



Bulletin MSG11-5715-742/UK

Operation Manual Series DFplus

Design > 50

Proportional Directional Control Valve



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Operation Manual

1. Introduction

The direct operated control valve DFplus shows extremely 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® actuator the DFplus reaches the frequency response of real servo valves.



D1FP



D3FP

Scope of installation manual

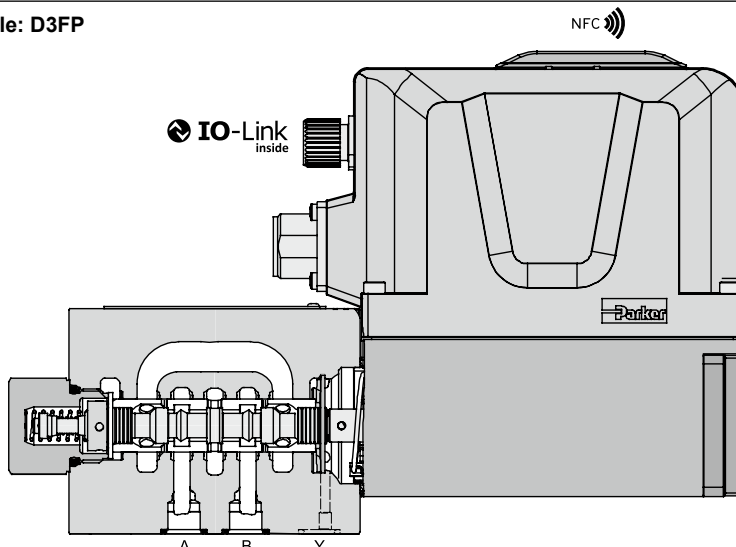
Valve series:

- D1FP
- D3FP
- D30FP
- D1FE
- D3FE

Related documents:

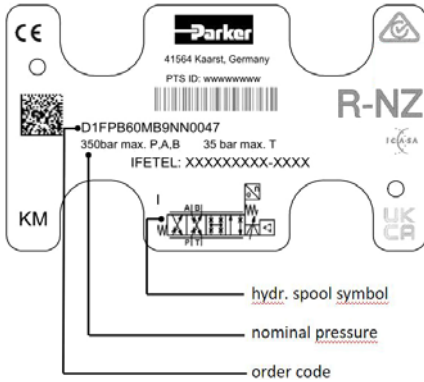
- Catalogue D1FP
- Catalogue D3FP
- Catalogue D30FP
- Catalogue D1FE
- Catalogue D3FE

Example: D3FP



Operation Manual

Name Plate



Characteristics of Valve Driver

The integral electronic driver combines all functions for optimal operation of the valve. Thanks to its excellent dynamic the valve is deployable within closed loop control applications. The most important features are:

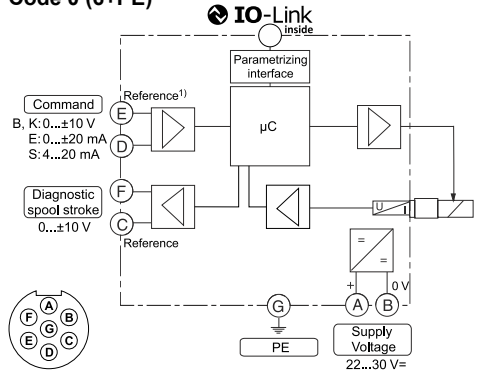
- high dynamic actuator with specially designed electronic driver
- closed loop controlled spool position
- constant current actuator control with overcurrent shutoff
- excellent properties for response sensitivity and temperature drift
- differential input stage with various command signal options
- diagnostic output for spool stroke
- meets relevant European EMC-standards



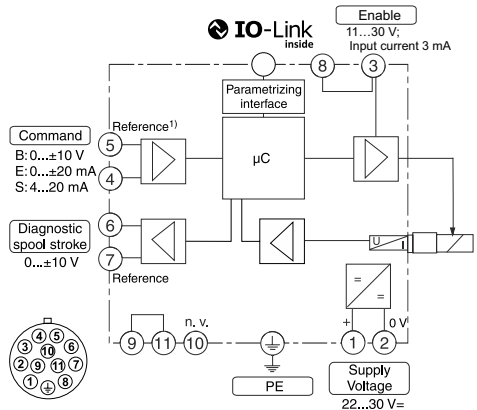
¹⁾ Do not connect with supply voltage zero.

Block Diagram of Onboard Electronics

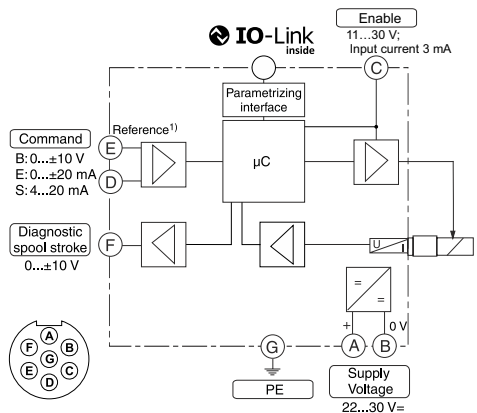
Code 0 (6+PE)



Code 5 (11+PE)



Code 7 (6+PE with enable)



Technical Data

General		
Model	Proportional directional control valve, direct operated (D*FE, D*FP), pilot operated (D30FP)	
Drive	VCD [®] -actuator	
Mounting interface	NG06 (CETOP 03) / NG10 (CETOP 05)	
Installation position	D*FE, D*FP: unrestricted; D30FP: horizontal mounting preferred (other mounting positions after consultation)	
Sensitivity	[%]	< 0.03
Hysteresis	[%]	< 0.05 (D*FE: <0.1)
Temp. drift of center position	[%/K]	< 0.025
Ambient temperature	[°C]	-20...+50
Vibration resistance	[G]	10 Sinus 5...2000 Hz acc. IEC 68-2-6 10 (RMS) Random noise 20...2000 Hz acc. IEC 68-2-36 15 Shock acc. IEC 68-2-27
Weight	[kg]	NG06: 3.6 / NG10: 6.5
Hydraulic		
Fluid	Hydraulic oil according to DIN 51524 ... 535, other on request	
Fluid temperature	[°C]	-20...+60 (NBR: -25...+60)
Viscosity permitted	[cSt] / [mm ² /s]	20...400
recommended	[cSt] / [mm ² /s]	30...80
Filtration	ISO 4406; 18/16/13	
Operating pressure max.	[bar]	350 for ports P, A, B / max. 35 for port T at internal drain, 250 (D1FE, D1FP: 350) at external drain / port Y max. 35 ¹⁾
Interfaces		
IO-Link	IEC 61131-9	
NFC	ISO/IEC 15693 • NFC Forum Type 5 tag certified by the NFC Forum, Frequency 13.56 MHz	
Electrical		
Duty ratio	[%]	100
Protection class	IP65 in accordance with EN 60529 (with correctly mounted plug-in connector) 6 = Full protection against contact, dust tight 5 = Protection against water jets (nozzle) from any angle	
Supply voltage / ripple	[V]	22...30, electric shut-off < 19, ripple < 5 % eff., surge free
Current consumption max.	[A]	3.5
Pre-fusing	[A]	4.0 A medium lag
Input signal	[V]	+10...0...-10, ripple < 0.01 % eff., surge free, 0...+10 V P→A (P→B)
Code B, (K) voltage	[V]	+10...0...-10, ripple < 0.01 % eff., surge free, 0...+10 V P→A (P→B)
Impedance	[kOhm]	100
Code E voltage	[mA]	+20...0...-20, ripple < 0.01 % eff., surge free, 0...+20 mA P→A
Impedance	[Ohm]	< 250
Code S current	[mA]	4...12...20, ripple < 0.01 % eff., surge free, 12...20 mA P→A
Impedance	[Ohm]	< 250
Code 5/7	[mA]	< 3.6 mA = enable off, > 3.8 mA = enable on acc. NAMUR NE43
Input capacitance typ.	[nF]	1
Differential input voltage max.	[V]	30 for terminal D and E against PE (terminal G)
Code 0	[V]	11 for terminal D and E against 0 V (terminal B)
Code 5	[V]	30 for terminal 4 and 5 against PE (terminal ⊥)
Code 7	[V]	11 for terminal 4 and 5 against 0 V (terminal 2)
Code 5/7	[V]	30 for terminal D and E against PE (terminal G)
Enable signal	[V]	acc. EN 61131-2; Type 3 Low -3...+5; High 11...30; input current 3 mA
Diagnostic signal	[V]	+10...0...-10
EMC	EN 61000-6-2, EN 61000-6-4	
Electrical connection	Code 0/7 Code 5	6 + PE acc. EN 175201-804 11 + PE acc. EN 175201-804
Wiring min.	Code 0/7 Code 5	7 x 1.0 (AWG16) overall braid shield 8 x 1.0 (AWG16) overall braid shield
Wiring length max.	[m]	50

¹⁾ For applications with $p_T > 35$ bar (max 350 bar) the Y-port has to be connected and the plug in the Y-port has to be removed.

2. Safety Instructions

Please read the operation manual before installation, start-up, service, repair or stocking! Disregard may result in damaging the valve or incorporated system parts.

Symbols

This manual uses symbols which have to be followed accordingly:



Instructions with regard to the warranty



Instructions with regard to possible damaging of the valve or linked system components



Helpful additional instructions

Service

Workings in the area of installation, commissioning, maintenance and repair of the valve may only be allowed by qualified personnel. These are persons which have, because of education, experience and instruction, sufficient knowledge on relevant directives and approved technical rules.

3. Important Details

Intended Usage

These operating instructions is valid for proportional directional control valves of the D*FP series.

The D*FP proportional directional control valve is a component intended for use in hydraulic systems that meet the safety requirements and rules according to DIN EN ISO 4413.

Any different or unintended use is to be considered as not intended. The manufacturer is not liable for warranty claims resulting from this.

Depending on the operating condition, there may be a risk of burns due to the surface temperature of the valve. For installation, observe DIN EN ISO 4413 section 5.2.6.2.

Common Instructions

Parker reserves the right for technical modifications of the described product. Illustrations and drawings within this manual are simplified representations. Due to improvement or modification of the product the illustrations might not match precisely with the described valve. The technical specifications and dimensions are not binding. No claims can be derived of it. Copyrights are reserved.

Liability

Parker does not assume liability for damage due to the following failures:

- incorrect mounting / installation
- improper handling
- lack of maintenance
- unintended usage



Do not disassemble the valve! In case of suspicion for a defect please contact Parker.

Storage

In case of temporary storage the valve must be protected against contamination, atmospheric exposure and mechanical damages. Each valve has been factory tested with hydraulic oil, resulting in protection of the internal parts against corrosion. Yet this protection is only ensured under the following conditions:

Storage period	Storage requirements
12 months	constant humidity < 60 % as well as constant temperature < 25 °C
6 months	varying humidity as well as varying temperature < 35 °C



Outdoor storage or within sea and tropical climate will lead to corrosion and might disable the valve!

Operation Manual


4. Mounting / Installation

Scope of Supply

Please check immediately after receiving the valve, if the content is matching with the specified scope of supply. The delivery includes:


- valve
- operation manual

The central connector has to be ordered separately and is not included in the delivery.


 Please check the delivery immediately after receiving the shipment for apparent damages due to shipping. Report shipment losses at once to the carrier and the supplier!

Mounting

- Compare valve type (located on the name plate) with bill of materials respectively circuit diagram.
- The valve may be mounted fix or movable in any direction.
- Check mounting surface for the valve. Unevenness of 0.01 mm/100 mm, surface finish of 6.3 µm are tolerable values.


 Keep valve mounting surface and work environment clean!

- Remove protection plate from the valve mounting surface
- Check the proper position of the valve ports and the O-rings.
- Mounting bolts:
 D1FE/D1FP: 4 pcs. M5x30
 D3FE/D3FP/D30FP: 4 pcs. M6x40
 use property class ISO 4762-12.9
- Bolt kits:
 D1FE/D1FP: BK375
 D3FE/D3FP/D30FP: BK385
- Tighten the bolts crisscross with the following torque values:
 D1FE/D1FP: 7.6 Nm
 D3FE/D3FP/D30FP: 13.2 Nm

 Insufficient condition of the valve mounting surface might create malfunction!
 Incorrect mounting resp. bolt torque may result in abrupt leakage of pressure fluid on the valve ports.


Limits of Use

The valve may be operated within the determined limits only. Please refer to the "technical data" section as well as to the "characteristic curves" in the Parker catalogue MSG-3500/UK "Hydraulic Valves Industrial Standard".

 Follow the environmental conditions! Unallowable temperatures, shock load, aggressive chemicals exposure, radiation exposure, illegal electromagnetic emissions may result in operating trouble and may lead to failure! Follow the operating limits listed in the "specifications" table!

Pressure Fluids

The following rules applies for the operation with various pressure fluids:


 This above information serves for orientation and does not substitute user tests among the particular operating conditions. In particular, no liability for media compatibility may be derived out of it.

Mineral oil: usable without restriction.

HFC: choose the right seal option.

For operation with the following pressure fluids please consult Parker:

HFA	oil-in-water emulsion
HFB	water-in-oil emulsion
HFD	anhydrous fluids (Phosphor-Ester)

 For detailed information concerning pressure fluids note VDMA-document 24317 as well as DIN 51524 & 51502.

Special gaskets may be available depending on the utilized fluid.

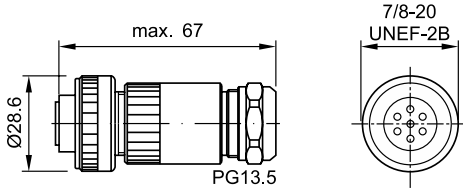
In case of doubt please consult Parker.

Operation Manual

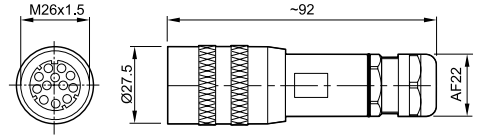
Electrical Connection

The valve is connected electrically by one common cable and a central connector.

The connection codes 0 and 7 require a 6 + PE female connector EN 175201-804.



The connection Code 5 requires a 11 + PE female connector EN 175201-804.



☞ The female connector can be ordered separately under article nr. 5004072.

⚠ In case third party connectors are used, accordance to the relevant EMC directives must be ensured.

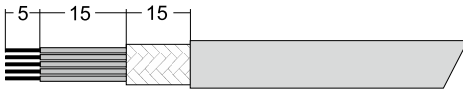
The connecting cable has to comply to the following specification:

Cable type	control cable, flexible, 7 conductors, overall braid shield
Cross section	min. AWG16
Outer dimension	8...12 mm
Cable length	max. 50 m

☞ For cable lengths > 50 m consult Parker.

The connection cable is coupled to the female connector by solder joints.

Skinning lengths for the connecting cable:



☞ The female connector has to be ordered separately under article nr. 5004711.

⚠ In case third party connectors are used, accordance to the relevant EMC directives must be ensured.

The connecting cable has to comply to the following specification:

Cable type	control cable, flexible, 8 conductors, overall braid shield
Cross section	min. AWG16
Outer dimension	12...15 mm
Cable length	max. 50 m

☞ For cable lengths > 50 m consult factory.

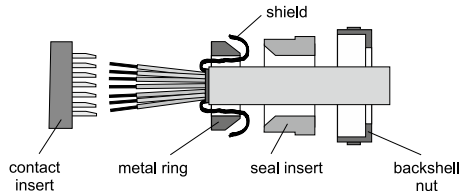
The connection cable is coupled to the female connector by crimp contacts.

Skinning lengths for the connecting cable:




⚠ Do not disconnect cable socket under voltage!


The shielding has to be assembled according the outline below:




The backshell nut of the cable gland has to be tightened with a suitable tool. The target value for the tightening torque is 4 Nm. Tighten the cap nut with a torque of 5 Nm after attaching the female connector on the socket.

 Incomplete tightening of backshell nut respectively cap nut may result in undesired release of the connection as well as degradation of the water tightness.

When using female connectors of other manufacturers, the relevant regulations must be observed.


 The cable may only be connected to the female connector by authorized and qualified personnel. A short between individual conductors resp. to the connector housing, bad soldering as well as improper shield connection may result in malfunction and breakdown of the valve.


 The mounting surface of the valve has to be connected to the earth grounded machine frame. The earth ground wire from the valve connecting cable as well as the cable shield have to be tied to the protective earth terminal within the control unit. It is necessary to use a low ohmic potential connection between control unit and machine frame to prevent earth loops (cross section AWG 6).


Electrical Interfacing


Supply Voltage

The supply voltage for the valve has to cover the range of 22...30 V. Valve is de-energized below 19 V. The residual ripple may not exceed 5 % eff.

 The applied power supply must comply to the relevant regulations (DIN EN 61558) and must carry a CE-mark. The operating voltage for the valve must be free of inductive surges. Do not exceed the max. value of 30V! Higher voltage can lead to failure of the valve.

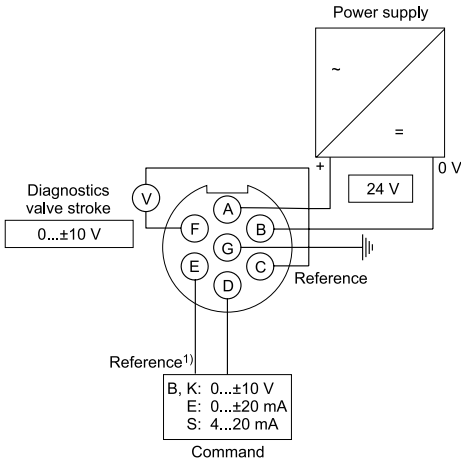
 The increased inrush current of the valve should be considered when selecting the power supply. A stabilized power supply with overcurrent limiting feature should not be used. Due to the inrush current of the valve the current limit circuit may respond prematurely and create problems during energizing of the supply voltage.

 The operation of the valve is blocked if the supply voltage polarity is interchanged.

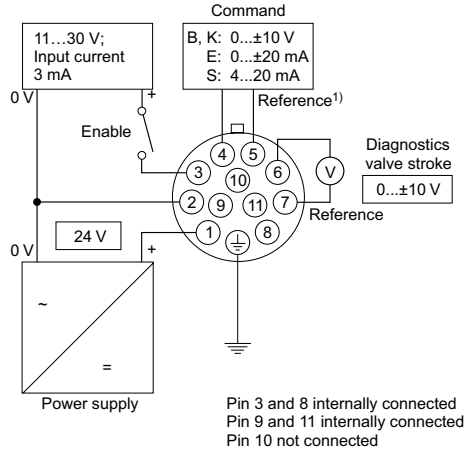
 Each valve requires a separate pre-fuse of 4 Amp semi time-lag. Failure to observe this instruction may create irreparable damage of valve respectively incorporated system parts.

Wiring

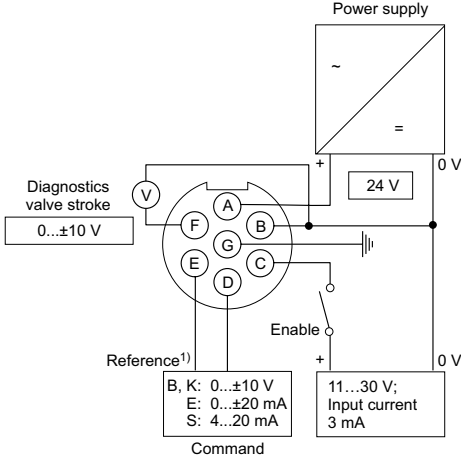
Code 0, 6 + PE acc. EN 175201-804



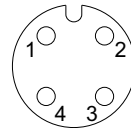
Code 5, 11 + PE acc. EN 175201-804



Code 7, 6 + PE acc. EN 175201-804 + enable



Pin assignment IO-Link (parametrizing) interface, M12 socket



PIN assignment acc. IEC 60974-5-2


- Pin 1: 24 VDC
- Pin 3: GND
- Pin 4: IO-Link Communication (C/Q)

¹⁾ Do not connect with supply voltage zero.

Operation Manual


Enable input (only for Code 5 / 11+PE as well as Code 7 / 6+PE)


A signal voltage enables the actuator drive of the valve. Continuous operation of the valve requires a permanent voltage 5...30 V (e.g. the supply voltage). In case of disabling the signal the valve will reach its power down position spring-actuated independently from the command signal value.

 The enable function represents no safety arrangement against unwanted valve operation in terms of accident prevention regulations.

Command signal input

The spool stroke is proportional to the command signal amplitude.


 The command input signal needs to be filtered as well as free of inductive surges and modulations. Due to the sensitivity of the valve a high signal quality is recommended. This will prevent malfunction.

 The option 4...20 mA uses the "3.6 mA" condition as breakdown-information. If the input signal line is interrupted, an evaluable failure information is available. In this case the actuator drive will be switched off. The drive will switch on when the input signal reaches a value of 3.8 mA, it switches off when the command falls below 3.6 mA. This determination follows the NAMUR-specification NE43.









NAMUR is an association of users of process control technology.

Diagnostic output









A diagnostic signal is available. Its voltage represents the operating condition of the valve.

 The output may drive a load of max. 5 mA. Exceeding of this limit leads to malfunction

Valves NG06

Code command signal	Command signal	Function	VCD actuator	Diagnostic signal
B	0...+10 V		on	0...+10 V
	0...-10 V		on	0...-10 V
E	0...+20 mA		on	0...+10 V
	0...-20 mA		on	0...-10 V
K	0...+10 V		on	0...-10 V
	0...-10 V		on	0...+10 V
S	4...12 mA		on	0...-10 V
	12...20 mA		on	0...+10 V

Valves NG10

Code command signal	Command signal	Function	VCD actuator	Diagnostic signal
B	0...+10 V		on	0...-10 V
	0...-10 V		on	0...+10 V
E	0...+20 mA		on	0...-10 V
	0...-20 mA		on	0...+10 V
K	0...+10 V		on	0...+10 V
	0...-10 V		on	0...-10 V
S	4...12 mA		on	0...+10 V
	12...20 mA		on	0...-10 V

Operation Manual

5. Operating Instructions

Spool Position at Power Down/Center Position



For valves with zero lap spools, distinction must be made between hydraulic neutral position and power-down position. Neutral position is taken at neutral input signal, corresponding to zero position of the hydraulic symbol. When the valve is switched off – no supply voltage, no enable, current signal (code S) < 3,8 mA – zero lap valves take the power down position (approximately 10 % opening) according to the ordering code. For valves with overlap spools, neutral position and power down position are the same (zero position).



Supply pressure must be ensured before valve is energized.

Solenoid Current Monitoring

If the actuator current time interval exceeds 10 seconds, the actuator is switched off to prevent overheating. For normal operating conditions this state will not be reached, but it may occur with a contaminated sluggish valve.



In this case the reason for the contamination should be rectified (hydraulic fluid exchange, filtration review, valve flushing).

The overcurrent shutoff condition may be reset by the actions below:

Code 0: Temporary disconnection of the supply voltage.

Code 5: Temporary disconnection of the enable signal.

Code 7: Temporary disconnection of the enable signal.



The shutoff of the VCD actuator due to overload will be indicated via the diagnostics output.

Temperature monitoring

The proportional directional control valves have internal temperature monitoring of the valve electronics.



When an overtemperature is reached, the valve switches off automatically. A restart is only possible again when the temperature of the valve electronics is within the operating temperature range.

6. Interface and Parameter

IO-Link Interface

IO-Link communication takes place via the externally accessible M12 interface.

The IO-Link interface allows an external access to the available valve parameters via an IO-Link master or via the ProPxD software.

Parker IO-LINK MASTER USB order no. 40983544 (Parameter overview in the operating instructions)

NFC Interface

The NFC interface allows a wireless access to valve data via the Parker App PDC (available free of charge in the **App Store** and **Google Play Store**).

NFC communication may only be used for maintenance purposes by trained personnel.



The valve may have hot surfaces. There is a risk of burn injury. Before using NFC radio communication, ensure that the valve has cooled down sufficiently.

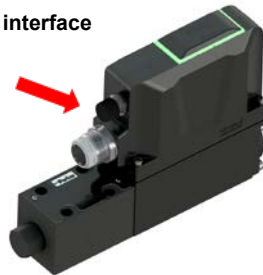
ProPxD Parameterizing Software

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 saved for documentation purposes.

The PC software can be downloaded free of charge at www.parker.com/isde – see page “Support” or directly at www.parker.com/propxd.

(IO-Link Master USB is required)

IO-Link interface



Valve Parameter - read + write

Parameter	Function	Description	Unit	Parameter range		Default settings	Note
				from	to		
24	CUSTOMER - Specification application Tag	Specification of the application					
25	CUSTOMER - Function Tag	Description of the function					
26	CUSTOMER - Location Tag	Location of the application					
96	Device Local	Indicates the source of the control word acting on the device state machine					
97	Device Mode	Device mode					
100	Hold Setpoint	Internal setpoint in device state HOLD					
101	Enable Behavior	Determines enable/disable reaction of state machine					
256	Command signal Type	Selection of the analog command signal type					"Command W read + write"
257	Scaling command signal	"Adjustment of the command signal option. To match the command signal input to the input signal mode."					
258	Command Signal Analog Cable Break	"Analog command signal cable break detection only for 4-20 mA"					
264	Diagnose A Output Signal Type	Set the diagnose output A signal type					
265	Diagnose B Output Signal Type	Set the diagnose output B signal type					
268	Diagnose A Measuring Point	Diagnose A measuring point					
269	Diagnose B Measuring Point	Diagnose B measuring point					
276	Zero adjust	Adjustment of zero position shifting (offset).	%	-90	90	0	
277	MIN Overlap Comp On/Off	To compensate asymmetries.					
278	MIN A-Channel	"Adjustment of stroke step for valve side A at min. operating threshold. To compensate for the overlap of the valve spool."	%	0	50	depending on valve	
279	MIN B-Channel	"Adjustment of stroke step for valve side B at min. operating threshold. To compensate for the overlap of the valve spool."	%	0	50	depending on valve	
280	MAX A-Channel	"Adjustment of maximum signal span for positive output signal. To match the command signal span to the valve operating range."	%	50	100	depending on valve	
281	MAX B-Channel	"Adjustment of maximum signal span for negative output signal. To match the command signal span to the valve operating range."	%	50	100	depending on valve	
284	Ramp Type	Selection of the ramp type	-				
285	Ramp Up Time Quadrant I	Ramp increasing rate for quadrant I	ms	0	32500	0	
286	Ramp Down Time Quadrant I	Ramp decreasing rate for quadrant I	ms	0	32500	0	
289	Ramp Up Time Quadrant III	Ramp increasing rate for quadrant III	ms	0	32500	0	
290	Ramp Down Time Quadrant III	Ramp decreasing rate for quadrant III	ms	0	32500	0	
295	LED Ring On Off	On/Off LED ring	-				
768	Validate Error Reaction Type	Set reaction type of the chosen error	-				
769	Validate Error Code	Chosen error to validate	-				

Valve Parameter - read only

Parameter	Function	Description	Unit
16	Vendor Name	PARKER	
19	Part no.	Part number	
20	Productdescription	Product description with design stage	
21	Serial number	PTS code	
23	Firmware Revision	Firmware revision number	
32	Error Counter	Number of error	
36	Device Status	Device Status OK or not OK	
67	Elektronik hardware version	Hardware identification	
86	Checksum Active Parameter Setting	Checksum over active parameters (user changed)	
64	Valve Type	Valve family	
770	Validate Error Counter	Number of occurred errors of the chosen error	
800	Operating Time Days	Daily counter in which the device is in operation	day
801	Operating Time Hours	Hour counter in which the device is in operation	hour
802	Operating Time Minutes	Minute counter in which the device is in operation	minutes
805	On Off Cycles	Counter how often the device was switched on off	
810	Device Supply Voltage Actual	Actual applied supply voltage of the device	V
811	Device Supply Voltage Max	Maximum applied supply voltage of the device	V
812	Device Supply Voltage Avg	Average supply voltage of the device	V
813	Device Current Actual	Actual current consumption that occurred on the device	A
814	Device Current Max	Maximum current consumption that occurred on the device	A
815	Device Current Avg	Average current consumption of the device	A
816	Device Power Actual	Actual power consumption that occurred on the device	W
817	Device Power Max	Maximum power consumption that occurred on the device	W
818	Device Power Avg	Average power consumption of the device	W
831	Temperature In electronic box Actual	Actual temperature that occurred in electronic box	°C
832	Temperature In electronic box Min	Minimum temperature that occurred in electronic box	°C
833	Temperature In electronic box Max	Maximum temperature that occurred in electronic box	°C
834	Temperature In electronic box Avg	Average temperature that occurred in electronic box	°C
847	Pilot Position Min.	Minimum pilot position that occurred	%
848	Pilot Position Max	Maximum pilot position that occurred	%
849	Pilot Position Avg	Average pilot position during operation	%
853	Command Min	Minimum command that occurred	%
854	Command Max	Maximum command that occurred	%
855	Command Avg	Average command during operation	%
1056	Error Word	Last occurred error	
1064	Error Memory 1 Error	Error memory 1 - error type	
1065	Error Memory 1 Day	Error memory 1 - day in which the error occurred	day
1066	Error Memory 1 Hour	Error memory 1 - hour in which the error occurred	hour
1067	Error Memory 1 Minute	Error memory 1 - minute in which the error occurred	minutes
1068	Error Memory 2 Error	Error memory 2 - error type	-
1069	Error Memory 2 Day	Error memory 2 - day in which the error occurred	day
1070	Error Memory 2 Hour	Error memory 2 - hour in which the error occurred	hour
1071	Error Memory 2 Minute	Error memory 2 - minute in which the error occurred	minutes
1072	Error Memory 3 Error	Error memory 3 - error type	
1073	Error Memory 3 Day	Error memory 3 - day in which the error occurred	day
1074	Error Memory 3 Hour	Error memory 3 - hour in which the error occurred	hour
1075	Error Memory 3 Minute	Error memory 3 - minute in which the error occurred	minutes
1076	Error Memory 4 Error	Error memory 4 - error type	
1077	Error Memory 4 Day	Error memory 4 - day in which the error occurred	day
1078	Error Memory 4 Hour	Error memory 4 - hour in which the error occurred	hour
1079	Error Memory 4 Minute	Error memory 4 - minute in which the error occurred	minutes
1080	Error Memory 5 Error	Error memory 5 - error type	
1081	Error Memory 5 Day	Error memory 5 - day in which the error occurred	day
1082	Error Memory 5 Hour	Error memory 5 - hour in which the error occurred	hour

Valve Parameter - read only

Parameter	Function	Description	Unit
1083	Error Memory 5 Minute	Error memory 5 - minute in which the error occurred	minutes
1084	Error Memory 6 Error	Error memory 6 - error type	
1085	Error Memory 6 Day	Error memory 6 - day in which the error occurred	day
1086	Error Memory 6 Hour	Error memory 6 - hour in which the error occurred	hour
1087	Error Memory 6 Minute	Error memory 6 - minute in which the error occurred	minutes
1088	Error Memory 7 Error	Error memory 7 - error type	
1089	Error Memory 7 Day	Error memory 7 - day in which the error occurred	day
1090	Error Memory 7 Hour	Error memory 7 - hour in which the error occurred	hour
1091	Error Memory 7 Minute	Error memory 7 - minute in which the error occurred	minutes
1092	Error Memory 8 Error	Error memory 8 - error type	
1093	Error Memory 8 Day	Error memory 8 - day in which the error occurred	day
1094	Error Memory 8 Hour	Error memory 8 - hour in which the error occurred	hour
1095	Error Memory 8 Minute	Error memory 8 - minute in which the error occurred	minutes
1096	Error Memory 9 Error	Error memory 9 - error type	
1097	Error Memory 9 Day	Error memory 9 - day in which the error occurred	day
1098	Error Memory 9 Hour	Error memory 9 - hour in which the error occurred	hour
1099	Error Memory 9 Minute	Error memory 9 - minute in which the error occurred	minutes
1100	Error Memory 10 Error	Error memory 10 - error type	
1101	Error Memory 10 Day	Error memory 10 - day in which the error occurred	day
1102	Error Memory 10 Hour	Error memory 10 - hour in which the error occurred	hour
1103	Error Memory 10 Minute	Error memory 10 - minute in which the error occurred	minutes
1186	Command Signal Analog	Analog command signal	%
1187	Command Signal Digital	Digital command signal (IO-Link)	%
1189	Internal Command Signal	Internal command signal from the valve controller to the valve actuator	%
1194	Actual Pilot Position	Actual position of the pilot stage	%

Error Codes

Error code	Error Description
0	no errors
8	overvoltage error
13	electronics temperature too low (< -20 °C)
14	electronics temperature too high (> 85 °C)
15	electronics temperature exceeded
16	over current shutdown
26	cable break command signal
27	cable break feedback signal 1
28	cable break feedback signal 2
51	firmware restarted
52	hardware failure
67	"spool Fail-Safe monitoring the valve spool has left the power-down-range"
71	hardware failure
72	hardware failure
73	hardware failure
74	hardware failure
82	undervoltage error
83	over current shutdown
84	over current shutdown
85	over current shutdown
86	over current shutdown
91	actuator shut down - overtemperature shutdown

LED flashing signals of the valve electronics

The device status is indicated by an LED with two color fields. Different device states are indicated by the color combinations and the flashing frequency.

Device status	LED field 1		LED field 2	
	Colour	Flash frequency	Colour	Flash frequency
Normal				
Active	Green	Permanent	Green	Permanent
Disabled	Green	1 Hz	Green	1 Hz
On Hold	Green	0.5 Hz	Green	0.5 Hz
Warning				
Active	Yellow	Permanent	Yellow	Permanent
Disabled	Yellow	1 Hz	Yellow	1 Hz
Error				
Active	Red	Permanent	Red	Permanent
Disabled	Red	1 Hz	Red	1 Hz
Normal + active IO Link communication				
Active	Blue	Permanent	Green	Permanent
Disabled	Blue	1 Hz	Green	1 Hz
On Hold	Blue	0.5 Hz	Green	0.5 Hz
Warning + active IO Link communication				
Active	Blue	Permanent	Yellow	Permanent
Disabled	Blue	1 Hz	Yellow	1 Hz

Air Bleeding of Hydraulic System

During initial startup, after an oil change as well as after the opening of lines or valves the hydraulic system must be air bled.

Filter

The function and lifetime of the valve are strongly affected by the cleanliness of the fluid.


Purity level class of 18/16/13 acc. ISO4406 is required.

Flushing

It is recommended to flush the pipelines by short circuiting the pressure and return lines. This prevents the installation dirt from entering the valve.

7. Trouble Shooting

Basic of troubleshooting is always a systematic approach.

 For suspect of a sluggish spool the valve may



be flushed with clean pressure fluid.

Troubleshooting in a hydraulic system requires detailed knowledge about function and construction of the system. Therefore the work may exclusively be performed by qualified personnel.

malfunction at hydraulic load runtime								
- generally no function								
- high frequent oscillation								
- low frequent oscillation								
- one way operation only								
- speed variations at unchanging command								
- different speeds depending on travel direction								
- speed too low								
- drifting without command								
- poor dynamic								
possible reasons for malfunction				corrective actions				
X							hydraulic pump resp. motor defective	replace hydraulic pump resp. motor
X	X	X	X	X	X	X	drive overloaded	reduce pressure resp. speed, increase valve size
X	X	X	X	X	X	X	valve contaminated	clean pressure fluid, filter / flush valve
			X	X		X	hydraulic fluid too viscous / too cold	change fluid grade, provide operational temperature
X	X	X					too low oil level within tank	refill pressure fluid
			X	X	X		filter contaminated	replace filter
X	X			X	X		supply voltage too low	keep supply voltage range
	X						supply voltage carries too much ripple	reduce ripple
X		X		X			command signal too low	increase command signal
	X						command signal carries too much ripple	reduce ripple
		X	X				center position adjustment incorrect	check center position adjustment
X	X		X	X	X		contacts of central connector contaminated	clean contacts / replace plug
X							feed cable interrupted	fix feed cable
X	X	X	X	X	X	X	wiring sequence incorrect	correct wiring sequence
X						X	feed cable without shielding	change cable grade

8. Accessories / Spare Parts

Accessories

The following accessories are available for the valve series DFplus:

Bolt kit

D1FE/D1FP ordering code BK 375

D3FE/D3FP/D30FP ordering code BK 385

Female connection

Code 0: 6+PE ordering code 5004072

Code 5: 11-PE ordering code 5004711

Code 7: 6-PE ordering code 5004072

Spare Parts

Seal kit NBR

D1FE/D1FP ordering code SK-D1FP

D3FE/D3FP/D30FP ordering code SK-D3FP

Please direct technical product enquiries to:

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