

## D03 Pattern Directional Control Valves

Also refer to "Directional Valve Features, Selection and Operating Recommendations" ([dynexdcvoperating.pdf](#))

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#### BROCHURE NOTES:

Consult the Dynex sales department for a review of any application which requires operating above the rated flows or pressures, or higher than normal operating temperatures.

Specifications shown were in effect when published. Since errors or omissions are possible, contact your sales representative for the most current specifications before ordering. Dynex reserves the right to discontinue or change designs at any time without incurring any obligation.



# D03 PATTERN



## VALVE DESCRIPTION

D03 valves provide high pressure and high flow capability in a very compact size. Flows to 15 gpm (57 L/min) are possible at pressures to 5000 psi (350 bar).

These valves operate very efficiently, with large-core flow passages and uniform flow areas throughout the body coring. Typical pressure drop (open center spool) is a low 98 psi at 8 U.S. gpm (7 bar at 30 L/min) nominal flow.

For a description of spools, internal operators and application information, see [dynexdcvoperating.pdf](#).

## Mounting

Subplate, N.F.P.A. D03 (CETOP 3) pattern.

## Actuator Options

6100 Series: Manual Lever;  
6500 Series: Direct Solenoid;  
6800 Series: Hydraulic Piloted;  
6900 Series: Air Piloted.

## Rated Flow

Nominal: 8 U.S. gpm (30 L/min);  
Maximum: 15 U.S. gpm (57 L/min).

## Rated Pressure

5000 psi (350 bar).

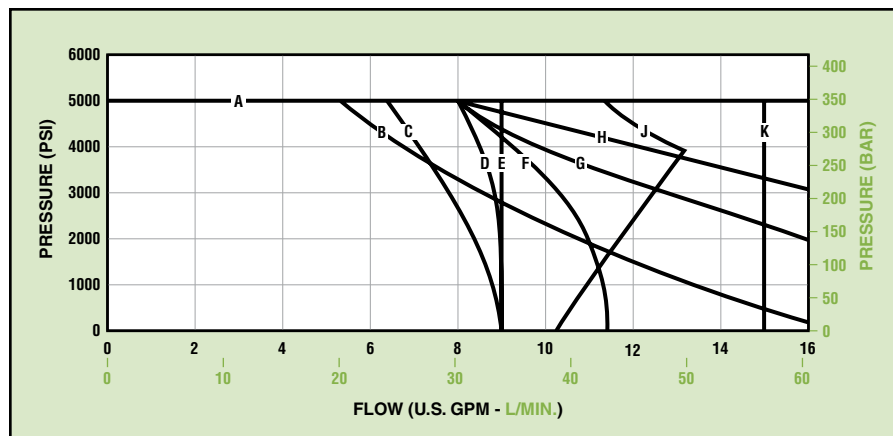
## Tank Port Pressure (Maximum)

Manual Actuated Models:  
3000 psi (210 bar).

Solenoid Actuated Models:  
Standard,  
1500 psi (105 bar);  
High Pressure Option ("HT"),  
AC models, 2300 psi (160 bar);  
DC models, 3000 psi (210 bar).

Hydraulic and Air Actuated Models:  
1500 psi (105 bar).

## Flow Capacity – Solenoid Models



## Flow Curve Reference

Solenoid Type	Spool Type										
	0	1	3	4	011	2	2R	32	32R	36	03
AC	A	A	H	A	C	E	E	J	J	B	B
DC and "EP"	A	A	A	A	D	K	K	F	F	G	A

## Response Time (Full Stroke)

Solenoid Energized:  
AC, 12 ms; DC, 20 ms.  
Spring Returned:  
AC, 15 ms; DC, 20 ms.

## Solenoid Options

Models are available with standard AC or DC solenoids. Optional Plug-In-Terminal Solenoids fit DIN Connector, Standard 43650 Form A ("Hirschmann" type).

## Electrical Connections

Standard Wiring Box with UL listed and CSA approved wire leads;

Optional Terminal Strip, Cable Grip or Pin Connector (N.F.P.A. standard T3.5-29-1980; A.N.S.I. standard B93.55M-1981).

## Explosion Proof Option ("EP")

Solenoids with special enclosures are approved by UL and CSA for use in hazardous locations. Available with AC or DC solenoids.

UL Classification:  
Class I, Group C, D;  
Class II, Group E, F, G.

## CSA/UL Recognized ("C" Option)

Solenoid coils are printed with the symbol:



This option is available with "115DF" standard AC solenoids only. For availability with other voltages, contact the Dynex sales department.

## VALVE FLOW CAPACITY

Flow capacity depends on valve actuator, internal operator and spool type.

## Solenoid Models

The flow capacity curves, above, show typical performance for each spool type. The letters in the "Flow Curve Reference" table identify the appropriate curve.

## Lever Operated Models

Most manual models are rated for 15 U.S. gpm (57 L/min) maximum. The exception is model 613011-D03 which is rated for 13 U.S. gpm (49 L/min) maximum. This model has a Code 3 internal operator (two position, detented operation) with Type 011 spool (tandem center).

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## Pilot Operated Models

The nominal flow capacity for most pilot operated valves is 15 U.S. gpm (57 L/min). When using a Type 011 spool (tandem center, open crossover), the maximum flow is 10 U.S. gpm (38 L/min).

Maximum flow for pilot operated valves is dependent on pilot pressure. The table shows the minimum pressure required to shift the spool, for various flow capacities.

Maximum Pilot Pressure:

Hydraulic, 3000 psi (210 bar);  
Air, 200 psi (14 bar).

Required Volume (to shift spool full stroke):  
Hydraulic, 0.014 in<sup>3</sup> (0,23 cm<sup>3</sup>);  
Air, 0.220 in<sup>3</sup> (3,61 cm<sup>3</sup>).

## Minimum Pilot Pressure

Series (Actuator Type)	Spool Type	Pilot Pressure at:					
		5 U.S. gpm (19 L/min)		8 U.S. gpm (30 L/min)		15 U.S. gpm (57 L/min)	
		psi	bar	psi	bar	psi	bar
6800 Series (Hydraulic Piloted) <sup>①</sup>	0	130	9,0	165	11,4	200	13,8
	1	150	10,3	165	11,4	420	29,0
	3	145	10,0	165	11,4	180	12,4
	4	130	9,0	165	11,4	200	13,8
	011, 2 or 2R	190	13,1	275	19,0	–	–
	32 or 32R	150	10,3	200	13,8	–	–
	36	150	10,3	200	13,8	350	24,1
	03	130	9,0	165	11,4	200	13,8
6900 Series (Air Piloted)	0	25	1,7	28	1,9	33	2,3
	1	21	1,4	22	1,5	24	1,7
	3 or 4	25	1,7	28	1,9	34	2,3
	011	23	1,6	40	2,8	–	–
	2 or 2R	23	1,6	40	2,8	–	–
	32 or 32R	25	1,7	30	2,1	–	–
	36	25	1,7	28	1,9	34	2,3
	03	25	1,7	28	1,9	33	2,3

<sup>①</sup> The values listed are based on zero tank pressure. As back-pressure increases above zero, the minimum pilot pressure must be increased by the same amount.

## VALVE EFFICIENCY

D03 valves provide exceptionally low pressure drop, as shown in the performance curves.

### Determining Pressure Drop

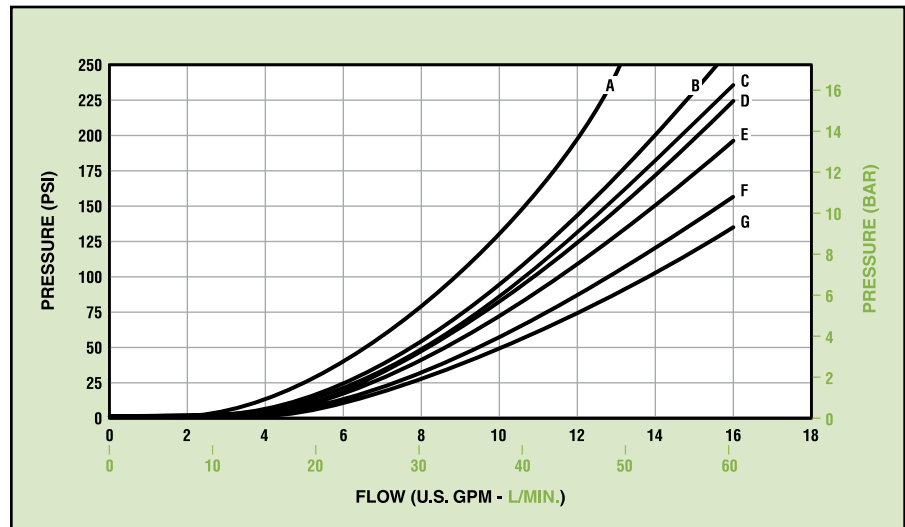
The curves show typical resistance to flow for various spool types. The table identifies the proper pressure drop curve for each spool and flow path.

### An Example

In the table under spool Type 1, curve "C" is called out to determine the pressure drop for P→A. Looking at the curves, "C" indicates a drop of about 55 psi at 8 U.S. gpm (3,8 bar at 30 L/min).

To determine total "loop" drop, the individual pressure drops for P→A and B→T (or P→B and A→T) must be added.

## Pressure Drop (ΔP)



## Flow Curve Reference

Flow Path	Spool Type										
	0	1	3	4	011	2	2R	32	32R	36	03
P→A	B	C	B	C	C	C	C	B	B	B	B
P→B	B	C	B	C	C	C	C	B	B	B	B
A→T	E	F	F	E	C	C	C	E	F	G	–
B→T	E	F	F	E	C	C	C	F	E	G	–
P→T	–	D	–	–	A	A	A	–	–	–	–

# D03 PATTERN

## INSTALLATION AND DIMENSIONS

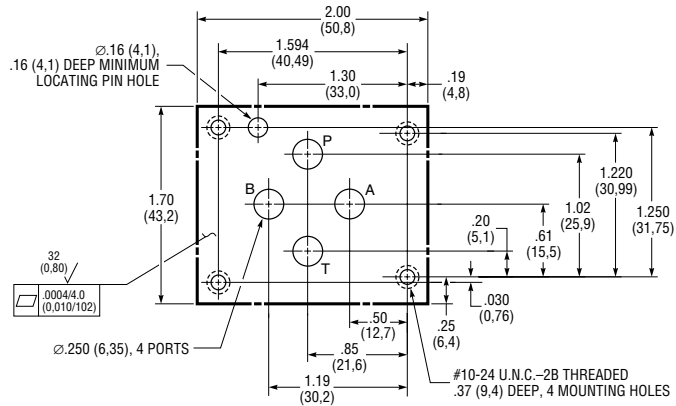
### Valve Mounting

The mounting surface drawing shows the minimum flush or raised surface required for the N.F.P.A. D03 (CETOP 3) pattern.

Port o-rings are included with all valves.

Mounting bolts must be ordered separately: 10-24 U.N.C. Threaded x 0.75 inch (19 mm), Grade 8 or better, four required. Recommended mounting torque is 65 lb·in (7,3 N·m).

See "Subplate and Bolt Kits" on page 5.



Minimum Mounting Surface, N.F.P.A. D03 (CETOP 3) Pattern

### Solenoid Model Dimensions

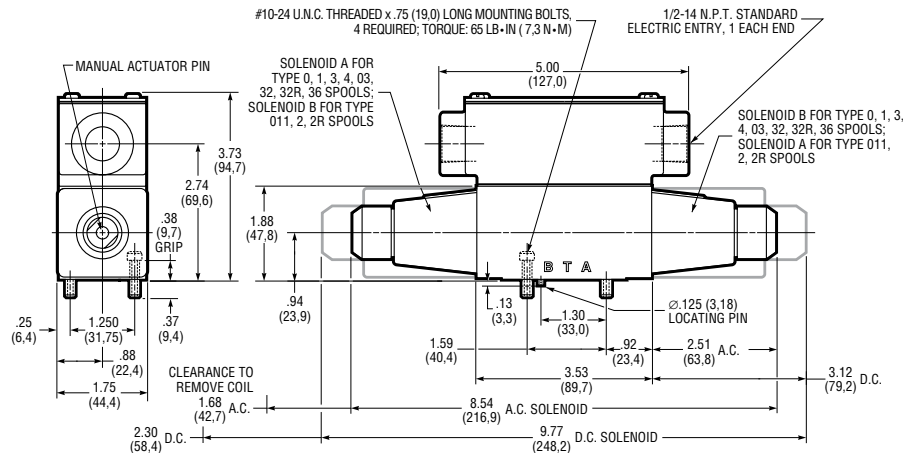
Dimensions are shown for both AC and DC solenoids. DC configuration is shown printed in gray.

The overall length of a single solenoid model (not shown) is 6.78 inches (172,2 mm) AC and 7.39 inches (187,7 mm) DC.

Weight (Mass):

Single Solenoid,  
AC, 3.4 lb (1,5 kg);  
DC, 3.9 lb (1,8 kg).

Double Solenoid,  
AC, 4.0 lb (1,8 kg);  
DC, 5.3 lb (2,4 kg).



6500 Series, Double Solenoid Models

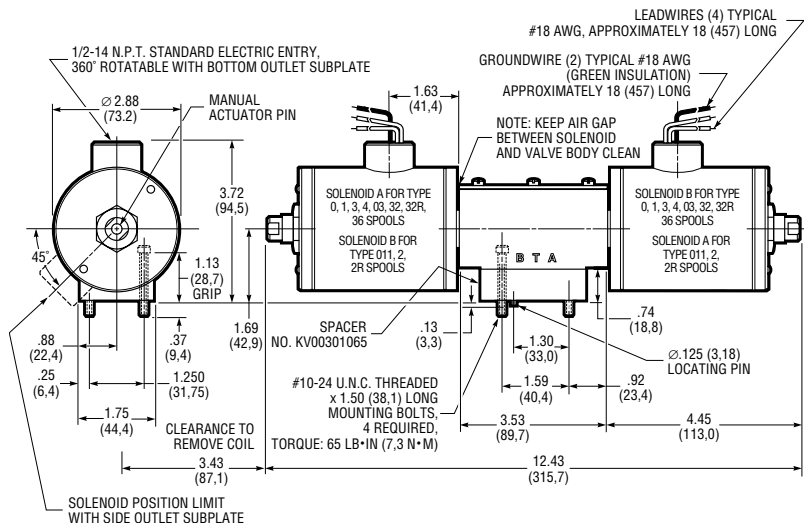
### Explosion Proof Solenoids

"EP" solenoids with special enclosures are approved by UL and CSA for use in hazardous locations. Overall length of single solenoid models (not shown) is 8.23 inches (209,9 mm).

A kit with a spacer plate (part number KV00301065) is required when valves are mounted on manifolds, side outlet subplates or when used as a pilot valve.

Weight (Mass):

Single Solenoid, 8.3 lb (3,8 kg);  
Double Solenoid, 14.0 lb (6,4 kg).



6500 Series, Double "EP" Solenoid Models

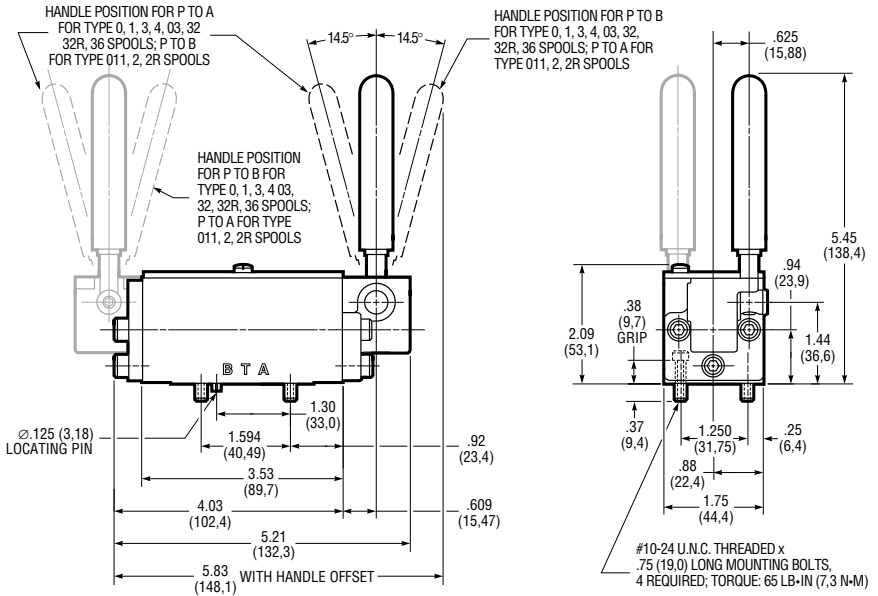
# D03 PATTERN

## Manual Operated Models

Manual models are lever actuated, with handle positioned in a choice of four positions on either port "A" or port "B" end of valve. To specify position, refer to "Typical Model Code" on page 6.

Valves can be mounted without removing nameplate; openings in the nameplate provide access to mounting holes in valve body.

Weight (Mass):  
3.2 lb (1,5 kg).

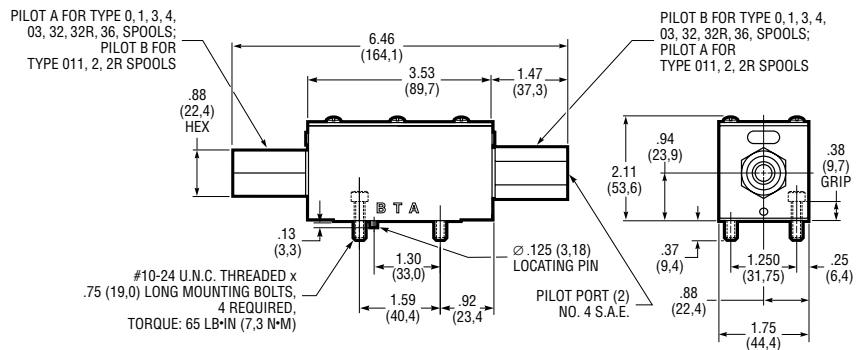


## Hydraulic Pilot Operated

Overall length of single actuator configuration (not shown) is 5.25 inches (133,4 mm).

Valves can be mounted without removing nameplate; openings in the nameplate provide access to mounting holes in valve body.

Weight (Mass):  
Single Actuator, 2.5 lb (1,1 kg);  
Double Actuator, 2.8 lb (1,3 kg).

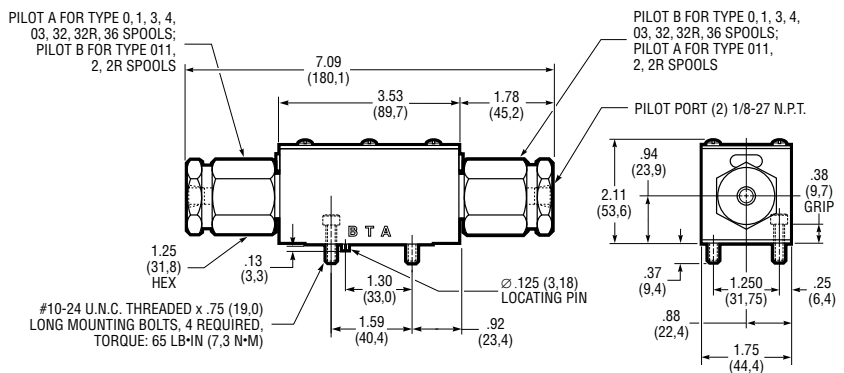


## Air Piloted Models

Overall length of single actuator configuration (not shown) is 5.56 inches (141,2 mm).

Valves can be mounted without removing nameplate; openings in nameplate provide access to mounting holes in valve body.

Weight (Mass):  
Single Actuator, 2.3 lb (1,0 kg);  
Double Actuator, 2.5 lb (1,1 kg).



## D03 SUBPLATE AND BOLT KITS

Part Number	Description
<b>Subplates:</b>	
P25-D03-.38	Universal, 3/8 inch N.P.T.F.
P27-D03-SAE8	Bottom Ports, No. 8 S.A.E.
PSO27-D03-SAE8	Side Ports, No. 8 S.A.E.
<b>Mounting Bolts:</b>	
P25-BK-12	Four 10-24 U.N.C. Threaded x 0.75 inches (19,0 mm)

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## TYPICAL MODEL CODE

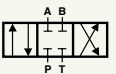
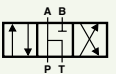
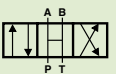
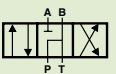
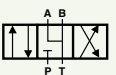
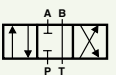
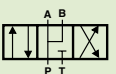
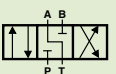
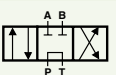
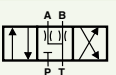
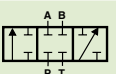
6 5 4 0 - D03 - 115DF - R - T - \* - 1 0

Valve Type	
6	Subplate Mounted Directional Control

Actuator	
1	Manual Lever
5	Solenoid Operated
8	Hydraulic Piloted
9	Air Piloted

Internal Operator	
1	Two Position: Spring Offset (P→B), Actuator Offset (P→A)
2	Two Position: Spring Offset (P→A), Actuator Offset (P→B)
3	Two Position: Actuator Offset, Detented; <sup>①</sup> Three Position: Detented (Manual Lever Only)
4	Two Position: Spring Centered, Actuator Offset <sup>②③</sup>
5	Three Position: Spring Centered, Actuator Offset
6	Two Position: Spring Offset, Actuator Centered <sup>②④</sup>
7	Two Position: Detented (Manual Lever Only)

① Only available with Type 0, 1 and 03 spools.  
 ② Not available with Manual Lever valves.  
 ③ For most spools, normal flow is actuator offset P→A. For Spool Type 011 (tandem center) normal flow is actuator offset P→B.  
 ④ For most spools, normal flow is spring offset P→B. For Spool Type 011 (tandem center) normal flow is spring offset P→A.

Spools			
0		2 <sup>①</sup>	
1		2R <sup>①</sup>	
3 <sup>①</sup>		32 <sup>①</sup>	
4 <sup>①</sup>		32R <sup>①</sup>	
011 <sup>①②</sup>		36 <sup>①</sup>	
		03	

① Not available with Type 3 Internal Operators (except Manual Lever models).  
 ② Open Crossover.

Valve Size	
D03	N.F.P.A. D03 (CETOP 3) Mounting Pattern

Design Number
1

Modification Number
0

Reverse Flow Option	
R	Reverse Flow (Code 4 and Code 6 Internal Operators Only)

Lever Position (Manual Models Only)	
A12	12 o'clock position, port "A" end
A3	3 o'clock position, port "A" end
A6	6 o'clock position, port "A" end
A9	9 o'clock position, port "A" end
B12	12 o'clock position, port "B" end
B3	3 o'clock position, port "B" end
B6	6 o'clock position, port "B" end
B9	9 o'clock position, port "B" end

Solenoid Options	
BH3A	3-pin Connector for single solenoid models on port "A" end <sup>①②③</sup>
BH3B	3-pin Connector for single solenoid models on port "B" end <sup>①②③</sup>
BH5A	5-pin Connector for single or double solenoid models on port "A" end <sup>①②③</sup>
BH5B	5-pin Connector for single or double solenoid models on port "B" end <sup>①②③</sup>
C	CSA and UL Recognized Coils (Etched with Symbol) <sup>④</sup>
CG	Cable Grip for .38 to .44 inch (9,5 to 11,1 mm) O.D. machine tool cable <sup>①②</sup>
HT	High Pressure Tank Port: 2300 psi (160 bar) maximum AC models; 3000 psi (210 bar) maximum DC models
M	Hand Actuated Manual Override <sup>①</sup>
SL	Solenoid Lights (available 115DF AC only) <sup>①②</sup>
T	Terminal Strip <sup>①②</sup>

① Option not available with "EP" solenoid models.  
 ② Option not available with "Plug-In Terminal" solenoid models.  
 ③ N.F.P.A. standard T3.539-1980; A.N.S.I. standard B93.55M-1981.  
 ④ Available with 115DF solenoids only.

Electrical Options			
Standard AC Solenoids (Dual Frequency):		Standard DC Solenoids:	
24DF	24V/60Hz, 24V/50Hz	12DC	12VDC
115DF	115V/60Hz, 110V/50Hz	24DC	24VDC
230DF	230V/60Hz, 220V/50Hz		
460DF	460V/60Hz, 440V/50Hz		
Plug-In Terminal AC Solenoids: <sup>①</sup>		Plug-In Terminal DC Solenoids: <sup>①</sup>	
115HA	115V/60Hz, 110V/50Hz	12HD	12VDC
230HA	230V/60Hz, 220V/50Hz	24HD	24VDC
Explosion-Proof AC Solenoids:		Explosion-Proof DC Solenoids:	
115EP	115V/60Hz	12EP	12VDC
110EP	110V/50Hz	24EP	24VDC
220EP	220V/50Hz		

① Fits DIN Connector Standard 43650 Form A ("Hirschmann" type).