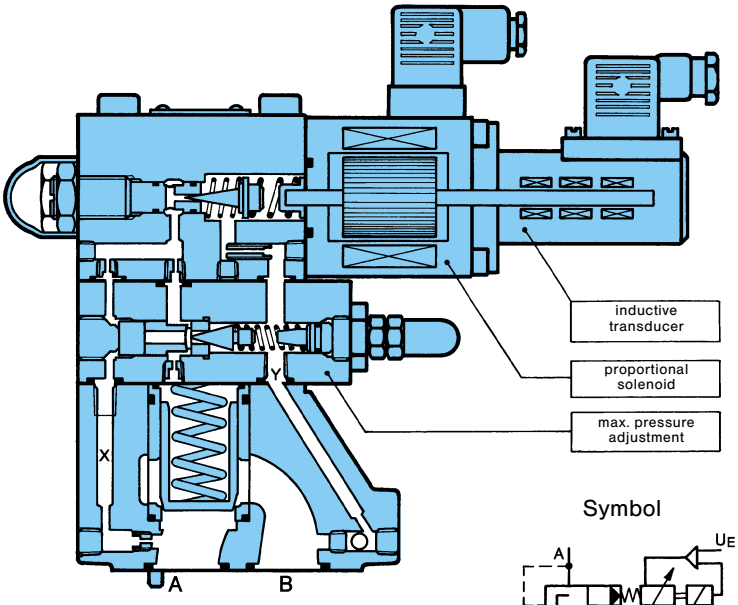
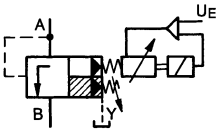
CETOP 05 / 08 / 10
max. 140 / 210 / 350 bar
max. 90 / 300 / 600 l/min

Features

- Subplate mounting with configuration according to CETOP, ISO and DIN.
- Cartridges for manifold application.
- With or without maximum pressure adjustment.
- Proportional solenoid with integrated, inductive transducer.
- Low hysteresis, ≦ 1%.
- Good repeatability, ≦ 0.5 %.
- 3 pressure stages, giving higher resolution.
- Maximum dynamic range by use of 12 V proportional solenoid.
- No mechanical adjustment of transducer necessary.
- Proportional amplifier to European format with voltage regulator, ramp generator, PID regulator, pulse-width-modulated output stage with output current limiter and load-independent output current.
- Valve and electronics from one supplier.



Symbol

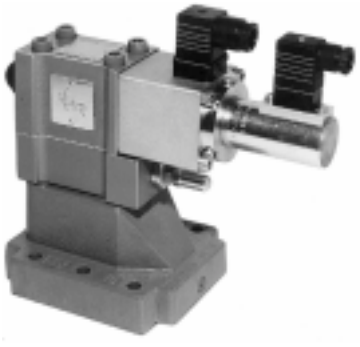


Description

DENISON R4VP pilot operated proportional pressure relief valves with electronic position control are designed to adjust pressure according to the current input. Of the tried and tested seat type, these valves comprise the pilot valve with proportional solenoid and integrated inductive transducer as well as main valve and cartridge. Furthermore these valves are available with a sandwiched, spring loaded relief valve for maximum pressure adjustment.
The pilot valve seat and the maximum pressure adjustment are factory adjusted and set.
All components are subject to the most stringent quality control during manufacture to ensure long service and high operational reliability. Each unit undergoes a final test-bench check before delivery.
Efficient manufacturing processes and adherence to close tolerances allows components to be replaced, changed or modified. This is also true, without exception, for spare parts, which are available through an international after-sales service network.

Operation

On receipt of a nominal value signal the proportional solenoid precommpresses the springs. The difference in length which results is recorded by the transducer (actual value) and compared to the nominal value by the PID regulator. The resulting differential signal is regulated against zero, so matching the actual value to the nominal value. Any variations are detected by the transducer and corrected. This system ensures high repeatability and almost hysteresis-free nominal value pressure characteristics. If no actual value reply is received, the valve switches to pressureless circulation (fail safe).
No mechanical adjustment of the displacement measuring system is necessary. Any functional tolerances, caused by valve production deviation, can be eliminated at the zero-point regulator on the amplifier board. The zero-point of the transducer, the max. pressure and the time ramps are all adjustable at the amplifier via trimming potentiometers. LED's indicate power on, out of circuit ramp and malfunction of the transducer. The unit operates with a pulse-width-modulated output stage.



R4VP – subplate type
with maximum pressure adjustment

R4VP – cartridge type
without maximum pressure adjustment

Proportional Amplifier
with faceplate and holder

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Characteristics

	General	
1	Design	Poppet type, two-stage
2	Type of connection	indirect via subplate or manifold
3	Mounting position	optional
4	Direction of flow	A→B
5	Ambient temperature range	−20 ... + 60 °C
6	Valve production deviation	± 3 % of max. pressure setting
	Hydraulic	
7	Pressure setting range	7...140 bar 7...210 bar 7...350 bar
8	Max. operating pressure (ports A, B)	350 bar
9	Pilot drain (port Y)	direct to tank without pressure
10	Fluid	Mineral oil according to DIN 51524 and 51525. For other fluids please consult DENISON.
11	Fluid temperature range	−18 ... + 80 °C
12	Viscosity range	10...650 cSt, optimal 30 cSt
13	Max. flow	90 l/min (R4VP 03) / CETOP 05) 300 l/min (R4VP 06) / CETOP 08) 600 l/min (R4VP 10) / CETOP 10)
14	Contamination level	Max. permissible contamination level according to NAS 1638 Class 8 (Class 9 for 15 Micron and smaller) or ISO 17/14
	Electrical	
15	Design	Proportional solenoid, single stroke, pushing
16	Nominal voltage – proportional solenoid	12 V DC
17	Nominal current	0...2.4 A
18	Nominal output	29 W at 20 °C
19	Coil resistance	4 Ω at 20 °C 4.6 Ω at 50 °C
20	Relative operating period	100 %
21	Type of protection (according to DIN 40050)	IP 65
22	Current consumption – Transducer	≦ 25 mA
23	Output voltage (from transducer)	7.5...12 V
24	Supply voltage (to the transducer)	20...28 V DC
25	Electrical connector – Proportional solenoid – Transducer	Plug-in connector accord. to DIN 43650-A/2 pol. + SL/PG 9/11 Plug-in connector accord. to DIN 43650-B (Plug-in connectors are included in valve order)
	Statical	
26	Hysteresis	≦ 1 % of max. pressure setting
27	Threshold	≦ 0.5 %
	Others	
28	Linearity	≦ 1.5 % (pressure setting range 20...100 %)
29	Repeatability	≦ 0.5 % of max. pressure setting

If the performance characteristics outlined above do not meet your requirements.
Please consult your local DENISON Office. Characteristics for the proportional amplifier see page 10.

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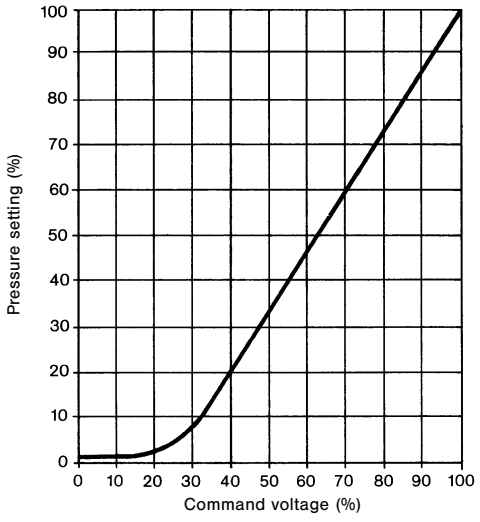
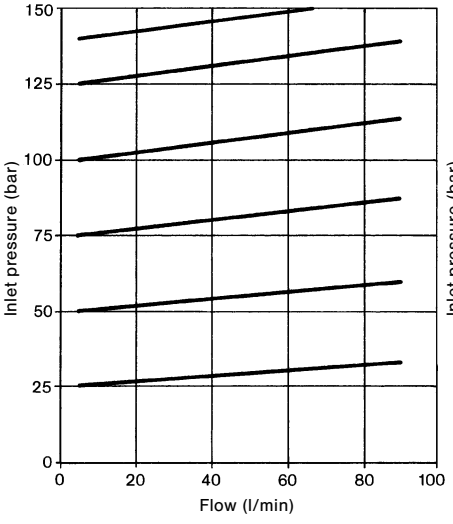
Characteristics (at 40 cSt, 50 °C)

Pressure setting dependent on command voltage
R4VP 03 / 06 / 10

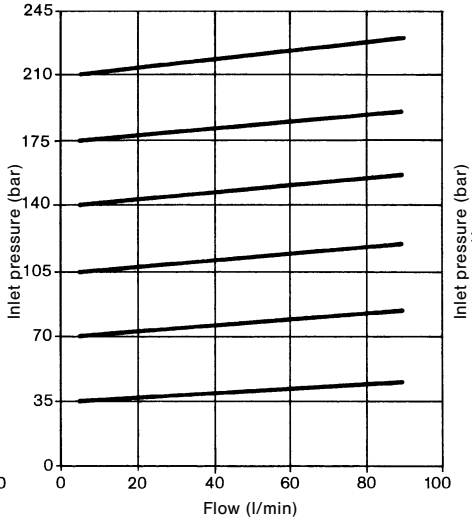


p-Q characteristic

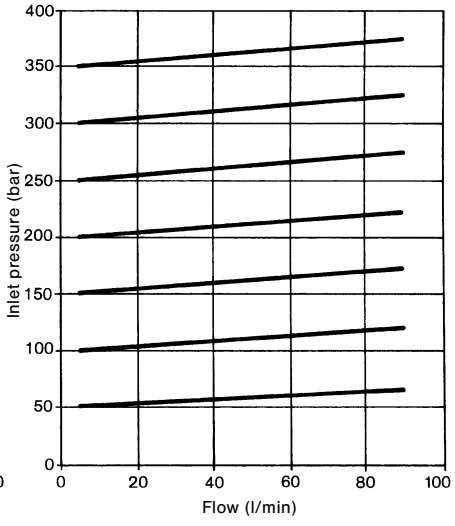
R4VP 03
Pressure stage 140 bar



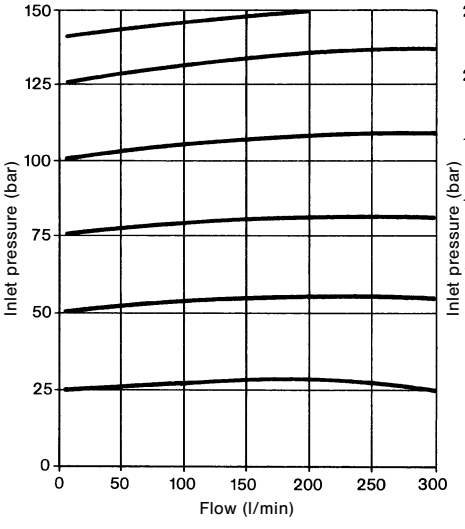
R4VP 03
Pressure stage 210 bar



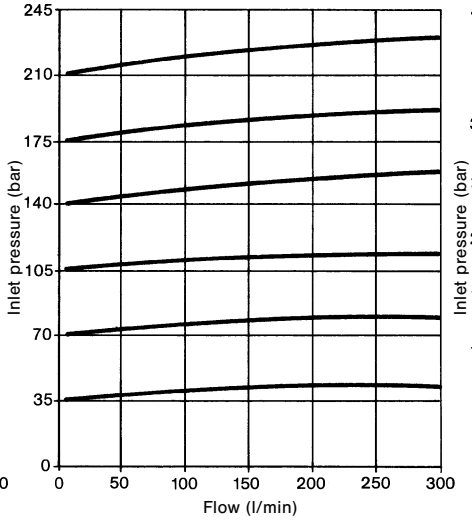
R4VP 03
Pressure stage 350 bar



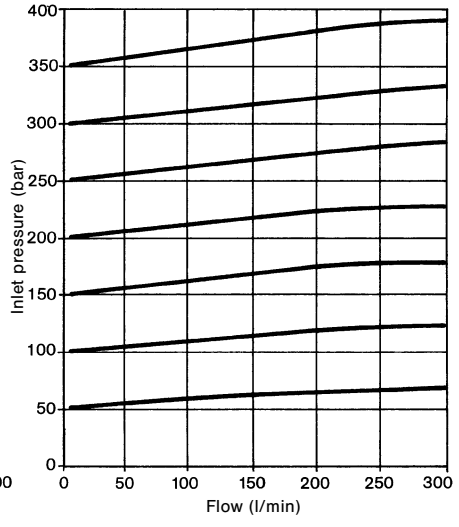
R4VP 06/10[1])
Pressure stage 140 bar



R4VP 06/10[1])
Pressure stage 210 bar



R4VP 06/10[1])
Pressure stage 350 bar



[1]) R4VP 10 max. 600 l/min.

All Performance Data given is typical and can be influenced by application.

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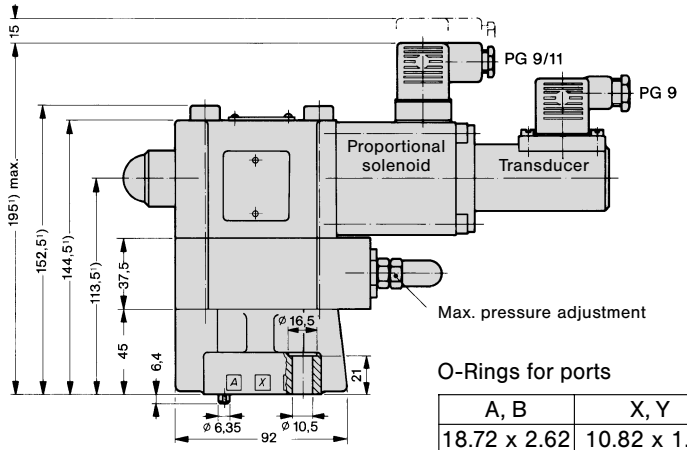
R4VP 03 (CETOP 05) Subplate Mounting, Configuration accord. to ISO

Weight: 5.7 kg (without max. pressure adjustment)
7.3 kg (with max. pressure adjustment)



O-Rings for ports

A, B	X, Y
18.72 x 2.62 691–00116	10.82 x 1.78 691–00013

¹) these dimensions are reduced by 37.5 mm for versions without max. pressure adjustment.
²) port X not required (internal pilot pressure from A).
³) pilot drain (Y) always directly to tank without pressure.

Order information

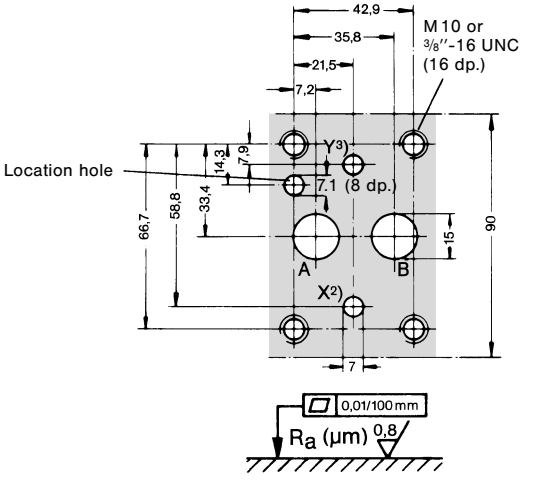
R4VP 03 – 53	*	–	*	2 – 103 – A	*

Pressure range
2 = 7...140 bar
3 = 7...210 bar
5 = 7...350 bar

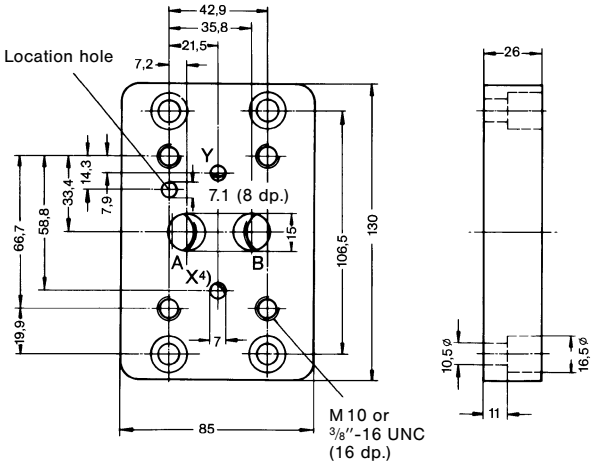
Max. pressure adjustment
0 = without
1 = with

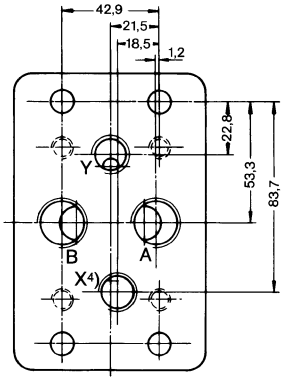
Seal class
1 = N.B.R. (Buna N) Standard
5 = VITON

Block mounting face according to CETOP, ISO and DIN



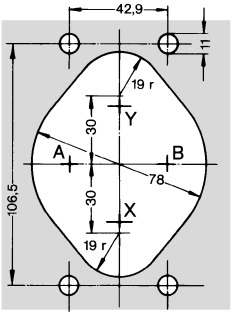
Subplate
Weight: 2 kg





⁴) Port X must be plugged

Panel opening



Subplate

Model-No.	Order-No.	Port sizes		4 Mounting screws*		
		A + B	X + Y	Dimension	Order-No.	min. tensile strength
SS–B–08–G113	S16–63124	G 1/2"	G 1/4"	M 10 x 35 DIN 912–12.9	700–70039	at p≦210 bar = 100 daN/mm² at p>210 bar = 120 daN/mm²

*Mounting screws are included in subplate order.
For valves ordered without subplate, mounting screws must be ordered separately.

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R4VP 06 (CETOP 08) Subplate Mounting, Configuration accord. to ISO

Weight: 7.7 kg (without max. pressure adjustment)
9.3 kg (with max. pressure adjustment)

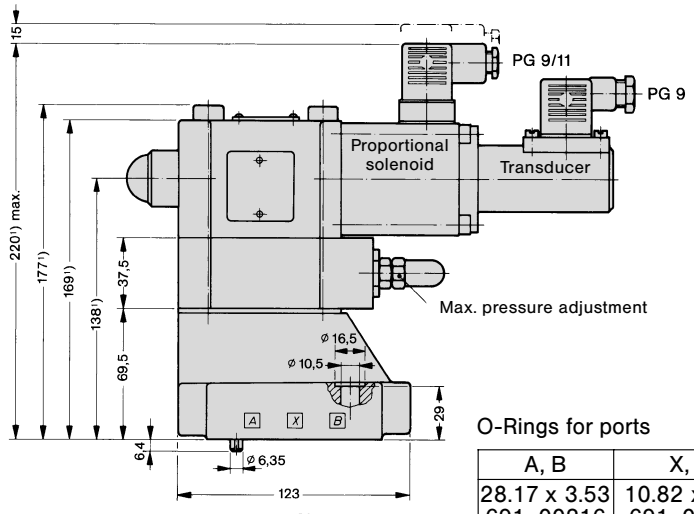
Order information

R4VP 06 – 53	*	–	*	2 – 103 – A	*

Pressure range
2 = 7...140 bar
3 = 7...210 bar
5 = 7...350 bar

Max. pressure adjustment
0 = without
1 = with

Seal class
1 = N.B.R. (Buna N) Standard
5 = VITON

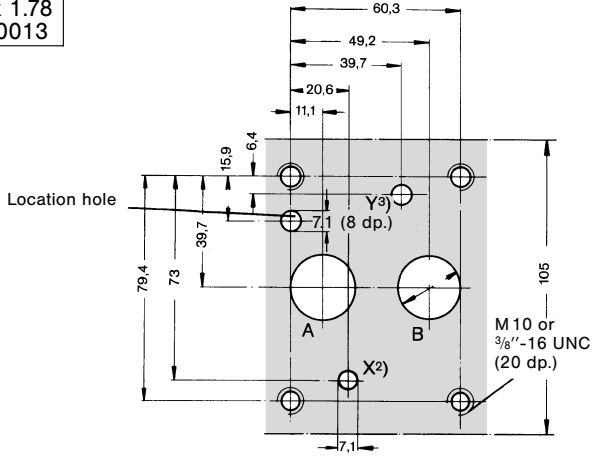


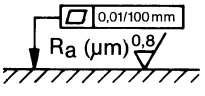
O-Rings for ports

A, B	X, Y
28.17 x 3.53 691–00216	10.82 x 1.78 691–00013

¹) these dimensions are reduced by 37.5 mm for versions without max. pressure adjustment.
²) port X not required (internal pilot pressure from A).
³) pilot drain (Y) always directly to tank without pressure.

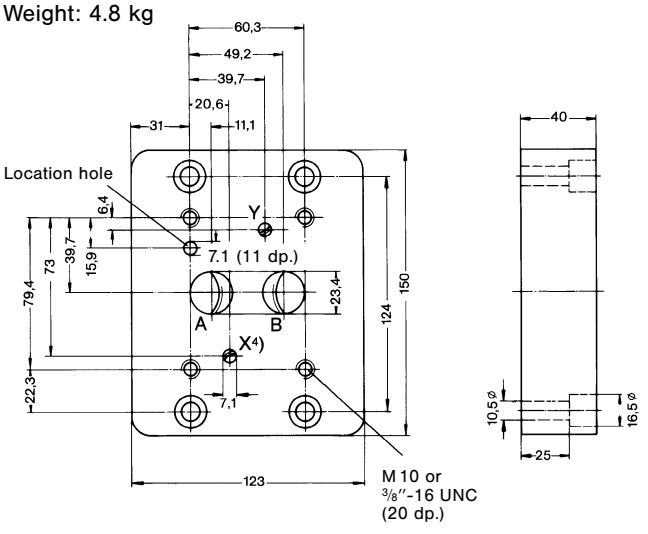
Block mounting face according to CETOP, ISO and DIN

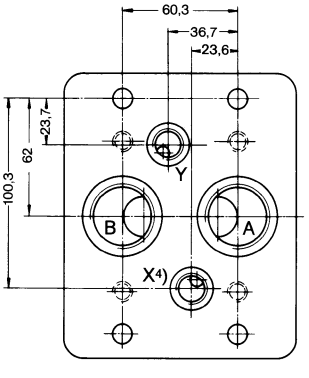




Subplates

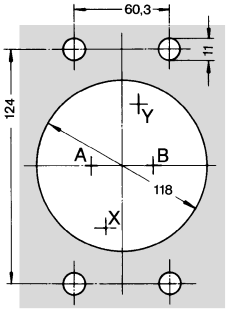
Weight: 4.8 kg





⁴) Port X must be plugged

Panel opening



Subplates

Model-No.	Order-No.	Port sizes		4 Mounting screws *		
		A + B	X + Y	Dimension	Order-No.	min. tensile strength
SS–B–12–G115	S16–39259	G 3/4"	G 1/4"	M 10 x 45	700–71602	at p ≦ 210 bar = 100 daN/mm²
SS–B–16–G115	S16–39168	G 1"	G 1/4"	DIN 912–12.9		at p > 210 bar = 120 daN/mm²

* Mounting screws are included in subplate order.
For valves ordered without subplate, mounting screws must be ordered separately.

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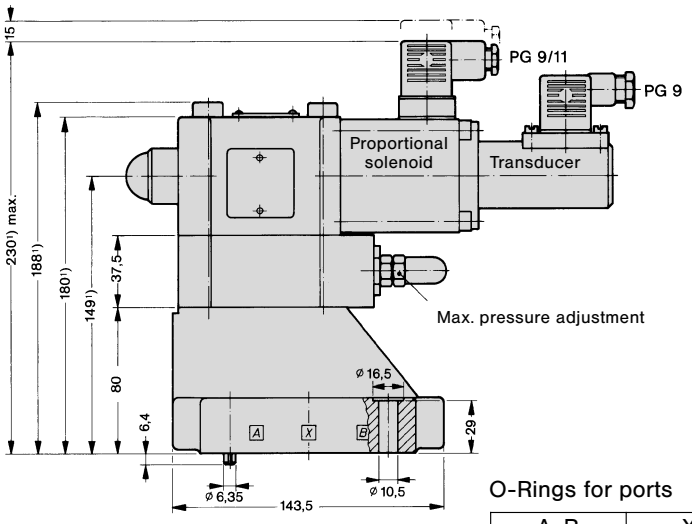
R4VP 10 (CETOP 10) Subplate Mounting, Configuration accord. to ISO

Weight: 9.1 kg (without max. pressure adjustment)
10.7 kg (with max. pressure adjustment)



Order information

R4VP 10 – 53	*	–	*	2 – 103 – A	*

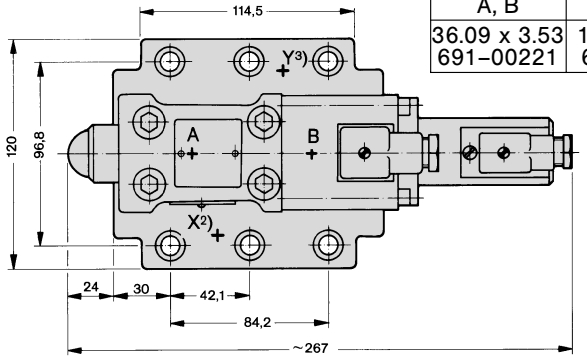
Pressure range
2 = 7...140 bar
3 = 7...210 bar
5 = 7...350 bar

Max. pressure adjustment
0 = without
1 = with

Seal class
1 = N.B.R. (Buna N) Standard
5 = VITON

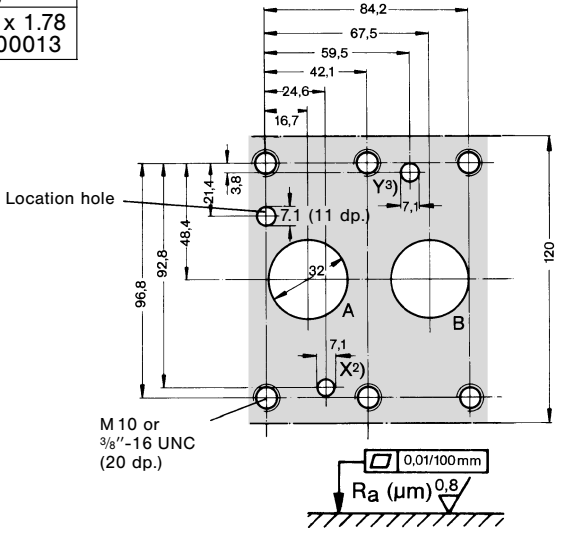
O-Rings for ports

A, B	X, Y
36.09 x 3.53 691–00221	10.82 x 1.78 691–00013

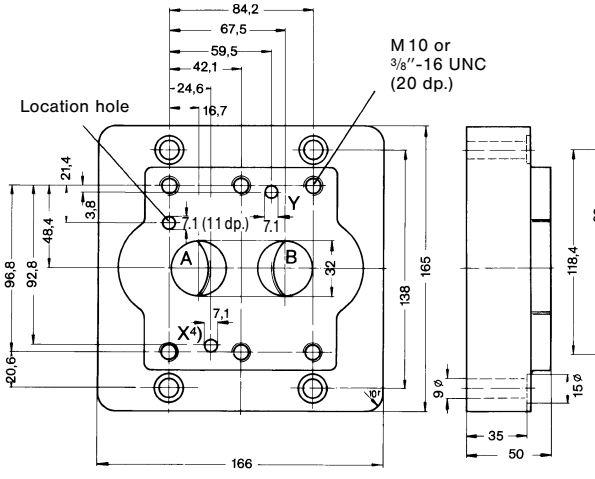


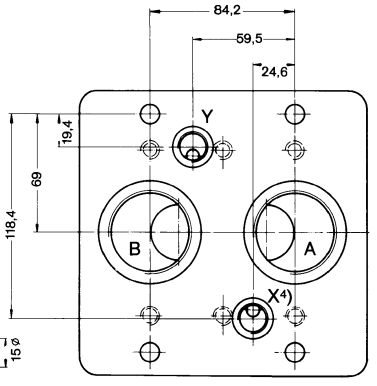
¹) these dimensions are reduced by 37.5 mm for versions without max. pressure adjustment.
²) port X not required (internal pilot pressure from A).
³) pilot drain (Y) always directly to tank without pressure.

Block mounting face according to CETOP, ISO and DIN



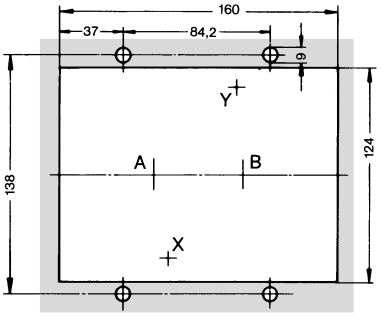
Subplate
Weight: 8.5 kg





⁴) Port X must be plugged

Panel opening



Subplate

Model-No.	Order-No.	Port sizes		6 Mounting screws*		
		A + B	X + Y	Dimension	Order-No.	min. tensile strength
SS–B–24–G117	S16–39197	G 1½"	G ¼"	M 10 x 45 DIN 912–12.9	700–71602	at p≦210 bar = 100 daN/mm² at p>210 bar = 120 daN/mm²

*Mounting screws are included in subplate order.
For valves ordered without subplate, mounting screws must be ordered separately.

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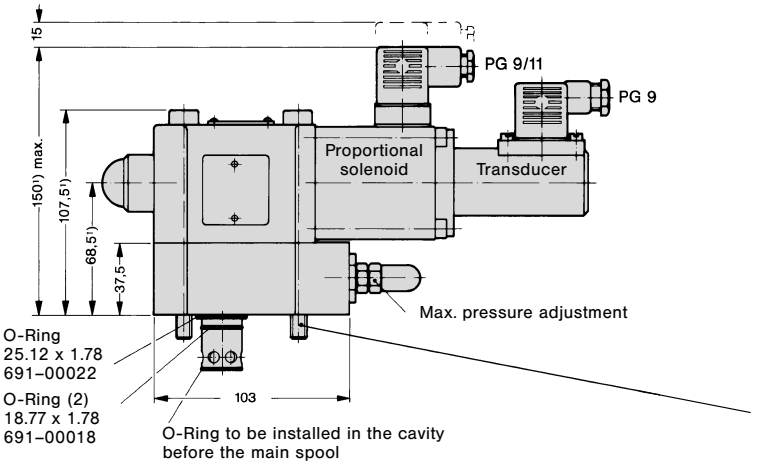
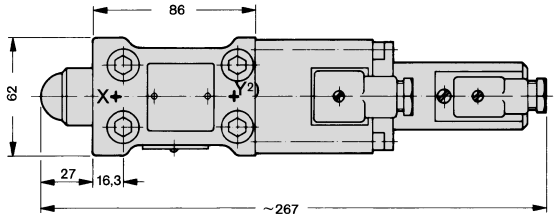




¹) these dimensions are reduced by 37.5 mm for versions without max. pressure adjustment.
²) pilot drain (Y) always directly to tank without pressure.

Order information

R4VP 03 – 00	*	–	*	2 – 103 – A	*

Pressure range
2 = 7...140 bar
3 = 7...210 bar
5 = 7...350 bar

Max. pressure adjustment
0 = without
1 = with

Seal class
1 = N.B.R. (Buna N) Standard
5 = VITON

Mounting screws (4)

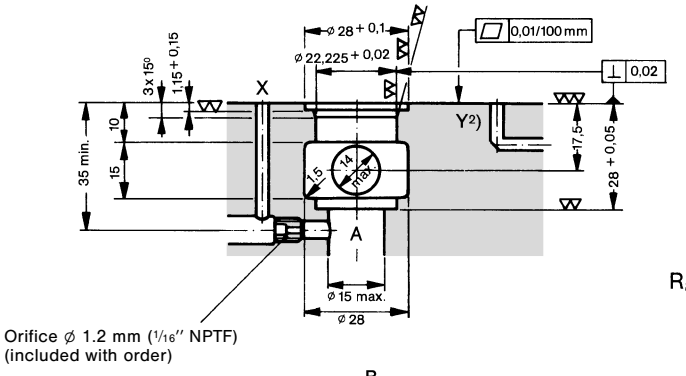
	Dimension	Order-No.
Max. pressure adjustment without	M10 x 75, DIN 912–10.9	361–11314–8
	or	
	3/8″–24 UNF x 3″	359–15320–8
Max. pressure adjustment with	M10 x 115, DIN 912–10.9	361–11393–8
	or	
	3/8″–24 UNF x 4 1/2″	359–15380–8

Torque 70 Nm
Mounting screws must be ordered separately.

O-Rings for ports X, Y

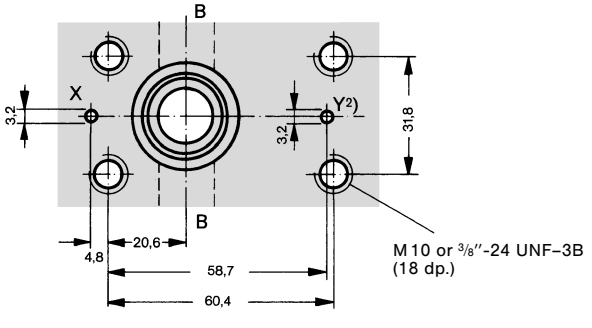
10.82 x 1.78	691–00013

Cavity



R_a (µm) $\frac{1,6}{\nabla} = \nabla\nabla$

$\frac{0,8}{\nabla} = \nabla\nabla\nabla$



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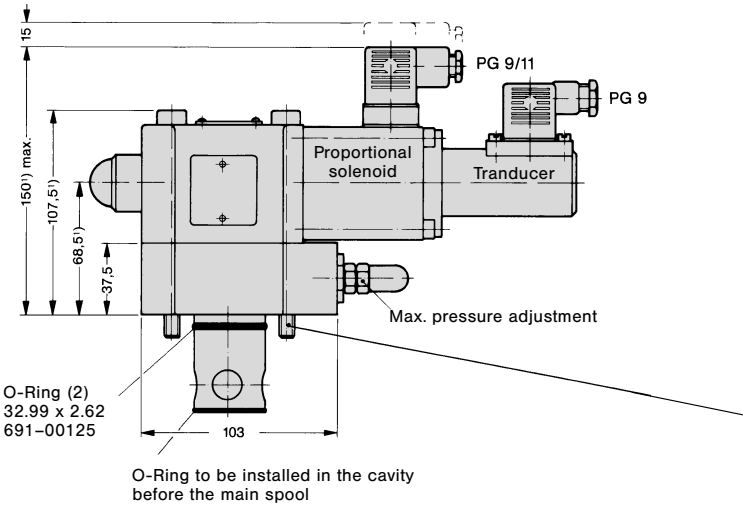
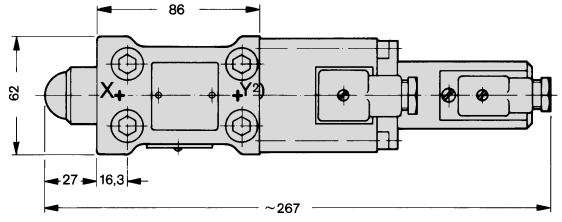
R4VP 06 (CETOP 08) Cartridge

Weight: 4.4 kg (without max. pressure adjustment)
6.0 kg (with max. pressure adjustment)





1) these dimensions are reduced by 37.5 mm for versions without max. pressure adjustment.
3) pilot drain (Y) always directly to tank without pressure.

Order information

R4VP 06 – 00	*	–	*	2 – 103 – A	*

Pressure range
2 = 7...140 bar
3 = 7...210 bar
5 = 7...350 bar

Max. pressure adjustment
0 = without
1 = with

Seal class
1 = N.B.R. (Buna N) Standard
5 = VITON

Mounting screws (4)

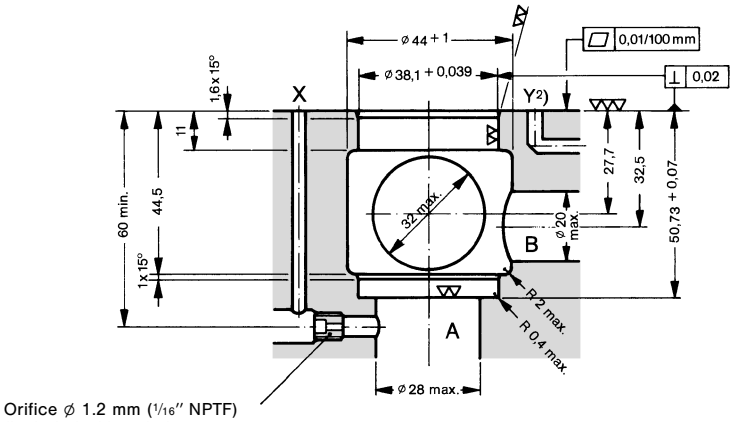
	Dimension	Order-No.
Max. pressure adjustment without	M10 x 75, DIN 912–10.9	361–11314–8
	or	
	3/8''–24 UNF x 3''	359–15320–8
Max. pressure adjustment with	M10 x 115, DIN 912–10.9	361–11393–8
	or	
	3/8''–24 UNF x 4 1/2''	359–15380–8

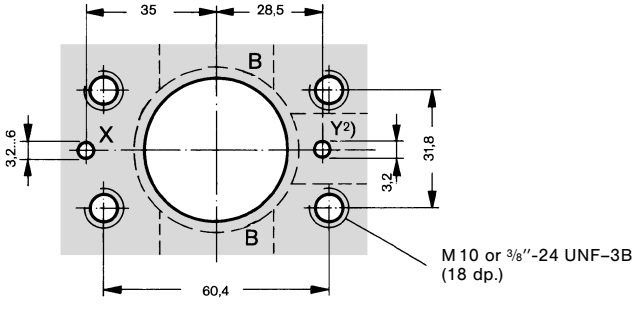
Torque 70 Nm
Mounting screws must be ordered separately.

O-Rings for ports X, Y

10.82 x 1.78	691–00013

Cavity





Ra (µm) 1,6 = ▽▽
0,8 = ▽▽▽

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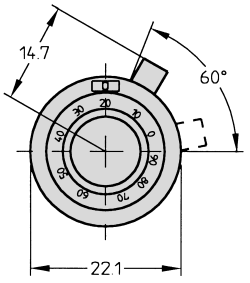
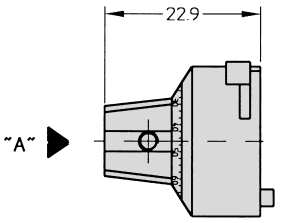
Accessories

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

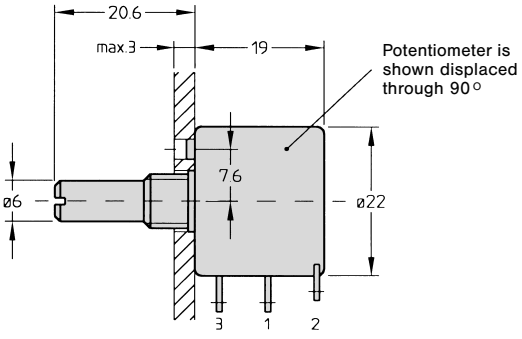
View „A“

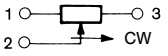




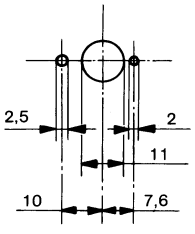
Adjusting knob with scale 0...100
and with revolution counter.
Adjustment is lockable.

Potentiometer



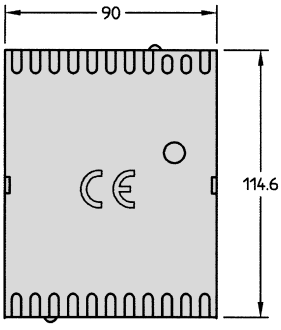


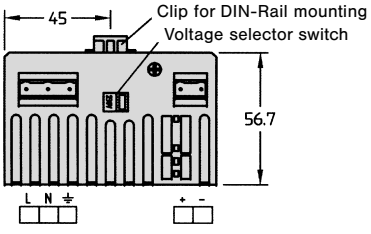
Panel opening

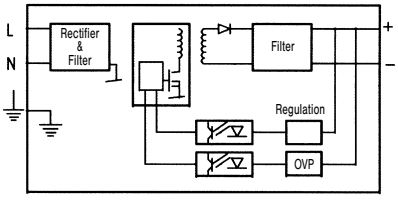


Potentiometer Characteristics	Potentiometer Order No.	
	701–00012–8	701–00013–8
Angle of rotation	360°	3600°
Linearity	± 0.5 %	± 0.25 %
Resolution-Drift	0.11% of 360°	0.02 % of 3600°

Power supply
Order No. 701–00023–8
Weight: 0.25 kg



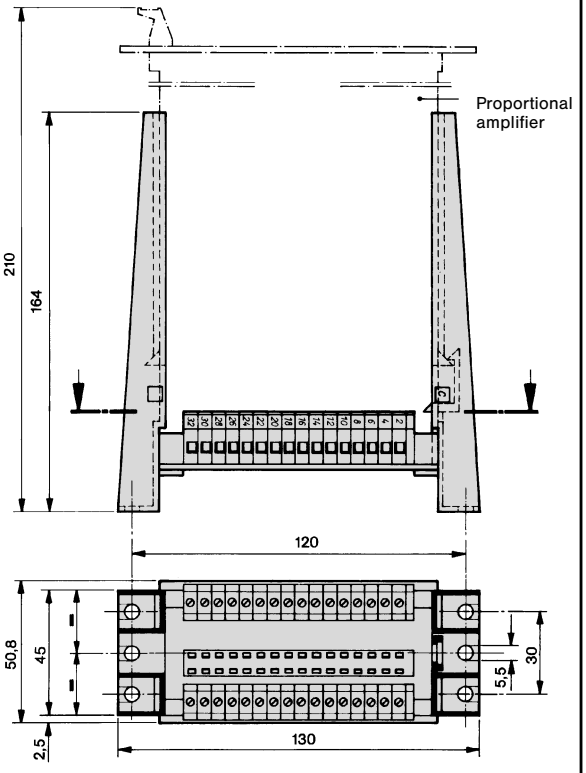




to the Proportional Amplifier (see pages 10–11)

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



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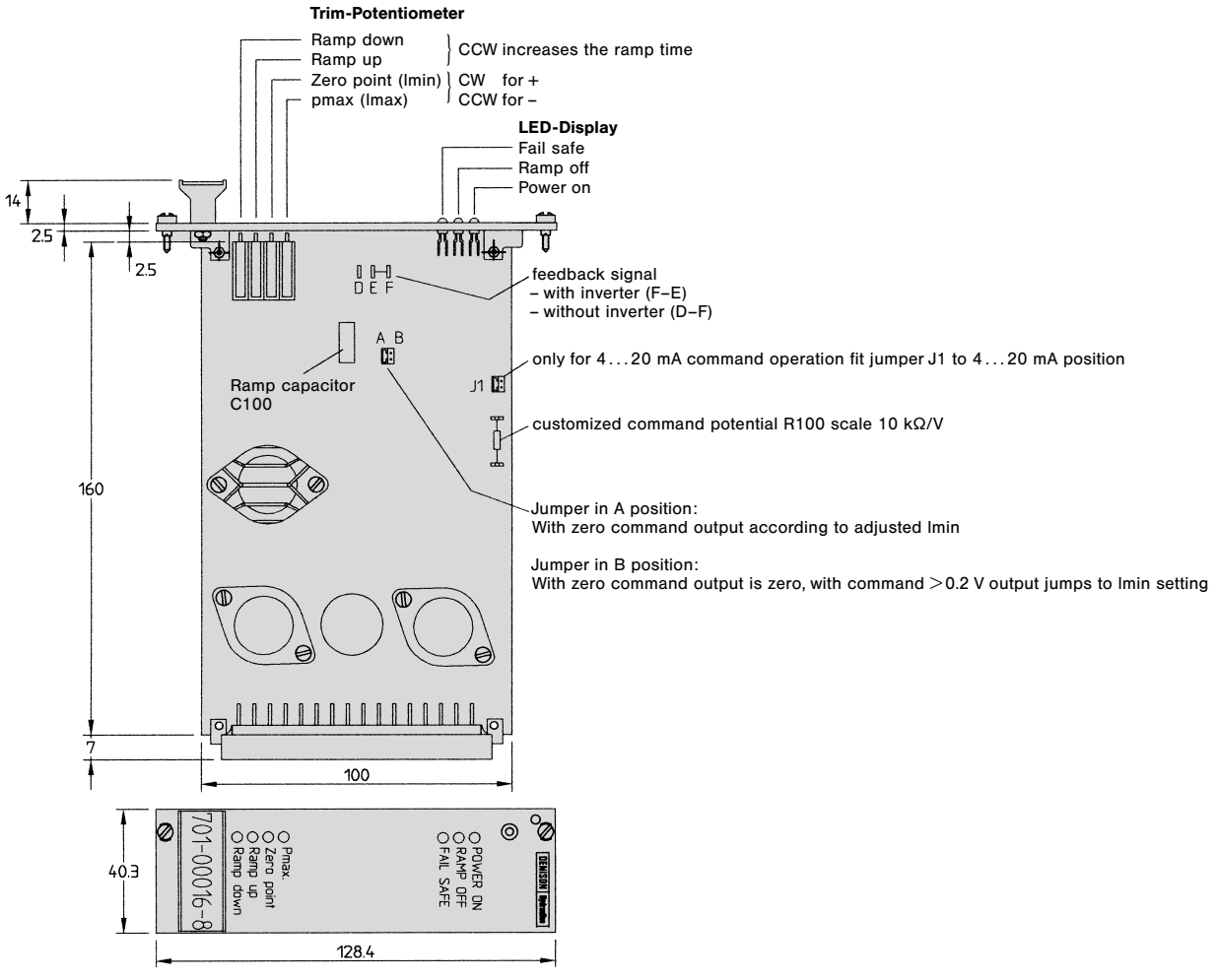
Proportional Amplifier
Order-No. 701–00016–8



Characteristics – Proportional Amplifier

Size Weight Multipoint connector Design	Euro size 100 x 160 x 40.3 (incl. front panel) 0.21 kg (with holder 0.36 kg) according to DIN 41612, pattern D, 32-pin Amplifier with voltage regulator, ramp generator, PID-Regulator, pulse-width modulated output stage with output current limitation
Supply voltage Ambient temperature range Command	DC, optimal 25...30 V DC; at full-wave bridge rectification 20 V_{eff} AC ± 10%; at three-phase bridge rectification 24 V_{eff} AC ± 10% 0...50 °C from separate supply or via potentiometer
Potentiometer supply	from proportional amplifier: Reference voltage + 12 V DC on a12 0 V on c16, c18, a16 or a18, wiper on a30
Inputs for external command	+ 4...+ 20 mA on a24 0...+ 5 V on a28 0...+ 20 mA on a26 0...+ 10 V on a30 Voltage input customized on a32. When using a32, resistor R100 must be soldered with 10 kΩ/V.
Output current Reference voltage	0...2.5 A on c8 and c10 ± 12 V DC, stabilized, up to 50 mA.
Ramp	Separately adjustable up and down from 0.05...5 s. The ramp can be switched off by a bridge from a12 to a4 or by a positive voltage of 3...30 V on a4.

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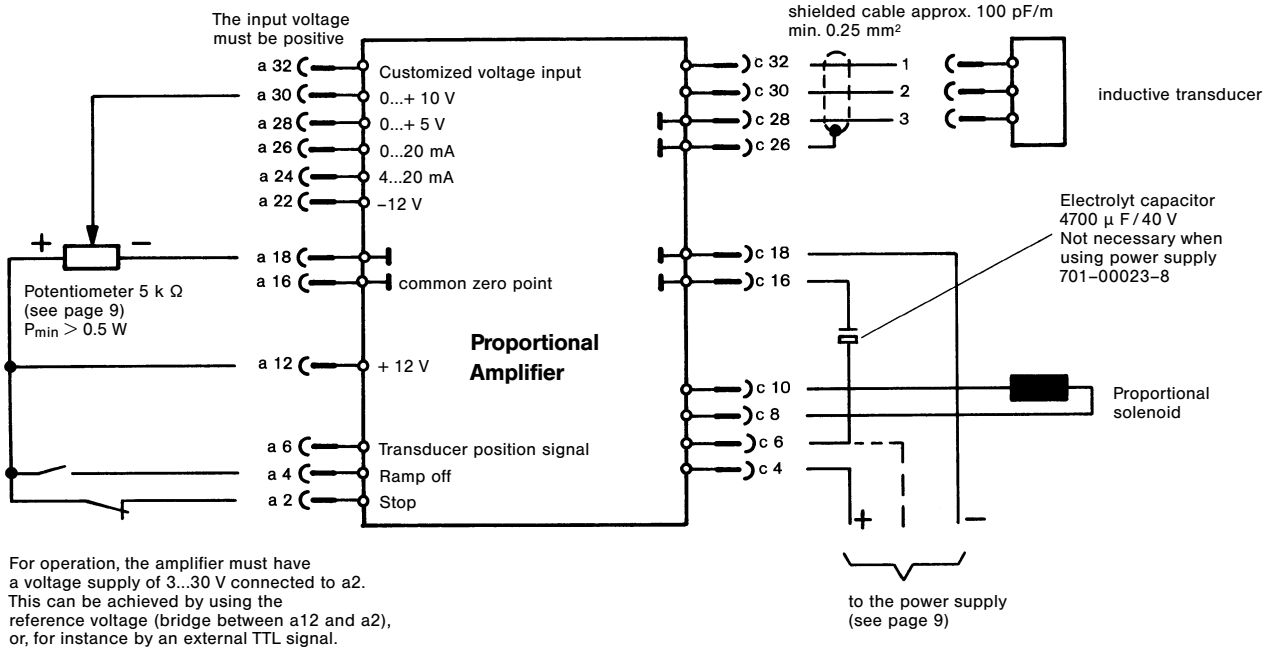
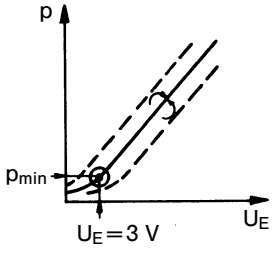
Description – Proportional Amplifier

The proportional amplifier is designed for the operation of proportional pressure valves with position control. It is protected against short-circuit and reverse polarity and has transducer monitoring and ramps which can be switched off externally as well as an emergency stop facility. Due to identical zero potential it is possible to run several amplifiers from a single power supply. The output stage works with pulse width modulation, which, in combination with a PID regulator and the transducer, works as a closed position control circuit. The output stage is protected against short-circuit and has a current limit circuit which works from approximately 2.5 A.

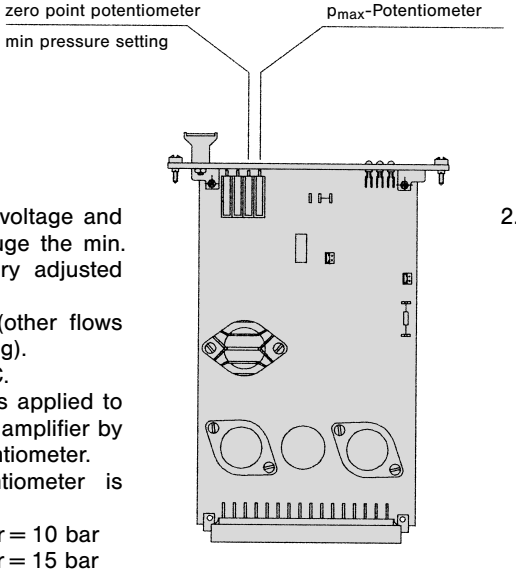
Short circuits at the reference voltage or the output stage or the broken wire of the transducer result in the immediate switch off the output stage and causing the "fail safe" LED to come on. In the event of a short circuit, the supply voltage must be switched off for a period of 20 seconds, after which the amplifier will be ready for operation again.

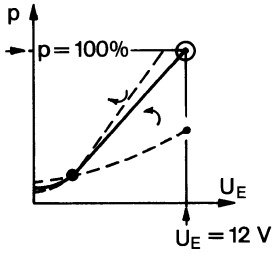
Zero point, maximum pressure, ramp up and ramp down are adjustable by potentiometers arranged on the front panel. The ramp generator has an adjustment range of 1 : 100 and ramp times are adjustable between 0.05 and 5.00 sec.





Adjustment procedure for proportional amplifier





1. Dependent on command voltage and by use of a sensitive gauge the min. pressure setting is factory adjusted as follow:
   - flow A→B = 30 l/min (other flows effect p-U_E-curve shifting).
   - viscosity 40 cSt at 50 °C.
   - 3 V command voltage is applied to a30 of the proportional amplifier by using a command potentiometer.
   - the zero point potentiometer is adjusted as follow:
     pressure stage...140 bar = 10 bar
     pressure stage...210 bar = 15 bar
     pressure stage...350 bar = 20 bar

2. The p_{max} potentiometer is preset to give 100 % (12 V) valve spring deflection (maximum pressure for specific valve). For requirements of less than 100 % maximum pressure but with 100 % input command signal turn p_{max} potentiometer anti-clockwise to lower pressure to required value.
   The original zero set point potentiometer setting and p_{min} value will be maintained but the sensitivity of the valve will be increased.

Important: When changing p_{min} (zero point), the p_{max}-adjustment must always be corrected.

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