Installation and operating instructions

Hydro MPC

Hydro MPC systems with 2 to 6 pumps and GENIECON PANEL

Hydro MPC
Installation and operating instructions
(all available languages)
http://net.grundfos.com/qr/i/93242156

Hydro MPC
Safety instructions
(all available languages)
http://net.grundfos.com/qr/i/93242157

GRUNDFOS

Hydro MPC

English (GB)

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Original installation and operating instructions

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1. General information

Read this document before you install the system. Installation and operation must comply with local regulations and accepted codes of good practice.

1.1 Related instructions

You can find further product information about the system in the following documents. The documents are available at Grundfos Product Center.

Installation and operating instructions

Title	QR code	Link	Publication number
GENIECON UNIT		*http://net.grundfos.com/qr/i/92956748*	92956748
GENIECON PANEL		*http://net.grundfos.com/qr/i/92956760*	92956760
GENIECON PANEL (application and operating instructions)		*http://net.grundfos.com/qr/i/93049481*	93049481
CR, CRI, CRN		*http://net.grundfos.com/qr/i/96462123*	96462123
CR, CRN 95-255		*http://net.grundfos.com/qr/i/99078486*	99078486
CRE, CRIE, CRNE, SPKE, MTRE, CME 0.37 - 11 kW		*http://net.grundfos.com/qr/i/98358864*	98358864
CRE, CRIE, CRNE, SPKE, MTRE, CME, BMS - E-pumps with MGE Model J, K motor		*http://net.grundfos.com/qr/i/92898118*	92898118

Service instructions

Title	QR code	Link	Publication number
CR, CRN 95-255		*http://net.grundfos.com/qr/i/99233360*	99233360

Quick guide

Title	QR code	Link	Publication number
Hydro MPC		*http://net.grundfos.com/qr/i/93242173*	93242173
Diaphragm tank		*http://net.grundfos.com/qr/i/98817081*	98817081

1.2 Hazard statements

The symbols and hazard statements below may appear in Grundfos installation and operating instructions, safety instructions and service instructions.

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 hazard statements are structured in the following way:

SIGNAL WORD
Description of the hazard
Consequence of ignoring the warning
- Action to avoid the hazard.

1.3 Notes

The symbols and notes below may appear in Grundfos installation and operating instructions, safety instructions and service instructions.

Observe these instructions for explosion-proof products.

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

A red or gray 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.

Tips and advice that make the work easier.

1.4 Hygiene

Grundfos systems are functionally tested and may therefore contain small amounts of residual water. Contaminated drinking water can endanger health, so before using the system, it must be rinsed or flushed thoroughly. This also applies if the system is not used for a longer period.

Rinsing and flushing must always be done in accordance with local regulations and practices.

1.5 Security

1.5.1 Firewall

If GENIECON UNIT needs to be connected to the internet, we recommend that you install a firewall between the unsecure network and GENIECON UNIT.

1.5.2 Tamper detection

GENIECON UNIT is equipped with a tamper-detection mechanism indicating if the back cover of GENIECON UNIT is removed.

If that happens, a security wire breaks and cannot be repaired. In such case, GENIECON UNIT operates normally, but the tamper-detection symbol is permanently displayed at the upper left corner of the home screen. This symbol warns that GENIECON UNIT may have been tampered with.

A "Do NOT open" sticker is placed on the side of GENIECON UNIT. Removing or damaging it or the back cover voids the warranty.

TM087533

1.5.3 Factory reset

In the event of suspected unauthorized tampering with the GENIECON unit, a factory reset can be performed to restore the default secure state. However, it does not clear the temper-detection symbol once it is already displayed on the screen.

Performing a factory reset erases all user data and settings that are added to the controller after commissioning the system. After the reset, you need to enter the default PIN code to access the product.

You can perform the factory reset in **Settings** > **Other settings** > **Reset** > **Factory reset**.

The factory-set PIN code is the last 4 digits of the product ID on the nameplate of GENIECON UNIT.

1.5.4 Access control

We recommend that you set up and enable a four-digit PIN code for GENIECON UNIT.

When GENIECON UNIT is powered on, you need to log in with the default PIN code and set a new PIN code. Once that is done, the default PIN code becomes inactive until a factory reset is performed.

When enabled, the user-defined PIN code must always be entered before you operate or change settings in GENIECON UNIT. When connecting to GENIECON UNIT from Grundfos GO or GO Link, the user-defined PIN code is required to authenticate the user's access to GENIECON UNIT.

Do the following to enable, disable or set a PIN code:

1. Go to **Settings** > **Other settings** > **PIN code**.
2. Enable or disable the toggle button as intended.
3. Tap **Reconfigure** to change your four-digit PIN code.

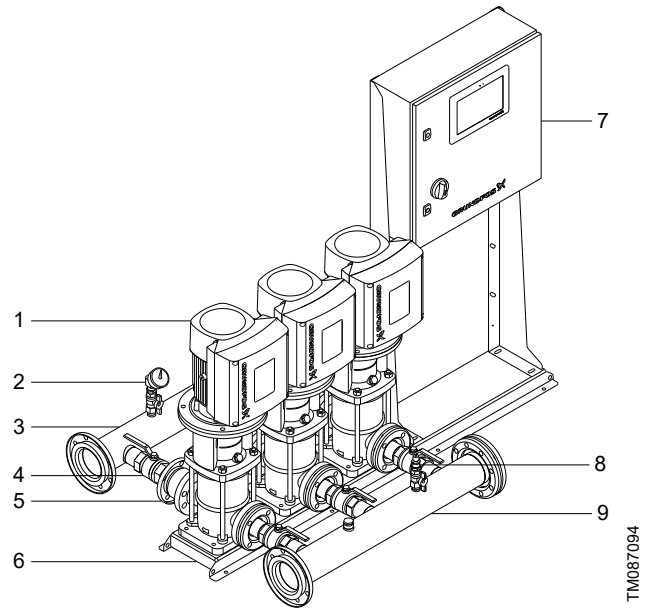
- The PIN code is enabled by default and you can disable it after commissioning.
- There is no limit to the number of tries if you enter the wrong PIN code.
- You can change the user-defined PIN code at any time.
- You can disable the PIN code at any time, but we recommend that you always use it as a minimum security measure.
- Disabling the PIN code function does not delete the current PIN code. To enable it again, you need to enter the user-defined PIN code.

2. System introduction

2.1 System description

As standard, the system consists of two to six CR, CRI, CRE or CRIE pumps. The pumps are connected in parallel, and are mounted on a common base frame with a control panel and all the necessary fittings such as manifolds, non-return valves, isolating valves, pressure transmitters, pressure gauges, and so on.

In some installations, a diaphragm tank must be included.



System components

Pos.	Description	Quantity
1	Pump	2-6
2	Outlet-pressure sensor and pressure gauge	1
3	Outlet manifold	1
4	Isolating valve	2 per pump
5	Non-return valve	1 per pump
6	Base frame	1-2
7	Control panel	1
8	Inlet-pressure sensor	1
9	Inlet manifold	1

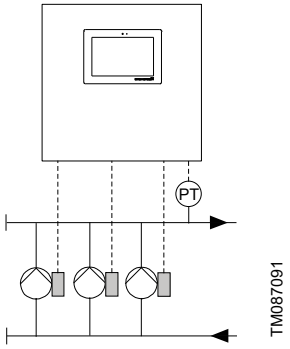
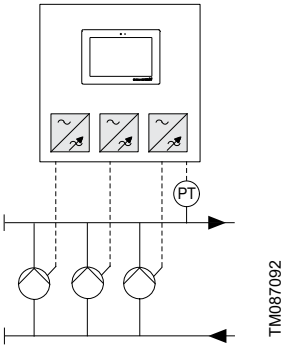
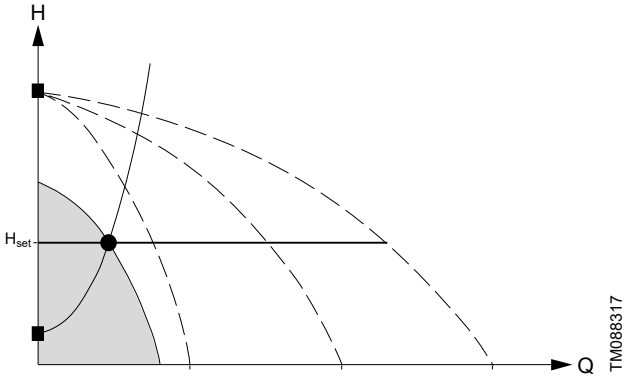
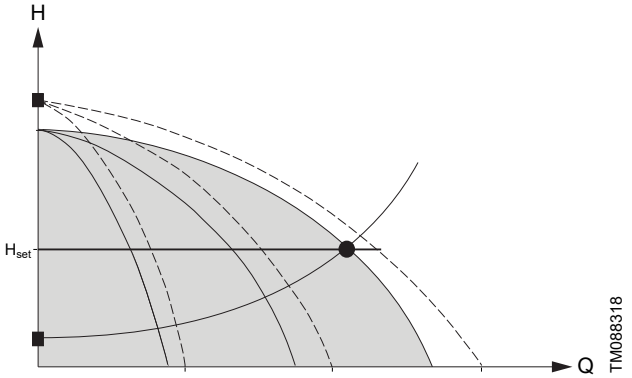
2.2 Control variants

The system is divided into groups based on the control variant:

Control variant	Description
-E	The system consists of two to six identical electronically speed-controlled CRE or CRIE pumps. Each pump has an integrated frequency converter. The motor power is from 0.37 to 26 kW.
-EC	The system consists of two to six identical CR or CRI pumps. Each pump is connected to a Grundfos CUE frequency converter in the control panel. The motor power starts from 30 kW.

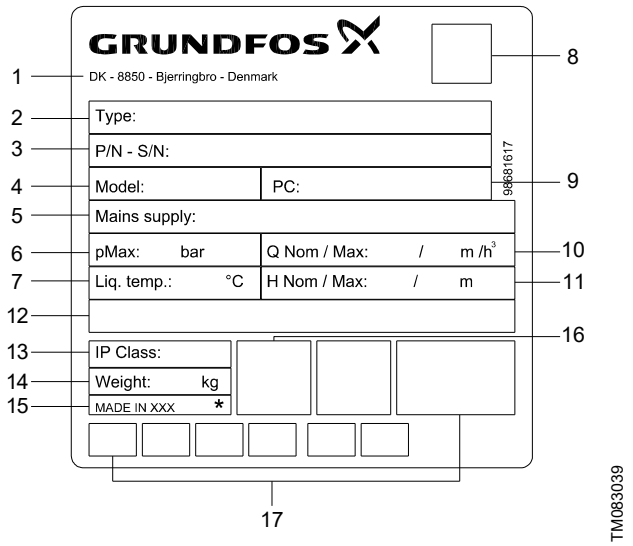
The system includes an application-optimized software that configures the system for the intended application.

The table below shows examples of two system groups.

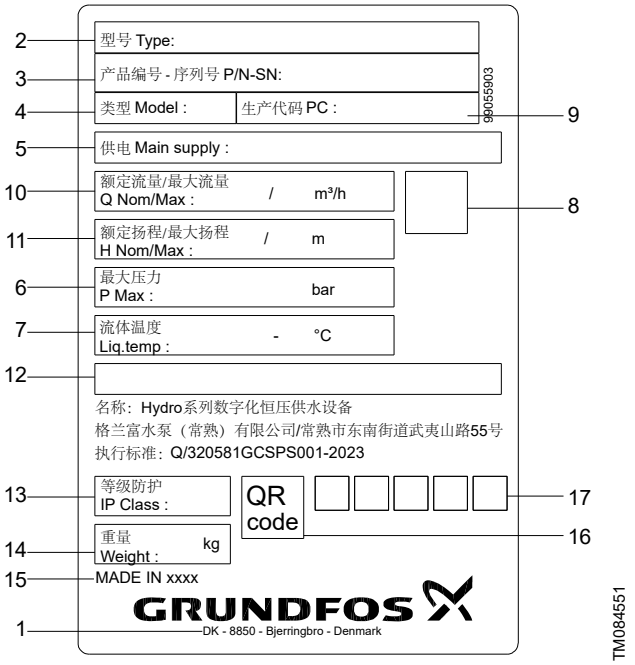
Hydro MPC-E	Hydro MPC-EC
System with three CRE or CRIE pumps	System with three CR or CRI pumps with CUEs
	
One CRE or CRIE pump in operation	One CR or CRI pump in operation
	
Three CRE or CRIE pumps in operation	Three CR or CRI pumps in operation
	
• The system maintains constant pressure by continuously adjusting the pump speed. • System performance is adjusted to demand by cutting pumps in or out and operating the active pumps in parallel. • Pump changeover is automatic depending on loads, operating hours and faults. • All pumps in operation run at an equal speed.	

2.3 Identification

2.3.1 Nameplate



Nameplate example for standard version



Nameplate example for China version

Pos.	Description
1	Company address
2	System type
3	System number and serial number
4	Model
5	Mains supply
6	Max. operating pressure
7	Liquid temperature
8	Data matrix application identifier
9	Production code
10	Nominal flow rate and max. flow rate
11	Nominal head and max. head
12	Technical documents
13	IP class
14	Weight
15	Country of origin
16	QR code
17	Marks of approval

2.3.2 Type key

Example: Hydro MPC-E 6 CRE155-1-1 V1 GD-A-D-ABC

Code	Explanation		Designation
Hydro MPC			System name
E	E: All pumps with E motors [1] X: Customized system type	EC: Fixed-speed main pumps with CUEs [2]	System type
6			Number of main pumps
CRE155-1-1			Pump type
V1	V1: 3 × 400 V, 50 Hz, N, PE V2: 3 × 400 V, 50 Hz, PE V3: 3 × 380 V, 50 Hz, N, PE V4: 3 × 380 V, 50 Hz, PE V5: 3 × 400 V, 60 Hz, N, PE V6: 3 × 400 V, 60 Hz, PE V7: 3 × 380 V, 60 Hz, N, PE V8: 3 × 380 V, 60 Hz, PE V9: 3 × 440 V, 60 Hz, N, PE VA: 3 × 440 V, 60 Hz, PE VB: 3 × 220 V, 60 Hz, N, PE VC: 3 × 220 V, 60 Hz, PE VD: 1 × 208 V, 60 Hz, PE	VE: 3 × 208 V, 60 Hz, PE VF: 3 × 230 V, 60 Hz, PE VG: 3 × 460 V, 60 Hz, N, PE VH: 3 × 460 V, 60 Hz, PE VJ: 3 × 575 V, 60 Hz, PE VK: 3 × 415 V, 50 Hz, N, PE VL: 3 × 415 V, 50 Hz, PE VM: 1 × 240 V, 50 Hz, N, PE VN: 1 × 230 V, 50 Hz, N, PE VQ: 1 × 230 V, 60 Hz, PE VR: 3 × 200 V, 50 Hz, PE VS: 3 × 200 V, 60 Hz, PE VX: Customized variant (special voltage rating)	Voltage code
GD	GA: Systems with GENIECON PANEL mounted on the same base frame as the pumps GC: Systems with GENIECON PANEL mounted on its own base for floor mounting [3] GD: Systems with GENIECON PANEL mounted on its own base frame [3] GE: APAC design, systems with GENIECON PANEL mounted on the same base frame as the pumps GG: APAC design, systems with GENIECON PANEL mounted on its own base for floor mounting [3] GH: APAC design, systems with GENIECON PANEL mounted on its own base frame [3] GW: Systems with GENIECON PANEL prepared for wall mounting [3] GX: Systems with GENIECON PANEL, customized mounting		Design
A	A: E B: DOL	C: SD	Starting method
D	A: Stainless steel manifold and base frame(s) with standard valves B: Stainless steel manifold and base frame(s) with valves C: Galvanized steel manifold and base frame(s) with standard valves D: Stainless steel manifold and galvanized steel base frame(s) with standard valves G: Galvanized steel manifold and galvanized steel base frame with local valves H: Galvanized steel manifold and black painted base frame(s) with standard valves I: Stainless steel manifold and black painted base frame(s) with standard valves J: Black coated mild steel manifold and base frame(s) with standard valves P: Stainless steel manifold and galvanized steel base frame with local valves X: Customized material combination		Material combination
ABC	A: Standard hydraulic B: Pilot pump C: Bypass D: Non-return valve on inlet E: Elbow manifold F: No inlet manifold G: Diaphragm tank H: Redundant inlet-pressure sensor I: Repair switch J: Redundant outlet-pressure sensor K: 1 free pump position L: 2 free pump positions M: 3 free pump positions	N: PN 10 pressure rating O: PN 25 pressure rating P: Low prepressure (NPSH) Q: PN 40 pressure rating R: Non-standard RPM S: Customized variant T: Certificate U: Undersized motor V: Standard controls with options W: Customized controls X: More than three options Y: Control panel with double door	Option

1) Integrated frequency converter, one per pump

2) Grundfos CUE frequency converter, one per pump

3) Maximum 3 m between GENIECON PANEL and pumps

3. Receiving the system

3.1 Transporting the system

Depending on its size, the system is supplied in either an open wooden crate or a cardboard box suitable for forklift or similar transport.

The forks of the fork lift must be at least two meters long.

If the system is secured with transport straps, do not remove the straps until the system is installed.

3.2 Inspecting the system

Upon receiving the system, make sure that the delivery matches the order, all components are supplied and the packaging is intact.

3.3 Scope of delivery

All supplied systems are factory-tested. The following documents are supplied with the system.

	Installation and operating instructions	Safety instructions	Quick guide
System	•	•	•
Fixed speed pumps or E-pumps when applicable	•	•	
GENIECON PANEL	•	•	•
Diaphragm tank	•		

A wiring diagram is also supplied with the system.

3.4 Handling and lifting the system

Always lift the system with the manifolds mounted to avoid bending the base frame if the pumps are too heavy.

DANGER
Overhead load
Death or serious personal injury
- Do not use the eyebolts of the motors when you lift the system.
- Do not lift the system by the manifolds.

DANGER
Fall hazard
Death or serious personal injury
- Do not stand on the manifolds.

WARNING
Overhead load
Death or serious personal injury
- Do not stand under or close to the load that is lifted.
- Comply with local regulations when you lift or handle the system.

WARNING
Crushing of feet
Death or serious personal injury
- Before you lift the system, make sure that the lifting equipment is capable of handling the load listed on the nameplate and packaging label.

CAUTION
Overhead load
Minor or moderate personal injury
- Use suitable lifting equipment when positioning the system.

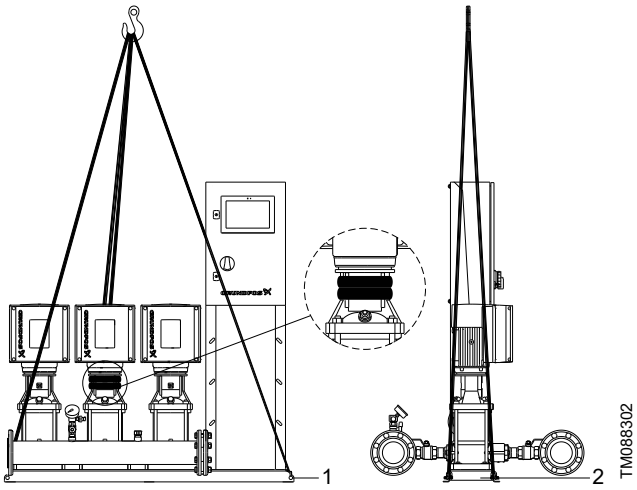
When you lift the system, the lifting point must always be above the center of gravity to ensure stability.

Systems with CR 1 to CR 95 have holes in the base frame for lifting. Systems with CR 125 or larger pumps have eyebolts in the base frame for lifting. For these systems, each lifting strap must be at least three meters long.

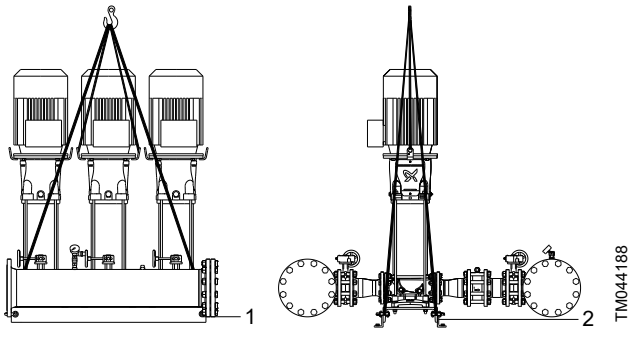
- Use certified lifting gear suitable for the load. Straps must be placed to ensure vertical pull to the system.
- Use a safety strap around one of the pump motors to prevent the system from tilting.
- Wrap the safety strap around the pump head multiple times if no eyebolts or brackets are available.
- Keep the safety strap tight.
- Use shackles mounted in the holes for lifting when you lift the systems with CR 1 to CR 95.

If the system is secured with transport straps, do not remove the straps until the system is installed.

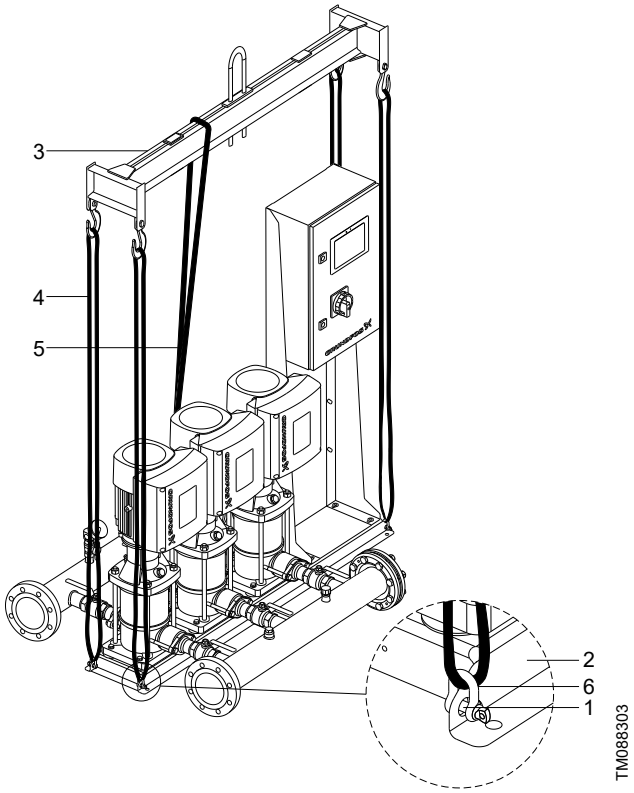
Do not use chains to lift systems with CR 125 or larger pumps, as that may damage the motors.



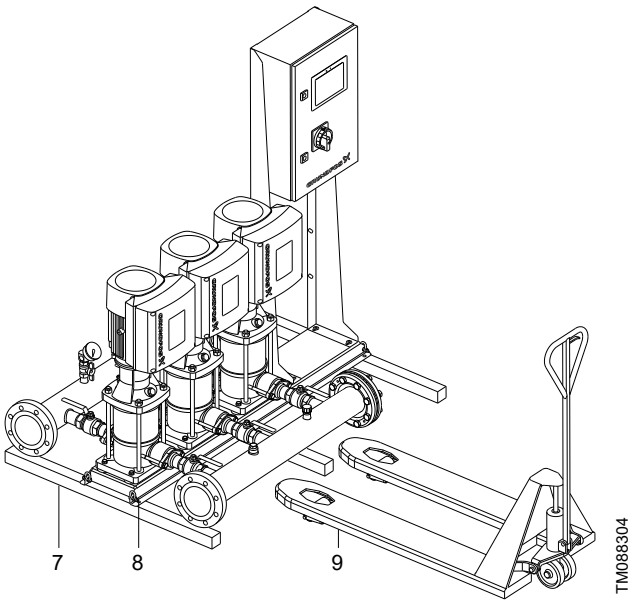
Using lifting gear to lift a system with a base frame made of bent steel plate, with a safety strap around the pump head



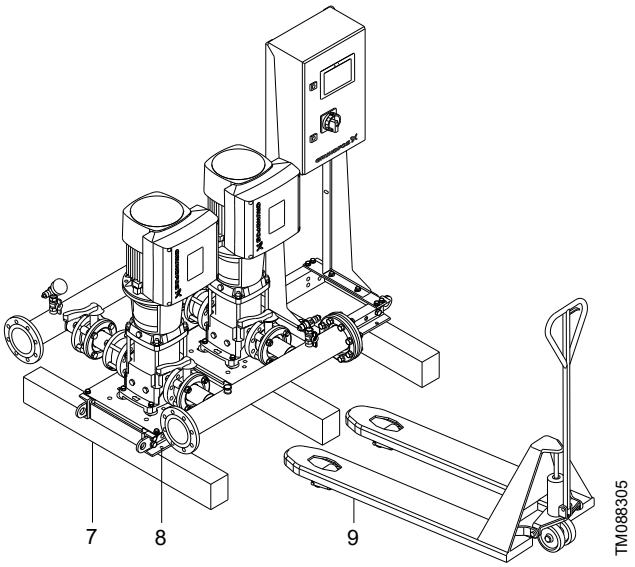
Using lifting gear to lift a pump assembly with a base frame made of bent steel plate



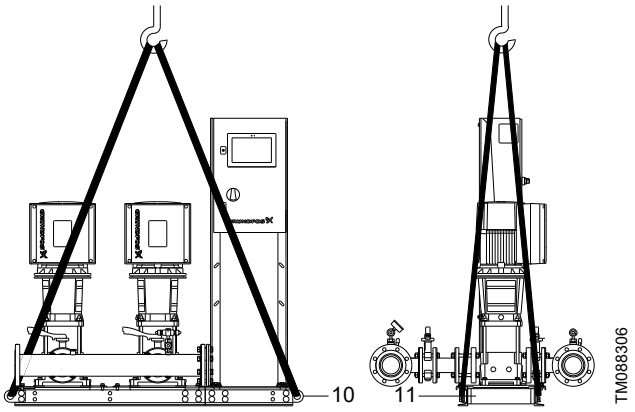
Using lifting gear to lift a system with a base frame made of bent steel plate



Using a fork lift to lift a system with a base frame made of bent steel plate



Using a fork lift to lift a system with a C-profile base frame



Using lifting gear to lift a system with a C-profile base frame

Pos.	Description
1	Lifting hole (included)
2	Base frame made of bent steel plate
3	Lifting gear
4	Lifting strap
5	Safety strap
6	Shackles
7	Wooden beam (included)
8	Wooden screws (included)
9	Fork lift
10	Lifting bracket (included)
11	C-profile base frame

4. Installing the system

WARNING
Crushing
Death or serious personal injury

- Use professional installation tools when you move or lift the system or its components.
- Use safety equipment when you mount the base frame.
- Use the supplied wooden beams to support the system when you mount the vibration dampers.
- Only trained persons can carry out the installation.

CAUTION
Overhead load
Minor or moderate personal injury

- Use suitable lifting equipment when you position the system.

CAUTION
Crushing of feet
Minor or moderate personal injury

- Use safety equipment when you install the pipes and the tank.

CAUTION
Sharp element
Minor or moderate personal injury

- Wear safety gloves.

4.1 Mechanical installation

4.1.1 Location

The system is designed only for indoor installation, and must not be exposed to direct sunlight.

- Install the system in a well-ventilated room to ensure sufficient cooling of the control panel and pumps.
- Install the system with a one-meter clearance on all sides for easy inspection and maintenance.

The system must only be connected to protected network subnets with strict access control.

The system must be installed in a location with access control to prevent unauthorized access to the system.

4.1.2 Network interfaces and services

The system exposes the following network interfaces in the factory default state:

Interface	Description
RJ45	Wired Ethernet Connectivity
Wi-Fi [4)]	Wireless Ethernet Connectivity

4) It will be available in the future.

The system exposes the following services over network interfaces:

Interface	Exposed service	Description
RJ45	Modbus TCP	TCP/IP-based fieldbus
RJ45	BACnet	UDP/IP-based fieldbus

4.1.3 Pipes

Arrows on the pump base show the direction of water flow through the pump.

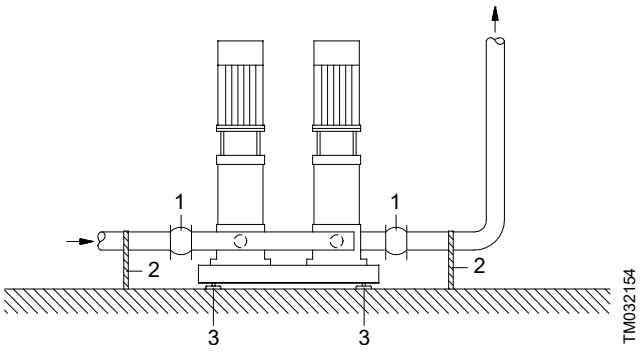
The pipes connected to the system must be of adequate size.

Connect the pipes to the manifolds of the system. Either end can be used. Apply sealing compound to the unused end of the manifold, and fit the screw cap. For manifolds with flanges, fit a blanking flange with a gasket.

To optimize operation and minimize noise and vibration, consider vibration damping of the system.

Noise and vibration are generated by the pump and motor rotations, as well as the flow in pipes and fittings. The impact on the environment is subjective and depends on correct installation and the condition of other system components.

If the system is installed in blocks of flats or if the first consumer on the line is close to the system, we recommend that you fit expansion joints on the inlet and outlet pipes to prevent vibration from being transmitted through the pipes.



Example showing the position of expansion joints, pipe supports and machine shoes

Pos.	Description
1	Expansion joint
2	Pipe support
3	Vibration damper (machine shoe)

Expansion joints, pipe supports and vibration dampers are not included in a standard system.

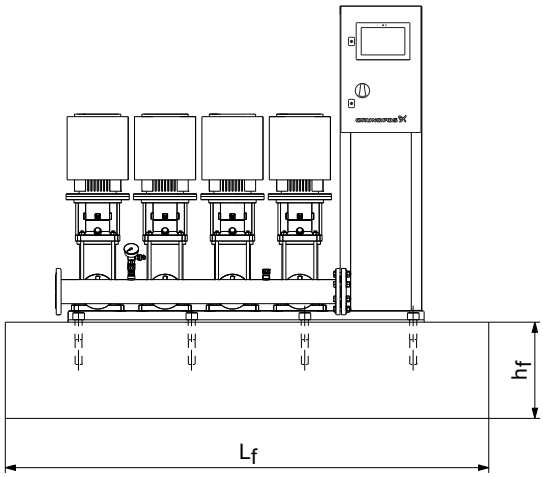
Proceed with the following steps before you start up the system:

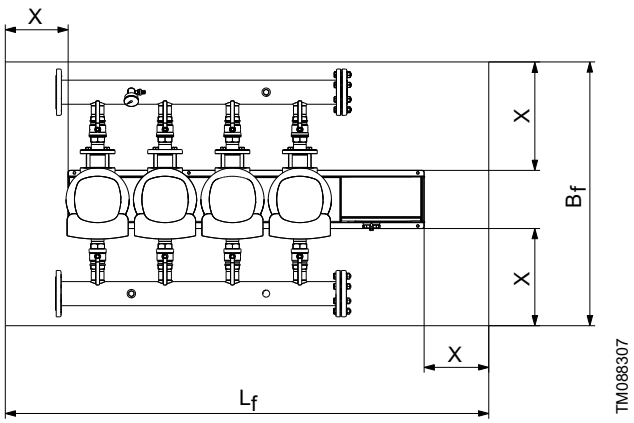
1. Tighten all nuts before startup.
2. Secure the pipes to parts of the building to ensure that they cannot move or twist.

4.1.4 Foundation

We recommend that you install the system on a level, rigid concrete foundation of sufficient mass to provide permanent support for the entire system. The foundation must be capable of absorbing vibration, operational loads or shock.

The weight of the concrete foundation must be 1.5 times the weight of the system.





Foundation

The minimum height of the foundation, h_f, is calculated as follows:

$$h_f = \frac{m_{\text{pump}} \times 1.5}{L_f \times B_f \times \delta_{\text{concrete}}}$$

The concrete density δ is usually taken as 2200 kg/m^3.

4.1.5 Vibration dampers

To prevent the transmission of vibration to buildings, we recommend using vibration dampers to isolate the system foundation from the building parts.

Damper selection must match the installation conditions, as an unsuitable damper can lead to elevated vibration levels. Therefore, vibration dampers must be sized by the supplier. If the system is installed on a base frame with vibration dampers, always fit expansion joints on the manifolds to prevent the system from hanging on the pipes.

4.1.6 Expansion joints

Fitting expansion joints can:

- absorb expansions or contractions in the pipes caused by changing liquid temperature
- reduce mechanical strains caused by pressure surges in the pipes
- isolate mechanical structure-borne noise in the pipes (only applicable to rubber bellows expansion joints).

Expansion joints must not be used to compensate for pipe inaccuracies, including flange misalignment.

The expansion joints must be fit at a distance of minimum 1 to 1.5 times the nominal flange diameter from the manifold on both the inlet and outlet sides. This prevents turbulence in the expansion joints, ensuring better inlet conditions and minimizing pressure loss on the pressure side.

Example of rubber bellows expansion joints without limiting rods

Example of rubber bellows expansion joints with limiting rods

Expansion joints with limiting rods can help reduce the forces they generate. We always recommend that you use expansion joints with limiting rods for flanges larger than DN 100.

Anchor the pipes so that they do not stress the expansion joints and the pump. The supplier's instructions must be followed and communicated to all advisers and pipe installers.

4.1.7 Prefilling of diaphragm tank, if applicable

If a diaphragm tank is connected to the system, prefill the tank with nitrogen to the following pressure: 70 % of the setpoint.

Use nitrogen to avoid corrosion.

4.2 Electrical installation

DANGER
Electric shock
Death or serious personal injury

- Disconnect the power supply and make sure that the power supply cannot be accidentally switched on.
- Make sure that the wires connected to the connection groups are separated from each other by reinforced insulation along their entire lengths.

WARNING
Electric shock
Death or serious personal injury

- Installation must be carried out by qualified persons, and according to local regulations.

- The electrical installation of the system must comply with enclosure class IP54.
- Check and make sure that the power supply and frequency correspond to the values stated on the nameplate.
- Make sure that the conductor cross-section meets the specifications in the wiring diagram.
- If the system cannot be installed with the supply disconnecting device located at least 0.6 m above ground level, install an external supply disconnecting device in accordance with EN 60204-1, Clause 5.3.2. Ensure that the disconnecting device can be locked in OFF (isolated) position. Based on a risk assessment performed by the installer or end user, install the device in a position compliant with EN 60204-1, Clause 5.3.4. Connect the system to an external emergency stop device or an emergency switch-off device in accordance with EN ISO 13850.

5. Starting up the system

DANGER
Electric shock
Death or serious personal injury

- Disconnect the power supply and wait at least five minutes before you make any connections in the control panel.
- Before you start the system, make sure that the power supply is disconnected and cannot be accidentally switched on.
- Tighten the wire connections.

DANGER
Electric shock
Death or serious personal injury

- Connect the motor to protective earth and provide protection against indirect contact according to local regulations.
- Before you start the system, make sure that there is no short-circuit.

WARNING
Contaminated drinking water
Death or serious personal injury

- Flush the system before you start it, in compliance with local legislation.

WARNING
High temperature
Death or serious personal injury

- Before operating it, make sure that the system can support the load specified on the nameplate.

CAUTION
Hot surface
Minor or moderate personal injury

- Make sure that the escaping hot liquid does not cause injury to people or damage the equipment.
- Do not touch wet components.

CAUTION
High noise level
Minor or moderate personal injury

- Use ear protection.

CAUTION
Sharp element
Minor or moderate personal injury

- Wear safety gloves.

After the mechanical and electrical installations are complete, proceed as follows:

1. Refer to the quick guide of the system to vent the pumps.
2. Connect the power supply.
3. Allow the system to start up.
4. During the first startup, a setup guide appears to assist with basic settings.
5. Follow the instructions.
6. When the setup is complete, make sure that all pumps are set to **Auto**.
7. The system is now ready for operation.

For further adjustment of the system, see the application and operating instructions of GENIECON PANEL.

6. Setting the system

6.1 Operating panel, GENIECON UNIT

The operating panel on the front door of the control panel features a touch display and a status LED at the top of the display. The operating panel enables manual setting and monitoring of the system performance.

GENIECON UNIT operating panel

Pos.	Description
1	Menu bar
2	System illustration
3	Focus menu
4	Events bar
5	Status LED
6	Ambient light sensor
7	Time and connectivity bar
8	System overview

For detailed information about setting the system, see the installation and operating instructions, as well as the application and operating instructions of GENIECON PANEL.

6.2 Overview of settings

For the overview of the settings, see the application and operating instructions of GENIECON PANEL.

6.3 Connectivity

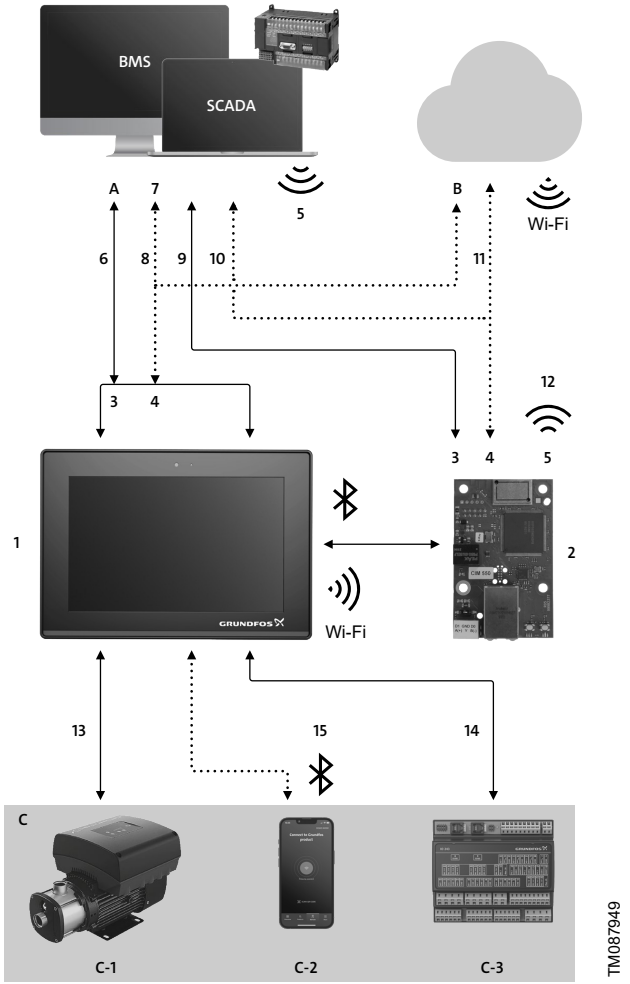
GENIECON UNIT includes communication hardware and software, including the Grundfos CIM (Communication Interface Module). The CIM can connect GENIECON UNIT to any SCADA, PLC or Building Management System via the applicable open protocols for wired (Ethernet, RS485) and wireless communication (Wi-Fi [5]), Bluetooth and Cellular connectivity).

GENIbus is used for communication between GENIECON UNIT, pumps, and I/O modules. GENIbus is a pump data communication protocol developed and maintained by Grundfos based on the GENIpro (Grundfos Electronics Network Intercommunications Protocol).

GENIECON UNIT supports 2 types of CIMs: software and hardware. The CIM is a hardware module installed in GENIECON UNIT, while the Soft CIM is a built-in feature and needs a license for activation.

The CIM can transfer data such as operating mode, setpoint, control mode, warnings, alarms, and power or energy consumption.

GENIECON UNIT supports wired and wireless communication with Grundfos GO Link, a PC tool that provides an overview of system status and advanced control from a Windows PC or laptop. It is especially useful in non-wireless environments during installation, commissioning and maintenance of Grundfos E-products in advanced applications. Grundfos GO is the most comprehensive mobile platform on the market. It allows for setting functions and providing access to the Grundfos E-products.



Pos.	Description
A	BMS/SCADA/PLC/GO Link
B	Grundfos Connect or GRUNDFOS iSOLUTIONS SUITE, GiS (only for China)
C	Internal Grundfos devices
C-1	Grundfos pumps

Pos.	Description
C-2	Grundfos GO
C-3	I/O module
1	Soft CIM
2	CIM
3	Fieldbus
4	Ethernet
5	Cellular
6	Fieldbus - configurable RS485 port, Modbus RTU/ BACnet MS/TP/GENIbus
7	Ethernet - configurable Ethernet port, Modbus TCP/ BACnet IP
8	Ethernet - configurable Ethernet port, GDP
9	Fieldbus - RS 485 port, CIM 150/200/300
10	Ethernet - Ethernet port, CIM 500
11	Ethernet - Ethernet port, CIM 550
12	Cellular communication, CIM 290
13	GENIbus port for E-pumps
14	Connection port for extension modules
15	Bluetooth

The CIM must be installed by authorized persons.

6.4 Communication Interface Modules and protocols

The following Communication Interface Modules can be used in GENIECON UNIT. The CIMs are optional and can be ordered separately.

CIM	Protocol	Part number
CIM 050	GENIbus	96824631
CIM 150	PROFIBUS DP	96824793
CIM 200	Modbus RTU	96824796
CIM 290-MA	LPWAN GiC	92865300
CIM 300	BACnet MS/TP	96893770
CIM 500	PROFINET IO, Modbus TCP, Ethernet/IP, BACnet IP	98301408
CIM 550	Ethernet GiC	92546689

Due to different regulations in different countries, not all CIMs on the list can be used worldwide. For detailed information, contact Grundfos.

5) It is not supported in the current software version.

7. Servicing the system

DANGER
Electric shock
Death or serious personal injury
- Before system maintenance, make sure that the power supply is disconnected and cannot be accidentally switched on.

WARNING
Contaminated drinking water
Death or serious personal injury
- Flush the system after a standstill period in compliance with local legislation.

WARNING
Overhead load
Death or serious personal injury
- Wear a safety helmet.

CAUTION
Overhead load
Minor or moderate personal injury
- Use suitable tools and lifting equipment for maintenance.

7.1 Maintaining the system

7.1.1 Pumps

Pump bearings and shaft seals are maintenance-free.

7.1.2 GENIECON UNIT

For the maintenance of GENIECON UNIT, see the installation and operating instructions of GENIECON UNIT.

7.1.3 Motor bearings

Motors without lubricating nipples are maintenance-free.

Lubricate motors via the lubricating nipples with a high-temperature lithium-based grease. See the instructions on the fan cover of Grundfos motors.

In seasonal operation, when the motor is idle for over six months, we recommend that you grease the motor before you take the pump out of operation.

7.2 Protecting the system against frost

If pumps are not used during periods of frost, they must be drained to avoid damage.

Follow the instructions below:

1. Loosen the vent screw in the pump head.
2. Remove the drain plug from the base.

Do not tighten the vent screw and fit the drain plug until you use the pump again.

7.3 Taking the system out of operation

DANGER
Electric shock
Death or serious personal injury
- Make sure that the power supply is disconnected and cannot be accidentally switched on.

Drain the system if you do not use it for a long time.

1. Switch off the main switch to take the system out of operation.
2. Switch off the corresponding motor protective circuit breaker and the automatic circuit breaker to take the individual pump out of operation.

8. Fault finding

DANGER
Electric shock
Death or serious personal injury
- Disconnect the power supply and wait at least five minutes before you make connections in the control panel.
- Make sure that the power supply is disconnected and cannot be accidentally switched on.

8.1 Pumps not running

The pumps are not running.

Cause	Remedy
The actual pressure is higher than or equal to the setpoint.	• Wait until the pressure decreases, or lower the pressure on the outlet side of the system. • Check if the pumps start.
The power supply is disconnected.	• Connect the power supply.
The main switch is off.	• Turn on the main switch.
The main switch is defective.	• Replace the main switch.
The motor protection is activated.	• Contact Grundfos.
The motor is defective.	• Repair or replace the motor.
The pressure transmitter is defective.	• Replace the pressure transmitter. Transmitters with 0-20 mA or 4-20 mA output signals are monitored by the system.
The cable is broken or short-circuited.	• Repair or replace the cable.

8.2 Pumps starting but stopping immediately

The pumps start but stop immediately as the system fails to reach the operating pressure.

Cause	Remedy
There is water shortage or there is no inlet pressure.	• Re-establish the water supply to the system. When the inlet pressure is re-established, the pumps restart in 15 seconds.

8.3 System stopping and failing to restart

The system stops and cannot restart.

Cause	Remedy
The pressure transmitter is defective.	• Replace the pressure transmitter. Transmitters with 0-20 mA or 4-20 mA output signals are monitored by the system.
The cable is broken or short-circuited.	• Repair or replace the cable.
The power supply of GENIECON UNIT is disconnected.	• Connect the power supply.
GENIECON UNIT is defective.	• Contact Grundfos.

8.4 Unstable water supply from system

The water supply from the system is unstable.

Cause	Remedy
The inlet pressure is too low.	• Check the inlet pipe and the inlet strainer, if any. • Clean the strainer and check for any leaks or blockages in the inlet pipe.
The inlet pipe, strainer or pump is partly blocked by impurities.	• Clean the inlet pipe, strainer or the pump.
The pumps are drawing in air.	• Check the inlet pipe for leakage. • Repair any leakage or exchange the inlet pipe.
The pressure transmitter is defective.	• Replace the pressure transmitter. Transmitters with 0-20 mA or 4-20 mA output signals are monitored by the system.

8.5 Pumps running but delivering no water

The pumps are running but deliver no water.

Cause	Remedy
The valves are closed.	• Open the valves.
The inlet pipe or the pumps are blocked by impurities.	• Clean the inlet pipe or the pumps.
The non-return valve is blocked in the closed position.	• Clean the non-return valve. Check if the non-return valve moves freely.
The inlet pipe is leaky.	• Check the inlet pipe for leakage.
There is air in the inlet pipe or the pumps.	• Vent and prime the pumps. Check the inlet pipe for leakage.

8.6 System not reaching the setpoint

The system is unable to reach the setpoint.

Cause	Remedy
The consumption is too high.	• Reduce the consumption, if possible. • Install a bigger system.
Too many standby pumps are selected.	• Reduce the number of standby pumps.
There is a pipe fracture or a leakage in the system.	• Check the system and repair the damaged parts, if possible.

8.7 Leakage in the shaft seal

There is leakage in the shaft seal.

Cause	Remedy
The shaft seal is defective.	• Replace the shaft seal.
The height adjustment of the pump shaft is inaccurate.	• Readjust the shaft height.

8.8 Noise

There is considerable noise in the system.

Cause	Remedy
The pumps are cavitating.	• Clean the inlet pipe or the pumps, and the inlet strainer if any.
The alignment of the chamber stack is incorrect, or the motor bearing causes the noise.	• Separate the motor and hydraulics by removing the coupling between the motor shaft and the shaft to the chamber stack. • Run the motor. - If the motor runs with noise, check both upper and lower motor bearing and replace them if necessary. - If the motor runs smoothly without any abnormal noise, align the chamber stack.

8.9 Too frequent starting and stopping

The pump is starting and stopping too frequently.

Cause	Remedy
The precharge pressure of the diaphragm tank is not correct.	• Set the correct precharge pressure.

9. Technical data

9.1 Pressure

Inlet pressure

The system can operate with a positive inlet pressure (precharged pressure system) or a negative inlet pressure (vacuum at the inlet manifold).

We recommend that you calculate the inlet pressure in the following cases:

- Water is drawn through long pipes.
- Water is drawn from depths.
- Inlet conditions are poor.

In this document, the term inlet pressure is defined as the pressure or vacuum that can be measured immediately before the system.

To prevent cavitation, make sure that the pressure on the inlet side remains above the minimum required level. The minimum inlet pressure H in meters head can be calculated as follows:

$$H = p_b \times 10.2 - NPSH - H_f - H_v - H_s$$

p_b	Barometric pressure in bar (p_b indicating the system pressure in closed systems) [6]
NPSH	Net Positive Suction Head in meters head (to be read from the curve at the highest flow rate the individual pump delivers)
H_f	Friction loss in inlet manifold in meters head (at the highest flow rate the individual pump delivers) [7]
H_v	Vapor pressure in meters head
H_s	Safety margin of minimum 0.5 meters head

6) Barometric pressure can be set to 1 bar.

7) If a non-return valve is installed on the inlet side of the pump, the friction loss of the valve must be added. See the manufacturer's data.

Maximum inlet pressure

See the installation and operating instructions of the pump supplied with the system.

Operating pressure

As standard, the maximum operating pressure is 16 bar.

On request, Grundfos offers systems with higher maximum operating pressure.

9.2 Temperature

Liquid temperature	5-60 °C
Ambient temperature	0-40 °C

Systems for higher temperature are available on request.

9.3 Relative humidity

The maximum relative humidity is 90 %.

9.4 Sound pressure level

The sound pressure depends on the specific pump type and motor size. You can find the sound pressure level in the installation and operating instructions of the pump.

In systems with multiple pumps, the total sound pressure ($L_{p,tot}$) increases proportionally with the total number of pumps. This can be calculated using the equation for combining multiple sound sources, as described by Leo Beranek and Istvan L. Ver in *Noise and Vibration Control Engineering* (John Wiley & Sons, 1992).

$$L_{p,tot} = 10Log_{10}\sum_{i} 10^{\frac{L_{p,i}}{10}}$$

This means that for a system with multiple identical pumps (N), the total system sound pressure level ($L_{p,tot}$) can be calculated by adding the values below to the sound level of the specific pump type.

$$L_{p,tot} = L_p + \Delta L_p$$

Number of pumps N	ΔL_p
	dB(A)
2	3
3	5
4	6
5	7
6	8

9.5 Electrical data

Supply voltage

See the nameplate.

Backup fuse

See the wiring diagram supplied with the system.

Other electrical data

The following data can be found in the installation and operating instructions of GENIECON PANEL, IO module IO 241 and pump module IO 243:

- digital inputs
- analog inputs
- digital outputs (relay outputs)
- inputs for PTC sensor or thermal switch.

10. Disposal

10.1 Precautions for disposal

DANGER
Electric shock
Death or serious personal injury

- Before you dismantle the system, make sure that the power supply is disconnected and cannot be accidentally switched on.

WARNING
Crushing of feet
Death or serious personal injury

- Before you lift the system, make sure that the lifting equipment is suitable for handling the load listed on the nameplate and packaging label.

WARNING
Hot surface
Death or serious personal injury

- Before you dismantle the system, make sure that it has cooled down.

CAUTION
Overhead load
Minor or moderate personal injury

- When you dismantle the system, use safety equipment.

CAUTION
Sharp element
Minor or moderate personal injury

- When you dismantle the system, use safety gloves.

10.2 Disposing of the system

This system or its components must be disposed of in an environmentally sound way:

1. Use the public or private waste collection service.
2. If this is not possible, contact the nearest Grundfos company or service workshop.

11. Document quality feedback

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