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Find the *Bosch Rexroth VT 2000 S 41* at our website: *Click HERE*

REXROTH
WORLDWIDE HYDRAULICS

Electronic Amplifier Model VT 2000 (Series 4X) for controlling proportional pressure control valves Euro card format

RA
29 908/11.86
Replaces: 10.85

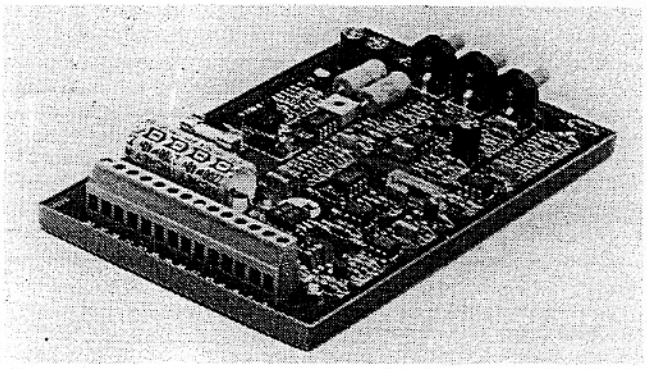
Electronic amplifier cards Model VT 2000 are proportional power amplifiers used to control proportional pressure relief valves (Model DBE) and pump controls [Model V4/"E" control (RS415)].

They incorporate the following features;

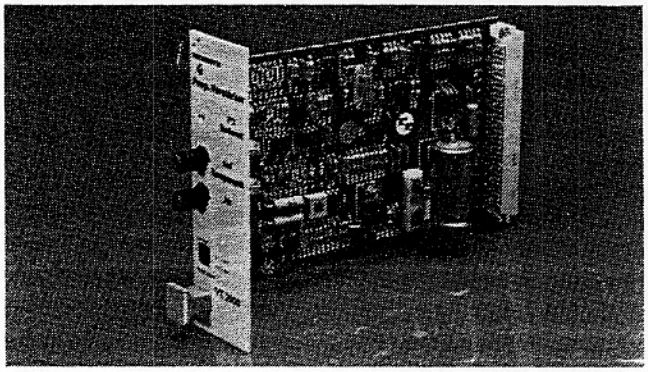
- Voltage stabilizer to provide constant voltage for consistant performance
- Integrated potentiometer for limiting the maximum input command voltage signals providing safe operator control
- Ramp generator to control the rate of pressure increase and decrease (signal vs time)
- "Up" and "down" ramp times which are separately adjustable for independent control
- Amplifier model "S" allows up and down to be switched off separately when desired
- Pulse width modulated output which provides a dither effect to reduce hysteresis, and allows high ambient temperature range
- 100 Hz / 200 Hz oscillator for optimum pump of valve performance respectively
- 10 V differential amplifier input which enables interface with programmable controllers, microprocessor or computers

Matching card holders
- VT 3002-1X, see RA 29916
  single card holder
- VT 1516-1X, see RA 29915
  single card holder w/power supply
- VT 1700-1X, see RA 29917
  double card holder w/power supply

Card racks
- Single (3u) or double (6u) tier see RA 29725

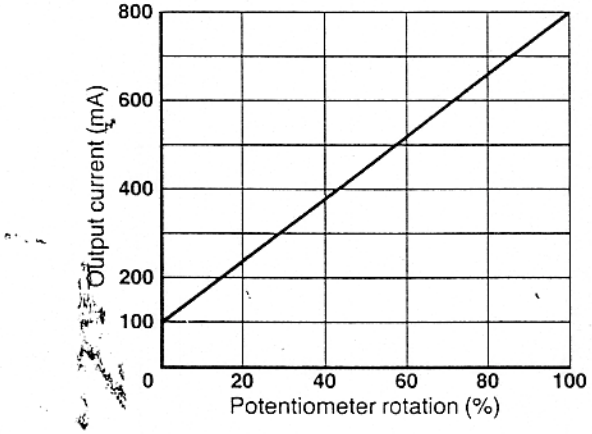


K 3852/3
VT 2000 K 4X/E



R 85/126
VT 2000 S 4X/E

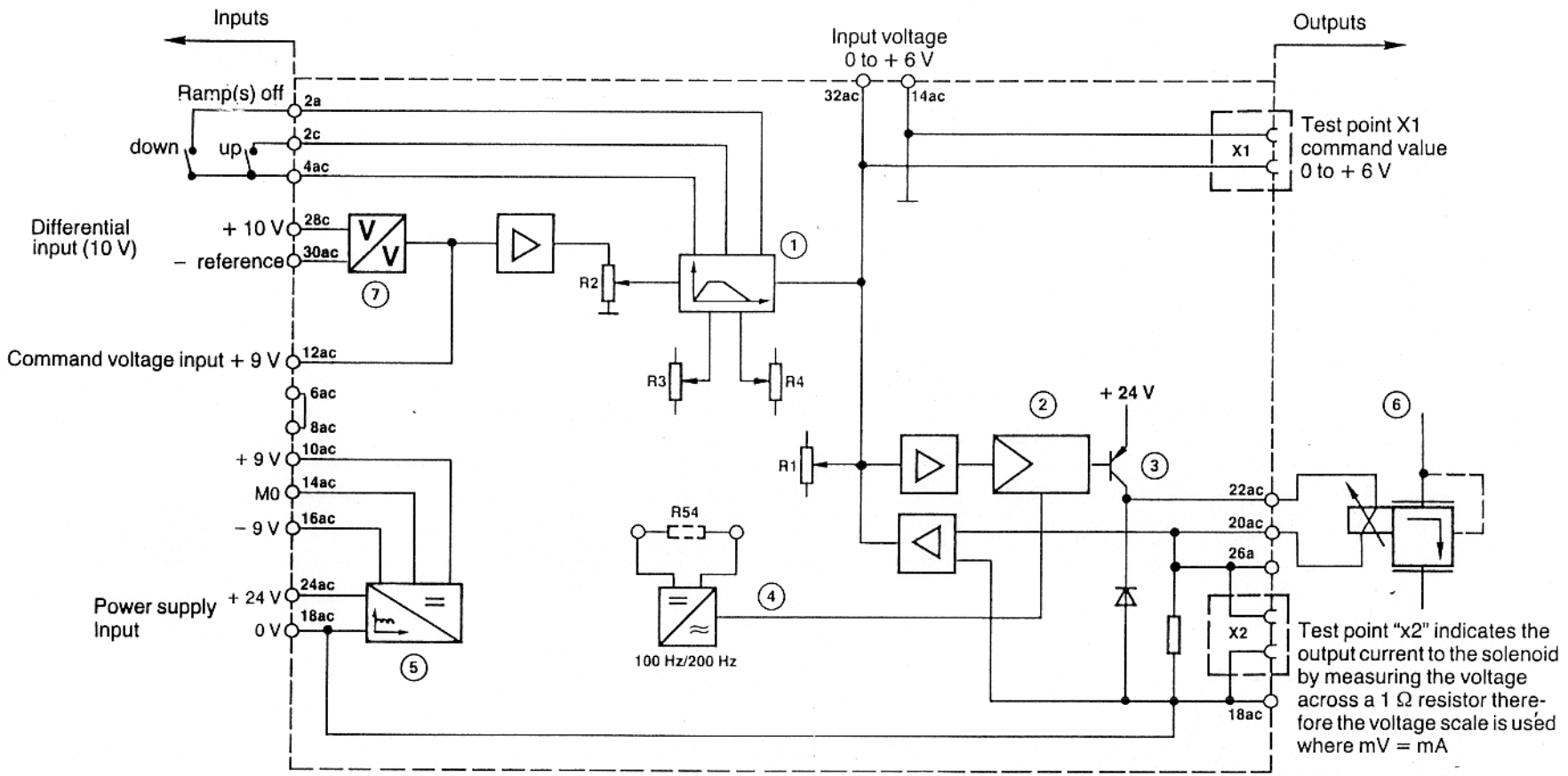
Output Curve



Technical Data

Power supply voltage	V_{DC}	24 V_{eff} ± 10 %
Input control voltage	V_{IN}	± 9 V with reference to (M0)
Power requirements	P	30 W
Minimum input load	R_{IN}	≥ 500 Ω
Maximum output load (coil resistance)	R	19.5 Ω
Minimum output (Bias) current	I_{min}	100 mA
Maximum output current	I_{maX}	800 mA
Pulse frequency	P_{freq}	100 Hz / 200 Hz
Fuse (5 mm x 20 mm)	I_s	1.2 Ampere M
Space requirements:		
Conductor side of card		1 division
Component side of card		7 divisions
Face plate requirement		8 divisions 1 div. = 0.200" (5.08 mm) 1 TE = 1 HP
Temperature drift	T_d	2 % (from I_{max})/°K
Ambient temperature range	T	32 to 122 °F (0 to 50 °C)
Weight (approx.)	W	0.33 lb (0.15 kg)

For applications outside these parameters, please consult us!



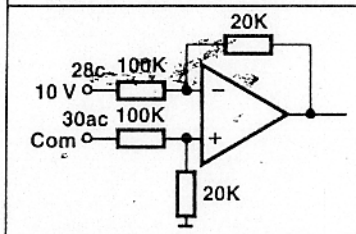
Measured zero M0 (or signal common) pin 14ac is raised 9 V with respect to Zero volt pin 18ac (0 V)

① Ramp generator
② Power amplifier
③ Output stage
④ PWM oscillator
⑤ Voltage regulator
⑥ Proportional solenoid
⑦ Differential input amplifier

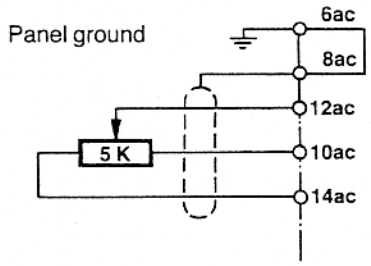
R1 = Minimum (Bias) current
R2 = Maximum current
R3 = Ramp time "up"
R4 = Ramp time "down"

Note: For model K pins 2a and 2c are combined, therefore when using an external potentiometer ramps "up" and "down" are no longer externally independently adjustable. In addition, a jumper between pins 2 and 4 will switch off both "up" and "down" ramps.

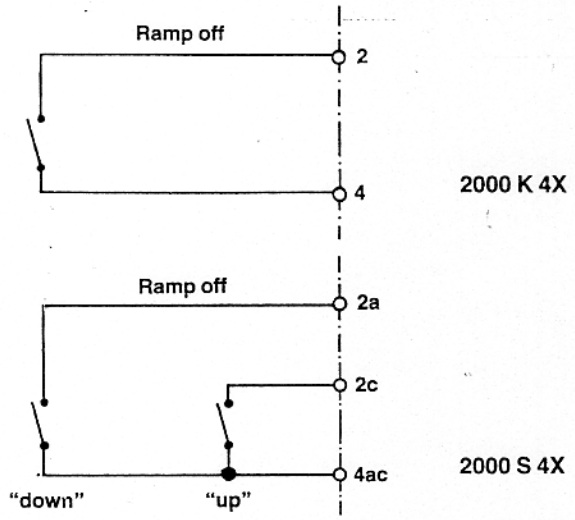
Differential Input Amp. (7)



Example of Manual Control with a 5 kΩ Potentiometer



Ramp Time Control



On Model VT 2000 K 4X the ramp times are not independently adjustable externally. A 500 kΩ potentiometer connected between pins 2 and 4 allows external adjustment of both ramps. A jumper from pins 2 and 4 will switch off both the "up" and "down" ramps.

On Model VT 2000 S 4X the ramp times may be externally adjusted with potentiometers. In addition each ramp may be switched off separately allowing the ramps to function independently. A 500 kΩ potentiometer connected between pins 4ac and 2c allows external adjustment for the "up" ramp. A 500 kΩ potentiometer connected between pins 4ac and 2a allows external adjustment for the "down" ramp. Jumpers connected between pins 4ac and 2c "up" and/or 4ac and 2a "down" will totally eliminate the ramp functions respectively.

Functional Description

Amplifier cards Model VT 2000 convert an input voltage signal proportionally into output current to power a proportional solenoid. Dependent on the amount of current to the solenoid, the force on the pilot poppet of the valve is varied, thereby increasing or decreasing pressure.

The input voltage from the power supply on pins 24ac & 18ac powers the card and is also fed thru a regulator (5) which filters, suppresses and smooths the voltage and divides its 18 V output over pins 10ac & 16ac with a reference potential "measured zero" on pin 14ac. From pins 10ac & 14ac the + 9 Volts may be manipulated externally via a simple potentiometer (see above), reed switches, dry circuit relays etc., and then used as a command input signal(s) to the amplifier at pin 12ac.

The card will also accept a differential analog input via pins 28c and 30ac. The differential signal is compared in the differential amplifier (7) and then the differential voltage is output. Pin 28c must have a 0 - 10 volt potential with respect to pin 30ac and the signal to both pins must be made or broken simultaneously.

After the inputs & outputs are connected, the bias current "minimum pressure" may be set by potentiometer "R1" if desired. Also the maximum current "highest pressure setting" may be set by potentiometer "R2", if it is desired to limit the pressure. Note that the bias current must be adjusted *first* on trim pot "R1" then the maximum current may be adjusted, through the face plate, with trim pot "R2".

The ramp generator (1) distributes a stepped input signal into a slowly increasing output signal over an adjustable period of time. The time or "slope" of the output signal curve may be adjusted by trim pots R3 (for the "up" ramp), and R4 (for the "down" ramp). These potentiometers are adjustable from the cards face plate and allow signal vs. time ramping of up to 5 seconds. A clockwise rotation of the trim pot(s) will increase the ramp time. Optional external potentiometer(s) may be connected to allow external adjustment (see above), R3 and R4 potentiometers with external potentiometers connected act as limiters. Note, the maximum ramp time of 5 seconds, can only be achieved over the full voltage range, if a lower command signal < + 9 V is selected then the ramp time will be correspondingly reduced.

The output signal of the ramp generator (1) is passed to the current regulator (2) and added to the value of potentiometer R1. Through modulation of the oscillator signal, a pulse width is generated, which in turn is used to switch the power transistor ofthe output stage. This pulsed current acts like a constant current with the added benefit of being interpreted by the solenoid as a dither signal thereby overcoming static friction.

The output signal from the power amplifier (2) travels through the output stage (3) supplying a current from 100 to 800 mA to the proportional solenoid (6). Two test points X1 and X2 are located on the face plate of the card. The command output level 0 - 6 V may be measured across test points X1 to ensure the inputs are correct. Likewise the actual current to the solenoid may be easily checked using test point X2. Note, the measurement on X2 is made with the meter set on the voltage scale (1 mV = 1 mA, due to the 1 Ω resistor).

Ordering Code

VT 2000		4X /	E		*

- Board with terminal strip = K
  32 pin plug-in Euro card design = S
  (for installation in Euro magazines or card holders)
- Series 40 to 49 = 4X
  (40 to 49 ≙ installation and connection dimensions remain unchanged)
- Further details to be written in clear text
- 1 = Pumps 100 Hz
  2 = Valves (standard) 200 Hz
- E * = English name plate

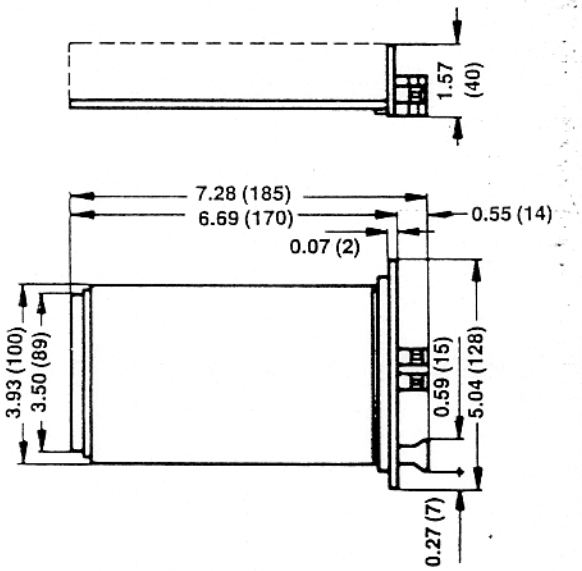
* Model "S" only

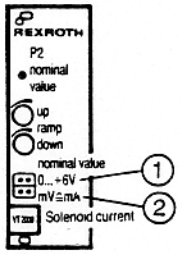
Additional Information

- Turn off power before connecting or disconnecting the amplifier card
- Measurements should be made with high impedance meter
- Signal common, measured zero (M0) is regulated above 9 V with respect to 0 V input supply voltage, therefore, "M0" may not be connected to "0 V" of power supply voltage, or externally grounded
- Radio transmitters or similar devices may not be used within 3 ft (1 m) of the card
- Switches used for input signal must handle currents under 1 mA (dry circuit contacts, reed switches)
- Shield all control voltage wires, connect the card end of shield to panel ground on the enclosure and leave one end of the shield open
- Do not run the solenoid wires in the vicinity of power wires
- Input and output terminals which are labelled wht the suffix "ac" are internally connected, therefore connections may be made to either terminals "a" or "c"

Unit Dimensions (Dimensions in inches and millimeters)

VT 2000 S 4X

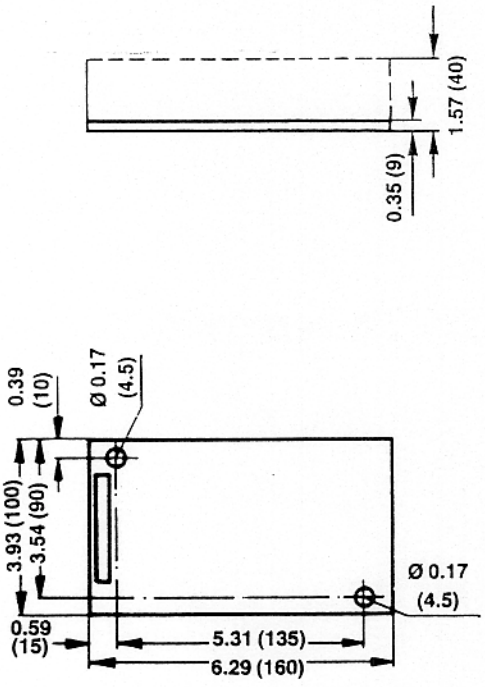




1 Test point X1 =
measurement of 0 ... + 6 V input voltage

2 Test point X2 =
measurement of output signal to solenoid

VT 2000 K 4X



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