



# Operating Manual Condensate Drain CDF140NC

Version: 10/2015/DE



## 1. General Information

### 1.1 Manufacturer

FST GmbH

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Sales office: Im Teelbruch 106 – D-45219 Essen

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***! For any questions about the product, please contact the sales office!***

In case of questions about the product, please specify the type. This information can be found on the type plate over the condensate drain. (→page 5)

### 1.2 Warranty notes

For warranty information, please refer to our "General Terms of Sale and Delivery".

(→ [www.fstweb.de](http://www.fstweb.de))

In the following cases the warranty shall be void:

- If the safety notes and instructions of this operating manual and of the additional documents are not observed.
- If the condensate drain is operated or maintained by personnel who do not have the required qualifications. (→ see "Target group": (→ see "target group" :Page 2)
- If the condensate drain is used for anything other than its intended use. (→ Page5)
- If aggressive substances in the compressed air or ambient air cause damage to the condensate drain.
- If parts other than genuine parts of the manufacturer have been used for maintenance and repair.
- If the condensate drain is operated although defects are evident.
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### 1.3 About this operating manual

This operating manual contains all the technical information required for installation, operation, maintenance and disposal of the condensate drain.

#### Target group

This operating manual is directed to all persons working on and with the condensate drain. We point out that these persons have to be qualified personnel who, because of their qualification and experience, are familiar with handling compressed air systems and electrical systems. If you are not experienced in using these systems, please ask the relevant experts for help. We highly recommend that commissioning and maintenance be carried out by the manufacturer or one of the authorised service partners.

#### Using the operating manual

Please read the operating manual and the additional documents carefully prior to installation and follow the notes and instructions. Safe and proper operation of the condensate drain can only be guaranteed if the instructions and notes are observed. The safety notes must be observed in particular.

The operating manual must be kept in the vicinity of the condensate drain and must be easily accessible.

When selling or hiring out the condensate drain, also provide this operating manual.

The manufacturer accepts no liability for damages resulting from disregard of the operating manual.

All the information in this operating manual is valid at the time the manual is published. Due to component or workflow modifications at any time affecting condensate drain maintenance, the latest information should be available prior to maintenance work.

## Signs and symbols used

- Boxes are used for bulleted lists.
- 1) Enumerated lists point out that the working steps are to be carried out in a specified order.
- Cross references refer to information on a different page or in a different document.



### Note!

This symbol refers to matters that should be given special attention. Observing the notes helps to ensure safe handling of the product.



### Tips and hints!

This symbol refers to matters that should be given special attention. Observing these advisory notes helps to ensure particular efficient operation of the product.



### CAUTION !

This symbol indicates a possible harmful situation. When not avoiding this situation, there is a danger of injury or damage to the product or to adjacent system components.



### WARNING !

This symbol indicates a possible dangerous situation. When not avoiding this situation, there is a danger of serious injury or death.



### DANGER !

This symbol indicates an immediate impending danger. Not avoiding this danger results in serious injury or death.

## 2. Safety notes

The condensate drain has been built according to state-of-the-art technology and recognised safety rules. However, there is a risk of danger that every person working with the condensate drain must be aware of. In particular, improper handling of compressed air and electricity may result in serious injury or death. If you are not experienced in using these systems, please ask the relevant experts for help.



### **DANGER ! – Overpressure (1)**

The condensate drain is under pressure.

Suddenly escaping compressed air may result in serious injury.

Do not carry out mechanical work on the condensate drain as long as the condensate drain is under pressure.



### **DANGER ! – Overload (2)**

The condensate drain must only be operated with compressed air within the maximum allowable operating conditions. The operating conditions are defined on the type plate (→ and page 5).

Exceeding the maximum allowable operating conditions may result in serious injury or death.

It is the duty of the operator to ensure that the connected pressure source is safe-guarded such that the maximum allowable operating pressure (PS) and the maximum allowable temperature (TS) are not exceeded.

Please also refer to section "Intended use" (→ page 5).



### **WARNING ! – Risk of slipping (3)**

Ambient moisture may condense on the outer surface of the condensate drain and drip on the floor. Condensate and oil may flow out of the drain onto the ground when opening the manual drain valve

Such liquids may cause a very slippery floor and may result in serious fall injury.

Immediately remove liquids properly from the floor.



### **DANGER ! – Damage (4)**

Damage on the condensate drain may result in unpredictable danger.

Operating a damaged condensate drain may result in serious injury or death.

Never operate a damaged condensate drain.



### **DANGER ! – Burst of components through impact of external force (5)**

The condensate drain is not designed to bear external forces. The additional stress may result in bursting of the condensate drain.

Burst of pressurised components may result in serious injury or death.

Piping connected to the condensate drain must be supported. External loads or stress must not be introduced into the connections of the condensate drain.



### **Note!**

- In order to prevent personal injury or damage, the safety notes must be observed when using this condensate drain.
- Observe the specific safety notes in the relevant chapters.
- Observe the legal guidelines and the accident prevention regulations.
- Observe the safety notes of the local site regulations.

## 2.1 Signs and instructions

The type plates show important information. Make sure that the type plates are always clearly readable.

## 2.2 Danger zones at the condensate drain



Description of Danger → see page 3+4

## 3. Description of application

Large quantities of liquid water are generated in compressed air system by condensation of water vapour. The liquid water is often accompanied by compressor oil. This so-called “condensate” is separated from the air flow in particular downstream of compressed air coolers, in pipe systems and in compressed air purification equipment. The condensate has to be drained from the compressed air flow in order to avoid damage in downstream equipment/consumers.

The condensate drain removes the condensate from the compressed air system. The condensate drain drains liquids (water and oil) from the compressed air system and transfers them on to a pressureless condensate collection vessel or a downstream condensate processing system, respectively.



### Disposal of condensate

Most condensates are polluted with hazardous substances and they form stable oil-water mixtures.

Such condensate must not be drained directly into the municipal wastewater system.

The manufacturer of the condensate drain offers condensate management system for the purification of the condensate. Such systems clean the condensate to a degree that allows disposal into the municipal wastewater system.

### 3.1 Intended use

The condensate is exclusively designed for the drainage of condensate from compressed air systems. The condensate shall be free of larger amounts of foam, pasty oil-water-emulsions, aggressive substances and larger dirt particles that might block the valve. Please contact the manufacturer before you use the condensate drain with other gasses than compressed air. Special safety regulations might have to be considered.

The condensate drain is designed work in an environment with the following conditions:

- indoors (i.e. Protected against weather impact and frost free)
- No vibration via floor or connected piping
- Ambient air must be free from aggressive and corrosive substances
- Free from dangers due to explosive atmospheres inside and outside the condensate drain. (The standard version does not comply with ATEX.)

# Technical product description

The condensate drain must only be operated with compressed air within the maximum allowable operating conditions. The maximum allowable operating conditions are specified on the type plate. (→Page 5)

Modifications to the condensate drain or use of third-party parts may cause unpredictable danger and damage. These measures must only be carried out after previous check and approval of the manufacturer. Only use genuine spare parts of the manufacturer.

Any other use is considered improper and therefore not permissible. The manufacturer accepts no liability caused by improper use.

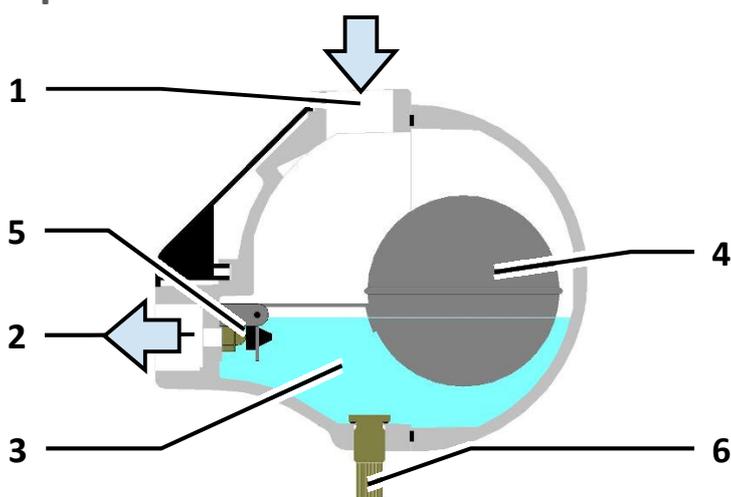
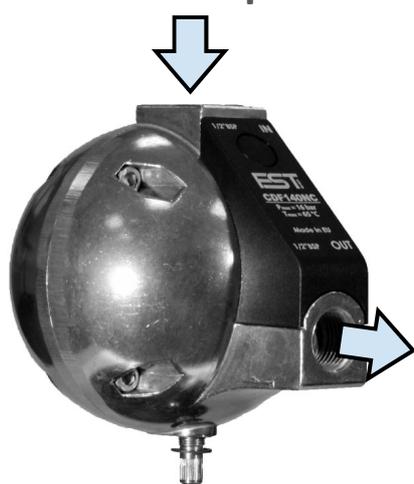
## 3.2 Technical data

Condensate drain	Nominal compressed air volume flow	Nominal condensate draining capacity	Connection Inlet	Connection outlet	weight	height	width	depth
	V [m <sup>3</sup> /h]*	M [Liter/h]*			[kg]	[mm]	[mm]	[mm]
<b>CDF140NC</b>	20.000	175	G 1/2	G 1/2	0,6	130	107	132

\* = typical compressed air flow that is accompanied by app. the amount of condensate mentioned in the next column of the table. The compressed air flow is refers to the standard conditions of 1bar(a) and 20°C as well as to the following operating conditions: compressed air suction conditions of 25°C at 60% rH and compressed air conditions of 7 bar operating overpressure and 35°C inlet temperature

Classification acc. to PED 97/23/EG	Art.3 Par.3
Fluid group	2
Min. / max. allowable pressure (PS)	1,5 to 16 bar
Min. / max. allowable temperature (TS)	+2 to +65°C

## 4. Technical product description



- 1 Condensate inlet
- 2 Condensate outlet
- 3 Condensate receiver

- 4 Float ball
- 5 Valve with valve cone and valve seat
- 6 manual drain valve

### 4.1 Function description

The condensate flows out of the compressed air system through the condensate inlet (1) into the housing of the condensate drain. The housing serves as condensate receiver (3). The liquid level rises with more condensate flowing into the condensate receiver. The rising liquid level lifts up the float ball (4). Via a lever the valve (5) is actuated by the float ball. Now the operation pressure of the compressed air presses the condensate through the hole in the valve seat and on to the condensate outlet (2). The liquid level in the condensate receiver drops again while condensate is flowing out through the valve. Gravity moves the float ball downward and the valve is closed again. This function is automatic and does not require any electrical or pneumatic auxiliary energy.

A separate manual drain valve (6) is fitted to the condensate drain housing. The condensate drain can be depressurised via this manual drain valve or condensate can be drained manually.

### 5. Fault analysis table

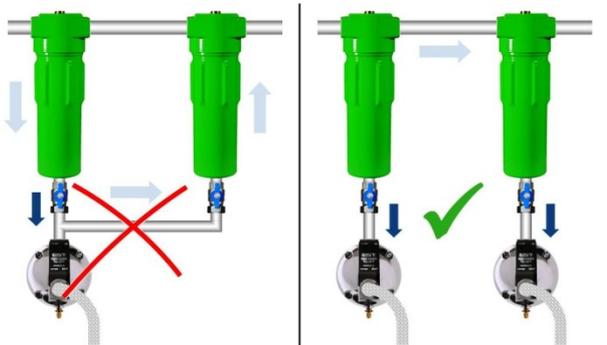
Fault	Cause	Recommended measure
The condensate drain does not drain condensate	<ul style="list-style-type: none"> <li>■ The operation pressure is too low (<math>P &lt; 1,5\text{bar}</math>)</li> <li>■ A shut off valve between drain connection and condensate drain is closed</li> <li>■ A strainer, which is mounted upstream of the condensate drain, is blocked</li> <li>■ The piping connected to the condensate drain is blocked</li> <li>■ Pressure on the downstream piping or insufficient differential pressure between condensate inlet and outlet (<math>\Delta P &lt; 1,5\text{ bar ?}</math>)</li> <li>■ The condensate drain is not mounted properly:                             <ul style="list-style-type: none"> <li>○ No balance line</li> <li>○ Air bubble trapped in the piping and condensate drain due to insufficient slope</li> <li>○ Pipe size too small</li> <li>○ Pipe blocked</li> </ul> </li> <li>■ Condensate contains much dirt</li> <li>■ Foam in the condensate receiver blocks off new condensate</li> </ul>	<ul style="list-style-type: none"> <li>■ Compare the actual operation conditions with the specified values and change accordingly.</li> <li>■ Open the shut off valve (if any)</li> <li>■ Clean the strainer (if any)</li> <li>■ Check the piping fitted to the condensate outlet for free flow</li> <li>■ Ensure that the downstream piping remains is near pressure less state</li> <li>■ Check the installation (→ page 8)</li> <li>■ Clean the condensate drain</li> <li>■ Check for accumulation of foam. Drain the foam regularly via the manual drain valve.</li> </ul>
Compressed air permanently blows off	<ul style="list-style-type: none"> <li>■ The valve cone is defective or blocked by dirt</li> <li>■ The float ball is blocked or dirt obstructs the downward movement of the float ball.</li> <li>■ The condensate drain is mounted incorrectly</li> </ul>	<ul style="list-style-type: none"> <li>■ Maintain the condensate drain</li> <li>■ Install the condensate drain in upright position with the condensate inlet facing up.</li> </ul>

## 6. Installation

Correct installation is the essential precondition for the safe and untroubled operation of the condensate drain. Please observe the following for the installation.

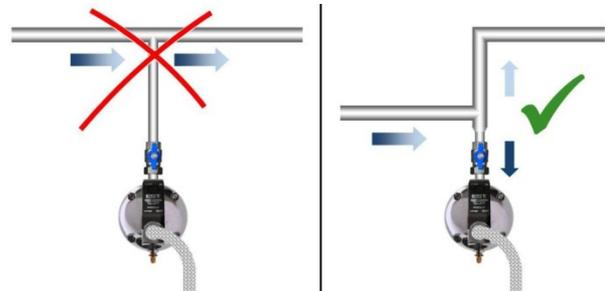
- The condensate shall be able to flow into the condensate receiver solely driven by gravity. We recommend to size the upstream piping with a cross-section of min. DN15.
- The condensate drain shall be fitted with a shut off valve with which the condensate drain can be separated from the pressurised pipe network. We recommend to use valves with full bore to allow for unhindered flow of condensate into the condensate drain.
- Make sure that the condensate drain and the connected piping is completely depressurised. In case that the compressed air network needs to stay pressurised please ensure that the shut of valve is secured against unintentional opening!
- The piping connected to condensate inlet and outlet must be suitable for the max. possible operation pressure. Even the usually pressureless downstream condensate piping might be pressurised up to full operation pressure when blocked.
- Any vibrations or pulsation must not be transmitted to the condensate drain via the piping. If required, install compensators or pulsation absorbers in the pipelines to be connected.
- The condensate drain shall be installed in vertical position with the condensate inlet facing up and the condensate outlet facing sideward. The max. allowable deviation from vertical is 5°.
- When checking the installation for leaks the maximum allowable operating pressure of the condensate drain must not be exceeded. (→ See specification on the type plate, page 5)

Please note:



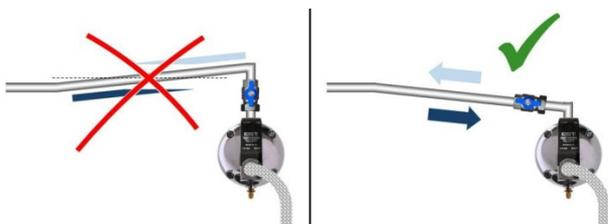
### Avoid bypass piping

Each drain point has to be fitted with an individual condensate drain.



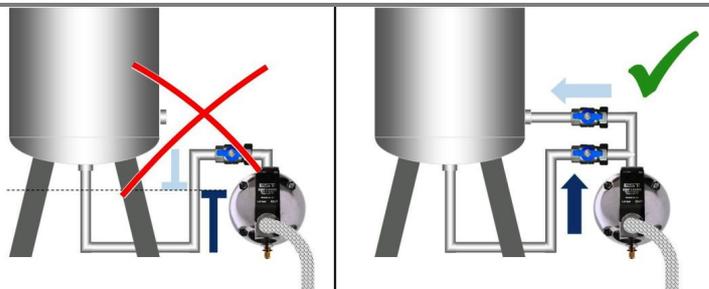
### Avoid condensate entrainment

The condensate shall not be blown past the drain point by the compressed air flow.



### Avoid air bubbles

Install the upstream piping with sufficient slope to allow for condensate to enter and air to escape from the condensate drain.



### Install a balance line

A balance line has to be installed when the upstream piping cannot be installed with sufficient slope.

## 7. Commissioning

After installation the condensate drain can be pressurised and is ready for operation. Perform the following actions in the listed order.



### CAUTION ! – Pressure blows and overload

Rapid opening of the valves may cause pressure blows and increased flow rates in the condensate drain. Pressure blows and increased flow rates may lead to damages of the condensate drain.

Open the valves **very slowly** and make sure that the flow noise does not become too loud. Pay special attention when opening valves that can be opened rapidly by means of a pivoting movement.

Pressurise the condensate drain as follows:

- 1) Check the installation of the condensate drain.
- 2) Check all components are tightened properly.
- 3) Make sure the compressed air system upstream of the condensate drain inlet is under pressure. If necessary, the compressor must be started.
- 4) Open the valve upstream of the condensate drain inlet **very slowly**.
- 5) Check the system for leaks during pressurisation. In the event of leaks, pressurisation must be stopped and the leaks must be repaired. To repair the leaks the condensate drain has to be depressurised again. (→ Page 9)
- 6) If flow noise and a pressure increase is no longer present when further opening the valve, it can be opened completely.
- 7) Now the condensate drain is ready to operate.

## 8. Decommissioning

- 1) Close the shut off valve upstream of the condensate drain.
- 2) Open the manual drain valve in order to depressurise the condensate drain. Leave the manual drain valve open until no more flow noise can be heard. Leave the manual drain valve open.  
Attention: the manual drain valve of the condensate drain is not designed to depressurise the surrounding compressed air system. Install additional drain valves for depressurising the compressed air system if necessary.  
Attention: Some residual pressure might remain inside the condensate drain.
- 3) Now the condensate drain is decommissioned.



## 9. Maintenance and repair



### CAUTION ! – Qualification and experience required

Persons working on and with the condensate drain have to be qualified personnel who, because of their qualification and experience, are familiar with handling compressed air systems. If you are not experienced in using these systems, please ask the relevant experts for help. We highly recommend that commissioning and maintenance shall be carried out by the manufacturer or one of the authorised service partners.

Please observe the following requirements for maintenance:

- Observe the notes in section "Intended use". (→ Page 5)
- Observe the "Safety notes" and the "General safety notes" in particular. (→ Pages 4, 5)
- Provide the required spare parts. Only use genuine spare parts of the manufacturer. The manufacture provides prepared spare part packets. (→ Page 2)
- Maintenance must only be carried out if the condensate drain is depressurised. Decommission the condensate drain (→page 9) and remove the drain from the place of installation.

Please observe the following when completing maintenance work:

- Make sure that all connections and screwed joints are tight and sealed.
- Carry out a leak test.
- Commission the condensate drain as described on → page 9 **Fehler! Textmarke nicht definiert..**

### 9.1 Regular maintenance intervals

The following table gives an overview of routine maintenance tasks. The required activities are described on the following pages.

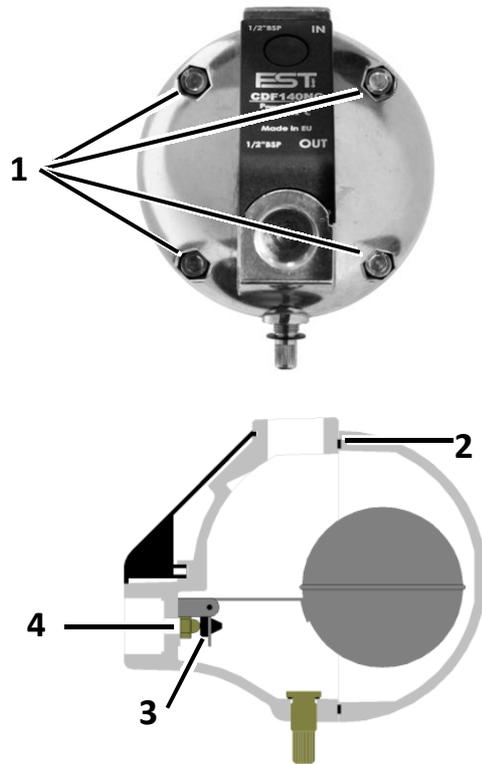
Component	Maintenance activity	Daily or weekly	Every year	See page
Condensate drain	Visual check and function monitoring	■		10
Condensate drain	Exchange spare parts and clean condensate drain		■*	11
Condensate drain	clean		When required	
* Service-Kit SK-CDF140NC				

#### 9.1.1 Visual check and function monitoring

- 1) Check the condensate drain for external damage and leakage
- 2) Open the manual drain valve of the condensate drain and check the amount of condensate that is drained. After short time compressed air should exhaust from the manual drain valve.
  - The condensate drain is in good condition when only few condensate is drained until compressed air exhausts from the manual drain valve.
  - The condensate drain is troubled when large amounts of condensate (> 350ml) leave the condensate drain before compressed air exhausts from the manual drain valve.

## 9.1.2 Exchange spare parts and clean condensate drain

- 1) Remove the four bolts (1) from the housing and take off the back part of the housing.
- 2) Remove the seal (2) from the housing
- 3) Remove the valve cone (3)
- 4) Clean the condensate drain
- 5) Check the hole in the valve seat (4) for free passage.
- 6) Install a new valve cone (3).
- 7) Install a new seal (2)
- 8) Install the back part of the housing and tighten the four bolts (1).



### 10. Appendix

#### 10.1 Manufacturer's declaration

## Manufacturer's Declaration

Herewith we declare that the below mentioned products in their conception and design in which we placed them on the market comply with the standards and directives mentioned below.

<b>Manufacturer/authorised representative:</b>	FST GmbH Weiherdamm 17 57250 Netphen, Germany
<b>Description of the assembly:</b>	Condensate drain Type CDF140NC
<b>Description of the pressure equipment constituting the assembly:</b>	The condensate drain is described in the above operating manual in more detail.
<b>Harmonised standards applied:</b>	DIN EN ISO 12100
<b>Other European Commission directives applied:</b>	97/23/EC annex I

In case changes are made to the product without prior consultation and written approval of the manufacturer this declaration will become void.

Signature:



22.10.2015, Norbert Hannen, General Manager