

ENGINEERING
TOMORROW



Electrical Installation

S45 Pump

Electric Proportional Control



Revision history

Table of revisions

Date	Changed	Rev
August 2016	Updated graphs and changed to Engineering Tomorrow	0202
September 2015	Converted to Danfoss layout	BA
January 2013	First edition	AA

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Literature references**S45 Electric Proportional Control 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 Electric Proportional Control Function Block User Manual</i>	Compliant function block set-up information	L1210641

Latest version of technical literature

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

Product overview

Product image

S45 Electric Proportional Control



Nomenclature

R	S	P	C	D	E	F	G	H	J	K	L	M	N
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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Electric proportional control options—normally closed

Code	Description	Frame				
		L	K	J	F	E
AH	Electric Proportional Pressure Control w/Pressure Comp. (NC, 12VDC) Left			•	•	•
AL	Electric Proportional Pressure Control w/Pressure Comp. (NC, 24VDC) Left			•	•	•
AV	Electric Proportional Pressure Control w/Pressure Comp. (NC, 12VDC) Right			•	•	•
AK	Electric Proportional Pressure Control w/Pressure Comp. (NC, 24VDC) Right			•	•	•
BH	Electric Proportional Pressure Control w/Pressure Comp. (NC, 12VDC) [>280 bar] Left			•	•	•
BL	Electric Proportional Pressure Control w/Pressure Comp. (NC, 24VDC) [>280 bar] Left			•	•	•
BM	Electric Proportional Pressure Control w/Pressure Comp. (NC, 12VDC) [>280 bar] Right			•	•	•
BK	Electric Proportional Pressure Control w/Pressure Comp. (NC, 24VDC) [>280 bar] Right			•	•	•
EM	Electric Proportional Pressure Control w/Pressure Comp. (NC, 12VDC)	•	•			
EN	Electric Proportional Pressure Control w/Pressure Comp. (NC, 24VDC)	•	•			

Electric proportional control options—normally open

Code	Description	Frame				
		L	K	J	F	E
AH	Electric Proportional Pressure Control w/Pressure Comp. (NC, 12VDC) Left			•	•	•
AL	Electric Proportional Pressure Control w/Pressure Comp. (NC, 24VDC) Left			•	•	•
AV	Electric Proportional Pressure Control w/Pressure Comp. (NC, 12VDC) Right			•	•	•
AK	Electric Proportional Pressure Control w/Pressure Comp. (NC, 24VDC) Right			•	•	•
BH	Electric Proportional Pressure Control w/Pressure Comp. (NC, 12VDC) [>280 bar] Left			•	•	•
BL	Electric Proportional Pressure Control w/Pressure Comp. (NC, 24VDC) [>280 bar] Left			•	•	•
BM	Electric Proportional Pressure Control w/Pressure Comp. (NC, 12VDC) [>280 bar] Right			•	•	•
BK	Electric Proportional Pressure Control w/Pressure Comp. (NC, 24VDC) [>280 bar] Right			•	•	•
EM	Electric Proportional Pressure Control w/Pressure Comp. (NC, 12VDC)	•	•			
EN	Electric Proportional Pressure Control w/Pressure Comp. (NC, 24VDC)	•	•			

Product overview

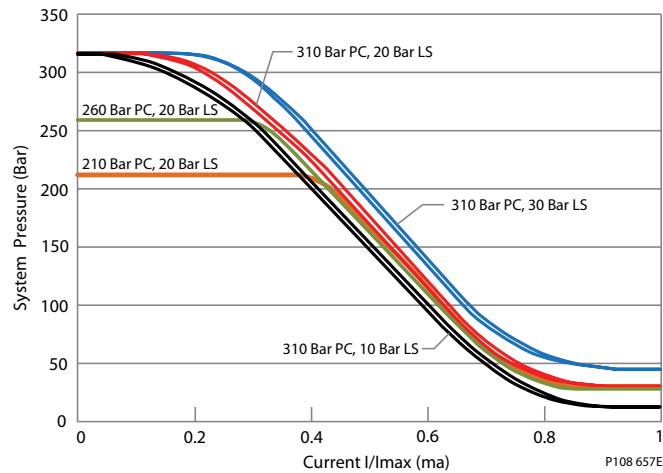
Only certain control options for the S45 pump use this electric proportional control. Please refer to the motor's nomenclature to determine if the pump is equipped with the proper option. You can find the nomenclature on the pump's nametag. For nomenclature details, refer to *S45 Axial Piston Open Circuit Pumps Technical Information, 520L0519*.

Theory of operation

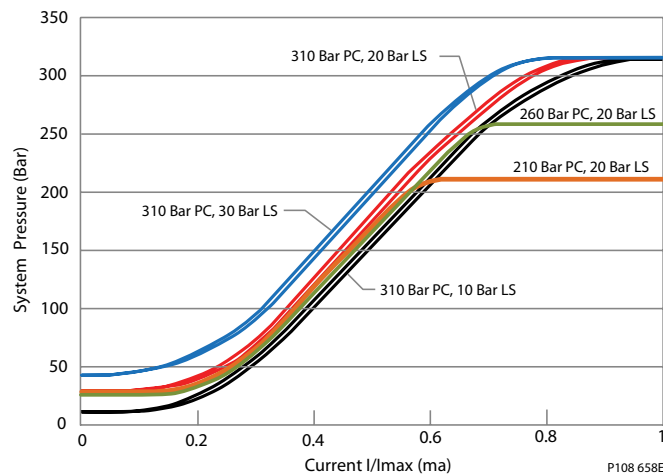
When an electric current is sent to the normally closed configuration control, the pump pressure decreases proportional to an increase in current. When an electric current is sent to the normally open configuration control, the pump pressure increases proportional to an increase in current. When the load in the system changes, the pump will adjust its displacement to maintain the pressure demanded by the controlling current. This control is especially useful for fan-drives, due to the direct relationship between fan-speed and pump pressure. Due to the nature of electric proportional controls, the relationship between current and pump pressure is unique for each individual PC/LS pressure setting combination.

Operating pressure versus input current

Normally closed electric proportional control



Normally open electric proportional control

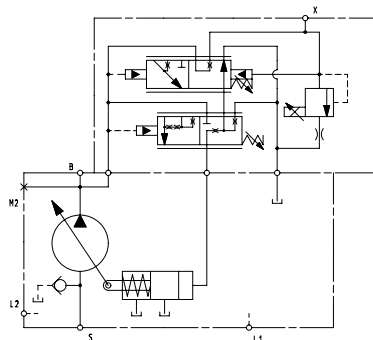


Product overview

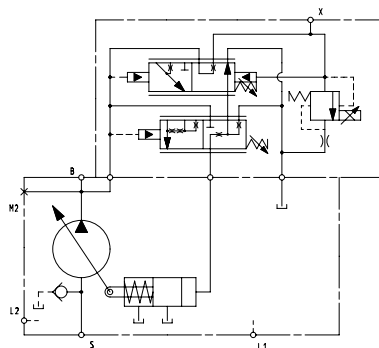
Hydraulic schematics

Pressure compensation controls

Normally closed electric proportional



Normally open electric proportional



- B** Outlet
- S** Inlet
- L1, L2** Case drain
- M2** System pressure gauge port
- X** Load sense port

Electrical specifications

For both normally open and normally closed solenoids

Voltage	12V	24V
Maximum current	1500 mA	665 mA
Inrush current	1700 mA	800 mA
Coil resistance at 20°C [70°F]	7.1 Ω	28.5 Ω
PWM range	200-300 Hz	200-300 Hz
PWM frequency (preferred)*	250 Hz	250 Hz
IP rating (IEC 60529 DIN 40050-9)	IP67	IP67
IP rating (IEC 60529 DIN 40050-9) with mating connector	IP69K	IP69K
Operating temperature	Consistent with pump limits: -40°C (-40°F) to 104°C (220°F)	Consistent with pump limits: -40°C (-40°F) to 104°C (220°F)

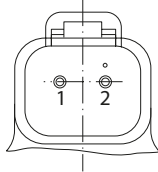
* PWM signal required for optimum control performance.

Electrical installation

Pinout

DEUTSCH connector

Pin location



Pinout

Pin	Function
1	PWM signal
2	Ground

Pinout (alternative)

Pin	Function
1	Ground
2	PWM signal

Pin compatibility

PLUS+1® module pin type

Pin	Function
1, 2	PWMOUT/DOUT/PVG Power supply*
1, 2	PWMOUT/DOUT/PVGOUT*
1, 2	Power ground

* Use output pins with configurable PWM frequency.

Mating connector

DEUTSCH connector parts list

Description	Quantity	Ordering number
Connector	1	DEUTSCH DT06-2S
Wedge lock	1	DEUTSCH W2S
Socket contact (16 and 18 AWG)	2	DEUTSCH 0462-201-16141
Mating connector kit	1	Danfoss K29657

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