CKD

SM－12021－A

INSTRUCTION MANUAL

SUPER DRAIN

DB1006E
DB3006E
DB1024
DB3024
DB1090D
DB3090D
DB3700

● Please read this instruction manual carefully before using this product, particularly the section describing safety.

● Retain this instruction manual with the product for further consultation whenever necessary.

Mar-22 2nd
CKD Corporation

Safety instructions

This manual is intended for personnel who are familiar with basic knowledge about electricity, compressed air, fluid, piping, and refrigerant. CKD shall not be held responsible for troubles or accidents that result from installation, operation or repairs made by personnel who are not qualified or trained for the above subjects.
Improper handling may cause the machine not to be operated at its maximum performance level or lead to accidents or personal injury.
Always confirm the machine specification and operate the machine in the correct manner designated by CKD.
This machine is equipped with various safety and other protective devices.
However, improper handling of the machine may cause personal injury and/or damage to the machine. Read this operation manual carefully and fully comprehend its contents before operation.
Read the contents of the following warning labels, as well as cautions stated in the operation manual, and follow the instructions contented therein.
Keep this operation manual near the machine where all concerned personnel have easy access to it.

Safety precautions

Safety precautions are classified into the following groups, WARNING and CAUTION.

WARNING **CAUTION**

WARNING This denotes hazards which COULD result in severe personal injury or death, if not avoided.

CAUTION This denotes hazards which COULD result in minor personal injury and/or product or property damage, if not avoided.

WARNING : ELECTRICAL SHOCK

★Power supply terminal box, switches, etc. may cause you electrical shock.
●Be sure to turn off the power before inspection. Do not operate the dryer with your wet hands.

CAUTION:GROUND CONNECTION

★Be sure to connect earth to prevent electrical shock.

CAUTION : FOOT HOLD

★You could fall if you climb on the panel.
●Do not climb on the panel.

This machine is designed for industrial use. Always carefully handle the machine in the correct manner.

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1. FORWARD

Thank you very much for purchasing our SUPER DRAIN .
This manual explains basic points of installation, operation, etc. to have our SUPER DRAIN perform at their best. Be sure to read this manual before using your SUPER DRAIN.
Keep this booklet handy for quick reference.
Please be advised in advance that there may be some discrepancies between products and contents of this book due to improvement of specification after printing.

2. CAUTIONS

2-1. Cautions at operation

(1) Do not use the SUPER DRAIN to remove humidity of except compressed air.
*Breakdown, explosion, or fire may result.

(2) Operate the SUPER DRAIN within specification ranges.
*Operation may stop abnormally, or the product's service life may be shortened.
*When the working pressure range is low, it is not likely to be able to start.

(3) Do not remodel this SUPER DRAIN.
*Break-down or shorter life time of the product may result. If you did, the warranty is expired.

(4) Do not touch any parts, wires, terminals in side of the SUPER DRAIN.
*Causes of an electric shock or a fire.

(5) If emergency stop occurs during operation, remove the cause of abnormal conditions referring to the trouble shooting.
*If the emergency stop occurs repeatedly, this may cause the SUPER DRAIN to malfunction.

(6) Do not use the SUPER DRAIN for pneumatic caisson shield or respiratory medical equipment.
*It could cause an accident includes injury.

(7) Do not use the SUPER DRAIN for transportation devices such as automobile, ship etc.
*Vibration could be a cause of breakdown of the internal components.

2-2. Safety instructions

Please check whether or not these instructions correspond to the device type.
Adhere to all advice given in these operating instructions. They include essential information which must be observed during the installation, operation and maintenance. Therefore it is imperative for the service technician and the responsible operator / technical staff to read these operating instructions prior to installation, start-up and maintenance.
The operating instructions must be accessible at any time at the place of application of the SUPER DRAIN.
In addition to these operating instructions, local or national regulations must be complied with, if necessary.
Make sure that the SUPER DRAIN is operated only within the permissible limit values indicated on the type plate. Any deviation involves a risk for persons and materials, and may result in malfunction and service failures.

2-2-1 Intended use

The SUPER DRAIN termed product below, is an electronically level-controlled condensate drain used for draining off condensate in compressed gas systems.
Any use of this system other than the use described in this manual is hereby deemed to be non-intended and can cause a hazard for the safety of people and the environment.
The following must be noted for intended use:

- Read and follow the manual.
- Only operate the product and accessories with media which are free of caustic, aggressive, corrosive, toxic,flammable, oxidising or inorganic components.
  In cases of doubt an analysis must be carried out.
- Only use the product and accessories within the operating parameters given in the technical data and the agreed delivery conditions.
- Only use the product and accessories within pipework designed for the technical data with appropriate connections,pipe diameters and assembly clearance.
- Only use the product and accessories in areas which are free of toxic and corrosive chemicals and gases.
- Only use the product and accessories outside potentially explosive atmospheres.
- Only use the product and accessories away from direct solar radiation and heat sources as well as areas subject to frost.
- Only combine the product and accessories with the products named and recommended by CKD in the manual.
- Adhere to the prescribed maintenance schedule.

Before using the product and the accessories, the operating company must make sure that all conditions and prerequisites for intended use are given.

The product and the accessories have been exclusively designed for use in a commercial or industrial area. All the assembly, installation, operation, disassembly and disposal work described may only be performed by qualified skilled personnel.

2-2-2 Reasonably foreseeable inappropriate use

Reasonably foreseeable inappropriate use is deemed to have occurred if the product or the accessories are used in any other way than that described in the chapter "Intended use".
Reasonably foreseeable inappropriate use includes the use of the product or the accessories in a manner not intended by the manufacturer or supplier but which may result from foreseeable human behaviour.
Reasonably foreseeable inappropriate use includes:

- The execution of any kind of modification, in particular constructive and process-technology related interventions.
- The overriding, bridging or non-application of existing or recommended safety devices.

This list is not exhaustive as not all possible inappropriate use can be foreseen in advance. If the operating company is aware of any inappropriate use of the product or accessories which are not listed here, the manufacturer must be informed immediately.

2-3 Responsibility of the operating company

The responsible operating company must ensure the following to prevent accidents, incidents and adverse effects on the environment:

- Before all actions, check to ensure that the manual available does in fact belong to the product.
- The product and the accessories are used, serviced and repaired in accordance with the intended use.
- All applicable statutory requirements, safety regulations and accident prevention regulations are being adhered to.
- All regulations and operating guidelines for safe working and information regarding behaviour in the event of accidents and fires are accessible at the operating location at all are times.
- The product and accessories are only used with the recommended and functioning safety devices.
- All assembly, installation and maintenance work is carried out by qualified skilled personnel only.
- Personnel have the necessary personal protective equipment available and also use this equipment.
- Suitable technical safety measures are taken so that the permissible operating parameters are not exceeded or undershot.

2-4 Target group and personnel

This manual addresses the personnel listed below who are involved with work on the product or the accessories.

Personnel requirements!
The personnel may not execute any actions on the product or the accessories when they are under the influence of drugs, medications, alcohol or other substances that may impair their consciousness.

Skilled personnel - transport and storage
Skilled personnel - transport and storage are people who, due to their training, professional experience and qualifications, have all the necessary skills to safely execute all actions in connection with the transport and storage of the product, to instruct, to recognise possible dangerous situations independently and to execute measures to avoid danger. The capabilities include, in particular, experience with hoists, forklifts and lifting equipment and knowledge of local laws, standards and guidelines relating to transport and storage.

Skilled personnel - compressed gas technology
Skilled personnel - compressed gas technology are people who, due to their training, professional experience and qualification, possess all the necessary capabilities to safely execute actions, and instruct all actions related to compressed gases and pressurised systems, to independently foresee potential hazardous situations and implement appropriate measures to avert any danger. The capabilities include, in particular, experience in handling measurement and control technology as well as knowledge of the regionally applicable laws, standards and regulations for compressed gas technology.

Skilled personnel - electrical engineering
Skilled personnel - electrical engineering are people who, due to their training, professional experience and qualification, have all the necessary capabilities to safely execute all actions related to electricity, to instruct and to independently foresee potential hazardous situations and take appropriate measures to avoid any danger. The capabilities include, in particular, experience in handling electric voltage plants, measurement and control technology as well as knowledge of the regionally applicable laws, standards and regulations (e.g. VDE 0100 / IEC 60364/ ATEX) applicable for handling electrical technology.

2-5 Safety instructions

Safety instructions warn against residual risks when handling the product and accessories. These safety instructions must be strictly observed in order to prevent accidents, personal injury, damage to property and impairments during operation.

Structural design of the safety instructions:

SIGNAL WORD	Type and source of danger!
 Safety symbol	Possible consequences if the danger is ignored
	• Measure to prevent the danger

Signal words:

DANGER	**Imminent hazard** Consequences of non-compliance: Death or serious personal injury
WARNING	**Imminent hazard** Consequences of non-compliance: Death or serious personal injury are possible
CAUTION	**Potential danger** Consequences of non-compliance: Personal injury or damage to property are possible
NOTE	**Additional notes, information, tips** Consequences of non-compliance: Malfunction and device failure during handling and maintenance are possible. No hazard to people or regarding the safe operation.

3．PRODUCT

3-1. Specifications

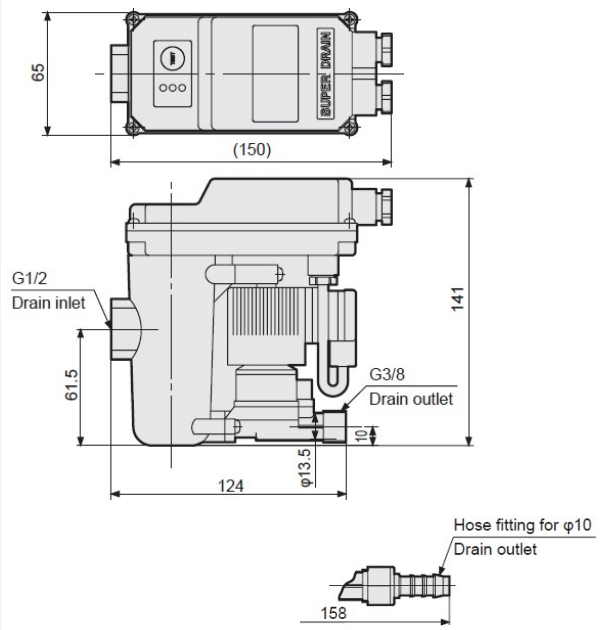
Model / Item		DB1006E-15 -AC200V	DB3006E-15 -AC200V	DB1024-15 -AC200V	DB3024-15 -AC200V
Port size	Drain inlet	G1/2		2×G1/2	
	Drain outlet	G3/8 or 10mm hose joint		G1/2 or 13mm hose joint	
Treating air flow rate of applicable air dryer (m^3/min)		9		40	
Capacity of applicable air compressor (kW) (note1)		55		240	
Working condition	Working fluid	Drain in the compressed air			
	Ambient temperature ℃	1 to 60			
	Working pressure range MPa	0.08 to 1.6			
Electrical specifications	Power supply	Single phase AC200V 50/60Hz			
	Max. power consumption	8.0VA			
Potential-free contact Switch to load		max.AC250V/ 1A、max.DC30V/ 1A			
Potential-free contact Switch to low signal		min.DC5V/ 10mA			
Protection class		IP65			
Weight kg		0.8		2.0	
Applicable air compressor type		Lubrication type	Pre-lubricated type	Lubrication type	Pre-lubricated type

Model / Item		DB1090D-20 -AC200V	DB3090D-20 -AC200V	DB3700-20 -AC200V
Port size	Drain inlet	3×G3/4		2×G3/4,G1
	Drain outlet	G3/8 or 10mm hose joint		G1/2
Treating air flow rate of applicable air dryer (m^3/min)		180		2000
Capacity of applicable air compressor (kW) (note1)		900		(7000)
Working condition	Working fluid	Drain in the compressed air		
	Ambient temperature ℃	1 to 60		
	Working pressure range MPa	0.08 to 1.6		
Electrical specifications	Power supply	Single phase AC200V 50/60Hz		
	Max. power consumption	8.0VA		
Potential-free contact Switch to load		max.AC250V/ 1A、max.DC30V/ 1A		
Potential-free contact Switch to low signal		min.DC5V/ 10mA		
Protection class		IP65		
Weight kg		2.9		5.9
Applicable air compressor type		Lubrication type	Pre-lubricated type	Lubrication type/Pre-lubricated type

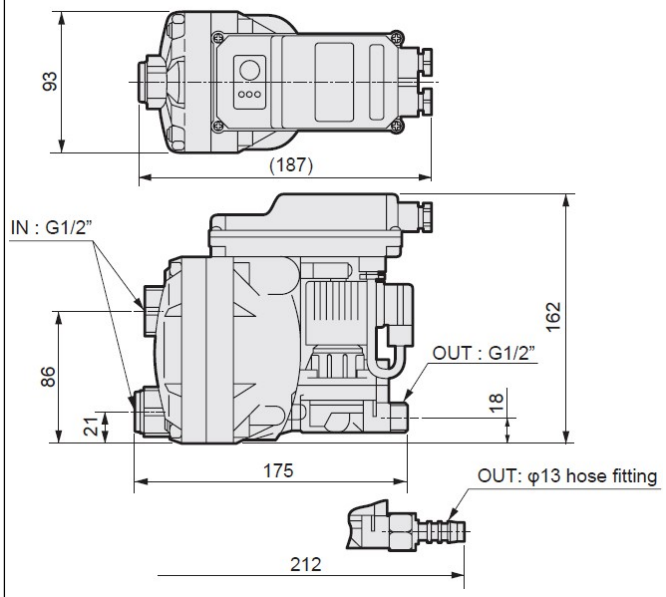
(Note1) It is the air compressor capacity display which is adapted for refrigerated air dryer. When you attach in after-cooler of air compressor, select by one half of the capacity of the above-mentioned display.

3-2. External Dimensions

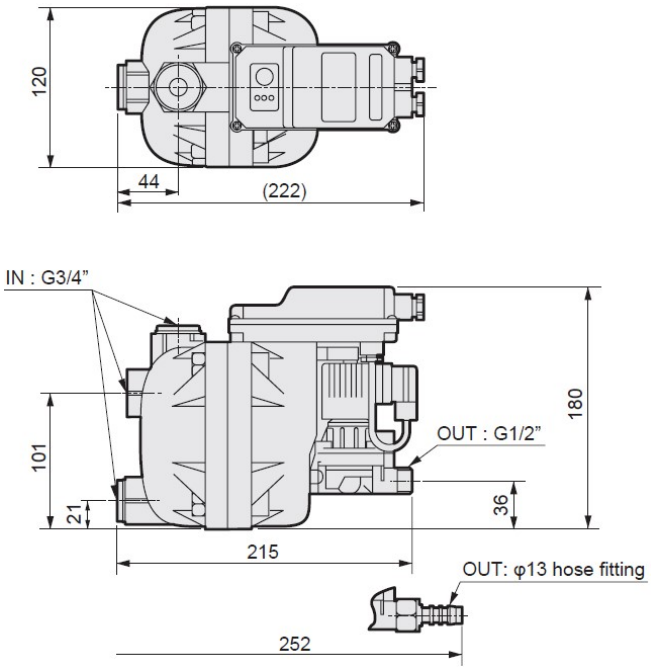
DB1006E-15/DB3006E-15



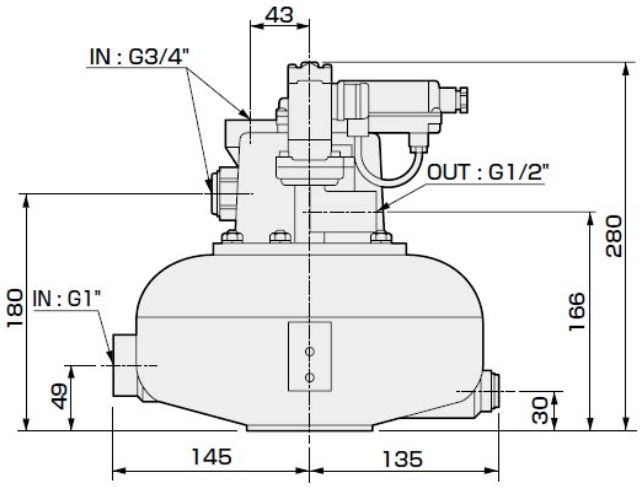
DB1024-15/DB3024-15



DB1090D-20/DB3090D-20



DB3700-20



3-3. Function

(1) DB1006E/3006E, DB1024/3024 (Fig.1,2)

The condensate flows via the condensate inlet (1) into the SUPER DRAIN and collects in the housing (2). The filling level in the housing (2) is permanently monitored by a capacitive sensor in the sensor tube (3).

The control actuates the pilot valve with valve core (4) and the membrane (5) opens the condensate discharge (6) to the condensate drain system. Once the SUPER DRAIN has been emptied, the condensate discharge (6) is closed tightly again before any loss of compressed gas can occur. (There is only one sensor and there is an alarm output.)

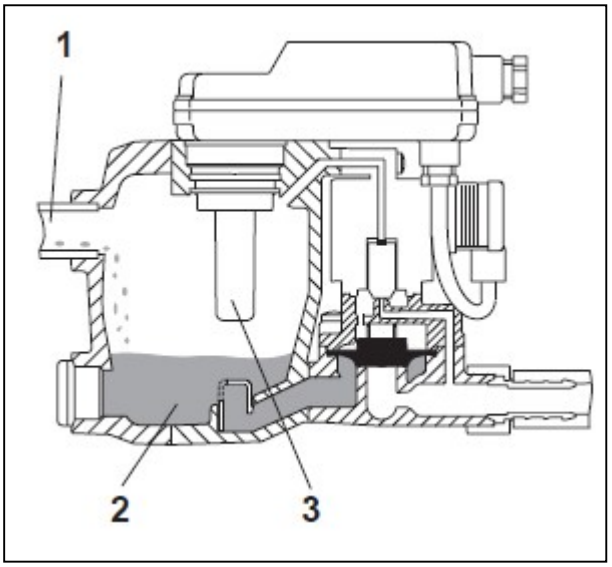


Fig.1

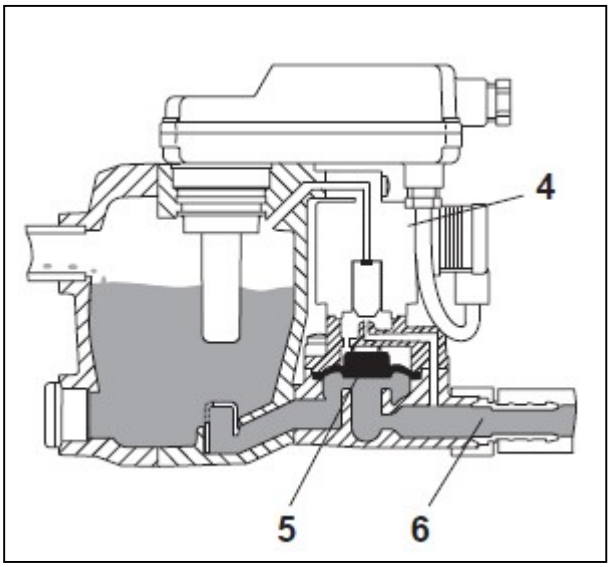


Fig.2

(Figure shows DB1024)

(2) DB1090D/3090D, DB3700 (Fig3,4)

The condensate flows via the condensate inlet (1) into the SUPER DRAIN and collects in the housing (2). The filling level in the housing (2) is permanently monitored by a capacitive sensor in the sensor tube (3).

The control actuates the pilot valve with valve core (4) and the membrane (5) opens the condensate discharge (6) to the condensate drain system. Once the SUPER DRAIN has been emptied, the condensate discharge (6) is closed tightly again before any loss of compressed gas can occur. (There are two sensors above and below, and there is also an alarm output.)

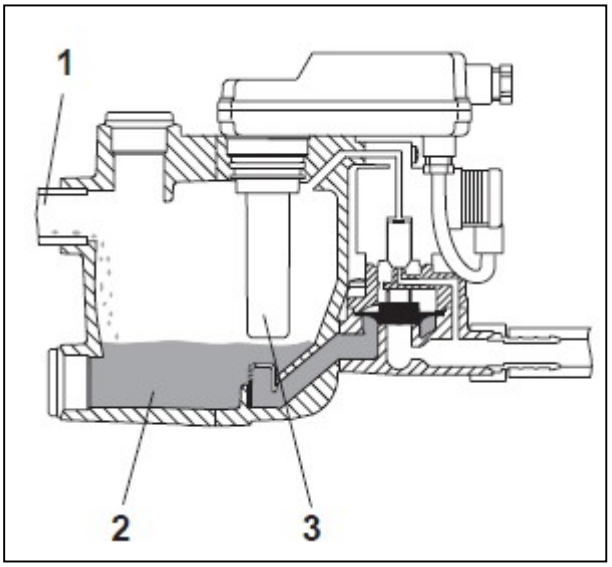


Fig.3

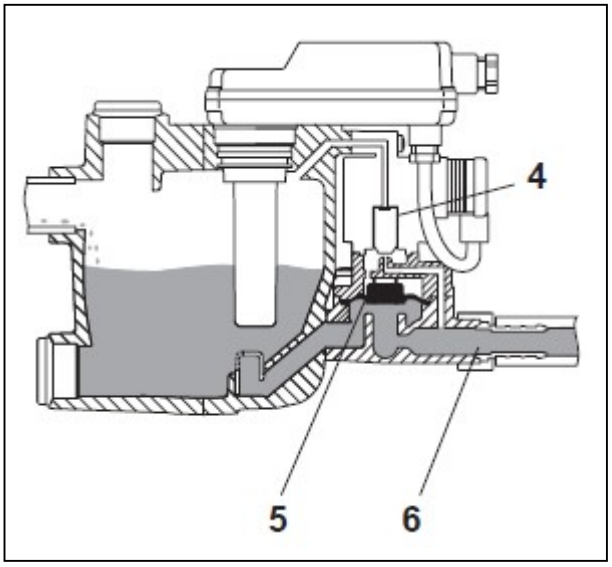
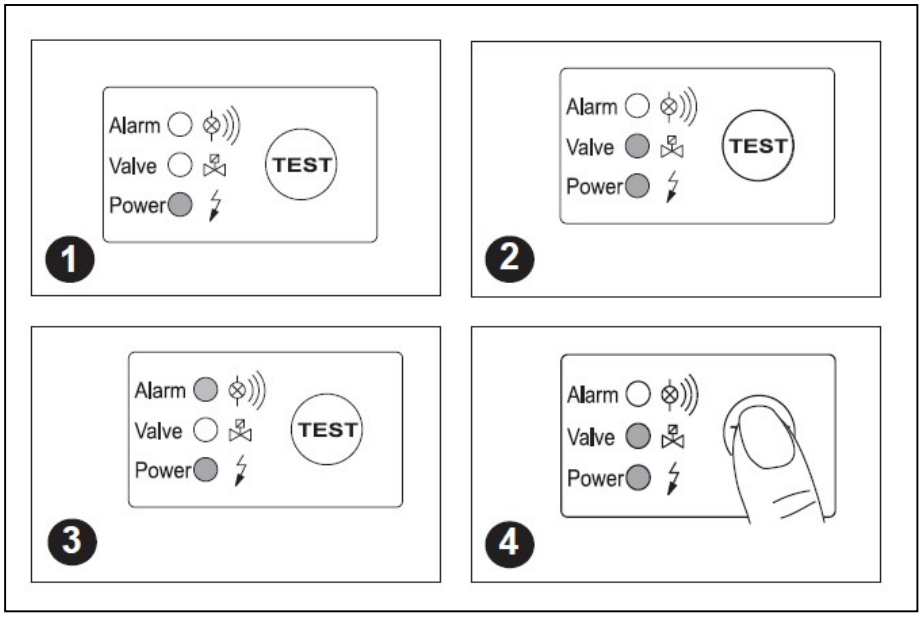


Fig.4

(Figure shows DB1090D)

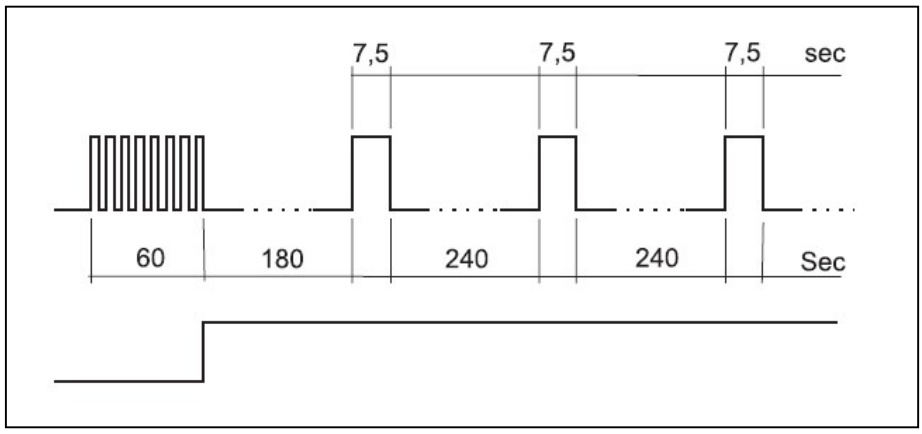
3-4. Electrical operation



① Ready for operation
Voltage is being applied
② Discharge procedure
Outlet line is open
③ Malfunction
Alarm mode is activated
④ Test
Manual drainage / alarm

Fig.5

The test button is used for checking correct functioning. Press for 1 minute or more to enter alarm mode.(Alarm is output)



Switching sequence of valve in alarm mode

Alarm signal via potential-free contact

Fig.6

When the microcontroller registers a malfunction, the device will automatically change to the alarm mode. The switching sequence of the valve (see Fig.6) continues until the fault is cleared (automatically or through maintenance). The red LED flashes as long as the device is in the alarm mode.
Malfunctioning could be caused by, e.g.:
• Mistakes during installation
• Dropping below the necessary minimum pressure
• Excessive condensate quantities (overloading)
• Blocked / shut off outlet line
• Extreme amount of dirt particles
• Frozen piping
If the fault is not cleared within the first minute, a fault signal is triggered (see illustration) which can be picked off as a potential-free signal via the alarm relay.

	alarm	normal	power off
nc-com	close	open	close
no-com	open	close	open

4. TRANSPORT AND STORAGE

WARNING	**Insufficient qualification!**
	Insufficient qualification of the personnel can lead to accidents, personal injury and damage to the device as well as impairments in operation during work on the product.
	The work on the product described below may only be executed and documented by skilled technical personnel - transport and storage.

CAUTION	**Inappropriate transport or storage!**
	Inappropriate transport or storage may result in personal injury or damage to the device.
 	· Wear protective gloves when working with packaging material · Use personal protective equipment, inspect it regularly for faultlessness and functionality and replace damaged parts immediately. · Handle packaging and product with care. · Pack all parts impact-proof using suitable material. · Transport and handle the packaging according to the markings (observe lifting gear attachment points, the centre of gravity and orientation e.g. keep vertical, do not throw etc.). · Use proper means of transport and lifting equipment that is in proper working order. · Always adhere to the specified transport and storage parameters. · Store the product only outside of areas exposed to direct sunlight and heat sources.

NOTE	**Handling packaging material!**
	Inappropriate disposal of packaging materials can cause environmental damage.
	· Dispose of the packaging material in accordance with the regional laws, provisions, guidelines and regulations of the country and place of use.

4-1. Transport

After transporting and removing the packaging material, inspect the product for possible transport damage.

4-2. Storage

• Adhere to storage and transport temperature.
• Store in a closed, dry as well as frost-free room.
• Store protected from external influences of the weather, direct sunlight and sources of heat.
• Secure against falling over and protect against vibrations at the storage location.

5. CAUTIONS

5-1. Operational Caution

(1) Do not exceed maximum-allowable-working-pressure 1.6MPa.
Where it is in non-pressure state and the power is turned off, be sure to perform maintenance and repair.

(2) Install by the piping material according to operating pressure.
Pipe joint should pipe firmly. Outlet pipe should pipe certainly so that splash starts neither people nor a thing.

(3) Install inlet piping part using a spanner cliff.
Spanner cliff dimension
DB3002E/1006E/1024 :32mm
DB1090D/3700 :25mm

(4) Those who are experienced and knowledgeable need to perform electric wiring.
Where the power is turned off, be sure to perform maintenance and repair.

(5) Do not use it in a place with a possibility of freezing.

(6) Super drain works, only when electricity is supplied.

(7) Do not use a test button for the continuous drain discharge.

(8) Use at dangerous places (atmosphere with the possibility of explosion etc.) cannot be performed.

(9) Use only pure replacement parts.

6. INSTALLATION

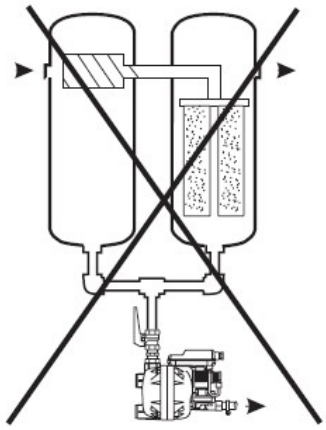
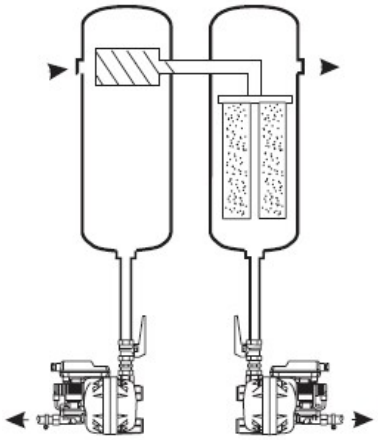
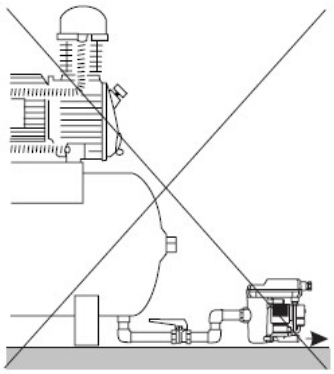
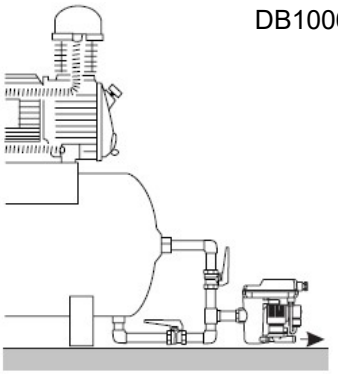
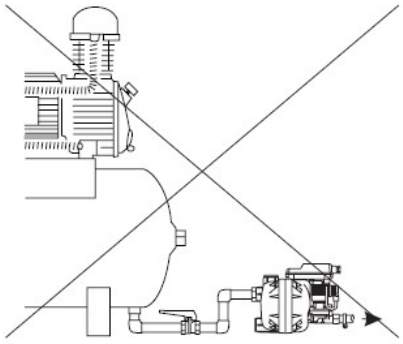
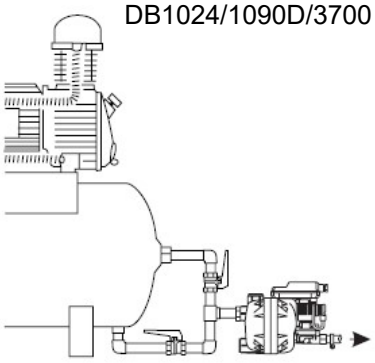
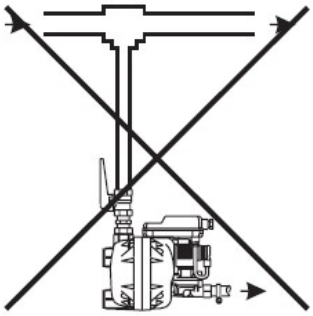
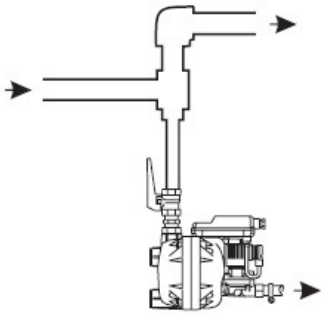
DANGER	**Use of incorrect spare parts, accessories or materials!**
	The use of incorrect spare parts, accessories or materials, as well as auxiliary and operating materials, may result in death or serious injury. Malfunction and device failure as well as material damage can occur.
	· For all work, only use undamaged original parts, auxiliary and operating materials which are specified by the manufacturer. · Use only the approved materials and suitable tools for the respective purpose and make sure that they are in proper working order.

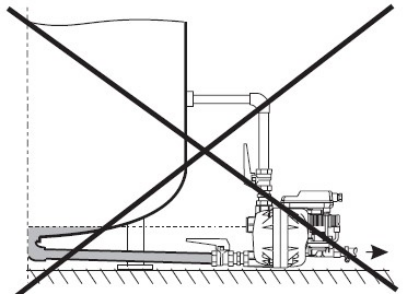
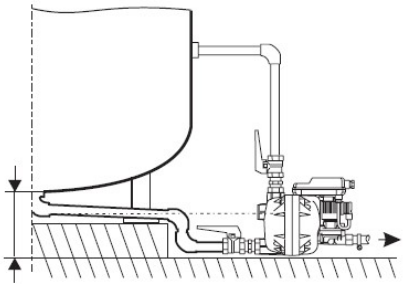
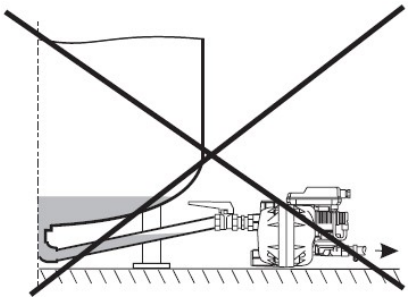
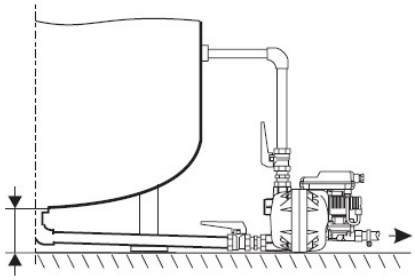
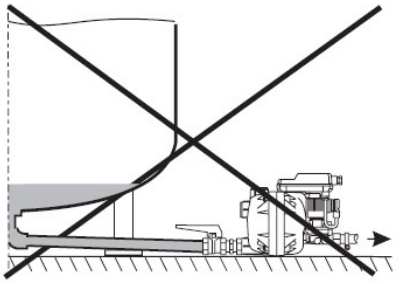
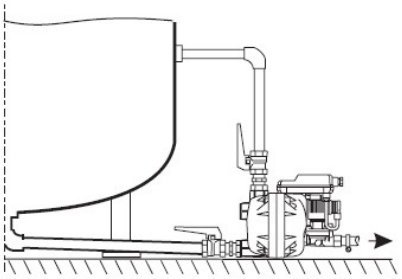
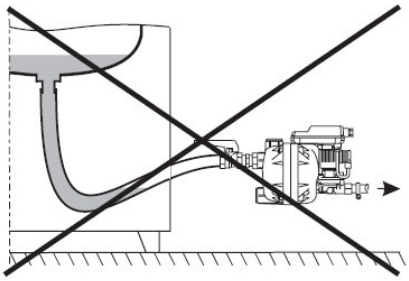
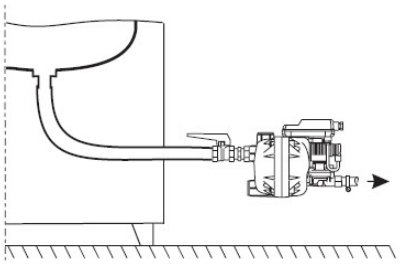
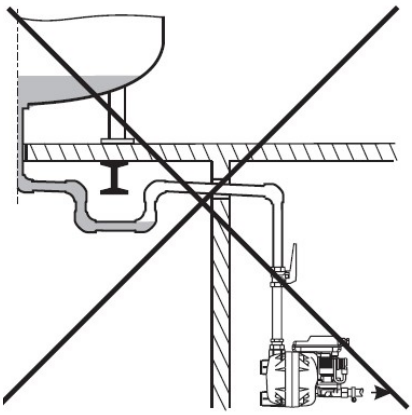
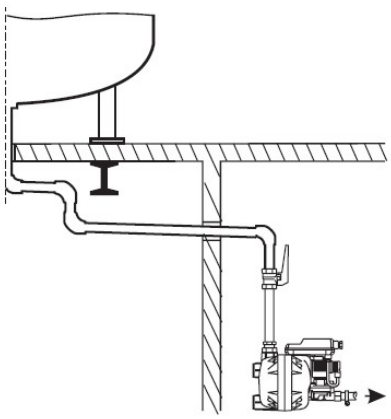
DANGER	**Pressure build-up in the pipework!**
	Death or serious personal injury can result through contact with fast or suddenly escaping compressed gas or through bursting system parts.
	· All work on the compressed gas system must be carried out in the depressurised state and with the compressed gas system secured against unintentional pressure build-up. · Set up a safety area around the working area during all assembly, installation, maintenance and repair work. · Before building up pressure in the pipework, check all pipe connections and tighten if necessary. · Slowly pressurise the system with pressure. · Avoid pressure blows and high differential pressures. · Assemble all pipelines without stress. · Install pipes tightly as feed and discharge lines.

WARNING	**Insufficient qualification!**
	Insufficient qualification of the personnel carrying out work on the product and accessories can lead to accidents, personal injury and damage to property as well as impair operation.
	· All work on the product and accessories may only be carried out by skilled technical personnel - compressed gas technology.

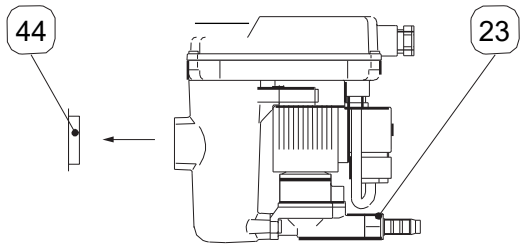
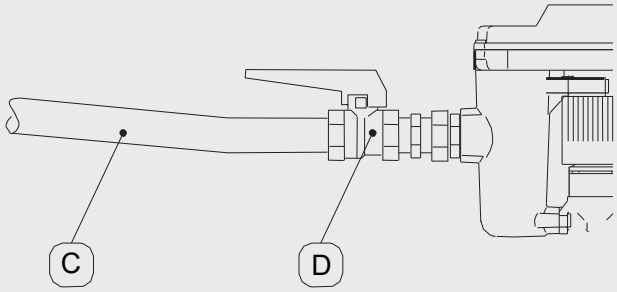
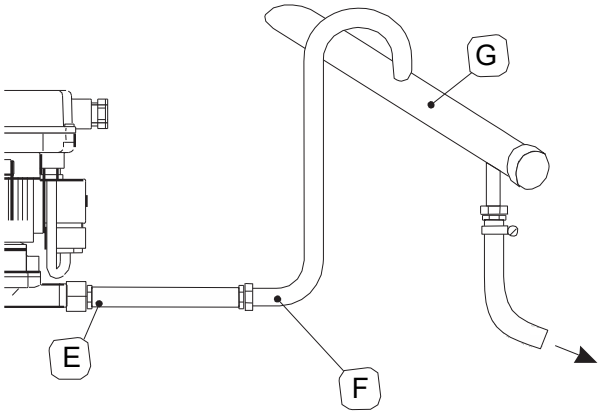
CAUTION	**Inappropriate assembly!**
	Inappropriate assembly of the product and the accessories can lead to personal injury and damage to property as well as impair operation.
	· Fix hoses in such a way that they do not flap around.

6-1 Installation

Wrong	Right	Description / explanation
		**Bypassing the filter!** Drain each point where condensate occurs separately in order to avoid bypassing the filters!
	DB1006E 	**Ensure sufficient venting!** If the gradient in the inflow is not sufficient or there are other problems with the inflow, a venting line must be laid!
	DB1024/1090D/3700 	
		**Deflecting surface!** In the case of direct drainage from the compressed gas line a deflection of the compressed gas flow is necessary!

Wrong	Right	Description / explanation
		**Note the minimum height of installation!** The height of the condensate inlet must be located lower than the lowest point of the collecting tank (e.g. vessel).
		**Continuous slope!** Lay the condensate inlet line with a continuous slope! If the installation height is limited, mount the lower inlet with a separate venting line. (Except DB1006E/3006E)
		**Ensure sufficient venting!** Large condensate quantities require installation of a separate venting line.
		**Continuous slope!** If a pressure hose is used for inflow, avoid the formation of a water pocket!
		**Continuous slope!** When laying pipes for the feed line, avoid the formation of a water pocket.

・Depressurise the compressed gas system or the respective system section and secure it against unintentional pressure build-up.

Illustration	Description / explanation
	•Remove the dust cap [44]. •Screw the enclosed hose connection [23] to the condensate discharge.
	**Assembly instructions** • The gradient of the condensate inlet line [C] must be ≥3%. •Do not mount any filters in the condensate inlet line [C]. • The diameter of the condensate inlet line [C] must be ≥1/2" (inner diameter ≥13 mm (0.5")). • Recommended interval: •Equip the condensate inlet line [C] with a shut-off valve [D] to make simple product maintenance possible. •Use a full bore valve or a gate valve •For the condensate inlet line [C] apply sealant to the end of the pressure-resistant pipe and screw in at the condensate inlet.
	**Assembly instructions** •The condensate discharge line [F] may be laid rising by max. 5 m. The minimum pressure required increases by 0.01MPa per metre of incline. •The diameter of the manifold [G] must be ≥1" and the gradient ≥3 %. •Do not use shut-off valves or check valve in the condensate discharge. •Do not kink or block the pressure hose [E] , or route it across storage or transport areas. •For the drain, connect a short pressure hose [E] (designed for the system pressure) to the condensate discharge and the condensate discharge line [F] using a hose clamp.

6-2. Electrical installation

DANGER	**Use of incorrect spare parts, accessories or materials!**
	The use of incorrect spare parts, accessories or materials, as well as auxiliary and operating materials, may result in death or serious injury. Malfunction and device failure as well as material damage can occur.
	•For all work, only use undamaged original parts, auxiliary and operating materials which are specified by the manufacturer. •Use only the approved materials and suitable tools for the respective purpose and make sure that they are in proper working order.

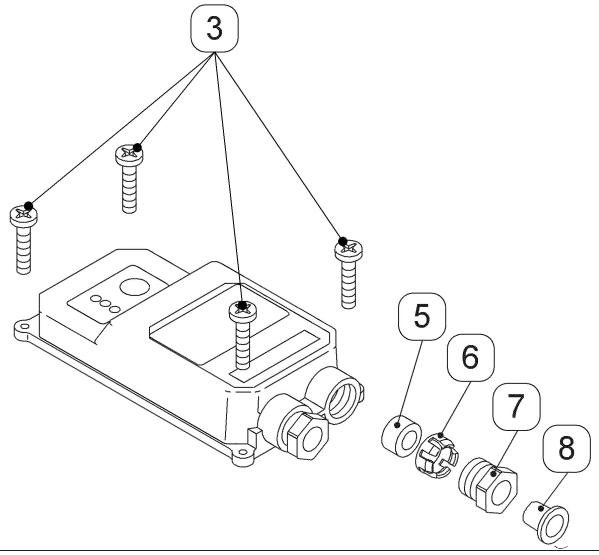
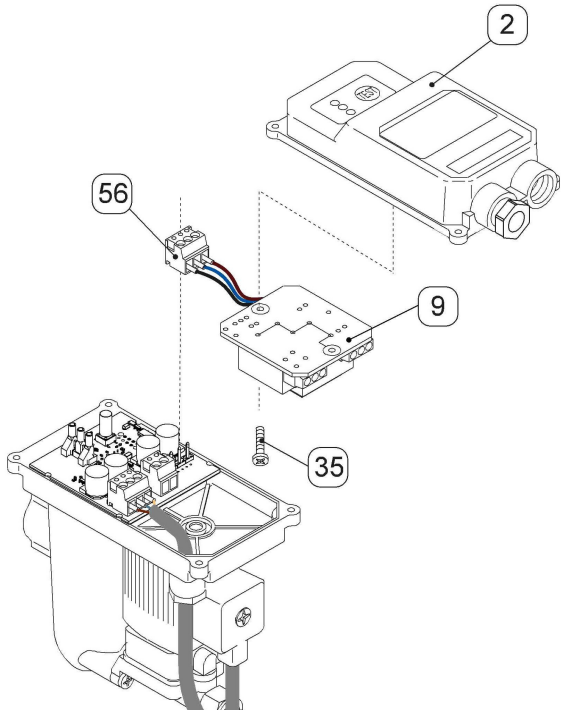
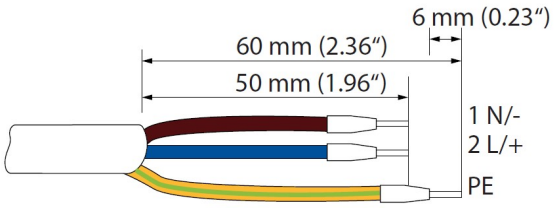
DANGER	**Electric voltage!**
	There is a danger of death or serious injuries as well as malfunction and device failure following contact with components which are in contact with electric voltage.
	•Only carry out installation, maintenance and repair work on the product and accessories when they have been disconnected and secured against being switched back on again. •Set up a safety area around the working area during all installation, maintenance and repair work. •For installation of the device, adhere to all applicable regulations. •Connect the protective conductor (earth connection) according to regulations.

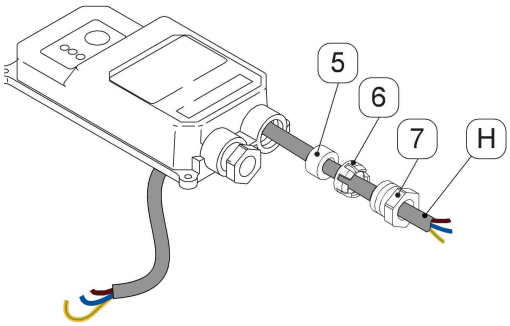
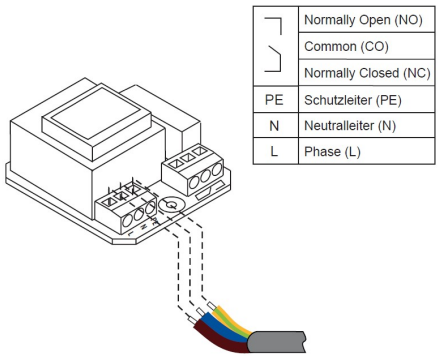
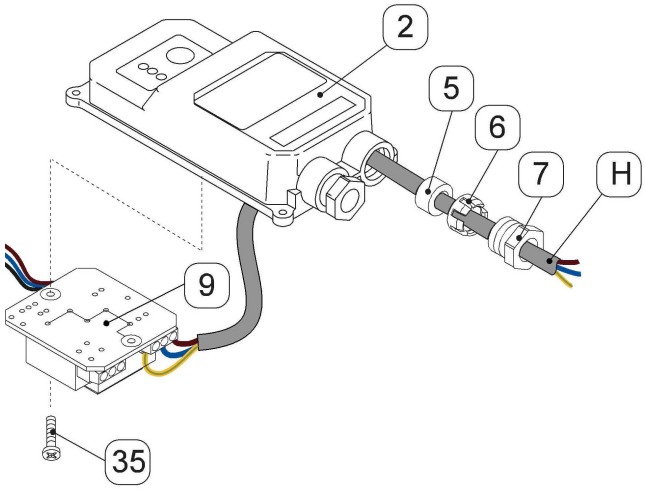
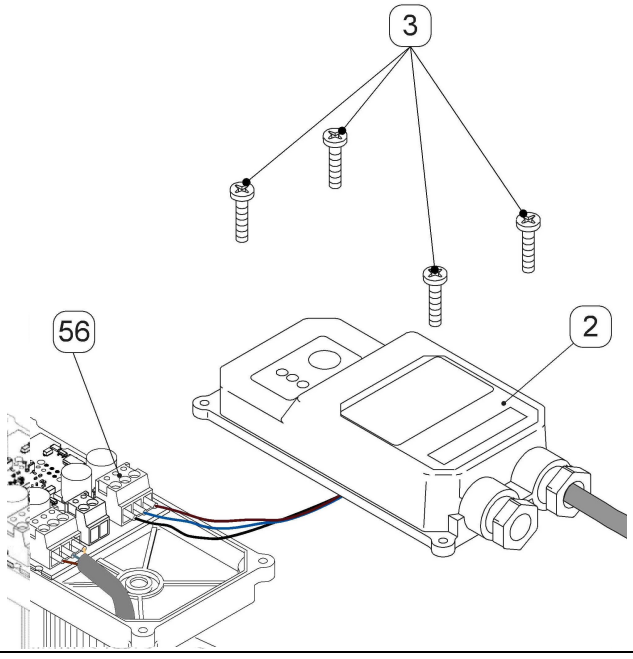
WARNING	**Insufficient qualification!**
	Insufficient qualification of the personnel carrying out work on the product and accessories can lead to accidents, personal injury and damage to property as well as impair operation.
	・All work on the product and the accessories may only be carried out by skilled technical personnel ‐ electrical engineering.

CAUTION	**Inappropriate electrical installation!**
	Inappropriate electrical installation of the product and the accessories can lead to personal injury and damage to property as well as impair operation.
	•Check all plug-type connections for a correct fit. •Avoid stumbling hazard through appropriate cable routing. •Avoid mechanical load on the cables through appropriate cable routing.

Preparatory tasks	
1.	Assembly must have been completed.
2.	Protect the cables for the voltage supply of the SUPER DRAIN in accordance with the specifications in the technical data. AC = 1 A (time-lag) recommended
3.	In the case of AC voltage supply an accessible circuit breaker (e.g. power plug or switch) that shuts off all energised conductors must be installed close to the unit.

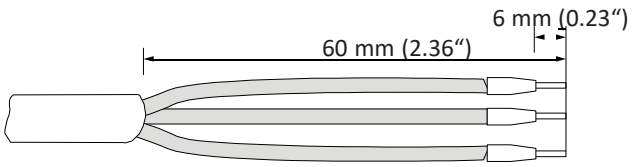
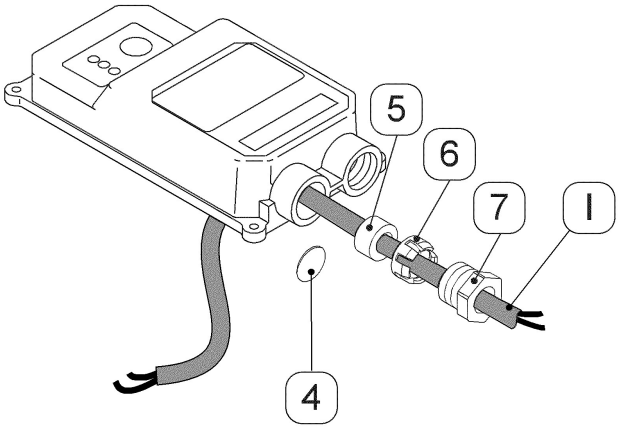
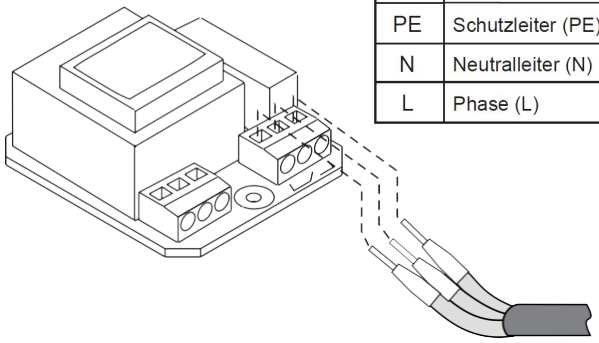
6-2-1. Voltage supply connection

Illustration	Description / explanation
	4. Loosen the 4 pan-head screws [3] in the top cover and unscrew the components of the cable gland [5, 6, 7, 8].
	5. Raise the top cover [2] a little and pull the screw terminal [61] of the power control board up and off. 6. Unscrew the pan-head screw [36] and take the power control board [9] out of the top cover [2].
	7. Prepare the 3-wire cable of the voltage supply.

	8. Slide the components of the cable gland [5, 6, 7] over the cable for voltage supply [H] and insert the cable into the top cover.
	9. Connect the voltage supply cable to the power control board in accordance with the terminal diagram.
	10. Insert the power control board [9] back into the top cover [2] and fasten using the pan-head screw [36]. Tighten the voltage supply cable [H] while doing this and screw the components of the cable gland [5, 6, 7] in place.
	11. Fit the screw terminal [56]. Set the top cover [2] in place and fix it using the panhead screws [3].

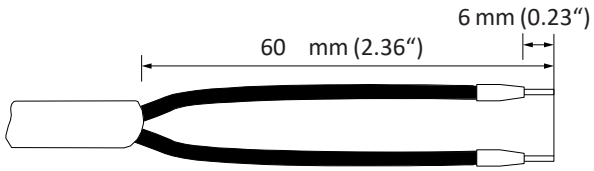
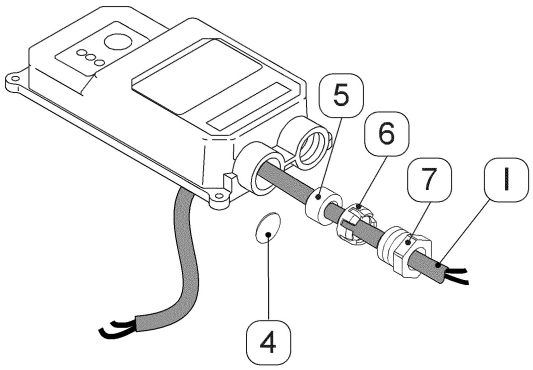
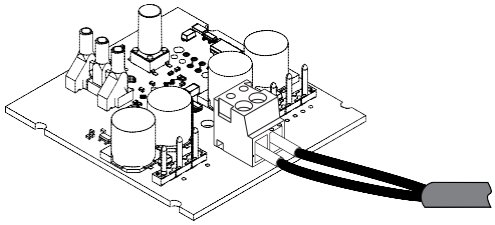
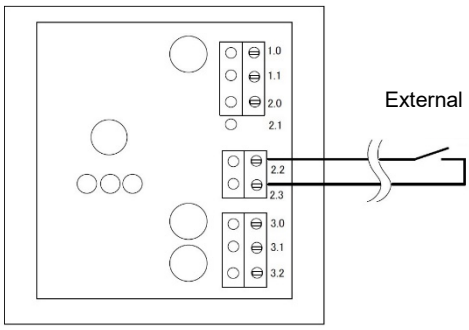
6-2-2. Connection of potential free contact

The SUPER DRAIN has a potential-free contact on the power control board. A fault message can be indicated at a remote maintenance centre through this.

Illustration	Description / explanation
	1. Prepare the 2/3-wire cable of the potential-free contact (depending on the application). If the external TEST button is to be connected in addition to the potential-free contact,a 4/5-wire cable must be used for the connection (depending on the application).
	2. Take the guard plate [4] out. 3. Slide the components of the cable gland [5, 6, 7] over the cable for potential-free contact [I] and insert the cable into the upper part of the hood.
	4. Connect the cable of the potential-free contact to the power control board in accordance with the terminal diagram.

6-2-3. Connection of external TEST

The SUPER DRAIN has an option for the connection of an external TEST button. This enables condensate to be discharged via remote control. If the external contact is closed, the solenoid valve opens like after pressing the TEST button on the top cover and the SUPER DRAIN discharges condensate.

Illustration	Description / explanation
	1.Prepare the external TEST button cable. If the potential free contact is to be connected in addition to the external TEST button, a 4/5-wire cable must be used for the connection (depending on the application).
	2. Take the dust protection pane [4] out of the left-hand cable gland. 3. Slide the components of the cable gland [5, 6, 7] over the cable [I] and insert the cable into the top cover.
 	4. Connect the cable of the external TEST button to the control PCB in accordance with the terminal diagram. When the external contact is closed, TEST button is pressed, and when the external contact is opened, TEST button is released.

7. OPERATION

DANGER	**Pressure build-up in the pipework!**
	Death or serious personal injury can result through contact with fast or suddenly escaping compressed gas or through bursting system parts.
	• All work on the compressed gas system must be carried out in the depressurised state and with the compressed gas system secured against unintentional pressure build-up. • Set up a safety area around the working area during all assembly, installation, maintenance and repair work. • Before building up pressure in the pipework, check all pipe connections and tighten if necessary. • Slowly pressurise the system with pressure. • Avoid pressure blows and high differential pressures. • Assemble all pipelines without stress. • Install pipes tightly as feed and discharge lines.

DANGER	**Electric voltage!**
	There is a danger of death or serious injuries as well as malfunction and device failure following contact with components which are in contact with electric voltage.
	• Only carry out installation, maintenance and repair work on the product and accessories when they have been disconnected and secured against being switched back on again. • Set up a safety area around the working area during all installation, maintenance and repair work. • For installation of the device, adhere to all applicable regulations. • Connect the protective conductor (earth connection) according to regulations.

WARNING	**Insufficient qualification!**
	Insufficient qualification of the personnel carrying out work on the product and accessories can lead to accidents, personal injury and damage to property as well as impair operation.
	• All work on the product and accessories may only be carried out by skilled technical personnel -compressed gas technology.

7-1. Operation

As soon as the SUPER DRAIN is supplied with voltage, a self-test starts automatically, during which all internal components necessary for the proper functioning of the SUPER DRAIN are checked.

If the self-test is positive, the SUPER DRAIN goes into normal operation.

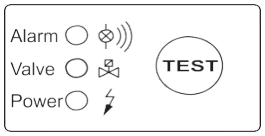
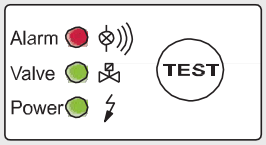
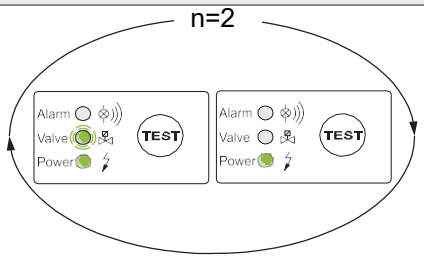
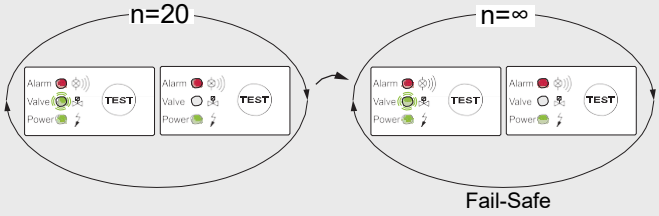
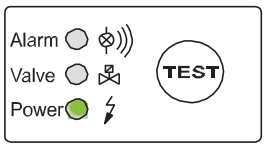
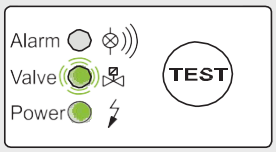
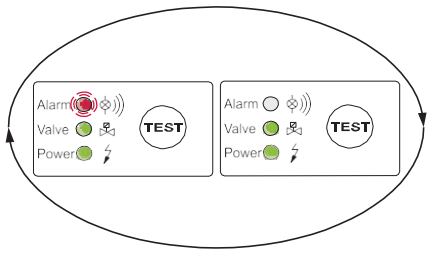
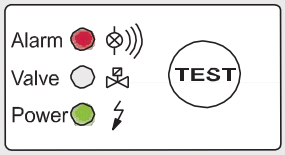
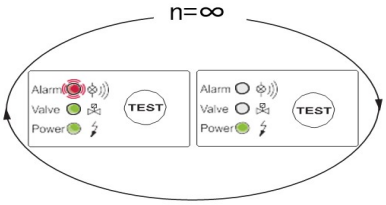
…For acoustic signalling, the solenoid valve cycles twice.

If the self-test is negative, the SUPER DRAIN goes into fail-safe operation.

…For acoustic signalling, the solenoid valve cycles 20 times.

The LED signalling of the various operating states can be seen in the following table.

7-2. Operating states

図	説明/解説
	**Disconnected** • All LEDs are off
	**Switch on / power-on self-test** • All LEDs light up for 1 second
	**Positive power-on self-test (repeat 2x)** • The red Alarm LED is off • The green Valve LED lights up during the solenoid valve cycles • The green Power LED is on • The solenoid valve cycles →**goes into normal operation**
	**Negative power-on self-test (repeat 20x)** • The red Alarm LED is on • The green Valve LED lights up during the solenoid valve cycles • The green Power LED is on • The solenoid valve cycles →**Goes to fail-safe operation (continuous loop)** • The solenoid valve cycles once per second
	**Ready for operation (normal operating mode)** • The red Alarm LED is off • The green Valve LED is off • The green Power LED is on
	**Discharge procedure (TEST button pressed briefly)** • The red Alarm LED is off • The green Valve LED lights up during the discharge procedure • The green Power LED is on
	**Pre-alarm (TEST button pressed >1 min and <5 min)** • The red Alarm LED flashes • The green Valve LED is on • The green Power LED is on
	**Alarm (TEST button pressed >5 min)** • The red Alarm LED is on • The green Valve LED is off • The green Power LED is on
	**Alarm mode (problem with condensate discharge)** • The red Alarm LED flashes • The green Power LED lights up • The green Valve LED lights up during the solenoid valve cycles • The solenoid valve sets a cycle every 4 minutes →Passes to normal mode with free condensate discharge

8. MAINTENANCE

DANGER	**Pressure build-up in the pipework!**
	Death or serious personal injury can result through contact with fast or suddenly escaping compressed gas or through bursting system parts.
	• All work on the compressed gas system must be carried out in the depressurised state and with the compressed gas system secured against unintentional pressure build-up. • Set up a safety area around the working area during all assembly, installation, maintenance and repair work. • Before building up pressure in the pipework, check all pipe connections and tighten if necessary. • Slowly pressurise the system with pressure. • Avoid pressure blows and high differential pressures. • Assemble all pipelines without stress. • Install pipes tightly as feed and discharge lines.

CAUTION	**Inappropriate cleaning and use of the wrong cleaning media!**
	Inappropriate cleaning and the use of the wrong cleaning media may result in minor injuries as well as damage to health and property.
	• Never clean the device with a dripping wet cloth. • Never use abrasive or aggressive cleaning agents or solvents which could damage the outer coating (e.g. markings, type plate, corrosion protection, etc.). • Never clean the device with hard or pointed implements. • Use an anti-static, damp cloth for cleaning the outside. • Immediately replace any product markings (pictograms, markings) that have become illegible.

WARNING	**Insufficient qualification!**
	Insufficient qualification of the personnel carrying out work on the product and accessories can lead to accidents, personal injury and damage to property as well as impair operation.
	• All work on the product and the accessories may only be carried out by skilled technical personnel - customer service.

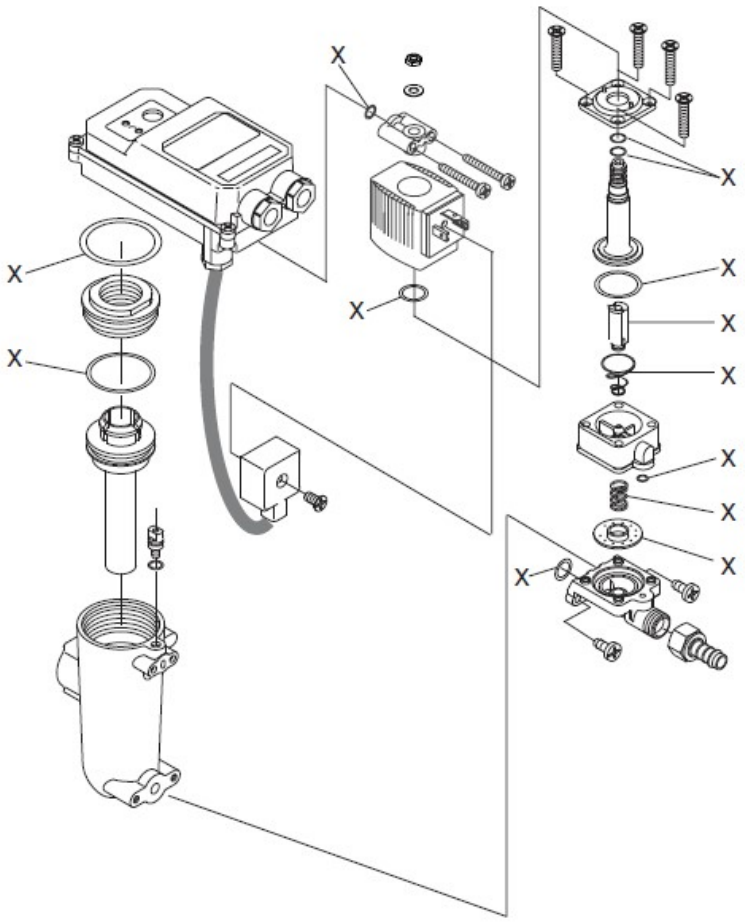
CAUTION	**Inappropriate maintenance!**
	Inappropriate maintenance of the product and the accessories can lead to personal injury and damage to property as well as impair operation.
	• Always adhere to the maintenance schedule and the given maintenance intervals.

NOTE	**Local hygiene regulations!**
	In addition to the cleaning instructions listed, any local hygiene regulations which are in place must be heeded.

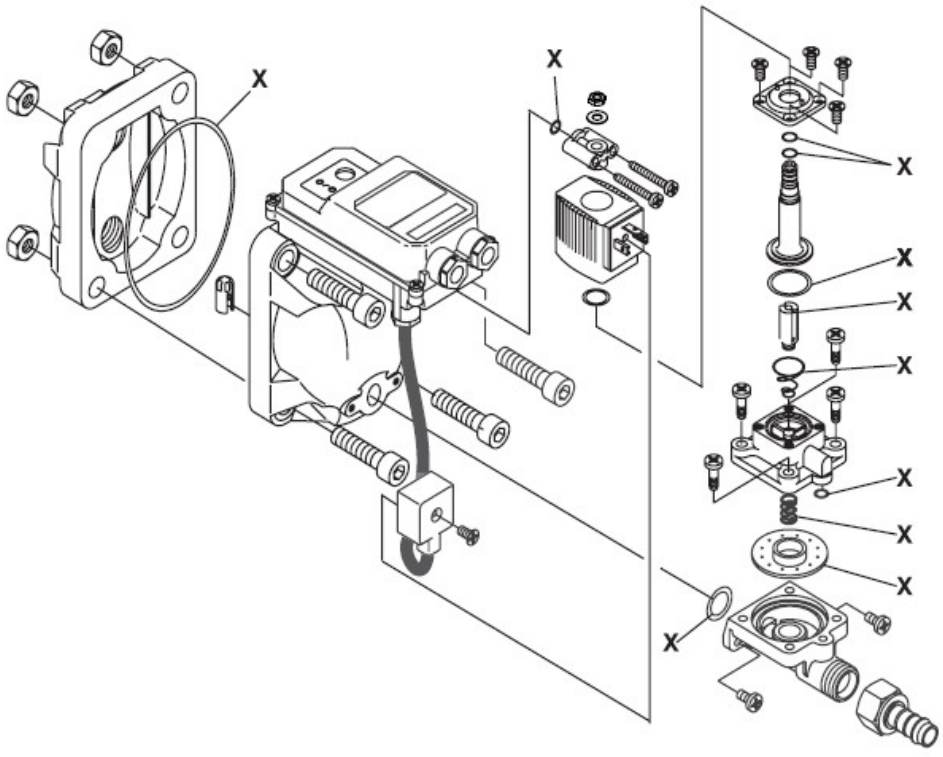
8-1. Maintenance

It is imperative to observe all hazard statements and warnings listed here.
Please also observe all regulations and notes regarding the industrial safety and fire prevention at the respective place of installation.
As a matter of principle, only use suitable and appropriate tools and materials in a proper condition.
Do not use aggressive cleaners and improper devices such as high-pressure cleaners.
Please note that condensates may contain aggressive or harmful components. Therefore, skin contact should be avoided.
Condensate is subject to mandatory waste disposal and must be collected in suitable containers, and disposed of or processed properly.

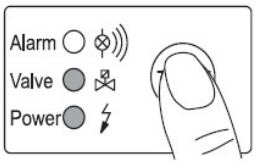
(DB1006E/3006E)



(DB1024/3024)



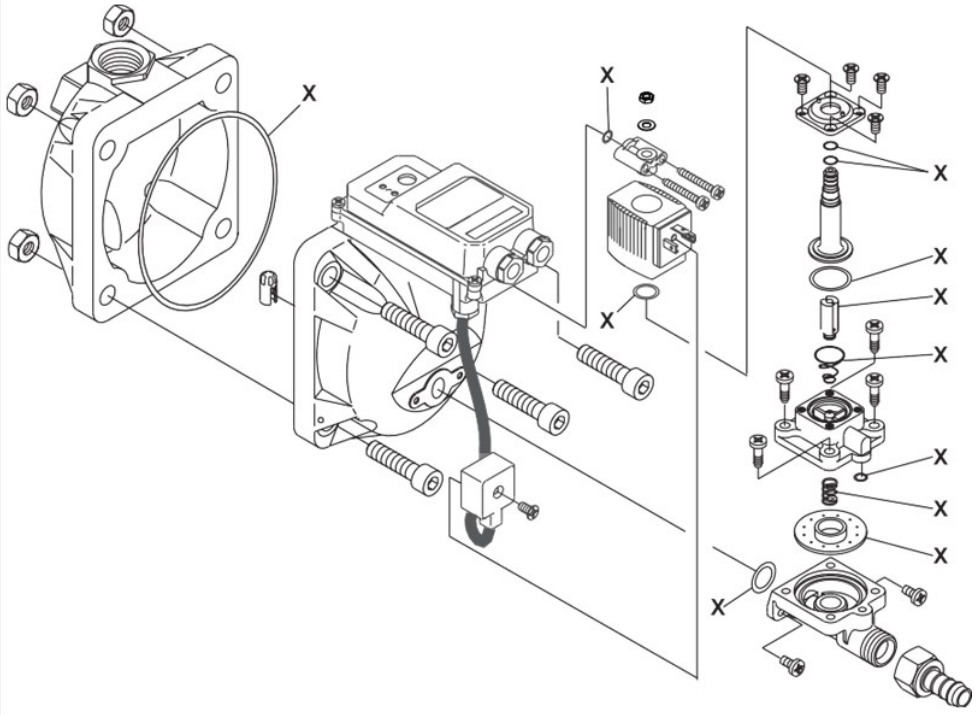
• Housing and valve should be cleaned once a year.
• Replace wearing parts once a year.
Set of wearing parts (x)



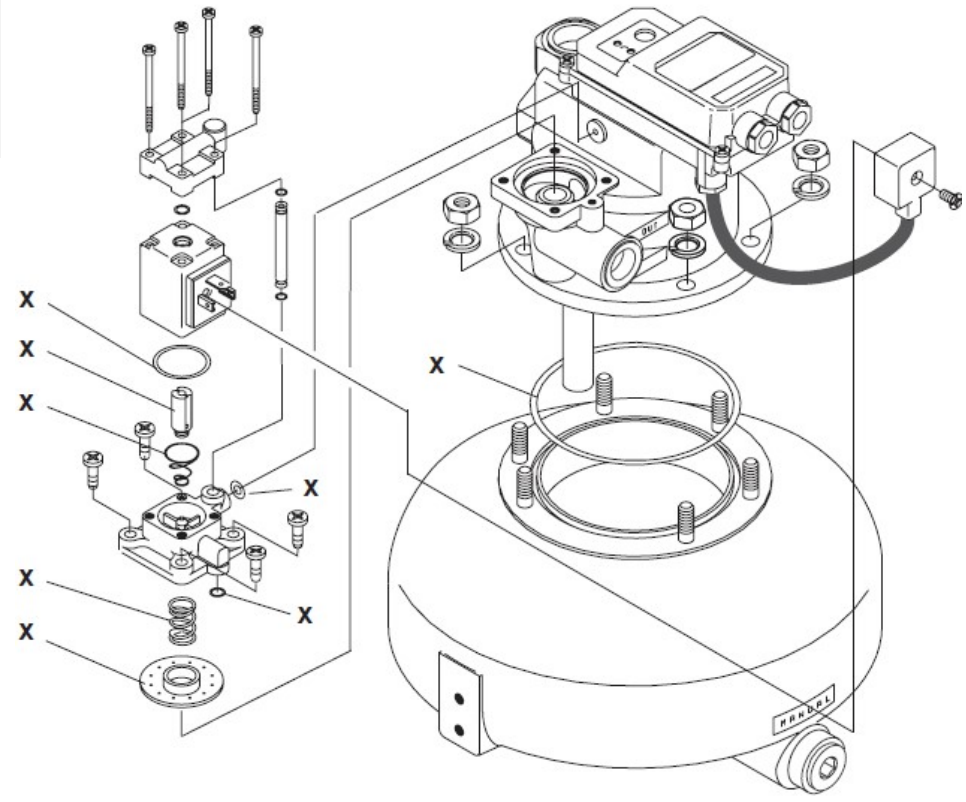
Functional test
• Briefly press test button 2 sec.
• Valve opens for condensate discharge.

Checking of alarm signal
• Shut off condensate inflow.
• Press test button for at least 1 minute.
• Red LED flashes (after 1 minute).
• Alarm signal is being relayed.

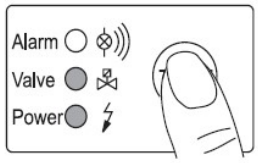
(DB1090D/3090D)



(DB3700)



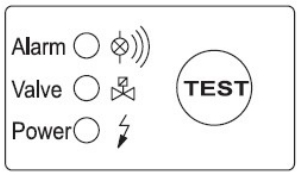
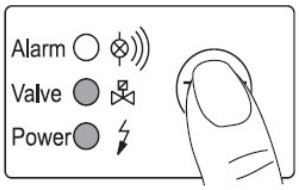
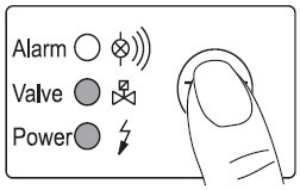
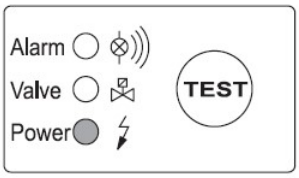
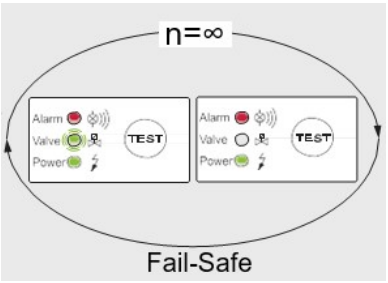
• Housing and valve should be cleaned once a year.
• Replace wearing parts once a year.
Set of wearing parts (x)



Functional test
• Briefly press test button 2 sec.
• Valve opens for condensate discharge.

Checking of alarm signal
• Shut off condensate inflow.
• Press test button for at least 1 minute.
• Red LED flashes (after 1 minute).
• Alarm signal is being relayed.

8-2. **Troubleshooting**

Illustration/Description	Possible causes	Troubleshooting
All LEDs off 	• Power supply faulty • Power supply board defective • Control PCB defective	• Read the operating voltage off on the type plate and check it • Check whether voltage is applied to the terminals of the power control board (PE, L, N) • Check the plug-type connection of the screw terminal on the control PCB
TEST button has been pressed but no condensate is being drained 	• Feed and / or outlet line shut off or blocked • Wear • Control PCB defective • Solenoid valve defective	• Check feed and discharge lines • Replace wear parts • Check whether the valve clocking can be heard, to do this press the TEST button several times • Check the plug-type connection of the connection terminal on the control PCB
Condensate is only drained when the TEST button is pressed 	• Feed line with insufficient slope • Excessive condensate quantities • Sensor tube extremely dirty • Dropping below necessary minimum pressure	• Install feed line at a gradient >3% • Mount venting line • Clean sensor tube • Check whether the necessary minimum pressure has been reached
Device constantly blows off air 	• Control air line blocked • Wear	• Clean entire valve unit • Replace wear parts • Clean sensor tube
Fail-safe operation 	• Wiring connection defective • Control PCB defective	• Check wiring connection • Replace control PCB

WARRANTY

1. Warranty period

Warranty period of this product is one year after purchase.

2. Scope of warranty

If any malfunction or damage occurs on the CKD's own responsibility within above warranty period, we will repair the product immediately free of charge.

However, the following are excluded from warranty.

①When using the product under the conditions or environment deviating from this specification.

②When the malfunction or damage results from mishandling or improper control.

③When the malfunction is caused by factors other than CKD product.

④When the product is used improperly.

⑤When the malfunction or damage results from the modification of functions, structures or specifications which CKD is not involved in, or repairs which is not designated by CKD after delivery.

⑥When the damage can be avoided if the machine and apparatus of your company which CKD product is installed in has functions and structures which commonly equipped with in the industry.

⑦When the malfunction or damage results from unforeseeable causes with the technology applied at the time of delivery.

⑧When the malfunction or damage results from fire, earthquake, flood, thunder, other natural disaster, pollution, salt hazard, gas hazard, abnormal voltage, abnormal water pressure or quality, congelation, or other external causes.

⑨In the case of repair parts which are used excessively.(filter element, dessicant etc.)

The warranty refers to only delivered products. We do not warrant for any secondary damage or loss caused by the faults of delivered products.

This product is premised on transaction and use in Japan.

As for the warranty of the product which is exported outside Japan, the following are applied.

①CKD will repair the products which returned to our factory freight prepaid. (We do not compensate transportation cost)

②After repairing the product we will deliver it to the designated domestic place in Japan with domestic packaging specifications.

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