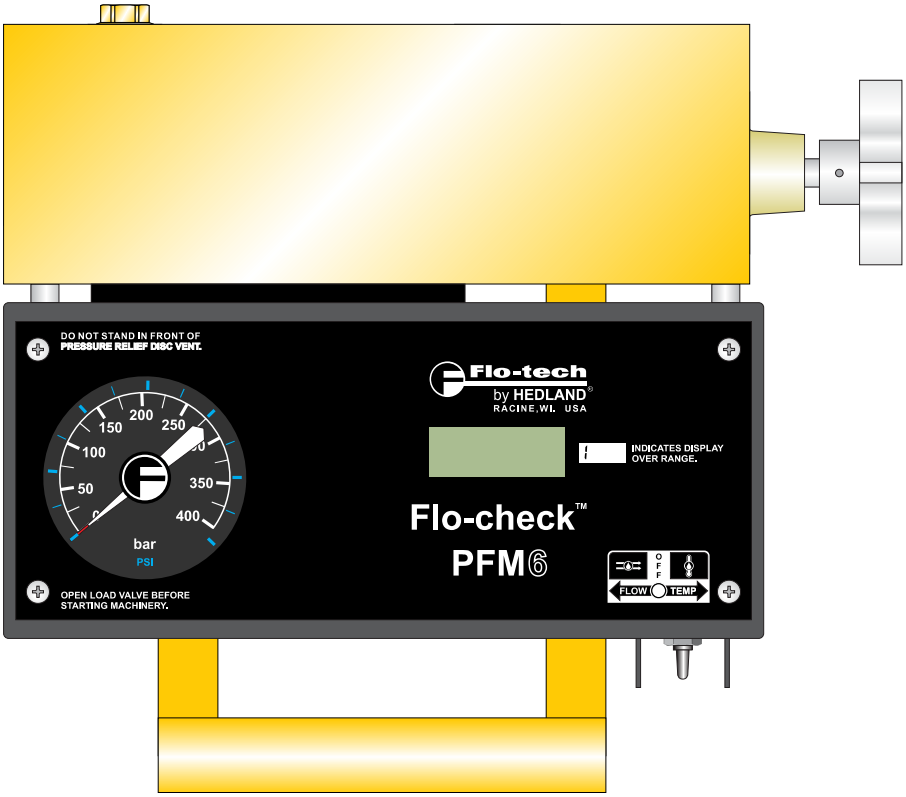
Flo-tech
Hydraulic Diagnostic Products

PFM Portable Hydraulic Testers

PFM6, PFM6BD and PFM8



Badger Meter

TUR-UM-00730-EN-02 (August 2014)

User Manual

CONTENTS

INTRODUCTION

Flo-tech Portable Hydraulic Testers are designed to provide fast diagnostic troubleshooting of hydraulic systems and components. These compact, self-contained testers feature laboratory accuracy and provide flow, temperature, pressure and optional power measurements simultaneously from one point.

Flo-tech offers three models, all available in up to five flow ranges and three port sizes.

PFM6 Digital Hydraulic Tester

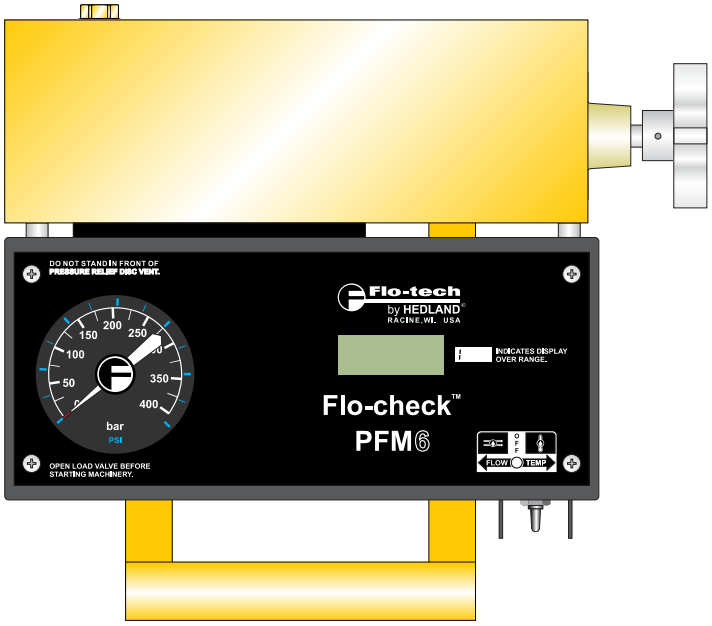


Figure 1: Digital hydraulic tester

Features

- Accuracy of ±1% of full flow range
- 3-1/2 digit LCD display for flow and temperature
- Helical tube pressure gauge
- One toggle switch to control power and select flow and temperature
- Loading valve with fingertip control of pressure up to 6000 psi (414 Bar)
- Platinum resistive temperature sensor
- Internal over-pressure burst disc protection

PFM6BD Bi-directional Hydraulic Tester

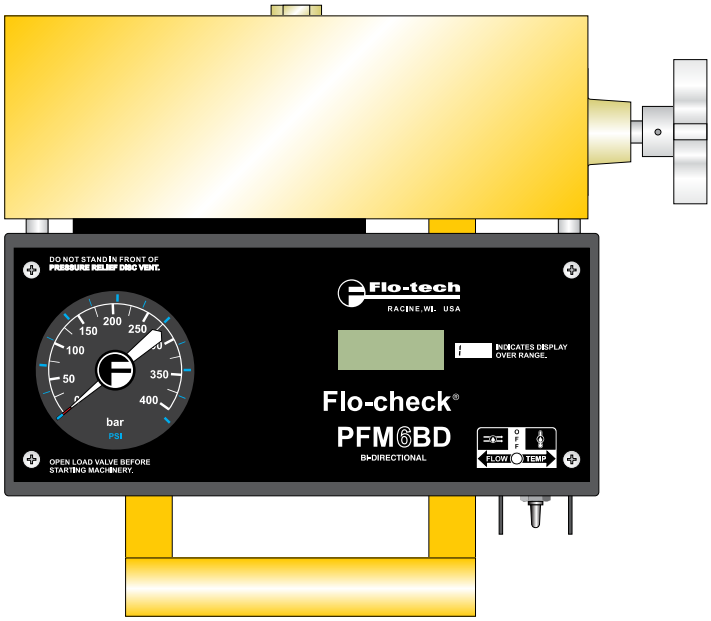


Figure 2: Bi-directional hydraulic tester

Features

- Bi-directional testing
- Low pressure drop
- Accuracy of ±1% of full flow range
- 3-1/2 digit LCD display for flow and temperature
- Helical tube pressure gauge
- One toggle switch to control power and select flow and temperature
- Loading valve with fingertip control of pressure up to 6000 psi (414 Bar)
- Platinum resistive temperature sensor
- Internal over-pressure burst disc protection

PFM8 Digital Hydraulic Tester & Dynamometer

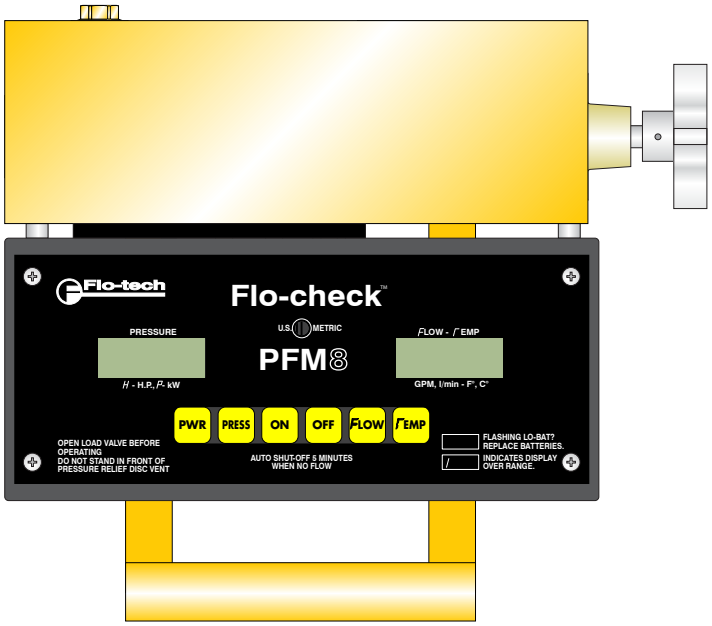


Figure 3: Digital hydraulic tester and dynamometer

Features

- Accuracy of ±1% of full flow range
- 3-1/2 digit LCD displays
- Digital pressure readings
- Membrane switch to select flow, temperature, pressure or power
- Front panel switch to select U.S. or metric readings
- Loading valve with fingertip control of pressure up to 6000 psi (414 Bar)
- Platinum resistive temperature sensor
- Internal over-pressure burst disc protection

CALIBRATION

Testers are calibrated with a 32 cSt (150 SUS) hydraulic oil. Standard calibration is done using 5 points and is traceable to NIST, ISO 9001. An optional 10 point calibration can be performed for increased accuracy.

SERIES/MODEL NUMBER DESIGNATIONS

Series	Model Number *	Nominal Port Size	Flow Rate	Power HP (kW)
PFM6-15	F5080 (CE) - XXX	SAE 12	1…15 GPM	N/A
PFM6-30	F5079 (CE) - XXX	SAE 12	2…30 GPM	
PFM6-60	F5078 (CE) - XXX	SAE 16	3…60 GPM	
PFM6-85	F5077 (CE) - XXX	SAE 16	4…85 GPM	
PFM6-200	F5076 (CE) - XXX	SAE 24	7…199.9 GPM	
PFM6-15	F5110 (CE) - XXX	G 3/4	4…56 LPM	N/A
PFM6-30	F5111 (CE) - XXX	G 3/4	7.5…113.6 LPM	
PFM6-60	F5112 (CE) - XXX	G 1	12…227 LPM	
PFM6-85	F5113 (CE) - XXX	G 1	15…321 LPM	
PFM6-200	F5114 (CE) - XXX	G 1-1/2	26…757 LPM	
PFM6BD-60	F5082 (CE) - XXX	SAE 16	3…60 GPM / 12…227 LPM	N/A
PFM6BD-85	F5083 (CE) - XXX	SAE 16	4…85 GPM / 15…321 LPM	
PFM6BD-200	F5084 (CE) - XXX	SAE 24	7…199.9 GPM / 26…757 LPM	
PFM8-15	F5061	SAE 12	1…15 GPM / 4…56 LPM	52.5 (39)
PFM8-30	F5058	SAE 12	2…30 GPM / 7.5…113.6 LPM	105 (78)
PFM8-60	F5052	SAE 16	3…60 GPM / 12…227 LPM	210 (157)
PFM8-85	F5053	SAE 16	4…85 GPM / 15…321 LPM	98 (222)
PFM8-200	F5054	SAE 24	7…199.9 GPM / 26…757 LPM	700 (522)

* Replace XXX with Psi, BAR, KG/CM2 or MPA to specify complete model number.

Table 1: Model number designations

⚠CAUTION

READ INSTRUCTIONS THOROUGHLY BEFORE INSTALLING THE TESTER. IF YOU HAVE ANY QUESTIONS REGARDING PRODUCT INSTALLATION OR MAINTENANCE, CALL YOUR LOCAL SUPPLIER OR THE FACTORY FOR MORE INFORMATION.

INSTALLATION

⚠CAUTION

THE INFORMATION IN THIS MANUAL IS FOR GENERAL APPLICATION ONLY. ANY GUIDELINES FURNISHED BY THE MANUFACTURER OF THE MACHINE'S HYDRAULIC COMPONENTS SHOULD BE FOLLOWED. SPECIFIC SYSTEMS MAY REQUIRE SPECIFIC TEST PROCEDURES.

Install the PFM6, PFM6BD or PFM8 tester at any location in the hydraulic circuit with the flow from *IN* to *OUT* as marked near the ports of the flow meter. The *IN* and *OUT* ports on the PFM6BD indicate the primary flow direction. It is advisable to keep any elbows, tees, valves, or other obstructions, at least 12 inches (31 cm) away from the inlet and outlet ports to preserve the accuracy of the flow measurement. Use quick disconnect couplings for easy connections and to keep tester sealed and clean when not in use.

See *"Test Procedures" on page 9* for typical test placement.

OPERATION

⚠WARNING

ALL TESTERS ARE SHIPPED WITH THE LOADING VALVE IN THE CLOSED POSITION. THE LOADING VALVE MUST BE OPENED FULLY BEFORE INITIATING FLOW AND TESTING OF THE HYDRAULIC CIRCUIT. TURN THE LOADING VALVE HANDLE COUNTERCLOCKWISE TO THE FULLY OPEN POSITION. FAILURE TO OPEN THE LOADING VALVE FULLY CAN RESULT IN INJURY TO PERSONNEL AND/OR DAMAGE TO THE EQUIPMENT.

The PFM6 and PFM6BD testers use a three position, single toggle switch to turn on the power and select to display either flow or temperature readings. These models are factory calibrated for either U.S. or metric readings.

The PFM8 testers can be changed in the field between U.S. and metric readings via a slide switch located in the center of the front panel. Use a small pointed object to slide this switch to the desired position.

After selecting U.S. or metric, select power and display options are made via the membrane switches. Press **ON** to display pressure on the left side and flow on the right side. Press **TEMP** to display the temperature on the right side. Press **PWR** to display the power on the left side.

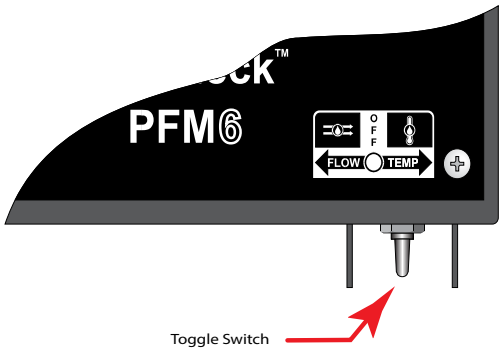


Figure 4: PFM6 and PFM6BD toggle switch

Display	Function
F	Flow
T (stylized)	Temperature
H	Horsepower
P	Kilowatt

NOTE: If no flow has been present for five minutes, the power saver circuit will automatically shut the PFM8 off. Press **ON** to restore power.

To prolong battery life on all testers, turn off the tester when the tester is not being used. Either return the toggle switch to the **OFF** position on the PFM6 and PFM6BD models, or press **OFF** on the PFM8 model.

Once the tester has been installed, the pressure can be regulated by operation of the loading valve.

IMPORTANT

Always start with the loading valve open.

⚠WARNING

TURN THE LOADING VALVE HANDLE COUNTERCLOCKWISE TO OPEN BEFORE STARTING MACHINERY. INJURY TO PERSONNEL AND/OR DAMAGE TO THE EQUIPMENT CAN RESULT IF THE LOADING VALVE IS FULLY CLOSED.

⚠CAUTION

THE PFM6BD IS NOT DESIGNED FOR HIGH PRESSURE "DEADHEAD" (LOADING VALVE FULLY CLOSED) APPLICATIONS IN THE REVERSE DIRECTION. USAGE UNDER THIS CONDITION COULD LEAD TO LOADING VALVE FAILURE. UNDER SUCH CONDITIONS, MAXIMUM OPERATING PRESSURE IS LIMITED TO 2000 PSI (138 BAR).

The PFM6 and PFM8 testers are equipped with a poppet style loading valve. The PFM6BD testers use a spool design loading valve to accommodate bi-directional flow. The spool design requires more turns to go from total open to total close.

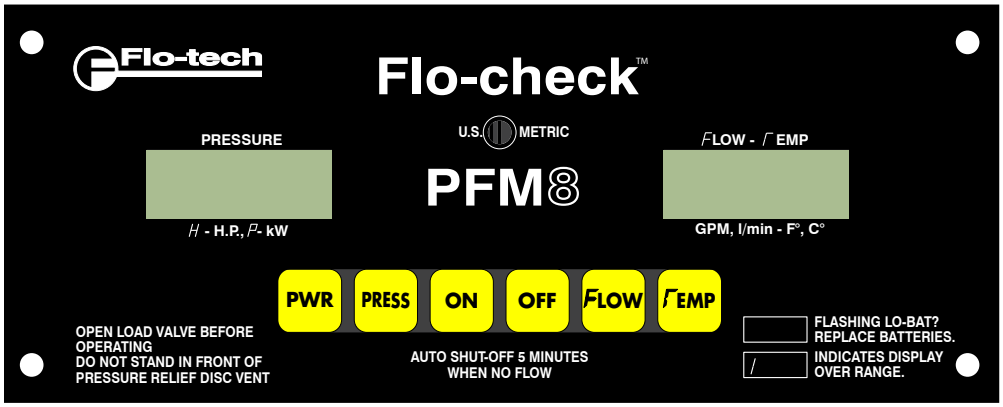


Figure 5: PFM8 slide and membrane switches

Pressure is displayed as follows:

PFM6	The gauge indicates pressure at the inlet port
PFM6BD	The gauge indicates pressure at the inlet port dependent on the direction of flow
PFM8	The pressure is displayed on the LCD. A minimum of 200 psi (14 kg/cm^2) is required to activate the display. The psi will increment in 10s (for example 200, 210, 220); kg/cm^2, bars or MPA will increment in single units (for example 141, 142, 143, etc.)

On all models, the battery voltage is affected by cold temperatures. Allow time for the circulating oil to warm the tester before critical measurements are taken. On the PFM6 and PFM6BD, a *LO BAT* signal on the display indicates a low battery condition. On the PFM8, a flashing colon on the display indicates a low battery condition. Replace the batteries with four AA alkaline batteries. See *"Battery Replacement" on page 15*.

TEST PROCEDURES

⚠WARNING

ALL TESTERS ARE SHIPPED WITH THE LOADING VALVE IN THE CLOSED POSITION. THE LOADING VALVE MUST BE OPENED FULLY BEFORE INITIATING FLOW AND TESTING THE HYDRAULIC CIRCUIT. TURN THE LOADING VALVE HANDLE COUNTERCLOCKWISE TO THE FULLY OPEN POSITION. FAILURE TO OPEN THE LOADING VALVE FULLY CAN RESULT IN INJURY TO PERSONNEL AND/OR DAMAGE TO THE EQUIPMENT.

⚠CAUTION

THE INFORMATION IN THIS MANUAL IS FOR GENERAL APPLICATION ONLY. ANY INFORMATION FURNISHED BY THE MANUFACTURER OF THE MACHINE'S HYDRAULIC COMPONENTS SHOULD BE FOLLOWED. SPECIFIC SYSTEMS MAY REQUIRE SPECIFIC TEST PROCEDURES.

General Information

The PFM6 and PFM6BD testers are designed to measure flow, pressure and temperature. The PFM8 testers are also designed to measure power.

The power measurements are derived from the product of flow and pressure. When using a PFM6 or PFM6BD, power can be calculated using the formulas in *"Hydraulic Formulas and Viscosity Information" on page 17*.

Standard Test Conditions

1. Install the PFM tester as described in one of the following test procedures:
   a. *"Pump Test" on page 10*
   b. *"Tee Test" on page 11*
   c. *"Control Valve, Cylinder and Hydraulic Motor Test" on page 12*
   d. *"Relief Valve in Separate Housing" on page 12*
   e. *"Relief Valves" on page 13*
2. Open the loading valve fully by turning the handle counterclockwise.
3. Start the pump and adjust it to rated speed.
4. To raise the system temperature, close the tester loading valve to develop a pressure somewhat below the relief valve pressure. Maintain pressure until the desired temperature is reached.
5. Open the tester's loading valve fully and proceed with the required test procedure.
6. The tester will display flow, pressure, temperature and power readings.

Pump Test

Install tee between the pump discharge port and the return line to the tank. Be sure the fluid path is only through the pump, the hydraulic test unit and back to the tank.

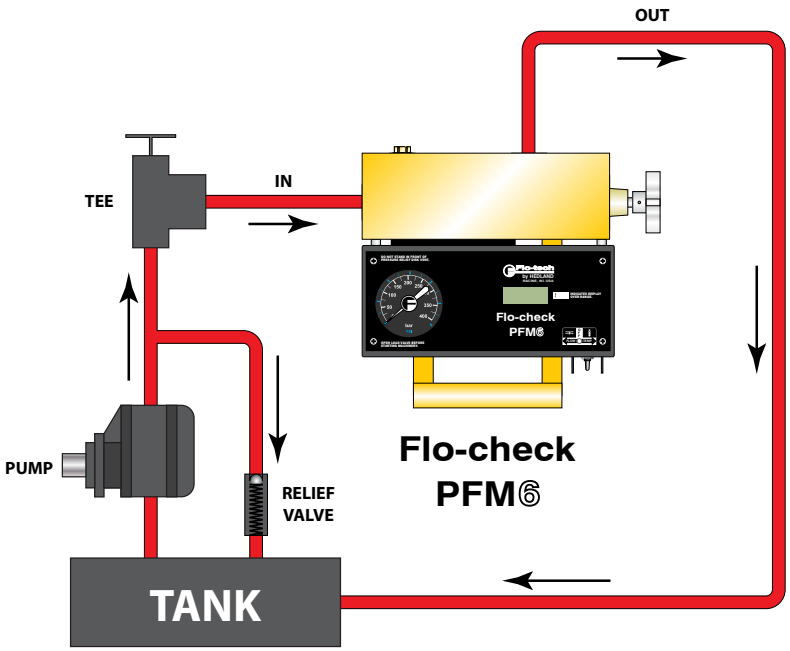


Figure 6: Pump test

1. Plug the line to the control valve.
2. Open the tester loading valve fully to read maximum pump flow at zero pressure.
3. Close the loading valve to increase pressure from zero pressure to rated or maximum pump pressure to determine pump condition.
4. Check the pump flow at rated pressure against the pump manufacturer's specifications. A decrease in flow from zero pressure to maximum pressure indicates the pump condition. A pump that delivers a constant low flow at zero pressure and at maximum pressure suggests suction problems.

Tee Test

Install tee between the pump and control valve. Connect the tee to the IN port of the PFM tester. The OUT port of the tester is connected to the tank. Pumps and relief valves can be isolated from the system and checked with the Tee Test.

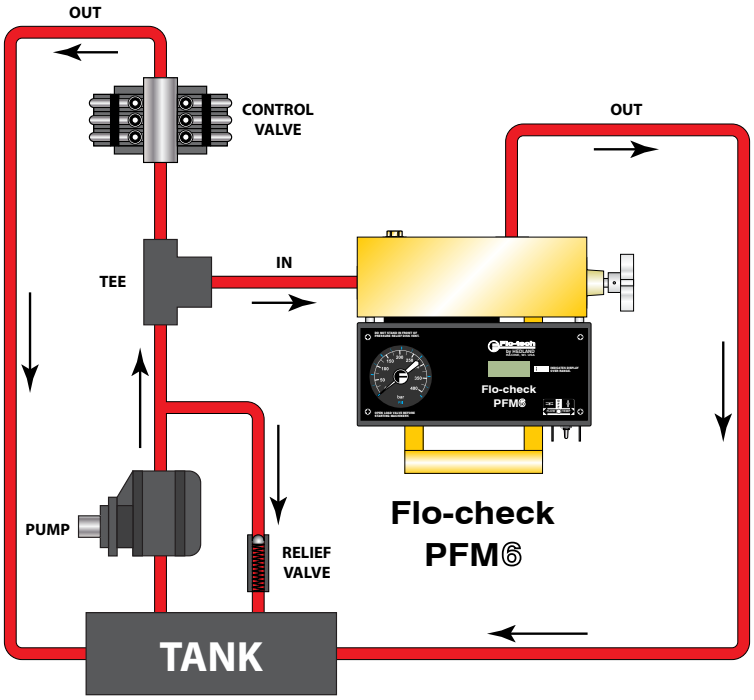


Figure 7: Tee test

⚠WARNING

INCREASE PRESSURE SLOWLY. THE RELIEF VALVE MAY NOW BE ISOLATED FROM THE HYDRAULIC CIRCUIT, AND SYSTEM PRESSURES HIGHER THAN THE RELIEF VALVE SETTING CAN RESULT IN INJURY TO PERSONNEL AND/OR DAMAGE TO THE EQUIPMENT.

1. Pump Test
   a. Plug the line to the control valve.
   b. Open the tester loading valve fully to read maximum pump flow at zero pressure.
   c. Close the loading valve to increase pressure from zero pressure to rated or maximum pump pressure to determine pump condition.
   d. Check the pump flow at rated pressure against the pump manufacturer's specifications. A decrease in flow from zero pressure to maximum pressure indicates the pump condition. A pump that delivers a constant low flow at zero pressure and at maximum pressure suggests suction problems.
2. Relief Valve Test (for relief valve in separate housing, see *"Relief Valve in Separate Housing" on page 12*.)
   a. Put a control valve into a power output mode with the output flow blocked, such as a cylinder at the end of its stroke.
   b. Close the tester loading valve while viewing the pressure. Pressure will increase until the relief valve opens. Record the pressure at this point. Repeat to check the relief valve adjustment.

Control Valve, Cylinder and Hydraulic Motor Test

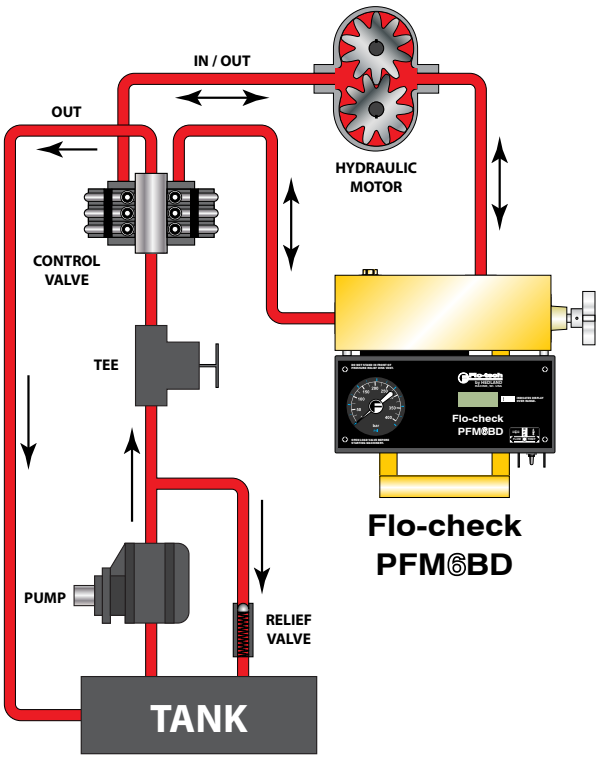


Figure 8: Control valve, cylinder and hydraulic motor test (PFM6BD)

1. Put one control valve in an operating position. Only one control valve should be in an operating position at any one time.
2. Slowly close the tester loading valve to achieve the pressure obtained in step 3 of *"Pump Test" on page 10* or Step 1c. *"Tee Test" on page 11* and record the flow. Repeat for all operating positions of all control valves.
   a. If all components are in good operating condition, pressure and flow measurements should be the same as in Step 3 of the *"Pump Test" on page 10*.
   b. If a decrease in flow in any control valve position is noted, leakage is indicated. See Step 3 below for the test routine to determine which control valve is at fault.
   c. If the decrease in flow is the same with the control valve in all positions, it indicates that the relief valve is at fault.

NOTE: This can also indicate some other leak is present in the control valve such as a defective casting, damaged seals, or worn valve position detents, but always check the relief valve first.

3. To locate the fault in the control valve, cylinder or motor, disconnect cylinder and plug connection.
   a. Place the control valve handle in the position where the greatest decrease of flow was noted.
   b. Close the tester loading valve to achieve the test pressure and record the flow.
   c. If the same decrease in flow is noted as in test performed in Step 2b above, then the control valve is at fault. However, if the flow readings are now higher and comparable to the other control valves, then a faulty cylinder or motor is indicated.

Relief Valve in Separate Housing

1. Install the tester in a Tee Test configuration to the line connecting the pump and relief valve. Plug any extra outlets.
2. Close the tester loading valve and watch the pressure and flow.
   a. Reconnect the control valve to the tee. Put a control valve into a power output mode with the output flow blocked, such as a cylinder at the end of its stroke.
   b. Close the tester loading valve while watching the pressure. Pressure will increase until the relief valve opens. Record the pressure at this point. Repeat to check the relief valve adjustment.

Relief Valves

Often relief valves will start to open before they reach their full pressure flow settings. Compare the pressure and flow rate readings made in Step 3 under *"Tee Test" on page 11*. Any great decrease in flow rate from those tests indicates a faulty relief valve.

MAINTENANCE/TROUBLESHOOTING

The PFM testers are designed to give years of trouble-free service. However, if there is an issue, you can make a few simple checks.

Load Valve

If the valve fails to load the system, remove the valve body and check for foreign material, worn parts or seals.

Flow

The absence of any flow reading may indicate a blockage of the turbine. Remove the retaining ring from the inlet port and carefully remove the turbine assembly. Remove any material that may be preventing easy rotation of the rotor.

Reassemble and attempt a flow reading again. If the tester still fails to indicate flow, return the tester to the factory.

Burst Discs and Burst Disc Bodies

The burst discs are designed to rupture at a specified pressure. The PFM6 and PFM8 testers have a single burst disc that bypasses flow around the loading valve when ruptured. The PFM6BD testers provide protection from excessive pressure in either direction with two internal burst discs that, when ruptured, bypass flow around the loading valve. If a rupture occurs, replace the burst discs.

⚠WARNING

IF YOU DO NOT HAVE THE PROPER TOOLS TO ACCOMPLISH THIS TASK, IT IS HIGHLY RECOMMENDED THAT YOU RETURN THE TESTER(S) TO THE FACTORY FOR REPLACEMENT OF THE BURST DISC HOUSING AND THE BURST DISCS. INJURY TO PERSONNEL AND/OR DAMAGE TO EQUIPMENT MAY RESULT IF THE BURST DISCS ARE INSTALLED IMPROPERLY.

The following tools and parts are needed:

- 5/8" open end box wrench
- 0…80 (or greater) pound-inch torque wrench

	Description	Part Number	Quantity
Burst discs	PFM6	F1614-7500	1
	PFM6BD	F1614-7500	2
	PFM8	F1614-7500	1
Optional	O-ring	F3137-015	1
	Backup ring	F1015-015	1

Burst Disc Procedure for PFM6 and PFM8 Testers

1. Position the tester block to expose the internal burst disc body as shown in *Figure 10.*
2. Loosen the burst disc body from the flow meter block.
3. Remove the burst disc body from the flow meter block.
4. Remove the ruptured burst disc from the flow meter block and discard.
5. Clean out the burst disc port. Remove any debris from the sealing surfaces.
6. Rotate the tester to face the burst disc port upwards and drop in a new burst disc. Make sure it lies flat on the sealing surface entrance. Lubricate the O-ring on the burst disc housing and insert it back into the block. Tighten the burst disc housing down to form the disc against the sealing surface.
7. Using a torque wrench, tighten the burst disc body in the block to 35 foot-pounds (50.8 Nm).

⚠CAUTION

DO NOT OVER TORQUE THE BURST DISC HOUSING. APPLYING TOO MUCH TORQUE WILL DAMAGE THE BURST DISC AND CAUSE THE DISC TO RUPTURE PREMATURELY.

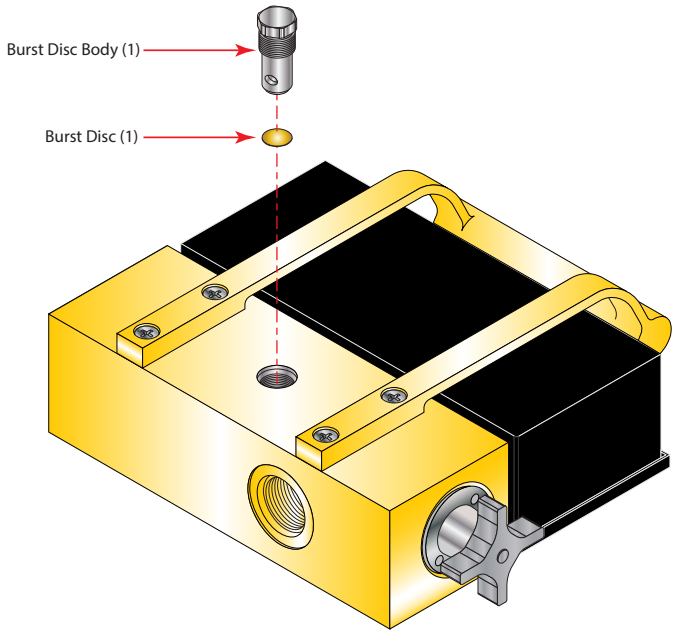


Figure 9: PFM6 and PFM8 burst disc

Burst Disc Procedure for PFM6BD

1. Position the PFM6BD to expose the internal burst disc body as shown in *Figure 11*.
2. Loosen the burst disc body from the flow meter block.
3. Remove the burst disc body from the flow meter block.
4. Remove the ruptured burst discs from the flow meter block and discard. Retain the support ring.
5. Clean out the burst disc port and the support ring. Remove any debris from the sealing surfaces.
6. Rotate the tester to face the burst disc port upwards and drop in a new burst disc. Make sure it lies flat on the sealing surface entrance. Drop in the support ring and follow it with the second burst disc. Lubricate the O-ring on the burst disc housing and insert it back into the block. Tighten the burst disc housing down to form the disc against the sealing surfaces.
7. Using a torque wrench, tighten the burst disc body in the block to 60 foot-pounds (81.4 Nm).

⚠CAUTION

DO NOT OVER TORQUE THE BURST DISC HOUSING. APPLYING TOO MUCH TORQUE WILL DAMAGE THE BURST DISC AND CAUSE THE DISC TO RUPTURE PREMATURELY.

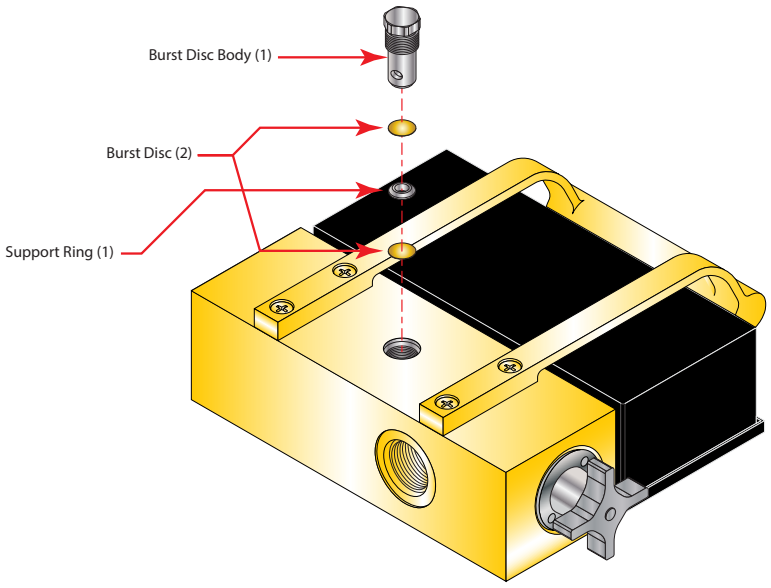


Figure 10: PFM6BD burst discs

Battery Replacement

All PFM testers use four AA size alkaline batteries. These batteries will normally provide approximately 50 hours of service before a low battery condition is indicated. On the PFM6 and PFM6BD, a *LO BAT* signal on the display indicates a low battery. On the PFM8, a flashing colon (:) on the display indicates a low battery. When a low battery has been displayed, immediately remove discharged batteries from the tester to prevent battery holder corrosion.

To change the batteries, remove the four screws on the cover assembly. Pull the cover slowly upward to clear the internal components. The batteries are located on the bottom of the case. See *Figure 12*. When installing the new batteries, ensure that they are centered in the holder and making contact at both ends. Replace the cover and secure the four screws.

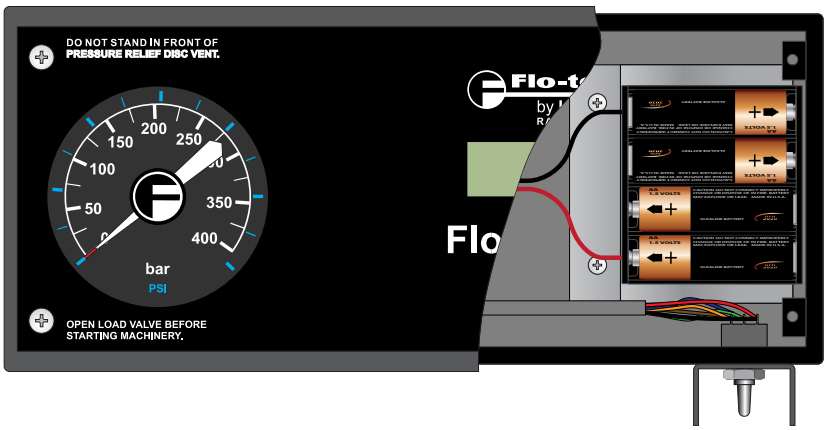
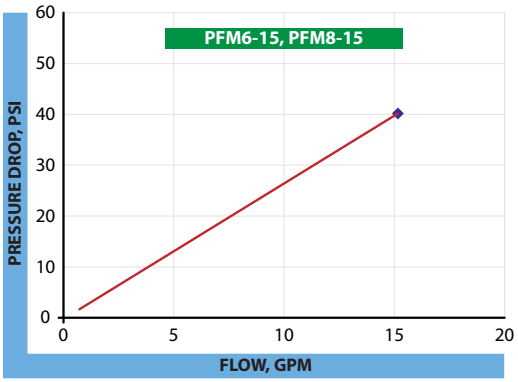
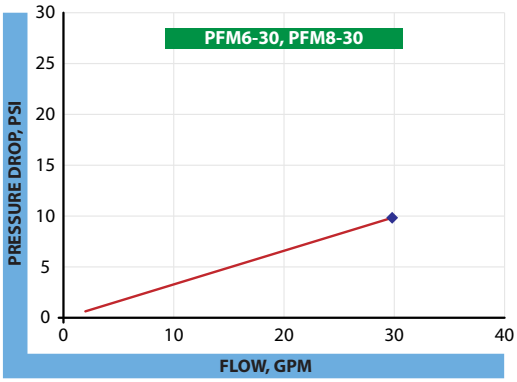


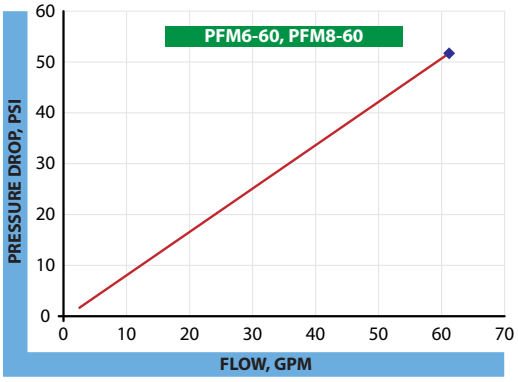
Figure 11: Battery replacement

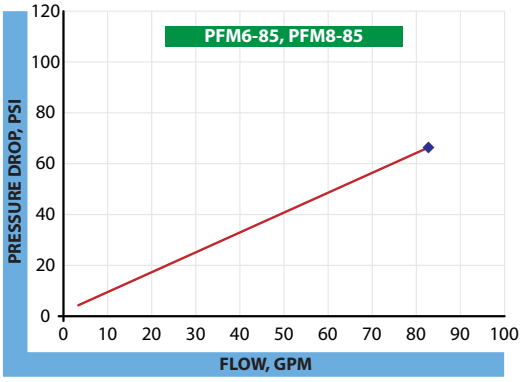
FLOW VS PRESSURE DROP

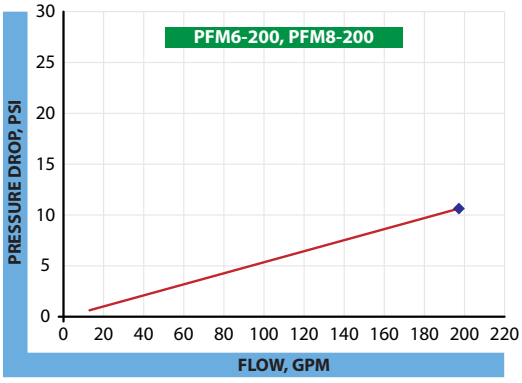
ΔP Captured Using Loading Valves

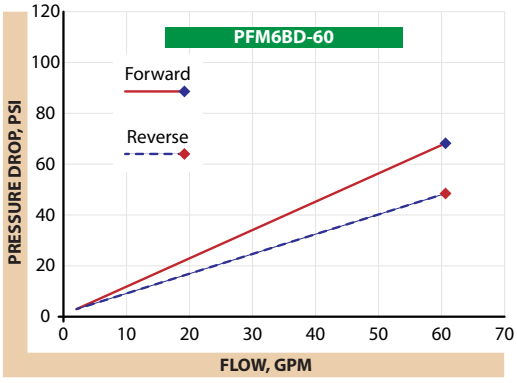


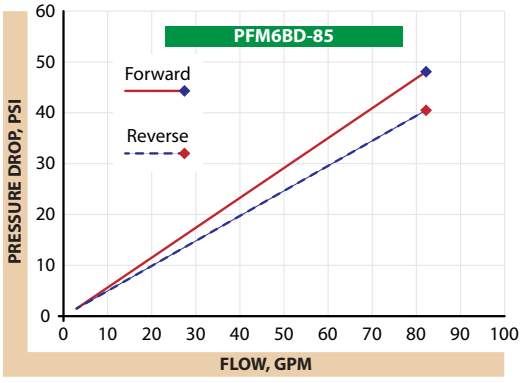


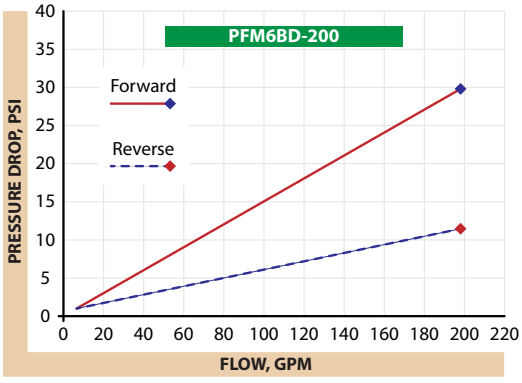












HYDRAULIC FORMULAS AND VISCOSITY INFORMATION

Flow Rate Formulas

$$\text{Frequency (Hz)} = \frac{\text{K x GPM}}{60} \qquad \text{GPM} = \frac{\text{Hz} \times 60}{\text{K}}$$

$$\text{K-Factor (K)} = \frac{\text{Hz} \times 60}{\text{GPM}} \qquad \text{Time Base (TB)} = \frac{\text{GPM}}{\text{Hz}}$$

Flow Rate Related Formulas

$$\text{Valve } C_v \text{ Factor} = \frac{\text{Flow Rate (GPM)} \times \sqrt{\text{Fluid Specific Gravity}}}{\sqrt{\Delta\text{P Across Valve (PSI)}}}$$

$$\text{Cylinder Velocity} = \frac{0.3208 \text{ x Flow Rate (GPM)}}{\text{Net Cylinder Area (in}^2\text{)}}$$

$$\text{Fluid Mortor Torque} = \frac{\text{Flow Rate (GPM)} \times \text{Pressure (PSIG)} \times 36.77}{\text{Rotational Speed}}$$

Power Formulas

$$\text{H.P.} = \frac{\text{LPM x Bar}}{447.4} \qquad \text{H.P.} = \frac{\text{LPM x Bar}}{447.4} \qquad \text{kW} = \frac{\text{LPM x Bar}}{600}$$

FLUID VISCOSITY CONVERSION TABLE

Saybolt Universal Seconds (SUS)	ISO-VG	CentiStoke	CentiPoise[1]	Typical Brands/Liquids at 100 °F
31	2	1.0	0.876	Water
35	3	2.5	2.19	—
40	5	4.2	3.68	
45	5/7	5.9	5.17	
50	7	7.5	6.57	Kerosene
55	7/10	8.8	7.71	Atlantic Richfield/Duro 55 Hydraulic Oil
60	10	10.5	9.20	Monsanto/Skydrol - 500 A
70	10/15	13.2	11.56	Mobil/Aero HFA Hydraulic Oil
80	15	15.7	13.75	No. 4 Fuel Oil
90	22	18.2	15.94	Stauffer Chemical/Fyrquel 90
100	22	20.6	18.05	Conoco/Syncon Synthetic AW Hydraulic Oil
150[2]	32	32.0	28.03	Mobil/DTE 24 Hydraulic Oil
200	46	43.2	37.84	Citco/Glycol FR-40XD (Oil in Water)
300	68	65.0	56.94	SAE 20 Crankcase Oil
400	68/100	86.0	75.34	Sunoco/Sunvis 41 Hydraulic Oil
500	100	108	94.61	SAE 30 Crankcase Oil
750	150	162	141.91	SAE 40 Crankcase Oil
1000	220	216	189.22	Mobil/Paper Machine Oil - Type K
1500	320	323	282.95	SAE 50 Crankcase Oil
2000	460	431	377.56	Amoco/American Industrial Oil - No. 460
3000	680	648	567.65	SAE 140 Gear Oil
4000	1000	862	755.11	SAE 250 Gear Oil

[1] CentiPoise are given for oil of 0.876 specific gravity. Relationship: CentiStokes × Specific Gravity = CentiPoise

[2] Fluid viscosity used to calibrate Testers and Sensors

* ±1% Viscosity Range for Flo-Tech Testers and Sensors is 25 to 500 SUS

Table 2: Viscosity conversion

SPECIFICATIONS

Material

Housing	6013-T351 Anodized aluminum
Turbine Rotor	T416 Stainless steel
Rotor Supports	6061-T6 Aluminum
Seals	Buna N standard Viton® and EPR optional
Ball Bearings	440 C Stainless steel
Hub Cones	6061-T6 Aluminum alloy
Temperature Probe	12L14 Steel, electroless nickel plate

PFM6/8 Series Testers

Valve	Cold rolled steel body with 303 SS stem (for 15/30 Models) 12L14 steel body with 303 SS stem (for 60/85/200 Models)
Sleeve for 200 Model	D.O.M. steel tube
Poppet	12L14 steel, hardened
Straightening Sections	CA360 Brass (for 15/30 Models) 6061-T6 Aluminum (for 60/85/200 Models)
Cones	2024-T4 Aluminum

PFM6BD Series Testers

Valve	12L14 steel body with 303 SS stem
Sleeve for 200 Model	4340 Alloy steel, hardened
Poppet	6061-T6 Aluminum
Straightening Sections	2024-T4 Aluminum
Cones	SAE Straight thread O-ring boss, female, J1926/1; BSPP ISO1179

Magnetic Pick-Up

Body	12L14 steel, electroless nickel plate
Nut	12L14 steel, electroless nickel plate
Electronic Case Cover	Cold rolled steel, zinc plate with clear seal, epoxy black paint

Performance

Flow Accuracy	±1% of full scale
Repeatability	±0.2%
Pressure Rating	6000 Psi (414 Bar) maximum with a 3:1 safety factor
Turbine Response	≤200 ms
Fluid Temperature	–4…300 °F (–20…150 °C)
Ambient Temperature	–4…131 °F (–20…55 °C)
Flow Readout	Linearity and zero shift = ±1 digit
Operating Pressure	Up to 6000 psi (414 Bar, 41.4 MPa, 420 kg/cm^2)
Pressure Drop	See *"ΔP Captured Using Loading Valves" on page 16*
Fluid Temperature	Up to 300 °F (150 °C)
Readout Accuracy	±1 digit
Battery Type	AA size alkaline, ~50 hr of service

DIMENSIONS

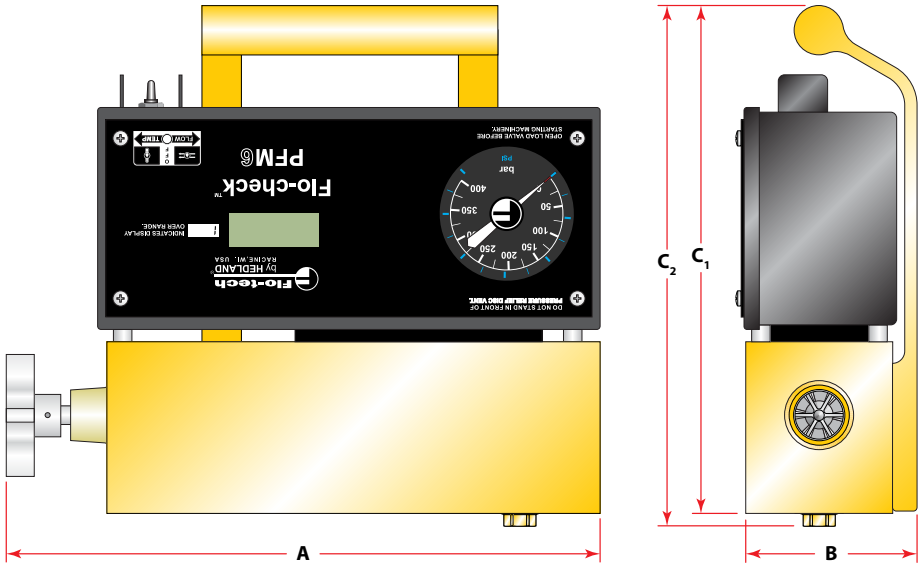


Figure 12: Hydraulic tester dimension illustration

C_1 - PFM6 and PFM8 Series

C_2 - PFM6BD Series

Series	Dimensions Length (A) × Depth (B) × Height (C)		Weight Lb (kg)
	inches	mm	
PFM6-15	11.3 × 3.6 × 10.3	287 × 92 × 262	13.85 (6.3)
PFM6-30	11.3 × 3.6 × 10.3	287 × 92 × 262	13.85 (6.3)
PFM6-60	11.5 × 3.6 × 10.3	292 × 92 × 262	16.50 (7.5)
PFM6-85	11.5 × 3.6 × 10.3	292 × 92 × 262	16.50 (7.5)
PFM6-200	12.3 × 4.1 × 10.8	311 × 105 × 275	20.00 (9.1)
PFM6BD-60	11.3 × 3.6 × 10.4	287 × 92 × 265	16.50 (7.5)
PFM6BD-85	11.3 × 3.5 × 10.4	287 × 92 × 265	16.50 (7.5)
PFM6BD-200	11.8 × 4.1 × 10.9	300 × 105 × 277	20.00 (9.1)
PFM8-15	11.3 × 3.6 × 10.3	287 × 92 × 262	13.85 (6.3)
PFM8-30	11.3 × 3.6 × 10.3	287 × 92 × 262	13.85 (6.3)
PFM8-60	11.5 × 3.6 × 10.4	292 × 92 × 265	16.50 (7.5)
PFM8-85	11.5 × 3.6 × 10.4	292 × 92 × 265	16.50 (7.5)
PFM8-200	12.3 × 4.1 × 10.9	11 × 105 × 277	20.00 (9.1)

Table 3: Dimensions

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Legacy Document Number: 05-TUR-UM-00193-EN