The direct operated control valve D1FP of the nominal size NG06 (CETOP 03) shows extremly high dynamics combined with maximum flow. It is the preferred choice for highest accuracy in positioning of hydraulic axis and controlling of pressure and velocity.

Driven by the patented VCD<sup>®</sup> actuator the D1FP reaches the frequency response of real servovalves. Compared with solenoid driven valves the D1FP can also be used in applications with pressure drops up to 350 bar across the valve. Because of the high flow capability the D1FP can be a substitute for NG10 valves in some cases.

At power-down the spool moves in a defined position. All common input signals are available.

### Features

- Real servovalve dynamics (-3 dB / 350 Hz at ±5 % input signal)
- No flow limit up to 350 bar pressure drop through the valve
- Max. tank pressure 350 bar (with external drain port y)
- High flow
- Defined spool positioning at power-down optional P-A/B-T or P-B/A-T or center position (for overlapped spools)
- Onboard electronics

# CE



**Direct Operated Proportional DC Valve** 











3



# Note:

#### Adapter plate for ISO 4401 to ISO 10372 size 04, Ordering code HAP04WV06-1661

Please order connector separately, see chapter 3 accessories.

Parametrizing cable OBE -> RS232, item no. 40982923

- <sup>1)</sup> On power down the spool moves in a defined position. This cannot be guaranteed in case of single flow path on the control edge A T resp. B T with pressure drops above 120 bar or contamination in the hydraulic fluid.
- <sup>2)</sup> Approx. 10 % opening, only zero lapped spools and underlap spools.
- <sup>3)</sup> Only for overlapped spools.
- <sup>4)</sup> Not for flow code M (40 l/min).
- $^{\scriptscriptstyle 5)}$  Plug in the Y-port needs to be removed at tank pressure >35 bar.



General

ю.	J
<u> </u>	1

Design			Direct operated servo proportional DC valve				
Actuation			VCD <sup>®</sup> actuator				
Size			NG06 / CETOP 03 / NFPA D03				
Mounting interf	face		DIN 24340 / ISO 4401 / CETOP RP121 / NFPA				
Mounting posit	ion		unrestricted				
Ambient tempe	erature	[°C]	-20+50				
MTTF <sub>D</sub> value 1)		[years]	150				
Weight		[kg]	5.0				
			10 Sinus 52000 Hz acc. IEC 68-2-6				
Vibration resist	tance	[g]	30 Random noise 202000 Hz acc. IEC 68-2-36				
			15 Shock acc. IEC 68-2-27				
Hydraulic							
Max. operating	pressure	[bar]	Ports P, A, B 350, port T 35 for internal drain, 350 for external drain, port Y 35 <sup>2</sup> )				
Fluid			Hydraulic oil according to DIN 51524 535, other on request				
Fluid temperate	ure	[°C]	-20+60 (NBR: -25+60)				
Viscosity peri	mitted	[cSt]/mm <sup>2</sup> /s]	20400				
reco	ommended	[cSt]/mm <sup>2</sup> /s]	3080				
Filtration			ISO 4406 (1999); 18/16/13				
Nominal flow							
at ∆p=35 bar p	er control edge 3)	[l/min]	3 / 6 / 12 / 16 / 25 / 40				
Flow maximum	1	[l/min]	90 (at ∆p=350 bar over two control edges)				
Leakage at 100	0 bar	[ml/min]	<400 (zerolap spool); <50 (overlap spool)				
Opening point		[%]	set to 23 commande signal (see flow characteristics)				
Static / Dynan	nic						
Step response	at 100 % step 4)	[ms]	<3.5				
Frequency resp	ponse						
(±5 % signal) <sup>4</sup>	)	[Hz]	350 (amplitude ratio -3 dB), 350 (phase lag -90°)				
Hysteresis		[%]	<0.05				
Sensitivity		[%]	<0.03				
Temperature d	rift	[%/K]	<0.025				
Electrical cha	racteristics						
Duty ratio		[%]	100				
Protection clas	S		IP65 in accordance with EN 60529 (with correctly mounted plug-in connector)				
Supply voltage	/ripple	[V]	DC 22 30, electric shut-off at < 19, ripple < 5 % eff., surge free				
Current consur	mption max.	[A]	3.5				
Pre-fusing		[A]	4.0 medium lag				
Input signal							
Code B	Voltage	[V]	10010, ripple <0.01 % eff., surge free, 0+10 V P->A				
	Impedance	[kOhm]	100				
Code E	Current	[mA]	20020, ripple <0.01 % eff., surge free, 0+20 mA P->A				
	Impedance	[Ohm]	250				
Code S	Current	[mA]	41220, ripple <0.01 % eff., surge free, 1220 mA P->A				
		101 1	<3.6 mA = disable, >3.8 mA = according to NAMUR NE43				
D'fferer fi bi	Impedance	[Ohm]	250				
Differential inpi	ut max.		20 (as terminal D and E assist DE (terminal O)				
			30 for terminal D and E against PE (terminal G)				
	Code 5		30 for terminal 4 and 5 against PE (terminal $\neq$ )				
Enchla sime 1			su ioi terminai D and E against PE (terminai G)				
Enable signal (	only code 5/7)		550, KI = 9 KUNIII				
Diagnostic sign	nai	[V]	+10010 / +12.5 error detection, rated max. 5 mA				
ENIC			EN 01000-0-2, EN 01000-0-4				
Electrical conn	ection	Code 0/7	b + PE acc. EN 1/5201-804				
	$\Omega_{\rm rade} 0/7$	Code 5	11 + PE acc. EN 1/5201-804				
wiring min.		[mm <sup>2</sup> ]	7X1.0 (AWG TO) OVERAIL DRAID SNIELD				
Mining Law att	Code 5	[mm²]	ox 1.0 (AvvG To) Overall Draid Shleid				
vviring length n	nax.	[m]	50				

<sup>1)</sup> If valves with onboard electronics are used in safety-related parts of control systems, in case the safety function is requested, the valve electronics voltage supply is to be switched off by a suitable switching element with sufficient reliability.

<sup>2)</sup> For applications with  $p_{\tau}$ >35 bar (max. 350 bar) the Y-port has to be connected and the plug in the Y-port has to be removed.

<sup>3)</sup> Flow rate for different  $\Delta p$  per control edge:  $Q_x = Q_{Nom.} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom.}}}$ 

<sup>4)</sup> Measured with load (100 bar pressure drop/two control edges).

## Flow curves

(Overlapped spool set to opening point 23 %) at  $\Delta p$  = 35 bar per metering edge Spool type **E01/E50** 



# Pressure gain



# Frequency response

±5 % command signal ±90 % command signal



All characteristic curves measured with HLP46 at 50 °C.

D1FP UK.indd RH 17.04.2015



## Spool type B31/B60



### **Functional limits**

at 25 %, 50 %, 75 % and 100 % command signal Spool type **E01M/E50M** 



#### Code 0



### Code 5



## Code 7





#### ProPxD interface program

The ProPxD software allows quick and easy setting of the digital valve electronics. Individual parameters as well as complete settings can be viewed, changed and saved via the comfortable user interface. Parameter sets saved in the non-volatile memory can be loaded to other valves of the same type or printed out for documentation purposes.

The PC software can be downloaded free of charge at www.parker.com/euro\_hcd – see page "Support" or directly at www.parker.com/propxd.

#### Features

- Comfortable editing of valve parameters
- · Saving and loading of customized parameter sets
- Executable with all Windows<sup>®</sup> operating systems from Windows<sup>®</sup> XP upwards
- Simple communication between PC and valve electronics via serial interface RS232C

The valve electronics cannot be connected to a PC with a standard USB cable – this can result in damages of PC and/or valve electronics.

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

le Options Diagnostics	Specials	Help C	?		
basic	D'FP/E	Param.			
PC settings	( constant	PC		Modul	Module settings
Tupe	No	Value	Description	Module ^	Tupe
*	617		Command Input (see installation man)		nomodul
	E19	0	cable break detection cmd in 1= active(4_20mA)		100 110000
DHP/DHE	E25	100	MIN operating threshold [0,01%]		Design series
	P1	0.0	Zero Adjust [%]		7777
Valve	P3	100.0	Max (%) A-channel		Venion
	P4	100.0	Max [%] B-channel		7777
	P7	0.0	Min (%) A-channel		Valve
default	P8	0.0	Min (%) B-channel		
					Channel "A"
					7777
					Channel "8"
					m
					1
				200	And the second second
					Receive al
Input					Sendial
Banger					
(# ±10V = 1					
C +20mA -2					
C 130ml -2					r
s +cume es					
C ±10nA =5					- Dita





Surface finish	E Kit	en F	5-7	🔿 Kit
R <sub>max</sub> 6.3	BK375	4x M5x30 ISO 4762-12.9	7.6 Nm ±15 %	NBR: SK-D1FP FPM: SK-D1FP-V HFC: SK-D1FP-H



# Catalogue HY11-3500/UK Characteristics

The direct operated control valve D3FP of the nominal size NG10 (CETOP 05) shows extremly high dynamics combined with high flow. It is the preferred choice for highest accuracy in positioning of hydraulic axis and controlling of pressure and velocity.

Driven by the patented VCD<sup>®</sup> actuator the D3FP reaches the frequency response of real servovalves.

At power-down the spool moves in a defined position. All common input signals are available.

## Features

CE

- Real servovalve dynamics (-3 dB / 350 Hz at ±5 % input signal)
- Max. tank pressure 250 bar (with external drain port Y)
- Defined spool positioning at power-down optional P-A/B-T or P-B/A-T or center position (for overlapped spools)
- Onboard electronics
- Spool / sleeve design

# Direct Operated Proportional DC Valve Series D3FP















For regenerative and hybrid function at D31FB (NG10) please refer solutions with sandwich- and adaptor plates "A10-1664 / A10-1665L / H10-1662 / H10-1666L" in chapter 12.

Please order connector separately, see chapter 3 accessories.

Parametrizing cable OBE -> RS232, item no. 40982923

<sup>2)</sup> Approx. 10 % opening, only zerolapped spools and underlapped spools.

<sup>3)</sup> Only for overlapped spools.

<sup>4)</sup> Plug in the Y-port needs to be removed at tank pressure >35 bar.



<sup>&</sup>lt;sup>1)</sup> On power down the spool moves in a defined position. This cannot be guaranteed in case of single flow path on the control edge A – T resp. B – T with pressure drops above 120 bar or contamination in the hydraulic fluid.

General			
Design			Direct operated servo proportional DC valve
Actuation			VCD <sup>®</sup> actuator
Size			NG10 / CETOP 05 / NFPA D05
Mounting interfa	ace		DIN 24340 / ISO 4401 / CETOP RP121 / NFPA
Mounting positi	on		unrestricted
Ambient tempe	rature	[°C]	-20+50
MTTF <sub>p</sub> value <sup>1)</sup>		[vears]	150
Weight		[/ [ka]	6.5
, see a s		191	10 Sinus 52000 Hz acc. IEC 68-2-6
Vibration resist	ance	[a]	30 Random noise 202000 Hz acc. IEC 68-2-36
		[9]	15 Shock acc. IEC 68-2-27
Hydraulic			
Max. operating	pressure	[bar]	Ports P, A, B 350, port T 35 for internal drain, 250 for external drain, port Y 35 <sup>2)</sup>
Fluid			Hydraulic oil according to DIN 51524 535, other on request
Fluid temperatu	ire	[°C]	-20+60 (NBR: -25+60)
Viscosity	permitted	[cSt]/[mm <sup>2</sup> /s]	20400
	recommended	[cSt]/[mm <sup>2</sup> /s]	3080
Filtration			ISO 4406 (1999): 18/16/13
Flow nominal			
at ∆p=35 bar pe	er control edge 3)	[l/min]	50 / 100
Flow maximum	0	[l/min]	150
Leakage at 100	) bar	[ml/min]	<400 (zerolap spool); <100 (overlap spool)
Opening point		[%]	set to 19 command signal (see flow characteristics)
Static / Dynam	lic		
Step response	at 100 % step <sup>4)</sup>	[ms]	<6
Frequency resp	$(+5\% signal)^{4}$	[Hz]	200 (amplitude ratio -3 dB), 200 (phase lag -90°)
Hysteresis [%]		[%]	<0.05
Sensitivity [%]		[%]	<0.03
Temperature dr	ift	[%/K]	<0.025
Electrical char	acteristics	[/0/14]	
Duty ratio		[%]	100
Protection class	3	[, -]	IP65 in accordance with EN 60529 (with correctly mounted plug-in connector)
Supply voltage	ripple	[V]	22 30. electric shut-off at < 19. ripple <5 % eff., surge free
Current consun	notion max.	[A]	3.5
Pre-fusing		[A]	4.0 medium lag
Input signal			
Code B	Voltage	[V]	10010. ripple <0.01 % eff., surge free, 0+10 V P->A
	Impedance	[kOhm]	100
Code E	Current	[mA]	20020, ripple <0.01 % eff., surge free, 0+20 mA P->A
	Impedance	[Ohm]	250
Code S	Current	[mA]	41220, ripple <0.01 % eff., surge free, 1220 mA P->A
			<3.6 mA = disable, >3.8 mA = according to NAMUR NE43
	Impedance	[Ohm]	250
Differential inpu	it max.		
	Code 0	[V]	30 for terminal D and E against PE (terminal G)
	Code 5	[V]	30 for terminal 4 and 5 against PE (terminal ≟)
	Code 7	[V]	30 for terminal D and E against PE (terminal G)
Enable signal	(only code 5/7)	[V]	530, Ri = 9 kOhm
Diagnostic sign	al	[V]	+10010 / +12.5 error detection, rated max. 5 mA
EMC			EN 61000-6-2, EN 61000-6-4
	ation	Code 0/7	6 + PE acc. EN 175201-804
Electrical conne	ection	Code 5	11 + PE acc. EN 175201-804
Wiring min.	Code 0/7	[mm²]	7 x 1.0 (AWG 16) overall braid shield
	Code 5	[mm <sup>2</sup> ]	8 x 1.0 (AWG 16) overall braid shield
Wiring length m	nax.	[m]	50

<sup>1)</sup> If valves with onboard electronics are used in safety-related parts of control systems, in case the safety function is requested, the valve electronics voltage supply is to be switched off by a suitable switching element with sufficient reliability.

<sup>2)</sup> For applications with  $p_T$ >35 bar (max. 250 bar) the Y-port has to be connected and the plug in the Y-port has to be removed.

<sup>3)</sup> Flow rate for different  $\Delta p$  per control edge:  $Q_x = Q_{Nom.} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom.}}}$ 

<sup>4)</sup> Measured with load (100 bar pressure drop/two control edges).



## Functional limits 1)

at 25 %, 50 %, 75 % and 100 % command signal

## Spool type E01/E02



## Flow curves

(Overlapped spool set to opening point 19 %) at  $\Delta p = 35$  bar per metering edge Spool type **E50/E55, E01/E02** 



# Pressure gain



## Functional limits 1)

at 25 %, 50 %, 75 % and 100 % command signal









# Frequency response

±5 % command signal

±90 % command signal



<sup>1)</sup> When exceeding the functional limits, for a period of time the valve will go into fail safe and power supply needs to be switched off/on to reenable the valve.



#### Code 0



## Code 5



## Code 7



#### ProPxD interface program

The ProPxD software allows quick and easy setting of the digital valve electronics. Individual parameters as well as complete settings can be viewed, changed and saved via the comfortable user interface. Parameter sets saved in the non-volatile memory can be loaded to other valves of the same type or printed out for documentation purposes.

The PC software can be downloaded free of charge at www.parker.com/euro\_hcd – see page "Support" or directly at www.parker.com/propxd.

#### Features

- Comfortable editing of valve parameters
- · Saving and loading of customized parameter sets
- Executable with all Windows<sup>®</sup> operating systems from Windows<sup>®</sup> XP upwards
- Simple communication between PC and valve electronics via serial interface RS232C

The valve electronics cannot be connected to a PC with a standard USB cable – this can result in damages of PC and/or valve electronics.

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

Parker Hannifin ProPxD					
ile Options Diagnostics	Special	s Help G	2		
basic	D'FP/	E Param			
PC settings	1	PC		Modul	Module settings
Type	No	Value	Description	Module ^	Type
*	E17		Command Input (see Installation man)		no modul
DEPARE	E19	0	cable break detection cmd in 1= active(420mA)		
Univers	E25	100	MIN operating threshold (0,01%)		Design series
	P1	0.0	Zero Adjust [%]		
Valve	P3	100.0	Max [%] A-channel	1	Version
	P4	100.0	Max [%] B-channel		7777
1222	P7	0.0	Min (%) A-channel		Valve
Input					Send all
Bange					
(* ±10V = 1					
C ±20nA ≈2	-				-
C 420mA x3	-				
C +10mA =5	-				



Surface finish	) Kit	E T	57	🔿 Kit
✓R <sub>max</sub> 6.3 √////////////////////////////////////	BK385	4xM6x40 ISO 4762-12.9	13.2 Nm ±15 %	NBR: SK-D3FP FPM: SK-D3FP-V HFC: SK-D3FP-H

<sup>1)</sup> O-ring recess diameter on valve body.



## Catalogue HY11-3500/UK Characteristics

# Pilot Operated Proportional DC Valve Series D30FP

The series of pilot operated control valves D30FP closes the gap between the direct operated D3FP valves and the conventional pilot operated D31FP valves.

Providing high flow capacity and practically no flow limits like D31FP in the envelope size of the D3FP.

The valve works with the hydraulic follower principle, with a moving sleeve as main spool.

## Features

CE

- · Pilot operated with hydraulic follower sleeve
- No flow limit up to 350 bar through the valve
- Defined spool positioning at power-down optional P-A / B-T or P-B / A-T or center position (for overlapped spools)









**D30FP\*3** with hydraulic follower principle





# Pilot Operated Proportional DC Valve Series D30FP

3



Parametrizing cable OBE -> RS232, item no. 40982923

<sup>1)</sup> Approx. 10 % opening, only zerolapped spools.

<sup>2)</sup> Only for overlapped spools.

<sup>3)</sup> For tank pressure >35 bar.



General			
Design			Pilot operated servo proportional DC valve
Actuation			VCD <sup>®</sup> actuator
Size			NG10 / CETOP 05 / NFPA D05
Mounting interfa	ace		DIN 24340 / ISO 4401 / CETOP RP121 / NFPA
Mounting positi	on		horizontal mounting preferred (other mounting positions after consultation)
Ambient tempe	rature	[°C]	-20+50
MTTE <sub>-</sub> value <sup>1)</sup>		[vears]	75
Weight		[) curo]	65
Vibration resist:	ance	[19]	10 Sinus 5, 2000 Hz acc. IEC 68-2-6
		[9]	30 Random poise 20, 2000 Hz acc. IEC 68-2-36
			15 Shock acc JEC 68-2-27
Hydraulic			
Max operating	pressure	[har]	Ports P. A. B. 350: Port T. 35 for internal drain. 250 for external drain
max. operating	procouro	[bar]	Port Y $35^{(2)}$
Fluid		[201]	Hydraulic oil according to DIN 51524 535 other on request
Fluid temperatu	Iro	[°C]	$-20 \pm 60$ (NBR: $-25 \pm 60$ )
Viscosity	nermitted	[CSt]/[mm <sup>2</sup> /s]	20 400
viscosity	recommended	[cSt]/[mm <sup>2</sup> /s]	20400
Filtration	recommended		3000 ISO 4406 (1000): 18/16/12
	t An Eher		100 4400 (1333), 10/10/13
Flow nominal a	$t \Delta p = 5 \text{ bar}$	[]/main]	00
per control edge	e <sup>3</sup>	[i/min]	80
Flow maximum		[l/min]	250
Leakage at 100	) bar	[ml/min]	<1800 (Zerolap spool); <1000 (Overlap spool)
Opening point		[%]	set to 9 commande signal (see flow characteristics)
Pilot supply pre	ssure	[bar]	>5 higher than tank pressure (only internal pilot oil supply)
Static / Dynam	ic		
Step response	at 100 % step <sup>4)</sup>	[ms]	<7
Frequency resp	onse	[Hz]	120 (amplitude ratio -3 dB), 120 (phase lag -90°)
(±5 % signal) 4)			
Hysteresis		[%]	<0.05
Sensitivity		[%]	<0.03
Temperature dr	ift	[%/K]	<0.025
Electrical char	acteristics		
Duty ratio		[%]	100
Protection class	3		IP65 in accordance with EN 60529 (with correctly mounted plug-in connector)
Supply voltage/	rinnle	[\/]	DC 22 30 electric shut-off at < 19 ripple < 5 % eff. surge free
Current consum	notion max		35
Pre-fusing	iption max.	[Λ] [Δ]	4.0 medium lag
Input signal		[A]	-to moduli lug
Code B		ц л	10. 0 -10 ripple <0.01 % eff. surge free 0 $\pm 10 \text{ V} \text{ P}_{->} \text{ A}$
	Imnedance	[v] [k∩hm]	100
Code E	Current		20 0 -20 ripple <0.01 % eff surge free 0 $\pm$ 20 mA P- $\times$ A
	Impedance		2020, hpple <0.01 /0 ell., sulge fiee, 0+20 filA F->A
Codo S	Current		4 12 20 ripple <0.01 % off surge free 12 20 mA $\mathbb{R} > 0$
	Guilent	ĮIIIAJ	-7.1220, hppic $<0.01$ /0 cm., surgerided, 1220 mA F->A
	Impodance	[Ohm]	S.0 IIIA = UISADIE, >3.0 IIIA = ACCUTUITIY TO INAIVIUK INE43
Differential inner	impedance	[Oninj	230
Differential inpu	it max.	D /I	20 for terminal D and E against DE (terminal C)
	Code 0	[V]	So for terminal D and E against $PE$ (terminal G)
	Code 5	[V]	30 for terminal 4 and 5 against PE (terminal = )
Eachla 1 14		[V]	SU for terminal D and E against PE (terminal G)
Enable signal (	only code 5/7)	[V]	530, Ri = 9 KOhm
Diagnostic sign	al	[V]	+10010 / +12.5 error detection, rated max. 5 mA
EMC			EN 61000-6-2, EN 61000-6-4
Electrical conne	ection	Code 0/7	6 + PE acc. EN 175201-804
	50001	Code 5	11 + PE acc. EN 175201-804
Wiring min.	Code 0/7	[mm²]	7 x 1.0 (AWG 18) overall braid shield
	Code 5	[mm²]	8 x 1.0 (AWG 18) overall braid shield
Wiring length m	nax.	[m]	50

<sup>1)</sup> If valves with onboard electronics are used in safety-related parts of control systems, in case the safety function is requested, the valve electronics voltage supply is to be switched off by a suitable switching element with sufficient reliability.

<sup>2)</sup> For applications with p<sub>T</sub>>35 bar (max. 250 bar) the Y-port has to be connected and the plug in the Y-port has to be removed.

<sup>3)</sup> Flow rate for different  $\Delta p$  per control edge:  $Q_x = Q_{Nom.} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom.}}}$ <sup>4)</sup> Measured with load (100 bar pressure drop/two control edges).



## Flow curves

(Overlapped spool set to opening point 9 %) at  $\Delta p = 5$  bar per metering edge Spool type **E01/02, E50** 





#### Code 0

#### ø Parametrizing cable 3 m length Item no.: 40982923 ۵۱ Parametrizing interface Command E 0...±10 V μC 0...±20 mA D 4...20 mA (FDiagnostic U spool stroke (C 0...±10 V = 6 + PE 0 G (A) (B) ↔ G C C C Supply PE Voltage 22...30 V=

### Code 5



## Code 7





#### ProPxD interface program

The ProPxD software allows quick and easy setting of the digital valve electronics. Individual parameters as well as complete settings can be viewed, changed and saved via the comfortable user interface. Parameter sets saved in the non-volatile memory can be loaded to other valves of the same type or printed out for documentation purposes.

The PC software can be downloaded free of charge at www.parker.com/euro\_hcd – see page "Support" or directly at www.parker.com/propxd.

#### Features

- Comfortable editing of valve parameters
- · Saving and loading of customized parameter sets
- Executable with all Windows<sup>®</sup> operating systems from Windows<sup>®</sup> XP upwards
- Simple communication between PC and valve electronics via serial interface RS232C

The valve electronics cannot be connected to a PC with a standard USB cable – this can result in damages of PC and/or valve electronics.

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

le Options Diagnostics	Specials	Help C	?			
basic	D'FP/E	Param.				
PC settings	12003	PC			Modulo cottings	
Tune	No	Value	Description	Module ^	Tupe	
*	617	1	Command Input (see installation man)		no modul	
A PROPERTY.	E19	0	cable break detection cmd in 1= active(420mA)		100 110000	
DHMDHE	E25	100	MIN operating threshold [0,01%]		Design series	
	P1	0.0	Zero Adjust [%]		7777	
Valve	P3	100.0	Max (%) A-channel	1.00	Venion	
	P4	100.0	Max [%] B-channel		2222	
	P7	0.0	Min (%) A-channel		Valve	
default	P8	0.0	Min (%) B-channel		1.0010	
1					Channel "A"	
					m	
					Channel '8"	
					7777	
					1	
					1	
					Receive all	
Input					Sental	
Banger			-			
(* ±10/ =1						
C 120mA -2						
C 130-1-2					r	
s + cuma es						
C ±10mA =5						





Surface finish	Dia Kit	E T	57	🔿 Kit
R <sub>max</sub> 6.3	BK385	4xM6x40 ISO 4762-12.9	13.2 Nm ±15 %	NBR: SK-D3FP FPM: SK-D3FP-V HFC: SK-D3FP-H

<sup>1)</sup> O-ring recess diameter on valve body.

The series of pilot operated servo proportional valves D\*1FP transfers the advantages of the Parker patented Voice Coil Drive (VCD®) to larger frame sizes and thus high flow rates. The high dynamics / high precision drive of the pilot valve allows the optimum control of the main spool and results in servo class performance of the complete valves.

The D\*1FP series is available in 5 sizes:

D31FP NG10 (CETOP 05)

D41FP NG16 (CETOP 07)

D81FP NG25 (CETOP 08) for port diam. up to 26 mm D91FP NG25 (CETOP 08) for port diam. up to 32 mm D111FP NG32 (CETOP 10)

The safety concept works with a safe 4th position at the D1FP pilot valve. This ensures that the main stage is hydraulically balanced at power down and allows to have the main spool spring centered (for overlapped spools) or approximately 10 % spring offset to spool position A or B (for zerolap spools).

The innovative integrated regenerative function into the A-line (optional) allows new energy saving circuits for differential cylinders. The hybrid version can be switched between regenerative mode and standard mode at any time.

## Features

- · High dynamics
- High flow
- Defined spool positioning at power-down optional P-A/B-T or P-B/A-T or center position (for overlapped spools)
- Onboard electronics
- Energy saving A-regeneration
- Switchable hybrid version

# D41FPE52 (Standard)





D41FP Standard





Standard D\*1FPE

Further literature about the opportunities of energy savings and more functional details of the integrated regeneration is available on request.





## D\*1FPR and D\*1FPZ









## Flow rate in % of nominal flow

Size <sup>1)</sup>	Spool	Port					
		A-T	P-A	P-B	B-A (R-Valve)	B-A (Hybrid)	B-T (Hybrid)
D41FPR/Z	31/32/61	100 %	50 %	100 %	50 %	40 %	20 %
D91FPR/Z	31/32/61	100 %	50 %	100 %	50 %	50 %	25 %
D111FPR/Z	31/32/61	100 %	50 %	100 %	50 %	50 %	20 %

<sup>1)</sup> D31FP: For size NG10 please refer solution with sandwich- and adaptor plates "A10-1664 / A10-1665L / H10-1662 / H10-1666L" in chapter 12.







General

Design				Pilot operated servo proportional DC valve					
Actuation				VCD®-actuator					
Size				NG10 (CETOP 05)	NG16 (CETOP 07)	NG25 (CETOP 08)	NG32 (CETOP 10)		
				D31	D41	D81 / D91	D111		
Mounting Int	erface			DIN 24340 / ISO 44	101 / CETOP RP121	/ NFPA			
Mounting po	sition			unrestricted					
Ambient tem	perature		[°C]	-20+50					
MTTF <sub>-</sub> value	1)		[vears]	75					
Weight			[ka]	11.3	14.2	23.5	64.5		
			[9]	10 Sinus 5 2000 F	z acc. IEC 68-2-6	2010	0.110		
Vibration res	istance		[0]	30 Random noise 2	20 2000 Hz acc IE(	68-2-36			
Vibration 103	Istance		[9]	15 Shock and JEC	60 0 07	00200			
Undraulia				TO SHOCK ACC. IEC	00-2-21				
Hydraulic				Internel effet due in 1		<u>р</u> г			
Max. operati	ng pressure		[bar]	Internal pliot drain I	P, A, B, X 350; I, Y 3	5			
	01			External pilot drain	P, A, B, I, X 350; Y	35			
Fluid				Hydraulic oil accord	ding to DIN 51524	535, other on reque	st		
Fluid temper	ature		[°C]	-20+60 (NBR: -25	5+60)				
Viscosity	permitted		[cSt]/[mm <sup>2</sup> /s]	20400					
	recommende	ed	[cSt]/[mm <sup>2</sup> /s]	3080					
Filtration				ISO 4406 (1999); 1	8/16/13				
Nominal flow	at ∆p = 5 bar	per control edge 2)	[l/min]	120	200	400 / 450	1000		
Max. recomm	nended flow (s	standard)	[l/min]	250	600	1000	3000		
	Regenerative	B-A / B-T	[]	depending on appli	cation, see flow curv	/es			
Leakage at 1	00 bar Ove	rlanned shool	[ml/min]	200	200	600	1000		
Lounago ar	Zero	lanned spool	[ml/min]	000	900	1000	5000		
	Dilot	happed spool	[m]/min]	500	300	1000	5000		
Ononing noi	FIIOL		[111/1111]	< 300	laignal (aga flaw aha	restariation)			
Opening poir	11		[%]		i signal (see now cha	aracteristics)			
Pliot supply	oressure		[bar]	20350	40	24			
Pilot flow du	ing step respo	onse at 210 bar	[l/min]	10	12	24	40		
Static / Dyna	amic			T	r	[]			
Step response	se at 100 % st	roke 3)	[ms]	10	13	19	45		
Frequency re	esponse								
	Amplitude ±5	5 % at 210 bar	[Hz]	128	95	95	40		
	Phase ±5 %	at 210 bar	[Hz]	118	95	90	75		
Hysteresis			[%]	< 0.1					
Sensitivity			[%]	< 0.05	< 0.05				
Temperature	drift of center	nosition	[%/K]	< 0.00					
Flectrical		position	[/0/14]	< 0.020					
Duty ratio			[%]	100					
Protection of	200		[/0]	IP65 in accordance with EN 60529 (with correctly mounted plug-in connector)					
Supply volto	ass ao / rinnlo		[] /]	22 - 30 ripple < 5 % off surge free					
Supply voltage	ge / rippie			2230, ripple < 5 $%$	% en., surge nee				
Current cons	sumption max.		[A]	3.5					
Pre-fusing			[A]	4.0 A medium lag					
Input signal	Code K (B)	Voltage	[V]	+10010, ripple < 0.01 % eff., surge free, 0+10 V P->A (P->B)					
		Impedance	[kOhm]	100					
	Code E	Voltage	[mA]	+20020, ripple	< 0.01 % eff., surge	free, 0+20 mA P-	>B		
		Impedance	[Ohm]	250					
	Code S	Current	[mA]	41220. ripple <	0.01 % eff., surge fr	ee, 1220 mA P->A	4		
		Impedance	[Ohm]	250	,	,			
		Impedance	[Onin]	< 3.6  mA - anable	off $> 3.8 \text{ mA} - \text{anab}$				
Input Capaci	tanco tun		[nE]		011, > 5.0 $111A = 611ab$		NL4J		
Differential in	tance typ.	Code 0		1 20 for terminal D av	ad E against DE /tar	minal (C)			
Differential in	iput max.	Code U	[v]	30 for terminal D ar	nd E against PE (teri	minal G)			
				11 for terminal D and E against 0V (terminal B)					
		Code 5	[V]	30 for terminal 4 ar	nd 5 against PE (tern	ninal ≟ )			
				11 for terminal 4 ar	nd 5 against 0V (term	ninal 2)			
		Code 7	[V]	30 for terminal D ar	nd E against PE (teri	minal G)			
Enable signa	al	Code 5/7	ivi	530, Ri > 8 kOhm	1	,			
Diagnostic si	gnal		ivi	+10010 / +12.5	5 V (overload), rated	max. 5 mA			
EMC	J			EN 61000-6-2, FN	61000-6-4				
Electrical co	nection	Code 0/7		6 + PE acc EN 17	5201-804				
		Code 5		11 + PE acc. EN 17	75201-804				
Wiring min		Code 0/7	[mm2]	$7 \times 10$ (AMC16) or	verall braid shield				
winnig min.			[[[]]] <sup>2</sup> ]						
10/2010		Code 5	[mm²]	0 X 1.0 (AVVG16) 0	verall braid shield				
vviring length	n max.		[m]	50					

<sup>1)</sup> If valves with onboard electronics are used in safety-related parts of control systems, in case the safety function is requested, the valve electronics voltage supply is to be switched off by a suitable switching element with sufficient reliability.

<sup>2)</sup> Flow rate for different  $\Delta p$  per control edge:  $Q_x = Q_{Nom.} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom.}}}$ 

<sup>3)</sup> Measured with load (210 bar pressure drop/two control edges).



#### **Electrical characteristics hybrid option**

Duty ratio		100 %		
Protection class		IP 65 in accordance with El	N 60529 (with correctly mount	ed plug-in connector)
		D41	D91	D111
Supply voltage	[V]	24	24	24
Tolerance supply voltage	[%]	±10	±10	±10
Current consumption	[A]	1.21	0.96	1.29
Power consumption	[W]	29	23	31
Solenoid connection		Connector as per EN 17530	1-803	
Wiring min.	[mm <sup>2</sup> ]	3 x 1.5 recommended		
Wiring length max.	[m]	50 recommended		

With electrical connections the protective conductor (PE 🛓) must be connected according to the relevant regulations.

## Wiring



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0...±10 V

4...20 mA 0...±20 mA Command



5...30 V

#### ProPxD interface program

The ProPxD software allows quick and easy setting of the digital valve electronics. Individual parameters as well as complete settings can be viewed, changed and saved via the comfortable user interface. Parameter sets saved in the non-volatile memory can be loaded to other valves of the same type or printed out for documentation purposes.

The PC software can be downloaded free of charge at www.parker.com/euro\_hcd – see page "Support" or directly at www.parker.com/propxd.

#### Features

- Comfortable editing of valve parameters
- Saving and loading of customized parameter sets
- Executable with all Windows<sup>®</sup> operating systems from Windows<sup>®</sup> XP upwards
- Simple communication between PC and valve electronics via serial interface RS232C

The valve electronics cannot be connected to a PC with a standard USB cable – this can result in damages of PC and/or valve electronics.

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

e Options Diagnostics	Specials	Help C	?		
basic	D*1FP/	E Param			
PC settings	_	PC		Modul	Module settings
Type	No.	Value	Description	Module *	Type
•	Laber		Command Input (see Installation man)	100	no modul
D*1FP/D*1FF	E19	0	cable break detection cmd in 1= active(420mA)		
	E25	100	MiN operating threshold		Design series
514	P1	0.0	Zero Adjust (%)		
Valve	P3	100.0	Max (%) D. channel		Version
	87	0.0	Max [76] D-channel		7777
default	P0	0.0	Min 1941 D. chonnel		Valve
					Channel 'B" Channel 'B" ???? Port k(C Receive all
Range 6 ±10/=1 ( ±20mA =2 ( ±20mA =3 ( ±10mA =5					Send at

## **Frequency response**

±5 % / ±25 % / ±90 % command signal Dynamics at 210 bar pilot supply pressure D31FP





### Flow curves D\*1FPB/E

(Overlapped spool set to opening point 10 %) at  $\Delta p = 5$  bar per metering edge

## D31FP





All characteristic curves measured with HLP46 at 50 °C.

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10

20

40 60





0

200

100

Frequency [Hz]

# Flow curves

# D81/91FP

Spool type E01/02/52, B31/32/61



#### Flow curves D\*1FPR/Z

(Overlapped spool set to opening point 10 %) at  $\Delta p$  = 5 bar per metering edge

## D31FP





## D91FP spool type R/Z 31/32/61



## D111FP

Spool type E01/02/52, B31/32/61







# D111FP

spool type R/Z\* on request

## Detail: Standard, regenerative and hybrid flow curves





3

# Pilot oil inlet (supply) and outlet (drain)





Regenerative and hybrid function with additional plate "A10-1664 / A10-1665L / H10-1662 / H10-1666L", see chapter 12.

Surface finish	E Kit	en F	57	🔿 Kit
√R <sub>max</sub> 6.3 ↓ □0.01/100	BK385	4x M6x40 ISO 4762-12.9	13.2 Nm ±15 %	NBR: SK-D31FP FPM: SK-D31FP-V



Surface finish	🗊 🛄 Kit	III F	57	🔿 Kit
R <sub>max</sub> 6.3	BK320	2x M6x55 4x M10x60 ISO 4762-12.9	13.2 Nm ±15 % 63 Nm ±15 %	NBR: SK-D41FP FPM: SK-D41FP-V



D81/91FP



Surface finish	) Kit	即我	27	🔿 Kit
√R <sub>max</sub> 6.3 ↓ □0.01/100	BK360	6x M12x75 ISO 4762-12.9	108 Nm ±15 %	NBR: SK-D81/D91FP FPM: SK-D81/D91FP-V

D111FP



$\bigcirc$	
+(+)+-	++
S	

3

Surface finish	) Kit	E P	27	🔿 Kit
√R <sub>max</sub> 6.3 ↓ 0.01/100	BK386	6x M20x90 ISO 4762-12.9	517 Nm ±15 %	NBR: SK-D111FP FPM: SK-D111FP-V



## Catalogue HY11-3500/UK Characteristics

# Direct and Pilot Operated Prop. DC Valve Series D\*FP and D\*1FP with EtherCAT

### Introduction

DFplus valves with EtherCAT interface fulfill the requirements of modern communication between valve and main control. Due to high data transmission speed and short cycle times, the high dynamics of the DFplus valves can be also utilized within the fieldbus system.

The valve is actuated and monitored by the EtherCAT interface. Actual value (spool position), temperature, operating hours and different error messages are available as diagnostic signals. The valve parameters are factory set and can be adapted with the Parker ProPxD software via the parametrizing interface.

In addition to the fieldbus communication, the valves provide the range of functions of the standard version including analogue command signal and diagnostic spare stroke. Thus they can be operated independent of the fieldbus control, particularly during commissioning and maintenance.

The option with EtherCAT is available for the series:

- D1FP, D3FP
- D30FP
- D31FP, D41FP, D81FP, D91FP, D111FP

as well as for cartridge valves TDP, TEP and TPQ in chapter 8.





D1FP with EtherCAT

## Features EtherCAT interface

- EtherCAT interface, 2x M12x1, connector 4-Pin (Ether-CAT In and EtherCAT Out)
- High dynamics
- High flow capacity
- Onboard electronics

## **Technical Data**

Electrical			
Duty ratio		[%]	100
Protection class			IP65 in accordance with EN 60529 (with correctly mounted plug-in connector)
Supply voltage/ripple		[V]	22 30, electric shut-off at < 19, ripple < 5 % eff., surge free
Current consumption max	κ.	[A]	3.5
Pre fusing		[A]	4.0 medium lag
Differential input		[V]	30 for terminal D and E against PE (terminal G)
Diagnostic signal		[V]	+10010 / +12.5 error detection, rated max. 5 mA
EMC			EN 61000-6-2, EN 61000-6-4
Electrical connection			6 + PE acc. to EN 175201-804
EtherCAT interface			2 x socket M12x1: 5p acc. to IEC61076-2-101
Wiring min.		[mm²]	3 x 1.0 (AWG16) overall braid shield
Wiring length max.		[m]	50
Wiring EtherCAT			acc. to CiA DS-301 Version 4 / Twisted pair cable acc. to ISO11898
			Communication Layer IEC 61158-x-12, 301 Version 4
EtherCAT profiles			Device Profile in accordance with CIA DS - 408 Version 1.5.2
			CANopen over EtherCAT (object dictionary)
			One PDO (Receive)
Functionality			One PDO (Transmit)
			BUS-cycle time down to 0.250 mSec.
Parameterization			
Interface			RS 232, parametrizing cable order code 40982923
Interface program			ProPxD (see www.parker.com/propxd)
Adjustment ranges	Vin	[%]	050
I	Max	[%]	50100
[ F	Ramp	[%]	032.5

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The EtherCAT option is also available for the cartridge valves in chapter 8, series TDP, TEP and TPQ

## Direct operated proportional DC valve



Please order connector separately, see chapter 3 accessories. Parametrizing cable OBE  $\rightarrow$  RS232, item no. 40982923

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