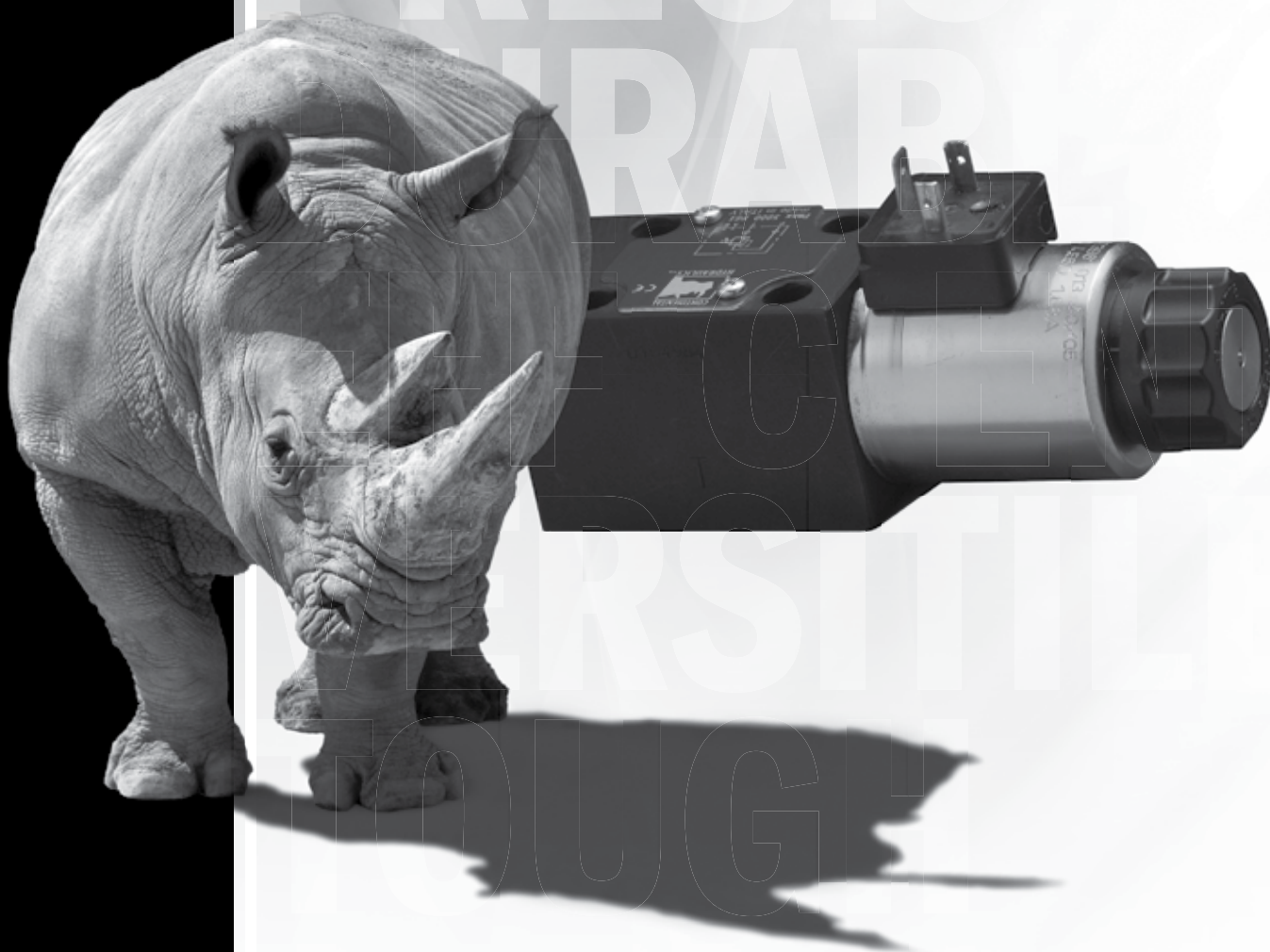




CONTINENTAL HYDRAULICS

# EDF\*M

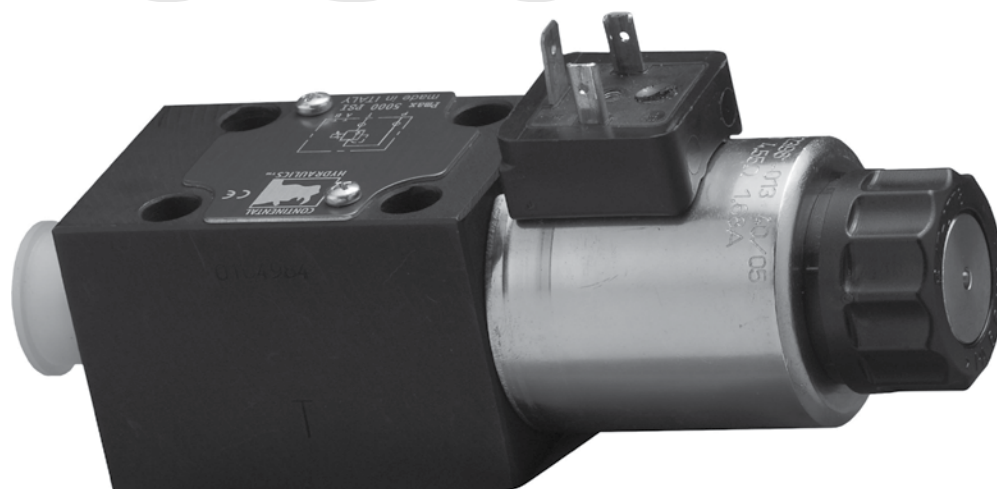
COMPENSATED PROPORTIONAL FLOW CONTROL VALVES



EDF\*M - COMPENSATED PROPORTIONAL FLOW CONTROL VALVES

# EDF\*M

## COMPENSATED PROPORTIONAL FLOW CONTROL VALVES



### DESCRIPTION

EDF03M and EDF05M are direct operated normally closed proportional flow control valves with pressure compensation. These valves are subplate mounted according to NFPA/T.3.5.1 R2-2002 and ISO 4401:2005 standards.

These valves are used to regulate flow in a hydraulic circuit. Output flow is directly proportional to the input current to the solenoid.

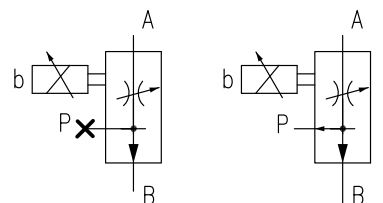
### OPERATIONS

The EDF valves can be used as either a restrictive (2 way) or bypass (3 way) flow control.

Restrictive compensators are typically used in circuits supplied by variable volume pumps. Block 'P' port of the subplate to use the valve as a restrictive compensator flow control.

Bypass compensators are typically used in circuits with fixed volume pumps. Connect 'P' port to the tank to use the valve as a bypass flow control.

T port in the manifold must always be plugged.



restrictive

by-pass

### TYPICAL PERFORMANCE SPECIFICATIONS

<b>MAXIMUM OPERATING PRESSURE:</b>	All Ports	3600 psi	250 bar
<b>REGULATED FLOW</b>	EDF03M	3.7 gpm 5.3 gpm 8 gpm 10.5 gpm	14 l/min 20 l/min 30 l/min 40 l/min
	EDF05M	21 gpm	80 l/min
<b>COMPENSATOR SPRING</b>	EDF03M-14	58 psi	4 bar
	EDF03M-30		
	EDF03M-20	116 psi	8 bar
	EDF03M-40		
	EDF05M-80		
<b>MINIMUM PRESSURE DROP A TO B</b>	EDF03M-14	145 psi	10 bar
	EDF03M-30		
	EDF03M-20	320 psi	22 bar
	EDF03M-40		
	EDF05M-80		

		EDF03M		EDF05M	
STEP RESPONSE	0 → 100%	< 70 ms			
HYSTERESIS	% of Q max	< 6%		< ± 2%	
REPEATABILITY	% of Q max	< ± 1.5%			
POWER SUPPLY		12V DC or 24V DC			
CONNECTION		DIN 43650	DT04-2P	DIN 43650	
PROTECTION	IEC 60529	IP65	IP69K	IP65	
WEIGHT		3.5 lbs	1.6 kg	7.7 lbs	3.5 kg

# IDENTIFICATION CODE

**EDF**   **M** -   -     -     **D** -   \_\_\_\_\_ DESIGN LETTER

SIZE	
<b>03</b>	NFPA F03 (D03)
<b>05</b>	NFPA D05

SEAL	
<b>A</b>	Buna (STD)
<b>G</b>	Viton

CONNECTION	
<b>K1</b>	DIN 43650 (STD)
<b>K7</b>	DT04-2P 'Deutsch (for EDF03M only)

VOLTAGE	
<b>12</b>	12 V DC Solenoid (STD)
<b>24</b>	24 V DC Solenoid

Manifold Mounting,  
See Mounting Surface  
Configuration On Page 12.

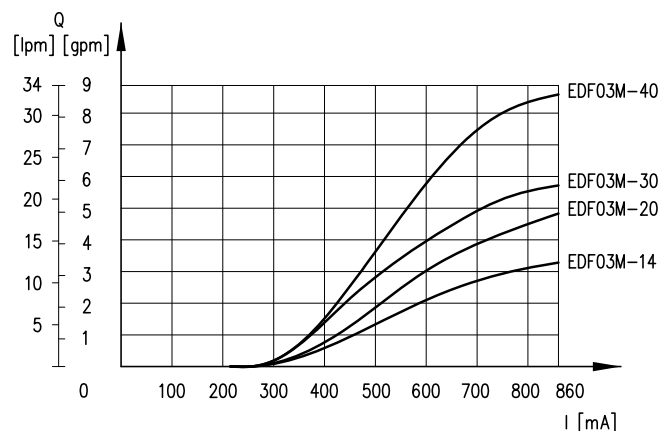
NOMINAL FLOW		
<b>03</b>	<b>14</b>	14 l/min (3.7 gpm)
	<b>20</b>	20 l/min (5.3 gpm)
	<b>30</b>	30 l/min (8 gpm)
	<b>40</b>	40 l/min (10.5 gpm)
<b>05</b>	<b>80</b>	80 l/min (21 gpm)

MECHANICAL	
<b>OMIT</b>	Manual override built-in with the tube (STD)
<b>U</b>	Manual override boot
<b>S</b>	Override with screw
<b>K</b>	Knob override

TYPICAL ORDERING CODE:  
**EDF03M-14-A-K112D-A**

# PERFORMANCE CURVES FOR EDF03M WITH RESTRICTIVE PRESSURE COMPENSATION

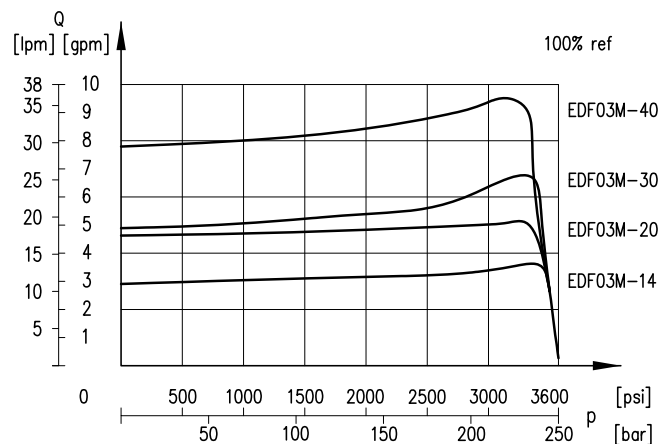
FLOW CONTROL  $Q = f(\text{command})$



## NOTES:

1. Typical flow rate characteristics A  $\rightarrow$  B for controlled flow rate: 14 - 20 - 30 - 40 lpm depending on the current supplied to the solenoid .
2. Curves obtained with maximum current 860 mA, at 100 Hz PWM with 24V DC coil and with mineral oil with viscosity of 170 sus (36 cSt) at 122°F (50°C).

FLOW CONTROL  $Q = f(pB)$

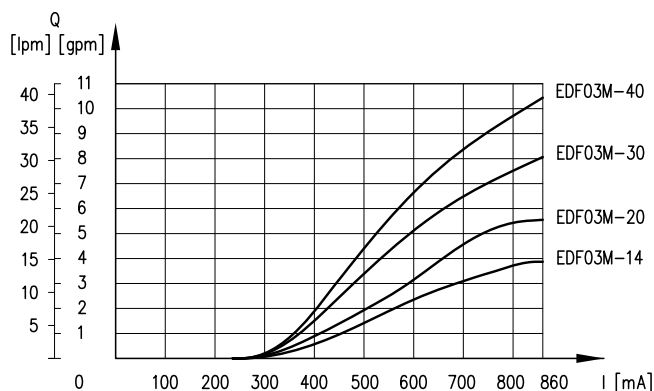


## NOTES:

1. Typical flow rate characteristics A  $\rightarrow$  B for controlled flow rate: 14 - 20 - 30 - 40 lpm depending on the pressure in line B.

# PERFORMANCE CURVES FOR EDF03M WITH BYPASS PRESSURE COMPENSATION

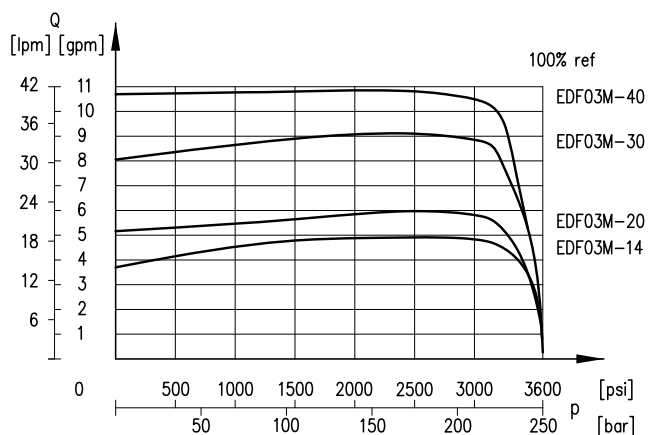
## FLOW CONTROL $Q = f(I)$



### NOTES:

1. Typical flow rate characteristics A  $\rightarrow$  B for controlled flow rate: 14 - 20 - 30 - 40 lpm depending on the current supplied to the solenoid.
2. Curves obtained with maximum current 860 mA, at 100 Hz PWM with 24V DC coil and with mineral oil with viscosity of 170 sus (36 cSt) at 122°F (50°C).

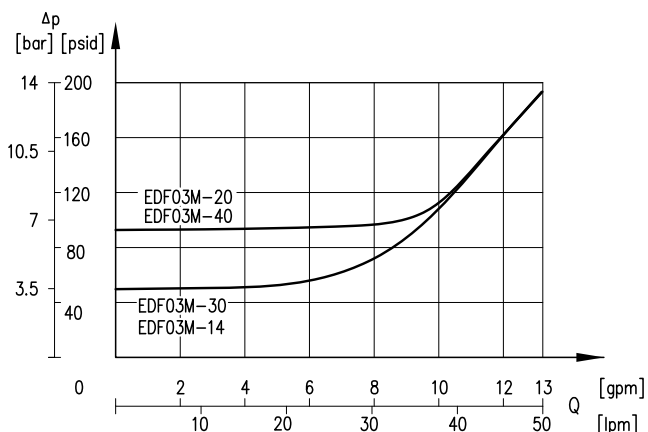
## FLOW CONTROL $Q = f(p_B)$



### NOTES:

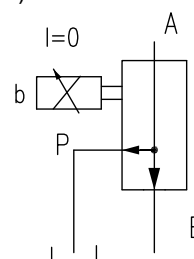
1. Typical flow rate characteristics A  $\rightarrow$  B for controlled flow rate: 14 - 20 - 30 - 40 lpm depending on the pressure in line B.

## PRESSURE DROPS $\Delta p_{A \rightarrow P} (Q_B = 0)$



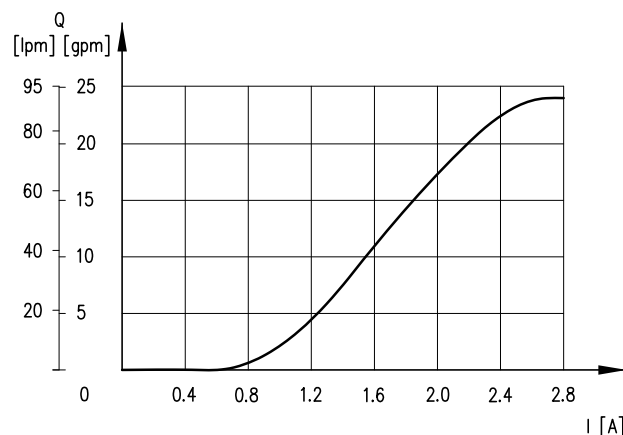
### NOTES:

1. Pressure drops with flow A  $\rightarrow$  P obtained with  $Q_B = 0$  (de-energized solenoid).



# PERFORMANCE CURVES FOR EDF05M WITH RESTRICTIVE PRESSURE COMPENSATION

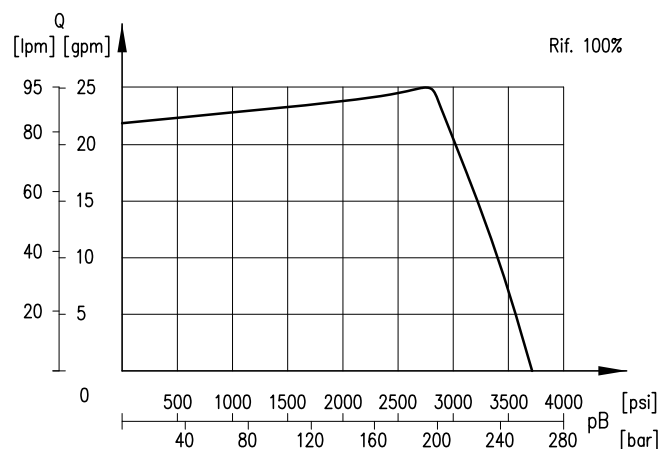
**FLOW CONTROL  $Q = f(\text{command})$**



**NOTES:**

1. Typical flow rate characteristics A  $\rightarrow$  B depending on the current supplied to the solenoid.
2. Curve obtained with maximum current 2.8 A, at 100 Hz PWM with 12V DC coil and with mineral oil with viscosity of 170 sus (36 cSt) at 122°F (50°C).

**FLOW CONTROL  $Q = f(pB)$**

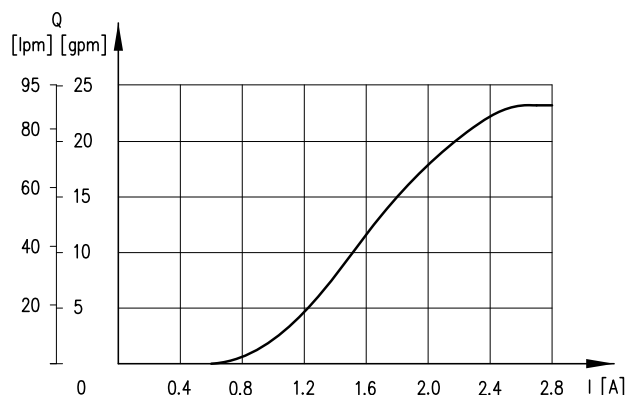


**NOTES:**

1. Typical flow rate characteristics A  $\rightarrow$  B for controlled flow rate depending on the pressure in line B.
2. Curve obtained with maximum current 2.8 A, at 100 Hz PWM with 12V DC coil and with mineral oil with viscosity of 170 sus (36 cSt) at 122°F (50°C).

# PERFORMANCE CURVES FOR EDF05M WITH BYPASS PRESSURE COMPENSATION

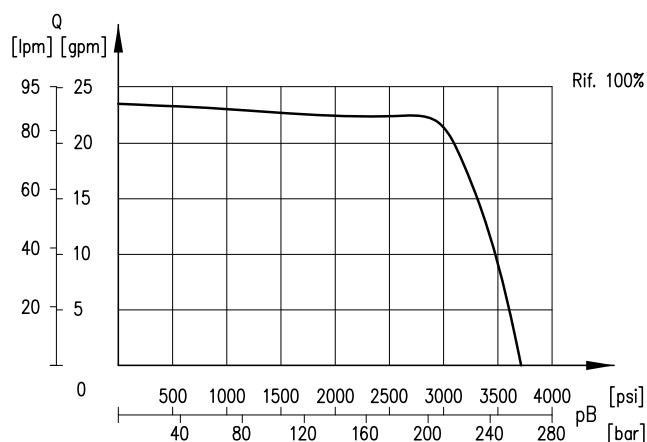
**FLOW CONTROL  $Q = f(\text{command})$**



**NOTES:**

1. Typical flow rate characteristics A  $\rightarrow$  B depending on the current supplied to the solenoid.
2. Curve obtained with maximum current 2.8 A, at 100 Hz PWM with 12V DC coil and with mineral oil with viscosity of 170 sus (36 cSt) at 122°F (50°C).

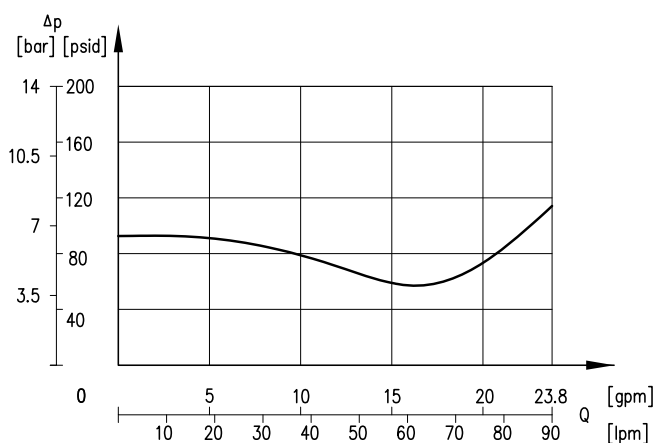
**FLOW CONTROL  $Q = f(pB)$**



**NOTES:**

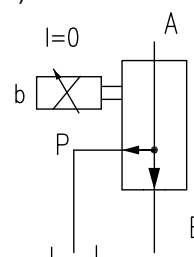
1. Typical flow rate characteristics A  $\rightarrow$  B depending on the pressure in line B.
2. Curve obtained with maximum current 2.8 A, at 100 Hz PWM with 12V DC coil and with mineral oil with viscosity of 170 sus (36 cSt) at 122°F (50°C).

**PRESSURE DROPS  $\Delta p$  A  $\rightarrow$  P ( $Q_B = 0$ )**



**NOTES:**

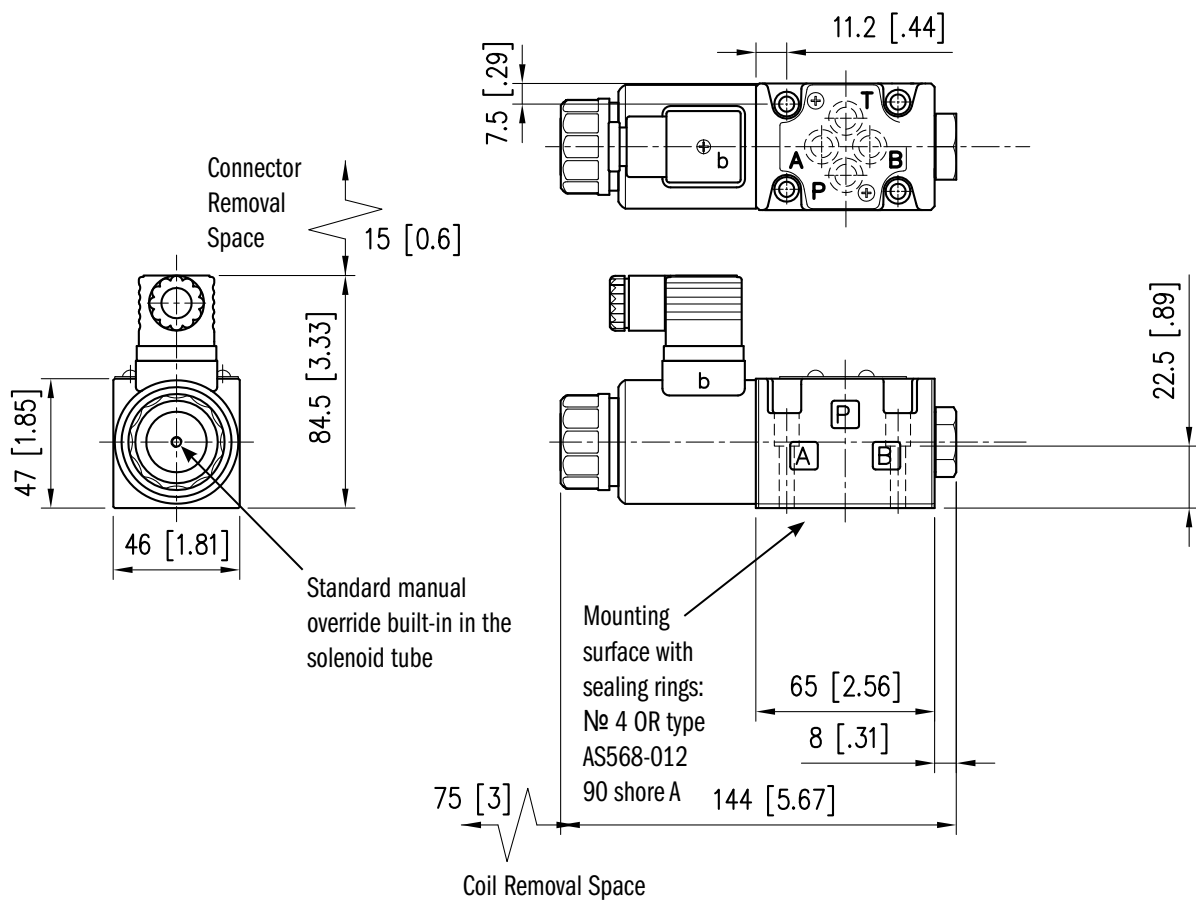
1. Pressure drops with flow A  $\rightarrow$  P obtained with  $Q_B = 0$  (de-energized solenoid).



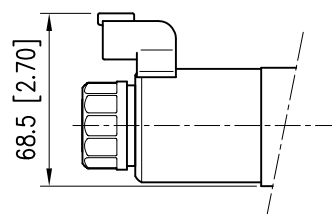
# OVERALL AND MOUNTING DIMENSIONS FOR EDF03M

EDF03M

Dimensions in mm [IN]



## K7 CONNECTION

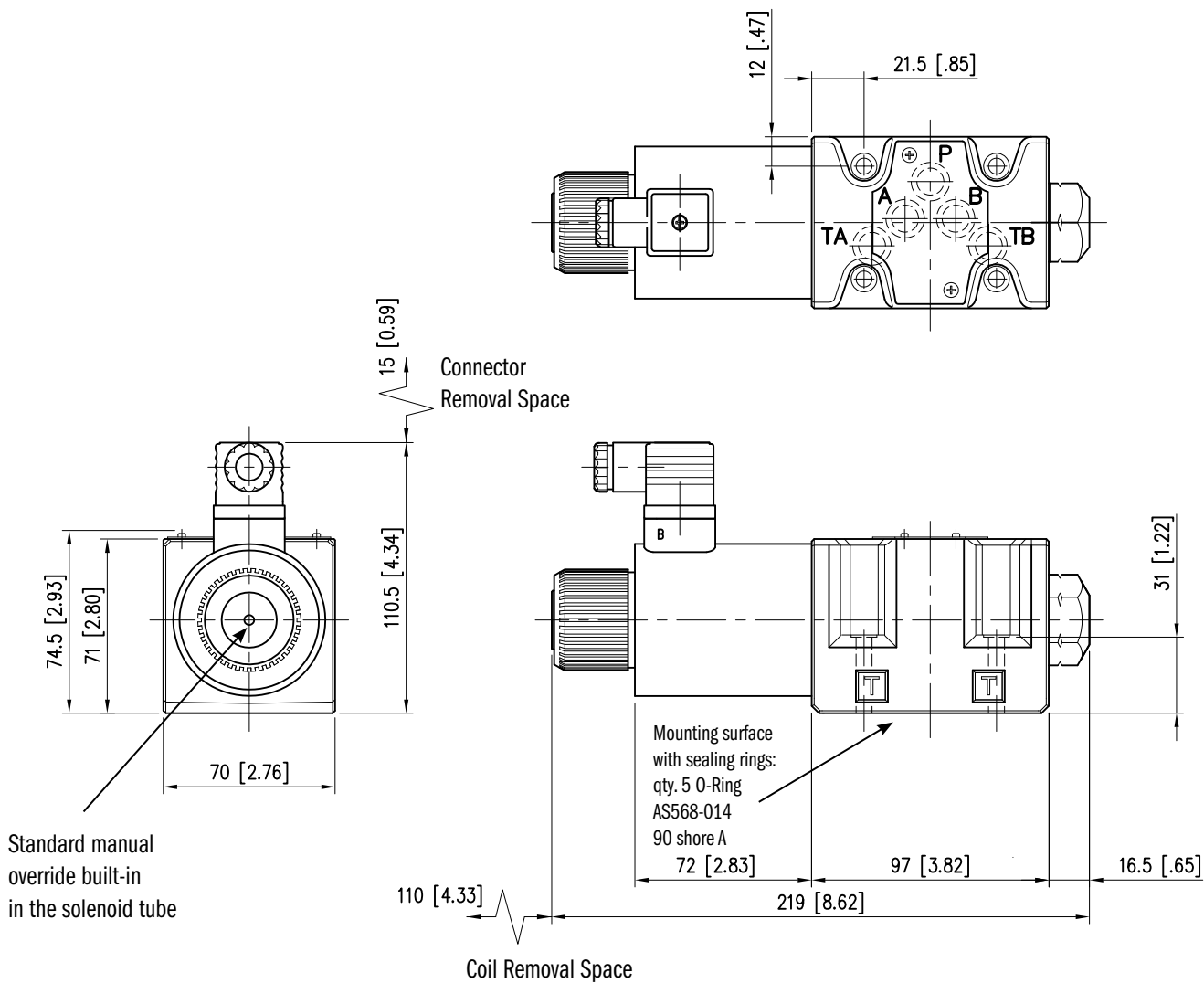




# OVERALL AND MOUNTING DIMENSIONS FOR EDF05M

EDF05M

Dimensions in mm [IN]

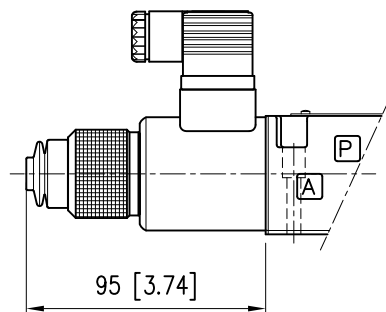


## MANUAL OVERRIDE

The standard valve has override pins integrated in the tube. The operation of this control must be executed with a suitable tool, careful not to damage the sliding surface.

Other manual overrides are available for EDF03M only.

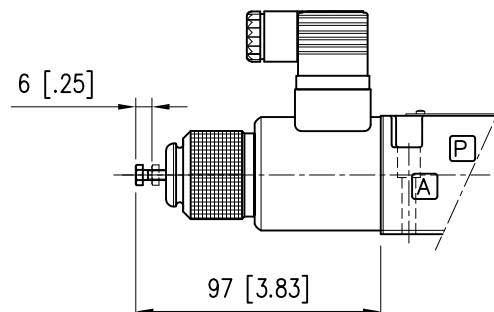
### MANUAL OVERRIDE BOOT PROTECTED (CODE U)



#### NOTE:

1. This device can be ordered separately with code **VMAP-03J-A**.

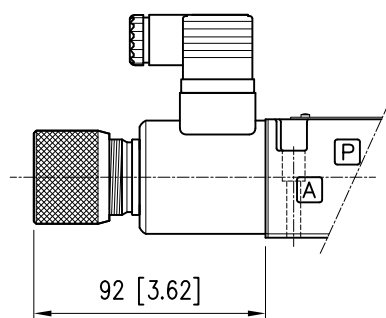
### SCREW MANUAL OVERRIDE (CODE S)



#### NOTES:

1. With metal ring nut provided with a M4 screw and a blocking locknut to allow continuous mechanical operations.
2. This device can be ordered separately with code **VMAP-03S-A**.

### KNOB (CODE K)



## ELECTRICAL DATA FOR EDF\*M

The proportional solenoid consists of tube and coil. The coil is mounted on the tube and fastened to it by a retainer nut.

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.

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)

### EDF03M

NOMINAL VOLTAGE	V DC	<b>12</b>	<b>24</b>
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
PWM FREQUENCY	Hz	200	100

### EDF05M

NOMINAL VOLTAGE	V DC	<b>12</b>	<b>24</b>
RESISTANCE AT 68° F	K1	3.2 Ω	8.65 Ω
CURRENT AT 68° F	K1	2.8 A	1.6 A
PWM FREQUENCY	Hz	100	

## ACCESSORY ELECTRONICS

Some external digital amplifiers are available to be coupled to the valve for a 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

# MOUNTING SURFACES

Due to its particular design, the valve functions as bypass or restrictive depending on how the 'P' port is used in the manifold where the valve will be mounted.

To work as restrictive, only ports A and B are used. P must be plugged. The P port is necessary when a discharge of residual flow is needed (3-way operation). Port T is never used and must be plugged.

The holes are made according to ISO 6263-03 standard with regard to size 03 (NFPA F03), and ISO 4401-05 (NFPA D05) for the size 05.

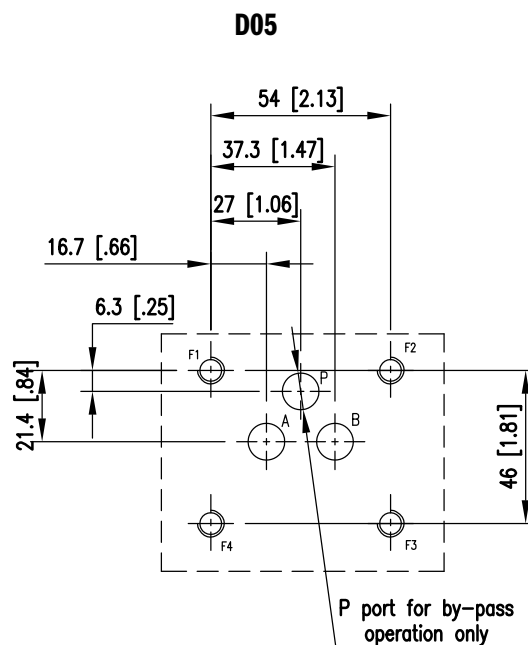
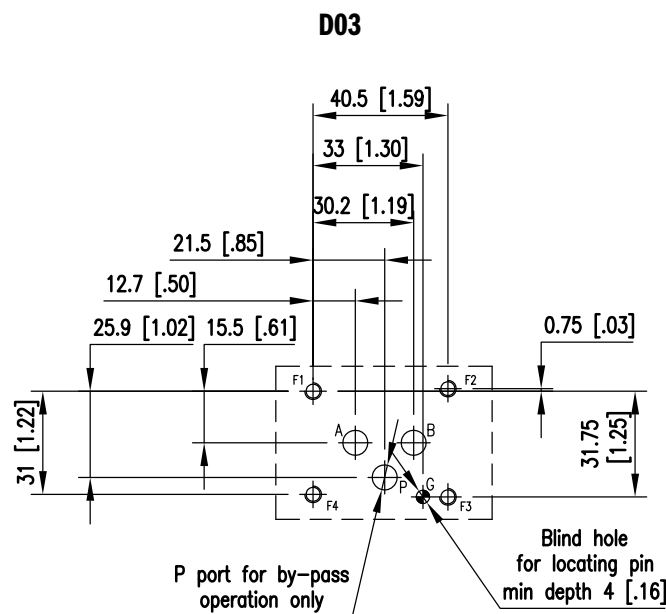
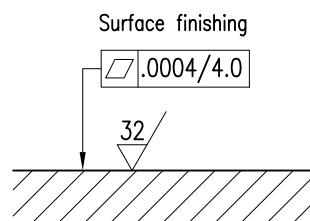
Dimensional tolerances are  $\pm 0.1$  mm (0.004") for bolt and pin location;  $\pm 0.2$  mm (0.008") for the other quotes.

## PORT FUNCTION:

A = Flow inlet

B = Regulated flow

P = Residual flow (bypass only)



VALVE SIZE	ISO MOUNTING SURFACE	NFPA MOUNTING SURFACE	DIMENSIONS mm [in]				
			ØA MAX	ØB MAX	ØP MAX	ØG	F
03	6263-03-03-*-97	F03 (D03)	7.5 [0.3]	7.5 [0.3]	7.5 [0.3]	4 [0.16]	M5x12 mm [10 - 24 UNC x 1/2"]
05	4401-05-04-0-05	D05	11.2 [0.44]	11.2 [0.44]	11.2 [0.44]	-	M6x10 mm [1/4 - 20 UNC x 7/16"]

# 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 ( $\Delta P$ ) 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.

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	

## BOLT KITS

<b>BD03-125</b>	4 Qty. 10-24 UNC x 1 ¼" Screws 4 Qty. #10 Lock Washers	1008406
<b>BD05-163-B</b>	4 Qty. 1/4 - 20 UNC x 1 ½" Screws 4 Qty. #1/4 Lock Washers	1013160

### NOTE:

1. The recommended torque values for the bolts which mount the valve to the manifold or subplate are:

EDF03M: 4 lb.ft (5.4 Nm)

EDF05M: 6 lb.ft (8.1 Nm)

## SEAL KIT

EDF03M	Buna Seal Kit	1008577
	Viton Seal Kit	1013096
EDF05M	Buna Seal Kit	1013142
	Viton Seal Kit	1013146

### NOTE:

1. The kit also contains the O-rings for tube and end-cap.