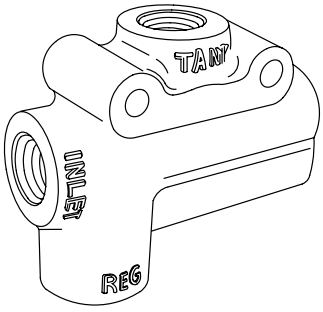
Pressure and Flow Control Valves

RM3 Overload Relief Valve

The RM3 is an internally pilot operated valve which provides pressure protection to the hydraulic system. Pressure settings are preset at the factory and are available from 35-175 bar (500-2500 psi) in increments of 17 bar (250 psi). Tank line pressures are additive to relief valve settings.

Maximum operating pressure is 175 bar (2500 psi). Approximate weight is 1,1 kg (2.5 lb.).



FM3 Flow Control and Relief Valve

The FM3 is a bypass type pressure compensated flow control and a relief valve. It is used in applications where a constant actuator speed is required in the face of varying pump output . . . for example, in power steering.

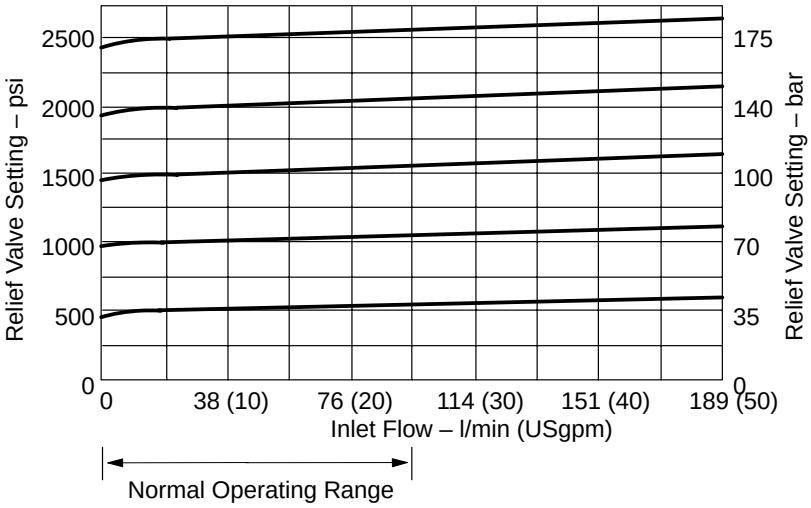
All inlet oil in excess of the specified regulated flow is diverted to the tank port. Pressure protection is provided by an integral relief valve which is preset at the factory. Available controlled flow rates and relief valve settings are shown in the model code on page 26. Tank line pressures are additive to relief valve settings.

Maximum operating pressure is 175 bar (2500 psi). Pressure drop between the inlet and regulated flow port is about 2.8 bar (40 psi). Approximate weight is 1,1 kg (2.5 lb.).

Typical Performance **Based on 60 SUS Viscosity Oil**

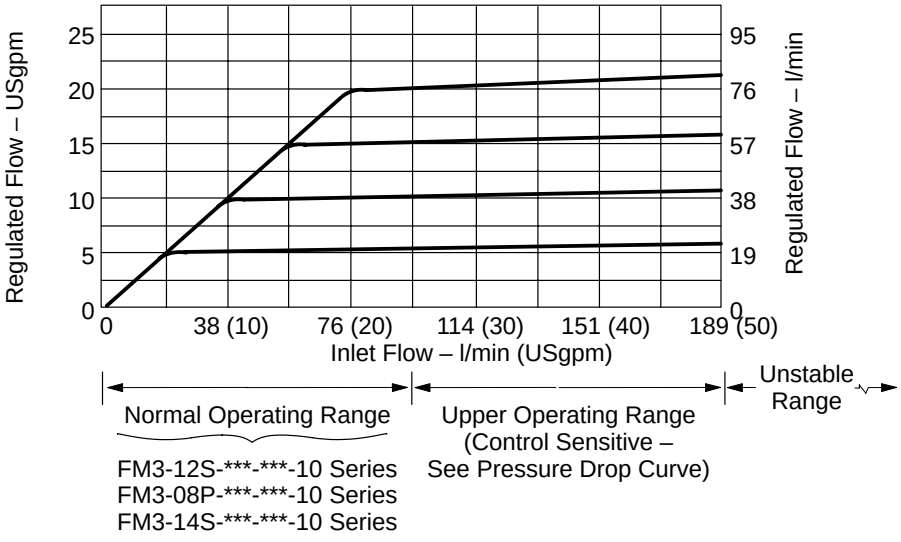
RM3 & FM3 Series

Relief Valve Pressure Override Characteristics



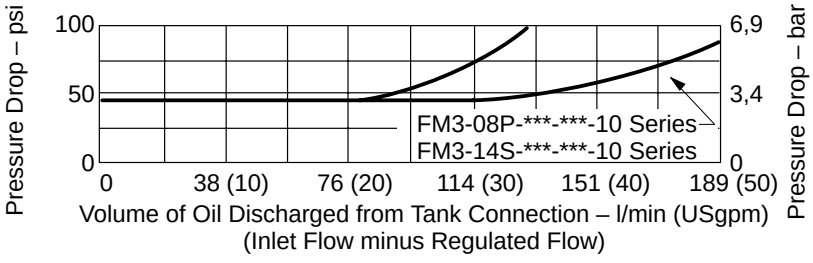
FM3 Series

Flow Control Characteristics



FM3 Series

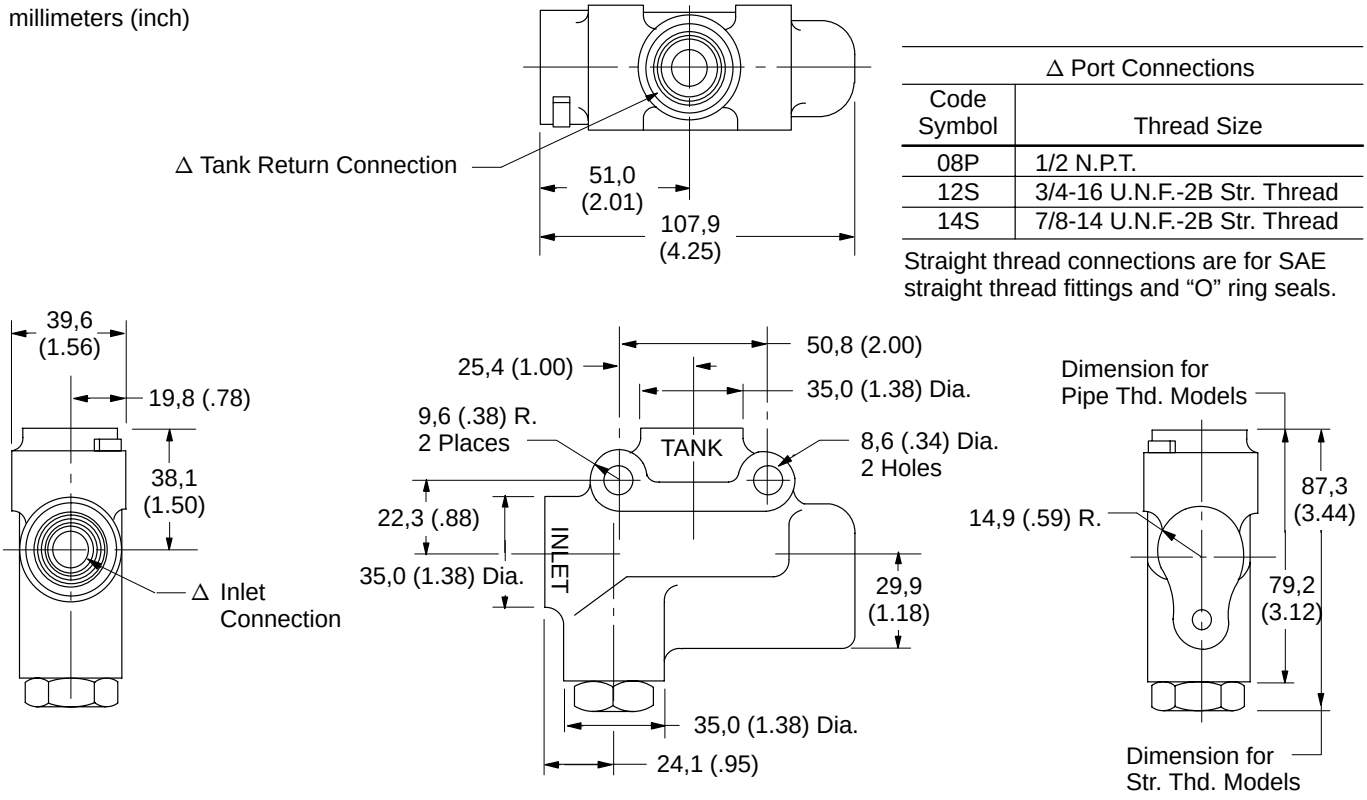
Pressure Drop – Inlet to Tank



Installation Dimensions

RM3 Series

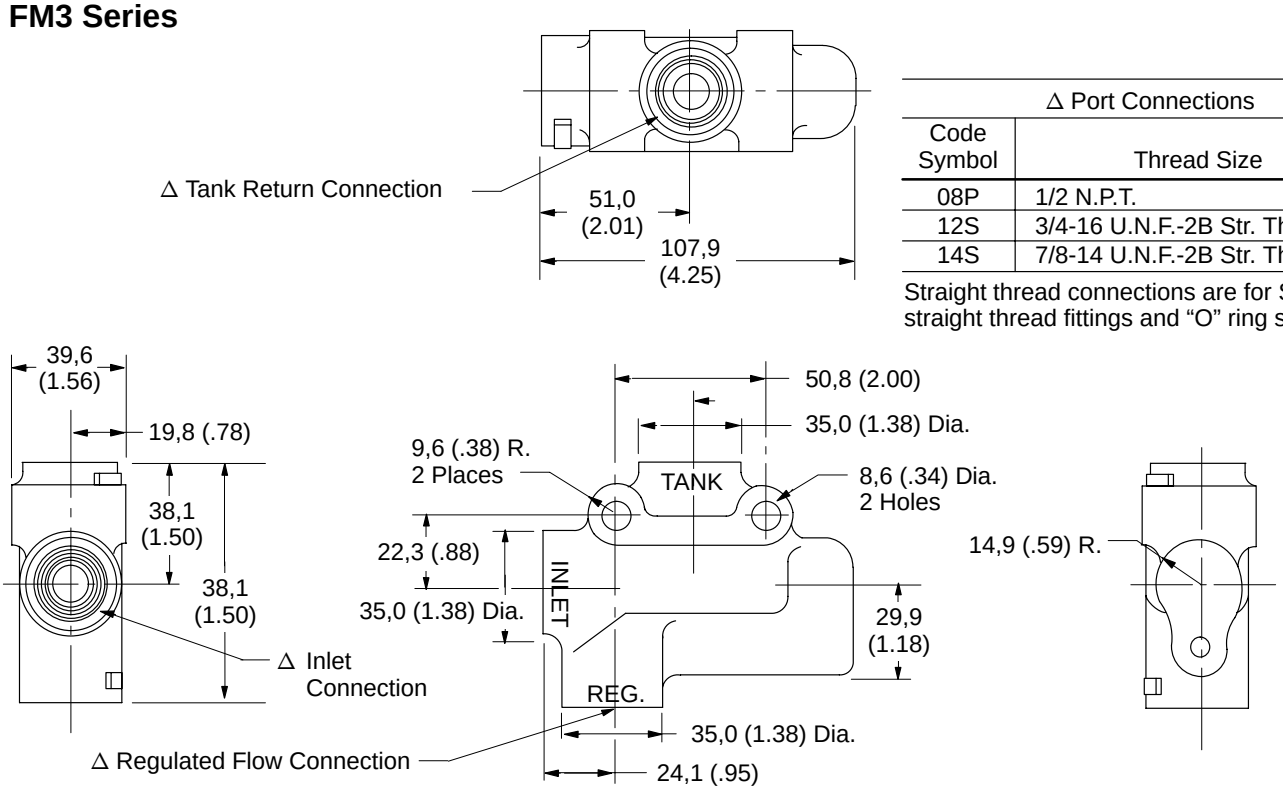
millimeters (inch)



Δ Port Connections	
Code Symbol	Thread Size
08P	1/2 N.P.T.
12S	3/4-16 U.N.F.-2B Str. Thread
14S	7/8-14 U.N.F.-2B Str. Thread

Straight thread connections are for SAE straight thread fittings and “O” ring seals.

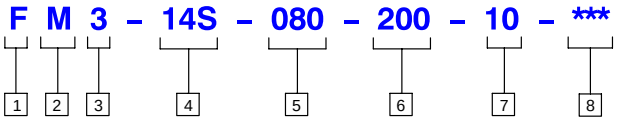
FM3 Series



Δ Port Connections	
Code Symbol	Thread Size
08P	1/2 N.P.T.
12S	3/4-16 U.N.F.-2B Str. Thread
14S	7/8-14 U.N.F.-2B Str. Thread

Straight thread connections are for SAE straight thread fittings and “O” ring seals.

Model Code



1 Valve Type
F = Flow Control & Relief
R = Relief

2 Mobile Design

3 Series Designation

4 Port Connections
08P = 1/2 NPT Thread
12S = 3/4 SAE Str. Thread
14S = 7/8 SAE Str. Thread

5 Controlled Flow Rates (FM3 series only)

020 = 2 gpm	130 = 13 gpm
040 = 4 gpm	160 = 16 gpm
060 = 6 gpm	200 = 20 gpm
080 = 8 gpm	250 = 25 gpm
100 = 10 gpm	

6 Relief Valve Setting

050 = 500 psi	175 = 1750 psi
075 = 750 psi	200 = 2000 psi
100 = 1000 psi	225 = 2250 psi
125 = 1250 psi	250 = 2500 psi
150 = 1500 psi	

7 Design Number
Subject to change. Installation dimensions remain the same for designs 10 thru 19.

8 Special Features Suffix

Application Guidelines

Pressure Drop

Select the valve that has minimum pressure drop at the required flow condition. Performance curves on preceding pages show approximate pressure drops (ΔP) through valves using 100 SUS fluids having .865 specific gravity. Pressure drop for fluids of other viscosities is approximately:

Viscosity (SSU)	75	150	200	250	300	350	400
% of Δ from Curve (Approx.)	93	111	119	126	132	137	141

For any other specific gravity, (G_1), pressure drop (ΔP_1) will be

$$\Delta P_1 = \Delta P \left(\frac{G_1}{G}\right).$$

For pressure drop data beyond the published curves in this catalog, a close proximation can be made by reading the pressure drop at 1/2 the required flow and multiplying it by 4.

When installing a valve, connecting lines should have as few bends and fittings as possible. High pressure lines and fittings restrict flow and may result in excessive pressure drop through the system. They should be used only where necessary in a pressure line.

Select quality tubing with as large an ID as economically possible. Avoid long lines and sharp bends. A good bend radius is $2^1/_2$ to 3 times the tube ID.

The increased pressure drop in sharper bends is caused by abrupt changes in flow direction, particularly in the inner edge of flow. Even in large-radius bends, pressure drop increases due to an increase in turbulence.

Circuit design to eliminate undesirable pressure drop can never be 100 percent effective. Some energy losses through heat generation must be accepted. Therefore, wherever possible, valves should be placed in the open where heat can be dissipated readily. If heat is added to the system faster than it can be rejected, some method of forced fluid cooling such as air- or water-cooled heat exchangers may be required.

Piping

Lines should be installed in such a way that high vehicle flexure does not cause stresses in the tubing which can be transmitted to valve port fittings.

When applications incorporate long hydraulic lines, or lines providing high velocity, the use of larger capacity lines is recommended to reduce line losses. Lines should not be smaller that the nominal port sizes shown in installation drawings. Flow capacities of piping are shown in catalog 694.

Connections should always be tight, but not to the point of distortion, to prevent air from entering the system. Particular care must be used to employ joints, seals and gaskets that will not leak or deteriorate. See preceding “Pressure Drop” section for additional information on piping.