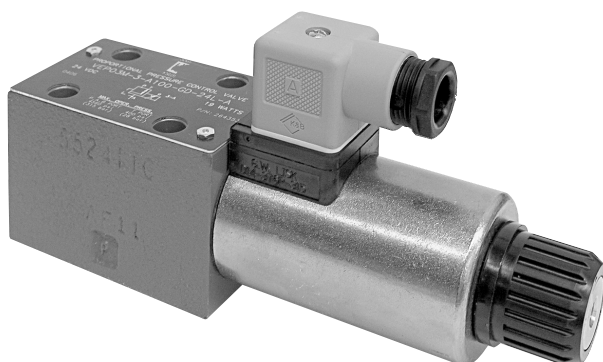


NEW VEP03M-3
PRESSURE CONTROL VALVES
PRESSURE REDUCING/RELIEVING, SUBPLATE MOUNTED



DESCRIPTION

These proportional valves are direct operated pressure reducing valves. They can be used to control pressure in parts of a circuit. This valve incorporates a pressure control spool with a pressure sensing piston to sense downstream pressure.

The single solenoid version, code B, will allow fluid flow from P port to B port when an electrical signal is applied. If the signal is decreased to zero, P port will be blocked and B port opened to the tank port. The code A version will allow flow from P to A.

The double solenoid version, code C, will allow flow from P to A (or P to B) when the signal is applied to the proper solenoid. A and B ports are used alternately for pressure reduction in the respective port. P and T ports are common.

These valves comply with the following European Community Directive:

89/336/EEC ECM Directive

Provided that all cables to the proportional control valve are shielded, and the shield is terminated at both ends.

The following standards were used to verify compliance with the Directives:

EN 55081-2, EN 50082-2, EN 55011: Class A, EN 61000-4-2, ENV 50140, E 61000-4-4, EN-50204, EN 50140

These devices are considered to be components, and will be incorporated into a larger system. The devices listed above are not to be placed into service until the machinery into which they are to be incorporated has been declared in conformity with the provisions of all relevant European Community Directives, and the completed machinery is appropriately CE marked.

TYPICAL PERFORMANCE SPECIFICATIONS

MOUNTING SURFACE		NFPA/T3.5.1M R2-2002 (D03) ISO/4401 SIZE 03	
MOUNTING POSITION		Unrestricted (Horizontal preferred)	
MAXIMUM OPERATING PRESSURE	P, A, B Ports T Port	4560 psi 400 psi	315 bar 28 bar
FLUID OPERATING VISCOSITY		30 - 350 SUS (0.3 - 75.5 Cs) Acceptable start-up 4000 SUS (863.0 Cs)	
HYSTERESIS (open loop)	With Dither	3%	
THRESHOLD (open loop)	Nominal w/Dither	3%	
REPEATABILITY	With Dither	1%	
VOLTAGE (Nominal)	Code 12	12 VDC	
	Code 24	24 VDC	
CURRENT (Maximum)	Code 12	2.2 Amp	
	Code 24	1.1 Amp	
WATTAGE (I ² R) @ 68° F. (20° C.) (Continuous)	Code 12	19	
	Code 24	19	
COIL RESISTANCE @ 68° F. (20° C.)	Code 12	3.8 Ohms	
	Code 24	15.2 Ohms	
INTERNAL LEAKAGE @ 0 VDC	@ 1000 psi (69 bar) ΔP	8 in. ³ /min. typical (131.1 ml/min.)	
FLUID TEMPERATURE RANGE		*Max. 150° F. (65° C.) For safety, over 130° F. (54° C.) is not recommended	
WEIGHT	Code A or B	4.3 lbs.	1.9 kg
	Code C	6.0 lbs.	2.7 kg
FILTRATION		ISO Code 18/16/13	

NOTE: Data taken with fluid temperature at 120°F. (49°C.) and viscosity at 100 SUS (20.6 Cs), using Continental Hydraulics ECM4 electronic controller.

* Temperatures over 150°F. (65°C.) may affect valve performance.

NEW VEP03M-3

PRESSURE CONTROL VALVES

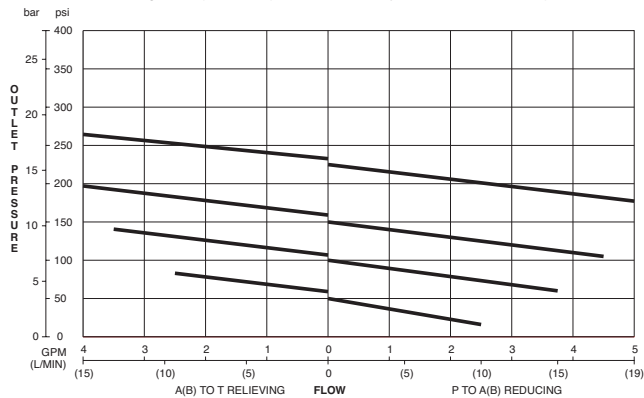
PRESSURE REDUCING/RELIEVING, SUBPLATE MOUNTED



PRESSURE VS. FLOW CURVES

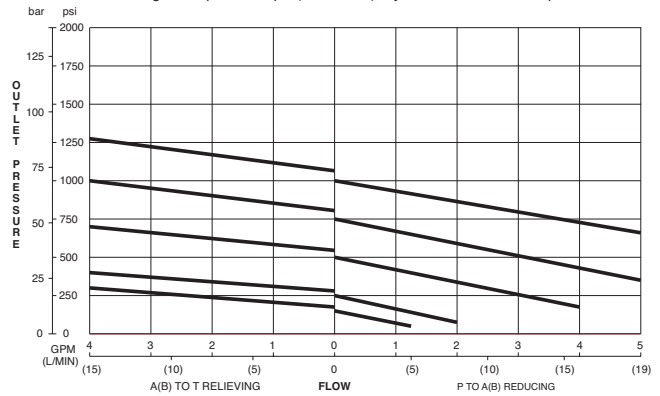
CODE 15

Control Pressure Range -- 29 psi to 217 psi (2 to 15 bar), System Pressure = 1500 psi



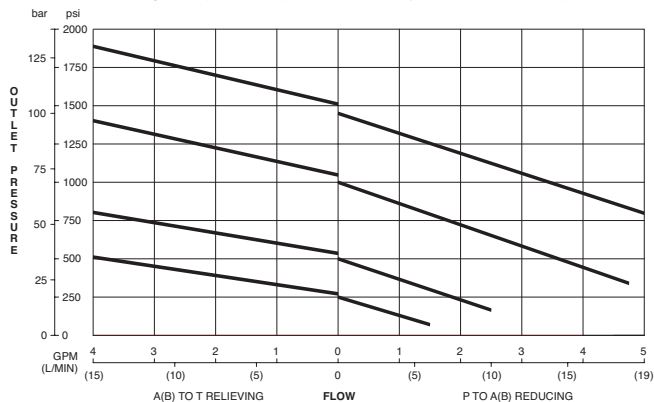
CODE 65

Control Pressure Range -- 29 psi to 940 psi (2 to 65 bar), System Pressure = 1500 psi



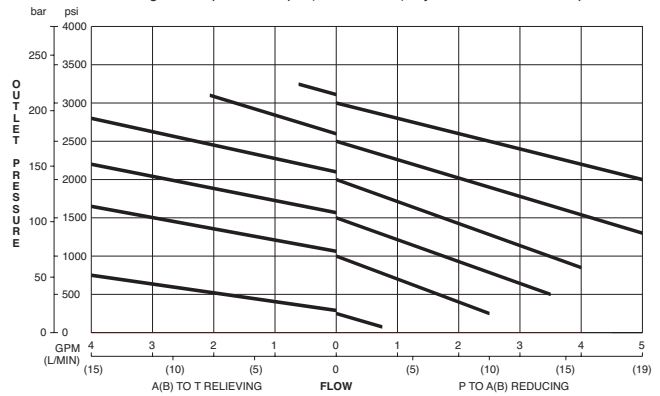
CODE 100

Control Pressure Range -- 72 psi to 1450 psi (5 to 100 bar), System Pressure = 3000 psi



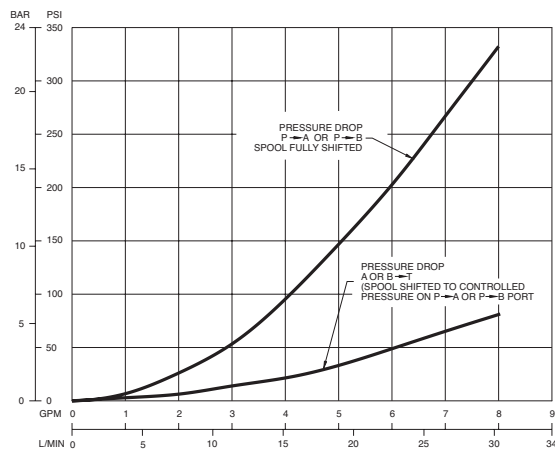
CODE 225

Control Pressure Range -- 290 psi to 3265 psi (20 to 225 bar), System Pressure = 3300 psi



PRESSURE DROP CURVES

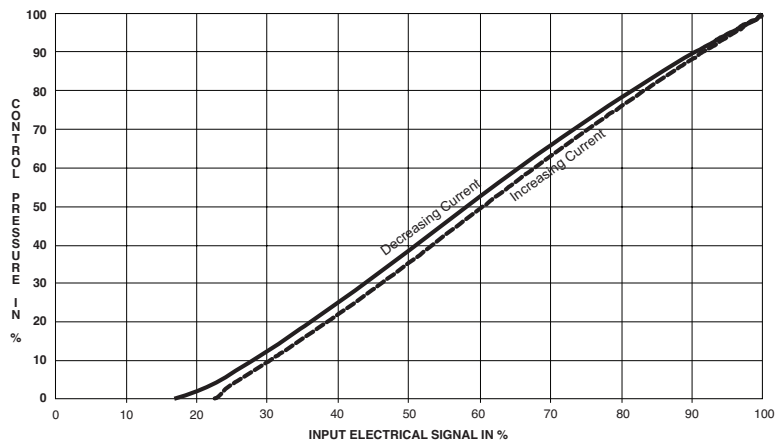
100 sus oil @ +120° F



CONTROL PRESSURE vs INPUT SIGNAL

Curve shown @ Zero Flow (Open Loop)

100 sus oil @ +120° F

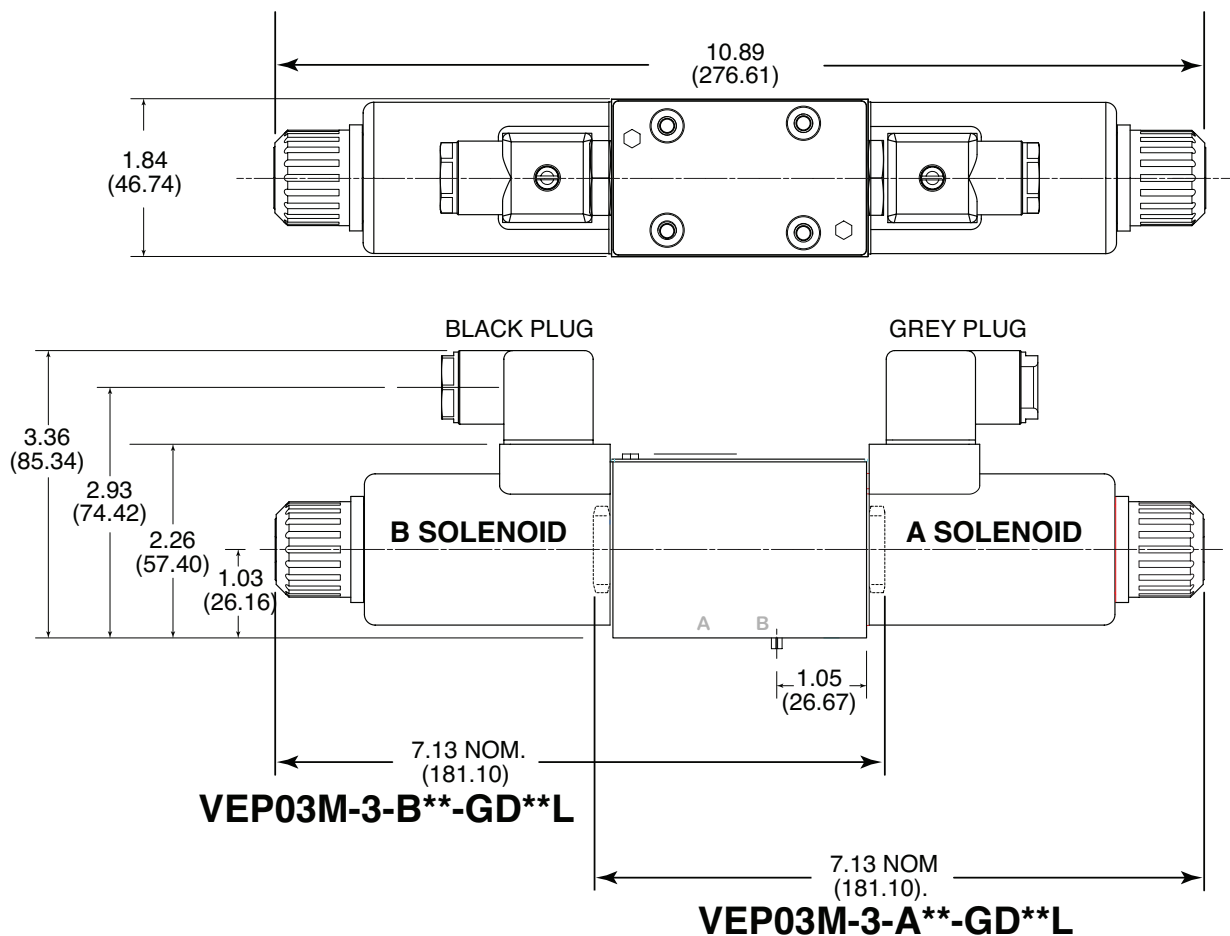


NEW VEP03M-3
PRESSURE CONTROL VALVES
PRESSURE REDUCING/RELIEVING, SUBPLATE MOUNTED

DIN CONNECTORS DIMENSIONS

Shown in: Inches
(millimeters)

NFPA D03 Size

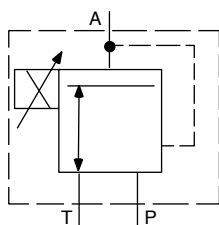


NOTE:

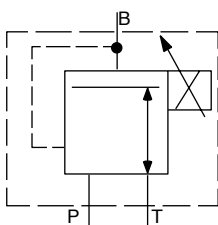
Four (4) mounting bolts are torqued to 10 - 12 lbs.-ft. (13.5 - 16.3 Nm).

VEP03M-3 SCHEMATICS

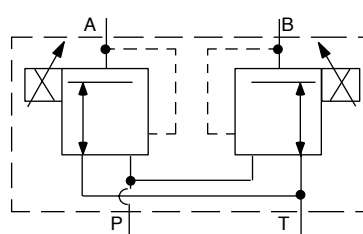
Code A



Code B



Code C



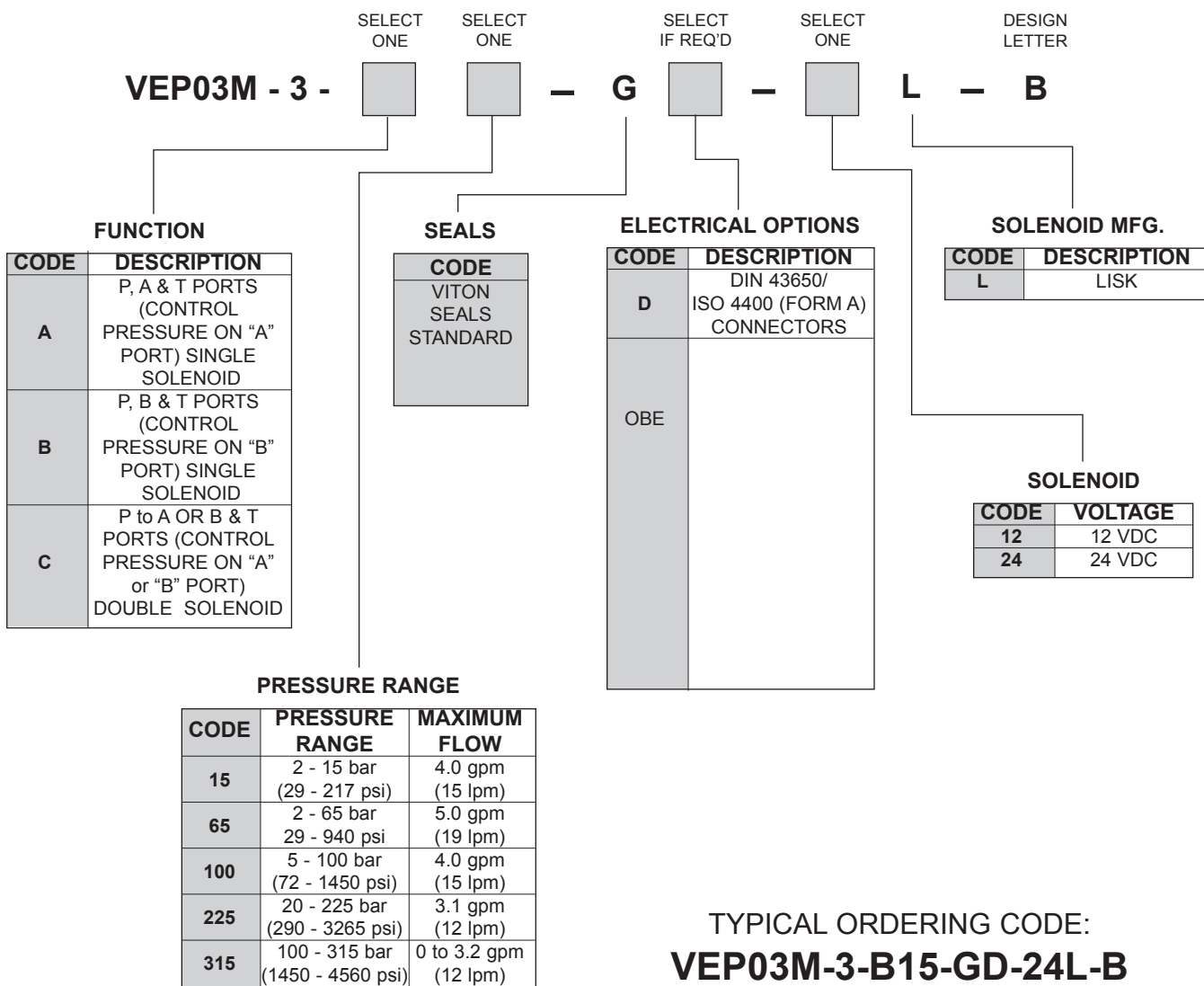
NEW VEP03M-3

PRESSURE CONTROL VALVES

PRESSURE REDUCING/RELIEVING, SUBPLATE MOUNTED



ORDERING CODE INFORMATION



EXCLUSIVE 3 YEAR WARRANTY

Continental Hydraulics Division warrants all hydraulic directional valves supplied by Continental Hydraulics against defects in materials and workmanship under normal use and service for 3 years from the date code on the valve.

Complete terms and conditions available upon request.

Continental Hydraulics
5505 West 123rd Street, Savage, MN 55378 U.S.A.
Phone: (952) 895-6400 Fax: (952) 895-6444
www.continentalhydraulics.com

Because Continental Hydraulics is continually improving its products, specifications and appearance are subject to change without notice.

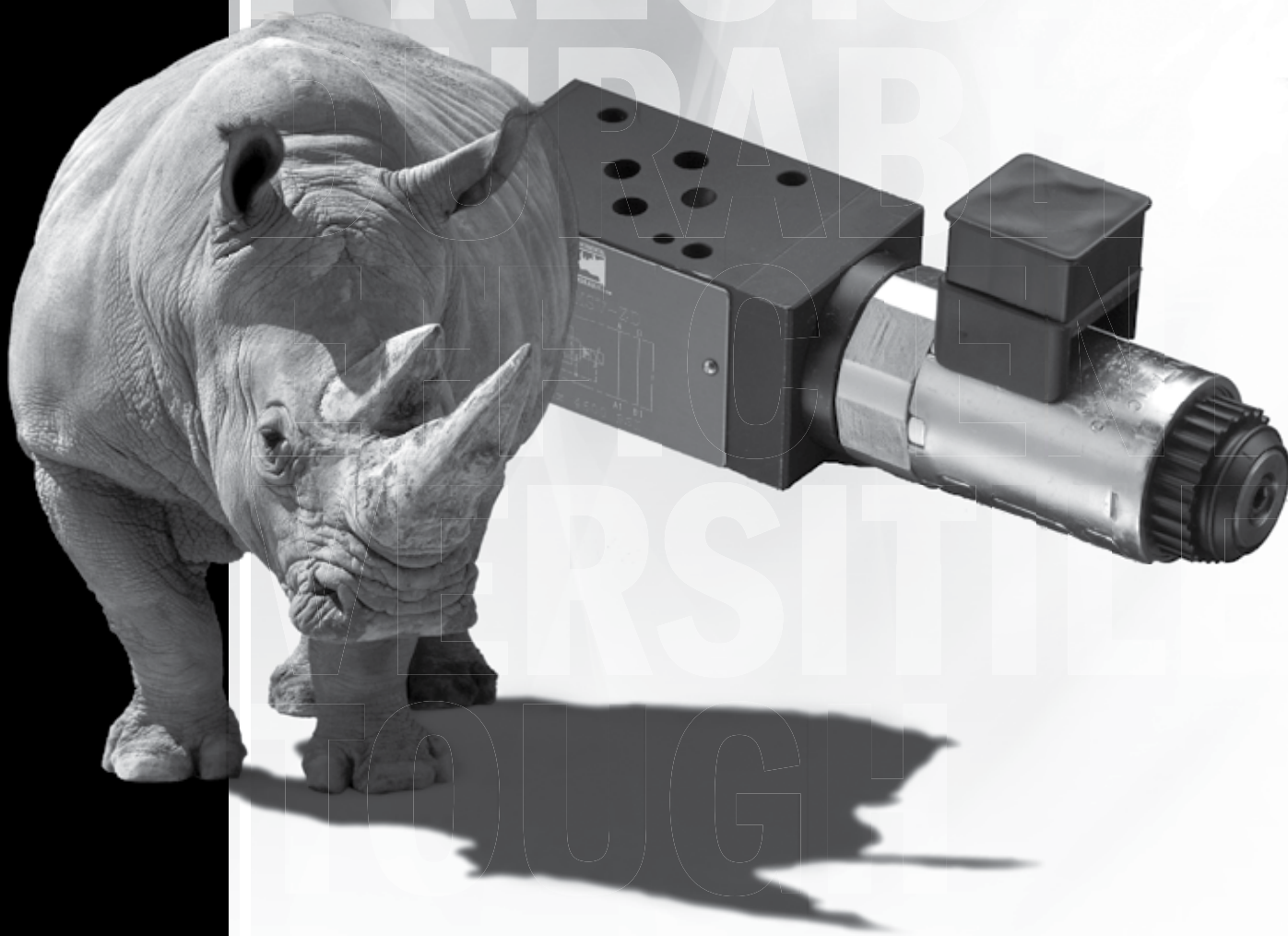
Form No. 266214 10/06 © 2006 Continental Hydraulics Printed in U.S.A.



CONTINENTAL HYDRAULICS

VEP03MSV-PDRP

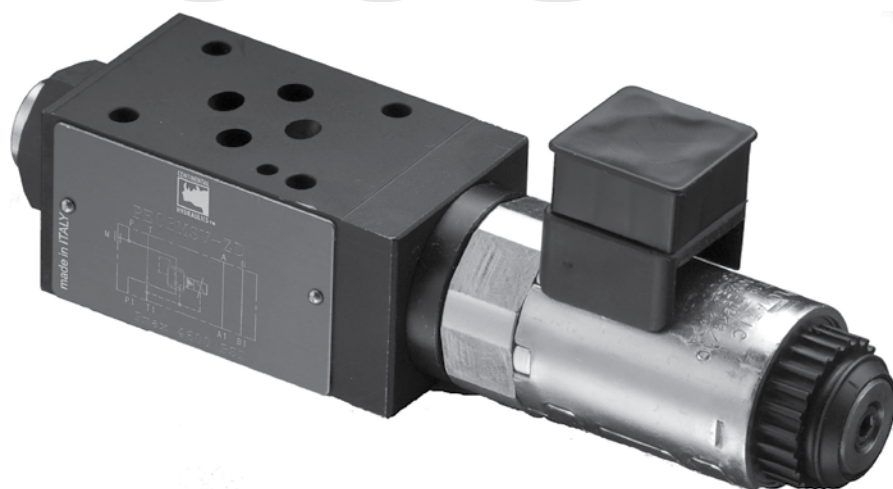
3-WAY PROPORTIONAL PRESSURE REDUCING/RELIEVING VALVES



VEP03MSV-PDRP - 3-WAY PROPORTIONAL PRESSURE REDUCING/RELIEVING VALVES

VEP03MSV-PDRP

3-WAY PROPORTIONAL PRESSURE REDUCING/RELIEVING VALVES



DESCRIPTION

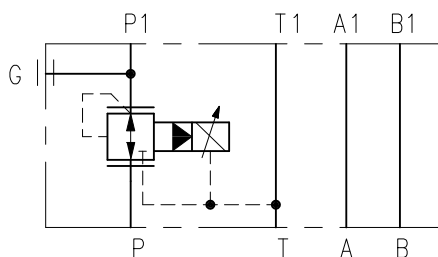
The VEP03MSV-PDRP is a D03 modular three-way proportional pressure reducing/relieving valve which conforms to NFPA D03 and ISO 4401 mounting standards.

OPERATIONS

These valves are designed to provide remote variable pressure control in the pressure port of a secondary circuit. The controlled pressure is proportional to the amount of current supplied to the solenoid.

As flow demands change, the valve opening will modulate to maintain the circuit pressure. The VEP03MSV-PDRP will also relieve the tank to vent a load induced pressure spike. In event of a loss in electrical power, the valve spool will return to the low pressure condition.

The proportional solenoids can be driven by a variable current power supply or by use of external Power Amplifier Cards designed to maximize the valve's performance.



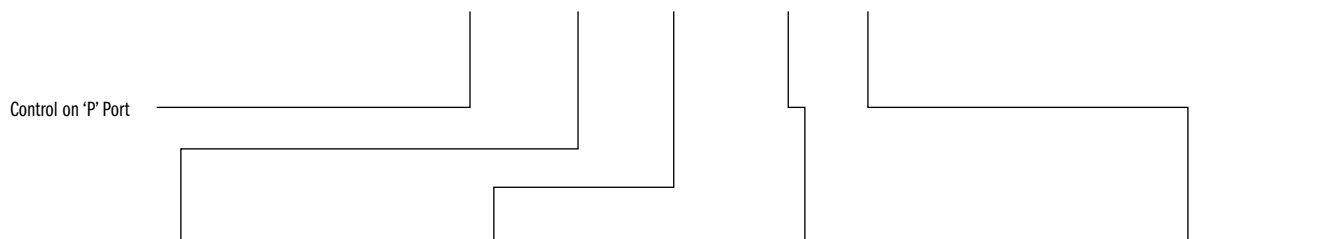
TYPICAL PERFORMANCE SPECIFICATIONS

MAXIMUM OPERATING PRESSURE:	P - A - B Ports	4600 psi	320 bar
	T Port	30 psi	2 bar
MAXIMUM FLOW RATE	Controlled Line	8 gpm	30 l/min
	Free Lines	13.2 gpm	50 l/min
	Drainage	24 in ³ /min	0.4 l/min
MOUNTING SURFACE	NFPA D03 ISO 4401-03-02-0-05		
WEIGHT	4 lbs		1.8 Kg

STEP RESPONSE WITH Q = 6.6 gpm	0 → 100%	100 ms
	100 → 0%	80 ms
HYSTERESIS WITH PWM 200	% of p nom	< 3%
REPEATABILITY	% of p nom	< ± 1.5%
POWER SUPPLY	12V DC / 24V DC	
CONNECTION	DIN 43650	
PROTECTION	IEC 60529	IP65

IDENTIFICATION CODE

VEP03MSV - PDRP - **-** **- K1** **D -** DESIGN LETTER



PRESSURE RANGE	
70	70 - 1000 psi (5 - 70 bar)
150	116 - 2175 psi (8 - 150 bar)
230	145 - 3300 psi (10 - 230 bar)

SEAL	
A	Buna (STD)
G	Viton

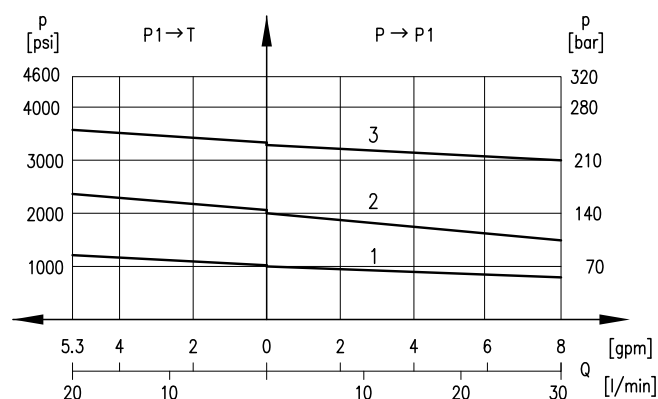
CONNECTION	
K1	DIN 43650

VOLTAGE	
12	12 V DC Solenoid
24	24 V DC Solenoid

TYPICAL ORDERING CODE:
VEP03MSV-PDRP-70-A-K112D-A

CHARACTERISTICS - VARIABLE ADJUSTMENT

PRESSURE REGULATION



CURVE	PRESSURE CODE
1	070
2	150
3	230

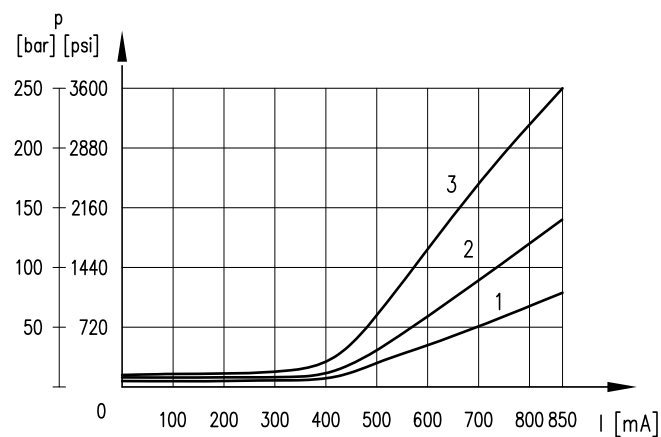
NOTES:

- Curves obtained with mineral oil with viscosity of 170 sus (36 cSt) at 122°F (50°C).
- The curves have been obtained with inlet pressure 725 psi (50 bar) higher than the nominal pressure.

Pressure values in P1 higher than 725 psi (50 bar) reduce flow values considerably.

CHARACTERISTICS - VARIABLE ADJUSTMENT

PRESSURE CONTROL

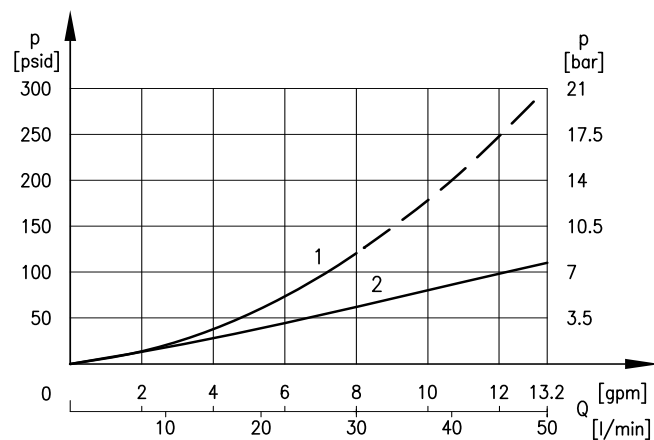


CURVE	PRESSURE CODE
1	070
2	150
3	230

NOTES:

- Curves obtained with mineral oil with viscosity of 170 SUS (36 cSt) at 122°F (50°C).
- Curves obtained without flow on the A and B ports.

PRESSURE DROPS Δp - Q



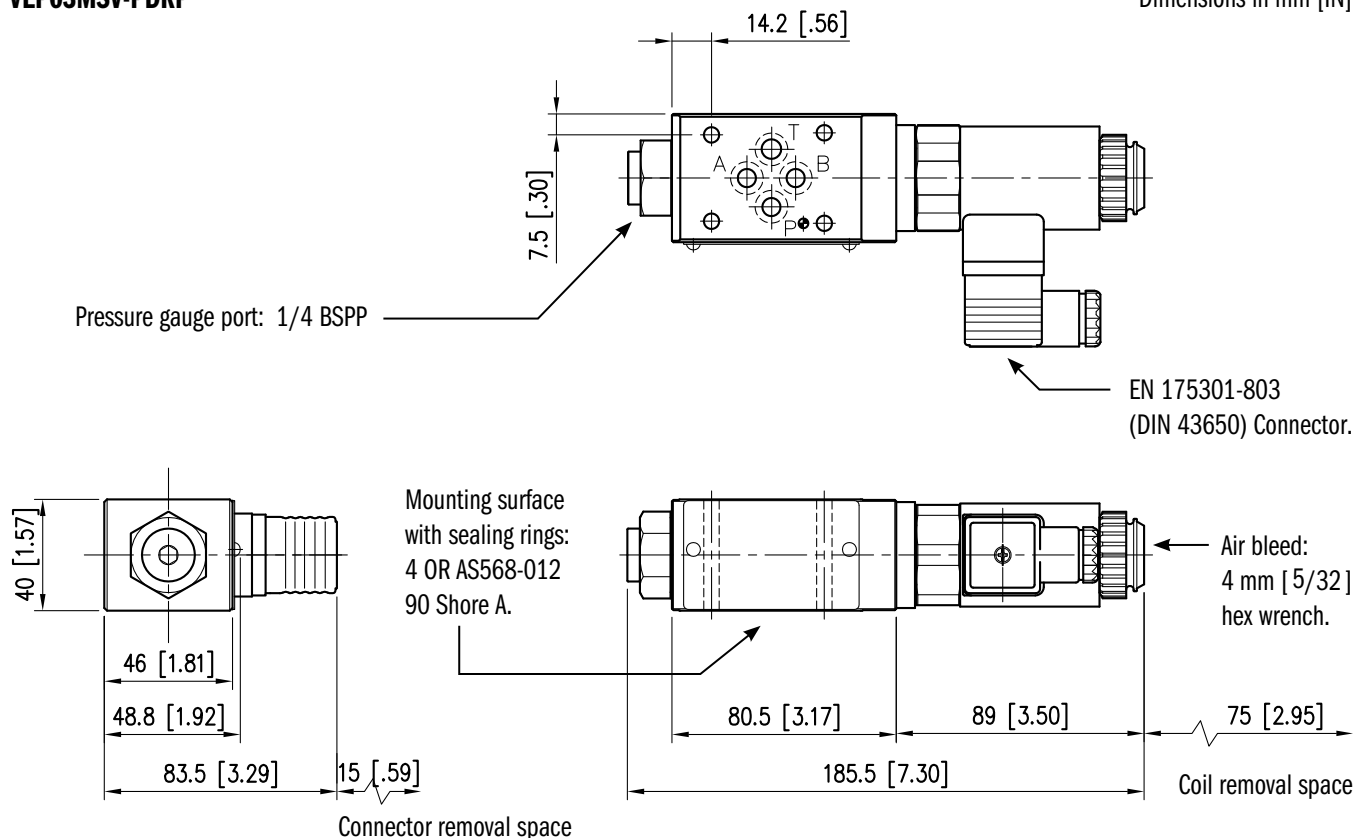
NOTES:

- Pressure drops $P \rightarrow P1$
- Pressure drops on through ducts (ex: $A \leftrightarrow A1$)

OVERALL DIMENSIONS FOR VEP03MSV-PDRP

VEP03MSV-PDRP

Dimensions in mm [IN]



ELECTRICAL CHARACTERISTICS FOR VEP03MSV-PDRP

The proportional solenoid consists of tube and coil. The coil is mounted on the tube and fastened to it by a ring retainer.

The coils can be mounted in any position depending on the installation requirements.

IP DEGREE

The declared IP degree is guaranteed for all valves only if the connector has been wired and mounted correctly on the coil.

ACCESSORY ELECTRONICS

Some external digital amplifiers are available to be coupled to the valve for better control and to improve the valve performances.

See Continental Hydraulics Control Amplifier Catalog for products to match your requirements.

VEA-3F-A: DIN Connector - Black

NOMINAL VOLTAGE	V DC	12	24
RESISTANCE AT 68° F		3.66 Ω	16.6 Ω
CURRENT AT 68° F		1.9 A	0.85 A
DUTY CYCLE		100%	
ELECTROMAGNETIC COMPATIBILITY (EMC)		European Directive 2004/108/EC	
IP DEGREE IEC 60529		IP 65	
CLASS OF PROTECTION FOR INSULATION	Copper Wire	Class H (356 °F)	
	Coil	Class F (311 °F)	

APPLICATION DATA

FLUIDS

All pressure drops shown on these data pages are based on 170 SUS fluid viscosity and 0.87 specific gravity. For any other specific gravity (G1) the pressure drop (ΔP) will be approx. $\Delta P_1 = \Delta P (G1/G)$. See the chart for other viscosities.

FLUID VISCOSITIES	Cst	10	14.5	32	36	43	54	65	76	86	108	216	324	400
	SUS	60	75	150	170	200	250	300	350	400	500	1000	1500	1900
MULTIPLIER		0.77	0.81	0.97	1.00	1.04	1.10	1.15	1.20	1.24	1.31	1.56	1.72	1.83

Use mineral oil-based hydraulic fluids HL or HM type, according to ISO 6743-4. For these fluids, use NBR seals. For fluids HFDR type (phosphate esters) use FPM seals (code G). For the use of other kinds of fluid such as HFA, HFB, HFC, please consult our technical department.

Using fluids at temperatures higher than 180 degrees F causes the accelerated degradation of seals as well as degradation of the fluids physical and chemical properties.

From a safety standpoint, temperatures above 130 degrees F are not recommended.

RANGE TEMPERATURES:	Ambient	- 4 to +130 °F	-20 to +54 °C
	Fluid	- 4 to +180 °F	-20 to +82 °C
FLUID VISCOSITY	Range	60 -1900 SUS	10 - 400 cSt
	Recommended	120 SUS	25 cSt
FLUID CONTAMINATION		ISO 4406:1999 Class 18/16/13	

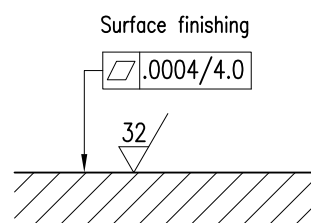
INSTALLATION

We recommend the VEPO3MSV-PDR* valve be installed either horizontally or vertically with the solenoid downward. The minimum regulated pressure may vary from the graphs shown on page 3 if the valve is installed vertically with the solenoid upwards.

Bleed the air from the hydraulic circuit. Be sure that the solenoid tube is always full of oil. It may be necessary to vent entrapped air from the solenoid tube in certain applications or after a long shutdown period. The air bleed vent is located on the end of the solenoid tube. See page 4 for the location. Be sure to close the air bleed when the process is complete.

Connect the valve T port directly to the tank. Any back pressure from the tank line will add directly to the controlled pressure. **The maximum allowable back pressure in the tank line under operational conditions is 2 bar.**

Valves are fixed by means of screws or tie rods on a flat surface with planarity and roughness equal to or better than those indicated in the relative symbols. If minimum values are not observed, fluid can easily leak between the valve and support surface.



SEAL KIT

BUNA SEAL KIT	1013188
VITON SEAL KIT	1013096



ABOUT CONTINENTAL HYDRAULICS

Rugged, durable, high-performance, efficient—the reason Continental Hydraulics' products are used in some of the most challenging applications across the globe. With a commitment to quality customer support and innovative engineering, Continental's pumps, valves, power units, mobile and custom products deliver what the markets demand. Continental has been serving the food production, brick and block, wood products, automotive and machine tool industries since 1962. Learn how our products survive some of the most harsh environments.

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CONTINENTAL



HYDRAULICS



CONTINENTAL HYDRAULICS

VER03M

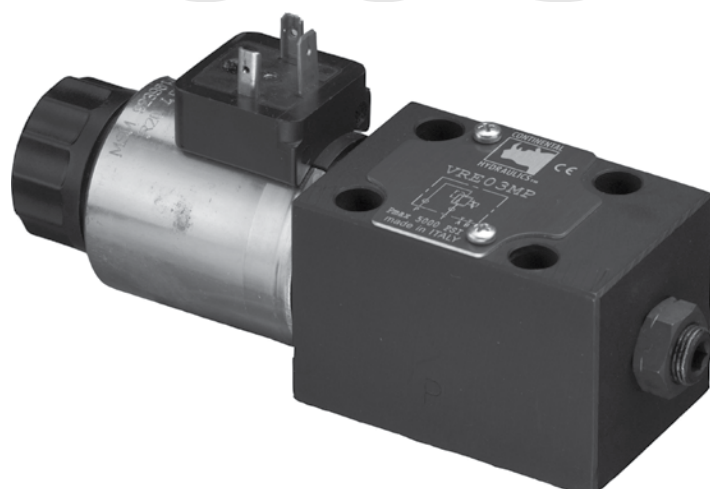
PROPORTIONAL PRESSURE RELIEF VALVES



VER03M - PROPORTIONAL PRESSURE RELIEF VALVES

VERO3M

PROPORTIONAL PRESSURE RELIEF VALVES



DESCRIPTION

VERO3M is a direct operated proportional relief valve, with mounting in compliance with NFPA/T3.5.1 R2-2002 and ISO 6264:1998 standards.

OPERATIONS

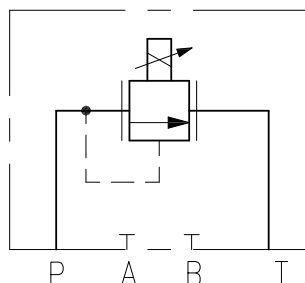
The VERO3M valves are designed to modulate pressure in a hydraulic circuit directly proportional to the input current to the valve.

The valve consists of a poppet, seat, spring and proportional solenoid. The spring and solenoid force acts on the poppet holding the valve closed. When system pressure exceeds the spring and solenoid forces, the valve begins to open and modulate P port pressure by discharging excess flow to tank. System pressure can be changed by changing the current to the solenoid.

There are four pressure ranges available: 70 bar, 140 bar, 210 bar and 350 bar with flow up to 1.32 gpm.

Any back pressure in T port is added to the controlled pressure in P port. The maximum recommended T port pressure is 30 psi while the valve is controlling pressure.

The valve can be driven by a variable current power supply or an external power amplifier card designed to maximize the valve's performance.



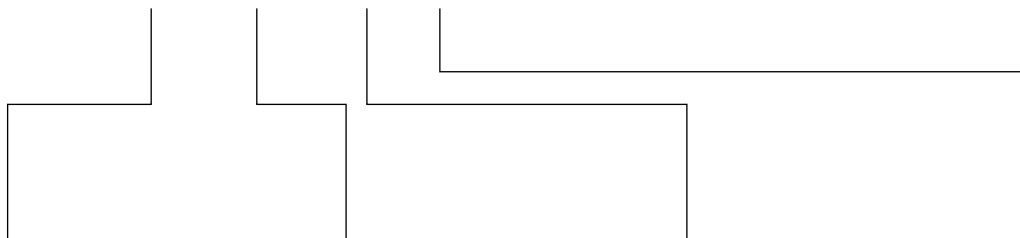
TYPICAL PERFORMANCE SPECIFICATIONS

MAXIMUM OPERATING PRESSURE	P Port	5000 psi	350 bar
	T Port	30 psi	2 bar
MAX FLOW		1.32 gpm	5 l/min
RATED FLOW		0.26 gpm	1 l/min
PRESSURE STAGES	VERO3M-070	10 - 1000 psi	0.7 - 70 bar
	VERO3M-140	16 - 2000 psi	1.1 - 140 bar
	VERO3M-210	26 - 3000 psi	1.8 - 210 bar
	VERO3M-350	40 - 5000 psi	2.8 - 350 bar
MOUNTING SURFACE		NFPA R03 (D03) ISO 6264-03-04-*97	

STEP RESPONSE @140 BAR	0 → 100%	80 ms	
	100 → 0%	40 ms	
HYSTERESIS	% of Q max	< 5%	
REPEATABILITY	% of Q max	< ± 1.5%	
POWER SUPPLY		12V DC or 24V DC	
CONNECTION		DIN 43650	DT04-2P
PROTECTION	IEC 60529	IP65	IP69K
WEIGHT:	Single Solenoid	3.5 lbs	1.6 Kg

IDENTIFICATION CODE

VER03M - - - **D** - _____ DESIGN LETTER



PRESSURE STAGES	
070	10 - 1000 psi (0.7 - 70 bar)
140	16 - 2000 psi (1.1 - 140 bar)
210	26 - 3000 psi (1.8 - 210 bar)
350	40 - 5000 psi (2.8 - 350 bar)

SEAL	
A	Buna (STD)
G	Viton

CONNECTION	
K1	DIN 43650 (STD)
K7	DT04-2P 'Deutsch'

VOLTAGE	
12	12 V DC Solenoid
24	24 V DC Solenoid

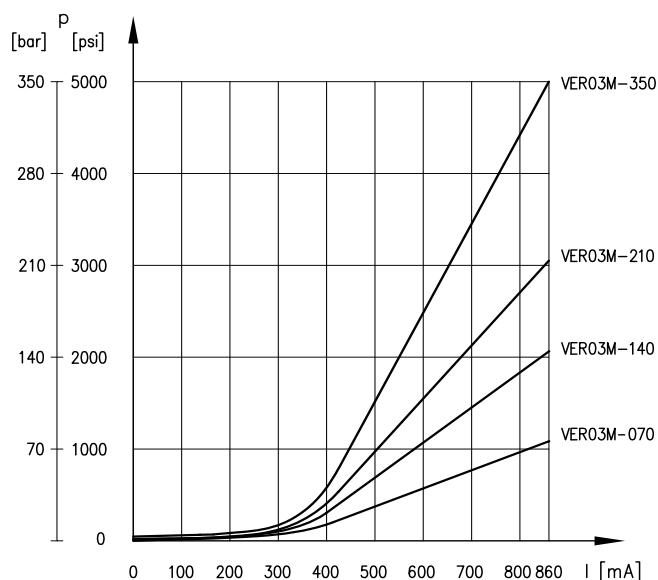
TYPICAL ORDERING CODE:
VER03M-210-A-K112D-A

CHARACTERISTIC CURVES

Typical control curves according to the current supplied to the solenoid for all the pressure stages, measured with input flow rate $Q = 1$ l/min. The curves are obtained without any hysteresis and linearity compensation and they are measured without any back pressure in T.

Curves obtained with mineral oil with viscosity of 170 sus (36 cSt) at 122°F (50°C).

PRESSURE GAIN

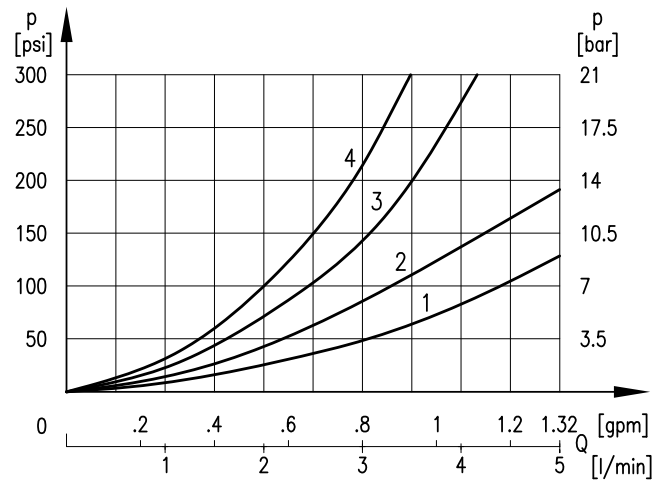


NOTES:

1. The full-scale pressure is set at the factory with a flow rate of 0.26 gpm (1 l/min). The full-scale pressure will increase considerably if the flow rate is higher. See the pressure variation diagram.
2. Curves obtained with current supplied to solenoid, VER03M 24V DC version.

CHARACTERISTIC CURVES

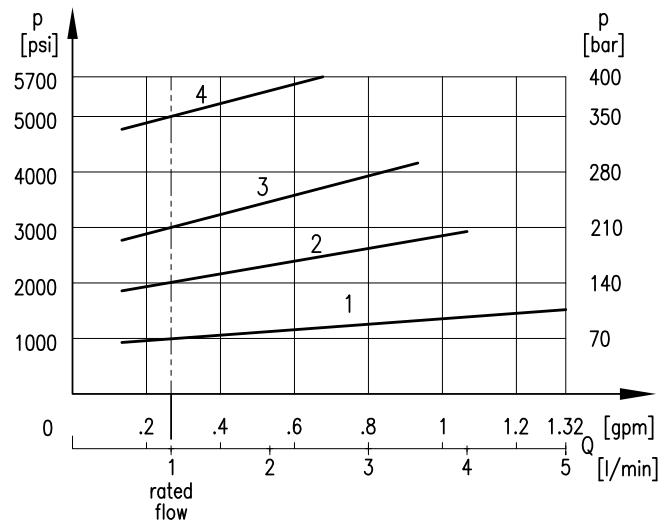
MINIMUM ADJUSTMENT PRESSURE



NOTES:

1. Curve obtained with current supplied to solenoid, VERO3M 24VDC version.
2. Values obtained with oil viscosity of 170 SUS (36 cSt) at 122°F (50°C).

PRESSURE VARIATIONS



CURVE	VALVE
1	VERO3M-070
2	VERO3M-140
3	VERO3M-210
4	VERO3M-350

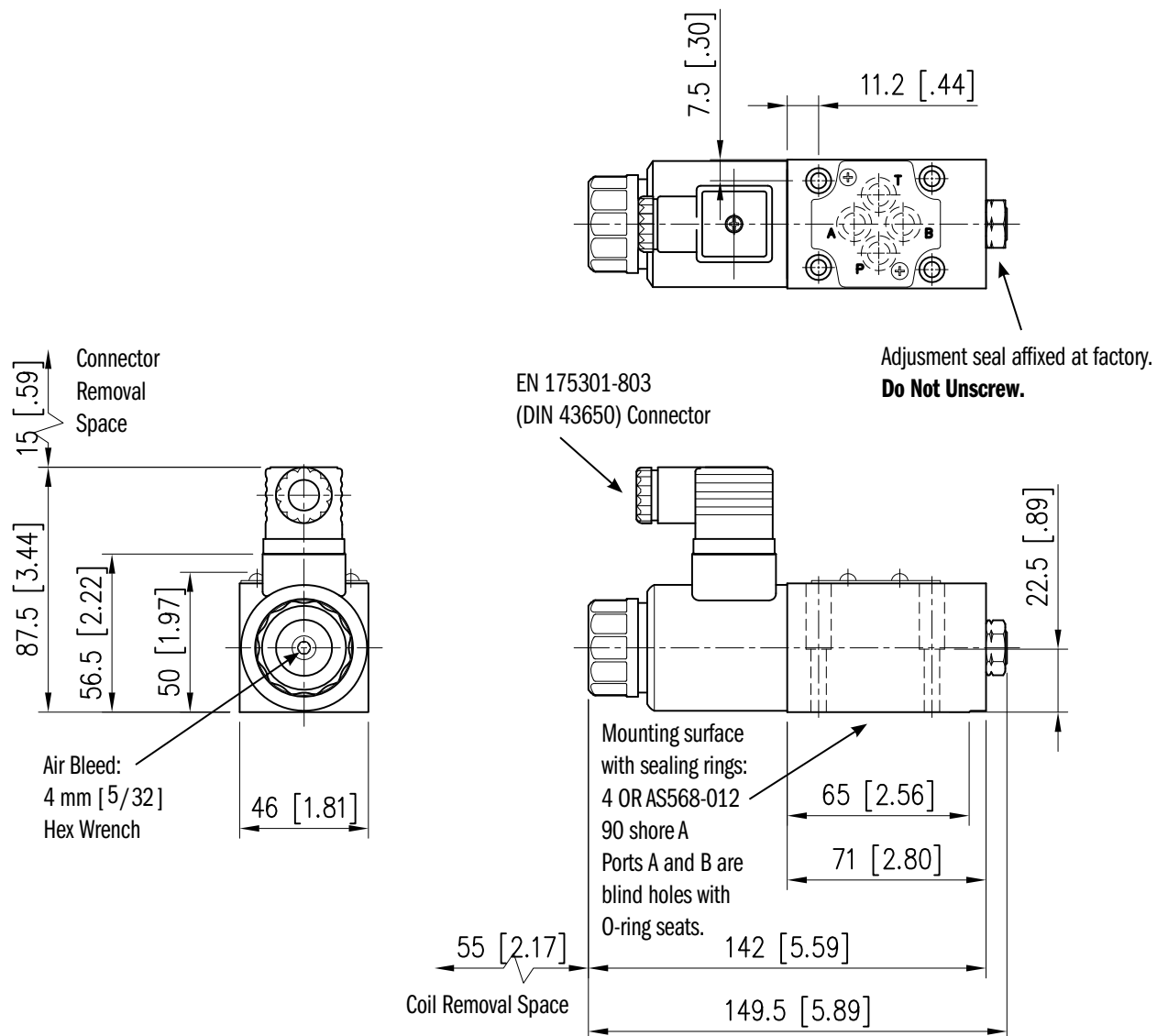
NOTES:

Full scale pressure is set at Q = .26 gpm (1 l/min).

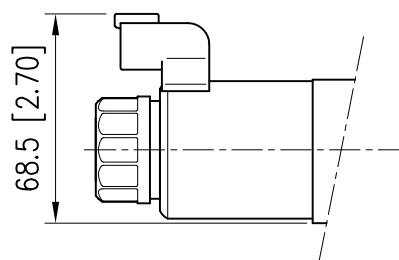
OVERALL AND MOUNTING DIMENSIONS FOR VER03M

VER03M

Dimensions in mm [IN]



K7 CONNECTION



ELECTRICAL CHARACTERISTICS FOR VER03M

The proportional solenoid consists of tube and coil. The coil is mounted on the tube and fastened to it by a ring retainer.

The coils can be mounted in any position depending on the installation requirements.

IP DEGREE

The declared IP degree is guaranteed for all valves only if the connector has been wired and mounted correctly on the coil.

The K7 connection meets DIN 40050-9 which extends the IEC 60529 rating system with an IP69K rating for high-pressure, high-temperature and wash-down applications.

NOMINAL VOLTAGE	V DC	12	24
RESISTANCE AT 68° F	K1	3.66 Ω	17.6 Ω
	K7	4.5 Ω	18.7 Ω
CURRENT AT 68° F	K1	1.88 A	0.86 A
	K7	2.72 A	1.29 A
DUTY CYCLE		100%	
ELECTROMAGNETIC COMPATIBILITY (EMC)		European Directive 2004/108/EC	
IP DEGREE IEC 60529	K1	IP 65	
	K7	IP 69K	
CLASS OF PROTECTION FOR INSULATION	Copper Wire	Class H (356 °F)	
	Coil	Class F (311 °F)	

ACCESSORY ELECTRONICS

Some external digital amplifiers are available to be coupled to the valve for better control and to improve the valve's performance.

See Continental Hydraulics Control Amplifier Catalog for products to match your requirements.

VEA-3F-A: DIN Connector - Black

APPLICATION DATA

FLUIDS

All pressure drops shown on these data pages are based on 170 SUS fluid viscosity and 0.87 specific gravity. For any other specific gravity (G1) the pressure drop (ΔP) will be approx. $\Delta P_1 = \Delta P (G1/G)$. See the chart for other viscosities.

FLUID VISCOSITIES	Cst	10	14.5	32	36	43	54	65	76	86	108	216	324	400
	SUS	60	75	150	170	200	250	300	350	400	500	1000	1500	1900
MULTIPLIER		0.77	0.81	0.97	1.00	1.04	1.10	1.15	1.20	1.24	1.31	1.56	1.72	1.83

Use mineral oil-based hydraulic fluids HL or HM type, according to ISO 6743-4. For these fluids, use NBR seals. For fluids HFDR type (phosphate esters) use FPM seals (code G). For the use of other kinds of fluid such as HFA, HFB, HFC, please consult our technical department.

Using fluids at temperatures higher than 180 degrees F causes the accelerated degradation of seals as well as degradation of the fluids physical and chemical properties.

From a safety standpoint, temperatures above 130 degrees F are not recommended.

RANGE TEMPERATURES:	Ambient	- 4 to +130 °F	-20 to +54 °C
	Fluid	- 4 to +180 °F	-20 to +82 °C
FLUID VISCOSITY	Range	60 -1900 SUS	10 - 400 cSt
	Recommended	120 SUS	25 cSt
FLUID CONTAMINATION		ISO 4406:1999 Class 18/16/13	

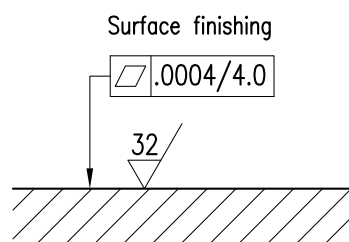
INSTALLATION

We recommend the VERO3MP valve be installed either horizontally or vertically with the solenoid downward. The minimum regulated pressure may vary from the graphs shown on page 3 if the valve is installed vertically with the solenoid upwards.

Bleed the air from the hydraulic circuit. Be sure that the solenoid tube is always full of oil. It may be necessary to vent entrapped air from the solenoid tube in certain applications or after a long shutdown period. The air bleed vent is located on the end of the solenoid tube. See page 4 for the location. Be sure to close the air bleed when the process is complete.

Connect the valve T port directly to the tank. Any back pressure from the tank line will add directly to the controlled pressure. **The maximum allowable back pressure in the tank line under operational conditions is 2 bar.**

Valves are fixed by means of screws or tie rods on a flat surface with planarity and roughness equal to or better than those indicated in the relative symbols. If minimum values are not observed, fluid can easily leak between the valve and support surface.



SEAL KIT

BUNA SEAL KIT	1013188
VITON SEAL KIT	1013096

BOLT KITS

BD03-125	Valve Only	1008406
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NOTE:

1. Bolt kit consists of: Qty. 4 10-24NC screws
Qty. 4 #10 Lock washer
2. The recommended torque value for fasteners is: 4 lb.ft (5.4 Nm)

SUBPLATES

AD03SPS8S	Aluminum	SAE-08	265801AP
DD03SPS8S	Ductile	SAE-08	265801AI

NOTES:

1. Max pressure for aluminum subplates: 3000 psi
2. Max pressure for ductile subplates: 5000 psi
3. Always verify subplate port size is proper for the application

ABOUT CONTINENTAL HYDRAULICS

Rugged, durable, high-performance, efficient—the reason Continental Hydraulics' products are used in some of the most challenging applications across the globe. With a commitment to quality customer support and innovative engineering, Continental's pumps, valves, power units, mobile and custom products deliver what the markets demand. Continental has been serving the food production, brick and block, wood products, automotive and machine tool industries since 1962. Learn how our products survive some of the most harsh environments.

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HYDRAULICS



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VER03MG

PROPORTIONAL PRESSURE RELIEF VALVES WITH OBE



VER03MG - PROPORTIONAL PRESSURE RELIEF VALVES WITH OBE

PRECISE

VER03MG

PROPORTIONAL PRESSURE RELIEF VALVES WITH OBE



DESCRIPTION

The VER03MG direct operated Proportional Relief Valve, with On-Board Digital Amplifier conforms to NFPA D03 / ISO 6264 standards.

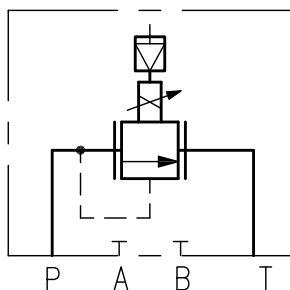
OPERATIONS

VER03MG valves are designed to control maximum pressure in low flow systems or as the proportional pressure pilot valve of larger two-stage pressure control valves.

Output pressure is controlled proportional to the input command reference signal supplied to the On-Board Digital Amplifier.

Four pressure ranges are available to help match your requirements.

The On-Board microprocessor controls all the valve functions and is preset to optimal valve performance. In field adjustments can be performed, via software, to customize the parameters based on your application needs.



TYPICAL PERFORMANCE SPECIFICATIONS

MAXIMUM OPERATING PRESSURE	P Port	5000 psi	350 bar
	T Port	30 psi	2 bar
MAX FLOW		1.32 gpm	5 l/min
RATED FLOW		0.26 gpm	1 l/min
PRESSURE STAGES	VER03MG-070	10 - 1000 psi	0.7 - 70 bar
	VER03MG-140	16 - 2000 psi	1.1 - 140 bar
	VER03MG-210	26 - 3000 psi	1.8 - 210 bar
	VER03MG-350	40 - 5000 psi	2.8 - 350 bar
MOUNTING SURFACE		NFPA R03 (D03) ISO 6264-03-04-* -97	

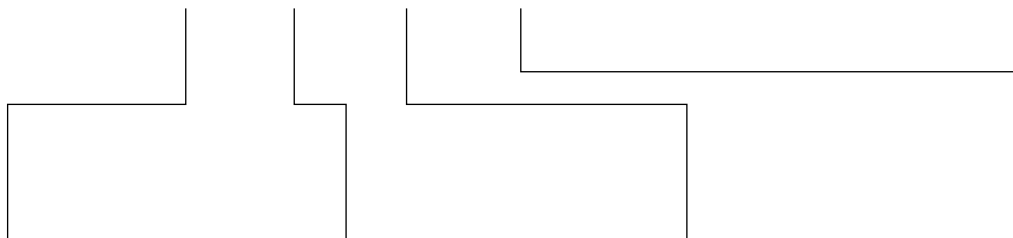
STEP RESPONSE @140 BAR	0 → 100%	50 ms	
	100 → 0%	30 ms	
STEP RESPONSE @ 210 BAR	0 → 100%	70 ms	
	100 → 0%	40 ms	
HYSTERESIS	% of Q max	< 3%	
REPEATABILITY	% of Q max	< ± 1%	
POWER SUPPLY		24V DC	
CONNECTION		7 Pin DIN 43563 Metal	
PROTECTION	IEC 60529	IP67	
WEIGHT:	Single Solenoid	4.4 lbs	2 Kg

NOTE:

Response times are at full rated pressure and an input flow rate of 0.53 gpm (2 l/min) with an oil volume under pressure of 0.13 gallons (0.5 liter). The response time is affected by flow rate and system capacitance.

IDENTIFICATION CODE

VER03MG - - - - **D** - _____ DESIGN LETTER



PRESSURE STAGES	
070	10 - 1000 psi (0.7 - 70 bar)
140	16 - 2000 psi (1.1 - 140 bar)
210	26 - 3000 psi (1.8 - 210 bar)
350	40 - 5000 psi (2.8 - 350 bar)

SEAL	
A	Buna (STD)
G	Viton

CONNECTION	
OBW	On board electronics 7 pin - no external enable required (STD)
OBC	On board electronics 7 pin external enable on Pin C required

REFERENCE SIGNAL	
E0	Voltage 0 - 10 V (STD)
E1	Current 4 - 20 mA

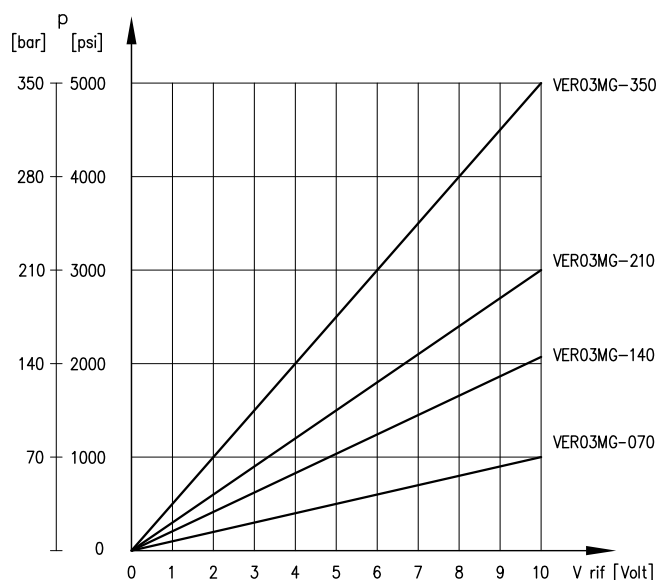
TYPICAL ORDERING CODE:
VER03MG-210-A-OBW-E0D-A

CHARACTERISTIC CURVES

Typical control curves according to the current supplied to the solenoid for all the pressure stages, measured with input flow rate $Q = 1$ l/min. The curves are obtained after linearization in factory of the characteristic curves through the digital amplifier. They are measured without any back pressure in T.

Curves obtained with mineral oil with viscosity of 170 sus (36 cSt) at 122°F (50°C).

PRESSURE GAIN



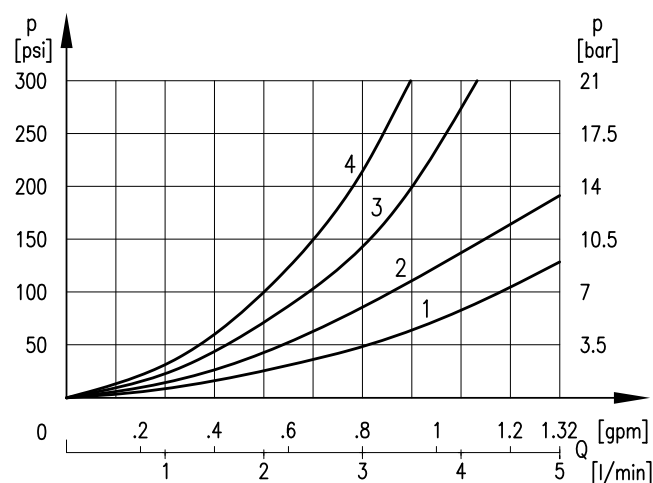
NOTE:

The full-scale pressure is set at the factory with a flow rate of 0.26 gpm (1 l/min).

If the flow rate is higher the full-scale pressure will increase considerably as you can see in the pressure variations diagram.

CHARACTERISTIC CURVES

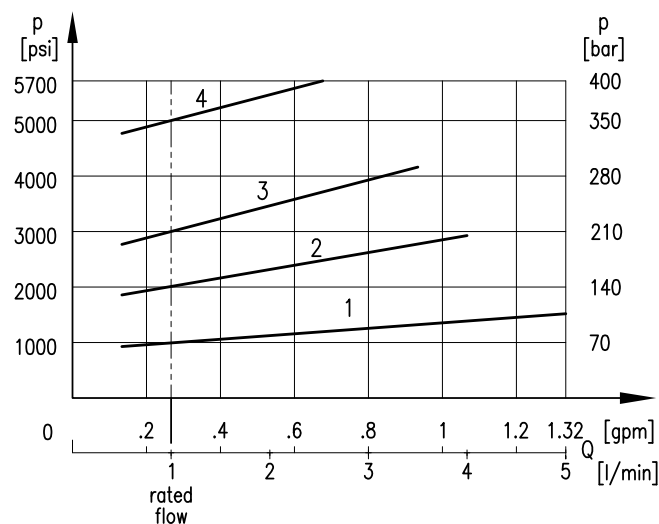
MINIMUM ADJUSTMENT PRESSURE



NOTES:

1. Values obtained with oil viscosity of 170 SUS (36 cSt) at 122°F (50°C).

PRESSURE VARIATIONS



CURVE	VALVE
1	VER03MG-070
2	VER03MG-140
3	VER03MG-210
4	VER03MG-350

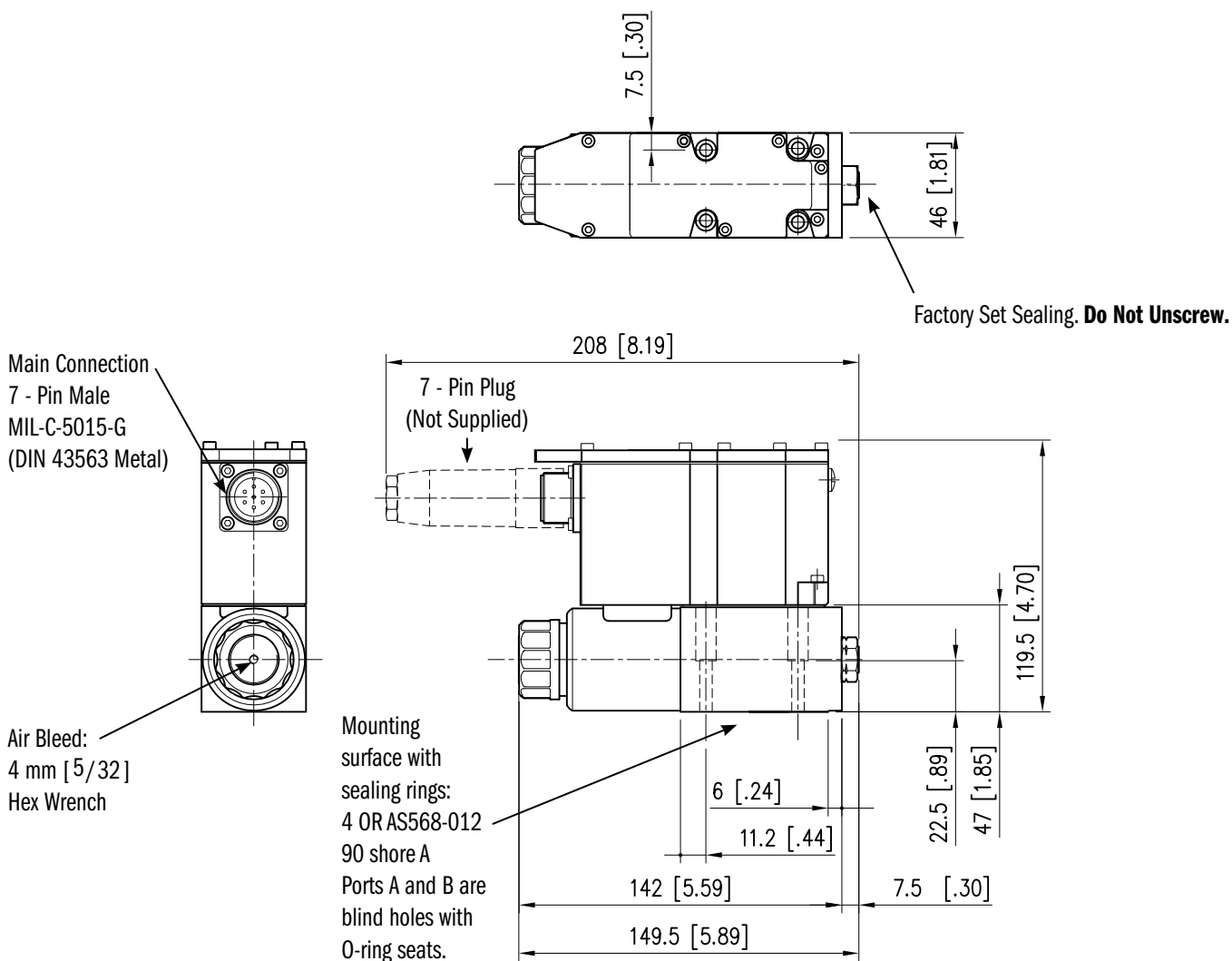
NOTES:

Full scale pressure is set at $Q = 0.265 \text{ gpm}$ (1 l/min).

OVERALL AND MOUNTING DIMENSIONS FOR VER03MG

VER03MG

Dimensions in mm [IN]



In order to avoid electromagnetic noises and fulfill the European EMC regulations, a 7 pin metal plug according to MIL-C-5015 G should be used instead of the standard plastic 6+PE connector EN 175201-408 (formerly DIN 43563).

ELECTRICAL CHARACTERISTICS

The proportional valve is controlled by a digital amplifier (driver), which incorporates a microprocessor that controls all the valve functions.

THE STANDARD VALVE IS SET AT FACTORY WITH:

- UP/DOWN ramp at zero value
- No deadband compensation
- Max valve pressure setting (100% of pressure control range)

It is possible to customize these and other parameters using the optional kit, VEA-PB5 or VEA-PB7 to be ordered separately (see related literature).

THE DIGITAL DRIVER ENABLES THE VALVE TO REACH BETTER PERFORMANCE COMPARED TO THE ANALOG VERSION, AND GIVES:

- Reduced response times
- Optimization and reproducibility of the characteristic curve, optimized in factory for each valve
- Complete interchangeability in case of valve replacement
- Opportunity to set, via software, the functional parameters
- Opportunity to perform a diagnostic program by means of the LIN connection
- High immunity to electromagnetic interference

The electronic card is available with (OBC) or without (OBW) external enabling signal feature.

POWER SUPPLY		24V DC (19V to 35V, ripple max 3 Vpp)
ABSORBED POWER		50 W
MAX CURRENT		2A
DUTY CYCLE		100%
MAIN CONNECTOR		7 pin MIL-C-5015-G (DIN 43563)
ELECTROMAGNETIC COMPATIBILITY (EMC) EUROPEAN DIRECTIVE 2004/108/EC	Emission	IEC EN 61000-6-4
	Immunity	IEC EN 61000-6-2
PROTECTION AGAINST ATMOSPHERIC AGENTS	IEC 60529	IP 67
ELECTRICAL PROTECTION	Overload Electronics Overheating Power Failure or < 4mA	

E0 - VOLTAGE

COMMAND SIGNAL (DIFFERENTIAL)	0 - 10V DC
IMPEDANCE	> 50 kΩ

E1 - CURRENT

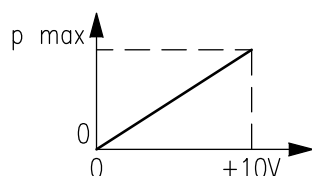
COMMAND SIGNAL	4 - 20 mA
IMPEDANCE	500 Ω

E0 VERSION - VOLTAGE REFERENCE SIGNAL

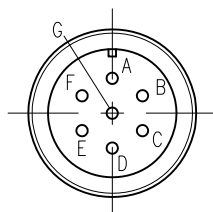
This is the most common version; it makes the valve completely interchangeable with the traditional proportional valves with analog type integrated electronics. The valve has only to be connected as indicated below.

The input signal is differential type and drives the valve as shown in the graph. The pressure output is proportional to $U_D - U_E$.

If only one input signal (single-end) is available, the pin B (0V power supply) and the pin E (0V reference signal) must be connected through a jumper and both connected to GND, electric panel side.

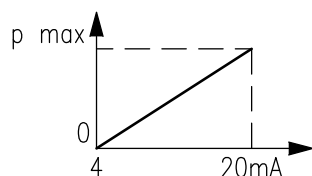


A	24V	Power supply positive. Use an external fuse 5A/50V fast type for protecting electronics.
B	0V	Power supply zero (0V)
C	NC or 24V	OBW Version: Not wired OBC Version: Valve enable
D	0 - 10V	Differential command signal (+V)
E	0V	Differential command signal (-V)
F	0 - 10V	Output monitor for command signal
G	GND	Protective ground

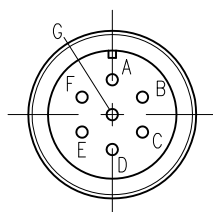


E1 VERSION - CURRENT REFERENCE SIGNAL

The current reference signal is supplied in range of 4 - 20 mA and drives the valve as shown in the chart below. If the current drops to less than 4 mA, the card de-energizes the coils and the valve will go to rest position. The valve will restart when the command signal rises into the 4 - 20 mA range.



A	24V	Power supply positive. Use an external fuse 5A/50V fast type for protecting electronics.
B	0V	Power supply zero (0V)
C	NC or 24V	OBW Version: Not wired OBC Version: Valve enable
D	4 - 20 mA	Command signal 4 - 20 mA
E	0V	Return
F	0 - 10V	Output monitor for command signal
G	GND	Protective ground



WIRING

Connections must be made via the 7 pin plug mounted on the amplifier.

RECOMMENDED CABLE SIZES ARE:

POWER SUPPLY

18 AWG (0.75 mm²)
for cables up to 65 ft (20 m)

16 AWG (1.00 mm²)
for cables up to 130 ft (40 m)

SIGNAL CABLES

20 AWG (0.50 mm²)

A suitable cable would have 7 wires, a separate shield for the signal wires and an overall shield.

PIN C:

Pin C is reserved for the Enable feature and is not connected on the standard card (OBW, see code at page 3) because the enable signal is run directly from the card.

In OBC card the Enable feature is external, pin C has to be connected with 24V.

PIN F:

For reading this value as current monitor signal, the card must be energized. This value has to be read on Pin B (0V).

A value of 10V means a current to the solenoid at 100% rated.

Pin F	Pin D	
	E0	E1
-	-	-
0V	0V	4mA
+10V	+10V	20mA

OBW OR OBC VERSION?

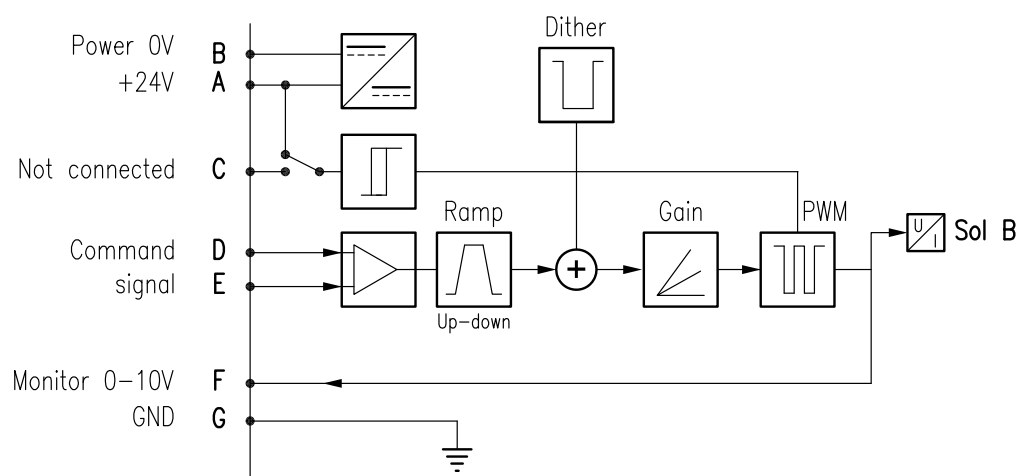
The standard option, code OBW, is programmed for internal enable. The enable signal is taken directly from the power supply of the valve. The card is enabled as soon as supply power is applied to Pins A and B.

Apply command signal to the valve and the output drivers energize the coil. The power supply must be switched off to disable the output to the valve.

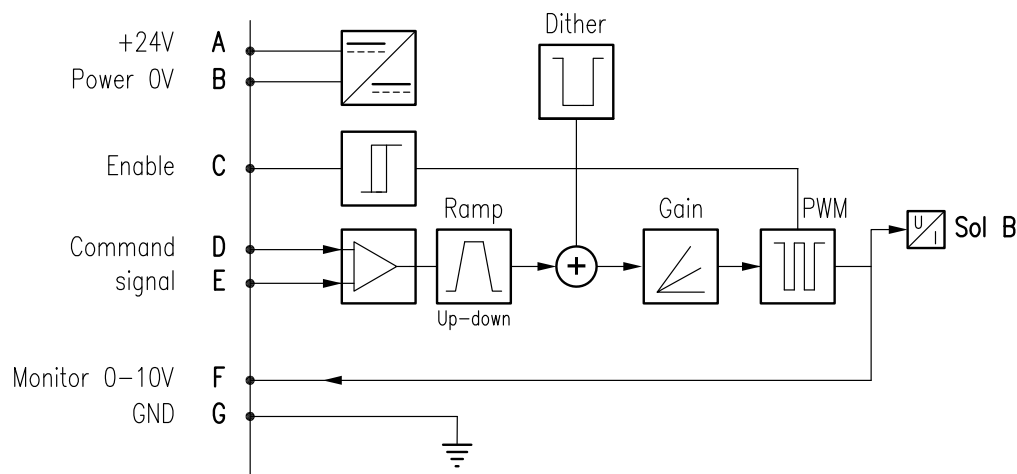
The OBC option is programmed for the external enable feature. A 24 V signal must be applied to Pin C to enable the output drivers to energize the valve coils.

The valve operation can be stopped by simply removing the enable signal from Pin C.

OBW CARD VERSION (STD)



OBC CARD VERSION



APPLICATION DATA

FLUIDS

All pressure drops shown on these data pages are based on 170 SUS fluid viscosity and 0.87 specific gravity. For any other specific gravity (G1) the pressure drop (ΔP) will be approx. $\Delta P1 = \Delta P (G1/G)$. See the chart for other viscosities.

FLUID VISCOSITIES	Cst	10	14.5	32	36	43	54	65	76	86	108	216	324	400
	SUS	60	75	150	170	200	250	300	350	400	500	1000	1500	1900
MULTIPLIER		0.77	0.81	0.97	1.00	1.04	1.10	1.15	1.20	1.24	1.31	1.56	1.72	1.83

Use mineral oil-based hydraulic fluids HL or HM type, according to ISO 6743-4. For these fluids, use NBR seals. For fluids HFDR type (phosphate esters) use FPM seals (code G). For the use of other kinds of fluid such as HFA, HFB, HFC, please consult our technical department.

Using fluids at temperatures higher than 180 °F causes a faster degradation of the fluid and of the seal characteristics.

The fluid's physical and chemical characteristics must be preserved.

RANGE TEMPERATURES:	Ambient	- 4 to +130 °F	-20 to +54 °C
	Fluid	- 4 to +180 °F	-20 to +82 °C
FLUID VISCOSITY	Range	60 -1900 SUS	10 - 400 cSt
	Recommended	120 SUS	25 cSt
FLUID CONTAMINATION		ISO 4406:1999 Class 18/16/13	

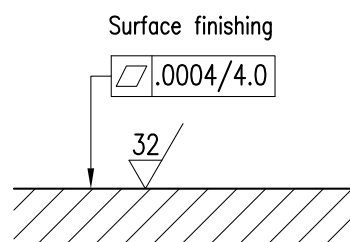
INSTALLATION

We recommend the VERO3MPG valve be installed either horizontally or vertically with the solenoid downward. The minimum regulated pressure may vary from the graphs shown on page 3 if the valve is installed vertically with the solenoid upwards.

Bleed the air from the hydraulic circuit. Be sure that the solenoid tube is always full of oil. It may be necessary to vent entrapped air from the solenoid tube in certain applications or after a long shutdown period. The air bleed vent is located on the end of the solenoid tube. See page 4 for the location. Be sure to close the air bleed when the process is complete.

Connect the valve T port directly to the tank. Any back pressure from the tank line will add directly to the controlled pressure. **The maximum allowable back pressure in the tank line under operational conditions is 2 bar.**

Valves are fixed by means of screws or tie rods on a flat surface with planarity and roughness equal to or better than those indicated in the relative symbols. If minimum values are not observed, fluid can easily leak between the valve and support surface.



SEAL KIT

BUNA SEAL KIT	1013188
VITON SEAL KIT	1013096

BOLT KITS

BD03-125	Valve Only	1008406
----------	------------	---------

NOTE:

1. Bolt kit consists of: Qty. 4 10-24NC screws
Qty. 4 #10 Lock washer
2. The recommended torque value for fasteners is: 4 lb.ft (5.4 Nm)

SUBPLATES

AD03SPS8S	Aluminum	SAE-08	265801AP
DD03SPS8S	Ductile	SAE-08	265801AI

NOTES:

1. Max pressure for aluminum subplates: 3000 psi
2. Max pressure for ductile subplates: 5000 psi
3. Always verify subplate port size is proper for the application

ABOUT CONTINENTAL HYDRAULICS

Rugged, durable, high-performance, efficient—the reason Continental Hydraulics' products are used in some of the most challenging applications across the globe. With a commitment to quality customer support and innovative engineering, Continental's pumps, valves, power units, mobile and custom products deliver what the markets demand. Continental has been serving the food production, brick and block, wood products, automotive and machine tool industries since 1962. Learn how our products survive some of the most harsh environments.

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HYDRAULICS

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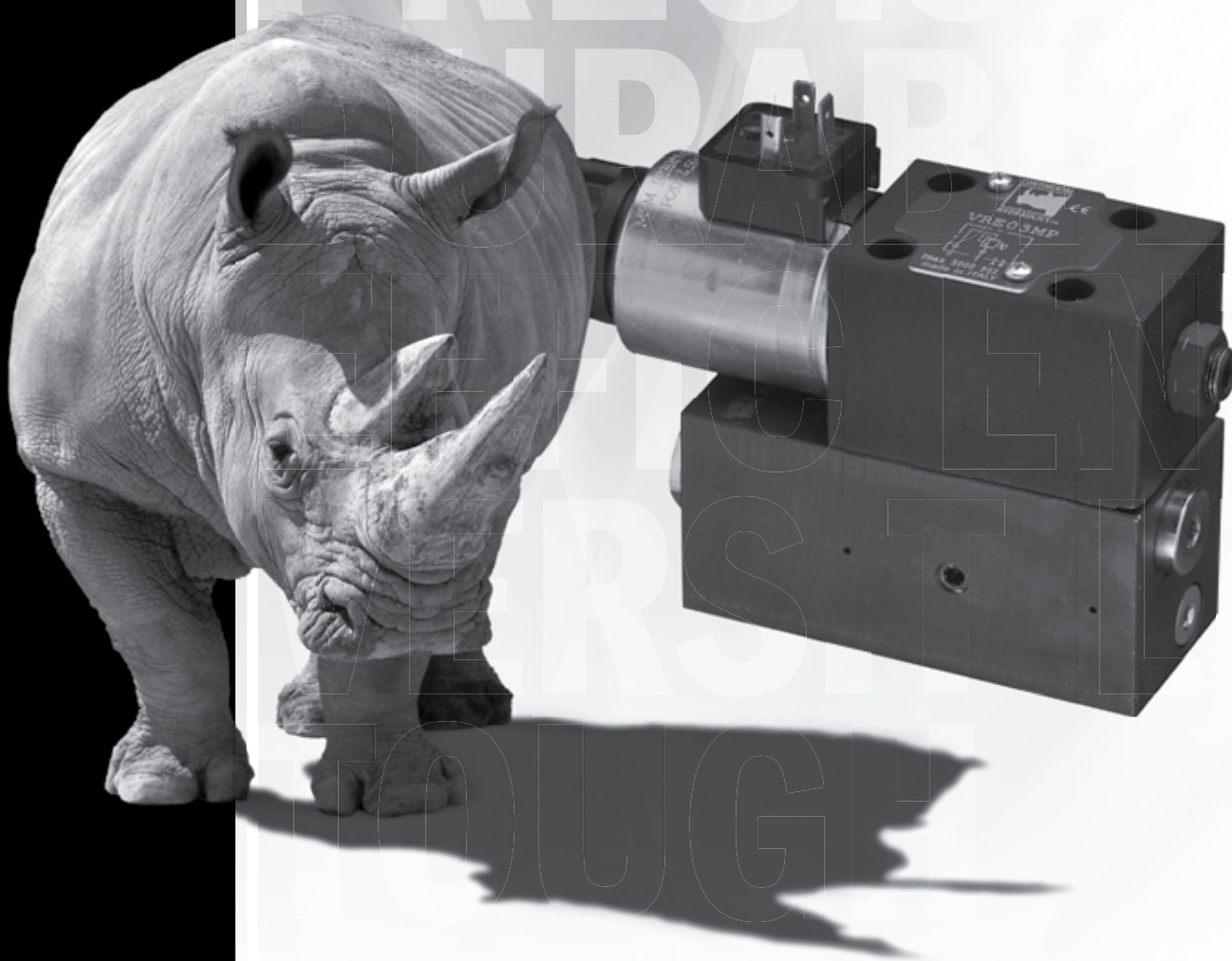


CONTINENTAL HYDRAULICS

VER03MP

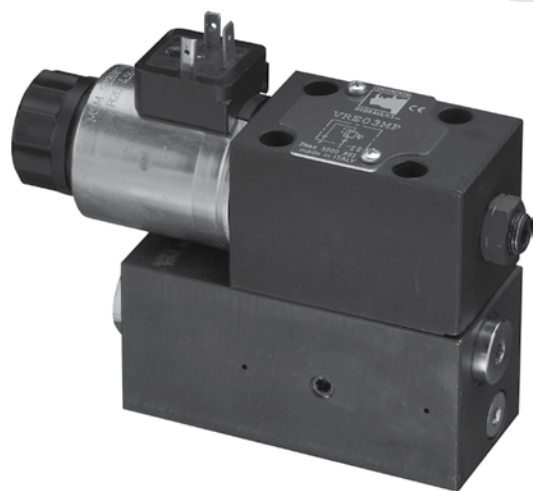
PROPORTIONAL PRESSURE RELIEF VALVES PILOT OPERATED

VER03MP - PROPORTIONAL PRESSURE RELIEF VALVES PILOT OPERATED



VER03MP

PROPORTIONAL PRESSURE RELIEF VALVES PILOT OPERATED



DESCRIPTION

Continental Hydraulics VER03MP pilot operated proportional relief valves conform to NFPA R03/D03 and ISO 6264:1998 mounting standards.

OPERATIONS

The VER03MP valves are designed to modulate pressure in a hydraulic circuit directly proportional to the input current to the valve.

The valve consists of a proportional pilot relief stage and a main relief stage. The main stage has a spool which is held closed by a spring. System pressure acts on the opposite end of the spool opposing the spring force. When system pressure exceeds the spring force, the valve begins to open. The spring preload sets the minimum controlled pressure. System pressure can be increased from minimum by increasing the pilot pressure which adds to the spring force. The spool will tend to close until the system pressure reaches its new setting.

There are four pressure ranges available: 70 bar, 140 bar, 210 bar and 350 bar with flow up to 13.2 gpm.

It is an internally piloted valve with three drain options - internal through T port, external through A port and external through Y port.

The valve can be driven by a variable current power supply or an external power amplifier card designed to maximize the valve's performance.

TYPICAL PERFORMANCE SPECIFICATIONS

MAXIMUM OPERATING PRESSURE:	P Port	5000 psi	350 bar
	T Port	30 psi	2 bar
MINIMUM FLOW		0.5 gpm	2 l/min
MAXIMUM FLOW		13.2 gpm	50 l/min
RATED FLOW		8 gpm	30 l/min
PRESSURE STAGES	VER03P-070	100 - 1000 psi	7 - 70 bar
	VER03P-140	100 - 2000 psi	7 - 140 bar
	VER03P-210	116 - 3000 psi	8 - 210 bar
	VER03P-350	145 - 5000 psi	10 - 350 bar
MOUNTING SURFACE		NFPA R03 / D03 ISO 6264-03-04-*97	

STEP RESPONSE @ 140 bar	0 → 100%	80 ms	
	100 → 0%	40 ms	
HYSTERESIS WITH PWM 200	% of p max	< 5%	
REPEATABILITY	% of p max	< ± 1.5%	
POWER SUPPLY		12V DC / 24V DC	
CONNECTION		DIN 43650	DT04-2P
PROTECTION	IEC 60529	IP65	IP69K
WEIGHT		7.3 lbs	3.3 Kg

IDENTIFICATION CODE

VER03MP - - - - - **D** - _____ DESIGN LETTER

PRESSURE STAGES	
070	100 - 1000 psi (7 - 70 bar)
140	100 - 2000 psi (7 - 140 bar)
210	116 - 3000 psi (8 - 210 bar)
350	145 - 5000 psi (10 - 350 bar)

SEAL	
A	Buna (STD)
G	Viton

PILOT / DRAIN	
1	Internal Pilot External Drain on A Port
3	Internal Pilot Internal Drain on T Port (STD)

CONNECTION	
K1	DIN 43650 (STD)
K7	DT04-2P 'Deutsch'

VOLTAGE	
12	12 V DC Solenoid
24	24 V DC Solenoid

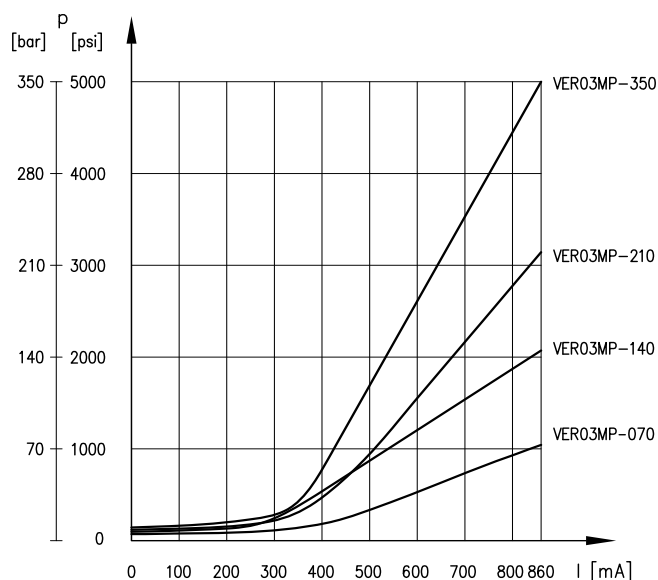
TYPICAL ORDERING CODE:
VER03MP-210-A-3-K1-12D-A

CHARACTERISTIC CURVES

Typical control curves according to the current supplied to the solenoid for all the pressure stages, measured with input flow rate $Q = 2.65$ gpm (10 l/min). The curves are obtained without any hysteresis and linearity compensation and they are measured without any back pressure in T.

Curves obtained with mineral oil with viscosity of 170 sus (36 cSt) at 122°F (50°C).

PRESSURE GAIN

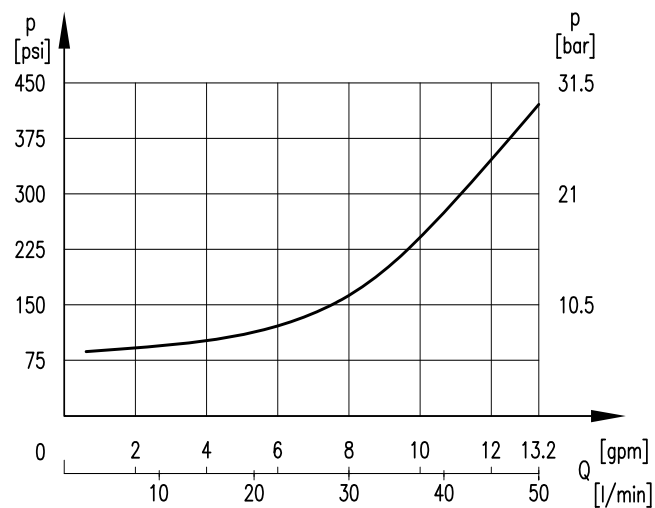


NOTES:

1. The full-scale pressure is set at factory with a flow rate of 2.65 gpm (10 l/min). The full-scale pressure will increase considerably if the flow rate is higher. See pressure variations diagram.
2. Curves obtained with current supplied to solenoid, VER03MP 24V DC version.

CHARACTERISTIC CURVES

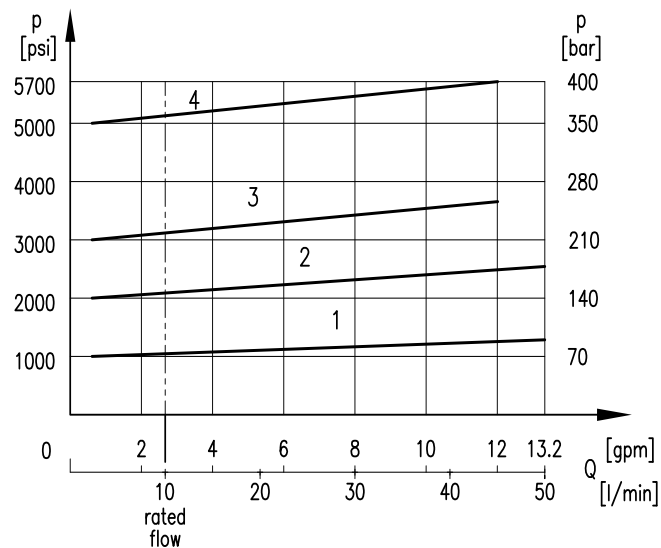
MINIMUM ADJUSTMENT PRESSURE



NOTES:

1. Curve obtained with current supplied to solenoid, VER03M 24VDC version.
2. Values obtained with oil viscosity of 170 SUS (36 cSt) at 122°F (50°C).

PRESSURE VARIATIONS



CURVE	VALVE
1	VER03MP-070
2	VER03MP-140
3	VER03MP-210
4	VER03MP-350

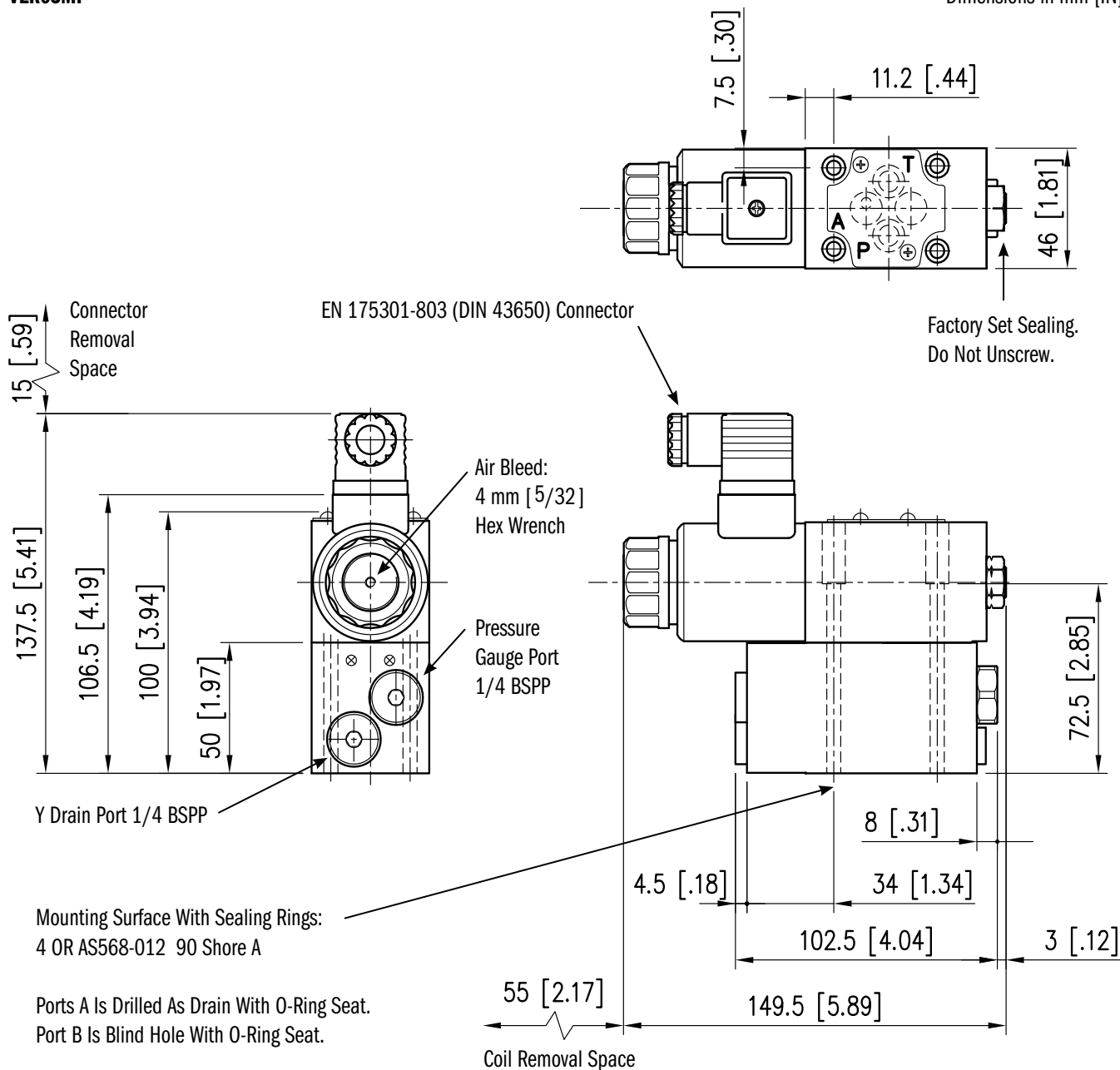
NOTES:

Full scale pressure is set at Q = 2.65 gpm (10 l/min).

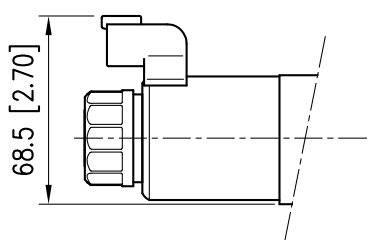
OVERALL AND MOUNTING DIMENSIONS FOR VER03MP

VER03MP

Dimensions in mm [IN]



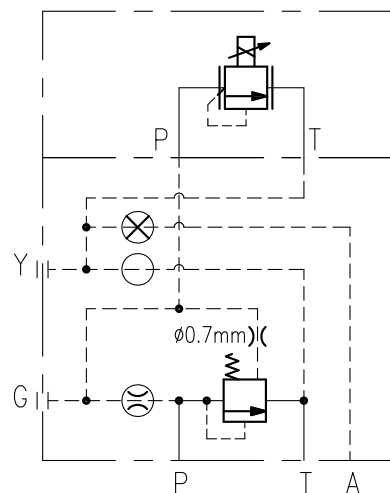
K7 CONNECTION



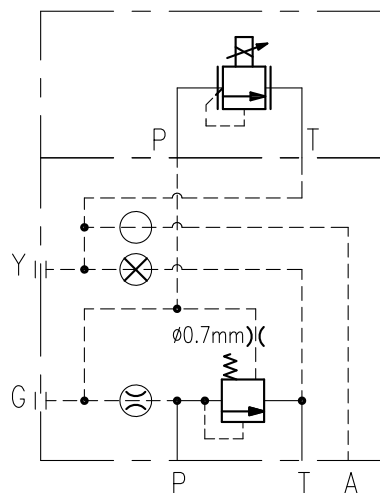
DRAIN OPTIONS

The valve is supplied standard with internal drainage on T port (see schematics below) Otherwise the external drainage option is supplied with discharge in A port.

INTERNAL DRAIN ON PORT T (STD)

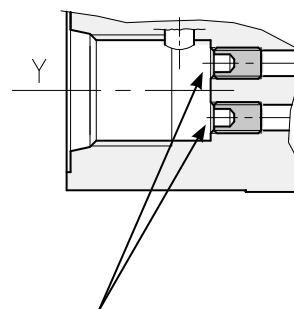
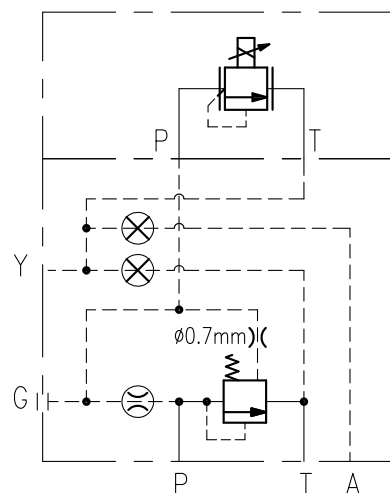


EXTERNAL DRAIN ON A PORT



EXTERNAL DRAIN ON Y PORT

Y port can be converted to an external drain port by installing an M4x6 ISO 4026 socket set screw in the open threaded passage in the Y port. Then plumb Y port directly to tank.



Both Ports Plugged.

ELECTRICAL CHARACTERISTICS FOR VER03MP

The proportional solenoid consists of tube and coil. The coil is mounted on the tube and fastened to it by a ring retainer.

The coils can be mounted in any position depending on the installation requirements.

IP DEGREE

The declared IP degree is guaranteed for all valves only if the connector has been wired and mounted correctly on the coil.

The K7 connection meets DIN 40050-9 which extends the IEC 60529 rating system with an IP69K rating for high-pressure, high-temperature and wash-down applications.

NOMINAL VOLTAGE	V DC	12	24
RESISTANCE AT 68° F	K1	3.66 Ω	17.6 Ω
	K7	4.5 Ω	18.7 Ω
CURRENT AT 68° F	K1	1.88 A	0.86 A
	K7	2.72 A	1.29 A
DUTY CYCLE		100%	
ELECTROMAGNETIC COMPATIBILITY (EMC)		European Directive 2004/108/EC	
IP DEGREE IEC 60529	K1	IP 65	
	K7	IP 69K	
CLASS OF PROTECTION FOR INSULATION	Copper Wire	Class H (356 °F)	
	Coil	Class F (311 °F)	

ACCESSORY ELECTRONICS

Some external digital amplifiers are available to be coupled to the valve for better control and to improve the valve performance.

See Continental Hydraulics Control Amplifier Catalog for products to match your requirements.

VEA-3F-A: DIN Connector - Black

APPLICATION DATA

FLUIDS

All pressure drops shown on these data pages are based on 170 SUS fluid viscosity and 0.87 specific gravity. For any other specific gravity (G1) the pressure drop (ΔP) will be approx. $\Delta P1 = \Delta P (G1/G)$. See the chart for other viscosities.

FLUID VISCOSITIES	Cst	10	14.5	32	36	43	54	65	76	86	108	216	324	400
	SUS	60	75	150	170	200	250	300	350	400	500	1000	1500	1900
MULTIPLIER		0.77	0.81	0.97	1.00	1.04	1.10	1.15	1.20	1.24	1.31	1.56	1.72	1.83

Use mineral oil-based hydraulic fluids HL or HM type, according to ISO 6743-4. For these fluids, use NBR seals. For fluids HFDR type (phosphate esters) use FPM seals (code G). For the use of other kinds of fluid such as HFA, HFB, HFC, please consult our technical department.

Using fluids at temperatures higher than 180 degrees F causes the accelerated degradation of seals as well as degradation of the fluids physical and chemical properties.

From a safety standpoint, temperatures above 130 degrees F are not recommended.

RANGE TEMPERATURES:	Ambient	- 4 to +130 °F	-20 to +54 °C
	Fluid	- 4 to +180 °F	-20 to +82 °C
FLUID VISCOSITY	Range	60 -1900 SUS	10 - 400 cSt
	Recommended	120 SUS	25 cSt
FLUID CONTAMINATION		ISO 4406:1999 Class 18/16/13	

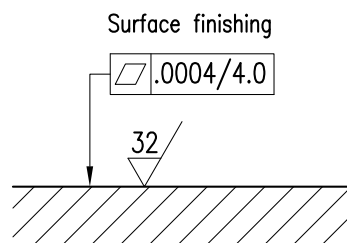
INSTALLATION

We recommend the VERO3MP valve be installed either horizontally or vertically with the solenoid downward. The minimum regulated pressure may vary from the graphs shown on page 3 if the valve is installed vertically with the solenoid upwards.

Bleed the air from the hydraulic circuit. Be sure that the solenoid tube is always full of oil. It may be necessary to vent entrapped air from the solenoid tube in certain applications or after a long shutdown period. The air bleed vent is located on the end of the solenoid tube. See page 4 for the location. Be sure to close the air bleed when the process is complete.

Connect the valve T port directly to the tank. Any back pressure from the tank line will add directly to the controlled pressure. **The maximum allowable back pressure in the tank line under operational conditions is 2 bar.**

Valves are fixed by means of screws or tie rods on a flat surface with planarity and roughness equal to or better than those indicated in the relative symbols. If minimum values are not observed, fluid can easily leak between the valve and support surface.



SEAL KIT

BUNA SEAL KIT	1013182
VITON SEAL KIT	1013183

BOLT KITS

BD03-325	Valve Only	1013152
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NOTES:

1. Bolt Kit Consists Of: Qty. 4 10-24NC 3¼ screws
Qty. 4 #10 Lock washer
2. The recommended torque value for fasteners is: 4 lb.ft (5.4 Nm)

SUBPLATES

SIDE PORTED	AD03SPS8S	Aluminum	SAE-08	265801AP
	AD03SPB8S	Ductile	SAE-08	265801AU
BOTTOM PORTED	DD03SPS8S	Aluminum	SAE-08	265801AI
	DD03SPB8S	Ductile	SAE-08	265801AH

NOTES:

1. Max pressure for aluminum subplates: 3000 psi (210 bar)
2. Max pressure for ductile subplates: 5000 psi (350 bar)
3. Always verify subplate port size is proper for the application

ABOUT CONTINENTAL HYDRAULICS

Rugged, durable, high-performance, efficient—the reason Continental Hydraulics' products are used in some of the most challenging applications across the globe. With a commitment to quality customer support and innovative engineering, Continental's pumps, valves, power units, mobile and custom products deliver what the markets demand. Continental has been serving the food production, brick and block, wood products, automotive and machine tool industries since 1962. Learn how our products survive some of the most harsh environments.

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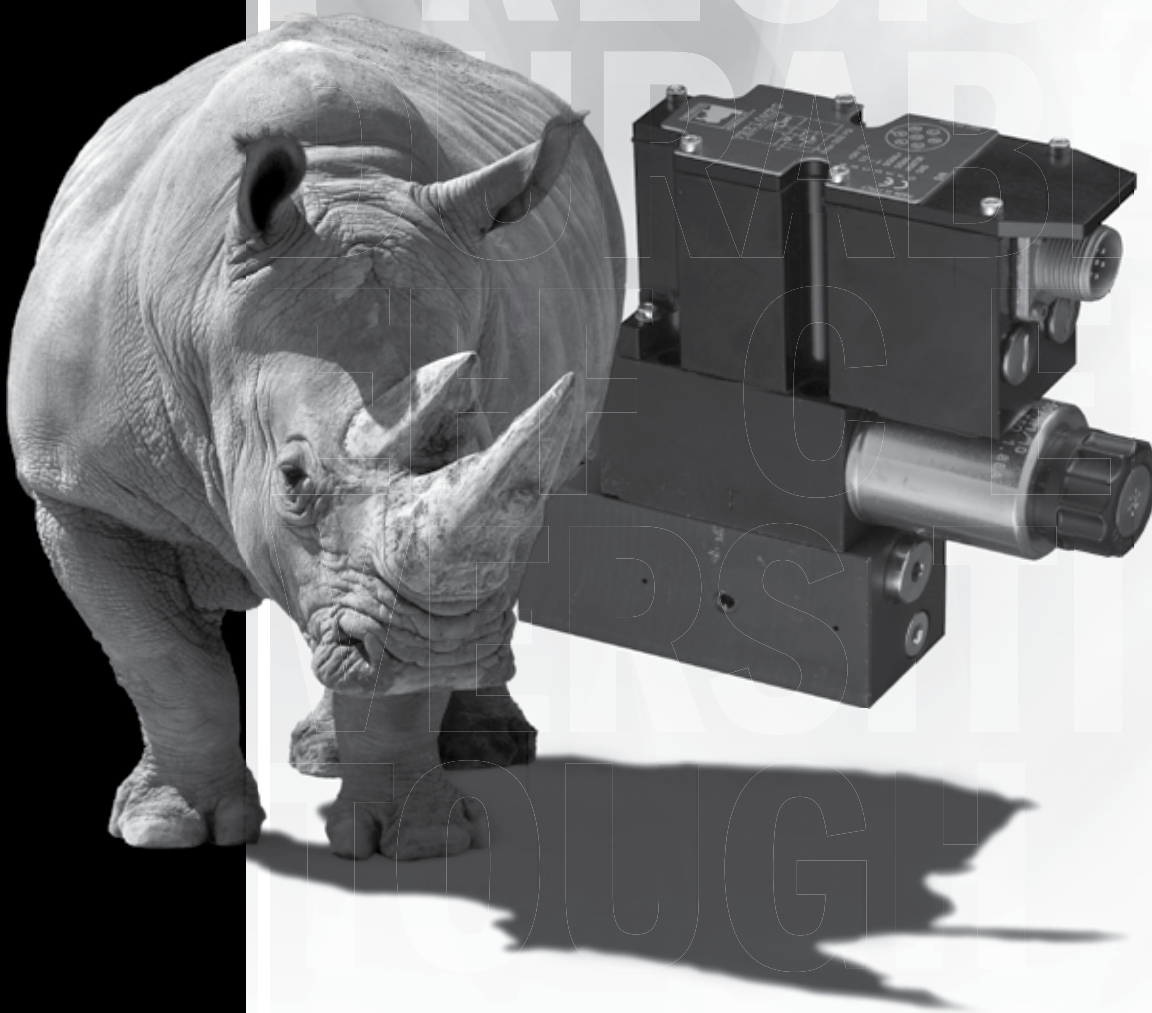


HYDRAULICS™

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VER03MPG

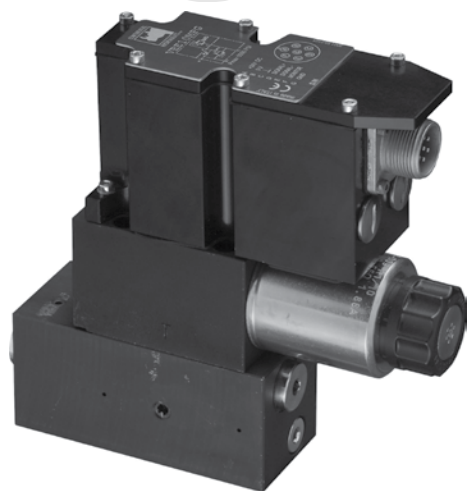
PROPORTIONAL PRESSURE RELIEF VALVES PILOT OPERATED WITH OBE



VER03MPG - PROPORTIONAL PRESSURE RELIEF VALVES PILOT OPERATED WITH OBE

VER03MPG

PROPORTIONAL PRESSURE RELIEF VALVES PILOT OPERATED WITH OBE



DESCRIPTION

Continental Hydraulics VER03MPG pilot operated proportional relief valves conform to NFPA R03/D03 and ISO 6264:1998 mounting standards.

OPERATIONS

The VER03MPG valves have integral electronics on-board to maximize the valve's performance. They are designed to modulate pressure in a hydraulic circuit directly proportional to the input command signal to the valve.

Command signals available are 0-10 VDC and 4 - 20 mA.

The valve consists of a proportional pilot relief stage with on-board electronics and a main relief stage. The main stage has a spool which is held closed by a spring. System pressure acts on the opposite end of the spool opposing the spring force. When system pressure exceeds the spring force, the valve begins to open. The spring preload sets the minimum controlled pressure.

System pressure can be increased from minimum by increasing the pilot pressure which adds to the spring force. The spool will tend to close until the system pressure reaches its new setting.

There are four pressure ranges available: 70 bar, 140 bar, 210 bar and 350 bar with flow up to 13.2 gpm.

It is an internally piloted valve with three drain options - internal through T port, external through A port and external through Y port.

TYPICAL PERFORMANCE SPECIFICATIONS

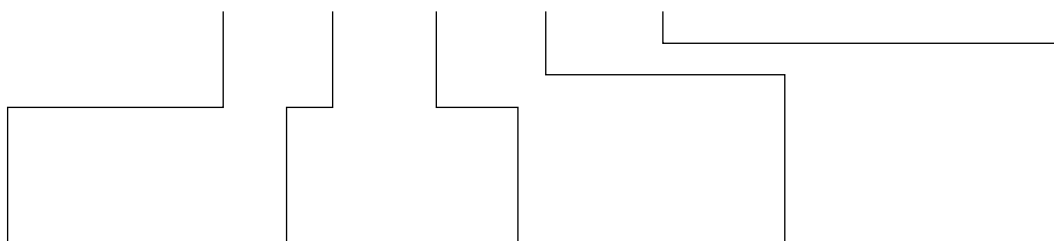
MAXIMUM OPERATING PRESSURE:	P Port	5000 psi	350 bar
	T Port	30 psi	2 bar
MINIMUM FLOW		0.5 gpm	2 l/min
MAXIMUM FLOW		13.2 gpm	50 l/min
RATED FLOW		8 gpm	30 l/min
PRESSURE STAGES	VER03MPG-070	100 - 1000 psi	7 - 70 bar
	VER03MPG-140	100 - 2000 psi	7 - 140 bar
	VER03MPG-210	116 - 3000 psi	8 - 210 bar
	VER03MPG-350	145 - 5000 psi	10 - 350 bar
MOUNTING SURFACE		NFPA R03 / D03 ISO 6264-03-04-*97	

STEP RESPONSE @ 140 bar	0 → 100%	50 ms	
	100 → 0%	30 ms	
STEP RESPONSE @ 210 bar	0 → 100%	70 ms	
	100 → 0%	40 ms	
HYSTERESIS WITH PWM 200	% of p max	< 3%	
REPEATABILITY	% of p max	< ± 1%	
POWER SUPPLY		12V DC / 24V DC	
CONNECTION		7 Pin DIN 43563 Metal	
PROTECTION	IEC 60529	IP67	
WEIGHT	Single Solenoid	8 lbs	3.6 Kg

NOTES: Response times are at full rated pressure and an input flow rate of 2.65 gpm (10 l/min) with an oil volume under pressure of 0.13 gallons (0.5 liter). The response time is affected by flow rate and system capacitance.

IDENTIFICATION CODE

VER03MPG - - - - - **D** - _____ DESIGN LETTER



PRESSURE STAGES	
070	100 - 1000 psi (7 - 70 bar)
140	100 - 2000 psi (7 - 140 bar)
210	116 - 3000 psi (8 - 210 bar)
350	145 - 5000 psi (10 - 350 bar)

SEAL	
A	Buna (STD)
G	Viton

PILOT / DRAIN	
1	Internal Pilot External Drain on A Port
3	Internal Pilot Internal Drain on T Port (STD)

CONNECTION	
OBW	On board electronics 7 Pin - no external enable required (STD)
OBC	On board electronics 7 Pin external enable on Pin C required

REFERENCE SIGNAL	
E0	Voltage 0 - 10V (STD)
E1	Current 4 - 20 mA

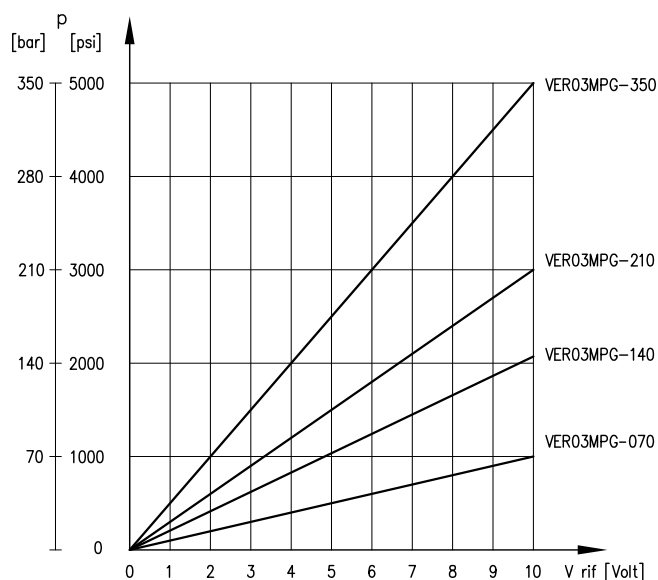
TYPICAL ORDERING CODE:
VER03MPG-210-A-3-OBW-E0D-A

CHARACTERISTIC CURVES

Typical control curves according to the current supplied to the solenoid for all the pressure stages, measured with input flow rate $Q = 2.65$ gpm (10 l/min). The curves are obtained after linearization in factory of the characteristic curves through the digital amplifier. They are measured without any back pressure in T.

Curves obtained with mineral oil with viscosity of 170 sus (36 cSt) at 122°F (50°C).

PRESSURE GAIN

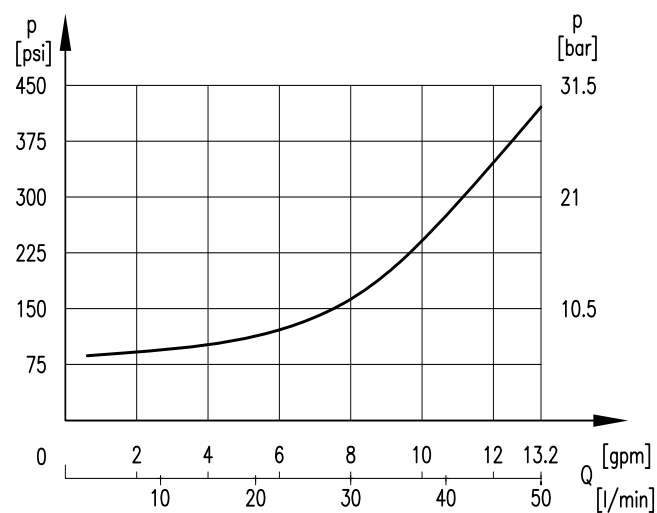


NOTES:

1. The full-scale pressure is set at factory with a flow rate of 2.65 gpm (10 l/min). The full-scale pressure will increase considerably if the flow rate is higher (see diagram $p_{max} = f(Q)$).
2. Curves obtained with current supplied to solenoid, VER03MPG 24V DC version.

CHARACTERISTIC CURVES

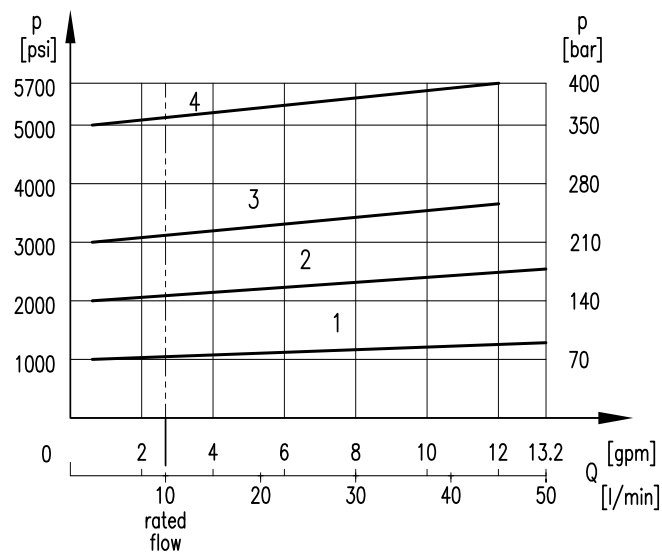
MINIMUM ADJUSTMENT PRESSURE



NOTES:

1. Curve obtained with current supplied to solenoid, VER03MPG 24VDC version.
2. Values obtained with oil viscosity of 170 SUS (36 cSt) at 122°F (50°C).

PRESSURE VARIATIONS



CURVE	VALVE
1	VER03MPG-070
2	VER03MPG-140
3	VER03MPG-210
4	VER03MPG-350

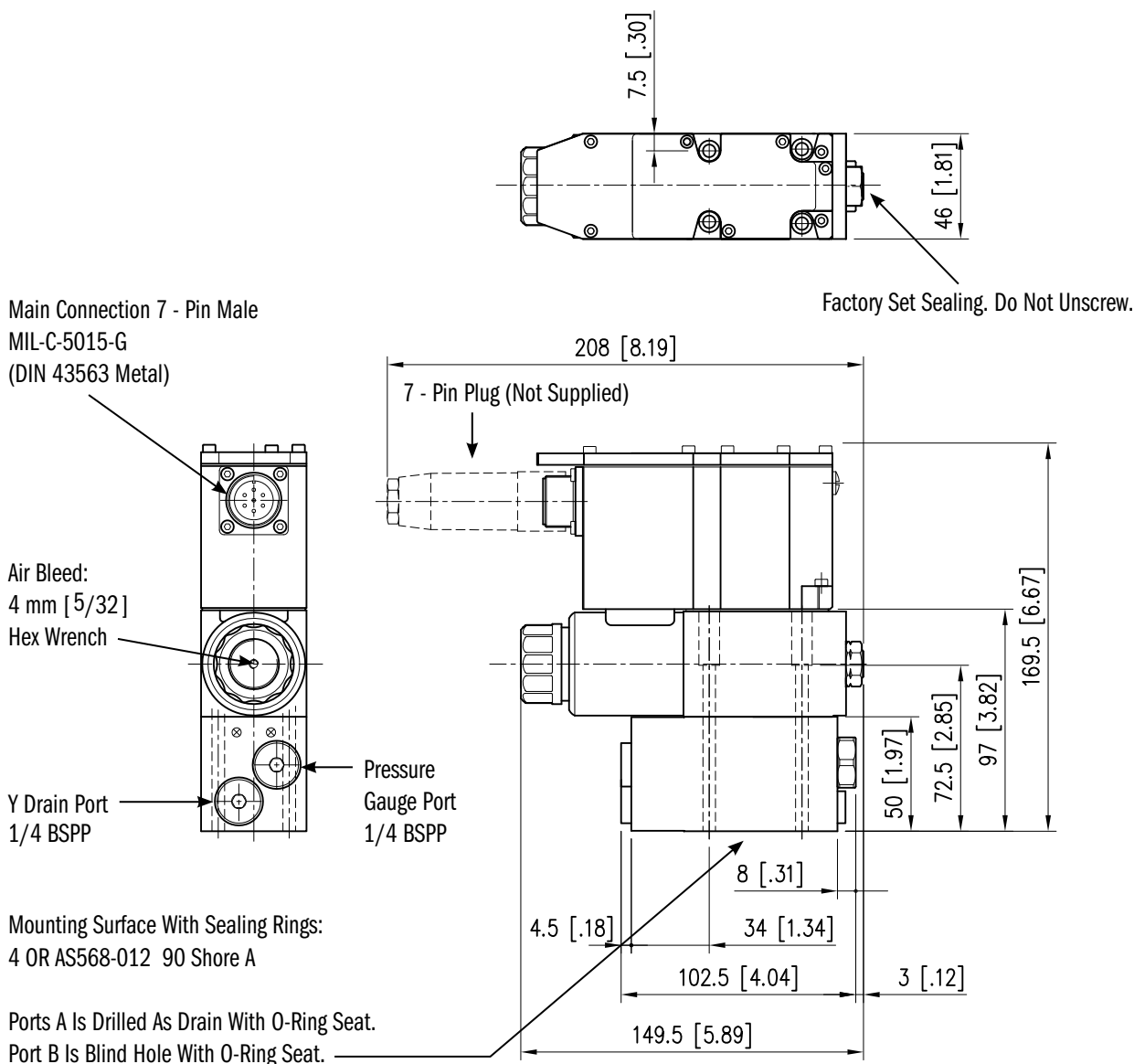
NOTES:

Full scale pressure is set at $Q = 2.65$ gpm (10 l/min).

OVERALL AND MOUNTING DIMENSIONS FOR VER03MPG

VER03MPG

Dimensions in mm [IN]

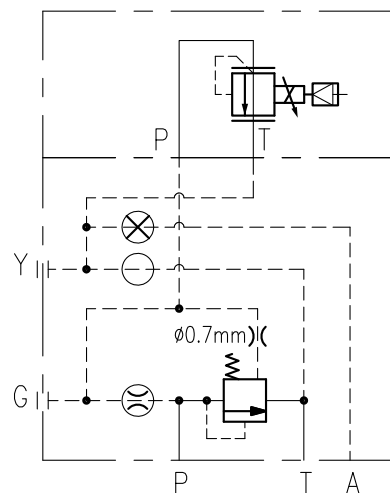


In order to avoid electromagnetic noises and fulfill the European EMC regulations, a 7 pin metal plug according to MIL-C-5015 G should be used instead of the standard plastic 6+PE connector EN 175201-408 (formerly DIN 43563)

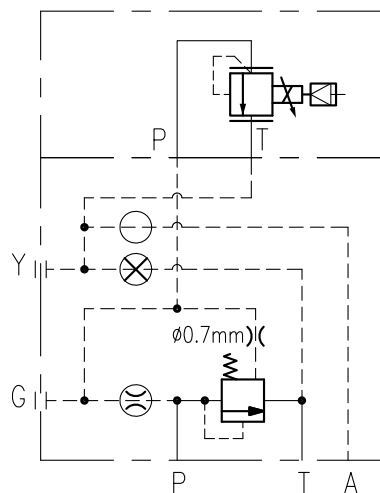
DRAIN OPTIONS

The valve is supplied standard with internal drainage on T port (see schematics below) Otherwise the external drainage option is supplied with discharge in A port.

INTERNAL DRAIN ON PORT T (STD)

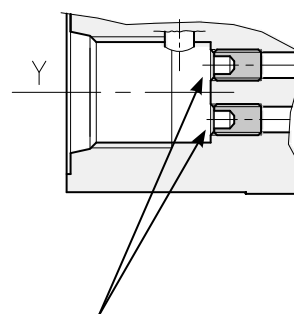
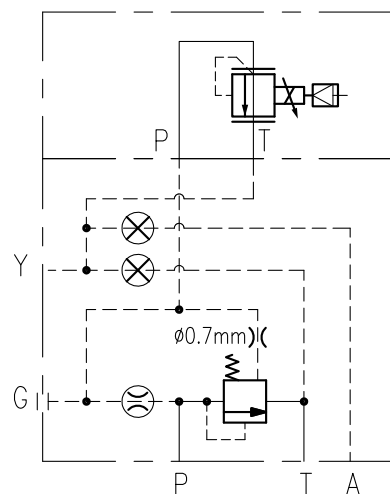


EXTERNAL DRAIN ON A PORT



EXTERNAL DRAIN ON Y PORT

Y port can be converted to an external drain port by installing an M4x6 ISO 4026 socket set screw in the open threaded passage in the Y port. Then plumb Y port directly to tank.



Both Ports Plugged.

ELECTRICAL CHARACTERISTICS

The proportional valve is controlled by a digital amplifier (driver), which incorporates a microprocessor that controls all the valve functions.

THE STANDARD VALVE IS SET AT THE FACTORY WITH:

- UP/DOWN ramp at zero value
- No deadband compensation
- Max valve opening (100% of spool stroke)

It is possible to customize these and others parameters using the optional kit, VEA-PB5 or VEA-PB7 to be ordered separately (see related literature).

THE DIGITAL DRIVER ENABLES THE VALVE TO REACH BETTER PERFORMANCE COMPARED TO THE ANALOG VERSION, AND GIVES:

- Reduced response times
- Optimization and reproducibility of the characteristic curve, optimized in factory for each valve
- Complete interchangeability in case of valve replacement
- Opportunity to set, via software, the functional parameters
- Opportunity to perform a diagnostic program by means of the LIN connection
- High immunity to electromagnetic interference.

The electronic card is available with (OBC) or without (OBW) external enabling signal feature.

POWER SUPPLY		24V DC (19V to 35V, ripple max 3 V pp)
ABSORBED POWER		50 W
MAX CURRENT		2A
DUTY CYCLE		100%
MAIN CONNECTOR		7 pin MIL-C-5015-G (DIN 43563)
ELECTROMAGNETIC COMPATIBILITY (EMC) EUROPEAN DIRECTIVE 2004/108/CE	Emission	IEC EN 61000-6-4
	Immunity	IEC EN 61000-6-2
PROTECTION AGAINST ATMOSPHERIC AGENTS	IEC 60529	IP 67
ELECTRICAL PROTECTION	Overload electronics overheating power failure or < 4mA	

E0 - VOLTAGE

COMMAND SIGNAL (DIFFERENTIAL)	0 - 10V DC
IMPEDANCE	> 50 kΩ

E1 - CURRENT

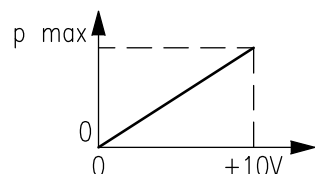
COMMAND SIGNAL	4 - 20 mA
IMPEDANCE	500 Ω

E0 VERSION - VOLTAGE REFERENCE SIGNAL

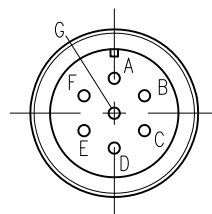
This is the most common version; it makes the valve completely interchangeable with the traditional proportional valves with analog type integrated electronics. The valve has only to be connected as indicated below.

The input signal is differential type and drives the valve as shown in the graph. The pressure output is proportional to UD - UE.

If only one input signal (single-end) is available, the pin B (0V power supply) and the pin E (0V reference signal) must be connected through a jumper and both connected to GND, electric panel side.

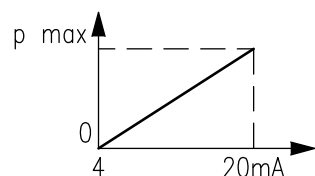


A	24V	Power supply positive. Use an external fuse 5A/50V fast type for protecting electronics.
B	0V	Power supply zero (0V)
C	NC or 24V	OBW Version: Not wired OBC Version: Valve enable
D	0 - 10V	Differential command signal (+V)
E	0V	Differential command signal (-V)
F	0 - 10V	Output monitor for command signal
G	GND	Protective ground

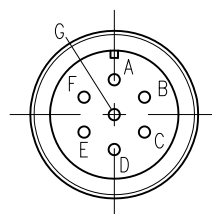


E1 VERSION - CURRENT REFERENCE SIGNAL

The current reference signal is supplied in range of 4 - 20 mA and drives the valve as shown in the chart below. If the current drops to less than 4 mA, the card de-energizes the coils and the valve will go to rest position. The valve will restart when the command signal rises into the 4 - 20 mA range.



A	24V	Power supply positive. Use an external fuse 5A/50V fast type for protecting electronics.
B	0V	Power supply zero (0V)
C	NC or 24V	OBW Version: Not wired OBC Version: Valve enable
D	4 - 20 mA	Command signal 4 - 20 mA
E	0V	Return
F	0 - 10V	Output monitor for command signal
G	GND	Protective ground



WIRING

Connections must be made via the 7 pin plug mounted on the amplifier.

RECOMMENDED CABLE SIZES ARE:

POWER SUPPLY

18 AWG (0.75 mm²)
for cables up to 65 ft (20 m)

16 AWG (1.00 mm²)
for cables up to 130 ft (40 m)

SIGNAL CABLES

20 AWG (0.50 mm²)

A suitable cable would have 7 wires, a separate shield for the signal wires and an overall shield.

PIN C:

Pin C is reserved for the Enable feature and is not connected on the standard card (OBW, see code at page 3) because the enable signal is run directly from the card.

With OBC card, the Enable feature is external, Pin C has to be connected with 24V.

PIN F:

For reading this value as current monitor signal, the card must be energized. This value has to be read on Pin B (0V).

A value of 10V means a current to the solenoid at 100% rated.

Pin F	Pin D	
	E0	E1
-	-	-
0V	0V	4mA
+10V	+10V	20mA

OBW OR OBC VERSION?

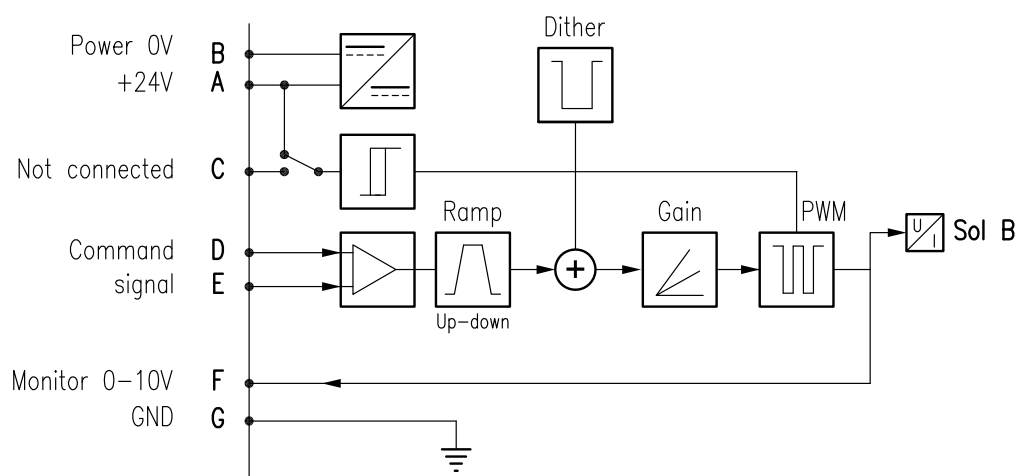
The standard option, code OBW, is programmed for internal enable. The enable signal is taken directly from the power supply of the valve. The card is enabled as soon as supply power is applied to Pins A and B.

Apply command signal to the valve and the output drivers energize the coil. The power supply must be switched off to disable the output to the valve.

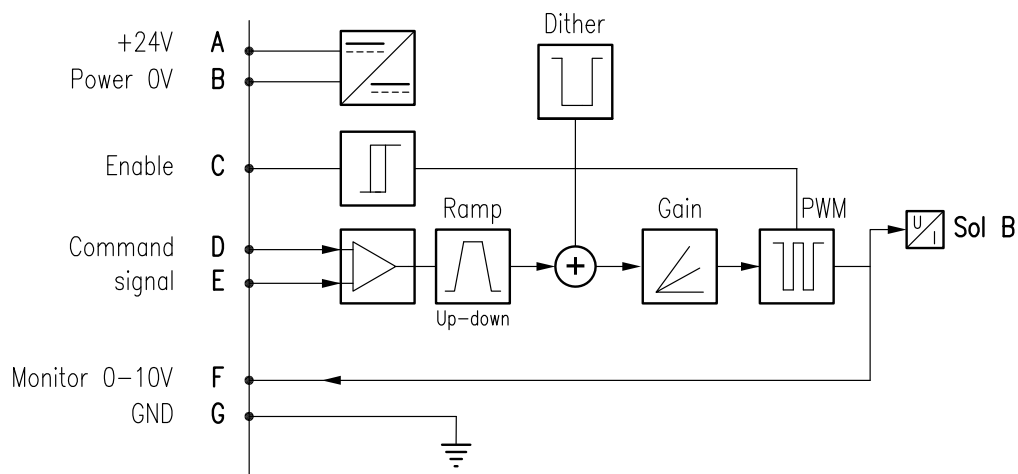
The OBC option is program-med for the external enable feature. A 24 V signal must be applied to Pin C to enable the output drivers to energize the valve coils.

The valve operation can be stopped by simply removing the enable signal from Pin C.

OBW CARD VERSION (STD)



OBC CARD VERSION



APPLICATION DATA

FLUIDS

All pressure drops shown on these data pages are based on 170 SUS fluid viscosity and 0.87 specific gravity. For any other specific gravity (G1) the pressure drop (ΔP) will be approx. $\Delta P_1 = \Delta P (G_1/G)$. See the chart for other viscosities.

FLUID VISCOSITIES	Cst	10	14.5	32	36	43	54	65	76	86	108	216	324	400
	SUS	60	75	150	170	200	250	300	350	400	500	1000	1500	1900
MULTIPLIER		0.77	0.81	0.97	1.00	1.04	1.10	1.15	1.20	1.24	1.31	1.56	1.72	1.83

Use mineral oil-based hydraulic fluids HL or HM type, according to ISO 6743-4. For these fluids, use NBR seals. For fluids HFDR type (phosphate esters) use FPM seals (code G). For the use of other kinds of fluid such as HFA, HFB, HFC, please consult our technical department.

Using fluids at temperatures higher than 180 degrees F causes the accelerated degradation of seals as well as degradation of the fluids physical and chemical properties.

From a safety standpoint, temperatures above 130 degrees F are not recommended.

RANGE TEMPERATURES:	Ambient	- 4 to +130 °F	-20 to +54 °C
	Fluid	- 4 to +180 °F	-20 to +82 °C
FLUID VISCOSITY	Range	60 -1900 SUS	10 - 400 cSt
	Recommended	120 SUS	25 cSt
FLUID CONTAMINATION		ISO 4406:1999 Class 18/16/13	

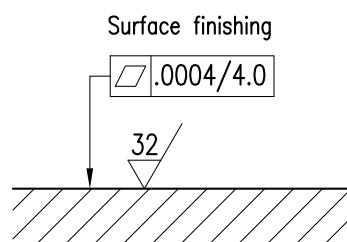
INSTALLATION

We recommend the VERO3MPG valve be installed either horizontally or vertically with the solenoid downward. The minimum regulated pressure may vary from the graphs shown on page 3 if the valve is installed vertically with the solenoid upwards.

Bleed the air from the hydraulic circuit. Be sure that the solenoid tube is always full of oil. It may be necessary to vent entrapped air from the solenoid tube in certain applications or after a long shutdown period. The air bleed vent is located on the end of the solenoid tube. See page 4 for the location. Be sure to close the air bleed when the process is complete.

Connect the valve T port directly to the tank. Any back pressure from the tank line will add directly to the controlled pressure. **The maximum allowable back pressure in the tank line under operational conditions is 2 bar.**

Valves are fixed by means of screws or tie rods on a flat surface with planarity and roughness equal to or better than those indicated in the relative symbols. If minimum values are not observed, fluid can easily leak between the valve and support surface.



SEAL KIT

BUNA SEAL KIT	1013182
VITON SEAL KIT	1013183

BOLT KITS

BD03-325	Valve Only	1013152
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NOTES:

1. Bolt Kit Consists Of: Qty. 4 10-24NC 3¼ screws
Qty. 4 #10 Lock washer
2. The recommended torque value for fasteners is: 4 lb.ft (5.4 Nm)

SUBPLATES

SIDE PORTED	AD03SPS8S	Aluminum	SAE-08	265801AP
	AD03SPB8S	Ductile	SAE-08	265801AU
BOTTOM PORTED	DD03SPS8S	Aluminum	SAE-08	265801AI
	DD03SPB8S	Ductile	SAE-08	265801AH

NOTES:

1. Max pressure for aluminum subplates: 3000 psi (210 bar)
2. Max pressure for ductile subplates: 5000 psi (350 bar)
3. Always verify subplate port size is proper for the application

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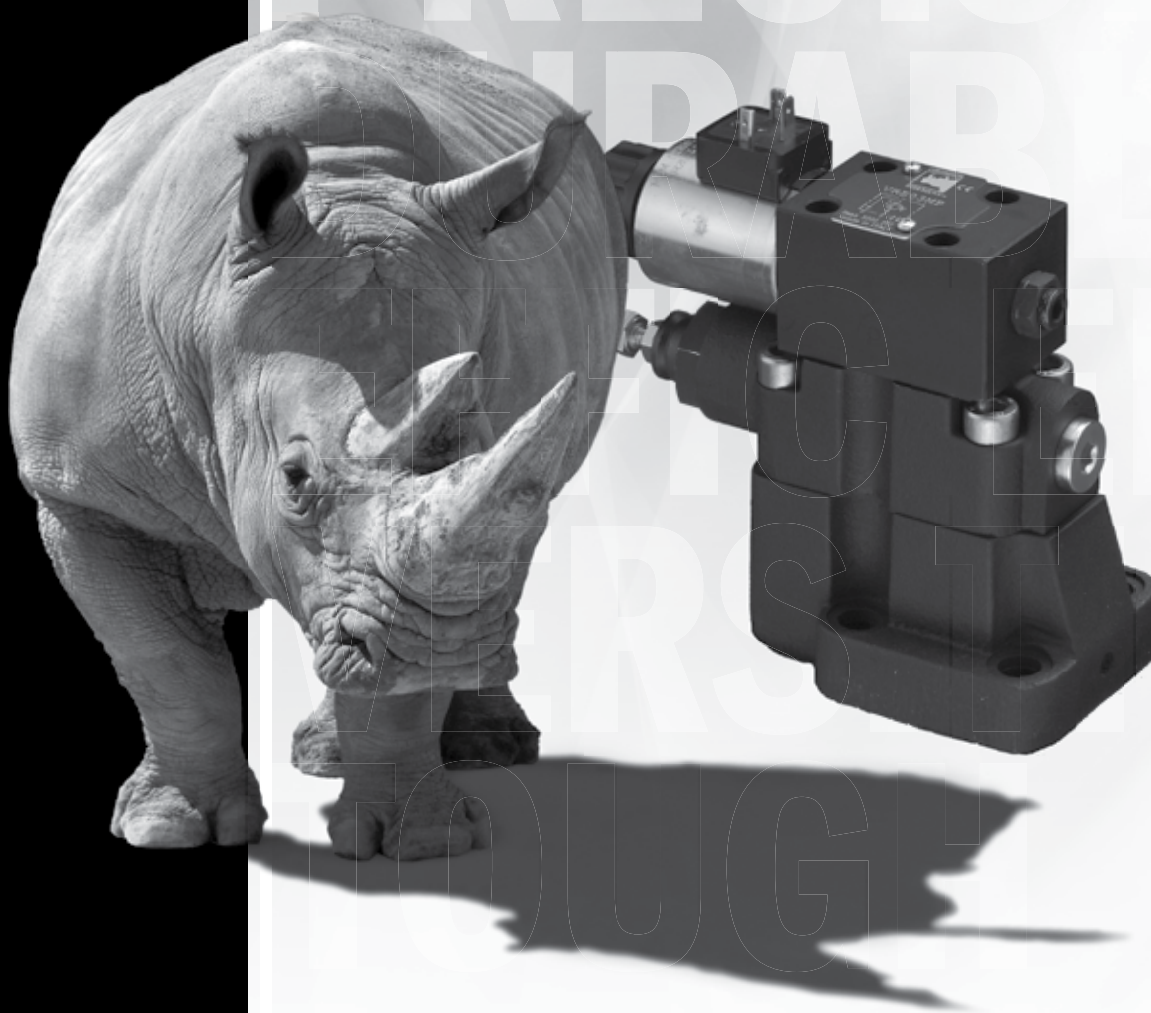
HYDRAULICS



CONTINENTAL HYDRAULICS

VER*SP

PROPORTIONAL PILOT RELIEF VALVES



VER*SP - PROPORTIONAL PILOT RELIEF VALVES

VER*SP

PROPORTIONAL PILOT RELIEF VALVES



DESCRIPTION

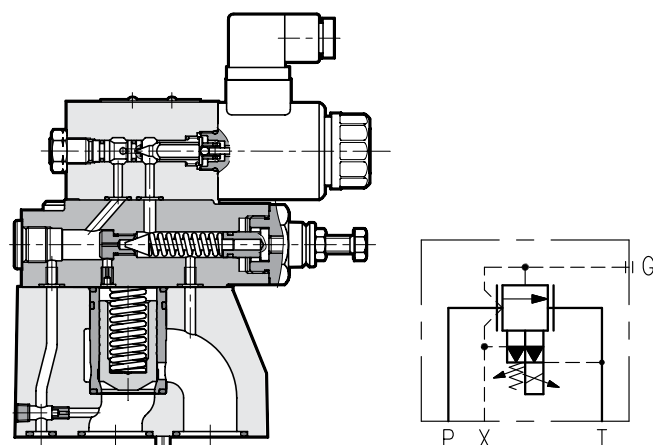
VER*SP valves are Proportional pilot operated pressure relief valves with subplate mounting according to NFPA T3.5.1 R2-2002 and ISO 6264:1998 standards.

Available in four proportional pressure ranges up to 5000 psi and in three nominal sizes for flow rates up to 132 gpm.

These valves are used to provide remote and variable pressure control in a hydraulic circuit. The pressure setting is directly proportional to the input current to the solenoid.

The valve solenoid can be driven by a variable current power supply or by use of an external Power Amplifier Card designed to maximize the valves performance.

They have a built-in manual relief valve that is factory set to the maximum value of the pressure control range.



TYPICAL PERFORMANCE SPECIFICATIONS

MAXIMUM OPERATING PRESSURE:		5000 psi	350 bar
MAXIMUM FLOW RATE	VER06SP	53 gpm	200 l/min
	VER08SP	105 gpm	400 l/min
	VER10SP	132 gpm	500 l/min
MOUNTING SURFACE	VER06SP	R06 NFPA - ISO 6264-06	
	VER08SP	R08 NFPA - ISO 6264-08	
	VER10SP	R10 NFPA - ISO 6264-10	
MAX WEIGHT	VER06SP	11 lbs	5 kg
	VER08SP	12.8 lbs	5.8 kg
	VER10SP	17.6 lbs	8 kg

STEP RESPONSE WITH Q = 50 l/min	0 → 100%	120 ms	
	100 → 0%	90 ms	
HYSTERESIS WITH PWM 200	% of p nom	< 5%	
REPEATABILITY	% of p nom	< ± 1.5%	
POWER SUPPLY		12V DC / 24V DC	
CONNECTION		DIN 43650	DT04-2P
PROTECTION	IEC 60529	IP65	IP69K

NOTE: Step response is the time taken for the valve output to reach 90% of the set pressure value following a step change in the command signal.

IDENTIFICATION CODE

VER **SP** - - - **D** - _____ DESIGN LETTER

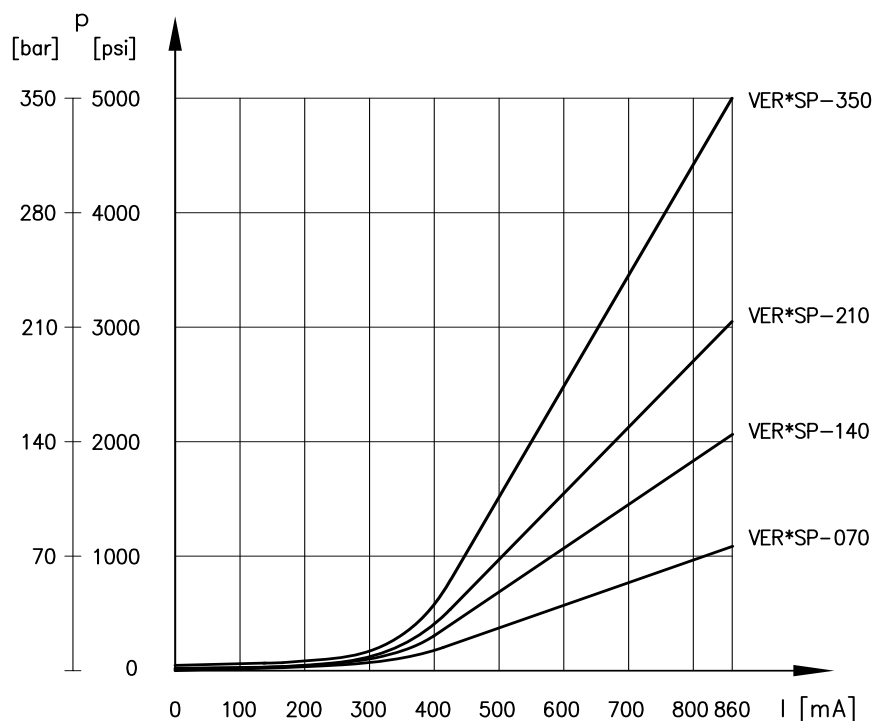
SIZE		PRESSURE CONTROL RANGE		SEAL		CONNECTION		VOLTAGE	
06	NFPA R06	070	Up to 1000 psi (up to 70 bar)	A	Buna (STD)	K1	DIN 43650 (STD)	12	12 V DC Solenoid
08	NFPA R08	140	Up to 2000 psi (up to 140 bar)	G	Viton	K7	DT04-2P 'Deutsch'	24	24 V DC Solenoid
10	NFPA R10	210	Up to 3000 psi (up to 210 bar)						
		350	Up to 5000 psi (up to 350 bar)						

TYPICAL ORDERING CODE:
VER06SP-210-A-K112D-A

CHARACTERISTIC CURVES

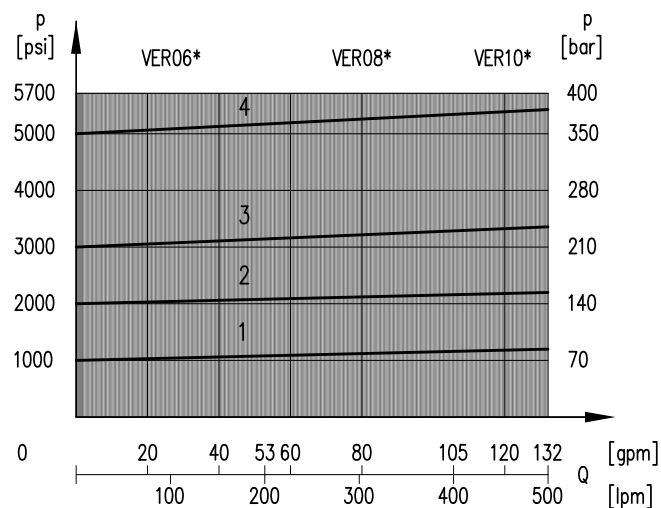
Curves obtained with mineral oil with viscosity of 170 sus (36 cSt) at 122°F (50°C).

PRESSURE GAIN



CHARACTERISTIC CURVES

ADJUSTMENT

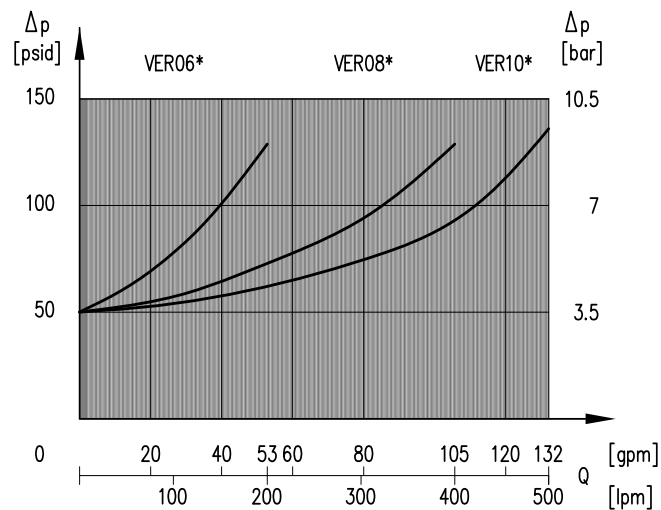


CURVE	PRESSURE RANGE
1	Up to 1000 psi
2	Up to 2000 psi
3	Up to 3000 psi
4	Up to 5000 psi

NOTES:

- Values obtained with oil viscosity of 170 SUS (36 cSt) at 122°F (50°C).

PRESSURE DROPS



OVERALL AND MOUNTING DIMENSIONS FOR VER*SP

SEALING RINGS:

VER06SP

2 O-Ring 17.86mm ID x 2.62mm CS 90 Shore A

1 O-Ring 9.13mm ID x 2.62mm CS 90 Shore A

VER08SP

2 O-Ring AS568-123 90 Shore A

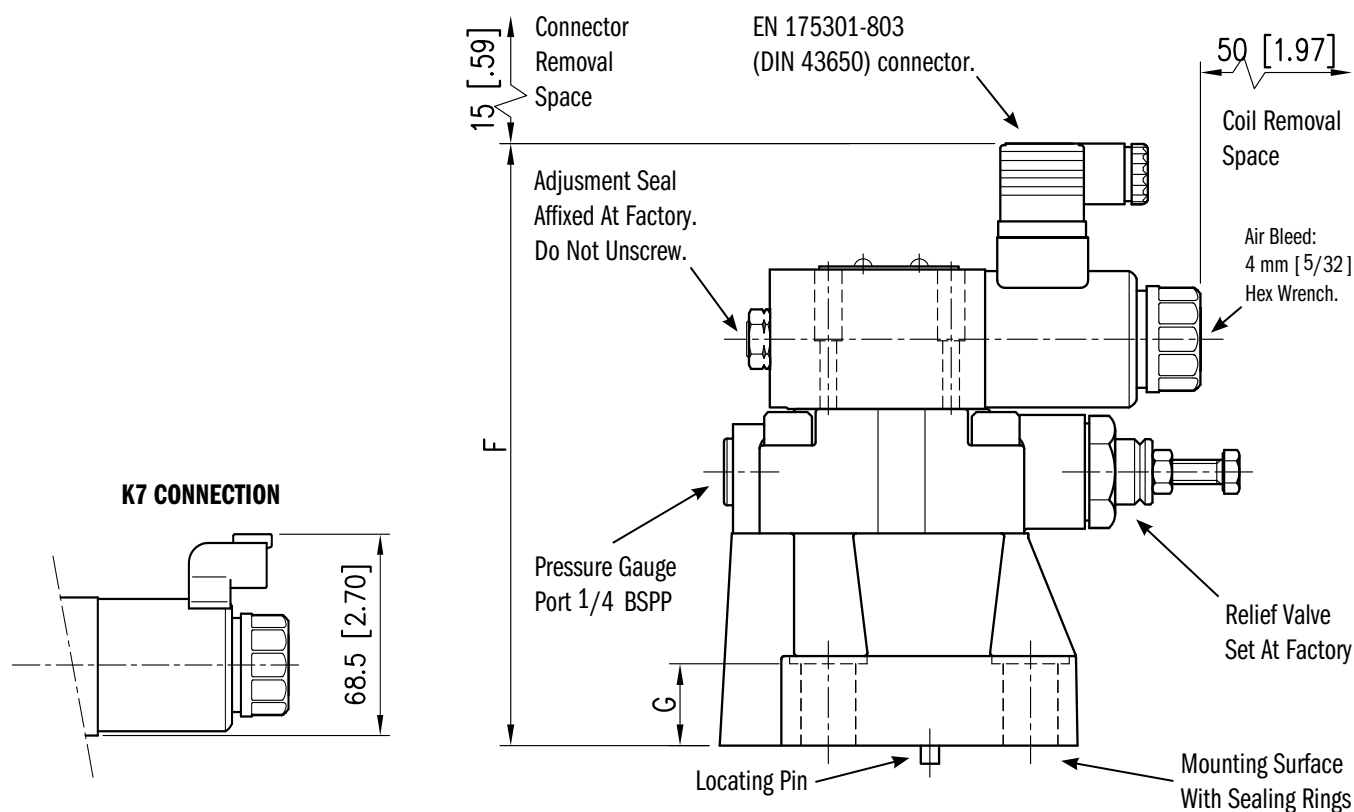
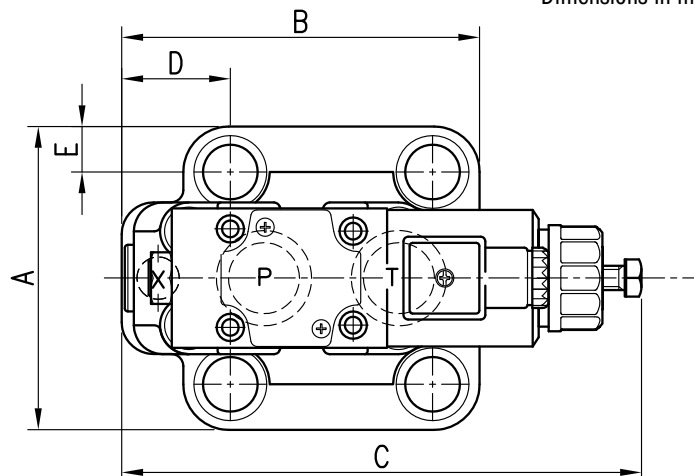
1 O-Ring 9.13mm ID x 2.62mm CS 90 Shore A

VER10SP

2 O-Ring AS568-220 90 Shore A

1 O-Ring 9.13mm ID x 2.62mm CS 90 Shore A

Dimensions in mm [IN]



VALVE	DIMENSIONS mm [in]							FASTENING	
	A	B	C	D	E	F	G	n° 4 FASTENERS	TIGHTNG TORQUE
VER06SP	80 [3.15]	80 [3.15]	179 [7.05]	13 [0.51]	13 [0.51]	186 [7.32]	22 [0.87]	M12x40 [½ -13 UNC x 1 ½"]	50.9 lb.ft
VER08SP	100 [3.94]	118 [4.64]	170 [6.69]	36 [1.42]	15 [0.59]	196 [7.72]	27 [1.06]	M16x50 [5/8 -11 UNC x 2"]	125.3 lb.ft
VER10SP	120 [4.72]	152 [5.98]	180 [7.09]	44 [1.73]	19 [0.74]	206 [8.11]	35 [1.38]	M18x60 [¾ -10 UNC x 2.5"]	173.3 lb.ft

ELECTRICAL CHARACTERISTICS FOR VER*SP

The proportional solenoid consists of tube and coil. The coil is mounted on the tube and fastened to it by a ring retainer.

The coils can be mounted rotating-free depending on the installation requirements.

IP DEGREE

The declared IP degree is guaranteed for all valves only if the connector has been wired and mounted correctly on the coil.

The K7 connection meets DIN 40050-9 which extends the IEC 60529 rating system with an IP69K rating for high-pressure, high-temperature and wash-down applications.

NOMINAL VOLTAGE	V DC	12	24
RESISTANCE AT 68° F	K1	3.66 Ω	17.6 Ω
	K7	4.5 Ω	18.7 Ω
CURRENT AT 68° F	K1	1.88 A	0.86 A
	K7	2.72 A	1.29 A
DUTY CYCLE		100%	
ELECTROMAGNETIC COMPATIBILITY (EMC)		European Directive 2004/108/EC	
IP DEGREE IEC 60529	K1	IP 65	
	K7	IP 69K	
CLASS OF PROTECTION FOR INSULATION	Copper Wire	Class H (356 °F)	
	Coil	Class F (311 °F)	

ACCESSORY ELECTRONICS

Some external digital amplifiers are available to be coupled to the valve for better control and to improve the valve performance.

See Continental Hydraulics Control Amplifier Catalog for products to match your requirements.

VEA-3F-A: DIN Connector - Black

MOUNTING SURFACES

All the mounting surfaces refer to ISO 6264:1998 and NFPA T3.5.1 R2-2002 standards.

The mounting surface standards recommend metric coarse threads. However, subplates are commercially available with UNC threads. Select a bolt size that matches the threads in the mounting surface.

Dimensional tolerances are ± 0.1 mm (0.004") for bolt and pin location; ± 0.2 mm (0.008") for the other quotes.

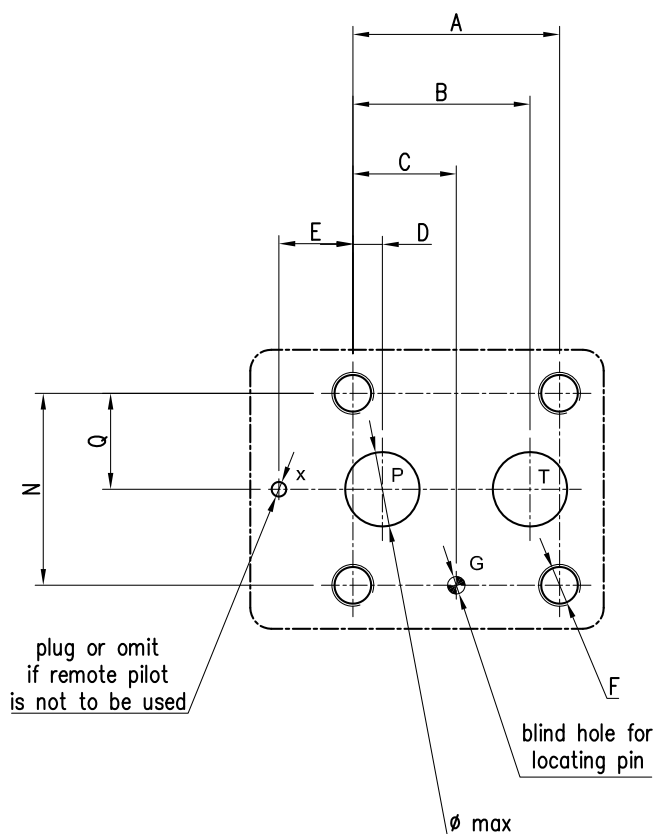
The minimum depth of the blind hole G is 8 mm (0.31 in).

PORT FUNCTION:

P = Pressure Inlet

T = Outlet To Reservoir

X = Remote Pilot Control Port



VALVE SIZE	MOUNTING SURFACE		DIMENSIONS mm [in]						
	NFPA	ISO	A	B	C	D	E	N	Q
06	R06	6264-06-09-0-97	53.8 [2.12]	47.5 [1.87]	22.1 [0.87]	22.1 [0.87]	0	53.8 [2.12]	26.9 [1.06]
08	R08	6264-08-13-0-97	66.7 [2.63]	55.6 [2.19]	33.4 [1.31]	11.1 [0.44]	23.8 [0.94]	70 [2.75]	35 [1.38]
10	R10	6264-10-17-0-97	88.9 [3.50]	76.2 [3.00]	44.5 [1.75]	12.7 [.50]	31.8 [1.25]	82.6 [3.25]	41.3 [1.63]

VALVE SIZE	MOUNTING SURFACE		DIMENSIONS mm [in]				
	NFPA	ISO	Øp max	Øt max	Øx	Øg	F
06	R06	6264-06-09-0-97	14.7 [0.58]	14.7 [0.58]	4.8 [0.19]	7.5 [0.295]	M12x40 [½ - 13 UNC x 1 ½"]
08	R08	6264-08-13-0-97	23.4 [0.92]	23.4 [0.92]	6.3 [0.25]	7.5 [0.295]	M16x50 [¾ - 11 UNC x 2"]
10	R10	6264-10-17-0-97	32 [1.26]	32 [1.26]	6.3 [0.25]	7.5 [0.295]	M18x60 [¾ - 10 UNC x 2.5"]

APPLICATION DATA

FLUIDS

All pressure drops shown on these data pages are based on 170 SUS fluid viscosity and 0.87 specific gravity. For any other specific gravity (G1) the pressure drop (ΔP) will be approx. $\Delta P1 = \Delta P (G1/G)$. See the chart for other viscosities.

FLUID VISCOSITIES	Cst	10	14.5	32	36	43	54	65	76	86	108	216	324	400
	SUS	60	75	150	170	200	250	300	350	400	500	1000	1500	1900
MULTIPLIER		0.77	0.81	0.97	1.00	1.04	1.10	1.15	1.20	1.24	1.31	1.56	1.72	1.83

Use mineral oil-based hydraulic fluids HL or HM type, according to ISO 6743-4. For these fluids, use NBR seals. For fluids HFDR type (phosphate esters) use FPM seals (code G). For the use of other kinds of fluid such as HFA, HFB, HFC, please consult our technical department.

Using fluids at temperatures higher than 180 degrees F causes the accelerated degradation of seals as well as degradation of the fluids physical and chemical properties.

From a safety standpoint, temperatures above 130 degrees F are not recommended.

RANGE TEMPERATURES:	Ambient	- 4 to +130 °F	-20 to +54 °C
	Fluid	- 4 to +180 °F	-20 to +82 °C
FLUID VISCOSITY	Range	60 -1900 SUS	10 - 400 cSt
	Recommended	120 SUS	25 cSt
FLUID CONTAMINATION		ISO 4406:1999 Class 18/16/13	

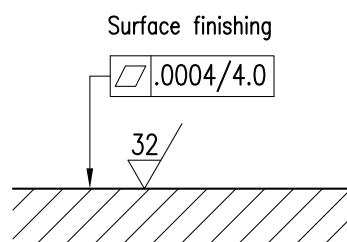
INSTALLATION

We recommend the VER*SP valve be installed either horizontally or vertically with the solenoid downward. The minimum regulated pressure may vary from the graphs shown on page 3 if the valve is installed vertically with the solenoid upwards.

Bleed the air from the hydraulic circuit. Be sure that the solenoid tube is always full of oil. It may be necessary to vent entrapped air from the solenoid tube in certain applications or after a long shutdown period. The air bleed vent is located on the end of the solenoid tube. See page 4 for the location. Be sure to close the air bleed when the process is complete.

Connect the valve T port directly to the tank. Any back pressure from the tank line will add directly to the controlled pressure. **The maximum allowable back pressure in the tank line under operational conditions is 2 bar.**

Valves are fixed by means of screws or tie rods on a flat surface with planarity and roughness equal to or better than those indicated in the relative symbols. If minimum values are not observed, fluid can easily leak between the valve and support surface.



SEAL KIT FOR VER*SP

	VER06SP	VER08SP	VER10SP
BUNA SEAL KIT	1013206	1013208	1013210
VITON SEAL KIT	1013207	1013209	1013211

BOLT KITS

VER06SP	BR06-175	1/2-13 UNC x 1 1/2"	1013240
VER08SP	BR08-200	5/8-11 UNC x 2"	1013241
VER10SP	BR10-250	3/4-10 UNC x 2.5"	1013242

NOTES:

Bolt Kits consist of Qty 4 bolts and Qty 4 Lock washers

SUBPLATES

R06 SIZE	AR06SPS12S	Aluminum	SAE-12	1013128AB
	DR06SPS12S	Ductile	SAE-12	1013128AC
PR08 SIZE	AR08SPS16S	Aluminum	SAE-16	1013128AD
	DR08SPS16S	Ductile	SAE-16	1013128AE
PR10 SIZE	AR10SPS24S	Aluminum	SAE-24	1013128AF
	DR10SPS24S	Ductile	SAE-24	1013128AG

NOTES:

1. Max pressure for aluminum subplates: 3000 psi (210 bar)
2. Max pressure for ductile subplates: 5000 psi (350 bar)
3. Always verify subplate port size is proper for the application

ABOUT CONTINENTAL HYDRAULICS

Rugged, durable, high-performance, efficient—the reason Continental Hydraulics' products are used in some of the most challenging applications across the globe. With a commitment to quality customer support and innovative engineering, Continental's pumps, valves, power units, mobile and custom products deliver what the markets demand. Continental has been serving the food production, brick and block, wood products, automotive and machine tool industries since 1962. Learn how our products survive some of the most harsh environments.

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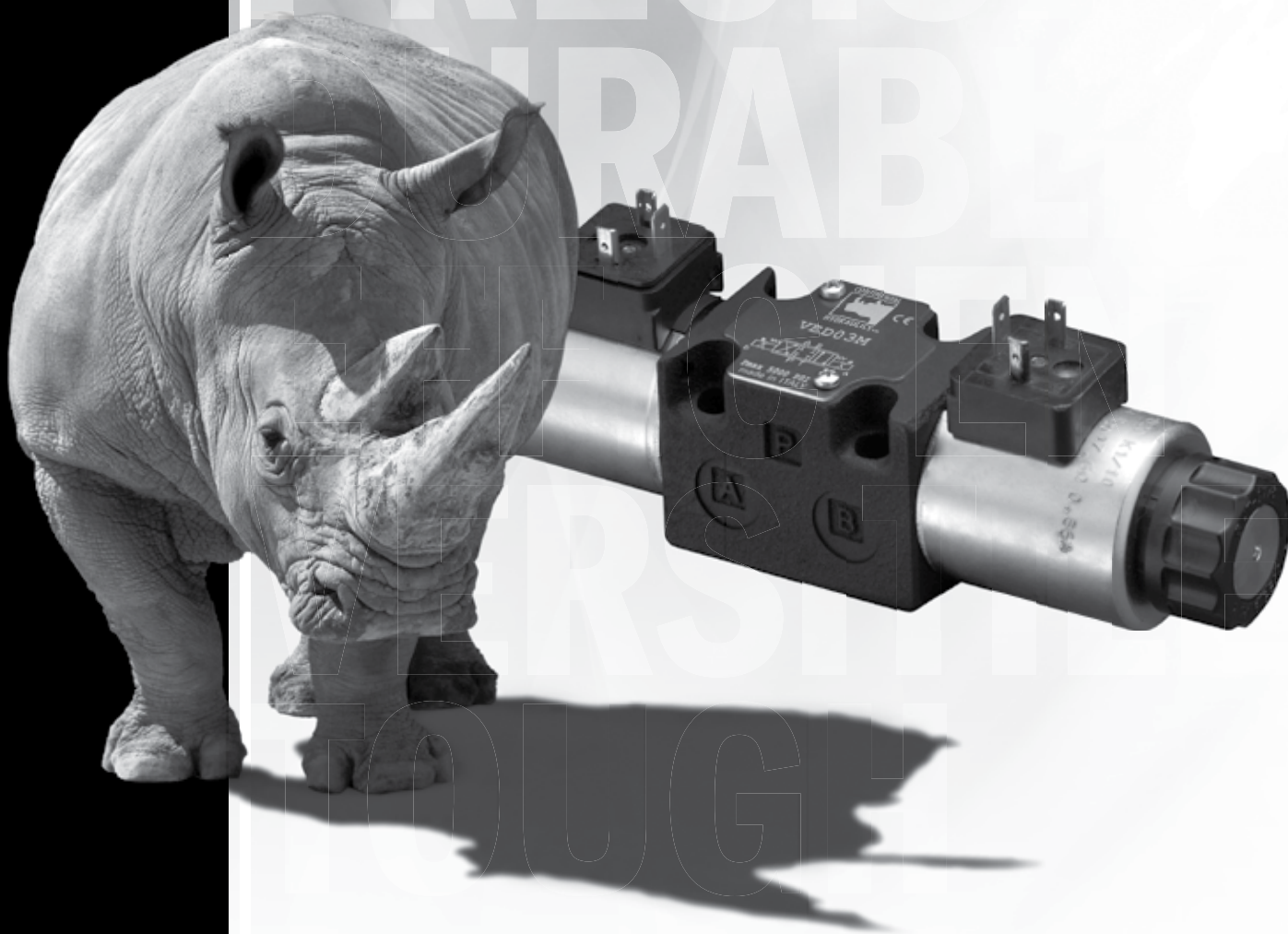
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CONTINENTAL HYDRAULICS

VED03M

PROPORTIONAL DIRECTIONAL CONTROL VALVES

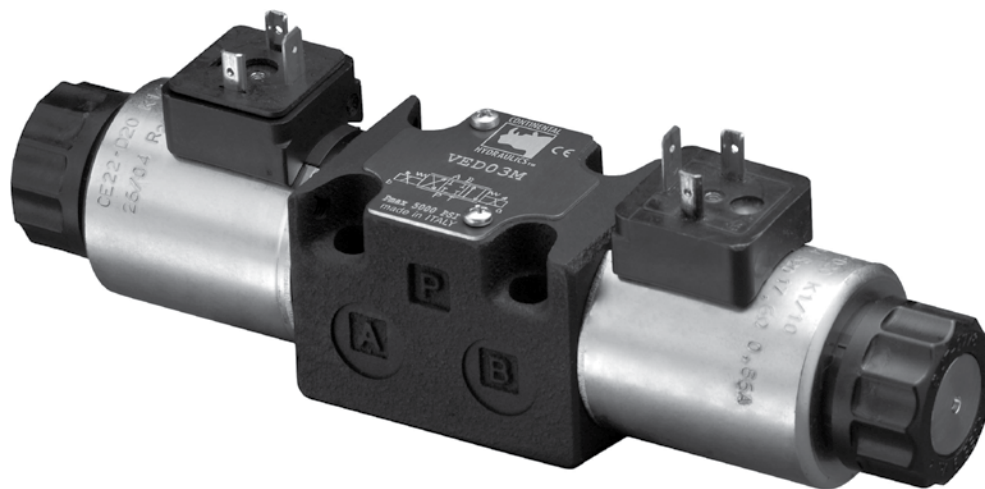
VED03M - PROPORTIONAL DIRECTIONAL CONTROL VALVES



PRECISE

VED03M

PROPORTIONAL DIRECTIONAL CONTROL VALVES



DESCRIPTION

Continental Hydraulics VED03M direct operated 4-way proportional valves conform to NFPA D03 and ISO 4401 mounting standards.

OPERATIONS

These valves are designed to control the direction and oil flow rate based on the amount of current supplied to the solenoid. In event of a loss in electrical power, the centering springs will return the valve spool to the center position.

The valve solenoids can be driven by a variable current power supply or by use of external Power Amplifier Cards designed to maximize the valves' performance.

A variety of manual overrides are also available.

TYPICAL PERFORMANCE SPECIFICATIONS

MAXIMUM OPERATING PRESSURE:	P - A - B Ports	5000 psi	350 bar
	T Port	3000 psi	210 bar
FLOW CAPACITY WITH ΔP 145 PSI (10 BAR)	AC/FC-04	1.06 gpm	4 l/min
	AC/FC-08	2.1 gpm	8 l/min
	AC/FC-16	4.2 gpm	16 l/min
	AC/FC-26	7 gpm	26 l/min
MOUNTING SURFACE		NFPA D03 ISO 4401-03-02-0-05	

STEP RESPONSE	0 \rightarrow 100%	50 ms	
	100 \rightarrow 0%	40 ms	
HYSTERESIS	% of Q max	< 6%	
REPEATABILITY	% of Q max	< \pm 1.5%	
VOLTAGE		12V DC 24V DC	
COIL CONNECTION		DIN 43650	DT04-2P
PROTECTION	IEC 60529	IP65	IP69K
WEIGHT:	Single Solenoid	3.5 lbs	1.6 Kg
	Dual Solenoid	4.4 lbs	2 Kg

RANGE TEMPERATURES:	Ambient	- 4 to +130° F	-20 to +54° C
	Fluid	- 4 to +180° F	-20 to +82° C
FLUID VISCOSITY	Range	60 -1900 SUS	10 - 400 cSt
	Recommended	120 SUS	25 cSt
FLUID CONTAMINATION		ISO 4406:1999 class 18/16/13	

IDENTIFICATION CODE

VED03M - - - **D** - _____ DESIGN LETTER

FUNCTION	
3	
	Dual operator 3 position spring centered
5	
	Single operator 2 position spring centered

MECHANICAL	
OMIT	Manual override built-in with the tube (STD)
R	Single solenoid port end B
U	Manual override boot
S	Override with screw
L	Lever override

VOLTAGE	
12	12 V DC Solenoid
24	24 V DC Solenoid (STD)

SEAL	
A	Buna (STD)
G	Viton

VOLTAGE	
K1	DIN 43650 (STD)
K7	DT04-2P 'Deutsch'

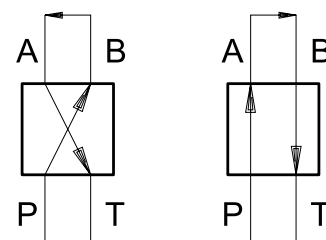
NOMINAL FLOW (with Δp P-T 145 psi)	
04	4 l/min (1.06 gpm)
08	8 l/min (2.1 gpm)
16	16 l/min (4.2 gpm)
26	26 l/min (7 gpm)
16/08	Asymmetrical Spool: 16 l/min (4.2 gpm) on P-A 08 l/min (2.1 gpm) on P-B
26/13	Asymmetrical Spool: 26 l/min (7 gpm) on P-A 13 l/min (3.5 gpm) on P-B

TYPICAL ORDERING CODE:
VED03M-3AC-16-A-K1-24D-C

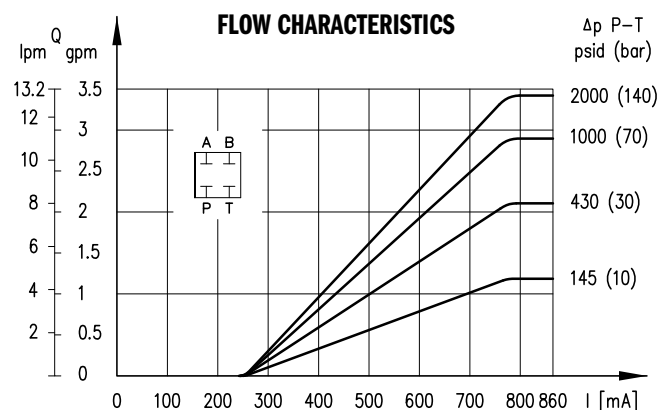
SPOOLS				
NAME	SYMBOLS	DESCRIPTION	APPLICATION	FUNCTION MATCHING
AC		METER IN / METER OUT	MOTION	3,5
FC		METER IN / METER OUT		3,5

PERFORMANCE CURVES FOR AC SPOOL

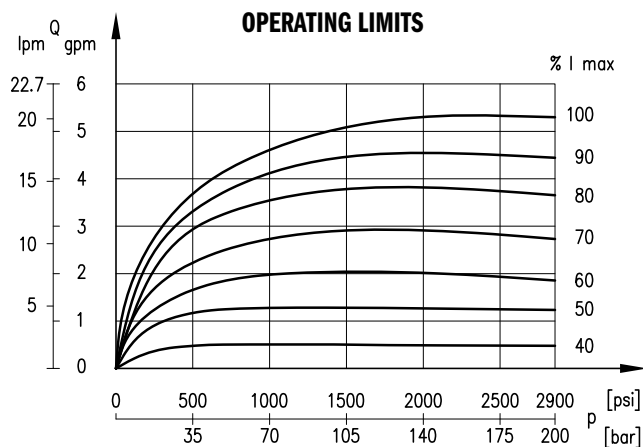
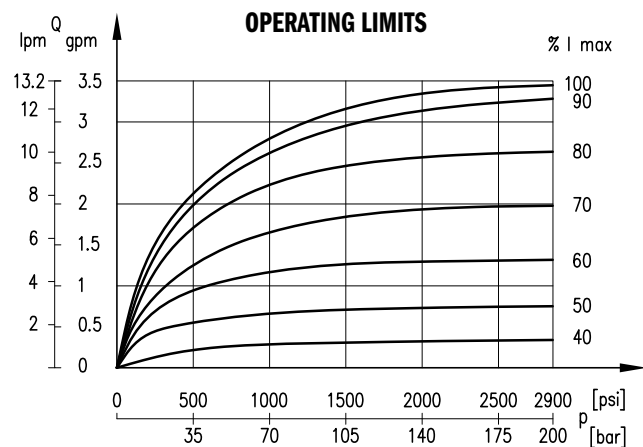
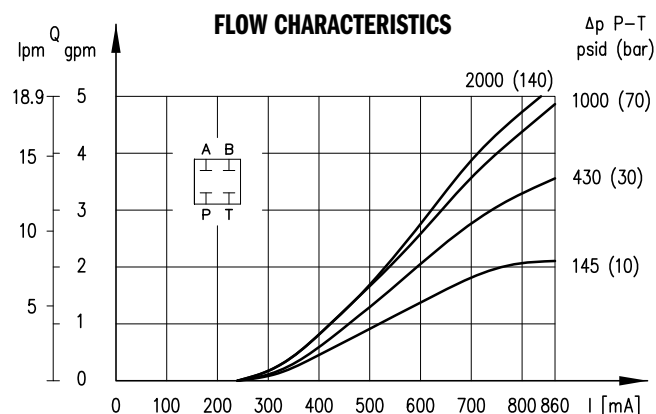
Curves obtained with mineral oil with viscosity of 170 sus (36 cSt) at 122°F (50°C); the Δp values are measured between P and T (full loop) valve ports.



AC-04



AC-08

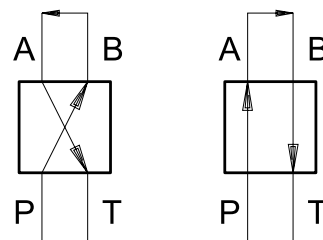


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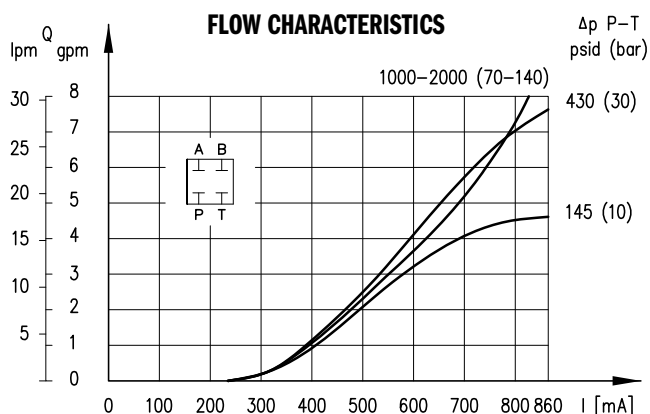
Curves obtained with **VED03M** 24V DC version.

PERFORMANCE CURVES FOR AC SPOOL

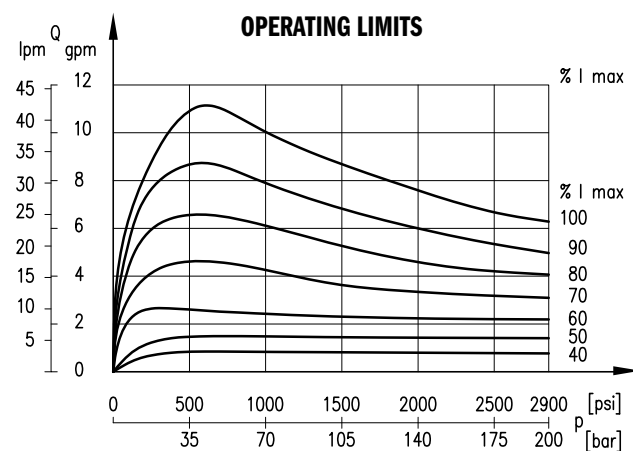
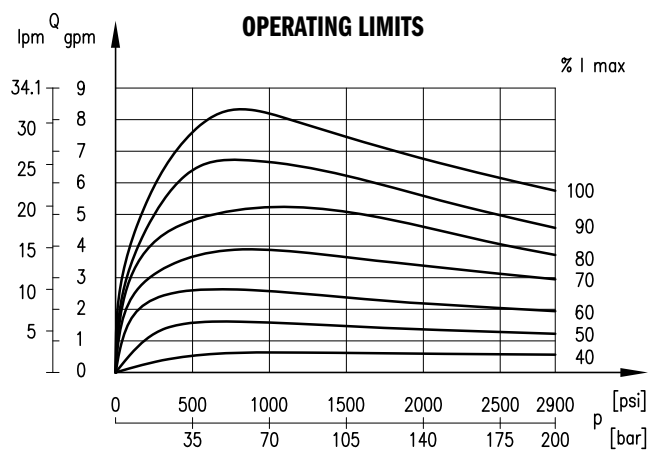
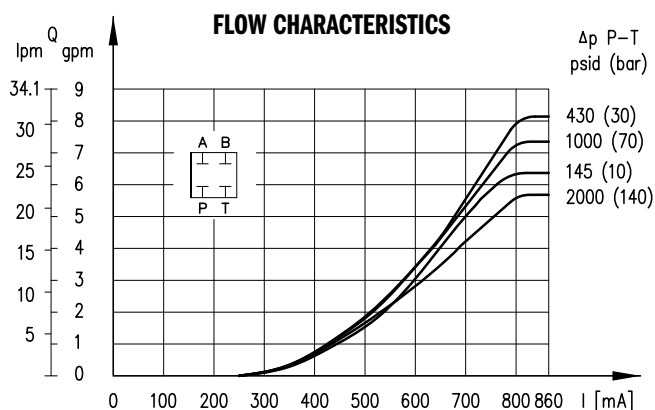
Curves obtained with mineral oil with viscosity of 170 sus (36 cSt) at 122°F (50°C); the Δp values are measured between P and T (full loop) valve ports.



AC-16



AC-26

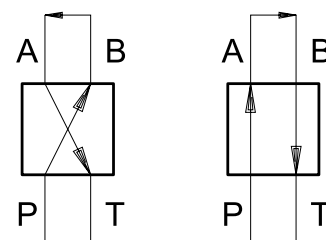


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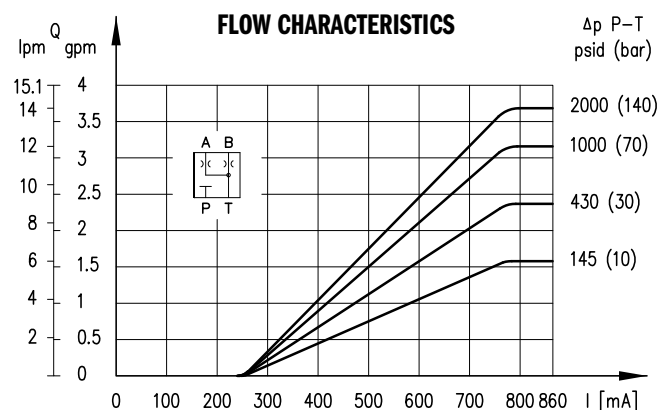
Curves obtained with **VED03M** 24V DC version.

PERFORMANCE CURVES FOR FC SPOOL

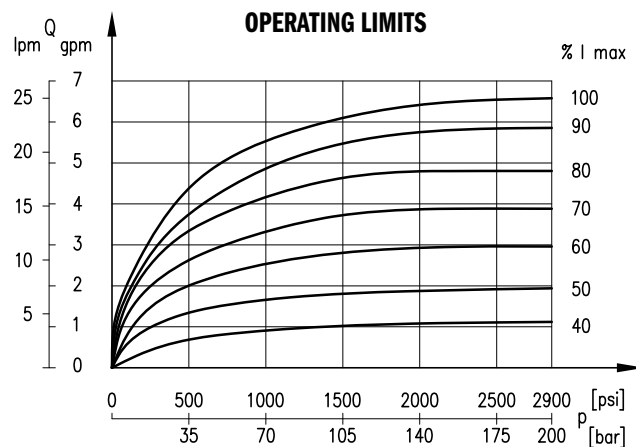
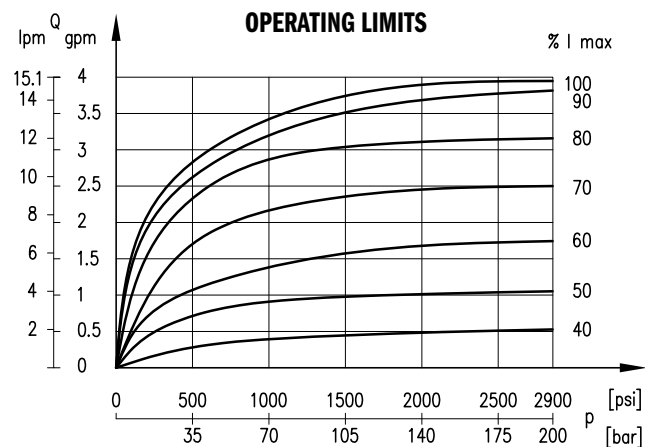
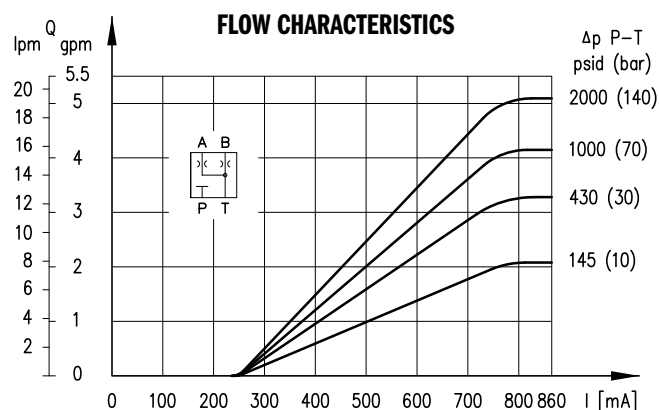
Curves obtained with mineral oil with viscosity of 170 sus (36 cSt) at 122°F (50°C); the Δp values are measured between P and T (full loop) valve ports.



FC-04



FC-08

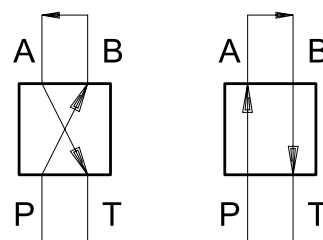


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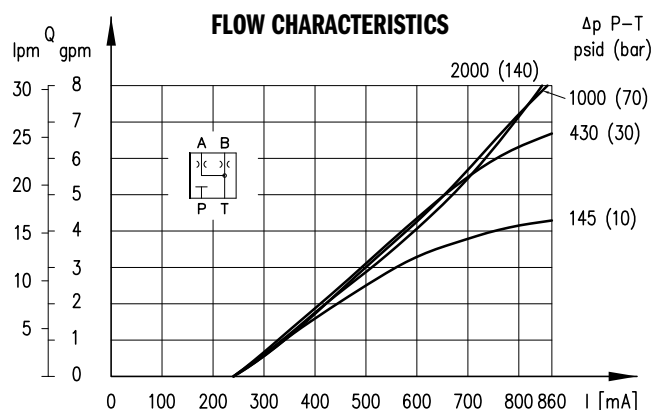
Curves obtained with **VED03M** 24V DC version.

PERFORMANCE CURVES FOR FC SPOOL

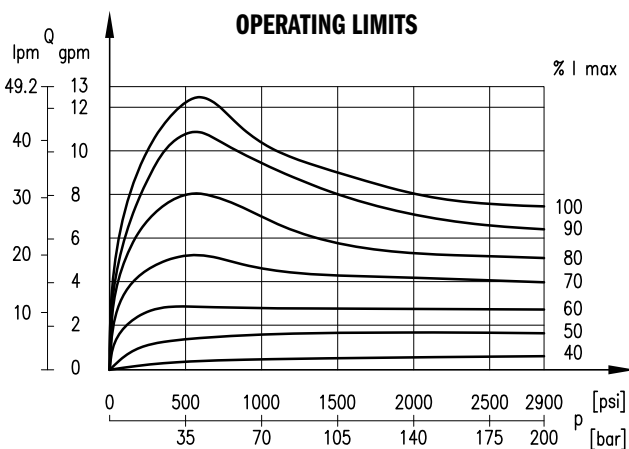
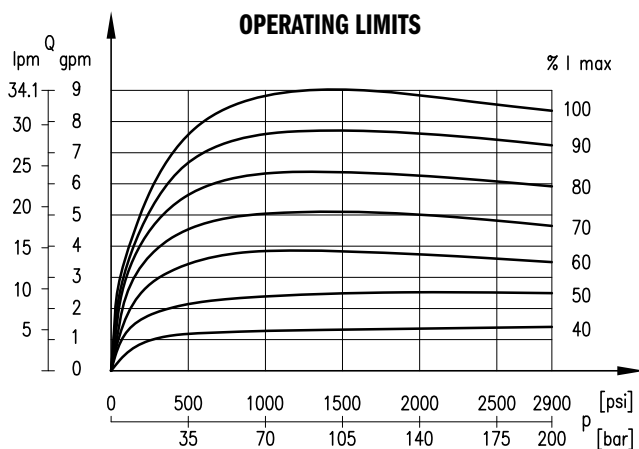
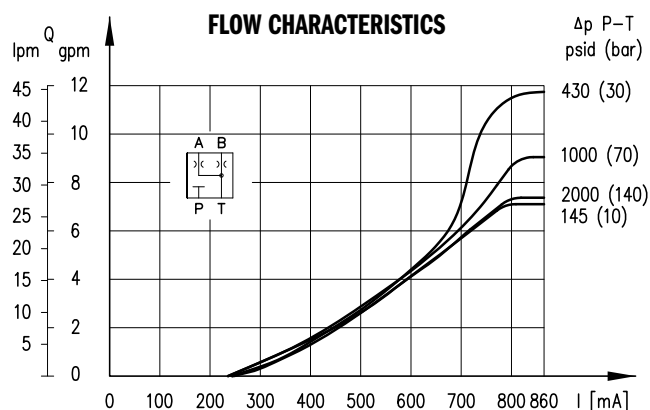
Curves obtained with mineral oil with viscosity of 170 sus (36 cSt) at 122°F (50°C); the Δp values are measured between P and T (full loop) valve ports.



FC-16



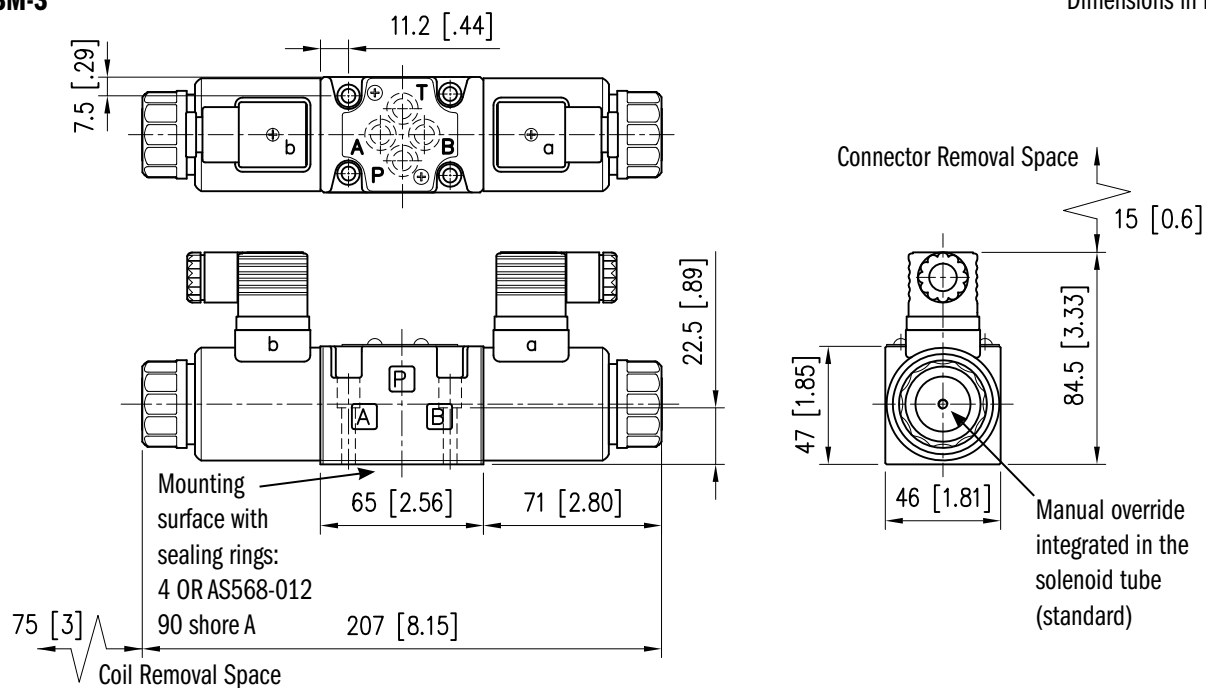
FC-26



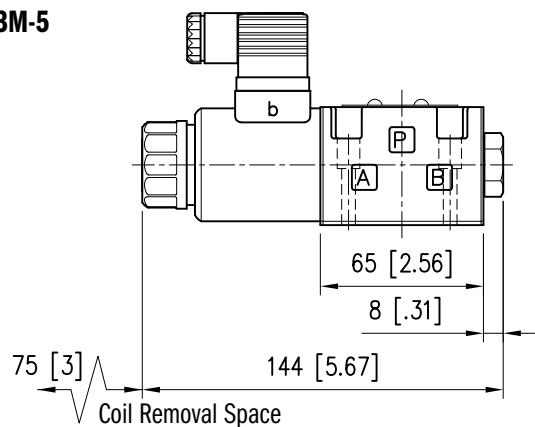
OVERALL AND MOUNTING DIMENSIONS FOR VED03M

VED03M-3

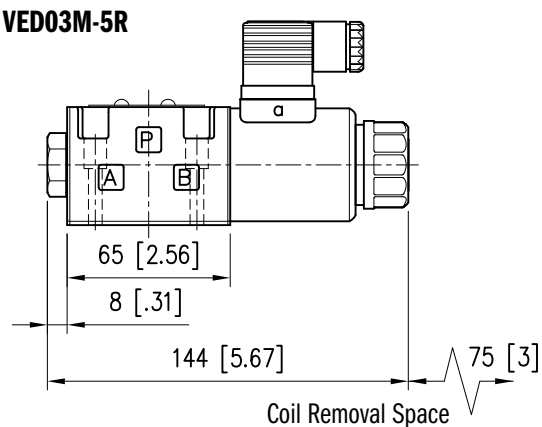
Dimensions in mm [IN]



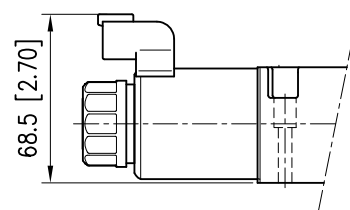
VED03M-5



VED03M-5R



K7 CONNECTION

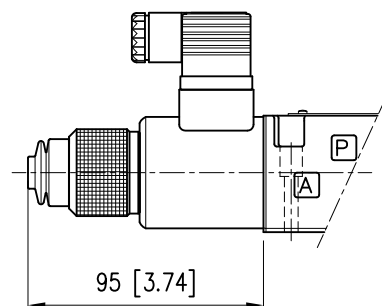


MANUAL OVERRIDE

The standard valve has override pins integrated in the tube. The operation of this control must be executed with a suitable tool, being careful not to damage the sliding surface.

Three other manual overrides are available, using the proper letter in the ordering code.

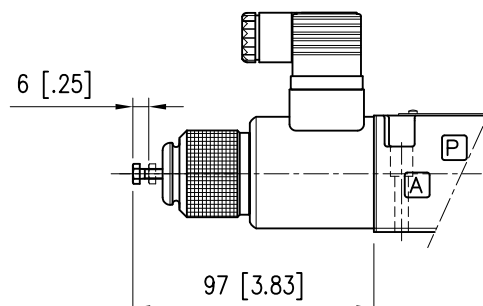
MANUAL OVERRIDE BOOT PROTECTED (CODE U)



NOTES:

1. This device can be ordered separately with code **VMAP-03J-A**

SCREW MANUAL OVERRIDE (CODE S)

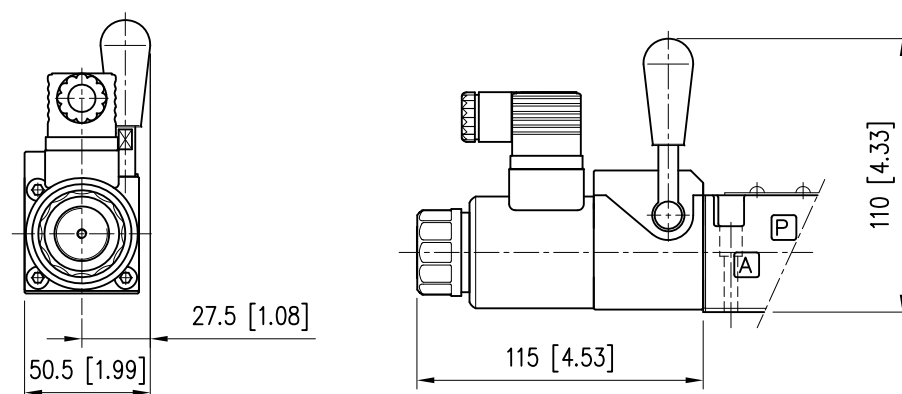


NOTES:

1. With metal ring nut provided with a M4 screw and a blocking locknut to allow continuous mechanical operation.
2. This device can be ordered separately with code **VMAP-03S-A**

LEVER MANUAL OVERRIDE (CODE L)

This device can be installed either on single or dual solenoid valves, on port end A only.



ELECTRICAL DATA FOR VED03M

The proportional solenoid consists of a tube and coil. The coil is mounted on the tube and fastened to it by a ring retainer.

The coils can be indexed to any position allowing for convenient location of the connector.

IP DEGREE

The declared IP degree is guaranteed for all valves only if the connector has been wired and mounted correctly on the coil.

The K7 connection meets DIN 40050-9 which extends the IEC 60529 rating system with an IP69K rating for high-pressure, high-temperature and wash-down applications.

NOMINAL VOLTAGE	V DC	12	24
RESISTANCE AT 68° F	K1	3.66 Ω	17.6 Ω
	K7	4.5 Ω	18.7 Ω
CURRENT AT 68° F	K1	1.88 A	0.86 A
	K7	2.72 A	1.29 A
DUTY CYCLE		100%	
ELECTROMAGNETIC COMPATIBILITY (EMC)		European Directive 2004/108/EC	
IP DEGREE IEC 60529	K1	IP 65	
	K7	IP 69K	
CLASS OF PROTECTION FOR INSULATION	Copper Wire	Class H (356° F)	
	Coil	Class F (311° F)	

ACCESSORY ELECTRONICS

Some external digital amplifiers are available to be coupled to the valve for better control and to improve the valve performance.

See Continental Hydraulics Control Amplifier Catalog for products to match your requirements.

VEA-3E-A: DIN Connector - Gray

VEA-3F-A: DIN Connector - Black

APPLICATION DATA

FLUIDS

All pressure drops shown on these data pages are based on 170 SUS fluid viscosity and 0.87 specific gravity. For any other specific gravity (G1) the pressure drop (ΔP) will be approx. $\Delta P1 = \Delta P (G1/G)$. See the chart for other viscosities.

FLUID VISCOSITIES	Cst	10	14.5	32	36	43	54	65	76	86	108	216	324	400
	SUS	60	75	150	170	200	250	300	350	400	500	1000	1500	1900
MULTIPLIER		0.77	0.81	0.97	1.00	1.04	1.10	1.15	1.20	1.24	1.31	1.56	1.72	1.83

Use mineral oil-based hydraulic fluids HL or HM type, according to ISO 6743-4. For these fluids, use NBR seals. For fluids HFDR type (phosphate esters) use FPM seals (code V). For the use of other kinds of fluid such as HFA, HFB, HFC, please consult our technical department.

Using fluids at temperatures higher than 180 degrees F causes the accelerated degradation of seals as well as the degradation of the fluids physical and chemical properties.

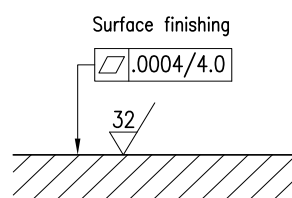
From a safety standpoint, temperatures above 130 degrees F are not recommended.

INSTALLATION

VED03M valves can be installed in any position without impairing correct operation.

Ensure that there is no air in the hydraulic circuit.

Valves are fixed by means of screws or tie rods on a flat surface with planarity and roughness equal to or better than those indicated in the relative symbols. If minimum values are not observed, fluid can easily leak between the valve and support surface.



SEAL KIT

BUNA SEAL KIT	1013188
VITON SEAL KIT	1013096

BOLT KITS

BD03-125	Valve Only	1008406
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NOTES:

1. Bolt kit consists of: Qty. 4 10-24NC screws / Qty. 4 #10 Lock washer
2. The recommended torque value for fasteners is: 4 lb.ft (5.4 Nm)

ABOUT CONTINENTAL HYDRAULICS

Rugged, durable, high-performance, efficient—the reason Continental Hydraulics' products are used in some of the most challenging applications across the globe. With a commitment to quality customer support and innovative engineering, Continental's pumps, valves, power units, mobile and custom products deliver what the markets demand. Continental has been serving the food production, brick and block, wood products, automotive and machine tool industries since 1962. Learn how our products survive some of the most harsh environments.

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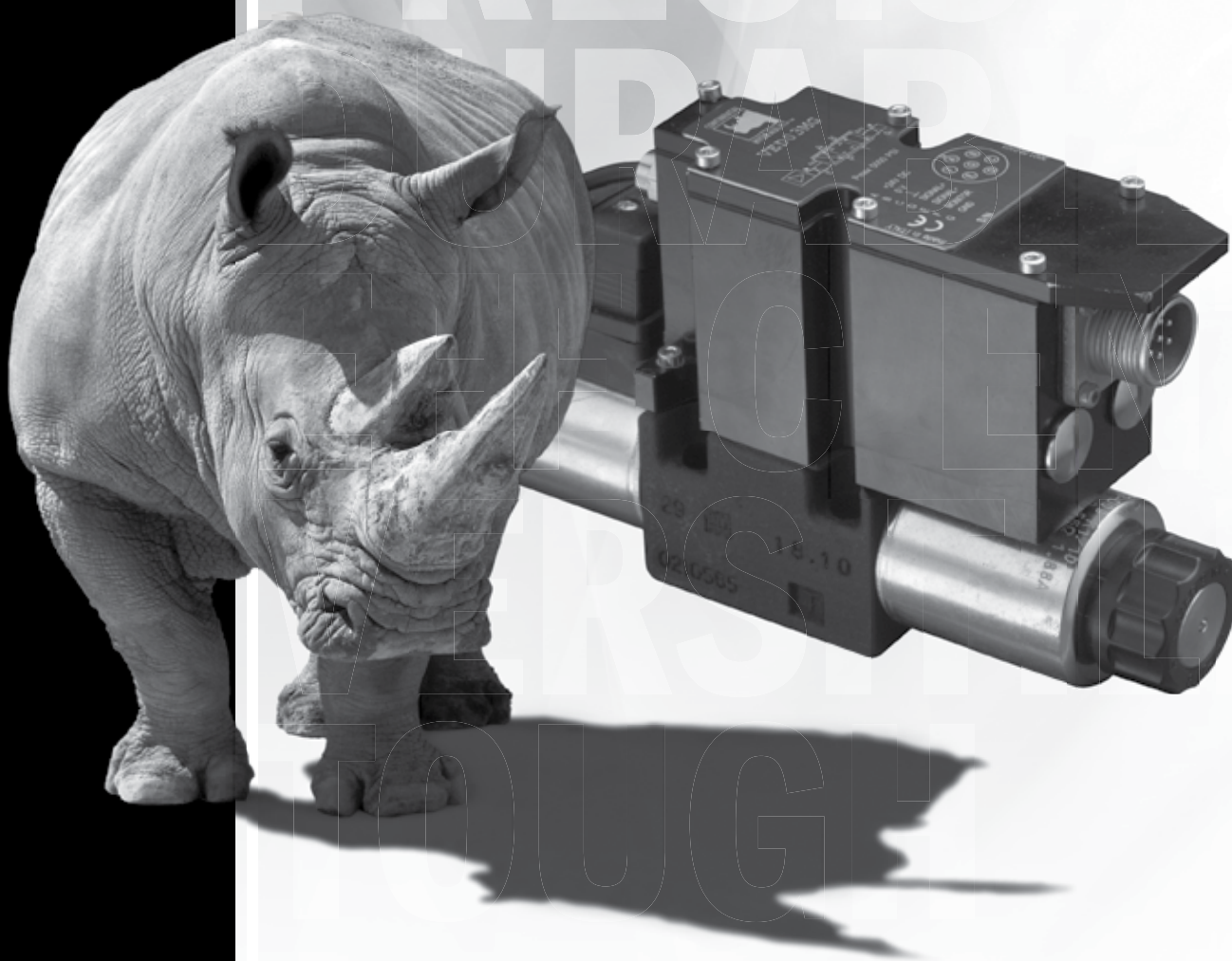
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VED03MG

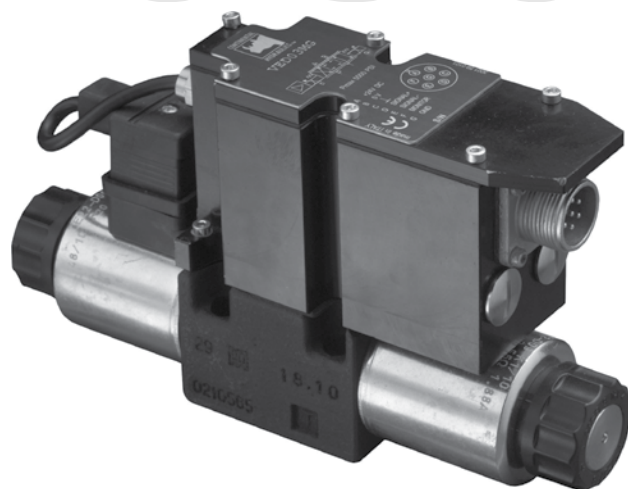
PROPORTIONAL DIRECTIONAL CONTROL VALVES WITH OBE

VED03MG - PROPORTIONAL DIRECTIONAL CONTROL VALVES WITH OBE



VED03MG

PROPORTIONAL DIRECTIONAL CONTROL VALVES WITH OBE



DESCRIPTION

Continental Hydraulics VED03MG direct operated 4-way proportional valves with On-Board Digital Amplifier conform to NFPA D03 and ISO 4401 mounting standards.

OPERATION

These valves are designed to control the direction and oil flow rate based on the degree of command signal supplied to the On-Board Amplifier. In event of a loss in electrical power, the centering springs will return the valve spool to the center position.

The On-Board microprocessor controls all the valve functions and is pre-set to optimal valve performance. In-field adjustments can be performed via software to customize the parameters based on your application needs.

A variety of manual overrides are also available.

TYPICAL PERFORMANCE SPECIFICATIONS

MAXIMUM OPERATING PRESSURE:	P - A - B Ports	5000 psi	350 bar
	T Port	3000 psi	210 bar
FLOW CAPACITY WITH ΔP 145 PSI (10 BAR)	AC/FC-04	1.06 gpm	4 l/min
	AC/FC-08	2.1 gpm	8 l/min
	AC/FC-16	4.2 gpm	16 l/min
	AC/FC-26	7 gpm	26 l/min
MOUNTING SURFACE		NFPA D03 ISO 4401-03-02-0-05	

STEP RESPONSE	0 → 100%	50 ms	
	100 → 0%	25 ms	
HYSTERESIS	% of Q max	< 3%	
REPEATABILITY	% of Q max	< ± 1%	
POWER SUPPLY		24V DC	
CONNECTION		7 pin DIN 43563 metal	
PROTECTION	IEC 60529	IP67	
WEIGHT:	Single Solenoid	4.2 lbs	1.9 Kg
	Dual Solenoid	5.3 lbs	2.4 Kg

RANGE TEMPERATURES:	Ambient	- 4 to +130° F	-20 to +54° C
	Fluid	- 4 to +180° F	-20 to +82° C
FLUID VISCOSITY	Range	60 -1900 SUS	10 - 400 cSt
	Recommended	120 SUS	25 cSt
FLUID CONTAMINATION		ISO 4406:1999 class 18/16/13	

IDENTIFICATION CODE

VED03MG - - - - **D** - _____ DESIGN LETTER

ELECTRONICS

G

with OBE

MECHANICAL

OMIT	Manual override built-in with the tube (STD)
U	Manual override boot
S	Override with screw

REFERENCE SIGNAL

E0	Voltage ± 10V (STD)
E1	Current 4 - 20 mA

FUNCTION

3

Dual operator
3 position
spring centered

5

Single operator
2 position
spring centered

SEAL

A	Buna (STD)
G	Viton

CONNECTION

OBW	On board electronics 7 pin - no external enable required (STD)
OBC	On board electronics 7 pin external enable on pin C required

NOMINAL FLOW
(with Δp P-T 143 psi)

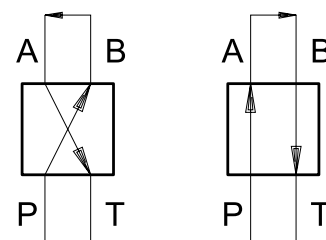
04	4 l/min (1.06 gpm)
08	8 l/min (2.1 gpm)
16	16 l/min (4.2 gpm)
26	26 l/min (7 gpm)
16/08	Asymmetrical spool: 16 l/min (4.2 gpm) on P-A 08 l/min (2.1 gpm) on P-B
26/13	Asymmetrical spool: 26 l/min (7 gpm) on P-A 13 l/min (3.5 gpm) on P-B

TYPICAL ORDERING CODE:
VED03MG-3AC-16-A-OBWE0D-C

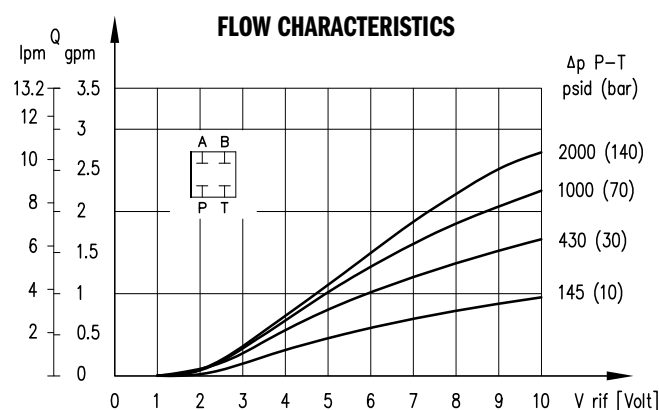
SPOOLS				
NAME	SYMBOLS	DESCRIPTION	APPLICATION	FUNCTION MATCHING
AC		METER IN / METER OUT	MOTION	3,5
FC		METER IN / METER OUT		3,5

PERFORMANCE CURVES FOR AC SPOOLS

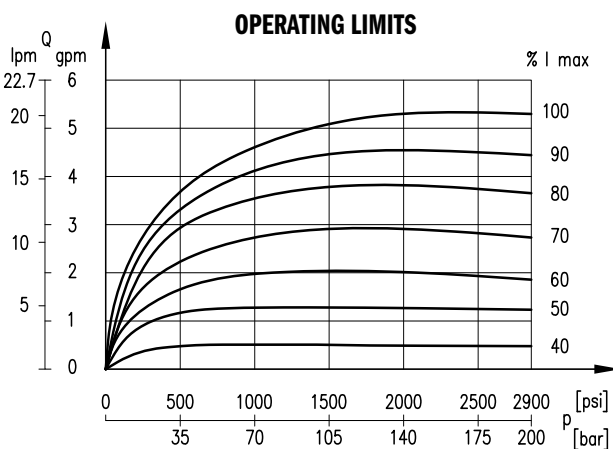
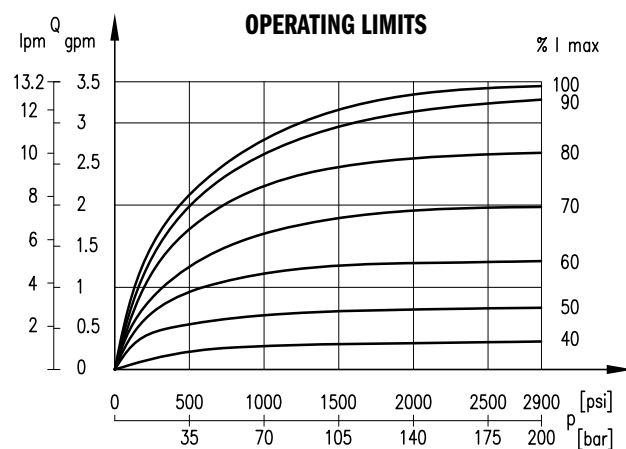
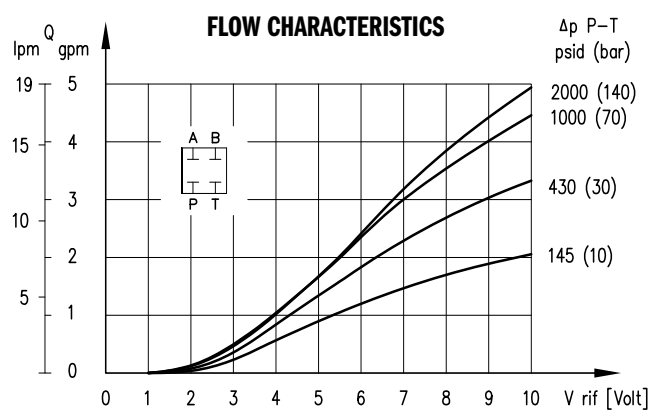
Curves obtained with mineral oil with viscosity of 170 sus (36 cSt) at 122°F (50°C); the Δp values are measured between P and T (full loop) valve ports.



AC-04



AC-08

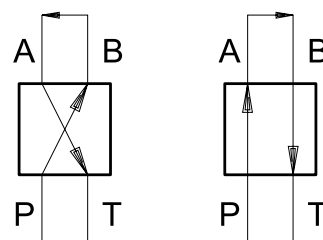


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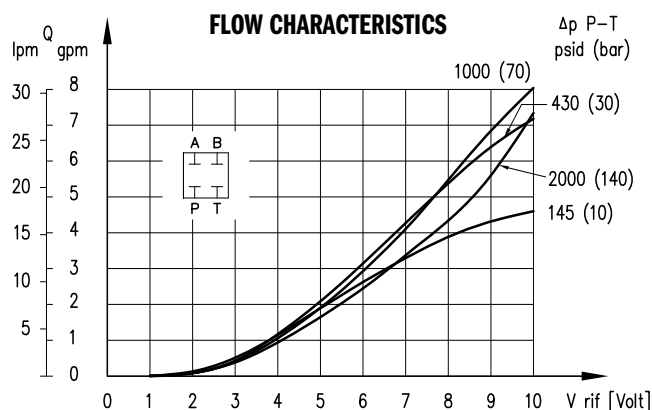
1. Curves obtained after linearization in factory of the characteristic curve through the digital amplifier of **VED03MG**.
2. The linearization of the curve is performed with a constant Δp of 430 psi (30 bar) and by setting the value of flow start at 10% of the reference signal.

PERFORMANCE CURVES FOR AC SPOOLS

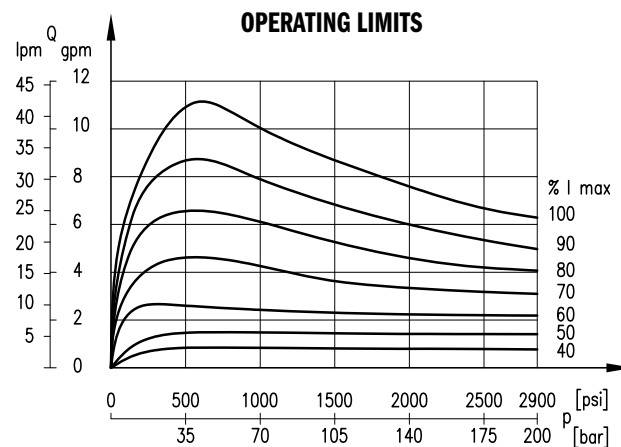
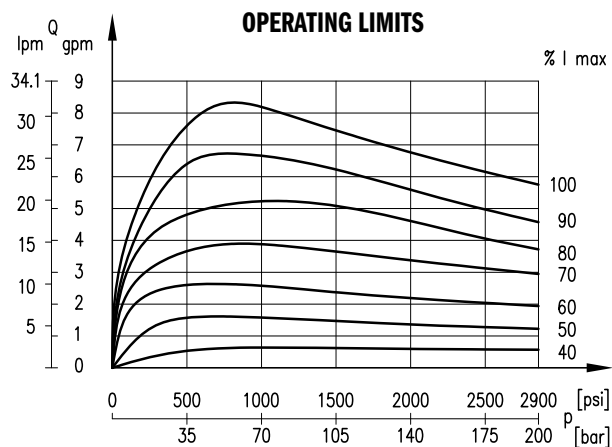
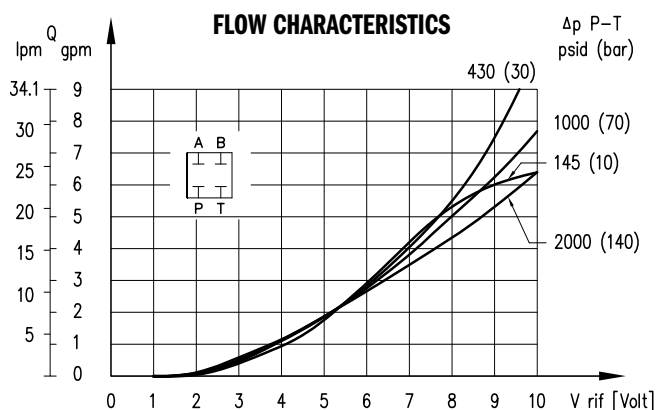
Curves obtained with mineral oil with viscosity of 170 sus (36 cSt) at 122°F (50°C); the Δp values are measured between P and T (full loop) valve ports.



AC-16



AC-26

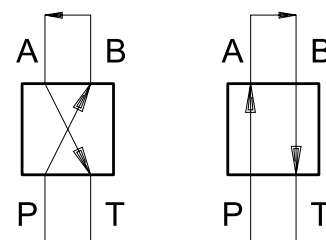


NOTES:

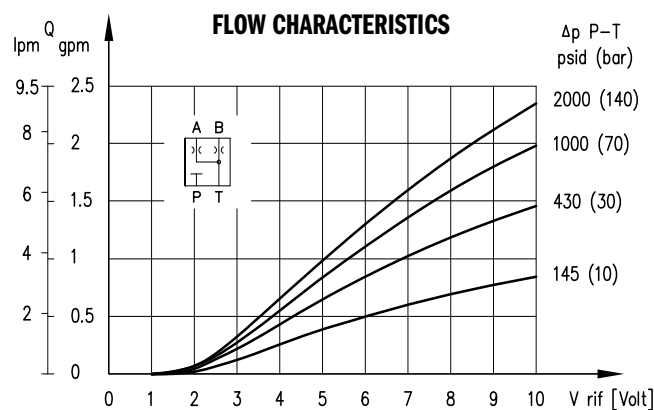
1. Curves obtained after linearization in factory of the characteristic curve through the digital amplifier of **VED03MG**.
2. The linearization of the curve is performed with a constant Δp of 430 psi (30 bar) and by setting the value of flow start at 10% of the reference signal.

PERFORMANCE CURVES FOR FC SPOOLS

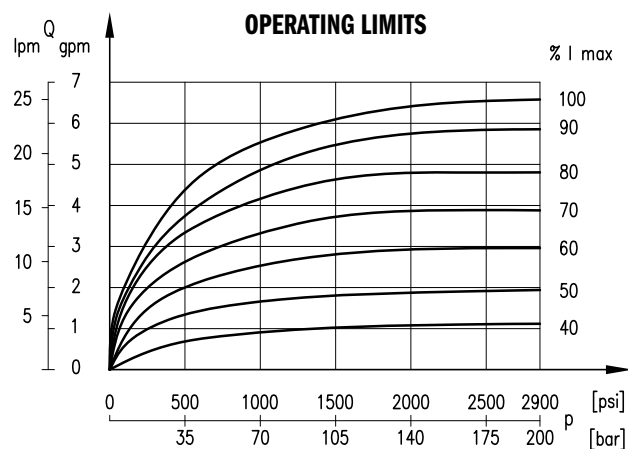
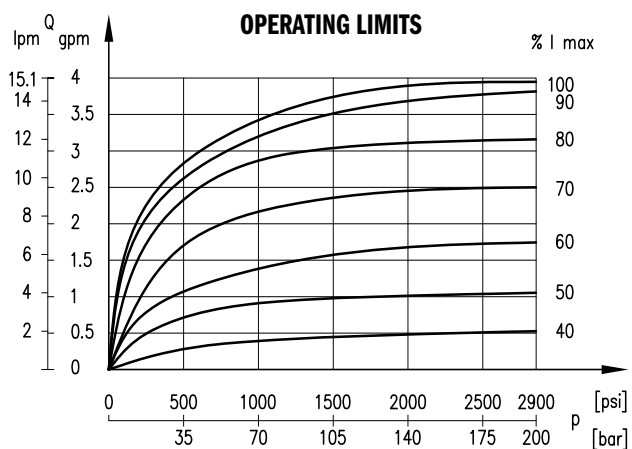
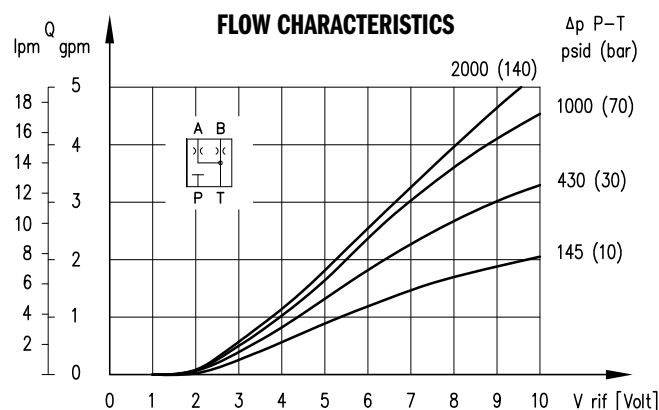
Curves obtained with mineral oil with viscosity of 170 sus (36 cSt) at 122°F (50°C); the Δp values are measured between P and T (full loop) valve ports.



FC-04



FC-08

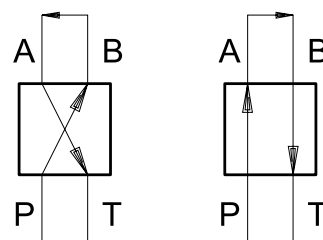


NOTES:

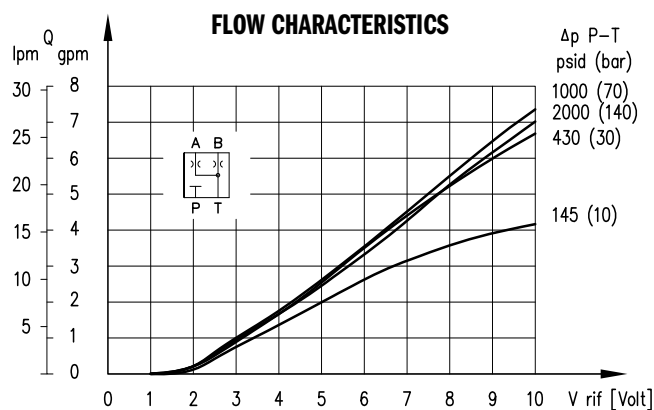
1. Curves obtained after linearization in factory of the characteristic curve through the digital amplifier of **VED03MG**.
2. The linearization of the curve is performed with a constant Δp of 430 psi (30 bar) and by setting the value of flow start at 10% of the reference signal.

PERFORMANCE CURVES FOR FC SPOOLS

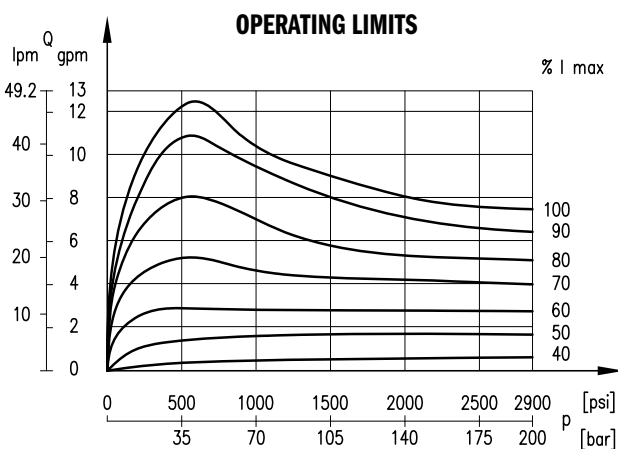
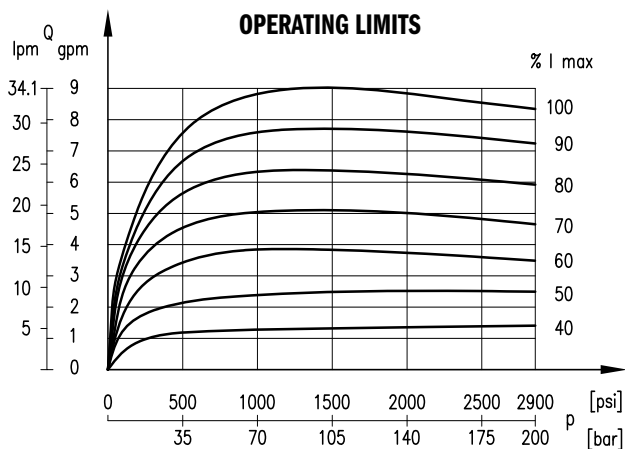
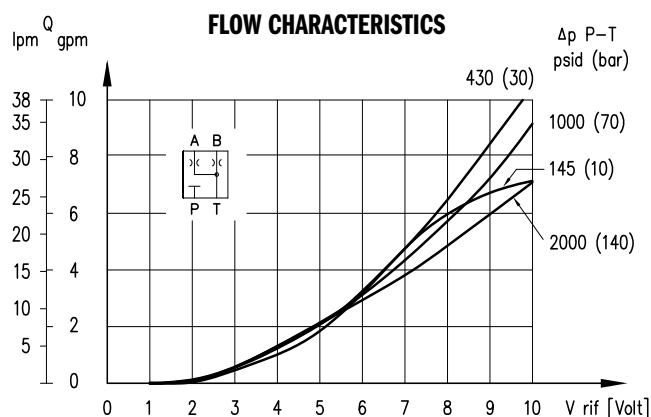
Curves obtained with mineral oil with viscosity of 170 sus (36 cSt) at 122°F (50°C); the Δp values are measured between P and T (full loop) valve ports.



FC-16



FC-26



NOTES:

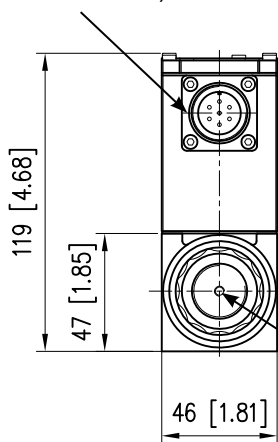
1. Curves obtained after linearization in factory of the characteristic curve through the digital amplifier of **VED03MG**.
2. The linearization of the curve is performed with a constant Δp of 430 psi (30 bar) and by setting the value of flow start at 10% of the reference signal.

OVERALL AND MOUNTING DIMENSIONS FOR VED03MG

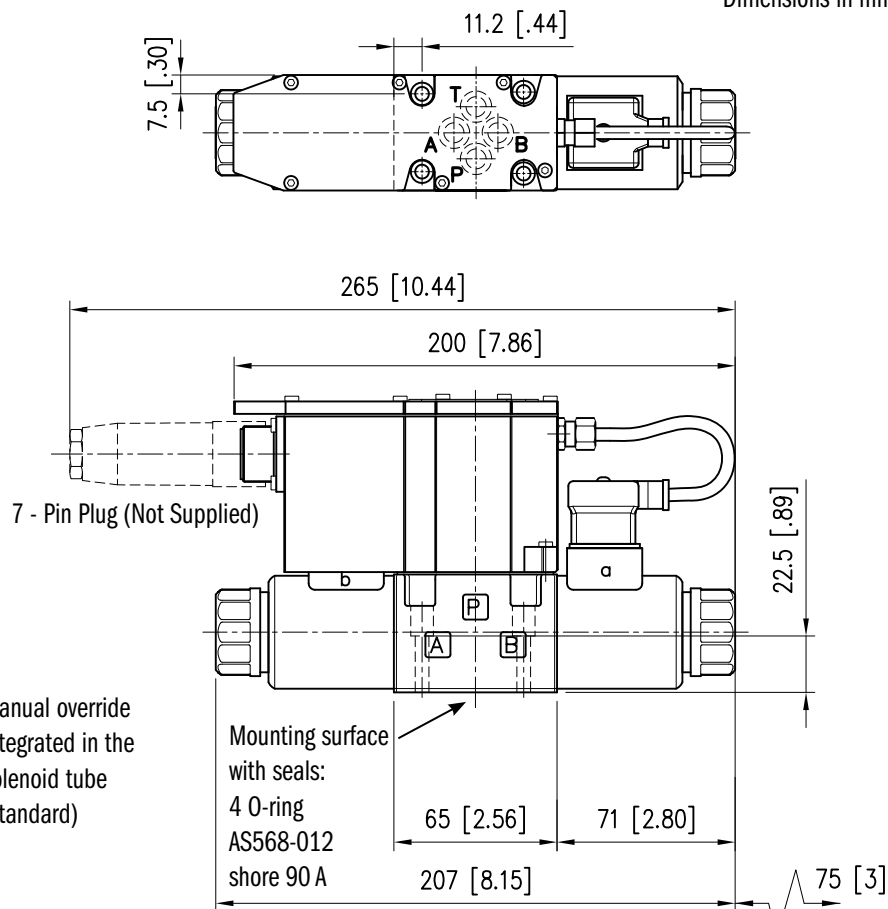
VED03MG-3

Dimensions in mm [IN]

Main connection
7 pin male
MIL-C-5015-G
(DIN 43563 metal)



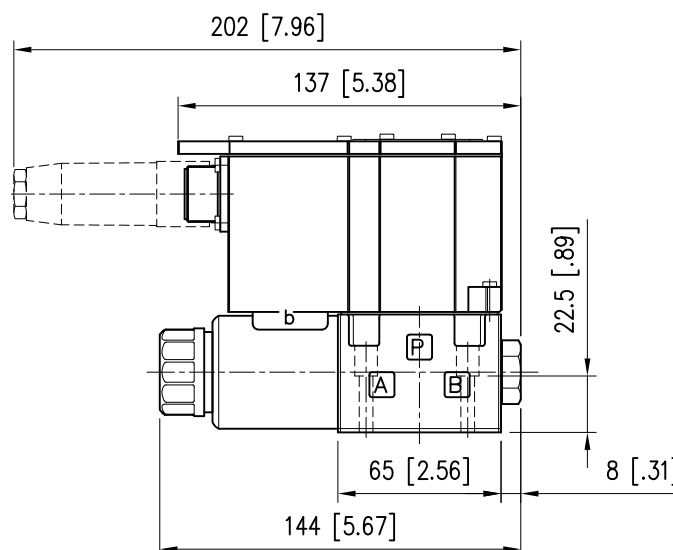
Manual override
integrated in the
solenoid tube
(standard)



VED03MG-5



In order to avoid electromagnetic noises
and fulfill the European EMC regulations, a
7 pin metal plug according to MIL-C-5015
G should be used instead of the standard
plastic 6+PE connector EN 175201-408
(formerly DIN 43563)

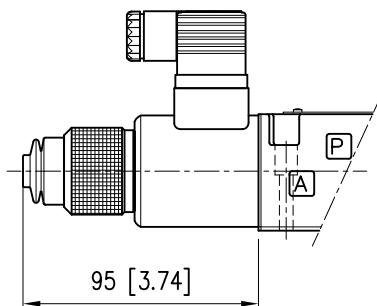


MANUAL OVERRIDE

The standard valve has override pins integrated in the tube. The operation of this control must be executed with a suitable tool, being careful not to damage the sliding surface.

Three other manual overrides are available, using the proper letter in the ordering code.

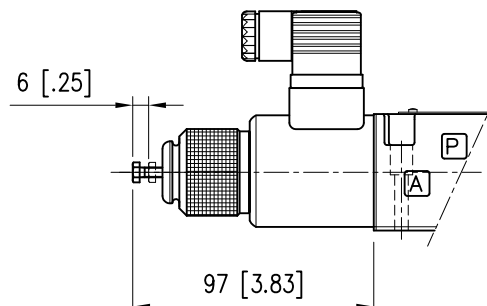
MANUAL OVERRIDE BOOT PROTECTED (CODE U)



NOTES:

1. This device can be ordered separately with code **VMAP-03J-A**.

SCREW MANUAL OVERRIDE (CODE S)



NOTES:

1. With metal ring nut provided with a M4 screw and a blocking locknut to allow continuous mechanical operation.
2. This device can be ordered separately with code **VMAP-03S-A**.

ELECTRICAL CHARACTERISTICS

The proportional valve is controlled by a digital amplifier (driver), which incorporates a microprocessor that controls all the valve functions.

THE STANDARD VALVE IS SET AT THE FACTORY WITH:

- UP/DOWN ramp at zero value
- No deadband compensation
- Max valve opening (100% of spool stroke)

It is possible to customize these and others parameters using the optional kit, LINPC-USB to be ordered separately (see related literature).

THE DIGITAL DRIVER ENABLES THE VALVE TO REACH BETTER PERFORMANCE COMPARED TO THE ANALOG VERSION, AND GIVES:

- Reduced response times
- Optimization and reproducibility of the characteristic curve, optimized in factory for each valve
- Complete interchangeability in case of valve replacement
- Opportunity to set, via software, the functional parameters
- Opportunity to perform a diagnostic program by means of the LIN connection
- High immunity to electromagnetic interference

The electronic card is available with (OBC) or without (OBW) external enabling signal feature.

POWER SUPPLY		24V DC (19V to 35V, ripple max 3V pp)
ABSORBED POWER		50 W
MAX CURRENT		2A
DUTY CYCLE		100%
MAIN CONNECTOR		7 pin MIL-C-5015-G (DIN 43563)
ELECTROMAGNETIC COMPATIBILITY (EMC) EUROPEAN DIRECTIVE 2004/108/EC	Emission	IEC EN 61000-6-4
	Immunity	IEC EN 61000-6-2
PROTECTION AGAINST ATMOSPHERIC AGENTS	IEC 60529	IP 67
ELECTRICAL PROTECTION	Overload Electronics Overheating Power Failure Or < 4mA	

E0 - VOLTAGE

COMMAND SIGNAL (DIFFERENTIAL)	Single Solenoid	0 - 10V DC
	Dual Solenoid	±10V DC
IMPEDANCE	> 50 kΩ	

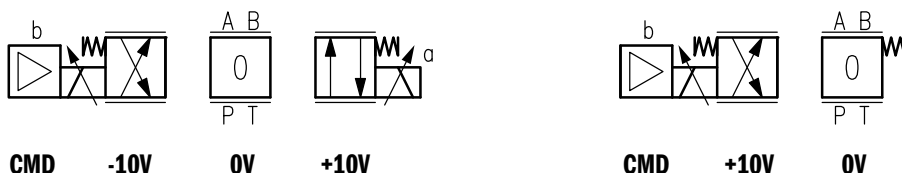
E1 - CURRENT

COMMAND SIGNAL	4 - 20 mA
IMPEDANCE	500 Ω

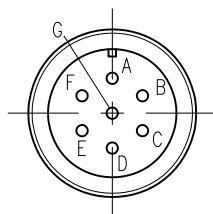
E0 VERSION - VOLTAGE REFERENCE SIGNAL

This is the most common version; it makes the valve completely interchangeable with the traditional proportional valves with analog type integrated electronics. The valve only has to be connected as indicated below.

The input signal is differential type and drives the valve as shown in the chart below. The spool stroke is proportional to UD - UE. If only one input signal (single-end) is available, the pin B (0V power supply) and the pin E (0V reference signal) must be connected through a jumper and both connected to GND, electric panel side.

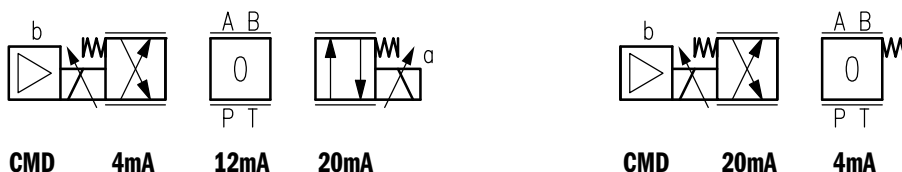


A	24V	Power supply positive. Use an external fuse 5A/50V fast type for protecting electronics.
B	0V	Power supply zero (0V)
C	NC or 24V	OBW Version: Not wired OBC Version: Valve enable
D	$\pm 10V$ or 0 - 10V	Differential command signal (+V)
E	0V	Differential command signal (-V)
F	0 - 10V	Output monitor for command signal
G	GND	Protective ground

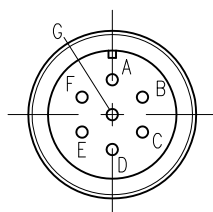


E1 VERSION - CURRENT REFERENCE SIGNAL

The current reference signal is supplied in a range of 4 - 20 mA and drives the valve as shown in the chart below. If the current drops to less than 4 mA, the card de-energizes the coils and the valve will go to rest position. The valve will restart when the command signal rises into the 4 to 20 mA range.



A	24V	Power supply positive. Use an external fuse 5A/50V fast type for protecting electronics.
B	0V	Power supply zero (0V)
C	NC or 24V	OBW Version: Not wired OBC Version: Valve enable
D	4 - 20 mA	Command signal
E	0V	Return
F	0 - 10V	Output monitor for command signal
G	GND	Protective ground



WIRING:

Connections must be made via the 7 pin plug mounted on the amplifier.

RECOMMENDED CABLE SIZES ARE:

POWER SUPPLY

18 AWG (0.75 mm²)
for cables up to 65 ft (20 m).

16 AWG (1.00 mm²)
for cables up to 130 ft (40 m).

SIGNAL CABLES

20 AWG (0.50 mm²)

A suitable cable would have 7 wires, a separate shield for the signal wires and an overall shield.

PIN C:

Pin C is reserved for the Enable feature and is not connected on the standard card (OBW, see code at page 3) because the enable signal is run directly from the card.

In the OBC card the Enable feature is external, Pin C has to be connected with 24V.

PIN F:

For reading this value as a current monitor signal, the card must be energized. This value has to be read on Pin B (0V).

A value of 10V means a current to the solenoid at 100% rating.

SINGLE SOLENOID		
Pin F	Pin D	
	E0	E1
-	-	-
0V	0V	4mA
+10V	+10V	20mA

DUAL SOLENOID		
Pin F	Pin D	
	E0	E1
+10 V	-10V	4mA
0V	0V	12mA
+10V	+10V	20mA

OBW OR OBC VERSION?

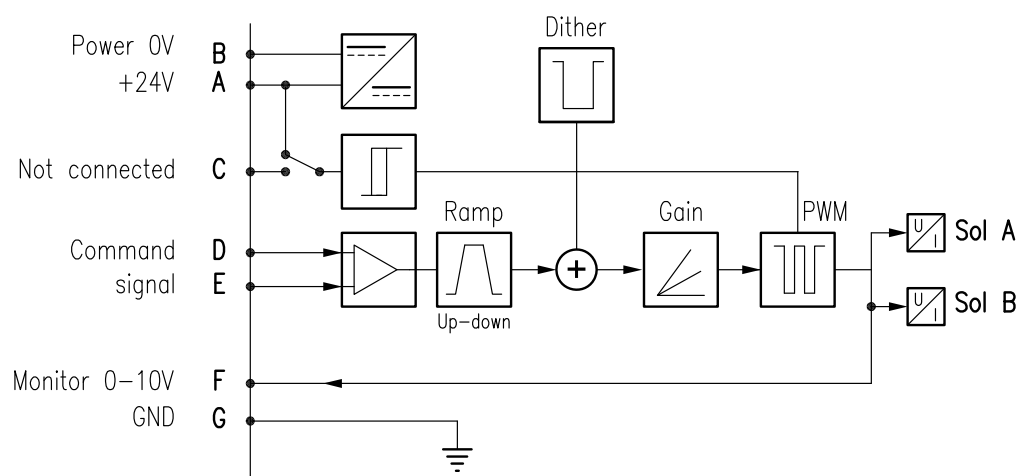
The standard option, code OBW, is programmed for internal enable. The enable signal is taken directly from the power supply of the valve. The card is enabled as soon as supply power is applied to Pins A and B.

Apply command signal to the valve and the output drivers energize the coil. The power supply must be switched off to disable the output to the valve.

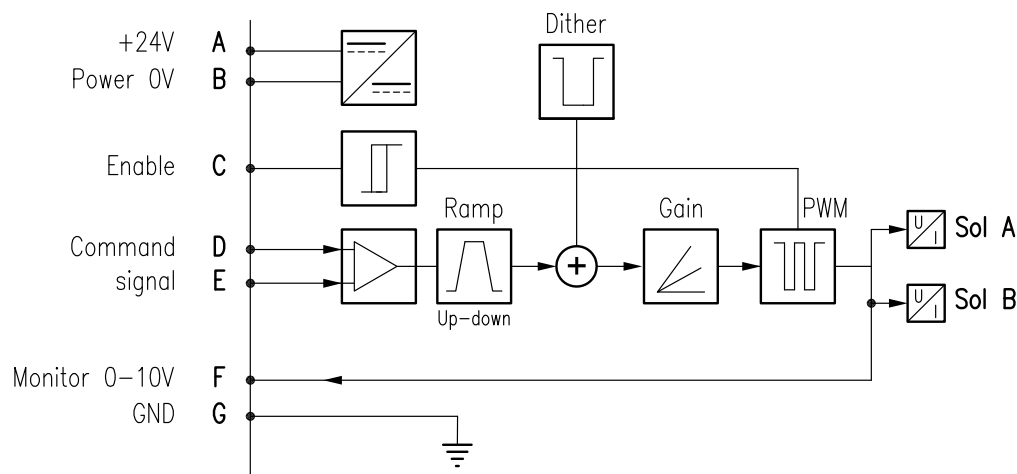
The OBC option is programmed for the external enable feature. A 24 V signal must be applied to Pin C to enable the output drivers to energize the valve coils.

The valve operation can be stopped by simply removing the enable signal from Pin C.

OBW CARD VERSION



OBC CARD VERSION



APPLICATION DATA

FLUIDS

All pressure drops shown on these data pages are based on 170 SUS fluid viscosity and 0.87 specific gravity. For any other specific gravity (G1) the pressure drop (ΔP) will be approx. $\Delta P_1 = \Delta P (G1/G)$. See the chart for other viscosities.

FLUID VISCOSITIES	Cst	10	14.5	32	36	43	54	65	76	86	108	216	324	400
	SUS	60	75	150	170	200	250	300	350	400	500	1000	1500	1900
MULTIPLIER		0.77	0.81	0.97	1.00	1.04	1.10	1.15	1.20	1.24	1.31	1.56	1.72	1.83

Use mineral oil-based hydraulic fluids HL or HM type, according to ISO 6743-4. For these fluids, use NBR seals. For fluids HFDR type (phosphate esters) use FPM seals (code V). For the use of other kinds of fluid such as HFA, HFB, HFC, please consult our technical department.

Using fluids at temperatures higher than 180 degrees F causes the accelerated degradation of seals as well as degradation of the fluids physical and chemical properties.

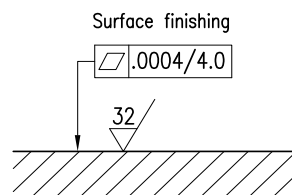
From a safety standpoint, temperatures above 130 degrees F are not recommended.

INSTALLATION

VED03MG valves can be installed in any position without impairing correct operation.

Ensure that there is no air in the hydraulic circuit.

Valves are fixed by means of screws or tie rods on a flat surface with planarity and roughness equal to or better than those indicated in the relative symbols. If minimum values are not observed, fluid can easily leak between the valve and support surface.



7 PIN PLUG

VEA-3P7P-A	Straight plug 7 pin plastic housing	264893
VEA-3P7M-A	Straight plug 7 pin metal housing	265947

BOLT KITS

BD03-125	Valve Only	1008406
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NOTES:

1. Bolt kit consists of: Qty 4 10-24NC screws / Qty 4 #10 Lock washer
2. Recommended torque values for the fasteners: 4 lb.ft. (5.4 Nm)

SEAL KIT

BUNA SEAL KIT	1013188
VITON SEAL KIT	1013096

ABOUT CONTINENTAL HYDRAULICS

Rugged, durable, high-performance, efficient—the reason Continental Hydraulics' products are used in some of the most challenging applications across the globe. With a commitment to quality customer support and innovative engineering, Continental's pumps, valves, power units, mobile and custom products deliver what the markets demand. Continental has been serving the food production, brick and block, wood products, automotive and machine tool industries since 1962. Learn how our products survive some of the most harsh environments.

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HYDRAULICS

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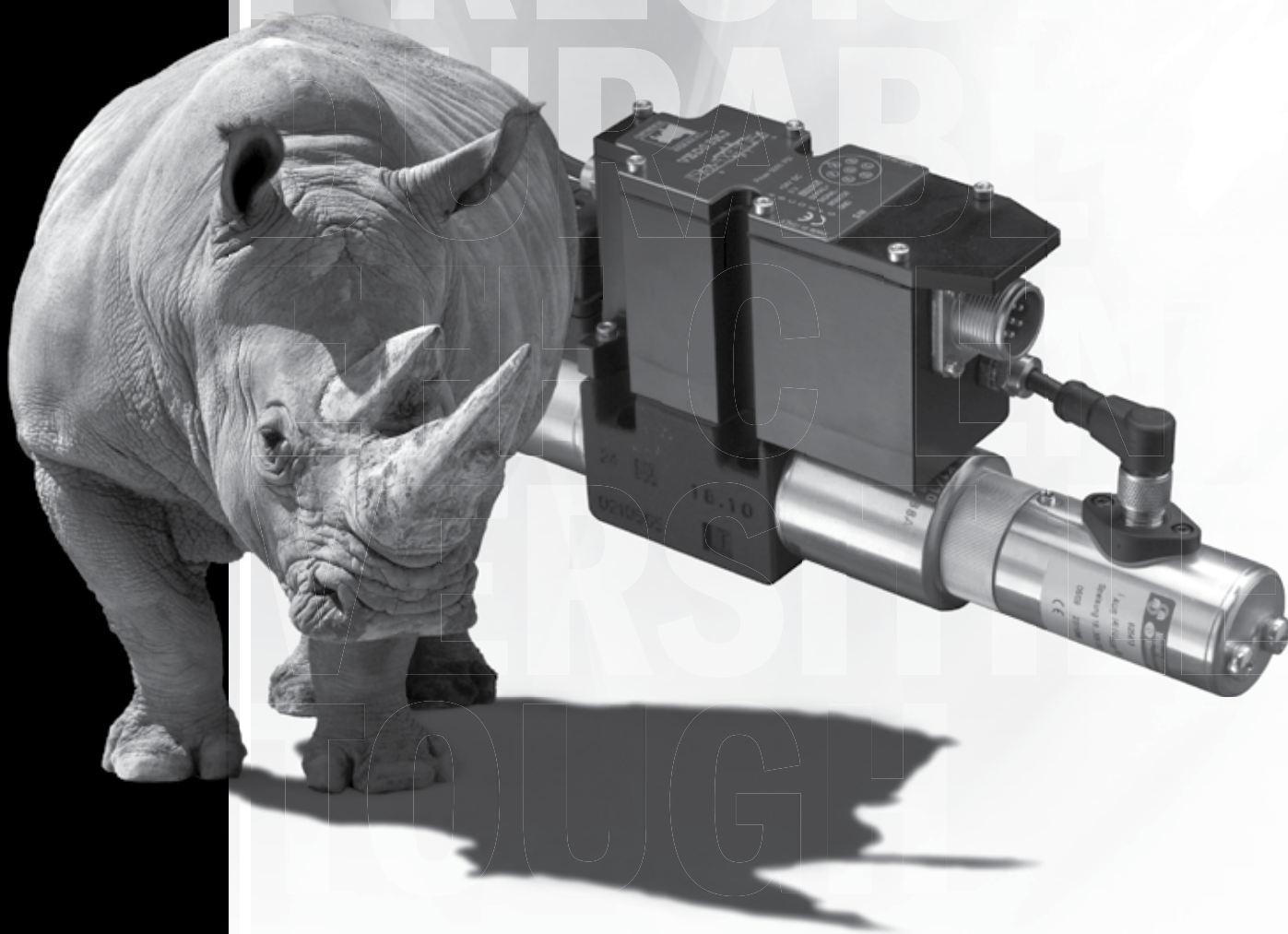


CONTINENTAL HYDRAULICS

VED03MJ

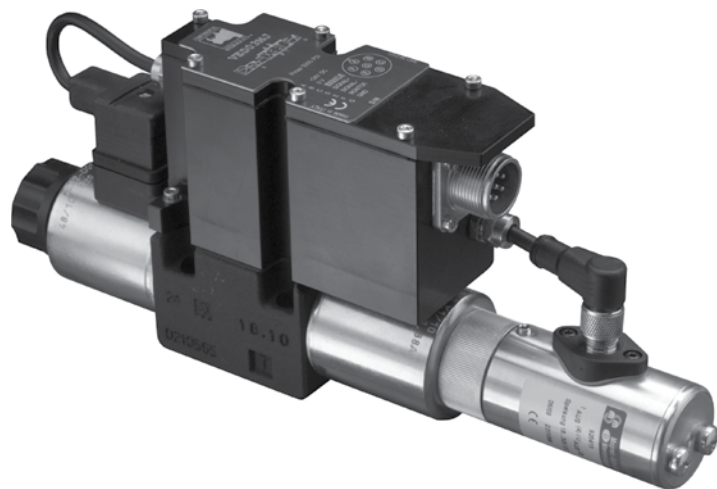
DIRECTIONAL CONTROL VALVES WITH OBE & POSITION FEEDBACK

VED03MJ - DIRECTIONAL CONTROL VALVES WITH OBE & POSITION FEEDBACK



VED03MJ

DIRECTIONAL CONTROL VALVES WITH OBE & POSITION FEEDBACK



DESCRIPTION

Continental Hydraulics VED03MJ direct operated 4-way proportional valves with On-Board Digital Amplifier and Spool Position sensing, conform to NFPA D03/ISO 4401 mounting standards.

OPERATION

These valves are designed to control the direction and oil flow rate based on the degree of command signal supplied to the On-Board Amplifier. In event of a loss in electrical power, the centering springs will return the valve spool to the center position..

This Valves series is also available with a Fail-Safe option.

The Spool Position Sensor circuit improves the overall valve performance by reducing hysteresis and improving response times.

The On-Board microprocessor controls all the valve functions and is pre-set to optimal valve performance.

In-field adjustments can be performed via software to customize the parameters based on your application needs.

TYPICAL PERFORMANCE SPECIFICATIONS

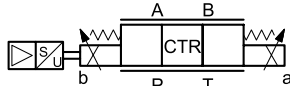
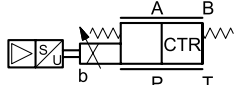

MAXIMUM OPERATING PRESSURE:	P - A - B Ports	5000 psi	350 bar
	T Port	3000 psi	210 bar
FLOW CAPACITY WITH ΔP 143 PSI (10 BAR)	ZC-04	1.1 gpm	4 l/min
	AC/FC/ZC-12	3.2 gpm	12 l/min
	AC/FC/ZC-30	8 gpm	30 l/min
MOUNTING SURFACE		NFPA D03 ISO 4401-03-02-0-05	
HYSTERESIS	% of Q max	< 0.2%	
REPEATABILITY	% of Q max	< 0.2%	
THRESHOLD		< 0.1%	
POWER SUPPLY		24V DC (19V to 35V, ripple max 3 Vpp)	
	Max Current	3A	
CONNECTION		7 pin (6 + ground), metal	
PROTECTION	IEC 60529	IP 65 / 67	
WEIGHT:	Single Solenoid	4.85 lbs	2.2 Kg
	Dual Solenoid	5.95 lbs	2.7 Kg

RANGE TEMPERATURES:	Ambient	- 4 to +130° F	-20 to +54° C
	Fluid	- 4 to +180° F	-20 to +82° C
FLUID VISCOSITY	Range	60 -1900 SUS	10 - 400 cSt
	Recommended	120 SUS	25 cSt
FLUID CONTAMINATION		ISO 4406:1999 class 18/16/13	

IDENTIFICATION CODE

VED03MJ - - - - **D** - _____ DESIGN LETTER

WITH POSITION FEEDBACK

FUNCTION	
3	
	Dual operator 3 position spring centered
5	
	Single operator 2 position spring centered
10	
	Dual operator - 4 positions (with fail-safe feature) spring centered. Available for ZCF symmetric spool only.

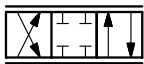
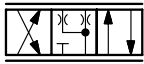
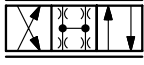
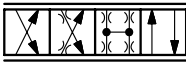
CONNECTION	
OBW	On board electronics 7 pin - no external enable required (STD)
OBC	On board electronics 7 pin external enable on pin C required

REFERENCE SIGNAL	
E0	Voltage $\pm 10V$ (STD)
E1	Current 4 - 20 mA

SEAL	
A	Buna (STD)
G	Viton

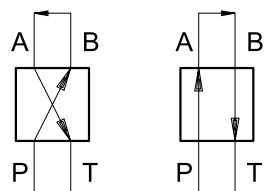
NOMINAL FLOW (with Δp P-T 143 psi)	
04	4 l/min (1.1 gpm) ZC and ZCF spools only
12	12 l/min (3.2 gpm)
30	30 l/min (8 gpm)
30/15	Asymmetrical spool: 30 l/min (8 gpm) on P-A 15 l/min (4 gpm) on P-B

TYPICAL ORDERING CODE:
VED03MJ-3AC-12-A-OBWE0D-C

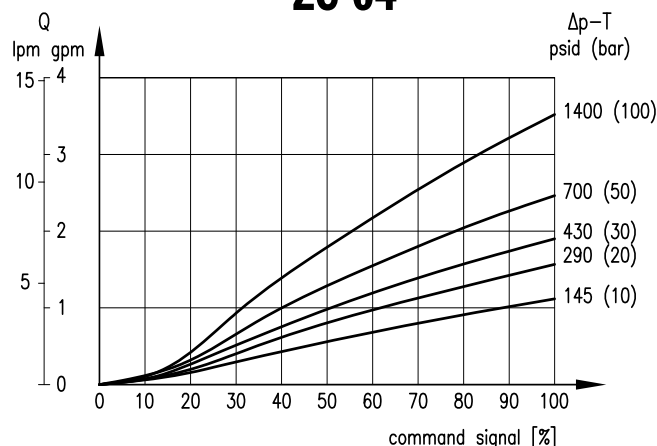
SPOOLS				
NAME	SYMBOLS	DESCRIPTION	APPLICATION	FUNCTION MATCHING
AC		METER IN / METER OUT	MOTION CONTROL	3, 5
FC		METER IN / METER OUT		3, 5
ZC		METER IN / METER OUT		3
ZCF		METER IN / METER OUT WITH FAIL SAFE		10

PERFORMANCE CURVES FLOW GAIN

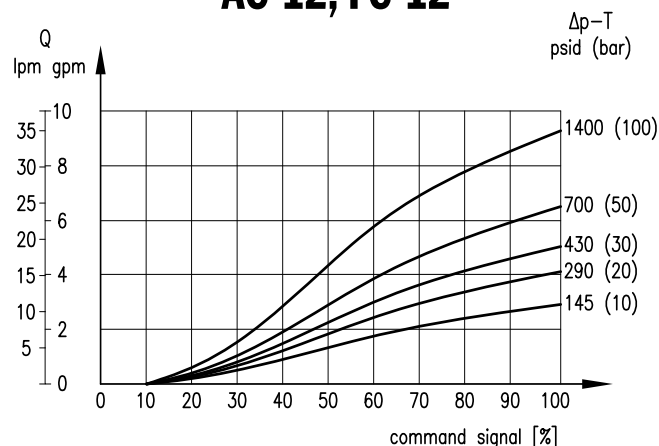
1. Curves obtained with mineral oil with viscosity of 170 sus (36 cSt) at 122°F (50°C) and dedicated OBE.
2. The Δp values are measured between P and T (full loop) valve ports.
3. Typical flow rate curves at constant Δp related to the reference signal and measured for the available spools and obtained after linearization in factory of the characteristic curve through the digital amplifier.



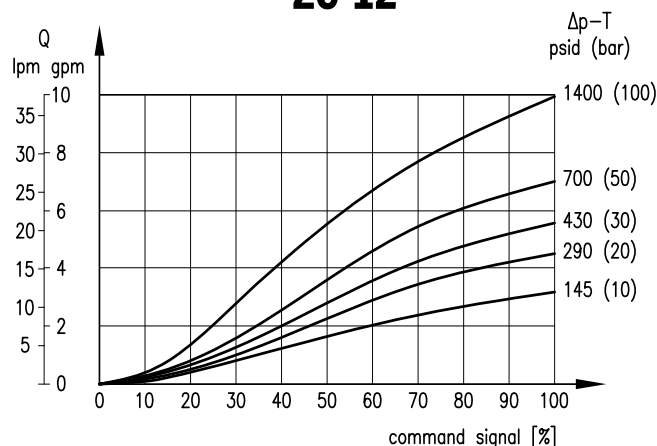
ZC-04



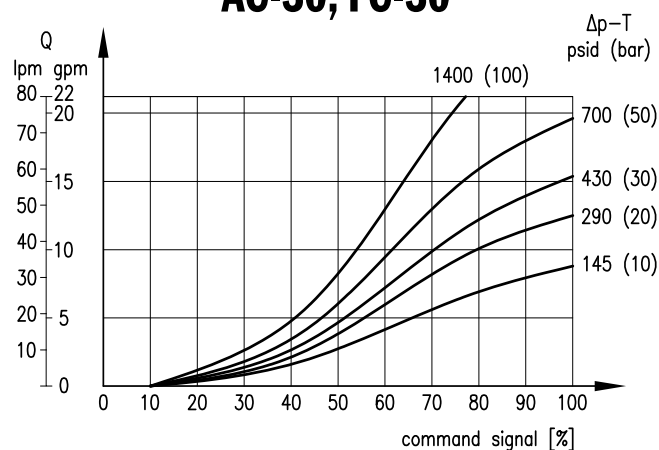
AC-12, FC-12



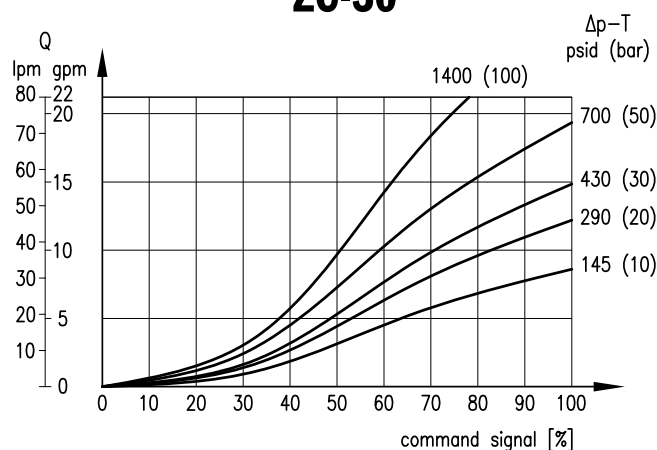
ZC-12



AC-30, FC-30



ZC-30



FAIL SAFE OPERATION

(POWER OFF CONDITION)

Flow P→B / A→T with valve in fail safe position, depending on the incoming pressure.

When a power failure (enabling OFF) occurs, the valve moves into 'fail safe' position by maintaining a minimum flow that allows the actuator to return slowly to a safety position.

During the black-out the centering springs retain the spool in fail safe position.

CURVE	SPOOLS
1	10ZCF-04
2	10ZCF-12 / 10ZCF-30

PRESSURE GAIN FOR SPOOLS "ZC"

The diagram shows the valve pressure gain, expressed as % of the ratio between the port pressure variation in A or B (Δp_{AB}) and the P system pressure, according to the reference signal. In practice, the pressure gain states the valve reaction towards external disturbances aimed at changing the actuator position.

FREQUENCY RESPONSE

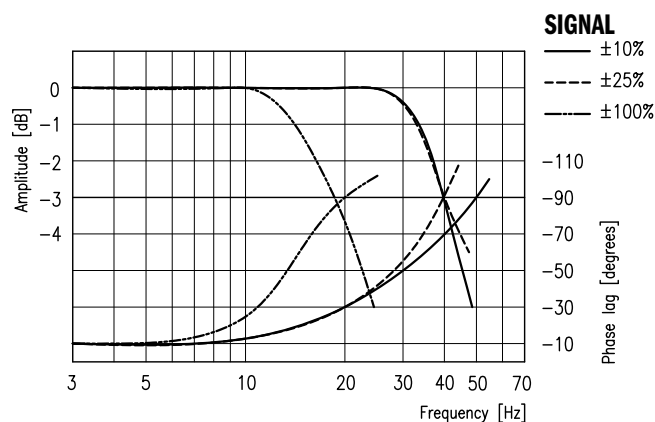
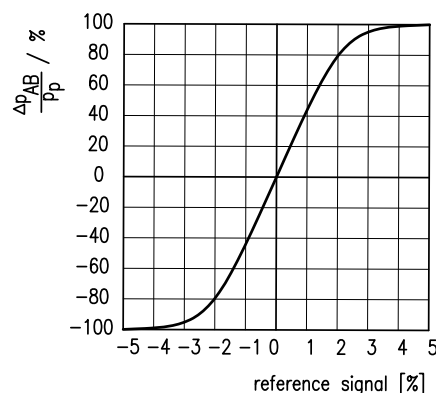
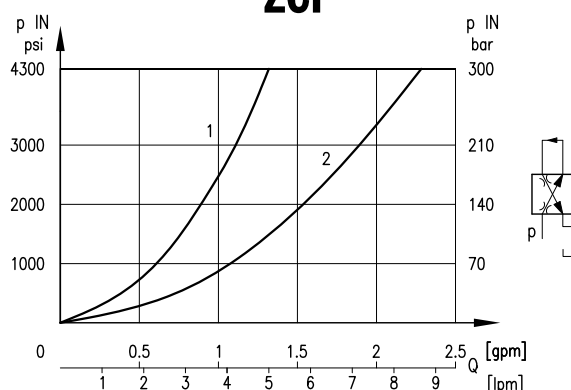
(TYPICAL)

Frequency response and response time obtained with mineral oil with viscosity of 170 SUS (36 cSt) at 122°F (50°C) and with on-board electronics and Δp (P-T) 143 psi.

RESPONSE TIME

	ENERGIZING				DE-ENERGIZING			
	0 ▶ 25%	0 ▶ 50%	0 ▶ 75%	0 ▶ 100%	25% ▶ 0	50% ▶ 0	75% ▶ 0	100% ▶ 0
TIMES [ms]	13	15	15	18	19	21	21	22

ZCF



OVERALL AND MOUNTING DIMENSIONS

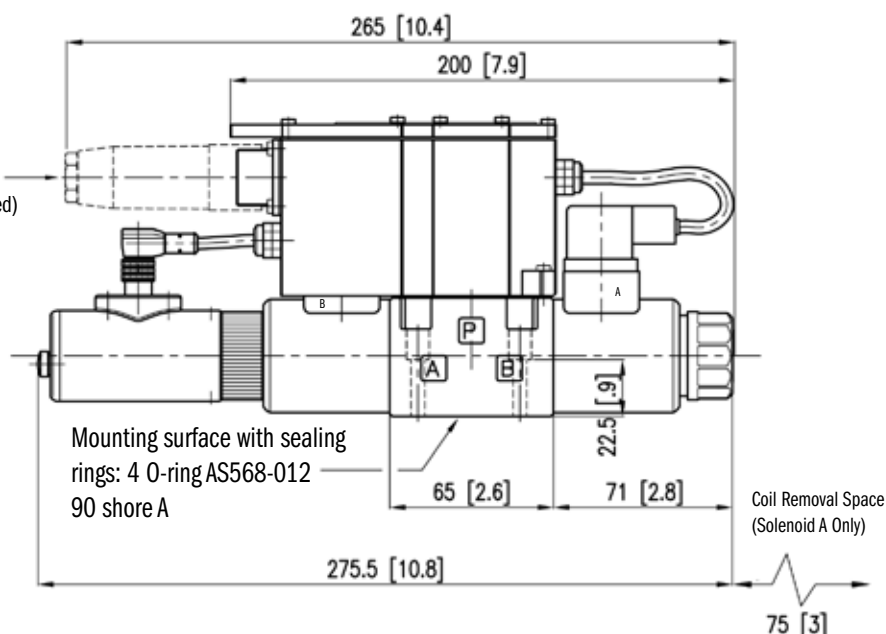
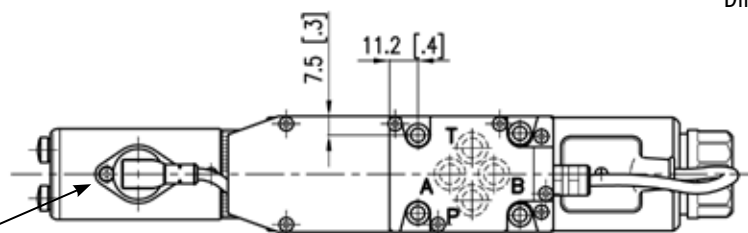
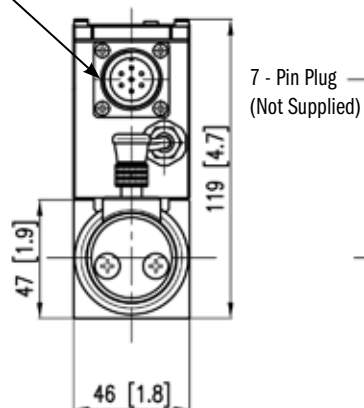
VED03MJ-3 / VED03MJ-10

Dimensions in mm [IN]

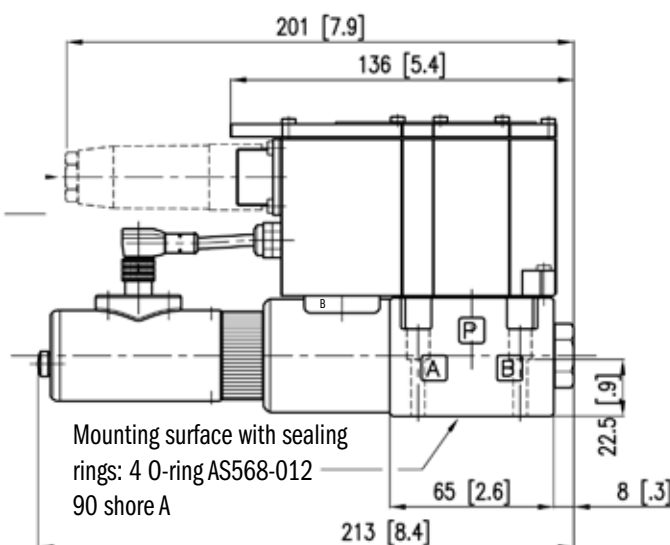
Adjustment sealing performed at factory.

Do not disassemble the transducer.

Main connection 7 - pin male
MIL-C-5015-G (DIN 43563 metal)



VED03MJ-5



In order to avoid electromagnetic noises and fulfill the EMC regulations, a 7 pin metal plug according to MIL-C-5015 G should be used instead of the standard plastic 6+PE plug.

The plug is not supplied, but can be ordered separately.

ELECTRICAL CHARACTERISTICS

The proportional valve is controlled by a digital amplifier (driver), which incorporates a microprocessor that controls all the valve functions.

THE STANDARD VALVE IS SET AT THE FACTORY WITH:

- UP/DOWN ramp at zero value
- No deadband compensation
- Max valve opening (100% of spool stroke)

It is possible to customize these and others parameters using the optional kit, LINPC-USB to be ordered separately (see related literature).

THE DIGITAL DRIVER ENABLES THE VALVE TO REACH BETTER PERFORMANCE COMPARED TO THE ANALOG VERSION, AND GIVES:

- Reduced response times
- Optimization and reproducibility of the characteristic curve, optimized in factory for each valve
- Complete interchangeability in case of valve replacement
- Opportunity to set, via software, the functional parameters
- Opportunity to perform a diagnostic program by means of the LIN connection
- High immunity to electromagnetic interference

The electronic card is available with (OBC) or without (OBW) external enabling signal feature.

POWER SUPPLY		24V DC (19V to 35V, ripple max 3Vpp)
ABSORBED POWER		50 W
MAX CURRENT		2A
DUTY CYCLE		100%
MAIN CONNECTOR		7 pin MIL-C-5015-G (DIN 43563)
ELECTROMAGNETIC COMPATIBILITY (EMC)	Emission	IEC EN 61000-6-4
	Immunity	IEC EN 61000-6-2
PROTECTION AGAINST ATMOSPHERIC AGENTS	IEC 60529	IP 65 / 67
ELECTRICAL PROTECTION	Overload electronics overheating LVDT sensor error power failure or < 4mA	

E0 - VOLTAGE

COMMAND SIGNAL (DIFFERENTIAL)	Single Solenoid	0 - 10V DC
	Dual Solenoid	±10V DC
IMPEDANCE		> 50 kΩ

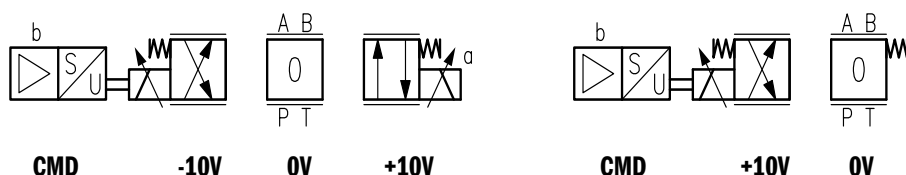
E1 - CURRENT

COMMAND SIGNAL	4 - 20 mA
IMPEDANCE	500 Ω

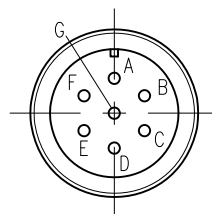
E0 VERSION - VOLTAGE REFERENCE SIGNAL

This is the most common version; it makes the valve completely interchangeable with the traditional proportional valves with analog type integrated electronics. The valve has only to be connected as indicated below.

The input signal is differential type and drives the valve as shown in the chart below. The spool stroke is proportional to UD - UE. If only one input signal (single-end) is available, the pin B (0V power supply) and the pin E (0V reference signal) must be connected through a jumper and both connected to GND, electric panel side.

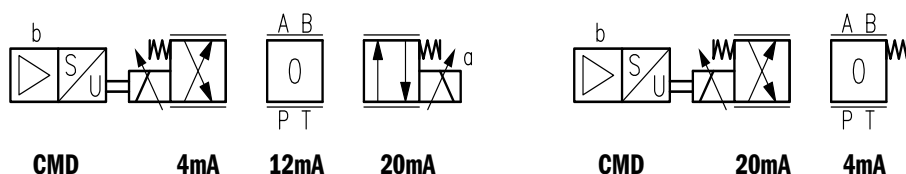


A	24V	Power supply positive. Use an external fuse 5A/50V fast type for protecting electronics.
B	0V	Power supply zero (0V)
C	NC or 24V	OBW Version: Not wired OBC Version: Valve enable
D	$\pm 10V$ or 0 - 10V	Differential command signal (+V)
E	0V	Differential command signal (-V)
F	2 - 6 - 10V or 6 - 10V	Output feedback monitor
G	GND	Protective ground

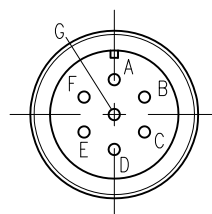


E1 VERSION - CURRENT REFERENCE SIGNAL

The current reference signal is supplied in range of 4 - 20 mA and drives the valve as shown in the chart below. If the current drops to less than 4 mA, the card de-energizes the coils and the valve will go to rest position. The valve will restart when the command signal rises into the 4 - 20 mA range.



A	24V	Power supply positive. Use an external fuse 5A/50V fast type for protecting electronics.
B	0V	Power supply zero (0V)
C	NC or 24V	OBW Version: Not wired OBC Version: Valve enable
D	4 - 20 mA	Command signal
E	0V	Return
F	2 - 6 - 10V or 6 - 10V	Output feedback monitor
G	GND	Protective ground



WIRING:

Connections must be made via the 7 pin plug mounted on the amplifier.

RECOMMENDED CABLE SIZES ARE:

POWER SUPPLY

18 AWG (0.75 mm²)
for cables up to 65 ft (20 m).

16 AWG (1.00 mm²)
for cables up to 130 ft (40 m).

SIGNAL CABLES

20 AWG (0.50 mm²)

A suitable cable would have 7 wires, a separate shield for the signal wires and an overall shield.

PIN C:

Pin C is reserved for the Enable feature. In the OBC card version, the Enable feature is external; Pin C has to be connected with 24V.

In the OBW card version, Pin C is not to be connected, because the enable signal is run directly from the card.

PIN F:

For reading this value as a feed-back monitor signal, the card must be enabled. This value has to be read on Pin B (0V).

When the card is disabled, the Pin F referred to Pin B does not mean a MONITOR value, but shows a voltage of 2.7 V of the LIN-bus communication.

When a failure or an LVDT error is detected, the drive brings the valve to rest position and locks it. In this state the Pin F, referring to the Pin B, shows a value of 0V.

To reset an LVDT error the card must be disabled and enabled again.

SINGLE SOLENOID		
Pin F	Pin D	
	E0	E1
-	-	-
6V	0V	4mA
+10V	+10V	20mA

DUAL SOLENOID		
Pin F	Pin D	
	E0	E1
+10 V	-10V	4mA
6V	0V	12mA
2V	+10V	20mA

OBW OR OBC VERSION?

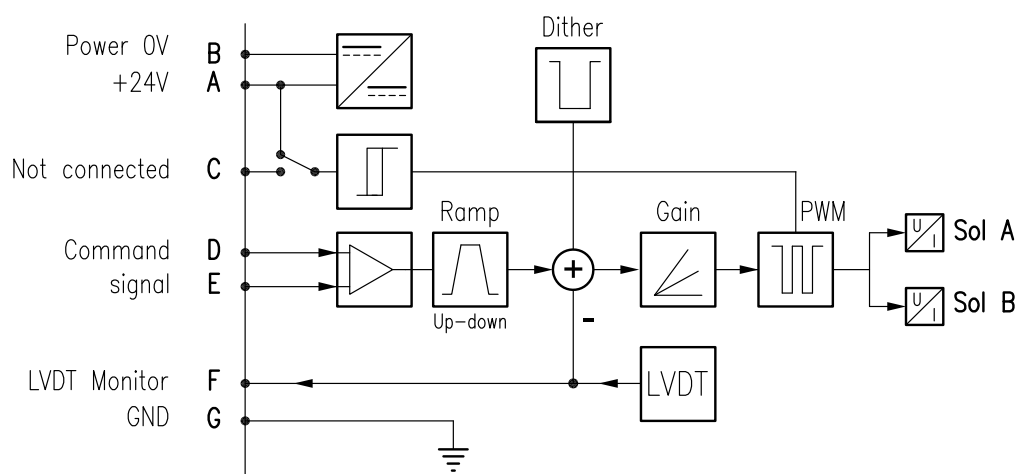
The standard option, code OBW, is programmed for internal enable. The enable signal is taken directly from the power supply of the valve. The card is enabled as soon as supply power is applied to Pins A and B.

Apply command signal to the valve and the output drivers energize the coil. The power supply must be switched off to disable the output to the valve.

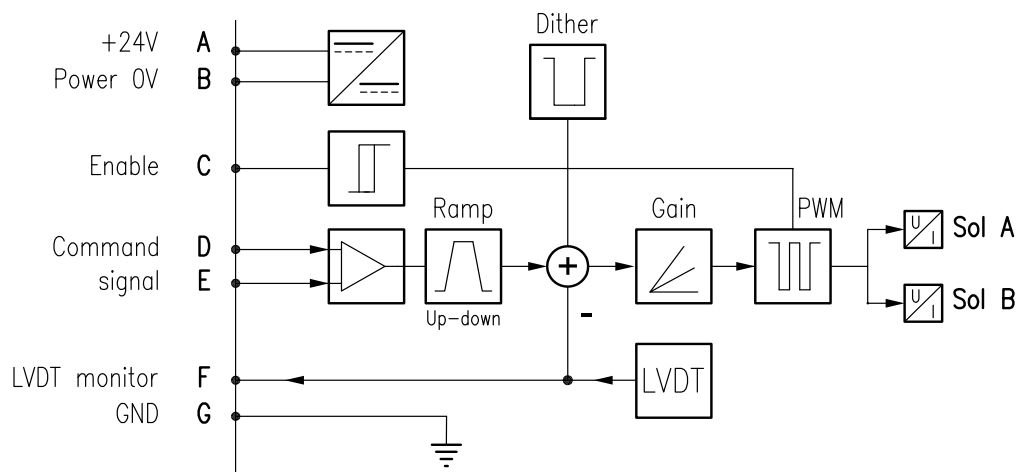
The OBC option is programmed for the external enable feature. A 24 V signal must be applied to Pin C to enable the output drivers to energize the valve coils.

The valve operation can be stopped by simply removing the enable signal from Pin C.

OBW CARD VERSION (STD)



OBC CARD VERSION



APPLICATION DATA

FLUIDS

Il pressure drops shown on these data pages are based on 170 SUS fluid viscosity and 0.87 specific gravity. For any other specific gravity (G1) the pressure drop (ΔP) will be approx. $\Delta P_1 = \Delta P (G1/G)$. See the chart for other viscosities.

FLUID VISCOSITIES	Cst	10	14.5	32	36	43	54	65	76	86	108	216	324	400
	SUS	60	75	150	170	200	250	300	350	400	500	1000	1500	1900
MULTIPLIER		0.77	0.81	0.97	1.00	1.04	1.10	1.15	1.20	1.24	1.31	1.56	1.72	1.83

Use mineral oil-based hydraulic fluids HL or HM type, according to ISO 6743-4. For these fluids, use NBR seals. For fluids HFDR type (phosphate esters) use FPM seals (code V). For the use of other kinds of fluid such as HFA, HFB, HFC, please consult our technical department.

Using fluids at temperatures higher than 180 degrees F causes the accelerated degradation of seals as well as degradation of the fluids physical and chemical properties.

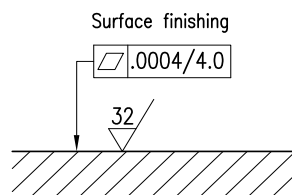
From a safety standpoint, temperatures above 130 degrees F are not recommended

INSTALLATION

VED03MJ valves can be installed in any position without impairing correct operation.

Ensure that there is no air in the hydraulic circuit.

Valves are fixed by means of screws or tie rods on a flat surface with planarity and roughness equal to or better than those indicated in the relative symbols. If minimum values are not observed, fluid can easily leak between the valve and support surface.



7 PIN PLUG

VEA-3P7P-A	Straight plug 7 pin plastic housing	264893
VEA-3P7M-A	Straight plug 7 pin metal housing	265947

BOLT KITS

BD03-125	Valve Only	1008406
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NOTES:

1. Bolt kit consists of: Qty 4 10-24NC screws / Qty 4 #10 Lock washer
2. Recommended torque values for the fasteners: 4 lb.ft. (5.4 Nm)

SEAL KIT

BUNA SEAL KIT	1013188
VITON SEAL KIT	1013096



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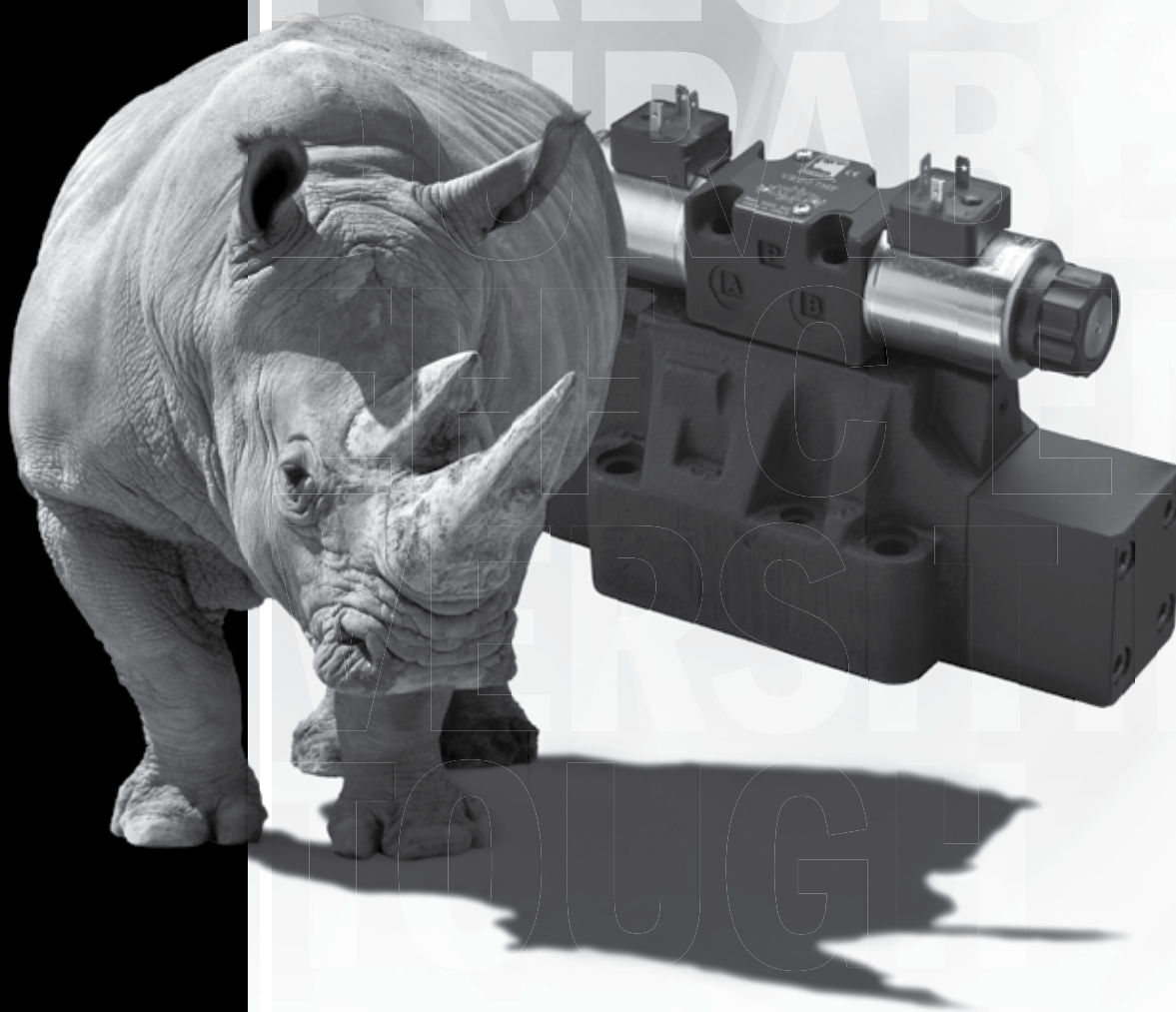
HYDRAULICS



CONTINENTAL HYDRAULICS

VED*M

PROPORTIONAL PILOT OPERATED DIRECTIONAL CONTROL VALVES



VED*M - PROPORTIONAL PILOT OPERATED DIRECTIONAL CONTROL VALVES

VED*M

PROPORTIONAL PILOT OPERATED DIRECTIONAL CONTROL VALVES



DESCRIPTION

Continental Hydraulics VED*M pilot operated 4-way proportional valves conform to NFPA and ISO 4401 mounting standard.

OPERATIONS

These valves are designed to control the direction and oil flow rate based on the amount of current supplied to the solenoid. In event of a loss in electrical power, the centering springs will return the valve spool to the center position.

The valve solenoids can be driven by a variable current power supply or by use of external Power Amplifier Cards designed to maximize the valves performance.

A variety of manual overrides and a version with a pressure reducing valve are also available.

TYPICAL PERFORMANCE SPECIFICATIONS

MAXIMUM OPERATING PRESSURE:	P - A - B Ports	5000 psi	350 bar
	T Port (int. drain)	145 psi	10 bar
	T Port (ext. drain)	3600 psi	250 bar
HYSTERESIS	% of Q max	< 4%	
REPEATABILITY	% of Q max	< ± 2%	
POWER SUPPLY		12V DC / 24V DC	
CONNECTION		DIN 43560	DT042P male
PROTECTION	IEC 60529	IP 65	IP 69K

		VED05*M		VED07M		VED08M		VED10M	
FLOW CAPACITY WITH ΔP 145 PSI (10 BAR)		21 gpm 21/10.5 gpm	80 l/min 80/40 l/min	26.5 gpm 40 gpm 40/20 gpm	100 l/min 150 l/min 150/75 l/min	53 gpm 80 gpm 80/40 gpm	200 l/min 300 l/min 300/150 l/min	93 gpm 132 gpm 132/66 gpm	350 l/min 500 l/min 500/250 l/min
MAX FLOW		48 gpm	180 l/min	120 gpm	450 l/min	210 gpm	800 l/min	420 gpm	1600 l/min
MOUNTING SURFACE		NFPA D05 alt. A / alt. B ISO 4401-05-05-0-05		NFPA D07 ISO 4401-07-07-0-05		NFPA D08 ISO 4401-08-08-0-05		NFPA D10 ISO 4401-10-09-0-05	
WEIGHT	Single Solenoid	18.7 lbs	8.5 Kg	23.2 lbs	10.5 Kg	37.5 lbs	17.0 Kg	116.0 lbs	54.5 Kg
	Dual Solenoid	19.8 lbs	9.0 Kg	24.3 lbs	11.0 Kg	38.4 lbs	17.4 Kg	117.0 lbs	53.0 Kg

IDENTIFICATION CODE

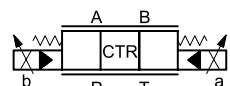
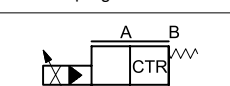
VED **M-** - - - - **D-** _____ DESIGN LETTER

SIZE	
05A	NFPA D05 alt. A
05B	NFPA D05 alt. B
07	NFPA D07
08	NFPA D08
10	NFPA D10

SEAL	
A	Buna (STD)
G	Viton

CONNECTION	
K1	DIN 43650 (STD)
K7	DT04-2P 'Deutsch'

VOLTAGE	
12	Voltage 12V DC
24	Current 24V DC (STD)

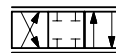

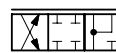

FUNCTION	
3	 <p>Dual operator 3 position spring centered</p>
5	 <p>Single operator 2 position spring centered</p>

NOMINAL FLOW (with Δp P-T 143 psi)		
05	80	80 l/min (21 gpm)
	80/40	Asymmetrical spool: 80 l/min (21 gpm) on P-A 40 l/min (10.5 gpm) on B-T
07	100	100 l/min (26.5 gpm)
	150	150 l/min (40 gpm)
	150/75	Asymmetrical spool: 150 l/min (40 gpm) on P-A 75 l/min (20 gpm) on B-T
08	200	200 l/min (53 gpm)
	300	300 l/min (80 gpm)
	300/150	Asymmetrical spool: 300 l/min (80 gpm) on P-A 150 l/min (40 gpm) on B-T
10	350	350 l/min (93 gpm)
	500	500 l/min (132 gpm)
	500/250	Asymmetrical spool: 500 l/min (132 gpm) on P-A 250 l/min (66 gpm) on B-T

PILOT/DRAIN	
1	Internal pilot External drain
2	External pilot External drain
3	Internal pilot Internal drain
4	External pilot Internal drain

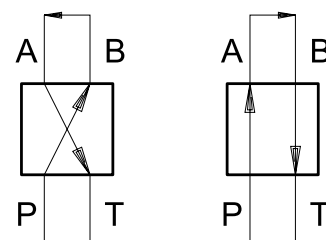
MECHANICAL (Omit if not required)	
R	Reverse operator 2 position spring centered solenoid A supplied
Z	Pilot pressure reducer. Mandatory with pilot drain 1 and 3 when pressure is higher than 3000 psi (210 bar)

TYPICAL ORDERING CODE:
VED07M-3AC-100-A1-K1-24D-C

SPOOLS					
NAME	SYMBOLS	DESCRIPTION	APPLICATION	SIZE	FUNCTION MATCHING
AC		METER IN / METER OUT	MOTION CONTROL	05, 07, 08, 10	3, 5
FC		METER IN / METER OUT		05, 07, 08, 10	3, 5
RL		METER IN / METER OUT (REGEN)		07, 08, 10	3
RA		METER IN / METER OUT (REGEN)		07, 08, 10	3

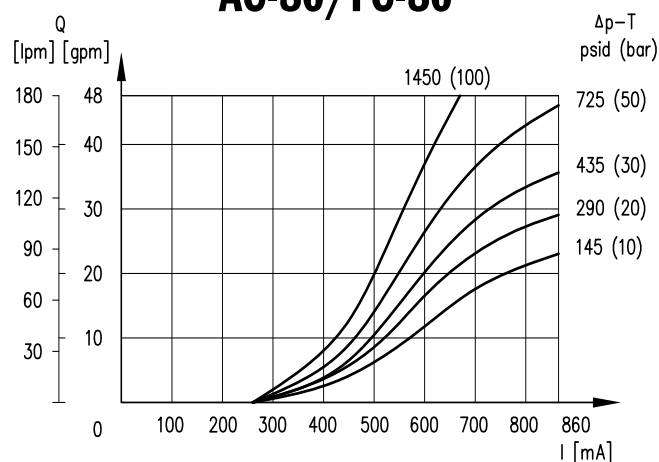
PERFORMANCE CURVES - FLOW GAIN

1. Curves obtained with mineral oil with viscosity of 170 sus (36 cSt) at 122°F (50°C) and VED*M at 24V with external amplifier.
2. The Δp values are measured between P and T (full loop) valve ports.
3. Typical flow rate curves at constant Δp related to the reference signal and measured for the available spools.



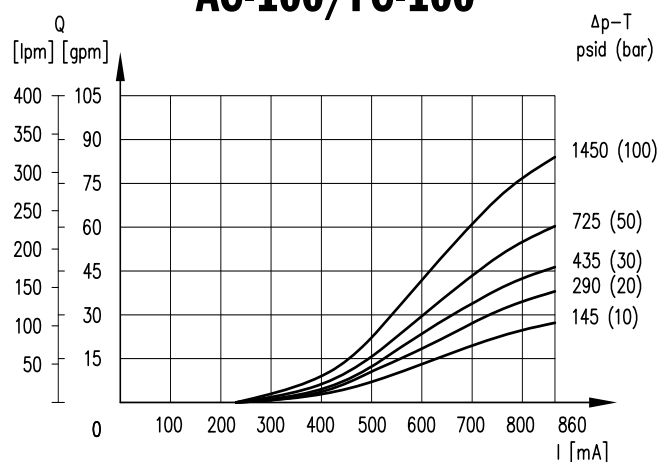
VED05*M

AC-80/FC-80

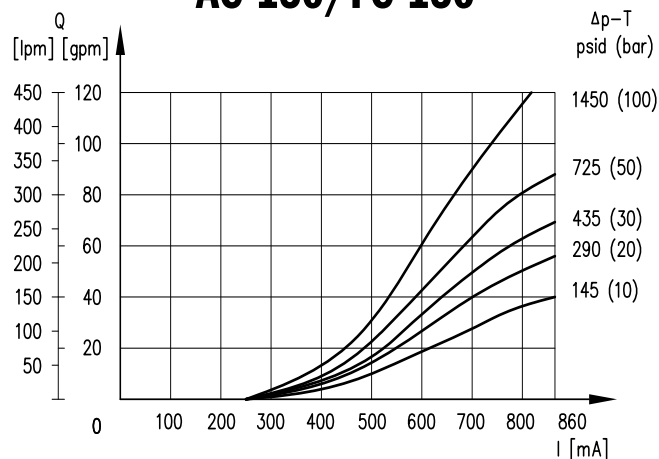


VED07M

AC-100/FC-100



AC-150/FC-150



RESPONSE TIME

VED05*M	ENERGIZING	DE-ENERGIZING
	0 ► 100%	100% ► 0
TIMES [ms]	50	40

RESPONSE TIME

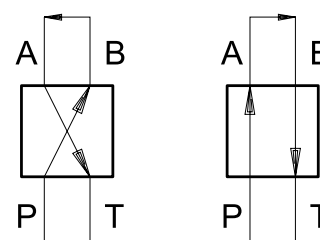
VED07M	ENERGIZING	DE-ENERGIZING
	0 ► 100%	100% ► 0
TIMES [ms]	80	50

PERFORMANCE CURVES - FLOW GAIN

1. Curves obtained with mineral oil with viscosity of 170 sus (36 cSt) at 122°F (50°C) and VED*M at 24V with external amplifier.

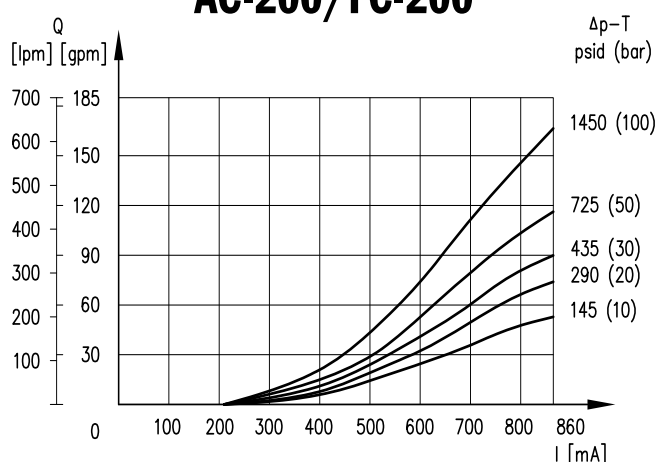
2. The Δp values are measured between P and T (full loop) valve ports.

3. Typical flow rate curves at constant Δp related to the reference signal and measured for the available spools.



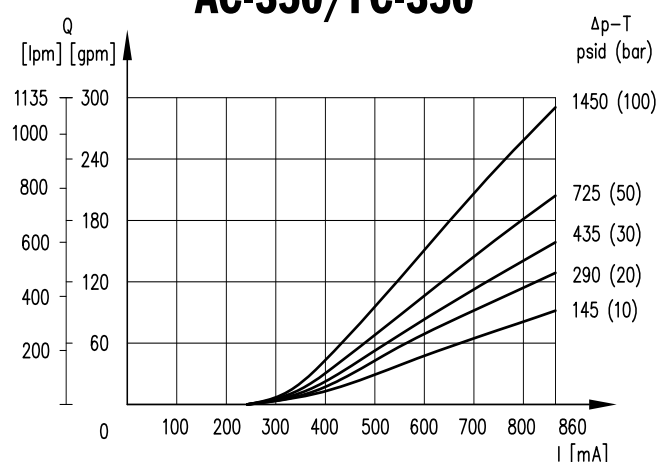
VED08M

AC-200/FC-200

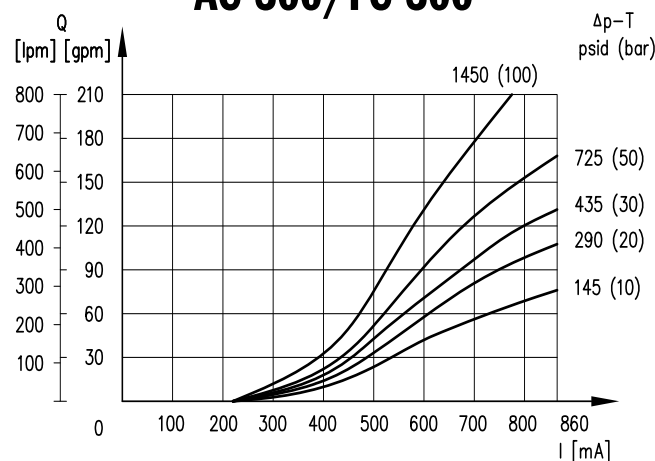


VED10M

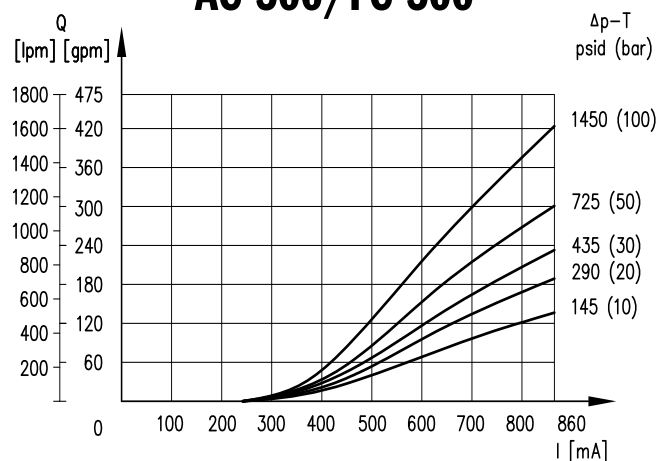
AC-350/FC-350



AC-300/FC-300



AC-500/FC-500



RESPONSE TIME

VED08M	ENERGIZING	DE-ENERGIZING
	0 ► 100%	100% ► 0
TIMES [ms]	100	70

RESPONSE TIME

VED10M	ENERGIZING	DE-ENERGIZING
	0 ► 100%	100% ► 0
TIMES [ms]	200	120

PILOTING AND DRAINAGE

The VED*M valves are available with piloting and drainage, both internal and/or external.

The version with internal pilot without pressure reducer is suitable only on systems where the pressure is not higher than 3000 psi (210 bar).

When the system pressure exceeds 3000 psi (210 bar) use of the version with external pilot is mandatory, or alternatively, the version with internal pilot and pressure reducer. The pressure reducer has fixed adjustment of 430 psi (30 bar).

The version with external drainage allows a higher back pressure on the unloading.

CODE	PILOT	X PLUG	DRAIN	Y PLUG
1	Internal	□	External	■
2	External	■	External	■
3	Internal	□	Internal	□
4	External	■	Internal	□

■ Plugged □ Unplugged

PILOTING REQUIREMENTS

Minimum value of piloting pressure on port X: 430 psi (30 bar).

PILOTING FLOW REQUIRED WITH OPERATION 0 ► 100%		
VED05*M	0.79 gpm	3 lpm
VED07M	1.32 gpm	5 lpm
VED08M	2.38 gpm	9 lpm
VED10M	3.43 gpm	13 lpm

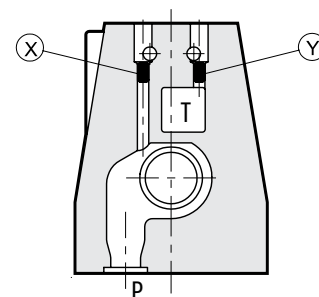
PILOTING VOLUME REQUIRED WITH OPERATION 0 ► 100%		
VED05*M	0.10 in ³	1.7 cm ³
VED07M	0.19 in ³	3.2 cm ³
VED08M	0.55 in ³	9.1 cm ³
VED10M	1.32 in ³	21.6 cm ³

PLUG SIZE:

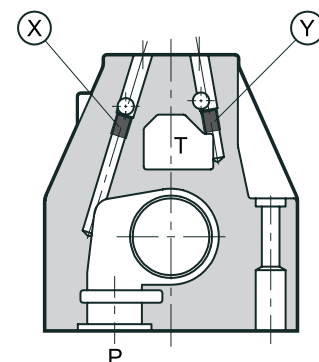
VED05*M	M5x6 mm
VED07M	M6x8 mm
VED08M	M6x8 mm
VED10M	M6x8 mm

PLUG MOUNTING

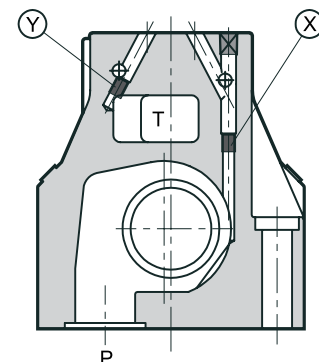
VED05*M



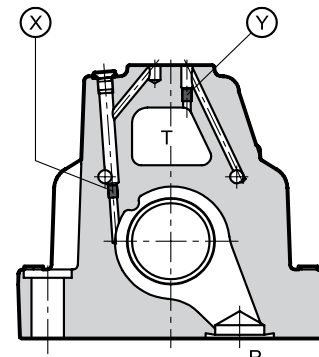
VED07M



VED08M



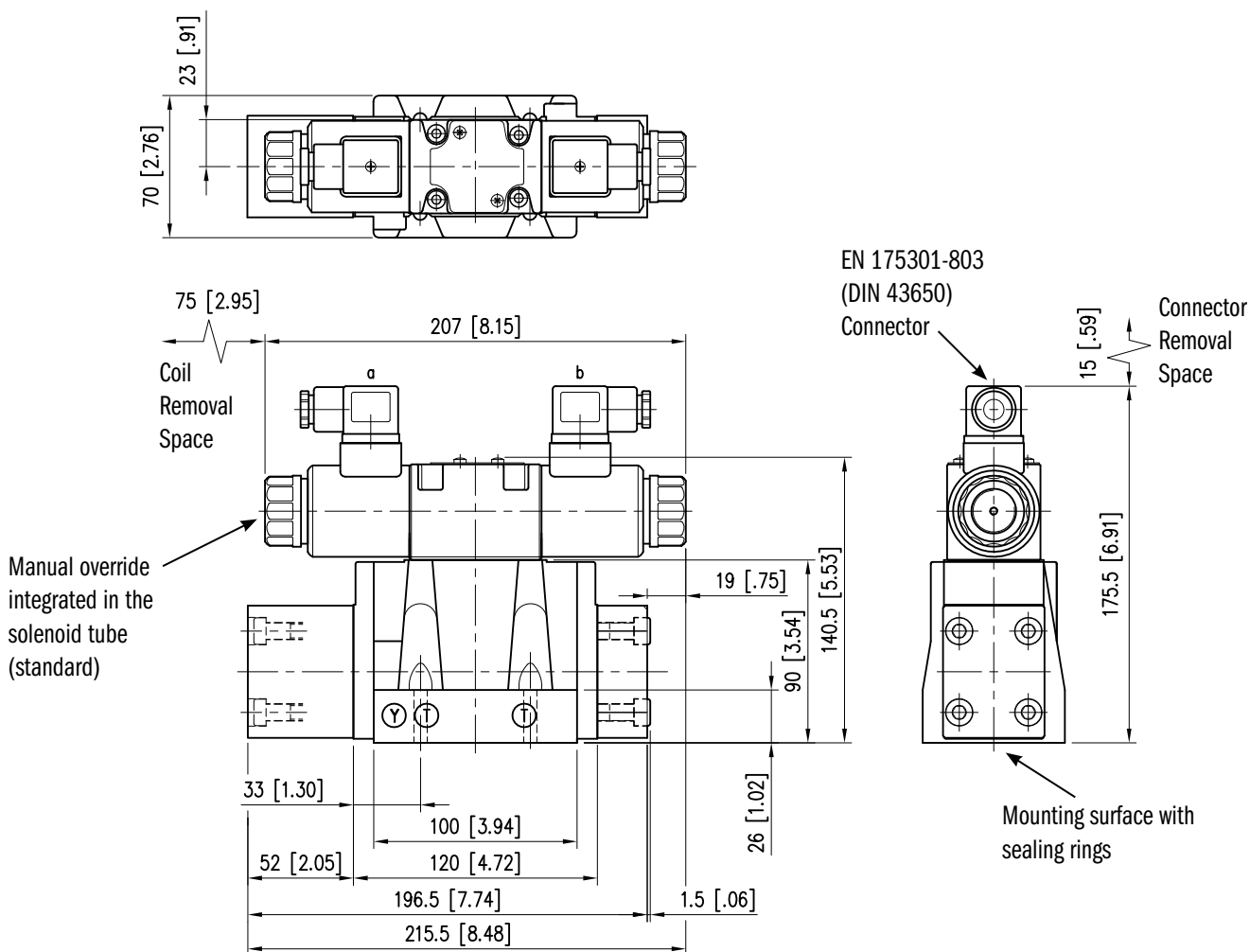
VED10M



OVERALL AND MOUNTING DIMENSIONS FOR VED05*M

VED05*M-3

Dimensions in mm [IN]



NOTES:

For single solenoid overall dimensions see related drawing. See page 11.

THREAD OF MOUNTING HOLES

1/4 - 20 UNC -2B x 0.60

FASTENING

4 bolts 1/4-20 UNC-2B x 1 1/2

TIGHTENING TORQUE

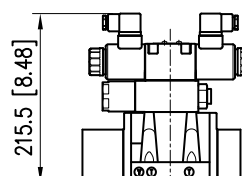
6 lb.ft (8.13 Nm)

SEALING RINGS

Qty. 5 O-ring AS568-014 90 shore A

Qty. 2 O-ring AS568-012 90 shore A

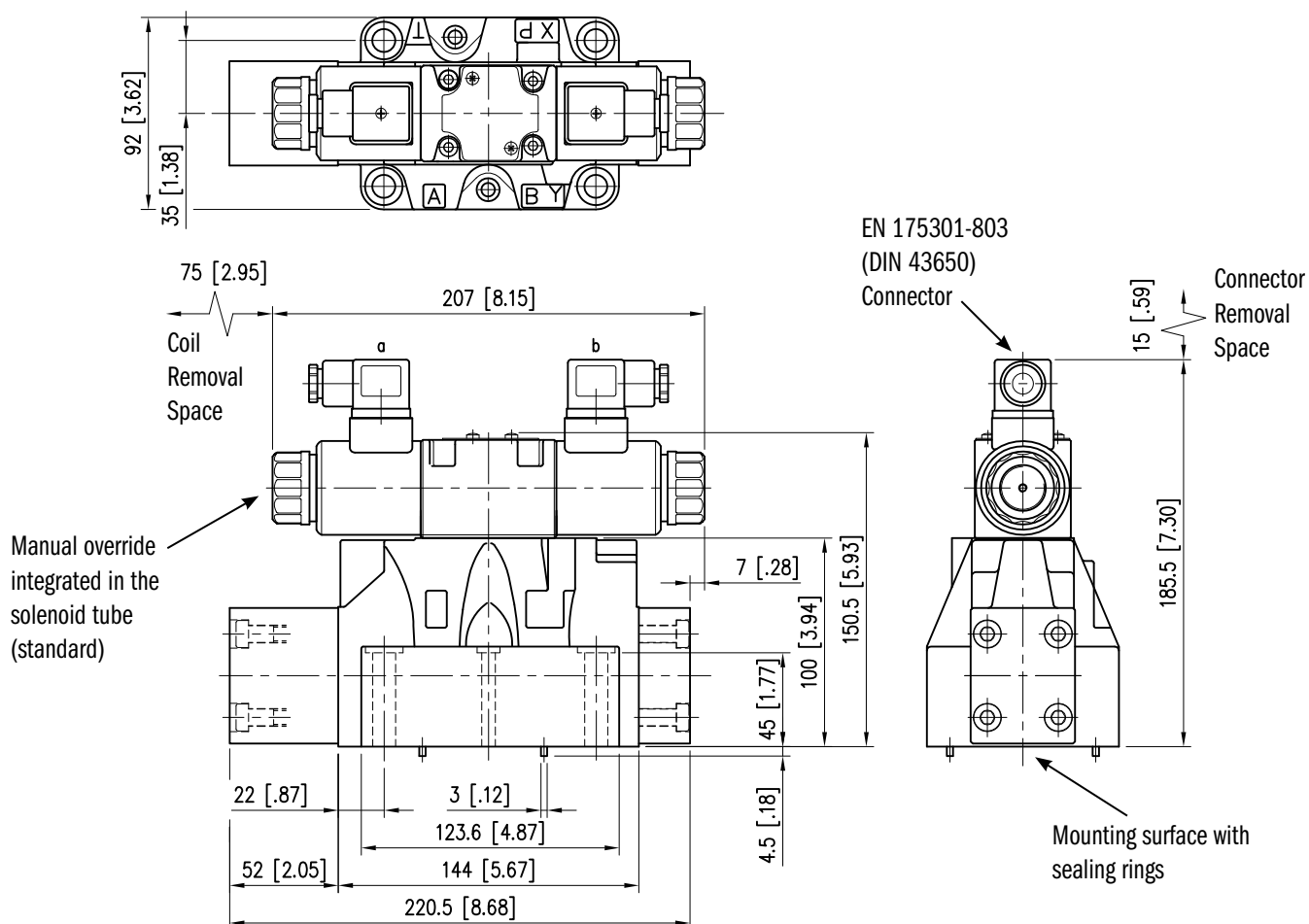
VED05*M*Z



OVERALL AND MOUNTING DIMENSIONS FOR VED07M

VED07M-3

Dimensions in mm [IN]



NOTES:

For single solenoid overall dimensions see related drawing. See page 11.

THREAD OF MOUNTING HOLE

1/4 - 20 UNC - 2B x 0.6

3/8 - 16 UNC - 2B x 0.9

FASTENING

2 bolts 1/4-20 UNC-2B x 2 (50 mm)

4 bolts 3/8-16 UNC-2B x 2 1/2 (60 mm)

TIGHTENING TORQUE

1/4 - 20 UNC - 2B: 6 lb.ft (8.13 Nm)

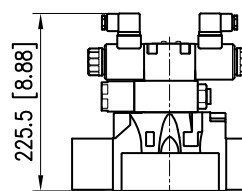
3/8 - 16 UNC - 2B: 29.5 lb.ft (40 Nm)

SEALING RINGS

Qty. 4 O-ring 22.22mm ID x 2.62mm CS 90 shore A

Qty. 2 O-ring AS568-013 90 shore A

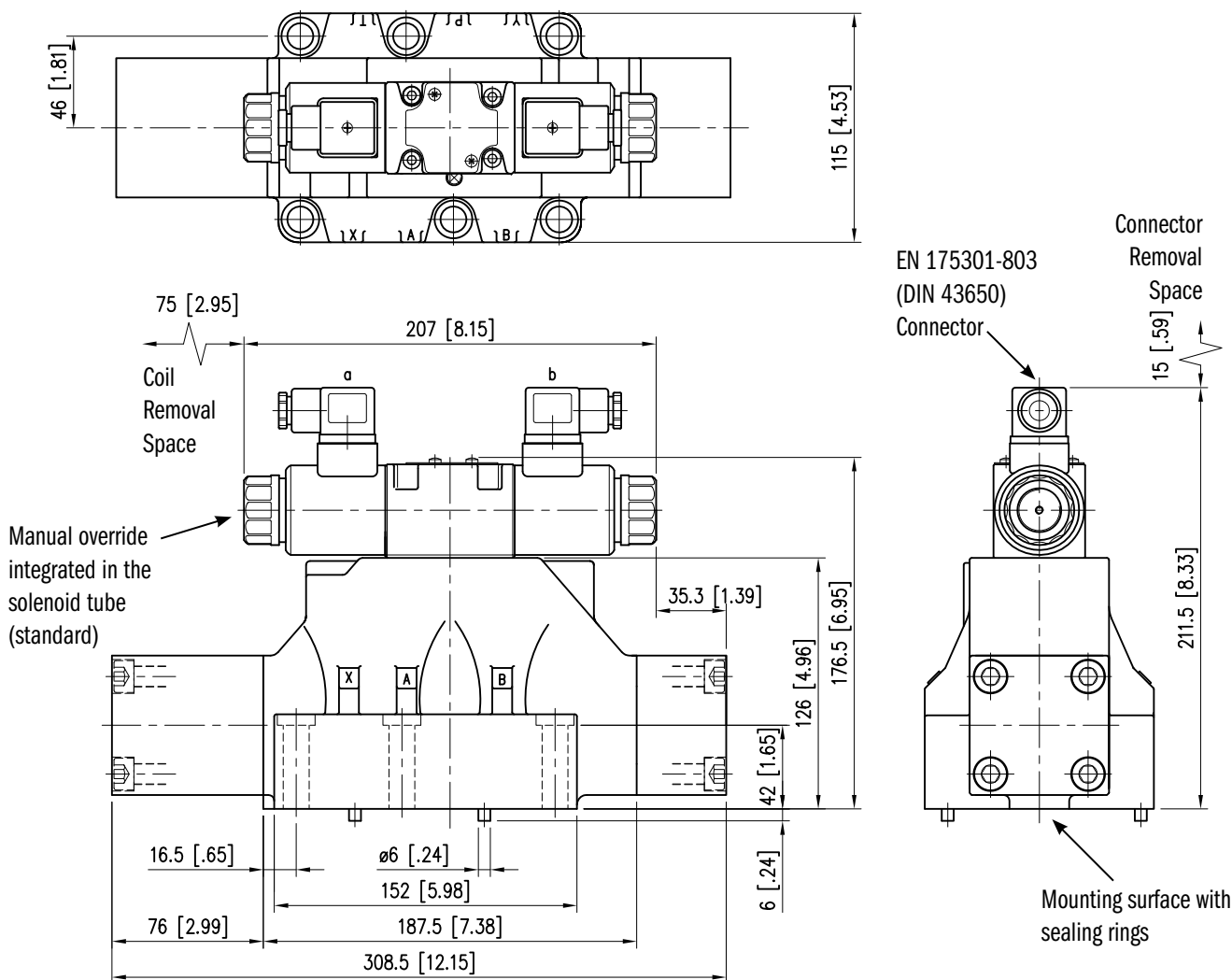
VED07M*Z



OVERALL AND MOUNTING DIMENSIONS FOR VED08M-3

VED08M-3

Dimensions in mm [IN]



NOTES:

For single solenoid overall dimensions see the related drawing. See page 11.

THREAD OF MOUNTING HOLES

1/2 - 13 UNC x 0.9

FASTENING

6 bolts 1/2 - 13 UNC x 2 1/2 (60 mm)

TIGHTENING TORQUE

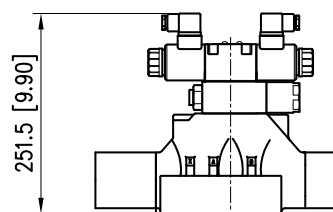
51 lb.ft (69 Nm)

SEALING RINGS

Qty. 4 O-ring AS568-123 90 shore A

Qty. 2 O-ring AS568-117 90 shore A

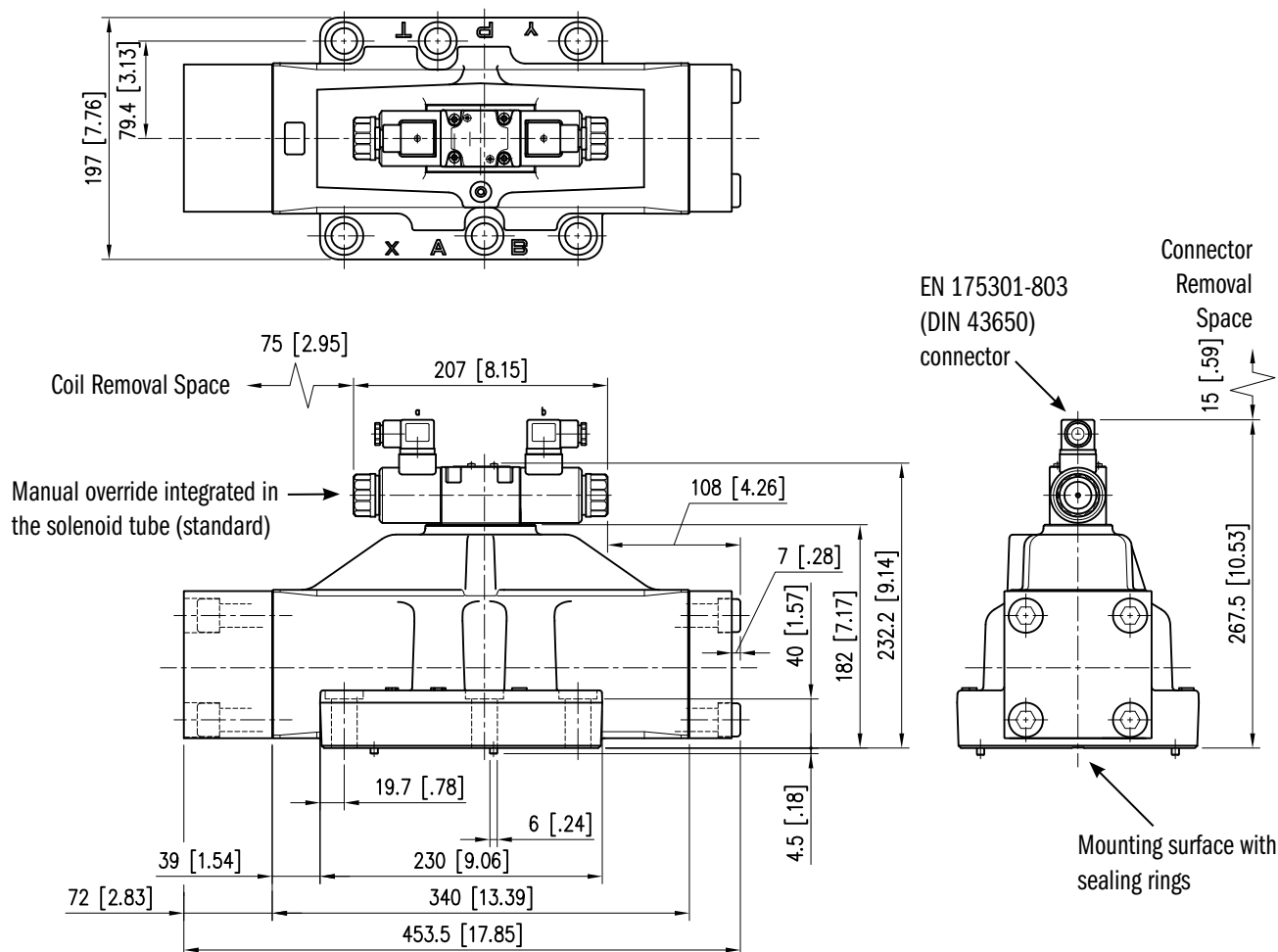
VED08M*Z



OVERALL AND MOUNTING DIMENSIONS FOR VED10M-3

VED10M-3

Dimensions in mm [IN]



NOTES:

For single solenoid overall dimensions see the related drawing. See page 11.

THREAD OF MOUNTING HOLES

3/4 - 10 UNC - 2B x 1.6

FASTENING

6 bolts 3/4 - 10 UNC - 2B x 2 3/4 (70 mm)

TIGHTENING TORQUE

245 lb.ft (332 Nm)

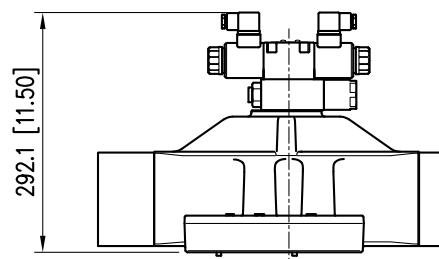
high strength: 415 lb.ft (562 Nm)

SEALING RINGS

Qty. 4 O-ring AS568-222 90 shore A

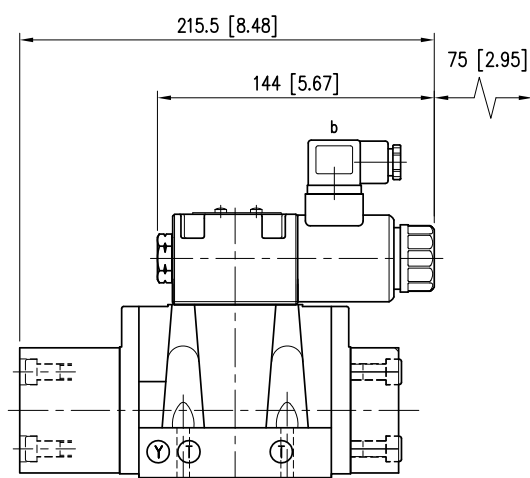
Qty. 2 O-ring AS568-117 90 shore A

VED10M*Z

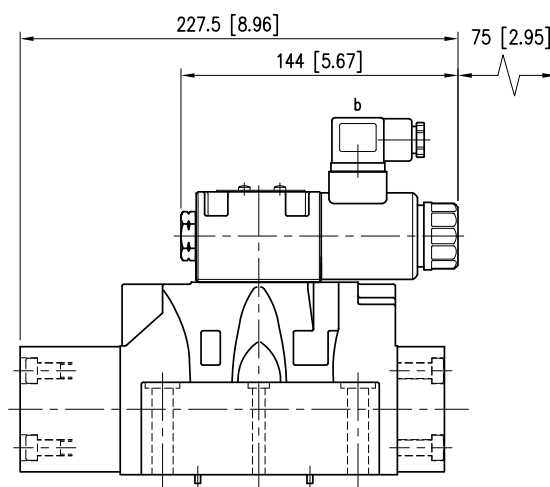


OVERALL DIMENSIONS FOR SINGLE SOLENOID VERSIONS

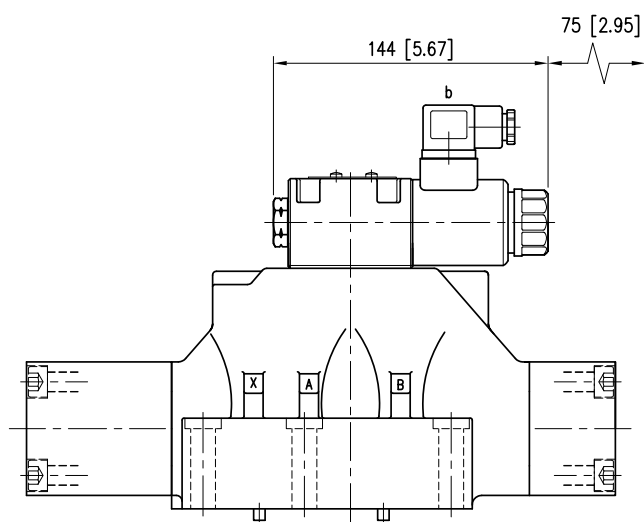
VED05*M-5



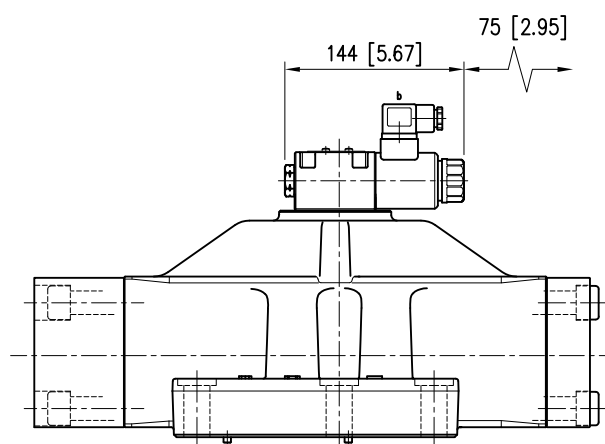
VED07M-5



VED08M-5R



VED10M-5R



NOTES:

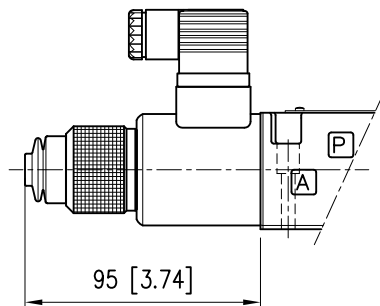
For missing dimensions refer to the previous drawings.

MANUAL OVERRIDE

The standard valve has override pins integrated in the tube. The operation of this control must be executed with a suitable tool, being careful not to damage the sliding surface.

Three other manual overrides are available, using the proper letter in the ordering code.

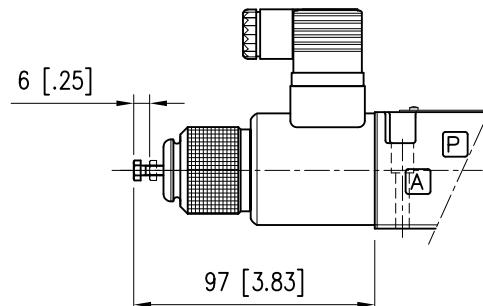
MANUAL OVERRIDE BOOT PROTECTED (CODE U)



NOTES:

1. This device can be ordered separately with code **VMAP-03J-A**.

SCREW MANUAL OVERRIDE (CODE S)



NOTES:

1. With metal ring nut provided with a M4 screw and a blocking locknut to allow continuous mechanical operation.
2. This device can be ordered separately with code **VMAP-03S-A**.



The manual override use doesn't allow any proportional regulation:

Using this kind of override, the main stage spool will open completely and the valve will behave as an on-off valve.

ELECTRICAL DATA FOR VED * M

The proportional solenoid consists of tube and coil. The coil is mounted on the tube and fastened to it by a ring retainer.

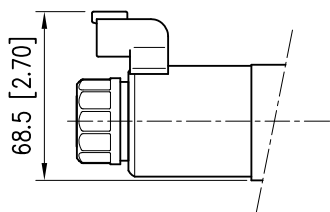
The coils can be indexed to any position allowing for convenient location of the connector.

IP DEGREE

The declared IP degree is guaranteed for all valves only if the connector has been wired and mounted correctly on the coil.

The K7 connection meets DIN 40050-9 which extends the IEC 60529 rating system with an IP69K rating for high-pressure, high-temperature and wash-down applications.

K7 CONNECTION



NOMINAL VOLTAGE	V DC	12	24
RESISTANCE AT 68° F	K1	3.66 Ω	17.6 Ω
	K7	4.5 Ω	18.7 Ω
CURRENT AT 68° F	K1	1.88 A	0.86 A
	K7	2.72 A	1.29 A
DUTY CYCLE		100%	
ELECTROMAGNETIC COMPATIBILITY (EMC)		European Directive 2004/108/EC	
IP DEGREE ACCORDING IEC 60529	K1	IP 65	
	K7	IP 69K	
CLASS OF PROTECTION FOR INSULATION	Copper Wire	Class H (356° F)	
	Coil	Class F (311° F)	

ACCESSORY ELECTRONICS

Some external digital amplifiers are available to be coupled to the valve for better control and to improve the valve performance.

See Continental Hydraulics Control Amplifier Catalog for products to match your requirements.

VEA-3E-A: DIN Connector - Gray

VEA-3F-A: DIN Connector - Black

MOUNTING SURFACES

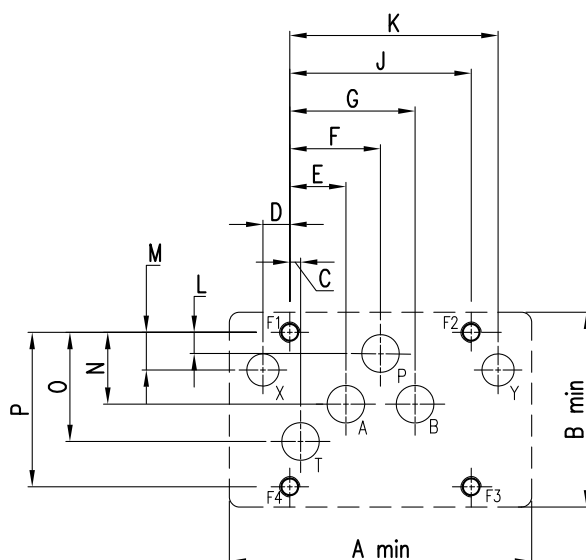
ALL THE MOUNTING SURFACES REFER TO NFPA T3.5.1 R2-2002 AND ISO 4401:2005 STANDARDS.

The mounting surface standards recommend metric coarse threads. However, subplates are commercially available with UNC threads. Select a bolt size that matches the threads in the mounting surface.

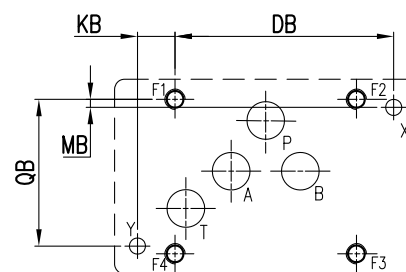
Dimensional tolerances are ± 0.1 mm (0.004") for bolt and pin location; ± 0.2 mm (0.008") for the other quotes.

The minimum depth of the blind hole G where required is 8 mm (0.31 in).

D05 - ALTERNATIVE A



D05 - ALTERNATIVE B



PORT FUNCTION:

P = PRESSURE PORT
T = TANK PORT

A = FIRST CYLINDER PORT
X = PILOT PORT

B = SECOND CYLINDER PORT
Y = DRAIN PORT

	MM	INCH
P, A, B, T MAX	Ø 11.2	Ø 0.44
X, Y ALT. A	Ø 6.3	Ø 0.25
X, Y ALT. B	Ø 4.8	Ø 0.19
MOUNTING BOLT THREAD SIZE	M6	1/4-20 UNC

	MM	INCH
A	90	3.54
B	58	2.28
C	3.2	0.126
D	8	0.310
E	16.7	0.660
F	27	1.06
G	37.3	1.47

	MM	INCH
J	54	2.125
K	62	2.44
L	6.3	0.25
M	11.2	0.44
N	21.4	0.84
O	32.5	1.28
P	46	1.82

	MM	INCH
DB	65.1	2.563
KB	11.2	0.44
MB	2.4	0.09
QB	43.7	1.72

NOTES:

NFPA D05 and ISO 4401-05 indicate different diameters for X and Y holes:

NFPA: Ø 9.6 max in D05 alt. A

Ø 4.8 max in D05 alt. B

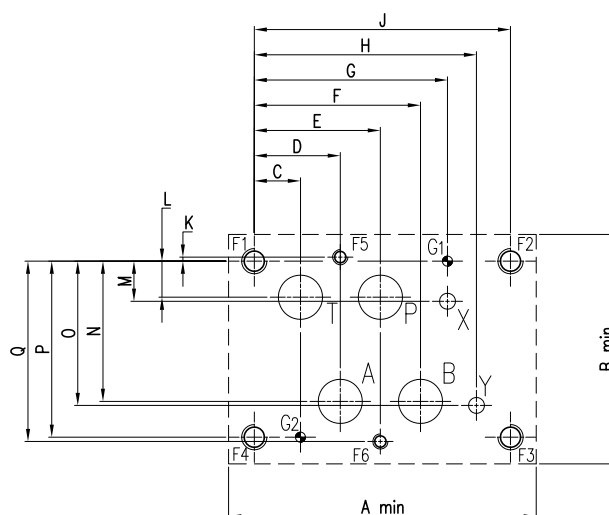
ISO: Ø 6.3 max both

D07

	MM	INCH
P, A, B, T MAX	Ø 17.5	Ø 0.69
X, Y MAX	Ø 6.3	Ø 0.25
G MAX	Ø 4	Ø 0.16
MOUNTING BOLT THREAD SIZE F1 - F4	M10	3/8 - 16 UNC
MOUNTING BOLT THREAD SIZE F5 - F6	M6	1/4 - 20 UNC

	MM	INCH
A	122	4.8
B	91	3.58
C	18.3	0.72
D	34.1	1.34
E	50	1.97
F	65.9	2.60
G	76.6	3.016
H	88.1	3.47

	MM	INCH
J	101.6	4
K	1.6	0.063
L	14.3	0.56
M	15.9	0.626
N	55.6	2.19
O	57.2	2.25
P	69.9	2.75
Q	71.5	2.815

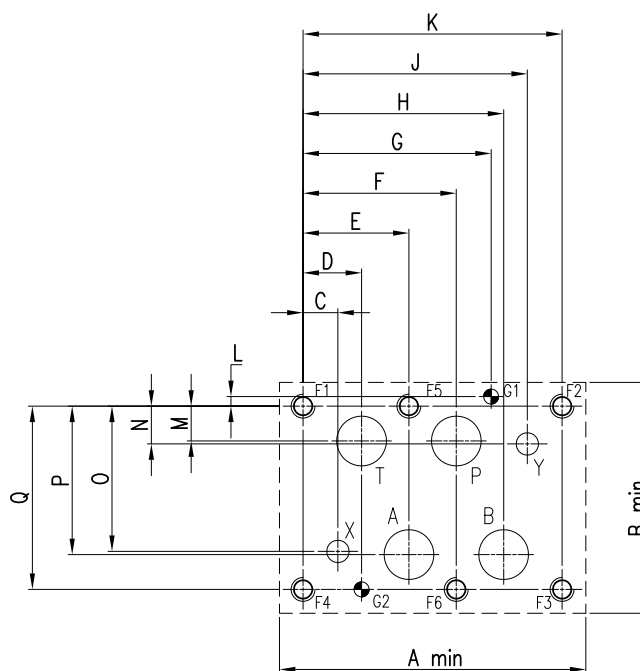


D08

	MM	INCH
P, A, B, T MAX	Ø 25	Ø 0.98
X, Y MAX	Ø 11.2	Ø 0.44
G MAX	Ø 7.5	Ø 0.30
MOUNTING BOLT THREAD SIZE	M12	1/2 - 13 UNC

	MM	INCH
A	154	6
B	116	4.57
C	17.5	0.69
D	29.4	1.157
E	53.2	2.09
F	77	3.03
G	94.5	3.719
H	100.8	3.97

	MM	INCH
J	112.7	4.44
K	130.2	5.125
L	4.80	0.187
M	17.5	0.69
N	19	0.75
O	73	2.874
P	74.6	2.93
Q	92.1	3.625

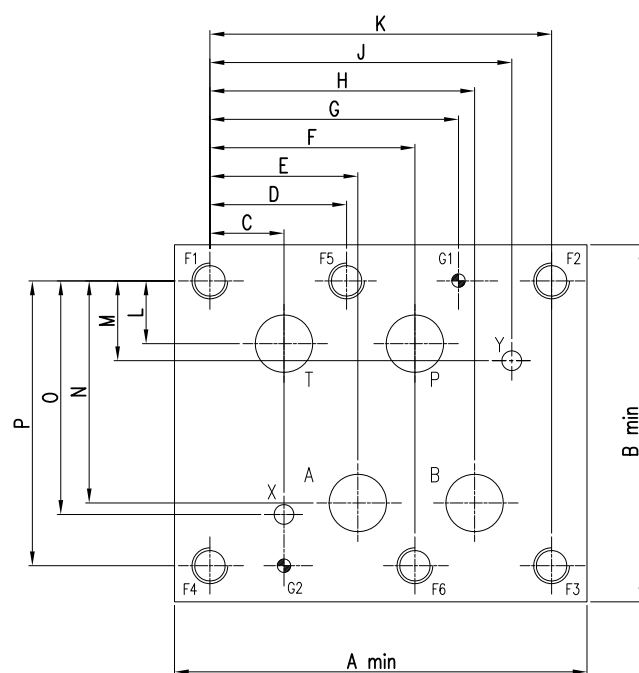


D10

	MM	INCH
P, A, B, T MAX	Ø 32	Ø 1.25
X, Y MAX	Ø 11.2	Ø 0.44
G MAX	Ø 7.5	Ø 0.30
MOUNTING BOLT THREAD SIZE	M20	¾-10 UNC

	MM	INCH
A	230	9.06
B	199	7.83
C	41.3	1.63
D	76.2	3
E	82.5	3.25
F	114.3	4.5
G	138.6	5.457
H	147.6	5.81

	MM	INCH
J	168.3	6.63
K	190.5	7.5
L	35	1.38
M	44.5	1.75
N	123.8	4.87
O	130.2	5.13
P	158.8	6.25



APPLICATION DATA

FLUIDS

All pressure drops shown on these data pages are based on 170 SUS fluid viscosity and 0.87 specific gravity. For any other specific gravity (G1) the pressure drop (ΔP) will be approx. $\Delta P1 = \Delta P (G1/G)$. See the chart for other viscosities.

FLUID VISCOSITIES	Cst	10	14.5	32	36	43	54	65	76	86	108	216	324	400
	SUS	60	75	150	170	200	250	300	350	400	500	1000	1500	1900
MULTIPLIER		0.77	0.81	0.97	1.00	1.04	1.10	1.15	1.20	1.24	1.31	1.56	1.72	1.83

Use mineral oil-based hydraulic fluids HL or HM type, according to ISO 6743-4. For these fluids, use NBR seals. For fluids HFDR type (phosphate esters) use FPM seals (code V). For the use of other kinds of fluid such as HFA, HFB, HFC, please consult our technical department.

Using fluids at temperatures higher than 180 degrees F causes the accelerated degradation of seals as well as degradation of the fluids physical and chemical properties.

From a safety standpoint, temperatures above 130 degrees F are not recommended.

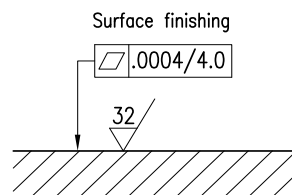
RANGE TEMPERATURES:	Ambient	-4 to +130 °F	-20 to +54 °C
	Fluid	-4 to +180 °F	-20 to +82 °C
FLUID VISCOSITY	Range	60 -1900 SUS	10 - 400 cSt
	Recommended	120 SUS	25 cSt
FLUID CONTAMINATION		ISO 4406:1999 Class 18/16/13	

INSTALLATION

The VED*M valves can be installed in any position without impairing correct operation.

Ensure that there is no air in the hydraulic circuit.

Valves are fixed by means of screws or tie rods on a flat surface with planarity and roughness equal to or better than those indicated in the relative symbols. If minimum values are not observed, fluid can easily leak between the valve and support surface.



BOLT KITS

D05 SIZE	BD05H -150 - B	Valve Only	1009397
D07 SIZE	BD07 - 250	Valve Only	1009400
D08 SIZE	BD08 - 250	Valve Only	1009401
D10 SIZE	BD10 - 275	Valve Only	1013038

SEAL KIT

D05* SIZE	Buna Seal Kit	1013174
	Viton Seal Kit	1013175
D07 SIZE	Buna Seal Kit	1013176
	Viton Seal Kit	1013177
D08 SIZE	Buna Seal Kit	1013178
	Viton Seal Kit	1013179
D10 SIZE	Buna Seal Kit	1013180
	Viton Seal Kit	1013181

SUBPLATES

D05 alt. A SIZE	AD05JESPS16S	Aluminium	SAE-16	351716AJ
	DD05JESPS16S	Ductile	SAE-16	351716AK
D07 SIZE	AD07SPS016S	Aluminium	SAE-16	1013039AB
	DD07SPS016S	Ductile	SAE-16	1013039AC
D08 SIZE	AD08SPS020S	Aluminium	SAE-20	265803AP
	DD08SPS020S	Ductile	SAE-20	265803AL
D10 SIZE	AD10SPS032S	Aluminium	SAE-32	1013040AB
	DD10SPS032S	Ductile	SAE-32	1013040AC

NOTES:

1. Max pressure for aluminum subplates: 3000 psi (210 bar)
2. Max pressure for ductile subplates: 5000 psi (350 bar)
3. Always verify subplate port size is proper for the application

ABOUT CONTINENTAL HYDRAULICS

Rugged, durable, high-performance, efficient—the reason Continental Hydraulics' products are used in some of the most challenging applications across the globe. With a commitment to quality customer support and innovative engineering, Continental's pumps, valves, power units, mobile and custom products deliver what the markets demand. Continental has been serving the food production, brick and block, wood products, automotive and machine tool industries since 1962. Learn how our products survive some of the most harsh environments.

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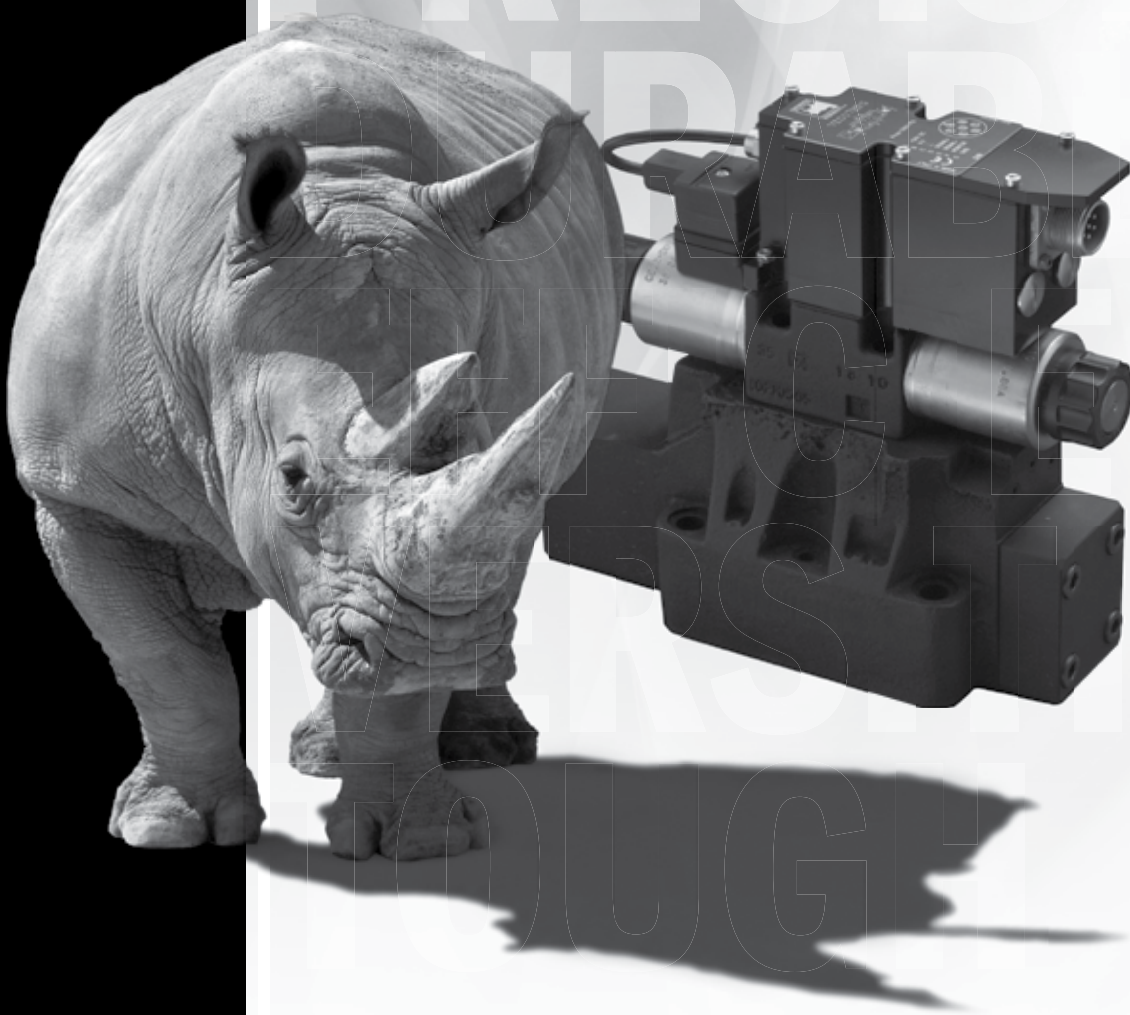
CONTINENTAL



CONTINENTAL HYDRAULICS

VED*MG

PILOT OPERATED DIRECTIONAL CONTROL VALVES WITH OBE



VED*MG - PILOT OPERATED DIRECTIONAL CONTROL VALVES WITH OBE

VED*MG

PILOT OPERATED DIRECTIONAL CONTROL VALVES WITH OBE



DESCRIPTION

The VED*MG pilot operated 4-way proportional valves with On-Board Digital Amplifier are available in 5 standard NFPA and ISO patterns.

OPERATION

The VED*MG valves are designed to control the direction and oil flow rate based on the amount of command signal supplied to the On-Board Amplifier.

In event of a loss in electrical power, the centering springs will return the valve spool to the center position.

The On-Board microprocessor controls all the valve functions and is pre-set to optimal valve performance. In-field adjustments can be performed, via software, to customize the parameters based on your application needs.

TYPICAL PERFORMANCE SPECIFICATIONS

MAXIMUM OPERATING PRESSURE:	P - A - B Ports	5000 psi	350 bar
	T Port (int. drain)	143 psi	10 bar
	T Port (ext. drain)	3600 psi	250 bar
HYSTERESIS	% of Q max	< 2%	
REPEATABILITY	% of Q max	< ± 1%	
POWER SUPPLY		24V DC (19V to 35V, ripple max 3V pp)	
	MAX CURRENT	3A	
CONNECTION		7 pin (6+gnd) metal	
PROTECTION	IEC 60529	IP 67	

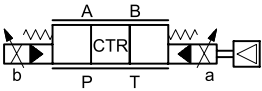
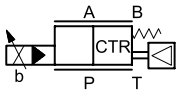
		VED05*MG		VED07MG		VED08MG		VED10MG	
FLOW CAPACITY WITH ΔP 145 PSI (10 BAR)		21 gpm 21/10.5 gpm	80 l/min 80/40 l/min	26.5 gpm 40 gpm 40/20 gpm	100 l/min 150 l/min 150/75 l/min	53 gpm 80 gpm 80/40 gpm	200 l/min 300 l/min 300/150 l/min	93 gpm 132 gpm 132/66 gpm	350 l/min 500 l/min 500/250 l/min
MAX FLOW		48 gpm	180 l/min	120 gpm	450 l/min	210 gpm	800 l/min	420 gpm	1600 l/min
MOUNTING SURFACE		NFPA D05 alt.A / alt.B ISO 4401-05-* -0-05		NFPA D07 ISO 4401-07-07-0-05		NFPA D08 ISO 4401-08-08-0-05		NFPA D10 ISO 4401-10-09-0-05	
WEIGHT	Single Solenoid	16.3 lbs	7.4 Kg	21.2 lbs	9.6 Kg	35.1 lbs	15.9 Kg	116.4 lbs	52.8 Kg
	Dual Solenoid	17.4 lbs	7.9 Kg	22.3 lbs	10.1 Kg	36.2 lbs	16.4 Kg	117.5 lbs	53.3 Kg

IDENTIFICATION CODE

VED **MG** - - **D** - ——— DESIGN LETTER

SIZE	
05A	NFPA D05 alt. A
05B	NFPA D05 alt. B
07	NFPA D07
08	NFPA D08
10	NFPA D10

With On Board Electronics

FUNCTION	
3	 <p>double operator 3 position spring centered</p>
	 <p>single operator 2 position spring centered</p> <p>D05 and D07 are available as code 5 only. D08 and D10 are available as code 5-R only.</p>

SEAL		
A	Buna (STD)	
G	Viton	

NOMINAL FLOW (with Δp P-T 143 psi)		
05	80	80 l/min (21 gpm)
	80/40	Asymmetrical spool: 80 l/min (21 gpm) on P-A 40 l/min (10.5 gpm) on B-T
07	100	100 l/min (26.5 gpm)
	150	150 l/min (40 gpm)
	150/75	Asymmetrical spool: 150 l/min (40 gpm) on P-A 75 l/min (20 gpm) on B-T
08	200	200 l/min (53 gpm)
	300	300 l/min (80 gpm)
	300/150	Asymmetrical spool: 300 l/min (80 gpm) on P-A 150 l/min (40 gpm) on B-T
10	350	350 l/min (93 gpm)
	500	500 l/min (132 gpm)
	500/250	Asymmetrical spool: 500 l/min (132 gpm) on P-A 250 l/min (66 gpm) on B-T

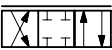
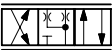
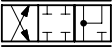
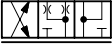
CONNECTION	
OBW	On board electronics 7 pin - no external enable required (STD)
OBC	On board electronics 7 pin external enable on Pin C required

REFERENCE SIGNAL	
E0	Voltage ± 10V (STD)
E1	Current 4 - 20 mA

PILOT/DRAIN	
1	Internal Pilot External Drain
2	External Pilot External Drain
3	Internal Pilot Internal Drain
4	External Pilot Internal Drain

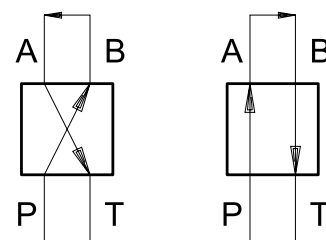
MECHANICAL (Omit if not required)	
R	Reverse operator 2 position spring centered solenoid A supplied . Code R available in D08 and D10 sizes only.
Z	Pilot pressure reducer. Mandatory with pilot drain 1 and 3 when pressure is higher than 3000 psi (210 bar).

TYPICAL ORDERING CODE:
VED07MG-3AC-100-A1-OBWE0D-A

SPOOLS					
NAME	SYMBOLS	DESCRIPTION	APPLICATION	SIZE	FUNCTION MATCHING
AC		METER IN / METER OUT	MOTION CONTROL	05, 07	3, 5
FC		METER IN / METER OUT		08, 10	3, 5R
RL		METER IN / METER OUT (REGEN)		05, 07	3, 5
RA		METER IN / METER OUT (REGEN)		08, 10	3, 5R
				07, 08, 10	3
				07, 08, 10	3

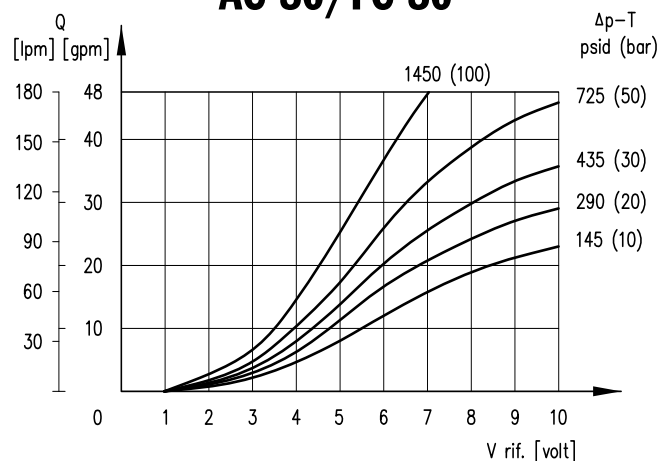
PERFORMANCE CURVES - FLOW GAIN

1. Curves obtained with mineral oil with viscosity of 170 sus (36 cSt) at 122°F (50°C) and dedicated OBE
2. The Δp values are measured between P and T (full loop) valve ports.
3. Typical flow rate curves at constant Δp related to the reference signal and measured for the available spools and obtained after linearization in factory of the characteristic curve through the digital amplifier.



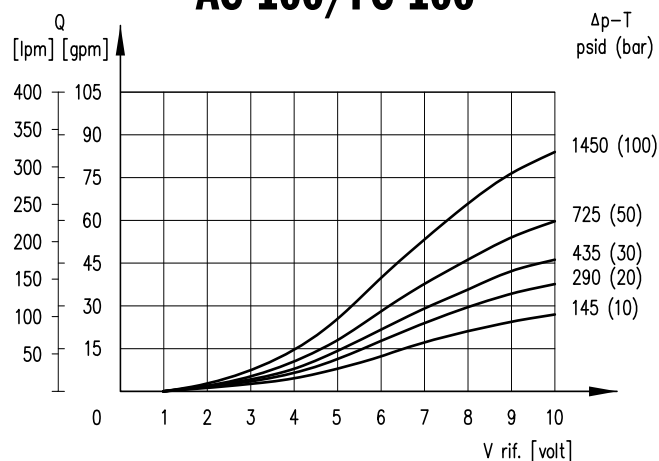
VED05*MG

AC-80/FC-80

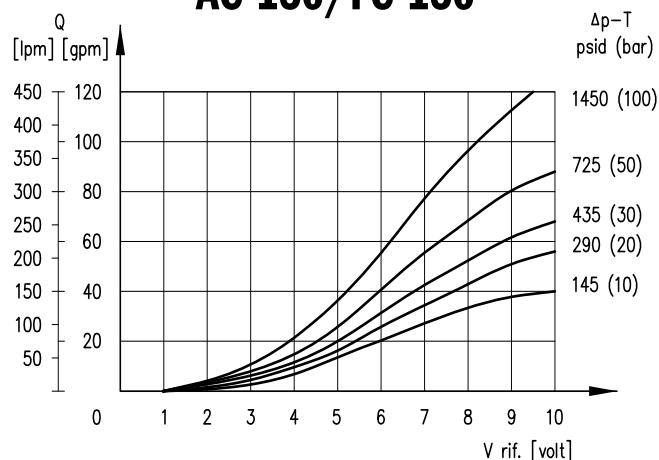


VED07MG

AC-100/FC-100



AC-150/FC-150



RESPONSE TIME

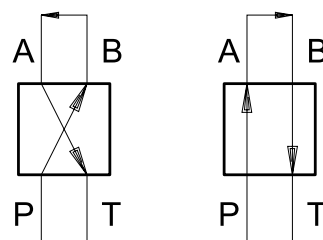
VED05*MG	ENERGIZING	DE-ENERGIZING
	0 ► 100%	100% ► 0
TIMES [ms]	45	25

RESPONSE TIME

VED07MG	ENERGIZING	DE-ENERGIZING
	0 ► 100%	100% ► 0
TIMES [ms]	65	35

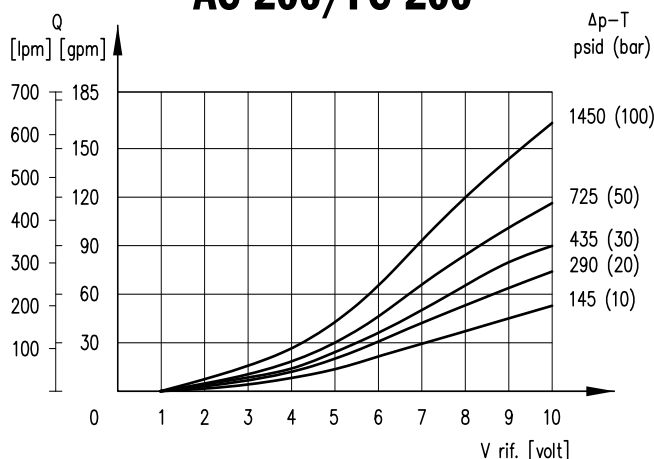
PERFORMANCE CURVES - FLOW GAIN

1. Curves obtained with mineral oil with viscosity of 170 sus (36 cSt) at 122°F (50°C) and dedicated OBE
2. The Δp values are measured between P and T (full loop) valve ports.
3. Typical flow rate curves at constant Δp related to the reference signal and measured for the available spools and obtained after linearization in factory of the characteristic curve through the digital amplifier.



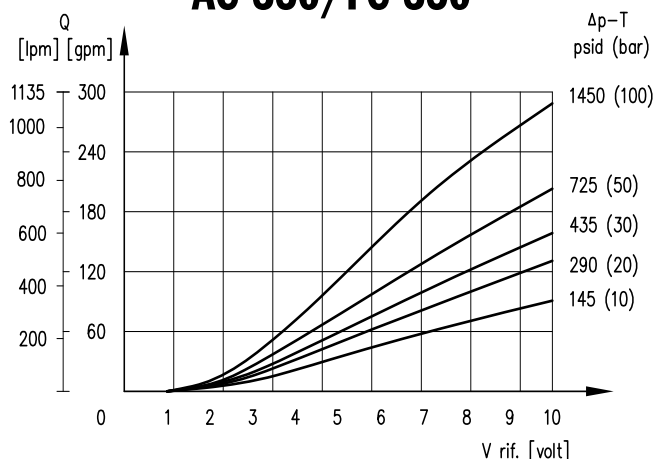
VED08MG

AC-200/FC-200

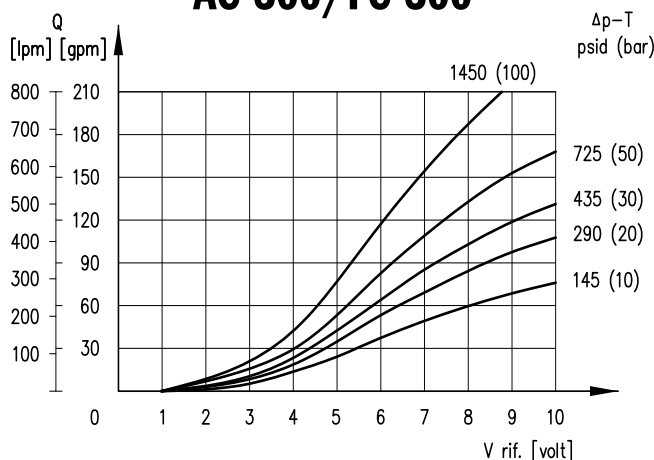


VED10MG

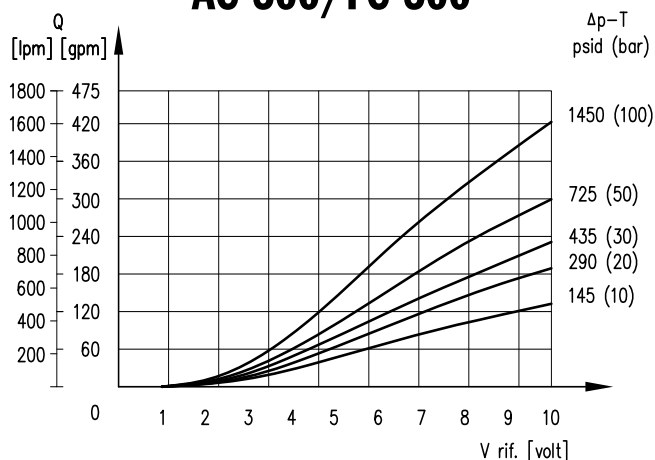
AC-350/FC-350



AC-300/FC-300



AC-500/FC-500



RESPONSE TIME

VED08MG	ENERGIZING	DE-ENERGIZING
	0 ► 100%	100% ► 0
TIMES [ms]	85	55

RESPONSE TIME

VED10MG	ENERGIZING	DE-ENERGIZING
	0 ► 100%	100% ► 0
TIMES [ms]	140	160

PILOTING AND DRAINAGE

The VED*MG valves are available with piloting and drainage, both internal and/or external.

The version with internal pilot without pressure reducer is suitable only on systems where the pressure is not higher than 3000 psi (210 bar).

When the system pressure exceeds 3000 psi (210 bar) the use of the version with external pilot is mandatory, or alternatively, the version with internal pilot and pressure reducer. The pressure reducer has fixed adjustment of 430 psi (30 bar).

The version with external drainage allows a higher back pressure on the unloading.

CODE	PILOT	X PLUG	DRAIN	Y PLUG
1	Internal	□	External	■
2	External	■	External	■
3	Internal	□	Internal	□
4	External	■	Internal	□

■ Plugged □ Unplugged

PILOTING REQUIREMENTS

Minimum value of piloting pressure on port X: 430 psi (30 bar).

PILOTING FLOW REQUIRED WITH OPERATION 0 ► 100%		
VED05*MG	0.55 gpm	2.1 lpm
VED07MG	0.63 gpm	2.4 lpm
VED08MG	1.45 gpm	5.5 lpm
VED10MG	1.71 gpm	6.5 lpm

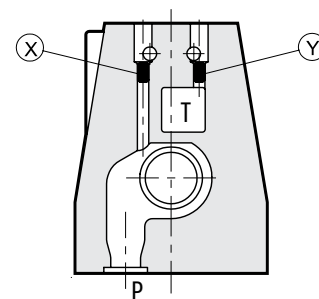
PILOTING VOLUME REQUIRED WITH OPERATION 0 ► 100%		
VED05*MG	0.11 in ³	1.7 cm ³
VED07MG	0.19 in ³	3.2 cm ³
VED08MG	0.55 in ³	9.1 cm ³
VED10MG	1.31 in ³	21.6 cm ³

PLUG SIZE:

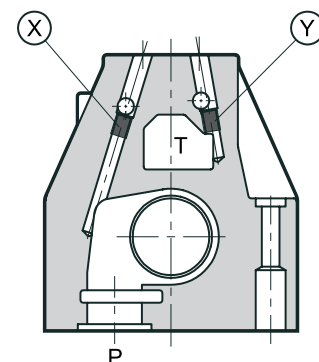
VED05*MG	M5x6 mm
VED07MG	M6x8 mm
VED08MG	M6x8 mm
VED10MG	M6x8 mm

PLUG MOUNTING

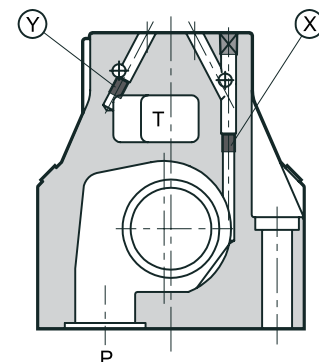
VED05*MG



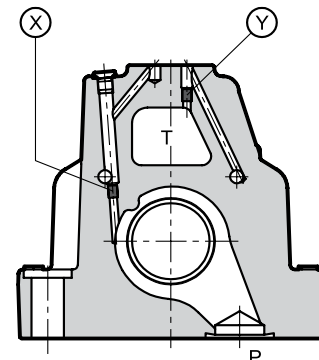
VED07MG



VED08MG



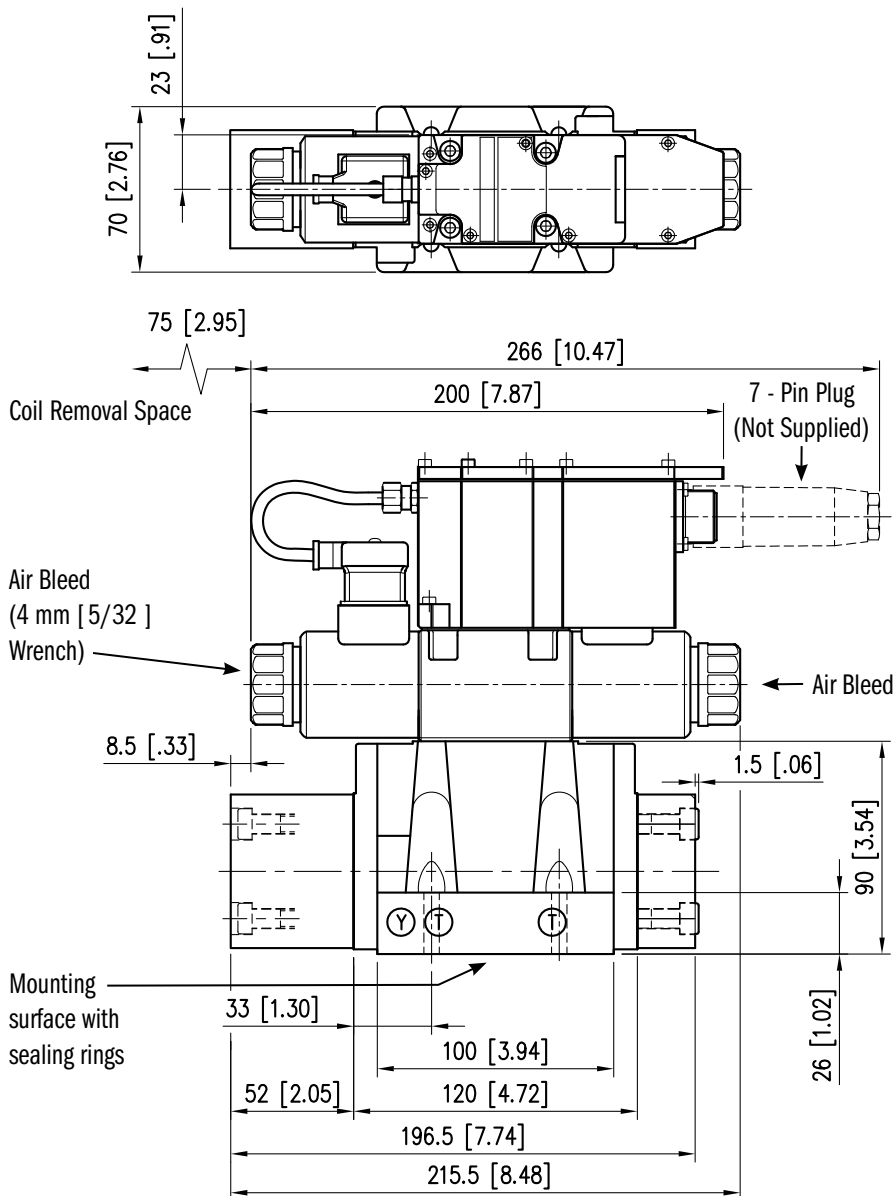
VED10MG



OVERALL AND MOUNTING DIMENSIONS FOR VED05*MG

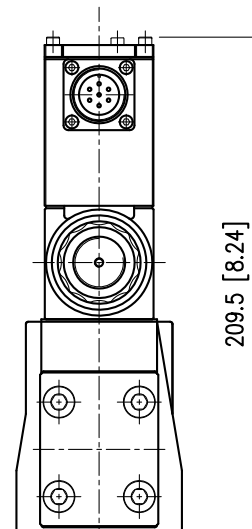
VED05*MG-3

Dimensions in mm [IN]



In order to avoid electromagnetic noises and fulfill the EMC regulations, a 7 pin metal plug according to MIL-C-5015 G should be used instead of the standard plastic 6+PE plug.

The plug is not supplied, but can be ordered separately.



NOTES:

1. At the first start up, or after a long period of no use, it is necessary to vent the air through the air bleed placed at the end of the solenoid tube.
2. For single solenoid overall dimensions see related drawing. See page 11.

THREAD OF MOUNTING HOLES

1/4 - 20 UNC - 2B x 0.60

SEALING RINGS

Qty. 5 O-ring AS568-014 90 shore A

Qty. 2 O-ring AS568-012 90 shore A

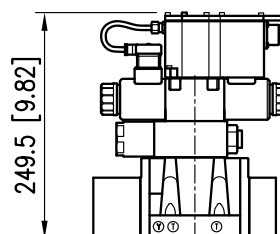
FASTENING

4 bolts 1/4-20 UNC-2B x 1 1/2

TIGHTENING TORQUE

6 lb.ft (8.13 Nm)

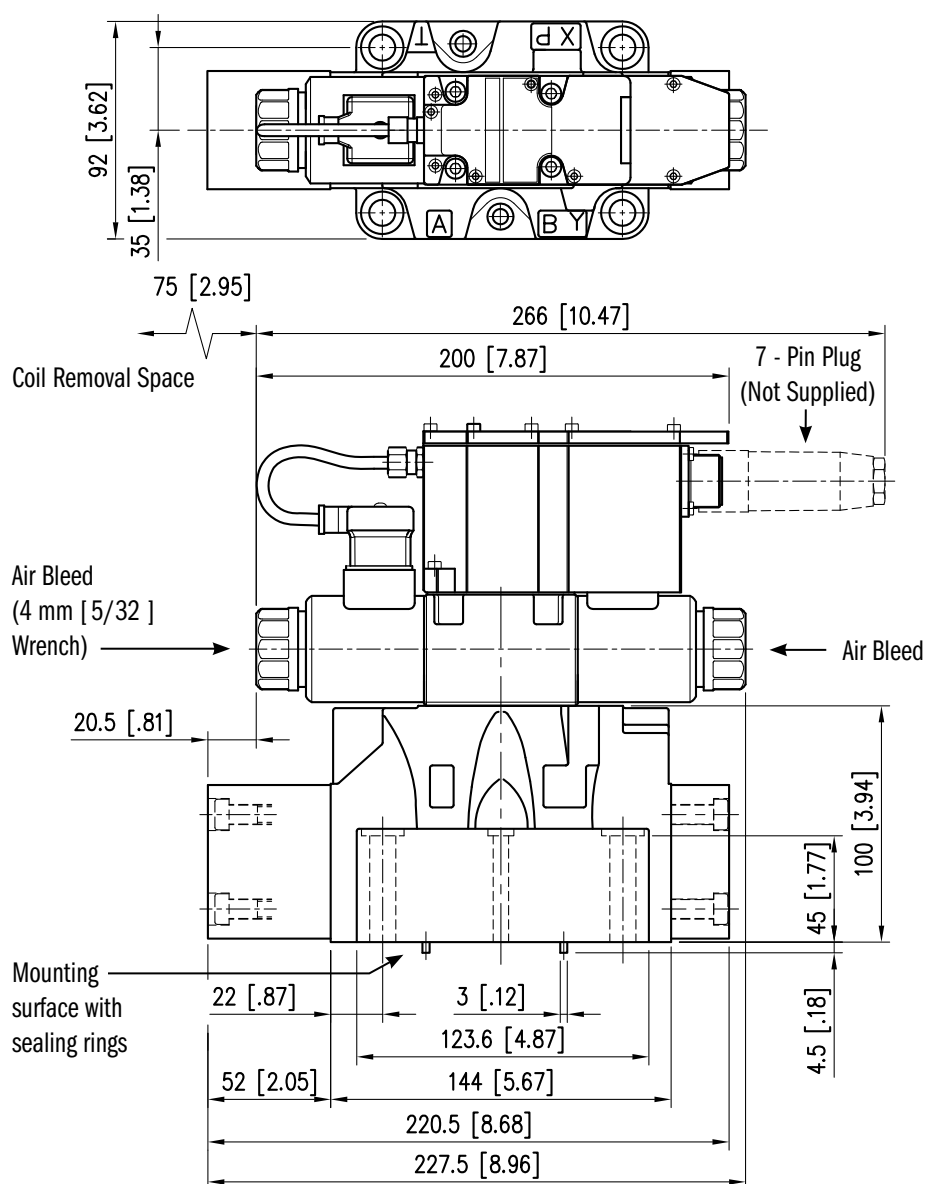
VED05*MG*Z



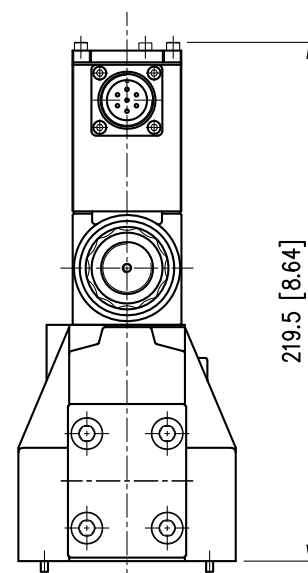
OVERALL AND MOUNTING DIMENSIONS FOR VED07MG

VED07MG-3

Dimensions in mm [IN]



In order to avoid electromagnetic noises and fulfill the European EMC regulations, a 7 pin metal plug according to MIL-C-5015 G should be used instead of the standard plastic 6+PE connector EN 175201-408 (formerly DIN 43563).



NOTES:

- At the first start up, or after a long period of no use, it is necessary to vent the air through the air bleed placed at the end of the solenoid tube.
- For single solenoid overall dimensions see related drawing. See page 11.

THREAD OF MOUNTING HOLES

1/4 - 20 UNC - 2B x 0.6

3/8 - 16 UNC - 2B x 0.9

SEALING RINGS

Qty. 4 O-ring 22.22mm ID x 2.62mm CS 90 shore A

Qty. 2 O-ring AS568-013 90 shore A

FASTENING

2 bolts 1/4-20 UNC-2B x 2 (50 mm)

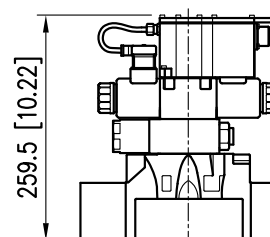
4 bolts 3/8-16 UNC-2B x 2 1/2 (60 mm)

TIGHTENING TORQUE

1/4 - 20 UNC - 2B: 6 lb.ft (8.13 Nm)

3/8 - 16 UNC - 2B: 29.5 lb.ft (40 Nm)

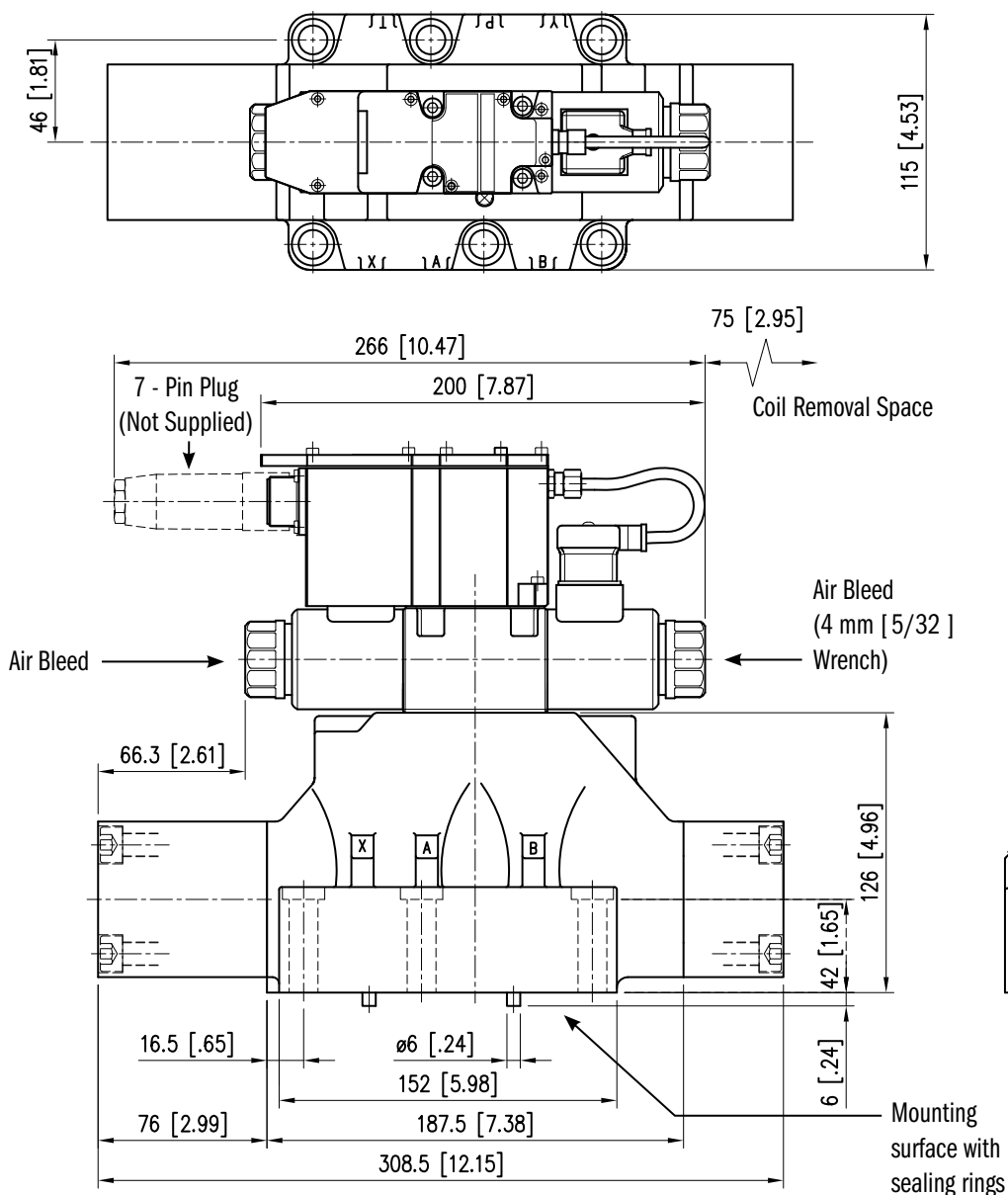
VED07MG*Z



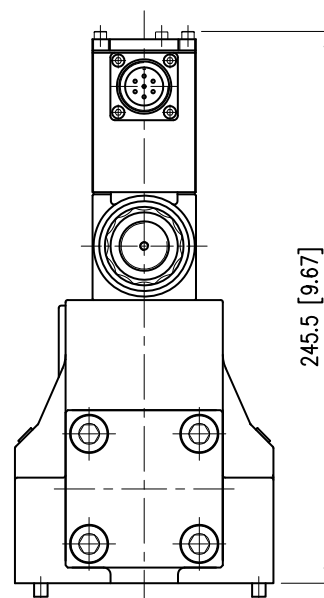
OVERALL AND MOUNTING DIMENSIONS FOR VED08MG-3

VED08MG-3

Dimensions in mm [IN]



In order to avoid electro-magnetic noises and fulfill the EMC regulations, a 7 pin metal plug according to MIL-C-5015 G should be used instead of the standard plastic 6+PE plug.



NOTES:

1. At the first start up, or after a long period of no use, it is necessary to vent the air through the air bleed placed at the end of the solenoid tube.
2. For single solenoid overall dimensions see the related drawing. See page 11.

THREAD OF MOUNTING HOLES

1/2 - 13 UNC x 0.9

SEALING RINGS

Qty. 4 O-ring AS568-123 90 shore A

Qty. 2 O-ring AS568-117 90 shore A

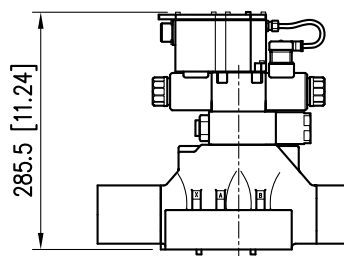
FASTENING

6 bolts 1/2 - 13 UNC x 2 1/2 (60 mm)

TIGHTENING TORQUE

51 lb.ft (69 Nm)

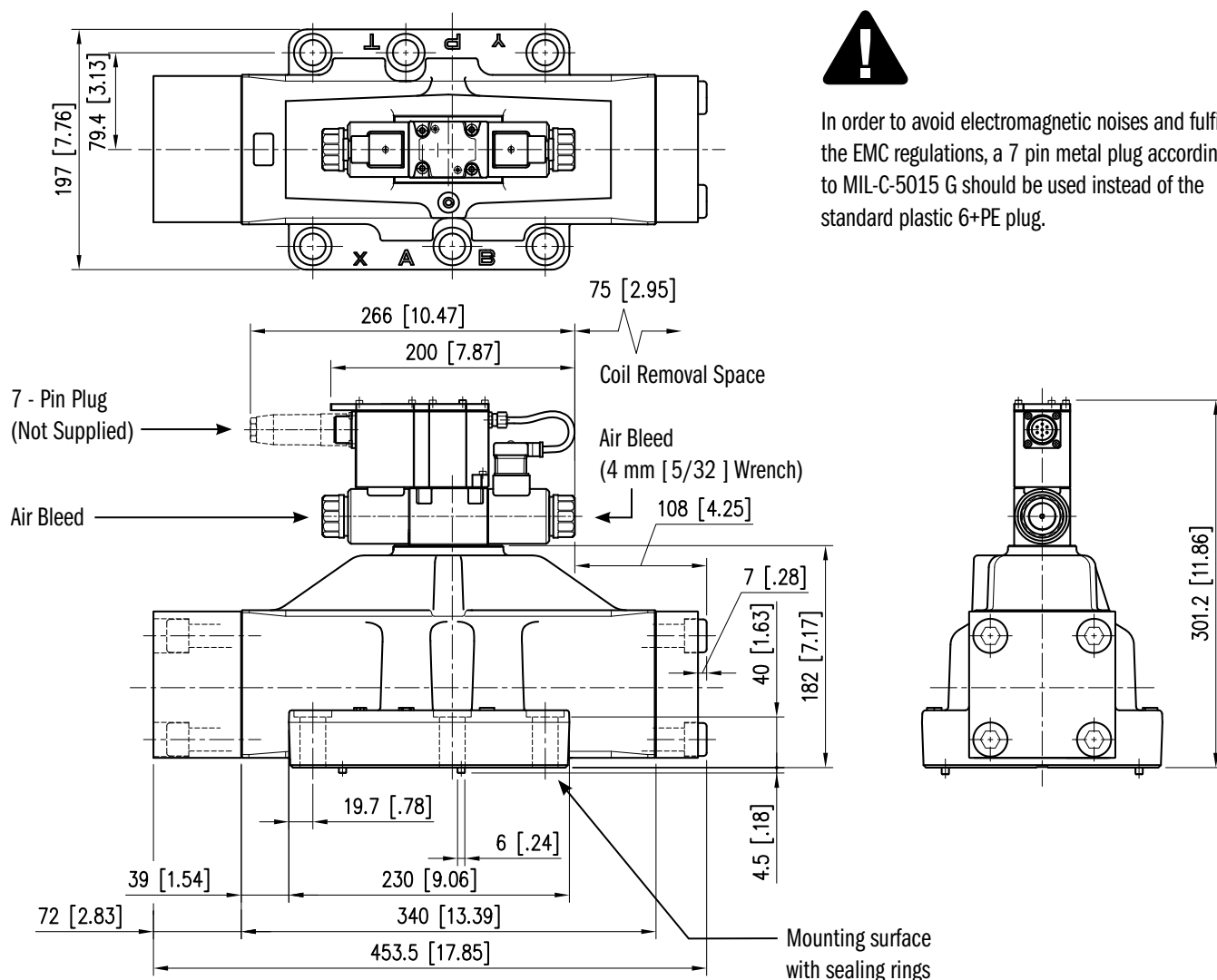
VED08MG*Z



OVERALL AND MOUNTING DIMENSIONS FOR VED10MG-3

VED10MG-3

Dimensions in mm [IN]



NOTES:

1. At the first start up, or after a long period of no use, it is necessary to vent the air through the air bleed placed at the end of the solenoid tube.
2. For single solenoid overall dimensions see the related drawing. See page 11.

THREAD OF MOUNTING HOLES

3/4 - 10 UNC - 2B x 1.6

SEALING RINGS

Qty. 4 O-ring AS568-222 90 shore A

Qty. 2 O-ring AS568-117 90 shore A

FASTENING

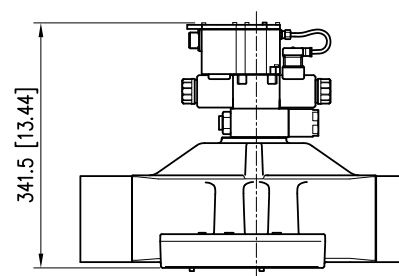
6 bolts 3/4 - 10 UNC - 2B x 2 3/4 (70 mm)

TIGHTENING TORQUE

245 lbf·ft (332 Nm)

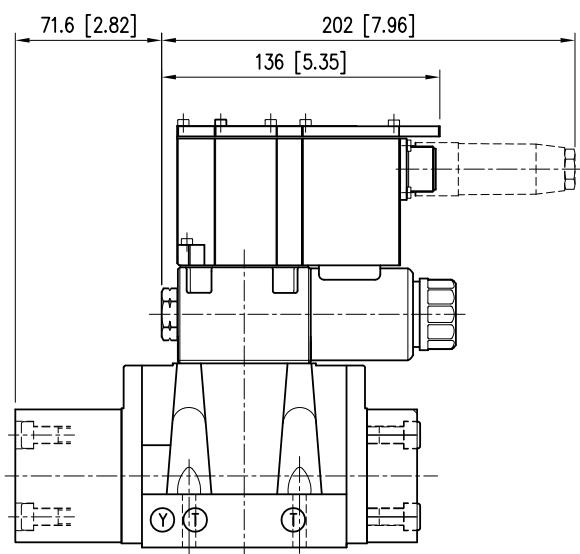
high strength: 415 lb.ft (562 Nm)

VED10MG*Z

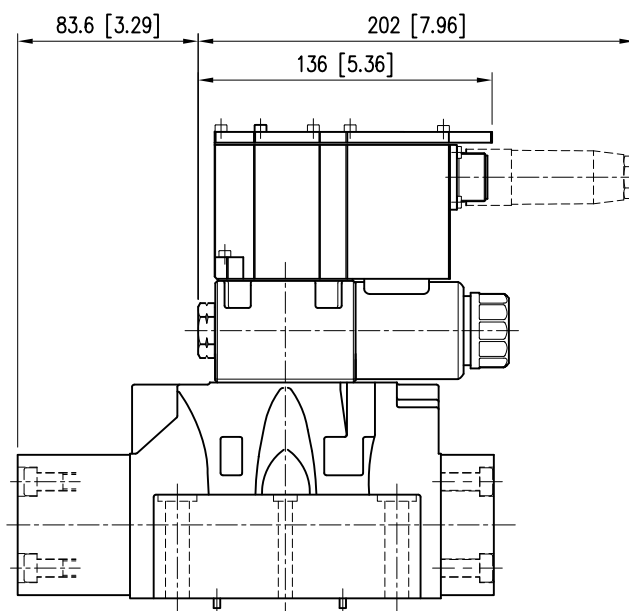


OVERALL DIMENSIONS FOR SINGLE SOLENOID VERSIONS

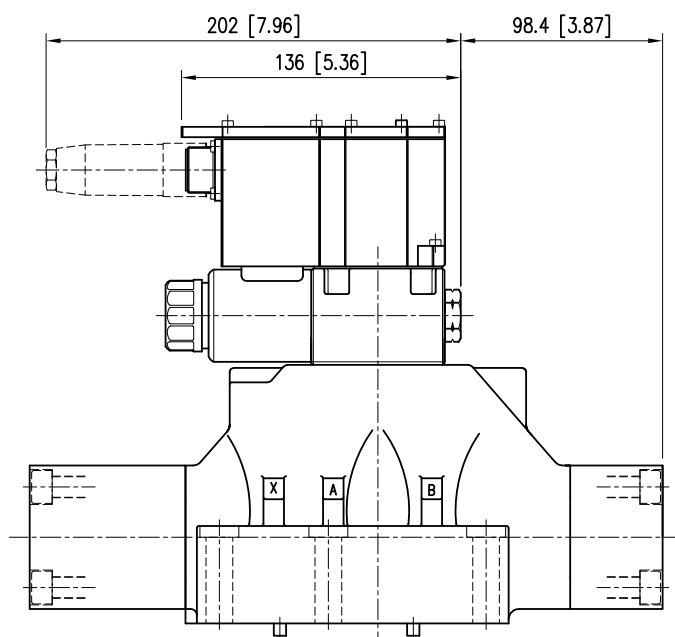
VED05*MG-5



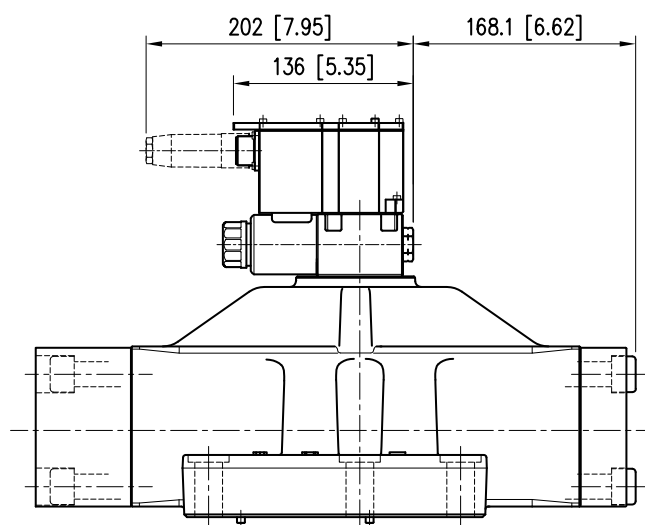
VED07MG-5



VED08MG-5R



VED10MG-5R



NOTES:

For missing dimensions refer to the previous drawings.

ELECTRICAL CHARACTERISTICS

The proportional valve is controlled by a digital amplifier (driver), which incorporates a microprocessor that controls all the valve functions.

THE STANDARD VALVE IS SET AT THE FACTORY WITH:

- UP/DOWN ramp at zero value
- No deadband compensation
- Max valve opening (100% of spool stroke)

It is possible to customize these and others parameters using the optional kit, **LINPC-USB** to be ordered separately (see related literature).

THE DIGITAL DRIVER ENABLES THE VALVE TO REACH BETTER PERFORMANCE COMPARED TO THE ANALOG VERSION, AND GIVES:

- Reduced response times
- Optimization and reproducibility of the characteristic curve, optimized in factory for each valve
- Complete interchangeability in case of valve replacement
- Opportunity to set, via software, the functional parameters
- Opportunity to perform a diagnostic program by means of the LIN connection
- High immunity to electromagnetic interference

The electronic card is available with (OBC) or without (OBW) external enabling signal feature.

POWER SUPPLY		24V DC (19V to 35V, ripple max 3V pp)
ABSORBED POWER		50 W
MAX CURRENT		2A
DUTY CYCLE		100%
MAIN CONNECTOR		7 pin MIL-C-5015-G (DIN 43563)
ELECTROMAGNETIC COMPATIBILITY (EMC) EUROPEAN DIRECTIVE 2004/108/EC	Emission	IEC EN 61000-6-4
	Immunity	IEC EN 61000-6-2
PROTECTION AGAINST ATMOSPHERIC AGENTS	IEC 60529	IP 67
ELECTRICAL PROTECTION	Overload Electronics Overheating Power Failure Or < 4mA	

E0 - VOLTAGE

COMMAND SIGNAL (DIFFERENTIAL)	Single Solenoid	0 - 10V DC
	Dual Solenoid	±10V DC
IMPEDANCE		> 50 kΩ

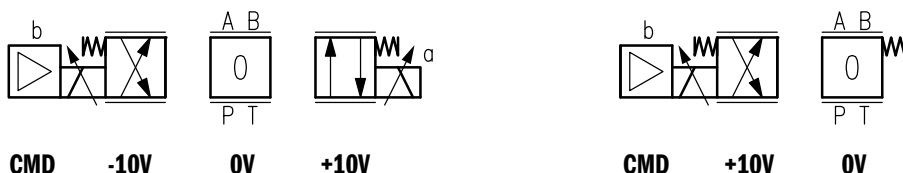
E1 - CURRENT

COMMAND SIGNAL	4 - 20 mA
IMPEDANCE	500 Ω

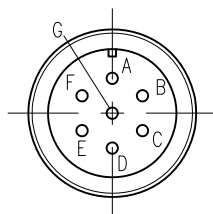
E0 VERSION - VOLTAGE REFERENCE SIGNAL

This is the most common version; it makes the valve completely interchangeable with the traditional proportional valves with analog type integrated electronics. The valve has only to be connected as indicated below.

The input signal is differential type and drives the valve as shown in the chart below. The spool stroke is proportional to UD - UE. If only one input signal (single-end) is available, the pin B (0V power supply) and the pin E (0V reference signal) must be connected through a jumper and both connected to GND, electric panel side.

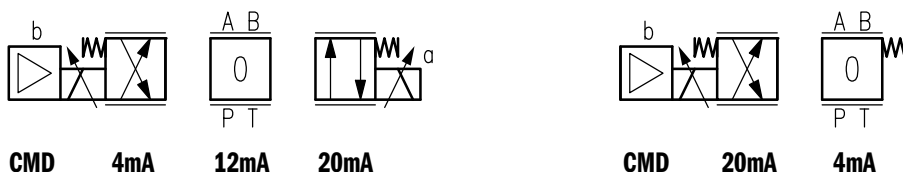


A	24V	Power supply positive. Use an external fuse 5A/50V fast type for protecting electronics.
B	0V	Power supply zero (0V)
C	NC or 24V	OBW Version: Not wired OBC Version: Valve enable
D	± 10V or 0 - 10V	Differential command signal (+V)
E	0V	Differential command signal (-V)
F	0 - 10V	Output monitor for command signal
G	GND	Protective ground

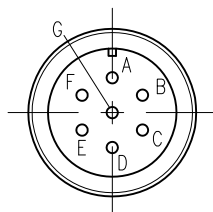


E1 VERSION - CURRENT REFERENCE SIGNAL

The current reference signal is supplied in a range of 4 - 20 mA and drives the valve as shown in the chart below. If the current drops to less than 4 mA, the card de-energizes the coils and the valve will go to rest position. The valve will restart when the command signal rises into the 4 to 20 mA range.



A	24V	Power supply positive. Use an external fuse 5A/50V fast type for protecting electronics.
B	0V	Power supply zero (0V)
C	NC or 24V	OBW Version: Not wired OBC Version: Valve enable
D	4 - 20 mA	Command signal
E	0V	Return
F	0 - 10V	Output monitor for command signal
G	GND	Protective ground



WIRING:

Connections must be made via the 7 pin plug mounted on the amplifier.

RECOMMENDED CABLE SIZES ARE:

POWER SUPPLY

18 AWG (0.75 mm²)
for cables up to 65 ft (20 m).

16 AWG (1.00 mm²)
for cables up to 130 ft (40 m).

SIGNAL CABLES

20 AWG (0.50 mm²)

A suitable cable would have 7 wires, a separate shield for the signal wires and an overall shield.

PIN C:

Pin C is reserved for the Enable feature and is not connected on the standard card (OBW, see code at page 3) because the enable signal is run directly from the card.

In the OBC card version the Enable feature is external; Pin C has to be connected with 24V.

PIN F:

For reading this value as a current monitor signal, the card must be energized. This value has to be read on Pin B (0V).

A value of 10V means a current to the solenoid at 100% rating.

SINGLE SOLENOID		
Pin F	Pin D	
	E0	E1
-	-	-
0V	0V	4mA
+10V	+10V	20mA

DUAL SOLENOID		
Pin F	Pin D	
	E0	E1
+10 V	-10V	4mA
0V	0V	12mA
+10V	+10V	20mA

OBW OR OBC VERSION?

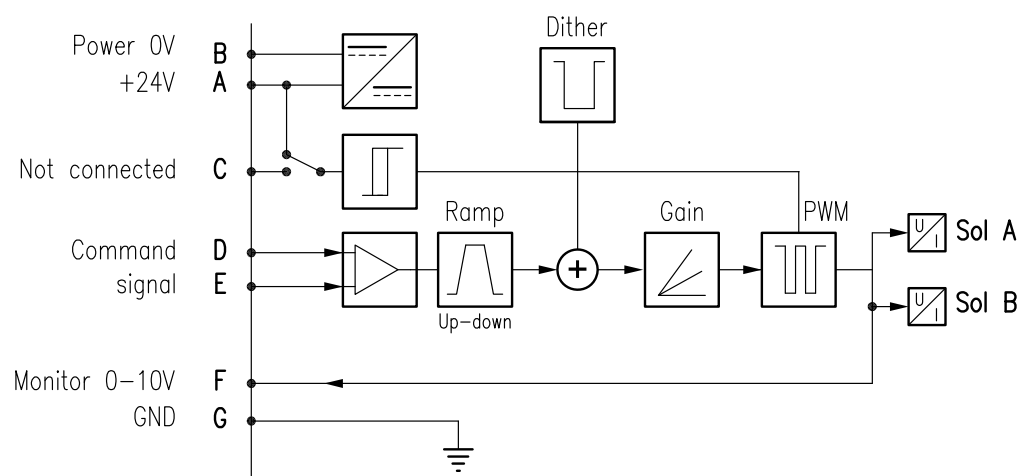
The standard option, code OBW, is programmed for internal enable. The enable signal is taken directly from the power supply of the valve. The card is enabled as soon as supply power is applied to Pins A and B.

Apply command signal to the valve and the output drivers energize the coil. The power supply must be switched off to disable the output to the valve.

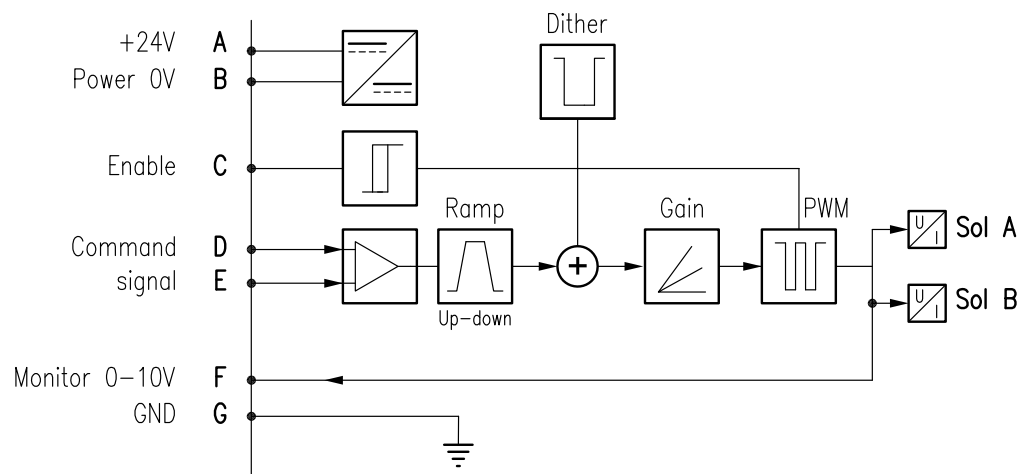
The OBC option is programmed for the external enable feature. A 24 V signal must be applied to Pin C to enable the output drivers to energize the valve coils.

The valve operation can be stopped by simply removing the enable signal from Pin C.

OBW CARD VERSION



OBC CARD VERSION



MOUNTING SURFACES

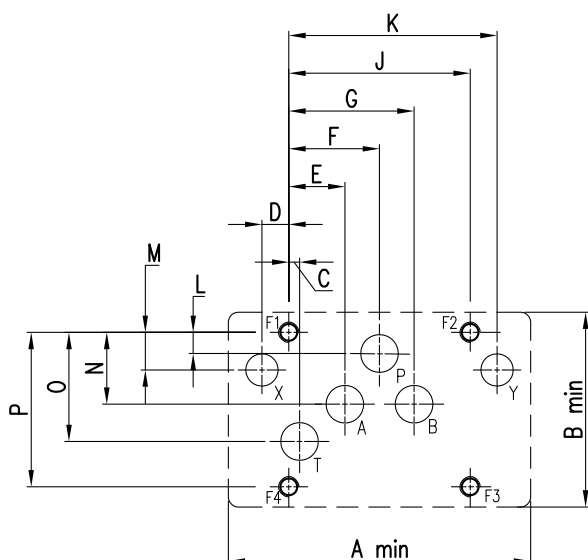
ALL THE MOUNTING SURFACES REFER TO NFPA T3.5.1 R2-2002 AND ISO 4401:2005 STANDARDS.

The mounting surface standards recommend metric coarse threads. However, subplates are commercially available with UNC threads. Select a bolt size that matches the threads in the mounting surface.

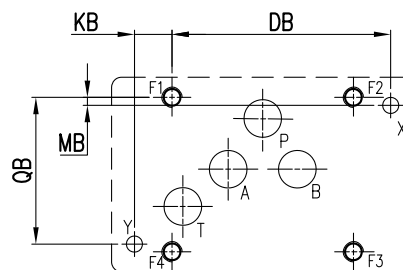
Dimensional tolerances are ± 0.1 mm (0.004") for bolt and pin location; ± 0.2 mm (0.008") for the other quotes.

The minimum depth of the blind hole G where required is 8 mm (0.31 in).

D05 - ALTERNATIVE A



D05 - ALTERNATIVE B



PORT FUNCTION:

P = PRESSURE PORT
T = TANK PORT

A = FIRST CYLINDER PORT
X = PILOT PORT

B = SECOND CYLINDER PORT
Y = DRAIN PORT

	MM	INCH
P, A, B, T MAX	Ø 11.2	Ø 0.44
X, Y ALT. A	Ø 6.3	Ø 0.25
X, Y ALT. B	Ø 4.8	Ø 0.19
MOUNTING BOLT THREAD SIZE	M6	1/4 - 20 UNC

	MM	INCH
A	90	3.54
B	58	2.28
C	3.2	0.126
D	8	0.310
E	16.7	0.660
F	27	1.06
G	37.3	1.47

	MM	INCH
J	54	2.125
K	62	2.44
L	6.3	0.25
M	11.2	0.44
N	21.4	0.84
O	32.5	1.28
P	46	1.82

	MM	INCH
DB	65.1	2.563
KB	11.2	0.44
MB	2.4	0.09
QB	43.7	1.72

NOTES:

NFPA D05 and ISO 4401-05 indicate different diameters for X and Y holes:

NFPA: Ø 9.6 max in D05 alt. A

Ø 4.8 max in D05 alt. B

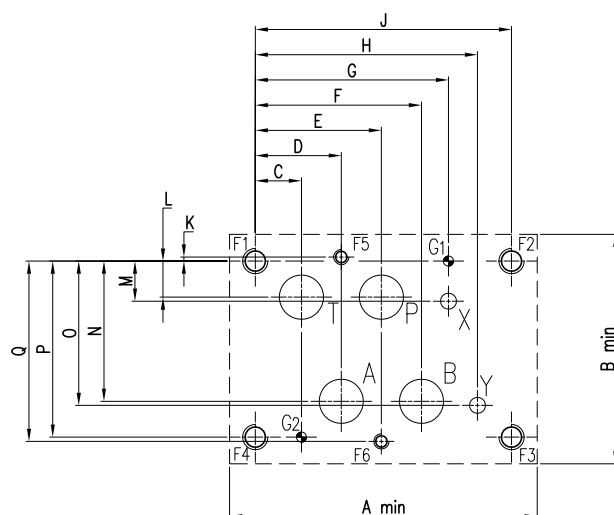
ISO: Ø 6.3 max both

D07

	MM	INCH
P, A, B, T MAX	Ø 17.5	Ø 0.69
X, Y MAX	Ø 6.3	Ø 0.25
G MAX	Ø 4	Ø 0.16
MOUNTING BOLT THREAD SIZE F1 - F4	M10	3/8-16 UNC
MOUNTING BOLT THREAD SIZE F5 - F6	M6	1/4-20 UNC

	MM	INCH
A	122	4.8
B	91	3.58
C	18.3	0.72
D	34.1	1.34
E	50	1.97
F	65.9	2.60
G	76.6	3.016
H	88.1	3.47

	MM	INCH
J	101.6	4
K	1.6	0.063
L	14.3	0.56
M	15.9	0.626
N	55.6	2.19
O	57.2	2.25
P	69.9	2.75
Q	71.5	2.815

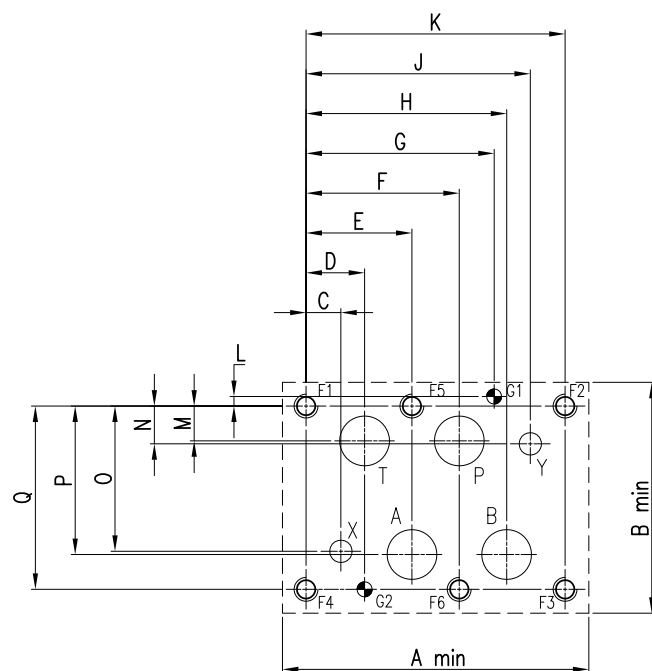


D08

	MM	INCH
P, A, B, T MAX	Ø 25	Ø 0.98
X, Y MAX	Ø 11.2	Ø 0.44
G MAX	Ø 7.5	Ø 0.30
MOUNTING BOLT THREAD SIZE	M12	1/2-13 UNC

	MM	INCH
A	154	6
B	116	4.57
C	17.5	0.69
D	29.4	1.157
E	53.2	2.09
F	77	3.03
G	94.5	3.719
H	100.8	3.97

	MM	INCH
J	112.7	4.44
K	130.2	5.125
L	4.80	0.187
M	17.5	0.69
N	19	0.75
O	73	2.874
P	74.6	2.93
Q	92.1	3.625

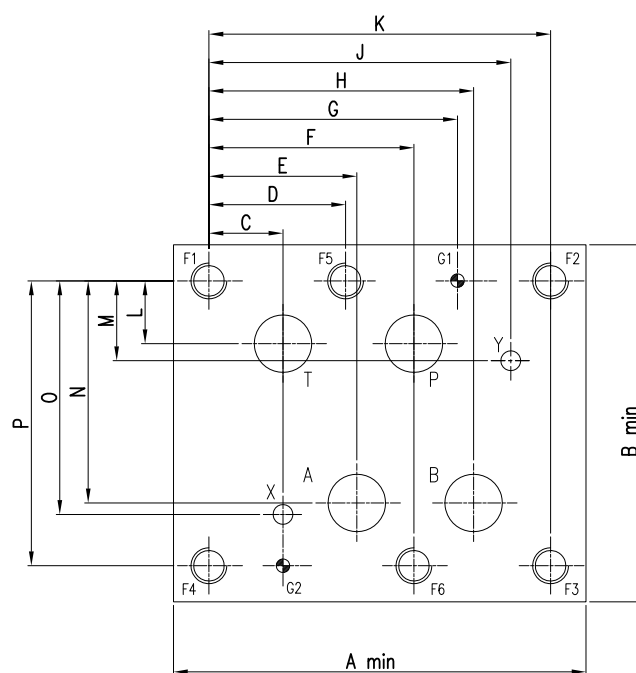


D10

	MM	INCH
P, A, B, T MAX	Ø 32	Ø 1.25
X, Y MAX	Ø 11.2	Ø 0.44
G MAX	Ø 7.5	Ø 0.30
MOUNTING BOLT THREAD SIZE	M20	¾-10 UNC

	MM	INCH
A	230	9.06
B	199	7.83
C	41.3	1.63
D	76.2	3
E	82.5	3.25
F	114.3	4.5
G	138.6	5.457
H	147.6	5.81

	MM	INCH
J	168.3	6.63
K	190.5	7.5
L	35	1.38
M	44.5	1.75
N	123.8	4.87
O	130.2	5.13
P	158.8	6.25



VED*MG - PILOT OPERATED DIRECTIONAL CONTROL VALVES WITH OBE

APPLICATION DATA

FLUIDS

All pressure drops shown on these data pages are based on 170 SUS fluid viscosity and 0.87 specific gravity. For any other specific gravity (G1) the pressure drop (ΔP) will be approx. $\Delta P_1 = \Delta P (G_1/G)$. See the chart for other viscosities.

FLUID VISCOSITIES	Cst	10	14.5	32	36	43	54	65	76	86	108	216	324	400
	SUS	60	75	150	170	200	250	300	350	400	500	1000	1500	1900
MULTIPLIER		0.77	0.81	0.97	1.00	1.04	1.10	1.15	1.20	1.24	1.31	1.56	1.72	1.83

Use mineral oil-based hydraulic fluids HL or HM type, according to ISO 6743-4. For these fluids, use NBR seals. For fluids HFDR type (phosphate esters) use FPM seals (code V). For the use of other kinds of fluid such as HFA, HFB, HFC, please consult our technical department.

Using fluids at temperatures higher than 180 degrees F causes the accelerated degradation of seals as well as degradation of the fluids physical and chemical properties.

From a safety standpoint, temperatures above 130 degrees F are not recommended.

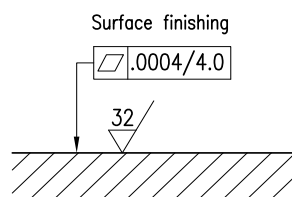
RANGE TEMPERATURES:	Ambient	- 4 to +130 °F	-20 to +54 °C
	Fluid	- 4 to +180 °F	-20 to +82 °C
FLUID VISCOSITY	Range	60 -1900 SUS	10 - 400 cSt
	Recommended	120 SUS	25 cSt
FLUID CONTAMINATION		ISO 4406:1999 Class 18/16/13	

INSTALLATION

VED*MG valves can be installed in any position without impairing correct operation.

Bleed the air from the hydraulic circuit. Be sure that the solenoid tube is always full of oil. It may be necessary to vent entrapped air from the solenoid tube in certain applications or after a long shutdown period. The air bleed vent is located on the end of the solenoid tube. See the drawings for the location. Be sure to close the air bleed when the process is complete.

Valves are fixed by means of screws or tie rods on a flat surface with planarity and roughness equal to or better than those indicated in the relative symbols. If minimum values are not observed, fluid can easily leak between the valve and support surface.



BOLT KITS

D05 SIZE	BD05H -150 - B	Valve Only	1009397
D07 SIZE	BD07 - 250	Valve Only	1009400
D08 SIZE	BD08 - 250	Valve Only	1009401
D10 SIZE	BD10 - 275	Valve Only	1013038

7 PIN PLUGS

VEA-3P7P-A	Straight plug 7 pin plastic housing	264893
VEA-3P7M-A	Straight plug 7 pin metal housing	265947

SEAL KIT

D05* SIZE	Buna Seal Kit	1013174
	Viton Seal Kit	1013175
D07 SIZE	Buna Seal Kit	1013176
	Viton Seal Kit	1013177
D08 SIZE	Buna Seal Kit	1013178
	Viton Seal Kit	1013179
D10 SIZE	Buna Seal Kit	1013180
	Viton Seal Kit	1013181

SUBPLATES

D05 alt. A SIZE	AD05JESPS16S	Aluminium	SAE-16	351716AJ
	DD05JESPS16S	Ductile	SAE-16	351716AK
D07 SIZE	AD07SPS016S	Aluminium	SAE-16	1013039AB
	DD07SPS016S	Ductile	SAE-16	1013039AC
D08 SIZE	AD08SPS020S	Aluminium	SAE-20	265803AP
	DD08SPS020S	Ductile	SAE-20	265803AL
D10 SIZE	AD10SPS032S	Aluminium	SAE-32	1013040AB
	DD10SPS032S	Ductile	SAE-32	1013040AC

NOTES:

1. Max pressure for aluminum subplates: 3000 psi (210 bar)
2. Max pressure for ductile subplates: 5000 psi (350 bar)
3. Always verify subplate port size is proper for the application

ABOUT CONTINENTAL HYDRAULICS

Rugged, durable, high-performance, efficient—the reason Continental Hydraulics' products are used in some of the most challenging applications across the globe. With a commitment to quality customer support and innovative engineering, Continental's pumps, valves, power units, mobile and custom products deliver what the markets demand. Continental has been serving the food production, brick and block, wood products, automotive and machine tool industries since 1962. Learn how our products survive some of the most harsh environments.

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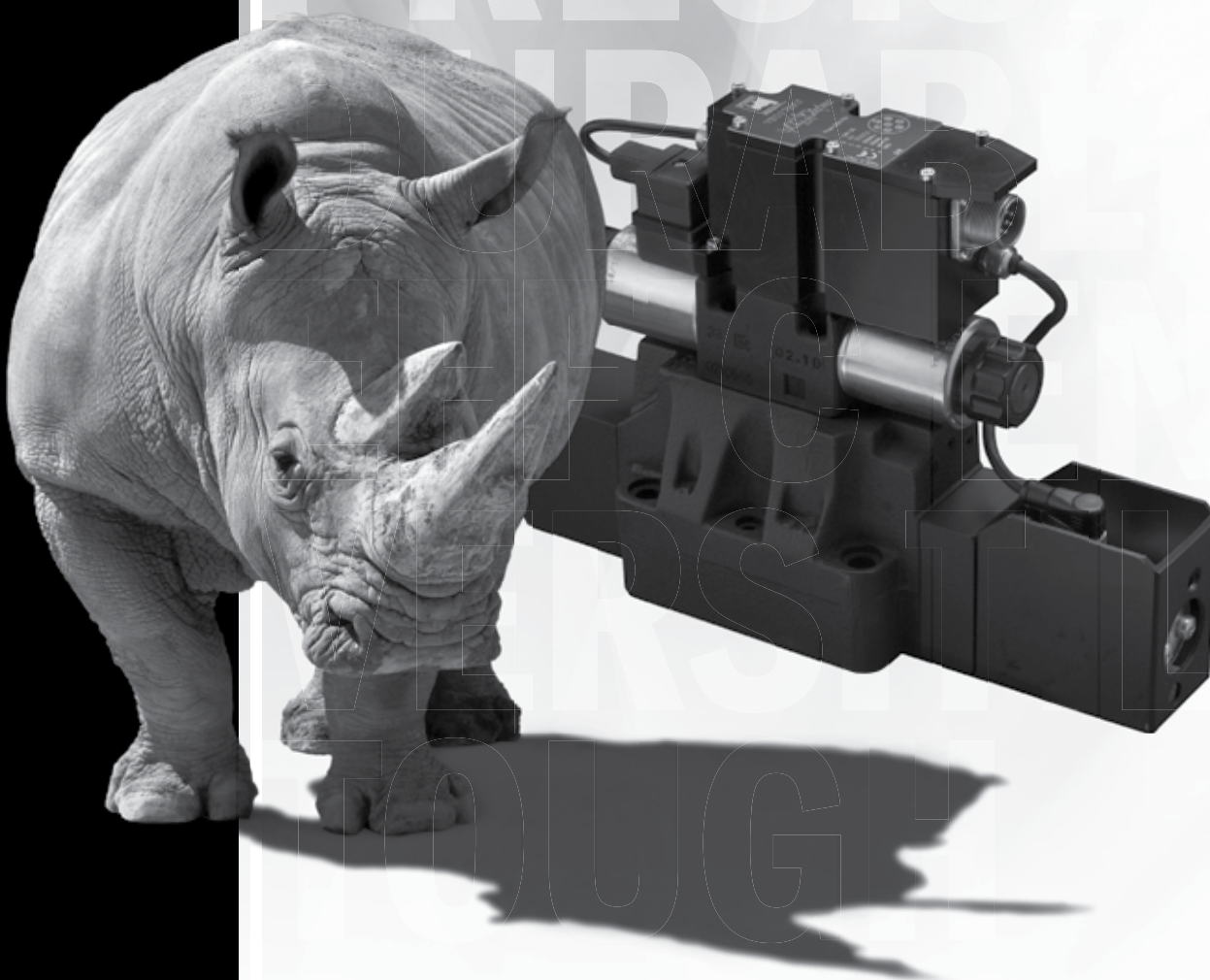
CONTINENTAL



CONTINENTAL HYDRAULICS

VED*MJ

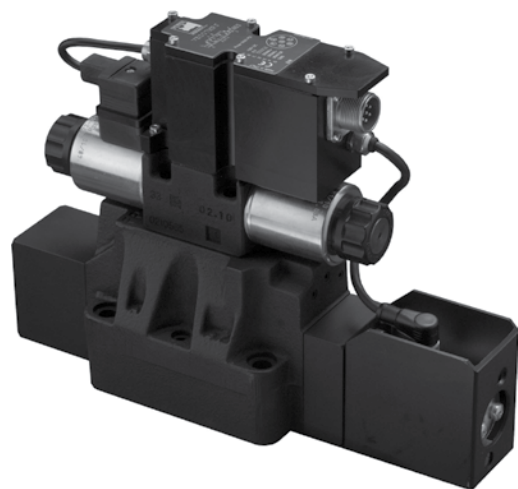
PILOT OPERATED DIRECTIONAL CONTROL VALVES WITH OBE & FEEDBACK



VED*MJ - PILOT OPERATED DIRECTIONAL CONTROL VALVES WITH OBE & FEEDBACK

VED*MJ

PILOT OPERATED DIRECTIONAL CONTROL VALVES WITH OBE & FEEDBACK



DESCRIPTION

Continental Hydraulics VED*MJ pilot operated 4-way proportional valves with On-Board Digital Amplifier and Spool Position sensing, conform to NFPA and ISO 4401:2005 (CETOP RP 121H) mounting standards.

OPERATIONS

These valves are designed to control the direction and oil flow rate based on the degree of command signal supplied to the On-Board Amplifier. In event of a loss in electrical power, the centering springs will return the valve spool to the center position.

The Spool Position Sensor circuit improves the overall valve performance by reducing hysteresis and improving response times.

The On-Board microprocessor controls all the valve functions and is pre-set to optimal valve performance. In-field adjustments can be performed via software to customize the parameters based on your application. The valves with internal pilot are available also with a pressure reducing valve.

TYPICAL PERFORMANCE SPECIFICATIONS

MAXIMUM OPERATING PRESSURE:	P - A - B Ports	5000 psi	350 bar
	T Port (int. drain)	145 psi	10 bar
	T Port (ext. drain)	3600 psi	250 bar
HYSTERESIS	% of Q max	< 0.5%	
REPEATABILITY	% of Q max	< ± 0.2%	
POWER SUPPLY		24V DC (19V to 35V, ripple max 3V pp)	
	MAX CURRENT	3A	
CONNECTION		7 pin (6+gnd) metal	
PROTECTION	IEC 60529	IP 65 / 67	

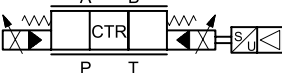
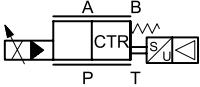
		VED05*MJ		VED07MJ		VED08MJ	
FLOW CAPACITY WITH ΔP 145 PSI (10 BAR)		21 gpm 21/10.5 gpm	80 l/min 80/40 l/min	26.5 gpm 40 gpm 40/20 gpm	100 l/min 150 l/min 150/75 l/min	53 gpm 80 gpm 80/40 gpm	200 l/min 300 l/min 300/150 l/min
MAX FLOW		48 gpm	180 l/min	120 gpm	450 l/min	210 gpm	800 l/min
MOUNTING SURFACE		NFPA D05 alt. A / alt. B ISO 4401-05-* -0-05		NFPA D07 ISO 4401-07-07-0-05		NFPA D08 ISO 4401-08-08-0-05	
WEIGHT	Single Solenoid	18.7 lbs	8.5 Kg	23.2 lbs	10.5 Kg	37.5 lbs	17.0 Kg
	Dual Solenoid	19.8 lbs	9.0 Kg	24.3 lbs	11.0 Kg	38.4 lbs	17.4 Kg

VED **MJ** - - - - **D** - ——— DESIGN LETTER

With Position Feedback

CONNECTION	
OBW	On board electronics 7 pin - no external enable required (STD)
OBC	On board electronics 7 pin external enable on Pin C required

REFERENCE SIGNAL	
E0	Voltage $\pm 10V$ (STD)
E1	Current 4 - 20 mA

FUNCTION	
3	 <p>Dual operator 3 position spring centered</p>
5	 <p>Single operator 2 position spring centered</p> <p>D05 and D07 are available as code 5 only. D08 is available as code 5-R only.</p>

NOMINAL FLOW (with Δp P-T 145 psi)		
05	80	80 l/min (21 gpm)
	80/40	Asymmetrical spool: 80 l/min (21 gpm) on P-A 40 l/min (10.5 gpm) on B-T
07	100	100 l/min (26.5 gpm)
	150	150 l/min (40 gpm)
	150/75	Asymmetrical spool: 150 l/min (40 gpm) on P-A 75 l/min (20 gpm) on B-T
08	200	200 l/min (53 gpm)
	300	300 l/min (80 gpm)
	300/150	Asymmetrical spool: 300 l/min (80 gpm) on P-A 150 l/min (40 gpm) on B-T

PILOT/DRAIN	
1	Internal pilot External drain
2	External pilot External drain
3	Internal pilot Internal drain
4	External pilot Internal drain

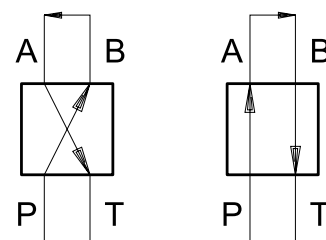
MECHANICAL (Omit if not required)	
R	Reverse operator 2 position spring centered solenoid A supplied . Code R available in D08 size only.
Z	Pilot pressure reducer. Mandatory with pilot drain 1 and 3 when pressure is higher than 3000 psi (210 bar).

TYPICAL ORDERING CODE:
VED07MJ-3AC-100-A3-OBWE0D-A

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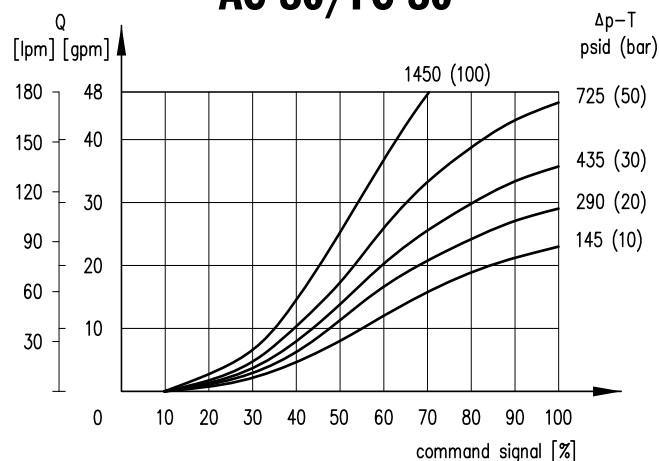
PERFORMANCE CURVES - FLOW GAIN

1. Curves obtained with mineral oil with viscosity of 170 sus (36 cSt) at 122°F (50°C) and dedicated OBE.
2. The Δp values are measured between P and T (full loop) valve ports.
3. Typical flow rate curves at constant Δp related to the reference signal and measured for the available spools and obtained after linearization in factory of the characteristic curve through the digital amplifier.



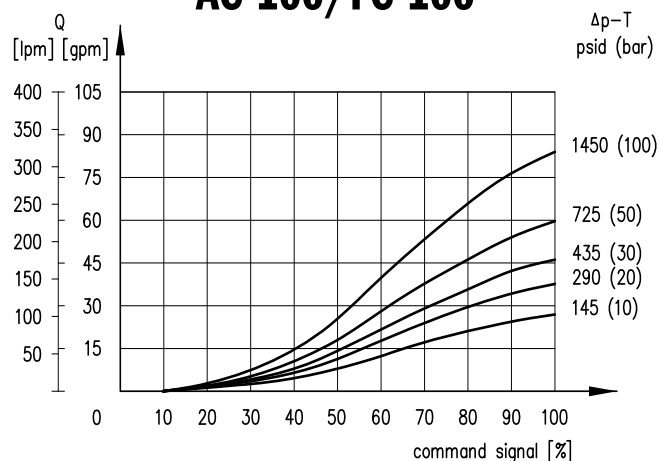
VED05*MJ

AC-80/FC-80

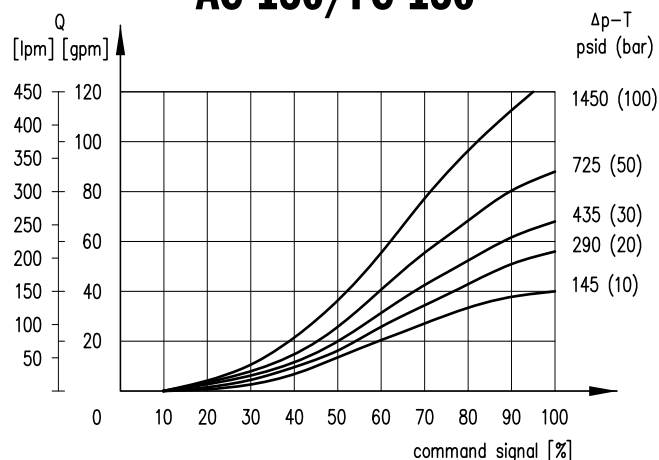


VED07MJ

AC-100/FC-100



AC-150/FC-150



RESPONSE TIME

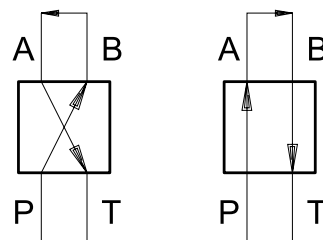
VED05*MJ	ENERGIZING	DE-ENERGIZING
	0 ► 100%	100% ► 0
TIMES [ms]	30	45

RESPONSE TIME

VED07MJ	ENERGIZING	DE-ENERGIZING
	0 ► 100%	100% ► 0
TIMES [ms]	40	50

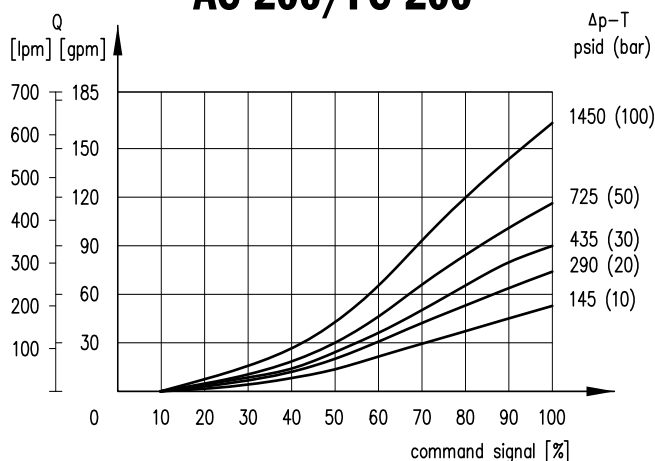
PERFORMANCE CURVES - FLOW GAIN

1. Curves obtained with mineral oil with viscosity of 170 sus (36 cSt) at 122°F (50°C) and dedicated OBE
2. The Δp values are measured between P and T (full loop) valve ports.
3. Typical flow rate curves at constant Δp related to the reference signal and measured for the available spools and obtained after linearization in factory of the characteristic curve through the digital amplifier.

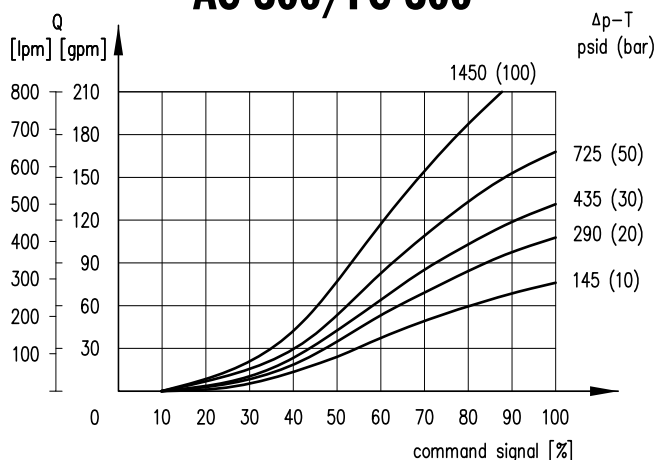


VED08MJ

AC-200/FC-200



AC-300/FC-300



RESPONSE TIME

VED08MJ	ENERGIZING	DE-ENERGIZING
	0 ► 100%	100% ► 0
TIMES [ms]	45	65

PILOTING AND DRAINAGE

The VED*MJ valves are available with piloting and drainage, both internal and/or external.

The version with internal pilot without pressure reducer is suitable only on systems where the pressure is not higher than 3000 psi (210 bar).

When the system pressure exceeds 3000 psi (210 bar) the use of the version with external pilot is mandatory, or alternatively, the version with internal pilot and pressure reducer. The pressure reducer has fixed adjustment of 430 psi (30 bar).

The version with external drainage allows a higher back pressure on the unloading.

CODE	PILOT	X PLUG	DRAIN	Y PLUG
1	Internal	□	External	■
2	External	■	External	■
3	Internal	□	Internal	□
4	External	■	Internal	□

■ Plugged □ Unplugged

PILOTING REQUIREMENTS

Minimum value of piloting pressure on port X: 430 psi (30 bar).

PILOTING FLOW REQUIRED WITH OPERATION 0 ► 100%		
VED05*MJ	1.24 gpm	4.7 lpm
VED07MJ	2.0 gpm	7.6 lpm
VED08MJ	4.23 gpm	16.0 lpm

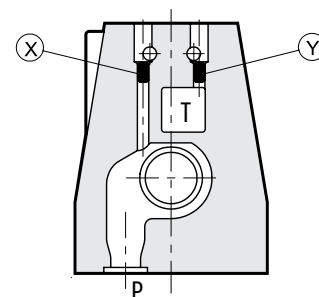
PILOTING VOLUME REQUIRED WITH OPERATION 0 ► 100%		
VED05*MJ	0.11 in ³	1.7 cm ³
VED07MJ	0.19 in ³	3.2 cm ³
VED08MJ	0.61 in ³	10.0 cm ³

PLUG SIZE:

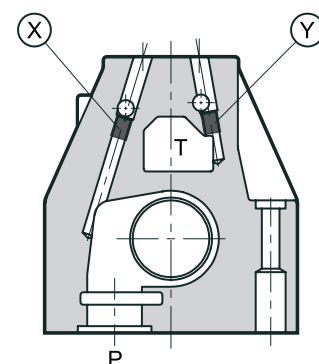
VED05*MJ	M5x6 mm
VED07MJ	M6x8 mm
VED08MJ	M6x8 mm

PLUG MOUNTING

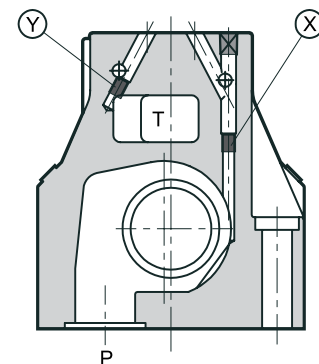
VED05*MJ



VED07MJ



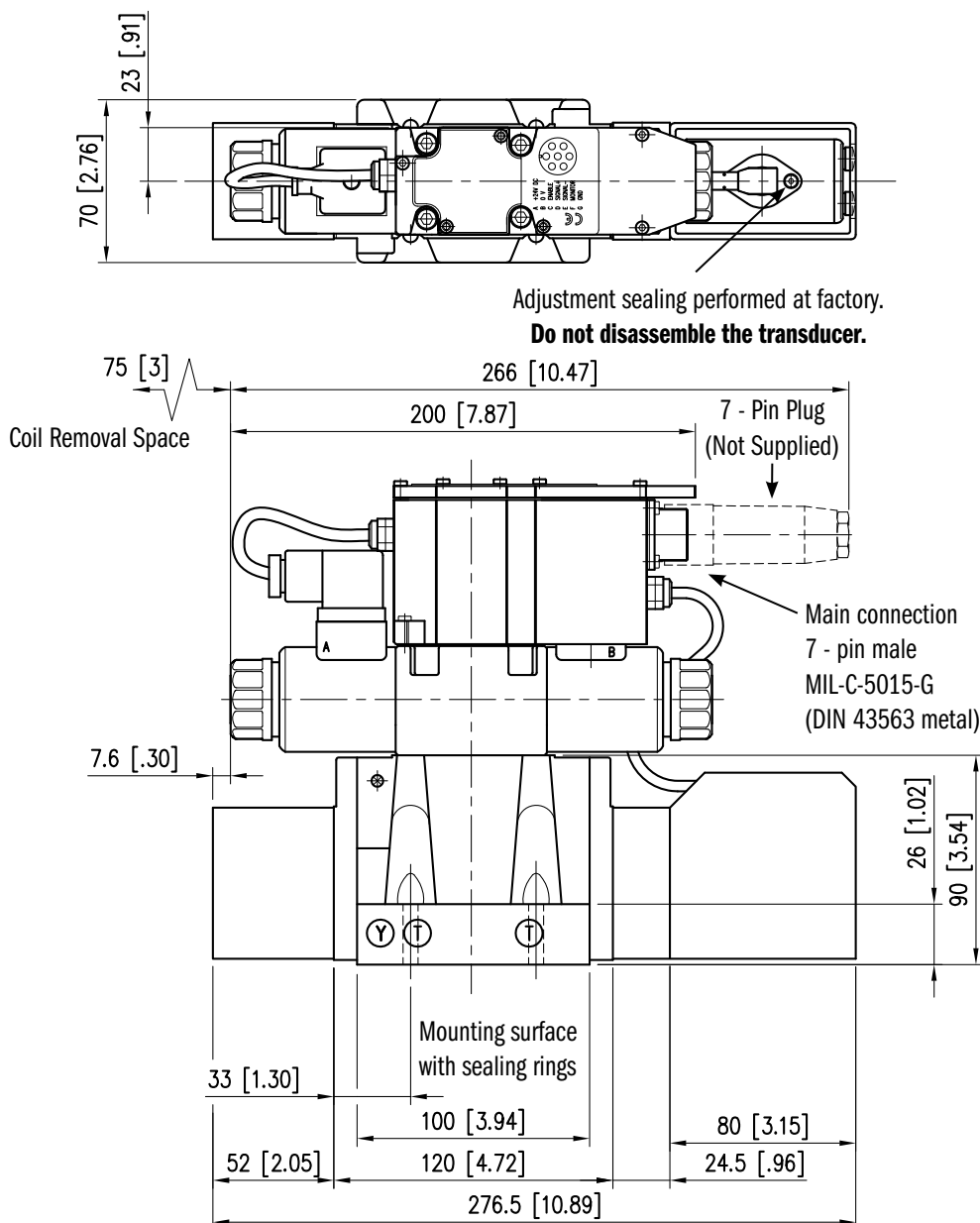
VED08MJ



OVERALL AND MOUNTING DIMENSIONS FOR VED05*MJ

VED05*MJ-3

Dimensions in mm [IN]



In order to avoid electromagnetic noises and fulfill the EMC regulations, a 7 Pin metal plug according to MIL-C-5015 G should be used instead of the standard plastic 6+PE plug.

The plug is not supplied, but can be ordered separately.

NOTES:

For single solenoid overall dimensions see related drawing. See page 10.

THREAD OF MOUNTING HOLES

1/4 - 20 UNC -2B x 0.60

FASTENING

4 bolts 1/4-20 UNC-2B x 1 1/2

TIGHTENING TORQUE

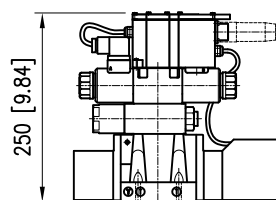
6 lb.ft (8.13 Nm)

SEALING RINGS

Qty. 5 O-ring AS568-014 90 shore A

Qty. 2 O-ring AS568-012 90 shore A

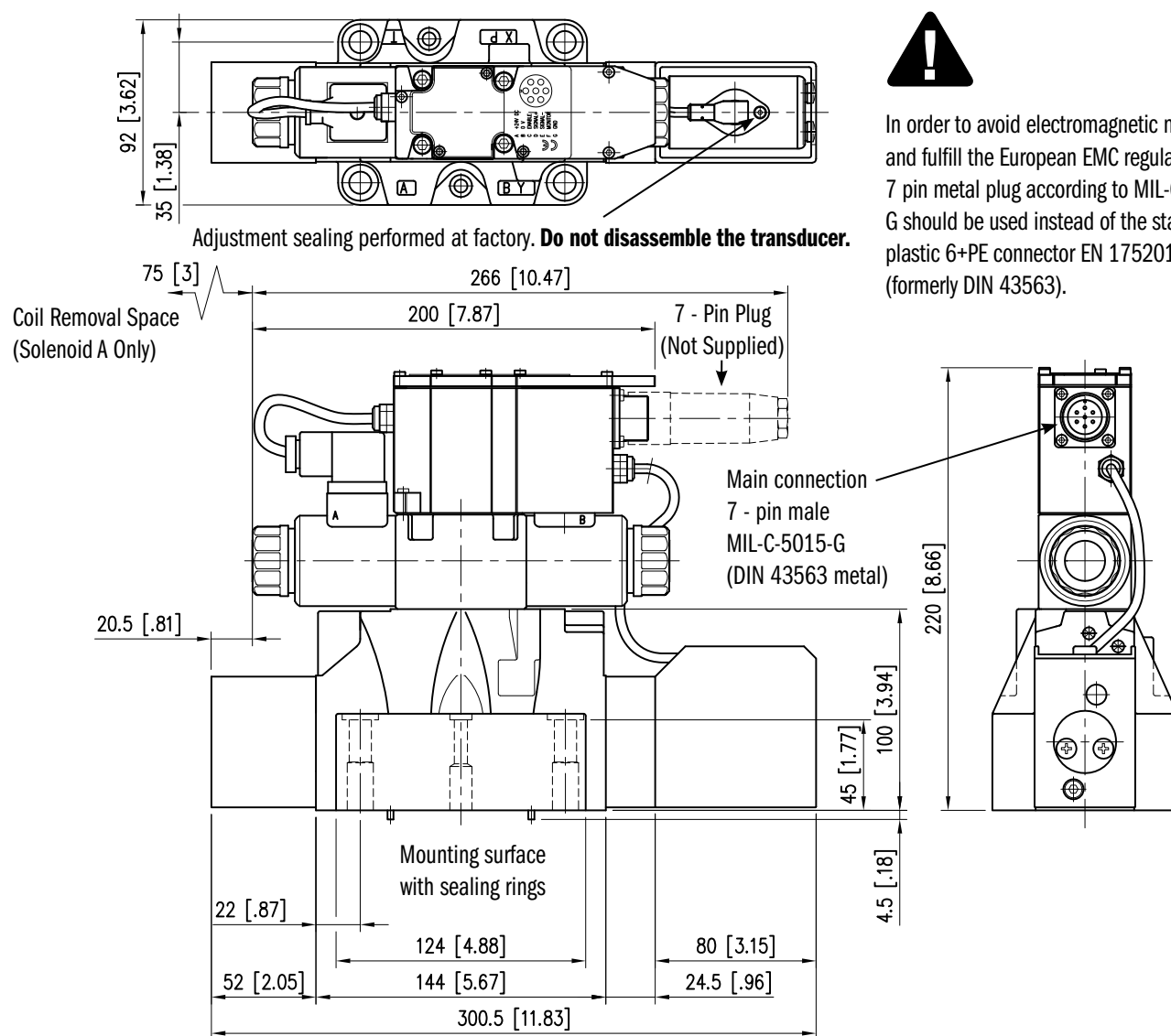
VED05*MJ*Z



OVERALL AND MOUNTING DIMENSIONS FOR VED07MJ

VED07MJ-3

Dimensions in mm [IN]



NOTES:

For single solenoid overall dimensions see related drawing. See page 10.

THREAD OF MOUNTING HOLES

1/4 - 20 UNC - 2B x 0.6

3/8 - 16 UNC - 2B x 0.9

FASTENING

2 bolts 1/4-20 UNC-2B x 2 (50 mm)

4 bolts 3/8-16 UNC-2B x 2 1/2 (60 mm)

TIGHTENING TORQUE

1/4 - 20 UNC -2B: 6 lb.ft (8.13 Nm)

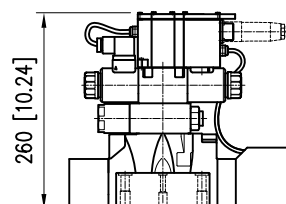
3/8 - 16 UNC -2B: 29.5 lb.ft (40 Nm)

SEALING RINGS

Qty. 4 O-ring 22.22mm ID x 2.62mm CS 90 shore A

Qty. 2 O-ring AS568-013 90 shore A

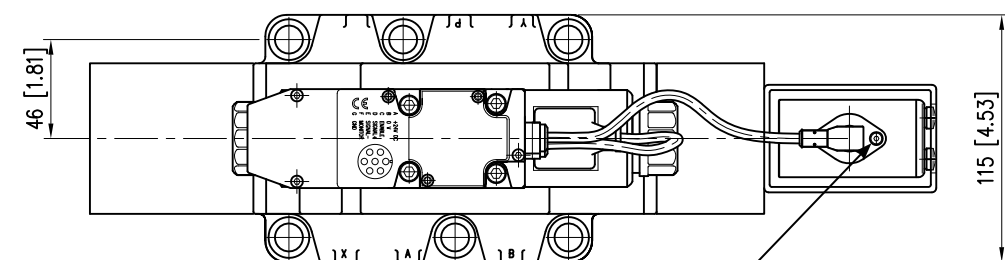
VED07MJ*Z



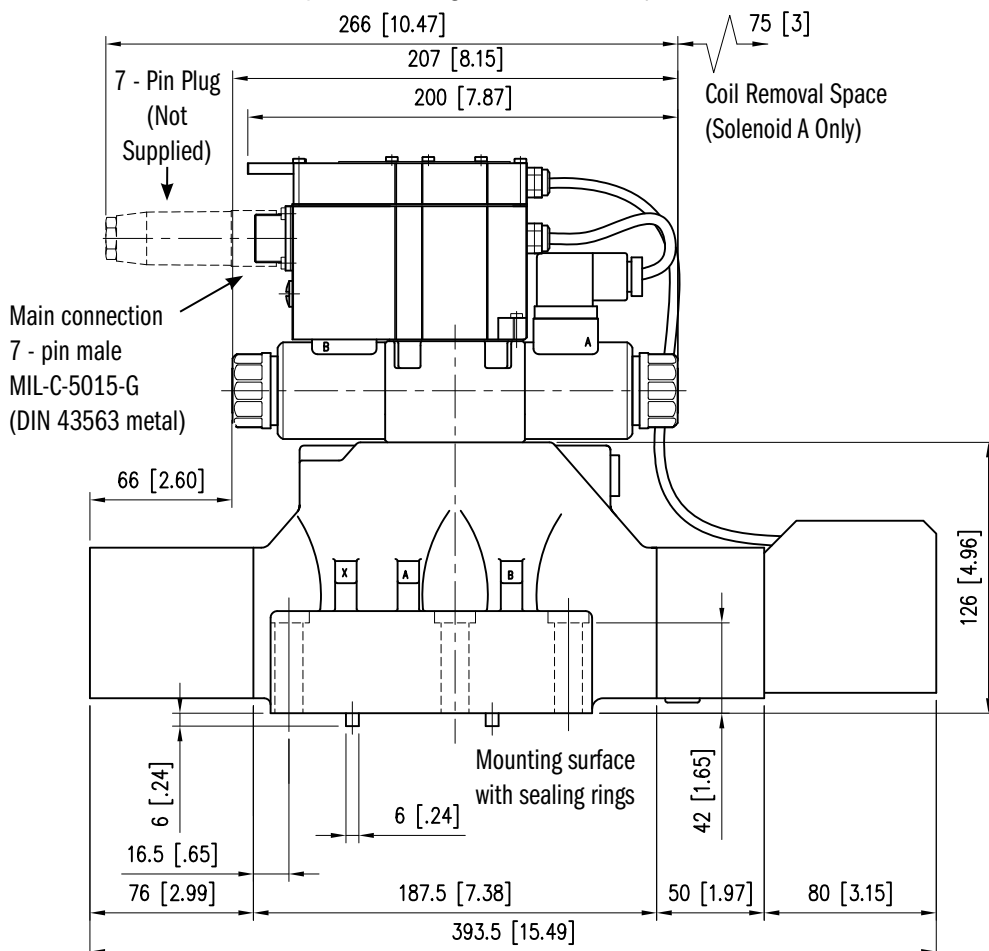
OVERALL AND MOUNTING DIMENSIONS FOR VED08MJ-3

VED08MJ-3

Dimensions in mm [IN]



In order to avoid electro-magnetic noises and fulfill the EMC regulations, a 7 pin metal plug according to MIL-C-5015 G should be used instead of the standard plastic 6+PE plug.



NOTES:

For single solenoid overall dimensions see the related drawing. See page 10.

THREAD OF MOUNTING HOLES

1/2 - 13 UNC x 0.9

FASTENING

6 bolts 1/2 - 13 UNC x 2 1/2 (60 mm)

TIGHTENING TORQUE

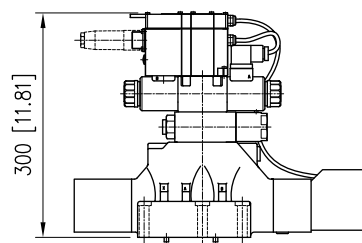
51 lb.ft (69 Nm)

SEALING RINGS

Qty. 4 O-ring AS568-123 90 shore A

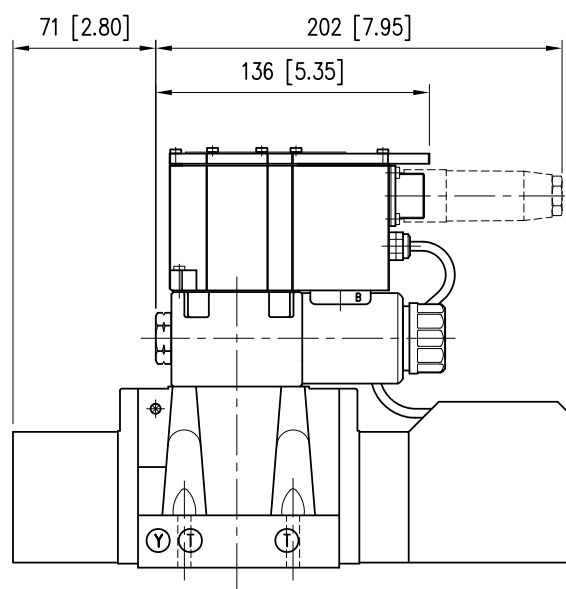
Qty. 2 O-ring AS568-117 90 shore A

VED08MJ*Z

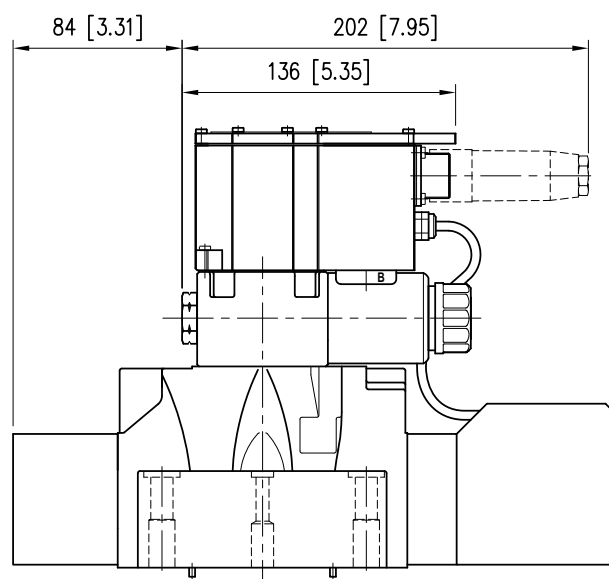


OVERALL DIMENSIONS FOR SINGLE SOLENOID VERSIONS

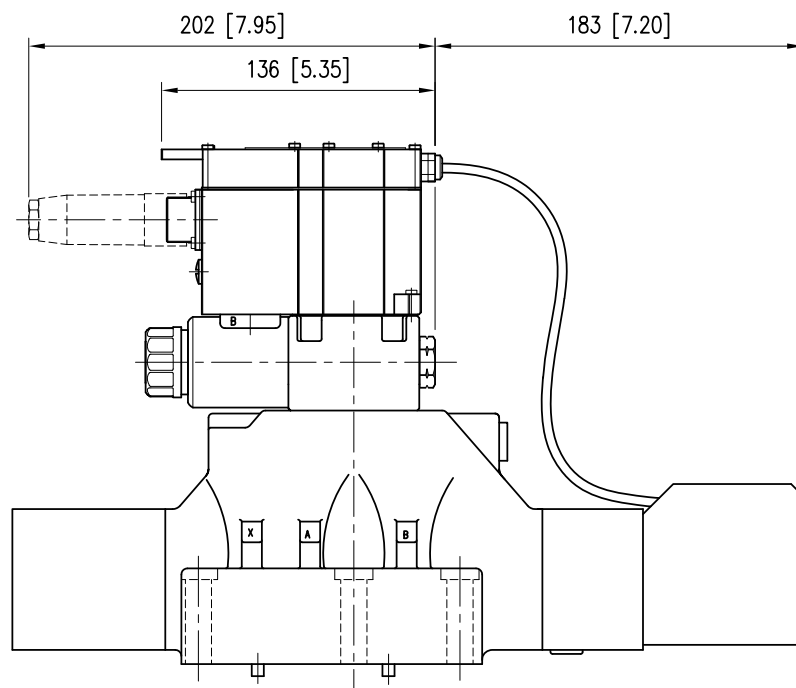
VED05*MJ-5



VED07MJ-5



VED08MJ-5R



ELECTRICAL CHARACTERISTICS

The proportional valve is controlled by a digital amplifier (driver), which incorporates a microprocessor that controls all the valve functions.

THE STANDARD VALVE IS SET AT THE FACTORY WITH:

- UP/DOWN ramp at zero value
- No deadband compensation
- Max valve opening (100% of spool stroke)

It is possible to customize these and others parameters using the optional kit, **LINPC-USB** to be ordered separately (see related literature).

THE DIGITAL DRIVER ENABLES THE VALVE TO REACH BETTER PERFORMANCE COMPARED TO THE ANALOG VERSION, AND GIVES:

- Reduced response times
- Optimization and reproducibility of the characteristic curve, optimized in factory for each valve
- Complete interchangeability in case of valve replacement
- Opportunity to set, via software, the functional parameters
- Opportunity to perform a diagnostic program by means of the LIN connection
- High immunity to electromagnetic interference

The electronic card is available with (OBC) or without (OBW) external enabling signal feature.

POWER SUPPLY		24V DC (19V to 35V, ripple max 3 Vpp)
ABSORBED POWER		50 W
MAX CURRENT		2A
DUTY CYCLE		100%
MAIN CONNECTOR		7 pin MIL-C-5015-G (DIN 43563)
ELECTROMAGNETIC COMPATIBILITY (EMC) EUROPEAN DIRECTIVE 2004/108/CE	Emission	IEC EN 61000-6-4
	Immunity	IEC EN 61000-6-2
PROTECTION AGAINST ATMOSPHERIC AGENTS	IEC 60529	IP 65 / 67
ELECTRICAL PROTECTION	overload electronics overheating LVDT sensor error power failure or < 4mA	

E0 - VOLTAGE

COMMAND SIGNAL (DIFFERENTIAL)	Single Solenoid	0 - 10V DC
	Dual Solenoid	±10V DC
IMPEDANCE		> 50 kΩ

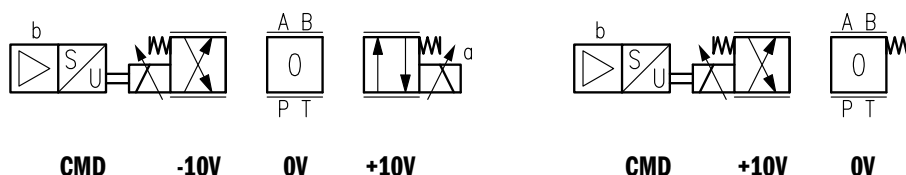
E1 - CURRENT

COMMAND SIGNAL	4 - 20 mA
IMPEDANCE	500 Ω

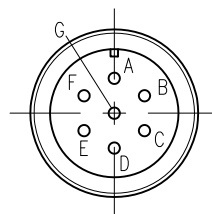
E0 VERSION - VOLTAGE REFERENCE SIGNAL

This is the most common version; it makes the valve completely interchangeable with the traditional proportional valves with analog type integrated electronics. The valve has only to be connected as indicated below.

The input signal is differential type and drives the valve as shown in the chart below. The spool stroke is proportional to UD - UE. If only one input signal (single-end) is available, the pin B (0V power supply) and the pin E (0V reference signal) must be connected through a jumper and both connected to GND, electric panel side.

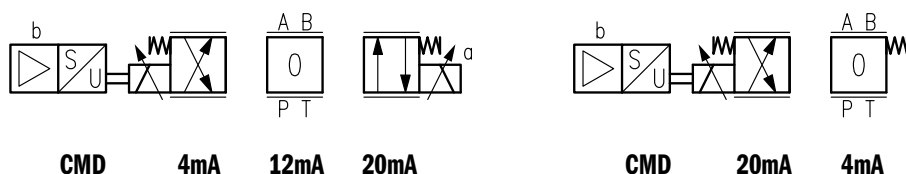


A	24V	Power supply positive. Use an external fuse 5A/50V fast type for protecting electronics.
B	0V	Power supply zero (0V)
C	NC or 24V	OBW Version: Not wired OBC Version: Valve enable
D	± 10V or 0 - 10V	Differential command signal (+V)
E	0V	Differential command signal (-V)
F	2 - 6 - 10V or 6 - 10V	Output feedback monitor
G	GND	Protective ground

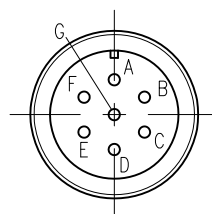


E1 VERSION - CURRENT REFERENCE SIGNAL

The current reference signal is supplied in a range of 4 - 20 mA and drives the valve as shown in the chart below. If the current drops to less than 4 mA, the card de-energizes the coils and the valve will go to rest position. The valve will restart when the command signal rises into the 4 to 20 mA range.



A	24V	Power supply positive. Use an external fuse 5A/50V fast type for protecting electronics.
B	0V	Power supply zero (0V)
C	NC or 24V	OBW Version: Not wired OBC Version: Valve enable
D	4 - 20 mA	Command signal
E	0V	Return
F	2 - 6 - 10V or 6 - 10V	Output feedback monitor
G	GND	Protective ground



WIRING:

Connections must be made via the 7 pin plug mounted on the amplifier.

RECOMMENDED CABLE SIZES ARE:

POWER SUPPLY

18 AWG (0.75 mm²)
for cables up to 65 ft (20 m).

16 AWG (1.00 mm²)
for cables up to 130 ft (40 m).

SIGNAL CABLES

20 AWG (0.50 mm²)

A suitable cable would have 7 wires, a separate shield for the signal wires and an overall shield.

PIN C:

Pin C is reserved for the Enable feature and is not connected on the standard card (OBW, see code at page 3 because the enable signal is run directly from the card.

In the OBC card version the Enable feature is external; Pin C has to be connected with 24V.

PIN F:

For reading this value as a feed-back monitor signal, the card must be enabled. This value has to be read on Pin B (0V).

When the card is disabled, the Pin F referred to Pin B does not means a MONITOR value, but shows a voltage of 2.7 V of the LIN-bus communication.

When a failure or an LVDT error is detected, the drive brings the valve rest position and locks it. In this state the Pin F, referring to the Pin B, shows a value of 0V.

To reset an LVDT error the card must be disabled and enabled again.

SINGLE SOLENOID		
Pin F	Pin D	
	E0	E1
-	-	-
6 V	0 V	4 mA
+10 V	+10 V	20 mA

DUAL SOLENOID		
Pin F	Pin D	
	E0	E1
+10 V	-10 V	4 mA
6 V	0V	12 mA
2 V	+10 V	20 mA

OBW OR OBC VERSION?

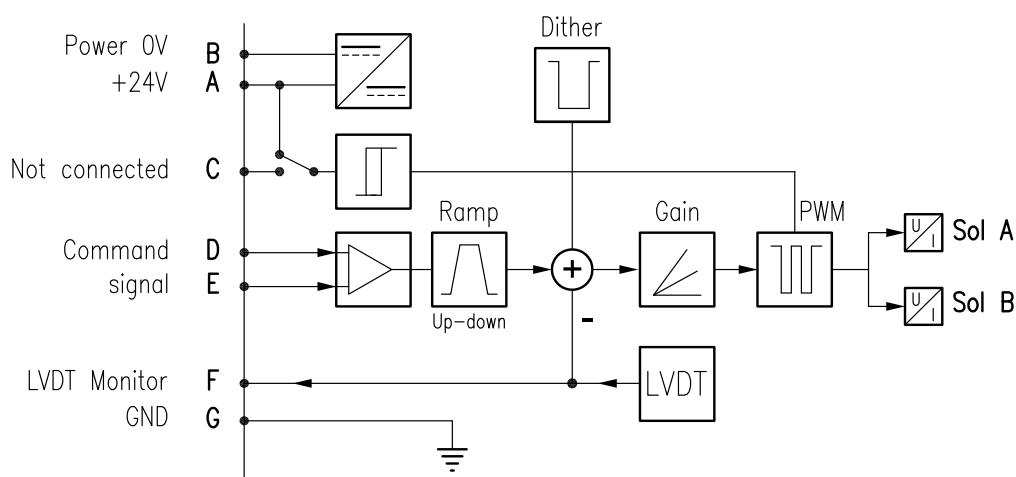
The standard option, code OBW, is programmed for internal enable. The enable signal is taken directly from the power supply of the valve. The card is enabled as soon as supply power is applied to Pins A and B.

Apply command signal to the valve and the output drivers energize the coil. The power supply must be switched off to disable the output to the valve.

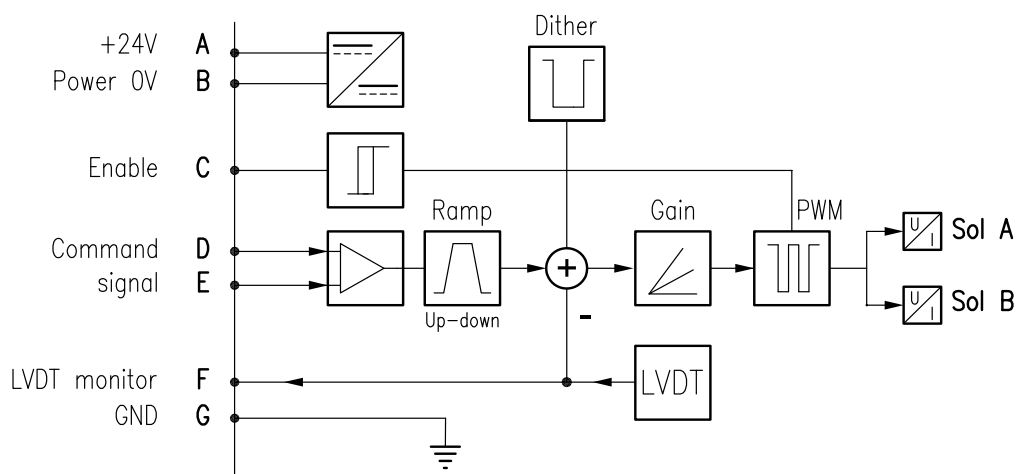
The OBC option is programmed for the external enable feature. A 24 V signal must be applied to Pin C to enable the output drivers to energize the valve coils.

The valve operation can be stopped by simply removing the enable signal from Pin C.

OBW CARD VERSION (STD)



OBC CARD VERSION



MOUNTING SURFACES

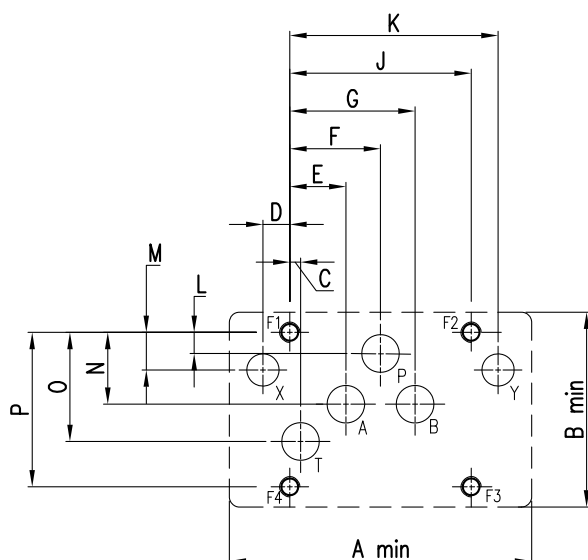
ALL THE MOUNTING SURFACES REFER TO NFPA T3.5.1 R2-2002 AND ISO 4401:2005 STANDARDS.

The mounting surface standards recommend metric coarse threads. However, subplates are commercially available with UNC threads. Select a bolt size that matches the threads in the mounting surface.

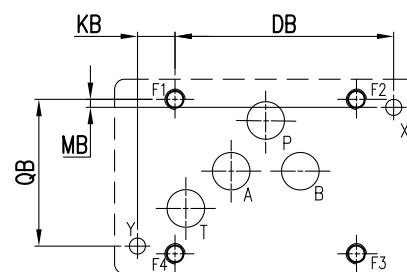
Dimensional tolerances are ± 0.1 mm (0.004") for bolt and pin location; ± 0.2 mm (0.008") for the other quotes.

The minimum depth of the blind hole G where required is 8 mm (0.31 in).

D05 - ALTERNATIVE A



D05 - ALTERNATIVE B



PORT FUNCTION:

P = PRESSURE PORT
T = TANK PORT

A = FIRST CYLINDER PORT
X = PILOT PORT

B = SECOND CYLINDER PORT
Y = DRAIN PORT

	MM	INCH
P, A, B, T MAX	Ø 11.2	Ø 0.44
X, Y ALT. A	Ø 6.3	Ø 0.25
X, Y ALT. B	Ø 4.8	Ø 0.19
MOUNTING BOLT THREAD SIZE	M6	1/4-20 UNC

	MM	INCH
A	90	3.54
B	58	2.28
C	3.2	0.126
D	8	0.31
E	16.7	0.66
F	27	1.06
G	37.3	1.47

	MM	INCH
J	54	2.125
K	62	2.44
L	6.3	0.25
M	11.2	0.44
N	21.4	0.84
O	32.5	1.28
P	46	1.82

	MM	INCH
DB	65.1	2.563
KB	11.2	0.44
MB	2.4	0.09
QB	43.7	1.72

NOTES:

NFPA D05 and ISO 4401-05 indicates different diameters for X and Y holes:

NFPA: Ø 9.6 max in D05 alt A

Ø 4.8 max in D05 alt B

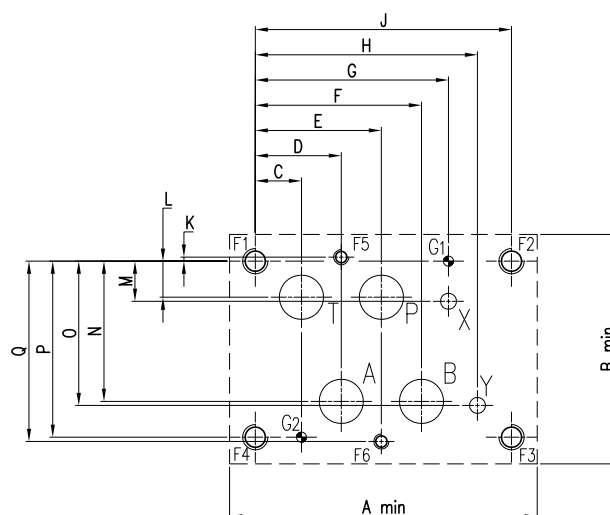
ISO: Ø 6.3 max both

D07

	MM	INCH
P, A, B, T MAX	Ø 17.5	Ø 0.69
X, Y MAX	Ø 6.3	Ø 0.25
G MAX	Ø 4	Ø 0.16
MOUNTING BOLT THREAD SIZE F1 - F4	M10	3/8 - 16 UNC
MOUNTING BOLT THREAD SIZE F5 - F6	M6	1/4 - 20 UNC

	MM	INCH
A	122	4.8
B	91	3.58
C	18.3	0.72
D	34.1	1.34
E	50	1.97
F	65.9	2.60
G	76.6	3.016
H	88.1	3.47

	MM	INCH
J	101.6	4
K	1.6	0.063
L	14.3	0.56
M	15.9	0.626
N	55.6	2.19
O	57.2	2.25
P	69.9	2.75
Q	71.5	2.815

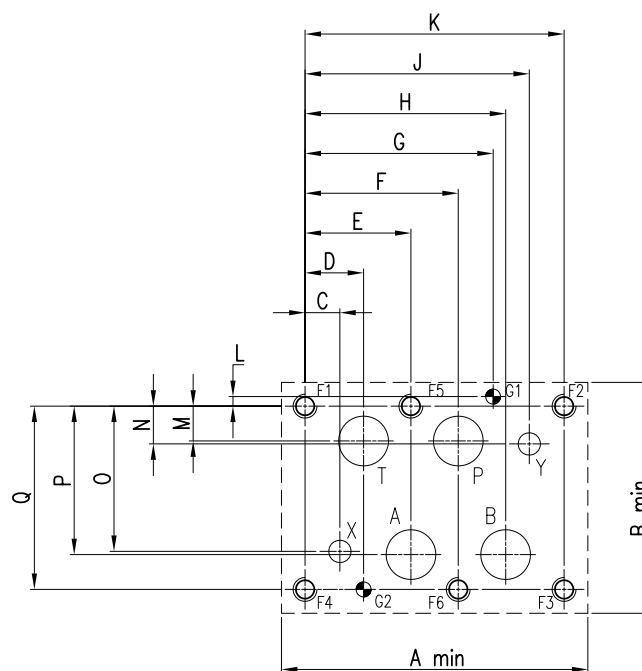


D08

	MM	INCH
P, A, B, T MAX	Ø 25	Ø 0.98
X, Y MAX	Ø 11.2	Ø 0.44
G MAX	Ø 7.5	Ø 0.30
MOUNTING BOLT THREAD SIZE	M12	1/2 - 13 UNC

	MM	INCH
A	154	6
B	116	4.57
C	17.5	0.69
D	29.4	1.157
E	53.2	2.09
F	77	3.03
G	94.5	3.719
H	100.8	3.97

	MM	INCH
J	112.7	4.44
K	130.2	5.125
L	4.80	0.187
M	17.5	0.69
N	19	0.75
O	73	2.874
P	74.6	2.93
Q	92.1	3.625



APPLICATION DATA

FLUIDS

All pressure drops shown on these data pages are based on 170 SUS fluid viscosity and 0.87 specific gravity. For any other specific gravity (G1) the pressure drop (ΔP) will be approx. $\Delta P_1 = \Delta P (G1/G)$. See the chart for other viscosities.

FLUID VISCOSITIES	Cst	10	14.5	32	36	43	54	65	76	86	108	216	324	400
	SUS	60	75	150	170	200	250	300	350	400	500	1000	1500	1900
MULTIPLIER		0.77	0.81	0.97	1.00	1.04	1.10	1.15	1.20	1.24	1.31	1.56	1.72	1.83

Use mineral oil-based hydraulic fluids HL or HM type, according to ISO 6743-4. For these fluids, use NBR seals. For fluids HFDR type (phosphate esters) use FPM seals (code V). For the use of other kinds of fluid such as HFA, HFB, HFC, please consult our technical department.

Using fluids at temperatures higher than 180 degrees F causes the accelerated degradation of seals as well as degradation of the fluids physical and chemical properties.

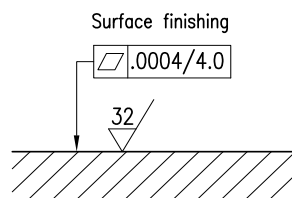
From a safety standpoint, temperatures above 130 degrees F are not recommended.

RANGE TEMPERATURES:	Ambient	- 4 to +130 °F	-20 to +54 °C
	Fluid	- 4 to +180 °F	-20 to +82 °C
FLUID VISCOSITY	Range	60 -1900 SUS	10 - 400 cSt
	Recommended	120 SUS	25 cSt
FLUID CONTAMINATION		ISO 4406:1999 Class 18/16/13	

INSTALLATION

VED*MJ valves can be installed in any position without impairing correct operation. Ensure that there is no air in the hydraulic circuit.

Valves are fixed by means of screws or tie rods on a flat surface with planarity and roughness equal to or better than those indicated in the relative symbols. If minimum values are not observed, fluid can easily leak between the valve and support surface.



7 PIN PLUGS

VEA-3P7P-A	Straight plug 7 pin plastic housing	264893
VEA-3P7M-A	Straight plug 7 pin metal housing	265947

BOLT KITS

D05 SIZE	BD05H -150 - B	Valve Only	1009397
D07 SIZE	BD07 - 250	Valve Only	1009400
D08 SIZE	BD08 - 250	Valve Only	1009401

SEAL KIT

D05* SIZE	Buna Seal Kit	1013174
	Viton Seal Kit	1013175
D07 SIZE	Buna Seal Kit	1013176
	Viton Seal Kit	1013177
D08 SIZE	Buna Seal Kit	1013178
	Viton Seal Kit	1013179

SUBPLATES

D05 alt. A SIZE	AD05JESPS16S	Aluminium	SAE-16	351716AJ
	DD05JESPS16S	Ductile	SAE-16	351716AK
D07 SIZE	AD07SPS016S	Aluminium	SAE-16	1013039AB
	DD07SPS016S	Ductile	SAE-16	1013039AC
D08 SIZE	AD08SPS020S	Aluminium	SAE-20	265803AP
	DD08SPS020S	Ductile	SAE-20	265803AL

NOTES:

1. Max pressure for aluminum subplates: 3000 psi (210 bar)
2. Max pressure for ductile subplates: 5000 psi (350 bar)
3. Always verify subplate port size is proper for the application

ABOUT CONTINENTAL HYDRAULICS

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HYDRAULICS

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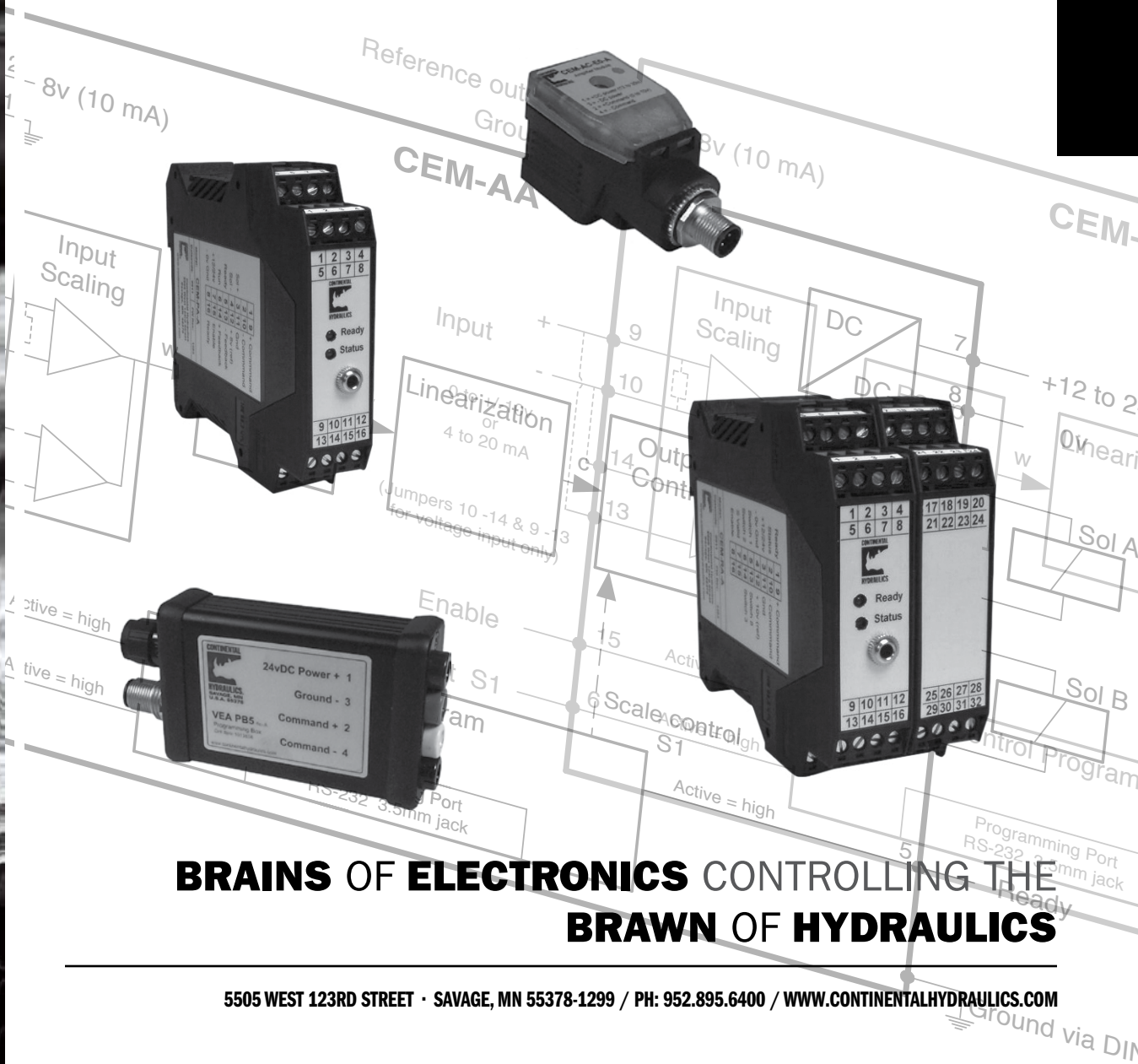


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CONTINENTAL HYDRAULICS

MOTION CONTROL SOLUTIONS

TABLE OF CONTENTS

CEM-AC	Single Channel Power Amplifier	page 3
	DIN coil mounted to single solenoid proportional flow or pressure valve	
CEM-AA	Dual Channel Power Amplifier	page 5
	Versatile amplifier with wide range of input signals	
CEM-RA	Dual Channel Ramp Amplifier	page 7
	Switch inputs for ramped motion profile control	
CEM-PA	Closed Loop Pressure Amplifier	page 9
	Single channel amplifier for PID closed loop control of Pressure Force Speed	
CEM-SA	Closed Loop Position Module	page 11
	Analog command and analog feedback	
CEM-SD	Closed Loop Position Module	page 13
	Analog command and digital SSI feedback	
CEM-MS	Closed Loop Synchronization Module	page 15
	Position synchronization of two hydraulic cylinders	
CEM-PID	Closed Loop PID Module	page 17
	Versatile closed loop PID signal conditioner	
VEA	Valve Electrical Accessories	page 19
	Programming boxes, cables and adapters	

CONTINENTAL HYDRAULICS

SINGLE CHANNEL POWER AMPLIFIER CEM-AC

SINGLE CHANNEL POWER AMPLIFIER - CEM-AC



DIN Coil Mount

DESCRIPTION:

This power amplifier mounts directly to a single solenoid proportional valve coil with a DIN style connector, and will drive up to 2.5A. It is suitable to control current to either a proportional flow or pressure valve coil.

A wide range of analog signals are accepted. There are two product choices for input; one accepts voltage commands, the other accepts current commands. These inputs are easily scaled to match system requirements. Two independent ramps are available for acceleration and deceleration control.

Min and Max output current are adjustable. Output characteristics can be independently customized. The module is disabled if the coil outputs are shorted or open. If command current is outside of the proper range, the module is also disabled. PWM and Dither are user adjustable.

This module is easily adapted to a variety of system requirements. All variables are user adjusted with easy to use software on your Microsoft Windows® laptop. Control variables are stored in non-volatile memory internal to the module. All variables can be read by the laptop, and reproduced exactly on other modules.

TECHNICAL DATA

Power Supply	Consumption	vDC	12 to 30 (including ripple)
	External Fuse	mA	<100mA + solenoid
Analog Input	Voltage	A	3 (medium action)
	Impedance	vDC	0 to +10 (voltage version)
	Current	ohm	90k
	Impedance	mA	4 to 20 (current version)
	Resolution	ohm	390
Solenoid Output	Sample Time	%	<0.1
		mS	1.0
		A	1.2
		A	2.5
	PWM Frequency	Hz	60 to 2650
	Dither Frequency	Hz	60 to 400
	Dither Amplitude	%	0 to 30
	Sample Time	mS	0.17

Electrical Connection			M12 5 pin male key style A
Power and Signal			LIN bus
Communication			via DIN coil pin
Ground			
Housing	Housing		Attaches to DIN 43650 coil
	Material		Polyamide PA
	Combustability Class	UL94	V1
	Protection Class	IP	65 (with gasket)
	Working Temperature	C	-20 to +60
Electro Magnetic Compatibility	Storage Temperature	C	-20 to +70
	Humidity	%	95 (non condensing)
	Emission		EN 61000-6-2
	Immunity		EN 61000-6-3
	Vibration Resistance		EIC 60068-2-6

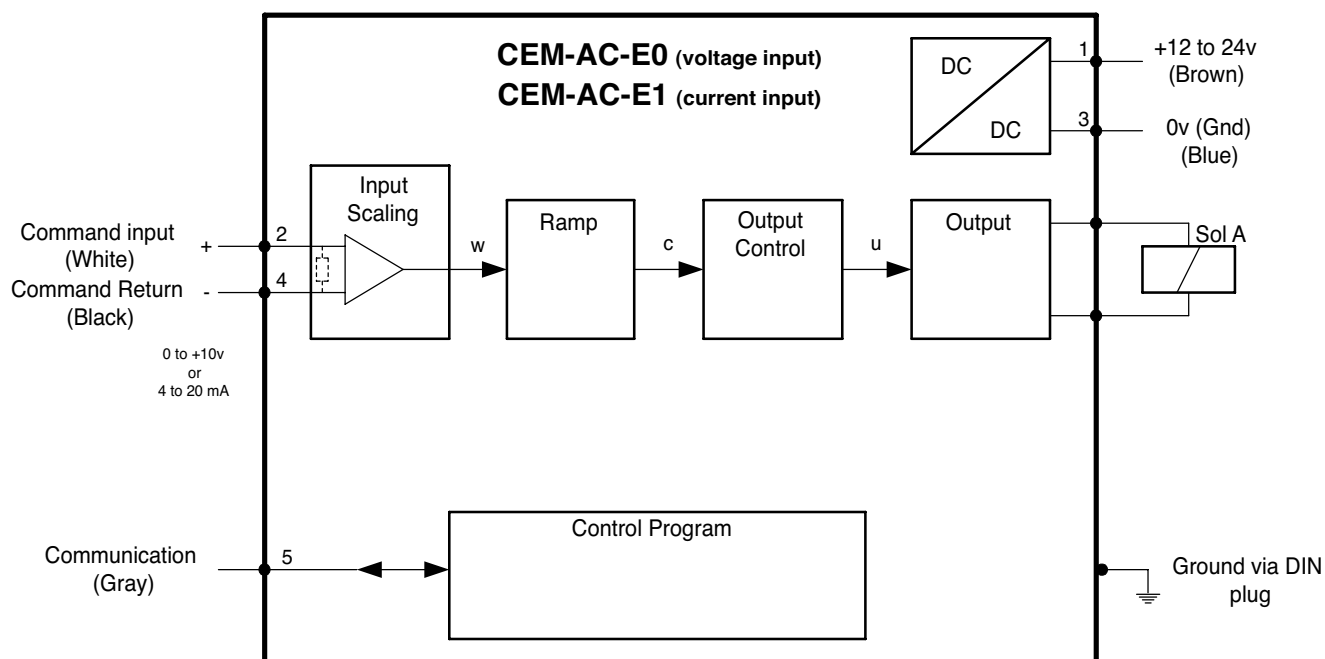
IDENTIFICATION CODE

CEM-AC-E0-A

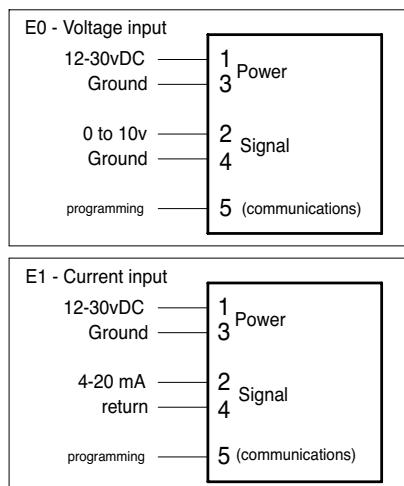
E0 voltage input command

E1 current input command

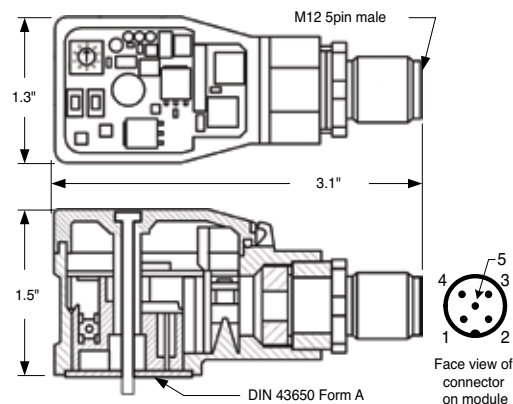
FUNCTIONAL DIAGRAM



WIRING EXAMPLE



DIMENSIONS



CONTINENTAL HYDRAULICS

DUAL CHANNEL POWER AMPLIFIER

CEM-AA

DUAL CHANNEL POWER AMPLIFIER - CEM-AA



Wide Range of Analog Input Signals

DESCRIPTION:

This power amplifier drives either single or dual solenoid proportional valve coils up to 2.6A. It is suitable to control current to proportional directional, flow or pressure valve coils.

A wide range of analog signals are accepted. User may select either voltage or current input mode. These inputs are easily scaled to match system requirements. Four ramps are available for independently setting acceleration and deceleration in each direction.

Min and Max output current are adjustable. Output characteristics can be independently customized. The module is disabled if the coil outputs are shorted or open. If command current signal is outside of the proper range, the module is disabled. PWM and Dither are user adjustable.

This module is easily adapted to a variety of system requirements. All variables are user adjusted with easy to use software on your Microsoft Windows® laptop. Control variables are stored in non-volatile memory internal to the module. All variables can be read by the laptop, and reproduced exactly on other modules.

TECHNICAL DATA

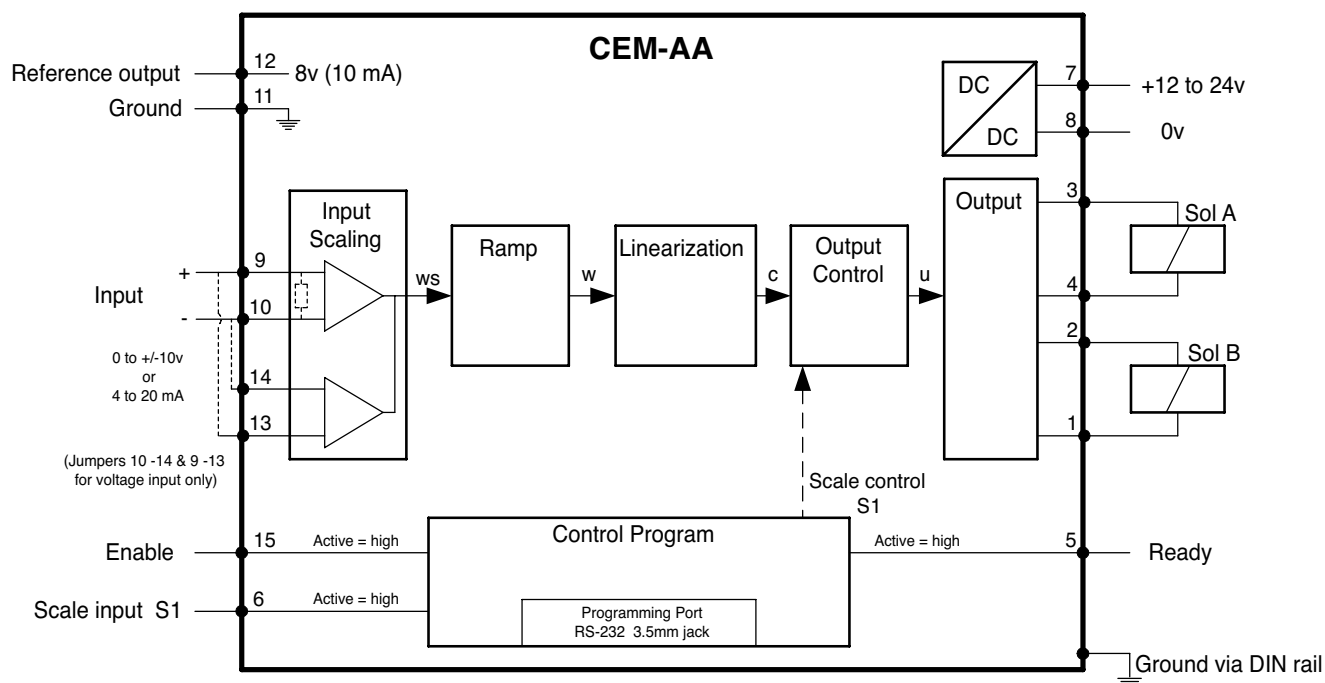
Power Supply	Consumption	vDC	12 to 30 (including ripple)
	External Fuse	mA	<100mA + solenoid
Analog Inputs	Voltage	A	3 (medium action)
	Impedance	vDC	0 to +/- 10
	Current	ohm	90k
	Impedance	mA	0 to +/- 20 (typ 4 to 20)
	Resolution	ohm	390
	Sample Time	%	<0.1
	Reference Voltage	mS	1.0
Digital Inputs		V	8 (10mA max)
		V	Logical 0 = < 2
Digital Outputs		V	Logical 1 = > 10
		ohm	25k
Electrical Connection		V	Logical 0 = < 2 (50mA max)
		V	Logical 1 = ~ Power Supply
Programming Port			RS-232 3.5mm Stereo Jack
Power and Signal Ground			4 strips with 4 screw terminals each via DIN Rail
Solenoid Outputs		A	1.0
		A	1.6
		A	2.6
	PWM Frequency	Hz	100 to 2650
	Dither Frequency	Hz	60 to 400
Housing	Dither Amplitude	%	0 to 30
	Sample Time	mS	0.17
	Module		Snap to 35mm DIN Rail EN 50022
	Material		Polyamide PA 6.6
	Combustibility Class	UL94	V0
Electro Magnetic Compatibility	Protection Class	IP	20
	Working Temperature	C	-20 to +60
	Storage Temperature	C	-20 to +70
	Humidity	%	95 (non condensing)
	Emission		EN 61000-6-2
Vibration Resistance	Immunity		EN 61000-6-3
			EIC 60068-2-6

IDENTIFICATION CODE

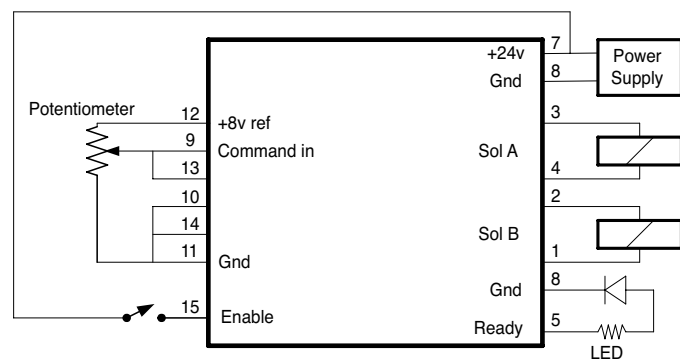
CEM-AA-A

Dual Channel Power Amplifier

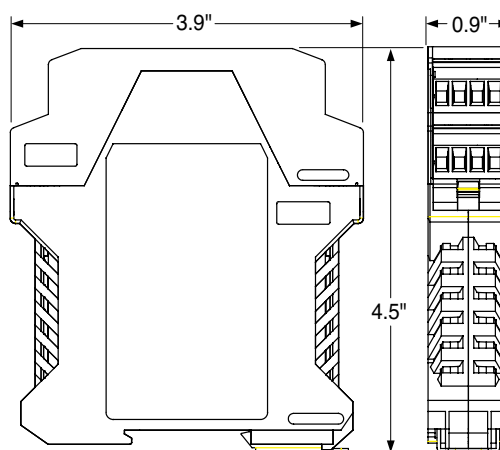
FUNCTIONAL DIAGRAM



WIRING EXAMPLE



DIMENSIONS



CONTINENTAL HYDRAULICS

DUAL CHANNEL RAMP AMPLIFIER

CEM-RA



Switch Inputs for Ramped Motion Profile

DESCRIPTION:

This ramp amplifier drives either single or dual solenoid proportional valve coils up to 2.6A. It is suitable to control current to either proportional directional, flow, or pressure valve coils. This module accepts 4 independent switch inputs, each of which has independently adjustable speed and ramp controls. Inputs are additive for up to 15 unique preset speed and ramp profiles.

In addition to the switch inputs, an analog input is also available. A wide range of analog signals are accepted. This input is easily scaled to match system requirements. Analog command can be used in addition to, or independent from, switch input speeds.

Min and Max outputs are adjustable. Output characteristics can be independently customized. The module is disabled if the coil outputs are shorted or open. PWM and Dither are user adjustable.

This module is easily adapted to a variety of system requirements. All variables are user-adjusted with easy to use software on your Microsoft Windows® laptop. Control variables are stored in non-volatile memory internal to the module. All variables can be read by the laptop, and reproduced exactly on other modules.

TECHNICAL DATA

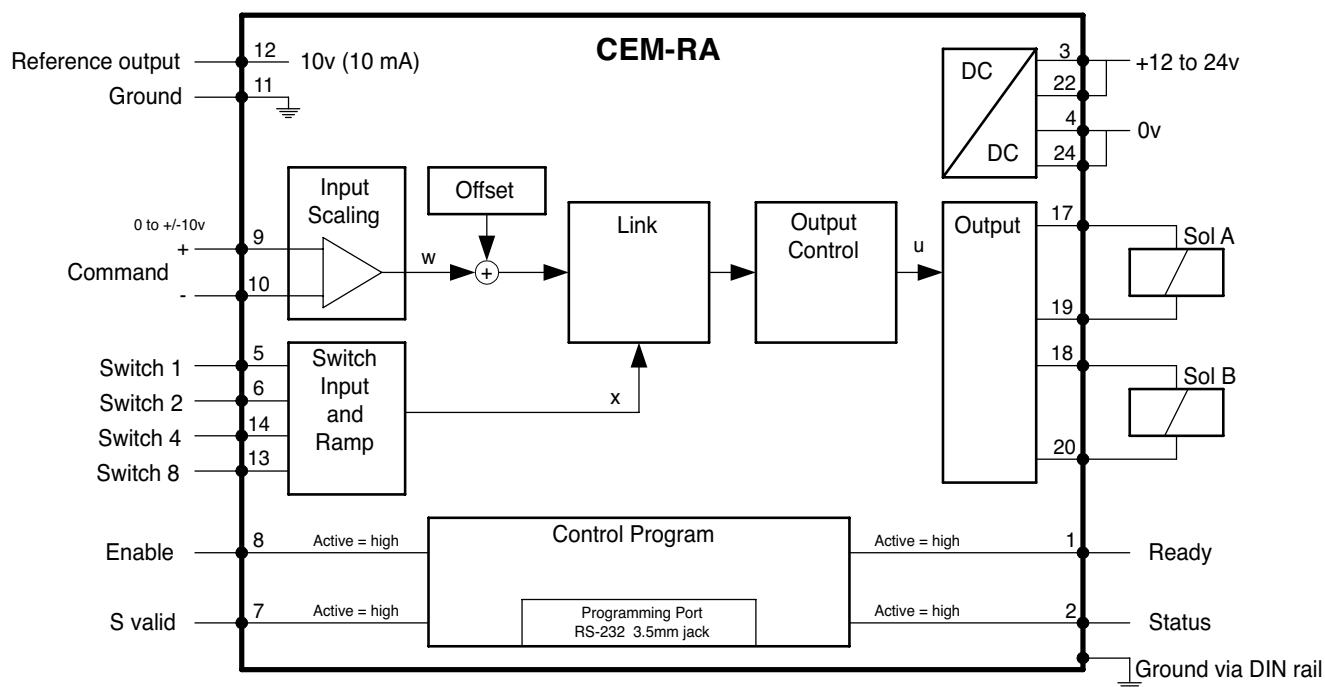
Power Supply	Consumption	vDC	12 to 30 (including ripple)
	External Fuse	mA	<100mA + solenoid
Analog Inputs	Voltage	A	3 (medium action)
	Impedance	vDC	0 to +/- 10
	Resolution	ohm	90k
	Sample Time	%	0.024
	Reference Voltage	mS	1.0
Digital Inputs		V	10 (10mA max)
	Impedance	V	Logical 0 = < 2
Digital Outputs		V	Logical 1 = > 10
		ohm	25k
Electrical Connection		V	Logical 0 = < 2 (50mA max)
		V	Logical 1 = ~ Power Supply
Programming Port			RS-232 3.5mm Stereo Jack
Power and Signal Ground			8 strips with 4 screw terminals each via DIN Rail
Solenoid Outputs		A	1.0
		A	1.6
		A	2.6
	PWM Frequency	Hz	100 to 2650
	Dither Frequency	Hz	60 to 400
Housing	Dither Amplitude	%	0 to 30
	Sample Time	mS	0.17
	Module		Snap to 35mm DIN Rail EN 50022
	Material		Polyamide PA 6.6
	Combustability Class	UL94	V0
Electro Magnetic Compatibility	Protection Class	IP	20
	Working Temperature	C	-20 to +60
	Storage Temperature	C	-20 to +70
	Humidity	%	95 (non condensing)
	Emission		EN 61000-6-2
Vibration Resistance	Immunity		EN 61000-6-3
			EIC 60068-2-6

IDENTIFICATION CODE

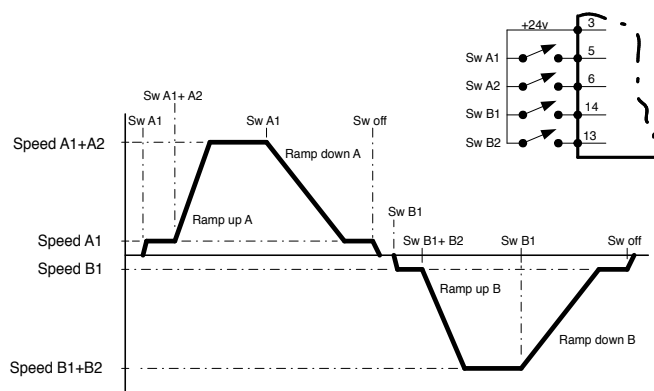
CEM-RA-A

Dual Channel Ramp Amplifier

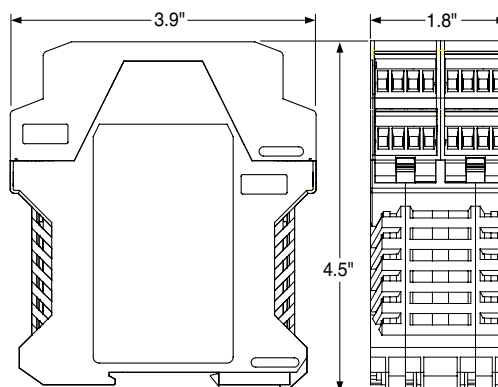
FUNCTIONAL DIAGRAM



WIRING EXAMPLE



DIMENSIONS



CONTINENTAL HYDRAULICS

CLOSED LOOP PRESSURE AMPLIFIER CEM-PA



CLOSED LOOP CONTROL OF PRESSURE, FORCE OR SPEED. Single Channel with PID Signal Conditioning.

DESCRIPTION:

This closed loop PID amplifier drives a single solenoid proportional pressure or flow control valve coil up to 2.6A. It is suitable to provide precise closed loop control in pressure, force, or velocity systems. This module uses traditional PID error correction to provide stable control in dynamic systems.

A wide range of analog signals are accepted. User may select either voltage or current input mode. These inputs are easily scaled to match system requirements. Input command can be ramped. PID variables are adjustable over a wide range. The amplifier is easily switched from open loop to closed loop control.

Min and Max output current are adjustable. Output characteristics can be independently customized. The module is disabled if the coil outputs are shorted or open. If command current signal is outside of the proper range, the module is disabled. PWM and Dither are user adjustable.

This module is easily adapted to a variety of system requirements. All variables are user adjusted with easy to use software on your Microsoft Windows® laptop. Control variables are stored in non-volatile memory internal to the module. All variables can be read by the laptop, and reproduced exactly on other modules.

TECHNICAL DATA

Power Supply	Consumption	vDC	12 to 30 (including ripple)
	External Fuse	mA	<100mA + solenoid 3 (medium action)
Analog Inputs	Voltage	vDC	0 to +10
	Impedance	ohm	90k
	Current	mA	4 to 20
	Impedance	ohm	390
	Resolution	%	<0.1
	Sample Time	mS	1.0
Digital Inputs	Reference Voltage	V	8 (10mA max)
		V	Logical 0 = < 2
Impedance		V	Logical 1 = > 10
		ohm	25k
Digital Outputs		V	Logical 0 = < 2 (50mA max)
		V	Logical 1 = ~ Power Supply
Electrical Connection			
Programming Port			RS-232 3.5mm Stero Jack
Power and Signal			4 strips with 4 screw terminals each
Ground			via DIN Rail

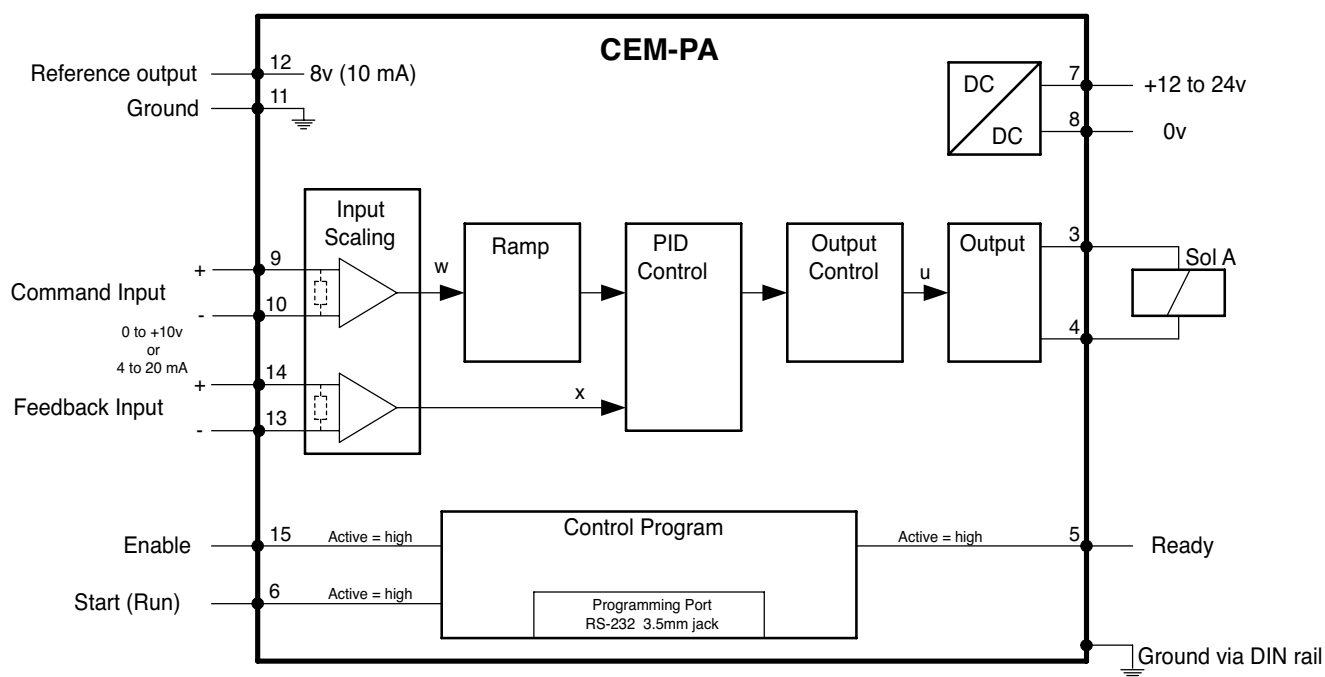
Solenoid Outputs	A	1.0	Software Selectable
	A	1.6	
	A	2.6	
	A	2.6	
	PWM Frequency	Hz	100 to 2650
Housing	Dither Frequency	Hz	60 to 400
	Dither Amplitude	%	0 to 30
	Sample Time	mS	0.17
	Module		Snap to 35mm DIN Rail EN 50022
	Material		Polyamide PA 6.6
Electro Magnetic Compatibility	Combustability Class	UL94	V0
	Protection Class	IP	20
	Working Temperature	C	-20 to +60
	Storage Temperature	C	-20 to +70
	Humidity	%	95 (non condensing)
Vibration Resistance	Emission		EN 61000-6-2
	Immunity		EN 61000-6-3
			EIC 60068-2-6

IDENTIFICATION CODE

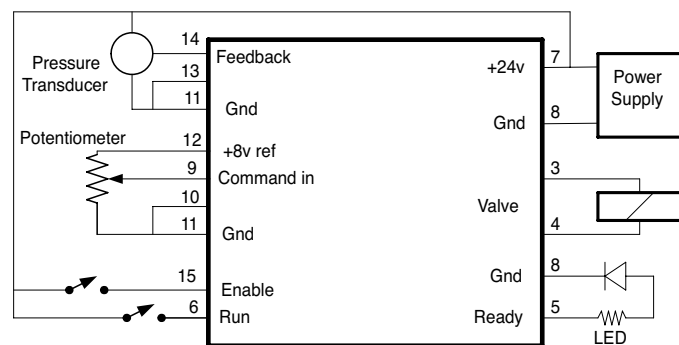
CEM-PA-A

Closed Loop Pressure Amplifier

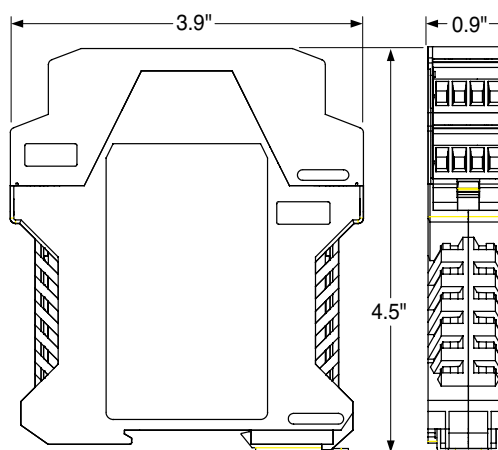
FUNCTIONAL DIAGRAM



WIRING EXAMPLE



DIMENSIONS



CONTINENTAL HYDRAULICS

CLOSED LOOP POSITION MODULE CEM-SA

CLOSED LOOP POSITION MODULE - CEM-SA



Analog Command and Feedback

DESCRIPTION:

This closed loop position module is designed to quickly and accurately move hydraulic cylinder loads. Position and velocity commands are from analog sources. Cylinder position feedback is from an analog source.

Stroke dependent deceleration is used to provide quick and repeatable positioning. Internal ramp and velocity adjustments allow for easy system tuning.

A wide range of analog signals are accepted. User may select either voltage or current input mode. These inputs are easily scaled to match system requirements.

Forward and Reverse "jog" inputs allow for manual load control. A user definable window for "in position" triggers an output for communication to the next machine function.

Output is an analog voltage, 0 to +10vdc, suitable for directly driving a proportional directional valve with on board electronics.

This module is easily adapted to a variety of system requirements. All variables are user adjusted with easy to use software on your Microsoft Windows laptop. Control variables are stored in non-volatile memory internal to the module. All variables can be read by the laptop, and reproduced exactly on other modules.

TECHNICAL DATA

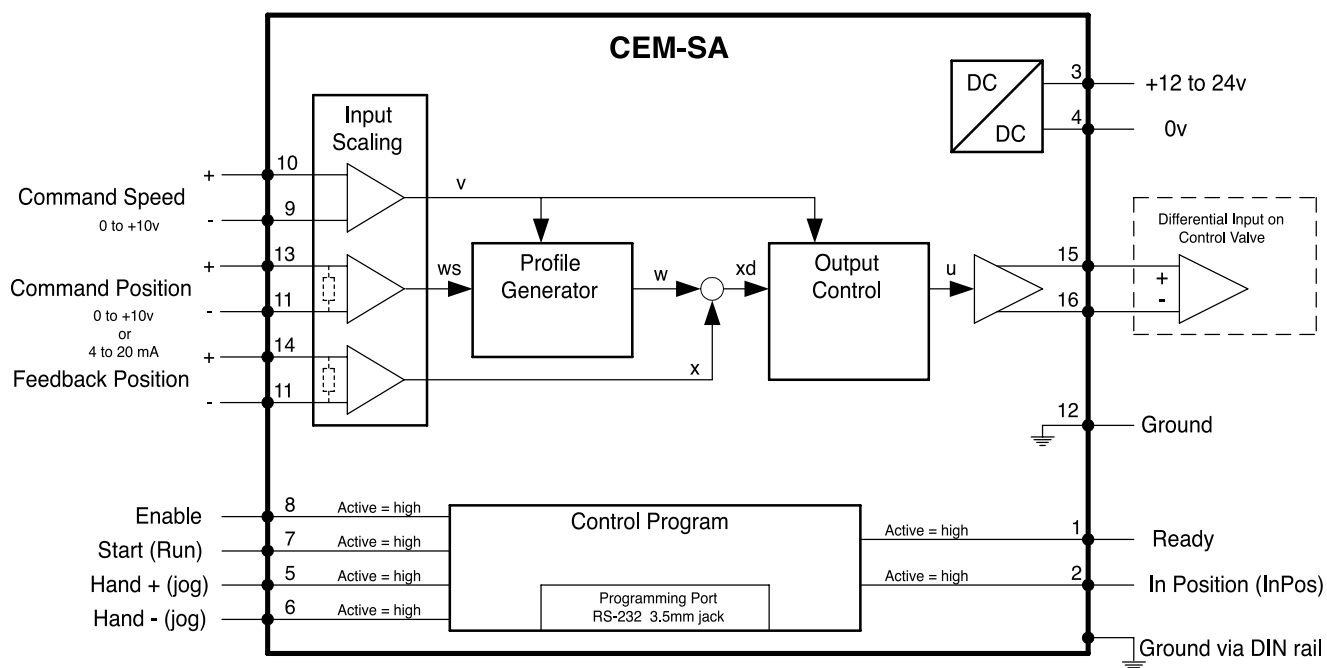
Power Supply	Consumption	vDC	12 to 30 (including ripple)
	External Fuse	mA	<100mA
Analog Inputs	Voltage	A	3 (medium action)
	Impedance	vDC	0 to + 10
	Current	ohm	33k
	Impedance	mA	0 to 20 (typ 4 to 20)
	Resolution	ohm	250
	Sample Time	%	0.01
	(Speed Input) Voltage	mS	1.0
	(Speed Input) Impedance	vDC	0 to +10
Digital Outputs		ohm	90k
		V	Logical 0 = < 2 (50mA max)
Electrical Connection		V	Logical 1 = ~ Power Supply
	Programming Port		RS-232 3.5mm Stereo Jack
	Power and Signal		4 strips with 4 screw terminals each
	Ground		via DIN Rail
Digital Inputs		V	Logical 0 = < 2
		V	Logical 1 = > 10
Analog Output	Impedance	ohm	25k
	Voltage	vDC	0 to +/- 10
	Current	mA	5 (max)
	Resolution	%	0.024
Housing	Module		Snap to 35mm DIN Rail EN 50022
	Material		Polyamide PA 6.6
	Combustability Class	UL94	V0
	Protection Class	IP	20
	Working Temperature	C	-20 to +60
	Storage Temperature	C	-20 to +70
	Humidity	%	95 (non condensing)
	Electro Magnetic Compatibility		
	Emission		EN 61000-6-2
	Immunity		EN 61000-6-3
	Vibration Resistance		EIC 60068-2-6

IDENTIFICATION CODE

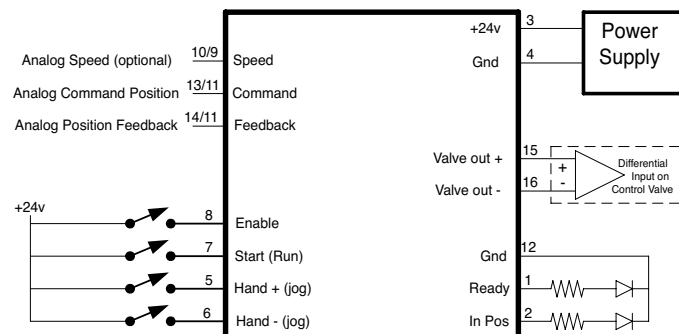
CEM-SA-A

Closed Loop Position Module

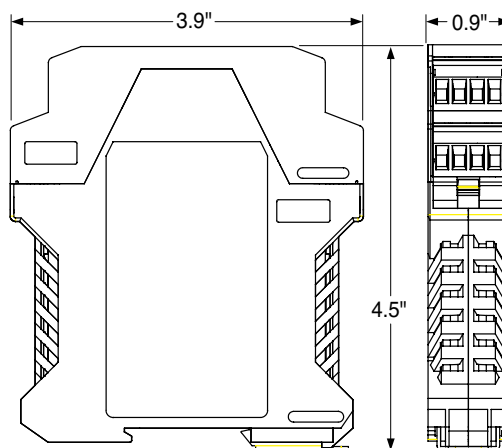
FUNCTIONAL DIAGRAM



WIRING EXAMPLE



DIMENSIONS



CONTINENTAL HYDRAULICS

CLOSED LOOP POSITION MODULE CEM-SD



Analog Command and SSI Digital Feedback

DESCRIPTION:

This closed loop position module is designed to quickly and accurately move hydraulic cylinder loads. Position and velocity commands are from analog sources. Cylinder position feedback is from a digital (SSI) source.

Stroke dependent deceleration is used to provide quick and repeatable positioning. Internal ramp and velocity adjustments allow for easy system tuning.

A wide range of analog signals are accepted. User may select either voltage or current input mode. These inputs are easily scaled to match system requirements.

Forward and Reverse "jog" inputs allow for manual load control. A user definable window for "in position" triggers an output for communication to the next machine function.

Output is an analog voltage, 0 to +10vdc, suitable for directly driving a proportional directional valve with on board electronics.

This module is easily adapted to a variety of system requirements. All variables are user adjusted with easy to use software on your Microsoft Windows® laptop. Control variables are stored in non-volatile memory internal to the module. All variables can be read by the laptop, and reproduced exactly on other modules.

TECHNICAL DATA

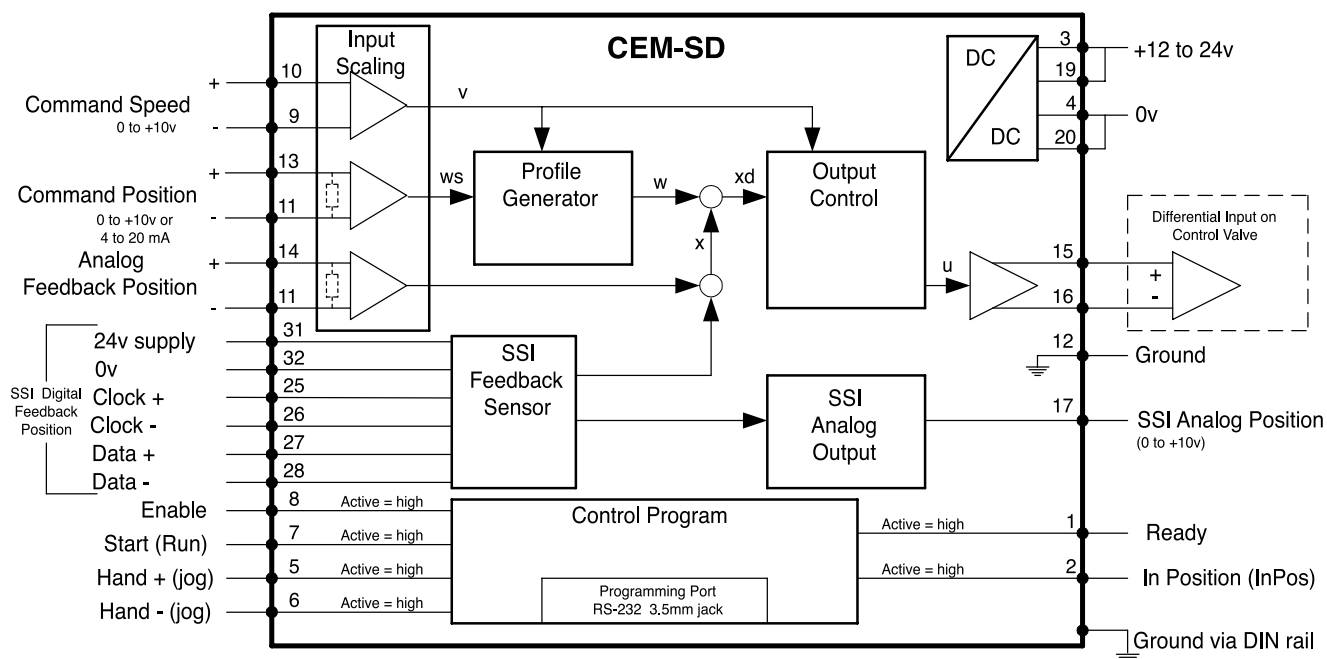
Power Supply	Consumption	vDC	12 to 30 (including ripple)
	External Fuse	mA	<100mA
Analog Inputs	Voltage	vDC	0 to + 10
	Impedance	ohm	33k
	Current	mA	0 to 20 (typ 4 to 20)
	Impedance	ohm	250
	Resolution	%	0.01
	Sample Time	mS	1.0
	(Speed Input) Voltage	vDC	0 to +10
SSI Feedback	(Speed Input) Impedance	ohm	90k
	Monitor	vDC	RS-422 150k baud
Electrical Connection	Programming Port	mA	0 to 10
	Power and Signal Ground		5 (max)
Digital Inputs	Impedance	V	12 to 30 (including ripple)
		ohm	<100mA
Digital Outputs		V	3 (medium action)
		V	25k
Analog Output	Voltage	vDC	Logical 0 = < 2
	Current	mA	Logical 1 = > 10
Housing	Resolution	%	25k
			Logical 0 = < 2 (50mA max)
Electro Magnetic Compatibility			Logical 1 = ~ Power Supply
Vibration Resistance			

IDENTIFICATION CODE

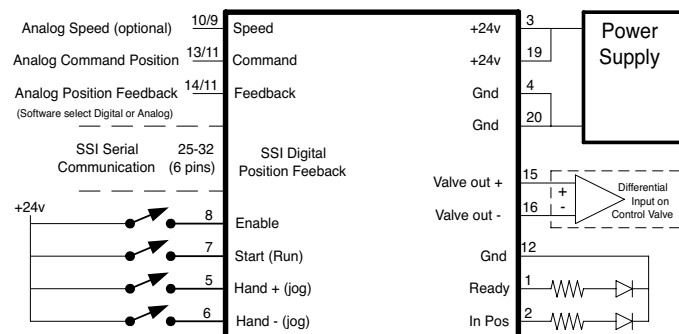
CEM-SD-A

Closed Loop Position Module

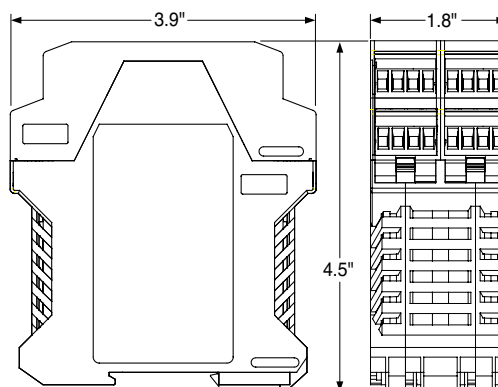
FUNCTIONAL DIAGRAM



WIRING EXAMPLE



DIMENSIONS



CONTINENTAL HYDRAULICS

CLOSED LOOP SYNCHRONIZATION MODULE CEM-MS

CLOSED LOOP SYNCHRONIZATION MODULE - CEM-MS



Two Axis Control

DESCRIPTION:

This closed loop position module is to be applied in pairs, each module driving a hydraulic cylinder for a system of synchronized motion. This pair of cylinders can quickly and accurately move hydraulic cylinder loads in unison. Position and velocity commands are from analog sources. Cylinder feedback is from an analog source.

Stroke dependent deceleration is used to provide quick and repeatable positioning. Internal ramp and velocity adjustments allow for easy system tuning.

A wide range of analog signals are accepted. User may select either voltage or current input mode. These inputs are easily scaled to match system requirements.

Output is an analog voltage, 0 to +10vdc, suitable for directly driving a proportional directional valve with on board electronics.

This module is easily adapted to a variety of system requirements. All variables are user adjusted with easy to use software on your Microsoft Windows® laptop. Control variables are stored in non-volatile memory internal to the module. All variables can be read by the laptop, and reproduced exactly on other modules.

TECHNICAL DATA

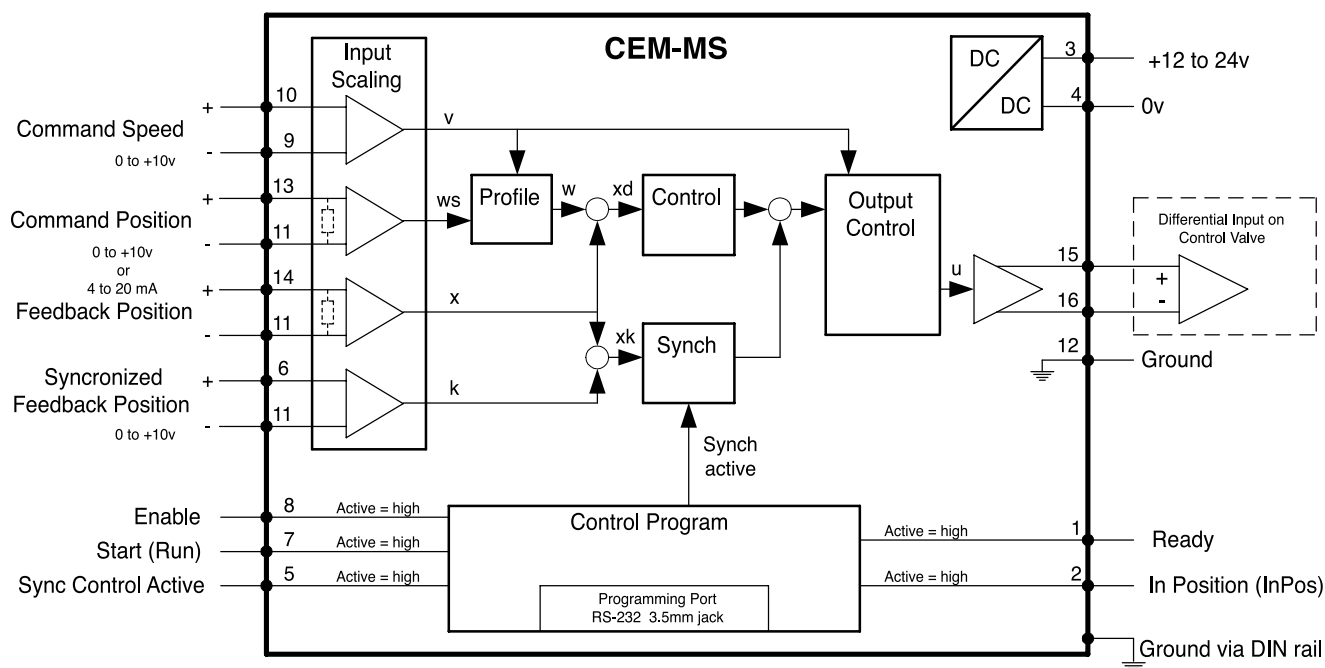
Power Supply	Consumption	vDC	12 to 30 (including ripple)
	External Fuse	mA	<100mA
Analog Inputs	Voltage	vDC	0 to +10
	Impedance	ohm	33k
	Current	mA	0 to 20 (typ 4 to 20)
	Impedance	ohm	250
	Resolution	%	0.01
	Sample Time	mS	1.0
	(Speed Input) Voltage	vDC	0 to +10
	(Speed Input) Impedance	ohm	90k
Digital Outputs	V	V	Logical 0 = < 2 (50mA max)
	V	V	Logical 1 = ~ Power Supply
Electrical Connection	Programming Port		RS-232 3.5mm Stereo Jack
	Power and Signal Ground		4 strips with 4 screw terminals each via DIN Rail
Digital Inputs	Impedance	V	Logical 0 = < 2
		V	Logical 1 = > 10
Analog Output	Voltage	vDC	0 to +/- 10
	Current	mA	5 (max)
	Resolution	%	0.024
Housing	Module		Snap to 35mm DIN Rail EN 50022
	Material		Polyamide PA 6.6
	Combustability Class	UL94	V0
	Protection Class	IP	20
	Working Temperature	C	-20 to +60
	Storage Temperature	C	-20 to +70
Electro Magnetic Compatibility	Humidity	%	95 (non condensing)
	Emission		EN 61000-6-2
	Immunity		EN 61000-6-3
	Vibration Resistance		EIC 60068-2-6

IDENTIFICATION CODE

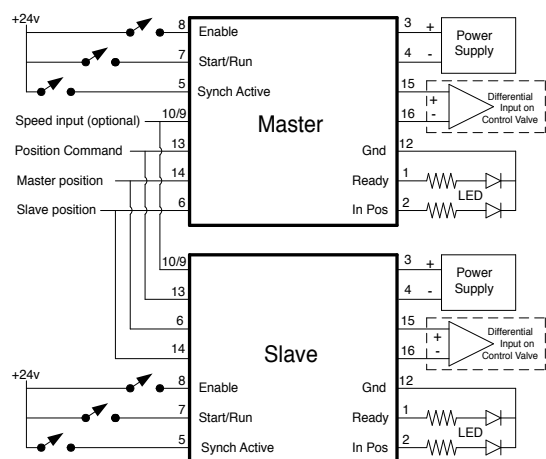
CEM-MS-A

Closed Loop Synchronization Module

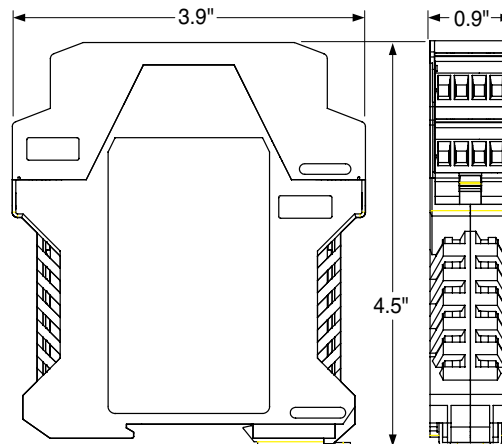
FUNCTIONAL DIAGRAM



WIRING EXAMPLE



DIMENSIONS



CONTINENTAL HYDRAULICS

CLOSED LOOP PID MODULE CEM-PID

CLOSED LOOP PID MODULE - CEM-PID



Universal PID Signal Conditioner

DESCRIPTION:

This closed loop PID module compares command and feedback signals, and applies traditional PID gain settings to the error signal. This modified signal is provided as an analog voltage (0 to +/-10v) output. It may be used to drive proportional pressure or flow control valves with on board electronics, or as a command to another amplifier module. It is suitable to provide dynamic closed loop control in pressure, force, or velocity systems.

A wide range of analog signals are accepted. User may select either voltage or current input mode. These inputs are easily scaled to match system requirements. Input command can be ramped. PID variables are adjustable over a wide range. Easily switched from open loop to closed loop control.

Output can be scaled to match the proportional valve being driven. If command current signal is outside of the proper range, the module is disabled. Digital outputs inform the user of system errors.

This module is easily adapted to a variety of system requirements. All variables are user adjusted with easy to use software on your Microsoft Windows® laptop. Control variables are stored in non-volatile memory internal to the module. All variables can be read by the laptop, and reproduced exactly on other modules.

TECHNICAL DATA

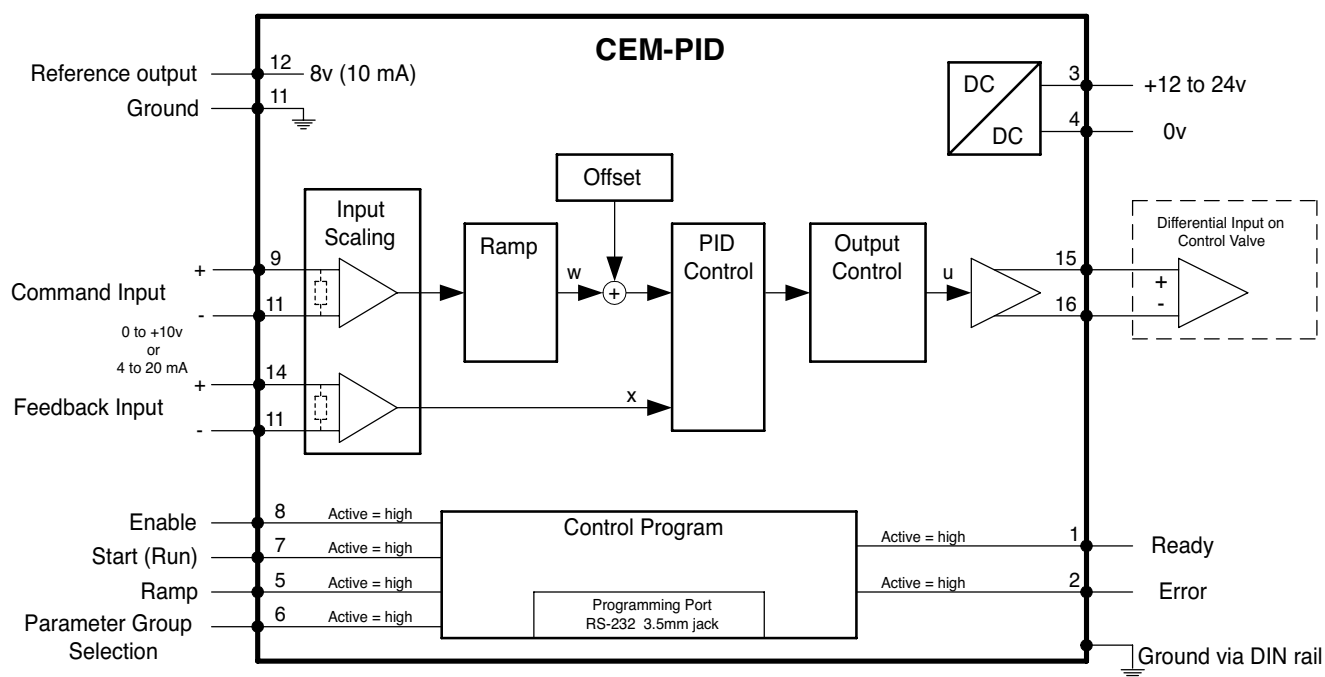
Power Supply	Consumption	vDC	12 to 30 (including ripple)
	External Fuse	mA	<100mA
Analog Inputs	Voltage	vDC	0 to +10
	Impedance	ohm	33k
	Current	mA	4 to 20
	Impedance	ohm	250
	Resolution	%	0.012
	Sample Time	mS	1.0
Digital Outputs	Reference Voltage	V	8 (10mA max)
		V	Logical 0 = < 2 (50mA max) Logical 1 = ~ Power Supply
Electrical Connection			
Programming Port			RS-232 3.5mm Stereo Jack
Power and Signal			4 strips with 4 screw terminals each
Ground			via DIN Rail
Digital Inputs		V	Logical 0 = < 2 Logical 1 = > 10
Impedance		ohm	25k
Analog Output	Voltage	vDC	0 to +/- 10
	Current	mA	5 (max)
	Resolution	%	0.024
Housing			
Module			Snap to 35mm DIN Rail EN 50022
Material			Polyamide PA 6.6
Combustability Class		UL94	V0
Protection Class		IP	20
Working Temperature		C	-20 to +60
Storage Temperature		C	-20 to +70
Humidity		%	95 (non condensing)
Electro Magnetic Compatibility			
Emission			EN 61000-6-2
Immunity			EN 61000-6-3
Vibration Resistance			EIC 60068-2-6

IDENTIFICATION CODE

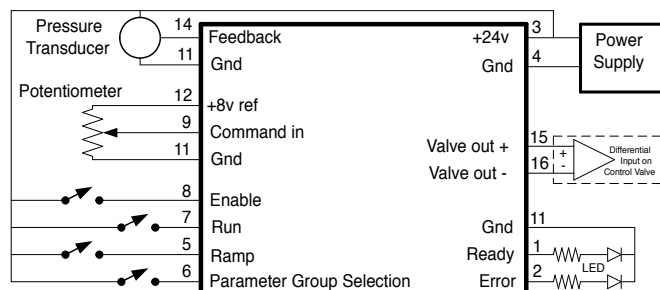
CEM-PID-A

Closed Loop PID Module

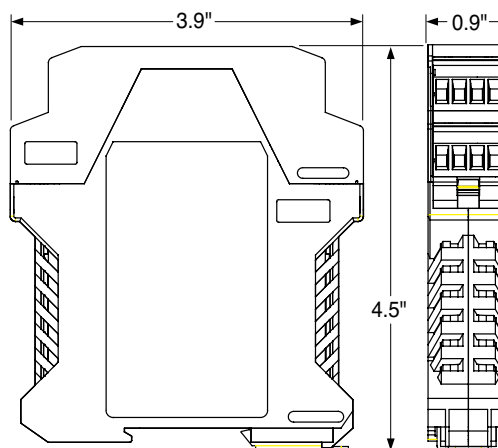
FUNCTIONAL DIAGRAM



WIRING EXAMPLE



DIMENSIONS



CONTINENTAL HYDRAULICS

VALVE ELECTRICAL ACCESSORIES

FOR ELECTRO HYDRAULIC PRODUCTS



DESCRIPTION:

These products are used to connect, configure and troubleshoot your electro hydraulic proportional products.

CHI electro hydraulic products are unique in the industry, as you need only "One cable, and One software" to configure our full line of all digital valves and control modules.

This easy to use software allows you precise and repeatable control of the electronic variables necessary to tune the motion profile of your control system.

All variables can be adjusted, saved and reproduced into other modules. Variable names and ranges are consistent from one module to another, making your machine tuning job easier.

Product offerings include:

Programming Cable

Programming Boxes

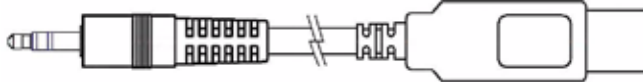
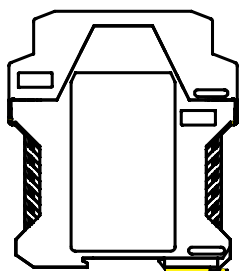
Adapters

Connectors and Cordsets

Software

PROGRAMMING CABLE

VEA-USB is a cable necessary to configure all digital valves and CEM control modules. One end has a USB connector to plug into your Microsoft Windows® laptop. The other end has a 3.5mm plug that connects to the control module or valve electronics jack. This tool allows you to communicate with, configure and troubleshoot electronic controllers.



PROGRAMMING BOX:

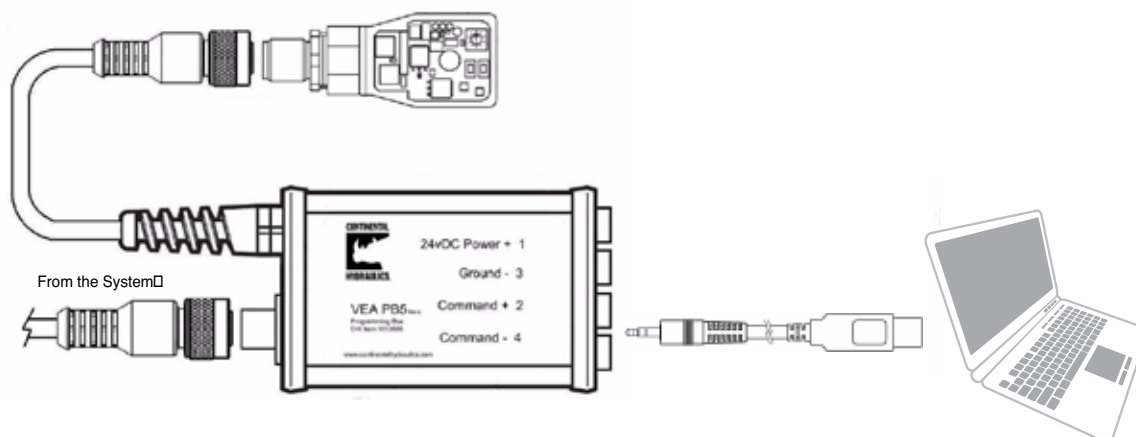
VEA-PB5 is a tool that eases the task of making adjustments to digital electronic controllers. This programming box can be used during the commissioning of a new product, or when troubleshooting an existing application.

To troubleshoot an existing application, simply disconnect the existing 5 pin connector, and insert this tool in series. You may now monitor the on board amplifier as being commanded by the machine controller. The VEA-PB5 allows you to connect your Microsoft Windows® laptop via the VEA-USB programming cable. You may then tune the variables to optimize you motion profile, and save those changes. Banana Jacks for power and signal are included, and allow for bench top programming.

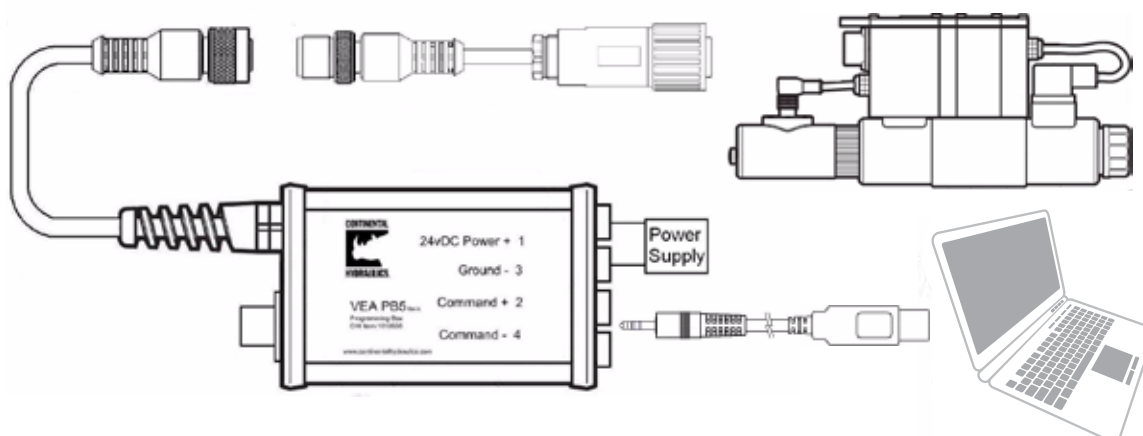
VEA-PB5 will connect directly to CEM-AC coil mounted amplifiers. VEA-527 is required to connect to "J" and "G" pressure and flow valves with 7 pin connector on board electronics.



CONFIGURING A CEM-AC



CONFIGURING A VALVE WITH ON BOARD ELECTRONICS ON THE BENCH



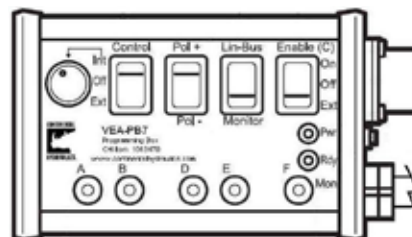
PROGRAMMING BOX:

VEA-PB7 is a tool that eases the task of making digital adjustments to your on board electronics equipped proportional valves. This programming box can be used during the commissioning of a new product, or troubleshooting an existing application.

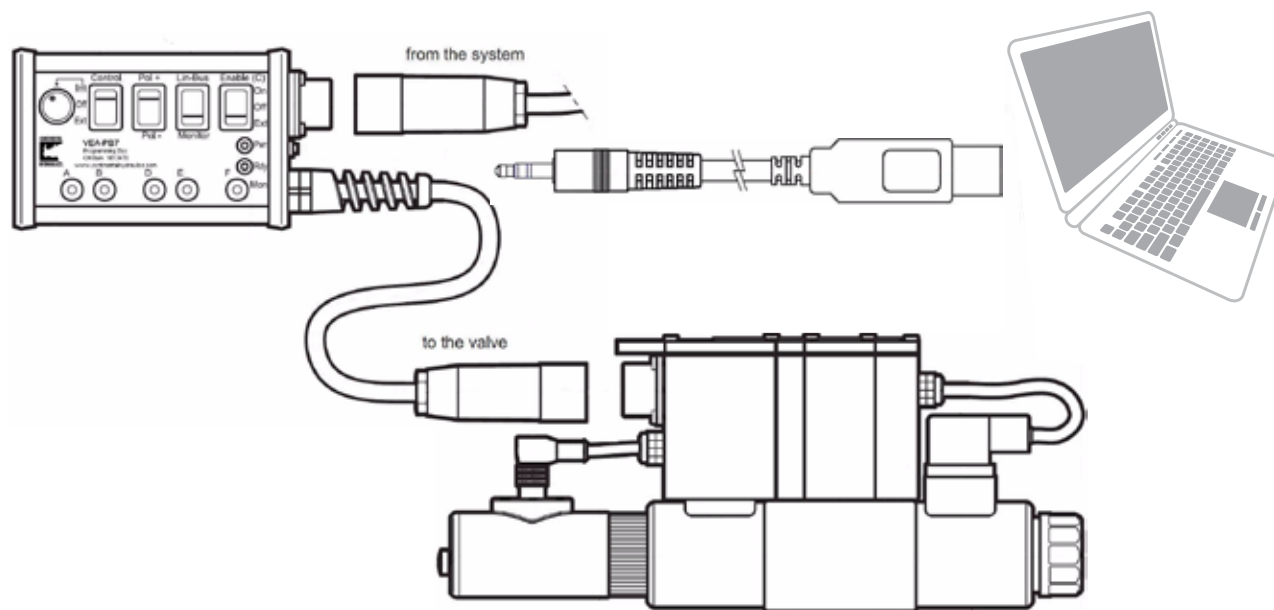
To troubleshoot an existing application, simply disconnect the existing 7 pin connector, and insert this tool in series. You may now monitor the on board amplifier as being commanded by the machine controller. The VEA-PB7 allows you to connect your Microsoft Windows® laptop via VEA-USB, and change variables as required. Banana Jacks for power and signal are included, and allow for benchtop programming.

VEA-PB7 also includes controls and switches that allow for independent total control of the valve during troubleshooting.

VEA-PB7 will connect directly to any “J” and “G” valves with 7 pin connector on board electronics.

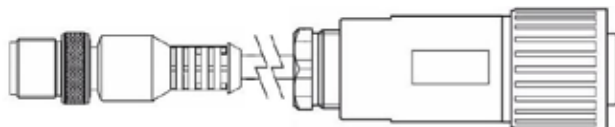


CONFIGURING A VALVE WITH ON BOARD ELECTRONICS



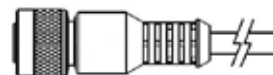
PROGRAMMING BOX CABLE ADAPTER

VEA-527 is an adapter that allows the VEA-PB5 to connect to proportional valves with on board electronics. It has a male M12 5 pin jack, and a female 7 pin plug to connect to the valve. Internally, Pin A is connected to Pin C to turn on "Enable". Power, signal and communication pins are wired straight through.

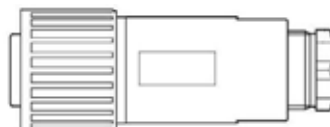


VALVE CONNECTORS AND CORDSETS

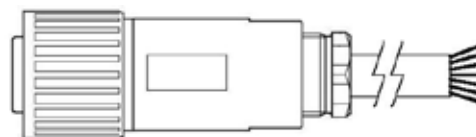
VEA-3P5C is a molded shielded cordset that brings power and signal to the CEM AC amplifier. It is a M12 female connector attached 5 conductors of 24ga finely stranded copper, all wrapped in a foil shield. The shield drain is to be connected to frame ground at the control box. The cable is 5 meters long, and can be easily cut to length during installation.



Electrical connectors and shielded cable assemblies connects the machine controller to the 7 pin on board electronics valve controller. Plastic **VEA-3P7P** and metal **VEA-3P7M** versions are offered.

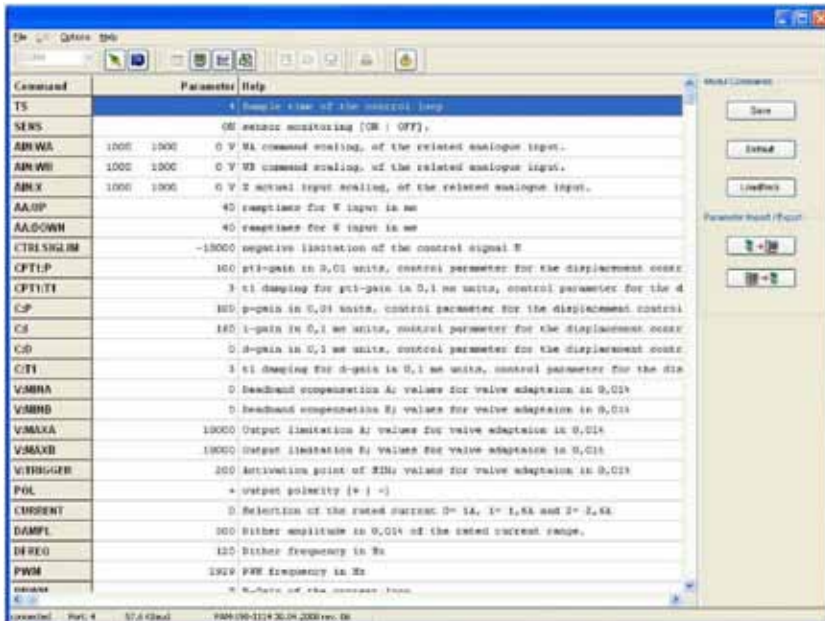
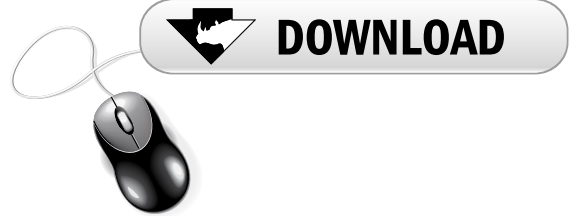


VEA-3P7C cordset attaches a plastic connector body to a 3 meter long cable made of 7 individual 18 gauge copper conductors, all wrapped in a foil shield. The outer jacket is an oil resistant gray PVC. The controller end of the cable is stripped and tagged with pin names.



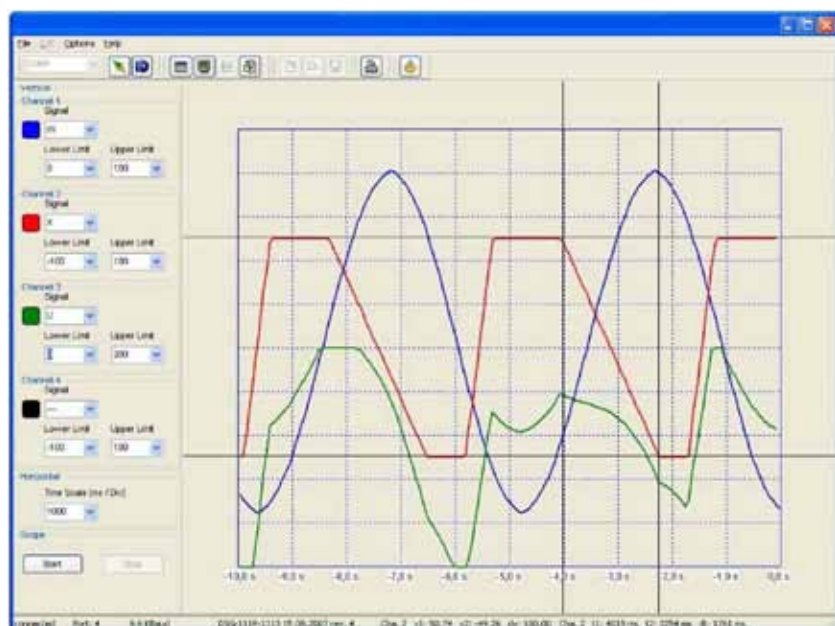
SOFTWARE

CHI PC is a “free to download” application for your Microsoft Windows® laptop. This tool allows you configure and troubleshoot all of your CHI digital electronics products. This easy to understand software can be used in all three process steps: configure and tune the machine, storing these variables to permanent memory, and monitoring the machine during operation.



The configuration page allows the user to scale inputs, adjust ramp times, set closed loop control variables, and adjust outputs to match the valve. Only those parameters that apply to the connected module appear on this screen.

The oscilloscope feature allows the user to monitor inputs and outputs in real time. Cursor control allows for precise measurement of variables.



CONTROL
PRECISE
CONTROL
PRECISE
CONTROL
PRECISE

ABOUT CONTINENTAL HYDRAULICS

Rugged, durable, high-performance, efficient—the reason Continental Hydraulics' products are used in some of the most challenging applications across the globe. With a commitment to quality customer support and innovative engineering, Continental's pumps, valves, power units, mobile and custom products deliver what the markets demand. Continental has been serving the food production, brick and block, wood products, automotive and machine tool industries since 1962. Learn how our products survive some of the most harsh environments.

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CONTINENTAL



HYDRAULICS

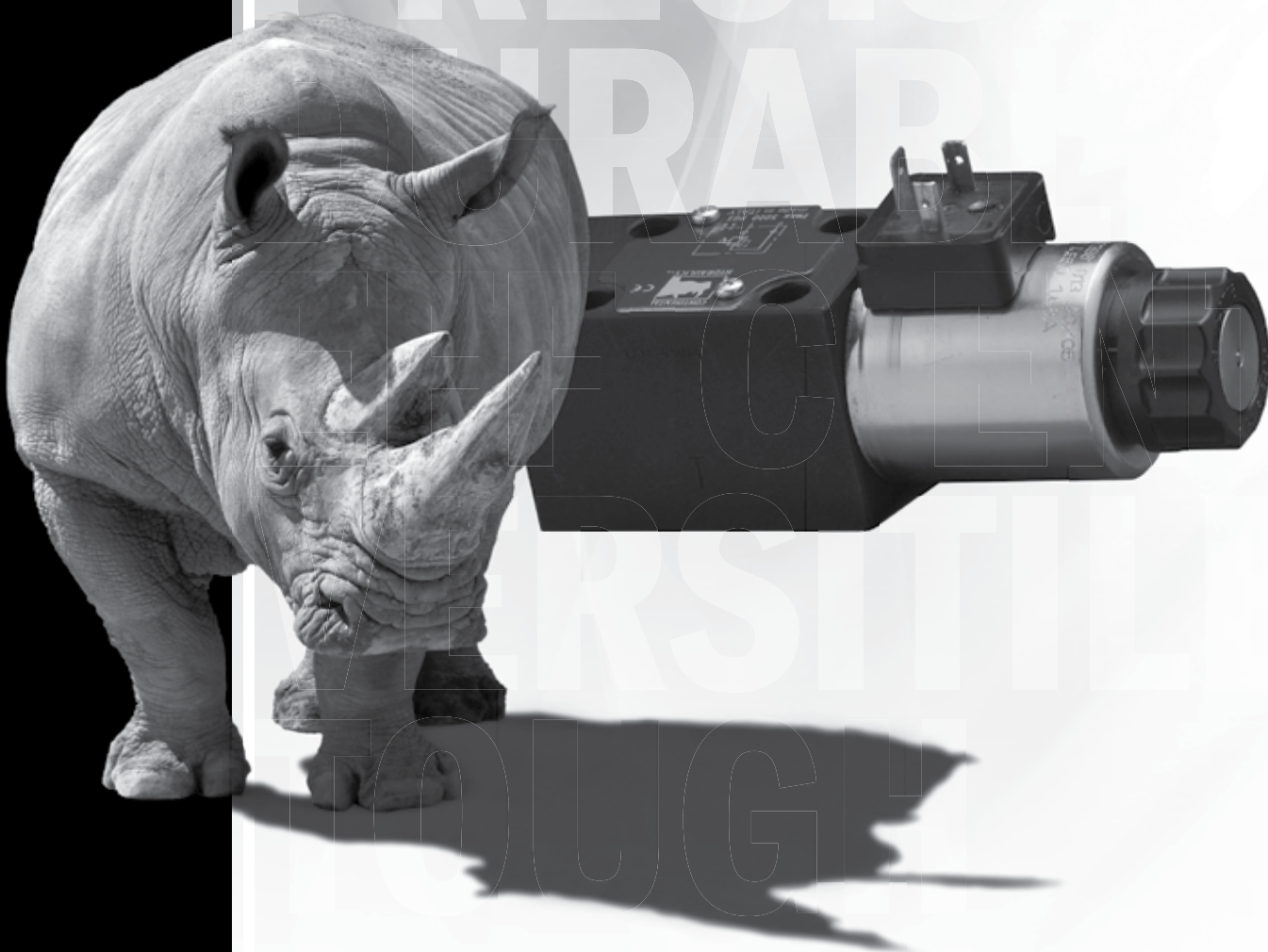
CONTINENTAL



CONTINENTAL HYDRAULICS

EDF*M

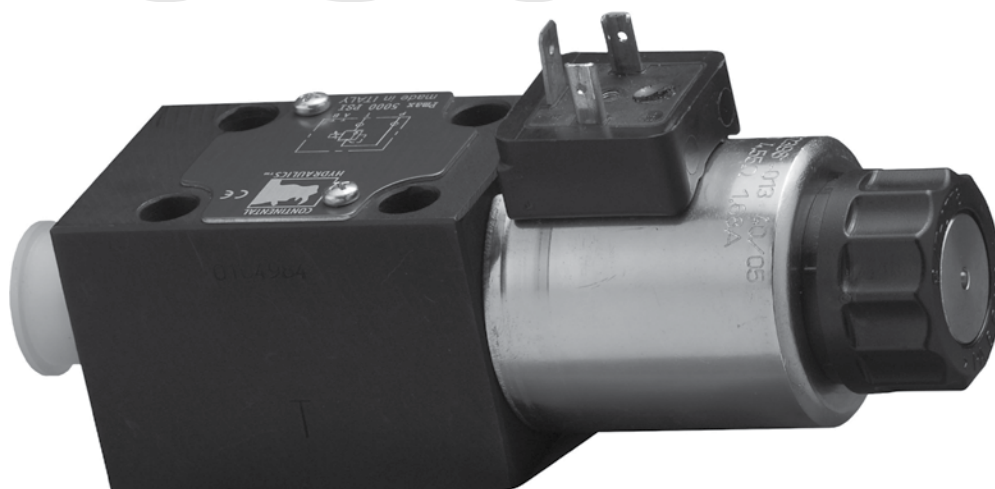
COMPENSATED PROPORTIONAL FLOW CONTROL VALVES



EDF*M - COMPENSATED PROPORTIONAL FLOW CONTROL VALVES

EDF*M

COMPENSATED PROPORTIONAL FLOW CONTROL VALVES



DESCRIPTION

EDF03M and EDF05M are direct operated normally closed proportional flow control valves with pressure compensation. These valves are subplate mounted according to NFPA/T.3.5.1 R2-2002 and ISO 4401:2005 standards.

These valves are used to regulate flow in a hydraulic circuit. Output flow is directly proportional to the input current to the solenoid.

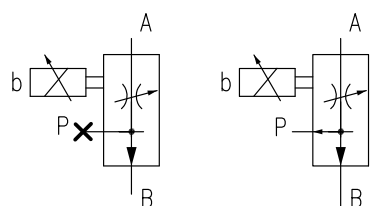
OPERATIONS

The EDF valves can be used as either a restrictive (2 way) or bypass (3 way) flow control.

Restrictive compensators are typically used in circuits supplied by variable volume pumps. Block 'P' port of the subplate to use the valve as a restrictive compensator flow control.

Bypass compensators are typically used in circuits with fixed volume pumps. Connect 'P' port to the tank to use the valve as a bypass flow control.

T port in the manifold must always be plugged.



restrictive

by-pass

TYPICAL PERFORMANCE SPECIFICATIONS

MAXIMUM OPERATING PRESSURE:	All Ports	3600 psi	250 bar
REGULATED FLOW	EDF03M	3.7 gpm 5.3 gpm 8 gpm 10.5 gpm	14 l/min 20 l/min 30 l/min 40 l/min
	EDF05M	21 gpm	80 l/min
COMPENSATOR SPRING	EDF03M-14	58 psi	4 bar
	EDF03M-30		
	EDF03M-20	116 psi	8 bar
	EDF03M-40		
	EDF05M-80		
MINIMUM PRESSURE DROP A TO B	EDF03M-14	145 psi	10 bar
	EDF03M-30		
	EDF03M-20	320 psi	22 bar
	EDF03M-40		
	EDF05M-80		

		EDF03M		EDF05M	
STEP RESPONSE	0 → 100%	< 70 ms			
HYSTERESIS	% of Q max	< 6%		< ± 2%	
REPEATABILITY	% of Q max	< ± 1.5%			
POWER SUPPLY		12V DC or 24V DC			
CONNECTION		DIN 43650	DT04-2P	DIN 43650	
PROTECTION	IEC 60529	IP65	IP69K	IP65	
WEIGHT		3.5 lbs	1.6 kg	7.7 lbs	3.5 kg

IDENTIFICATION CODE

EDF **M** - - - **D** - _____ DESIGN LETTER

SIZE	
03	NFPA F03 (D03)
05	NFPA D05

SEAL	
A	Buna (STD)
G	Viton

CONNECTION	
K1	DIN 43650 (STD)
K7	DT04-2P 'Deutsch (for EDF03M only)

VOLTAGE	
12	12 V DC Solenoid (STD)
24	24 V DC Solenoid

Manifold Mounting,
See Mounting Surface
Configuration On Page 12.

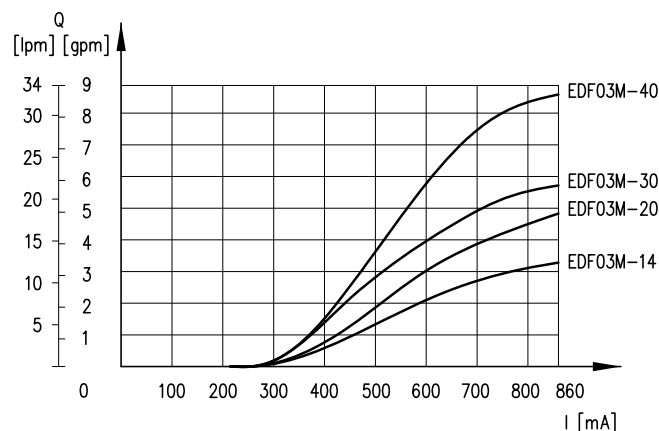
NOMINAL FLOW		
03	14	14 l/min (3.7 gpm)
	20	20 l/min (5.3 gpm)
	30	30 l/min (8 gpm)
	40	40 l/min (10.5 gpm)
05	80	80 l/min (21 gpm)

MECHANICAL	
OMIT	Manual override built-in with the tube (STD)
U	Manual override boot
S	Override with screw
K	Knob override

TYPICAL ORDERING CODE:
EDF03M-14-A-K112D-A

PERFORMANCE CURVES FOR EDF03M WITH RESTRICTIVE PRESSURE COMPENSATION

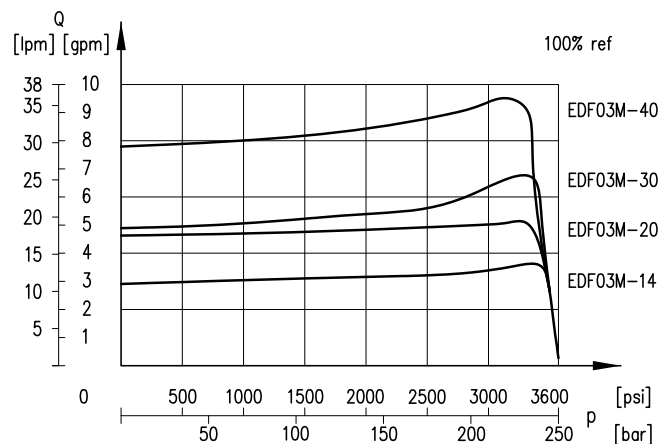
FLOW CONTROL $Q = f(\text{command})$



NOTES:

1. Typical flow rate characteristics A → B for controlled flow rate: 14 - 20 - 30 - 40 lpm depending on the current supplied to the solenoid .
2. Curves obtained with maximum current 860 mA, at 100 Hz PWM with 24V DC coil and with mineral oil with viscosity of 170 sus (36 cSt) at 122°F (50°C).

FLOW CONTROL $Q = f(pB)$

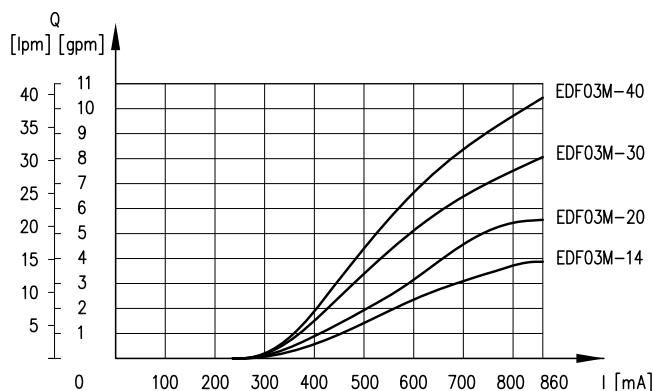


NOTES:

1. Typical flow rate characteristics A → B for controlled flow rate: 14 - 20 - 30 - 40 lpm depending on the pressure in line B.

PERFORMANCE CURVES FOR EDF03M WITH BYPASS PRESSURE COMPENSATION

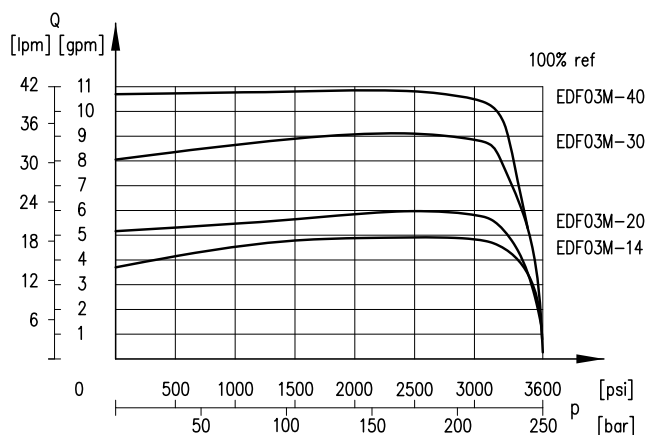
FLOW CONTROL $Q = f(I)$ (command)



NOTES:

1. Typical flow rate characteristics A → B for controlled flow rate: 14 - 20 - 30 - 40 lpm depending on the current supplied to the solenoid.
2. Curves obtained with maximum current 860 mA, at 100 Hz PWM with 24V DC coil and with mineral oil with viscosity of 170 sus (36 cSt) at 122°F (50°C).

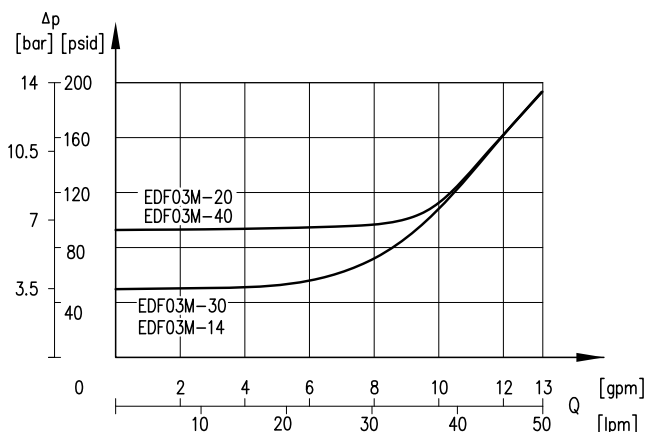
FLOW CONTROL $Q = f(p_B)$



NOTES:

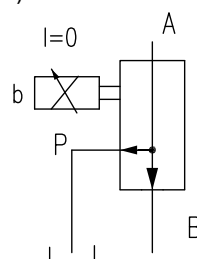
1. Typical flow rate characteristics A → B for controlled flow rate: 14 - 20 - 30 - 40 lpm depending on the pressure in line B.

PRESSURE DROPS Δp A → P ($Q_B = 0$)



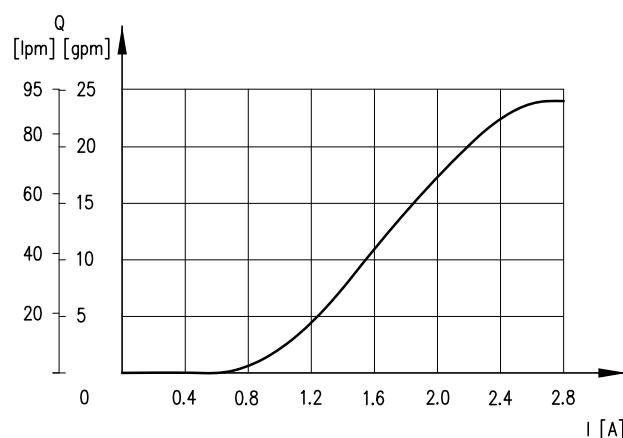
NOTES:

1. Pressure drops with flow A → P obtained with $Q_B = 0$ (de-energized solenoid).



PERFORMANCE CURVES FOR EDF05M WITH RESTRICTIVE PRESSURE COMPENSATION

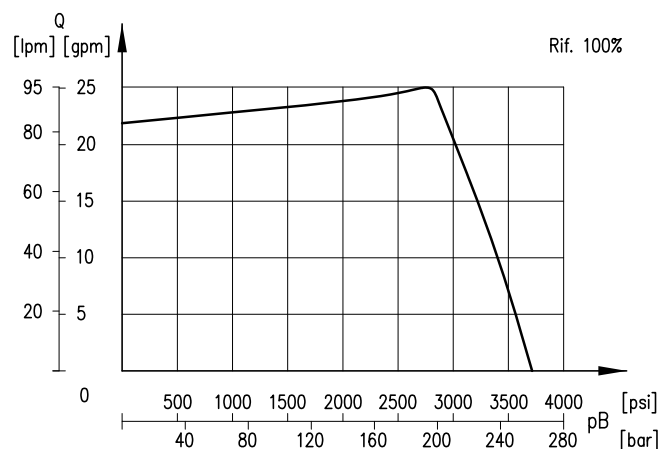
FLOW CONTROL $Q = f(\text{command})$



NOTES:

1. Typical flow rate characteristics A \rightarrow B depending on the current supplied to the solenoid.
2. Curve obtained with maximum current 2.8 A, at 100 Hz PWM with 12V DC coil and with mineral oil with viscosity of 170 sus (36 cSt) at 122°F (50°C).

FLOW CONTROL $Q = f(pB)$

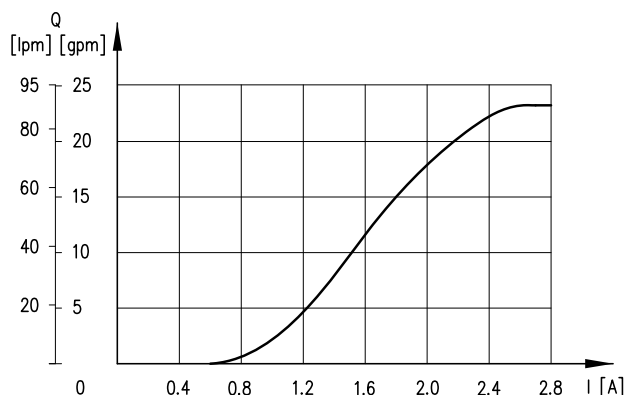


NOTES:

1. Typical flow rate characteristics A \rightarrow B for controlled flow rate depending on the pressure in line B.
2. Curve obtained with maximum current 2.8 A, at 100 Hz PWM with 12V DC coil and with mineral oil with viscosity of 170 sus (36 cSt) at 122°F (50°C).

PERFORMANCE CURVES FOR EDF05M WITH BYPASS PRESSURE COMPENSATION

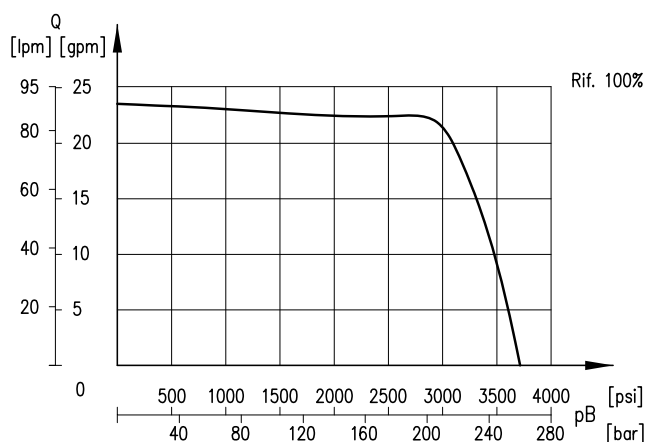
FLOW CONTROL $Q = f(I)$ (command)



NOTES:

1. Typical flow rate characteristics A \rightarrow B depending on the current supplied to the solenoid.
2. Curve obtained with maximum current 2.8 A, at 100 Hz PWM with 12V DC coil and with mineral oil with viscosity of 170 sus (36 cSt) at 122°F (50°C).

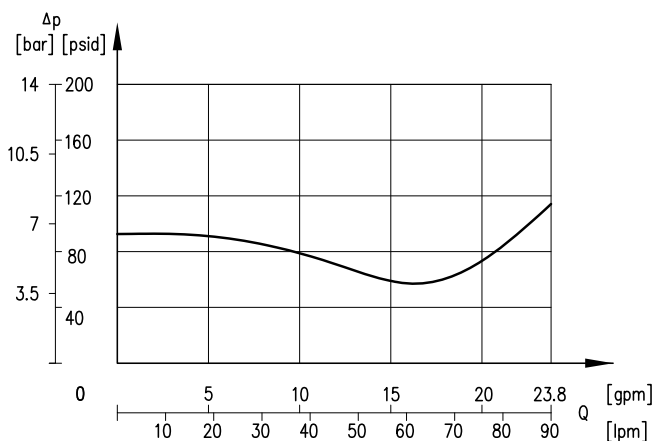
FLOW CONTROL $Q = f(p_B)$



NOTES:

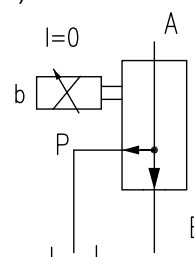
1. Typical flow rate characteristics A \rightarrow B depending on the pressure in line B.
2. Curve obtained with maximum current 2.8 A, at 100 Hz PWM with 12V DC coil and with mineral oil with viscosity of 170 sus (36 cSt) at 122°F (50°C).

PRESSURE DROPS Δp A \rightarrow P ($Q_B = 0$)



NOTES:

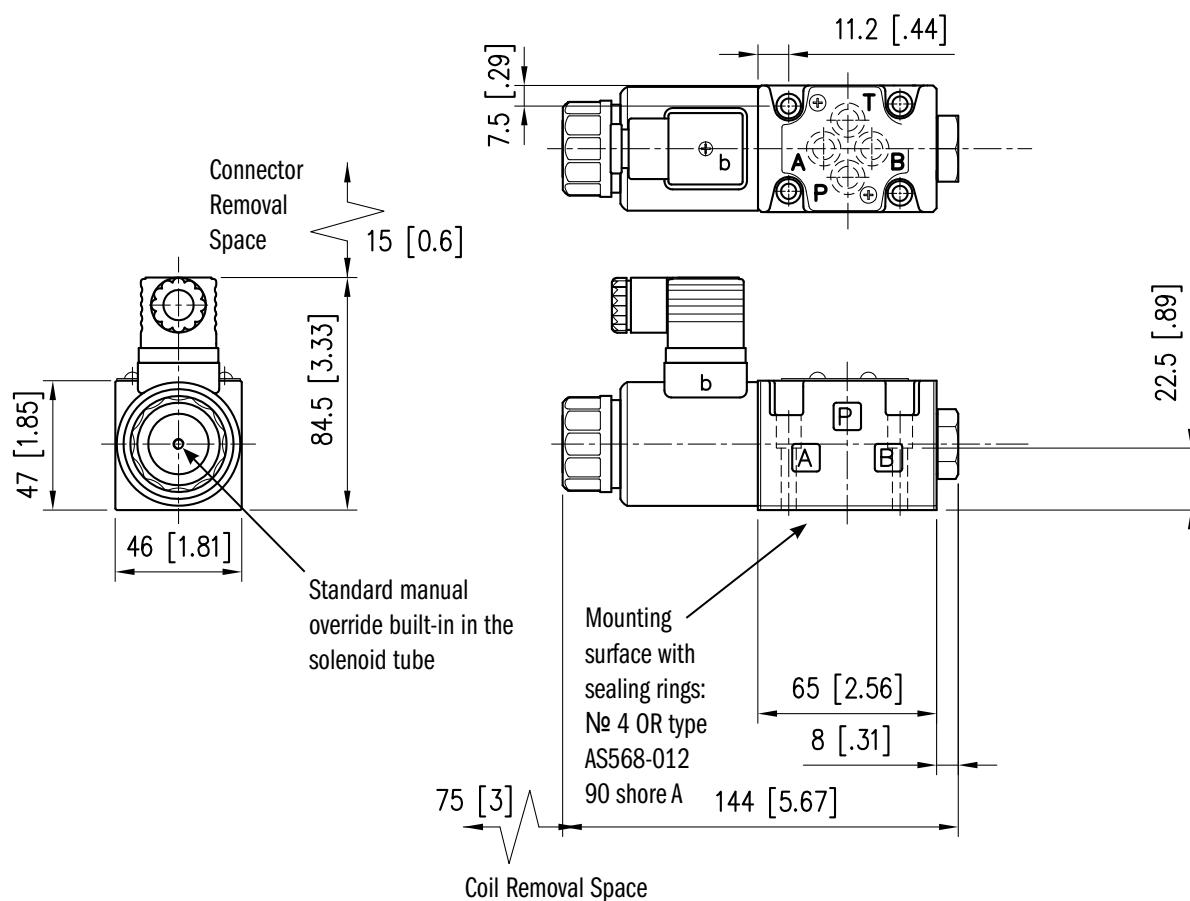
1. Pressure drops with flow A \rightarrow P obtained with $Q_B = 0$ (de-energized solenoid).



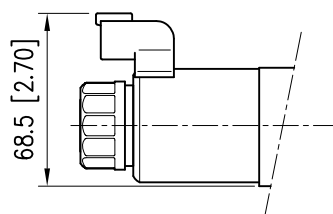
OVERALL AND MOUNTING DIMENSIONS FOR EDF03M

EDF03M

Dimensions in mm [IN]



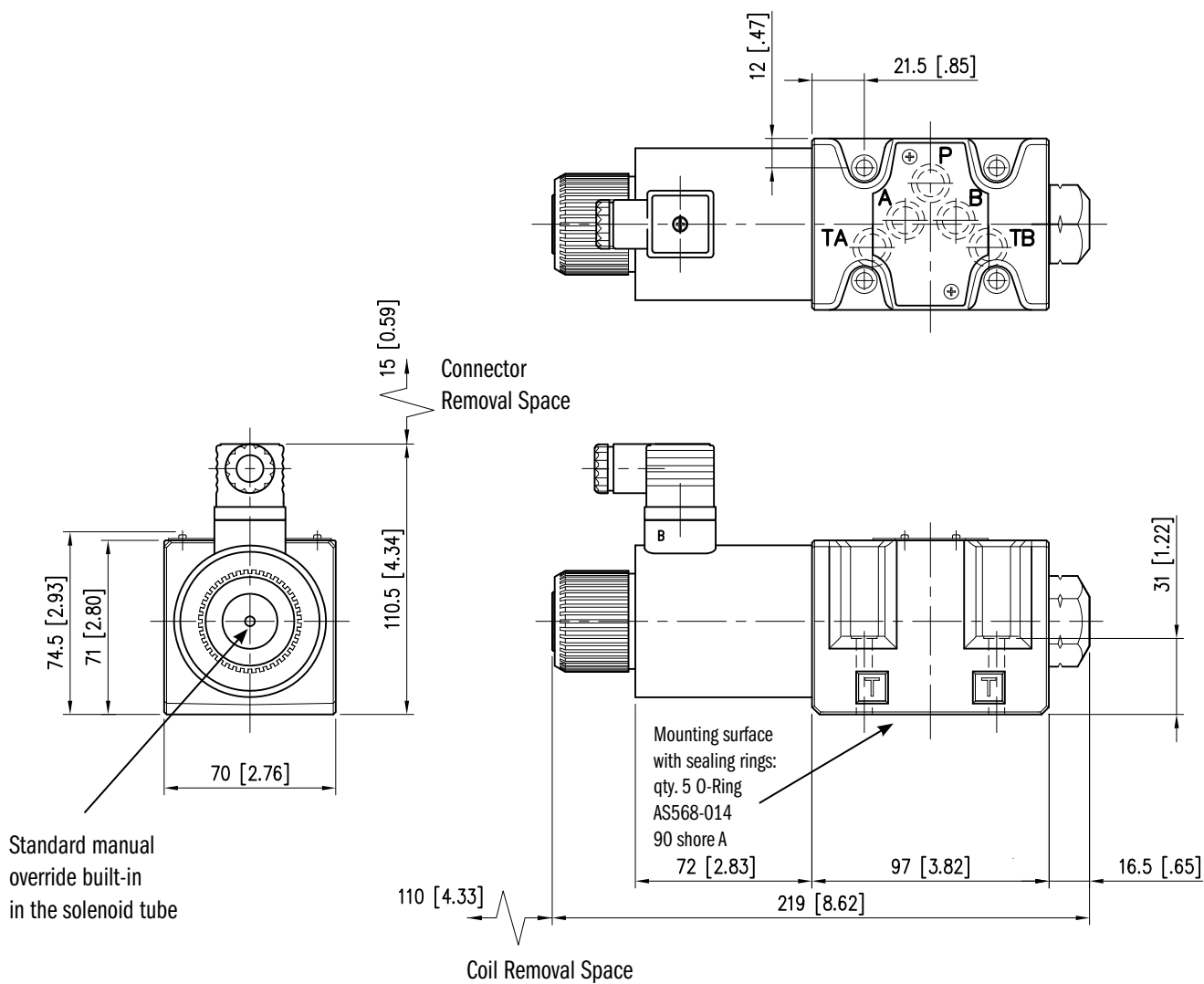
K7 CONNECTION



OVERALL AND MOUNTING DIMENSIONS FOR EDF05M

EDF05M

Dimensions in mm [IN]

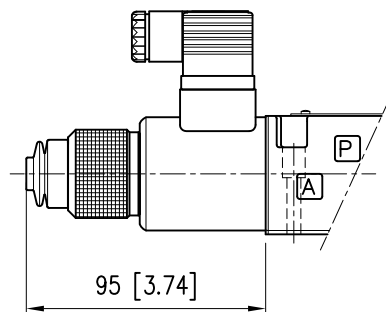


MANUAL OVERRIDE

The standard valve has override pins integrated in the tube. The operation of this control must be executed with a suitable tool, careful not to damage the sliding surface.

Other manual overrides are available for EDF03M only.

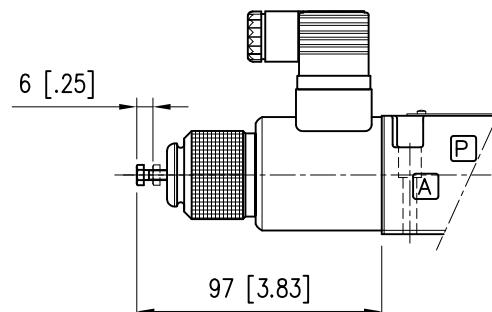
MANUAL OVERRIDE BOOT PROTECTED (CODE U)



NOTE:

1. This device can be ordered separately with code **VMAP-03J-A**.

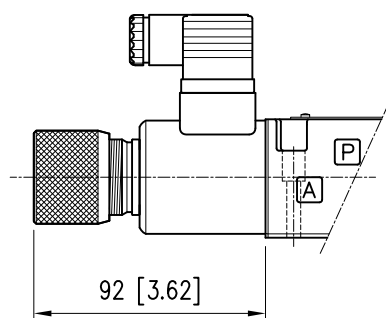
SCREW MANUAL OVERRIDE (CODE S)



NOTES:

1. With metal ring nut provided with a M4 screw and a blocking locknut to allow continuous mechanical operations.
2. This device can be ordered separately with code **VMAP-03S-A**.

KNOB (CODE K)



ELECTRICAL DATA FOR EDF*M

The proportional solenoid consists of tube and coil. The coil is mounted on the tube and fastened to it by a retainer nut.

The coils can be mounted in any position depending on the installation requirements.

IP DEGREE

The declared IP degree is guaranteed for all valves only if the connector has been wired and mounted correctly on the coil.

The K7 connection meets DIN 40050-9 which extends the IEC 60529 rating system with an IP69K rating for high-pressure, high-temperature and wash-down applications.

DUTY CYCLE		100%
ELECTROMAGNETIC COMPATIBILITY (EMC)		European Directive 2004/108/EC
IP DEGREE IEC 60529	K1	IP 65
	K7	IP 69K
CLASS OF PROTECTION FOR INSULATION	Copper Wire	Class H (356° F)
	Coil	Class F (311° F)

EDF03M

NOMINAL VOLTAGE	V DC	12	24
RESISTANCE AT 68° F	K1	3.66 Ω	17.6 Ω
	K7	4.5 Ω	18.7 Ω
CURRENT AT 68° F	K1	1.88 A	0.86 A
	K7	2.72 A	1.29 A
PWM FREQUENCY	Hz	200	100

EDF05M

NOMINAL VOLTAGE	V DC	12	24
RESISTANCE AT 68° F	K1	3.2 Ω	8.65 Ω
CURRENT AT 68° F	K1	2.8 A	1.6 A
PWM FREQUENCY	Hz	100	

ACCESSORY ELECTRONICS

Some external digital amplifiers are available to be coupled to the valve for a better control and to improve the valve performance.

See Continental Hydraulics Control Amplifier Catalog for products to match your requirements.

VEA-3F-A: DIN Connector - Black

MOUNTING SURFACES

Due to its particular design, the valve functions as bypass or restrictive depending on how the 'P' port is used in the manifold where the valve will be mounted.

To work as restrictive, only ports A and B are used. P must be plugged. The P port is necessary when a discharge of residual flow is needed (3-way operation). Port T is never used and must be plugged.

The holes are made according to ISO 6263-03 standard with regard to size 03 (NFPA F03), and ISO 4401-05 (NFPA D05) for the size 05.

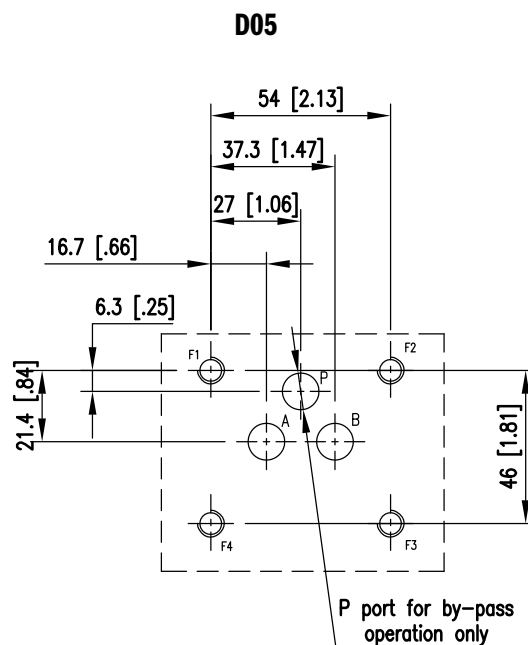
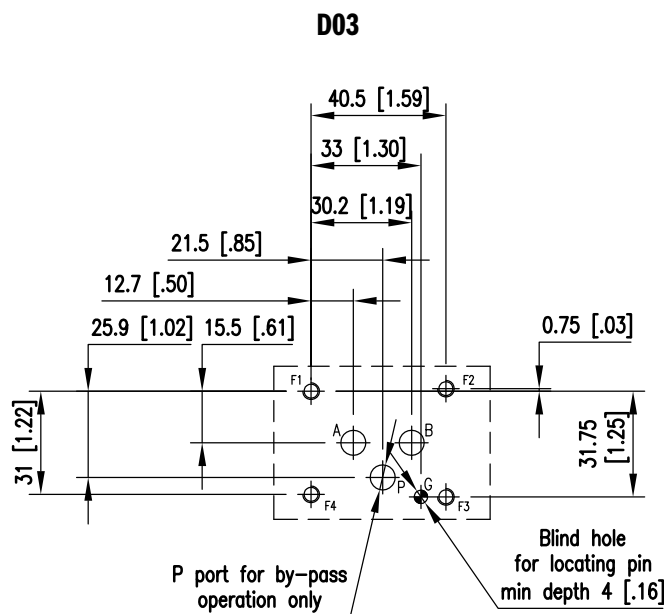
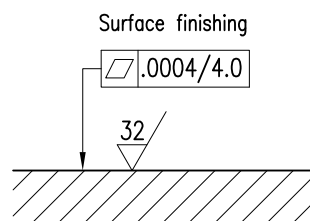
Dimensional tolerances are ± 0.1 mm (0.004") for bolt and pin location; ± 0.2 mm (0.008") for the other quotes.

PORT FUNCTION:

A = Flow inlet

B = Regulated flow

P = Residual flow (bypass only)



VALVE SIZE	ISO MOUNTING SURFACE	NFPA MOUNTING SURFACE	DIMENSIONS mm [in]				
			ØA MAX	ØB MAX	ØP MAX	ØG	F
03	6263-03-03-*-97	F03 (D03)	7.5 [0.3]	7.5 [0.3]	7.5 [0.3]	4 [0.16]	M5x12 mm [10 - 24 UNC x 1/2"]
05	4401-05-04-0-05	D05	11.2 [0.44]	11.2 [0.44]	11.2 [0.44]	-	M6x10 mm [1/4 - 20 UNC x 7/16"]

APPLICATION DATA

FLUIDS

All pressure drops shown on these data pages are based on 170 SUS fluid viscosity and 0.87 specific gravity. For any other specific gravity (G1) the pressure drop (ΔP) will be approx. $\Delta P_1 = \Delta P (G1/G)$. See the chart for other viscosities.

FLUID VISCOSITIES	Cst	10	14.5	32	36	43	54	65	76	86	108	216	324	400
	SUS	60	75	150	170	200	250	300	350	400	500	1000	1500	1900
MULTIPLIER		0.77	0.81	0.97	1.00	1.04	1.10	1.15	1.20	1.24	1.31	1.56	1.72	1.83

Use mineral oil-based hydraulic fluids HL or HM type, according to ISO 6743-4. For these fluids, use NBR seals. For fluids HFDR type (phosphate esters) use FPM seals (code G). For the use of other kinds of fluid such as HFA, HFB, HFC, please consult our technical department.

Using fluids at temperatures higher than 180 degrees F causes the accelerated degradation of seals as well as degradation of the fluids physical and chemical properties.

From a safety standpoint, temperatures above 130 degrees F are not recommended.

RANGE TEMPERATURES:	Ambient	-4 to +130 °F	-20 to +54 °C
	Fluid	-4 to +180 °F	-20 to +82 °C
FLUID VISCOSITY	Range	60 -1900 SUS	10 - 400 cSt
	Recommended	120 SUS	25 cSt
FLUID CONTAMINATION		ISO 4406:1999 Class 18/16/13	

BOLT KITS

BD03-125	4 Qty. 10-24 UNC x 1 ¼" Screws 4 Qty. #10 Lock Washers	1008406
BD05-163-B	4 Qty. 1/4 - 20 UNC x 1 ½" Screws 4 Qty. #1/4 Lock Washers	1013160

NOTE:

1. The recommended torque values for the bolts which mount the valve to the manifold or subplate are:

EDF03M: 4 lb.ft (5.4 Nm)

EDF05M: 6 lb.ft (8.1 Nm)

SEAL KIT

EDF03M	Buna Seal Kit	1008577
	Viton Seal Kit	1013096
EDF05M	Buna Seal Kit	1013142
	Viton Seal Kit	1013146

NOTE:

1. The kit also contains the O-rings for tube and end-cap.

ABOUT CONTINENTAL HYDRAULICS

Rugged, durable, high-performance, efficient—the reason Continental Hydraulics' products are used in some of the most challenging applications across the globe. With a commitment to quality customer support and innovative engineering, Continental's pumps, valves, power units, mobile and custom products deliver what the markets demand. Continental has been serving the food production, brick and block, wood products, automotive and machine tool industries since 1962. Learn how our products survive some of the most harsh environments.

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