

Electronic Valve Actuator

SEVA (Smart Electronic Valve Actuator)

DESCRIPTION

The SEVA is our next generation Smart Electric Valve Actuator that provides our customers with an electric actuator with best-in-class features. This product was designed for extreme conditions with military grade components while providing the accuracy and repeatability the market demands.

The SEVA actuator is manufactured by:
Badger Meter® Inc., 6116 E. 15th St., Tulsa, OK 74112.

Two models are available:

- SEVA 100 for 1/4...1 in. Research Control® Valves
- SEVA 200 for 1/4...2 in. Control Valves

FEATURES

- Microprocessor-controlled, linear stepper motor
- Manual override
- Maximum thrusts of 100 and 200 lbf
- Overvoltage protection
- Setup via firmware and terminal interface via USB port
- Universal AC input
- 24V DC input
- Optional limit switches for customer-adjustable limit points
- Analog input/output
- USB CDC device (mini - B)
- Internally powered (active) feedback
- SoloCue Software
- Optional communication protocols:
 - EtherNet/IP
 - Modbus® TCP/IP
 - Modbus® RTU

OPERATION

The SEVA actuator consists of a microprocessor-controlled, linear stepper motor that responds to various control inputs. It also offers an optional isolated loop powered position output for signaling back to an indicator or control panel.

APPROVALS / RATINGS



- Class 1, Div 1, Group C, D T6
- Class 1, Zone 1, AEx/Ex db IIB T6 Gb FM16US0247X
- TYPE 4X IP66, Ta -20...50° C



Badger Meter

RCV-DS-01787-EN-12 (April 2023)



- II 2 G Ex db IIB T6 Gb IP66 FM16ATEX0073X (ATEX Directive 2014/34/EU)
- Ex db IIB T6 Gb Ta -20...50° C IP66 IECExFMG16.0034X
- II 2 G Ex db IIB T6 Gb IP66 FM21UKEX0007X (EKEX UKSI 2016:1107)



- Class I, Div 1, Groups C, D T6
- Ex d IIB T6 Gb CSA17CA70119932X
- Type 4X IP66, Ta -20...50° C

CE 2809

- Compliance with Safety Standards EN 61010-1:2010
- CE Directives:
 - Low Voltage Directive 2014/35/EU
 - EMC Directive 2014/30/EU
 - Machinery Directive 2006/42/EC
- ATEX 2014/34/EU

UKCA 1725

- Compliance with Safety Standards EN 61010-1:2010
- UKCA Statutory Instruments
 - Low Voltage – S.I. 2016/1101
 - EMC – S.I. 2016/1091
 - Machinery – S.I. 2016/1597
- UKEX S.I. 2016:1107

SPECIFICATIONS

Model	SEVA 100	SEVA 200
Supply Power/Standard	24V DC, Universal AC Input 115...230V AC, 60Hz	
Control Input	Standard 4...20 mA; Configurable 0...5/10V DC	
Position Accuracy	±1% of full scale	±1% of full scale
Humidity	85% non-condensing	85% non-condensing
Stroke	Up to 1.5 in. (38.10 mm)	Up to 1.5 in. (38.10 mm)
Stem Thread	3/8 ACME	3/8 ACME
Motor Size	NEMA 23	NEMA 23
Motor Power Consumption	13W	25W
Maximum Thrust	100 lbf (445 N)	200 lbf (890 N)
Height	12.35 in. (313.69 mm), diameter 7.65 in. (194.31 mm)	12.35 in. (313.69 mm), diameter 7.65 in. (194.31 mm)
Weight	< 10 lb (4.55 kg)	< 10 lb (4.55 kg)
Operating Temperature	Standard: -4...122° F (-20...50° C)	
Max. Surface Temperature	140° F (60° C)	

Table 1: Specifications

Materials

The enclosure of the SEVA is manufactured from aluminum alloy with stainless steel fasteners. Yoke and cover fasteners are metric and of A4-80 grade material (austenitic, 316 alloy with a minimum tensile strength of 800 MPa). The thread fit tolerance of the fasteners is 6g. When replacement parts are needed, ensure that they meet the minimum requirements specified by Badger Meter. ONLY IDENTICAL FASTENERS CAN BE USED IN ORDER TO MAINTAIN THE HAZARDOUS LOCATION RATING OF THE UNIT. Substitutions not meeting the requirements will invalidate any hazardous area certifications of the product and may result in fire, shock, or other improper and hazardous operation.

	Housing Cover	Housing Base	Yoke	Lead Screw
Standard	Aluminum	Aluminum	SS	SS

Table 2: Housing materials

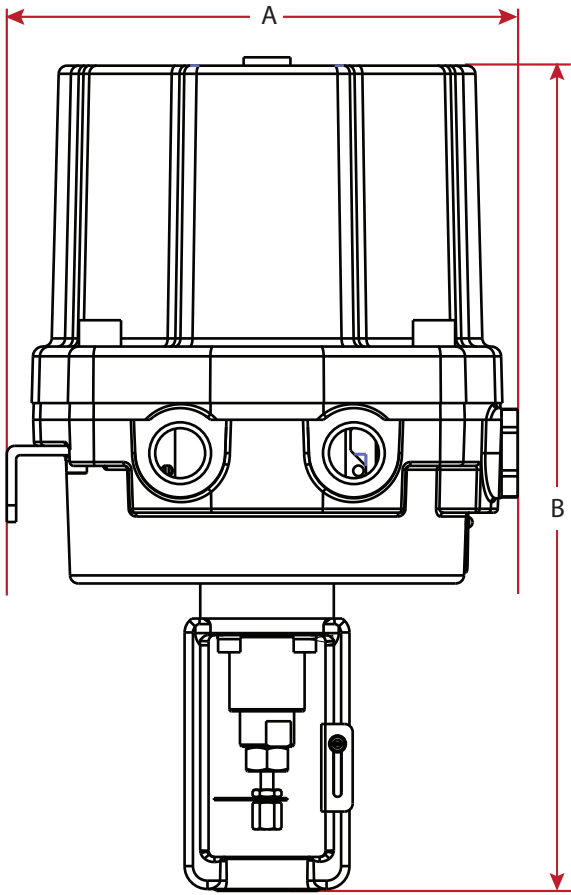
SEVA-100/200	Type	Thread	Length	Material	Assembly Torque
Cover Fastener	Socket Head Cap Screw per ISO 4762	M10 × 1.5 6 g	1.57 in. (40 mm)	A4-80 (800 MPa tensile)	40...50 N•m
Yoke Fastener	Socket Head Cap Screw per ISO 4762	M5 × 0.8 6 g	1.18 in. (30 mm)	A4-90 (800 MPa tensile)	4...6 N•m

Table 3: Fastener materials

SEVA-100/200	Size (SAE No.)	Material	Operating Temp
Cover/Base O-ring	-258	Buna-N 70	-4...122° F (-20...50° C)
Base/Yoke O-ring	-025	Buna-N 70	-4...122° F (-20...50° C)
Yoke/Stem O-ring	-114	Parker ELF N1090	-4...122° F (-20...50° C)

Table 4: Cover, base and yoke materials

DIMENSIONS

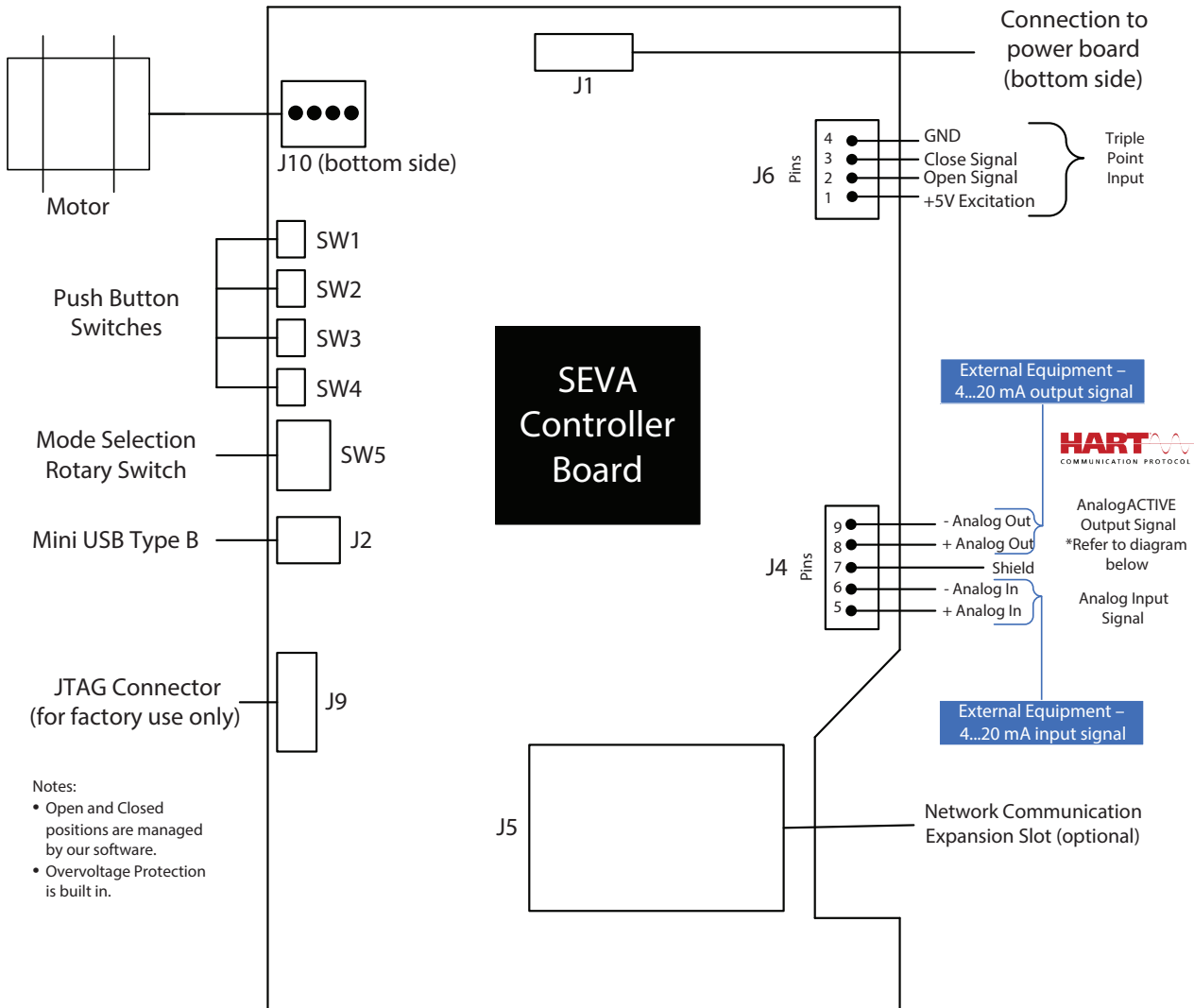


	A	B
SEVA 100	7.65 in. (194.31 mm)	12.35 in. (313.69 mm)
SEVA 200	7.65 in. (194.31 mm)	12.35 in. (313.69 mm)

Figure 1: SEVA dimension

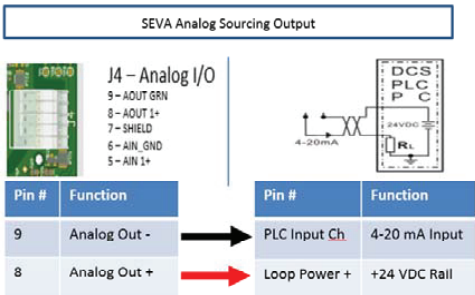
WIRING CONNECTIONS

SEVA Controller Board



* SEVA Active Feedback (Analog Output Signal)

Passive Load Connection



Active Load Connection

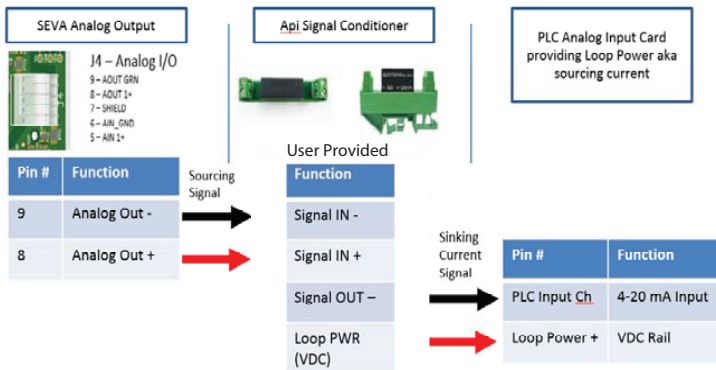


Figure 2: SEVA wiring block diagram

SEVA Power Board

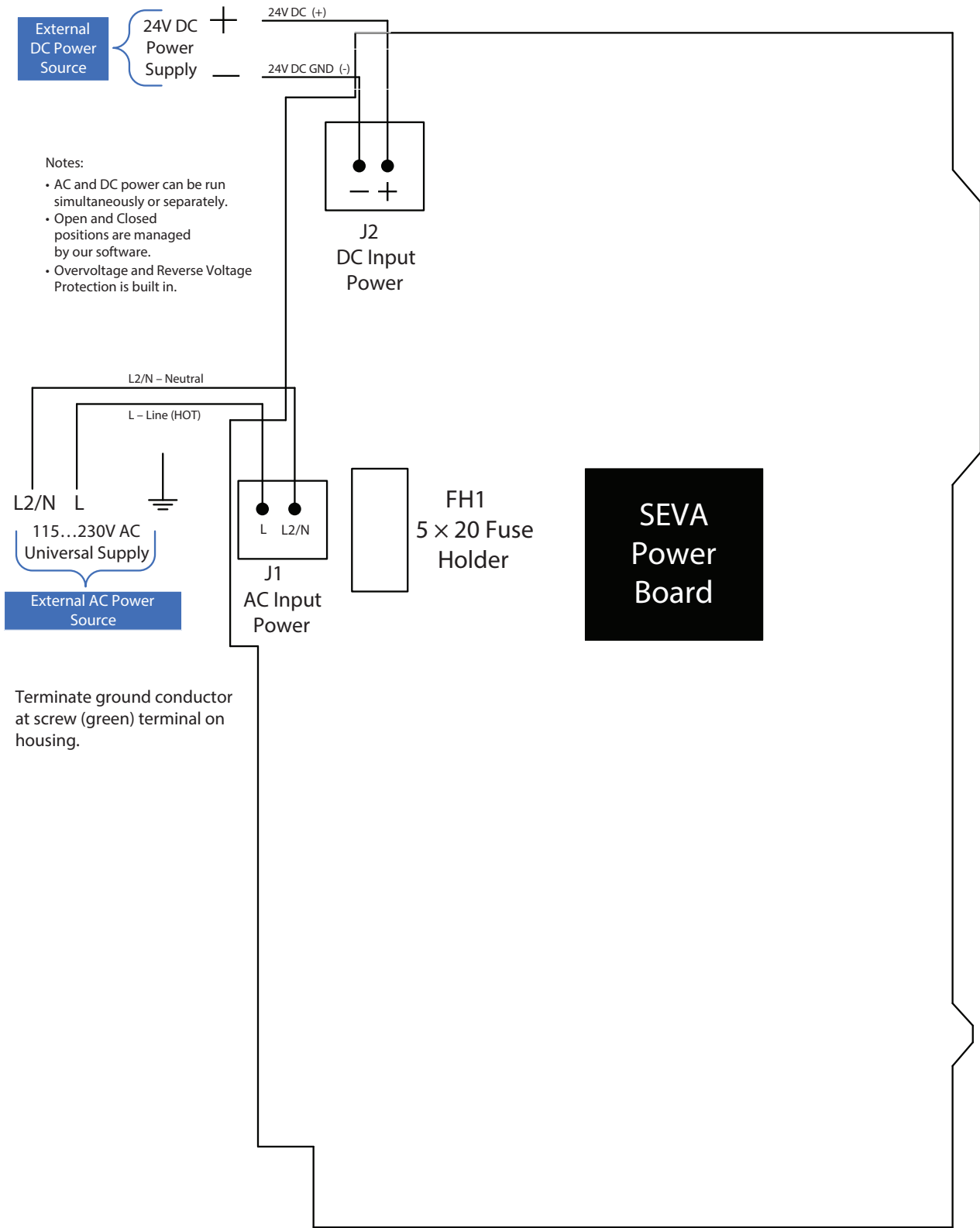
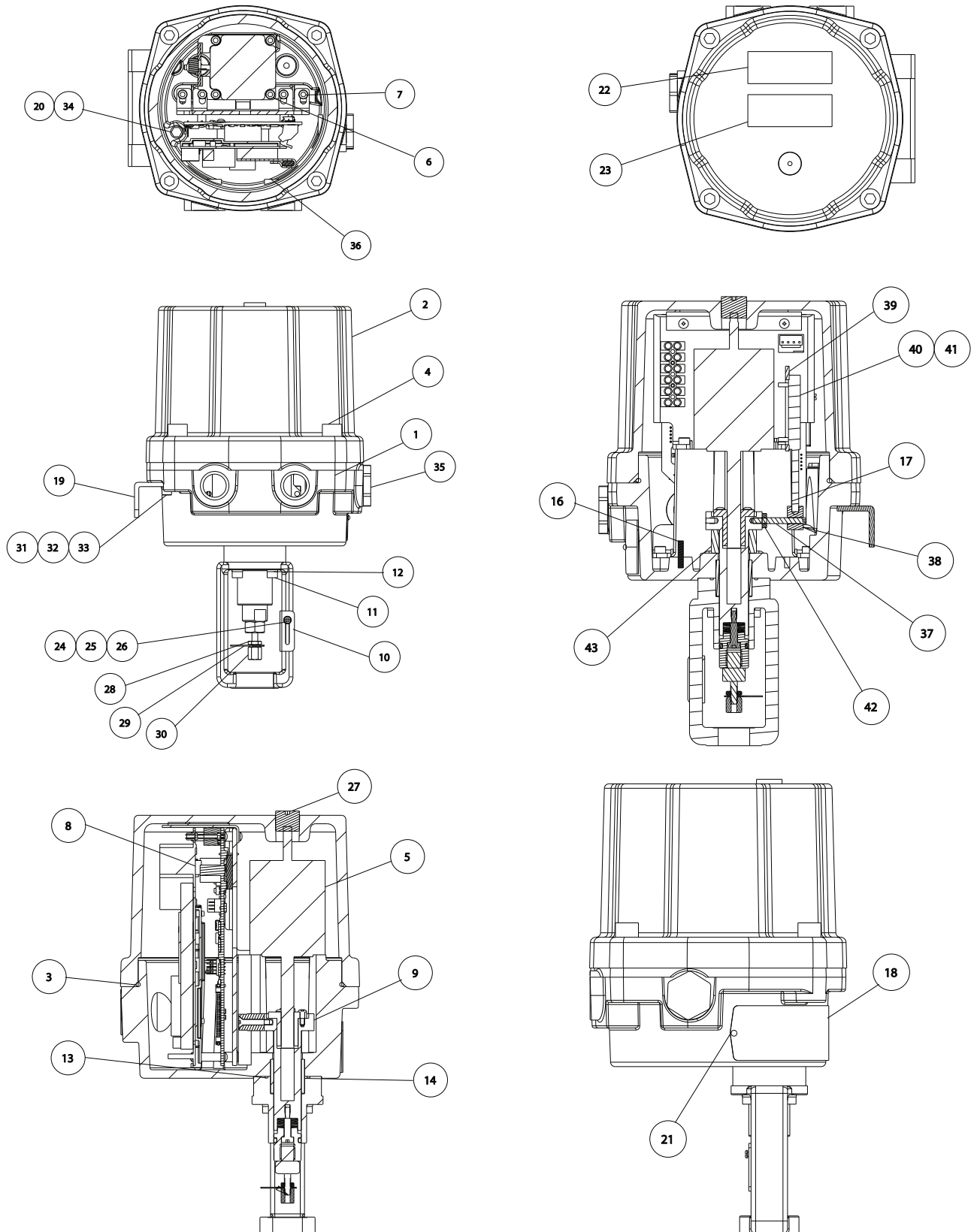


Figure 3: SEVA power board

COMPONENTS DRAWING

See "Components Identification" on page 7 for descriptions of these items.



Components Identification

Item	Description
1	Base
2	Cover
3	O-ring
4	Screw
5	Motor
6	Screw
7	Screw
8	Circuit board
9	Stem assembly
10	Yoke
11	Screw
12	Lockwasher
13	O-ring
14	Bearing
16	Pin dowel
17	Thermal pad pedestal
18	Nameplate
19	Wall mount bracket
20	Screw
21	Screw
22	Caution decal 1

Item	Description
23	Caution decal 2
24	Travel scale
25	Washer
26	Screw
27	Plug
28	Connector
29	Travel pointer
30	Hex nut
31	Screw
32	Washer
33	Flat washer
34	Lockwasher
35	Pipe plug
36	Ferrite core base
37	Screw
38	Potentiometer coupling
39	Potentiometer bracket
40	Potentiometer assembly
41	TORX® screw
42	Hex nut
43	Downstop ring

PART NUMBER CONSTRUCTION

		SEVA	100	-	A	0	U	A	A	Z
Model	SEVA 100 - 100# maximum thrust		100							
	SEVA 200 - 200# maximum thrust		200							
Input	Pick initial configuration. All are available.									
	4...20 mA (Signal to Open)				A					
	0...5V DC (Signal to Open)				B					
	0...10V DC (Signal to Open)				C					
	3 Point				D					
	4...20 mA (Signal to Close)				E					
	0...5V DC (Signal to Close)				F					
	0...10V DC (Signal to Close)				G					
Protocols	No Communication					0				
	Modbus RTU (485)					M				
	Modbus TCP/IP (Dual Port)					D				
	EtherNet/IP (Dual Port)					E				
Conduit Entry Threads	3/4 in. NPT						U			
	M25 X 1.5						M			
Yoke Hole Diameter	0.625 in. (Used on 1/4" RCV valves)							A		
	0.875 in. (Used on 1/2", 3/4" and 1" RCV valves)							B		
	1 in. (Used on Kynar Model valves)							C		
	1.125 in. (Used on the following models 9000, 9100 and 1711 RCV valves)							D		
Stem Thread	#6-32 (Used on 1/4" RCV valves)								A	
	#10-32 (Used on 1/2", 3/4" and 1" RCV valves)								B	
	#1/4-28 (Used on the following models 9000 and 1711 RCV valves)								C	
	#5/16-23 (Used on 9100 model RCV valves)								D	
Limit Switch	Mechanical Limit Switch									S
	None									Z

Control. Manage. Optimize.

Research Control is a registered trademark of Badger Meter, Inc. Other trademarks appearing in this document are the property of their respective entities. Due to continuous research, product improvements and enhancements, Badger Meter reserves the right to change product or system specifications without notice, except to the extent an outstanding contractual obligation exists. © 2023 Badger Meter, Inc. All rights reserved.