

MANUAL

CONTROL UNIT FOR ROTATING HEAT EXCHANGERS

MicroMax370



2004-12-13
Version 1.0
F21037902GB

Declaration of manufacturer

The manufacturer ensures that the products are in accordance with the requirements of EMC DIRECTIVE 89/336EEG including additional directives 92/31 EEG and 93/68/EEG

Manufacturer	IBC automatic i Höganäs ab Brännerigatan 5, 263 37 Höganäs, Sweden
Product	Control unit for rotating heat exchangers (frequency inverter)
Model	MicroMax370
EC directives applied to the product	EN50081-1, edition 1, 1992 EN50081-2, edition 1, 1993 EN50082-1, edition 1, 1992 EN50082-2, edition 1, 1995

The manufacturer assures that the products are in accordance with the requirements of above mentioned EC regulations.

Höganäs 2004-12-13

IBC automatic i Höganäs ab

Christer Persson
MD

To meet the requirements of the EMC regulations a screened cable must be used for both motor and control signals.

The screen must be connected in both ends.



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Description of functions

- MicroMax370 – enclosed IP54, is a modern frequency inverter with the additional functions which are necessary to control a rotating heat exchanger optimally. Input signal 0-10 V.
- The revolution speed of the heat exchanger and in consequence its efficiency is regulated by the control unit so that the speed of the rotor is proportional to the input signal from the control central.

Operational functions

Max. frequency **100 / 150 Hz**

At normal run, i.e. when maximum speed of the rotor is between 10-12 rpm, the DIP-switch must be in position 100 Hz.

If a maximum speed of the rotor of 15-18 rpm is required, the DIP-switch must be in position 150 Hz.

Cleaning function

The heat exchanger rotates at minimum speed for 10 seconds every 30 minutes if the input signal is below the threshold value, i.e. the rotor is standing still.

The function can be deselected with a DIP- switch.

Rotation monitor

The rotation monitor (a magnet installed on the rotor with the magnetic sensor belonging to it) stops the control unit and gives an alarm at belt breakage, or similar disorders. The control unit trips if a pulse is not received every 5 minutes.

The function can be deselected with a DIP-switch.

Threshold value

The control unit has a preset threshold value of 0.1 V. If the input signal is below this value, the rotor stops.

Reset

Via the reset button alternatively at power on.

Restart

Automatic restart after power on.

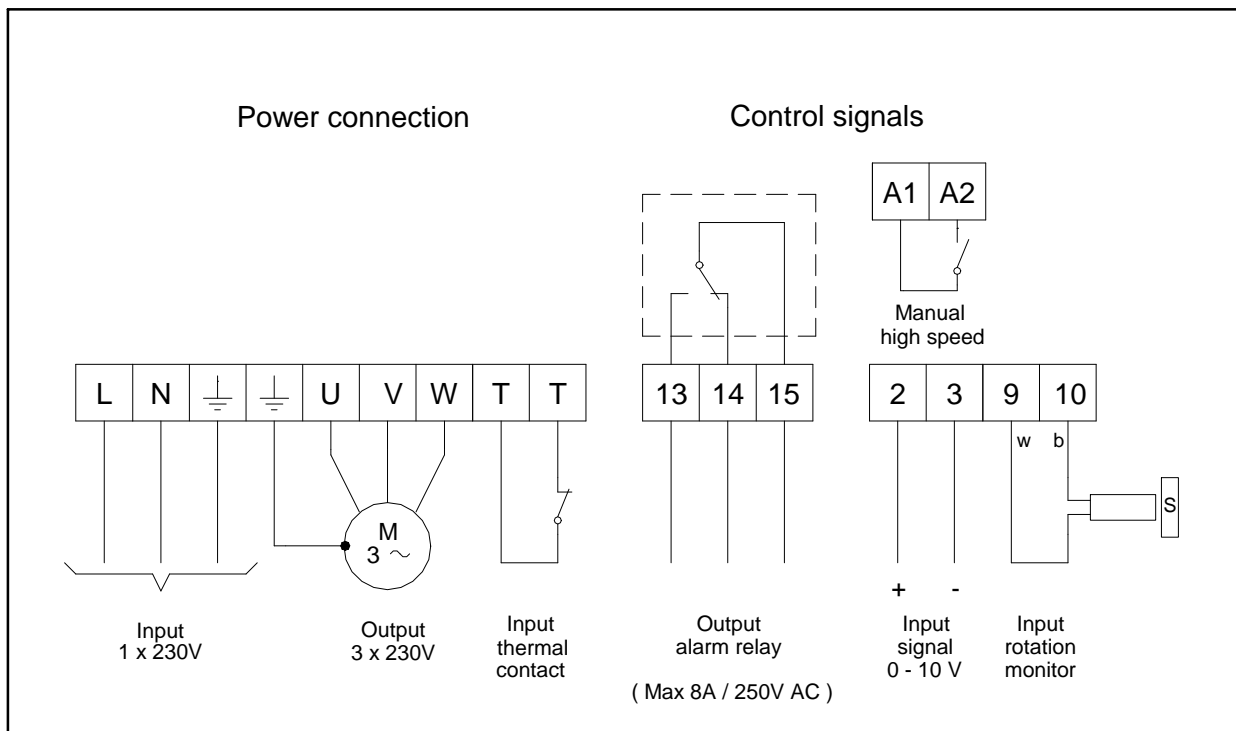
Separation

Disconnection between motor and the control unit ought not to take place when the motor is running.

General data

<i>Motor power max.</i>	370	W	<i>Acceleration time</i>	(Fixed) 30	s
<i>Motor current max.</i>	2,2	A	<i>Retardation time</i>	(Fixed) 30	s
<i>Overload 2 min/30min</i>	3,5	A	<i>Ambient temp.</i>		°C
<i>Connection voltage</i>	1x230, +6-10%	V	<i>not condensing</i>	0-45	
<i>Connection frequency</i>	50-60	Hz	<i>Protection form</i>	IP54	
<i>Output voltage</i>	3x0-230	V	<i>Weight</i>	1,1	kg
<i>Output frequency</i>	4-100/150	Hz	<i>Measures, hxbxd</i>	198x164x60	mm
<i>Min. frequency</i>	(Fixed) 4	Hz	<i>Internal fuse</i>	4	AT
<i>Max. frequency</i>	40-100/150	Hz	<i>External fuse max.</i>	10	A

Connection diagram



Connections

Thermal contact (T-T)

Must be looped if the thermal contact of the motor is not connected.

Alarm relay (13-14-15)

Closes between 14 - 15 at alarm or power off.
Max 8A/250V AC.

Input signal (2-3)

0-10V

Rotation monitor (9-10)

White cable is connected to terminal 9, brown cable to terminal 10. The magnet must be installed with the south side towards the sensor. Max. distance 15 mm.

Manual high speed (A1-A2)

Cooling recycling. Will give adjusted max. speed when closed.

Manual driving (at test)

At high speed

The motor rotates at preset max. speed, when the DIP switch is in position On.

At low speed

The motor rotates at preset min. speed, when the DIP switch is in position On.

Checks before power on

- Check that** the motor has been connected for 3 x 230 V. If a circuit breaker has been connected between the motor and the control unit, the thermal contact of the motor should be connected through an auxiliary contact in the circuit breaker.
- Check that** the control unit has been connected according to the instruction on page 3. Feeding tension 230V + 6 - 10 %.
- Check that** the rotation monitor and the cleaning function have been selected.
- Check that** at normal speed of the rotor (10-12 rpm) the max. frequency DIP-switch is set on 100 Hz.

Starting procedure

Should be done in correct order

- Check that** the motor rotates in the correct direction compared with the rotation direction of the rotor. If not, change two phases to the motor.
- Adjustment of max. rpm** Put the DIP-switch for "High speed" in position On, alternatively use 0 - 10 V input signal. Adjust "Max. rpm" so that the rotor rotates at 10 -12 rpm (or according to the instruction of the rotor manufacturer).
- Check of min. rpm** Put the DIP-switch for "Low speed" in position On. Check that the rotor starts. The min. rpm is permanently set.
- Check of rotation monitor** Put the DIP-switch for "High speed" in position On. The indication "Rotation" (yellow LED 2) flashes when the magnet passes the magnetic sensor. Regardless if the DIP-switch for "Rotation monitor" is turned On or Off.
- Cleaning function** It is tested when the power is turned on. If the DIP-switch for the cleaning function is on and the input signal is lower than the threshold value (0.1 V) the rotor starts the cleaning function directly when the power is switched on.
- Finish by** letting the control central run the rotor at max. and min. rpm and check that the rotor speed correct.

Operational indications

On (green)	"Power on" gives a fixed light. Flashes when the control unit has tripped.
Run (yellow 1)	Indicates run. Lights when heat exchanger rotates.
Rotation (yellow 2)	Flashes when the rotation monitor is affected. Regardless of the setting of the DIP-switch.

Alarm indications

**The green LED flashes and the red LED below lights.
All alarms remains until reset.**

**Rot. monitor
(red 1)** **The control unit has tripped because of the rotation monitor.**

Probable cause of failure at installation:

- The magnet has been turned the wrong way.
- The magnetic sensor has been wrongly connected (the wrong polarity). See connections page 3.

Probable cause of failure at operation:

- The belt has broken.
- The belt slips.
- The rotor has stuck.
- The magnetic sensor or the magnet is not intact.

**Motor temp.
(red 2)** **The thermal contact of the motor has opened because of a too high winding temperature.**

Probable cause of failure:

- See page 6, Alt. 1 Over-current.

The thermal contact of the motor closes when the temperature goes down.

**Over-voltage
(red 3)** **Over-voltage.**

Probable cause of failure:

- The input voltage exceeds 250 V for more than 4 - 5 sec, after that the control is tripped.

**Under-voltage
(red 4)** **Under-voltage.**

Probable cause of failure:

- The input voltage is below 205 V for more than 4 - 5 sec, after that the control is tripped.

Over-voltage and under-voltage (red 3 and 4)

Probable cause of failure:

Alt 1. Over-current.

The control unit limits the current to 4A and then is tripped after 4 -5 sec.

- The motor is too small compared with the rotor diameter.
- The rotor runs stiffly.
- The motor is out of order, for example a fault of bearing. Measure the current.

N.B. With a small motor the control unit does not trip, because, even when the motor shaft is stuck, the current is below the current limit. This means that after 5 - 6 min. the control unit is tripped on the rotation monitor. Possibly the control unit can also be tripped on the thermal contact if the motor gets too hot.

Alt 2. Short-circuit phase to phase.

The control unit limits the current at 4A and then is tripped after 4 - 5 sec.

Probable cause of failure:

- Winding fault in the motor. Measure the motor resistance, it should be approximately the same on all phases.
- Short-circuit between the phases in the cable.

Alt 3. Short-circuit phase to earth (earth fault).

The control unit is tripped directly.

Probable cause of failure:

- Earth fault in the motor or the cable.

N.B.

To reset the control unit at an earth fault the control unit must be turned off.

N.B.

The correct value of voltage and current can only be obtained with a moving-iron instrument.

IBC automatic

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