

Manufacturer's Declaration

This product is intended for installation in a machine or system, based on the machine directive 2006/42/EC. It is forbidden to start use of the product until the machine or system into which it should be built is operating in accordance with the EC directives.

The product corresponds to the low voltage directive 2006/95/EC.

The product corresponds to the EMC directive 2004/108/EC.



Safety Regulations Danger!

To prevent injury or damage, only professionals and specialists should work on the devices, following the relevant standards and directives. Please read the Installation and Operational Instructions carefully before installation and initial operation of the device.

- Danger of death on touching voltage-carrying cables and components
- Before opening the device, switch off the input voltage and wait for 15 minutes
- Electronic devices cannot be guaranteed fail-safe
- Only work on this device when it is de-energised. Protect against inadvertent switch-on



Warning:

Without a conformity inspection, this product is not suitable for use in areas where there is a high danger of explosion. This statement is based on directive 94/9 EC (ATEX directive).



Application

This unit is used to start, stop and to position by switching and controlling the *mayr*®-clutch-brake units.

Function

The ROBA®-takt control unit operates according to the principle of a clocked switching controller with a frequency of 18 kHz. Its coil is energised by actuating the sensor for clutch and brake. A temperature monitor protects the unit from overheating. Should the temperature exceed >80 °C, the coil voltage is switched off. The LED "excess temperature unit" lights up red.

A slope separation avoids simultaneous occurrence of clutch and brake torques.

On overexcitation, the coil attraction time is reduced, allowing exact switching and positioning.



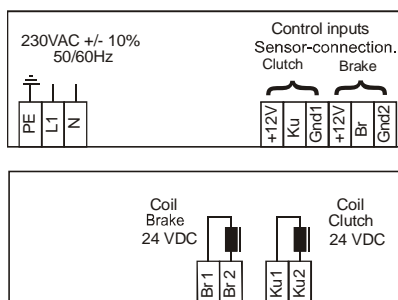
Electrical Connection

PE, L1, N	Connection input voltage
+12V / Ku / Gnd1	Sensor connection for clutch
+12V / Br / Gnd2	Sensor connection for brake
Br1 / Br2	Coil connection for brake
Ku1 / Ku2	Coil connection for clutch

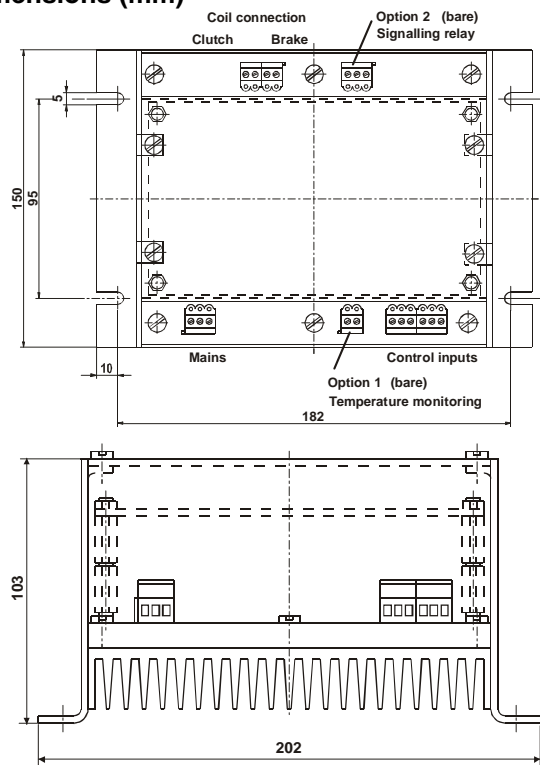


Warning! Do not apply external voltage to the terminals +12V. The coil connections Br1, Br2, Ku1 and Ku2 have a potential connection to the input voltage terminals L1 and N.

Without overvoltage protection, all components connected to the control inputs must have a basic insulation (230 V) and must be protected against physical contact.



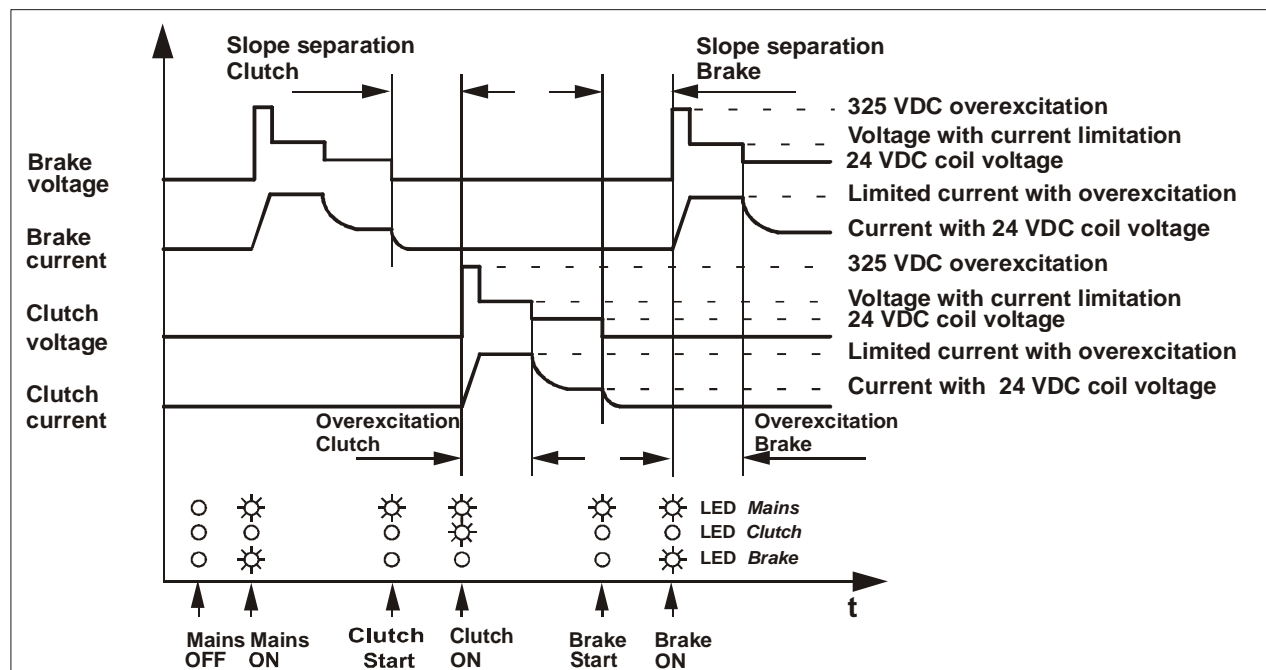
Dimensions (mm)



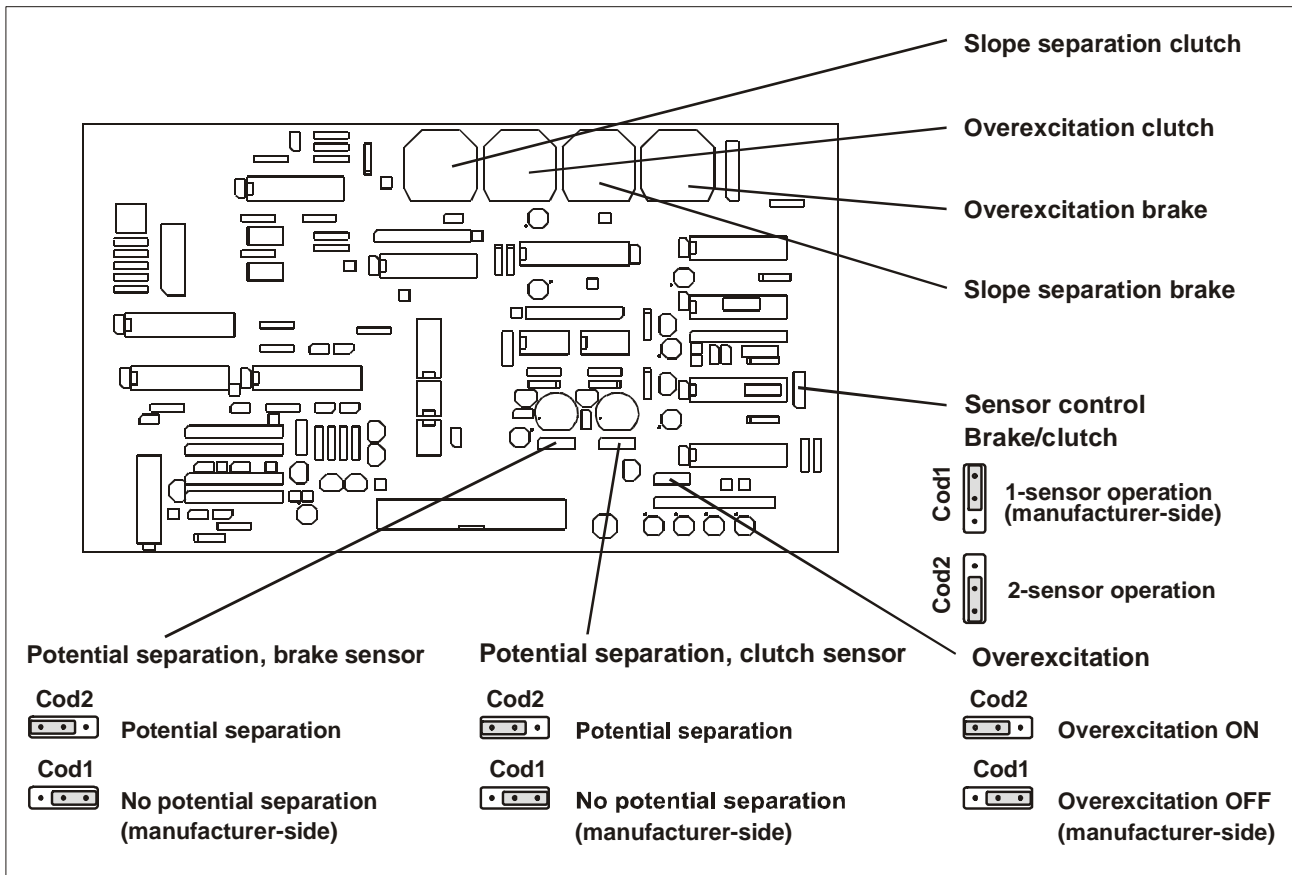
Function Description

	Function	Functional sequence
1	Input voltage switch-on	<ul style="list-style-type: none"> • Coil - Brake is energised (priority) • LED input voltage lights up green • LED brake lights up yellow
2	Start – clutch	<ul style="list-style-type: none"> • Clutch is energised with overexcitation (if adjusted) • After the overexcitation time is over, the coil voltage is applied • LED clutch lights up green
3	Start – brake	<ul style="list-style-type: none"> • Brake is energised with overexcitation (if adjusted) • After the overexcitation time is over, the coil voltage is applied • LED brake lights up yellow
4	Slope separation for the brake and clutch	• 2-150 ms, individually adjustable from the outside for clutch and brake
5	Overexcitation	• 2-50 ms, individually adjustable from the outside for clutch and brake
6	Excess temperature >80 °C in the ROBA®-takt control unit	<ul style="list-style-type: none"> • The coil voltage is switched off at >80 °C • LED excess temperature lights up red
7	Malfunction, short circuits at brake1, brake2, clutch1 and / or clutch2	• LED malfunction lights up red
8	Option 1, Temperature monitoring of the coil > +130 °C	• Coil temperature monitoring (only possible on coils with built-in PTC thermistor)
	Option 2, Signalling relay for malfunction signal	<ul style="list-style-type: none"> • Signalling relay for excess temperature and short circuits • Short circuits at coil connections • ROBA®-takt control unit excess temperature • Excess temperature of coil (only in combination with Option 1)

Functional Sequence



Adjustments (unit)



Coding

Function	Coding 1 (factory setting)	Coding 2
Potential separation Sensor - brake Sensor - clutch	"No potential separation" Application for: <ul style="list-style-type: none"> Potential-free contacts SPS control External voltage NAMUR – proximity switches PNP – NC contact 	"Potential separation" Application for: Special sensors, e.g. NPN sensors (please contact the manufacturers!)
Overexcitation	"Overexcitation OFF" Application used to avoid unnecessary coil heating	"Overexcitation ON" Application used for fast switching and exact positioning
Control sensor Brake and clutch	"1-Sensor operation" Application used when one common sensor switches for clutch and brake	"2-Sensor operation" Application used when individual sensors switch for clutch and brake



Warning! To avoid any malfunctions or mistakes, please check the functions of the control elements and the operating variants before changing the coding.

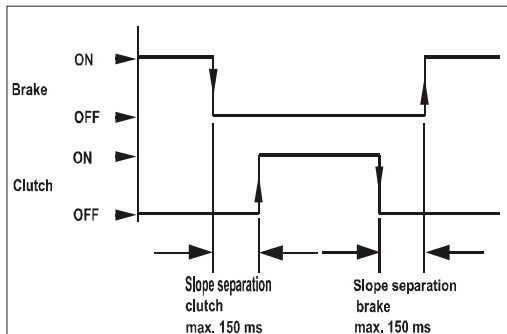


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Adjustments

Adjustment of slope separation The fitted adjustment potentiometers for clutches and brakes are accessible from the outside using a screw driver. A scale of 2-150 ms allows exact adjustment of the slope separation.

The slope separation prevents simultaneous occurrence of the clutch and brake slopes. The slope separation is used to optimise the positioning as well as to prevent unnecessary wear on the armature disk and additional coil-heating caused by friction. (Please observe the adjustments, see Table ROBA®-takt Sizes and Switching Times).

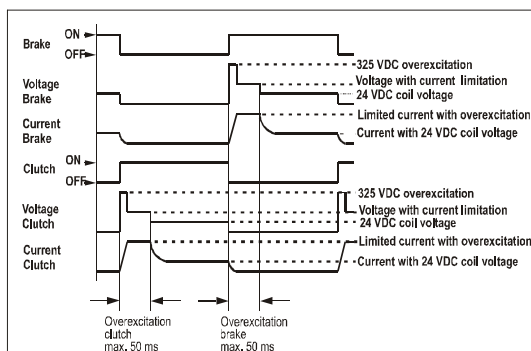


Overexcitation Time Adjustment:

The fitted adjustment potentiometers for clutches and brakes are accessible from the outside using a screw driver. A graduation of 2-50 ms allows an exact adjustment of the overexcitation time. (Please observe the adjustments, see Table ROBA®-takt Sizes and Switching Times as well as the Table Coding). With an overexcitation impulse of 325 VDC, the clutch or brake can be energised when switched on to allow exact switching and positioning.



For application, the coding is to be changed from "overexcitation OFF" (manufacturer-side setting) to „overexcitation ON“, see Fig. Adjustments (unit).



Installation

Ensure a well-conducting connection between the control unit housing and the metallic screw-on surface areas. Use toothed lock washers or spring washers below the fixing screws.

Ensure the cable connections are laid malfunction-free! Lay the control cables (+12V / Ku / Gnd1 / +12V / Br / Gnd2) separately and at a sufficient distance from high voltage current- carrying or pulsating wires (PE / L1 / N / Br1 / Br2 / Ku1 / Ku2).

Ensure an **EMC-standardized installation!**

Technical Data

Input voltage	230 VAC $\pm 10\%$, 50-60 Hz
Current consumption	Max. 4 Amp./100 % duty cycle
No-load supply power	< 7 Watt
Coil _{NOM} -voltage	24 VDC
Coil _{NOM} -power	Max. 96 Watt
Coil _{NOM} -current	Manufacturer-side setting to mayr®-ROBA®-takt-size
Coil overexcitation	Max. 325 VDC
Overexcitation time	current limitation is adapted to the respective coil size
Slope separation	2-50 ms (-30 % up to +60 %), externally adjustable (only applicable with coding „overexcitation ON“)
Protection	IP 20
Ambient temperature	0 °C up to +50 °C
Storage temperature	-20 °C up to +70 °C
Clamping conductor cross section	0.14-2.5 mm ² / AWG 26-14
Weight	1.5 kg
Protection fuse	F1/F2 (4 A MT, 5x20mm)
Input-side G-microfuse	F3, the current is adapted to the ROBA®-takt sizes. Always use the same replacement fuses two; one for connection to PELV/SELV (control wires)
Coil-side G- microfuse	For installation in overvoltage category III, a suitable overvoltage protection unit is required between the incoming voltage and the ROBA®-takt control unit.
Overvoltage category	
Overvoltage protection	

ROBA®-takt Control Unit Temperature Monitoring

A fitted temperature switch prevents overheating of the ROBA®-takt control unit.

Switch-off: at >80 °C operating temperature, the coil voltage is switched off.

Re-start: only possible after the ROBA®-takt control unit has cooled down to below 40 °C.

Reset: by switching the input voltage off and on again

Short Circuit-proof Coil Connection

If a short circuit occurs between the coil connections Br1 and Br2 or Ku1 and Ku2, the coil voltage is switched off.

Resetting the short circuit monitoring:

- Switch off the input voltage
- Clear the short circuit
- Switch on the input voltage. The LED **input voltage** lights up green, the LED **brake** lights up yellow.
- Continue with **start clutch....**



Warning! Device is not protected against earth short circuits!

If connections Br1, Br2, Ku1 or Ku touch earthed metal components, they can cause earth short circuits and therefore device failure. Customer-side protection using an ELCB is necessary.

Connection Example Control elements / control function	Connection Example 1-sensor operation	Connection Example 2-sensor operation
Brake = (Br) Clutch = (Ku)		
Application	Function (condition-controlled)	Function (slope-controlled)
Contact potential-free (NO contact) 	Close contact: Clutch ON Open contact: Brake ON	Close contact: Clutch ON or Close contact: Brake ON
SPS control (10 up to 30 VDC) 	+24 VDC signal: Clutch ON 0 VDC signal: Brake ON	+24 VDC signal to clutch: Clutch ON or +24 VDC signal to brake: Brake ON
External voltage (10 up to 30 VDC) 	+10-30 VDC signal: Clutch ON 0 VDC signal: Brake ON	+10-30 VDC signal to clutch: Clutch ON or +10-30 VDC signal to brake: Brake ON
NAMUR Proximity switch (10 up to 30 VDC) 	Sensor undamped: Clutch ON Sensor damped: Brake ON	Sensor clutch undamped: Clutch ON or Sensor brake undamped: Brake ON
PNP – NC contact Proximity switch (10 up to 30 VDC) 	Sensor undamped: Clutch ON Sensor damped: Brake ON	Sensor clutch undamped: Clutch ON or Sensor brake undamped: Brake ON

ROBA®-takt Clutch-brake Unit Connection



The ROBA®-takt control unit is adjusted **manufacturer-side** to the size of each individual ROBA®-takt clutch-brake unit. Connecting other sizes can result in malfunctions. Therefore, please compare the sizes on the Type tags before putting the device into operation.



The ROBA®-takt control unit can be adapted to other ROBA®-takt clutch-brake units by changing the plug-in jumper. Please contact the manufacturers! (Please observe the necessary adjustments, see Table ROBA®-takt Sizes and Switching times)

Comparison Table:

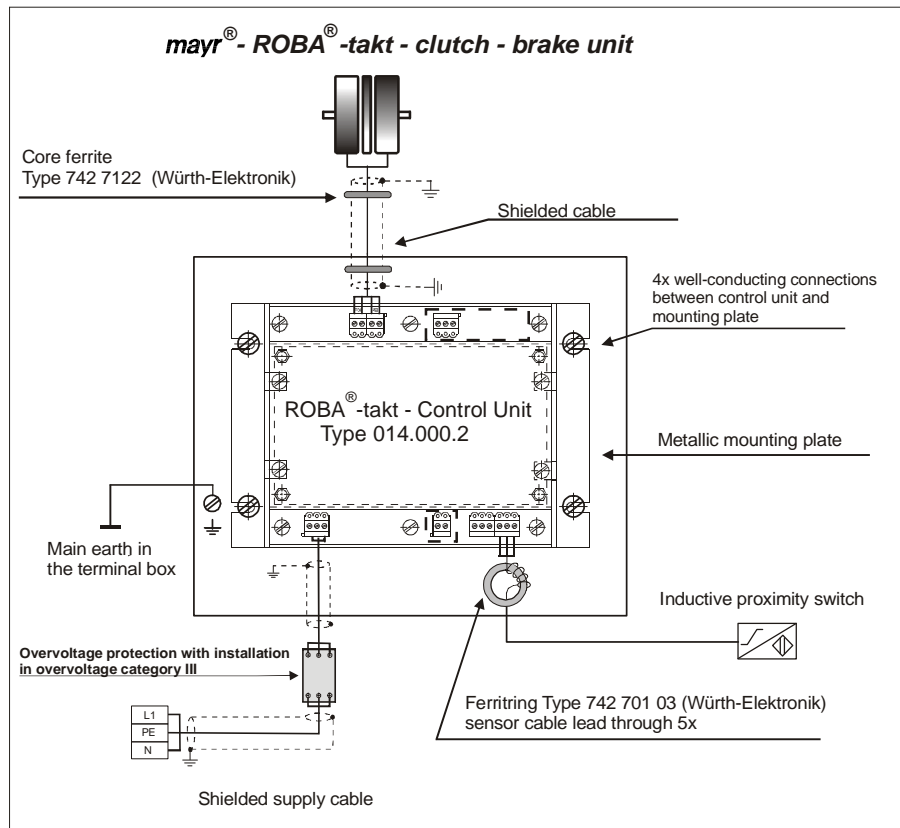
ROBA®-takt Control Unit Type	connect with	ROBA®-takt Clutch-brake Unit Type
3/014.000.2		3/67_.0_.0
4/014.000.2		4/67_.0_.0
5/014.000.2		5/67_.0_.0
6/014.000.2		6/67_.0_.0
7/014.000.2		7/67_.0_.0

EMC-standardized Installation ROBA®-takt Control Unit Type 014.000.2 and ROBA®-takt Clutch-brake Units



Warning! The measures described for compliance with the EMC-guideline for the functional components *ROBA®-takt control unit* and the *ROBA®-takt clutch-brake units* are examined under laboratory conditions at an approved establishment and cannot necessarily be transferred directly to the condition of a machine or equipment due to deviations. The Installation and Operational Instructions refer exclusively to the use of *mayr®-ROBA®-takt clutch-brake units*. If other aggregates are used, the EMC directive standardisation cannot be guaranteed.

Connection Example

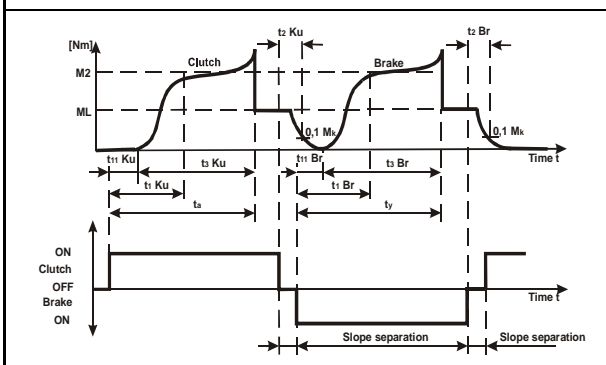


ROBA®-takt Sizes and Switching Times

ROBA [®] -takt sizes		3	4	5	6	7
Switching times [ms]	t ₁ Ku	10	12	18	21	33
	t ₁ K _u	55	72	89	91	120
	t ₁ Br	9	6	9	16	16
	t ₁ Br	30	39	76	92	106
	t ₂ Ku	24	28	60	55	128
	t ₂ Br	11	25	26	27	71
without over-excitation						
	t ₁ Ku	6	9	9	13	17
	t ₁ K _u	45	52	57	58	71
	t ₁ Br	4	4	5	9	10
with overexcitation (only connection time)	t ₁ Br	16	24	45	68	58
Recommended period of overexcitation [ms]		10*	10*	10	15	20
min. required slope separation [ms]	with overexcitation	29	33	43	65	106
	without overexcitation	22	28	37	52	95
Magnitude of overexcitation approx. 10 x nominal voltage (current limitation)						
Permitted friction work with one single switching QE [J]		3.8x10 ³	6.2x10 ³	9x10 ³	15x10 ³	25x10 ³
Total friction work Q _{tot} [J]		22.5x10 ⁷	44x10 ⁷	87x10 ⁷	171x10 ⁷	340x10 ⁷

The switching times are valid for DC-side switching with a heated coil. Deviations are possible depending on the installation, ambient temperature and the rectifier Type with which the aggregate is operated.

* For operation with overexcitation and high switching frequencies (80-100 % of the diagram value), the recommended period of overexcitation according to the Table must not be exceeded.



What must be done if ...?

LED input voltage does not light up	<input type="checkbox"/> Input voltage available? <input type="checkbox"/> G-microfuse F1/F2 o.k.?
LED input voltage lights up red	<input type="checkbox"/> Check coil and coil connection for short circuits or earth contacts.
LED clutch does not light up	<input type="checkbox"/> Check sensor clutch for correct contact, voltage or damping.
LED brake does not light up	<input type="checkbox"/> Check sensor brake for correct contact, voltage or damping.
LED excess temp. unit lights up red	<input type="checkbox"/> Excess temperature >80 °C in the ROBA®-takt control unit.
Coil clutch or brake is not energised	<input type="checkbox"/> Check functions of sensor clutch and sensor brake. <input type="checkbox"/> Is microfuse F3 O.K? <input type="checkbox"/> Check coils for interruptions.