A

General Description

Series D1FB (NG6) and D3FB (NG10) proportional directional valves with CANopen interface are based on the series for standard digital electronics of the same name.

CANopen-Profile

CANopen Application Layer and Communication Layer
CiA DS - 301 Version 4.01

CANopen Layer Setting Services (LSS) and Protocols
CiA DS – 305 Version 2.0

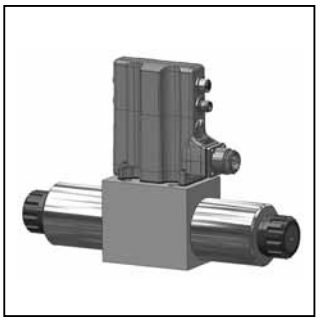
Device Profile in accordance with
CiA DSP – 408 Version 1.5.2

The baud rate and node ID can be set by dip switches or Layer Setting Service (LSS).

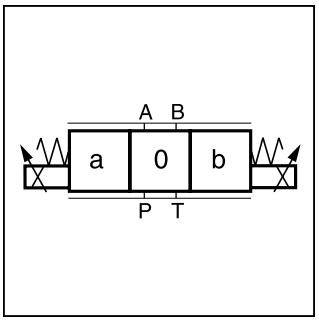
The valve parameters are factory set. Additionally the ProPxD software permits the editing of all parameters via the separate communication port. The software is also used for the valves with digital onboard electronics and the electronics modules. The cable for connection to a serial RS232 interface is available as accessory.

The digital onboard electronics is situated in a robust metal housing and can be used in rough environments.

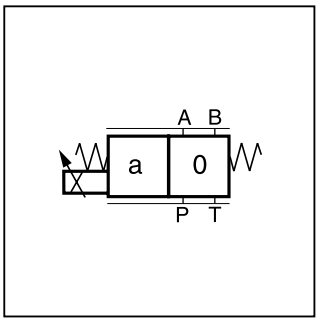
The series D1FB and D3FB are available with spool/sleeve design as well as with spool/body design.



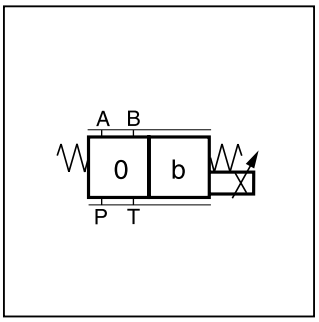
D3FB*C



D*FB*C



D*FB*E



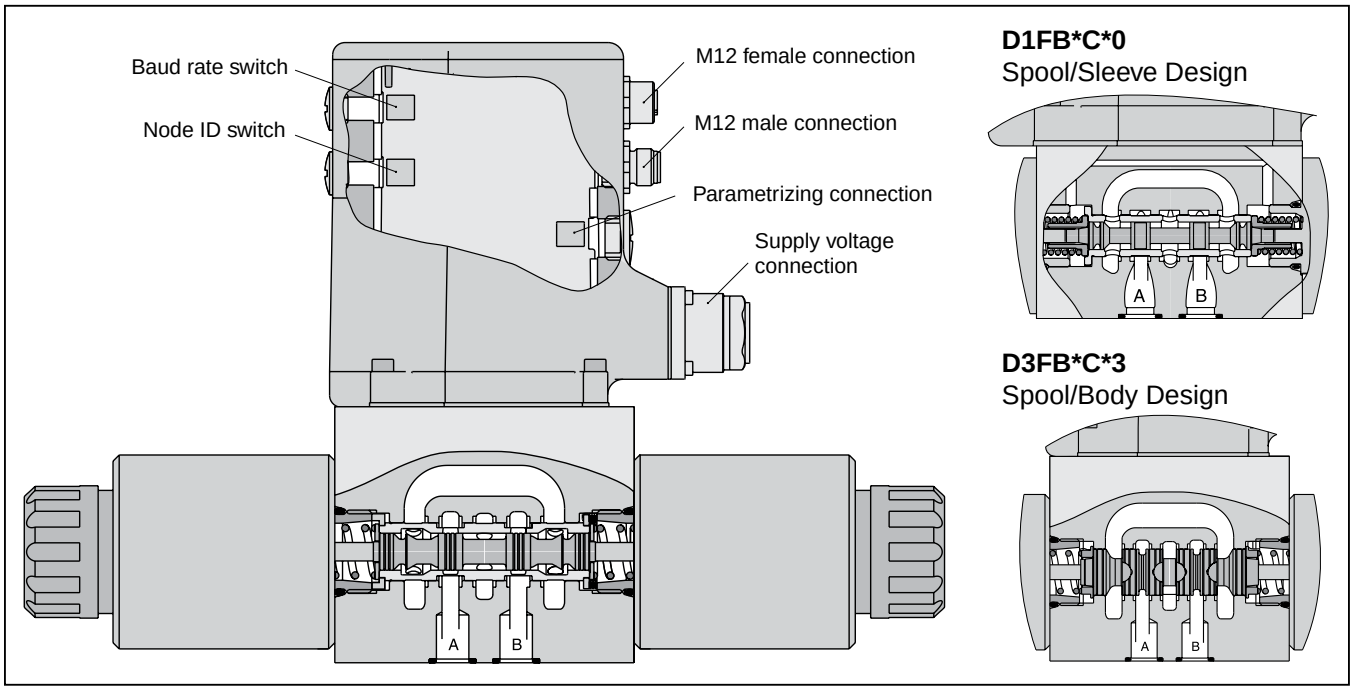
D*FB*K

Features

- CANopen interface.
- Spool/sleeve design and spool/body design.
- High repeatability from valve to valve.
- Low hysteresis.
- Manual override.
- Failsafe center position.

D3FB*C*0

Spool/Sleeve Design



D_FB with CANopen.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

A

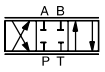
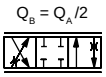
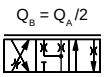
D	1	F	B			0		U	0		
Directional Control Valves	Size	Flow Control	Standard Dynamics Standard Repeatability	Spool	Style		Seal	Communication Interface CANopen DSP 408, 6 + PE, 1xM12 Male 1xM12 Female	Options	Design	Design Series NOTE: Not required when ordering.

Code	Description
1	DIN NG6 CETOP 3 NFPA D03

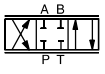
Code	Description
0	Spool/sleeve design
3	Spool/body design

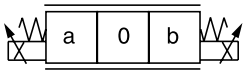
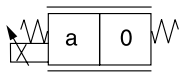
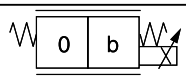
Code	Description
N	Nitrile
V	Fluorocarbon

D1FB*0: Spool/Sleeve Design

Code	Spool	Flow LPM (GPM) at Δp 5 Bar (72.5 PSI) per metering edge
E01H E01F E01C		20 (5.3) 12 (3.2) 6 (1.6)
E02H E02F E02C		20 (5.3) 12 (3.2) 6 (1.6)
E03H E03F E03C		20 (5.3) 12 (3.2) 6 (1.6)
B31H B31F	$Q_B = Q_A/2$ 	20/10 (5.3/2.6) 12/6 (3.2/1.6)
B32H B32F	$Q_B = Q_A/2$ 	20/10 (5.3/2.6) 12/6 (3.2/1.6)

D1FB*3: Spool/Body Design

Code	Spool	Flow LPM (GPM) at Δp 5 Bar (72.5 PSI) per metering edge
E01K E01H E01F		30 (7.9) 20 (5.3) 10 (2.6)
E02K E02H E02F		30 (7.9) 20 (5.3) 10 (2.6)

Code	Style
C	
E	
K	

Bolt Kit:

BK209	(4) 10-24x1.25 SHCS
BK375	4x M5x30

Weight:

D1FB	2.5 kg (5.5 lbs.)

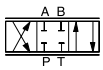
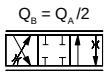
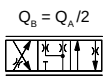
Parametrizing cable OBE => RS232
Item no. 40982923

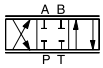
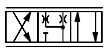
D	3	F	B			0		U	0		
Directional Control Valves	Size	Flow Control	Standard Dynamics Standard Repeatability	Spool	Style		Seal	Communication Interface CANopen DSP 408, 6 + PE, 1xM12 Male 1xM12 Female	Options	Design	Design Series NOTE: Not required when ordering.

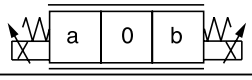
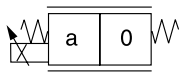
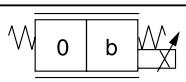
Code	Description
3	DIN NG10 CETOP 5 NFPA D05

Code	Description
N	Nitrile
V	Fluorocarbon

Code	Description
0	Spool/sleeve design
3	Spool/body design

D3FB*0: Spool/Sleeve Design		
Code	**Spool**	**Flow LPM (GPM) at Δp 5 Bar (72.5 PSI) per metering edge**
E01M E01S		40 (10.6) 60 (15.9)
E02M E02S		40 (10.6) 60 (15.9)
B31M B31S		40 / 20 (10.6 / 5.3) 60 / 30 (15.9 / 7.9)
B32M B32S		40 / 20 (10.6 / 5.3) 60 / 30 (15.9 / 7.9)

D3FB*3: Spool/Body Design		
Code	**Spool**	**Flow LPM (GPM) at Δp 5 Bar (72.5 PSI) per metering edge**
E01M E01S E01U		40 (10.6) 60 (15.9) 80 (21.2)
E02M E02S E02U		40 (10.6) 60 (15.9) 80 (21.2)

Code	Style
C	
E	
K	

Bolt Kit:

BK98	(4) 1/4-20x1.625 SHCS
BK385	4x M6x40

Weight:

D3FB	7.0 kg (15.4 lbs.)

Parametrizing cable OBE => RS232
Item no. 40982923

A

General			
Design	Direct operated proportional DC valve		
Actuation	Proportional solenoid		
Size	**NG6 / CETOP 3 / NFPA D03**		**NG10 / CETOP 5 / NFPA D05**
Mounting Interface	DIN 24340 / ISO 4401 / CETOP RP121 / NFPA		
Mounting Position	Unrestricted		
Ambient Temperature [°C]	-20...+60 (-4°F...+140°F)		
MTTF$_D$ Value (OBE) [years]	75		
Vibration Resistance [g]	10 Sinus 5...2000 Hz acc. IEC 68-2-6 30 Random noise 20...2000 Hz acc. IEC 68-2-36 15 Shock acc. IEC 68-2-27		
Hydraulic			
Maximum Operating Pressure	Ports P, A, B 350 Bar (5075 PSI); Port T 210 Bar (3045 PSI)		
Maximum Pressure Drop PABT / PBAT	350 Bar (5075 PSI)		
Fluid	Hydraulic oil as per DIN 51524...535, other on request		
Fluid Temperature [°C]	-20...+60 (-4°F...+140°F)		
Viscosity **Permitted [cSt] / [mm²/s]** **Recommended [cSt] / [mm²/s]**	 20...380 (93...1761 SSU) 30...80 (139...371 SSU)		
Filtration	ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)		
Nominal Flow at Δp=5 Bar (72.5 PSI) per Control Edge *	**D1FB*0**	**D1FB*3**	**D3FB*0/3**
	6 LPM (1.6 GPM) / 12 LPM (3.2 GPM) / 20 LPM (5.3 GPM)	10 LPM (2.6 GPM) / 20 LPM (5.3 GPM) / 30 LPM (7.9 GPM)	40 LPM (10.6 GPM) / 60 LPM (15.9 GPM) / 80 LPM (21.2 GPM)
Leakage at 100 Bar (1450 PSI) [ml/min]	<50 (3.0 cu. in.)	<60 (3.7 cu. in.)	<100 (6.1 cu. in.)
Overlap [%]	25, electrically normalized at 10 (see flow characteristics)		
Static / Dynamic			
Step Response at 100% Step [ms]	30	30	40
Hysteresis [%]	<4	<6	<5
Temperature Drift Solenoid Current [%/K]	<0.02		
Electrical			
Duty Ratio [%]	100		
Protection Class	IP65 in accordance with EN60529 (with correctly mounted plug-in connector)		
Supply Voltage/Ripple DC [V]	18...30, ripple < 5% eff., surge free		
Current Consumption Maximum [A]	2.0		3.0
Pre-fusing Medium Lag [A]	2.5		4.0
EMC	EN 61000-6-2, EN 61000-6-4		
Connection Supply Voltage	6 + PE acc. to EN 175201-804		
Connection CANopen	1 x Male M12x1: 5p 1 x Female M12x1: 5p acc. to IEC61076-2-101		
Wiring Supply Voltage Minimum [mm²]	3 x 1.0 (AWG16) overall braid shield		
Wiring Length Maximum [m]	50 (164 ft.)		
Wiring CANopen	acc. to CiA DS-301 Version 4 / Twisted pair cable acc. to ISO11898		

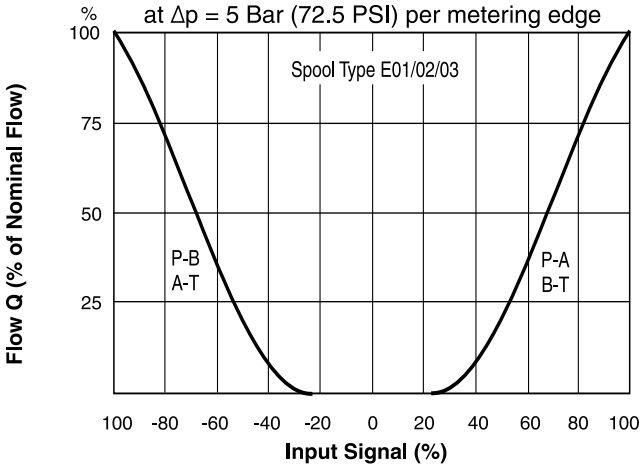
* Flow rate for different Δp per control edge: $Q_x = Q_{Nom.} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom.}}}$

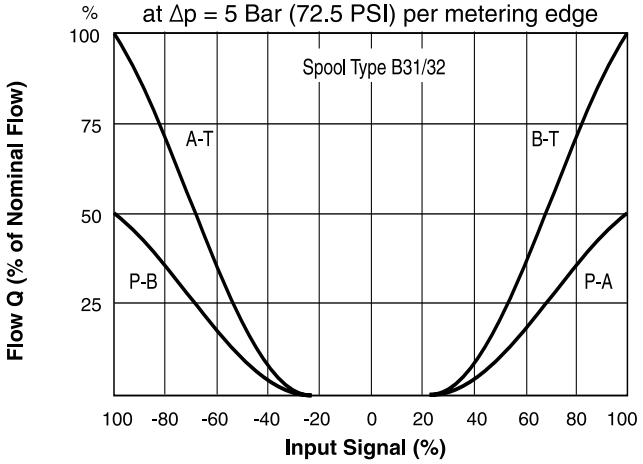
Continued on the next page

CANopen		
Profiles		Communication Layer CIA DS - 301 Version 4 Device Profile in accordance with CIA DS - 408 Version 1.5.2 Layer Setting Service CIA DS - 305 Version 2
Functionality		CANopen slave One PDO (Receive) One PDO (Transmit) One SDO (not useable for valve parameterizing) Emergency object Sync object Node guarding Life guarding Heartbeat time (producer/consumer) Minimum boot - up Node - ID - adjustment by DIP switch and LSS Baud Rate - adjustment by DIP switch and LSS
Parameterization		
Interface		RS 232, parametrizing cable order code 40982923
Interface Program		ProPxD (see www.parker.com/euro_hcd)
Adjustment Ranges		
	Minimum **[%]**	0...50
	Maximum **[%]**	50...100
	Ramp **[s]**	0...32.5

A

D1FB*0 Flow

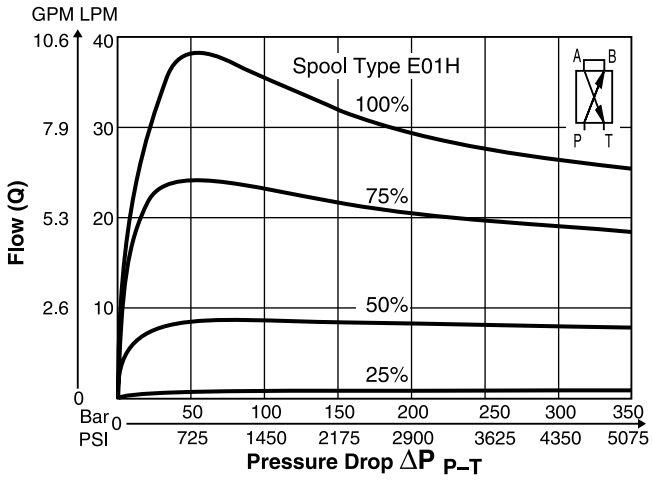




All performance curves measured with HLP46 at 50°C (122°F).

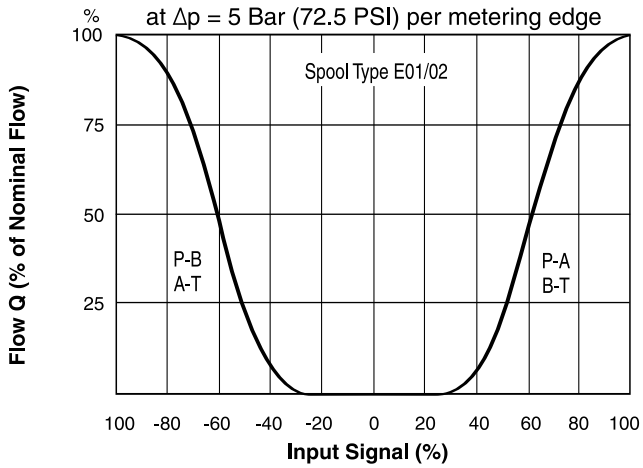
Flow Limit

At 25%, 50%, 75% and 100% command signal (symmetric flow). At asymmetric flow a reduced flow limit has to be considered – typically approx. 10% lower.



All performance curves measured with HLP46 at 50°C (122°F).

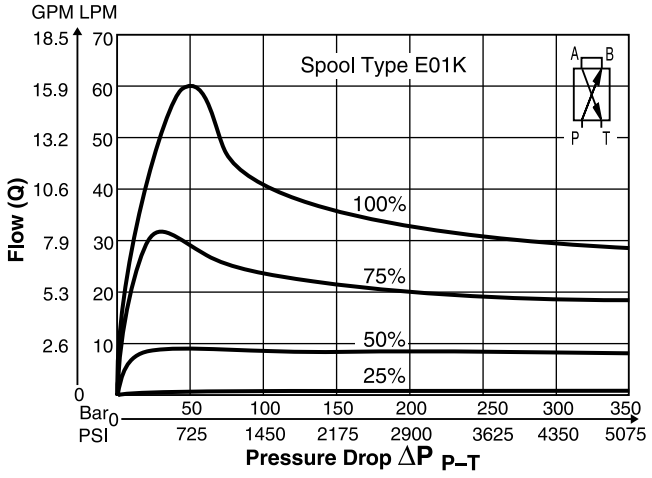
D1FB*3 Flow



All performance curves measured with HLP46 at 50°C (122°F).

Flow Limit

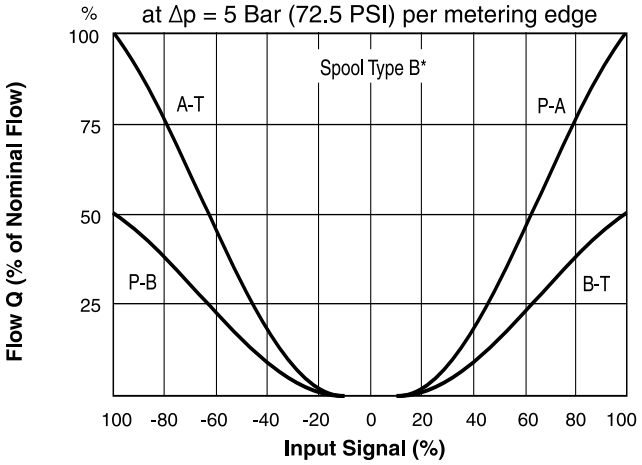
At 25%, 50%, 75% and 100% command signal (symmetric flow). At asymmetric flow a reduced flow limit has to be considered – typically approx. 10% lower.

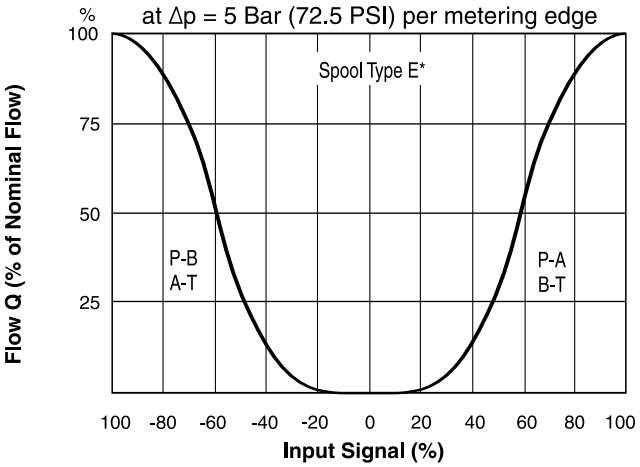


All performance curves measured with HLP46 at 50°C (122°F).

A

D3FB Flow



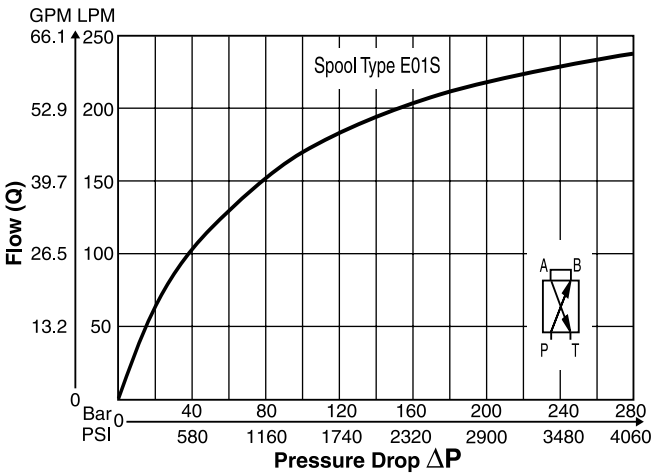


All performance curves measured with HLP46 at 50°C (122°F).

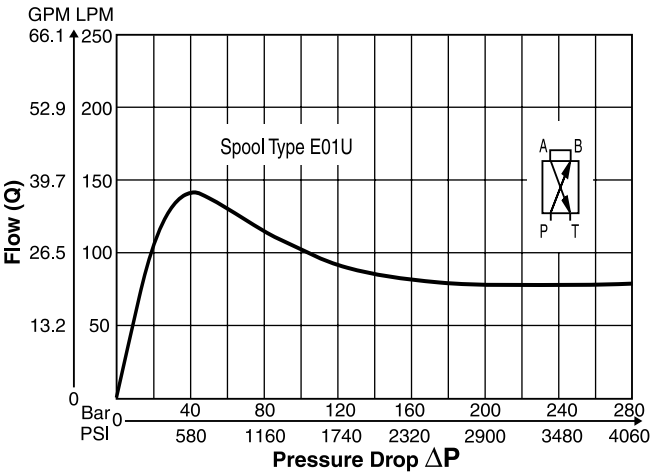
Flow Limit

100% command signal (symmetric flow). At asymmetric flow a reduced flow limit has to be considered – typically approx. 10% lower.

D3FB*0

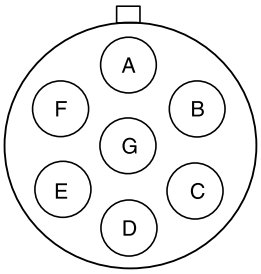


D3FB*3



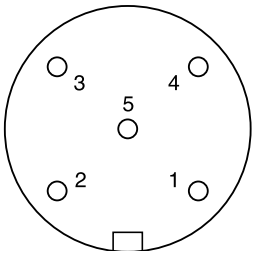
All performance curves measured with HLP46 at 50°C (122°F).

Supply Voltage Connection 6 + PE



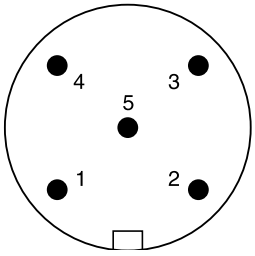
A Supply voltage 18...30V
B Supply voltage 0V
C hC
D hC
E hC
F hC
G PE

CANopen Connection



CAN in: M12, 5 pole male terminals.
Pin 1: CAN_SHLD
Pin 2: nc
Pin 3: CAN_GND
Pin 4: CAN_H
Pin 5: CAN_L

Shield is CAN_GND.

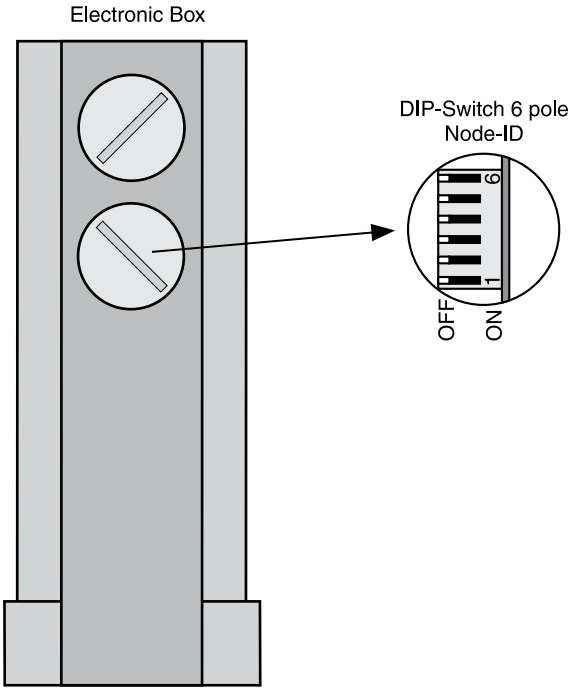


CAN out: M12, 5 pole female terminals.
Pin 1: CAN_SHLD
Pin 2: nc
Pin 3: CAN_GND
Pin 4: CAN_H
Pin 5: CAN_L

Shield is CAN_GND.

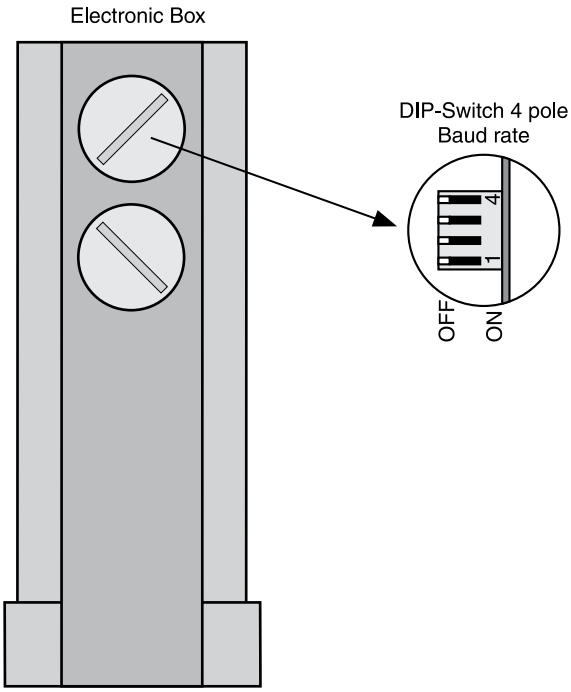
A

Node–ID Adjustment with DIP Switches



Node-ID	DIP Switch Setting					
	1	2	3	4	5	6
0 LSS -Priority	**OFF**	**OFF**	**OFF**	**OFF**	**OFF**	**OFF**
1	**ON**	OFF	OFF	OFF	OFF	OFF
2	OFF	**ON**	OFF	OFF	OFF	OFF
3	**ON**	**ON**	OFF	OFF	OFF	OFF
…						
61	**ON**	OFF	**ON**	**ON**	**ON**	**ON**
62	OFF	**ON**	**ON**	**ON**	**ON**	**ON**
63	**ON**	**ON**	**ON**	**ON**	**ON**	**ON**
	1	2	3	4	5	6
	Value					

Baud Rate Adjustment with DIP Switches



Baud Rate	DIP Switch Setting			
	1	2	3	4
0 LSS -Priority	**OFF**	**OFF**	**OFF**	Valve Parameterization and Diagnostics ON/OFF
10 kBit/s	**ON**	OFF	OFF	
20 kBit/s	OFF	**ON**	OFF	
50 kBit/s	**ON**	**ON**	OFF	
125 kBit/s	OFF	OFF	**ON**	
250 kBit/s	**ON**	OFF	**ON**	
500 kBit/s	OFF	**ON**	**ON**	
1 MBit/s	**ON**	**ON**	**ON**	

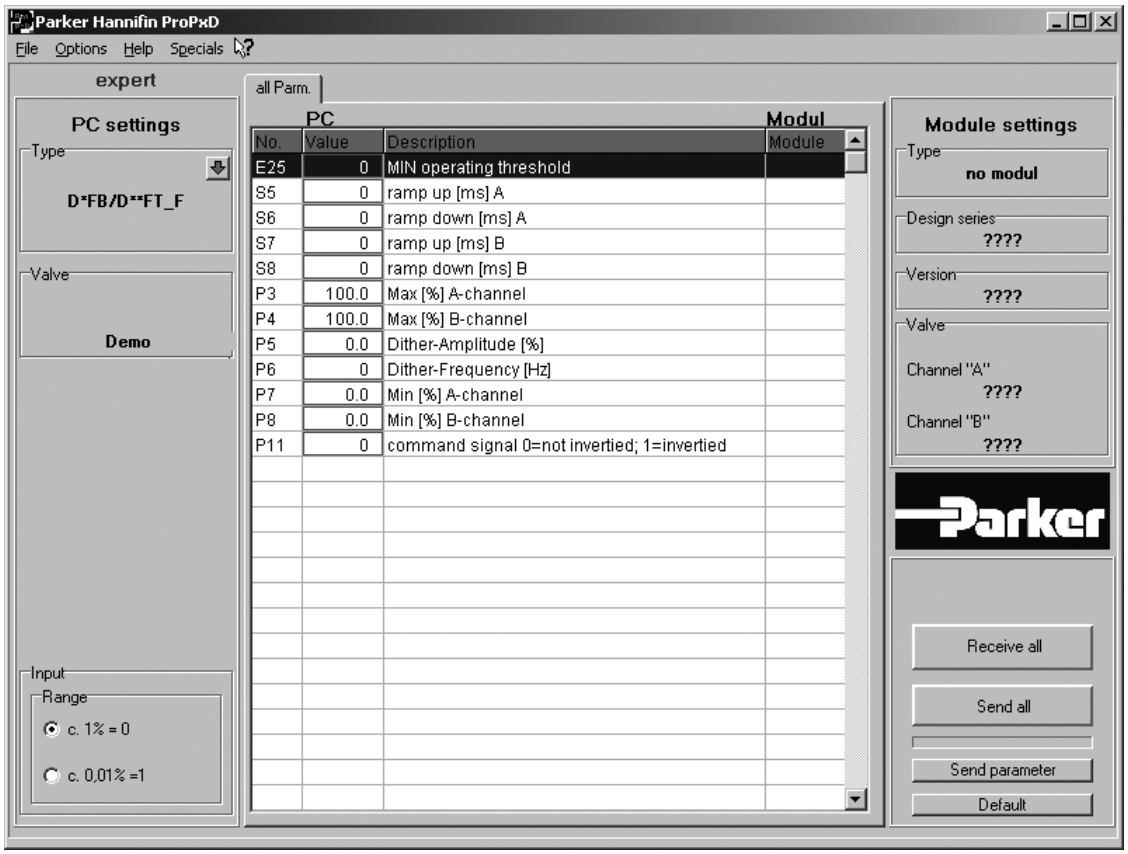
A

ProPxD Interface Program

The ProPxD software permits comfortable parameter setting for the module electronics. Via the clearly arranged entry mask the parameters can be noticed and modified. Storage of complete parameter sets is possible as well as printout or record as a text file for further documentation. Stored parameter sets may be loaded anytime and transmitted to other valves. Inside the electronics a nonvolatile memory stores the data with the option for recalling or modification.

Features

- Simple editing of all parameters.
- Storage and loading of optimized parameter adjustments.
- Executable with all Windows® operating systems from Windows® 95 upwards.
- Communication between PC and electronics via serial interface RS-232.
- Simple to use PC user software, free of charge: www.parker.com/euro_hcd – see "Software Downloads"

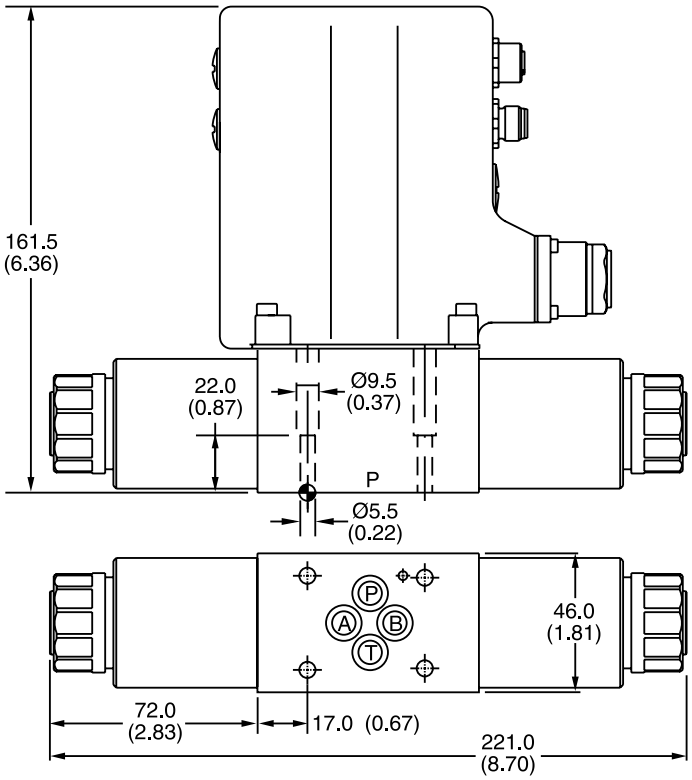


The parametrizing cable may be ordered under item no. 40982923.

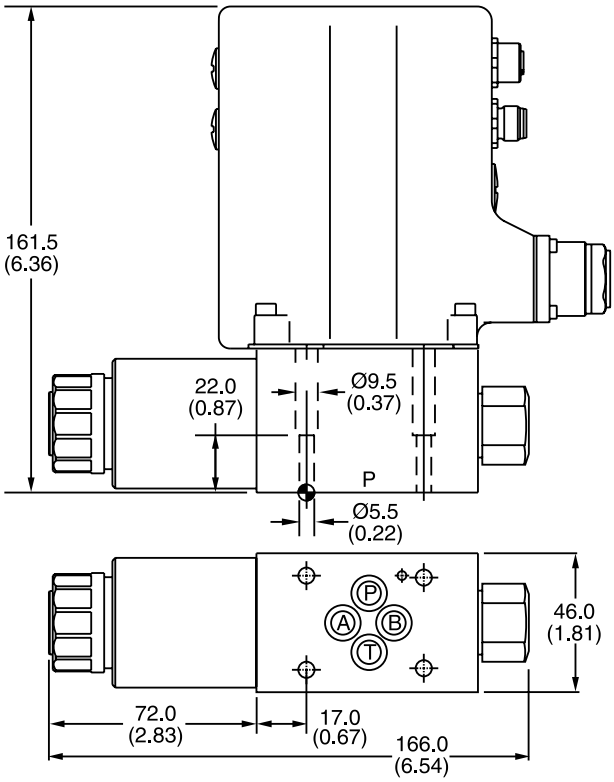
A

Inch equivalents for millimeter dimensions are shown in (**)

D1FB*C



D1FB*E

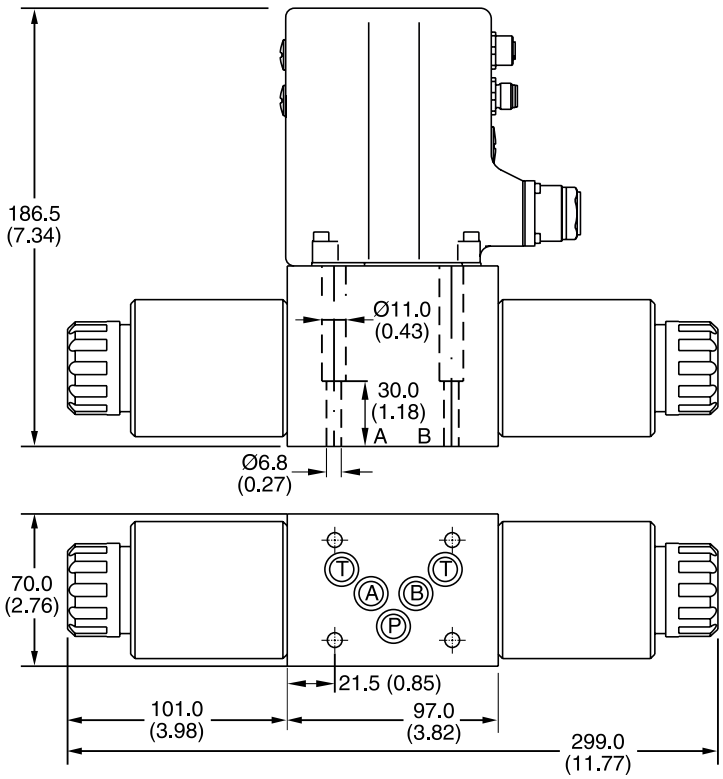


Surface Finish	Kit			Seal Kit
R_{max}6.3 0.01/100	BK375 BK209	4x M5x30 DIN 912 12.9 4x 10-24x1.25	7.6 Nm (5.6 lb.-ft.) ±15 %	Nitrile: SK-D1FB Fluorocarbon: SK-D1FBV

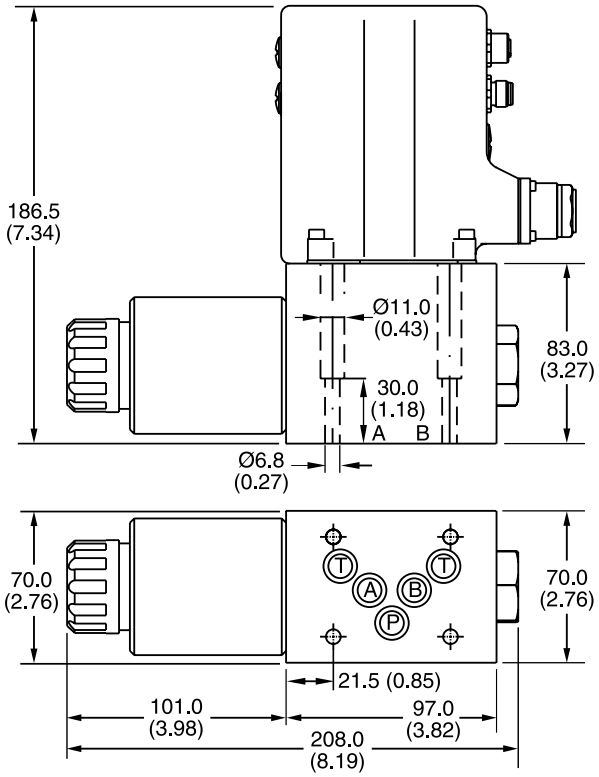
A

Inch equivalents for millimeter dimensions are shown in (**)

D3FB*C OBE



D3FB*E OBE



Surface Finish	Kit			Seal Kit
$R_{max}6.3$ 0.01/100	BK385 BK98	4x M6x40 DIN 912 12.9 4x 1/4-20x1.62	13.2 Nm (9.7 lb.-ft.) ±15 %	Nitrile: SK-D3FB Fluorocarbon: SK-D3FBV