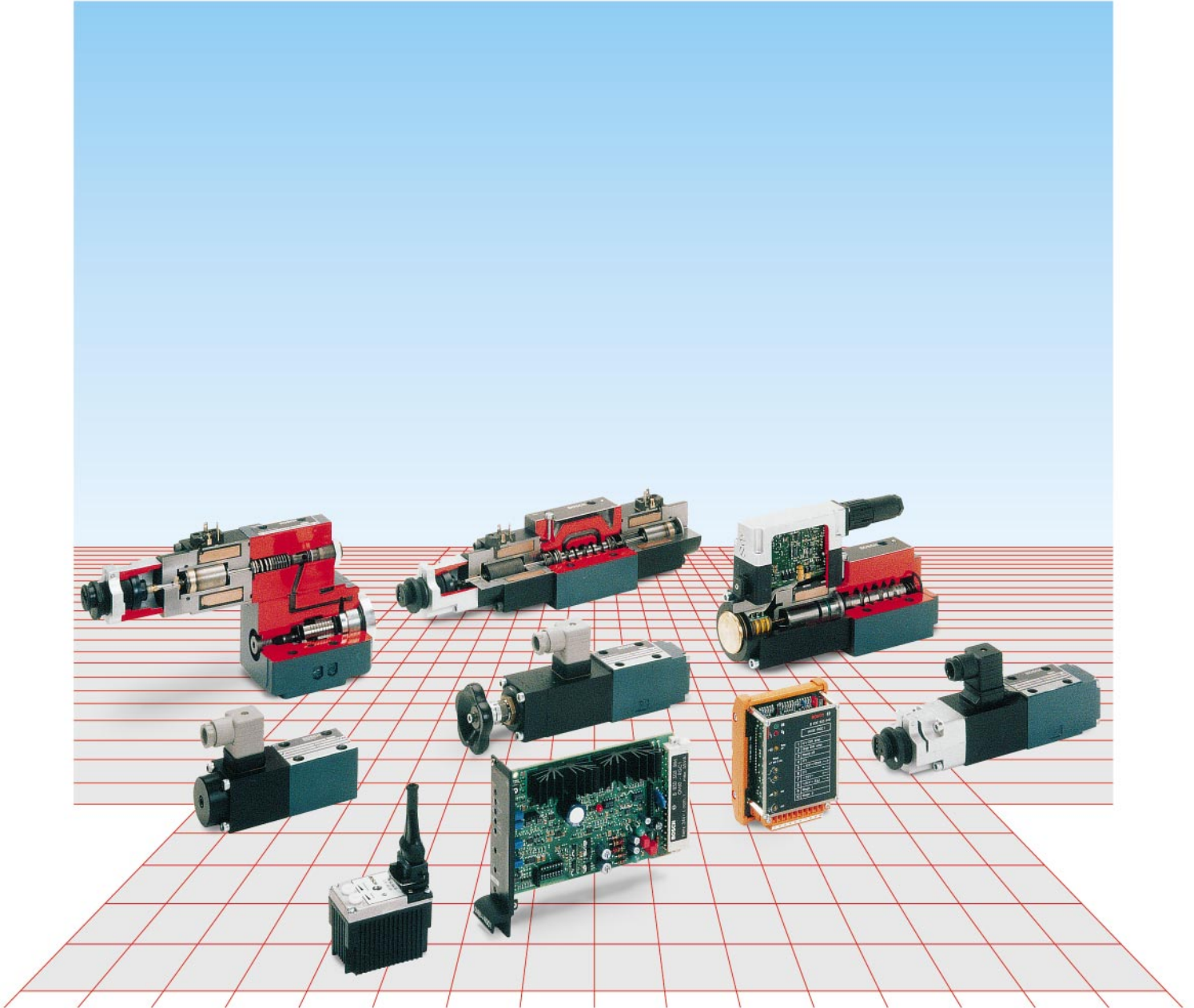


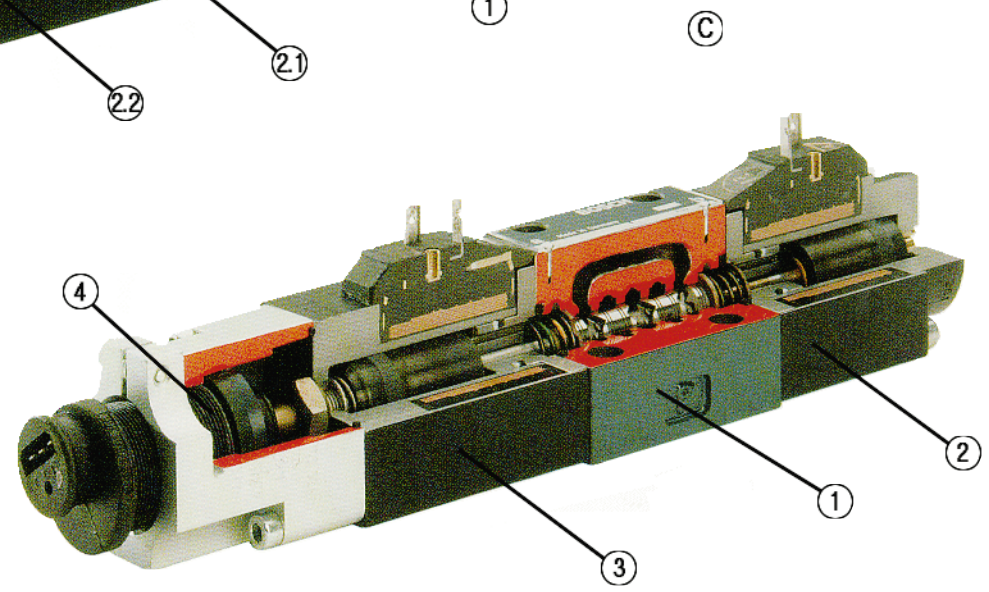
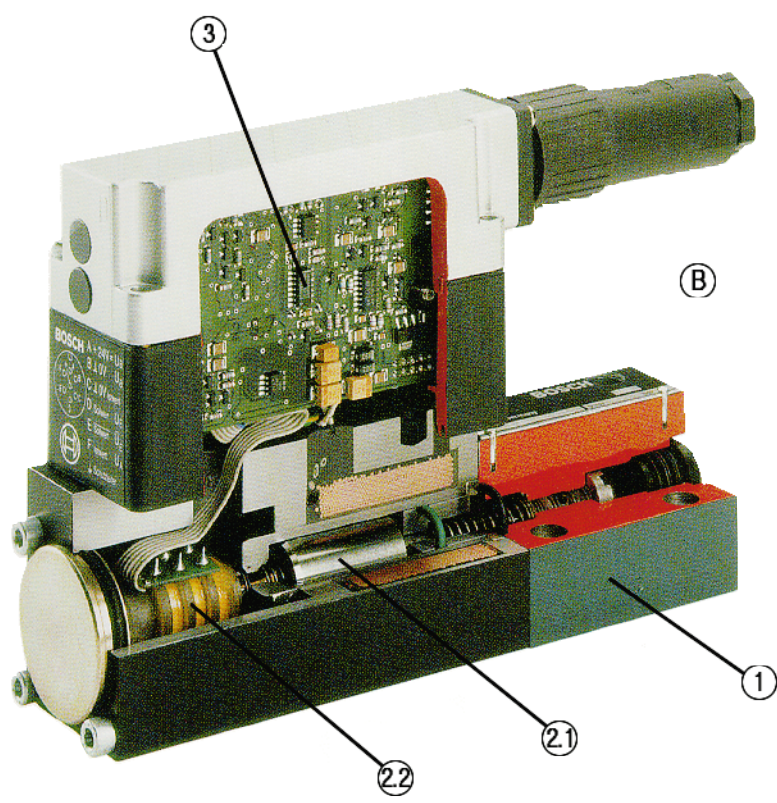
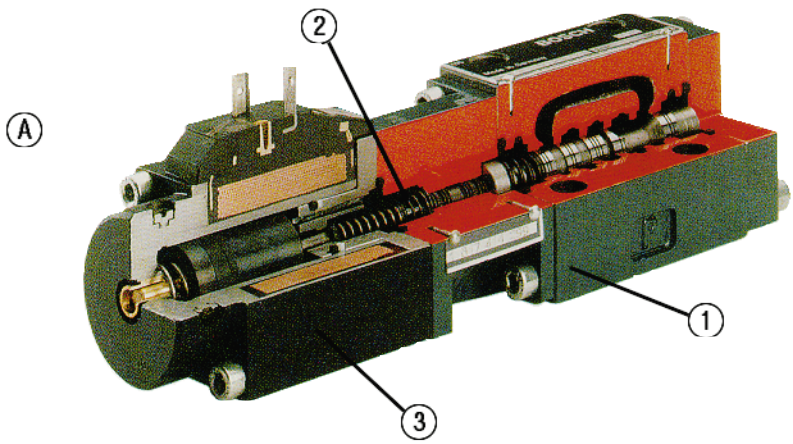


**BOSCH**



**Proportional control valves  
without /with integrated amplifier  
(NG 6, 10)**

**13**



**Picture** **(A)****Proportional pressure relief valve, pilot operated NG 6**

- ① Housing for max. 40 l/min.
- ② Pilot valve with conical seat
- ③ Solenoid without position control, with bleed screws

**Picture** **(B)****Pressure valve, with integrated amplifier NG 6**

- ① Housing with conical seat
- ②.1 Solenoid
- ②.2 Position transducer
- ③ Amplifier for controlling solenoid position

**Picture** **(C)****Directional control valve NG 6**

- ① Housing with 4/3-way function
- ② Solenoid b
- ③ Solenoid a
- ④ AC/AC Position transducer

**Note**

Further catalogs and information on proportional valves and servo solenoid valves:

- Theory and Applications USY 013/3
- Proportional valves “pilot operated” AKY 013/3
- Servo solenoid valves AKY 013/2
- Electronic accessories and sensors AKY 013/4

We reserve the right to make technical alterations.

**Proportional valves with and without position control**

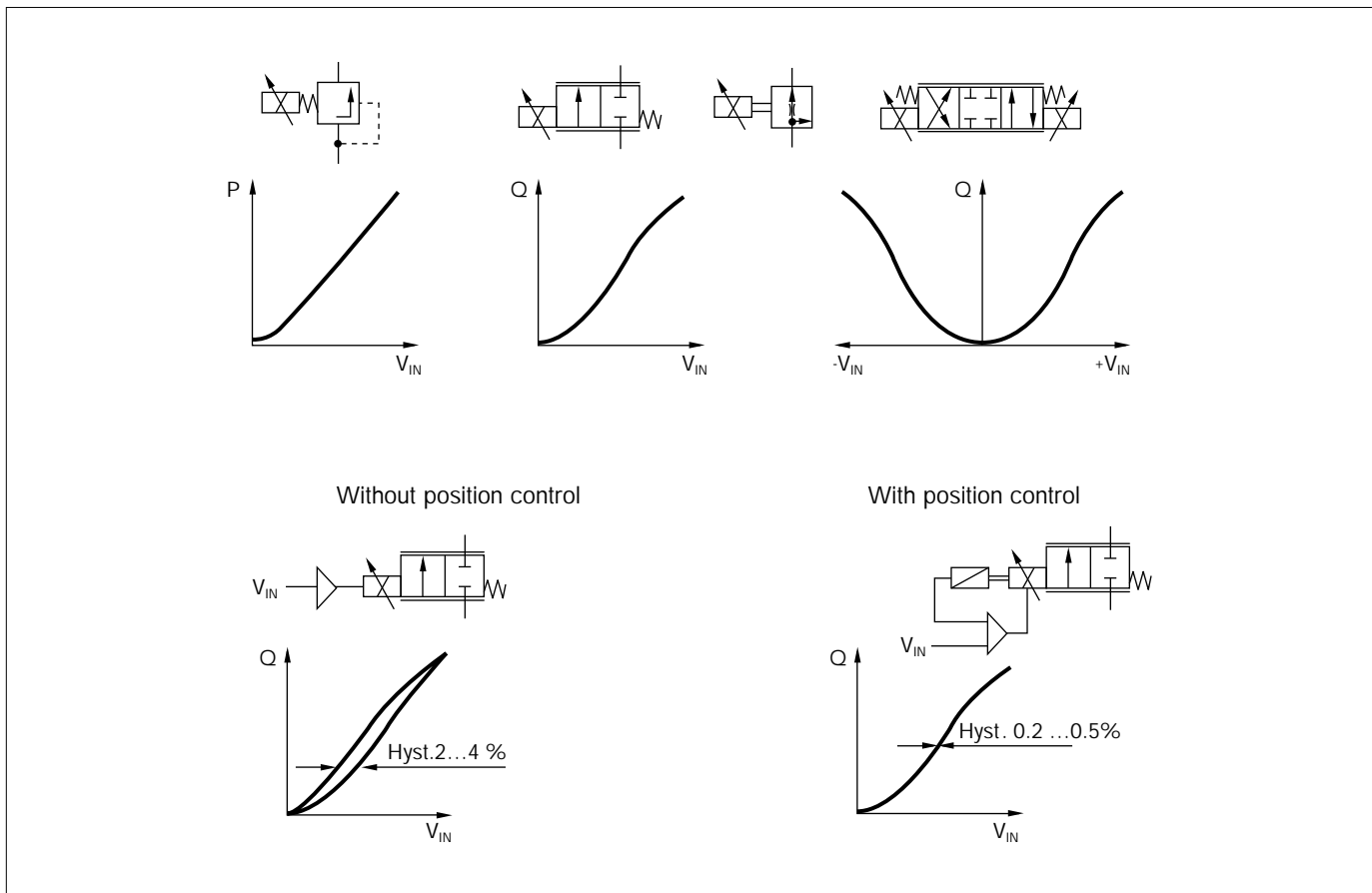
Proportional valves convert an analog electrical signal into a proportional hydraulic output. Valve functions include:

- Proportional pressure valves
- Proportional throttle valves
- Proportional directional control valves

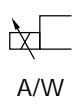


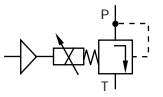

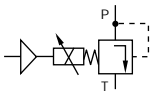


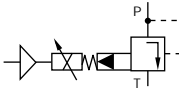


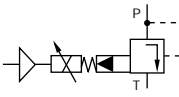

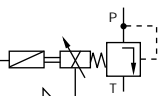

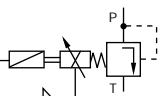

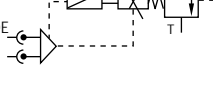

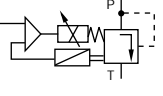

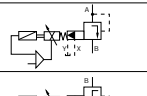

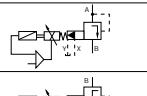

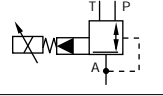

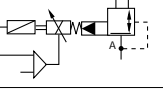

The valve operation is based on the force of a proportional solenoid opposing the force of the spring. Solenoid force can be adjusted to provide a given spring compression, resulting in a given displacement (position). In the case of pressure control valves, this displacement corresponds to a pressure setting. In the case of throttle or directional control valves, this displacement corresponds to a spool position (flow).

In order to increase accuracy and attenuate the effect of disturbances, the position of the armature is fed back into a closed loop control circuit. This brochure covers valves and their associated electronic amplifiers supplied with or without position control.

Valves with a position control capability meet the most demanding requirements for accuracy, reproducibility, hysteresis etc., whereas those without it constitute an inexpensive alternative in return for reduced performance.












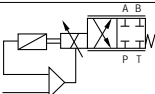

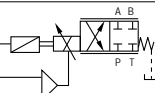

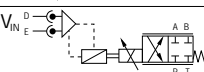

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


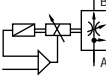

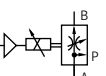

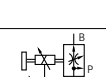

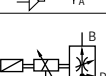

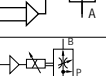

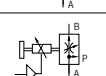

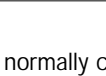

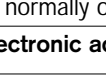





Proportional pressure valves																		
Valve							Amplifier											
Symbol	LVDT	NG		p PSI (bar)	Q <sub>nom.</sub> GPM (l/min.)		Page	Type	Version	Ramp		Page						
	—	6	0.8/18	<b>1160 (80)</b> <b>2610 (180)</b> <b>3625 (250)</b> <b>4570 (315)</b>	0.26 (1) Max 0.4 (1.5)		8	K	1 M 45-0.8A	• <b>0 811 405 081</b> • <b>0 811 405 126</b> • <b>0 811 405 144</b>		123 117 110						
		M	1 M 08-RGC 1															
	—	6	0.8/18	<b>1160 (80)</b> <b>2610 (180)</b> <b>3625 (250)</b> <b>4570 (315)</b>	0.26 (1) Max 0.4 (1.5)		8	P	AS0.8-V									
								K	1 M 45-2.5A									
		2.5/25	<b>1160 (80)</b> <b>2610 (180)</b> <b>3625 (250)</b> <b>4570 (315)</b>	10.6 (40)		11	K	1 M 45-0.8A	• <b>0 811 405 081</b> • <b>0 811 405 126</b> • <b>0 811 405 144</b>	M	1 M 08-RGC 1		123 117 110					
														P	AS0.8-V			
	—	6	0.8/18	<b>1160 (80)</b> <b>2610 (180)</b> <b>4570 (315)</b>	10.6 (40)		11	M	1 M 08-RGC 1			123 117 110						
								P	AS0.8-V									
		2.5/25	<b>1160 (80)</b> <b>2610 (180)</b> <b>4570 (315)</b>	31.7 (120)		14	K	1 M 45-0.8A	• <b>0 811 405 081</b> • <b>0 811 405 126</b> • <b>0 811 405 144</b>	M	1 M 08-RGC 1		123 117 110					
														P	AS0.8-V			
	—	10	0.8/18	<b>1160 (80)</b> <b>2610 (180)</b> <b>4570 (315)</b>	31.7 (120)		14	M	1 M 08-RGC 1			123 117 110						
								P	AS0.8-V									
	●	6	3.7/50	<b>363 (25)</b> <b>1160 (80)</b> <b>2610 (180)</b> <b>3625 (250)</b> <b>4570 (315)</b>	0.26 (1) Max 0.8 (3)		17	K	1 M 45-0.8A	• <b>0 811 405 081</b> • <b>0 811 405 126</b> • <b>0 811 405 144</b>		123 117 110						
								M	1 M 08-RGC 1									
	●	6	3.7/50	<b>363 (25)</b> <b>1160 (80)</b> <b>2610 (180)</b> <b>3625 (250)</b> <b>4570 (315)</b>	0.26 (1) Max 0.8 (3)		17	K	PV 60	• <b>0 811 405 097</b> • <b>0 811 405 102</b> • <b>B 830 303 391</b>		130 133 136						
								K	PV 60-RGC 1									
								K	PV 60-RGC 3									
								See 0 811 405 079 Family										
	●	6	24 V Max. 30VA	<b>1160 (80)</b> <b>2610 (180)</b> <b>3625 (250)</b> <b>4570 (315)</b>	0.26 (1) Max 0.4 (1.5)		20	Integrated Electronics										
									6	2.5/25	<b>1160 (80)</b> <b>2610 (180)</b> <b>3625 (250)</b> <b>4570 (315)</b>	0.26 (1) Max 0.8 (3)		25	K	PDL 1	• <b>0 811 405 095</b> • <b>0 811 405 100</b> • <b>B 830 303 387</b>	130 133 136
															K	PDL 1-RGC 1		
															K	PDL 1-RGC 3		
															See 0 811 405 079 Family			
	●	10	3.7/50	<b>2610 (180)</b> <b>4570 (315)</b>	31.7 (120)		28	K	PV 60	• <b>0 811 405 097</b> • <b>0 811 405 102</b> • <b>B 830 303 391</b>	130 133 136							
								K	PV 60-RGC 1									
	●	10	3.7/50	<b>2610 (180)</b> <b>4570 (315)</b>	31.7 (120)		29	K	PV 60-RGC 3		130 133 136							
								K	PV 60-RGC 3									
	●	6	0.8/18	<b>1090 (75)</b> <b>2540 (175)</b> <b>4500 (310)</b>	10.6 (40)		33	K	1 M 45-0.8A	• <b>0 811 405 081</b> • <b>0 811 405 126</b> • <b>0 811 405 144</b>		123 117 110						
								M	1 M 08-RGC 1									
								P	AS0.8-V									
	●	6	2.5/25	<b>1090 (75)</b> <b>2540 (175)</b> <b>4500 (310)</b>	10.6 (40)		36	K	PV 45	• <b>0 811 405 096</b> • <b>0 811 405 101</b> • <b>B 830 303 388</b>		130 133 136						
								K	PV 45-RGC 1									
								K	PV 45-RGC 3									
								See 0 811 405 079 Family										

— No LVDT  
● LVDT

K = Eurocard      M = DIN Rail Module  
P = Plug Amplifier      B = Box Amplifier




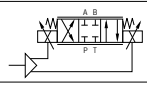

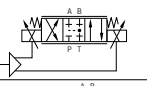
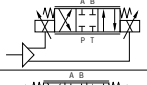

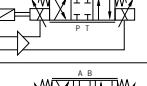

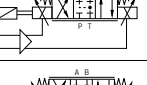



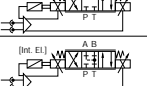
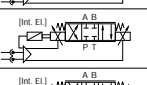


## Contents

Proportional throttle valves												
Valve								Amplifier				
Symbol	LVDT	NG	 A/W	p PSI (bar)	Q <sub>nom.</sub> GPM (l/min.)		Page	Type	Version	Ramp		Page
	—	6	2.5/25	<b>4570 (315)</b>	4.7 (18) 9 (35)		39	K	1 M 45-2.5A	• <b>0 811 405 079</b>		123
	Man.	6			9 (35) 9 (35)			M P B	1 M 25-RGC 1 AS2.5-V 1 CH/2.5A	• <b>0 811 405 127</b> • <b>0 811 405 143</b> • <b>0 811 405 091</b>		117 110 113
	—	10	2.5/50	<b>4570 (315)</b>	10.5 (40) 21 (80)		43					
	●	6	2.7/25	<b>4570 (315)</b>	26 (10) 5.3 (20) 9 (35)		47		QV 45 QV 45-RGC 1 QV 45-RGC 3	– <b>0 811 405 098</b> • <b>0 811 405 103</b> • <b>B 830 303 389</b>		130 133 136
	●	10	3.7/50	<b>4570 (315)</b>	5.3 (20) 10.6 (40) 21 (80)		51		QV 60 QV 60-RGC 1 QV 60-RGC 3	– <b>0 811 405 099</b> • <b>0 811 405 104</b> • <b>B 830 303 390</b>		130 133 136
	●	10	24 V 50 VA	<b>4570 (315)</b>	13.2 (50) 21 (80)		55	Integrated Electronics				

Proportional Flow Control												
Valve								Amplifier				
Symbol	LVDT	NG	 A/W	p PSI (bar)	Q <sub>nom.</sub> GPM (l/min.)		Page	Type	Version	Ramp		Page
	●	6	2.7/25	<b>1450 (100)</b> <b>3625 (250)</b>	0.7 (2.6) 26 (10) 9 (35)		61		QV 45 QV 45-RGC 1 QV 45-RGC 3	– <b>0 811 405 098</b> • <b>0 811 405 103</b> • <b>B 830 303 389</b>		130 133 136
	—		2.5/25		2 (7.5) 9 (35)			K	1 M 45-2.5 A	• <b>0 811 405 079</b>		123
	—				2 (7.5) 9 (35)			M	1 M 25-RGC 1	• <b>0 811 405 127</b>		117
	—				2 (7.5) 9 (35)			P	AS2.5-V	• <b>0 811 405 143</b>		110
	—				2 (7.5) 9 (35)			B	1 CH/2.5 A	• <b>0 811 405 091</b>		113
	●	10	2.5/25	<b>3625 (250)</b>	21 (80)		67		QV 45 QV 45-RGC 1 QV 45-RGC 3	– <b>0 811 405 098</b> • <b>0 811 405 103</b> • <b>B 830 303 389</b>		130 133 136
	—				16 (60) 21 (80)			K	1 M 45-2.5 A	• <b>0 811 405 079</b>		123
	—				21 (80)			M	1 M 25-RGC 1	• <b>0 811 405 127</b>		117
	—				16 (60)			P	AS2.5-V	• <b>0 811 405 143</b>		110
	—							B	1 CH/2.5 A	• <b>0 811 405 091</b>		113

NC = normally closed  
NO = normally open

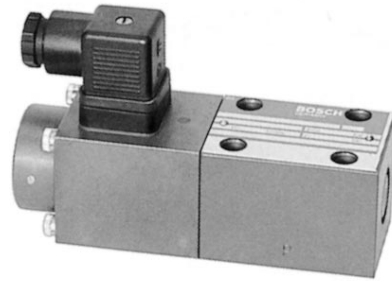
**Contents**

Proportional directional control valves													
Valve								Amplifier					
Symbol	LVDT	NG	 A/W	p PSI (bar)	Q <sub>nom.</sub> GPM (l/min.)		Page	Version	Ramp		Page		
01 	—	6	2.5/25	<b>4570 (315)</b>	2 (7.5) 4.75 (18) 9.25 (35)	<b>0 811 404 123</b> <b>0 811 404 115</b> <b>0 811 404 114</b>	72	Card 2 M 45-2.5A Box 2 CH/2.5A 1 M 2.5-RGC 2	• <b>0 811 405 080</b> • <b>0 811 405 092</b> • <b>0 811 405 106</b>		126		
01 + L 	—			2 (7.5) 4.75 (18) 9.25 (35)	<b>0 811 404 125</b> <b>0 811 404 117</b> <b>0 811 404 116</b>		115						
01 	—	10	2.5/50	<b>4570 (315)</b>	10.5 (40) 21 (80)	<b>0 811 404 830</b> <b>0 811 404 832</b>	76						120
01 + L 	—				10.5 (40) 21 (80)	<b>0 811 404 831</b> <b>0 811 404 833</b>							
01 	●	6	2.7/25	<b>4570 (315)</b>	2.6 (10) 5.3 (20) 9.25 (35)	<b>0 811 404 101</b> <b>0 811 404 100</b> <b>0 811 404 119</b>	80	WV 45-RGC 2 WV 45-RGC 4	• <b>0 811 405 119</b> • <b>0 811 405 137</b>		140		
01 + L 	●				2 (7.5) 4.75 (18) 9.25 (35)	<b>0 811 404 126</b> <b>0 811 404 120</b> <b>0 811 404 121</b>					143		
01 	●	10	3.7/50	<b>4570 (315)</b>	10.6 (40) 21 (80) (80:45)	<b>0 811 404 003</b> <b>0 811 404 001</b> <b>0 811 404 086</b>	84	WV 60-RGC 2 WV 60-RGC 4	• <b>0 811 405 120</b> • <b>0 811 405 138</b>		140		
01 + L 	●				10.6 (40) 21 (80) (80:45)	<b>0 811 404 081</b> <b>0 811 404 080</b> <b>0 811 404 087</b>					143		
01 	●	6	24 V 30VA	<b>4570 (315)</b>	4.7 (18) 8.5 (32)	<b>0 811 404 140</b> <b>0 811 404 141</b>	88	<b>Integrated Electronics</b>					
01 + L 	●				4.7 (18) 8.5 (32)	<b>0 811 404 142</b> <b>0 811 404 143</b>							
01 	●	10	24 V 50VA	<b>4570 (315)</b>	13 (50) 21 (80)	<b>0 811 404 770</b> <b>0 811 404 771</b>	92	<b>Integrated Electronics</b>					
01 + L 	●				13 (50) 21 (80)	<b>0 811 404 772</b> <b>0 811 404 773</b>							

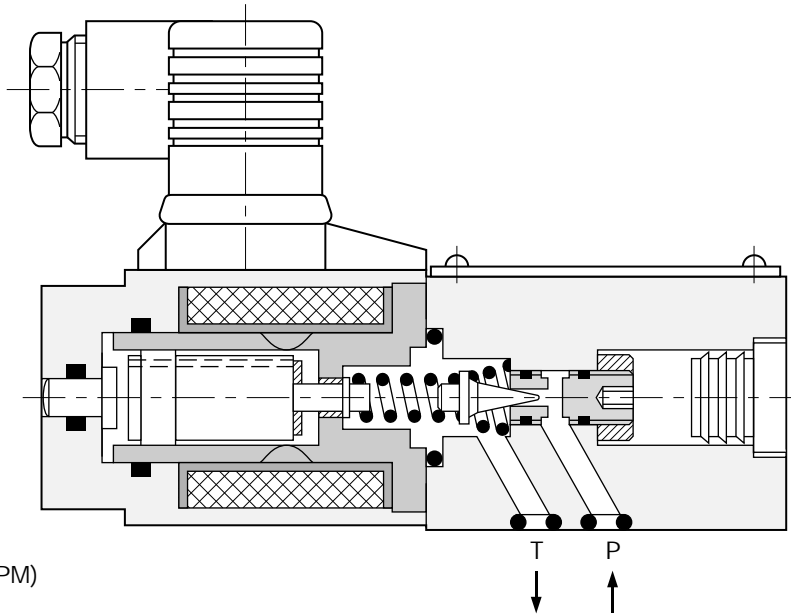
<b>Accessories</b>	Page
Pressure compensators	98
Subplates, mounting patterns	103
Amplifier product range	108, 109
Connectors, card holder	147-151
Extender card	152
Test box I	153
Test adapter for valves with integrated electronics	154
Test box III	155
Index	156

**Proportional pressure relief valve**

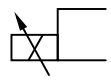

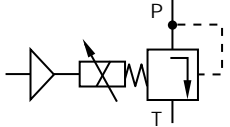
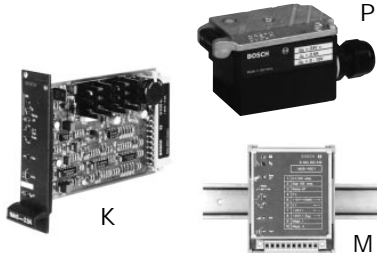
**NG 6**



**Function**



Pilot stage ( $Q_{nom.} = 0.26$  GPM)  
without position control

Symbol	 A/W	$Q_{nom.}$ GPM [l/min]	$P_{nom.}$ PSI [bar]	LBS [kg]		
	0.8/18	<b>A</b> 0.26 (1) max 0.4 (1.5)	1160 (80)	4 (1.9)	<b>0 811 402 018</b>	
	(R <sub>L</sub> = 22 Ω)		<b>B</b>		2610 (180)	<b>0 811 402 017</b>
					3625 (250)	<b>0 811 402 019</b>
					4570 (315)	<b>0 811 402 016</b>
		1160 (80)		<b>0 811 402 030</b>		
	2.5 / 25	2610 (180)	<b>0 811 402 031</b>			
	3625 (250)	<b>0 811 402 024</b>				
	4570 (315)	<b>0 811 402 032</b>				
	Amplifier see Page 108	<b>A</b>	K	1 M45-0.8A	0.7 (0.3)	<b>0 811 405 081</b>
			M	1 M08-RGC 1	0.5 (0.2)	<b>0 811 405 126</b>
			P	AS0.8-V	.3 (.15)	<b>0 811 405 144</b>
		<b>B</b>	K	1 M45-2.5 A	0.7 (0.3)	<b>0 811 405 079</b>
			M	1 M25-RGC 1	0.5 (0.2)	<b>0 811 405 127</b>
			P	AS2.5-V	0.3 (0.15)	<b>0 811 405 143</b>
			Box +	1 CH/2.5A Box Amplifier 25 Pin Connector	1.1 (0.5) 0.5 (0.2)	<b>0 811 405 091</b> <b>1 834 484 185</b>



<b>Characteristics</b>				
<b>General</b>				
Construction, pilot stage	Poppet-seat			
Actuation	Proportional solenoid without position control			
Connection type	Subplate, mounting configuration NG 6 (ISO 4401)			
Mounting Position	optional			
Ambient temperature range	-4 to 122°F (-20...+ 50°C)			
<b>Hydraulic</b>				
Pressure medium	Hydraulic oil as per DIN 51524...535 Other fluids after prior consultation			
Viscosity, recommended max. permitted	100...465 SUS (20...100 cSt) 60...3700 SUS (10...800 cSt)			
Hydraulic oil temperature	-4 to 176 °F (-20...+ 80°C)			
Filtration  In line with operational reliability and service life	Permissible contamination level	Achieved using filter $\beta_x = 75$		
	Class 8 (NAS 1638)	X = 10		
	17/14 (ISO 4406)			
Flow direction	See symbol			
Nominal pressure (at Q = 1 l/min) PSI (Bar)	<b>1160</b> (80)	<b>2610</b> (180)	<b>3625</b> (250)	<b>4570</b> (315) bar
Minimum pressure (at Q = 1 l/min) PSI (Bar)	43 (3)	58 (4)	87 (6)	116 (8) bar
Max. working pressure Port P Port T	4570 PSI (315) bar 3625 PSI (250) bar, static			
<b>Electrical</b>				
Duty cycle	100%			
Environmental protection	IP 65 as per DIN 40 050 and IEC 14 434/5			
Solenoid connector	Connector DIN 43 650/ISO 4400			
Solenoid current	0.8 A	2.5 A		
Coil resistance R <sub>20</sub>	22 Ω	2.5 Ω		
Power consumption	18 VA	25 VA		
<b>Static/dynamic</b>				
Hysteresis	≤ ± 2%			
Range of inversion	≤ ± 1.5%			
Manufacturing tolerance p max.	≤ 10%			
Response time 100% signal change	ON: < 30 ms OFF: ≤ 70 ms			

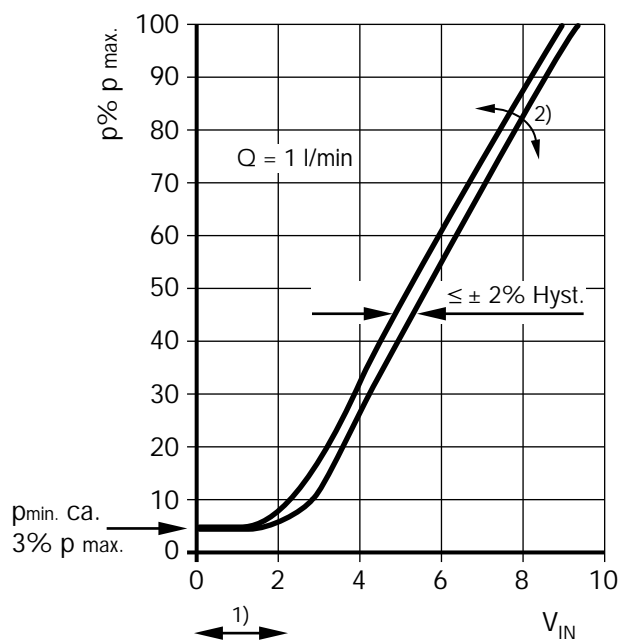
Characteristics determined with proportional amplifier:

1 M 45 – 0.8 A (max. 0.8 A)

1 M 45 – 2.5 A (max. 2.5 A)


**Performance curves**


v = 35 cSt

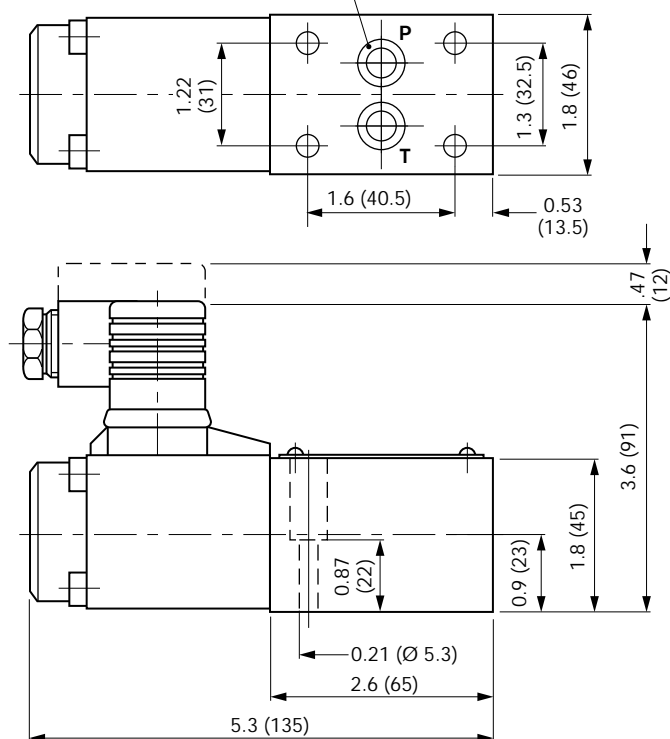


- 1) Zero adjustment
- 2) Gain adjustment

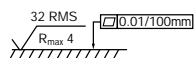
**Dimensions**

(2x)  10 x 15

 2 820 210 008

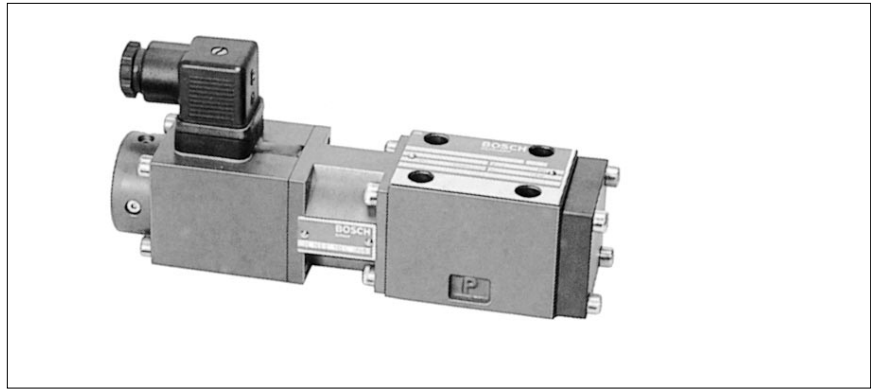


Dimensions of mounting configuration NG 6 ISO 4401 see page 103

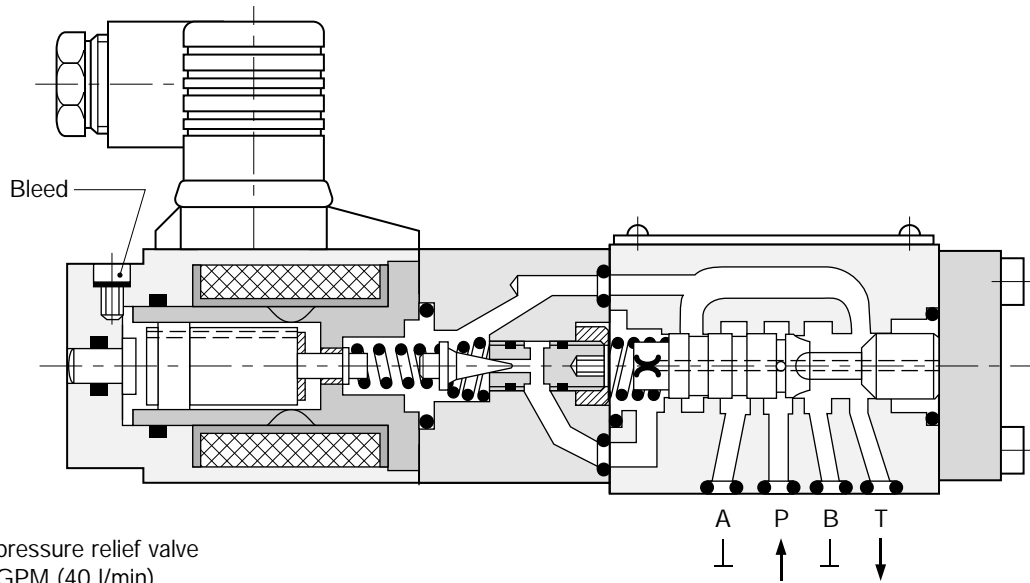


**Proportional pressure relief valve**

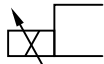
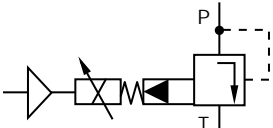
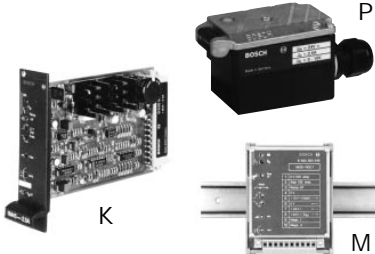
**NG 6**



**Function**



Pilot operated pressure relief valve  
 ( $Q_{max.} = 10.6 \text{ GPM (40 l/min)}$ )  
**without position control**

Symbol	 A/W	$Q_{nom.}$ GPM [l/min]	$P_{max.}$ PSI [bar]	LBS [kg]	⊕	
	0.8/18 ( $R_L = 22 \Omega$ )	Ⓐ 10.6 (40)	1160 (80)	4.9 (2.2)	0 811 402 045 <sup>(1)</sup>	
	2.5/25		Ⓑ		2610 (180)	0 811 402 044 <sup>(2)</sup>
					4570 (315)	0 811 402 043 <sup>(3)</sup>
		Amplifier see Page 108	Ⓐ	K 1 M45-0.8A	0.7 (0.3)	0 811 405 081
				M 1 M08-RGC 1	0.5 (0.2)	0 811 405 126
				P AS0.8-V	.3 (.15)	0 811 405 144
Ⓑ				K 1 M45-2.5 A	0.7 (0.3)	0 811 405 079
				M 1 M25-RGC 1	0.5 (0.2)	0 811 405 127
P AS2.5-V	0.3 (0.15)	0 811 405 143				
Box + 25 Pin Connector	1 CH/2.5A Box Amplifier 25 Pin Connector	1.1 (0.5) 0.5 (0.2)	0 811 405 091 1 834 484 185			

Was <sup>(1)</sup> B 811 102 156, <sup>(2)</sup> B 811 102 155, <sup>(3)</sup> B 811 102 154

<b>Characteristics</b>			
<b>General</b>			
Construction, pilot stage	Poppet-seat		
Construction, main stage	Spool		
Actuation	Proportional solenoid without position control		
Connection type	Subplate, mounting configuration NG 6 (ISO 4401)		
Mounting position	optional		
Ambient temperature range	-4 to 122°F (-20...+ 50°C)		
<b>Hydraulic</b>			
Pressure medium	Hydraulic oil as per DIN 51524...535 Other fluids after prior consultation		
Viscosity, recommended max. permitted	100...465 SUS (20...100 cSt) 60...3700 SUS (10...800 cSt)		
Pressure medium temperature	-4 to 176 °F (-20...+ 80°C)		
Filtration  In line with operational reliability and service life	Permissible contamination level	Achieved using filter β x = 75	
	Class 8 (NAS 1638)	X = 10	
	17/14 (ISO 4406)		
Flow direction	See symbol		
Nominal pressure PSI (Bar)	<b>1160</b> (80)	<b>2610</b> (180)	<b>4570</b> (315)
Minimum pressure PSI (Bar)	101.5 (7)	116 (8)	145 (10)
Max. working pressure Port P Port T	4570 PSI (315) bar 3625 PSI (250) bar, static		
Control oil flow	approx. 0.16 GPM (0.6 l/min)		
Nominal flow	max. 10.6 GPM (40 l/min)		
<b>Electrical</b>			
Duty cycle	100%		
Environmental protection	IP 65 as per DIN 40 050 and IEC 14 434/5		
Solenoid connector	Connector DIN 43 650/ISO 4400		
Solenoid current	0.8 A	2.5 A	
Coil resistance R <sub>20</sub>	22 Ω	2.5 Ω	
Power consumption	18 VA	25 VA	
<b>Static/dynamic</b>			
Hysteresis	≤ ± 2%		
Range of inversion	≤ ± 1.5%		
Manufacturing tolerance p <sub>max.</sub>	≤ 10%		
Response time 100% signal change	ON: 200 ms OFF: ≤ 250 ms		

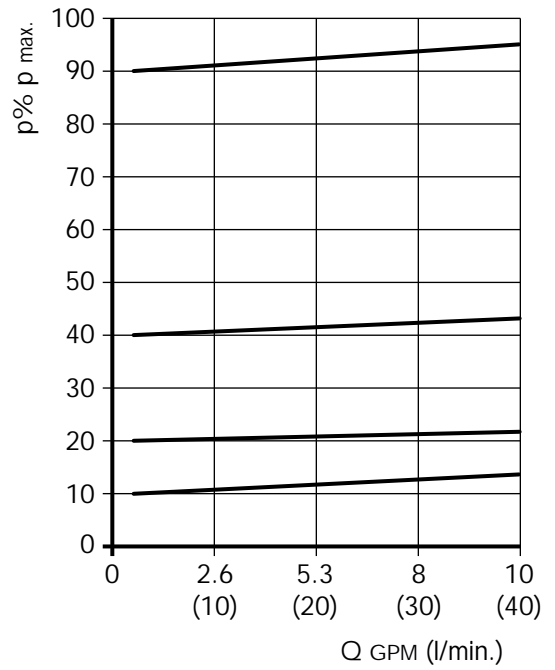
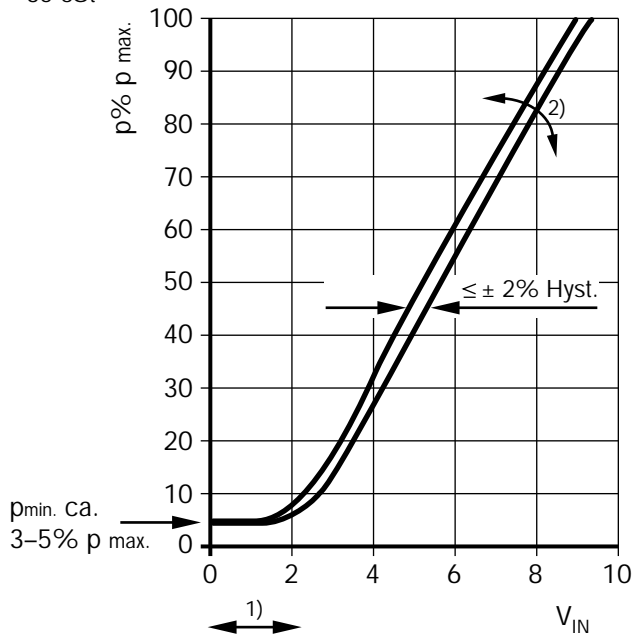
Characteristics values determined with proportional amplifier:

1 M 45 – 0.8 A (max. 0.8 A)

1 M 45 – 2.5 A (max. 2.5 A)

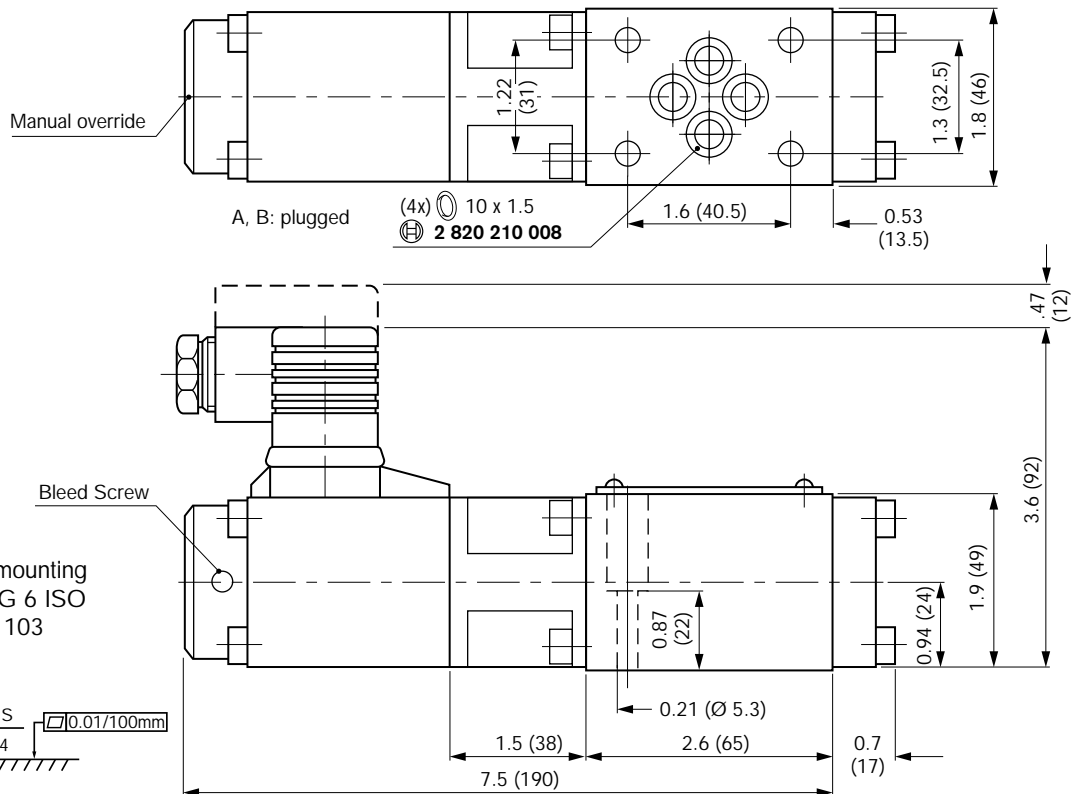
**Performance curves**

v = 35 cSt



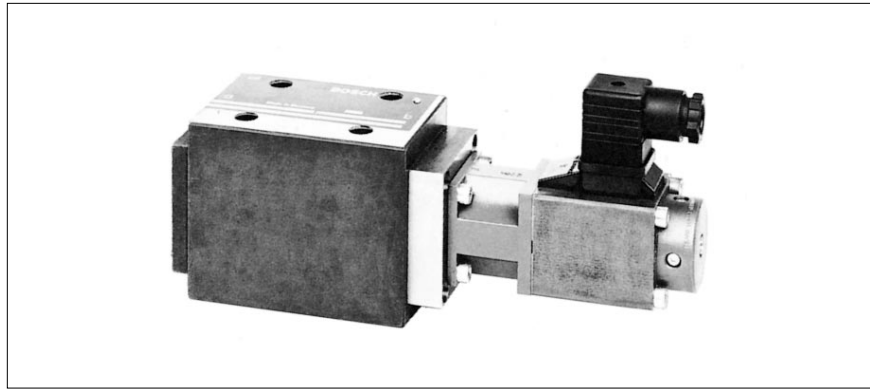
- 1) Zero adjustment
- 2) Gain adjustment

**Dimensions**

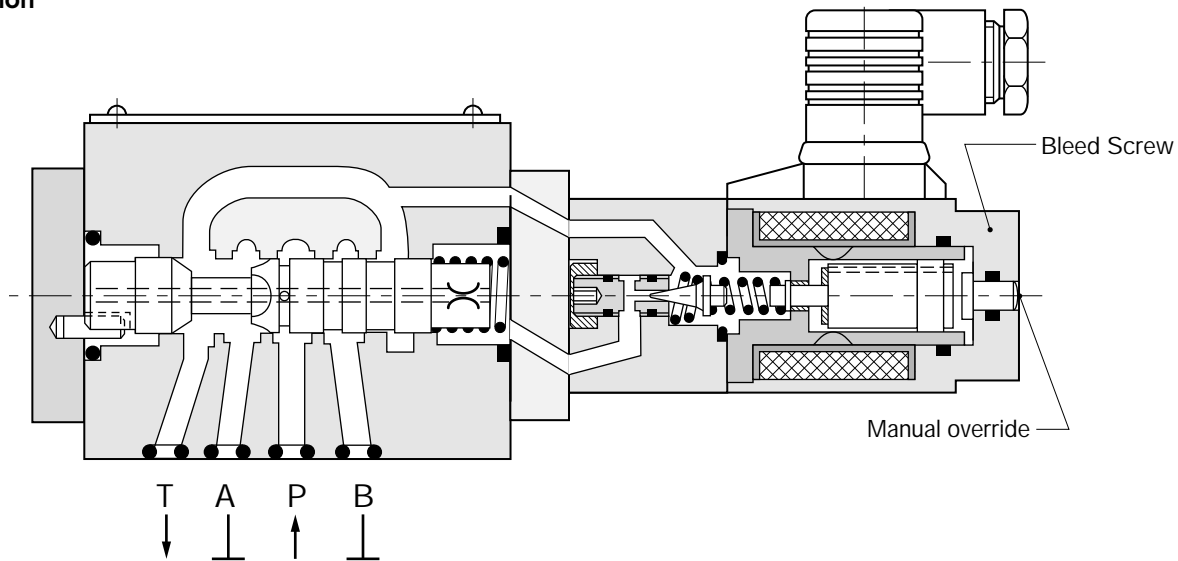


**Proportional pressure relief valve**

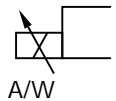

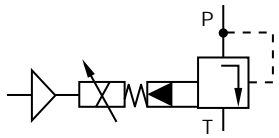
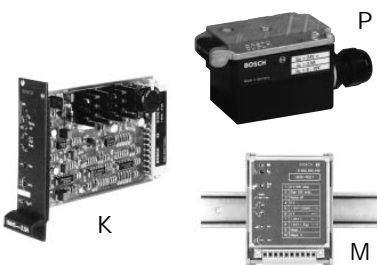
**NG 10**



**Function**



Pilot operated pressure relief valve  
 ( $Q_{max.} = 31.7 \text{ GPM}$ )  
**without** position control

Symbol	 A/W	$Q_{max.}$ GPM [l/min]	$P_{max}$ PSI [bar]	LBS [kg]		
	0.8/18 ( $R_L = 22 \Omega$ )	<b>A</b> 31.7 (120)	1160 (80)	14.4 (6.5)	<b>0 811 402 108</b>	
	2.5 / 25		<b>B</b>		2610 (180)	<b>0 811 402 109</b>
		4570 (315)		<b>0 811 402 110</b>		
	Amplifier see Page 108	<b>A</b>	K 1 M45-0.8A	0.7 (0.3)	<b>0 811 405 081</b>	
			M 1 M08-RGC 1	0.5 (0.2)	<b>0 811 405 126</b>	
			P AS0.8-V	.3 (.15)	<b>0 811 405 144</b>	
			<b>B</b>	K 1 M45-2.5 A	0.7 (0.3)	<b>0 811 405 079</b>
				M 1 M25-RGC 1	0.5 (0.2)	<b>0 811 405 127</b>
				P AS2.5-V	0.3 (0.15)	<b>0 811 405 143</b>
Box +	1 CH/2.5A Box Amplifier 25 Pin Connector	1.1 (0.5) 0.5 (0.2)	<b>0 811 405 091</b> <b>1 834 484 185</b>			

<b>Characteristics</b>				
<b>General</b>				
Construction, pilot stage	Poppet-seat			
Construction, main stage	Spool			
Actuation	Proportional solenoid without position control			
Connection type	Subplate, mounting configuration NG 10 (ISO 4401)			
Mounting position	optional			
Ambient temperature range	-4 to 122°F (-20...+ 50°C)			
<b>Hydraulic</b>				
Pressure medium	Hydraulic oil as per DIN 51524...535 Other fluids after prior consultation			
Viscosity, recommended max. permitted	100...465 SUS (20...100 cSt) 60...3700 SUS (10...800 cSt)			
Pressure medium temperature	-4 to 176 °F (-20...+ 80°C)			
Filtration  In line with operational reliability and service life	Permissible contamination level	Achieved using filter $\beta_x = 75$		
	Class 8 (NAS 1638)	X = 10		
	17/14 (ISO 4406)			
Flow direction	See symbol			
Nominal pressure PSI (Bar)	<b>1160</b> (80)	<b>2610</b> (180)	<b>3625</b> (250)	<b>4570</b> (315)
Minimum pressure (at 60 l/min)	131 (9)	145 (10)	160 (11)	174 (12)
Max. working pressure Port P Port T	4570 PSI (315) bar pressureless, static max., 3625 PSI (250) bar			
Control oil flow	approx. 0.16 GPM (0.6 l/min)			
Nominal flow range	1.3...31.7 GPM (5...120 l/min.)			
<b>Electrical</b>				
Duty cycle	100%			
Environmental protection	IP 65 as per DIN 40 050 and IEC 14 434/5			
Solenoid connector	Connector DIN 43 650/ISO 4400			
Solenoid current	0.8 A		2.5 A	
Coil resistance R <sub>20</sub>	22 Ω		2.5 Ω	
Power consumption	18 VA		25 VA	
<b>Static/dynamic</b>				
Hysteresis	≤ ± 2.5%			
Range of inversion	≤ ± 2.5%			
Manufacturing tolerance p <sub>max.</sub>	≤ 10%			
Response time 100% signal change	ON: 300 ms OFF: 300 ms			

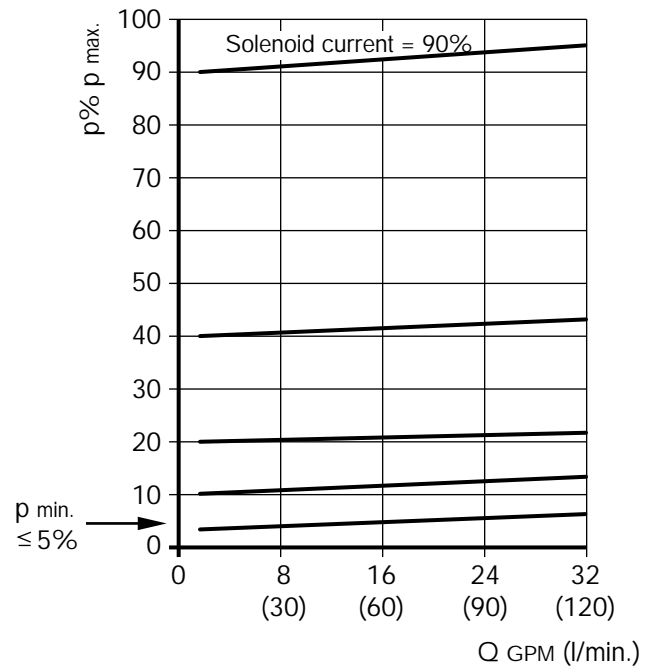
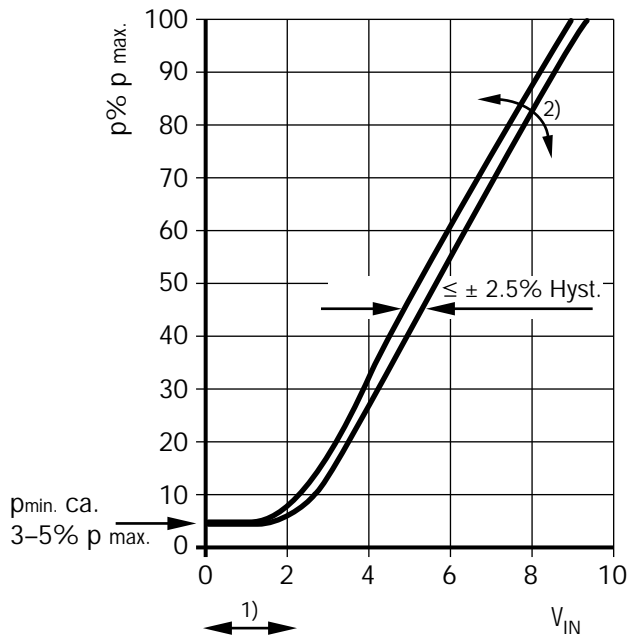
Characteristics values determined with proportional amplifier:

1 M 45 – 0.8 A (max. 0.8 A)

1 M 45 – 2.5 A (max. 2.5 A)

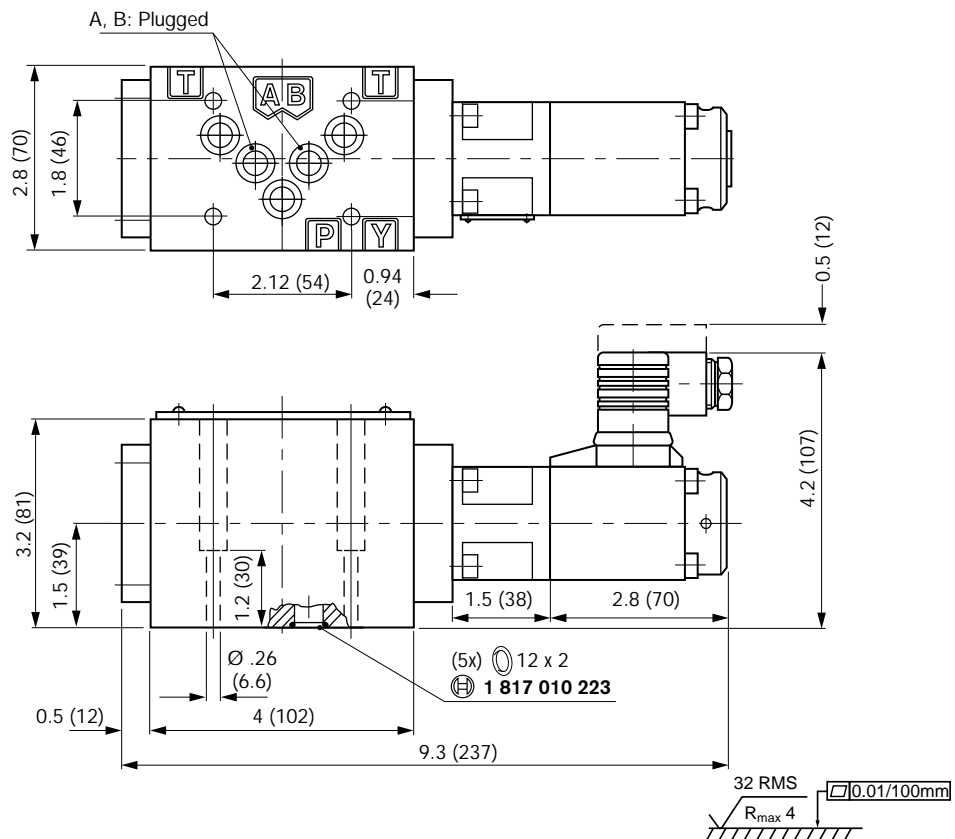
**Performance curves**

v = 35 cSt



- 1) Zero adjustment
- 2) Gain adjustment

**Dimensions**

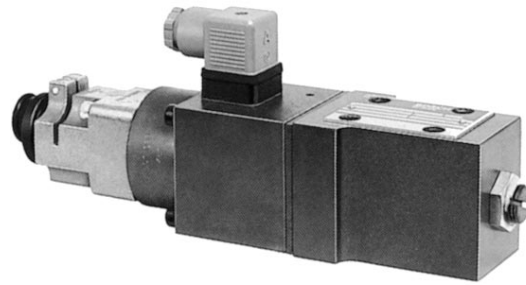


Dimensions of mounting configuration NG 10 ISO 4401 see page 104

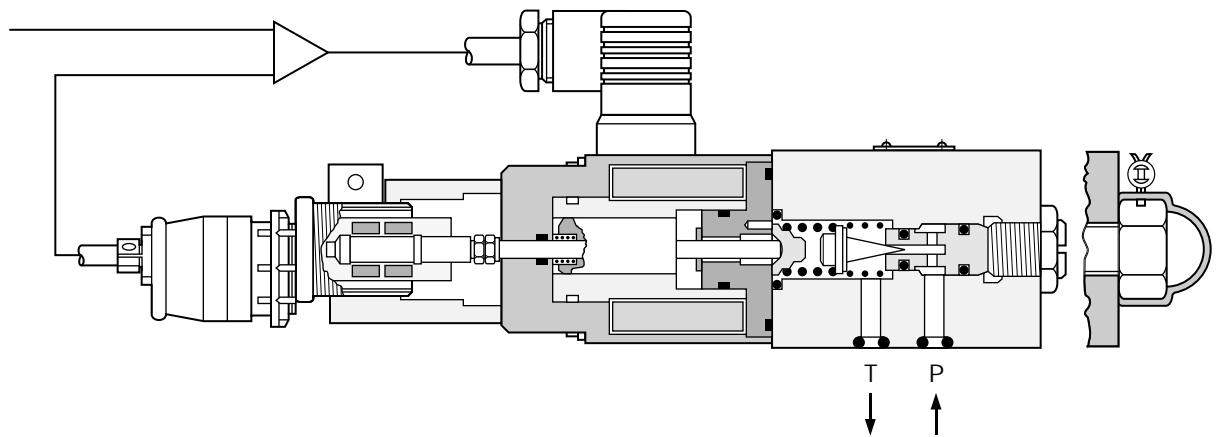


**Proportional pressure relief valve**

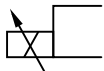
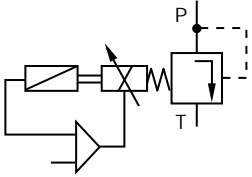

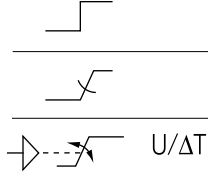
**NG 6**



**Function**



Pilot stage ( $Q_{nom.} = 0.26$  GPM)  
with position control

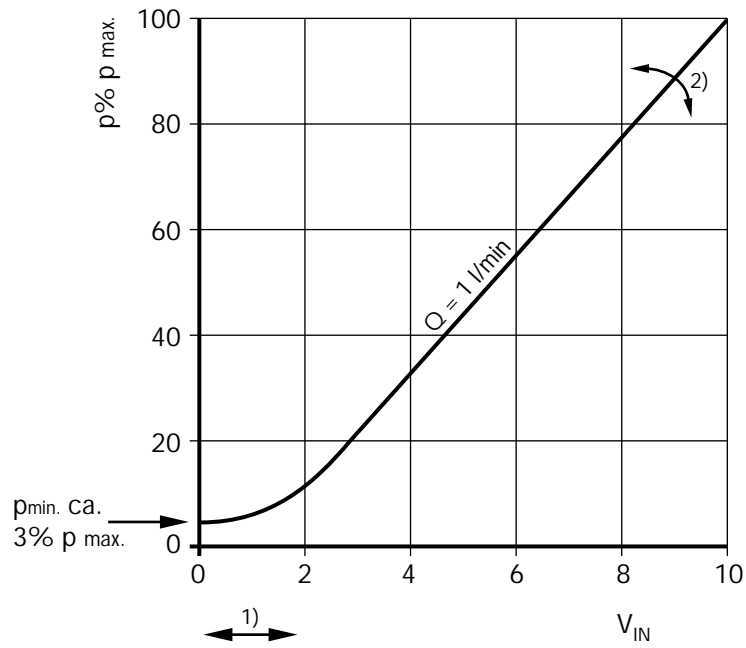
Symbol	 A/W	$Q_{nom.}$ GPM [l/min]	$P_{nom.}$ PSI [bar]	LBS [kg]	⊕
	3.7/50	0.26 (1) max 0.8 (3)	14.5...363 (1...25)	10 (4.5)	<b>0 811 402 013</b>
			43...1160 (3...80)		<b>0 811 402 007*</b>
			58...2610 (4...180)		<b>0 811 402 003</b>
			73...3625 (5...250)		<b>0 811 402 001*</b>
			87...4570 (6...315)		<b>0 811 402 004</b>
  U/ΔT	Amplifier see Page 109	K	PV 60	0.5 (0.2)	<b>0 811 405 097</b>
		K	PV 60-RGC1	0.5 (0.2)	<b>0 811 405 102</b>
		K	PV 60-RGC3	0.7 (0.3)	<b>B 830 303 391</b>

\* With anti-tamper seal.

<b>Characteristics</b>					
<b>General</b>					
Construction	Poppet/seat				
Actuation	Proportional solenoid without position control				
Connection type	Subplate, mounting configuration NG 6 (ISO 4401)				
Mounting Position	optional				
Ambient temperature range	-4 to 122°F (-20...+ 50°C)				
<b>Hydraulic</b>					
Pressure medium	Hydraulic oil as per DIN 51524...535 Other fluids after prior consultation				
Viscosity, recommended max. permitted	100...465 SUS (20...100 cSt) 60...3700 SUS (10...800 cSt)				
Pressure medium temperature	-4 to 176 °F (-20...+ 80°C)				
Filtration  In line with operational reliability and service life	Permissible contamination level		Achieved using filter $\beta_x = 75$		
	Class 8 (NAS 1638)		X = 10		
	17/14 (ISO 4406)				
Flow direction	See symbol				
Nominal pressure (at Q = 1 l/min) PSI (bar)	<b>363</b> (25)	<b>1160</b> (80)	<b>2610</b> (180)	<b>3625</b> (250)	<b>4570</b> (315)
Minimum pressure (at Q = 1 l/min) PSI (bar)	14.5 (1)	43 (3)	58 (4)	73 (5)	87 PSI (6)
Max. working pressure Port P Port T	4570 PSI (315) bar ≤ 29 PSI (2 bar)				
<b>Electrical</b>					
Duty cycle	100%				
Environmental protection	IP 65 as per DIN 40 050 and IEC 14 434/5				
Solenoid connector	Connector DIN 43 650/ISO 4400				
Position transducer connector	Special connector				
Solenoid current	max. 3.7 A				
Coil resistance R <sub>20</sub>	2.5 Ω				
Power consumption	max. 50 VA				
<b>Static/dynamic</b>					
Hysteresis	≤ 0.3%				
Range of inversion	≤ 0.2%				
Manufacturing tolerance p max.	≈ 6%				
Response time	45 ms 25 ms				
100% signal change					
10% signal change					

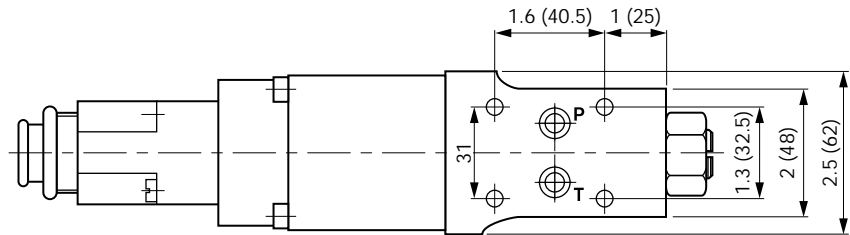
Characteristics values determined with proportional amplifier: PV 60

**Performance curves**

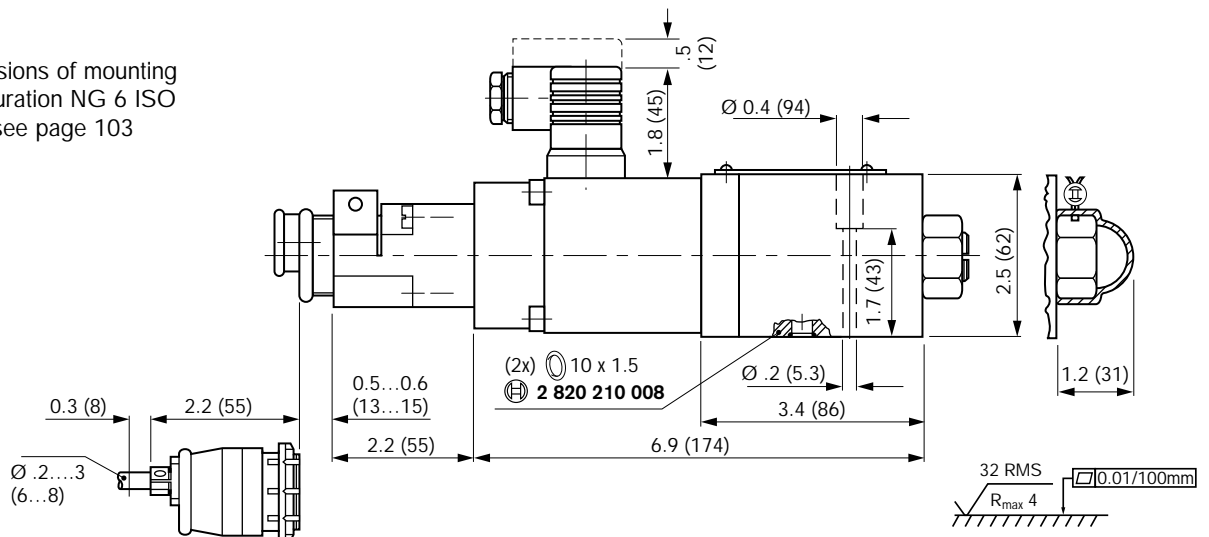


- 1) Zero adjustment
- 2) Gain adjustment

**Dimensions**

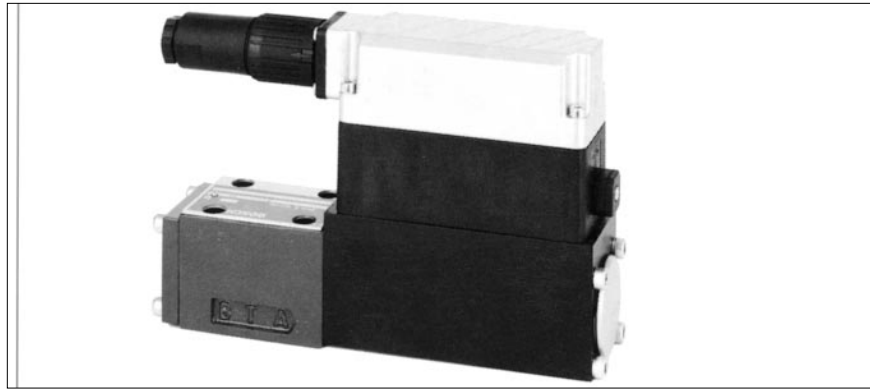


Dimensions of mounting configuration NG 6 ISO 4401 see page 103

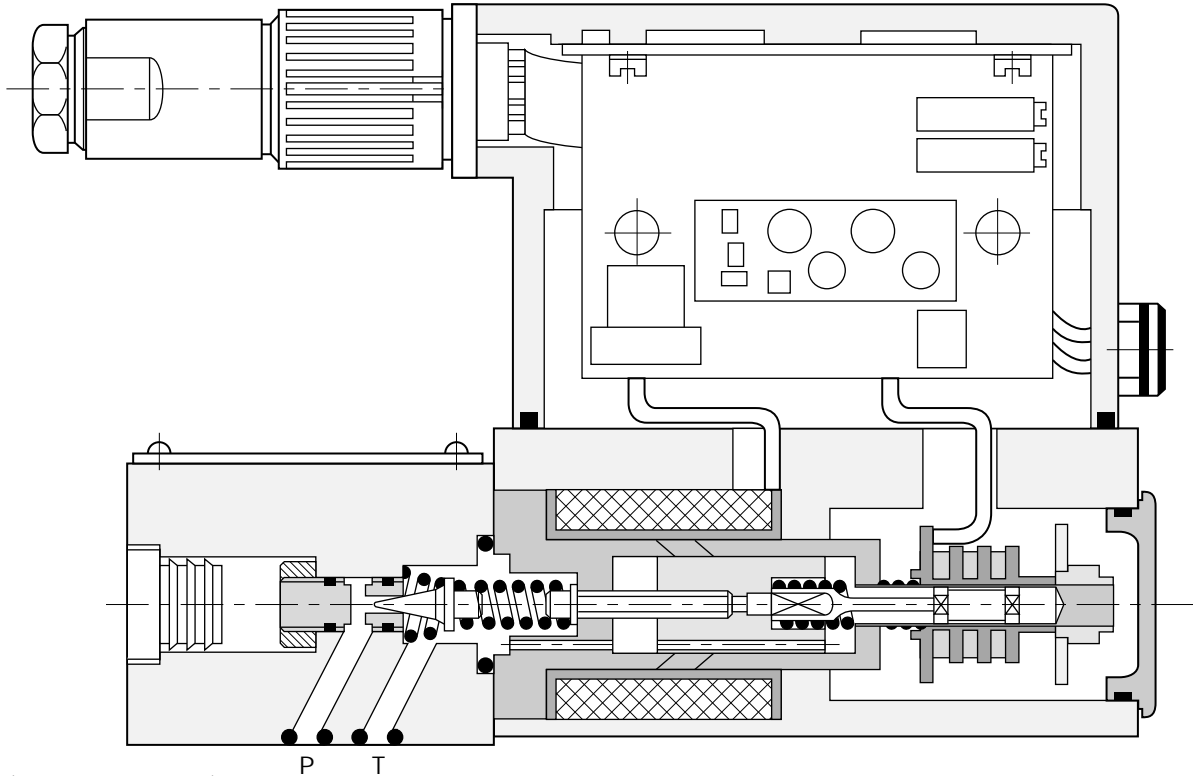


**Proportional pressure relief valve with integrated amplifier**


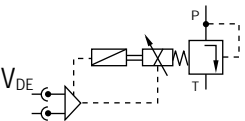
**NG 6**



**Function**



Pilot stage ( $Q_{nom.} = 0.26$  GPM)

Symbol	V/W	$Q_{nom.}$ GPM [l/min]	$P_{nom.}$ PSI [bar]	LBS [kg]	
Int. El. 	24 VDC max. 30 VA	0.26 (1) max. 0.4 (1.5)	1160 (80)	6 (2.7)	<b>0 811 402 072</b>
			2610 (180)		<b>0 811 402 071</b>
			3625 (250)		<b>0 811 402 073</b>
			4570 (315)		<b>0 811 402 070</b>

7-Pin Connectors (not included with valve)



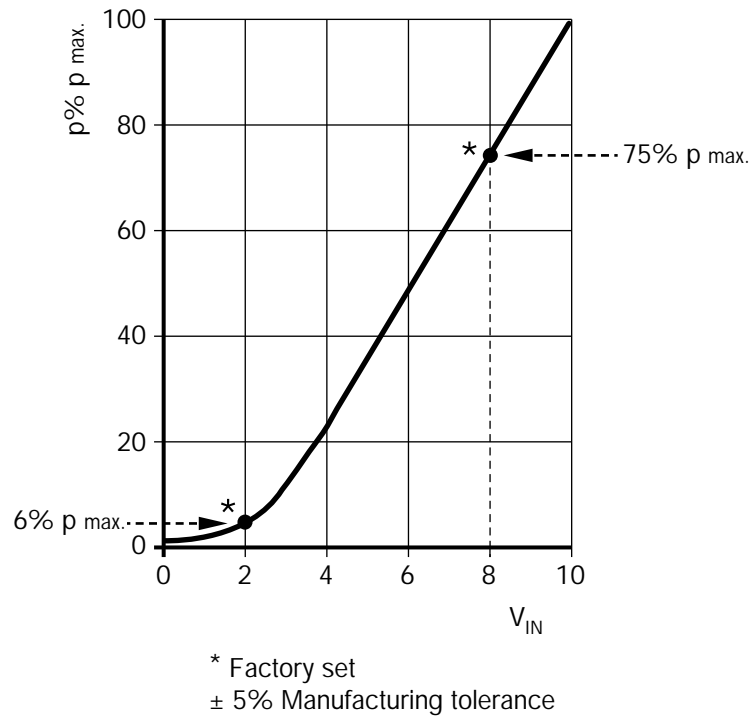
Plug 7-pole  
Page 148

Metal MS Connector

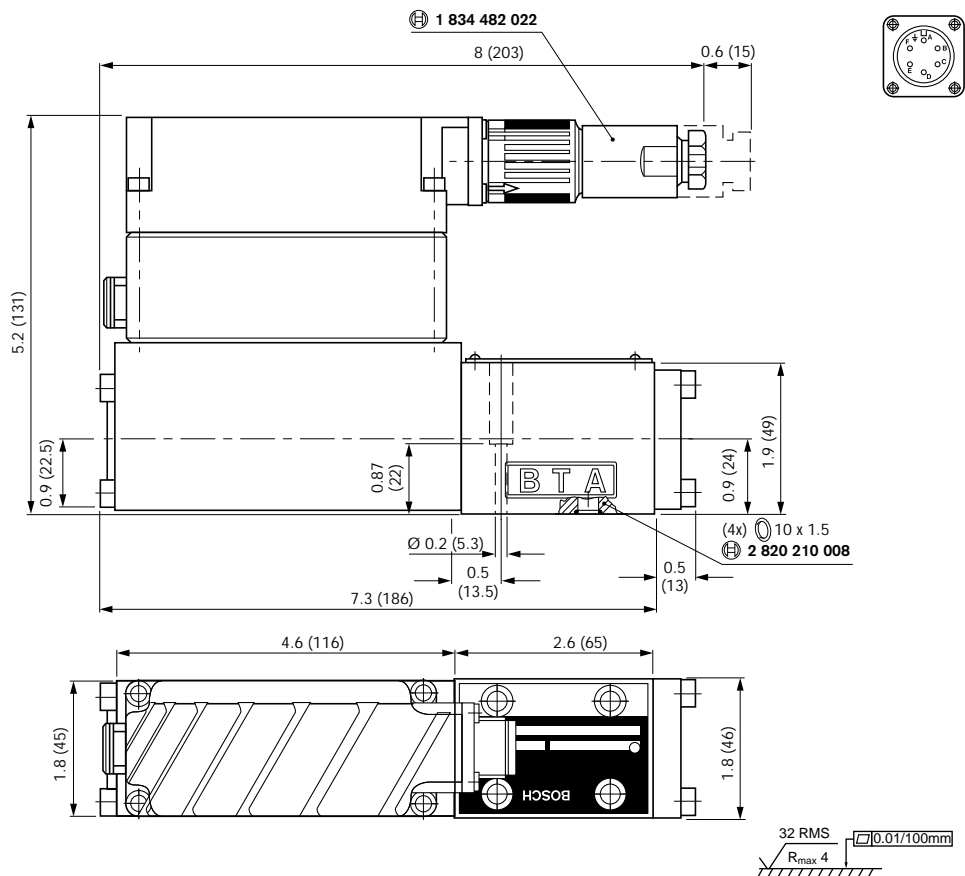
KS	<b>1 834 482 022</b>
KS	<b>1 834-482 026</b>
MS	<b>1 834 482 023</b>
MS	<b>1 834 482 024</b>
	<b>9 536 230 054</b>

<b>Characteristics</b>				
<b>General</b>				
Construction	Poppet/seat			
Actuation	Proportional solenoid without position control			
Connection type	Subplate, mounting configuration NG 6 (ISO 4401)			
Mounting position	optional			
Ambient temperature range	-4 to 122°F (-20...+ 50°C)			
Vibration test condition	max. 25 g shaken in 3 dimensions (24 h)			
<b>Hydraulic</b>				
Pressure medium	Hydraulic oil as per DIN 51524...535 Other fluids after prior consultation			
Viscosity, recommended max. permitted	100...465 SUS (20...100 cSt) 60...3700 SUS (10...800 cSt)			
Pressure medium temperature	-4 to 176 °F (-20...+ 80°C)			
Filtration	Permissible contamination level	Achieved using filter $\beta_x = 75$		
In line with operational reliability and service life	Class 8 (NAS 1638)	X = 10		
	17/14 (ISO 4406)			
Flow direction	See symbol			
Nominal pressure (at Q = 1 l/min)	<b>1160</b> (80)	<b>2610</b> (180)	<b>3625</b> (250)	<b>4570</b> (315)
Minimum pressure (at Q = 0.26 GPM)	43 (3)	58 (4)	73 (5)	116 (8)
Max. working pressure Port P Port T	4570 (315) bar ≤ 29 PSI (2 bar) (static 3625 PSI 250 bar)			
<b>Static/dynamic</b>				
Hysteresis	≤ 0.2%			
Range of inversion	≤ 0.1%			
Manufacturing tolerance	< ± 5%			
Response time 100% signal change 10% signal change	30 ms 10 ms			
Thermal drift	< 1%, at $\Delta T = 72^\circ F$			
<b>Electrical characteristics</b>	see page 23			

Performance curves

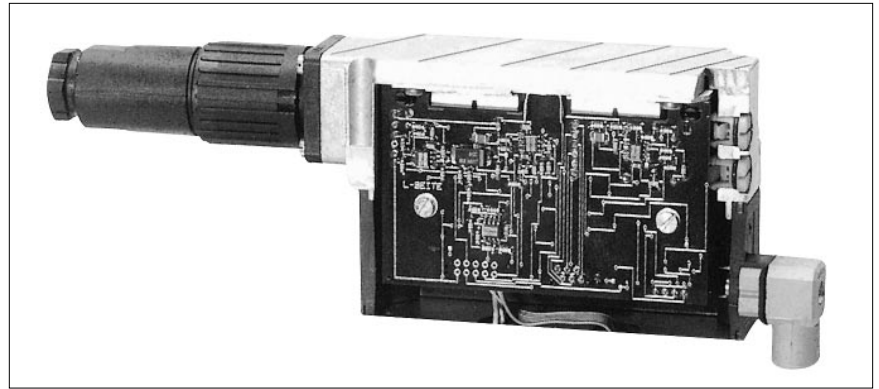



Dimensions



Dimensions of mounting configuration NG 6 ISO 4401 see page 95

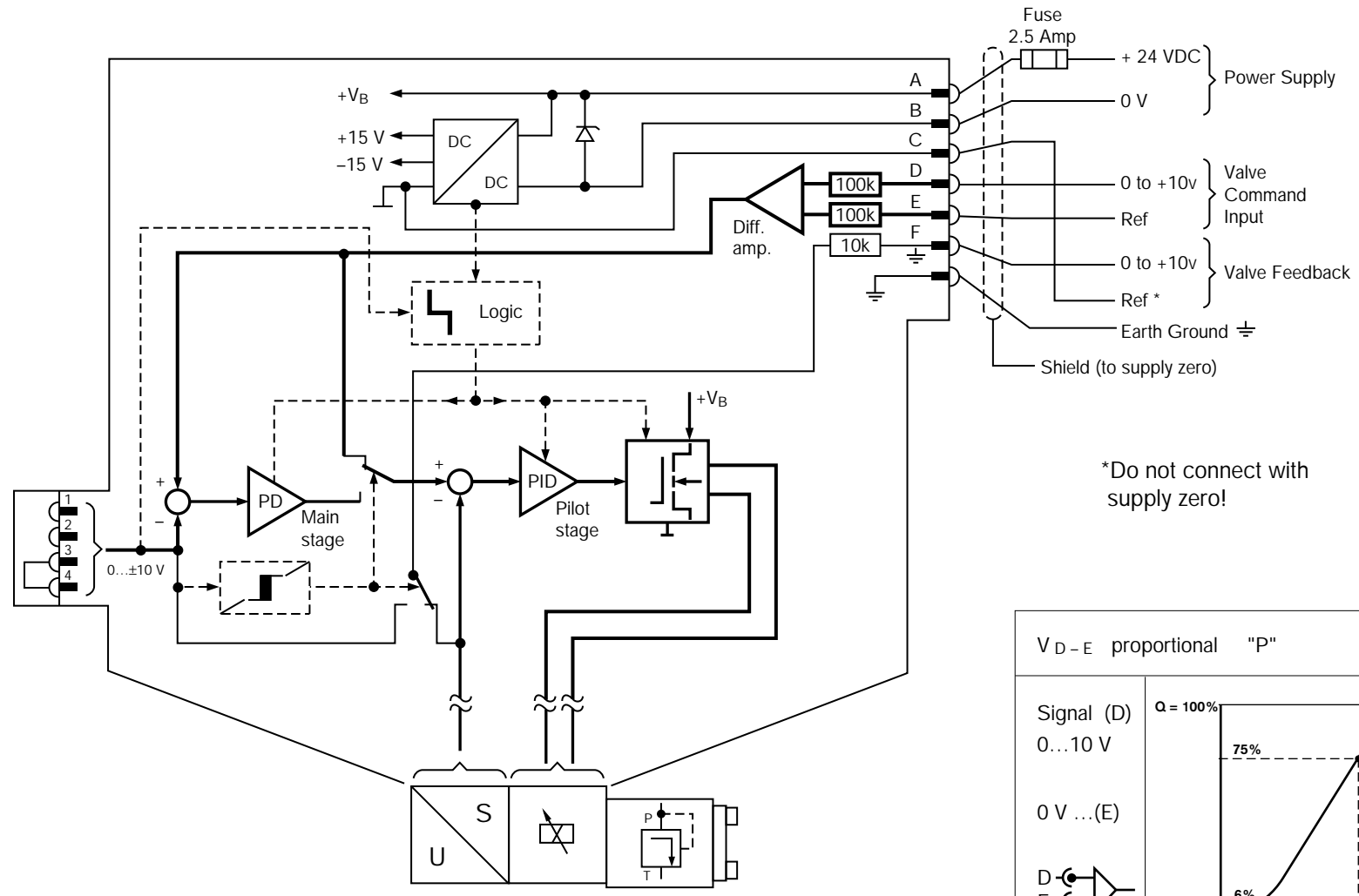
**Electronics**



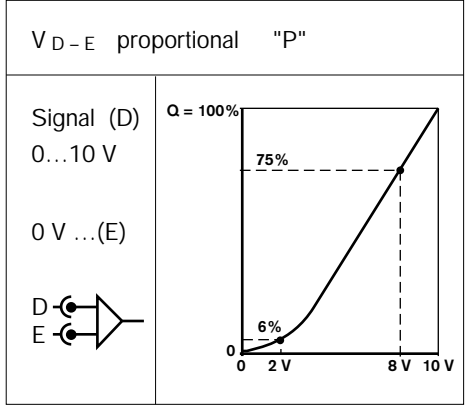
<b>Characteristics</b>	
<b>Electrical</b>	
Duty cycle	100%
Degree of protection	IP 65 as per DIN 40050 and IEC 14434/5
Connection	7-pin plug, PG 11
Voltage supply Terminal A: B: 0 V	24 VDC nominal min. 21 V DC/max. 40 VDC Ripple max. 2 VDC
Power	max. 30 VA
External fuse	2.5 A <sub>F</sub>
Input signal Terminal D: V <sub>IN</sub> E: 0 V	0... + 10 V Differential amplifier R <sub>i</sub> = 100 k Ω
Maximum differential input voltage at 0 V	D → B } max. 18 VDC E → B }
Test signal Terminal F: V <sub>Test</sub> C: 0 V	0... + 10 V proportional to poppet position R <sub>a</sub> = 10 k Ω
Safety lead to ground 	Connect only when supply transformer does not conform to VDE 0551
Recommended cable	7 Conductor shielded cable up to 65 Ft. : 18 AWG up to 130 Ft. : 16 AWG
Adjustment (Factory set)	V <sub>D-E</sub> 2 V: p= 6% p <sub>max.</sub> V <sub>D-E</sub> 8 V: p=75% p <sub>max.</sub>

**Note:**  
Supply voltage is 24 VDC nominally, below 18 VDC a rapid shut-off (similar to "Enable - OFF") is initiated internally.

Block diagram



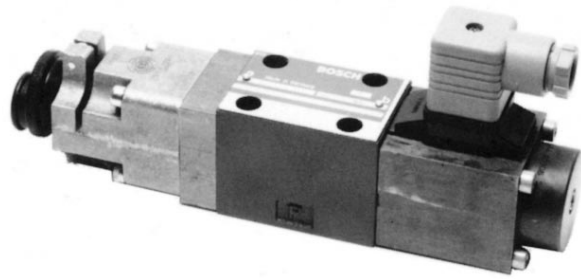
\*Do not connect with supply zero!



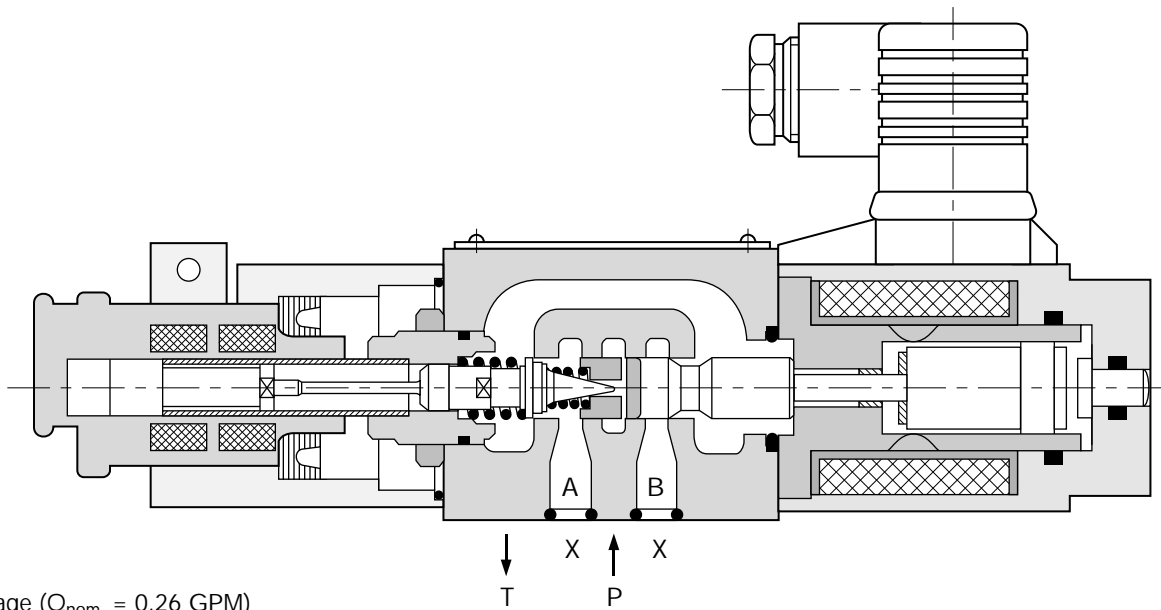


**Proportional linear pressure relief valve**

**(PDL) NG 6**



**Function**



Pilot stage ( $Q_{nom.} = 0.26$  GPM)  
with position control

Symbol		$Q_{nom.}$ GPM [l/min]	$P_{nom.}$ PSI [bar]	LBS [kg]	⊕
	A/W	0.26 (1) max 0.8 (3)	43...1160 (3...80)	5.0 (2.3)	<b>0 811 402 023</b>
			58...2610 (4...180)		<b>0 811 402 022</b>
			73...3625 (5...250)		<b>0 811 402 021</b>
			87...4570 (6...315)		<b>0 811 402 020</b>
	Amplifier see Page 109	K	PDL1	0.5 (0.2)	<b>0 811 405 095</b>
		K	PDL1-RGC1	0.5 (0.2)	<b>0 811 405 100</b>
		K	PDL1-RGC3	0.7 (0.3)	<b>B 830 303 387</b>

**General**

The PDL valve is a proportional pressure valve. The solenoid forces the seat into the poppet. The force on the poppet is determined by the compression of the spring on the back side of the poppet. This force determines the relieving pressure of the valve. The amplifier adjusts the solenoid current (solenoid force) so that the poppet spring is compressed to the correct distance. The LVDT provides feedback on the spring compression. Placing the LVDT on the valve cone results in a linear relationship between electrical input signal and regulating pressure.

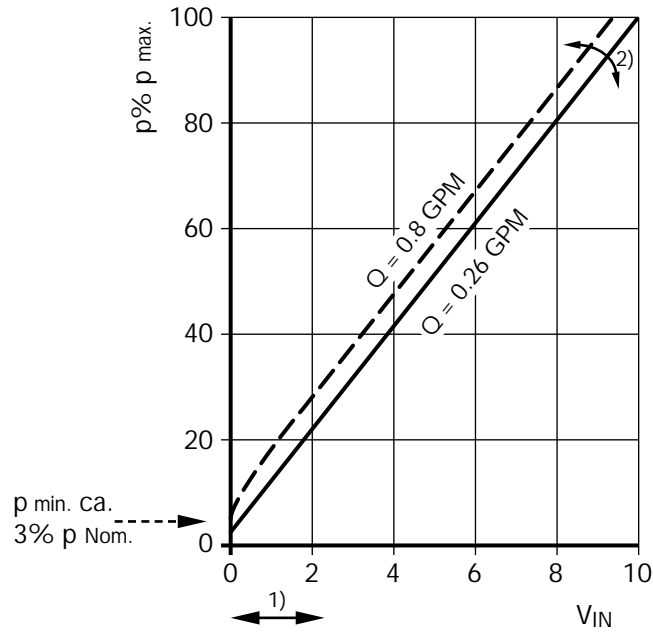
Further benefits of this design includes good static and dynamic performance characteristics such as:

- minimal deviation in linearity
- low hysteresis
- reduced response time for pressure build-up and release
- high resistance to wear.

<b>Characteristics</b>				
<b>General</b>				
Construction	Poppet-seat			
Actuation	Proportional solenoid			
Connection type	Subplate, mounting configuration NG 6 (ISO 4401)			
Mounting Position	horizontal, <b>vertical solenoid above</b>			
Ambient temperature range	-4°...122° F (-20...+50°C)			
<b>Hydraulic</b>				
Pressure medium	Hydraulic oil as per DIN 51524...535 Other fluids after prior consultation			
Viscosity, recommended max. permitted	100...465 SUS (20...100 cSt) 60...3700 SUS (10...800 cSt)			
Hydraulic oil temperature	-4 to 176 °F (-20...+ 80°C)			
Filtration  In line with operational reliability and service life	Permissible contamination level	Achieved using filter β x = 75		
	Class 8 (NAS 1638)	X = 10		
	17/14 (ISO 4406)			
Flow direction	See symbol			
Nominal pressure (at Q = 0.26 GPM)	<b>1160</b> (80)	<b>2610</b> (180)	<b>3625</b> (250)	<b>4570</b> PSI (315)
Minimum pressure (at Q = 0.26 GPM)	43 (3)	58 (4)	73 (5)	87 (6)
<b>Additional maximum pressure protection required</b>				
Max. working pressure Port P Port T	4570 (315) bar ≤ 3000 (200) bar (static)			
<b>Electrical</b>				
Duty cycle	100%			
Degree of protection	IP 65 as per DIN 40 050 and IEC 14 434/5			
Solenoid connector	Connector DIN 43 650/ISO 4400			
Position transducer connector	Special connector			
Solenoid current	max. 2.7 A			
Coil resistance R <sub>20</sub>	2.5 Ω			
Power consumption	max. 25 W			
<b>Static/dynamic</b>				
Hysteresis	≤ 1%			
Range of inversion	≤ 0.8%			
Manufacturing tolerance p <sub>max.</sub>	≤ 2%			
Response time 100% signal chance 10% signal chance	45 ms 25 ms			

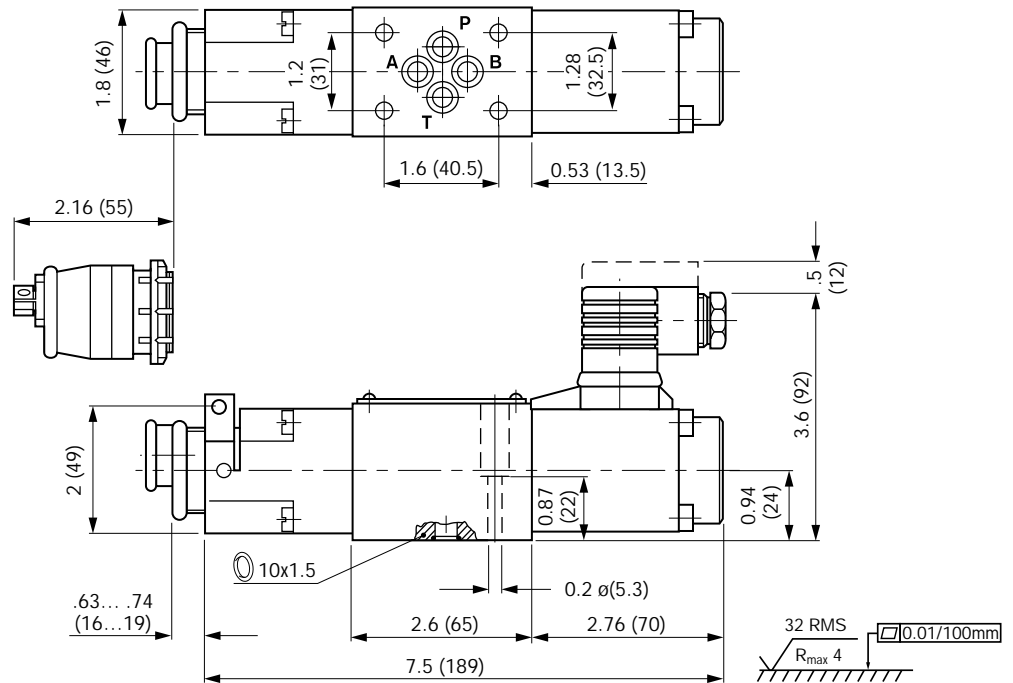
Characteristics values determined with proportional amplifier: PDL 1

**Performance curves**



- 1) Zero adjustment
- 2) Gain adjustment

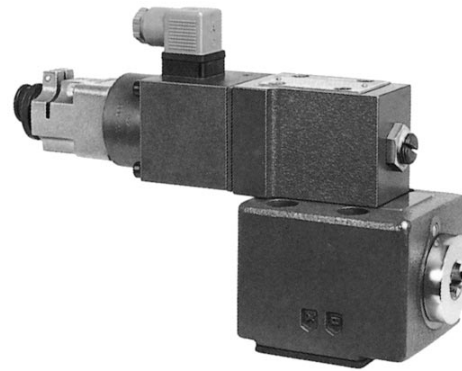
**Dimensions**



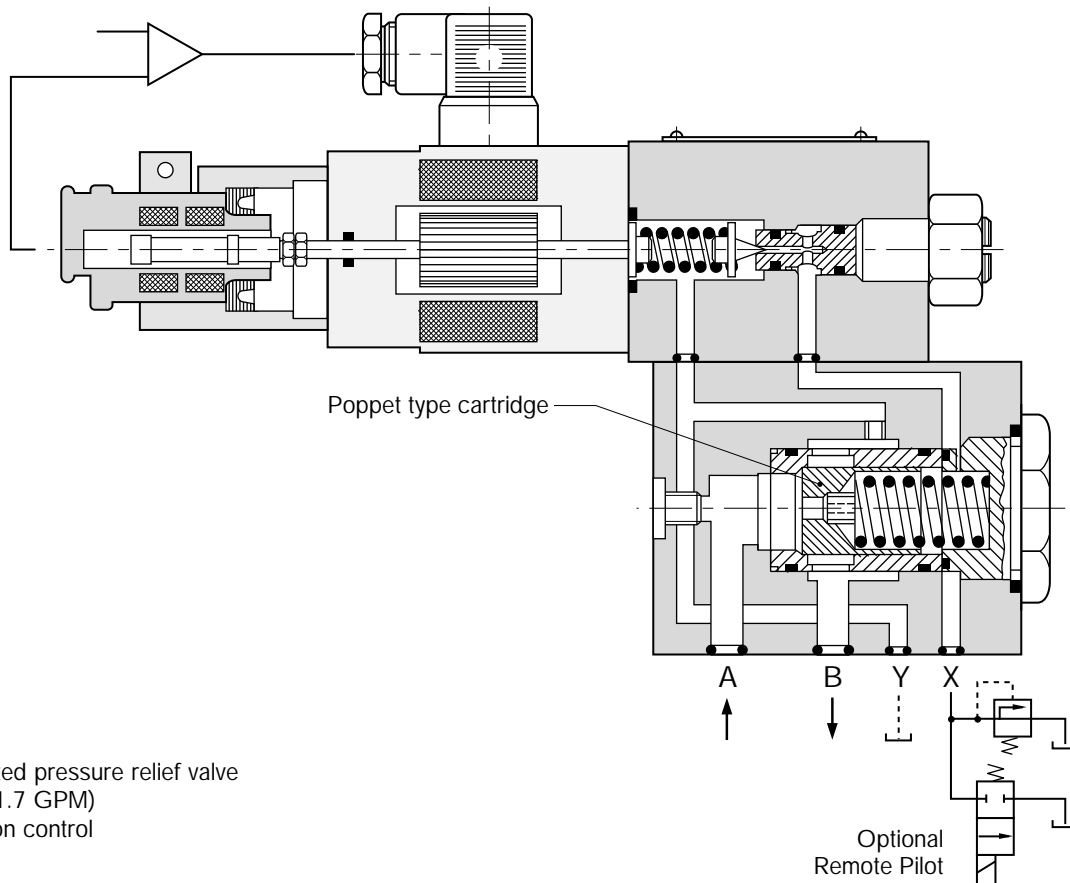
Dimensions of mounting configuration NG 6 ISO 4401 see page 103

**Proportional pressure relief valve**

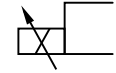

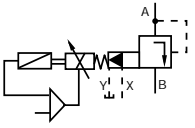

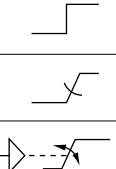
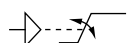
**NG 10**



**Function**

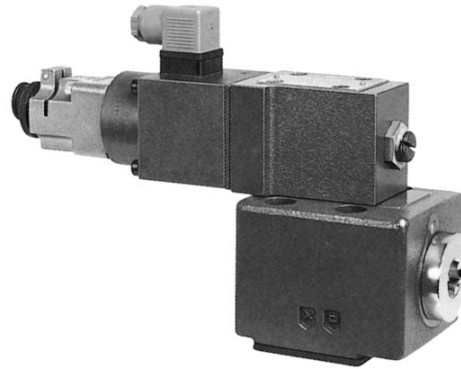


Pilot operated pressure relief valve  
 ( $Q_{nom.} = 31.7$  GPM)  
**with** position control

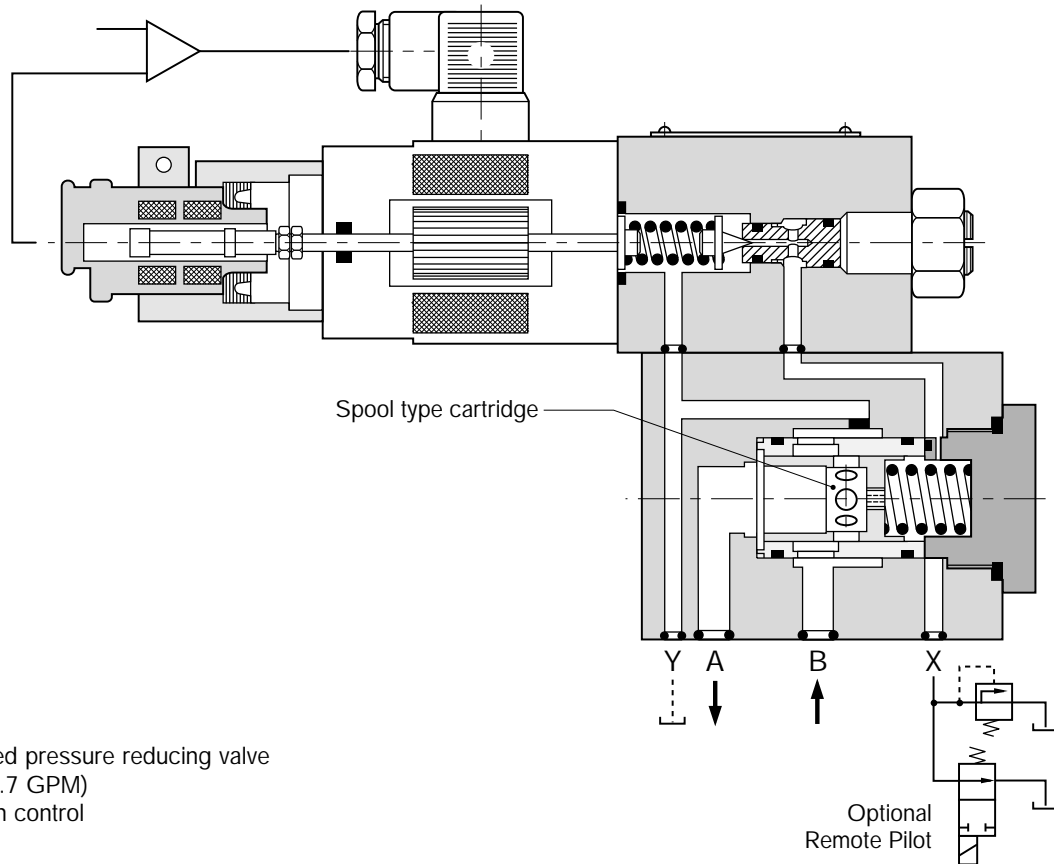
Symbol		$Q_{nom.}$ GPM [l/min]	$P_{nom.}$ PSI [bar]	LBS [kg]		
	A/W	3.7/50	31.7 (120)	2610 (180)	21 (9.5)	<b>0 811 402 100</b> <b>0 811 402 101</b>
				4570 (315)		
		Amplifier see Page 109	K	PV 60	0.5 (0.2)	<b>0 811 405 097</b>
			K	PV 60-RGC 1	0.5 (0.2)	<b>0 811 405 102</b>
			K	PV 60-RGC 3	0.7 (0.3)	<b>B 830 303 391</b>
						

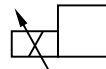

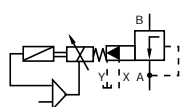


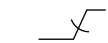
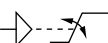
**Proportional pressure reducing valve**

**NG 10**



**Function**



Symbol	 A/W	$Q_{nom.}$ GPM [l/min]	$P_{nom.}$ PSI [bar]	LBS [kg]	
	3.7/50	31.7 (120)	2610 (180) 4570 (315)	21 (9.5)	<b>0 811 402 150</b> <b>0 811 402 151</b>
    U/ΔT	Amplifier see Page 109	K	PV 60	0.5 (0.2)	<b>0 811 405 097</b>
		K	PV 60-RGC 1	0.5 (0.2)	<b>0 811 405 102</b>
		K	PV 60-RGC 3	0.7 (0.3)	<b>B 830 303 391</b>

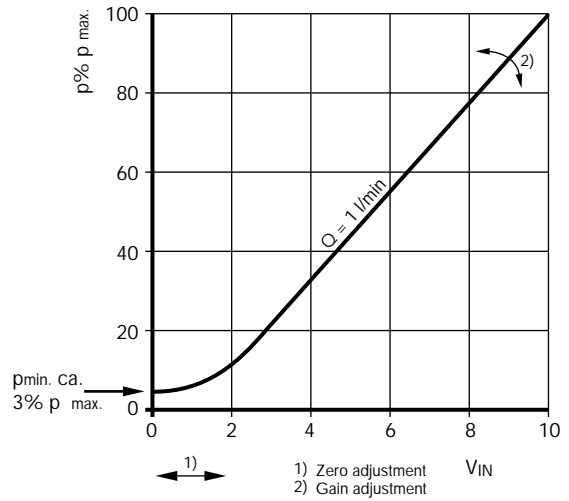
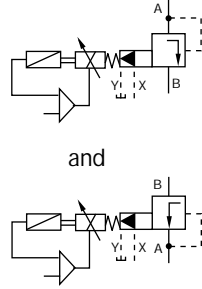
Characteristics		
<b>General</b>		
Construction, pilot stage	Poppet-seat	
Construction, main stage	Cartidge-type	
<b>Pressure relief valve</b>	Poppet valve, normally closed	
<b>Pressure reducing valve</b>	Spool valve, normally open	
Actuation	Proportional solenoid with position control	
Connection type	Subplate, mounting configuration NG 10 ISO 5781	
Mounting Position	optional	
Ambient temperature range	-4°...122°F (-20°...+50° C)	
<b>Hydraulic</b>		
Pressure medium	Hydraulic oil as per DIN 51524...535 Other fluids after prior consultation	
Viscosity, recommended max. permitted	100...467 SUS (20...100 cSt) 60...3700 SUS (10...800 cSt)	
Pressure medium temperature	-4°...176°F (-20°...+80°C)	
Filtration	Permissible contamination level	
In line with operational reliability and service life	Class 8 (NAS 1638)	Achieved using filter $\beta_x = 75$
	17/14 (ISO 4406)	X = 10
Flow direction	See symbol	
Nominal pressure	<b>2610</b> (180)   <b>4570</b> (315) bar	
Minimum pressure	87 (6)   116 (8) bar	
Max. working pressure Port A, B Port Y Port X	4570 PSI (315 bar) $\leq 29$ PSI (2 bar) external control oil drain 4570 PSI (315 bar) remote pilot	
Nominal flow	31.7 GPM (120 l/min)	
<b>Electrical</b>		
Duty cycle	100%	
Degree of protection	IP 65 as per DIN 40 050 and IEC 14 434/5	
Solenoid connector	Connector DIN 43 650/ISO 4400	
Position transducer connector	Special connector	
Solenoid current	max 3.7 A	
Coil resistance $R_{20}$	2.5 $\Omega$	
Power consumption	max. 50 W	
<b>Static/dynamic</b>		
Hysteresis	$\leq 1\%$	
Range of inversion	$\leq 0.5\%$	
Manufacturing tolerance for p	$\approx 6\%$	
Response time 100% signal change	$\approx 80$ ms	

Characteristics values determined with proportional amplifier: PV 60

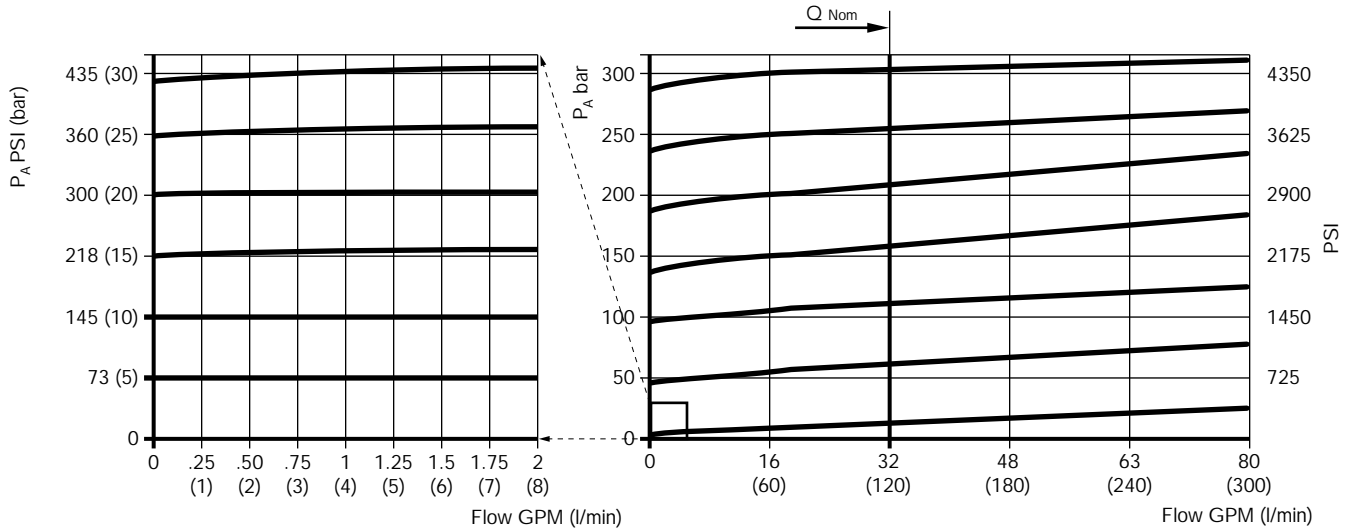
**Performance curves**

v = 35 cSt

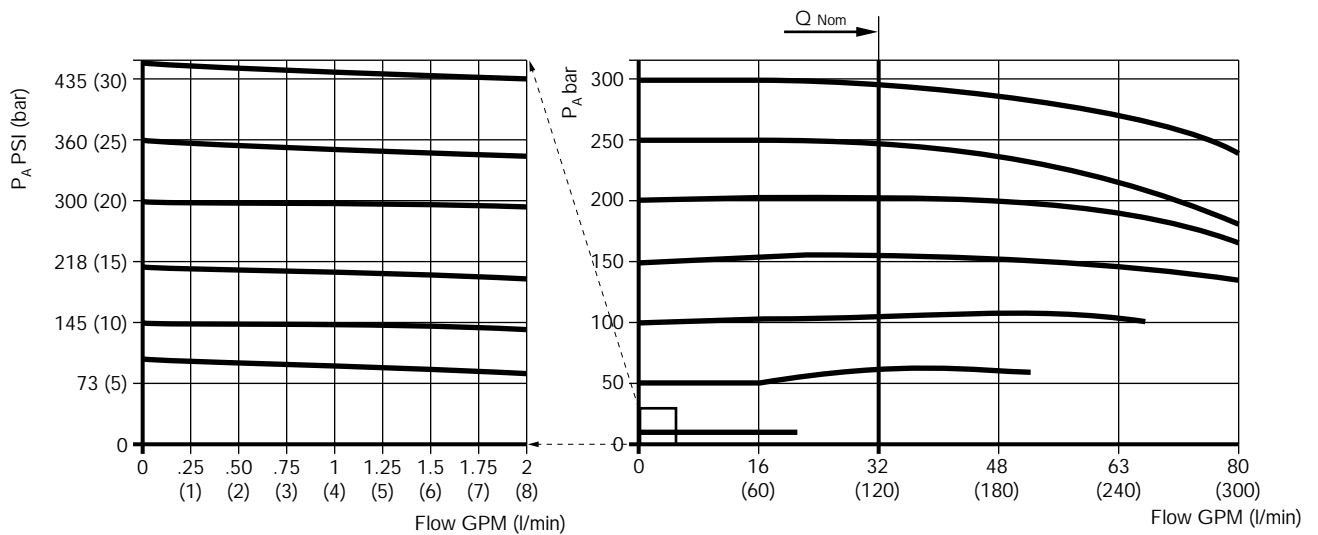
$p = f(V_{IN})$



**RELIEF VALVE FLOW CURVES**



**REDUCING VALVE FLOW CURVES**

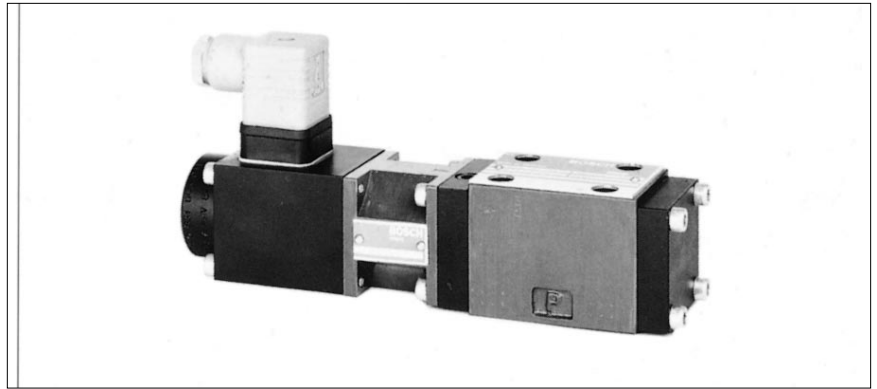




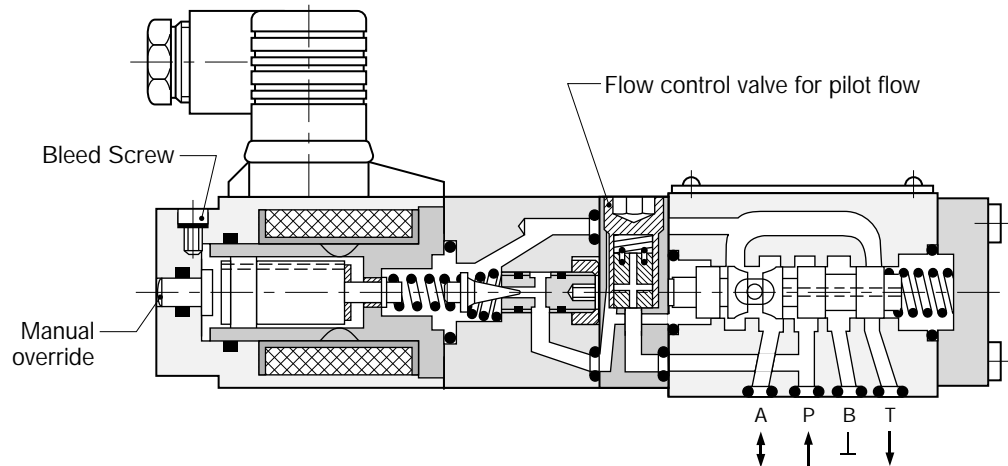


**Proportional pressure reducing/relieving valve**


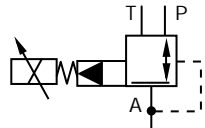
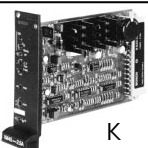
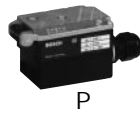

**NG 6**



**Function**



**Pilot operated 3-way-pressure reducing/relieving valve** ( $Q_{max.} = 10 \text{ GPM}$ ) **without** position control

Symbol	 A/W	$Q_{max.}$ GPM [l/min]	P PSI [bar]	LBS [kg]	⊕
 <p>Min. pressure setting 0 PSI or pressure in T port</p>	0.8/18 ( $R_L = 22 \Omega$ )	10 (40)	0...1090 (75)	5.7 (2.3)	<b>0 811 402 059<sup>(1)</sup></b>
			0...2540 (175)		<b>0 811 402 055<sup>(2)</sup></b>
			0...4500 (310)		<b>0 811 402 058<sup>(3)</sup></b>
 K  P  M	Amplifier see Page 108	K	1M45-0.8A	0.7 (0.3)	<b>0 811 405 081</b>
M	1M08-RGC 1	0.5 (0.2)	<b>0 811 405 126</b>		
P	AS0.8-V	0.3 (0.15)	<b>0 811 405 144</b>		

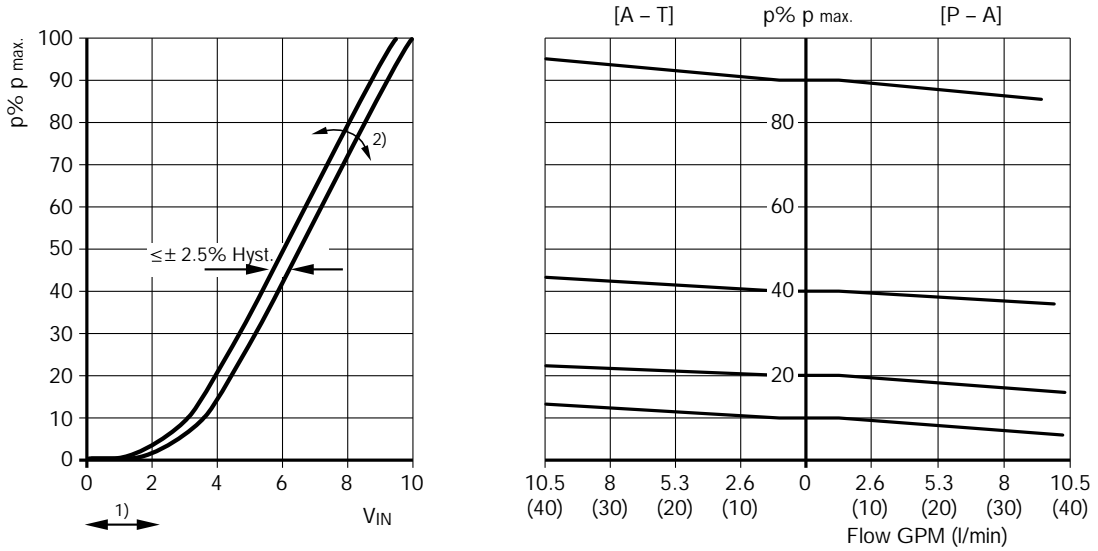
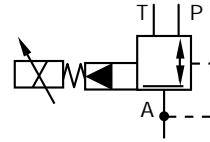
Was <sup>(1)</sup> B 811 102 160, <sup>(2)</sup> B 811 102 157, <sup>(3)</sup> B 811 102 158

<b>Characteristics</b>			
<b>General</b>			
Construction, pilot stage	Poppet-seat		
Construction, main stage	Spool valve NG 6		
Actuation	Proportional solenoid without position control		
Connection type	Subplate, mounting configuration NG 6 ( ISO 4401)		
Mounting position	optional		
Ambient temperature range	-4° ... 122°F (-20° ... + 50° C)		
<b>Hydraulic</b>			
Pressure medium	Hydraulic oil as per DIN 51524...535 Other fluids after prior consultation		
Viscosity, recommended max. permitted	100...465 SUS (20...100 cSt) 60...3700 SUS (10...800 cSt)		
Pressure medium temperature	-4° ... 176°F (-20° ... +80°C)		
Filtration  In line with operational reliability and service life	Permissible contamination level	Achieved using filter β x = 75	
	Class 8 (NAS 1638) 17/14 (ISO 4406)	X = 10	
Flow direction	See symbol		
Nominal pressure in A	<b>1090</b> (75)	<b>2540</b> (175)	<b>4500</b> (310 bar)
Minimum pressure in A	0 PSI or pressure in T		
Inlet pressure in P	min. p <sub>P</sub> = p <sub>A</sub> + 73 PSI		
Max. working pressure in Port A, B in Port T	4570 PSI (315 bar) 3625 PSI (250 bar) (B plugged)		
Control oil flow	approx. 0.16 GPM (0.6 l/min.)		
Q <sub>max.</sub>	10 GPM (40 l/min)		
<b>Electrical</b>			
Duty cycle	100%		
Environmental protection	IP 65 as per DIN 40 050		
Solenoid connector	Connector DIN 43 650/ISO 4400		
Solenoid current	0.8 A		
Coil resistance R <sub>20</sub>	22 Ω		
Power consumption	18 VA		
<b>Static/dynamic</b>			
Hysteresis	≤ ± 2%		
Manufacturing tolerance p <sub>max.</sub>	≤ 10%		
Response time 100% signal change	ON: 200 ms OFF: ≤ 250ms		

Characteristics values determined with proportional amplifier: 1 M 45– 0.8 A

**Performance curves**

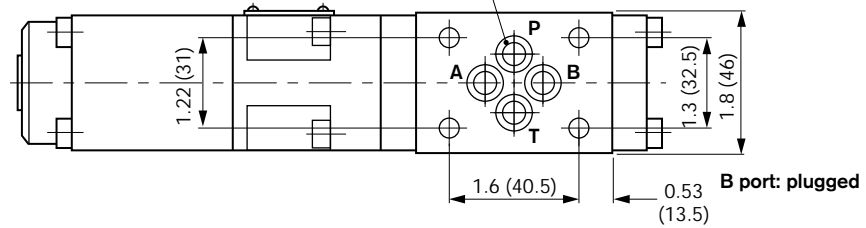
v = 35 cSt



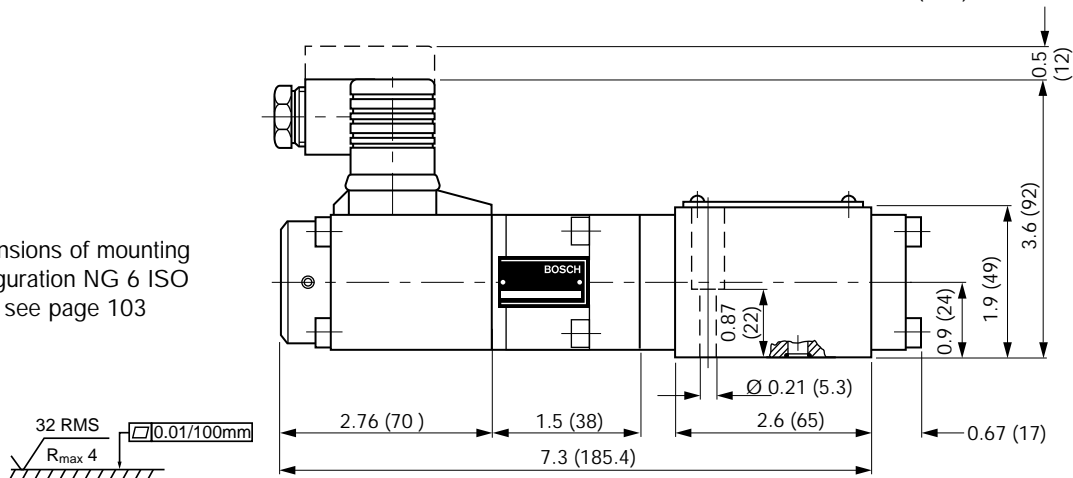
- 1) Zero adjustment
- 2) Gain adjustment

**Dimensions**

(4x)  $\varnothing 10 \times 1.5$   
**2 820 210 008**

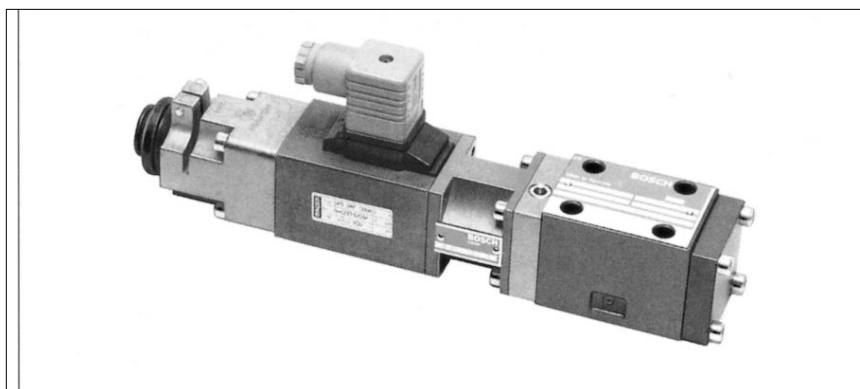


Dimensions of mounting configuration NG 6 ISO 4401 see page 103

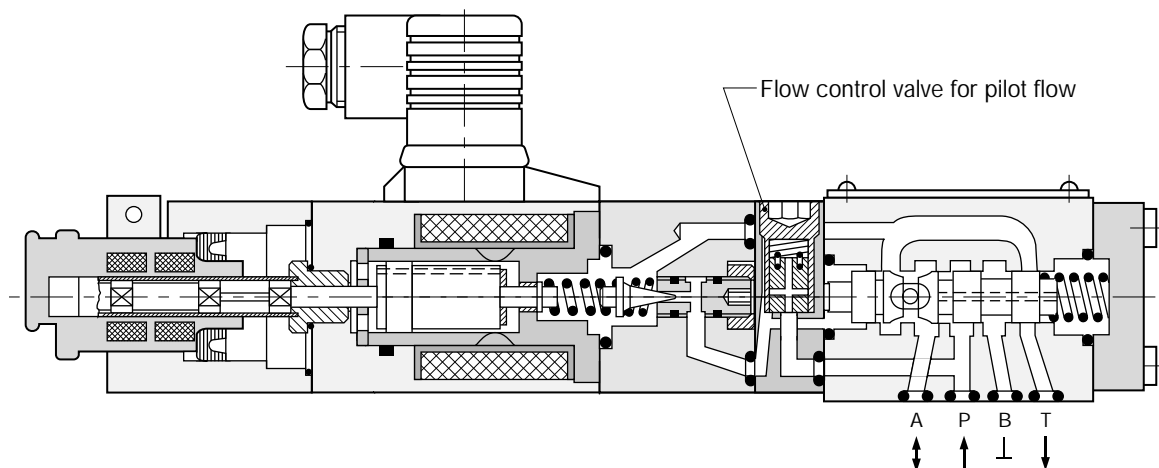


**Proportional pressure reducing/relieving valve**

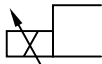

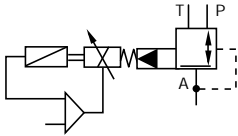


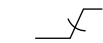
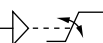
**NG 6**



**Function**



**Pilot operated 3-way-pressure reducing valve** ( $Q_{max.} = 10 \text{ GPM}$ )  
**with position control**

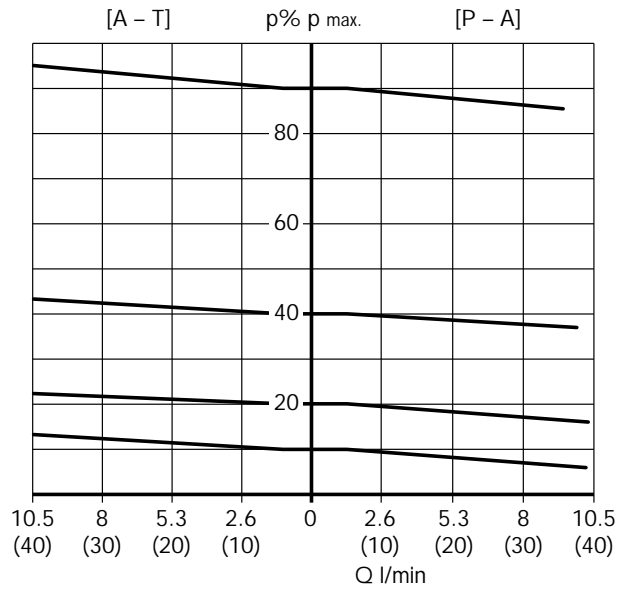
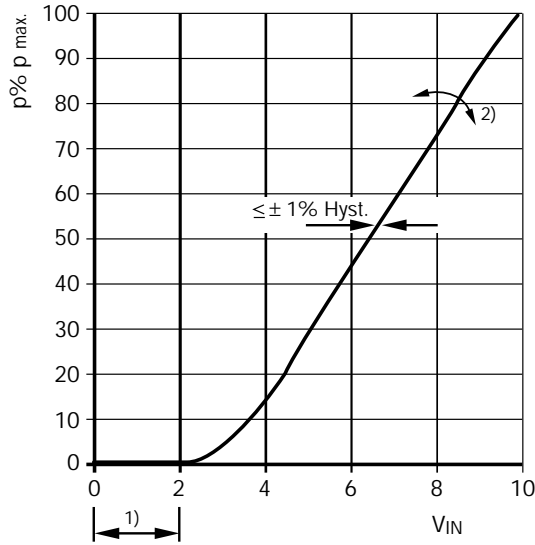
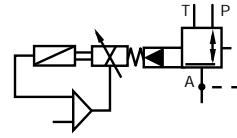
Symbol	 A/W	$Q_{max.}$ GPM [l/min]	P PSI [bar]	LBS [kg]	
 <p>Min. setting pressure 0 PSI or pressure in T port</p>	2.5/25	10 (40)	0...1090 (75)	5.3 (2.4)	<b>0 811 402 050</b>
			0...2540 (175)		<b>0 811 402 051</b>
			0...4500 (310)		<b>0 811 402 052</b>
    U/ΔT	Amplifier see Page 109	K	PV45	0.5 (0.2)	<b>0 811 405 096</b>
		K	PV45-RGC1	0.5 (0.2)	<b>0 811 405 101</b>
		K	PV45-RGC3	0.7 (0.3)	<b>B 830 303 388</b>

<b>Characteristics</b>			
<b>General</b>			
Construction, pilot stage	Poppet-seat		
Construction, main stage	Spool valve NG 6		
Actuation	Proportional solenoid with position control		
Connection type	Subplate , mounting configuration NG 6 ( ISO 4401)		
Mounting position	optional		
Ambient temperature range	-4°...122°F (-20°...+50° C)		
<b>Hydraulic</b>			
Pressure medium	Hydraulic oil as per DIN 51524...535 Other fluids after prior consultation		
Viscosity, recommended max. permitted	100...465 SUS (20...100 cSt) 60...3700 SUS (10...800 cSt)		
Pressure medium temperature	-4°...176°F (-20°...+80°C)		
Filtration In line with operational reliability and service life	Permissible contamination level	Achieved using filter	
	Class 8 (NAS 1638)	β x = 75	
	17/14 (ISO 4406)	X = 10	
Flow direction	See symbol		
Nominal pressure in A	<b>1090</b> (75)	<b>2540</b> (175)	<b>4500</b> (310)
Minimum pressure in A	0 PSI or pressure in T		
Inlet pressure in P	min. $p_P = p_A + 73$ PSI		
Max. working pressure in Port A, B in Port T	4570 PSI (315 bar) 3625 PSI (250 bar)		
Control oil flow	approx. 0.16 GPM		
$Q_{max.}$	10 GPM (40 l/min)		
<b>Electrical</b>			
Duty cycle	100%		
Environmental protection	IP 65 as per DIN 40 050		
Solenoid connector	Connector DIN 43 650/ISO 4400		
Position transducer connector	Special connector		
Solenoid current	max > 2.5 A		
Coil resistance $R_{20}$	2.5 Ω		
Power consumption	max. 25 W		
<b>Static/dynamic</b>			
Hysteresis	≤ 1%		
Manufacturing tolerance $p_{max.}$	≤ 10%		
Response time 100 % signal change 10 %	50ms 20 ms		

Characteristics values determined with proportional amplifier: PV 45

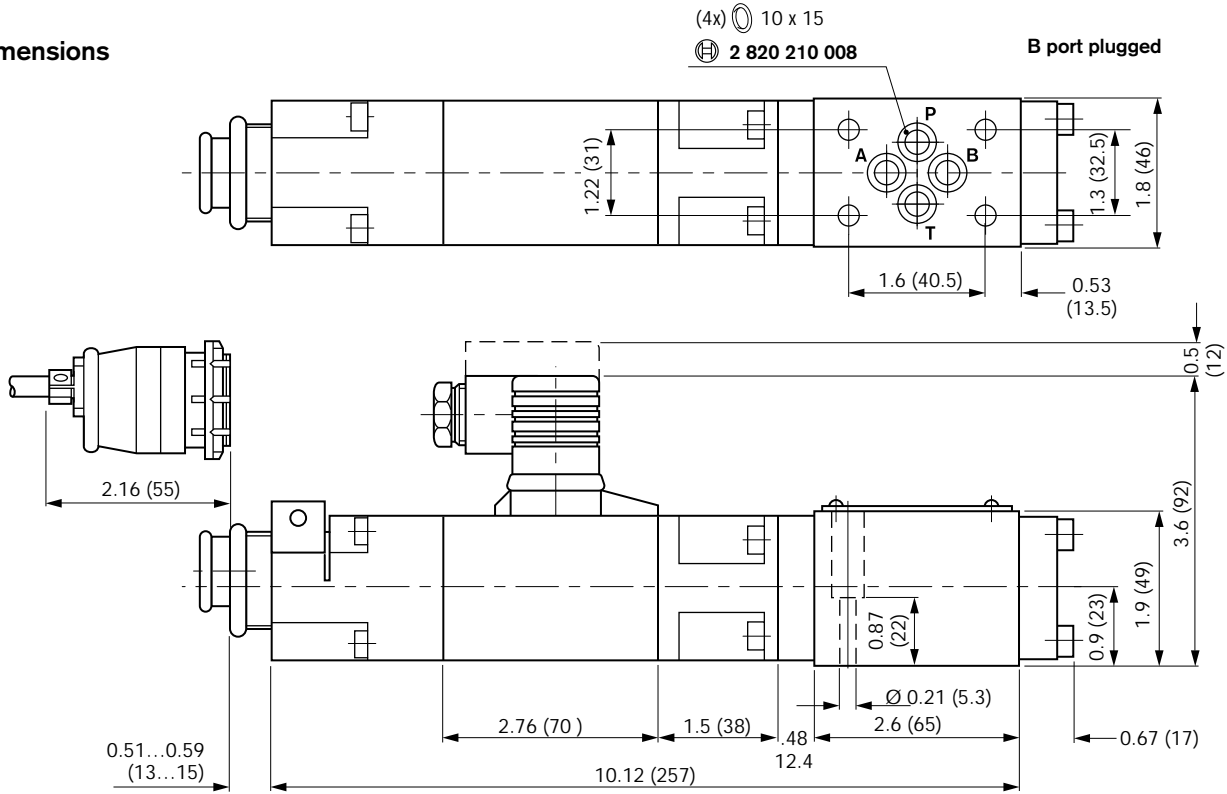
**Performance curves**

$v = 35 \text{ cSt}$

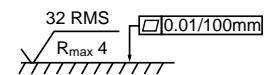


- 1) Zero adjustments
- 2) Gain adjustments

**Dimensions**

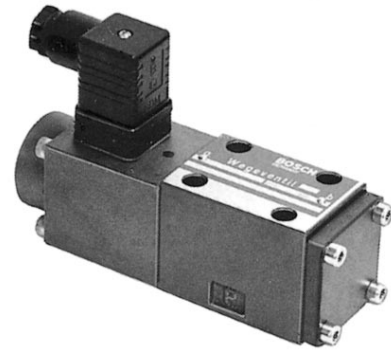


Dimensions of mounting configuration NG 6 ISO 4401 see page 103

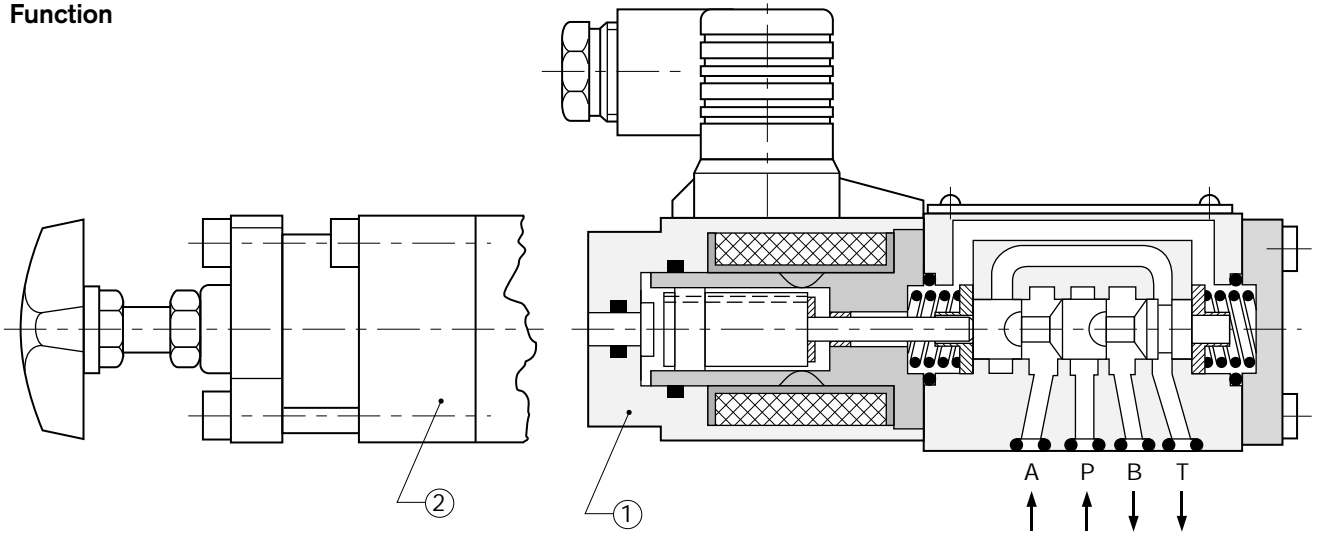


**Proportional throttle valve**

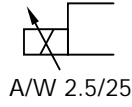
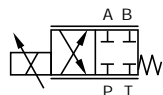
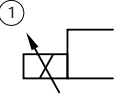
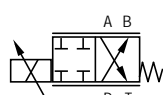
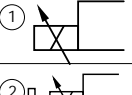
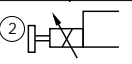



**NG 6**





**Function**



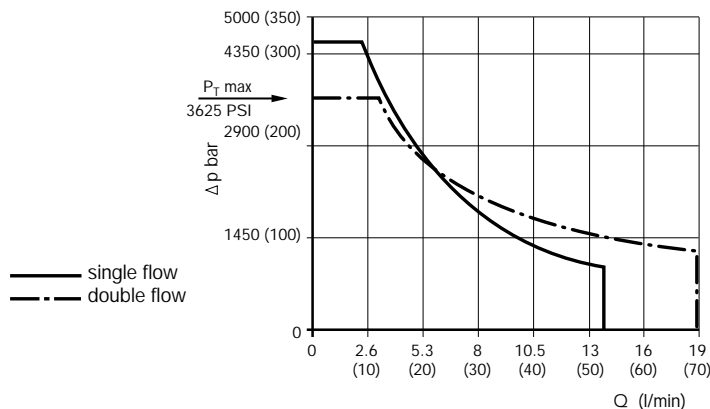
- ① Proportional throttle valve without position control
- ② Optional with manual override

Symbol	Function	 A/W 2.5/25	$P_{max.}$ PSI [bar]	$Q$ GPM [l/min]	LBS [kg]	⊕	
	Normally closed	① 	P, A, B: 4570 (315)	4.7 (18) 9 (35)	$\Delta p = 116 \text{ PSI (8 bar)}$	4.4 (2)	<b>0 811 403 105</b> <b>0 811 403 104</b>
	Normally open	①  ② 	T: 3625 (250)	9 (35)		<b>0 811 403 108</b> <b>0 811 403 109</b>	
 K	Amplifier see Page 108			K 1M45-2.5A		0.7 (0.3)	<b>0 811 405 079</b>
 P				P 2.5A		0.3 (0.15)	<b>0 811 405 041</b>
 M				Box 1Kan./ 2.5A + 25P	1.1 (0.5) 0.5 (0.2)	<b>0 811 405 091</b> <b>1 834 484 185</b>	
				M 1M25-RGC 1	0.6 (0.25)	<b>0 811 405 127</b>	

Characteristics		
General		
Construction	spool type valve	
Actuation	Proportional solenoid without position control	
Connection type	Subplate, NG 6 (ISO 4401)	
Mounting position	optional	
Ambient temperature range	-4° ... 122°F (-20° ... +50°C)	
Hydraulic		
Pressure medium	Hydraulic oil as per DIN 51524...535 Other fluids after prior consultation	
Viscosity, recommended max. permitted	100...465 SUS (20...100 cSt) 60...3700 SUS (10...800 cSt)	
Pressure medium temperature	-4° ... 176°F (-20° ... +80°C)	
Filtration	Permissible contamination level	Achieved using filter β x = 75
In line with operational reliability and service life	Class 8 (NAS 1638)	X = 10
	17/14 (ISO 4406)	
Flow direction	See symbol	
Nominal flow at Δp = 116 PSI	4.7 (18) or 9 GPM (35 l/min) (per path)	
Leakage/Metering- edge I = 0 (Δp = 1450 PSI)	 4.88 in <sup>3</sup> /min ≤ (80 cm <sup>3</sup> /min)	
	I = max.  9.15 in <sup>3</sup> /min ≤ (150 cm <sup>3</sup> /min)	
Max. working pressure Port P, A, B Port T	4570 (315 bar) 3625 (250 bar)	
Electrical		
Duty cycle	100% (9 VDC)	
Degree of protection	IP 65	
Solenoid connector	Connector DIN 43 650/ISO 4400	
Solenoid current	max. 2.5 A	
Coil resistance R <sub>20</sub>	3.0 Ω	
Power consumption	max. 25 W	
Static/dynamic		
Hysteresis	≤ ± 2%	
Range of inversion	≤ ± 1.5%	
Manufacturing tolerance Q max.	≈ 10%	
Response time 100% signal change	ON: 70 ms OFF: 70 ms	

Characteristics values determined with proportional amplifier: 1 M 45 -2.5 A

### Operating limits



### Nominal flow

This always refers to a pressure differential of Δp = 116 PSI at the metering orifice.

Where other pressure differentials are involved, flow is calculated according to the following formula:

$$Q_x = Q_{\text{nom}} \cdot \sqrt{\frac{\Delta p_x}{116}}$$

However, the **operating limits** must be observed. When the operating limits are exceeded, the ensuing flow forces lead to uncontrollable spool movements.

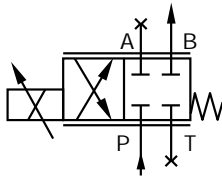
**Pressure compensators** should be used to limit the pressure drop.



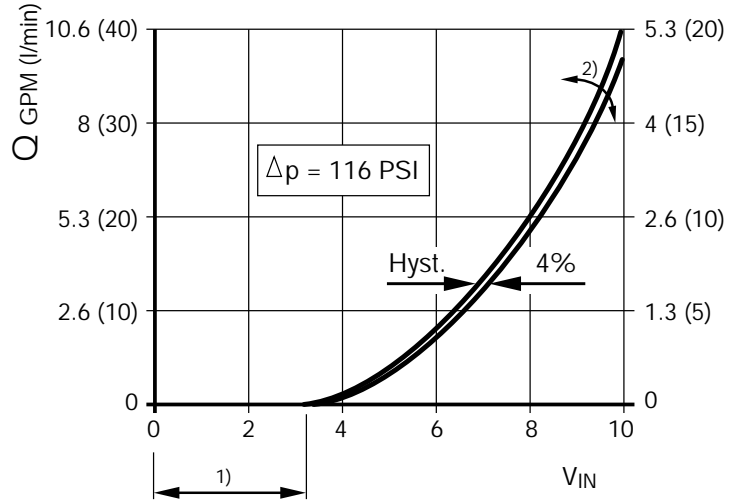
**Performance curves**

$v = 35 \text{ cSt}$

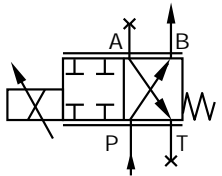
**$Q_{nom} = 18, 35 \text{ l/min}$**



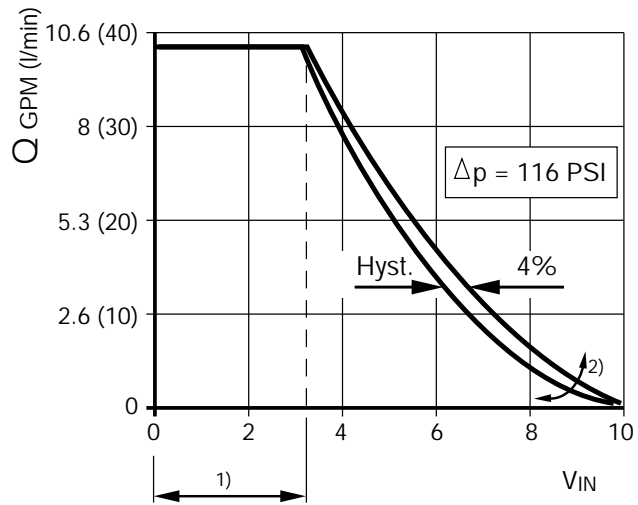
$p_{max} = 3625 \text{ PSI (250 bar), T — X}$   
 $p_{max} = 4570 \text{ PSI (315 bar), T - - - X}$



**$Q_{nom} = 35 \text{ l/min}$**

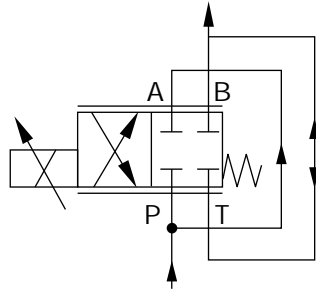


$p_{max} = 3625 \text{ PSI (250 bar), T — X}$   
 $p_{max} = 4570 \text{ PSI (315 bar), T - - - X}$



- 1) Zero adjustment
- 2) Gain adjustment


Doubled flow rate

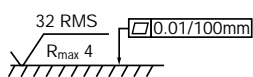
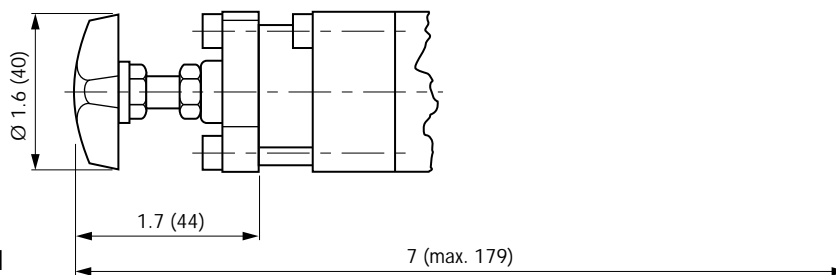
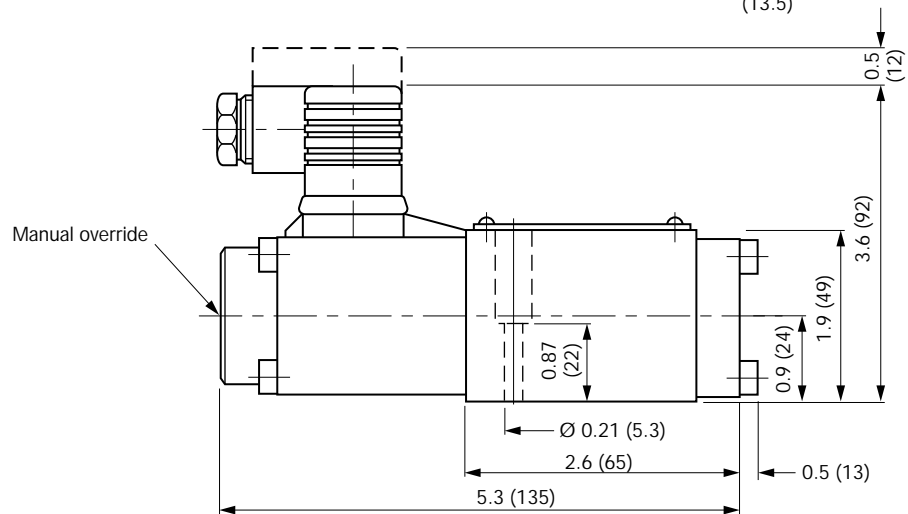
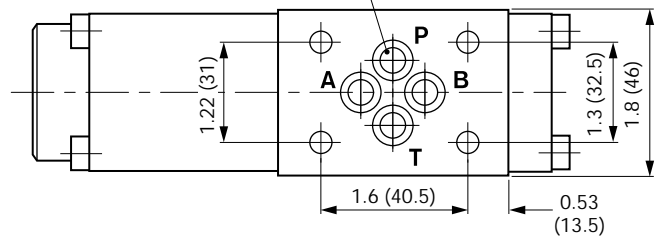


$p_{max} = 3625 \text{ PSI}$

Dimensions

(4x)  10 x 1.5

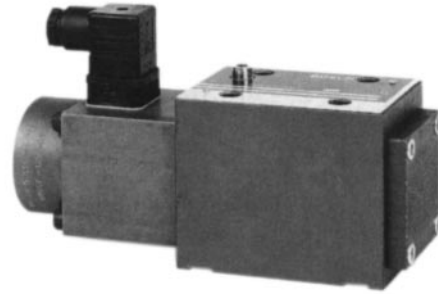
 2 820 210 008



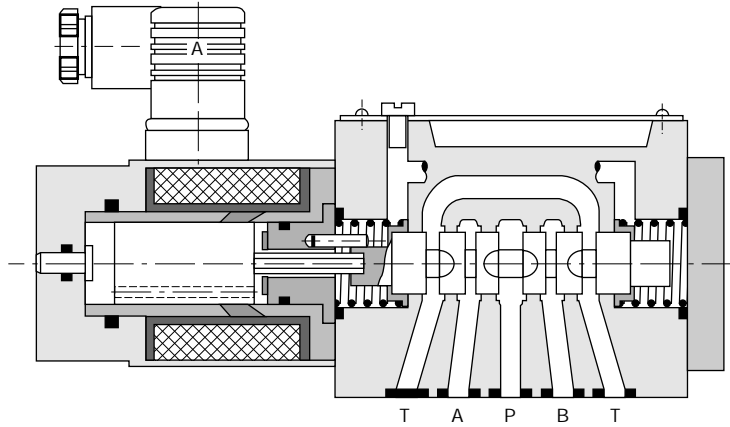
Dimensions of mounting  
configuration NG 6 ISO 4401  
see page 103



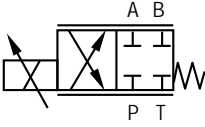
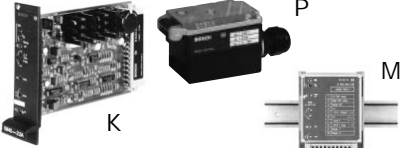
**Proportional throttle valve without LVDT**



**NG 10**



**Function**



Symbol	 A/W	$P_{max.}$ PSI [bar]	Q GPM (l/min)	LBS [kg]	
	2.5/50 ( $R_{20} = 5.8 \Omega^*$ )	P, A, B: 4570(315) T:3625(250)	10.5 (40)	15(6.9)	<b>0 811 403 020</b>
			21 (80)		
	Amplifier see Page 108		K 1M45-2.5A	0.7 (0.3)	<b>0 811 405 079</b>
			P AS2.5-V	0.3 (0.15)	<b>0 811 405 143</b>
			Box 1Kan./ 2.5A	1.1 (0.5)	<b>0 811 405 091</b>
			+ 25P	0.5 (0.2)	<b>1 834 484 185</b>
			M 1M25-RGC 1	0.6 (0.25)	<b>0 811 405 127</b>

Characteristics		
General		
Construction	spool type valve	
Actuation	Proportional solenoid without position control	
Connection type	Subplate, NG 6 (ISO 4401)	
Mounting position	optional	
Ambient temperature range	-4° ... 122°F (-20° ... +50°C)	
Hydraulic		
Pressure medium	Hydraulic oil as per DIN 51524...535 Other fluids after prior consultation	
Viscosity, recommended max. permitted	100...465 SUS (20...100 cSt) 60...3700 SUS (10...800 cSt)	
Pressure medium temperature	-4° ... 176°F (-20° ... +80°C)	
Filtration	Permissible contamination level	Achieved using filter β x = 75
In line with operational reliability and service life	Class 8 (NAS 1638)	X = 10
	17/14 (ISO 4406)	
Flow direction	See symbol	
Nominal flow at Δp = 116 PSI	10.5 (40) or 21 GPM (80 l/min) (per path)	
Leakage/Metering- edge I = 0 (Δp = 1450 PSI)	 4.88 in <sup>3</sup> /min ≤ (80 cm <sup>3</sup> /min)	
	I = max.  9.15 in <sup>3</sup> /min ≤ (150 cm <sup>3</sup> /min)	
Max. working pressure Port P, A, B Port T	4570 (315 bar) 3625 (250 bar)	
Electrical		
Duty cycle	100% (9 VDC)	
Degree of protection	IP 65	
Solenoid connector	Connector DIN 43 650/ISO 4400	
Solenoid current	max. 2.5 A	
Coil resistance R <sub>20</sub>	5.8 Ω	
Power consumption	max. 50 W	
Static/dynamic		
Hysteresis	≤ ± 5%	
Range of inversion	≤ ± 3%	
Manufacturing tolerance Q max.	≈ 10%	
Response time 100% signal change	ON: 100 ms OFF: 100 ms	

**Nominal flow**

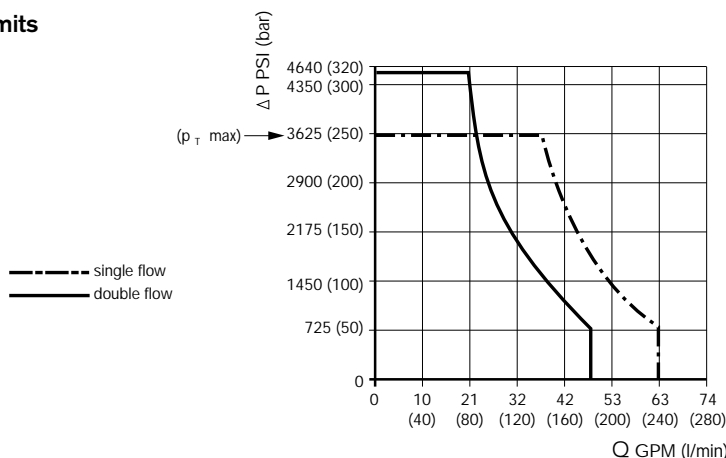
This always refers to a pressure differential of Δp = 116 PSI at the metering orifice.  
Where other pressure differentials are involved, flow is calculated according to the following formula:

$$Q_x = Q_{nom} \cdot \sqrt{\frac{\Delta p_x}{116}}$$

However, the **operating limits** must be observed. When the operating limits are exceeded, the ensuing flow forces lead to uncontrollable spool movements.  
**Pressure compensators** should be used to limit the pressure drop.

Characteristics values determined with proportional amplifier: 1 M 45 -2.5 A

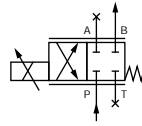
**Operating limits**



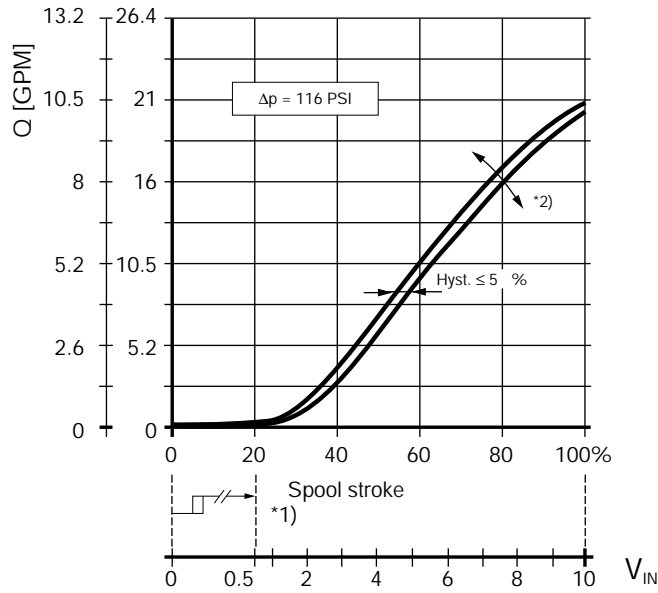
**Performance curves**

$\nu = 36 \text{ cSt}$

$Q_{\text{nom}} = 10.5 \text{ GPM}, 21 \text{ GPM}$

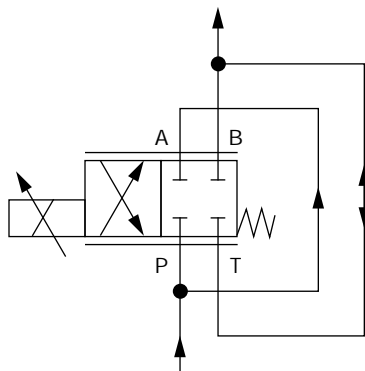


$P_{\text{max}} = 3625 \text{ PSI}, T \text{ --- } x$   
 $P_{\text{max}} = 4570 \text{ PSI}, T \text{ - - - } x$



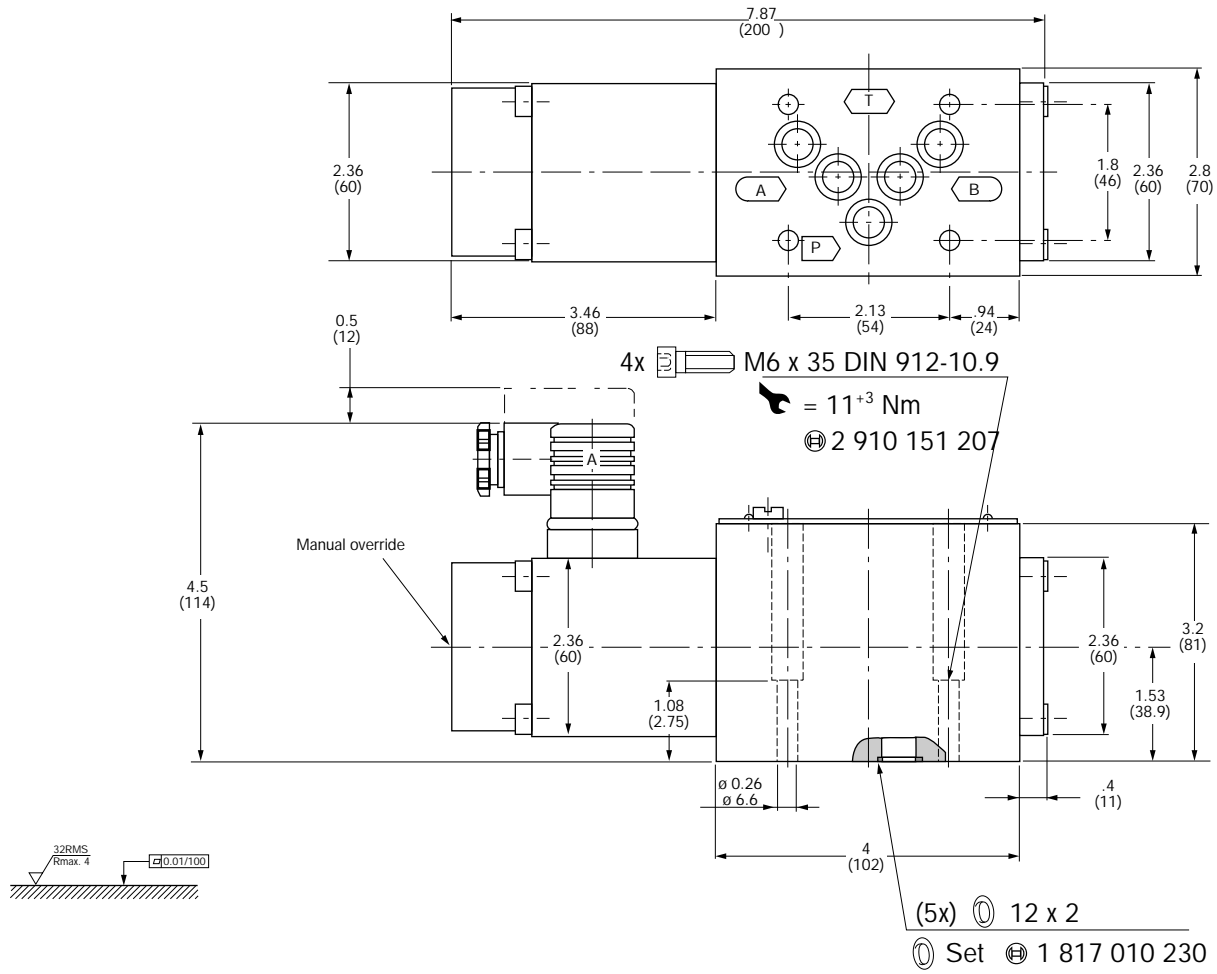
- 1) Zero adjustment
- 2) Gain adjustment

**Double flow rate**



$P_{\text{max}} = 250 \text{ bar}$

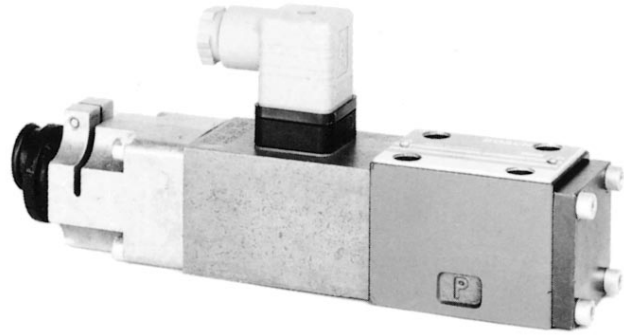
Dimensions



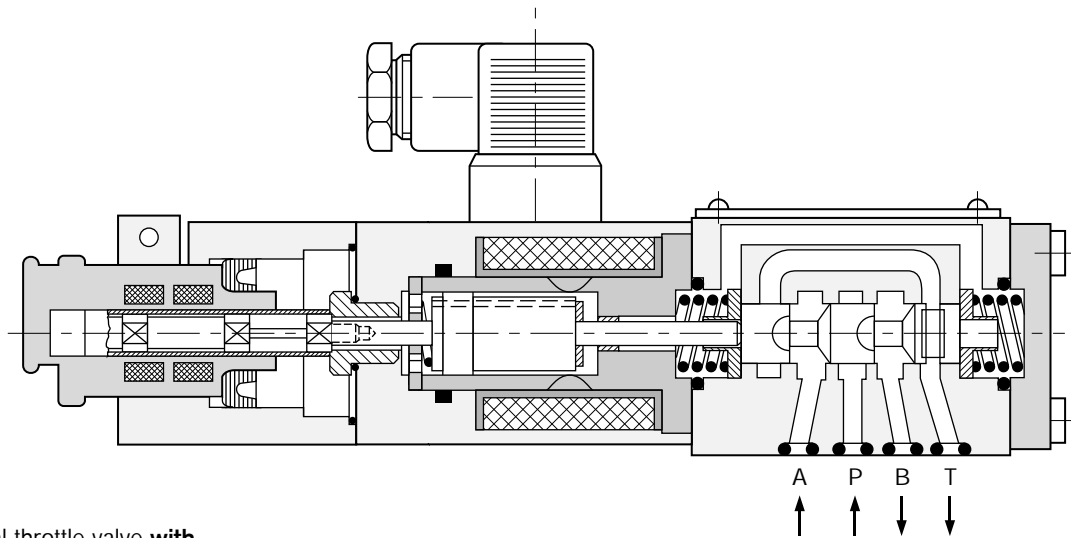
Dimensions of mounting hole  
configuration NG 10 ISO 4401  
see page 104

**Proportional throttle valve**


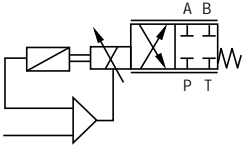

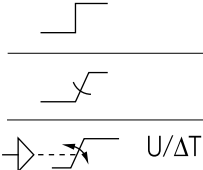
**NG 6**

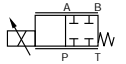


**Function**



Proportional throttle valve **with** position control

Symbol		$P_{max.}$	$Q$			
	A/W	PSI [bar]	GPM (l/min)	LBS [kg]	⊕	
	2.7/25	P, A, B: 4570(315) T:3625(250)	2.6 (10) 5.3 (20) 9 (35)	5(2.2)	<b>0 811 403 100</b> <b>0 811 403 101</b> <b>0 811 403 126</b>	
			$\Delta p = 116 \text{ PSI}$			
		Amplifier see Page 109	K	QV 45	0.5(0.2)	<b>0 811 405 098</b>
		K	QV 45-RGC 1	0.5 (0.2)	<b>0 811 405 103</b>	
		K	QV 45-RGC 3	0.7(0.3)	<b>B 830 303 389</b>	

Characteristics		
<b>General</b>		
Construction	Spool type valve	
Actuation	Proportional solenoid with position control	
Connection type	Subplate, mounting configuration NG 6 (ISO 4401)	
Mounting Position	optional	
Ambient temperature range	-4°...122°F (-20°...+50°C)	
<b>Hydraulic</b>		
Pressure medium	Hydraulic oil as per DIN 51524...535 Other fluids after prior consultation	
Viscosity, recommended max. permitted	100...465 SUS (20...100 C st) 60...3700 SUS (10...800 C st)	
Pressure medium temperature	-4°...176°F (-20°...+80°C)	
Filtration  In line with operational reliability and service life	Permissible con- tamination level	Achieved using filter β x = 75
	Class 8 (NAS 1638)	X = 10
	17/14 (ISO 4406)	
Nominal flow at Δp = 116 PSI	<b>2.5</b> (10) <b>5.3</b> (20) <b>9</b> GPM (35 l/min)	
Leakage/Metering notch    I <sub>m</sub> = 0 (Δp = 1450 PSI)	 ≤ 4.88 in <sup>3</sup> /min (80 cm <sup>3</sup> /min)	
Max. working pressure Port P, A, B Port T	4570 PSI (315 bar) 3625 PSI (250 bar)	
<b>Electrical</b>		
Duty cycle	100%	
Degree of protection 434/5	IP 65 as per DIN 40 050 and IEC 14	
Solenoid connector	Connector DIN 43 650/ISO 4400	
Position transducer connector	Special Connector	
Solenoid current	max. 2.7 A	
Coil resistance R <sub>20</sub>	3.0 Ω	
Power consumption	max. 25 W	
<b>Static/dynamic</b>		
Hysteresis	≤ 0.3%	
Range of inversion	≤ 0.2%	
Manufacturing tolerance Q <sub>max.</sub>	≈10%	
Response time 100% signal change	≈ 12 ms	

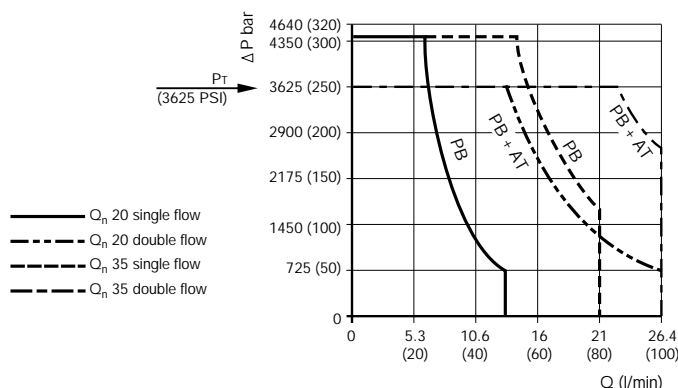
**Nominal flow**

This always refers to a pressure differential of Δp = 116 PSI at the throttle point. Where other pressure differentials are involved, flow is calculated according to the following formula:

$$Q_x = Q_{nom} \cdot \sqrt{\frac{\Delta p_x}{116}}$$

However, the **operating limits** must be observed. When the operating limits are exceeded, the ensuing flow forces lead to uncontrollable spool movements. **Pressure compensators** should be used to limit the pressure drop.

Characteristic values determined with proportional amplifier: QV 45

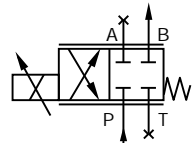
**Operating limits**



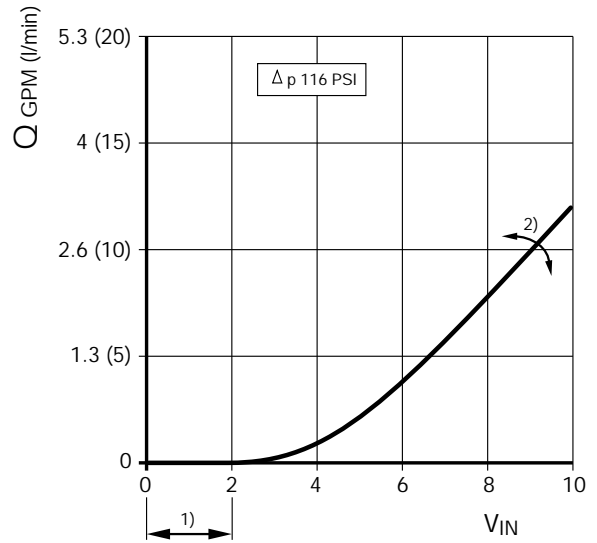
**Performance curves**

$v = 35 \text{ cSt}$

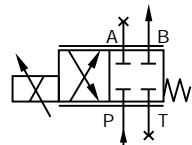
**$Q_{nom} = 10 \text{ l/min}$**



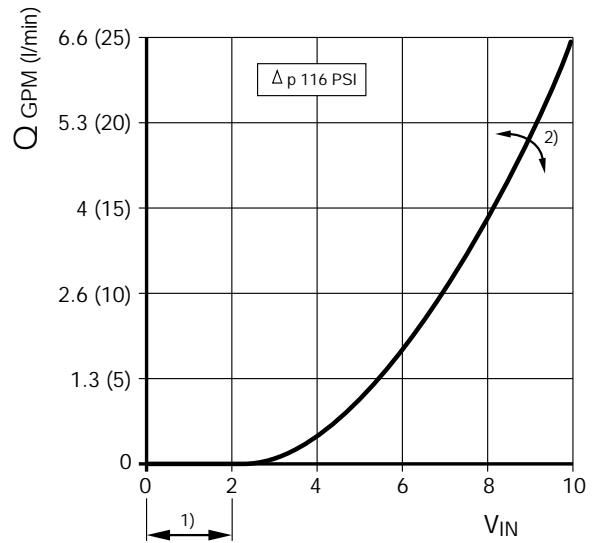
$p_{max} = (3625 \text{ psi}), T \text{ — } x$   
 $p_{max} = (4570 \text{ psi}), T \text{ - - } x$



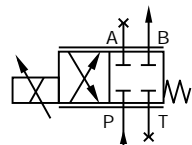
**$Q_{nom} = 20 \text{ l/min}$**



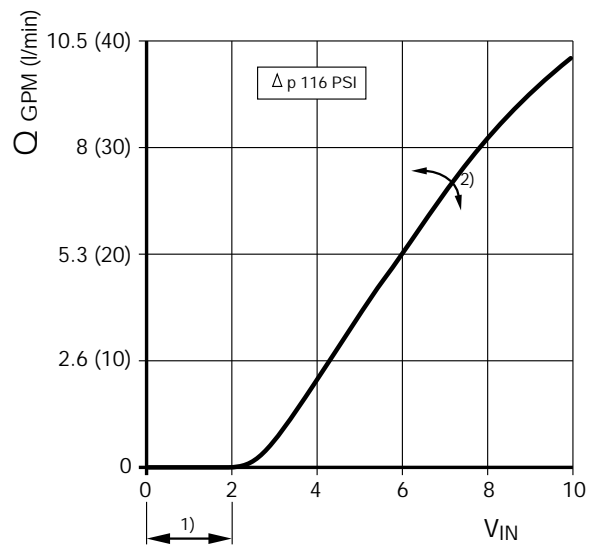
$p_{max} = (3625 \text{ psi}), T \text{ — } x$   
 $p_{max} = (4570 \text{ psi}), T \text{ - - } x$



**$Q_{nom} = 35 \text{ l/min}$**

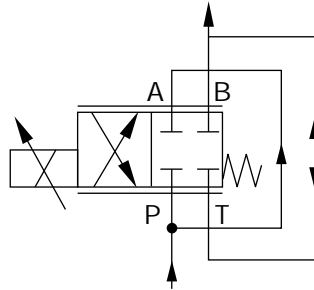


$p_{max} = (3625 \text{ psi}), T \text{ — } x$   
 $p_{max} = (4570 \text{ psi}), T \text{ - - } x$



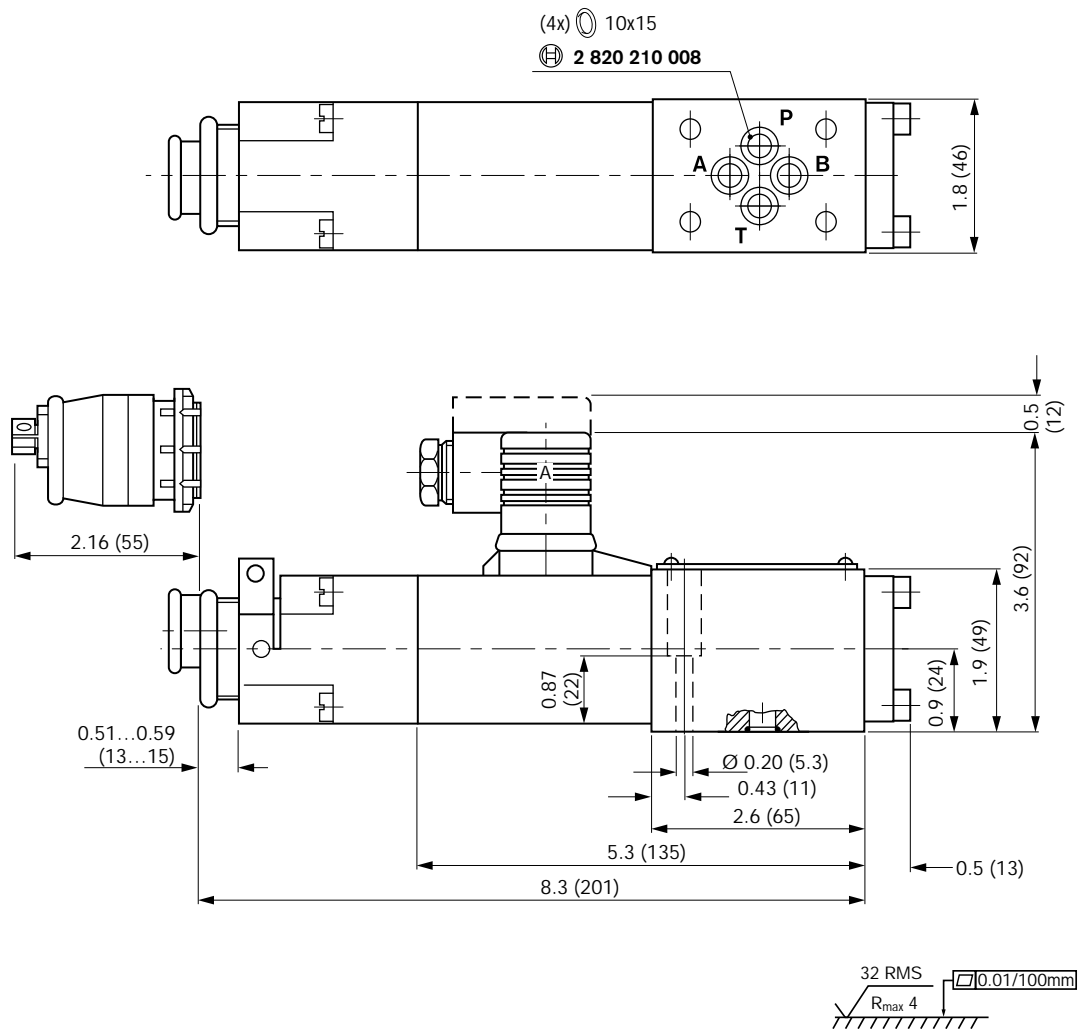
1) Zero adjustment  
 2) Gain adjustment

Doubled flow rate



$p_{max} = 3625 \text{ PSI}$

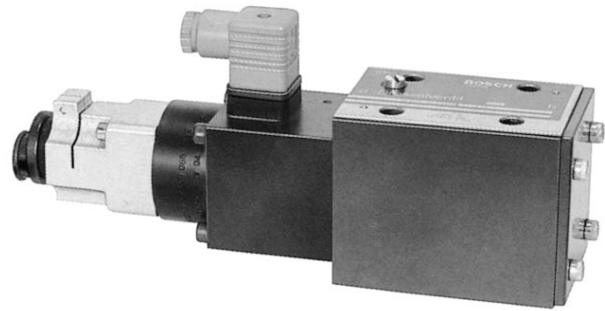
Dimensions



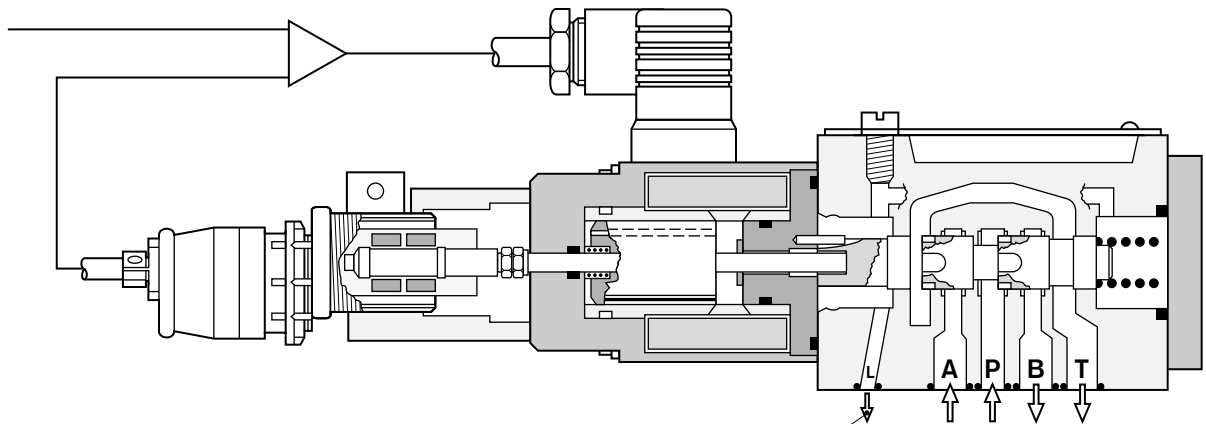
Dimensions of mounting  
 configuration NG 6 ISO 4401  
 see page 103

**Proportional throttle valve**

**NG 10**

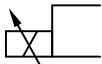

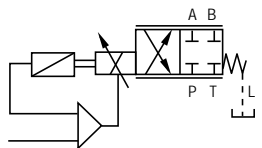
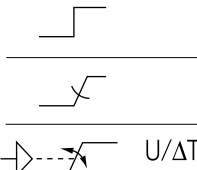




**Function**



Additional drain port  $p_{max} \leq 29$  PSI

Proportional throttle valve **with** position control

Symbol	 A/W	$P_{max}$ PSI [bar]	$Q$ GPM (l/min)	LBS [kg]	
	3.7/50	P, A, B: 4570 (315) T:4000 (280) L: $\leq 29$ (2)	5.3 (20)	5(2.2)	<b>0 811 403 003</b> <b>0 811 403 002</b> <b>0 811 403 001</b>
			10.6 (40)		
			21 (80)		
 U/ $\Delta$ T 	Amplifier see Page 109	K	QV 60	0.5(0.2)	<b>0 811 405 099</b>
		K	QV 60-RGC 1	0.5 (0.2)	<b>0 811 405 104</b>
		K	QV 60-RGC 3	0.7(0.3)	<b>B 830 303 390</b>

Characteristics		
<b>General</b>		
Construction	spool type valve	
Actuation	Proportional solenoid with position control	
Connection type	Subplate, mounting configuration NG 10 (ISO 4401) + L	
Mounting Position	optional	
Ambient temperature range	-4°...122°F (-20°...+50°C)	
<b>Hydraulic</b>		
Pressure medium	Hydraulic oil as per DIN 51524...535 Other fluids after prior consultation	
Viscosity, recommended max. permitted	100...465 SUS (20...100 C st) 60...3700 SUS (10...800 C st)	
Pressure medium temperature	-4°...176°F (-20°...+80°C)	
Filtration	Permissible contamination level	Achieved using filter β x= 75
In line with operational reliability and service life	Class 8 (NAS 1638)	X = 10
	17/14 (ISO 4406)	
Flow direction	See symbol	
Nominal flow ( at Δp = 116 PSI)	<b>5.3</b> (20) <b>10.6</b> (40) <b>21</b> GPM (80 l/min) (per flow path)	
Leakage/Metering notch I <sub>m</sub> = 0 (Δp = 1430 PSI)	 ≤ 4.88 in. <sup>3</sup> /min (80 cm <sup>3</sup> /min)	
Max. working pressure Port P, A, B Port T Port L	4570 PSI (315 bar) 3625 PSI (250 bar) 29 PSI (≤ 2 bar)	
<b>Electrical</b>		
Cyclic duration factor	100%	
Degree of protection	IP 65 as per DIN 40 050 and IEC 14 434/5	
Solenoid connector	Connector DIN 43 650/ISO 4400	
Position transducer connector	Special Connector	
Solenoid current	max. 3.7 A	
Coil resistance R <sub>20</sub>	2.5 Ω	
Power consumption	max. 50 W	
<b>Static/dynamic</b>		
Hysteresis	≤ 0.3%	
Range of inversion	≤ 0.2%	
Manufacturing tolerance	≈ 10%	
Response time 100% signal change 10% signal change	≈ 25 ms ≈ 15 ms	

**Nominal flow**

This always refers to a pressure differential of Δp = 116 PSI at the throttle point.

Where other pressure differentials are involved, flow is calculated according to the following formula:

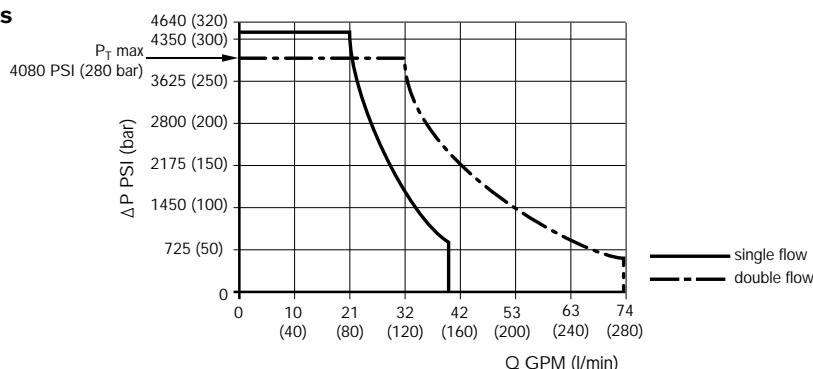
$$Q_x = Q_{nom} \cdot \sqrt{\frac{\Delta p_x}{116}}$$

However, the **operating limits**

must be observed. When the operating limits are exceeded, the ensuing flow forces lead to uncontrollable spool movements.

**Pressure compensators** should be used to limit the pressure drop.

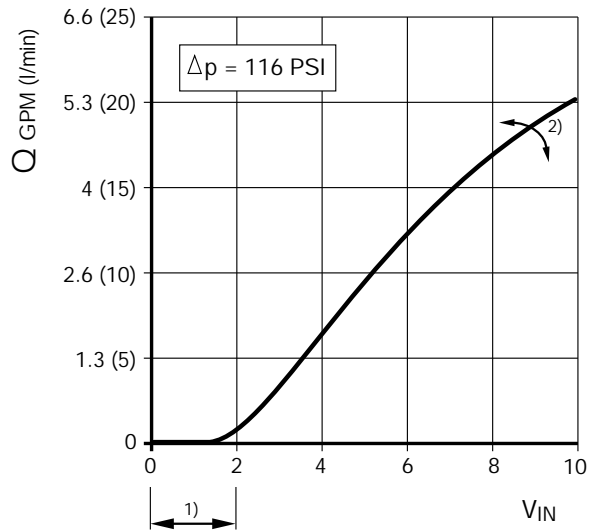
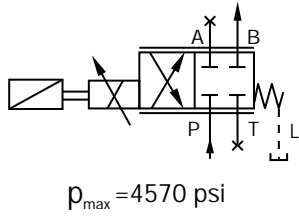
Characteristics values determined with proportional amplifier: QV 60

**Operating limits**

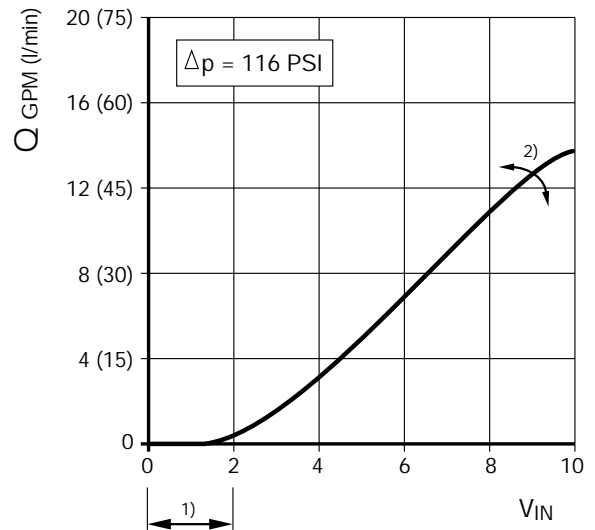
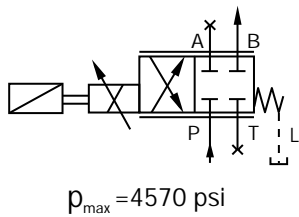
**Performance curves**

$\nu = 35 \text{ cSt}$

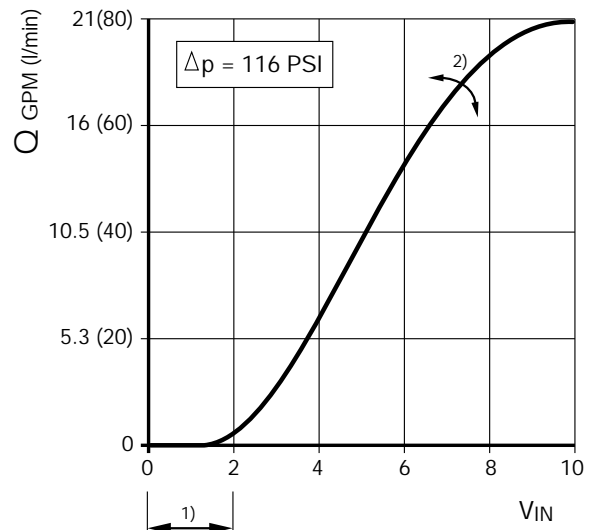
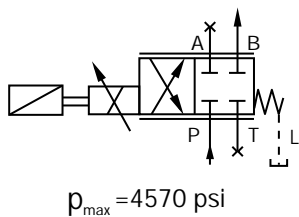
**$Q_{\text{nom}} = 20 \text{ l/min}$**



**$Q_{\text{nom}} = 40 \text{ l/min}$**

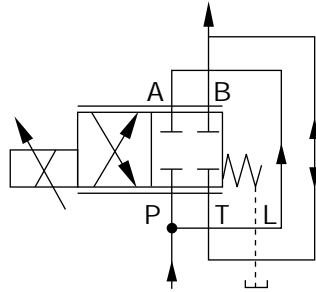


**$Q_{\text{nom}} = 80 \text{ l/min}$**



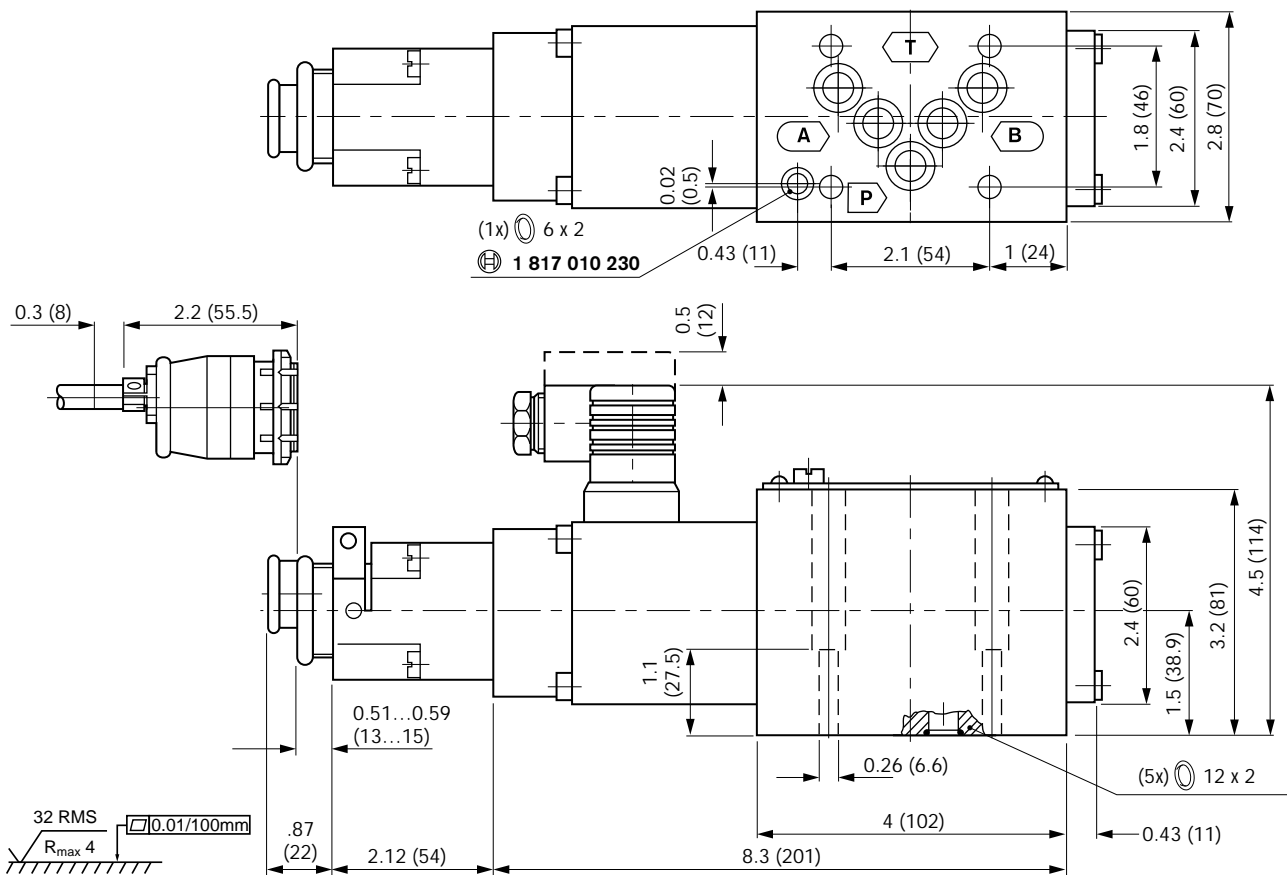
- 1) Zero adjustment
- 2) Gain adjustment

Doubled flow rate



$p_{max} = 4060 \text{ PSI}$

Dimensions



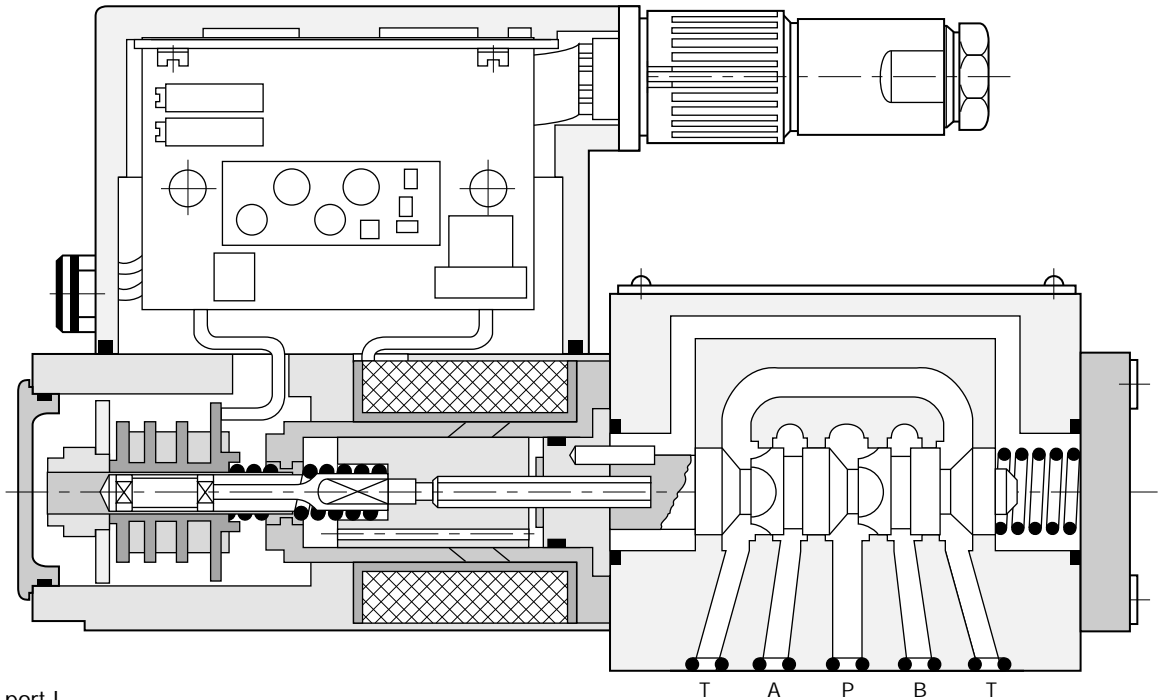
Dimensions of mounting configuration NG 10 ISO 4401 see page 104

**Note:** Additional "L" Port

**Proportional throttle valve with integrated amplifier**

**NG 10**

**Function**




without port L

Symbol		$P_{max.}$ PSI [bar]	Q GPM (l/min)	LBS [kg]	⊕
Int. El. 	24 VDC max 50 VA	P, A, B: 4570(315) T:2900(200)	13.2 (50) 21 (80)	15.7(7.1)	<b>0 811 404 751<sup>(1)</sup></b> <b>0 811 404 750</b>
				$\Delta p = 72.5 \text{ PSI (5 bar)}$	

7-Pin Connectors (not included with valve)

	Plug 7-pole Page 148	KS	<b>1 834 482 022</b>
		KS	<b>1 834-482 026</b>
	Metal MS Connector	MS	<b>1 834 482 023</b>
		MS	<b>1 834 482 024</b>
			<b>9 536 230 054</b>

Was <sup>(1)</sup> B 810 005 206

Characteristics		
<b>General</b>		
Construction	Spool valve, operated directly, without steel valve	
Actuation	Proportional solenoid with position control and with integrated amplifier	
Type of mounting	Subplate (ISO 4401)	
Assembly position	optional	
Ambient temperature range	-4°...122°F (-20°...+50°C)	
Vibration Test Condition	max. 25 g shaken in 3 dimensions (24 h)	
<b>Hydraulic</b>		
Pressure medium	Hydraulic oil as per DIN 51524...535 Other fluids subject to approval	
Viscosity, recommended max. permitted	100...465 SUS (20...100 cSt) 60...3700 SUS (10...800 cSt)	
Pressure medium temperature	-4°...176°F (-20°...+80°C)	
Filtration  In line with operational reliability and service life	Permissible contamination level	Achieved using filter $\beta_x = 75$
	Class 7 NAS 1638	$X = 5$
	17/14 (ISO 4406)	
Flow direction	See symbol	
Max. operating pressure (static)	Ports P, A, B 4570 PSI (315) bar Port T 3625 PSI (200) bar	
Nominal flow GPM (l/min) at $\Delta p = 5 \text{ bar}^*/ \text{Land}$	<b>13.2</b> (50) <b>21</b> (80)	
Operating limits	See diagram	
Leakage at 100 bar/ Metering notch	 $\leq 4.88 \text{ in.}^3/\text{min. (80 cm}^3/\text{min.)}$	
<b>Static/dynamic</b>		
Hysteresis	< 0.3%	
Range of inversion	< 0.2%	
Manufacturing tolerance	< $\pm 3\%$	
Response time 100% signal change 10% signal change	25 ms 10 ms	
Thermal drift	< 1%, at $\Delta T = 40^\circ\text{C}$	
<b>Electrical characteristics</b>	see page 59	

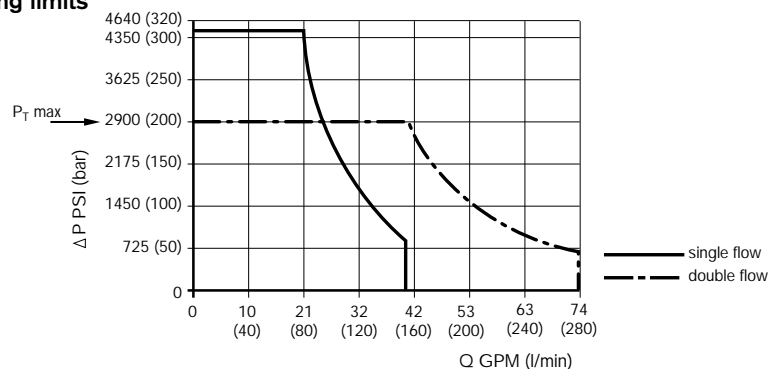
**\*Nominal flow**

This always refers to a pressure differential of  $\Delta p = 73 \text{ PSI}$  at the throttle point. Where other pressure differentials are involved, flow is calculated according to the following formula:

$$Q_x = Q_{\text{nom}} \cdot \sqrt{\frac{\Delta p_x}{72.5}}$$

However, the **operating limits** must be observed. When the operating limits are exceeded, the ensuing flow forces lead to uncontrollable spool movements.

**Pressure compensators** should be used to limit the pressure drop.

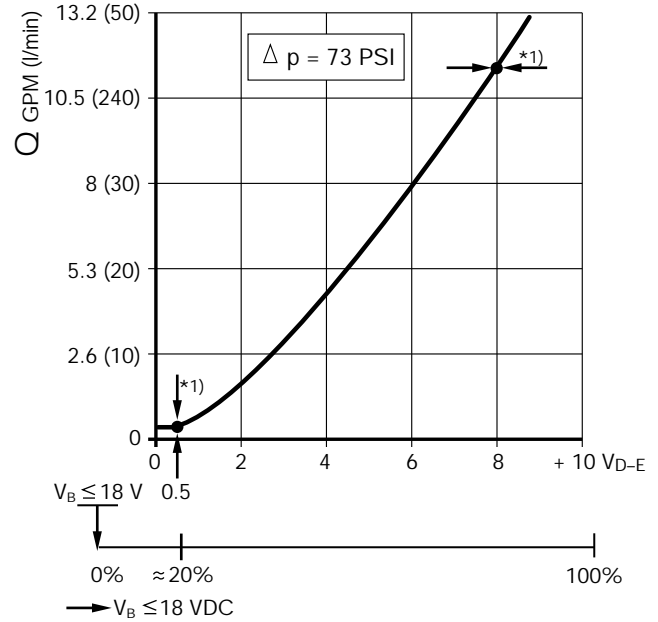
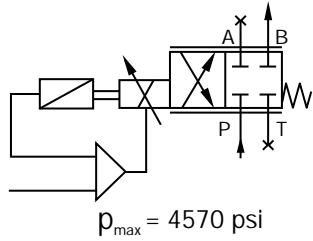
**Operating limits**



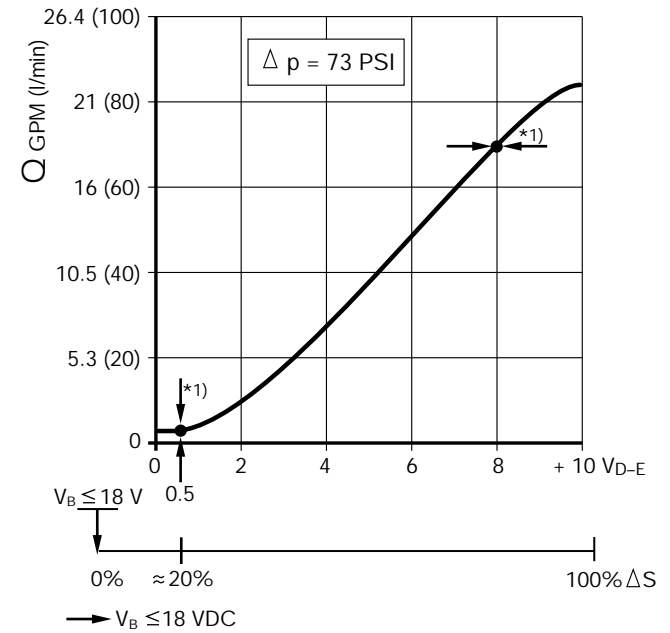
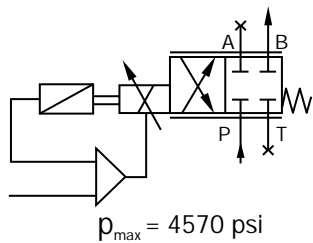
**Performance curves**

$v = 35 \text{ cSt}$

$Q_{\text{nom}} = 50 \text{ l/min}$

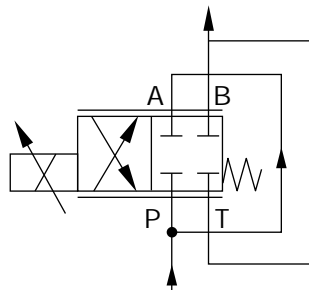


$Q_{\text{nom}} = 80 \text{ l/min}$



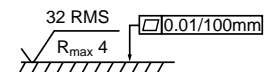
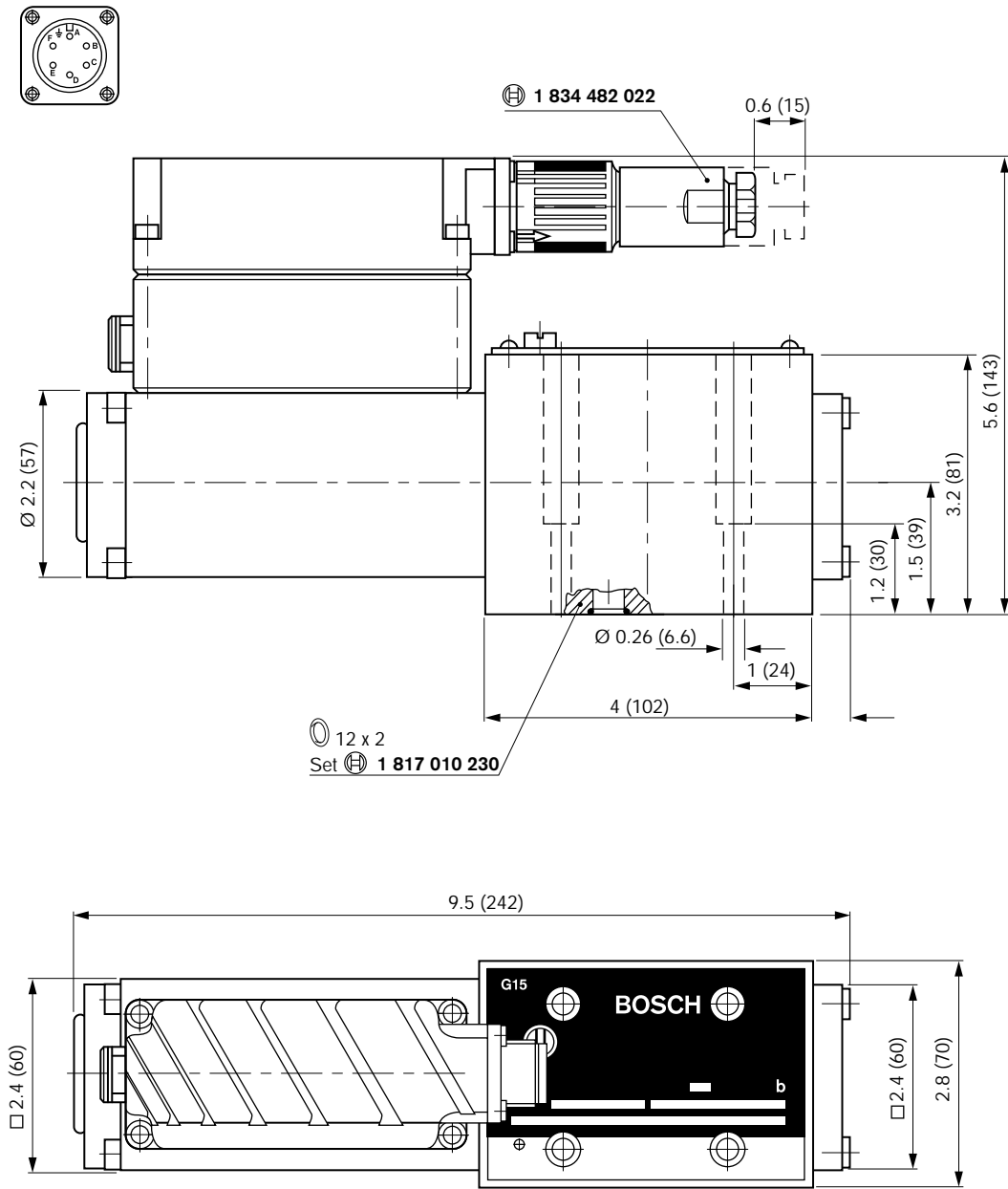
1) Factory setting  $\pm 3\%$

**Doubled flow rate**



$p_{\text{max}} = 2900 \text{ PSI}$

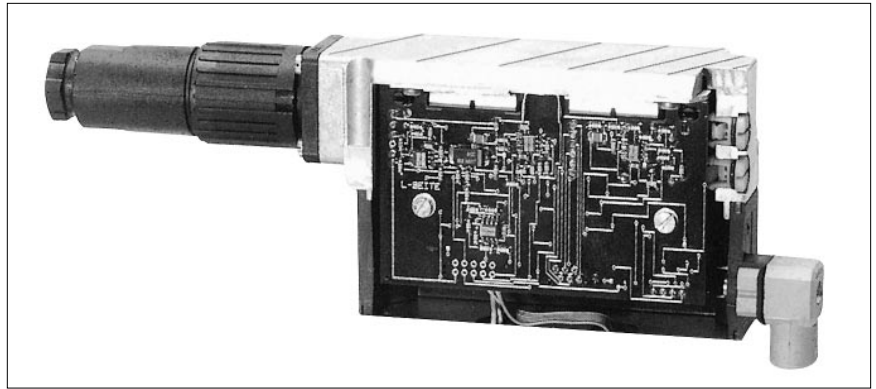
Dimensions



\*This dimension is 1.2" (ISO standard) previous versions were 1".

Dimensions of mounting configuration NG 10 ISO 4401 see page 104

**Electronics**

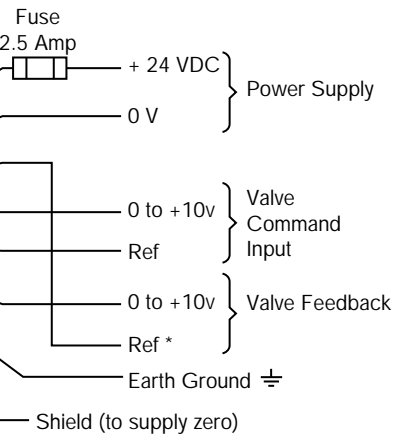
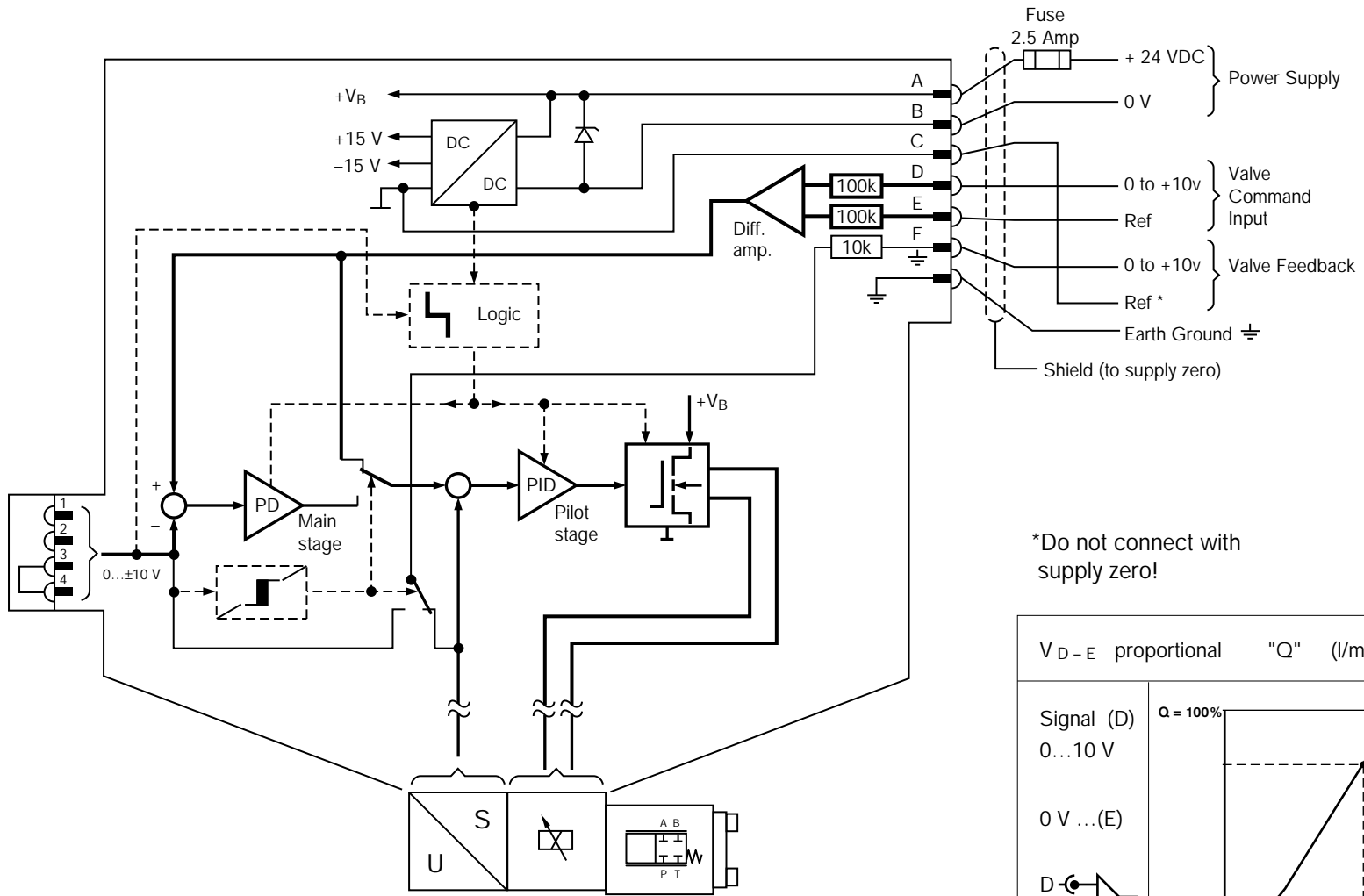


<b>Characteristics</b>			
<b>Electrical</b>			
Duty cycle	100%		
Degree of protection	IP 65 as per DIN 40 050 and IEC 14434/5		
Connection	7-pole plug, PG 11		
Voltage supply Terminal A: B: 0 V	24 VDC nominal min. 21 VDC/max. 40 VDC Ripple max. 2 VDC		
Power	max. 50 VA		
External fuse	2.5 A <sub>F</sub>		
Input signal Terminal D: V <sub>IN</sub> E: 0 V	0...+ 10 V Differential amplifier R <sub>i</sub> = 100 k Ω		
Maximum differential input voltage at 0 V	D → B E → B max. 18 VDC		
Test signal Terminal F: V <sub>test</sub> C: 0 V	0...+ 10 V proportional to main spool stroke R <sub>a</sub> = 10 k Ω		
Safety lead to ground	Connect only when supply transformer does not conform to VDE 0551		
Recommended cable	7 conductor shielded up to 65 Ft. : 18 AWG up to 130 Ft. : 16 AWG		
Q <sub>n</sub> Type (l/min)		13.2 (50)	21 (80)
Adjustment (Factory set) ± 3% (l/min) Δp = 73 PSI	V <sub>D-E</sub> 0.6 VDC	0.2 (0.8)	0.4 (1.5)
	V <sub>D-E</sub> 8 VDC	12 (45)	18.5 (70)

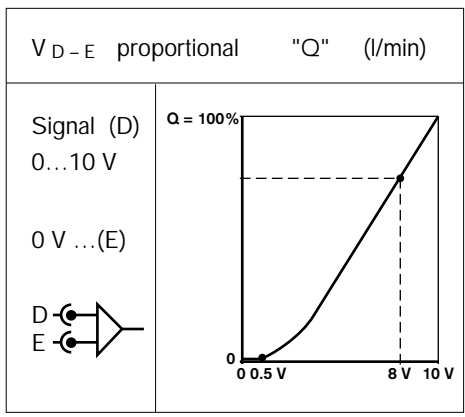
**Note:**

Supply voltage is 24 VDC nominal, below 18 VDC a rapid shut-off (similar to "Enable - OFF") is initiated internally.

Block diagram

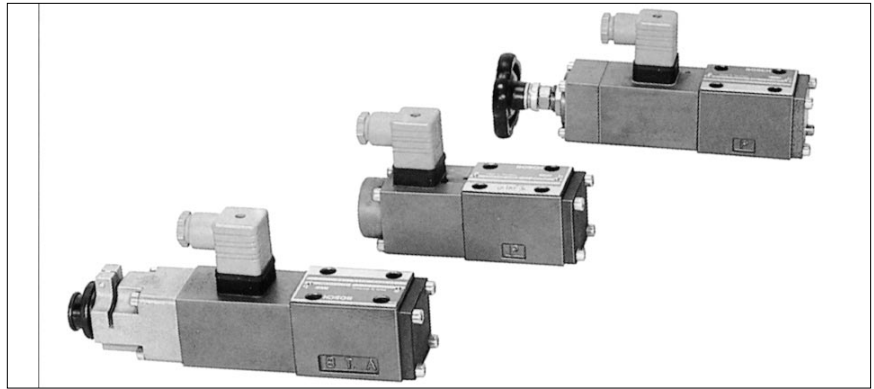


\*Do not connect with supply zero!

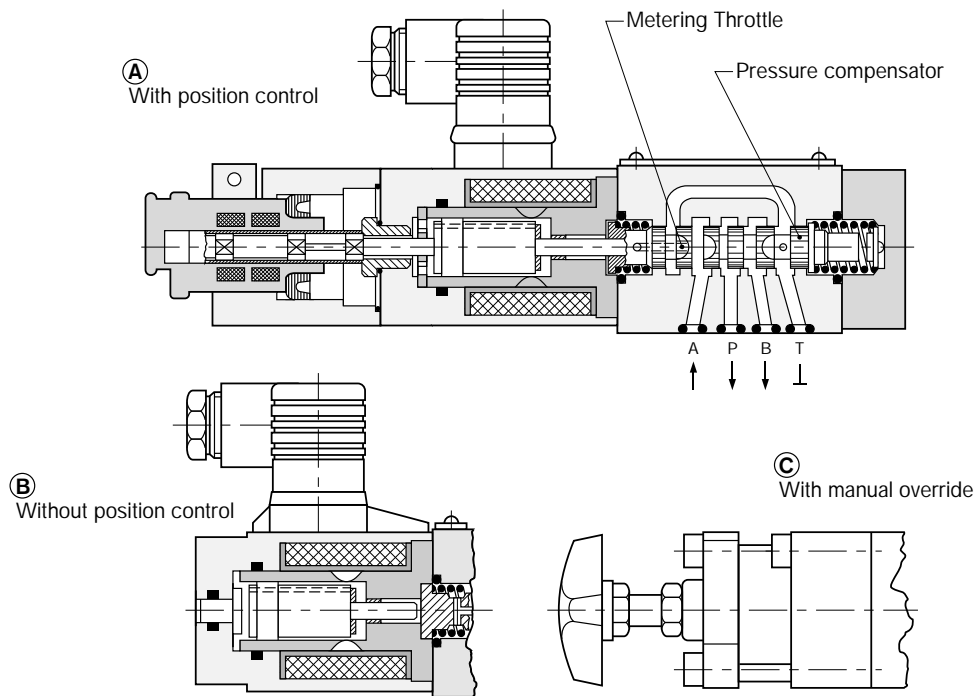


**Proportional flow control valve**

**NG6**

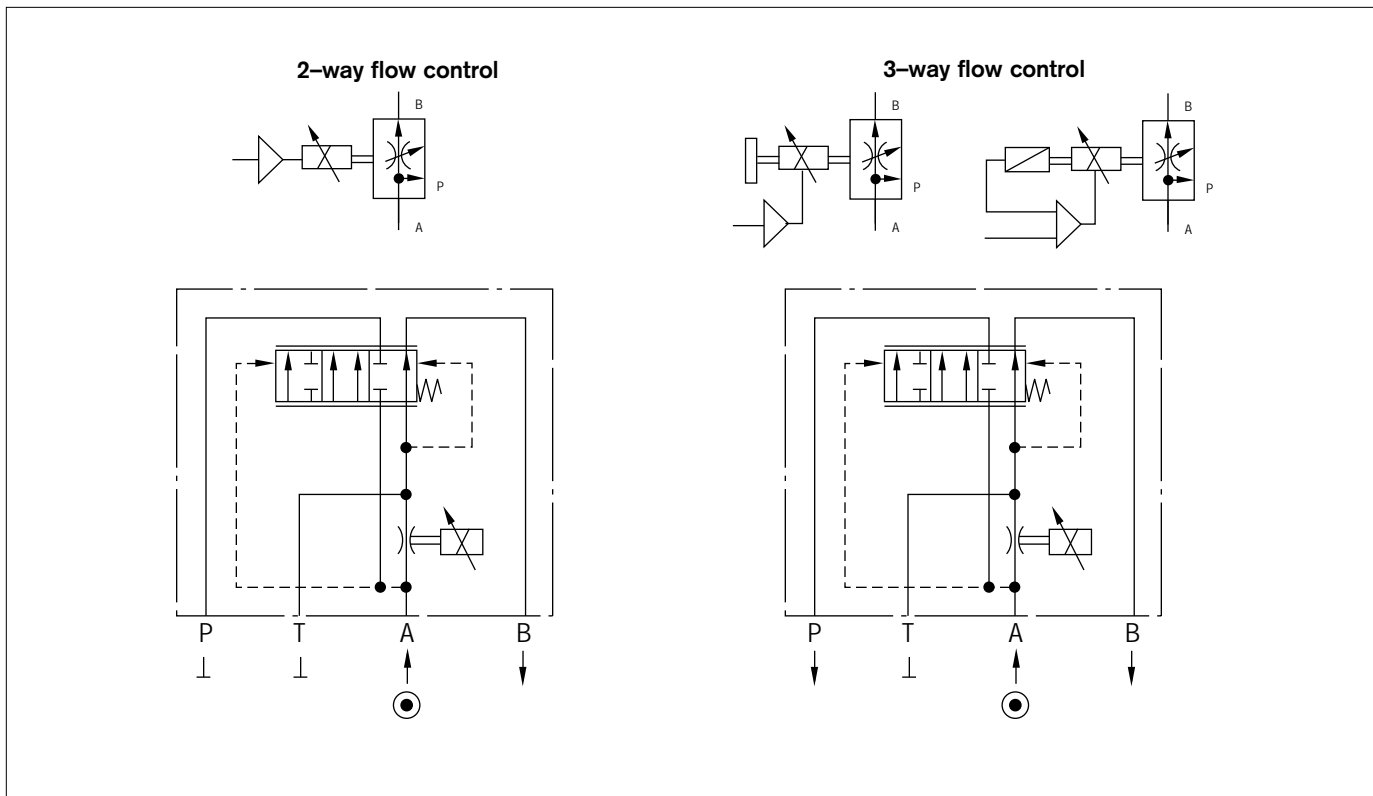


**Function**



Symbol	Basic Position	A/W	P <sub>max.</sub> PSI [bar]	Δp A-B PSI [bar]	GPM [l/min]		LBS [kg]	⊕
					Q <sub>A</sub> max	Q <sub>B</sub>		
	Normally closed	2.7/25	1450 (100)	58 (4)	–	0.7 (2.6)	5 (2.2)	<b>0 811 403 121*</b>
			3625 (250)	116 (8)	13 (50)	2.6 (10)		<b>0 811 403 117</b>
			116 (8)	13 (50)	9 (35)	<b>0 811 403 114</b>		
	Normally closed	2.5/25		58 (4)	8 (30)	2 (7.5)	4.4 (2.0)	<b>0 811 403 112</b>
			116 (8)	10.5 (40)	9 (35)	<b>0 811 403 113</b>		
	Normally open*		58 (4)	–	2 (7.5)	<b>0 811 403 118*</b>		
			116 (8)	–	9 (35)	<b>0 811 403 119*</b>		
	Normally closed			58 (4)	8 (30)	2 (7.5)	5 (2.2)	<b>0 811 403 115</b>
				116 (8)	10.5 (40)	9 (35)		<b>0 811 403 116</b>

\*To be used only as a 2-way flow control valve



**Flow Direction**

Normally closed proportional flow control valves may be used either as 2-way or 3-way flow control valves.

**2-way flow control valve**


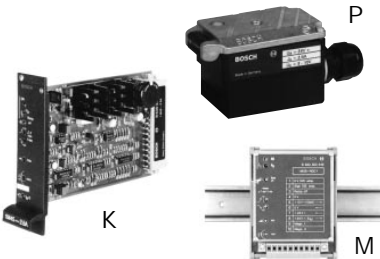
- A: Supply
- B: Discharge
- P: closed
- T: closed

**3-way flow control valve**

- A: Supply
- B: Discharge
- P: Residual flow, can be loaded up to 250 bar, or tank
- T: closed

Normally open flow control valves may only be used as 2-way flow control valves.

**Amplifier**

Symbol		Valve	Type	LBS [kg]			
	Amplifier see Page 108, 109	<b>B</b>	K	1 M 45 – 2.5 A	0.7 (0.3)	<b>0 811 405 079</b>	
			P	AS2.5 – V	0.33 (0.15)	<b>0 811 405 143</b>	
			Box	1 CH./2.5 A	1.1 (0.5)	<b>0 811 405 091</b>	
		<b>C</b>		+	25 P	0.5 (0.2)	<b>1 834 484 185</b>
				M	1 M 25 – RGC 1	0.5 (0.2)	<b>1 811 405 127</b>
				<b>A</b>	K	QV 45	0.5 (0.2)
		K	QV 45 – RGC 1		0.5 (0.2)	<b>0 811 405 103</b>	
		K	QV 45 – RGC 3		0.7 (0.3)	<b>B 830 303 389</b>	

<b>Characteristics</b>				
<b>General</b>				
Construction	Spool type valve with integrated pressure compensator			
Actuation	Proportional solenoid with and without position control			
Connection type	Subplate, mounting configuration NG 6 (ISO 4401)			
Mounting Position	optional			
Ambient temperature range	-4°...122°F (-20°...+50°C)			
<b>Hydraulic</b>				
Pressure medium	Hydraulic oil as perDIN 51524...535 Other fluids after prior consultation			
Viscosity, recommended max. permitted	100...465 SUS (20...100 cSt) 60...3700 SUS (10...800 cSt)			
Pressure medium temperature	-4°...176°F (-20°...+80°C)			
Filtration  In line with operational reliability and service life	Permissible contamination level		Achieved using filter $\beta_x = 75$	
	Class 8 (NAS 1638)		X = 10	
	17/14 (ISO 4406)			
Flow direction	See symbol			
Nominal flow GPM (l/min) Supply	-	8 (30)	8 (30)	9 (35)
	Controlled	<b>0.7</b> (2.6)	<b>2</b> (7.5)	<b>2.6</b> (10)
Controlled			<b>2.6</b> (10)	<b>9</b> (35)
$Q_{min.}$ controlled (in <sup>3</sup> /min)*	0.61	-	2.4	3
Max. working pressure Port A, B Port T Port P	3625 (250 bar) or 1450 (100 bar) plugged plugged or 3625 (250 bar) residual flow			
Min. pressure drop A → B	$Q_{nom.} = 2.6$ and $7.5$ l/min: 58...87 PSI (4...6 bar) $Q_{nom.} = 10$ and $35$ l/min: 145...203 PSI (10...14 bar)			
<b>Electrical</b>				
Duty cycle	100%			
Environmental protection	IP 65 as per DIN 40 050 and IEC 14 434/5			
Solenoid connector	Connector DIN 43 650/ISO 4400			
Position transducer connector	Special connector			
	<b>without position control</b>		<b>with position control</b>	
Solenoid current	max. 2.5 A		max. 2.7 A	
Coil resistance $R_{20}$	2.5 $\Omega$		2.7 $\Omega$	
Power consumption	25 W		25 W	
<b>Static/dynamic</b>				
Hysteresis	$\leq \pm 2.5\%$		$\leq 1\%$	
Range of inversion	$\leq \pm 1.5\%$		$\leq 0.5\%$	
Manufacturing tolerance $Q_{max.}$	$\approx 20\%$		$\approx 5\%$	
Response time 100%/ 10% signal change	70/-ms		35/25 ms	
Response time with max. load change	$\leq 30$ ms		$\leq 30$ ms	

\* only for position controlled valves

Characteristic values determined with proportional amplifiers

Valve with position control: QV 45

Valve without position control: 1 M 45- 2.5 A

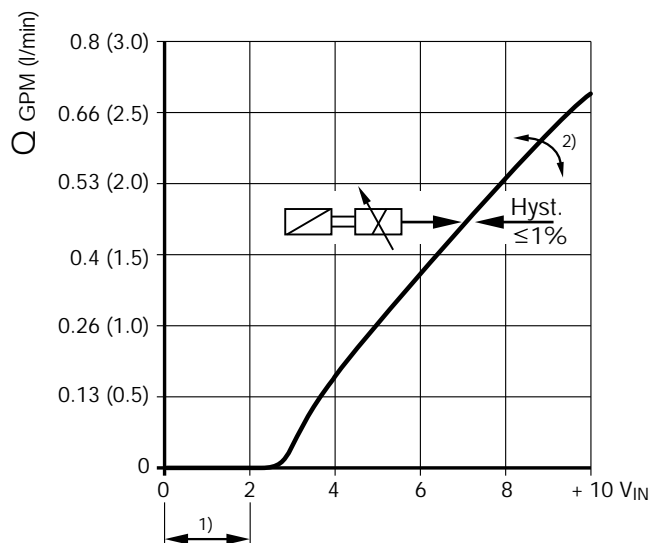
**Performance curves**

v = 35 cSt

**Q<sub>nom</sub> = 0.7 GPM 2.6 (l/min)**

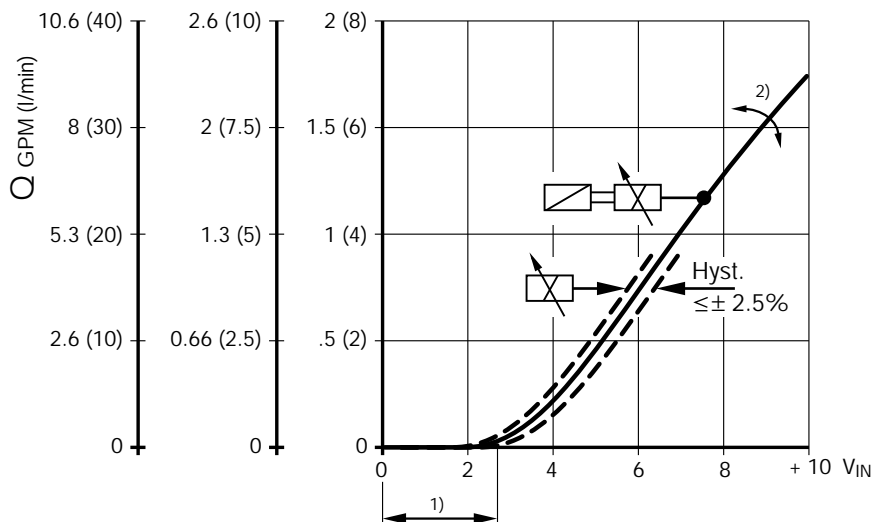
**p<sub>max</sub> = 1450 PSI (100 bar)**

Special version for very low flow rates



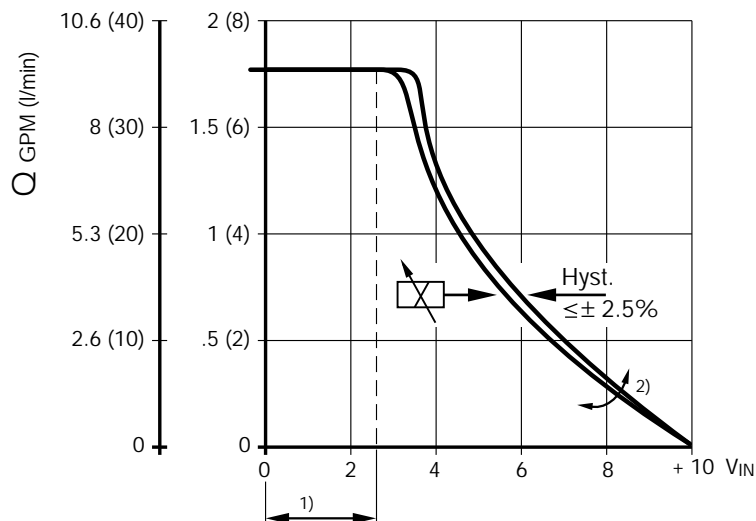
**Q<sub>nom</sub> = 2 (7.5), 2.6 (10), 9 (35) GPM (l/min)**

Normally closed



**Q<sub>nom</sub> = 2 (7.5), 9 (35) GPM (l/min)**

Normally open

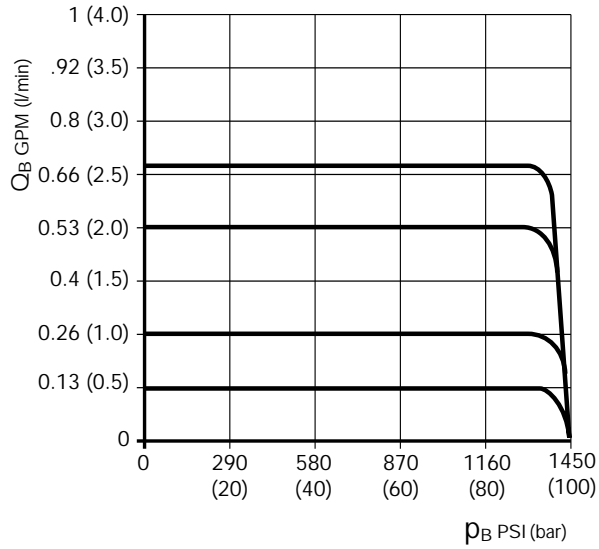
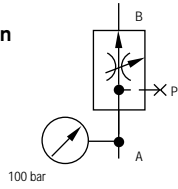


- 1) Zero adjustment
- 2) Gain adjustment

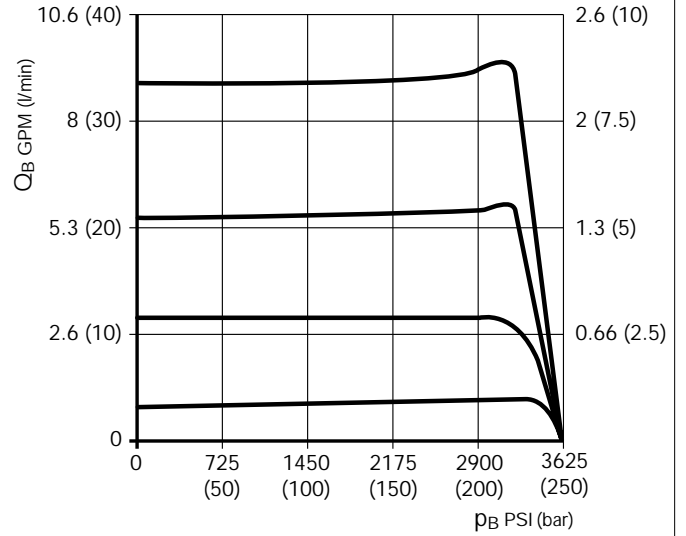
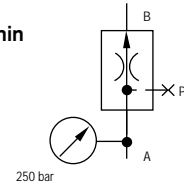


**2-way flow control**

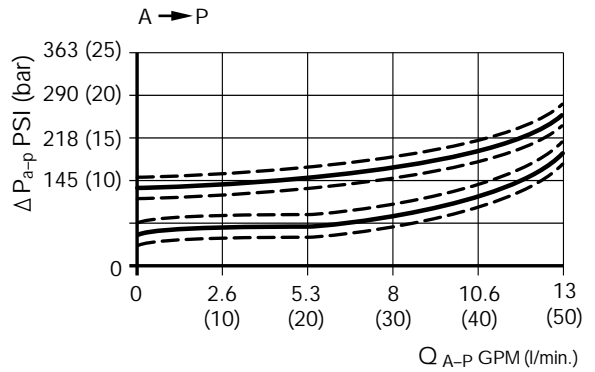
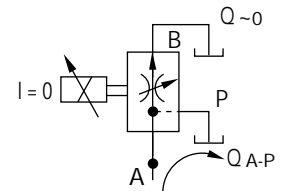
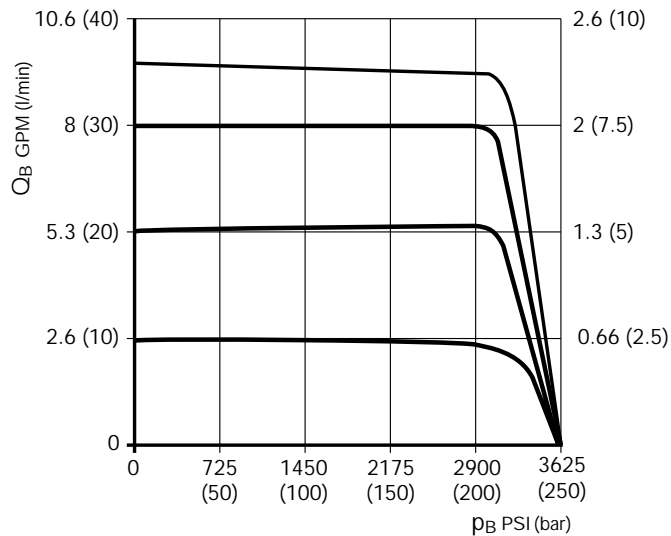
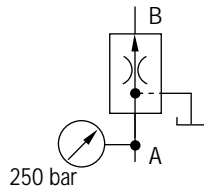
$Q_{nom} = 2.6 \text{ l/min}$



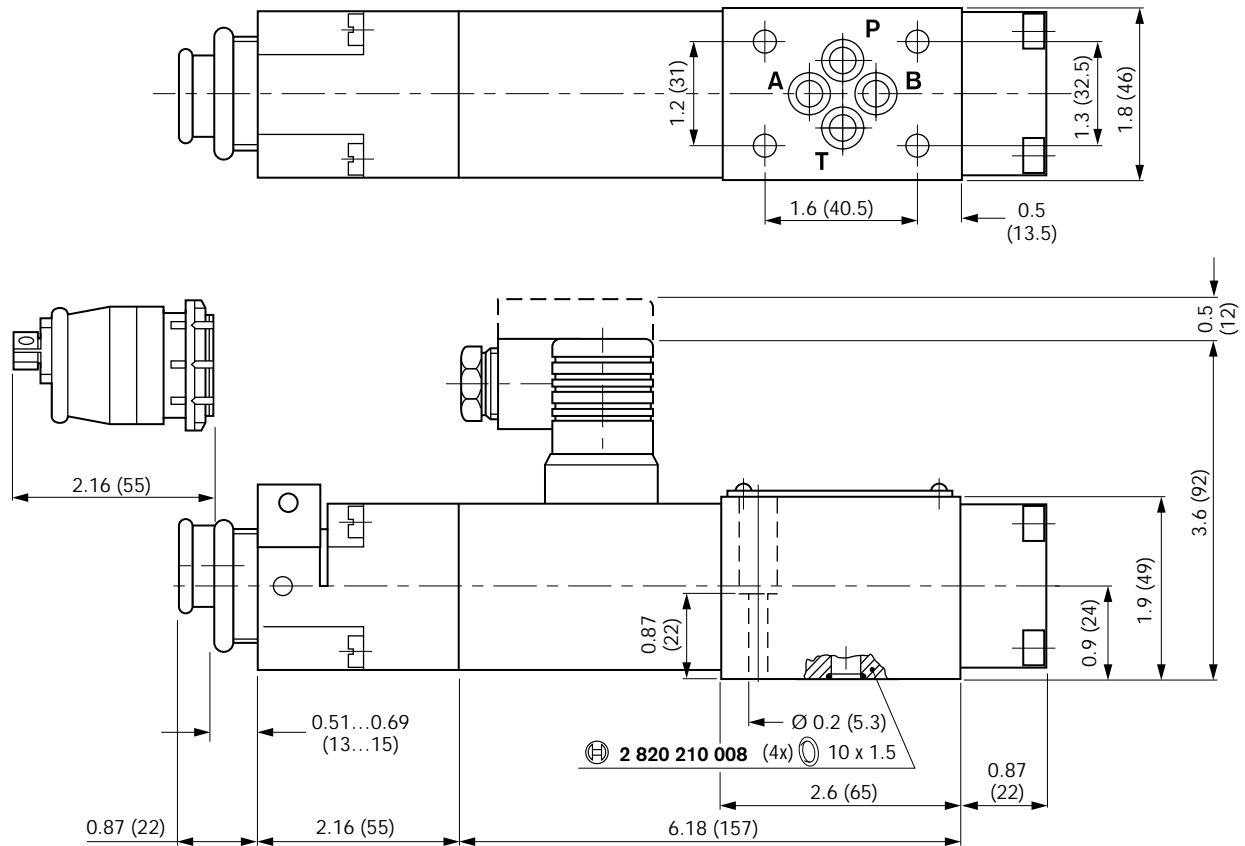
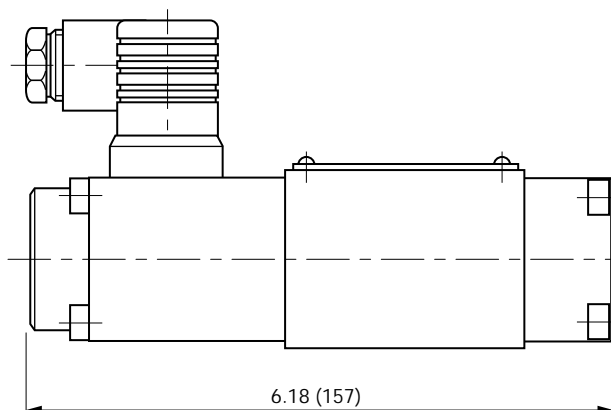
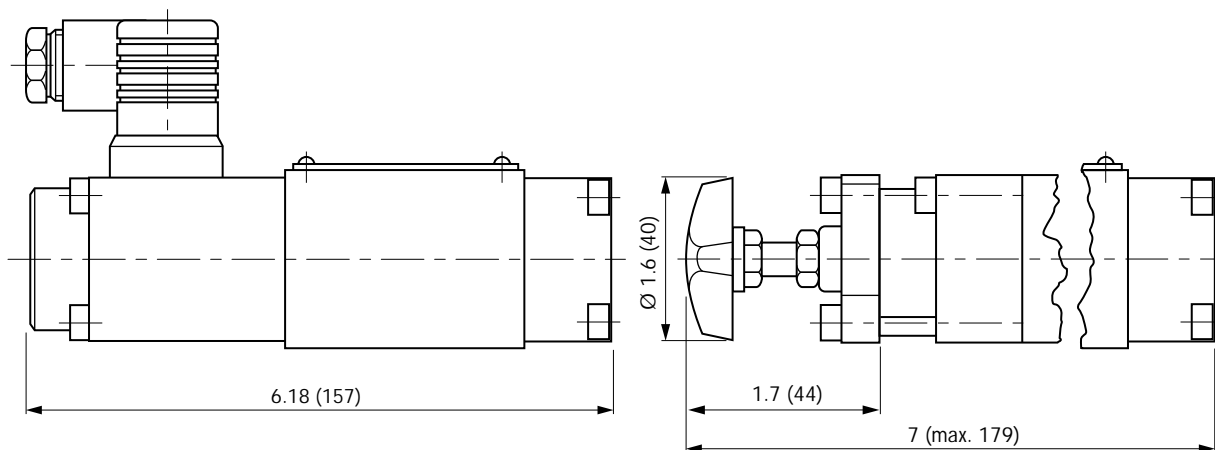
$Q_{nom} = 7.5, 10, 35 \text{ l/min}$



**3-way flow control**



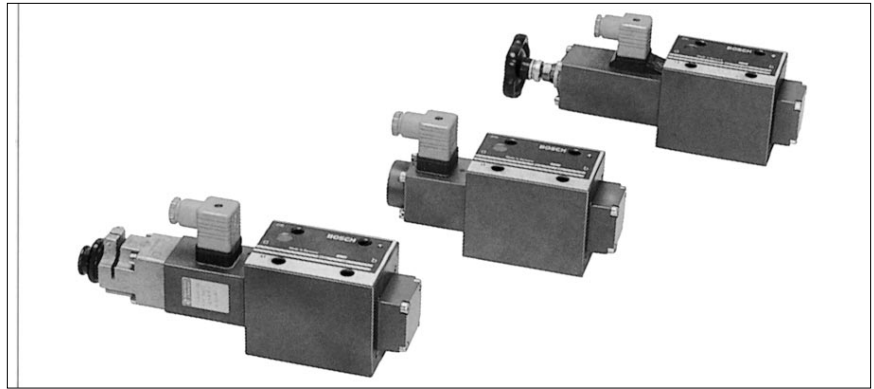
## Dimensions

**A** with position control**B** without position control**C** with manual override

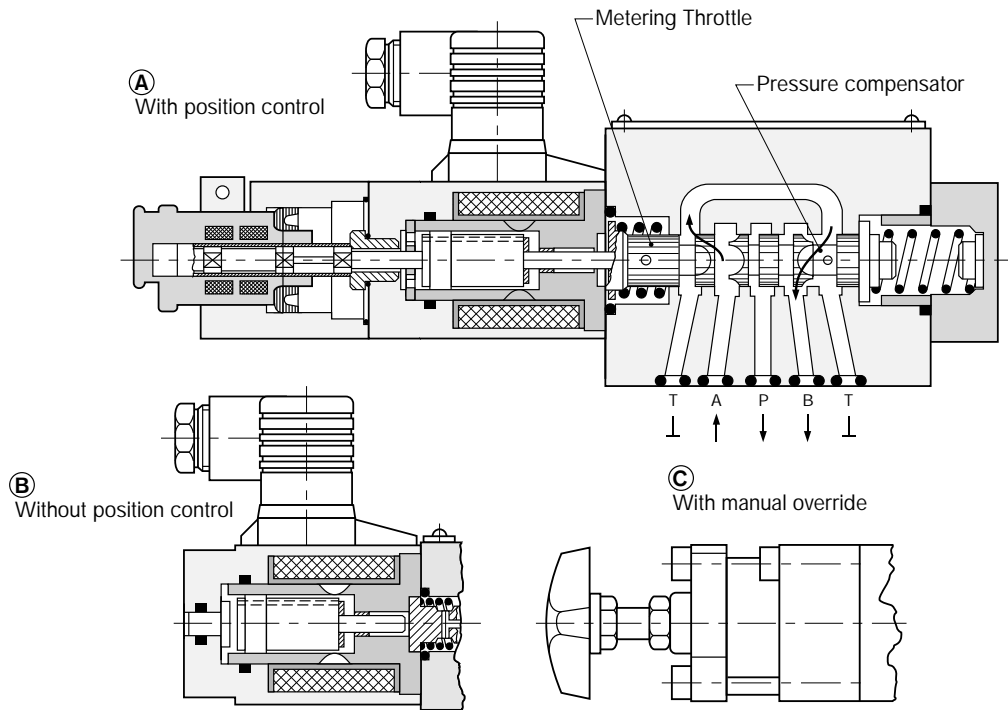
Dimensions of mounting  
configuration NG 6 ISO 4401  
see page 103



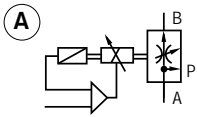
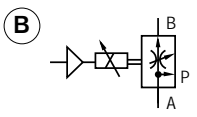
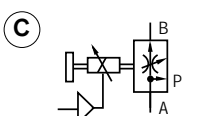
**Proportional flow control valve**

**NG 10**

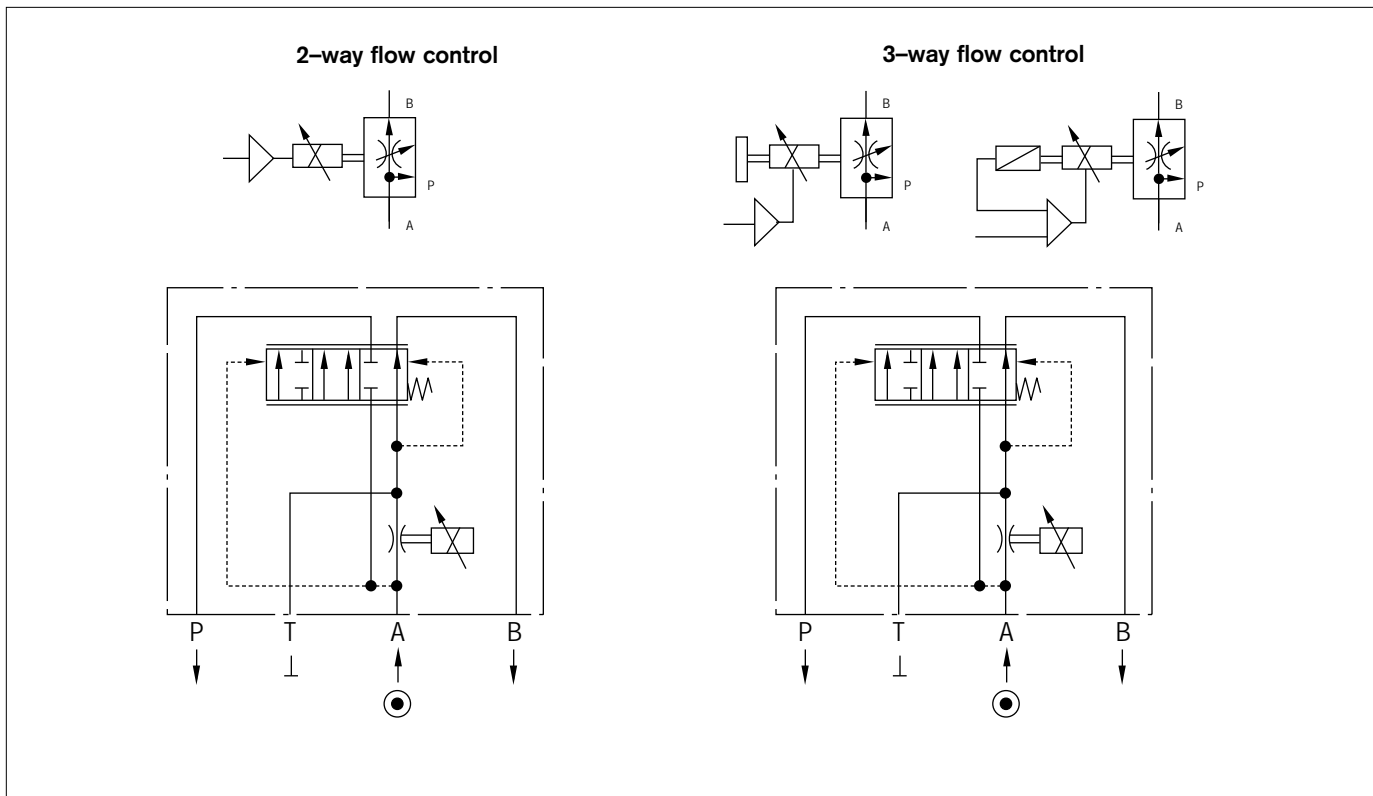


**Function**



Symbol	Basic Position	 A/W	$P_{max.}$ PSI [bar]	$\Delta p$ A-B PSI [bar]	GPM [l/min]		LBS [kg]	
					$Q_A$ max	$Q_B$		
	Normally closed	2.5/25	3625 (250)	116 (8)	26.4 (100)	21 (80)	13.3 (6)	<b>0811 403 012</b>
	Normally closed				17 (65)	16 (60)	12.8 (5.8)	<b>0811 403 010</b>
	Normally open*				-	21 (80)		<b>0811 403 013*</b>
	Normally closed				17 (65)	16 (60)	13.3 (6)	<b>0811 403 011</b>

\*To be used only as a 2-way flow control valve



**Flow Direction**

Normally closed proportional flow control valves position may be used either as 2-way or 3-way flow control valves.

**2-way flow control valve**


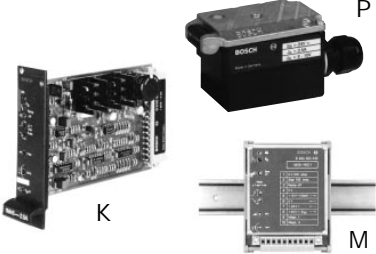



- A: Supply
- B: Discharge
- P: closed
- T: closed



**3-way flow control valve**

- A: Supply
- B: Discharge
- P: Residual flow, can be loaded up to 3625 PSI (250 bar) or tank
- T: closed

Flow control valves with open basic position may only be used as 2-way flow control valves.

**Amplifier**

Symbol		Valve	Type	LBS [kg]			
	Amplifier see Page 108, 109		K	1 M 45 – 2.5 A	0.7 (0.3)	<b>0 811 405 079</b>	
			P	AS2.5 – V	0.33 (0.15)	<b>0 811 405 143</b>	
			Box	1 CH./2.5 A	1.1 (0.5)	<b>0 811 405 091</b>	
				M	25 P	0.5 (0.2)	<b>1 834 484 185</b>
				M	1 M 25 – RGC 1	0.5 (0.2)	<b>0 811 405 127</b>
				K	QV 45	0.5 (0.2)	<b>0 811 405 098</b>
				K	QV 45 –RGC 1	0.5 (0.2)	<b>0 811 405 103</b>
				K	QV 45 – RGC 3	0.7 (0.3)	<b>B 830 303 389</b>

<b>Characteristics</b>		
<b>General</b>		
Construction	Spool type valve with integrated pressure compensator	
Actuation	Proportional solenoid with and without position control	
Connection type	Subplate, mounting configuration NG 10 (ISO 4401)	
Mounting position	optional	
Ambient temperature range	-4° ... 122°F (-20° ... +50°C)	
<b>Hydraulic</b>		
Pressure medium	Hydraulic oil as per DIN 51524...535 Other fluids after prior consultation	
Viscosity, recommended max. permitted	100...465 SUS (20...100 C ST) 60...3700 SUS (10...800 C ST)	
Pressure medium temperature	-4° ... 176°F (-20° ... +80°C)	
Filtration  In line with operational reliability and service life	Permissible contamination level	Achieved using filter $\beta_x = 75$
	Class 8 (NAS 1638)	X = 10
	17/14 (ISO 4406)	
Flow direction	See symbol	
Nominal flow GPM (l/min)	 17 (65)	 21 (80)
Max. working pressure Port A, B Port T Port P	3625 PSI (250 bar) plugged plugged or 3625 (250 bar) residual flow	
Min. pressure drop	116 PSI (8 bar)	
<b>Electrical</b>		
Cyclic duration factor	100%	
Degree of protection	IP 65 as per DIN 40 050 and IEC 14 434/5	
Solenoid connector	Connector DIN 43 650/ISO 4400	
Position transducer connector	Special connector	
	<b>without position control</b>	<b>with position control</b>
Solenoid current	max. 2.5 A	max. 2.7 A
Coil resistance $R_{20}$	2.5 $\Omega$	2.7 $\Omega$
Power consumption	25 W	25 W
<b>Static/dynamic</b>		
Hysteresis	$\leq \pm 2.5\%$	$\leq 1\%$
Range of inversion	$\leq \pm 1.5\%$	$\leq 0.5\%$
Manufacturing tolerance $Q_{max.}$	$\approx 20\%$	$\approx 5\%$
Response time 100%/ 10% signal change	70/-ms	35/25 ms
Response time with max. load change	$\leq 45$ ms	$\leq 45$ ms

Characteristic values determined with proportional amplifiers

Valve with position control: QV 45

Valve without position control: 1 M 45- 2.5 A

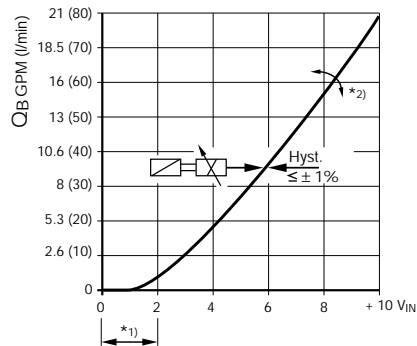
**Performance curves**

$v = 35 \text{ cSt}$

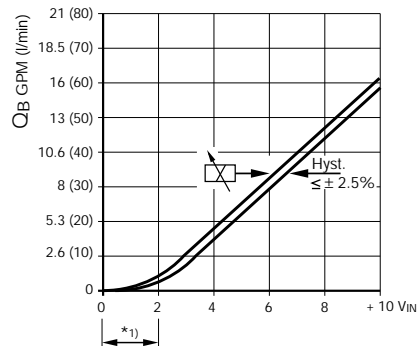
$Q_{nom} = 80 \text{ (l/min)}$

Normally closed

with position control

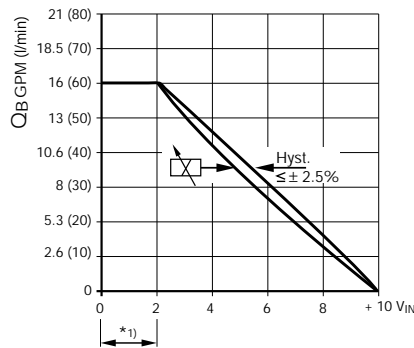


without position control



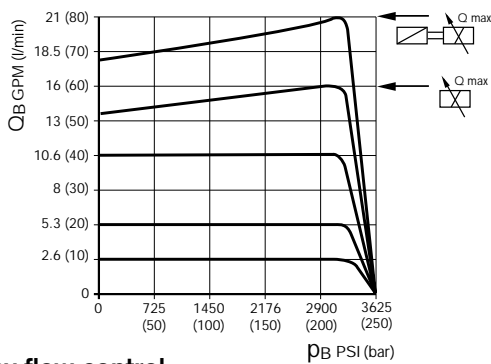
$Q_{nom} = 80 \text{ (l/min)}$

Normally open

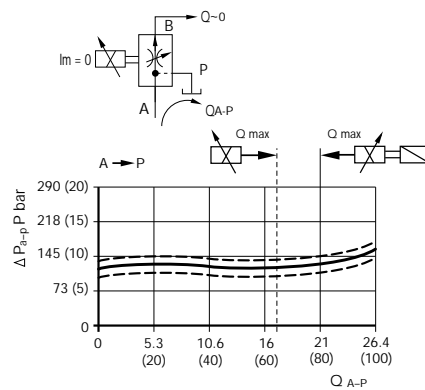
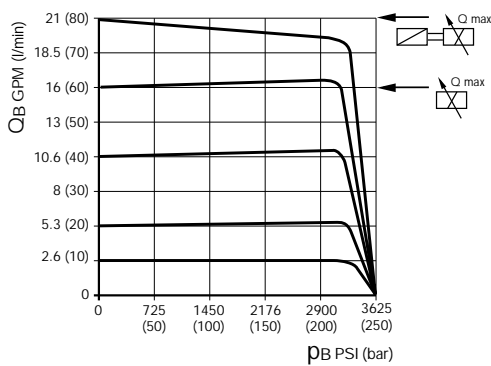


- 1) Zero adjustment
- 2) Gain adjustment

**2-way flow control**

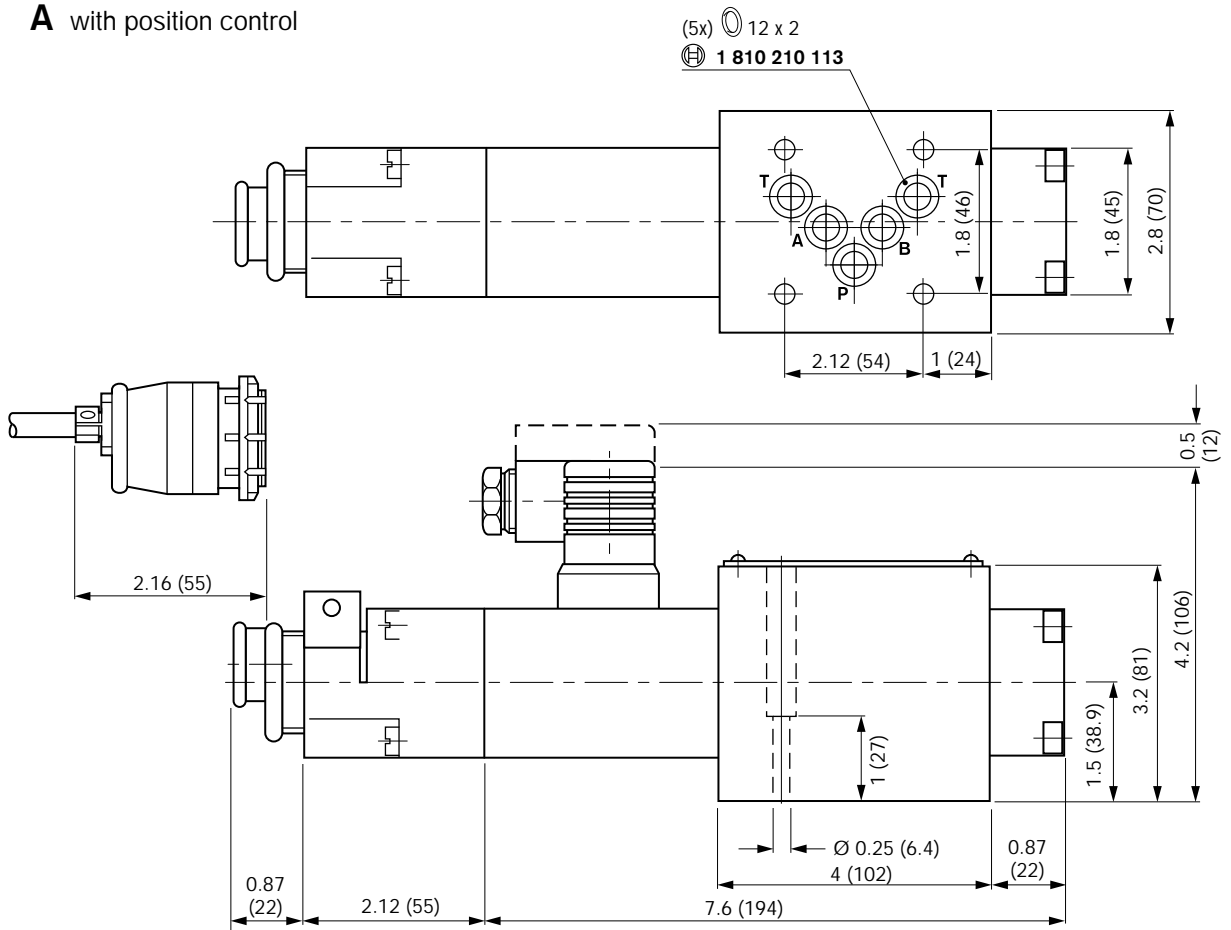


**3-way flow control**

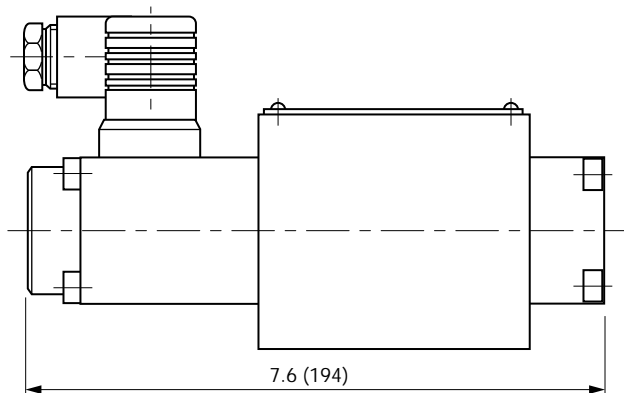


**Dimensions**

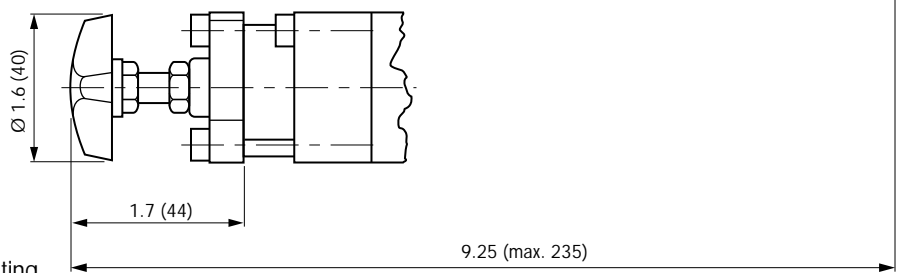
**A with position control**



**B without position control**



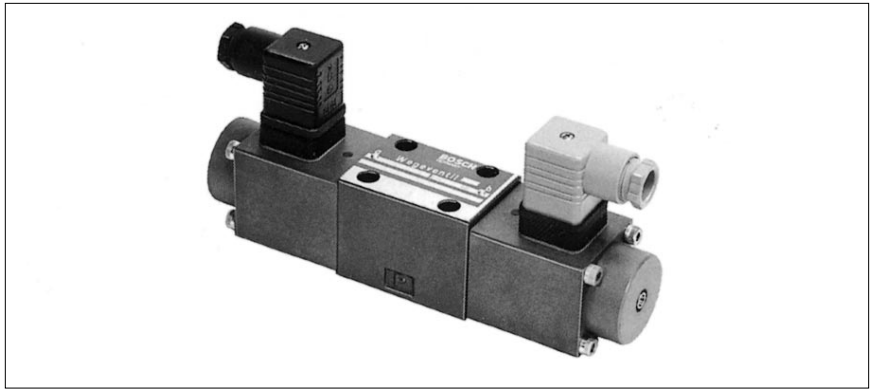
**C with manual override**



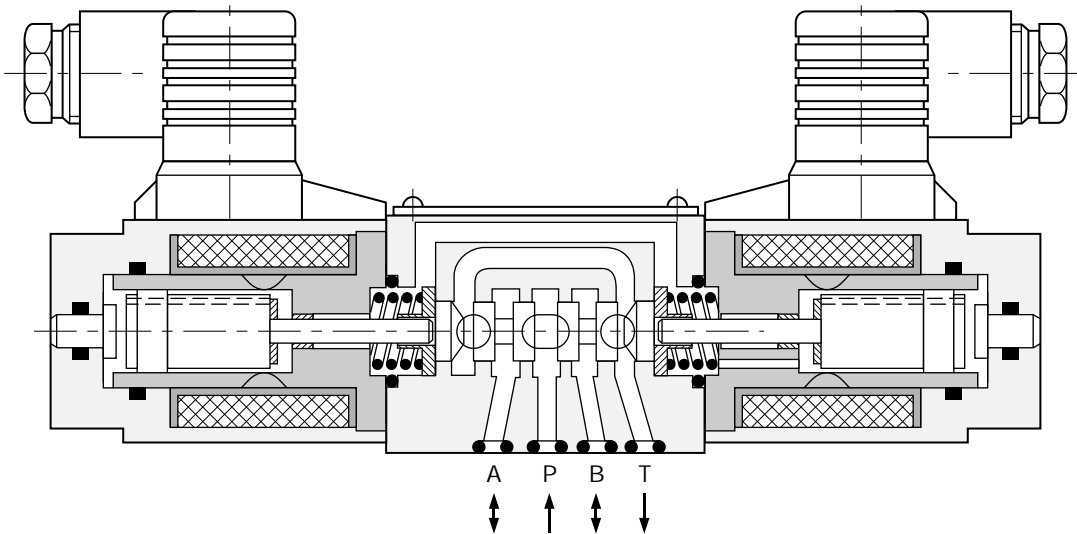
Dimensions of mounting configuration NG 10 ISO 4401 see page 103

**Proportional directional control valve**



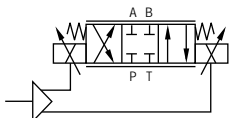

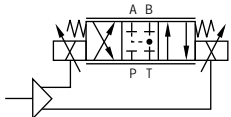
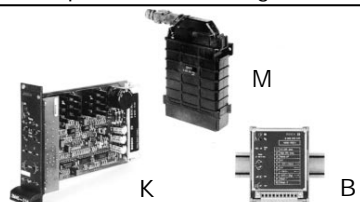
**NG 6**



**Function**



Proportional directional control valve **without** position control

Symbol	 A/W	P <sub>max.</sub> PSI [bar]	Q GPM (l/min)	LBS [kg]	
01 	2.5/25	P, A, B: 4570 (315) T:3625 (250)	2 (7.5)	5.8 (2.6)	
01 + L  Center position with leakage drain			4.75 (18)		
			9.25 (35)		
			Δp = 116 PSI (8 bar)		
	Amplifier see Page 108	K	2 M 45 – 2.5 A	0.7 (0.3)	<b>0 811 405 080</b>
		Box	2 CH./2.5 A	1.1 (0.5)	<b>0 811 405 092</b>
		+	25 P	0.5 (0.2)	<b>1 834 484 185</b>
		M	2 M 2.5 – RGC 2	0.8 (0.4)	<b>0 811 405 106</b>

Was <sup>(1)</sup> B 810 026 500



Characteristics		
<b>General</b>		
Construction	spool type valve	
Actuation	Proportional solenoid without position control	
Connection type	Subplate, mounting configuration NG 6 (ISO 4401)	
Mounting Position	optional	
Ambient temperature range	-4°...122°F (-20°...+50°C)	
<b>Hydraulic</b>		
Pressure medium	Hydraulic oil as per DIN 51524...535 Other fluids after prior consultation	
Viscosity, recommended max. permitted	100...465 SUS (20...100 cSt) 60...3700 SUS (10...800 cSt)	
Pressure medium temperature	-4°...176°F (-20°...+80°C)	
Filtration	Permissible contamination level	Achieved using filter
In line with operational reliability and service life	Class 8 (NAS 1638)	β x = 75
	17/14 (ISO 4406)	X = 10
Flow direction	See symbol	
Nominal flow(l/min)*	<b>2</b> (7.5) <b>4.75</b> (18) or <b>9.25</b> (35) (Δp = 116 PSI)	
Max. working pressure Port P, A, B Port T	4570 PSI (315) bar 3625 PSI (250) bar	
<b>Electrical</b>		
Duty cycle	100% (9 VDC)	
Degree of protection	IP 65	
Solenoid connector	Connector DIN 43 650/ISO 4400	
Solenoid current	max. 2.5 A	
Coil resistance R <sub>20</sub>	3.0 Ω	
Power consumption	max. 25 W	
<b>Static/dynamic</b>		
Hysteresis	≤ 4%	
Range of inversion	≤ 3%	
Manufacturing tolerance Q max.	≈ 10%	
Response time 100% signal change	70 ms	

**\*Nominal flow**

This always refers to a pressure differential of Δp = 116 PSI at the throttle point. Where other pressure differentials are involved, flow is calculated according to the following formula:

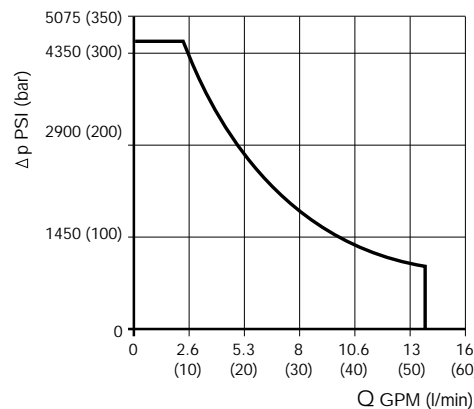
$$Q_x = Q_{nom} \cdot \sqrt{\frac{\Delta p_x}{116}}$$

However, the **operating limits** must be observed. When the operating limits are exceeded, the ensuing flow forces lead to uncontrollable spool movements.

**Pressure compensators** should be used to limit the pressure drop.

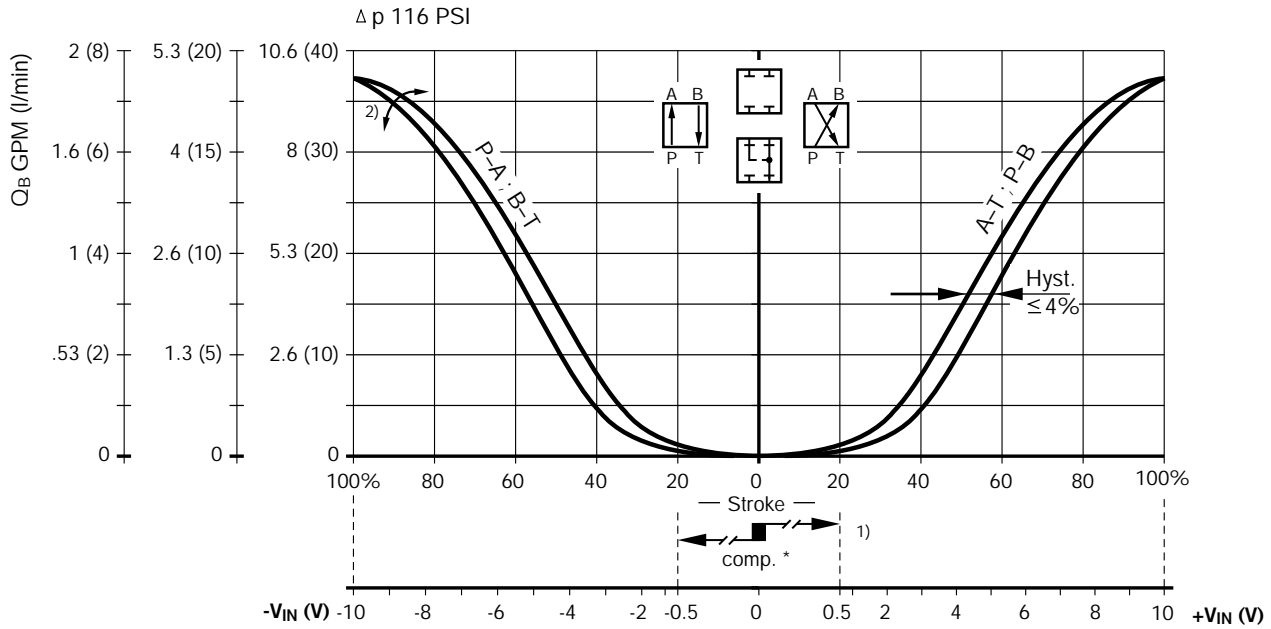
All characteristic values in connection with proportional amplifier:  
(V<sub>B</sub> = 24 V) 2 M 45 -2.5 A

**Operating limits**

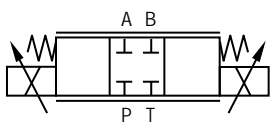
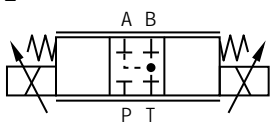


**Performance curves**

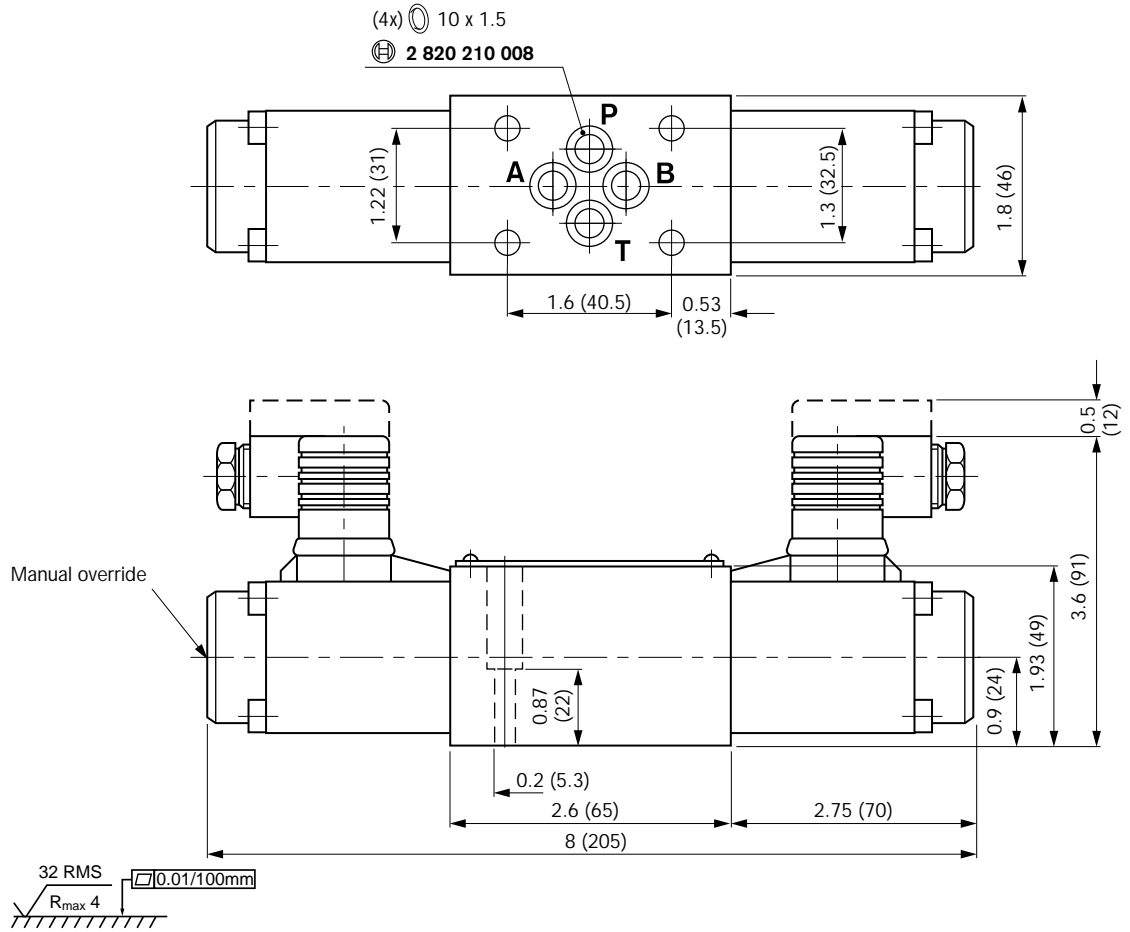
v = 35 cSt



- 1) Zero adjustment
- 2) Gain adjustment

Symbol	Valve in center position
<p>01</p> 	<p>Leakage</p> <p><math>A \rightarrow T = 4.88 \text{ in}^3/\text{min} (80 \text{ cm}^3/\text{min}) \quad \Delta p = 1450 (100 \text{ bar})</math></p> <p><math>B \rightarrow T = 4.88 \text{ in}^3/\text{min} (80 \text{ cm}^3/\text{min})</math></p>
<p>01 + L</p> 	<p><math>A \rightarrow T = .25 \dots 0.5 \text{ GPM} (1 \dots 2 \text{ l/min}) \quad \Delta p = 116 \text{ PSI} (8 \text{ bar})</math></p> <p><math>B \rightarrow T = .25 \dots 0.5 \text{ GPM} (1 \dots 2 \text{ l/min})</math></p>

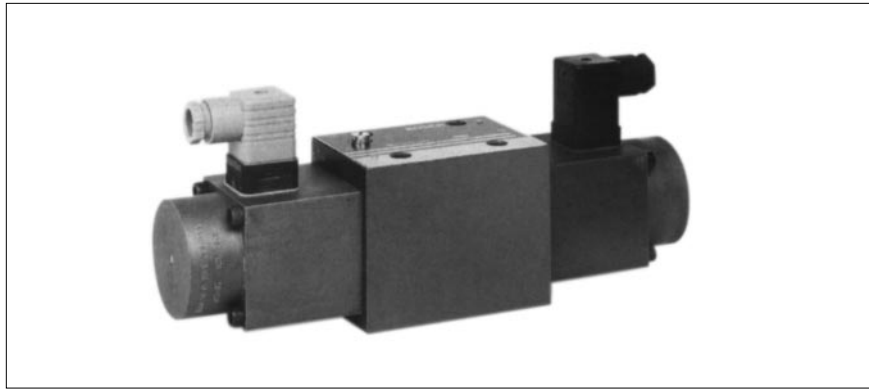
**Dimensions**



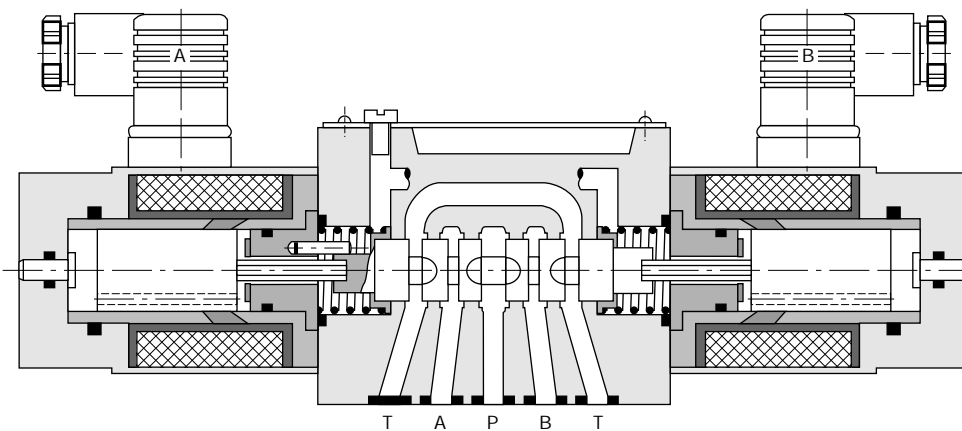
Dimensions of mounting  
 configuration NG 6 ISO 4401  
 see page 103

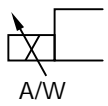

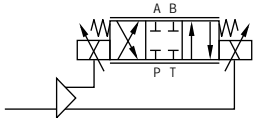
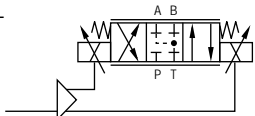
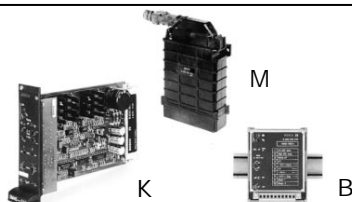
**Proportional directional control valve without LVDT**

**NG 10**



**Function**



Symbol	 A/W	$P_{max.}$ PSI [bar]	Q GPM (l/min)	LBS [kg]		
01 	2.5/50  ( $R_{20} = 5.8 \Omega^*$ )	P, A, B: 4570(315) T:3625(250)	10.5 (40)	$\Delta p = 116 \text{ PSI (8 bar)}$	1.7 (7.7)	<b>0 811 404 830</b>
21 (80)			<b>0 811 404 832</b>			
10.5 (40)						<b>0 811 404 831</b>
21 (80)			<b>0 811 404 833</b>			
01 + L  Leakage drain in center position	Amplifier see Page 108	K Box + M	2 M 45 – 2.5 A	0.7 (0.3)	<b>0 811 405 080</b>	
			2 CH./2.5 A	1.1(0.5)	<b>0 811 405 092</b>	
			25 P	0.5(0.2)	<b>1 834 484 185</b>	
			2 M 2.5-RGC 2	1.0(0.4)	<b>1 811 405 106</b>	

\*) Amplifier and valve must be operated at 24 V<sub>DC</sub>

Characteristics		
General		
Construction	Spool type valve	
Actuation	Proportional solenoid without position control	
Connection type	Subplate, mounting NG 10 (ISO 4401)	
Mounting Position	optional	
Ambient temperature range	-4°...122°F (-20°...+50°C)	
Hydraulic		
Pressure medium	Hydraulic oil as per DIN 51524...535 Other fluids after prior consultation	
Viscosity, recommended max. permitted	100...465 SUS (20...100 cSt) 60...3700 SUS (10...800 cSt)	
Pressure medium temperature	-4°...176°F (-20°...+80°C)	
Filtration	Permissible con- tamination level	
In line with operational reliability and service life	Class 8 (NAS 1638)	Achieved using filter β x = 75
	17/14 (ISO 4406)	X = 10
Flow direction	See symbol	
Nominal flow GPM (l/min)* (Δp = 116 PSI)	<b>10.6 (40) 21 (80) 21 : 12 (80 : 45)</b>	
Max. working pressure Port P, A, B Port T Port L	4570 PSI (315) bar 3625 PSI (250) bar ≤ 29 PSI (2 bar)	
Electrical		
Duty cycle	100%	
Degree of protection	IP 65 as per DIN 40 050 and IEC 14 434/5	
Solenoid connector	Connector DIN 43 650/ISO 4400	
Solenoid current	max. 2.5 A	
Coil resistance R <sub>20</sub>	5.8 Ω	
Power consumption	max. 50 W	
Static/dynamic		
Hysteresis	≤ 6%	
Range of inversion	≤ 4%	
Manufacturing tolerance Q max.	≈ 10%	
Response time 100% signal change	100 ms	

**\*Nominal flow**

This always refers to a pressure differential of Δp = 116 PSI at the throttle point.  
Where other pressure differentials are involved, flow is calculated according to the following formula:

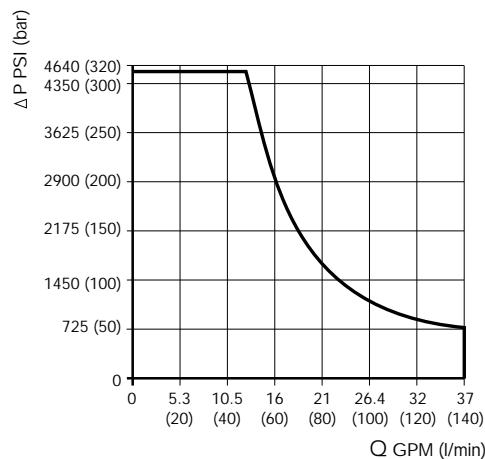
$$Q_x = Q_{nom} \cdot \sqrt{\frac{\Delta p_x}{116}}$$

However, the **operating limits** must be observed. When the operating limits are exceeded, the ensuing flow forces lead to uncontrollable spool movements.

**Pressure compensators** should be used to limit the pressure drop.

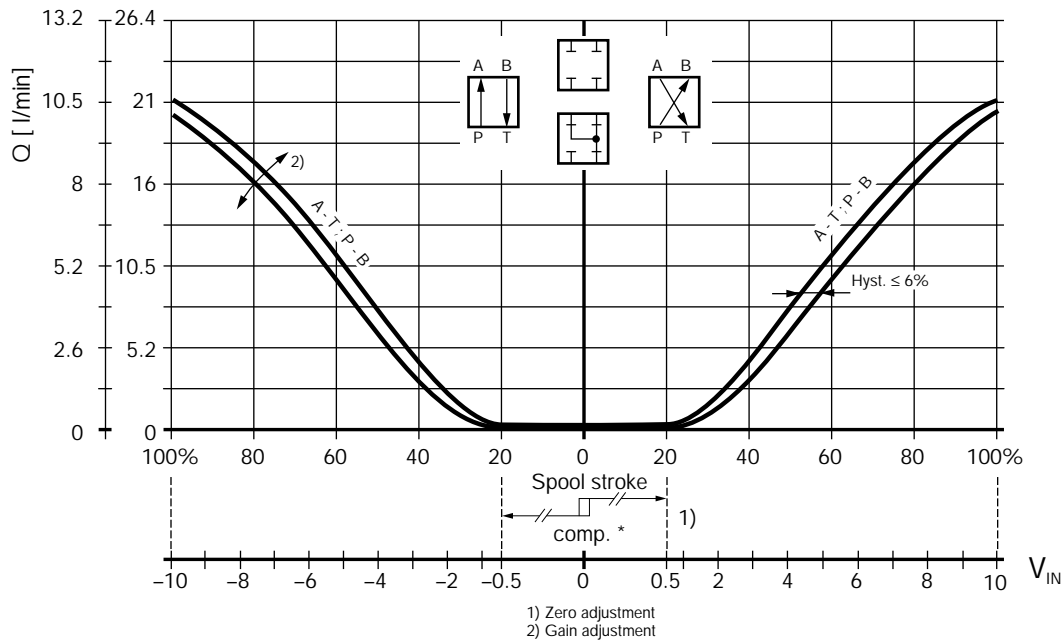
All characteristic values determined with proportional amplifier: 2 M 45 – 2.5A

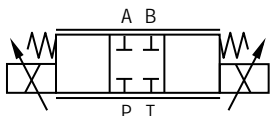
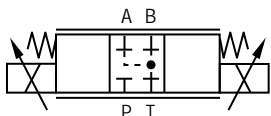
**Operating limits**



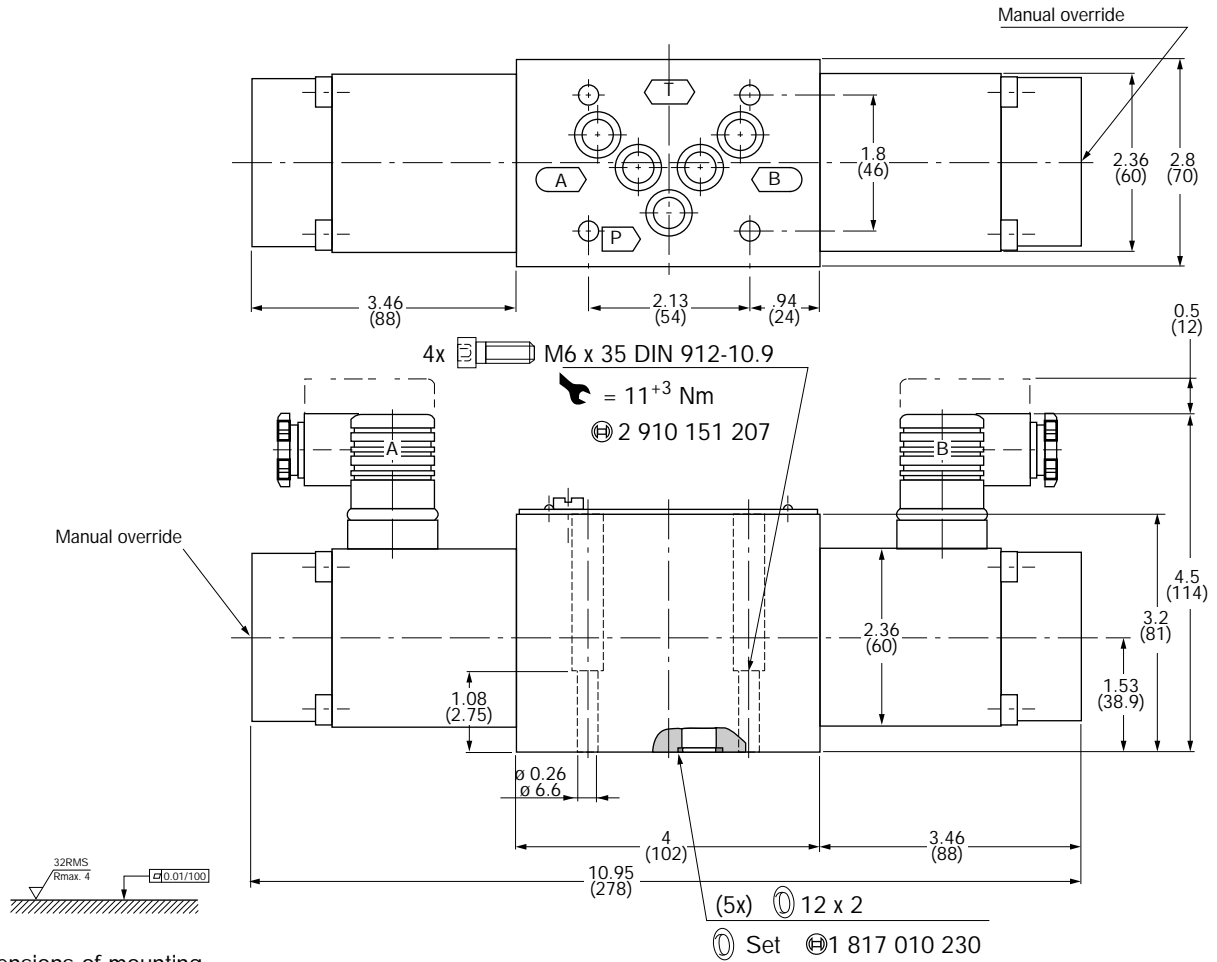
**Performance curves**

v = 36 cSt



Symbol	Valve in center position
<p>01</p> 	<p>Leakage</p> <p><math>A \rightarrow T = 4.88 \text{ in}^3/\text{min} (80 \text{ cm}^3/\text{min})</math>    <math>\Delta p = 1450 (100 \text{ bar})</math></p> <p><math>B \rightarrow T = 4.88 \text{ in}^3/\text{min} (80 \text{ cm}^3/\text{min})</math></p>
<p>01 + L</p> 	<p><math>A \rightarrow T = .25 \dots 0.5 \text{ GPM} (1 \dots 2 \text{ l/min})</math>    <math>\Delta p = 116 \text{ PSI} (8 \text{ bar})</math></p> <p><math>B \rightarrow T = .25 \dots 0.5 \text{ GPM} (1 \dots 2 \text{ l/min})</math></p>

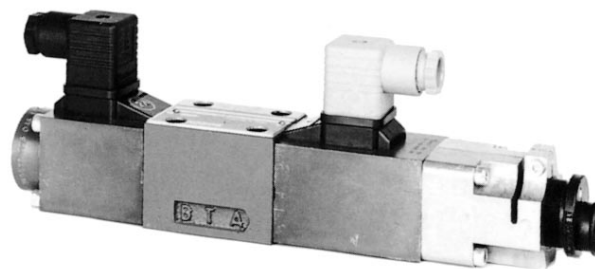
**Dimensions**



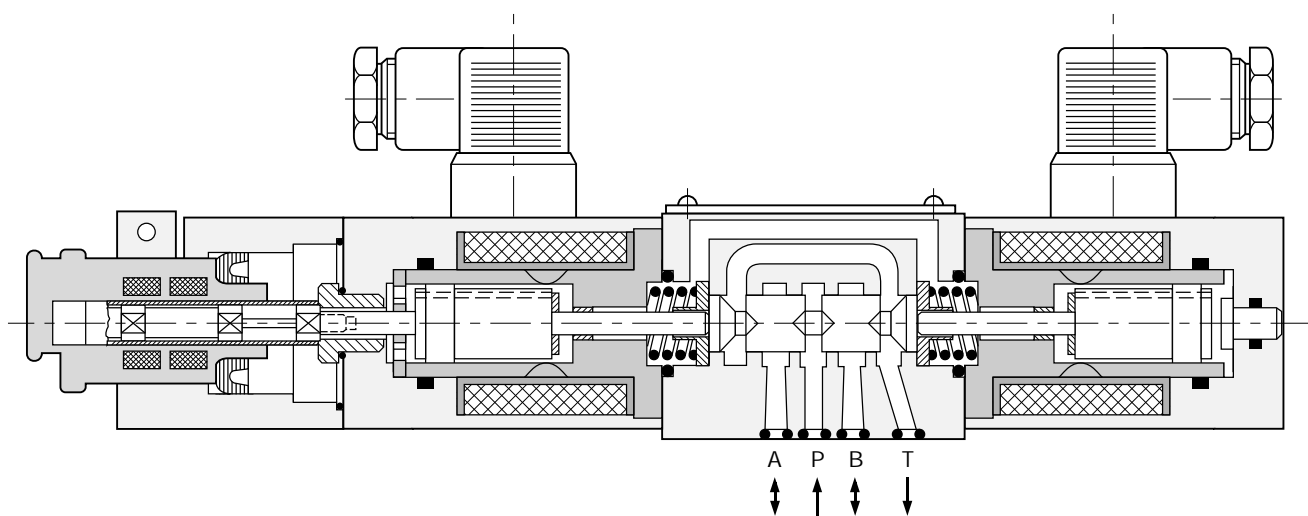
Dimensions of mounting configuration NG 6 ISO 4401 see page 103

**Proportional directional control valve**

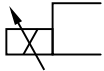

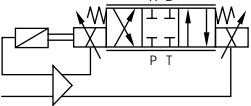
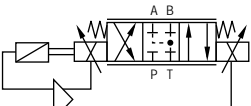

**NG 6**



**Function**



Proportional directional control valve **with** position control

Symbol	 A/W	$P_{max.}$ PSI [bar]	Q GPM (l/min)	LBS [kg]			
01 	2.7/25	4570(315)	2.6 (10)			6.2 (2.8)	<b>0 811 404 101</b>
01 + L  Leakage drain in center position			5.3 (20)	116 PSI (8 bar)	<b>0 811 404 100</b>		
			9.25 (35)		<b>0 811 404 119</b>		
	Amplifier see Page 109	K	WV 45 – RGC 2	0.6 (0.25)	<b>0 811 405 119</b>		
		K	WV 45– RGC 4	0.7 (0.3)	<b>0 811 405 137<sup>(2)</sup></b>		

Was <sup>(1)</sup> B 810 026 501, <sup>(2)</sup> B 830 303 467



Characteristics		
<b>General</b>		
Construction	spool type valve	
Actuation	Proportional solenoid without position control	
Connection type	Sub-plate, mounting configuration NG 6 (ISO 4401)	
Mounting Position	optional	
Ambient temperature range	-4°...122°F (-20°...+50°C)	
<b>Hydraulic</b>		
Pressure medium	Hydraulic oil as per DIN 51524...535 Other fluids after prior consultation	
Viscosity, recommended max. permitted	100...465 SUS (20...100 cSt) 60...3700 SUS (10...800 cSt)	
Pressure medium temperature	-4°...176°F (-20°...+80°C)	
Filtration	Permissible contamination level	Achieved using filter
In line with operational reliability and service life	Class 8 (NAS 1638)	β x = 75
	17/14 (ISO 4406)	X = 10
Flow direction	See symbol	
Nominal flow(l/min)* at ΔP = 116 PSI	<b>2 (7.5) 2.6 (10) 4.75 (18) 5.3 (20) or 9.25 (35)</b>	
Max. working pressure Port P, A, B Port T	4570 PSI (315) bar 3625 PSI (250) bar	
<b>Electrical</b>		
Duty cycle	100%	
Degree of protection	IP 65 as per DIN 40 050 and IEC 14 434/5	
Solenoid connector	Connector DIN 43 650/ISO 4400	
Position transducer connector	Special Connector	
Solenoid current	max. 2.7 A	
Coil resistance R <sub>20</sub>	3.0 Ω	
Power consumption	max. 25 W	
<b>Static/dynamic</b>		
Hysteresis	0.3%	
Range of inversion	0.2%	
Manufacturing tolerance Q max.	5%	
Response time 100% signal change 10% signal change	30 ms 15 ms	

**\*Nominal flow**

This always refers to a pressure differential of Δp = 116 PSI at the throttle point.

Where other pressure differentials are involved, flow is calculated according to the following formula:

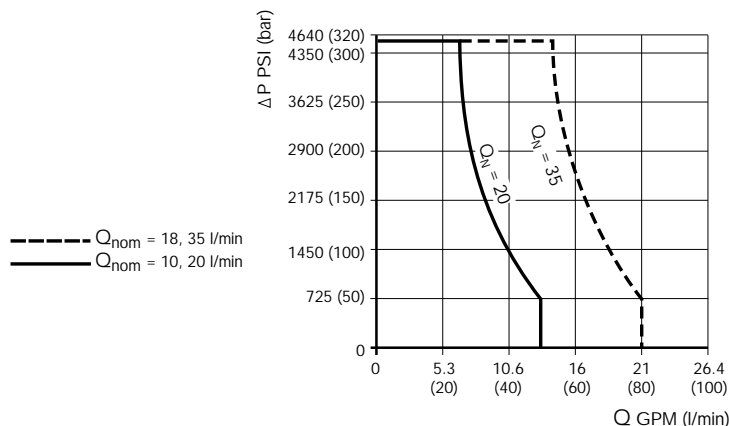
$$Q_x = Q_{nom} \cdot \sqrt{\frac{\Delta p_x}{116}}$$

However, the **operating limits** must be observed. When the operating limits are exceeded, the ensuing flow forces lead to uncontrollable spool movements.

**Pressure compensators** should be used to limit the pressure drop.

All characteristic values in connection with proportional amplifier: WV 45 – RGC 2

**Operating limits**

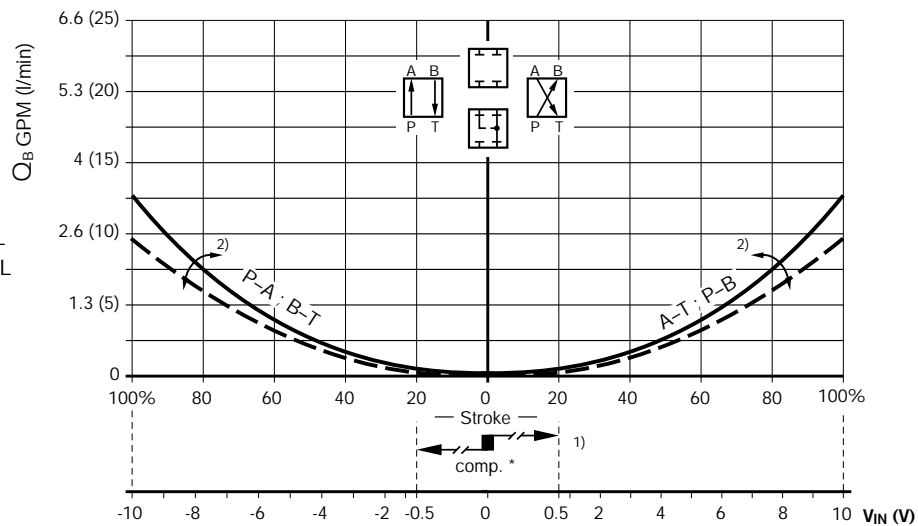


**Performance curves**

v = 35 cSt

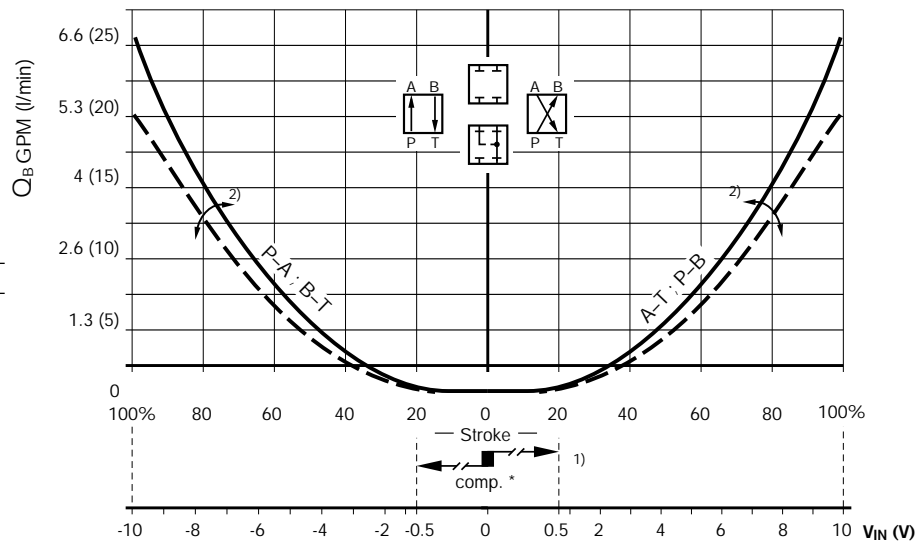
**Q<sub>nom</sub> = 7.5, 10 l/min**  
Spools 01 and 01 + L

— Q<sub>nom</sub> = 10L  
- - - Q<sub>nom</sub> = 7.5L

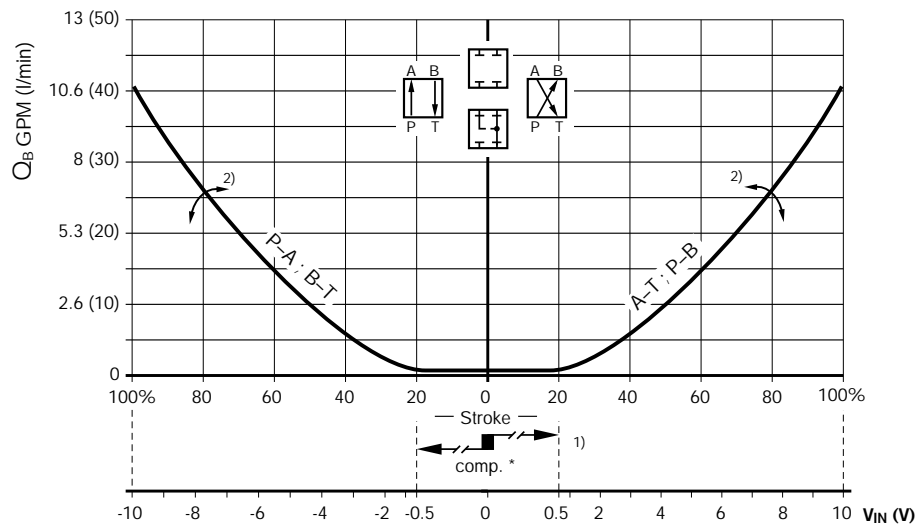


**Q<sub>nom</sub> = 18, 20 l/min**  
Spools 01 and 01 + L

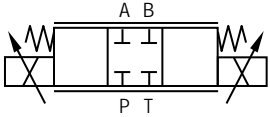
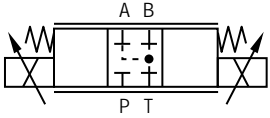
— Q<sub>nom</sub> = 20L  
- - - Q<sub>nom</sub> = 18L



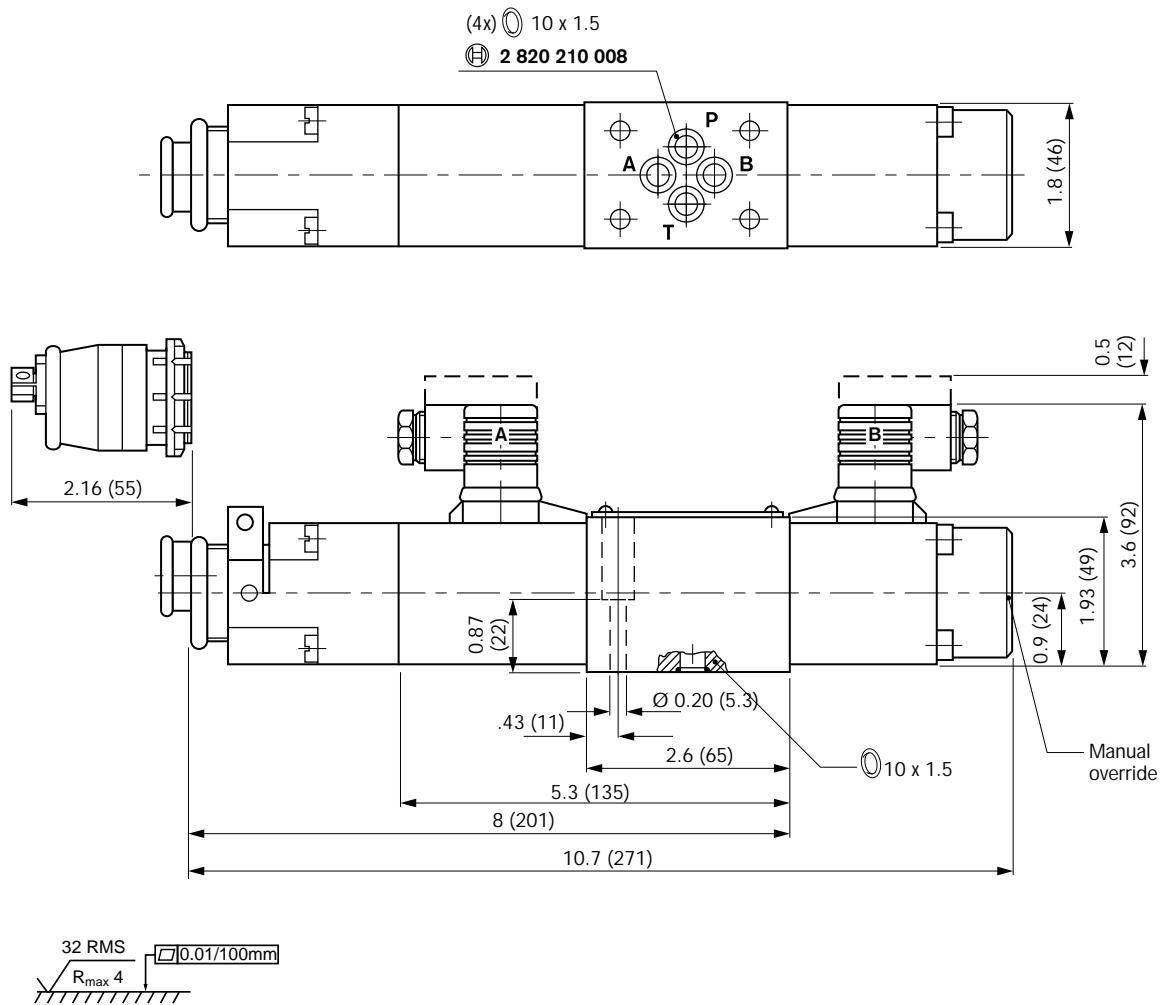
**Q<sub>nom</sub> = 35 l/min**  
Spools 01 and 01 + L



1) Zero adjustment    2) Gain adjustment

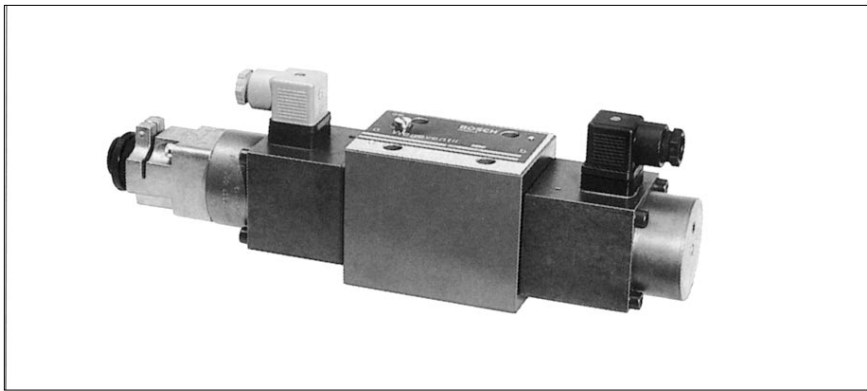
Symbol	Valve in central position
<p>01</p> 	<p>Leakage  <math>A \rightarrow T = 4.88 \text{ in}^3/\text{min} (80 \text{ cm}^3/\text{min})</math>    <math>\Delta p = 1450 (100 \text{ bar})</math>  <math>B \rightarrow T = 4.88 \text{ in}^3/\text{min} (80 \text{ cm}^3/\text{min})</math></p>
<p>01 + L</p> 	<p><math>A \rightarrow T = .25 \dots 0.5 \text{ GPM} (1 \dots 2 \text{ l/min})</math>    <math>\Delta p = 116 \text{ PSI} (8 \text{ bar})</math>  <math>B \rightarrow T = .25 \dots 0.5 \text{ GPM} (1 \dots 2 \text{ l/min})</math></p>

**Dimensions**

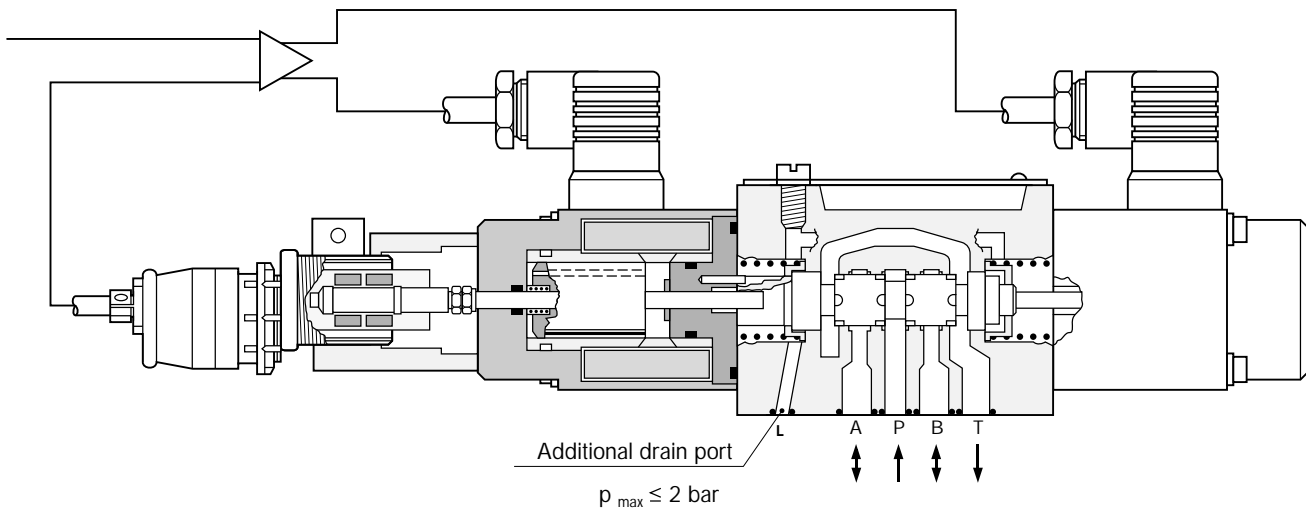


Dimensions of mounting configuration NG 6 ISO 4401 see page 103

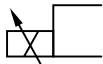

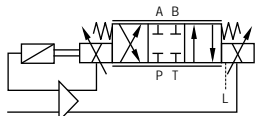
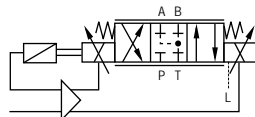

**Proportional directional control valve NG 10**



**Function**



Proportional directional control valve **with** position control

Symbol	 A/W	$P_{max.}$ PSI [bar]	Q GPM (l/min)	LBS [kg]	
01 	3.7/50	4570(315)	10.6 (40)	17.6 (8)	<b>0 811 404 003</b> <b>0 811 404 001</b> <b>0 811 404 086</b>
			21 (80)		
01 + L  Center position with leakage drain			10.6 (40)		<b>0 811 404 081</b> <b>0 811 404 080</b> <b>0 811 404 087</b>
			21 (80)		
	Amplifier see Page 109	K K	WV 60 – RGC 2	0.55 (0.25)	<b>0 811 405 120</b> <b>0 811 405 138</b>
			WV 60 – RGC 4	0.7 (0.3)	

Characteristics		
<b>General</b>		
Construction	Spool type valve	
Actuation	Proportional solenoid with position control	
Connection type	Subplate, mounting NG 10 (ISO 4401) + L	
Mounting Position	optional	
Ambient temperature range	-4°...122°F (-20°...+50°C)	
<b>Hydraulic</b>		
Pressure medium	Hydraulic oil as per DIN 51524...535 Other fluids after prior consultation	
Viscosity, recommended max. permitted	100...465 SUS (20...100 cSt) 60...3700 SUS (10...800 cSt)	
Pressure medium temperature	-4°...176°F (-20°...+80°C)	
Filtration	Permissible contamination level	Achieved using filter β x = 75
In line with operational reliability and service life	Class 8 (NAS 1638)	X = 10
	17/14 (ISO 4406)	
Flow direction	See symbol	
Nominal flow GPM (l/min)* (Δp = 116 PSI)	<b>10.6 (40) 21 (80) 21 : 12 (80 : 45)</b>	
Max. working pressure Port P, A, B Port T Port L	4570 PSI (315) bar 3625 PSI (250) bar ≤ 29 PSI (2 bar)	
<b>Electrical</b>		
Duty cycle	100%	
Degree of protection	IP 65 as per DIN 40 050 and IEC 14 434/5	
Solenoid connector	Connector DIN 43 650/ISO 4400	
Position transducer connector	Special Connector	
Solenoid current	max. 3.7 A	
Coil resistance R <sub>20</sub>	2.5 Ω	
Power consumption	max. 50 W	
<b>Static/dynamic</b>		
Hysteresis	≤ 0.75%	
Range of inversion	≤ 0.5%	
Manufacturing tolerance Q max.	≈ 10%	
Response time 100% signal change 10% signal change	50 ms 20 ms	

**\*Nominal flow**

This always refers to a pressure differential of Δp = 116 PSI at the throttle point.

Where other pressure differentials are involved, flow is calculated according to the following formula:

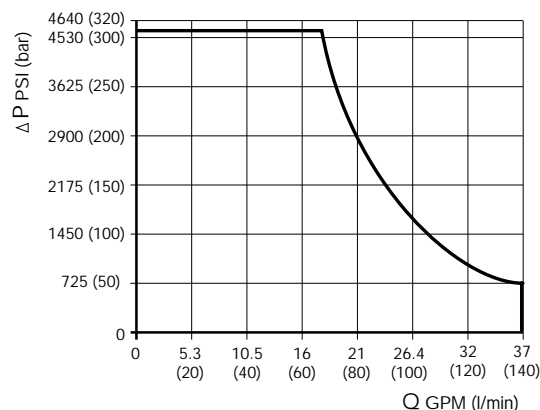
$$Q_x = Q_{nom} \cdot \sqrt{\frac{\Delta p_x}{116}}$$

However, the **operating limits** must be observed. When the operating limits are exceeded, the ensuing flow forces lead to uncontrollable spool movements.

**Pressure compensators** should be used to limit the pressure drop.

Characteristic values determined with proportional amplifier: WV 60 – RGC 2

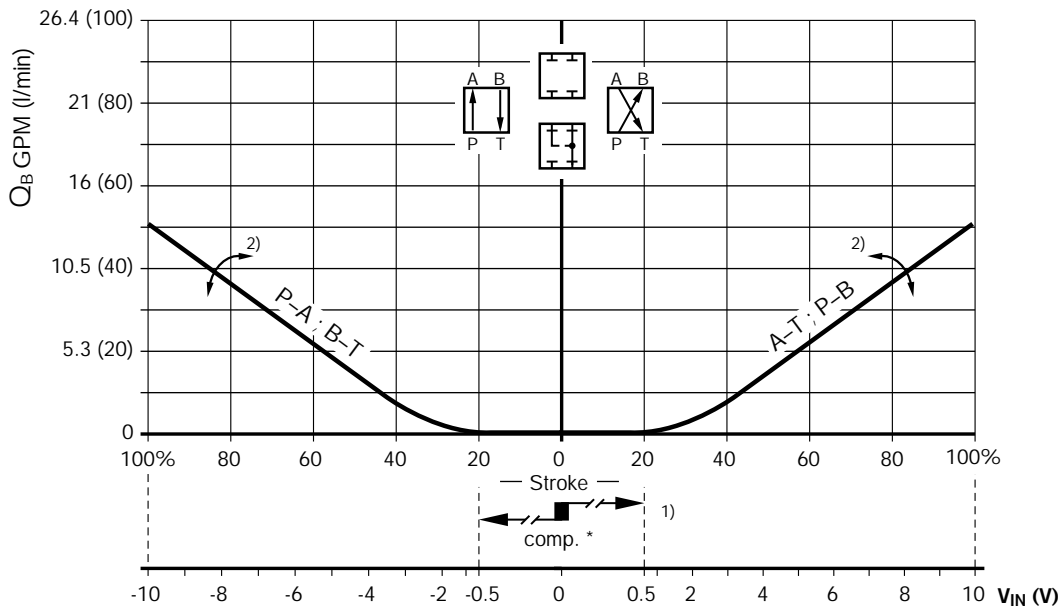
**Operating limits**



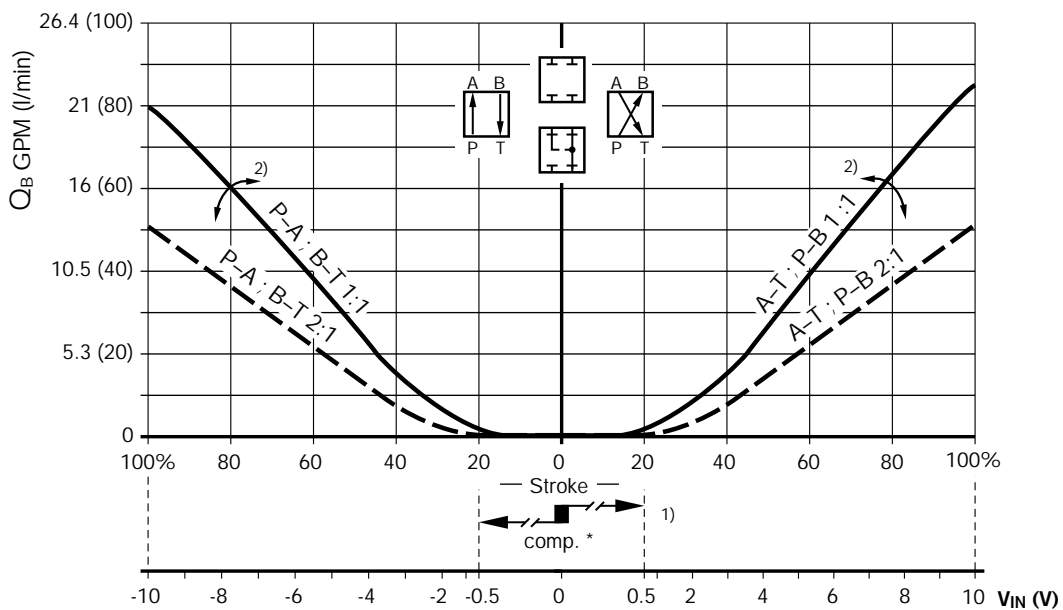
**Performance curves**

$\nu = 35 \text{ cSt}$

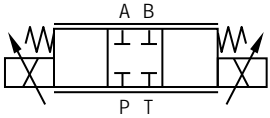
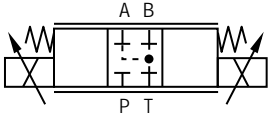
$Q_{\text{nom}} = 40 \text{ l/min, Spools 01 and 01 = L}$



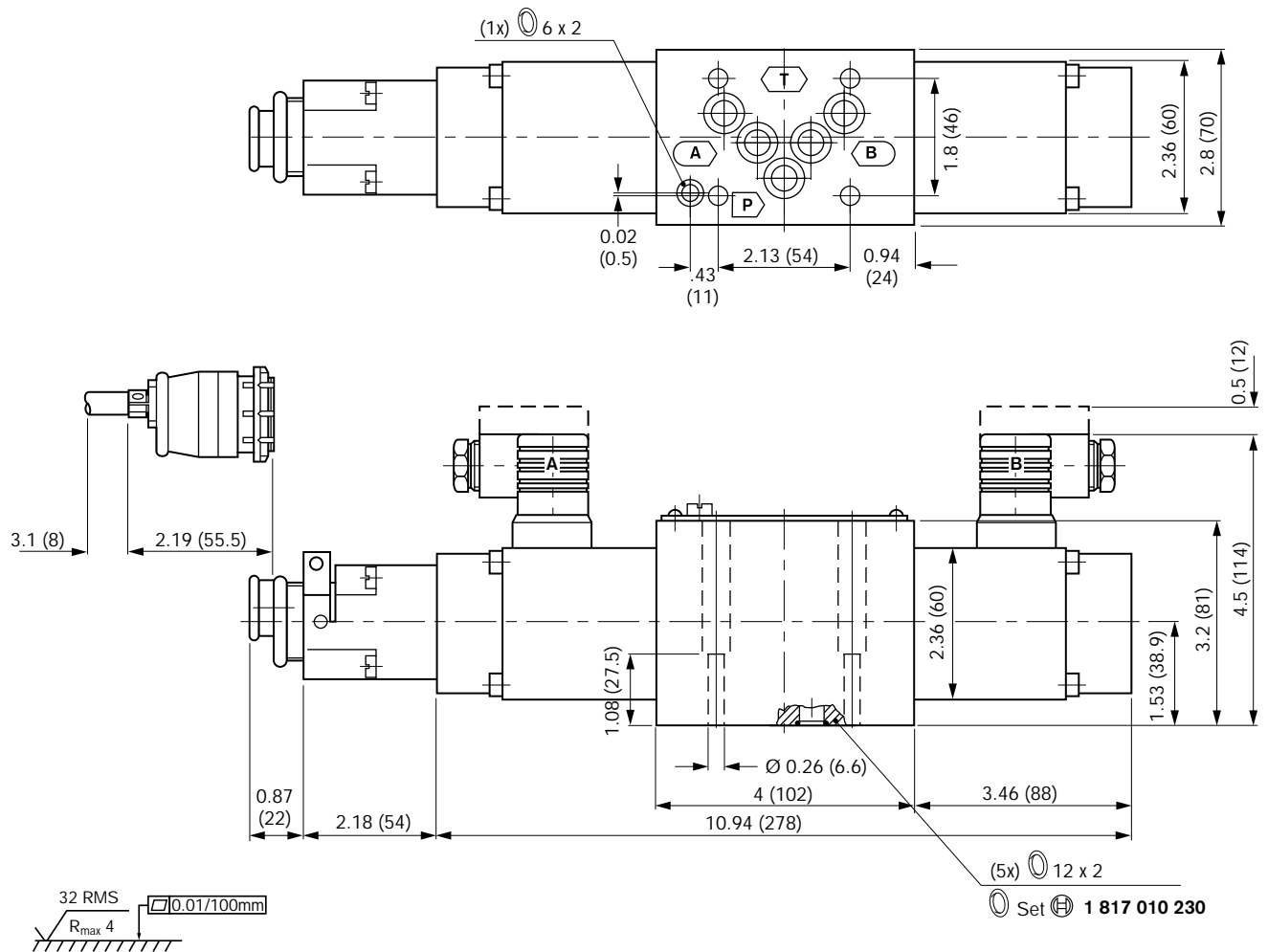
$Q_{\text{nom}} = 80 \text{ l/min, Spools 01 and 01 = L}$



- 1) Zero adjustment
- 2) Gain adjustment

Symbol	Valve in central position
<p>01</p> 	<p>Leakage  <math>A \rightarrow T = 4.88 \text{ in}^3/\text{min}</math>  <math>B \rightarrow T = 4.88 \text{ in}^3/\text{min}</math>  <math>\Delta p = 1450 \text{ PSI (100 bar)}</math></p>
<p>01 + L</p> 	<p>Leakage drain  <math>A \rightarrow T = 0.13 \dots 0.26 \text{ GPM}</math>  <math>B \rightarrow T = 0.13 \dots 0.26 \text{ GPM}</math>  <math>\Delta p = 116 \text{ PSI (8 bar)}</math></p>

**Dimensions**

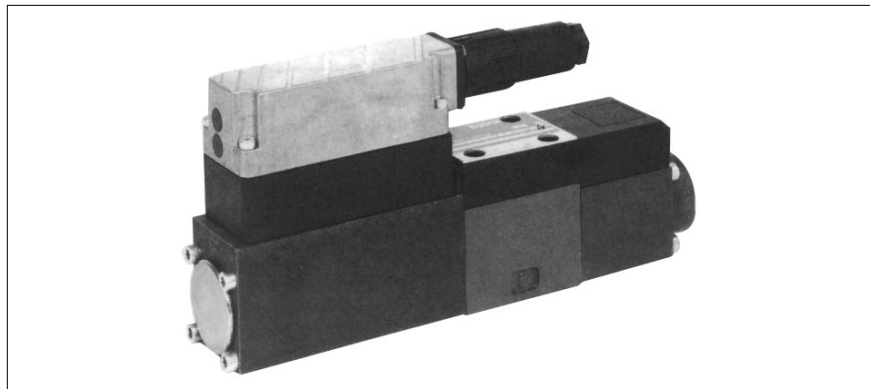


Dimensions of mounting configuration NG 10 ISO 4401 see page 104

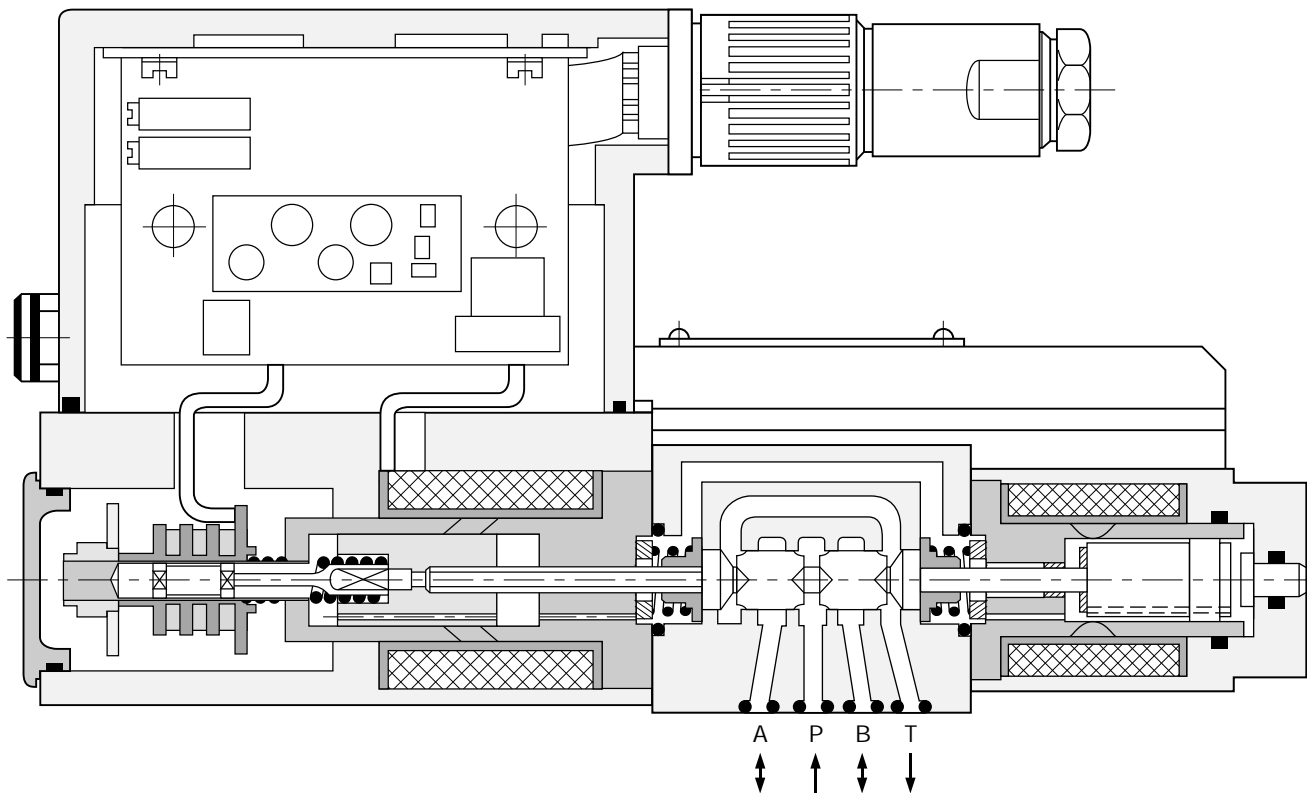
**Note:** Additional "L" Port

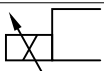

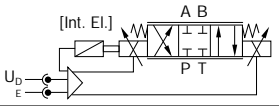
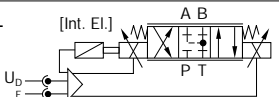
**Proportional directional control valves with integrated amplifier**

**NG 6**



**Function**



Symbol	 V/W	P <sub>max.</sub> PSI [bar]	Q GPM (l/min)	LBS [kg]			
01 	24 VDC max 30 VA	P, A, B: 4600(315) T:2900(200)	4.7 (18)	8.6 (3.9)	<b>0 811 404 140</b> <sup>(1)</sup>		
01 + L 			8.5 (32)			<b>0 811 404 141</b> <sup>(2)</sup>	
			4.7 (18)				<b>0 811 404 142</b> <sup>(3)</sup>
			8.5 (32)				

Δp = 72.5 PSI (5 bar)


7-Pin Connectors (not included with valve)



Plug 7-pole Page 148	KS	<b>1 834 482 022</b>
	KS	<b>1 834-482 026</b>
	MS	<b>1 834 482 023</b>
	MS	<b>1 834 482 024</b>
Metal MS Connector		<b>9 536 230 054</b>

Was <sup>(1)</sup> B 810 026 777, <sup>(2)</sup> B 810 026 548, <sup>(3)</sup> B 810 026 776, <sup>(4)</sup> B 810 026 775



Characteristics		
General		
Construction	Spool valve, direct operated, without steel sleeve	
Actuation	Proportional solenoid with position control and with integrated amplifier	
Type of mounting	Subplate, (ISO 4401)	
Assembly Position	optional	
Ambient temperature range	-4°...122°F (-20°...+50°C)	
Vibration Test condition	max. 25 g shaken in 3 dimensions (24 h)	
Hydraulic		
Pressure medium	Hydraulic oil as per DIN 51524...535 Other fluids after prior consultation	
Viscosity, recommended max. permitted	100...465 SUS (20...100 cSt) 60...3700 SUS (10...800 cSt)	
Pressure medium temperature	-4°...176°F (-20°...+80°C)	
Filtration  In line with operational reliability and service life	Permissible contamination level	Achieved using filter β x = 75
	Class 8 (NAS 1638)	X = 10
	17/14 (ISO 4406)	
Flow direction	see symbol	
Max. operating pressure (static)	Ports P, A, B 4600 PSI (315 bar) Port T 2900 PSI (200 bar)	
Nominal flow GPM (l/min) at Δp = 73 PSI*/	<b>4.7 (18)</b> <b>8.5 (32)</b>	
Land Q <sub>A</sub> at 8V	3.7 (14) (+/-3%)      6.6 (25) (+/-3%)	
Operating limits	see diagram	
Leakage at 1450 PSI/Land	 ≤ 5 in <sup>3</sup> /min (80 cm <sup>3</sup> /min)	
Static/dynamic		
Hysteresis	≤ 0.3%	
Range of inversion	≤ 0.2%	
Manufacturing tolerance Q <sub>max.</sub>	≤ ± 3%	
Response time 100% signal change 10% signal change	30 ms 5 ms	
Thermal drift	< 1%, at ΔT = 72°F (40°C)	
Electrical characteristics		
	see page 96	

**Nominal flow**

This always refers to a pressure differential of Δp = 72.5 PSI at the throttle point. Where other pressure differentials are involved, flow is calculated according to the following formula:

$$Q_x = Q_{nom} \cdot \sqrt{\frac{\Delta p_x}{72.5 \text{ PSI}}}$$

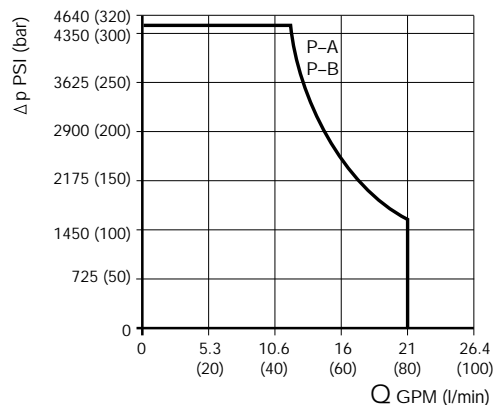
However, the **operating limits** must be observed. When the operating limits are exceeded, the ensuing flow forces lead to uncontrollable spool movements.

**Pressure compensators** should be used to limit the pressure drop.

**Signal Flow**

V (D-E)	Symbol
+ 0.5...+10	PA/BT
0V	CENTER
- 0.5...-10	PB/AT

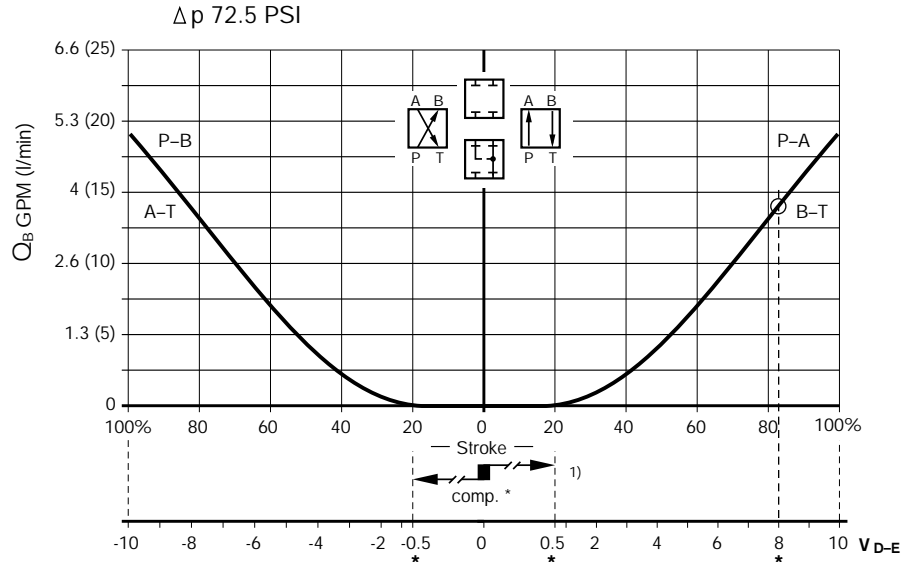
**Operating limits**



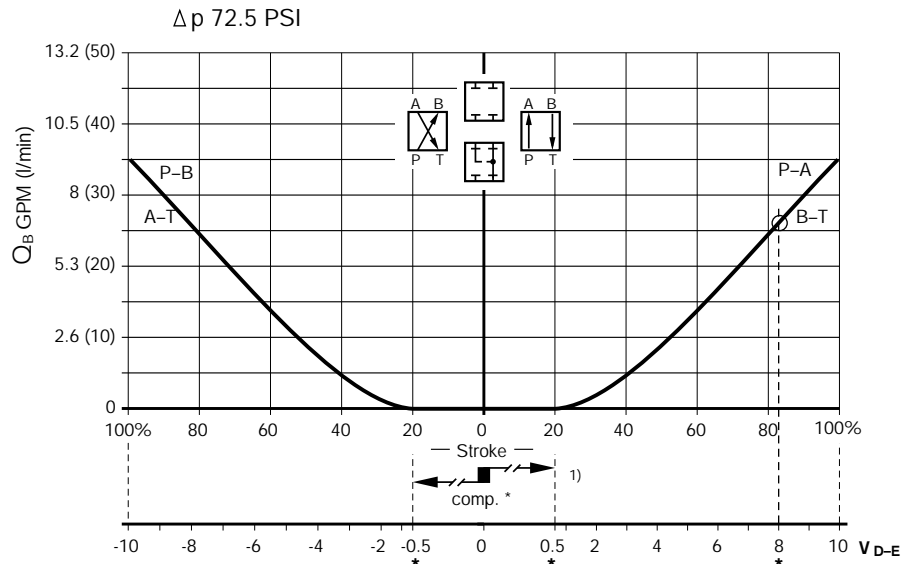
**Performance curves**

$v = 35 \text{ cSt}$

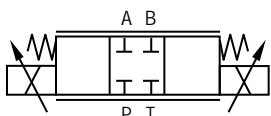
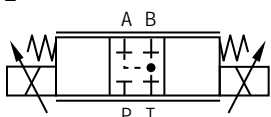
$Q_{nom} = 4.7 \text{ GPM (18 l/min)}$



$Q_{nom} = 8.5 \text{ GPM (35 l/min)}$



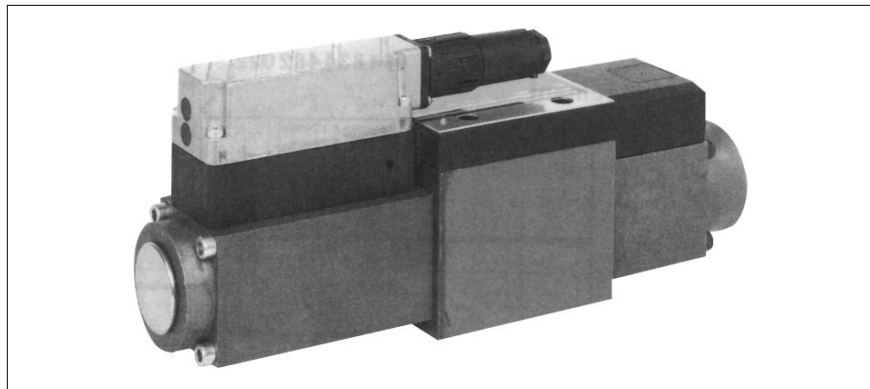
\*Factory setting  $\leq \pm 3\%$

Symbol	Valve in center position
<p>01</p> 	<p>Leakage  <math>A \rightarrow T = 5 \text{ in}^3/\text{min (80 cm}^3/\text{min)}</math>  <math>B \rightarrow T = 5 \text{ in}^3/\text{min (80 cm}^3/\text{min)}</math>  <math>\Delta p = 1450 \text{ (100 bar)}</math></p>
<p>01 + L</p> 	<p><math>A \rightarrow T = 0.2 \dots 0.4 \text{ GPM (0.8 \dots 1.6 l/min)}</math>  <math>B \rightarrow T = 0.2 \dots 0.4 \text{ GPM (0.8 \dots 1.6 l/min)}</math>  <math>\Delta p = 72.5 \text{ PSI (5 bar)}</math></p>

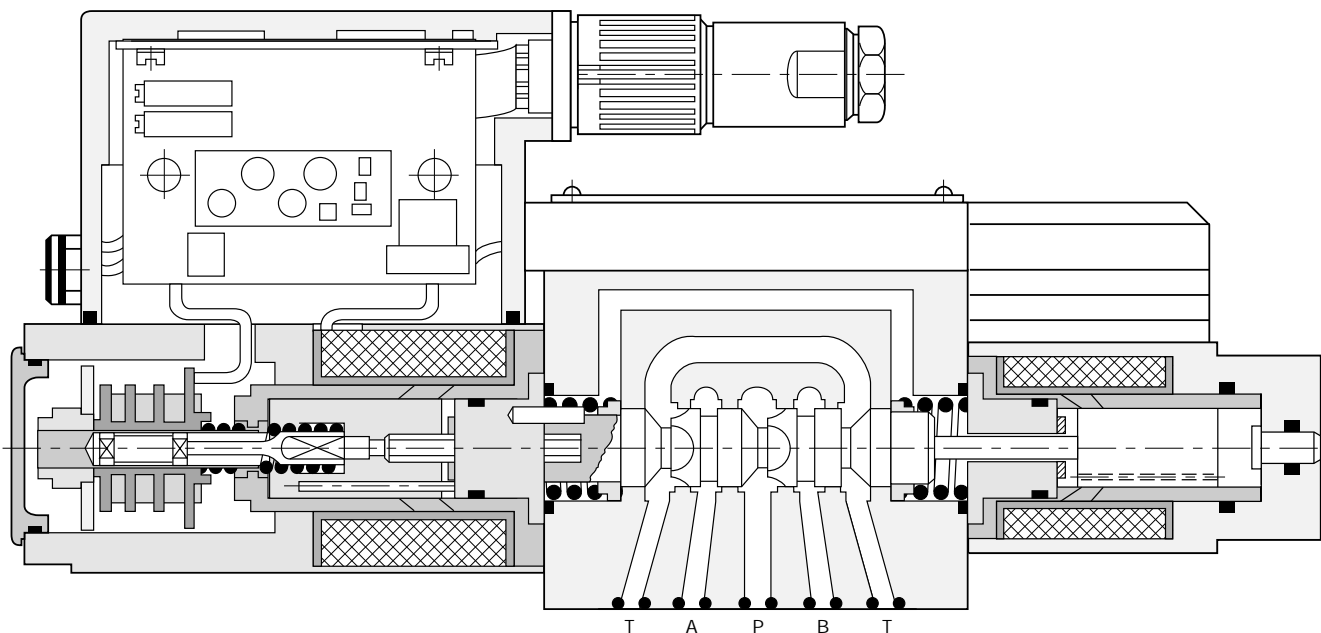




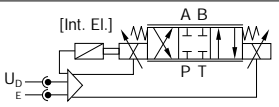

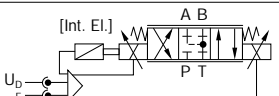
**Proportional directional control valves with integrated amplifier**

**NG 10**



**Function**




Symbol	 V/W	P <sub>max.</sub> PSI [bar]	Q GPM (l/min)	LBS [kg]	
01 	24 VDC max 50 VA	P, A, B: 4600(315) T:2900(200)	13 (50)	19.5 (8.8)	
01 + L 			21 (80)		
			13 (50)		
			21 (80)		

$\Delta p = 72.5 \text{ PSI (5 bar)}$

7-Pin Connectors (not included with valve)

	Plug 7-pole Page 148	KS	<b>1 834 482 022</b>
		KS	<b>1 834-482 026</b>
		MS	<b>1 834 482 023</b>
		MS	<b>1 834 482 024</b>
	Metal MS Connector		<b>9 536 230 054</b>

Was <sup>(1)</sup> B 810 006 390, <sup>(2)</sup> B 810 006 351, <sup>(3)</sup> B 810 006 401, <sup>(4)</sup> B 810 006 400

Characteristics		
General		
Construction	Spool valve, direct operated, without steel sleeve	
Actuation	Proportional solenoid with position control and with integrated amplifier	
Type of mounting	Subplate, (ISO 4401)	
Assembly Position	optional	
Ambient temperature range	-4°...122°F (-20°...+50°C)	
Vibration Test condition	max. 25 g shaken in 3 dimensions (24 h)	
Hydraulic		
Pressure medium	Hydraulic oil as per DIN 51524...535 Other fluids after prior consultation	
Viscosity, recommended max. permitted	100...465 SUS (20...100 cSt) 60...3700 SUS (10...800 cSt)	
Pressure medium temperature	-4°...176°F (-20°...+80°C)	
Filtration  In line with operational reliability and service life	Permissible contamination level	Achieved using filter β x = 75
	Class 8 (NAS 1638)	X = 10
	17/14 (ISO 4406)	
Flow direction	see symbol	
Max. operating pressure (static)	Ports P, A, B	4600 PSI (315 bar)
	Port T	2900 PSI (200 bar)
Nominal flow GPM (l/min) at Δp = 73 PSI*/	<b>13</b> (50)	<b>21</b> (80)
Land Q <sub>A</sub> at 8V	9 (35) (+/-3%)	18.5 (70) (+/-3%)
Operating limits	see diagram	
Leakage at 1450 PSI/Land	 ≤ 5 in <sup>3</sup> /min (80 cm <sup>3</sup> /min)	
Static/dynamic		
Hysteresis	≤ 0.3%	
Range of inversion	≤ 0.2%	
Manufacturing tolerance Q <sub>max.</sub>	≤ ± 3%	
Response time 100% signal change	≈ 50 ms	
10% signal change	≈ 15 ms	
Thermal drift	< 1%, at ΔT = 72°F (40°C)	
<b>Electrical characteristics</b>	see page 96	

**Nominal flow**

This always refers to a pressure differential of Δp = 72.5 PSI at the throttle point. Where other pressure differentials are involved, flow is calculated according to the following formula:

$$Q_x = Q_{nom} \cdot \sqrt{\frac{\Delta p_x}{72.5 \text{ PSI}}}$$

However, the **operating limits** must be observed. When the operating limits are exceeded, the ensuing flow forces lead to uncontrollable spool movements.

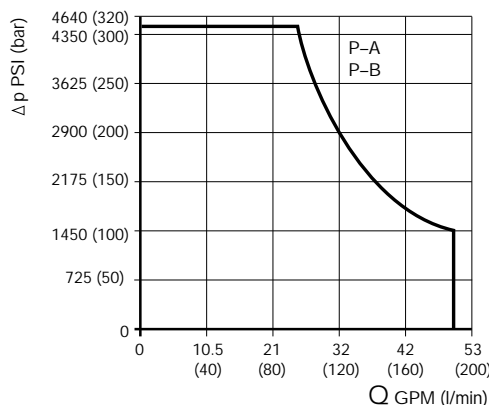
**Pressure compensators** should be used to limit the pressure drop.

Characteristic values determined with proportional amplifier: QV 45

**Signal Flow**

V (D-E)	Symbol
+ 0.5...+10	PA/BT
0V	CENTER
- 0.5...-10	PB/AT

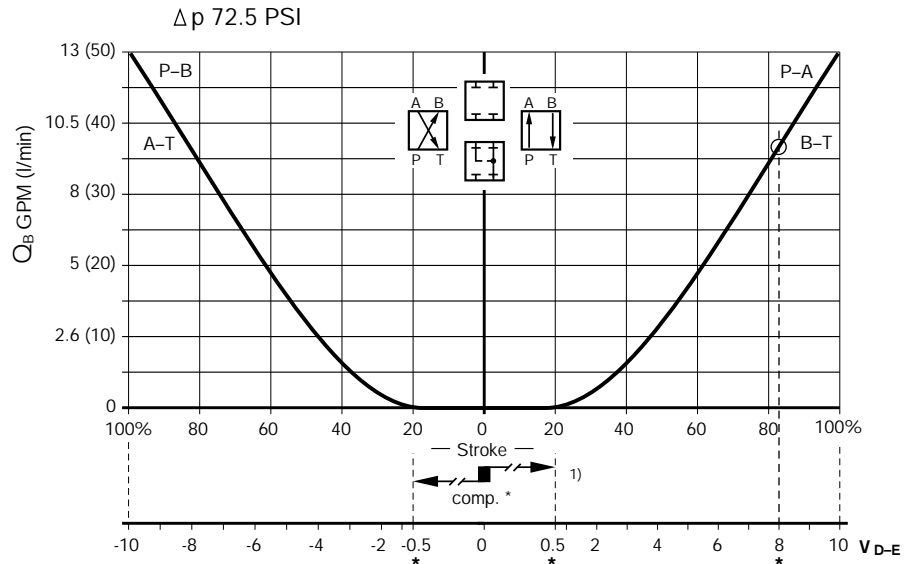
**Operating limits**



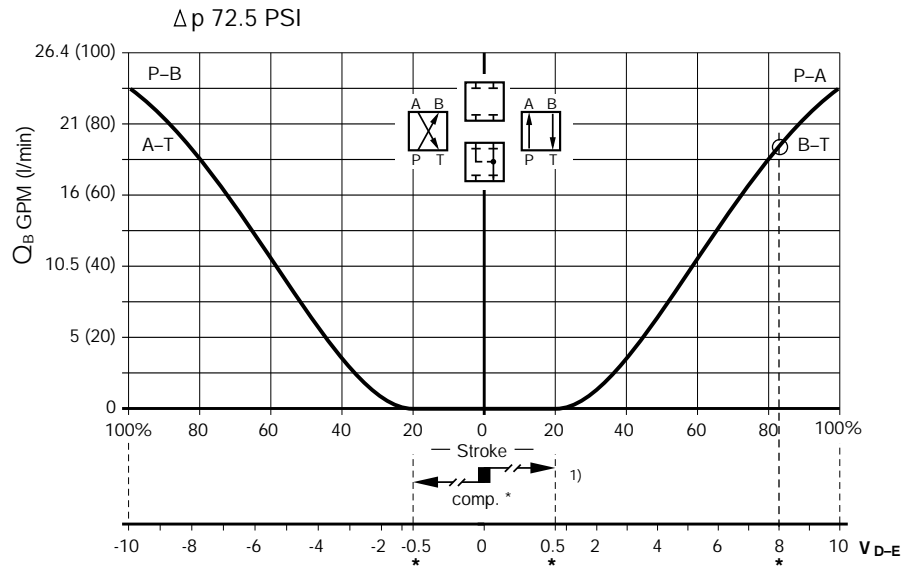
**Performance curves**

v = 35 cSt

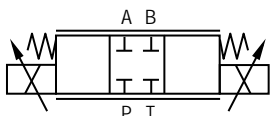
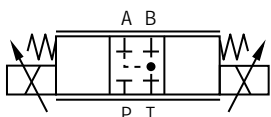
**Q<sub>nom</sub> = 13 GPM**  
**(50 l/min)**



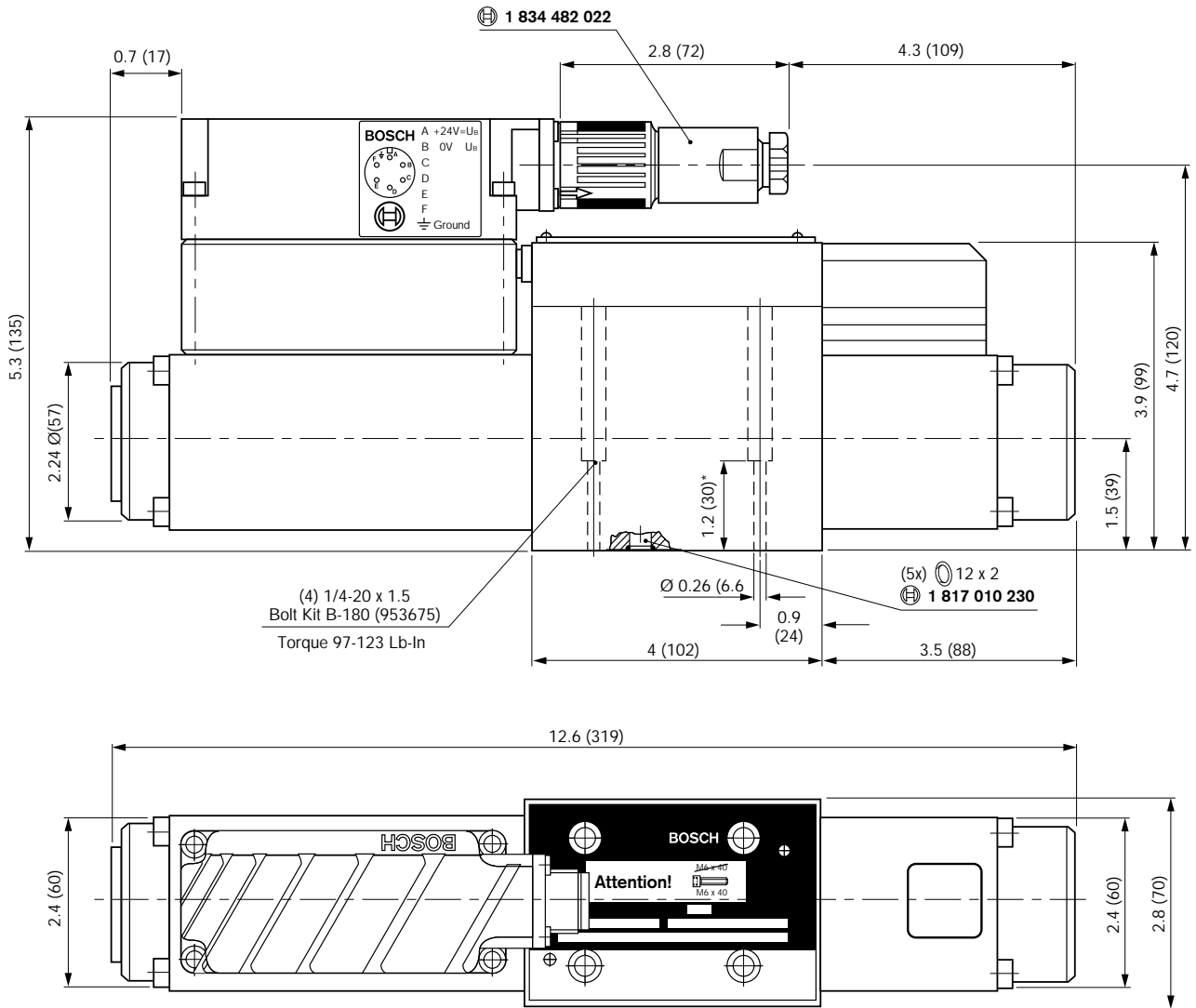
**Q<sub>nom</sub> = 21 GPM**  
**(80 l/min)**



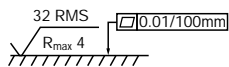
\*Factory setting  $\leq \pm 3\%$

Symbol	Valve in center position
<p>01</p> 	<p>Leakage                      A → T = 5 in<sup>3</sup>/min (80 cm<sup>3</sup>/min)      <math>\Delta p = 1450</math> (100 bar)                      B → T = 5 in<sup>3</sup>/min (80 cm<sup>3</sup>/min)</p>
<p>01 + L</p> 	<p>A → T = 0.1...0.2 GPM (0.4...0.8 l/min)      <math>\Delta p = 72.5</math> PSI (5 bar)                      B → T = 0.1...0.2 GPM (0.4...0.8 l/min)</p>

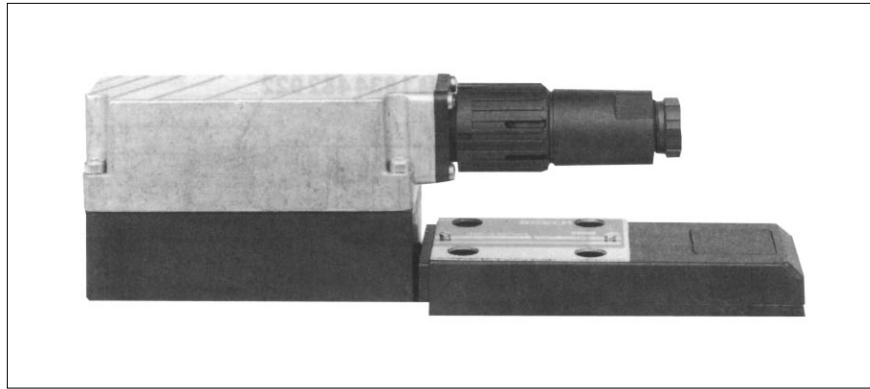
**Dimensions**



\*This dimension is now 1.2" (ISO Standard) previous series was 1".



Dimensions of mounting configuration NG 10 ISO 4401 see page 104

**Electronics****NG 6, 10**

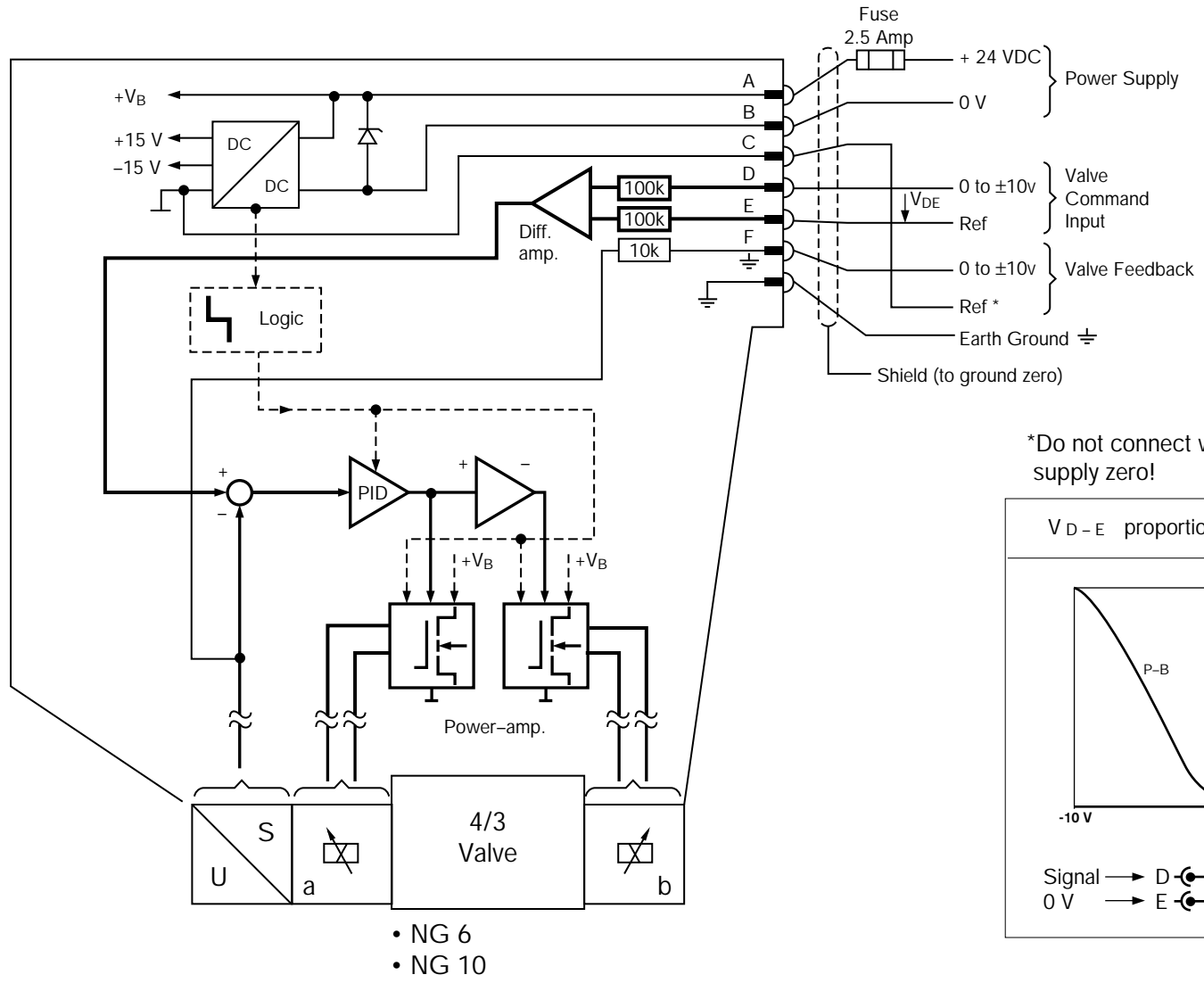
Characteristics				
Electrical	NG 6		NG 10	
Cyclic duration factor	100%			
Degree of protection	IP 65 per DIN 40 050 and IEC 14434/5			
Connection	7-pin plug, PG 11			
Voltage supply Terminal A: B: 0 V	24 VDC nominal min. 21 VDC/max. 40 VDC Ripple max. 2 VDC			
Power	30 VA	50 VA		
External fuse	2.5 A <sub>F</sub>			
Input signal Terminal D: V <sub>IN</sub> E: 0 V	0...±10 V Differential amplifier R <sub>i</sub> = 100 kΩ			
Maximum differential input voltage at 0 V	D → B } max. 18 VDC E → B }			
Test signal Terminal F: V <sub>test</sub> C: 0 V	0...±10 V proportional to main spool stroke R <sub>a</sub> = 10 kΩ			
Ground	Connect only when supply transformer is not grounded			
Recommended cable 7 conductor shielded	up to 65 Ft.: 18 AWG up to 130 Ft.: 16 AWG			
Adjustment V <sub>D-E</sub> + 8 V = (Factory set) ± 3% GPM [l/min.] Δp = 5 bar	3.7 (14)	6.6 (25)	9.25 (35)	18.5 (70)
Q <sub>N</sub> Type GPM [l/min.]	4.7 (18)	8.5 (32)	13 (50)	21 (80)

**Note:**

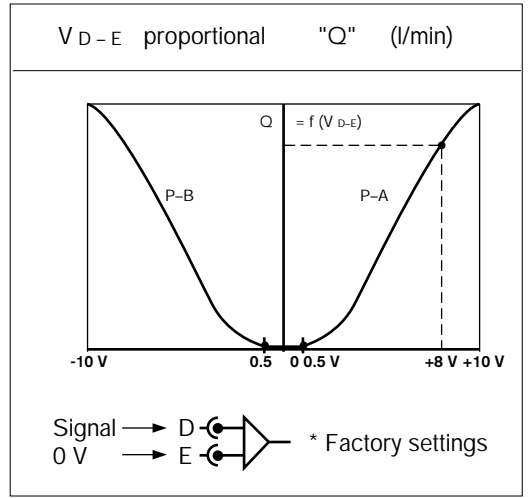
Supply voltage 24 VDC nominal, below 18 VDC a rapid shut-down (similar to "Enable-OFF") is initiated internally.



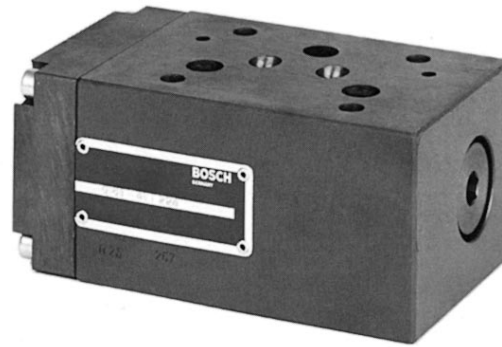
**Block diagram**



\*Do not connect with supply zero!



## Pressure compensators

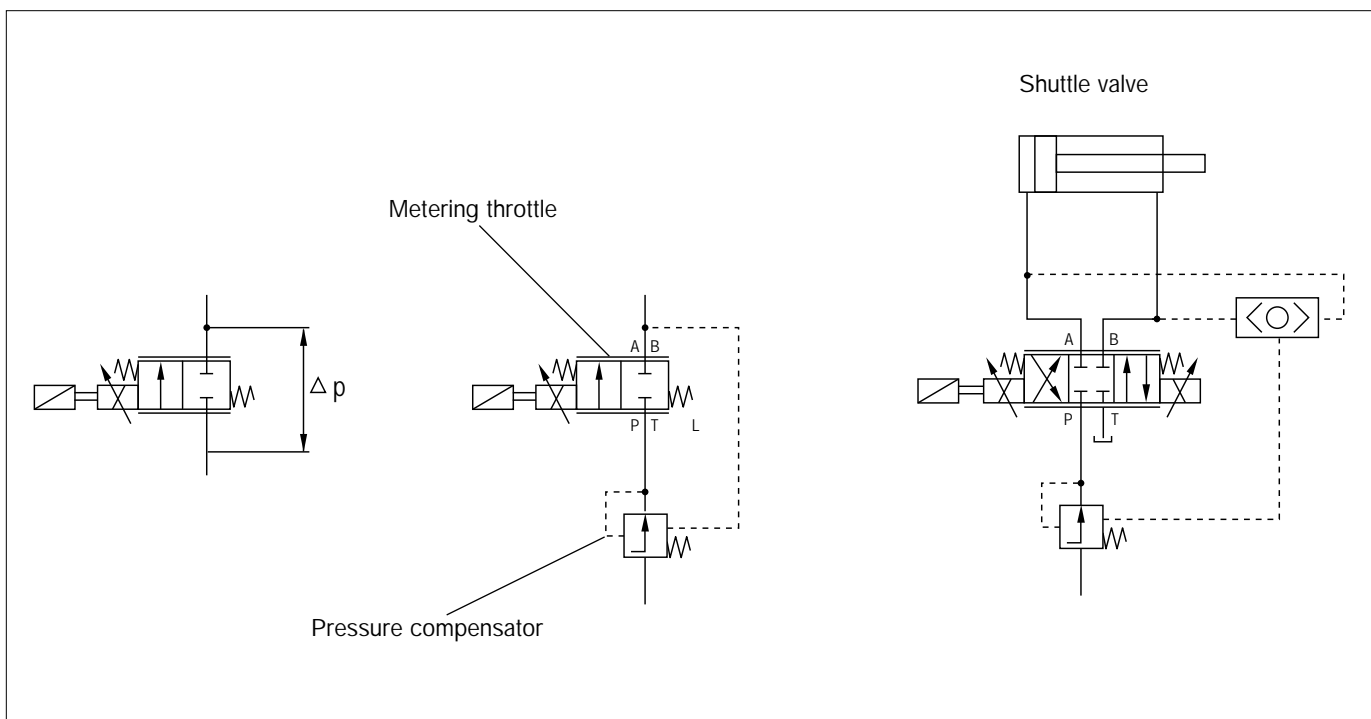


As with all throttle valves the flow through proportional throttle and proportional directional control valves is dependent on the pressure drop ( $\Delta p$ ).

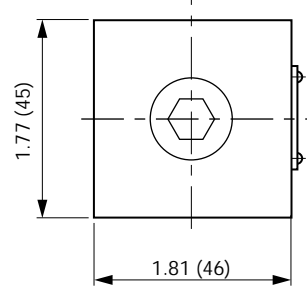
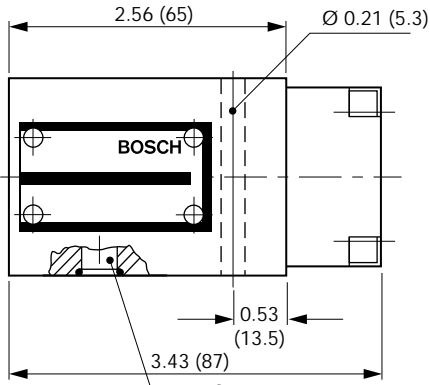
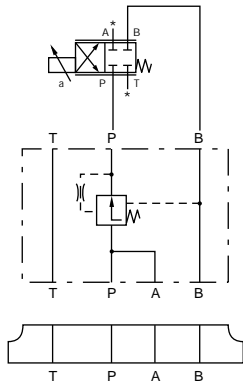
The effect of a pressure compensated flow control valve is obtained by combining the throttle valve with a "pressure compensator".

The pressure compensator keeps the pressure drop ( $\Delta p$ ) constant at the "metering orifice". The pressure drop ( $\Delta p$ ) is determined by the pressure compensator spring and lies in the 4...8 bar range.

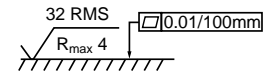
Combining a proportional directional control valve with a pressure compensator produces the effect of a bi-directional pressure compensated flow control valve. The varying load pressure is sensed by a shuttle valve. A counterbalance valve should be applied with an overrunning load.



**2-way pressure compensator NG 6**

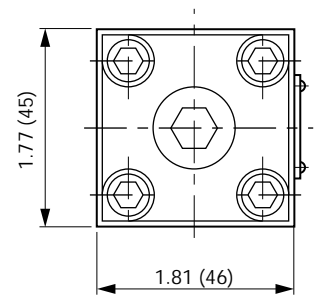
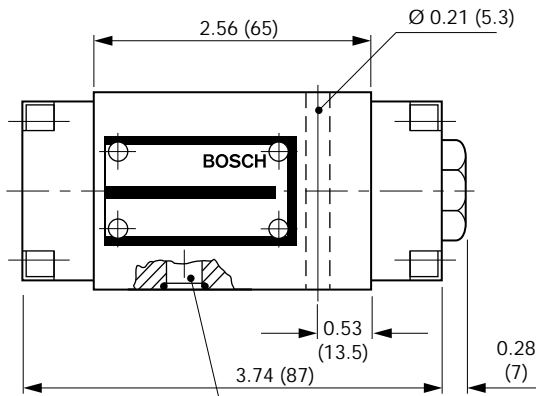
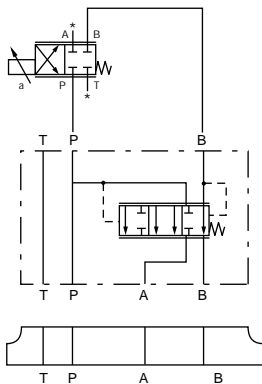


(4x) 10 x 1.5  
Set **1 817 010 269**

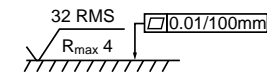


For valve	NG	$\Delta p$ PSI (bar)	Q GPM (l/min)	LBS (kg)	
Proportional throttle valve	6	116 (8)	6.6 (25)	2.4 (1.3)	<b>0 811 401 201</b>

**3-way pressure compensator NG 6**

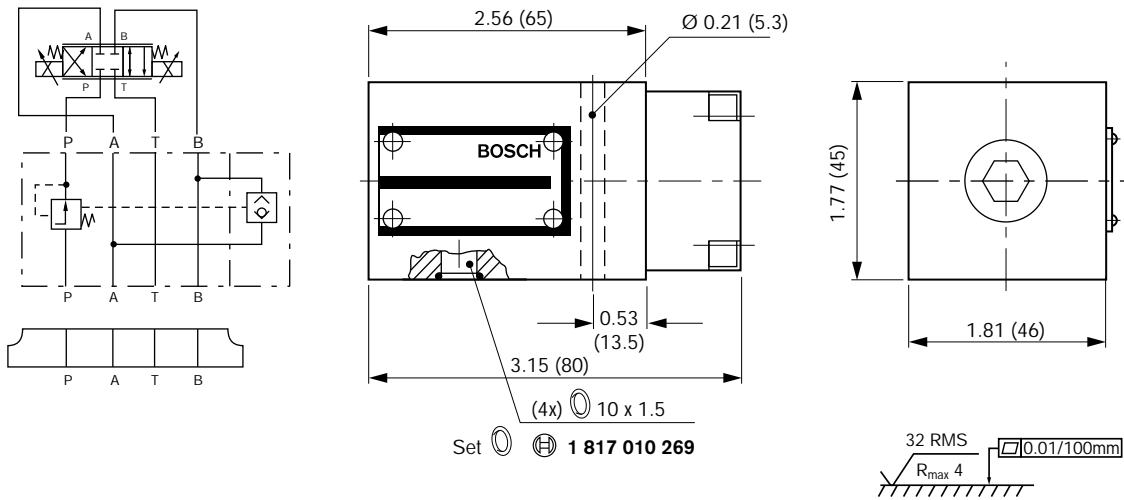



(4x) 10 x 1.5  
Set **1 817 010 271**



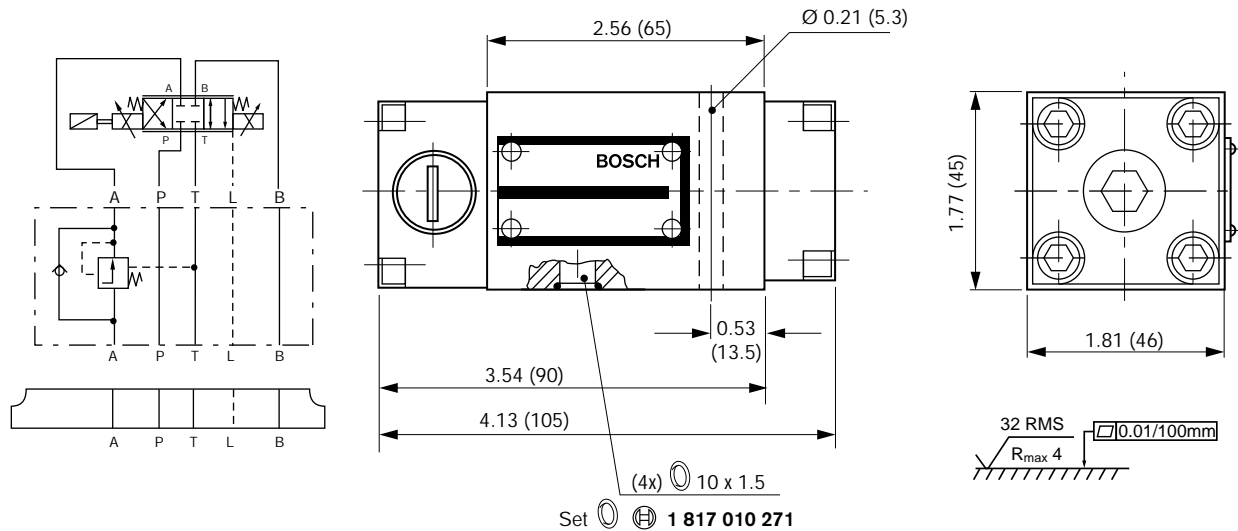
For valve	NG	$\Delta p$ PSI (bar)	Q GPM (l/min)	LBS(kg)	
Proportional throttle valve	6	116 PSI (8)	6.6 (25)	2.9 (1.3)	<b>0 811 401 203</b>


**2-way pressure compensator with shuttle valve NG 6**



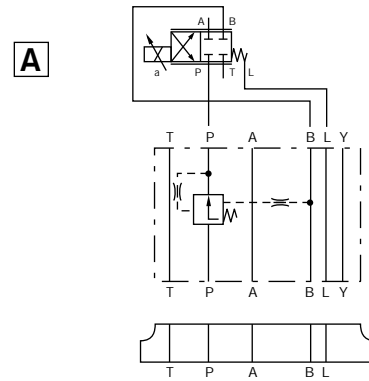
For valve	NG	$\Delta p$ PSI (bar)	Q GPM (l/min)	LBS (kg)	
Proportional directional valve	6	116 PSI (8)	6.6 (25)	2.7 (1.2)	<b>0 811 401 200</b>

**3-way pressure compensator in A NG 6**

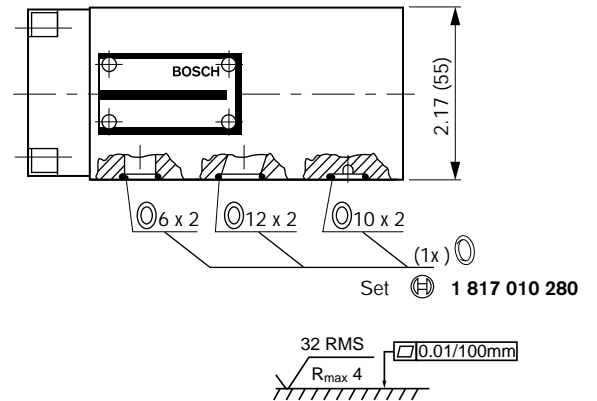
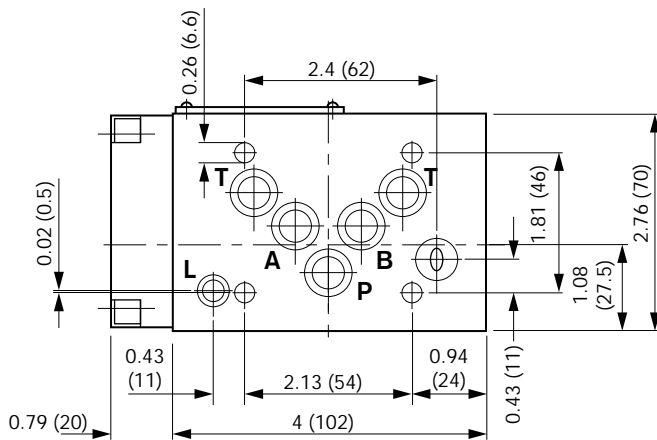
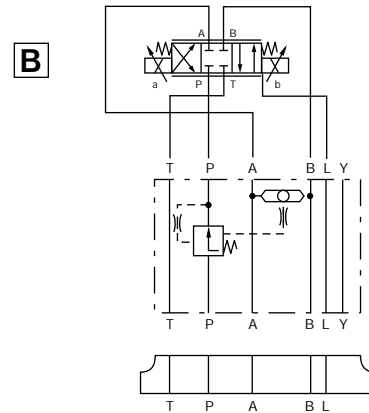


For valve	NG	$\Delta p$ PSI (bar)	Q GPM (l/min)	LBS (kg)	
Proportional directional valve	6	116 PSI (8)	6.6 (25)	2.7 (1.2)	<b>0 811 401 202</b>

**2-way pressure compensator NG 10**



**2-way pressure compensator with shuttle valve NG 10**



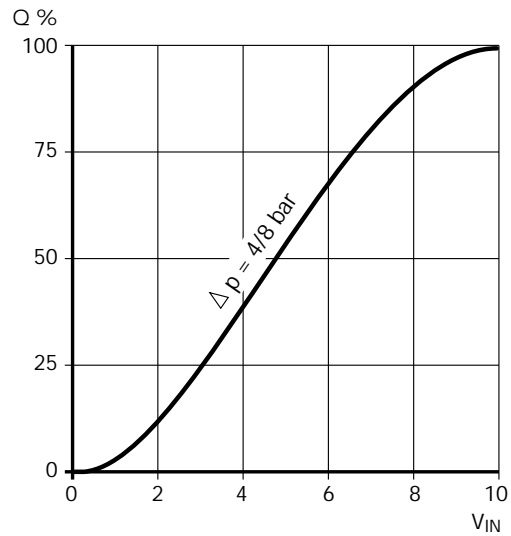
Mounting pattern as per  
DIN 24 340 A10 and ISO 4401  
with additional L-port (Bosch)

	For valve	NG	$\Delta p$ PSI (bar)	$Q$ GPM (l/min)	LBS (kg)	$\oplus$
<b>A</b>	Throttle valve	10	58 (4)	13 (50)	4 (1.8)	<b>0 811 401 220</b>
			116 (8)	20 (75)		<b>0 811 401 221</b>
<b>B</b>	Directional control valve		58 (4)	13 (50)	<b>0 811 401 222</b>	
			116 (8)	20 (75)	<b>0 811 401 223</b>	

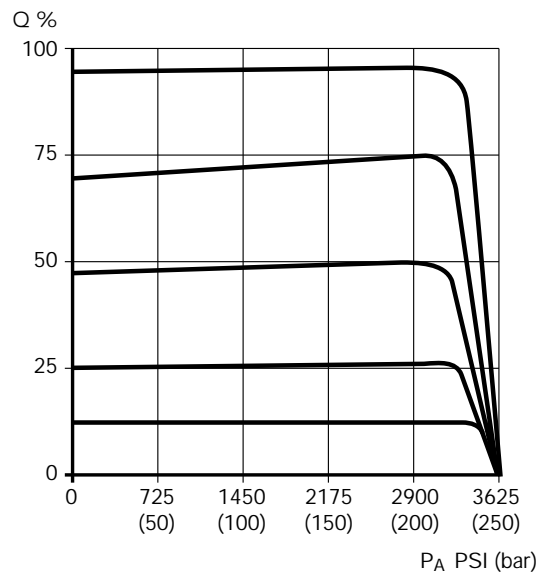
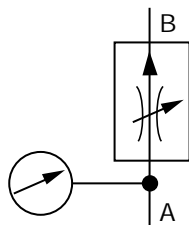
Performance curves of the pressure compensators

$Q = f(V_{IN})$  NG 6, NG 10

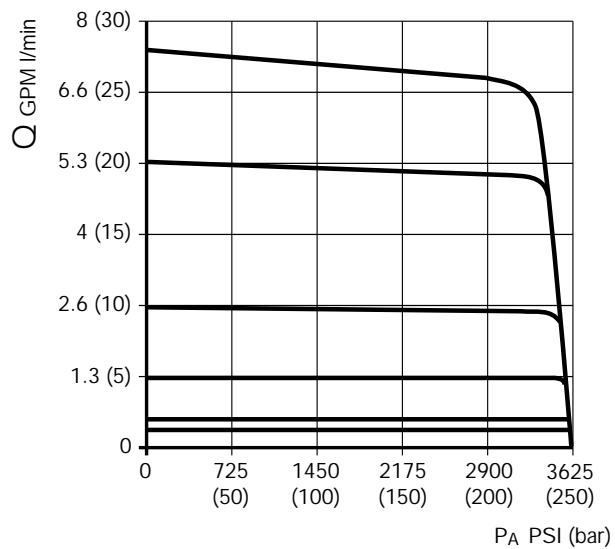
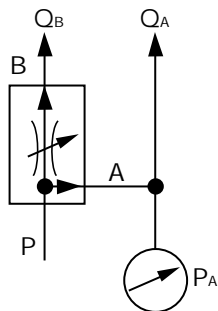
The characteristic curve of the proportional throttle/ directional control valve is valid for  $\Delta p = 116$  (8) or 58 (4), PSI (bar)



Flow as a function of Load Pressure



Flow as a function of A Port Pressure



**NG 6 Subplates**

Inches (Millimeters)

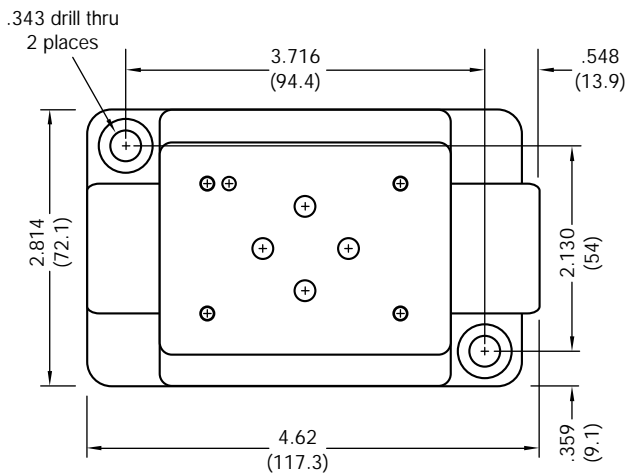
Bolt Kit	
Kit	Part Number
B-120 valve only	<b>953 611</b>

NG 6 Side Ported		
Port Size	A in. (mm)	Part Number
1/4" NPTF	.474 (12.0)	<b>9 000 010 147</b>
3/8" NPTF	.474 (12.0)	<b>9 000 010 145</b>
1/2" NPTF	.579 (14.7)	<b>9 000 010 142</b>
#6 SAE	.474 (12.0)	<b>9 000 010 143</b>
#8 SAE	.579 (14.7)	<b>9 000 010 141</b>

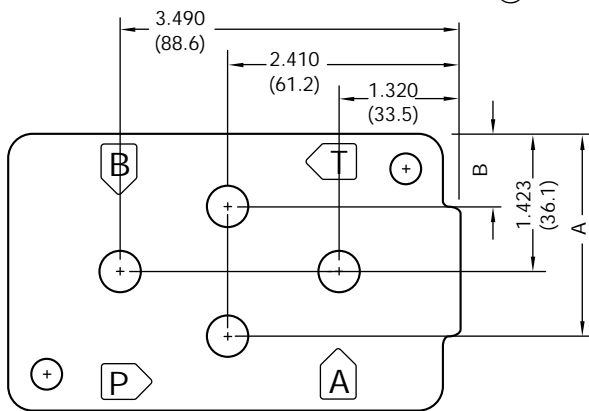
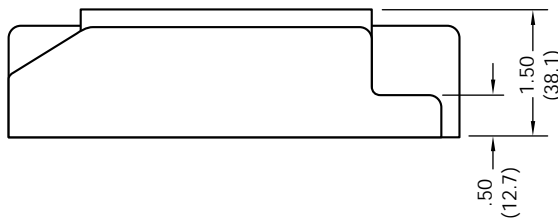
NOTE: Max. Pressure = 4600 PSI (315)

NG 6 Bottom Ported			
Port Size	A in. (mm)	B in. (mm)	Part Number
1/4" NPTF	2.017 (51.2)	.829 (21.0)	<b>9 000 010 148</b>
3/8" NPTF	2.079 (52.8)	.766 (19.5)	<b>9 000 010 146</b>
1/2" NPTF	2.130 (54.1)	.710 (18.0)	<b>9 000 010 139</b>
#6 SAE	2.050 (52.0)	.797 (20.2)	<b>9 000 010 144</b>
#8 SAE	2.130 (54.1)	.710 (18.0)	<b>9 000 010 140</b>

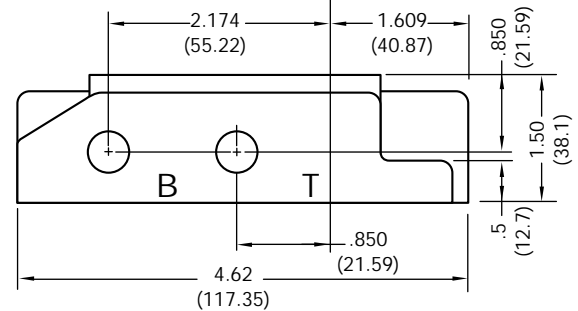
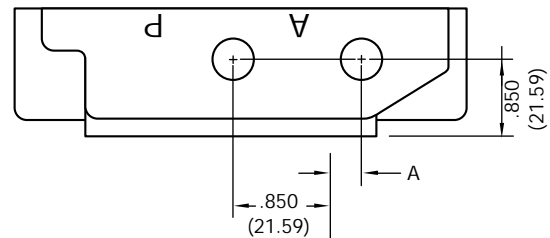
NOTE: Max. Pressure = 4600 PSI (315)



**Bottom ported**



**Side ported**



When a subplate is not used a machined pad must be provided.  
The mounting surface should comply with NFPA T3.5.1M R1- 1984  
and ANSI B93.7M- 1986 specifications.

**NG 10 Subplates**

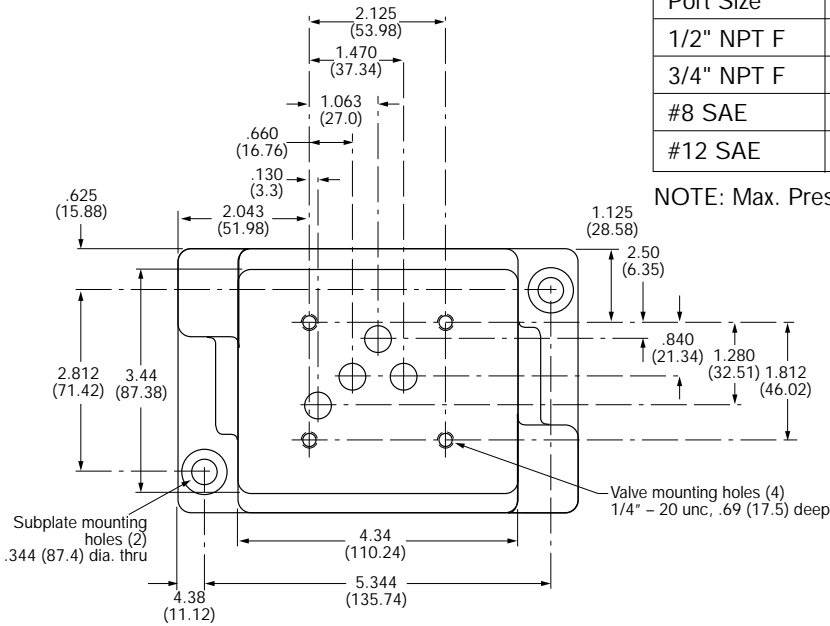
Inches (Millimeters)

NG 10 Side Ported		
Port Size	Part Number	With "L" Port
1/2" NPT F	<b>9 000 010 164</b>	<b>9 000 010 171</b>
3/4" NPT F	<b>9 000 010 166</b>	<b>9 000 010 180</b>
#8 SAE	<b>9 000 010 165</b>	<b>9 000 010 173</b>
#12 SAE	<b>9 000 010 175</b>	<b>9 000 010 182</b>

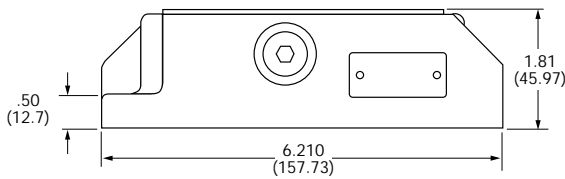
NG 10 Bottom Ported		
Port Size	Part Number	With "L" Port
1/2" NPT F	<b>9 000 010 172</b>	<b>9 000 010 170</b>
3/4" NPT F	<b>9 000 010 181</b>	<b>9 000 010 179</b>
#8 SAE	<b>9 000 010 174</b>	<b>9 000 010 168</b>
#12 SAE	<b>9 000 010 183</b>	<b>9 000 010 176</b>

NOTE: Max. Pressure = 4600 PSI (315)

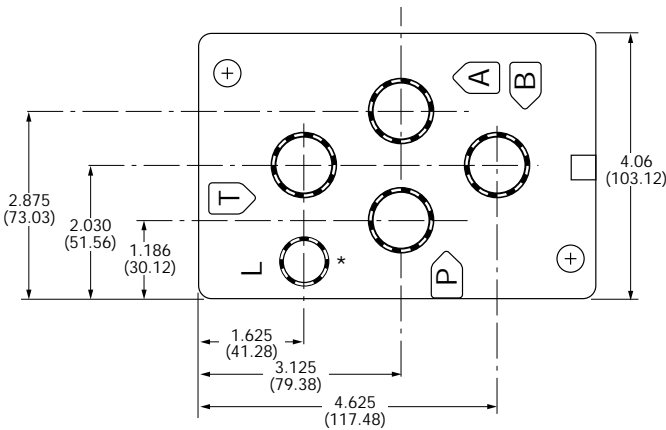
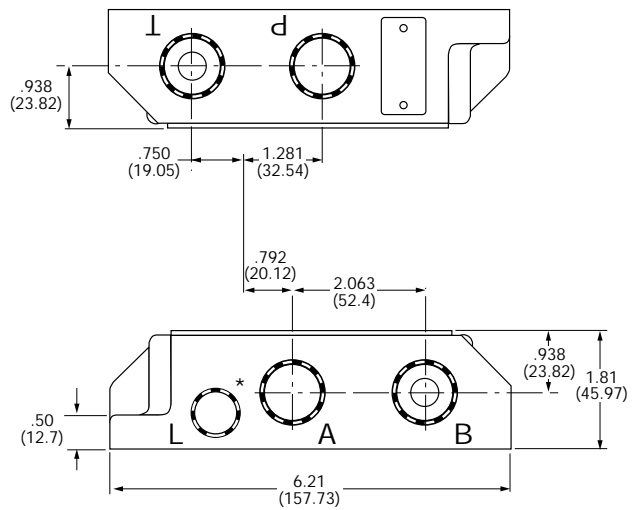
Bolt Kit	
Kit	Part Number
B-180 valve only	<b>953 675</b>



**Bottom ported**



**Side ported**

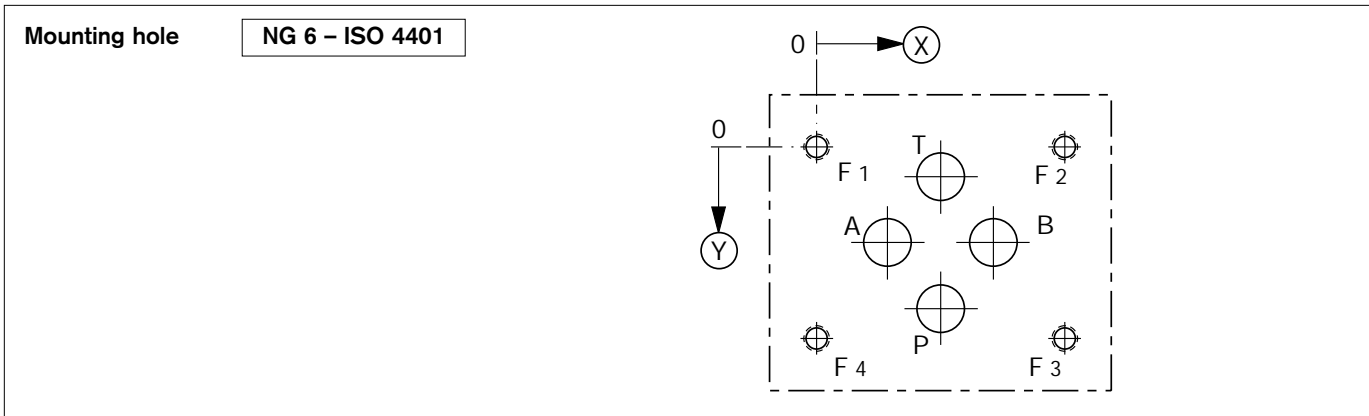


\* For subplates with "L" port:  
NPT = 1/4" NPTF  
SAE = #6 SAE

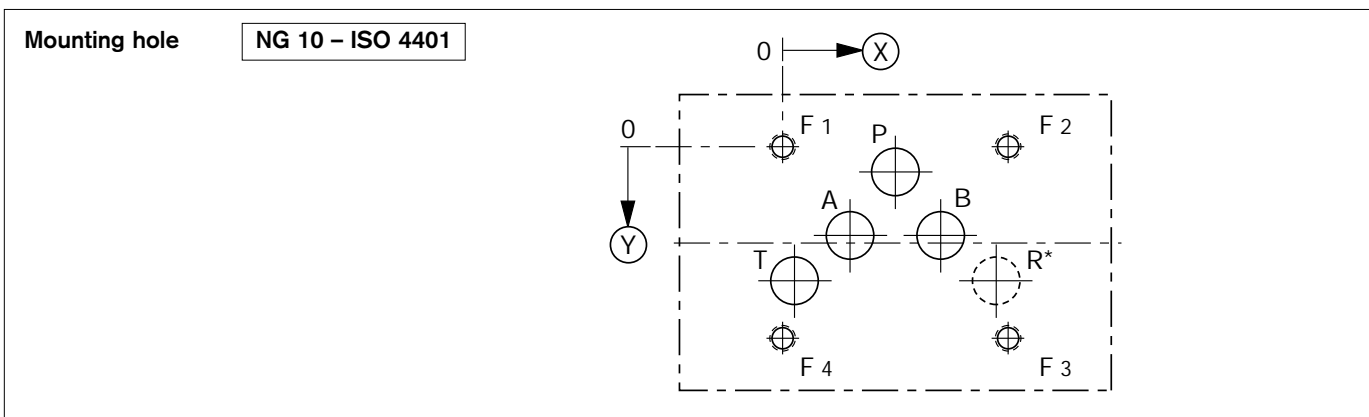
When a subplate is not used a machined pad must be provided. The mounting surface should comply with NFPA T3.5.1M R1- 1984 and ANSI B93.7M- 1986 specifications.



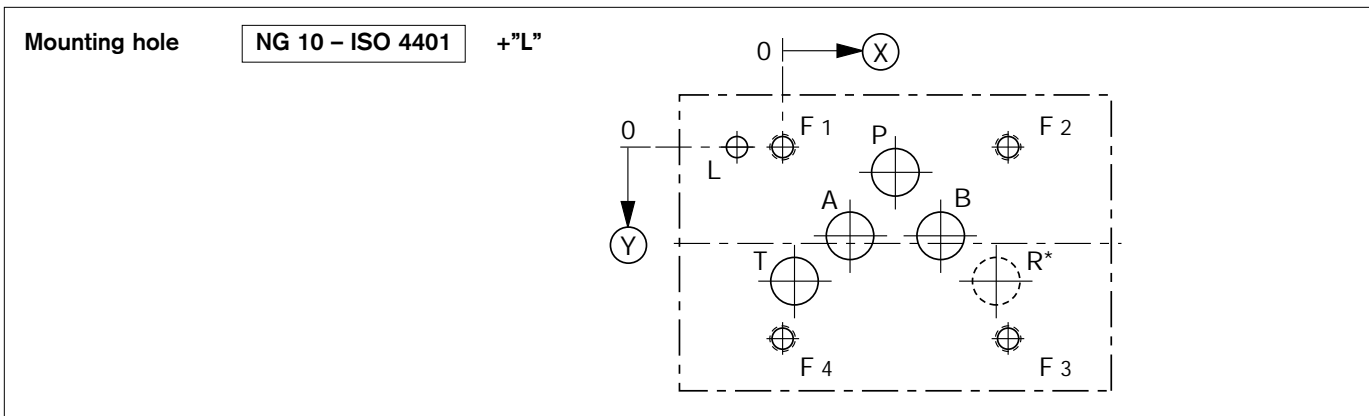




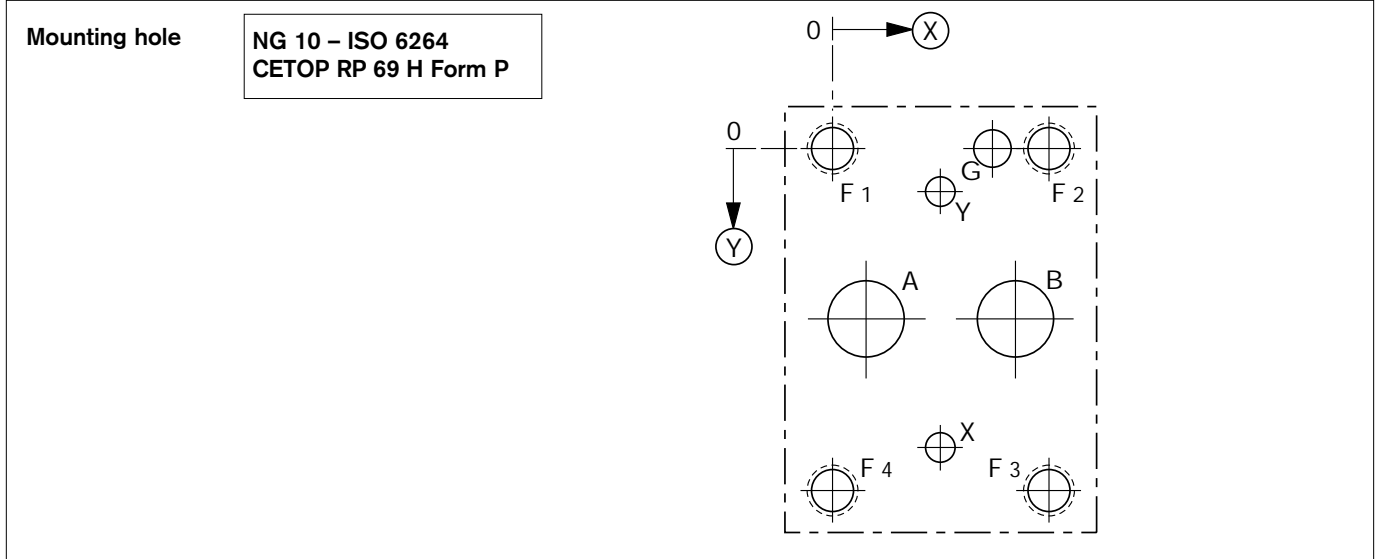
	P	A	T	B	F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>	F <sub>4</sub>
⊗	21.5	12.7	21.5	30.2	0	40.5	40.5	0
⊙	25.9	15.5	5.1	15.5	0	-0.75	31.75	31
∅	8 <sup>1)</sup>	8 <sup>1)</sup>	8 <sup>1)</sup>	8 <sup>1)</sup>	M 5 <sup>2)</sup>	M 5 <sup>2)</sup>	M 5 <sup>2)</sup>	M 5 <sup>2)</sup>



	P	A	T	B	F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>	F <sub>4</sub>	R
⊗	27	16.7	3.2	37.3	0	54	54	0	50.8
⊙	6.3	21.4	32.5	21.4	0	0	46	46	32.5
∅	10.5 <sup>1)</sup>	10.5 <sup>1)</sup>	10.5 <sup>1)</sup>	10.5 <sup>1)</sup>	M 6 <sup>2)</sup>	M 6 <sup>2)</sup>	M 6 <sup>2)</sup>	M 6 <sup>2)</sup>	10.5 <sup>1)</sup>



	P	A	T	B	F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>	F <sub>4</sub>	R	L
⊗	27	16.7	3.2	37.3	0	54	54	0	50.8	-11
⊙	6.3	21.4	32.5	21.4	0	0	46	46	32.5	0.5
∅	10.5 <sup>1)</sup>	10.5 <sup>1)</sup>	10.5 <sup>1)</sup>	10.5 <sup>1)</sup>	M 6 <sup>2)</sup>	M 6 <sup>2)</sup>	M 6 <sup>2)</sup>	M 6 <sup>2)</sup>	10.5 <sup>1)</sup>	4.5

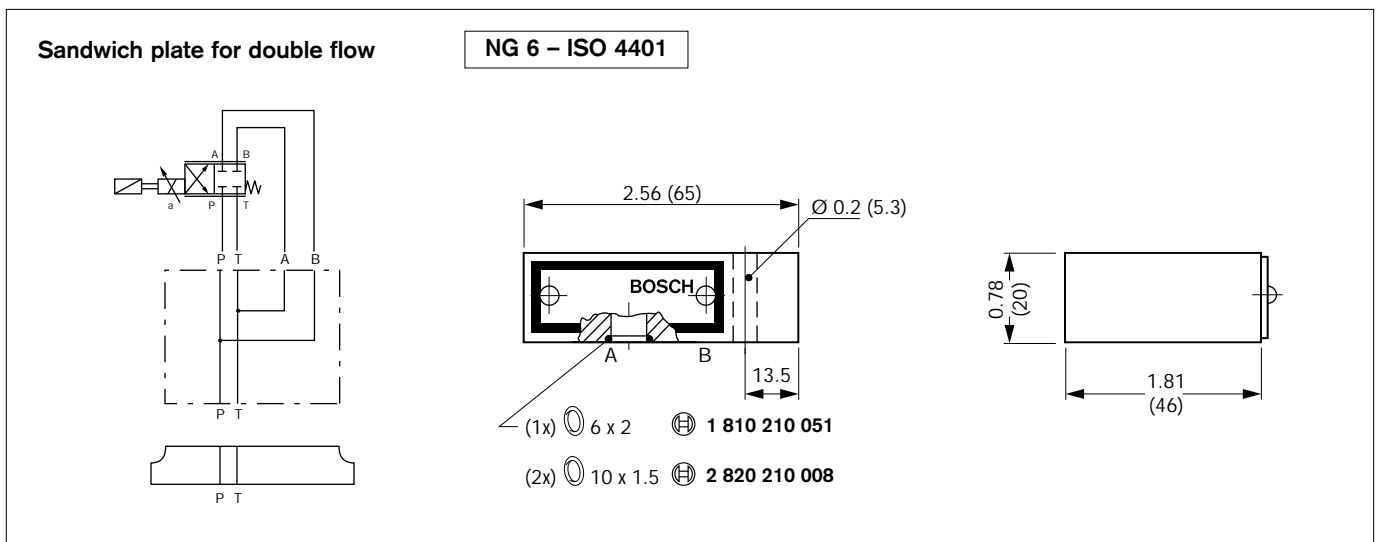


	A	B	X	Y	G	F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>	F <sub>4</sub>
⊗	7.2	35.8	21.4	21.4	31.8	0	42.9	42.9	0
⊙	33.35	33.35	7.9	58.7	0	0	0	66.7	66.7
∅	14.7	14.7	4.8	4.8	7.5	M 10 <sup>2)</sup>	M 10 <sup>2)</sup>	M 10 <sup>2)</sup>	M 10 <sup>2)</sup>

- 1) Non-standard
- 2) Thread depth:  
 steel = 1.5 x dia. \*  
 iron = 2 x dia.  
 non-ferrous = 2.5 x dia.  
 \* NG 10 min. 10.5 mm

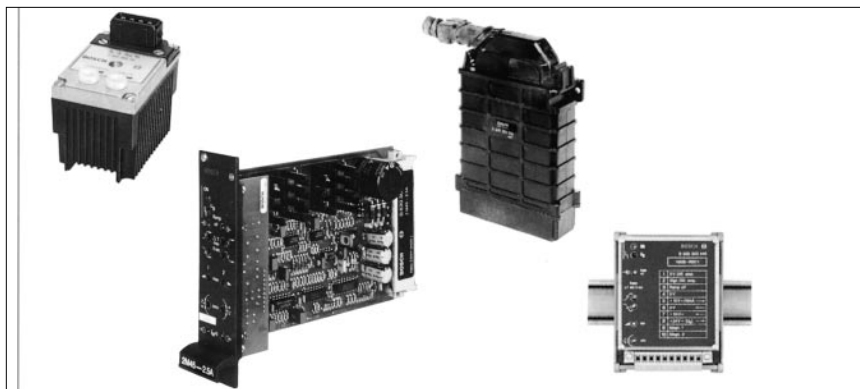
**Tolerances**










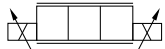




- for connection bores:  
 ± 0.2 mm in X and Y axes
- for mounting and positioning pin bores:  
 ± 0.1 mm in X and Y axes positioning pin bore  
 diameter: H 12
- surface roughness R<sub>max.</sub>: 4 μm
- surface flatness  
 0.01 mm over a distance of 100 mm



For valve	NG	Q GPM (l/min)	P <sub>max.</sub> PSI (bar)	LBS (kg)	⊕
Proportional throttle valve	6	10 (40)	3600 (250)	1.1 (0.5)	<b>0 811 401 204</b>


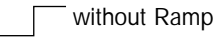
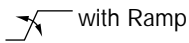
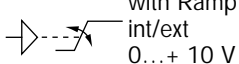


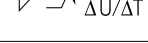
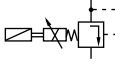


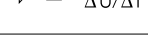
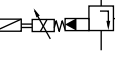






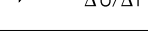
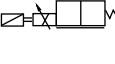


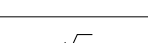
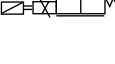


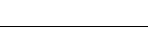
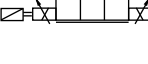


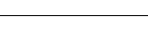
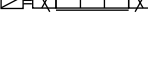
**Amplifier product range**



Version			For		Page	
P 	Mobile Application	AS2.5-V		<b>0 811 405 143</b>	110	
		AS0.8-V		<b>0 811 405 144</b>	110	
		AS2.5-mA		<b>0 811 405 145</b>	110	
B 	Mobile Application	0...2.5 A 1 CH.		<b>0 811 405 091</b>	113	
		0...2.5 A 2 CH.			<b>0 811 405 092</b> <b>1 834 484 185</b>	115 115
M 	Industrial Application	1 M 08-RGC 1		<b>0 811 405 126</b>	117	
		1 M 2.5-RGC 1			<b>0 811 405 127</b>	117
		2 M 2.5-RGC 2			<b>0 811 405 106</b>	120
K 	Industrial Application	1 M 45-0.8 A		<b>0 811 405 081</b>	123	
		1 M 45-2.5 A			<b>0 811 405 079</b>	123
		2 M 45-2.5 A			<b>0 811 405 080</b>	126

These amplifier types are optimally designed for use with Bosch solenoids 0...800 mA or 0...2.5A.

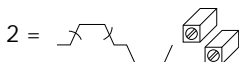
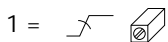
- P = Plug
- M = Module
- B = Box
- K = Card

Version	Mobile Application		For	⊕	Page
  without Ramp  with Ramp  with Ramp int/ext 0...+ 10 V	   $\Delta U/\Delta T$	PV 60 PV 60-RGC 1 PV 60-RGC 3	 50 VA/3.7 A	<b>0 811 405 097</b> <b>0 811 405 102</b> <b>B 830 303 391</b>	130 133 136
	   $\Delta U/\Delta T$	PV 45 PV 45-RGC 1 PV 45-RGC 3	 25 VA/2.5 A	<b>0 811 405 096</b> <b>0 811 405 101</b> <b>B 830 303 388</b>	130 133 136
	   $\Delta U/\Delta T$	PDL 1 PDL 1-RGC 1 PDL 1-RGC 3	 25 VA/2.5 A	<b>0 811 405 095</b> <b>0 811 405 100</b> <b>B 830 303 387</b>	130 133 136
	   $\Delta U/\Delta T$	QV 45 QV 45-RGC 1 QV 45-RGC 3	 25 VA/2.5 A	<b>0 811 405 098</b> <b>0 811 405 103</b> <b>B 830 303 389</b>	130 133 136
	   $\Delta U/\Delta T$	QV 60 QV 60-RGC 1 QV 60-RGC 3	 50 VA/3.7 A	<b>0 811 405 099</b> <b>0 811 405 104</b> <b>B 830 303 390</b>	130 133 136
	   $\Delta U/\Delta T$	WV 45-RGC 2 WV 45-RGC 4	 25 VA/2.5 A	<b>0 811 405 119</b> <b>0 811 405 137</b>	140 143
	   $\Delta U/\Delta T$	WV 60-RGC 2 WV 60-RGC 4	 50VA/3.7 A	<b>0 811 405 120</b> <b>0 811 405 138</b>	140 143



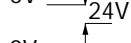


These amplifier types are optimally designed for use with single stage proportional valves with position control (AC/AC position transducer)

**Type**

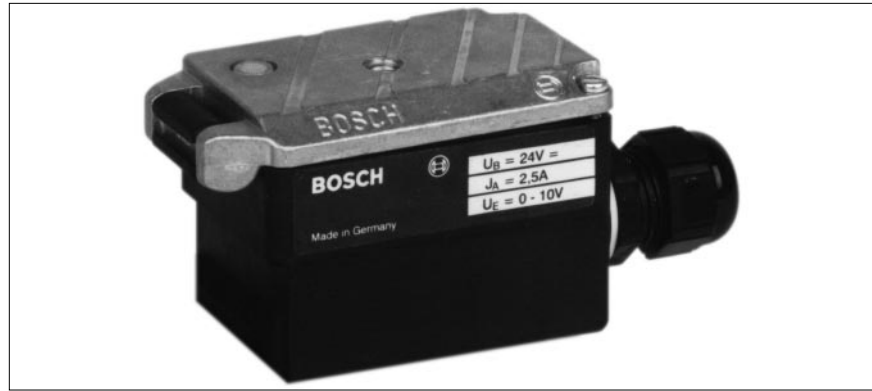
- PV = Pressure valve
- PDL = Linear pressure valve
- QV = Throttle-flow valve
- WV = Directional control valve
- R = Ramp
- G = Gain/max.
- C = Control



Terms

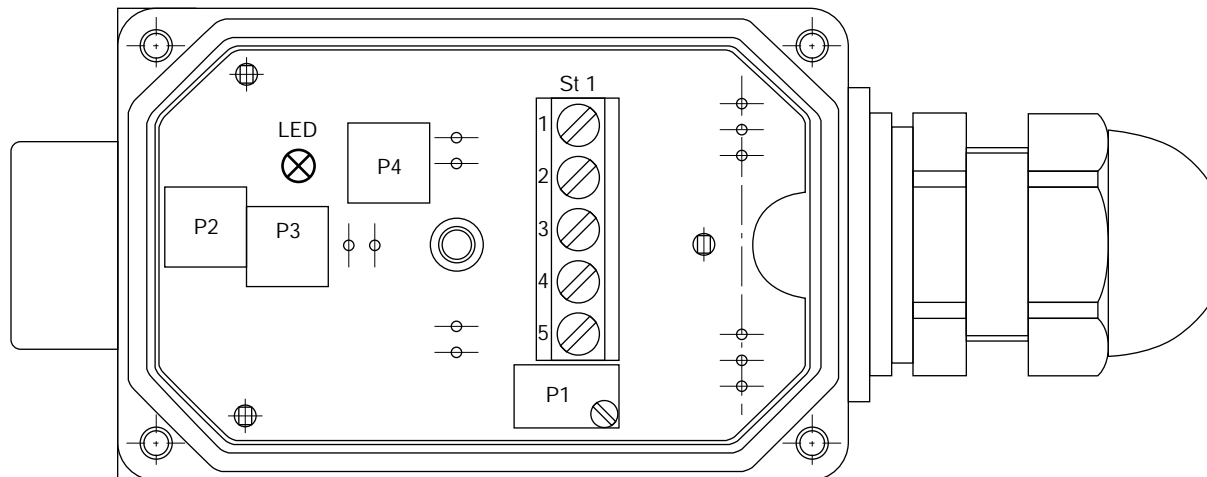
-  Fault indicator
- 24V  
0V  24V  
Output: normally high goes low with fault
- 0V  24V  
Output: normally low goes high when true
-  Indicator lamp
-  Test point

**Proportional  
plug amplifier**




**Dimensions**

- 0–10 VDC Differential Input
- Ramp, Dither, Zero and Gain adjustable under metal cap
- CE approved
- Rugged housing

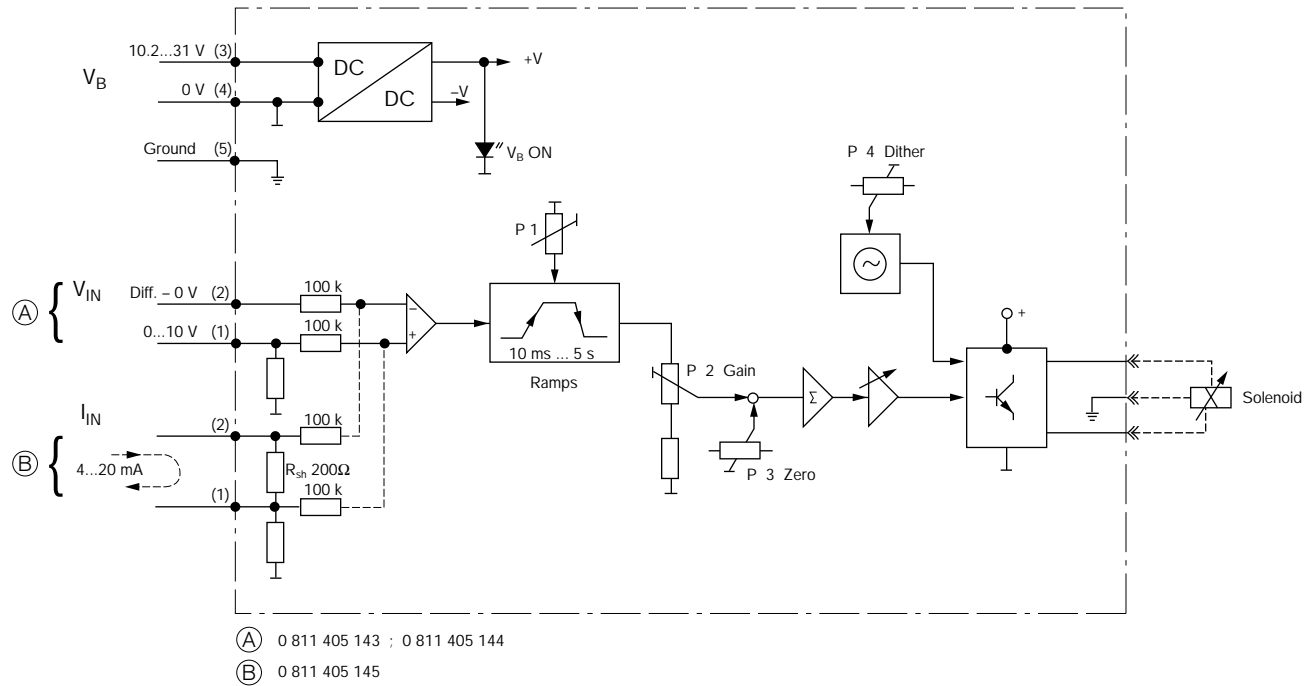


P1 – Ramp time  
 P2 – Gain  
 P3 – Zero  
 P4 – Dither frequency  
 St 1 – Terminal strip  
 LED – Display  $U_B$

Type	For proportional valves without position control	A/W	LBS (kg)	
AS 2.5 – mA	2.5 amp coil 4 – 20 mA command	2.5/25	0.3 (0.15)	<b>0 811 405 145<sup>(1)</sup></b>
AS 0.8 – V	800 mA coil 0 – +10 VDC command	0.8/18		<b>0 811 405 144<sup>(2)</sup></b>
AS 2.5 – V	2.5A coil 0 – +10 VDC command	2.5/25		<b>0 811 405 143<sup>(3)</sup></b>

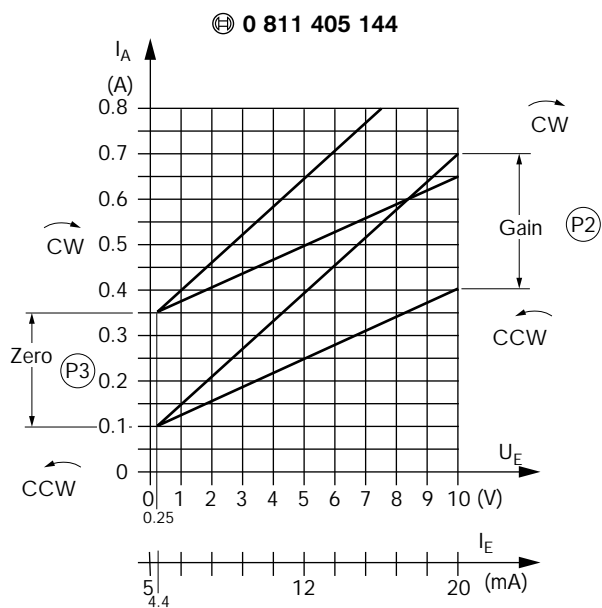
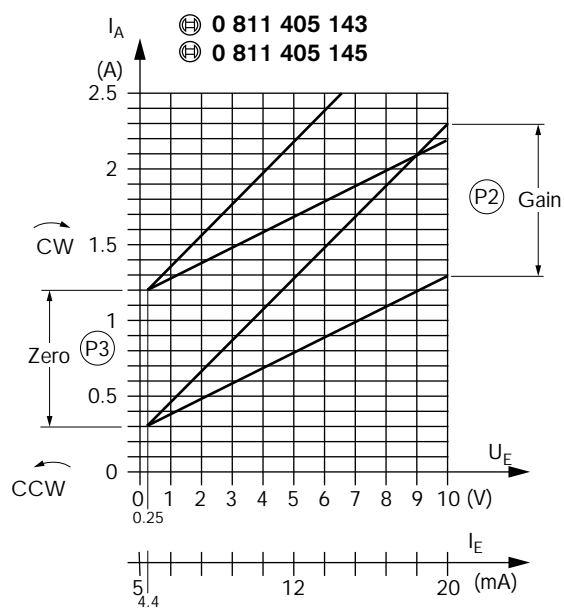
Was <sup>(1)</sup> B 830 304 276, <sup>(2)</sup> B 830 304 275, <sup>(3)</sup> B 830 304 273

**Block diagram and terminal assignment**

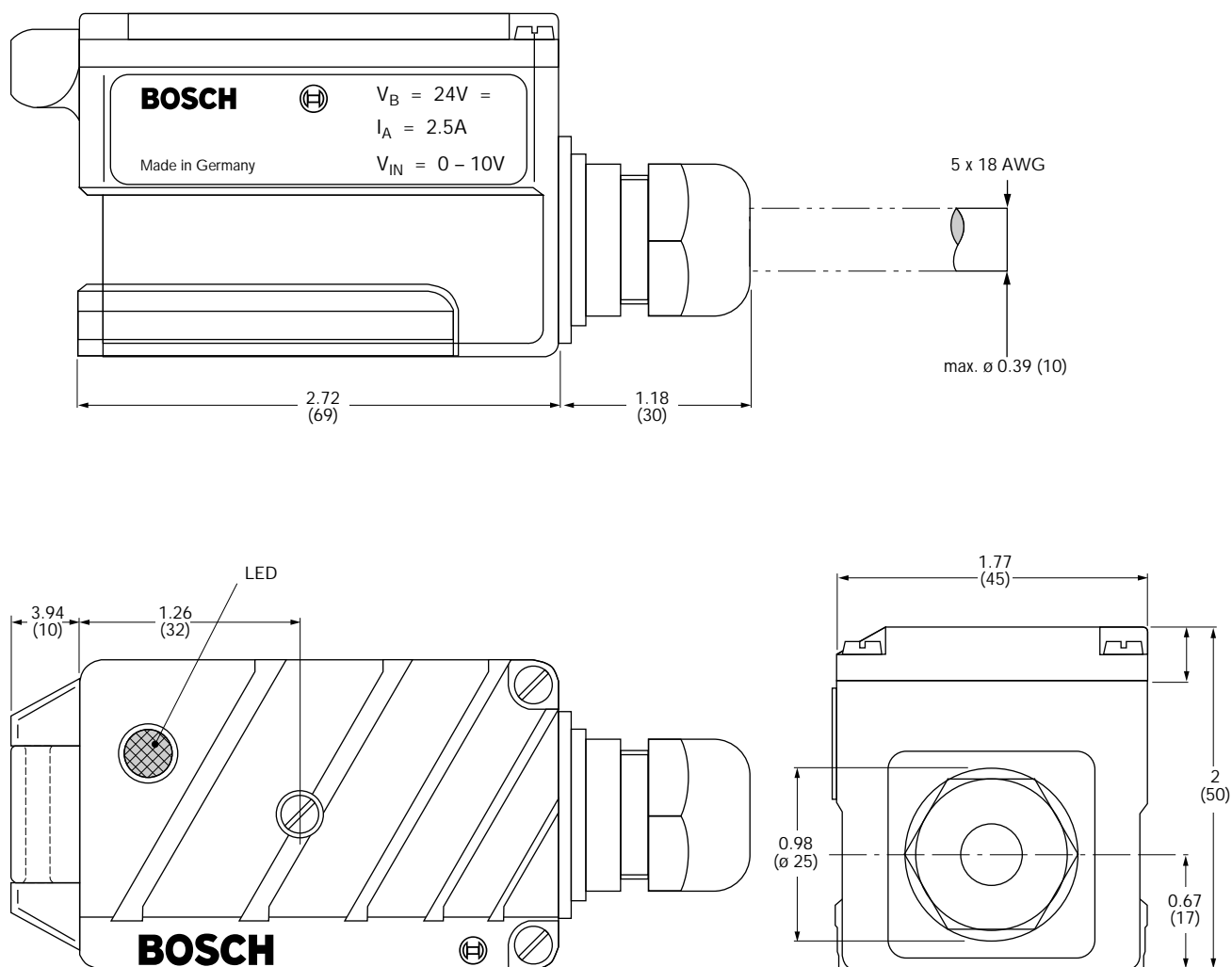


Characteristics	
Structure	Connector shell
Plug connection	-Solenoid -Power setpoint
Plug connection	Solenoid DIN 43650 Cable: 5 x 18AWG shielded (incl. Ground)
Ambient temperature range	-4°...158°F (-20°...+70°C) min. storage temperature -4°F (-20°C)
Environmental protection	IP 65 when attached to valve
Supply voltage	nom. 24VDC (10.2 ... 31V) Rectified volt. 10.2 ... 27V Ripple max. 2V <sub>SS</sub>
Current rating	1.1 A or 1.5 A
Setpoint	⊕ 0 811 405 143 ⊕ 0 811 405 144 ⊕ 0 811 405 145
	0 ... 10VDC
	4 ... 20 mA
Output	⊕ 0 811 405 145 ⊕ 0 811 405 143 ⊕ 0 811 405 144
	I <sub>max</sub> = 2.5 A (PWM)
	I <sub>max</sub> = 0.8 A (PWM)
Ramp time	10 ms ... 5 s
Dither frequency range (adjustable)	80 ... 350 Hz, preset at factory
Offset compensation range	See performance curves on page 111
Gain compensation range	
Special features	LED (green): Supply voltage on Short-circuit-proof inputs and outputs PWM output stage Rapid energizing for fast response times Adjustment via potentiometer

Adjustment



Dimensions

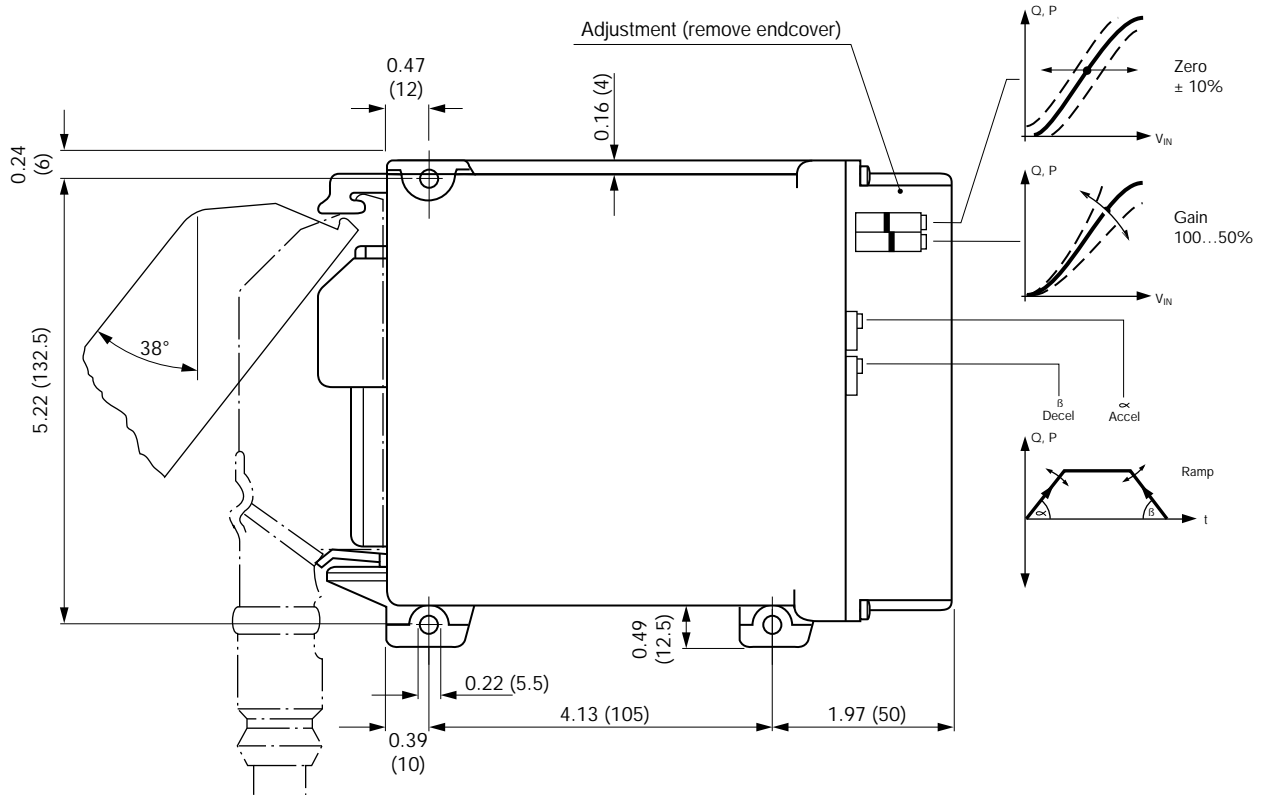






**1 Channel amplifier box with ramps**



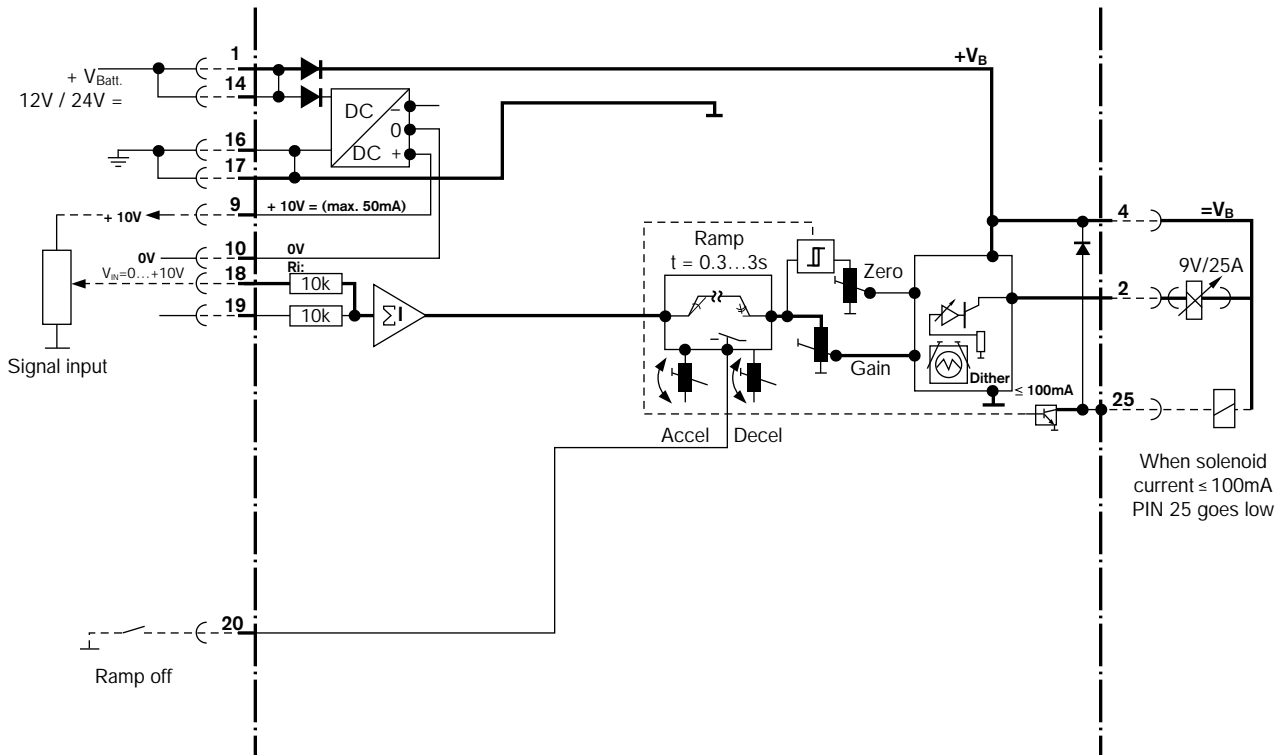
**Dimensions**



For valve	LBS [kg]	
All proportional valves <b>without</b> position control. Solenoid 2.5 A/25 W	1.1 (0.5)	<b>0 811 405 091<sup>(1)</sup></b>
 Connector (Set not included)	0.5 (0.2)	<b>1 834 484 185<sup>(2)</sup></b>

Was <sup>(1)</sup> B 830 303 092 <sup>(2)</sup> D 831 004 396

## Block diagram and terminal assignment



Characteristics	
Dimensions (with plug)	8 1/2 x 6 x 2 in.
Plug connection	Special 25-pin plug (Bosch)
Ambient temperature range	-4° ... 158°F (-20° ... +70°C)
Degree of protection	IP 65 (splashwater) with plug attached and cable sleeve-sealed
Power supply	11...30 VDC, ripple ≤ 10%
Max. power consumption	≤ 30 W
Input signal (setpoint)	0...10 V to (18) or (19) $R_i = 10 \text{ k}\Omega$
Signal source	Potentiometer 1 k $\Omega$ + 10 V supply from (9) (50 mA)
Proportional solenoid output	pulse width modulated $I_{\text{max.}} = 2.5 \text{ A}$
Cable lengths and cross-sections	Solenoid: up to 65 ft. : 18 AWG up to 130 ft. : 14 AWG
Special features	- inputs and outputs short-circuit-proof - PWM output stage - Rapid energization for fast adj. time
Adjustment after removal of housing cover	1. Zero 2. Gain 3. Ramp UP/DOWN
Output PIN 25	(25) : Solenoid $I_m = 0$
<b>Attention:</b> (1) and (14) as well as (16) and (17) are to be jumpered.	

**Ramps**

Ramp UP (Accelerate) and ramp DOWN (Decelerate) are set by the appropriate potentiometers.

**Ramp ON**, if (20) or (8) open.

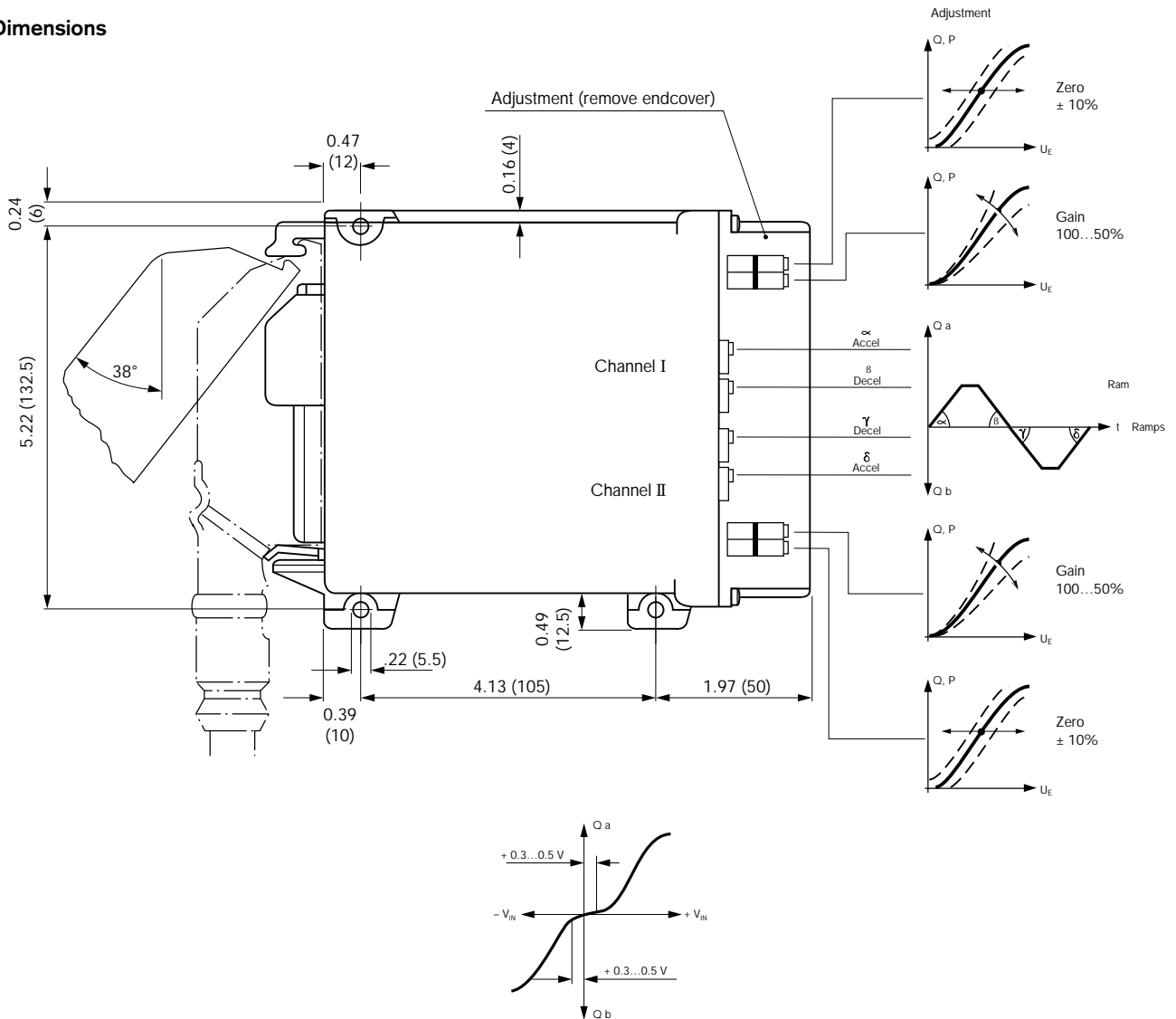
**Ramp OFF**, if (20) or (8) grounded.



**Ramp OFF**, interrupts a ramp in progress. There is an abrupt transition to the signal output value.

**2 Channel amplifier box with ramps**



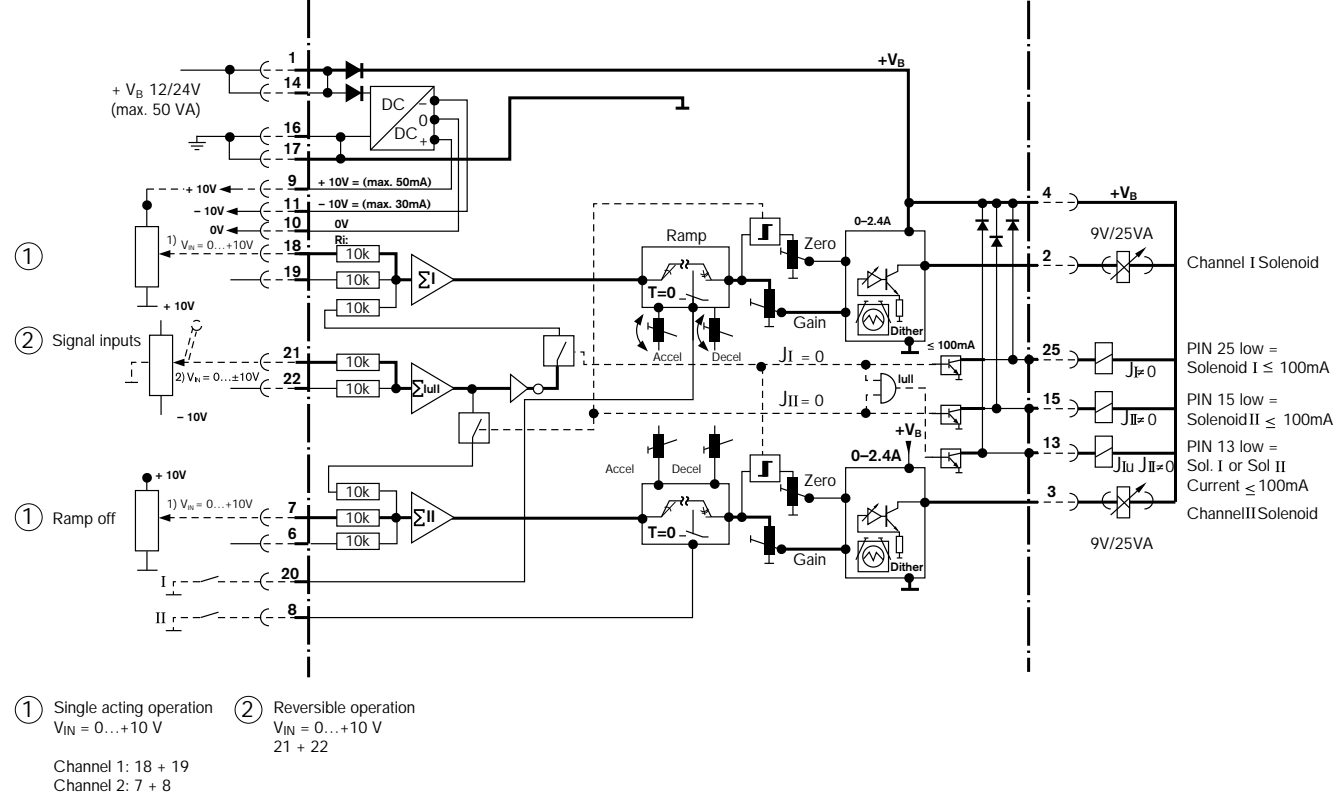
**Dimensions**



For valve	LBS [kg]	
All proportional valves <b>without</b> position control. Solenoid 2.5 A/25 W	1.3 (0.6)	<b>0 811 405 092<sup>(1)</sup></b>
 Plug (not included)	0.5 (0.2)	<b>1 834 484 185<sup>(2)</sup></b>

Was <sup>(1)</sup> B 830 303 060, <sup>(2)</sup> D 831 004 396

Block diagram and terminal assignment



Characteristics	
Dimensions (with plug)	approx. (210 x 150 x 50) mm
Plug connection	Special 25-pin plug (Bosch)
Ambient temperature range	-4° ... 158°F (-20° ... +70°C)
Degree of protection	IP 65 (splashwater) with plug attached and cable sleeve-sealed
Power supply	11...30 VDC, ripple $\leq 10\%$
Max. power consumption	1-Channel: 30 W, 2-Channel: 60 W
Reversing duty input signal	0...± 10 V to (21) or (22)
Input signal for 2x single valves (setpoint)	0...10 V Channel I (18) or (19) Channel II (7) or (6)
Signal source	Potentiometer < 1 k $\Omega$ + 10 V supply from (9) 50 mA - 10 V supply from (11) 30 mA
Proportional solenoid output (2)	pulse width modulated $I_{max.} = 2.5\text{ A}$
Cable lengths and cross-sections	Solenoid: up to 65 ft. : 18 AWG up to 130 ft. : 14 AWG
Special features	- inputs and outputs short-circuit-proof - PWM output stage - Rapid energization for short adj. time
Adjustment after removal of housing cover Channels 1 and 2	1. Zero 2. Gain 3. Ramp UP/DOWN
Outputs (open collector)	PIN 25: Solenoid $I_{MI} = 0$ PIN 15: Solenoid $I_{MII} = 0$ PIN 13: $I_{MI}$ or $I_{MII} = 0$
<b>Attention:</b> (1) and (14) as well as (16) and (17) are to be jumpered.	

Ramps

For each channel, ramp UP (Accelerate) and ramp DOWN (Decelerate) are set by the appropriate trimming potentiometers.

**Ramp ON**, if (20) or (8) open

**Ramp OFF**, if (20) or (8) grounded.

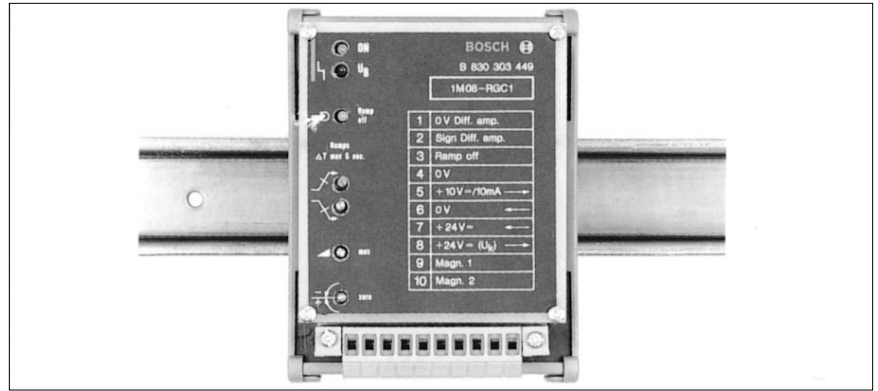
**Ramp OFF**, interrupts a ramp in progress. There is an abrupt transition of the signal output value.

Attention:

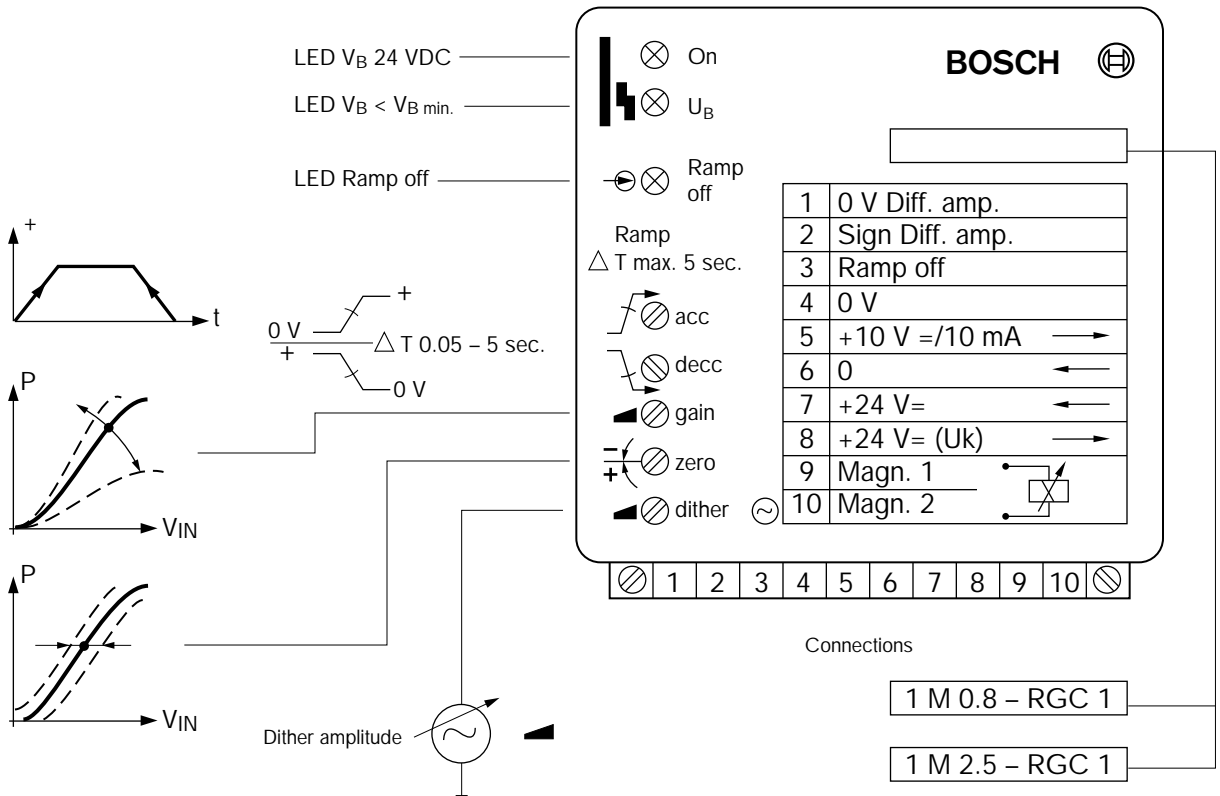
When used in reversible operation mode (Input  $\pm$  setpoint at pin 21 or 22), no input signal is to be applied to Channel I: pin 18 or 19 or Channel II: pin 6 or 7

**Amplifier-module for proportional valves with one solenoid and no LVDT**

**0...800mA**  
**0...2.5A**



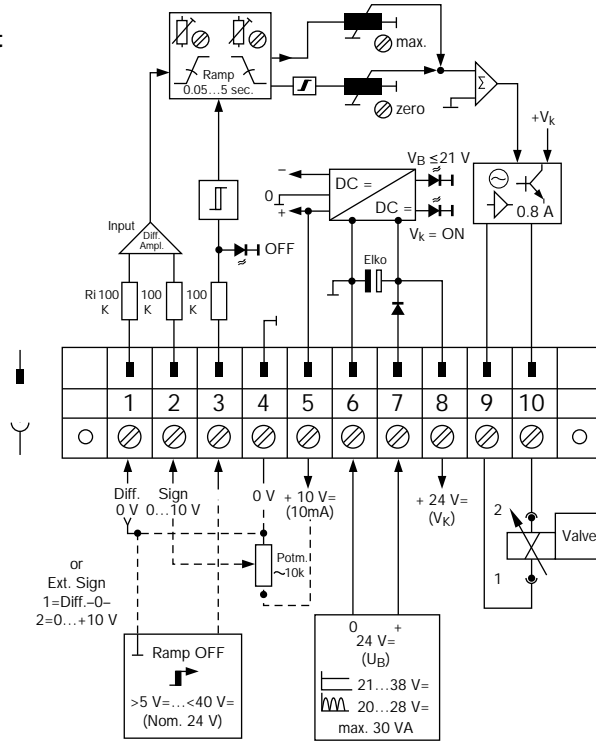
**Function**



Type	For proportional valves with one solenoid and no LVDT	Solenoid	LBS [kg]	
1 M08-RGC 1	(1) 800 mA solenoid	0.8 A/20 VA	0.6 (0.25)	<b>0 811 405 126</b>
1 M 2.5-RGC 1	(1) 2.5 amp solenoid	2.5 A/35VA		<b>0 811 405 127</b>

\* In scope of delivery

Block diagram and terminal assignment



<b>Characteristics</b>	1 M 08 – RGC 1	1 M 2.5 – RGC 1
Module format	3.5 x 4.5 x 2 in. (w x l x h)	3.5 x 4.5 x 3 in. (w x l x h)
Plug connector	Connector 10–pole (Screw clamp)	
Ambient temperature range	32°...158°F (0°...+ 70°C) Storage temperature min. -4°, max.158°F	
Power supply V <sub>B</sub> to (7) - (6)	24 VDC nominal battery voltage 21...40 V Rectified AC voltage V <sub>rms</sub> = 21...28 V (single-phase, full wave rectification)	
Smoothing capacitor, connected separately to (8)	4700 µF/63 VDC, only required if U <sub>B</sub> ripple > 10%	
Valve solenoid A/W	0.8 A/20 W	2.5/25 VA
Current input	1.25 A	1.5 A
	This value may be greater with a low input voltage and long solenoid wires.	
Power consumption (typical)	30 VA	35 VA
Setpoint	(2): 0... + 10 V differential amplifier (1): 0 V (R <sub>i</sub> = 100 k Ω)	
Setpoint source	Potentiometer 10 k Ω + 10 V supply from (5) (10 mA) or external signal source	
Solenoid output (9)–(10)	PWM output I <sub>max</sub> = 0.8 A	I <sub>max</sub> = 2.5 A
Amplifier/valve leads	Solenoid lead: up to 65 ft.: 18 AWG up to 165 ft.: 14 AWG	
LED displays	green: Enable yellow: LVDT cable break red: undervoltage ( V <sub>B</sub> too low)	
External ramp shut-off	(3): 6...40 VDC (nom. 10 VDC)	
Ramp times	0.05...5s	
Adjustments	Zero valve Gain Ramp times	
Special features	Inputs and outputs short-circuit-proof PWM output stage Rapid energization for fast adj. time	

**Ramps**

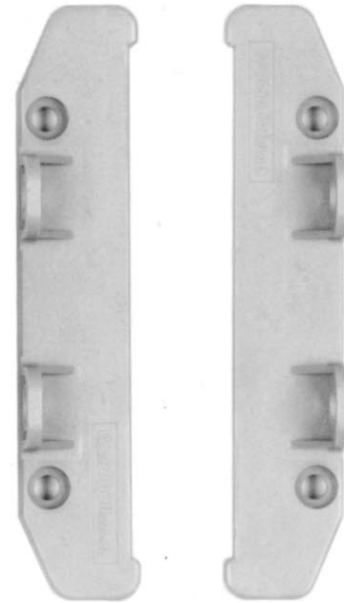
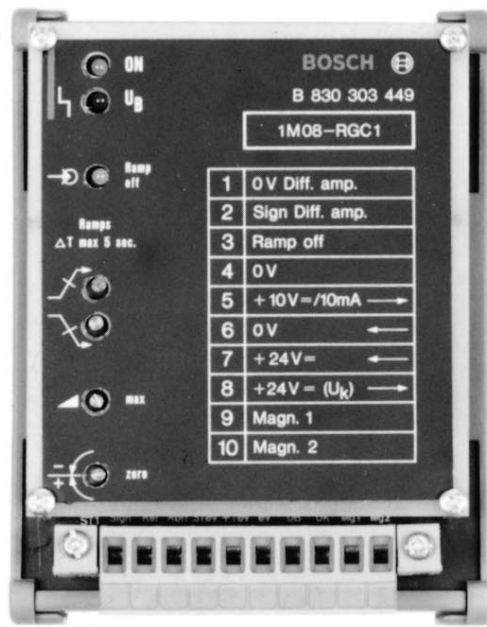
Ramp UP (Accelerate) and ramp DOWN (Decelerate) are set by the appropriate trimming potentiometers.

**Ramp ON**, if (3) open.

**Ramp OFF**, if V . 6 V at (3) e.g. 10 V from (5).

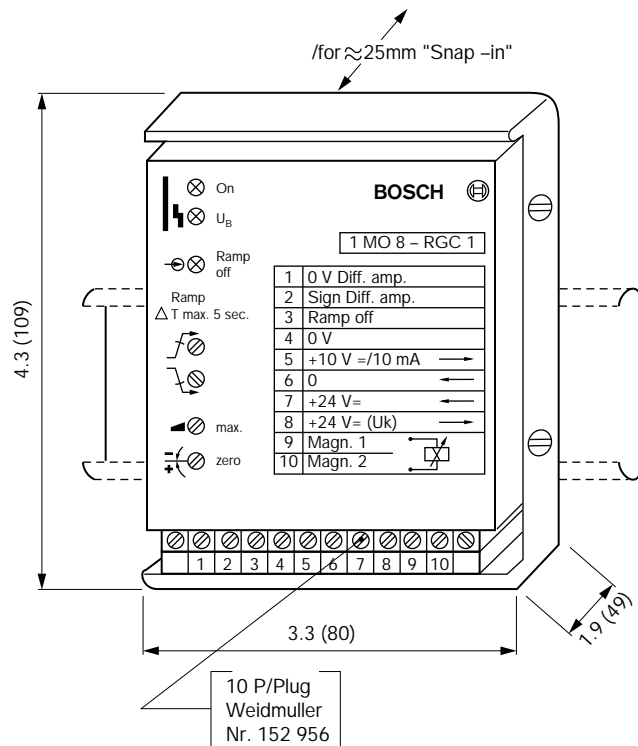
**Ramp OFF**, interrupts a ramp in progress. There is an abrupt transition of the signal output value.

**Mounting variations**



Panel mounting brackets (supplied loose)

**Dimensions**



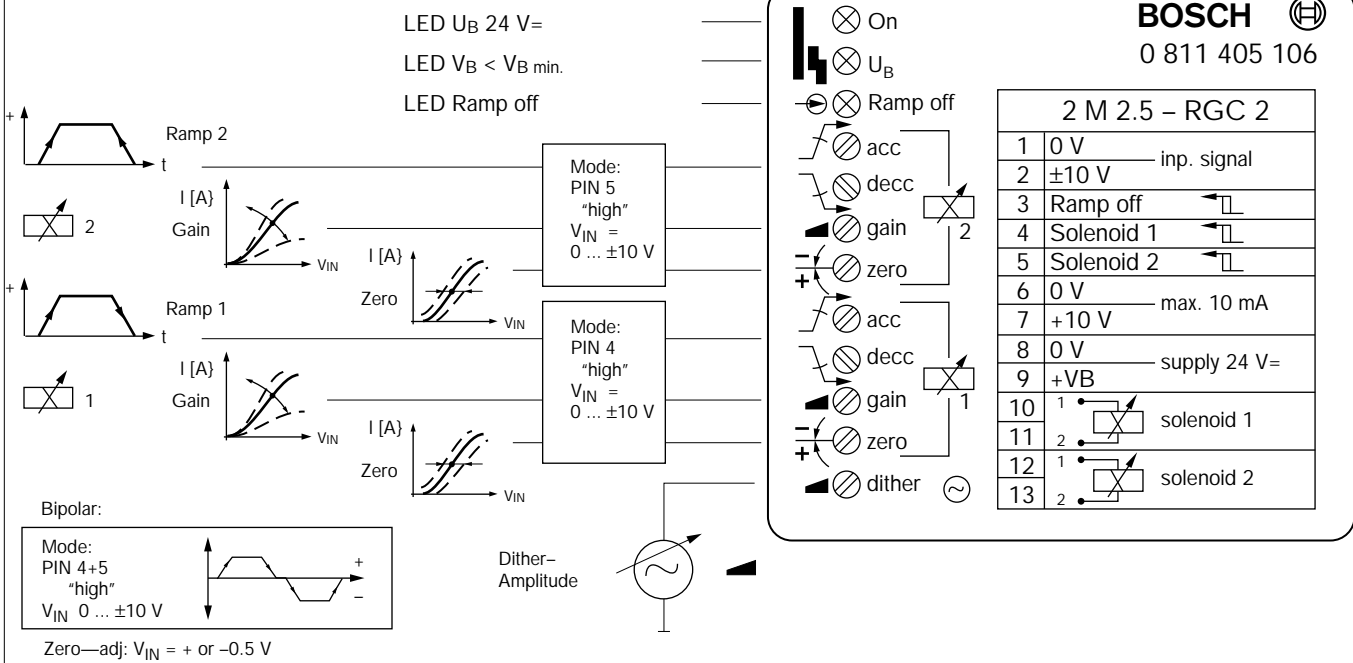
DIN rail mounting


**Amplifier-module for proportional valves with two 2.5A solenoids and no LVDT**

**0 ... 2.5 A**

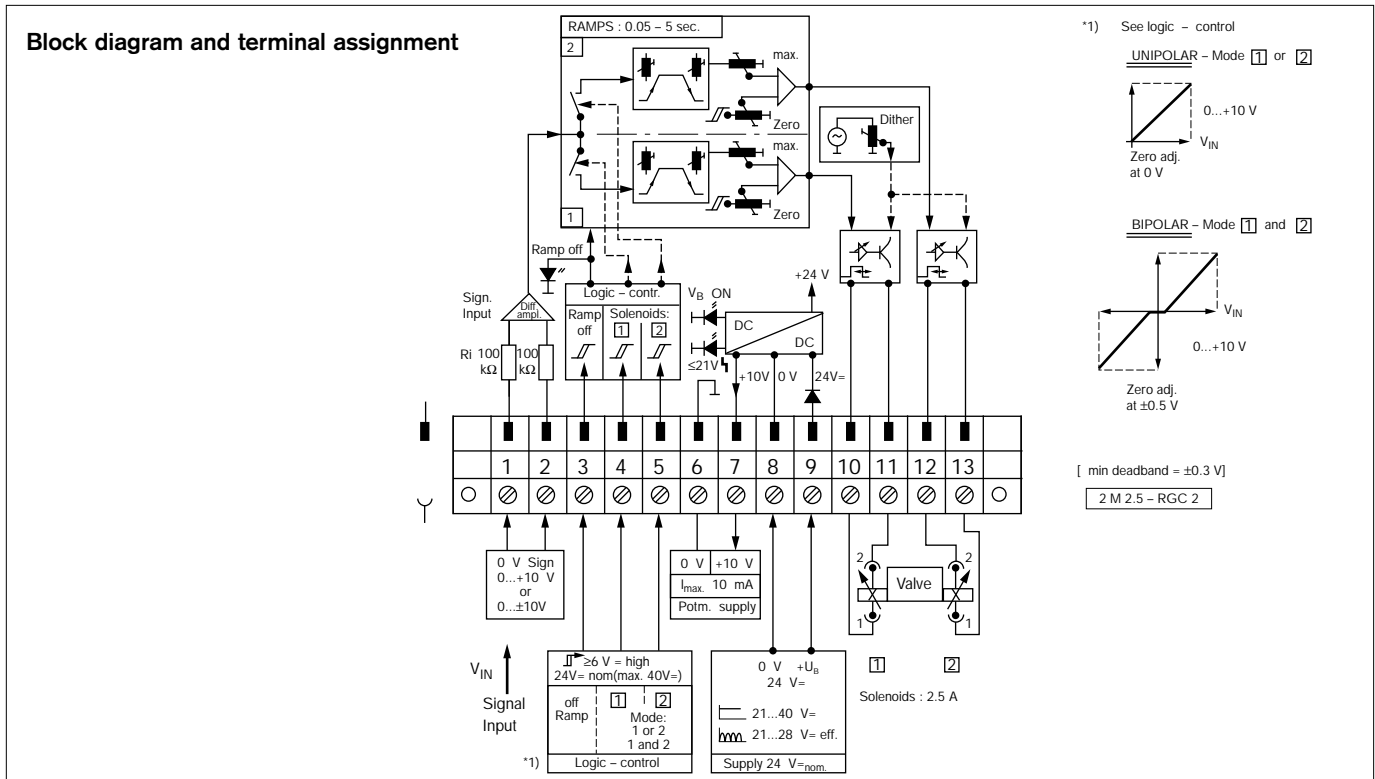


**Function**



Type	For valve	Solenoid	LBS (kg)	
1 M 2.5 - RGC2	Proportional valves without position control	2.5 A	0.7 (0.3)	<b>0 811 405 106</b>





Characteristics		2 M 2.5 – RGC 2
Module format		3.5 x 4.5 x 3 in. (w x l x h)
Plug connector		Connector 13 PIN (Screw clamp)
Ambient temperature range		32°...158°F (0°...+ 70°C) Storage temperature min. -4°, max.158°F
Power supply $V_B$ to (9)		24 VDC nominal battery voltage 21...40 V Rectified AC voltage $V_{rms} = 21...28$ V (single-phase, full wave rectification)
Valve solenoid A/W		2.5/25 VA
Current input		1.5 A This value may be greater with a low input voltage and long solenoid wires.
Power consumption (typical)		35 VA
Setpoint : signal (2) 0V (1)		0... + 10 V or ±0.3... ±10 V (see mode) Differential amplifier, ( $R_i = 100$ k $\Omega$ )
Setpoint and logic	Mode ±10V	(4) and (5) +24V (>6V ... max. 40V) Setpoint ±0.3 ... ±10V
	Mode +10V	(4) + 24V → Setpoint 0 ... +10V ① (5) + 24V → Setpoint 0 ... +10V ②
Setpoint source		Potentiometer 10 k $\Omega$ + 10 V supply from (7) max. 10 mA or external signal source
Solenoids output 1 and 2		PWM output $I_{max} = 2.5$ A
Amplifier/valve leads		Solenoid lead: up to 65 ft.: 18 AWG up to 165 ft.: 14 AWG
LED displays		green: Enable yellow: Ramp – off red: undervoltage ( $V_B$ too low)
External ramp shut-off		(3): 6...40 VDC (nom. 10 VDC)
Ramp times		0.05...5s
Adjustments		Zero valve, Ramp times, Gain, Dither amplitude
Special features		Inputs and outputs short-circuit-proof PWM output stage Rapid energization for fast adj. time

**Ramps**

Ramp UP (Accelerate) and ramp DOWN (Decelerate) are set by the appropriate potentiometers.

**Ramp ON**, if (3) not connected.

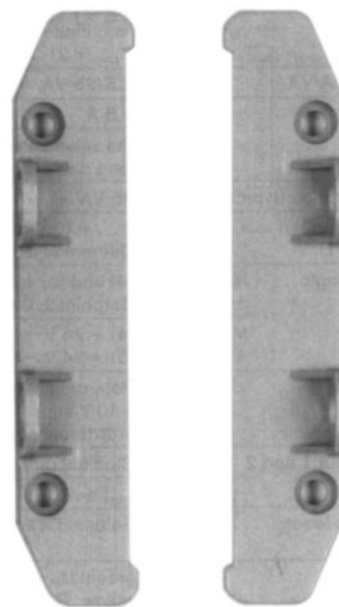
**Ramp OFF**, if  $V > 6$  V at (3) e.g. 10 V from (7) or 24VDC.

**Ramp OFF**, interrupts a ramp in progress. There is an abrupt transition of the signal output value.

**Setting of zero/max. (gain)**

- In mode (4) and (5) = high (24 DC)  
Setpoint  $V_{IN}$  (1) (2) ± 10V  
Zero: from 0.3 V, usually at 0.5 V  
set + = solenoid 1  
set – = solenoid 2  
Gain: at + 10V  
set + = solenoid 1  
set – = solenoid 2
- In mode (4) or (5) = high  
Setpoint  $V_{IN}$  (1) (2) 0 ... + 10V  
Zero: at 0V setpoint  
Gain: at + 10V setpoint  
The logic signal determines that:  
4 = solenoid 1  
5 = solenoid 2.

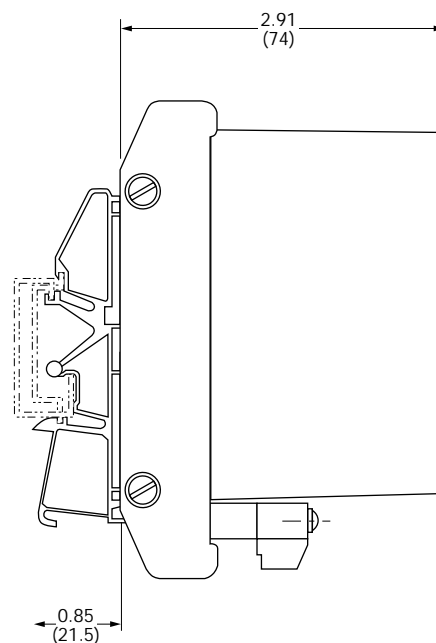
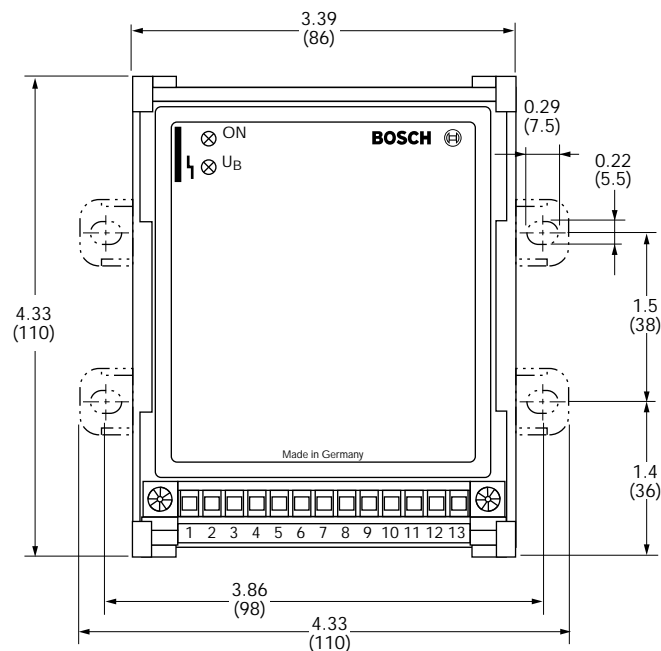
Mounting variations



Rail mounting

Wall mounting Supplied loose

Dimensions

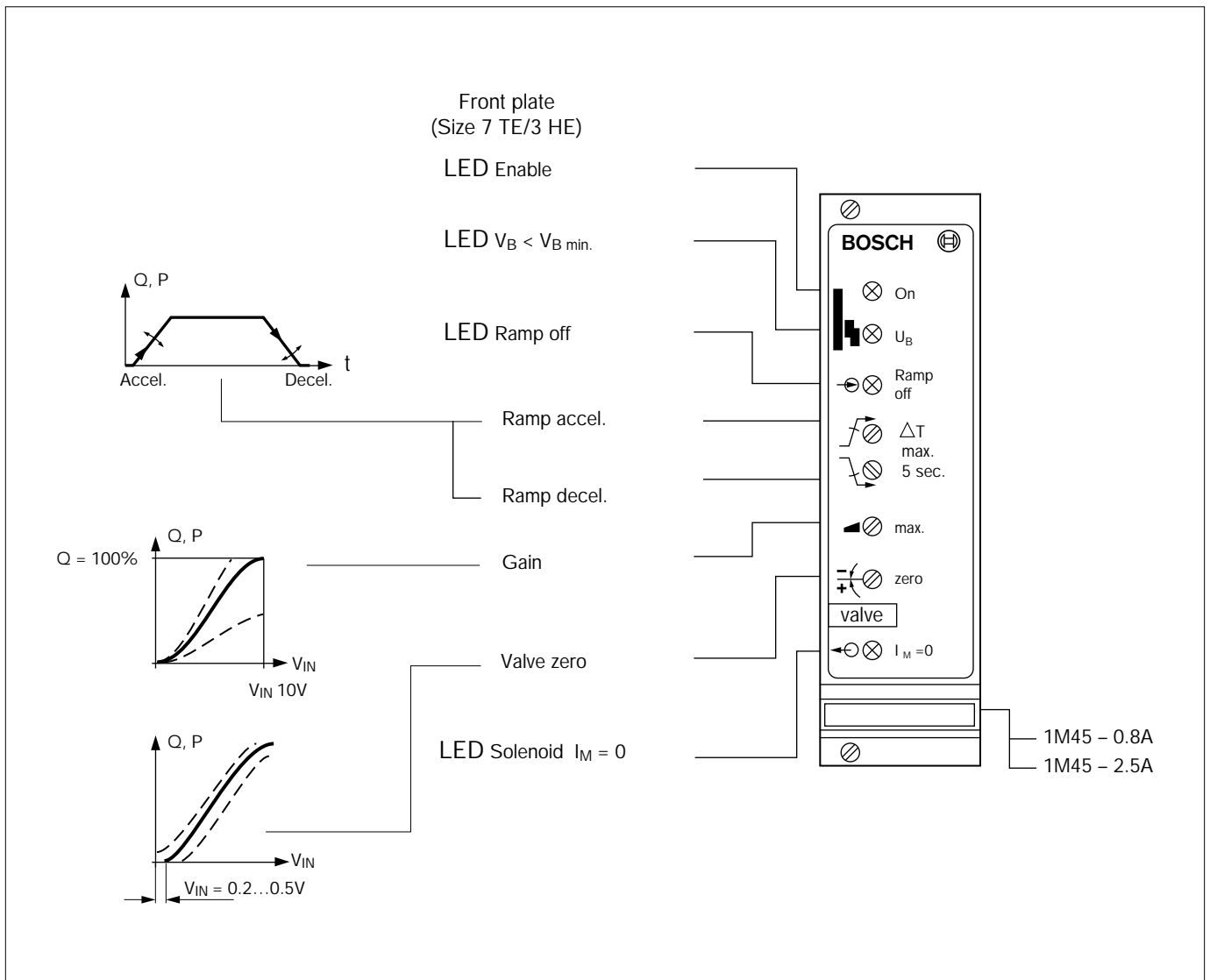



Wall mounting

2 M 2.5 - RGC2

DIN rail mounting

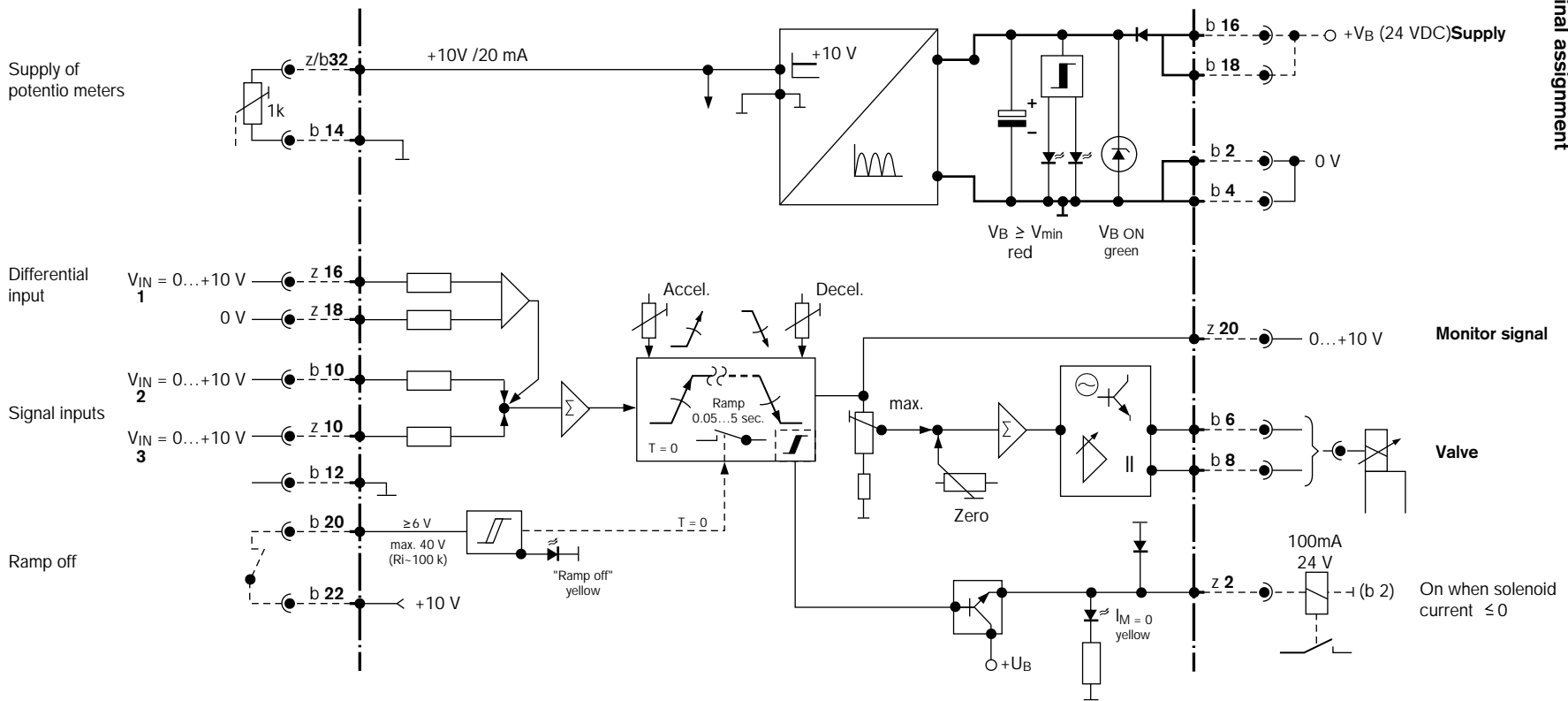
**1 Channel amplifier  
without position control  
with ramps**



Type	For valve	Solenoid	LBS [kg]	
1 M45-2.5 A	All proportional valves without position control	2.5 A/25 W	0.44 (0.2)	<b>0 811 405 079<sup>(1)</sup></b>
1 M45-0.8 A	Proportional pressure valves without position control	0.8 A/20 VA		<b>0 811 405 081<sup>(2)</sup></b>

Was <sup>(1)</sup> B 830 303 442, <sup>(2)</sup> B 830 303 444

Block diagram and terminal assignment



© 0 811 405 079  
 © 0 811 405 081

<b>Characteristics</b>	
Format	(100 x 160x approx. 35) mm (w x l x h) Euro format with front plate (7 modular spacings)
Plug connector	DIN 41612 – F32
Ambient temperature range	32°...158°F (0°...+ 70°C) Storage temperature min. -4°, max. 158°F
Power supply $V_B$ to (7) - (6)	24 VDC nominal battery voltage 21...40 V Rectified AC voltage $V_{rms} = 21...28$ V (single-phase, full wave rectification)
Current rating	0 811 405 079                      max. 2.5 A 0 811 405 081                      max. 1.25 A
Power consumption	0 811 405 079                      max. 35 VA 0 811 405 081                      max. 30 VA
Setpoint-Potentiometer	$R_L = 1$ k $\Omega$ Supply: b/z 32, +10 V/20 mA
Input signals	b 10: + 10 V b 10: + 10 V z 16: $\pm$ 10 V }      Differential input z 18: 0 V }
External ramp shut-off	b 20: 6...40 VDC (nom. 10 VDC)
Monitor signal ramp	z 20 : 0...10 V
Cable lengths and cross-sections	Solenoid: up to 65 ft.: 18 AWG up to 150 ft.: 14 AWG
Special features	Inputs and outputs short-circuit-proof PWM output stage Rapid energization for fast adj. time
LED displays	yellow: Ramp OFF yellow: Solenoid current $I_M = 0$ green: Power ON red: Power supply low (< 21V)
Valve response time	50 ms 100% Signal change
Valve hysteresis	< 4%
Ramp times	0.05...5s
Adjustment possibilities	Valve zero ( $V_{IN} \geq 0.3$ (0.5) VDC) Gain $V_{IN} = +10V$ Ramp times
<b>Attention:</b> Power zero (b 2) and control zero (b 12) must be jumpered For distance from power supply < 3 ft. jumper at connector For distance > 3 ft., route control zero separately to ground.	

**Ramps**

Ramp UP (Accerlerate) and ramp DOWN (Decelerate) are set by the appropriate potentiometers.

**Ramp ON**, if b 20 open.

**Ramp OFF**, if  $U > 6$  V at b 20 e.g. 10 V from b 22.

**Ramp OFF**, interrupts a ramp in progress. There is an abrupt transition of the signal output value.

## 2 Channel amplifier without position control with ramps

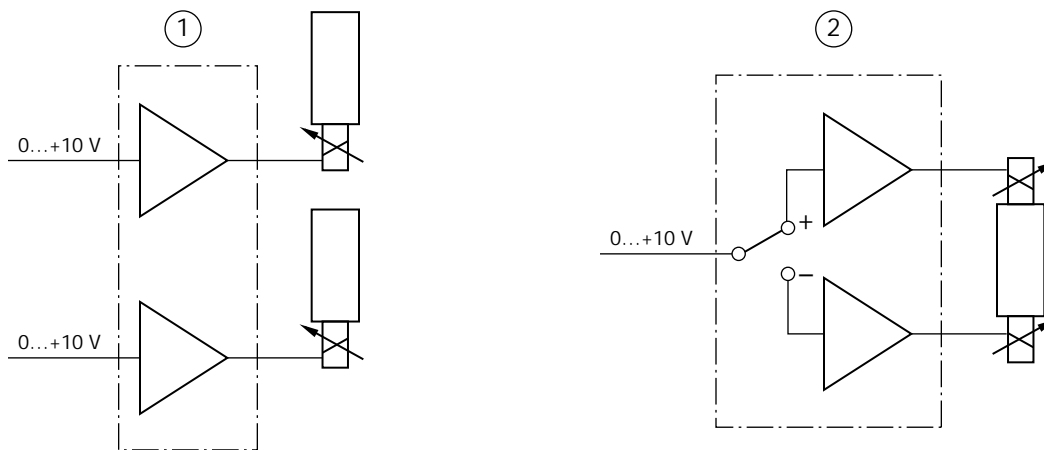



### ① Single-channel operation

For two individual proportional valves, e.g., pressure or flow-control valves.

### ② Reversible operation

For a proportional directional-control valve with dual solenoids or for a reversible radial piston pump with electric adjustment.

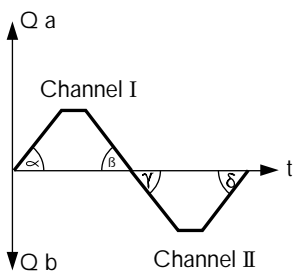


Type	For valve	Solenoid	LBS [kg]	
2 M 45-2.5 A	All proportional valves without position control	2.5 A/25 VA	0.6 (0.25)	<b>0 811 405 080<sup>(1)</sup></b>

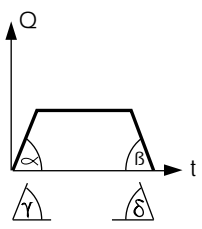
Was <sup>(1)</sup> B 830 303 443

**Adjustment**

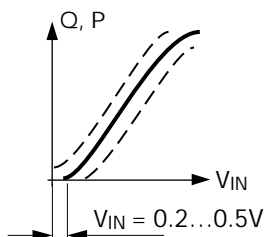
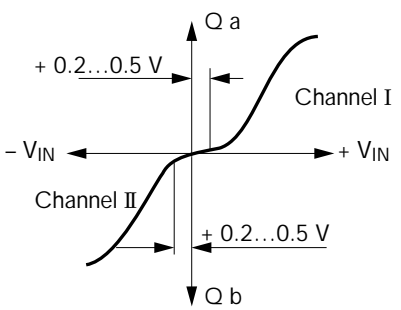
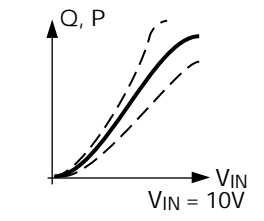
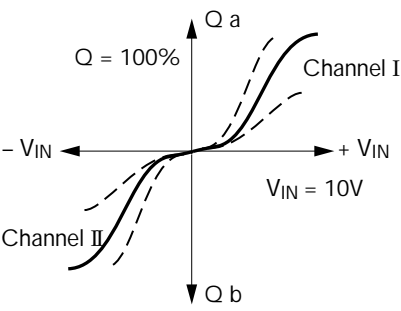
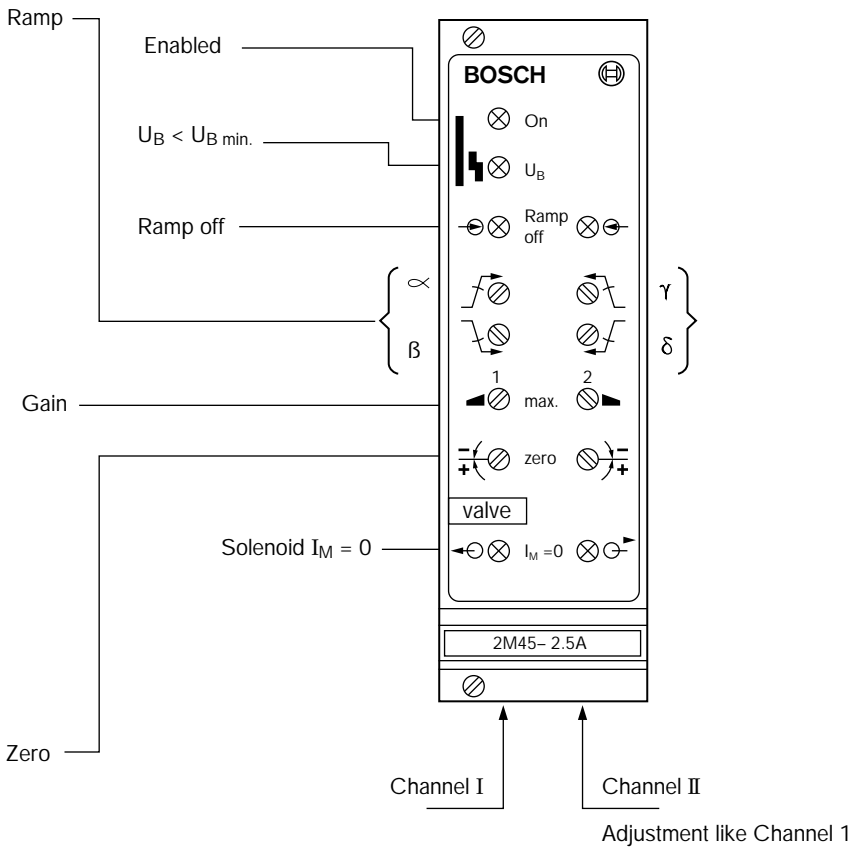
Reversible operation



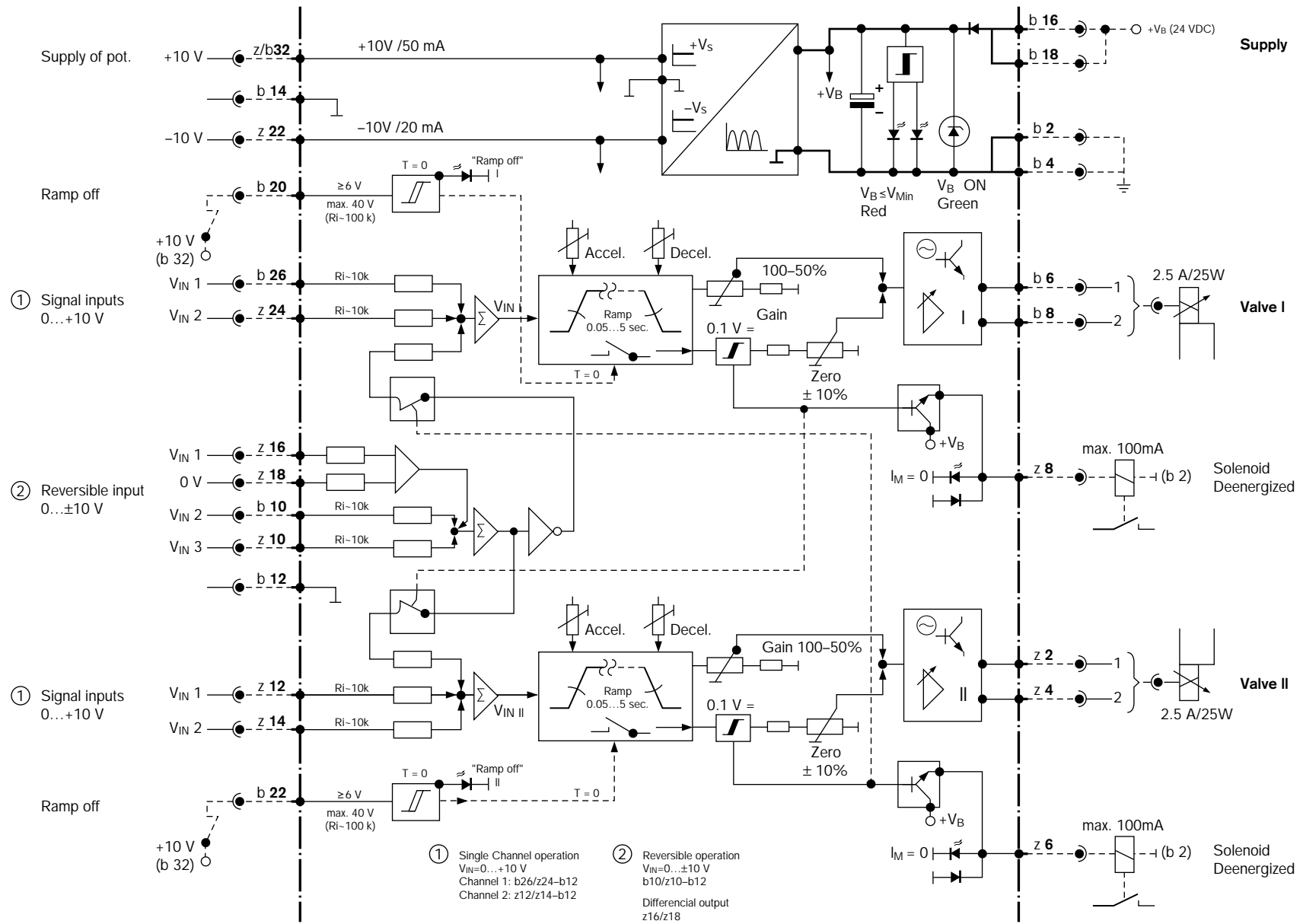
Single-channel operation



LED - Displays



Block diagram and terminal assignment





<b>Characteristics</b>		
Format	(100 x 160x approx. 35) mm (w x l x h) Euro-card format with front plate (7 modular spacings)	
Plug connector	DIN 41612 – F32	
Ambient temperature range	32°...158°F (0°...+ 70°C) Storage temperature min. -4°, max.158°F	
Power supply $V_B$ to (7) - (6)	24 VDC nominal battery voltage 21...40 V Rectified AC voltage $V_{rms} = 21...28$ V (single-phase, full wave rectification)	
Current and power consumption	for one channel: max. 1.5 A/35 VA for both channels: max. 2.8 A/65 VA	
Signal input for single-channel operation $V_{IN} = 0... + 10$ V	Channel 1 b 26 and/or z 24	Channel 2 z 12 and/or z 14
	In both cases with control zero at b 12 as reference	
Input signal for reversible operation $V_{IN} = 0... \pm 10$ V	Either differential input z 16/Z 18 (0 V) or b 10 and/or z 10 with control zero at b 12 as reference. No other signals to be present at inputs b 26/z 24 and z 12/z 14 during reversible operation	
Output for reversible operation	$V_{IN} = +$ : Channel 1 (b 6/b 8) $V_{IN} = -$ : Channel 2 (z 2/z 4)	
Signal Source	Potentiometer $R = 1$ k $\Omega$ Supply z 22: -10 V/20 mA z, b 32: + 10v/50 mA or external source	
Ramp times *	adjustable 0.05...5 s	
Ramp "OFF" *	Channel 1 b 20	Channel 2 b 22
	$V = 6...40$ V, e.g. 10 V from b 32	
Cable lengths and cross-sections	Solenoid: < 65 ft.: 18 AWG <150 ft.: 14 AWG	
Special features	Inputs and outputs short-circuit-proof PWM output	
Adjustment and LED displays	see page 127	
<b>Attention:</b> Power zero b 2 and control zero b 12 must be jumpered. For distance from power supply unit < 3 ft., direct to DIN plug. For distance > 3 ft., route control zero separately to ground.		

**\* Ramps**

Adjustment with potentiometer:  
See page 108.

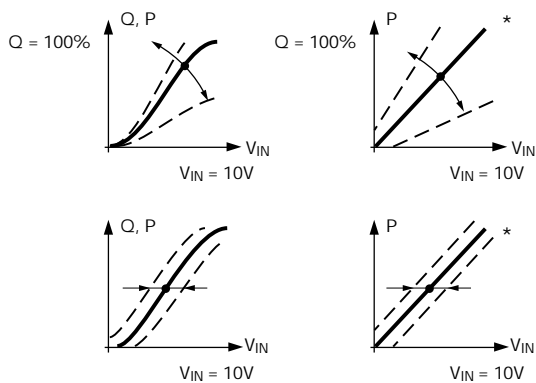
**Ramp OFF** interrupts a ramp in progress. There is an abrupt transition of the signal output value. For reversible operation, acceleration and braking in both forward and reverse directions can be set independently via the 4 ramps ( $\alpha$ ,  $\beta$ ,  $\gamma$ ,  $\delta$ ).

Upon transition from positive to negative signal, the direction reversal is effected only after completion of the ramp process.

**Valve amplifier without ramps**



Front plate  
(Size 7 TE/3 HE)



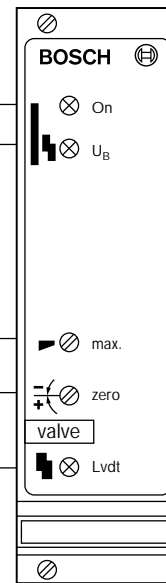
LED green Enabled

LED red  $V_B < V_{B \text{ min.}}$


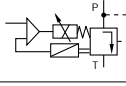
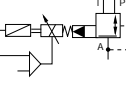
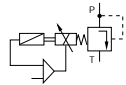
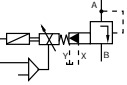
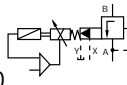
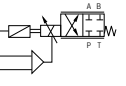
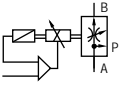

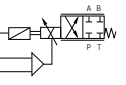
Gain  
(100...50%)

Zero adjustment  
(±10%)

LED yellow Cable break



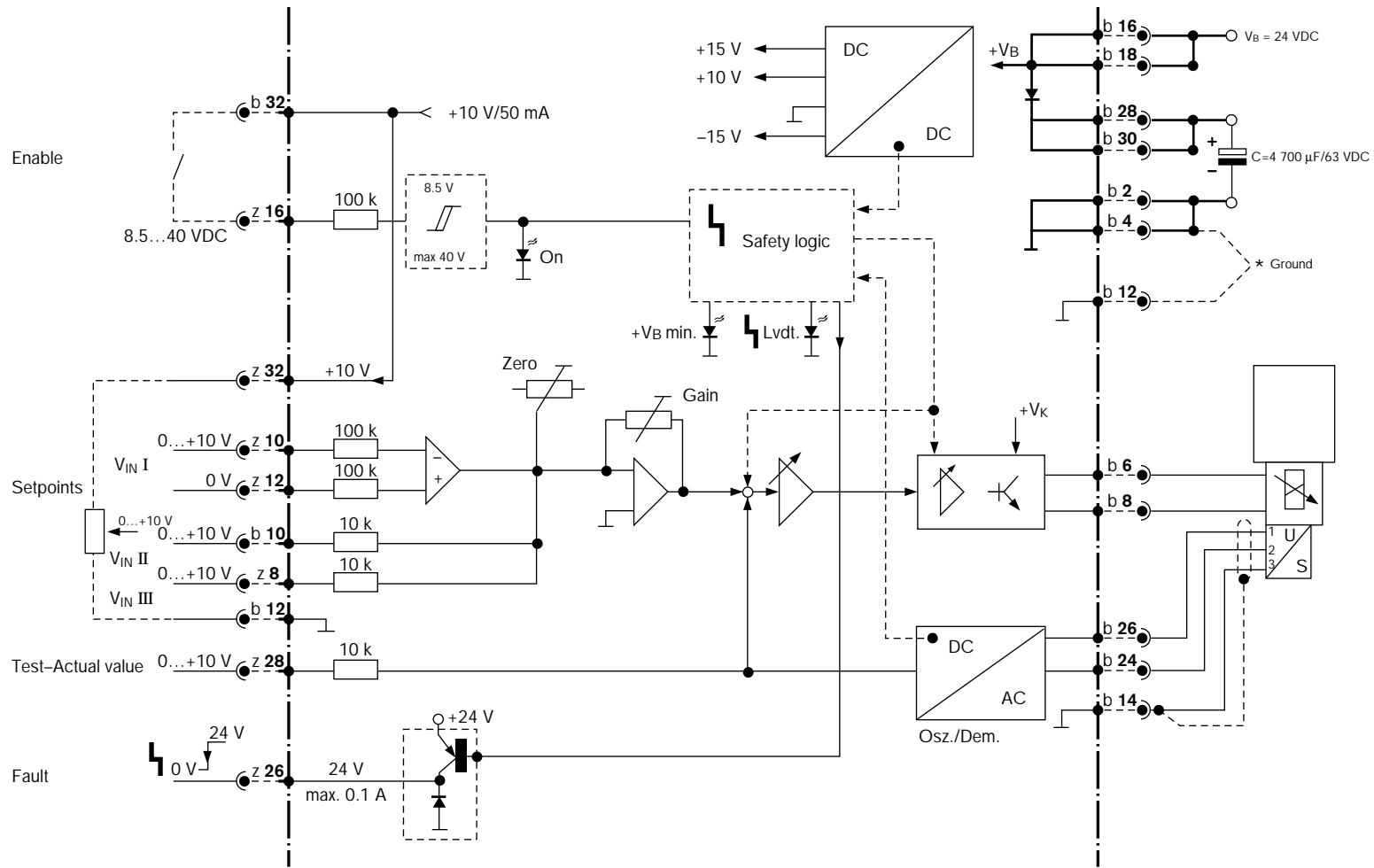
- PDL 1\*
- PV 45
- PV 60
- QV 45
- QV 60

Type	For proportional valves	Solenoid	LBS [kg]	
PDL 1*	 NG 6	2.7 A/25 W	0.55 (0.25)	<b>0 811 405 095<sup>(1)</sup></b>
PV 45	 NG 6	2.7 A/25 W		
PV 60	 NG 6  NG 10  NG 10	3.7 A/50 W	<b>0 811 405 097<sup>(3)</sup></b>	
QV 45	 NG 6  NG 6  NG 10	2.7 A/25 W		<b>0 811 405 098<sup>(4)</sup></b>
QV 60	 NG 10	3.7 A/50 W	<b>0 811 405 099<sup>(5)</sup></b>	

Was <sup>(1)</sup> B 830 303 375, <sup>(2)</sup> B 830 303 376, <sup>(3)</sup> B 830 303 377, <sup>(4)</sup> B 830 303 378, <sup>(5)</sup> B 830 303 379



**Block diagram and terminal assignment**

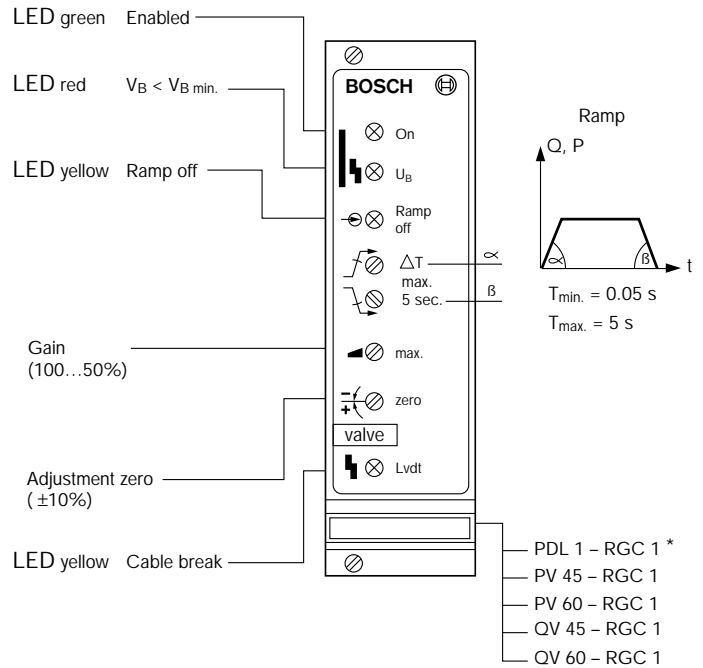
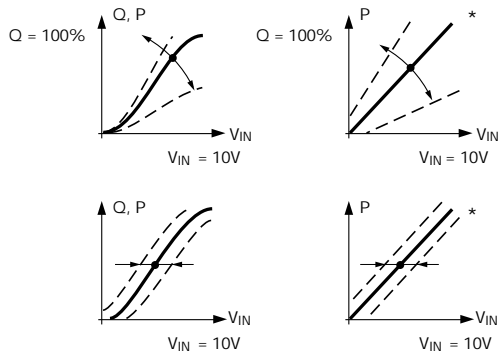




**Valve amplifier with ramps**



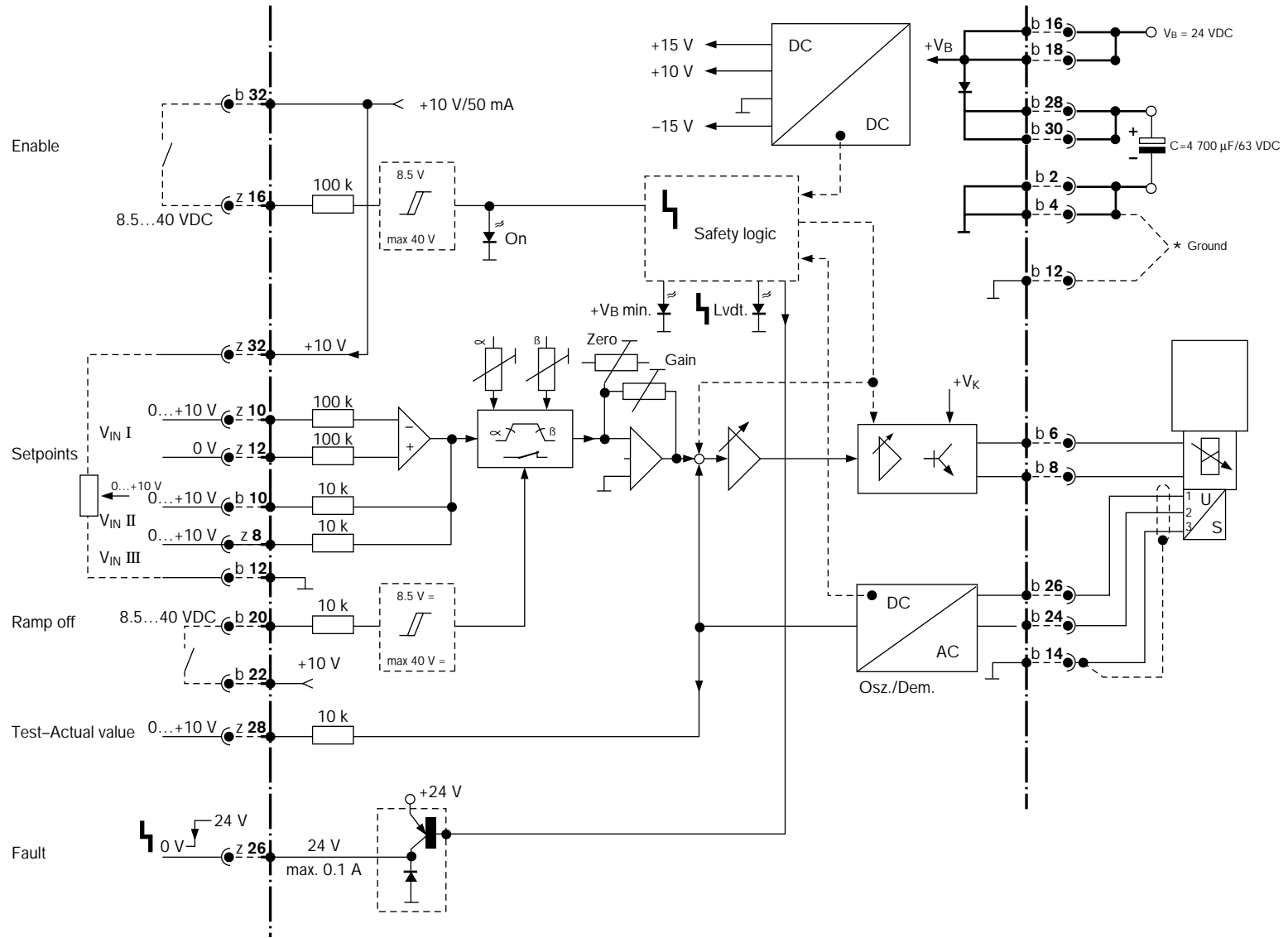
Front plate with lettering  
(Size 7 TE/3 HE)



Type	For proportional valves	Solenoid	LBS [kg]	⊕
PDL 1-RGC 1*	NG 6	2.7 A/25 W	0.55 (0.25)	<b>0 811 405 100<sup>(1)</sup></b>
PV 45-RGC 1	NG 6	2.7 A/50 W		
PV 60-RGC 1	NG 6 NG 10 NG 10	3.7 A/50 W	0.81 (0.36)	<b>0 811 405 102<sup>(3)</sup></b>
QV 45-RGC 1	NG 6 NG 10	2.7 A/25 W		
QV 60-RGC 1	NG 10	3.7 A/50 W	0.81 (0.36)	<b>0 811 405 104<sup>(5)</sup></b>

Was <sup>(1)</sup> B 830 303 382, <sup>(2)</sup> B 830 303 383, <sup>(3)</sup> B 830 303 384, <sup>(4)</sup> B 830 303 385, B 830 303 386

Block diagram and terminal assignment



Characteristics		
Format	(100 x 160x approx. 35) mm (w x l x h) Euro-card format with front plate (7 modular spacings)	
Plug connector	DIN 41612 – F32	
Ambient temperature range	32°...158°F (0°...+ 70°C)	
Storage temperature min.	-4...158°F (-20...70°C)	
Power supply V <sub>B</sub> to b 16/b 18 and b 2/b 4 (0 V)	24 VDC nominal battery voltage 21...40 V Rectified AC voltage V <sub>rms</sub> = 21...28 V (single-phase, full wave rectification)	
Smoothing capacitor to b 28/b 30 – b 2/b 4	4700 µF, 63 V capacitor required if ripple > 10%	
Solenoid	<b>2.7 A/25 W</b>	<b>3.7 A/50 W</b>
Power consumption	max. 35 W	max. 55 W
Current rating	max. 1.5 A	max. 2.2 A
Solenoid output b 6 – b 8	pulse width modulated I <sub>max.</sub> = 2.7 A   I <sub>max.</sub> = 3.7 A	
Setpoint	V <sub>IN I</sub> : 0... + 10 V (z 10) 0 V (z 12) } Differential- input V <sub>IN II</sub> : 0... + 10 V V <sub>IN III</sub> : 0... + 10 V	
Signal source (Setpoint)	Potentiometer R = 1 k Ω + 10 V supply from b 32 (10 mA) or external source	
Actual-value feedback ⊕ 0 811 405 100 ⊕ 0 811 405 101 ⊕ 0 811 405 102 ⊕ 0 811 405 103 ⊕ 0 811 405 104	Osci b 26	Testp. z 28*
	10.2 V <sub>eff</sub> /7.8 kHz	0... + 10 VDC
	10.2 V <sub>eff</sub> /7.8 kHz	0... + 10 VDC
	10.8 V <sub>eff</sub> /7.8 kHz	0... + 10 VDC
	10.2 V <sub>eff</sub> /7.8 kHz	0... + 10 VDC
	10.8 V <sub>eff</sub> /7.8 kHz	0... + 10 VDC
Enabling, output stage	at z 16, V = 8.5...40 V; (e.g. 10 V from z 32) LED (green) on front plate lights up	
Ramp OFF	at b 20, V = 8.5...40 V	
Cable lengths and cross-sections	Solenoid cable: < 65 Ft.: 18 AWG 65 Ft....150 Ft.: 14 AWG Pos. transducer: 3 conductor 20 AWG shielded up to 150' Supply and capacitor 18 AWG	
LED displays	green: enable yellow: cable break red: 24V Power supply low (<21V)	
Fault indication – Cable break – V <sub>B</sub> too low – ± 15 V stabilization	z 26: Switching output No fault + 24 V (max 100 mA) Fault 0 V	
Short-circuit-proof outputs	Output stage to solenoid Signal to LVDT Potentiometer supply	
Special features	LVDT cable break Position control with PID action PWM stage output stage Rapid energizing and de-energizing for fast operating times Disable ramp	
Adjustment via trimming potentiometer	1. Zero 2. Gain 3. Acceleration ramp 4. Braking ramp	
<b>Attention:</b> Power zero b 2 and control zero b 12 must be jumpered. For distance from power supply unit < 3 ft., direct to DIN plug. At greater distances connect control zero separately to ground.		

**Ramps**
**Ramp ON:** No signal to b 20.

**Ramp OFF:** 8.5...40 V to b 20 or  
connection between b 22 and b 20.

**Ramp OFF** or **Cable break** interrupts  
a ramp in progress. There is an  
abrupt transition of the signal output  
value.

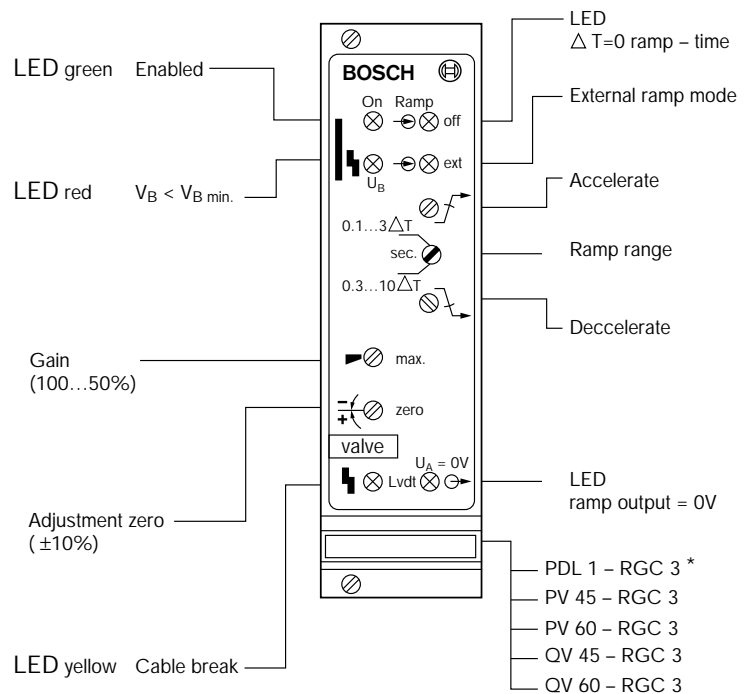
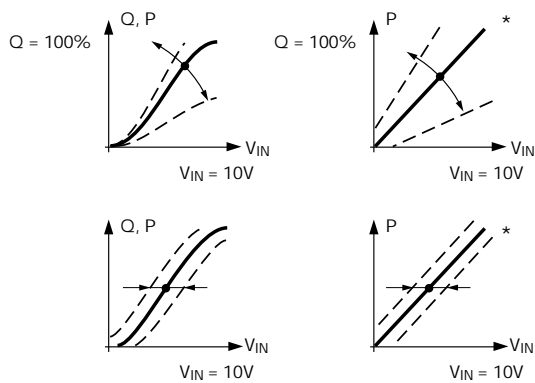
\* 0 V at I<sub>m</sub> = 0 V (enable OFF)


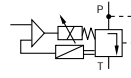
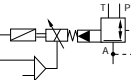
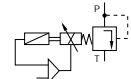
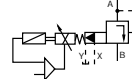
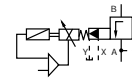
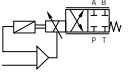
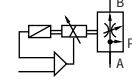

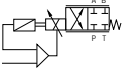
+ 10 V at I<sub>m</sub> = max (V<sub>IN</sub> = 10 V, Potentiometer = cw)

**Valve amplifier with voltage-controlled ramps**

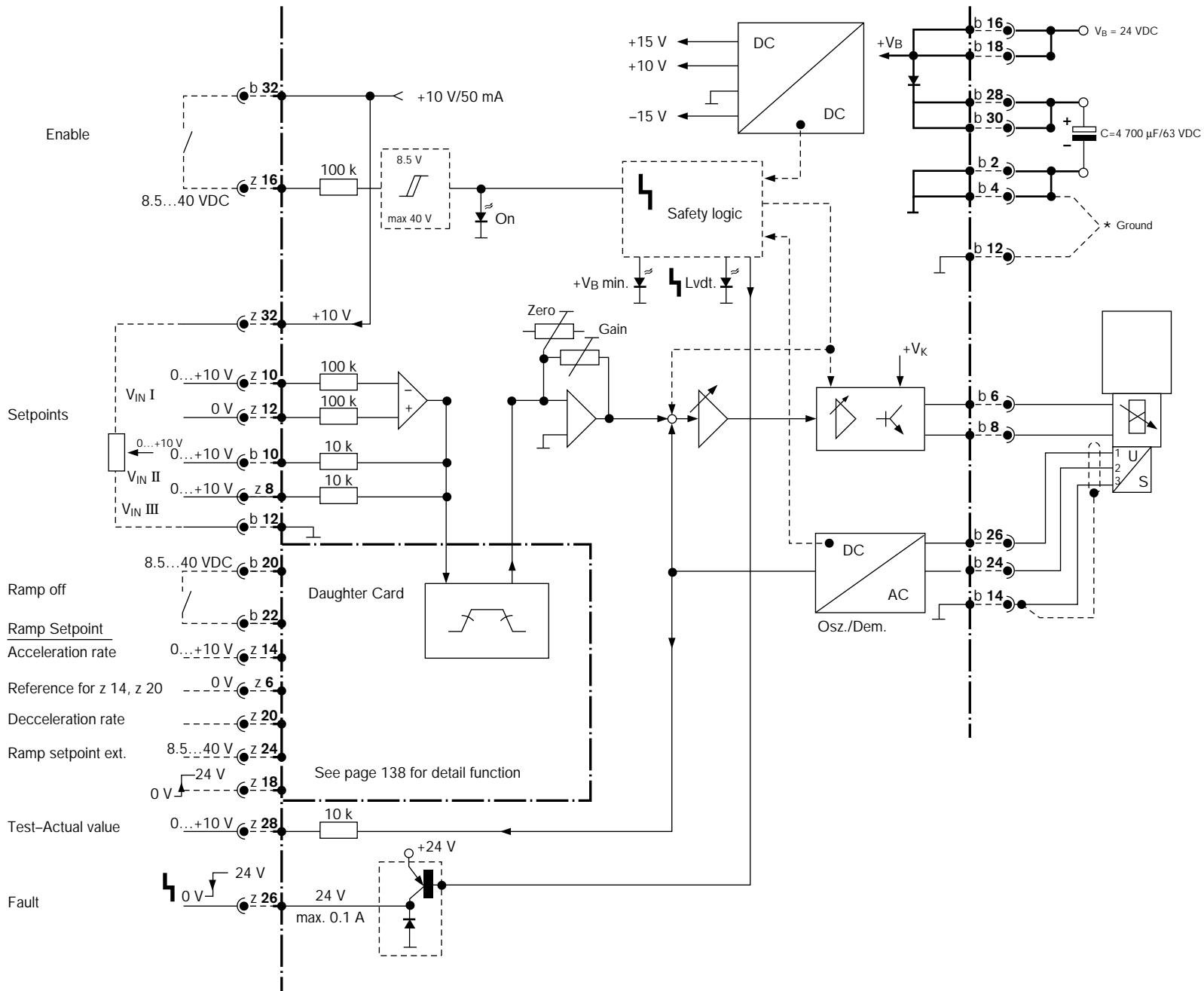


Front plate  
(Size 7 TE/3 HE)



Typ	For proportional valves	Solenoid	LBS [kg]	
PDL 1- RGC 3*	 NG 6	2.7 A/25 W	0.66 (0.3)	<b>B 830 303 387</b>
PV 45- RGC 3	 NG 6	2.7 A/50 W		
PV 60- RGC 3	 NG 6  NG 10  NG 10	3.7 A/50 W		<b>B 830 303 391</b>
QV 45- RGC 3	 NG 6  NG 6  NG 10	2.7 A/25 W		<b>B 830 303 389</b>
QV 60 RGC 3	 NG 10	3.7 A/50 W		<b>B 830 303 390</b>

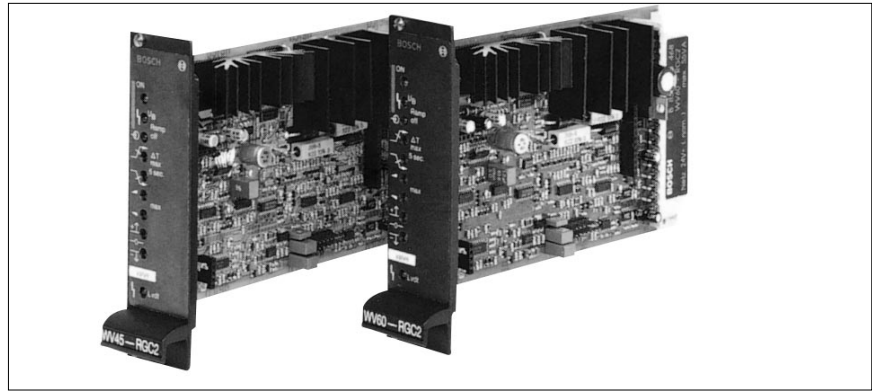


**Block diagram and terminal assignment**


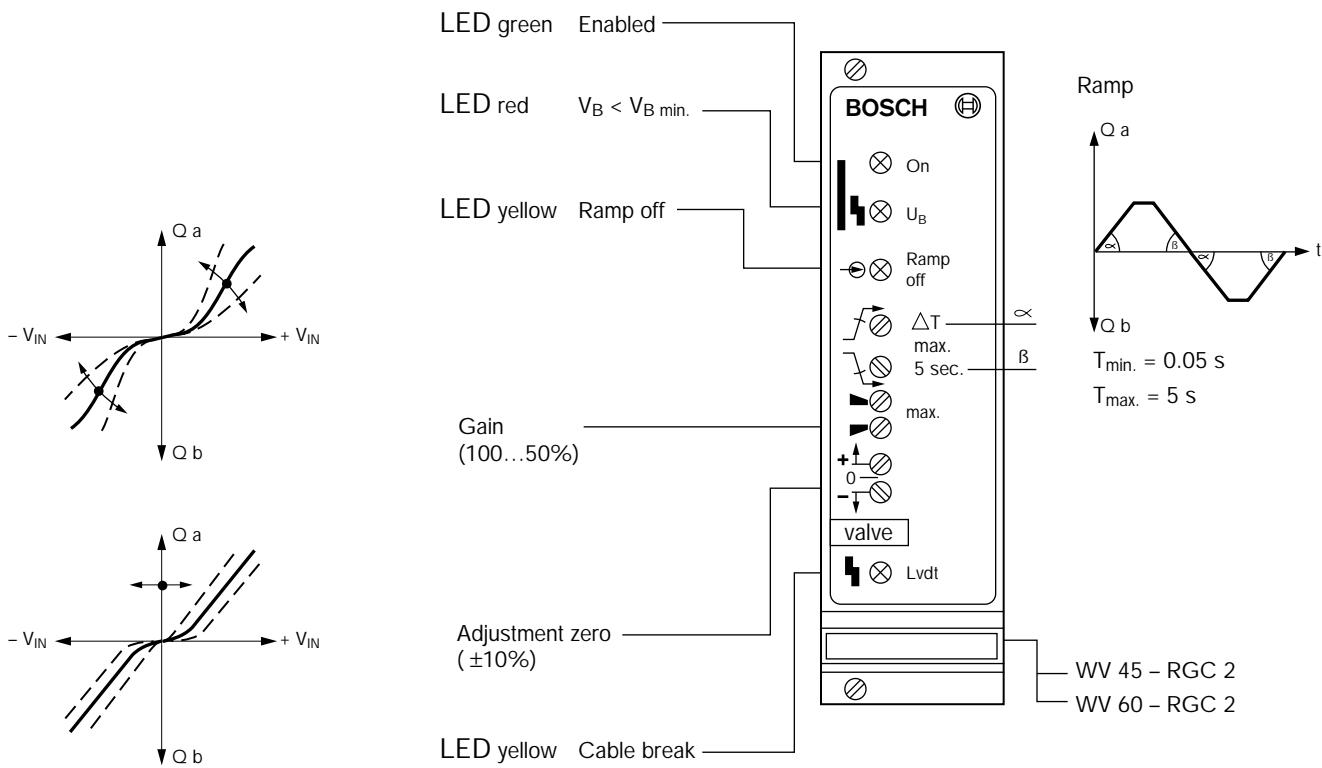



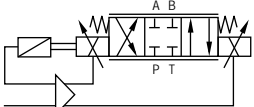


**Valve amplifier with ramps**

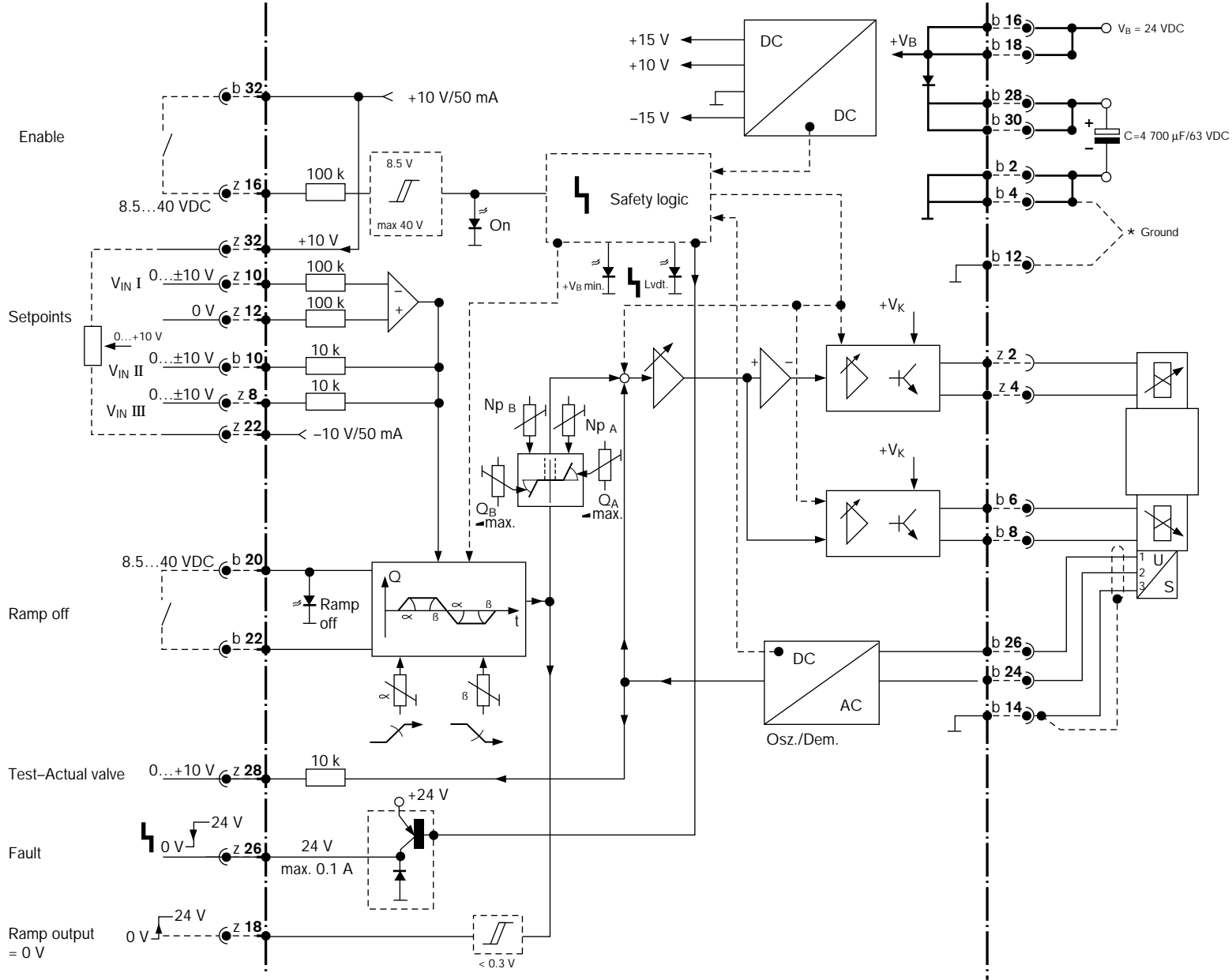




Front plate  
(Size 7 TE/3 HE)



Type	For proportional directional control valves	NG	Solenoid	LBS [kg]	
WV 45-RGC 2		6	2.7 A/25 W	0.56 (0.25)	<b>0 811 405 119<sup>(1)</sup></b>
WV 60-RGC 2		10	3.7 A/50 W		<b>0 811 405 120<sup>(2)</sup></b>

Was <sup>(1)</sup> B 830 303 466, <sup>(2)</sup> B 830 303 468

**Block diagram and terminal assignment**

Characteristics	
Format	(100 x 160x approx. 35) mm (w x l x h) Eurocard format with front plate (7 modular spacings)
Plug connector	DIN 41612 – F32
Ambient temperature range	32°...158°F (0°...+ 70°C)
Storage temperature min.	-4°, max.158°F
Power supply $V_B$ to b 16/b 18 and b 2/b 4 (0 V)	24 VDC nominal battery voltage 21...40 V Rectified AC voltage $V_{rms} = 21...28$ V (single-phase, full wave rectification)
Smoothing capacitor to b 28/b 30 – b 2/b 4	4700 $\mu$ F, 63 V at ripple > 10%
Solenoid	<b>2.7 A/25 W</b> <b>3.7 A/50 W</b>
Power consumption	max. 35 W                              max. 55 W
Current rating	max. 1.5 A                              max. 2.2 A
Solenoid output b 6 – b 8/z 2 – z 4	pulse width modulated $I_{max.} = 2.7$ A $I_{max.} = 3.7$ A
Input signal (Setpoint)	0...± 10 V summing optionally to b 10, z 8, z 10, z 12, z 14/b 14; $R_I = 10$ k $\Omega$
Signal source (Setpoint)	Potentiometer $R = 1$ k $\Omega$ + 10 V b 32 (10 mA) - 10 V z 22 (50 mA) or external source
Actual-value feedback  0 811 405 119  0 811 405 120	Osci b 26                              Testp. z 28*
	10.2 $V_{eff}/7.8$ kHz                      0... + 10 VDC
	10.2 $V_{eff}/7.8$ kHz                      0... + 10 VDC
Enabling, output stage	at z 16, $V = 8.5...40$ V; (e.g. 10 V from z 32) LED (green) on front plate lights up
Ramp OFF	at b 20, $V = 8.5...40$ V
Cable lengths and cross-sections	Solenoid cable: < 65 Ft.: 18 AWG 65 Ft...150 Ft.: 14 AWG Pos. transducer: 3 conductor 20 AWG shielded up to 150 Ft. Supply and capacitor 18 AWG
Short—circuit—proof outputs	Output stage to solenoid Signal to LVDT Potentiometer supply
Special features	LVDT cable break Position control with PID action PWM output stage Rapid energizing and de-energizing for fast response times Ramps with quadrant recognition Deadband compensation in valve Center position Disable ramp
Fault indication – Cable break – $V_B$ too low – ± 15 V stabilization	z 26: Switching output No fault + 24 V (max 100 mA) Fault 0 V
Adjustment via trimming potentiometer	1. Zero $N_{PA}$ and $N_{PB}$ . 2. Gain $Q_A$ and $Q_B$ 3. Ramps for acceleration and deceleration $t = 0.05...5$ sec
LED displays	green: enable ON red: 24V power supply voltage low (<21V) yellow: cable break feedback signal yellow: ramp off yellow: LVDT cable break
<b>Attention:</b> Power zero b 2 and control zero b 12 must be jumpered. For distance from power supply unit < 3 ft., direct to DIN plug. At greater distances connect control zero separately to ground.	

**Instruction for the use of ramps****Ramp ON:** if b 20 open..**Ramp OFF:** if b 20 jumped to b 22  
or  $V = 8.5...40$  VIf **Ramp OFF**, **Enable OFF** or **Cable Break** occur while the card is ramping, an abrupt transition to the commanded value occurs.**Quadrant recognition**

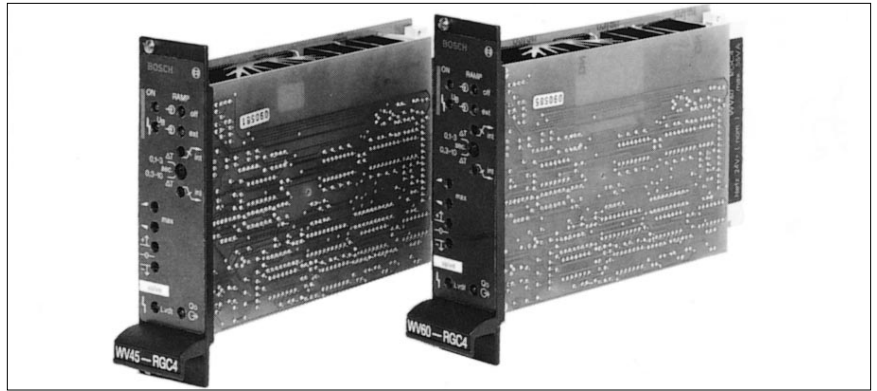
Travel through the center position leaves the direction of motion of the valve spool unchanged but not that of the cylinder. So that the acceleration values for both directions of movement remain the same, the ramp is switched when the valve crosses over from one quadrant to another.

**Deadband compensation in the valve center position**

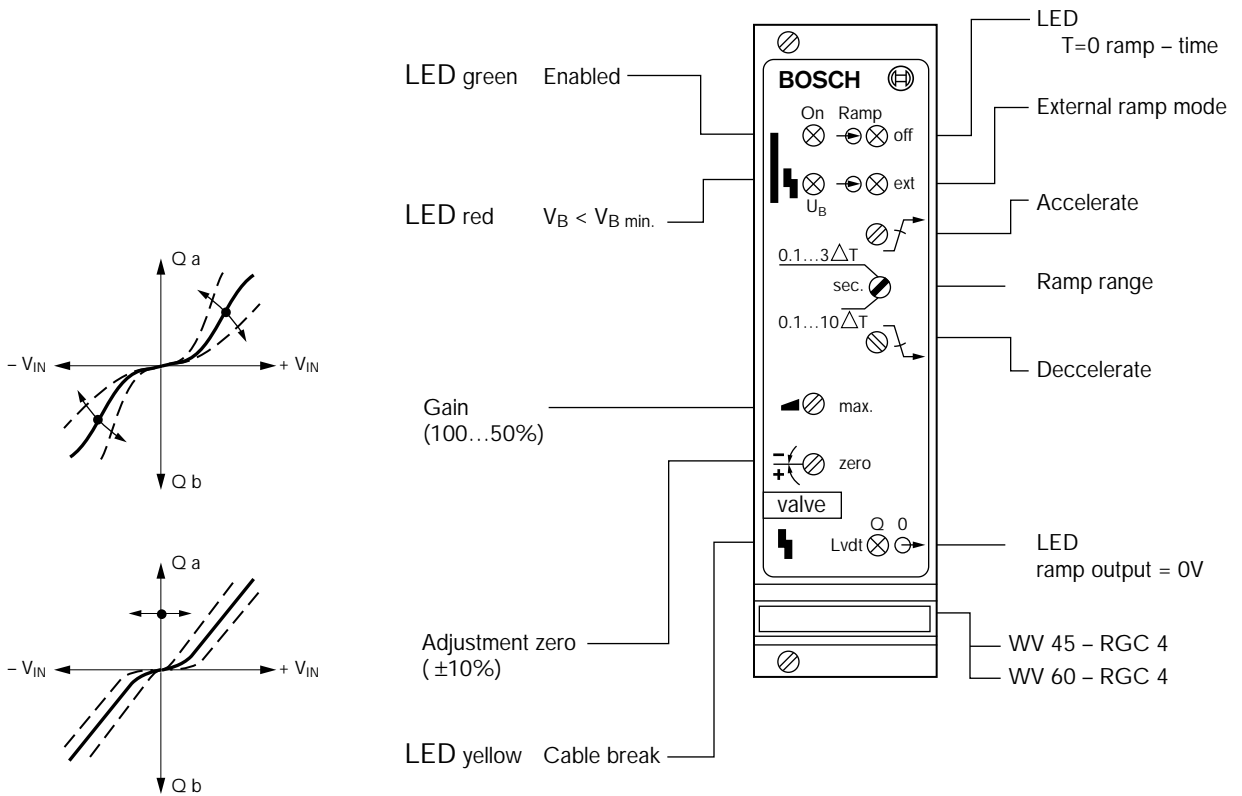
The positive over lap of ± 20% of the spool stroke is bypassed by means of an electronic compensation circuit in the ± 15% range of the spool stroke. This compensating step change may be optimized as required (after prior consultation).

\* Values for potentiometer in end position (cw) and for "zero potentiometer"

**Valve amplifier with voltage-controlled ramps**



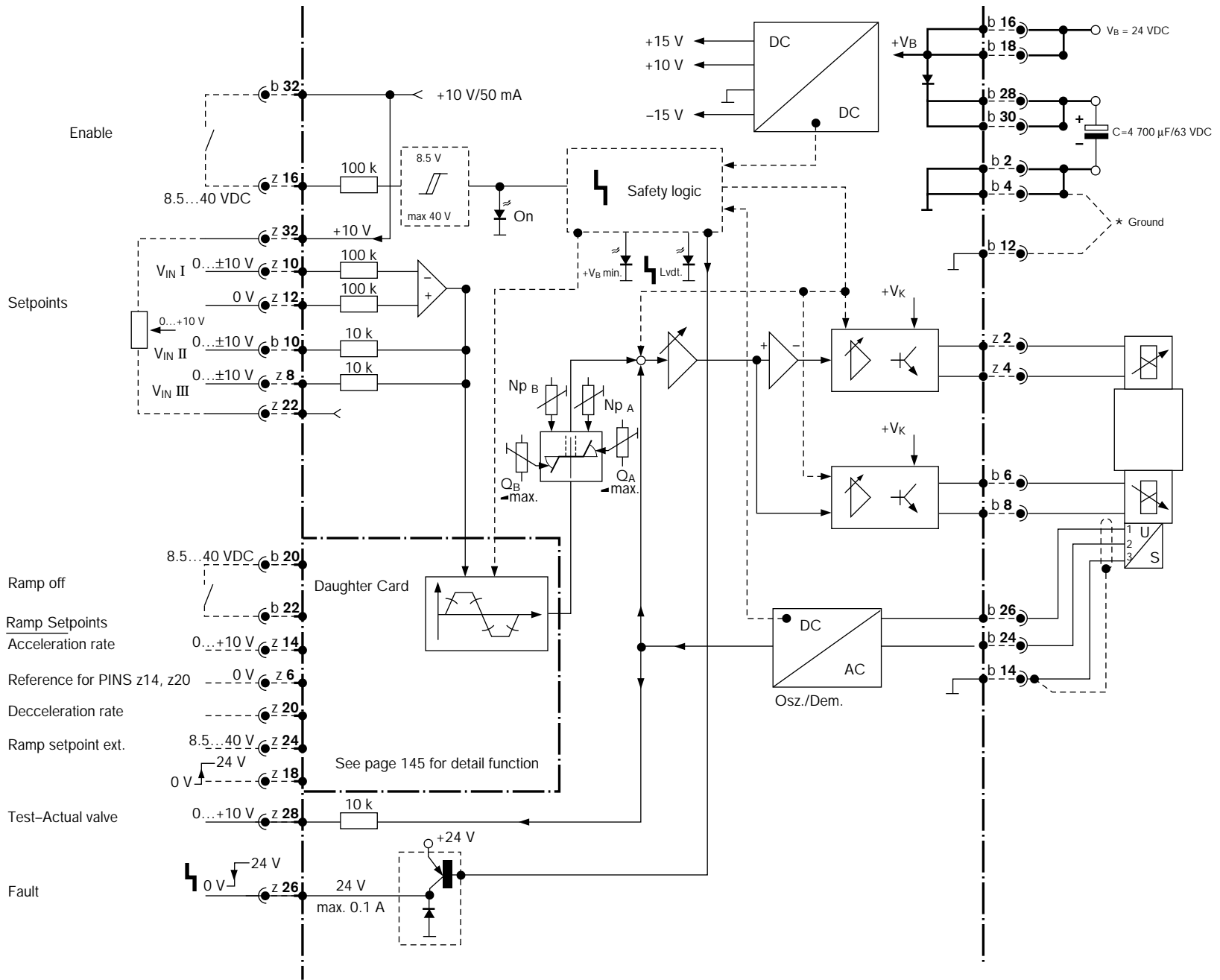
Front plate  
(Size 7 TE/3 HE)



Type	For proportional directional control valves	NG	Solenoid	LBS [kg]	
WV 45-RGC 4		6	2.7 A/25 W	0.66 (0.3)	<b>0 811 405 137<sup>(1)</sup></b>
WV 60-RGC 4		10	3.7 A/50 W		<b>0 811 405 138<sup>(2)</sup></b>

Was <sup>(1)</sup>B 830 303 467, <sup>(2)</sup>B 830 303 469

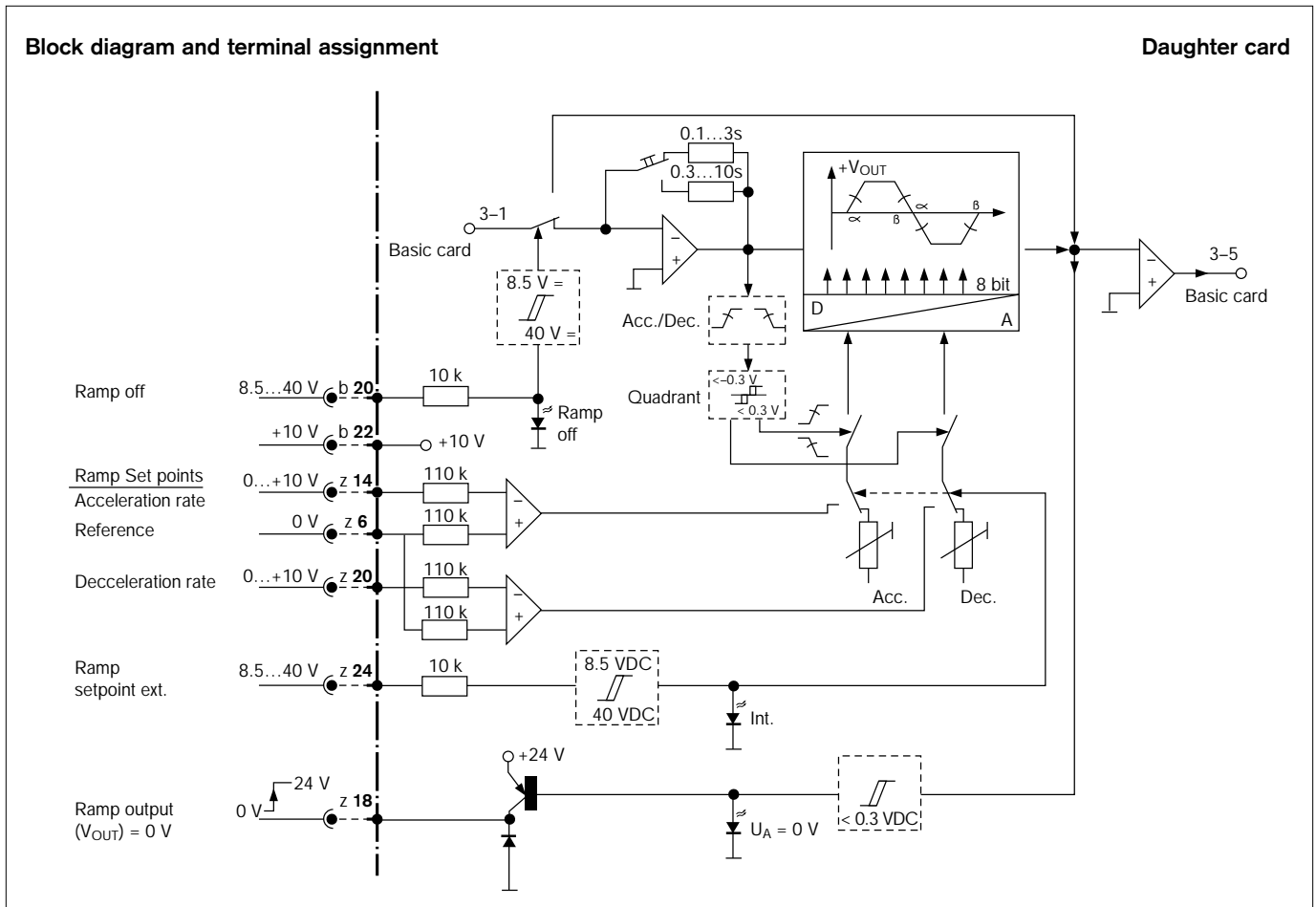
Block diagram and terminal assignment







**Instruction for the use of ramps**

1. Quadrant recognition:
  - Quadrant recognition of the ramps takes place automatically for positive and negative valve setpoints.
  
2. INTERNAL/EXTERNAL ramp selection:
  - External ramp is selected by energizing PIN z 24 with 8 to 40 V DC. "EXTERNAL" status LED is energized.
  - The internal ramp potentiometers are disabled
  
3. INTERNAL ramp adjustment:
  - Set potentiometer to the desired ramp setting.
  - Internal ramps are disabled if z 24 or b 20 are energized.
  
4. EXTERNAL ramp adjustment:
  - Ramp rate is proportional to the voltage applied to z 14 and z 20 (reference z 6)
  - Max. resolution: 75 mV
  - z 24 must be energized and b 20 must not be energized.
  
- 5 Ramp time range:
  - 2 ramp time ranges can be set (switch on front plate). These apply to both internal and external ramp selection.
  
6. RAMP OFF:
  - Ramp is disabled energizing b 20. "Ramp off" status is displayed by an LED.
  - If the card is still ramping, there is an abrupt transition to the command value.
  
7. Signal  $V_{OUT} = 0 V \rightarrow 0 \leftarrow$ 
  - When the ramp output voltage  $V_{OUT}$  is equal to 0 V, signal output z 18 is switched to 24 V
  - This condition is also displayed by an LED.
  - If the ramp function is disabled, this signal does not occur.




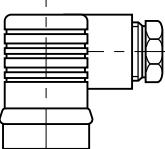
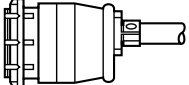
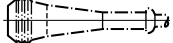


Characteristics		
Format	(100 x 160x approx. 35) mm (w x l x h) Euro-card format with front plate (7 modular spacings)	
Plug connector	DIN 41612 – F32	
Ambient temperature range	32°...158°F (0°...+ 70°C)	
Storage temperature min.	-4°, max.158°F	
Power supply $V_B$ to b 16/b 18 and b 2/b 4 (use of 2 contracts)	24 VDC nominal battery voltage 21...40 V Rectified AC voltage $V_{rms} = 21...28$ V (single-phase, full wave rectification)	
Smoothing capacitor to b 28/b 30 – b 2/b 4	4700 $\mu$ F, 63 V at ripple > 10%	
Solenoid	<b>2.7 A/25 W</b>	<b>3.7 A/50 W</b>
Power consumption	max. 35 W	max. 55 W
Current rating	max. 1.5 A	max. 2.2 A
Solenoid output b 6 – b 8/z 2 – z 4	pulse width modulated $I_{max.} = 2.7$ A   $I_{max.} = 3.7$ A	
Input signal (Setpoint)	0...± 10 V summing optionally to b 10, z 8, z 10, z 12, z 14/b 14; $R_1 = 10$ k $\Omega$	
Signal source (Setpoint)	Potentiometer $R = 1$ k $\Omega$ + 10 V b 32 (10 mA) - 10 V z 22 (50 mA) or external source	
Actual-value feedback  0 811 405 137  0 811 405 138	Osci b 26	Testp. z 28*
	10.2 $V_{eff}/7.8$ kHz	0... ± 10 V =
	10.2 $V_{eff}/7.8$ kHz	0... ± 10 V =
Enabling, output stage	at z 16, $V = 8.5...40$ V; (e.g. 10 V from z 32) LED (green) on front plate lights up	
Ramp internal/external	at...V = 8.5...40 V external ramp setpoints	
Ramp OFF	at b 20, $V = 8.5...40$ V	
Cable lengths and cross-sections	Solenoid cable: < 65 Ft.: 18 AWG 65 Ft....150 Ft.: 14 AWG Pos. transducer: 3 conductor 20 AWG shielded up to 150 Ft. Supply and capacitor 18 AWG	
Short-circuit-proof outputs	Output stage to solenoid Signal to LVDT Potentiometer supply	
Special features	LVDT cable break Position control with PID action PWM output stage Rapid energizing and de-energizing for fast adjusting times Ramps with quadrant recognition Deadband compensation in valve Center position Ramp disable Ramp setpoints can be entered internally (pots.) or externally (voltage)	
Fault indication – Cable break – $V_B$ too low – ± 15 V stabilization	Switching output No fault + 24 V (max 100 mA) Fault 0 V	
Adjustment via trimming potentiometer	1. Zero $N_{PA}$ and $N_{PB}$ . 2. Gain $Q_A$ and $Q_B$ 3. Ramps for acceleration and deceleration $t = 0.05...5$ sec 4. Changeover of ramp adjustment range	
LED displays	green: enable ON green: ramp yellow: open circuit of feedback signal yellow: ramp OFF yellow: $Q_0 = 0$ V red: 24 V power supply voltage low (<21 V)	
<b>Attention:</b> Power zero b 2 and control zero b 12 must be jumpered. For distance from power supply unit < 3 ft.,connect directly to DIN plug. At greater distances connect control zero separately to ground.		

\* Values for potentiometer in end position (cw) and for "zero potentiometer"

**Plug connectors  
Card connectors**



**Connector for proportional control valves and amplifier**

Symbol		LBS [kg]		
	Plug connector solenoid	grey A	0.11 (0.05)	<b>1 834 484 058</b>
		black B		<b>1 834 484 057</b>
	Plug connector AC/AC position transducer			<b>1 834 484 040</b>
	Plug connector 4 pole for plug amplifier		0.066 (0.03)	<b>1 834 484 098</b>
	Plug connector (Set) for amplifier box		0.44 (0.2)	<b>1 834 484 185</b>
	Plug connector for electronic card	Page 151	0.22 (0.1)	<b>1 834 486 000</b>
	Card holder		0.44 (0.2)	<b>1 834 486 001</b>


### Plugs for valves with integrated amplifier



When ordering a valve the plug for the cable side must be selected accordingly.

For order numbers, see table.

For installation instructions, see pages 108 and 109.

A	+24 VDC <sub>nom</sub> $V_B$	Supply
B	0 V	
C	Ref. 0 V	Ref. for Pin F
D	0 ... $\pm 10$ V	Valve Command
E	Diff. 0 V	
F	0 ... $\pm 10$ V	Valve Actual Position
		Ground

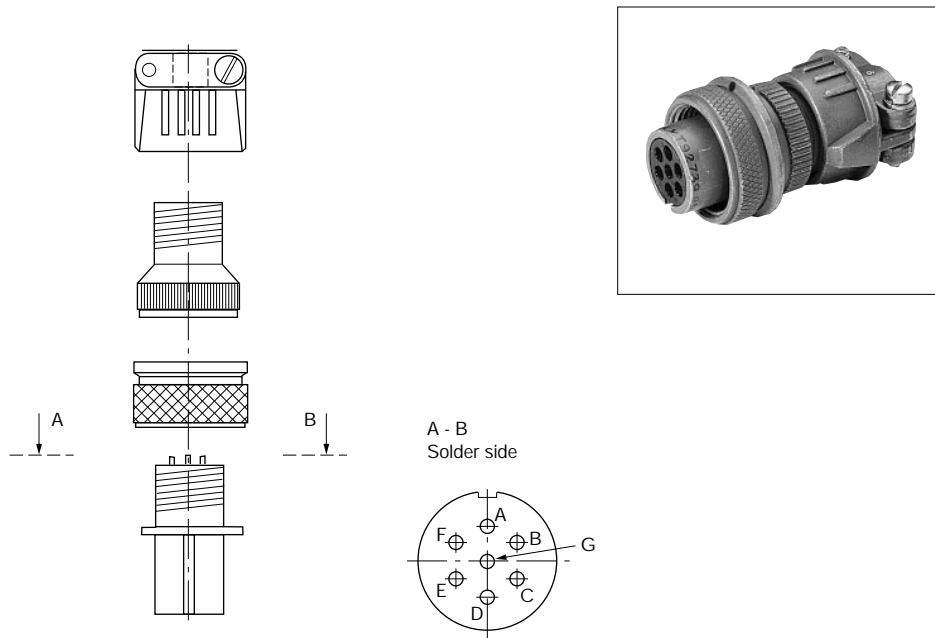
<b>Cable</b>	Up to 65 Feet: 18 AWG - 7-conductor shielded Up to 130 Feet: 16 AWG - 7-conductor shielded
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<b>Version</b>	KS Plastic	MS Metal
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Nr.	Version	Contacts	IP	Lbs (kg)	
①	Metal, Olive drab MS	7 P Soldered	66	0.10 (0.05)	9 536 230 054
②	Plastic KS	7 P Soldered	65	0.10 (0.05)	1 834 482 022
③	Plastic KS	7 P Crimped	65	0.10 (0.05)	1 834 482 026
③	Metal MS	7 P Crimped	65	0.17 (0.08)	1 834 482 023
④	Metal for 2 cables MS	7 P Crimped	65	0.19 (0.09)	1 834 482 024

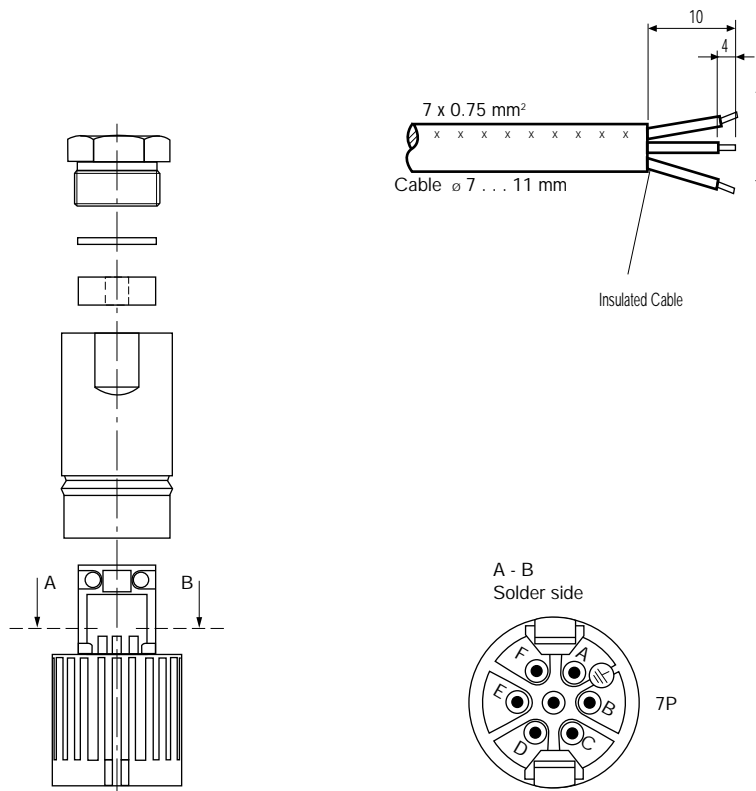
9 536 230 054

①



1 834 482 022

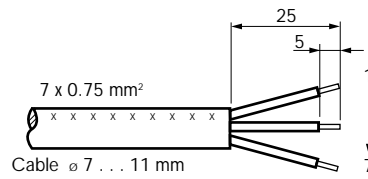
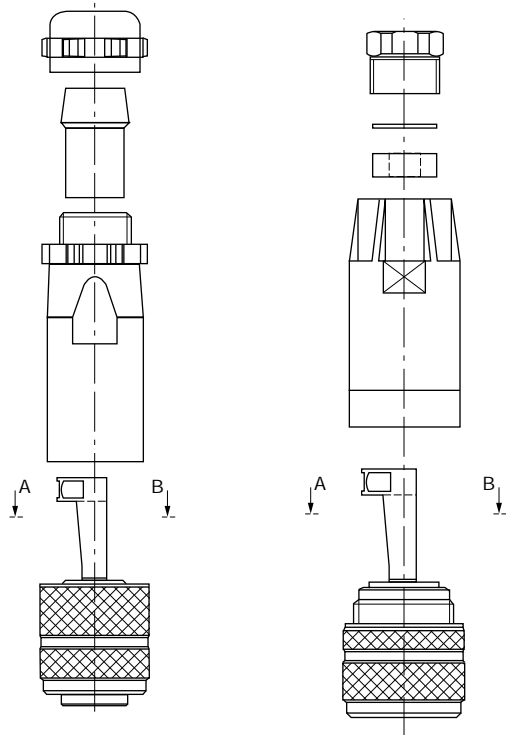
②



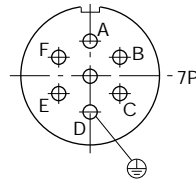
1 834 482 023

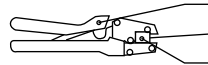
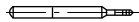

1 834 482 026

③



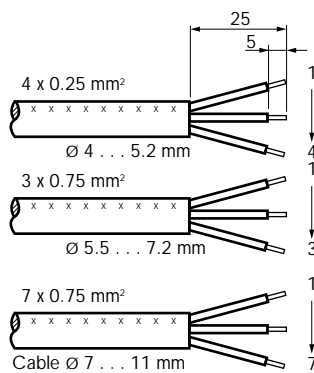
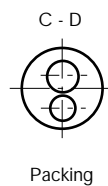
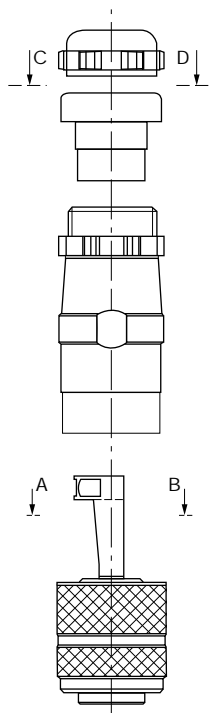
A-B  
Crimp side



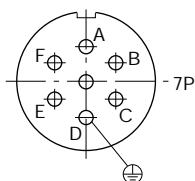
Amphenol		Order No.
Crimping tool		TA 0000 163
Contact remover		FG 0300 146-(1)
Contact	0.5 ... 1.5 mm <sup>2</sup> 	2016 0002 (1)

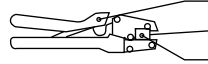
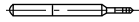

1 934 482 024

④

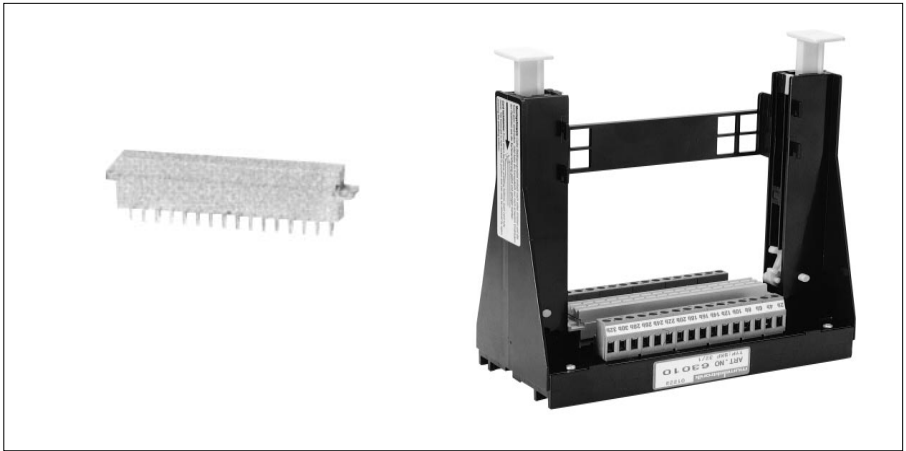


A-B  
Crimp side

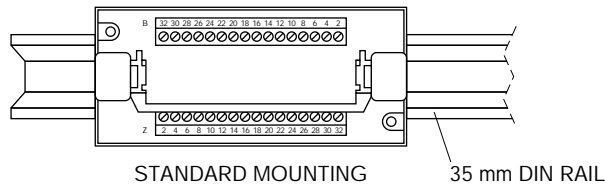
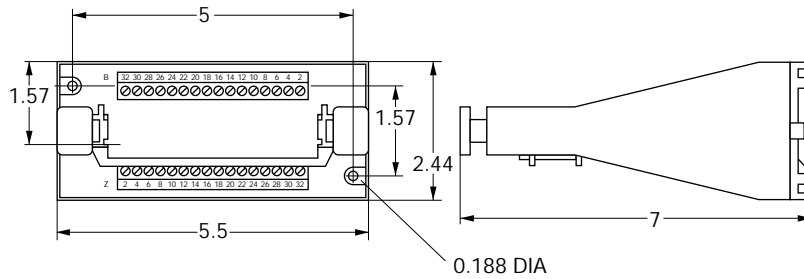


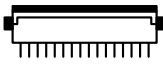

Amphenol		Order No.
Crimping tool		TA 0000 163
Contact remover		FG 0300 146-(1)
Contact	0.5 ... 1.5 mm <sup>2</sup> 	2016 0002 (1)

**Card holder**



LOCATION OF MOUNTING SCREWS AND OVERALL SIZE



Symbol		lbs.	(kg)	
	Plug connector for electronic card	0.22	(0.1)	<b>1 834 486 000</b>
	Card holder	0.55	(0.25)	<b>1 834 486 001</b>

**Extender card****Version**

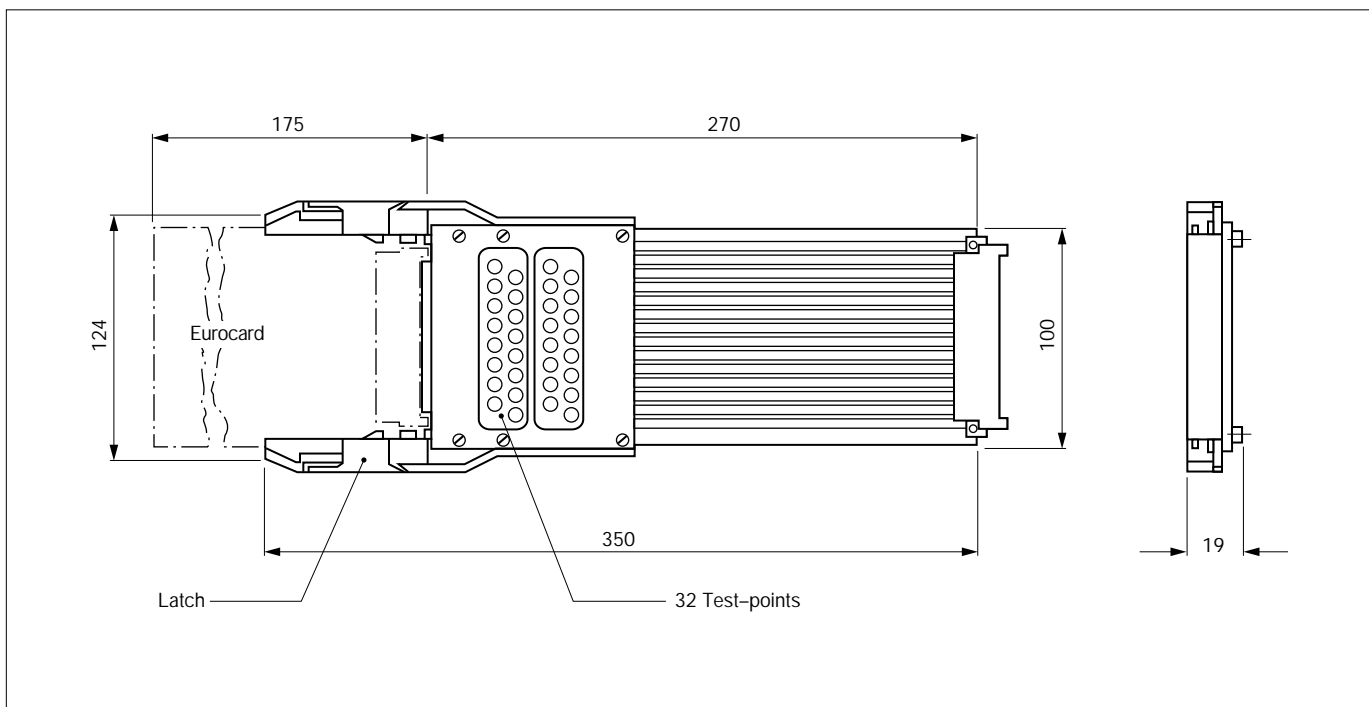
- For Euro format cards
- 100 x 161 mm with plug according to DIN 41612, type F 32.
- Test points 4 mm dia. for all conductors b and z, 2...32.
- Heavy duty conductors for solenoid current connections and voltage supply.


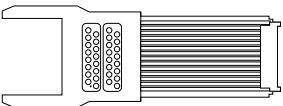
**Application**

- For checking existing electrical systems.
- Measuring and checking loads.

**Caution:**

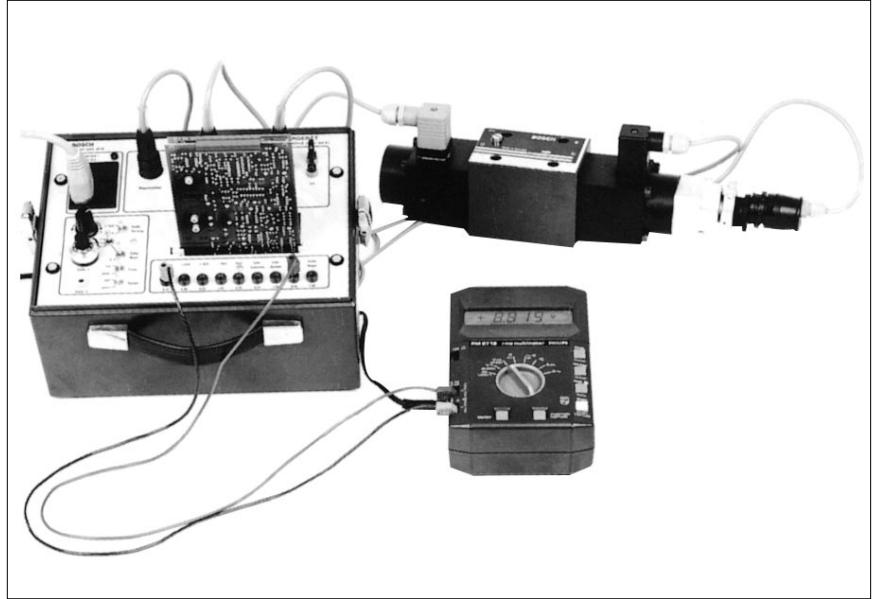
Never apply external voltages to the test connections.



Symbol		LBS [kg]	
	DIN 41612-F 32 Test-adapter	1.1 (0.5)	<b>0 811 405 114</b>


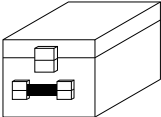


**Test box I**



This test box provides all electrical connections, including voltage supply and provision for entering setpoints for single stage proportional-control valves and their valve amplifiers. It makes it possible to commission units into service and to perform adjustments regardless of the circuitry of the machine in question. Easily accessible test sockets facilitate standard voltage and current measurements. The test box is an indispensable service aid for carrying out specific monitoring procedures during initial operation and in fault diagnosis.

For further information see:  
HPUS UBY 013/1 U.S.

Symbol		Dimensions	LBS [kg]	
	Test box I	w x h x d (270 x 200 x 200) mm	13.25 (6)	<b>B 830 303 013 – EN</b>

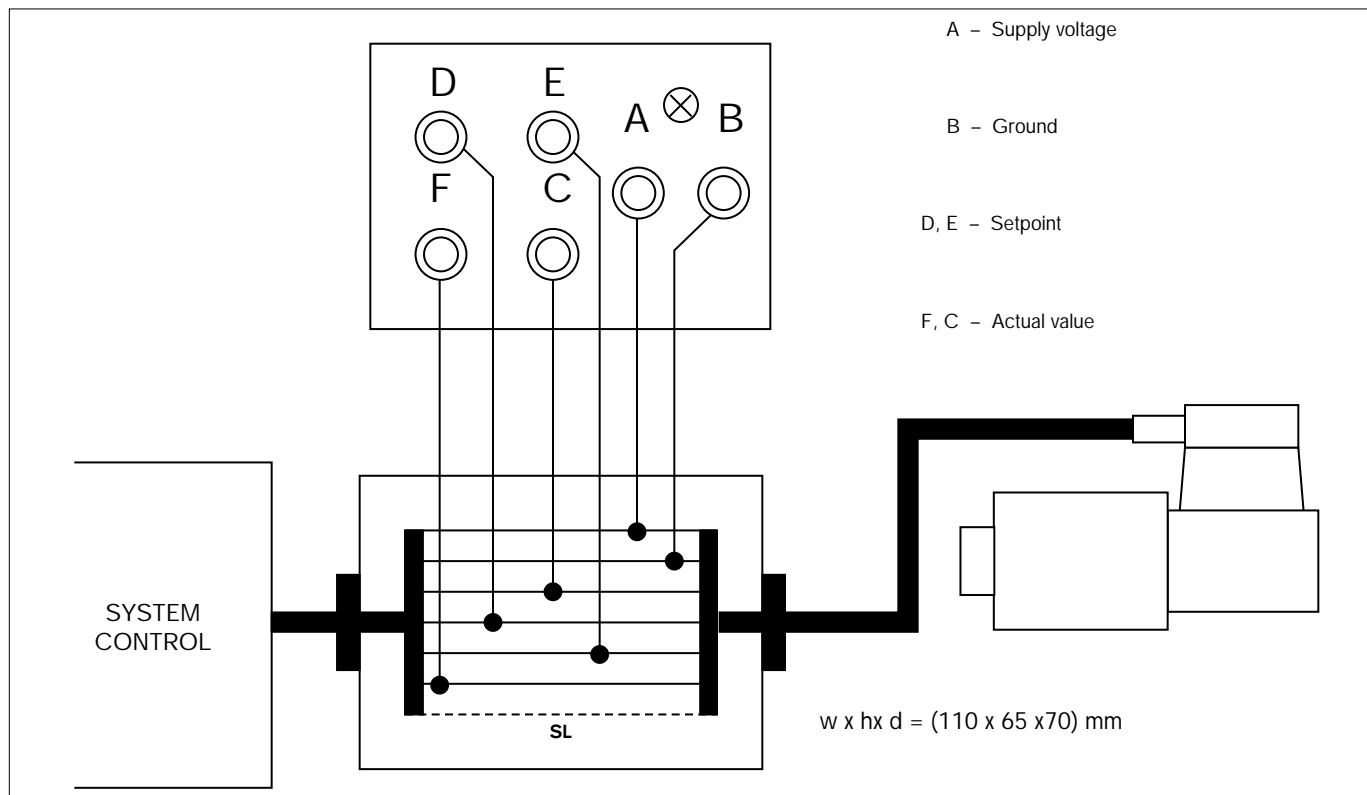
**Test adapter for valves with integrated electronics**




- The test adapter is employed for testing communication signals between the system control and the valve (supply voltage, setpoint, actual value).
- The LED also indicates the presence of supply voltage.

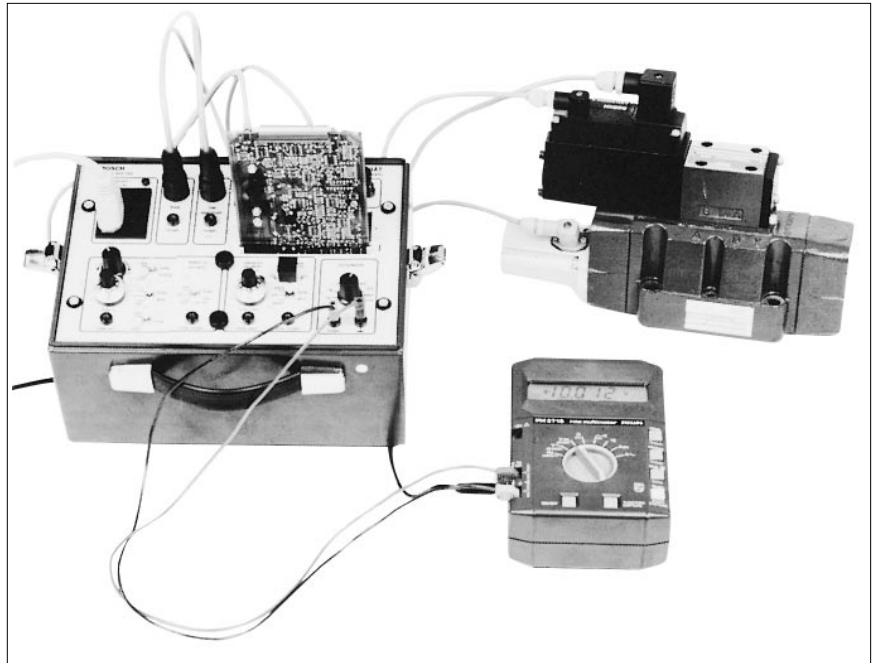
**Important:**

Never feed external voltage into the test jacks.


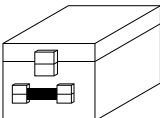


Type	Application	LBS [kg]	
Adapter II	For all valves with integrated electronics	0.9 (0.4)	<b>B 830 303 458</b>

**Test box III**



Test box III is used for commissioning into service and monitoring operation with all valves incorporating integrated electronics. The valve unit is provided with all necessary signal and voltage connections, inputs and outputs and measurement taps, making it possible to design a test program which operates independently of the machine's control system..  
 Supplied with the Test box are a power cord and a valve connection cable (2.5 m, two 7-pin plugs). The unit can be connected to either 110 V or 220 V power.

Symbol		Dimensions	LBS [kg]	
	Test box III	w x h x d (270 x 160 x 200) mm	11 (5)	<b>B 830 303 421 – EN</b>

Part number	Page	Part number	Page	Part number	Page	Part number	Page
953 611	103	0 811 403 013	67	0 811 405 098	130	9 536 230 054	148
953 675	104	0 811 403 020	43	0 811 405 099	130		
		0 811 403 021	43	0 811 405 100	133	B 810 005 206	55
0 811 401 200	100	0 811 403 100	47	0 811 405 101	133		
0 811 401 201	99	0 811 403 101	47	0 811 405 102	133	B 810 006 351	92
0 811 401 202	100	0 811 403 104	39	0 811 405 103	133	B 810 006 390	92
0 811 401 203	99	0 811 403 105	39	0 811 405 104	133	B 810 006 400	92
0 811 401 204	107	0 811 403 108	39	0 811 405 106	120	B 810 006 401	92
0 811 401 220	101	0 811 403 109	39	0 811 405 114	152		
0 811 401 221	101	0 811 403 112	61	0 811 405 119	140	B 810 026 500	72
0 811 401 222	101	0 811 403 113	61	0 811 405 120	140	B 810 026 501	80
0 811 401 223	101	0 811 403 114	61	0 811 405 126	117	B 810 026 548	88
		0 811 403 115	61	0 811 405 127	117	B 810 026 775	88
0 811 402 001	17	0 811 403 116	61	0 811 405 137	143	B 810 026 776	88
0 811 402 003	17	0 811 403 117	61	0 811 405 138	143	B 810 026 777	88
0 811 402 004	17	0 811 403 118	61	0 811 405 143	110		
0 811 402 007	17	0 811 403 119	61	0 811 405 144	110	B 811 102 154	11
0 811 402 013	17	0 811 403 121	61	0 811 405 145	110	B 811 102 155	11
0 811 402 016	8	0 811 403 126	47			B 811 102 156	11
0 811 402 017	8			1 815 503 011	105	B 811 102 157	33
0 811 402 018	8	0 811 404 001	84	1 815 503 012	105	B 811 102 158	33
0 811 402 019	8	0 811 404 003	84	1 815 503 351	105	B 811 102 160	33
0 811 402 020	25	0 811 404 080	84	1 815 503 364	105		
0 811 402 021	25	0 811 404 081	84	1 815 503 372	105	B 830 303 013-EN	153
0 811 402 022	25	0 811 404 086	84			B 830 303 375	130
0 811 402 023	25	0 811 404 087	84	1 834 482 022	148	B 830 303 376	130
0 811 402 024	8	0 811 404 100	80	1 834 482 023	148	B 830 303 377	130
0 811 402 030	8	0 811 404 101	80	1 834 482 024	148	B 830 303 378	130
0 811 402 031	8	0 811 404 114	72	1 834 482 026	148	B 830 303 379	130
0 811 402 032	8	0 811 404 115	72			B 830 303 382	133
0 811 402 040	11	0 811 404 116	72	1 834 484 040	147	B 830 303 383	133
0 811 402 041	11	0 811 404 117	72	1 834 484 057	147	B 830 303 384	133
0 811 402 042	11	0 811 404 119	80	1 834 484 058	147	B 830 303 385	133
0 811 402 043	11	0 811 404 120	80	1 834 484 098	147	B 830 303 386	133
0 811 402 044	11	0 811 404 121	80	1 834 484 185	113, 115	B 830 303 387	136
0 811 402 045	11	0 811 404 123	72	1 834 484 185	147	B 830 303 388	136
0 811 402 050	36	0 811 404 125	72			B 830 303 389	136
0 811 402 051	36	0 811 404 126	80	1 834 486 000	151	B 830 303 390	136
0 811 402 052	36	0 811 404 140	88	1 834 486 001	151	B 830 303 391	136
0 811 402 055	33	0 811 404 141	88			B 830 303 421-EN	155
0 811 402 058	33	0 811 404 142	88	2 910 151 209	105	B 830 303 442	123
0 811 402 059	33	0 811 404 143	88	2 910 151 309	105	B 830 303 443	126
0 811 402 070	20	0 811 404 750	55			B 830 303 444	123
0 811 402 071	20	0 811 404 751	55	9 000 010 139	103	B 830 303 458	154
0 811 402 072	20	0 811 404 770	92	9 000 010 140	103	B 830 303 466	140
0 811 402 073	20	0 811 404 771	92	9 000 010 141	103	B 830 303 467	143
0 811 402 100	28	0 811 404 772	92	9 000 010 142	103	B 830 303 468	140
0 811 402 101	28	0 811 404 773	92	9 000 010 143	103	B 830 303 469	143
0 811 402 108	14	0 811 404 830	76	9 000 010 144	103		
0 811 402 109	14	0 811 404 831	76	9 000 010 145	103	B 830 304 273	110
0 811 402 110	14	0 811 404 832	76	9 000 010 146	103	B 830 304 275	110
0 811 402 111	14	0 811 404 833	76	9 000 010 147	103	B 830 304 276	110
0 811 402 150	29			9 000 010 148	103		
0 811 402 151	29	0 811 405 079	123	9 000 010 168	104		
		0 811 405 080	126	9 000 010 170	104		
0 811 403 001	51	0 811 405 081	123	9 000 010 171	104		
0 811 403 002	51	0 811 405 091	113	9 000 010 173	104		
0 811 403 003	51	0 811 405 092	115	9 000 010 176	104		
0 811 403 010	67	0 811 405 095	130	9 000 010 179	104		
0 811 403 011	67	0 811 405 096	130	9 000 010 180	104		
0 811 403 012	67	0 811 405 097	130	9 000 010 182	104		

9 535 233 179  
ATUS AKY 013/1 US (1.97)

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