GRUNDFOS DELTA HCU

NBS, NBSE pumps
60 Hz

Service instructions

GRUNDFOS DELTA HCU
Service instructions
Other languages
http://net.grundfos.com/qr/i/92705309

GRUNDFOS

GRUNDFOS DELTA HCU

English (US)

Original service instructions

Table of contents

1. General information

Read this document before you start service work on the product. Service work must comply with local regulations and accepted codes of good practice.

Observe the safety instructions in the installation and operating instructions for the product.

1.1 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.

1.2 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.

1.3 Target group

These service instructions are intended for professional installers, operators and service technicians of the product.

We recommend that service and maintenance be carried out by skilled persons with technical qualifications required by the specific legislation in force.

2. General safety warnings

DANGER

Electric shock

Death or serious personal injury

- Disconnect the power supply before you start operating the product. Make sure that the power supply cannot be accidentally switched on.

WARNING

Electric shock

Death or serious personal injury

- We recommend that you lock the control cabinet to prevent unauthorized access to the cabinet.
- All operations must be carried out by qualified personnel according to local regulations.

WARNING

Electric shock

Death or serious personal injury

- Follow the safety instructions for the motor. Mains connectors are marked with L, N and PE.
- The pump and the internal pipes must be grounded to the same PE equipotential.

WARNING

Hot surface

Death or serious personal injury

- Install the external pipe connections according to the guidelines of the pipe manufacturer to avoid excessive stress on the pipes.
- Before maintaining the product, isolate the product from the main pipes, and cool it down before draining.
- Open the drainage valve slowly to release the pressure inside the pipe when draining the pump. Hot water and steam can evaporate from the drain sump.

WARNING

Hot surface

Death or serious personal injury

- Turn off the butterfly valves before doing maintenance on pressurized or hydraulic parts.
- Turn off the butterfly valves before carrying out any work on hydraulic parts. Make sure that the butterfly valves are in a completely closed position and that the lock is engaged.
- Isolate and drain the hot water supply before decommissioning.
- Make sure that the surface of the product cools down before you touch the product.

WARNING

Overhead load

Minor or moderate personal injury

- Use appropriate lifting equipment when lifting the product.
- Do not lift the product by the manifolds.
- Make sure that there is no person walking below the lifted product.

WARNING

Overhead load

Death or serious personal injury

- Before lifting the product, make sure that the lifting equipment can lift the load stated on the nameplate.

WARNING

Body Injury

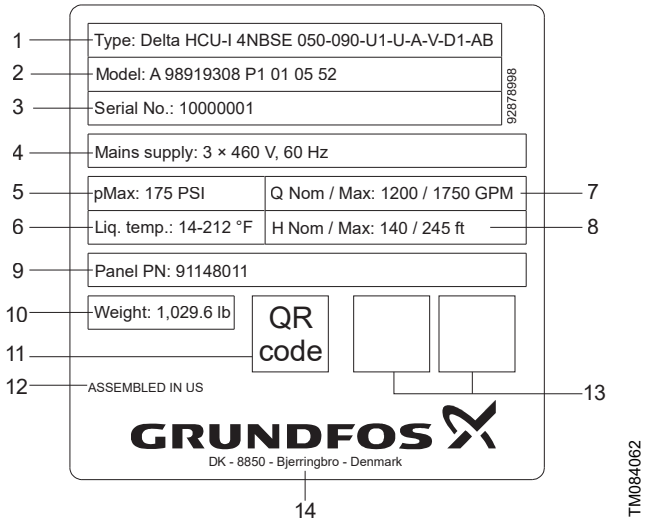
Death or serious personal injury

- Before lifting the cabinet, remove all external connections. Make sure there is some space from the base frame and remove the soil or sand from the base frame.

For long-term end-of-line service, we recommend that you install a blind or companion flange for safety precautions.

3. Identification

3.1 Nameplate



Example of GRUNDFOS DELTA HCU nameplate

Pos.	Description
1	Product name
2	Factory code and production code (year and week)
3	Serial number
4	Mains supply
5	Maximum operating pressure [psi]
6	Temperature range of liquid
7	Max. flow rate
8	Max. head
9	Material number of the control panel
10	Net weight
11	QR code
12	Production site
13	Marks of approval
14	Address of manufacturer

3.1.1 Service range of the pump

Pump type	Service range		
	IEC motor [1]		NEMA motor [2]
	1	2	6
NBS			X
NBSE			X

1) The IEC motors fitted with the pumps are according to the IEC (International Electrotechnical Commission) standard with respect to frame size, dimensions and connecting interfaces, such as the flange and shaft.

2) The NEMA motors fitted with the pumps are according to the NEMA (National Electrical Manufacturers Association - USA) standard with respect to frame size, dimensions and connecting interfaces, such as the flange and shaft.

The numbers 1, 2 and 6 mean the service range of the pump. The service range can be found on the nameplate of the pump.

The service range is designed for ordering the service parts and achieving clear communication about the service information of the pump.

3.1.2 Looking up service parts in Grundfos Product Center

You can find general product information about GRUNDFOS DELTA HCU in Grundfos Product Center at *https://product-selection.grundfos.com* or by scanning the QR code below:

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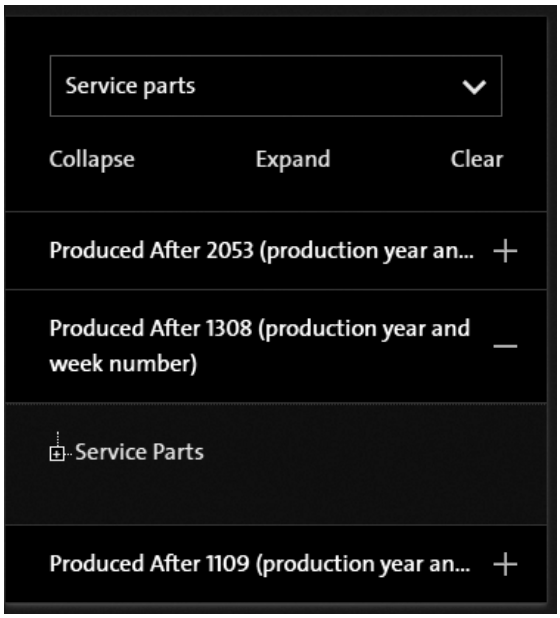
- Check the production code (model code) on the nameplate of the pump before looking up service parts in Grundfos Product Center.
- The production code contains information on the year and week of production to ensure that the correct service parts are selected.

  For example, if a pump has a year-week code 1748, it means that the pump was produced after week 48 of 2017. The service parts list produced after 1308 must be used.



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This search method is used when new service parts cannot be used on previous models.

3.1.3 Looking up pump service parts in Service Kit Catalogue

You can find extra service information about pumps in the Service Kit Catalogue at *https://api.grundfos.com/literature/Grundfosliterature-6859164.pdf*, which offers the following benefits:

- You can have a full overview of service architecture including material variants.
- You can see small kit exploded-view drawings with position numbers explaining the bill of material of the service parts in detail.
- If service is not available when searching product part numbers in Grundfos Product Center, the service parts can be found by looking into the type designation.
- A PDF file can be downloaded to smart devices without internet access with a physical catalogue.

3.2 Type key

Example: DELTA HCU-I 4NBSE 050-090-UL-J-A-A-I8-AB

Code	Description	Designation
DELTA HCU		Product name
-I	E: Multi-E control, with E-motor I: MPC, with E-motor or CUE X: Customized system type	System type
4	2, 3, 4 etc.	Number of main pumps
NBSE 050-090	TP, TPE, NB, NBE, CR, CRE etc.	Pump type
-UL-	UJ = 1 × 208-230 V, PE, 60 Hz UK = 3 × 208-230 V, PE, 60 Hz UL = 3 × 460-480 V, PE, 60 Hz UX = CSU variant (special voltage rating)	Voltage code
J-	B: Manifolds on the same side of the pump, stacked on top of each other with the manifold centerlines in the same vertical plane I: Manifolds on opposite sides of the pump, in a straight branch configuration, with the manifold centerlines in the same horizontal plane J: Manifolds at the top of the system with manifold centerlines in different horizontal and vertical planes L: Suction manifold and branch centerline in the same horizontal plane, discharge manifold and branch centerline in the same vertical plane U: Manifolds at the top of the system with the manifold centerlines in the same horizontal plane X: Other type of design	Design, manifold layout
A-	A: • Suction: suction diffuser with isolation valve • Discharge: non-return valve with isolation valve B: • Suction: suction diffuser with isolation valve • Discharge: combination valve C: • Suction: suction diffuser with isolation valve • Discharge: combination valve with isolation valve D: • Suction: Y-strainer with isolation valve • Discharge: non-return valve with isolation valve E: • Suction: Y-strainer with isolation valve • Discharge: combination valve F: • Suction: Y-strainer with isolation valve • Discharge: combination valve with isolation valve G: • Suction: isolation valve only • Discharge: non-return valve with isolation valve H: • Suction: isolation valve only • Discharge: combination valve I: • Suction: isolation valve only • Discharge: combination valve with isolation valve X: Other	Design, branch layout

Code	Description	Designation
A-	A: ANSI flange T: Thread connection V: Victaulic connections X: Other	Build type
I8-	I3: 3" I4: 4" I5: 5" I6: 6" I8: 8" IA: 10" IB: 12" IC: 14" ID: 16" IE: 18" IF: 20" IG: 24" X: Other	Manifold size
AB	A: Additional sensors, gauges and tapping points B: No standby pumps C: Bypass D: Pump electrical disconnect switches E: With expansion joints, bellows and compensators F: Alternative manifold connection points when built with Victaulic, flanged ends G: Without manifold blind flanges I: Insulation required O: Outdoor installation P: Pipework material other than mild steel S: One pressure & one temperature sensor on the inlet manifold, one pressure sensor on the outlet manifold T: Certificate for pumps U: Undersized motor V: Vibration dampers X: More than 2 options Y: Other Z: SWA Cabling (BS 5467) for Power Transfer	Options

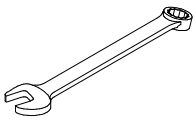
3.2.1 Letter codes for shaft seals

For the letter codes for shaft seals of the NBS and NBSE pumps, see the NBS and NBSE Service instructions on GPC. The link is *http://net.grundfos.com/qr/i/92622616*.

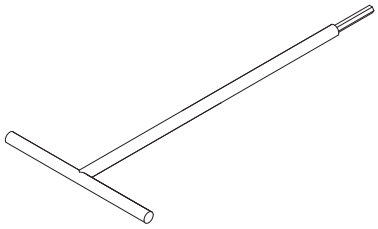
3.2.2 Codes for rated motor power

For the codes for rated motor power of the NBS and NBSE pumps, see the NBS and NBSE Service instructions on GPC. The link is *http://net.grundfos.com/qr/i/92622616*.

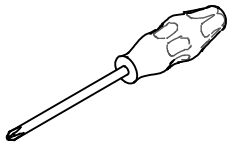
4. Service tools



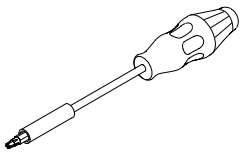
Ring/open-end spanner



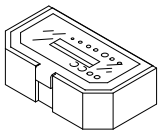
Hexagon T-key



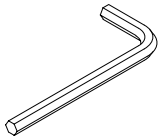
Cross-recess screwdriver



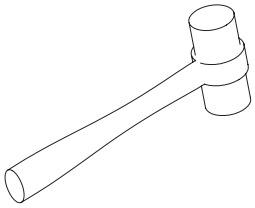
Reversible-bit screwdriver



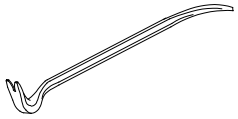
Bits kit



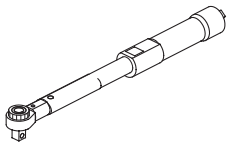
Hexagon key



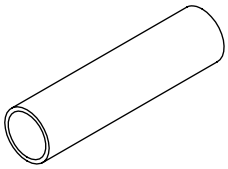
Plastic hammer



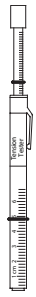
Pry bar



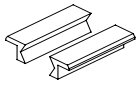
Torque wrench



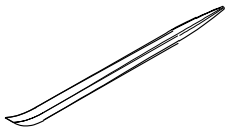
Punch for shaft seal



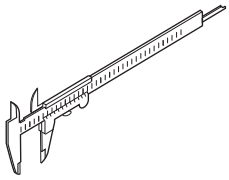
Gauge for inner diameter measurement of wear ring



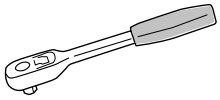
Soft jaws



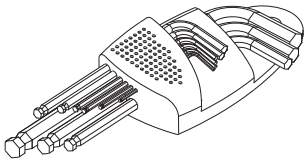
Pinch bar



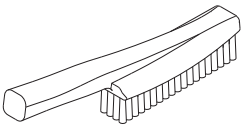
Sliding gauge



Ratchet spanner with socket



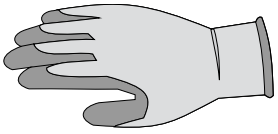
Hexagon key set



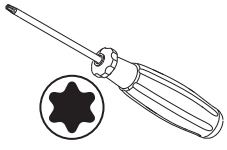
Steel brush

Safety shoes

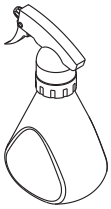
Safety helmet



Safety gloves



Screwdriver, Torx



Sprayer

5. Maintaining the product

5.1 Handling and lifting the product

WARNING

Overhead load

Death or serious personal injury

- Before lifting the product, make sure that the lifting equipment is capable of lifting the load stated on the nameplate.
- Do not stand under or close to the load that is lifted.
- Lifting should comply with local regulations.

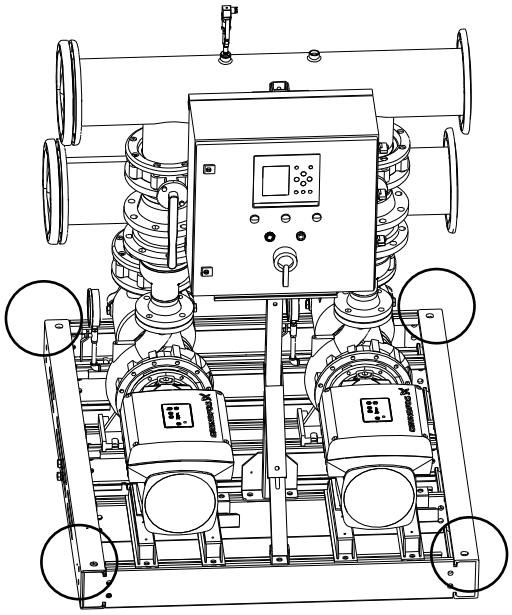
WARNING

Overhead load

Minor or moderate personal injury

- Use appropriate lifting equipment when lifting the product.
- Do not lift the product by the manifolds.

- During handling, the lifting point must always be above the center of gravity of the pump system.
- The base frame contains some holes in the four corners for installing the lifting equipment. See the figure below.



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Example of lifting the system

5.2 Stopping the product

1. If GRUNDFOS DELTA HCU is installed in the cooling system, make sure that the chiller has been shut down for some time before stopping the product to avoid freezing accidents.
2. Navigate to the **Operation** menu on the CU352 and change the operation mode to **Stop**.
3. Once all the pumps are stopped, switch off the disconnectors for each pump.
4. Switch off the main disconnector for the control panel.

5.3 Dismantling and assembly of pumps

For details about how to dismantle and assemble pumps, you can read the NBS and NBSE Service instructions on the GPC website at *http://net.grundfos.com/qr/i/92622616*.

See the section on service video for some pump maintenance information.

WARNING

Overhead load

Death or serious personal injury

- Pay attention to the pump weight, and take precautions to prevent personal injury if the pump topples or falls by accident.

CAUTION

Crushing of feet

Minor or moderate personal injury

- Do not drop pump components when servicing the product.

Related information

11. Service videos

5.4 Recommended lubricants for pumps

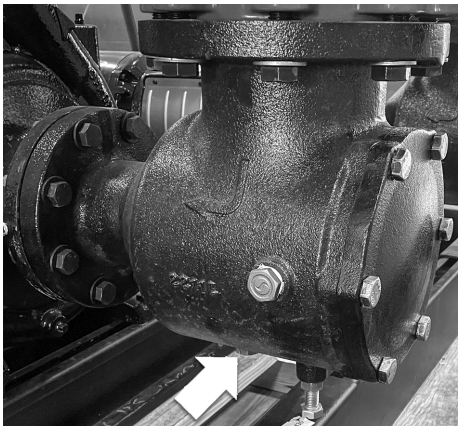
We recommend that you use the following lubricants to grease the pumps:

- Elastomer Lubricant Vegetable Glycerin
- anti-seize compound, food grade.

5.5 Dismantling and assembly of suction diffuser

Before you maintain the suction diffuser, make sure the pump is stopped and will not start up by accident.

1. Isolate the suction diffuser.
2. Drain the suction diffuser by removing the drain plug on the bottom.



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3. Reinstall the drain plug.

4. Unscrew the bolts on the back of the suction diffuser.

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5. Pull out the filter by removing the back cover of the suction diffuser.

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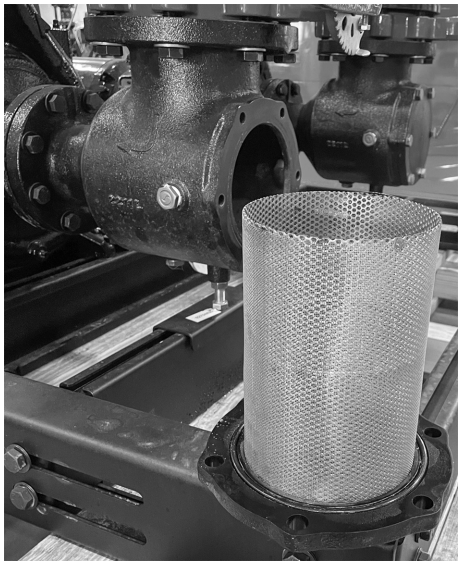

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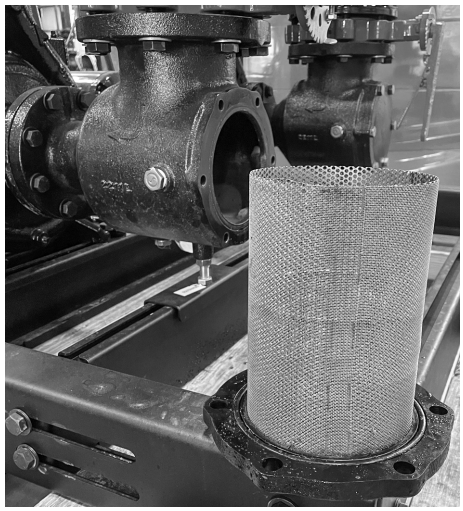
6. Clean the filter.



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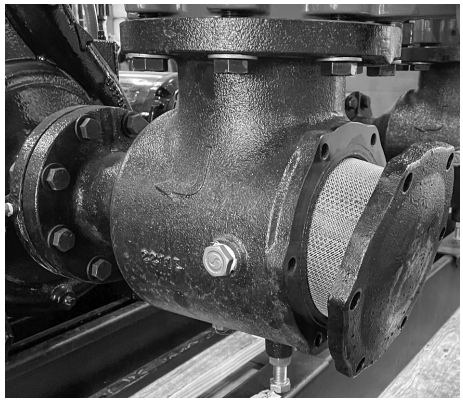
7. Install the filter in the suction diffuser.



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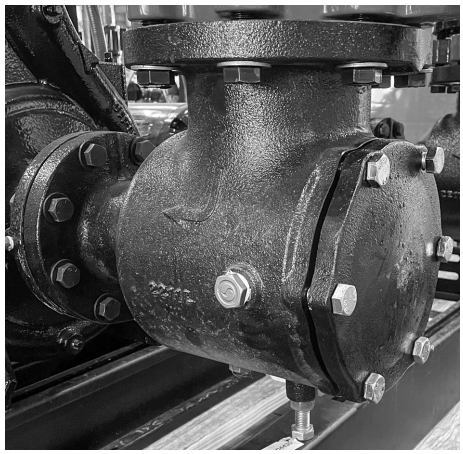
8. Reinstall all the bolts on the back of the suction diffuser.



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6. Starting up the product

Liquid may be present in the system. In situations that could cause the liquid to freeze, make sure that the liquid is melted before starting the product.

After carrying out the mechanical and electrical installation, proceed as follows:

1. Ask a qualified person to check if the power supply and plumbing connections are proper. Make sure the power supply is off.
2. Prime the system as follows:
   a. Turn off all the isolating valves on the outlet pipe of the pump and slowly open all pump isolating valves on the inlet pipe. Both the pumps and the inlet pipe must be completely filled with liquid.

WARNING
Escaping liquid
Death or serious personal injury

- Pay attention to the orientation of the priming hole to ensure that the escaping liquid does not cause personal injury or damage to the motor or other components.

- In hot-liquid installations, pay special attention to the risk of personal injury caused by scalding hot liquid.
- In cold-liquid installations, pay special attention to the risk of personal injury caused by freezing cold liquid.

   b. Loosen all priming plugs to vent the pumps. Once the liquid runs out, tighten the priming plugs.
3. Make sure that all the circuit breakers are in the ON position.
4. Make sure that the pump isolation valves on the outlet manifold are closed.
5. Switch on the power supply.
6. If this is the first time the system is powered on, the Start-up wizard may appear. Complete the Start-up wizard and go to step 8. If the wizard does not appear, go to step 7.
7. Run the Start-up wizard and do the following:
   a. Move the top line display to **Settings**. If it prompts a password, enter 1234.
   b. Move down to **Functions, CU 352** and press the **OK** button.
   c. Move down to **Run wizard again** and press the **OK** button.
8. Vent the system by opening the vent plug on each pump as in step 2, while the pump is running in step 6 of the Start-up wizard. Venting the pump by running it ensures all air is removed from the inlet pipe. Do not run the system with the isolation valves on the outlet side closed for more than five minutes to prevent overheating of the pumped liquid.
9. As the pumps stop, check the pump rotation. Repeat this step if necessary.

To get better visibility, remove the coupling guard. If the surroundings are not bright enough, a flashlight may be required.

WARNING
Crushing of hands
Death or serious personal injury

- Do not touch the couplings while the pumps are running. Replace all the coupling guards after checking the rotation.
- Disconnect the main power supply when removing and replacing the coupling guards.

If the direction of rotation is incorrect, navigate to 1-06 Clockwise Direction in the CUE and adjust the rotational direction.

10. When the pumps are vented and checked for correct rotation, the system is now ready for operation. As the isolation valves on the outlet side are still closed, partially open each outlet isolation valve to allow water to enter into the outlet pipe. Continue the process of filling the outlet pipe until the outlet piping pressure is approximately at the desired setpoint pressure of the system.
11. Open the isolation valves completely on the outlet side of the pump. The system is now ready for operation.

It may be necessary to clear alarms in the fault log.

7. Fault finding

DANGER

Electric shock

Death or serious personal injury

- Switch off the power supply and wait at least five minutes before making any connections in the breaker cabinet or control cabinet.
- Make sure that the power supply is turned off and cannot be accidentally switched on.

7.1 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 drops, or lower the pressure on the outlet side of the system. Check if the pumps start.
The power supply is switched off.	• Connect the power supply.
The main switch cuts out.	• 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.
The individual pump is set to the manual mode and stopped.	• Set all individual pumps to the auto mode.
The primary sensor is set to the wrong channel.	• Correct the channel setting for the primary sensor.

7.2 Pumps starting but stopping immediately

The pumps start but stop immediately. The operating pressure is not reached.

Cause	Remedy
Water shortage or no inlet pressure.	• Re-establish the supply of water to the system. When the inlet pressure is re-established, the pumps will restart after 15 seconds.

7.3 System stopping without restarting

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 CU 352 is switched off.	• Connect the power supply.
CU 352 is defective.	• Contact Grundfos.

7.4 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.
The inlet pipe, strainer or pumps are partly blocked by impurities.	• Clean the inlet pipe, strainer or pumps.
The pumps suck air.	• Check the inlet pipe for leakages.
The pressure transmitter is defective.	• Replace the pressure transmitter.
The inlet pipe of the pressure transmitter sucks the air in.	• Purge the air from the inlet pipe of the pressure transmitter.

7.5 Pumps running but delivering no water

The pumps are running but delivering 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 leakages.
There is air in the inlet pipe or the pumps.	• Vent and prime the pumps. Check the inlet pipe for leakages.

7.6 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 necessary.

7.7 Leakage from 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.

7.8 Noise

There is considerable noise in the system.

Cause	Remedy
The pumps are cavitating.	• Clean the inlet pipe or the pumps, and possibly the inlet strainer.

Cause	Remedy
The pumps do not rotate freely (frictional resistance) due to inaccurate height adjustment of the pump shaft.	• Readjust the shaft height.

7.9 Very frequent starts and stops

There are very frequent starts and stops.

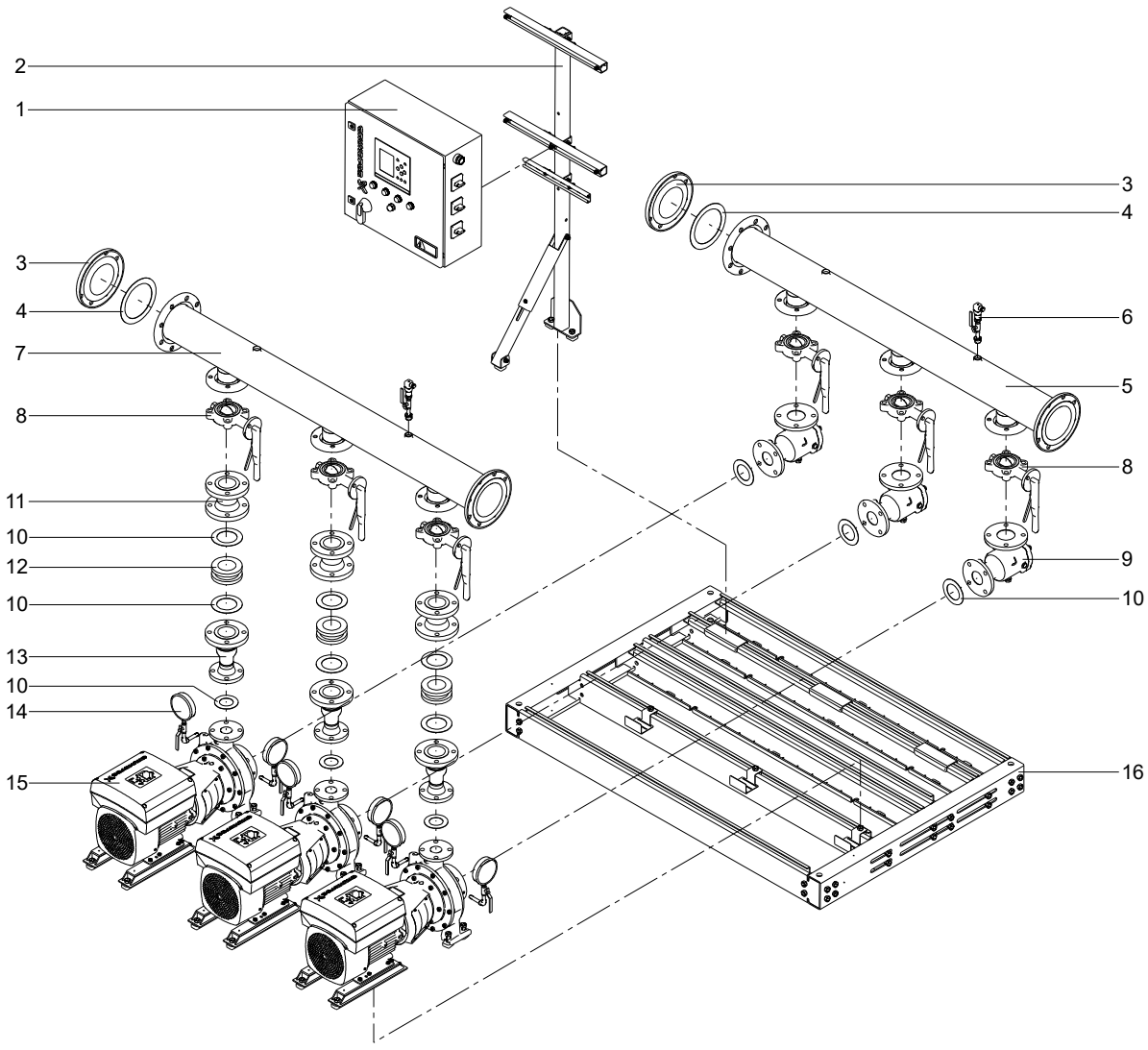
Cause	Remedy
The diaphragm tank precharge pressure is not correct.	• Set the correct precharge pressure.

8. Spare parts

For the spare parts of pumps, see the information on the GPC website at *https://product-selection.grundfos.com/us/products/nbs-nbse?tab=products*.

9. Exploded-view drawings

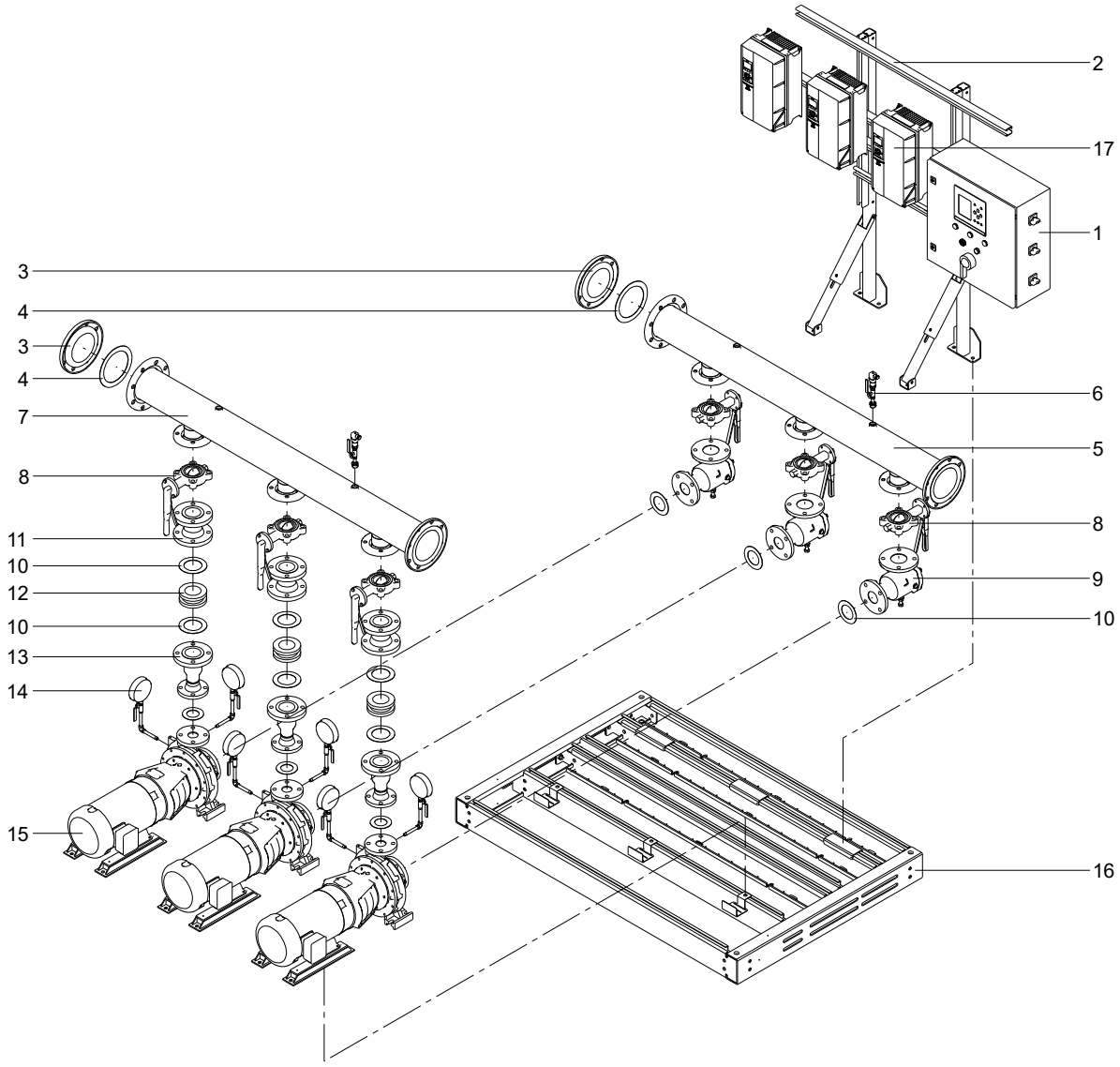
9.1 Exploded-view drawing of the system with E-pump



Pos.	Description
1	Control panel
2	Support bracket for cabinet and VFD
3	Blind flange
4	Gasket
5	Inlet manifold
6	Pressure transmitter
7	Outlet manifold
8	Butterfly valve
9	Suction diffuser
10	Gasket
11	Spool spacer pipe
12	Check valve
13	Spool reducer pipe

Pos.	Description
14	Pressure gauge
15	Pump
16	Base frame

9.2 Exploded drawing of the system with CUE



Pos.	Description
1	Control panel
2	Support bracket for cabinet and VFD
3	Blind flange
4	Gasket
5	Inlet manifold
6	Pressure transmitter
7	Outlet manifold
8	Butterfly valve
9	Suction diffuser
10	Gasket
11	Spool spacer pipe

Pos.	Description
12	Check valve
13	Spool reducer pipe
14	Pressure gauge
15	Pump
16	Base frame
17	Grundfos CUE

10. Related documents

Book name	Part number	QR code or link
GRUNDFOS DELTA HCU Installation and operating instructions	92705454	QR92705454
NBS, NBSE Service instructions	92622616	*GPC link*
NBS, NBSE Service kit catalogue	92646120	*GPC link*
NBS, NBSE Installation and operating instructions	99932034	QR99932034
CUE Quick Guide	96794343	*GPC link*
CUE Installation and operating instructions	96780034	*GPC link*
CU 3X2, CU 3X4 Installation and operating instructions	96842987	QR96842987

11. Service videos

Service video	Link
How to replace low-pressure shaft seal on Grundfos NBS single-stage pump	*YouTube link*
How to replace high-pressure shaft seal on Grundfos NBS single-stage pump	*YouTube link*
How to disassembly and assembly Grundfos NBS single-stage pump	*YouTube link*
CUE videos on GPC	*GPC link*

12. Disposing of the product

This product or parts of it 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.

See also end-of-life information at *www.grundfos.com/product-recycling*.

13. Document quality feedback

To provide feedback about this document, scan the QR-code using your phone's camera or a QR code app.

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Revision Info
Last revised on 04-2021

92705309 **03.2024**
ECM: 1388501

www.grundfos.com

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