Operating Instructions

Condensate Drain

Ultramat® UFM-D03

Donaldson Ultrafilter

Original instructions in German

R02 / 01.04.2011

dear Customer,

Thank you for choosing the D03 condensate drain unit. Before installing and commissioning the D03 unit, please read the installation and operating instructions carefully and observe the instructions contained therein. Only strict compliance with the regulations and instructions given in this manual guarantees trouble-free operation of the D03 unit and reliable condensate discharge.

EC Declaration of Conformity

We hereby declare that the products specified below, in the version delivered by us, conform to the requirements of the relevant standards. This declaration applies only to the products in the state in which they were placed on the market. It does not apply to parts installed by anyone other than the manufacturer or to modifications made subsequently.

Product: UFM

Manufacturer: Donaldson Filtration Deutschland GmbH

Büssingstrasse 1, D – 42781 Haan

Product description and function: Electronically controlled, level-dependent condensate drain for use in compressed air systems.

Model	Working pressure (bar)	24 VDC	115 VAC	230 VAC
UFM-D03	min. 0.8 / max. 16	X	X	X
UFM-D05	min. 0.8 / max. 16	X	X	X
UFM-D10	min. 0.8 / max. 16	X	X	X

Low Voltage Directive 2006/95/EC

Standards applied: EN 61010-1:2001 + Corrigendum 1:2002

Year of CE marking: 11

Devices supplied with 24 VDC are not covered by the scope of the Low Voltage Directive.

EMC Directive 2004/108/EC

Standards applied: EN 55011:2007 + A2:2007, Group 1, Class B

EN 61326-1:2006, containing: IEC 61000-4-2:2008, IEC 61000-4-3:2006 + A1:2007, IEC 61000-4-4:2004, IEC 61000-4-5:2005 (AC supply only), IEC 61000-4-6:2008, IEC 61000-4-11:2004 (AC supply only)

Haan, 15.03.2011 — Donaldson Filtration Deutschland GmbH

P. Schaaf (Plant Manager), M. Pohlmann (Quality Representative)

Table of Contents

1. Pictograms and symbols
   - Follow the installation and operating instructions.
   - Follow the installation and operating instructions (on the nameplate).
   - General hazard symbol (danger, warning, caution).
   - General hazard symbol (danger, warning, caution) — mains voltage and live parts.

2. Safety instructions

Check that this manual corresponds to the type of device.

All instructions given in this operating manual must be observed. The manual contains fundamental information required for installation, operation and maintenance of the device. Therefore, the installer and the operator/qualified personnel must read this manual carefully before installation, commissioning and maintenance.

The operating instructions must be available at all times at the location where the D03 unit is in use.

In addition to the instructions in this manual, applicable local or national regulations must also be observed.

Ensure that the D03 unit is operated only within the permissible limits specified on the nameplate. Otherwise, there is a risk of personal injury, property damage, and operating malfunctions.

> **DANGER — Compressed air!**
> Contact with rapidly or suddenly escaping compressed air, or with burst and/or unsecured parts of the device, can cause serious injury or death.

Instructions:

- Do not exceed the maximum working pressure (see nameplate).
- Maintenance work may only be carried out when the unit is depressurized (pressure equal to zero).
- Use only pressure-resistant, non-crushable materials for installation.
- The inlet line must be permanently piped. The outlet line: a short pressure-resistant flexible hose fitted on a non-crushable pipe.
- Prevent persons or objects from coming into contact with condensate or escaping compressed air.

DANGER — Mains voltage!

Contact with uninsulated live parts of the device can cause electric shock resulting in injury or death.

Instructions:

- During electrical installation, observe all applicable regulations (e.g. VDE 0100 / IEC 60364).
- Maintenance work may only be carried out when the device is disconnected from power (voltage equal to zero).
- The removed control panel has no IP protection rating.
- All work on the electrical installation of the device may only be carried out by authorized qualified personnel.

Further safety instructions:

- During installation and operation of the device, national regulations and safety instructions must also be observed.
- The D03 unit must not be used in explosion-hazard areas.
- Do not apply excessive tightening forces to the screw connections at the inlet. This applies in particular to conical screw connections.
- The D03 unit operates only when the power supply is connected.
- The test button must not be used for continuous drainage of the unit.
- Use only original spare parts. Only then is trouble-free operation of the device guaranteed.

Additional instructions:

- The removed control panel has no IP protection rating.
- During installation, use the wrench flats on the inlet for counter-holding (wrench size SW27).
- The service unit must not be disassembled into individual parts.

CAUTION — Malfunction!

Incorrect installation and insufficient maintenance may lead to malfunctions of the D03 unit. Non-discharged condensate can cause damage to the installation and to downstream production processes.

Instructions:

- Reliable and safe condensate discharge directly optimizes compressed air quality.
- To avoid damage and failure, the following must be strictly observed:
- intended use of the D03 unit and its operating parameters relating to the specific application (see section "Intended use of the device");
- the installation and operating instructions contained in this manual;

- regular maintenance and inspection of the D03 unit in accordance with the instructions in this manual.

3. Intended use of the device

- The D03 is a condensate drain with electronically regulated level, designed for operation in compressed air systems.
- The unit may be used only within the permissible operating parameters (see Technical data).
- The D03 discharges condensate from individual components of the system at working pressure with virtually no compressed air loss.
- The D03 begins operation once the power supply and working pressure are present (see Technical data).
- When the unit is used in installations with increased compressed-air quality requirements (food industry, medical technology, laboratory equipment, special processes, etc.), the user must decide on additional regulations regarding compressed-air quality monitoring. These have an impact on the safety of downstream processes and help prevent personal injury and material damage.
- It is the user's responsibility to ensure the conditions specified in the instructions are maintained throughout the entire period of operation of the device.

4. Exclusions from the scope of application

- The D03, as a condensate drain unit, cannot by itself guarantee a defined compressed air quality. Additional equipment must be used for this purpose.
- The D03 is not suitable for use in vacuum systems or in systems at atmospheric pressure, nor in explosion-hazard areas.
- The D03 must not be exposed to continuous direct sunlight or heat radiation.
- The D03 unit must not be installed or operated in areas with aggressive atmospheres.
- The D03 has no heating and is therefore not suitable for operation in areas where frost may occur.
- The D03 unit is not suitable for CO2 installations.

5. Technical data

min./max. working pressure	0.8...16 bar (12...230 psi)
min./max. temperature	+1...+60 °C (+34...+140 °F)
condensate inlet	G ½ (½") diameter; max. thread depth 13.5 mm (½")
condensate outlet	G ¼ (¼") Ø 8...10 mm hose connector
condensate	oily + oil-free
housing	Aluminium + fibreglass-reinforced plastic
weight (empty unit)	0.8 kg (1.8 lbs)

The product has been tested in accordance with CAN/CSA-C22.2 No. 61010-1, second edition, including Amendment No. 1 or a later version of this standard, using the same level of test requirements.

Max. capacity for the blue climate zone — see also the section "Climate zones and capacity":

max. compressor capacity	2.5 m³/min (87.5 scfm)
max. dryer capacity	5 m³/min (175 scfm)
max. filter capacity	25 m³/min (875 scfm)

Electrical data:

operating voltage (see nameplate)	230 / 115 / ... / 24 VAC ± 10 %, 50...60 Hz / 24 VDC ± 10 %
power consumption	P < 3.0 VA (W)
fuse protection	AC: 1 A time-lag fuse recommended; DC: 1 A time-lag fuse required
recommended cable sheath diameter	Ø 5.8...8.5 mm (0.23"...0.34")
recommended conductor cross-section	3 x 0.75...1.5 mm² (AWG 18...20)
recommended stripped cable length	PE: approx. 60 mm; L/N: approx. 50 mm
recommended wire-end ferrule length	~ 6 mm (~ 0.24 inch)
protection class	IP 54

VAC = V alternating current; VDC = V direct current

6. Dimensions

[Refer to the original document for the dimensional drawing of the UFM-D03.]

7. Operating principle

Condensate flows into the D03 unit through the inlet line and accumulates in the housing.

A capacitive sensor continuously detects the filling level of the housing. As soon as the container is completely filled, the sensor transmits a signal to the electronic control system.

The pilot valve is activated. The diaphragm opens the outlet line to empty the condensate container.

After the D03 unit has been drained, the outlet line is reliably closed in time, preventing unnecessary compressed air losses.

When the operating voltage is supplied to the unit, the green Power LED lights up. The unit is ready for operation and energized.

If a disturbance occurs in condensate drainage, the valve opens every 3 seconds to automatically clear the fault.

Valve function test (manual drain): Press the button for at least 2 seconds. If the button is pressed longer, the valve starts to operate in pulsed mode. The valve must not be used for continuous drainage.

8. Installation

DANGER — Compressed air!

Contact with rapidly or suddenly escaping compressed air, or with burst and/or unsecured parts of the device, can cause serious injury or death.

Instructions:

- Do not exceed the maximum working pressure (see nameplate).
- Maintenance work may only be carried out when the unit is depressurized.
- Use only pressure-resistant, non-crushable materials for installation.
- The inlet line must be permanently piped. The outlet: a short pressure-resistant flexible hose fitted on a non-crushable pipe.
- Prevent persons or objects from coming into contact with condensate or escaping compressed air.

CAUTION — Malfunction!

Incorrect installation and insufficient maintenance may lead to malfunctions of the D03 unit. Non-discharged condensate can cause damage to the installation and to downstream production processes.

Note:

All hazard and warning instructions must be strictly observed. At the installation site, fire protection and occupational safety regulations must also be observed. Use only suitable tools and materials in proper working condition. Do not use aggressive cleaning agents. Please note that condensate may contain aggressive and health-hazardous substances. Therefore, avoid skin contact with condensate. Condensate is a waste material subject to disposal. Collect it in appropriate containers and dispose of or treat it properly.

Installation guidelines:

- Only the mounting position shown is permitted for the D03 unit (3). The unit must not be mounted in a horizontal or inclined position.
- Inlet pipe (1) and ball valve (2): at least G½.
- No filter or strainer may be installed in the inlet.
- Inlet slope: > 1%.
- Use only ball valves (2).
- Working pressure: min. 0.8 bar, max. 16 bar.
- Short pressure-resistant flexible hose (4) fitted on a non-crushable pipe.
- For each metre of rise in the outlet line (5), the required minimum pressure increases by 0.1 bar.
- The outlet line (5) may rise by a maximum of 5 m.
- The condensate collection line (7) must be laid with a slope of ½", which is at least 1%.
- The outlet line (6) must be inserted into the collection line (7) from above.

- Before start-up, always carry out a leak test and check correct engagement of the control panel.

Installation — Correct vs. Incorrect:
Pressure difference!

Each condensate accumulation point must be drained separately.

Continuous slope!

Water pockets must not form in the piped inlet lines.

Deflector surface!

If drainage is to take place directly from the pipe, changing the direction of the air stream is recommended.

Venting!

In case of insufficient inlet slope or other problems, install an air equalization line.

9. Electrical installation

> **DANGER — Mains voltage!**
> Contact with uninsulated live parts of the device can cause electric shock resulting in injury or death.

Instructions:

- During electrical installation, observe all applicable regulations (e.g. VDE 0100 / IEC 60364).
- Maintenance work may only be carried out when the device is disconnected from power.
- The removed control panel has no IP protection rating.
- All work on the electrical installation of the device may only be carried out by authorized qualified personnel.

Instructions:

1. Read the permissible mains voltage on the nameplate and strictly comply with it.
2. For AC supply, an easily accessible power-disconnection device (plug or switch) must be provided nearby.
3. For DC supply, use only safe voltage and a PELV switch in accordance with IEC 60364-4-41.
4. Carry out installation in accordance with VDE 0100 / IEC 60364.
5. Ensure correct terminal assignment.
6. Do not install while powered.
7. Unscrew screw (1) and remove the upper part of the cover (2).
8. Unscrew the cable gland (3), remove the sealing plug (if present), and feed the supply cable (4) through.
9. Connect the cable (4) to terminals KL1 (1.1 ... 1.3) (5).
10. Route the cables as per the diagram (see also terminal assignment).
11. Tighten the cable gland (3) slightly to form a seal.
12. Refit the upper part of the cover (2) and tighten the screw (1).
13. There must be no potential difference between the ground connection and the mains. Otherwise, equipotential bonding must be carried out in accordance with IEC 60364 / VDE 0100.

Terminal assignment — AC version:

KL 1	1.1	1.2	1.3
	earth / ground	neutral / phase	phase / neutral

- KL 1.1 — mains supply PE
- KL 1.2 — mains supply N or L
- KL 1.3 — mains supply L or N

L = line conductor (black); N = neutral conductor (blue); PE = protective earth conductor (green/yellow)

Terminal assignment — DC version:

KL 1	1.1	1.2	1.3
	earth / ground	neutral / 0 V	+ 24 V

- KL 1.1 — mains supply PE
- KL 1.2 — 0 V
- KL 1.3 — + 24 V

Note:
There is no galvanic isolation between the connection terminals KL1 of 24 VDC units and the housing or the condensate connections. The 24 VDC voltage must meet the requirements for protective extra-low voltage (e.g. EN 60950). The cable gland must be tightened slightly to form a seal.

Electrical wiring diagram:
[Refer to the original document for the electrical wiring diagram.]

10. Inspection and maintenance

DANGER — Compressed air!
Contact with rapidly or suddenly escaping compressed air, or with burst and/or unsecured parts of the device, can cause serious injury or death.

DANGER — Mains voltage!
Contact with uninsulated live parts of the device can cause electric shock resulting in injury or death.

CAUTION — Malfunction!
Incorrect installation and insufficient maintenance may lead to malfunctions of the D03 unit. Non-discharged condensate can cause damage to the installation and to downstream production processes.

Note:
All hazard and warning instructions must be strictly observed. At the installation site, fire protection and occupational safety regulations must also be observed. Use only suitable tools and materials in proper working condition. Do not use aggressive cleaning agents. Condensate may contain aggressive and health-hazardous substances — avoid skin contact. Condensate is a waste material subject to disposal.

Maintenance recommendations:

After 8,000 operating hours or no later than 2 years, the service unit must be replaced with a new one.

14. Press the snap hook and remove the control panel (1).
15. Detach (2) from the outlet.
16. Unscrew the cover (if present) using a screwdriver (10).
17. Disconnect the service unit from the piping at the inlet by unscrewing the union nut (6),
18. or the screws (7) of the angle connector,
19. or the screws (8) of the intermediate adapter (9). Pull the adapter (9) downward out of the service unit.
20. Check that the new service unit matches the control panel (1) (type designation and colour of the snap hook (2)).
21. Installation of the new service unit is carried out in reverse order to disassembly. Observe the tightening torque of the screws (7, 8): 4...5 Nm.

Mounting the control panel on the service unit:

22. Check that the service unit matches the control panel (1) (type designation and colour of the snap hook).
23. Check that the sensor wall (14) with spring contacts is clean, dry and free of foreign objects.
24. Insert the sensor into the sensor wall (14).
25. Attach the hook (15) of the control panel to the sensor wall.
26. Press the control panel onto the service unit until it engages.

Start-up after maintenance work:

Before start-up, always carry out:

- a leak test of the screw connections at the inlet;
- a check of the electrical connections;
- a check of the correct engagement of the control panel.

11. Troubleshooting

Fault	Possible causes	Corrective actions
LED does not light up	Incorrect power supply. Damaged circuit board.	Check voltage value on nameplate. Check connections and operating voltage. Check the circuit board for possible damage.
Test button pressed but condensate is not discharged	Inlet and/or outlet line blocked or cut off. Wear. Damaged circuit board. Damaged service unit. Pressure dropped below the minimum value. Pressure exceeded the maximum value.	Check inlet and outlet lines. Check whether the valve opening can be heard (press the test button several times > 2 s). Check the circuit board for possible damage. Check working pressure.
Condensate is discharged only when the test button is pressed	Inlet line has insufficient slope. Cross-section too small. Excessive condensate	Lay the inlet line with a slope. Replace the service unit.

	accumulation (surge). Heavily contaminated service unit.	
The unit blows off continuously	Service unit is damaged or contaminated.	Replace the service unit.

Manufacturer
Donaldson Filtration Deutschland GmbH

Industrial Filtration Solutions

Büssingstrasse 1

D-42781 Haan, Germany

www.donaldson.com

IOM_UFM-D03_PL / R02 / 2011/04