

MB MARSH BELLOFRAM®

MB T-10 Pressure Regulator Series

Pressure
Regulator Series

Type-10

Precision
Control
Devices

ISO 9001:2000
certified

MOTORIZED TYPE 10 PRESSURE REGULATOR

Bellofram's high precision Type 10 pressure regulator - a servo balanced system in which the main valve is operated by a pilot valve - is also available in a motorized configuration. This combination is particularly attractive because it offers low power requirements (2 rpm/4 watts; 6 rpm/6 watts) with extremely high accuracy.

APPLICATIONS

The motorized Type 10 pressure regulator can be used for any application where electric control of a pneumatic system is desired. It is often used for remote pressure control and for ventilation systems. It can also be easily integrated into open or closed loop process control systems and may be used with programmable controllers.

FEATURES

- Mountable at any angle
- In the event of power failure, the pneumatic output remains constant at last setting
- Low electrical power requirements
- Adjustable mechanical stop limits maximum output pressure
- No electrical power is required when operating at constant output pressure
- No pre-regulation of supply pressure required
- Built-in overload slip clutch prevents damage to gear train at end of travel, eliminating the need for limit switches in most applications.

CONSTRUCTION

The regulator and motor are mounted to a bracket and connected to each other through a flexible coupling. The assembly can be mounted through holes in the bracket.

MOTOR SPECIFICATIONS: Reversible, synchronous motor with gear drive and slip clutch.

OPERATING VOLTAGE: 110V, 24V or 220V AC.

FREQUENCY: Ordering information on last page.

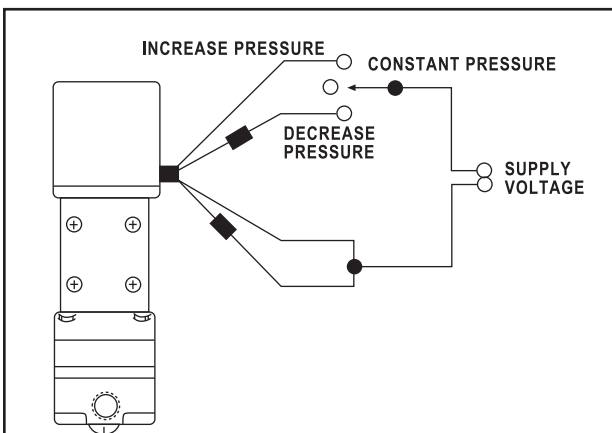
POWER CONSUMPTION (maximum): 2 rpm/4 watts; 6 rpm/6 watts.

SPEEDS AVAILABLE: 2 and 6 rpm.

TORQUE: Approx. 8 in. oz.

For other voltages and motor speeds, contact factory.

TYPICAL INSTALLATION CONTROL CIRCUIT DIAGRAM



NOTE: To increase output pressure, apply voltage to unmarked leads. To decrease output pressure, apply voltage to marked leads.

ISO 9001:2000
certified



TYPE 10 MOTORIZED REGULATOR

REGULATOR-MOTOR SPECIFICATIONS

Pressure Range		Approximate Time to Cover Full Range (seconds)	
psig	BAR	2 rpm	6 rpm
2-25	0.1-1.7	75	25
2-60	0.1-4.1	90	30
2-120	0.1-8.3	150	50

Type-10

FEATURES

HIGHLY ACCURATE PRESSURE REGULATION

The Bellofram Type 10 Regulator controls output pressure with an accuracy of 0.1%, and has very low sensitivity to changes in supply pressure and flow.

START-UP STABILITY

The Type 10 Regulator has been designed to eliminate the need for any readjustment of the regulated pressure after long "down time." At start-up, the regulated pressure will return to its output setting.

FLOW STABILITY

The regulated pressure is held constant over substantial changes in flow due to the high-gain pneumatic servo amplifier. Particularly good from dead end to 20 cubic meters per hour (12 SCFM).

AUTOMATIC HIGH DOWNSTREAM RELIEF CAPACITY

An integral relief valve provides for exhaust flow whenever the regulated pressure is reset to a lower value. The exceptionally large capacity of this relief valve assures immediate response when the downstream regulated pressure must be reduced under dead-end conditions.

PRESSURE STABILITY

A high performance servo-operated control mechanism is utilized in the regulator. The pressure supplied to the pneumatic servo amplifier is reduced and held constant.

LOCKING CAPABILITY

The standard Type 10 regulator has a locking nut which, when tightened, prevents inadvertent adjustment of pressure.

TEMPERATURE STABILITY

Shifts in the regulated pressure over wide ambient temperature variations are minimized by the use of a measuring capsule made of specially selected stainless steel alloys.

PROVEN RELIABILITY

Thousands of Bellofram Pressure Regulators are in the field. Proof of the accuracy of the Regulator is reflected by its use in most air gauging systems and other precision pressure control applications.

MOUNTING

The unit may be installed in any position. It can be panel mounted or supported by in-line plumbing.



APPLICATIONS

Industrial processes, inspection procedures, control and analytical instrumentation require precise regulation of air pressure in pipes and vessels. Maintaining constant pressures in these applications is usually complicated by the presence of numerous disturbances, such as changes in supply pressure, flow, and ambient temperature, that tend to upset prevailing conditions.

Bellofram Pressure Regulators provide accuracy, precision control, and maximum stability under the most adverse operating conditions.

Here are a few of the many applications for the Type 10 Pressure Regulator:

- Gas Mixing
- Valve Operators
- Gate Actuators
- Positioner Signal
- Calibration Stands
- Air Hoists
- Air Gauging
- Clamp Units
- Web Tensioning
- Press Units
- Roll Loading
- Cylinder Loading
- Force Balance Hoists
- Disc & Shoe Air Brakes

Ideal for medical applications!

SALES & APPLICATIONS

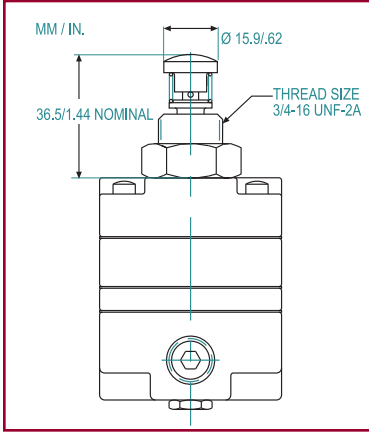
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PRINCIPLE OF OPERATION

Drawings & dimensions are for reference only.



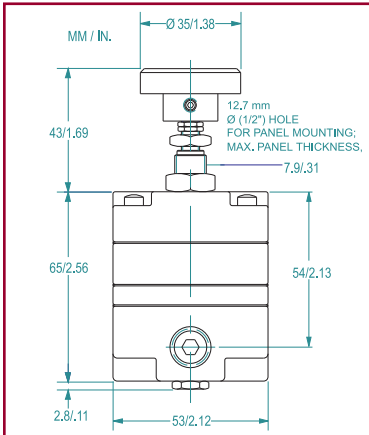
TYPE 10PL PLUNGER OPERATED REGULATOR

This reliable plunger operated regulator provides unmatched accuracy and repeatability. Regulated pressure is changed by direct linear actuation of the plunger instead of turning a knob.

PLUNGER TRAVEL

Pressure Range		Plunger Travel*	
BAR	psig	mm	in
0.1–1.7	2-25	1.9	.075
0.1–4.1	2-60	2.3	.090
0.1–8.3	2-120	2.5	.100

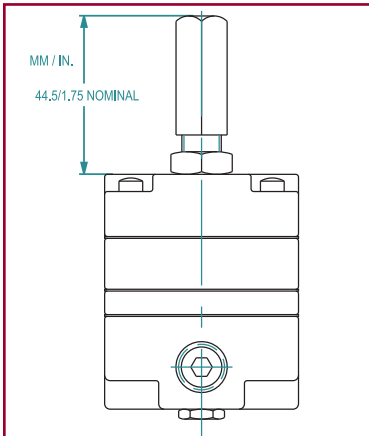
*±10% manufacturing tolerance



RETURN SPRING

0.4 in. (10mm) nominal return height; 7 oz. (200g) approximate preload force; 7.5 lb./in. (135g/mm) approximate spring rate, between 0.4 in. (10mm) and 0.24 in. (6.5mm) compressed height.

Plunger Knob Material: Steel



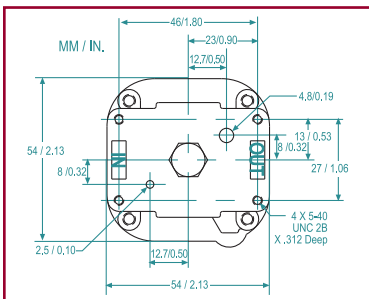
TYPE 10 REGULATOR

The basic Type 10 Regulator is offered with a choice of three port sizes and three output ranges.

TYPE 10HR & 10EXHR HIGH RELIEF REGULATORS

Similar in proven accuracy and rugged construction to other Type 10 Regulators, these units provide extra fast “blowdown” for very rapid release of down stream pressure. The extra relief feature makes these regulators suitable for cylinder return stroke actuation, air hoists, and similar applications requiring fast exhaust.

The Type 10 Regulator is available with a tamper-resistant cover, as illustrated. The cover is threaded over the adjusting screw to prevent inadvertent or unwarranted adjustment of output pressure.



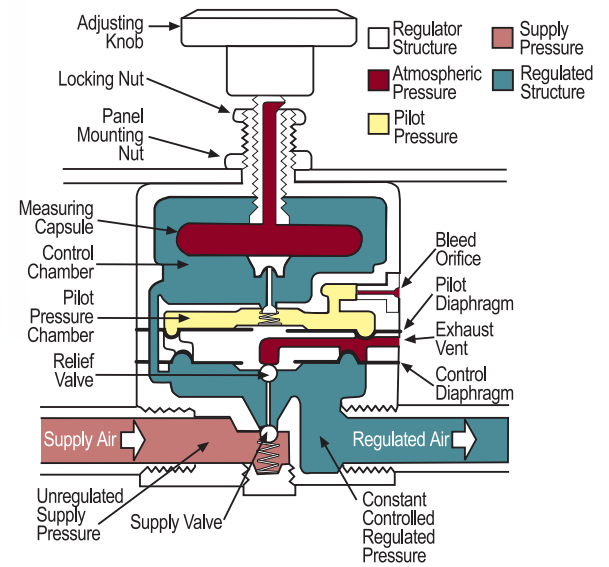
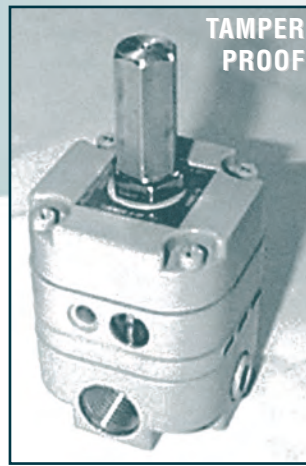
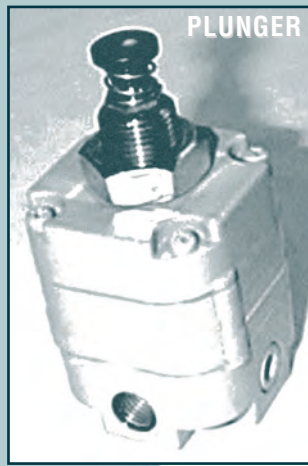
TYPE 10LR LOW RANGE FLOW REGULATOR

The main feature of the Type 10LR is its low-range flow characteristic. It operates on a maximum of 50 psig / 3.4 BAR supply pressure and offers an output pressure range of 0.5 psig / 0.03 BAR to 25 psig / 1.7 BAR.

TYPE 10 HIGH FLOW

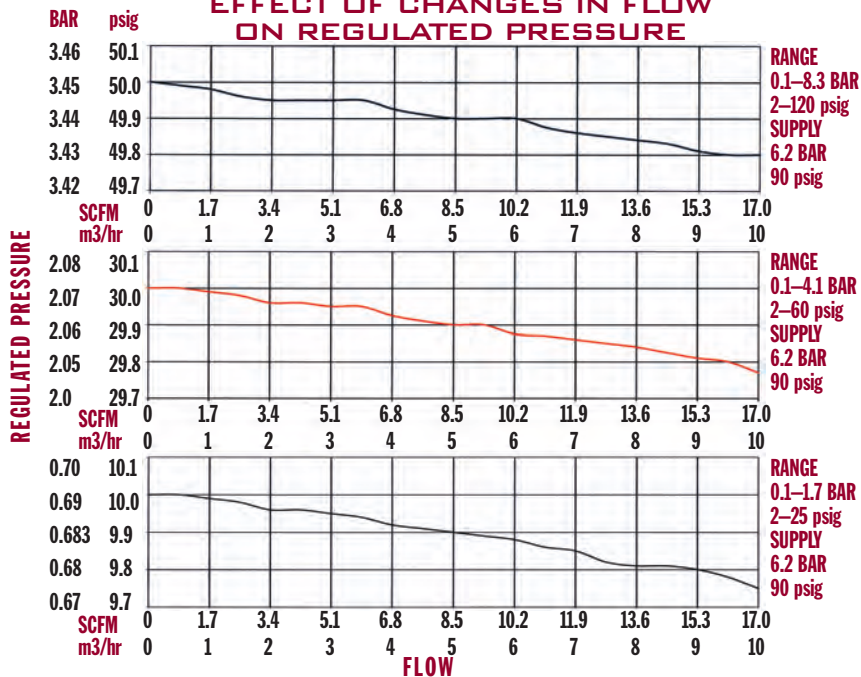
This regulator is ideal for applications where the supply pressure is relatively low and a high flow rate is desired.

The Type 10 Regulator is also available with bottom ports, consult factory.

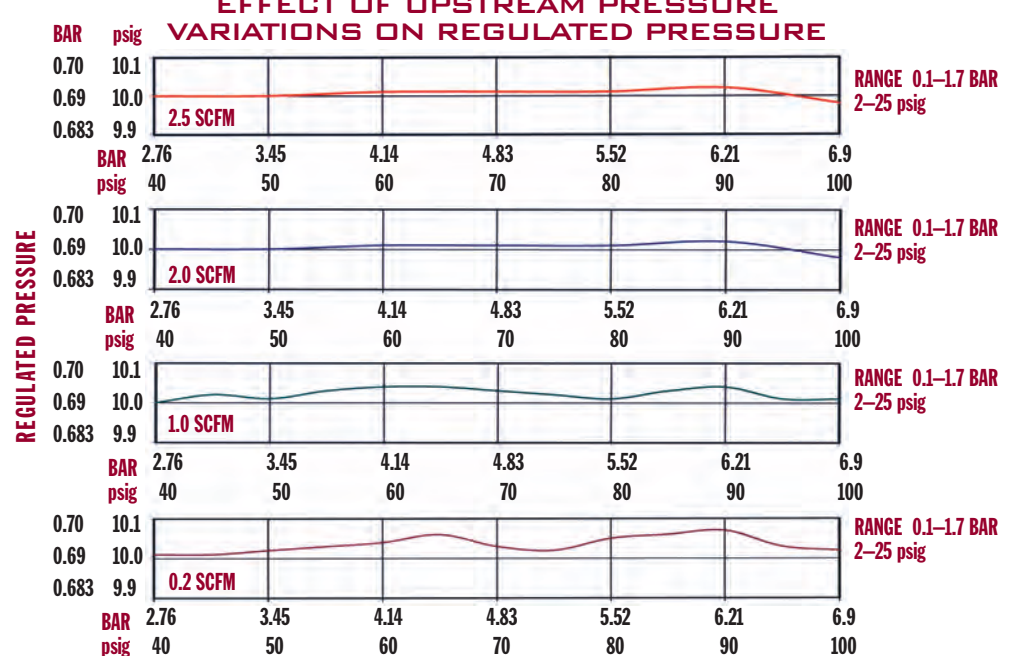


	TYPE 10LR	TYPE 10 / 10PL	TYPE 10HR	TYPE10 EXHR	TYPE10 HF	TYPE 10 MOTORIZED
Maximum Supply Pressure	50 psig / 3.4 BAR	150 psig / 10.3 BAR	150 psig / 10.3 BAR	150 psig / 10.3 BAR	50 psig / 3.4 BAR	150 psig / 10.3 BAR
Pressure Ranges	.5-25 psig 0.03 – 1.7 BAR	2-25, 2-60, 2-120 psig 0.14–1.7, 0.14–4.1, 0.14–8.3 BAR	2-120 psig 0.14–8.3 BAR	2-120 psig 0.14–8.3 BAR	2-25 psig 0.14–1.7 BAR	0.5-25, 2-25, 2-60, 2-120 psig 0.03–1.7, 0.14–1.7, 0.14–4.1, 0.14–4.1, 0.14–8.3 BAR
Port Sizes	1/4"	1/8", 1/4", 3/8"	1/8", 1/4", 3/8"	1/8", 1/4", 3/8"	3/8"	1/8", 1/4", 3/8"
Effect of Supply Pressure Variation on Outlet Pressure	0.005 psig / 0.3 mBAR per 25 psig / 1.7 BAR change	0.005 psig / 0.3 mBAR per 25 psig / 1.7 BAR change	0.005 psig / 0.3 mBAR per 25 psig / 1.7 BAR change	0.005 psig / 0.3 mBAR per 25 psig / 1.7 BAR change	0.005 psig / 0.3 mBAR per 25 psig / 1.7 BAR change	0.005 psig / 0.3 mBAR per 25 psig / 1.7 BAR change
Sensitivity	1/8" / 3.2mm of water	1/8" / 3.2mm of water	1/8" / 3.2mm of water	1/8" / 3.2mm of water	1/8" / 3.2mm of water	1/8" / 3.2mm of water
Bleed Rate	4.8 scfh / 2.3 LPM	4.8 scfh / 2.3 LPM	4.8 scfh / 2.3 LPM	4.8 scfh / 2.3 LPM	4.8 scfh / 2.3 LPM	4.8 scfh / 2.3 LPM
Forward Flow Capacity	4 scfm / 113 LPM	14 scfm / 396 LPM	14 scfm / 396 LPM	14 scfm / 396 LPM	40 scfm / 1132 LPM	10 scfm / 283 LPM
Exhaust Capacity (based upon raising output 5 psig above setpoint)	2 scfm / 56 LPM	2 scfm / 56 LPM	10 scfm / 283 LPM	15 scfm / 424 LPM	2 scfm / 56 LPM	2 scfm / 56 LPM
Temperature Range	-20 to 160° F -29 to 71° C	-20 to 160° F -29 to 71° C	-20 to 160° F -29 to 71° C	-20 to 160° F -29 to 71° C	-20 to 160° F -29 to 71° C	0 to 140° F -18 to 60° C
Effect of Changes in Flow on Regulated Pressure	0.25 psig / 0.01 BAR per 10 scfm / 283 LPM	0.25 psig / 0.01 BAR per 10 scfm / 283 LPM	0.25 psig / 0.01 BAR per 10 scfm / 283 LPM	0.25 psig / 0.01 BAR per 10 scfm / 283 LPM	0.25 psig / 0.01 BAR per 10 scfm / 283 LPM	0.25 psig / 0.01 BAR per 10 scfm / 283 LPM

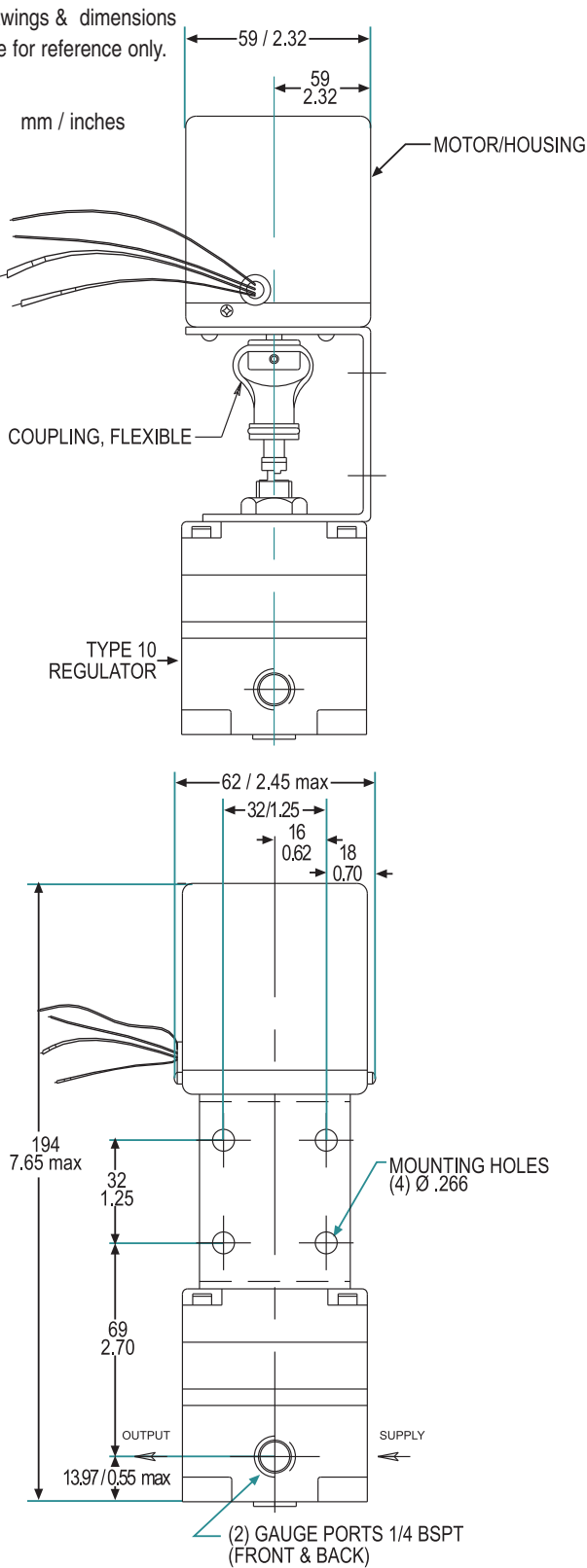
EFFECT OF CHANGES IN FLOW ON REGULATED PRESSURE



EFFECT OF UPSTREAM PRESSURE VARIATIONS ON REGULATED PRESSURE



Drawings & dimensions are for reference only.



IMPORTANT NOTICE

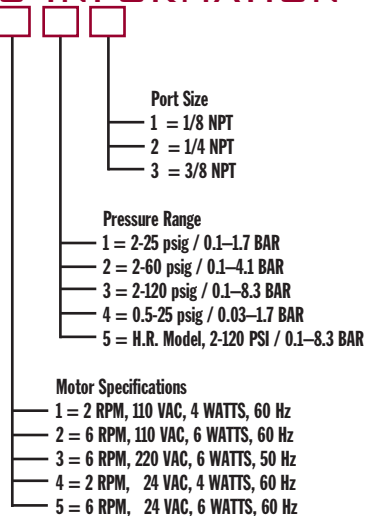
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MANUAL TYPE 10 ORDERING INFORMATION

Type	Part Number	Port Size NPT	Control Range	
			BAR	psig
10	960-001-000	1/8"	0.1-1.7	2-25
	960-003-000	1/4"	0.1-1.7	2-25
	960-005-000	3/8"	0.1-1.7	2-25
10	960-007-000	1/8"	0.1-4.1	2-60
	960-009-000	1/4"	0.1-4.1	2-60
	960-011-000	3/8"	0.1-4.1	2-60
10	960-013-000	1/8"	0.1-8.3	2-120
	960-015-000	1/4"	0.1-8.3	2-120
	960-017-000	3/8"	0.1-8.3	2-120
10BM	960-126-000	N/A	0.1-1.7	2-25
	960-127-000	N/A	0.1-4.1	2-60
	960-128-000	N/A	0.1-8.3	2-120
10HR	960-028-000	1/8"	0.1-8.3	2-120
	960-029-000	1/4"	0.1-8.3	2-120
	960-030-000	3/8"	0.1-8.3	2-120
10EXHR	960-072-000	1/8"	0.1-8.3	2-120
	960-073-000	1/4"	0.1-8.3	2-120
	960-074-000	3/8"	0.1-8.3	2-120
10PL	960-019-000	1/8"	0.1-1.7	2-25
	960-020-000	1/4"	0.1-1.7	2-25
	960-021-000	3/8"	0.1-1.7	2-25
10PL	960-022-000	1/8"	0.1-4.1	2-60
	960-023-000	1/4"	0.1-4.1	2-60
	960-024-000	3/8"	0.1-4.1	2-60
10PL	960-025-000	1/8"	0.1-8.3	2-120
	960-026-000	1/4"	0.1-8.3	2-120
	960-027-000	3/8"	0.1-8.3	2-120
10LR	960-053-000	1/4"	0.03-1.7	.5-25
10HF	960-703-000	3/8"	0.1-1.7	2-25

MOTORIZED TYPE 10 ORDERING INFORMATION

Part No. 9 6 0 - 1 8 0 -



TYPE 10 PRESSURE REGULATOR SERIES

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