

# SoluTECH

## FILTER & CLARIFICATION GROUP



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Dear customer,

Thank you for your confidence in becoming the owner of a filter or a clarification group.

The filter or clarification group is built according to the ASME code and made of stainless steel. It withstands service pressures up to 10 bars and temperatures up to 85°C.

It can be installed online on the network to be filtered or installed in a bypass. For installation in a bypass, the flow will be adjusted to take into account 20 % to 25 % of the total volume of your water network to be filtered.

We have spared no effort to ensure the product satisfies you.

It is easy to use: We advise that you carefully read this manual before commissioning the filter or clarification group.

Also know that our technical department is at your service.

## SAFETY

The descriptions are written in clear text. The highlighted areas, **WARNING, ATTENTION and NOTE**, mean the following:

**NOTE:** Signals a distinctive feature or important information.

**WARNING:** Risk of injury or accident.

**ATTENTION:** Risk of improper operation.

Please read this manual carefully before using your device.

**ATTENTION:** For your safety and that of the device, please observe the basic precautions for use and the following instructions:

- This manual contains notes that are very important regarding installation, use and maintenance of your device.
- Make sure the device and its packaging have not been damaged during transport.
- Do not use the device if it is visibly damaged, and immediately contact your dealer.

**WARNING:** It is recommended that most electrical devices be connected to a dedicated circuit. This means a single socket that only feeds the device in question and on which no other plug or bypass circuit will be added.

### KEEP THESE INSTRUCTIONS

Disposing of your old device



1. This symbol represents a garbage can on wheels with an X across it, indicating that the product comes under European directive 2002/96/EC.
2. Electrical and electronic components must be discarded separately in containers intended for the purpose.
3. Disposal according to the instructions will help reduce the negative consequences and risks to the environment and human health.

### INSTALLATION INSTRUCTIONS

**ATTENTION:** All electrical work necessary for installing this device must be done by a qualified electrician or qualified personnel.

All plumbing work necessary for installing this device must be done by a qualified professional or qualified personnel.

### CABLING

**WARNING:** To keep people safe, remove the fuse of the electrical circuit or disengage the circuit breaker before the installation connection. Make sure there is no electrical voltage at the electrical socket.

Do not use an extension cord or electrical socket adapter with this device. The electrical connections and the ground connections must comply with national, regional and/or local standards.

This device must be supplied with voltage and at the frequency specified in this manual. It must be connected to an individual circuit correctly grounded, and protected by a circuit breaker or a fuse suitable for the installed equipment.

The hydraulic and electrical connections must be made according to the rules of the technology and the local standards applicable to installation of the device.

Furthermore, like all electrical assemblies, the electronics are sensitive to magnetic or electrical interference. If there is a power slave switch for transformers or any other interference emitter, it will be necessary to connect using a suitable cable and possibly to install noise suppression.

# SAFETY INSTRUCTIONS

## a) General safety instructions

**ATTENTION:** This technical manual contains essential information that must be observed during installation, use and maintenance of the pressure devices.

It is imperative that this manual be read and understood before installation and commissioning by all operators and other people in charge. The technical manual must be available at the installation site at all times. All warning and information labels must be clearly visible and legible.

The warning labels are no substitute for reading and understanding the technical manual. Improper use of this device may cause severe injury.

Read the device plate, the warning labels and the installation, use and maintenance manual before installation and commissioning.

If installation is being done indoors, near operating machines, at a high or low temperature, the accessible parts of the device must be protected from all contact.

Appropriate measures for preventing dangerous leaks or overflows must be taken to protect personnel and the environment. Local environmental regulations must be strictly applied.

Usage precautions must be taken to prevent electrical current hazards. Contact the supplier to ensure conformity.

The user is responsible for ensuring that all installation, maintenance and use are done by competent, authorized personnel who adequately know the manual. Make sure that the device is firmly closed before any startup, while scrupulously following the instructions in the manual. All health and safety rules must be observed.

## b) Safety clothing

**WARNING:** Before handling the device, the operator must change into safety clothing, including gloves and face protection. If hot liquids are being handled, the operator must be equipped with heat-resistant NOMEX® clothing or another type to prevent combustion or burns.

The filter must be used in keeping with the instructions given in this manual. No claims may be enforced in the event of improper use.

The pocket filter is designed only for filtering liquids. A fluid is defined as a liquid by regulation 97/23/EC on filter pressure if the vapor pressure at maximum temperature is less than or equal to 0.5 bar. The filter is built according to strict safety standards, and any modification may be extremely dangerous for the users, third parties and the environment.

# DESCRIPTION

The filter is delivered ready for placement and hydraulic connection to your installation. It is equipped in series with a pocket with a 20-micron filtration threshold and a magnetic sparkplug.

The filter has:

- an entry,
- an exit for treated water,
- a 3/4" female drain,
- a 1/4" BSP female blowhole,
- two 1/4" BSP female connectors for manometers.

The clarification group is a kit that is ready for placement and hydraulic and electrical connection to your installation. It is equipped in series with a pocket with a 20-micron filtration threshold and a magnetic spark plug, an electric circulator, shutoff valves, a drain and a blowhole.

The clarification group GTC also has an automatic clog sensor to indicate the right time to replace the filter pocket.

The clarification group has:

- an entry with a shutoff tap,
- an exit for treated water with a shutoff tap,
- an electric circulator,
- 2 manometers to monitor the filter's pressure drop,
- a filter equipped with a filter medium, a magnetic spark plug, an air vent valve on the lid,
- a discharge tap at the low point.

The clarification group GTC also has clarification group:

- a pallet flow detector,
- an automation cabinet for electrical protection and clog management.

The body of the filter is constructed according to the ASME code. Its features, such as gaskets, connections and high-resistance pocket media make for easy use and long service life. The lid is designed to allow correct placement of the pocket. The finish of the pocket support prevents a joint underneath it. The tilting bolts make it easier to move the lid when changing the pocket.

## GENERAL FEATURES

The filter is made with steel pipes.

- Filter design according to: ASME code
- Filter material: Stainless steel 304
- Pocket support: Stainless steel 304
- Felt pocket: 20-micron thickness
- Type of filter joint: Nitrile
- Service pressure: max. 10 bar
- Ambient temperature: 30°C
- Liquid temperature: min. 30°C & max. 85°C
- Low pressure drop: 0.01 bar (clean filter)

	Clarification filter			Clarification group				GTC clarification group		
	5-9	10-20	21-50	XS	5-9	10-20	21-50	5-9	10-20	21-50
Entry/exit diameters	1" 1/4	2"	3"	5/4"	DN32	DN50	DN80	DN32	DN50	DN80
Drain diameter	3/4" F									
Blowhole diameter	1/4" BSP									
Circulator type	-	-	-	80-32	32-65F	50-80	80-140/2	32-65F	50-80	80-140/2
Supply voltage	-	-	-	230V	230V	230V	380/415V	230V	230V	380/415V
Power P1 (W) min./max	-	-	-	4/75	9/190	25/590	-	9/190	25/590	-
Power P2	-	-	-	-	140W	500W	2.2kW	140W	500W	2.2kW
Intensity (A) min./max.	-	-	-	0.04/0.66	0.13/1.30	0.20/2.60	-	0.13/1.30	0.20/2.60	-
Rated current	-	-	-	-	-	-	7.70/4.45A	-	-	7.70/4.45A
Startup intensity	-	-	-	-	-	-	850-950%	-	-	850-950%

## INSTALLATION AND CONNECTIONS

The user must make sure that only authorize, qualified, competent personnel handle, store and perform assembly and connections. Before installation, make sure that the product to be filtered is chemically compatible with the filter's and joint's construction material. Failure to observe the chemical compatibility rules may cause failure in the filtration and poses a risk of severe injury to the user.

### WARNING:

For safety, use appropriate individual safety equipment (goggles, gloves, clothing, etc.).

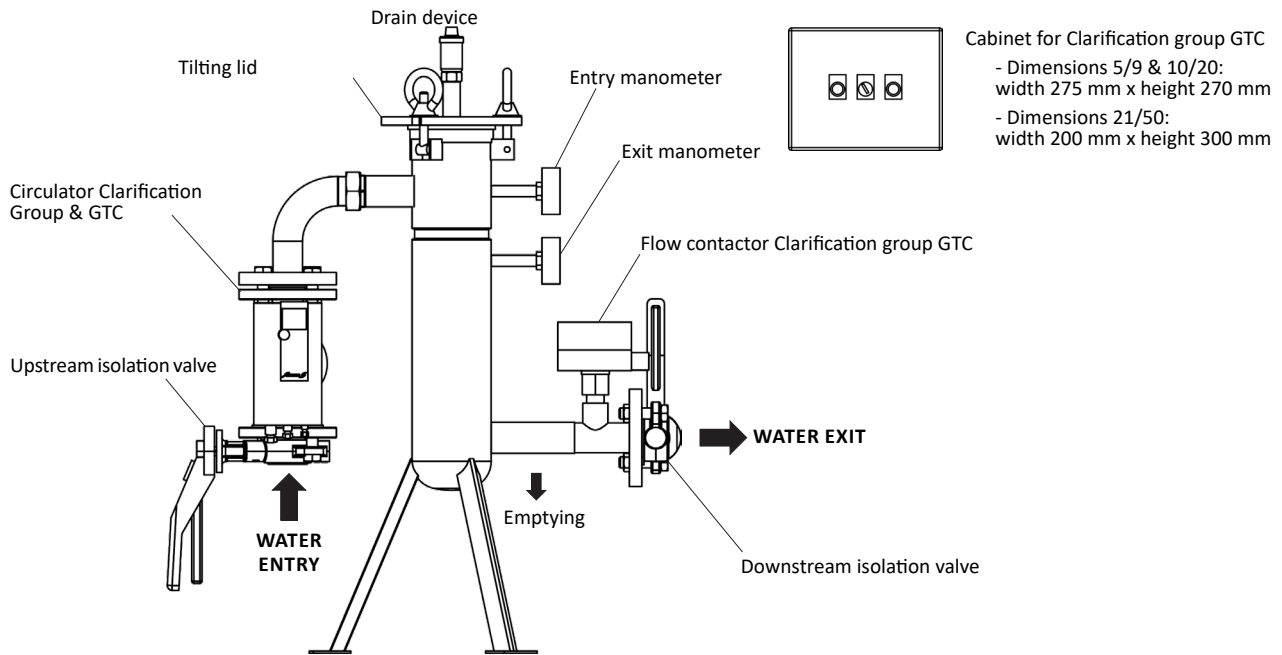
Do not confuse the entry with the exit and make sure that there are no objects inside the filter. Handling must be done only according to:

- this technical manual,
- the safety warnings and instructions,
- the requirements and specifications of filter,
- standard health and safety rules.

The filter must be installed near the circuit to be treated.

Choose a flat, stable location, protected from freezing, dry and with an ambient temperature no greater than 50°C.

For safety reasons, it is imperative that the filter be attached to the floor with a suitable support system.



**ATTENTION:** The entire filtration assembly can tilt and cause property damage and physical injury, especially when the filter is being handled or maintained.

For the clarification group, a single-phase electrical supply with ground must be provided. It must be constantly under voltage, protected from any impacts and splashes (feed cable not provided).

See the power of the installed equipment at the end of the manual. The ground connection is necessary.

The electrical connection and circuit protection must be done according to applicable regulations by qualified personnel.

Verify the frequency and operating voltage indicated on the circulator's type plate. For the hydraulic connection, the entry for water to be filtered must be connected to the holding pipes of the filter upstream from the circulator. The exit for filtered water must be connected to the holding pipes of the filter downstream from the pocket filter.

## RECOMMENDATIONS

**ATTENTION:** The joints may deteriorate and cause severe injury. Replace the joint when in doubt about its condition or when replacing the filter pocket.

The threads are clean and well lubricated. The threads and welded parts are regularly checked for cracks and wear. Damaged parts must be replaced with original parts. Certain parts, such as valves or various indicators, must be checked continuously to prevent bad operation.

**ATTENTION:** Never open a filter that is under pressure. The filter lid has no lifting mechanism. Do not loosen the tilting bolts enough to free the lid. During reinstallation, they allow the lid to be adjusted correctly on the joint.

## ELECTRICAL CONNECTION

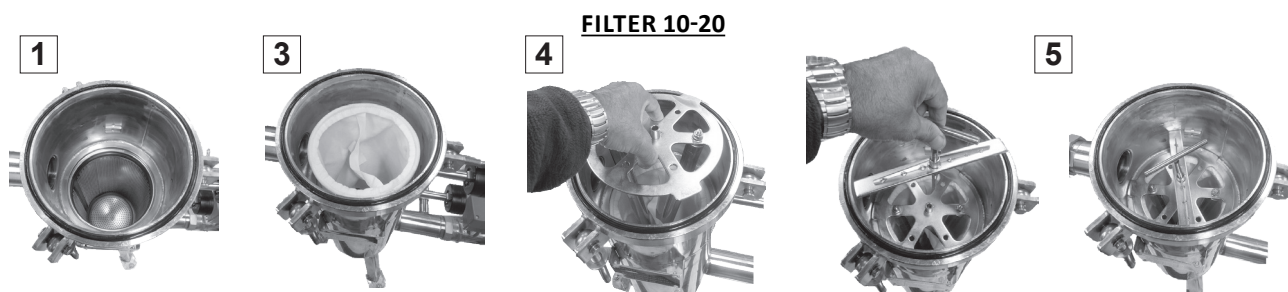
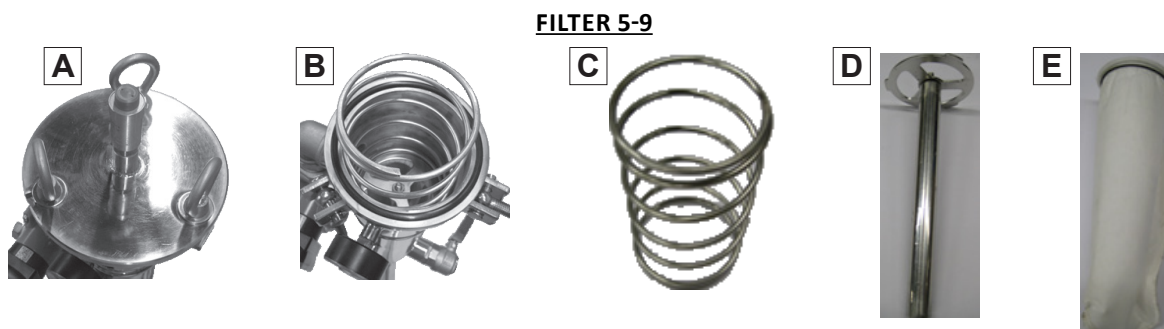
Make the connection (cables not provided) as described on the electrical schematic in this manual.

**ATTENTION:** Verifying the electrical properties on your equipment's type plate is mandatory.

Start with the electrical connection between the control cabinet and the demisting filter equipment. The current feed to the electrical cabinet will be done last.

## INSTALLING THE FILTER POCKET

1. - Open the filter (A) and remove the accessories (B), spring (C for 5-9) and magnetic bar (D).
2. - Make sure the O-ring is placed properly on the pocket (E).
3. - Place the pocket and its O-ring (E) into the filter.
4. - Put the magnetic bar (D) in place.
5. - Position the spring (C for 5-9) (pocket support for 10-20) and reclose the filter.



## REPLACING THE FILTER POCKET

- For the clarification group, stop the circulator and cut the voltage to the installation.
- First close the entry valve, and then the exit valve. Use the control manometer at the entry and exit of the filter to make sure the filter has no pressure.
- Turn the red cap of the Flexvent® located on the filter lid counter-clockwise.
- Unscrew the tilting nuts to free the lid.
- Lift the lid to open the filter.

**ATTENTION:** If a lid falls, it may cause severe injury. Never put your hands, fingers or other limbs between the lid and the filter.

- Remove the filter (A), the magnetic bar (D) and the filter pocket (E).
- Install a new pocket (E) with its O-ring. Make sure that the pocket is properly positioned over its entire circumference — this ensures perfect tightness between the pocket and the filter body.
- Remove the lid joint and clean the throat. If the joint is deteriorated, replace it only with an original part. Insert the joint and make sure it is correctly positioned in the throat.
- Put the magnetic bar (D) back into the filter pocket (E).
- Then position the spring (C) and the filter lid (A).
- Moderately tighten each nut, so that the lid will correctly position on the filter, and then tighten them (tightening torque: 5.9 m.kgf or 57.86 N.m).
- Gently open the entry valve. Close immediately if the slightest leak is detected and start the procedure over from the beginning of the paragraph.

After filling, put the red cap back in its original position.

Start the filter or the clarification group back up according to the paragraph “Commissioning the installation”.

**WARNING:** Very hot liquid may spray and cause severe accidents. It is strongly recommended that proper safety equipment be worn. Do not remove the red “Flexvent®” cap during operation.

# COMMISSIONING THE INSTALLATION

**WARNING:** Hot or chemically active liquids may cause severe injury or property damage. Observe the predefined parameters — improper use can cause severe injury.

**NEVER OPEN A FILTER THAT IS UNDER PRESSURE.**

The device is equipped with a magnetic sensor incorporated in the lid.

Gently open the shutoff valve upstream from the filter.

On the clarification group, open the “Flexvent®” located on the filter lid. Remove the drain screw (beware of hot liquid escaping) until a trickle of water escapes through the hold in the screw. Drain correctly and reinstall the drain screw. After filling, put the red cap back in its original position. Slowly open the shutoff valves upstream and downstream from the clarification group to correctly fill the installation with water.

Check the tightness of all the connections.

Expansion of the materials may cause leaks in the filter and the clarification group, caused by a temperature difference. If necessary, retighten the fittings, gently and gradually, if a leak is detected in the installation.

For the clarification group, it is mandatory also to check the minimum pressure available at the entry to the circulator, which is often a function of the liquid temperature. The installation cannot be drained through the circulator.

To prevent condensation inside the terminal box and stator, the temperature of the pumped liquid must always be higher than the ambient temperature.

## OPERATION CLARIFICATION GROUP GTC

The voltage to the control cabinet of the clarification group is turned on by turning the switch to position 1 on the front; the white signal light goes on. If it doesn't, open the cabinet and check whether the “QSG1” contactor is in “On” position. Also check whether the contactors “QF1” and “QF2” are raised.

When the circulator is operating, check that the butterfly valves upstream and downstream from the installation are open. Check the pressure on the 2 manometers on the filter body.

The pallet detector placed downstream from the filter informs the control cabinet of the installation's flow.

Once the minimum flow on the device has been reached, the pallet detector delivers a contact to the control cabinet that stops the circulator from operating and triggers a “clog” alarm signaled on the cabinet by a red signal light.

The fault can be fixed on terminals 7 and 8 of the control cabinet (see the paragraph “Electrical connection”).

At this time, it is a good idea to perform filter maintenance according to the procedure described in the paragraph “Filter maintenance”.

Dismiss the fault using the switch on the front of the control cabinet.

The installation can then be put back in operation.

## FILTER MAINTENANCE

**ATTENTION:** Before any work on the filter or the clarification group, it is mandatory to observe the safety instructions mentioned in the paragraph “Safety & safety instructions” and to scrupulously observe the rules established at the site where the device is installed.

For your safety, use appropriate individual safety equipment.

Filtration occurs from the interior to the exterior of the pocket installed in the basket (pocket support). The lid is equipped with a gasket. If the filter nonetheless has to be removed, make sure that the gasket is properly placed and tighten the bolts properly (tightening torque: 5.9 m.kgf or 57.86 N.m).

Raise the pressures indicated on the control manometers for the entry and exit during commissioning and/or after cleaning or replacement of the filter pocket.

The filter pocket our filters are equipped with will gradually clog, slower or faster, depending on the nature of the liquid conveyed. Be careful not to exceed a pressure drop of 1 bar between the entry and exit of the filter.

When this pressure drop is reached, it is a good idea to change the filter pockets. To do this, follow the procedure described in the paragraph “Replacing the filter pocket”.

**The pockets are disposable components and are not washed.**

The pocket supports can be rinsed with water or solvent but are not replaced unless they are deformed or corroded.

If a magnetic element is installed inside the filter pocket, it is necessary to wipe the magnetic bar with a dry cloth to eliminate all metallic particles. The inside and outside of the filter body can be cleaned with water or by brushing. Avoid any detergent that may deteriorate the surface or the filter coating.



## FAULTS, CAUSES & SOLUTIONS

FAULTS	CAUSES	SOLUTIONS
The circulator doesn't work.	Installation fuses.	Replace the fuse.
	Differential relay is released.	Reestablish contact.
	Circulator defective, see error messages.	Repair or replace the circulator.
Noise in the circulator, see error messages.	Air inside the circulator.	Purge the circulator.
	Entry pressure too weak.	Increase the pressure.
Flow reduced and pressure drop increased.	Pocket is clogged.	Replace the used pocket with a new pocket.
Leak between the lid and the filter body.	Bolts poorly tightened.	Retighten the bolts.
	Defective joints.	Replace the joint.

## SUPPLIES

CODES	DESIGNATION
P0069203	Pocket PP 20 µ for filter 5/9
P0069214	Pocket PP 20 µ for filter 10/20
P0069232	Pocket PP 20 µ for filter 21/50

## REPLACEMENT PARTS

CODES	DESIGNATION
P0095849	Circulator 80-32 for clarification group XS
P0095840	Circulator 32-65F for clarification group & GTC 5/9
P0095847	Circulator 50-80 for clarification group & GTC 10/20
P0974855	Circulator 80-140/2 for clarification group & GTC 21/50
P0069202	O-ring for filter lid 5/9
P0069213	O-ring for filter lid 10/20
P0069231	O-ring for filter lid 21/50
P0069204	Magnetic filter bar 5/9
P0069215	Magnetic filter bar 10/20
P0069233	Magnetic filter bar 21/50
P0043079	Manometer diameter 63 mm 10 bar
P0031620	Automatic drain DN15
P0029295	Pallet flowmeter 1" M measurement range 0.8 to 90 m3/h

# CIRCULATOR FEATURES

## CLARIFICATION GROUP XS

### MOTOR:

230 V - 50 Hz (60Hz) single-phase motor with wet rotor, pads lubricated by the pumped fluid.

Synchronous motor with ECM technology (Electronically Commutated Motor), equipped with a rotor and permanent magnets. The magnetic field turning the stator is created by electronic switching of the reels.

P1 (W) min 4W - max 75W

I (A) min 0.04 - max 0.66

Speed (rpm) min 1200 - max 4800

Protection rating: IP X2D

Max. temperature of fluid conveyed: TF 95

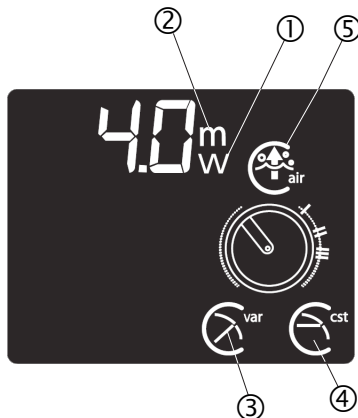
EMC conformity: - 61000-6-1  
- 61000-6-2  
- 61000-6-3  
- 61000-6-4

### INSTALLATION:

Motor axis always horizontal.

Connection to the installation by union connections.

### DISPLAY:



### SETTINGS:

#### Setting the pressure head (2).

Turing the white button shows an LED indicator of the pressure head in m.

To make adjustment easier, the white button can be set to the symbols I, II or III on the  $\Delta p_c$  scale as reference points equivalent to the old 3-speed circulators.

#### Electrical consumption (1).

In operation mode, the currently absorbed power is displayed in W.

### REGULATION FUNCTION:

With this adjustment mode (3), the electronics allow reduction of the differential pressure (pressure head) if the flow is reduced, according to the predefined differential pressure instruction.

In adjustment mode (4), the electronics keep the circulator's differential pressure constant whatever the flow, based on the predefined pressure instruction.

### DEGASSING FUNCTION (5):

1st utility: During first startup, this function allows degassing of the air bubbles that are in the circulator's rotor chamber.

2nd utility: This function also supports degassing of the heating installation. Its function frees the air bubbles trapped in the installation and sends them to the highest point of the installation (degasser).

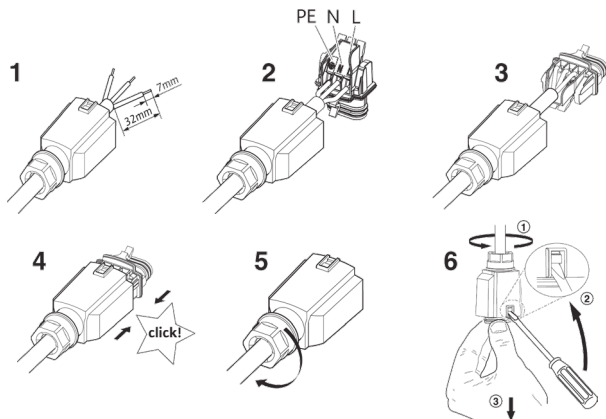
The "degassing" function lasts about 10 minutes. At the end of those 10 minutes, the pressure head must be adjusted again —if it isn't, the circulator will revert to the factory setting.

### ELECTRICAL CONNECTION:

WARNING! Risk of electric shock!

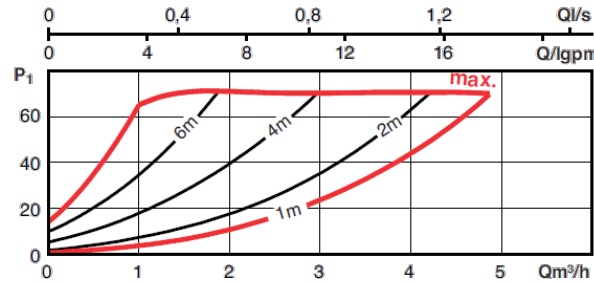
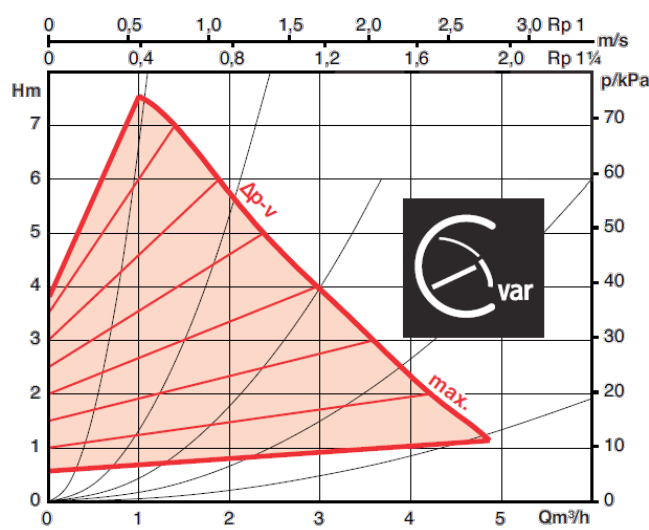
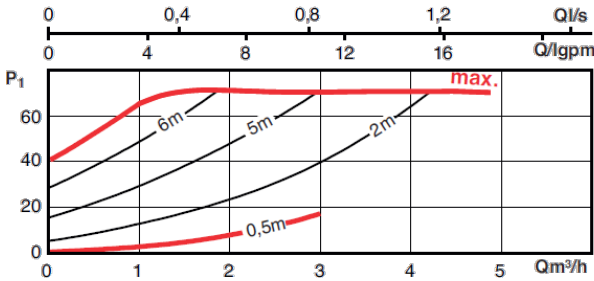
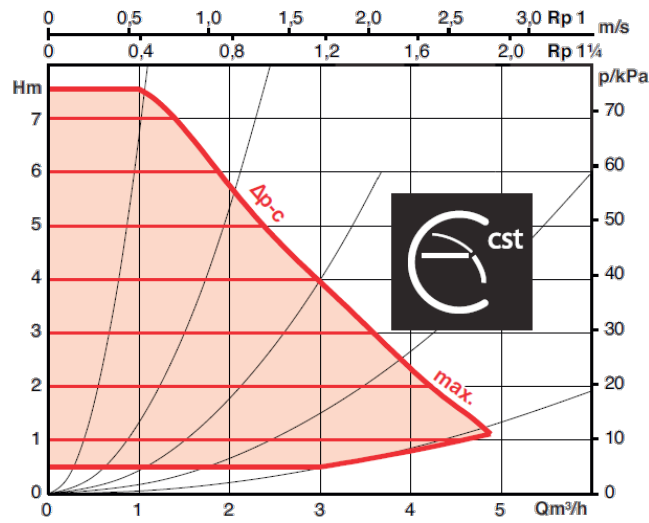
The electrical connection must be made by an electrician authorized by the company that provides the electricity (EVU) and in accordance with local regulations [such as VDE].

- The properties of the electrical voltage at the network connection must correspond to the indications on the type plate.
- Connect the connector



- Connection at sector: L, N, PE
- Max. fuse caliber: 10 A, delayed action.
- Link the pump to the ground according to the rules of the technology.
- The electrical connection must be made according to standard VDE 0700/Part 1 using a fixed electrical cable equipped with a multi-polar switch or contactor with at least 3 mm of range from opening of the contact.
- To ensure protection against water drops and to lighten the traction constraints at the PG screw joint, use an electrical connection line of an adequate diameter (e.g. H05WF3G1.5 or AVMH-3x1.5).
- If the pump is used in an installation where the water temperature exceeds 90°C, use an electrical connection line with adequate thermal resistance.
- The electrical line must be installed so that it never touches the pipes, the pump body or the motor casing.
- To remove the connector, use a screwdriver.

**HYDRAULIC PERFORMANCE:**



**COMMISSIONING:**

**WARNING! Burn hazard!**

Depending on the pump's or installation's mode (temperature of the fluid conveyed), the entire pump may reach a very high temperature.

There is a burn hazard upon bodily contact with the pump!

**First Commissioning**

Fill and degas the installation in keeping with the instructions. In general, the pump's rotor compartment degasses itself after it has been operating a short time. Nonetheless, if it is necessary to degas the rotor compartment, go back to the "Air" function (5) and activate the "On" function.

**MAINTENANCE**

Maintenance and repair must be done only by qualified, specialized personnel!

**WARNING! Risk of electric shock!**

Any electrical risk must be eliminated.

Before any maintenance or repair work, drain the voltage from the pump and protect it from the voltage being turned on at the wrong time. Damaged cables should only be repaired by a qualified electrician.

**ERROR MESSAGES**

No. E04 = Undervoltage, electrical supply too weak on the network side. Check the supply voltage.

No. E05 = Overvoltage, electrical supply on the network side too strong. Check the supply voltage.

No. E10 = Blockage, rotor blocked. Call technical service.

No. E11 = Dry operation, air in the pump. Check the water quantity or pressure.

No. E21 = Overload, motor rough. Call technical service.

No. E23 = Short circuit, motor intensity too high. Call technical service.

No. E25 = Making contact/winding, defective winding. Call technical service.

No. E30 = Module temperature higher than normal, module interior too hot. Check the use conditions.

No. E36 = Operating out of synch, motor faults. Call technical service.

## CLARIFICATION GROUP 5/9 & 10/20

Min. supply pressure (greater than atmospheric pressure) on the pump's suction pipes to prevent cavitation noises (with a fluid temperature  $T_{fluid}$ ):

from  $-10^{\circ}\text{C} \dots +50^{\circ}\text{C} = 0.3 \text{ bar}$

$+95^{\circ}\text{C} = 1.0 \text{ bar}$

$+110^{\circ}\text{C} = 1.6 \text{ bar}$

The values are valid up to 300 m above sea level, increase for higher locations: additional 0.01 bar/100 m.

### DESIGN

#### Hydraulic part:

- Single or double body, union or flange.

Internal line of the volute and wheel in 3D for maximally optimizing the hydraulic performance.

- A wheel joint between the pump body and wheel improves the performance further by limiting internal recycling of fluid.

- The pump body is completely coated with a cathoretic treatment to resist corrosion.

#### Motor:

- Single-phase 230 V – 50/60 Hz.

- Single-phase motor with wet rotor, pads lubricated by the pumped fluid.

Synchronous motor with ECM technology (Electronically Commutated Motor), equipped with a rotor and permanent magnets. The magnetic field turning the stator is created by electronic switching of the reels.

The rotating field creates continuous torque through attraction of opposing magnetic poles of the rotor, by controlling its position (synchronous motor). This ensures optimal motor performance whatever the speed. The separation between the wet rotor and winding is provided by a mantel made of composite, completely non-magnetic, to reduce motor losses.

Speed: 1,400 to 4,800 rpm

Network voltage: single phase 230 V  $\pm$  10%

Frequency: 50 Hz - 60 Hz

Insulation class: 155 (F)

Protection rating: IPX4D

EMC conformity: EN 61800-3

issue EN 61000-6-3

immunity EN 61000-6-2

#### Protection differential (FI)

The FI protection differentials of "all current" models according to EN 61008-1 are permitted.

#### INSTALLATION:

Motor axis always horizontal.

Connection to the installation by union connections.

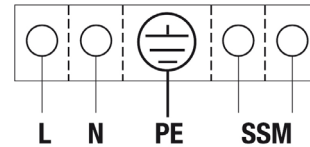
#### ELECTRICAL CONNECTION:

In the boxes and terminals,

L – N: connection to the network, single-phase 230V 50 Hz current

PE: grounding

SSM: dry contact for fault report (normal closed, open for fault) Max. load: 1 A – 250 V – AC



### OPERATIONAL MODES

Depending on the network pressure drop, the self-regulating circulator allows automatic adaptation to the rotation speed to keep electrical consumption minimal (ECM technology) and to keep the operating noise level as low as possible. The circulator properties are adjusted automatically based on the installation's heating or cooling needs.

#### Manual settings

Basic function settings, i.e.: start/stop, constant  $\Delta P$  control mode, variable  $\Delta P$  control mode and speed regulation.

#### Constant pressure

In adjustment mode, the electronics keep the circulator's differential pressure constant whatever the flow, based on the predefined pressure instruction.

#### Variable pressure

With this adjustment mode, the electronics allow reduction of the differential pressure (pressure head) if the flow is reduced, according to the predefined differential pressure instruction.

#### Speed settings

The speed can be adjusted manually to a constant value between 1,400 and 4,800 rpm (depending on the model).

Remote surveillance, additionally, a dry contact (open by default) allows remote surveillance of every operating incident (e.g. by GTC).

### GENERAL PUMP FUNCTIONS

The pump is electronics with an electronic protection module against overloads, which shuts off the pump if there is an overload.














To record data, the regulator module is equipped with non-volatile memory. All data settings are retained in case of an electrical outage, however long it lasts. Once the power comes back on, the pump starts operating again with the setting values configured before the power went out.

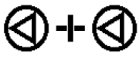


SSM: The contact for the centralized fault report (normally open potential-free contact) may be connected to centralized technical management. The internal contact is closed when the pump has no power, but there is no breakdown or fault in the regulator module.

For connection to external monitoring units, the system can be extended by modules with interfaces suitable for communication. Analog and digital IF modules are optionally available.

#### MEANING OF THE SCREEN ON THE LCD DISPLAY

**NOTE:** The screen's legibility largely depends on the observer's viewing angle. Large variations in the ambient temperature speed aging of the screen and may limit its legibility.

 auto	Automatic switching to slow mode is enabled. Activation of slow mode requires minimal power.
 auto	The pump turns in slow mode at a minimum rotation speed.
(no symbol)	Automatic switching to slow mode is blocked, i.e. the pump operates only in regulation mode.
	Slow mode is activated by a serial digital interface or "Ext.Min", regardless of the system's temperature.
	The pump turns at maximum rotation speed for the mode. The setting can only be activated by a serial digital interface.
	The pump is activated.
OFF 	The pump is deactivated.
H 5,0 <sub>m</sub>	The differential pressure setpoint is set to H = 5.0 m.
	Regulation type $\Delta p-v$ , regulation to variable differential pressure setpoint.
	Regulation type $\Delta p-c$ , regulation to constant differential pressure setpoint.
	The "Actuator" operating mode deactivates the setting in the module. The pump's rotation speed is kept at a constant value. The rotation speed is regulated by the adjustment knob or provided by the bus interface.
	"L" is displayed when the Q limit operating mode is activated. The Q limit operating mode limits the maximum flow to a set value. The setting can only be made through an IR control and service unit (accessory).
26,0 <sup>RPM</sup> <sub>x100</sub>	The pump is set to a constant rotation speed (here 2600 rpm) (regulation mode).
10V	With the regulation mode, the rotation speed or the pressure head of the operating mode $\Delta p-c$ or $\Delta p-v$ of the pump is set with the entry 0-10 V from the IF module (accessories) Ext.Off, Ext.Min and SBM. Therefore the adjustment knob has no function for entering the setpoint.
	Regulation type $\Delta p-T$ , regulation to the setpoint differential pressure depending on the temperature. The current setpoint value HS displays. This type of regulation can only be activated through the IR control and service unit (accessories) or through the serial digital interface.
	All the settings on the module are blocked except for fault acknowledgement. The block is engaged by the IR control and service unit (accessories). The settings and blockage can only be made with the IR control and service unit (accessories).
	The pump operates through a serial data interface. The "Start/Stop" function is not activated on the module. It is still only possible to set the operating modes, display position or fault acknowledgement on the module. The IR control and service unit (accessories) allows momentary interruption of the interface's operation (to check, extract data). Some IF modules allow the menu to be reopened. (Despite the plugged-in module, the menu can be operated manually) (see the documentation for the IF modules).

SL	The pump operates as a slave pump. It is not possible to change the screen display.
	The dual pump operates in complementary mode with output optimization (master + slave).
	The dual pump works in Main Operation/Reserve (master or slave).
Id	Displays on pumps equipped with certain IF modules (see the documentation for the IF modules) when a signal (checkmark) is issued by the pump's central technology.
	The pump is set in "US Units" mode.
HV	The error tolerance matrix is activated. Heating operating mode (in the event of faults).
AC	The error tolerance matrix is deactivated. Air conditioning operating mode (in the event of faults).

Menu structure: There are three menu levels. The levels at the bottom of the display for the main settings are accessible from Level 1 by pressing and holding the adjustment knob.

- Level 1 - Status display (display of operating status)
- Level 2 - Operation menu (setting main functions): Press the adjustment knob for more than 1 second.
- Level 3 - Option menus (other setting): Press the adjustment knob for more than 6 seconds.

**NOTE:** After 30 seconds without an entry, the display returns to level 1 (display of operating status). Unconfirmed temporary changes are rejected.

#### INSTALLATION AND ELECTRICAL CONNECTION

**DANGER!** Death hazard!

Any non-compliant installation or electrical connection can result in death. All hazards associated with electricity must be eliminated.

- The electrical connection must be installed only by qualified technicians in compliance with applicable regulations!
- Observe the accident prevention regulations!
- Observe the local electricity providers' instructions!

Pumps with preinstalled cable:

- Never pull the pump cable!
- Do not bend the cable!
- Never place an object on the cable!

#### INSTALLATION

**WARNING!** Risk of physical injury!

Non-compliant installation may cause physical injury.

- There is a crushing hazard!
- There is a risk of injury by sharp ridges or edges. Wear appropriate safety equipment (such as gloves)!
- There is a risk of injury from the pump or motor falling! If necessary, secure the pump or motor with suitable lifting equipment to prevent it from falling!

**ATTENTION!** Risk of property damage!

Non-compliant installation may cause property damage.

- Have only qualified personnel do the assembly!
- Observe applicable national and regional regulations!
- The pump can be carried only by the motor/pump body for transport. Never carry it by the module, terminal box or preinstalled cable.

Installation indoors:

- Install the pump in a well-ventilated location and — in keeping with the protection index (see the pump's type plate) — away from dust.

Ambient temperatures below -10°C are prohibited.

- Installation outdoors:

- Install the pump in a pit (e.g. light shafts or ring vat) with a lid or in a cabinet/body to protect it from bad weather.

Ambient temperatures below -10°C are prohibited.

- Do not expose the pump to direct sunlight.

- The pump must be protected such that all condensation flow grooves stay free of dirt.

- Protect the pump from rain. Drops of water from above are permissible if the electrical connection has been made in keeping with the assembly and commissioning manual and the terminal box has been closed according to regulations.

**ATTENTION!** Risk of property damage!

If the permissible temperature is not reached or if it is exceeded, provide adequate heating or ventilation.

The electronic module can deactivate due to excessive temperatures.

Never place objects on the electronic module. Maintain an adequate space of at least 10 cm around the electronic module.

- Perform all welding and soldering work before pump installation.

**ATTENTION!** Risk of property damage!

Impurities coming from the hydraulic circuit can destroy the pump's operation. Rinse the pump's hydraulic circuit before installation.

- Provide stop shutoff valves upstream and downstream from the pump.
- Use suitable devices to attach the pipes to the ground, platform or wall such that the pump does not have to support the weight of the pipes.
- For assembly on the supply line of an installation in an open circuit, tapping of the safety suction line must be installed upstream from the pump (DIN EN 12828).
- Assemble the pump at a location that is easy to access to facilitate later inspection or replacement.
- During assembly or installation, observe:
  - Perform assembly without any electrical voltage and with the pump shaft placed horizontally (see assembly positions).
  - Make sure the pump can be installed with the right flow direction (according to Fig. 2a/2b). Observe the triangle on the pump body indicating the direction.
  - Make sure the pump can be installed in the permissible position. If necessary, turn the module with the regulator module.

**ATTENTION!** Risk of property damage!

Water may get into the module if it is not positioned correctly. Positioning the module with the cable connection directed upward is not authorized!

**Assembling the pump with a threaded connection**

- Install the correct threaded connections before assembling the pump.
- When assembling the pump, use the flat joints provided between the suction flange or discharge and the threaded connections.
- Screw the sleeves onto the thread of the suction flange or discharge and tighten with the adjustable wrench or pipe wrench.

**ATTENTION!** Risk of property damage!

To tighten the pump's threaded connections, do not hold the motor/module, but use the wrench faces on the suction flange or discharge.

**Assembling the flange pump**

Assembly of pumps with combined flange PN6/10 (flange pumps DN32 to DN 65 inclusive) and flange pumps DN80.

**WARNING!** Risk of injury and property damage!

If the installation is bad, the flange connection may be damaged and leak. There is a risk of injury or property damage due to very hot fluid escaping.

- Never connect two combined flanges to each other!
- Pumps with combined flange are not authorized for PN16 service pressures.
- Use of safety components (such as a Grower washer) may cause leaks in the flange connection. They are therefore not authorized. Between the head of the screw or nut and the combined flange, joint washers must be used.
- The authorized tightening torques according to the table must not be exceeded even if screws with higher resistance ( $\geq 4.6$ ) are used, because otherwise chipping can occur on the slot edges. The screws therefore lose their pre-stressing and the flange connection can no longer be tight.

- Use long enough screws. The screw's thread must extend at least one screw thread from the nut.

**Insulating the pump in cooling or air conditioning circuits**

- For use in cooling or air conditioning circuits, use diffusion-tight insulation materials available on the market.

**ATTENTION!** Risk of property damage!

If the diffusion-tight insulation is provided by the customer, the pump body must not be insulated up to the joint line with the motor. The condensation flow holes must remain free so that the condensation forming in the motor can flow out unobstructed (Fig. 6). Otherwise, accumulation of condensation in the motor can cause an electrical fault.

**Electrical connection**

**DANGER!** Death hazard!

An improper electrical connection may cause death by electrocution.

- Have the electrical connection made only by electrical installers authorized by the local electricity provider and in keeping with applicable local regulations.
- Before working on the pump, the supply voltage must be disconnected on all poles. Work on the module must not start until after 5 minutes, because there will still be dangerous contact voltage.
- Make sure that all connections (including the dry contacts) are free of any electrical voltage.
- If a regulator module is defective, do not start the pump.
- In the event of unauthorized removal of regulation or control components, electrocution may occur from contact with internal electrical components.
- The pump must not be connected to a continuous electrical supply (ASI or IT network).

**ATTENTION!** Risk of property damage!

A non-compliant electrical connection may cause property damage.

- The motor can be damaged if incorrect voltage is applied!
- Activation by triac relay or semiconductor must be checked case by case, because the electronics may be damaged or the EMC (electromagnetic compatibility) may be negatively affected!
- If the pump is activated or deactivated with external control devices, all supply voltage timing circuits must be deactivated (e.g. by pulse packet control) to prevent damage to the electronics.
- The properties of the network current and supply voltage must correspond to the indications on the type plate.
- The electrical connection must be made through a fixed connection line (3 x 1.5 mm<sup>2</sup> minimum section), equipped with a plug device or multi-polar switch with a contact opening of at least 3 mm.
- If the machine is stopped through a network relay to be provided by the customer, the following minimum requirements must be met: Rated current  $\geq 10$  A, rated voltage 250 VAC.
- Fuse protection: 10/16 A, delayed action or thermal circuit breaker with characteristic C.
- Dual pumps: Equip the two motors for the dual pump with a separate connection line to the network that can be drained of voltage and with separate network side fuse protection.

- Thermal protection of the motor by the customer is not necessary. If such protection is already provided in the installation, it must be bypassed or set to the highest current value.
- Discharge current by leff pump  $\leq 3.5$  mA (according to EN 60335)
- It is recommended that the pump be protected with a differential circuit breaker. When dimensioning the differential circuit breaker, consider the number of pumps connected and the rate current of their motors.
- When using the pump in installations with water temperatures higher than 90°C, it is necessary to use a heat-resistant connection conduit.
- All connection lines must be placed so as never to come into contact with the pipes and/or with the pump body and the motor casing.

To guarantee protection against water drops and strain relief for the screw-on cable ducts, use an adequate external diameter and screw them tightly enough. Moreover, near the cable gland, the cables must be folded to form a loop that allows water drops to flow out. Close the unconnected cable glands with existing sealing washers and tighten them completely.

**DANGER!** Death hazard by electric shock!

The voltage occurring on the IF module interface contacts may pose an electrocution hazard.

If no IF module (accessories) is installed in the housing, the stopper must prevent any risk of electrocution on the IF module interface. Make sure the stopper is perfectly in place.

- Start the pumps only with the module lid correctly screwed on. Make sure the lid joint is perfectly in place.

**WARNING!** Risk of injury and property damage!

The protection index and electrical safety are not guaranteed if the cover of the air entry and exit openings (black cover) is damaged. Make sure the covers are in the right position.

- Fitting for the screw-on cable glands:

Standard DIN EN 60204-1 (VDE 0113, P.1) must be observed:

- Par. 14.1.3 by analogy: Conduits of different electrical circuits can be part of the same multiple cable if the highest insulation from the cable is adequate.
- Par. 4.4.2 by analogy: If there are operational disruptions from electromagnetic compatibility, the delivery circuits for the low-level signals must be separated from high-tension cables.

**DANGER!** Death hazard by electric shock!

If the network and SSM supplies are run through the same 5-strand cable, the SSM feed must not be done with low protection voltage, because that may cause voltage transmissions.

- Ground the pump/installation according to regulations.
- L, N,: Connection voltage to the network: 1~230 VAC, 50/60 Hz, DIN IEC 60038. It is also possible to connect the network between 2 phases of a three-phase network grounded at the neutral point with voltage between phases of 3~230 VAC, 50/60 Hz.
- SSM: A centralized fault report is available at the SSM terminals in the form of a dry opening contact. Contact load:
  - Minimum permissible: 12 V CC, 10 mA
  - Maximum permissible: 250 V AC, 1 A

- Number of startups:
- Starting/stopping by the supply voltage  $\leq 20 / 24$  h
- Starting/stopping by Ext.Off, 0-10 V or by serial digital interface  $\leq 20 / h$

## COMMISSIONING

It is mandatory to observe the hazard indications and the warnings in the previous chapters!

Before starting the pump, make sure it is suitably assembled and connected.

### Fill and drain

**NOTE:** An incomplete air purge causes noises in the pump and the installation.

Fill and drain the installation correctly. A purge of the pump's rotor chamber takes place automatically after a short period of operation.

Dry operation for a short time does not damage the pump.

**WARNING!** Risk of injury and property damage!

Loosening of the motor head or connection of the flanges or threaded connection for air to escape is not authorized!

- There is a burn hazard!

Escaping fluid may cause injury and property damage.

- Burn hazard upon contact with the pump!

Depending on the pump's or installation's operational status (temperature of the fluid conveyed), the entire pump may get very hot.

### Menu settings

**WARNING!** Burn hazard!

Depending on the installation's operational status, the pump assembly may reach an extremely high temperature. There is a risk of burning from contact with metal surfaces (e.g. cooling ribs, motor casing, pump body).

The setting on the regulator module can be made during operation by working the adjustment knob. Do not touch hot surfaces.

### Handling the adjustment knob

- From the basic setting, pressing the button (for the first menu: press for more than one second) allows a choice of successive settings menus in a defined order. The corresponding symbol flashes.

- Rotating to the right or left allows modification of the parameters toward the front or back of the screen. The new set symbol flashes. Pressing the button confirms the new setting. This leads to the next setting option.

- The setpoint value (differential pressure or rotation speed) is modified in the basic settings simply by rotating the adjustment knob. The new value flashes. Pressing the button confirms the new setpoint value.

If the new setting is not confirmed, the old value is restored after 30 seconds and the setting goes back to the basic settings.

### Adapting the display

- For the current layout of the regulator module, horizontal or vertical, it is possible to change the display in steps of 90°. For this, the setting must be made from position 3 of the menu. The screen position given by the basic setting flashes at "ON" (for the horizontal position).

It is possible to adapt the display by turning the adjustment knob. "ON" flashes for the vertical position. Pressing on the adjustment knob confirms the setting.



## Menu settings

When controlling the simple pump display, the following menus appear:

- Operation of the simple pump:

Settings for commissioning/sequence of the menu in operation (horizontal representation of the display).

When the module is started, all the symbols appear on the screen for 2 seconds. The the current setting will freeze.

### Current setting (basic) (factory setting):

**H 5.0m** - e.g. setpoint pressure head  $H_s = 5.0$  m and  $\frac{1}{2} H_{max}$  (factory setting depending on pump type).



- Regulation type  $\Delta p-v$ .

- The pump operates in regulation mode; the slow mode is blocked (also see the menu item).



- empty = simple pump.



- The setpoint differential pressure is regulated by turning the adjustment knob. The new setpoint differential pressure flashes.



- Briefly pressing the button confirms the new setting. If the button is not pressed, the previously set setpoint differential pressure that flashed goes back to its previous value after 30 seconds.



- Press the control button for more than 1 second. The next menu item displays.

If no setting is made in the menu for 30 seconds, the screen will revert to the basic setting.

### Setting the screen position

vertical / horizontal

The set screen position is indicated by "ON" flashing.



- Turning the adjustment knob changes the position.



- The setting is confirmed.

### The currently set regulation type flashes.



- Other types of settings can be chosen by turning the adjustment knob.

The new type of setting chosen flashes.



- The setting is confirmed and goes to the next menu.

### The menu item only appears if an IF module with an entry of 0-10 V is connected.

The symbol "10 V" displays.

Entry 0-10 V start/stop.

### Activate the entry 0-10 V:

The screen shows "ON" and the "Motor Module symbol".

It is not possible to manually set the setpoint value with the adjustment knob.

"10 V" appears in the basic setting.



- The setting can be changed by turning the adjustment knob.

### Deactivate the entry 0-10 V:

The screen shows "Off".



- The setting is confirmed.

If no entry is activated, the menu guidance moves to the point.

If no entry voltage reaches the 0-10 V contact, the screen shows "Off" and the "motor symbol" doesn't glow.

### Start/stop pump

Start the pump:

The screen shows "ON" and the "Motor Module symbol"



- The setting can be changed by turning the adjustment knob.

### Stop the pump:

The screen shows "OFF".



- The setting is confirmed.

When the pump is stopped the "Motor symbol" goes out.

### Authorize/block slow mode

One of the following elements flashes



- Normal regulation mode, slow mode blocked, or



- Slow mode authorized:



- Appears during automatic regulation mode, or



- During slow mode.



- Chose one of the two settings by turning the adjustment knob.



- The setting is confirmed.

The screen goes to the next menu.

The menu item is skipped when:

- the pump operates with IF modules,
- the setting mode is chosen,
- the entry 0...10 V has been activated.

### Operation of the dual pump:

#### Setting for commissioning

When the module is started, all the symbols appear on the screen for 2 seconds.

Then the menu appears.

On the screen for the two pumps, the symbol MA (master) flashes.

If no setting is made, the two pumps operate with constant differential pressure ( $H_s = \frac{1}{2} H_{max}$  with  $Q = 0$  m<sup>3</sup>/h).

Setting the left pump's adjustment knob selects it as master, and the setting from the operating mode menu appears on the screen. The right pump's screen automatically shows SL (slave).

The configuration: left pump master, right pump slave is chosen. Turning the button on the slave pump therefore no longer has any meaning.

Settings are no longer possible.

It is not possible to make a setting from the position of the screen on the slave pump.

Setting the slave pump position is done on the setpoint given by the master pump.

#### Operation of the dual pump: Menu sequence in operation

When the module is started, all the symbols appear on the screen for 2 seconds. The the current setting will freeze. Scrolling on the MA screen shows the same menu sequence as on the simple pump.

Then the MA menu displays continuously.

Making settings to the MA makes the SL appear on this screen. When the slave (SL) has been activated by the setting, the other pump (right) becomes master. An interchange between the master and slave has therefore taken place.

Now programming can only be done on the right pump (MA).


Settings to the SL are no longer possible. The change from master to slave is only possible from the master system.

Regulation of the supplementary operating mode or main/ reserve operating mode

The current setting shows:

 - Supplementary operating mode, or

 - Main/reserve operating mode.

 - Turning the adjustment knob lights up the other setting.


 - The setting is confirmed.


The screen reverts to the basic setting.

#### Menu on the IF modules with bus function:

##### Signal to Building Technical Management (GTB)

"ID" (ID number) appears on the IF modules connected to the serial digital interface to issue a signal to the building technical management. (for service or startup of the centralized technical control (GTC)).

 - The ID display flashes when the adjustment knob is turned.

 - The ID signal is registered on the GTB.


The screen goes to the next menu.


If no signal is to be issued, the adjustment knob can be turned until the ID display no longer flashes.

With the button turned, the screen goes to the next menu.

##### Setting the bus address

"OFF": The bus communication is stopped.

 - Appears on the screen and indicates that communication is made through the serial data interface.

 - By turning the adjustment knob, you can select a BUS address (e.g. 64).

The address zone depends on the bus system used (see the corresponding assembly and commissioning manual).

 - The setting is confirmed.

The screen goes to the next menu.

##### Configuring the IF modules

This setting is for configuring the IF modules (e.g. the Baud ratio, the bit format); A, C, E and F are free parameters.

The menu display and various parameters depend on the IF module in consideration.

See the installation and commissioning manual for the IF module!


- The values can be changed by turning the adjustment knob.

- The setting is confirmed.

The screen reverts to the basic setting.

##### Option menu: Adjustment of the heating (HV) / air conditioning (AC) operating mode and conversion of IS to US units.


##### Adjustment of the heating (HV) / air conditioning (AC) operating mode.

 - In the basic setting, press the adjustment knob (menu 1 level) for more than 6 seconds.

During the 6 seconds, the menu 2 level appears after about 1 second (menu item, setting the display position).

After another 5 seconds, the screen goes to menu 3 level.

The "HV" display appears (factory setting).


 - By turning the adjustment knob, the cooling/air conditioning (AC) operating mode can be changed. "AC" flashes.

 - The setting is confirmed.

The screen goes to the next menu.

##### Conversion of IS units into US units

"m ft" appears, the unit currently entered flashes. (factory setting [m]).

 - By turning the adjustment knob, it is possible to set to [ft]. The new setting flashes.

 - The setting is confirmed.

The screen reverts to the basic setting.

If no setting is made in the menu for 30 seconds, the screen will revert to the basic setting.

##### Fault indication: Simple pump and dual pump

If there is a fault, the current fault is indicated by E (Error), by the code number and by the error source flashing: motor, regulator module or network feed.

For the code numbers and their meanings,

See "Fault reports".

## FLOW LIMITATION

If there is an overfeed of product because of a differential pressure setting ( $\Delta p-c$ ,  $\Delta p-v$ ), the maximum flow can be reduced within limits of 25% to 90%  $Q_{max}$  by using the IR control and service unit (accessory).

(Pump software version SW  $\geq 6.0$ ). When the set value is achieved, the pump regulates on the characteristic curve for the length of the limit — never beyond.

**NOTE:** “Q limit” cannot be set without using the IR control and service unit (accessory). The partial zones can be under-supplied when the “Q limit” is used in unequalized hydraulic systems. Perform hydraulic equalization.

## OPERATION

Failure of electronic devices due to electromagnetic fields.

When the pumps are operating, the electromagnetic fields are generated with the frequency converter. This disrupts certain electronic device, which can cause the device to malfunction and in turn cause physical injury or death (e.g. for people with active or passive medical devices implanted).

This is why, during operation, people with heart pacemakers should not be allowed near the installation or pump, for example. On magnetic or electronic data media, this can cause data loss.

## DEACTIVATION

The pump must be put out of service for maintenance or repairs or for dismantling.

**DANGER!** Death hazard!

When work is being done on electrical devices, there is danger of electric shock.

- Work on the electrical part of the pump must be done only by qualified electricians.
- For all maintenance and repair work, drain the voltage from the pump and protect it from the voltage being turned back on at the wrong time.
- Work on the module must not start until after 5 minutes, because there will still be dangerous contact voltage.
- Make sure that all connections (including the dry contacts) are free of any electrical voltage.
- Even without voltage, the pump may have current running through it. Furthermore, the driven rotor induces dangerous contact voltage that remains on the motor's contacts. Close the shutoff valves upstream and downstream from the pump.
- If a regulator module is defective, do not start the pump.

**WARNING!** Burn hazard!

Burn hazard upon contact with the pump!

Depending on the pump's or installation's operational status (temperature of the fluid conveyed), the entire pump may get very hot.

Let the installation and pump cool to the ambient temperature.

## MAINTENANCE

Observe the chapter “Shutting down” before starting maintenance, cleaning or repair work.

The security instructions given must be observed.

Once the maintenance and repair work are done, assemble and connect the pump according to the chapter “Assembly and electrical connection”.

The pump must be started up according to “Commissioning”.

## DISMANTLING/INSTALLATION

**WARNING!** Risk of injury and property damage!

If dismantling or installation is not done according to the rules, personal injury and property damage may result.

- Burn hazard upon contact with the pump!

Depending on the pump's or installation's operational status (temperature of the fluid conveyed), the entire pump may get very hot.

- If the system's fluid temperatures and pressures are too high, there is a burn risk from hot fluid.

Before dismantling the motor, close the shutoff valves on the two sides of the pump, let the pump cool to ambient temperature and empty the blocked sector of the installation. Empty the installation if there are no shutoff valves.

- Observe the manufacturer's instructions and the safety data sheets on any additives during installation.

- There is an injury risk from the motor or pump falling after the fastening screws are loosened.

Observe the national accident prevention regulations and any internal safety instructions for work, operation and operator safety. Wear safety equipment when necessary!

**WARNING!** Danger of a powerful magnetic field!

There is always a powerful magnetic field inside the machine, which can cause injury or property damage during an improper dismantling.

- As a matter of principle, the rotor must be removed from the motor only by qualified personnel!

- There is a crushing hazard! When the rotor is being removed from the motor, it can be brutally brought back to its starting position due to the powerful magnetic field.

- If the unit consisting of the wheel, shield and rotor must be removed from the motor, people wearing medical devices, such as heart pacemakers, insulin pumps, hearing aids, implants, etc., are particularly exposed. This can cause death, severe injury or serious property damage. Such people must always get an occupational medicine evaluation.

Electronic devices may have their operation disrupted or be damaged by the rotor's powerful magnetic field.

- If the rotor is outside the motor, it may brutally attract magnetic objects. This may cause injury or property damage.

When it is installed, the rotor's magnetic field is led through the motor's ferromagnetic circuit. There is therefore no damageable magnetic field outside the machine.

**DANGER!** Death hazard by electric shock!

Even without the module (with no electrical connection), dangerous contact voltage may remain on the motor's contacts.

Observe the warning on the front of the motor: “Warning: Voltage generated”.

If the regulator module has to be placed in a different position, it is not necessary to completely remove the motor from the pump body. The motor can be aimed in the desired position by being inserted into the pump body (observe the authorized installation positions indicated).

**NOTE:** Systematically pivot the **motor head before the installation is completed.**

**ATTENTION!** Risk of property damage!

During maintenance or repair work, if the motor head is separated from the pump body, the O-ring that is on the motor head and the pump body must be replaced with a new one.

Make sure that the O-ring is properly adjusted during installation on the motor head.

- Loosen the 4 Allen screws to loosen the motor.

**ATTENTION!** Risk of property damage!

Do not damage the O-ring that is on the motor head and pump body. The O-ring must be in the bevel indicating the direction of the wheel without being deformed.

- After installation, retighten the 4 Allen screws in a staggered manner.
- If access to the screw on the motor flange is not ensured, the regulator module can be separated from the motor by loosening the 2 screws.
- Commissioning the pump.

## **DISMANTLING/INSTALLATION OF THE REGULATOR MODULE**

**WARNING!** Risk of injury and property damage!

If dismantling or installation is not done according to the rules, personal injury and property damage may result.

Observe the warnings provided

**DANGER!** Death hazard by electric shock!

Even without the module (with no electrical connection), dangerous contact voltage may remain on the motor's contacts (causes: generator mode when there is flow across the pump).

Do not push any object (e.g. nails, screwdrivers, iron wire) into the motor contacts.

The regulator module can be detached from the motor by loosening the 2 screws:

- Loosen the fastening screw on the lid of the terminal box.
- Remove the lid from the terminal box.
- Loosen the M5 (SW4) Allen screws on the regulator module.
- Remove the regulator module from the motor.
- Installation is done in the reverse order — do not forget the flat joint between the motor casing and the regulator module.

## **FAULTS, CAUSES AND SOLUTIONS**

For the faults, causes and solutions, see the diagram.

“Fault message/warning”

**The pump doesn't work when supplied with current.**

Electric fuse defective; check the fuses.

No voltage in the pump; fix the voltage disconnection.

**The pump is making noise.**

Cavitation caused by inadequate entry pressure.

Increase the system's entry pressure within the permissible range. Check the pressure head setting and possibly adjust it to a lower level.

## **FAULT REPORTS**

- A fault appears.
- The pump stops, the fault message LED (continuous red light) starts. The error message appears on the screen, the SSM opens. The fault must therefore be repaired manually.
- Dual pump: The reserve pump is activated.
- Retransmission of the fault by the serial digital interface depends on the type of IF module. See the details in the documentation (installation and commissioning manual for the IF module).

**NOTE:** The code number “E04” (network undervoltage) and “E05” (network overvoltage) are considered errors only in AC mode and cause an immediate stop.

**E04** = Sector terminal Network undervoltage Electrical supply too weak on the network side. Check the supply voltage.

**E05** = Sector terminal Network overvoltage. Electrical supply too strong on the network side. Check the supply voltage.

**E10** = Motor blockage in the pump, e.g. by deposit formation. The deblocking routine triggers automatically. If the blockage is not eliminated after 40 seconds, the pump deactivates. Call customer service

**E20** = Motor temperature too high for winding. Motor overloaded. Let the motor cool, check the setting. Water temperature too high. Reduce the water temperature.

**E21** = Motor Motor overload. Deposits in the pump Call customer service

**E23** = Motor Short circuit / grounding. Motor/module defective. Call customer service

**E25** = Motor Contact fault. Module connected wrong. Reconnect the module

**E30** = Module Module temperature too high. Limited air inlet to the module heatsink. Improve room ventilation, check the operating conditions, and if necessary, call customer service.

**E31** = Module Temperature of power piece too high. Ambient temperature too high. Improve room ventilation, check the operating conditions, and if necessary, call customer service.

**E36** = Module Module defective. Electronic components defective. Call customer service or replace the module.

## **WARNING MESSAGES**

- The fault (warning only) is displayed.
- The warning LED for faults and the SSM relay do not respond.
- The pump continues to turn; the fault may appear often.
- Operational status signaled as defective must not continue for a long time. The cause must be eliminated.

**EXCEPTION:** The warnings “E04” and “E05” remain for more than 5 minutes in HV operating mode; they are transmitted as fault reports.

- Retransmission of the fault by the serial digital interface depends on the type of IF module. See the details in the documentation (installation and commissioning manual for the IF module).

**E03** = Water temperature >110°C. Heating badly regulated Set to a lower temperature.

**E04** = Network undervoltage. Network overloaded Check the electrical installation.

**E05** = Network overvoltage. Supply fault from the electricity provider. Check the electrical installation.

**E07** = 1st generator mode. Driven by the entry pump (flow from the suction side to the discharge side of the pump). Equalize the pumps' power setting.

2. Turbine mode. The pump is driving in the wrong direction (flow from the discharge side toward the suction side of the pump). Check the flow, and install check valves if necessary.

**E09** = Only for pumps with  $P1 \geq 800W$ . Turbine mode. The pump is driving in the wrong direction (flow from the discharge side toward the suction side of the pump). Check the flow, and install check valves if necessary.

**E11** = Pump operating dry. Air in the pump. Purge the pump and installation.

**E38** = Motor Fault at the fluid temperature probe. Motor defective. Call customer service.

**E50** = Bus interface communication fault, conduit defective, IF module connected wrong, cable defective. After 5 minutes, control switches through the interface to local regulation mode.

**E51** = Master/slave combination not authorized. Pumps of different types. Simple pumps: Place pumps of the same type. Dual pump: Call customer service or remove the pump type MA and SL using an IR device. If the module types are not identical, get a replacement module that matches.

**E52** = Master/slave communication fault. IF modules connected wrong, cable defective. After 5 seconds, the modules pass into simple pump operation. Reconnect the modules and check the cable.

**E53** = Bus address not authorized. Same bus address assigned twice. Start addressing the module again.

**E54** = I/O - module connection. I/O connection module interrupted. Check the connection.

**MA** = Master/slave not configured. Define the master and slave.

## **CLARIFICATION GROUP 21/50**

### **GENERAL INFORMATION**

Reference: TP 80-140/2 96108445

Single-cell, mono-block volute pump with in-line suction and discharge holes of identical diameter.

The pump is designed to slide forward. The head of the pump (motor, head and wheel) can therefore easily be removed for maintenance or repairs while the pump body remains on the pipes.

The pump is equipped with a non-equalized elastomer bellows. The mechanical bellows complies with standard EN 12756. The connection to the pipes is made with flanges DIN PN 16 (EN 1092-2 and ISO 7005-2).

The pump is equipped with a ventilated asynchronous motor.

### **INSTALLATION**

The pump must be placed in a dry, well-ventilated place protected from freezing.

During installation, pumps with oval holes for nuts in the flange (PN 6/10), washers must be used.

The arrows on the pump body indicate the circulation direction of the liquid in the pump.

Pumps equipped with motors smaller than 11 kW must be installed on horizontal or vertical pipes.

Pumps with motors 11 kW and larger must only be installed on horizontal pipes with the motor in vertical position.

To facilitate inspection and removal of the minimum or pump head, the following minimum space is necessary above the motor:

- 300 mm for motors up to and including 4.0 kW.
- 1 meter for motors 5.5 kW and larger.

Dual pumps installed on horizontal pipes must be equipped with an automatic air purge aimed at the upper part of the pump body.

The automatic air purge is not provided with the pump.

If the liquid temperature goes below the ambient temperature, condensation forms in the motor while it is stopped. In that case, the emptying hole of the motor flange must be open and point downward.

If dual pumps are used for liquids with a temperature below 0°C/32°F, the condensed water may freeze and cause the coupling to block. The problem can be resolved by installing heating elements. Pumps equipped with motors smaller than 11 kW must be installed with the motor shaft in horizontal position.

### **Pipes**

Shutoff valves must be installed on each side of the pump to prevent the installation from emptying if the pump must be cleaned or repaired.

The pump is designed for installation on straight pipes under the condition that the pipes are properly supported on each side of the pump.

When the pipes are installed, make sure that the pump body is not subjected to constraints by the pipes.

The suction and discharge pipes must be correctly sized for the pump's entry pressure.

To prevent sediments from forming, never install the pump at the lowest point of the installation.

Install the pipes so as to prevent air pockets, especially on the pump's suction side.

The pump cannot operate against a closed discharge butterfly valve, because this increases the temperature and forms steam in the pump, which can damage it.

There is a risk that the pump will discharge against a closed butterfly valve — a minimum flow of liquid across the pump must be ensured by connecting a bypass on the discharge pipes. The bypass can be connected to a reservoir. A minimum flow equal to 10% of the maximum output flow is provided at all times.

The flow and the pressure head at the maximum output are indicated on the type plate.

#### Eliminating noise and vibration

To achieve optimal operation with a minimum of noise and vibration, vibration dampers can be used. In general, it is advised that use it for motors 11 kW and larger, but their use is mandatory for 90 kW and larger. However, smaller motors may also generate vibration noise.

The vibration noise is generated by the pump's rotating parts, the flow of liquid in the pipes and the connections. The environmental effects will be minimized by proper installation, but will depend on the installation overall.

To eliminate noise and vibration, it is necessary to use a concrete foundation and equip the system with anti-vibration sleeves and expansion joints.

#### Positions of the terminal box

**Warning:** Before starting any work on the pump, make sure the pump is not carrying voltage and that it will not accidentally start itself up.

The terminal box can be turned in 4 positions in 90° steps.

Change the terminal box position as follows:

1. If necessary, use a screwdriver to remove the coupling's protection screens.

Do not remove the coupling.

2. Remove the screws attaching the motor to the pump.

3. Turn the motor to the required position.

4. Put the screws back and tighten them.

5. Put the protection screens back on.

#### 5.5 Base plate

The dual pumps have four holes on the lower part of the pump body. For some dual pumps, a base plate made of two distinct elements is available.

#### Antifreeze protection

Pumps that are not operating during freezing periods must be emptied to prevent damage.

#### Electrical connection

The electrical connection must be made according to local regulations.

**Warning:** Before removing the lid of the terminal box, and before removal/reinstallation of the pump, make sure the electrical supply has been cut.

It is mandatory to connect the pump to an external main switch with an isolation interval of at least 3 mm between each pole.

The frequency and operating voltage are indicated on the motor's type plate.

Make sure the motor is designed for the supply voltage it is used with.

Standard single-phase motors have incorporated thermal protection and do not require any other protection.

Three-phase motors must be connection to a circuit breaker.

Motors of 3 kW and more incorporate thermal probes (PTC). The probes are designed according to standard DIN 44082.

The electrical connection must be made as indicated in the schematic placed in the terminal box lid.

The motors of dual pumps must be connected separately.

Do not start the pump before it has been filled with liquid and purged.

#### Operation of frequency converter

Motors of types MEZ 63, MG 71 and MG 80, supplied with up to 440 V (see motor's type plate) must be protected upstream against voltage peaks greater than 650 V.

All three-phase motors (of size 90 and above) can be connected to a frequency converter.

Connecting a frequency converter often has the effect of better system insulation and more noise compared to ordinary operation. Moreover, large motors are loaded with current send from the frequency converter.

When operating with a frequency converter, the following must be taken into account:

- In 2-, 4- and 6-pole motors of 75 kW and over, one of the motor's bearings must be electrically insulated to prevent damage from current passing through the motor bearings.

- For an application involving an increased risk of noise, the motor noise can be reduced by installing a dU/dt filter between the motor and the frequency converter. For specific cases, it is recommended that a sinusoidal filter be installed.

- The cable length between the motor and the frequency converter influences the load on the motor. The cable length must conform to the instructions provided by the supplier of the frequency converter.

- For feed voltages between 500 V and 690 V, either a dU/dt filter must be installed to reduce the voltage peaks, or a motor with reinforced insulation must be used.

- For feed voltages of 690 V, a motor with reinforced insulation must be used, or a dU/dt filter must be installed.

#### STARTUP

Do not start the pump before it has been filled with liquid and purged. To ensure correct ventilation, the purge screw must point upward.

Closed installations or open installations in which the liquid level is above the pump suction:

1. Close the shutoff valve on the discharge side and loosen the purge screw on the lantern.

**Warning:** Pay attention to the direction of the drain hole and make sure that the escaping liquid does not injure the person or damage the motor or other components. Especially pay attention in hot-water installations.

2. Slowly open the shutoff valve on the suction pipes until a trickle of water exits the drain hole.

3. Tighten the drain screw and completely open the shutoff valves.

Open installations in which the liquid level is below the pump suction:

The suction pipes and the pump must be filled with liquid and drained before the pump can be started.

1. Close the shutoff valve on the discharge side and completely open the shutoff valve on the suction side.

2. Loosen the drain screw.

3. Remove the stopper on one of the pump's flanges, depending on the pump's position.
4. Pour some liquid into the priming hole until the suction pipes and the pump are filled with liquid.
5. Replace and tighten the priming stopper.
6. Tighten the drain screw.

The suction pipes may be filled with liquid and drained before they are connected to the pump, or a priming device can be installed before the pump.

#### Checking the rotation direction

Do not start the pump to control the rotation direction before it is filled with liquid.

The rotation direction must not be checked with motor alone, because the position of the shaft must be adjusted when the coupling has been removed.

The correct rotation direction is indicated by arrows on the hood of the motor fan or on the pump body.

#### Startup

1. Before starting the pump, completely open the shutoff valve on the pump's suction pipes and leave the shutoff valve on the discharge pipes almost closed.
2. Start the pump.
3. Drain the pump during its startup by loosening the drain screw on the lantern until a trickle of liquid leaves the drain hole.

#### Warning

Pay attention to the direction of the drain hole and make sure that the escaping liquid does not injure the person or damage the motor or other components. Especially pay attention in hot-water installations.

When the installation has been filled with liquid, slowly open the shutoff valve on the discharge pipes until it is completely open.

#### Frequency of starts and stops

On dual pumps, the operating and backup heads must be alternated at least once a week to allow equal distribution of operating hours on the two pumps.

The interchange can be done manually or automatically from the control cabinet.

If the dual pumps are used for pumping water for domestic use, it is recommended that the pumps be interchanged ones a day to prevent possible blockage of the backup pump (lime deposits, etc.).

Automatic interchange is recommended.

#### MAINTENANCE AND SERVICE

**Warning:** Before starting any work on the pump, make sure the pump is not carrying voltage and that it will not accidentally start itself up.

#### Pump

The pump does not require maintenance.

If the pump is emptied for an extended downtime, inject two or three drops of silicone oil on the shaft between the lantern and the coupling.

This will prevent the seal faces of the mechanical bellows from adhering.

#### Motor

The motor must be inspected at regular intervals.

It is important to keep the motor clean to ensure proper ventilation. If the pump is installed in a dusty environment, it must be checked and cleaned regularly.

#### Lubrication:

The bearings of motors smaller than 11 kW are lubricated for life and do not need to be lubricated.

The bearings of motors 11 kW and larger must be greased according to the indications on the type plate.

The motor must be lubricated with lithium-based grease according to the following specifications:

- NLGI grade 2 or 3.
- Oil viscosity: 70 to 150 cSt to 40°C (~ +104°F).
- Temperature range: -30°C (~ -22°F) to 140 °C (~ +284°F) during continuous operation.

#### Service

**Warning:** If the pump has been used with liquids that are harmful to health or toxic, the pump is to be considered contaminated.

#### Adjusting the pump shaft

If the motor has been removed during pump assembly or repair, the pump shaft must be adjusted after the motor is installed.

Pumps with two-part coupling

It must be ensured that the cylindrical pin is correctly installed on the pump shaft.

Adjust the shaft as follows:

1. Use a screwdriver to remove the coupling's protection screens.
2. Install the Allen screws on the coupling, but do not tighten it.
3. Lift the pump's coupling and the shaft (toward the motor) using a screwdriver or similar tool so that the two shafts touch each other.
4. Tighten the Allen screws on the coupling to 5 Nm (0.5 kpm).
5. Make sure the gaps on the two sides of the half coupling are the same.
6. Tighten the screws two by two (same side), see Fig. 14, to the tightening torque indicated below.

Allen screw	Tightening torque
M6 x 20	13 Nm (1.3 kpm)
M8 x 25	31 Nm (3.1 kpm)

Put the protection screens on.

Pumps with integrated shaft/coupling

For pumps with an integrated shaft/coupling, it is recommended that the motor not be removed.

If it has been removed, it is necessary to remove the motor lantern for correct reinstallation of the motor. Otherwise, the mechanical bellows may become damaged.

#### TECHNICAL FEATURES:

##### Liquid:

Pumped liquid: Water

Liquid temperature range: 0 .. 120°C

Liquid temperature: 20°C

Bulk density: 998.2 kg/m<sup>3</sup>

##### Technical:

Pump speed data: 2900 mn-1

Nominal flow: 52.2 m<sup>3</sup>/h

Rated pressure: 10.4 m

Actual diameter of the mobile wheel: 105 mm

Main mechanical bellows: BAQE

Curve tolerance: ISO9906:2012 3B

**Materials:**

Pump body: Cast iron

EN-JL1040

ASTM A48-40 B

Mobile wheel: Cast iron

EN-JL1030

ASTM A48-30 B

**Installation:**

Maximum ambient temperature: 60°C

Maximum service pressure: 16 bar

Standard flange: DIN

Pipe connection: DN 80

Pump suction: DN 80

Pump discharge: DN 80

Pressure by stage: PN 16

Obstacle: 360 mm

Size of flange for motor: FF165

**Electrical data:**

Motor type: 90LC

IE efficiency class: IE3

Rated power - P2: 2.2 kW

Power (P2) required by the pump: 2.2 kW

Supply frequency: 50 Hz

Rated voltage: 3 x 220-240 D/380-415 Y V

Rated current: 7.70/4.45 A

Startup intensity: 850-950%

Cos phi - power factor: 0.89-0.87

Rated speed: 2890-2910 mn-1

IE output: IE3 85.9%

Motor output at full load: 85.9%

Motor output at 3/4 load: 86.8%

Motor output at 1/2 load: 86.0%

Number of poles: 2

Protection rating (IEC 34-5): 55 dust/jetting

Insulation class (IEC 85): F

**Other:**

Minimum Efficiency Index, MEI  $\geq$ : 0.69

ErP status EuP Standalone/Prod.

Net weight: 61 kg

Gross weight: 69 kg

Packing list: 0.18 m<sup>3</sup>

**FAULT SEARCH CHART**

**Warning:** Before removing the lid of the terminal box, and before removal of the pump, make sure the electrical supply has been cut and that it cannot be connected accidentally.

**1. The motor doesn't start.**

- a) No electricity.
- b) The fuses have blown.
- c) The thermal-magnetic circuit breaker is released.
- d) The main contacts in the circuit breaker or reel are defective.
- e) The control circuit fuses are defective.
- f) The motor is defective.

**2. The thermal-magnetic circuit breaker releases immediately when the electrical supply is engaged.**

- a) A fuse is blown.
- b) The contacts in the circuit breaker are defective.
- c) The cable connection is not tightened or is defective.
- d) The motor windings are defective.
- e) The pump is mechanically blocked.
- f) The actuator setting is too weak.

**3. The thermal-magnetic circuit breaker occasionally releases.**

- a) The actuator setting is too weak.
- b) The grid voltage is too weak at peak periods.
- c) The differential pressure across the pump is too low.

**4. The motor starter hasn't released, but the pump doesn't work.**

- a) No electricity.
- b) The fuses have blown.
- c) The main contacts in the circuit breaker or reel are defective.
- e) The control circuit fuses are defective.

**5. The pump flow is irregular.**

- a) The pump's entry pressure is too weak.
- b) The suction pipes or pump suction is partly clogged by impurities.
- c) The pump is sucking air.

**6. The pump turns but no water flows.**

- a) The suction pipes or pump suction is clogged by impurities.
- b) The foot/check valve is locked in closed position.
- c) The suction pipes leak.
- d) Air in the suction pipes or in the pump.
- e) The motor rotation direction is wrong.

**7. The pump runs the wrong way when it stops. In dual pump installations, the backup pump often turns slowly.**

- a) Leak in the suction pipes.
- b) The foot/check valve is defective.
- c) The foot/check valve is locked in open or partially open position.

**8. Leak in the mechanical bellows.**

- a) The position of the pump's shaft is wrong.
- b) The mechanical bellows is defective.

**9. Noise.**

- a) Cavitation phenomenon.
- b) The pump doesn't turn freely (meets resistance) because of the wrong shaft position.
- c) Operation of the frequency converter: See the paragraph Operation of frequency converter.
- d) Resonance in the installation.
- e) Foreign objects in the pump



**10. The pump runs constantly (applies only to automatic start/stop pumps).**

- a) The stop pressure is too high.
- b) Water consumption is more than expected.
- c) The discharge pipes leak.
- d) The pump's rotation direction is wrong.
- e) The pipes, butterfly valves or strainer are clogged with impurities.
- f) Start/stop device may be defective.

**11. The operation period is too long (applies only to pumps with automatic start/stop).**

- a) The stop pressure is too high in relation to the amount of water required.
- b) The pipes, butterfly valves or strainer are clogged with impurities.
- b) The pump is partly clogged by impurities.
- d) Water consumption is more than expected.
- e) The discharge pipes leak.

**Disposal**

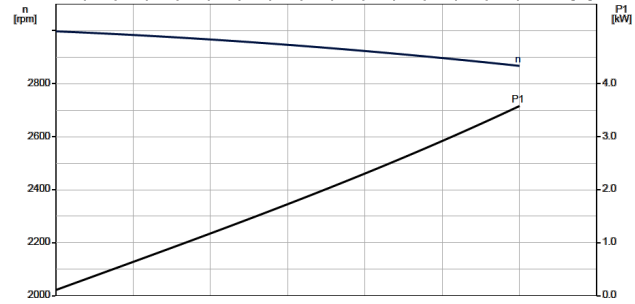
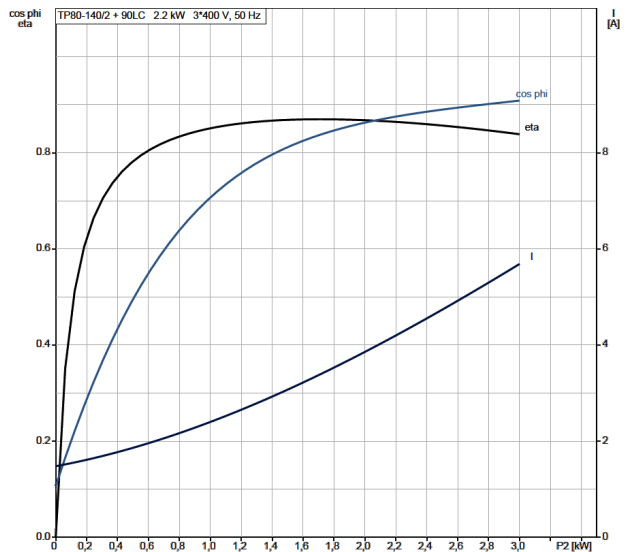
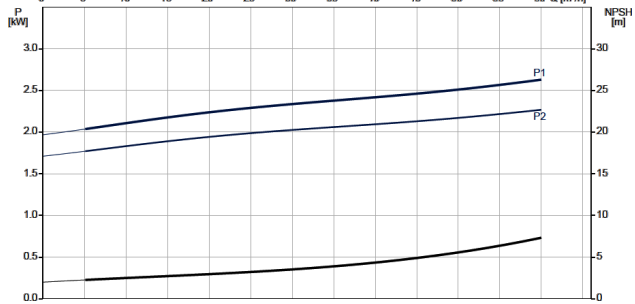
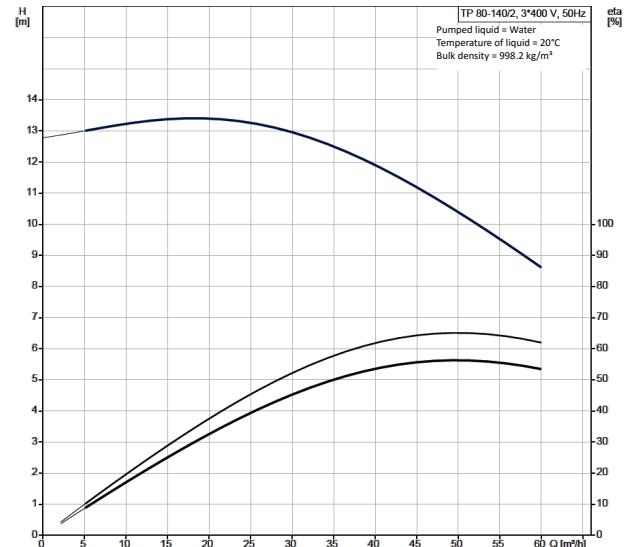
This product or parts of it must be disposed of in an environmentally sound manner.

Use the local public or private waste collection service.

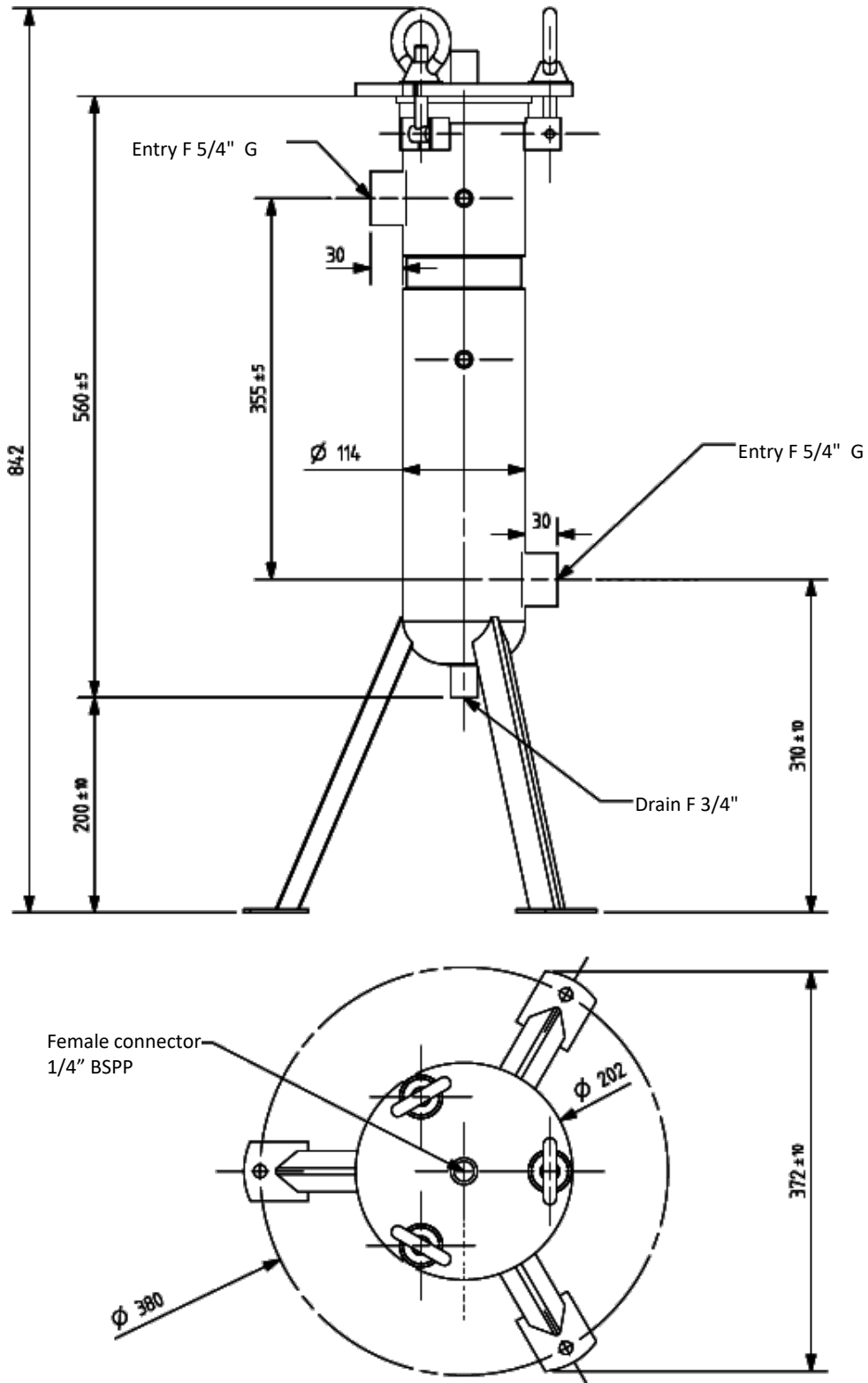
Entry pressure indicated in bar (value measured using a manometer placed on the suction side of the pump)

Model: TP(D) 80-140/2

20°C	0.1 bar
60°C	0.2 bar
90°C	0.7 bar
110°C	1.4 bar
120°C	1.9 bar
140°C	3.6 bar

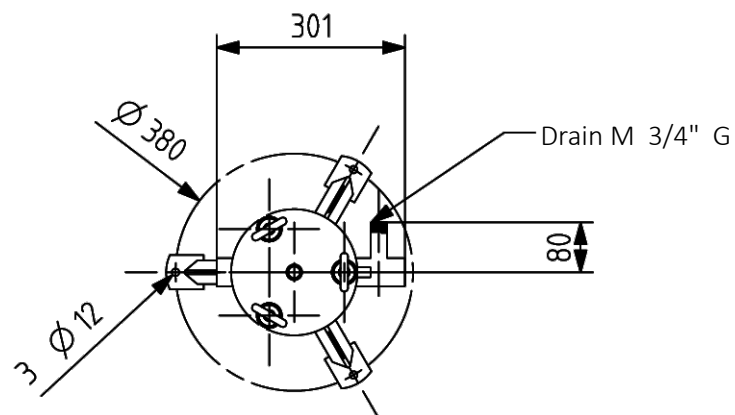
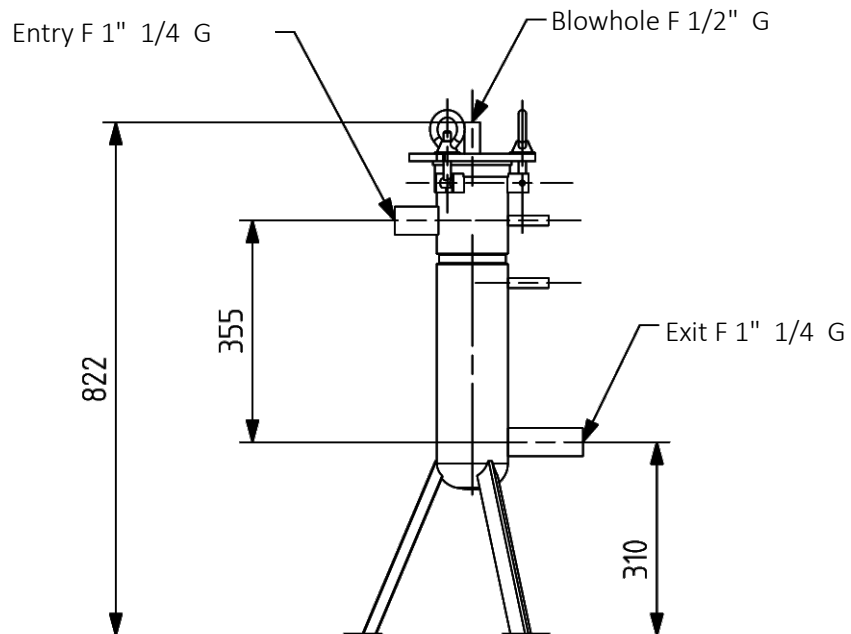


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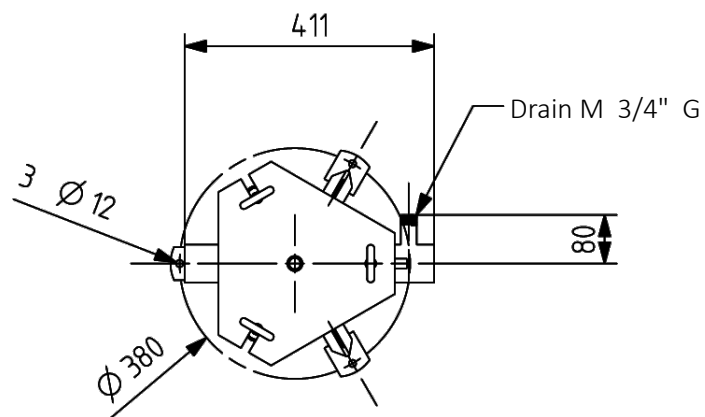
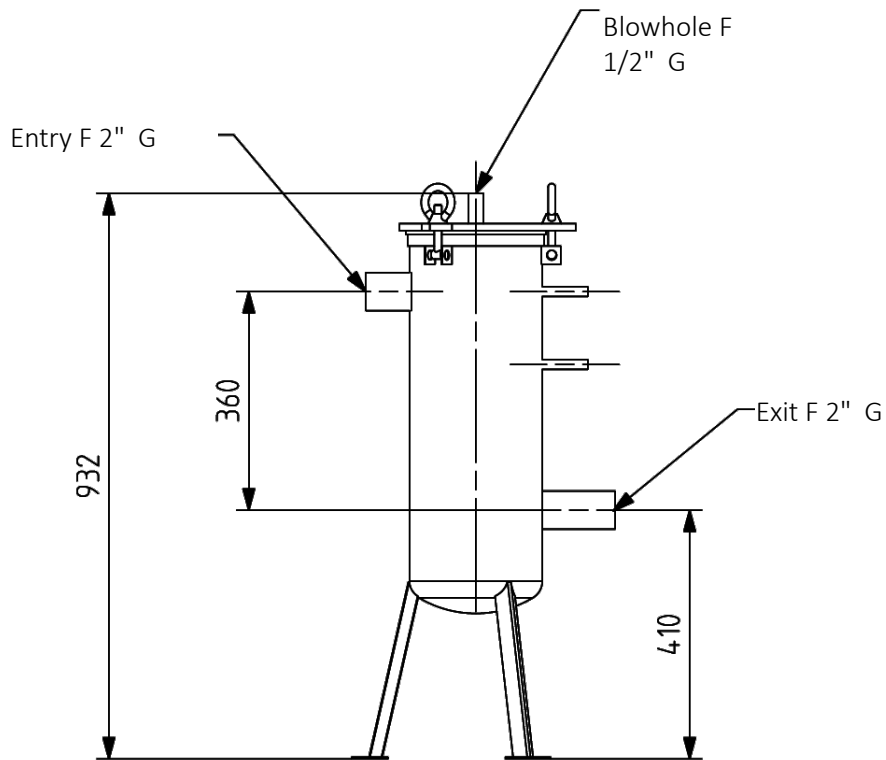
Dimensions in millimeters

# JAMS IN CLARIFICATION FILTER 5/9



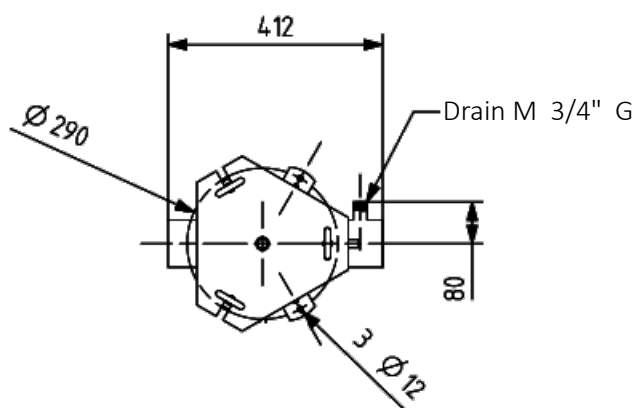
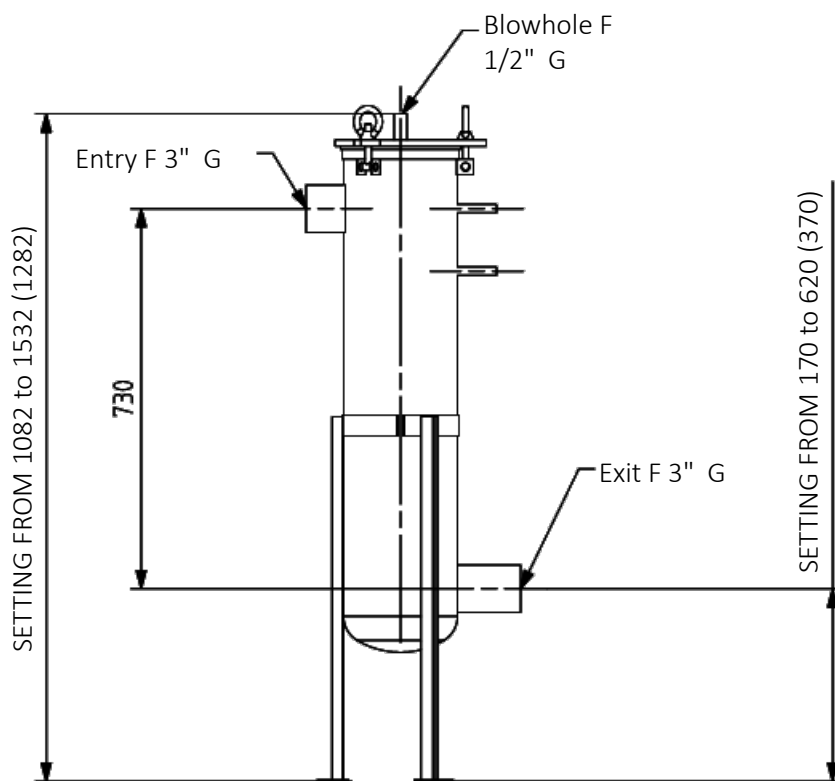
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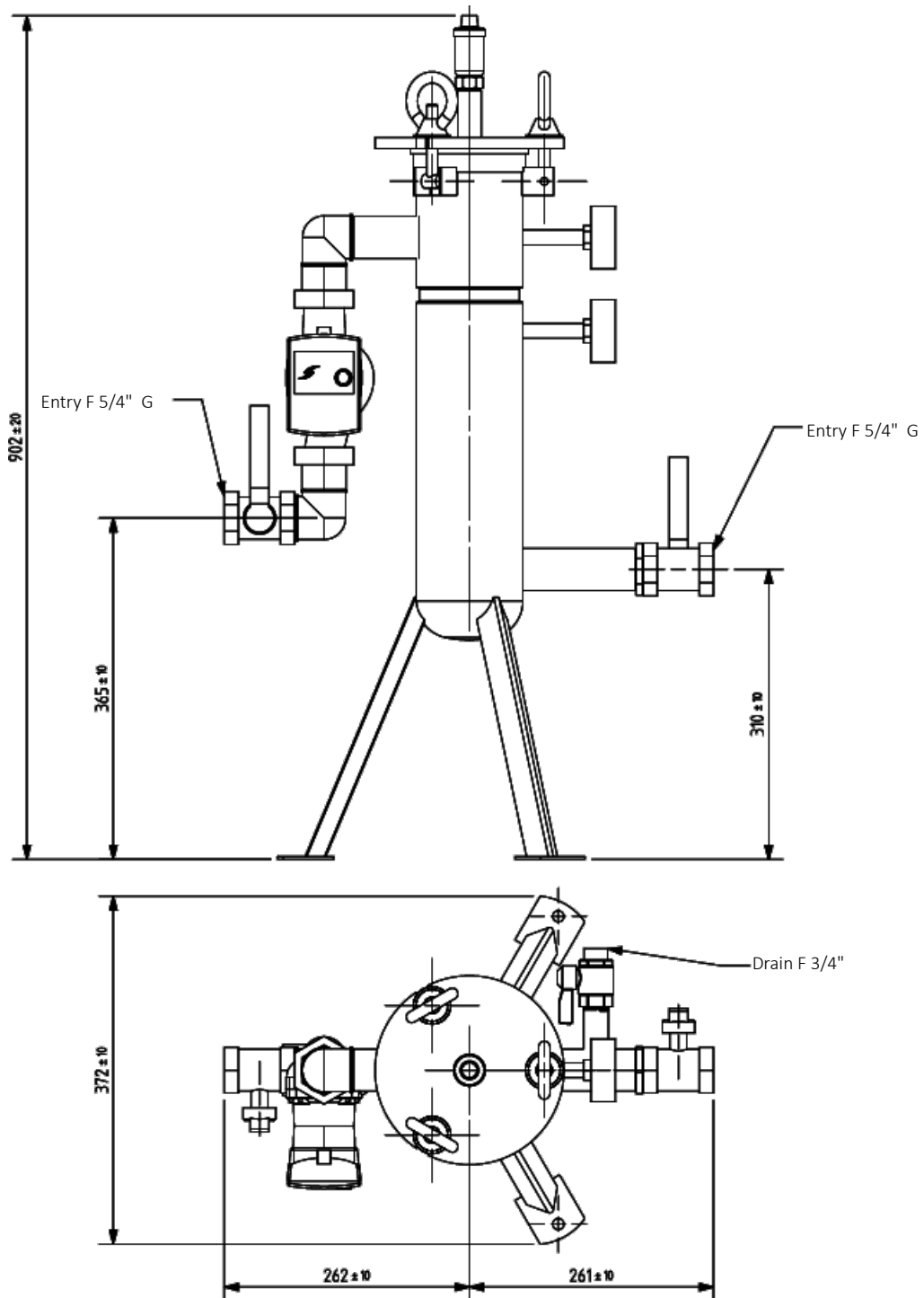
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# JAMS IN CLARIFICATION FILTER 21/50



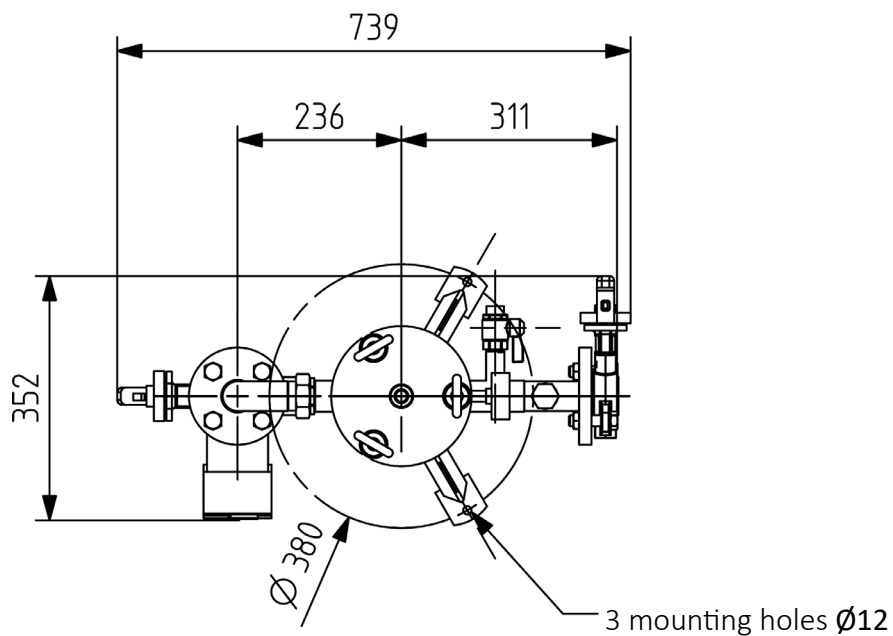
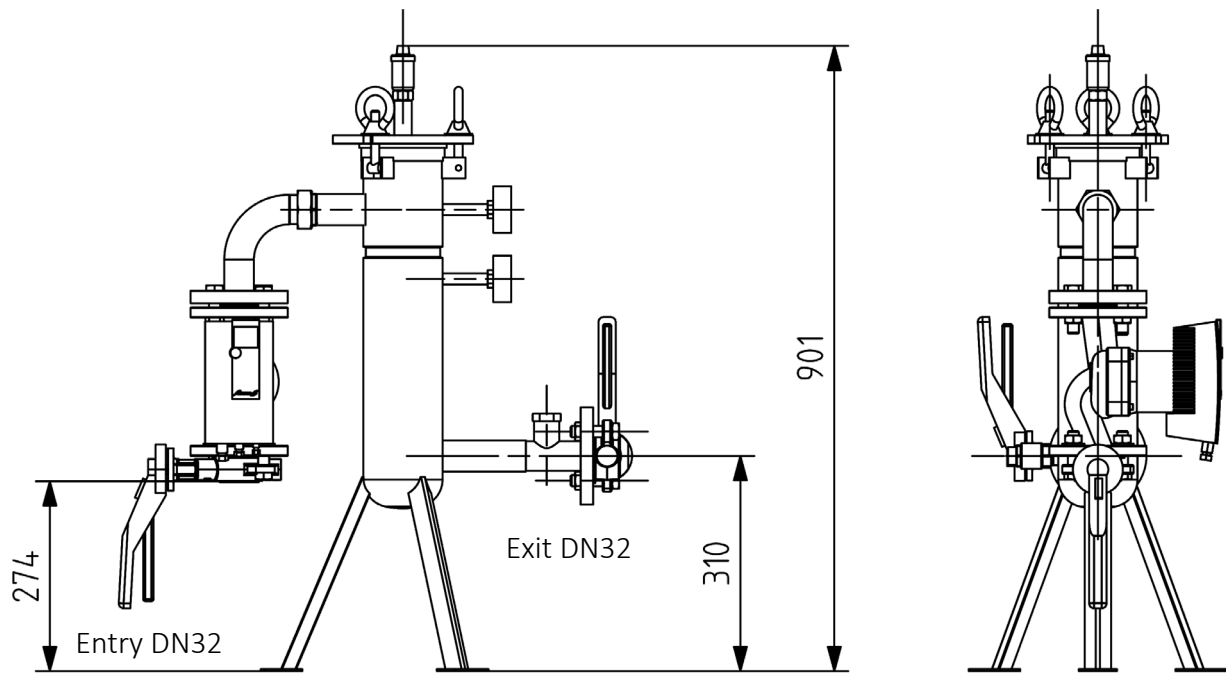
Dimensions in millimeters

# JAMS IN CLARIFICATION GROUP XS



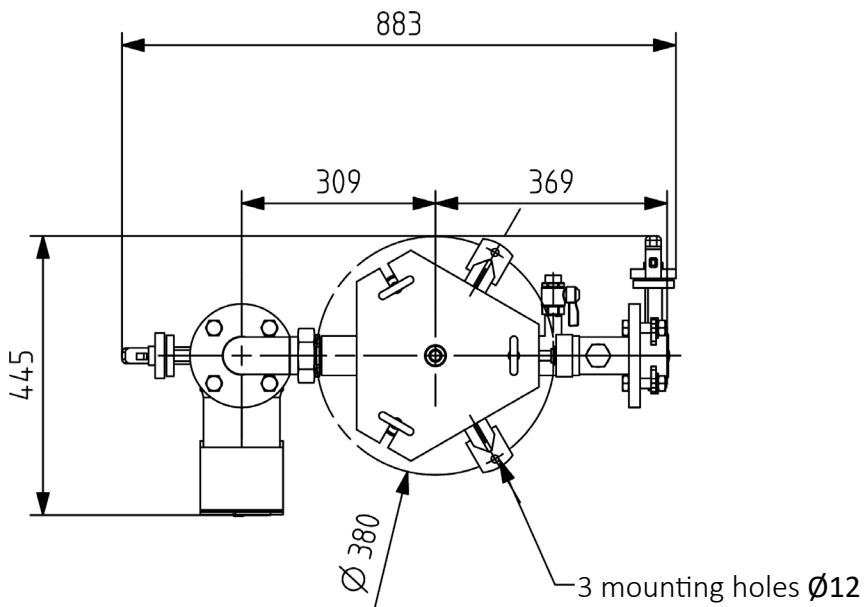
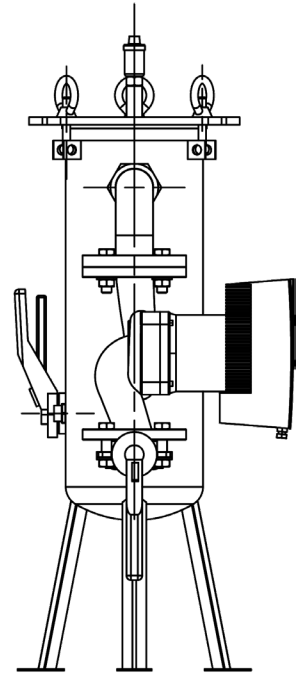
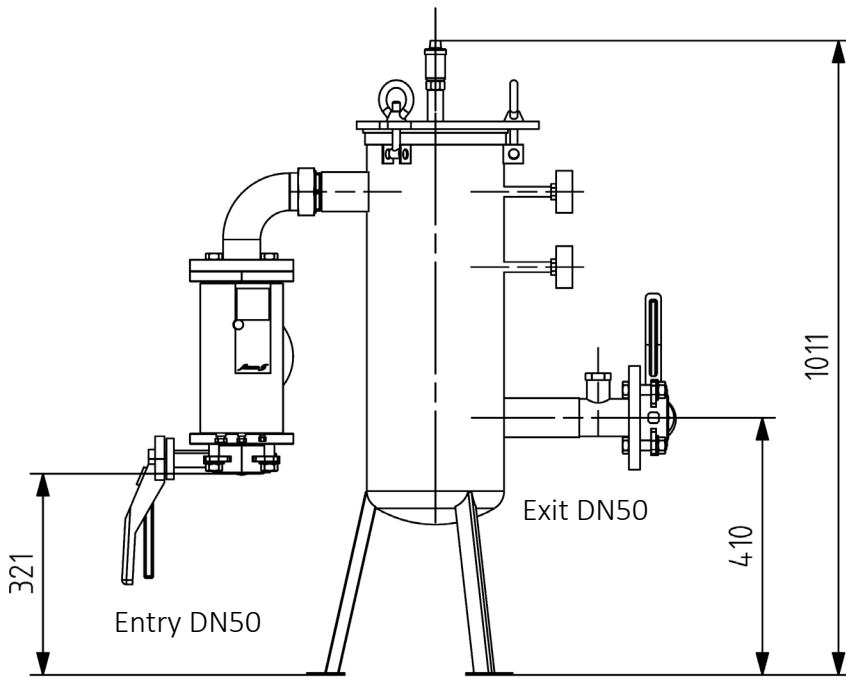
Dimensions in millimeters

# JAMS IN CLARIFICATION GROUP 5/9



Dimensions in millimeters

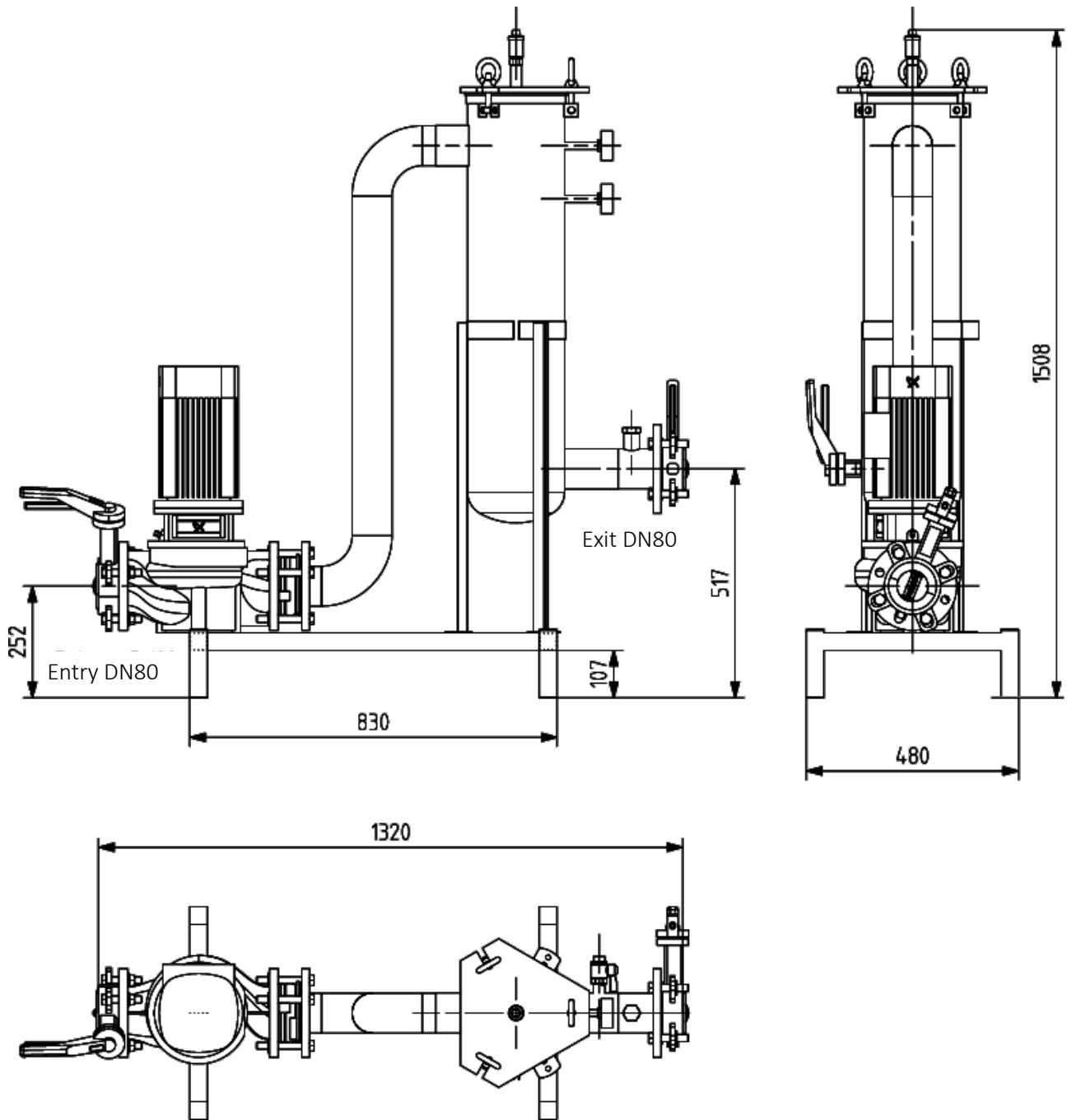
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Dimensions in millimeters

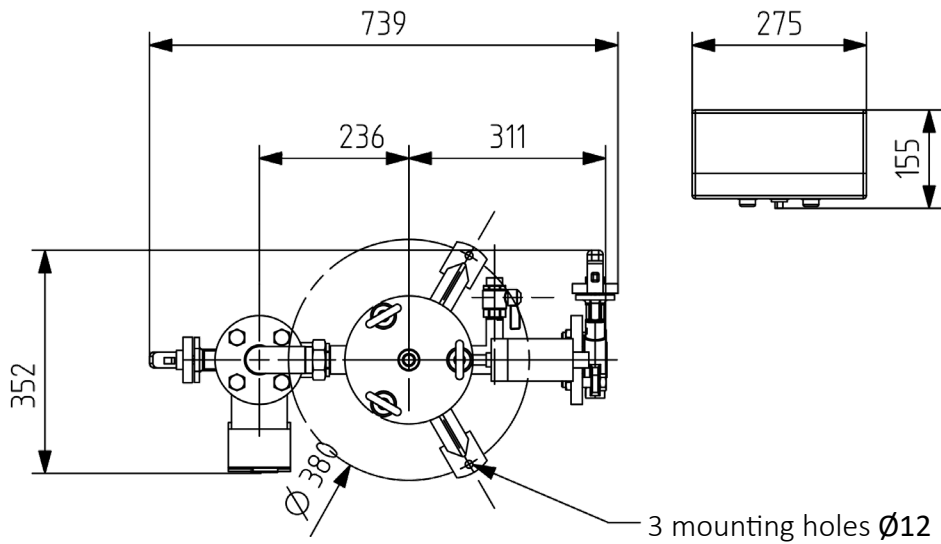
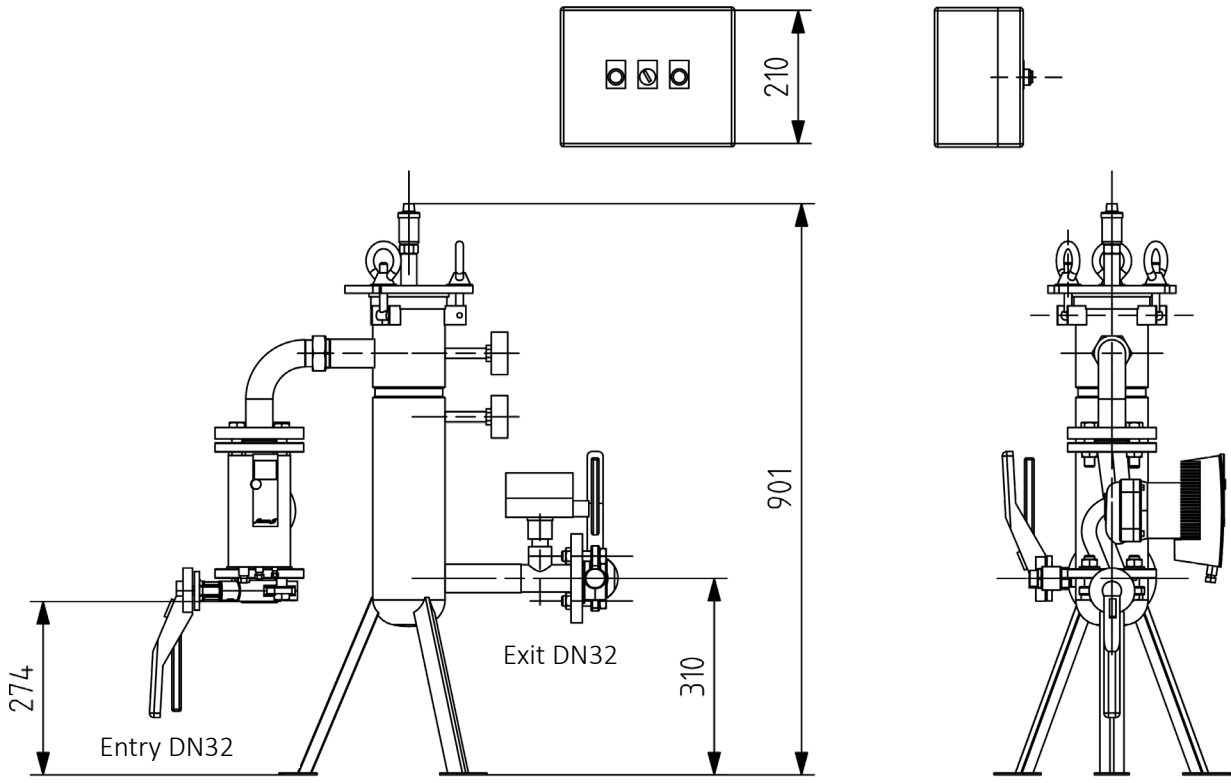


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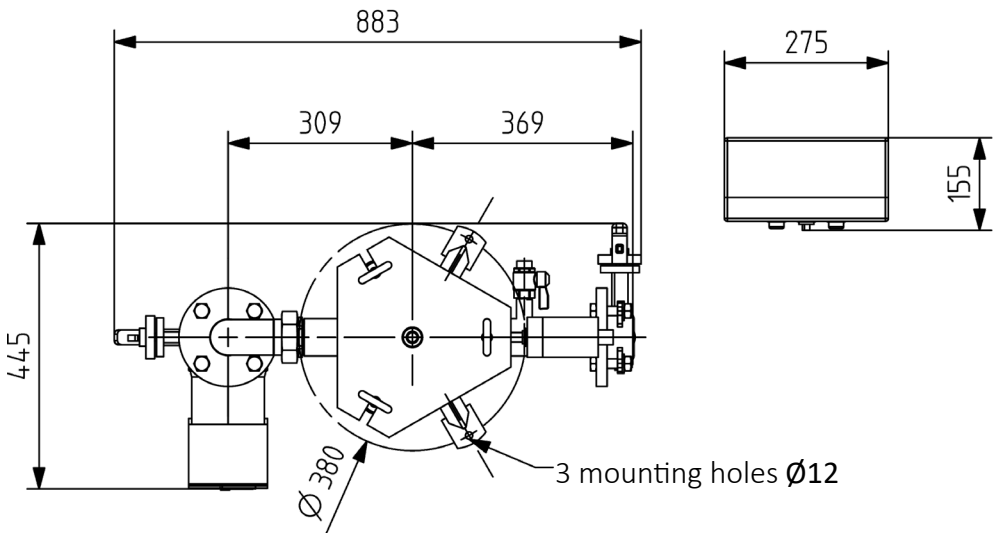
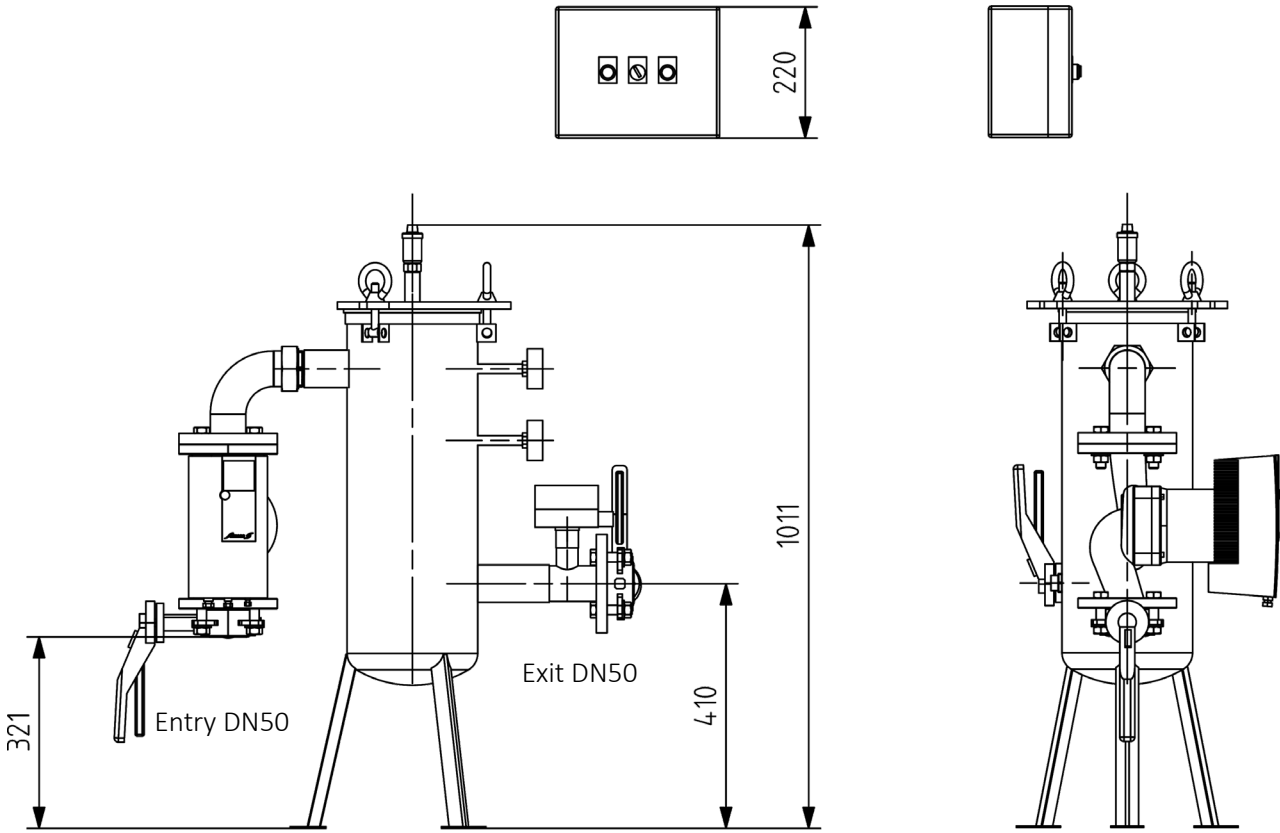
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# JAMS IN CLARIFICATION GROUP GTC 5/9



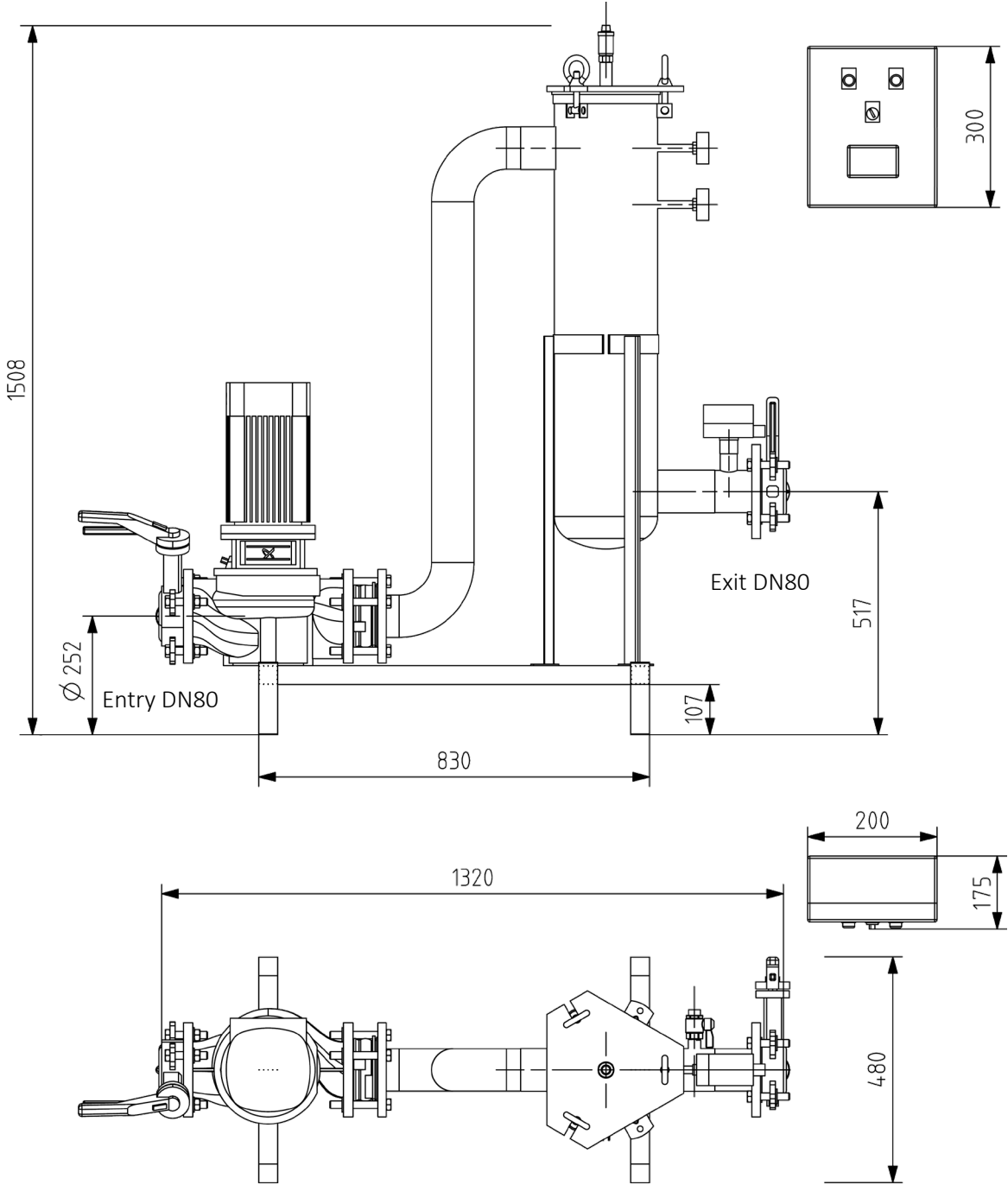
Dimensions in millimeters

# JAMS IN CLARIFICATION GROUP GTC 10/20



Dimensions in millimeters

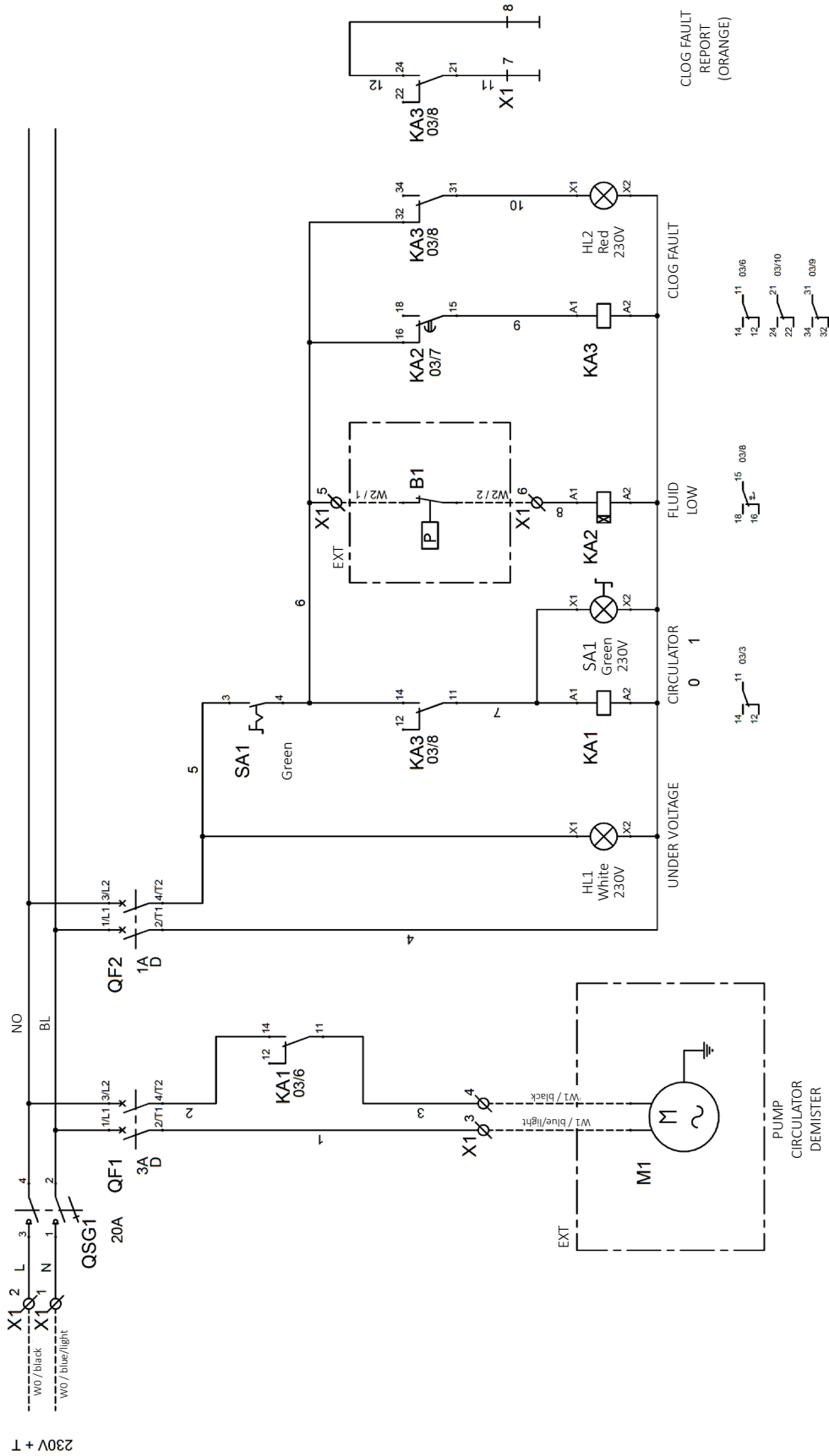
# JAMS IN CLARIFICATION GROUP GTC 21/50



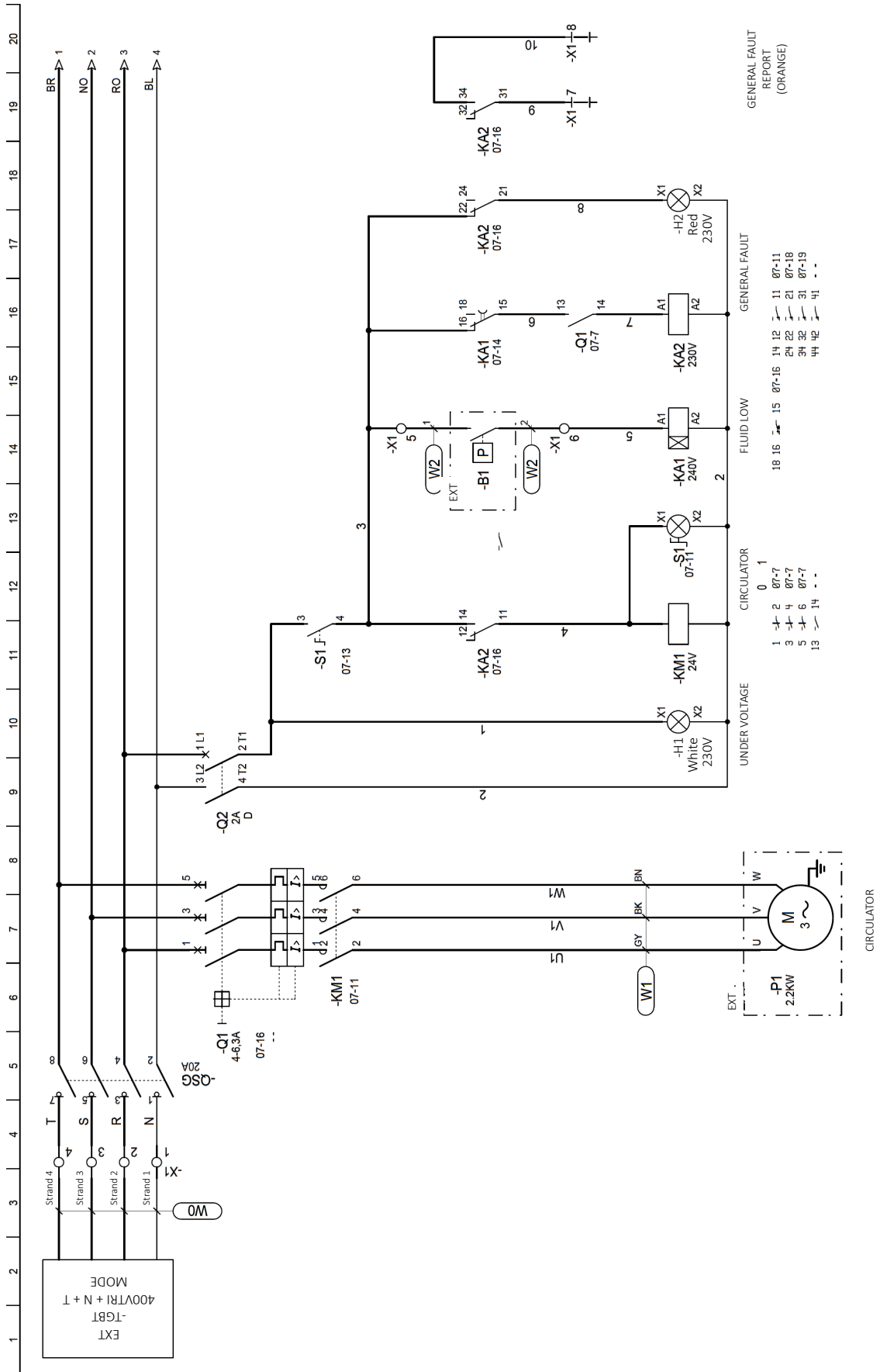
Dimensions in millimeters



# SCHEMATIC FOR ELECTRICAL CABINET GTC 5/9 & 10/20



# SCHEMATIC FOR ELECTRICAL CABINET GTC 21/50



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