Vacuum leak detector

VLX ..

Documentation VLX ..

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GERMANY

Contents of the documentation

[1] For Germany > 55°C acc. to TRGS 509 and TRGS 751

Table of Contents

Drawings:

Appendix:

1. Subject

Type VLX .. vacuum leak detector as part of a leak detection system.

2. Operative Range

2.1 Requirements for the Interstitial Spaces

- Vacuum-resistant with respect to the operating vacuum of the leak detector, even with temperature fluctuations.
- The suitability of the interstitial space as part of a leak detection system (e.g., according to EN 13160 T7) is not taken into consideration here and must be ensured by the operator.
- No leak-detector liquid in the interstitial space (if this is the case, see Appendix A)
- Tanks listed under 2.2 must fulfill the above requirements.

2.2 Pressureless Tanks

Group	Tank design	Installation example	Suitable leak detector type	Usage limits
A	Single-walled horizontal (underground or aboveground) cylindrical tanks with leak protection lining or jacketing and suction line leading to the low point	A – 01	VLX 34 VLX 330 VLX 500 VLX 570	None for density and diameter
B	Same as A, but with no suction line to the low point	B/C–01	VLX 330 VLX 500 VLX 570	Appendix E, no. E.1
C	Double-walled horizontal cylindrical (underground or aboveground) tanks			
D	Double-walled (or single-walled with leak protection lining or jacketing) vertical cylindrical tanks or troughs with a dished bottom (underground or aboveground) with a suction line leading to the low point	D – 01	VLX 34 VLX 330 VLX 500 VLX 570	Appendix E, no. E.3
E	Same as D, but with no suction line to the low point	E – 01	VLX 330 VLX 500 VLX 570	Appendix E, no. E.1
F	Rectangular or cylindrical tanks or troughs with a flat bottom (completely double-walled or with leak-protection lining or jacketing) with a suction line to the low point	F – 01	VLX 34 VLX 330 VLX 500 VLX 570	Appendix E, no. E.2
G	Same as F, but with no suction line to the low point	G – 01	VLX 330 VLX 500 VLX 570	Appendix E, no. E.1

2.3 Pressureless Pipes[1]

Group	Pipe	Installation example	Suitable leak detector type	Usage limits
H	Made at the factory or on-site of metal or plastic with general building site approval or with acceptance as part of an individual determination by the responsible authority.	H – 01 H – 02 H – 03	VLX 330 VLX 500 VLX 570	Appendix E, no. E.1

2.4 Tanks/Pipes with Overlay/Feed Pressures up to 5 bar

Designs as under 2.2 and 2.3, also tanks with double bottoms, such as tanks per DIN 4119, as long as the product stored poses no risk of explosion, i.e., the product being stored or conveyed must have a flash point >60°C[2], and there must be no explosive vapor-air mixtures, regardless of the flash point.

2.5 Stored/Conveyed Material

Water-polluting liquids

- with a flash point > 60°C[3], without any explosive vapor-air mixtures.
- with a flash point < 60°C[4], and with a flash point > 60°C[5] with explosive vapor-air mixtures (e.g., through outgassing).
  These explosive vapor-air mixtures must be heavier than air and must be classifiable in gas group II A or II B and in temperature code T1 to T3, like gasoline, for example.

Liquids that fall under the second point are listed in the explosive liquids section below.

If different water-polluting liquids are conveyed in individual pipes and monitored with one leak detector, these liquids must not have any hazardous effects on one another or cause any chemical reactions.

2.6 Resistance to Materials

For VLX .. leak detectors, material MS 58 or (1.4301, 1.4306, 1.4541)[6], and the material used for the connecting lines must be sufficiently resistant to the stored material[7].

[1] Double-walled fittings can also be integrated in the pipe.
Double-walled fittings can also be monitored for themselves with this leak detector. Apply the installation examples for the pipes appropriately.

[2] In Germany the limit is set at 55°C according to TRGS 509 and TRGS 751

[3] In Germany the limit is set at 55°C according to TRGS 509 and TRGS 751

[4] In Germany the limit is set at 55°C according to TRGS 509 and TRGS 751

[5] In Germany the limit is set at 55°C according to TRGS 509 and TRGS 751

[6] See DIN 6601, center section

[7] Sufficient means that the physical properties are not adversely affected; discoloration is acceptable.

3 Functional Description

3.1 Normal Operation

The vacuum leak detector is connected to the interstitial space via the suction, measuring and connecting line(s). The vacuum generated by the pump is measured and controlled by a vacuum switch.

When the operating vacuum is reached (Pump OFF), the pump shuts off. The vacuum drops off slowly due to slight, unavoidable leaks in the leak detector system. When the Pump ON switch value is reached, the pump turns on and the interstitial space is evacuated until the operating vacuum is reached (Pump OFF).

In normal operation, the vacuum swings between the Pump OFF and Pump ON switch values, with short periods when the pump is run and longer standstills, depending on the tightness and temperature fluctuations of the leak detection unit.

3.2 Air Leaks

If an air leak occurs (in the outer or inner wall, above the liquid level), the vacuum pump switches on to restore the operating vacuum. If the leak causes the incoming air to exceed the pump's capacity limit, the pump remains on continuously.

Increasing leak rates lead to a further increase in pressure (with the pump running) until the Alarm ON switch value is reached. This triggers the visual and acoustic alarm.

3.3 Liquid Leaks

In case of a liquid leak, the liquid enters the interstitial space and collects in the low point of the interstitial space.

The incoming liquid decreases the vacuum, which causes the pump to turn on and evacuate the interstitial space(s) until the operating vacuum is reached. The process repeats itself until the liquid stop valve in the suction line closes.

Because of the vacuum that still exists on the measuring line side, additional leaked liquid is sucked into the interstitial space, the measuring line and, if applicable, into a pressure-compensating vessel. This causes the vacuum to drop until the "Alarm ON" pressure is reached. This triggers the visual and acoustic alarm.

3.4 Switch Values of the Leak Detector

Type	**Alarm ON**	**Pump OFF**	Used in **Group:**
VLX 34	50 ± 15	80 ± 10	A/D/F
VLX 330	350 ± 20	410 ± 20	A/B/C/D/E/F/G/H
VLX 500	520 ± 20	590 ± 20	A/B/C/D/E/F/G/H
VLX 570	590 ± 20	670 ± 20	A/B/C/D/E/F/G/H

The measured switch value for "Alarm OFF" must be less than the measured switch value for "Pump OFF".

The measured switch value for "Pump ON" must be greater than the measured switch value for "Alarm ON".

4 Installation Instructions

4.1 General Notes

(1) Observe the approvals of the manufacturer for the tank/pipe and the interstitial space.

(2) Only qualified service companies must be used for installation and startup[8].

(3) Applicable regulations regarding electrical installation[9].

(4) Pneumatic connections, connecting lines and fittings must maintain the pressure that may occur over the entire temperature range in case of a leak.

(5) Before entering inspection chambers, the oxygen content must be tested and the inspection chamber flushed if necessary.

In addition, for explosive liquids:

(6) Observe explosion protection regulations[10].

(7) Pneumatic connections, connecting lines and fittings must be designed to at least PN 10 for the entire temperature range.

(8) When using metallic connection lines, you must make sure that the mains earth is connected to the same potential as the tank/pipe being monitored.

4.2 Personal Protective Equipment

The parts listed here refer in particular to safety when working with systems that may be subject to risk of explosion.

If work is performed in areas in which an explosive atmosphere may be expected, the minimum required equipment is as follows:

- Suitable clothing (risk of electrostatic charge).
- Suitable tools (e.g., per EN 1127).
- Suitable gas warning equipment calibrated to the existing vapor-air mixture (work should be performed only at a concentration of 50% below the lower explosion limit)[11].
- Measuring equipment to determine the oxygen content (Ex/O-Meter)

4.3 Installation of the Leak Detector

(1) Wall installation, in the building or outside, no further steps.

In addition, for explosive liquids:

(2) Outside the explosive zone, out of doors, but not in shafts or troughs. Through shafts and troughs only if they are defined or will be defined as explosion zones.

[8] For Germany: Specialist firms according to the Federal Water Act, which have verified their qualification for the installation of leak detection systems, for ex-liquids.
[9] For Germany: e.g., VDE regulations, regulations of the electrical supply companies.
[10] For Germany: e.g., BetrSichV
Generally: laws on the basis of the European Directive 1999/92/EG and/or other applicable codes.
[11] Other countries' regulations may give different percentages.

(3) Outside of the explosion zone, inside the building. Sufficient ventilation must be ensured; EN 60079-10/EN 13 237 may be used to help assess this.

(4) If the leak detector is used on tanks that are operated with a slight overpressure[12] resulting, for example, from a vapor recovery system, it must be installed at least 1 m above the crown of the tank.

4.4 Installation of the Connecting Lines

(1) Strong, metallic pipes must be used for the connecting lines (e.g. copper pipes). Plastic pipes with sufficient pressure resistance (over the entire temperature range) may also be used if the interstitial space is NOT zone 0.
Conduits for connecting lines through which the explosion atmosphere can carry over must be sealed gas-tight.

(2) Inside clearance min. 6 mm.

(3) Resistant to the stored product.

(4) Color coding: *measuring line:* RED; *suction line:* WHITE or CLEAR; *exhaust:* GREEN.

(5) The full cross section must be maintained.

(6) The lines between the interstitial space and leak detector must not exceed 50 m in length. If the distance is greater than this, a larger cross section must be used.

In addition, for explosive liquids:

The following lengths may not be exceed for the exhaust line:
Pipe with 6 mm inside clearance: **max. 50 m**[13]
If these lengths are not sufficient, the manufacturer must be consulted.

(7) If there are low points when laying the pipes, a condensate trap must be installed at each low point.

(8) Install a liquid stop valve in the suction line.

(9) The exhaust line is generally routed to the tank vent, in which case an explosion protection device must be installed on the tank vent side.
Further exceptions:
Tanks with interior overlay pressure, tanks according to DIN 4119 with double-layered floor, or comparable:

A) The exhaust line can lead outside to a safe area, outside of the explosion area: Provide a condensate trap and liquid stop valve in the exhaust. The area within 1 m diameter of the end of the exhaust is considered as having zone 1 conditions; attach a warning sign if necessary.

B) The exhaust ends in zone 1 (e.g. remote fill chamber or collection space):
An explosion protection device[14] must be provided at the end of the exhaust line. Condensate traps must be provided at low points; a liquid stop valve is not required if the end of the exhaust is in an area which is made liquid-tight according to water protection laws.

[12] It must be ensured that the overpressure does not continuously exceed 50 mbar.

[13] Pipe with 4 mm inside clearance: max. 15 m

[14] The explosion protection device is not required if the exhaust is routed so that it is frostproof, and it can be guaranteed that the exhaust will not become kinked or clogged.

(10) For applications with pressure-compensating vessels (see drawings H-01 and 02):
Length of the measuring line from the pressure-compensating vessel (V=0.1 l)[15]:

Type 330: L_{max} 20 m
Type 500: L_{max} 12 m
Type 570: L_{max} 9 m

For each 10 ml of the condensate trap(s) used in the measuring line between the pressure-compensating vessel and leak detector, L_{max} is reduced by 0.4 m.

In addition, for explosive liquids:

(11) Install explosion protection devices on the tank side.

(12) If connecting lines (suction, measuring or exhaust lines) must lead up and away from the leak detector, this can only be done at a distance of at least 1.5 m from the leak detector.

(13) Leadthroughs for connecting lines through which the explosion atmosphere can carry over must be sealed gas-tight.

4.4.1 If more than one pipe interstitial space is connected to one leak detector at a time:

(1) Lay connecting lines at a downward angle to the interstitial space or the manifold. If there are low points in the connecting lines and lines are laid out of doors as well, install condensate traps at all low points.

(2) Lay suction and measuring lines at a downward angle to the manifold. If this is not possible, place condensate traps at all low points.

(3) Connect a liquid stop valve to each connecting line to the interstitial space, against direction of flow.
These prevent leaking liquids from entering the interstitial spaces of the other pipes.

4.5 Power Specifications

(1) Power supply: see nameplate.

(2) Fixed wiring, i.e., no plug or switch connections.

(3) Terminal configuration (see also SL-854 200):

2	outer conductor (phase)
3	neutral conductor
4/5	outer signal (230 V in case of alarm, can be turned off by activating the switch “audible alarm”.)
11/14	voltage-free contacts (opened in case of alarm or loss of power)
21/24	voltage-free contacts (opened in case of alarm or loss of power)

4.6 Installation Examples

Installation examples are given in the Appendix. The explosion protection devices are not required if the product does not pose any risk of explosion.

[15] If this volume is multiplied, L_{max}.is multiplied as well.

Observe the following at all times:

1. For containers with a suction line:
   The suction line must lead either through the interstitial space or outside of the tank (but must then be compression proof), from the low point of the interstitial space to above the interstitial space, as well as above the tank's maximum fill level.
2. Installation example H – 01:
   The high point(s) of the pipe to be monitored must be below node point 96 (suction/measuring line division). The low point(s) must not exceed the H_{max} dimension. Within these boundaries, the pipe may also have other high and low points.
3. Installation example H – 02:
   As under no. 2, the pipe here may also have high and low points within the listed boundaries.
4. Installation example H – 03:
   The dimension H_{max} is the boundary between the "highest" high point and the "lowest" low point. The volumes of the connected pipes must meet the following conditions:
   $4 \bullet V_{MS\ 1} > V_{MS\ 1} + V_{MS\ 2} + V_{MS\ 3} + V_{MS\ 4}$ and
   $4 \bullet V_{MS\ 2} > V_{MS\ 2} + V_{MS\ 3} + V_{MS\ 4}$, etc.
   where $V_{MS\ (number)}$ is the volume of the specific interstitial space.

5 Startup

(1) Observe and comply with all guidelines from section 4.

(2) Connect the pneumatic devices.

(3) Complete the electrical wiring, but do not yet connect to the power supply.

(4) Close the housing cover.

(5) Connect to the power supply.

(6) Check that the operating and alarm lights and the acoustic alarm work properly. Press the "Acoustic alarm" button; it lights up.

(7) Set three-way valve 21 to position "III" and connect the test measuring instrument.

(8) Apply a vacuum to the system.
(In case of explosive liquids, use an **explosion-protected** installation pump (Caution: observe the temperature code and gas group!))
To do this, connect the installation pump at pipe union 82, turn on the installation pump and open its stop cock. The interstitial space is evacuated. Monitor the vacuum buildup on the measuring instrument.
NOTE: If no pressure buildup is achieved with the installation pump connected, the leak must be located and corrected (check the performance of the installation pump as well is necessary).

(9) After reaching the operating vacuum of the leak detector (the pump in the leak detector shuts off), close the previously opened stop cock, switch off the pump and remove it.

(10) Set three-way valve 21 to position "I" and remove the test measuring instrument.

(11) Press the "Acoustic alarm" button; the light will go out.

(12) Perform the function test per section 6.4.

6 Operating Instructions

6.1 General Notes

(1) If the leak detection system is installed properly and tightly, it can be assumed that the leak detector works within the control range.

(2) Frequent switching on or continuous running of the pump indicates leaks, which should be corrected within a reasonable time.

(3) If the alarm goes off, this always indicates a more significant leak or a defect. Determine the cause and correct it shortly.

(4) The operator must check the function of the operating lights at regular intervals.

(5) For any repair work, disconnect the power to the leak detector.

(6) A loss of power is indicated by the “Operating” signal light going off. A loss of power to the relay contacts (if used for alarm transmission) triggers the alarm.
After the power loss, the green signal light lights up again and the voltage-free contacts no longer generate an alarm (unless the power loss has caused the pressure to drop below the alarm pressure).

In addition, for explosive liquids:

(7) For any repair work, disconnect the power to the leak detector. Check for explosive atmosphere if necessary.

(8) Explosion protection requirements must be satisfied (where necessary), such as laws on the basis of the European Directive 1999/92/EG and/or other applicable codes.

6.2 Intended Use

- Double-walled tank, pressureless[16] (except as per section 2.4)
- Double-walled pipe, pressureless[17] (except as per section 2.4)
- The tank/pipe must be grounded per EN 1127
- The leak detection system must be tight according to the table in the documentation
- The leak detector must be installed out of doors, outside the explosion zone (or inside the building if the listed requirements are met), see section 4.3.
- In case of explosive vapor-air mixtures, the following conditions must be met: IIA or II B, T1 to T3; vapors heavier than air
  and explosion protection devices installed on the tank/pipe side.
- Conduits inside and out of the manhole or inspection chambers must be sealed gas-tight
- The power supply must not be disconnectable

[16] If the tank is operated with a slight overpressure < 50 mbar (because of a vapor recovery system, for example), the leak detector must be installed at least 1 m above the crown of the tank.

[17] The accumulation pressure in the inside pipe while the liquid is flowing is not considered. There must not be a shutoff device at the low point of the pipe.

6.3 Maintenance

(1) Maintenance work and function tests must be performed by trained personnel only[18].

(2) Once a year to ensure functional and operational safety.

(3) Test scope per section 6.4.

(4) Compliance with the conditions per sections 4 to 6.3 must also be tested.

(5) Disconnect the power to the leak detector before opening the housing.

6.4 Function Testing

The functional and operational safety tests must be performed

- after every startup
- according to section 6.3[19]
- each time a malfunction is corrected.

The explosion protection measures (with explosive liquids) must be included in all function testing.

6.4.1 Test Scope

(1) Coordinate the work to be performed with those responsible for operation if necessary.

(2) Observe the safety instructions for working with the stored material.

(3) Check the condensate traps and empty if necessary (6.4.2).

(4) Check the free passage of air in the interstitial space (section 6.4.3).

(5) Test the switch values with the interstitial space (section 6.4.4)
or Test the switch values with the testing device (section 6.4.5).

(6) Test the vacuum pump delivery (section 6.4.6).

(7) Test the leak detection system for tightness (section 6.4.7).

(8) Create the operating conditions (section 6.4.8).

(9) An expert must complete a test report, confirming functional and operational safety.

6.4.2 Checking and Emptying the Condensate Traps

(1) Close any shut-off valves on the interstitial space side.

(2) Set three-way valves 20 and 21 to position IV to ventilate the connection lines.

(3) Open and empty the condensate traps. CAUTION: The condensate traps may contain the stored/conveyed material. Take proper protective measures.

(4) Close the condensate traps.

[18] For Germany: Expert knowledge or under the responsibility of an expert
For Europe: Authorisation from the manufacturer.

[19] For Germany: also observe provisions of federal state law (e.g. ordinance on installations handling materials hazardous to water)

(5) Set three-way valves 20 and 21 to position I.

(6) Open the stop cocks on the interstitial space side.

6.4.3 Checking the Free Passage of Air in the Interstitial Space

(1) Connect the measuring instrument to three-way valve 21, then set to position III.

(2) For tanks and pipes per installation example H 3: Set three-way valve 20 to position IV,
For pipes per installation examples H 1 and H 2: Open the test valve at the end opposite the leak detector; in case of multiple pipe interstitial spaces, the test valves must be opened sequentially at the end opposite the leak detector.

(3) Check that the measuring instrument registers a pressure drop. If no pressure drop occurs, locate and correct the cause.

(4) Set three-way valve 20 to position I or open the test valve(s).

(5) Set three-way valve 21 to position I.

(6) Remove the measuring instrument.

6.4.4 Testing the Switch Values with the Interstitial Space

(1) Connect the measuring instrument to three-way valve 21 and set to position III.

(2) For tanks and pipes per installation example H 3: Ventilate with three-way valve 20 (position III)
For pipes per installation examples H 1 and H 2: Open the test valve at the end of the interstitial space opposite the leak detector. In case of multiple pipes, the leak detector-side stop cocks of the interstitial spaces not included in the test can be closed.

(3) Check switch values “Pump ON” and “Alarm ON” (with visual and acoustic alarm). Note the values.

(4) Press the “Acoustic alarm” button if necessary.

(5) Set three-way valve 20 to position I or close the test valve and check switch values “Alarm OFF” and “Pump OFF”. Note the values.

(6) The unit passes the test if the measured switch values fall within the specified values.

(7) Open any stop cocks that were closed prior to the test.

(8) Set three-way valve 21 to position I. Press the “Acoustic alarm” button again if necessary.

(9) Remove the test measuring instrument.

6.4.5 Testing the Switch Values with the Testing Device (P-115 392)

(1) Connect the testing device to the two hose ends on each of the free pipe unions of three-way valves 20 and 21.

(2) Connect the measuring instrument to the tee of the testing device.

(3) Close the needle valve of the testing device.

(4) Set three-way valves 20 and 21 to position II. The operating vacuum is built up in the test vessel.

(5) Ventilate using the needle valve, check switch values “Pump ON” and “Alarm ON” (visual and acoustic). Note the values.

(6) Press the “Acoustic alarm” button if necessary.

(7) Slowly close the needle valve and check switch values “Alarm OFF” and “Pump OFF”.

(8) The unit passes the test if the measured switch values fall within the specified values.

(9) Set three-way valves 20 and 21 to position I. Press the “Acoustic alarm” button if necessary.

(10) Remove the testing device.

6.4.6 Testing the Vacuum Pump Delivery

(1) Connect the measuring instrument to three-way valve 20 and set to position II.

(2) Set three-way valve 21 to position II to ventilate the vacuum switch. The alarm is triggered and the pump runs.

(3) Read the delivery rate of the pump from the measuring instrument.

(4) The unit passes the test if the achieved pressure is > 150 mbar (type 34), > 550 mbar (type 330), > 700 mbar (type 500) or > 750 mbar (type 570).

(5) Set three-way valves 20 and 21 to position I.

(6) Remove the measuring instrument.

6.4.7 Leak Detection System Tightness Testing

(1) Check that all stop cocks between the leak detector and interstitial space are open.

(2) Connect the measuring instrument to three-way valve 21, position III.

(3) The vacuum pump must have reached the Pump OFF switch value for the tightness test. Wait for a possible pressure compensation and then start the tightness test.

(4) The test is positive if the values of the following table are met. A higher pressure drop means a higher load on the wear parts.

Interstitial space volume in liters	**1 mbar pressure drop in**
100	9 minutes
250	22 minutes
500	45 minutes
1000	1.50 hours
1500	2.25 hours
2000	3.00 hours
2500	3.75 hours
3000	4.50 hours
3500	5.25 hours
4000	6.00 hours

(5) Set the test valve to position I and remove the measuring instrument.

6.4.8 Creating the Operating Conditions

(1) Seal the housing.

(2) Seal the stop cocks (between the leak detector and interstitial space) for each connected interstitial space in the open position.

6.5 Alarms

(1) With explosive liquids, one must assume that an alarm means that there is an explosive vapor-air mixture in the interstitial space. Take proper protective measures.

(2) An alarm is indicated by the “Alarm” signal lighting up and the sounding of the acoustic signal.

(3) Close any stop cocks in the connecting line between the interstitial space and leak detector.

(4) Shut off the acoustic signal by pressing the “Acoustic alarm” button. The button lights up.

(5) Inform the installation company.

(6) The installation company must determine the cause and correct it.

(7) Perform the function test per section 6.4, observing the conditions from sections 4 to 6.2.

7 Removal

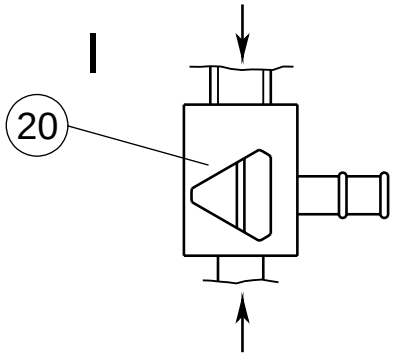
For removal from units, which can cause an explosion risk, the following points must be observed in particular:

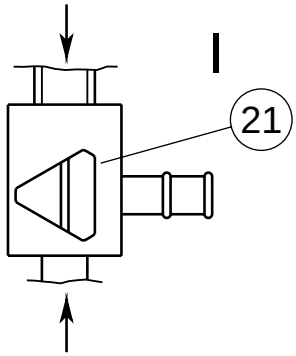
- Follow applicable rules for electrical disconnection.
- Make sure the unit is free of gas before and during removal.
- Seal any openings gas-tight through which the explosion atmosphere can carry over.
- Do not use spark-producing tools (saws, parting grinders, etc.) for removal. If this is unavoidable, be certain to observe EN 1127.
- Use low-spark tools.
- Avoid the buildup of electrostatic charges (e.g., through friction).
- Properly dispose of contaminated components (possibly through outgassing).

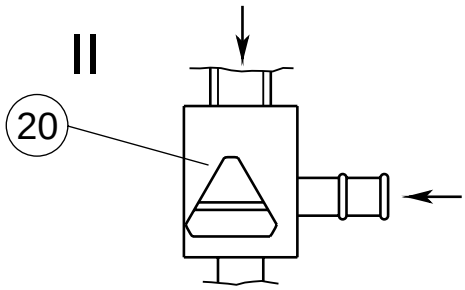
8 Identification

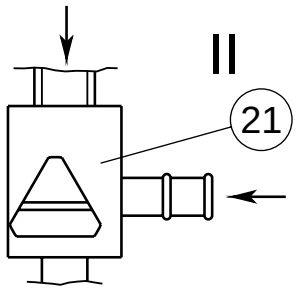
- Type
- Electrical data
- Manufacturer or manufacturer symbol
- Date of manufacture (month/year)
- Serial number
- Symbol specified by law
- Explosion data

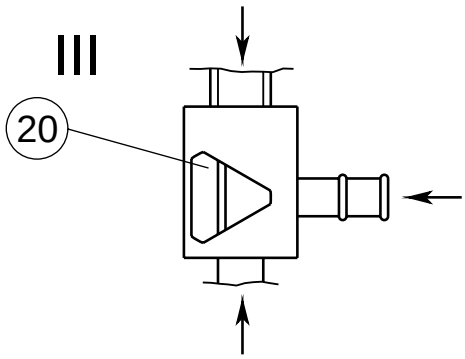
9 Index

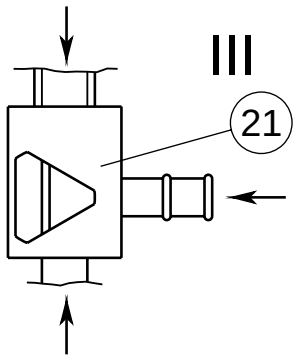


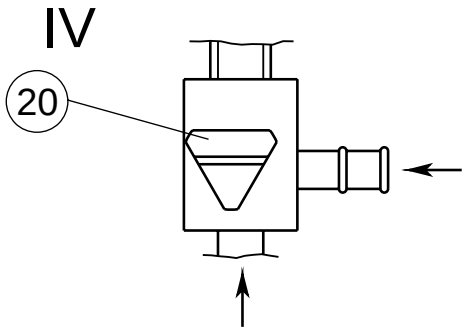


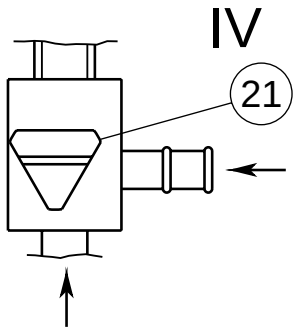












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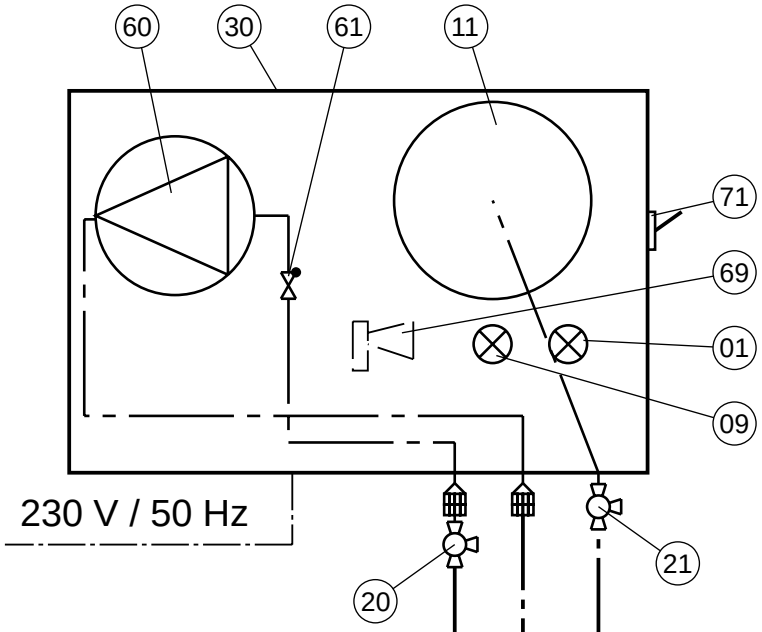

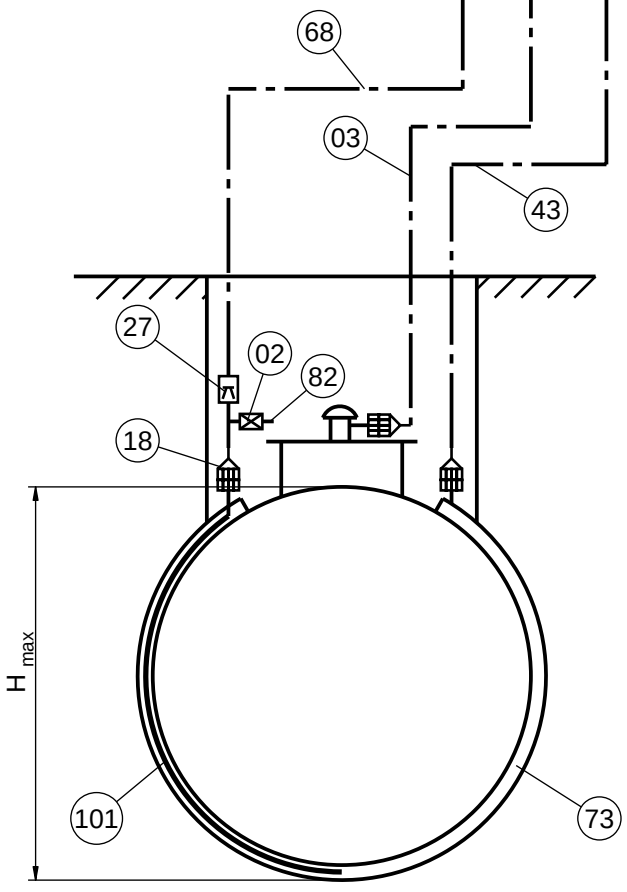

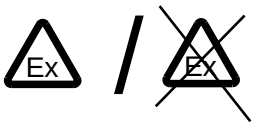

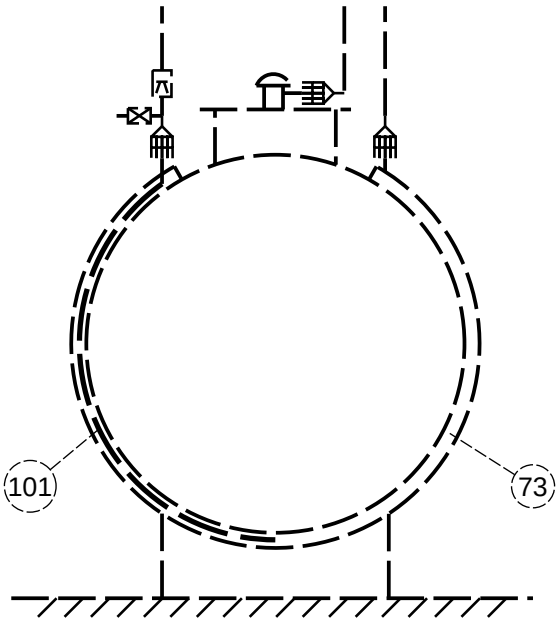

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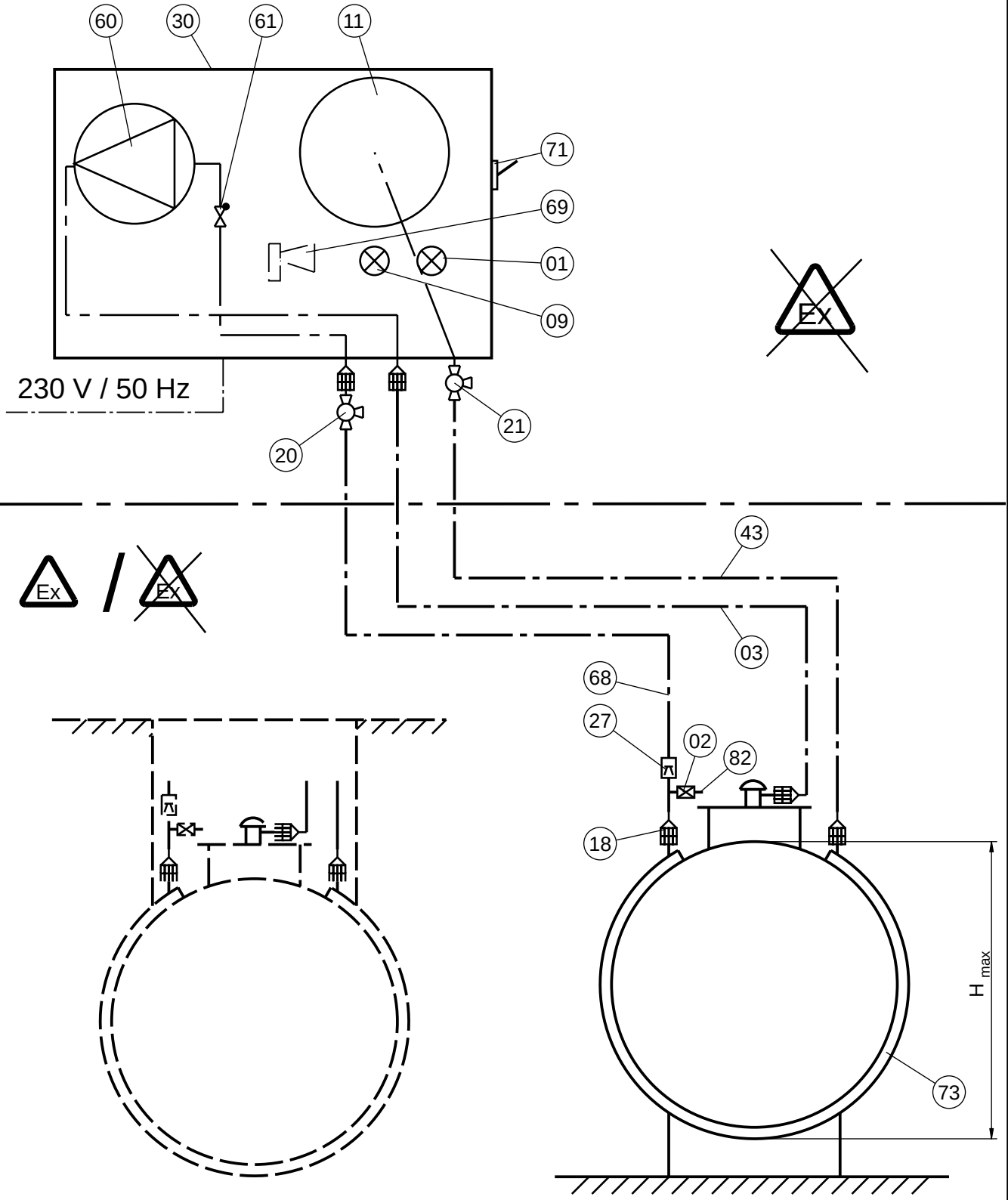
A - 01



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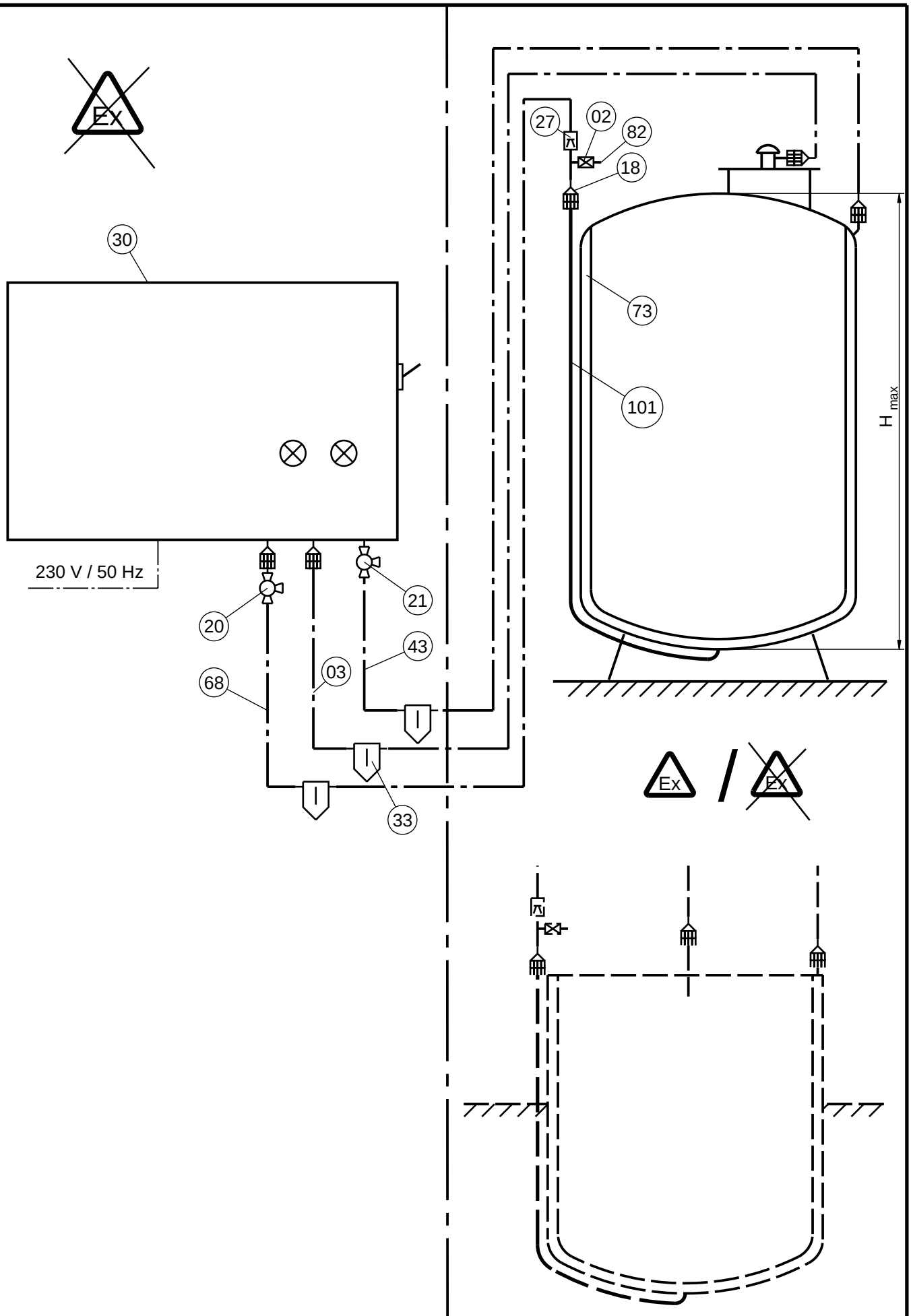

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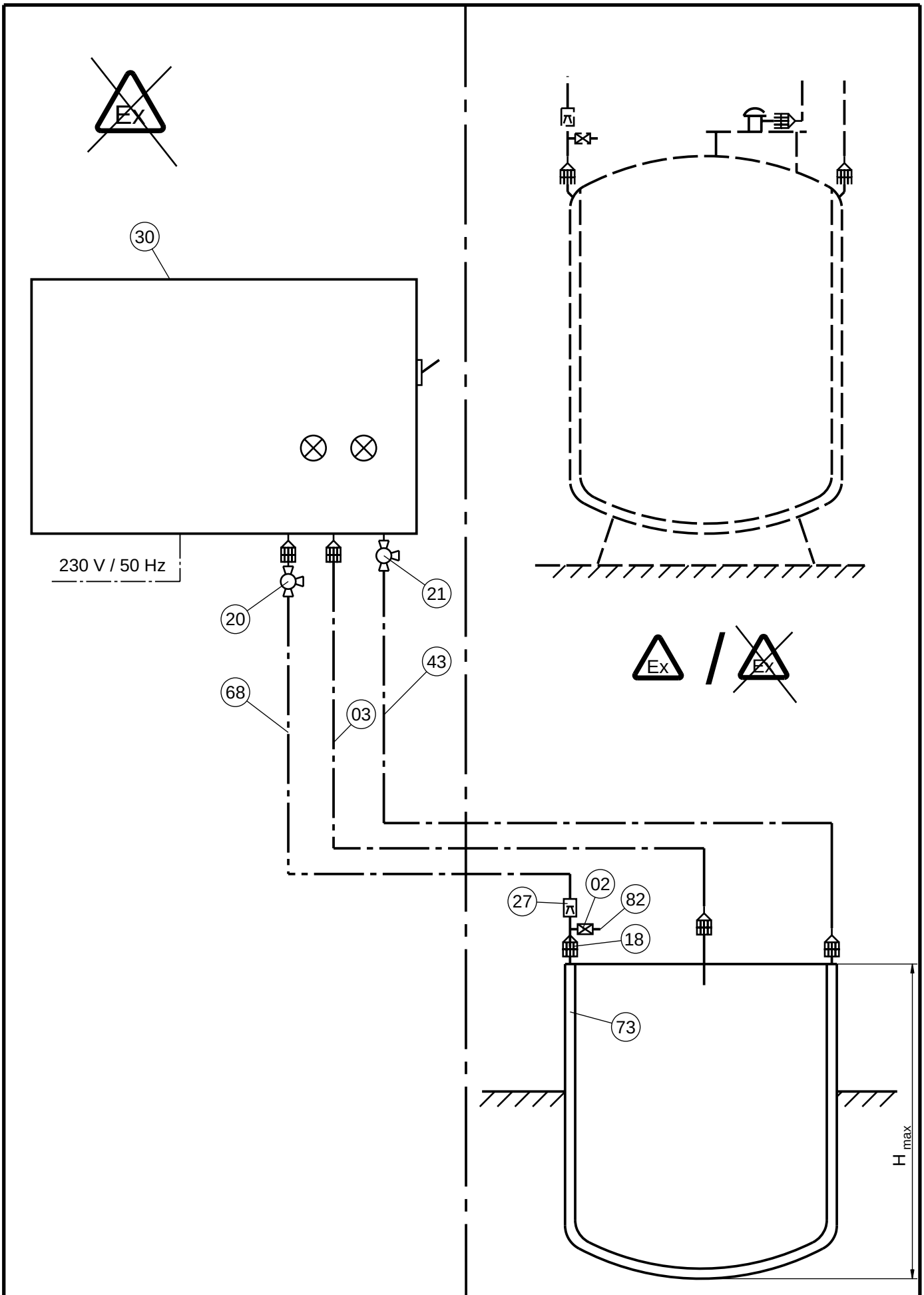
D - 01



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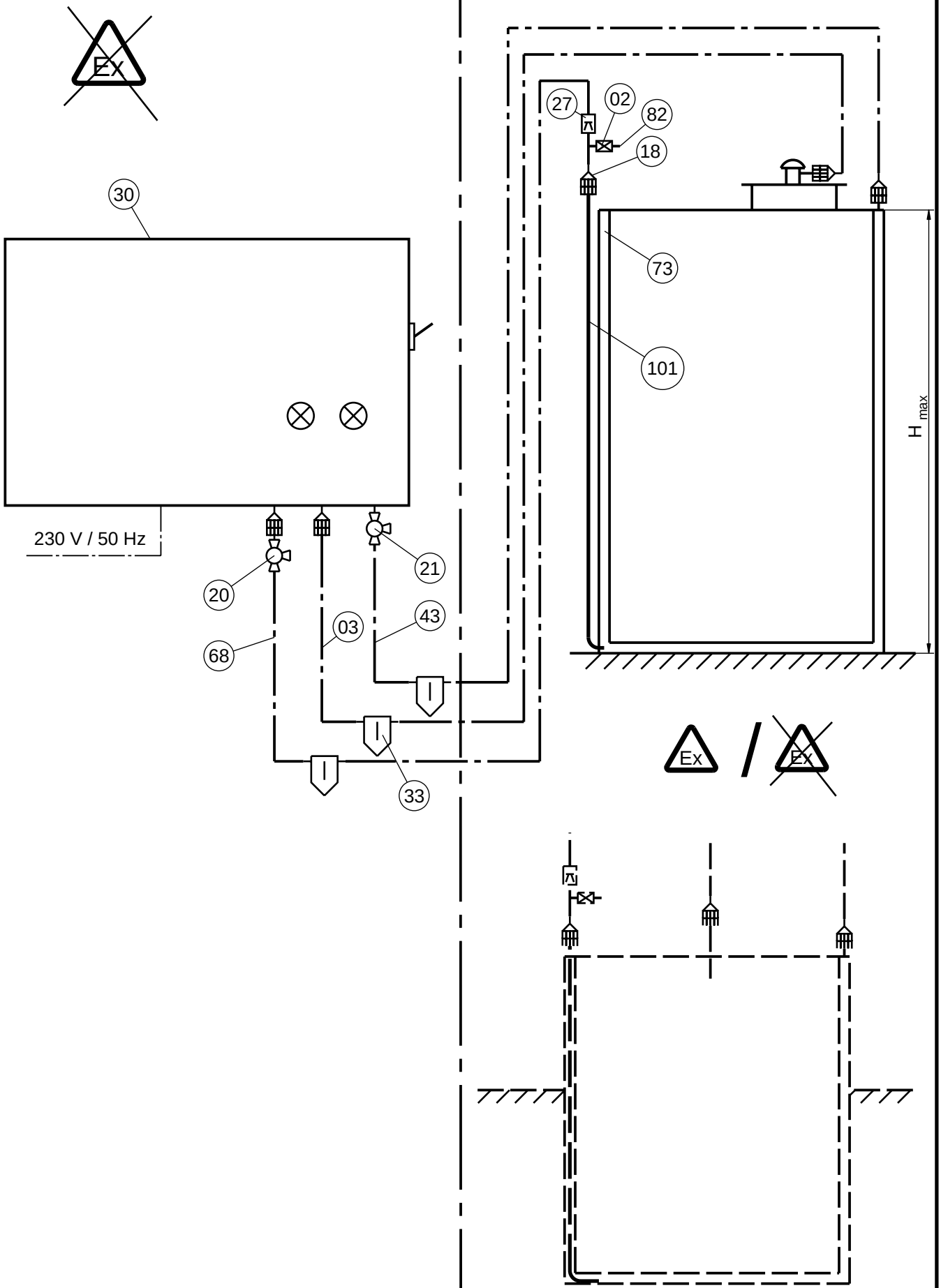
E - 01



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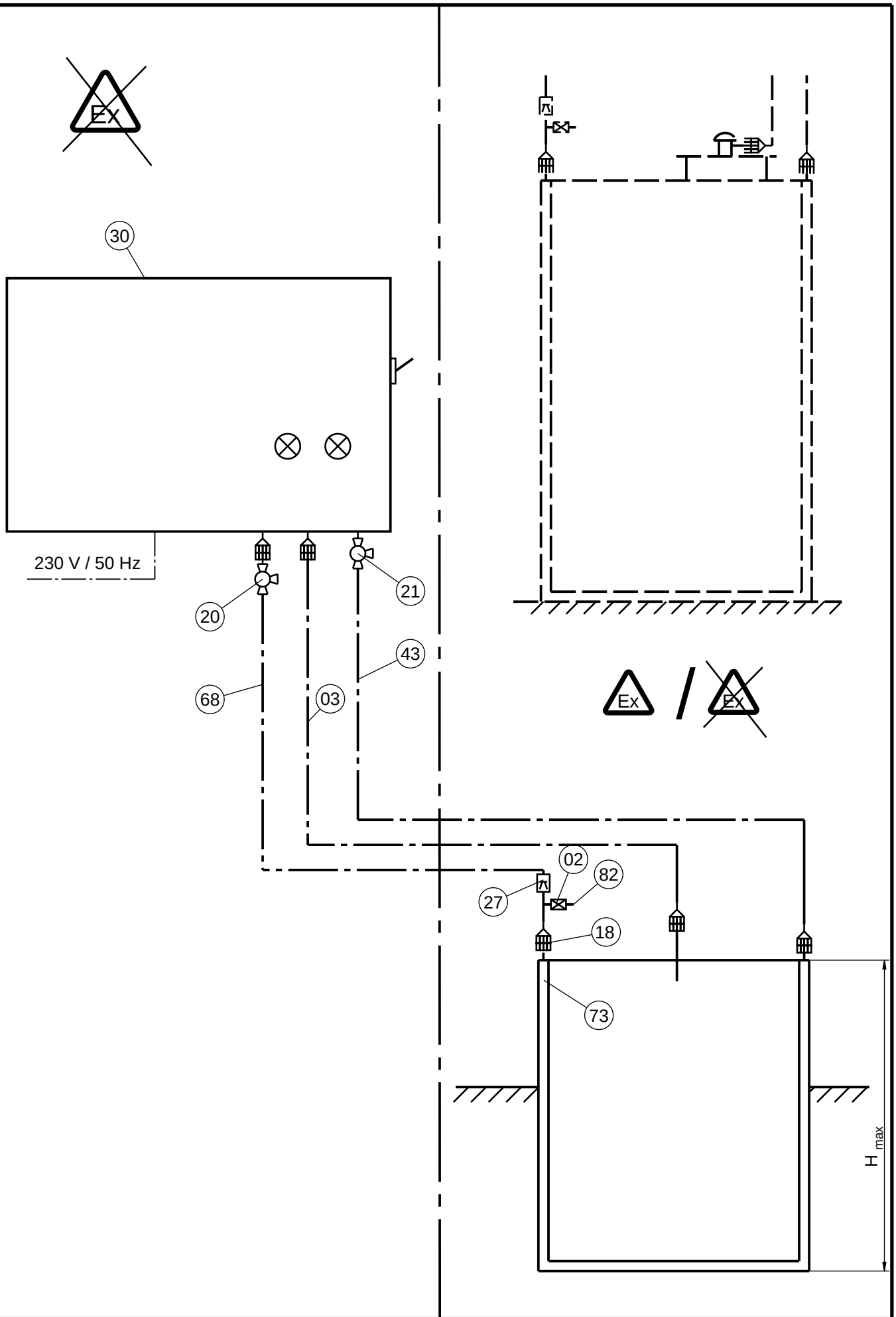
F - 01



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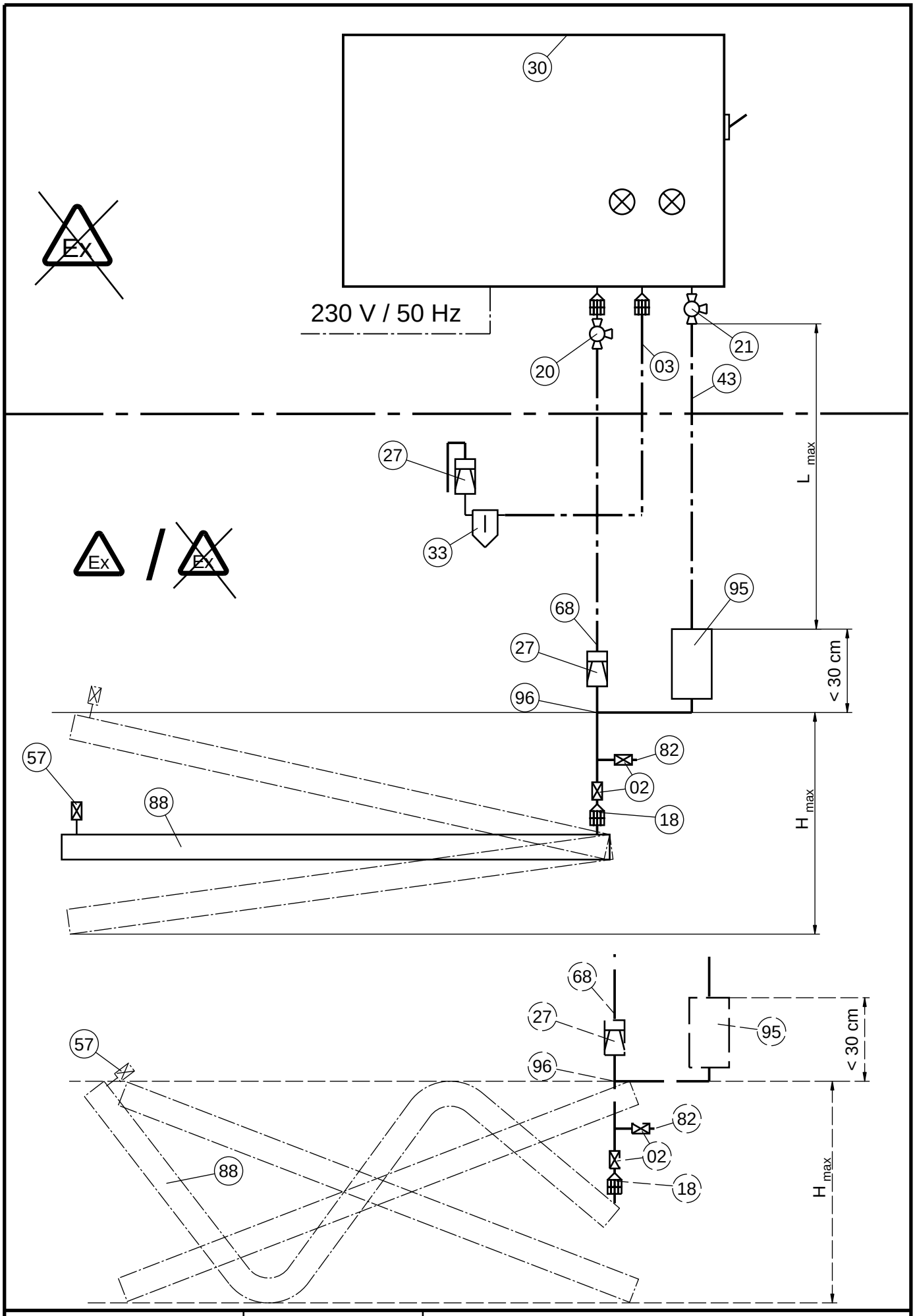
G - 01



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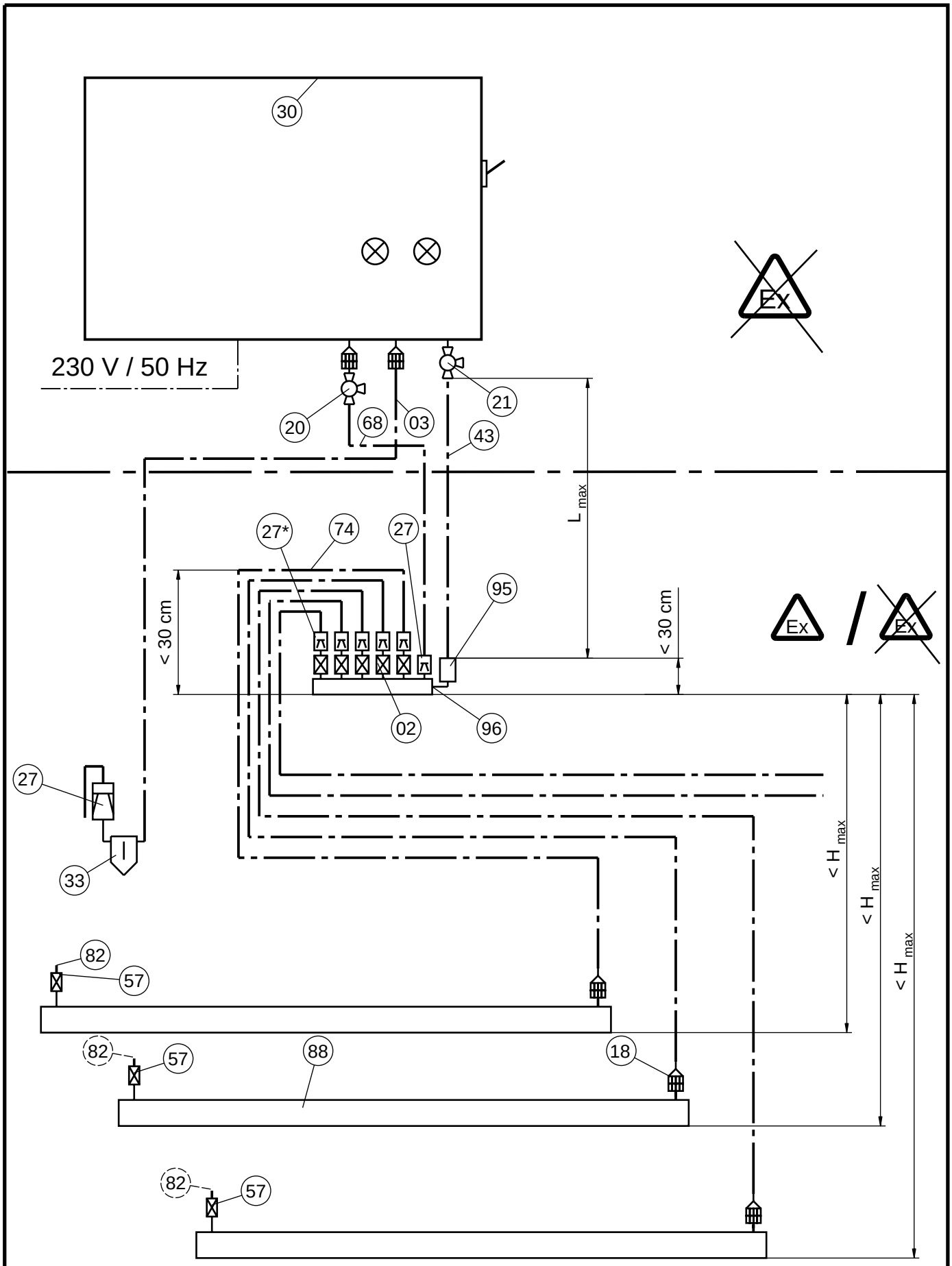
H - 01



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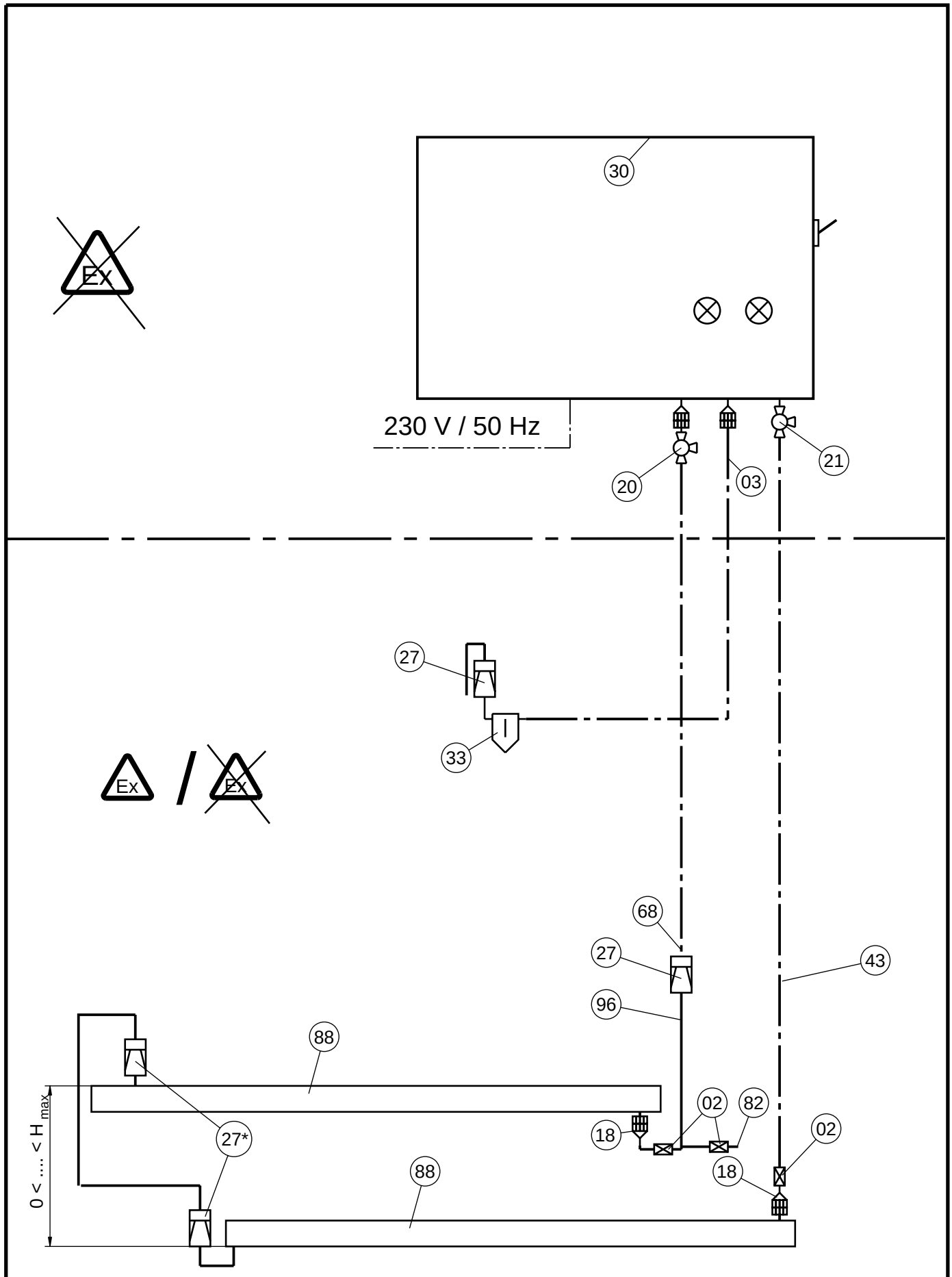
H - 02



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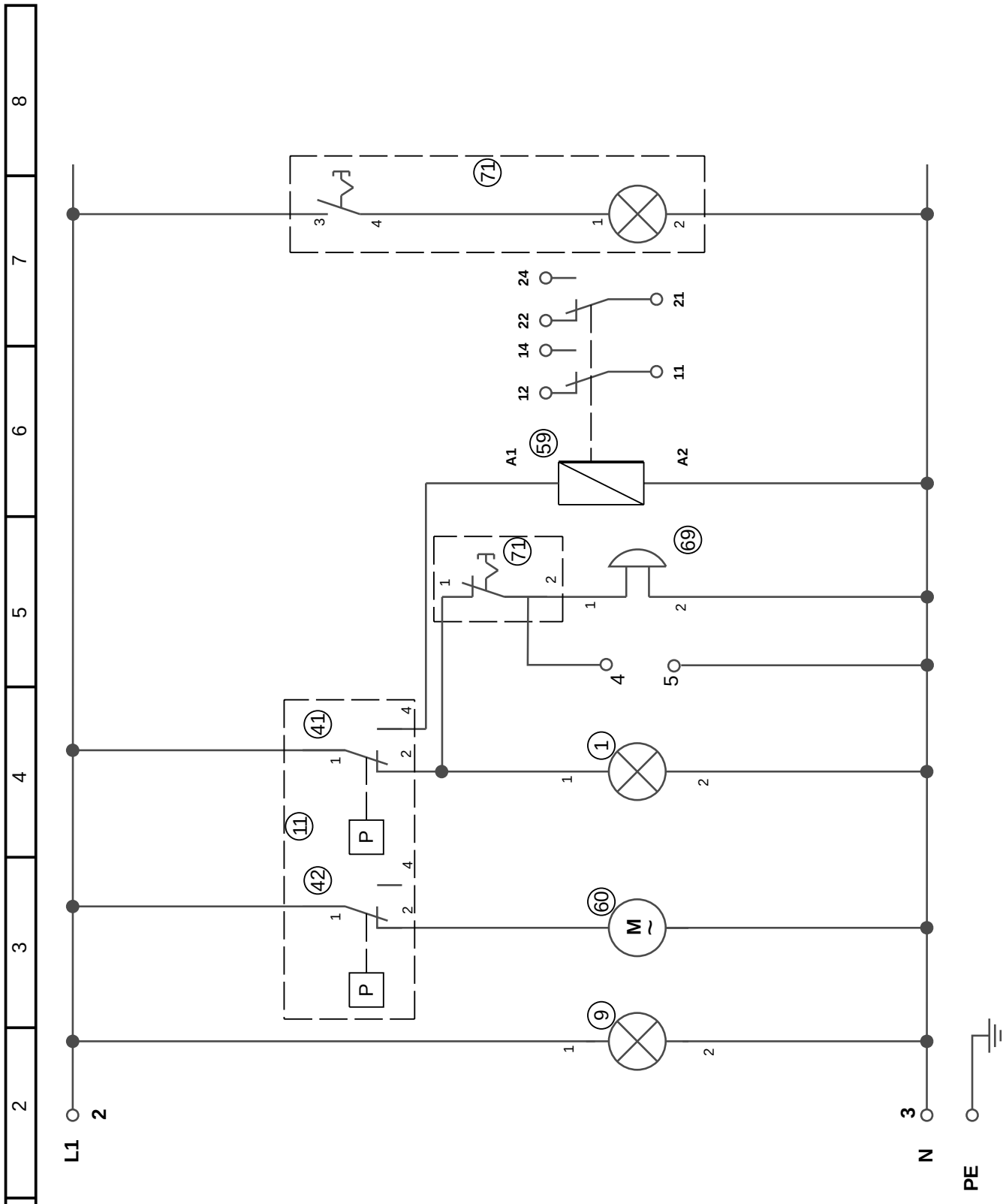

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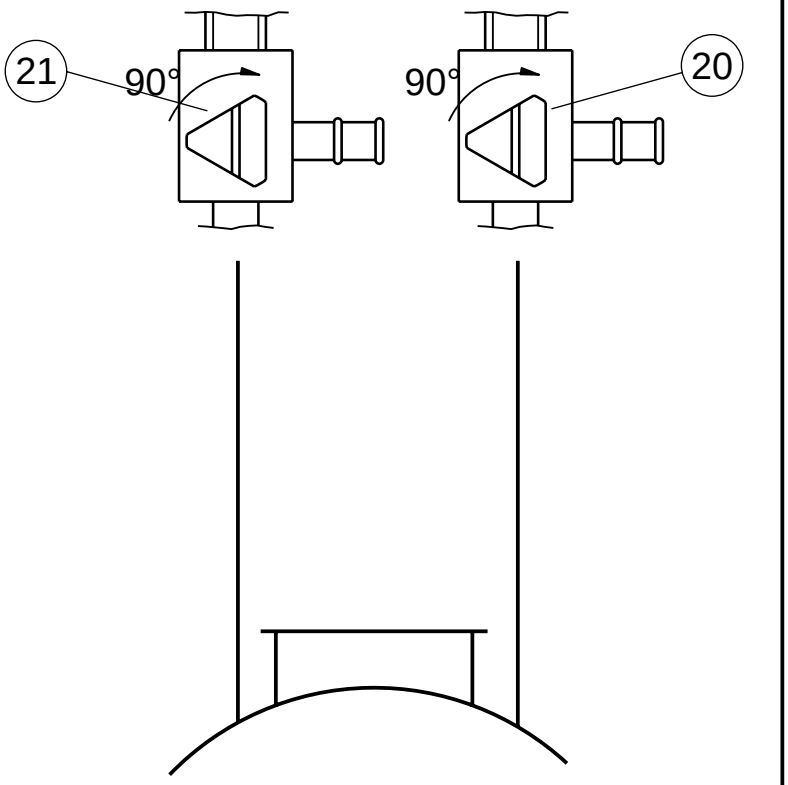

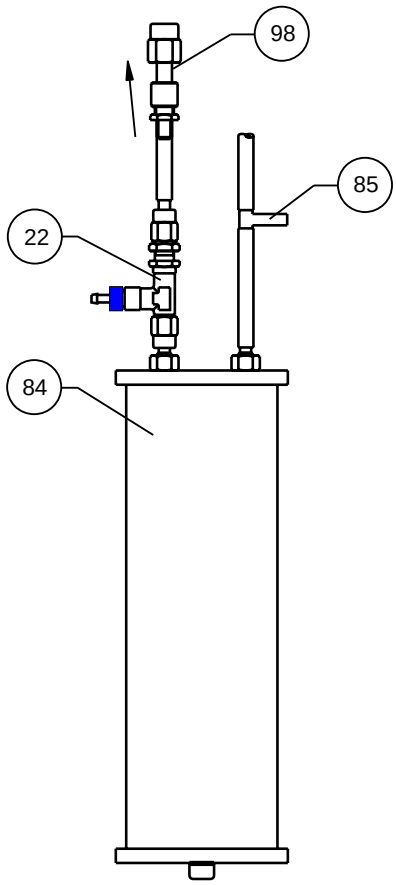

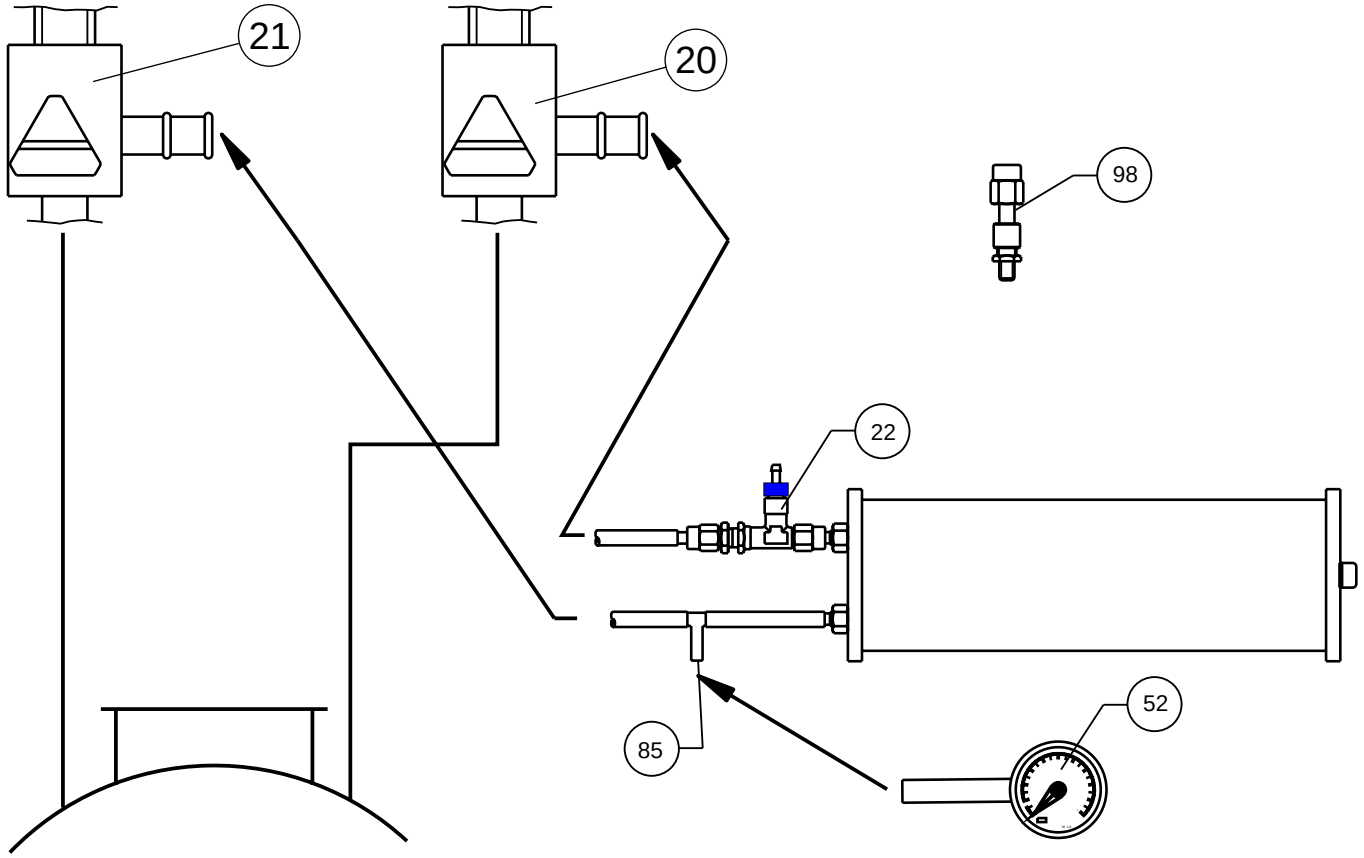

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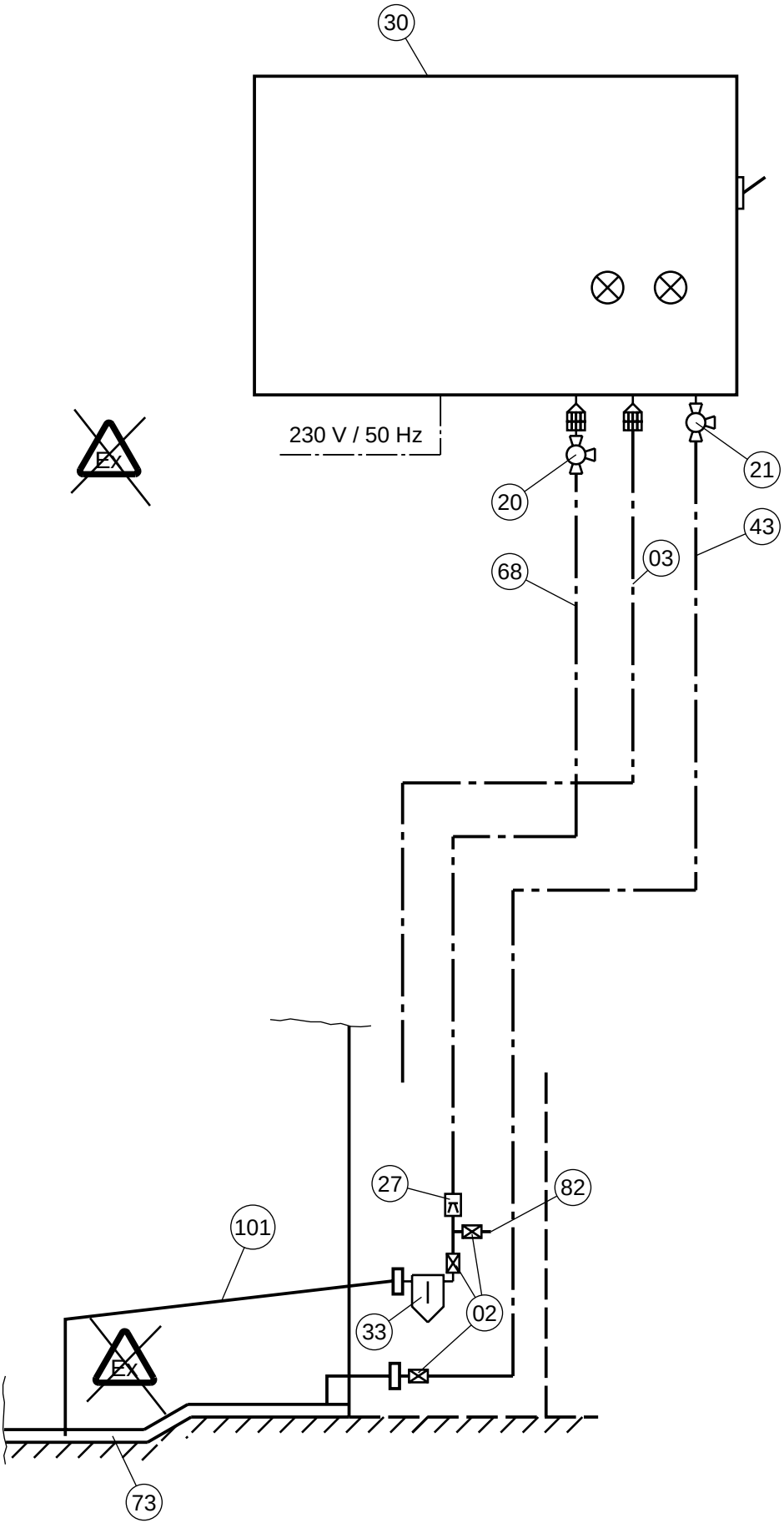

18-06-2003

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MBS - 2.4

Using the VLX .. Vacuum Leak Detector on Interstitial Spaces Filled with Leak Detection Liquid

A.1 Prerequisites

(1) Only leak detectors with suitable alarm pressures, which depend on the tank diameter and the density of the stored product, may be used.

(2) The procedure described below is intended for tanks as defined per DIN 6608.

(3) If this method is used on other tanks, the permission of the locally responsible authorities is required on a case-by-case basis.

A.2 Preparation

(1) Remove the liquid-based leak detector

(2) Remove the leak detection liquid from the interstitial space by suction:

(3) Suction procedure:
– Install the connections for the suction and measuring lines
– Connect the installation pump to the suction line connection via the intermediate container[1]
– **Apply suction until no more liquid is removed**
– Connect the vacuum gauge to the measuring line connection
– Continue the evacuation process (at approx. 500 mbar) until no more liquid is removed
– Repeat the evacuation process if necessary to ensure that a gas cushion is created above the remaining leak detection liquid.

A.3 Installation and Startup of the Leak Detector

(1) The suctioning of the leak detection liquid creates a gas cushion above the leak detection liquid.

(2) Install the vacuum leak detector according to the documentation and start it up.

(3) Perform a function test of the leak detector.

A.4 Alarms

(1) An alarm can occur if insufficient leak detection liquid has been removed and the liquid in the interstitial space has risen due to increased heat.
Remedy:
Regenerate the air cushion above the leak detection liquid.

(2) An alarm can also occur in case of penetration of groundwater/stored product or air in the interstitial space and an associated rise in the liquid.
Remedy:
Locate the leak and correct it if necessary, then restart the leak detector.
If the leak cannot be located or repaired, consult the locally responsible expert for further instructions.

[1] The liquid to be suctioned out is collected in this container.

E.1 H_{max}, Depending on Density

Density of the stored material [kg/dm³]	$H_{max.}$ [m]			
	Type 330	Type 500	Type 570	
0.8	3.8	6.0	6.9	Aboveground tanks/pipelines only
0.9	3.4	5.3	6.1	
1.0	3.1	4.8	5.5	Aboveground or underground tanks/pipelines
1.1	2.8	4.4	5.0	
1.2	2.6	4.0	4.6	
1.3	2.4	3.7	4.2	
1.4	2.2	3.4	3.9	
1.5	2.0	3.2	3.7	
1.6	1.9	3.0	3.4	
1.7	1.8	2.8	3.2	
1.8	1.7	2.7	3.1	
1.9	1.6	2.5	2.9	

E.2 Max. Tank Height, Depending on Density

Density of the stored material [kg/dm³]	$H_{max.}$ [m]				
	Type 34	Type 330	Type 500	Type 570	
0.8	7.8	28.2	29.0	26.1	Aboveground tanks only
0.9	7.0	25.1	25.8	23.2	
1.0	6.3	22.6	23.2	20.8	Aboveground or underground tanks
1.1	5.7	20.5	21.1	19.0	
1.2	5.2	18.8	19.3	17.4	
1.3	4.8	17.4	17.8	16.0	
1.4	4.5	16.1	16.6	14.9	
1.5	4.2	15.1	15.5	13.9	
1.6	3.9	14.1	14.5	13.0	
1.7	3.7	13.3	13.6	12.3	
1.8	3.5	12.6	12.9	11.6	
1.9	3.3	11.9	12.2	11.0	

E.3 Tank per DIN 6618 T2: 1989 and Troughs with a Rounded Bottom (dished bottom) and the Same Dimensions

Diameter [mm]	Height [mm]	Max. density of the stored material [kg/dm^3]			
		Type 34	Type 330	Type 500	Type 570
1600	≤ 2,820	≤ 1.90	≤ 1.90	≤ 1.90	≤ 1.90
	≤ 6,960	≤ 1.60	≤ 1.90	≤ 1.90	≤ 1.90
2000	≤ 8,540	≤ 1.40	≤ 1.90	≤ 1.90	≤ 1.90
2500	≤ 8,800	≤ 1.00	≤ 1.90	≤ 1.90	≤ 1.90
2900	≤ 9,585	≤ 0.90	≤ 1.90	≤ 1.90	≤ 1.90
	≤ 12,750	≤ 0.90	≤ 1.90	≤ 1.90	≤ 1.80
	≤ 15,950	-	≤ 1.60	≤ 1.60	≤ 1.40

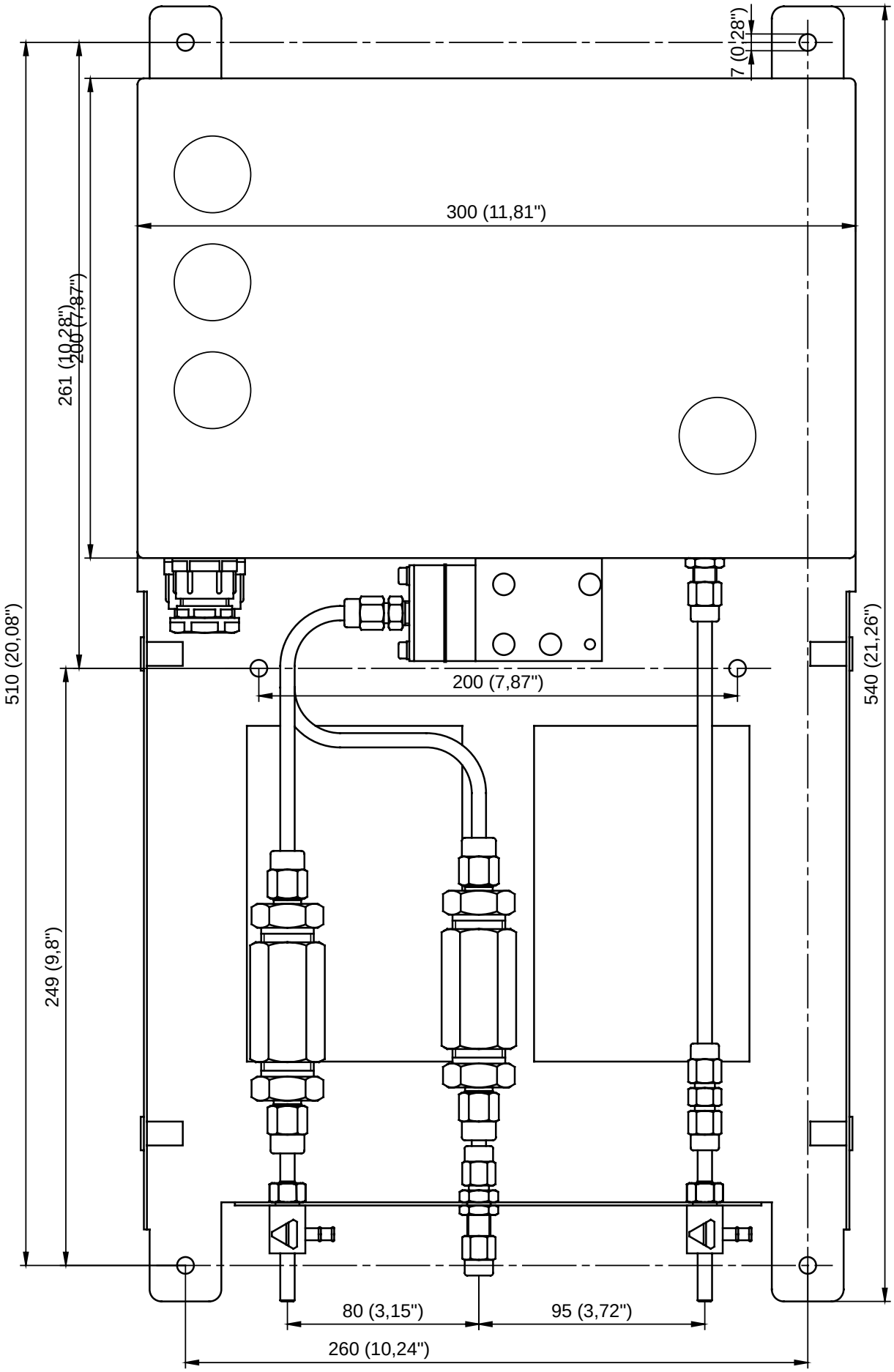
Technical Data

1. Electrical Data

Input capacity (without external signal)		230 V - 50 Hz - 50 W
Max. input capacity of the external signal (terminals 4 and 5)		230 V - 50 Hz - 460 VA
Switch contact load, voltage-free contacts,	max:	230 V - 50 Hz - 5 A
(terminals 11/14 and 21/24)	min:	6 V / 10 mA
External fuse protection of the leak detector	max.	10 A
Overvoltage category		2

2. Pneumatic Data (Requirements for the Test Measuring Instrument)

Nominal size	min. 100
Class precision	min. 1.6
End scale value	-600 mbar/-1000 mbar



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Dimension / Drilling

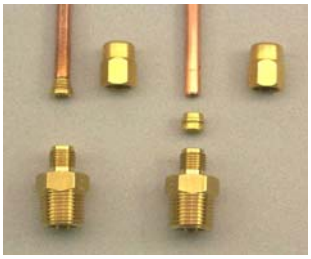
Work sheet: AB-820 500

Installation of screw connections

1 Flanged screw connection for flanged pipes

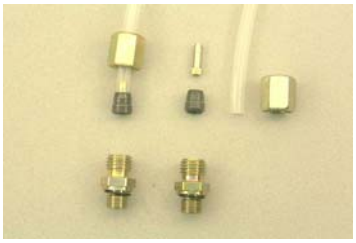
1. Oil O-rings
2. Place the intermediate ring loosely in the screw connection sleve
3. Push the union nut and pressure ring over the pipe
4. Tighten the union nut by hand
5. Tighten the union nut until there is a noticeable increase in force
6. Final installation: Turn ¼ turn further

2 Clamping ring screw connection for plastic and metal pipes



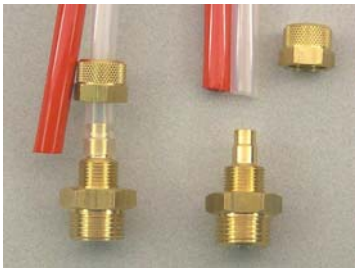
1. Insert support sleeve into the pipe end
2. Insert the pipe with support sleeve as far as it will go
3. Tighten the screw connection until stronger resistance can be felt
4. Unfasten the nut slightly
5. Tighten the nut until there is noticeable resistance (The nut must match the thread on the base body exactly)

3 Cutting ring screw connection for plastic and metal pipes



1. Insert the reinforcement sleeve into the end of the pipe
2. Drive in the reinforcement sleeve
3. Push the union nut and cutting ring over the end of he pipe
4. Screw the union nut on by hand until it noticeably rests in place
5. Press the pipe against its limit stop with internal cone
6. Tighten the union nut by approximately 1.5 turns (pipe must not turn)
7. Unfasten the union nut: check whether the pipe can be seen to protrude from the cutting ring. (not of significance if the clamping ring can be turned)
8. Tighten the union nut without applying increased force.

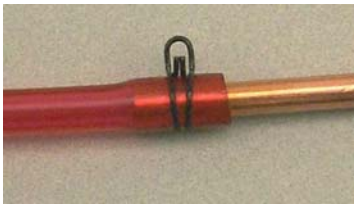
4 Quick-release screw connection for PA and PUR hose



1. Cut the PA pipe to length at a right angle
2. Unfasten the union nut and push it over the end of the pipe
3. Push the pipe onto the nipple up to the start of the thread
4. Tighten the union nut by hand
5. Re-tighten the union nut with a screwdriver until there is a noticeable increase in force (approximately 1 to 2 turns)

NOT suitable for PE hose

5 Hose connections (4 and 6 mm nozzle for OVERPRESSURE)



1. Push the wire or screw clip over the hose
2. Push the hose onto the Cu pipe or hose nozzle (heat or moisten PVC hose as necessary). The hose must fit tightly all round
3. Wire clip: press together with pliers and push onto the connection point
   Screw clip: push onto the connection point and tighten with screwdriver
   make sure that the clip is an even tight fit..

6 Hose connections (4 and 6 mm nozzle for NEGATIVE PRESSURE)

For negative pressure applications with which there is no overpressure on the connection lines even in case of a leak, as point 5 but without clips.

For negative pressure applications with which there may be overpressure, as point 5 but without clips.

EU DECLARATION OF CONFORMITY

We,

SGB GmbH
Hofstraße 10
57076 Siegen, Germany,

hereby declare in sole responsibility that the leak detectors

VLX ..

comply with the essential requirements of the EU directives listed below.

This declaration shall lose its validity if the device is modified without consulting us.

Number/short title	**Satisfied regulations**
2014/30/EU EMC Directive	EN 55 014-1: 2012; -2: 2016 EN 61 000-3-2: 2015; -3-3: 2014
2014/35/EU Low Voltage Directive	EN 60 335-1: 2012 EN 61 010-1: 2010 EN 60 730-1: 2011
2014/34/EU Equipment in Potentially Explosive Atmospheres	The leak detector with its pneumatic parts may be connected to spaces (interstitial spaces of tanks / pipelines / fittings) which are required for category 1 devices, provided the conditions listed in the documentation for the leak detector have been satisfied. The following documents were used: EN 1127-1: 2011 EN 13 160-1-2: 2003 EN 13463-1: 2009 PTB 03 ATEX 4041 X with: EN 13463-1:2001; EN 12 874:2001 The ignition hazard analysis did not result in any additional hazards, taking into account the EC type examination certificates for the components used.

Compliance is declared by

ppa. Martin Hücking
(Technical Director)

Declaration of Performance (DoP)

Number: **002 EU-BauPVO 06-2014**

1. Distinct identification code of the product type:

   Class I
   Vacuum leak detector

2. Type, batch or serial number or other label for the identification of the building product according to article 11 para. 4:

   VLX xx: ***Vacuum leak detector for containers and pipes, with xx vacuum for alarm setting***

3. Purpose of use or purposes of use of the building product intended by the manufacturer according to the applicable harmonised technical specification:

   Vacuum leak detector, which is intended for application in double-walled, underground or above-ground, pressurised or unpressurised tanks or pipelines for liquids/fluids hazardous to water

4. Name, registered trade name or registered brand and contact address of the manufacturer according to article 11 para. 5:

   SGB GmbH
   Hofstraße 10
   57076 Siegen
   Germany
   Tel.: +49 271 48964-0
   Fax.: +49 271 48964-6
   E-mail: sgb@sgb.de

5. If applicable, name and contact address of the agent authorised with the tasks according to article 12 para. 2:

   n/a

6. System or systems for the evaluation and inspection of the reliability of performance of the building product according to appendix V of the Building Products Regulation:

   System 3

7. In the case of the declaration of performance, which applies to a building product, which is covered by a harmonised standard:

   TÜV Nord Systems GmbH & Co.KG, CC Tankanlagen, Große Bahnstraße 31, 22525 Hamburg, Germany
   ID number of the notified test laboratory: 0045

   conducted a type approval text according to system 3 and issued the following test report:

   Test report no.: PÜZ 8111401078

8. Declared performance:

Essential features	**Performance**	**Harmonised technical specification**
Pressure switch point	Passed	EN 13160-2: 2003
Reliability	10,000 Cycles	
Pressure test	Passed	
Volume flow rate test in the alarm switch point	Passed	
Function and leak tightness of the leak detection system	Passed	
Temperature resistance	-20°C .. +60°C	

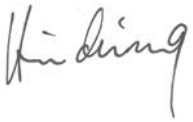
9. The performance of the product according to numbers 1 and 2 corresponds to the declared performance according to number 8:

Solely the manufacturer is responsible for the compilation of this declaration of performance according to number 4

Signed for the manufacturer and in the name of the manufacturer by:

Dipl.-Ing. M. Hücking, Director of Operations

Siegen, 30-06-2014



TÜV NORD Systems GmbH & Co. KG
PÜZ (testing, supervision and certification) — centre for containers, pipelines and pieces of equipment for systems with substances hazardous to water

Große Bahnstraße 31.22525 Hamburg
Tel.: 040 8557-0
Fax: 040 8557-2295
hamburg@tuev-nord.de
www.tuev-nord.de

Certification

Note:
Translation of the German test report – no guarantee for translation of technical terms

Contracting body:
SGB GmbH
Hofstr. 10
D-57076 Siegen

Manufacturer:
see above

Subject of testing:

Leak detector with leak detector system type VLX ... in the versions VLX .../Ex, VLX .../A-Ex according to DIN EN 13160-1:2003 and DIN EN 13160-2:2003 class 1 vacuum monitoring system

Types of tests:
Testing of the building product before confirming conformance in line with the ÜHP (manufacturer's declaration of conformity) procedure (initial testing)

Testing period: 05/28 - 10/24/2014

Test results:
The leak detector type VLX 330 / Ms as a sample for vacuum systems corresponds to the leak monitoring system class 1 according to EN 13160-1:2003 and meets the requirements of EN 13160-1:2003 in conjunction with the EN 13160-2:2003. Regarding the area of application and the installation of the leak detector, the specifications in the
– operating manual "Vacuum Leak Detector VLX ..", document no. 602.200, updated 10/2014
– operating manual "Vacuum Leak Detector VLX ..", document no. 602.205, updated 12/2013
– operating manual "Vacuum Leak Detector VLX ..", document no. 602.408, updated 04/2014 apply

Details on testing can be found in the test report PÜZ PÜZ 8111401078 dated 10/24/2014 for leak detector type VLX....

Hamburg, October 29, 2014

TÜV NORD TÜV NORD Systems

Test laboratory supervisor

J. Straube

Warranty

Dear customer,

You have purchased a high-quality leak detector from our company.

All of our leak detectors undergo a 100% quality control examination. The type plate with the serial number is only affixed after all test criteria have been complied with.

The **warranty period** for our leak detectors is **24 months**, beginning on the date of installation on site. The maximum warranty period is 27 months from our date of sale.

Our warranty will be effective only if the customer submits to us the functional report or test report on initial putting into service, prepared by a recognised company specialised in water and water protection systems, including the serial number of the leak detector.

The warranty shall not apply in the event of faulty or improper installation or improper operation, or if modifications or repairs are carried out without the manufacturer's consent.

Furthermore, our warranty is subject to our General Terms and Conditions, available on internet:
www.sgb.de/en/contact/imprint.html

In case of malfunction, please contact your local specialist company:

Stamp of the specialist company

Yours sincerely

SGB GmbH
Hofstr. 10
57076 Siegen
Germany

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fax: +49 271 48964-6
e-mail: sgb@sgb.de
web: www.sgb.de