Operating Instructions

Controllers
for
Belt Drives

EBC 3000

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Declaration of Conformity

According to the Low-Voltage Directive 2014/35/EU
and Electromagnetic Compatibility Directive 2014/30/EU

We hereby declare that the product meets the following requirements:

Low-Voltage Directive 2014/35/EC
Electromagnetic Compatibility Directive 2014/30/EU

Applied harmonised standards:

DIN EN 60204 T1
EN 61439-1

Remarks:

Rhein-Nadel-Automation

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CE

1. About this document

Attention
Read this document carefully and observe the safety directives before commencing any work.

The information given in this document reflects the following version:

Product	from software version	Date
EBC3000	-	2019-03-01

Document description:
This document provides assistance in choosing your product. You will also find information on mechanical and electrical installation, operation, product extensions and accessories.
Non-observance may cause trouble with the product or the environment, reduce the product lifetime or lead to other damage.

2. Safety information

2.1 Design of safety directives

Notice
This notice identifies useful tips for use of the controller.

Attention!
This symbol identifies hazardous situations.
Non-observance of such warnings may cause irreversible injury or even death!

2.2 Fundamental safety directives

Non-observance of the following fundamental safety measures and directives may lead to severe injury and damage to property!

Meeting the requirements given in the related documentation is a precondition for safe and trouble-free operation and for achieving the product properties specified. Further additional safety directives in the other sections must be observed as well.

2.3 Personnel

Attention!
Any work on electrical equipment of the machine/system shall be carried out exclusively by a professional electrician, or by instructed persons working under the direction and supervision of a professional electrician, according to electrotechnical rules.

Only qualified professionals are allowed to work on or with the product. IEC 60364 or CENELEC HD 384 define the qualification of these persons:

- They are familiar with set-up, installation, commissioning and operation of the product.
- They possess the qualification required for performance of their work.
- They know all regulations for the prevention of accidents, directives and laws applicable to set-up, installation and commissioning on site, and they are able to apply the same.
- They have knowledge and skills of First Aid.

2.4 Intended use

Please observe the following directives for intended use of the controllers:

- The devices herein described must only be stored, fitted and operated under the conditions specified in this documentation.
- Here you are not concerned with domestic devices! They are solely intended to be used as components for commercial or professional applications pursuant to EN 61000−3−2.
- They satisfy the protection requirements of 2014/35/EU: Low Voltage Directive.
- They do not constitute a machine as defined by 2006/42/EU: Machinery Directive.
- A machine comprising the product must not be commissioned or put into operation for the intended use until it has been declared to be in conformity with the EC Directive 2006/42/EU: Machinery Directive; Observe EN 60204−1.
- Commissioning or starting operation for the intended use is only permitted in compliance with the EMC Directive 2014/30/EU.
- Use of the product in living areas may lead to EMC disturbance. The user is responsible for taking interference suppression measures.
- The devices are designed for operation of RNA's small belt conveyors. Observe the limits indicated in the technical specification.

Attention!

- Prior to start-up make sure that the protective earth conductor is connected and in proper condition. Make the PE conductor test with approved test devices only.
- Never start up despite detected damage.
- Do not make any technical modifications to the device, except as described in this document.
- Never start up in an incompletely installed state.
- Never operate the device without the required guards in place.
- Connect, disconnect or change any electrical connections only in the absence of voltage.

2.5 Residual hazards

Residual hazards may remain even if all directives have been observed and protective measures taken. Such residual hazards must be considered by the user in the risk assessment of his machine/equipment. Non-observance may lead to severe injury and damage to property!

2.5.1 Device

Pay attention to the warning signs fitted to the device!

Symbol	Description
	**Hazardous voltage:** Prior to commencing any work on the product check for absence of voltage on all power connections.
	**Leakage current:** Make fixed installation and PE connection according to EN 60204−1!

Attention
Be sure to **pull the mains plug** before opening the controller!
Wait 10 minutes until the power supply unit is discharged.

2.5.2 Protection of the drive system

Certain device parameter settings may cause overheating of the connected drive motor, e.g., due to prolonged operation with an incorrectly set maximum current.

2.5.3 Degree of protection - Protection of persons and equipment

- All specifications relate to installed condition ready for operation.
- All slots that are not used must be closed by protection caps or dummy plugs in order not to reduce the protection against accidental contact.

3. Product information

3.1 Functional description

The EBC 3000 controller was developed for operation of RNA narrow-track feeder FP 15. Thanks to a form factor close to 1, its pulse width modulation feature generates a very high efficiency and an excellent starting behaviour. All controls including the port for connecting the motor are arranged on the front panel.

The operating voltage for the belt drive (24V max.) is generated by a switched-mode power supply conforming to VDE 0551. This means that the motor voltage is a **safe touch, extra low voltage**.

An internal current scan (I x R compensation) largely compensates for speed variations due to varying belt loading conditions.

- Minimum and maximum output voltage U_{min} and U_{max} as well as maximum motor current I_{max} are steplessly adjustable on the printed circuit-board.
- Via additional wiring the belt conveyor movement can be started/stopped/reversed by an external controller.
- Also, RPMs can be set via an external 0-10V or 0-20mA signal.
- The controller is rated and dimensioned for mains voltages from 110V AC to 230V AC. The controller tests the mains voltage and self-adjusts accordingly.

3.2 Technical data

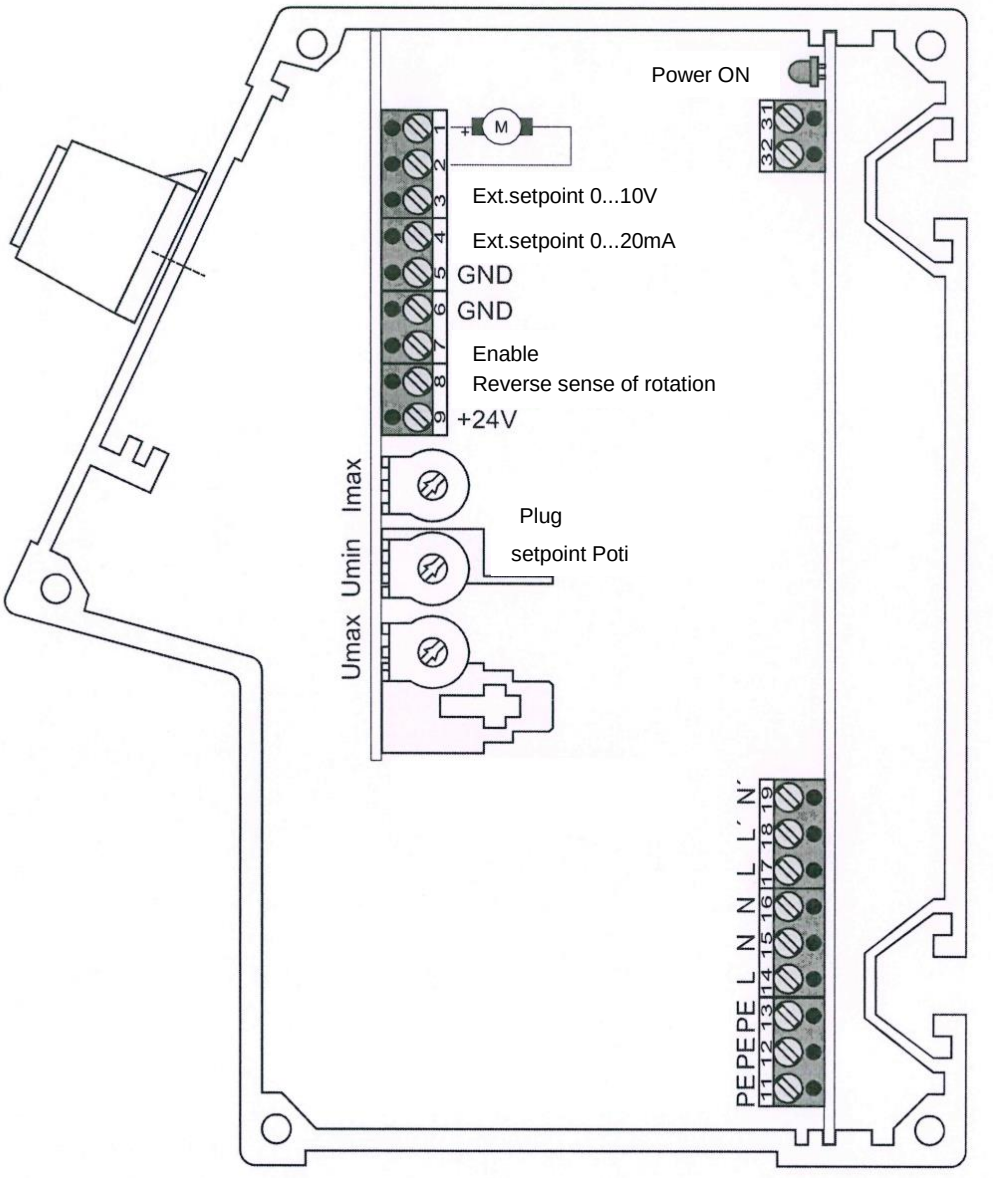
Mains connection	230V; ± 10%; 50 / 60 Hz 110V; +15% -5%; 50/60 Hz
Primary fuse	Miniature fuse 5 x 20 mm; 2A medium slow
Output voltage	0...28 V DC
Output current	0.4...2 A
External setpoint control	0-10V 0-20mA
External enabling signal	Internal via wire jumper External Floating contact (load 24VDC, < 10mA) Or voltagge signal (load 24VDC, < 10mA)
Maximum current	adjustable on PCB
Min./max. speed	adjustable on PCB
Enclosure dimensions	210 x 90 x 150 (H x W x L)
Radio interference suppression and immunity to interference	acc. to EMC directive
Ambient temperature	0...50C°
Degree of protection	IP 54
Mounting	vibration-free
installation position	Vertical
Cooling	free convection
Leakage current	Less than 2mA
Power loss	max. 10W

3.3 Internal connections and adjustments

The right side panel of the enclosure needs to be opened for following adjustments/work items.

Attention!
Observe the safety instructions!
Be sure to **pull the mains plug** before opening the controller!
Wait 10 minutes until the power supply unit is discharged.

The figure below shows the locations of terminals and potentiometers.
To feed in a cable replace the M16 blanking plug by a cable gland with strain relief Notice: IP54!



3.4 Factory default settings

The controllers are factory-set as follows:

- Minimum output voltage: 4.9 Volts;
- Maximum output voltage: 25.5 Volts;
- Maximum load current: 1.5 Amps

In special situations, or following modifications, it may be necessary to readjust these settings. Be sure to observe the following:
For FB 15 belt feeders, the maximum output voltage and maximum load current must not be set higher and the minimum output voltage must not be set lower than specified in the list above.
It is also important to know that the potentiometers for output voltage are not completely isolated from each other. This means that changes to the maximum voltage will result in minor changes to the minimum voltage, and vice versa. Accordingly, you may need to readjust both potentiometers several times.

3.5 Enabling of operation by external components

The standard setup of the controller is configured so that the belt feeder drive will start as soon as the power switch is set to ON. If you want to the configure the controller so that it can start/stop the motor in response to an external enabling signal without disconnecting it from the mains supply, open the controller in accordance with above safety information. Replace the blanking plug in the side of the casing by a size M16 strain-relieved cable gland to feed through the cable for the enabling signal. There are two ways of enabling:

3.5.1 Enabling via a contact

Closing of a contact enables the controller and operates the belt feeder motor. The connection is made at terminals XK1.7 and XK1.9, after removing the factory-installed wire jumper. Be sure to observe the following:

- Voltage is present at this connection! Take care to observe cable type and colour as well as insulation requirements. The contact must of course be a potential-free (dry-type) contact.
- Avoid routing this cable in the immediate vicinity of high-energy switching devices or strong interference fields.

3.5.2 Enabling via voltage signal.

Connect the starting signal to terminals XK1.6 (0V) and XK1.7 (+24V) and remove the wire jumper between XK1.7 and XK1.9. The drive starts as soon as a signal between 10 and 30 VDC is present with the correct polarity. The input is protected against polarity reversal. Using an optocoupler in the controller provides an isolated input and also permits the installation of non-shielded cables of almost any length. Here too, take great care to avoid high-energy interferences.

3.5.3 Reversing duty via a contact

To use reversing duty connect a floating (dry-type) contact to terminals XK1.9 and XK1.8 of the controller. When direction of rotation is reversed, the motor stops briefly, then starts running in the opposite direction at the set speed. If reversing duty is not implemented at all, or when the described contact is open, the motor runs in the default direction of rotation.
For the rest, the conditions are the same as for enabling via a contact.

3.5.4 Reversing duty via voltage signal

Connect the voltage signal for reversing duty to terminals XK1.6 (0V) and XK1.8 (+24V) of the controller. When direction of rotation is reversed, the motor stops briefly, then starts running in the opposite direction at the set speed. If reversing duty is not implemented at all, or when the described contact is open, the motor runs in the default direction of rotation.
For the rest, the conditions are the same as for enabling via a via voltage signal.

3.6 External setpoint with 0-10 V or 0-20mA signal for speed setting.

The connection is made at terminal block XK1
For 0-10V setpoint signal: connect to terminal XK1.3 (0-10V) and terminal XK1.5 (GND)
For 0-20mA setpoint signal: connect to terminal XK1.4 (0-20mA) and terminal XK1.5 (GND)

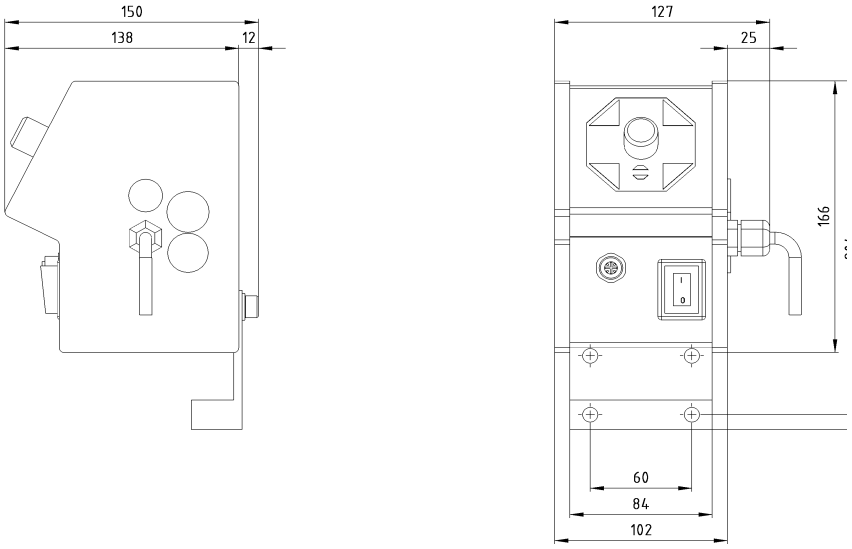
If an external setpoint is used, either:

- Disconnect the front-mounted potentiometer from the circuit board and secure the cable with a cable tie,

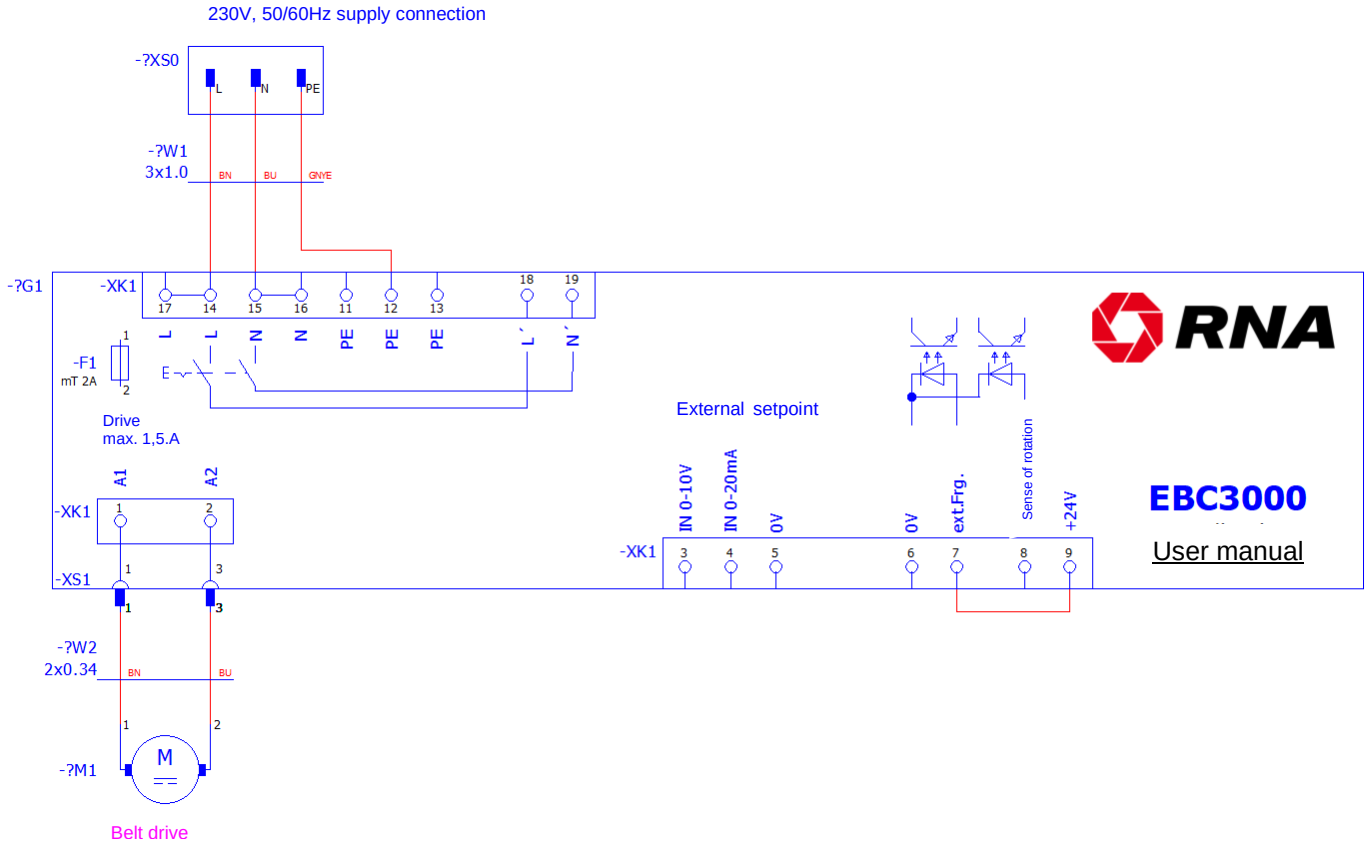
or:

- Disconnect the front-mounted potentiometer from the circuit board, remove it, and close the opening with a blanking plug.
  Attention: IP54.

4. Dimensioned drawing



5. Connection diagram



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