



# PUR(A, B, C, D)

>> INSTRUCTION FOR VARIABLE SPEED WITH WIRING DIAGRAM FOR EMX™ – P10  
ROTOR SIZE 030–124

AIRCOMFORT

ECONOVENT





## VARIABLE SPEED – DESCRIPTION, CONTROL PUR (A, B, C, D) ROTOR SIZE 030–124

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### SAFETY INSTRUCTIONS

- Read all the instructions before installation and use.
- The installation work shall be done by authorised personnel.
- General conditions and regulations for the installation and operation of electrical installations must be observed.
- Measures to protect against injury and machine damage shall be taken in accordance with local conditions and regulations.
- EMX-P10 is intended for fixed installation.
- Cables must not be connected or disconnected while the power supply is on.
- Check that the equipment is correctly connected before it goes into service; see instructions under Installation instructions.
- Faults due to incorrect installation or operation are not covered by the warranty.

### DURING OPERATION

- Measurements in the control unit, during operation, must only be carried out on the terminals and only by authorized personnel. Note: Take extreme care.
- Do not open or dismantle the unit when it is in operation.

### ON REMOVAL AND SCRAPPING

- The enclosure of the EMX-P10 is made of plastics. The material shall be handled and recycled in accordance with current legislation.
- The circuit board contains small amounts of tin and lead, which must be handled and recycled in accordance with current legislation.

## VARIABLE SPEED – PRODUCT DESCRIPTION PUR (A, B, C, D) ROTOR SIZE 030–124

### PUR (A, B, C, D) WITH VARIABLE SPEED

The range of motor cassettes is available with various types of drive equipment depending on the torque power requirements of the various rotor diameters.

Rotor size	System
030–080	EMX-P10 with 25 W motor
081–124	EMX-P10 with 40 W motor

### GENERAL DESCRIPTION

The EMX-P10 is a control unit which is specially adapted for speed regulation of rotary heat exchangers. A motor with gear and tachometer from Panasonic or Oriental Motor are intended to be connected to the control unit, with outputs of 25 or 40 W (max 0.7A). The control unit has integrated motor capacitors of 1.5  $\mu$ F or 2.3  $\mu$ F, for 25 respectively 40 W motors. External motor capacitors can also be used).

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NOTE! Max motor current 0.7A.

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### WHEN IN OPERATION

EMX-P10 has a number of functions which make the control unit fully suited to its task:

- No fine adjustment is required.
- All control inputs are isolated from the mains.
- Accepts most of the control signals on the market.
- The direction of rotation of the motor is reversible.
- Protection class IP54 or IP00.

### BUILT-IN FEATURES

#### AUTOMATIC PURGING OPERATION

When the control signal drops below a certain value, for precise values see the Installation Description section, the heat exchanger's rotor rotates approximately 30 °C every 10 minutes.

#### SOFT START/ SOFT STOP

The control unit is equipped with soft start and soft stop functions. During intermittent operation start-up is adaptive to provide fast and soft start.

### ROTATION MONITOR

The rotation monitor checks that the heat exchanger rotor is actually rotating. A magnet mounted on the periphery of the motor activates a pulse sensor once per revolution. If, for instance, the belt breaks the pulses cease and an alarm is given. It takes approximately 20 motor revolutions to activate the alarm. The rotation monitor only monitors the system during continuous operation.

### ALARM OUTPUT

Relay with change-over contact. The relay changes over when the rotation monitor activates the alarm, on the event of a network power failure and on the event of an overload.

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NOTE: The relay does not switch in the event of pre alarm or overload.

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### OPERATION INDICATION

Two LEDs indicate operation status, see table and description on page 7.

### SPEED CONTROL

It is possible to choose the type of speed control via dip-switches:

#### CONTINUOUS OPERATION

In continuous operation the speed is varied continuously from maximum down to 0 / 25 of the maximum speed (0.6 – 15 rpm at 15 rpm maximum).

#### CONTINUOUS OPERATION AND INTERMITTENT OPERATION IN THE EVENT OF LOW CONTROL SIGNAL

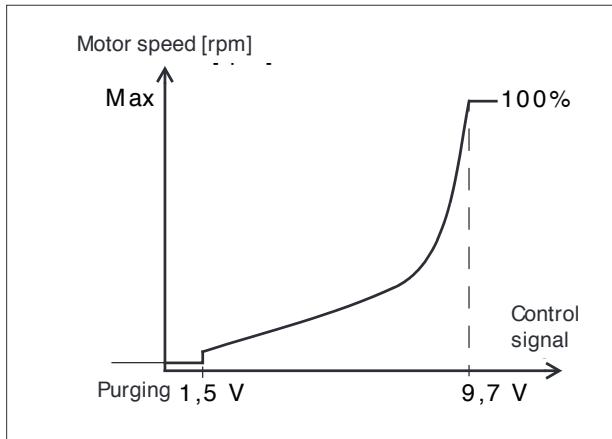
This operation status continuously provides operation down to maximum / 15 of the maximum speed, at lower speeds intermittent operation applies. Cyclic time 40 seconds. Intermittent operation from / 15 down to / 50. Total average speed range 0.3 – 15 rpm at 15 rpm max.

## VARIABLE SPEED – INSTALLATION INSTRUCTIONS

### PUR (A, B, C, D) ROTOR SIZE 030–124

#### THE DRIVE SYSTEM'S OPERATING CONDITIONS AT DIFFERENT CONTROL SIGNALS

The drive system has an integrated linearisation function that provides a linear function between the control signal and the motor's efficiency, instead of the speed being proportional to the control signal. This provides good conditions for stable temperature control.



Control signal	Purging	Max. speed (RPM)
0–10 V	1,5 V	9,7 V
2–10 V	3,2 V	9,87 V
4–20 mA	6,4 mA	19,5 mA
0–20 mA	3 mA	19,4 mA

#### INSTALLATION INSTRUCTIONS

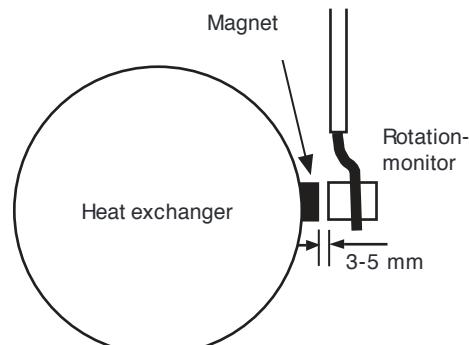
##### INSTALLING

Both the motor and the control unit must be installed inside the heat exchanger housing.

##### INSTALLING THE ROTATION MONITOR

The magnet for the pulse sensor (the rotation monitor) is attached with screws to the periphery of the heat exchanger. If the housing around the rotor is magnetically conducting, the magnet must be isolated from the housing. The pulse sensor is installed so that the magnet passes it at a distance of 3 to 5 mm; see illustration.

Fig. 1 Rotation monitor



## VARIABLE SPEED – SWITCH INSTRUCTIONS PUR (A, B, C, D) ROTOR SIZE 030–124

### WIRING INSTRUCTIONS



#### WARNING!

The control unit is not protected against short circuits between the wires of the motor cable or against earth faults between the motor cables and earth (ground). A short circuit may totally destroy the control unit. Before switching on the power, always use an ohmmeter to check that there are no short circuits.

An external fuse must always be fitted. A safety switch must be installed between the mains and the control unit. When the mains power is switched off, a power failure alarm is given.

**NOTE! The control unit does not require adjustment.**

#### TACHOMETER SIGNAL

All motor with gear and tachometer from Panasonic or Oriental Motor are intended to be connected to the control unit, with outputs of 25 or 40 mV (max 0.7A). The tachometer signal is suitable for DIP switch 1. Regulation is intended for 4-pole motors and only 1 phase capacitor motors can be used. The tachometer must produce 12 pulses per motor revolution and be of the 2 or 24 volt type.

### SETTING DIP SWITCHES

Tachometer signal		Control signal	
12 V Panasonic	ON: 1 2 3 OFF: 1	0-10 V	ON: 1 2 3 OFF: 1
24 V Oriental motors	ON: 1 2 3 OFF: 1	2-10 V	ON: 1 2 3 OFF: 1
		4-20 mA	ON: 1 2 3 OFF: 1
		0-20 mA	ON: 1 2 3 OFF: 1

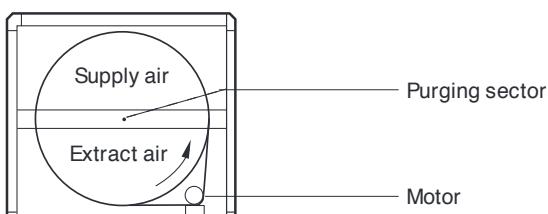
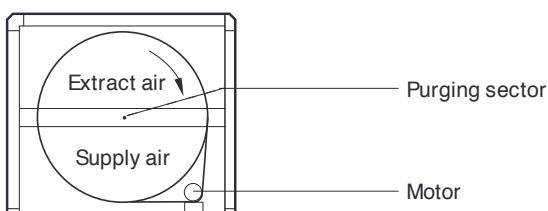
  

Rotation monitor		Operation	
Rotation monitor-activated	ON: 4 5 OFF:	Continuous	ON: 4 5 OFF:
No rotation monitor	ON: 3 4 5 OFF:	Continuous and intermittent	ON: 4 5 OFF:

Table 1 Operation with different control signals

Control signal	Purging	From min. to max. RPM	Max. (RPM)
0-10 V	0-1,5 V	1,5-9,7 V	>9,7 V
2-10 V	0-3,2 V	3,2-9,8 V	>9,8 V
4-20 mA	0-6,4 mA	6,4-19,5 mA	>19,5 mA
0-20 mA	0-3 mA	3-19,4 mA	>19,4 mA

### DIRECTION OF ROTATION



## VARIABLE SPEED – WIRING INSTRUCTIONS PUR (A, B, C, D) ROTOR SIZE 030–124

**MANUAL CONTROL WITH 10 KOHM POTENTIOMETER**  
The drive system can easily be controlled manually with a 10 kOhm potentiometer connected as follows:

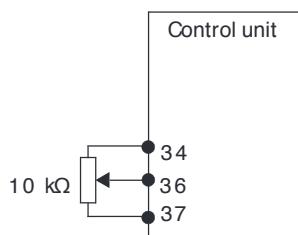


Fig. 2 10 kOhm potentiometer

### WIRING DIAGRAM FOR 25 W AND 40 W MOTOR

**NOTE!** When connecting a motor having an output of 25 W, cut off the jumper wire BY1 at the motor terminal block.

### MOTOR CAPACITOR

Bridge BY1 at the motor terminal controls the size of the motor capacitor that is connected to terminal T3. Cut the link for a capacitor value of 0.5 µF if the link is left uncut, a capacitance of 2.3 µF (1.5 µF + 0.8 µF) is connected to T3. An external capacitor can be used instead of the built-in capacitors. The external capacitor is connected according to Fig. 4. Motor terminal T3 is not used when an external motor capacitor is connected.

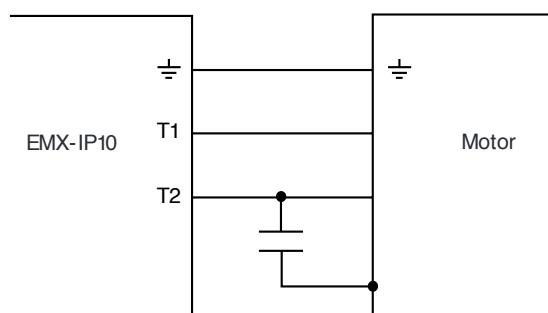


Fig. 4

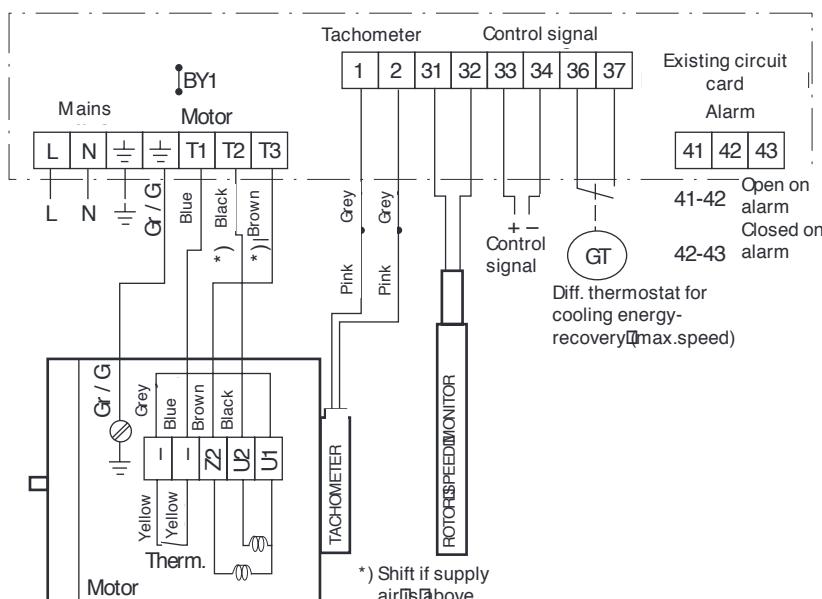


Fig. 3 Wiring diagram

**WARNING!**



Residual voltage remains for four minutes after switching off the mains power supply. No control unit alignment is needed. The control unit is not protected against short circuit between the conductors in the motor cable or against an earth fault between the motor cables and earth. Short circuit or an earth fault immediately leads to total breakdown of the control unit. So before switching on the power supply, always check with an ohmmeter that there is no short circuit or earth fault in the system. Do not connect a switch between the motor and the control unit.

## VARIABLE SPEED – FUNCTIONS

### PUR (A, B, C, D) ROTOR SIZE 030–124

#### RECOMMENDATIONS FOR EMC

In order to meet the requirements of European EMC Directive 89/ 336/ EEC, it is important to observe the following instructions:

- Both motor and control unit shall be installed inside the heat exchanger housing.
  - The earth wire in the mains cable is connected to the control unit's ground terminal.
  - Check that the heat exchanger's metal casing is grounded separately, not via the mains cable.
  - The motor must be grounded in the control unit.
- EMX-P10 has a built-in EMC filter. Screened cable does not need to be used.

#### HEAT RECOVERY ON COOLING

A difference thermostat for heat recovery on cooling (max rpm) can be connected between terminals 36 and 37; see wiring diagram.

#### DIRECTION OF ROTATION

To change the direction of rotation when the built-in motor capacitor is used, reverse the motor cables at terminals T2 and T3. When an external motor capacitor is used, swap the cable that is connected to T2 with the cable that is connected only to the motor capacitor.

#### CONNECTION OF THE MOTOR

It is possible to establish whether the motor is connected or not by taking readings on the motor windings/ terminals, see Fig. 5. Take readings between T1-T2, T1-T3 and T2-T3. The resistance between T2 – T3 should be twice that of the two first readings. Applies to Panasonic and Oriental Motor. There may be other versions.

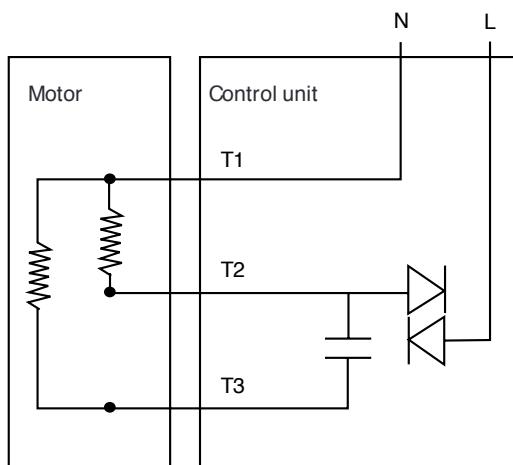


Fig. 5

#### OPERATING STATUS INDICATION

Two LEDs indicate operating status. Both LEDs light up briefly when the power is switched on.

TABLE 2 OPERATING STATUS INDICATION BY LEDS.

Green	Red	Indication	External alarm with alarm relay	Restart
Lights for 2 seconds	Lights for 2 seconds	Power on		
Flashes slowly	Off	Purging operation		
Flashes fast	Off	Continuous operation		
Lights for 2 seconds	Off	The magnet passes the rotation sensor		
Flashes fast	Constantly lit	Prealarm, overload	No	Automatically restarts 3 times, cooling time 40 min
Off	Flashes fast	Rotation alarm	Yes	Manual switch on and off the supply voltage
Off	Constantly lit	Overload alarm	Yes	

## VARIABLE SPEED – MAINTENANCE AND TROUBLESHOOTING

### PUR (A, B, C, D) ROTOR SIZE 030–124

#### MAINTENANCE AND TROUBLESHOOTING

##### MAINTENANCE

Ensure that the installation has been correctly carried out, e.g. check all cable terminals, check that the cables are properly stripped and that the DIP switches are correctly set.

##### TROUBLESHOOTING

The magnet for the pulse sensor (the rotation monitor) is attached with screws to the periphery of the heat exchanger. If the housing around the motor is magnetically conducting, the magnet must be isolated from the housing. The pulse sensor is installed so that the magnet passes it at a distance of 3 to 5 mm; see illustration.

TABLE 3 TROUBLESHOOTING

Observation/ indication	Cause/ action:
No LED is lit	Check that there is 230 VAC 10% at the mains terminal block. If the mains voltage is incorrect, replace the control unit.
Green LED flashing slowly/ purging operation - low control signal	Are 31 and 32 reversed? Are DIP switches 2-3 set? Vary the control signal between min and max. Can 0-10 V (2-10 V) be measured between 31 (+) and 32 (-)? Check EMX-P10 by linking 36-37. The motor should now run up to max rpm.
Red LED is flashing/ the rotation monitor is giving an alarm/ the motor is still running.	The rotation monitor has detected that input 31-32 has not been closed the last 4 motor revolutions. This may be due to: <ul style="list-style-type: none"> <li>• Faulty rotation monitor. The rotation monitor can be checked with the aid of the green LED. First reset the alarm by switching the mains supply to the control unit off and on again. The LED gives a steady light for about 2 seconds when 31-32 is closed, e.g. when the magnet passes the impulse sensor.</li> <li>• Faulty control unit. First reset the alarm by switching the mains supply to the control unit off and on again. Link 36-37. If the voltage between terminals T1 and T2 about 180-230 VAC, not, replace the control unit.</li> </ul>

TABLE 3 TROUBLESHOOTING

Observation/ indication	Cause/ action:
Red LED lights constantly and green is off	The motor protector has tripped. Check that the correct motor is connected, that Jumper BY1 has been cut, the required value of the motor capacitor is 0.5 µF and that the heat exchanger is not binding. Also check that the tachometer cable is correctly connected and is not damaged.
The motor runs intermittently	See page 3 about continuous and intermittent operation.
The rotation monitor does not give an alarm.	Check DIP switch 2. Also check sensors/ magnets.
The motor rotates in the wrong direction	Swap the motor cables in terminals T2 and T3 with each other when using the integrated capacitor. When the external motor capacitor is used the cable connected to T2 is switched with the one that is only connected to the motor capacitor. See, page 16.
The motor runs at full speed even when the control signal is low	Check the integrated tachometer in the motor as well as the wiring for the tachometer.
Motor does not run smoothly, jerky	Check that the capacitance value is correct for the motor being used. See page 6 and Fig. 4.

##### ON REPLACEMENT

When the control unit is replaced, the entire enclosure with circuit boards must be replaced.

## VARIABLE SPEED – TECHNICAL DATA

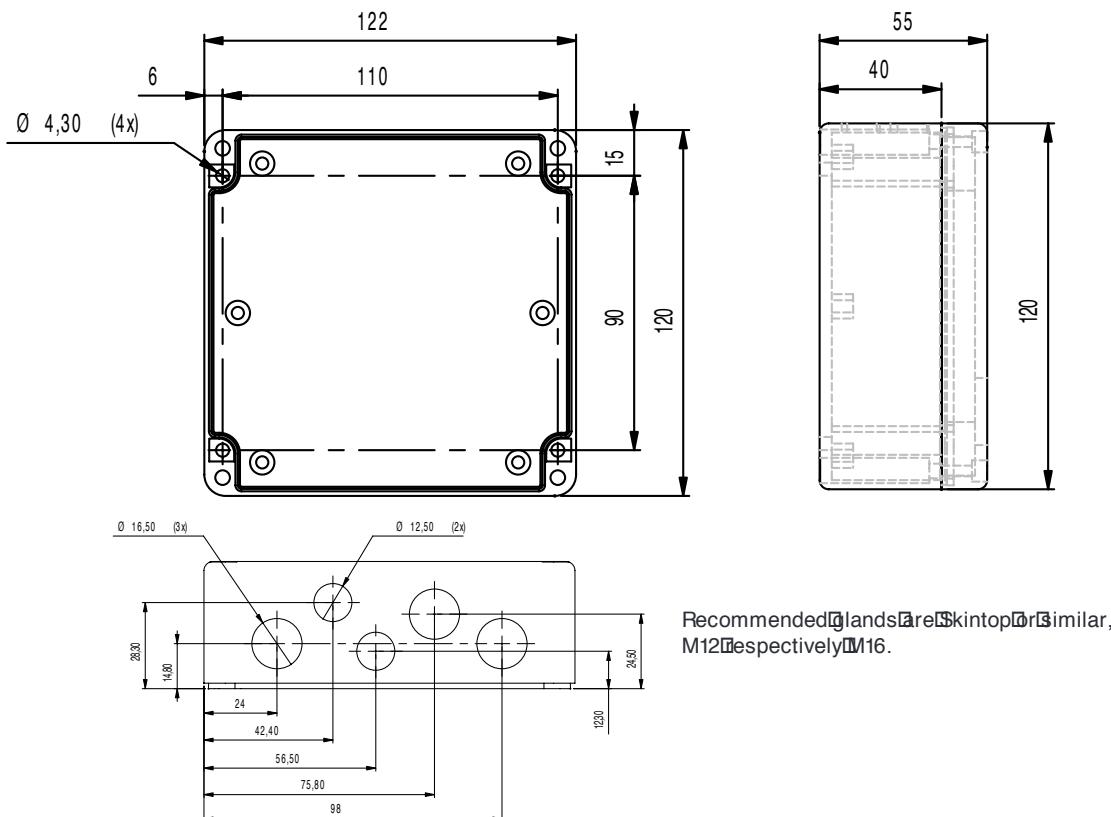
### PUR (A, B, C, D) ROTOR SIZE 030–124

#### TECHNICAL DATA

TABLE 4 DATA

Output data	Purging operation	Built-in function
	Start/ softstop	Built-in function
	Alarm output	Changeover contact, max 3 A, 230 VAC, AAC1
	Motor, 25 or 40 W	Terminal for motor with gear and tachometer
Input data	Mains voltage	230 VAC ± 10% / 50 / 60 Hz
	Current, max	0.7 A
	Control signal	0-10 V, 2-10 V, 0-20 mA, 4-20 mA, 0-10 kΩmΩ potentiometer
General	Protection class	IP54 (Enclosed version, with appropriate glands). IP00 (Circuit board version)
	Weight	0.4 kg, Enclosed version
	Dimensions B * H * D	122 x 120 x 55 mm
	Ambient temperature	-30 to +40 °C
	Speed range	1:25 during continuous operation. 1:50 during combination of continuous operation and intermittent operation.
	EMC, Emission	EN50081-1
	EMC, Immunity	EN50082-2

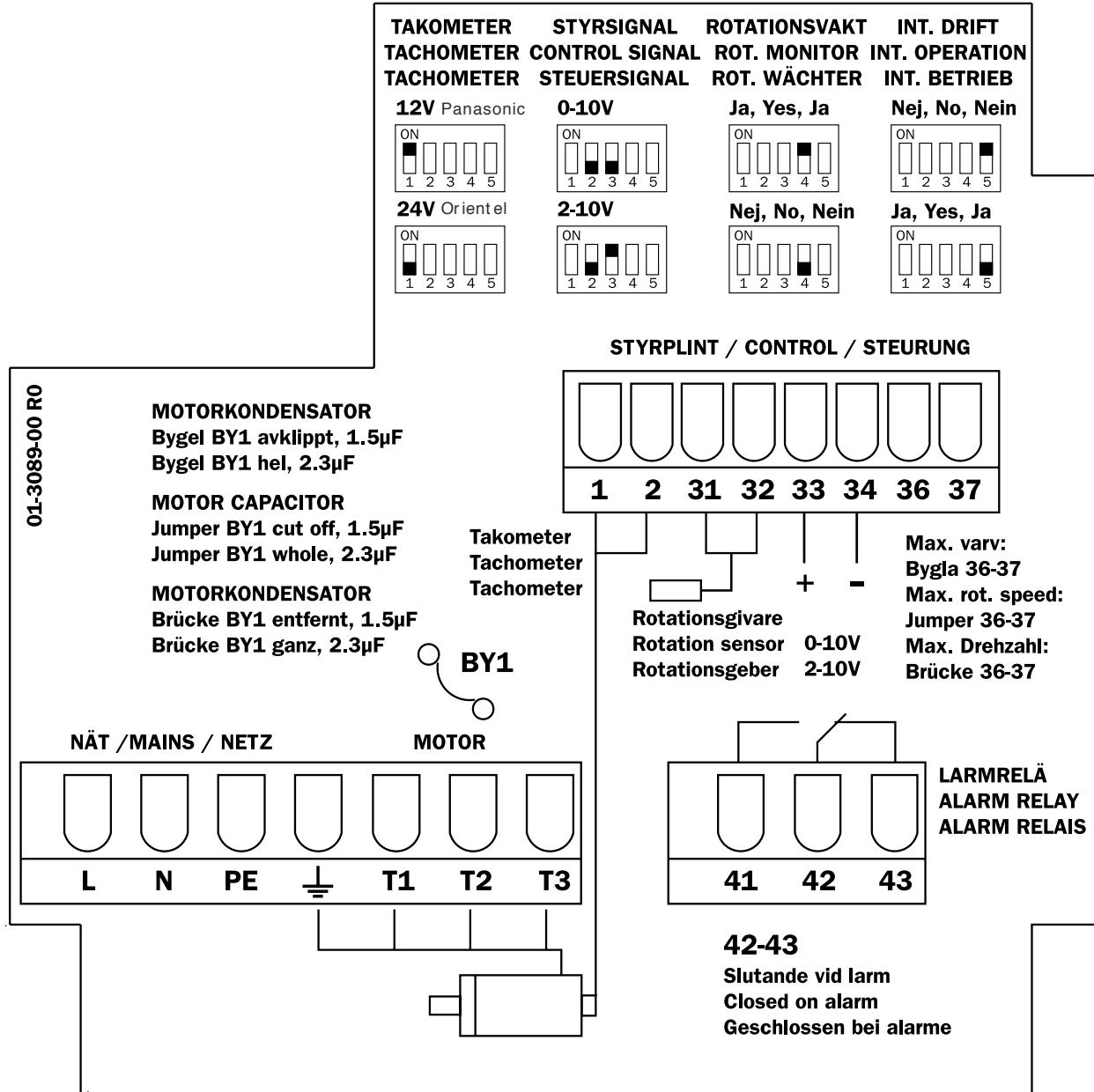
#### DIMENSIONS AND HOLE OUTLINES



## VARIABLE SPEED – CONNECTION LABEL PUR (A, B, C, D) ROTOR SIZE 030–124

### APPENDIX

CONNECTION LABEL (CAPS INSIDE)



## VARIABLE SPEED – CONNECTION LABEL PUR (A, B, C, D) ROTOR SIZE 030–124

### FRONTPANEL



SLIDE IN ROTOR CASSETTE - TECHNICAL DATA | 9320 GB | 20140828

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