MAGNA1

Installation and operating instructions

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Original installation and operating instructions

CONTENTS

These installation and operating instructions describe MAGNA1.

Sections 1-5 give the information necessary to be able to unpack, install and start up the product in a safe way.

Sections 6-11 give important information about the product, as well as information on service, fault finding and disposal of the product.

Prior to installation, read this document and the quick guide. Installation and operation must comply with local regulations and accepted codes of good practice.

This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved.

Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.

1. General information

1.1 Symbols used in this document

DANGER

Indicates a hazardous situation which, if not avoided, will result in death or serious personal injury.

WARNING

Indicates a hazardous situation which, if not avoided, could result in death or serious personal injury.

CAUTION

Indicates a hazardous situation which, if not avoided, could result in minor or moderate personal injury.

The text accompanying the three hazard symbols DANGER, WARNING and CAUTION is structured in the following way:

SIGNAL WORD

Description of hazard

Consequence of ignoring the warning.

- Action to avoid the hazard.

A blue or grey circle with a white graphical symbol indicates that an action must be taken.

A red or grey circle with a diagonal bar, possibly with a black graphical symbol, indicates that an action must not be taken or must be stopped.

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

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

1.2 Safety symbols on the pump

Check the position of the clamp before you tighten the clamp. Incorrect position of the clamp will cause leakage from the pump and damage the hydraulic parts in the pump head.

Fit and tighten the screw holding the clamp to 8 Nm ± 1 Nm.

Do not apply more torque than specified even though water is dripping from the clamp. The condensed water is most likely coming from the drain hole under the clamp.

2. Receiving the product

2.1 Inspecting the product

Check that the product is in accordance with the order.

Check that the voltage and frequency of the product match voltage and frequency of the installation site. See section *6.3.1 Nameplate*.

Pumps tested with water containing anticorrosive additives are taped on the inlet and outlet ports to prevent residual test water from leaking into the packaging. Remove the tape before installing the pump.

2.2 Scope of delivery

2.2.1 Plug-connected single-head pump

TM05 5508 3016

Fig. 1 Plug-connected single-head pump

The box contains the following items:

- MAGNA1-pump
- insulating shells
- gaskets
- quick guide
- safety instructions
- one ALPHA plug.

2.2.2 Plug-connected twin-head pump

TM06 7222 3016

Fig. 2 Plug-connected twin-head pump

The box contains the following items:

- MAGNA1-pump
- gaskets
- quick guide
- safety instructions
- two ALPHA plugs.

2.2.3 Terminal-connected single-head pump

TM06 7223 3016

Fig. 3 Terminal-connected single-head pump

The box contains the following items:

- MAGNA1-pump
- insulating shells
- gaskets
- quick guide
- safety instructions
- box with terminal and cable glands.

2.2.4 Terminal-connected twin-head pump

TM06 6791 3016

Fig. 4 Terminal-connected twin-head pump

The box contains the following items:

- MAGNA1-pump
- gaskets
- quick guide
- safety instructions
- two boxes with terminal and cable glands.

2.3 Lifting the pump

Observe local regulations concerning limits for manual lifting or handling.

Always lift directly on the pump head or the cooling fins when handling the pump. See fig. 5.

For large pumps, it may be necessary to use lifting equipment. Position the lifting straps as illustrated in fig. 5.

TM05 5819 3016

Fig. 5 Correct lifting of pump

Do not lift the pump head by the control box, i.e. the red area of the pump. See fig. 6.

TM006 7219 3016

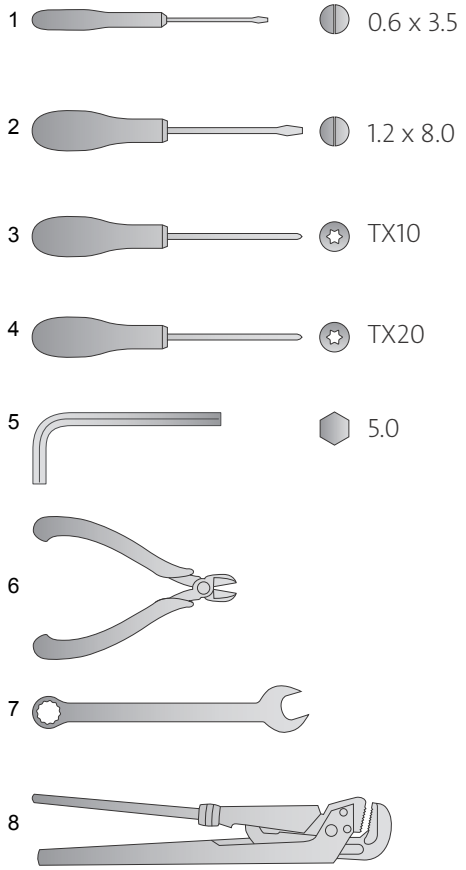
Fig. 6 Incorrect lifting of pump

3. Installing the product

3.1 Location

The pump is designed for indoor installation.

3.2 Tools



TM05 6472 4712

Fig. 7 Recommended tools

Pos.	Tool	Size
1	Screwdriver, straight slot	0.6 x 3.5 mm
2	Screwdriver, straight slot	1.2 x 8.0 mm
3	Screwdriver, torx bit	TX10
4	Screwdriver, torx bit	TX20
5	Hexagon key	5.0 mm
6	Side cutter	
7	Open-end spanner	Depending on DN size
8	Pipe wrench	Only used for pumps with unions

3.3 Mechanical installation

The pump range includes both flanged and threaded versions. These installation and operating instructions apply to both versions, but give a general description of flanged versions. If the versions differ, the threaded version will be described separately.

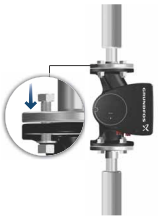
Install the pump so that it is not stressed by the pipes. For maximum permissible forces and moments from pipe connections acting on the pump flanges or threaded connections, see page 26.

You can suspend the pump directly in the pipes, provided that the pipes support the pump.

Twin-head pumps are prepared for installation on a mounting bracket or base plate. Pump housing with M12 thread.

To ensure adequate cooling of motor and electronics, observe the following requirements:

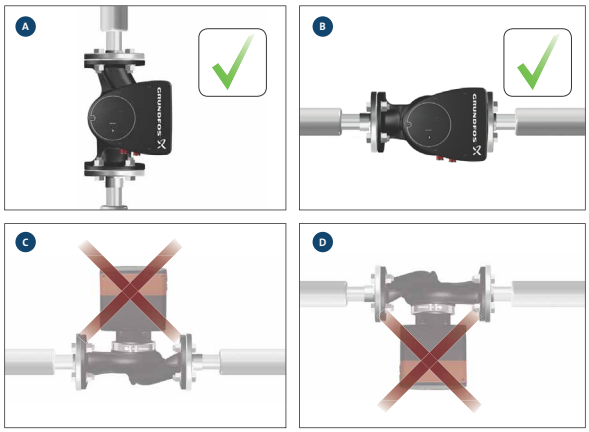
- Position the pump in such a way that sufficient cooling is ensured.
- The ambient temperature must not exceed 40 °C.

Step	Action	Illustration
1	Arrows on the pump housing indicate the liquid flow direction through the pump. The liquid flow direction can be horizontal or vertical, depending on the control-box position.	 TM05 5513 3812  TM05 5514 3812
2	Close the isolating valves and make sure that the system is not pressurised during installation of the pump.	  TM05 2863 0612
3	Mount the pump with gaskets in the pipes.	 TM05 5515 3812
4	Flanged version: Fit the bolts, washers and nuts. Use the correct size of bolts according to system pressure. For further information about torques, see page 26. Threaded version: Tighten the union nuts.	 TM05 5516 3816  TM05 5517 3812

3.3.1 Pump positions

Always install the pump with horizontal motor shaft.

- Pump installed correctly in a vertical pipe. See fig. 8, pos. A.
- Pump installed correctly in a horizontal pipe. See fig. 8, pos. B.
- Do not install the pump with vertical motor shaft. See fig. 8, pos. C and D.

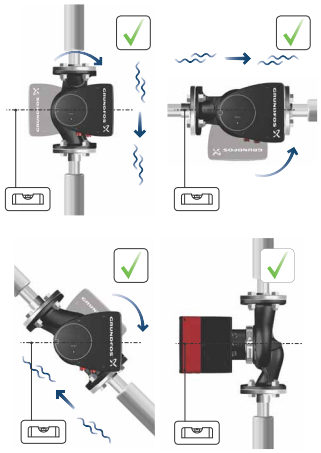


TM05 5518 3016

Fig. 8 Pump installed with horizontal motor shaft

3.3.2 Control box positions

To ensure adequate cooling, make sure that the control box is in horizontal position with the Grundfos logo in vertical position. See fig. 9.



TM05 5522 3016

Fig. 9 Pump with control box in horizontal position

Fit twin-head pumps installed in horizontal pipes with an automatic air vent, Rp 1/4, in the upper part of the pump housing. See fig. 10.

TM05 6062 3016

Fig. 10 Automatic vent

3.3.3 Pump head position

If you remove the pump head before installing the pump in the pipes, pay special attention when fitting the pump head to the pump housing:

1. Visually check that the floating ring in the sealing system is centred. See figures 11 and 12.
2. Gently lower the pump head with rotor shaft and impeller into the pump housing.
3. Make sure that the contact face of the pump housing and that of the pump head are in contact before you tighten the clamp. See fig. 13.

Fig. 11 Correctly centred sealing system

Fig. 12 Incorrectly centred sealing system

Check the position of the clamp before you tighten it. Incorrect position of the clamp will cause leakage from the pump and damage the hydraulic parts in the pump head. See fig. 13.

Fig. 13 Fitting the pump head to the pump housing

3.3.4 Changing the control box position

The warning symbol on the clamp holding the pump head and pump housing together indicates that there is a risk of personal injury. See specific warnings below.

CAUTION

Pressurised system

Minor or moderate personal injury

- Pay special attention to any escaping vapour when loosening the clamp.

CAUTION

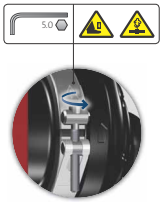
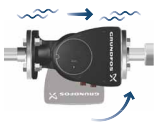
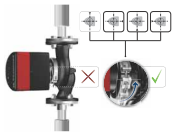
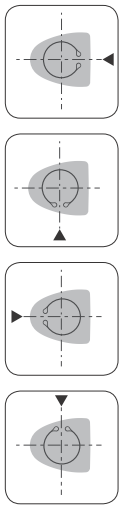
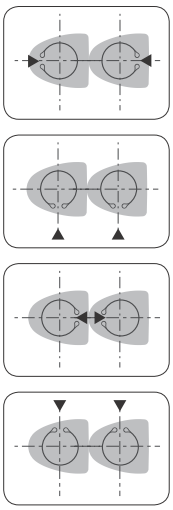
Crushing of feet

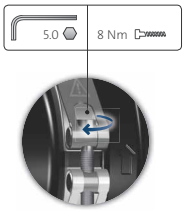
Minor or moderate personal injury

- Do not drop the pump head when loosening the clamp.

Fit and tighten the screw holding the clamp to 8 Nm ± 1 Nm. Do not apply more torque than specified even though water is dripping from the clamp. The condensed water is most likely coming from the drain hole under the clamp.

Check the position of the clamp before you tighten the clamp. Incorrect position of the clamp will cause leakage from the pump and damage the hydraulic parts in the pump head.

Step	Action	Illustration
1	Loosen the screw in the clamp that holds the pump head and pump housing together. If you loosen the screw too much, the pump head will be completely disconnected from the pump housing.	 TM05 2867 3016
2	Carefully turn the pump head to the desired position. If the pump head is stuck, loosen it with a light blow of a rubber mallet.	 TM05 5526 3016
3	Place the control box in horizontal position so that the Grundfos logo is in vertical position. The motor shaft must be in horizontal position.	 TM05 5527 3016
4	Due to the drain hole in the stator housing, position the gap of the clamp as shown in step 4a or 4b.	 TM05 2870 3016
4a	Single-head pump. Position the clamp so that the gap points towards the arrow. It can be in position 3, 6, 9 or 12 o'clock.	 TM05 2918 3016
4b	Twin-head pump. Position the clamps so that the gaps point towards the arrows. They can be in position 3, 6, 9 or 12 o'clock.	 TM05 2917 3016

Step	Action	Illustration
5	Fit and tighten the screw holding the clamp to 8 ± 1 Nm. Do not retighten the screw if condensed water is dripping from the clamp.	 TM05 2872 3016
6	Fit the insulating shells. The insulating shells for pumps in air-conditioning and cooling systems must be ordered separately.	 TM05 5529 3016

As an alternative to insulating shells, you can insulate the pump housing and pipes as illustrated in fig. 13.

Do not insulate the control box or cover the control panel.

TM05 5549 3016

Fig. 14 Insulation of pump housing and pipe

3.4 Electrical installation

Carry out the electrical connection and protection according to local regulations.

Check that the supply voltage and frequency correspond to the values stated on the nameplate.

WARNING

Electric shock

Death or serious personal injury

- Lock the main switch in position 0. Type and requirements as specified in EN 60204-1, 5.3.2.

WARNING

Electric shock

Death or serious personal injury

- Connect the pump to an external main switch with a minimum contact gap of 3 mm in all poles.
- Use earthing or neutralisation for protection against indirect contact.
- If the pump is connected to an electric installation where an electrical circuit breaker (voltage sensing ELCB, residual-current device RCD or residual-current circuit device RCCB) is used as an additional protection, this circuit breaker must be marked with the first or both of the symbols shown below:

- Make sure that the pump is connected to an external main switch.
- The pump requires no external motor protection.
- The motor incorporates thermal protection against slow overloading and blocking.
- When switched on via the power supply, the pump starts after approximately 5 seconds.

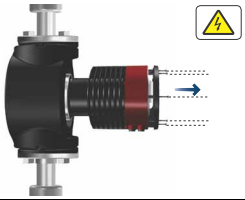
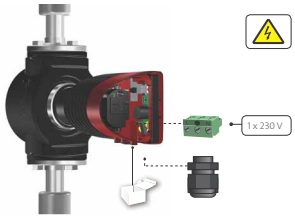
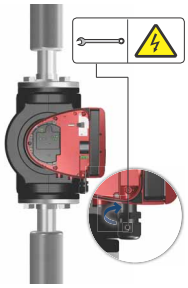
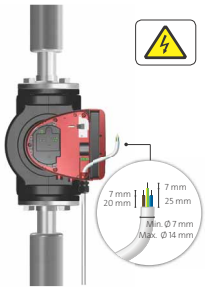
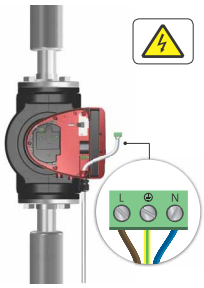
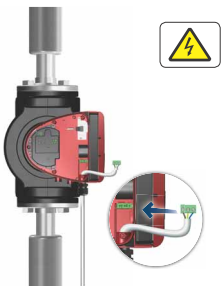
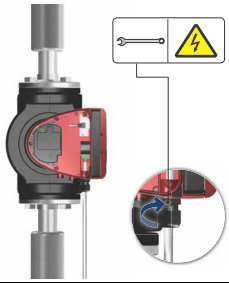
3.4.1 Supply voltage

1 x 230 V ± 10 %, 50/60 Hz, PE.

The voltage tolerances are intended for mains-voltage variations. Do not use the voltage tolerances for running pumps at other voltages than those stated on the nameplate.

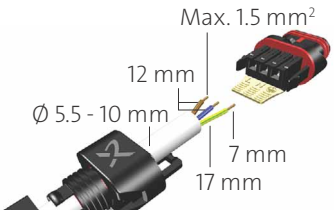
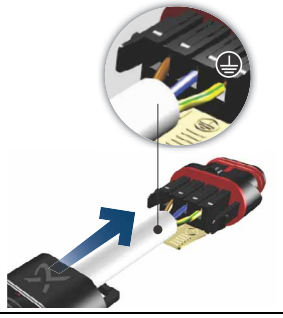
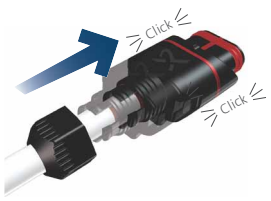
3.4.2 Connection to the power supply

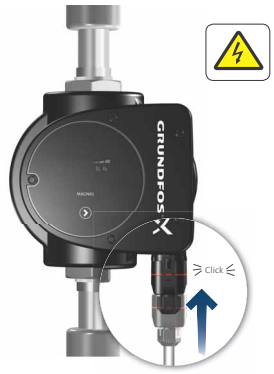
Terminal-connected versions

Step	Action	Illustration
1	Remove the front cover from the control box. Do not remove the screws from the cover.	 TM05 5530 3016
2	Locate the power supply plug and cable gland in the small cardboard box supplied with the pump.	 TM05 5531 3016
3	Connect the cable gland to the control box.	 TM05 5532 3016
4	Pull the power supply cable through the cable gland.	 TM05 5533 3016
5	Strip the cable conductors as illustrated.	 TM05 5534 3016
6	Connect the cable conductors to the power supply plug.	 TM05 5535 3016
7	Insert the power supply plug into the male plug in the control box.	 TM05 5536 3016
8	Tighten the cable gland. Refit the front cover.	 TM05 5537 3016

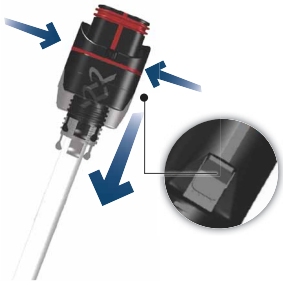
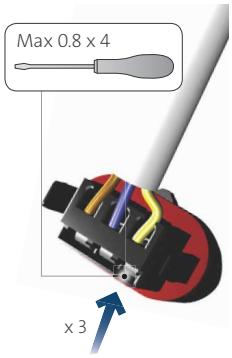
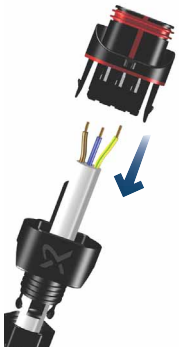
Plug-connected versions

Assembling the plug

Step	Action	Illustration
1	Fit the cable gland and plug cover to the cable. Strip the cable conductors as illustrated.	 TM05 5538 3016
2	Connect the cable conductors to the power supply plug.	 TM05 5539 3016
3	Bend the cable with the cable conductors pointing upwards.	 TM05 5540 3016
4	Pull out the conductor guide plate and throw it away.	 TM05 5541 3016
5	Click the plug cover onto the power supply plug.	 TM05 5542 3016
6	Screw the cable gland onto the power supply plug.	 TM05 5543 3016

Step	Action	Illustration
7	Insert the power supply plug into the male plug in the control box.	 TM05 5544 3016

Disassembling the plug

Step	Action	Illustration
1	Loosen the cable gland and remove it from the plug.	 TM05 5545 3016
2	Pull off the plug cover while pressing on both sides.	 TM05 5546 3016
3	Loosen the cable conductors one by one by pressing a screwdriver gently into the terminal clip.	 TM05 5547 3016
4	The plug has now been removed from the power supply plug.	 TM05 5548 3016

3.4.3 Connection diagrams

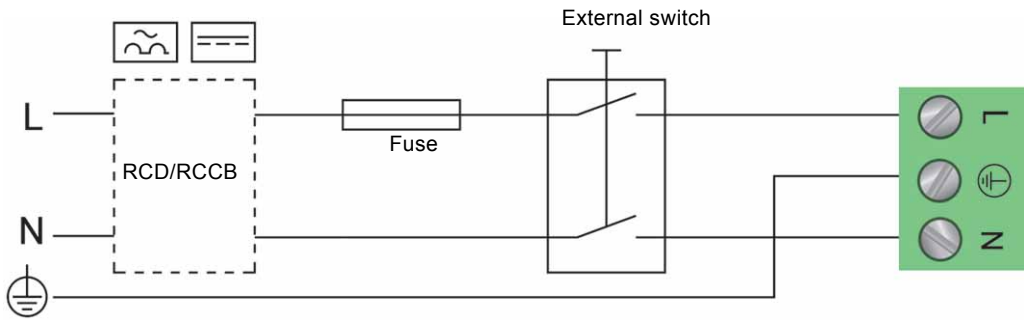


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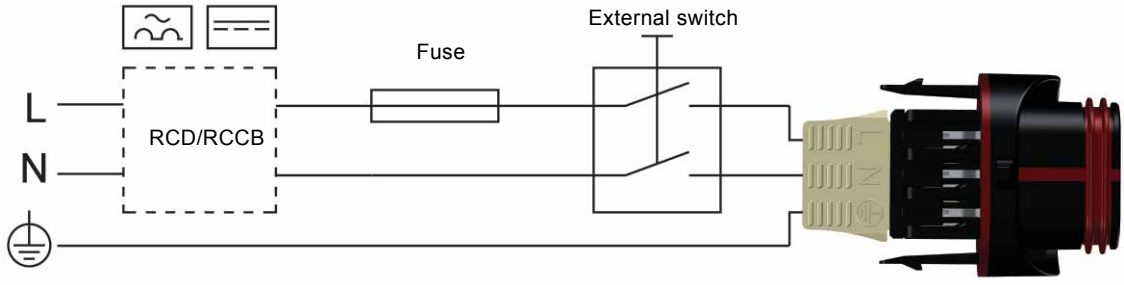
Fig. 15 Example of a mains-connected motor with main switch, backup fuse and additional protection



TM05 5277 3016

Fig. 16 Example of a plug-connected motor with main switch, backup fuse and additional protection

Make sure that the fuse is dimensioned according to the nameplate and local regulations.

Connect all cables in accordance with local regulations.

Make sure that all cables are heat-resistant up to 75 °C.
Install all cables in accordance with EN 60204-1 and EN 50174-2:2000.

4. Starting up the product

The number of starts and stops via the power supply must not exceed four times per hour.

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 *10. Technical data*.

The pump is self-venting through the system, and the system must be vented at the highest point.

Step	Action	Illustration
1	Switch on the power supply to the pump. The pump starts after approximately 5 seconds.	
2	Control panel at first startup.	
3	The pump has been factory-set to the intermediate proportional-pressure curve. Select the control mode according to the system application.	

5. Storing and handling the product

5.1 Storing the product

5.1.1 Frost protection

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

6. Product introduction

Grundfos MAGNA1 is a complete range of circulator pumps with integrated controller enabling adjustment of pump performance to the actual system requirements. In many systems, this reduces the power consumption considerably, reduces noise from thermostatic radiator valves and similar fittings and improves the control of the system.

You can set the desired head on the control panel.

6.1 Applications

The pump is designed for circulating liquids in the following systems:

- heating systems
- domestic hot-water systems
- air-conditioning and cooling systems.

You can also use the pump in the following systems:

- ground source heat pump systems
- solar heating systems.

6.2 Pumped liquids

The pump is suitable for thin, clean, non-aggressive and non-explosive liquids, not containing solid particles or fibres that may attack the pump mechanically or chemically.

In heating systems, the water must meet the requirements of accepted standards on water quality in heating systems, for example the German standard VDI 2035.

The pumps are also suitable for domestic hot-water systems.

Observe local regulation regarding pump-housing material.

We strongly recommend that you use stainless-steel pumps in domestic hot-water applications to avoid corrosion.

In domestic hot-water systems, we recommend that you use the pump only for water with a degree of hardness lower than approximately 14 °dH.

In domestic hot-water systems, we recommend that you keep the liquid temperature below 65 °C to eliminate the risk of lime precipitation.

Do not pump aggressive liquids.

Do not pump flammable, combustible or explosive liquids.

6.2.1 Glycol

You can use the pump for pumping water-ethylene-glycol mixtures up to 50 %.

Example of a water-ethylene-glycol mixture:

Maximum viscosity: 50 cSt ~ 50 % water / 50 % glycol mixture at -10 °C.

The pump has a power-limiting function that protects it against overload.

The pumping of glycol mixtures affects the maximum curve and reduces the performance, depending on the water-ethylene-glycol mixture and the liquid temperature.

To prevent the glycol mixture from degrading, avoid temperatures exceeding the rated liquid temperature and minimise the operating time at high temperatures.

Clean and flush the system before you add the glycol mixture.

To prevent corrosion or lime precipitation, check and maintain the glycol mixture regularly. If further dilution of the supplied glycol is required, follow the glycol supplier's instructions.

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

Fig. 17 Pumped liquids

You can connect the pump to the power supply in two ways, that is via terminals and via plug. These options are available for both flanged and threaded versions.

6.3 Identification

6.3.1 Nameplate

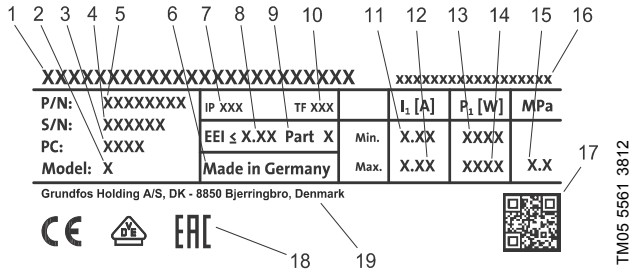


Fig. 18 Example of nameplate

Pos.	Description
1	Product name
2	Model
3	Production code, PC, year and week*
4	Serial number
5	Product number
6	Country of manufacture
7	Enclosure class
8	Energy Efficiency Index, EEI
9	Part, according to EEI
10	Temperature class
11	Minimum current [A]
12	Maximum current [A]
13	Minimum power [W]
14	Maximum power [W]
15	Maximum system pressure
16	Voltage [V] and frequency [Hz]
17	QR code
18	CE mark and approvals

* Example of production code: 1326. The pump was produced in week 26, 2013.

Fig. 19 Production code on packaging

6.4 Insulating shells

Insulating shells are available for single-head pumps only.

Limit the heat loss from the pump housing and pipes.

Reduce the heat loss from the pump and pipes by insulating the pump housing and the pipes. See fig. 20.

- Insulating shells for pumps in heating systems are supplied with the pump.
- Insulating shells for pumps in air-conditioning and cooling systems, down to -10 °C, are available as accessories and must be ordered separately. See section *9.1 Insulating kits for air-conditioning and cooling systems*.

Insulating shells increases the pump dimensions.

Fig. 20 Insulating shells

Pumps for heating systems are factory-fitted with insulating shells. Remove the insulating shells before you install the pump.

6.5 Non-return valve

If a non-return valve is fitted in the pipe system, ensure that the set minimum outlet pressure of the pump is always higher than the closing pressure of the valve. See fig. 21. This is especially important in proportional-pressure control mode with reduced head at low flow.

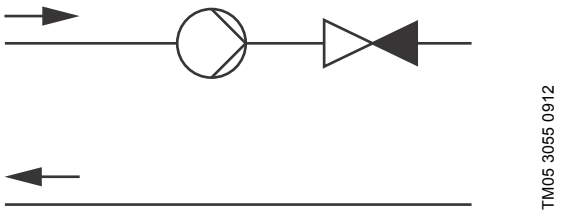


Fig. 21 Non-return valve

7. Control functions

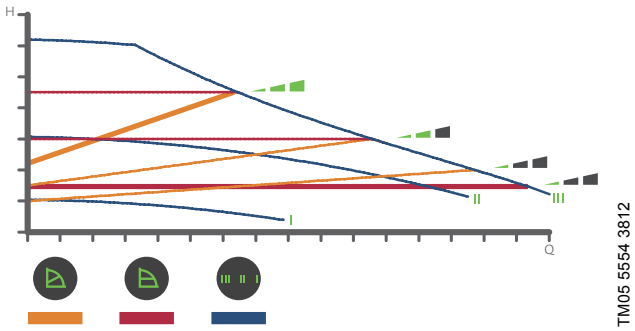


Fig. 22 Selection of pump setting for system type

Factory setting: Intermediate proportional-pressure curve, referred to as PP2.

Proportional-pressure curve (PP1, PP2 or PP3)

Proportional-pressure control adjusts the pump performance to the actual heat demand in the system, but the pump performance follows the selected performance curve, PP1, PP2 or PP3. See fig. 23 where PP2 has been selected. For further information, see section *8. Fault finding the product*.

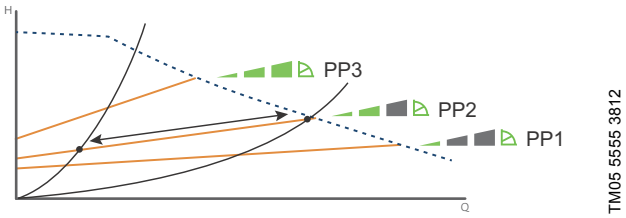


Fig. 23 Three proportional-pressure curves/settings

The selection of the right proportional-pressure setting depends on the characteristics of the heating system in question and the actual heat demand.

Constant-pressure curve (CP1, CP2 or CP3)

Constant-pressure control adjusts the pump performance to the actual heat demand in the system, but the pump performance follows the selected performance curve, CP1, CP2 or CP3. See fig. 24 where CP1 has been selected. For further information, see section *8. Fault finding the product*.

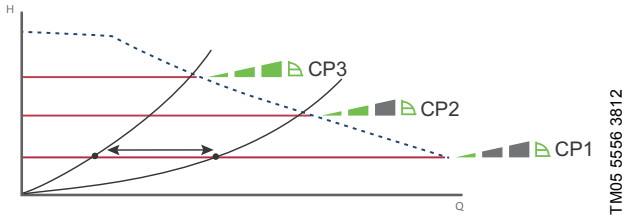


Fig. 24 Three constant-pressure curves/settings

The selection of the right constant-pressure setting depends on the characteristics of the heating system in question and the actual heat demand.

Constant curve (I, II or III)

At constant-curve operation, the pump runs at a constant speed, independent of the actual flow demand in the system. The pump performance follows the selected performance curve, I, II or III. See fig. 25 where II has been selected. For further information, see section *8. Fault finding the product*.

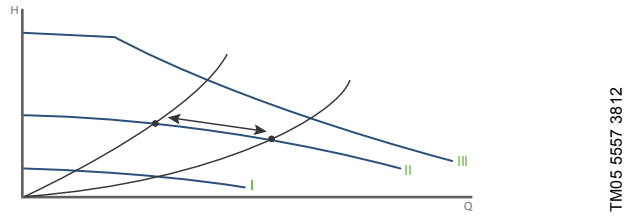


Fig. 25 Three constant-curve settings

The selection of the right constant-curve setting depends on the characteristics of the heating system in question.

7.1 Overview of control functions

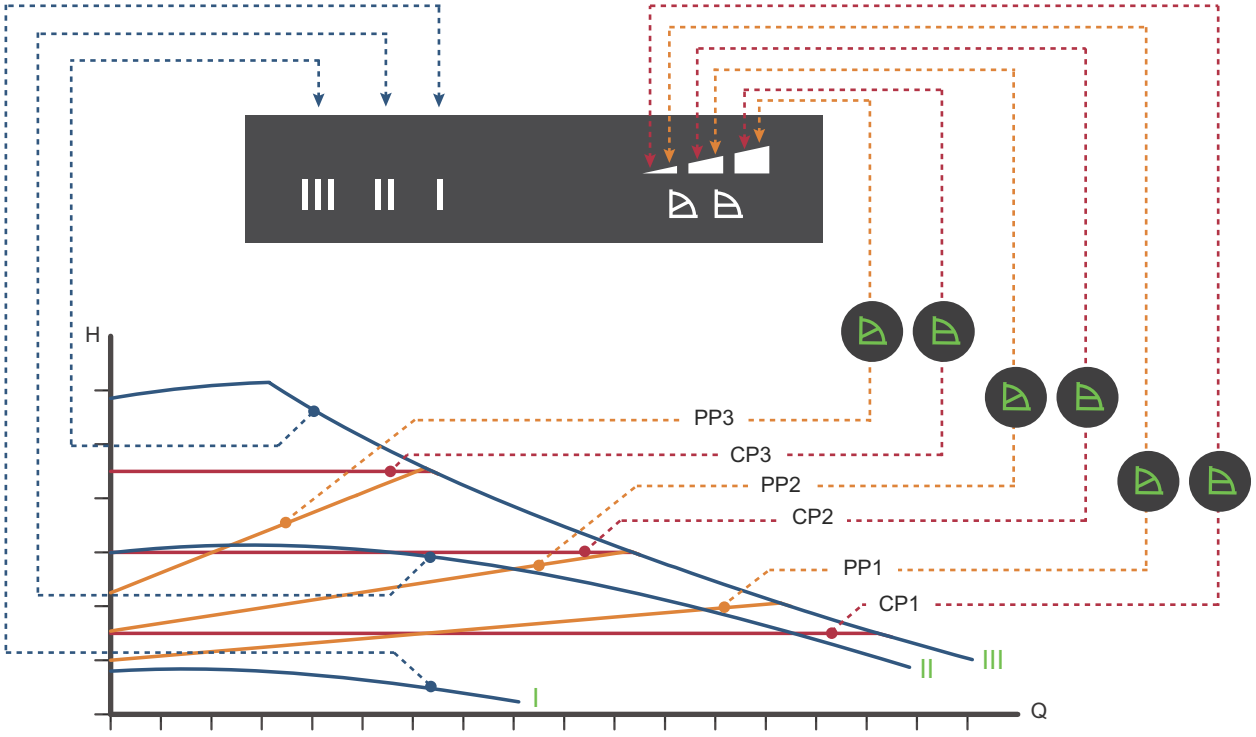
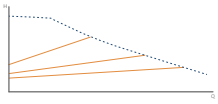
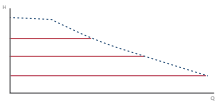
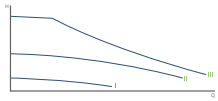


Fig. 26 Pump setting in relation to pump performance

Setting	Pump curve	Function
PP1	Lowest proportional-pressure curve	The duty point of the pump will move up or down on the lowest proportional-pressure curve, depending on the heat demand. See fig. 26. The head is reduced at falling heat demand and increased at rising heat demand.
PP2	Intermediate proportional-pressure curve	The duty point of the pump will move up or down on the intermediate proportional-pressure curve, depending on the heat demand. See fig. 26. The head is reduced at falling heat demand and increased at rising heat demand.
PP3	Highest proportional-pressure curve	The duty point of the pump will move up or down on the highest proportional-pressure curve, depending on the heat demand. See fig. 26. The head is reduced at falling heat demand and increased at rising heat demand.
CP1	Lowest constant-pressure curve	The duty point of the pump will move out or in on the lowest constant-pressure curve, depending on the heat demand in the system. See fig. 26. The head is kept constant, irrespective of the heat demand.
CP2	Intermediate constant-pressure curve	The duty point of the pump will move out or in on the intermediate constant-pressure curve, depending on the heat demand in the system. See fig. 26. The head is kept constant, irrespective of the heat demand.
CP3	Highest constant-pressure curve	The duty point of the pump will move out or in on the highest constant-pressure curve, depending on the heat demand in the system. See fig. 26. The head is kept constant, irrespective of the heat demand.
III	Speed III	The pump runs on a constant curve which means that it runs at a constant speed. At speed III, the pump is set to run on the maximum curve under all operating conditions. See fig. 26. You obtain quick venting of the pump by setting the pump to speed III for a short period.
II	Speed II	The pump runs on a constant curve which means that it runs at a constant speed. At speed II, the pump is set to run on the intermediate curve under all operating conditions. See fig. 26.
I	Speed I	The pump runs on a constant curve which means that it runs at a constant speed. At speed I, the pump is set to run on the minimum curve under all operating conditions. See fig. 26.

7.2 Selecting control function

System application	Select this control mode
In systems with relatively large pressure losses in the distribution pipes and in air-conditioning and cooling systems. • Two-pipe heating systems with thermostatic valves and the following: – very long distribution pipes – strongly throttled pipe balancing valves – differential-pressure regulators – large pressure losses in those parts of the system through which the total quantity of water flows, for example boiler, heat exchanger and distribution pipe up to the first branching. • Primary circuit pumps in systems with large pressure losses in the primary circuit. • Air-conditioning systems with the following: – heat exchangers, fan coils – cooling ceilings – cooling surfaces.	Proportional pressure 
In systems with relatively small pressure losses in the distribution pipes. • Two-pipe heating systems with thermostatic valves and the following: – dimensioned for natural circulation – small pressure losses in those parts of the system through which the total quantity of water flows, for example boiler, heat exchanger and distribution pipe up to the first branching or modified to a high differential temperature between flow pipe and return pipe, for example district heating. • Underfloor heating systems with thermostatic valves. • One-pipe heating systems with thermostatic valves or pipe balancing valves. • Primary circuit pumps in systems with small pressure losses in the primary circuit.	Constant pressure 
You can also set the pump to operate according to the maximum or minimum curve, like an uncontrolled pump: • Use the maximum-curve mode in periods in which a maximum flow is required. This operating mode is for instance suitable for hot-water priority in domestic hot-water systems. • Use the minimum-curve mode in periods in which a minimum flow is required.	Constant curve 

7.3 Operating the product

CAUTION

Hot surface

Minor or moderate personal injury

- Only touch the control panel to avoid burns.

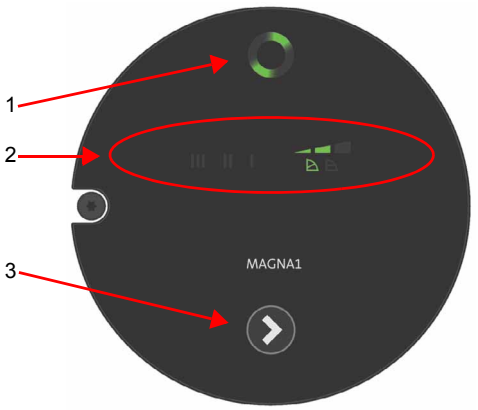


Fig. 27 Control panel

Pos.	Description
1	Operating status of Grundfos Eye. See section *7.4 Grundfos Eye*.
2	Eight light fields indicating the pump setting. See section *7.5 Light fields indicating the pump setting*.
3	Push-button for selection of pump setting.

7.4 Grundfos Eye

Grundfos Eye is on when you switch on the power supply. See fig. 27, pos. 1.

Grundfos Eye is an indicator light providing information about the actual pump status.

The indicator light flashes in different sequences and provides information about the following:

- power on and off
- pump alarms.

The function of Grundfos Eye is described in section *8.1 Grundfos Eye operating status*.

Faults preventing the pump from operating properly, for example blocked rotor, are indicated by Grundfos Eye. See section *8.1 Grundfos Eye operating status*.

If a fault is indicated, correct the fault and reset the pump by switching the power supply off and on.

If the pump impeller is rotated, for example when filling the pump with water, sufficient energy may be generated to light up the control panel even if the power supply has been switched off.

7.5 Light fields indicating the pump setting

The pump has nine performance settings which you can select with the push-button. See fig. 27, pos. 3.

The pump setting is indicated by eight light fields in the display. See fig. 27, pos. 2.

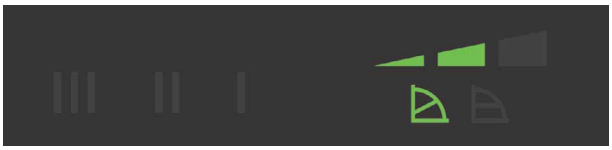


Fig. 28 Factory setting, PP2

Button presses	Active light fields	Description
0		Intermediate proportional-pressure curve, referred to as PP2
1		Highest proportional-pressure curve, referred to as PP3
2		Lowest constant-pressure curve, referred to as CP1
3		Intermediate constant-pressure curve, referred to as CP2
4		Highest constant-pressure curve, referred to as CP3
5	III	Constant curve III
6	II	Constant curve II
7	I	Constant curve I
8		Lowest proportional-pressure curve, referred to as PP1

8. Fault finding the product

8.1 Grundfos Eye operating status

Grundfos Eye	Indication	Cause
	No lights are on.	The power is off. The pump is not running.
	Two opposite green indicator lights running in the direction of rotation of the pump.	The power is on. The pump is running.
	Two opposite red indicator lights flashing simultaneously.	Alarm. The pump is stopped.

8.2 Fault finding

Reset a fault indication in one of the following ways:

- When you have eliminated the fault cause, the pump reverts to normal duty.
- If the fault disappears by itself, the fault indication is automatically reset.

CAUTION

Pressurised system

Minor or moderate personal injury

- Before dismantling the pump, drain the system or close the isolating valve on either side of the pump. The pumped liquid may be scalding hot and under high pressure.

WARNING

Electric shock

Death or serious personal injury.

- Switch off the power supply for at least 3 minutes before you start any work on the product. Lock the main switch in position 0. Type and requirements as specified in EN 60204-1, 5.3.2.

WARNING

Electric shock

Death or serious personal injury.

- Make sure that other pumps or sources do not force flow through the pump even if the pump is stopped.

If the power supply cable is damaged, it must be replaced by the manufacturer, the manufacturer's service partner or a similarly qualified person.

Fault	Automatic reset and restart?	Corrective actions
Other pumps or sources force flow through the pump even if the pump is stopped. There is light in the display even if the power supply is switched off.	Yes	Check the system for defective non-return valves and replace the valves, if necessary. Check the system for correct position of non-return valves.
The supply voltage to the pump is too low.	Yes	Check that the power supply is within the specified range.
The pump is blocked.	No	Dismantle the pump and remove any foreign matter or impurities preventing the pump from rotating. Check the water quality to eliminate the risk of lime precipitation.
No water at the pump inlet, or the water contains too much air.	No	Prime and vent the pump before a new startup. Check that the pump is operating correctly. If not, replace the pump, or contact Grundfos Service.
Fault in the pump electronics.	Yes	Replace the pump, or contact Grundfos Service.
The supply voltage to the pump is too high.	Yes	Check that the power supply is within the specified range.

9. Accessories

9.1 Insulating kits for air-conditioning and cooling systems

You can fit single-head pumps for air-conditioning and cooling systems with insulating shells. A kit consists of two shells made of polyurethane and a self-adhesive seal to ensure tight assembly.

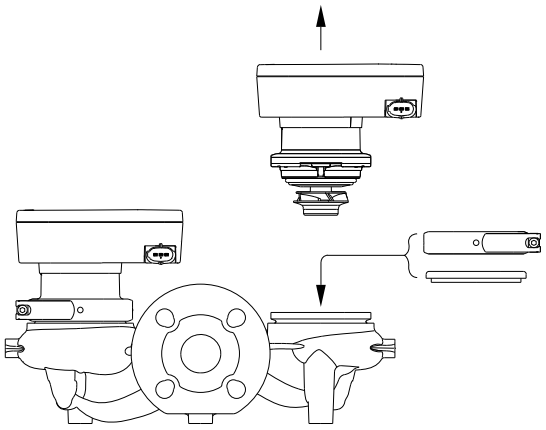
The dimensions of the insulating shells for pumps in air-conditioning and cooling systems differ from those of the insulating shells for pumps in heating systems.

Pump type	Product number
MAGNA1 25-40/60/80/100/120 (N)	98538852
MAGNA1 32-40/60/80/100 (N)	98538853
MAGNA1 32-40/60/80/100 F (N)	98538854
MAGNA1 32-120 F (N)	98164595
MAGNA1 40-40/60 F (N)	98538855
MAGNA1 40-80/100 F (N)	98164597
MAGNA1 40-120/150/180 F (N)	98164598
MAGNA1 50-40/60/80 F (N)	98164599
MAGNA1 50-100/120/150/180 F (N)	98164600
MAGNA1 65-40/60/80/100/120/150 F (N)	98538839
MAGNA1 80-40/60/80/100/120 F	98538851
MAGNA1 100-40/60/80/100/120 F	98164611

The insulating kit also fits stainless-steel versions (N).

9.2 Blanking flanges

A blanking flange is used to blank off the opening when one of the pumps of a twin-head pump is removed for service to enable uninterrupted operation of the other pump.



TM05 5525 3812

Fig. 29 Position of blanking flange

Pump type	Product number
MAGNA1 D 32-40/60/80/100 (F) MAGNA1 D 40-40/60 F	98159373
MAGNA1 D 32-120 F MAGNA1 D 40-/80/100/120/150/180 F MAGNA1 D 50-40/60/80/100/120/150/180 F MAGNA1 D 65-40/60/80/100/120/150 F MAGNA1 D 80-40/60/80/100/120 F MAGNA1 D 100-40/60/80/100/120 F	98159372

9.3 Counterflanges

Counterflange kits consist of two flanges, two gaskets and bolts and nuts, making it possible to install the pump in any pipes. See *MAGNA1 data booklet*, *Accessories* section, for the right dimension and product number.

9.4 ALPHA plugs

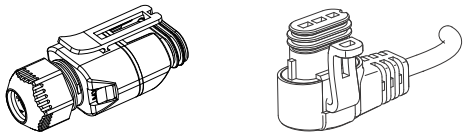


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Fig. 30 ALPHA plugs

Description	Product number
ALPHA plug with cable relief	97928845
ALPHA plug, angled, with 4 m cable	96884669
ALPHA plug, angled, with inrush protection with 1 m cable	97844632

10. Technical data

Supply voltage

1 x 230 V ± 10 %, 50/60 Hz, PE.

Motor protection

The pump requires no external motor protection.

Enclosure class

IPX4D (EN 60529).

Insulation class

F.

Relative air humidity

Maximum 95 %.

Ambient temperature

0 to 40 °C.

During transport: -40 to +70 °C.

Temperature class

TF110 (EN 60335-2-51).

Liquid temperature

Continuously: -10 to +110 °C.

Stainless steel pumps in domestic hot-water systems:

In domestic hot-water systems, we recommend that you keep the liquid temperature below 65 °C to eliminate the risk of lime precipitation.

System pressure

The actual inlet pressure and the pump pressure against a closed valve must be lower than the maximum permissible system pressure.

The maximum permissible system pressure is stated on the pump nameplate:

PN 6: 6 bar or 0.6 MPa

PN 10: 10 bar or 1.0 MPa

PN 16: 16 bar or 1.6 MPa.

Test pressure

The pumps can withstand test pressures as indicated in EN 60335-2-51.

- PN 6: 7.2 bar
- PN 10: 12 bar
- PN 6/10: 12 bar
- PN 16: 19.2 bar.

During normal operation, do not use the pump at higher pressures than those stated on the nameplate. See fig. 18.

The pressure test has been made with water containing anti-corrosive additives at a temperature of 20 °C.

Minimum inlet pressure

The following relative minimum inlet pressure must be available at the pump inlet during operation to avoid cavitation noise and damage to the pump bearings.

The values in the table below apply to single-head pumps and twin-head pumps in single-head operation.

Single-head pumps DN	Liquid temperature		
	75 °C	95 °C	110 °C
	Inlet pressure [bar] / [MPa]		
25-40/60/80/100/120	0.10 / 0.01	0.35 / 0.035	1.0 / 0.10
32-40/60/80/100/120	0.10 / 0.01	0.35 / 0.035	1.0 / 0.10
32-120 F	0.10 / 0.01	0.20 / 0.020	0.7 / 0.07
40-40/60 F	0.10 / 0.01	0.35 / 0.035	1.0 / 0.10
40-80/100/120/150/180 F	0.10 / 0.01	0.50 / 0.05	1.0 / 0.10
50-40/60/80 F	0.10 / 0.01	0.40 / 0.04	1.0 / 0.10
50-100/128 F	0.10 / 0.01	0.50 / 0.05	1.0 / 0.10
50-150/180 F	0.70 / 0.07	1.20 / 0.12	1.7 / 0.17
65-40/60/80/100/120/150 F	0.70 / 0.07	1.20 / 0.12	1.7 / 0.17
80-40/60/80/100/120 F	0.50 / 0.05	1.00 / 0.10	1.5 / 0.15
100-40/60/80/100/120 F	0.70 / 0.07	1.20 / 0.12	1.7 / 0.17

In the case of twin-head operation, increase the required relative inlet pressure by 0.1 bar or 0.01 MPa compared to the stated values for single-head pumps or twin-head pumps in single-head operation.

The actual inlet pressure and the pump pressure against a closed valve must be lower than the maximum permissible system pressure.

The relative minimum inlet pressures apply to pumps installed up to 300 metres above sea level. For altitudes above 300 metres, increase the required relative inlet pressure by 0.01 bar or 0.001 MPa per 100 metres altitude. The pump is only approved for an altitude of maximum 2000 metres above sea level.

Sound pressure level

The sound pressure level of the pump is lower than 43 dB(A).

Leakage current

The mains filter will cause a leakage current to earth during operation. The leakage current is less than 3.5 mA.

Power factor

The terminal-connected versions have a built-in active power factor correction which gives a cos φ from 0.98 to 0.99.

The plug-connected versions have a built-in passive power factor correction with coil and resistors which ensure that the current drawn from the grid is in phase with the voltage and that the current is approximately sinusoidal which gives a cos φ from 0.55 to 0.98.

11. Disposing of the product

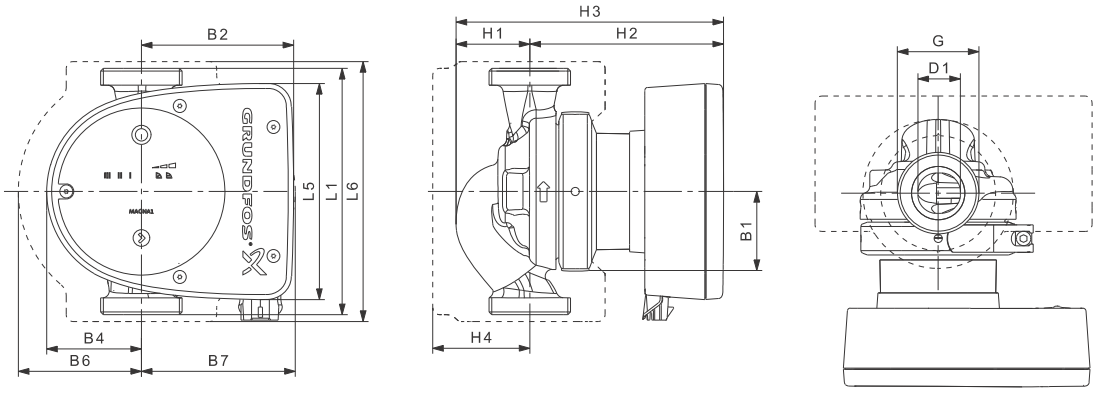
This product has been designed with focus on the disposal and recycling of materials. The following average disposal values apply to all variants of MAGNA1 pumps:

- 85 % recycling
- 10 % incineration
- 5 % depositing.

Dispose of this product or parts of it in an environmentally sound way according to local regulations.

For further information, see the end-of-life information on www.grundfos.com.

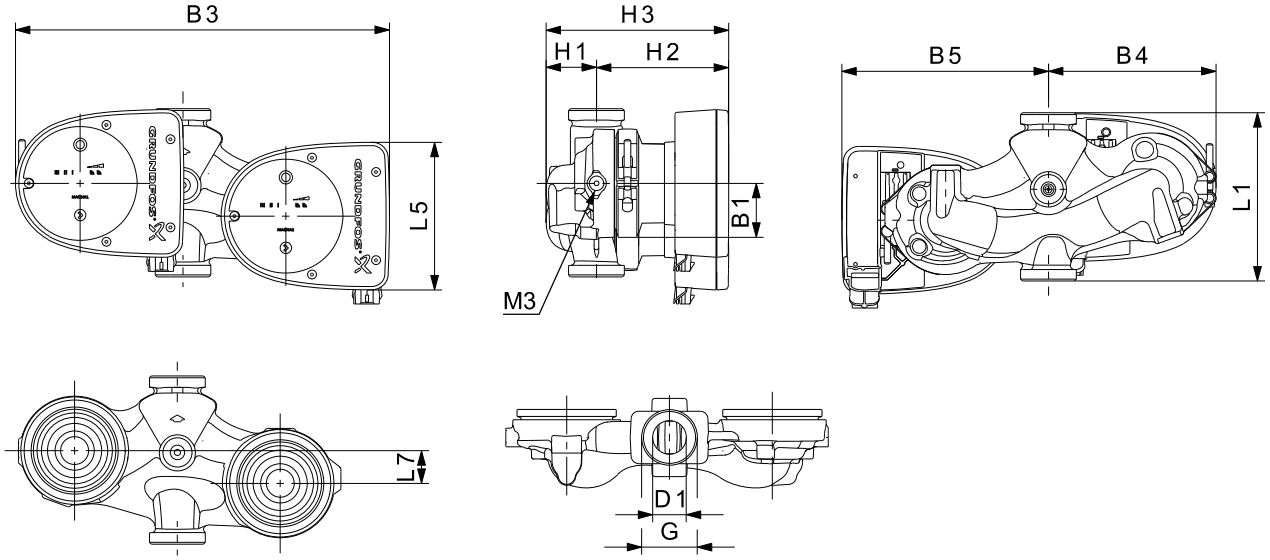
1. Dimensions



TM05 5142 3512

Fig. 1 Single-head pump dimensions, threaded version

Pump type	Dimensions [mm]													[inch]
	L1	L5	L6	B1	B2	B4	B6	B7	H1	H2	H3	H4	D1	G
MAGNA1 25-40 (N)	180	158	190	58	111	69	90	113	54	142	196	71	25	1 1/2
MAGNA1 25-60 (N)	180	158	190	58	111	69	90	113	54	142	196	71	25	1 1/2
MAGNA1 25-80 (N)	180	158	190	58	111	69	90	113	54	142	196	71	25	1 1/2
MAGNA1 25-100 (N)	180	158	190	58	111	69	90	113	54	142	196	71	25	1 1/2
MAGNA1 25-120 (N)	180	158	190	58	111	69	90	113	54	142	196	71	25	1 1/2
MAGNA1 32-40 (N)	180	158	190	58	111	69	90	113	54	142	196	71	32	2
MAGNA1 32-60 (N)	180	158	190	58	111	69	90	113	54	142	196	71	32	2
MAGNA1 32-80 (N)	180	158	190	58	111	69	90	113	54	142	196	71	32	2
MAGNA1 32-100 (N)	180	158	190	58	111	69	90	113	54	142	196	71	32	2
MAGNA1 32-120 (N)	180	158	190	58	111	69	90	113	54	142	196	71	32	2



TM05 5201 3512

Fig. 2 Twin-head pump dimensions, threaded version

Pump type	Dimensions [mm]											[inch]	
	L1	L5	L7	B1	B3	B4	B5	H1	H2	H3	D1	G	M3
MAGNA1 D 32-40	180	158	35	58	400	179	221	54	142	196	32	2	1/4
MAGNA1 D 32-60	180	158	35	58	400	179	221	54	142	196	32	2	1/4
MAGNA1 D 32-80	180	158	35	58	400	179	221	54	142	196	32	2	1/4
MAGNA1 D 32-100	180	158	35	58	400	179	221	54	142	196	32	2	1/4

2. Dimensions

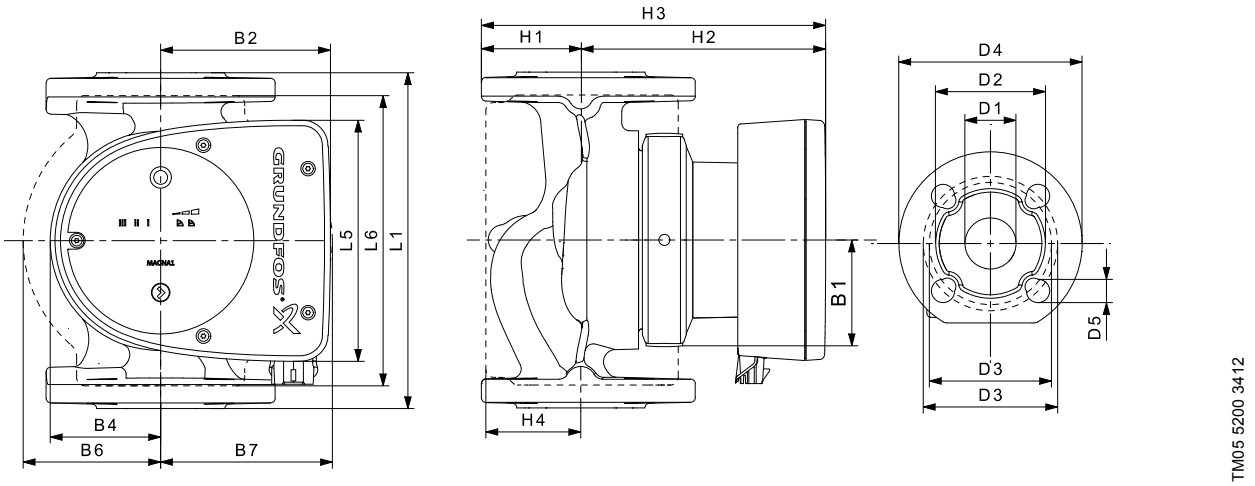


Fig. 3 Single-head pump dimensions, plug-connected versions, flanged version

Pump type	Dimensions [mm]																
	L1	L5	L6	B1	B2	B4	B6	B7	H1	H2	H3	H4	D1	D2	D3	D4	D5
MAGNA1 32-40 F (N)	220	158	220	58	111	69	100	110	65	142	207	82	32	76	90/100	140	14/19
MAGNA1 32-60 F (N)	220	158	220	58	111	69	100	110	65	142	207	82	32	76	90/100	140	14/19
MAGNA1 32-80 F (N)	220	158	220	58	111	69	100	110	65	142	207	82	32	76	90/100	140	14/19
MAGNA1 32-100 F (N)	220	158	220	58	111	69	100	110	65	142	207	82	32	76	90/100	140	14/19
MAGNA1 40-40 F (N)	220	158	220	58	111	69	105	105	65	156	221	83	40	84	100/110	150	14/19
MAGNA1 40-60 F (N)	220	158	220	58	111	69	105	105	65	156	221	83	40	84	100/110	150	14/19

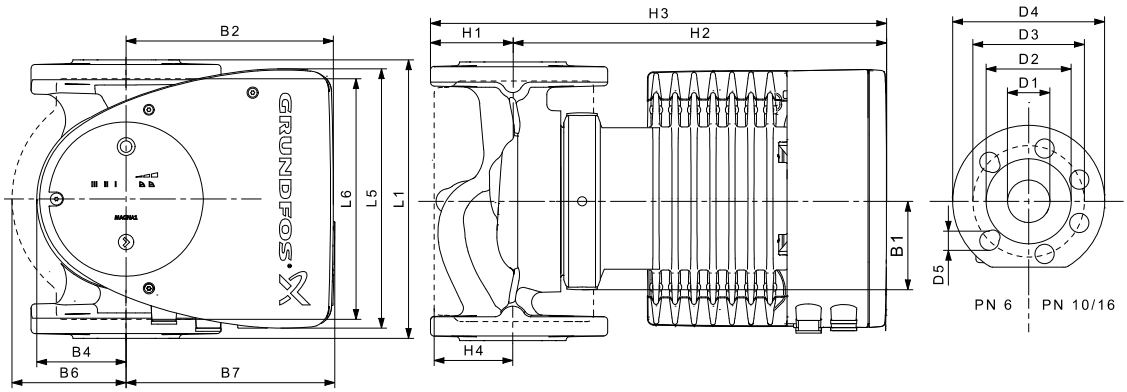


Fig. 4 Single-head pump dimensions, terminal-connected versions, flanged version

Pump type	Dimensions [mm]																
	L1	L5	L6	B1	B2	B4	B6	B7	H1	H2	H3	H4	D1	D2	D3	D4	D5
MAGNA1 32-120 F (N)	220	204	216	84	164	73	106	116	65	301	366	86	32	76	90/100	140	14/19
MAGNA1 40-80 F (N)	220	204	220	84	164	73	106	128	65	304	369	83	40	84	100/110	150	14/19
MAGNA1 40-100 F (N)	220	204	220	84	164	73	106	128	65	304	369	83	40	84	100/110	150	14/19
MAGNA1 40-120 F (N)	250	204	220	84	164	73	106	128	65	304	369	83	40	84	100/110	150	14/19
MAGNA1 40-150 F (N)	250	204	220	84	164	73	106	128	65	304	369	83	40	84	100/110	150	14/19
MAGNA1 40-180 F (N)	250	204	220	84	164	73	106	128	65	304	369	83	40	84	100/110	150	14/19
MAGNA1 50-40 F (N)	240	204	240	84	164	73	127	127	71	304	374	97	50	102	110/125	165	14/19
MAGNA1 50-60 F (N)	240	204	240	84	164	73	127	127	71	304	374	97	50	102	110/125	165	14/19
MAGNA1 50-80 F (N)	240	204	240	84	164	73	127	127	71	304	374	97	50	102	110/125	165	14/19
MAGNA1 50-100 F (N)	280	204	240	84	164	73	127	127	72	304	376	97	50	102	110/125	165	14/19
MAGNA1 50-120 F (N)	280	204	240	84	164	73	127	127	72	304	376	97	50	102	110/125	165	14/19
MAGNA1 50-150 F (N)	280	204	240	84	164	73	127	127	72	304	376	97	50	102	110/125	165	14/19
MAGNA1 50-180 F (N)	280	204	240	84	164	73	127	127	72	304	376	97	50	102	110/125	165	14/19
MAGNA1 65-40 F (N)	340	204	296	84	164	73	133	133	74	312	386	94	65	119	130/145	185	14/19
MAGNA1 65-60 F (N)	340	204	296	84	164	73	133	133	74	312	386	94	65	119	130/145	185	14/19
MAGNA1 65-80 F (N)	340	204	296	84	164	73	133	133	74	312	386	94	65	119	130/145	185	14/19
MAGNA1 65-100 F (N)	340	204	296	84	164	73	133	133	74	312	386	94	65	119	130/145	185	14/19
MAGNA1 65-120 F (N)	340	204	296	84	164	73	133	133	74	312	386	94	65	119	130/145	185	14/19
MAGNA1 65-150 F (N)	340	204	296	84	164	73	133	133	74	312	386	94	65	119	130/145	185	14/19
MAGNA1 80-40 F	360	204	310	84	164	73	163	163	96	318	413	115	80	128	150/160	200	19
MAGNA1 80-60 F	360	204	310	84	164	73	163	163	96	318	413	115	80	128	150/160	200	19
MAGNA1 80-80 F	360	204	310	84	164	73	163	163	96	318	413	115	80	128	150/160	200	19
MAGNA1 80-100 F	360	204	310	84	164	73	163	163	96	318	413	115	80	128	150/160	200	19
MAGNA1 80-120 F	360	204	310	84	164	73	163	163	96	318	413	115	80	128	150/160	200	19
MAGNA1 100-40 F	450	204	396	84	164	73	178	178	103	330	433	120	100	160	170	220	19
MAGNA1 100-60 F	450	204	396	84	164	73	178	178	103	330	433	120	100	160	170	220	19
MAGNA1 100-80 F	450	204	396	84	164	73	178	178	103	330	433	120	100	160	170	220	19
MAGNA1 100-100 F	450	204	396	84	164	73	178	178	103	330	433	120	100	160	170	220	19
MAGNA1 100-120 F	450	204	396	84	164	73	178	178	103	330	433	120	100	160	170	220	19

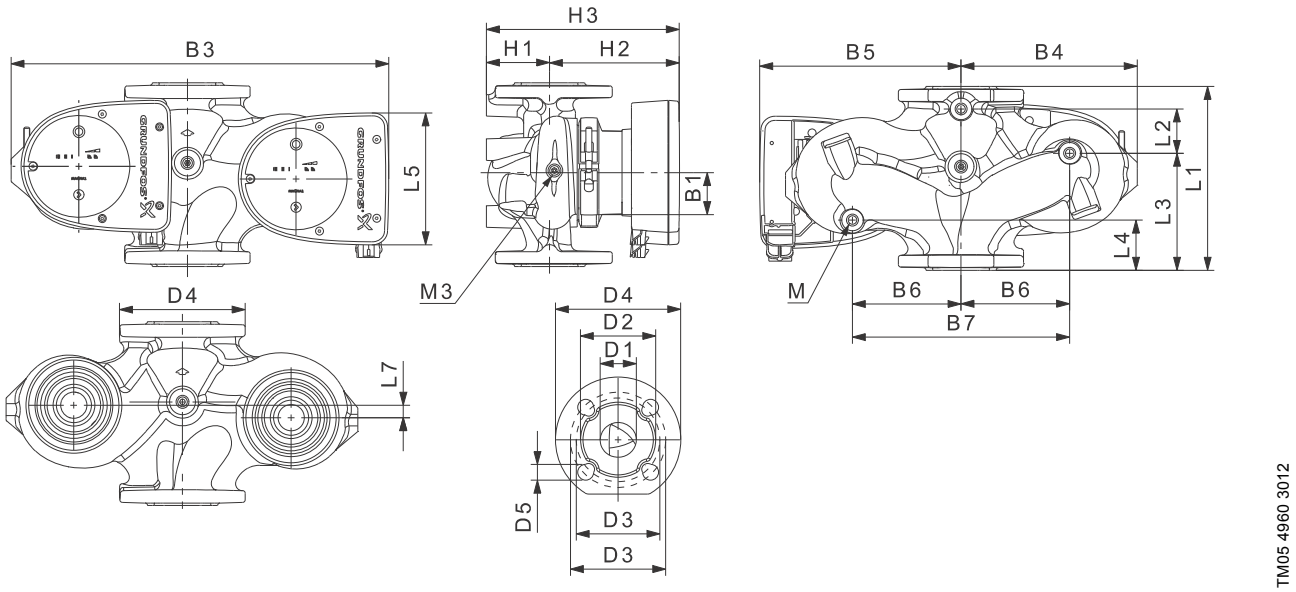


Fig. 5 Twin-head pump dimensions, plug-connected versions, flanged version

Pump type	Dimensions [mm]																				
	L1	L2	L3	L4	L5	L7	B1	B3	B4	B5	B6	B7	H1	H2	H3	D1	D2	D3	D4	D5	M
MAGNA1 D 32-40 F	220	73	120	85	158	35	58	400	179	221	130	260	69	142	211	32	76	90/100	140	14/19	12
MAGNA1 D 32-60 F	220	73	120	85	158	35	58	400	179	221	130	260	69	142	211	32	76	90/100	140	14/19	12
MAGNA1 D 32-80 F	220	73	120	85	158	35	58	400	179	221	130	260	69	142	211	32	76	90/100	140	14/19	12
MAGNA1 D 40-40 F	220	53	140	60	158	15	58	452	211	241	130	260	76	156	232	40	84	100/110	150	14/19	12
MAGNA1 D 40-60 F	220	53	140	60	158	15	58	452	211	241	130	260	76	156	232	40	84	100/110	150	14/19	12
MAGNA1 D 40-80 F	220	53	140	60	204	15	84	502	210	294	130	260	76	303	379	40	84	100/110	150	14/19	12

Note M3: Rp 1/4 for air vent available on all twin-head pumps.

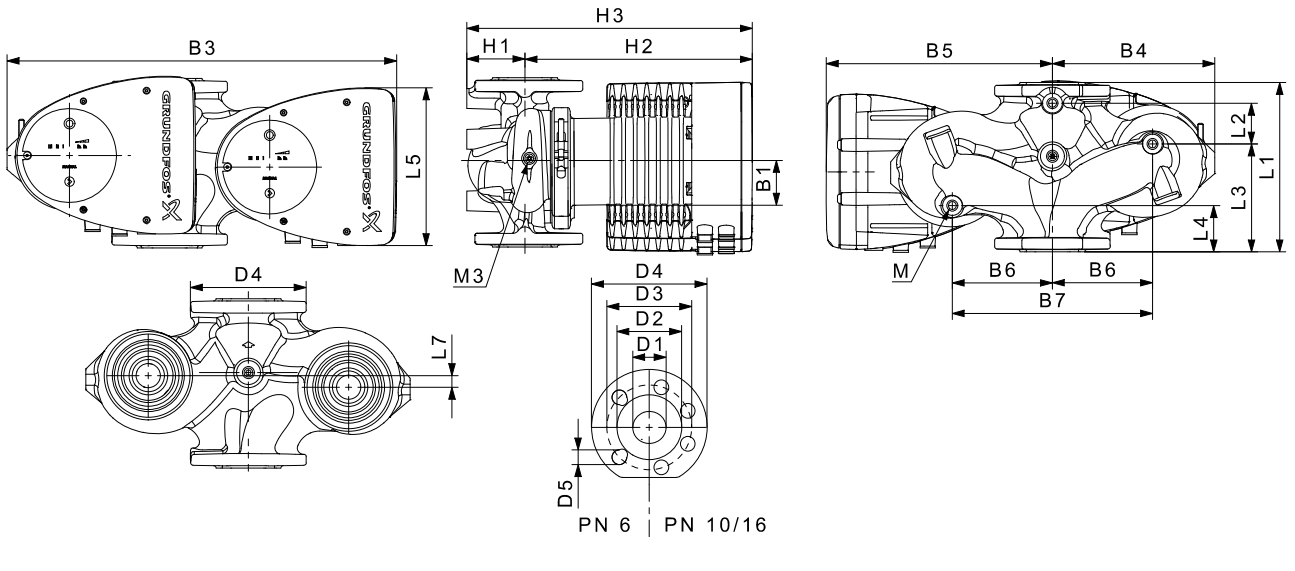


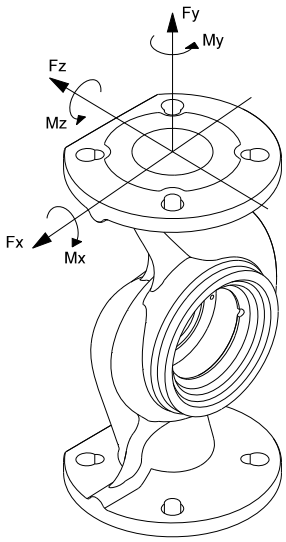
Fig. 6 Twin-head pump dimensions, terminal connected versions (flanged version)

Pump type	Dimensions [mm]																				
	L1	L2	L3	L4	L5	L7	B1	B3	B4	B5	B6	B7	H1	H2	H3	D1	D2	D3	D4	D5	M
MAGNA1 D 32-120 F	220	97	90	50	204	50	84	502	210	294	130	260	68	300	368	32	76	90/100	140	14/19	12
MAGNA1 D 40-80 F	220	53	140	60	204	15	84	502	210	294	130	260	76	303	379	40	84	100/110	150	14/19	12
MAGNA1 D 40-100 F	220	53	140	60	204	15	84	502	210	294	130	260	76	303	379	40	84	100/110	150	14/19	12
MAGNA1 D 40-120 F	250	58	155	75	204	0	84	512	220	294	130	260	69	303	372	40	84	100/110	150	14/19	12
MAGNA1 D 40-150 F	250	58	155	75	204	0	84	512	220	294	130	260	69	303	372	40	84	100/110	150	14/19	12
MAGNA1 D 40-180 F	250	58	155	75	204	0	84	512	220	294	130	260	69	303	372	40	84	100/110	150	14/19	12
MAGNA1 D 50-40 F	240	48	160	45	204	45	84	515	221	294	130	260	75	304	379	50	102	110/125	165	14/19	12
MAGNA1 D 50-60 F	240	48	160	45	204	45	84	515	221	294	130	260	75	304	379	50	102	110/125	165	14/19	12
MAGNA1 D 50-80 F	240	48	160	45	204	45	84	515	221	294	130	260	75	304	379	50	102	110/125	165	14/19	12
MAGNA1 D 50-100 F	280	175	75	75	204	0	84	517	223	294	130	260	75	304	379	50	102	110/125	165	14/19	12
MAGNA1 D 50-120 F	280	175	75	75	204	0	84	517	223	294	130	260	75	304	379	50	102	110/125	165	14/19	12
MAGNA1 D 50-150 F	280	175	75	75	204	0	84	517	223	294	130	260	75	304	379	50	102	110/125	165	14/19	12
MAGNA1 D 50-180 F	280	175	75	75	204	0	84	517	223	294	130	260	75	304	379	50	102	110/125	165	14/19	12
MAGNA1 D 65-40 F	340	218	92	92	204	0	84	522	228	294	130	260	77	312	389	65	119	130/145	185	14/19	12
MAGNA1 D 65-60 F	340	218	92	92	204	0	84	522	228	294	130	260	77	312	389	65	119	130/145	185	14/19	12
MAGNA1 D 65-80 F	340	218	92	92	204	0	84	522	228	294	130	260	77	312	389	65	119	130/145	185	14/19	12
MAGNA1 D 65-100 F	340	218	92	92	204	0	84	522	228	294	130	260	77	312	389	65	119	130/145	185	14/19	12
MAGNA1 D 65-120 F	340	218	92	92	204	0	84	522	228	294	130	260	77	312	389	65	119	130/145	185	14/19	12
MAGNA1 D 65-150 F	340	218	92	92	204	0	84	522	228	294	130	260	77	312	389	65	119	130/145	185	14/19	12
MAGNA1 D 80-40 F	360	218	102	102	204	0	84	538	244	294	130	260	97	318	415	80	128	150/160	200	19	12
MAGNA1 D 80-60 F	360	218	102	102	204	0	84	538	244	294	130	260	97	318	415	80	128	150/160	200	19	12
MAGNA1 D 80-80 F	360	218	102	102	204	0	84	538	244	294	130	260	97	318	415	80	128	150/160	200	19	12
MAGNA1 D 80-100 F	360	218	102	102	204	0	84	538	244	294	130	260	97	318	415	80	128	150/160	200	19	12
MAGNA1 D 80-120 F	360	218	102	102	204	0	84	538	244	294	130	260	97	318	415	80	128	150/160	200	19	12
MAGNA1 D 100-40 F	450	243	147	147	204	0	84	551	252	299	135	270	103	330	434	100	160	170	220	19	12
MAGNA1 D 100-60 F	450	243	147	147	204	0	84	551	252	299	135	270	103	330	434	100	160	170	220	19	12
MAGNA1 D 100-80 F	450	243	147	147	204	0	84	551	252	299	135	270	103	330	434	100	160	170	220	19	12
MAGNA1 D 100-100 F	450	243	147	147	204	0	84	551	252	299	135	270	103	330	434	100	160	170	220	19	12
MAGNA1 D 100-120 F	450	243	147	147	204	0	84	551	252	299	135	270	103	330	434	100	160	170	220	19	12

Note M3: Rp 1/4 for air vent available on all twin-head pumps.

3. Forces and moments

Maximum permissible forces and moments from the pipe connections acting on the pump flanges or threaded connections are indicated in fig 7.



TM05 5639 4012

Fig. 7 Forces and moments from the pipe connections acting on the pump flanges or threaded connections

	Force [N]				Moment [Nm]			
Diameter DN	**Fy**	**Fz**	**Fx**	**ΣFb**	**My**	**Mz**	**Mx**	**ΣMb**
25*	350	425	375	650	300	350	450	650
32*	425	525	450	825	375	425	550	800
40	500	625	550	975	450	525	650	950
50	675	825	750	1300	500	575	700	1025
65	850	1050	925	1650	550	600	750	1100
80	1025	1250	1125	1975	575	650	800	1175
100	1350	1675	1500	2625	625	725	875	1300

* The values also apply to pumps with threaded connection.

The above values apply to cast-iron versions. For stainless-steel versions, the values can be multiplied by two according to the ISO 5199 standard.

4. Tightening torques for bolts

Recommended tightening torques for bolts used in flanged connections:

Bolt dimension	Torque
M12	27 Nm
M16	66 Nm

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