

PRESSURE REGULATORS

Master Pneumatic regulators are made in a wide range of sizes to suit nearly all industrial requirements for pneumatic pressure regulation. Good pressure regulation is essential to the efficient use of pneumatic equipment. A compressor may supply air at 150 psig, but most of the equipment will operate best at lower pressures. A cylinder, for example, may develop sufficient force for its purpose with 50-psig air. Remember that compressed air is costly, so using higher air pressure than necessary is wasteful, and may also shorten the life of the cylinder. A general purpose pressure regulator is the answer for greater economy and efficiency.



Regulators are of two basic designs. Piston design provides highest air flow; diaphragm design provides high sensitivity and quick response. All regulators are self-relieving, but a non-relieving option is available. A pressure gauge is standard, and gauge ports are at the front and the rear of each unit.

In addition there are precision regulators in all port sizes for applications demanding extra precision in the regulation of air pressure, plus regulators for remote, external piloting.

MODULAR or INLINE MOUNTING

SENTRY, GUARDSMAN, SERIES 350, SERIES 380, and **Full-Size VANGUARD** regulators are of modular design. Regulators are connected to filters or lubricators by special modular connectors which seal the faces between units. They may also be inline mounted with pipe nipples. **MINIATURE** and **High-Capacity VANGUARD** regulators are inline mounted only.

SENTRY REGULATORS

Port sizes 1/8 and 1/4 or fittings for tubing up to 10 mm. Modular units have durable plastic, corrosion-resistant bodies. A non-relieving version can be used with water, oil, and many other liquids.

GUIDE to REGULATORS and SERVO VALVES

REGULATOR SERIES	MODULAR	PORTS	PAGES
SENTRY †			
General Purpose R10M, R11M models	yes	1/8, 1/4	134-135
Water Pressure R13M, R14M models	yes	1/8, 1/4	196-197
External piloted PR11M models	yes	1/8, 1/4	166-167
MINIATURE			
General Purpose R55M, R56M models	no	1/8, 1/4	136-137
Stainless Steel R56S models	no	1/4	138-139
Precision R57M models	no	1/8, 1/4	158-159
Externally Piloted PR56M models	no	1/8, 1/4	168-169
Water Pressure R53MB, R54MB models	no	1/8, 1/4	198-209
Relief Valves RV56 models	no	1/8, 1/4	164-201
CO ₂ Miniature relief valve CX models	no	1/8, 1/4	202-203
CO ₂ Miniature CX models	no	1/8, 1/4	140-141
High pressure model	no	1/8, 1/4, 3/8	146-147
GUARDSMAN			
General Purpose R60 models	yes	1/4, 3/8, 1/2	142-143
GUARDSMAN II			
General Purpose R75 models	yes	1/4, 3/8, 1/2	144-145
350 SERIES			
General Purpose R350 models	yes	1/4, 3/8, 1/2	148-149
Full-Size VANGUARD			
General Purpose R100 models	yes	1/4, 3/8, 1/2, 3/4	150-151
Precision IR100 models	yes	1/4, 3/8, 1/2, 3/4	162-163
External Pilot PR100 models	yes	1/4, 3/8, 1/2, 3/4	174-175
High relief externally pilot HPR100	no	1/4, 3/8, 1/2, 3/4	178-179
External relief pilot PRH100 models	yes	1/4, 3/8, 1/2, 3/4	176-177
Full-Size SERIES 380			
General Purpose R380 models	yes	3/8, 1/2, 3/4	152-153
Precision IR380 models	yes	3/8, 1/2, 3/4	160-161
External pilot PR380 models	yes	3/8, 1/2, 3/4	170-171
External relief pilot PRH380 models	no	3/8, 1/2, 3/4	172-173
High-Flow VANGUARD			
General Purpose R180, M models	no	3/4, 1, 1-1/4, 1-1/2	154-157
Precision IR180M models	no	3/4, 1, 1-1/4, 1-1/2	164-165
External Pilot PR180M models	no	3/4, 1, 1-1/4, 1-1/2, 2	180-181
External Pilot R200 models	no	1-1/2, 2	186-187
External pilot PR300 models	no	3	194-195
High-relief externally pilot HPR180	no	3/4, 1, 1-1/4	184-185
External relief pilot PRH180m models	no	3/4, 1, 1-1/4, 1-1/2	182-183
Electro-Pneumatic Servo Valves	no		204-206

† Also available with quick-connect tube fittings up to 10 mm.

MINIATURE REGULATORS

Port sizes 1/8, 1/4. Aluminum-bodied units for inline mounting. Same performance characteristics as the **SENTRY** models. Brass or stainless steel bodies, and water pressure models are also available.

PRECISION MINIATURE regulators are available to provide outstanding pressure control at relatively low cost. A large diaphragm area gives high sensitivity, and a small valve seat gives greater precision and little variation in outlet pressure from fluctuations in supply pressure. With an inlet pressure of 100 psig (7 bar), repeatability is within 1/4 psig. Regulated pressure range is 0–60 psig (0–4.1 bar). Optional springs allow other pressure ranges.

GUARDSMAN REGULATORS

Port sizes 1/4, 3/8, 1/2. Modular units in a balanced-valve, piston design with very quick response for fast-cycling valves and cylinders. Two sub-series: **R60** models with durable plastic dome, and **R75** models with high-strength metal dome for more severe environments. Regulation performance is essentially the same.

SERIES 350, SERIES 380 and VANGUARD REGULATORS

Port sizes 1/4 to 3/4. Modular units with diaphragm design for sensitivity and accurate pressure regulation. An adjustment-locking key to prevent tampering is standard.

Full-Size **VANGUARD SERIES 350**, and **SERIES 380 PRECISION** regulators are also available. They are of diaphragm design, and were developed to give superior torque control with pneumatic tools. However, they are well suited to many other applications because of their ability to regulate very high air flows with great precision. They will hold regulated pressure within 3 psig (0.2 bar), and repeatability is within 0.5 psig (0.034 bar). For torque control and applications that cannot tolerate over-pressurization, regulated pressure can be limited to 85 psig (5.9 bar). Air from a constant bleed, which is important to the precision of these units, is normally inaudible.

HIGH-FLOW VANGUARD REGULATORS

Port sizes 3/4 to 1-1/2. Inline mounting and piston design are featured in these high-air-flow models. An adjustment-locking key to prevent tampering is standard.

PRECISION High-Capacity regulators are also available. They are of diaphragm design, and have essentially the same precise operating characteristics as the Full-Size **VANGUARD** precision regulators described above. Their larger port sizes, however, make them the choice for very high-air-flow applications.

EXTERNALLY PILOTED REGULATORS

Regulators operated with external pilots are as precise as the external pilot regulators used. A 1/4" R55M pilot regulator (or R57M precision model) provides an accurately controlled air spring for excellent regulation. The pilot control regulator can be installed at a distance from the main regulator for convenience in making adjustments.



Full-Size **VANGUARD PRH100** modular external relief piloted regulators use a diaphragm design for high sensitivity. They provide air flows up to 160 scfm (94 l/s) in applications where low pressure drop and/or remote adjusting are desired.

High-Flow PR180 VANGUARD external piloted regulators and **High-Flow PRH180 VANGUARD** external relief piloted regulators are of diaphragm design, and provide air flows up to 600 scfm (284 l/s).

High-Flow R200 VANGUARD Regulators provide air flows up to 1000 scfm (474 l/s). For fast response, good sensitivity, and long service life they employ a piston traveling in a hard-anodized, Teflon-impregnated, metal cylinder. A high-flow, self-relieving valve is built into the main regulator.

RELIEF VALVES

Relief valves are set for a desired maximum system pressure, and inserted in a tee downstream of regulated pressure to prevent over-pressurization of the system beyond the relief valve setting. Relief valves are adjustable from 1 to 125 psig (0.07 to 8.6 bar). Optional springs are available for other pressure ranges. If pressure exceeds the relief valve setting it will dump system air to atmosphere or to a valve to provide a warning signal.



Port sizes 1/8 and 1/4. A pressure gauge is standard equipment.

ELECTRO-PNEUMATIC SERVO VALVES



Electro-pneumatic servo valves employ the latest in closed loop control technology. Flow rate is typically one scfm, but when used with a volume booster a flow rate in excess of 1,000 scfm can be achieved.

Electro-Pneumatic Servo Valves

ER Series



Servo Valve

Model Shown: ER-1A2C200



37-288
Brass Inlet Filter
(Included when purchasing a servo-valve.)



Servo Valve with Booster

Model Shown: B2JA-ER-1A2C200

SPECIFICATIONS

Accuracy (servo valve with booster): $< \pm 2.5\%$ F.S.

Analog Monitor Signal:

Voltage: 0 – 10 VDC @ 20 ma maximum.

Current: 4 – 20 ma sinking (sourcing optional).

Ambient/Media Temperature:

32° to 158°F (0° to 70°C).

Command Signal Impedance:

Voltage: 4.7 k Ω . Current: 100 Ω .

Command Signal Voltage/Current:

0 – 10 VDC/4 – 20 ma.

Electrical Connector: 6-pin Brad Harrison.

Fluid Media: Compressed air.

Housing: Aluminum; powder coated.

Input Pressure: Servo-valve With Regulator

29.9 in Hg to 300 psig (760 mm Hg to 21 bar).

Linearity/Hysteresis (servo valve with booster):

$< \pm 2.0\%$ F.S. BFSL.

Manifold: Brass.

Output Pressure: 0 to 200 P.S.I..

Repeatability (servo valve with booster):

$< \pm 0.6\%$ F.S.

Seals: Fluorocarbon.

Supply Voltage/Current:

15 – 24 VDC/250 ma (required).

Transducer: Silicon, aluminum.

Valves: Nickel-plated brass.

Note: High-pressure servo-valve (≥ 175 psi) - inlet and exhaust ports reversed from picture shown.

"ER-" without booster accuracy: $< \pm 0.2\%$ F.S.

Linearity / Hysteresis: $< \pm 0.15\%$ F.S. BFSL

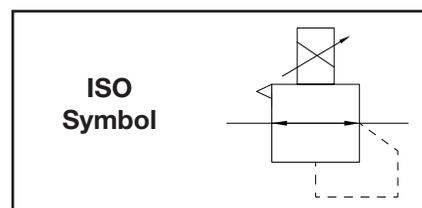
Repeatability: $< \pm 0.02\%$ F.S.

The Series ER servo valve is Master Pneumatic's latest product using closed loop control technology. It incorporates many important standard features.

Standard flow rate of the valve is typically one scfm maximum. When used with a volume booster a flow rate in excess of 1,000 scfm can be achieved.

Check the items below to see how cost-effective these valves can be in your plant.

- ◆ Fits into very small space.
- ◆ Accurate to $\pm/- 2.5\%$ F.S. (with booster)
- ◆ 0 – 10 VDC analog monitor output.
- ◆ NEMA 4 1P65 rating.
- ◆ Accepts analog command signal inputs.
- ◆ Servo-valve with regulator: control pressure ranges from vacuum to 300 psig.
- ◆ Valve is insensitive to shock, vibration, or mounting position.
- ◆ Easily repairable in the field.



ORDERING INFORMATION for SERVO-VALVE ONLY

Change the letters in the sample model number below to specify the electro-pneumatic servo valve you want.

ER-1 A 1 A 100

LOOP

- Single loop 1
- Double loop 2

PIN CONNECTOR

- 6 Pin Brad Harrison Connector A

COMMAND INPUT / TRANSDUCER FEEDBACK.

- 0-10 VDC / no feedback 1
(Use '1' option under 'LOOP' section).
- 4-20 MA / no feedback 2
(Use '1' option under 'LOOP' section).
- 0-10 VDC / 4-20 MA 3
(Use '2' option under 'LOOP' section
Pressure transducer must be ordered
separately. See below).
- 4-20 MA / 4-20 MA 4
(Use '2' option under 'LOOP' section
Pressure transducer must be ordered
separately. See below).
- 0-10 VDC / 0-10 VDC 5
(Use '2' option under 'LOOP' section
Pressure transducer must be ordered
separately. See below).
- 4-20 MA / 0-10 VDC 6
(Use '2' option under 'LOOP' section
Pressure transducer must be ordered
separately. See below).

MAX INLET / MAX CALIBRATED RANGE VAC-500 PSIG

- Max Inlet: 35 PSI, 0-30 PSI 030
- Max Inlet: 110 PSI, 0-50 PSI 050
- Max Inlet: 110 PSI, 0-100 PSI 100
- Max Inlet: 190 PSI, 0-100 PSI A01
- Max Inlet: 330 PSI, 0-200 PSI 200
- Max Inlet: 330 PSI, 0-300 PSI 300
- 0-20 in.Hg (Vac) V20
(this option not available with volume
booster)

Consult factory for pressure ranges not starting at "0" or any unspecified adjusting ranges not shown above.

MONITOR SIGNAL

- 0-10 VDC A
- 4-20 MA - Sinking B
- 4-20 MA - Sourcing C

NOTE: Cable must be ordered separately.
Transducer feed back on option 'LOOP' must be ordered separately. See choices below.

Electro-Pneumatic Servo Valves Accessories

ER- Series



ER-SPS100
Switching power supply.



CABLES

- (6 pin Brad harrison connector).
- ER-CBL-6** (6ft)
 - ER-CBL-12** (12ft)
 - ER-CBL-24** (24ft)

PRESSURE TRANSDUCERS

- ER-DSI100-H24** (0-100 PSI, 4-20MA with 6FT cable)
- ER-DSI200-H24** (0-200 PSI, 4-20MA with 6FT cable)
- ER-DSI100-H251** (0-100 PSI, 4-20MA with 20FT cable)
- ER-DSI200-H251** (0-200 PSI, 4-20MA with 20FT cable)

- ER-DSY100-H24** (0-100 PSI, 0-10VDC with 6FT cable)
- ER-DSY200-H24** (0-200 PSI, 0-10VDC with 6FT cable)
- ER-DSY100-H251** (0-100 PSI, 0-10VDC with 20FT cable)
- ER-DSY200-H251** (0-200 PSI, 0-10VDC with 20FT cable)

MOUNTING BRACKETS

- ER-BRK-1** (Used with Electro-Pneumatic Servo Valve only)

Brackets that are used with the servo valve and volume booster see mounting bracket section page.