

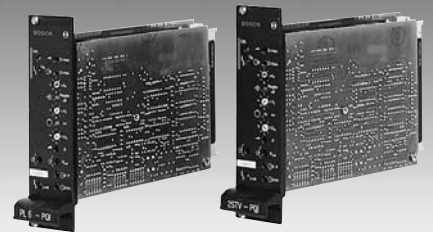
# p/Q amplifier

RE 30058/03.04

1/8

## Type VT-VARAP1

Series 2X



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## Features

- Suitable for actuating directly operated and pilot operated servo solenoid valves
- Analog amplifiers in Eurocard format for installation in 19" rack
- Output stage with closed-loop control
- Rapid energizing and de-energizing for fast response times
- Enabling input
- Short-circuit-proof outputs
- External control shutoff
- Open-circuit detection for feedback signal cable and pressure sensor
- Suitable for pressure sensors (1...6 V, 0...10 V, 4...20 mA)
- Closed-loop position control with PID action

### Testing and service equipment

- Test box type VT-PE-TB2, see RE 30064
- Test adapter type VT-PA-3, see RE 30070

### Pressure measuring technology

- Pressure sensor HM18, see RE 30271

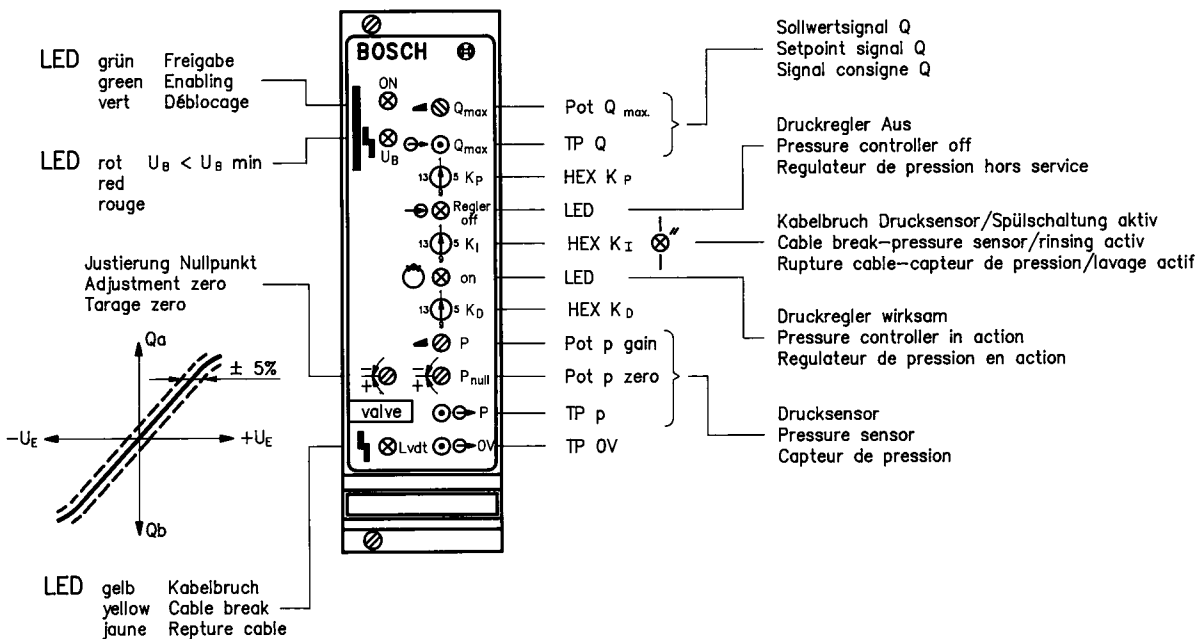
Ordering data and scope of delivery

	<b>VT-</b>	<b>V</b>	<b>A</b>	<b>R</b>	<b>A</b>	<b>P</b>	<b>1</b>	<b>-</b>	<b>-</b>	<b>/</b>	<b>/</b>	
<p><b>Hydraulic component</b> (actuation) Axis control = <b>A</b></p> <p><b>Valve type</b> Servo solenoid valve = <b>R</b></p> <p><b>Actuation</b> Analog = <b>A</b></p> <p><b>Function</b> p/Q control = <b>P</b></p> <p><b>Output stages</b> 1 output stage = <b>1</b></p>											<p><b>Option</b> No code Servo solenoid valve NG 6/10 directly operated <b>5/3V</b> = p/Q valve NG 10 directly operated <b>2STV</b> = servo solenoid valve, pilot operated, NG 10, 16, 25 <b>3/2V</b> = servo solenoid valve, pilot operated, control line A → X</p> <p><b>Customer version</b> V0 = Catalog version</p> <p><b>Series</b> 2X = Series 20 to 29</p> <p><b>Serial numbers for types</b> 527 = 2.7 A solenoid 537 = 3.7 A solenoid</p>	

Preferred types (available a short notice)

Type	Material no.	For valve types
VT-VARAP1-527-20/V0	0 811 405 152	4WRPH 6
VT-VARAP1-537-20/V0	0 811 405 153	4WRPH 10
VT-VARAP1-537-20/V0/5/3V	0 811 405 154	5WRP 10
VT-VARAP1-527-20/V0/2STV	0 811 405 155	4WRL
VT-VARAP1-527-20/V0/3/2VAX	0 811 405 156	3/2 V; NG 25, 32, 50





Front panel







**Technical data** (For applications outside these parameters, please consult us!)

P.C.B. format	(100 x 160 x approx. 35) mm (B x L x H) Europe format with front panel (7 modular spacings)	
Plug connector	Connector DIN 41612 – F 32	
Ambient temperature	0 °C ... +70 °C, storage temperature min. –20 °C; max. +70 °C	
Weight <i>m</i>	0.25 kg	
Power supply $U_B$ to z 2 – b 2	24 V DC Battery voltage 21...40 V Rectified AC voltage $U_{eff} = 21...28$ V (single-phase, full-wave rectification)	
Smoothing capacitor, separately to b 4, z 4	4700 $\mu$ F/63 V DC, only required if $U_B$ ripple >10 %	
Valve solenoid A/VA max.	<b>2.7/40 (NG 6)</b>	<b>3.7/60 (NG 10)</b>
Current rating	1.7 A	2.7 A
	The current rating can rise at min. $U_B$ and long cable length to control solenoid	
Power consumption (typical)	37 W	55 W
Input signal (setpoint $Q$ )	b 20: 0... $\pm$ 10 V z 20: 0... $\pm$ 10 V } Difference amplifier ( $R_i = 100$ k $\Omega$ )	
Input signal (setpoint $p$ )	z 12: 0...10 V z 10: 0 V } Difference amplifier	
Feedback signal from pressure sensor	z 14: 4...20 mA current input b 16: 0...+10 V / 1...+6 V voltage input b 18: 0 V reference	
Pressure control OFF	b 10: 6...40 V DC	
External scanning of controller	z 24: 24 V/0.1 A max.	
Limit frequency	For applications $\leq 30$ Hz	
Signal source	Potentiometer 10 k $\Omega$ , $\pm 10$ V supply from b 32, z 32 (10 mA) or external signal source	
Output stage enable	To z 16, $U = 8.5...40$ V, $R_i = 100$ k $\Omega$ , LED (green) on front panel lights up	
Sensor power supply	z 6: +15 V/35 mA, $R_i \sim 25$ $\Omega$	
Position transducer	Power supply	b 30: –15 V/25 mA z 30: +15 V/35 mA
	Pilot stage signal	b 22: 0 ... $\pm 10$ V, $R_L > 10$ k $\Omega$ /ref. b 24
	Main stage signal	b 26: 0 ... $\pm 10$ V, $R_L > 10$ k $\Omega$ /ref. b 28
Solenoid output	Clocked current regulator	
b 6 – b 8	$I_{max.} = 2.7$ A	$I_{max.} = 3.7$ A
Length of amplifier to valve cables	Solenoid cable: up to 20 m 1.5 mm <sup>2</sup> 20 up to 60 m 2.5 mm <sup>2</sup> Position transducer: 4 x 0.5 mm <sup>2</sup> (screened) Pressure sensor: 4 x 0.5 mm <sup>2</sup> (screened)	
LED displays	Green: Enable $U_B$ ON Yellow: Position transducer open circuit  Red: Supply voltage too low  Yellow: Pressure control OFF  Yellow: Pressure control working  Both yellow LED's flashing: Pressure sensor open circuit	
Special features	Open-circuit protection for feedback signal cable and pressure sensor Closed-loop position control with PID action Clocked output stage Rapid energizing and de-energizing for fast response times Short-circuit-proof outputs External control shutoff	
Error signal	z 22: No fault: + $U_K$ ; max. 100 mA Fault: 0 V	
	– Position transducer open circuit – $U_B$ too low – $\pm 15$ V stabilization	

**Note**

Connect power zero b 2 and control zero b 12, b 14 or z 28 separately to central ground (neutral point).

## Additional information / Example

### Applications

The  $p/Q$  amplifiers comprise a base card with front panel, containing the valve amplifier with position control and a daughter card. The daughter card, inserted in the base card, is where the actual pressure control process occurs. This amplifier is only available as a single combination unit. When used together with the appropriate servo solenoid valves (see table on page 2) and pressure sensors (sensor signal 1...6 V, 0...10 V or 4...20 mA), this unit can be employed for controlling flow and pressure in a closed-loop control circuit. The input parameters are the setpoints for pressure  $p$  and flow  $Q$ . Pressure and valve spool position are transmitted as feedback values.

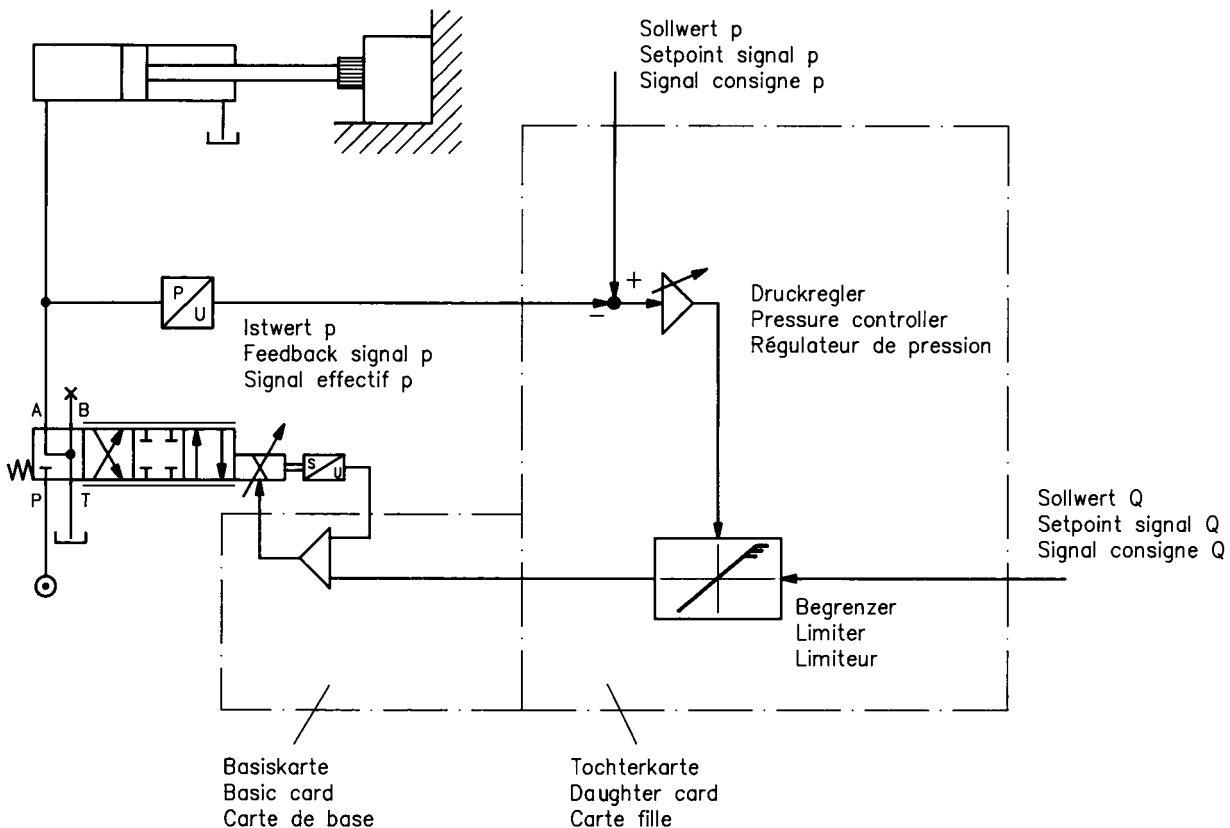
The combination of valve amplifier and  $p/Q$  amplifier functions:

- As a flow controller when  $p_{\text{setpoint}} < p_{\text{feedback value}}$ , that is, while the pressure control function remains inoperative.
- As a pressure regulator when  $p_{\text{setpoint}} > p_{\text{feedback value}}$ , that is, the flow is reduced until  $p_{\text{feedback value}} = p_{\text{setpoint}}$ . The pressure control only functions when there is a positive setpoint voltage to z 20.

The setpoint  $Q$  corresponds to the spool position as long as the pressure control system remains inoperative, that is when  $p_{\text{setpoint}} > p_{\text{feedback value}}$  or when the pressure control is switched off (DIL 4 OFF). Setpoint  $Q$  can lie within the range  $U_E = 0...±10$  V. For effective pressure regulation, however, setpoint  $p$  must be supplemented by a setpoint  $Q$ . This is  $U_E ≥ 2...+10$  V.

### Example 1

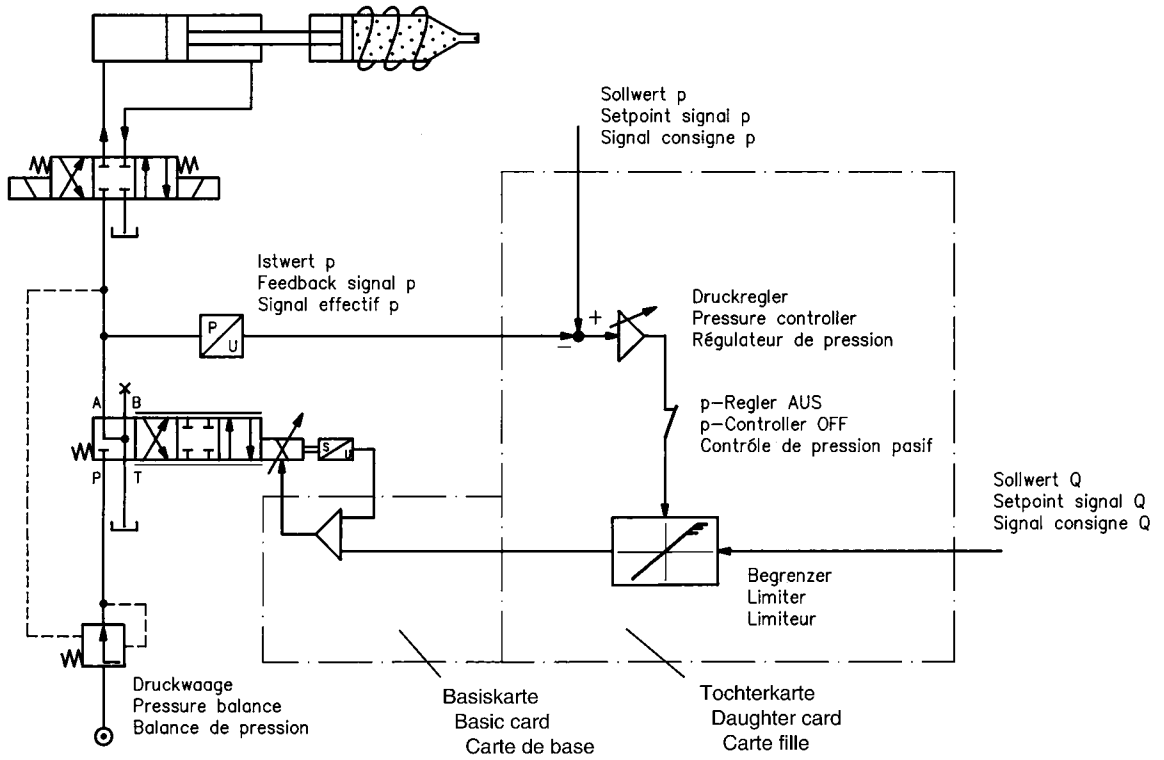
Pressure control in a cylinder chamber in order to obtain a constant clamping force.



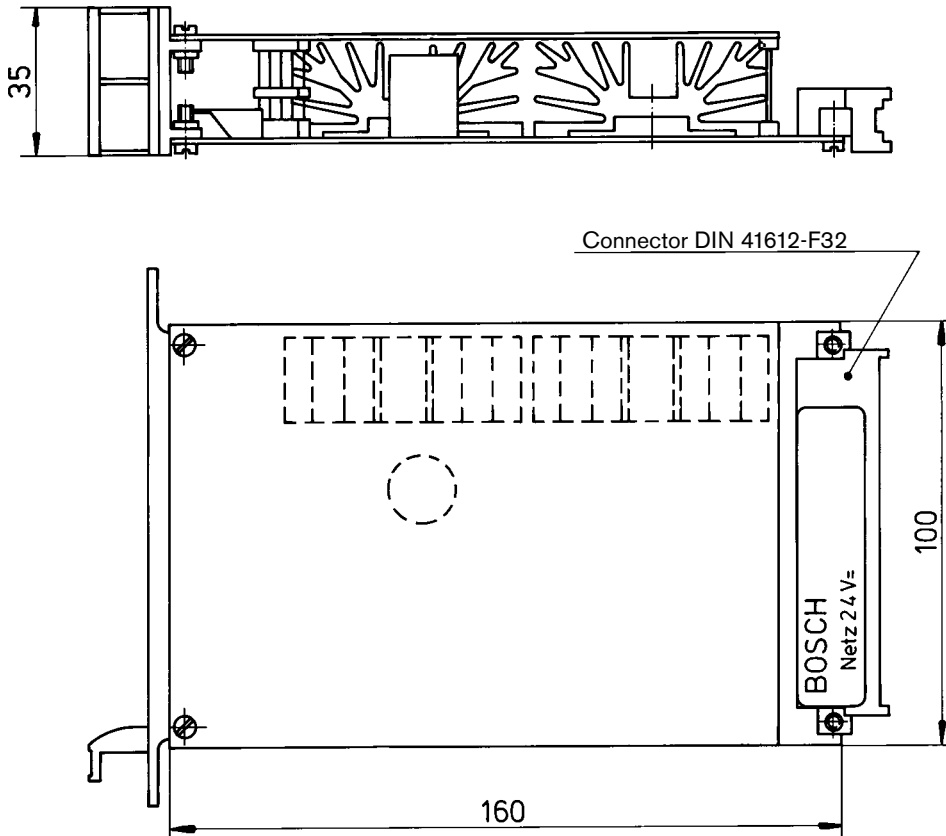
**Example**

**Example 2**

The flow is controlled with load compensation by means of a pressure compensator, and the pressure is controlled in the closed loop (pressure override).



**Unit dimensions (in mm)**



## Notes

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