Washwater Monitoring System
MES 1003 **Installation Guide**

danfoss-ixa.com

Table of Contents

1. Safety

1.1. Safety message types

The following symbols are used in this manual.

Definitions

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

Indicates a potentially hazardous situation, which, if not avoided, could result in minor or moderate injury. It may also be used to alert against unsafe practices.

Indicates important information, including situations which may result in damage to equipment or property.

1.2. General safety

This manual contains important instructions that must be followed during installation and maintenance of the Water Monitoring System.

BEFORE INSTALLATION
Check for damage to equipment and packaging. If in doubt, contact the supplier before commencing installation.

Personnel conducting the installation must be:

- Trained and authorized in general safety rules for work on electrical equipment.
- Familiar with local requirements, rules, and regulations for the installation.

When planning the installation site, ensure that the product label and warning labels remain visible.

2. Introduction

2.1. Purpose of the manual

The Installation Guide provides information required to install the Water Monitoring System.

Other available resources:

- MES1003 WMS User Guide (100837-MAN)
- MES1003 WMS Data Sheet (100602-DSH)
- MES1003 WMS Spare Parts Catalogue (101155-CAT)

These documents are available for download at https://danfoss-ixa.com/services-and-support, or from the supplier of the Water Monitoring System.

2.2. Abbreviations and definitions

Abbreviation	Description
EGCS	Exhaust Gas Clean System
EOCR	Electrical Over Current Relay
LCP	Local Control Panel
PAH	Polycyclic Aromatic Hydrocarbons
P&ID	Piping & Instrumentation Diagram
TCP	Transmission Control Protocol
WAU	Water Analyzing Unit
WMS	Water Monitoring System
WSR	Water Sample pressure Reduction unit
WSU	Water Sample Unit

Table 1: Abbreviations

3. Product description

3.1. MES 1003 Water Monitoring System working principle

The MES1003 WMS is compliant to the standard MEPC259(58), which defines how to measure PAH, turbidity and pH in any type of EGCS. From a product conceptual perspective, the MES1003 distinguishes itself from other water monitoring systems as it is based on a sampling principle, where one WAU will perform measurements from up to four sample points in an EGCS.

The system consists of a WAU and several WSU and/or WSR.

The MES1003 WMS is a standalone system, with its own controller and local control display. The WMS interfaces to external systems through Modbus TCP/IP.

The WAU contains all components which control the sampling and perform the measurements. This includes the controller, a set of three-way valves and the measurement chamber with the three sensors measuring PAH, turbidity and pH.

The three-way valves are programmed to lead water from one sample point at a time into the measurement chamber. When water is not being led into the measurement chamber, it is instead bypassed which will avoid stagnant water in the system.

De-bubbling and temperature measurement of the sample water is performed in the WSU/WSR. The latter is used to report the temperature in the sampling point. The de-bubbler is a passive component which removes any air bubbles present in the sample water as they interfere with the turbidity measurement.

A WSR is used where the sample water is pressurized by e.g., the inlet pumps for the EGCS. The WSR will reduce the pressure of the sample water with a pressure reduction valve which will supply sample water to the WAU within specified flow rate and pressure.

A WSU is used where the sample water is not pressurized e.g., at the discharge of the EGCS. The WSU is connected to an external pump, which will pressurize the sample water and supply sample water to the WAU within specified flow rate and pressure.

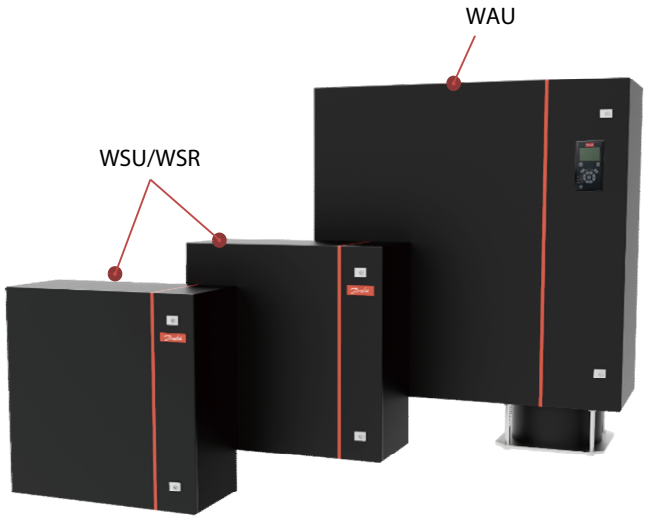


Illustration 1: MES1003 - Water Monitoring System

3.2. System overview

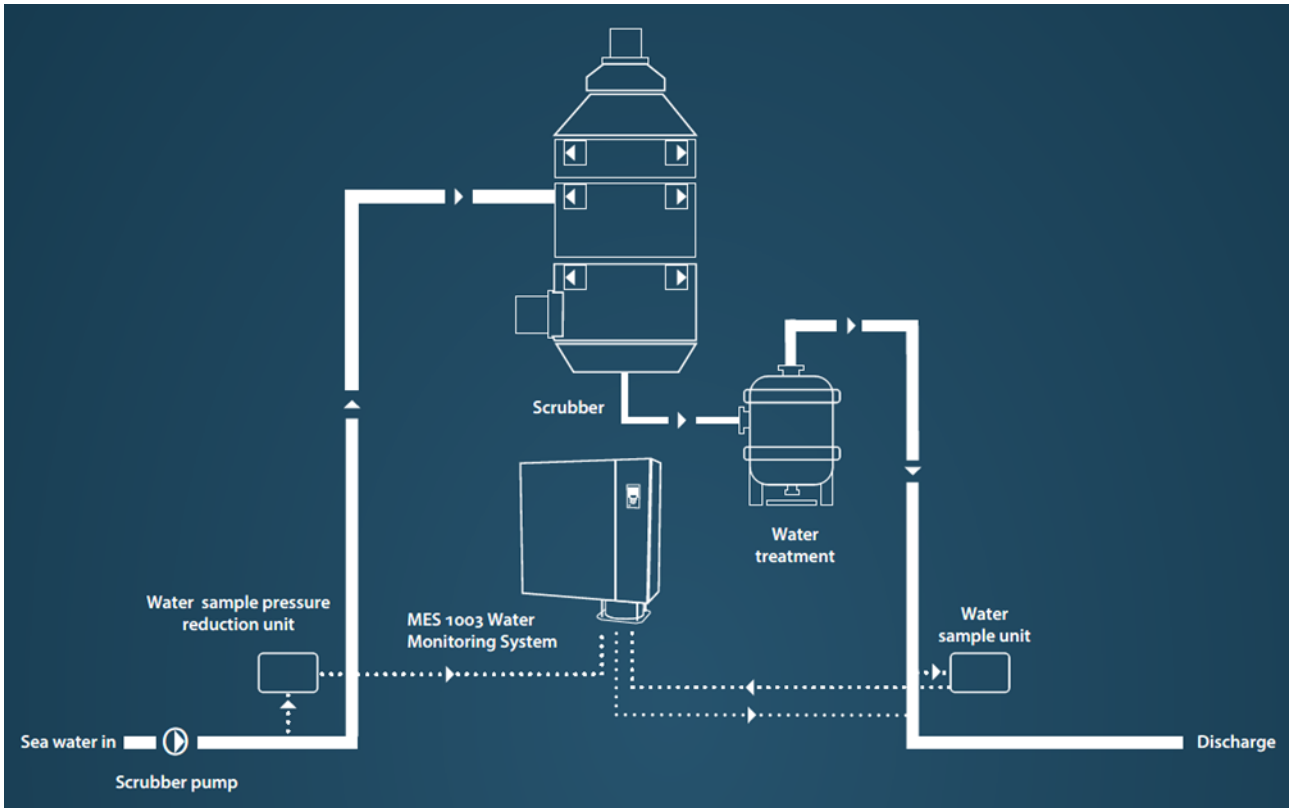


Illustration 2 : System overview of a MES 1003 WMS in an open-loop EGCS

3.3. MES 1003 WMS configurations

The MES 1003 WMS is available in various configurations. Common for all systems are that they consist of one WAU and one to four sample units. The sample units can be of the types: WSU or WSR.

For more details on MES 1003 WMS configurations, please contact our support at ixa@danfoss.com.

3.4. Piping and instrumentation diagrams

In the following section system overviews are illustrated as P&IDs showing both Danfoss IXA and costumer scope of supply in the MES 1003 WMS.

Components that are colored blue in the following P&IDs are standard scope of supply by Danfoss IXA.

Components that are colored purple in the following P&IDs are components which can be supplied by the customer itself, or components that can be purchased though Danfoss IXA as accessories.

Components that are colored red in the following P&IDs are customer's scope of supply.

Components that are colored grey in the following P&IDs are optional components that depend on the configuration of the MES 1003 WMS, or components that the customer can choose to install if applicable to the installation.

- = Danfoss IXA scope of supply
- = Supplied by customer or Danfoss IXA
- = Customer scope of supply
- = Optional components

NOTICE

Ensure that all costumer scope wetted parts are suitable for EGCS process water.

3.4.1. WSR

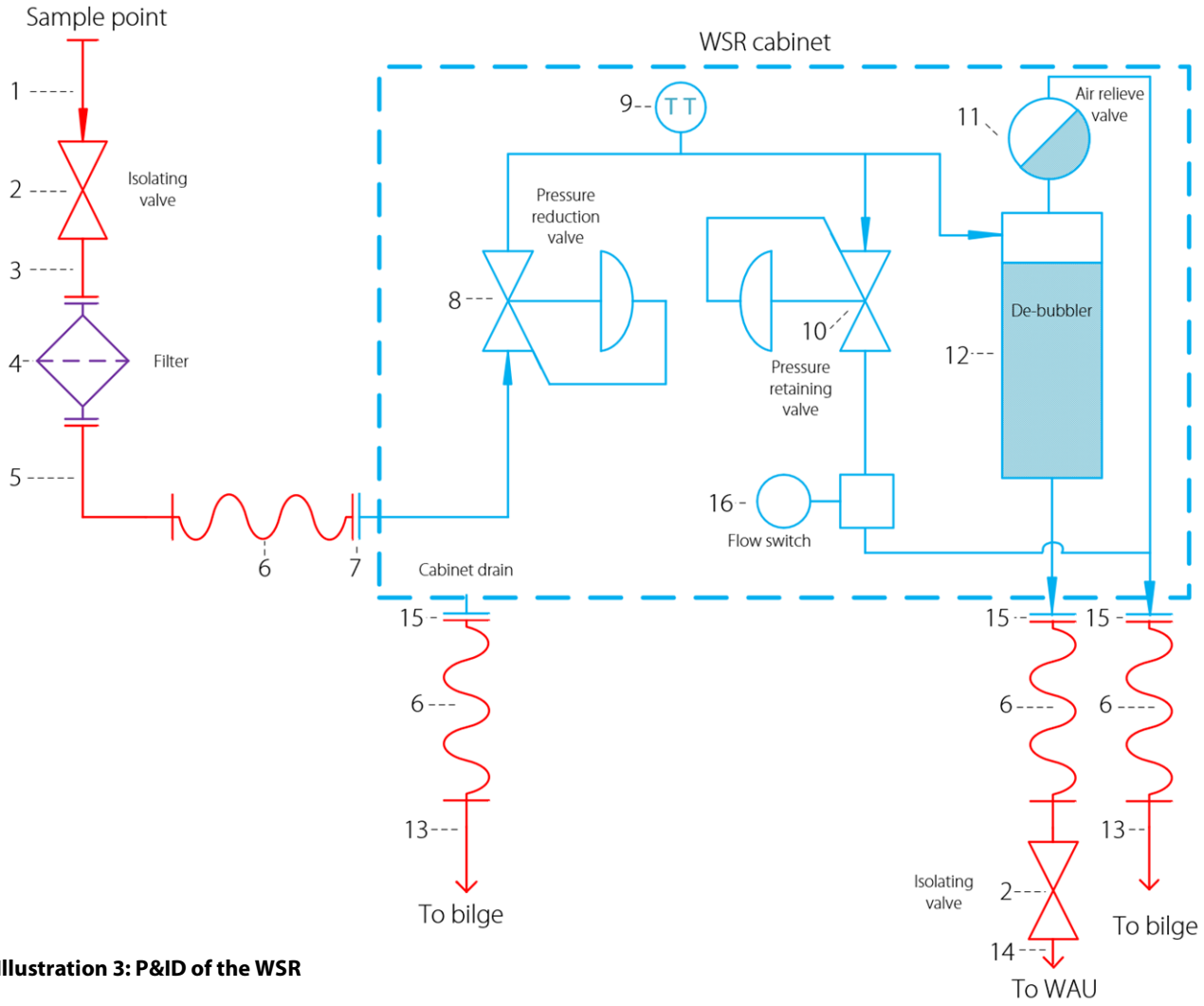


Illustration 3: P&ID of the WSR

Item	Description	Notes	Scope of supply
1	Pipe from sample point to isolating valve	-	Customer
2	Isolating valve	-	Customer
3	Pipe from isolating valve to filter	-	Costumer
4	Filter	0.5mm or 500 microns	Costumer or Danfoss IXA - Accessory
5	Pipe from filter to flexible connection	-	Customer
6	Flexible connection	Length: 200-1000mm	Customer
7	WSR inlet connection	1 Inch BSPP (G) Female	Danfoss IXA
8	Pressure reduction valve	• Adjustable 0.5-9 bar • Hysteresis max. 0.5 bar • ΔP in/out min. 1 bar	Danfoss IXA
9	Temperature transmitter	-	Danfoss IXA
10	Pressure retaining valve	• Adjustable 0.5-9 bar • Hysteresis max. 0.5 bar • ΔP in/out min. 1 bar	Danfoss IXA
11	Air relieve valve	-	Danfoss IXA
12	De-bubbler	-	Danfoss IXA
13	Pipe from drains to bilge	-	Customer
14	Pipe from WSR to WAU	-	Customer
15	WSR drain/discharge connection	½ Inch BSSP (G) Female	Danfoss IXA
16	Flow switch	-	Danfoss IXA

Table 2: WSR components description, notes and scope of supply

3.4.2. WSU

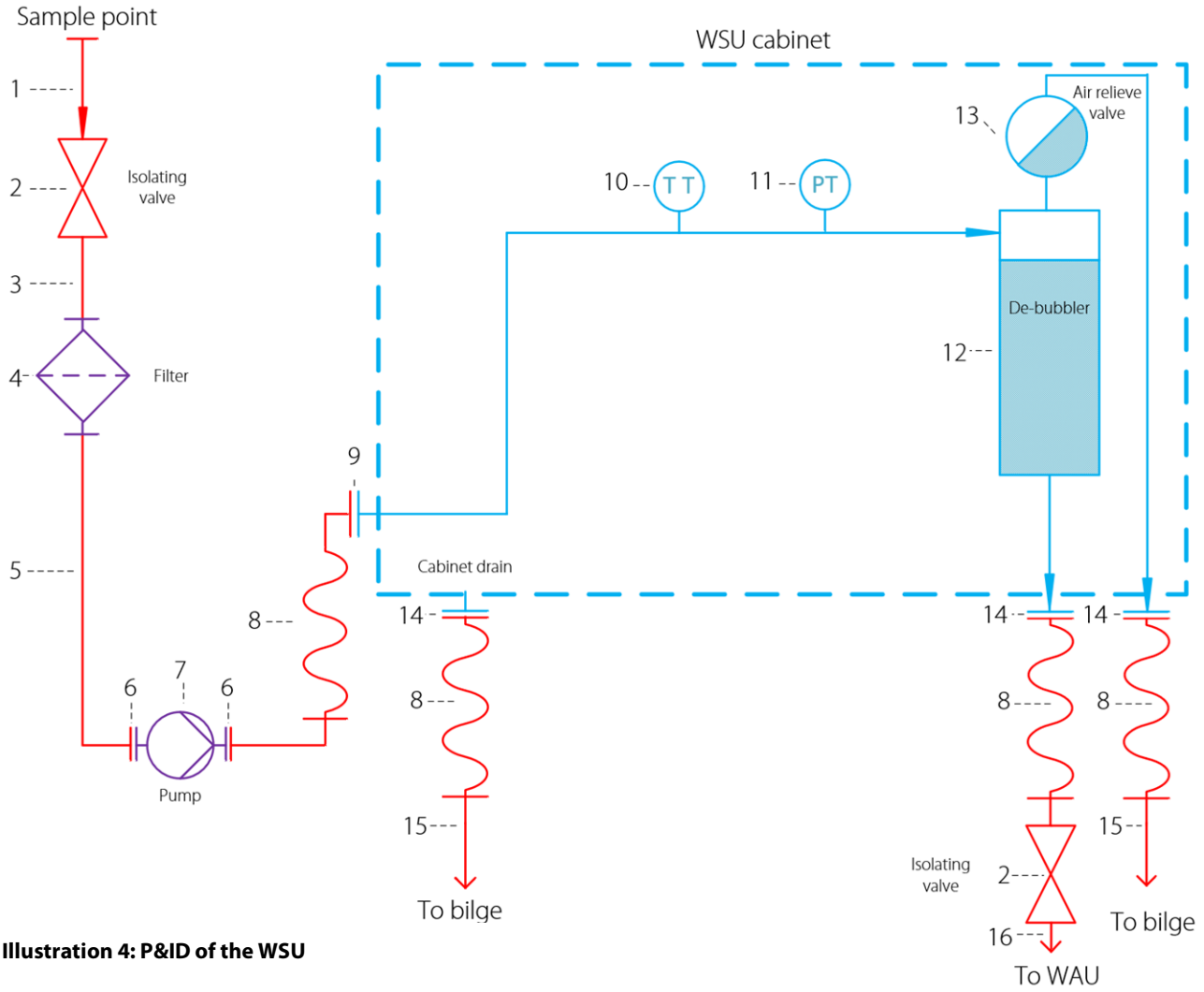


Illustration 4: P&ID of the WSU

Item	Description	Notes	Scope of supply
1	Pipe from sample point to isolating valve	DN 25	Customer
2	Isolating valve	DN 25	Customer
3	Pipe from isolating valve to filter	DN 25	Costumer
4	Filter	0.5mm or 500 microns	Costumer or Danfoss IXA - Accessory
5	Pipe from filter to pump	DN 25	Customer
6	Connection flange to pump	DN 25/32	Customer
7	Pump	-	Costumer or Danfoss IXA - Accessory
8	Flexible connection	Length: 200-1000mm	Customer
9	WSU inlet connection	1 Inch BSPP (G) Female	Danfoss IXA
10	Temperature transmitter	-	Danfoss IXA
11	Pressure transmitter	-	Danfoss IXA
12	De-bubbler	-	Danfoss IXA
13	Air relieve valve	-	Danfoss IXA
14	WSU drain/discharge connection	½ Inch BSSP (G) Female	Danfoss IXA
15	Pipe from drains to bilge	-	Customer
16	Pipe from WSU to WAU	-	Customer

Table 3: WSU components description, notes and scope of supply

3.4.3. WAU

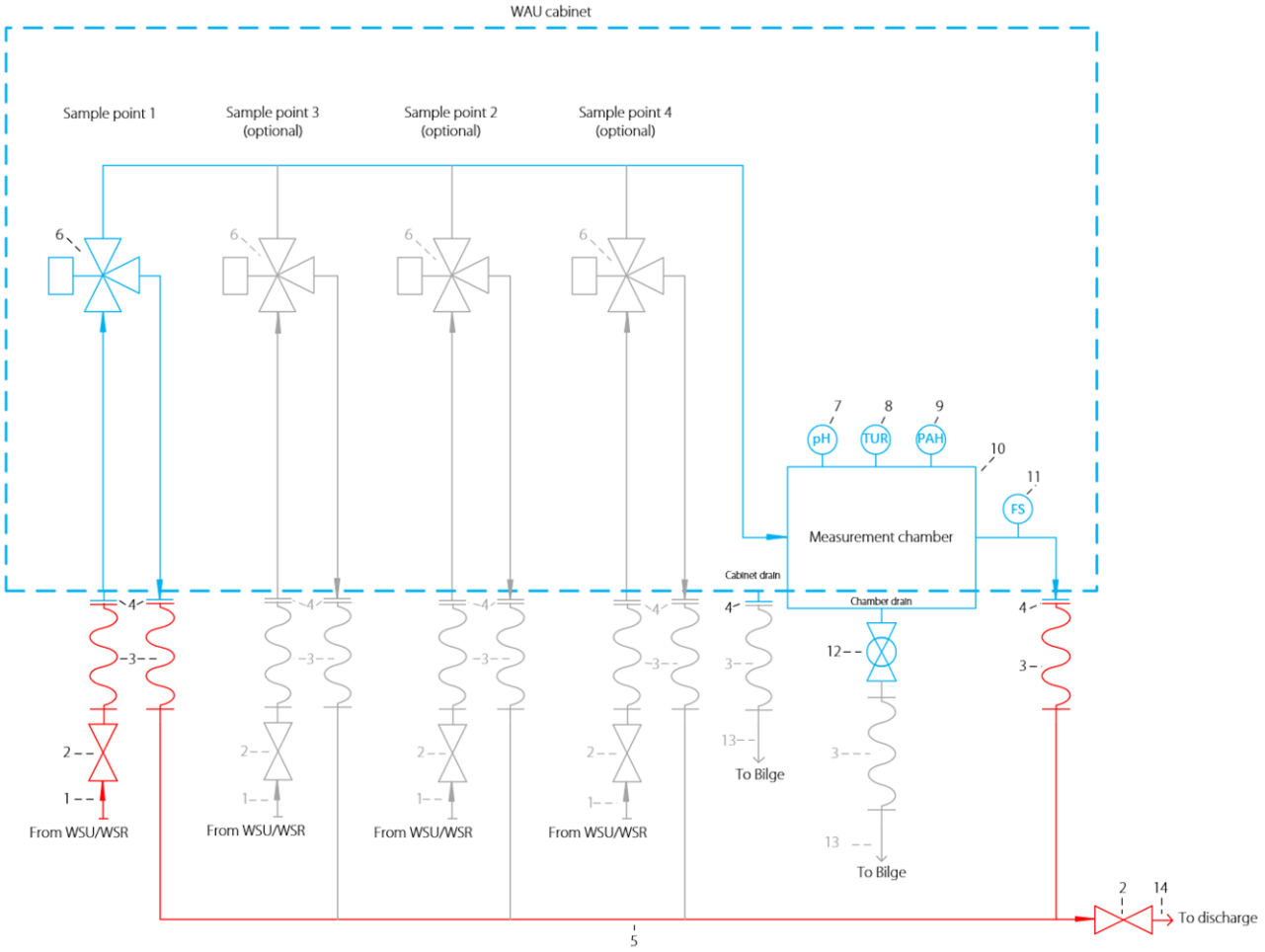


Illustration 5: P&ID of the WAU

Item	Description	Notes	Scope of supply
1	Pipe from WSU or WSR	-	Customer
2	Isolating valve	-	Customer
3	Flexible connection	Length: 200-1000mm	Costumer
4	WAU inlet, discharge or drain connection	½ Inch BSPP (G) Female	Danfoss IXA
5	Common discharge pipe from WAU to isolating valve	For closed-loop or hybrid EGCS please refer to section 4.6.2	Customer
6	3-way solenoid valve	-	Danfoss IXA
7	pH sensor	-	Danfoss IXA
8	Turbidity sensor	-	Danfoss IXA
9	PAH sensor	-	Danfoss IXA
10	Measurement chamber	Max 3. bar	Danfoss IXA
11	Flow switch	-	Danfoss IXA
12	Drain valve for measurement chamber	-	Danfoss IXA
13	Pipe for drains to bilge	-	Customer
14	Pipe from isolation valve to discharge	-	Customer

Table 4: WAU components description, notes and scope of supply

3.5. Dimensions

3.5.1. WAU

NOTICE

Weight: 85 kg.

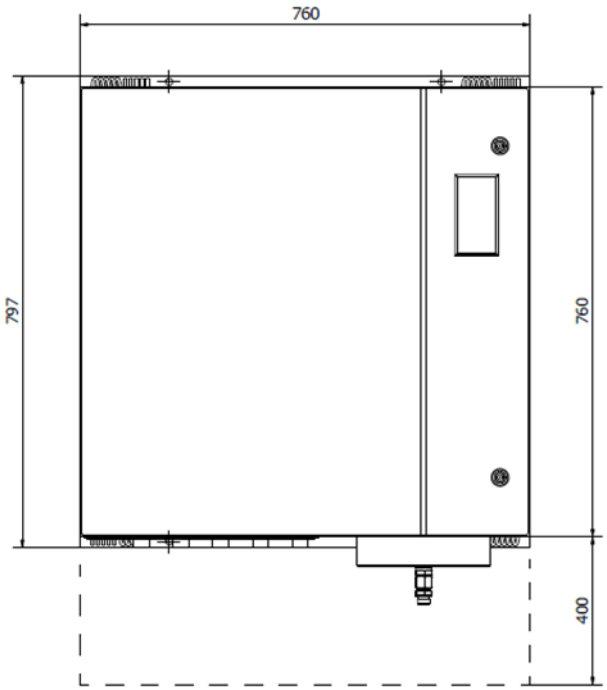


Illustration 6: General space requirements for WAU cabinet

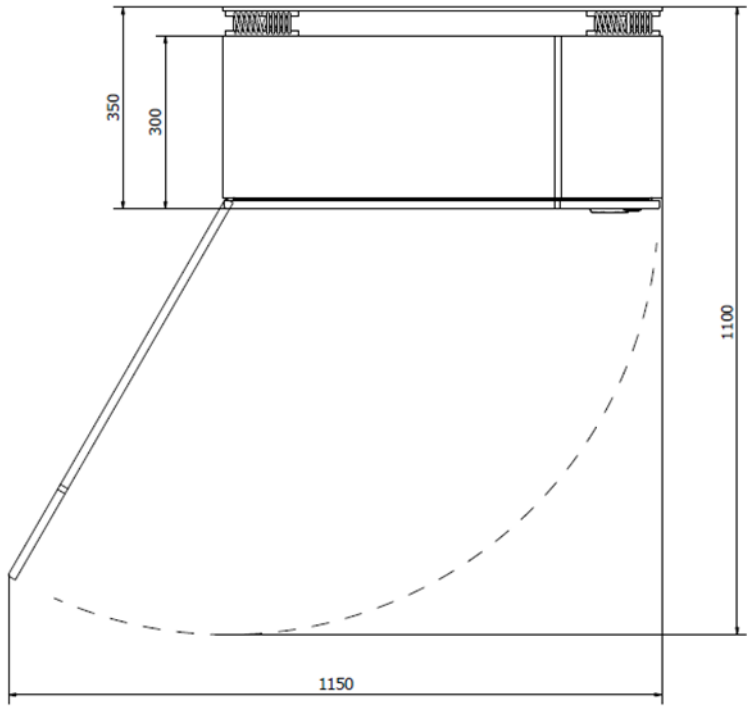


Illustration 7: WAU cabinet opening radius of door

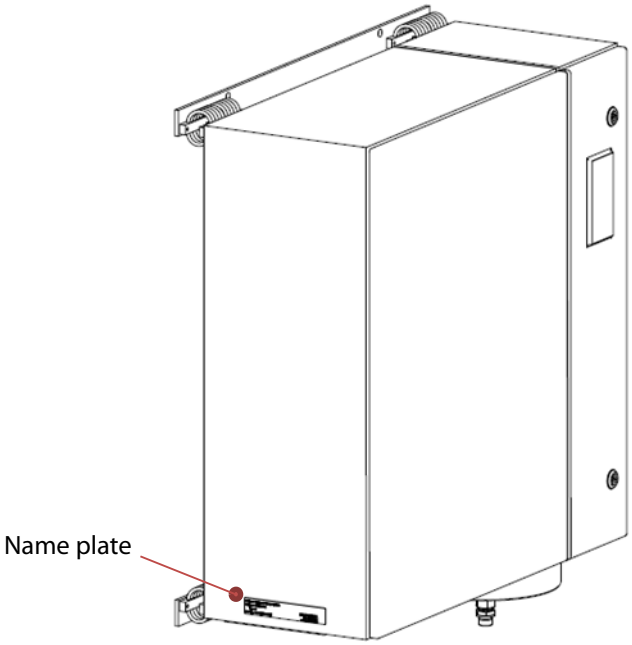


Illustration 8: WAU cabinet position of name plate

3.5.2. WSU and WSR

NOTICE

Weight: 30 kg.

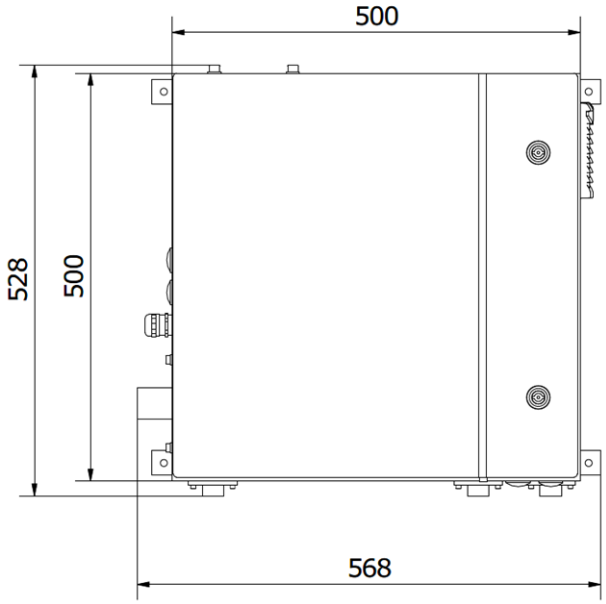


Illustration 9: General space requirements for WSU and WSR cabinet

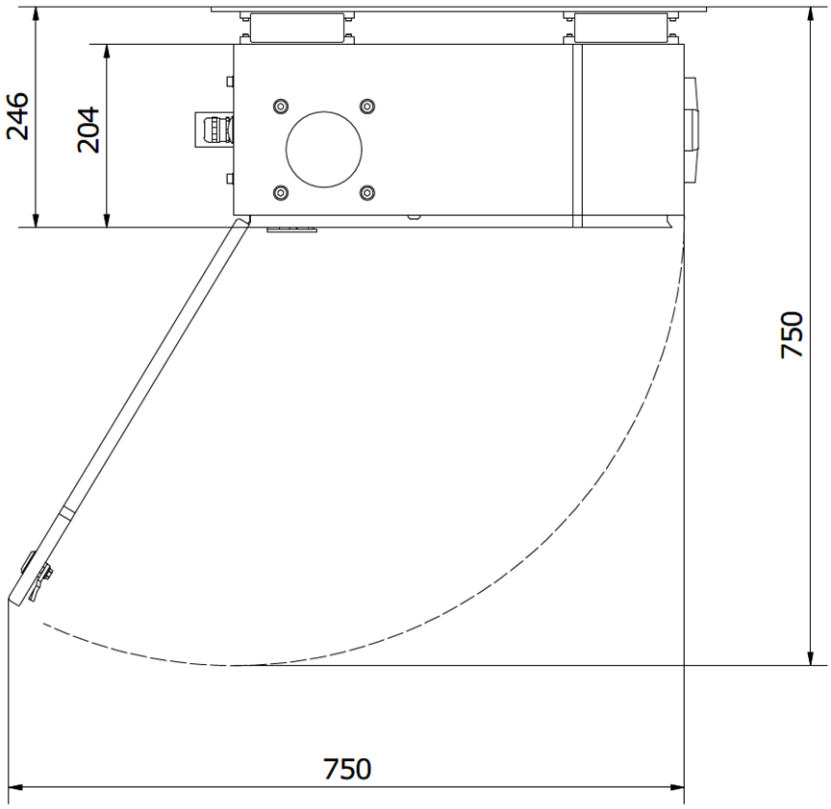


Illustration 10: WSU and WSR opening radius of door

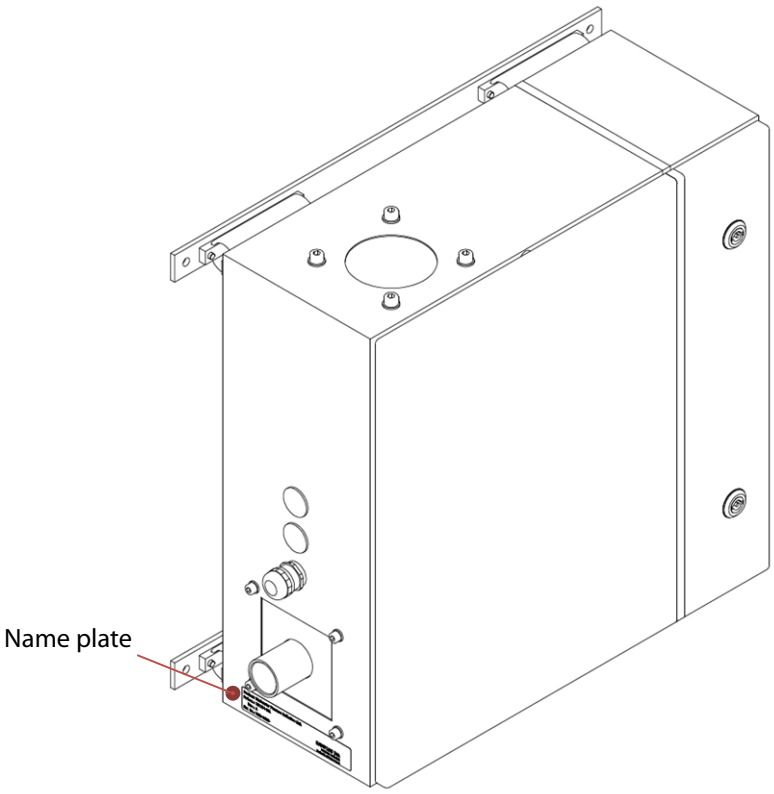


Illustration 11: WSU and WSR cabinet position of name plate

3.5.3. Pump

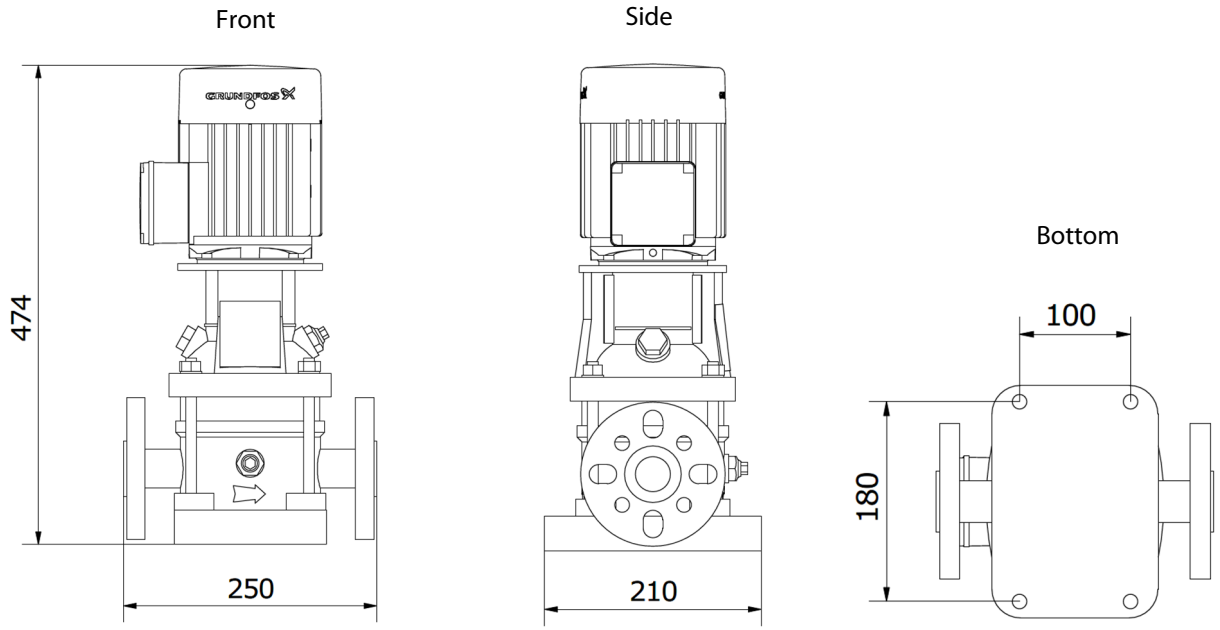


Illustration 12: Pump dimensions – front, side, and bottom view

4. Mechanical installation

4.1. General installation requirements

NOTICE

It is important to plan the installation of the cabinets. Neglecting to plan may result in extra work during and after installation.

NOTICE

When receiving the cabinets, make sure that the packaging is intact. Also check for any damage that might have occurred to the WMS during transport. In case damage has occurred, immediately contact the shipping company to claim the damage as per applicable incoterms.

NOTICE

- Ensure the name plates on the equipment are visible and readable.
- The maximum allowed pressure drop in the WMS piping system must not exceed 1.6 bar when using the centrifugal pump supplied by Danfoss IXA (1.1 bar if connected to a 50Hz electrical power system). Pressure drop in WSU/WSR can be assumed to be 0.05 bar. Pressure drop in WAU can be assumed to be 0.15 bar.
- A maximum pressure of 3 bar is allowed to enter the measurement chamber.
- Ensure that the filters are mounted in a reachable and visible position for easy maintenance.

4.2. Preparation

4.2.1. Preparing the installation site

NOTICE

Determine the installation locations.

Ensure that space requirements for the installation are sufficient and that there is easy access for any maintenance work.

4.3. Mounting the WAU, WSU & WSR cabinets

This section describes how to prepare and mount the WAU, WSU & WSR cabinets.

NOTICE

All cabinets must be mounted levelled and correctly oriented (upright).

Bolts washers and nuts used for mounting must be suitable for the environment.

WARNING

The cabinets are heavy – Use approved lifting equipment.

4.3.1. Mounting the WAU cabinet

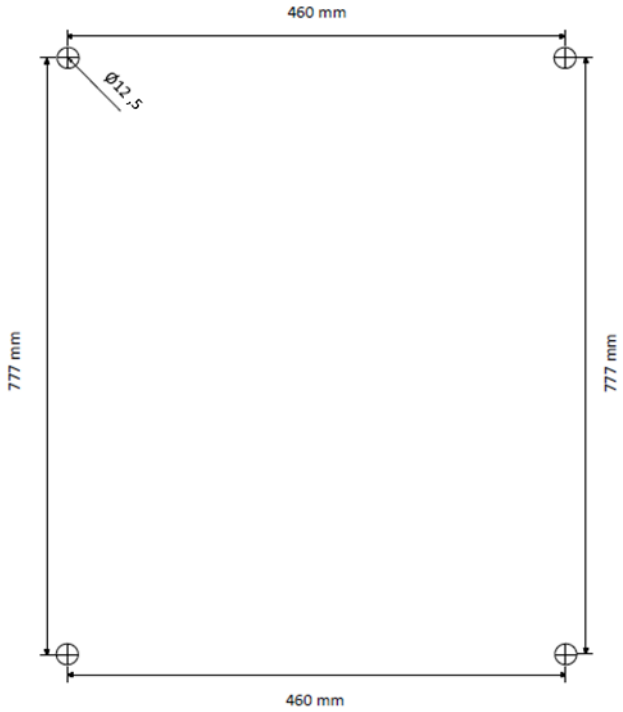


Illustration 13: WAU cabinet hole distances

- Drill four 12.5mm holes in the bulkhead or dedicated structure according to Illustration 13.
- Mount the WAU cabinet using M12 bolts, washers, and nuts.
- Tighten all bolts with torque 50 Nm.

4.3.2. Mounting the WSU or WSR Cabinet

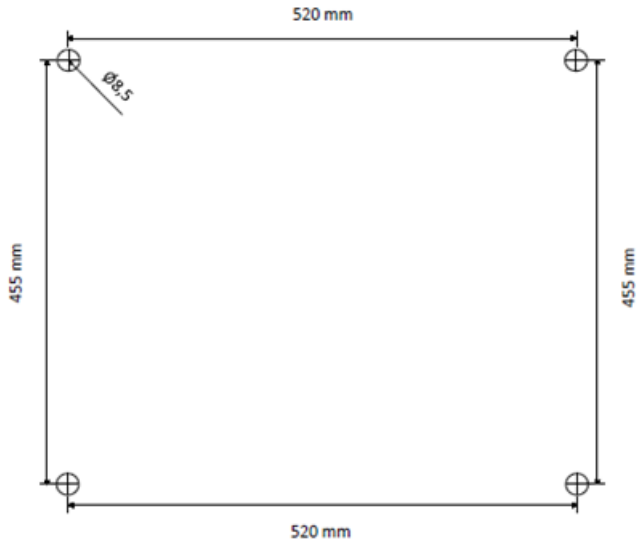


Illustration 14: WSU cabinet hole distances

- Drill four 8.5mm holes in the bulkhead or dedicated structure according to Illustration 14.
- Mount the WSU or WSR cabinet using M8 bolts, washers, and nuts.
- Tighten all bolts with torque 17 Nm.

4.3.3. Mounting the pump

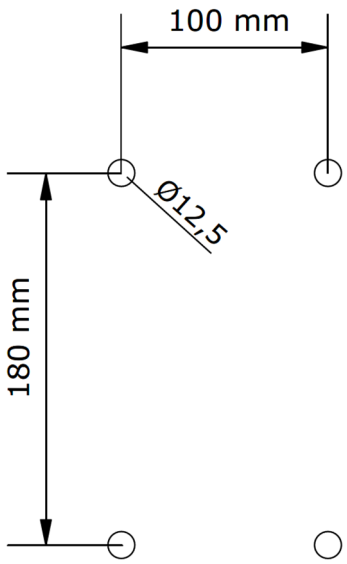


Illustration 15: Pump base plate hole distances

- Drill four 12.5mm holes in the floor or dedicated structure according to Illustration 15.
- Mount the pump using M12 bolts, washers, and nuts.
- Tighten all bolts with torque 50 Nm.

4.4. WSR installation principle

NOTICE

It is important that the installation of the WSR piping is according to the installation principle in Illustration 16.

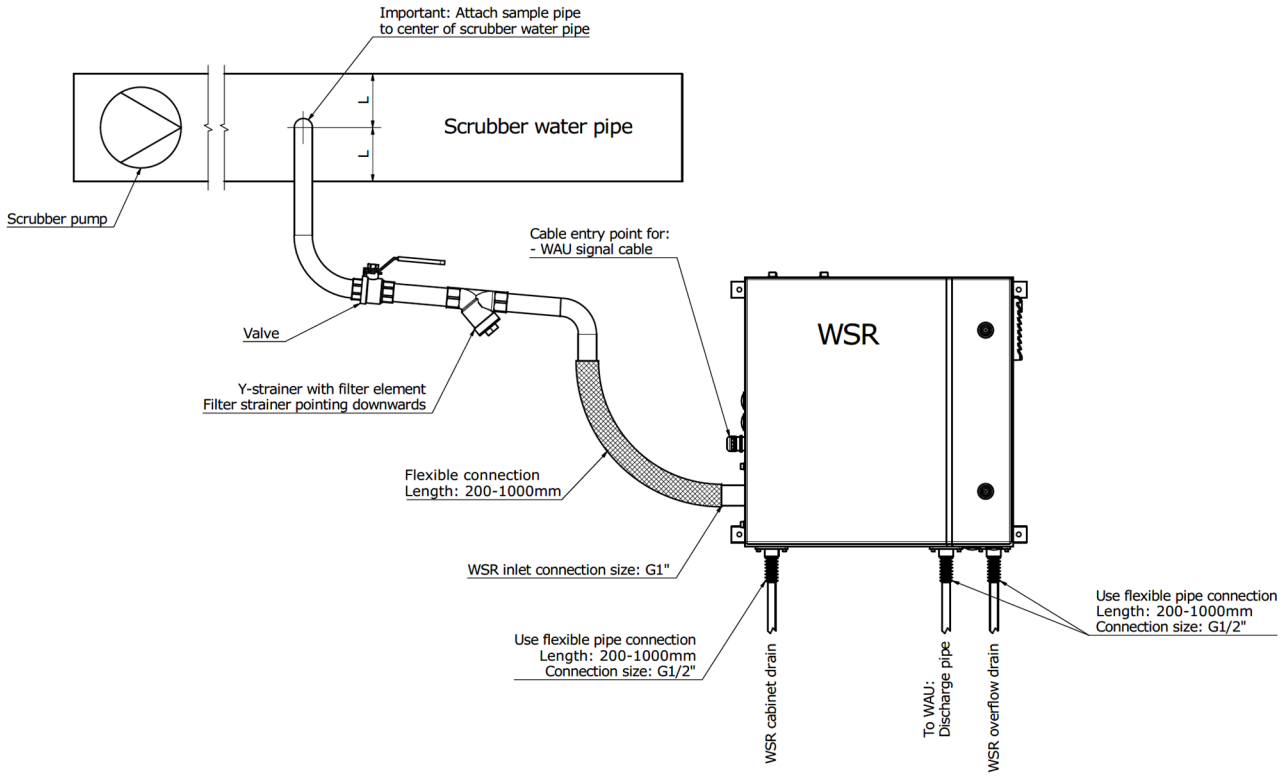


Illustration 16: Illustration of WSR installation principle

4.4.1. WSR installation point

The inlet piping to the WSR can be connected at any convenient position in the scrubber water pipe with a tie-in to the pressure side of a scrubber pump.

If the installation point to the WSR inlet piping is positioned in a horizontal section of a scrubber water pipe, the installation point must be positioned in the center of the scrubber water pipe, to avoid letting sedimentation into the system, which can be present in the bottom of the scrubber water pipe, and to avoid letting air into the system, which can be present in the top of the scrubber water pipe.

4.4.2. WSR inlet piping

The piping between the installation point and the WSR must be routed in such a way that air pockets does not occur.

4.4.3. Isolating valve

The inlet piping must be fitted with a valve for isolating the system during maintenance. The isolating valve must be positioned prior to any serviceable components e.g., filter and WSR.

4.4.4. Filter

The medium passing through the WSR need to be filtered to ensure that a maximum particle size of 0.5mm or 500 microns is passing through the system. The filter must be positioned prior to the WSR.

4.4.5. WSR flexible connections

All connections to the WSR must be fitted with flexible connections, to prevent vibrations from propagating to the WSR cabinet. It is recommended to keep the length of the flexible connections between 200 -1000mm.

4.4.6. WSR overflow drain

A small amount of sample water is expected to be released from the air relieve valve during start and stop of the system, hence it is recommended to install an overflow drainpipe to bilge.

If the pressure retaining valve activates an overflow is expected, hence it is recommended to install an overflow drainpipe to bilge.

4.5. WSU installation principle

NOTICE

It is important that the installation of the WSU piping is according to the installation principle in Illustration 17.

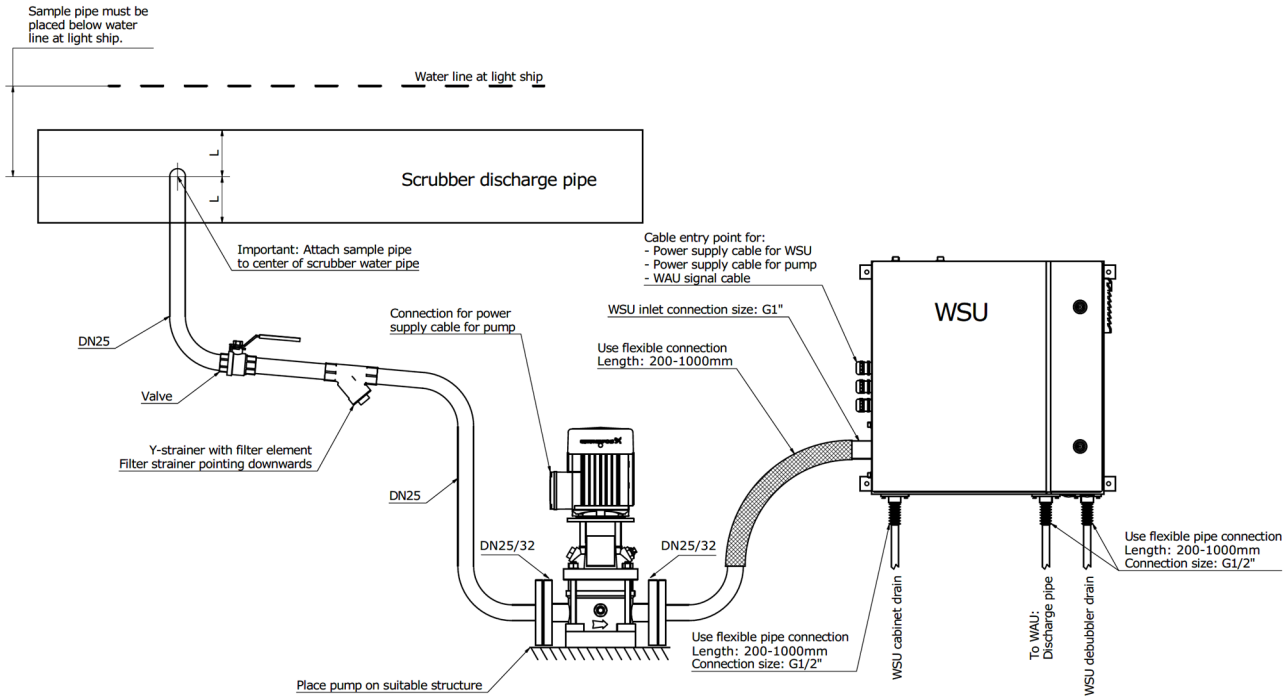


Illustration 17: Illustration of WSU installation principle

4.5.1. WSU installation point

When determining the position of the installation point for the WSU inlet piping, it is important that it is positioned below water line at light ship, to ensure that water is always available to the system.

It is important to position the installation point for the WSU inlet piping in the center of the scrubber water pipe, to avoid letting sedimentation into the system, which can be present in the bottom of the scrubber water pipe, and to avoid letting air into the system, which can be present in the top of the scrubber water pipe.

4.5.2. WSU inlet piping

The piping between the installation point and the pump must be of minimum DN 25 to keep the pump from cavitating. This requirement also applies to valves and filters in the WSU inlet piping.

The piping between the installation point and the pump must be routed in such a way that air pockets does not occur to protect the pump from air entering.

4.5.3. Isolating valve

The inlet piping must be fitted with a valve for isolating the system during maintenance. The isolating valve must be positioned prior to any serviceable components e.g., filter, pump, WSU.

4.5.4. Filter

The medium passing through the WSU need to be filtered to ensure that a maximum particle size of 0.5mm or 500 microns is passing through the system. The filter must be positioned prior to the pump.

4.5.5. Pump

The pump can be supplied by Danfoss IXA and is a centrifugal pump that can be mounted to the floor or to a suitable structure. Arrows on the pump base show the direction of flow of liquid through the pump. For more information on pump performance refer to section 7.1.

4.5.6. WSU flexible connections

All connections to the WSU must be fitted with flexible connections, to prevent vibrations from propagating to the WSU cabinet. It is recommended to keep the length of the flexible connections between 200 -1000mm.

4.5.7. WSU overflow drain

A small amount of sample water is expected to be released from the air relieve valve during start and stop of the system, hence it is recommended to install an overflow drainpipe to bilge.

4.6. WAU installation principle

4.6.1. WAU flexible connections

All connections to the WAU must be fitted with flexible connections, to prevent vibrations from propagating to the WAU cabinet. It is recommended to keep the length of the flexible connections between 200 -1000mm.

If drain from the WAU is connected to piping, these connections must too be fitted with flexible connections.

4.6.2. WAU discharge

NOTICE

It is important that the installation of the WAU discharge pipe is according to installation principle in Illustration 18.

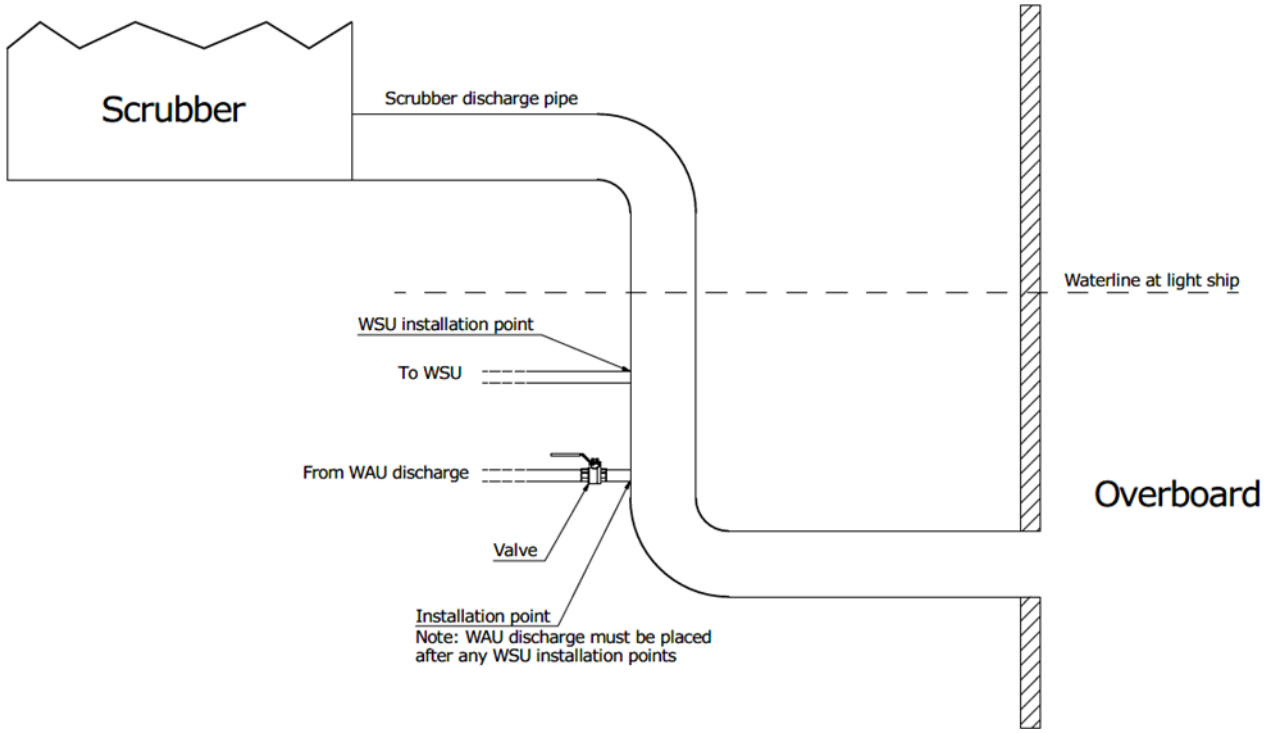


Illustration 18: Positioning of WAU discharge

- The discharge from WAU must have an isolating valve installed to perform maintenance on the system.
- The installation point of the WAU discharge must be placed after any WSU installation points to prevent affecting the measurements of the WMS.

- In an open-loop EGCS the WAU discharge can be a common pipeline for all sample points in the WMS.

NOTICE

In a closed-loop or hybrid EGCS the WAU discharges must be separated and led back to their respective process water pipelines.

4.7. WAU, WSU & WSR interfaces

4.7.1. WAU interfaces

For details, see Table 5: WAU interfaces

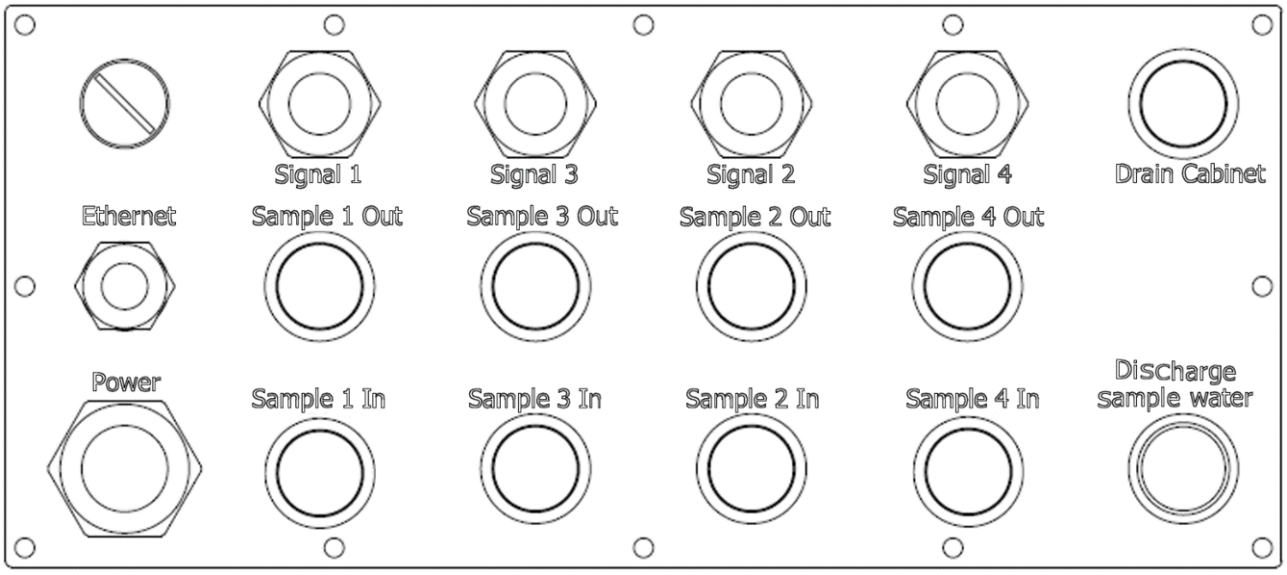


Illustration 19: WAU interfaces

Name	Description	Size
Signal 1	For signal cable between WSU/WSR and WAU	Cable gland M25
Signal 2	For signal cable between WSU/WSR and WAU	Cable gland M25
Signal 3	For signal cable between WSU/WSR and WAU	Cable gland M25
Signal 4	For signal cable between WSU/WSR and WAU	Cable gland M25
Drain cabinet	Drain for WAU cabinet (in case of leakage inside the cabinet)	½ Inch BSPP (G) Female
Ethernet	For communication cable between WAU and EGCS control system	Cable gland M20
Sample 1 Out	Bypass of sample water from sample point 1	½ Inch BSPP (G) Female
Sample 2 Out	Bypass of sample water from sample point 2	½ Inch BSPP (G) Female
Sample 3 Out	Bypass of sample water from sample point 3	½ Inch BSPP (G) Female
Sample 4 Out	Bypass of sample water from sample point 4	½ Inch BSPP (G) Female
Power	For power supply of the WAU	Cable gland M32
Sample 1 In	Inlet of sample water from sample point 1	½ Inch BSPP (G) Female
Sample 2 In	Inlet of sample water from sample point 2	½ Inch BSPP (G) Female
Sample 3 In	Inlet of sample water from sample point 3	½ Inch BSPP (G) Female
Sample 4 In	Inlet of sample water from sample point 4	½ Inch BSPP (G) Female
Discharge sample water	Discharge of sample water – from measurement chamber	½ Inch BSPP (G) Female

Table 5: WAU interfaces

4.7.2. WSR interfaces

For details see, Table 6: WSR cabinet side view.

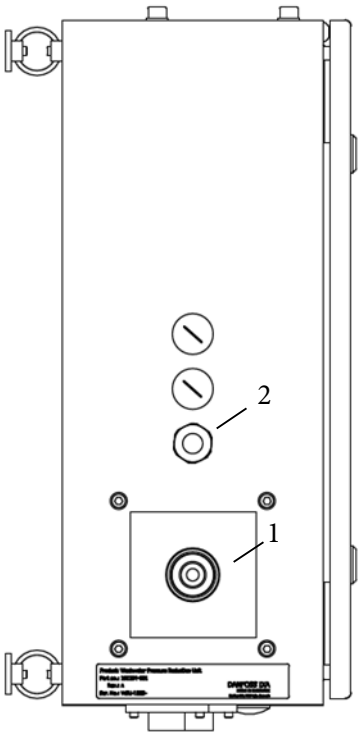


Illustration 20: WSR cabinet side view

Name	Description	Size
1 - WSR inlet	For connecting WSR inlet pipe	1 Inch BSPP (G) Female
2 - Cable gland	For signal cable between WSR and WAU	M25

Table 6: WSR cabinet side view

For details see, Table 7: WSR cabinet bottom view.

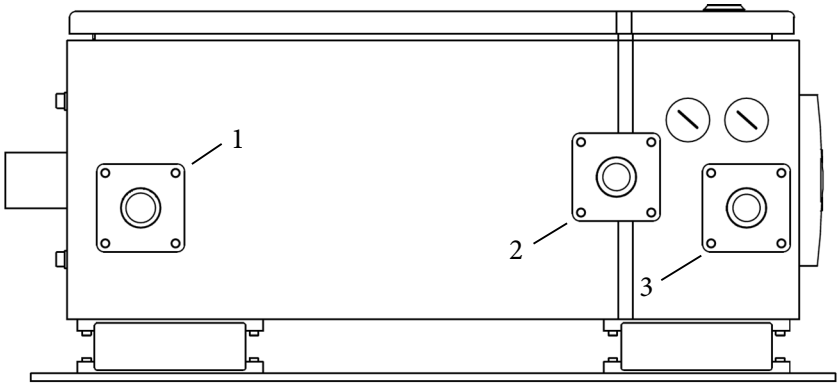


Illustration 21: WSR cabinet bottom view

Name	Description	Size
1 - Cabinet drain	Drain for WSR cabinet (in case of leakage inside the cabinet)	½ Inch BSPP (G) Female
2 - WSR outlet	For piping between WSR and WAU	½ Inch BSPP (G) Female
3 - Overflow drain	Drain for air relieve valve and pressure retaining valve	½ Inch BSPP (G) Female

Table 7: WSR cabinet bottom view

4.7.3. WSU interfaces

For details see, Table 8: WSU cabinet side view.

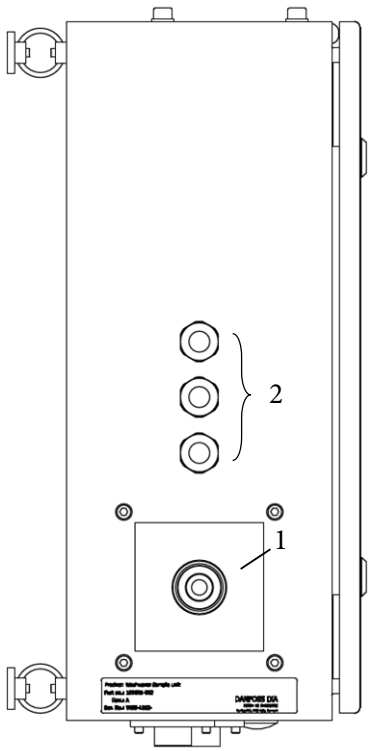


Illustration 22: WSU cabinet side view

Name	Description	Size
1 - WSU inlet	For connecting WSU inlet pipe	1 Inch BSPP (G) Female
2 - Cable glands	For signal cable between WSU and WAU, for WSU power supply and for pump power supply cable	M25

Table 8: WSU cabinet side view

For details see, Table 9: WSU cabinet bottom view.

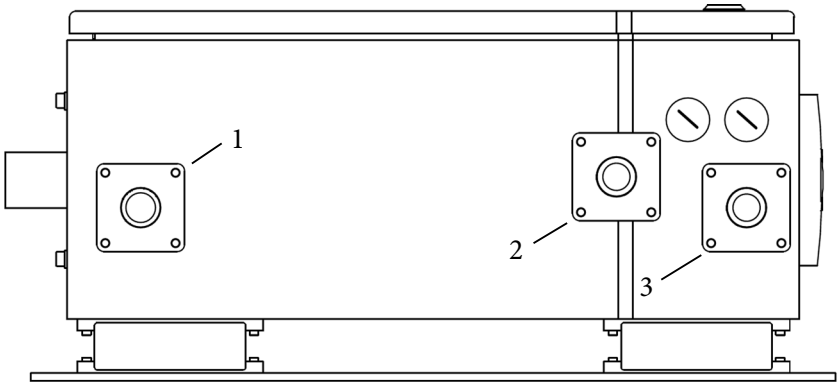


Illustration 23: WSU cabinet bottom view

Name	Description	Size
1 - Cabinet drain	Drain for WSU cabinet (in case of leakage inside the cabinet)	½ Inch BSPP (G) Female
2 - WSU outlet	For piping between WSU and WAU	½ Inch BSPP (G) Female
3 - Overflow drain	Drain for air relieve valve	½ Inch BSPP (G) Female

Table 9: WSU cabinet bottom view

5. Electrical installation

5.1. General electrical installation requirements

WARNING

Do not apply power to the system before cables are properly connected. Secure cables with cable ties.
Follow applicable regulations, rules and requirements when working with electrical equipment.

NOTICE

Allow enough excess cable length for the cabinets to move freely in vibrating environments. Cabinets can move 30mm in all directions.

5.2. Overview of electrical wiring of the WMS

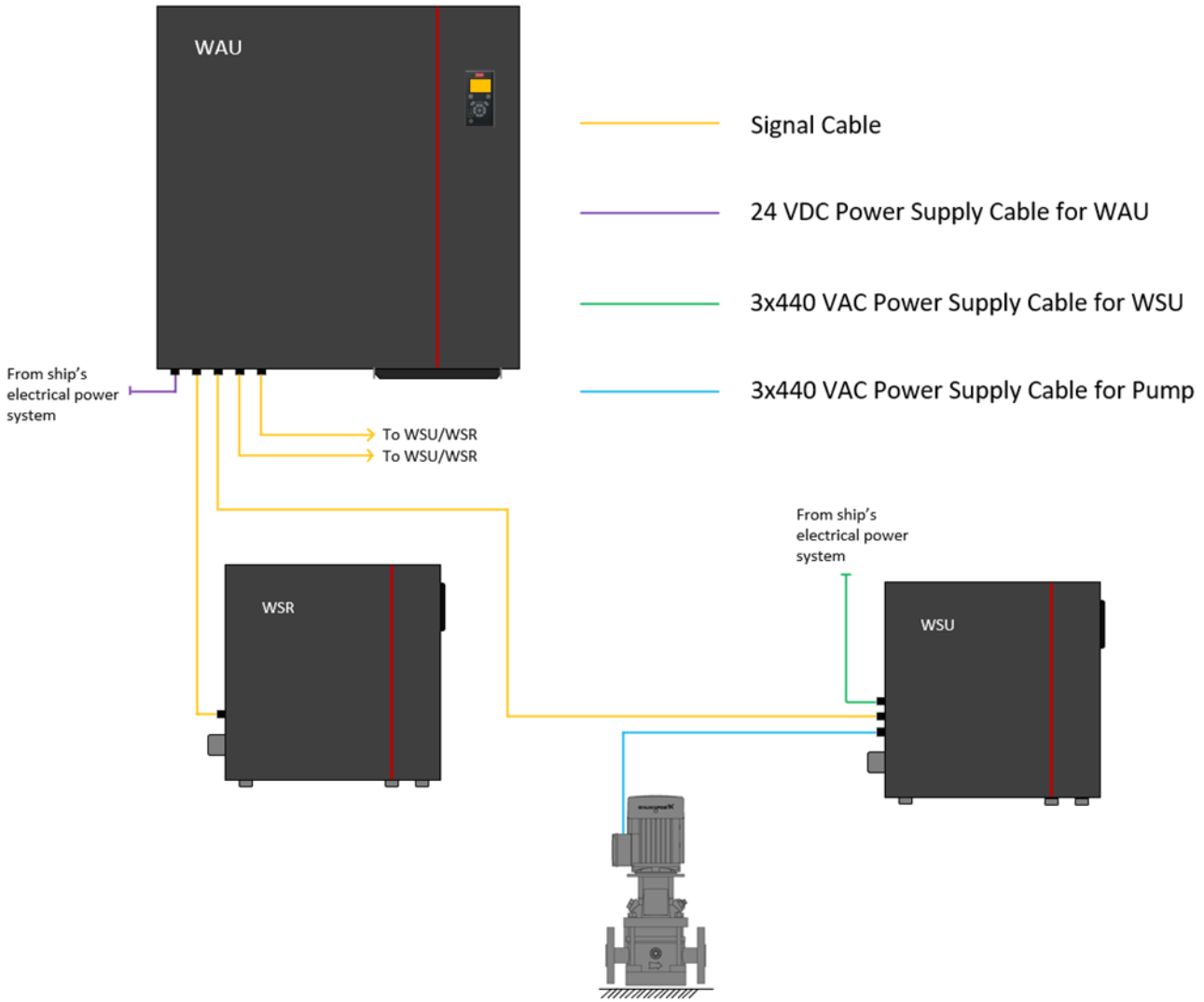


Illustration 24: Example of an overview of electrical wiring of the WMS

NOTICE

Power supply cables and signal cables for the WMS are not included in Danfoss IXA's scope of supply and should be considered in the customer's scope of supply.

5.2.1. Power supply cable for WSU

The power supply cable for the WSU should be a shielded marine grade cable with four conductors. The termination points are limited to a minimum conductor cross-section of 0.14 mm^2 and a maximum conductor cross-section of 1.5 mm^2.

5.2.2. Power supply cable for WAU

The power supply cable for the WAU should be a shielded marine grade cable with two conductors, and the termination points are limited to a minimum conductor cross-section of 0.5 mm^2 and a maximum conductor cross-section of 10 mm^2.

5.2.3. Signal cable between WAU and WSR

The signal cable between the WAU cabinet and WSR cabinets should be a shielded marine grade cable with five conductors, and the termination points are limited to a minimum conductor cross-section of 0.14 mm^2 and a maximum conductor cross-section of 1.5 mm^2.

5.2.4. Signal cable between WAU and WSU

The signal interface cable between the WAU cabinet and WSU cabinets should be a shielded marine cable with four conductor pairs (e.g., 4x2x0.75 mm^2), and the termination points are limited to a minimum conductor cross-section of 0.14 mm^2 and a maximum conductor cross-section of 1.5 mm^2.

5.2.5. Dimensioning of power supply cables

For dimensioning of power supply cable for WSU and power supply cable for pump please refer to section 5.4.4 for details on the power consumption.

For dimensioning of power supply cables for WAU please refer to Table 13: WAU power supply specification for WAU power consumption.

5.2.6. Dimensioning of signal cables between WAU and WSU/WSR

For dimensioning the signal cables between the WAU and WSU/WSR the maximum power consumption for each conductor pair is 3 W with a supply voltage of 24 VDC.

5.2.7. Cable shield installation in EMC cable glands

The WMS systems contains EMC cable glands. The illustration below shows the correct installation of the shield in the EMC cable gland.

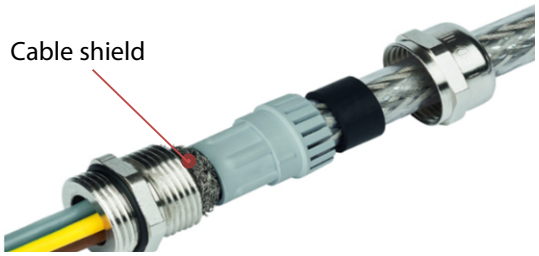


Illustration 25: Correct installation of the shielded cable in the EMC cable gland

NOTICE

Cable shields shall normally be earthed at one end only or according to applicable requirements to the electrical installation.

NOTICE

Incorrect installation of the cable shields in the EMC cable gland may cause the WMS to malfunction.

NOTICE

For protective covering of the conductors that may be exposed after installing the cable shield in the EMC cable gland, use only materials of a standardized type which in all cases has the thermal stability of the corresponding insulating material for which it replaces.

5.3. Electrical installation of WSR

5.3.1. Overview of the electrical system in WSR

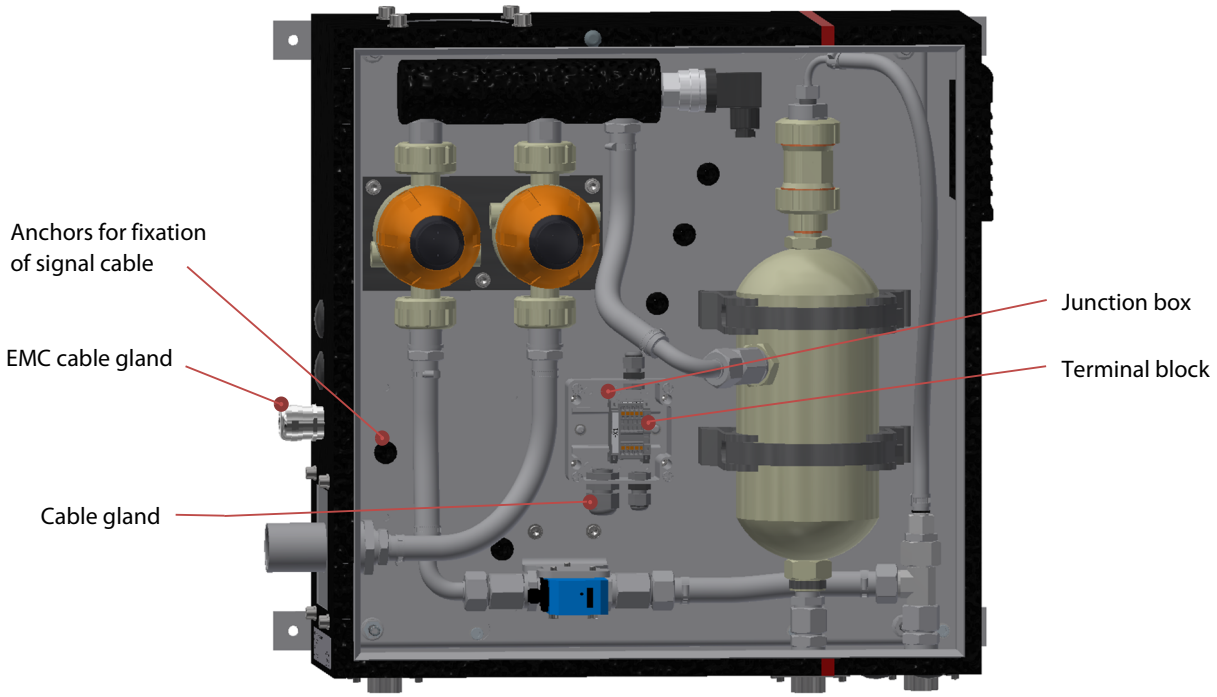


Illustration 26: Overview of the relevant components to the electrical installation of the WSR

NOTICE

- Use the dedicated anchors for fixation of signal cable to avoid damage to cable insulation.
- To secure the ingress protection of the junction box the cable gland must have a tight fit to the cable.
- Be careful not to damage or misplace the cover of the junction box when removed during installation.

5.3.2. Wiring of the WSR

The illustration below shows how to connect the signal cable in the terminal block of the WSR junction box.

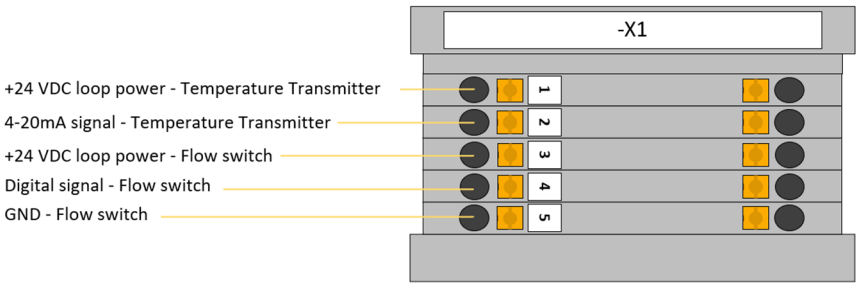


Illustration 27: WSR terminal block connections

NOTICE

The specified conductor cross-section of the terminals in the terminal block are minimum 0.14 mm^2 and maximum 1.5 mm^2.

5.4. Electrical Installation of WSU

5.4.1. Overview of the electrical system in WSU

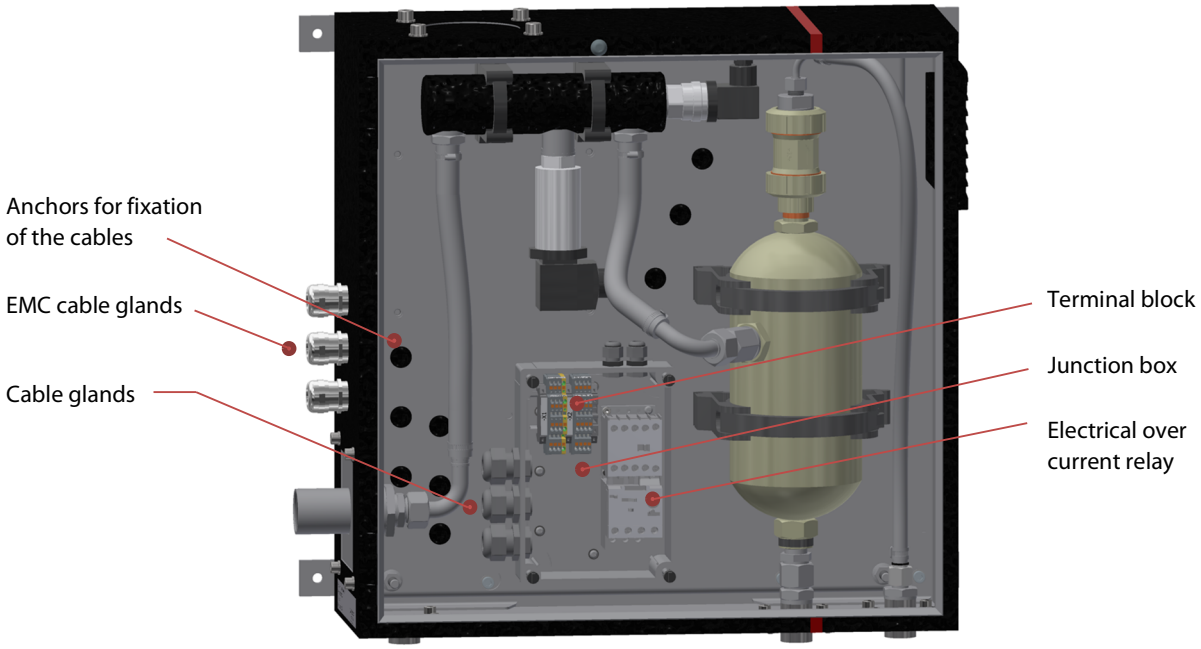


Illustration 28: Overview of the relevant components to the electrical installation of the WSU

NOTICE

- Use the dedicated anchors for fixation of the cables to avoid damage to cable insulation.
- To secure the ingress protection of the junction box the cable glands must have a tight fit to the cable.
- Be careful not to damage or misplace the cover of the junction box when removed during installation or during adjustment of the electrical over current relay.

5.4.2. Overview of the electrical over current relay

NOTICE

The EOCR must be set to set to full load current of the pump. Refer to section 5.4.4 for information on motor name plate.

Illustration 29: Overview of the EOCR in the WSU

5.4.3. Wiring of the WSU

The illustration below shows how to connect power supply and signal cables in the terminal block of the WSU junction box.

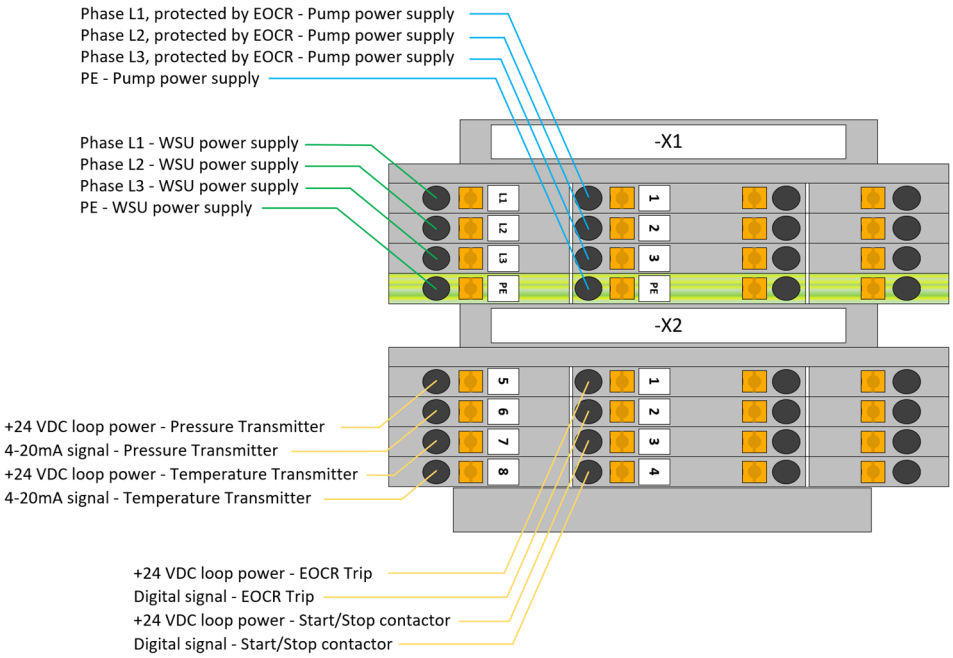


Illustration 30: WSU terminal block connections

The terminal block is divided into two sections.

Terminal block	Specification
-X1	Terminals for WSU and pump power supply
-X2	Terminals for signal cable between WSU and WAU

Table 10: Terminal block sections in WSU junction box

NOTICE

The specified conductor cross-section of the terminals in the terminal block are minimum 0.14 mm^2 and maximum 1.5 mm^2.

5.4.4. Name plate of motor for pump

3~ Motor – P_2: 0.370 kW					
50 Hz	D/Y	U 220-240/380-415 V	60 Hz	D/Y	U 220-255/380-440 V
n 2850-2880 min^{-1}		I $^1/_1$ 1.74/1.00 A	n 3410-3470 min^{-1}		I $^1/_1$ 0.87/0.83 A
Cos Φ 0.80-0.70		I_{max} 1.92/1.10 A	Cos Φ 0.85-0.76		I_{max} 0.96/0.91 A

Table 11: Name plate WSU pump motor

5.5. Electrical installation of WAU

5.5.1. Overview of the electrical system in WAU

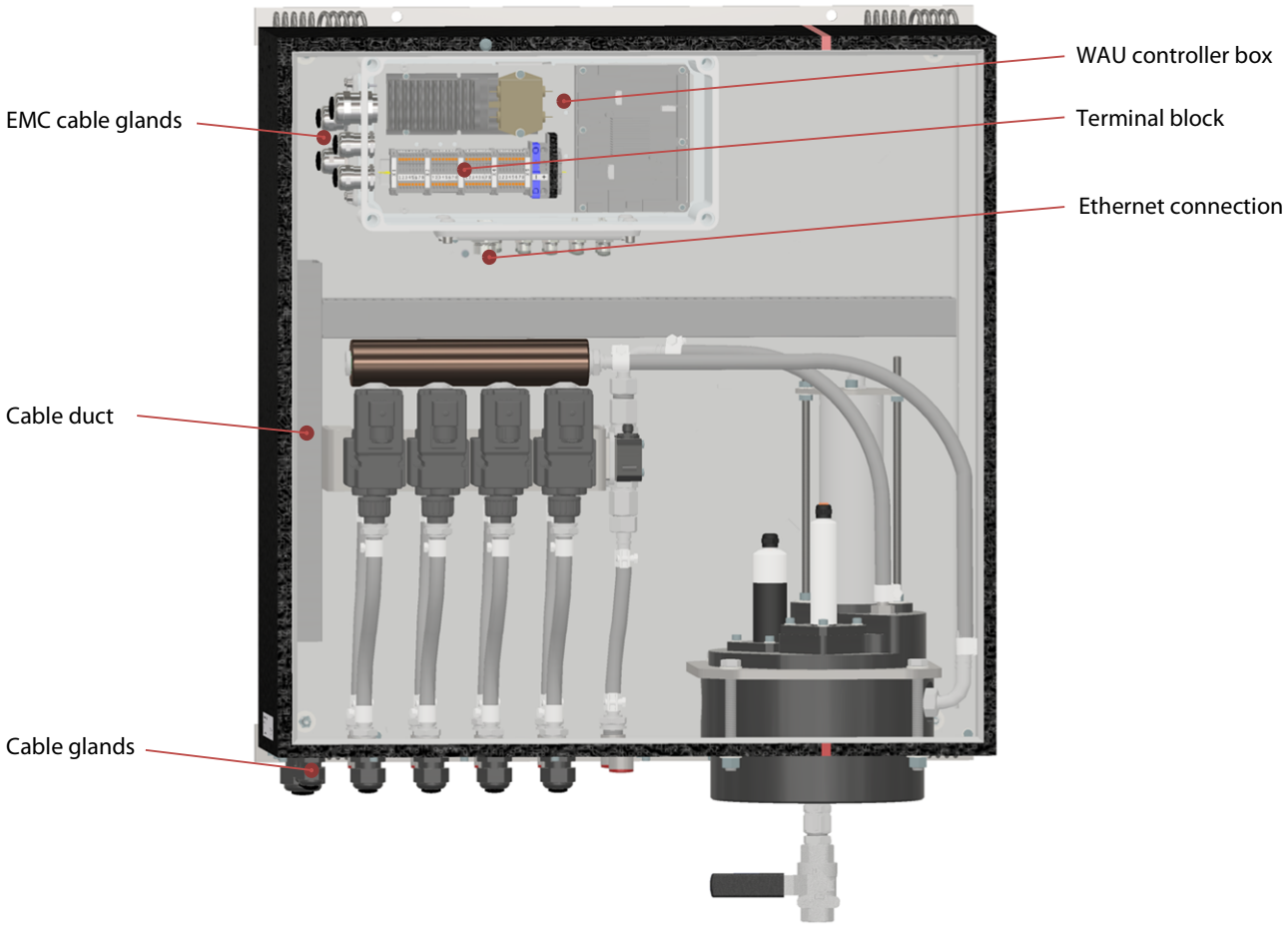


Illustration 31: Overview of the relevant components to the electrical installation of the WAU

NOTICE

- Use the dedicated cable duct for routing of the cables inside the WAU.
- To secure the ingress protection of the controller box the cable glands must have a tight fit to the cable.
- Be careful not to damage or misplace the cover of the junction box when removed during installation.

5.5.2. Wiring of the WAU

The illustration below shows how to connect the WAU power supply cable and the signal cables in the terminal block of the WAU.

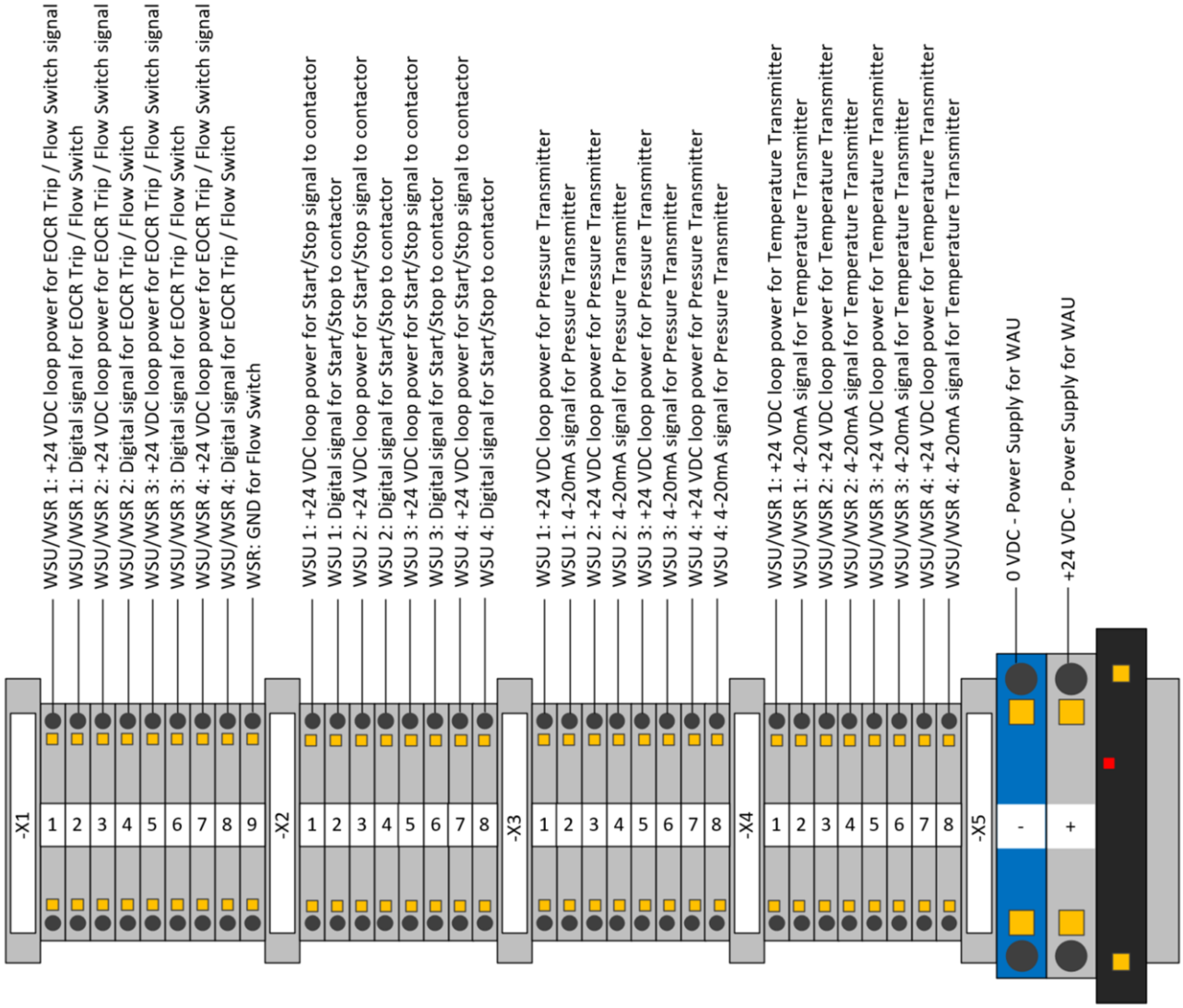


Illustration 32: WAU terminal block connections

The terminal block is devided in five sections.

Terminal block	Specification
-X1	Terminals for WSU EOCR trip signals / WSR flow switch signals
-X2	Terminals for WSU start/stop signals
-X3	Terminals for WSU pressure transmitter signals
-X4	Terminals for WSU/WSR temperature transmitter signals
-X5	Terminals for WAU power supply and for fuse

Table 12: Terminal block sections in WAU controller box

NOTICE

The specified conductor cross-section of the terminals in terminal block -X1..-X4 are min. 0.14 mm^2 and max. 1.5 mm^2.
The specified conductor cross-section of the terminals in terminal block -X5 are min. 0.5 mm^2 and max.10 mm^2.

5.5.3. Specifications for WAU power supply

The table below shows the technical specifications of the power supply for the WAU controller.

Parameter	Specification
Input voltage range	9-36 VDC
Output voltage	24 VDC
Output current full load	6.3 A
Rated power output	150 W

Table 13: WAU power supply specification

5.5.4. Fuse specifications and installation

The WAU controller is protected by a fuse which specification can be seen in the table below. The fuse is installed in the black terminal as illustrated below. A red LED indicator shows the condition of the fuse.

Parameter	Specification
Rated current	6.3 A
Class	T (Time-lag)
Size	G / 5 x 20 mm
Insulating tube	Ceramic, non-transparent with extinguishing filler

Table 14: Fuse Specifications

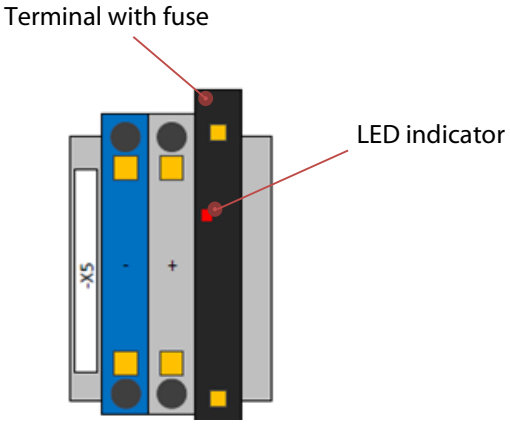


Illustration 33: Overview of terminal for fuse

6. Before operating the system

6.1. Flushing the piping system

NOTICE

When the entire piping system for the WMS is installed make sure that all pipes are flushed free from dirt, dust, welding remains and everything else than can end up in the piping system during construction. If flushing of the pipes is not performed before operating, the WMS system will malfunction.

6.2. Prime and vent pump

NOTICE

The centrifugal pump supplied by Danfoss IXA must be primed and vented prior to operation.

1. Close the isolating valve on the outlet side of the pump and open the isolating valve on the inlet side.
2. Remove the priming plug from the pump head and slowly fill the pump with liquid. Replace the priming plug and tighten securely.
3. See the correct direction of rotation of the pump on the motor fan cover.
4. Start the pump and check the direction of rotation.
5. Vent the pump by means of the vent valve in the pump head. At the same time, open the outlet isolating valve a little.
6. Close the vent valve when a steady stream. Completely open the outlet isolating valve.

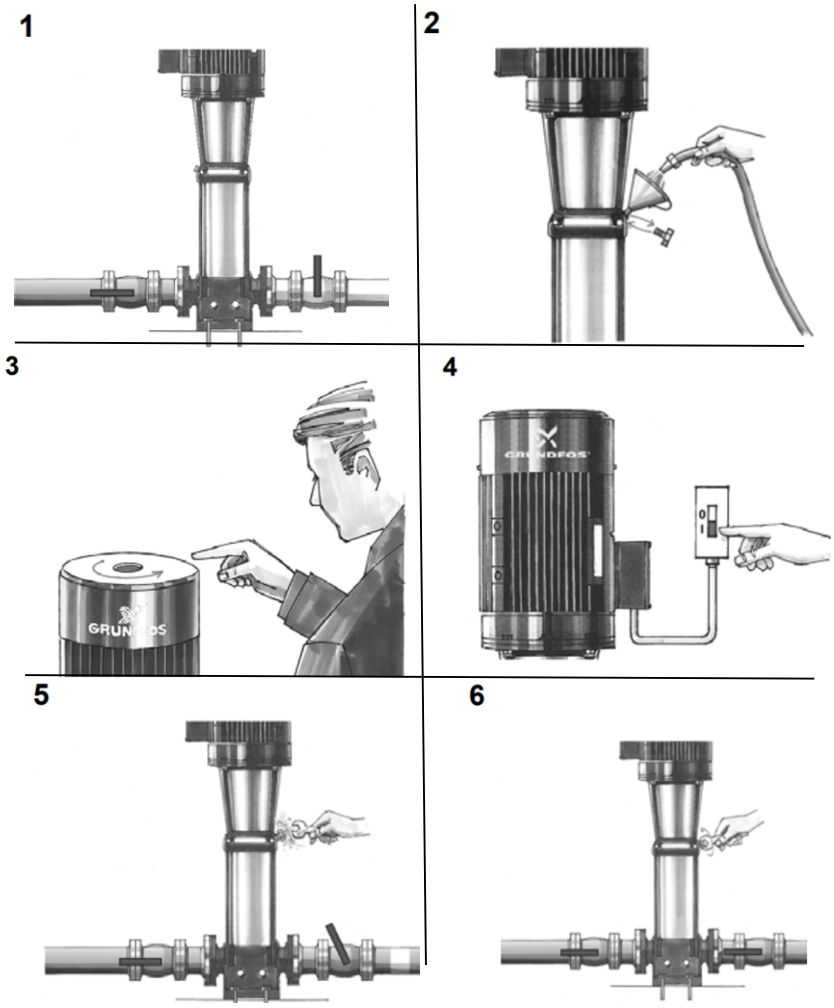


Illustration 34: Example on how to prime and vent a centrifugal pump

6.3. pH sensor installation

When receiving the WAU the pH sensor is not yet installed. Installation of the pH sensor must be done on site. Please see Illustration 35 for installation of the pH sensor.

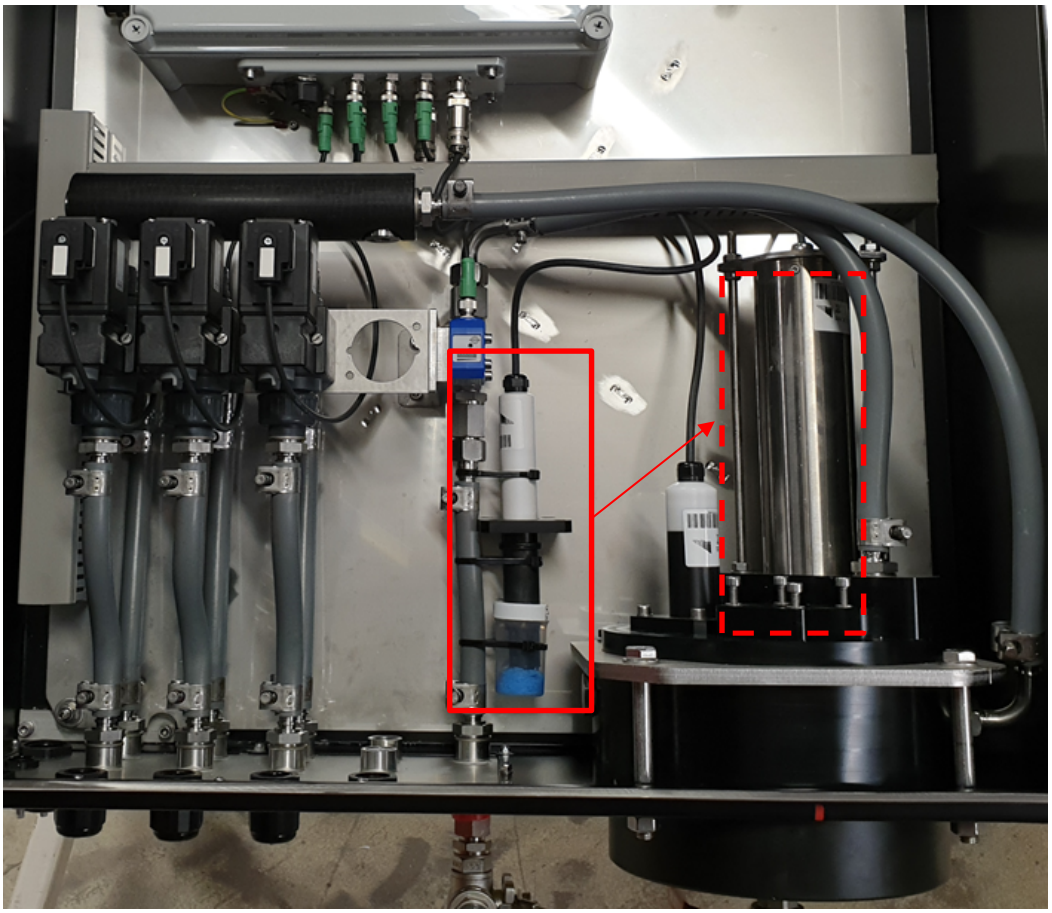


Illustration 35: Placement of pH sensor when receiving the WAU

When installing the pH sensor remove the protective cap by holding the sensor vertically downwards and unscrewing the cap. The sensor is supplied with a filled protective cap containing a solution of pH4 buffer and potassium chloride. Therefore, the sensor does not need to be activated in order to achieve optimum measurements.

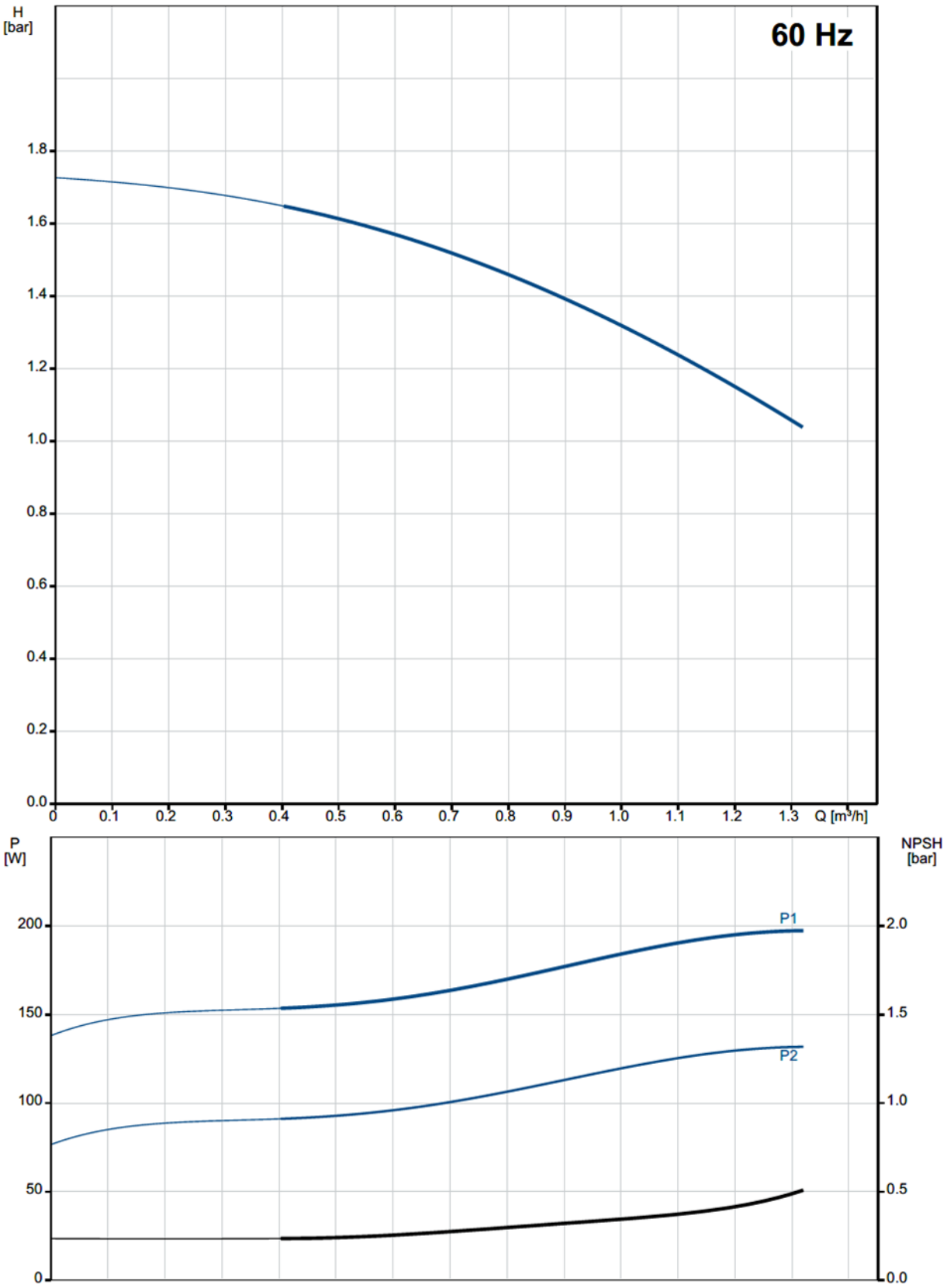
NOTICE

If the sensor is dry, it must first be conditioned for several hours (>12h) in pH4 buffer. The measurement chamber must be filled with water immediately after installing the pH sensor to prevent the sensor from drying out.

When installing the pH sensor make sure that the gasket is correctly installed, then tighten the bolts with torque 0.35 Nm.

7. Appendix

7.1. Pump performance curves



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