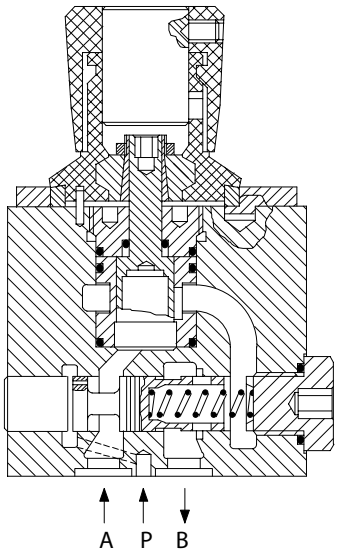
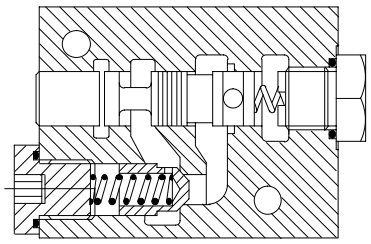
Pressure Compensated Flow Control Valves

F(C)G-3, 10 Series; ISO 4401, Size 03/NFPA D01





General Description

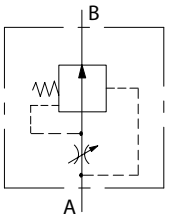
These pressure compensated valves are designed to provide adjustable controlled flow rates independent of changes in inlet and/or outlet pressures above a minimum pressure differential. Models are available with or without integral reverse flow check valves. Those with check valves are optionally available with an anti-jump feature designed to eliminate transient surges above the controlled flow rate setting whenever flow is first directed to the inlet port A.

All models have rotary adjustment of controlled flow and can be supplied with or without an integral key-lock feature.

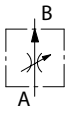
The construction of a typical model with integral check valve and anti-jump feature is shown opposite. Its operation is the same as for similar valves described in the "Industrial Hydraulics" manual although the spring-loaded hydrostat is functionally located downstream of the adjustable restrictor, as shown in the "Functional Symbols" section.

Functional Symbols

FG-3-***-*-10 models, without reverse flow check

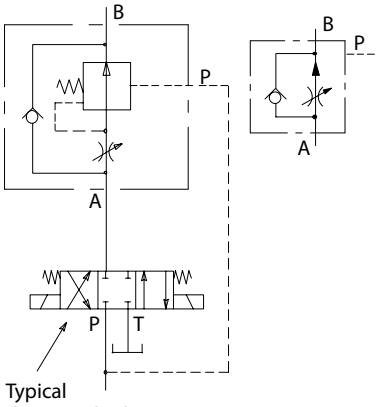


Detailed symbol



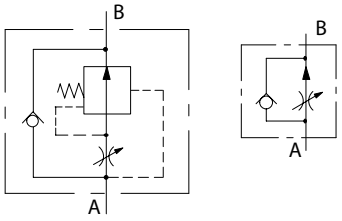
Simplified symbol

FCG-3-***-A-*-10 models, with reverse flow check and anti-jump feature



Typical directional valve

FCG-3-***-*-10 models, with reverse flow check



Basic Characteristics

Max. flow rates ..... 1,0 to 18 L/min (0.42 to 4.75 USgpm), dependent on model

Max. pressure ..... 315 (4500 psi) or 160 bar (2325 psi), dependent on model

Functions ..... In line, with or without reverse flow check and anti-jump feature

Note: FCG-3-***-A models are designed primarily for meter-in applications where the P port can be connected to an upstream point that provides continuous pilot pressure to the hydrostat to prevent "jump". Consult your Danfoss representative about alternative applications.

Model Code

F(C)G -3- *** (-A) - * - 10

1 2 3 4 5

1 Type
FCG = Flow control with reverse flow check
FG = Flow control without reverse flow check

2 Max. controlled flow rate
10 = 1,0 L/min (0.26 USgpm)
16 = 1,6 L/min (0.42 USgpm)
32 = 3,2 L/min (0.85 USgpm)
63 = 6,3 L/min (1.66 USgpm)
120 = 12,0 L/min (3.17 USgpm)
180 = 18,0 L/min (4.75 USgpm)

3 Anti-jump feature (FCG model option)
Omit when not required and for all FG models.

4 Controlled flow adjustment
H = Manual without key lock
K = Manual with key lock

5 Design number, 10 series
Subject to change. Installation dimensions remain unchanged for design numbers 10-19 inclusive.

Operating Data

Pressure Limits	
Max. pressure, all ports: FCG-3-***-A models All other models	 160 bar (2320 psi) 315 bar (4500 psi)
Min. pressure differential for effective controlled flow (port A pressure > port B pressure): F(C)G-3-10/16/32 models F(C)G-3- 63/120/180 models	 5 bar (75 psi) 8,5 bar (125 psi)

Flow Limits	
Recommended controlled flow ranges: F(C)G-3-10 F(C)G-3-16 F(C)G-3-32 F(C)G-3-63 F(C)G-3-120 F(C)G-3-180	 0,015 to 1,0 L/min (0.004 to 0.26 USgpm) 0,015 to 1,6 L/min (0.004 to 0.42 USgpm) 0,025 to 3,2 L/min (0.007 to 0.85 USgpm) 0,025 to 6,3 L/min (0.007 to 1.66 USgpm) 0,08 to 12,0 L/min (0.02 to 3.17 USgpm) 0,08 to 18,0 L/min (0.02 to 4.75 USgpm)
Max. recommended reverse flow (FCG model)	30 L/min (7.9 USgpm)

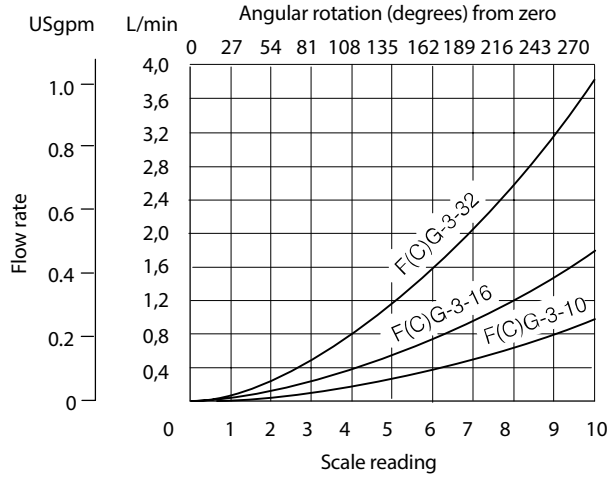
Applications
FG-3 models are for general use in meter-in, meter-out or bleed-off applications.
FCG-3-***-*-10 m odels are for general use in meter-in or meter-out applications in which high reverse flow rates can occur.

FCG-3-***-A-10 models are for similar use in those meter-in applications where the possibility of transient surges above the controlled flow rate setting, whenever flow is first directed to the inlet port, is undesirable, e.g.
- for feed speed control
- for successive fast approach/feed sequences (fine machining of interrupted bores).

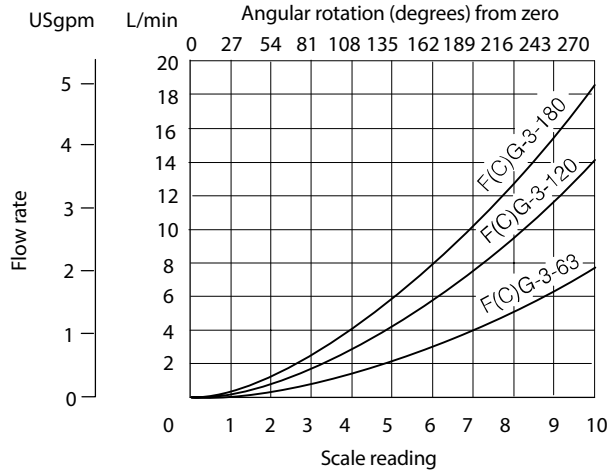
Performance Data

Typical with petroleum oil at 36 cSt (170 SUS) and at 50 °C (122 °F)

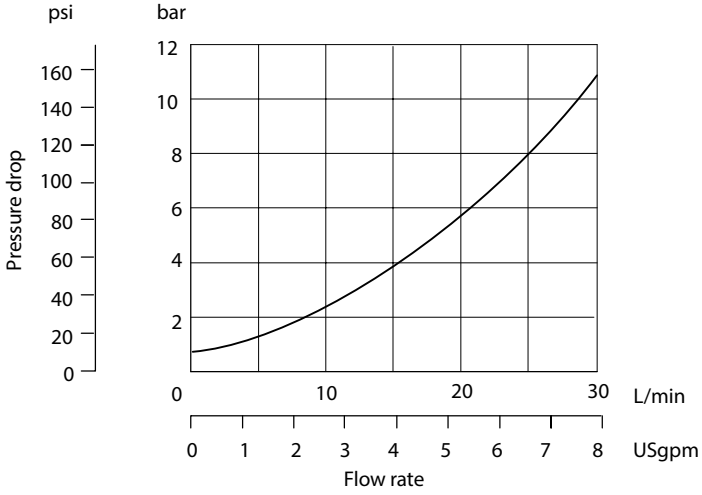
Controlled Flow, F(C)G-3-16/32 Models



Controlled Flow, F(C)G-3-63/120/180 Models



Reverse Flow Pressure Drop, FCG Models



Thermal stability of controlled flow, typical example:
Flow set at 20 °C (68 °F) .... 0,25 L/min (0.07 USgpm)
Flow increase at 70 °C (158 °F) ..... +12%

Hydraulic Fluids
All valves can be used with antiwear or other hydraulic petroleum oils. If fire-resistant fluids are required to be used, consult your Vickers by Danfoss representative. The extreme operating viscosity range is from 300 to 10 cSt (1460 to 54 SUS) but the recommended running range is from 54 to 13 cSt (245 to 70 SUS). For further information fluids see catalog 920.

Temperature Limits
Min. ..... −20 °C (−4 °F)
Max.* ..... +80 °C (176 °F)

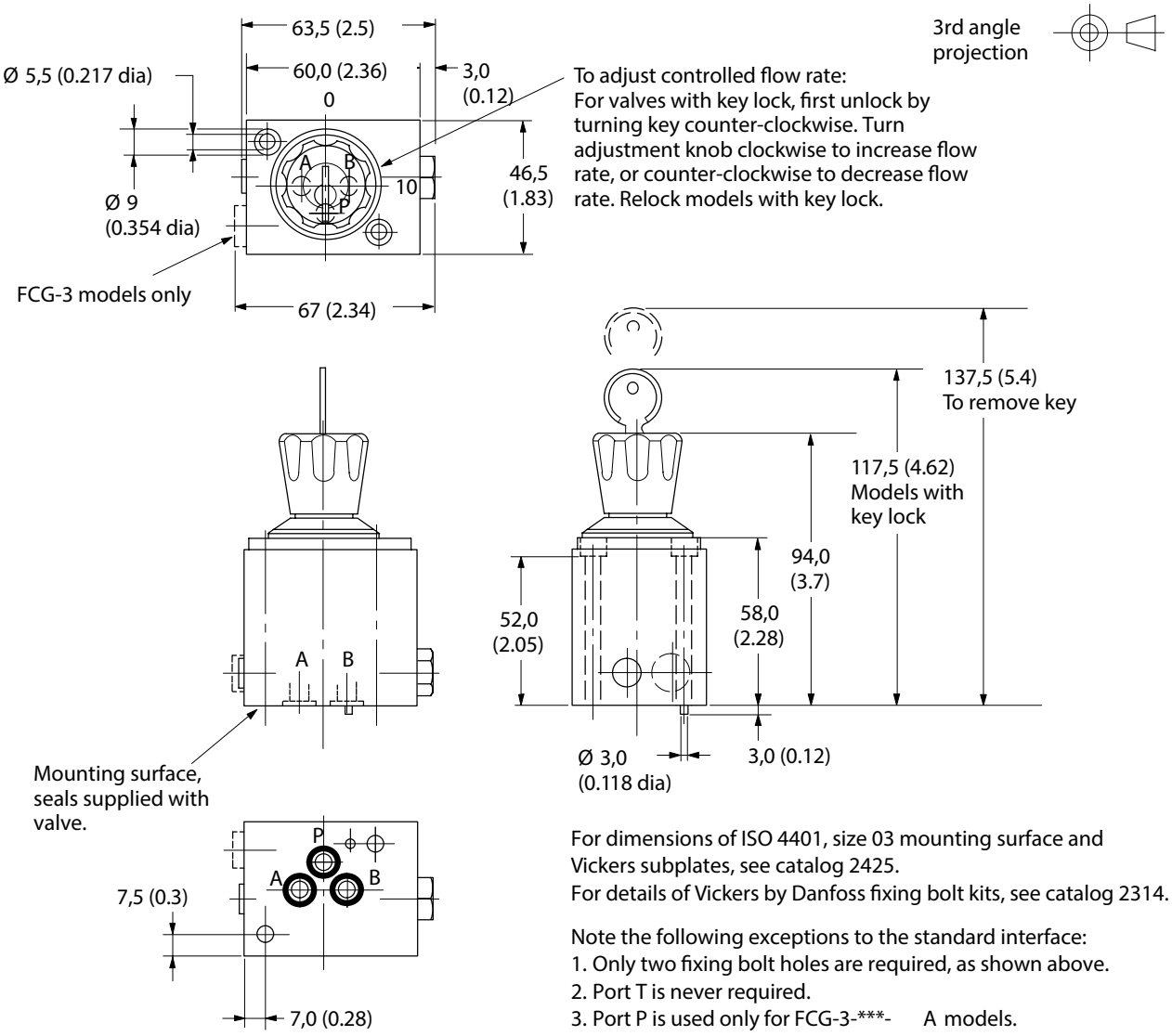
* To obtain optimum service life from both fluid and hydraulic system, 65 °C (150 °F) is normally the maximum temperature for hydraulic petroleum oils.

Whatever the actual temperature range, ensure that the viscosities stay within the limits specified in the "Hydraulic Fluids" section.

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 (3050 psi) 19/ 17/14
Above 210 bar (3050 psi) 19/ 17/14

Installation Dimensions in mm (inches)



For dimensions of ISO 4401, size 03 mounting surface and Vickers subplates, see catalog 2425.
For details of Vickers by Danfoss fixing bolt kits, see catalog 2314.

Note the following exceptions to the standard interface:
1. Only two fixing bolt holes are required, as shown above.
2. Port T is never required.
3. Port P is used only for FCG-3-***- A models.

Mass

All models ..... 1,1 kg (2.4 lb) approx.

Installation Data

Mounting Attitude
Unrestricted

Mounting Surface, Subplates and Fixing Bolts
See note in "Installation Dimensions" section. F(C)G-3 valves cannot be used to top normal ISO 4401 size 03/NFPA D01 module stacks unless the application will be satisfactory with a two-bolt fixing and with the two or three-port arrangements of the F(C)G-3 valves; consult your Vickers by Danfoss representative if such an arrangement is required.

A two-bolt fixing kit BK 986743M containing M5 x 60 long soc. hd. cap screws is available separately for securing an F(C)G-3 valve direct to a subplate.

Ordering Procedure

Valves and fixing bolt kits must be ordered as separate items e.g.
2 off FCG-3-120-A-K-10 valve
2 off BK 986743M bolt kit

Service and Repair

The construction of these valves is such that the only spare parts available are the mounting surface seals (kit no. 986742 containing three seals). Experience shows that the only servicing likely to be needed is the possibility to dismantle the spring-loaded hydrostat for cleaning in cases where contaminant has accumulated through continuous use in less than ideal environments. For details see "Spare Parts" leaflet 40594.

ENGINEERING
TOMORROW

Products we offer:

- Cartridge valves
- DCV directional control valves
- Electric converters
- Electric machines
- Electric motors
- Gear motors
- Gear pumps
- Hydraulic integrated circuits (HICs)
- Hydrostatic motors
- Hydrostatic pumps
- Orbital motors
- PLUS+1® controllers
- PLUS+1® displays
- PLUS+1® joysticks and pedals
- PLUS+1® operator interfaces
- PLUS+1® sensors
- PLUS+1® software
- PLUS+1® software services, support and training
- Position controls and sensors
- PVG proportional valves
- Steering components and systems
- Telematics

Hydro-Gear
www.hydro-gear.com

Daikin-Sauer-Danfoss
www.daikin-sauer-danfoss.com

Danfoss Power Solutions is a global manufacturer and supplier of high-quality hydraulic and electric components. We specialize in providing state-of-the-art technology and solutions that excel in the harsh operating conditions of the mobile off-highway market as well as the marine sector. Building on our extensive applications expertise, we work closely with you to ensure exceptional performance for a broad range of applications. We help you and other customers around the world speed up system development, reduce costs and bring vehicles and vessels to market faster.

Danfoss Power Solutions – your strongest partner in mobile hydraulics and mobile electrification.

Go to www.danfoss.com for further product information.

We offer you expert worldwide support for ensuring the best possible solutions for outstanding performance. And with an extensive network of Global Service Partners, we also provide you with comprehensive global service for all of our components.

Local address:

Danfoss
Power Solutions (US) Company
2800 East 13th Street
Ames, IA 50010, USA
Phone: +1 515 239 6000

Danfoss
Power Solutions GmbH & Co. OHG
Krokamp 35
D-24539 Neumünster, Germany
Phone: +49 4321 871 0

Danfoss
Power Solutions ApS
Nordborgvej 81
DK-6430 Nordborg, Denmark
Phone: +45 7488 2222

Danfoss
Power Solutions Trading (Shanghai) Co., Ltd.
Building #22, No. 1000 Jin Hai Rd
Jin Qiao, Pudong New District
Shanghai, China 201206
Phone: +86 21 2080 6201

Danfoss can accept no responsibility for possible errors in catalogues, brochures and other printed material. Danfoss reserves the right to alter its products without notice. This also applies to products already on order provided that such alterations can be made without subsequent changes being necessary in specifications already agreed.
All trademarks in this material are property of the respective companies. Danfoss and the Danfoss logotype are trademarks of Danfoss A/S. All rights reserved.

© Danfoss | September 2022