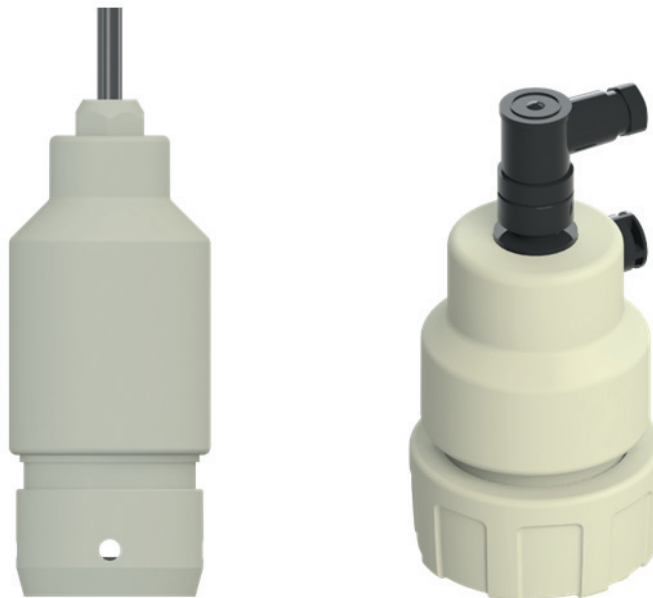


# Hydrostatic filling level sensor

Original operating manual

Pump series  
HFT C2 Compact,  
HFT C2 Flex (hanging sensor)



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We reserve the right to make  
technical changes.

Read carefully before use.  
Save for future use.



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# 1 About this document

This manual

- is part of the equipment
- applies to all series referred to
- describes safe and proper operation during all operating phases

## 1.1 Target groups

### Operating company

- Responsibilities:
  - Always keep this manual accessible where the device is used on the system.
  - Ensure that employees read and observe this document, particularly the safety instructions and warnings, and the documents which also apply.
  - Observe any additional country-specific rules and regulations that relate to the system.

### Qualified personnel, fitter








- Mechanics qualification:
  - Qualified employees with additional training for fitting the respective pipework.
- Electrical qualification:
  - Qualified electrician
- Transport qualification:
  - Qualified transport specialist
- Responsibility:
  - Read, observe and follow this manual and the other applicable documents, especially all safety instructions and warnings.

## 1.2 Other applicable documents

To download: <b>Resistance lists</b> Resistance of materials used to chemicals  <a href="http://www.asv-stuebbe.de/pdf_resistance/300051.pdf">www.asv-stuebbe.de/pdf_resistance/300051.pdf</a>	
 To download: <b>Data sheet</b> Technical specifications, conditions of operation  <a href="http://www.asv-stuebbe.de/pdf_datasheets/301149.pdf">www.asv-stuebbe.de/pdf_datasheets/301149.pdf</a>	
To download: <b>CE declaration of conformity</b> Conformity with standards  <a href="http://www.asv-stuebbe.de/pdf_DOC/301192.pdf">www.asv-stuebbe.de/pdf_DOC/301192.pdf</a>	


Tab. 1 Other application documents, purpose and where found

## 1.3 Warnings and symbols

Symbol	Meaning
	<ul style="list-style-type: none"> <li>• Immediate acute risk</li> <li>• Death, serious bodily harm</li> </ul>
	<ul style="list-style-type: none"> <li>• Potentially acute risk</li> <li>• Death, serious bodily harm</li> </ul>
	<ul style="list-style-type: none"> <li>• Potentially hazardous situation</li> <li>• Minor injury</li> </ul>
	<ul style="list-style-type: none"> <li>• Potentially hazardous situation</li> <li>• Material damage</li> </ul>
	Safety warning sign ► Take note of all information highlighted by the safety warning sign and follow the instructions to avoid injury or death.
	Instruction
1., 2., ...	Multiple-step instructions
✓	Precondition
→	Cross reference
	Information, notes

Tab. 2 Warnings and symbols

## 2 General safety instructions


 The manufacturer accepts no liability for damages caused by disregarding any of the documentation.

### 2.1 Intended use

The device measures the hydrostatic pressure of a liquid medium.

- Device must only be used for measuring the filling level in liquid media.
- Only use the device with suitable media (→ resistance lists).
- Adhere to the operating limits (→ [9.1 Technical specifications, Page 9](#)).

### 2.2 General safety instructions

 Observe the following regulations before carrying out any work.

#### 2.2.1 Obligations of the operating company

##### Safety-conscious operation

- Only operate the device if it is in perfect technical condition and only use it as intended, staying aware of safety and risks, and in adherence to the instructions in this manual.
- Ensure that the following safety aspects are observed and monitored:
  - Intended use
  - Statutory or other safety and accident-prevention regulations
  - Safety regulations governing the handling of hazardous substances
  - Applicable standards and guidelines in the country where the pump is operated
- Make personal protective equipment available.

##### Qualified personnel

- Make sure all personnel tasked with work on the device have read and understood this manual and all other applicable documents, especially the safety, maintenance and repair information, before they start any work.
- Organize responsibilities, areas of competence and the supervision of personnel.
- The following work should be carried out by specialist technicians only:
  - Installation, repair and maintenance work
  - Work on the electrical system
- Make sure that trainee personnel only work on the device under supervision of specialist technicians.

#### 2.2.2 Obligations of personnel

Only complete work on the device if the following requirements are met:

- System is empty
- System has been flushed
- System is depressurized
- System has cooled down
- System is secured against being switched back on again
- Do not make any modifications to the device.

### 2.3 Specific hazards

#### 2.3.1 Hazardous media

- When handling hazardous media, observe the safety regulations for the handling of hazardous substances.
- Use personal protective equipment when carrying out any work on the device.
- Collect leaking pumped liquid and residues in a safe manner and dispose of in accordance with environmental regulations.

### 3 Layout and Function

#### 3.1 Type plate

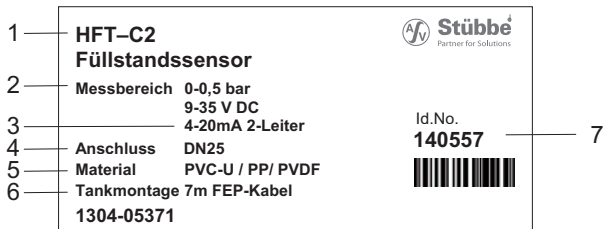


Fig. 1 Type plate

- 1 Device type
- 2 Filling level measurement range (hydrostatic pressure)
- 3 Outlet
- 4 Connection
- 5 Gasket material
- 6 Installation cable
- 7 ID number

Device types

- HFT-C2 – Compact, current output
- HFT-C2 – Flex, current output

#### 3.2 Description

The device measures the filling level of a liquid medium. It transmits the measured value via a current output.

To calculate the filling height, use the following formula:

$$p(h) = \rho * g * h$$

Formulaic symbol	Meaning
p(h)	Hydrostatic pressure as a function of the liquid column
ρ	Density (for example of water: 998.2 kg/m³ at 20 °C); [ρ] = kg/m³
g	Location factor (gravitational acceleration, gnorm = 9.80665 m/s²); [g] = m/s²
h	Height of liquid column; [h] = m

Tab. 3 Explanation of the formulaic symbol

#### 3.3 Layout

##### 3.3.1 Layout



Fig. 2 HFT-C2 Compact layout

- 1 4-pole plug M12
- 2 Sensor housing
- 3 Process connection



Fig. 3 HFT-C2 Flex layout

- 1 FEP cable
- 2 Sensor housing
- 3 Protection cap

## 4 Transport, Storage and Disposal

### 4.1 Unpacking and inspection on delivery

1. Unpack the device when received and inspect it for transport damage and completeness.
2. Check that the information on the type plate agrees with the order/design data.
3. Report any transport damage to the manufacturer immediately.
4. If fitted immediately: Dispose of packaging material according to local regulations.
  - If fitted at a later point: leave device in its original packaging.

### 4.2 Transportation

- ▶ Device should preferably be transported in the original packaging.

### 4.3 Storage

#### NOTE

#### Material damage due to inappropriate storage!

- ▶ Store the device properly.

1. Make sure the storage room meets the following conditions:
  - Dry
  - Frost-free
  - Vibration-free
  - Not in direct sunlight
  - Storage temperature +10 °C to +60 °C
2. Device should preferably be stored in the original packaging.

### 4.4 Disposal

- Plastic parts can be contaminated by poisonous or radioactive media to such an extent that cleaning will not be sufficient.

#### WARNING

#### Risk of poisoning and environmental damage from medium.

- ▶ Use personal protective equipment when carrying out any work on the device.
- ▶ Prior to the disposal of the device: Neutralize residues of medium in the device.

1. Remove battery and dispose of in accordance with local regulations.
2. Remove electronic parts and dispose of in accordance with local regulations.
3. Dispose of plastic parts in accordance with local regulations.

## 5 Installation and connection

### 5.1 Check operating conditions

1. Ensure the required operating conditions are met:
  - Resistance of body and seal material to the medium (→ resistance lists).
  - Media temperature (→ 9.1 Technical specifications, Page 9).
  - Working pressure (→ 9.1 Technical specifications, Page 9).
2. Consult with the manufacturer regarding any other use of the device.

### 5.2 Install device

#### 5.2.1 Installing Compact version

- ✓ Process pipework has been properly prepared.
- ✓ Process pipework has been secured against unintentional opening with shut-off valves.

- Avoidance of medium buildup.  
Select installation location so that no build-up or crystallization is possible.

#### WARNING

#### Risk of injury and poisoning due to medium spraying out.

- ▶ Use personal protective equipment when carrying out any work on the fitting.

1. Unscrew union nut.
2. Insert union nut on to the spool piece of the process pipework.  
Check mounting direction.
3. Weld device insert to the process pipework spool piece.
4. Check O-ring fitting.
5. Connect device to the process pipework. Tighten union nut by hand only.

### 5.2.2 Installing Flex version

✓ Tank has been properly prepared.

**i** Avoidance of medium buildup.  
Select installation location so that no build-up or crystallization is possible.

**i** Lateral movements of sensors lead to measurement errors.  
Fit protection tube or use additional weight if necessary  
Select installation location so that no build-up or crystallization is possible.

## ⚠ WARNING

### Risk of injury and poisoning due to medium spraying out.

► Use personal protective equipment when carrying out any work on the fitting.

1. Insert the sensor into the tank at the top.
2. Lower the sensor to the bottom of the tank.
3. Screw the cable gland tight.

## 5.3 Perform the hydrostatic test (only Compact)

**i** Perform hydrostatic test using neutral medium, e.g. water.

1. Pressurize the device, ensuring
  - Test pressure <  $1.5 \times P_N$  (Nominal pressure)
  - Test pressure <  $P_N + 5$  bar
  - Test pressure < permissible system pressure
2. Check that the device is not leaking.

## 5.4 Electrical connection of device

### 5.4.1 Electrical connection of Compact version

✓ Device is connected to the process pipework.  
✓ Power supply switched off and secured against being switched back on again.

**i** Cable without shielding can be used to connect the device. If electromagnetic interference is anticipated, then shielded cable must be used.

1. Cut sensor cable to length.
2. Fit plug (→ 9.4 Plug assignment, Page 9).
3. Connect sensor housing with sensor cable.

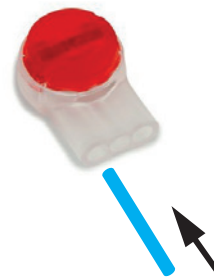
### 5.4.2 Electrical connection of Flex version

✓ Device is installed in the tank.  
✓ Power supply switched off and secured against being switched back on again.

**i** Cable without shielding can be used to connect the device. If electromagnetic interference is anticipated, then shielded cable must be used.

1. Connect the sensor cable.

The sensor cable is prepared and can be connected to the cable extension with the supplied crimp connectors.




2. Insert the wire ends into the single wire connectors. Ensure that the wire ends are not stripped.
3. Close the single wire connectors.
4. Crimp the single wire connectors (→ 9.5 Sensor cable, Page 9). Use combination pliers if necessary.
  - The capillary tube must not be closed.

## 6 Operation

### 6.1 Initial start-up

- ✓ Device is connected properly to the process pipework.
- ✓ Device is connected properly with the power supply and ready for operation.

 For this purpose, the current output for filling level must be displayed in the higher-level controller as a measured value.

- ▶ After starting the higher-level controller, the device transmits the filling level as current signal (4 ... 20 mA).

## 7 Maintenance

### WARNING

**Risk of injury and poisoning due to hazardous or hot media.**

- ▶ Use personal protective equipment when carrying out any work on the device.
- ▶ Allow device to cool.
- ▶ Make sure the device is depressurized.
- ▶ Block the media supply to the device.
- ▶ Empty the process pipework, safely collect the media and dispose of it in accordance with environmental regulations.
- ▶ Switch off the power supply to the system.
- ▶ Secure power supply against being switched back on again.
- ▶ Provide warning of maintenance and repair work and set up warning signs.

### 7.1 Servicing

Interval	Action
As necessary	<ul style="list-style-type: none"> <li>• Clean device with a damp cloth.</li> </ul>
Six-monthly	Visual and function check: <ul style="list-style-type: none"> <li>• Normal operating conditions unchanged</li> <li>• No leaks</li> <li>• No unusual operating noises or vibrations</li> </ul>

Tab. 4 Servicing activities

- ▶ Perform maintenance tasks according to the table.

### 7.2 Maintenance

#### 7.2.1 Removing the device

- ✓ System is empty.
  - ✓ System has been flushed.
  - ✓ System is depressurized.
  - ✓ System has cooled down.
  - ✓ System is secured against being switched back on again.
1. Unplug connection cable.
  2. Disassemble device from the process pipework. For the Flex version: Pull the sensor out of the tank.
  3. Decontaminate device if required.

#### 7.2.2 Replacement parts and return

1. Have the following information ready to hand when ordering spare parts (→ 3.1 Type plate, Page 5).
  - Device type
  - ID number
  - Nominal pressure and diameter
  - Connection and gasket material
2. Please complete and enclose the document of compliance for returns (→ [www.asv-stuebbe.com/service/downloads](http://www.asv-stuebbe.com/service/downloads)).



3. Only use spare parts from ASV Stübbe.

## 8 Troubleshooting

### WARNING

**Risk of injury and poisoning due to hazardous media liquids!**

- ▶ Use personal protective equipment when carrying out any work on the device.


Error	Possible cause	Corrective action
Medium leaks out at screw connection	Pre-tension of the O-ring too small	▶ Retighten union nut by hand.

Tab. 5 Troubleshooting




## 9 Appendix

### 9.1 Technical specifications

 Technical data (→ Data sheet).

### 9.2 Dimensions

 Dimensions (→ Data sheet).

### 9.3 Accessories

Description	Ident. number
Tank lead-through 2" PP EPDM	148157
Tank lead-through 2" PP FPM	148158
Tank lead-through 2" PVDF EPDM	148149
Tank lead-through 2" PVDF FPM	148150

Tab. 6 Accessories

### 9.4 Plug assignment

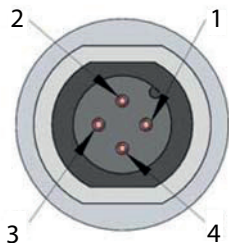


Fig. 4 Connection diagram

- 1 Signal (+), 4...20 mA
- 2 Signal (-), 4...20 mA
- 3 n.c.
- 4 n.c.

### 9.5 Sensor cable

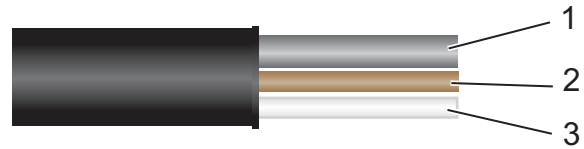


Fig. 5 Sensor cable

- 1 Capillary tube
- 2 Signal (+), brown wire
- 3 Signal (-), white wire