

Proportional Pressure Relief Valves

KCG-3, 1* Series

Basic Characteristics

Max. pressure 350 bar (5075 psi)
 Max. flow 5 L/min (1.3 USgpm)
 Mounting face to ISO 4401 size 03

General Description

An electro-hydraulic proportional relief valve designed to regulate pressure in a hydraulic system in proportion to an applied electrical input.

These open-loop, single-stage valves can be used for direct control of pressure in low flow systems, or for pilot control of larger pressure controls, and for such applications as pressure-controlled pumps.

KCG-3

The valve responds to variations in current supply to its solenoid; separate Vickers by Danfoss amplifiers, with PWM output stage and output current control, are available for driving this model, see "Operating Data".

Other Models

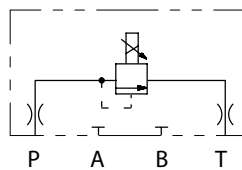
For proportional pressure relief valves with flow ratings up to 400 L/min (106 USgpm), see catalog 2324 (model types KCG, sizes 6 and 8)

Features and Benefits

- Valve design ensures low hysteresis and good repeatability.
- Self-bleeding design simplifies installation and ensures consistent performance.
- When used for piloting a large pressure relief or reducing valve, a low minimum pressure is obtainable combined with fast and stable response to step input signals.

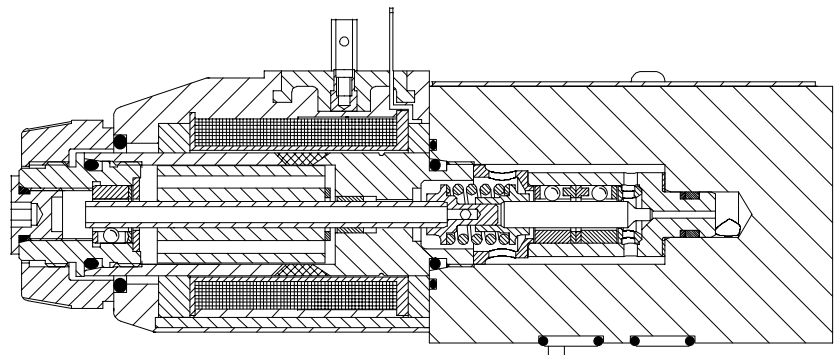
Functional Symbol

KCG-3



Typical Section:

KCG-3 Valve with Type "U" Coil Connection

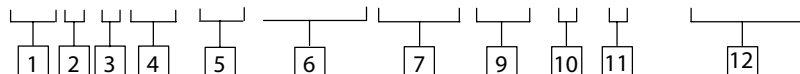


Model Code

Features in brackets () may be omitted. All other features must be specified.

Models requiring separate amplifier

KCG-3 (-L)-* -D-Z-M-***** -*** -1 -1* (P**) - (T**)**



1 Valve type
KC = Proportional pressure relief

2 Mounting type
G = Subplate mounted

3 Interface
3 = ISO 4401, size 03 (NFPA D03)

4 Solenoid location
Blank = At port B end
L = At port A end

5 Controlled pressure range
At rated flow of 1 L/min (0.26 USgpm)
40 = 2-40 bar (29-580 psi)
100 = 3-100 bar (44-1450 psi)
160 = 4-160 bar (58-2300 psi)
250 = 5-250 bar (73-3625 psi)
350 = 6-350 bar (87-5000 psi)

6 Override
DZM = Damper and no manual override

7 Coil connections
U = ISO 4400 (DIN 43650) interface
U1 = Fitted with ISO4400 with DIN plug

9 Coil rating
Code = amps x ohms ▲
G = 3,5 x 1,65
GP = 3,0 x 2,0
H = 1,6 x 7,3
HA = 0,94 x 22
HL = 0,80 x 29 ◆
▲ Resistance at 20 °C (68 °F).
◆ For valves replacing ECG-02 models.

10 Tank pressure rating
1 = 10 bar (145 psi)

11 Design number, 1* series
Subject to change. Installation dimensions unaltered for design numbers 10 to 19 inclusive.

12 Port orifice plugs
Both P** and T** must be specified or omitted
Blank - Standard orifice
08 - 0.8 mm dia.
09 - 0.9 mm dia.
10 - 1.0 mm dia.
11 - 1.1 mm dia.
12 - 1.2 mm dia.
13 - 1.3 mm dia.
14 - 1.4 mm dia.
15 - 1.5 mm dia.
18 - 1.8 mm dia.
20 - 2.0 mm dia.
99 - No orifice plug fitted

Operating Data

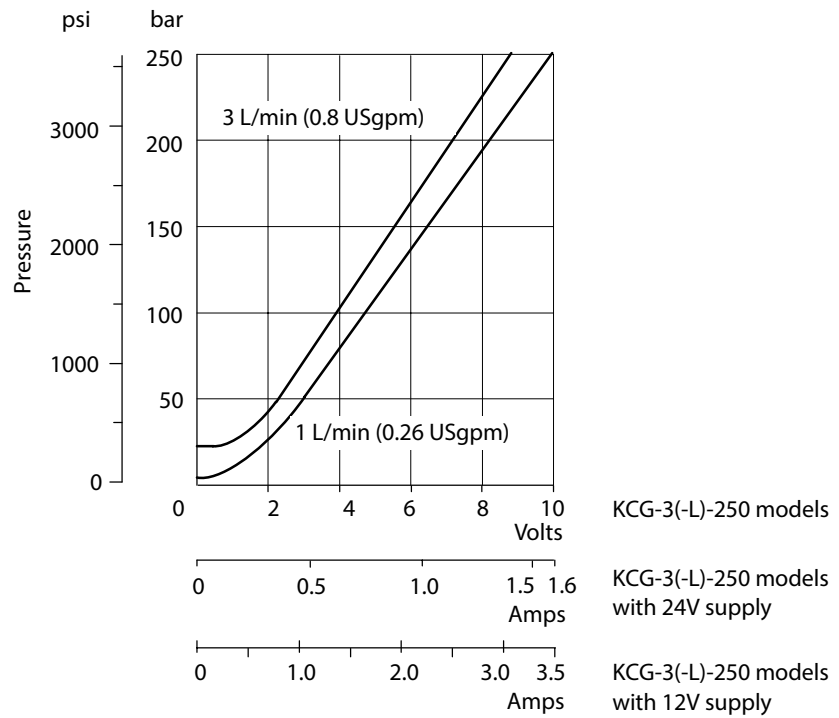
Standard test conditions are with antiwear hydraulic oil at 36 cSt (168 SUS) and 40°C (104°F)

<p>Maximum pressures:</p> <p>Port P:</p> <ul style="list-style-type: none"> Operating Static <p>Port T:</p> <ul style="list-style-type: none"> Operating Static 	<p>See 5 in “Model Code ”</p> <p>350 bar (5075 psi)</p> <p>2 bar (29 psi). See “Back pressure at port T” under “Installation and start-up ” on next page.</p> <p>210 bar (3000 psi)</p>
<p>Flow limits:</p> <ul style="list-style-type: none"> Rated flow Maximum flow 	<p>1 L/min (0.26 USgpm)</p> <p>5 L/min (1.3 USgpm)</p>
<p>Coil or amplifier rating: KCG models</p>	<p>See 9 in “Model Code ”</p> <p>24V x 40W max. (22 to 36V including 10% pk.-to-pk. max. ripple)</p>
<p>Pressure gain</p> <p>Factory setting - Maximum with 10V command signal.</p> <p>User adjustment - 30 to 120% of factory setting.</p> <p>Note that altering this setting will affect valve to valve interchangeability.</p>	<p>See graph</p>
<p>Pressure override</p>	<p>See graph</p>
<p>Minimum-pressure adjustment</p>	<p>50% of maximum pressure limit of model</p>
<p>Pressure step response:</p> <p>KCG-3-250-D-Z-M-****-H1 model using EEA-PAM-513-A-3* amplifier:</p> <ul style="list-style-type: none"> 0 to 100% step 100 to 0% step 25 to 100% step 100 to 25% step 	<p>Typical times to reach 90% of commanded step:</p> <ul style="list-style-type: none"> 48 ms 9 ms 37 ms 18 ms
<p>Linearity, between 10% and 100% of controlled pressure range</p>	<p><4%</p>
<p>Hysteresis KCG models</p>	<p><4% (with 100 mA pk.-to-pk. dither)</p> <p><5% (with factory-set dither)</p>
<p>Repeatability KCG models</p>	<p>< ± 0,5% of rated pressure for a constant coil current</p> <p>< ± 1.0% of rated pressure for a constant amplifier supply voltage and constant command signal</p>
<p>Mass (weight) KCG</p>	<p>1,7 kg (3.8 lb)</p>
<p>Supporting products:</p> <p>Amplifiers for KCG valves with “H” type coils only:</p> <ul style="list-style-type: none"> EHH-AMP-7*2 series (power plug) EEA-PAM-513-A-3* (2 adjustable ramps) <p>ISO 4400 (DIN 43650) electrical connector:</p> <ul style="list-style-type: none"> Black, marked “B” Gray, marked “A” <p>Subplates, size 03</p> <p>Mounting bolts ■</p> <p>■ Note: If not using Vickers by Danfoss recommended bolt kits, bolt must be to ISO 898 grade 12.9 or stronger.</p>	<p>See catalogs 2114, 2115 and AN456962265001en-000101</p> <p>See catalog BC444273273086en-000101</p> <p>Part number 710775</p> <p>Part number 710776</p> <p>See catalog 2425</p> <p>See catalog 2314A</p>
<p>Installation and start-up (commissioning):</p> <p>Installation and start-up (commissioning) guide</p> <p>Electrical data</p> <p>Electromagnetic capability</p> <p>Mounting attitude</p> <p>Back pressure at port T</p>	<p>Installation guidelines can be found in PowerSource.</p> <p>See under that heading on previous page.</p> <p>See under that heading on previous page.</p> <p>No restriction, provided that the valve is kept full of fluid through port T.</p> <p>Port T should be piped directly to reservoir with minimum restriction. Any back pressure at this port is additive to the controlled pressure at port P. The recommended max. pressure at port T when the valve is controlling pressure is 2 bar (29 psi); the max. pressure at T under static conditions is 210 bar (3000 psi).</p>

Performance Data

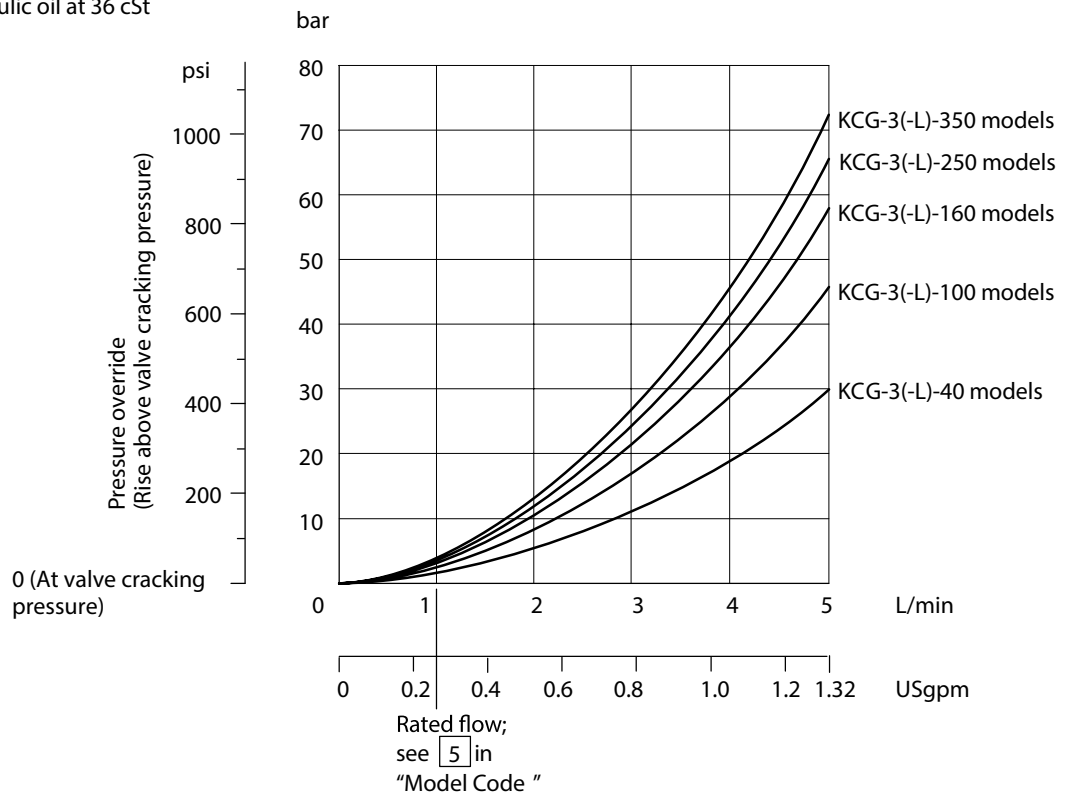
Pressure Gain, Typical
 Typical pressure v. command signal
 response of KCG-3-250 models

Test conditions:
 Fluid = Antiwear hydraulic oil at 36 cSt
 (168 SUS)



Pressure Override, Typical

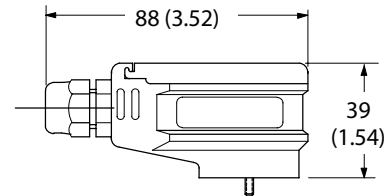
Test conditions:
 Fluid = Antiwear hydraulic oil at 36 cSt
 (168 SUS)



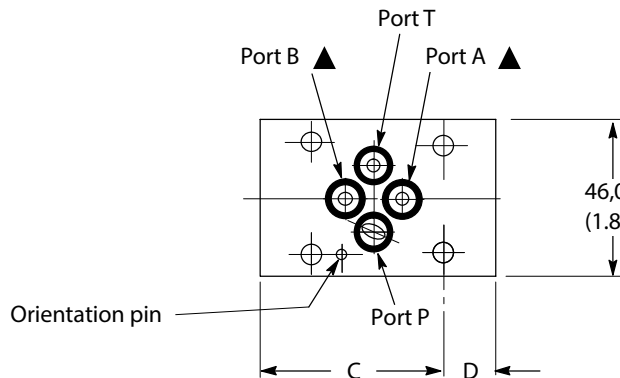
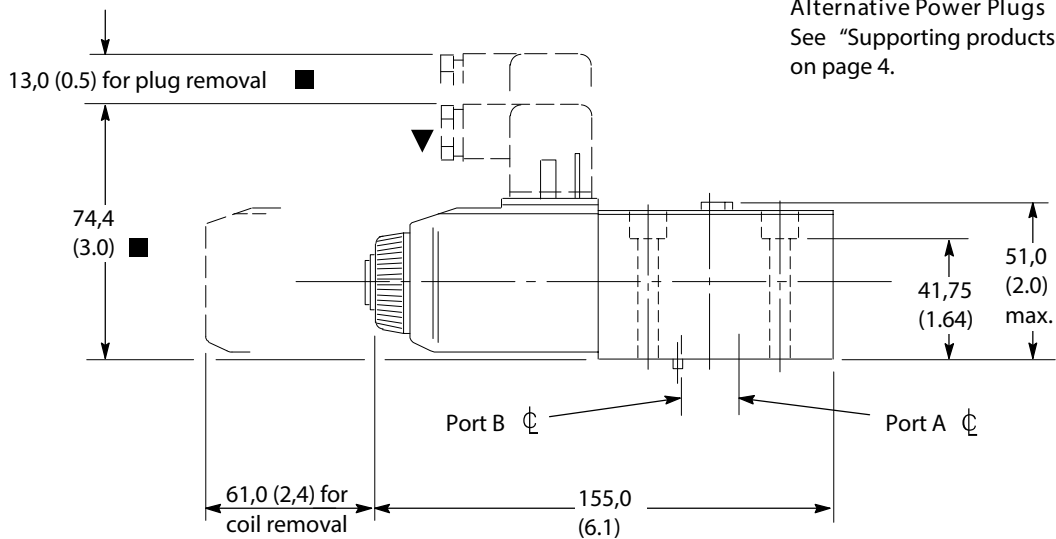
Installation Dimensions in mm (inches)

KCG-3-***-D-Z-M-U-10 models

For KCG-3- L-***-D-Z-M-U models the solenoid is mounted at port A-end of body, which then has C and D dimensions as in table.



Alternative Power Plugs
See "Supporting products"
on page 4.



Model	C	D
KCG-3-***	57,3 (2.26)	20,5 (0.81)
KCG-3-L-***	61,2 (2.41)	16,8 (0.66)

- KCG-3-(L)-***-D-Z-M-U models.
Dimensions may vary according to source of plug.
- ▲ Ports A and B are blind holes with O-ring recesses.
- ▼ The cable entry on this plug can be repositioned at 90 ° intervals by reassembly of the contact holder relative to the plug housing. The cable entry is Pg 11 for cables Ø6-10 mm (0.24-0.4 " dia).

Further Information

Hydraulic Fluids

Materials and seals used in these valves are compatible with:

Anti-wear petroleum oils L-HM
Non-alkyl based
phosphate esters L-HFD

The extreme operating range is 500 to 13 cSt (270 to 70 SUS) but the recommended running range is 54 to 13 cSt (245 to 70 SUS). For further technical information about fluids see 694.

Contamination Control Requirements

Recommendations on contamination control methods and the selection of products to control fluid condition are included in Vickers by Danfoss publication 9132 or 561, "Vickers by Danfoss Guide to Systemic Contamination Control". The book also includes information on the Vickers by Danfoss concept of "ProActive Maintenance". The following recommendations are based on ISO cleanliness levels at 2 µm, 5 µm and 15 µm.

For products in this catalog the recommended levels are:

Up to 210 bar (3000 psi) 18 /16/13
Above 210 bar (3000 psi) 17 /15/12

Installation and Start-up Guidelines

The proportional valves in this catalog can be mounted in any attitude but it may be necessary, in certain demanding applications, to ensure that the solenoids are kept full of hydraulic fluid.

If this proves to be the case any accumulated air can be bled from the solenoid bleed screw. This task is easier if the valve has been mounted base downwards. Good installation practice dictates that the tank port, and any drain port, are piped so as to keep the valve full of fluid once the system start-up has been completed.

Temperatures

For petroleum oil:

Min. -20°C (-4°F)

Max.* +70°C (158 °F)

* To obtain optimum service life from both fluid and hydraulic system, 65 °C (150 °F) normally is the maximum temperature.

For other fluids where limits are outside those of petroleum oil, consult fluid manufacturer or Danfoss representative. Whatever the actual temperature range, ensure that viscosities stay within those specified under "Hydraulic Fluids".

Ambient for:

Valves at full performance specification:

-20 to +60 °C (-4 to +140 °F).

Valves, as above, will operate at temperatures of 0 to -20 °C (32 to -4 °F) but with a reduced dynamic response.

Storage:

-25 to +85 °C (-13 to +185 °F)

Eurocard electronics:

0 to 50 °C (32 to 122 °F)

Seal Kits

KCG-302-138201

Products we offer:

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