FLUKE®
Calibration

CPS-40M-HC40

Contamination Prevention System

CPS-100M

High-Pressure Contamination Prevention System

Instructions

Introduction

The Fluke CPS-40M-HC40 (CPS-40M) Contamination Prevention System and CPS-100M High-Pressure Contamination Prevention System (Product) are accessories that protect pressure controllers from contamination by the Device Under Test (DUT).

- CPS-40M-HC40 (CPS-40M) has a maximum-working pressure of 44 MPa (6400 psi).
- CPS-100M has a maximum-working pressure of 110 MPa (16 000 psi).

When the CPS is enabled, the pressure controller controls the CPS valves to decrease the test system pressure, purge contaminants, and completely vent the test system.

The Product is connected to the pressure controller by a high pressure hose and a control cable. There is an optional vacuum pump connection (CPS-40M only). All upward pressure changes are accomplished by the pressure controller. Rough downward changes in pressure are accomplished through the Product's vent valve. This results in most of the gas being exhausted out of the Product instead of going back to the controller. Contaminants from the DUT are filtered and liquids drop into a sump. The sump is automatically purged into a waste bottle when the system is vented. The product includes both mesh and coalescing filters that are replaceable.

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Fluke Corporation
P.O. Box 9090
Everett, WA 98206-9090
U.S.A.

Fluke Europe B.V.
P.O. Box 1186
5602 BD Eindhoven
The Netherlands

ООО «Флюк СИАЙЭС»
125167, г. Москва,
Ленинградский проспект
дом 37,
корпус 9, подъезд 4, 1
этаж

How to Contact Fluke Calibration
To contact Fluke Calibration, call one of the following telephone numbers:

- Technical Support USA: 1-877-355-3225
- Calibration/Repair USA: 1-877-355-3225
- Canada: 1-800-36-FLUKE (1-800-363-5853)
- Europe: +31-40-2675-200
- Japan: +81-3-6714-3114
- Singapore: +65-6799-5566
- China: +86-400-810-3435
- Brazil: +55-11-3759-7600
- Anywhere in the world: +1-425-446-6110

To see product information and download the latest manual supplements, visit Fluke Calibration's website at www.flukecal.com.
To register your product, visit http://flukecal.com/register-product.

Safety Information

A **Warning** identifies conditions and procedures that are dangerous to the user. A **Caution** identifies conditions and procedures that can cause damage to the Product or the equipment under test.

⚠Warning

To prevent personal injury:

- **Read all safety information before you use the Product.**
- **Wear eye protection.**
- **Do not use with flammable or combustible liquids.**
- **Use the Product only as specified, or the protection supplied by the Product can be compromised.**
- **Carefully read all instructions.**
- **Do not use the Product if it operates incorrectly.**
- **Do not use the product if it is altered or damaged.**
- **Disable the Product if it is damaged.**
- **Do not attempt to operate the Product above its rated pressure.**
- **Do not disconnect tubing when the system is pressurized.**

⚠ Caution

To avoid damage to the Product, carefully follow the cleaning and decontamination instructions in the manual. Do not use unapproved solvents or cleaners on the Product.

Symbols

The symbols shown in Table 1 are found in these instructions or on the Product.

Table 1. Symbols

Symbol	Definition
	WARNING, RISK OF DANGER.
	Consult user documentation.
	Certified by CSA Group to North American safety standards.
	Conforms to European Union directives.
	Conforms to relevant Australian Safety and EMC standards.
	This product complies with WEEE Directive marking requirements. The affixed label indicates that you must not discard this electrical/electronic product in domestic household waste. Product Category: With reference to the equipment types in the WEEE directive Annex I, this product is classed as category 9 “Monitoring and Control Instrumentation” product. Do not dispose of this product as unsorted municipal waste.

Box Contents

The Product is either of these kits:

CPS-40M:

- CPS-40M-HC40 Test Station
- Pressure Hose, JIC #4 (AN4) fittings
- Pressure Hose Adapter Fittings, JIC #4 (AN4): 1/4 NPT; 1/4 BSP; 7/16-20 (x2)
- Vacuum Hose, 3/8 inch polyethylene
- Vacuum Hose Adapter Fittings, 3/8 tube: 1/4 NPT; 1/4 BSP; 7/16-20 (x2)
- PK-ADPTR-HC40 Adapter Set
- CPS Cable
- Instructions

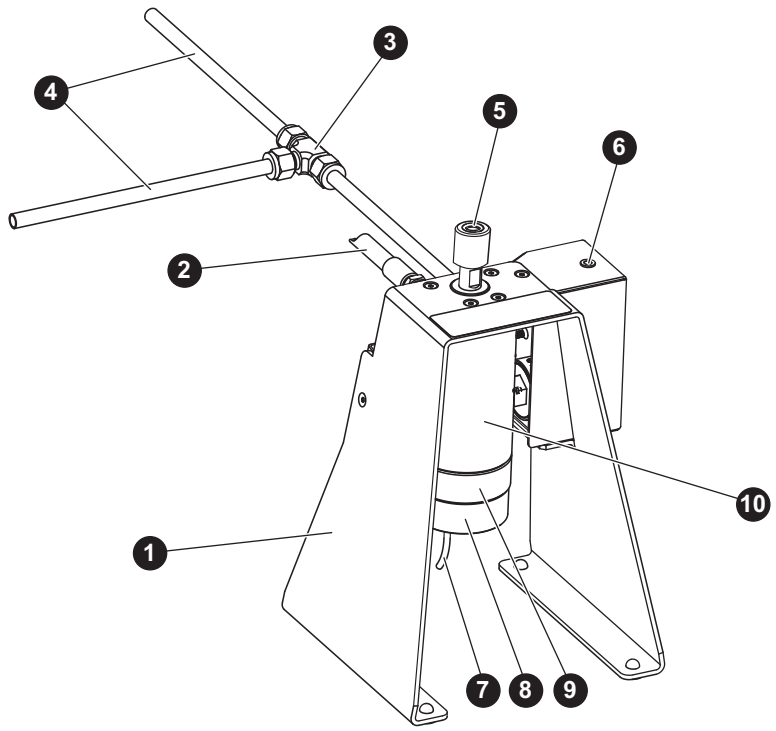
CPS-100M:

- CPS-100M Test System
- High-Pressure Hose, DH500 Fittings (cone and threaded connection compatible with Autoclave F250C and HIP HF4)
- CPS Cable
- Instructions

Features

The CPS-40M features are shown in Table 2. The CPS-100M features are shown in Table 3.

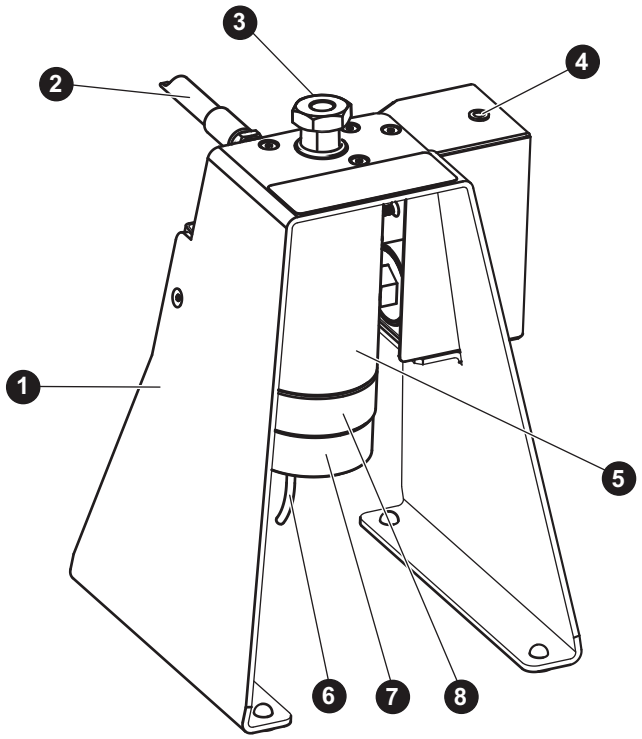
Table 2. CPS-40M



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Number	Description
1	Stand
2	Pressure Hose
3	Tee
4	Vacuum Hose
5	TEST port connector
6	LED Indicator
7	Drain Tube
8	Filter Cover
9	Filter Housing
10	Body

Table 3. CPS-100M



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Number	Description
1	Stand
2	High-pressure Hose
3	DUT Port
4	LED Indicator
5	Body
6	Drain Tube
7	Filter Cover
8	Filter Housing

Set Up

This section details Product set up.

⚠ Warning

To prevent personal injury, use thread sealing tape only on NPT fittings to avoid incorrect sealing. Do not use on JIC #4 (AN4), BSP, SAE or DH500 fittings.

CPS-40M-HC40

For atmospheric calibration:

1. Ensure the O-ring is on the SAE side of a SAE to JIC #4 (AN4) adapter.
2. Install the above adapter to the CONTROLLER port of the CPS.
3. Install the applicable adapter (JIC #4 (AN4) to NPT, BSP or SAE) to the TEST port of the pressure controller.
4. Connect the pressure hose to the two adapters and tighten with a wrench.
5. Attach the CPS cable to the connector on the rear panel of the CPS, plug the other end into the solenoid driver connector on the rear-panel of the pressure controller.
6. Install the free end of the drain tube into a suitable container to collect fluid contaminants.

For sub-atmospheric calibration:

1. Ensure O-ring is on the SAE side of a SAE to 3/8 tube adapter.
2. Install the above adapter to the VAC port of the CPS and tighten with a wrench.
3. Install the applicable adapter (3/8 tube to NPT, BSP or SAE) to the EXHAUST port of the pressure controller and tighten with a wrench.
4. Place the CPS in desired location noting that test gauges will likely be mounted on top of it.
5. Plan the cuts on the 3 needed vacuum tubing sections; vacuum pump to tee, tee to CPS, and tee to pressure controller. See Table 2. Cut the vacuum tubing into these three pieces.
6. Connect the vacuum tubing to the tee and adapters (to vacuum pump, VAC port on CPS, and EXHAUST port on pressure controller) by normal nut and ferrule tube connection methods.

CPS-100M

To set up the CPS-100M:

1. Slide the gland nut over the threaded center of the hose end fitting as shown in Figure 1.
2. Screw the collar onto the left-hand thread hose end fitting, counter-clockwise.
3. Repeat steps 1 and 2 for the other hose end.
4. Install the High-Pressure Hose from the CONTROLLER port on the CPS to the TEST port on the pressure controller. Torque to 15 N · m (11 lbf · ft) with a wrench. Excessive torque will lead to premature leaks that will require replacement of the fitting.
5. Attach the CPS cable to the connector on the rear panel of the CPS, plug the other end into the solenoid driver connector on the rear panel of the pressure controller.
6. Install the free end of the drain tube into a suitable container to collect fluid contaminants.

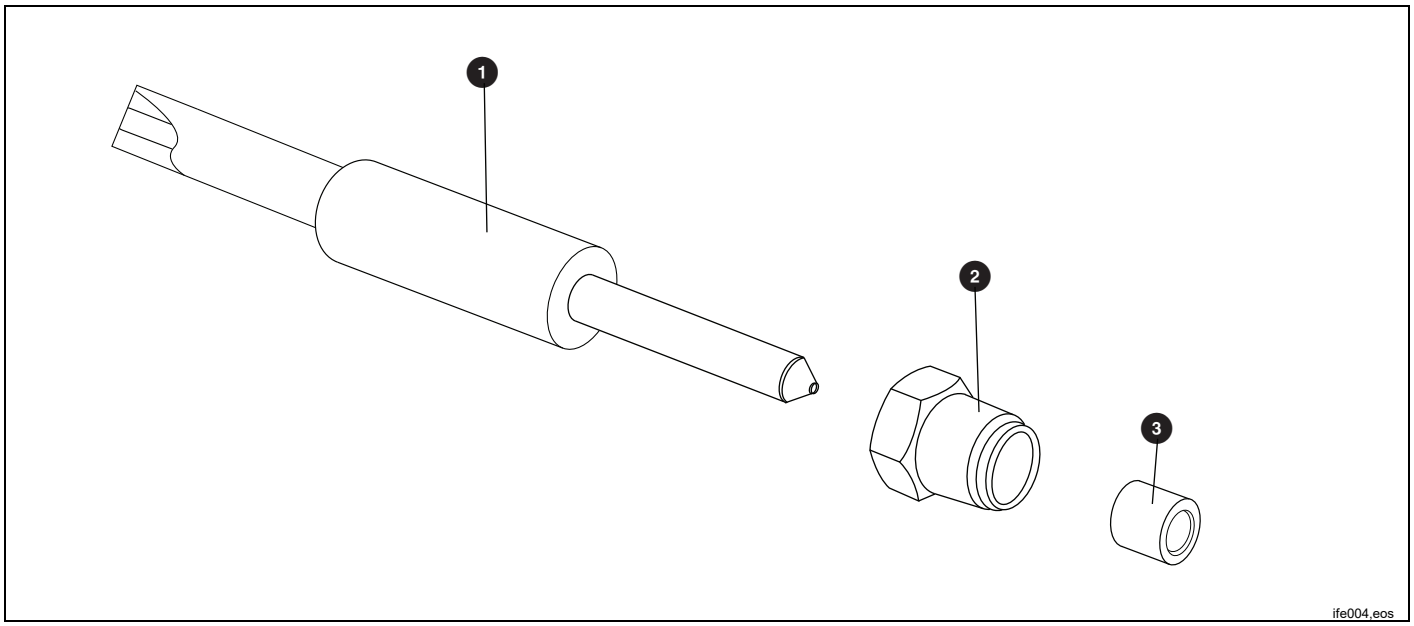


Figure 1.

⚠ Caution

To prevent Product damage, before you use the CPS-100M, enable the CPS on the pressure controller (SETUP>Instrument Setup External Values>CPS) – refer to controller operators manual. The CPS must be enabled or the controller could be exposed to contamination. When enabled, the LED illuminates.

Operation - DUT Connection

⚠ Caution

To prevent Product damage or damage to a gauge:

- **To prevent incorrect sealing that creates an unsafe condition, do not use thread-sealing tape or any other sealing method on the DUT or the adapters. The Gauge Adapter sealing system can be hand-tight sealed up to 44 MPa (6400 psi). Wrenches or similar tools are not required. Over tightening can cause damage to threads or sealing faces.**
- **Before connection, ensure that there are O-rings fitted to the test port and gauge adapter.**
- **Check that the sealing face of the device to be fitted is clean and undamaged, as scratches or dents can form leak-paths.**
- **Any DUT that is known to be full of liquid, or grossly contaminated, should be cleaned before using with a CPS and pressure controller. Also use the CPS Purge and CPS Cleanout Tasks to perform a final clean of the DUT before calibration.**

CPS-40M-HC40

1. Select the appropriate adapter from the adapter set to match the thread on the DUT.
2. Screw the adapter fully onto the DUT so that the bottom face of the DUT seals on the O-ring inside the adapter. Hand-tight is sufficient.
3. Turn the adapter collar counter-clockwise until the adapter seals on the O-ring in the mounting post to mount the DUT/adapter assembly to the test port. Hand-tight is sufficient.
4. To adjust the position of the DUT, hold the adapter, and turn the collar clockwise 1/4-turn.
5. Position the DUT to face the desired direction, and turn the collar counter-clockwise to re-seal.

CPS-100M

The DUT mounts directly to the test port on the CPS-100M, with a metal-to-metal DH500 connection. Torque to 15 N · m (11 lbf · ft) with a wrench.

1. To adjust the position of the DUT, unscrew the gland nut counter-clockwise 1/4-turn.
2. Position the DUT to face the desired direction, and tighten the gland nut clockwise re-seal.

Operation - CPS Tasks

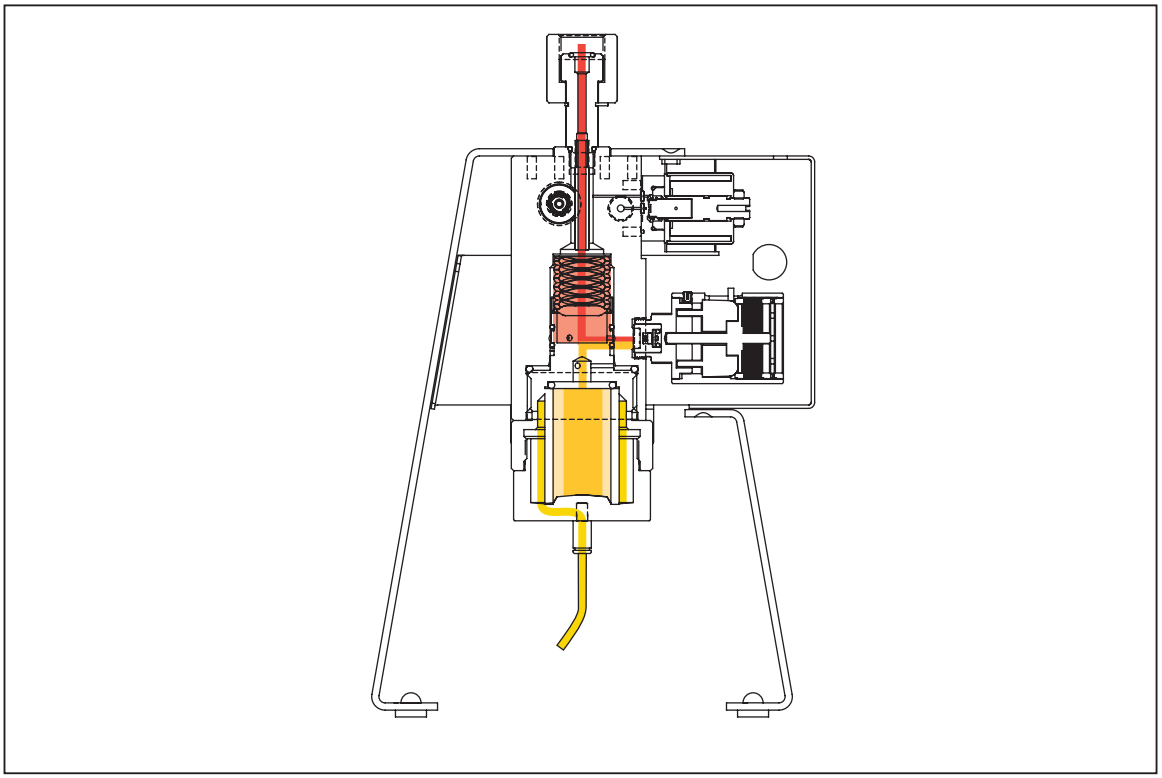
Tasks are accessed by the **Setup>Tasks** menu path on the controller's display screen.

Purge

Purge is used to void the test system connected to the CPS of liquid or particulate contaminants by pressurizing and venting the test system plumbing through the CPS (same as normal operation). Fluke Calibration recommends to do this before a calibration is performed if gross contaminants might be present. To purge the system, the Product pressurizes to the user-defined purge pressure and then vents to the drain tube. The controller repeats the process for the number of cycles that are set.
To run a purge process:

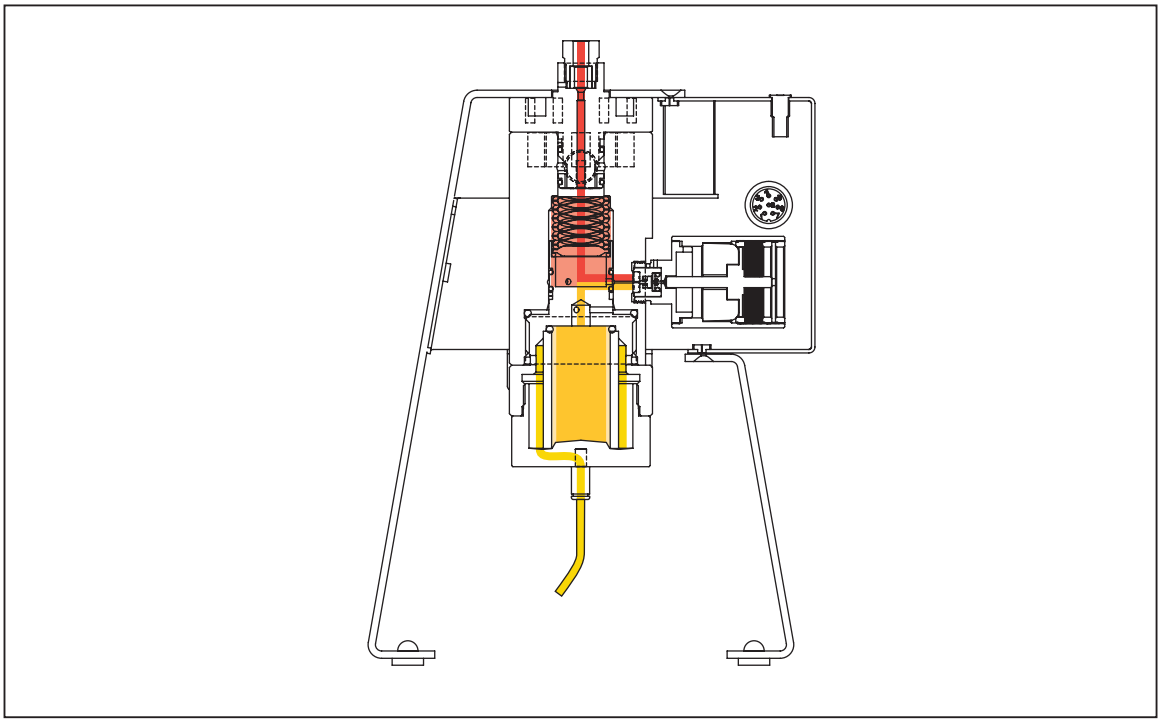
1. Select the **Purge Task** to enter the menu.
2. Set the Pressure, 350 kPa (50 psi) for example, but not higher than the rating of the DUT.
3. Set the number of cycles.
4. Select **Run** to start the purge process.

Figures 2 and 3 show the normal operaton and the Purge function of both models in a cross-section.



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Figure 2. Cutaway of the CPS-40M-HC40 during a Normal Downward Pressure Excursion, or Purge Task



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Figure 3. Cutaway of the CPS-100M Purge Task during a Normal Downward Pressure Excursion, or Purge Task

CPS Cleanout

CPS Cleanout is a function that pushes contaminants from the sump of the CPS out the drain tube. A low-pressure setpoint is automatically set to establish a flow to clean out the CPS for the specified amount of time. This same function occurs each time the CPS is controlling downward or venting with the pressure less than 170 kPa (25 psi).

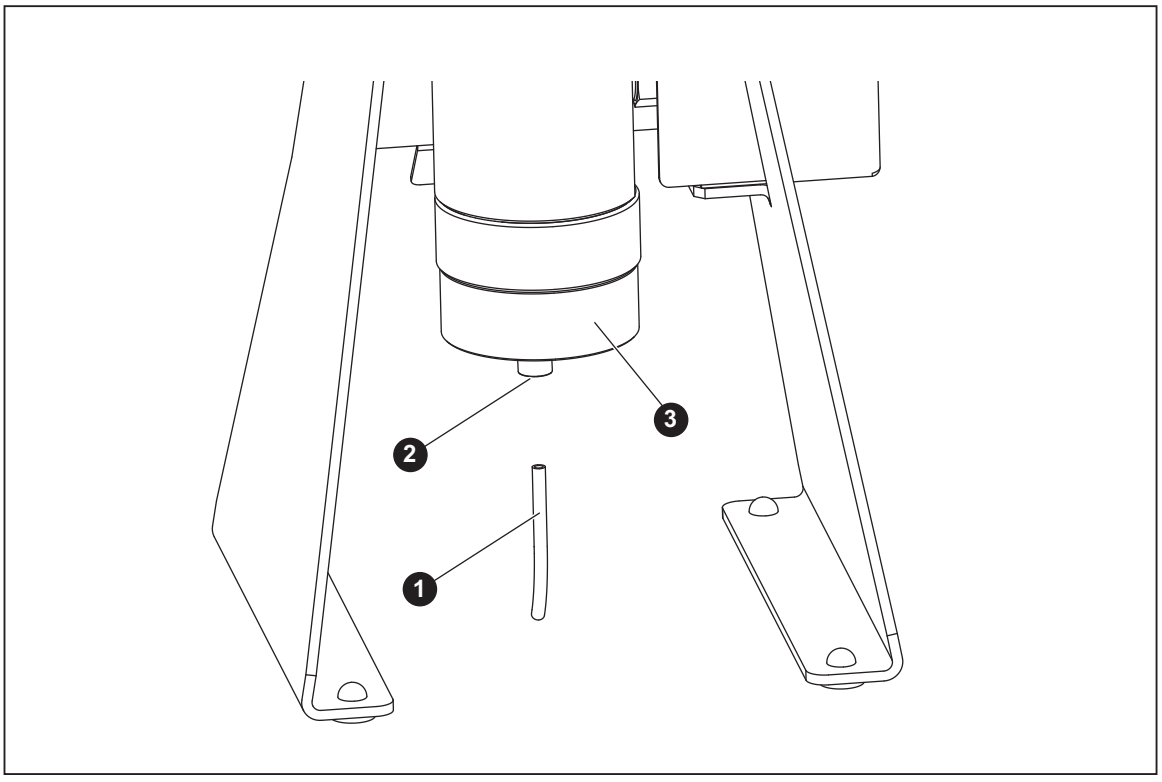
Disconnect the Product

To disconnect the Product, ensure that the system is vented and then disable the CPS in the controller settings. Make sure that the CPS is disabled in the firmware if it is physically disconnected from the controller. Failure to do so could result in the controller not being able to vent pressure. Once disabled in the firmware, the CPS can be disconnected both electrically and pneumatically. Do not leave the CPS physically connected to the controller if it has been disabled in the firmware.

Maintenance

Inspect the drain tube and waste bottle/container after use. If the drain tube or liquid from the tube shows signs of contamination (particulates or oily substances), the coalescing filter and mesh filter should be inspected. The frequency of inspection will vary depending on the condition of Devices Under Test (DUT) that have been calibrated. With time and experience, you can determine if a regular inspection interval is more appropriate, or if the filters should be inspected when the waste bottle/container is full.

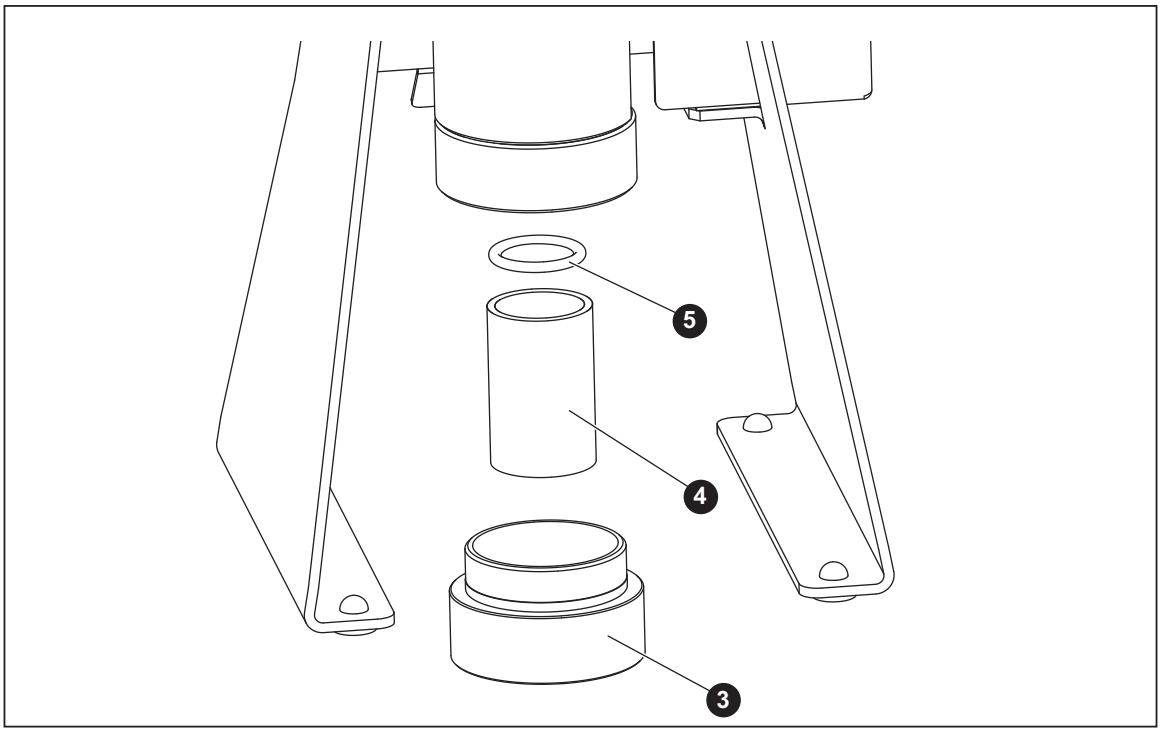
Push on the plastic ring on fitting ❷ to disconnect drain tube ❶, and pull gently on the drain tube. See Figure 2.



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Figure 2.

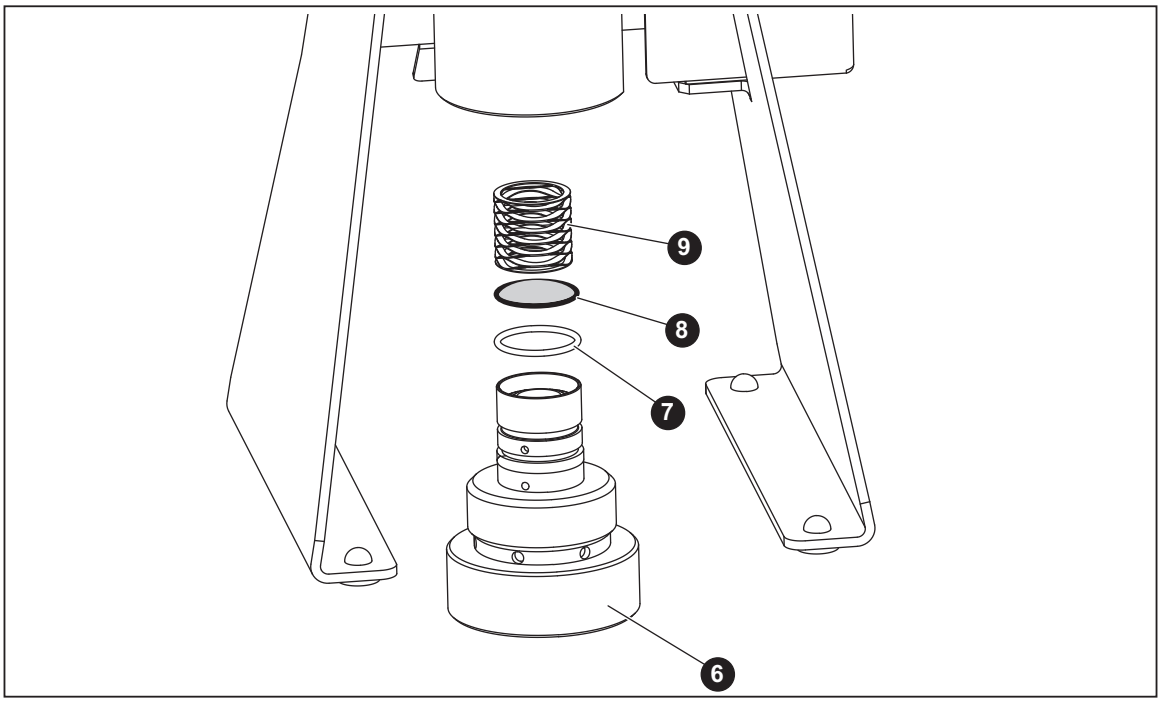
1. Unscrew the filter cover ❸ counter-clockwise to release the coalescing filter ❹ and O-ring (see Table 4) ❺. See Figure 3.



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Figure 3.

2. Unscrew filter housing ❻ counter-clockwise to release mesh filter ❽, spring ❾ and O-ring (see Table 4) ❼. See Figure 4.



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Figure 4.

The coalescing filter ❹ cannot be cleaned, and should be replaced when heavily discolored or showing signs of deterioration (see Table 4).

3. Clean the mesh filter ❽ with suitable solvent and replace if necessary (see Table 4).
4. Clean interior chambers of filter housing ❻ to remove any contaminant particles or residue.
5. Fit the O-ring, mesh filter, and spring to housing and screw clockwise into the main body.
6. Fit coalescing filter and the O-ring to the filter cover ❸ and screw clockwise into the filter housing.

Replacement Parts

Replacement parts are listed in Table 4.

Table 4. Replacement Parts

Number (See Figures 3 and 4)	Description	Part Number
❹	Coalescing Filter	4578779
❺	O-ring (above coalescing filter)	4840807
❼	O-ring (below mesh filter)	3922019
❽	Mesh Filter	4976723

Specifications

Operating Temperature .....-20 °C to +50 °C
Storage Temperature.....-20 °C to +70 °C
Operating Humidity.....5 % to 95 % relative humidity, non-condensing
Wetted Materials.....Stainless Steel, Aluminum, Nitrile, PTFE, borosilicate glass
CPS-40M-HC40
  Pressure Range.....-0.1 MPa to 44 MPa (-15 to 6400 psi)
  Weight .....3900 g (8.0 lb)
  Dimensions.....175 mm x 185 mm x 300 mm (6.9 in x 7.3 in x 11.8 in)
CPS-100M
  Pressure Range.....0 MPa to 110 MPa (16 000 psi)
  Weight .....3630 g (8.6 lb)
  Dimensions.....175 mm x 185 mm x 270 mm (6.9 in x 7.3 in x 10.7 in)
Safety
  General.....IEC 61010-1; Pollution Degree 2

LIMITED WARRANTY AND LIMITATION OF LIABILITY

This Fluke product will be free from defects in material and workmanship for one year from the date of purchase. This warranty does not cover fuses, disposable batteries, or damage from accident, neglect, misuse, alteration, contamination, or abnormal conditions of operation or handling. Resellers are not authorized to extend any other warranty on Fluke's behalf. To obtain service during the warranty period, contact your nearest Fluke authorized service center to obtain return authorization information, then send the product to that Service Center with a description of the problem.

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