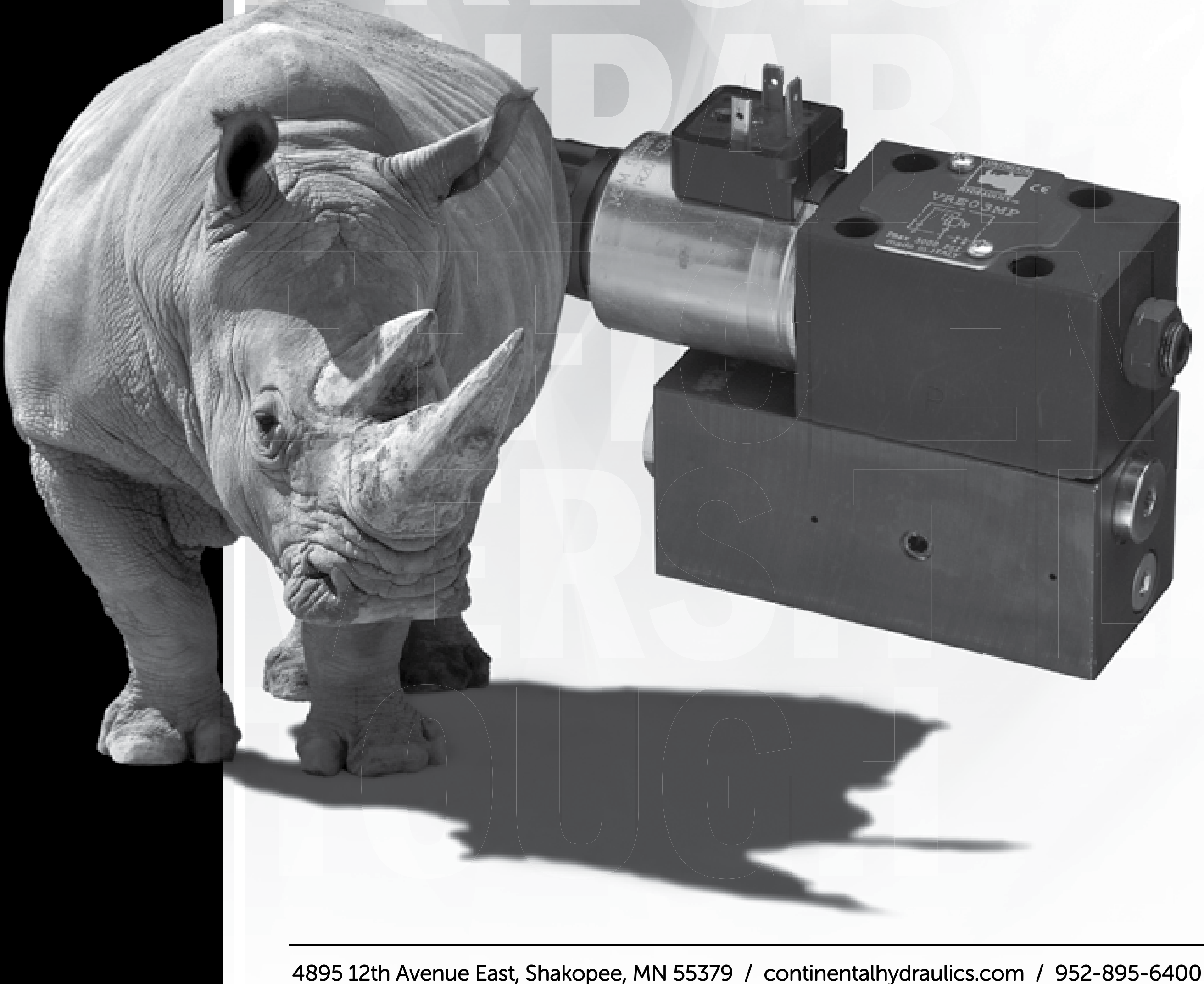
CONTINENTAL HYDRAULICS

VER03MP

PROPORTIONAL PRESSURE RELIEF VALVES PILOT OPERATED



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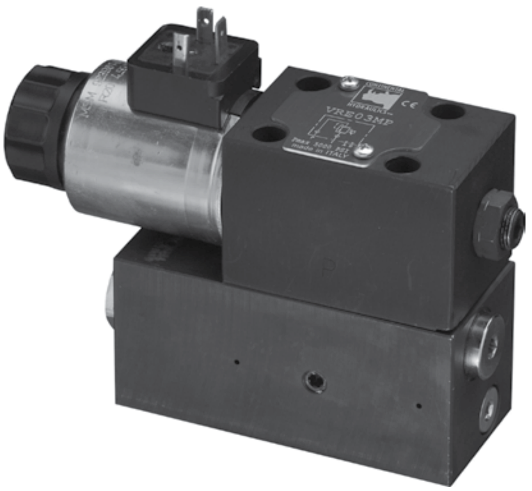


DESCRIPTION

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

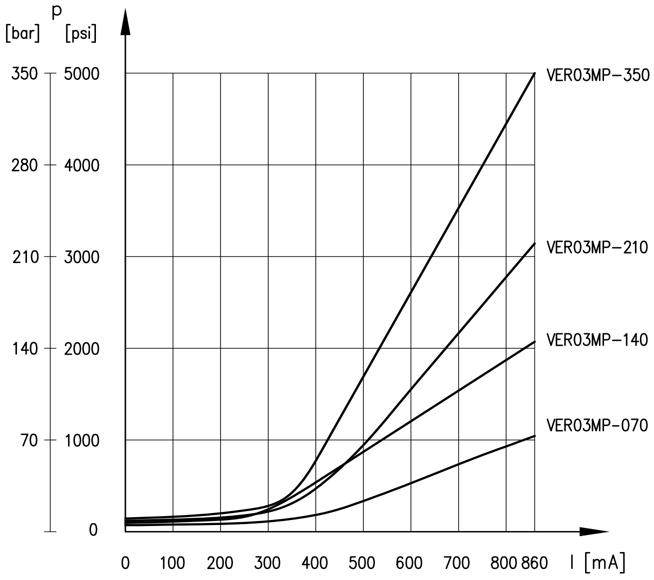
TYPICAL ORDERING CODE:
VER03MP-210-A-3-K1-12D-A

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



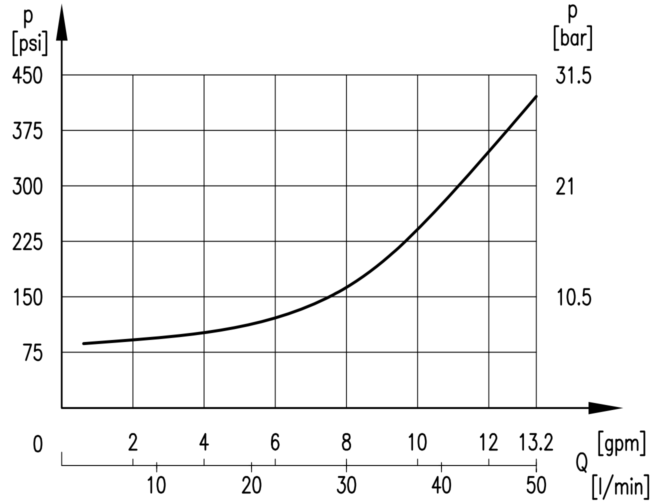
NOTES:

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

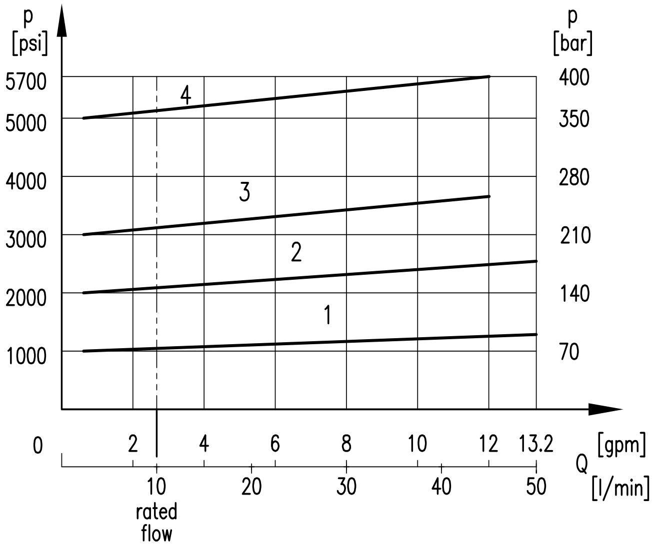


NOTES:

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

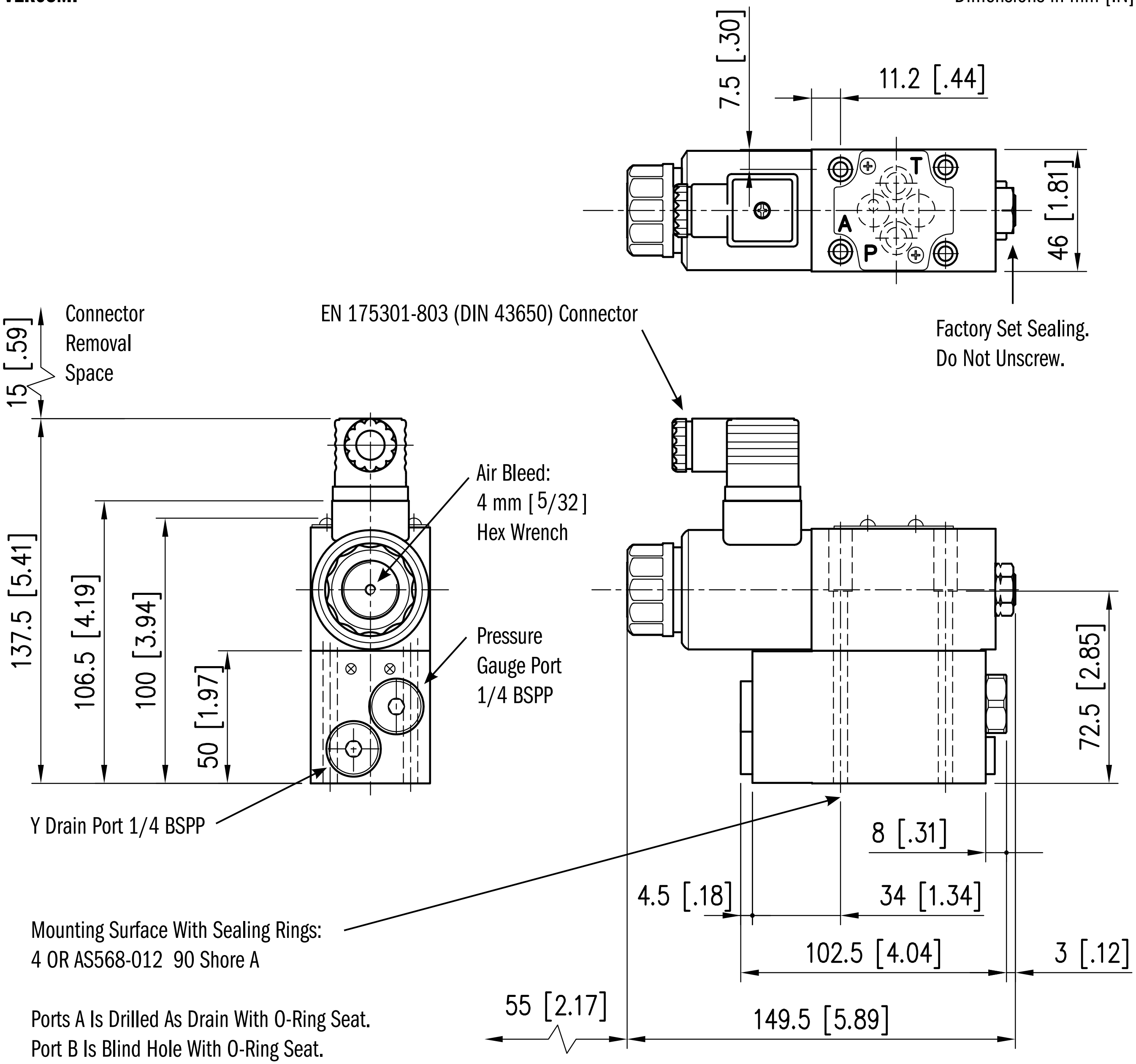
NOTES:

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

OVERALL AND MOUNTING DIMENSIONS FOR VER03MP

VER03MP

Dimensions in mm [IN]



Connector Removal Space

EN 175301-803 (DIN 43650) Connector

Factory Set Sealing.
Do Not Unscrew.

Air Bleed:
4 mm [5/32]
Hex Wrench

Pressure
Gauge Port
1/4 BSPP

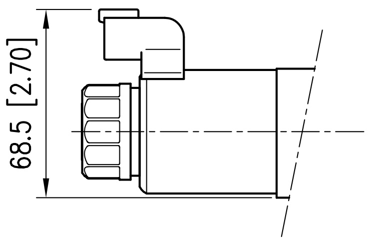
Y Drain Port 1/4 BSPP

Mounting Surface With Sealing Rings:
4 OR AS568-012 90 Shore A

Ports A Is Drilled As Drain With O-Ring Seat.
Port B Is Blind Hole With O-Ring Seat.

Coil Removal Space

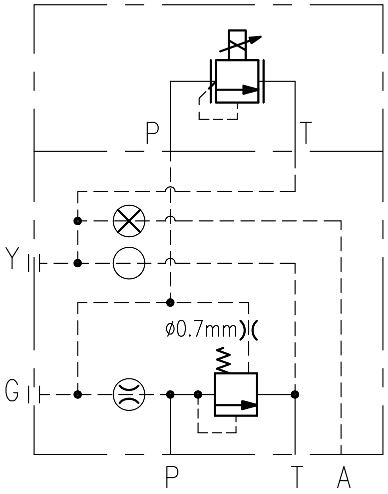
K7 CONNECTION



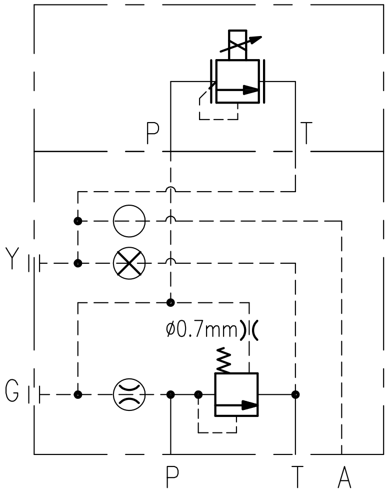
DRAIN OPTIONS

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)

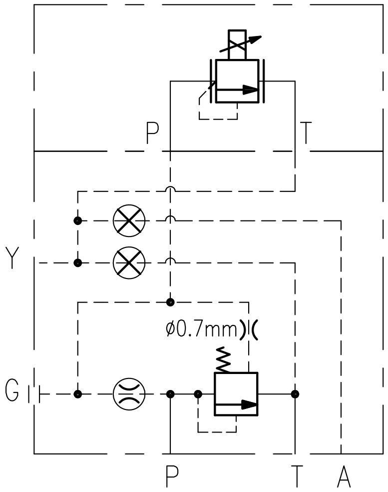


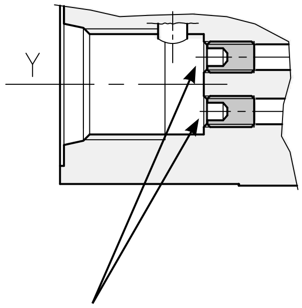
EXTERNAL DRAIN ON A PORT



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. ΔP1 = ΔP (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
MULTIPIER		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	

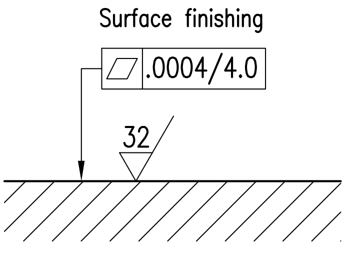
INSTALLATION

We recommend the VER03MP 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

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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