Power Amplifiers for Proportional Valves

EEA-PAM-56*-A-14 Design

EEA-PAM-561-A-14 for use with valve types:
KDG5V-5, 3* and KDG5V-7, 1* series
EEA-PAM-568-A-14 for use with valve types:
KDG5V-8, 1* series

General Description

This basic amplifier is designed for driving Vickers type KFDG5V-5/7/8, 2-stage proportional valves in applications requiring only one (adjustable) ramp setting for both acceleration and deceleration.

Analog command input signals can be non-inverting current, or non-inverting, inverting or differential voltages. The amplifier requires a power supply of 24V DC and is enabled by a 24V logic signal.

The ramp is normally enabled but can be selectively disabled by suitable wiring to an external switch.

The amplifier front panel contains LEDs showing the status of power, control supply and outputs. Potentiometers for adjusting ramp, deadband compensation and gain are also mounted in the front panel.

Features

- Basic valve amplifier
- Voltage and current command signals
- 1 ramp for acceleration and deceleration
- 24V DC power supply
- Pulse-width-modulated coil drives

14-design Features

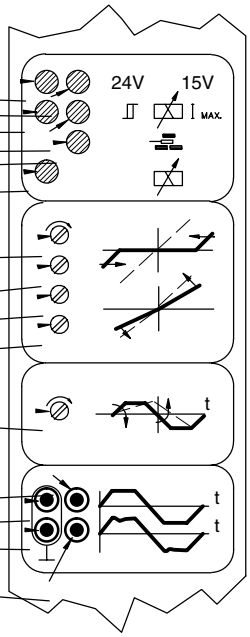
- Wider supply voltage range plus increased tolerance to ripple
- Low supply voltage protection
- Additional monitor points on edge connector
- Gain re-positioned in circuitry to give:
  - Ramp setting unaffected by gain adjustment
  - Constant trigger voltage for deadband compensation

Front Panel

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

Potentiometers
[7] Deadband compensation; towards flow from main-stage service port (A or B) nearest LVDT
[8] Deadband compensation; towards flow from main-stage service port (B or A) furthest from LVDT
[9] Gain; flow from service port (A or B) nearest LVDT
[10] Gain; flow from service port (B or A) furthest from LVDT
[11] Ramp

[12] Monitor point ■, conditioned command signal
[13] Common ground (0V) ■
[14] Monitor point ■, LVDT (spool) position

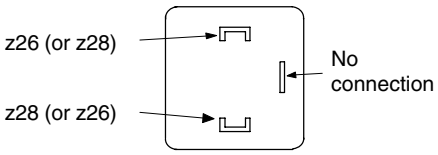


■ *Ø 2 (0.0787 dia.) sockets*

***Warning:** Electromagnetic Compatibility (EMC)*
This product does not conform to the European Community directives for electromagnetic compatibility (EMC). It is only suitable for use within the European Economic Area in a sealed electromagnetic environment or as a spare for an existing machine. (Ref. UK Electromagnetic Compatibility Regulations 14 & 18, 1995.)

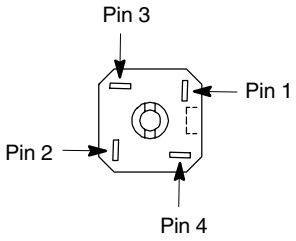
Valve Wiring Connections

Solenoid Connections



Note: Connections *not* polarity sensitive

LVDT Connections



LVDT plug pin	Amplifier pin
1	b14
2	z22
3	b16
4	Not connected

Operating Data

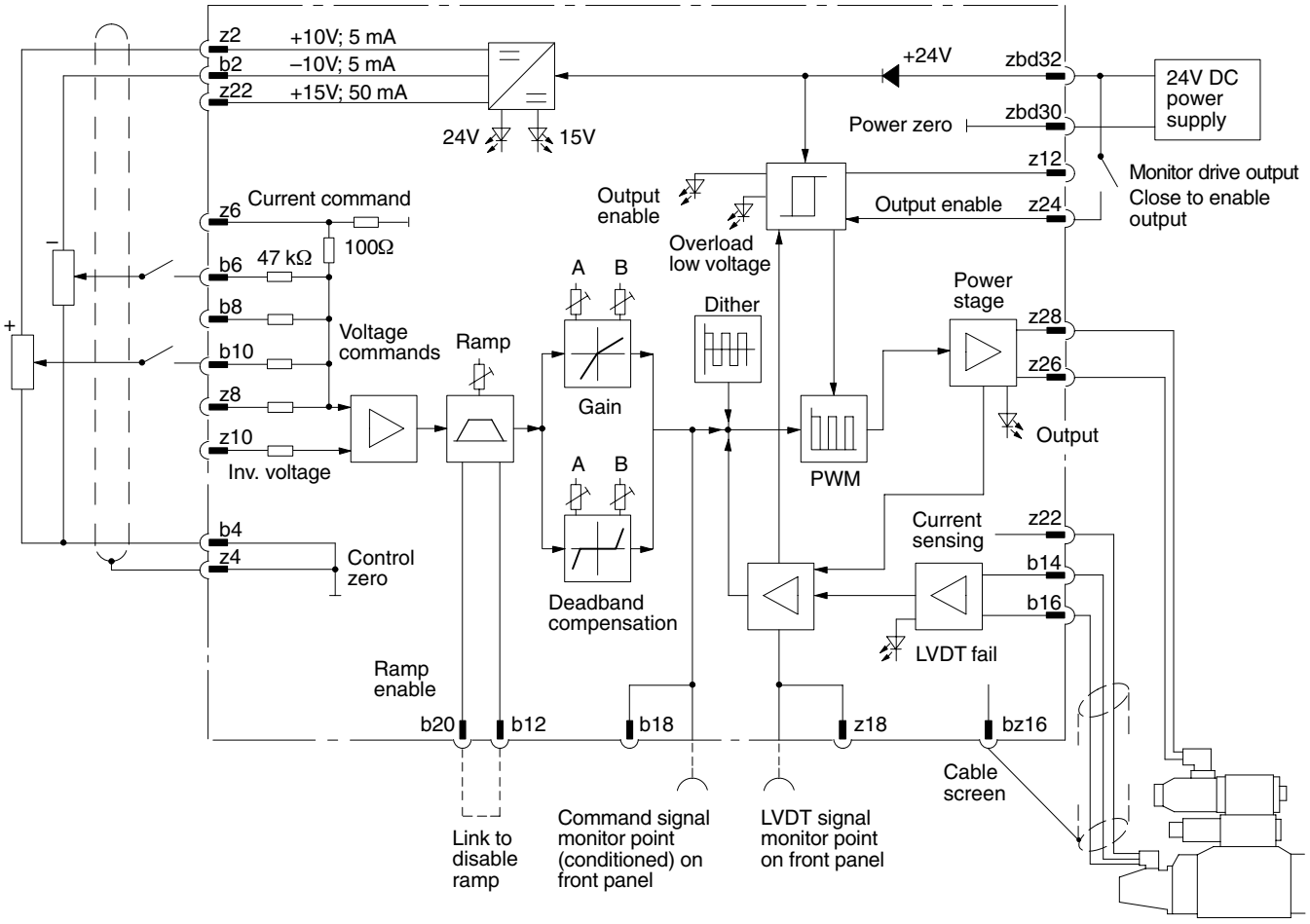
Power (input) supply	20 to 34V DC x 40W max. 24V DC nominal <4V pk-to-pk ripple Amplifier shuts down below 19V
Control (output) supplies: z22	+15V x 50 mA max. in addition to LVDT demand
z2	+10V x 5 mA max.
b2	–10V x 5 mA max.
Command signal inputs:	
Direct voltage pins b8, b6, z8, b10	
Inverting voltage pin z10	
Voltage range	±10V
Input impedance (voltage)	47 kΩ
Current pin z6	
Current range	±20 mA
Input impedance (current)	100Ω
Standing solenoid current at zero command signal Note: A positive signal to a non-inverting signal pin reduces solenoid current	1,4A
Deadband compensation, separate controls for each direction from spool-centered position:	
Factory setting	10% of max. stroke ▲
Adjustment per direction from centered position	0 to 50% of max. stroke ▲
Gain, separate controls for each direction from spool-centered position:	
Factory setting	Max. spool stroke at 10V command signal ▲
Adjustment per direction from centered position	1,9 to 20% of max. spool stroke per 1 volt ▲
Ramp time adjustment, linear:	
Factory setting	Max. time
Adjustment range	50 ms to 2s, under pre-set deadband compensation and gain conditions specified above
Dither	Factory-set
Feedback from LVDT to b14	4 to 20 mA (100Ω)
Overload protection, factory-set	Automatic reset when fault removed
Output enabled (power available to solenoid) z24	Apply 10 to 30V (6.8 kΩ)
Output disabled (no power output to solenoid) z24	Apply ≤0,8V or open circuit
Ramp enabled (machine actuator acceleration and deceleration limited by ramp potentiometer) b12, b20	Open circuit between b20 and b12

▲ *From spool-centered position*

Continued on next page

Ramp disabled (fastest acceleration and deceleration of machine actuator; ramp circuit bypassed) b12, b20	Link b20 to b12
Command signal monitor point	±5V full scale. Command signal conditioned by deadband compensation, gain and ramp functions
Spool position monitor point front panel and z18	±5V full scale
Monitor point impedance front panel and b18	10 kΩ
Monitor point protection	Short-circuit protected
Output point to alarm indicator z12	>+6V when enabled <–6V when disabled
Ambient temperature range	0 to 50°C (32 to 122°F)
Mass	0,22 kg (0.48 lb)
Supporting products: Power supply unit options Electronic accessories Portable test equipment	See catalogs: 2419 2460 2462 and 2315

Circuit and Connections



Command Signals and Outputs

Command signals				**Valve flow**
Type	**Input pins**		**Secondary pins ref.**	
	Ref.	**Signal polarity**		
Non-inverting voltages	b6/8/10 or z8	+	bz4	P-B
		–		P-A
Non-inverting current	z6	+		P-B
		–		P-A
Inverting voltage	z10	–	Link *one* of b6/8/10 or z8 to bz4	P-B
		+		P-A
Differential voltage		–	*One* of b6/8/10 or z8	P-B
		+		P-A
	One of b6/8/10 or z8	+	z10	P-B
		–		P-A

Installation Dimensions mm (inches)

Plug-in Unit of 3U Height, to IEC 297

3rd angle projection