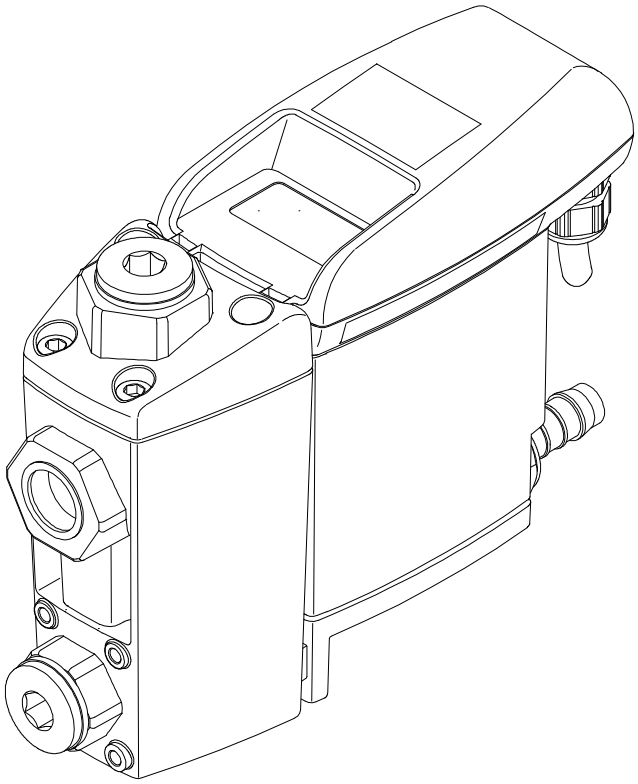
EN-US - english US

Instructions for installation and operation

Condensate drain

BEKOMAT® 33 / 33 CO (BM33 / BM33CO)



01-365

Dear customer,

Thank you for deciding in favor of the BEKOMAT® 33 / 33 CO condensate drain. Please read the installation and operating instructions carefully before mounting and starting up the BEKOMAT® 33 / 33 CO, and follow our directions. Perfect functioning of the BEKOMAT® 33 / 33 CO, and thus reliable condensate discharge, can only be guaranteed when the provisions and notes stipulated here are strictly adhered to.

1 Pictograms and symbols

Observe the installation and operating instructions

Observe the installation and operating instructions
(on the type plate)

General danger symbol (danger, warning, caution)

General danger symbol (danger, warning, caution) for supply voltage and supply voltage-carrying plants components

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 BEKOMAT® 33 / 33 CO.

In addition to these operating instructions, local or national regulations must be complied with, if necessary.

Make sure that the BEKOMAT® 33 / 33 CO is operated only within the permissible limit values indicated on the ID 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 pressure less.**
- 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 to (e.g. VDE 0100/ IEC 60364).
- **Service measures 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 authorized 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 BEKOMAT 33 / 33 CO in hazardous areas.
- Regarding the inlet screw joints, excessive tightening forces must be avoided. This applies in particular to conical screw joints.
- The BEKOMAT 33 / 33 CO 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:

- During installation, use the spanner flat at the feed pipe (wrench size SW28 + 34) 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 BEKOMAT.

Condensate which is not discharged may cause damage to plants and in production processes.

Measures:

- Condensate drainage which is reliable in performance directly optimizes 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 BEKOMAT, 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 BEKOMAT in accordance with the instructions in this operating manual

3 Proper use

- The BEKOMAT is an electronically level-controlled condensate drain for compressed-air plants.
- The device is employed within the permissible performance parameters (see "Technical data").
- The BEKOMAT is able to drain condensate under operating pressure from the plant components virtually without compressed-air loss.
- For its function, the BEKOMAT 33 / 33 CO 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.

- It is the task of the operator to ensure that the indicated conditions are met during the entire operating time.
- For the employment in CO_2 plants, a BEKOMAT with a CO specification must be used.

4 Exclusion from the scope of application

- The BEKOMAT as a condensate drain **alone cannot** guarantee a defined compressed-air quality, for this purpose, other additional technical devices are required.
- BEKOMAT 33 / 33 CO is **not** suitable for use in plants carrying vacuum or atmospheric ambient pressure or in ex-areas.
- The BEKOMAT must not be exposed to permanent direct solar or thermal radiation.
- The BEKOMAT 33 / 33 CO must not be installed and operated in areas with an aggressive atmosphere.
- The BEKOMAT 33 / 33 CO is not heatable and, therefore, not suitable for the use in areas where frost is likely to occur.

5 Technical data

min./max. operating pressure	0,8...16 bar (12...230 psi)
min./max. temperature	+1...+60 °C (+34...+140 °F)
Condensate inflow	3 x NPT ½ (½") internal
Condensate outflow	G ½ (½") Ø 13 mm hose connector
Condensate	oil-contaminated + oil-free
Housing	aluminium + plastic, glass fibre-reinforced
Weight (empty)	1,65 kg (3.63 lbs)

This product has been tested to the requirements of CAN/CSA-C22.2 No. 61010-1, second edition, including Amendment 1, or a later version of the same standard incorporation the same level of testing requirements.

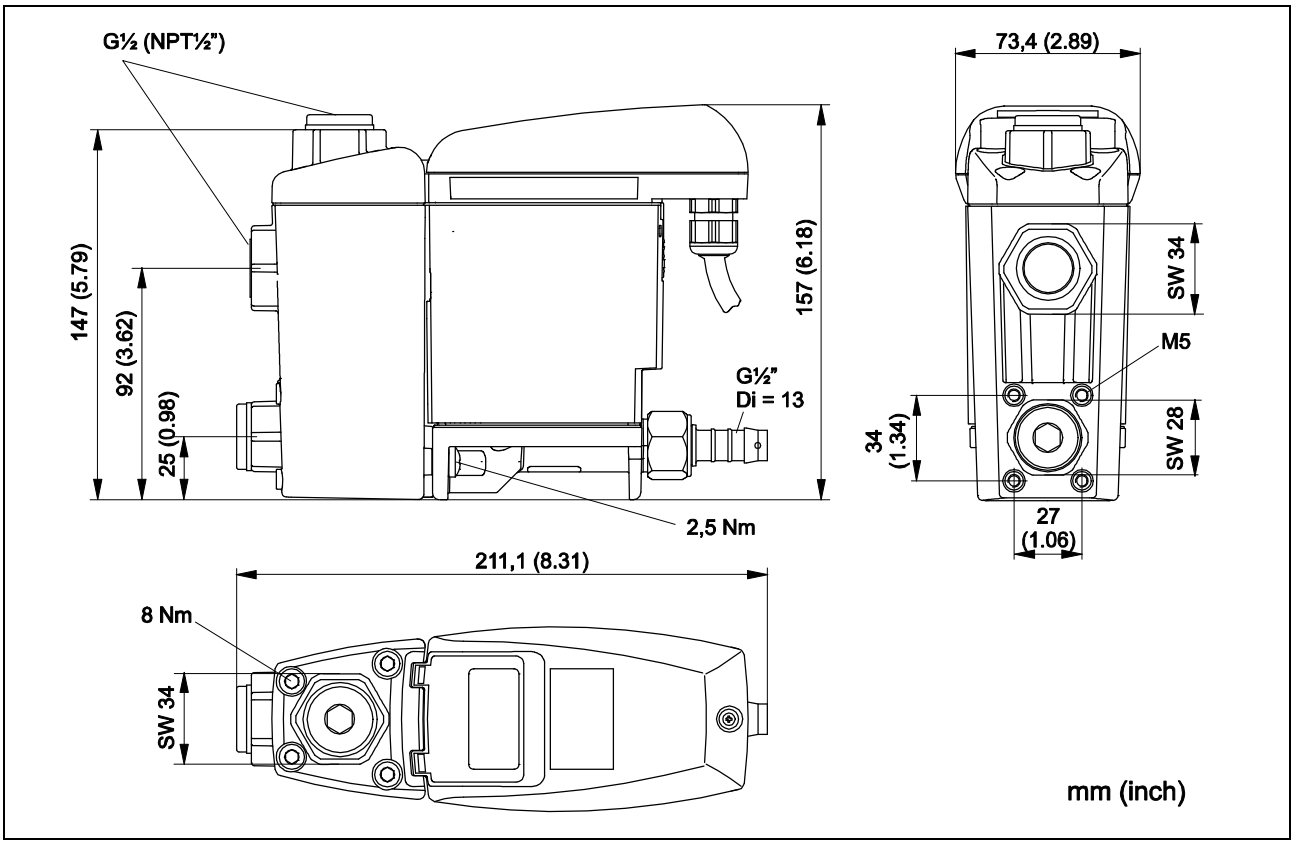
Peak compressor performance	500 scfm
Peak refrig. dryer performance (only with pre-separation)	1,000 scfm
Peak filter performance (behind dryer)	5,000 scfm

Supply voltage (see type plate)	230 / 115 /.../ 24 VAC ± 10 %, 50...60 Hz / 24 VDC ± 10 %
Power consumption	P < 8,0 VA (W)
Fusing	recommended for AC: 1 A slow stipulated for DC: 1 A slow
Recommended cable-jacket diameter	Ø 5,8...8,5 mm (0.23"...0.34")
Recommended wire cross-section	3 x 0,75...1,5 mm² (AWG 18...20)
Recommended stripping of cable jacket	PE: approx. 60 mm (2.36") L/N: approx. 50 mm (1.97")
Recommended length of the wire end-tube	~ 6 mm (~ 0.24 inch)
Connection data of the potential-free contact Switch to load *)	AC: max. 250V / 1A DC: max. 30V / 1A
Connection data of the potential-free contact Switch to low signal *)	min. 5 VDC / 10 mA
Protection class	IP 54

VAC = V alternating current
VDC = V direct current

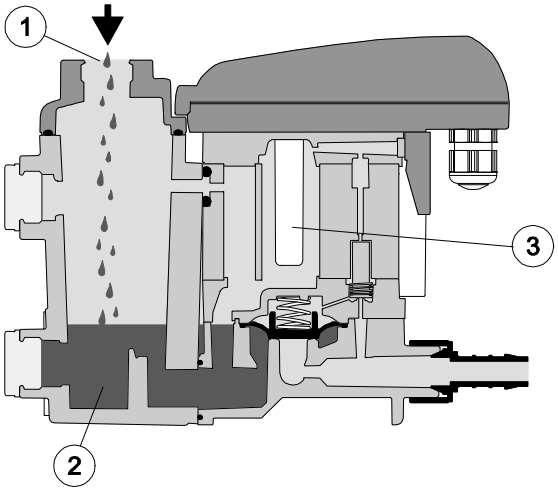
*) The switching of loads means that the properties of the contact are no longer suitable for the switching of low signals.

6 Dimension drawing



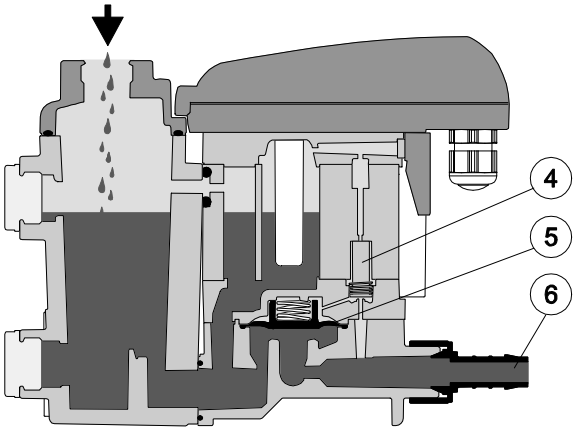
SW = wrench size

7 Function



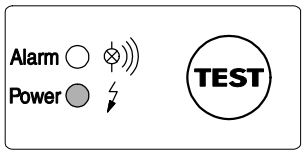
Via the inlet line (1) the condensate flows into the BEKOMAT 33 / 33 CO and accumulates in the housing (2).

A capacitive functioning sensor (3) continuously registers the filling level and relays a signal to the electronic control as soon as the container is filled.



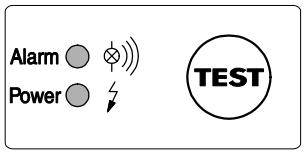
The pilot valve (4) is activated and the membrane (5) opens the outlet line to discharge the condensate (6).

When the BEKOMAT is empty, the outlet line is reclosed tightly in time before unnecessary compressed-air losses occur.



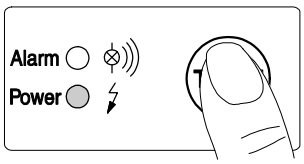
Two LEDs show the individual operating states of the BEKOMAT 33 / 33 CO .

Ready to operate, voltage is applied.



In the event that the condensate discharge is disturbed, an alarm mode starts which is indicated by flashing of the red alarm LED.

Malfunction /alarm

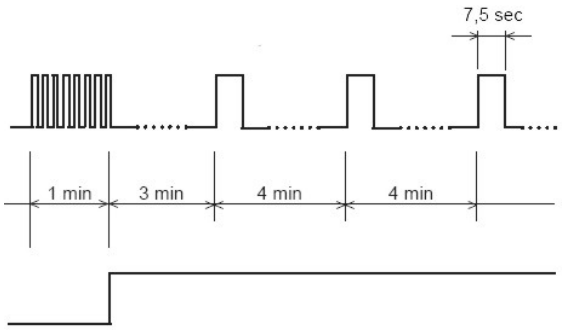


Test of the valve function (manual drainage): Press the button for approx. two seconds.

Test of the alarm function (see below): Press the button for at least one minute.

Do not use for permanent drainage.

Switching sequence of the valve in the alarm mode



Trouble indication via a potential-free contact

Alarm mode:

In the event that the condensate discharge is disturbed, the valve opens after a time cycle (approx. every three seconds) to eliminate the malfunction automatically. If the malfunction is not eliminated after one minute, a trouble indication is released:

- The alarm LED flashes
- The alarm relay switches over (the signal can be picked off potential-freely).
- The valve opens every four minutes for 7.5 seconds.
- When the malfunction has been eliminated, the BEKOMAT will switch back automatically into the normal mode.

Possible trouble sources include:

- Mistakes during installation
- Dropping below the minimum pressure
- Excessive accumulation of condensate (excess load)
- Blocked / obstructed outlet line
- Extreme amount of dirt particles
- Frozen pipe work

8 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 pressure less.**
- 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 BEKOMAT.

Condensate which is not discharged may cause damage to plants and in production processes.

Measures:

- Condensate drainage which is reliable in performance directly optimizes 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 BEKOMAT, 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 BEKOMAT 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.

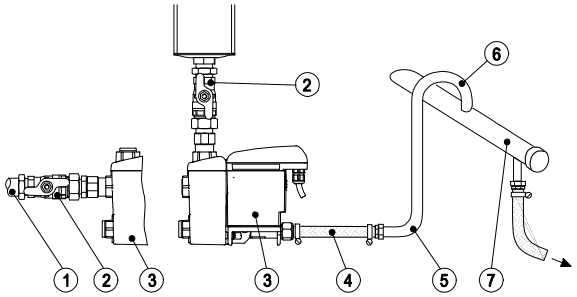
Do not use aggressive cleaners and improper devices such as high-pressure cleaners.

Please note that condensates may contain aggressive or harmful components. Therefore, skin contact should be avoided.

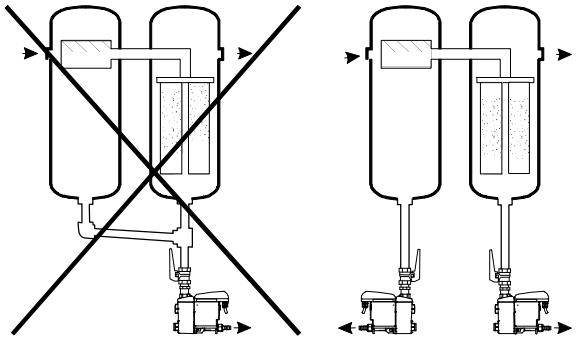
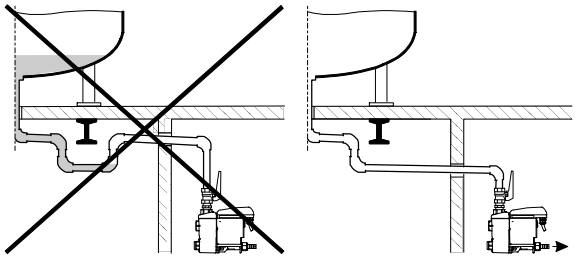
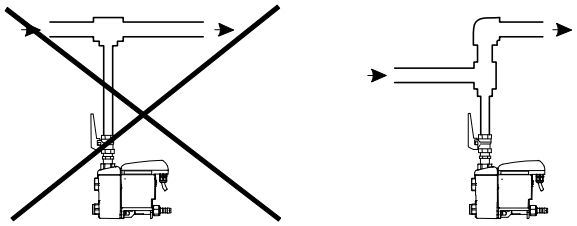
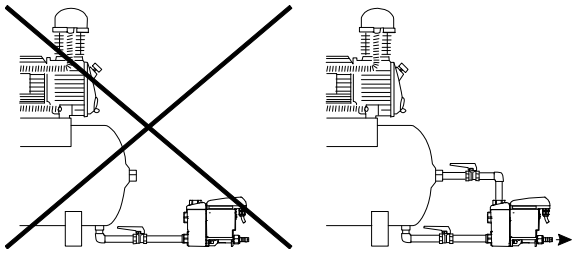
Condensate is subject to mandatory waste disposal. As such, it must be collected in suitable containers, and disposed of or processed properly.

Installation

Installation instructions:



- Only the displayed installation position of the BEKOMAT (3) is permissible. Never install in a horizontal or any other tilted position.
- Feed pipe (1) and ball valve (2) at least ½”.
- No filter or screen in the inlet line.
- Slope in the inlet line >1%.
- Use ball valves (2) only.
- Operating pressure: min. 12 psi, max. 230 psi.
- Short pressure hose (4) fixed on a pressure-resistant pipe.
- The required minimum pressure increases by 0.44 psi per foot gradient in the discharge pipe (5).
- Discharge pipe (5) rising by max. 16.4 feet.
- Install manifold (7) ¾" with a slope of 1%.
- Insert the discharge pipe (6) from the top into the manifold (7).
- Prior to the start-up, always carry out a leak test and verify the correct engagement of the control unit.

wrong	correct	
		**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.

9 Electrical installation

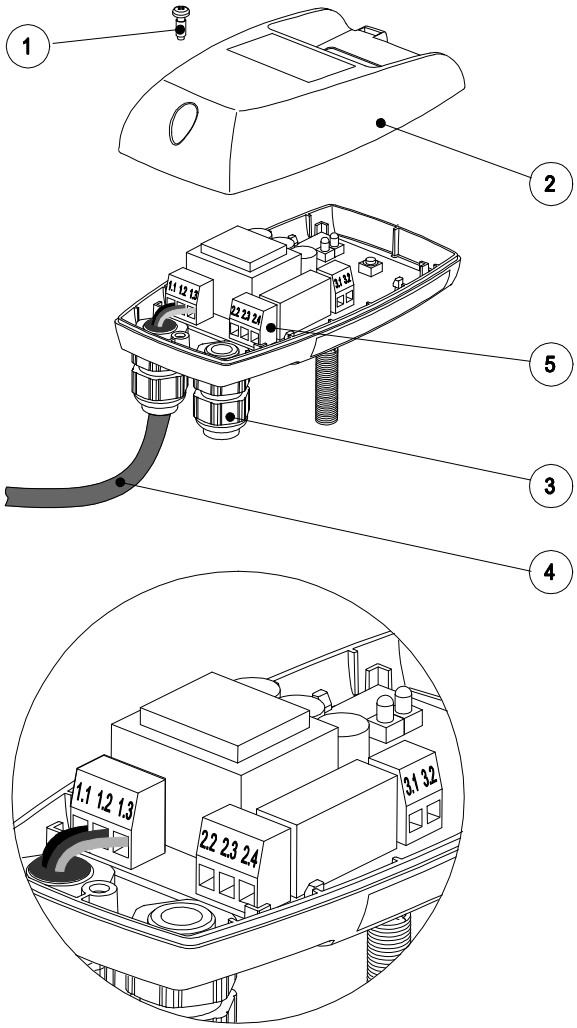
Danger!

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 to (e.g. VDE 0100/ IEC 60364).
- **Service measures 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 authorized and qualified personnel only.



Note:

Power supply connection:

1. Read the permissible mains voltage on the type plate and make sure this voltage is observed.
2. At an AC supply, a reliably accessible separator must be provided close-by (e.g. power plug or switch), which separates all current-carrying conductors.
3. At a DC supply, only use a protective extra-low-voltage (PELV) in accordance with IEC 60364-4-41.
4. Carry out installation in accordance with VDE 0100 / IEC 60364.
5. Observe the terminal assignment.
6. Do not install when the device is energised.
7. Unscrew the screw (1) and remove the upper part of the cover (2).
8. Unscrew the threaded cable connection (3) (if there is one), remove the plug and lead the cable (4) for the supply voltage through.
9. Connect the cable (4) with terminals KL1 (1.1 ... 1.3) (5).
10. Install the cables as shown (see also terminal assignment in the following text).
11. Tighten the threaded cable connection (3) with a slightly sealing effect.
12. Put on the upper part of the cover (2) and tighten the screw (1) fingertight.
13. Between the earth conductor/PE connection and the piping, a potential difference is not admissible. If required, potential equalisation in accordance with IEC 60364 / VDE 0100 must be provided for.

Connection of the potential-free contact and of the external test:

1. Selection of the suitable cable.
2. Connection to KL2 and KL3, as is shown on the following page.
3. The installation steps are the same as for the power supply connection.tenzialfreie Kontakt berührungsgefährliche Spannungen, so ist auch hierfür eine Trennvorrichtung, wie oben beschrieben, vorzusehen.

Terminal assignment AC version (supply voltage)

KL 1			KL 2			KL 3	
1	2	3	2	3	4	1	2
phase/neutral	neutral/phase	earth/ground	normally closed	common	normally open	0 V	external test
1.1	1.2	1.3	2.2	2.3	2.4	3.1	3.2

- KL 1.1 L or N mains connection
- KL 1.2 N or L mains connection
- KL 1.3 PE mains connection

L = Outer conductor
N = Neutral conductor
PE = Protective earth conductor

Terminal assignment DC version (supply voltage)

KL 1			KL 2			KL 3	
1	2	3	2	3	4	1	2
+24 V	neutral 0 V	earth/ground	normally closed	common	normally open	0 V	external test
1.1	1.2	1.3	2.2	2.3	2.4	3.1	3.2

- KL 1.1 + 24 V
- KL 1.2 0 V
- KL 1.3 PE mains connection

Terminal assignment of the potential-free contact and of the external test (AC and DC versions)

KL 1			KL 2			KL 3	
1	2	3	2	3	4	1	2
+24 V	neutral 0 V	earth/ground	normally closed	common	normally open	0 V	external test
1.1	1.2	1.3	2.2	2.3	2.4	3.1	3.2

Alarm / potential-free contact:

- KL 2.2 n.c.
- KL 2.3 com.
- KL 2.4 n.o.

n.c. - com. closed during malfunction or voltage breakdown (standby-current principle)

n.o. - com. closed during normal operation

Contacts KL 2.2 - 2.4 are potential-free.

External test / remote control:

- KL 3.1 0V
- KL 3.2 external test (IN1)

Contacts connected = test active = discharge

Contacts open = test inactive

Contacts KL 3.1 -3.2 are not potential-free.

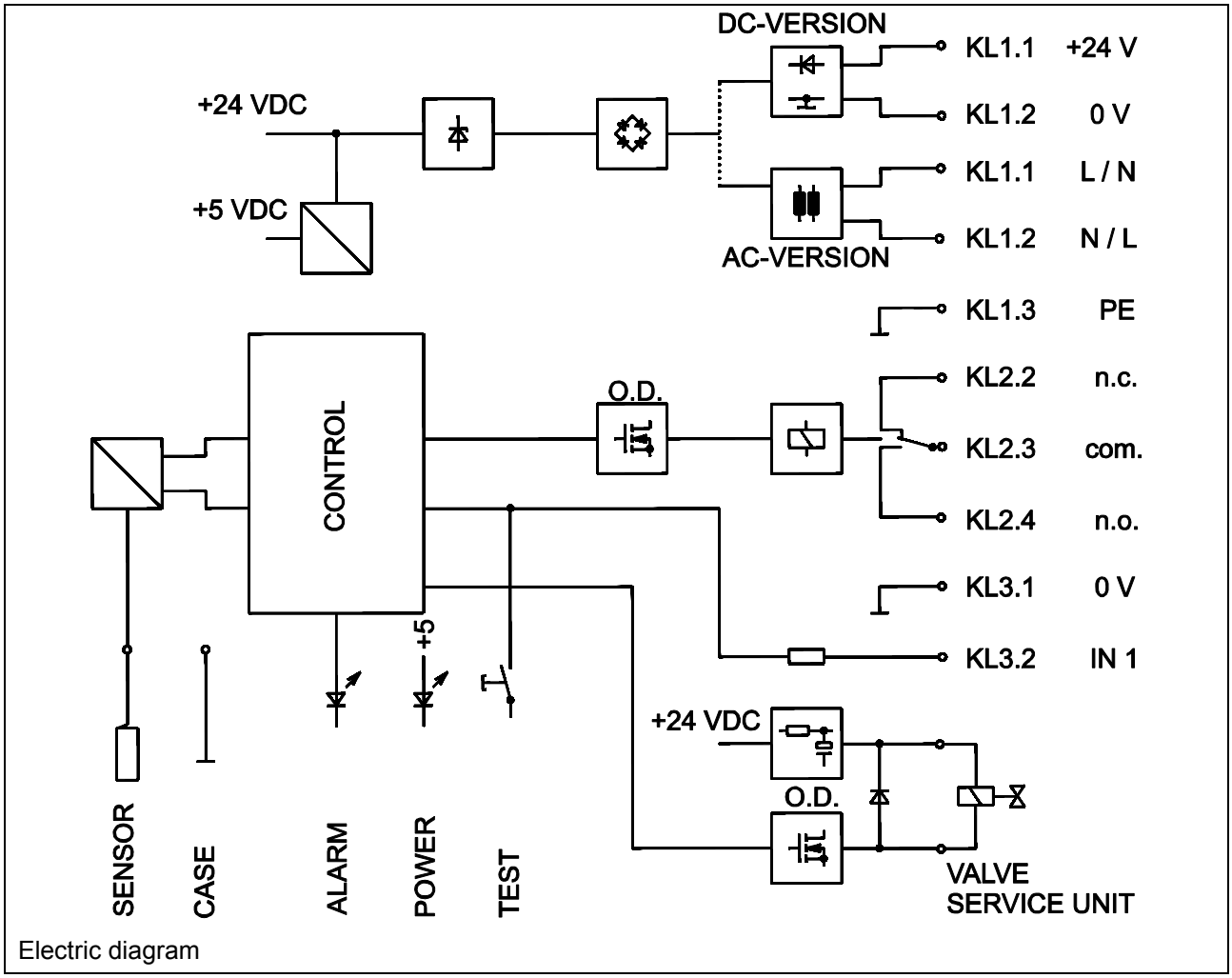
Note:

Between terminals KL 1.1 and 1.3. of the VCD devices and housings or condensate connections, there is no galvanic isolation.

As regards tests, for example protective conductor tests in accordance with VDE 0701-0702 / IEC 85/361/CD, it must be observed that there is only a connection for the establishment of a functional earthing between the touchable conductive parts of the device and the protective conductor base, and no protective connection capable of carrying current.

The provided 24 VDC voltage must meet the requirements for protective extra-low voltages (PELV) in accordance with IEC 60364-4-41.

Tighten the threaded cable connection with a slightly sealing effect.



Electric diagram

10 Control and maintenance

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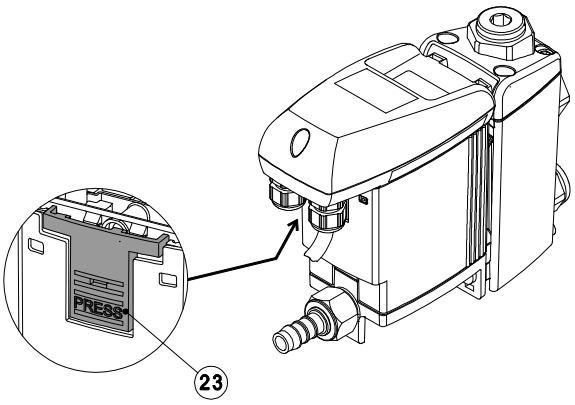
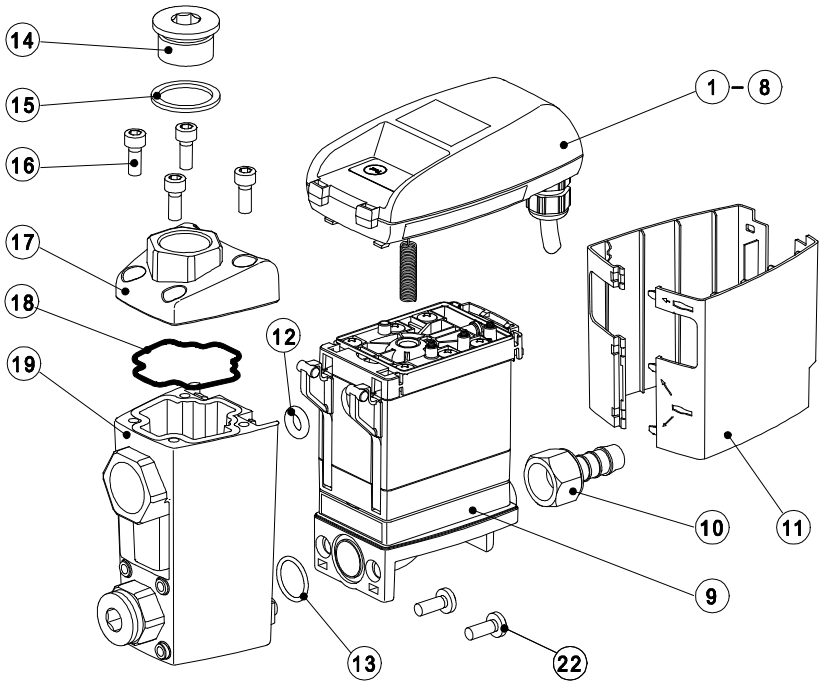


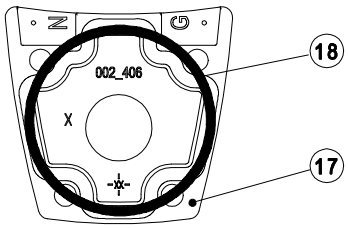
Maintenance recommendation:

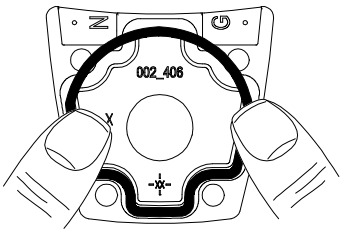
Replace the service unit (9) after
6 400 operating hours or max. two years.

It is recommended to **clean the condensate receiver** tank after two years at the latest, **when maintenance works are carried out**:

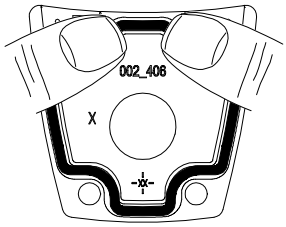
1. Remove the control unit (1...8) by pressing the arresting hook (23)
2. Unfasten BEKOMAT from the outlet
3. Detach BEKOMAT from the tubing at the inlet
4. Unscrew both M6 bolts (22) and remove the service unit (9) by slightly pulling and lifting it
5. Remove the design shell (11) using a screw-driver
6. Unscrew the four cover screws (16) and remove the cover (17)
7. Clean the condensate receiver tank (19)

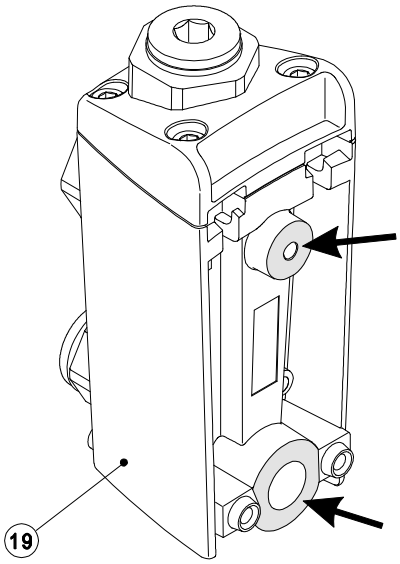




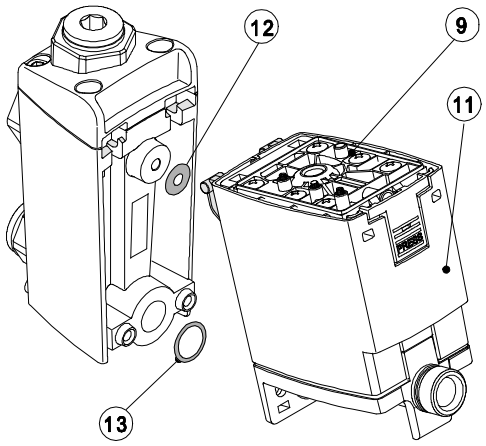


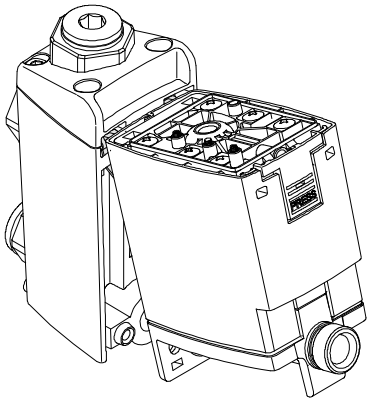
8. Insert new cover O-ring (18) according to the diagram
9. Clean the sealing surfaces of the cover
10. Put on the cover (17) with the new O-ring and carefully tighten the four cover screws (16) crosswise (8 Nm)

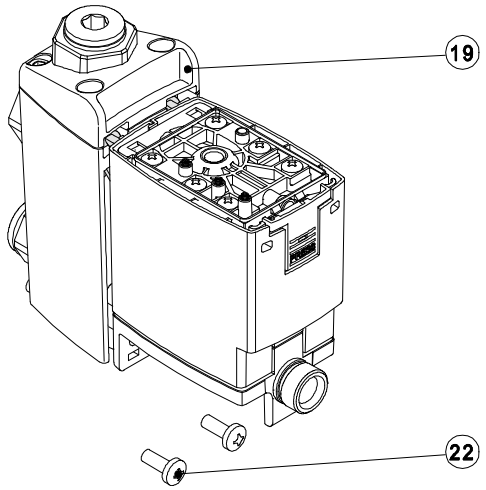




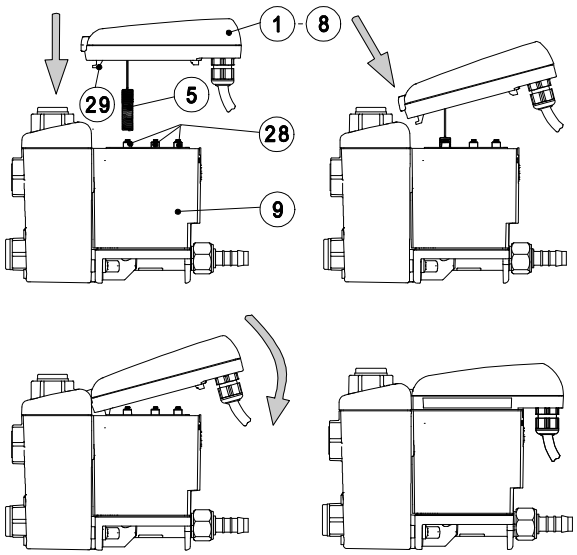
11. Clean the sealing surfaces (←) at the condensate receiver tank (19)







12. Check whether or not the service unit (9) goes with the control unit (1...8) (model designation and color of the arresting hook)
13. Check the O-rings at the new service unit (12, 13)
14. Mount the design shell (11)
15. Mount the service unit along with the design shell to the condensate receiver tank (19) and tighten both erection bolts (22) (2,5 Nm)
16. Re-install the BEKOMAT at the inlet tubing and outlet, in reverse order to disassembly



Installation of the control unit on the service unit BEKOMAT:

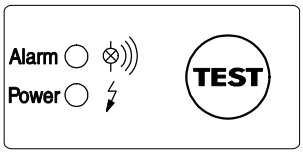
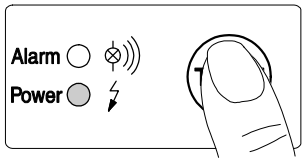
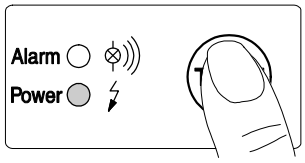
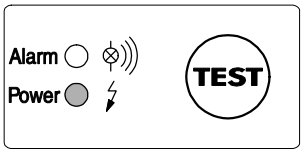
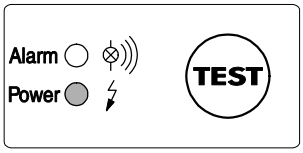
1. Check whether or not the service unit with contact springs (28) is clean, dry and free from impurities.
2. Insert the sensor (5) into the service unit (9).
3. Insert the hook (29) of the control unit (1...8) in the service unit (9).
4. Press the control unit (1...8) against the service unit (9), snap into place and make sure it is securely mounted.

Start-up subsequent to maintenance measures:

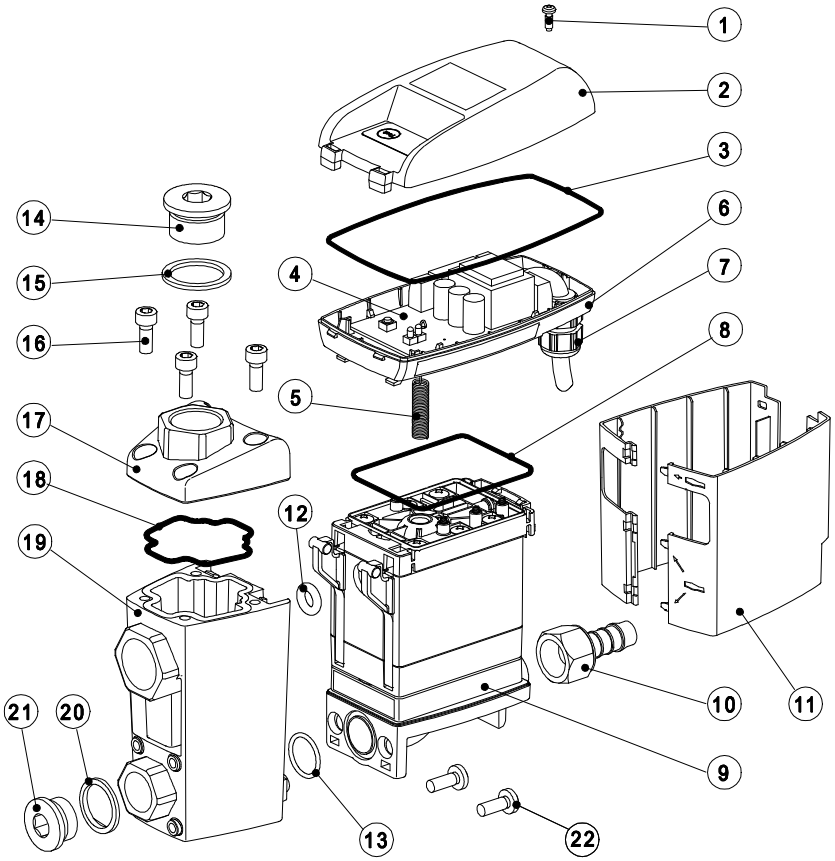
Always carry out prior to the start-up:

- Leak test of the screwed connector of the condensate receiver tank and of the connection of this tank to the service unit
- Control of the electrical connections
- Check the correct engagement of the control unit

11 Troubleshooting and fault elimination

Error indication	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
 **The device is not tight**	O-rings between the condensate receiver tank and the service unit are defective or the sealing surfaces are dirty The screw joints are not tightened	Check the screw joints Dismantle the service unit, control the O-rings and sealing surfaces Replace O-rings if required and clean the sealing surfaces Check tightness after the installation

12 Elements and components



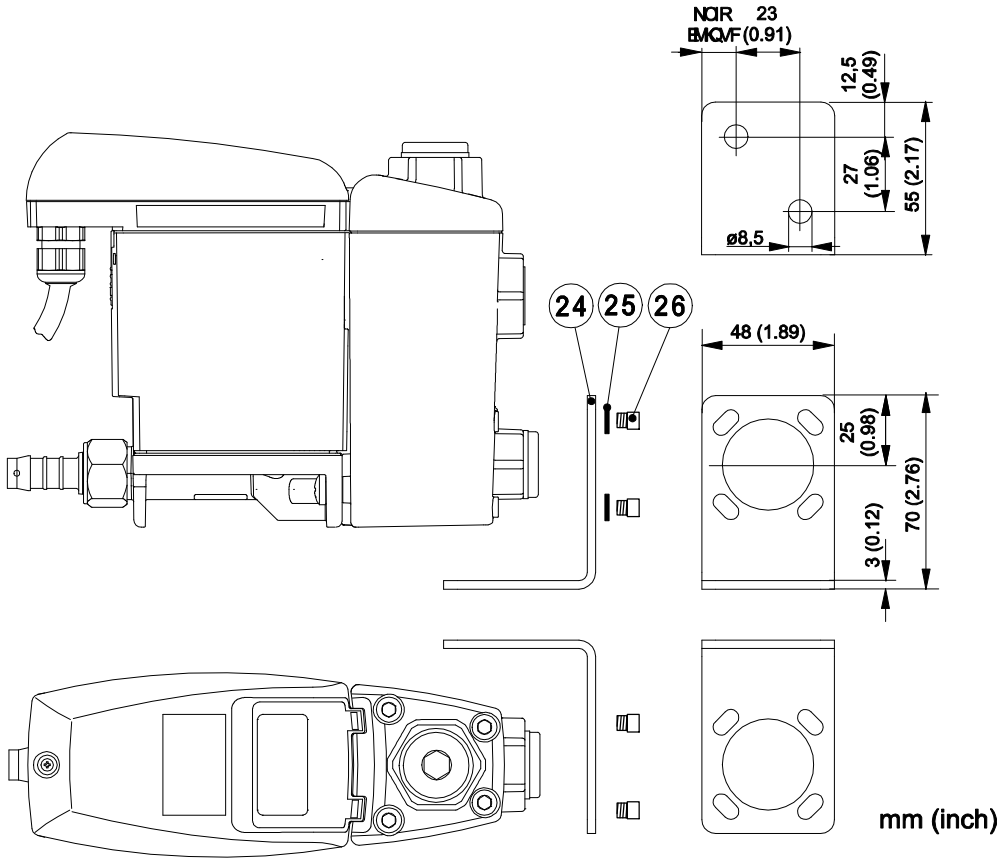
1 Screw 3.5 x 10
2 Upper part of the cover
3 Molded gasket
4 Circuit board
5 Sensor
6 Lower part of the cover
7 Cable bushing
8 Cord packing 2.5 x 235
9 Service unit
10 Hose connector G ½
11 Design shell
12 O-ring 8 x 4
13 O-ring 18.5 x 2
14 Locking screw G ½
15 Flat gasket
16 Hexagon socket head screw M6 x 16
17 Lid
18 O-ring 48.9 x 2.62
19 Condensate receiver tank
20 Flat gasket
21 Locking screw G ½
22 Cross recessed head screw M6 x 16

13 Recommended spare parts

Available sets of spare parts	Contents	Order number
Service unit	9, 12, 13	XE KA33 101 SAP no. 4012873
Service unit CO	9, 12, 13	XE KA33 103 SAP no. 4012872
Gasket kit	3, 8, 12, 13, 18	XE KA33 002 SAP no. 4012922
Design shell	11	XE KA32 011 SAP no. 4010167

14 Accessories

Available accessory sets	Contents	Order number
Mounting brackets for wall and base	24 (Mounting bracket) 25 (Washer) 26 (Hexagon socket head screw)	XZ KA33 001 SAP no. 4012883



Accessories

Available accessory sets	Contents	Order number
Connection set With manual drainage, valve for inlet with screw joint	Ball valve G½ PN25 Ball valve G¼PN10 Reducing adapter G½ - G¼ Ms Double nipple G¼ Ms	XZ KA13 003 SAP no. 2000040
Connection set With manual drainage, valves for venting line and inlet with screw joint	Ball valve G½ PN25 Ball valve G¼ PN10 Reducing adapter G½ - G¼ Ms Double nipple G¼ Ms T-piece G½ Ms nickel-plated Lock nut Rp½ Ms	XZ KA13 004 SAP no. 2000041
Outlet set With hose and installation material	Tubing piece 13.3x3.3x800 Grommet 13-G½ Ms SW24 Hose clamp 16-27/12	XZ KA12 001 SAP no. 2000046

15 Declaration of conformity

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41468 Neuss, GERMANY
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www.beko.de

EG-Konformitätserklärung

Wir erklären hiermit, dass die nachfolgend bezeichneten Produkte den Anforderungen der einschlägigen Richtlinien und technischen Normen entsprechen. Diese Erklärung bezieht sich nur auf die Produkte in dem Zustand, in dem sie von uns in Verkehr gebracht wurden. Nicht vom Hersteller angebrachte Teile und/oder nachträglich vorgenommene Eingriffe bleiben unberücksichtigt.

Produktbezeichnung:	Kondensatableiter
Modelle:	BEKOMAT 31, 32, 33
Spannungsvarianten:	24 VDC, 24 VAC, 100 VAC, 115 VAC, 200 VAC, 230 VAC
Betriebsdruckbereich:	0,8 - 16 bar(g)
Produktbeschreibung und Funktion:	Kondensatableiter zur elektronisch niveaugeregelten Ableitung von Kondensat im Druckluftnetz.

Niederspannungs-Richtlinie 2006/95/EG

Angewandte harmonisierte Normen:	EN 61010-1:2001 + Corrigendum 1:2002
Anbringungsjahr der CE-Kennzeichnung:	06 (BEKOMAT 31, 32) 09 (BEKOMAT 33)

Die Geräte mit einer Betriebsspannung von 24VDC und 24VAC fallen nicht in den Anwendungsbereich der Niederspannungs-Richtlinie.

EMV-Richtlinie 2004/108/EG

Angewandte harmonisierte Normen:	EN 55011:2007 + A2:2007, Gruppe 1, Klasse B; EN 61326-1:2006

Neuss, 09.05.2011

BEKO TECHNOLOGIES GMBH

i.V. Christian Riedel
Leiter Qualitätsmanagement

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EC Declaration of Conformity

We hereby declare that the products indicated hereafter, in the delivered performance, comply with the stipulations of the relevant standards. This declaration only refers to products in the condition in which they have been placed into circulation. Parts which have not been installed by the manufacturer and / or modifications which have been implemented subsequently remain unconsidered.

Product designation:	Condensate drain
Types:	BEKOMAT 31, 32, 33
Voltage options:	24VAC, 24VDC, 100VAC, 115VAC, 200VAC, 230VAC
Pressure options:	0.8 - 16 bar operating pressure
Product description and function:	Condensate drain for the electronically level-controlled discharge of condensate in the compressed-air system.

Low-Voltage Directive 2006/95/EC

Harmonised standards applied:	EN 61010-1:2001 + Corrigendum 1:2002
Year of CE labelling:	06 (BEKOMAT 31, 32) 09 (BEKOMAT 33)

The devices with a supply voltage of 24VDC do not come under the scope of application of the Low-Voltage Directive.

EMC Directive 2004/108/EC

Harmonised standards applied:	EN 55011:2007 + A2:2007, Group 1, Class B; EN 61326-1:2006:

Neuss, 9 May 2011

BEKO TECHNOLOGIES GMBH

p.p. Christian Riedel
Quality manager

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