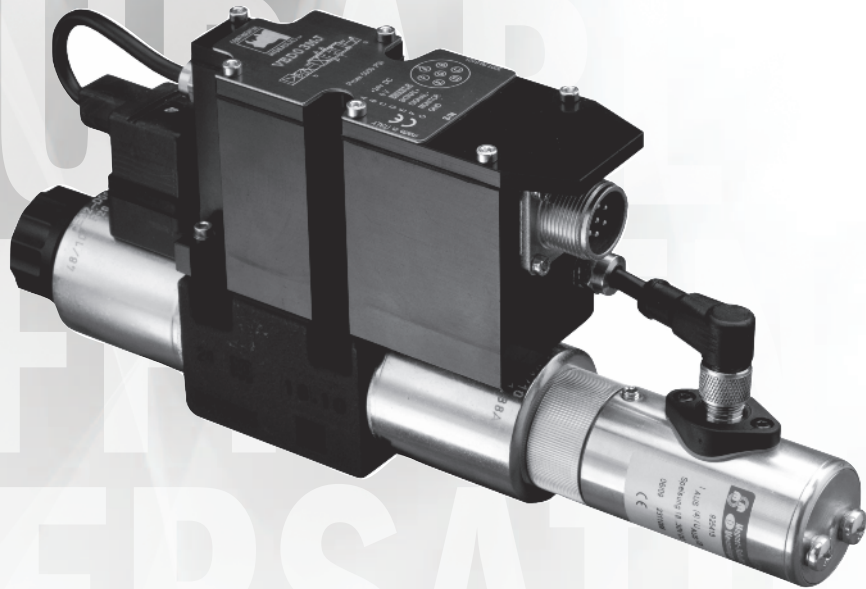




CONTINENTAL HYDRAULICS

VED03MK

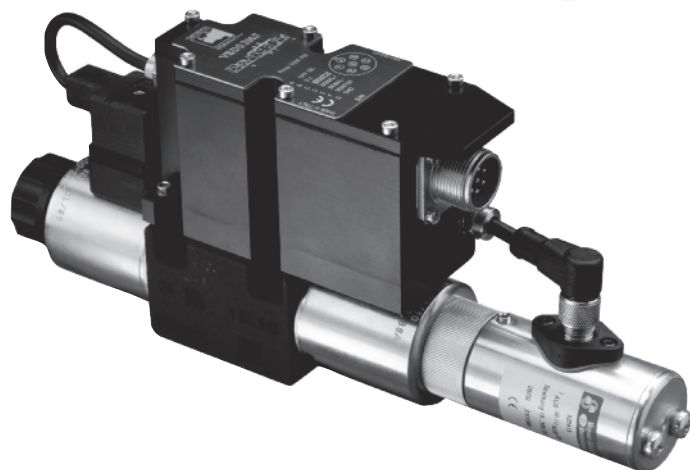
PROPORTIONAL DIRECTION CONTROL VALVES WITH OBE & POSITION FEEDBACK



VED03MK - PROPORTIONAL DIRECTION CONTROL VALVES WITH OBE & POSITION FEEDBACK

VED03MK

DIRECTIONAL CONTROL VALVES WITH OBE & POSITION FEEDBACK



DESCRIPTION

Continental Hydraulics VED03MK 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	3.21 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	5.3 lbs	2.4 kg
	Dual Solenoid	6.6 lbs	3 kg

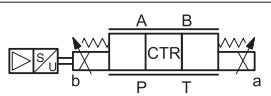
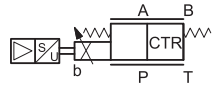
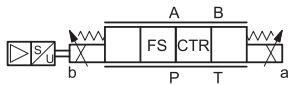
RANGE TEMPERATURES	Ambient	- 4 to +130 °F	-20 to +54 °C
	Fluid	- 4 to +180 °F	-20 to +82 °C
FLUID VISCOSITY	Range	60 -1900 SUS	10 - 400 cSt
	Recommended	120 SUS	25 cSt
FLUID CONTAMINATION		ISO 4406:1999 Class 18/16/13	

IDENTIFICATION CODE

VED03MK - [] - [] - [] - [] - [] - [] **D** - [] _____ DESIGN LETTER

D03
SIZE

POSITION
FEEDBACK

FUNCTION	
3	 <p>Dual Solenoid 3 Position Spring Centered</p>
5	 <p>Single Solenoid 2 Position Spring Centered</p>
10	 <p>Dual operator - 4 positions (with fail-safe feature) spring centered Available for ZCF symmetric spool only</p>

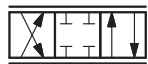
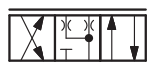


SEAL	
A	Buna (STD)
G	Viton

CONNECTION	
OBW	On board electronics - Internal Enable Monitor signal PIN F to PIN B
OBC	On board electronics - PIN C Enable Monitor signal PIN F to PIN B
OBM	On board electronics - Internal Enable Monitor signal PIN F to PIN C

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

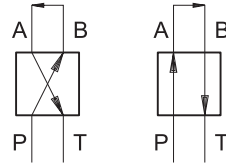
NOMINAL FLOW (with Δp P-T 143 psi)	
04	4 l/min (1.1 gpm) ZC and ZCF spools only
12	12 l/min (3.2 gpm)
30	30 l/min (8 gpm)
30/15	Asymmetrical spool: 30 l/min (8 gpm) on P-A 15 l/min (4 gpm) on P-B

TYPICAL ORDERING CODE:
VED03MK-3AC-12-A-OBWEOD-D

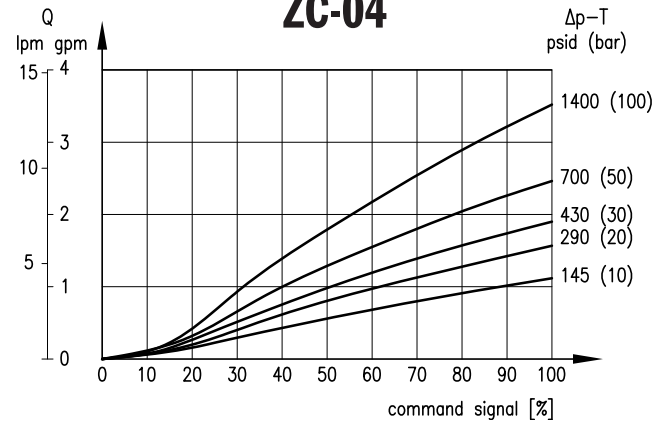
SPOOLS				
NAME	SYMBOL	DESCRIPTION	APPLICATION	FUNCTION MATCHING
AC		METER IN / METER OUT	MOTION CONTROL	3, 5
FC				
ZC				
ZCF		METER IN / METER OUT WITH FAIL SAFE		

PERFORMANCE CURVES FLOW GAIN

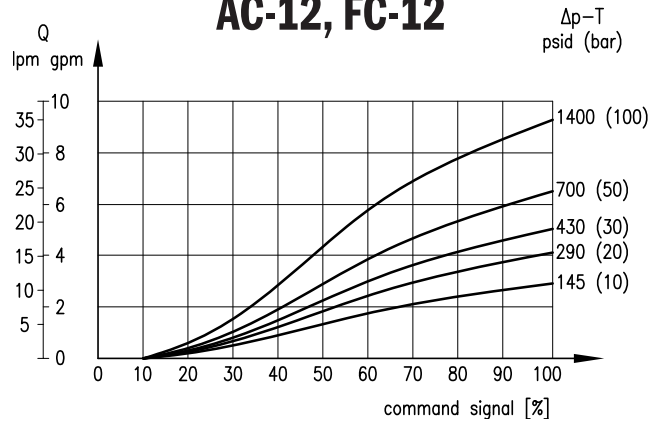
1. Curves obtained with mineral oil viscosity of 170 sus (36 cSt) at 122°F (50°C) and dedicated OBE.
2. The Δp values are measured between P and T (full loop) valve ports.
3. Typical flow rate curves at constant Δp related to the reference signal and measured for the available spools and obtained after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



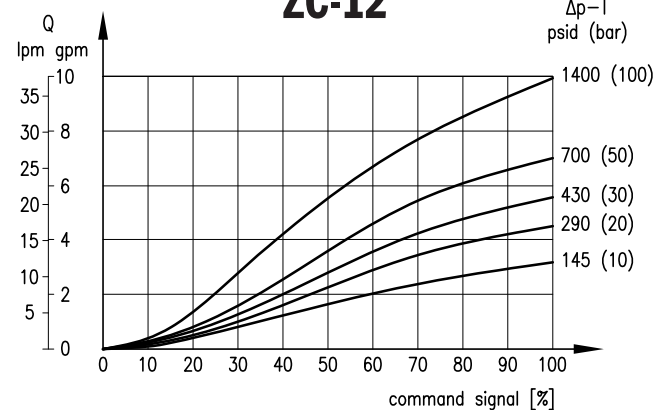
ZC-04



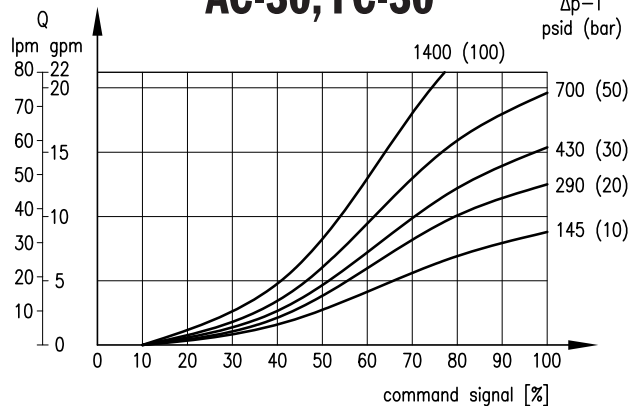
AC-12, FC-12



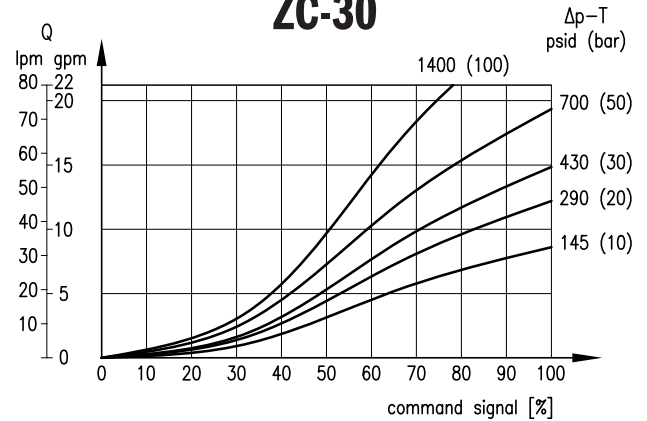
ZC-12



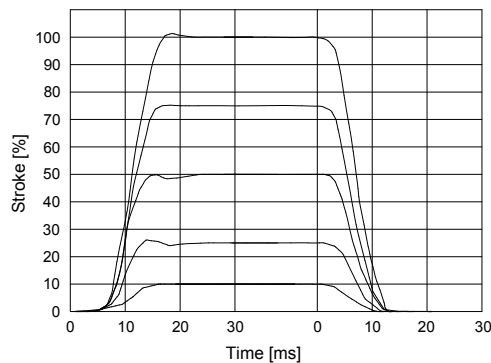
AC-30, FC-30



ZC-30



STEP RESPONSE TIME



FAIL SAFE OPERATION

(POWER OFF CONDITION)

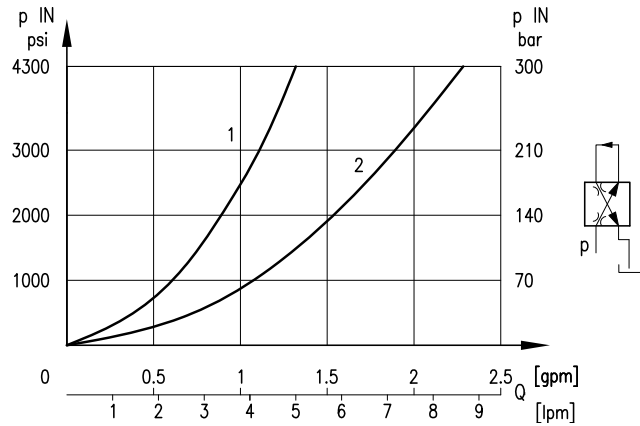
Flow P → B / A → T with valve in fail safe position, depending on the incoming pressure.

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

ZCF

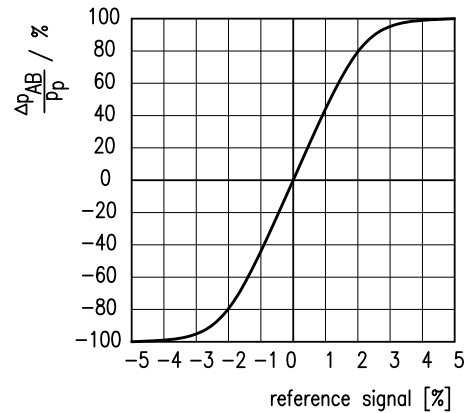


PRESSURE GAIN FOR SPOOLS "ZC"

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.

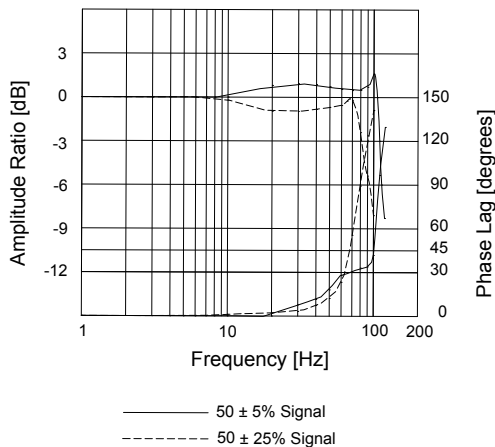
During the black-out the centering springs retain the spool in fail safe position.



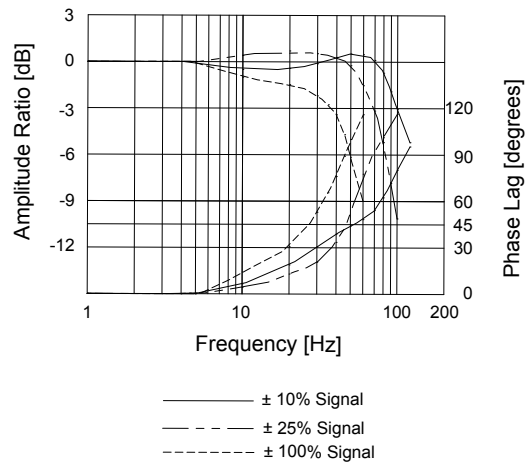
FREQUENCY RESPONSE

Frequency response and response time obtained with mineral oil viscosity of 170 sus (36 cSt) at 122°F (50°C) and Δp (P-T) 145 psi.

FREQUENCY RESPONSE 50%



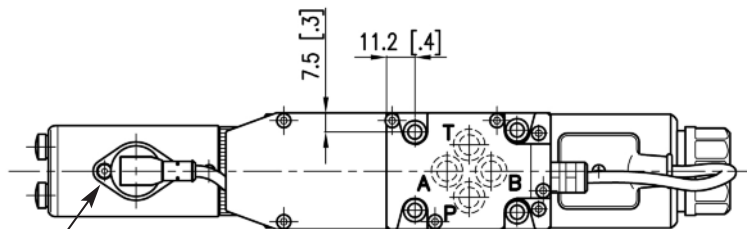
FREQUENCY RESPONSE



OVERALL AND MOUNTING DIMENSIONS

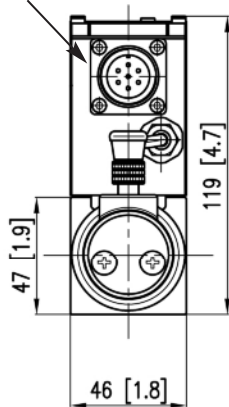
Dimensions in mm [IN]

VED03MK-3 / VED03MK-10

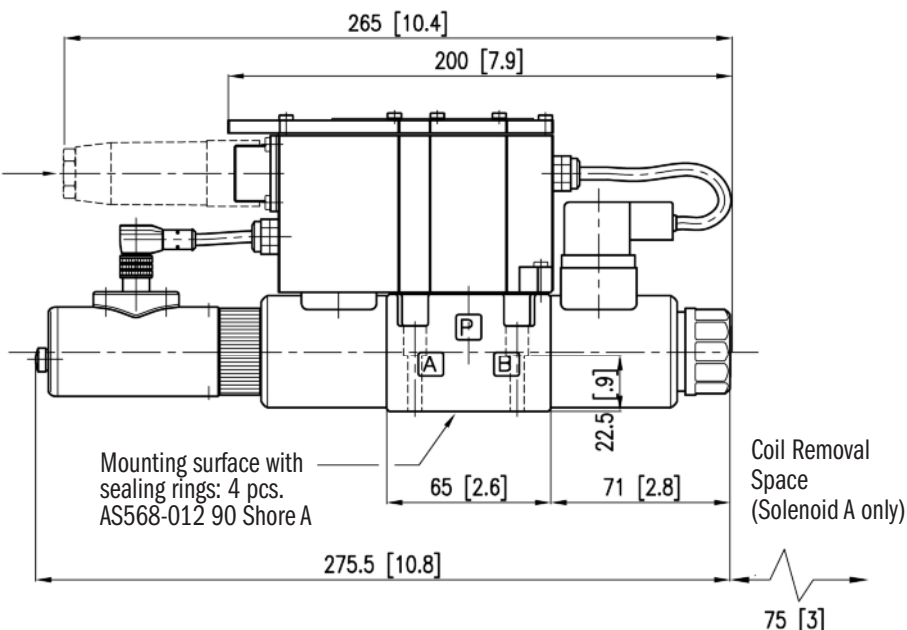


Adjustment sealing performed at factory.
Do not disassemble the transducer.

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



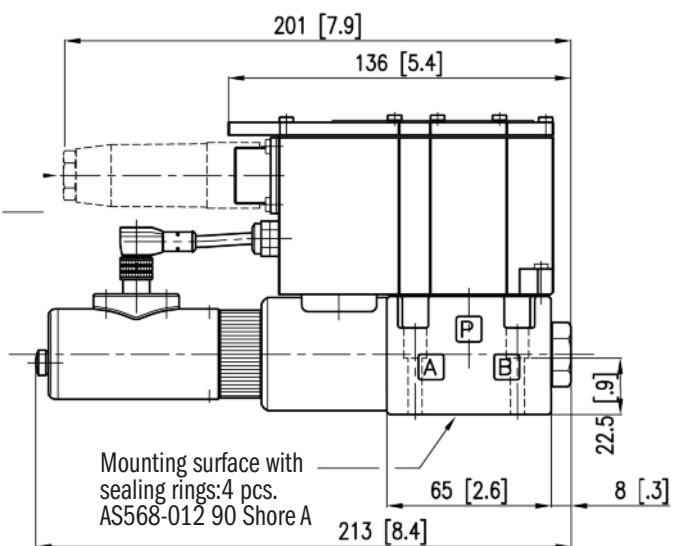
7-pin Plug
(not supplied)



Mounting surface with
sealing rings: 4 pcs.
AS568-012 90 Shore A

Coil Removal
Space
(Solenoid A only)

VED03MK-5



Mounting surface with
sealing rings: 4 pcs.
AS568-012 90 Shore A



In order to avoid electromagnetic noises and fulfill the EMC regulations, a 7-pin metal plug according to MIL-C-2015 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
- Deadband compensation preset at factory
- Max valve opening (100% of spool stroke)

It is possible to customize these and others parameters using the optional kit, 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

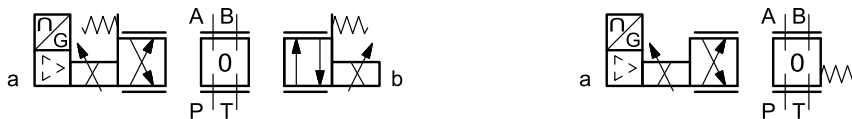
The electronic card is available with (OBC) or without (OBW/OBM) external enabling signal feature.

POWER SUPPLY	24V DC (19V to 35V, ripple max 3Vpp)	
ABSORBED POWER	25 VA	
MAX CURRENT	1.88 A	
DUTY CYCLE	100%	
MAIN CONNECTOR	7-pin MIL-C-5015 G (DIN 43563)	
ELECTROMAGNETIC COMPATIBILITY (EMC)	Emissions	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, cable break power failure or < 4 mA	

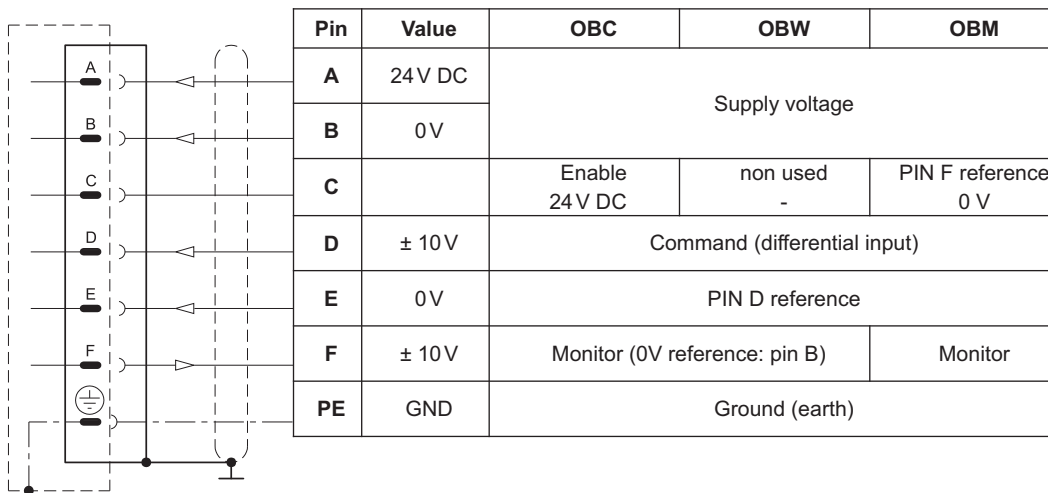
COMMAND SIGNAL	voltage (E0)	V DC	±10 (Impedance Ri > 11 kΩ)
	current (E1)	mA	4-20 (Impedance Ri = 58 Ω)
MONITOR SIGNAL	voltage (E0)	V DC	±10 (Impedance Ro > 1 kΩ)
	current (E1)	mA	4-20 (Impedance Ro = 500 Ω)

E0 VERSION - VOLTAGE REFERENCE SIGNAL

Reference signal required is ± 10 volt on dual solenoid valves, and 1-10 volt for single solenoid valves.
The monitor signal is ± 10 volt. This signal is available 0.5 sec after card is powered on OBW / OBM.

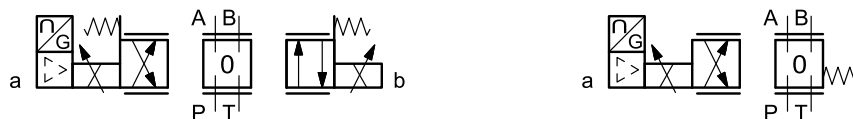


COMMAND	-10V	0V	+10V	COMMAND	+10V	0V
MONITOR	-10V	0V	+10V	MONITOR	+10V	0V

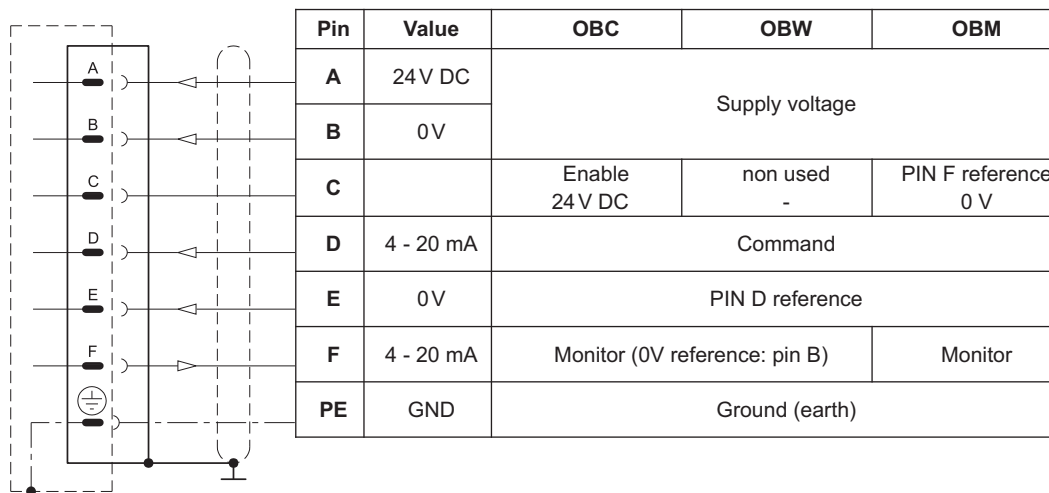


E1 VERSION - CURRENT REFERENCE SIGNAL

Reference signal required is 4-20 mA. If the current value drops below 4 mA the card shut down until the correct signal has been applied.
The monitor signal is 4-20 mA. This signal is available 0.5 sec after card is powered on OBW / OBM.



COMMAND	4 mA	12 mA	20 mA	COMMAND	20 mA	4 mA
MONITOR	4 mA	12 mA	20 mA	MONITOR	20 mA	4 mA



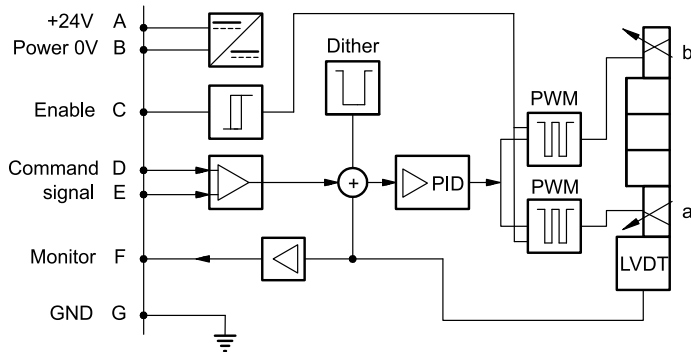
OBC / OBW / OBM VERSIONS

OBC version is programmed for use of an external 24 volt Enable signal applied at Pin C to allow the valve to function. The Monitor signal output is referenced between Pin F and Pin B.

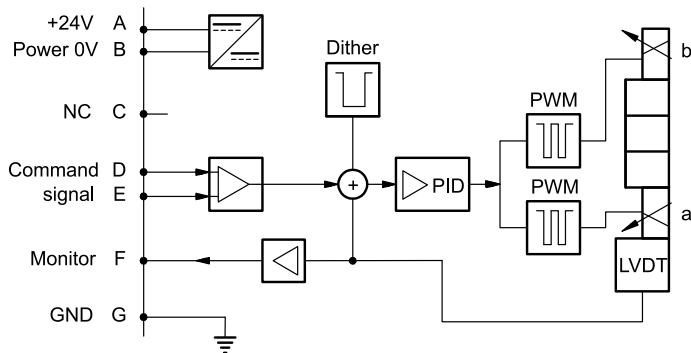
OBW version is programmed for Internal enable, power for enable is taken directly from the power supply. The power to the valve must be turned off to disable the valve. The Monitor signal output is referenced between Pin F and Pin B.

OBM version is programmed for Internal enable, power for enable is taken directly from the power supply. The power to the valve must be turned off to disable the valve. The Monitor signal output is reference between Pin F and Pin C for PIN to Pin interchangeability with other manufacturers.

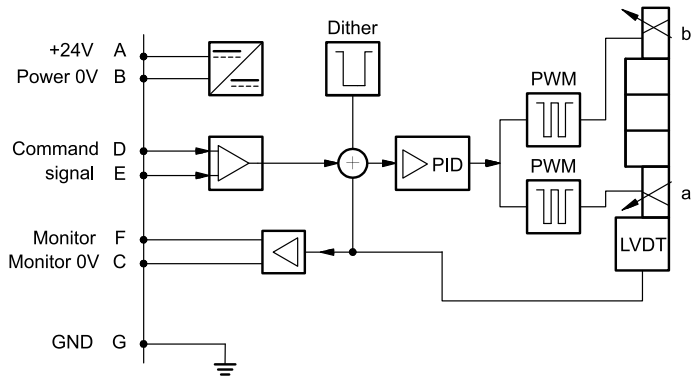
OBC ON-BOARD FUNCTION



OBW ON-BOARD FUNCTION



OBM ON-BOARD FUNCTION



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.

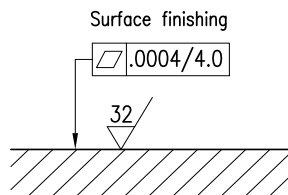
From a safety standpoint, temperatures above 130 degrees F are not recommended.

INSTALLATION

VED03MK 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 KIT

BD03-125	Valve only	1008406
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NOTES:

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

SEAL KIT

Buna Seal Kit	1013188
Viton Seal Kit	1013096



POWERFUL

CURATE

OVATIVE

PRECISE

DURABLE

EFFICIENT

ERCATTLE

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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