# Bermad Diaphragm Type, Direct Acting Pressure Relief Valve / Fire Pump Casing Relief Valve

## Model: FP-3HC-0

# Installation Operation Maintenance Manual (IOM)

Rev. 09.04.2020

## Safety First

BERMAD believes that the safety of personnel working with and around our equipment is the most important consideration. Please read all safety information below and any other relevant source before attempting to perform any maintenance function.
Comply with all approved and established precautions for working with your type of equipment and/or environment. Authorized personnel should perform all maintenance tasks.
Prior to performing a procedure, read it through to the end and understand it. If anything is unclear, ask the appropriate authority. When performing a procedure, follow the steps in succession without omission.

## 1. Description

Bermad FP-3HC-0 Pressure-Relief Valve is an adjustable direct acting, diaphragm type, pressure relief valve, automatically relieving at the chosen pre-set inlet pressure. It is suitable to for use as a pressure safety relief valve (PSV) downstream of a pressure control valve, a thermal pressure relief valve for piping systems or as a Fire Pump Casing Relief Valve.

## 2. Specifications

2.1 **Rated Pressure**: 25 bar / 365 psi
2.2 **Temperature rating**: 80°C / 180°F (max water temperature)
2.3 **Process Connections**: 3/4" ISO-7 Rp
2.4 **Pressure gauge connection**: 1/4" NPT (F)

**Table 1 Adjustment Range:**

| Model | Adjustment Pressure Range | | In field adjustment |
|---|---|---|---|
| | bar | psi | 1 turn of adjusting screw = approx. |
| FP-3HC-0-16 | 1 - 16 | 15 - 235 | FP-3HC-0-16 1-16 15-235 |
| FP-3HC-0-30* | 7 - 25 | 100 - 365 | 1.8 bar/25.7 psi |

* With high pressure setting kit

## 3. Installation

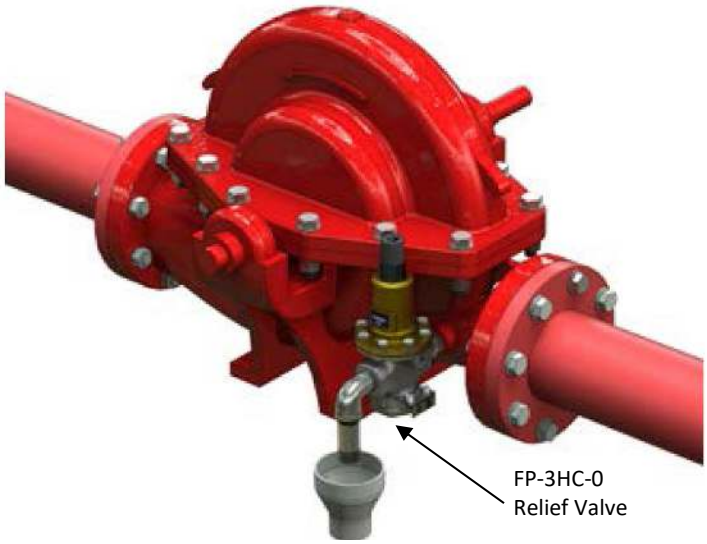
Be sure to use qualified personnel when installing, operating and maintaining this valve.
Prior to installation inspect the valve for any damage that may have been caused during shipment and ensure all ports are clean and free from any obstructions.

The valve can be installed in any orientation, vertical or horizontal.
Be sure not to install the valve at any low point or at the bottom of the piping, where accumulated debris might enter the valve and hamper correct functioning.
The valve will occasionally open to release over pressure, expelling water to the atmosphere. Where relevant, install piping to direct the expelled water to a preferred drainage point.

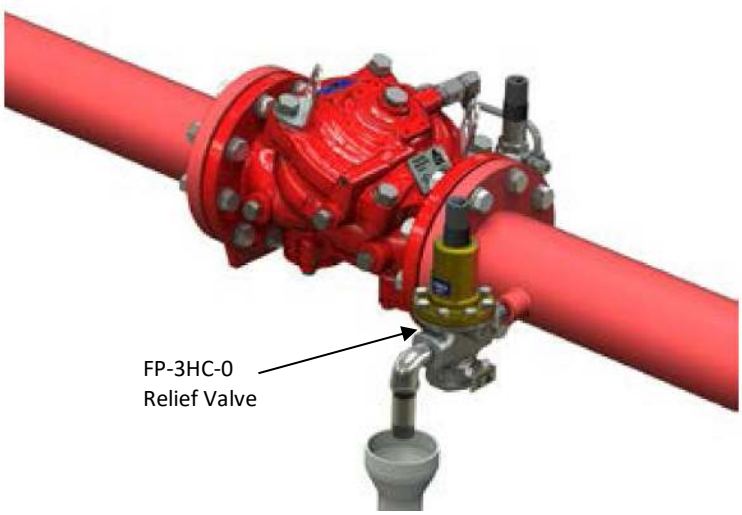
**NOTE**: Model FP-3HC-0 is suitable for minimum flow fire pump applications, it is not suitable for discharging the full-rated pump capacity of a fire pump. For full rated fire pump relief valves please select fire pump relief valve sized as per NFPA 20.

3.1 Before installing the valve, flush the pipeline to remove any scale, debris, etc.
**Warning**: not flushing the line may result in rendering the valve inoperable.
3.2 The BERMAD FP-3HC-0 relief valve maybe installed in any position, vertical horizontal or otherwise.
3.3 Select the valve position and orientation that will facilitate the future maintenance, adjustment and inspection.
3.4 Install the valve in the pipeline with the valve flow arrow on the body in the proper direction.
3.5 Ensure an unrestricted relief passage from the valve to the atmosphere.
3.6 Install a drainpipe with appropriate fitting facing downward at the FP-3HC-0 valve discharge port to prevent blockage.
3.7 Install the valve above or at the middle of the pipeline to avoid the accumulation of debris upstream of the FP-3HC-0 valve.

**Figure 1: Relief Valve Typical Installation**




**Fire Pump Casing Relief Valve Installation**




**Pressure Relief Downstream of Pressure Control / Reducing Valve**

## 4. Operation

The FP-3HC-0 Pressure Relief valve is held closed by the force of the spring above the diaphragm attached to the closure disc.
The inlet pressure is sensed by the diaphragm, when the inlet pressure force applied under the diaphragm exceeds the adjusted spring force, the valve will open to relieve any overpressure.
When the inlet pressure force drops to below the force of the spring the valve will return to close.

### 4.1 Re-adjustment

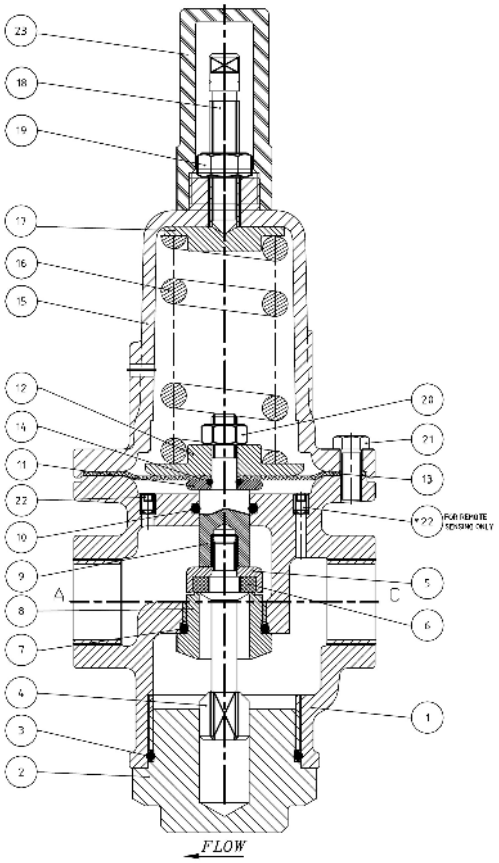
Tools required: adjustable wrench
The valve is pre-set before leaving the factory, the set point is clearly indicated on the setting sticker on the valve cover.
If the set point is to be adjusted follow the instructions below:

4.1.1 Unscrew the tamper proof cap (item 23, fig.2) exposing the adjusting screw and loosen the locknut (item 19, fig. 2)
By alternately turning the adjusting screw (item 18, fig.2) a half turn and then reading the outlet pressure, gradually adjust the pressure: Counter-clockwise to decrease (-) the inlet pressure or Clockwise to Increase (+) the inlet pressure.

4.1.2 If needed replace the setting indication sticker to display the new setting value.

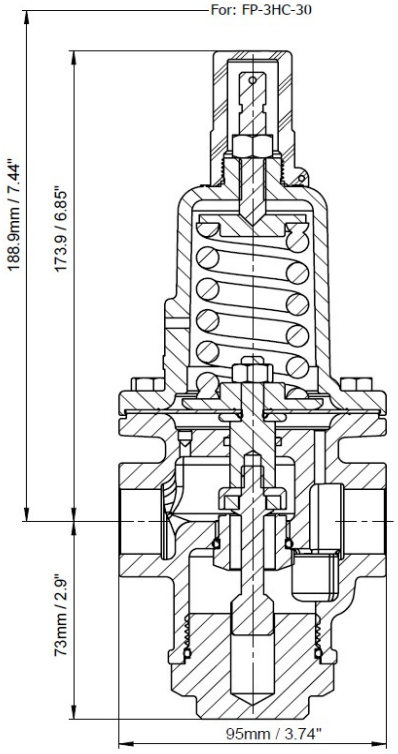
4.1.3 The pressure has been set re-tighten the locknut and replace the tamper proof cap.

**Figure 2: FP-3HC-0 Relief Valve Cross Sectional Drawing**




| No. | ITEM |
|---|---|
| 1 | Valve Body |
| 2 | Lower Plug |
| 3 | Lower Plug O-Ring |
| 4 | Lower Guide |
| 5 | Seal Housing |
| 6 | Seal |
| 7 | Seat O ring |
| 8 | Seat |
| 9 | Shaft |
| 10 | Shaft O ring |
| 11 | Diaphragm Washer |
| 12 | Diaphragm retainer |
| 13 | Diaphragm |
| 14 | Diaphragm O ring |
| 15 | Cover |
| 16 | Spring |
| 17 | Upper spring guide |
| 18 | Adjusting screw |
| 19 | Locking nut |
| 20 | Nut |
| 21 | Bolt |
| 22 | Socket screw |
| 23 | Tamper proof cap |

**Figure 3: FP-3HC-0 Relief Valve Product Dimensional Drawing**



## 5. Maintenance

The FP-3HC-0 valve is to be inspected, tested and maintained in accordance with the Maintenance Instructions of the plant, this Maintenance Manual, as well as the Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems, NFPA 25.

The following inspection procedure shall be performed in addition to any specific requirements of the NFPA 25 and also to any requirements of the authorities having jurisdiction.
Any malfunction must be immediately corrected. The installing contractor or product supplier should be contacted regarding any questions. It is recommended that the FP-3HC-0 relief valve be inspected, tested, and maintained by a qualified inspection service

### 5.1 Quarterly Inspection

5.1.1 Visually check for any evidence of damage or leak
5.1.2 The pressure gauge should show a pressure below that of the set pressure (see setting sticker on the valve cover)
5.1.3 Visually check for any obstructions in the discharge drain port
5.1.4 If a strainer is installed before the valve, clean or flush any accumulated debris within it.

### 5.2 Abnormal Conditions

| Symptom | Probable Cause | Remedy |
|---|---|---|
| Leakage from discharge/drain port | High supply pressure | Check supply pressure gauge |
| | Debris obstruction on seal | Flush the valve by releasing the adjusting screw |
| | Worn or damaged seal | Replace seal (item 6, fig.2) |
| Valve fails open | Blocked internal trim | Disassemble valve and clear any obstructions |
| | Blocked sensing port | Remove valve cover and diaphragm and clear any obstructions |
| Leakage shows on valve cover | Damaged or worn diaphragm | Replace diaphragm |
| | Loose diaphragm assembly | Tighten diaphragm holding nut (item 20, fig.2) |