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Silver Zinc Battery Designs

Automatically Activated Design Principles

The basic design of the automatically activated, silver-zinc battery utilizes a gas generator, tubular electrolyte reservoir, manifold, battery block, sump, vent system and heater system where applicable. Detailed descriptions of these components and their contribution to the overall operation of the battery are contained in the following paragraphs.

Gas Generator

The means of moving the electrolyte reservoir to the battery block is provided by the gas generator. The gas generator consists of an igniter and a rapid burning propellant. The igniter and propellant are sealed by a frangible diaphragm to prevent contamination. Normally an electrical signal ignites a match, which in turn ignites the propellant. As the propellant burns a gas pressure is generated which bursts the frangible diaphragm. Alternate methods of ignition are available; these include mechanical release of a firing pin, pneumatic or hydraulic pres-sure, and inertial devices. Eagle-Picher manufactures its own gas generators.

Electrolyte Reservoir

The electrolyte reservoir provides the means of storing the electrolyte (potassium hydroxide) for long periods of time (5 years and longer) with no contamination prior to use. The reservoir consists of copper or stainless steel tubing shaped to fit around or along the battery block. The reservoir utilizes two (2) frangible diaphragms at each end of the reservoir. Upon application of gas pressure at the generator side of the reservoir, the frangible diaphragms burst resulting in a hydraulic pressure at the manifold side of the reservoir. Sufficient hydraulic pressure results in the bursting of the output diaphragms and entry of the electrolyte into the manifold. The pressure generated by the gas generator is sufficient to sweep the reservoir free of electrolyte.

Manifold

The manifold provides the means of proper distribution of electrolyte to each cell in the battery block. The manifold is designed to channel excess electrolyte to the sump system along with the gases produced by the gas generator.

Battery Block

The housing, which contains the cell arrangement, is referred to as the battery block. The block contains spacers for isolation of cells and is designed to accommodate the shape-dictated configuration pattern. The number of cells required for each block is dictated by the voltage requirements. The cell is designed to meet the cur-rent and time profile of

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the individual specification. The cell assembly consists of silver-oxide positive plates and zinc negative plates. The requirements for temperature, activation time and activated stand time govern the type of material used to separate and isolate the positive and negative plates. The material generally used for the battery block is Plexiglas. Eagle-Picher manufactures each battery block.

Vent System

The vent system provides the means of releasing internal pressures generated at activation and during late stages of battery discharge and blocks entry of outside atmosphere prior to activation. The vent system consists of a one-way relief valve and an external vent tube. The relief valve allows the battery block to operate at a nominal pressure.

Heater System

A thermostatically controlled heater system is normally incorporated in the battery when the specification requires cold battery operation. The heater system consists of thermostats located properly to ensure proper internal temperature, and heater of sufficient wattage to bring the battery to optimum temperature within the allotted time. Basic heaters consist of resistance wire wound around the electrolyte reservoir.

Click the battery number in the below figure to obtain the technical data sheet for that particular battery.

Automatic Activated Silver Zinc (AgZn) Batteries

Battery Number	Voltage	Capacity (amp-hrs)	Rate (amps)	Wet Stand Time (months)
GAP-4156	28	0.31	0.28	120
GAP-4157	Multiple	Multiple	Multiple	120
GAP-4325-9	Multiple	Multiple	Multiple	1.2
GAP-4328	Multiple	Multiple	Multiple	1.0
GAP-4331-21	26	0.22	10.3	0.6
GAP-4425	Multiple	Multiple	Multiple	5.0
GAP-4438	28	0.43	5.2	0.5
GAP-4445	28	19	30	1.0
GAP-4470	Multiple	Multiple	Multiple	2.0

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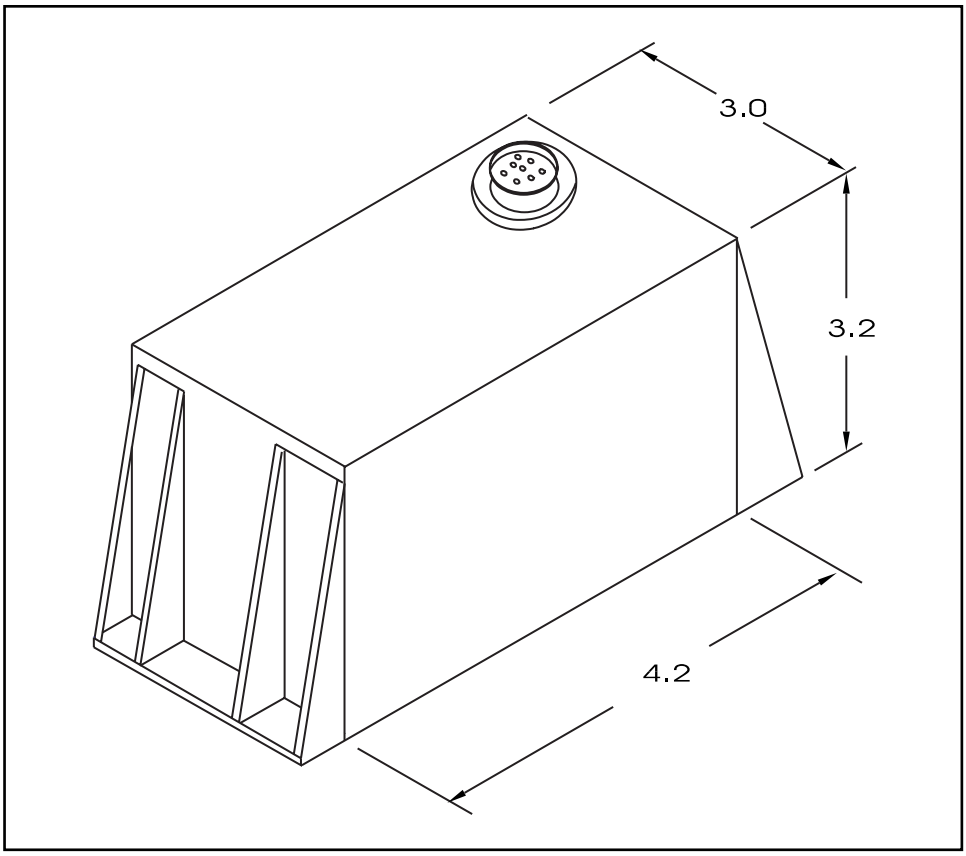
MODEL GAP-4156

Voltage	28
Capacity (amp-hrs)	0.31
Rate (amps)	0.28
Weight (lbs)	4.0
Volume (in^3)	57
Temperature	60-130°F
Heater	N/A
Max. Heater Time	N/A
Max. Activation	120 Seconds
Max. Stand Time	6.0 Hours
NSN	6135-00-994-5021 AH



Automatically Activated

Silver-Zinc Systems

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MODEL GAP-4157

	Output		(Amps)
Section	Volts	Amp-Hrs	Rate
A	5.5	0.46	0.50
B	5.5	0.46	0.50

Voltage _____ (see chart)

Capacity (amp-hrs) _____ (see chart)

Rate (amps) _____ (see chart)

Weight (lbs) _____ 1.35

Volume (in^3) _____ 16.88

Temperature _____ 80-120°F

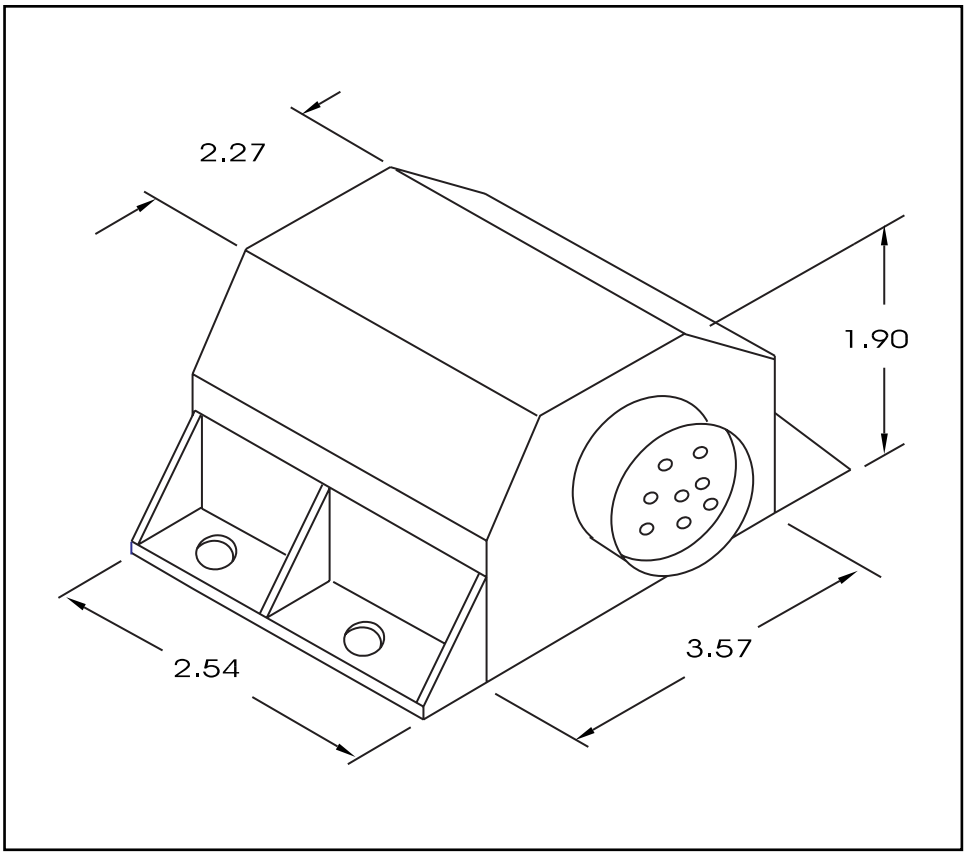
Heater _____ None

Max. Heater Time _____ N/A

Max. Activation _____ 120 Seconds

Max. Stand Time _____ 6.0 Hours

NSN _____ 6135-00-992-8750 AH



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Silver-Zinc Systems

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MODEL GAP-4325-9

	Output		(Amps)
Section	Volts	Amp-Hrs	Rate
1) +EM	26-30	3.95	65
2) 8.5	7.8-11	1.43	24
3) -EM	26-33	4.26	70
4) +ELX	26-30.5	0.50	7.8
5) +18	17.4-21.1	0.22	3.5
6) -ELX	26-30.5	0.38	5.9
7) -18	17.4-21.1	0.37	5.9

Voltage _____ (see chart)

Capacity (amp-hrs) _____ (see chart)

Rate (amps) _____ (see chart)

Weight (lbs) _____ 24.6

Volume (in^3) _____ 427

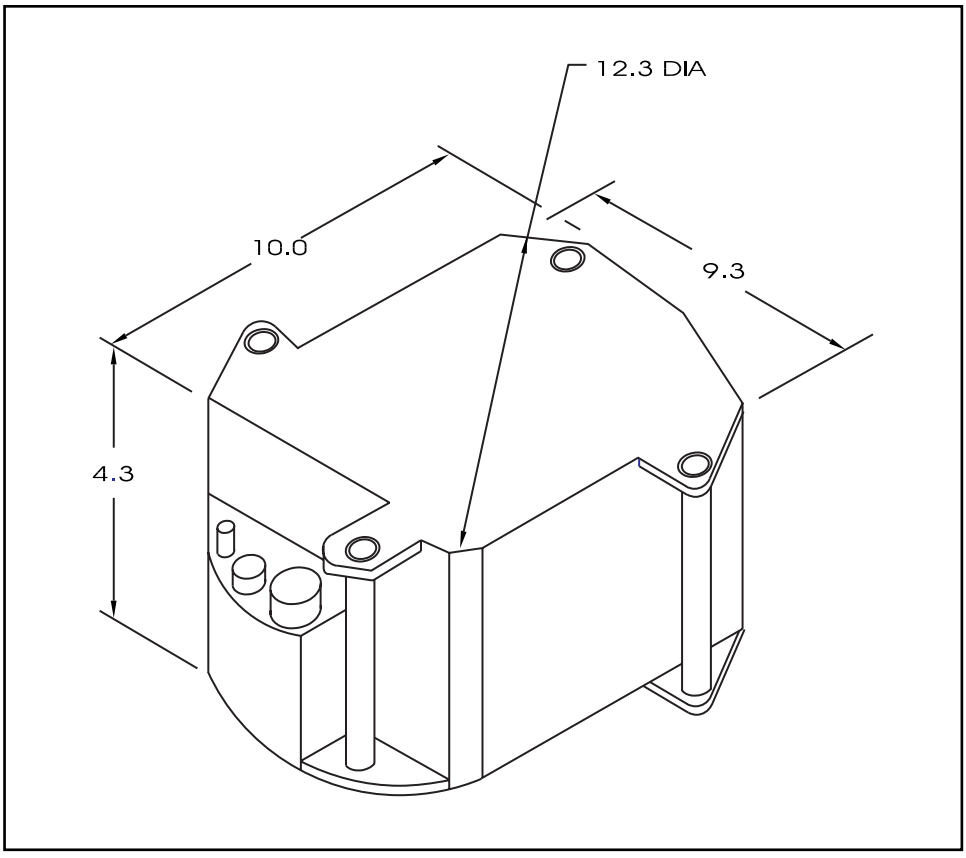
Temperature _____ 45-105°F

Heater _____ None

Max. Heater Time _____ N/A

Max. Activation _____ 1.2 Seconds

Max. Stand Time_____0



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Silver-Zinc Systems

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MODEL GAP-4328

	Output		(Amps)
Section	Volts	Amp-Hrs	Rate
I T1	59.1	0.024	0.78
I T2	25.2	0.050	1.65
I T3	19.2	0.037	1.20
I T4	11.8	0.038	2.70
II T1	-58.9	0.024	0.80
II T2	-13.3	0.024	0.80

Voltage _____ (see chart)

Capacity (amp-hrs) _____ (see chart)

Rate (amps) _____ (see chart)

Weight (lbs) _____ 7.2

Volume (in^3) _____ 13.54

Temperature _____ -65-150°F

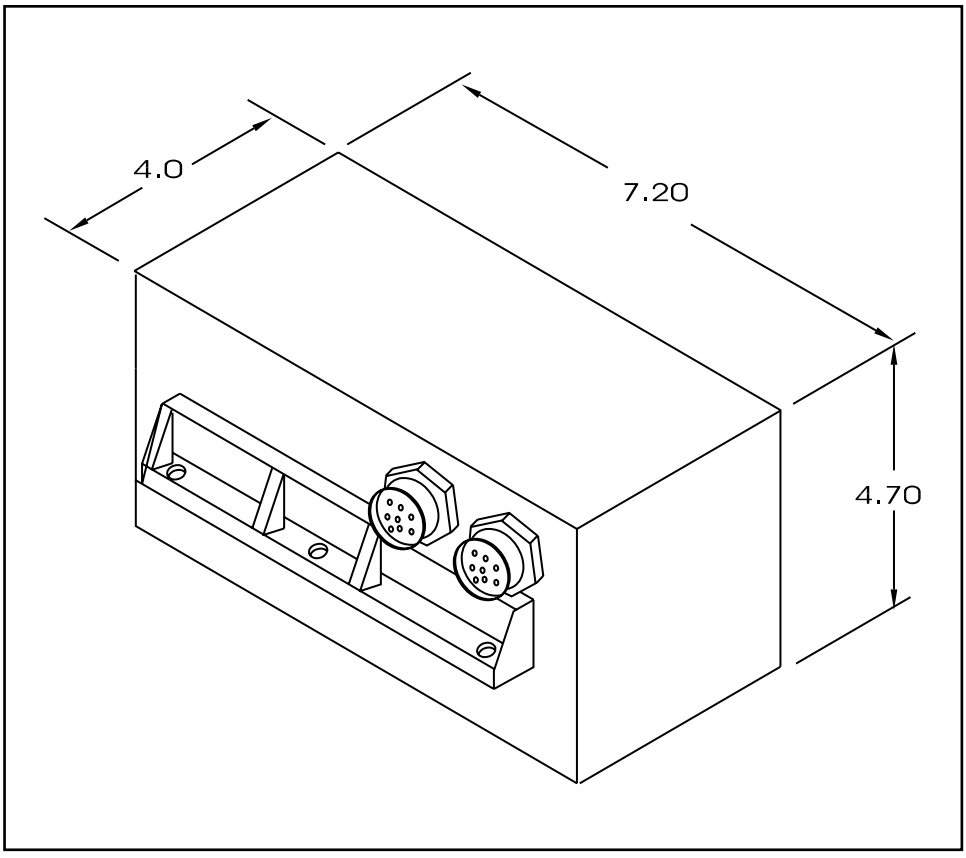
Heater _____ 208 VAC 700 Watts

Max. Heater Time _____ 7.0 Minutes

Max. Activation _____ 1.0 Second

Max. Stand Time_____0

NSN _____ 6135-00-484-8556



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Silver-Zinc Systems

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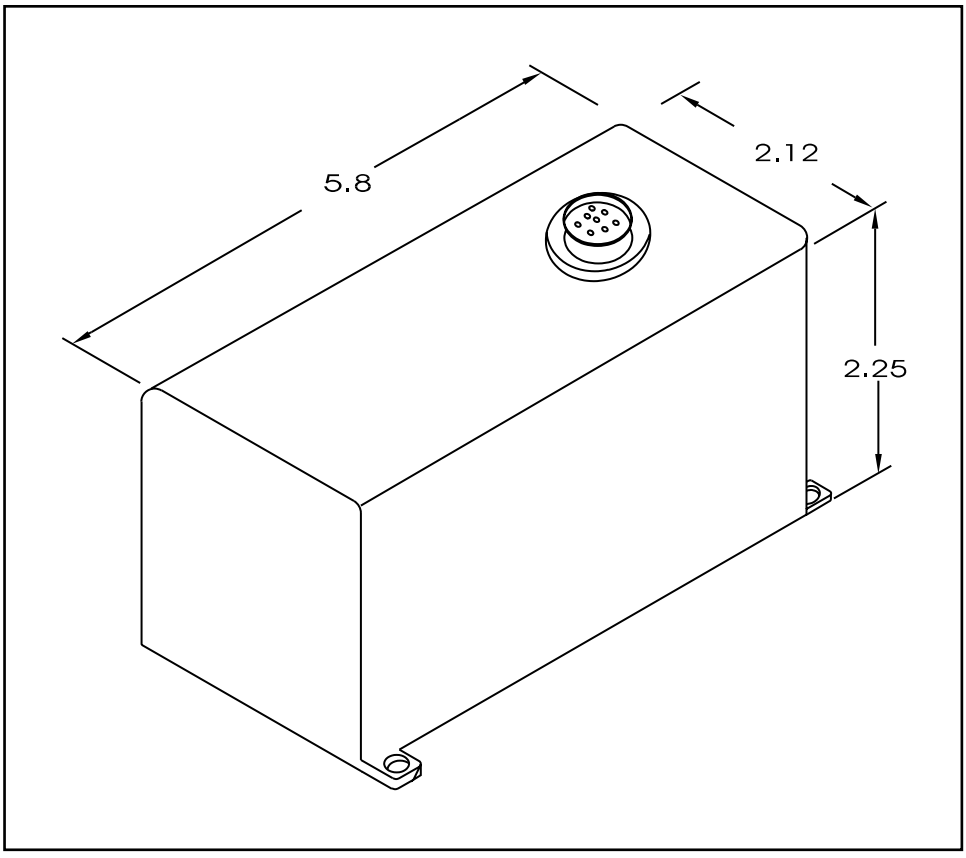
MODEL GAP-4331-21

Voltage	26
Capacity (amp-hrs)	0.22
Rate (amps)	10.3
Weight (lbs)	2.2
Volume (in^3)	28
Temperature	-35-160°F
Heater	115 VAC 300 Watts
Max. Heater Time	3.0 Minutes
Max. Activation	0.60 Seconds
Max. Stand Time	0



Automatically Activated

Silver-Zinc Systems

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MODEL GAP-4425

	Output		(Amps)
Section	Volts	Amp-Hrs	Rate
A	28	7.5	3.5
B	6.7	2.8	1.25

Voltage _____ (see chart)

Capacity (amp-hrs) _____ (see chart)

Rate (amps) _____ (see chart)

Weight (lbs) _____ 9.2

Volume (in^3) _____ 113

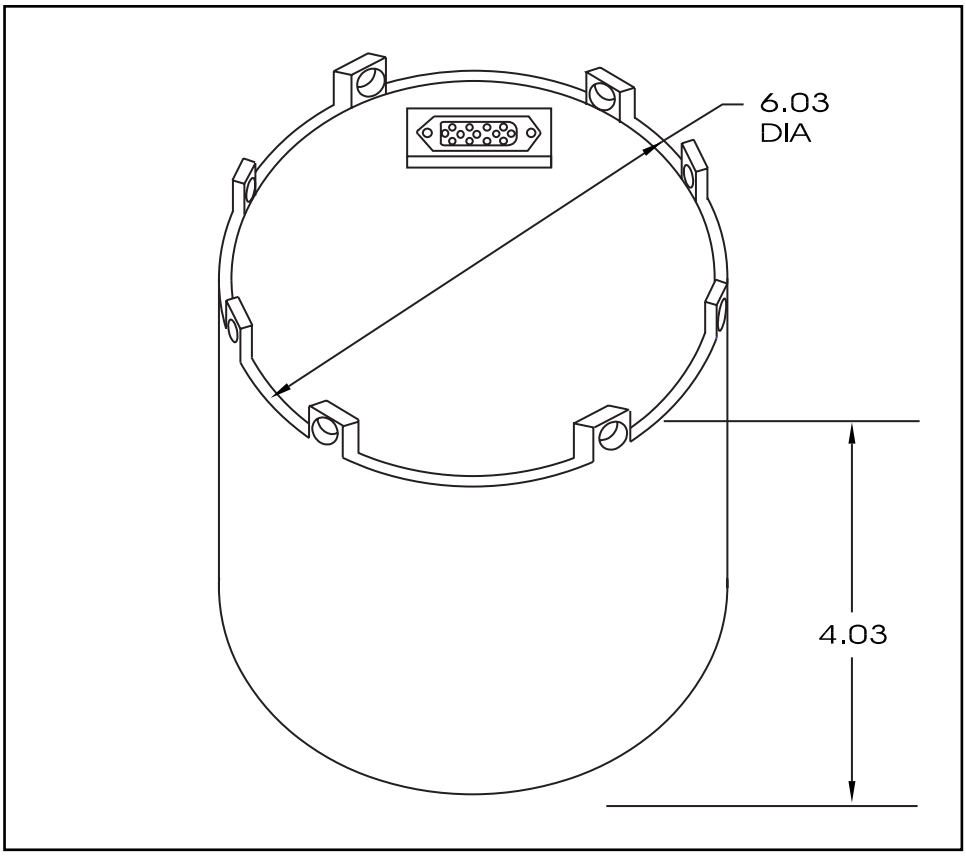
Temperature _____ 60-100°F

Heater _____ None

Max. Heater Time _____ N/A

Max. Activation _____ 5.0 Seconds

Max. Stand Time_____0



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Silver-Zinc Systems

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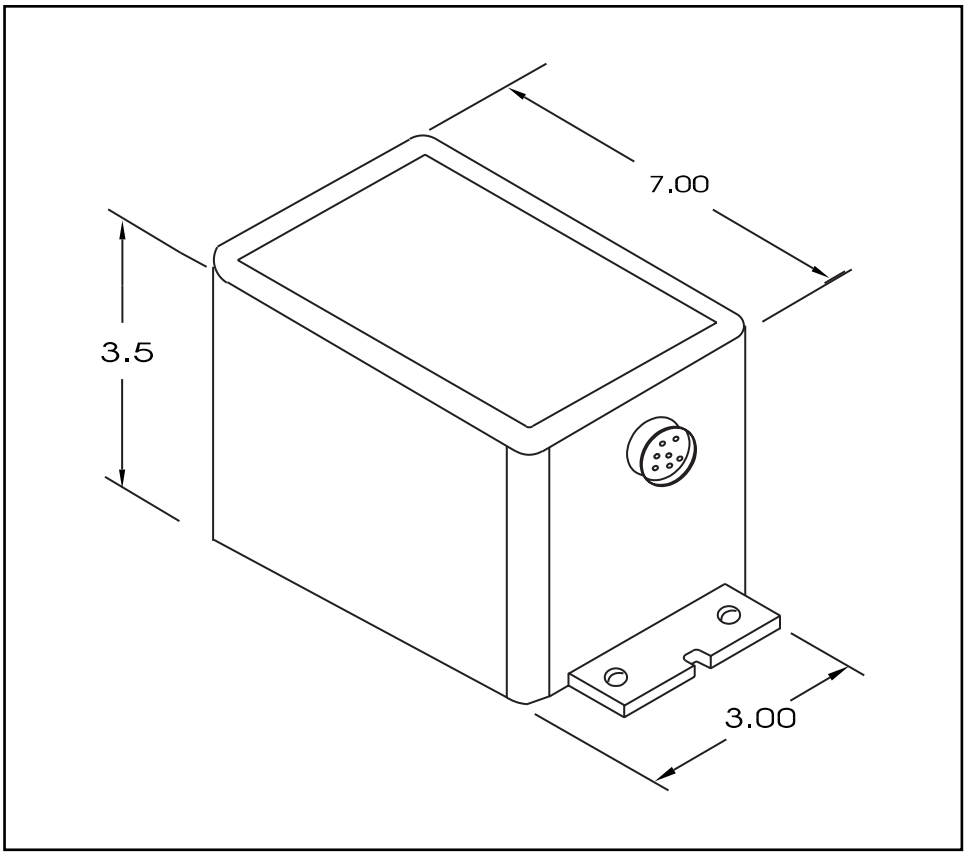
MODEL GAP-4438

Voltage	28
Capacity (amp-hrs)	0.43
Rate (amps)	5.2
Weight (lbs)	3.75
Volume (in^3)	47.25
Temperature	20-120°F
Heater	115 VAC or 28 VDC (75 Watts)
Max. Heater Time	10 Minutes
Max. Activation	0.50 Seconds
Max. Stand Time	0.083 Hours



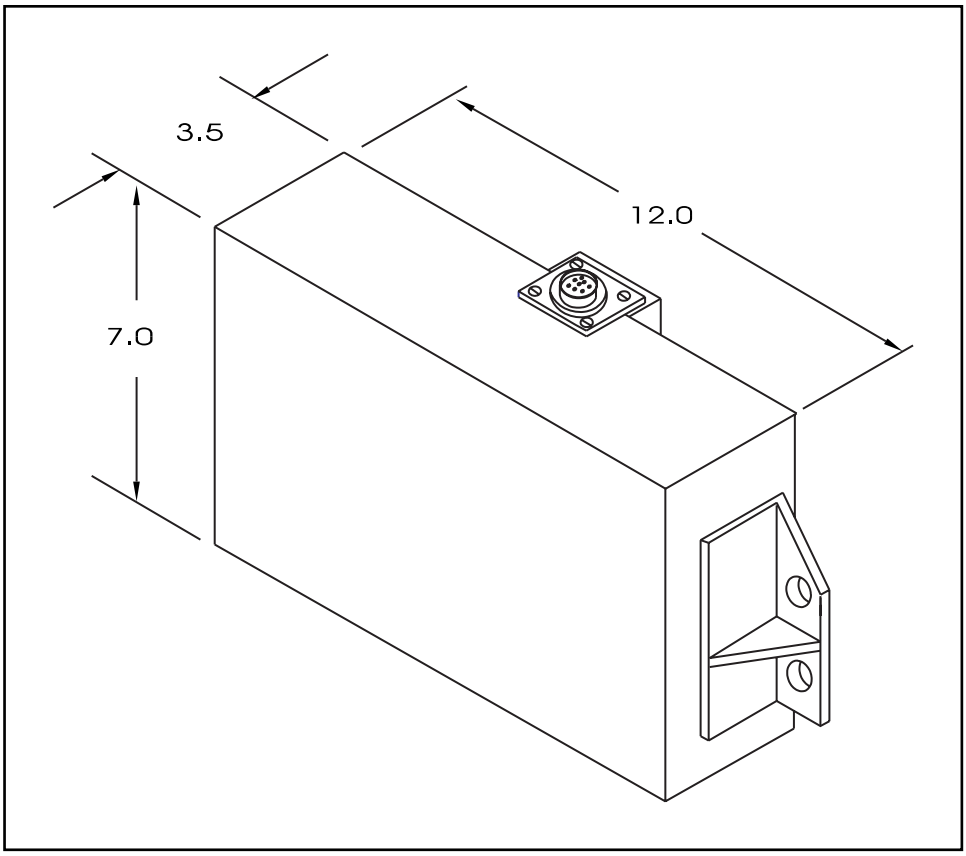
Automatically Activated

Silver-Zinc Systems

EAGLE PICHER

MODEL GAP-4445

Voltage	28
Capacity (amp-hrs)	19
Rate (amps)	30
Weight (lbs)	20.5
Volume (in^3)	294
Temperature	80-120°F
Heater	None
Max. Heater Time	N/A
Max. Activation	1.0 Second
Max. Stand Time	0



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Silver-Zinc Systems

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MODEL GAP-4470

	Output		(Amps)
Section	Volts	Amp-Hrs	Rate
1A	28.0	8.1	40
1B	26.5	0.54	3
2	28.0	6.0	27

Voltage _____ (see chart)

Capacity (amp-hrs) _____ (see chart)

Rate (amps) _____ (see chart)

Weight (lbs) _____ 19.75

Volume (in^3) _____ 308

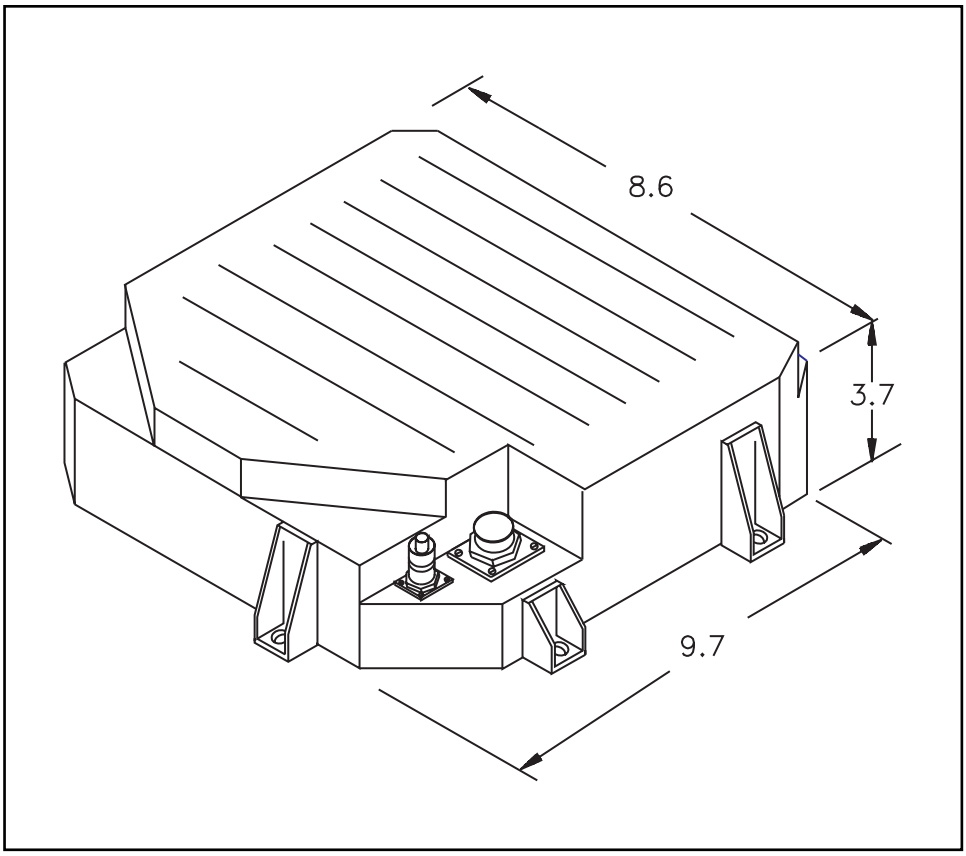
Temperature _____ -65-160°F

Heater _____ 115 VAC 500 Watts

Max. Heater Time _____ 30 Minutes

Max. Activation _____ 2.0 Seconds

Max. Stand Time_____ 0



Automatically Activated

Silver-Zinc Systems