Chubb Information Bulletin

Issue No: IB201905

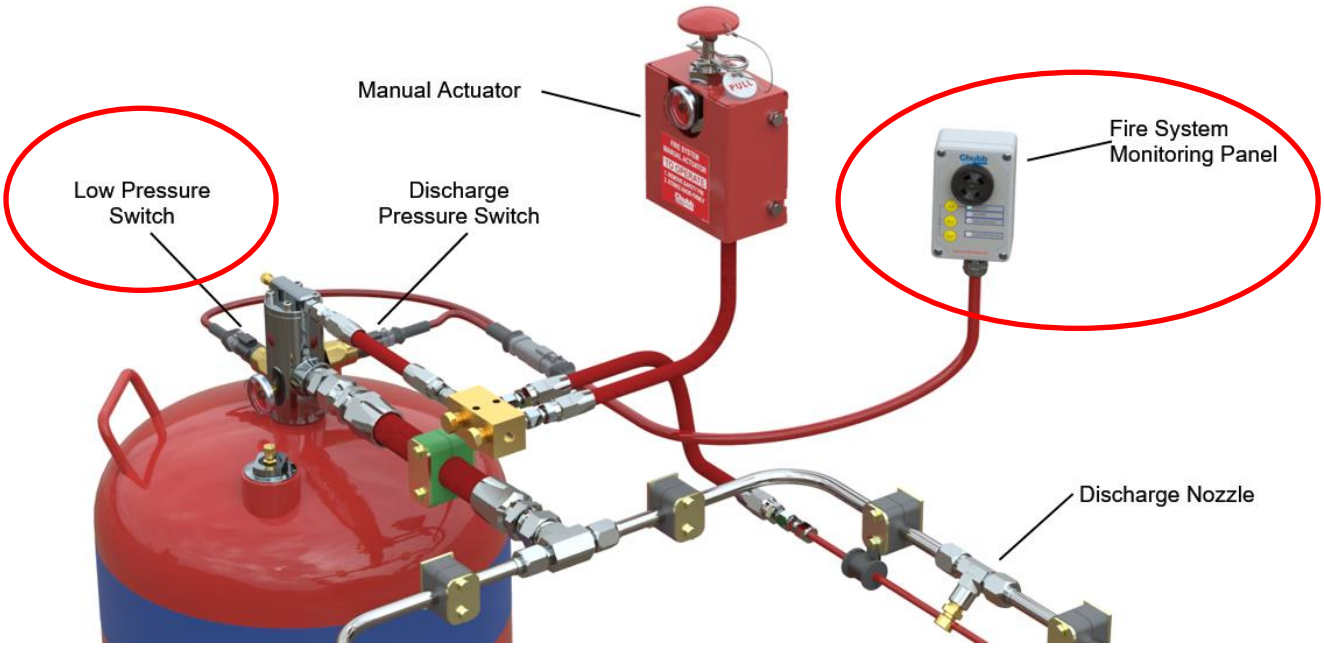
Subject: **PEFS F3 Pressure Switch Monitoring**

Product: PEFS F3 systems

Parts: 137060 (1550kPa pressure switch)

Reported Issue:

For new PEFS F3 systems, the fire alarm panel is registering a “Low pressure” alarm too often. Spurious alarms require investigation by the driver or service person which can adversely impact on productivity.



Low pressure alarm - This condition is initiated when an open circuit occurs on the low pressure switch. A low pressure condition will cause***;***

- **‘LOW PRESSURE’** LED to illuminate
- Audible alarm will sound once every 10 seconds

The ‘**LOW PRESSURE’** indication will automatically clear when the suppression system pressure returns to normal.

The PEFS F3 system has an operating pressure of 1700kPa. The current low pressure alarm switch is set to open circuit @ 1550kPa.

This is the same pressure differential that our previous PEFS system was operating at - 1350kPa operating pressure with low pressure alarm @ 1200kPa (150kPa difference).

Investigation:

1. Pressure switch

   The pressure switch Chubb supplies with the PEFS F3 system was chosen because of its quality and accuracy (tolerance & hysteresis). After several reports of low pressure alarms, a random sample of stocked switches were tested.

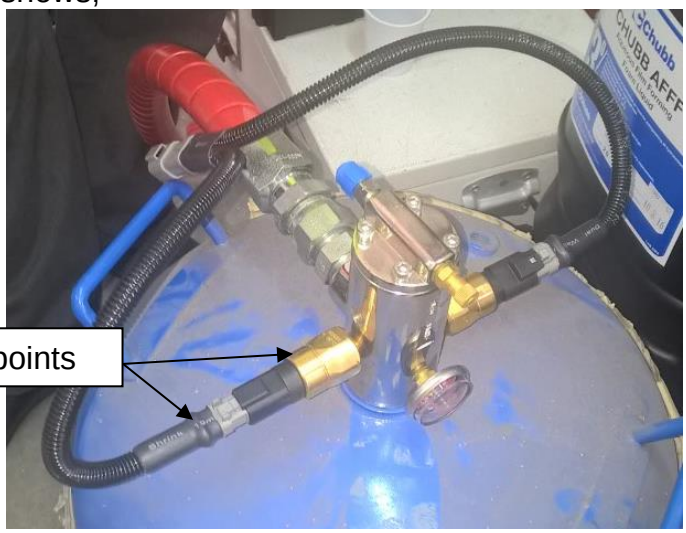
   Result: All switches tested within tolerance for both rising and falling pressures.

   Action: None

2. Cable and connectors

   In instances where our technicians have attended breakdowns related to “Low Pressure” alarms the cable and connections are normally inspected and tested for continuity.

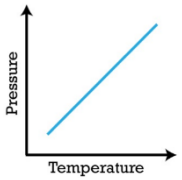
   Result: The instances of cable damage or wear is minimal but there has been a number of reports that some connectors have been damaged as a result of continual vibration/stress over time. The damage, and in some cases, breakage has occurred at the mating connector and could be attributed to the length of the connector arrangement, the bend radius of the cable, and the method of securing as the following example shows;



   Action: Inspect cables, conduit, harnesses and connectors at each service routine for signs of stress associated with clamping methods.

3. Pressurising procedure

   Pressure in our system will change when temperature changes. Since 2007, Chubb has included pressuring guidelines within our installation and maintenance manuals that assist our technicians in determining the pressure a system should be charged in consideration of the ambient temperature at the time. Example for our PEFS F3 system which has a nominal pressure of 1700kPa @ 21°C;



Ambient Temperature (°C)	Charge Pressure (kPa)
5	1602
10	1633
15	1663
21	1700
25	1725
30	1755
35	1786
40	1816
45	1847
50	1878

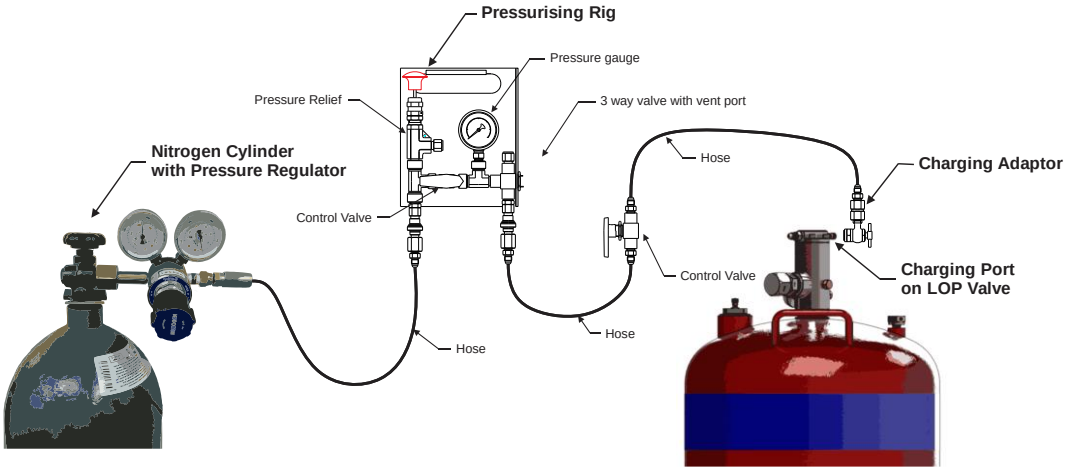
On a 30°C day →

← Pressurise the system to 1755kPa

Table 14 - PEFS F3 cylinder charging pressure versus ambient temperature

In the above example, if the ambient temperature was to drop 20°C overnight, the system pressure is likely to also drop back to 1633kPa. However if the system was pressurised to 1700kPa when it was 30°C then if the pressure was to drop 20°C overnight then the monitoring panel is likely to indicate a low pressure warning.

Result: More detailed pressurising instructions has been added to the PEFS F3 product manuals in consideration of temperature changes and their acute effect on pressure. When pressurising a LOP system it is important to use an in line gauge and leave the pressure source connected after the working pressure is reached for no less than a minute.

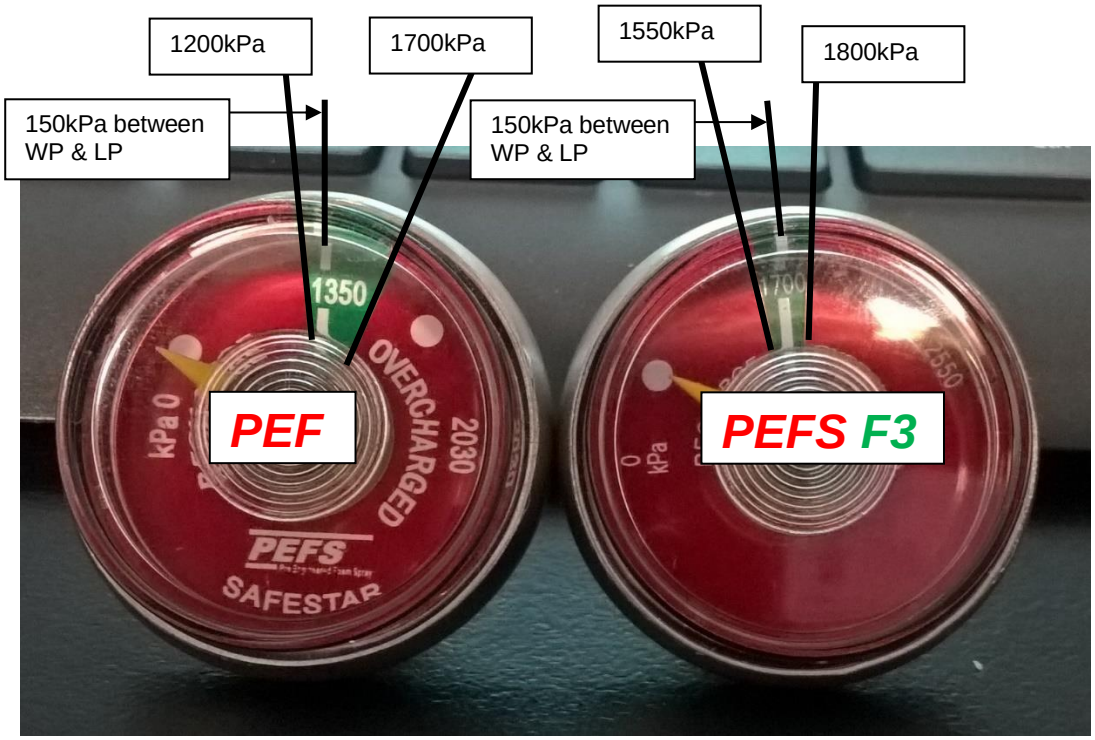


Action: Care must be taken to ensure system is pressurised to correct operating pressure.

4. Pressure Indicators

The new PEFS F3 pressure indicator has the same 150kPa pressure gap between operating pressure and low pressure that the previous PEFS system had. The end of the green sector (left side) indicates the pressure at which the low pressure switch will operate.

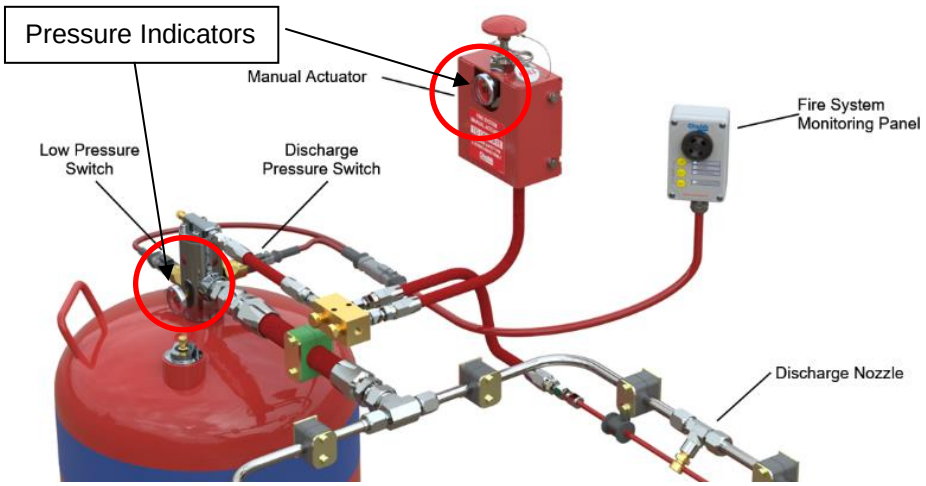
The PEFS F3 indicator does not have the same gap between operating pressure and the end of the green sector as the previous PEFS system had. See example below.



Result: If a system is not pressurised in accordance with the recommendations provided in our manuals and/or a significant temperature change occurs in a short period of time, there is a possibility that a “low pressure” alarm will activate.

Note: This dynamic can occur with any type of foam spray system.

LOP systems can also be installed with multiple pressure indicators (see below) but due to the effects of temperature, age and tolerances, not all of the indicators may read the same pressure. A wide green band or (pressure tolerance) is always needed in this application.



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A review of field service practices has revealed that technicians have been resolving low pressure alarms by pressurising systems over the operating pressure mark on the indicator to offset any pressure drop that may occur over time. The new PEFS F3 indicator has less of a gap on the right side of the green sector so the over pressurising practice has been less effective at resolving nuisance alarms. The reduced gap is due to the PEFS F3 working pressure being closer to our cylinders' maximum design pressure.

Specifications

Part Number	26023
Description	Valve Assembly LOP PEFS F3
Height	121 mm
Width	81 mm
Diameter	50 mm
Depth	79mm
Working Pressure	1700 kPa @21°C
Maximum Working Pressure	1.86 MPa @15°C 2.2 MPa @65°C

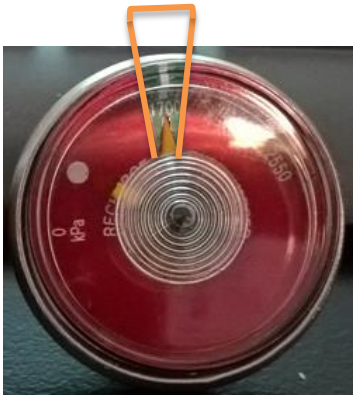
Action: Temperature testing has been carried out in our factory and the results show that without a larger tolerance area on the overcharge side of the indicator, 150kPa may not be enough of a gap between operating pressure and low pressure alarm for this application.


To increase the gap, more fire performance testing needs to be carried out on all of Chubb's cylinder sizes at even lower pressures. This project is currently underway and some successful results have been obtained at a lower pressure of 1450kPa (Testing is still ongoing).

Until a permanent solution is deployed and where continual nuisance faults are being experienced, the PEFS 1450kPa (Part No. 87067) switch may be substituted for the PEFS F3 1550kPa switch. In extreme conditions the PEFS 1200kPa (Part No. 87066) switch may be used.

Low pressure alarms occur automatically and provide the operator a visual and audible warning notification via the installed fire panel. A 1450kPa / 1200kPa pressure switch will still be able to warn operators of a drop in system pressure related to a moderate or sudden system pressure loss. Provided equipment operators continue to perform the recommended daily/shift start/seat change inspections, any slow leak in the system will be identified before the equipment is operated.

Recommended operator daily/shift checks:

Item	Action	Description
System pressure check	Check all cylinder valves and LOP manual actuator pressure indicators are visible and read within the normal range (green sector).	
Manual actuators	(a) Check that all pull pins are in place and secure. (b) Physically check that all manual actuators are secure, clean, undamaged and accessible.	
Fire panel	(a) Check that all indicators show normal condition. (b) Check that all panels are secure, clean, undamaged and accessible.	

Issue Date: 22 October 2019

Updated: 8 November 2021