Power Amplifiers

Models with Command Logic Module and 4 Ramps
EEA-PAM-5**-C-32 Series

General Description

The EEA-PAM-5**-C-32 Eurocards are power amplifiers with a 4-input (demand signal) module and 4-ramp function generator with quadrant detection. The ramp generator allows acceleration and deceleration to be set separately for both directions of movement.

The type of EEA-PAM-5**-C-32 amplifier used depends on the type of proportional valve, see “Model Codes” on next page.

Features and Benefits

- All features of “A” amplifiers
- 4 adjustable ramp times, 4-quadrant acceleration/deceleration
- 4 adjustable command pre-sets selectable by 24V logic signal
- Polarity of the 10V reference voltage selectable by 24V logic signal

Front Panel

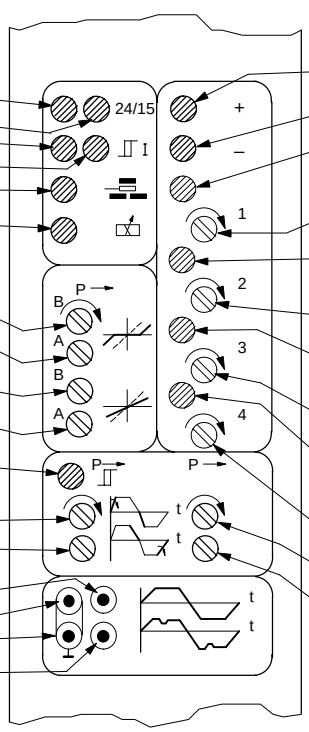
LEDs
[1] 24V power supply input, green
[2] ±15V control supply output, green
[3] Drive (solenoid) enabled, yellow
[4] Overload, red
[5] LVDT failure, red ▼ ▲
[6] Drive to solenoid, yellow ★

Potentiometers
[7] Deadband compensation, flow from port P to B ◆ ▲
[8] Deadband compensation, flow from port P to A ◆ ▲
[9] Gain, flow from port P to B ◆ ▲
[10] Gain flow from port P to A ◆ ▲

LED
[11] Ramps enabled, yellow

Potentiometers
[12] Spool acceleration, flow from port P to B ◆ ▲
[13] Spool deceleration, flow from port P to B ◆ ▲

Monitor points ■
[14] Conditioned command signal
[15] Common ground 0V
[16] ▲ ●



LEDs
[17] Positive input polarity ON, yellow
[18] Negative input polarity ON, yellow
[19] Input 1 ON, yellow

Potentiometer
[20] Input 1 adjustment

LED
[21] Input 2 ON, yellow

Potentiometer
[22] Input 2 adjustment

LED
[23] Input 3 ON, yellow

Potentiometer
[24] Input 3 adjustment

LED
[25] Input 4 ON, yellow

Potentiometers:
[26] Input 4 adjustment
[27] Spool acceleration, flow from port P to A ◆ ▲
[28] Spool deceleration, flow from port P to A ◆ ▲

▼ *LED and symbol not on EEA-PAM-523/525 amplifiers.*
▲ *Main-stage spool in the case of K*DG5V valves.*
● *Of solenoid current in the case of EEA-PAM-523/525 models, of spool position for others.*

■ *Ø2,0 mm (0.0787″ dia.) sockets.*
★ *Indicates drive to whichever solenoid is energized.*
◆ *In the case of EEA-PAM-523/525 amplifiers, one of these relationships may not apply if two single solenoid valves are connected.*

This product has been designed and tested to meet specific standards outlined in the European Electromagnetic Compatibility Directive (EMC) 89/336/EEC, amended by 91/263/EEC, 92/31/EEC and 93/68/EEC, article 5. For instructions on installation requirements to achieve effective protection levels, see this leaflet and the Installation Wiring Practices for Vickers Electronic Products leaflet 2468. Wiring practices relevant to this Directive are indicated by ⚠ Electromagnetic Compatibility (EMC) .

Model Codes

Amplifier model	For valves	
EEA-PAM-523-C-32	K*G4V-3; KDG5V-5/7/8	} With type "H" coils only
EEA-PAM-525-C-32	K*G4V-5	
EEA-PAM-533-C-32	KF*G4V-3	
EEA-PAM-535-C-32	KF*G4V-5	
EEA-PAM-561-C-32	KFDG5V-5/7	
EEA-PAM-568-C-32	KFDG5V-8	

Operating Data

Power requirements		See appropriate base amplifier, e.g. for EEA-PAM-535-C-32 see EEA-PAM-535-A-32
Control (output) supplies	z22	+15V for LVDTs only
Output voltages for control: At pin z2 At pin b2 At pins z2 and b2		 +10V (±1%) x 5 mA –10V (±1%) x 5 mA Ripple <20 mV pk.-to-pk. Temperature drift <1 mV/°C (<0,5 mV/°F) thru' 0-50°C (32-122°F) range All outputs short-circuit protected
Command signal inputs: Direct-voltage pins Inverting-voltage pin Voltage range Input impedance (voltage) Current pin Current range Input impedance (current)	 b8, b6, z8, b10 z10 z6 	 ±10V 47 kΩ ±20 mA 100Ω
Command voltage source	d20	±10V x 10 mA
Command voltage polarity selection: For flow from (main) port P to A▲ For flow from (main) port P to B▲ Input impedance **Warning:** Loss of signal at pin d2 causes polarity reversal and possible erratic motion. ▲ *In the case of EEA-PAM-523/525 amplifiers, one of these relationships may not apply if two single-solenoid valves are connected.*		 Pin d2 at 0 to +5V Pin d2 at +10 to +40V 47 kΩ
Logic inputs: Switch-on voltage Switch-off voltage Input current	 d10, d12, d14 or d18	 +10 to +40V <+5V ≤10 mA
Command voltage inputs: Voltage and source Input impedance External command potentiometer	d22, d24, d26 and d28	 +10V gives valve flow from port P to B, or –10V gives flow from P to A Four 50 kΩ pots 5 kΩ; 0,25W minimum Part no. 714127; see catalog 2460 ◆ *Not applicable when using EEA-PAM-523/525 amplifiers to drive two single-solenoid valves.*
Drive enabled (power available to solenoid)	z24	Apply >9,8V to <40V (22 kΩ)
Drive disabled (no power to solenoid)	z24	Apply open circuit or up to 4,5V

Continued on next page

Alarm output:	z12	
Set alarm		Enable amplifier (on pin z24) when switching power on
Signal		HIGH when alarm is activated Output = Supply minus 2V I = 50 mA max. LOW when solenoid overload has occurred. (Maintained until reset.) Output = 0 to ±2 volts Output resistance = 50 ohms
Reset after failure		Disable and re-enable on pin z24
Ramps enabled (valve switching rate limited by ramp potentiometers)	b24	Apply >9,8V to <40V (22 kΩ)
Ramps disabled (fastest valve switching; ramp circuit bypassed)	b24	Apply open circuit or up to 4,5V
Ramp active indicator	b12	
Drive ramping up		Output >10V
Drive ramping down		Output <–10V
Drive not ramping		Output 0V (±2V ripple)
Output resistance		10 kΩ
Drive signal zero indicator	b20	
Drive signal at null (within deadband limits)		Output = Supply minus 1,5V I = 50 mA max.
Drive active		Output = 0 ±2V
Output resistance		50Ω
Ambient temperature range		0 to 50°C (32 to 122°F)
Storage temperature range		–25 to +85°C (–12 to +185°F)
Edge connectors		DIN 41612 F48 male type on board. Mating connector must be an F48 female type
Installation dimensions and panel display		Dimensions are the same as for the corresponding base amplifier but the panel display is different; see first page
Mass		0,40 kg (0.88 lb) approx.
Other characteristics		See catalog 2464 for the relevant base amplifier EEA-PAM-5**-**A**-32
Installation and start-up guidelines (supplied with product)		9166
Installation wiring requirements for Vickers electronics products		2468
Application notes (available on request)		9061
Supporting products:		See catalogs:
Power unit options		2419
Electronic accessories		2460
Portable test equipment		2462 and 2315

Warning: *Electromagnetic Compatibility (EMC)*

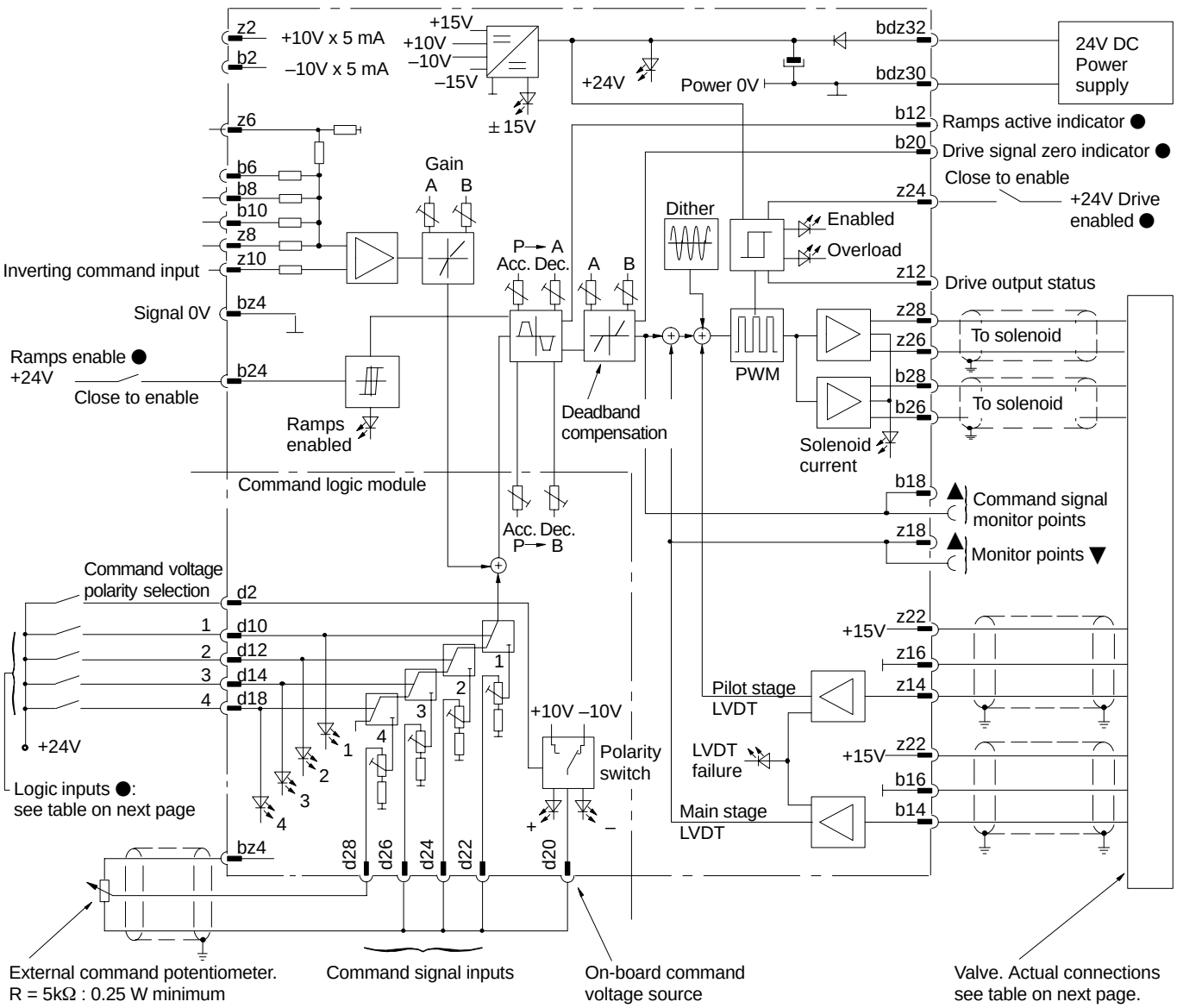
It is necessary to ensure that the valve is wired up in accordance with the connection arrangements shown in this leaflet. For effective protection, the user's electrical cabinet, the valve subplate or manifold and the cable screens should be connected to efficient earth (ground) points. The metal 7-pin connector part no. 934939 should be used for the integral amplifier.

In all cases, both valve and cable should be kept as far away as possible from any source of electromagnetic radiation such as cables carrying heavy current, relays and certain kinds of portable radio transmitters, etc. Difficult environments could mean that extra screening may be necessary to avoid the interference.

Circuit and Connections

EEA-PAM-5-C-32**
Shown with command logic module. Individual ramp adjustments of spool acceleration and deceleration for each direction of movement, are provided. The circuit here includes the essential characteristics of all amplifiers listed in the “Model Codes” section, two pages back; actual amplifiers omit certain sub-circuits to those connection pins not needed for the valves concerned.

*Read circuit in conjunction with that for relevant base amplifier EEA-PAM-5**-A*



⏚ *Customer’s protective ground connection.*
▼ *Solenoid current for 523/525-C models; LVDT position for all others.*
▲ *On front panel.*
● *See under this heading in “Operating Data” table, on previous two pages.*

Logic Selection Inputs

Logic input pin	Command pot.	Secondary pin	Voltage to pin d2	Valve flow
d10	1	bdz30	0 +24V	P-A P-B } ■
d12	2	bdz30	0 +24V	P-A P-B } ■
d14	3	bdz30	0 +24V	P-A P-B } ■
d18	4	bdz30	0 +24V	P-A P-B } ■

■ *In the case of EEA-PAM-523/525-C models, one of these relationships may not apply if two single-solenoid valves are connected.*

Solenoid and LVDT Connections for Proportional Valves

Amplifier type	Solenoid with LVDT and/or for flow P to B	Solenoid without LVDT, or on pilot valve	Pilot-stage LVDT, (black plug):				Main-stage LVDT, (gray plug):			
			Pin 1	Pin 2	Pin 3	Pin 4	Pin 1	Pin 2	Pin 3	Pin 4
EEA-PAM-523-C-32	b26/b28	z26/z28	–	–	–	Not connected	–	–	–	Not connected
EEA-PAM-525-C-32	b26/b28	z26/z28	–	–	–	Not connected	–	–	–	Not connected
EEA-PAM-533-C-32	b26/b28	z26/z28	–	–	–	Not connected	b14	z22	b16	Not connected
EEA-PAM-535-C-32	b26/b28	z26/z28	–	–	–	Not connected	b14	z22	b16	Not connected
EEA-PAM-561-C-32	–	z26/z28	–	–	–	Not connected	b14	z22	b16	Not connected
EEA-PAM-568-C-32	–	z26/z28	–	–	–	Not connected	b14	z22	b16	Not connected