

LTU350/1

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Ausgabe AB | 2008-12

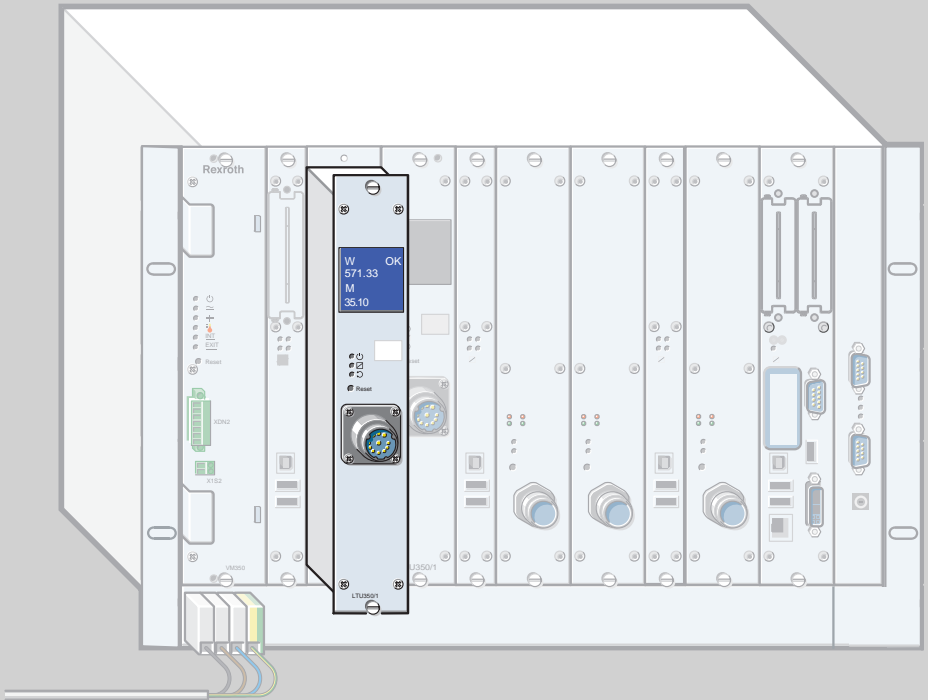


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The data specified above only serves to describe the product. No statements concerning a certain condition or suitability for a certain application can be derived from our information. The information given does not release the user from the obligation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

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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 LTU 350/1 servo amplifier.

Read these instructions completely, especially chapter “2 General safety instructions” on page 17, before working with the LTU350/1 servo amplifier.

Related documents

The LTU350/1 servo amplifier is a system component.

Also observe the instructions for the other system components.

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 LTU350/1 servo amplifier 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 LTU350/1 servo amplifier.
- 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 LTU350/1 servo amplifier on to third parties.

Intended use

The LTU350/1 servo amplifier is a component in terms of the machine directive 98/37/EC and is not a ready-for-use machine. The product is exclusively intended for being integrated in a machine or system or for being assembled with other components to form a machine or system. The product may be commissioned only if it is integrated in the machine/system for which it is designed and the machine/system fully complies with the EC machine directive. Observe the operating conditions and performance limits specified in the technical data.

The LTU350/1 servo amplifier is a work appliance and not designed for private use.

Intended use includes having read and understood these instructions, especially the chapter “2 General safety instructions”.

The LTU350/1 servo amplifier is intended for installation in the BT356 card rack or the SB35x system box.

Improper use

Any use of the LTU350/1 servo amplifier other than described in chapter “Intended use” is considered as improper.

Personnel qualifications

Assembly, commissioning and operation, disassembly, service (including maintenance and repair) require basic electrical and mechanical knowledge, as well as knowledge of the appropriate technical terms. In order to ensure operating safety, these activities may therefore only be carried out by qualified technical personnel or an instructed person under the direction and supervision of qualified personnel.

Qualified personnel are those who can recognize possible hazards and institute the appropriate safety measures due to their professional training, knowledge, and experience as well as their understanding of the relevant conditions pertaining to the work to be done. Qualified personnel must observe the rules relevant to the subject area.


Safety instructions in this document


In this manual, there are safety instructions before the steps whenever there is a danger of personal injury or damage to the equipment. The measures described to avoid these hazards must be observed.


Safety instructions are set out as follows:

	 SIGNAL WORD
	Type of RISK!
	Consequences Precautions


- **Safety sign (warning triangle):** draws attention to the risk
- **Signal word:** identifies the degree of hazard
- **Type of risk:** identifies the type or source of the hazard
- **Consequences:** describes what occurs when the safety instructions are not complied with
- **Precautions:** states how the hazard can be avoided

	This warning symbol cautions against dangers to your health. Observe all the safety instructions that follow this symbol to avoid possible injuries or death.
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	This warning symbol cautions against dangers to your health caused by electrical voltage or currents. Observe all the safety instructions that follow this symbol to avoid possible injuries or death.
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 CAUTION
CAUTION indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury or damage to equipment.

WARNING!
ATTENTION indicates a situation which, if not avoided, could result in minor or moderate damage to equipment.

 NOTE!
If this information is disregarded, the operating procedure may be impaired.

Adhere to the following instructions

General instructions

Only accessories and add-on units that have been approved for use in Rexroth tightening systems may be used therein. Non-approved components may neither be added nor connected to the system. The same applies to cables and lines which belong to the Rexroth tightening system. Otherwise, functional and system safety is jeopardized.

Observe the regulations for accident prevention and environmental protection for the country where the product is used and at the workplace.

Exclusively use Rexroth products in good technical order and condition.

Check the product for visible defects, for example damage to the circuit board, components, housing, and plug connectors or missing screws.

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

Persons who assemble, operate, disassemble or maintain Rexroth products must not consume any alcohol, drugs or pharmaceuticals that may affect their ability to respond.

The warranty only applies to the delivered configuration.

The warranty will not apply if the product is incorrectly assembled or handled or not used as intended.

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

During assembly

Make sure the relevant system component is not under pressure or voltage before assembling the product or when connecting and disconnecting plugs. Protect the system against being switched on.

Lay cables and lines so that they cannot be damaged, are in accordance with the bending radiuses, 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 water may condense in the housing.

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

During cleaning

Cover all openings with the appropriate protective equipment in order to prevent detergents from penetrating 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.

Disposal

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

3 Delivery contents

The delivery contents include:

- 1 LTU350/1 servo amplifier
- 1 operating instructions for the servo amplifier

4 Product description

Performance description

The LTU350/1 servo amplifier supplies power to and controls the ErgoSpin handheld nutrunner. The speed and current are controlled in the servo amplifier.

i NOTE!

Further information on the equipment variants can be found in the operating instructions for the BT356 card rack or SB35x system box.

Device description

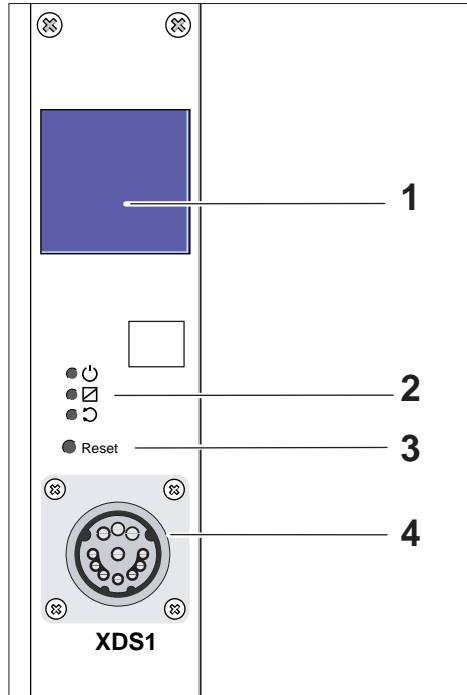


Fig. 1: Front view section of LTU350/1

- 1 LC display
- 2 LED displays
- 3 Reset button
- 4 XDS1 interface for tightening spindle

Display

The graphic LC display (Figure 2) enables a display of the result values (torque, angle, gradient, time) and error codes. Texts are shown in 4 lines, each with 8 characters. The display is permanently backlit (LED).

The contrast can be adjusted in the BS350 operating system, if necessary.

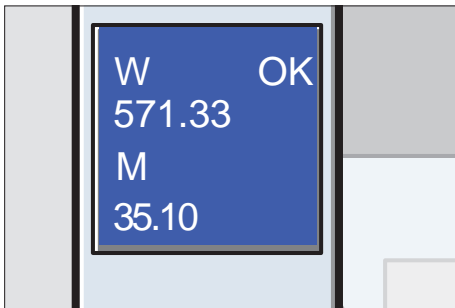


Fig. 2: LC display

Display

Table 1

Target function	Actual value
Upper torque	T
Lower torque	TI
Relative torque, upper	T&
Relative torque, lower	TI&
Angle	A
Input	IN
Time	t
Yield point	Yp
Gradient	G

Table 2

Monitoring function	Actual value
Torque	T
Relative torque	T&
Torque max. value	T>
Torque min. value	T<
Torque average value	TA
Torque range	T[
Redundancy torque	TR
Tightening from above	TCh
Tightening from below	TCl
Angle	A
Total angle	AO
Redundancy angle	AR
Gradient	G
Gradient average value	GA
Time	t
Stick slip	STS
Yield point	Yp

Table 3

Function	Actual value	Displays Yes/No
Total time	to	Yes

Table 4

Event	Marking
Remove start signal	C(c)w → 0
System error	Fault

The inverse display shows:

- Error
- NOK.




Language packs

The language pack for the LTU350/1 is uploaded to the controller using the BS350 operating program. This is done via the menu item "Configuration | HMI SE/CS" in the BS350.

LED display and reset button

There are three LEDs on the front panel of the servo amplifier to indicate the operating state.

Table 5

LED/ button	Display	Diagnosis
	BTB Off	No power supply or LTU is in download mode
	Green	Ready for operation
	Green, flashing	Not ready for operation, but no system error; emergency OFF has been triggered
	Red	System error
	Orange	VM supply module not ready
	TS Off	Motor contactor open
	Green	Ready for operation
	Red	Motor contactor error
	FG Off	No servo amplifier release
	Green	Servo amplifier release
Reset	When pressed, a reset is performed to reinitialise the tightening channel	

XDS1 interface for handheld nutrunner

The tightening spindle is connected to the servo amplifier via a spindle connecting cable that is connected to the 11-pin socket. The power supply for the motor, logic supply, and transmission of interface signals is provided via this cable.

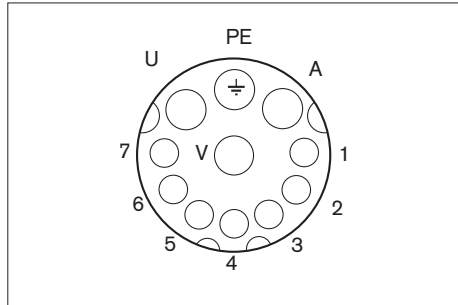


Fig. 3: Socket, view from front side

Table 6

Pin	Signal assignment
1	CAN-L
2	CAN-H
3	24 V
4	GND
5	HS
6	SAMI-B
7	SAMI-A
U	Phase U
V	Phase V
A	Phase W
PE	Protective earth/shield

Motor contactor control

Table 7 Positions of the PIN plug in the LTU350/1

PIN plug in position:	Explanation
1	Operation of ErgoSpin as hand-held nutrunner without emergency OFF (condition on delivery)
2	Operation of ErgoSpin as tightening spindle with emergency OFF via the VM350 supply module BS350: VM350 emergency OFF active

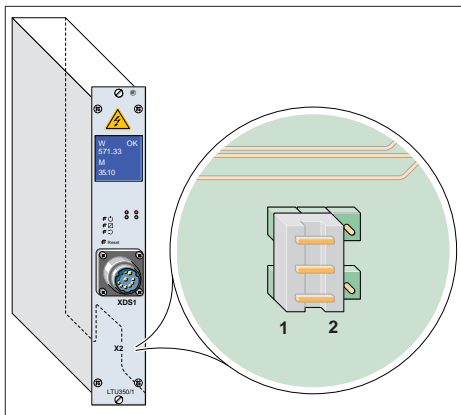


Fig. 4: PIN plug

Fuses

The intermediate circuit of the servo amplifier is protected by two safety fuses. If these fuses blow (melt), the BTB LED changes from green to red. In this state, operation is no longer possible. These safety fuses are located on the rear of the servo amplifier and must be replaced in the case described above (for removal, see Figure 5).

WARNING!

► Be sure to observe the safety instructions in chapter 1 (see page 17).

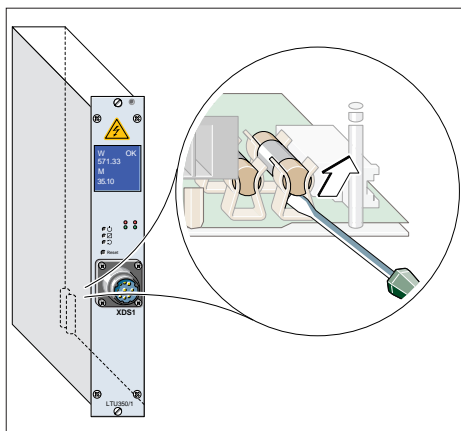


Fig. 5: Removal of the safety fuses

ENGLISH

i NOTE!

The position of the PIN plug is verified with the channel configuration in the BS350.

i NOTE!

Further information on emergency OFF circuits can be found in the operating instructions for the VM350 supply module.

Recommended fuse:
 3 608 875 374
 12 A, 500 V DC;
 10.3 x 38 mm

Manufacturer: Ferraz Shawmut
 Order No.: 6JX12

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 27).


6 Assembly


When installing the product, always observe the ambient conditions specified in the technical data (see “Technical data” on page 27).

Required tools

- Screwdriver (size 0.8 x 4.5 mm)



Assembling LTU350/1 servo amplifier

	<p>⚠ CAUTION</p>
	<p>Risk of damage to persons and property!</p> <p>Assembly of the LTU350/1 servo amplifier requires basic mechanical and electrical knowledge.</p> <ul style="list-style-type: none"> ▶ Only qualified personnel (see “Personnel qualifications” on page 18) are authorized to assemble the LTU350/1 servo amplifier. ▶ Measures to prevent electrostatic discharge (ESD protection) must be undertaken to protect the module and system components during all assembly work.

	<p>⚠ CAUTION</p>
	<p>Risk of injuries when assembling under voltage!</p> <p>If you do not switch off the power supply before assembling the LTU350/1 servo amplifier you may become injured or the device or system components may be damaged.</p> <ul style="list-style-type: none"> ▶ Always switch off the power supply to the relevant system component before assembling the LTU350/1 servo amplifier.

1. Switch off the power supply for the BT356 card rack or SB35x system box and allow for a discharging time of 10 seconds.
2. Completely insert the LTU350/1 servo amplifier into the respective slot in the BT356 card rack or SB35x system box.
3. Tighten the knurled bolts on the front. Make sure that the front panel is flush to the BT356 card rack or SB35x system box by tightening the knurled bolts.

7 Commissioning

	 CAUTION
	<p>Risk of damage to persons and property!</p> <p>Commissioning of the LTU350/1 servo amplifier requires basic mechanical and electrical knowledge.</p> <ul style="list-style-type: none"> ▶ Only qualified personnel (see “Personnel qualifications” on page 18) are authorized to commission the system. ▶ Once the device has been switched off, it cannot be switched back on again until at least 30 seconds have elapsed.

If you use the components in an existing system as a replacement or an extension, you must install the firmware that is used in the system.



Before commissioning, check that all plug-in connections are firmly fitted.

8 Operation

Operation is not necessary while the system is running.

9 Maintenance and repair

Cleaning and care

	 CAUTION
	<p>Any dirt or liquids penetrating the device lead to malfunctions!</p> <p>Safe function of the LTU350/1 servo amplifier is no longer ensured.</p> <ul style="list-style-type: none"> ▶ Pay particular attention to the utmost cleanliness when working with the LTU350/1 servo amplifier.

Maintenance

The LTU350/1 servo amplifier is maintenance-free if employed for its intended use.

Spare parts

Please refer to the address directory under www.boschrexroth.com and in chapter “16 Service and sales” on page 28 for the addresses of our foreign subsidiaries.

10 Decommissioning



For details on how to disassemble or replace the LTU350/1 servo amplifier, please refer to chapter “11 Disassembly and replacement” on page 26.

11 Disassembly and replacement

Required tools

- Screwdriver

Disassembling

	 CAUTION
	<p>Removing the LTU350/1 servo amplifier while live</p> <p>Damage to the LTU350/1 servo amplifier!</p> <ul style="list-style-type: none"> ▶ Always switch off the power supply to the relevant system component before disassembling the LTU350/1 servo amplifier. ▶ For safety reasons, the LTU350/1 servo amplifier may only be inserted or removed at the earliest 10 seconds after the power supply to the BT356 card rack or SB35x system box has been switched off.

Proceed as follows to disassemble the LTU350/1 servo amplifier:

1. Switch off the power supply for the BT356 card rack or SB35x system box and allow for a discharging time of 10 seconds.
2. Loosen the knurled screws on the front panel and pull out the LTU350/1 servo amplifier.
3. If necessary, assemble a BP 351 dummy panel, order number 3 608 878 058.

12 Disposal

Environmental protection

Careless disposal of the LTU350/1 servo amplifier could lead to pollution of the environment.

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

You can also send the device to Bosch Rexroth for disposal.

13 Extension and conversion

Do not convert the LTU350/1 servo amplifier.

14 Troubleshooting

Malfunctions and information on errors are displayed:

- on the display (see section "Display" on page 21)
- by the LED on the front (see section "LED display and reset button" on page 21)
- in the tightening system via the BS350.

Should you be unable to remedy an occurring defect, please contact one of the addresses found under www.boschrexroth.com or in the address directory in chapter "16 Service and sales" on page 28.

15 Technical data

Table 8

Designation	LTU350/1
Order number	0 608 750 111
Input voltages	From the supply module
Intermediate circuit voltage	160 V _{DC} to 320 V _{DC}
Control voltage	+ 24 V / - 24 V / 5 V (SELV)
Output voltage	3-phase, 0-230 V _{AC}
Output frequency	0 Hz to 1000 Hz
Rated current/peak current	Depending on the connected motor, max. 12 A / 50 A
Maximum line length to motor	100 m
Interference suppression	EN 55011 class A (industrial area)
Interference immunity	IEC 1000-4 part 2 to part 5 severity level 4
Permissible ambient temperature	0 to 55 °C with fan
Admissible relative humidity during operation	20 % - 90 % non-condensing
Admissible storage temperature	-20 °C to 70 °C
Admissible relative storage humidity	20 - 95 %
Protection class	Protection class I
Protection type	IP20 (protection against accidental contacts) when installed
Dimensions (W x H x D)	46 mm x 271 mm x 285 mm
Weight	2.85 kg