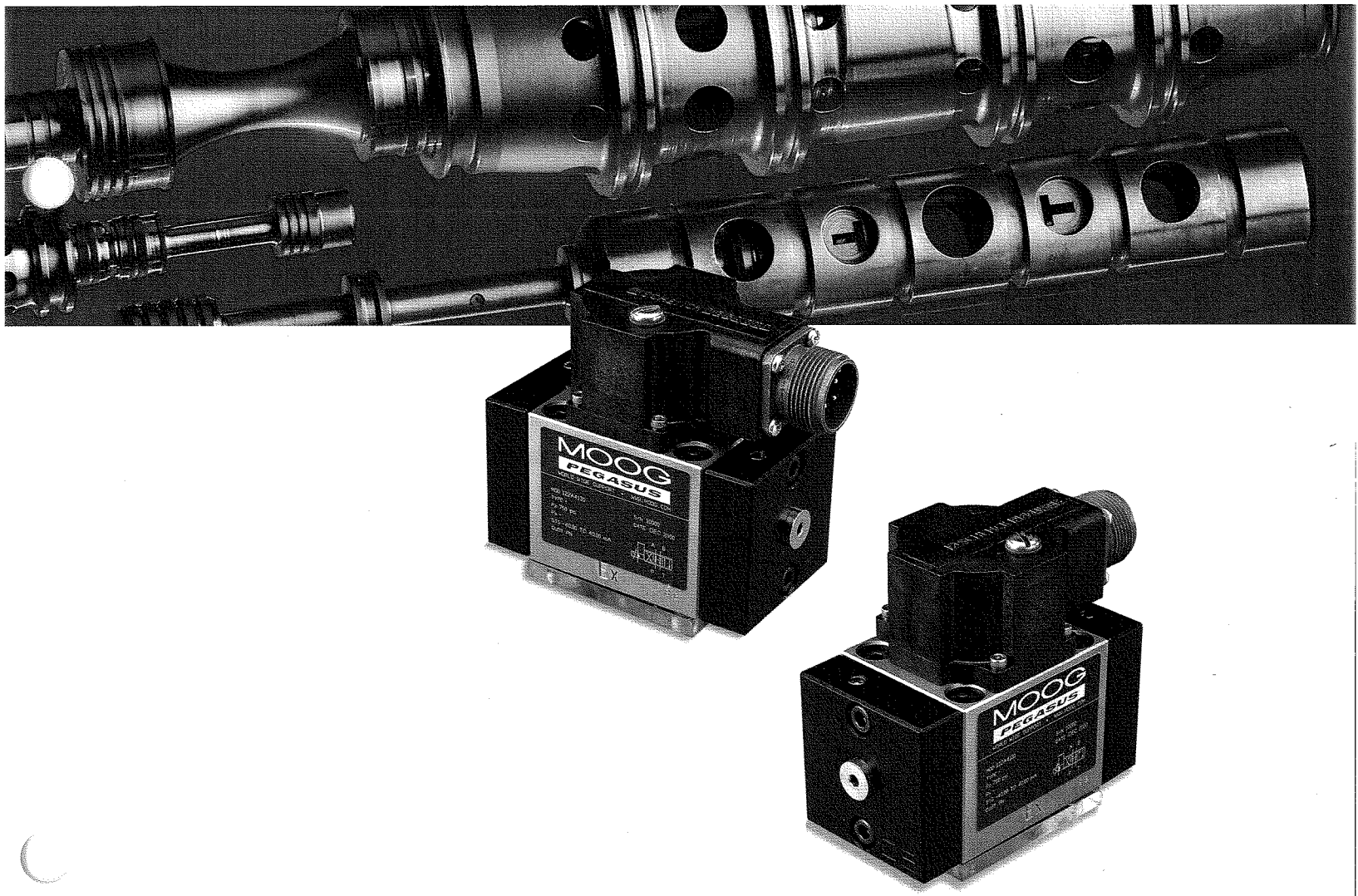
MOOG

PEGASUS

Hydraulic Servovalves

Models 122, 142, 162, 1282



MOOG PEGASUS SERIES SERVOVALVES

The Moog Pegasus valve is a two-stage flow control servovalve that covers a range of rated flows from 5 to 80 gpm at 1000-psi valve pressure drop. The output stage is a closed center, 4-way sliding spool for use with 4-way applications. The pilot stage is a double air gap; dry torque motor attached to a flapper or drive arm that extends into the 2nd stage spool. Nozzles in the spool form a symmetrical double-nozzle flapper arrangement whose pressures are communicated to the spool ends. The spool then "follows" the flapper in order to maintain equal spool end pressures. There is no mechanical feedback; the feedback is based solely on pressure. The operating principle is analogous to that of an electrical Wheatstone bridge, except that the galvanometer is replaced by the second stage spool.

These valves are suitable for electrohydraulic position, speed, pressure or force control systems, with medium dynamic response requirements.

Important Note:
This catalog has been developed for the sole use of the Moog sales force and Moog distributors.

Moog Pegasus models may be sold into exisiting applications only.

Our quality management system is certified in accordance with DIN EN ISO 9001.

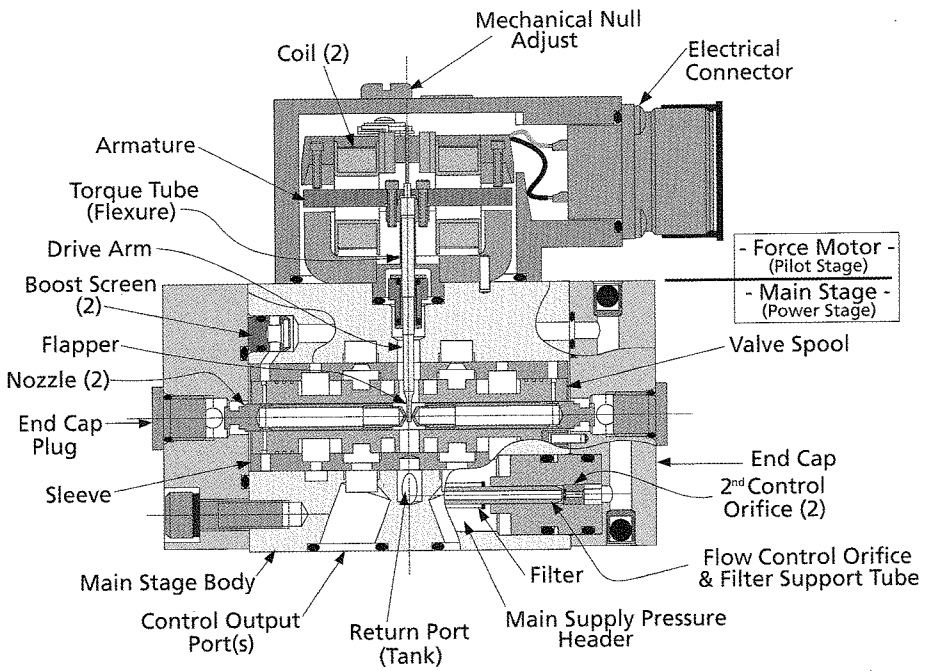
This catalog is for users with technical knowledge. To ensure that all necessary characteristics for function and safety of the system are given, the user has to check the suitability of the products described herein. In case of doubt, please contact Moog.

OPERATING PRINCIPLE OF THE SERVOVALVE

An electrical input command signal is applied to the torque motor coils and creates a magnetic force which acts on the pilot stage of the armature. This causes the armature to rotate, flex the torque tube and displace the drive arm, in turn, causing the flapper to increase the pressure at one nozzle while simultaneously decreasing it at the other. This pressure differential across the valve spool forces it, and the nozzles which are fixed in it, to move until the pressures equalize.

Movement of the spool results in flow of oil from the supply pressure port (A) to one flow control orifice. The pilot oil then divides into half and passes through a second set of control orifices to opposite ends of the valve spool. The pilot oil continues flowing around the valve spool to a pair of flapper nozzles, which are separated by the drive arm and flapper, maintaining a hydraulic pressure balance across the spool. The spool motion also applies a force to the cantilever spring, creating a restoring torque on the armature/flapper assembly. Once the restoring torque becomes equal to the torque from the magnetic forces, the armature/drive arm assembly moves back to the neutral position, and the spool is held open in a state of equilibrium until the command signal changes to a new level.

In summary, the spool position is proportional to the input current. With constant pressure drop across the valve, flow to the load is proportional to the spool position.



Moog Pegasus Servovalve

PERFORMANCE SPECIFICATIONS FOR STANDARD MODELS

Operating Pressure Range*

Port P, A and B	up to 4,500 psi [310 bar]
Port T	up to 4,500 psi [310 bar]

Temperature Range

Fluid	-15°F to +180°F [-26°C to +82°C]
Ambient	-15°F to +180°F [-26°C to +82°C]

Seal Material (V) Viton - Standard, (B) Buna-N, (E) EPR

Operating Fluid Compatible with common hydraulic fluids, other fluids on request

Viscosity

Recommended 60 - 450 SUS @ 100°F [38°C]

System Filtration

High pressure filter (without bypass, but with dirt alarm) mounted in the main flow and, if possible, directly upstream of the valve. Refer to Moog filtration catalog for recommended filtration scheme.

Class of Cleanliness

The cleanliness of the hydraulic fluid greatly affects the performance (spool positioning, high resolution) and wear (metering edges, pressure gain, leakage) of the servovalve.

Recommended Cleanliness Class

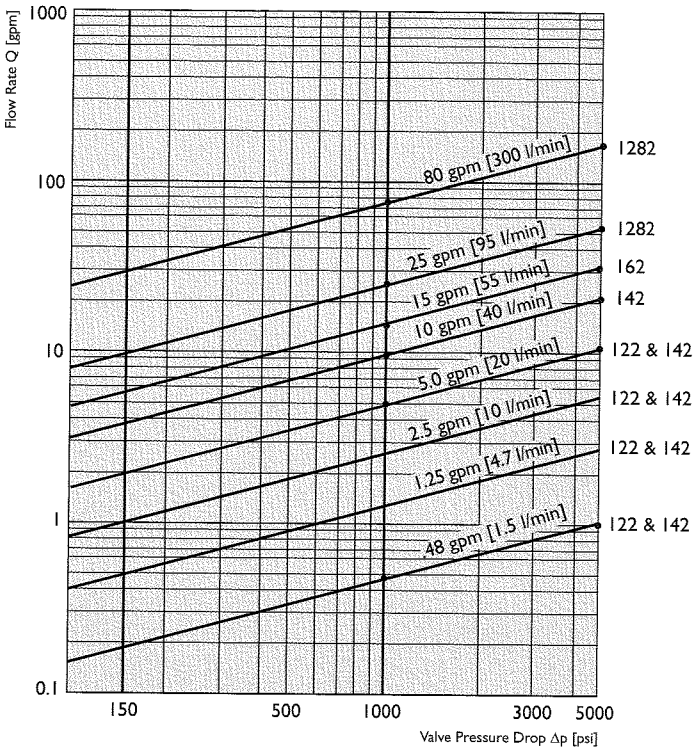
For normal operation: ISO 4406 < 14/11
For longer life: ISO 4406 < 13/10

Filter Rating recommended

For normal operation: $\beta_{10} \geq 75$ (10 µm absolute)
1.25 gpm [4.73 l/min]
For longer life: $\beta_5 \geq 75$ (5 µm absolute)
2.50 gpm [9.46 l/min]

Installation Options any position, fixed or movable

*Valves are optimized for specific pressure ranges. Consult factory.



VALVE FLOW CALCULATIONS

Valve control flow to the load will change with load pressure drop and valve current.

$$Q = Q_R [I_c/I_R] \sqrt{[(P_S-P_L) / 1000]}$$

Q [gpm] = calculated flow

Q_R = rated flow @ 1000 psid [70 bar drop]

I_c = valve current

I_R = rated current

P_S = supply pressure

P_L = load pressure

PERFORMANCE SPECIFICATIONS FOR STANDARD MODELS

	English [Metric]	122
Mounting Pattern		ISO 10372-03-03-0-92
Pilot Stage		115R Force Motor
Mass	lb [kg]	2.75 [1.25]
Rated Flow @ 1000 psi [70 bar]	gpm [l/min]	5.0 [19.0]
Rated Flow Tolerance		+10%, -0%
Operating Pressure Max.	psi [bar]	4565 [315]
Response Time	[ms]	(see response charts)
Threshold*	[%]	± 0.50
Hysteresis*	[%]	± 3.0
Null Shift with ΔT = 55K	[%]	< ± 2.0
Null Leakage Flow @ 1000 psid [70 bar] and 110°F [42°C]	gpm [l/min]	< 0.50 [1.9] with standard lap
Main Spool Stroke approx.	in [mm]	0.02 [0.51]
Pilot Leakage Flow	gpm [l/min]	N/A

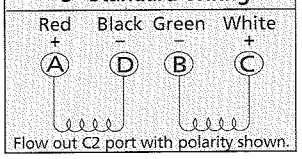
* measured at 3,000 psi [210 bar] pilot or operating pressure, respectively, fluid viscosity of 32 mm²/s and fluid temperature of 104°F [40°C].

ELECTRICAL CHARACTERISTICS

Single Coil Operation					Parallel (Dual Coil)				Series (Dual Coil)			
mA	OHMS (Ω)	VOLTS	WATTS	INDUCTANCE (H)	mA	OHMS (Ω)	VOLTS	WATTS	mA	OHMS (Ω)	VOLTS	WATTS
200	22	4.4	0.88	0.11	200	11	2.2	0.44	100	44	4.4	0.44
140	40	5.6	0.78	0.20	140	20	2.8	0.39	70	80	5.6	0.39
100	100	10.0	1.00	0.50	100	50	5.0	0.50	50	200	10.0	0.50
50	320	16.0	0.80	1.60	50	160	8.0	0.40	25	640	16.0	0.40
40	320	12.8	0.52	1.60	40	160	6.4	0.26	20	640	12.8	0.26
40	1200	48.0	1.92	6.00	40	600	24.0	0.96	20	2400	48.0	0.96
30	800	24.0	0.72	4.00	30	400	12.0	0.36	15	1600	24.0	0.36
50	80	4.0	0.20	0.50	50	40	2.0	0.10	25	160	4.0	0.10
40	80	3.2	0.13	0.50	40	40	1.6	0.06	20	160	3.2	0.06
10	1000	10.0	0.10	7.41	10	500	5.0	0.05	5	2000	10.0	0.05
8	1000	8.0	0.06	7.41	8	500	4.0	0.03	4	2000	8.0	0.03

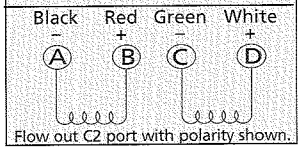
CONNECTOR SCHEMATIC

"S" Standard Wiring



Flow out C2 port with polarity shown.

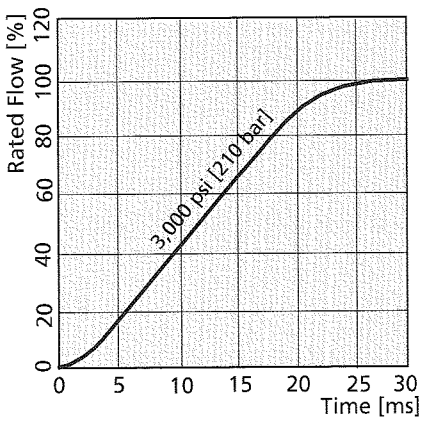
"M" Wiring



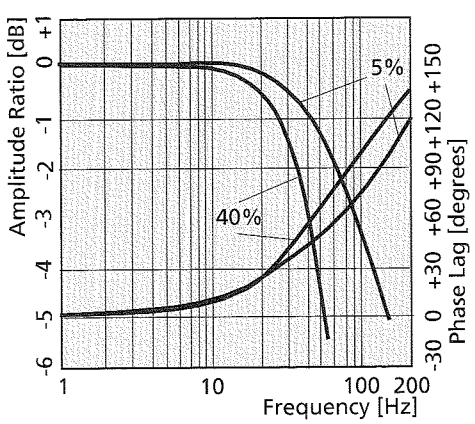
Flow out C2 port with polarity shown.

PERFORMANCE SPECIFICATIONS FOR STANDARD MODELS

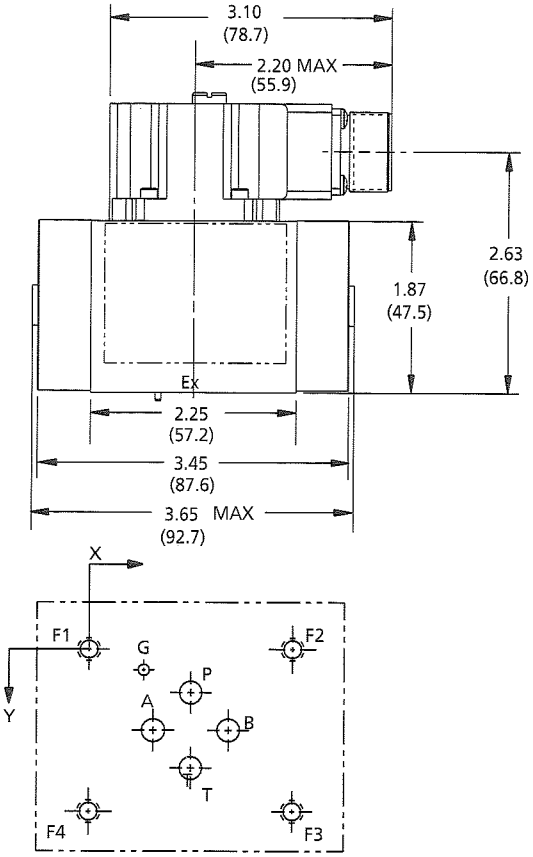
Step Response - 5 gpm

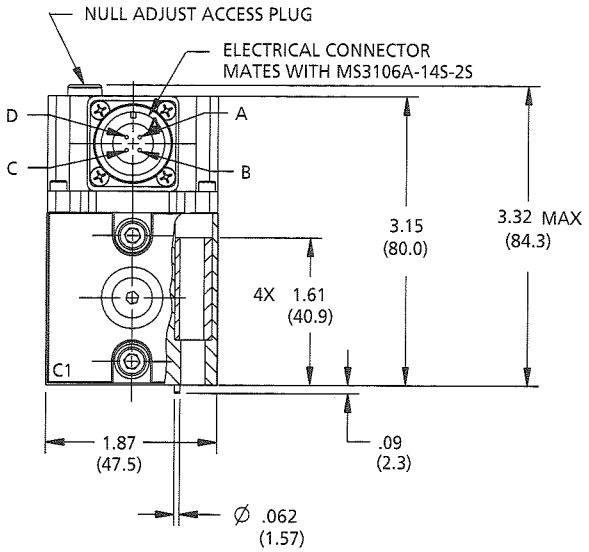


Frequency Response - 5 gpm



INSTALLATION DIAGRAM





The mounting manifold must conform to ISO 10372-03-03-0-92.
Surface to which valve is mounted requires a $\sqrt{32}$ [ΔΔ] finish, flat within 0.002[0.05] TIR.

For external null adjust, flow out of port B will increase with clockwise rotation of null adjust (3/32 hex key). Flow bias is continually varied for a given port as the null adjust is rotated.

	P	A	B	T	G	F_1	F_2	F_3	F_4
	Ø 0.19 [4.9]	**Ø 0.19 [4.9]**	**Ø 0.19 [4.9]**	**Ø 0.19 [4.9]**	**Ø 0.09 [2.4]**	0.19 - 32.0 [M5]	0.19 - 32.0 [M5]	0.19 - 32.0 [M5]	0.19 - 32.0 [M5]
x	0.84 [21.4]	0.53[13.5]	1.16 [29.5]	0.84 [21.4]	0.44 [11.1]	0	1.69 [42.9]	1.69 [42.9]	0
y	0.36 [9.1]	0.67 [17.0]	0.67 [17.0]	0.98 [24.9]	0.17 [4.3]	0	0	1.34 [34.1]	1.34 [34.1]

SPARE PARTS AND ACCESSORIES

O-rings (included in delivery)		FPM 85 Shore
for P, T, A, B	ID 0.24 [6.1] x Ø 0.07 [1.8]	42082-7
Mating connector, waterproof IP65 (not included in delivery)		49054F14S2S
Mounting bolts (included in delivery)		A01407-528 4 pieces
Filter Replacement Kit		B52555RK202K1

PERFORMANCE SPECIFICATIONS FOR STANDARD MODELS

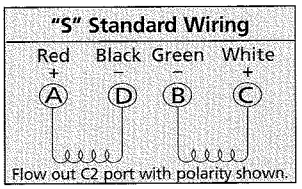
	English [Metric]	142
Mounting Pattern		ISO 10372-03-03-0-92
Pilot Stage		115R Force Motor
Mass	lb [kg]	2.75 [1.25]
Rated Flow @ 1000 psi [70 bar]	gpm [l/min]	10.0 [40.0]
Rated Flow Tolerance		+10%, -0%
Operating Pressure Max.	psi [bar]	5000 [345]
Response Time	[ms]	(see response charts)
Threshold*	[%]	± 0.50
Hysteresis*	[%]	± 3.0
Null Shift with ΔT = 55K	[%]	< ± 2.0
Null Leakage Flow @ 1000 psid [70 bar] and 110°F [42°C]	gpm [l/min]	< 0.40 [1.5] with standard lap
Main Spool Stroke approx.	in [mm]	0.02 [0.51]
Pilot Leakage Flow	gpm [l/min]	N/A

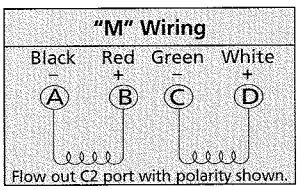
* measured at 3,000 psi [210 bar] pilot or operating pressure, respectively, fluid viscosity of 32 mm²/s and fluid temperature of 104°F [40°C].

ELECTRICAL CHARACTERISTICS

Single Coil Operation					Parallel (Dual Coil)				Series (Dual Coil)			
mA	OHMS (Ω)	VOLTS	WATTS	INDUCTANCE (H)	mA	OHMS (Ω)	VOLTS	WATTS	mA	OHMS (Ω)	VOLTS	WATTS
200	22	4.4	0.88	0.11	200	11	2.2	0.44	100	44	4.4	0.44
140	40	5.6	0.78	0.20	140	20	2.8	0.39	70	80	5.6	0.39
100	100	10.0	1.00	0.50	100	50	5.0	0.50	50	200	10.0	0.50
50	320	16.0	0.80	1.60	50	160	8.0	0.40	25	640	16.0	0.40
40	320	12.8	0.52	1.60	40	160	6.4	0.26	20	640	12.8	0.26
40	1200	48.0	1.92	6.00	40	600	24.0	0.96	20	2400	48.0	0.96
30	800	24.0	0.72	4.00	30	400	12.0	0.36	15	1600	24.0	0.36
50	80	4.0	0.20	0.50	50	40	2.0	0.10	25	160	4.0	0.10
40	80	3.2	0.13	0.50	40	40	1.6	0.06	20	160	3.2	0.06
10	1000	10.0	0.10	7.41	10	500	5.0	0.05	5	2000	10.0	0.05
8	1000	8.0	0.06	7.41	8	500	4.0	0.03	4	2000	8.0	0.03

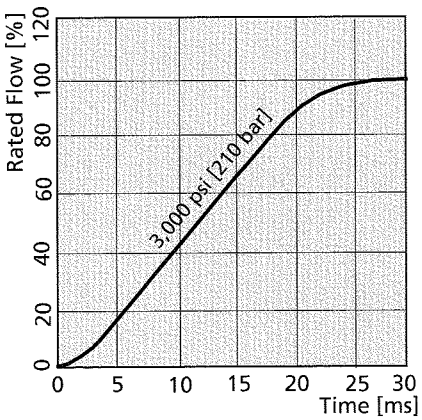
CONNECTOR SCHEMATIC



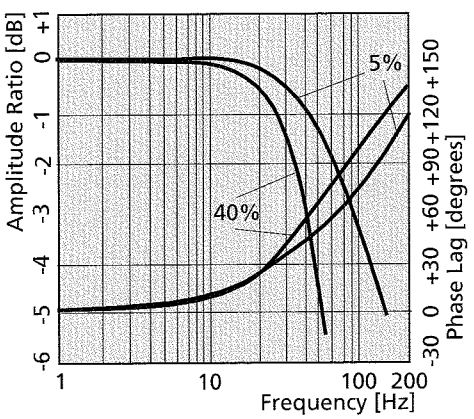


PERFORMANCE SPECIFICATIONS FOR STANDARD MODELS

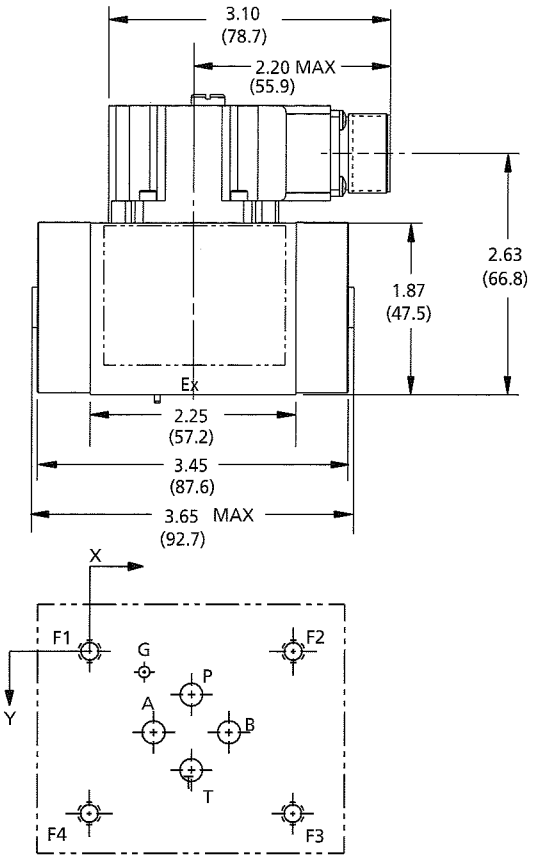
Step Response - 10 gpm

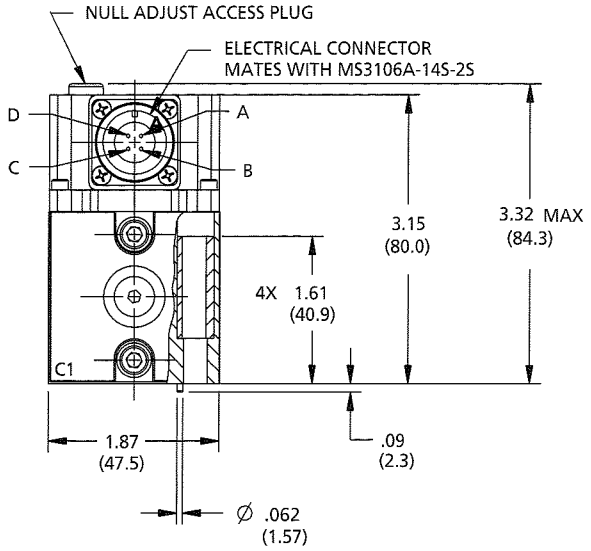


Frequency Response - 10 gpm



INSTALLATION DIAGRAM





The mounting manifold must conform to ISO 10372-03-03-0-92.
Surface to which valve is mounted requires a $\sqrt{32}$ [ΔΔ] finish, flat within 0.002[0.05] TIR.

For external null adjust, flow out of port B will increase with clockwise rotation of null adjust (3/32 hex key). Flow bias is continually varied for a given port as the null adjust is rotated.

	P Ø 0.31 [7.9]	A Ø 0.31 [7.9]	B Ø 0.31 [7.9]	T Ø 0.31 [7.9]	G Ø 0.9 [2.4]	F_1 0.25-20.0 [M6]	F_2 0.25-20.0 [M6]	F_3 0.25-20.0 [M6]	F_4 0.25-20.0 [M6]
x	0.84 [21.4]	0.38[9.7]	1.31 [33.3]	0.84 [21.4]	0.45[11.1]	0	1.69 [42.9]	1.69 [42.9]	0
y	0.20 [5.1]	0.67 [17.0]	0.67 [17.0]	1.14 [29.0]	0.17 [4.3]	0	0	1.34 [34.1]	1.34 [34.1]

SPARE PARTS AND ACCESSORIES

O-rings (included in delivery) for P, T, A, B	ID 0.24 [6.1] x Ø 0.07 [1.8]	FPM 85 Shore 42082-22
Mating connector, waterproof IP65 (not included in delivery)		49054F14S2S
Mounting bolts (included in delivery)		A31324-132B 4 pieces
Filter Replacement Kit		B52555RK202K1

PERFORMANCE SPECIFICATIONS FOR STANDARD MODELS

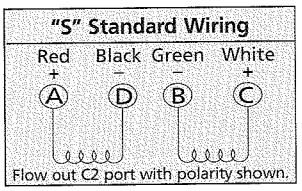
	English [Metric]	162
Mounting Pattern		ISO 10372-03-03-0-92
Pilot Stage		115R Force Motor
Mass	lb [kg]	2.75 [1.25]
Rated Flow @ 1000 psi [70 bar]	gpm [l/min]	15.0 [57.0]
Rated Flow Tolerance		+10%, -0%
Operating Pressure Max.	psi [bar]	5000 [345]
Response Time	[ms]	17
Threshold*	[%]	± 0.50
Hysteresis*	[%]	± 3.0
Null Shift with ΔT = 55K	[%]	< ± 2.0
Null Leakage Flow @ 1000 psid [70 bar] and 110°F [42°C]	gpm [l/min]	< 0.50 [1.9] with standard lap
Main Spool Stroke approx.	in [mm]	0.02 [0.51]
Pilot Leakage Flow	gpm [l/min]	N/A

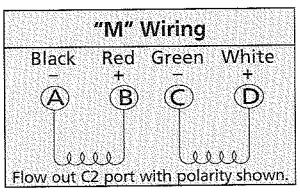
* measured at 3,000 psi [210 bar] pilot or operating pressure, respectively, fluid viscosity of 32 mm²/s and fluid temperature of 104°F [40°C].

ELECTRICAL CHARACTERISTICS

Single Coil Operation					Parallel (Dual Coil)				Series (Dual Coil)			
mA	OHMS (Ω)	VOLTS	WATTS	INDUCTANCE (H)	mA	OHMS (Ω)	VOLTS	WATTS	mA	OHMS (Ω)	VOLTS	WATTS
200	22	4.4	0.88	0.11	200	11	2.2	0.44	100	44	4.4	0.44
140	40	5.6	0.78	0.20	140	20	2.8	0.39	70	80	5.6	0.39
100	100	10.0	1.00	0.50	100	50	5.0	0.50	50	200	10.0	0.50
50	320	16.0	0.80	1.60	50	160	8.0	0.40	25	640	16.0	0.40
40	320	12.8	0.52	1.60	40	160	6.4	0.26	20	640	12.8	0.26
40	1200	48.0	1.92	6.00	40	600	24.0	0.96	20	2400	48.0	0.96
30	800	24.0	0.72	4.00	30	400	12.0	0.36	15	1600	24.0	0.36
50	80	4.0	0.20	0.50	50	40	2.0	0.10	25	160	4.0	0.10
40	80	3.2	0.13	0.50	40	40	1.6	0.06	20	160	3.2	0.06
10	1000	10.0	0.10	7.41	10	500	5.0	0.05	5	2000	10.0	0.05
8	1000	8.0	0.06	7.41	8	500	4.0	0.03	4	2000	8.0	0.03

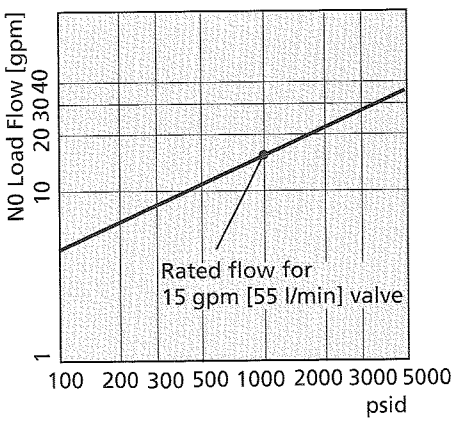
CONNECTOR SCHEMATIC



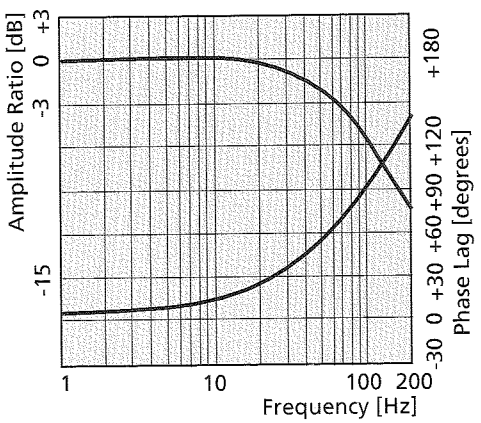


PERFORMANCE SPECIFICATIONS FOR STANDARD MODELS

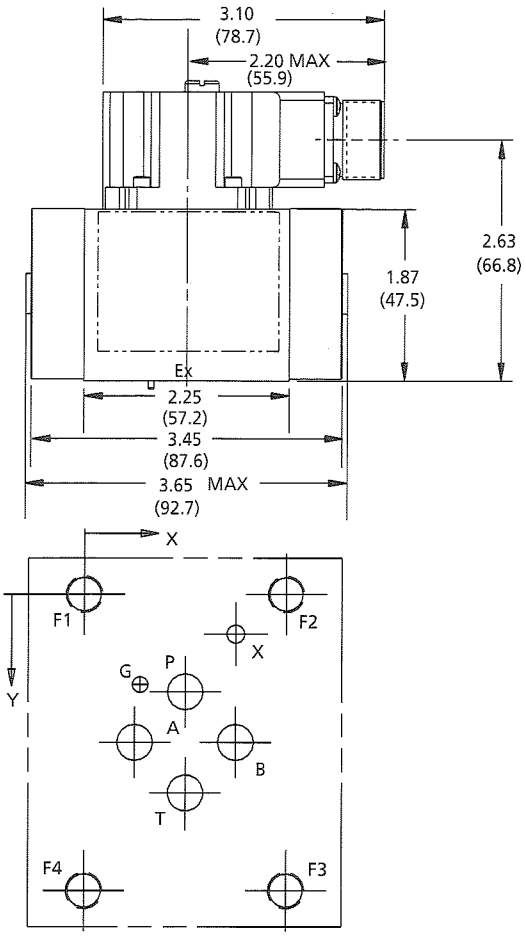
Valve Pressure Drop

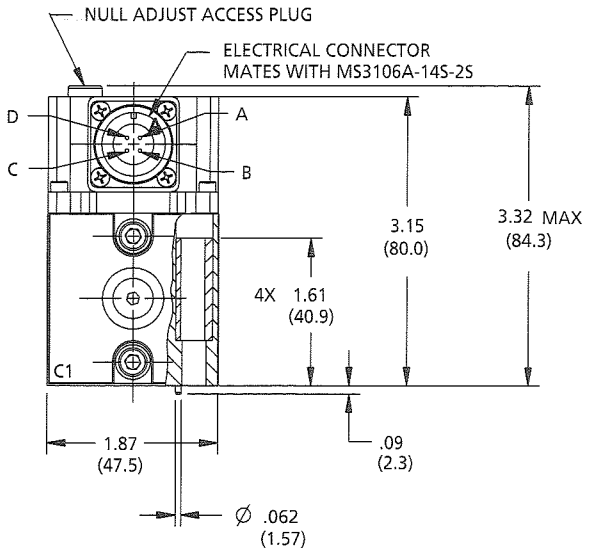


Frequency Response



INSTALLATION DIAGRAM





The mounting manifold must conform to ISO 10372-04-04-0-92.
Surface to which valve is mounted requires a $\sqrt{32}$ [ΔΔ] finish, flat within 0.001[0.03] TIR.

For external null adjust, flow out of port B will increase with clockwise rotation of null adjust (3/32 hex key). Flow bias is continually varied for a given port as the null adjust is rotated.

	P	A	B	T	G	F_1	F_2	F_3	F_4
	Ø 0.31 [7.9]	**Ø 0.31 [7.9]**	**Ø 0.31 [7.9]**	**Ø 0.31 [7.9]**	**Ø 0.09 [2.4]**	0.25-20.0 [M6]	0.25-20.0 [M6]	0.25-20.0 [M6]	0.25-20.0 [M6]
x	0.84 [21.4]	0.38[9.7]	1.31 [33.3]	0.84 [21.4]	0.45 [11.1]	0	1.69 [42.9]	1.69 [42.9]	0
y	0.20 [5.1]	0.67 [17.0]	0.67 [17.0]	1.14 [29.0]	0.17 [4.3]	0	0	1.34 [34.1]	1.34 [34.1]

SPARE PARTS AND ACCESSORIES

O-rings (included in delivery)		FPM 85 Shore
for P, T, A, B	ID 0.24 [6.1] x Ø 0.07 [1.8]	42082-22
Mating connector, waterproof IP65 (not included in delivery)		49054F14S2S
Mounting bolts (included in delivery)		A31324-132B 4 pieces
Filter Replacement Kit		B52555RK202K1

PERFORMANCE SPECIFICATIONS FOR STANDARD MODELS

	English [Metric]	1282
Mounting Pattern		10372-06-05-0-92
Pilot Stage		1282R Force Motor
Mass	lb [kg]	33.5 [15.2]
Rated Flow @ 1000 psi [70 bar]	gpm [l/min]	80.0 [300]
Rated Flow Tolerance		+10%, -0%
Operating Pressure Max.	psi [bar]	5000 [345]
Response Time	[ms]	60
Threshold*	[%]	± 0.50
Hysteresis*	[%]	± 3.0
Null Shift with ΔT = 55K	[%]	< ± 2.0
Null Leakage Flow @ 1000 psid [70 bar] and 110°F [42°C]	gpm [l/min]	< 1.5 [5.7] with standard lap
Main Spool Stroke approx.	in [mm]	0.04 [1.0]
Pilot Leakage Flow	gpm [l/min]	N/A

* measured at 3,000 psi [210 bar] pilot or operating pressure, respectively, fluid viscosity of 32 mm²/s and fluid temperature of 104°F [40°C].

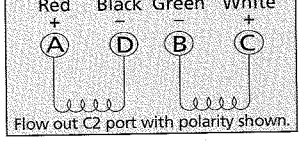
ELECTRICAL CHARACTERISTICS

Single Coil Operation					Parallel (Dual Coil)				Series (Dual Coil)			
mA	OHMS (Ω)	VOLTS	WATTS	INDUCTANCE (H)	mA	OHMS (Ω)	VOLTS	WATTS	mA	OHMS (Ω)	VOLTS	WATTS
A - High					A - High				A - High			
200	22	4.4	0.88	0.73	200	11	2.2	0.44	100	44	4.4	0.44
100	100	10.0	1.00	2.67	100	50	5.0	0.50	50	200	10.0	0.50
40	320	12.8	0.51	10.67	40	160	6.4	0.26	20	640	12.8	0.26
20	1000	20.0	0.40	33.33	20	500	10.0	0.20	10	2000	20.0	0.20
B Medium					B Medium				B Medium			
40	80	3.2	0.13	2.67	40	40	1.6	0.06	20	160	3.2	0.06

For other coil current/resistance combinations, consult factory. Higher power gives optimal performance.
Group A coils for 40, 60, and 80 gpm flows. Group B coils for 40 or 60 gpm flows only.

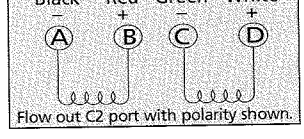
CONNECTOR SCHEMATIC

"S" Standard Wiring



Flow out C2 port with polarity shown.

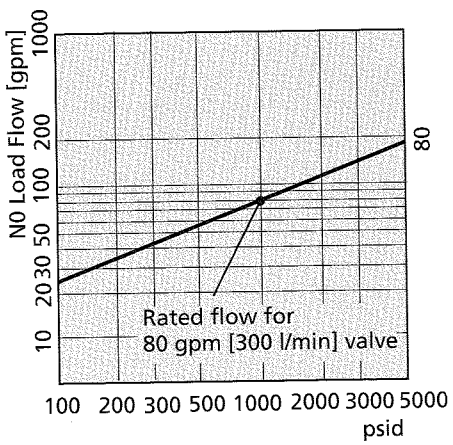
"M" Wiring



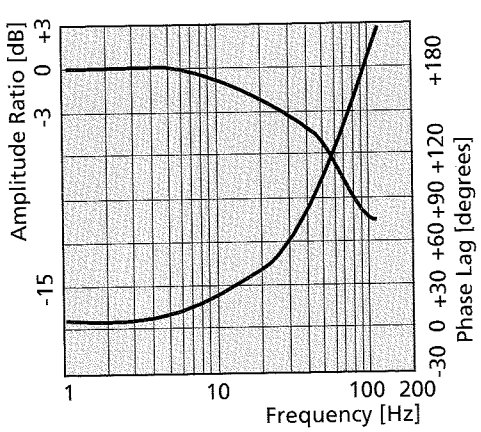
Flow out C2 port with polarity shown.

PERFORMANCE SPECIFICATIONS FOR STANDARD MODELS

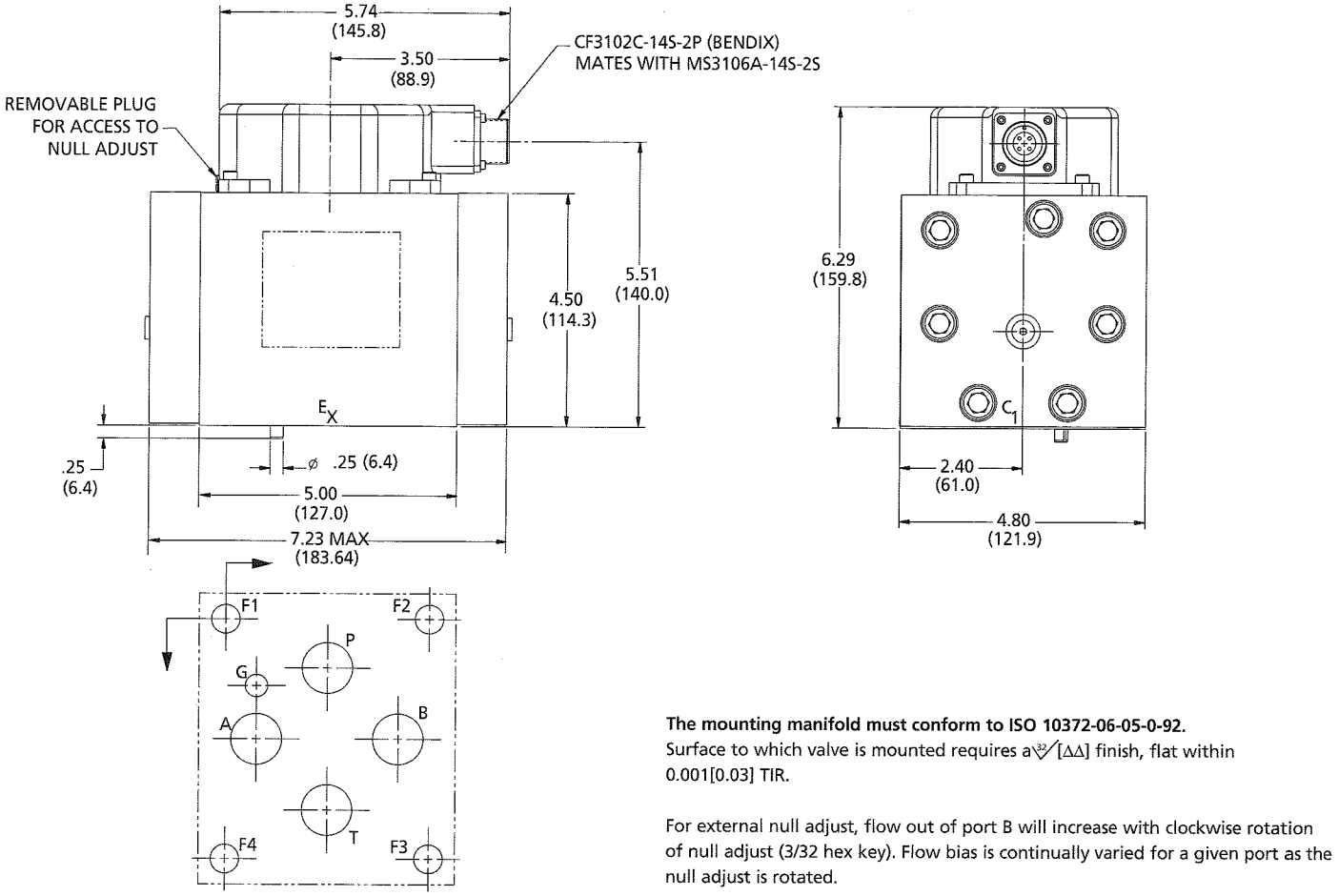
Valve Pressure Drop



Frequency Response



INSTALLATION DIAGRAM



The mounting manifold must conform to ISO 10372-06-05-0-92.
Surface to which valve is mounted requires a$\sqrt{32}$/[ΔΔ] finish, flat within 0.001[0.03] TIR.

For external null adjust, flow out of port B will increase with clockwise rotation of null adjust (3/32 hex key). Flow bias is continually varied for a given port as the null adjust is rotated.

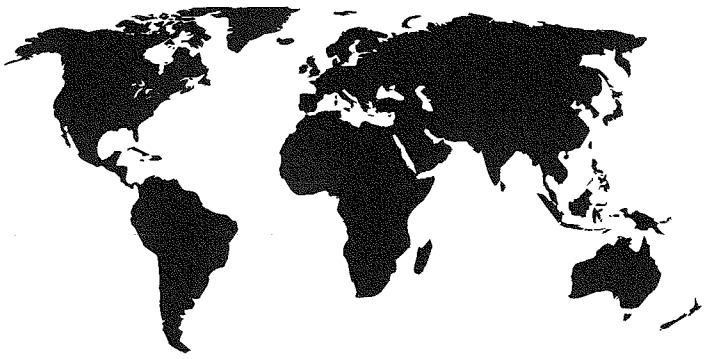
	P	A	T	B	G	F_1	F_2	F_3	F_4
	Ø 0.63 [16.0]	**Ø 0.63 [16.0]**	**Ø 0.63 [16.0]**	**Ø 0.63 [16.0]**	**Ø 0.31 [8.0]**	M10	M10	M10	M10
x	1.44 [36.5]	0.44[11.1]	1.44 [36.5]	2.44 [61.9]	0.44 [11.1]	0	2.87 [73.0]	2.87 [73.0]	0
y	0.69 [17.4]	1.69 [42.8]	2.69 [68.2]	1.69 [42.8]	0.93 [23.7]	0	0	3.37 [85.6]	3.37 [85.6]

SPARE PARTS AND ACCESSORIES

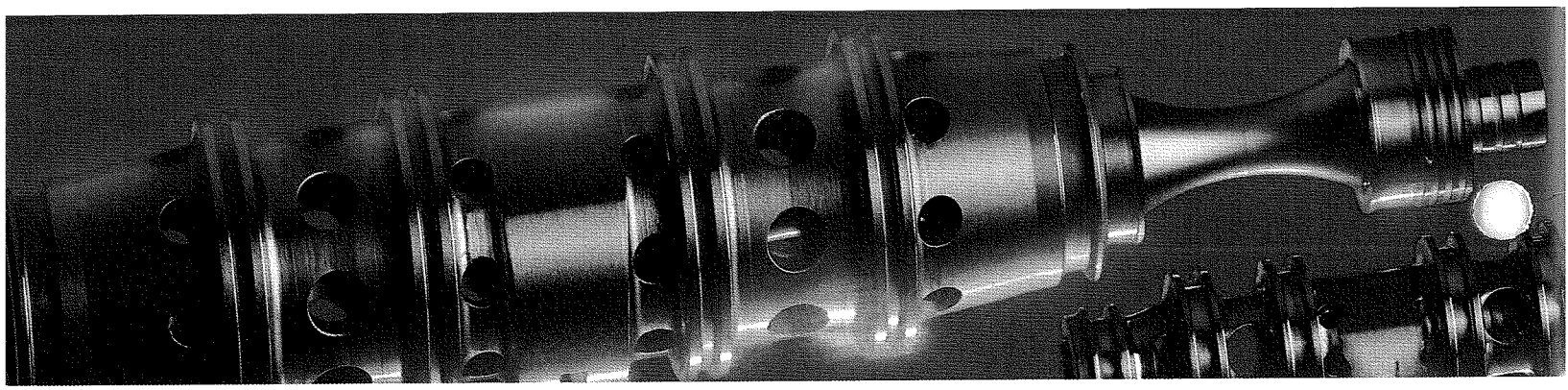
O-rings (included in delivery) for P, T, A, B	ID 0.24 [6.1] x Ø 0.07 [1.8]	FPM 85 Shore 42082-38	
Mating connector, waterproof IP65 (not included in delivery)		49054F14S2S	
Mounting bolts (included in delivery)		A31324-364B	4 pieces
Filter Replacement Kit		B52555RK203K1	

ORDERING INFORMATION FOR STANDARD MODELS

Model	Rated Flow (Δ 1,000 psi)		Internal Leakage (at 1,000 psi)		Rated Current (Single Coil)	Nominal Coil Resistance
	gpm	lpm	gpm	lpm	mA	Ohms
122	0.50 - 5.0	1.9 - 19	< 0.50	< 1.9	8 - 200	22 - 1200
142	0.50 - 10	2 - 40	< 0.40	< 1.5	8 - 200	22 - 1200
162	up to 15	up to 57	< 0.50	< 1.5	10 - 200	22 - 1200
1282	up to 80	up to 300	< 1.5	< 5.7	10 - 200	22 - 1200



Argentina
Australia
Austria
Brazil
China
England
Finland
France
Germany



India
Ireland
Italy
Japan
Korea
Luxembourg
Norway
Russia
Singapore
Spain
Sweden
USA

MOOG

Moog Industrial Controls Division
East Aurora, NY 14052-0018
Telephone: 716/655-3000
Fax: 716/655-1803
Toll Free: 1-800-272-MOOG
www.moog.com

CDL6734 500-425 401