DOFLUID

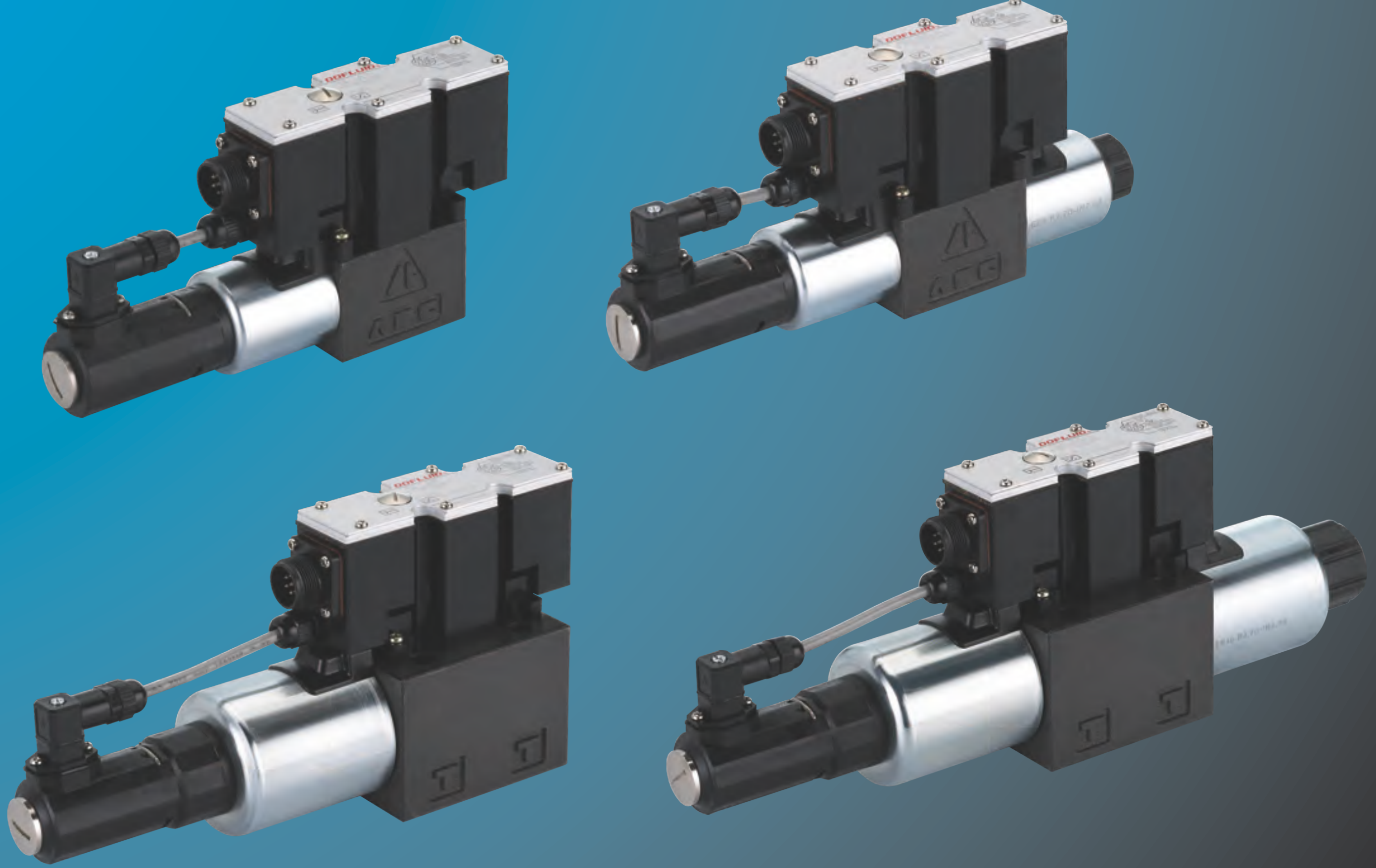
# Extra Quick Response Type valves direct operated 4/2- and 4/3-way proportional directional with electrical position feedback with integrated electronics (OBE)

C US

SGS-TÜV NO. 6042/00/0029

ISO 9001 URS REGISTERED FIRM UKAS QUALITY MANAGEMENT 043

## Type DPGEE 6/10



URS ISO 9001 International
Quality Certificate


This certificate is awarded by
UNITED URS
Registrar of Systems Ltd
Certificate of Registration
This certificate has been awarded to
DOFLUID PNEUMATIC AND HYDRAULIC CO., LTD.
in recognition of the organisation's Quality System which complies with
ISO 9001:2000
The scope of activities covered by this certificate are defined below
MANUFACTURE OF ELECTRO HYDRAULIC PROPORTIONAL PRESSURE/FLOW VALVES AND SOLENOID OPERATED DIRECTIONAL VALVES
Certificate Number: 2775 Issue No. 2
Date of Issue: 12 August 2003 (09/11/00)
Expiry Date: November 2003
Issued by:

CE Approval
for Europe


SGS-TÜV
Member of the SGS-Group and TÜV Saarland e.V.
Product Certification
CERTIFICATE
of EMC Compliance
Certificate No: 6042/00/0029
Applicant: DOFLUID PNEUMATIC & HYDRAULIC CO., LTD.
Test Report Number: EM/2000/30009
Date of Certificate Issue: April 5, 2000
Conclusion
Authorized Signatory:
SGS-TÜV Saarland Forster GmbH
Dipl.-Ing. Stefan Pranich

CSA (C/U.S.) Certificate
for U.S.A. & CANADA


CSA INTERNATIONAL
Certificate of Compliance
Certificate: 210378-1193393
Project: 1193393
Date Issued: July 11, 2001
Issued to: Dofluid Pneumatic & Hydraulic Co., Ltd.
No 10, Lane 560, Chung-Cheng N. Rd.,
Sanchung City,
Taipei Hsien, Taiwan
The products listed below are eligible to bear the CSA Mark shown, with adjacent indicator "C" and "US".
Issued by: Sebastian George, P. Eng.
Vancouver, BC Canada
PRODUCTS
CLASS 3221 01 - VALVES
CLASS 3221 81 - VALVES

CSA (C/U.S.) Certificate
for U.S.A. & CANADA


CSA INTERNATIONAL
Contract No: 210378
Project No: 1193393
Date: July 24, 2001
Mr. Chou, Pai-Chih
Dofluid Pneumatic & Hydraulic Co., Ltd.
Subject: General Purpose Valves, Solenoid Operated, Sereis DFA/B-02, DFA/B-03
Dear Mr. Chou:
Yours truly
Sebastian George, P. Eng.
Vancouver, BC Canada

**THE TOP LEADER OF SERVO CONTROL TECHNOLOGY IN ASIA**

The only Taiwan hydraulic component maker till now, possesses CSA (C/U.S.) certificate for U.S.A. & CANADA, passed the strict test under high safety rate of pressure upto 15,000 psi (1000 Bar).


**COMPANY INTRODUCTION:**
Established in 1976
Capital: NTD 1,000 Million
(about US$ 33 Million)

**Factory's major facilities:**
A. 42 CNC lathes (with auto robot arm system)
B. 67 Custom machines
C. 12 CNC machining centers
D. 8 Precision honing machines
E. 6 Super precision CNC grinding machines for spools

**DOFLUID manufacturing area:**
67,500 square feet (7,000 square meters)

**International quality approvals**
A. CE/SGS-TüV No. 6042/00/0029
B. ISO 9001
C. CSA-C/U.S. Certificate for U.S.A. & CANADA

**Market share:**
No. 1 manufacturer in Taiwan for export and domestic sales of solenoid directional valves & proportional directional / pressure / flow control valves.

**Productivity:**
Above 100,000 pcs of solenoid directional valves and proportional pressure / flow control valves per month (only hydraulic valve company in Taiwan to manufacture all parts including coils)

▲ CNC LATHES

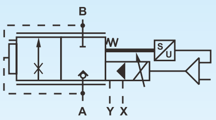
▲ SUPER PRECISION CNC GRINDING MACHINES

▲ CUSTOM MACHINES

DOFLUID®

## Extra Quick Response Type Proportional Flow Control Valves

(with Position Control)

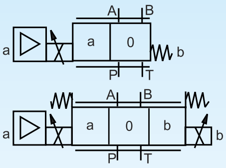


QPG-25 QPG-32 QPG-40 QPG-50

## Amplifiers

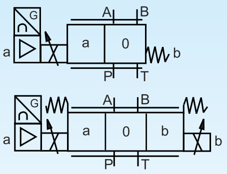
QPE-074 / 076

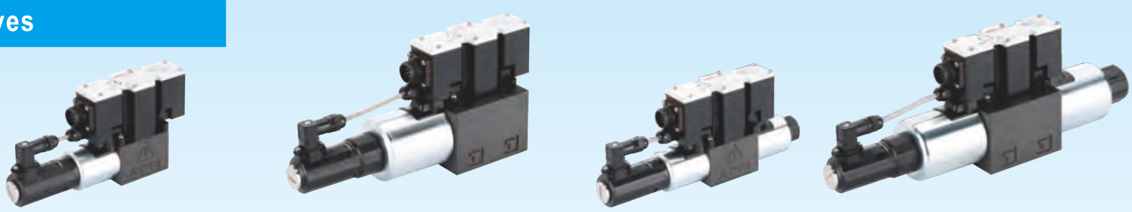
## Proportional Directional Control Valves (without Position Control)



DPGE-6-2B2B-7/15/30 DPGE-10-2B2B-30/60 DPGE-6-3C2-7/15/30 DPGE-10-3C2-30/60

## Extra Quick Response Type Proportional Directional Control Valves (with Position Control)

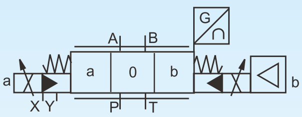


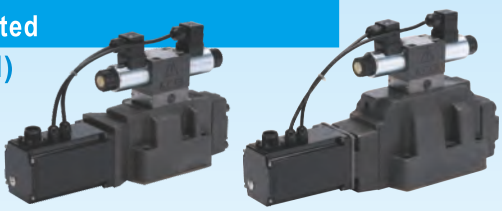


DPGEE-6-2B2B-8/16/32 DPGEE-10-2B2B-25/50/75 DPGEE-6-3C2-8/16/32 DPGEE-10-3C2-25/50/75

## Extra Quick Response Type Proportional Directional Control Valves Pilot Operated

(with Position Control)

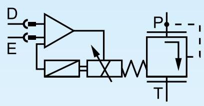


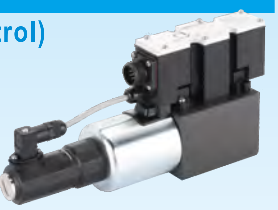


DPGKE-10/16/25/27/32/35

## Extra Quick Response Type Proportional Pressure Relief Valve

(with Position Control)





PPGEE-6-30/80/180/250/315

## Safety Valve Series

CGS-16/25/32/40/50/63 ※-DFA/B-02/03 ※-DFA/B-04/06/10

## Guide Frame with Plugs

QPF-001

## Wet Type Solenoid Operated Directional Control Valves

S-DFA / B / C-02-※-AC / DC※-※-35(35C) DFA / B / C-03-※-AC※-※-35 S-DFA / B / C-02-※-DC※-※-35 S-DFA / B / C-03-※-DC※-※-35

## Proportiona Pressure Relief and Flow Control Valves

EDG-01 EBG-03 / 06 / 10 EFBG-03 / 06 / 10

## Overview of contents



## Features

– Direct operated proportional directional valve with electrical posisiton feedback and integrated electronics (OBE) for type DPGEE
– Closed loop control of the direction and size of a flow
– Operation is by proportional solenoids with a central thread and removable coil
– For subplate mounting:
  Porting pattern to ISO 4401,
  subplates to catalogue sheets (separate order)
– Spring centred control spool
– Control electronics
  • DPGEE
    - integrated electronics (OBE) with voltage input or current input (A1 resp. B1)

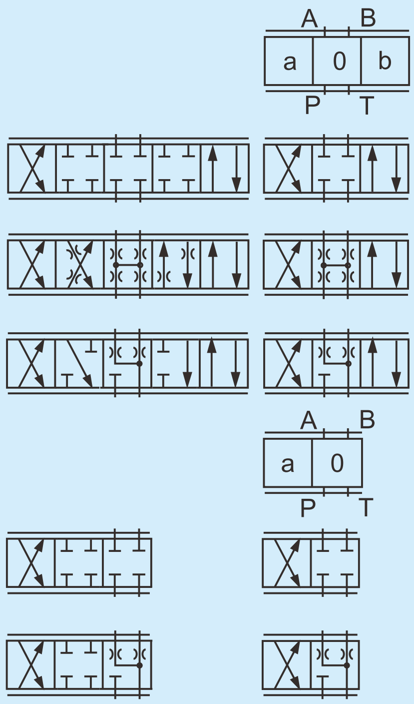
## Ordering details

| DPGEE | | | | D24 | | | N | * |
|---|---|---|---|---|---|---|---|---|

With integrated electronics (OBE)

Nominal size 6 = 6
Nominal size 10 = 10

**Spool symbols**




= 3C2
3C2-1

= 3C3

= 3C40
3C40-1

= 2B2B

= 2B40B

With spool symbols 3C2-1 and 3C40-1:

P → A: $q_{Vmax}$ B → T: $q_V/2$
P → B: $q_V/2$ A → T: $q_{Vmax}$

Note:
For spools 3C40 and 2B40B there is, in the neutral position, a connection between A to T and B to T with approx. 3 % of the relevant nominal cross-section.

Manufacturing year
12: 2012
13: 2013

N = NBR seals

Electronic interfaces A1 or B1
For DPGEE
A1 = Command value input ±10 V
B1 = Command value input 4 to 20 mA

Electrical connections
For DPGEE:
No code = without DIN type DF31
DF31= plug-in connector – separate order

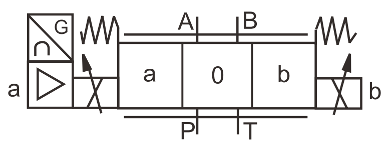
D24= Power supply voltage 24 VDC

Nominal flow at a valve pressure differential $\Delta p$ = 10 bar

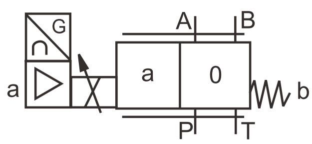
| | Nominal size 6 |
|---|---|
| 08= | 8 l/min |
| 16= | 16 l/min |
| 32= | 32 l/min |
| | Nominal size 10 |
| 25= | 25 l/min |
| 50= | 50 l/min |
| 75= | 75 l/min |

## Symbols

Proportional directional valves without integrated electronics
Type DPGEE-3C2; DPGEE-3C40




Type DPGEE-2B2B; DPGEE-2B40B

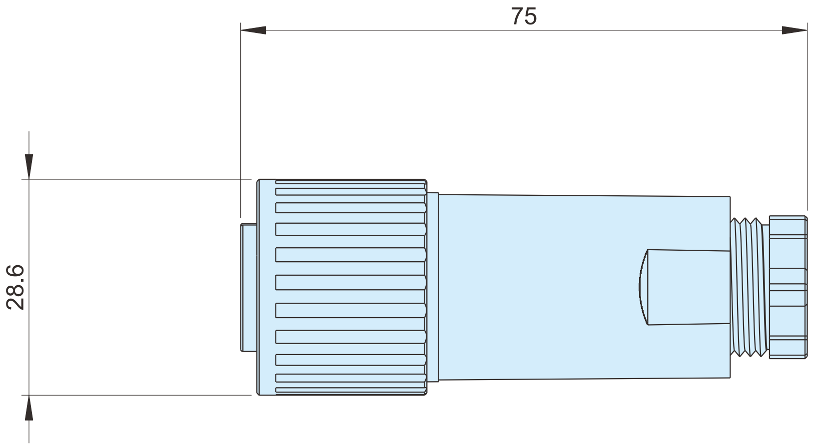


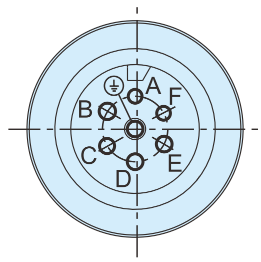
## Technical data

| General | | | | |
|---|---|---|---|---|
| Nominal size | | | 6 | 10 |
| Installation | | | optional, preferably horizontal | |
| Storage temperature range | | °C | –20 to +80 | |
| Ambient temperature range | | °C | –20 to +50 | |
| Weight | | kg | 2.4 | 6.5 |
| **Hydraulic** (measured with HLP46, $\vartheta_{oil}$ = 40 °C ± 5 °C and $p$=100 bar) | | | | |
| Max. operating pressure | Ports A, B, P | bar | 315 | |
| | Port T | bar | 210 | |
| Nominal flow $q_{V\ nom}$ at $\Delta p$ = 10 bar | | l/min | 8, 16, 32 | 25, 50,75 |
| Max. permissible flow | | l/min | 80 | 180 |
| Pressure fluid | | | mineral oil (HL, HLP) to DIN 51524<br>other pressure fluids on request! | |
| Pressure fluid temperature range | | °C | –20 to +80 (preferably +40 to +50) | |
| Viscosity range | | $mm^2/s$ | 20 to 380 (preferably 30 to 46) | |
| Max. permissible degree of pressure fluid contamination cleanlisness class to ISO 4406 © | | | class 20/18/15 | |
| Hysteresis | | % | ≤ 0.1 | |
| Reversal span | | % | ≤ 0.05 | |
| Response sensitivity | | % | ≤ 0.05 | |
| Zero point displacement with changes to the pressure fluid temperature and operating temperature | | %/10K | 0.15 | |
| | | %/100 bar | 0.1 | |
| **Electical** | | | | |
| Nominal size | | | 6 | 10 |
| Voltage type | | | DC | |
| Command value signal | Voltage input „A1“ | V | ±10 | |
| | Current input „B1“ | mA | 4 to 20 | |
| Solenoid coil resistance | Cold value at 20 °C | Ω | 2.7 | 3.7 |
| | Max. warm value | Ω | 4.05 | 5.55 |
| Duty | | % | 100 | |
| Max. coil temperature | | °C | 150 | |
| Electrical connection | | | plug-in connector DIN type DF31 | |
| **Control electronics** | | | | |
| Supply voltage | Nominal voltage | VDC | 24 | |
| | Lower limiting value | V | 19.4 | |
| | Upper limiting value | V | 35 | |
| Amplifier current consumption | $I_{max}$ | A | <2 | |
| | Max. impulse current | A | 3 | |

## Integrated electronics (OBE) for type DPGEE (nominal dimensions in mm)

For pin allocation, see block circuit diagram
Plug-in connector to DIN type DF31 separate order




| Component plug allocation | Contact | Interface A1 signal | Interface B1 signal |
|---|---|---|---|
| Supply voltage | A | 24 VDC (u(t) = 19.4 to 35 V); $I_{max}$ = 2 A | |
| | B | 0 V | |
| Reference potential actual value | C | Ref. contact F; $R_e$ > 50 kΩ | Ref. contact F; $R_e$< 10 Ω |
| Differential amplifier input | D | ±10 V command value; $R_e$>50 kΩ | 4 to 20 mA command value; $R_e$>100 Ω |
| | E | reference potentional command value | |
| Measurement output (actual value) | F | ±10 V actual value (limiting load 5 mA) | 4 to 20 mA actual value, load resistance max. 300 Ω |
| | PE | connected with cooling body and valve housing | |

Com. value: A positive command value 0 to +10 V (or 12 to 20 mA) at D and the reference potential at E results in a flow from P to A and B to T.
A negative command value 0 to –10 V (or 12 to 4 mA) at D and the reference potential at E results in a flow from P to B and A to T.
For a valve with 1 solenoid on side a (e.g. spool variants 2B2B and 2B40B) a positive command value 0 to +10 V or 4 to 20 mA) at D and the reference potential at E results in a flow from P to B and A to T.

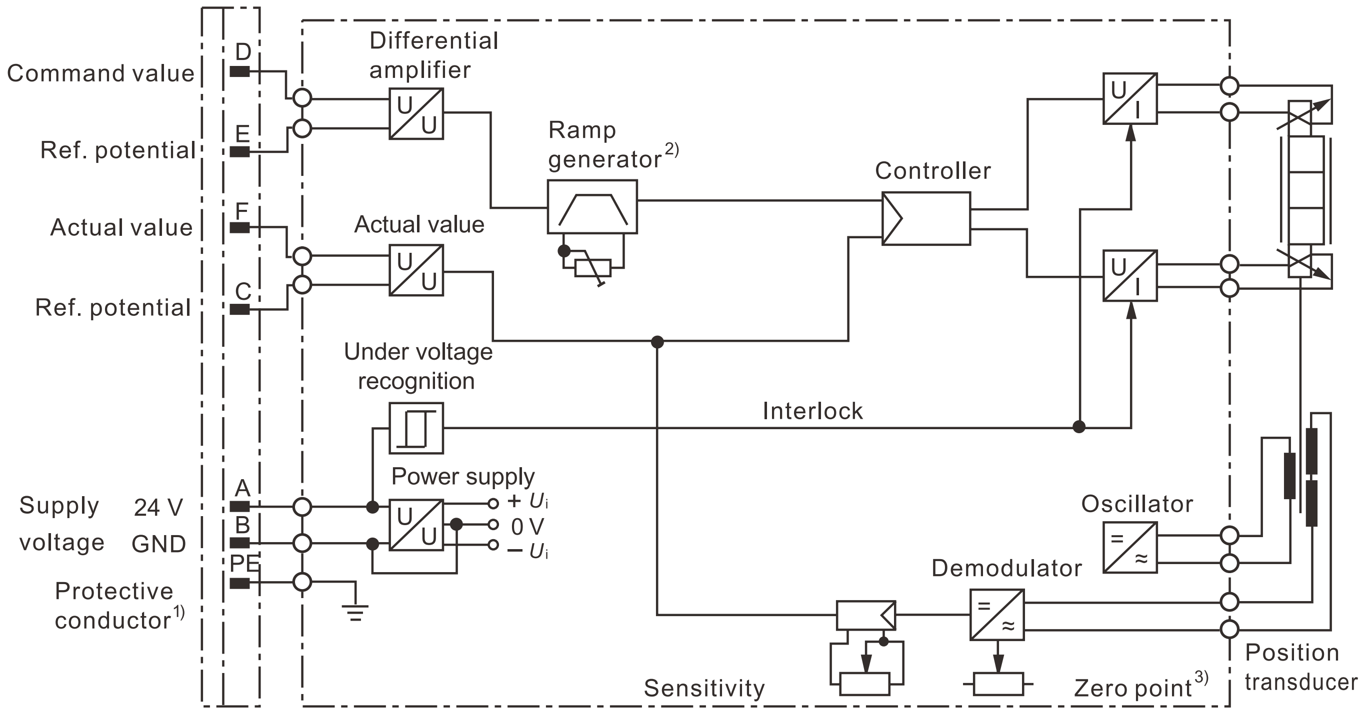
Actual value: Actual value 0 to +10 V resp. 12 to 20 mA at F and the reference potential at C results in flow from P to A and B to T, 0 to –10 V resp. 12 to 4 mA results in flow from P to B and A to T.
For a valve with 1 solenoid results 4 to 20 mA at F and the reference potential at C results in flow from P to B and A to T.

Connection cable: Recommendation: – up to 25 m cable length type LiYCY 7 x 0.75 $mm^2$
– up to 50 m calbe length type LiYCY 7 x 1.0 $mm^2$
For outside diameter see plug-in connector sketch
Only connect screen to PE on the supply line.

## Integrated electronics (OBE) for type DPGEE

Block circuit diagram / connection allocation

| Interface | Integrated electronics (OBE) | Valve |
|---|---|---|

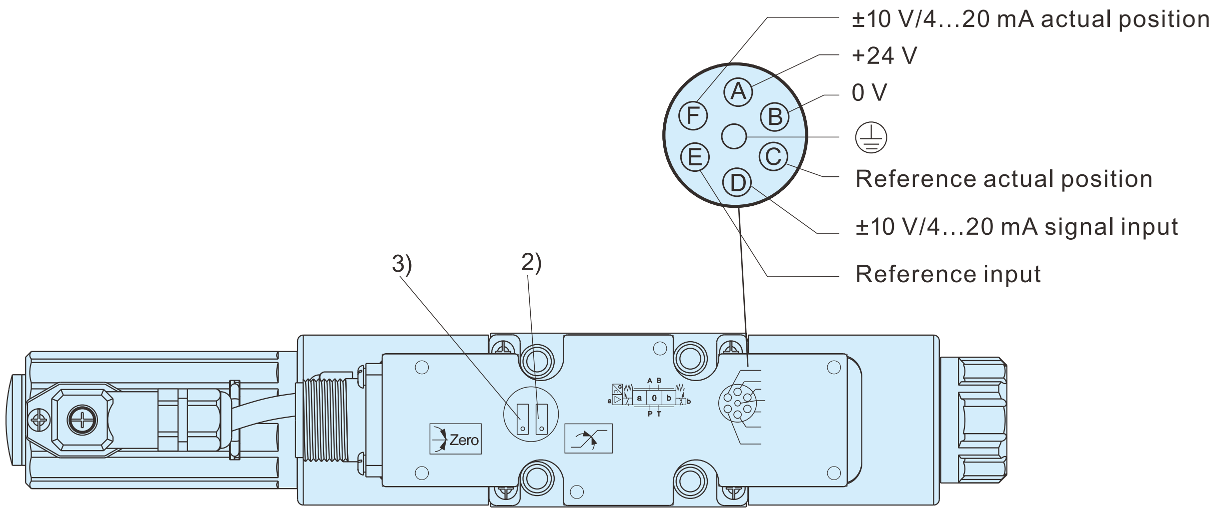



Note: Electrical signals processed by control electronics (e.g. actual value) must not be used for switching off safety relevant machine functions!

1) The protective conductor (PE) is connected to the cooling body and the valve housing!

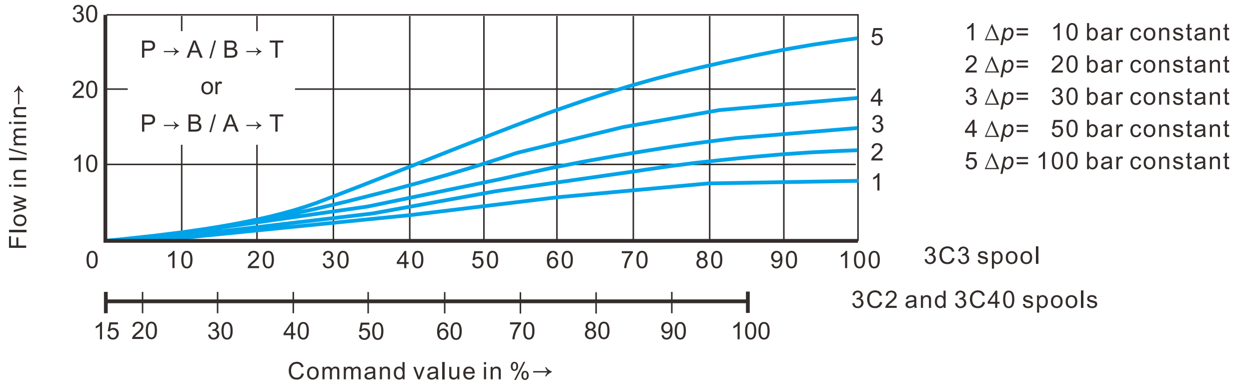
2) The ramp is externally adjustable from 0 to 2.5 s; the same applies for $T_{up}$ and $T_{down}$

3) Zero point is externally adjustable

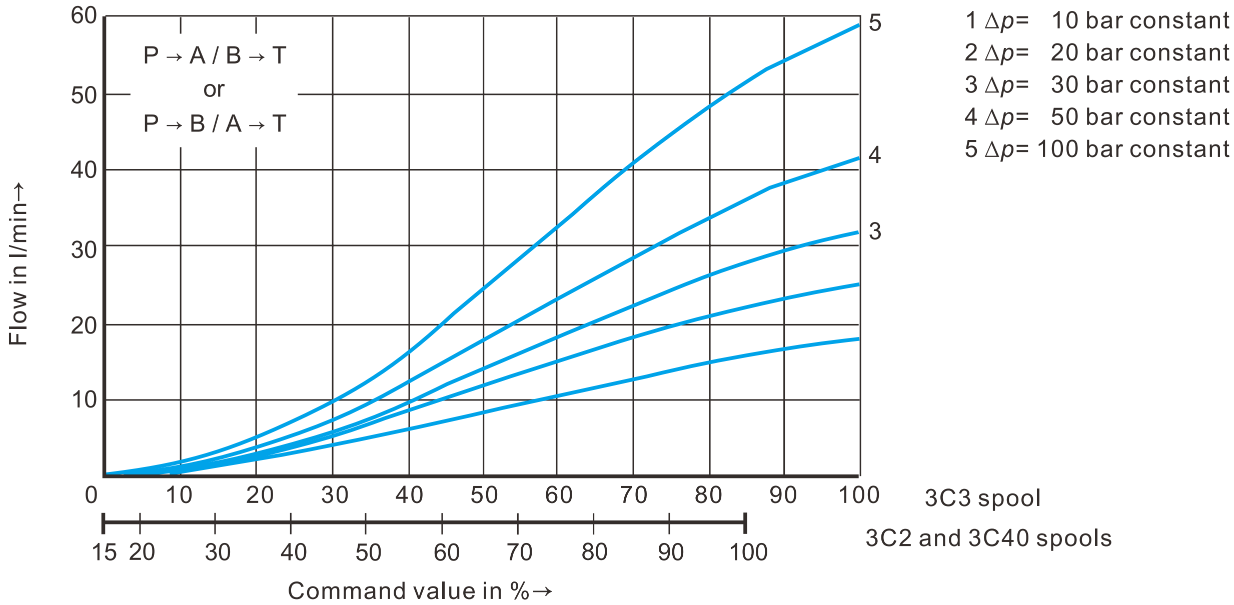


## Characteristic curves for type DPGEE (measured with HLP46, $\vartheta_{oil}$ = 40 °C ± 5 °C and $p$ =100bar) NS 6

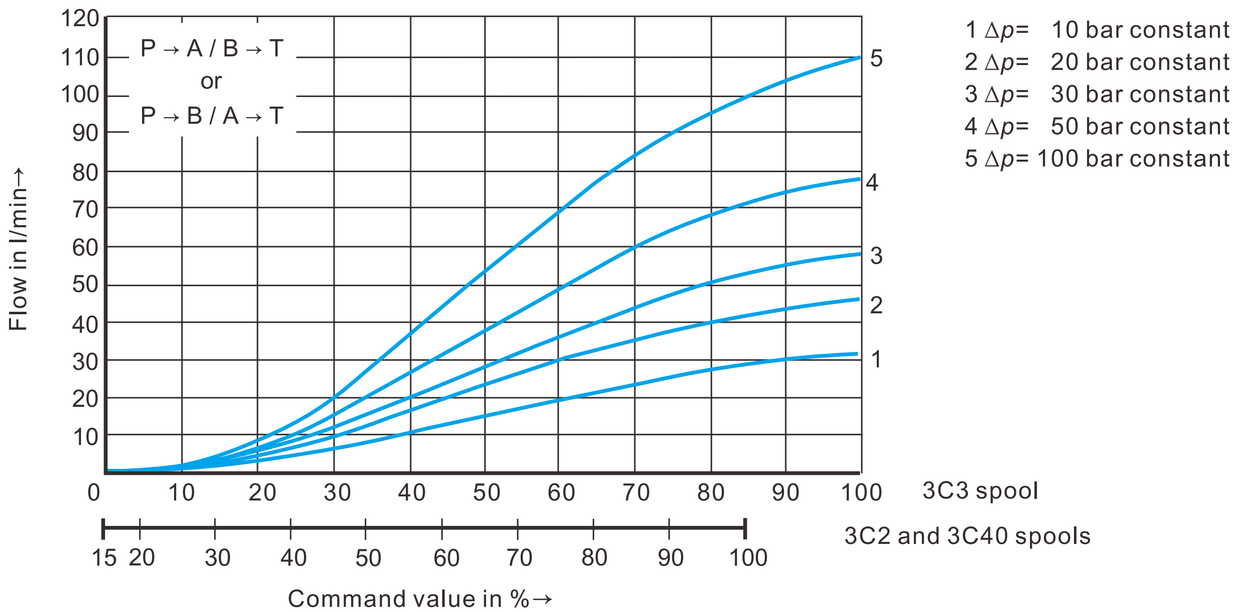
8 l/min nominal flow at a 10 bar valve pressure differential



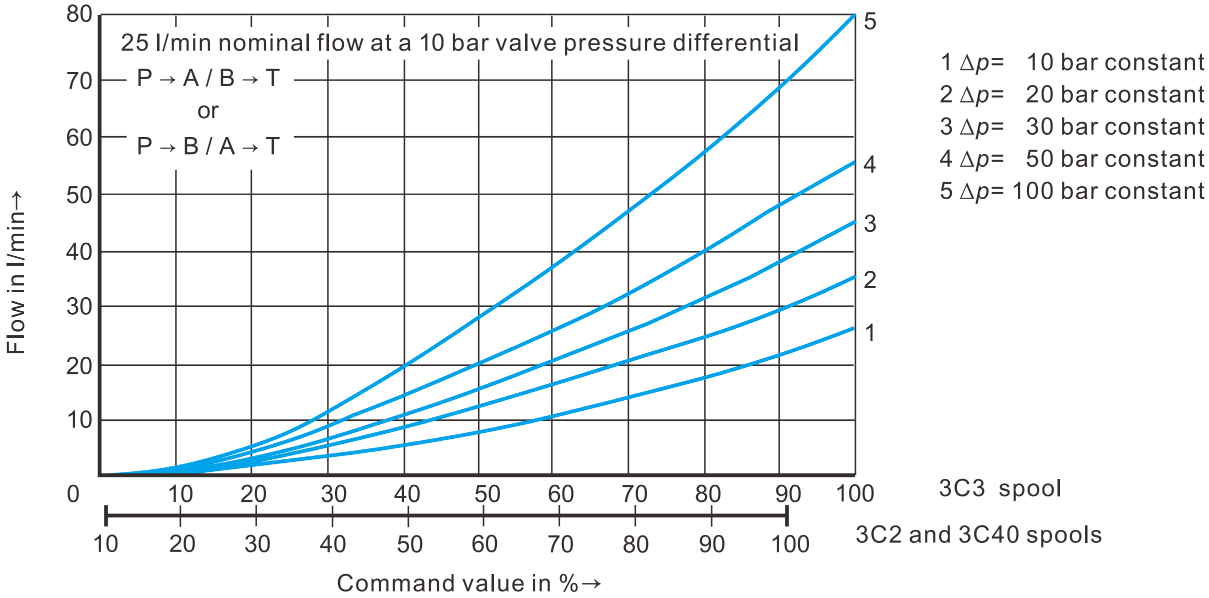

16 l/min nominal flow at a 10 bar valve pressure differential

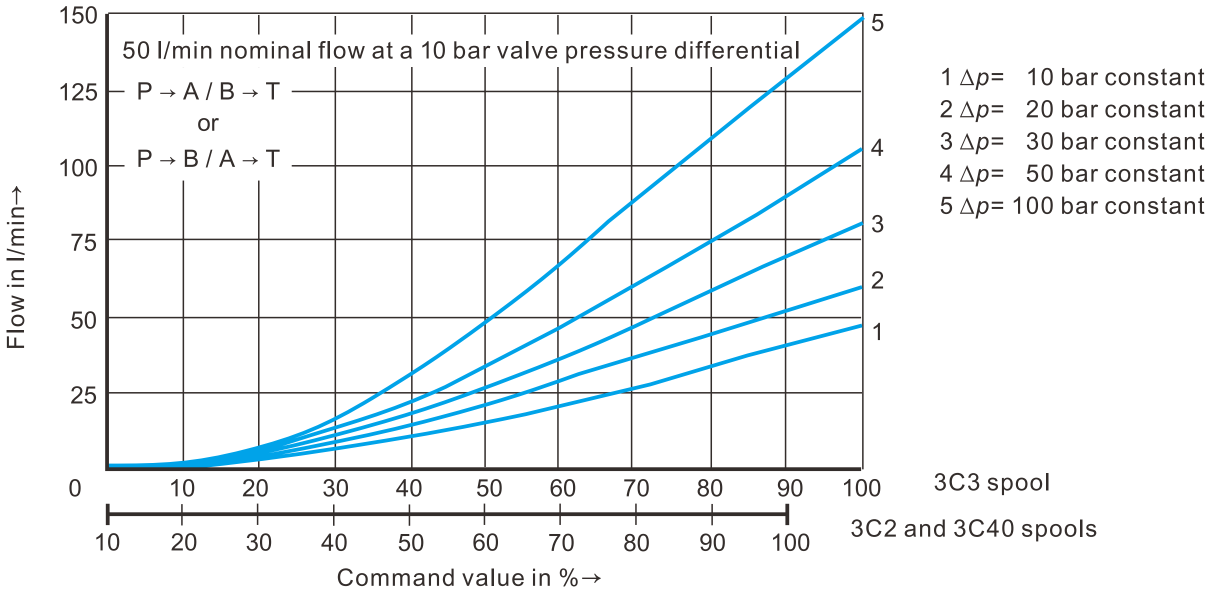


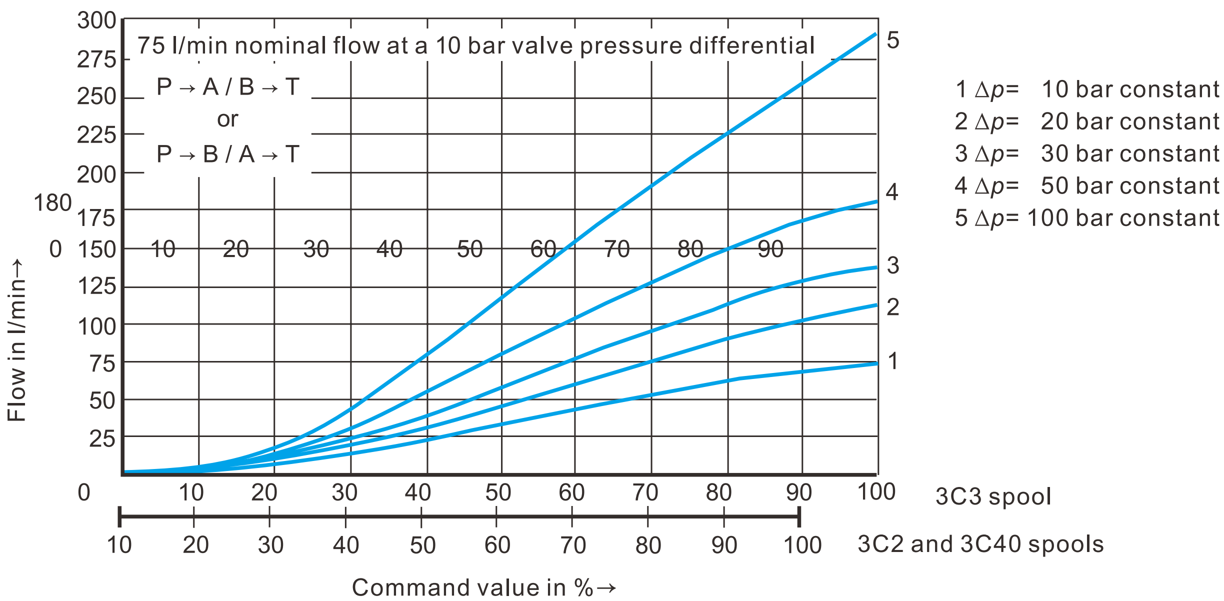

32 l/min nominal flow at a 10 bar valve pressure differential



## Characteristic curves for type DPGEE (measured with HLP46, $\vartheta_{oil}$ = 40 °C ± 5 °C and $p$ =100bar) NS 10



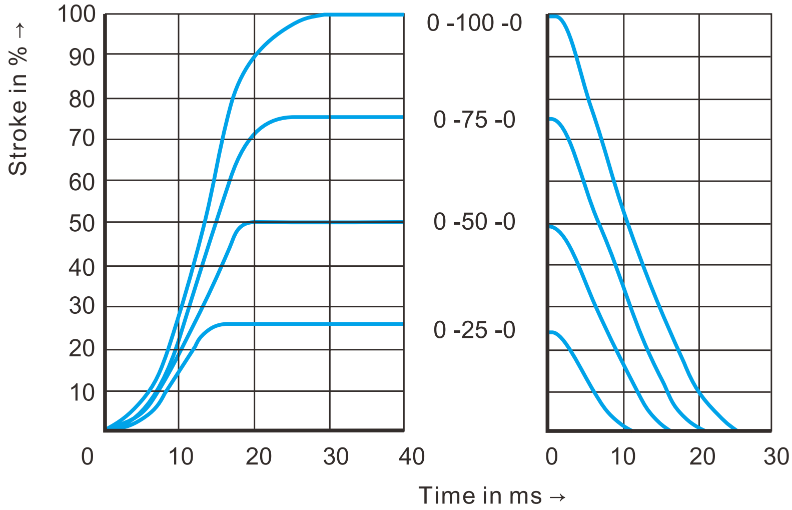



## Transient function with a stepped form of electrical input signal for type DPGEE

(measured with HLP46, $\vartheta_{oil}$ = 40 °C ± 5 °C and $p_S$=10bar)

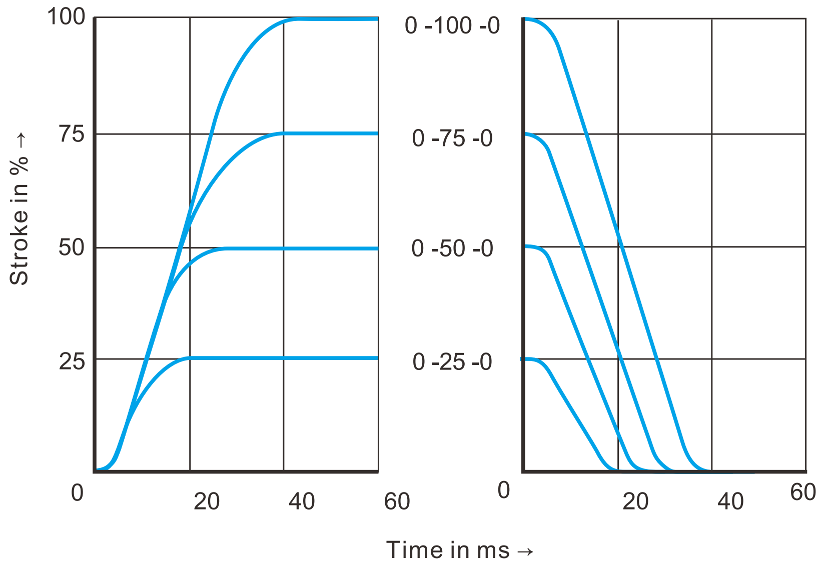
NS 6

4/3 valve version
Spool symbol “3C2“



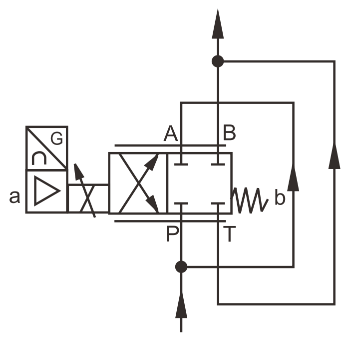

NS 10

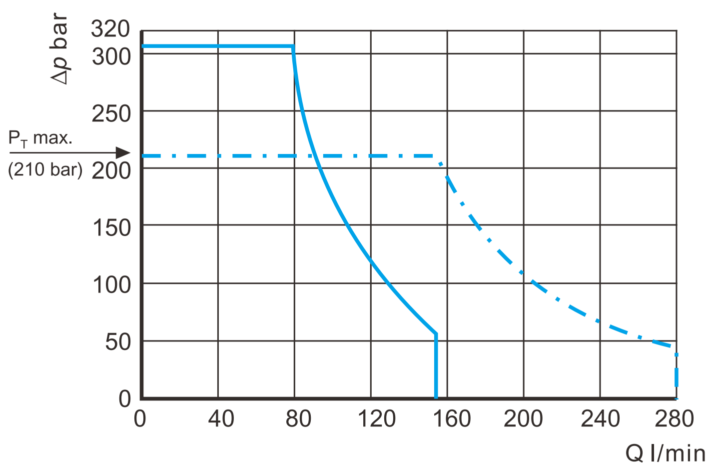
4/3 valve version
Spool symbol “3C2“




### Doubled flow rate

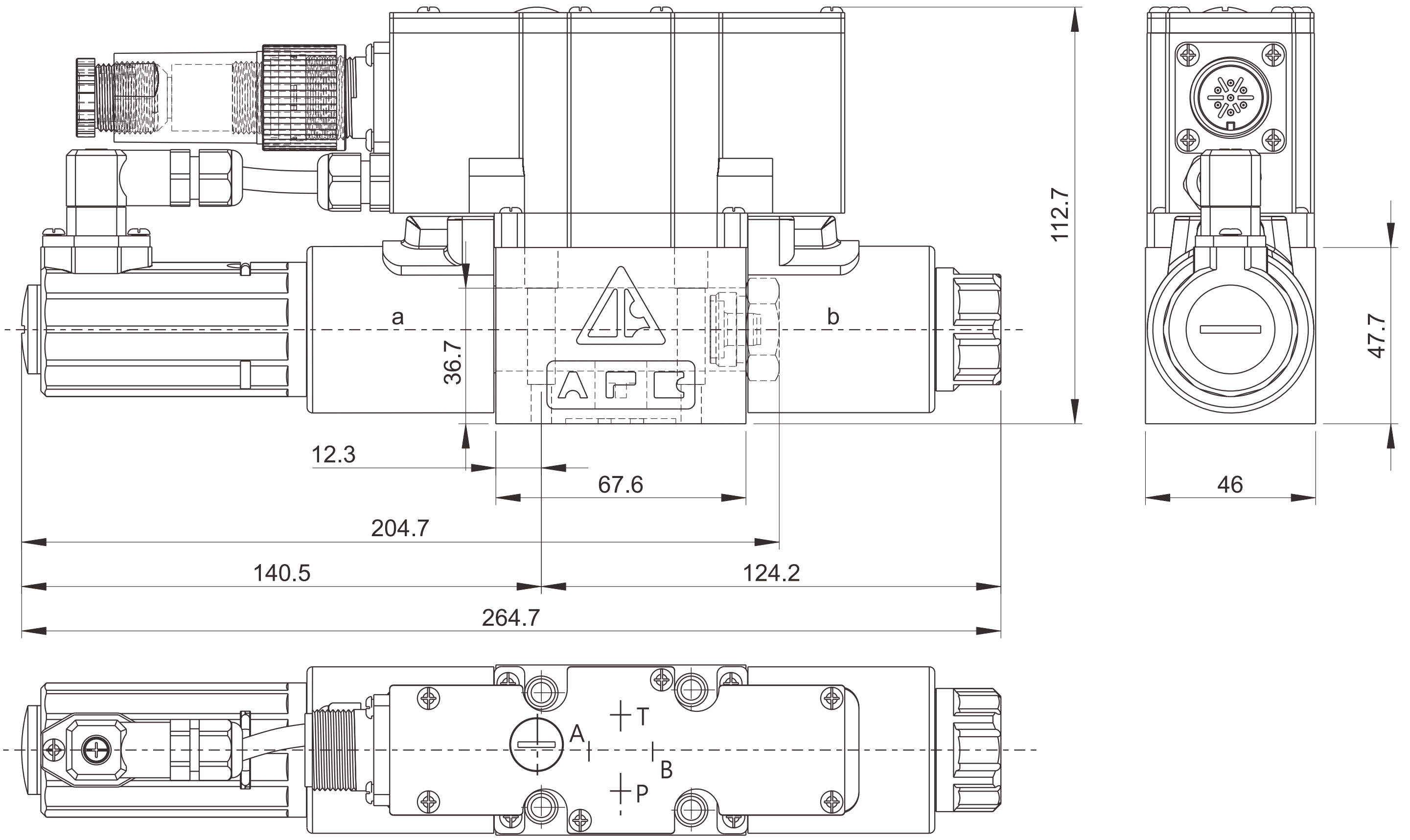
Pmax.=210 bar (Only for NS 10 2B2B)



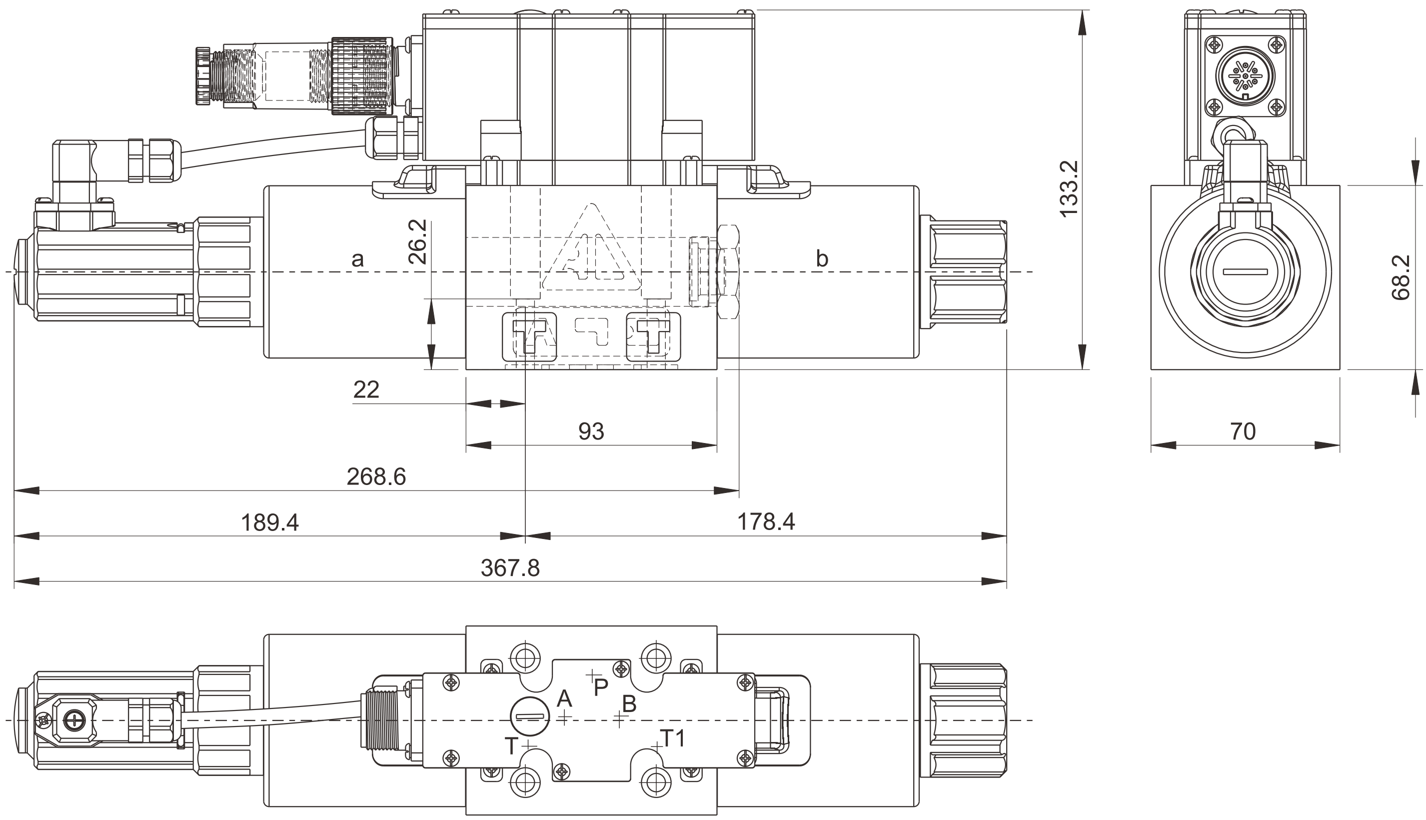




single flow
double flow

## Unit dimensions (nominal dimensions in mm) — Nominal size 6

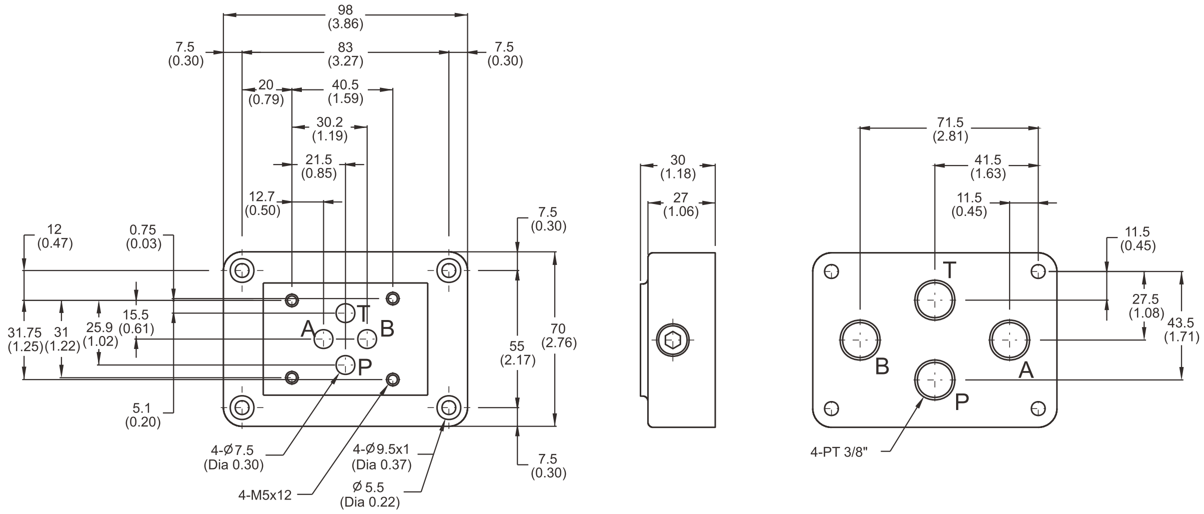


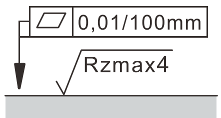

## Unit dimensions (nominal dimensions in mm) — Nominal size 10



## Subplate mounting

Nominal size 6



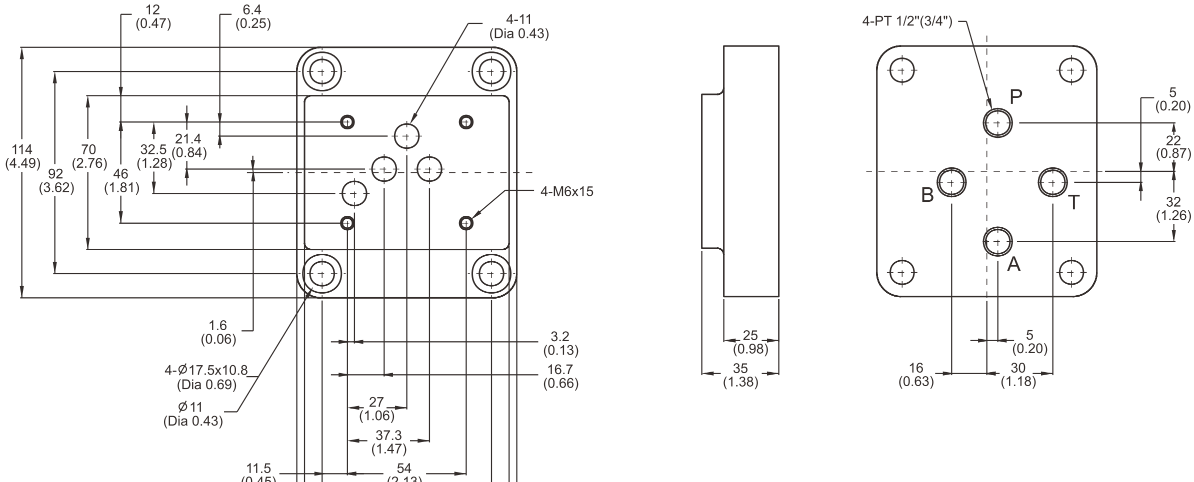



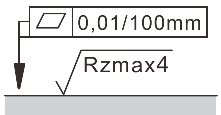

Required surface finish of the
valve mounting surface

Tolerances to:– General tolerances ISO

## Subplate mounting

Nominal size 10




Required surface finish of the
valve mounting surface

Tolerances to:– General tolerances ISO

## ELECTRO HYDRAULIC PROPORTIONAL VALVES

EFBG-03/06/10

EDG-01

EBG-03

EBG-06

## SOLENOID OPERATED DIRECTIONAL VALVES

DFA-02-※-AC/DC※-※-35(35C)

DFA-03-※-AC※-※-35

DFA-03-※-AC※-※-35H

DFB-02-※-AC/DC※-※-35(35C)

DFB-03-※-AC※-※-35

DFB-03-※-AC※-※-35H

DFA-02-※-DC※-※-35

DFA-03-※-DC※-※-35

DFA-03-※-AC※-※-35H

DFB-02-※-DC※-※-35

DFB-03-※-DC※-※-35

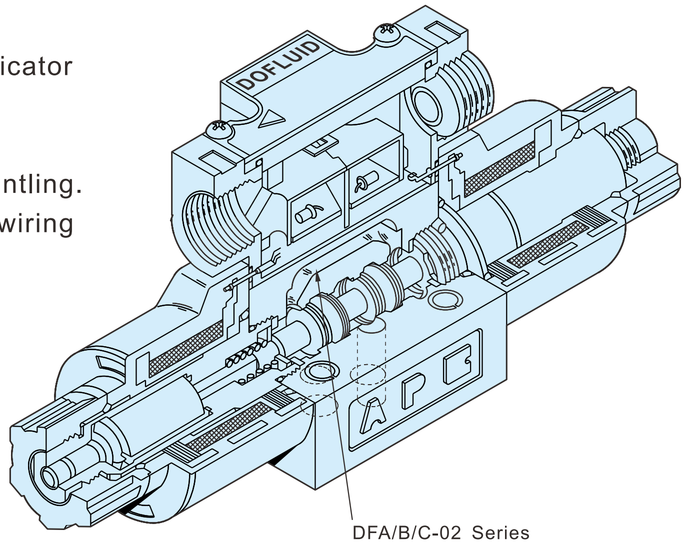
DFB-03-※-DC※-※-35H

## Wet Type (Oil Immersed) Solenoid

- Max. high pressure of 35 MPa (5,000 psi) & Max. high flow capacity of 160 ℓ/min (42 gpm).
- Oil immersed armature provides stable, quiet operation-even under high pressure & high cycle frequency, allowing for longer valve life.
- Valve mounting accomplished without disturbing valve nameplate or electrical box.
- High tank port back pressure upto 21 MPa/3040 psi (check each spool type for max. allowable).
- Shockless type coils are available-reducing voltage spikes, providing even quieter operation and extending relay contact life.
- Twin tank line design greatly reduces both pressure drop and system operating cost.

## Joint Box/plug-In Coils

- Large electrical box supplied standard, with indicator lights and terminal strip including earth ground terminal.
- SImple design allows easy assembly and dismantling.
- Coils can be easily replaced without disturbing wiring and without risk of oil leakage.



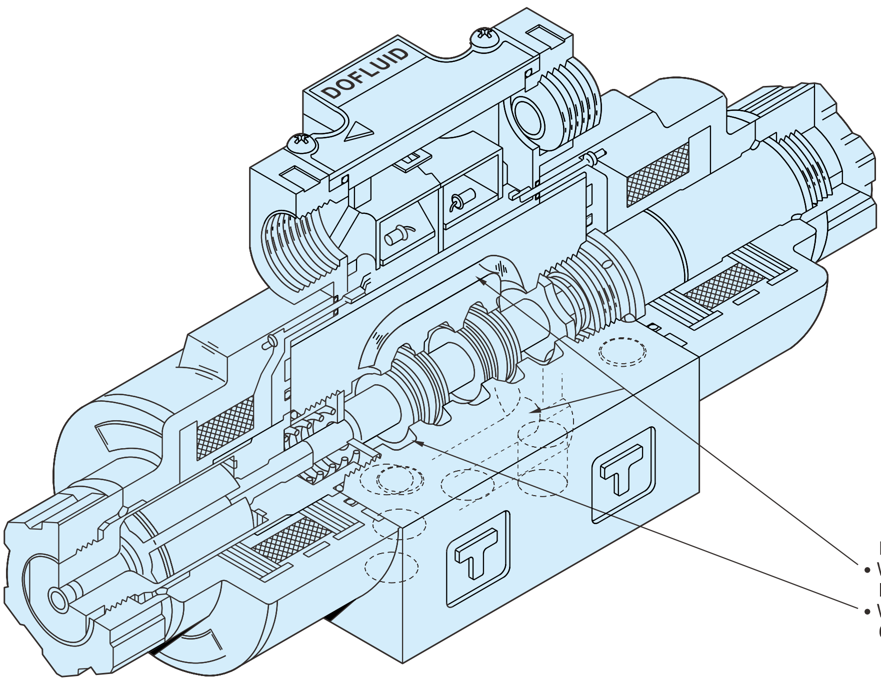

DFA/B/C-02 Series
- With both upper & lower return line ports (to T port)

## Lead Wire Coils

- Lead wire coils available popular with the mobile industry.
- Single spade DC coil also available for one wire "spade" connection.

## DIN Coils

- Manufactured to accept standard 3 pin DIN 43 650 and ISO 4400 connectors.
- AC coils are rated for both 50/60 Hz service-rewiring not required if switching frequencies.
- DC coils are not polarity sensitive.




DFA/B/C - 03 Series
- With both upper & lower return line ports (to T port)
- With special 5 channels and 6 teeth

## DIN Connector

Conforms to standard 3 pin DIN 43 650 and ISO 4400 standard connectors.
Clear lighted connectors are supplied standard for AC coils-optional lighted connectors available for DC coils.

## AC Solenoid

50-60 Hz common service solenoids do not require re-wiring when the applied frequency is changed.

## Electric Shockless

AC coils can be provided with optional RAC type to include rectified coils that convert AC to DC- this reduces voltage spikes, provides even quieter operation and extends relay contact life. Coil heat generation is much less in holding applications when using rectified coils. The rectifier is supplied either in the electrical box or provided in the DIN connector.

## Hydraulic Shockless

Valves can be provided with option S to slow the shifting of the spool. Oil is metered as the armature moves in the large core tube causing increased shifting times, up to 4 times normal (depending on temperature). Note : AC valves are always supply rectified to DC valve. Shockless valves will not operate as shockless until tank line has become filled with oil-this will occur automatically after a first few cycles.

## Other Notice

Pressure ratings are reduced for the tank port-check each of spool types for maximum allowable pressure (including pressure spikes). Do not supply-electric power to the AC solenoid unless the coil is mounted to the valve. Electrical power should be maintained on detented valves when in operation-the detent only maintains the valve start-up condition. When plumbing valves for 1 way or 2 way operation-flow should be limited and unused ports should be plugged (do not plug the tank port on models 2B8, 2B8L, 2D8). Do not exceed voltage specifications shown in the catalog.

## Variety

There are various kinds of solenoid directional valves for your selection, which with different sizes of 1/4 & 3/8", different AC or DC solenoid, different wiring of joint box type or DIN (hirschmann) type, different spool types, with or without shockless type etc.

## Fluld Types Recommended

1. Petroleum based mineral oil (conform to ISO VG 32 & 46)
2. Phosphate-esters based hydraulic oil.
3. Water-glycol group hydraulic oil.

## Fluid Temperature Range

From +5 °C to +60 °C(41 °F - 140 °F) recommended

## Fluid Viscosity Range

15-310 cSt (80-1400 SSU) recommended

## Contamination Control

Fluid contamination should be kept at/above NAS 1638-12 class and adopt filtration of 25μm or even better filtration, otherwise, valves are easily to be damaged or shorten life.

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## NO.1 EXPORTER OF HYDRAULIC COMPONENT IN TAIWAN

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DOFLUID PNEUMATIC & HYDRAULIC CO., LTD.
HEAD OFFICE & FACTORY
No.10, Ln. 560, Zhongzheng N. Rd., Sanchong Dist., New Taipei City 241, Taiwan (R.O.C.)
TEL: 886-2-29866016 FAX: 886-2-29841350
E-mail: df.dofluid@msa.hinet.net
www.dofluid.com.tw