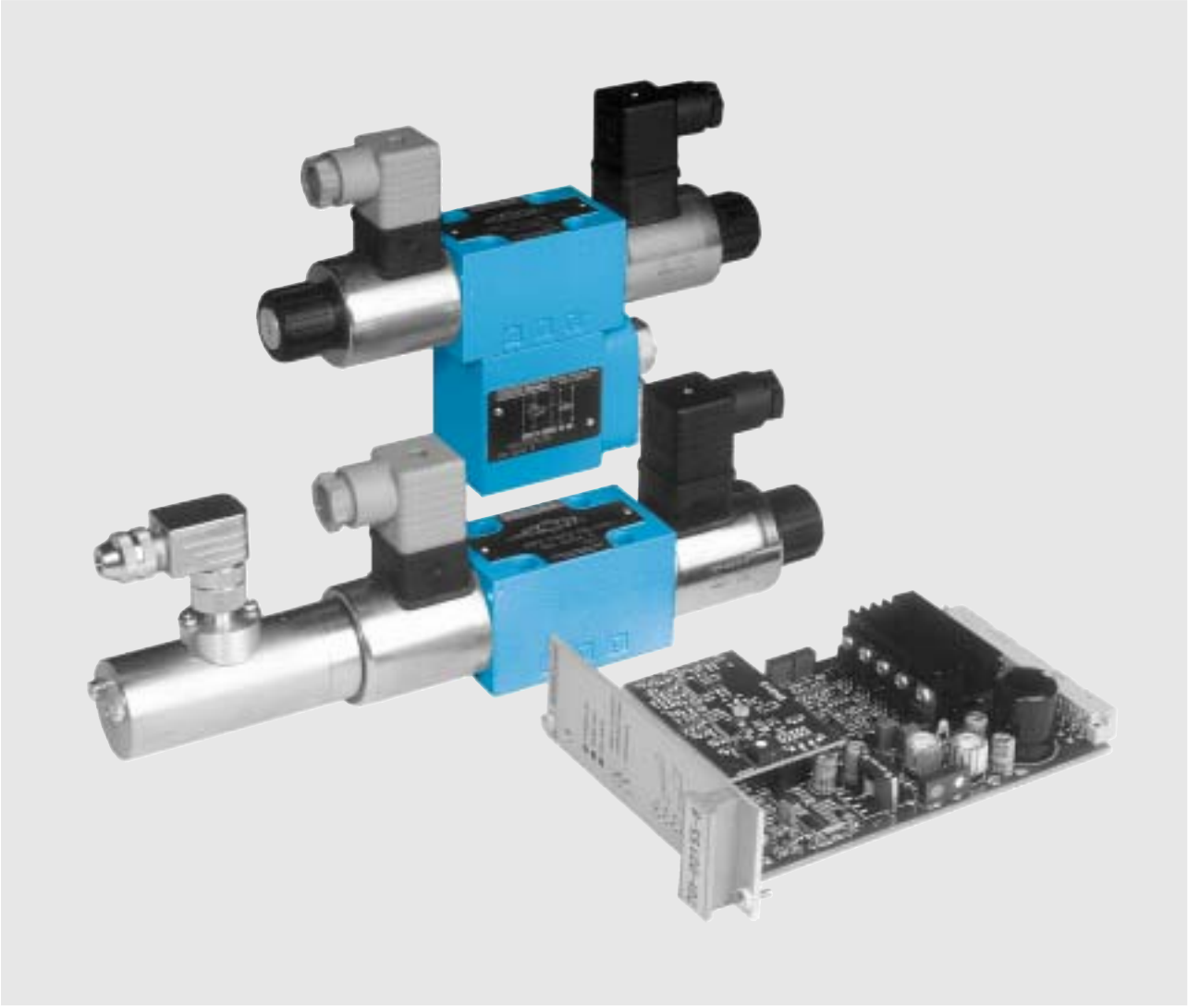
DENISON HYDRAULICS
Proportional Directional Valves

Series 4DP01 – Cetop 03



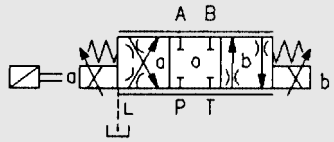
Publ. 4–EN 315–E, Replaces 4–EN 315–D

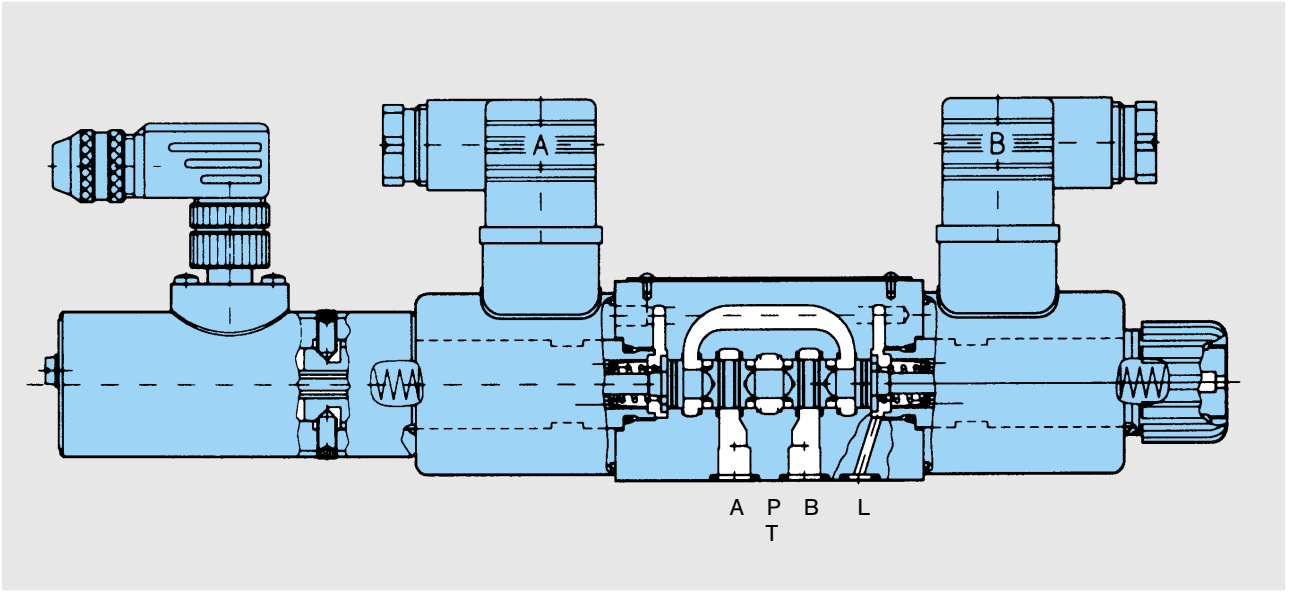
DENISON Hydraulics

FEATURES

- Stepless control of hydraulic operations to optimise machine cycling.
- Spools for various functions and flows to match precise system requirements.
- Also suitable for double flow operation (see below).
- Integral position feedback for superior dynamic performance, precise repeatability, and reduced hysteresis.
- Suitable for use with an external closed loop system.
- Economic operation through system power saving.
- Valve and servo amplifier from one source to guarantee precise matching.
- Electrical connection is by a standard plug-in connector according to ISO 4400, DIN/VDE 0660 part 208 A6.
- Stackable 2- and 3-port pressure compensators maintain flow independent of load induced pressure changes. Available in three different pressure drop ranges (see page 23).
- Mounting configuration according to CETOP, ISO and DIN.
- Easy assembly – no dynamic loaded seals.
- Each valve is factory tested prior to delivery.
- Full interchangeability of spools through close tolerances.
- Worldwide DENISON service.

SYMBOL (example)

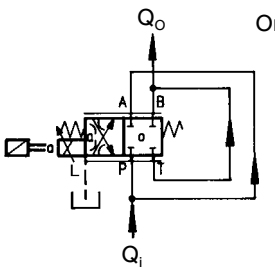




DOUBLE FLOW

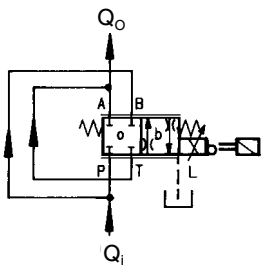
By splitting the flow between two metering edges, the 4DP01 proportional directional valve can control considerably higher flow than can be achieved by a single flow circuit.
For this application, a body with drain port L must be used. The max. permissible operating pressure is then the max. permissible pressure in port T (210 bar).

Spool position 06



Only for spool 13

Spool position 05



DESCRIPTION

GENERAL

The proportional directional valves, 4DP01 series, are direct operated by proportional solenoids and are, therefore, dynamically independent of pilot oil or supply pressure.
In the de-energized state, the spool is held in neutral position by springs. An electrical input signal (command-point) changes the setting of the hydraulic output (flow). See diagram on page 6.
Energizing the opposite solenoid reverses the flow direction.

When using the 4DP01 for **power control,** the force of the proportional solenoid moves the spool against a spring. When the spring compresses sufficiently, the reaction force of the spring is equal to the solenoid force and a balance is reached between the two.
With each signal input, a balance point between the spring and solenoid forces is reached and, therefore, a particular spool stroke.
With each spool stroke, a certain throttling cross-section is produced at the metering edges of the spool. The flow characteristics of different valves depend on the resistance profile of the throttle notches.
The flow depends on size and pressure drop at the set flow cross-section. In combination with a pressure compensator the pressure drop and thus the flow can be kept constant.

The **position feedback design** has an inductive transducer to sense the spool position. The difference between command and feedback signal, caused by friction and flow forces are balanced by the servo amplifier position feedback circuit.
Depending on the application, valves with or without position feedback can be selected, as per required hysteresis, repeatablility, response time etc.

ELECTRONIC

The servo amplifiers developed in conjunction with the valve are illustrated in this brochure, with schematic block diagrams and terminal connections, as well as accessories.

DRAIN LINE

Where the T-port is exposed to pressures $>$160 bar (see page 4) or where the return line flow causes large pressure changes in the return line, port "L" must be connected to tank. The valves should be mounted at a level below that of the oil in the reservoir. This ensures that the valve is at all times filled with oil.

VALVE MOUNTING ABOVE THE OIL LEVEL IN THE TANK

Where it is necessary to mount the valve above the oil level in the tank, then it is recommended that ports T and L are preloaded by means of a check valve with a back pressure spring of 1...2 bar, mounted in the drain line.

PRESSURE COMPENSATORS

The flow of a proportional valve equates to $Q = f(\Delta p : A)$, the pressure differential Δp across the throttling orifice A.
Pressure compensators sense the Input and Output pressure of the proportional valve and maintain a constant pressure differential (Δp).
In combination with 2- or 3-port pressure compensators, proportional valves maintain flow or speed independent of load pressure changes.

GENERAL AND HYDRAULIC CHARACTERISTICS

• Design	Sliding spool valve, proportional, with or without feedback		
• Mounting position	Optional but horizontal recommended (see also page 3)		
• Type of mounting	Subplate body according to ISO 4401		
• Max. operating pressure	P, A, B	T	L
– drain port "L" connected	350 bar	210 bar	10 bar
– without drain port "L"	350 bar	160 bar	160 bar
• Flow	see curves page 7		
• Nominal flow (at $\Delta p = 5$ bar each metering edge)	10 / 20 / 30 l/min		
• Fluid temperature range	– 18 . . . + 80 °C		
• Ambient temperature range	– 18 . . . + 50 °C		
• Viscosity range	10 . . . 650 cSt; optimal 30 cSt		
• Hysteresis	≦ 1 % with position feedback		
(at $\Delta p = 100$ bar)	≦ 5 % without position feedback		
• Repeatability	≦ 0.5 % with position feedback		
(at $\Delta p = 100$ bar)	≦ 3 % without position feedback		
• Response time [1]	without feedback		with feedback
	12 V	24 V	12 V
– step signal 0 . . . 100 %	40 ms	55 ms	30 ms
– step signal 100 . . . 0 %	25 ms	30 ms	20 ms
– step signal ± 100 %	60 ms	75 ms	40 ms
[1] at $\Delta p = 5$ bar each metering edge			
• Fluid	Mineral oil according to DIN 51524/25 (other fluids on request)		
• Contamination level	Fluid must be cleaned before and continuously during operation by filters that maintain a cleanliness level of NAS 1638 Class 8 (Class 9 for 15 Micron and smaller). This approximately corresponds to ISO 17/14. Better cleanliness levels will significantly extend the life of the components. As contaminant entrainment and contaminant generation may vary with each application, each must be analyzed to determine proper filtration to maintain the required cleanliness level.		

ELECTRIC CHARACTERISTICS

• Type of voltage (DC)	12 V	24 V (not with position feedback)
• Coil resistance		
– cold start 20 °C	3.7 Ω	15.7 Ω
– warm value 50 °C	4.51 Ω	21.8 Ω
• Nominal current	2.2 A	1.1 A
• Max. current	2.5 A	1.2 A
• Max. coil temperature (temperature class F)	+ 155 °C	+ 155 °C
• Type of protection (DIN 40050)	IP 65	IP 65
• Relative operating period	100 %	100 %

TRANSDUCER CHARACTERISTICS

• Supply voltage U_S	20 . . . 28 V DC (protected against reverse polarity)
• Permissible ripple from U_S	≦ 5 %
• Current consumption I_S	≦ 40 mA
• Output voltage U	7.5 V ± 4.05 V DC
• Sensitivity	1.5 V / mm
• Measuring stroke	± 2.7 mm
• Temperature drift	≦ ± 0.03 % from stroke / °C

If the performance characteristics outlined above do not meet your own particular requirements, please consult your local DENISON Office.

ORDERING CODE

Model No.: 4DP01 – . . .. – .. B . – G.. C1 – ..

Series
01 = Cetop 03

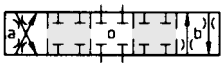
Body
3 = Standard body
L = body with drain port "L"
(always connect "L" to tank
when T > 160 bar)

Control
E = solenoid operation w/o position feedback
T = solenoid operation with position feedback

Spool type

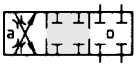
Spool position 03

02 

43 

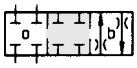
Spool position 06

12 

13 

Spool position 05

12 

13 

Flow P–A; B–T or P–B; A–T
(at 5 bar Δ p for each metering edge)
F10 = 10 l/min
F20 = 20 l/min
F30 = 30 l/min

Spool position
03 = 3 (a, o, b), spring centered pos. "o"
05 = 2 (o, b), spring centered pos. "o", energized to "b"
06 = 2 (o, a), spring centered pos. "o", energized to "a"

Design letter

Seal class
1 = NBR seals
5 = FPM seals (Viton®)

Solenoid voltage
G12 = 12 V DC
G24 = 24 V DC (not for valves with position feedback)

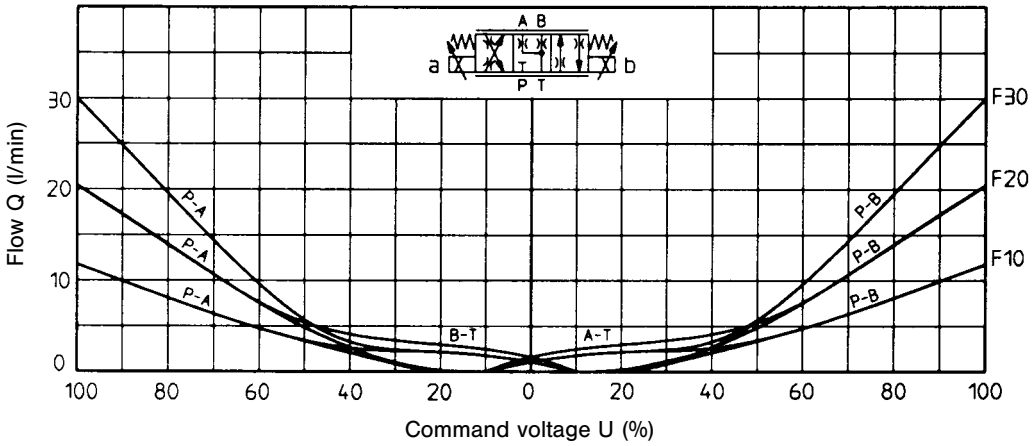
Electrical connector
C1 = connector PG 11 (for valves w/o position feedback)
connector PG 11 + PG 9 (for valves with position feedback)

Modification

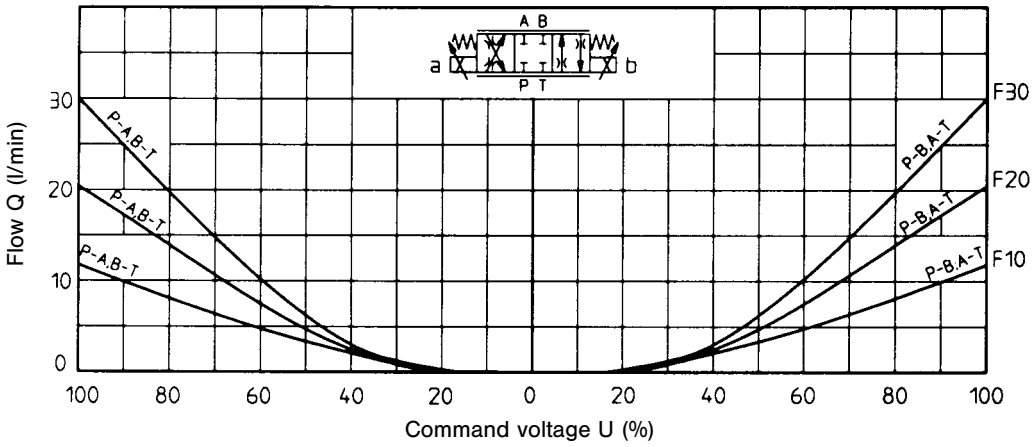
Note: For ordering information on Cetop 03 pressure compensators see page 23.

Oil temperature 50 °C; viscosity 40 cSt.

Spool 02 (Δ p = 5 bar for each metering edge)



Spool 43 (Δ p = 5 bar for each metering edge)



Nominal flow

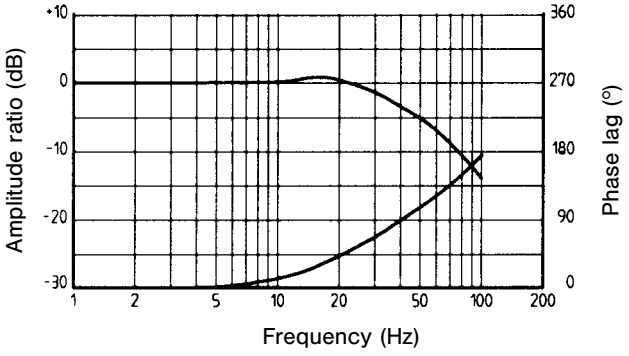
In the case of a different pressure drop (e.g. in combination with a pressure compensator), the flow is altered as follows:

$$Q_X = Q_N \cdot \sqrt{\frac{\Delta p_X}{5}}$$

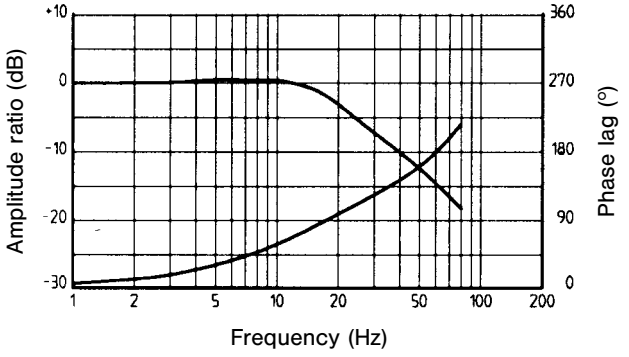
Attention: Q_{max} see page 7

Frequency characteristics (Signal 50 % ± 25 %)

with feedback



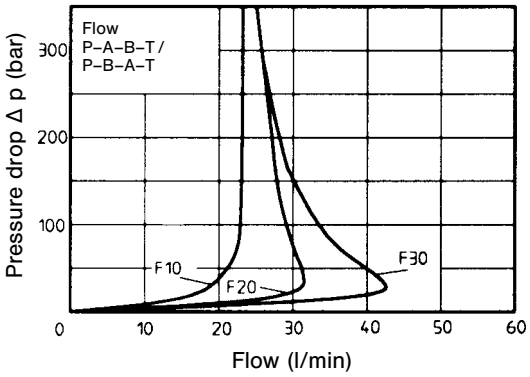
without feedback



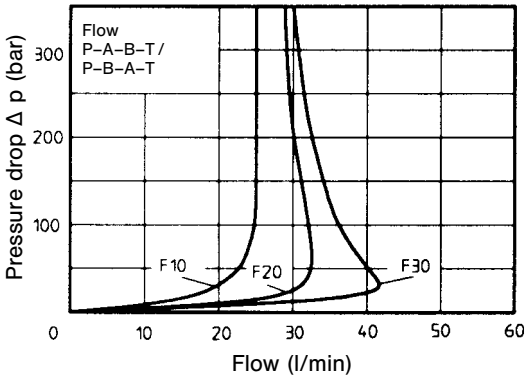
Oil temperature 50 °C; viscosity 40 cSt.

4DP01 – . E (without feedback)

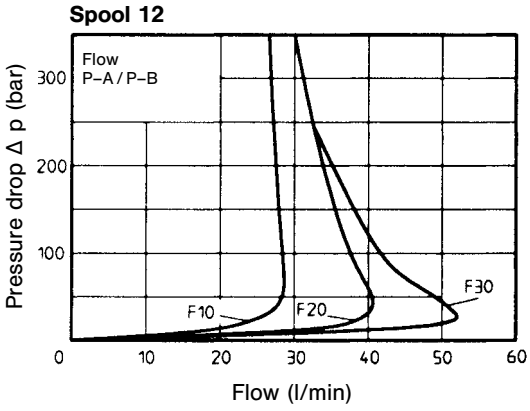
Spool 02



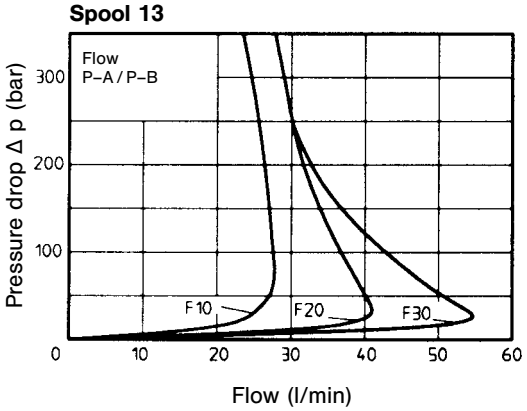
Spool 43



Spool 12

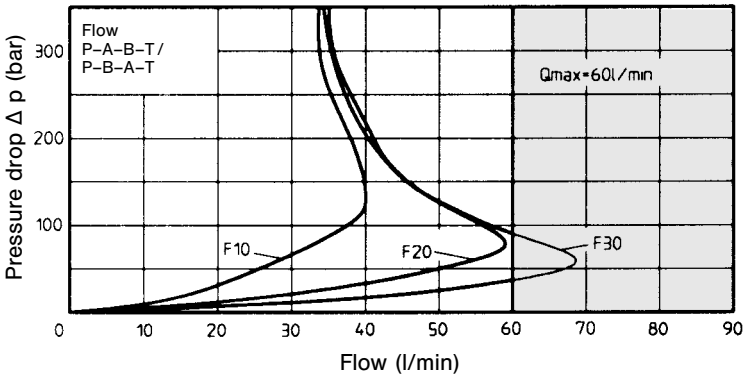


Spool 13

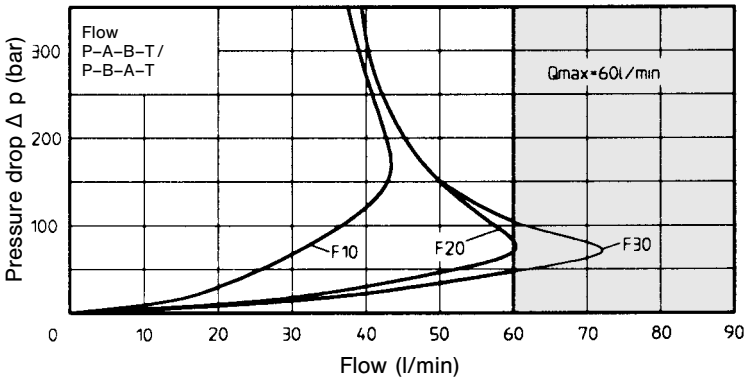


4DP01 – . T (with feedback)

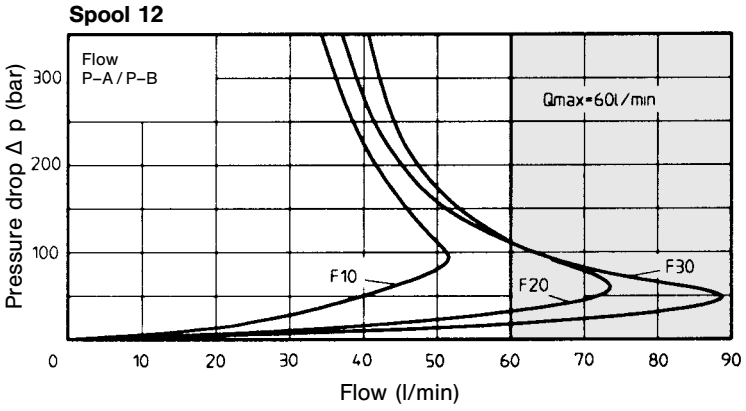
Spool 02



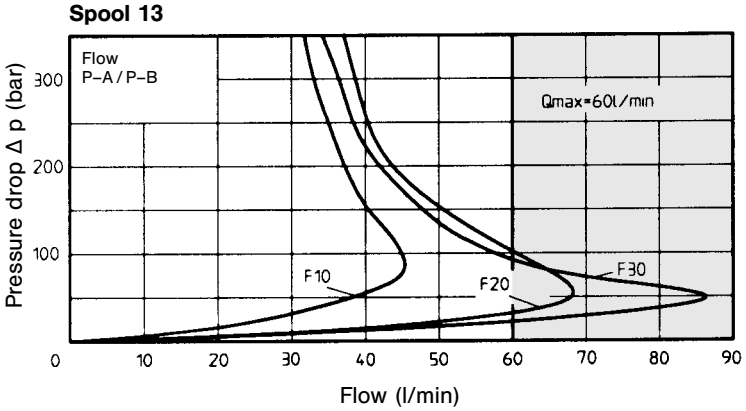
Spool 43



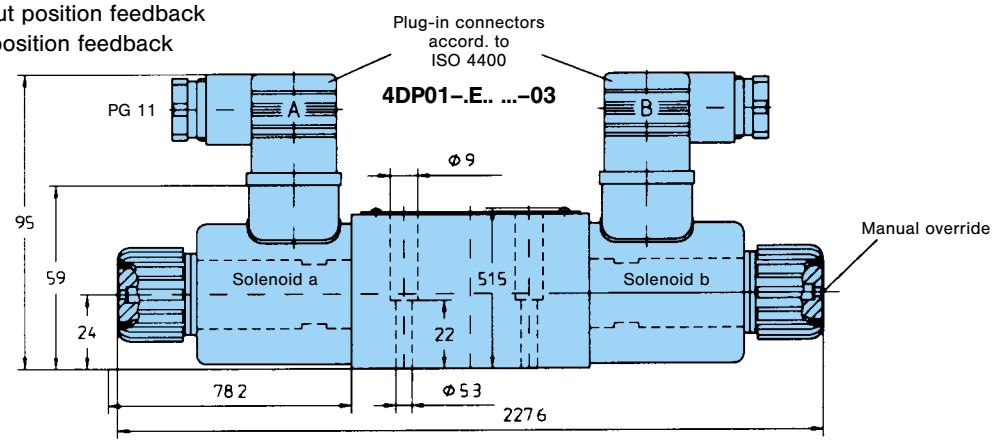
Spool 12

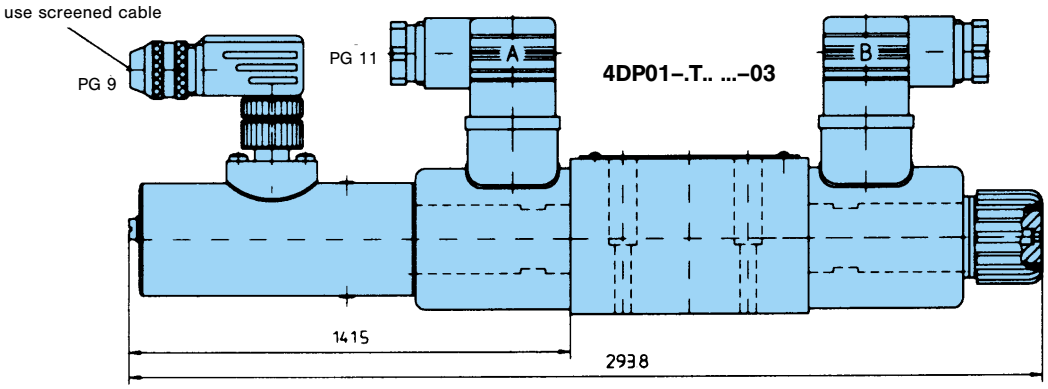


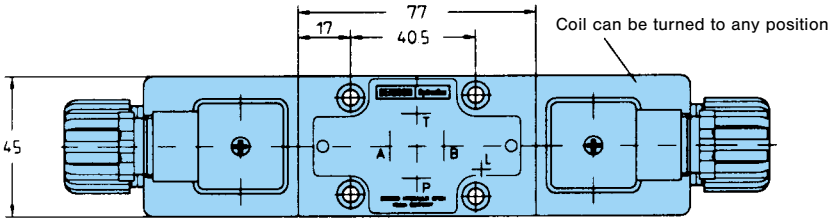
Spool 13

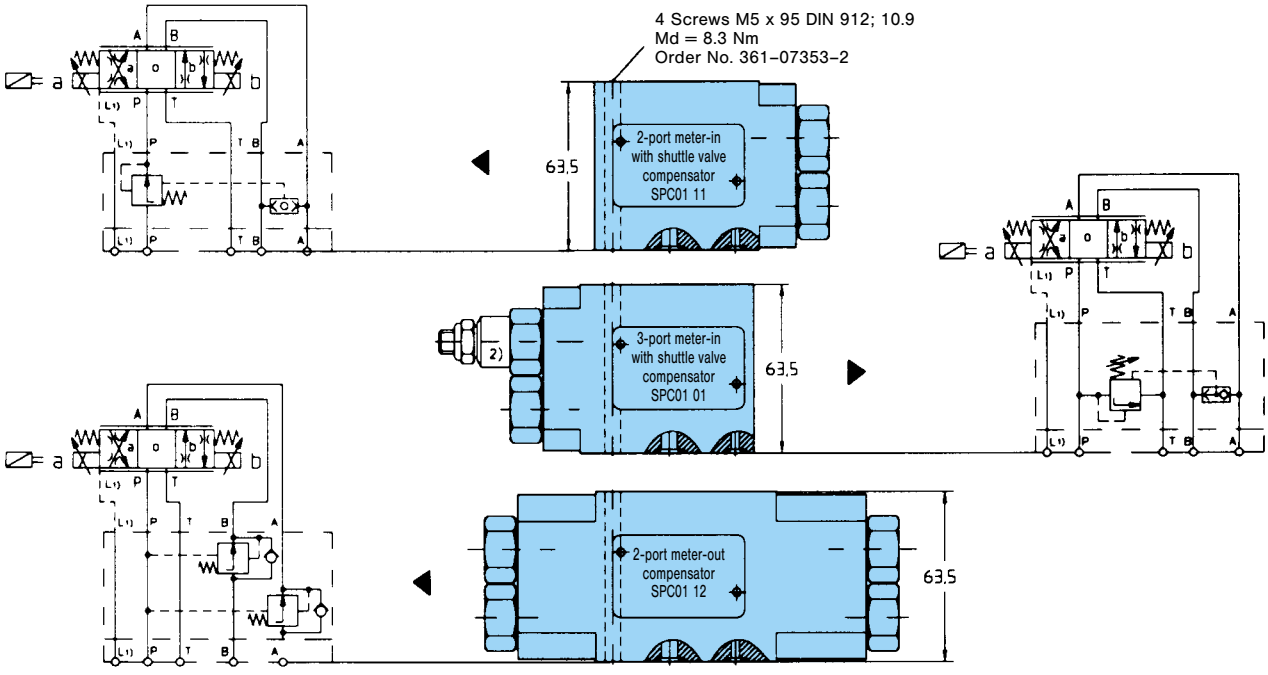


Weight: 2.3 kg without position feedback
Weight: 2.6 kg with position feedback





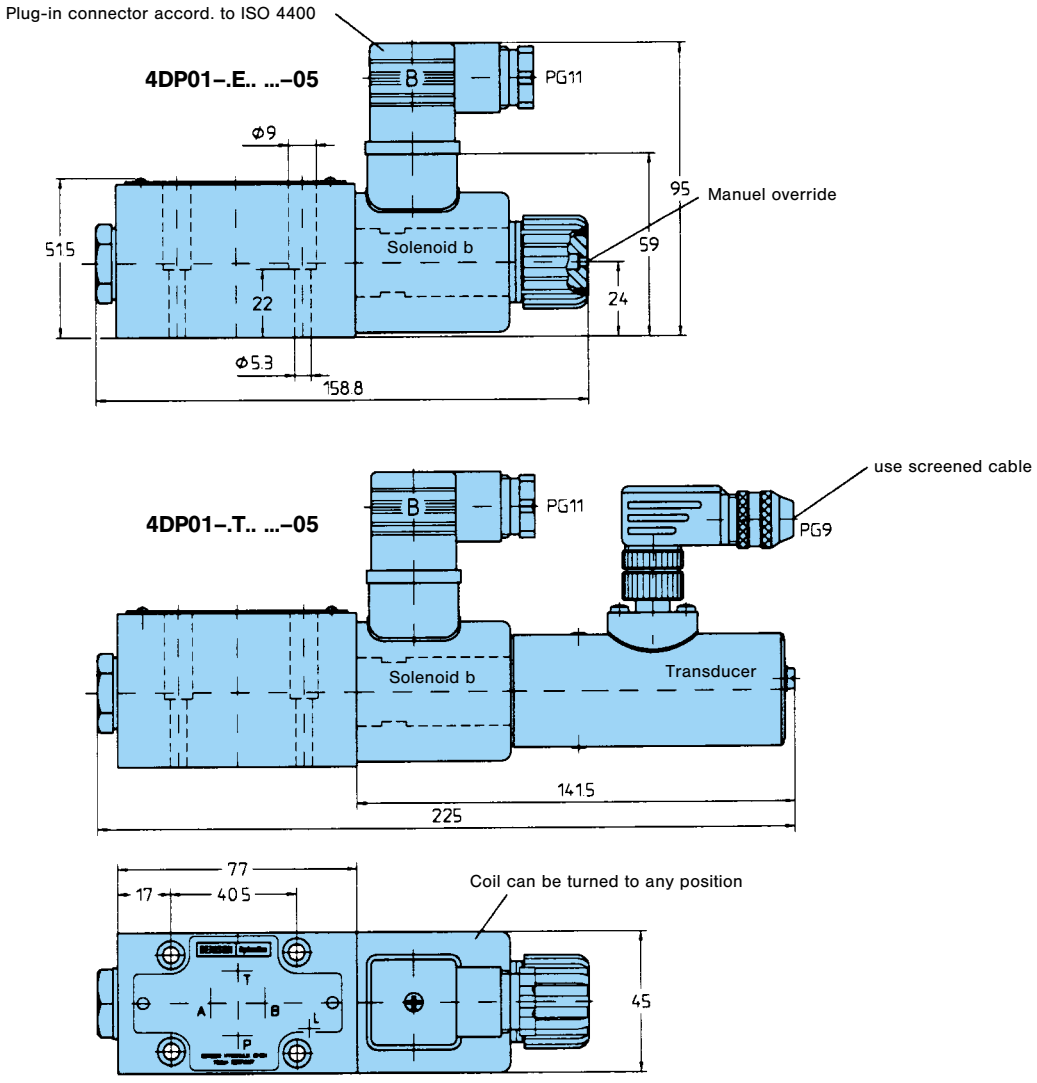




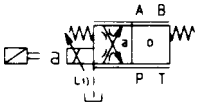
1) Always connect L to tank when T > 160 bar
2) Optional adjustment for SPC01 01

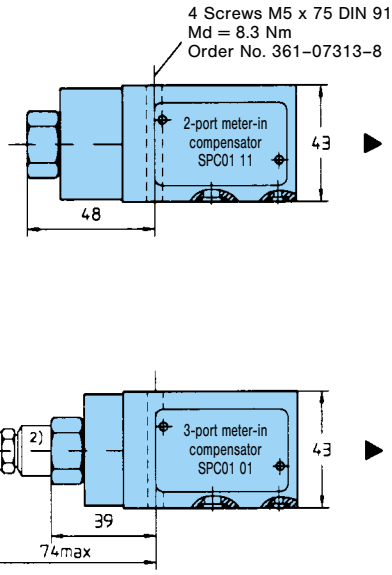
Note:
For order information on pressure compensators see page 23

Weight: 1.8 kg without position feedback, 2.1 kg with position feedback

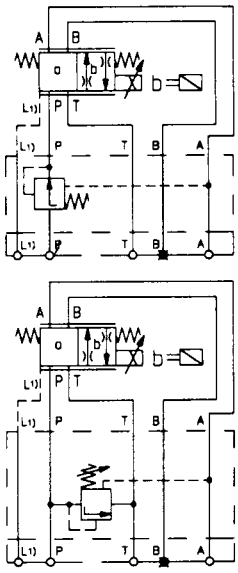


Spool position 06





Spool position 05



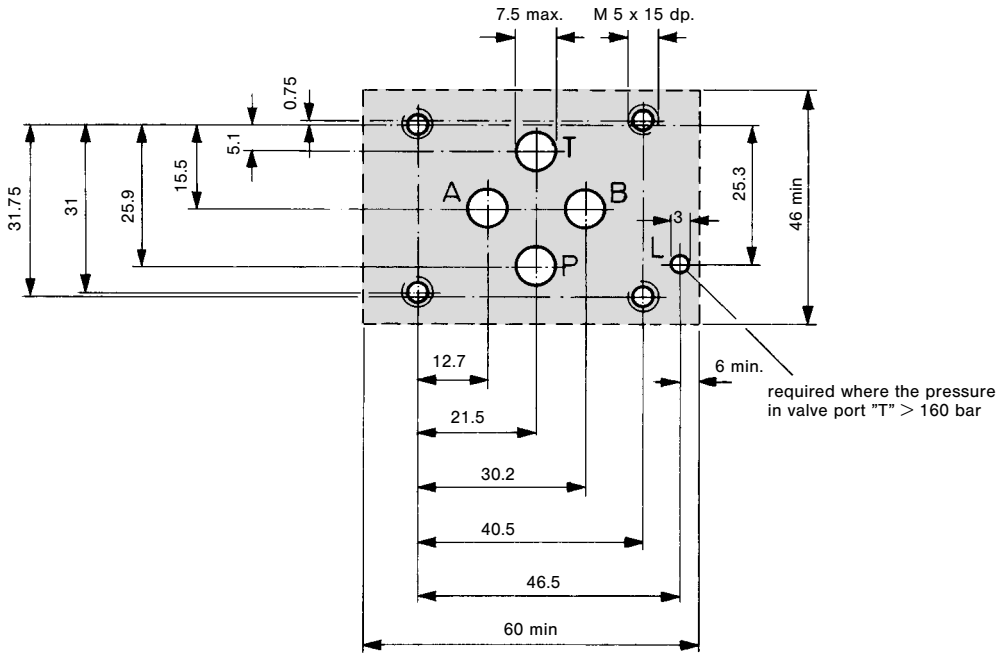
[1] Always connect L to tank when T > 160 bar

[2] Optional adjustment for SPC01 01

Note:

For order information on pressure compensators see page 23

According to CETOP, ISO and DIN



Block mounting face

Flatness 0.01 mm / 100 mm length

Surface finish 0.8

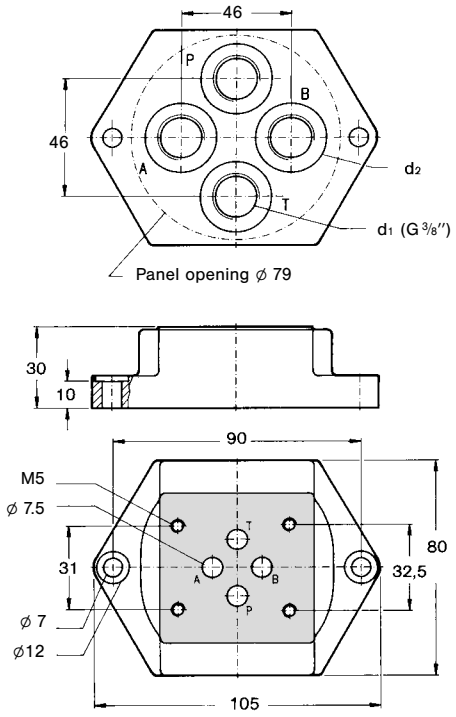
For valves ordered without subplate, mounting screws must be ordered separately.

4–mounting screws	Order-No.
M 5 x 30, DIN 912; 10.9	700–70834–8

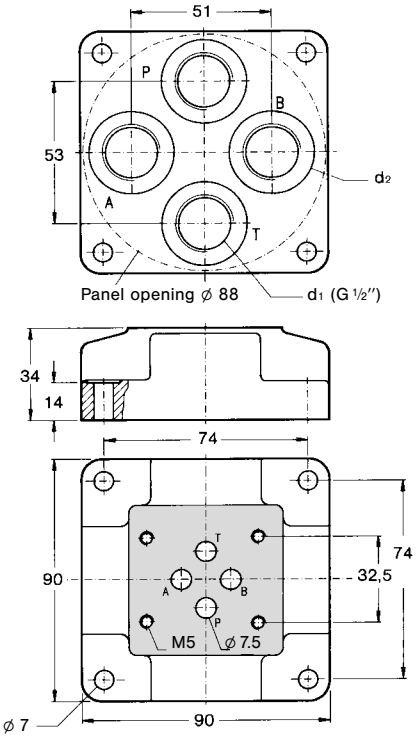
Torque 8.3 Nm

Mounting configuration accord. to CETOP, ISO and DIN

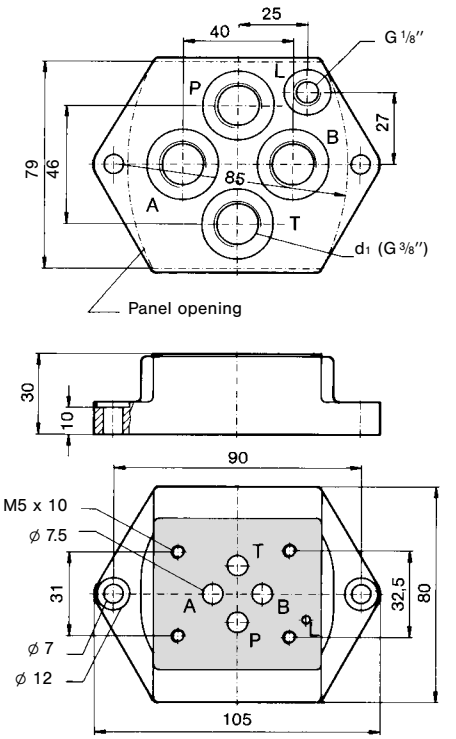
⅜″ Subplate w/o L-port



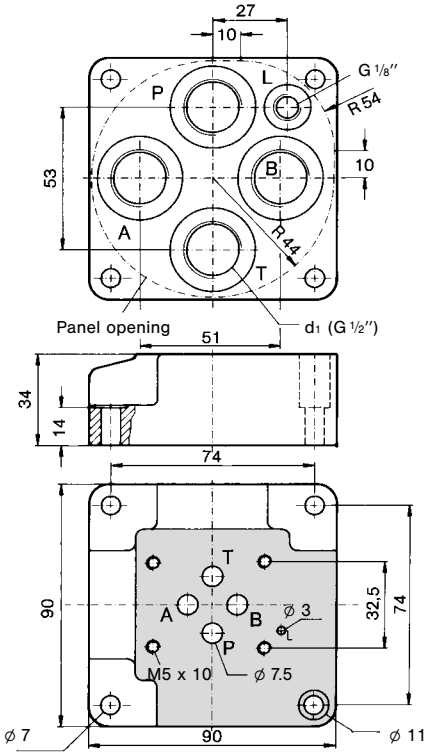
½″ Subplate w/o L-port



⅜″ Subplate with L-port



½″ Subplate with L-port



Model No.	Order No.	Weight	d1 (A, B, P, T)	L-port	d2
SS–B–06–G 136	S26–32960	1.4 kg	G ⅜″	–	⌀ 26 x 1
SS–B–08–G 136	S26–32961	1.7 kg	G ½″	–	⌀ 31 x 1
SS–B–06–G 140	S26–34139	1.4 kg	G ⅜″	G ⅛″	⌀ 26 x 1
SS–B–08–G 140	S26–34140	1.7 kg	G ½″	G ⅛″	⌀ 31 x 1

Mounting screws are included in subplate order.

Order No.: 701–00153–8 (12 V)
701–00154–8 (24 V)
Weight: 0.25 kg

These servo amplifiers are designed to control direct operated proportional directional valves without position feedback. They proportionally convert electrical input signals into solenoid current.
These amplifiers have two reverse polarity and short circuit protected PWM-output stages with max. current limit.
To operate the single solenoid proportional valve, only one output stage is connected. Four different inputs are available for different command signals. On the front panel there are potentiometers to adjust the ramp circuits up / down (independently from each other), flow gain (Imax) and the zero point (Imin).
The zero-point adjustment enables the positive overlap of the spool, typical of proportional valves, to be bypassed. The electrical zero-point (Imin) can be adjusted to 0...50 % of Imax.
By changing the input signal from 0...2 %, the amplifier passes over to the "Imin-leap"-function (dead-band elimination).
The front panel includes diagnostic LEDs to display the working condition (power on), ramp function (ramp off) and "fail-safe" in case of short circuit or external stop of the card. Two measuring sockets are provided to measure either the nominal solenoid current or the command voltage.
These servo amplifiers can also be used with "A"-design valves.

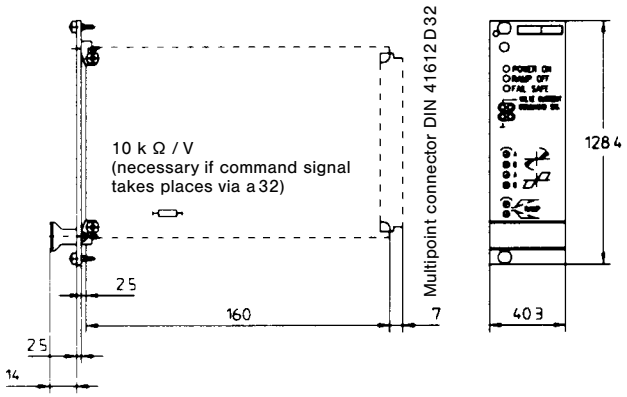
Characteristics – Servo Amplifiers

- Supply voltage
  - nominal: 24 V DC
  - smoothed battery voltage: 23...32 V DC
  - rectified AC: 16...24 V U_{eff} (single-phase, full-wave rectifier)
- Reference voltage: ± 15 V 25 mA ± 5 %; ± 10 V[1]) 10 mA ± 0.5 % } from amplifier [1]) stabilized
- Current consumption max.
  - 12 V – solenoid: approx. 2.5 A
  - 24 V – solenoid: approx. 1.2 A
- Short circuit protection: for solenoids A, B and reference voltage
- Inputs (for single solenoid prop. valves only positive (+) command signals):
  1. +/– 0...20 mA, 100 Ω
  2. +/– 0... 5 V, 50 k Ω
  3. +/– 0...10 V, 100 k Ω

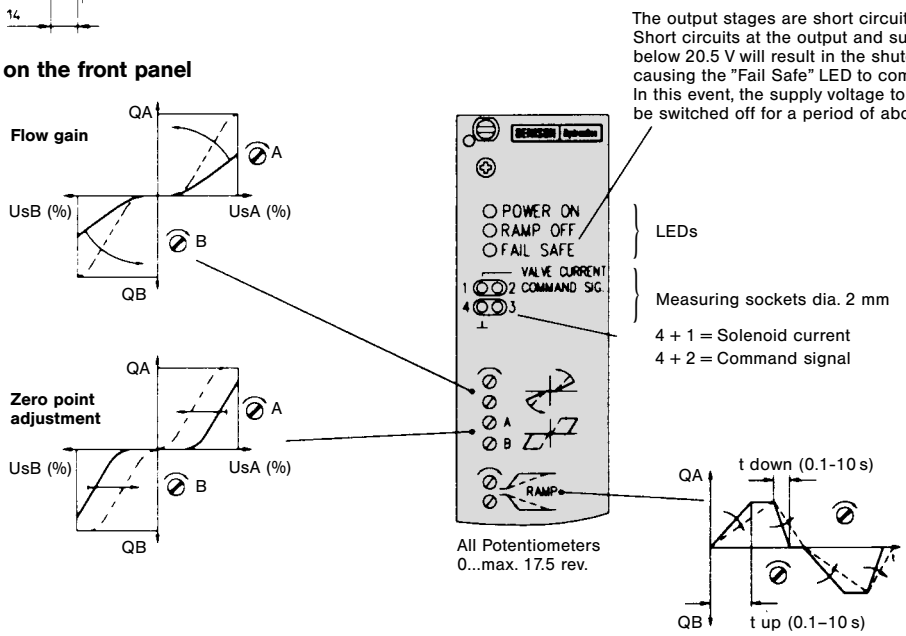
  } input impedance
  4. free choice 10 k Ω / V input voltage
- Outputs
  - 2 solenoids version: (+) = solenoid A; (–) = solenoid B
  - 1 solenoid version: (+) = solenoid A or B
- External stop: illuminates on "Fail Safe", implement as normally closed circuit connection with an input voltage between 2.5 and 24 V DC: input impedance 4.7 k Ω
- Potentiometers for
  - flow gain A, B (I_{max}): ...2.2 A (12 V); ...1.1 A (24 V) solenoid current at 100 % command
  - zero point adjustment A, B (I_{min}): 0...50 % from I_{max}; 20 % factory set
  - ramp up: 0.1...10 s ± 20 % ≙ 1...100 V/s
  - ramp down: 0.1...10 s ± 20 % ≙ 1...100 V/s
- Ramp off: illuminates when "Ramp off". Ramp is switched off by applying an input voltage between 2.5 and 24 V DC at pin a4; input impedance 4.7 k Ω
- PWM: 150 Hz ± 10 % at 24 V; 250 Hz ± 10 % at 12 V
- Measuring socket – solenoid current: ± 1 V ≙ ± 1 A ± 5 %
  – command voltage: approx. 0...± 10 V at 100 % command signal (depends on I_{max}-adjustment)

Note: Power supply, Potentiometer, Card holder see page 22.

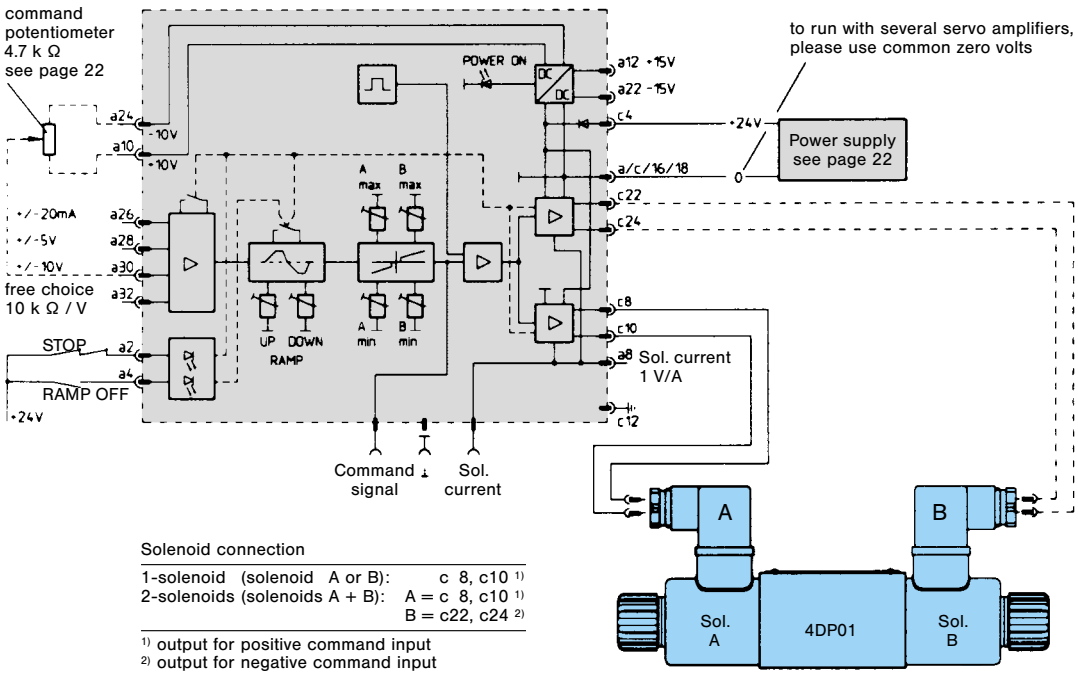
Dimensions Plug-in module 3HE according to IEC 297



Details on the front panel



Schematic block diagram and terminal assignment



Solenoid connection

1-solenoid (solenoid A or B):	c 8, c10 [1]
2-solenoids (solenoids A + B):	A = c 8, c10 [1]
	B = c22, c24 [2]

[1] output for positive command input
[2] output for negative command input

Order No.: 701–00155–8 (12 V)
Weight: 0.25 kg

This servo amplifier is designed to control a direct operated proportional directional valve equiped with a transducer. The transducer forms a position feedback circuit for the valve together with the PID-regulator on the amplifier card. Differences between command and actual point are supplied as a corrective current to the proportional solenoid on the valve.
The amplifier has two reverse polarity and short circuit protected PWM-output stages with max. current limit.
To operate the single solenoid proportional valve, only one output stage is connected. Four different inputs are available for different command signals. On the front panel there are potentiometers to adjust the ramp circuits up / down (independently from each other), flow gain (Imax) and the zero point (Imin).
The zero-point adjustment enables the positive overlap of the spool, typical of proportional valves, to be bypassed. The electrical zero-point (Imin) can be adjusted to 0...50 % of Imax.
By changing the input signal from 0...2 %, the amplifier passes over to the "Imin-leap"-function (dead-band elimination).
The front panel includes diagnostic LEDs to display the working condition (power on), ramp function (ramp off) and "fail-safe" in case of short circuit or external stop of the card. Three measuring sockets are provided to measure the nominal solenoid current, the command voltage, and the transducer feedback signal.
This servo amplifier can also be used with "A"-design valves.

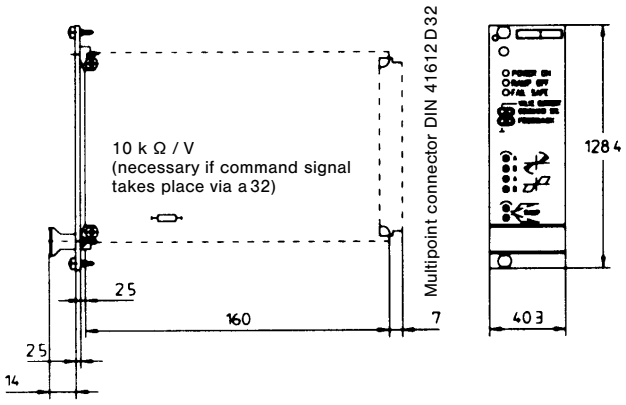
Characteristics – Servo Amplifier

- Supply voltage
  - nominal: 24 V DC
  - smoothed battery voltage: 23...32 V DC
  - rectified AC: 19...24 V Ueff (single-phase, full-wave rectifier)
  - transducer: approx. 24 V ± 10 % stabilized (from amplifier)
- Reference voltage: ± 15 V 25 mA ± 5 % / ± 10 V[1]) 10 mA ± 0.5 % } from amplifier [1]) stabilized
- Valve nominal current: Inom A = Inom B = 2.2 A
- Current consumption max.: approx. 2.5 A
- Short circuit protection: for solenoids A, B and reference voltage
- Inputs (at prop. valves with one solenoid only positive (+) command signals)
  1. +/– 0...20 mA, 100 Ω
  2. +/– 0... 5 V, 50 k Ω
  3. +/– 0...10 V, 100 k Ω

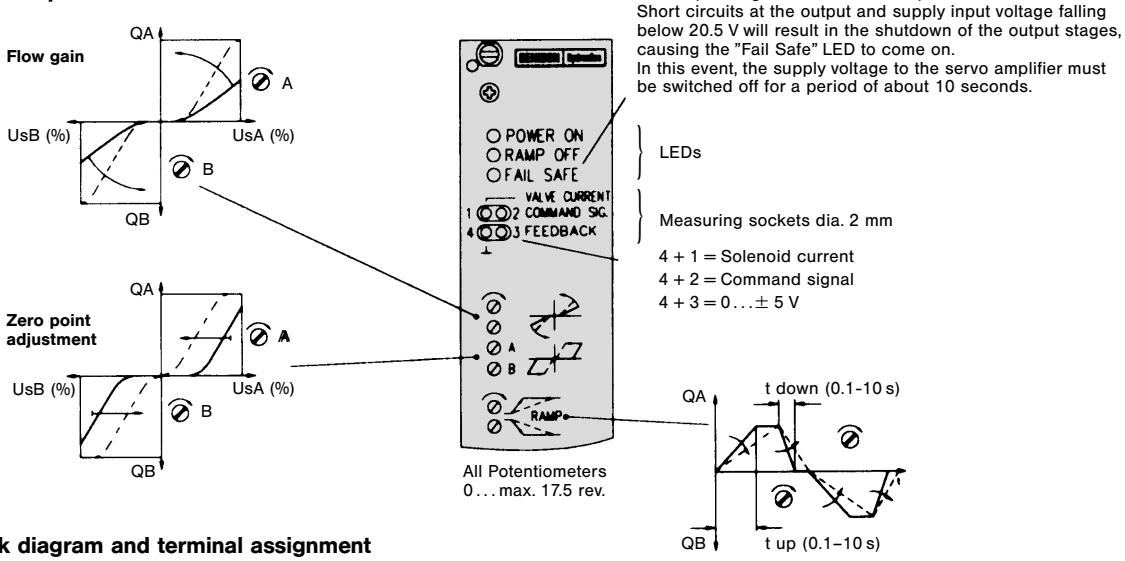
  } input impedance
  4. free choice 10 k Ω / V input voltage
- Outputs
  - 2 solenoids version: (+) = solenoid A; (–) = solenoid B
  - 1 solenoid version: (+) = solenoid A or B
- External stop: illuminates on "Fail Safe", implement as normally closed circuit connection with an input voltage between 2.5 and 24 V DC: input impedance 4.7 k Ω
- Potentiometers for
  - flow gain A, B (Imax): ...2.2 A, solenoid current at 100 % command
  - zero point adjustment A, B (Imin): 0...50 % from Imax; 10 % factory set
  - ramp up: 0.1...10 s ± 20 % ≙ 1...100 V/s
    down: 0.1...10 s ± 20 % ≙ 1...100 V/s
- Ramp off: illuminates when "Ramp off". Ramp is switched off by applying an input voltage between 2.5 and 24 V DC at pin a4; input impedance 4.7 k Ω
- Measuring socket
  - solenoid current: ± 1 V ≙ ± 1 A ± 5 %
  - command voltage: approx. 0...± 10 V at 100 % command signal (depends on Imax-adjustment)
  - feedback: ± 5 V max. level at 100 % command signal

Note: Power supply, Potentiometer, Card holder see page 22.

Dimensions Plug-in module 3HE according to IEC 297



Details on the front panel



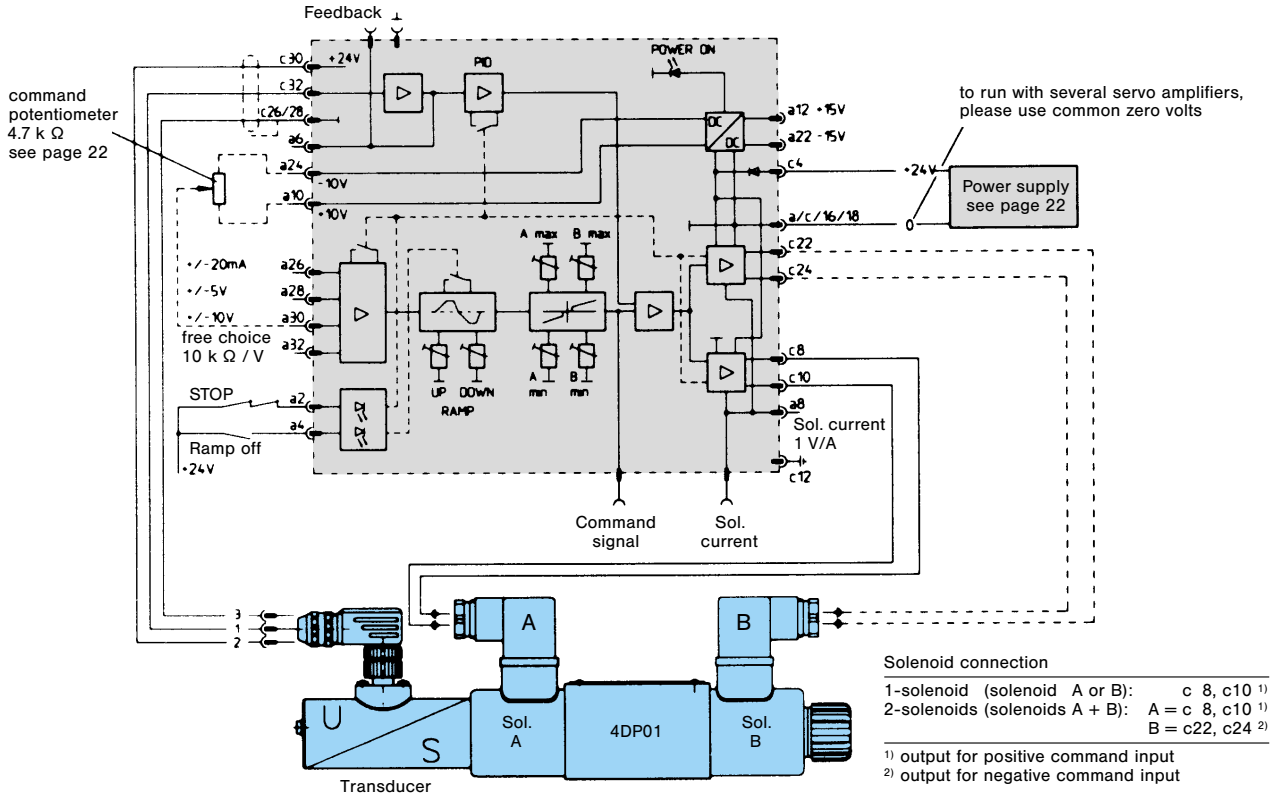
The output stages are short circuit proof.
Short circuits at the output and supply input voltage falling below 20.5 V will result in the shutdown of the output stages, causing the "Fail Safe" LED to come on.
In this event, the supply voltage to the servo amplifier must be switched off for a period of about 10 seconds.

LEDs

Measuring sockets dia. 2 mm

4 + 1 = Solenoid current
4 + 2 = Command signal
4 + 3 = 0 . . . ± 5 V

Schematic block diagram and terminal assignment



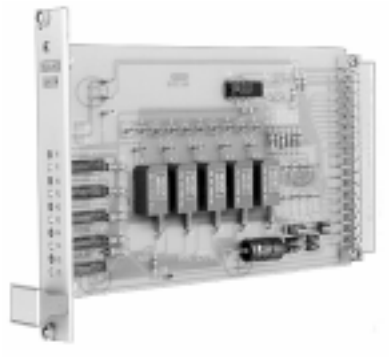
Solenoid connection

1-solenoid (solenoid A or B):	c 8, c10 [1]
2-solenoids (solenoids A + B):	A = c 8, c10 [1]
	B = c22, c24 [2]

[1] output for positive command input
[2] output for negative command input

COMMAND CARD FIVE CHANNEL

Order No.: 701–00028–8
Weight: 0.15 kg



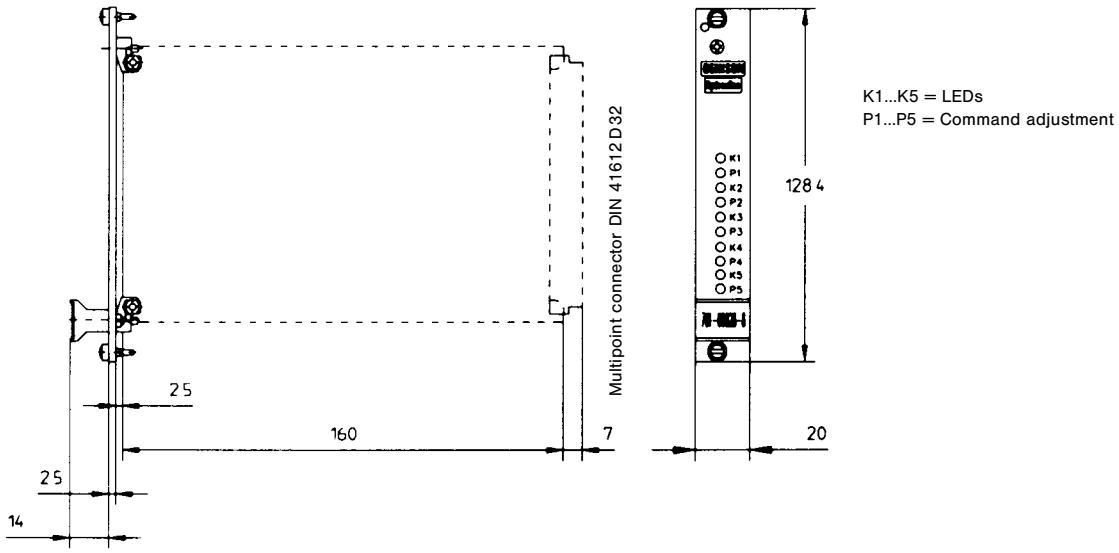
This command card is designed to interface with all servo amplifiers for DENISON proportional valves.
Five multiturn-potentiometers (P1...P5) allow different command signals. Selection is made by external energizing of the five selector relays on the command card. By moving the solder bridges (+/–) it is possible to preset positive or negative commands for the desired level and direction.
In addition, the command card has a summing amplifier which enables the monitoring of the internal commands (solder bridges 1...5), or additional external resistor array.
These inputs (e.g. a 4) also make it possible to cascade further command cards if required.
The output signal to the servo amplifier is available "not inverted" (a 2) and "inverted" (c 2).
The command card has a power rectifier with a 24 V DC output (input 24 V AC). Via this output c 30/32, the command relays can be energized.
All potentiometers are adjustable on the front panel.
The operating status of the corresponding command is indicated by an LED display on the front pannel (K1...K5).
LED on = Command level selected.

Characteristics – Command Card

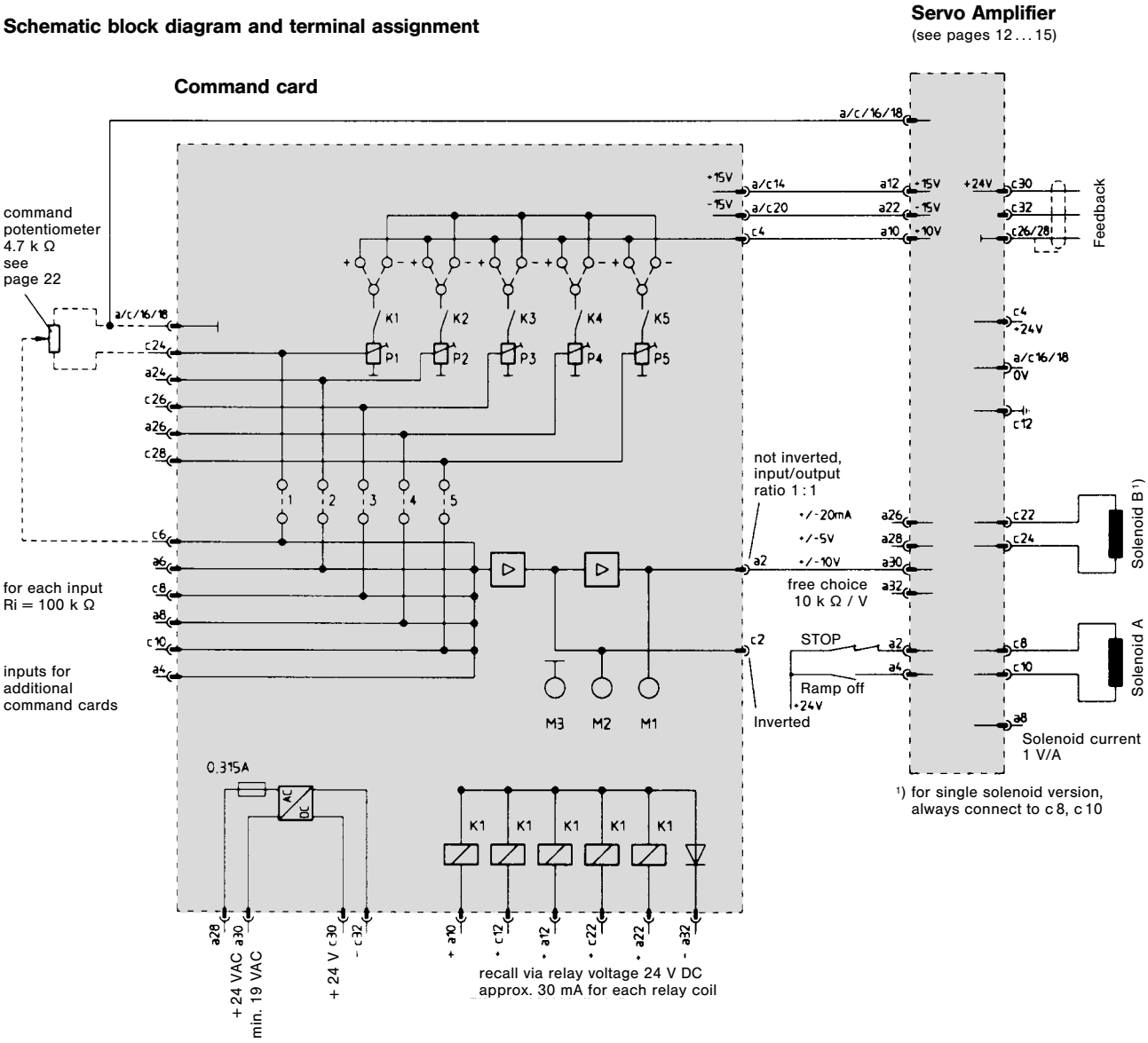
• Supply voltage:	
– command card	supply from servo amplifier
– rectifier	24 V AC (min. 19 V AC)
• Command potentiometer	5 potentiometers 0 . . . 10 V
• Command relays	5 potential – free contacts
• Relay contacts:	
– max. current on contact (resistive load)	100 mA
– max. switching voltage	30 V
– coil voltage	24 V DC, approx. 30 mA incl. LED-display

Note: Servo Amplifiers see pages 12...15.
Potentiometer, Card holder see page 22.

Dimensions Plug-in module 3HE according to IEC 297



Schematic block diagram and terminal assignment



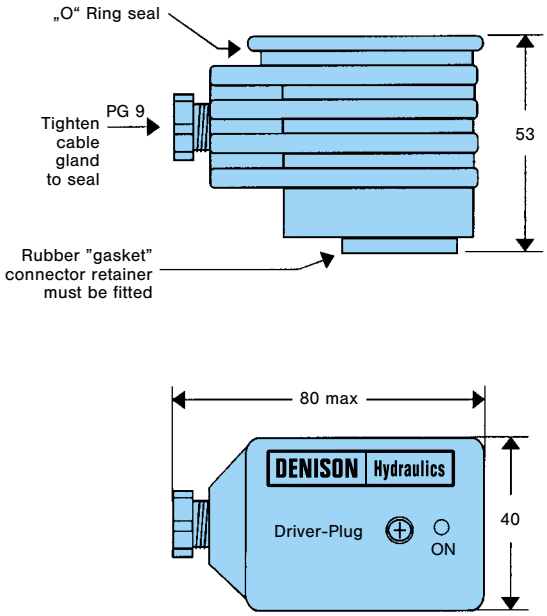
Order No. 701–00507–8 (12 V)
701–00508–8 (24 V)

This range of Plug-on Drivers is designed to operate DENISON 4DP01 open loop Proportional Directional valves. The Plug-on Driver has reverse polarity and short circuit protection and converts a linear input command signal to a proportional output current sufficient to control the valve solenoid.
Each Plug-on Driver controls one proportional solenoid.
When these Plug-on Drivers are used as a pair, to drive a double solenoid valve, the individual ramp settings must be set to zero (0), and the ramp, where required, has then to be supplied by the external command system.
In addition, the command invert link must be fitted to Plug-on Driver "B".
Interesting features of this module include the fact that all necessary building blocks, normally required to control a proportional valve, are included within the small sized Plug-on Driver.
This version is housed in a rugged thermo plastic shell which has a "o" ring sealing to give an IP 54 rating when assembled correctly.

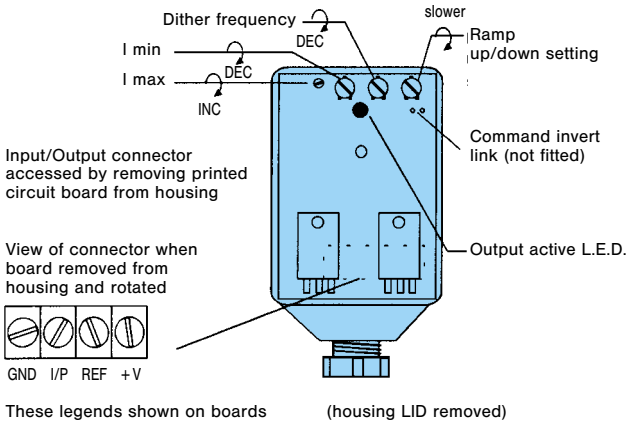
Characteristics – Plug-on Driver

• Board style	Custom design
• Connector type	Standard Hirschmann female outline (rotatable)
• Input supply voltage	12 or 24 Volts DC + 20 %
• Input supply current	Valve current + approx. 30 mA max.
• User output voltage	1 x + 8.5 VDC (+/– 15 %) 10 mA max.
• Valve supply voltage	. . . 95 % of DCV input (P.W.M.)
• Valve current	12 V = 2.2 Amp 24 V = 1.1 Amp
• Command input values	0 . . . + 10 V
• Available adjustments (inside)	I_{min}, I_{max}, ramp up & down (same value), dither frequency
• Ramp type	linear and continuously variable
• Ramp up time	50 ms . . . 8 s +/– 20 % ≙ 0.5 . . . 100 V/s
• Ramp down time	50 ms . . . 8 s +/– 20 % ≙ 0.5 . . . 100 V/s
• Dither amplitude	preset
• Dither frequency	40 . . . 300 Hz +/– 20 %

Dimensions

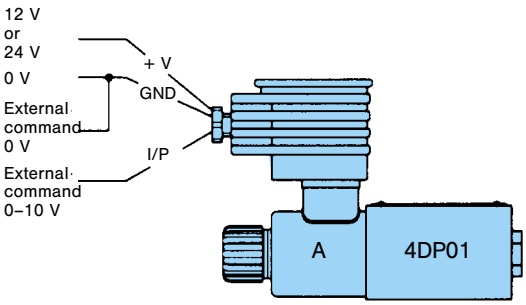


Details

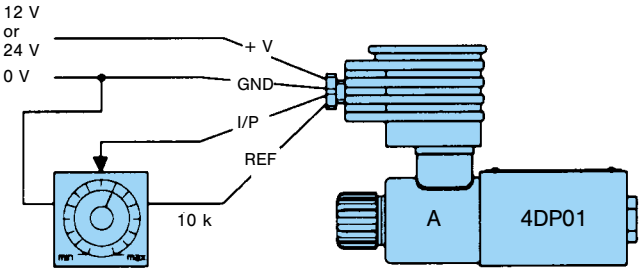


Installation

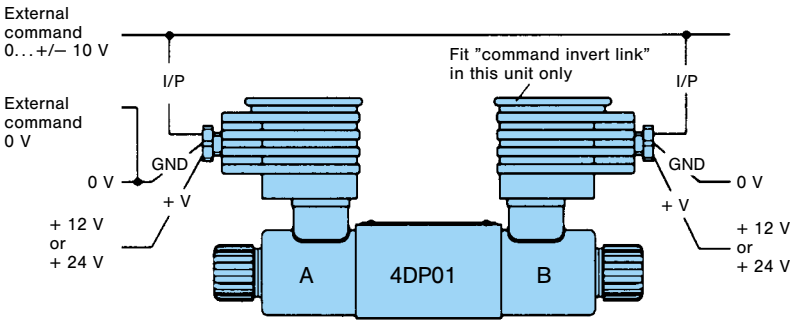
Proportional valve with external command input



Proportional valve with potentiometer command input



Double sided valve application showing external command input connections



Notes:

1. Solenoid A responds to ”+” voltage commands only.
2. Solenoid B responds to ”–” voltage commands only.
3. The individual ramp settings must be set to zero (0), and the ramp, where required, has then to be supplied by the external command system.
4. External command voltage range is +/– 10 V max.
5. Command deadband is approximately +/– 220 mV around zero volts.
6. Set ”I_{min}” before setting I_{max}”.
7. In addition, the command invert link must be fitted to Plug-on Driver ”B”.

Order No. 701–00502–8 (12 V)
701–00503–8 (24 V)

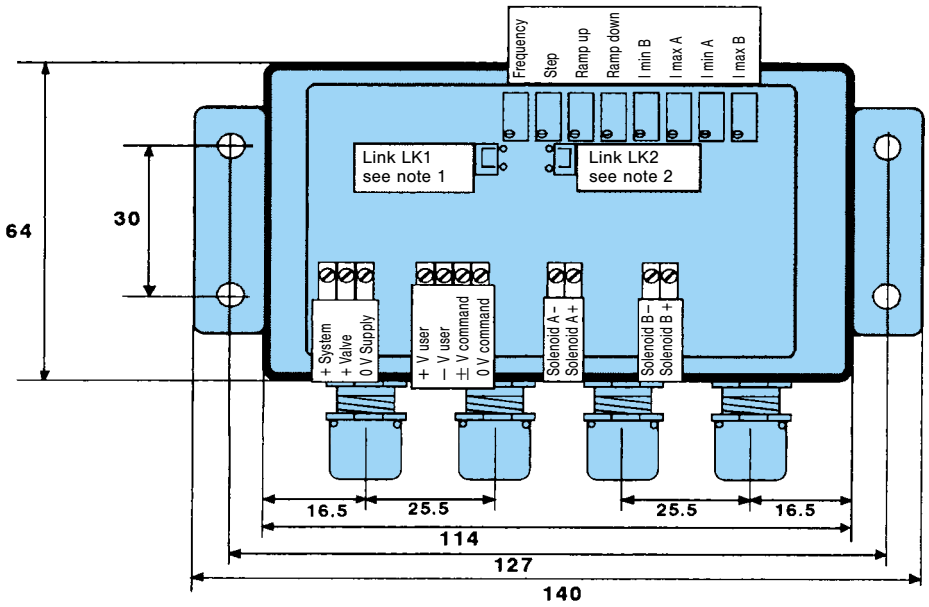
This range of high quality Dual Drivers is designed to operate DENISON 4DP01 open loop Proportional Directional Valves. This dual driver has reverse polarity and short circuit protection and converts a linear input command signal to a proportional output current sufficient to control the valve solenoids.
This version of the dual driver is designed to control a double solenoid valve.
The innovative feature of this dual driver, apart from the aluminium enclosure (IP65 & EMI proof), is that all the necessary building blocks required to control a proportional directional valve are built into the dual driver, and adjustments are, once set, protected from unauthorised tampering within the enclosure.

Characteristics – Dual Driver

• Board style	Custom design
• Connector type	PG 7 cable glands and screw terminals
• Input supply voltage	12 or 24 Volts DC +/– 20 %
• Input supply current	Valve current + approx. 50 mA max.
• User output voltage	+/– 10 VDC (+/— 5 %) 5 mA max. / rail
• Valve supply output	. . . 95 % of DCV input (P.W.M.)
• Valve current	12 V = 2.2 Amp 24 V = 1.1 Amp
• Command input values	0 . . . +/– 10 V
• Available adjustments (inside)	I_{min}, I_{max} (A & B), ramp up, ramp down, dither frequency, deadband
• Ramp type	linear and continuously variable
• Rampe up time	50 ms . . . 10 s +/— 20 % ≙ 1.0 . . . 200 V/s
• Rampe down time	50 ms . . . 10 s +/— 20 % ≙ 1.0 . . . 200 V/s
• Dither amplitude	preset
• Dither frequency	50 . . . 300 Hz +/— 15 %

Dimensions & Details

Adjustment potentiometer locations

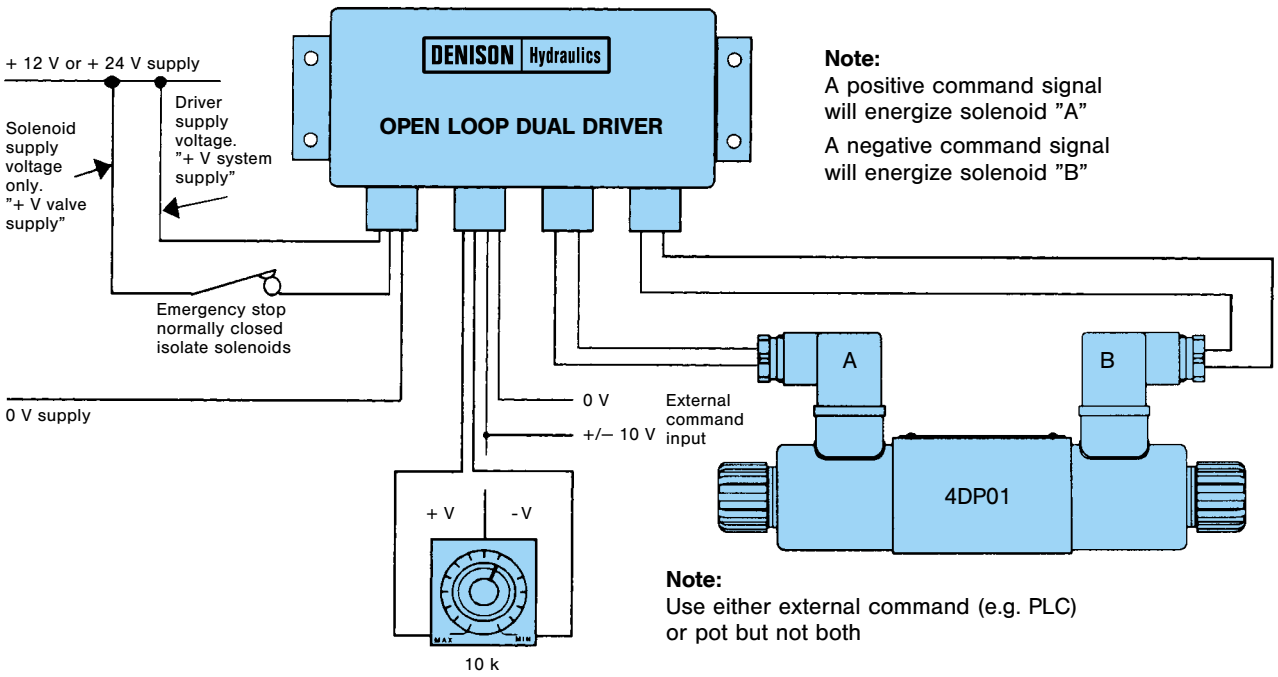


Box height = 55 mm
4 fixing holes
5 mm dia.

Note 1:
Keep link LK1 fitted when no ramp is required.
System internal ramp is then less than 5 msec.

Note 2:
Keep link LK2 fitted if no individual deadband is required.
Without threshold the deadband is approx. 60 mVolt.
With threshold the deadband potentiometer (step) must be adjusted to reach the required value.

Installation



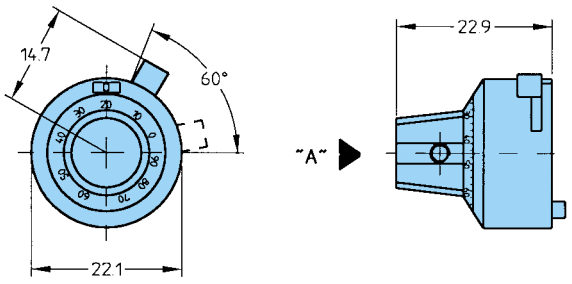
Note:
A positive command signal will energize solenoid "A"

A negative command signal will energize solenoid "B"

Note:
Use either external command (e.g. PLC) or pot but not both

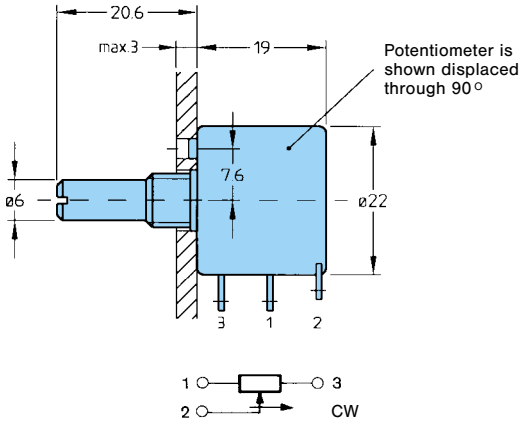
Potentiometer-Adjusting knob
Order No. 701–00014–8

View „A“

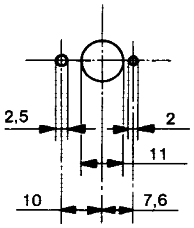


Adjusting knob with scale 0...100
and with revolution counter.
Adjustment is lockable.

Potentiometer

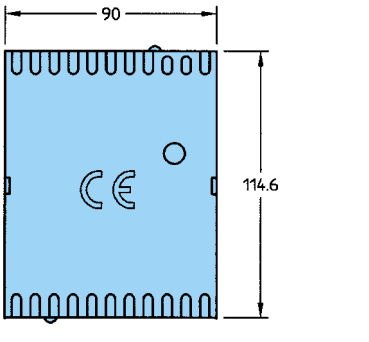


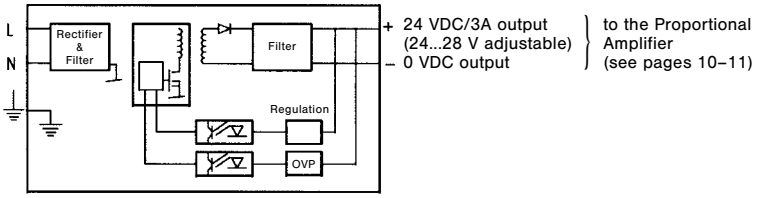
Panel opening



Potentiometer-Characteristics	Potentiometer Order No.	
	701–00012–8	701–00013–8
Angle of rotation	360°	3600°
Linearity	± 0.5 %	± 0.25 %
Resolution-Drift	0.11% of 360°	0.02 % of 3600°

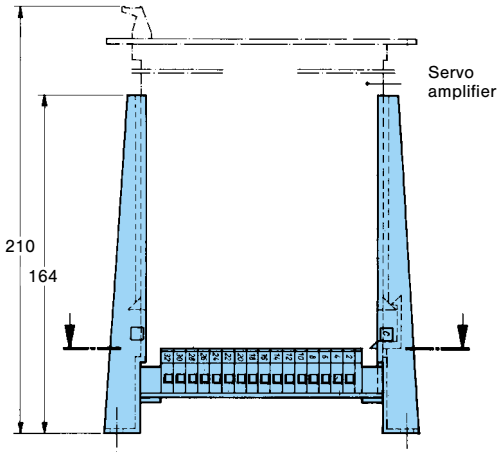
Power supply
Order No. 701–00017–8
Weight: 2 kg

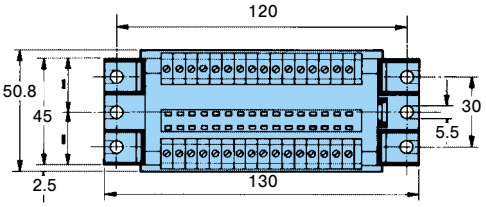




L = Nominal frequency 50/60 Hz
Nominal voltage 230 VAC or 115 VAC (pay attention to voltage selector switch setting)
N = Neutral line

Euro-Card-Holder
Order No. 701–00007–8
Holder for individual mounting according to DIN 41612





ORDER INFORMATION FOR PRESSURE COMPENSATORS

Model No.: **SPC 01 .. .. 1 . . A**

Series
SPC = Pressure compensator

Size
01 = Cetop 03

Function
01 = 3-port Meter-in Compensator
11 = 2-port Meter-in Compensator
12 = 2-port Meter-out Compensator [1)]
[1)] only with sensing port Code C

Control pressure drop range
04 = 2...5 bar adjustable
(only for 3-port compensator)
05 = 5 bar
10 = 10 bar (only for 3-port compensator)

Seal class
w/o code = NBR-seals
V = Viton

Design letter

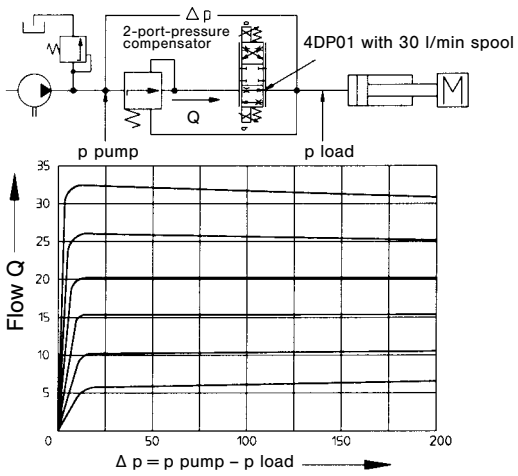
Body
3 = Aluminium (up to 210 bar)
5 = Steel (up to 350 bar)

Load sensing port
A = in A
C = in A or B

Circuit type
1 = single

		Model No.	Order No.	Weight
3-port Meter-in Compensators with shuttle valve P-A/B	Alu	SPC 01 01 041C3A	026 425800	0.8 kg
		SPC 01 01 051C3A	026 425810	
		SPC 01 01 101C3A	026 425820	
	Steel	SPC 01 01 041C5A	026 425830	1.6 kg
		SPC 01 01 051C5A	026 425840	
		SPC 01 01 101C5A	026 425850	
3-port Meter-in Compensators P–A	Alu	SPC 01 01 041A3A	026 425920	0.5 kg
		SPC 01 01 051A3A	026 425930	
		SPC 01 01 101A3A	026 425940	
	Steel	SPC 01 01 041A5A	026 425950	1.1 kg
		SPC 01 01 051A5A	026 425960	
		SPC 01 01 101A5A	026 425970	
2-port Meter-in Compensators with shuttle valve P-A/B	Alu	SPC 01 11 051C3A	026 425570	0.7 kg
	Steel	SPC 01 11 051C5A	026 425600	1.5 kg
2-port Meter-in Compensators P–A	Alu	SPC 01 11 051A3A	026 425690	0.6 kg
	Steel	SPC 01 11 051A5A	026 425720	1.3 kg
2-port Meter-out Compensators P-A/B	Alu	SPC 01 12 051C3A	026 426050	1.4 kg
	Steel	SPC 01 12 051C5A	026 426080	2.9 kg

Flow regulation
Example: 2-port Meter-in compensator



The product described is subject to continual development and the manufacturer reserves the right to change the specifications without notice.