Condensate Drain
Ultramat® UFM-D10
Dear customer,
Thank you for deciding in favour of the D10 condensate drain. Please read the installation and operating instructions carefully before mounting and starting up the D10, and follow our directions. Perfect functioning of the D10, and thus reliable condensate discharge, can only be guaranteed when the provisions and notes stipulated here are strictly adhered to.
| 1 | Pictograms and symbols                              | 4 |
| 2 | Safety instructions                                 | 4 |
| 3 | Proper use                                         | 5 |
| 4 | Exclusion from the scope of application            | 6 |
| 5 | Technical data                                     | 7 |
| 6 | Dimension drawing                                  | 8 |
| 7 | Function                                           | 9 |
| 8 | Installation                                       | 11 |
| 9 | Electrical installation                            | 14 |
| 10| Control and maintenance                            | 18 |
| 11| Troubleshooting and fault elimination              | 23 |
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 plant 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 D10.

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

Make sure that the D10 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.
Proper use

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 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 D10 in hazardous areas.
- Regarding the inlet screw joints, excessive tightening forces must be avoided. This applies in particular to conical screw joints.
- The D10 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 D10.
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 D10, 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 D10 in accordance with the instructions in this operating manual

3 Proper use
- The D10 is an electronically level-controlled condensate drain for compressed-air plants.
- The device is employed within the permissible performance parameters (see "Technical data").
- The D10 is able to drain condensate under operating pressure from the plant components virtually without compressed-air loss.
- For its function, the D10 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.
Exclusion from the scope of application

- For the employment in CO$_2$ plants, a D10 with a CO specification must be used.

4 Exclusion from the scope of application

- The D10 as a condensate drain *alone cannot* guarantee a defined compressed-air quality, for this purpose, other additional technical devices are required.
- D10 is **not** suitable for use in plants carrying vacuum or atmospheric ambient pressure or in ex-areas.
- The D10 must not be exposed to permanent direct solar or thermal radiation.
- The D10 must not be installed and operated in areas with an aggressive atmosphere.
- The D10 is not heatable and, therefore, not suitable for the use in areas where frost is likely to occur.
### Technical data

<table>
<thead>
<tr>
<th><strong>Technical data</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>min./max. operating pressure</strong></td>
</tr>
<tr>
<td><strong>min./max. temperature</strong></td>
</tr>
<tr>
<td><strong>Condensate inflow</strong></td>
</tr>
<tr>
<td><strong>Condensate outflow</strong></td>
</tr>
<tr>
<td><strong>Condensate</strong></td>
</tr>
<tr>
<td><strong>Housing</strong></td>
</tr>
<tr>
<td><strong>Weight (empty)</strong></td>
</tr>
</tbody>
</table>

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 incorporating the same level of testing requirements.

Max. performance for the "blue" climate zone – see also Chapter "Climate zones and performance data"

| **max. compressor performance** | 10 m³/min (350 scfm) |
| **max. refrig.-dryer performance** | 20 m³/min (700 scfm) |
| **max. filter performance** | 100 m³/min (3500 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  |
| **Connection data of the potential-free contact Switch to low signal *)** | 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 D10 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 (5) opens the outlet line to discharge the condensate (6). When the D10 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 D10. 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.
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 D10 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 pipework
Installation

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 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 D10.

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 D10, 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 D10 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 instructions:

- Only the displayed installation position of the D10 (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. 0.8 bar, max. 16 bar.
- Short pressure hose (4) fixed on a pressure-resistant pipe.
- The required minimum pressure increases by 0.1 bar per metre gradient in the discharge pipe (5).
- Discharge pipe (5) rising by max. 5 m.
- Install manifold (7) ¾" with a slope of 1%.
- Introduce 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.
<table>
<thead>
<tr>
<th>wrong</th>
<th>correct</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Wrong Diagram" /></td>
<td><img src="image2" alt="Correct Diagram" /></td>
</tr>
<tr>
<td><strong>Pressure differences!</strong></td>
<td>Each condensate accumulation point must be drained separately.</td>
</tr>
<tr>
<td><img src="image3" alt="Wrong Diagram" /></td>
<td><img src="image4" alt="Correct Diagram" /></td>
</tr>
<tr>
<td><strong>Continuous slope!</strong></td>
<td>Avoid a water pocket when installing the feed pipe</td>
</tr>
<tr>
<td><img src="image5" alt="Wrong Diagram" /></td>
<td><img src="image6" alt="Correct Diagram" /></td>
</tr>
<tr>
<td><strong>Deflector area!</strong></td>
<td>If drainage is to be carried out directly from the pipe, deflection of the air flow will be useful.</td>
</tr>
<tr>
<td><img src="image7" alt="Wrong Diagram" /></td>
<td><img src="image8" alt="Correct Diagram" /></td>
</tr>
<tr>
<td><strong>Ventilation!</strong></td>
<td>If the slope in the inlet line is not sufficient or if any other inflow problems occur, a venting line needs to be installed.</td>
</tr>
</tbody>
</table>
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 authorised 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.
4. If the potential-free contact carries voltage that is dangerous in the case of contact, a corresponding separator must also be provided, as described above.

### Terminal assignment AC version (supply voltage)

<table>
<thead>
<tr>
<th></th>
<th>KL 1</th>
<th>KL 2</th>
<th>KL 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>4</td>
<td>1</td>
</tr>
</tbody>
</table>

- 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)

<table>
<thead>
<tr>
<th></th>
<th>KL 1</th>
<th>KL 2</th>
<th>KL 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>4</td>
<td>1</td>
</tr>
</tbody>
</table>

- 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)

<table>
<thead>
<tr>
<th>KL 1</th>
<th>KL 2</th>
<th>KL 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
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</table>

+24 V neutral 0 V earth/ground normally closed 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.
Electrical installation

Electric diagram
10 Control and maintenance

Danger!
Compressed air!
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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
Control and maintenance

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

Maintenance recommendation:
Replace the service unit (9) after 9,600 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 D10 from the outlet
3. Detach D10 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 screwdriver
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 colour 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 D10 at the inlet tubing and outlet, in reverse order to disassembly
Control and maintenance

Installation of the control unit on the service unit D10:

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
# Troubleshooting and fault elimination

## 11 Troubleshooting and fault elimination

<table>
<thead>
<tr>
<th>Error indication</th>
<th>Possible reasons</th>
<th>Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>LED does not light up</td>
<td>Supply voltage incorrect  Circuit board defective</td>
<td>Check voltage on the type plate  Check the connections and the supply voltage  Check the circuit boards for possible damage</td>
</tr>
<tr>
<td>Test button pressed, but no condensate discharge</td>
<td>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</td>
<td>Check feed and discharge pipe  Check whether or not the valve opens audibly (press the test button several times for &gt; 2 seconds)  Check the circuit board for possible damage  Check the operating pressure</td>
</tr>
<tr>
<td>Condensate discharge only when the test button is pressed</td>
<td>Feed pipe without sufficient slope  Cross section not large enough  Condensate accumulation too high (surge)  Service unit extremely dirty</td>
<td>Install feed pipe with a slope  Replace the service unit</td>
</tr>
<tr>
<td>Device blows off continuously</td>
<td>Service unit defective or dirty</td>
<td>Replace the service unit</td>
</tr>
<tr>
<td>The device is not tight</td>
<td>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</td>
<td>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</td>
</tr>
</tbody>
</table>