the user from the obligation of own judgment and verification. Please note that our products are subject to a natural process of wear and aging.

This document was written in German.

1 About This Document

This manual contains important information on the safe and appropriate assembly, transport, commissioning, operation, maintenance, disassembly and simple troubleshooting of the CS351/CC-CS351 Compact System.

The description of the software used in the Compact System is not a part of these instructions. For any information on software and operation which you may require, please see the online help of the operating program for BS350 as well as the system documentation on the enclosed USB system stick.

Read these instructions completely, especially chapter “General safety instructions” on page 58 before working with the Compact System.

Scope of the documentation

This documentation is applicable for the CS351 and CC-CS351 Compact Systems. Tightening operations requiring documentation according to VDI/VDE 2862 Category A can be performed using tightening systems which consist of the ErgoSpin hand-held nutrunner and the CS351E... Compact System. Tightening operations requiring documentation according to VDI/VDE 2862 Category B can be performed using CC tightening systems which consist of the CC-ErgoSpin hand-held nutrunner and the CS351E... or CC-CS351E-D Compact System.

The CS351... Compact System allows connecting the system to field buses.

Related documents

Please also observe the generally applicable, legal or otherwise binding regulations of European or national legislation and the rules for the prevention of accidents and for environmental protection applicable in your country.

2 General safety instructions

The Compact System has been manufactured according to the accepted rules of current technology. There is, however, still a danger of personal injury or damage to equipment if the following general safety instructions and the warnings before the steps contained in these instructions are not complied with.

- Read these instructions completely and thoroughly before working with the Compact System.
- Keep these instructions in a location where they are accessible to all users at all times.
- Always include the operating instructions when you pass the Compact System on to third parties.

Intended use

The product described in this documentation is part of the control and power electronics for Rexroth tightening systems and is intended for the industrial application of tightening processes exclusively in conjunction with other products. Only use the product with the corresponding connecting cables. The product is intended for industrial use, and not for domestic applications.

NOTE

The Compact System CS351/CC-CS351 is not designed to be directly connected to the public low-voltage power supply, it is only intended for use in industrial environments (emission class A).

Observe the operating conditions and performance limits specified in the technical data.

Proper use includes having read and understood these instructions, particularly chapter 2 “General safety instructions”.

Only use the Compact System CS351 in conjunction with a Rexroth ErgoSpin/CC-ErgoSpin hand-held nutrunner or tightening spindles to tighten and loosen bolts and nuts. Only use the Compact System CC-CS351 in conjunction with a Rexroth CC-ErgoSpin hand-held nutrunner or tightening spindles to tighten and loosen bolts and nuts.

The integrated logic is not permitted for safety-critical applications. Safety-critical applications are all applications that may result in personal injury or property damage.

Improper use

Any use of the Compact System other than that described in the section “Intended use” is considered improper.

Personnel qualification

Assembly, commissioning and operation, disassembly, service (including maintenance and care) require basic electrical and mechanical skills and familiarity with the associated technical concepts. In order to ensure operating safety, these activities must therefore only be carried out by appropriately qualified technical personnel or an instructed person under the direction and supervision of qualified personnel.

Qualified personnel are those who are able to assess the tasks they are commissioned to perform, identify possible risks and take the appropriate safety measures due to their professional training, knowledge, and experience as well as their knowledge of the applicable regulations. Qualified personnel must observe the rules relevant to the subject area.

Safety instructions in this document

In this manual, all activities entailing a danger of personal injury or damage to the equipment are preceded by a warning. The hazard avoidance measures described must be observed.

Warnings are structured as follows:

⚠ SIGNAL WORD

Type of HAZARD!

Consequences

▶ Precautions

- **Warning symbol (warning triangle)**: alerts the user to the hazard
- **Signal word:** identifies the severity of the hazard
- **Type of hazard:** identifies the type or source of the hazard
- **Consequences:** describes the consequences of failing to comply with the safety instructions
- **Precautions:** indicates how the hazard can be avoided

	This warning symbol cautions against dangers to your health. Observe all safety instructions that follow this symbol to avoid possible injuries or death.

	This warning symbol cautions against dangers to your health caused by electric voltages or currents. Observe all safety instructions that follow this symbol to avoid possible injuries or death.

The signal words have the following meanings:

⚠ DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, will certainly result in death or serious injury.

⚠ WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, can result in death or serious injury.

⚠ CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, can result in minor or moderate injury or damage to equipment.

General safety instructions

NOTE

NOTE indicates a situation which, if not avoided, can result in minor or moderate damage to equipment.

If this information is not observed, operation may be impaired.

Adhere to the following instructions

General instructions

Observe the valid regulations for occupational safety and environmental protection for the country where the product is used and at the workplace.

Only use Rexroth products that are in perfect technical condition.

- Check the product for visible defects such as cracks in the housing or missing screws or seals.

Do not change or modify the Compact System under any circumstances.

Only use the product within the performance range indicated in the technical data.

Persons who assemble, operate, disassemble or maintain Rexroth products must not do so while under the influence of alcohol, other drugs or pharmaceuticals that may affect their ability to respond.

Do not expose the Compact System to unacceptable mechanical loads under any circumstances. Never use the product as a handle or step. Do not place any objects on it.

Observe the local, system-specific regulations and requirements; proper use of tools, lifting, and transport equipment; as well as the relevant standards, provisions, and occupational safety regulations.

During assembly

Make sure the system component in question is depressurized and de-energized before assembling the product or connecting or disconnecting plugs. Protect the system from being switched on.

Lay cables and lines in accordance with the permissible bending radiuses so that they cannot be damaged and no one can trip over them.

Before commissioning, make sure that all the connection gaskets and plugs are installed correctly to ensure that they are leakproof and fluids and foreign bodies are prevented from penetrating the product.

During commissioning

Let the product acclimate itself for several hours before commissioning, otherwise condensation may form in the housing. Condensation can damage the compact system when it is switched on.

Make sure that all electrical connections are either assigned or covered. Commission the product only if it is installed completely.

During operation

Only allow persons who are authorized by the operator to access the system's direct operating area. This also applies when the system is not in operation.

In case of an emergency, fault or any other anomalies, switch the system off and protect it from being switched on again.

DANGER

Inadequate emergency OFF equipment!

Danger to life through electrical or mechanical forces

- The user is responsible for determining the need for an emergency OFF system, its implementation, and the risk analysis therefor! Make sure the emergency OFF equipment is accessible and effective. Releasing the emergency OFF equipment must not result in an uncontrolled system restart!
- Check the function of the emergency OFF equipment before switching the system on.

Only operate the Compact System in grounded networks. Operation in non-grounded networks (IT network) is not permitted, as clearance and creepage distances in the system may be overloaded.

Here, protective grounding is the permissible protective measure in accordance with EN 50178. The input cable to the Compact System must have a PE wire.

Ensure that there is potential equalization between the workpiece and the tightening spindle, as well as the carrier plate therefor, so that potential equalization is ensured for all system components.

Protect the system from short circuits in the connector cables with a fuse provided by the customer.

After switching the device off, wait 10 seconds before turning it back on.

Observe the discharging time (at least 90 seconds after disconnecting the system from the network) before working on the power supply connections.

During cleaning

Cover all openings with appropriate protective devices to prevent detergent from getting into the system.

Never use solvents or aggressive detergents. Only clean the product using a slightly damp, lint-free cloth. Only use water to do this and, if necessary, a mild detergent.

Do not use a high-pressure cleaner for cleaning.

During maintenance and repair

Perform the prescribed maintenance work at the intervals specified in the instruction manual.

Make sure that no lines, connectors or components are disconnected while the system is under pressure and energized. Protect the system from being switched on again.

Disposal

Dispose of the product in accordance with the currently applicable national regulations in your country.

Batteries must not be disposed in the general waste; the end user is obliged by law to return used batteries. Used batteries may contain contaminants which might be harmful for the environment or for your personal health if not correctly stored or disposed of. However, batteries also contain various valuable materials and must be collected and recycled separately.

Our batteries can be returned after use either

- to commercial waste management companies for used batteries
- to treatment facilities for used devices according to the electric and electronic devices act
- or free of charge at our distribution agencies or the Murrhardt site

The symbol with the crossed out waste container means that batteries must not be disposed of in the general waste but collected and recycled separately.

3 Scope of delivery

The delivery contents include:

- 1 CS351 or CC-CS351 Compact System
- 1 power supply connection cable (in acc. with the EU regulations), length 2 m
- 1 hardware operating instructions for the Compact System
- 1 suspension strip
- Preassembled dummy panels on all slots

4 Product description

Performance description

The Compact System combines a servo amplifier, power supply, display, controller, and slots for optional interface cards.

The system is a comprehensive solution for use with ErgoSpin or CC-ErgoSpin hand-held nutrunners or tightening spindles.

Compact System variants for hand-held nutrunners include:

- CS351E-D with LC display.
- CS351E-D IL with LC display and integrated logic compliant with IEC 61131-3.
- CS351E-G with large color TFT display (VGA 640x480) with integrated touchscreen.
- CS351E-G IL with large color TFT display (VGA 640x480) with integrated touchscreen and integrated logic compliant with IEC 61131-3.
- CS351E-G+ with large color TFT display (VGA 640x480) with integrated touchscreen, integrated logic compliant with IEC 61131-3., and integrated computer unit
- CS351E-D NK with LC display for connection to the modular system 350 (SB356, BT356).

A Compact System variant for hand-held nutrunners is:

- CC-CS351E-D with LC display.

Compact System variants for tightening spindles include:

- CS351S-D with LC display.
- CS351S-D IL with LC display and integrated logic compliant with IEC 61131-3.
- CS351S-G with large color TFT display (VGA 640x480) with integrated touchscreen.
- CS351S-G IL with large color TFT display (VGA 640x480) with integrated touchscreen and integrated logic compliant with IEC 61131-3.
- CS351S-G+ with large color TFT display (VGA 640x480) with integrated touchscreen, integrated logic compliant with IEC 61131-3., and integrated computer unit
- CS351S-D NK with LC display for connection to the modular system 350 (SB356, BT356)

In normal operating state, the front panel is covered.
The front cover can be opened or removed to connect external devices.

Product description

Device description

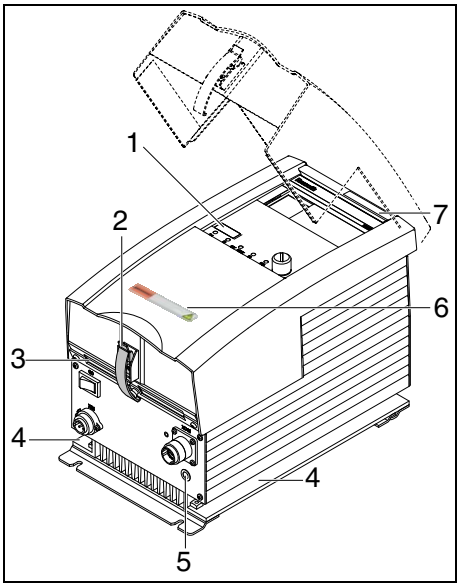

Fig. 1: Compact System view

Legend relating to Fig. 1:

1 Name plate

2 Front cover lock

3 Cable duct strip

4 Side cable ducts

5 Affixed pressure compensation membrane
(do not remove)

6 Safety warning (only visible when front cover is open)

7 Type label

Warning

This warns about the high electrical voltages in the Compact System during operation and provides maintenance information (see “Disassembly and replacement” on page 101).

Interface overview

Controller and servo amplifier of the Compact System feature the following available electrical interfaces (see Fig. 2; the interface components depend on the particular CS variant):

Outside the front cover:

- 1 USB device interface for CS351 controller (X3U3),
  specification compatible with 2.0
  (with screwed-on cover)
- 1 power supply connection interface (X1N)
- CS351E: interface for hand-held nutrunner (XDS1)
- CS351S: interface for tightening spindle (XDS2)
- 1 power switch (Q0)

Inside the front cover:

- 1 motor OFF interface (XDN1)
- 2 USB host interfaces for CS351 controller (X3U1, X3U2), specification 2.0
- 1 slot (A) for the use of standard type A modules
  Slot A is without function in CC-CS351; inserted modules will not be detected
- 2 slots (B1, B2) for the use of standard type B modules
  Slot B2 is not applicable in CS351E-G+ and CS351S-G+ due to the integrated computer unit.
- 1 restart/reset button (reset)
- 1 RS232 interface for CS351 controller (X3C1),
- 1 Ethernet interface (X7E1) for CS351 controller
- 1 mass storage slot (X6C1)
- Only in CS351E-D (IL) / CS351S-D (IL):
  - DVI interface to connect an external monitor (DVI-D single link, XDVI)
  - USB host interface (X3U4)
- Only in CS351E-D NK/ CS351S-D NK:
  - Interfaces for connection to the system bus 350 (XDAC1, XDAC2)

The external interfaces of the integrated computer unit (variants) CS351E-G+, CS351S-G+) are arranged inside the front cover below slots B1/B2 (see Fig. 3):

- Slot for a Micro-SD memory card (X6MSD2)
- Status bar (St1, St2), St2 is orange in normal operation mode
- Reset button of the integrated computer unit (reboot)
- RS232 interface of the computer unit (X3C2)
- 1 DVI interface to connect an external monitor (DVI digital, XDVI2)
- 3 USB interfaces (X3U6, X3U7, X3U8) to connect a mouse, keyboard, USB stick
- 1 Ethernet interface (X7E4) to the built-in Ethernet switch (connected to computer unit and CS351 controller)
- 1 Ethernet interface (X7E5) for integrated computer unit

NOTE

Damage due to use of non-original parts!

Damage to the Compact System

▶ Only use interface modules from Rexroth (manufacturer ID “Rexroth”).

Product description

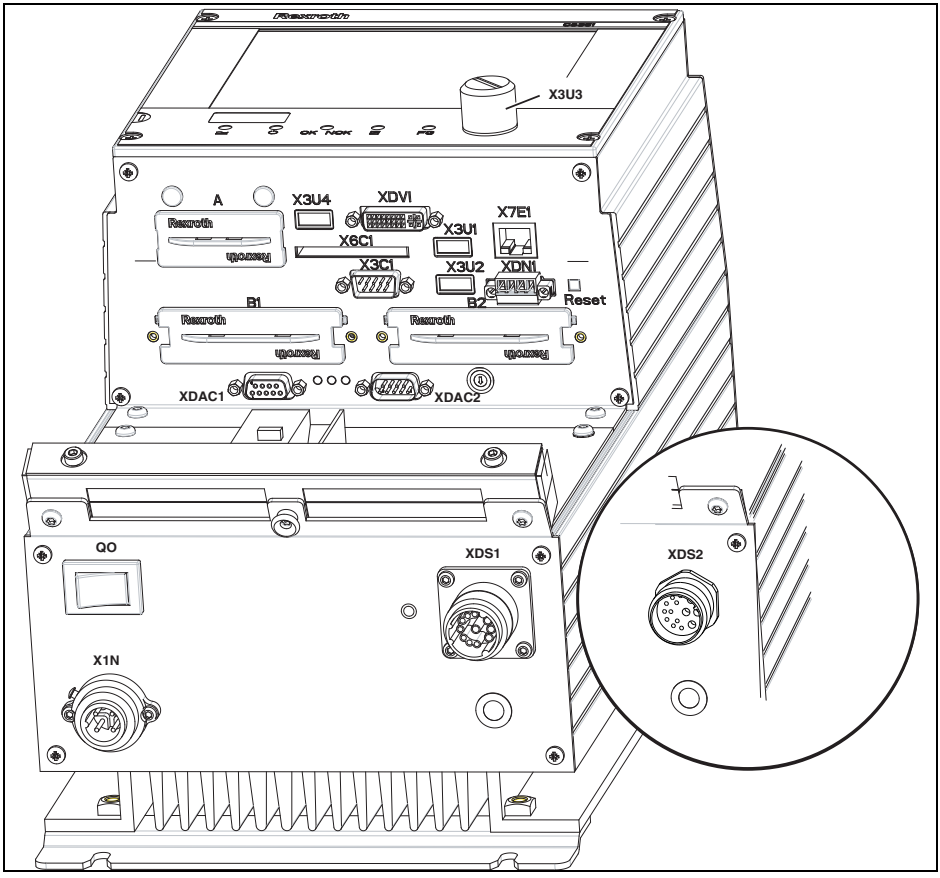

Fig. 2: Available interfaces of the Compact System (interface components depending on CS variant)

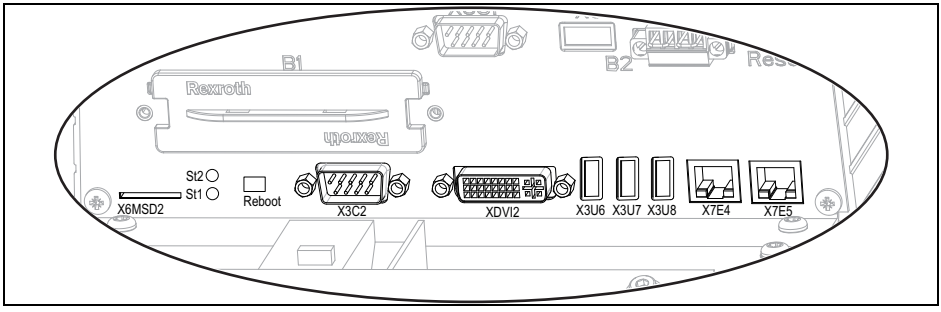

Fig. 3: Interfaces of the integrated computer unit (below slots B1/B2)

Tab.1: Interface combinations

Variant / Interface	CS351S-D	CS351S-D IL	CS351S-G	CS351S-G IL	CS351S-G+	CS351S-D NK	–
	CS351E-D	CS351E-D IL	CS351E-G	CS351E-G IL	CS351E-G+	CS351E-D NK	CC-CS351E-D
Inside the front cover							
XDN1	X	X	X	X	X	X	X
X3U1, X3U2	X	X	X	X	X	X	X
Slot A	X	X	X	X	X	–	–
Slot B1	X	X	X	X	X	X	X
Slot B2	X	X	X	X	–	X	X
X3C1	X	X	X	X	X	X	X
X7E1	X	X	X	X	X	X	X
X6C1	X	X	X	X	X	X	X
XDVI	X	X	–	–	–	–	X
X3U4	X	X	–	–	–	–	X
XDAC1, XDAC2	–	–	–	–	–	X	–
X6MSD2	–	–	–	–	X	–	–
X3C2	–	–	–	–	X	–	–
XDVI2	–	–	–	–	X	–	–
X3U6 – X3U8	–	–	–	–	X	–	–
X7E4, X7E5	–	–	–	–	X	–	–
Outside the front cover							
X1N	X	X	X	X	X	X	X
X3U3	X	X	X	X	X	X	X
XDS1	CS351E-D	CS351E-D IL	CS351E-G	CS351E-G IL	CS351E-G+	CS351E-D NK	CC-CS351E-D
XDS2	CS351S-D	CS351S-D IL	CS351S-G	CS351S-G IL	CS351S-G+	CS351S-D NK	–

X: Interface present

–: Interface not present or without function

4.1 External interfaces

X1N power supply connection interface

The compact system is delivered with an EU power supply connection and power plug with screw terminals. The power supply connection cable can be unscrewed at the connection plug and assembled as desired.
A connection cable for the American market is available, but must be ordered separately.

NOTE

Damage due to use of non-original parts!

Damage to the Compact System

- Only use power supply connection cables from Rexroth.
- The Rexroth product range includes suitable cables. Observe local regulations in this regard.

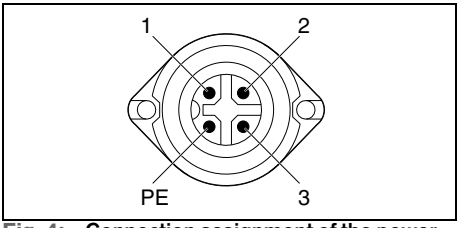

Fig. 4: Connection assignment of the power supply connection plug

Tab.2: X1N pin assignment

Pin	Signal	Description/ function	Voltage/ current
1	L1	L1 power supply connection	230 V_{AC}/5 A, 120V_{AC}/10A
2	N	Power supply connection neutral	230 V_{AC}/5 A, 120V_{AC}/10A
3	n.c.	-	
PE	PE	Leading PE wire	PE potential

XDS1 interface for hand-held nutrunner

The ErgoSpin/CC-ErgoSpin hand-held nutrunner is connected to the Compact System via a spindle connection cable that is connected to the 11-pin connection socket. The power supply for the motor, logic supply, and transmission of interface signals is provided via this cable.

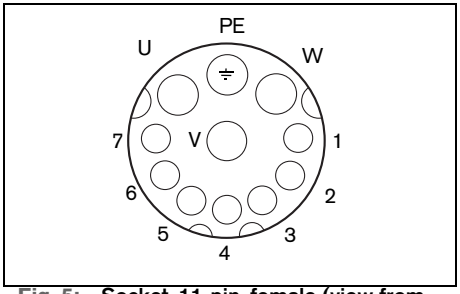

Fig. 5: Socket, 11-pin, female (view from front side)

Tab.3: XDS1 assignment

Pin	Signal	Description/function
1	CANL	Serial spindle data CAN low
2	CANH	Serial spindle data CAN high
3	VEE	24 V spindle power supply
4	GND	Reference potential logic
5	HS	Start switch for motor contactor (motor breaker)
6	B	Serial interface B
7	A	Serial interface A
U	U	Motor phase U
V	V	Motor phase V
W	W	Motor phase W
⏚	PE	Protective conductor (projecting)

XDS2 interface for tightening spindle

The tightening spindle is connected to the Compact System via a spindle connecting cable that is connected to the 14-pin socket.

The power supply for the motor and the transmission of the interface signals is provided via this cable.

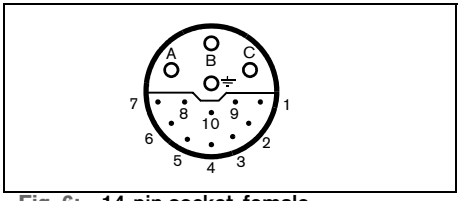

Fig. 6: 14-pin socket, female (front view)

Tab.4: XDS2

Pin	Signal	Description/function
⏚	PE	Protective conductor (projecting)
A	U	Motor phase U
B	V	Motor phase V
C	W	Motor phase W
1	VTR	Driver power supply
2	CANL	Serial spindle data CAN low
3	CHB	Incremental encoder channel 2
4	GND	Reference potential logic
5	INDX	Index impulse
6	VEE	24 V spindle power supply
7	MKTF	Motor ID and motor temperature error
8	HS	Start switch for motor contactor (motor breaker)
9	CANH	Serial spindle data CAN high
10	CHA	Incremental encoder channel 1

Product description

1 motor OFF interface XDN1

⚠ CAUTION

Risk of damage to persons and property!

- Make sure the emergency OFF equipment is accessible and effective. Releasing the emergency OFF equipment must not result in an uncontrolled system restart!!

The motor off interface is used to integrate the tightening controller into an emergency stop mechanism. For information about the category and performance level of the motor off interface, refer to the technical information TIe_197 or the project planning manual.

Two independent motor stop circuits are available:

- motor off circuit 1 (NH1) is implemented via a contactor installed in the Compact System. This separates the motor from the servo amplifier (motor is braked).
- motor off circuit 2 (NH2) prevents the development of a motor rotating field (motor is not braked).

Both connections are bridged in the delivery state.

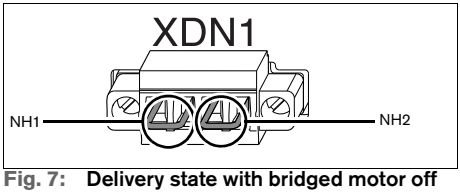

Fig. 7: Delivery state with bridged motor off circuits (NH1 and NH2)

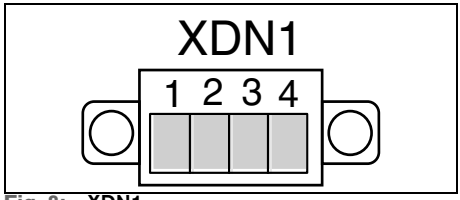

Fig. 8: XDN1

Tab.5: XDN1 assignment

Pin	Signal assignment	Descrip-tion/ function	Voltage/ current
1	VEE NH1	motor off 2 supply voltage	24 V/0.3 A
2	NH1	motor off 1 return (motor contactor)	24 V/0.1A
3	VEE NH2	motor off 2 supply voltage	24 V/0.3 A
4	NH2	motor off 2 return (end step)	24 V/0.1A

Boundary conditions:

- The maximum cable length for the motor OFF circuit is 30 m.
- Always design the motor OFF circuits separately and with potential-free contacts. Do not mix up the motor OFF circuits under any circumstances.
- Both motor OFF interfaces must be led back. If only one is used, the other one must be provided with a wire jumper.
- If you are only using one motor OFF connection option, we recommend implementing the motor OFF function via motor OFF circuit NH1 (see Fig. 9, page 72).

The maximum torque at the bolted connections of the terminals at XDN1 must not exceed 0.3 Nm.

⚠ CAUTION

Risk of damage to persons and property!

- The user is obliged to maintain the system-specific requirements for an emergency OFF system.
- When using external power supply contactors in higher-level emergency OFF circuits, observe the restarting time of 10 seconds for single switching and 30 seconds for repeated switching.
- Check that the emergency OFF circuits are functioning properly before commissioning the tightening system.
- Observe the local, system-specific regulations and requirements; proper use of tools, lifting, and transport equipment; as well as the pertinent standards, provisions, and occupational safety regulations.

⚠ CAUTION

Risk of damage to persons and property!

Dangerous shock currents due to inadequate PE wire connections!

- Protective conductor connections must not be affected by mechanical, chemical, or electrochemical influences. The connection must be permanent.

NOTE

- The voltage circuits at terminal XDN1 are safely isolated from the power supply circuits (safe isolation in accordance with EN50178). The requirements for safe isolation of electric circuits must be observed when using the connection options on this terminal.

Product description

Motor OFF protective circuit

1. Cut-out via the internal motor contactors

After a cut-out via the motor contactor, the motor phases are electromechanically isolated from the power supply.

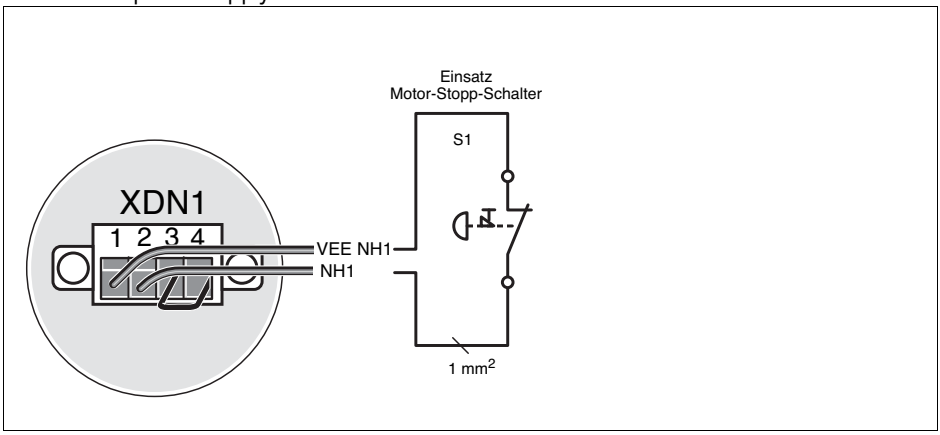

Fig. 9: Motor OFF circuit 1 (NH1) connection to the Compact System

Motor Off switch directly connected to the contacts for motor OFF

If the S1 motor breaker switch is actuated, the motor of the hand-held nutrunner/tightening spindle will be decelerated by the servo amplifier and the internal contactor in the compact system will be opened. This tightening job abort leads to an error message in the controller. The error message is automatically acknowledges once switch S1 is closed again. Now you can restart the system.

2. Cut-out via the end step

In addition, the motor OFF can be switched via the end step or along with the cut-out via the motor contactors (double protection).

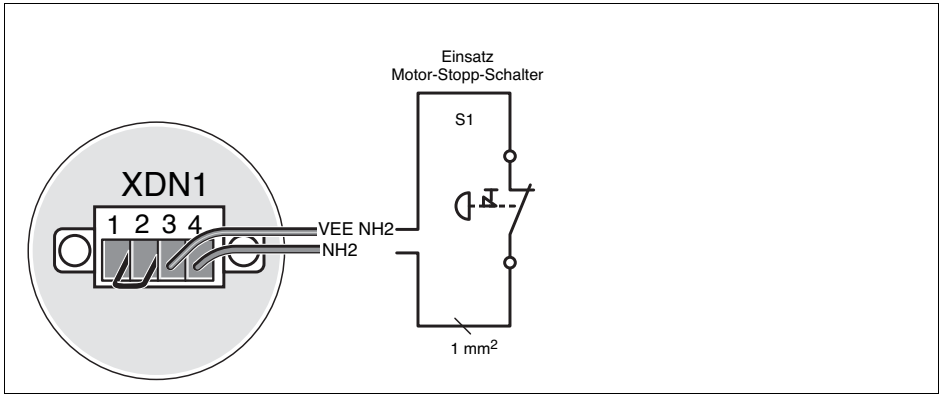

Fig. 10: Motor OFF circuit 2 (NH2) connection to the Compact System

Use of the ErgoSpin/CC-ErgoSpin hand-held nutrunner as a stationary tightening spindle (valid for " 1. Cut-out via the internal motor contactors" and " 2. Cut-out via the end step")

If the ErgoSpin/CC-ErgoSpin hand-held nutrunner is used as a stationary tightening spindle, the start switch must be continually actuated.

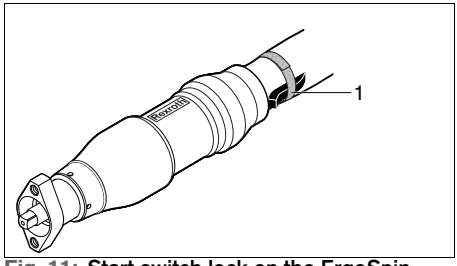

Fig. 11: Start switch lock on the ErgoSpin hand-held nutrunner

1 Band with Velcro® (see ErgoSpin accessories)

Product description

Ethernet interface X7E1

The interface has an 8-pin RJ45 socket (10/100 Base T) design.

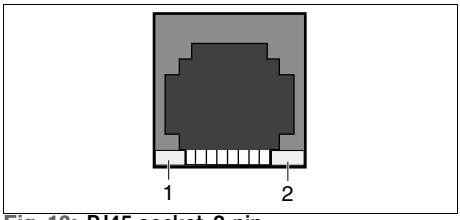

Fig. 12: **RJ45 socket, 8-pin**

1 Yellow LED

2 Green LED

Tab.6: LED states

LED	State	Display/description
1	Yellow	Transfer speed 100 Mbit/s
	Off	Transfer speed 10 Mbit/s
2	Green	Connection to network is active
	Green Flashing	Data transfer running
	Off	No connection to network

Tab.7: X7E1 assignment

Pin	Signal	Description/function
1	Transmit +	Ethernet transmission cable
2	Transmit –	Ethernet transmission cable
3	Receive +	Ethernet reception cable
4	n.c.	
5	n.c.	
6	Receive –	Ethernet reception cable
7	n.c.	
8	n.c.	

The MAC address can be found on the name plate on the top of the Compact System.

RS232 interface X3C1

This interface is intended to connect a printer or scanner. The maximum data transmission rate is 115 kbit/s.

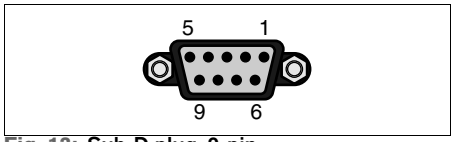

Fig. 13: **Sub-D plug, 9-pin**

Tab.8: X3C1 assignment

Pin	Signal	Description/function	Voltage/current/standard
1	-		
2	RxD	RS232 receive	–12 V to +12 V, RS232
3	TxD	RS232 send	–12 V to +12 V, RS232
4	-	-	-
5	GND	Reference potential logic	
6	-		
7	RTS	RS232 Request send	–12 V to +12 V, RS232
8	CTS	RS232 Enable send	–12 V to +12 V, RS232
9	-		

A slot interface (A)

This interface is intended for use of type A interface modules from Rexroth.

NOTE

Damage due to improper assembly!

Damage to the connections

- Carefully insert the modules, following the assembly instructions in the module operating instructions.
- Only use interface modules from Rexroth.

An overview of all available interface modules can be found on the Internet at www.boschrexroth.com/schraubtechnik.

B slot interfaces (B1, B2)

These interfaces are intended for use of type B interface modules from Rexroth.

NOTE

Damage due to improper assembly!

Damage to the connections

- Carefully insert the modules following the assembly instructions in the module operating instructions.
- Only use interface modules from Rexroth.

An overview of all available interface modules can be found on the Internet at www.boschrexroth.com/schraubtechnik.

Slog B2 is not applicable in compact systems with integrated computer unit. The computer unit must be configured as interface module in slot B2 on commissioning.

NOTE

Damage due to improper disassembly/assembly!

Damage to the connections

- The computer unit is an integral part of the tightening system. It must not be installed in or removed from the Compact System subsequently like an interface module.

Product description

Slot for the mass storage (X6C1)

This interface is intended for the use of the CF350 mass storage.

NOTE

Damage due to improper assembly!

Damage to the connections

- Only use mass storage from Rexroth.
- Insert the CF350 mass storage in the Compact System with the plug-in connections facing forwards, so the “Rexroth” product label (front of the card) is visible.
- When installed, the mass storage will protrude approximately 1.5 cm from the device. Push it into the slot until you feel it reach the end stop.

NOTE

Damage caused by disconnecting the mass storage with voltage applied!

Damage to the mass storage

- Only disconnect the mass storage when the Compact System is not under voltage.

USB host interfaces (X3U1, X3U2)

These interfaces are designed as type A sockets. They meet the requirements according to USB Specification 2.0.

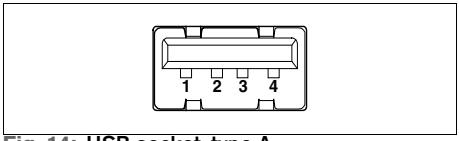

Fig. 14: USB socket, type A

Tab. 9: X3U1, X3U2 assignment

Pin	Signal	Description/ function	Volt-age/ current
1	VCC	5 V supply	5 V= / 0.5 A
2	USB_Data–	Receive USB data	
3	USB_Data+	Receive USB data	
4	GND	Reference potential for all voltages	PE potential

USB device interface (X3U3)

This interface is intended for the connection of a PC for programming and parameterization. It is designed as a type B socket. It is compatible with USB 2.0 (maximum data rate 3 Mbit/s)

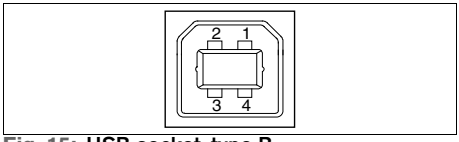

Fig. 15: USB socket, type B

Tab.10: X3U3 assignment

Pin	Signal	Descrip-tion/ function	Volt-age/ current
1	USB_S_VBUS	5 V supply from PC activates the interface	5 V= / 0.5 A
2	USB_S_Data–	Send USB data	
3	USB_S_Data+	Receive USB data	
4	GND	Reference po-tential for all voltages	PE poten-tial

USB host interfaces (X3U4)

These interfaces are designed as a type A socket. They meet the requirements according to USB Specification 2.0.

This interface serves as a USB return channel for the touchscreen/mouse. For this, the device connected to the return channel must behave like a USB mouse. The total current for all the USB host interfaces (X3U1, X3U2 and X3U4) may not exceed 1 A.

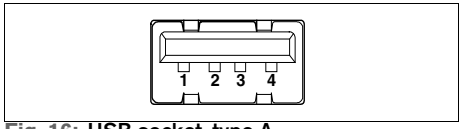

Fig. 16: USB socket, type A

DVI interface (XDVI)

Tab.11: X3U4 assignment

Pin	Signal	Description/ function	Volt-age/ current
1	VCC	5 V supply	5 V= / 0.5 A
2	USB_Data–	Receive USB data	
3	USB_Data+	Receive USB data	
4	GND	Reference poten-tial for all voltages	Potential PE

This interface is intended for the connection of an external monitor. It is designed as a socket in accordance with the Single Link Digital DVI specification.

- You can connect a DVI monitor with the following resolutions:
  - VGA (640 x 480)
  - SVGA (800 x 600)
  - XGA (1024 x 768)

It is not possible to connect a VGA monitor via an interface adapter.

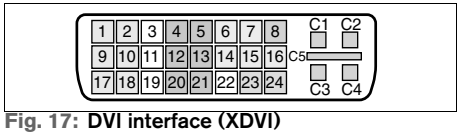

Fig. 17: DVI interface (XDVI)

Product description

Tab.12: DVI interface (XDVI) assignment

Pin	Signal	Description/ function	Voltage/ current
1	TMDS data 2–	Data 2–	DVI differential
2	TMDS data 2+	Data 2+	DVI differential
3	TMDS data 2 shield	Shield for data 2	PE potential
4	n.c.		
5	n.c.		
6	DDC CLK	DDC clock	
7	DDC data	DDC data	
8	n.c.	Analog Vsync	
9	TMDS data 1–	Data 1–	DVI differential
10	TMDS data 1+	Data 1+	DVI differential
11	TMDS data 1 shield	Shield for data 1	PE potential
12	n.c.		
13	n.c.		
14	VCC	5 V supply	5 V= / 0.5 A
15	GND	Reference potential for all voltages	PE potential
16	HPD	Hot plug detect	
17	TMDS data 0–	Data 0–	DVI differential
18	TMDS data 0+	Data 0+	DVI differential
19	TMDS data 0 shield	Shield for data 0	PE potential
20	n.c.		
21	n.c.		
22	TMDS clock shield	TMDS clock shield	PE potential
23	TMDS CLK+	TMDS clock+	DVI differential
24	TMDS CLK–	TMDS clock–	DVI differential
C1	n.c.		
C2	n.c.		
C3	n.c.		
C4	n.c.		
C5	n.c.		

TMSD = transition minimized differential signaling

Interfaces for connection to the system bus (XDAC1, XDAC2)

The NK350 network coupler integrated in the CS351x-D NK Compact System allows connecting the compact system to the system bus of the 350 system. In this case, ,the CS351x-D NK Compact System can only cooperate with a KE350 communication unit that is installed in the BT356 subrack or SB356 system box. You cannot operate the CS351x-D NK as isolated system.

The NK350 network coupler allows up to 40 tightening channels in up to 16 BT356 subracks, SB35x system boxes and Compact System CS351x-D NK to be networked. It is equipped with an LED display for the illustration of network conditions.
The address of the
CS351x-D NK is set using the hex coding switch..
Additional bus termination resistors are not required.

The total cable length in the network is limited to 150 m. The maximum cable length between two network couplers may not exceed 50 m. The network cable between two network couplers may consist of no more than four partial segments. A ring structure is not permissible in the network configuration.

The D-Sub plugs of the network cables NKLxx have the protection class IP40. If several cables are assembled, the user must ensure the higher degree of protection that is possibly required.

If a network cable is created from several partial segments, distance segments are required at the connection points.

Tab.13: Spacer bolts for network lines

Manufacturer	Thread	Wrench size	Length	Order no.
FCT	4-40 UNC	4.5 mm	6.2 mm	F1066
Harting	4-40 UNC	5.0 mm	6.0 mm	09 67 001 9985
Provertha	4-40 UNC	4.5 mm	5.5 mm	53554 T

XDAC1, XDAC2

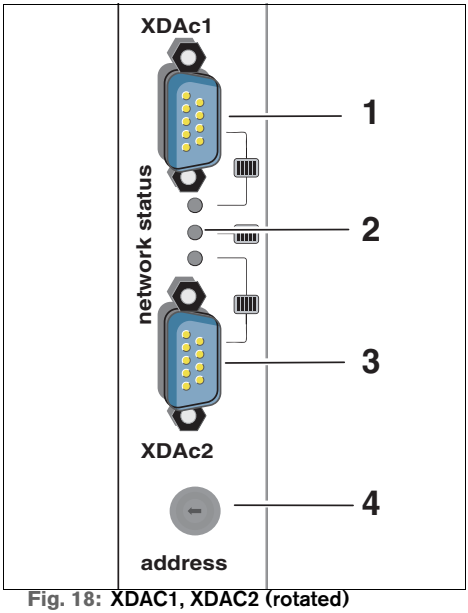

Fig. 18: XDAC1, XDAC2 (rotated)

1 XDAC1 (female)

2 System diagnosis LEDs

3 XDAC2 (male)

4 Hex coding switch
Address BT356/SB35x)

Product description

Interface XDAC1 (female)

This interface is intended for connecting an NKLx network cable in order to integrate further users.

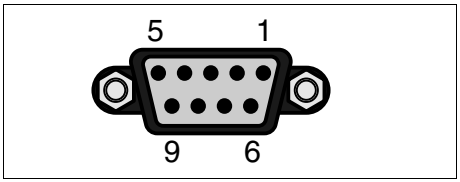

Fig. 19: 9-pin Sub-D socket

Interface XDAC2 (male)

This interface is intended for connecting an NKLx network cable in order to integrate further users.

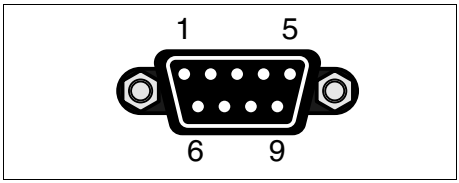

Fig. 20: 9-pin Sub-D plug

Tab. 14:

Pin	Signal	Description/function	Voltage/ current/ standard
1	GNDiso	Reference potential Bus, isolated from PE	0 V, potential-free
2	-	-	-
3	AC2+	Data bus, positive differential line	RS485, differential
4	AC1+	Control bus positive differential line	RS485, differential
5	GNDiso	Reference potential Bus, isolated from PE	0 V, potential-free
6	-	-	-
7	VEEiso	Bus supply, isolated from PE	10 V-25 V, potential-free
8	AC2–	Data bus, negative differential line	RS485, differential
9	AC1–	Control bus negative differential line	RS485, differential

Tab. 15:

Pin	Signal	Description/function	Voltage/ current/ standard
1	GNDiso	Reference potential Bus, isolated from PE	0 V, potential-free
2	-	-	-
3	AC2+	Data bus, positive differential line	RS485, differential
4	AC1+	Control bus positive differential line	RS485, differential
5	GNDiso	Reference potential Bus, isolated from PE	0 V, potential-free
6	-	-	-
7	VEEiso	Bus supply, isolated from PE	10 V-25 V, potential-free
8	AC2–	Data bus, negative differential line	RS485, differential
9	AC1–	Control bus negative differential line	RS485, differential

LED display

The network status is indicated by the three LEDs on the front panel (see Fig. 21):

- LED 1 describes the network status of the users connected to XDAC1,
- LED2 describes the network condition of the compact system
- LED 3 describes the network status of the users connected to XDAC2,

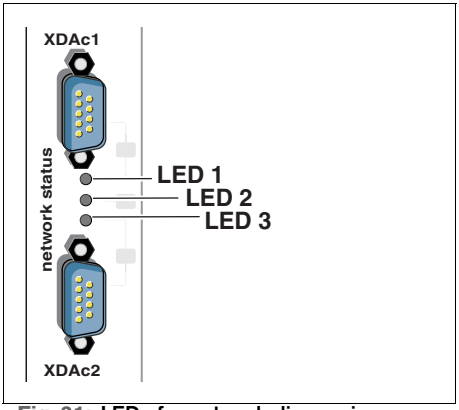

Fig. 21: LEDs for network diagnosis

Tab.16:

State	LED 1 user(s) at XDAC1	LED 2 Internal user(s)	LED 3 user(s) at XDAC2
Power supply too low	All three LEDs flashing red synchronously		
Connection is being established/reconfiguration	Yellow flashing light	Yellow flashing light	Yellow flashing light
Communication with user(s) at XDAC1 established	Green		
Communication with user(s) at XDAC2 established			Green
Internal communication established		Green	
Poor connection to user(s) at XDAC1[a)]	Red flashing light		
Poor connection to user(s) at XDAC2[a)]			Red flashing light
User at XDAC1 is not activated or not available	Off		
User at XDAC2 is not activated or not available			Off
Internal user(s) not activated		Off	

a) The cause may be a cable fault. Check whether the maximum cable length has been kept and replace the cable if necessary.

Hex coding switch

On networked systems (sibracks, system boxes or compact systems), the valid address must be set on the hex coding switch before commissioning. For this purpose, the address is determined on the internal bus.

This setting ensures a clear identification of each tightening channel. Values from 0 - F (address 0 - 15) can be entered. After having entered the address, you must reset or restart the system.

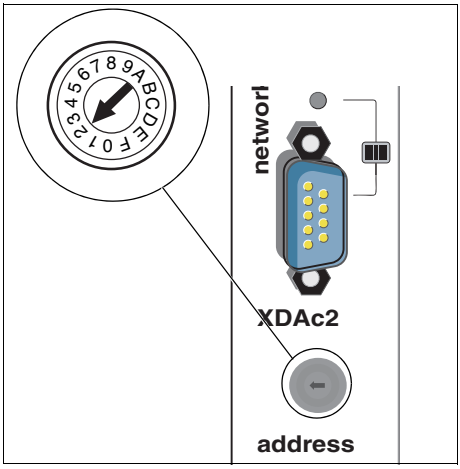

Fig. 22: **Setting the address of the Compact System**

NOTE

Never enter two identical addresses (subrack, system box or compact system) in the system bus. The address of a system bus consumer must always be unique.

4.2 Further interfaces of the variant with integrated computer unit

The integrated computer unit of the CS351E-G+ and CS351S-G+ variants features the following additional interfaces..

Slot for a Micro-SD memory card (X6MSD2)

The slot with SDIO interface (Secure Digital Input Output) is designed for an SD memory card of size 15 x 11 x 1mm (length x width x height) functioning according to SDHC standard.. These cards have a storage capacity of up to 32 GB.

NOTE

If it is inserted improperly, the memory card may get lost.

- Carefully insert the card in the slot, holding it straight and with its pins pointing forward. The product label (front of the card) must be uppermost. Particularly when starting insertion, make sure that you position the card in the guide provided and not in the gap between the card guide and the front panel.
- Push the memory card into the slot until you feel it reach the end stop. Do not push it any further.

Serial interface X3C2

The interface is intended for connection of a printer or scanner to the computer unit. The interface supports the RS232, RS422 and RS485 protocols.

It is designed as 9-pin male Sub-D socket.

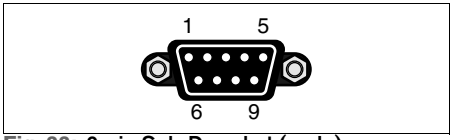

Fig. 23: 9-pin Sub-D socket (male)

The cable between the connected device and the serial interface may be no longer than 30 m.

DVI interface XDVI2

This interface is intended for the connection of an external TFT monitor. The interface is designed as a socket according to DVI specification.

It provides for connection of a digital monitor having a resolution of, e.g.,.1280 x 1024.

The cable between the connected monitor and the DVI interface XDVI2 may be no longer than 5 m.

It is not possible to connect a VGA monitor

For further information about the design of the DVI-D socket and its pin assignment, refer to page 77 et seq.

USB interfaces X3U6, X3U7, X3U8

These interfaces are designed as type A sockets. They meet the requirements according to USB Specification 2.0.

These sockets are intended for connection of a mouse, a keyboard or an external storage medium.

The cable between the connected USB device and the USB interface X3U6, X3U7 oder X3U8 may be no longer than 3 m.

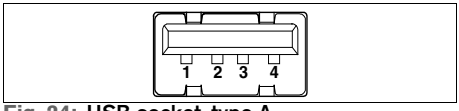

Fig. 24: USB socket, type A

Tab.17: X3U6, X3U7, X3U8 assignment

Pin	Signal	Description/ function	Volt-age/ current
1	VCC	5 V supply	5 V= / 0.5 A
2	USB_Data–	Receive USB data	
3	USB_Data+	Receive USB data	
4	GND	Reference potential for all voltages	PE potential

Ethernet interfaces X7E4, X7E5

The integrated computer unit features two Ethernet interfaces. The interfaces have an 8-pin RJ45 socket (10/100 BaseT) design.

- The X7E4 Ethernet interface is connected to the computer unit and the controller of the compact system via the internal switch.
- The X7E5 Ethernet interface is directly connected to the integrated computer unit.

For further information about the design of the RJ45 socket, its pin assignment and the states of its LEDs, refer to page 74.

LED indicators (St1, St2)

LEDs St1 and St2 (see Fig. 25) show the operating state of the computer unit..

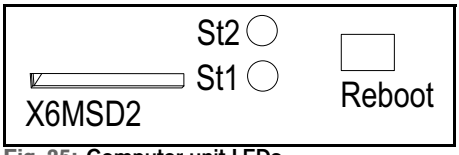

Fig. 25: Computer unit LEDs

If LED St1 is off and St2 emits orange light, the computer unit is functioning properly. Otherwise, the voltage supply is wrong or the computer unit is defective.

Computer unit components (CS351E-G+, CS351S-G+)

- Intel Atom 1.6 GHz processor
- 2 GB RAM
- 16 GB mass storage (Solid State Disk)
- Windows 7 (pre-installed)
- Built-in Ethernet switch for optional communication with the computer unit or the controller of the Compact System

5 Transport and storage

For storing and transporting the product always observe the ambient conditions specified in the technical data (see “Technical data” on page 103).

Make sure the Compact System is kept upright if it is transported in the assembled state. If it is not possible to keep it upright while transporting, secure the Compact System accordingly.

6 Assembly

Assembling the Compact System

⚠ CAUTION

Risk of damage to persons and property!

Assembly of the Compact System requires basic mechanical and electrical skills.

- No one except qualified personnel (see “Personnel qualification” on page 59) is authorized to assemble the Compact System.

⚠ WARNING

Dangerous shock currents due to inadequate PE wire connections!

Danger to life

- Make sure the PE wire connections have not been damaged by mechanical, chemical or electrochemical influences. A permanent connection is required.

⚠ CAUTION

Destruction of electrical components!

Health risk

- Do not destroy any installed components. Dispose of destroyed components in a professional way.

⚠ CAUTION

Electrostatic discharge!

Damage to the Compact System

- Comply with all the precautions for ESD protection when handling components and modules! Avoid electrostatic discharge!

Always observe the ambient conditions specified in the technical data (see “Technical data” on page 103).

On delivery, the Compact System has two preassembled metal brackets on the rear (wall bracket and a lift-out protection). The Compact System is hung in the suspension strip (in the scope of delivery) mounted to the wall using the wall brackets. The Compact System must be bolted down at the lift-out protection to ensure that it is not unintentionally taken off the suspension strip.

Assembly

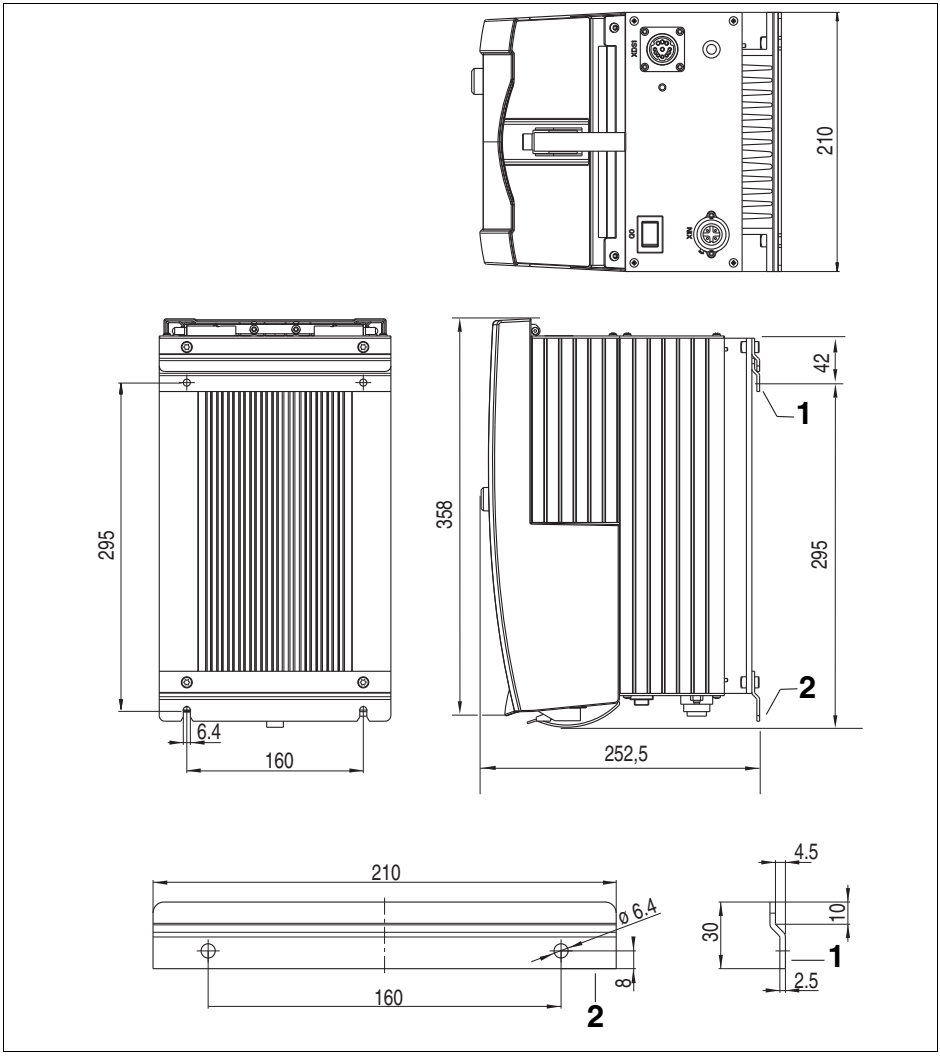

Fig. 26: Wall bracket (dimensions in mm)

1 Wall bracket

2 Lift-out protection

The permissible installation position for the Compact System is vertical.

During assembly, the Compact System should have at least 10 mm space when lined up and at least 300 mm space above it.

⚠ CAUTION

Overheating of the Compact System!

Damage to the Compact System caused by overheating

- Keep the air ways used for cooling at the rear side of the system clear when assembling the Compact System.

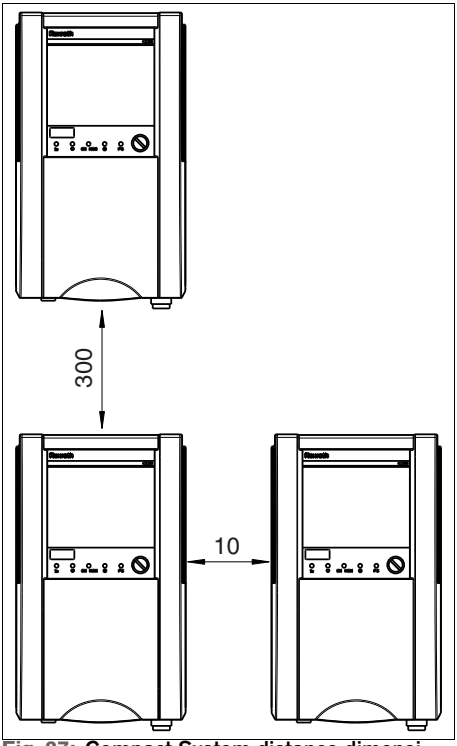

Fig. 27: Compact System distance dimensions (dimensions in mm)

7 Commissioning

⚠ CAUTION

Risk of damage to persons and property!

Commissioning of the Compact System requires basic mechanical and electrical skills.

- No one except qualified personnel (see “Personnel qualification” on page 59) is authorized to commission the system.

⚠ CAUTION

Loss of protection class IP 54 due to missing seals and plugs!

Liquids and foreign bodies may penetrate and damage the product.

- **Prior to commissioning make sure that all dummy panels are in place and that the front cover is closed and locked.**

Commissioning

Removing the front cover

You can remove the front cover to improve access to the interfaces.

1. Release and open the front cover.

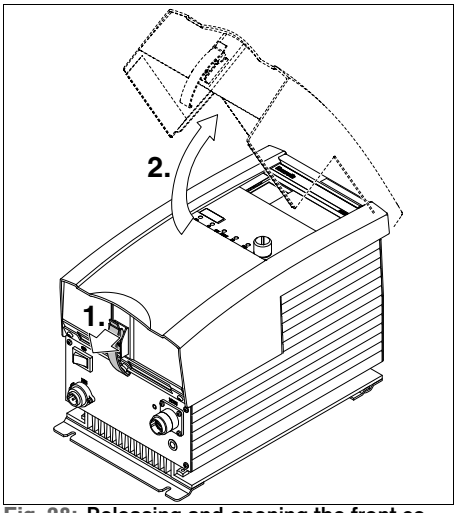

Fig. 28: Releasing and opening the front cover

2. Slide the left and right axle pins in and remove the front cover.

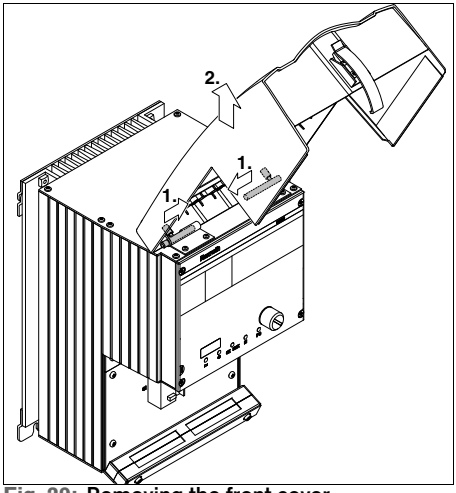

Fig. 29: Removing the front cover

Assembly:

1. Push the axle pins in and insert the front cover.
2. Release the axle pins – both axle pins must engage in the front cover.

Commissioning the Compact System

Proceed as follows to commission the Compact System:

1. Install all of the required interface modules
   - Release and remove the front cover (see page 88).
   - Slide the respective module in.
   - Secure the module.
2. To operate the integrated computer unit, connect an USB mouse and keyboard (connectors X3U6 – X3U8) as well as a monitor (XDVI 2) (optional). Devices and connection cables are not included in the delivery of the Compact System.
3. Connect the Compact System to the external peripherals (e.g. partner controller or external TFT display).
4. Connect the emergency OFF equipment, if necessary.
5. Check whether all module slots are closed by modules or dummy panels.
6. Lay all the connection cables through the cable duct strip:
   - Open both bolts and remove the front part of the cable duct.
   - Insert all of the cables connected inside the front cover in the cable duct.
   - Assemble the front part of the cable duct.
7. Assemble the front cover.
8. Close and lock the front cover.

9. Connect the hand-held nutrunner/tightening spindle:
10. Connect the power supply connection cable. The user is responsible for complying with the regulations for the power supply connection.
11. Switch the Compact System on at the power switch.

Variants with integrated computer unit: Configuring the computer unit

The integrated computer unit already has an activated pre-installed Windows 7 operating system.
After the CS351 Compact System has been switched on, the integrated computer unit is started automatically and Windows 7 is opened.

The computer unit can only be commissioned/configured while a hand-held nutrunner or tightening spindle is connected.

To ensure that the controller of the Compact System can communicate with the integrated computer unit, the following steps must be carried out on commissioning:

- Configure the integrated computer unit in slot B2 in the BS350 operating program of the Compact System.
- Configure the connection to the Compact System via the Windows Control Panel of the computer unit.

For information about controlling the BS350 operating program, refer to the online help and to the system documentation on the enclosed USB system stick.

In the BS350 operating program:

1. Connect the BS350 operating program to the Compact System.
2. The BS350 displays an interface module IMpc 3608861118 for the computer unit in module slot B2.. Confirm the selection.
3. Assign an IP address (e. g. 192.168.1.7) and a subnet mask (e. g. 255.255.255.0) to the module.

The IP address may not be within the same address range as the X7E1 Ethernet interface of the controller, i.e., the IP address must be different from each other at least in one of the three front parts. You can assign IP address 192.168.**1**.7 to the module if the IP address of X7E1 is, e. g., 192.168.**0**.7 or 192.168.**2**.2.

4. After having set the computer card in module slot B2 of the operating program, send the data to the Compact System and then manually trigger a reset of the Compact System controller (push and hold the reset button on the front panel for approx. 1 second).

Windows Control Panel of the computer unit:

An USB mouse, an USB keyboard and a monitor must be connected to the computer unit.

1. Select "Control Panel" from the Windows start menu.
2. Select "View network status and tasks" and click the "Change Adapter Settings" function.
   This displays the list of LAN connections.

Commissioning

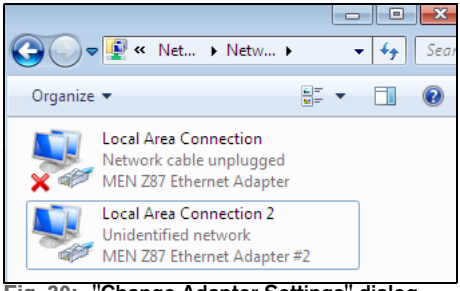

Fig. 30: "Change Adapter Settings" dialog

3. Double-click the LAN connection connecting the computer unit to the Compact System (usually "Local Area Connection 2").
   Tip: If you do not assign the X7E4, X7E5 Ethernet connections of the computer unit prior to commissioning, the connection without the red X is the direct connection to the Compact System.

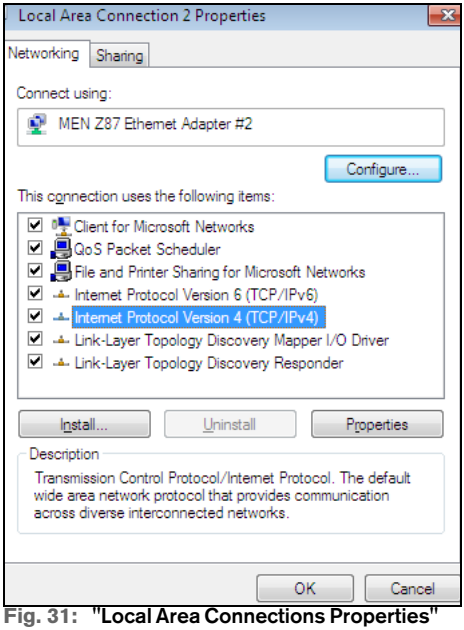

Fig. 31: "Local Area Connections Properties" dialog

4. "MEN Z87 Ethernet Adapter #2" must be set under "Connect using:".
5. Click "Internet Protocol Version 4 (TCP/IPv4)" and then "Properties".

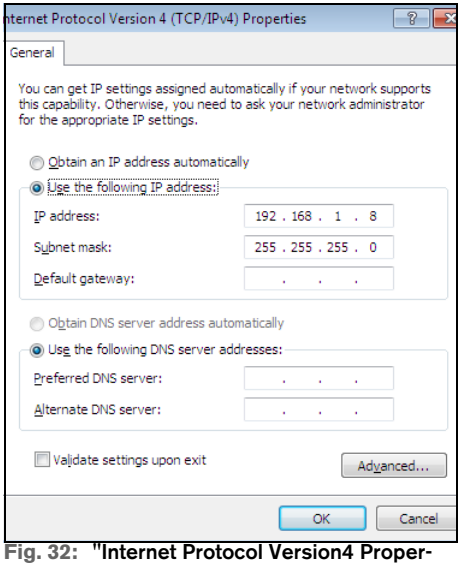

Fig. 32: "Internet Protocol Version4 Properties" dialog

6. Activate option "Use the following IP address:" and enter the IP address and the subnet mask for the computer unit (e.g. 192.168.1.8 and 255.255.255.0). The IP address must be within the same address range as that of the Compact System..

Check whether the Compact System and the computer unit are connected to each other.

1. Open the Windows Start menu of the computer unit, enter "CMD" in the search box, and push the <ENTER> key. This opens a user prompt.
2. Enter the ping command with the IP address of the Compact System, which is "ping 192.168.1.7" in the example.

Fig. 33: "ping" command output

The computer and the Compact System are connected if the "Packets" line of the screen displays "Sent = 4" and "Received = 4".

8 Operation

⚠ CAUTION

Disconnection of plug connectors that are carrying voltage!

Damage to the Compact System

- Always switch the system off at the main switch and then disconnect the power supply connection cable. Wait until the discharging time (at least 90 seconds) has elapsed.

⚠ CAUTION

Contamination of the Compact System!

Injuries and damage to property

- Only operate the Compact System with the front cover closed.

⚠ CAUTION

Hot surfaces!

Injuries

- The metal surfaces of the housing may have a temperature of up to 70 °C during operation.

Operation

NOTE

Important operation information

- Keep the air ways used for cooling the Compact System clear.
- The Compact System may only be operated in grounded networks. Operation in networks that are not directly grounded (IT network) is not permitted, as clearance and creepage distances in the system may be overloaded, impairing the function of the installed residual-current-operated protective device (only for ErgoSpin variants).
- The only protective measure permissible in accordance with EN 50 178 is protective grounding. The input cable to the Compact System must have a PE wire.
- To ensure potential equalization of all system components, a potential equalizer is required between the workpiece and tightening spindle (or its carrier plate), in addition to grounding the Compact System.

Securing the Compact System

The lock on the front cover can be secured with a padlock.

LED indicators of the Compact System

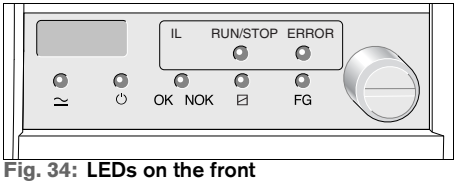

Fig. 34: LEDs on the front

Tab.18: LED modes

LED	Color	Diagnosis
≃	Off	No power supply or low-voltage power supply available
	Blue	Power supply and low-voltage power supply available
⏻	Green	Ready for operation
	Green Flashing	Not ready for operation, but no system error
	Red Flashing	System fault
OK/NOK	Green	Tightening case evaluation: OK
	Red Flashing	Tightening case evaluation: NOK
⊘	Off	Motor contactor not picked up
	Green	Motor contactor operated
	Red/ green, flashing	Servo amplifier initialization
	Red	Motor contactor error
FG	Green	Servo amplifier release
	Off	No enable Servo amplifier
RUN/ STOP	Green	Integrated logic activated
(only for CS... IL)	Red	Integrated logic deactivated
ERROR (only for CS... IL)	Red Flashing	Integrated logic error

9 Maintenance and repair

DANGER

Electrical voltages!

Electrocution

- Do not carry out maintenance work on the tightening channel unless the Compact System has been switched off and the power plug disconnected. Protect the system from being switched on again.

9.1 Repair

Reset function of the Compact System

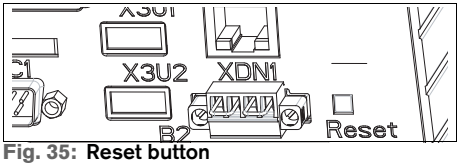

Fig. 35: Reset button

A software reset is generated if the reset button is briefly pressed, i.e. for < 1 second. The controller is reset once the button is released.

A hardware reset is generated if the reset button is pressed for a long period, i.e. for > 3 seconds. The controller and servo amplifier are reset once the button is released.

Reboot function of the computer unit

If you have to reset the operating system because it is blocked by a running program or has crashed, push and hold the reboot button (see Fig. 36).
Once you release the button, the operating system is restarted.

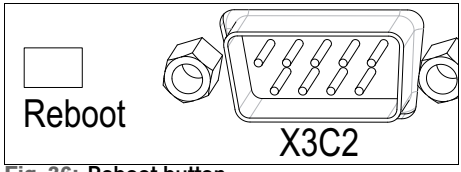

Fig. 36: Reboot button

Windows repair

If the Windows operating system of the integrated computer unit fails to run or boot properly, it can be returned to its state on delivery using an USB recovery stick.

The USB recovery stick is not included in the delivery of the Compact System and must be ordered separately.

For the Windows license key required for repair, refer to the small sticker on the cover of the Compact System directly below the type label.

For instructions on this Windows repair, refer to the documentation supplied with the USB recovery stick.

Maintenance and repair

Exchanging fuses

DANGER

Electrical voltages!

Electrocution

- ▶ Do not carry out maintenance work on the tightening channel unless the Compact System has been switched off and the power plug disconnected. Protect the system from being switched on again.
- ▶ Wait until the discharging time (at least 90 seconds) has elapsed.

- Open and remove the front cover.
- Remove the four bolts on the front plate and take off the front plate.
- Exchange the fuses (see Fig. 37).

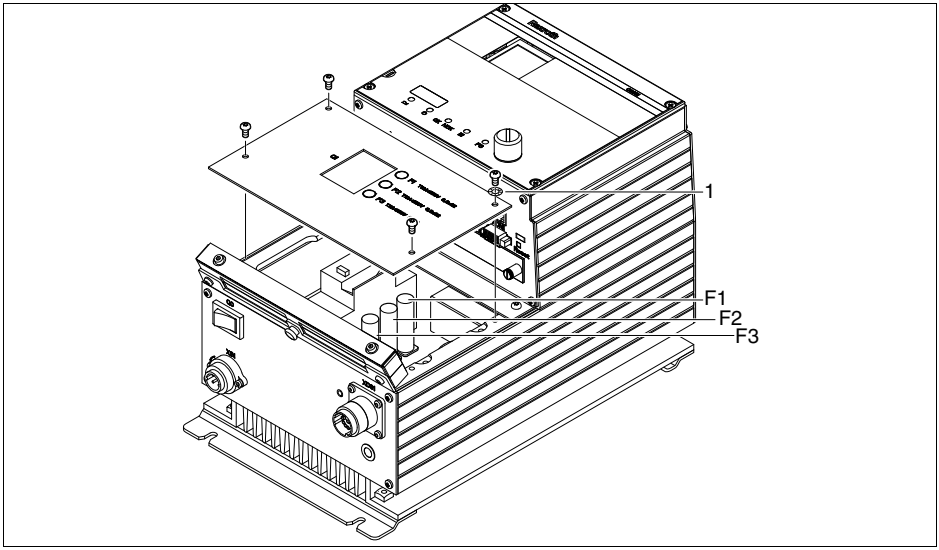

Fig. 37: **Fuses**

F1 Main circuit fuse Si 10 A, 250 V, 6.3x32 mm slow-blow, Manufacturer: ESKA/ENDRICH, order number UL632.727

F2 Main circuit fuse Si 10 A, 250 V, 6.3x32 mm slow-blow, Manufacturer: ESKA/ENDRICH, order number UL632.727

F3 Controller fuse 2 A STG 5x20mm T Manufacturer: LITTELFUSE, type: 0215002)

1 Tooth lock washer to ensure grounding of the front plate

DANGER

Electrical voltages!

Electrocution

- Make sure when assembling the front plate that the tooth lock washer (with the ground symbol) is fitted on the top right bolt. Low impedance connection of the front plate to ground is only ensured if the washer is fitted.

Assemble the front plate. The tightening torque for the bolts is 1.4 + 1 Nm.

Maintenance and repair

Changing the battery of the Compact System

When switched off, the installed battery has a service life of approximately four years from the date of production. The service life increases accordingly when under operation. It is only subject to self-discharge when under operation. If the battery has run down, an error message is generated.

The tightening controller has a built-in battery-buffered RAM for storing the tightening results. The data is saved in the RAM due to the battery if the power fails. The system clock is also supplied by the battery. The above mentioned data, as well as date and time, will be lost if the battery is discharged.

Proceed as follows to exchange the battery:

- Carry out data storage (when the battery is exchanged, all data stored in the memory module is lost).

DANGER

Electrical voltages!

Electrocution

- ▶ Do not carry out maintenance work on the tightening channel unless the Compact System has been switched off and the power plug disconnected. Protect the system from being switched on again.
- ▶ Wait until the discharging time (at least 90 seconds) has elapsed.

CAUTION

Risk of damage to persons and property!

- ▶ To protect the assembly and the system components, measures against damage caused by electrostatic discharge (ESD protection) must be implemented for this assembly work.

- Open and remove the front cover.
- Remove the four bolts on the display unit. Hold the display unit and swivel it to the left. Do not let the ribbon cable tighten or come loose!

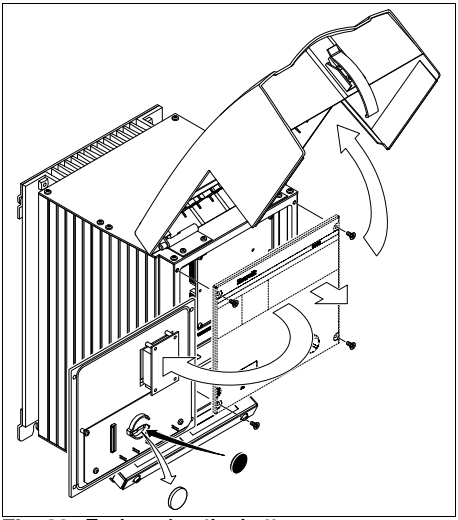

Fig. 38: Exchanging the battery

- Remove the dead battery. Under no circumstances should conductive tools (e. g. tweezers) be used to remove batteries - danger of short circuit. Remove the battery from the holder by hand.

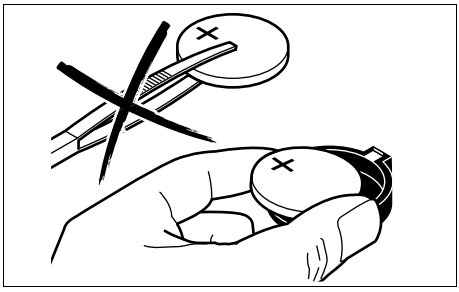

Fig. 39: Exchanging the battery

Tab. 19: Battery: Recommended types

Component	Name	Manufacturer/ Supplier	Type	Remark
Lithium cell 3 V	BT1	SONY	CR 2450	Lithium battery 3 V, Q ≥ 560 mAh 24.5x5 mm
		VARTA	CR 2450	

- Insert the new battery. Positive pole at the top. Press the battery into the holder until it engages.
- Assemble the display unit. The tightening torque for the bolts is 1.4 + 1 Nm.
- Set the date and time via the operating program.

Please observe the battery disposal instructions in chapter 2, section " Disposal".

Variant with integrated computer unit: Changing the battery of the computer unit

The service life of the computer unit battery is at least five years after manufacture. The battery supplies the real-time clock of the operating system with electric current.

The battery must be changed if the bios of the computer unit loses its settings.

The replacement battery is a CR2032 button cell (3 V lithium).

DANGER

Electrical voltages!

Electrocution

- ▶ Open the housing only while the Compact System is off and the power plug is disconnected. Protect the system from being switched on again.
- ▶ Wait until the discharging time (at least 90 seconds) has elapsed.

CAUTION

Risk of damage to persons and property!

- ▶ To protect the assembly and the system components, measures against damage caused by electrostatic discharge (ESD protection) must be implemented for this assembly work.

Proceed as follows to exchange the battery:

- Open and remove the front cover.
- Remove the eight screws of the housing cover (the hinges of the front cover are on the housing cover). Lift off the cover.
- Move the ribbon cable a little to the side without tensioning or disconnecting it.

Maintenance and repair

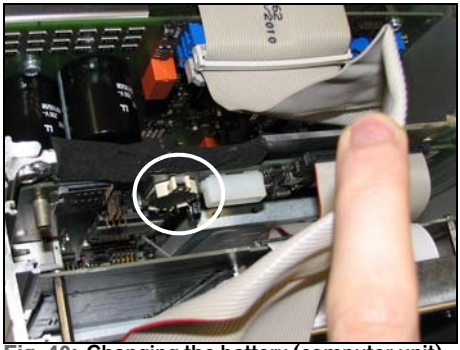

Fig. 40: **Changing the battery (computer unit)**

- Remove the discharged battery by hand or using tweezers which must be made of non-conducting material. Under no circumstances may conductive tools be used to remove the battery - short circuit danger.
  Fig. 40 shows the position of the battery in the white circle.
- Insert the new battery. Positive pole at the front. Press the battery into the holder until it engages.
- Attach the cover. The tightening torque for the bolts is 1.4 + 1 Nm.

Please observe the battery disposal instructions in chapter 2, section " Disposal".

Cleaning and care

⚠ CAUTION

Any dirt or liquids penetrating the device lead to malfunctions!

Safe function of the Compact System is no longer assured.

- ▶ Always ensure absolute cleanliness when working on the Compact System.
- ▶ Do not use a high-pressure cleaner.

⚠ CAUTION

Damage to the surface caused by solvents and aggressive detergents!

Aggressive detergents can damage the seals on the Compact System and cause them to age faster.

- ▶ Never use solvents or aggressive detergents.
- ▶ Do not use a high-pressure cleaner for cleaning.

Cover all openings with the appropriate protective caps/equipment.

Check that all seals and plugs for the plug connections are firmly fitted so that no humidity can penetrate the Compact System during cleaning.

Avoid causing damage when cleaning the Compact System, especially to the TFT display, by only wiping it with a damp cloth. Avoid contact of the display with hard, sharp-edged objects.

9.2 Maintenance

Testing the residual-current-operated protective device

The residual-current-operated protective device is only available with the CS351E Compact System for ErgoSpin hand-held nutrunners.

Check the function of the residual-current-operated protective device (RCD) by actuating the test button. Unless otherwise specified, we recommend performing this test once a month, but at least every six months.

If the residual-current-operated protective device has been triggered, the control voltage for the power and controller electronics will be maintained. Only the main circuit will be isolated.

NOTE

Damages to the compact system

- Do not press the test button while tightening.
- If the residual-current-operated protective device has been triggered, only switch it on again after tightening has been completed (abort by the controller).

1. Actuate the test button. The residual-current-operated protective device must be triggered (position “0”).
2. Switch the residual-current-operated protective device back on (position “1”).

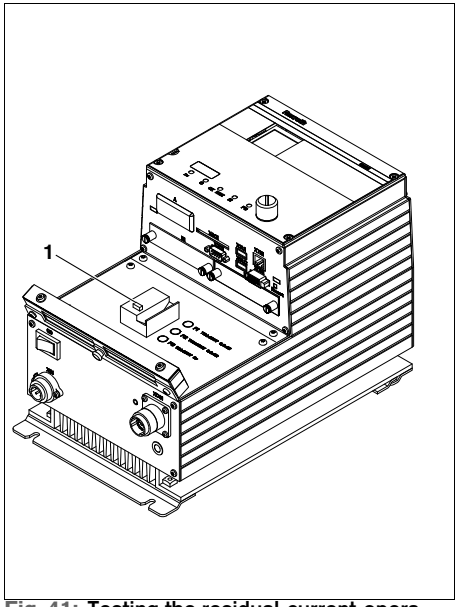

Fig. 41: Testing the residual-current-operated protective device

1 Test button for the residual-current-operated protective device

Spare parts and accessories

For the addresses of out national representations, please refer to www.boschrexroth.com and to the address directory in chapter "12 Disposal" on page 102.

Accessories

Tab.20: Accessories

Accessories	Part no.
USB350 programming cable	3 608 877 427
US power supply connection cable CS351USC (110 V)	3 608 877 033
CF350	3 608 877 428
USB Recovery Boot Stick Windows 7 Professional for Compact Systems with integrated computer unit	0 608 830 291
USB Recovery Boot Stick Windows Embedded Standard 7 for Compact Systems with integrated computer unit	0 608 830 292

10 Decommissioning

The Compact System is a component that does not require decommissioning. As a result, this chapter of the manual does not contain any information.

For details about how to disassemble or replace your Compact System please refer to chapter “11 Disassembly and replacement” on page 101.

11 Disassembly and replacement

The Compact System must be considered a unit.

As a result, the entire Compact System must be exchanged if there are any defects or malfunctions.

For complaints and repairs, please send the **fully assembled** Compact System to the supplier or our customer service workshop in Murrhardt, Germany. Complaints and repairs cannot be accepted if this procedure is not followed.

Disassembling

Follow the warnings printed on the label on the Compact System:

⚠ WARNING

Dangerous internal voltage!

- Before opening the device or performing maintenance work, make sure that the device is de-energized, protect it from being switched on again, and allow a 90 second discharging time.
- Read the manual before using the system or performing maintenance work.

Fig. 42: **Label on the Compact System**

Proceed as follows to disassemble the Compact System:

1. Switch off the power supply to the Compact System and allow for a discharging time of at least 90 seconds.
2. Remove the power supply connection cable.
3. Remove the hand-held nutrunner/tightening spindle:
4. Release and open the front cover.
5. Disconnect the motor OFF equipment and external peripherals.
6. After you have removed the module, close off the module slot with a dummy panel.
7. Close the front cover.

12 Disposal

Environmental protection

Careless disposal of the Compact System could lead to pollution of the environment.

Therefore, dispose of the device in accordance with the currently applicable regulations in your country.

Products

Products manufactured by us can be returned free-of-charge for disposal. However, a prerequisite for this is that there are no objectionable films such as oil, grease or other contamination on the device.

Further, the product may not contain any improper foreign substances or foreign components when it is returned.

Please send the products carriage paid to the following address:

Bosch Rexroth Electric Drives and Controls GmbH
Schraub- und Einpress-Systeme
Fornsbacherstr. 92
71540 Murrhardt, Germany

These instructions have been printed on recycled paper free of chlorine.

Packaging

Packaging materials consist of cardboard, wood, and styrofoam. They can be easily recycled at any point of acceptance. For ecological reasons, please refrain from returning the empty packaging to us.

13 Extension and conversion

Do not convert the Compact System.

14 Troubleshooting

If you are not able to remedy an occurring defect, please contact one of the addresses that you can find under www.boschrexroth.com or in the address directory in chapter “16 Service and sales” on page 106.

15 Technical data

Tab.21:

General data						
Designation	CS351E-D	CS351E-G	CS351S-D	CS351S-G	CS351E-D NK	CS351S-D NK
IL designation	CS351E-D IL	CS351E-G IL	CS351S-D IL	CS351S-G IL	–	–
CC designation	CC-CS351E-D	–	–	–	–	–
IL designation with computer card	–	CS351E-G+	–	CS351S-G+	–	–
Order number	0 608 830 257	0 608 830 258	0 608 830 254	0 608 830 255	0 608 830 281	0 608 830 282
IL order number	0 608 830 274	0 608 830 275	0 608 830 276	0 608 830 277	–	–
CC order number	0 608 830 289	–	–	–	–	–
IL order number with computer card	–	0 608 830 293	–	0 608 830 294	–	–
Dimensions (width x height x depth)	210 x 357.6 x 245.5					
Weight	9.7 kg	9.9 kg	9.7 kg	9.9 kg	9.9 kg	9.9 kg
Storage temperature range	–20 °C ... + 70 °C					
Protection type according to EN 60529/IEC529	IP 54					
Installation position	Vertical					
Voltage	1x 230 V (±10%) 50 - 60 Hz or 1x 120 V (+5% - –10%) 50 - 60 Hz[a] or 1x 110 V (±10%) 50 - 60 Hz[a] (automatic voltage selector switch integrated)					
Rated current	10 A (at 120 V)/ 5.2 A (at 230 V)					
Peak power	4800 VA					
Nominal power	1200 VA[c]					

a) The power of size BG5 spindles is limited for supply voltages between 110–120 V (50–60 Hz). Here, the maximum torque which can be achieved is 70 % of the spindle nominal torque.

b) 23 W with activated screensaver

c) Use a slow-blow fuse for high starting currents.

Technical data

Tab.21:

General data						
Designation	CS351E-D	CS351E-G	CS351S-D	CS351S-G	CS351E-D NK	CS351S-D NK
IL designation	CS351E-D IL	CS351E-G IL	CS351S-D IL	CS351S-G IL	–	–
CC designation	CC-CS351E-D	–	–	–	–	–
IL designation with computer card	–	CS351E-G+	–	CS351S-G+	–	–
Order number	0 608 830 257	0 608 830 258	0 608 830 254	0 608 830 255	0 608 830 281	0 608 830 282
IL order number	0 608 830 274	0 608 830 275	0 608 830 276	0 608 830 277	–	–
CC order number	0 608 830 289	–	–	–	–	–
IL order number with computer card	–	0 608 830 293	–	0 608 830 294	–	–
Power consumption in ready mode	23 W	26 W / 23 W [b]	23 W	26 W / 23 W [b]	23 W	26 W / 23 W [b]
Protection class	Protection class A according to EN 50178					
Interference suppression	EN 55011 class A					
Interference immunity	DIN EN 61000-4 part 2 to part 5 severity level 4					
Allowed ambient temperature	0 to 45 °C					
Permissible relative humidity during operation	20 - 90%, non-condensing					
Permissible relative storage humidity	up to 95%					
Max. permissible altitude for use	2000 m above MSL (if setup heights exceed 2000 m above MSL, we recommend using an isolating transformer)					
Operating at setup heights higher than 1000 m above MSL	At 1000 m above MSL and higher, a reduction in nominal power of approx. 1% per 100 m altitude may occur due the low air pressure.					

[b] 23 W with activated screensaver

Technical data

Tab.21:

General data						
Designation	CS351E-D	CS351E-G	CS351S-D	CS351S-G	CS351E-D NK	CS351S-D NK
IL designation	CS351E-D IL	CS351E-G IL	CS351S-D IL	CS351S-G IL	–	–
CC designation	CC-CS351E-D	–	–	–	–	–
IL designation with computer card	–	CS351E-G+	–	CS351S-G+	–	–
Order number	0 608 830 257	0 608 830 258	0 608 830 254	0 608 830 255	0 608 830 281	0 608 830 282
IL order number	0 608 830 274	0 608 830 275	0 608 830 276	0 608 830 277	–	–
CC order number	0 608 830 289	–	–	–	–	–
IL order number with computer card	–	0 608 830 293	–	0 608 830 294	–	–
Operation in a network protected by an RCD	1 device can be operated in a network protected by an RCD (release current ≥ 30 mA).					
RCD installed	Yes		No		Yes	No
Maximum admissible line length between compact system and ErgoSpin/tightening spindle	50 m[d)]					

d) The length of the connecting cable for certain components may be limited. You must therefore observe the length specification if stickers with limitations are attached to the components.

16 Service and sales

Service

We are always the right partner when it comes to system know-how.

For any problem: Rexroth service

- You can reach us around the clock at: +49 (0) 9352 40 50 60
- Or contact us by email: service.svc@boschrexroth.de

Worldwide service

Our global service network can be reached at any time in over 40 countries. You can find detailed information on our service locations in Germany and worldwide on the Internet at:

www.boschrexroth.com/service-405060

Information preparation

We will be able to help you quickly and efficiently if you have the following information ready:

- Detailed description of the malfunction and the circumstances
- Information on the name plate of the affected product, particularly the material and serial numbers
- Telephone/fax numbers and e-mail address where we can reach you if we have any questions.

Sales

Bosch Rexroth AG
Electric Drives and Controls
Schraub- und Einpress-Systeme
Fornsbacher Str. 92 ■ D-71540 Murrhardt
Postfach 1161 ■ D-71534 Murrhardt

You can contact us

- By telephone
  +49 (0)71 92/ 22 208
- By fax
  +49 (0)71 92/ 22 181
- By e-mail
  schraubtechnik@boschrexroth.de

Internet

Information on Rexroth tightening technology can be found at
www.boschrexroth.com/schraubtechnik

Additional information on service, repairs, and training, as well as the current addresses of our sales offices, can be found at

www.boschrexroth.com

If you are located outside Germany, please contact your local Rexroth partner.

Rexroth
Bosch Group

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schraubtechnik@boschrexroth.de
www.boschrexroth.com

Ihr Ansprechpartner / Contact: