Pressure Compensated Lead Acid battery Assembly Instructions

Draft 2/7/2011

Components needed:

1 each, Deka Solar battery part number: 8G31-DEKA, X-Terminal type.

http://www.mrsolar.com/pdf/MK_Battery/MK8G31.pdf

1 each, Battery Comp Adapter, MBARI part number 10020549DWG rev-A

1 each, Top Flange, MBARI part number 10020550DWG

1 each, SubConn MCBH4F 4-pin female connector

1 each, 7/16-20 Thin hex nut for above connector, McMaster part number: 92174A430

1 each, Brass Quick Disconnect, Through-wall barbed, McMaster part number: 5478K715

1 each, Brass Quick Disconnect, Barbed, McMaster part number: 5478K419

1 each, 3/16" Thick polyurethane sheet for compensation diaphragm, McMaster part number 8789K396

18 each ¼-20 x 1" stainless steel socket head cap screws, McMaster part number: 92196A542

18 each ¼" stainless steel narrow flat washers, McMaster part number: 90945A761

8", ¼" ID silicone tubing for gas vent

24", .030 stainless steel welding wire

1 tube, 3M DP8010NS Structural Adhesive, This needs a special dispenser.

4 each, #18 ring terminals, ID____

Assembly procedure

Bond the top:

1. Remove any labels around the top perimeter of the battery case.
2. Clean the top bonding area with isopropyl alcohol.
3. Sand the bonding area of the battery with #180 grit sandpaper using a NEW Clean piece of abrasive sheet. Discard after use.
4. Clean the area just sanded with isopropyl alcohol again. Do not touch it after this.
5. Clean the battery comp adapter with soap and hot water, allow time for drying.
6. Clean the battery comp adapter with alcohol.
7. Sand the bonding area of the comp adapter with #180 grit sandpaper using a NEW Clean piece of abrasive sheet. Discard after use.
8. Clean the battery comp adapter with alcohol. Do not touch it after this.
9. Under the fume hood or outside bond the comp adapter to the battery using the 3M DP8010NA adhesive. Use gloves and insure that there is good ventilation. Create large fillet of adhesive to insure a 100% gap fill with the adhesive between the battery and comp adapter.
10. Weight the adapter while the adhesive cures.

Create the comp diaphragm:

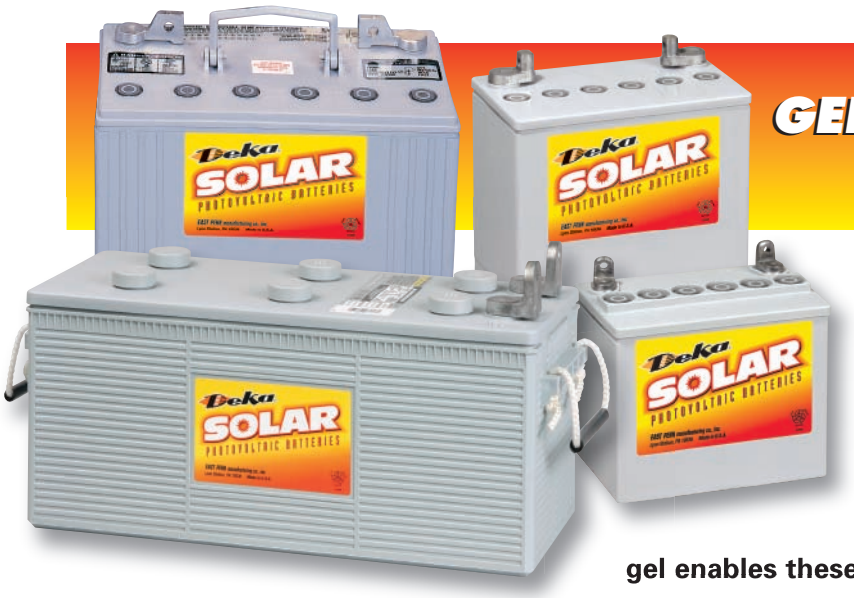
1. Cut out the sheet polyurethane using the top flange as a template
2. Use a ¼" diameter arch punch to punch out the 18 fastener holes using the top flange as a template. Use McMaster part 3427A12 punch.

Assembly:

1. Drill the top of the battery to allow gas venting. Use a 1/8" or #30 drill bit. Install a sleeve on the bit to only expose 3/16" of drill to limit the drill depth. Drill 3-4 holes per cell on the top of the battery inside the comp adapter. See photo.
2. Install the MCBH4F with the o-ring and the 7/16-20 thin brass nut.
3. Connect the MCBH4F wires to the battery terminals per the battery box diagram.
4. Install the ¼" vent female quick disconnect.
5. Install an 8" long piece of ¼" silicone tubing on the QD's hose barb.
6. Fabricate a hose positioned using the .030 stainless steel welding wire.
7. Fill the top of the comp adapter with oil. Use a syringe to remove the trapped air in cells. Refill top and repeat until most of the trapped gas is gone.
8. Install top diaphragm using the ¼-20 cap screws and washers. Place the washers with the filleted side down.

Deka SOLAR

PHOTOVOLTAIC BATTERIES



GEL MONOBLOC/ 6V & 12V

The *Deka Solar Valve-Regulated Gel Monobloc series* offers reliable, versatile, maintenance-free power. The thixotropic gel enables these batteries to be completely spillproof providing many available options for installation. The gelled electrolyte gives more protection to the battery plates, and is better suited for deep cycle discharge. With longer discharge and less charging time, these batteries are ideal for many renewable energy applications.

FEATURES & BENEFITS	
Valve-Regulated	Sealed construction eliminates periodic watering, corrosive acid fumes, and spills
Gelled Electrolyte	Electrolyte will not stratify
Positive and Negative Plate	Lead calcium
Self-Discharge	Less than 2% per month stand loss means little deterioration during transport and storage
Exclusive IPF™ Technology	Optimizes power capacity, cell consistency, and long-term reliability
Rated Non-Spillable by ICAO, IATA, and DOT	Transports easily and safely by air, no special containers needed

APPLICATIONS

• Water pumping • Residental • Communications
• Cathodic protection • Remote monitoring • Refrigeration
• Lighting • Aids to navigation • Wind generation

LEAD RETURN Pb RECYCLE

QUALITY SYSTEM CERTIFIED ISO 9001 ISO/TS 16949
ENVIRONMENTAL SYSTEM CERTIFIED ISO 14001

UL Recognized Component

Deka SOLAR®

PHOTOVOLTAIC BATTERIES

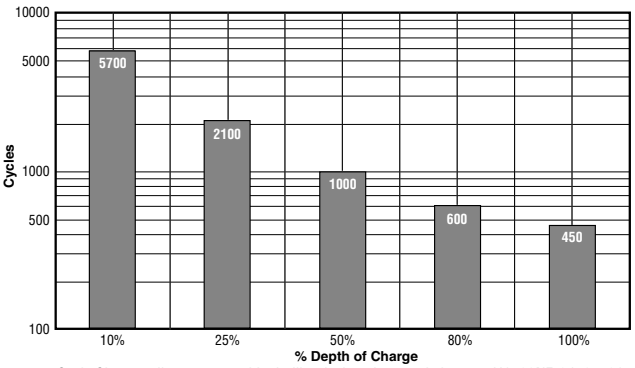
The Deka Solar series of valve-regulated, gelled-electrolyte batteries is designed to offer reliable, maintenance-free power for renewable energy applications where frequent deep cycles are required and minimum maintenance is desirable.

Specifications

Voltage ..... 12 volts nominal (8GGC2 is 6 volts)
Plate alloy ..... Lead calcium
Element, post ..... Threaded stud or "flag" terminal, forged bushing
Container/cover ... Polypropylene
Electrolyte ..... Sulfuric acid thixotropic gel
Vent ..... Self sealing

Gel Cycle Life vs Depth of Discharge at +25°C (77°F)* Based on BCI 2-hour Capacity

Gel Cycle Life vs Depth of Discharge at +25°C (77°F) Based on BCI 2-hour Capacity



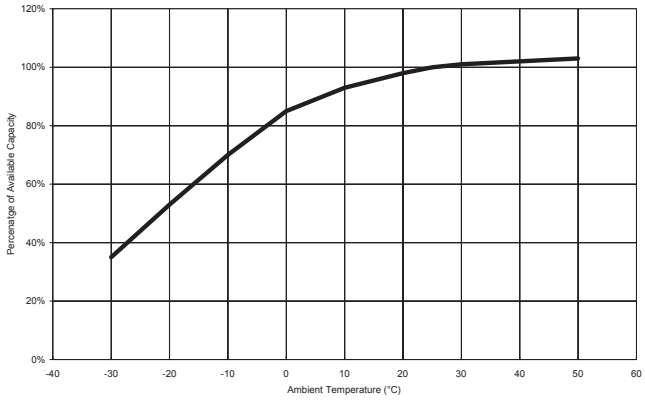
Cycle Chart applies to types with similiar design characteristics, ex., U1, 22NF, 24, 27, 31.

The solar battery excels in cycling applications.
**Dependent upon proper charging and ambient temperatures.*

Photovoltaic Charging Parameters		
Bulk Charge	Max Current (amps)	30% of 20 Hr Rate
Absorption (Regulation) Charge	Constant Voltage	2.35 - 2.40 vpc
Float Charge	Constant Voltage	2.25 - 2.30 vpc
Equalize Charge	Constant Voltage	2.40 - 2.45 vpc
Temperature Coefficient	0.005 mv / °C	

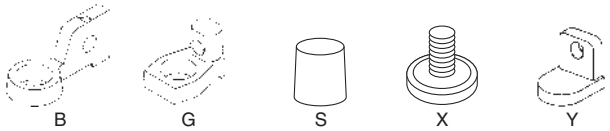
Cut-off parameters per charge & equalize intervals are application specific and will vary dependent upon site specific characteristics such as temperature, days of autonomy, array to load ratio, ect.

Capacity vs. Operating Temperature



Capacity vs. Operating Temperatures: Above are the changes in capacity for wider ambient temperature range, giving the available capacity, as a percentage of the rated capacity, at different ambient temperatures. The curves show the behavior of the battery after a number of cycles.

Terminal Information



Type No.	Footnotes	Volts	Discharge Amps per unit to 1.75VPC at 77°F (25°C)														Approx. Wt. Lbs. (Kgs.)	Dimensions In (mm)		
			5 Min	10 Min	15 Min	20 Min	30 Min	60 Min	90 Min	3 Hr	6 Hr	8 Hr	20 Hr	24 Hr	48 Hr	100 Hr		L	W	H
8GU1	4,38,39,Y	12	74.7	54.3	44.6	38.8	31.9	21	15	8.50	4.67	3.56	1.58	1.33	0.73	0.36	23.4 (10.6)	7¾ (197)	5⅛ (130)	7¼ (184)
8GU1H	4,17,38,39,Y	12	74.7	54.3	44.6	38.8	31.9	21	15	8.50	4.67	3.56	1.58	1.33	0.73	0.36	23.4 (10.6)	8⅜ (211)	5⅛ (130)	7¼ (184)
8G22NF	4,38,39,G	12	120	86.7	69.1	60	47	31.8	23.2	13.30	7.65	5.74	2.55	2.15	1.16	0.58	37 (16.8)	9⅜ (238)	5½ (140)	9¼ (235)
8G24	4,17,38,39,G	12	204	152	119	100	78	48.5	35	19.77	10.75	8.30	3.68	3.12	1.68	0.845	52 (23.6)	10⅞ (276)	6¾ (171)	9¼ (235)
8G27	4,17,38,39,G	12	242	185.3	142.5	118.8	90.25	57	41.5	23.30	12.67	9.80	4.32	3.67	1.99	0.99	62.7 (28.4)	12¾ (324)	6¾ (171)	9¼ (235)
8G30H	4,17,38,39,B	12	266	199.5	161.5	137.8	104.5	64.5	47	26.20	14.20	11.00	4.88	4.10	2.15	1.08	69.5 (31.5)	12¹⁵⁄₁₆ (329)	6¾ (171)	9¾ (248)
8G31	4,17,38,39,X	12	266	199.5	161.5	137.8	104.5	64.5	47	26.20	14.20	11.00	4.88	4.10	2.15	1.08	69.5 (31.5)	12¹⁵⁄₁₆ (329)	6¾ (171)	9⅜ (238)
8GGC2	4,38,39,G	6	325	250	210	180	150	99	76	45.30	25.80	20.00	9.00	7.60	3.90	1.98	68.4 (31.0)	10¼ (260)	7⅛ (181)	11 (279)
8G4D	4,17,38,39,S	12	485	375	300	255	195	122	88	49.20	26.70	20.70	9.15	7.78	4.22	2.10	127 (57.5)	20¾ (527)	8½ (216)	10 (254)
8G8D	4,17,38,39,S	12	600	460	370	315	245	150	105	60.60	33.00	25.50	11.25	9.54	5.18	2.65	157 (71.1)	20¾ (527)	11 (279)	10 (254)

ALL RATINGS ARE AFTER 15 CYCLES AND CONFORM TO B.C.I. SPECIFICATIONS.
IMPORTANT CHARGING INSTRUCTIONS: WARRANTY VOID IF OPENED OR IMPROPERLY CHARGED. Do not install in a sealed container. Constant under or overcharging will damage any battery and shorten its life! Use a good constant potential, voltage-regulated charger. The **open circuit voltage** of a fully charged 12-volt battery is 12.8V at 68°F (20°C).

Batteries manufactured in polypropylene cases and covers.

Footnotes:
4 - Gray Cover / Gray Case
17 - Includes handle
38 - "Non-Spillable" defined by DOT(Department of Transportation) definitions
39 - "Non-Spillable" defined by ICAO (International Commercial AirlineOrganization) and IATA (International Airline Transport Association) definitions

B - Flag terminal w/ 3/8" diameter hole
G - Offset post w/ horizontal hole, stainless steel 5/16" bolt & hex nut
S - SAE "automotive type" post
X - 3/8" x 16" stainless steel stud posts
Y - Small L terminal with round holes

"POWERED FOR PERFORMANCE"®

EAST PENN manufacturing co., inc.

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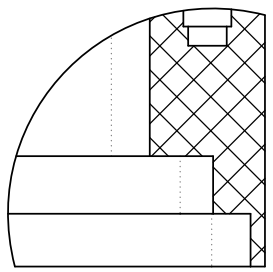
Domestic & International Inquiries Call: 610-682-3263
www.eastpennunigy.com • e-mail: sales@eastpennunigy.com

E.P.M. Form No. 0919 Rev. 6/10

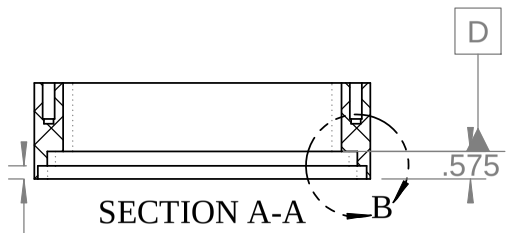
MK POWERED

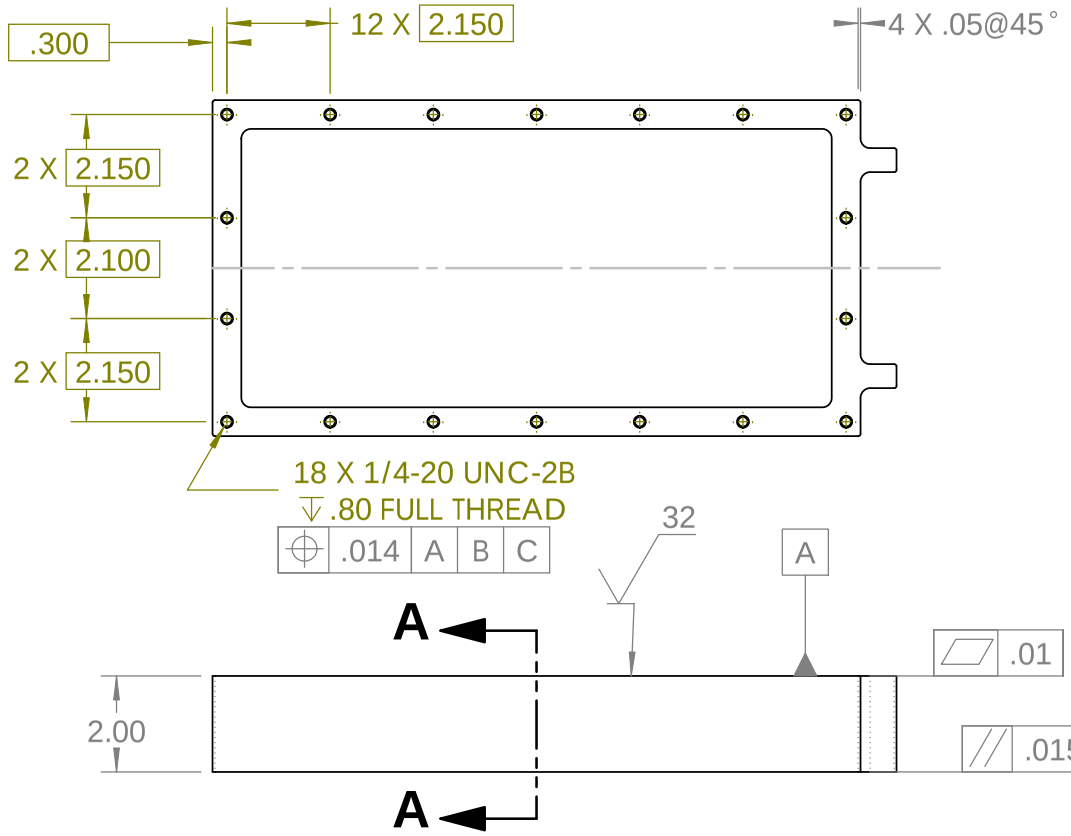
Domestic Inquiries Call: 1-800-372-9253
www.mkbattery.com • e-mail: sales@mkbattery.com

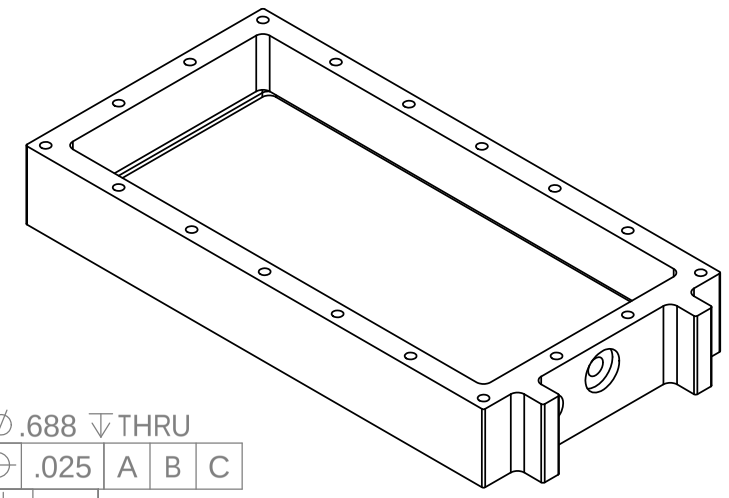
REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
	INITIAL RELEASE	6/7/2010	
A	ADD QD HOLE	2/4/2011	

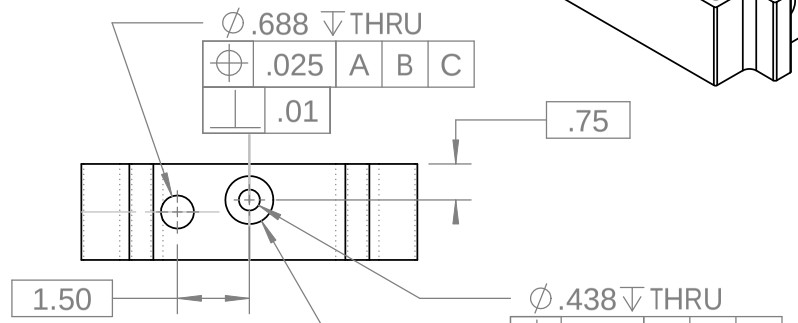


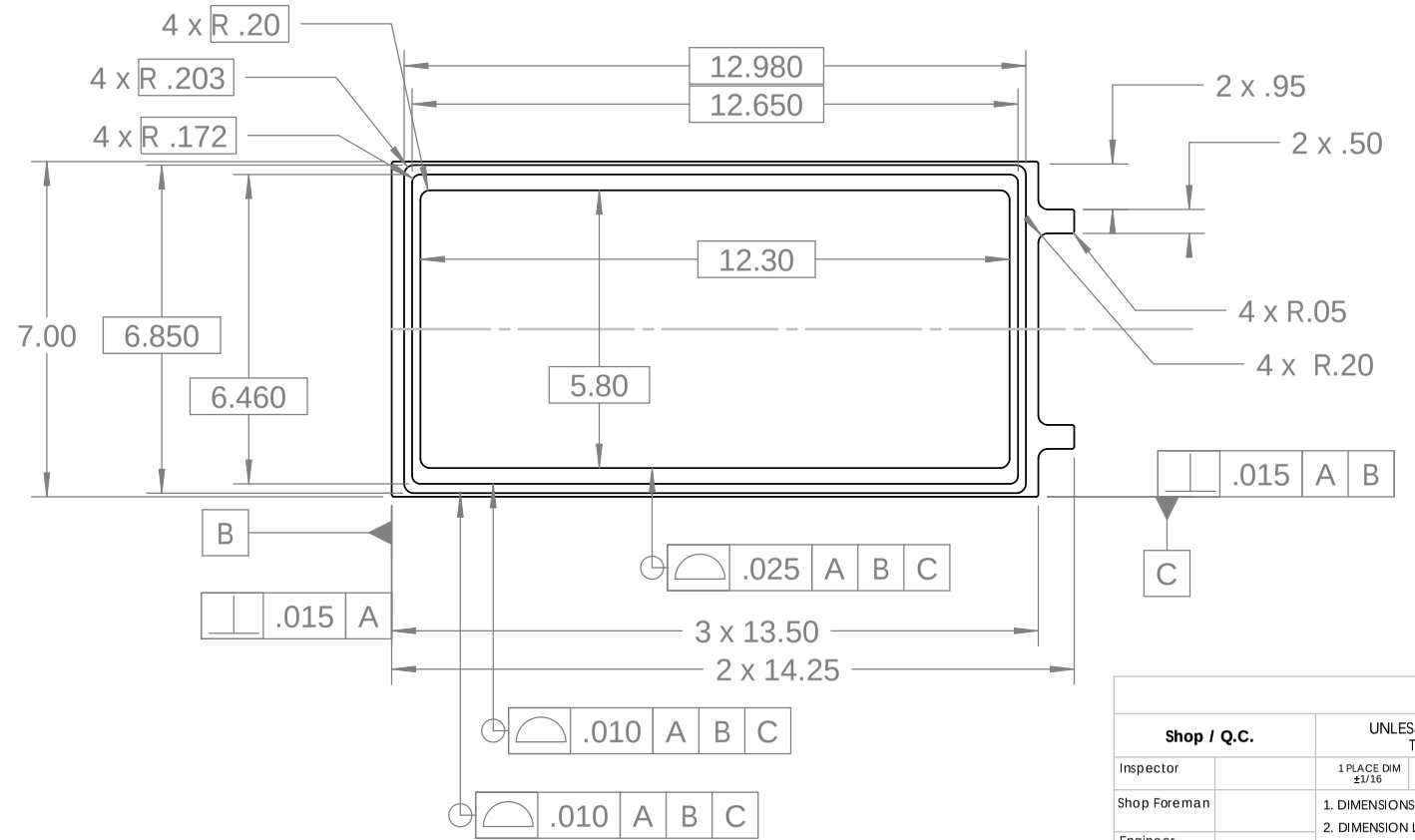
DETAIL B
SCALE 1 : 1











4 EACH, ABS

BILL OF MATERIALS

Shop / Q.C.	
Inspector	
Shop Foreman	
Engineer	
NEXT ASSY Description	NEXT ASSY Number
Application	

UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:

1 PLACE DIM ±1/16	2 PLACE DIM ±.02	3 PLACE DIM ±.005	ANGLES ±1°

1. DIMENSIONS ARE IN INCHES
2. DIMENSION LIMITS HELD AFTER PLATING.
3. REMOVE BURRS AND SHARP EDGES .015 MAX.
4. MACHINED FILLET RADII .0150-.030.
5. MACHINED DIAMETERS ON A COMMON CENTERLINE CONCENTRIC WITHIN .OO5
6. PERPENDICULARITY & PARALLELISM OF MACHINED SURFACES .002 PER INCH. MAX .012 INCHES FOR SINGLE SURFACE.

DO NOT SCALE DRAWING

APPROVALS	DATE
DRAWN C OKUDA	6/7/2010
ENGINEER C OKUDA	6/7/2010
CHECKED	
PROJECT NO. 900827	
PROJECT OCEAN ACIDIFICATION	
WEIGHT	

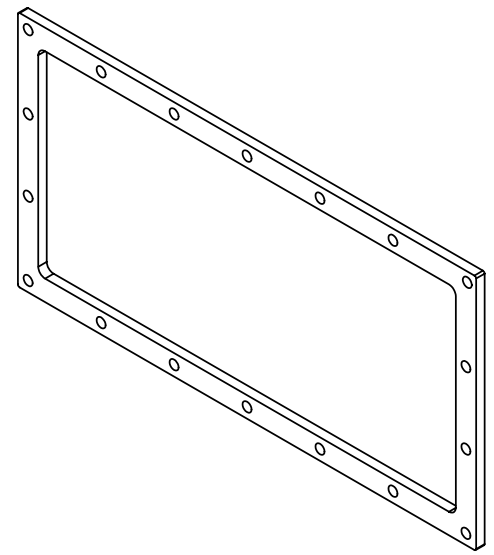
Monterey Bay Aquarium Research Institute
MBARI
7700 Sandholdt RD.
Moss Landing, CA 95039
PH: (831) 775-1700

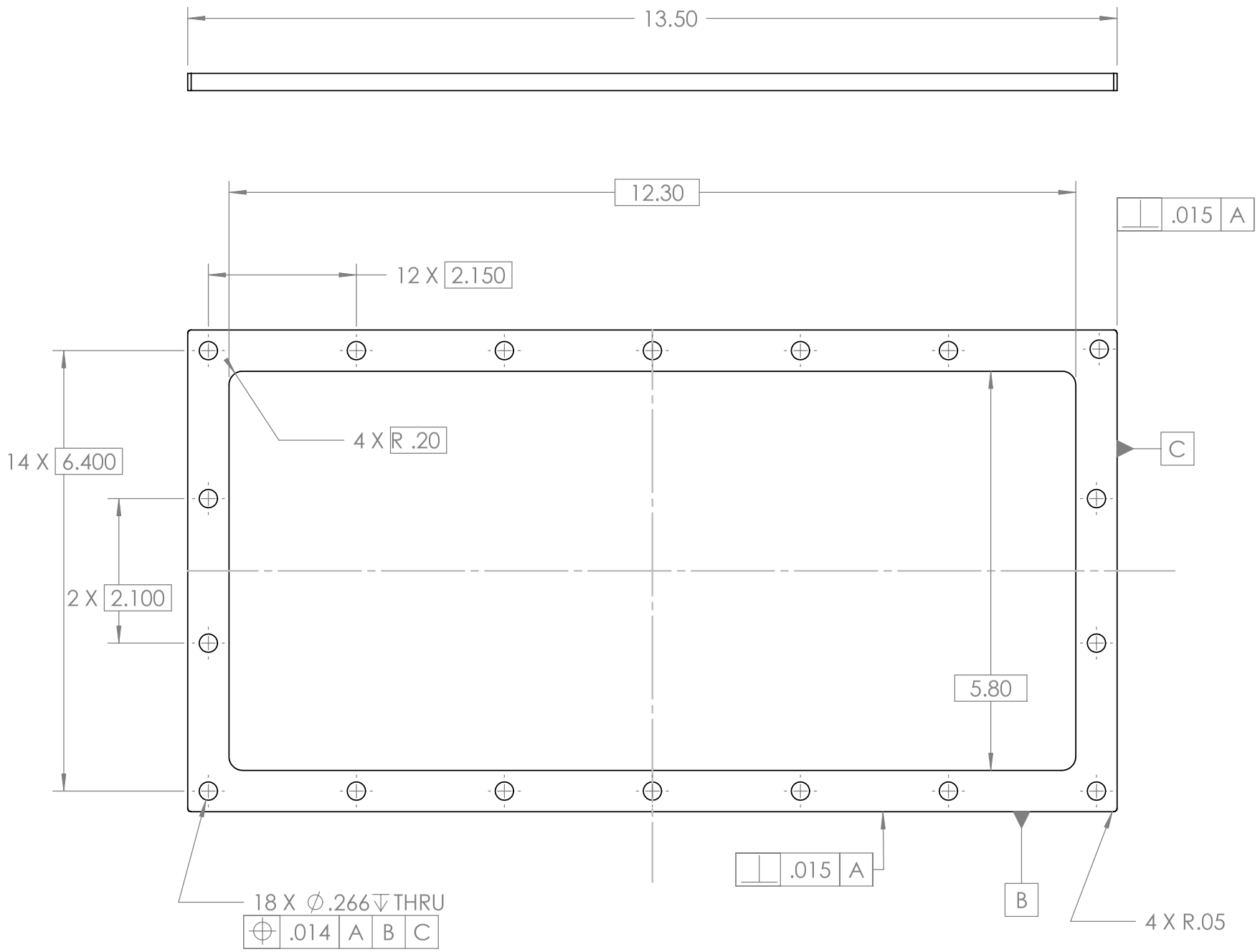
BATTERY COMP ADAPTER

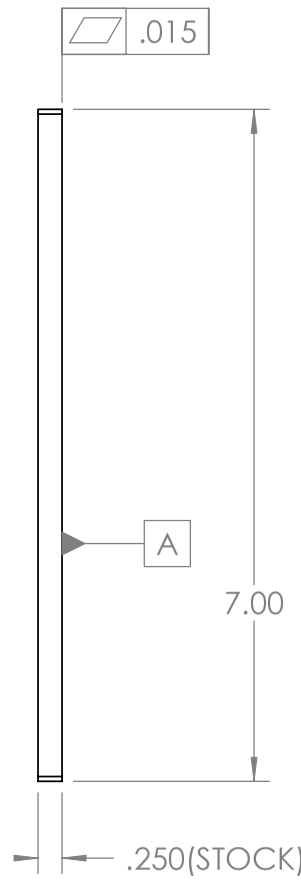
SIZE	DWG. NO.	REV.
B	10020549DWG	A

SCALE 1:4 | CAD FILE: MECH ENG ON TORNADO | SHEET 1 OF 1

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
	INITIAL RELEASE	6/7/2010	







4 EACH, 1/4 6061 T-6 ALUM

ANODIZE PER MIL 8625F TYPE-III CLASS 1 (HARD NO COLOR)

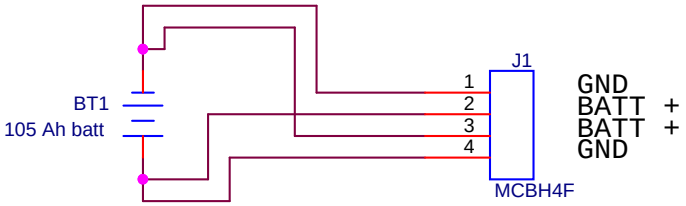
BILL OF MATERIALS

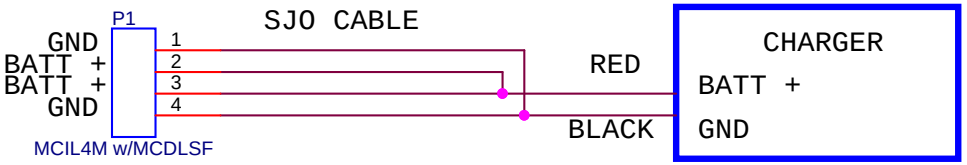
Shop / Q.C.		UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:				APPROVALS	DATE
Inspector		1 PLACE DIM ±1/16	2 PLACE DIM ±.02	3 PLACE DIM ±.005	ANGLES ±1°	DRAWN C OKUDA	6/7/2010
Shop Foreman		1. DIMENSIONS ARE IN INCHES				ENGINEER C OKUDA	6/7/2010
Engineer		2. DIMENSION LIMITS HELD AFTER PLATING.				CHECKED	
		3. REMOVE BURRS AND SHARP EDGES .015 MAX.				PROJECT NO. 900827	
NEXT ASSY Description	NEXT ASSY Number	4. MACHINED FILLET RADII .0150-.030.				PROJECT OCEAN ACIDIFICATION	
		5. MACHINED DIAMETERS ON A COMMON CENTERLINE CONCENTRIC WITHIN .005					
		6. PERPENDICULARITY & PARALLELISM OF MACHINED SURFACES .002 PER INCH, MAX .012 INCHES FOR SINGLE SURFACE.					
Application		DO NOT SCALE DRAWING				WEIGHT	

Monterey Bay Aquarium Research Institute
MBARI
7700 Sandholdt RD.
Moss Landing, CA 95039
PH: (831) 775-1700

TOP FLANGE

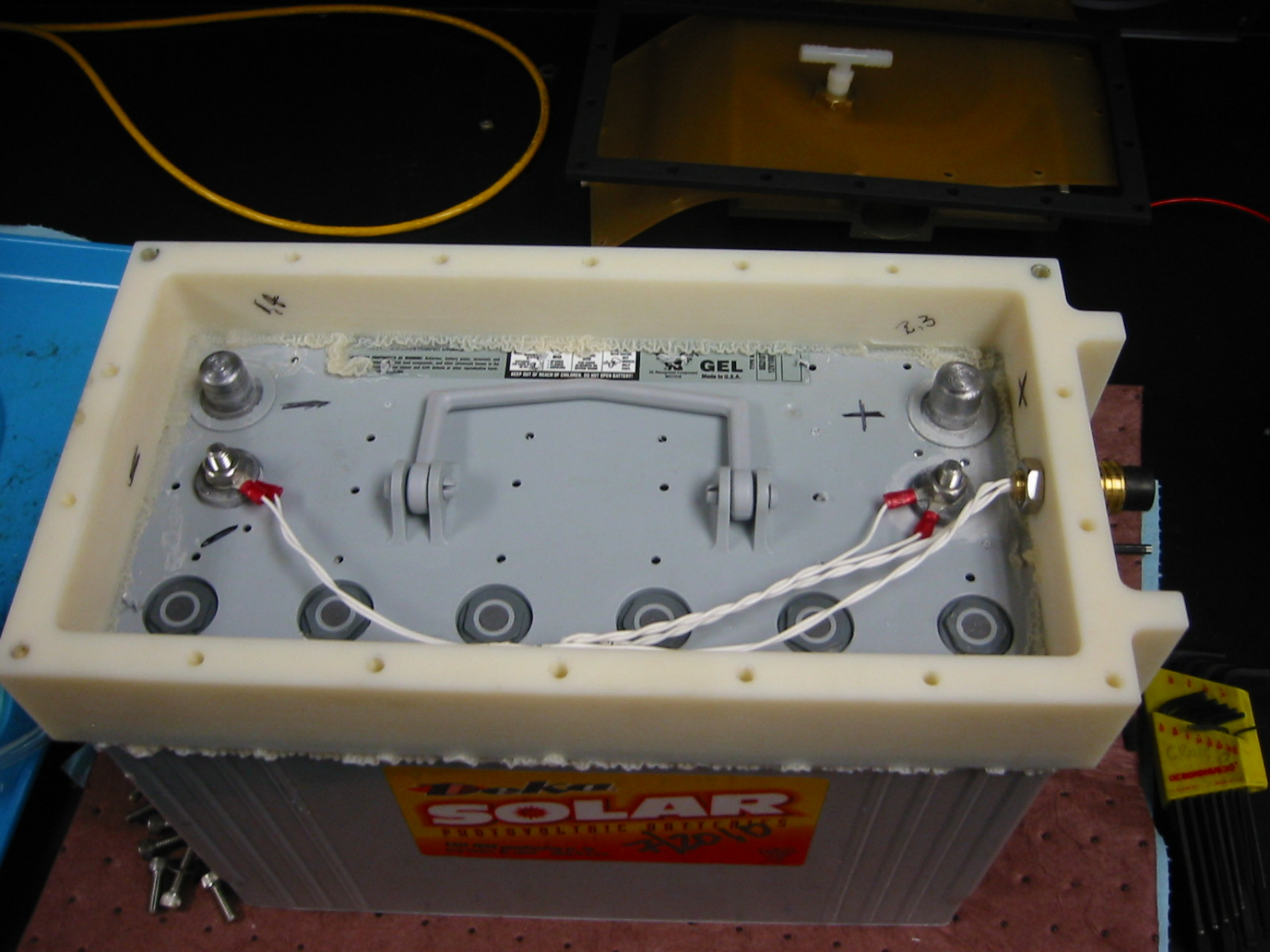
SIZE	DWG. NO.	REV.
B	10020550DWG	
SCALE 1:4	CAD FILE: MECH ENG ON TORNADO	SHEET 1 OF 1





DRAFT 5/27/2010

Title: BRS battery box wiring		
Size: A	Document Number: <Doc>	Rev: -
Date: Tuesday, January 18, 2011	Sheet 1 of 1	


GEL
Made in U.S.A.
Dakm
SOLAR