

CONTINENTAL

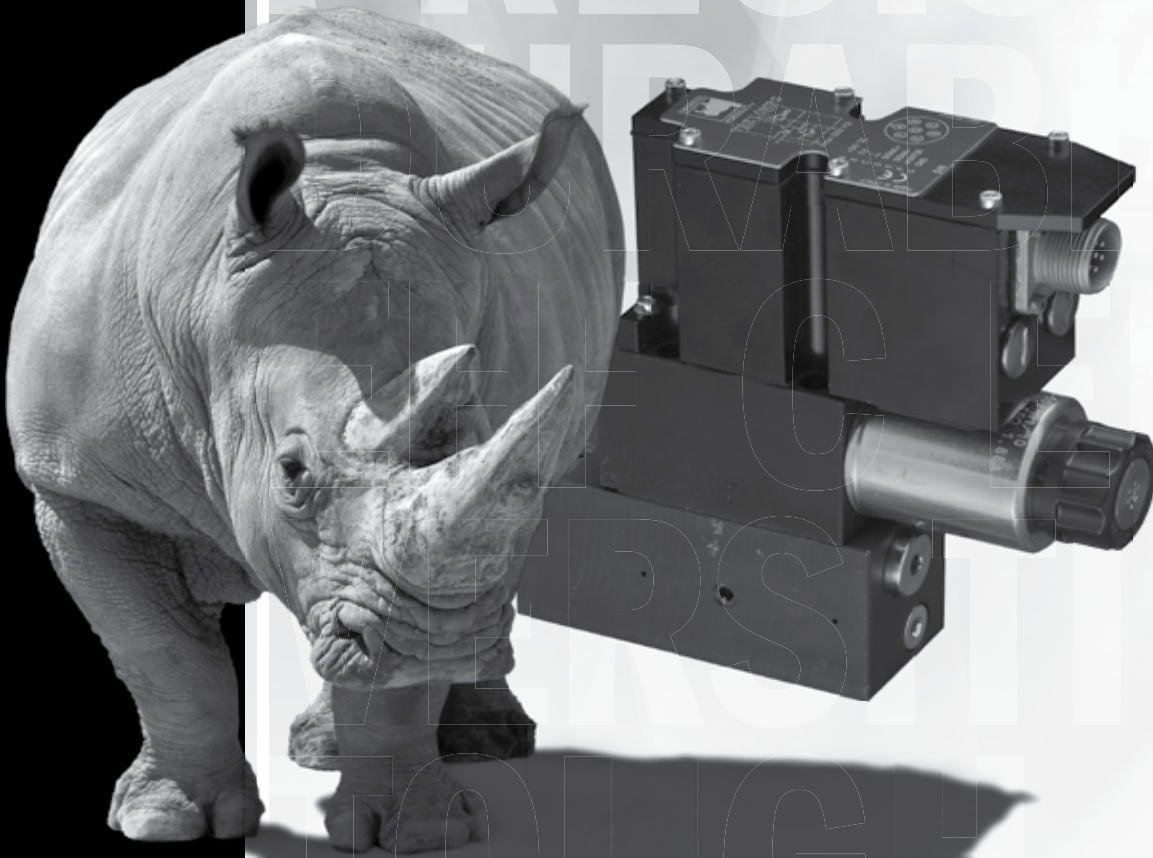


HYDRAULICS

CONTINENTAL HYDRAULICS

VERO3MPG

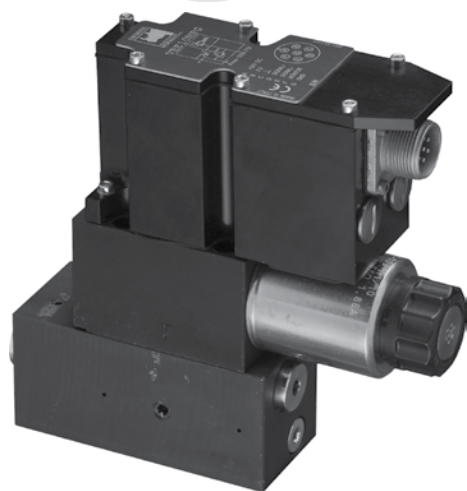
PROPORTIONAL PRESSURE RELIEF VALVES PILOT OPERATED WITH OBE



VERO3MPG - PROPORTIONAL PRESSURE RELIEF VALVES PILOT OPERATED WITH OBE

VERO3MPG

PROPORTIONAL PRESSURE RELIEF VALVES PILOT OPERATED WITH OBE



DESCRIPTION

Continental Hydraulics VERO3MPG pilot operated proportional relief valves conform to NFPA R03/D03 and ISO 6264:1998 mounting standards.

OPERATIONS

The VERO3MPG 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.

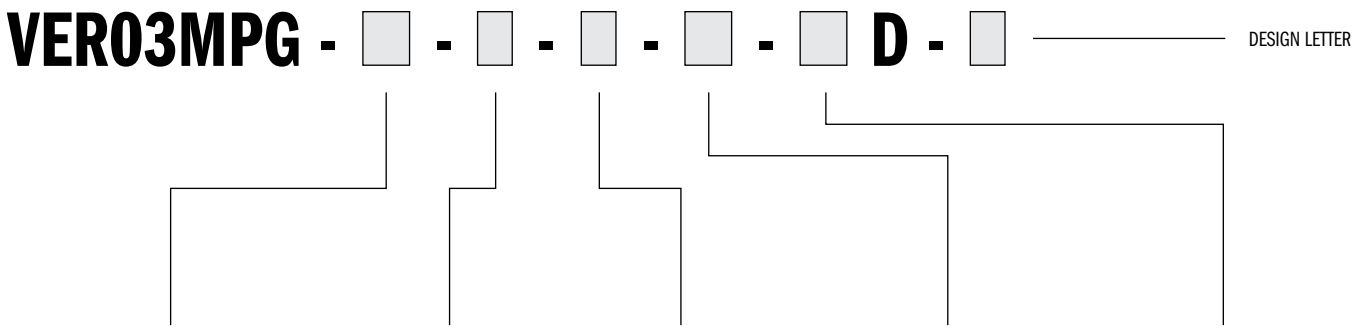
TYPICAL PERFORMANCE SPECIFICATIONS

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	VERO3MPG-070	100 - 1000 psi	7 - 70 bar
	VERO3MPG-140	100 - 2000 psi	7 - 140 bar
	VERO3MPG-210	116 - 3000 psi	8 - 210 bar
	VERO3MPG-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



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

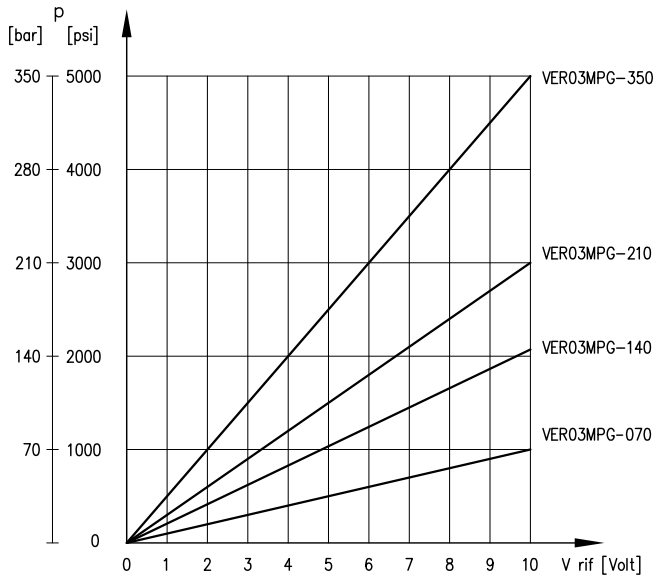
TYPICAL ORDERING CODE:
VER03MPG-210-A-3-OBW-E0D-A

CHARACTERISTIC CURVES

Typical control curves according to the current supplied to the solenoid for all the pressure stages, measured with input flow rate $Q = 2.65 \text{ gpm}$ (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



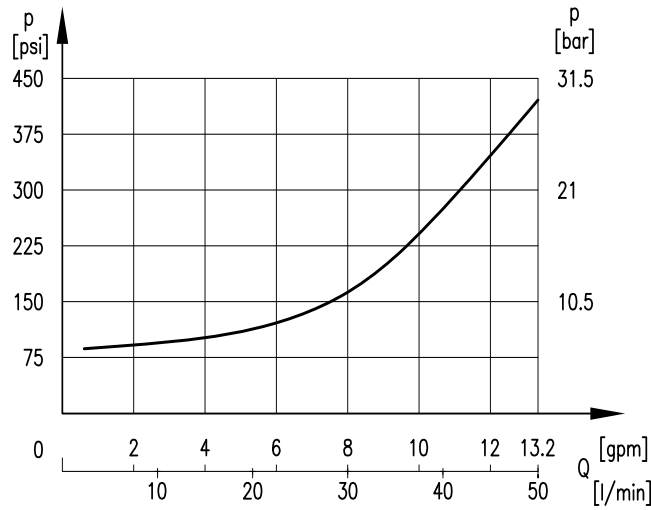
NOTES:

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

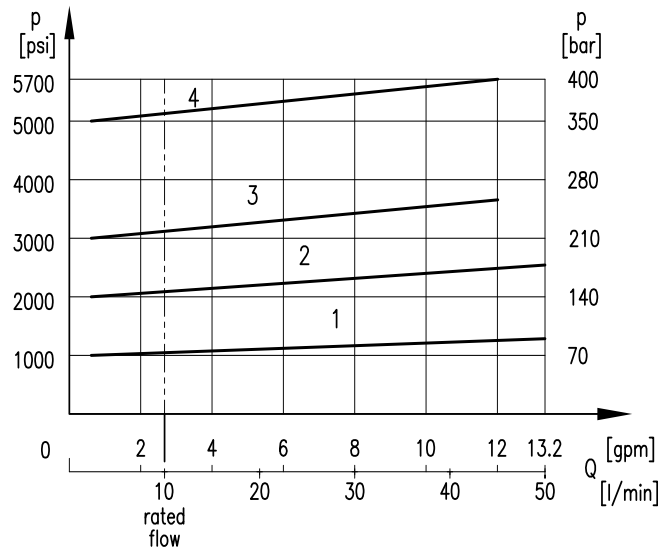
MINIMUM ADJUSTMENT PRESSURE



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

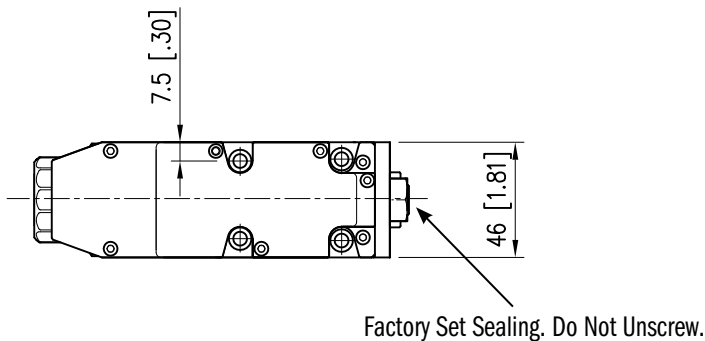
NOTES:

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

OVERALL AND MOUNTING DIMENSIONS FOR VER03MPG

VER03MPG

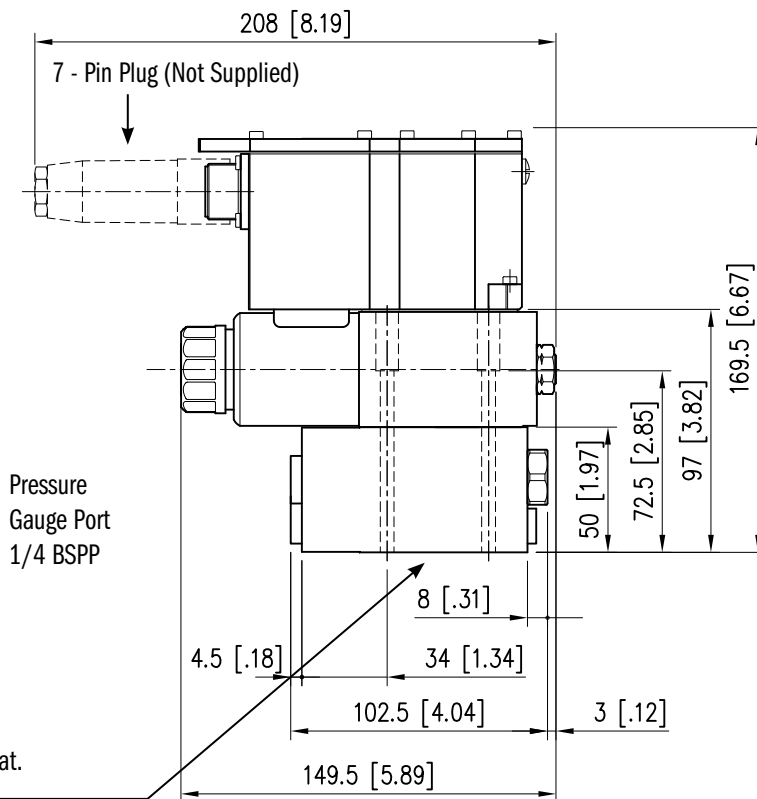
Dimensions in mm [IN]



Main Connection 7 - Pin Male
MIL-C-5015-G
(DIN 43563 Metal)

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

Y Drain Port
1/4 BSPP



Pressure
Gauge 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.



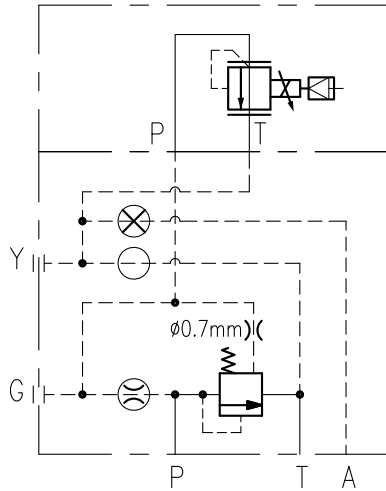
In order to avoid electromagnetic noises and fulfill the European EMC regulations, a 7 pin metal plug according to MIL-C-5015 G should be used instead of the standard plastic 6+PE connector EN 175201-408 (formerly DIN 43563)

VER03MPG - PROPORTIONAL PRESSURE RELIEF VALVES PILOT OPERATED WITH OBE

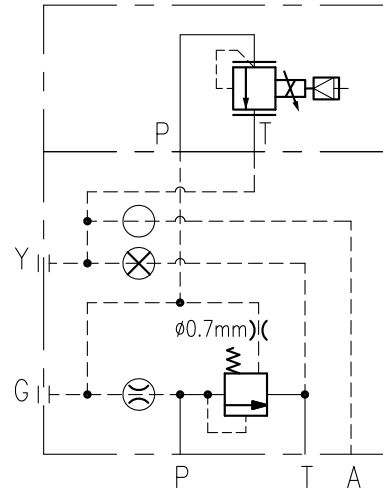
DRAIN OPTIONS

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)

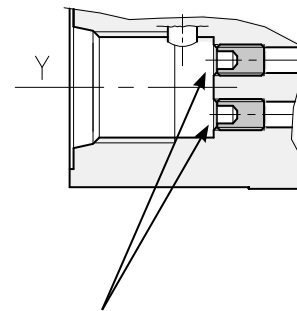
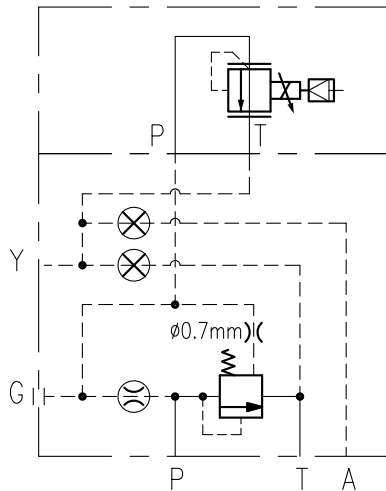


EXTERNAL DRAIN ON A PORT



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

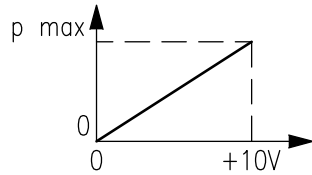
COMMAND SIGNAL	4 - 20 mA
IMPEDANCE	500 Ω

E0 VERSION - VOLTAGE REFERENCE SIGNAL

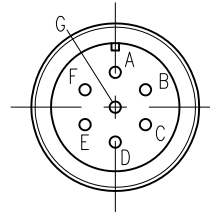
This is the most common version; it makes the valve completely interchangeable with the traditional proportional valves with analog type integrated electronics. The valve has only to be connected as indicated below.

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.

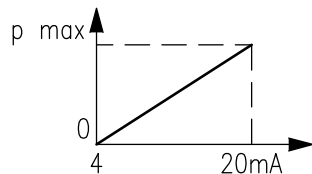


A	24V	Power supply positive. Use an external fuse 5A/50V fast type for protecting electronics.
B	0V	Power supply zero (0V)
C	NC or 24V	OBW Version: Not wired OBC Version: Valve enable
D	0 - 10V	Differential command signal (+V)
E	0V	Differential command signal (-V)
F	0 - 10V	Output monitor for command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

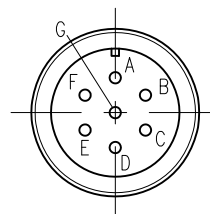


E1 VERSION - CURRENT REFERENCE SIGNAL

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?

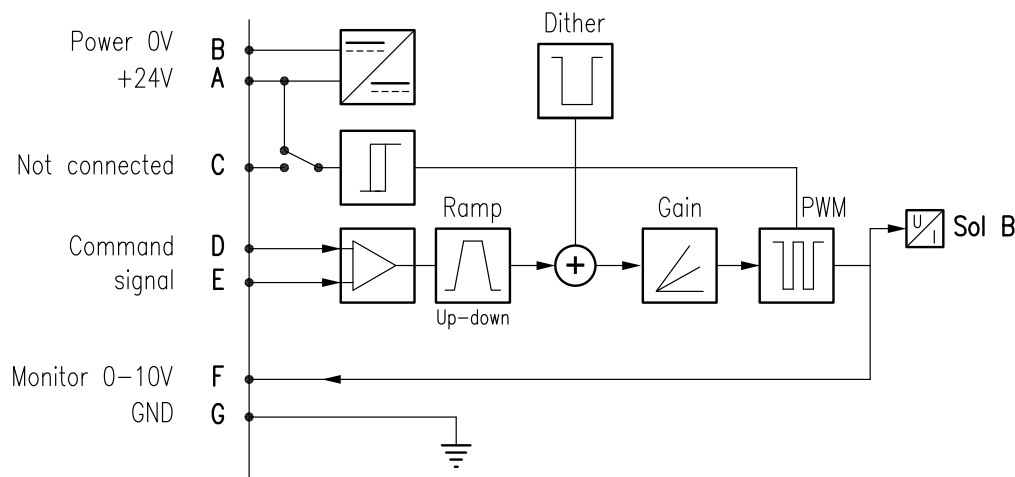
The standard option, code OBW, is programmed for internal enable. The enable signal is taken directly from the power supply of the valve. The card is enabled as soon as supply power is applied to Pins A and B.

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.

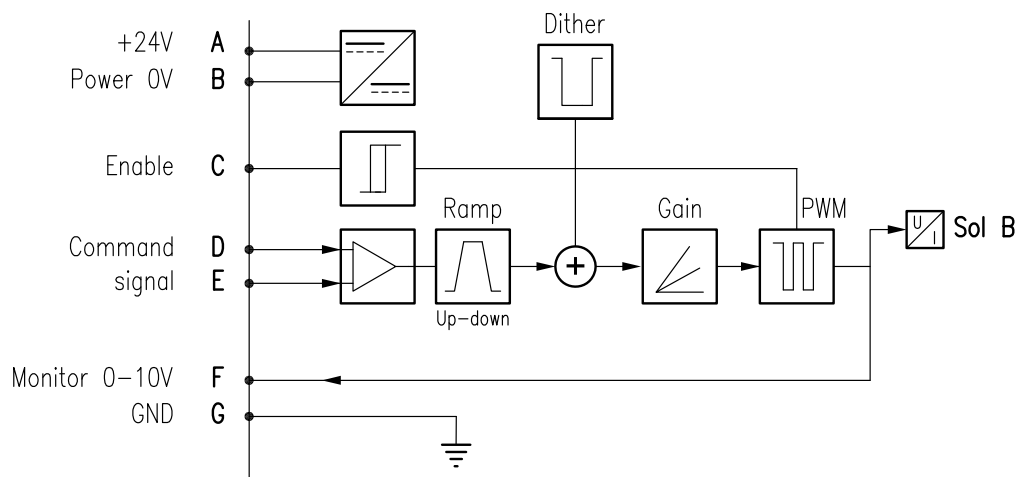
The OBC option is program-med for the external enable feature. A 24 V signal must be applied to Pin C to enable the output drivers to energize the valve coils.

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. $\Delta P1 = \Delta P (G1/G)$. 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	

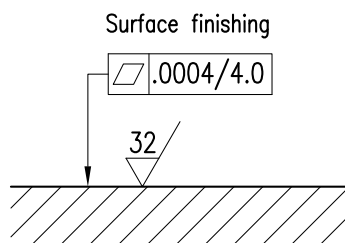
INSTALLATION

We recommend the 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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POWERFUL
ACCURATE
INNOVATIVE
PRECISE
DURABLE
EFFICIENT
VERSATILE

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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