

GRUNDFOS MAGNA

Series 2000

MAGNA 40-120, 65-120, 65-60

Installation and operating instructions



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Installation and operating instructions

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Notice d'installation et d'entretien

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1. Symbols used in this document



WARNING!

If these safety instructions are not observed, it may result in personal injury!



If these safety instructions are not observed, it may result in malfunction or damage to the equipment!



Notes or instructions that make the job easier and ensure safe operation.

2. General description

The GRUNDFOS MAGNA Series 2000 is a complete range of circulator pumps with integrated differential pressure control enabling adjustment of pump performance to the actual system requirements.

In many systems, this will reduce the power consumption considerably, reduce noise from thermostatic valves and similar fittings, and improve the control of the system.

The desired head can be set on the pump control panel.

3. Applications

The GRUNDFOS MAGNA is designed for circulating liquids in heating systems. The pump can also be used in domestic hot-water systems.

The pump range is primarily used in

- systems with a **variable flow**.

The pump range can also be used in

- systems with a **constant flow** where it is desirable to optimize the setting of the pump duty point,
- systems with **variable supply-pipe temperature**.

GRUNDFOS MAGNA pumps can be used in snow-melting applications. To avoid condensation in the control box, the pump should not be installed on the return side.

3.1 Pumped liquids

Thin, clean, non-aggressive and non-explosive liquids, not containing solid particles, fibers or mineral oil.

In **heating systems**, the water should meet the requirements of accepted standards on water quality in heating systems.

In **domestic hot-water systems**, it is advisable to use GRUNDFOS MAGNA pumps only for water with a degree of hardness lower than approx. 17 grains/gallon (14 °dH).



WARNING!

The pump must not be used for the transfer of inflammable liquids such as diesel oil, petrol or similar liquids.

WARNING!



Prior to installation, read these installation and operating instructions. Installation and operation must comply with local regulations and accepted codes of good practice.

4. Installation

Arrows on the pump housing indicate the liquid flow direction through the pump.

4.1 Changing the control box position

WARNING!



Before any dismantling of the pump, the system must be drained or the isolating valves on either side of the pump must be closed as the pumped liquid may be scalding hot and under high pressure.

Change the control box position as follows:

1. Remove the inspection screw (1) and the four Allen screws (6 mm) (2) in the stator housing, see fig. 1.
2. Lift off the stator housing (3). Keep the rotor (4) in place using a suitable tool, e.g. a T-key (M8) (5), see fig. 2.
3. Check that the O-ring (6) is intact. A defective O-ring must be replaced.
4. Hold the stator housing/control box (3) in the desired position.
5. Lower the stator housing over the rotor. Keep the rotor in place as described in point 2.
6. Fit and tighten the four screws, torque 14-17.5 Nm, and the inspection screw, torque 8-10 Nm.

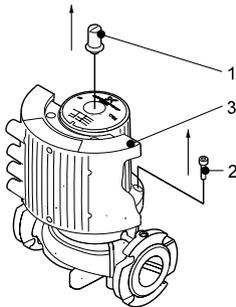


Fig. 1 Removing the control box

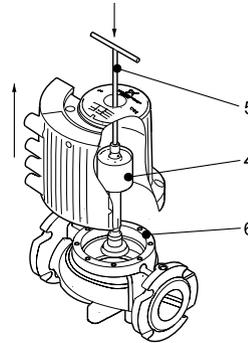


Fig. 2 Changing the control box position

Pos.	Description
1	Inspection screw
2	Screw
3	Stator housing/control box
4	Rotor
5	T-key (not provided with the pump)
6	O-ring

4.2 Two pumps in parallel

Two pumps in parallel can be controlled via the optional GENI module. Both pumps should have a GENI module installed in the control box. The modules are connected with a wire. The modules determine the pump operating mode, see section 7.11 GENI module.

4.3 Check valve

If a check valve is fitted in the pipe system, see fig. 3, it must be ensured that the set minimum discharge pressure of the pump is always higher than the closing pressure of the valve. This is especially important in proportional-pressure control mode (reduced head at low flows).

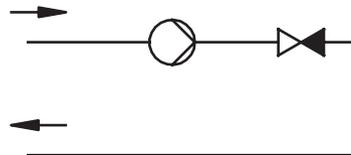


Fig. 3 Check valve

4.4 Frost protection

If the pump is not used during periods of frost, necessary steps must be taken to prevent frost bursts.

Note

Additives with a density and/or kinematic viscosity higher than those/ that of water will reduce the hydraulic performance.

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5. Electrical connection

The electrical connection and protection should be carried out in accordance with local regulations.

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WARNING!

Never make any connections in the pump control box unless the electricity supply has been switched off for at least 5 minutes.

The ground terminal of the pump must be earthed.

The pump must be connected to an external mains switch with a contact separation of at least 1/8 inch (3 mm) in each pole.



Grounding or neutralization can be used for protection against indirect contact.

Megging must be carried out as described in section 10. Megging.

If the pump is connected to an electric installation where an earth leakage circuit breaker (ELCB) is used as additional protection, this circuit breaker must trip out when earth fault currents with DC content (pulsating DC) occur.

The earth leakage circuit breaker must be marked with the symbol shown:



- The pump requires no external motor protection.
- The operating voltage and frequency are marked on the pump nameplate. Please make sure that the motor is suitable for the electricity supply on which it will be used.

Open the control box cover as shown in fig. 4.

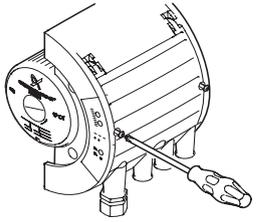
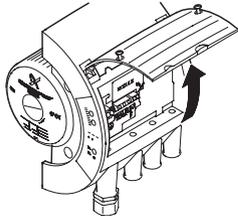
Step	Action
1	
2	

Fig. 4 Opening the control box

If the control box cover cannot be lifted sufficiently, it can be removed as shown in fig. 5.

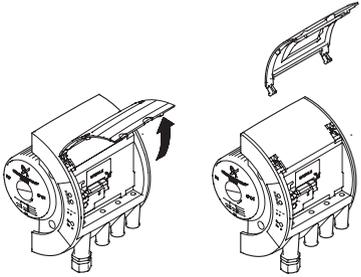
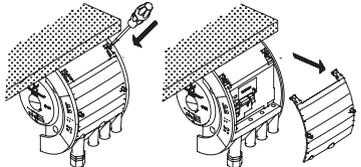
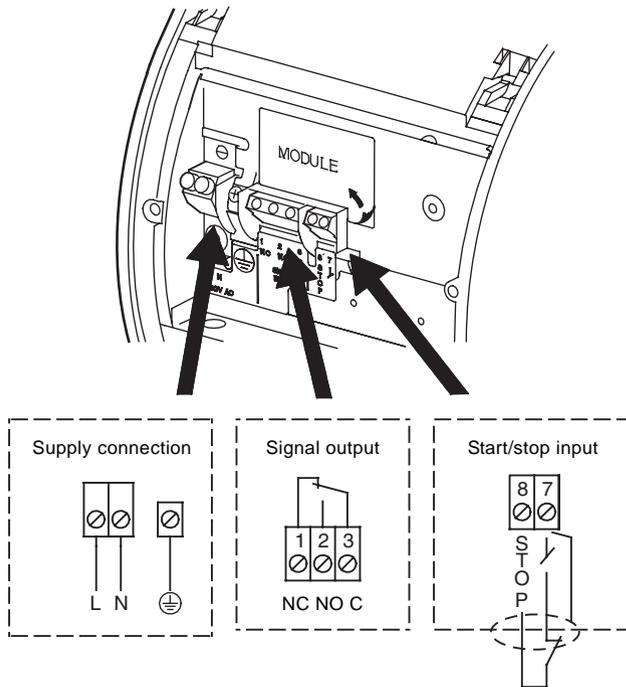
Step	Action
1	
2	

Fig. 5 Removing the control box cover

5.1 Supply voltage

1 x 230 V \pm 10 %, 50/60 Hz.

5.2 Connection diagram



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Fig. 6 Wiring diagram

WARNING!



- **Wires connected to**
 - **supply terminals,**
 - **outputs NC, NO, C and**
 - **start/stop input****must be separated from each other and from the supply by reinforced insulation.**
- **All wires connected to a terminal block must be tied up at the terminals.**

Note:

- If no external on/off switch is connected, the connection across terminals STOP and ⚡ should be maintained.
- All cables used must be heat-resistant up to +185 °F (+85 °C).
- All cables used must be installed in accordance with NEC or applicable local codes and regulations.
- If a GENI module is fitted, the screen must be connected to ⚡. See page 50.

Concerning demands on signal wires and signal transmitters, see section 11. *Technical data*.

A connection example can be found on page 49.

6. Start-up

Do not start the pump until the system has been filled with liquid and vented. Furthermore, the required minimum inlet pressure must be available at the pump inlet, see section 11. *Technical data*. The system cannot be vented through the pump.

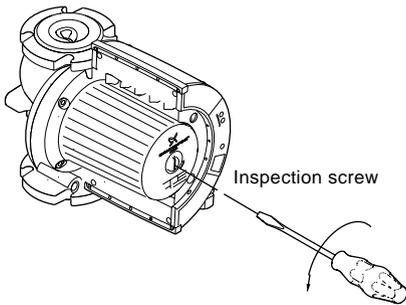
The pump can be vented by slackening the inspection screw.

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WARNING!



If the inspection screw is to be loosened, see fig. 7, care should be taken to ensure that the escaping, scalding hot liquid does not cause personal injury or damage to components.



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Fig. 7 Venting the pump

7. Functions

Most functions can be selected on the pump control panel. However, some functions can only be selected with the R100 or via expansion modules.

On the pump control panel, see fig. 13, page 15:

- **AUTO_{ADAPT}** (factory setting)
Recommended for most heating installations.
During operation, the pump automatically makes the necessary adjustment to the actual system characteristic. This setting ensures minimum energy consumption and noise level which reduces operating costs and increases comfort.
- **Proportional-pressure control**
The pump head is changed continuously in accordance with the water demand in the system. The desired setpoint can be set on the pump control panel.
- **Constant-pressure control**
A constant head is maintained, irrespective of water demand. The desired setpoint can be set on the pump control panel.
- **Automatic night-time duty**
The pump changes automatically between normal duty and night-time duty depending on the supply-pipe temperature. Automatic night-time duty can be combined with the above-mentioned control modes.

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Further functions:

Via the digital input:

- **External start/stop**
The pump can be started or stopped via the digital input.

With the R100 remote control:

- **Constant-curve duty**
The pump runs at a constant speed, on or between the max. and min. curves.
- **Temperature influence**
The head varies depending on the liquid temperature.
- **External fault and operating signal**
The pump controls an external fault or operating signal device via a potential-free output.

Via expansion modules:

GENI module

- **External analog control** of head or speed via a signal from an external 0-10 V signal transmitter.
- **External forced control** via inputs for:
 - Max. curve,
 - Min. curve.
- **Bus communication via GENibus**
The pump can be controlled and monitored by a GRUNDFOS Pump Management System 2000, a building management system or another type of external control system.
- **Control of two pumps in parallel**
The control of two pumps in parallel is described in section 7.11.

LON module

- **Bus communication via LON**
This module enables connection to a network based on LonWorks® technology and to other units which are based on this communication standard.
-

7.1 Control modes

A GRUNDFOS MAGNA pump can be set to the control mode which is most suitable for the individual system.

Possible control modes:

- $AUTO_{ADAPT}$ (factory setting)
- Proportional pressure
- Constant pressure.

Each of the control modes can be combined with automatic night-time duty, see section 7.3 *Automatic night-time duty*.

$AUTO_{ADAPT}$

To be set on the control panel or with the R100, see section 8. *Setting the pump*.

The control mode $AUTO_{ADAPT}$ continuously adapts the pump performance.

The setpoint (H_{set1}) of the pump has been factory-set as follows and cannot be changed manually:

- MAGNA 40-120, 65-120 to 21 feet (6.5 m).
- MAGNA 65-60 to 11.5 feet (3.5 m).

When the pump registers a lower pressure on the max. curve, A_2 , the $AUTO_{ADAPT}$ function automatically selects a correspondingly lower control curve, H_{set2} , thus reducing the energy consumption.

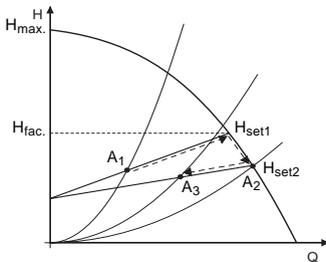


Fig. 8 $AUTO_{ADAPT}$

- A_1 : Original duty point.
- A_2 : Lower registered pressure on the max. curve.
- A_3 : New duty point after $AUTO_{ADAPT}$ control.
- H_{set1} : Original setpoint.
- H_{set2} : New setpoint after $AUTO_{ADAPT}$ control.
- $H_{fac.}$: Factory-set setpoint.

The $AUTO_{ADAPT}$ function can be reset by pressing the button \odot for approx. 10 seconds until the control mode is back to the starting point ($AUTO_{ADAPT}$ or $AUTO_{ADAPT}$ with automatic night-time duty).

Proportional-pressure control

To be set on the control panel or with the R100, see section 8. *Setting the pump*.

The pump head is reduced as the water demand declines and increased as the water demand rises, see fig. 9.

Constant-pressure control

To be set on the control panel or with the R100, see section 8. *Setting the pump*.

The pump maintains a constant pressure, irrespective of water demand, see fig. 9.

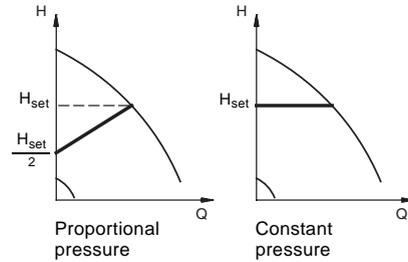


Fig. 9 Pressure control

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7.2 Selection of control mode

System type	Description	Select this control mode
Typical heating systems	Grundfos recommends to let the pump remain in AUTO _{ADAPT} mode. This ensures optimum performance at the lowest possible energy consumption.	AUTO _{ADAPT}
Relatively great head losses in the distribution pipes	<ol style="list-style-type: none"> Heating systems with thermostatic valves and: <ul style="list-style-type: none"> with a dimensioned pump head higher than 13 feet (4 m), very long distribution pipes, strongly throttled pipe balancing valves, differential pressure regulators, great head losses in those parts of the system through which the total quantity of water flows (e.g. boiler, heat exchanger and distribution pipe up to the first branching). Primary circuit pumps in systems with great head losses in the primary circuit. 	Proportional pressure 
Relatively small head losses in the distribution pipes	<ol style="list-style-type: none"> Heating systems with thermostatic valves and: <ul style="list-style-type: none"> with a pump head lower than 6.5 feet (2 m), designed for natural circulation, with small head losses in those parts of the system through which the total quantity of water flows (e.g. boiler, heat exchanger and distribution pipe up to the first branching) or designed for a high differential temperature between supply pipe and return pipe (e.g. district heating). Radiant floor heating systems with thermostatic valves. One-pipe heating systems with thermostatic valves or pipe balancing valves. Primary circuit pumps in systems with small head losses in the primary circuit. 	Constant pressure 

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7.2.1 Setpoint setting

If AUTO_{ADAPT} is selected, the setpoint cannot be set.

The setpoint can be set by pressing  or  when the pump is in control mode:

- proportional pressure
- constant pressure
- constant-curve duty.

Set the setpoint so that it matches the system.

A too high setting may result in noise in the system whereas a too low setting may result in insufficient heating or cooling in the system.

7.3 Automatic night-time duty

To be set on the control panel or with the R100, see section 8. *Setting the pump.*

Once automatic night-time duty has been activated, the pump automatically changes between normal duty and night-time duty (duty at low performance). Changeover between normal duty and night-time duty is dependent on the supply-pipe temperature.

The pump automatically changes over to night-time duty when the built-in sensor registers a supply-pipe temperature drop of more than 18-27 °F (10-15 °C) within approx. 2 hours. The temperature drop must be at least 0.18 °F/min. (0.1 °C/min.).

Changeover to normal duty takes place without a time lag when the temperature has increased by approx. 18 °F (10 °C).

7.4 Constant-curve duty

To be set with the R100, see section 8. *Setting the pump.*

The pump can be set to operate according to a constant curve, like an uncontrolled pump, see fig. 10.

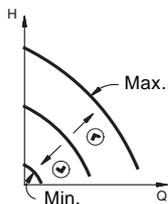


Fig. 10 Operating curves

7.5 Max. or min. curve duty

To be set on the control panel, with the R100 or via GENI module, see section 8. *Setting the pump.*

The pump can be set to operate according to the max. or min. curve, like an uncontrolled pump, see fig. 11.

This operating mode is available, irrespective of the control mode.

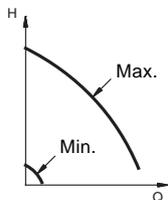


Fig. 11 Max. and min. curves

The **max. curve** mode can be selected if an uncontrolled pump is required.

The **min. curve** mode can be used in periods in which a minimum flow is required. This operating mode is for instance suitable for manual night-time duty if automatic night-time duty is not desired.

7.6 Temperature influence

The temperature influence function is available with proportional- or constant-pressure control mode.

To be set with the R100, see section 8. *Setting the pump.*

When the temperature influence function is activated, the setpoint for head will be reduced according to the liquid temperature.

The temperature influence limits can be set to 122 °F (50 °C) or 176 °F (80 °C). The temperature limits are not adjustable.

These temperature limits are called T_{max} . The setpoint is reduced in relation to the head set (= 100 %) according to the characteristics below.

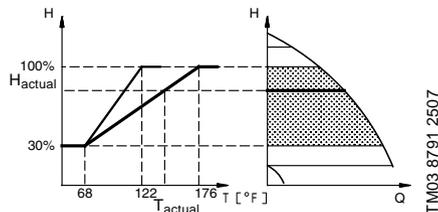


Fig. 12 Temperature influence

In the above example, $T_{max} = 176$ °F (80 °C) has been selected. The actual liquid temperature T_{actual} causes the setpoint for head to be reduced from 100 % to H_{actual} .

The temperature influence function requires:

- Proportional- or constant-pressure control mode.
- The pump must be installed in the supply-side pipe.
- System with supply-pipe temperature control.

Temperature influence is suitable in:

- systems with variable flows (e.g. two-pipe heating systems), in which the activation of the temperature influence function will ensure a further reduction of the pump performance in periods with small heating demands and consequently a reduced supply-pipe temperature.
- systems with almost constant flows (e.g. one-pipe heating systems and radiant floor heating systems), in which variable heating demands cannot be registered as changes in the head as is the case with two-pipe heating systems. In such systems, the pump performance can only be adjusted by activating the temperature influence function.

Selection of T_{max} .

In systems with a dimensioned supply-pipe temperature of:

- up to and including 131 °F (55 °C), select $T_{max} = 122$ °F (50 °C),
- above 131 °F (55 °C), select $T_{max} = 176$ °F (80 °C).

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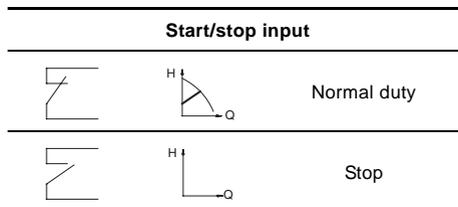
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7.7 External start/stop

The pump can be started or stopped via an external potential-free contact or a relay connected to terminals 7 and 8, see section 5.2 *Connection diagram*.

Functional diagram: Start/stop input



7.8 Signal relay

The pump incorporates a signal relay, terminals 1, 2 and 3, for a potential-free fault and operating signal. The function of the signal relay, fault signal (factory setting) or operating signal, is set with the R100.

The output, terminals 1, 2 and 3, is electrically separated from the rest of the controller.

The signal relay is activated as follows:

- **Fault signal**

The signal relay is activated together with the red indicator light on the pump, see section 8.2 *Control panel*.

- **Operating signal**

The signal relay is activated together with the green indicator light on the pump, see section 8.2 *Control panel*.

Functions of signal relay

Signal relay	Fault signal
	<p>Not activated:</p> <ul style="list-style-type: none"> • The electricity supply has been switched off. • The pump has not registered a fault.
	<p>Activated:</p> <ul style="list-style-type: none"> • The pump has registered a fault.
Signal relay	Operating signal
	<p>Not activated:</p> <ul style="list-style-type: none"> • The pump has been set to stop. • The pump has registered a fault and is unable to run.
	<p>Activated:</p> <ul style="list-style-type: none"> • The pump is running. • The pump has registered a fault, but is able to run.

Resetting of fault indications

A fault indication can be reset in one of the following ways:

- Briefly press , , or  on the pump. This will not influence the pump performance set.
- Briefly switch off the electricity supply to the pump.
- With the R100, see section 8.4 *R100 display overview*.

Before the pump can revert to normal duty, the fault cause must be eliminated.

If the fault disappears by itself, the fault indication will automatically be reset.

The fault cause will be stored in the pump alarm log. The latest five faults can be called up with the R100.

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7.9 Indicator lights

For position on pump, see fig. 13, section 8.2 *Control panel*.

The indicator lights, pos. 2, are used for operating and fault indication. Furthermore, they indicate whether the pump is externally controlled.

Note

When the R100 remote control communicates with the pump, the red indicator light will flash rapidly.

The function of the operating and fault indicator lights can be found in section 9. *Fault finding chart*.

The indicator light for external control is on

- if the pump control panel is inactive,
- if the pump is in constant-curve operating mode,
- if the temperature influence is active or
- if the pump is controlled by an external unit.

7.10 Expansion modules

The pump can be fitted with an expansion module enabling communication with external signals (signal transmitters).

Two types of expansion module are available:

- GENI module.
For mounting and operation, see separate installation and operating instructions for the GENI module.
- LON module.
For mounting, see separate fitting instructions for the LON module.

7.11 GENI module

The GENI module offers the following functions:

- External analog 0-10 V control
- External forced control
- Bus communication via GENIbus
- Control of two pumps in parallel.

See separate installation and operating instructions for the GENI module.

7.12 LON module

The LON module offers the possibility of connecting the pump to a LonWorks network. The module is used for data transmission between a network and pumps of the type MAGNA 40-120, 65-120 and 65-60.

For further information, see the documentation files on the CD-ROM supplied with the LON module.

8. Setting the pump

For the setting of the pump, use:

- control panel
- R100 remote control
- bus communication (not described in detail in these instructions, contact Grundfos).

The table shows the application of the individual operating units and in which section the function has been described.

Possible settings	Control panel	R100
AUTO _{ADAPT}	8.2.1	8.7.1
Automatic night-time duty	8.2.1	8.7.2
Proportional-pressure control	8.2.1	8.7.1
Constant-pressure control	8.2.1	8.7.1
Setpoint setting	8.2.2	8.5.1
Max. curve duty	8.2.3	8.5.2
Min. curve duty	8.2.4	8.5.2
Constant-curve duty	–	8.5.2
Temperature influence	–	8.7.3
Activation/deactivation of pump buttons	–	8.7.4
Allocation of pump number	–	8.7.6
Start/stop	8.2.5	8.5.2
Resetting of fault indications	8.2.6	8.5.3
Reading of various data	–	8.6.1 - 8.6.7

"–" = not available with this operating unit.

8.1 Factory setting

The pump is factory-set to AUTO_{ADAPT} without automatic night-time duty.

8.2 Control panel



WARNING!

At high liquid temperatures, the pump may be scalding hot, only the buttons should be touched to avoid burns.

The control panel, fig. 13, incorporates:

Pos.	Description
1	Buttons for setting
2	<ul style="list-style-type: none"> Indicator lights for operating and fault indication and symbol for indication of external control
3	Button for change of control mode
4	Light symbols for indication of control mode and night-time duty
5	Light fields for indication of head, flow and operating mode

For further information, see section 9. *Fault finding chart.*

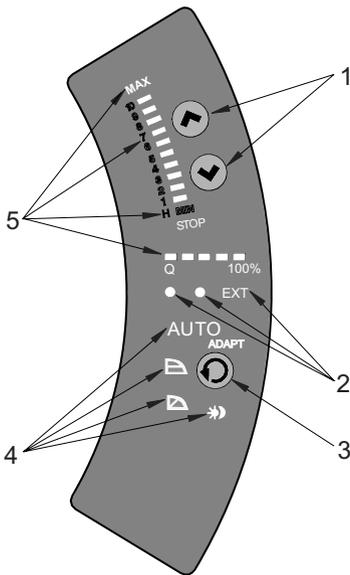


Fig. 13 Control panel

8.2.1 Control mode setting

Description of function, see section 7.1 *Control modes.*

To change the control mode, press , pos. 3, according to this cycle:

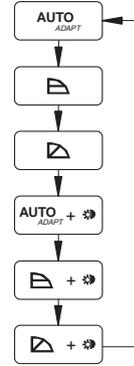


Fig. 14 Cycle of control modes

Automatic night-time duty can be activated together with each of the control modes.

The light symbols in pos. 4, see fig. 13, indicate the pump settings:

Light in	Control mode	Automatic night-time duty
AUTO ADAPT	AUTO ADAPT	NO
	Proportional pressure	NO
	Constant pressure	NO
-	Constant curve	NO
AUTO ADAPT	AUTO ADAPT	YES
	Proportional pressure	YES
	Constant pressure	YES
-	Constant curve	YES

"-" = no light.

TM03 8798 2507

TM03 1288 1505

US

8.2.2 Setpoint setting

Set the setpoint of the pump by pressing or when the pump has been set to proportional-pressure control, constant-pressure control or constant-curve duty.

The light fields, pos. 5, on the control panel indicate the setpoint set.

MAGNA 40-120, 65-120

The light fields can indicate a maximum setpoint of 10 corresponding to 32 feet (10 m).

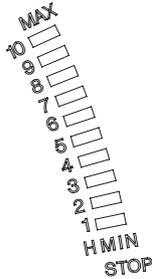


Fig. 15 Light fields MAGNA xx-120

MAGNA 65-60

The light fields can indicate a maximum setpoint of 5 corresponding to 16 feet (5 m).



Fig. 16 Light fields MAGNA 65-60

8.2.3 Setting to max. curve duty

Description of function, see section 7.5 *Max. or min. curve duty*.

To change over to the max. curve, press continuously until "MAX" illuminates, see fig. 17. To change back, press continuously until the desired setpoint is indicated.

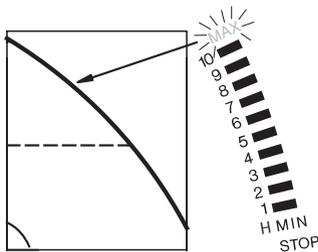


Fig. 17 Max. curve

TM02 0482 2507

TM02 0483 2507

TM02 0246 2507

8.2.4 Setting to min. curve duty

Description of function, see section 7.5 *Max. or min. curve duty*.

To change over to the min. curve, press continuously until "MIN" illuminates, see fig. 18. To change back, press continuously until the desired setpoint is indicated.

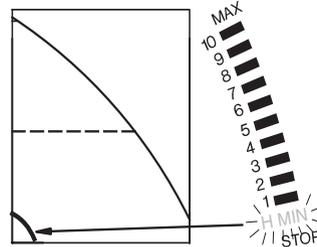


Fig. 18 Min. curve

TM02 0247 2507

8.2.5 Start/stop of pump

To stop the pump, press continuously until "STOP" illuminates. When the pump is stopped, the green indicator light will be flashing.

To start the pump, press continuously.

If the pump is to be stopped, it is recommended to use the start/stop input, the R100 or to switch off the electricity supply. In this way, the setpoint will remain unchanged when the pump is started again.

Note

8.2.6 Resetting of fault indications

The fault indications are reset by briefly pressing any button. The settings remain unchanged. If the fault has not disappeared, the fault indication will reappear. The time until the fault reappears may vary from 0 to 255 seconds.

8.3 R100 remote control

The pump is designed to communicate with the Grundfos R100 remote control via infra-red light.

During communication, the R100 must be pointed at the pump control panel. When the R100 is communicating with the pump, the red indicator light will flash rapidly.

The R100 offers additional possibilities of setting and status displays for the pump.

8.4 R100 display overview

The R100 displays are divided into four parallel menus, see fig. 19:

- 0. GENERAL, see operating instructions for R100
- 1. OPERATION
- 2. STATUS
- 3. INSTALLATION

The number stated at each individual display in fig. 19 refers to the section in which the display is described.

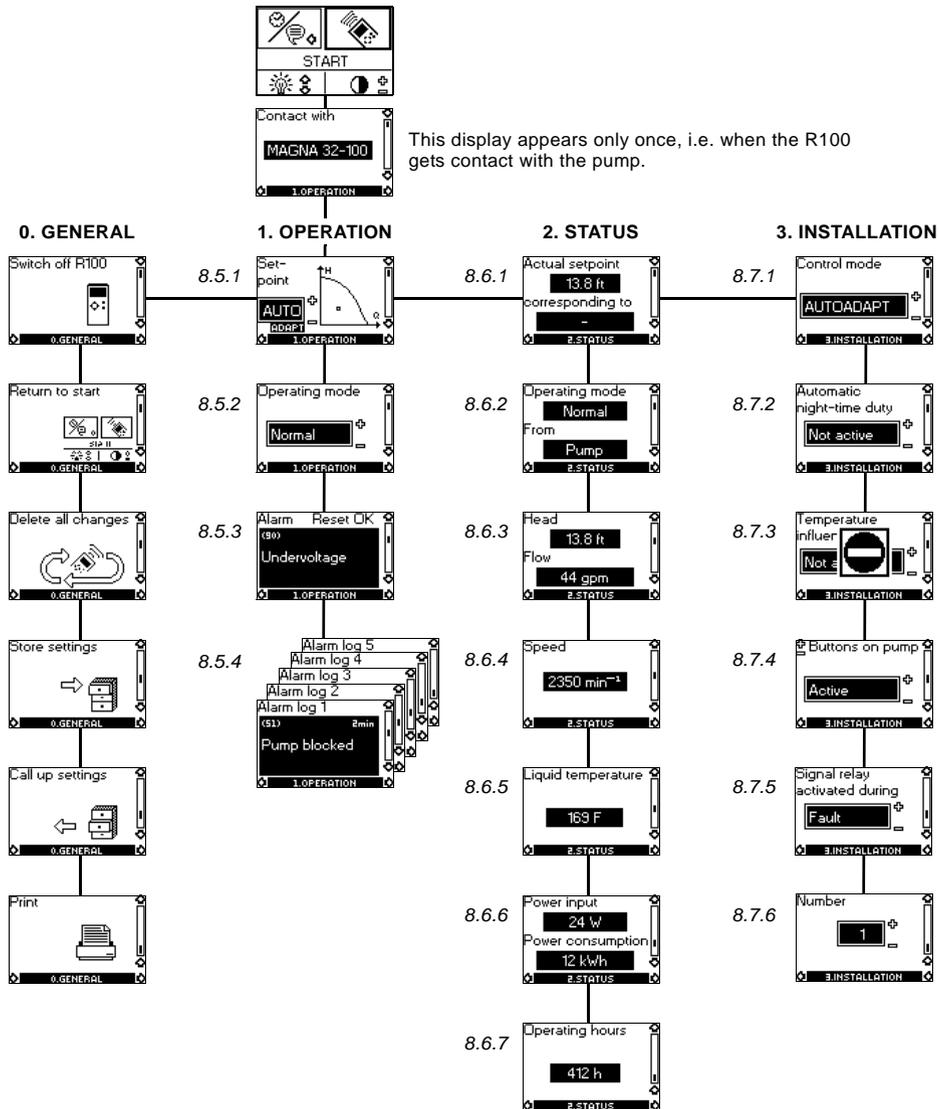


Fig. 19 Menu overview

8.5 Menu OPERATION

When the communication between the R100 and the pump has been established, "Contact with" appears in the display. When the "arrow down" on the R100 is pressed, menu OPERATION appears.

Note

The display "Contact with" appears only once, i.e. when the R100 gets contact with the pump.

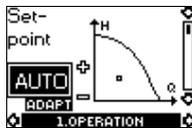
US

8.5.1 Setpoint

This display depends on the control mode selected in the display "Control mode" in menu INSTALLATION.

If the pump is forced-controlled via external signals, the number of possible settings will be reduced, see section 8.8 *Priority of settings*. Attempts to change the settings will result in an indication in the display saying that the pump is forced-controlled and changes therefore cannot be made.

This display will appear when the pump is in AUTO_{ADAPT} mode.



Set the desired setpoint by pressing the buttons "+" and "-" on the R100 (not possible when the pump is in AUTO_{ADAPT} mode).

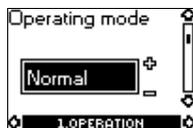
Furthermore, it is possible to select one of the these operating modes:

- Stop
- Min. (min. curve)
- Max. (max. curve).

If proportional pressure, constant pressure or constant curve has been selected, the display is different.

The actual duty point of the pump is indicated by a square in the Q/H field. No indication at low flow.

8.5.2 Operating mode



Select an operating mode:

- Stop
- Min. (min. curve)
- Normal (AUTO_{ADAPT}, proportional pressure, constant pressure or constant curve)
- Max. (max. curve).

8.5.3 Fault indications



If the pump is faulty, the cause will appear in this display.

Possible causes:

- Pump blocked
- Internal fault
- Overvoltage
- Undervoltage
- Overtemperature
- Module fault
- Fault in module communication.

The fault indication can be reset in this display.

If the fault has not disappeared when resetting is attempted, the fault indication will reappear in the display when communicating with the pump.

8.5.4 Alarm log



The alarm code with text appears in this display.

The display also shows the number of minutes the pump has been connected to the electricity supply after the fault occurred.

The last five fault indications will appear in the alarm log.

8.6 Menu STATUS

The displays appearing in this menu are status displays only. It is not possible to change or set values.

The actual values in the display are indicative and based on estimation.

8.6.1 Actual setpoint



Field "Actual setpoint":

Actual setpoint of pump.

Field "corresponding to":

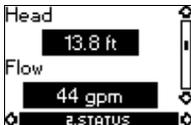
Actual setpoint in % of the setpoint set if the pump is connected to an external analog 0-10 V signal transmitter or if temperature influence or proportional-pressure control is activated.

8.6.2 Operating mode



This display shows the actual operating mode (*Stop*, *Min.*, *Normal* or *Max.*) and where it was selected (*Pump*, *R100*, *BUS* or *External*).

8.6.3 Head and flow



The actual head and flow of the pump.

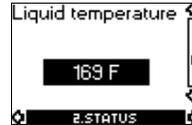
If "<" is indicated in front of the flow, the flow is less than the displayed value.

8.6.4 Speed



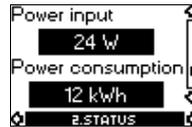
The actual pump speed.

8.6.5 Liquid temperature



The actual temperature of the pumped liquid.

8.6.6 Power input and power consumption



Actual power input and power consumption of the pump.

The value of power consumption is an accumulated value and cannot be set to zero.

8.6.7 Operating hours



Operating hours of the pump.

The value of operating hours is an accumulated value and cannot be set to zero.

US

8.7 Menu INSTALLATION

This menu shows the settings that should be considered when installing the pump.

8.7.1 Control mode

Description of function, see section 7.1 *Control modes* or section 7.4 *Constant-curve duty*.



Select one of the control modes:

- *AUTOADAPT*
- *Prop. pressure* (proportional pressure)
- *Const. pressure* (constant pressure)
- *Const. curve* (constant curve).

Setting of setpoint and curve is carried out in display 8.5.1 *Setpoint* in menu OPERATION (not possible when the pump is in *AUTOADAPT* mode).

8.7.2 Automatic night-time duty



In this display, automatic night-time duty can be activated or deactivated.

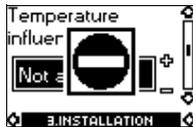
Automatic night-time duty can be set to:

- *Active*
- *Not active*,

irrespective of the control mode selected.

8.7.3 Temperature influence

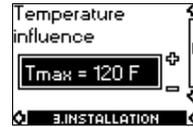
Description of function, see section 7.6 *Temperature influence*.



Note *If the pump is in control mode AUTOADAPT or constant curve, the temperature influence cannot be set with the R100.*

The temperature influence function can be activated in this display when the control mode is proportional pressure or constant pressure, see section 8.7.1 *Control mode*.

In the case of temperature influence, the pump must be installed in the supply pipe. It is possible to choose between maximum temperatures of 122 °F (50 °C) and 176 °F (80 °C).



When the temperature influence is active, a small thermometer is shown in the display "Setpoint" in menu OPERATION, see section 8.5.1 *Setpoint*.

8.7.4 Buttons on pump



To prevent unauthorized persons from operating the pump, the function of the buttons (⊕), (⊖) and (⊙) can be deactivated in this display. The buttons can be reactivated only with the R100.

The buttons can be set to:

- *Active*
- *Not active*.

8.7.5 Signal relay



In this display, the function of the internal signal relay can be set:

- *Fault* (functions as a fault signal relay)
- *Operation* (functions as an operating signal relay).

8.7.6 Pump number



A number from 1 up to and including 64 can be allocated to a pump or can be changed so that the R100, Pump Management System 2000 or other systems can distinguish between two or more pumps.

8.8 Priority of settings

The external forced-control signals will influence the settings available on the pump control panel and with the R100. However, the pump can always be set to max. curve duty or to stop on the pump control panel or with the R100.

If two or more functions are activated at the same time, the pump will operate according to the setting with the highest priority.

The priority of the settings is as shown in the table.

Without expansion module

Priority	Possible settings	
	Pump control panel or R100	External signals
1	Stop	
2	Max. curve	
3		Stop
4	Min. curve	
5	Setpoint setting	

Example: If the pump has been forced to stop via an external signal, the pump control panel or the R100 can only set the pump to max. curve.

With expansion module

Priority	Possible settings		
	Pump control panel or R100	External signals	Bus signal
1	Stop		
2	Max. curve		
3		Stop	Stop
4		Max.curve	Max.curve
5	Min. curve	Min. curve	Min. curve
6	Setpoint setting		Setpoint setting

	Not active when the pump is controlled via bus.
	Only active when the pump is controlled via bus.

As illustrated in the table, the pump does not react to external signals (max. curve and min. curve) when the pump is controlled via bus.

If the pump is to react to external signals (max. curve and min. curve), the system must be configured for that function.

For further details, please contact Grundfos.

9. Fault finding chart

WARNING!



Before removing the control box cover, make sure that the electricity supply has been switched off for at least 5 minutes.

The pumped liquid may be scalding hot and under high pressure. Before any removal or dismantling of the pump, the system must therefore be drained or the isolating valves on either side of the pump must be closed.

US

- Indicator light is off.
- Indicator light is on.
- Indicator light is flashing.

Indicator lights		Fault	Cause	Remedy
Green	Red			
		The pump is not running.	One fuse in the installation is blown/tripped off.	Replace/reset the fuse. Check that the electricity supply falls within the specified range.
			The current-operated or voltage-operated circuit breaker has tripped off.	Reset the circuit breaker. Check that the electricity supply falls within the specified range.
			The pump may be defective.	Replace the pump or call GRUNDFOS SERVICE for assistance.
		The pump is not running.	The pump has been stopped in one of the following ways: <ol style="list-style-type: none"> With the button With the R100. External on/off switch in position off. Via bus signal. 	<ol style="list-style-type: none"> Start the pump by pressing . Start the pump with the R100 or by pressing . Switch on the on/off switch. Start the pump via bus signal.
		The pump has stopped due to a fault.	Electricity supply failure.	Check that the electricity supply falls within the specified range.
			Pump blocked and/or impurities in the pump.	Dismantle and clean the pump.
			The pump may be defective.	Use the R100 for fault finding, see section 8.5.3 <i>Fault indications</i> . Replace the pump or call GRUNDFOS SERVICE for assistance.
		The pump is running but is faulty.	The pump is faulty, but is able to operate.	The pump is able to operate. Try to reset the fault indication by briefly switching off the electricity supply or by pressing the button , or .
		The pump has been set to stop and is faulty.	The pump is faulty, but is able to operate (has been set to STOP).	Use the R100 for fault finding, see section 8.5.3 <i>Fault indications</i> . In the case of repeated faults, contact GRUNDFOS SERVICE.

Indicator lights		Fault	Cause	Remedy
Green	Red			
☀	○	Noise in the system.	Air in the system.	Vent the system.
			The flow is too high.	Reduce the setpoint and possibly change over to AUTO _{ADAPT} or constant pressure.
			The pressure is too high.	Reduce the setpoint and possibly change over to AUTO _{ADAPT} or proportional pressure.
☀	○	Noise in the pump.	Air in the pump.	Vent the pump.
			The inlet pressure is too low.	Increase the inlet pressure and/or check air volume in the expansion tank (if installed).

US

Note *The R100 can also be used for fault finding.*

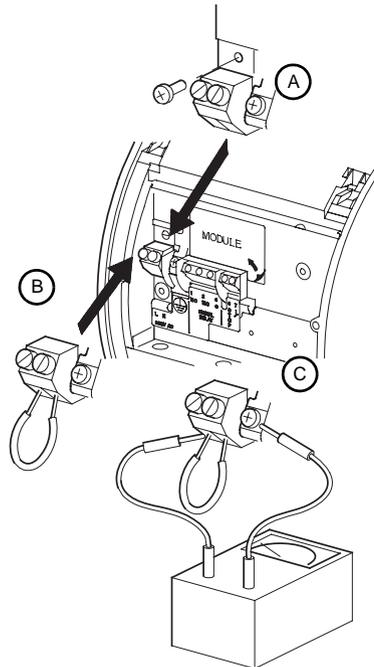
10. Megging

Megging of an installation incorporating a GRUNDFOS MAGNA pump is not allowed, as the built-in electronics may be damaged. If megging of the pump is necessary, the pump should be electrically separated from the installation.

Megging of the pump can be carried out as described below.

Megging of pumps

1. Switch off the electricity supply.
2. Remove the wires from terminals L and N and the earth conductor.
3. Short-circuit terminals L and N using a short wire (see B).
4. Remove the screw for electronics frame connection (see A).
5. Test between terminals L/N and earth (see C).
Maximum test voltage: 1000 VAC/1500 VDC.
Note: Never test between supply terminals (L and N).
Maximum permissible leakage current: < 35 mA.
6. Fit the screw for electronics frame connection (see A).
7. Remove the short wire between terminals L and N (see B).
8. Fit the supply wires to terminals L and N and the earth conductor.
9. Switch on the electricity supply.



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11. Technical data

Supply voltage

1 x 230 ± 10 %, 50/60 Hz.

Motor protection

The pump requires no external motor protection.

Enclosure class

IP 44.

Insulation class

F.

Relative air humidity

Maximum 95 %.

Ambient temperature

32 °F to 104 °F (0 °C to +40 °C).

Temperature class

TF110 to EN 60335-2-51.

Liquid temperature

Maximum +230 °F (+110 °C).

Continuously: +59 °F to +203 °F (+15 °C to +95 °C).

Pumps in domestic hot-water systems:

Continuously: +59 °F to +140 °F (+15 °C to +60 °C).

Ambient temperature		Liquid temperature			
[°F]	[°C]	Min. [°F]	Max. [°F]	Min. [°C]	Max. [°C]
32	0	59	203/230	15	95/110
86	30	59	203/230	15	95/110
95	35	59	194/194	15	90/90
104	40	59	158/158	15	70/70

Maximum system pressure

175 psi (12 bar/1.2 MPa).

Number of bolt holes in the pump flange:

- 2 holes (MAGNA 40-120) and
- 4 holes (MAGNA 65-120, 65-60).

Inlet pressure

Recommended inlet pressures:

- Min. 13.1 psi at 167 °F (0.9 bar at +75 °C).
- Min. 17.5 psi at 203 °F (1.2 bar at +95 °C).

EMC (electromagnetic compatibility)

EN 61800-3.

Sound pressure level

The sound pressure level of the pump is lower than 54 dB(A).

Leakage current

The pump mains filter will cause a discharge current to earth during operation. $I_{\text{leakage}} < 3.5 \text{ mA}$.

Standby loss

Lower than 3 W.

Pump inputs and outputs

Signal output	Internal potential-free change-over contact. Maximum load: 250 V, 2 A, AC1. Minimum load: 5 V, 100 mA. Screened cable, depending on signal level.
Input for external start/stop	External potential-free switch. Contact load: 5 V, 10 mA. Screened cable. Loop resistance: Maximum 130 Ω

Inputs of pump with GENI module

Inputs for max. and min. curves	External potential-free switch. Contact load: 5 V, 1 mA. Screened cable. Loop resistance: Maximum 130 Ω
Input for analog 0-10 V signal	External signal: 0-10 VDC. Maximum load: 1 mA. Screened cable.
Bus input	Grundfos bus protocol, GENIbus protocol, RS-485. Screened cable. Wire cross section: 0.25 - 1 mm ² . Cable length: Maximum 3900 feet (1200 m).

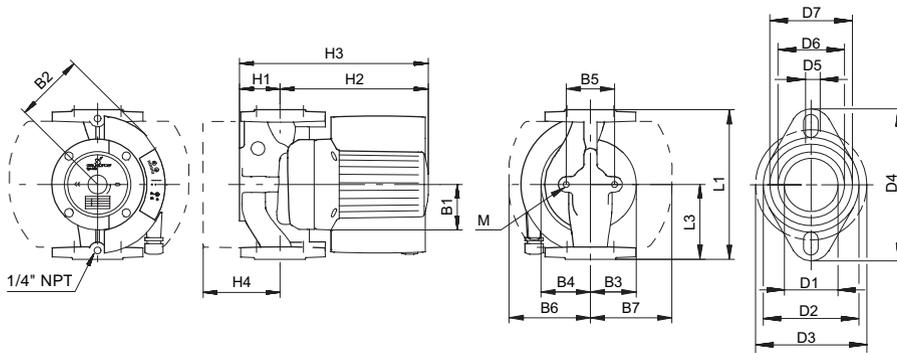
Input of pump with LON module

Bus input	LonTalk® protocol, FTT 10. Twisted-pair cable. Wire cross section: 0.25 - 1 mm ² .
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12. Disposal

90 percent of this product is recyclable. Please utilize public or private waste collection services for recycling.

Subject to alterations.



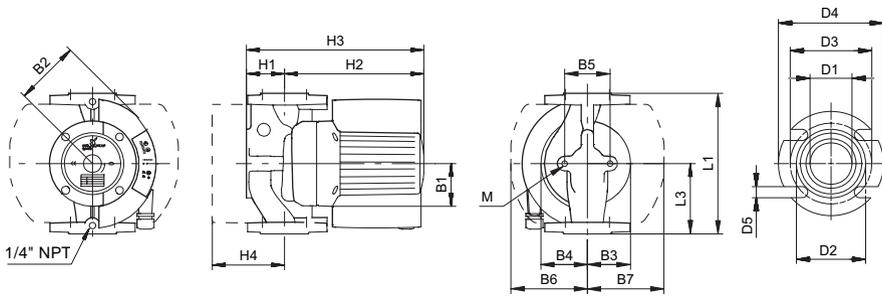
TM03 9055 3207

MAGNA 40-120

GF 15/40

	[Inch/pouce]	[mm]
L1	8 1/2	216
L3	4 1/4	108
B1	3 1/16	77
B2	4 1/2	115
B3	2 15/16	75
B4	3 1/8	80
B5	3 3/4 or 3 1/8*	96 or 80*
B6	5 1/2	140
B7	4 5/16	110
H1	2 11/16	68
H2	9 1/2	242
H3	12 3/16	310
H4	3 3/4	96
D1	1 9/16	40
D2	2 15/16	75
D3	3 1/8 or 3 7/16	80/87
D4	4 3/4	120
D5	1/2	12
D6	1 15/16	49
D7	2 3/8	60

* 3 1/8" (80 mm), stainless-steel pump housing / corps du circulateur en acier inoxydable



TM03 9058 3307

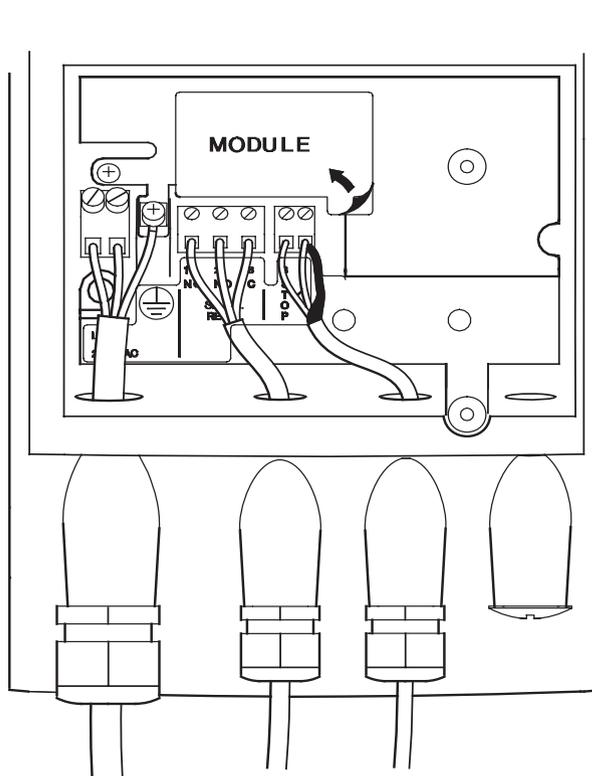
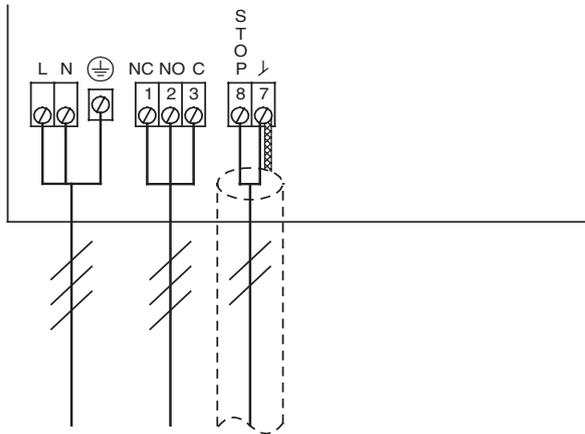
	MAGNA 65-120		MAGNA 65-60	
	GF 53		GF 53	
	[Inch/pouce]	[mm]	[Inch/pouce]	[mm]
L1	11 1/2	292	11 1/2	292
L3	5 3/4	146	5 3/4	146
B1	3 1/16	77	3 1/16	77
B2	4 15/16	125	4 15/16	125
B3	3 7/16	88	3 7/16	88
B4	4 1/8	104	4 1/8	104
B5	3 3/4 or 3 1/8*	96 or 80*	3 3/4 or 3 1/8*	96 or 80*
B6	5 1/2	140	5 1/2	140
B7	4 5/16	110	4 5/16	110
H1	3 1/4	82	3 1/4	82
H2	9 15/16	252	9 15/16	252
H3	13 1/8	334	13 1/8	334
H4	4 3/16	107	4 3/16	107
D1	2 1/2	63	2 1/2	63
D2	3 15/16	100	3 15/16	100
D3	5	127	5	127
D4	6	152	6	152
D5	5/8	16	5/8	16

* 3 1/8" (80 mm), stainless-steel pump housing / corps du circulateur en acier inoxydable

Connection diagram without optional expansion modules

Diagramme montrant la connexion sans l'utilisation d'un module d'extension optionnel

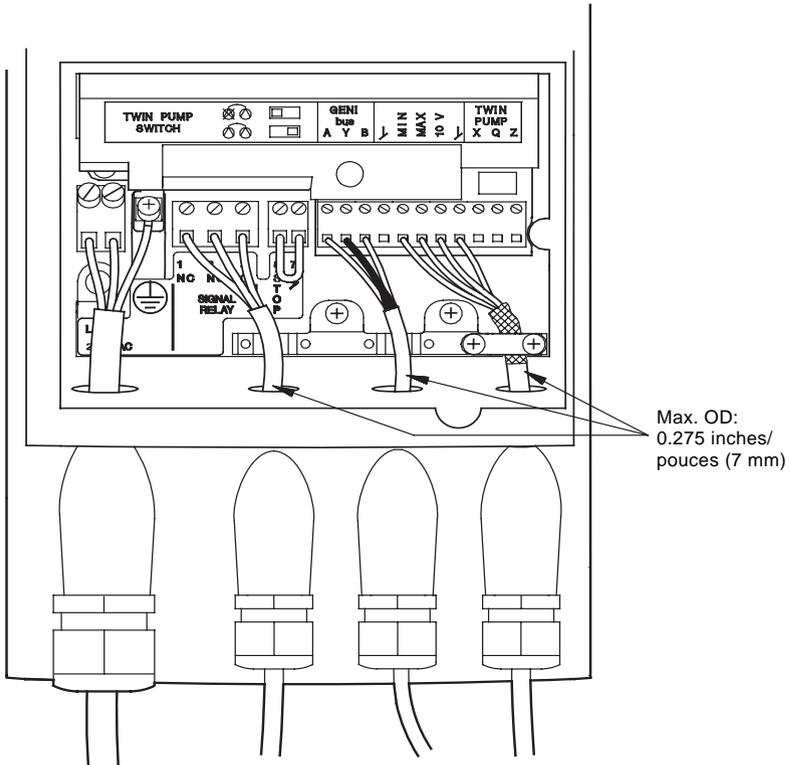
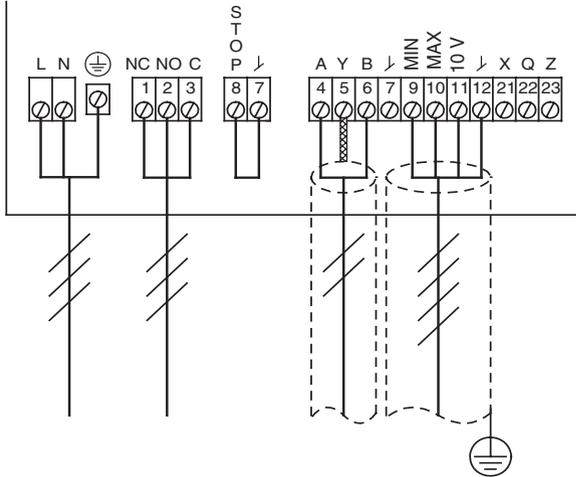
MAGNA 40-120, 65-120, 65-60



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Connection diagram with optional GENI module with no external stop function
Diagramme montrant la connexion en utilisant le module GENI optionnel sans fonction d'arrêt externe

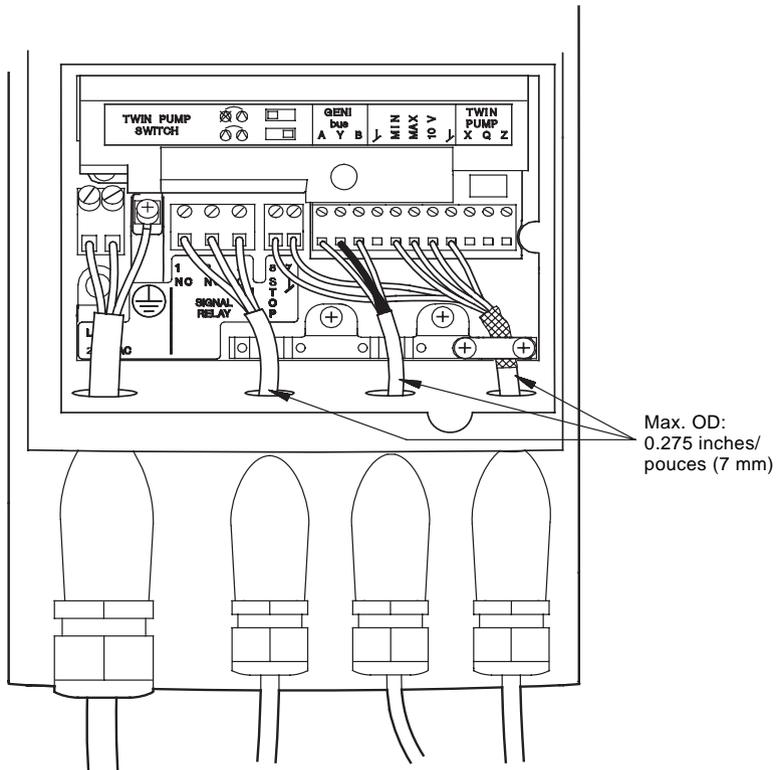
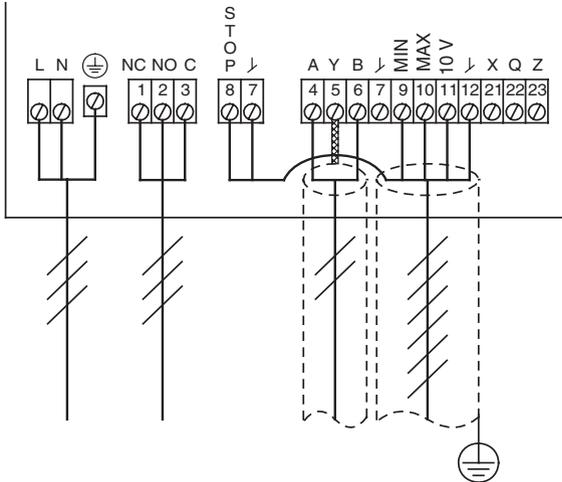
MAGNA 40-120, 65-120, 65-60 with GENI module (avec module GENI)



Connection diagram with optional GENI module with external stop function

Diagramme montrant la connexion en utilisant le module GENI optionnel avec fonction d'arrêt externe

MAGNA 40-120, 65-120, 65-60 with GENI module (avec module GENI)

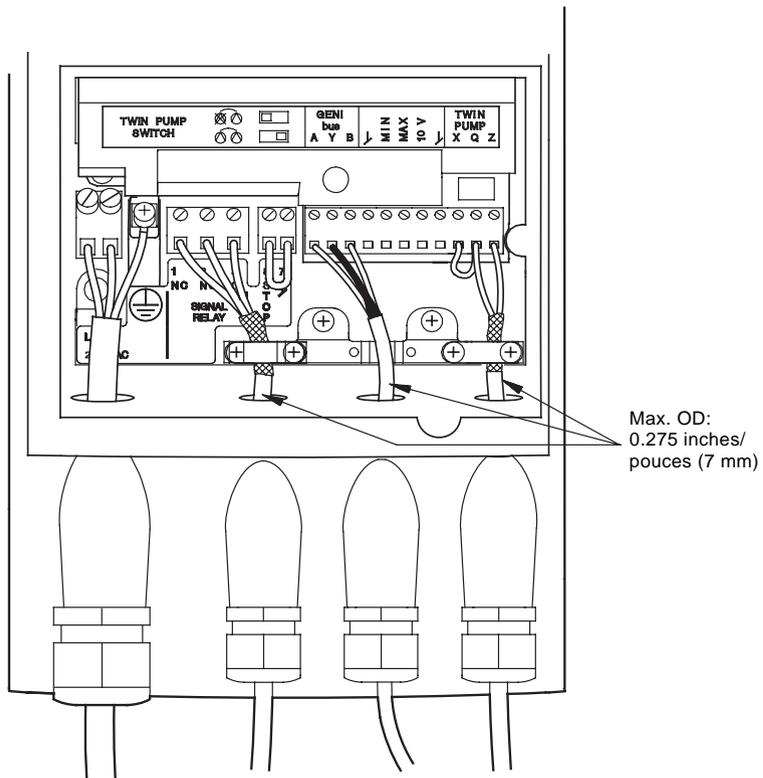
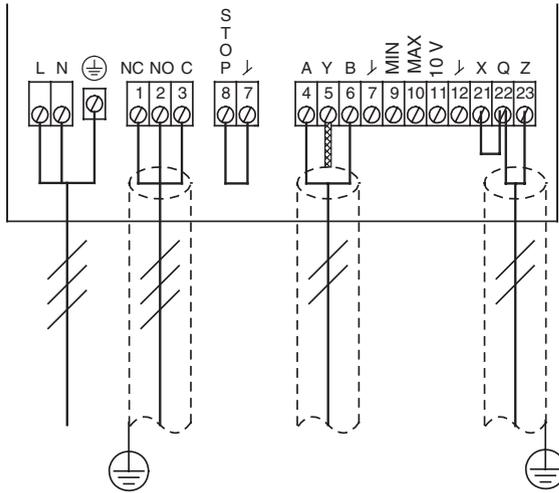


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Wiring diagram for two pumps in parallel (master)

Diagramme de connexion pour deux circulateurs en parallèle (maître)

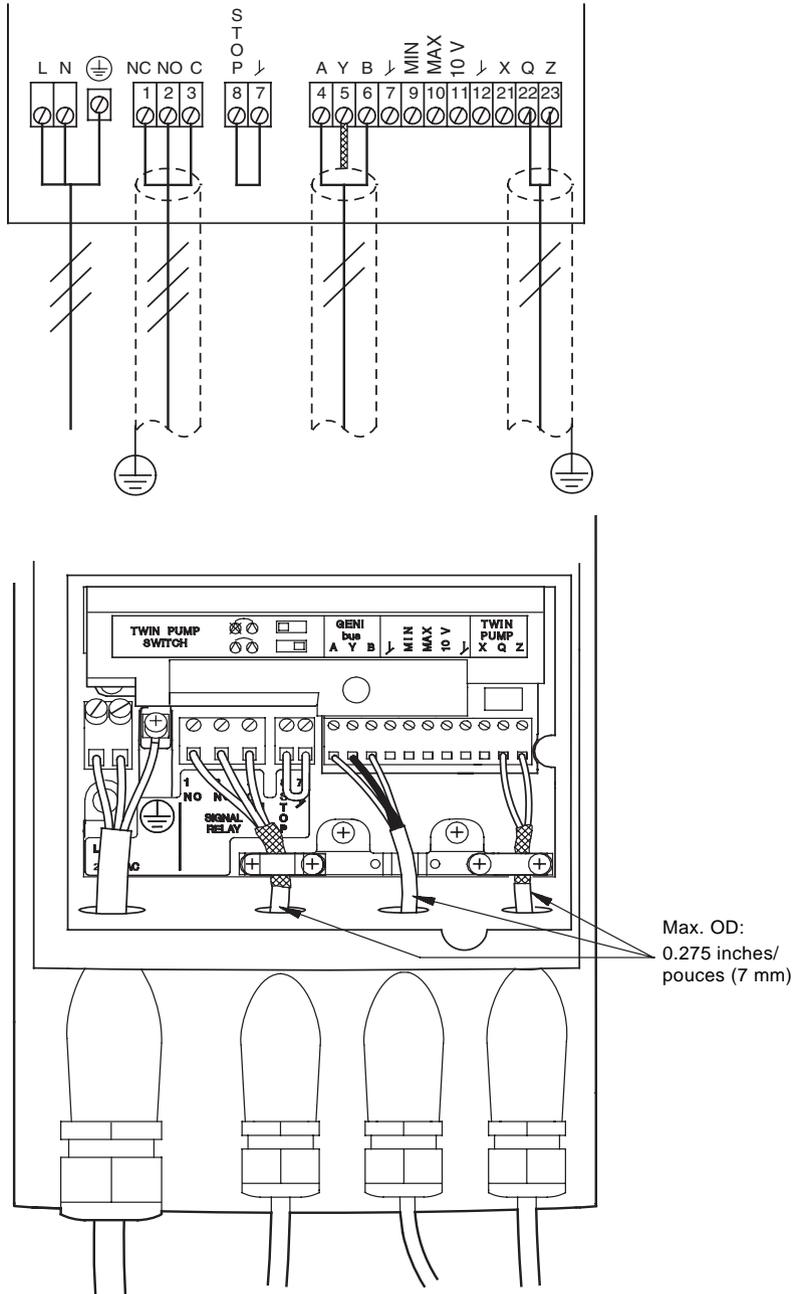
MAGNA 40-120, 65-120, 65-60 with GENI module (avec module GENI)



Wiring diagram for two pumps in parallel (slave)

Diagramme de connexion pour deux circulateurs en parallèle (esclave)

MAGNA 40-120 65-120, 65-60 with GENI module (avec module GENI)



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BE > THINK > INNOVATE >

Being responsible is our foundation
Thinking ahead makes it possible
Innovation is the essence

L-MAG-TL-01

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