



Smartflow Spill Prevention Couplings
Installation, Operation & Maintenance Manual
4 inch Couplings





GENERAL SAFETY GUIDLINES

!!! IMPORTANT !!!

READ THE COMPLETE MANUAL BEFORE USE AND RETAIN FOR FUTURE REFERENCE

- Do not make modifications or additions that are not authorised by the manufacturer
 - Only use genuine CEJN spare parts for maintenance

Document Revision Table:

Description	Date
First Issue	02/01/2021
REVA – ATEX Gas Ph IIa > IIb	20/10/22
	10/05/23
REVC – Updated to CEJN	01/11/24

Installation Advice

Before installation commences it is essential to check that material and performance specifications are acceptable for the specific end user application. The pressure rating (PS) and other safe operating limits and primary materials of construction relating to each Smartflow product are clearly identified on the data label of each product, see Figure 1.

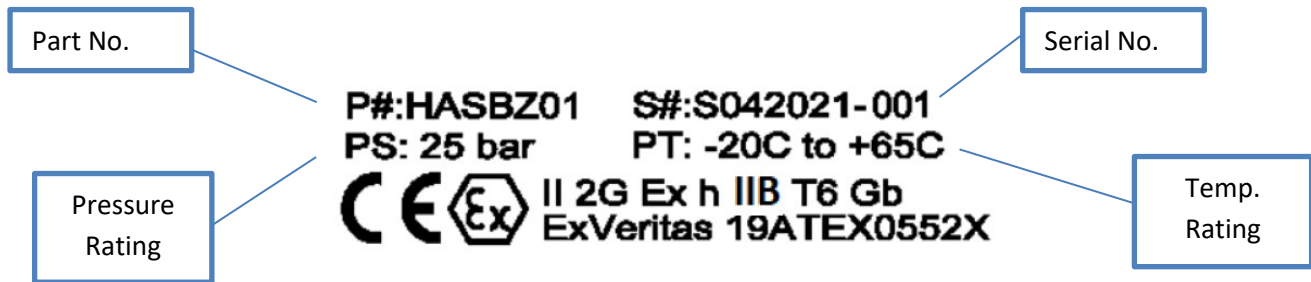


Figure 1

Before commencing any further activities, the **USER** is advised of the following:

- Temperature of couplings may exceed touch limits thus user is responsible for PPE requirements, e.g. gloves.
- Entrained solids can seriously affect coupling seal integrity and thus user is responsible for installing appropriate upstream filtering.
- User is responsible for installing coupling in an appropriately designed system with adequate over pressure, pressure limiting protection.
- The couplings are not design for fire engulfment; the user is responsible for taking appropriate measures.

Additional information relating to the materials of construction for each individual component is available upon request. The Technical Department at CEJN are always happy to provide guidance on material suitability for given processes and transfer media. Our data is a collective of our own application experiences and published chemical resistance information. If unsure regarding a particular application, ask.

Do not assume that products supplied for a specific application are suitable for similar applications. The performance of the materials of construction can be affected by many variables. If you wish to use your Smartflow product for a different application than that originally specified check with the Technical Department at CEJN to ensure compatibility before installation.

Preliminary checks should be undertaken to ensure safe and satisfactory operation of installed products, which fulfils the requirements of the applicable prevailing industry and associated local, national and international standards. Attention shall be paid to pressure ratings, operating temperatures, flow velocities, safety factors and position of upstream and downstream process closures.

Ensure maximum flow velocity does not exceed 5.25 m/s to reduce the static electrical build-up of process media transfer. If the velocity is greater than the stated above, the end user is responsible to ensure that correct and adequate grounding is achieved to eliminate static electrical build up from occurring. See API 2003 for further details on how to reduce static charge generation.



Installation

Particular care should be taken to ensure that the correct installation takes place ensuring safe and satisfactory operation. The installed product does not interfere with the correct operation of affiliated equipment in the process transfer line. (i.e. isolation valves, excess flow valves, safety devices, etc.)

Before securing the flange or threaded connections to mating equipment, it is essential that NO foreign objects, dirt, grit are present in the coupling interface.

All connections, flanged or threaded, should be made without imparting excessive strain to the equipment and leak tight pressure test shall be performed to at least 1.5 time the 'cold' working pressure of the lowest installed system component prior to use but not exceeding the maximum 'cold' working pressure of the installed product. All gaskets and sealing materials use to make the connection should be of suitable material and able to operate to at least the maximum pressure and the temperature parameters of the Smartflow equipment.

Where the hose or loading arm assembly is the primary static dissipation or earth route, the electrical continuity shall be checked to ensure regulatory compliance.

Every Smartflow coupling is designed to take reasonable axial loads associated with good handling practice but is not designed to accept continuous excessive load values associated with maladjustment or poor installation. Excessive strain will increase component wear and possible premature failure if not installed and used corrected.

Loading Arm Balancing

Careful attention should be paid to the balancing of loading arms, the weight of the coupling plus transfer media should be taken into account at the specification stage. It is usual for loading arm balance settings to account for weight variations due to differences in the full and empty cycles. The loading arm should be set to balance in the condition present at the time of connection.

When Smartflow equipment is used with hoses; attention should be paid to hose lengths to ensure correct handling characteristics. The hose assembly should be designed that the minimum hose length is supported by the coupling or the operator.

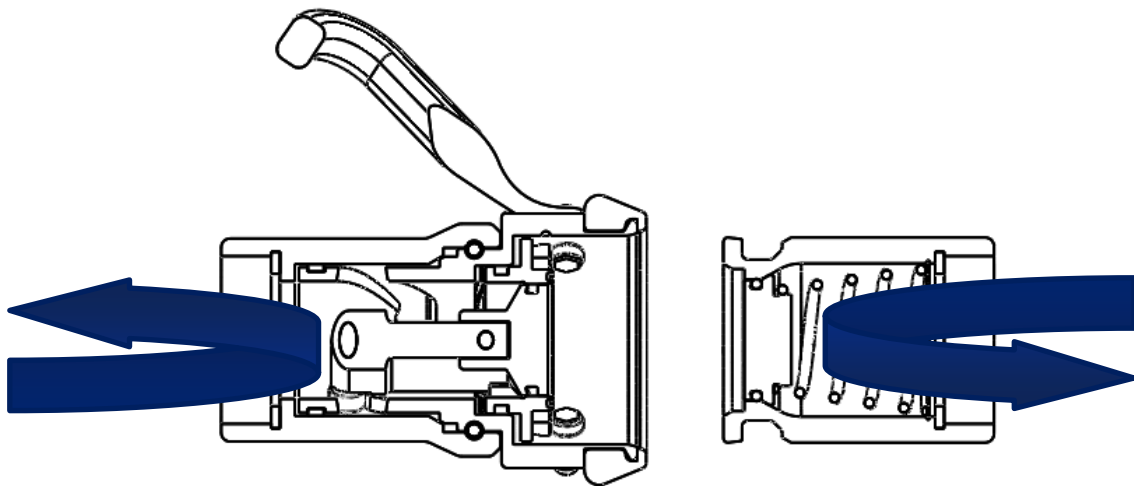
User Instructions

The Principle of Operation

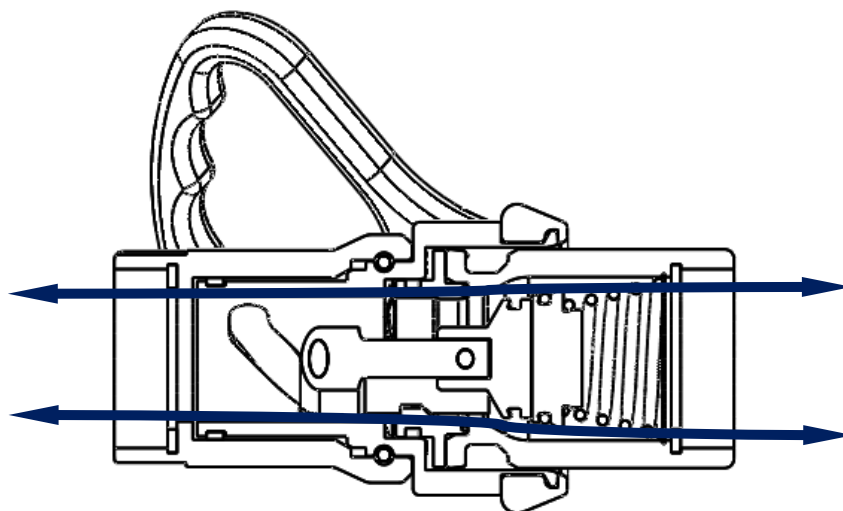
The function and design of all Smartflow Spill Prevention Couplings mean they all follow the same simple operating principle.

To connect, align the Hose unit over the Tank unit and push until the three rollers engage in the three slots and then rotate the Hose unit approximately 106° clockwise. This will allow the valves to open and medium to flow.

Disconnection is as simple as the connection process, rotate anti-clockwise and pull away from the Tank unit. See the figures below.



No connection, no flow



Connection, full flow



Making a connection & disconnection

It is recommended that the following steps are taken when making or breaking Smartflow coupling connections. These recommendations are given to reduce any potential harm to the equipment, operator and environment.

The Hose unit: ensure that all line isolations have been made and that no line pressure is present at the hose unit

The Tank unit: ensure that all line isolations upstream of the tank unit are fully open

Ensuring that the hose is correctly supported, lift the hose unit into the correct position to begin the connection process. It is important that the hose assembly is balanced correct as to reduce any excessive axial forces being applied to the coupling connection.

The larger coupling ranges come with handle that are suitable to aid with hose alignment.

Once the hose assembly has been correctly supported, the hose unit should slide easily over the tank unit. All three of the rollers engage in the three slots in any one of three positions at 120 degree centre.

Coupling connection is achieved by pushing the hose unit towards the tank unit and then rotating the hose unit until resistance is felt against the rotational movement. Do not apply excessive force as damage may occur to the unit, rendering it inoperable for future use.

The coupling assembly is now ready to receive fully process medium flow. Site operating procedures should be adhered to during this process.

To reduce the likelihood of pressure surges it is preferable that the 'destination' receptacle line isolations are the last isolations to be operated in the transfer sequence.

The disconnection procedure is the reverse of the connection procedure as outlined above.

Important Notes regarding the use of Smartflow products:

The hose assembly should be designed that the minimum hose length is supported by the coupling or operator.

Hose lengths should be of sufficient length to ensure they operate with the hose manufacturer's stipulated minimum bend radius.

Care should be taken to ensure that the fluid flow should not exceed 5.25 m/s. This will help reduce the static electrical charge build-up.

Service and Maintenance – Tank Units

The following service and maintenance activities should only be carried out by trained, competent persons and use genuine spare CEJN parts, failure to do so will invalidate any warranties.

The following tools and equipment will be required for the maintenance of Smartflow tank units see figure 2.

Suitable tools: O-ring removal picks; flat bladed screw driver.

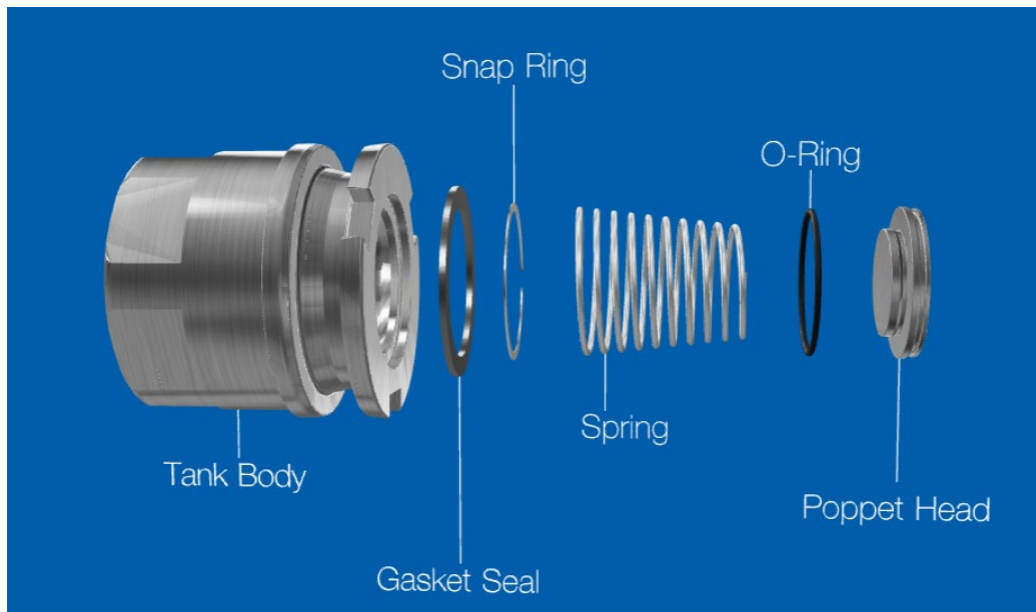


Figure 2. Tank Unit Parts

ITEM NO.	PART NUMBER	DESCRIPTION
1	MPTOB	Tank Outer Body
2	MPTPH	Tank Poppet Head
3	MPTCS	Tank Compression Spring
4	BPTCI	Internal Snap Ring
5	BPOS2207501*	O-ring Seal
6	MPUGSUPE	Gasket Seal PTFE

Table 2. Tank Unit Part Descriptions

Items marked with “*” have variations in part numbers, please contact CEJN when ordering these spare parts.



Tank Units

Tank unit disassembly instructions

1. Carefully remove the gasket seal if the unit has parallel threaded interface connection.
2. Removing the spring clip will allow the compression spring and poppet head to be removed from inside the tank body. Inspect all items for any signs of damage or wear. Replace as necessary.
3. Remove O-ring using O-ring removal pick tool and replace if damaged or signs of wear are seen.

Tank unit assembly instructions

1. Ensure all parts are clean from grease and or other debris. Inspect thoroughly to ensure all parts are fit for service. If any parts are found to be damaged or worn, replace immediately.
2. Install the O-ring on the poppet head.
3. Install the spring into the back of the poppet head.
4. Insert the spring and poppet head into the main body, taking care not to damage the O-ring seal.
5. Fit the internal snap ring into the groove whilst ensuring the spring is compressed.
6. Ensure the gasket seal is fitted correctly in to the gasket seal groove.
7. Pressure testing to 1.5 time MWP to check for fluid leaks around the front O-ring seal area.

Hose units

Figure 3. Hose Unit Parts

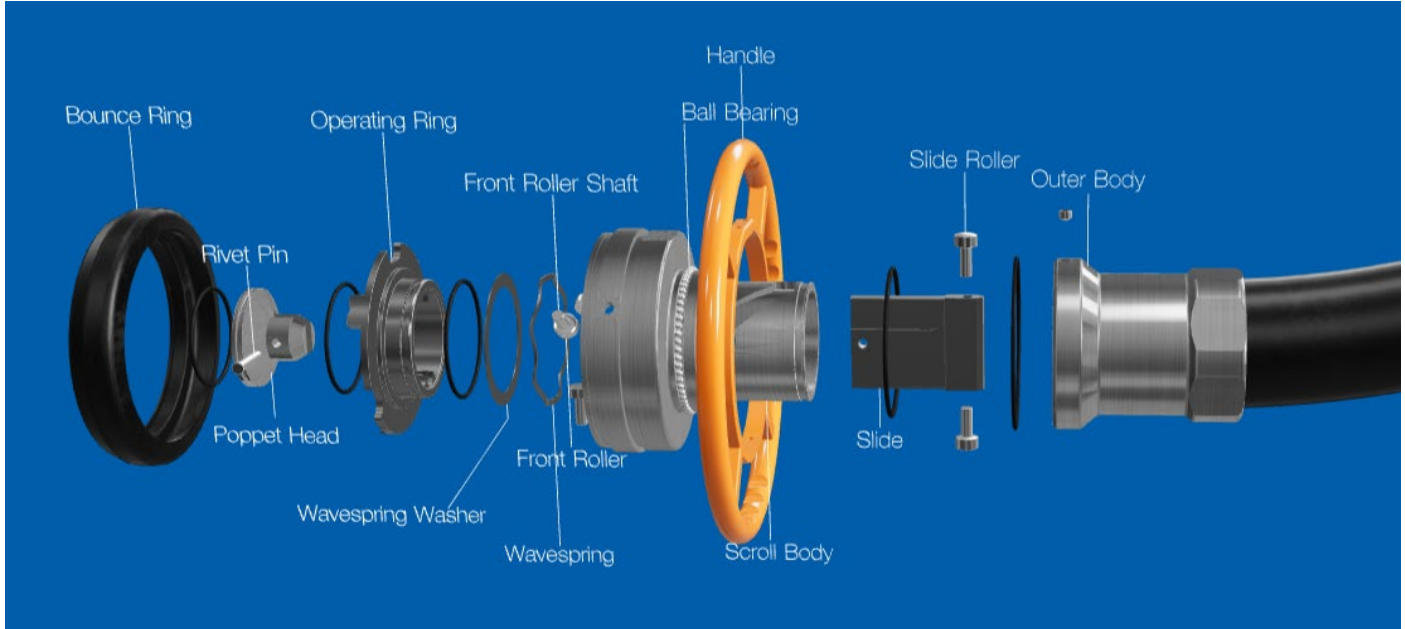


Table 2. Hose Unit Part Descriptions

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	MPHSBES	4-inch Hose Scroll Body	1
2	MPHSLES	4-inch Hose Slide	1
3	MPHORES	4-inch Hose Operating Ring	1
4	MPHPHES	4-inch Hose Poppet Head	1
5	MPHFRES	4-inch Hose Front Roller	3
6	MPHFSES	4-inch Hose Front Roller Shaft	3
7	MPHWSES	4-inch Hose Wavespring	1
8	MPHPBEE	4-inch Carbon Filled PTFE Bearing Ring	1
9	MPHOBESJY	4-inch Hose Outer Body - 4" NPT	1
10	MPHBREN	4-inch Hose Bounce Ring - NBR	1
11	MPHOKE1	4-inch Hose O-Ring Kit - Viton (not shown)	1
12	MPHWHEG	4-inch Hose Wheel Handle Rubber Coated Aluminium	1
13	MPHSRES	4-inch Hose Slide Roller	2



Hose units

Hose unit disassembly

1. Carefully remove the gasket seal if the unit has parallel threaded interface connection.
2. Remove the ball plug and apply generously the penetrating oil spray directly into the ball groove. Using a suitable open container, carefully rotate the main body allowing the roller ball bearings to fall out of the ball plug hole. Reapplication of penetrating oil spray may be required during this process.
3. Once all ball bearing have been removed. Carefully remove outer body from the scroll body.
4. Remove the wear band from the end of the scroll body
5. Remove the external circlips from the roller shaft.
6. Remove the slide rollers and roller shaft from the slide.
7. Placing the scroll body centrally into the small hand operated press. Apply the press force slowly until the operating ring lugs fractionally clears the front rollers. With the opening force applied rotate the operating ring clear of the front rollers. Relax the hand press force and remove the operating ring sub assembly.
8. Remove and inspect the wave spring washers. Replace if any signs of damage is noted.
9. Using the O-ring removal tool, carefully remove all O-rings.
10. Inspect the operating ring and slide for signs of damage or excessive wear. Replace if required.
11. Removal of the front rollers can be achieved by unfastening the retaining hex nuts and spring washers.

Hose unit assembly

1. Ensure parts are clean from grease and or other debris. Inspect thoroughly to ensure all parts are fit for returned service. If any parts are found to be damaged or worn, replace immediately.
2. Reinstall front rollers if removed, ensuring the torque limit of the retaining hex nuts meets the criteria given in table 3.
3. Carefully replace all O-ring on to the operating ring sub assembly.
4. Install the wave springs on to the back of the operating ring sub assembly.
5. Carefully insert the operating ring sub assembly into the scroll body. Ensure that the slide rollers and shaft are aligned correctly!
6. Using the small hand press, apply compressive force slowly until the lugs of the operating ring just clear the front rollers.
With the force still applied rotate the operating ring sub assembly so that the lugs line up under the rollers and the cross hole for the slide shaft is in line with the scroll pattern.
Once correct alignment has been achieved relax the pressure on the hand operated press.
7. Reinstall the slide shaft and rollers. Ensuring the rollers are retained by the external circlips.
8. Reinstall the wear band to the end of the scroll body.
9. Carefully insert the scroll body and all attached components into the outer body.
10. Apply small amounts of recommended grease into the ball pull hole during insertion and rotation of the ball bearings.
11. Reinstall the ball plug once all ball bearings are reinstalled
12. If the unit has parallel threaded interface connection, reinstall the gasket seal carefully.

Pressure test

All Smartflow units are pressure tested to 1.5 time maximum working pressure (cold) prior to leaving the factory. After any maintenance work that has been carried out the units require the same pressure test criteria to be applied. The acceptance of the test must hold pressure without any variation in pressure using a closed loop system for a minimum set time of 5 minutes.

All pressure test equipment must be suitable for testing and have current certificates of calibration.



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