

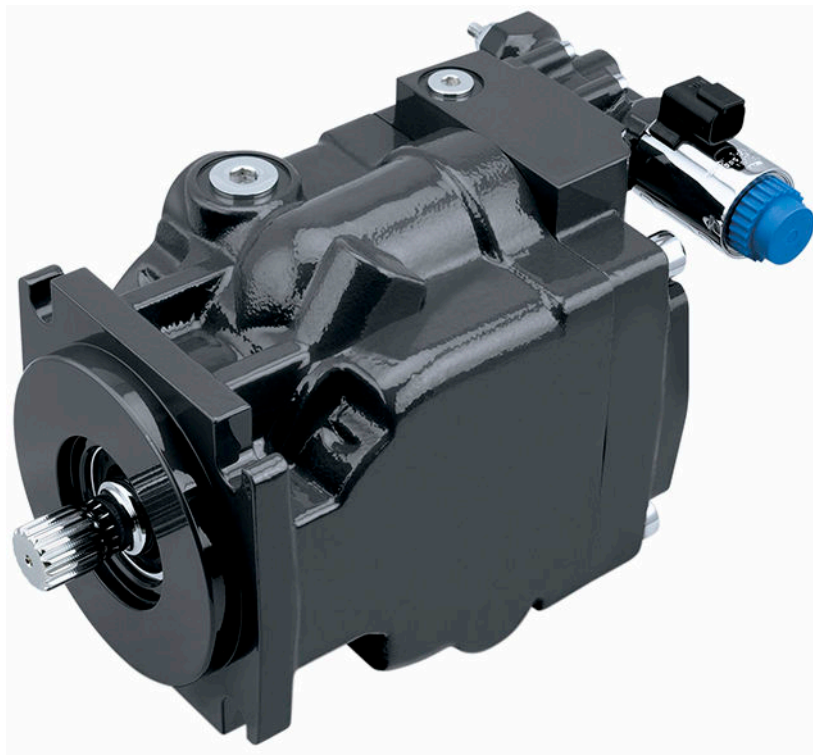
ENGINEERING
TOMORROW



Electrical Installation

Series 45 Pumps

Fan Drive Control (FDC)



Revision history

Table of revisions

Date	Changed	Rev
July 2016	First edition	0101

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Literature references

Literature references

Literature title	Description	Literature number
<i>S45 Axial Piston Open Circuit Pumps Technical Information</i>	Complete product electrical and mechanical specifications	520L0519
<i>S45 Pump Fan Drive Control Function Block User Manual</i>	Compliant function block set-up information	BC00000369

Latest version of technical literature

Danfoss product literature is online at: <http://powersolutions.danfoss.com/literature/>

Product overview

Product image

S45 Fan Drive Control



Order code

S45 Pump model code

R	S	P	C	D	E	F	G	H	J	K	L	M	N

Fan Drive Control configuration

The available Normally Closed Fan Drive Controls for Series 45 are shown below. The allowable Pressure Compensator (PC) pressure settings are provided for each frame.

C module—Control

Fan Drive Control Options		Frame				
Code	Description	L	K	J	F	E
SA	Pressure Compensation (12Vdc), 100-210 Bar, Left			•	•	
SB	Pressure Compensation (24Vdc), 100-210 Bar, Left			•	•	
SC	Pressure Compensation (12Vdc), 220-310 Bar, Left			•	•	
SD	Pressure Compensation (24Vdc), 220-310 Bar, Left			•	•	
SE	Pressure Compensation (12Vdc), 100-210 Bar, Right			•	•	
SF	Pressure Compensation (24Vdc), 100-210 Bar, Right			•	•	
SG	Pressure Compensation (12Vdc), 220-310 Bar, Right			•	•	
SH	Pressure Compensation (24Vdc), 220-310 Bar, Right			•	•	

G module options—Choke Orifice

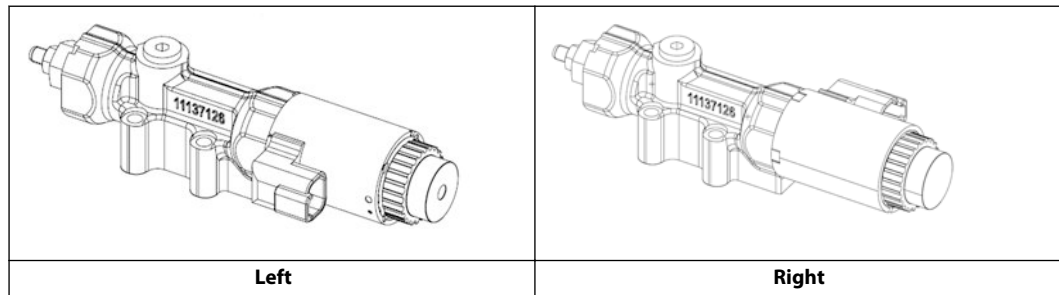
Fan Drive Control options	Choke Orifice size
G	0.8 mm (0.031 in)
F	1.0 mm (0.039 in)

H module options—Gain Orifice

Fan Drive Control options	Gain Orifice Size
E	1.2 mm (0.047 in)

Product overview

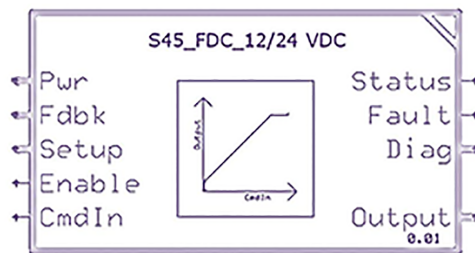
NC Fan Drive Control 3D Views



Fan Drive Control Principle

The Fan Drive Control is a unique electrically actuated pressure control solution that consists of a normally closed proportional solenoid and one dual diameter spool sliding in the control housing. System pressure acts on an area between the two spool diameters of the spool lands. This hydraulic force is balanced with forces of springs and the solenoid when the spool is in the metering position. When no current is sent to the solenoid it operates the pump at or below the PC setting which is adjusted mechanically with the adjustor screw and lock nut. Increasing the control current proportionally reduces the pump's outlet pressure until a minimum standby pressure is reached.

Control Block 12V and 24V



The minimum system pressure is given by swashplate moments of the pump and by servo system leakages which produce a pressure drop across the control. In addition, fan motor type and fan inertia impact minimum system pressure.

The Normally Closed Fan Drive Control coupled with a microprocessor allows the pump to operate at an infinite range of operating pressures between a minimum system pressure and PC setting.

We recommend that a relief valve be installed in the pump outlet for additional system protection.

Warning

The Fan Drive Control is intended for fan drive systems only! Use in other systems could result in system component damage or unintended machine movement. The Fan Drive Control is not intended to serve as the primary system pressure relief. Loss of the input signal to this control will cause the pump to produce maximum flow.

Product overview

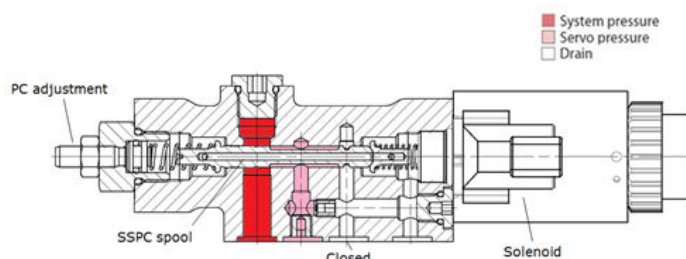
Fan Drive Control System Characteristics

- Constant pressure and variable flow
- High or low system pressure mode based on fan cooling demand
- System flow adjusts to meet system requirements

Unintended Applications for Fan Drive Control Systems

- Applications with frequent PC events (system pressure overshoots)
- Adjustable Load Sensing systems

Fan Drive Control Cross Section



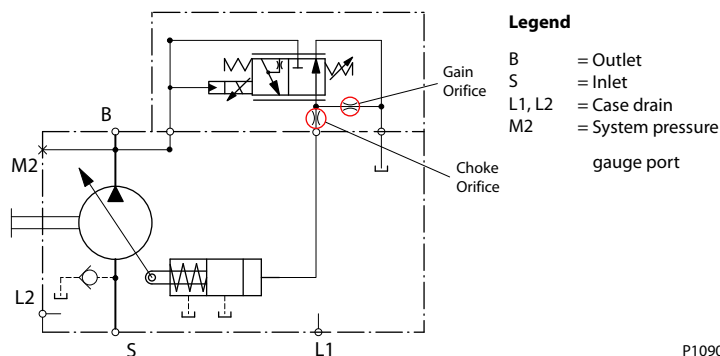
Fan Drive Control characteristic - Normally Closed

When an electric current is sent to the Normally Fan Drive Control, pump outlet pressure decreases proportionally to the increase in current. When the load in the system changes, the pump will adjust its displacement to maintain the pressure demanded by the controlling current. This predictable control is especially useful for fan-drive systems, due to the direct relationship between fan-speed and pump pressure. Due to the nature of the Fan Drive Control, the relationship between current and pump pressure is unique for each individual PC pressure setting combination. The relationship between pump outlet pressure and control input current (for a 24V coil) is shown for various PC settings below. The hydraulic schematic for the Normally Closed Fan Drive Control is shown below as well.

Attaining remarkably low system pressures is possible with the Fan Drive Control. The minimum system pressure is greatly dependent on individual system parameters such as fan motor type and fan size. This feature is highly desirable in low cooling demand conditions to keep fan speed as slow as possible.

Virtually eliminated control deadband increases controllability and reduces power loss. Control current resolution is greatly improved.

S45 pump with integrated FDC control Schematic



P109019

Product overview

Solenoid data – Normally closed

Solenoid Data – Normally Closed

	12V	24V
Connector on solenoid	Deutsch DT04-2P	
Mating Connector (not included)	Deutsch DT06-2S	
Identification by color of nut	Black	Blue
Nominal current	1650 mA	840 mA
Maximum Control Current	1800 mA	920 mA
Environmental rating	IP67 without mating connector, IP69K with mating connector	
Maximum output driver current	2.0 Amps	
PLUS+1 dither frequency	Not recommended	
Useable PWM Frequency Range	50-200 Hz	
Recommended PWM Frequency	200 Hz	
Nominal Resistance at 20°C	3.66 Ω	14.2 Ω
Inductivity (pin at stroke end)	33 mH	140 mH
Minimum voltage	9.5 Vdc	19.0 Vdc
Maximum power	17.9 Watts	18.1 Watts

The Fan Drive Control is designed as a current driven control. It requires a PWM- input signal.

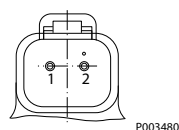
Electrical installation

Connectors

Description	Quantity	Ordering Number
Mating Connector	1	Deutsch® DT06-2S
Wedge Lock	1	Deutsch® W25
Socket Contact (16 and 18 AWG)	2	Deutsch® 0462-201-16141
Danfoss mating connector kit	1	K29657

Pinout

Pin location



Pin	Function
1	Power ground- or PWMOUT
2	PWMOUT or Power ground-

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