VED03 G Series

Proportional Directional Control Valves with Integrated Digital Electronics

DESCRIPTION

VED03 G series Proportional valves are Direct Operated with Integrated Digital Electronics.

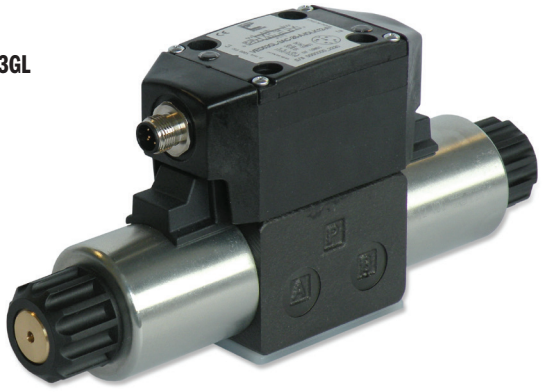
VED03GL style uses a compact box and M12- 5 Pin connection. Control interface option include Analog, IO-Link and CANopen inputs.
See pages 3 - 5 for more details.

VED03MG style uses the industry standard common 7 Pin connection and Analog inputs.
See pages 6 - 9 for more details.

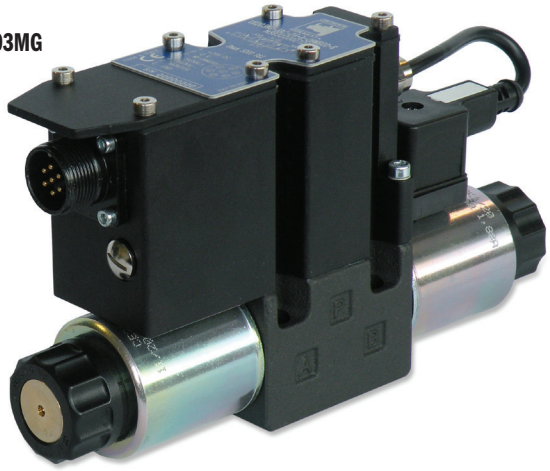
VED03GH style provides for a variety of Fieldbus communication options.
See pages 10 - 14 for more details.

For all other performance data and accessories.
See pages 15 - 18

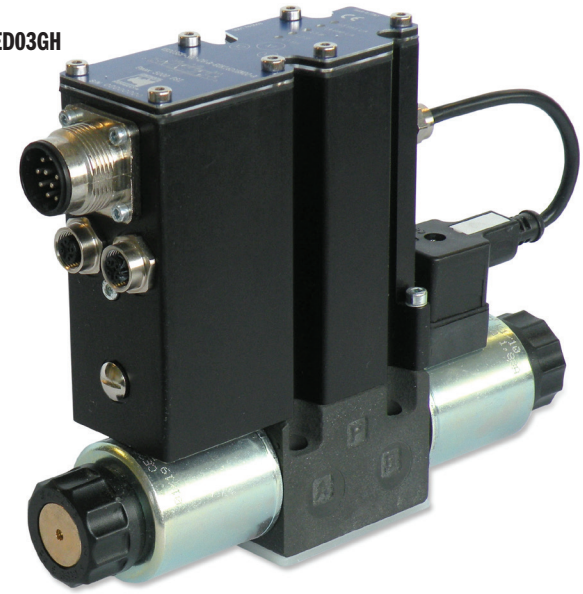
VED03GL



VED03MG



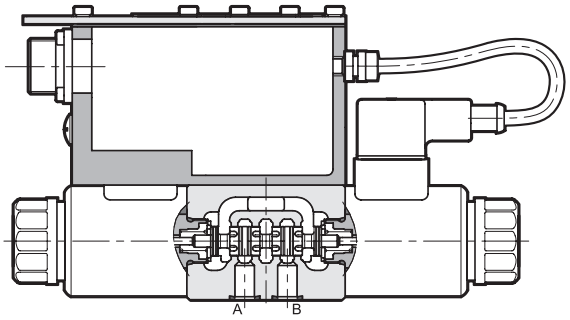
VED03GH



PERFORMANCE (Mineral oil with viscosity of 36 cSt at 50°C and p = 140 bar)

Max operating pressure: P - A - B ports **T port**	PSI (bar)	5000 (350) 3000 (210)
Nominal flow with Δp 10 bar P-T	l/min	1 - 4 - 12 - 18 - 30
Response times	see page 16	
Hysteresis	% of Q max	< 3%
Repeatability	% of Q max	< ±1%
Electrical characteristics	see data under each style	
Ambient temperature range	°F (°C)	-4 / 140 (-20 / +60)
Fluid temperature range	°F (°C)	-4 / 176 (-20 / +80)
Fluid viscosity range	cSt	10 - 400
Fluid contamination degree	according to ISO 4406:1999 class 18/16/13	
Recommended viscosity	cSt	25
Mass: Single solenoid valve **Double solenoid valve**	lbs (kg)	4.2 (1.9) 5.3 (2.4)

VED03 G Series

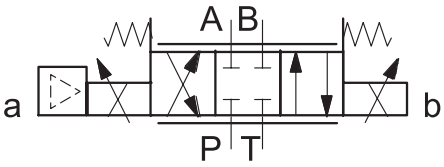


OPERATING PRINCIPLE

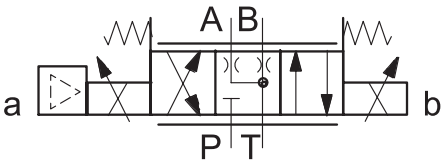
- The VED03 G* are proportional directional valves, direct operated, with digital integrated electronics and with mounting interface according to ISO 4401-03 standards.
- They control the positioning and the speed of hydraulic actuators.
- They are available with different types of electronics, with analogue or fieldbus interfaces.
- The valves are easy to install. The driver manages digital settings directly.

HYDRAULIC SYMBOLS (typical)

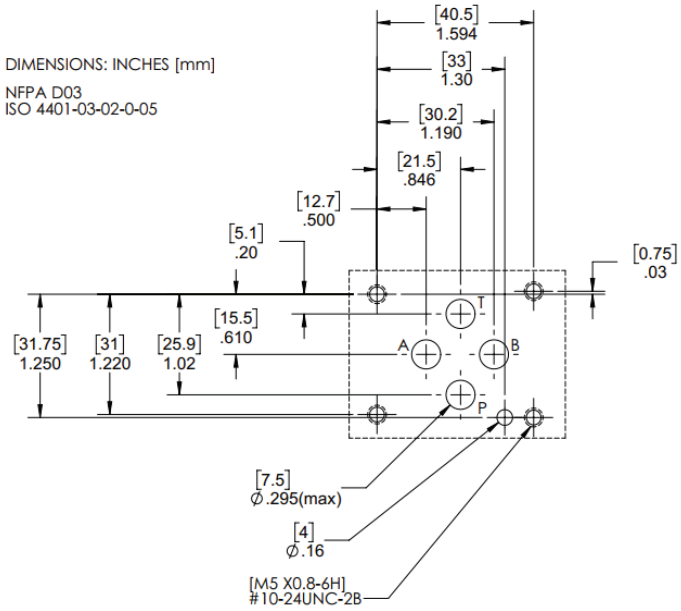
VED03*G*-3AC



VED03*G*-3FC



MOUNTING INTERFACE

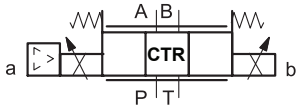
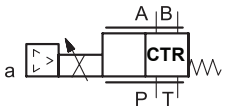


IDENTIFICATION CODE: Compact Electronics

VED03GL - □□ - □ - □ - □ K12 - □ ——— DESIGN LETTER

Proportional D03 Direct Operated Directional Control with Digital On-Board and Compact Box

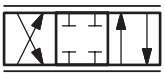
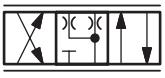
Low Profile Connection Box with M12 A 5 Pin (Male)

FUNCTION	
3	
	Dual Solenoid 3 Position Spring Centered
5	
	Single Solenoid 2 Position Spring Centered

SEALS	
CODE	**DESCRIPTION**
A	BUNA (STD)
G	VITON

NOMINAL CONTROLLED FLOW with ΔP 10 Bar P-T	
CODE	**FLOW RATE**
01	1 l/min
04	4 l/min
08	8 l/min
16	16 l/min
16/08	16 (P-A) / 8 (P-B) l/min
26	26 l/min
26/13	26 (P-A) / 13 (P-B) l/min

CONTROL INTERFACE	
CODE	**DESCRIPTION**
E0	Analog Voltage (±10V)
E1	Analog Current (4-20mA)
IOL	IO-Link Interface
CA	CANopen Interface

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

Note: Function Code 5 valve only available with solenoid supplied on A port end. (P-B / A-T)

TYPICAL ORDERING CODE:
VSD03GL-3AC-08 -A-IOLK12-*

VED03GL - COMPACT ELECTRONICS

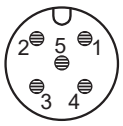
In versions 'IOL' and 'CA' pin 3 and pin 5 are galvanic isolated up to 100 V to avoid earth loops.
In IO-Link networks, the length of the connecting cable is limited to 20 meters.

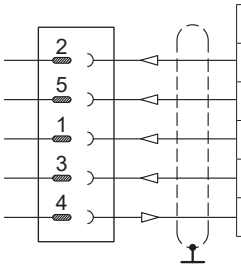
VED03GL Electrical Characteristics

Command signal: voltage (E0) **current (E1)**	V DC mA	±10 (Impedance Ri = 11 kOhm) 4 - 20 (Impedance Ri = 58 Ohm)
Monitor signal: voltage (E0) **current (E1)**	V DC mA	0 - 5 (Impedance Ro > 1 kOhm) 4 - 20 (Impedance Ro = 500 Ohm)
IO-Link communication (IOL): Data rate	kBaud	IO-Link Port Class B 230.4
Can Open communication (CA): Data rate	kbit	10 - 1000
Data register (IOL and CA versions only)		Solenoid voltage supply, solenoid faults (short circuit, bad config, internal), box temperature, switch-on time, vibrations
Connection		5-pin M12 code A (IEC 61076-2-101)

Pin tables

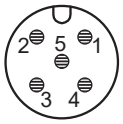
'E0' connection

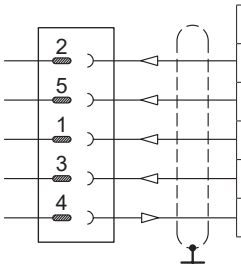




Pin	Values	Function
2	24V DC	Supply voltage (solenoid and logic)
5	0V	
1	± 10V	Command
3	0V	Command reference
4	0 - 5V	Monitor (0V reference: pin 5)

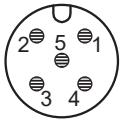
'E1' connection

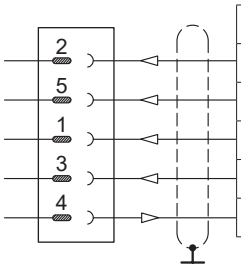




Pin	Values	Function
2	24V DC	Supply voltage (solenoid and logic)
5	0V	
1	4 - 20 mA	Command
3	0V	Command reference
4	4 - 20 mA	Monitor (0V reference: pin 5)

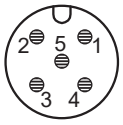
'IOL' connection

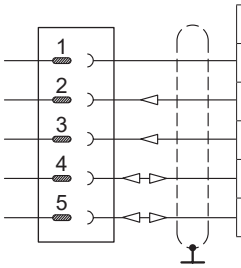




Pin	Values	Function
2	2L+ 24V DC	Supply of the power stage
5	2L- 0V (GND)	Internal galvanic isolation from PIN 3
1	1L+ +24V DC	IO-Link supply voltage
3	1L- 0V (GND)	
4	C/Q	IO-Link Communication

'CA' connection

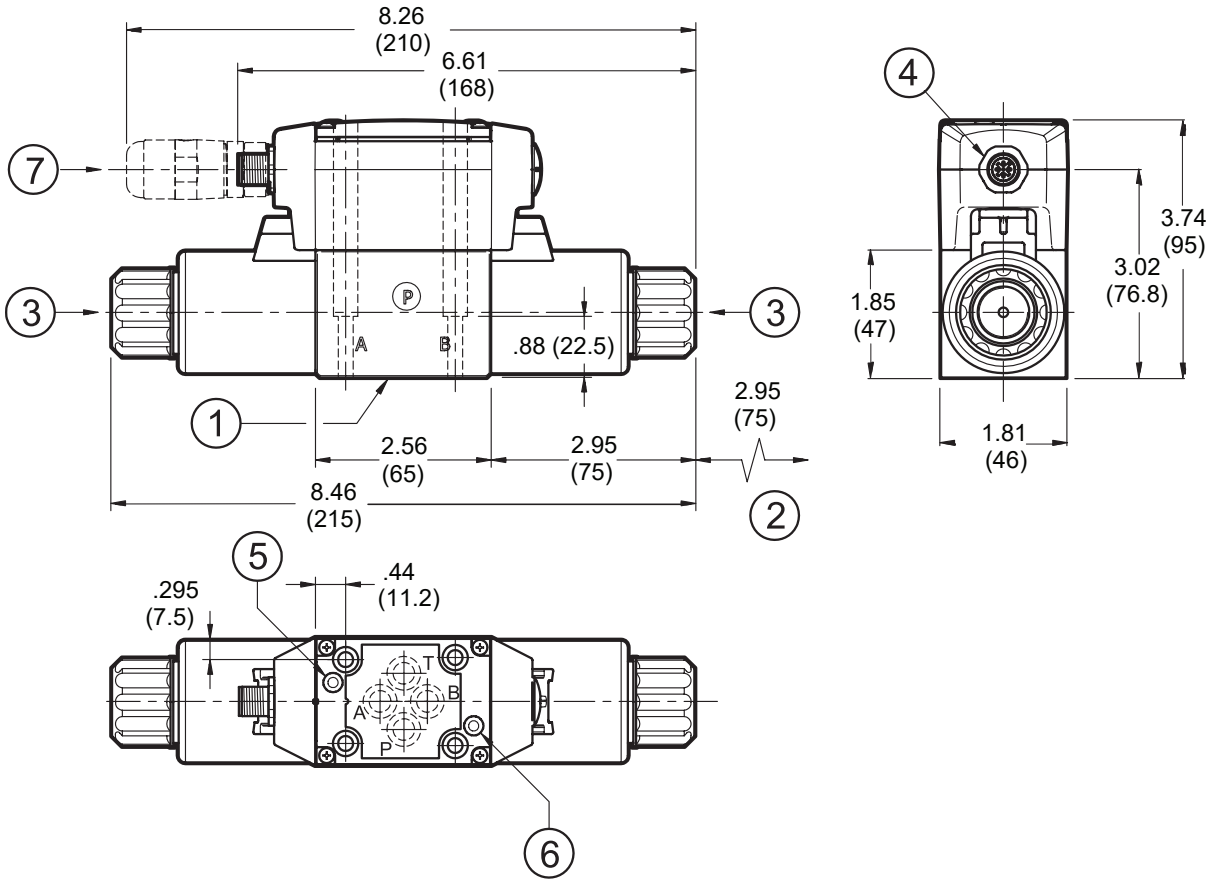




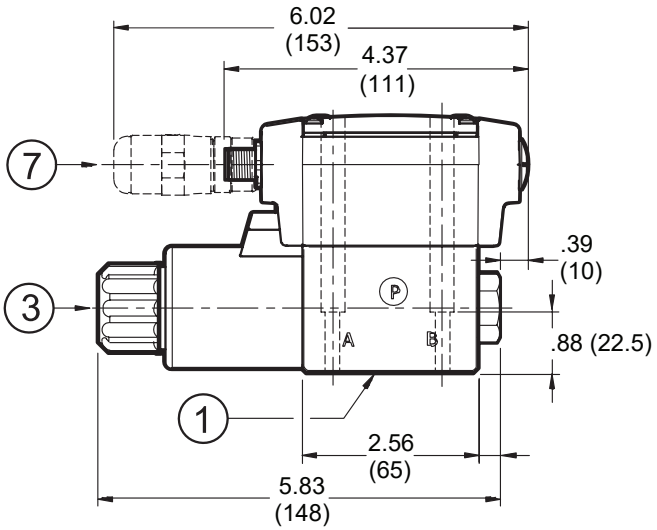
Pin	Values	Function
1	CAN_SH	Shield
2	24V DC	Supply voltage
3	0V (GND)	
4	CAN H	Bus line (high)
5	CAN_L	Bus line (low)

VED03JL - OVERALL AND MOUNTING DIMENSIONS

Dimensions inch (mm)



VED03GL-5** K12



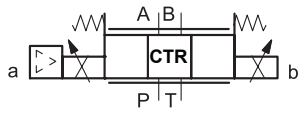
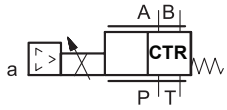
Valve Bolts: 4 SHC screws 10-24 NC x 1.25" ASTM A574
Torque: 4-6 lb.-ft. (5.4 - 8 Nm)
Threads of mounting holes: 10-24 NC

1	Mounting surface with sealing rings: QTY 4 O-Ring size AS568-012 / 90 Shore
2	Coil removal space
3	Standard manual override embedded in the solenoid tube
4	Connection M12 A 5 pin
5	L1 LED
6	L2 LED
7	Mating connector M12 5 poles - code A, female. To be ordered separately.

IDENTIFICATION CODE: Standard (7 Pin) Electronics

VED03MG - □□ - □ - □ - □□ D - □ — DESIGN LETTER

Proportional D03 Direct Operated with Digital On-Board Controls Standard 7 PIN Connection

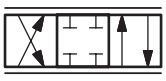
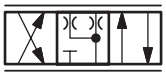
FUNCTION	
3	
	Dual Solenoid 3 Position Spring Centered
5	
	Single Solenoid 2 Position Spring Centered

SEALS	
CODE	DESCRIPTION
A	BUNA (STD)
G	VITON

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

NOMINAL CONTROLLED FLOW with ΔP 10 Bar P-T	
CODE	FLOW RATE
01	1 l/min
04	4 l/min
08	8 l/min
16	16 l/min
16/08	16 (P-A) / 8 (P-B) l/min
26	26 l/min
26/13	26 (P-A) / 13 (P-B) l/min

CONNECTION	
CODE	DESCRIPTION
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

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

Note: Function Code 5 valve only available with solenoid supplied on A port end. (P-B / A-T)

TYPICAL ORDERING CODE:
VED03MG-3AC-26-A-OBWE0D- *

VED03MG ELECTRONICS COMMON DATA

Duty cycle		100% (continuous operation)
Protection class according to EN 60529		IP65 / IP67
Supply voltage	V DC	24 (from 19 to 30 VDC), ripple max 3 Vpp
Power consumption	VA	25
Maximum solenoid current	A	1.88
Fuse protection, external	A	3
Managed breakdowns		Overload and electronics overheating, LVDT sensor error, cable breakdown, supply voltage failure
Electromagnetic compatibility (EMC) emissions EN 61000-6-4, immunity EN 61000-6-2		According to 2014/30/EU standards

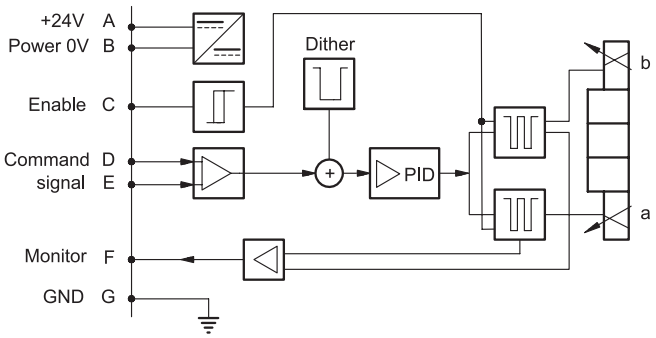
VED03MG - STANDARD ELECTRONICS

3.1 - Electrical characteristics

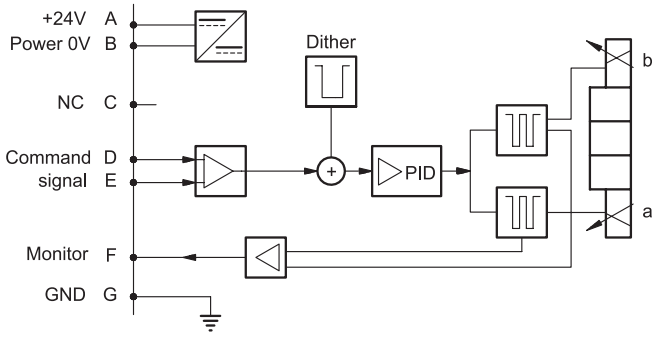
Command signal: voltage (E0)	V DC	±10 (Impedance Ri = 11 kOhm)
current (E1)	mA	4 - 20 (Impedance Ri = 58 Ohm)
Monitor signal: voltage (E0)	V DC	0 - 5 (Impedance Ro > 1 kOhm)
current (E1)	mA	4 - 20 (Impedance Ro = 500 Ohm)
Communication for diagnostic		LIN-bus Interface (by means of the Programming Box)
Connection		6 pin + PE (MIL-C-5015-G - DIN EN 175201-804)

On-board electonics diagrams

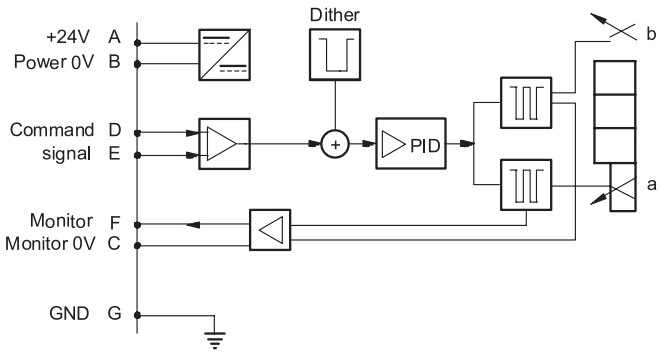
VERSION OBC - External Enable



VERSION OBW - Internal Enable

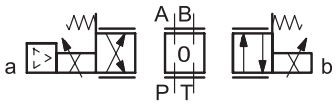


VERSION OBM - 0V Monitor



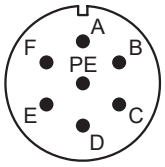
VED03MG Versions with voltage command (E0)

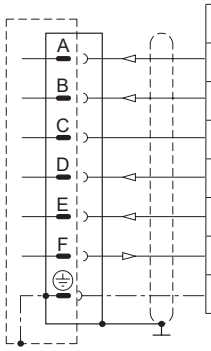
The reference signal is between -10V and +10V on double solenoid valve, and 0 - 10V on single solenoid valve.
The monitor feature of versions OBW and OBM becomes available with a delay of 0.5 sec from the power-on of the card.





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



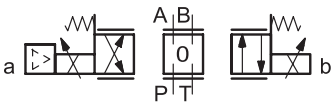


Pin	Values	version OBC	version OBW	version OBM
A	24V DC	Supply voltage		
B	0V			
C		Enable 24V DC	do not connect -	PIN F reference 0V
D	± 10V	Command		
E	0V	Command reference		
F	± 10V	Monitor (0V reference: pin B)		Monitor
PE	GND	Ground (Earth)		

VDD03MG Versions with current command (E1)

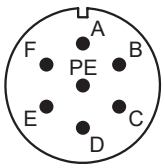
The reference signal is supplied in current 4 - 20 mA. If the current for command is lower, the card shows a breakdown cable error. To reset the error is sufficient to restore the signal.

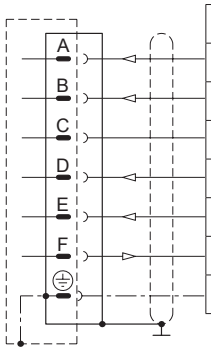
The monitor feature of versions OBW and OBM becomes available with a delay of 0.5 sec from the power-on of the card.





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



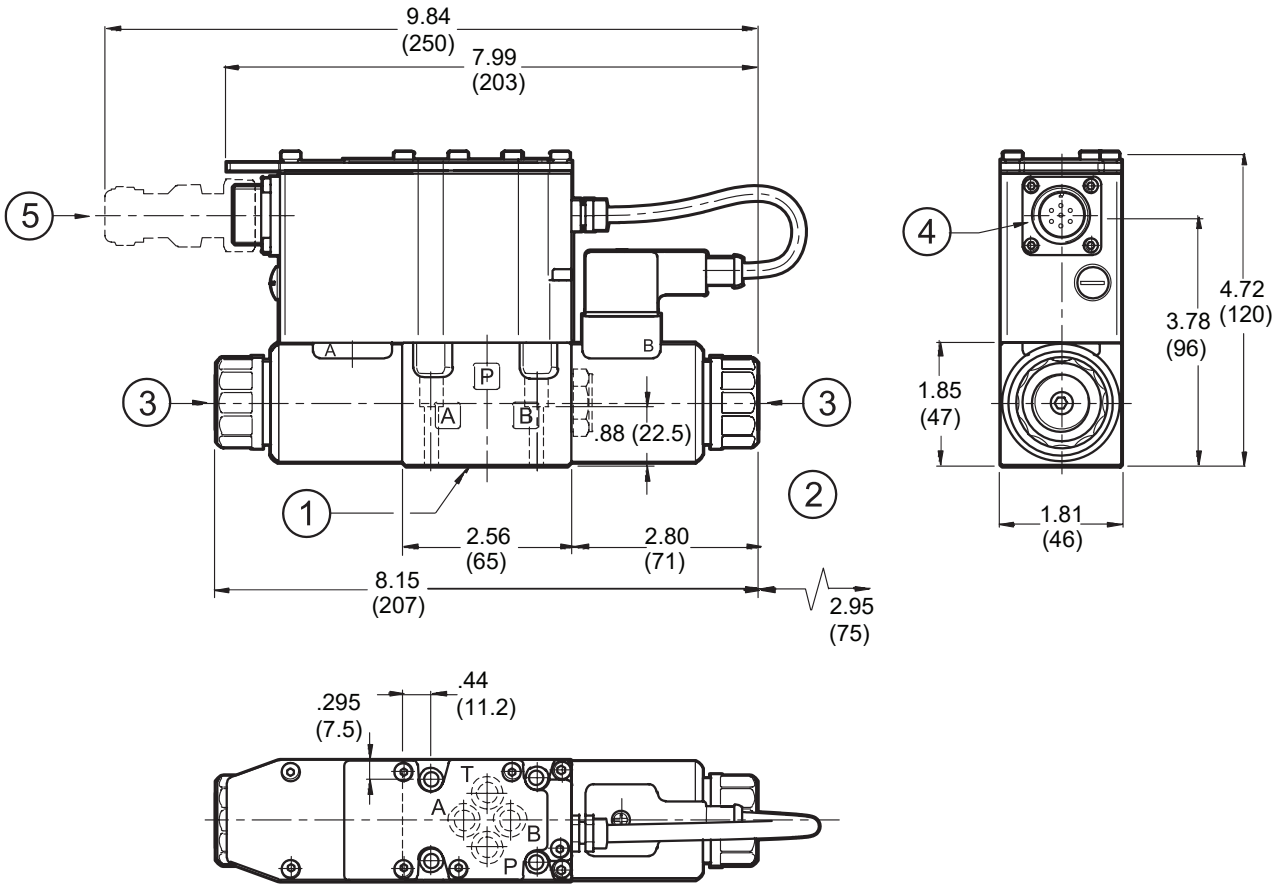


Pin	Values	version OBC	version OBW	version OBM
A	24V DC	Supply voltage		
B	0V			
C		Enable 24V DC	do not connect -	PIN F reference 0V
D	4 - 20 mA	Command		
E	0V	Command reference		
F	4 - 20 mA	Monitor (0V reference: pin B)		Monitor
PE	GND	Ground (Earth)		

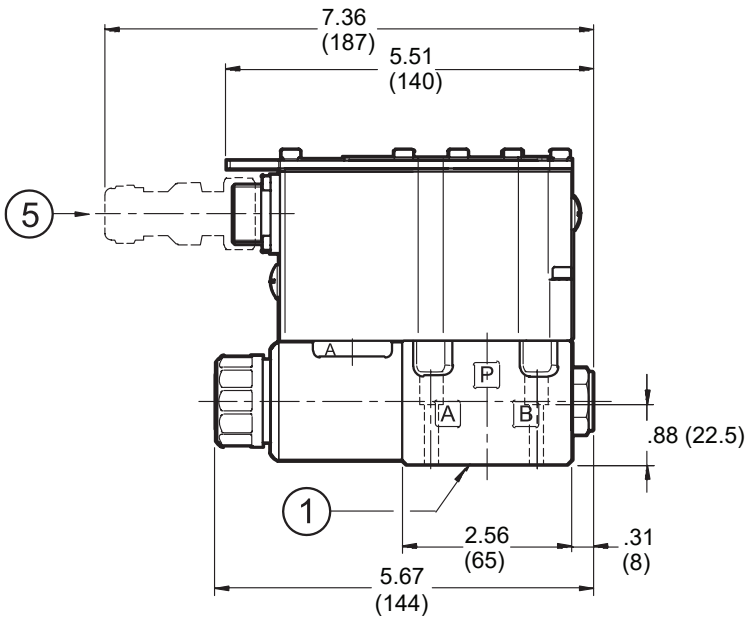
VED03MG - OVERALL AND MOUNTING DIMENSIONS

Dimensions inch (mm)

VED03MG-3*



VED03MG-5*



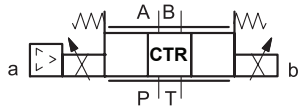
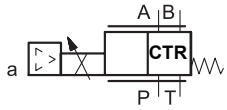
Valve Bolts: 4 SHC screws 10-24 NC x 1.25" ASTM A574
Torque: 4-6 lb.-ft. (5.4 - 8 Nm)
Threads of mounting holes: 10-24 NC

1	Mounting surface with sealing rings: QTY 4 O-Ring Size AS568-012 / 90 Shore
2	Coil removal space (solenoid B only)
3	Manual override by pin embedded in the solenoid tube
4	Main connection 6 pin + PE
5	Mating connector 6 poles + PE , female type MIL-5015-G To be ordered separately.

IDENTIFICATION CODE: Fieldbus Electronics

VED03GH - □□ - □ - □ - □ K16 □ - □ ——— DESIGN LETTER

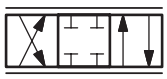
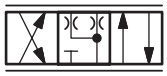
Proportional D03 Direct Operated Control with Digital On-Board and Fieldbus Controls

FUNCTION	
3	
	Dual Solenoid 3 Position Spring Centered
5	
	Single Solenoid 2 Position Spring Centered

SEALS	
CODE	DESCRIPTION
A	BUNA (STD)
G	VITON

NOMINAL CONTROLLED FLOW with ΔP 10 Bar P-T	
CODE	FLOW RATE
01	1 l/min
04	4 l/min
08	8 l/min
16	16 l/min
16/08	16 (P-A) / 8 (P-B) l/min
26	26 l/min
26/13	26 (P-A) / 13 (P-B) l/min

CONNECTIONS (Select one for each X connection)		
	CODE	DESCRIPTION
X1 Main Connector Configuration (Select One)	D1	One Command
	D0	Full Digital (on request - available for reference signal FD type Only)
X2, X3 Fieldbus type (Select One)	CA	CAN Open
	PD	PROFIBUS DP
	EC	EtherCAT
	EN	Ethernet / IP
	PN	Profinet
	PL	PowerLink
X7 Digital Transducer (Select One)	0	None
	1	SSI Type
	2	Encoder Type
X4 Analog transducer (Select One)	0	None
	1	Single / Double Transducer

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

CONTROL INTERFACE	
CODE	DESCRIPTION
E0	Analog Voltage (±10V)
E1	Analog current (4-20MA)
FD	Full Digital Version (on Request)

Note: Function Code 5 valve only available with solenoid supplied on A port end. (P-B / A-T)

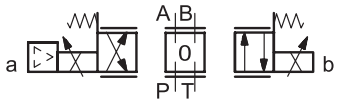
TYPICAL ORDERING CODE:
VSD03GH-3AC-26-A-E0K16D1EN00-*

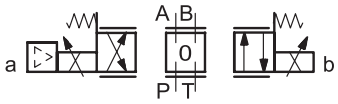
VED03GH - FIELDBUS ELECTRONICS

The 11+ PE pin connection allows separate supply voltage for electronics and solenoids.

VED03GH Electrical characteristics

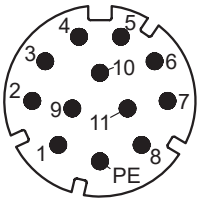
Command signal: voltage (E0) **current (E1)** **digital (FD)**	V DC mA	±10 (Impedance Ri = 11 kOhm) 4 - 20 (Impedance Ri = 58 Ohm) via fieldbus
Monitor signal: voltage (E0) **current (E1)**	V DC mA	±10 (Impedance Ro > 1 kOhm) 4 - 20 (Impedance Ro = 500 Ohm)
Communication / diagnostic		via Bus register
Communication interface standards **CAN Open** **PROFIBUS DP** **EtherCAT, Ethernet /IP, Profinet, PowerLink**		 EN 50325-4 + DS408 EN 50170-2 / IEC 61158 IEC 61158
Communication physical layer **CAN Open** **PROFIBUS DP** **EtherCAT, Ethernet /IP, Profinet, PowerLink**		 optical insulated CAN ISO 11898 optical insulated RS485 fast ethernet, insulated 100 Base TX
Power connection		11 pin + PE (DIN 43651)

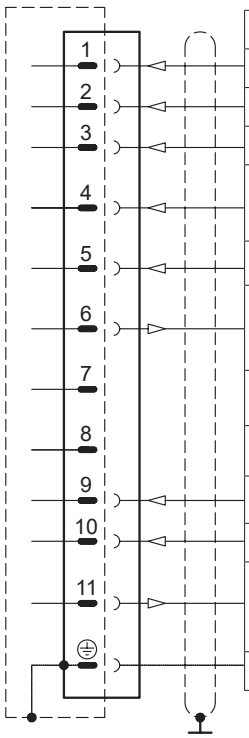




COMMAND	**-10V**	**0V**	**+10v**	**4 mA**	**12 mA**	**20 mA**
MONITOR	**-10V**	**0V**	**+10v**	**4 mA**	**12 mA**	**20 mA**

X1 Main connection pin table





D1: one command

Pin	Values	Function
1	24V DC	Main supply voltage
2	0 V	
3	24V DC	Enable
4	± 10V (E0) 4 - 20 (E1)	Command
5	0V	Command reference signal
6	± 10V (E0) 4 - 20 (E1)	Monitor (0V reference pin 10)
7	NC	do not connect
8	NC	do not connect
9	24V DC	Logic and control supply
10	0 V	
11	24V DC	Fault (0V DC) or normal working (24V DC) (0V reference pin 2)
12	GND	Ground (Earth)

D0: full digital

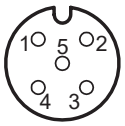
Pin	Values	Function
1	24V DC	Main supply voltage
2	0 V	
3	24V DC	Enable
4	NC	do not connect
5	NC	do not connect
6	NC	do not connect
7	NC	do not connect
8	NC	do not connect
9	24V DC	Logic and control supply
10	0 V	
11	24V DC	Fault (0V DC) or normal working (24V DC) (0V reference pin 2)
12	GND	Ground (Earth)

VED03G H FIELDBUS connections

Please wire following guidelines provided by the relative standards communication protocol.

Communication connection CA (CAN Open)

X2 (IN) connection: M12 A 5 pin female



Pin	Values	Function
1	CAN_SH	Shield
2	NC	Do not connect
3	GND	Signal zero data line
4	CAN_H	Bus line (high)
5	CAN_L	Bus line (low)

X3 (OUT) connection: M12 A 5 pin male



Pin	Values	Function
1	CAN_SH	Shield
2	NC	Do not connect
3	GND	Signal zero data line
4	CAN_H	Bus line (high)
5	CAN_L	Bus line (low)

Communication connection PD (PROFIBUS DP)

X2 (IN) connection: M12 B 5 pin male (IN)



Pin	Values	Function
1	+5 V	Termination supply signal
2	PB_A	Bus line (high)
3	0 V	Data line and termination signal 0
4	PB_B	Bus line (low)
5	SHIELD	

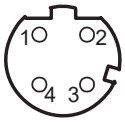
X3 (OUT) connection: M12 B 5 pin female



Pin	Values	Function
1	+5 V	Termination supply signal
2	PB_A	Bus line (high)
3	0 V	Data line and termination signal 0
4	PB_B	Bus line (low)
5	SHIELD	

Communication connections: EC (EtherCat), EN (Ethernet/IP), PN (PROFINET), PL (POWERLINK)

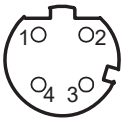
X2 (IN) connection M12 D 4 pin female



Pin	Values	Function
1	TX+	Transmitter
2	RX+	Receiver
3	TX-	Transmitter
4	RX-	Receiver
HOUSING	SHIELD	

Note: Shield connection on connector housing is recommended.

X3 (OUT) connection: M12 D 4 pin female

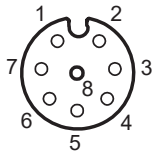


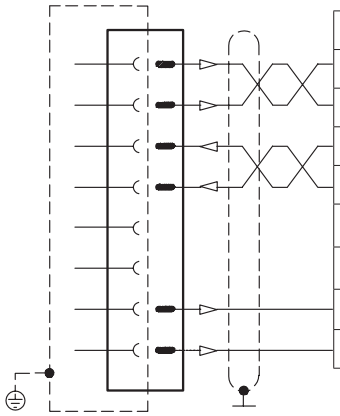
Pin	Values	Function
1	TX+	Transmitter
2	RX+	Receiver
3	TX-	Transmitter
4	RX-	Receiver
HOUSING	SHIELD	

Digital transducer connection

X7 connection: M12 A 8 pin female)

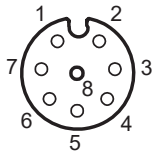
VERSION 1: SSI type

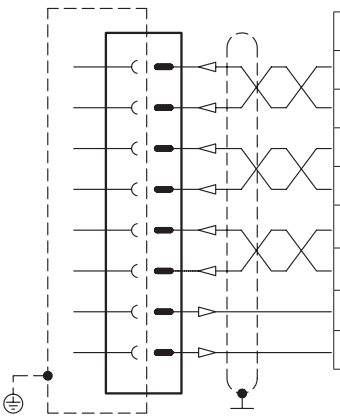




Pin	SSI Values	Function	Notes
1	CLK+	Serial synchronous clock (+)	Input - digital signal
2	CLK-	Serial synchronous clock (-)	
3	MISO+	Serial position data (+)	
4	MISO-	Serial position data (-)	
5	NC	-	do not connect
6	NC	-	
7	+24 V	transducer power supply	Output power supply
8	0 V	-	Common GND

VERSION 2: ENCODER type



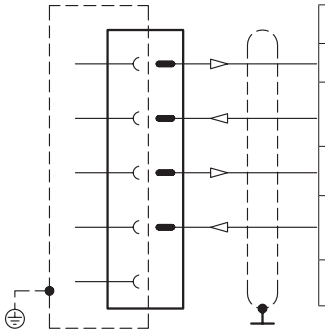


Pin	SSI Values	Function	Notes
1	ENC_Z+	input channel Z+	Input - digital signal
2	ENC_Z-	input channel Z-	
3	ENC_A+	input channel A+	
4	ENC_A-	input channel A-	
5	ENC_B+	input channel B+	
6	ENC_B-	input channel B-	
7	+5 V	transducer power supply	Output power supply
8	0 V	-	Common GND

Analogue transducer connection X4 connection: M12 A 4 pin female

VERSION 1: single / double transducer (single or double is a software-selectable option)



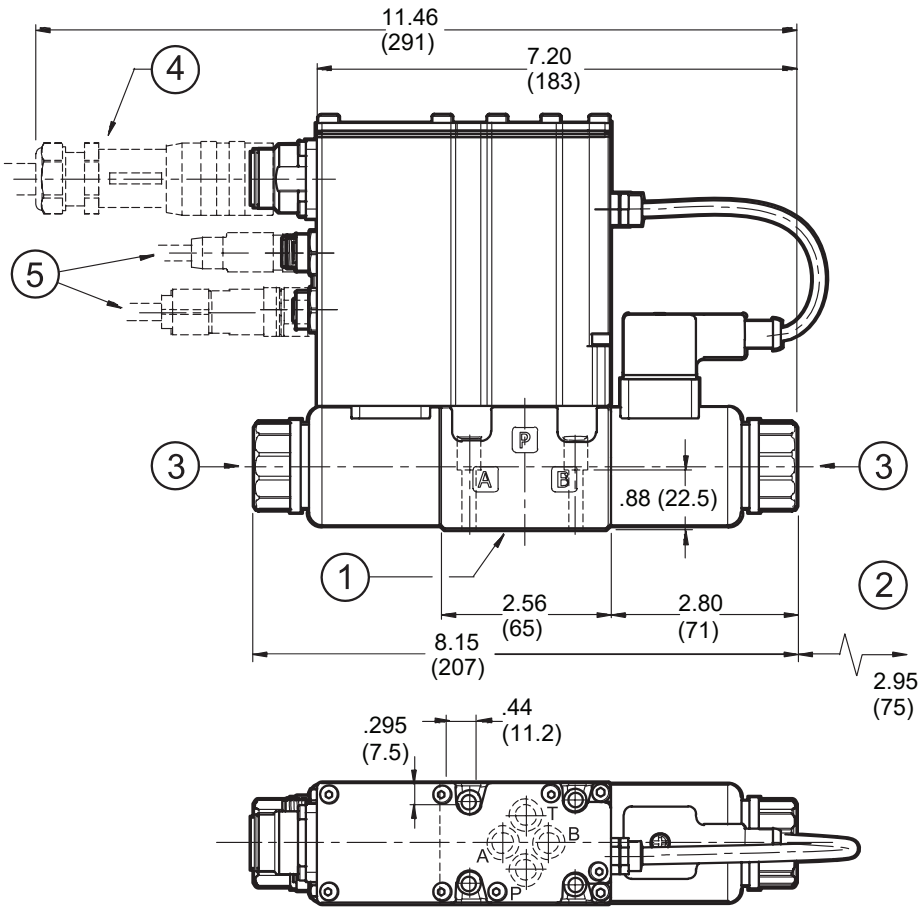


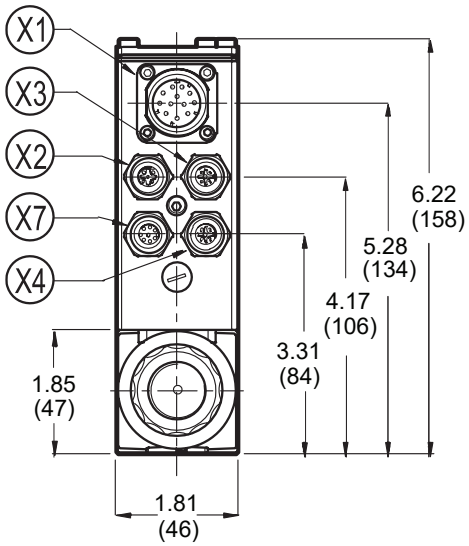
Pin	Values	Notes
1	+24V	Remote transducer power supply (out) 100 mA
2	±10 V 4 ÷20 mA	Input signal of transducer 1 (range software selectable)
3	0V	Common reference signal for transducer power and signals
4	±10 V 4 ÷20 mA	Input signal of transducer 2 (range software selectable)
5	-	

VED03GH - OVERALL AND MOUNTING DIMENSIONS

Dimensions inch (mm)

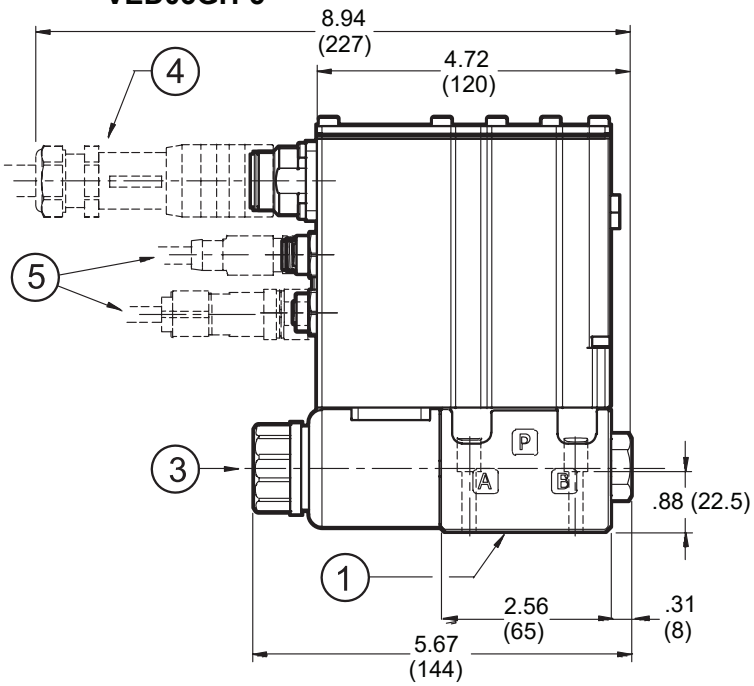
VED03GH-3**





Note: Depending on the chosen version, X4 and X7 connections may not be present. Please refer to page 10-12 for connection descriptions and pinout.

VED03GH-5**



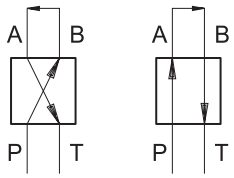
Valve Bolts: 4 SHC screws 10-24 NC x 1.25" ASTM A574
Torque: 4-6 lb.-ft. (5.4 - 8 Nm)
Threads of mounting holes: 10-24 NC

X1	Main connection 11 pin + PE
X2	Fieldbus communication (IN)
X3	Fieldbus communication (OUT)
X4	X4 connection for analogue transducer
X7	X7 connection for digital transducer

1	Mounting surface with sealing rings: QTY 4 O-Ring AS568-012 / 90 Shore
2	Coil removal space (solenoid B only)
3	Manual override by pin integrated in the solenoid tube
4	Mating connector 11 poles + PE To be ordered separately.
5	Mating connectors for fieldbus communication and signals To be ordered separately.

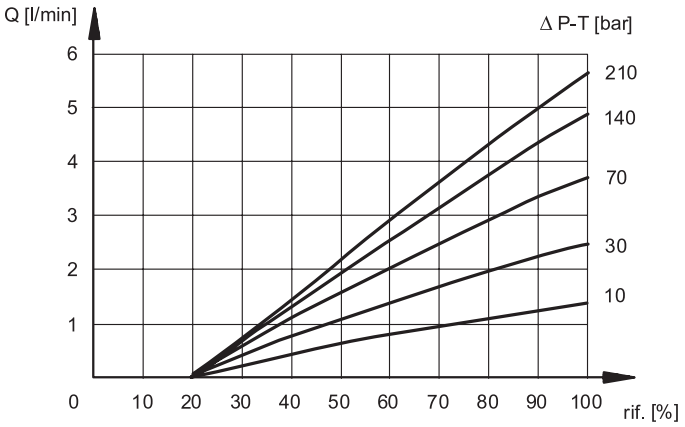
VED03 G Series - CHARACTERISTIC CURVES

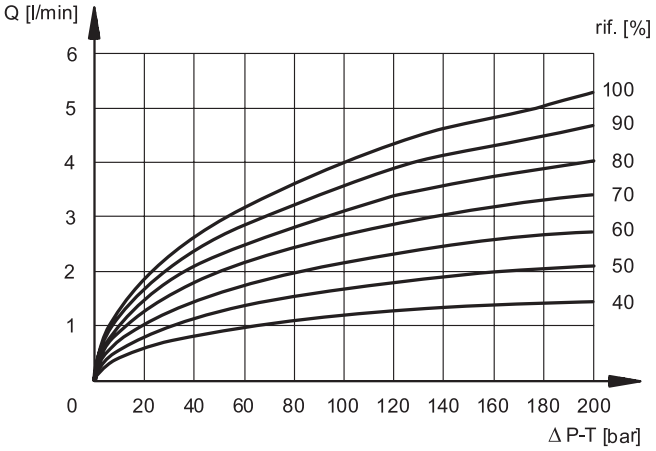
(Obtained with mineral oil with viscosity of 36 cSt at 50°C and p = 210 bar)



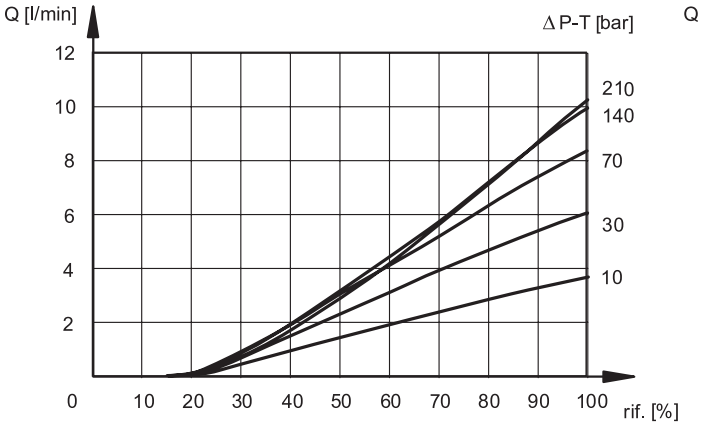
Typical flow rate curves related to the reference signal and measured for the available spools.
The Δp values are measured between P and T valve ports.

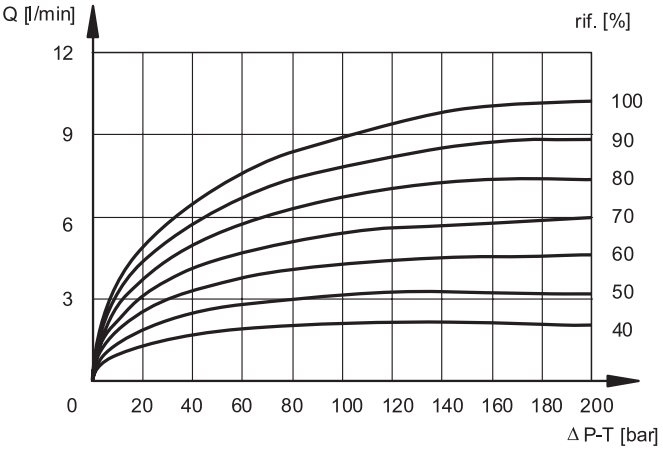
SPOOL TYPE AC01 / FC01



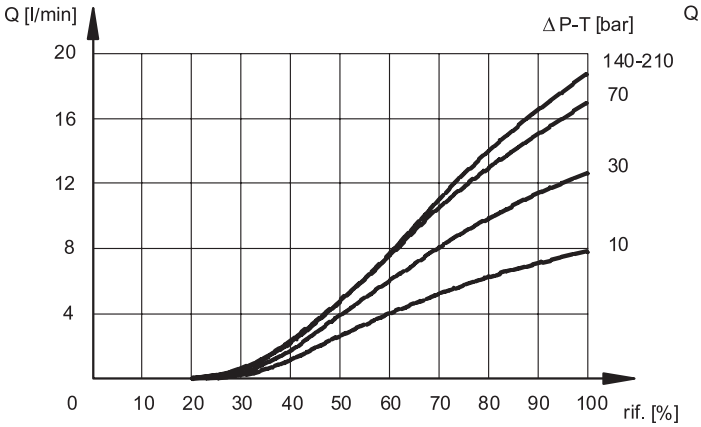


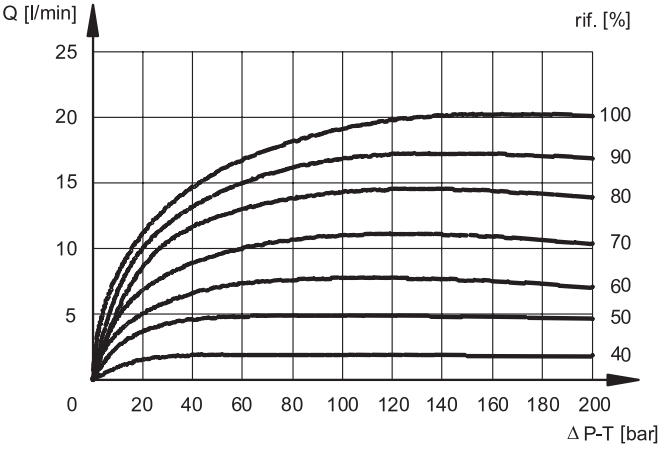
SPOOL TYPE AC04 / FC04



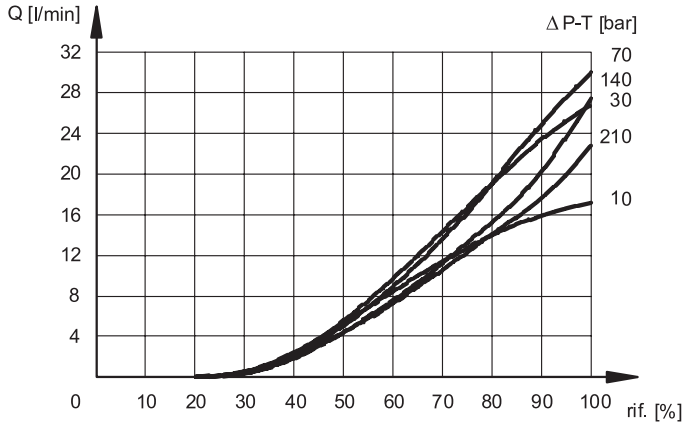


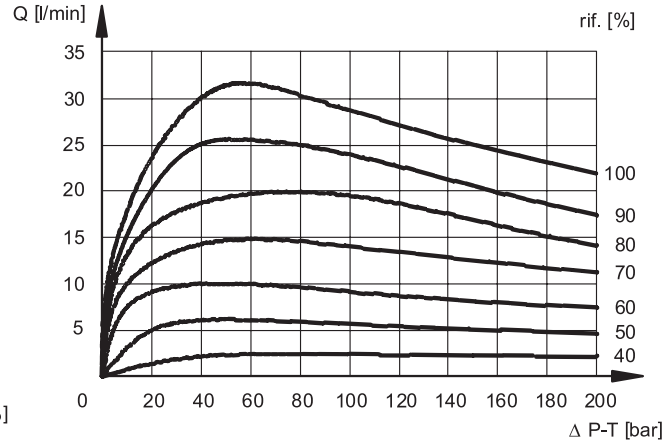
SPOOL TYPE AC08 / FC08



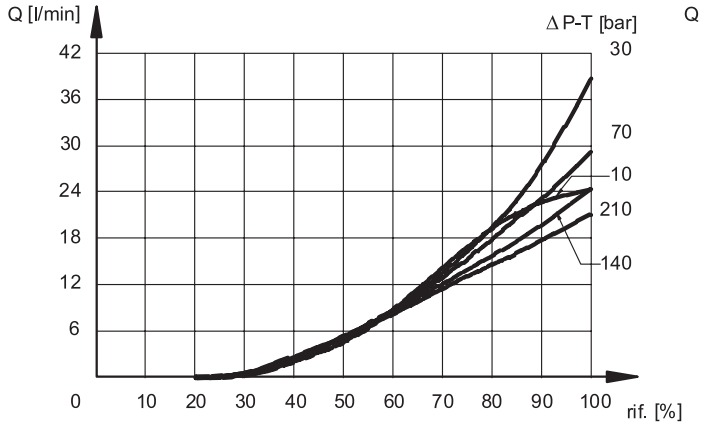


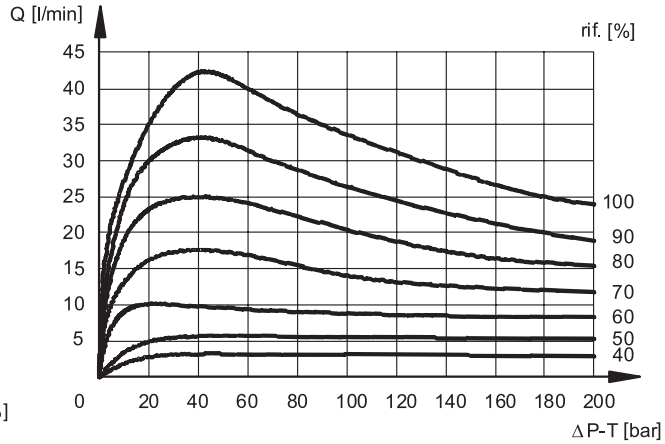
SPOOL TYPE AC16 / FC16





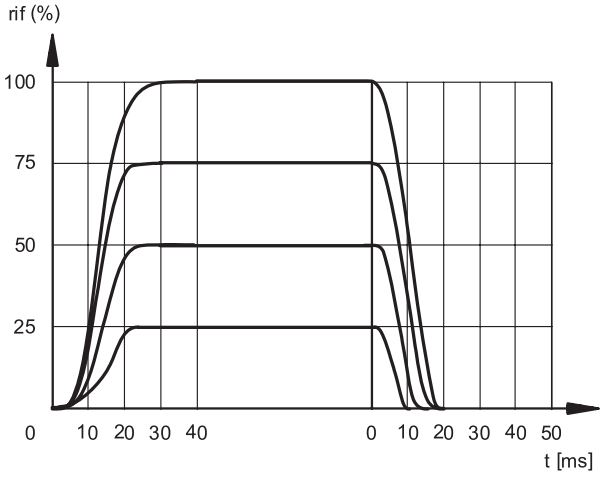
SPOOL TYPE AC26 / FC26





RESPONSE TIMES

(obtained with mineral oil with viscosity of 36 cSt at 50°C and p = 140 bar)

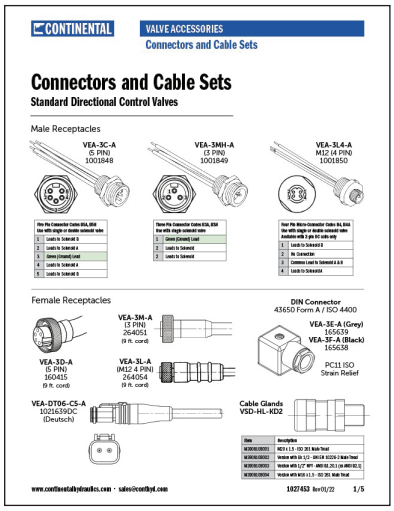


Common Conversions Formulas:

LPM to GPM (LPM x .2642 = GPM)
GPM to LPM (GPM x 3.785 = LPM)

Bar to PSI (Bar x 14.5 = PSI)
PSI to Bar (PSI x .06895 = Bar)

ACCESSORIES CATALOGS



Connectors and Cables Sets
Form #1027453



Programming and Test Devices
Form #1027454

CONTINENTAL HYDRECO

INDUSTRIAL AND MOBILE SOLUTIONS

PROUD MEMBER OF THE DUPLOMATIC GROUP
MOTION SOLUTIONS

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