CKD

SM－614416－A

INSTRUCTION MANUAL

SUPER DRAIN

DB3003D-15

● 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.

OCT-15
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.

Danger!
Compressed air!
Risk of serious injury or death through contact with quickly or suddenly escaping compressed air or through bursting plant components or plant components which are not secured.

Measures:
- Do not exceed the maximum operating pressure (see type plate).
- **Only carry out service measures when the system is pressureless.**
- Use pressure-resistant installation material only.
- The feed pipe must be tubed firmly. Discharge pipe: short, fixed pressure hose onto pressure-resistant pipe.
- Make sure that persons or objects cannot be hit by condensate or escaping compressed air.

Danger!
Supply voltage!
There is the risk of an electric shock involving injury or death when coming into Contact with non-insulated components carrying supply voltage.

Measures:
- During electric installations, all regulations in force need to be adhered.
- **When the control unit is open, service and installation works must only be undertaken when thesystem is deactivated.**
- **The removed control unit has no IP degree of protection.**
- All types of electrical works must be carried out by authorised and qualified personnel only.

Further safety instructions:
- For installation and operation, the national regulations and safety codes in force must also be adhered to.
- Do not use the SUPER DRAIN in hazardous areas.
- Regarding the inlet screw joints, excessive tightening forces must be avoided. This applies in particular to conical screw joints.
- The SUPER DRAIN will only function when voltage is applied.
- Do not use the test button for permanent drainage.
- Use genuine spare parts only. This is imperative to ensure perfect functioning.

Additional advice:
- The removed control unit has **no IP degree of protection**.
- During installation, use spanner flat at the feed pipe (wrenchsize SW27) as a back rest.
- The service unit must not be dismantled.

Caution!
Malfunction during operation!
Through incorrect installation and poor maintenance, malfunction may occur at the SUPER DRAIN.
Condensate which is not discharged may cause damage to plants and in production processes.

Measures:

- Condensate drainage which is reliable in performance directly optimises the compressed-air quality.
- To prevent damage and breakdowns, it is imperative to observe the following:
    - Exact compliance with the specifications of use and with the performance parameters of the SUPER DRAIN, in connection with the case of application (see "Proper use" section)
    - Exact compliance with the installation- and operation instructions in this manual
    - Regular maintenance and control of the SUPER DRAIN in accordance with the instructions in this operating

2-3. Proper use

- The SUPER DRAIN is an electronically level-controlled condensate drain for compressed-air plants.
- The device is employed within the permissible performance parameters (see "Technical data").
- The SUPER DRAIN is able to drain condensate under operating pressure from the plant components virtually without compressed-air loss.
- For its function, the SUPER DRAIN requires an supply voltage and an operating pressure (see "Technical data").
- As far as the employment in plants with increased demands on compressed air is concerned (food industry, medical technology, laboratory equipment, special processes etc.), the operator must decide on measures for the monitoring of the compressed-air quality. These have an effect on the safety of the subsequent processes and may prevent damage to persons and plants.

2-4. Exclusion from the scope of application

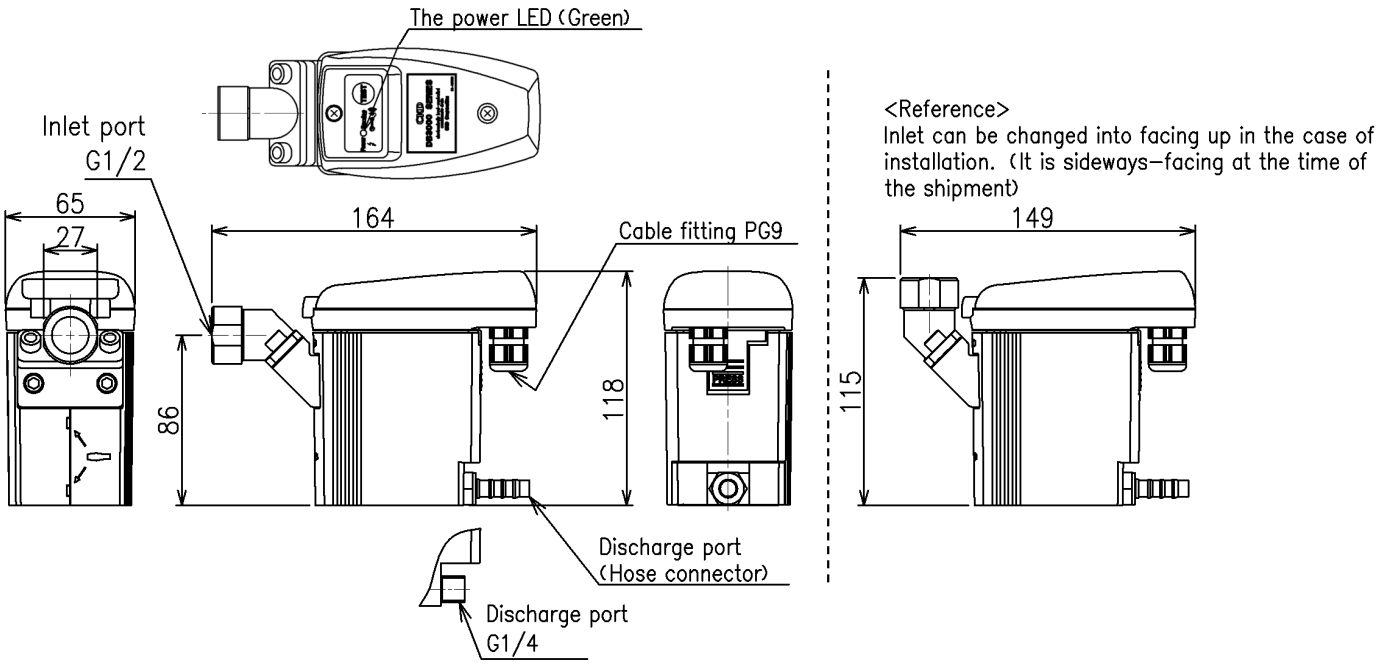
- The SUPER DRAIN as a condensate drain alone cannot guarantee a defined compressed-air quality, for this purpose, other additional technical devices are required.
- The SUPER DRAIN is not suitable for use in plants carrying vacuum or atmospheric ambient pressure or in ex-areas.
- The SUPER DRAIN must not be exposed to permanent direct solar or thermal radiation.
- The SUPER DRAIN must not be installed and operated in areas with an aggressive atmosphere.
- The SUPER DRAIN is not heatable and, therefore, not suitable for the use in areas where frost is likely to occur.
- The SUPER DRAIN is not suitable for CO2 plants.

3． PRODUCT

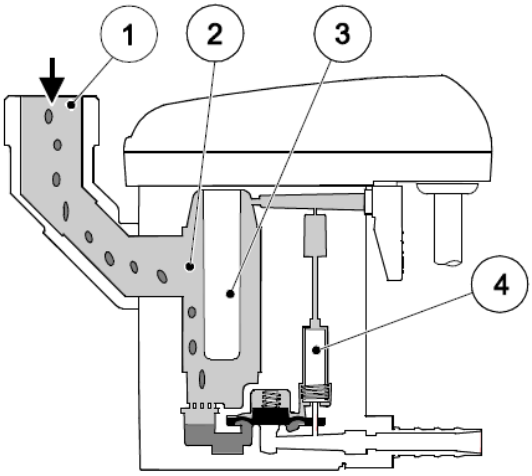
3-1. Specifications

Model			DB3003D-15
Port size	Drain inlet		G1/2 max. screw-in depth 13,5 mm
	Drain outlet		G1/4 or φ8～10mmHosejoint
Max. compressor performance		m^3/min(ANR)	2.5
Max. refrigeration dryer performance		m^3/min(ANR)	5
Max. filter performance (downstream of dryer)		m^3/min(ANR)	25
Working condition	Condensate		Oil-contaminated + Oil-free
	Ambient temperature	℃	1～60
	Working pressure range	MPa	0.08～1.6
Electrical specifications	Power supply		Single-phase AC95V～AC240V±10% 50/60Hz DC100V～DC125V±10%
	Power consumption	VA	0.6～3
	Recommended cable jacket diameter	mm	φ5.0～10
	Recomm. cable cross-section	mm^2	0.75～2.5
	Recommended stripping of cable jacket	mm	～50
	Recommended length of the wire end tube	mm	～6
IP protection			IP67
Weight (empty)		kg	0.8

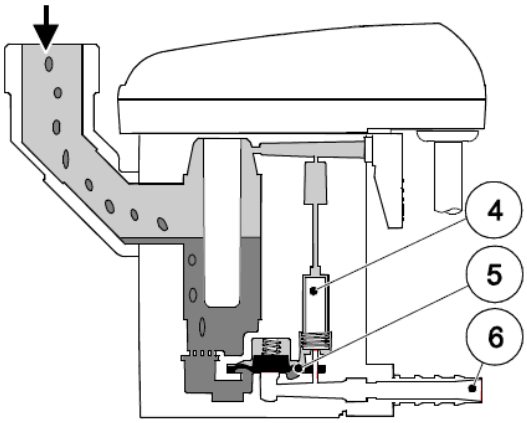
3-2. External Dimensions



3-3. Function

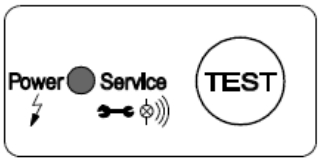


Via the inlet line (1) the condensate flows into the SUPER DRAIN and accumulates in the housing (2). A capacitively functioning sensor (3) continuously registers the filling level and relays a signal to the electronic control as soon as the container is filled.

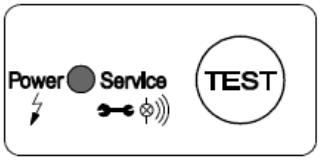


The pilot valve (4) is activated and the membrane opens the outlet line to discharge the condensate (6). When the SUPER DRAIN is empty, the outlet line is reclosed tightly in time before unnecessary compressed-air losses occur.

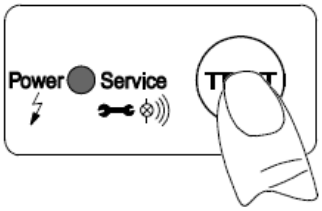
(Although inlet of a figure is upward, it is sideways at the time of factory shipments.)



When applying supply voltage, the SUPER DRAIN carries out a self-test.
The LED is lit orange for 1 second; subsequently, the device changes over to the **"ready-to-operate"** state and the LED is lit green.



Ready to operate, voltage is applied.

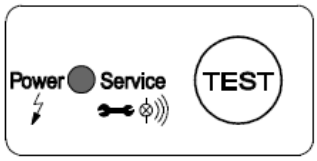


Test of the valve function (manual drainage):
Press and hold the push-button for approx. 2 s.
Do not use for permanent drainage.

The SUPER DRAIN releases a maintenance message for a service that is to be carried out.

Depending on the operating mode, a visual maintenance message (service) is activated which signalizes the replacement of the service unit.

The maintenance message is indicated by the flashing supply voltage-LED "Power".

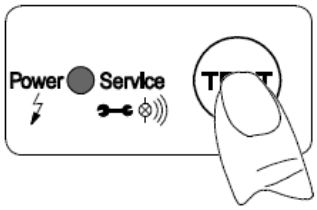


The maintenance message is released after 2 x 8.760h or one million switching cycles.

The maintenance signal is released when one of these two values is reached.

In the event of a power outage or when the energy supply is deactivated, the status of the timer will be maintained.

The activities to be carried out regarding maintenance are described in the chapter entitled "Check and maintenance".



Prior to the replacement of the service unit, a reset needs to be carried out. The control unit is released by actuating the arresting hook. When removed, the TEST button must be pressed and held for at least five seconds.

4. INSTALLATION

4-1 Installation

Danger!
Compressed air!
Risk of serious injury or death through contact with quickly or suddenly escaping compressed air or through bursting plant components or plant components which are not secured.

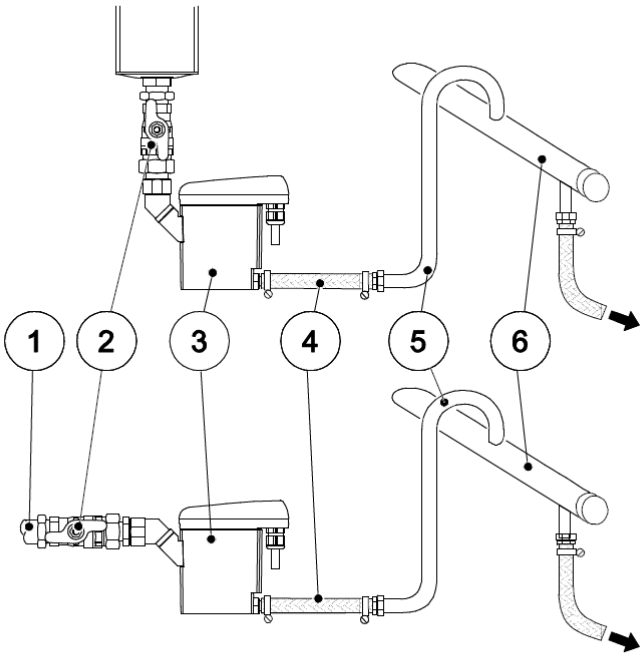
Measures:
- Do not exceed the maximum operating pressure (see type plate).
- **Only carry out service measures when the system is pressureless.**
- Use pressure-resistant installation material only.
- The feed pipe must be tubed firmly. Discharge pipe: short, fixed pressure hose onto pressure -resistant pipe.
- Make sure that persons or objects cannot be hit by condensate or escaping compressed air.

Caution!
Malfunction during operation!
Through incorrect installation and poor maintenance, malfunction may occur at the SUPER DRAIN.
Condensate which is not discharged may cause damage to plants and in production processes.

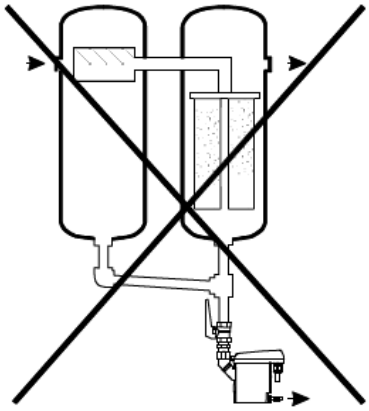
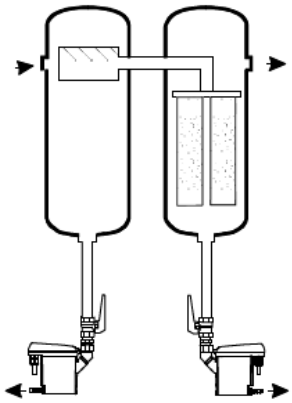
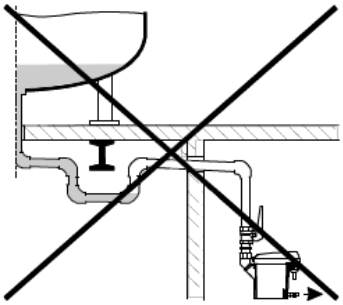
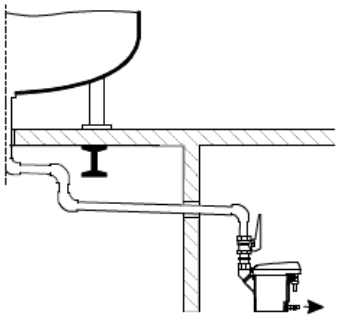
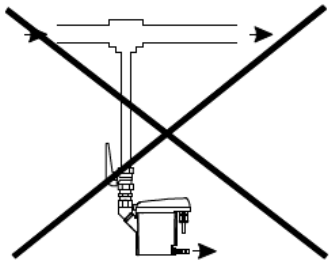
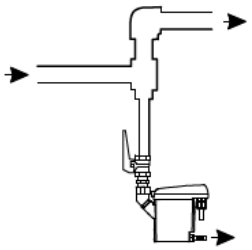
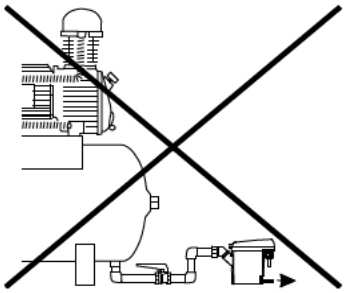
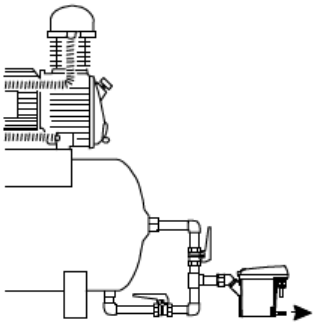
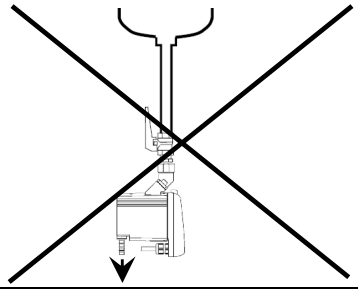
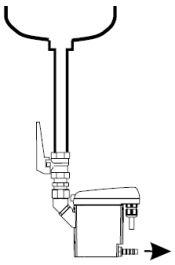
Measures:
- Condensate drainage which is reliable in performance directly optimises the compressed-air quality.
- To prevent damage and breakdowns, it is imperative to observe the following:
  - Exact compliance with the specifications of use and with the performance parameters of the SUPER DRAIN, in connection with the case of application (see "Proper use" section)
  - Exact compliance with the installation- and operation instructions in this manual
  - Regular maintenance and control of the SUPER DRAIN in accordance with the instructions in this operating manual

Note:

- It is imperative to observe all hazard statements and warnings listed here.
- Please also observe all regulations and notes regarding industrial safety and fire prevention at the 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. As such, it must be collected in suitable containers, and disposed of or processed properly.



- Only the displayed installation position of the SUPER DRAIN (3) is permissible. Never install in a horizontal or any other tilted position.
- Feed pipe (1) and ball valve (2) at least G½.
- No filter or screen in the inlet line.
- Slope in the inlet line >1%.
- Use ball valves (2) only.
- Operating pressure: min. 0.08MPa, max. 1.6MPa.
- Short pressure hose (4) fixed on a pressure –resistant pipe.
- The required minimum pressure increases by 0.01MPa per metre gradient in the discharge pipe (5).
- Discharge pipe (5) rising by max. 5 m.
- Install manifold (6) ½″ with a slope of 1%.
- Introduce the discharge pipe (5) from the top into the manifold (6).
- Prior to the start-up, always carry out a leak test and verify the correct engagement of the control unit.

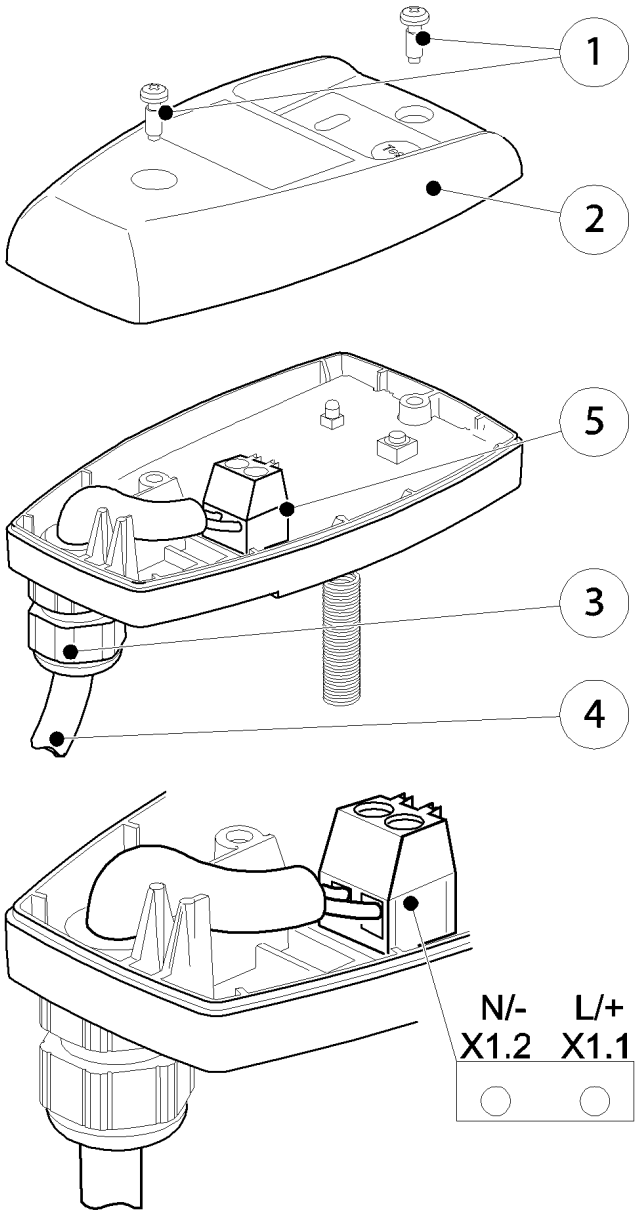
wrong	correct	Installations
		**Pressure differences!** Each condensate accumulation point must be drained separately.
		**Continuous slope!** Avoid a water pocket when installing the feed pipe
		**Deflector area!** If drainage is to be carried out directly from the pipe, deflection of the air flow will be useful.
		**Ventilation!** If the slope in the inlet line is not sufficient or if any other inflow problems occur, a venting line needs to be installed.
		**Installation posture** Attach it with sideways-facing posture with a top cover as the top.

4-2. Electrical installation

Danger!
Supply voltage!
There is the risk of an electric shock involving injury or death when coming into contact with non-insulated components carrying supply voltage.

Measures:

- During electric installations, all regulations in force need to be adhered.
- **When the control unit is open, service and installation works must only be undertaken when the system is deactivated.**
- **The removed control unit has no IP degree of protection.**
- All types of electrical works must be carried out by authorised and qualified personnel only.



Note:

1. Read the permissible supply voltage on the type plate and make sure this voltage is observed.
2. For the supply voltage, a reliably accessible separator must be provided close-by (e.g. power plug or switch), which separates all current-carrying conductors.
3. Observe the terminal assignment.
4. Do not install when the device is energised.
5. Unscrew the screws (1) and remove the upper part of the cover (2)
6. Unscrew the threaded cable connection (3), remove the plug (if there is one), and lead the cable (4) for the power supply through.
7. Connect the cable (4) with terminals X1 (1.1, 1.2) (5).
8. Install the cables as shown (see also terminal assignment in the following text).
9. Tighten the threaded cable connection (3) with a slightly sealing effect.
10. Put on the upper part of the cover (2) and tighten the screws (1) fingertight. (0.9±0.1Nm)

5. CONTROL AND MAINTENANCE

5-1. Exchange of the service unit

Danger!
Compressed air!
Risk of serious injury or death through contact with quickly or suddenly escaping compressed air or through bursting plant components or plant components which are not secured.

Measures:

- Do not exceed the maximum operating pressure (see type plate).
- **Only carry out service measures when the system is pressureless.**
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Through incorrect installation and poor maintenance, malfunction may occur at the SUPER DRAIN .
Condensate which is not discharged may cause damage to plants and in Production processes.

Measures:

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- To prevent damage and breakdowns, it is imperative to observe the following:
  - Exact compliance with the specifications of use and with the performance parameters of the SUPER DRAIN, in connection with the case of application (see "Proper use" section)
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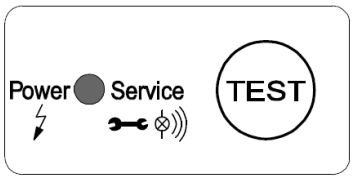
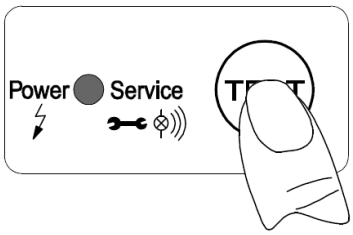
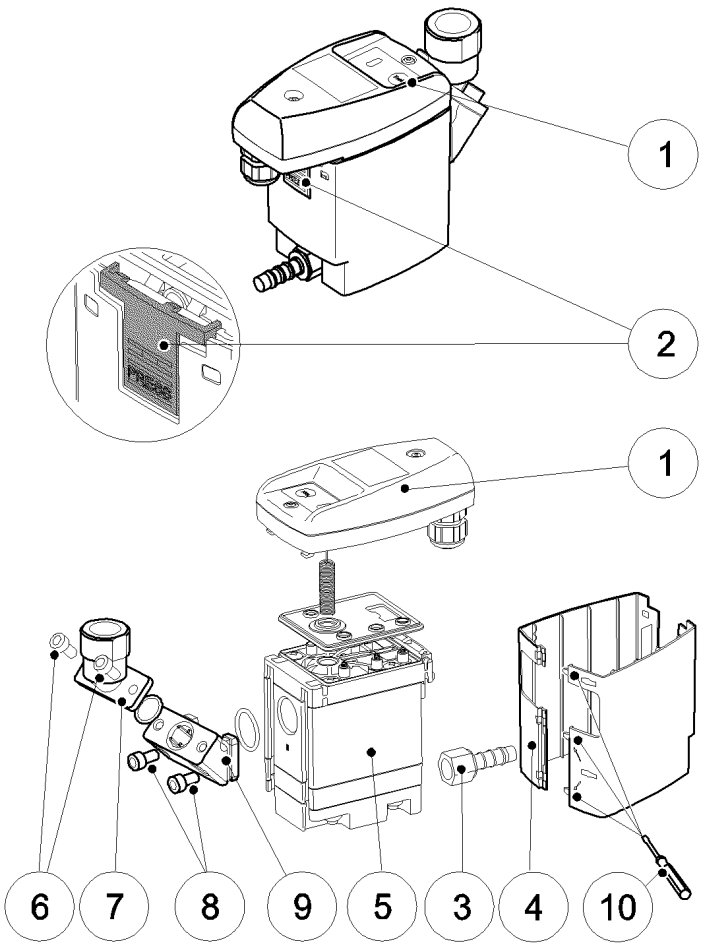
Note:

- It is imperative to observe all hazard statements and warnings listed here.
- Please also observe all regulations and notes regarding industrial safety and fire prevention at the 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. As such, it must be collected in suitable containers, and disposed of or processed properly.







Maintenance recommendation:

After 2 x 8,760 operating hours or one million switching cycles, a maintenance message is released.
The green power LED flashes. Afterwards, or at the latest after two years (2 x 8,760 operating hours), the service unit (5) needs to be replaced.

1. Prior to the replacement of the service unit, a reset needs to be carried out. The control unit is released by actuating the arresting hook. When removed, the TEST button below the LED must be pressed and held for at least five seconds.

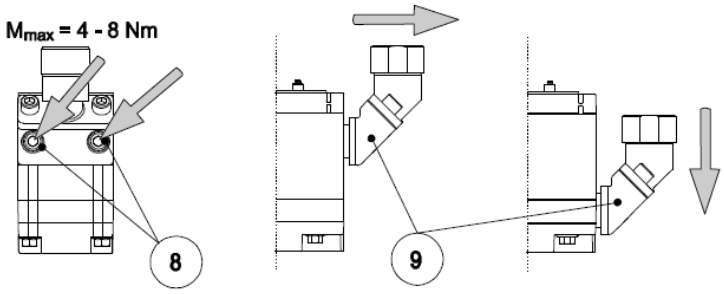
2. Remove the control unit (1) by pressing the arresting hook (2).

3. Unfasten the SUPER DRAIN from the outlet (3).

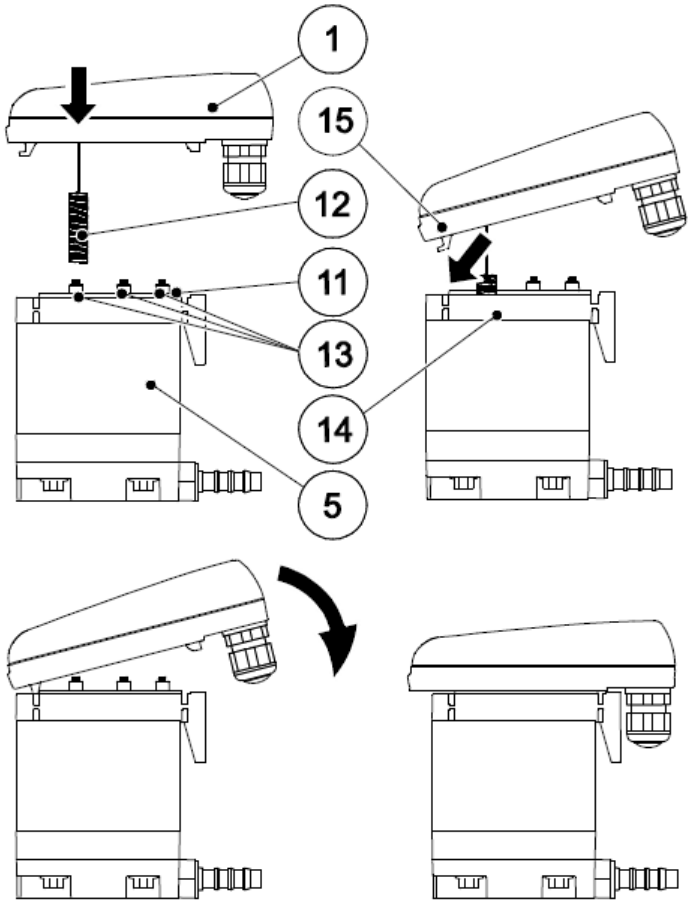
4. Remove the design shell (4) using a screwdriver (10).

5. Detach the service unit (5) from the tubing at the inlet by removing the union nut.

6. **or** remove the screws (6) from the angle nozzle (7).



7. **or** remove the screws (8) at the intermediate adapter (9) and remove the latter from the service unit by pulling it downwards.
8. Check whether or not the new service unit (5) goes with the control unit (1). (model designation and colour of the arresting hook (2)).
9. Installation of the new service unit (5) in reverse order.



Installation of the control unit on the service unit:

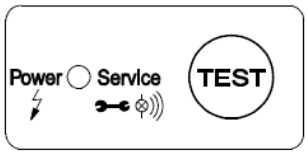
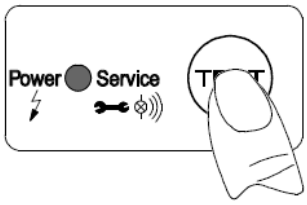
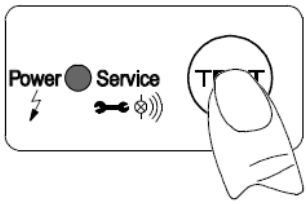
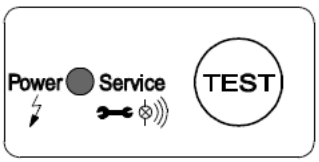
1. Check whether or not the service unit (5) goes with the control unit (1) (model designation and colour of the arresting hook).
2. Check whether or not the sealing mat (11) and the contact springs (13) are clean, dry, and free from impurities.
3. Introduce the sensor (12) into the sensor tube plate (14).
4. Hang the hook (15) of the control unit (1) in the sensor tube plate (14).
5. Press the control unit (1) against the service unit (5) and snap into place.

Start-up subsequent to maintenance measures:

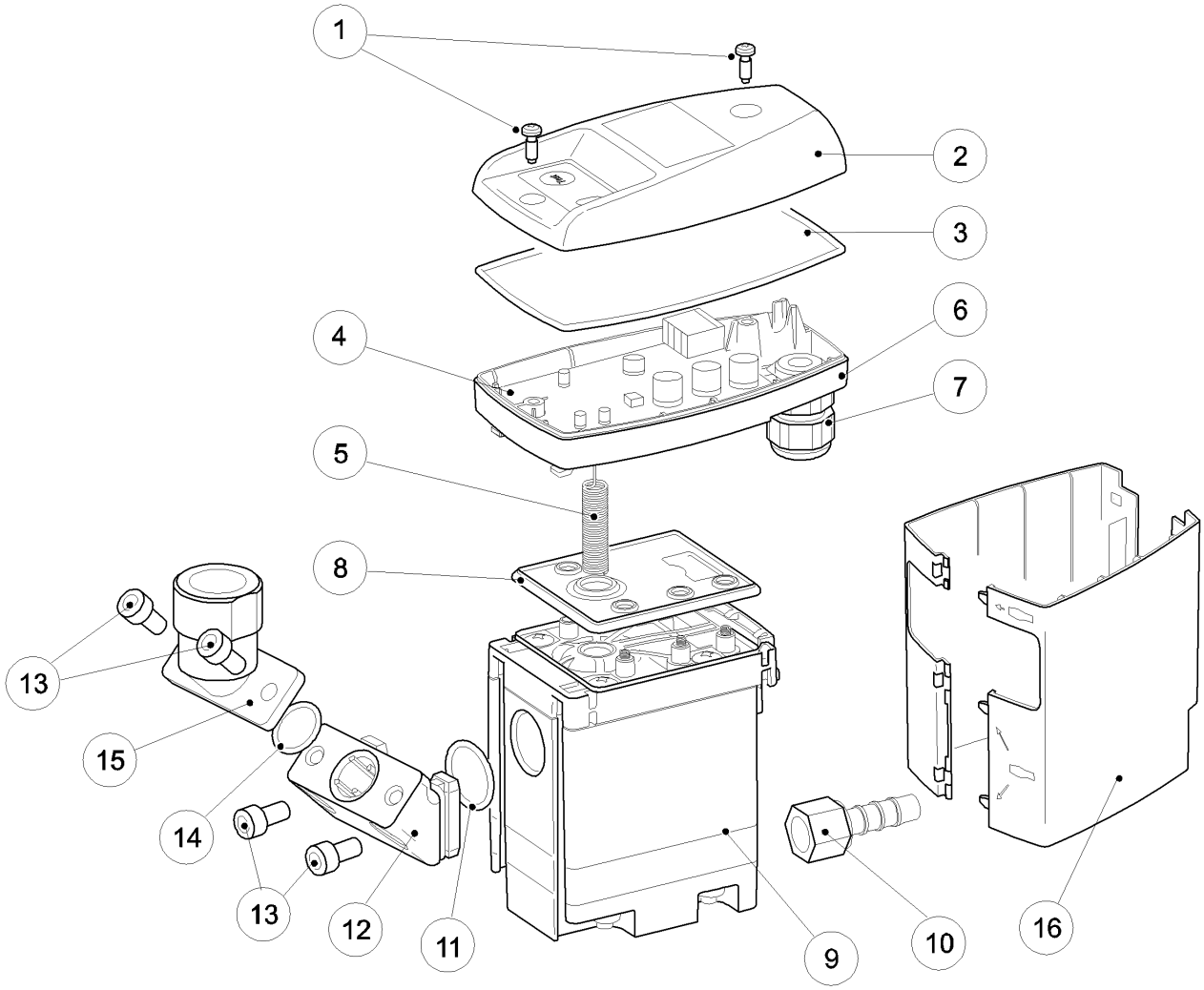
Always carry out prior to the start-up:

- Leak test of the screwed connector
- Check of the electrical connections
- Check of the correct engagement of the control unit

5-2. **Troubleshooting and fault elimination**

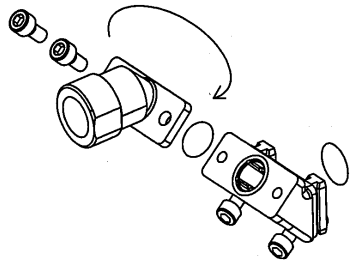
Symptoms	Possible reasons	Measures
 **LED does not light up**	Supply voltage incorrect Circuit board defective	Check voltage on the type plate Check the connections and the supply voltage Check the circuit boards for possible damage
 **Test button pressed, but no condensate discharge**	Feed pipe and/or discharge pipe blocked or obstructed Wear and tear Circuit board defective Service unit defective Minimum pressure not reached Maximum pressure exceeded	Check feed and discharge pipe Check whether or not the valve opens audibly (press the test button several times for > 2 seconds) Check the circuit board for possible damage Check the operating pressure
 **Condensate discharge only when the test button is pressed**	Feed pipe without sufficient slope Cross section not large enough Condensate accumulation too high (surge) Service unit extremely dirty	Install feed pipe with a slope Replace the service unit
 **Device blows off continuously**	Service unit defective or dirty	Replace the service unit

5-3. **Elements and components**



① Screw (3.5 x 10)
② Upper part of the cover
③ Moulded gasket (2×307)
④ Circuit board
⑤ Sensor
⑥ Lower part of the cover
⑦ Cable bushing (PG9)
⑧ Sealing mat
⑨ Service unit
⑩ Hose connector (G1/4)
⑪ O-ring (20 x 2)
⑫ Intermediate adapter
⑬ Screw (M6 x 12)
⑭ O-ring (14 x 1.78)
⑮ Angle adapter
⑯ Design shell

(Direction of inlet piping can be horizontally changed by reversing 180 degrees of elbow adapters ⑮.)



Recommended spare parts

Available sets of spare parts	Contents	Order number
Service unit	8,9,11	DB3003D-KFL-614389
Gasket kit	3,8,11	DB3003D-KFL-614390
Design shell	16	DB3003D-KFL-614391
Connection adapter	11,12,13,14,15	DB3003D-KFL-614392

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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