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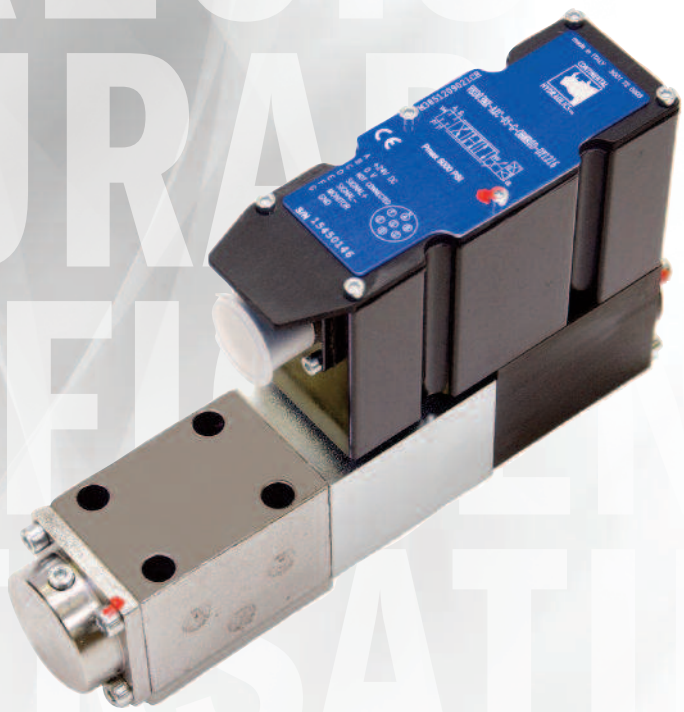
VED03MX

HIGH PERFORMANCE, SERVO-PROPORTIONAL DIRECTIONAL CONTROL VALVE



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VED03MX

HIGH PERFORMANCE PROPORTIONAL DIRECTIONAL CONTROL VALVE, SERVO-SOLENOID, SPOOL/SLEEVE DESIGN

DESCRIPTION

Continental Hydraulics VED03MX, High Response 4-way servo-proportional valve with precision lapped Spool / Sleeve, position sensing LVDT and Enhanced On-Board Digital Amplifier. These valves conform to NFPA D03 and ISO 4401 mounting standards.

FEATURES and OPERATION

The VED03MX valve is a 4-way (3 position + Fail-Safe Position) Servo-Proportional valve.

Spring offset and precision Line to Line Spool/Sleeve for no delay when crossing "null", resulting in high dynamic performance and increased control when used in precision Positioning and Pressure control applications.

- 160 Hz high frequency response operation
- On-Board Digital Control resulting in extremely low Phase Lag and high frequency operation
- 3 position with Fail-Safe 4th Position
- High Precision Lap Spool in Sleeve design provides zero crossing delay at Null
- Spool position feedback

TYPICAL PERFORMANCE SPECIFICATIONS

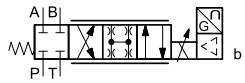
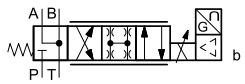
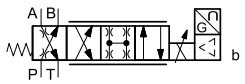
MAXIMUM OPERATING PRESSURE	P - A - B Ports	5000 psi (350 bar)
	T Port	3600 psi (250 bar)
NOMINAL RATED FLOW (70 bar Δp P-T)	5 - 10 - 20 - 40 lpm	
MOUNTING SURFACE	NFPA D03 ISO 4401-03-02-0-05	
HYSTERESIS	% of Q max	< 0.2%
THRESHOLD	< 0.1%	
STEP RESPONSE	8 ms	
FREQUENCY RESPONSE	160 Hz at ±5% signal	
CONTAMINATION LEVEL (ISO class)	preferred	16/14/11
	maximum	17/15/12
VISCOSITY	25 cSt recommended (5-400 cSt viscosity range)	
TEMPERATURE RANGE	Ambient	-4 to +140° F -20 to +60° C
	Fluid	-4 to +180° F -20 to +80° C
WEIGHT	5.7 lbs (2.6 kg)	

IDENTIFICATION CODE

VED03MX - □ - □ - □ - □ □ D - D — DESIGN LETTER

D03 SIZE

HIGH RESPONSE SPOOL IN SLEEVE

FUNCTION	
AZC	
FZC	
10ZC	
	FAIL SAFE POSITION When a power failure occurs, the electronics de-energize the solenoid and the spool will take the fail safe position by means of the centering spring.

SEAL	
A	Buna (STD)
G	Viton

NOMINAL FLOW (with Δp 35 bar/Land)	
05	5 l/min (1.3 gpm)
10	10 l/min (2.6 gpm)
20	20 l/min (5.3 gpm)
40	40 l/min (10.6 gpm)

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

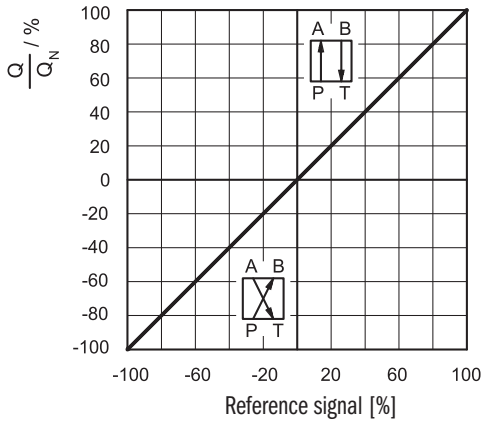
REFERENCE SIGNAL	
E0	Voltage ± 10 V (STD)
E1	Current 4-20 mA

TYPICAL ORDERING CODE:
VED03MX-AZC-20-A-OBME0D-D

PERFORMANCE CURVES

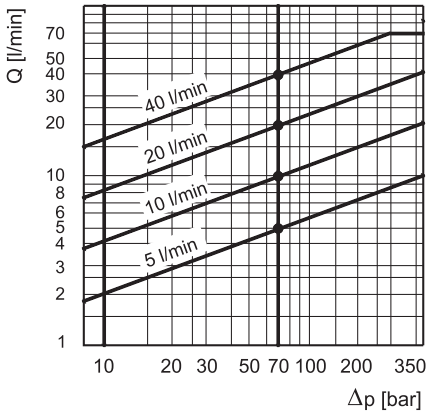
Curves obtained with mineral oil viscosity of 170 sus (36 cSt) at 122°F (50°C) and dedicated OBE

REFERENCE / FLOW RATE CURVE



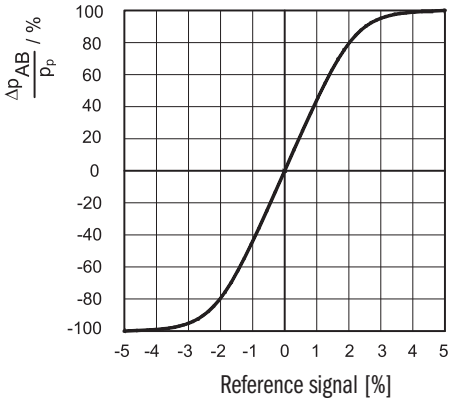
Typical flow rate curves at constant Δp = 70 bar P-T according to the reference signal.
NOTE: with positive reference signal connected to pin D the valve regulates P - A / B - T.

FLOW RATE CURVE ACCORDING TO Δp



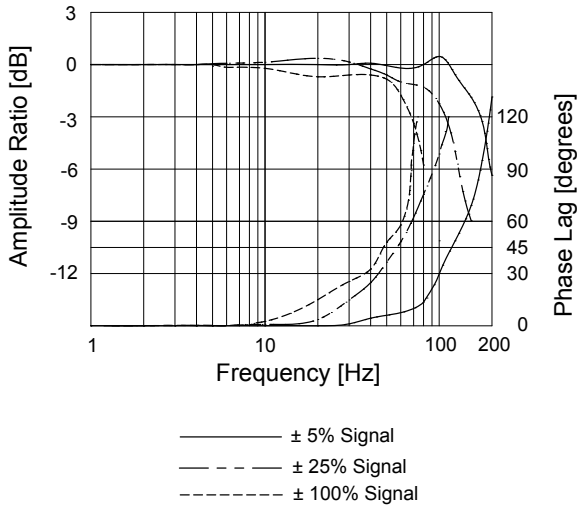
The diagram states the maximum valve controlled flow rate according to the pressure drop between the P and T ports.

PRESSURE GAIN (LZ)

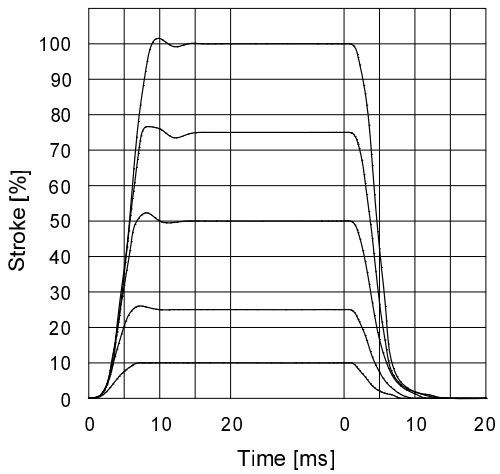


The diagram shows the valve pressure gain, expressed as % of the ratio between the port pressure variation in A or B (Δp AB) and the P system pressure, according to the reference signal. In practice, the pressure gain states the valve reaction towards external disturbances aimed at changing the actuator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

FREQUENCY RESPONSE



STEP RESPONSE TIME

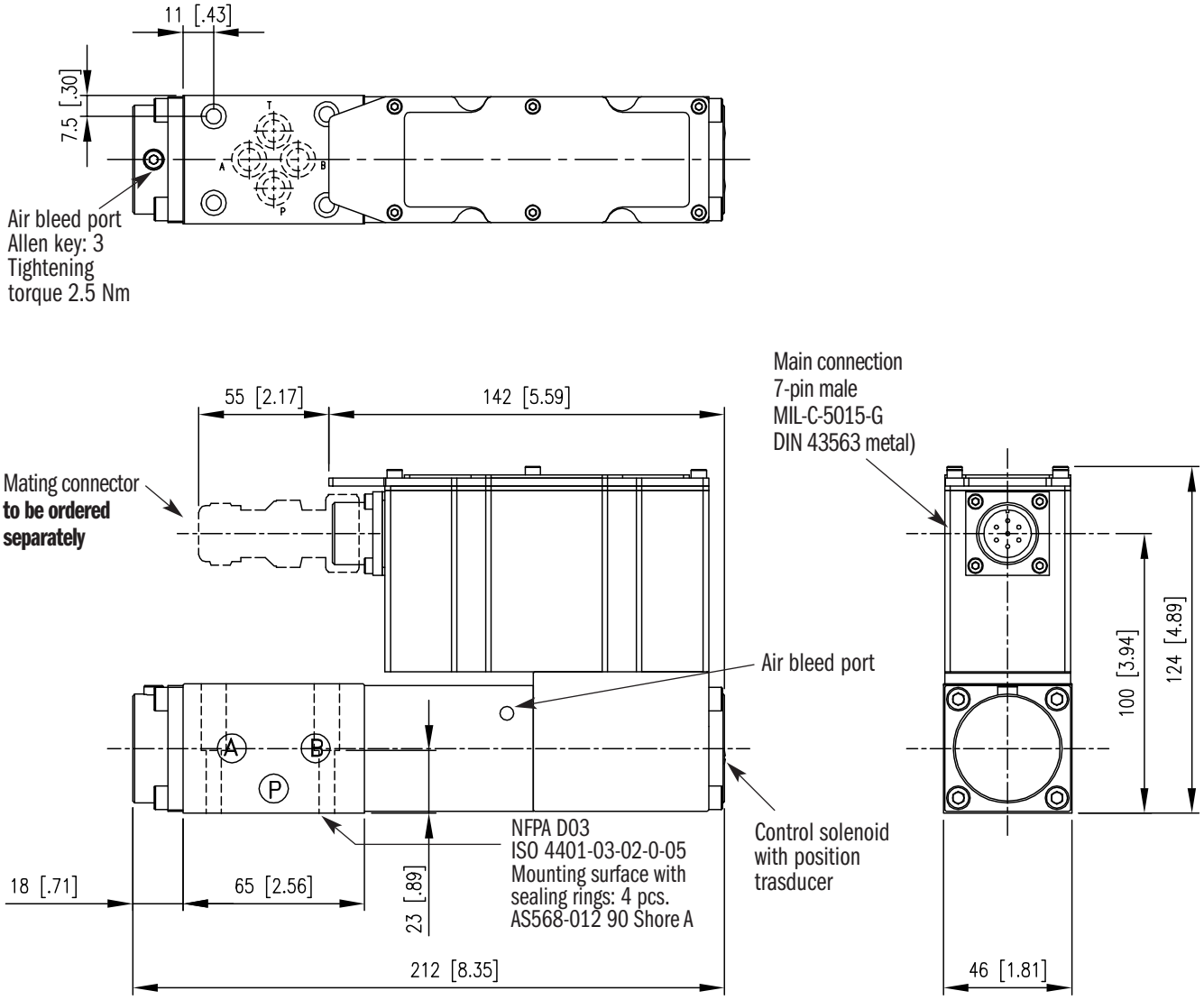


Due to inherent phase lag characteristics of the overall system and machine, common industrial control practices recommends, as rule of thumb, to utilize the 45°, or less phase lag frequency ratings, when applying Servo and Proportional valves to any position control loop for stable, repeatable and consistent control.

OVERALL AND MOUNTING DIMENSIONS

Dimensions in mm [IN]

VED03MX



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.

All air should be bled out of the valve prior to applying valve into fully automatic conditions.

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
- 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 VEA-PB7 program box
- High immunity to electromagnetic interference

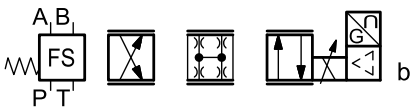
The electronic card is available with (OBC) or without (OBW/OBM) external enabling signal feature.

POWER SUPPLY		24V DC (19V to 35V, ripple max 3Vpp)
ABSORBED POWER		35 VA
MAX CURRENT		2.6 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	

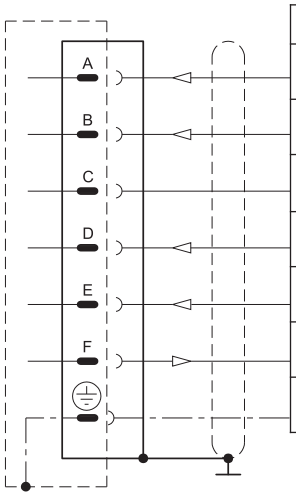
COMMAND SIGNAL	voltage (EO)	V DC	±10 (Impedance Ri > 11 kΩ)
	current (E1)	mA	4-20 (Impedance Ri = 58 Ω)
MONITOR SIGNAL	voltage (EO)	V DC	±10 (Impedance Ro > 1 kΩ)
	current (E1)	mA	4-20 (Impedance Ro = 500 Ω)

E0 VERSION - VOLTAGE REFERENCE SIGNAL

Reference signal required is ± 10 volt.
The monitor signal is ± 10 volt. This signal is available 0.5 sec after card is powered on OBW / OBM.



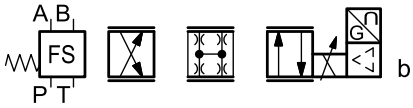
COMMAND	**-10V**	**0V**	**+10V**
MONITOR	**-10V**	**0V**	**+10V**



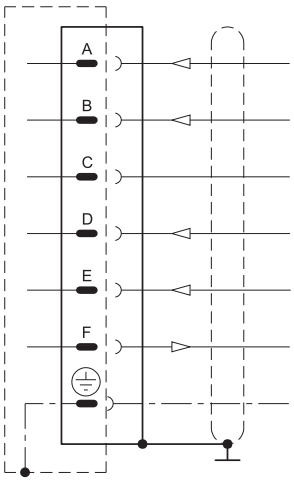
Pin	Value	OBC	OBW	OBM
A	24 V DC	Supply voltage		
B	0 V			
C		Enable 24 V DC	non used -	PIN F reference 0 V
D	± 10 V	Command (differential input)		
E	0 V	PIN D reference		
F	± 10 V	Monitor (0V reference: pin B)		Monitor
PE	GND	Ground (earth)		

E1 VERSION - CURRENT REFERENCE SIGNAL

Reference signal required is 4-20 mA. If the current value drops below 4 mA, the card will 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**
MONITOR	**4 mA**	**12 mA**	**20 mA**



Pin	Values	version A	version B	version C
A	24 V DC	Supply Voltage		
B	0 V			
C		Enable 24 V DC	not used -	PIN F reference 0 V
D	4 ÷ 20 mA	Command		
E	0 V	PIN D reference		
F	4 ÷ 20 mA	Monitor (0V reference: pin B)		Monitor
PE	GND	Ground (Earth)		

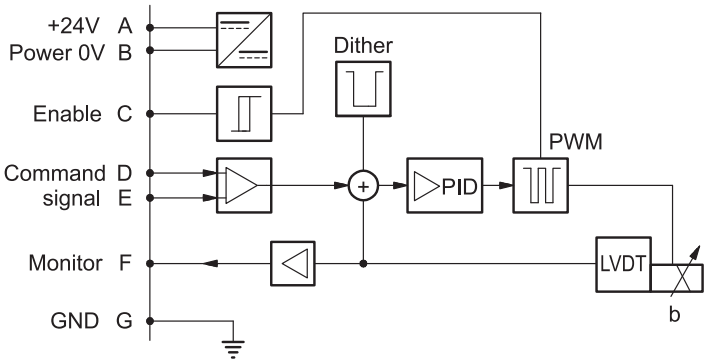
OBC / OBW / OBM VERSIONS

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.

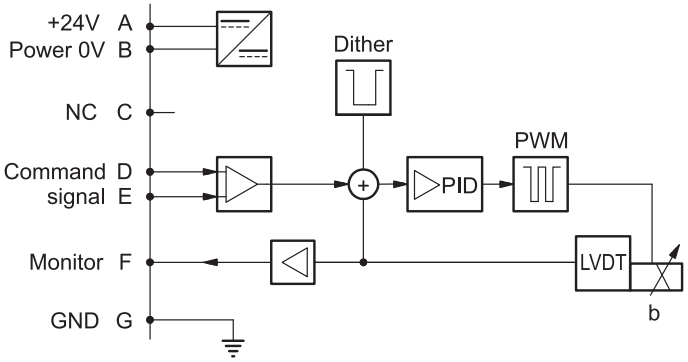
OBW version is programmed for Internal enable, power for enable is taken directly from the power supply. The power to the valve must be turned off to disable the valve. The Monitor signal output is referenced between Pin F and Pin B.

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.

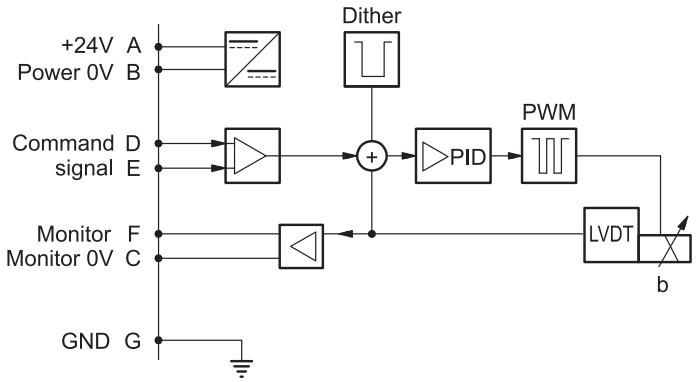
OBC ON-BOARD FUNCTION



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. 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.

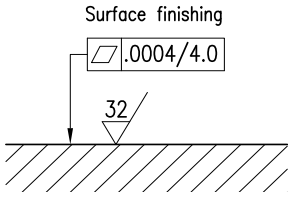
From a safety standpoint, temperatures above 130 degrees F are not recommended.

INSTALLATION

VED03MX valves can be installed in any position without impairing correct operation.

Ensure that there is no air in the hydraulic circuit. Reference page 5.

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

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)

POWERFUL
ACCURATE
INNOVATIVE
PRECISE
DURABLE
EFFICIENT
VERSATILE

ABOUT CONTINENTAL HYDRAULICS

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