MANUAL

CONTROL UNIT FOR ROTATING HEAT EXCHANGERS

VariMax100

IBC automatic
Industrial Automation • Industrial Electronics

PAGE REFERENCE

FUNCTIONAL DESCRIPTION

- VariMax100 together with the VariMax-motor100 is an optimized solusion for running a rotating heat exchanger.
- VariMax100 is intended for thermal wheel up to 3,9 m and for hygroscopic up to 3,0 m.
- VariMax100 has a built-in shift of the input signal, which means that the efficiency of the wheel becomes proportional to the input signal.
- VariMax100 has a fixed set threshold value at 0,1 V (hysteresis 0,13-0,07 V).
- VariMax100 has a rotation monitor and a built-in cleaning function. The functions are disconnectable through DIP-switches.
- VariMax100 starts automatically after voltage drop and gives reset on all alarms at restart.
- The VariMax-motor100 is a multipolar motor with a large moment within the complete speed area.
- The motor rotates with 1-400 rpm, this corresponds to about a wheel speed at 0,05-12 rpm for thermal wheel and 0,2-20 rpm for hygroscopic.
- At non-moving motor a holding moment is activated so that the wheel is always standing still. The holding moment disappears if the voltage to the control unit disappears.
- As standard the motor is mounted with 3 m cable.
- At a total cable length of more than 3 m, an external EMC filter must be used.

TECHNICAL DATA CONTROL UNIT

Connection voltage	1 x 230 V +/-15% 50/60 Hz
Power input max	500 W
Input current	2,2 A
Incoming fuse max	10 A
Output voltage *)	3x280 V
Motor current / phase	3,2 A
Internal fuse **)	4 AT

Acceleration- and retardation time	30 s
Ambient temperature not condensing	-30 - +45°C
Protection form	IP54
Weight	3 kg
Measures, HxWxD	225x205x104 mm

*) Exact value can not be achieved with a digital measuring instrument.

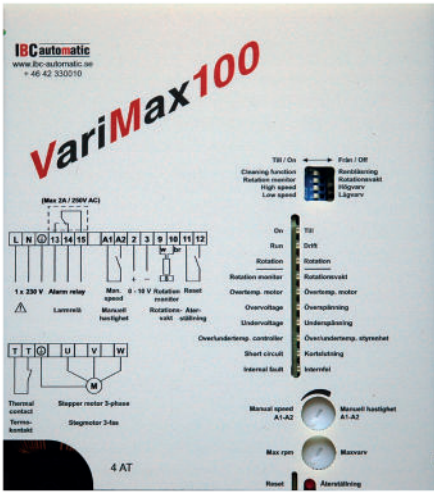
**) The fuse protects both motor and electronics

TECHNICAL DATA MOTOR

Moment Max	10 Nm
Min rotation speed	1 rpm
Max rotation speed	400 rpm
Motor temp. mantle max	110 °C
Shaft diameter	19 mm

Shaft length	35 mm
Ambient temperature	-30 - +45 °C
Protection form	IP54
Weight incl. motor bracket	8,4 kg
Measures incl. shaft and motor bracket HxWxL	142x150x180 mm

FUNCTIONS



DIP-switches ON to the left

Operation indications

Alarm indications

Adjustments

Push-button for Reset

DIP-SWITCHES

Cleaning	Cleaning function connected at ON. When the wheel has been still for 30 minutes, the cleaning function is activated and the wheel rotates for 20 seconds with 12 rpm on the motor.
Rotation monitor	Rotation monitor connected at ON.

MANUAL RUN (AT TEST)

High speed	The wheel rotates at set max speed, as the switch stands at ON.
Low speed	The wheel rotates at fixed set min speed (1 rpm on the motor), as the switch is in ON-position.

OPERATION INDICATIONS

On/alarm	"Voltage on", lights with fixed light.
Run	Lights as the motor will rotate.
Rotation	Twinkles when the magnet passes the rotation monitor, regardless adjustment of the DIP-switch "Rotation monitor". Twinkles even if the input signal is lower than the threshold value.

ALARM

At alarm the control unit restarts after 30 seconds. Every red light diode lights during the same time (30 s). After restart, the light diode goes out, this occurs twice. The third time, the alarm relay closes and the alarm "continues".

To make the alarm relay pull and the alarm to "progress", the three alarms above must occur within 90 minutes, or else the sequence is reset.

Green light diode lights with a fixed light at the first and second alarm and not until the third alarm, it starts to twinkle.

Then all alarms are remaining.

Rotation monitor	Alarms and trips if pulse is not received every 30 minutes at minimum speed (1 rpm on the motor) and every 20 seconds at maximum speed (400 rpm on the motor). The time between theese speeds is linear. The function is disconnectable through DIP-switches.

Cont. on next page

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Probable cause of fault at installation	- Magnet turned the wrong way. - Magnetic transmitter wrongly connected (wrong polarity). - Distance between magnetic transmitter and magnet too large, max 15 mm. See connections page 5.
Problable cause of fault at run	- Broken belt. - Slipping belt. - Stuck wheel. - Magnet transmitter or magnet not intact.
Motor temperature	Alarms and trips at too high winding temperature.
Over voltage	Alarms and trips if the input voltage exceeds 265 V.
Under voltage	Alarms and trips if the input voltage is below 190 V.
Over-/under temperature	Alarms and trips if the temperature in the control unit is above/below safe temperature.
Short circuit Probable cause of fault	Alarms and trips at short circuit phase - phase or phase - earth. -Short circuit between phases in cable or motor. -Ground fault between phase - earth in cable or motor. -Interruption of one phase of the cable or motor. Measure the motor resistance, should be the same on all phases.
Internal fault	Alarms and trips if an internal fault in the control unit has occurred.

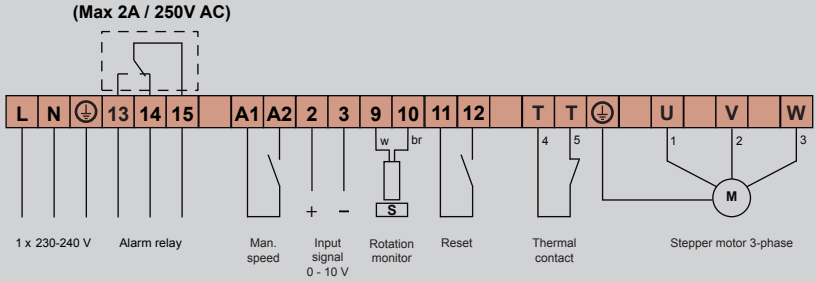
ADJUSTMENTS VIA POTENTIOMETER

Manual speed	By closing A1-A2 the speed is controlled through the potentiometer signed "Manual speed". Can be regulated between 1-400 rpm on the motor (about 0,05-12 rpm on the wheel). The wheel rotates with a set rotation speed regardless the value of the input signal. Factory set: 1 rpm on the motor shaft.
Maximum rotation speed	Potentiometer for adjustments of maximum speed of rotation. Regulates between 50-400 rpm on the motor (about 2-12 rpm on the wheel). Factory set: 50 rpm on the motor shaft.

PUSH-BUTTON

Reset	Reset-button for reset of the control unit. (The control unit even resets at voltage reduction and at shackled terminals 11-12).

CONNECTION DIAGRAM

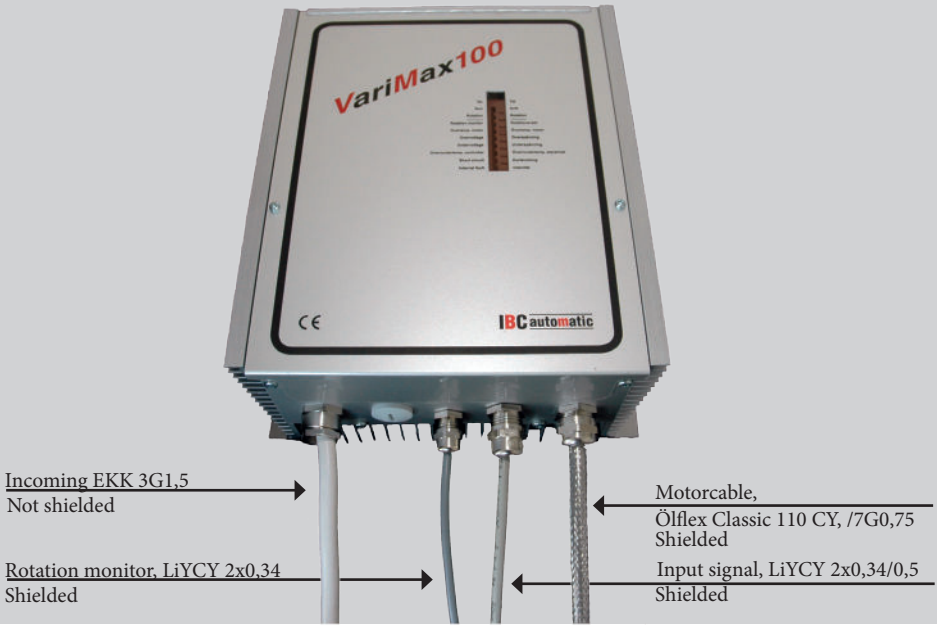


CONNECTIONS

The voltage must be turned off before working on the equipment.

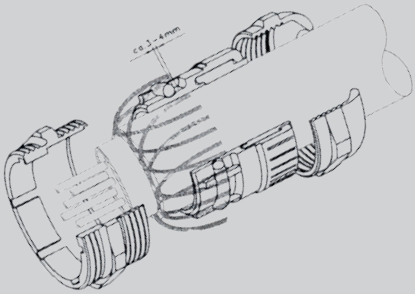
Input voltage (L-N-PE)	1x230 V +/-15%, 50/60 Hz. NOTE! Protective ground must always be connected.
Alarm relay (13-14-15)	Closes between 14-15 at alarm or voltage reduction. Max 2 A / 250 V AC.
Manual speed (A1-A2)	Gives set speed of rotation at shackle.
Input signal (2-3)	0-10 V. Plus connected to terminal 2, minus to terminal 3.
Rotation monitor (9-10)	White cable connected to terminal 9, brown to terminal 10. Magnet mounted with south-side (S) pointing at the transmitter. Max distance 15 mm.
12 V- output (10-11)	Output for 12 VDC, terminal 10 is minus and terminal 11 is plus. Max 50 mA.
Reset (11-12)	Remote alarm reset. The control unit is automatically reset at power failure.
Thermal contact (T-T)	To protect the motor from overheating this must be connected.
Motor (U-V-W)	VariMax-motor100 must be used. Direction of rotation is changed by shifting two of the phases.

EMC-INSTALLATION



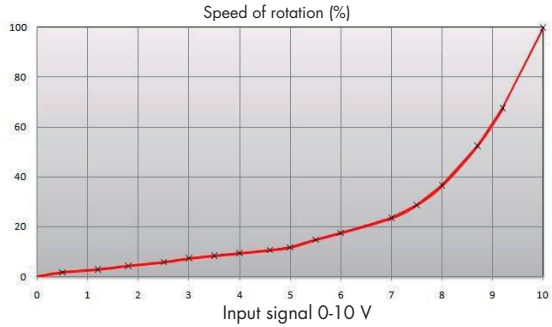
EMC-gland shall be used with shielded cable.
Cables above, or equivalent, shall be used for fulfilling the EMC-terms.

EMC-GLAND



NOTE!
When connecting the cable to the EMC-gland, it is important that the connection is done as above.

INPUT SIGNAL/SPEED OF ROTATION



The input signal is directly proportional to the rotor efficiency, which means that the input signal and the speed follow the diagram.

CHECK BEFORE SWITCHING ON THE CONTROL UNIT

Control that	the control unit is connected according to instructions on page 5. Input voltage 230 V +/-15%, 50/60 Hz.
Control that	the input signal is 0-10 V.
Control that	rotation monitor and cleaning function are connected.

PUTTING THE EQUIPMENT INTO OPERATION

Should be done in order

Control that	the motor rotates in the correct direction according to the rotation direction of the wheel. At incorrect rotation direction, two of the phases are shifting to the motor.
Adjustment of max speed of rotation	Put the DIP-switch for high speed in position ON. Adjust "Max speed" so that the wheel rotates with 10-12 rpm (or according to instructions from the wheel manufacturer).
Control of min speed of rotation	Put the DIP-switch for low speed in position ON. Control that the wheel starts. The min speed of rotation is fixed set.
Control of rotation monitor	Yellow light diode "Rotation" should twinkle when the magnet passes the magnetic transmitter, irrespective of the DIP-switch position.
Control of cleaning function	Turn of voltage. Control that the DIP-switch "Clean" is in position ON and that the input signal is disconnected. After turning on voltage, the wheel rotates for 20 seconds with 12 rpm on the motor.
Finish with	letting the central control, control the wheel at max- and min speed of rotation and control that the speed of the wheel is correct.

MANUFACTURER´S DECLARATION

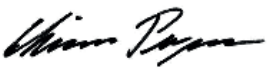
The manufacturer´s assurance of the agreement of the product with the demands in the EMC directive 2004/108/EG.

Manufacturer	IBC automatic i Höganäs AB Brännerigatan 5 A, 263 37 HÖGANÄS
Product	Control unit for rotating heat exchangers
Type designation	VariMax100
EC directives applied to the product	All control units are approved in accordance with the demands as specified in the EMC- directive 2004/108/EG and are tested according to standard EN 61800-3:2004, emission category C1 and immunity category C2. All control units follow the low voltage directive 2006/95/EG, standard EN 61800-5-1.

The manufacturer assures on his own responsibility that the product which this assurance concerns corresponds with the demands in the EC directives stated above.

This product is corresponding to the RoHS-directive.

Höganäs 2012-03-14
IBC automatic i Höganäs AB



Christer Persson
MD

In this product we use FreeRTOS v6.1.0 (http://www.freertos.org) and this source may be provided by us.

PERSONAL NOTES

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