



Coils and Electronic Controls

Solenoid valve and Proportional valve coils and electronic controls for proportional valves



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Coils

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Coil Features and Benefits

The solenoid operated directional valves in this catalog are offered with a choice of standard voltages and several types of electrical connections. For other coil ratings and connections, consult your Eaton representative.

Standard AC coils are internally rectified to supply them with DC current, therefore they have no "inrush" current value.

- Coils are rated for continuous duty
- Coils are interchangeable for serviceability

- Variety of voltages and terminations
- Coils offer a one-piece weather-proof encapsulated design, eliminating the need for extra seals
- AC voltage coils are internally full-wave rectified for 50 or 60 cycle (Hz) applications

An arc suppression diode molded into the coil is available as a standard option on DC coils. Also available, are explosion-proof coils and cartridges that are CSA approved and recognized by the US Underwriters Laboratories are available.

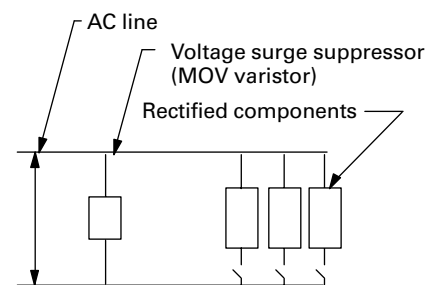
Protection of Internally Rectified Coils

The rectifiers used in these coils may require protection from high voltage surges in some electrical circuits containing highly inductive or capacitive components. These include certain types of motors, solenoids, relays, and transformers.

Protection is simple and inexpensive. It consists of

installing a commercially available voltage surge suppressor like the General Electric MOV varistor V130LA20A for 115 volts AC or the V250LA20A for 230 volts AC, across the AC line supplying the rectified components. A single suppressor will normally protect all of the rectified components in the circuit, as shown in the surge suppressor circuit diagram to the right.

Surge suppressor circuit diagram



All voltage surge producing components must be installed on this side of suppressor.

Switches or relay contacts only. Relay coils must be connected on the line side of the surge suppressor.

No inductive or capacitive loads can be installed between the surge suppressor and rectified valves without additional precautions.



WARNING

Application of these products beyond published performance specifications may cause valve malfunction which may result in personal injury and/or damage to the machine.



CAUTION

Coils may be hot to touch if used in continuous duty applications.

8-Series, 16 Watt Coils

8-16 W

"S" Series Coils

For 8 Size Solenoid &
Proportional Solenoid
Valves

(formerly 8 series,
210 bar coils)

RATINGS AND SPECIFICATIONS

RATINGS AND SPECIFICATIONS		Std. Voltages	Amperes*	Lead Color
Duty Rating	Continuous from 85% to 110% of nominal voltage	12 DC	1.32	red
Operating temperature	100°C (218°F) continuous @nominal voltage	24 DC	0.66	black
Lead Wires	18 gauge, 610 mm (24") long, UL style 3173 CSA CL 1251 (meets SAE J1128 XLPE style SXL)	36 DC	0.44	blue
Power Rating	16 watts @ 25°C (77°F)	24 AC	0.73	orange
Encapsulant	P.E.T.	120 AC	0.15	yellow
Magnet Wire	U.L. class N, 200°C (392°F) NEMA pub. no. MW 1000, section MW 35-C (single)	240 AC	0.07	red/white
Flyback diode (arc suppressor)	Maximum recurrent peak reverse voltage – 800 V (optional)	*Nominal voltage 25°C (77°F).		

Coil part numbers

VOLTAGE	G** CONNECTOR	P CONNECTOR	Q CONNECTOR	W CONNECTOR	N CONNECTOR	Y CONNECTOR
12VDC	02-160690	02-160684	02-160681	02-160678	02-160958	02-178001
24VDC	02-160691	02-160685	02-160682	02-160679	02-160959	02-178002
36VDC	02-160692	02-160686	02-160683	02-160680	02-160960	02-178003
24VAC	02-160702	02-160699	02-160696	02-160693	–	–
115VAC	02-160703	02-160700	–	–	–	–
220VAC	02-160704	02-160701	–	–	–	–
12VDC*	02-178810	–	02-178804	02-178802	02-160953	02-160957
24VDC*	02-178811	–	02-178805	02-178803	02-178812	02-178815

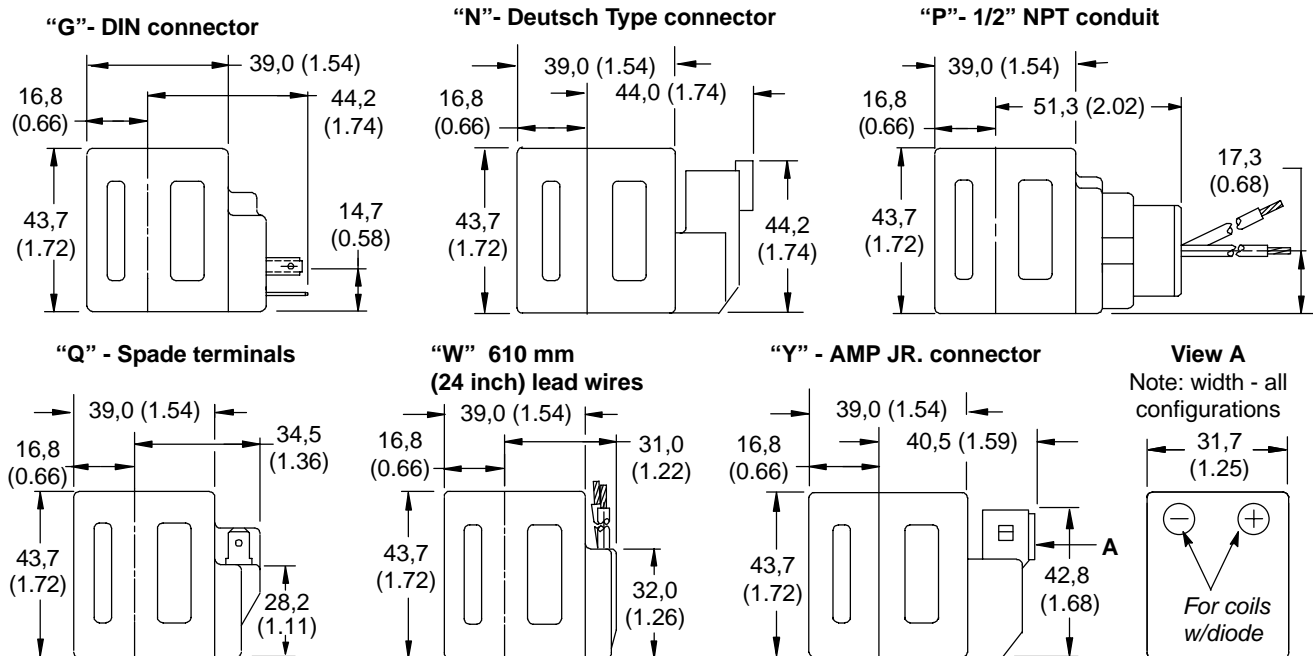
*With flyback diode.

**DIN 43650 connector for "G" style coil – 02-166796.

For other voltages and connectors contact your Eaton representative.

Coil Dimensions

mm (inch)



8-Series, 20 Watt Coils

8-20 W

"P" Series Coils

For 8 Size Solenoid Valves

(formerly 8 series,
350 bar coils)

RATINGS AND SPECIFICATIONS

Duty Rating	Continuous from 85% to 110% of nominal voltage	Std. Voltages	Amperes*	Lead Color
Operating temperature	100°C (212°F) continuous @nominal voltage	12 DC	1.67	red
Lead Wires	18 gauge, 610 mm (24") long, UL style 3173 CSA CL 1251 (meets SAE J1128 XLPE style SXL)	24 DC	0.83	black
Power Rating	20 watts @ 25°C (77°F)	36 DC	0.56	blue
Encapsulant	P.E.T.	24 AC	0.97	orange
Magnet Wire	U.L. class N, 200°C (392°F) NEMA pub. no. MW 1000, section MW 35-C (single)	120 AC	0.19	yellow
Flyback diode (arc suppressor)	Maximum recurrent peak reverse voltage – 800 V (optional)	240 AC	0.09	red/white

*Nominal voltage @ 25°C (77°F).

Coil part numbers

VOLTAGE	G** CONNECTOR	P CONNECTOR	Q CONNECTOR	W CONNECTOR	N CONNECTOR	Y CONNECTOR
12VDC	02-178143	02-178137	02-178134	02-178131	02-178146	02-178704
24VDC	02-178144	02-178138	02-178135	02-178132	02-178147	02-178705
36VDC	02-178145	02-178139	02-178136	02-178133	02-178148	02-178706
24VAC	02-178160	02-178157	02-178156	02-178156	–	–
115VAC	02-178161	02-178158	–	–	–	–
220VAC	02-178162	02-178159	–	–	–	–
12VDC*	02-178824	02-178820	02-178818	02-178816	02-178826	02-178830
24VDC*	02-178825	02-178821	02-178819	02-178817	02-178827	02-178831

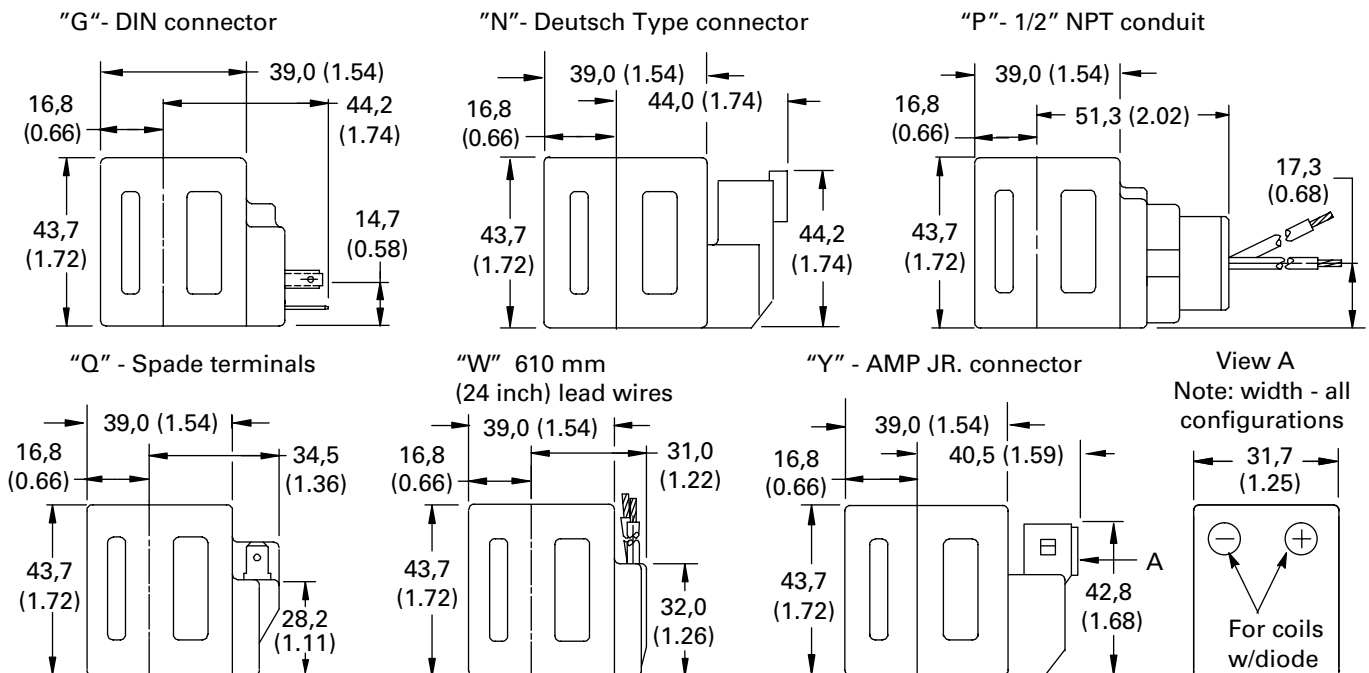
*With flyback diode.

**DIN 43650 connector for "G" style coil – 02-166796.

For other voltages and connectors contact your Eaton representative.

Coil Dimensions

mm (inch)



10-Series, 20 Watt Coils

10-20 W

"J" Series Coils

For 10, 12, 16 and 20 Size
Solenoid and Proportional
Solenoid Valves

(formerly 10 series,
210 bar coils)

RATINGS AND SPECIFICATIONS

Duty Rating	Continuous from 85% to 110% of nominal voltage	Std. Voltages	Amperes*	Lead Color
Operating temperature	100°C (212°F) continuous @ nominal voltage	12 DC	1.66	red
Lead Wires	18 gauge, 610 mm (24") long, UL style 3173 CSA CL 1251 (meets SAE J1128 XLPE style SXL)	24 DC	0.83	black
Power Rating	20 watts @ 25°C (77°F)	36 DC	0.55	blue
Encapsulant	P.E.T.	24 AC	0.83	orange
Magnet Wire	U.L. class N, 200°C (392°F) NEMA pub. no. MW 1000, section MW 35-C (single)	120 AC	0.17	yellow
Flyback diode (arc suppressor)	Maximum recurrent peak reverse voltage – 800 V (optional)	240 AC	0.08	red/white

*Nominal voltage @ 25°C (77°F).

Coil part numbers

VOLTAGE	G** CONNECTOR	P CONNECTOR	Q CONNECTOR	W CONNECTOR	N CONNECTOR	Y CONNECTOR
12VDC	02-178086	02-178078	02-178070	02-178063	02-178093	02-178711
24VDC	02-178087	02-178079	02-178073	02-178065	02-178094	02-178712
36VDC	02-178089	02-178080	02-178075	02-178066	02-178095	02-178713
24VAC	02-178112	02-178104	02-178103	02-178102	–	–
115VAC	02-178114	02-178106	–	–	–	–
220VAC	02-178117	02-178109	–	–	–	–
12VDC*	02-178840	–	02-178834	02-178832	02-178842	02-178762
24VDC*	02-178841	–	02-178835	02-178833	02-178843	02-178846

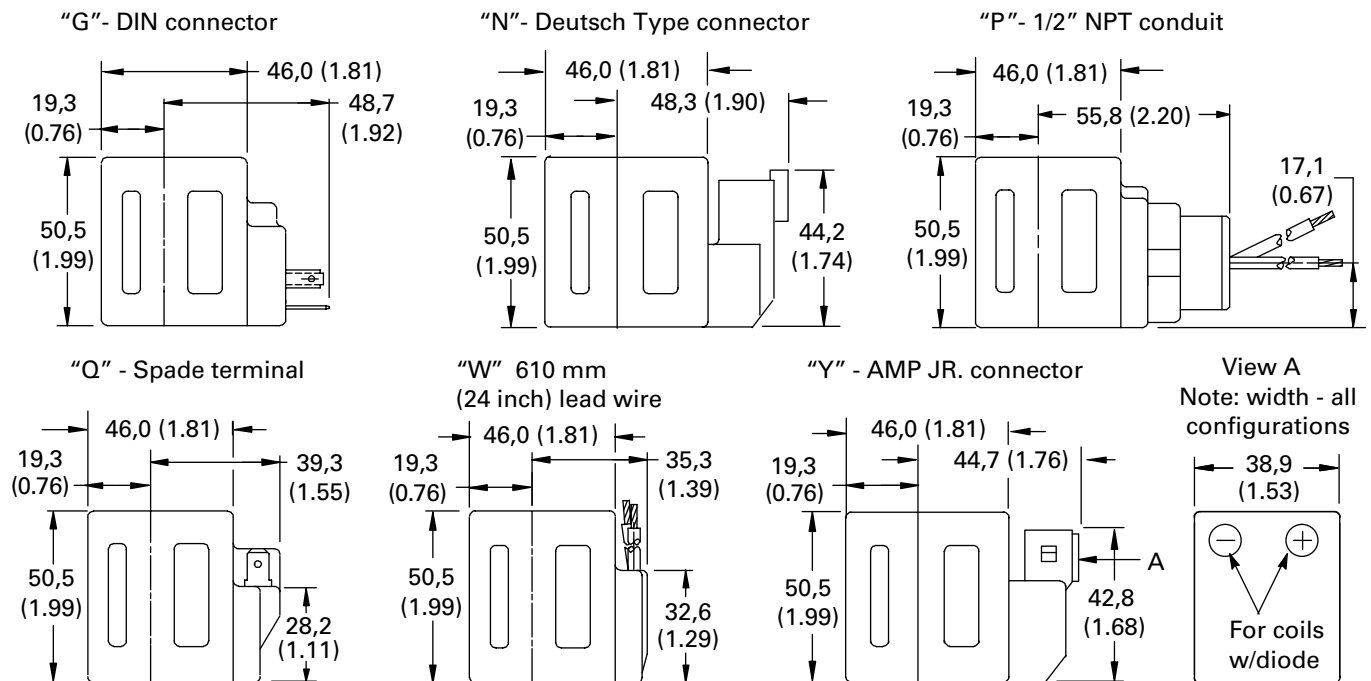
*Without flyback diode.

**DIN 43560 connector for "G" style coil – 02-166796.

For other voltages and connectors contact your Eaton representative.

Coil Dimensions

mm (inch)



10-Series, 26 Watt Coils

For 10, 12, 16 and 20 Size
Solenoid Valves

(formerly 10 series,
350 bar coils)

10-26 W

"H" Series Coils

RATINGS AND SPECIFICATIONS

Duty Rating	Continuous from 85% to 110% of nominal voltage	Std. Voltages	Amperes*	Lead Color
Operating temperature	100°C (212°F) continuous @ nominal voltage	12 DC	2.20	red
Lead Wires	18 gauge, 610 mm (24") long, UL style 3173 CSA CL 1251 (meets SAE J1128 XLPE style SXL)	24 DC	1.09	black
Power Rating	26 watts @ 25°C (77°F)	36 DC	0.73	blue
Encapsulant	P.E.T.	24 AC	1.26	orange
Magnet Wire	U.L. class N, 200°C (392°F) NEMA pub. no. MW 1000, section MW 35-C (single)	120 AC	0.25	yellow
Flyback diode (arc suppressor)	Maximum recurrent peak reverse voltage – 800 V (optional)	240 AC	0.12	red/white

*Nominal voltage @ 25°C (77°F).

Coil part numbers

VOLTAGE	G** CONNECTOR	P CONNECTOR	Q CONNECTOR	W CONNECTOR	N CONNECTOR	Y CONNECTOR
12VDC	02-178027	02-178021	02-178018	02-178015	02-178030	02-178035
24VDC	02-178028	02-178022	02-178019	02-178016	02-178031	02-178036
36VDC	02-178029	02-178023	02-178028	02-178017	02-178032	02-178037
24VAC	02-178047	02-178044	02-178043	02-178042	–	–
120VAC	02-178048	02-178045	–	–	–	–
240VAC	02-178049	02-178046	–	–	–	–
12VDC*	02-178855	02-178851	02-178849	02-178847	02-178857	02-178861
24VDC*	02-178856	02-178852	02-178850	02-178850	02-178858	02-178862

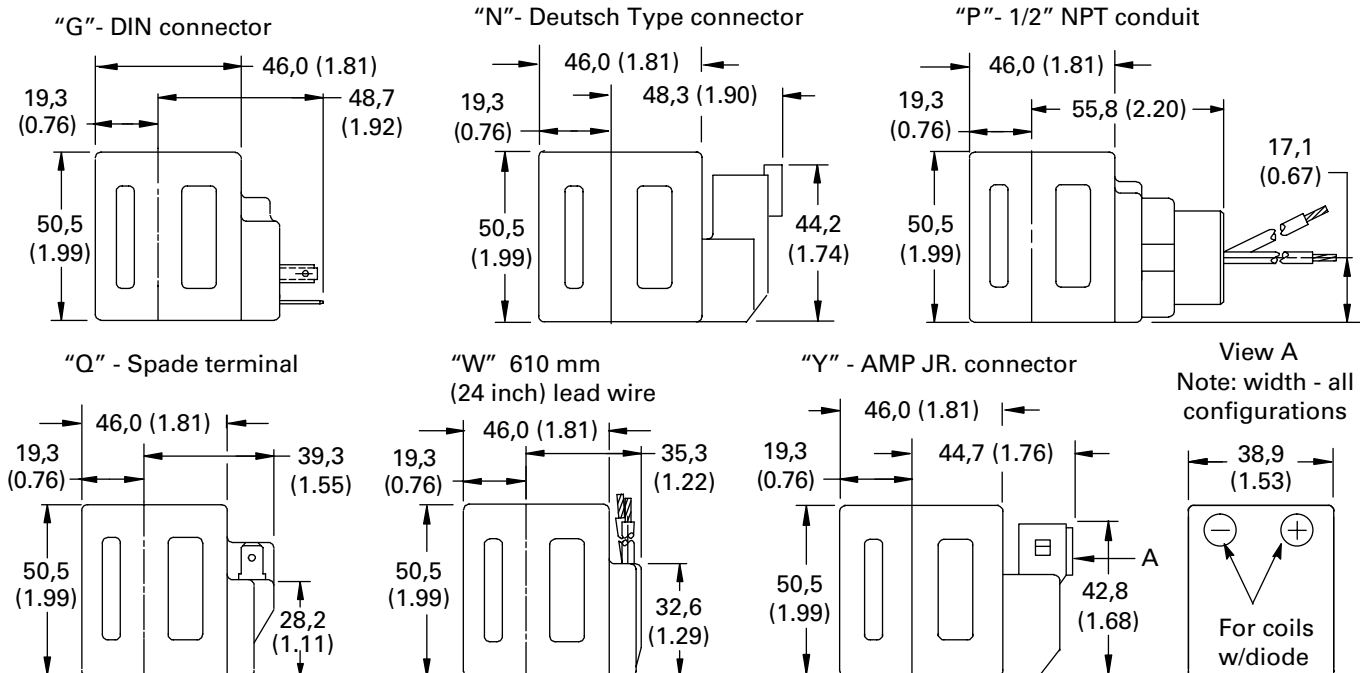
*Without flyback diode.

**DIN 43560 connector for "G" style coil – 02-166796.

For other voltages and connectors contact your Eaton representative.

Coil Dimensions

mm (inch)



Explosion Proof Valves

Coil Options
(SV*E Series)

SPECIFICATIONS

Hydraulic Performance Specifications for explosion proof valves are the same as the base valve.
For details please refer to the base valve page reference.

Coil Temperature Range	-40° to 100°C (-40° to 212°F)
Coil Duty	Continuous from 85% to 110% of nominal voltage
Housing Type	Explosion proof version with 1/2" threaded conduit hub
Coil Type	Epoxy encapsulated lead wire coil
Lead Wire	24" Long, 18 gauge with 1/32" cross linked Polyethylene insulation

APPROVALS

UL	File AU2206, Component - Industrial truck accessory, Battery powered
CSA	Both for general purpose and Hazardous locations Class I, Group C & D Class II, Group E, F & G

SUMMARY

Model Code	Description	Typical Application Pressure psi (bar)	Rated flow l/min (Usgpm)	Base Valve design	Section Reference
SV1E-10-C-XX-XXXXU	2 way, 2 position, normally closed, poppet type	210 (3000)	45 (12)	SV1-10-C	A
SV2E-10-C-XX-XXXXU	2 way, 2 position, normally closed, poppet type	210 (3000)	23 (6)	SV2-10-C	A
SV3E-10-C-XX-XXXXU	2 way, 2 position, normally closed, poppet type	210 (3000)	45 (12)	SV3-10-C	A
SV4E-10-C-XX-XXXXU	2 way, 2 position, normally closed, spool type	210 (3000)	23 (6)	SV4-10-C	A
SV1E-16-C-XX-XXXXU	2 way, 2 position, normally closed, poppet type	210 (3000)	132 (35)	SV1-16-C	A
SV2E-20-C-XX-XXXXU	2 way, 2 position, normally closed, poppet type	210 (3000)	227 (60)	SV2-20-C	A
SV4E-10-0-XX-XXXXU	2 way, 2 position, normally open, spool type	210 (3000)	23 (6)	SV4-10-0	A
SV3E-10-0-XX-XXXXU	2 way, 2 position, normally open, poppet type	210 (3000)	45 (12)	SV3-10-0	A
SV5E-10-0-XX-XXXXU	2 way, 2 position, normally open, poppet type	210 (3000)	45 (12)	SV5-10-0	A
SV3E-16-0-XX-XXXXU	2 way, 2 position, normally open, poppet type	210 (3000)	132 (35)	SV3-16-0	A
SV3E-20-0-XX-XXXXU	2 way, 2 position, normally open, poppet type	210 (3000)	227 (60)	SV3-20-0	A
SV1E-10-3-XX-XXXXU	3 way, 2 position, spool type	210 (3000)	23 (6)	SV1-10-3	A
SV1E-10-4-XX-XXXXU	4 way, 2 position	210 (3000)	23 (6)	SV1-10-4	A
SV2E-10-4-XX-XXXXU	4 way, 2 position, circuit center	210 (3000)	23 (6)	SV2-10-4	A
SV3E-10-4-XX-XXXXU	4 way, 2 position, normally open	210 (3000)	23 (6)	SV3-10-4	A
SV4E-10-4-XX-XXXXU	4 way, 2 position, tandem center	210 (3000)	23 (6)	SV4-10-4	A

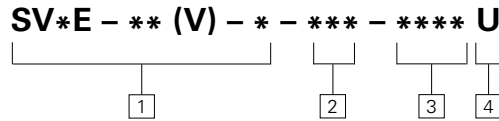
REPLACEMENT COIL PART NUMBERS

Voltage	Assembly Number	Amperes (A)	Power (W)	Lead Color
12 VDC	888831	1.50	20	Red
24 VDC	888832	0.75	20	Black
36 VDC	888834	0.50	20	Blue
48 VDC	888835	0.38	20	Purple
110 VDC	888836	0.16	20	Brown
24 VAC	888837	0.75	20	Orange
115 VAC	888838	0.16	20	Yellow
230 VAC	888840	0.08	20	Red/White
480 VAC	888841	0.04	20	Black/White



Explosion Proof Valves

(SV*E Series) Model Code



1 Base Valve

SV1E-10-C	SV1-10-C
SV2E-10-C	SV2-10-C
SV3E-10-C	SV3-10-C
SV4E-10-C	SV4-10-C
SV1E-16-C	SV1-16-C
SV2E-20-C	SV2-20-C
SV4E-10-0	SV4-10-0
SV3E-10-0	SV3-10-0
SV5E-10-0	SV5-10-0
SV3E-16-0	SV3-16-0
SV3E-20-0	SV3-20-0
SV1E-10-3	SV1-10-3
SV1E-10-4	SV1-10-4
SV2E-10-4	SV2-10-4
SV3E-10-4	SV3-10-4
SV4E-10-4	SV4-10-4

For performance specifications refer to base valve data sheet.

Viton® seal options are available.

Dimensions

mm (inch)

Note

Cartridge only or coil housing are not available as a service parts.

It is not possible to convert standard valves to explosion proof variants.

SV1E-10-3 shown. Dimensions of coil housing are the same for all Vickers explosion proof SiCV valves, for other dimensions please refer to base valve datasheet.

2 Port Size/Housing number

Refer to table in Model Code for Base valves

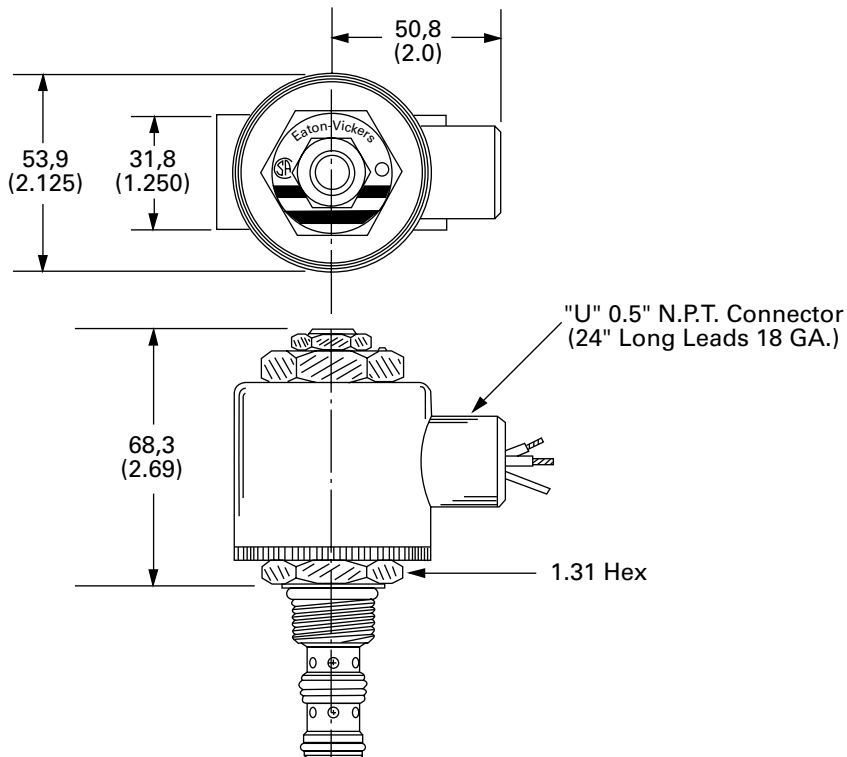
4 Type (C.S.A. Approved)

U - 1/2" NPT Connector
Class I, Group C & D
Class II, Group E, F & G

3 Voltage*

CODE	VOLTAGE	REPLACEMENT COIL PART NUMBER
12D	12 VDC	888831
24D	24 DVC	888832
36D	36 VDC	888834
48D	48 VDC	888835
110D	110 VDC	888836
24A	24 VAC	888837
115A	115 VAC	888838
230A	230 VAC	888840
460A	460 VAC	888841

* Arc suppression diode is not available.





CONTROL AND SPECIFICATIONS

Rheostat	12 VDC operation 10-12 Ω, 20-25 watts 24 VDC operation 25-30 Ω, 20-25 watts
Power plug options	EHH-AMP-702, EPAD-SA-1A6-10 (Require 24 VDC power supply to power plug and 12 VDC coil)
Amplifier card	EEA-PAM-523 (Requires 24 VDC power supply and either 12VDC or 24 VDC coil)
Joystick suppliers	OEM Controls, Inc, Shelton, CT P-Q Controls, Inc, Bristol, CT

Power plug details in section B.

Std. Voltages	Amperes*	Lead Color	Power Rating
12 DC	1.32	red	16 W
24 DC	.66	black	16 W

*Nominal voltage @ 25°C (77°F).

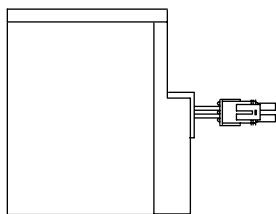
Coil part numbers

VOLTAGE	F CONNECTOR	Q CONNECTOR	U* CONNECTOR	W CONNECTOR	Y CONNECTOR
12VDC	02-308810	02-317154	02-154070	02-154072	02-308808
24VDC	02-308811	02-317155	02-154071	02-154073	02-308809

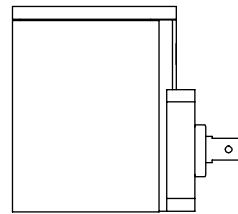
*DIN 43650 connector for "U" style coil – 02-166796.

Coil Kits

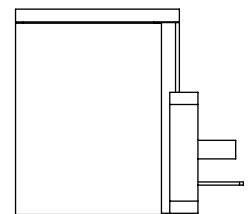
"F" - Weather-Pack male on leads



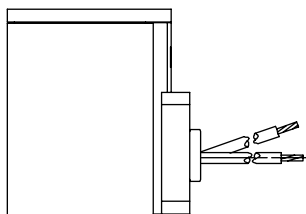
"Q" - Spade terminal



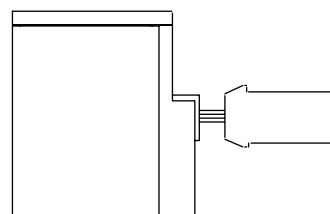
"U" - DIN 43650



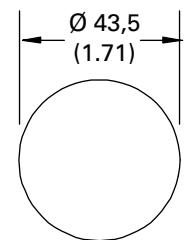
"W" 610 mm (24 inch) lead wire



"Y" - Metri-Pack 150 male on leads



Note: Width – all configurations



CAUTION

Coils may be hot to touch if used in continuous duty applications.

CONTROL AND SPECIFICATIONS

Power plug options	EHH-AMP-702, EPAD-SA-1A6-10 (Require 24 VDC power supply to power plug and 12 VDC coil)
Amplifier card	EEA-PAM-523 (Requires 24 VDC power supply and either 12VDC or 24 VDC coil)
Joystick suppliers	OEM Controls, Inc., Shelton, CT P-Q Controls, Inc., Bristol, CT

Power plug details in Section B.

SPECIFICATIONS

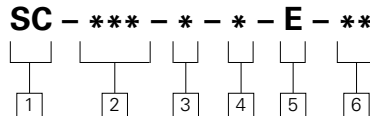
Standard Voltage	Amperes*	Resistance	Power
12 VDC	2.55	4.7 Ω	30 W
24 VDC	1.26	19.0 Ω	30 W



CAUTION

Coils may be hot to touch if used in continuous duty applications.

Coil Model Code



Model code positions 2, 3, 4, 5 and 6 are integrated into EPV model code when ordered with valve.

1 Solenoid Coil

2 Voltage Rating

012 - 12VDC
024 - 24VDC

3 Protection

D - Standard DC coil
B - DC coil with flyback diode

4 Connection

G - DIN 43650*
W - Leadwire - 24"
E - Weather-Pack female on leads
N - Deutch DT0402P on leads
Z - Metri-Pack 150 on leads

*DIN 43560 connector for "G" style coil - 02-166796.

5 Series

E - EPV series coil, 30W

6 Special Features

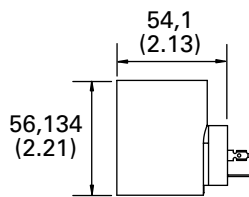
00 - None

Coil Kits

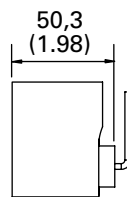
STANDARD COIL PART NUMBERS

Model Code	Assembly Number
SC-012BGE00	4995052-230
SC-012BWE00	4995052-231
SC-012DGE00	4995052-001
SC-012DWE00	4995052-002
SC-024BGE00	4995052-232
SC-024BWE00	4995052-233
SC-024DGE00	4995052-003
SC-024DWE00	4995052-004

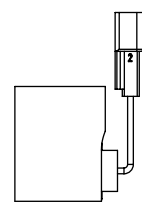
"G" - DIN 43650



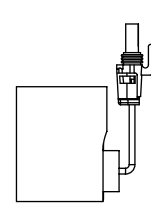
"W" - 610 mm (24 inch) lead wire



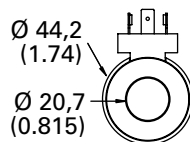
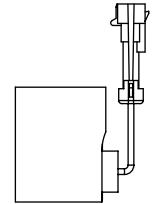
"E" - Weather-Pack female on leads



"C" - Deutch DT0402P on leads



"H" - Metri-Pack 150 male on leads



Note: Width all configurations

Electronic Controls

Proportional Valve
Control Power Plugs

EHH-AMP-702-D/J/K-2* Series

For use with valve types:

EPV**-12D-1*

EFV1**-012DE*

ERV1/2**-12D-1*

EPRV1**-12D-1*

General Description

Three types of plugs, conforming to ISO 4400/DIN 43650 interface, with integral amplifiers and necessary adjustment potentiometers, are designed for use with non-feed back hydraulic valves.

This plug/valve combination offers very low cost solutions to many hydraulic control problems requiring proportional control.

Type D is controlled with a 0-10V command signal, and has adjustable gain, ramp, deadband compensation and dither.

Type J, designed for closed-loop applications, is controlled with a 0-10V command signal, and has no ramp function.

Type K is controlled with a 4-20 mA command signal, and has an adjustable ramp time of 50 ms to 5s.

Features and Benefits

- Integral amplifier provides essential functions for control of proportional valves
- Adjustable ramp time (types D and K), gain, deadband compensation and dither
- Ease of installation, with reduced cost
- Fully short-circuit and reverse-polarity protected
- Differential voltage command signal (types D and J)
- Adjustable dither
- EMC to latest European standards
- Protection to IP67

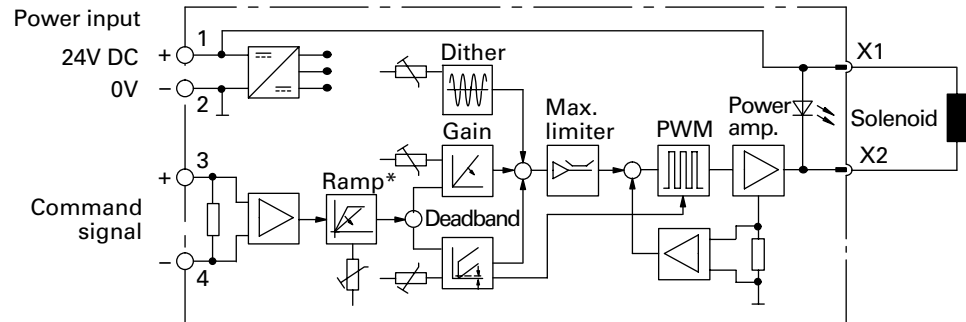
Application

Primary applications are in the control of non-feedback proportional valves where the cost of more sophisticated electronic controls can be avoided.

Type J is typically used in closed-loop applications.

Electrical Block Diagram

EHH-AMP-702-D/J/K-2*

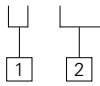


Note

This product has been designed and tested to meet specific standards outlined in the European Electro-magnetic Compatibility Directive (EMC) 89/336/EEC, amended by 91/26/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 a warning symbol and Electromagnetic Compatibility (EMC).

Model Code/ Operating Data

EHH – AMP – 702 – * – 2*



1 Adjustment range

- D** - Proportional plug:
0 - 10 VDC with ramp
- J** - Proportional plug: 0 - 10
VDC without ramp
function
- K** - Proportional plug:
4-20 mA with ramp

2 Design number, 20 series

Subject to change. Installation dimensions unaltered for design numbers 20 to 29 inclusives.

OPERATING DATA

Electrical

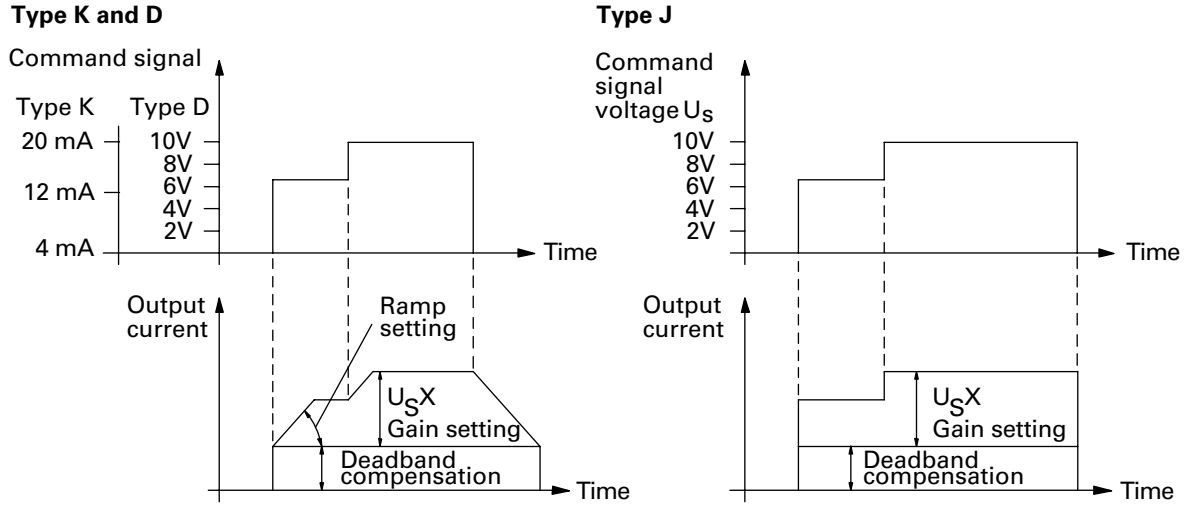
	Types D and J	Type K
Connections		
1	24V DC	
2	0V (power and signal)	
3	Positive command signal	
4	Negative command signal	
Power (input) supply	20-30V DC including $\pm 10\%$ maximum ripple (peak-to-peak) 24V DC nominal	
Absolute maximum voltage	40V	
Max. power consumption including solenoid	35W	
Reverse polarity protected	Yes	
Short circuit protected	Yes	
Maximum output current	1,6A	
Maximum output voltage typical (1,6A output current)	Typically 1,5V below supply voltage	
Command signal	0-10V (10 kohms)	4-20 mA (250 ohms)
Deadband triggering	200 mV	4 mA
For output (LED on)	200 mV to 10V	4-20 mA
For no output (LED off)	0 mV to 100 mV	0-4 mA
Deadband adjustment range	100 to 1000 mA	
Gain adjustment range	0.02A/V to 0.16A/V	0.01 A/mA to 0.08 A/mA
Dither adjustment range	0 to 500 mA	
Ramp time (types D and K only)	50 ms to 5s	
PWM frequency	1200 Hz $\pm 10\%$	
Dither frequency	120 Hz $\pm 10\%$	
Protection	IEC 529: IP67 (when correctly installed with interface seal in place) Fully short-circuit and reverse-polarity protected	
Isolation to VDE 0110	Group "B"	
Electromagnetic compatibility (EMC):		
Emission	EN 50081-2	
Immunity	EN 50082-2	

Mechanical

Housing	PA6 glass-reinforced plastic (conforming to UL-94HB). Color: gray
Mounting interface	ISO 4400 (DIN 43650)
Cable clamp	Pg9 screw type
Cable diameter	\emptyset 5 to 10 mm (0.197 to 0.394" dia.)
Wire section	0,5 to 1,0 mm ² (20-17 AWG)
Temperature, ambient range	-20° to +70°C (-4° to +158°F)
Mass	0,07 kg (0.154 lb)

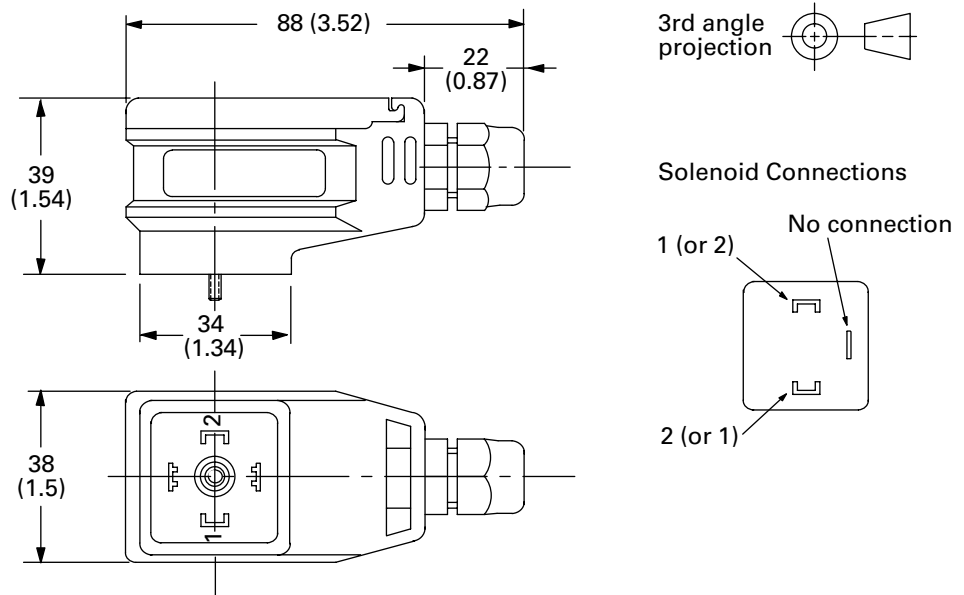
Installation Data

Input/Output Characteristics



Installation Dimensions

mm (inch)



Installation Data

Adjustments

Ramp time: Turn clockwise to increase ramp time (Only types D/K).

Gain: Turn clockwise to increase gain.

Deadband compensation: Turn clockwise to increase deadband compensation current.

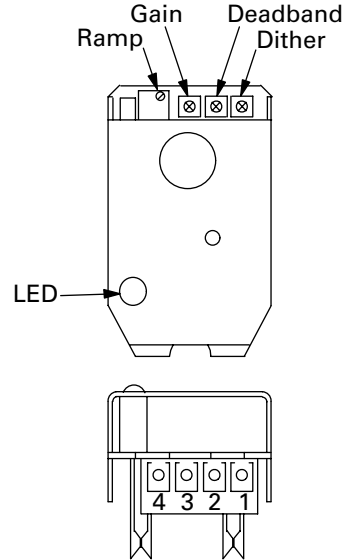
Dither: Turn clockwise to increase the dither current.

Terminal 1: Power Supply 20V-30V DC, positive.

Terminal 2: Power Supply 0V.

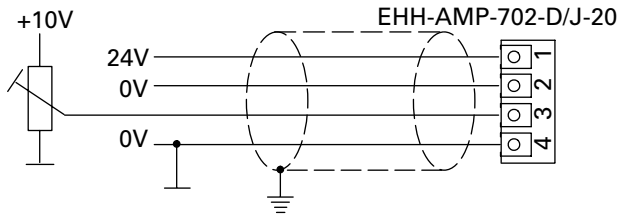
Terminal 3: Command signal positive (see "Operating Data").

Terminal 4: Command signal negative (see "Operating Data").

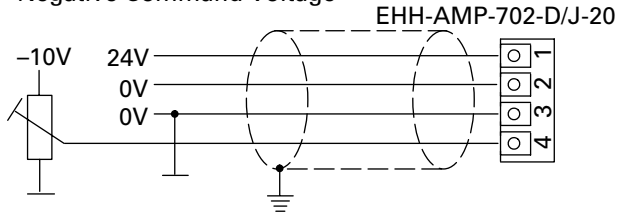


Installation Wiring Options

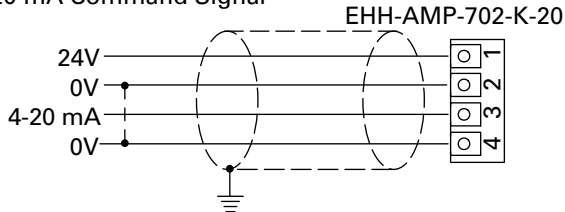
Positive Command Voltage



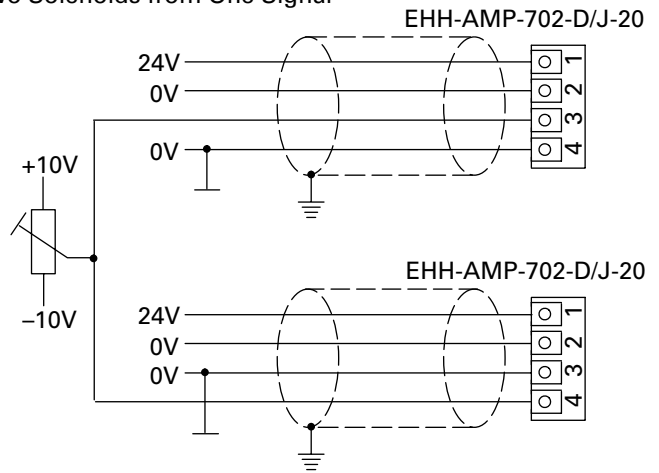
Negative Command Voltage



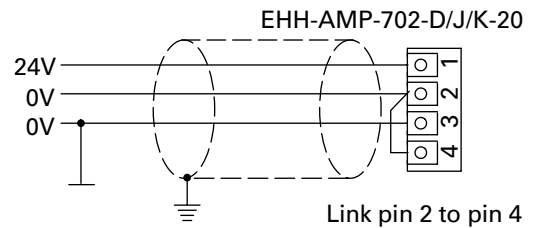
4-20 mA Command Signal



Bi-polar Command Voltage for Operating Two Solenoids from One Signal



Connections when replacing -10 design power plug with -20 design and only 3 wires exist



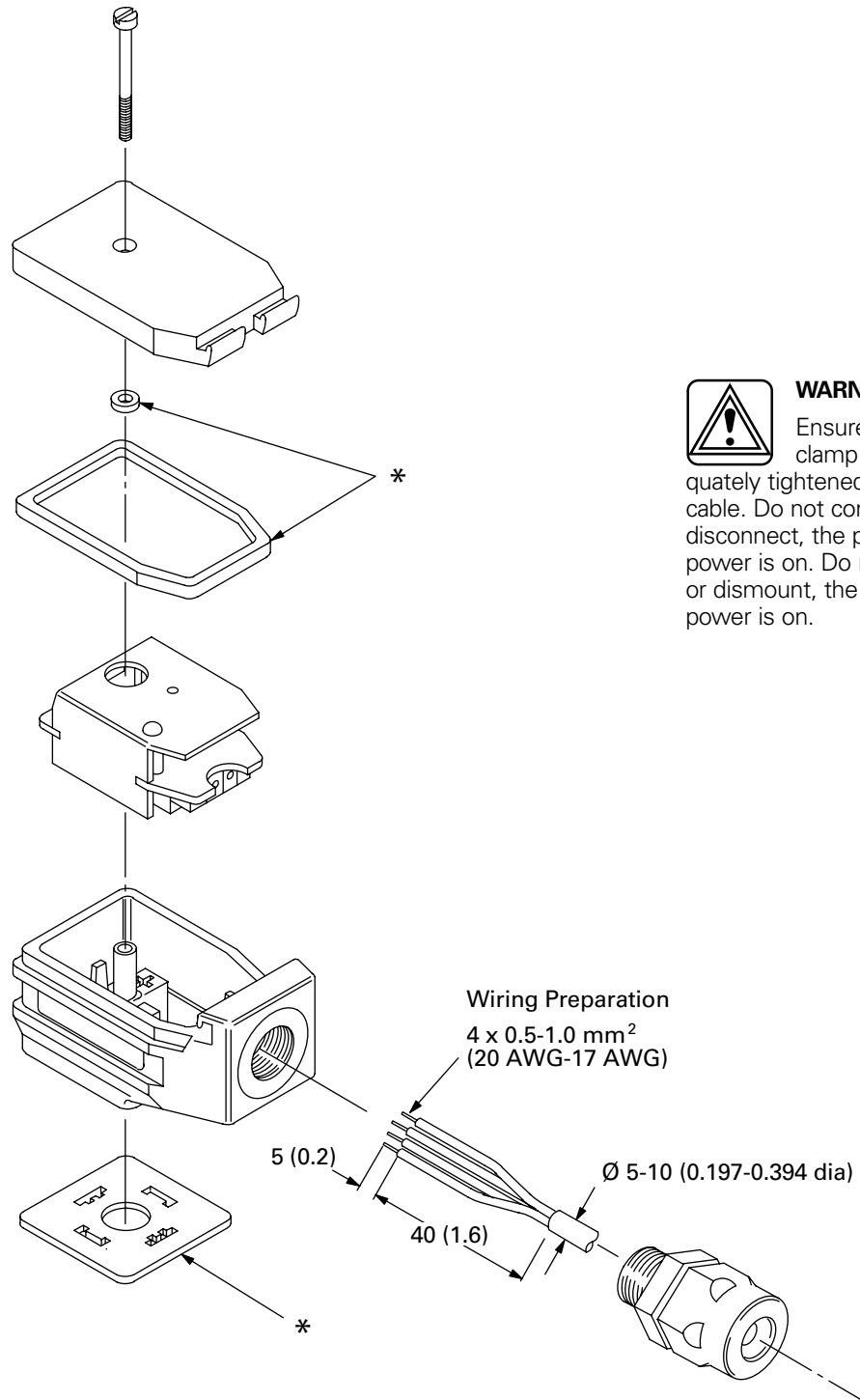
Protective ground connection.



WARNING

Electromagnetic Compatibility (EMC) - Screened cables should be used and particular attention paid to the grounding of the screens as shown in the above diagrams.

Assembly Showing Wiring Connection Points



WARNING

Ensure cable clamp nut is adequately tightened to secure cable. Do not connect, or disconnect, the plug while power is on. Do not mount, or dismount, the plug while power is on.

*All seals must be fitted correctly at plug installation to provide protection to IP67 (IEC 529).

Installation Data

Start-Up Procedure

- Correctly wire the plug and, before mounting it on the valve solenoid, apply 24V DC (20 to 30V limits) to the “power input” terminals.
- Check for correct plug function by illumination/non-illumination of the LED. The LED should illuminate when the demand applied to the “signal input” terminal is between 200 mV and 10V (or 4 mA and 20 mA) and should not be illuminated when the applied demand is less than 100 mV (4 mA). If there is a malfunction a new plug must be fitted.

- Switch off power supply and command/input signal and then install plug on solenoid. Ensure that all seals are fitted correctly and clamped as the retaining screw is tightened: this is essential in providing IP67 protection.
- Ensure that the hydraulic system will not cause any erratic movement of actuators, then:
 - Switch on power supply again.
 - Repeat LED/function check as in 2.An LED malfunction now indicates a short circuit at the load.
- Successful completion of these checks means that the plug and load are ready for use.

Spare Parts

The only spare part available is the interface seal, part number 732100.

Ordering Procedure

Order plug by full model code, and spare interface seals by part number 732100.

Electronic Controls

“Soft Switch” Power Plugs

EHH-AMP-702-C-2* 10 Series

For use with valve types:

EPV**-12D-1*

EFV1**-012DE*

ERV1/2**-12D-1*

EPRV1**-12D-1*

General Description

These plugs, conforming to ISO 4400/DIN 43650 interface, offer adjustable, ramped on/off switching times through the use of an integral amplifier.

The switching time range is 50 ms to 5 seconds.

The soft switch plug is rated for 24V DC nominal and controlled by a 24V logic signal. Applying an “on” signal causes the output current to ramp up to, and stay at, an adjustable maximum while the “on” signal is maintained. At “switch-off” the output current is ramped down to zero and will remain at zero until the next “on” signal.

Ramp times (switching times) can be adjusted by an in-built potentiometer.

An adjustment also allows for compensation of any deadband in the valve.

Features and Benefits

- Integral amplifier provides control from on/off logic command signal
- Adjustable ramp time
- Deadband compensation
- Adjustable output level
- Adjustable dither
- EMC to latest European standards
- Improved switching time repeatability
- Fully short-circuit and reverse-polarity protected
- Protection to IP67

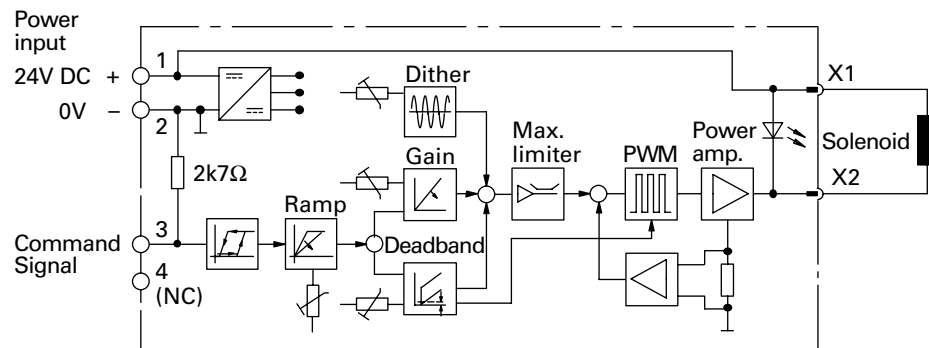
Application

Focus applications for this plug are in the control of hydraulic solenoid operated directional and pressure control valves where control of valve response time can significantly reduce shocks in the hydraulic system.

Best results in reducing hydraulic shocks will only be obtained by using valves with the right “low shock”; or “proportional” features.

Electrical Block Diagram

EHH-AMP-702-C-2*
10 Series



Note

This product has been designed and tested to meet specific standards outlined in the European Electro-magnetic Compatibility Directive (EMC) 89/336/EEC, amended by 91/26/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 a warning symbol and Electromagnetic Compatibility (EMC).

Model Code/ Operating Data

EHH – AMP – 702 – C – 2*



1 Design number, 20 series

Subject to change. Installation dimensions unaltered for design numbers 20 to 29 inclusives.

OPERATING DATA

Electrical

Connections	
1	24V DC
2	0V (power and signal)
3	Positive command signal
4	Negative command signal
Power (input) supply	20-30V DC including $\pm 10\%$ maximum ripple ripple (peak-to-peak) 24V DC nominal
Absolute maximum voltage	40V
Max. power consumption including solenoid	35W
Reverse polarity protected	Yes
Short circuit protected	Yes
Maximum output current	1,6A
Maximum output voltage typical (1,6A output current)	Typically 1,5V below supply voltage
Command signal	
For output (LED on)	15V to 24V
For no output (LED off)	0V to 5V
Input impedance	2700 ohms
Deadband adjustment range	<100 - 1000 mA
Gain adjustment range	0.02A to 1,6A (maximum)
Dither adjustment range	0 to 500 mA
Ramp time	50 ms to 5s
PWM frequency	1200 Hz $\pm 10\%$
Dither frequency	120 Hz $\pm 10\%$
Protection	IEC 529: IP67 (when correctly installed with interface seal in place) Fully short-circuit and reverse-polarity protected
Isolation to VDE 0110	Group "B"
Electromagnetic compatibility (EMC):	
Emission	EN 50081-2
Immunity	EN 50082-2

Mechanical

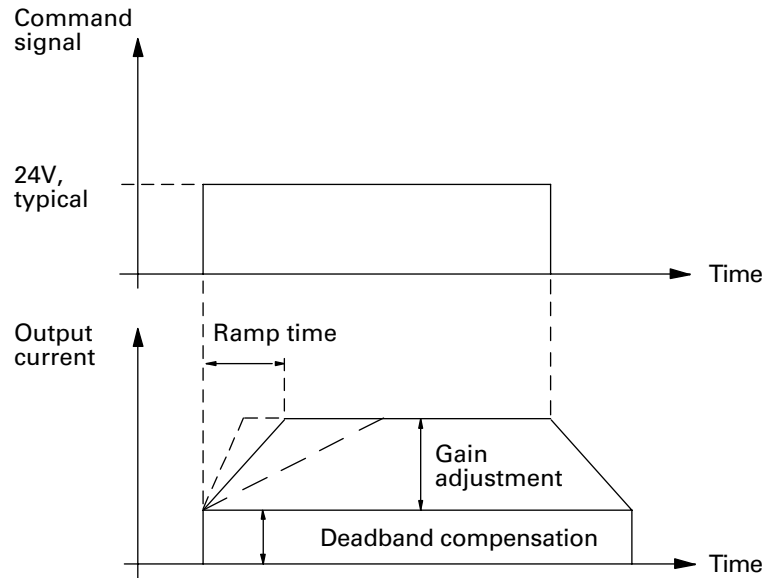
Housing	PA6 glass-reinforced plastic (conforming to UL-94HB). Color: gray
Mounting interface	ISO 4400 (DIN 43650)
Cable clamp	Pg9 screw type
Cable diameter	\emptyset 5 to 10 mm (0.197 to 0.394" dia.)
Wire section	0,5 to 1,0 mm ² (20-17 AWG)
Temperature, ambient range	-20° to +70°C (-4° to +158°F)
Mass	0,07 kg (0.154 lb)

Installation Data

Input/Output Characteristics

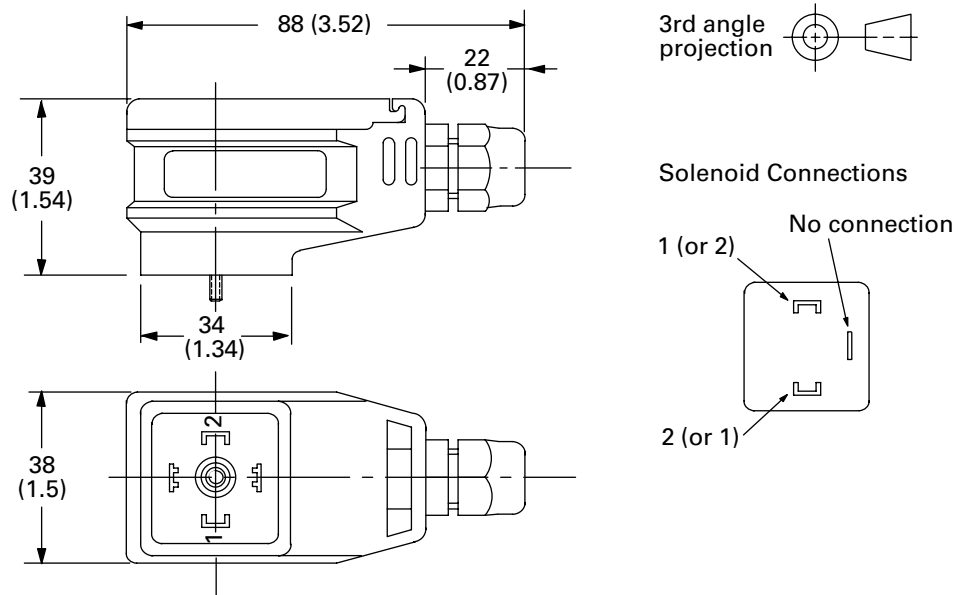
Functions

Switch-on/off: after switching on with a 15V signal the amplifier will remain in the "on" condition with a command signal above 6V. The command signal must be reduced to below 5V to achieve switch-off of the amplifier.



Installation Dimensions

mm (inch)



Installation Data

Adjustments

Ramp time: Turn clockwise to increase ramp time.

Gain: Turn clockwise to increase gain.

Deadband compensation: Turn clockwise to increase deadband compensation current.

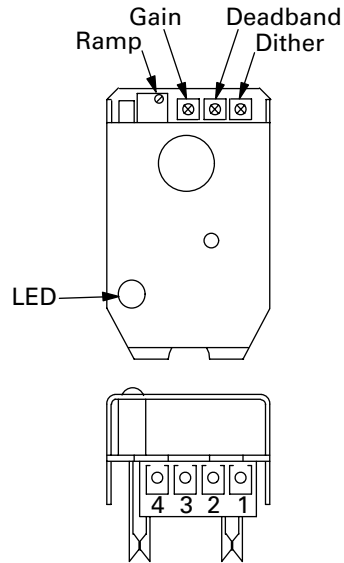
Dither: Turn clockwise to increase the dither current.

Terminal 1: Power Supply 20V-30V DC, positive.

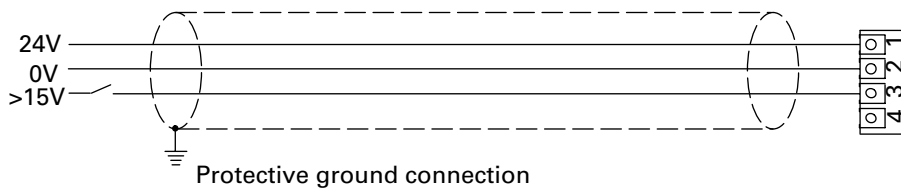
Terminal 2: Power Supply 0V.

Terminal 3: Switch command signal positive.

Terminal 4: Not connected



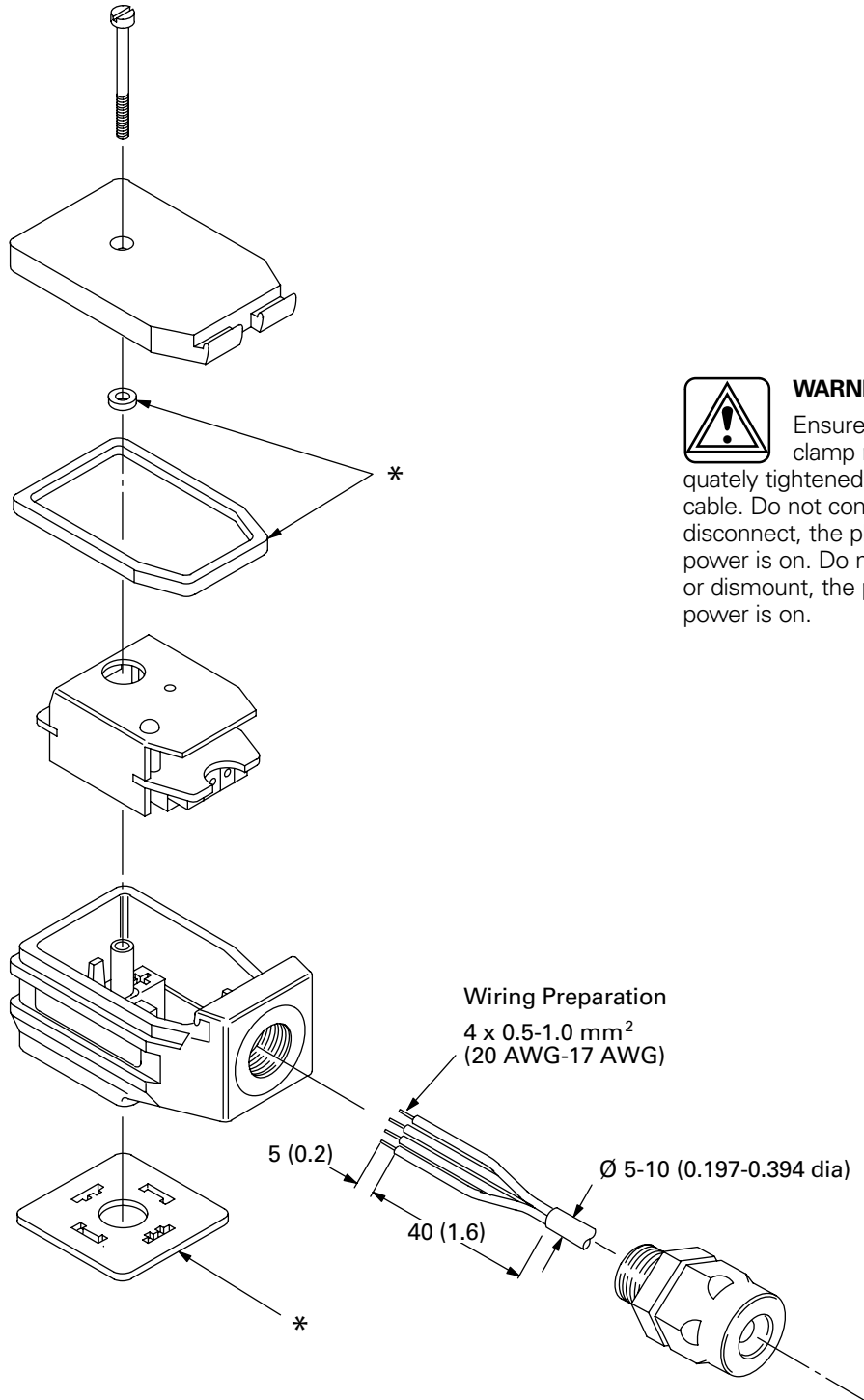
Installation Wiring



WARNING

Electromagnetic Compatibility (EMC) - Screened cables should be used and particular attention paid to the grounding of the screens as shown in the above diagram.

Assembly Showing Wiring Connection Points



WARNING

Ensure cable clamp nut is adequately tightened to secure cable. Do not connect, or disconnect, the plug while power is on. Do not mount, or dismount, the plug while power is on.

*All seals must be fitted correctly at plug installation to provide protection to IP67 (IEC 529).

Installation Data

Start-Up Procedure

- Correctly wire the plug and, before mounting it on the valve solenoid, apply 24V DC (20 to 30V limits) to the “power input” terminals.
- Check for correct plug function by illumination/non-illumination of the LED:
 - a. Apply less than 2 to 3 volts to the input terminal: LED should not be illuminated.
 - b. Increase voltage: the LED should illuminate when the voltage reaches 15V. **Do not exceed 30V command signal.**
 - c. Decrease voltage: the LED should go off when the voltage is less than 5V.

- Switch off power supply and command/input signal and then install plug on solenoid. Ensure that all seals are fitted correctly and clamped as the retaining screw is tightened: this is essential in providing IP67 protection.
- Ensure that the hydraulic system will not cause any erratic movement of actuators, then:
 - Switch on power supply again.
 - Repeat LED/function check as in 2.An LED malfunction now indicates a short circuit at the load.
- Successful completion of these checks means that the plug and load are ready for use.

Spare Parts

The only spare part available is the interface seal, part number 732100.

Ordering Procedure

Order plug by full model code, and spare interface seals by part number 732100.