GMW

USER'S MANUAL

MODEL: 3472-50
MODEL: 3472-70

100MM ELECTROMAGNET

File No: M3472g.407 Revision Date: July, 2009

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Section 1
SPECIFICATIONS
Table 1. Model 3472-50 Specifications

Pole Diameter:	100mm (4 inch)
Pole Gap:	0 - 115mm (0 to 4.5 inch)
Standard Pole Caps:	100mm (4 inch) cylindrical 75mm (3 inch) tapered 50mm (2 inch) tapered 25mm (1 inch) tapered
Coils (series connection)	
coil resistance (20°C)	0.59 Ohm
max resistance (hot)*	0.71 Ohm
max power (air)	20A/14V(0.3kW)
max power (water)	50A/36V(1.8kW)
Self Inductance	
Water Cooling (18°C)	3 liters/m (0.8 US gpm)0.8 bar (12 psid)
Overtemperature Interlock	Elmwood 3450G thermostat part number 3450G 611-1 L50C 89/16 mounted on each coil and wired in series. Contact rating 120Vac,0.5A. Closed below 50°C.
Water Flow Interlock	Imo/Gems flow switch part number FS927 Part No.70823 mounted on outlet side of water circuit. Contact rating 0.17A/120Vac (non inductive). Set to open at a flow of less than 2.5 l/min (0.7 USgpm)
.	
Dimensions	Drawing 11801851 626mm W x 345mm D x 470mm H (24.7 inch W x 13.5 inch D x 18.5 inch H)
Weight	325 kg (715 lb)

***CAUTION - The value of maximum coil resistance given should not be exceeded. At this resistance the coils are at maximum safe temperature for continuous operation.**

Section 1
SPECIFICATIONS
Table 1. Model 3472-70 Specifications

Pole Diameter	100mm (4 inch)
Pole Gap	0 - 82mm (0 to 3.2 inch)
Standard Pole Caps	100mm (4 inch) cylindrical 75mm (3 inch) tapered 50mm (2 inch) tapered 25mm (1 inch) tapered
Coils (series connection)	
coil resistance (20°C)	0.59 Ohm
max resistance (hot)*	0.71 Ohm
max power (air)	20A/14V(0.3kW)
max power (water)	70A/50V(3.5kW)
Self Inductance	
Water Cooling (18°C)	6 liter/m (1.6 US gpm)2.0 bar (30 psid)
Overtemperature Interlock	Elmwood 3450G thermostat part number 3450G 611-1 L50C 89/16 mounted on each coil and wired in series. Contact rating 120Vac,0.5A. Closed below 50°C.
Water Flow Interlock	Imo/Gems flow switch part number FS927 Part No.70825 mounted on outlet side of water circuit. Contact rating 0.17A/120Vac (non inductive). Set to open at a flow of less than 4.5 *l*/min (1.2 USgpm).
Dimensions	Drawing 11801852 626mm W x 364mm D x 470mm H (24.7 inch W x 14.3 inch D x 18.5 inch H)
Weight	335 kg (737 lb.)

***CAUTION - The value of maximum coil resistance given should not be exceeded. At this resistance the coils are at maximum safe temperature for continuous operation.**

Section 1
SPECIFICATIONS
Table 2. Model 3472-50/3472-70 Electrical and Water Connections

DC Current (as seen from the rear refer to Drawing 11801851/2)

Right hand terminal	Negative
Left hand terminal	Positive

Ground

An M5 screw (Part 51 on drawing 11801851/2) is provided near the Interlock Terminal Block connections to enable the magnet frame to be grounded according to local safety regulations. It is normally appropriate to connect the magnet frame to the power supply ground.

Interlocks (refer to Drawing 11801851/2)

1	Water flow
2	Water flow
3	Temperature
4	Temperature
5	No connection
6	No connection
7	Signal ground
8	No connection

Water (refer to Drawing 11801851/2)

outlet	¼ inch NPT
inlet	¼ inch NPT
	(mating couplings for ¼ inch hose provided)

CAUTION - Ensure that the high current connections are tight. Loose connections may lead to oxidation and overheating. The field stability may be degraded and the current terminations damaged.

Section 2

WARNINGS

REFER TO WARNINGS BELOW BEFORE OPERATING ELECTROMAGNET

1 Personnel Safety

In operation the magnet fringing field is in excess of 0.5mT (5G). This can cause malfunctioning of heart pacemakers and other medical implants. We recommend that the fringing field should be mapped and warning signs be placed outside the 0.5mT (5G) contour. Entry to this region should be restricted to qualified personnel

2 Ferromagnetic Objects

During operation the magnet exerts strong magnetic attraction towards ferromagnetic objects in the near vicinity of its pole gap or coils. Loose objects can be accelerated to sufficient velocity to cause severe personnel injury or damage to the coils or precision pole faces if struck. Keep ferromagnetic tools clear!

3 Arcing

This magnet stores considerable energy in its field during operation. Do not disconnect any current lead while under load or the magnetic field energy will be discharged across the interruption causing hazardous arcing.

4 Coil Hot Resistance

Do not exceed the maximum coil hot resistance given in the specifications or coil overheating and possible damage may occur.

5 Interlocks

These should always be connected if the magnet is operated unattended, to avoid the possibility of coil overheating caused by excessive power dissipation or inadequate cooling.

6 Watches, Credit Cards, and Magnetic Disks

Do not move magnetically sensitive items into the close vicinity of the magnet. Even some anti-magnetic watches can be damaged when placed in close proximity to the pole gaps during operation. Credit cards, and magnetic disks are affected by magnetic fields as low as 0.5mT (5G). Depending on the previous operating field and the pole gap, the remanent field in the gap can be in excess of 5mT (50G) with the magnet power supply off or disconnected.

Section 3

INSTALLATION

Caution: This is a heavy system. All movement, lifting and installation of the 3472 Electromagnet must be under the supervision of an experienced person to prevent the possibility of serious injury or damage to the Electromagnet and associated equipment.

Unpacking Instructions and Damage Inspection

To unpack the electromagnet please use the following procedure (Refer to Drawing 18800371).

1. First remove all of the "Hex Head Screws" located at the lower edge of all the side panels of the "Crate Top Cover".
2. Gently rock the "Crate Top Cover" to work it loose from the shipping crate base.
3. Use one person on each side of the shipping crate, grip the side panels of the Crate Top Cover. Lift "Crate Top Cover" high enough to clear top of electromagnet, walk cover sideways to clear area and place on floor.
4. Inspect the magnet to ensure that no damage has occurred to the magnet in shipment. If damage is evident report the damage in detail to the shipper for claim and simultaneously notify GMW in case assessment of the damage must be made. If no damage is found proceed with magnet unpacking and installation.
5. Remove the M16 Hex Bolts that secure the magnet to the steel "shipping angle brackets".
6. Remove the hex lag bolts that secure the steel "shipping angle brackets" to shipping crate base, and remove "shipping angle brackets".
7. Install M16 lifting eye and washer to top of magnet yoke, screw down firmly.
8. The magnet is now prepared for final installation. Follow the appropriate following procedure to install to 45°, vertical, or direct mounting.

Direct Mounting

1. With suitable lifting equipment (e.g. 500kg (1100 lb.) minimum safe lifting rating), lift magnet 50mm (2") clear of shipping crate base.
2. Slide shipping crate base clear.
3. Lower magnet to 50mm (2") above floor.
4. Move magnet to final location and secure using the steel "shipping angle brackets". The brackets can be modified to suit installation space needs.

45° Mounting (Refer to Drawing 11900190)

1. With suitable lifting equipment (e.g. 500kg (1100 lb.) minimum safe lifting rating), lift magnet 50mm (2") clear of shipping crate base.
2. Slide shipping crate base clear.
3. Lower magnet to 50mm(2") above floor.
4. Move magnet to desired final location and place on 12mm (0.5") plywood sheet and wooden 100mm x 100mm (4" x 4") blocks (refer to drawing 11900190, figure 2).
5. Install 45° Mounting Brackets using M16 x 30 Hex bolts, flat and spring washers (refer to drawing 11900190, figure 2).
6. Lift magnet from top lifting eye about 50mm (2") remove 100mm x 100mm (4") wooden block located next to 45° mounting bracket (refer to drawing 11900190, figure 2).

45° Mounting (Continued)

7. Lower magnet so that it rests only on the front 100mm x 100mm (4") wooden block (refer to drawing 11900190, figure 3). The magnet is unstable in this position and must be held by lifting eyebolt or blocks under the 45° mounting brackets.
8. Install shackles and lifting sling to BOTH FRONT EYEBOLTS. Caution, keep hands and feet clear of magnet and 45° brackets during the following operation. Take weight of magnet and push the top front of the magnet rearward. The magnet weight should move over center. Lower magnet so that it rests on the 45° mounts (refer to drawing 11900190, figure 3 and 4).

Rolling or Rolling/Rotating Base Mounting (refer to Drawing 11900190)

Caution do not attempt to move magnet and rolling base or rolling/rotating base until the magnet has been firmly bolted down to the base (refer to drawing 11900190, figure 6).

1. To mount on rolling base or rolling/rotating base lift magnet from BOTH FRONT EYEBOLTS high enough to clear top of base (refer to drawing 11900190, figure 5).
2. Slide rolling base or rolling/rotating base underneath, lower magnet to 12mm (0.5") above base top surface (refer to drawing 11900190, figure 5).
3. Position rolling base or rolling/rotating base so the tapped holes in the base are aligned with the 45° mounting bracket holes (refer to drawing 11900190, figure 5). Lower the rolling base support legs until they contact the floor, to prevent the base from accidentally moving horizontally.
4. Lower magnet onto rolling base or rolling/rotating base assembly (refer to drawing 11900190, figure 5).
5. Secure magnet and 45° mounting assembly to rolling base or rolling/rotating base with M16 x 25 long Hex Head Bolts (refer to drawing 11900190, figure 6).
6. Raise the support legs and move magnet and rolling base or rolling/rotating base to desired location.
7. Screw down the four support legs located on each corner of the rolling or rolling/rotating base until the wheels clear the floor by 6mm (.25").
8. Secure the support legs with the locknut.
9. Secure rolling/rotating base to an adequate concrete floor to prevent movement and possible injury to personnel during an earthquake.

Pole Cap Selection and Installation (Refer to drawing 11801851/2)

Using the field uniformity and excitation curves determine the most desirable pole cap; cylindrical or tapered. In general:

If a uniform field is required use a cylindrical cap.
If a high field is required use a tapered cap.

Pole cap removal (refer to drawing 11801851/2)

1. Turn off the power supply
2. Draw pole caps about 20mm into the pole sleeves.
3. Loosen the axial stud nut (item 35 on drawing 11801851/2).
4. Insert the hex key wrench into the end of the draw stud (item 6 on drawing 11801851/2).
5. Remove stud (item 6 on drawing 11801851/2) while supporting the pole cap.

Section 3

INSTALLATION

Pole Cap Selection and Installation (Continued)

Pole cap fitting.
1. Ensure the pole caps, pole cores, and pole sleeves are clean and free from debris.
2. Reverse the above pole cap removal sequence.

Electrical Circuit
Never connect or remove cables from the magnet with the power supply connected. The stored energy in the magnet can cause arcing resulting in severe injury to personnel or equipment damage.

The magnet has two coils which are connected in series, (Refer to drawing 11801851/2 and Table 2 page 3.6). The power supply cables should be connected directly to the dc current terminals marked + and -. Recommended current cable for the 3472-50 is stranded copper of 16mm² cross section (4 AWG) for the 3472-70 the cable size should be increased to 25mm² cross section (3 AWG).

Because the magnet stores a significant amount of energy in its magnetic field, special care should be taken to insure that the current terminations are secure and cannot work loose in operation. Local heating at the terminations can cause rapid oxidation leading to a high contact resistance and high power dissipation at the terminals. If left unattended this can cause enough local heating to damage the terminals and the coils.

The 3472 Interlocks
The Model 3472-50 has two thermostats, Elmwood 3450G Part Number 3450G611-1 L50C 89/16. They are located on the coil cooling plate and wired in series terminating at positions 3 and 4 on the Interlock Terminal block. The sensors are normally closed, opening when the coil central cooling plate temperature exceeds 50°C +/3°C. The 3472-70 uses six thermostats, three on each coil.
The water flow switch is connected to terminals 1 and 2. The contacts are normally open, closing when the water flow exceeds approximate 2.5l/min. for the 3472-50 and 4.51/min for the 3472-70.

Cooling
The Model 3472 can be operated to an average coil temperature of 70°C. Assuming an ambient enviroment temperature of 20°C and a temperature coefficient of resistivity for copper of 0.0039/°C, the hot resistance of the coil should not exceed 20% more than the ambient temperature "cold" resistance. The coil thermostat will open when any coil cooling plate temperature exceeds approximately 50°C . Clean, cool (16°C - 20°C) water at 3 *l*/min at 0.8 bar (12 psid) should be used to cool the 3472-50 magnet, and clean, cool (16°C - 20°C) water at 6 *l*/min at 2.0 bar (30 psid) for the 3472-70.

The cooling copper tubes are electrically isolated from the coils to avoid electrochemical corrosion. A 50 micron filter should be placed before the input to the magnet to trap particulates and avoid unreliable operation of the water flow switch interlock.

Cooling (Continued)
For continuous operation of the magnet it may be appropriate to use a recirculating chiller to reduce water and drainage costs. The chiller capacity will depend on whether cooling is required for the magnet alone or magnet and power supply. For the Model 3472-50 Electromagnet alone a suitable chiller is the Bay Voltex Model: RRS-0850, for the Model 3472-70 alone use the Bay Voltex Model: RRS-1650. Use distilled or deionized water with a biocide to prevent bacterial growth and corrosion. Do not use corrosion inhibitors in high quality electrical systems since the water conductivity is increased which can result in increased leakage currents and electrochemical corrosion.

At currents of approximately 20A and below the Model 3472 can be operated safely without water cooling. However the coil temperature will vary with the power dissipation. This results in dimensional and permeability changes of the magnet yoke and air cooling is not suitable when high field stability is required.

Freon, oil, ethylene glycol or other cooling mediums can be used. The flow required will be approximately inversely proportional to their specific heats. An experimental determination of the flow and pressure required will be necessary.

Avoid cooling the magnet below the dew point of the ambient air. Condensation may cause electrical shorts and corrosion.

During operation the resistance can be checked using a voltmeter across each coil. The voltage will rise to a constant value once thermal equilibrium has been reached. If it is desired to save water, the flow can be reduced until the hot resistance is approached. NOTE: This adjustment must be made slowly enough to allow for the thermal inertia of the coils.

Section 4

OPERATION

General

The magnet operates as a conventional electromagnet.

1. Adjust the poles to the desired gap with the poles approximately symmetrical about the center magnet line. To reduce mechanical backlash when the magnetic field is applied, it is best to set the poles by increasing the gap.
2. Adjust the cooling water flow to about 3 liters/min (0.8 USgpm) for the 3472-50. For the 3472-70 set water flow to about 6 liters/min (1.6 US gpm,). For operation at less than maximum power the water flow may be correspondingly reduced. Note that the inlet water temperature will determine the actual flow rate required. The above specified flow rates were determined with a water inlet temperature of approximately 18°C.
3. Turn on the power supply and increase the current until the desired field is reached.

Calibration

The excitation curves may be used to estimate the field in the air gap to within four or five percent. More accurate field determination may be obtained by deriving experimentally a calibration curve for the particular pole and air gap combination being used. Magnetic hysteresis in the yoke and poles can cause an error of 30 to 70G (3 to 7mT) with an arbitrary application of such a calibration curve. This effect may be reduced to less than one percent by following a prescribed 'current setting schedule' designed to make the magnet 'forget' its prior magnetic history. The schedule should of course be used both in establishing the calibration curve and in its subsequent use. A possible schedule would be:

From zero current, increase to maximum current and reduce again to zero current. Increase again to maximum current and reduce to the current to give the desired field setting. Approaching the desired field from a higher setting will typically produce better field uniformity. This is because the field changes at the pole edges will normally lag the field change at the center thereby helping to compensate the radial decrease in field.

Greater precision in setting up the calibration curve will be achieved with the use of a digital gaussmeter and by making a numerical table. This table used with an interpolation routine will eliminate the error associated with reading a graph.

In any event, three points need to be remembered:

1. A calibration curve or table is only as good as the precision employed in generating it.
2. The field is defined only at the point it is measured. It will generally be different at a different point in the air gap. For example, the excitation curves refer to the field on the pole axis and at the center of the air gap (median plane).
3. The field is most directly a function of the current in the magnet coils. Voltage across the coils is not a good measure of field since the electrical resistance of the coils depends on the temperature (about 0.4% per degree celsius).

Section 4

OPERATION

Field Control Operation

The necessity to use calibration curves can be avoided by using a field controller to sense the magnetic field and provide a corresponding power supply control signal through the power supply programming inputs. Contact GMW for suitable instrumentation.

Section 5

MAINTENANCE

Periodically check that the pole adjustment mechanism is clean, properly lubricated and free of grit and dirt, which may cause binding of the mechanism. Be very careful not to damage the relatively soft pole surface since this may degrade the magnetic field uniformity in the gap.

Note that the surface treatments used provide good corrosion protection but in order to maintain the inherent mechanical precision of the magnet, heavy build-up of plating materials is deliberately avoided. As a result, high humidity or otherwise seriously corrosive atmospheres can cause corrosion. Periodically apply an appropriate corrosion protection, particularly when the magnet is stored for an extended period.

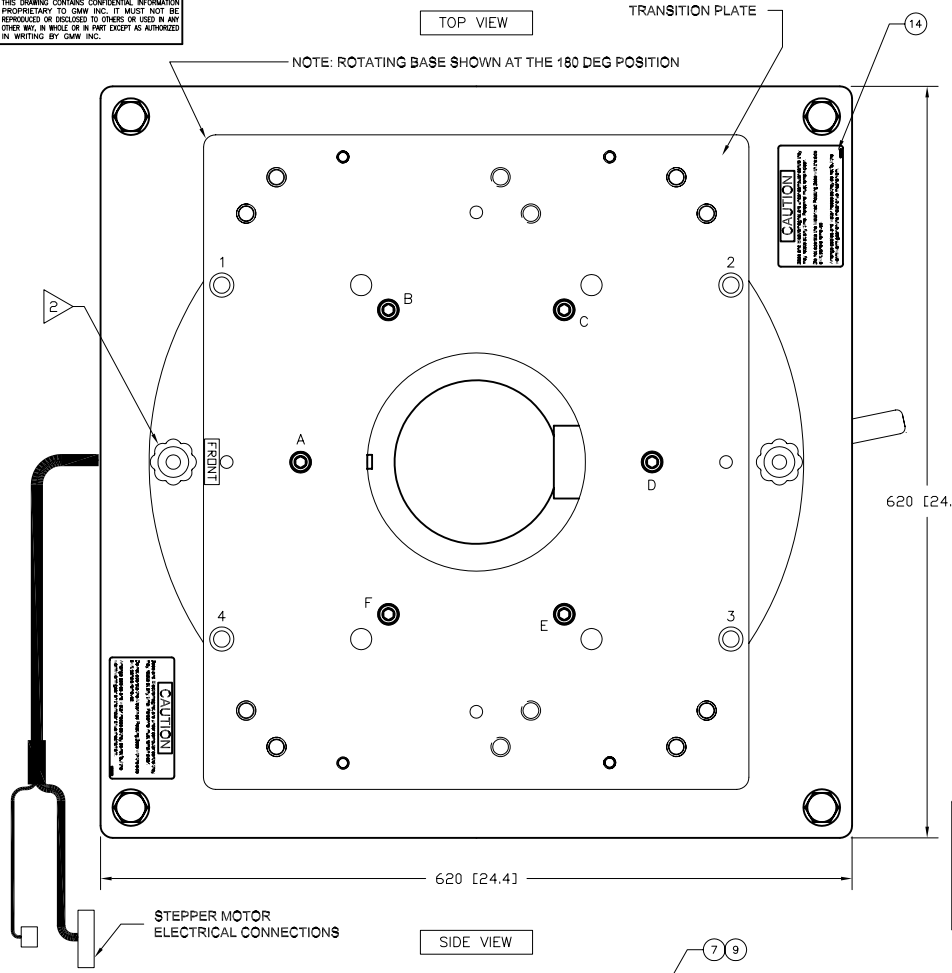
Check the cooling water circuit to ensure the water is clean and free of debris and bacterial growth. Ensure the in-line water filter is clean.

Section 6

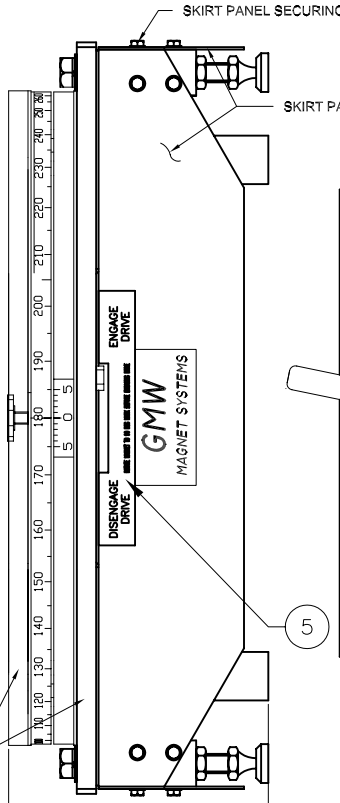
STANDARD OPTIONS

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		02/16/98	G.DOUGLAS
B	CORRECT 45° MTG HOLES LOCATION		10/20/98	G.DOUGLAS
C	CORRECT ITEM 1 PART NO, ADD ITEM 1 NOTE		04/10/08	G.DOUGLAS
D	CORRECT ITEM 5, ADD ITEM 14 & NOTE 2		21/08/08	G.DOUGLAS

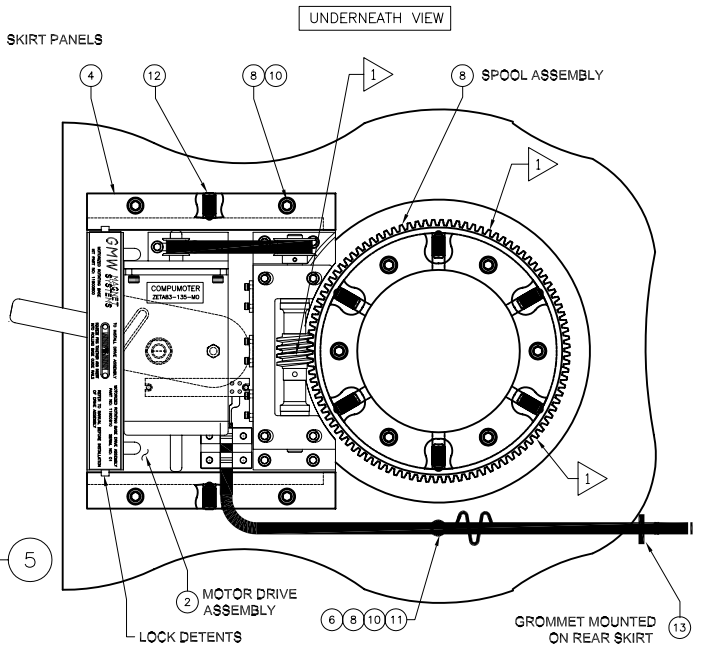
TOP VIEW



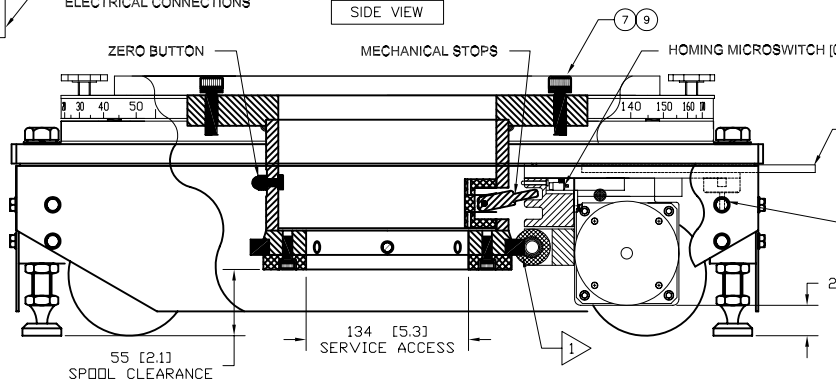
FRONT VIEW



UNDERNEATH VIEW



SIDE VIEW



1. APPLY GP or GRAPHITE GREASE TO WORM AND ALL THE TEETH ON THE WORM GEAR.
2. REMOVE ROTATION LOCKS [x2] FOR MOTORIZED OPERATION.

NOTE: ROTATING BASE SHOWN AT THE 180 DEG POSITION

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
14	2	10900180	CAUTION LABEL	
13	1		GROMMET 25MM OD X 20MM ID	
12	2	SBMH-ION	BALL PLUNGER, M10 [heavy pressure] VLIER	
11	1	DIN 433	WASHER. FLAT M8 X 1.6 S/S	
10	5	BN 792	WASHER, M8 x 1.4 RIBBED SPRING/STEEL	
9	6	BN 792	WASHER, M10 x 1.6 RIBBED SPRING/STEEL	
8	5	DIN 912	SHCS, M8 X 20 S/S	
7	6	DIN 912	SHCS M10 X 30 S/S	
6	1	17901230	CABLE SUPPORT	
5	1	10900160	DISENGAGE/ENGAGE LABEL	
4	2	17901020	MOTOR DRIVE ASSEMBLY GUIDES	
3	1	11900820	SPOOL ASSY	
2	1	11900810	MOTOR DRIVE ASSY	
1	1	11803430	ROLLING/ROTATING BASE ASSY	

PARTS LIST

DRAWN G.DOUGLAS DATE 02/16/98
CHECK DATE
ENGINEERING DATE
NEXT ASSY SYSTEM
SOFTWARE AUTOCAD 2000

DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)

	LINEAR INCHES	LINEAR mm
X.XXX	±.005	±0.03
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	63	1.6

THIRD ANGLE PROJECTION

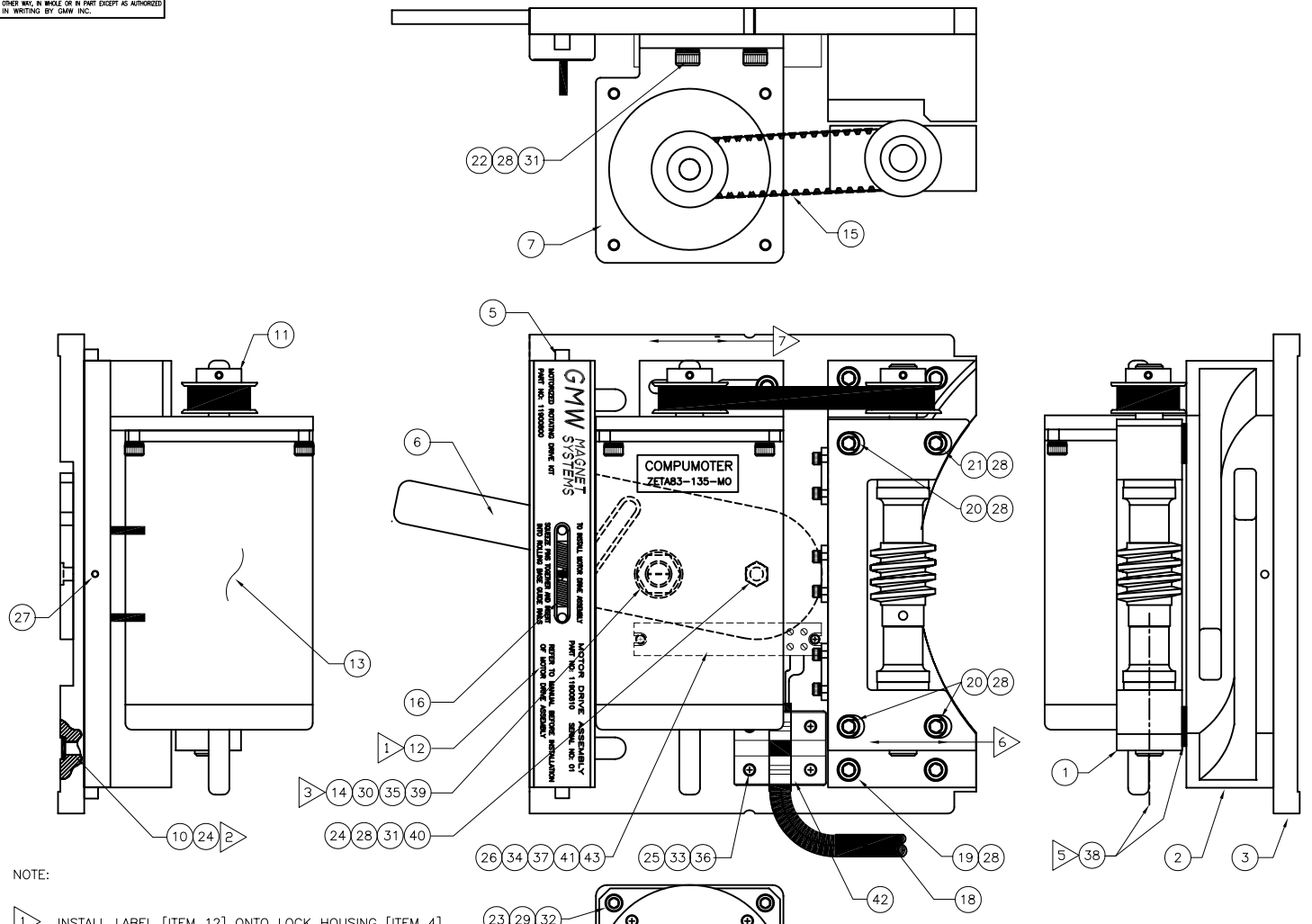
GMW
955 Industrial Rd, San Carlos, CA 94070
Tel: (650)802-8292. Fax: (650)802-8298.

TITLE
MOTORIZED ROTATING DRIVE
3473/3472/5403

SIZE A1 | DRAWING NO. 11900800 | REV D
SCALE 1:2 | WT kg | SHEET 1 OF 1

REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		02/16/98	G.DOUGLAS
B	ADD ITEMS 43,44, CHG NOTES, ITEM 13		11/29/97	G.DOUGLAS
C	CHG ITEM 11,44, ADD NOTE: 4		04/07/98	G.DOUGLAS
D	CHANGE ITEMS 11, 12, 13, 15		03/11/08	G.DOUGLAS
E	ADD ITEM 45 & NOTE 5 & 6 CHG PULLEYS VIEW		08/21/08	G.DOUGLAS



NOTE:

1. INSTALL LABEL [ITEM 12] ONTO LOCK HOUSING [ITEM 4]. THEN TRIM AROUND CUTOUT FOR RELEASE PINS.
2. APPLY LOCTITE TO THREADS ON [ITEM 24]. THEN ASSEMBLE LOCK HOUSING [ITEM 4], USING S/S SPACER [ITEM 10].
3. SCREW DOWN [ITEM 14] SO THAT [ITEM 6] IS RETAINED IN BOTH DETENTS. LOCK IN PLACE WITH [ITEM 39].
4. FIT [ITEM 44] OVER EXPOSED AREA OF [ITEM 17]
5. SHIM WASHERS USED FOR WORM CENTERLINE HEIGHT ADJUSTMENT.
6. MOVE WORM MOUNT ASSEMBLY FORWARDS/BACKWARDS FOR WORM MESHING ADJUSTMENT.
7. MOVE MOTOR MOUNT FORWARDS OR BACKWARDS TO ADJUST BELT TENSION.

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
45	1	17906300	LOCK HOUSING PLATE	
44	A/R		HEAT SHRINK SLEEVING, 4MM	
43	1	0.33uF	CAPACITOR	
42	2	OHS	PIPE SADDLE, COPPER 3/8" 10MM	
41	1	2412.6	TERMINAL BLOCK, 12 WAY WEIDMULLER	
40	1	DIN 934	NUT, M6, HEX HD B S/S	
39	1	DIN 934	NUT, M10, HEX HD S/S	
38	16	BN 748	WASHER, SHIM M6 X 18 X 0.5 S/S	
37	2	DIN 6797	WASHER, INT LOCK M3 X 0.4 S/S	
36	4	DIN 6797	WASHER, INT LOCK M4 X 0.5 S/S	
35	1	DIN 6797	WASHER, INT LOCK M10 X 0.5 S/S	
34	2	DIN 433	WASHER, FLAT M3 X 0.5 S/S	
33	4	DIN 433	WASHER, FLAT M4 X 0.5 S/S	
32	4	DIN 433	WASHER, FLAT M5 X 1.0 S/S	
31	3	DIN 433	WASHER, FLAT M6 X 1.6 S/S	
30	1	DIN 433	WASHER, FLAT M10 X 1.6 S/S	
29	4	BN 792	WASHER, M5 X 1.1, RIBBED SPRING/STEEL	
28	11	BN 792	WASHER, M6 X 1.2, RIBBED SPRING/STEEL	
27	1	DIN 916 A2	SHSC M3 X 16 S/S	
26	2	DIN 7985A	SCREW, PAN HD M3 X 16 S/S	
25	4	DIN 7985A	SCREW, PAN HD M4 X 16 S/S	
24	5	BN 1206	SHCS, M6 X 16, LOW PROFILE HD #1415670	
23	4	DIN 912	SHCS M5 X 12 S/S	
22	2	DIN 912	SHCS M6 X 16 S/S	
21	1	DIN 912	SHCS, M6 X 30 S/S	
20	3	DIN 912	SHCS, M6 X 35 S/S	
19	4	DIN 912	SHCS, M6 X 45 S/S	
18	6M	8778	CABLE, 6 SHIELDED PAIRS, 22 AWG, BELDEN	
17	2	DIN 1481	SPRING PIN, M4 X 26L	
16	1	IHI	SPRING, COMPRESSION, 6MM DIA X 50L	
15	1	TB20EF6-55	BELT, TIMING, BERG 11" [280MM]	
14	1	SBMH-10N	BALL PLUNGER, M10 [heavy pressure] VLIER	
13	1	ES33B-DFR10	MOTOR, STEPPER, ZETA, COMPUMOTER	
12	1	109000150	LABEL, SPECIFICATION	
11	1	TP20A6W6-18	PULLEY, TIMING BELT 18 TEETH BERG	
10	5	17901202	SPACER, 9mm LONG S/S	
9	1	17901201	SPACER, 4mm LONG S/S	
8	1	17901180	SPACER, CABLE CLAMP	
7	1	17901060	MOTOR MOUNT	
6	1	17901051	DISENGAGE LEVER [For Model 3473 base]	
5	2	17901040	LOCK BAR	
4	1	17901030	LOCK HOUSING	
3	1	17901010	BASE PLATE	
2	1	11900840	STOP BLOCK ASSEMBLY	
1	1	11900850	WORM MOUNT ASSEMBLY	

PARTS LIST

DRAWN	G.DOUGLAS
DATE	05/04/97
CHECK	
DATE	
ENGINEERING	
DATE	
11900800	5403
11900800	3472
11900800	3473
NEXT ASSY	SYSTEM
SOFTWARE	AUTOCAD 2000

DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)

	LINEAR INCHES	LINEAR mm
X.XXX	±.005	±0.03
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	63	1.6

THIRD ANGLE PROJECTION

GMW
955 Industrial Rd, San Carlos, CA 94070
Tel: (650)802-8292. Fax: (650)802-8298.

TITLE: MOTORIZED ROTATING DRIVE MOTOR DRIVE ASSEMBLY 3473

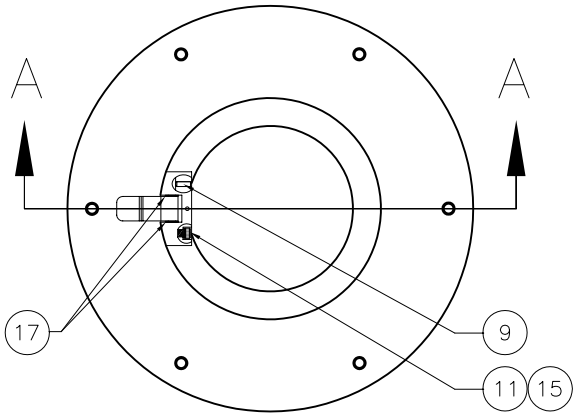
SIZE	DRAWING NO.	REV
A1	11900810	E

SCALE 1:1 | WT kg | SHEET 1 OF 1

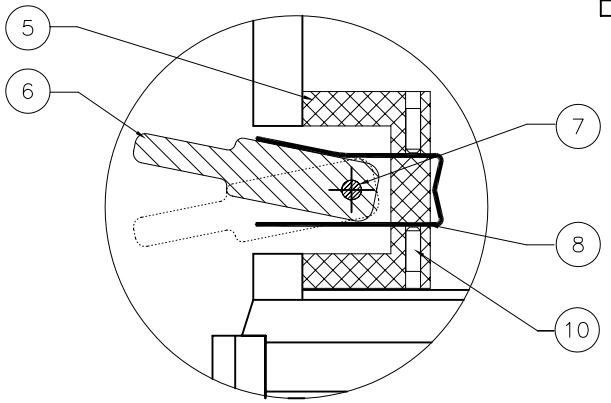
REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		07/07/97	G.DOUGLAS
B	ADD ITEM 17&18, MOD SPRING SHAPE		11/25/97	G.DOUGLAS
C	CHG ITEM 17, ADD ASSEMBLY NOTE		04/12/08	G.DOUGLAS

TOP VIEW

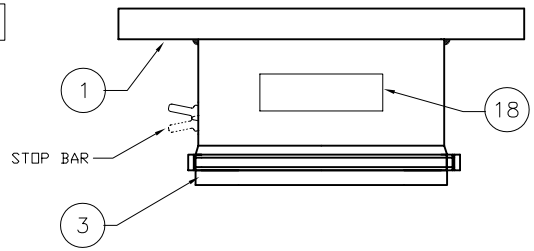


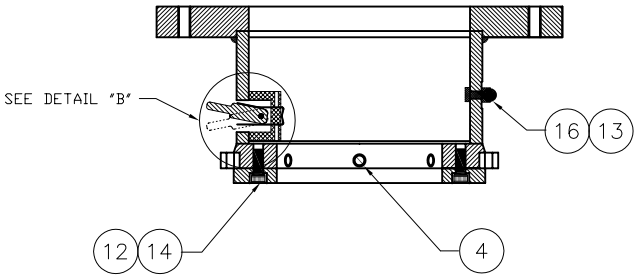
SCALE 4:1



DETAIL "B"

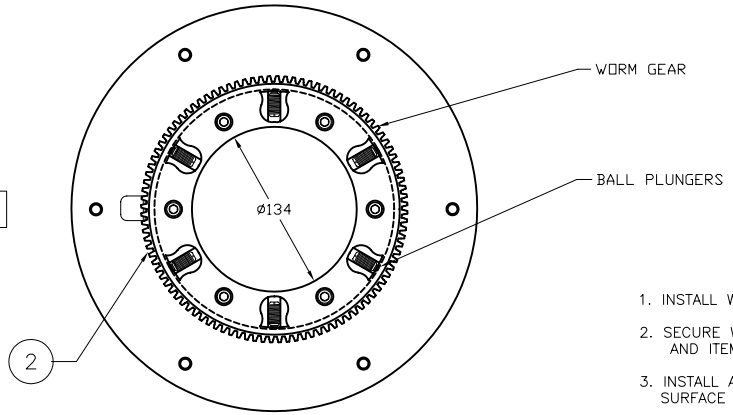
SIDE VIEW





SECTION A–A

BOTTOM VIEW



ASSEMBLY NOTES

1. INSTALL WORM GEAR [ITEM 2] ONTO SPOOL [ITEM 1].
2. SECURE WORM GEAR IN PLACE WITH SPOOL CLAMP RING ITEM 3 AND ITEM 12 & 14.
3. INSTALL AND TIGHTEN BALL PLUNGERS ITEM 4 AGAINST REAR SURFACE OR WORM GEAR ITEM 2 TO PREVENT WORM GEAR ROTATING.

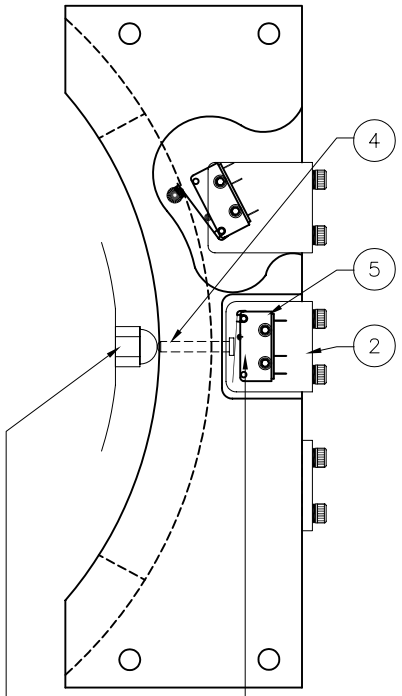
ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
18	1	10900170	LABEL, SPOOL IDENTIFICATION	
17	2	DIN 137	WASHER, CURVED 6 x 11x 0.5 S/S	
16	1	DIN 1587	NUT, HEX DOMED M6 X 12 S/S	
15	4	BN 792	WASHER, LOCK M6 X 1.2	
14	6	BN 792	WASHER, LOCK M8 X 1.4	
13	1	BN80	BOLT, M6 X 16 HEX NYLON	
12	6	DIN 912	SHCS M8 X 16 S/S	
11	4	DIN 912	SHCS M6 X 25 S/S	
10	2	DIN 913 A2	SHSS M3 X 10 S/S	
9	2	DIN 913 A2	SHSS M4 X 12 S/S	
8	A/R	1.0mm	PIANO WIRE S/S	
7	1	DIN 6325	DOWEL PIN, M6 X 60	
6	1	17901090	STOP BAR	
5	1	17901100	STOP BAR GUIDE	
4	6	SBMH-10N	BALL PLUNGER, VLIER S/S	
3	1	17901130	SPOOL CLAMP RING	
2	1	12900020	WORM GEAR, BRONZE	
1	1	11900830	SPOOL WELDED ASSY	

PARTS LIST

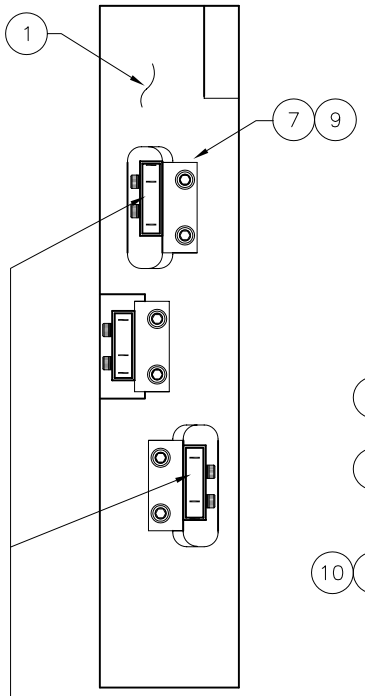
DRAWN G.DOUGLAS	DATE 04/27/97	DO NOT SCALE FROM DRAWING	GMW
CHECK	DATE	DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)	955 Industrial Rd, San Carlos, CA 94070
ENGINEERING	DATE	LINEAR: INCHES / mm; X.XXX ±.005 / ±0.03; X.XX ±.01 / ±0.1; X.X ±.03 / ±0.3; X ±.06 / ±1; DEG. ±.5 / ±0.5; FINISH 63 / 1.6	Tel: (650)802-8292. Fax: (650)802-8298.
			TITLE: MOTORIZED.ROT.DRIVE SPOOL ASSEMBLY
1190080003472/3/4			SIZE A1 · DRAWING NO. 11900820 · REV C
NEXT ASSY	SYSTEM	THIRD ANGLE PROJECTION	
SOFTWARE AUTOCAD 2000			SCALE 1:2 · WT kg · SHEET 1 OF 1

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		07/07/97	G.DOUGLAS
B	UPDATE VIEW OF MICROSWITCH CUTOUTS		03/10/08	G.DOUGLAS

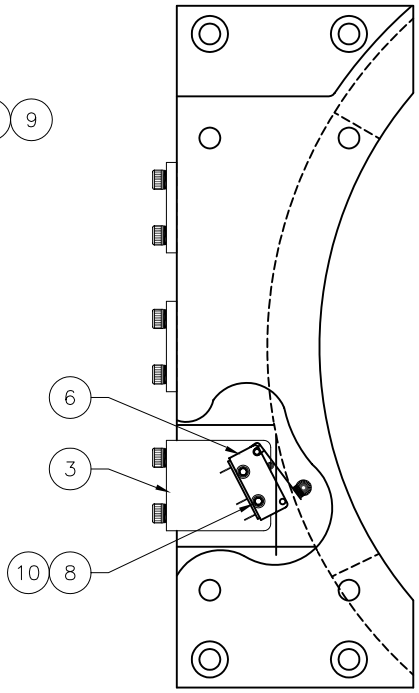
BOTTOM VIEW



REAR VIEW



TOP VIEW



MAXIMUM TRAVEL LIMIT MICROSWITCHES. NC CONTACT.
MICROSWITCH OPENS WHEN MAX TRAVEL POSITION IS REACHED.

HOMING MICROSWITCH NO CONTACT. MICROSWITCH CLOSES
CONTACT WHEN HOMING POSITION 0.0 DEG IS REACHED.

ZERO BUTTON (HOMING POSITION 0.0 DEG) MOUNTED ON SPOOL ASSEMBLY
SEE DWG NO: 119000820 FOR MORE DETAILS.

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
10	6	BN 752	WASHER, LOCK SP/S M2 X 0.5 SP/S	
9	6	BN 792	WASHER, LOCK SP/S M3 X 0.9 SP/S	
8	6	DIN 912	BOLT, SHCS M2 X 10 S/S	
7	6	DIN 912	BOLT, SHCS M3 X 10 S/S	
6	2	V4NT7	MICROSWITCH, BURGESS	
5	1	V4NT9	MICROSWITCH, BURGESS	
4	1	17901170	SHAFT, ZERO MICROSWITCH	
3	2	17901160	BRACKET, LIMIT MICROSWITCH	
2	1	17901150	BRACKET, ZERO MICROSWITCH	
1	1	17901070	STOP BLOCK	

PARTS LIST

DRAWN G.DOUGLAS	DATE 05/02/97	
CHECK	DATE	
ENGINEERING	DATE	
11900810		
NEXT ASSY	SYSTEM	
SOFTWARE AUTOCAD 2000		

DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)

	INCHES	mm
LINEAR		
X.XXX	±.005	±0.03
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	63	1.6

THIRD ANGLE PROJECTION

GMW
955 Industrial Rd, San Carlos, CA 94070
Tel: (650)802-8292. Fax: (650)802-8298.

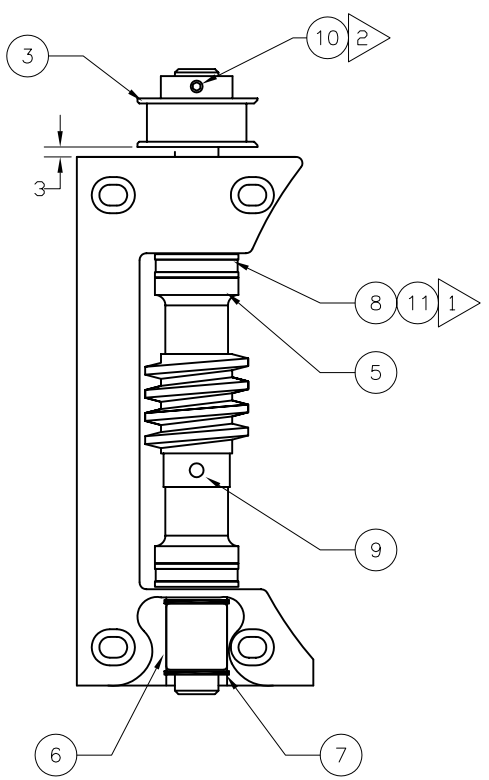
TITLE
MOTORIZED.ROT.DRIVE
STOP BLOCK ASSY

SIZE	DRAWING NO.	REV
A2	11900840	B

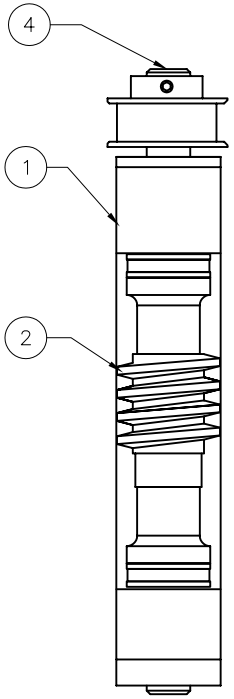
SCALE 1:1 | WT kg | SHEET 1 OF 1

REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		07/07/97	G.DOUGLAS
B	ADD ITEM 11 AND NOTE: 1, CHG ITEM 3		11/27/97	G.DOUGLAS
C	CHG ITEM 3		04/08/98	G.DOUGLAS
D	CHANGE ITEM 3,7,8		03/07/08	G.DOUGLAS
E	CHANGE ITEM 10 & PULLEY/BEARING VIEW, ADD NOTE	2	08/21/08	G.DOUGLAS



TOP VIEW



FRONT VIEW

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
11	A/R	BN 748	SHIM WASHER, 14 X 26 X 0.1MM THICK	
10	1		SETSCREW 8-32 x 1/4" UNC	
9	1	DIN 1481	PIN, SPRING M4 X 18L, SP/S	
8	2	B5-6-SS	BEARING, THRUST 0.5" SHAFT, BERG	
7	4	Q9-71	BEARING RETAINING RING, BERG	
6	2	S99NH2-BN1624	BEARING, NEEDLE ROLLER, SDP	
5	2	17901190	SPACER, WORM	
4	1	12900060	WORM SHAFT	
3	1	TP20A8W6-18	PULLEY, 18 TEETH [for 0.5" shaft] BERG	
2	1	12900030	WORM	
1	1	17901080	WORM MOUNT	

PARTS LIST

NOTE:

1. USE ITEM 11 TO PACK WORM DRIVE ASSEMBLY TO REDUCE SHAFT AXIAL MOVEMENT TO MINIMUM POSSIBLE. SHAFT MUST ROTATE FREELY.

2. ENSURE SETSCREW FITS ONTO SHAFT FLAT SURFACE.

DRAWN	G.DOUGLAS	DATE 05/03/97
CHECK		DATE
ENGINEERING		DATE
11800810		
NEXT ASSY	SYSTEM	
SOFTWARE	AUTOCAD 2000	

DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)

	LINEAR INCHES	mm
X.XXX	±.005	±0.03
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	63	1.6

THIRD ANGLE PROJECTION

GMW
955 Industrial Rd, San Carlos, CA 94070
Tel: (650)802-8292. Fax: (650)802-8298.

TITLE
MOTORIZED.ROT.DRIVE
WORM MOUNT ASSY

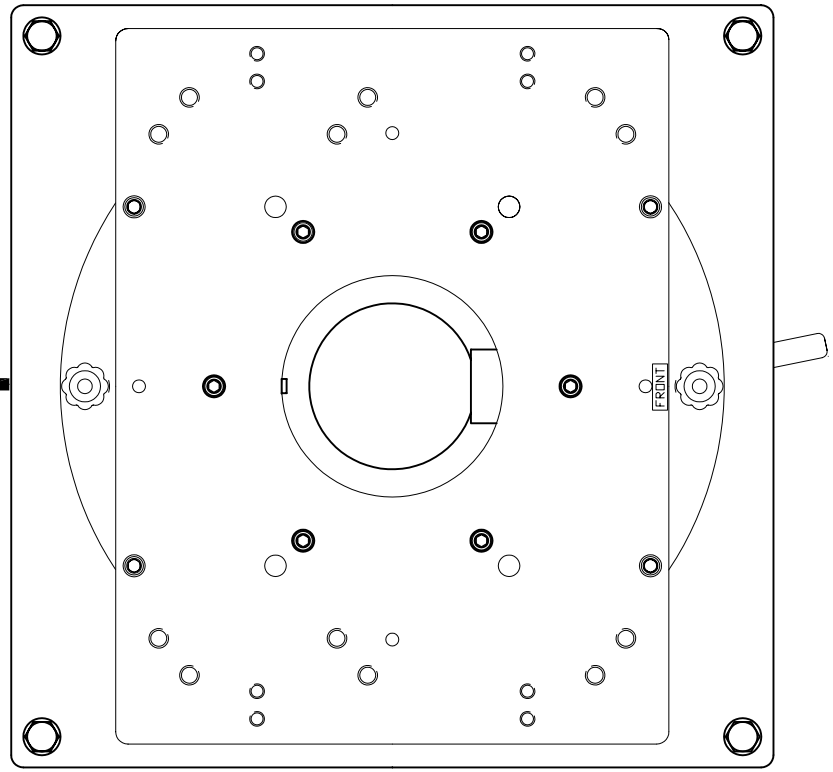
SIZE	DRAWING NO.	REV
A2	11900850	E

SCALE 1:1 | WT kg | SHEET 1 OF 1

REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		02/17/98	G.DOUGLAS
B	INCR SIZE OF TRANSISTION PLATE, ADD 5403EG MTG HOLES		07/02/03	G.DOUGLAS

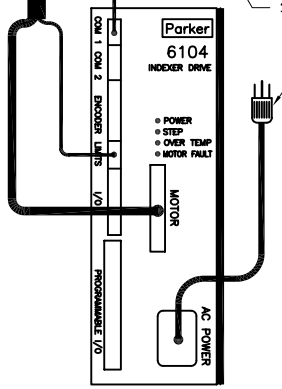
TOP VIEW



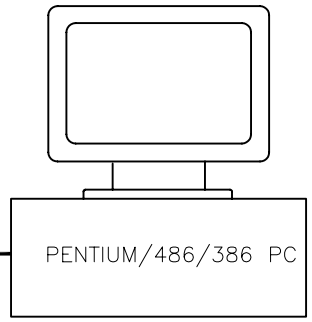
MOTOR AND LIMIT SWITCH CABLE PART NO 16900400

SERIAL COMMUNICATIONS CABLE PART NO 16900410

AC POWER INPUT



STEPPER MOTOR CONTROLLER



CONTROL COMPUTER

NOTE

1. THIS DRAWING SHOWS 3473/3472/5201 SYSTEM. WIRING IDENTICAL FOR 3474 SYSTEM.
2. SEE DRAWING NO: 13900350 FOR DETAILED ELECTRICAL WIRING.
3. MICROSWITCHES FUNCTIONS
   HOMING: ROTATES DRIVE TO 0.0 DEG POSITION
   LIMITS: STOPS ROTATION AT +/−200 DEG POSITION.
   MICROSWITCHES MOUNTED ON STOP BLOCK ASSEMBLY SEE DWG NO: 11900840 FOR DETAILS.

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE

PARTS LIST

DRAWN G.DOUGLAS	DATE 02/17/98	DO NOT SCALE FROM DRAWING (UNLESS OTHERWISE SPECIFIED)	GMW 955 Industrial Rd, San Carlos, CA 94070 Tel: (650)802-8292. Fax: (650)802-8298.
CHECK	DATE		
ENGINEERING	DATE		TITLE MOTORIZED.ROT.DRIVE ELECTRICAL ASSY
NEXT ASSY	SYSTEM	THIRD ANGLE PROJECTION	SIZE A1 · DRAWING NO. 11901020 · REV B
SOFTWARE AUTOCAD 2000			SCALE 1:2 · WT kg · SHEET 1 OF 1

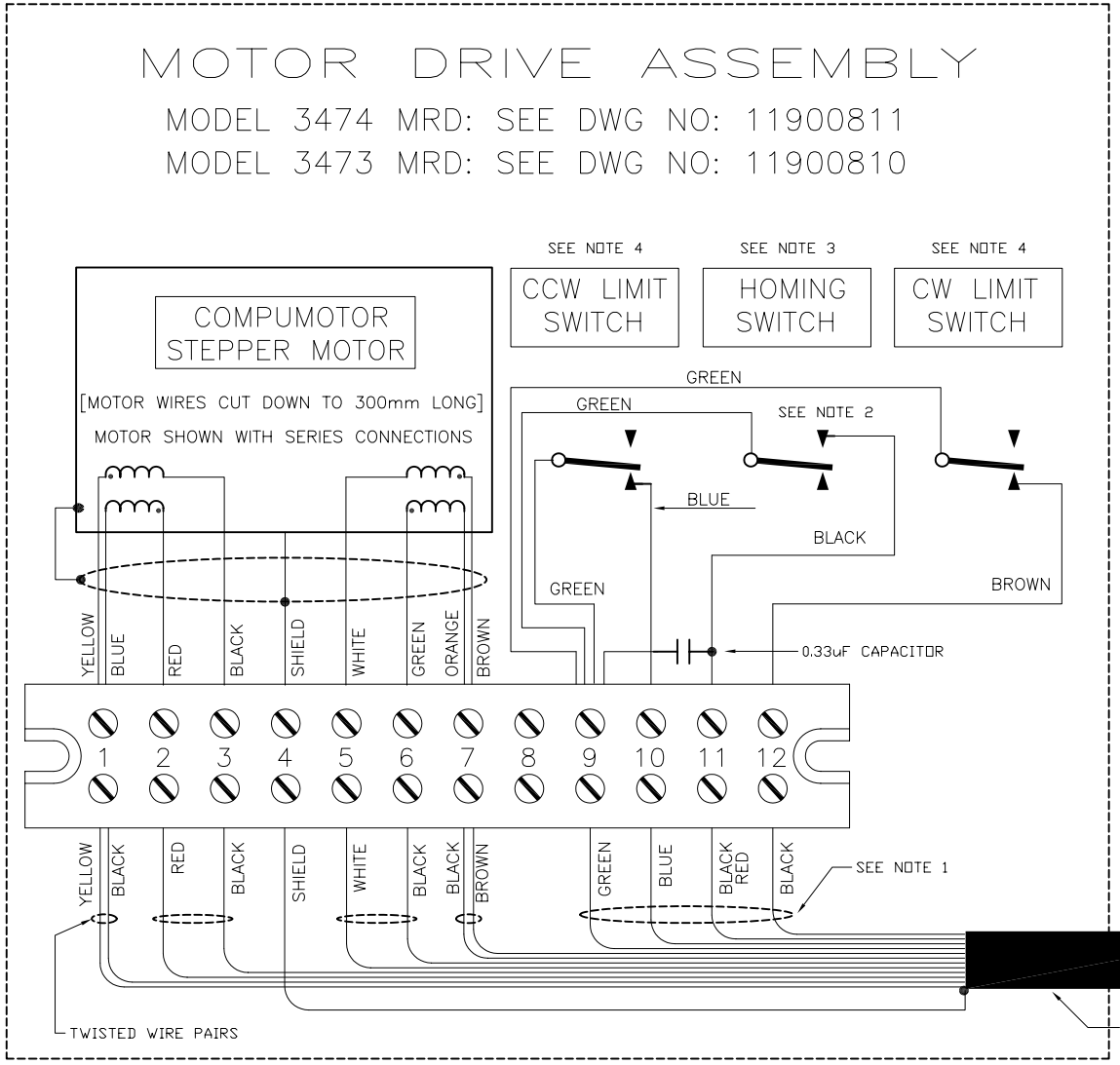
LINEAR	INCHES	mm
X.XXX	±.005	±0.03
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	√63	1.6√

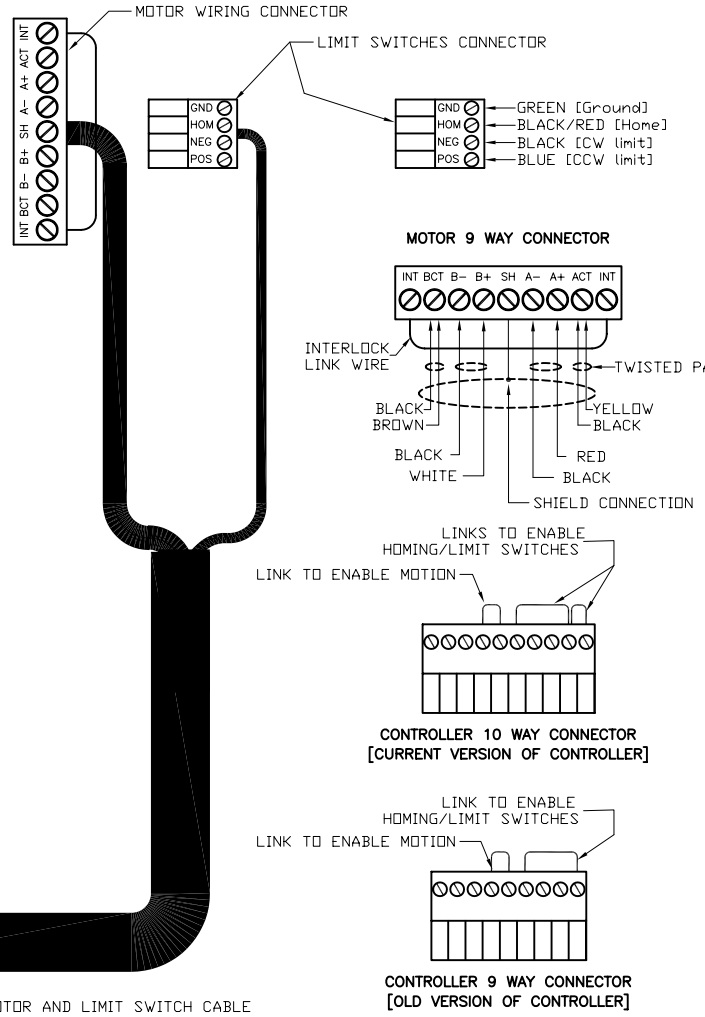
REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		02/13/98	G.DOUGLAS
B	ADD CONTROLLER CONNECTOR LINKING		10/12/01	G.DOUGLAS
C	ADD MOTOR & LIMIT SWITCH CONNECTIONS		06/18/08	G.DOUGLAS

MOTOR DRIVE ASSEMBLY

MODEL 3474 MRD: SEE DWG NO: 11900811
MODEL 3473 MRD: SEE DWG NO: 11900810





NOTE:
1 USE BLACK WIRES FROM GREEN AND WHITE PAIRS. DO NOT MIX WITH BLACK WIRES USED FOR STEPPER MOTOR.
2. HOMING SWITCH USES NORMALLY OPEN CONTACT. CCW/CW LIMIT SWITCHES USE NORMALLY CLOSED CONTACTS.
3. WHEN HOMING COMMAND IS GIVEN ROTATING BASE RETURNS TO ZERO DEG POSITION AND STOPS.
4. ROTATION DIRECTIONS CCW AND CW REFERENCED TO ROTATING BASE VIEWED FROM TOP SURFACE LOOKING DOWNWARDS.

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
		PARTS LIST		

DRAWN G.DOUGLAS 02/13/98
CHECK
ENGINEERING
DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)

	LINEAR	INCHES	mm
	X.XXX	±.005	±0.03
	X.XX	±.02	±0.1
	X.X	±.03	±0.3
	X	±.06	±1
	DEG.	±.5	±0.5
	FINISH	63	1.6

11900800	5201
11900800	3473
11900801	3474
NEXT ASSY	SYSTEM

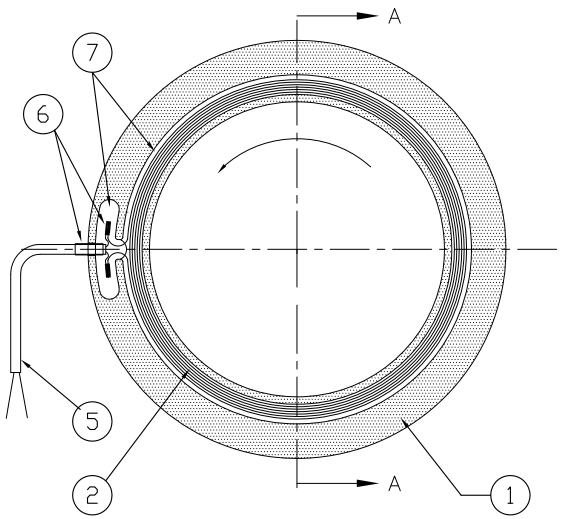
SOFTWARE AUTOCAD 2000
THIRD ANGLE PROJECTION

GMW
955 Industrial Rd San Carlos, CA 94070
Tel: (650)802-8292. Fax: (650)802-8298.

TITLE: MOTORIZED.ROT.DRIVE ELECTRICAL WIRING
SIZE A1 | DRAWING NO. 13900350 | REV C
SCALE 2:1 | WT kg | SHEET 1 OF 1

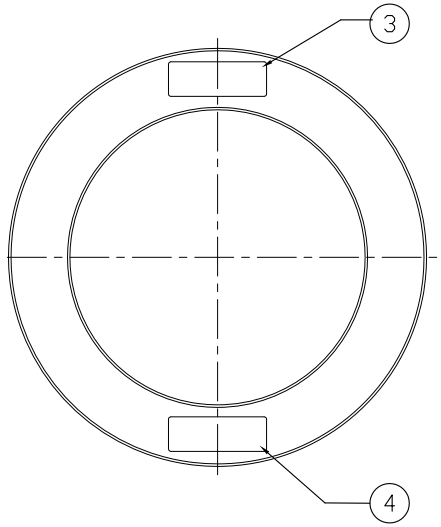
REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		12/13/94	G.DOUGLAS

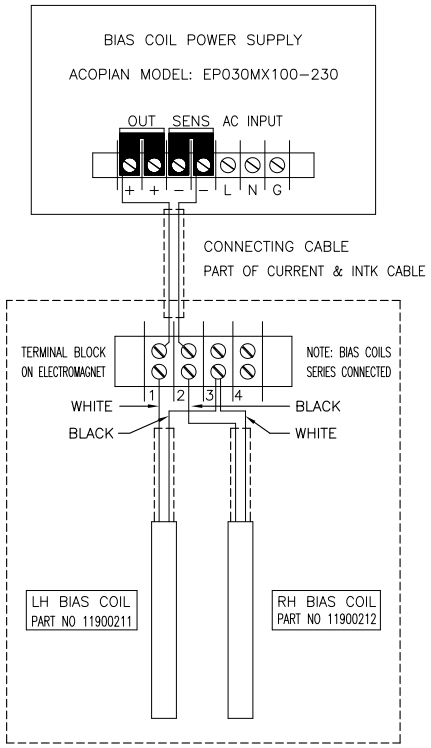
REAR VIEW



SECTION VIEW A–A

FRONT VIEW





ASSEMBLY NOTES

1. ENSURE COIL WINDING IS FITTED TO SPOOL WITH WINDING DIRECTION AS SHOWN.
2. CONNECT START OF WINDING TO WHITE WIRE OF INPUT CABLE.
3. CONNECT FINISH OF WINDING TO BLACK WIRE OR INPUT CABLE.
4. HEATSHRINK INPUT CABLE & WINDING TERMINATIONS AS SHOWN.
5. TEST COMPLETED ASSEMBLY AT FULL POWER BEFORE POTTING.
6. POT COMPLETE ASSEMBLY AFTER PASSING FULL POWER TEST

SPECIFICATIONS

COIL RESISTANCE @ 20°C 12.4 OHMS [series connected]
SPOOL ID: 120mm [4.72"]
SPOOL OD: 170mm [6.72"]
SPOOL WIDTH: 6mm [0.24"]
FIELD @ MAX POWER: 150 GAUSS.
MAX CURRENT: 1.0 AMPS.
MAX VOLTS: 50 VOLTS

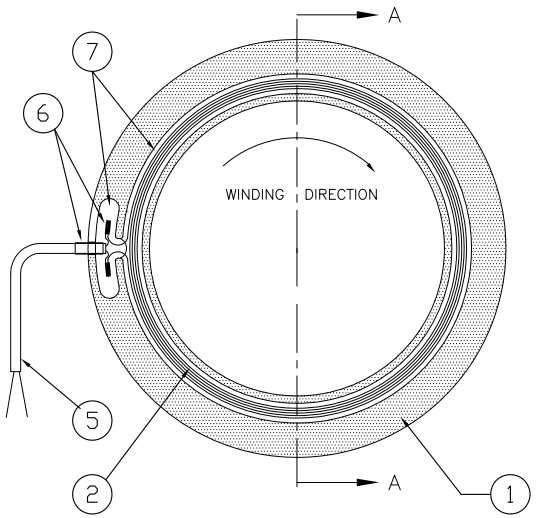
ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
7	A/R		POTTING COMPOUND	
6	A/R		HEATSHRINK SLEEVING 5mm	
5	1m	5610B2401	CABLE, ALPHA 2 CORE, BLACK PVC	
4	1	14900012	LABEL, SPECIFICATIONS [LH SIDE]	
3	1	14900011	LABEL, MODEL & SERIAL NO.	
2	1	17900270	WINDING [100 turns 26AWG magnet wire	
1	1	17900269	SPOOL	

PARTS LIST

DRAWN G.DOUGLAS	DATE 12/13/94	DO NOT SCALE FROM DRAWING DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)	GMW P.O. Box 2578, Redwood City, CA 94064 Tel: (415)802-8292. Fax: (415)802-8298.
CHECK	DATE		
ENGINEERING	DATE		
		LINEAR: INCHES ±.005, mm ±0.03; X.XX ±.01, ±0.1; X.X ±.03, ±0.3; X ±.06, ±1; DEG. ±.5, ±0.5; FINISH 63, 1.6	TITLE: LH BIAS COIL ASSY MODEL: 5483
	3472	THIRD ANGLE PROJECTION	SIZE A1 · DRAWING NO. 11900211 · REV A
NEXT ASSY	SYSTEM		SCALE 1:1 · WT kg · SHEET 1 OF 1
SOFTWARE: AUTOCAD 12			

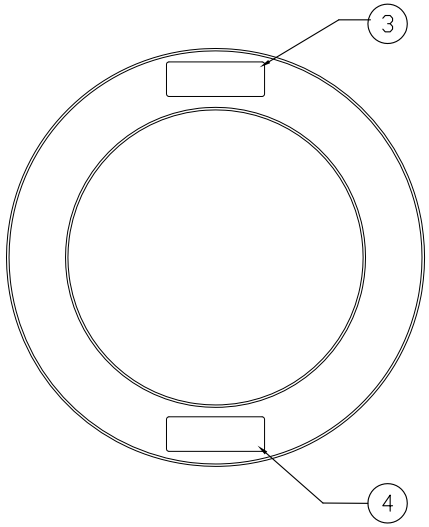
REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		12/13/94	G.DOUGLAS

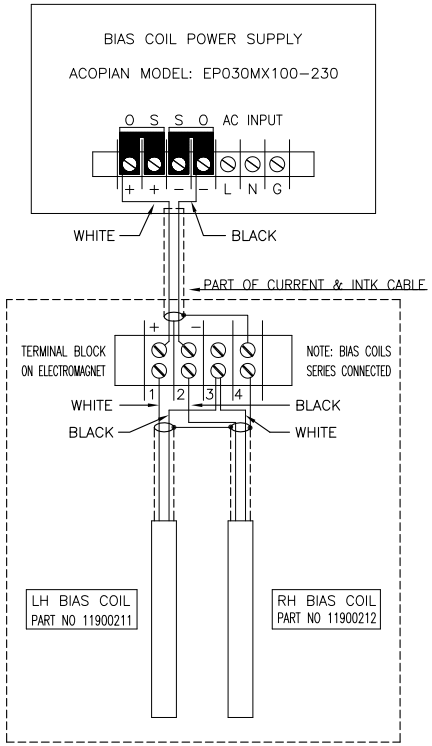
REAR VIEW



SECTION VIEW A–A

FRONT VIEW





ASSEMBLY NOTES

1. ENSURE COIL WINDING IS FITTED TO SPOOL WITH WINDING DIRECTION AS SHOWN.
2. CONNECT START OF WINDING TO WHITE WIRE OF INPUT CABLE.
3. CONNECT FINISH OF WINDING TO BLACK WIRE OR INPUT CABLE.
4. HEATSHRINK INPUT CABLE & WINDING TERMINATIONS AS SHOWN.
5. TEST COMPLETED ASSEMBLY AT FULL POWER BEFORE POTTING.
6. POT COMPLETE ASSEMBLY AFTER PASSING FULL POWER TEST

SPECIFICATIONS

COIL RESISTANCE @ 20°C 12.4 OHMS [series connected]
SPOOL ID: 120mm [4.72"]
SPOOL OD: 170mm [6.72"]
SPOOL WIDTH: 6mm [0.24"]
FIELD @ MAX POWER: 150 GAUSS.
[INSTALLED ON THE MODEL: 3472 WITH 15mm GAP]
MAX CURRENT: 1.0 AMPS.
MAX VOLTS: 50 VOLTS

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
7	A/R	521	POTTING COMPOUND, EVERCOAT	
6	A/R		HEATSHRINK SLEEVING 5mm	
5	1m	5610B2401	CABLE, ALPHA 2 CORE, BLACK PVC	
4	1	14900003	LABEL, SPECIFICATIONS [RH SIDE]	
3	1	14900001	LABEL, MODEL & SERIAL NO.	
2	1	17900270	WINDING [100 turns 26AWG magnet wire]	
1	1	17900250	SPOOL	

PARTS LIST

DRAWN	G.DOUGLAS 12/13/94
CHECK	DATE
ENGINEERING	DATE
	3472
NEXT ASSY	SYSTEM
SOFTWARE:	AUTOCAD 12

DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)

LINEAR	INCHES	mm
X.XXX	±.005	±0.03
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	63	1.6

THIRD ANGLE PROJECTION

GMW
P.O. Box 2578, Redwood City, CA 94064
Tel: (415)802-8292. Fax: (415)802-8298.

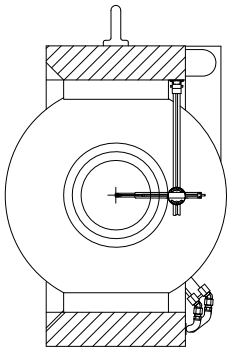
TITLE
RH BIAS COIL ASSY
MODEL: 5483

SIZE	DRAWING NO.	REV
A1	11900212	A

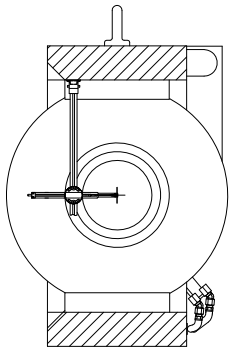
SCALE 1:1 | WT kg | SHEET 1 OF 1

REVISIONS

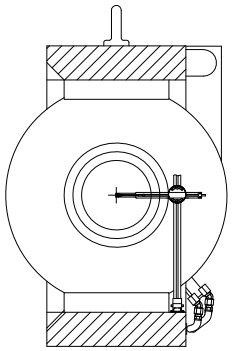
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		09/11/98	G.DOUGLAS
B	ADD 5451 TO SELECTION TABLE		10/07/03	G.DOUGLAS



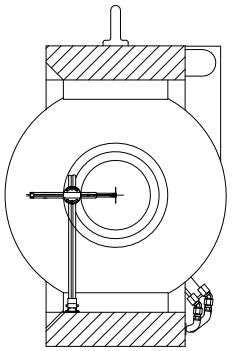
TOP/REAR INSTALLATION



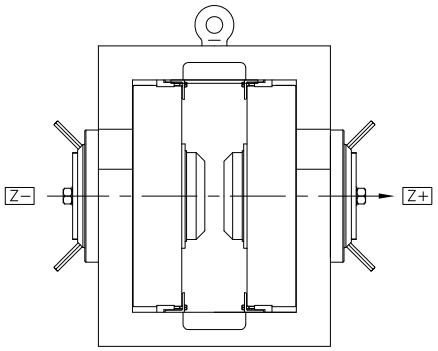
TOP/FRONT INSTALLATION



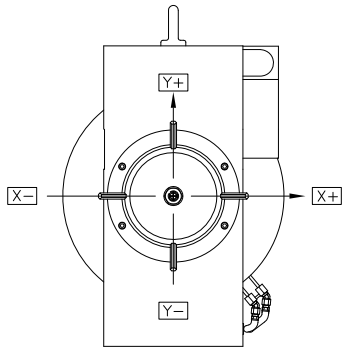
BOTTOM/REAR INSTALLATION



BOTTOM/FRONT INSTALLATION

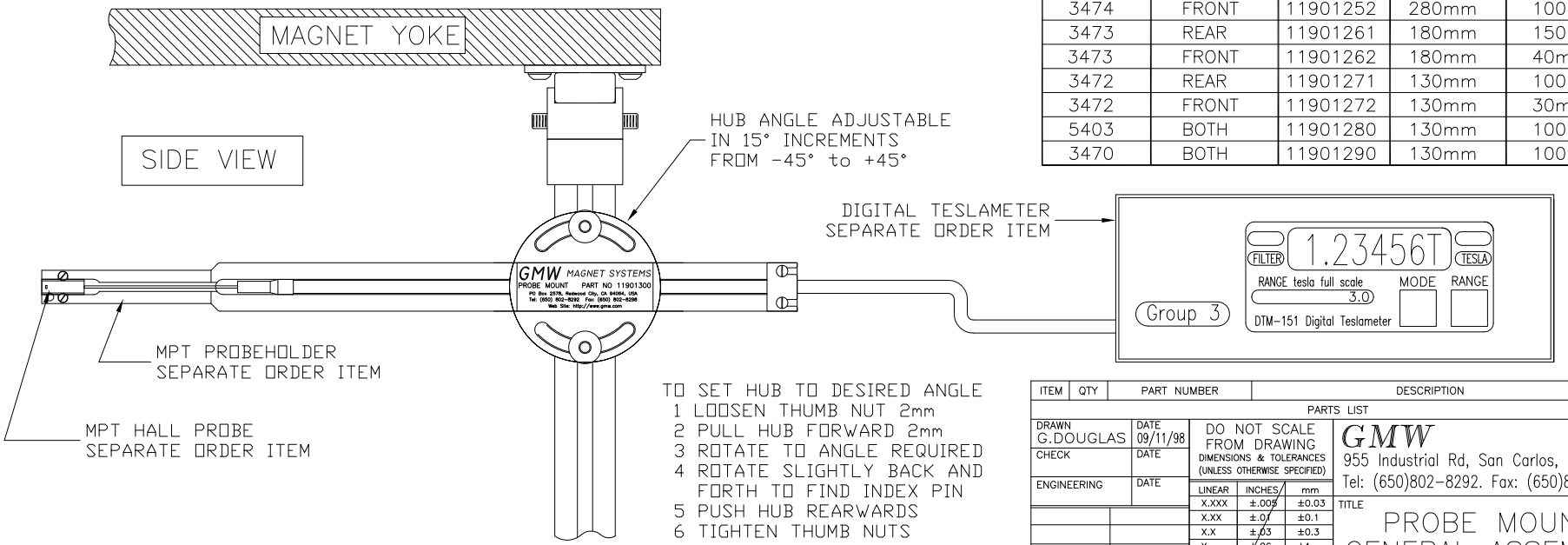


MAGNET FRONT VIEW



MAGNET SIDE VIEW

MAGNET MODEL	INSTALLATION POSITION	ASSEMBLY NUMBER	VERTICAL TRAVEL "Y"	HORIZONTAL TRAVEL "Z"
3474/5451	REAR	11901251	280mm	200mm
3474	FRONT	11901252	280mm	100mm
3473	REAR	11901261	180mm	150mm
3473	FRONT	11901262	180mm	40mm
3472	REAR	11901271	130mm	100mm
3472	FRONT	11901272	130mm	30mm
5403	BOTH	11901280	130mm	100mm
3470	BOTH	11901290	130mm	100mm



TO SET HUB TO DESIRED ANGLE
1 LOOSEN THUMB NUT 2mm
2 PULL HUB FORWARD 2mm
3 ROTATE TO ANGLE REQUIRED
4 ROTATE SLIGHTLY BACK AND FORTH TO FIND INDEX PIN
5 PUSH HUB REARWARDS
6 TIGHTEN THUMB NUTS

NOTE: ABOVE PROBE MOUNT SHOWN INSTALLED ON MODEL: 3474 ELECTROMAGNET.
OTHER CONFIGURATIONS AND MOUNTINGS ARE AVAILABLE. CONSULT TABLE FOR GMW ELECTROMAGNETS.

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE

PARTS LIST

DRAWN G.DOUGLAS DATE 09/11/98
CHECK DATE
ENGINEERING DATE
NEXT ASSY SYSTEM
SOFTWARE AUTOCAD 2000

DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)

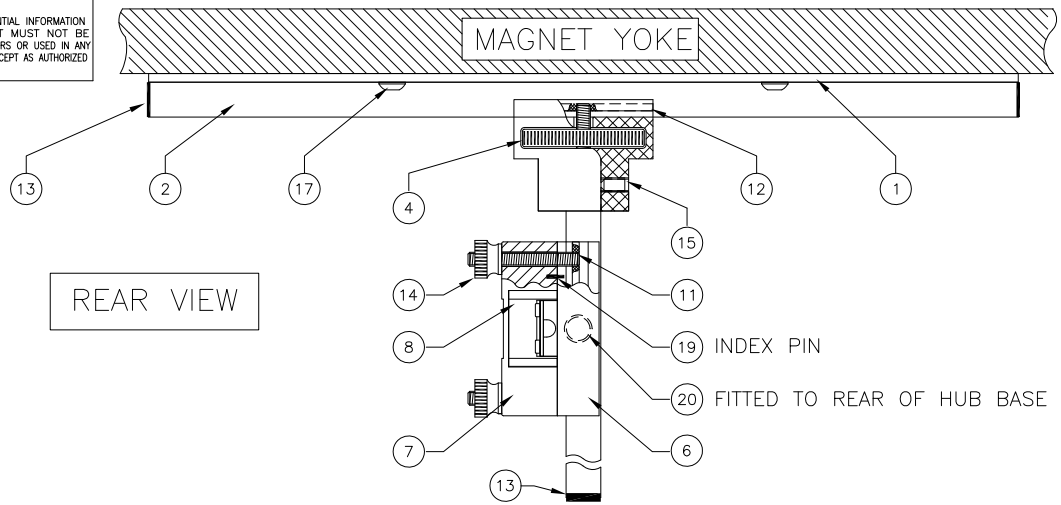
LINEAR	INCHES	mm
X.XXX	±.005	±0.03
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	63	1.6

THIRD ANGLE PROJECTION

GMW
955 Industrial Rd, San Carlos, CA 94070
Tel: (650)802-8292. Fax: (650)802-8298.

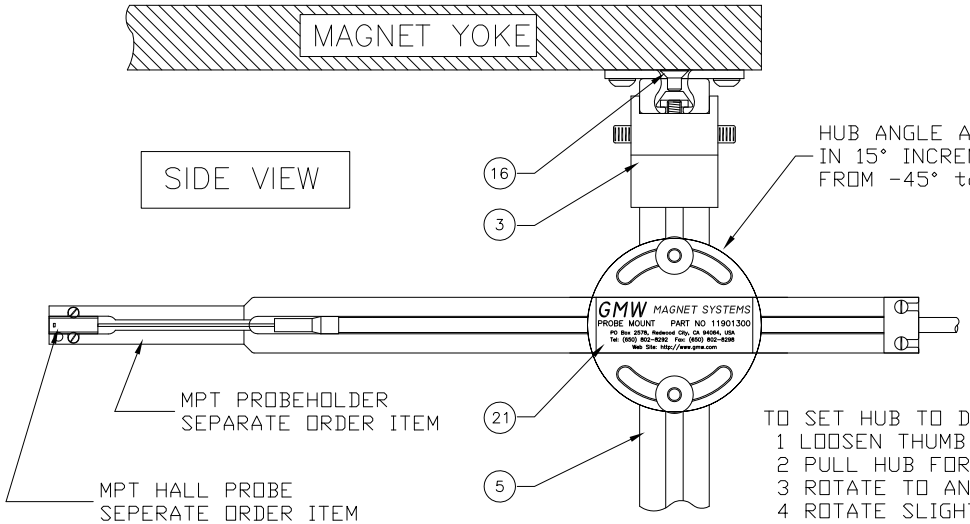
TITLE
PROBE MOUNT GENERAL ASSEMBLY

SIZE A2 | DRAWING NO. 11901300 | REV B
SCALE 1:1 | WT kg | SHEET 1 OF 1



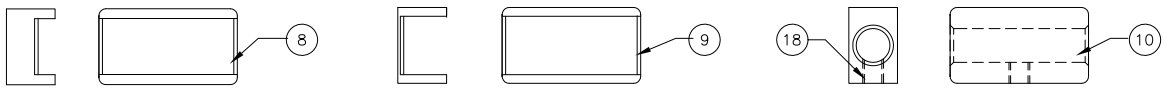
REAR VIEW

NOTE: THIS DRAWING SHOWS REAR INSTALLATION OF PROBE MOUNT
FOR FRONT INSTALLATION OF PROBE MOUNT SEE DRAWING NO 11901272



SIDE VIEW

TO SET HUB TO DESIRED ANGLE
1 LOOSEN THUMB NUT 2mm
2 PULL HUB FORWARD 2mm
3 ROTATE TO ANGLE REQUIRED
4 ROTATE SLIGHTLY BACK AND FORTH TO FIND INDEX PIN
5 PUSH HUB REARWARDS
6 TIGHTEN THUMB NUTS



REVISIONS

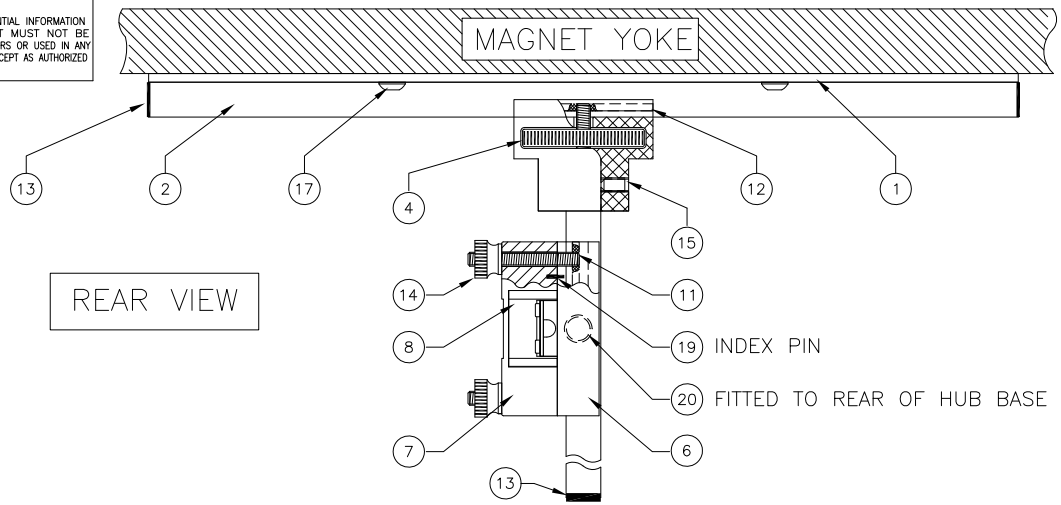
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		08/27/98	G.DOUGLAS

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
21	1	10900320	LABEL, INDENTIFICATION	
20	1	SBMH8	BALL PLUNGER, M8 S/S VLIER	
19	2	VSM 12771B	DOWEL PIN M1 X 5 S/S [Index Pin]	
18	1	BN 1073	SET SCREW, M6 X 5 SLOTTED HD NYLON	
17	4	ISO 7380	SHCS M4 X 8 BUTTON HD S/S	
16	5	DIN 7991	SHCS, M4 X 6 FLAT HEAD S/S	
15	2	DIN 917	SHSS M4 X 8 CONE POINT S/S	
14	2	08M040070TN	THUMB NUT, NYLON	
13	3	18-830	ITEM PRODUCTS, END CAP, PLASTIC	
12	1	17902010	BASE STUD	
11	1	17902000	HUB STUD	
10	1	17901990	HUB INSERT [For Sentron Hall Probes]	
9	1	17901980	HUB INSERT [For Metrolab NMR probes]	
8	1	17901970	HUB INSERT [for Grp3 MPT Hall Probes]	
7	1	17901960	HUB COVER	
6	1	17901950	HUB BASE	
5	1	17901943	VERTICAL MOUNTING EXTRUSION	
4	1	17901930	BASE NUT	
3	1	17901920	BASE SUPPORT	
2	1	17902090	BASE MOUNTING EXTRUSION	
1	1	17902080	BASE MOUNTING PLATE	

PARTS LIST

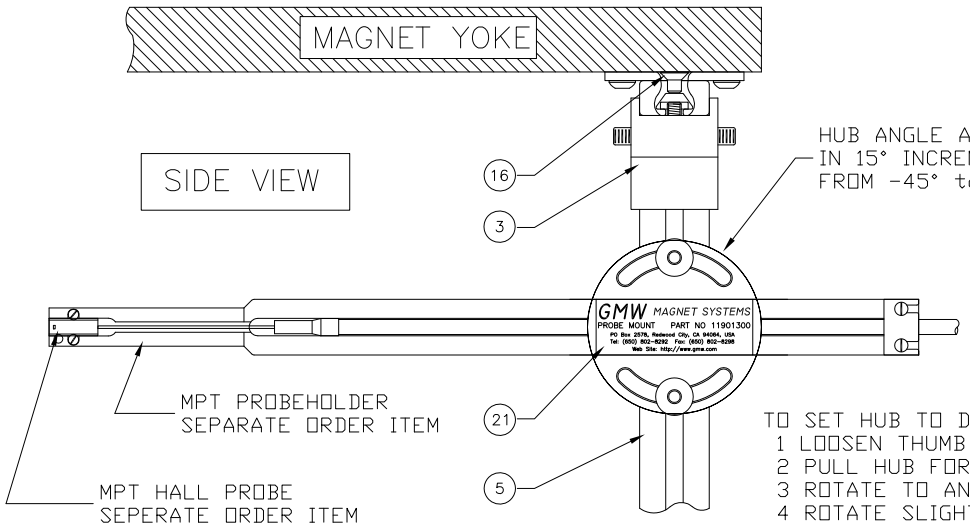
DRAWN G.DOUGLAS	DATE 08/27/98	DO NOT SCALE FROM DRAWING DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)	GMW 955 Industrial Rd, San Carlos, CA 94070 Tel: (650)802-8292. Fax: (650)802-8298.
CHECK	DATE		
ENGINEERING	DATE		TITLE: PROBE MOUNT MODEL: 3472
NEXT ASSY	SYSTEM	THIRD ANGLE PROJECTION	SIZE A2 · DRAWING NO. 11901271 · REV A
SOFTWARE AUTOCAD 2000			SCALE 1:1 · WT kg · SHEET 1 OF 1

LINEAR	INCHES	mm
X.XXX	±.005	±0.03
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	63	1.6



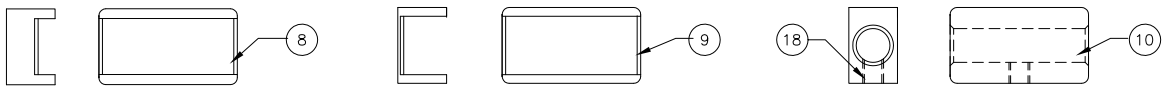
REAR VIEW

NOTE: THIS DRAWING SHOWS FRONT INSTALLATION OF PROBE MOUNT
FOR REAR INSTALLATION OF PROBE MOUNT SEE DRAWING NO 11901271



SIDE VIEW

TO SET HUB TO DESIRED ANGLE
1 LOOSEN THUMB NUT 2mm
2 PULL HUB FORWARD 2mm
3 ROTATE TO ANGLE REQUIRED
4 ROTATE SLIGHTLY BACK AND FORTH TO FIND INDEX PIN
5 PUSH HUB REARWARDS
6 TIGHTEN THUMB NUTS



REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		08/27/98	G.DOUGLAS

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
21	1	10900320	LABEL, INDENTIFICATION	
20	1	SBMH8	BALL PLUNGER, M8 S/S VLIER	
19	2	VSM 12771B	DOWEL PIN M1 X 5 S/S [Index Pin]	
18	1	BN 1073	SET SCREW, M6 X 5 SLOTTED HD NYLON	
17	4	ISO 7380	SHCS M4 X 8 BUTTON HD S/S	
16	5	DIN 7991	SHCS, M4 X 6 FLAT HEAD S/S	
15	2	DIN 917	SHSS M4 X 8 CONE POINT S/S	
14	2	08M040070TN	THUMB NUT, NYLON	
13	3	18-830	ITEM PRODUCTS, END CAP, PLASTIC	
12	1	17902010	BASE STUD	
11	1	17902000	HUB STUD	
10	1	17901990	HUB INSERT [For Sentron Hall Probes]	
9	1	17901980	HUB INSERT [For Metrolab NMR probes]	
8	1	17901970	HUB INSERT [for Grp3 MPT Hall Probes]	
7	1	17901960	HUB COVER	
6	1	17901950	HUB BASE	
5	1	17901943	VERTICAL MOUNTING EXTRUSION	
4	1	17901930	BASE NUT	
3	1	17901920	BASE SUPPORT	
2	1	17902070	BASE MOUNTING EXTRUSION	
1	1	17902060	BASE MOUNTING PLATE	

PARTS LIST

DRAWN G.DOUGLAS	DATE 08/27/98	DO NOT SCALE FROM DRAWING DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)	GMW 955 Industrial Rd, San Carlos, CA 94070 Tel: (650)802-8292. Fax: (650)802-8298.
CHECK	DATE		
ENGINEERING	DATE		TITLE: PROBE MOUNT MODEL: 3472
NEXT ASSY	SYSTEM	THIRD ANGLE PROJECTION	SIZE A2 · DRAWING NO. 11901272 · REV A
SOFTWARE AUTOCAD 2000			SCALE 1:1 · WT kg · SHEET 1 OF 1

LINEAR	INCHES	mm
X.XXX	±.005	±0.03
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	63	1.6

Section 7

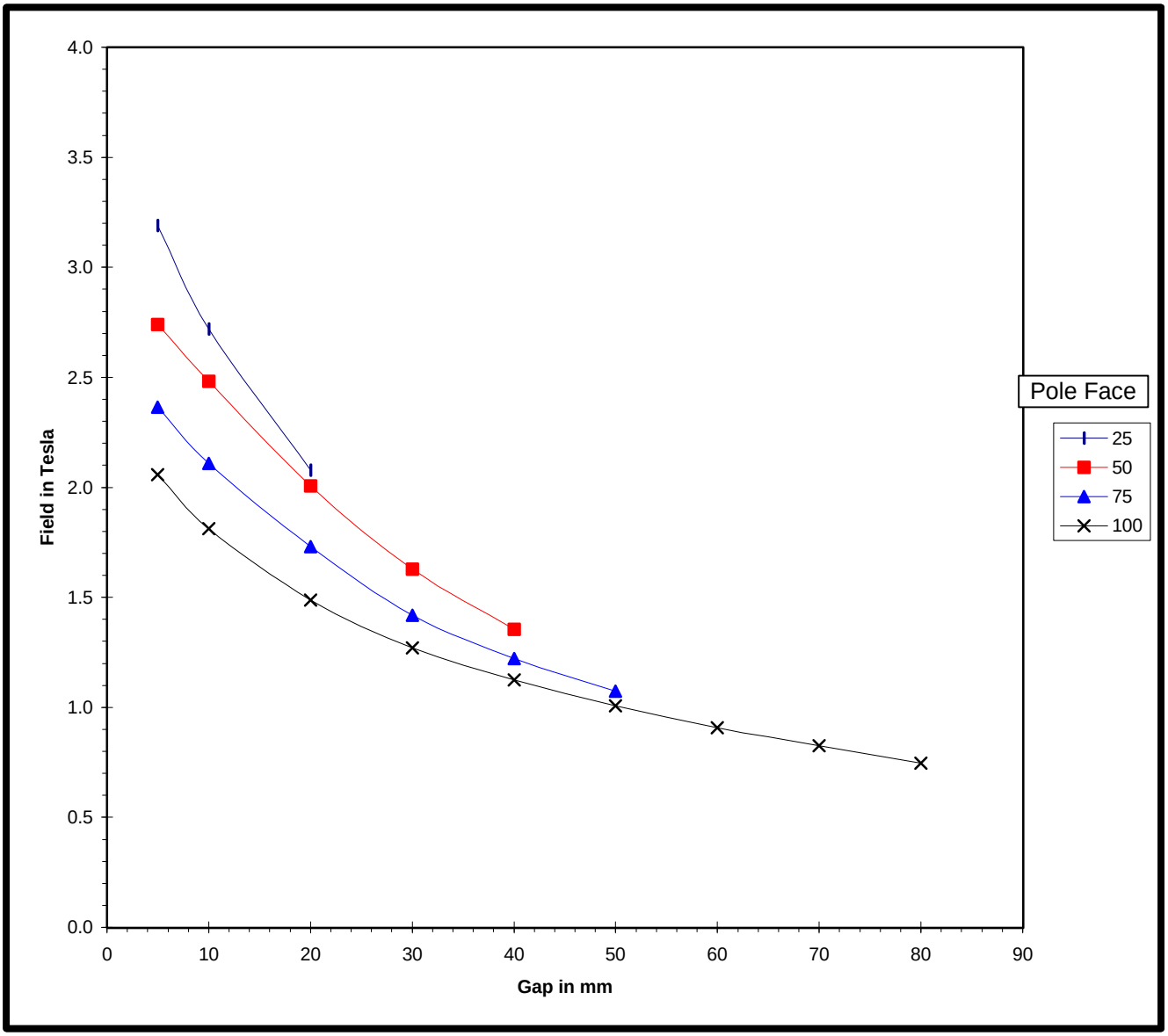
CUSTOM OPTIONS

Section 8

EXCITATION CURVES

GMW Associates
Electromagnet Excitation Plot
Field Vs Gap

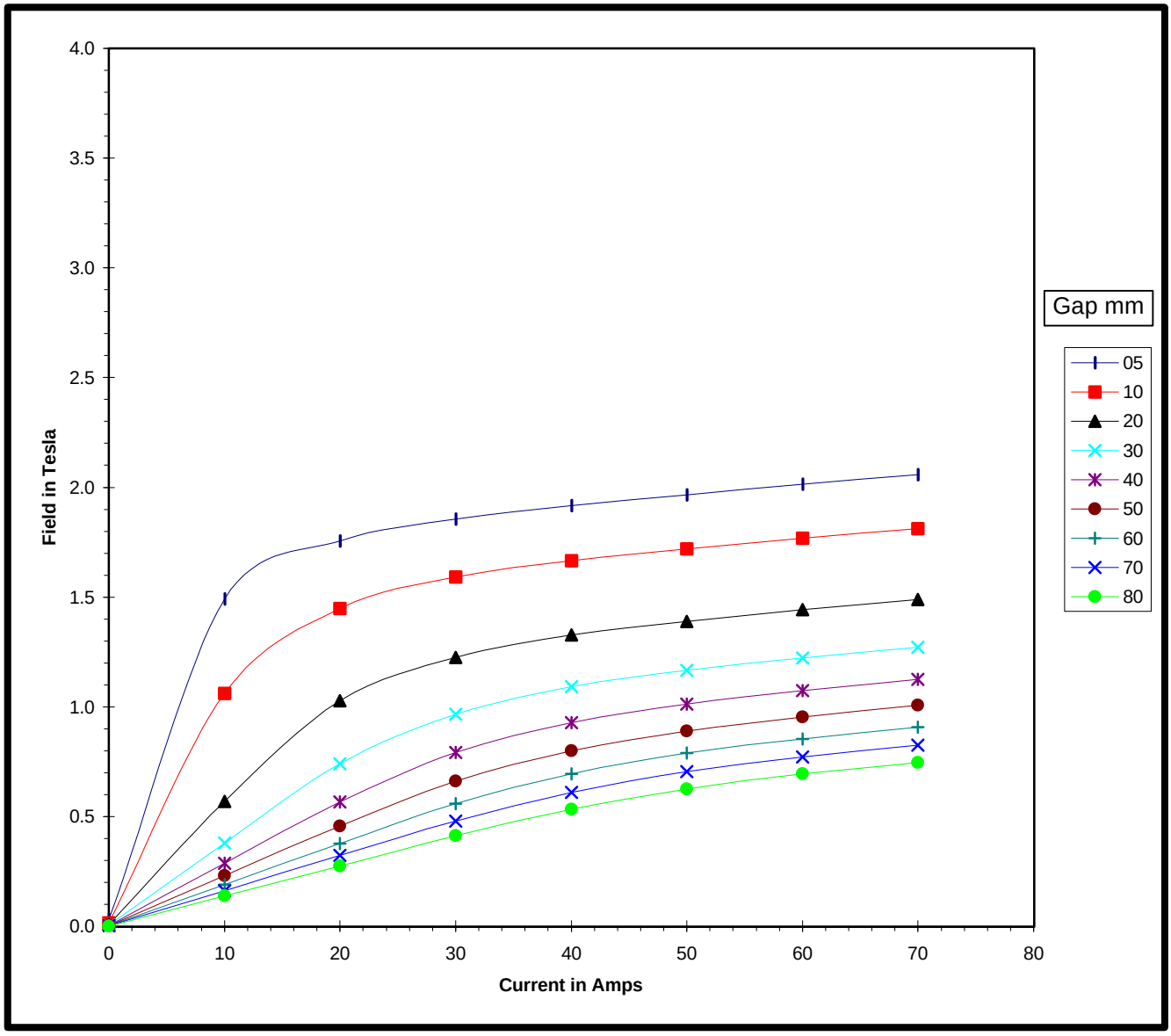
Contract No:		Page: 1 of 1		Date:	04 Dec, 97
Customer:				Engr:	E schulze
Model:	3472-70	Power Supply:	D/F 854 100-100	Set Current:	70 Amps
Serial No:	31	Serial No:	9101033	Target Field:	
Pole Face:	As per table below	Position:	X=0, Y=0, Z=0		
Serial No:	None	Notes:			
Pole Gap:	As per table below				
Pole Spacers:	None				



Filename: 3472 Gap-Field.xls

GMW Associates
Electromagnet Excitation Plot
Field Vs Current

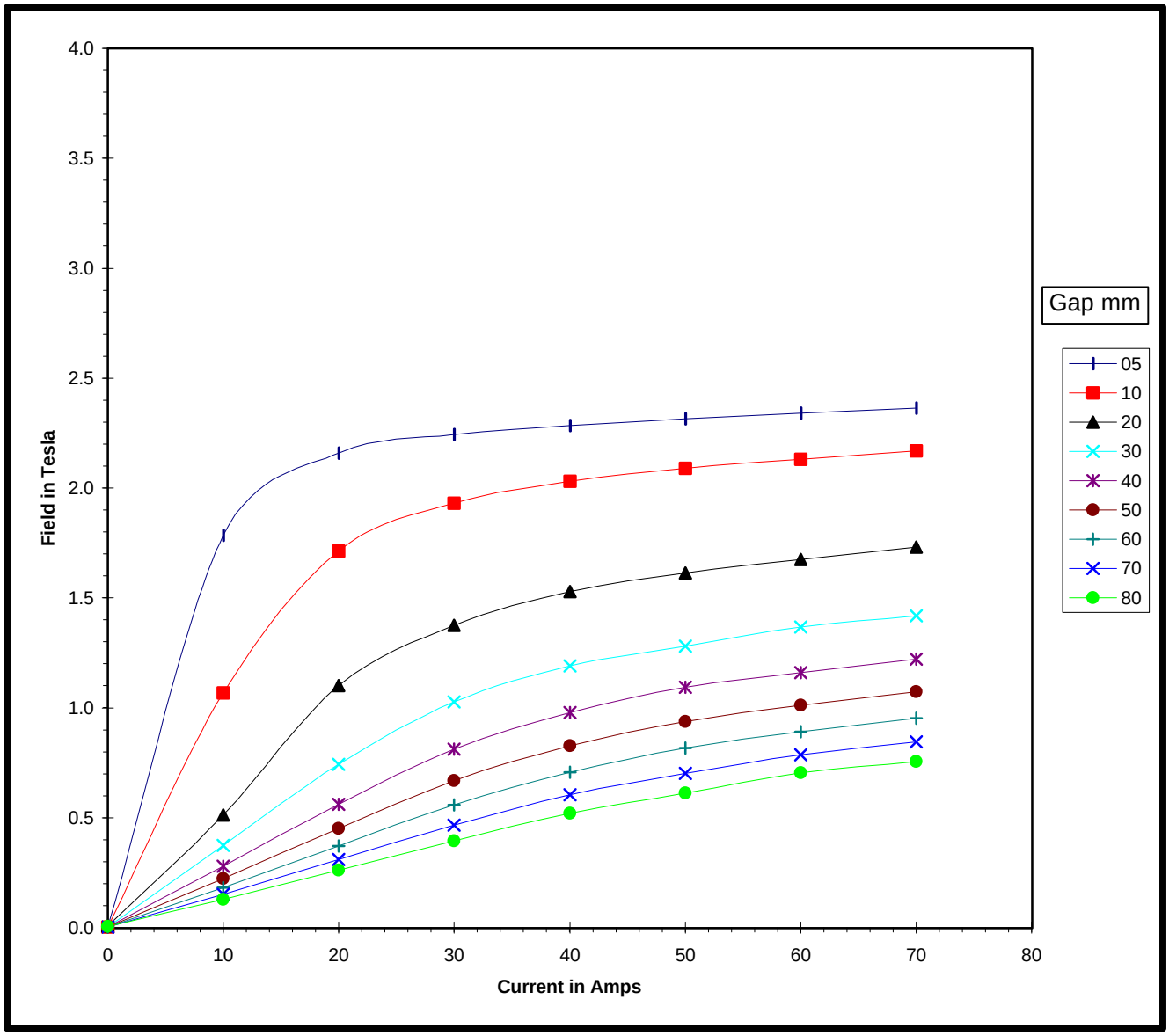
Contract No:		Page: 1 of 4		Date:	04 Dec, 97
Customer:				Engr:	E schulze
Model:	3472-70	Power Supply:	D/F 854 100-100	Set Current:	70 Amps
Serial No:	31	Serial No:	9101033	Target Field:	
Pole Face:	100	Position:	X=0, Y=0, Z=0		
Serial No:	None	Notes:			
Pole Gap:	As per table below				
Pole Spacers:	None				



Filename: 3472 Ex 100-05-80.xls

GMW Associates
Electromagnet Excitation Plot
Field Vs Current

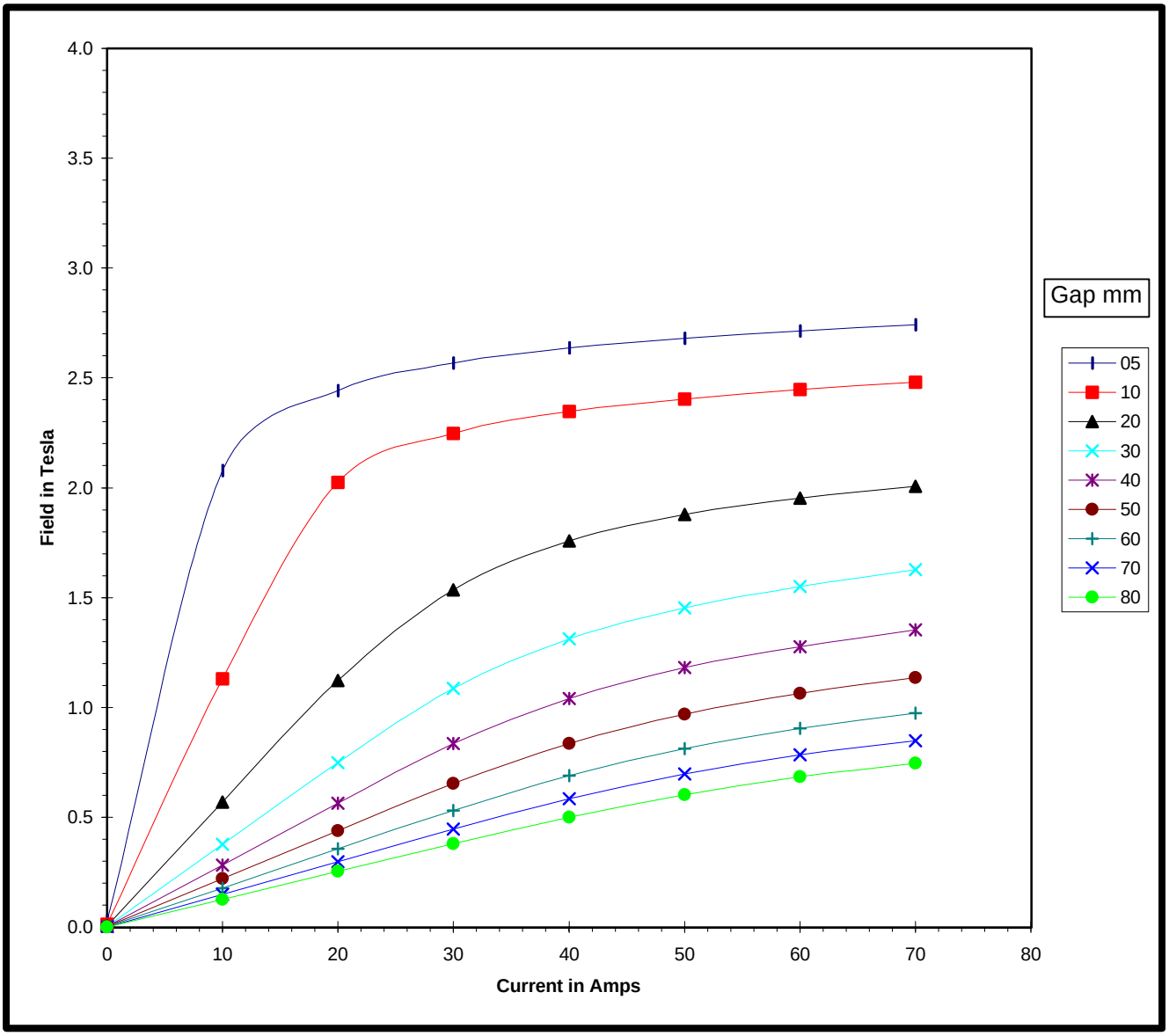
Contract No:		Page: 2 of 4		Date:	26 Feb, 98
Customer:				Engr:	E schulze
Model:	3472-70	Power Supply:	D/F 854 100-100	Set Current:	70 Amps
Serial No:	31	Serial No:	9101033	Target Field:	
Pole Face:	75	Position:	X=0, Y=0, Z=0		
Serial No:	None	Notes:			
Pole Gap:	As per table below				
Pole Spacers:	None				



Filename: 3472 Ex 75-05-80.xls

GMW Associates
Electromagnet Excitation Plot
Field Vs Current

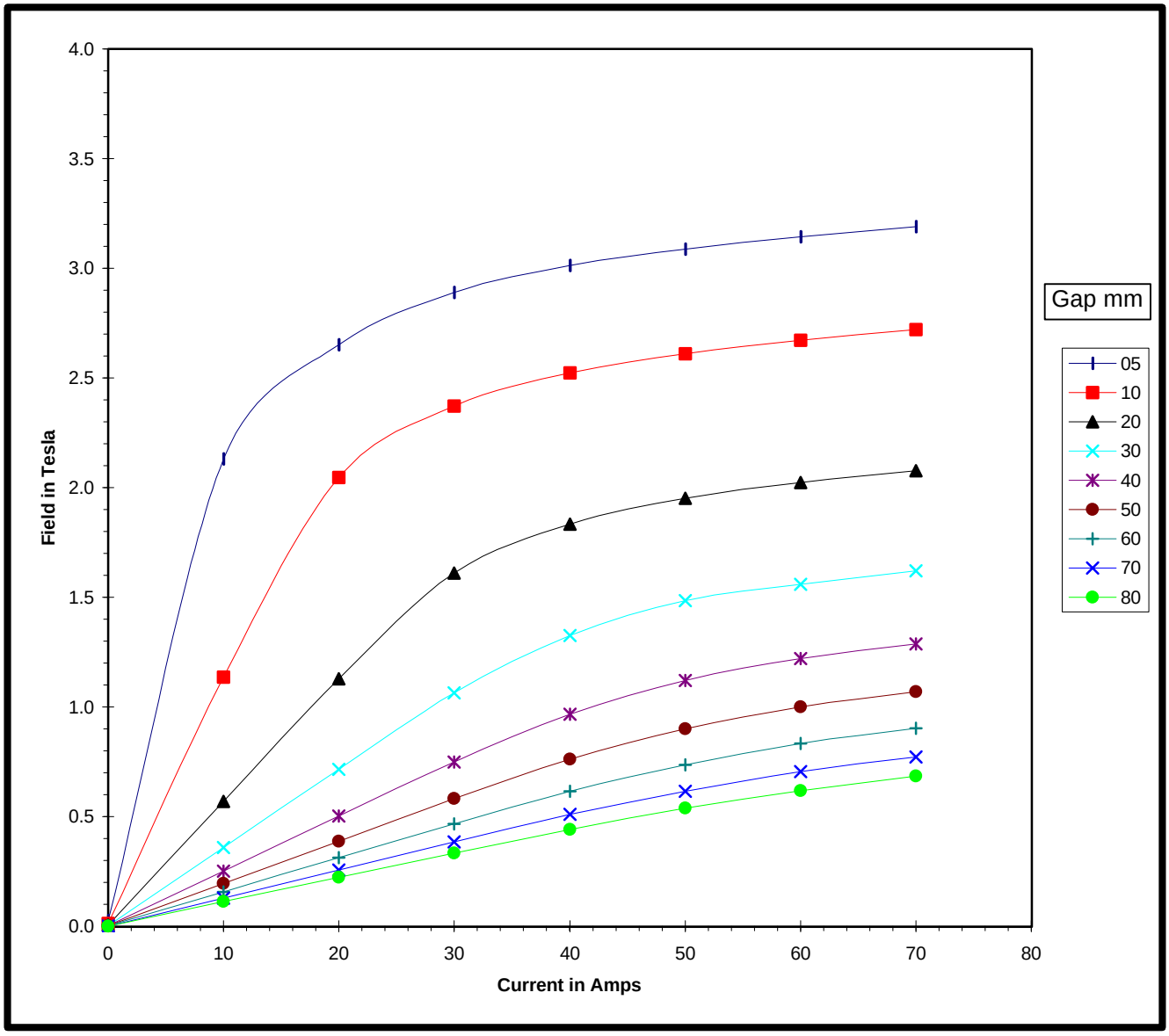
Contract No:		Page: 3 of 4		Date:	04 Dec, 97
Customer:				Engr:	E schulze
Model:	3472-70	Power Supply:	D/F 854 100-100	Set Current:	70 Amps
Serial No:	31	Serial No:	9101033	Target Field:	
Pole Face:	50	Position:	X=0, Y=0, Z=0		
Serial No:	None	Notes:			
Pole Gap:	As per table below				
Pole Spacers:	None				



Filename: 3472 Ex 50-05-80.xls

GMW Associates
Electromagnet Excitation Plot
Field Vs Current

Contract No:		Page: 4 of 4		Date:	04 Dec, 97
Customer:				Engr:	E schulze
Model:	3472-70	Power Supply:	D/F 854 100-100	Set Current:	70 Amps
Serial No:	31	Serial No:	9101033	Target Field:	
Pole Face:	25	Position:	X=0, Y=0, Z=0		
Serial No:	None	Notes:			
Pole Gap:	As per table below				
Pole Spacers:	None				

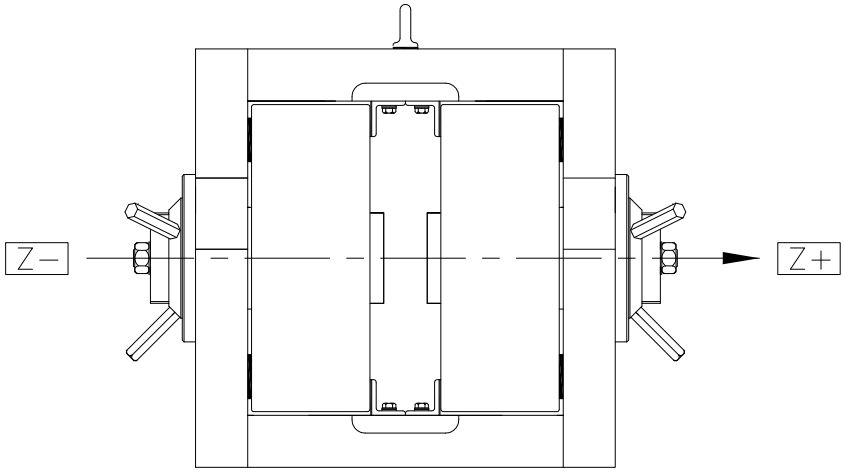


Filename: 3472 Ex 25-05-80.xls

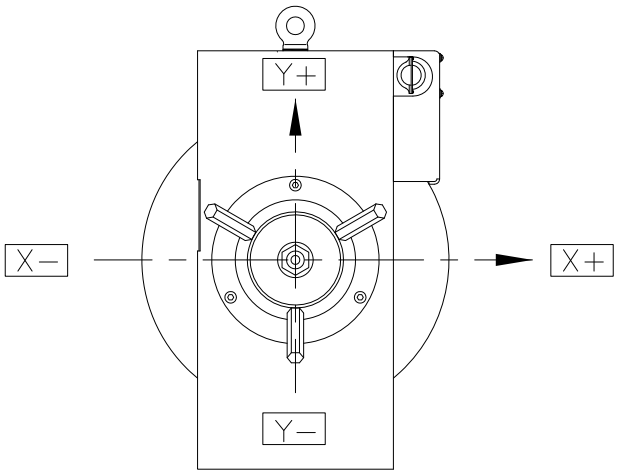
Section 9

TEST DATA

FRONT VIEW



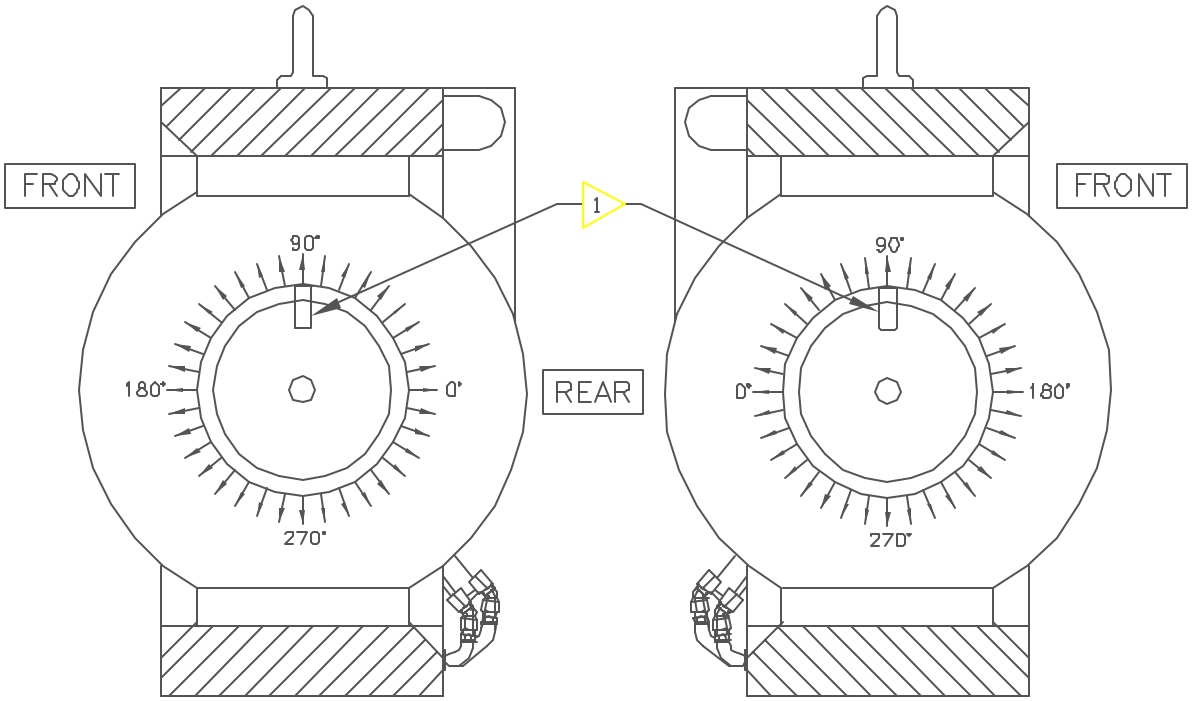
SIDE VIEW



MAGNETIC PLOTTING AXIS

80900030	A	SHEET 1 OF 1

1 SHIM SHOWN FITTED TO POLE AT 90 DEG POSITION



LH POLE: CAP REMOVED

RH POLE: CAP REMOVED

LH POLE SHIM DETAILS		
NUMBER	THICKNESS	POSITION
1	_____mm	_____deg
2	_____mm	_____deg
3	_____mm	_____deg
4	_____mm	_____deg

RH POLE SHIM DETAILS		
NUMBER	THICKNESS	POSITION
1	_____mm	_____deg
2	_____mm	_____deg
3	_____mm	_____deg
4	_____mm	_____deg

MAGNET MODEL: _____

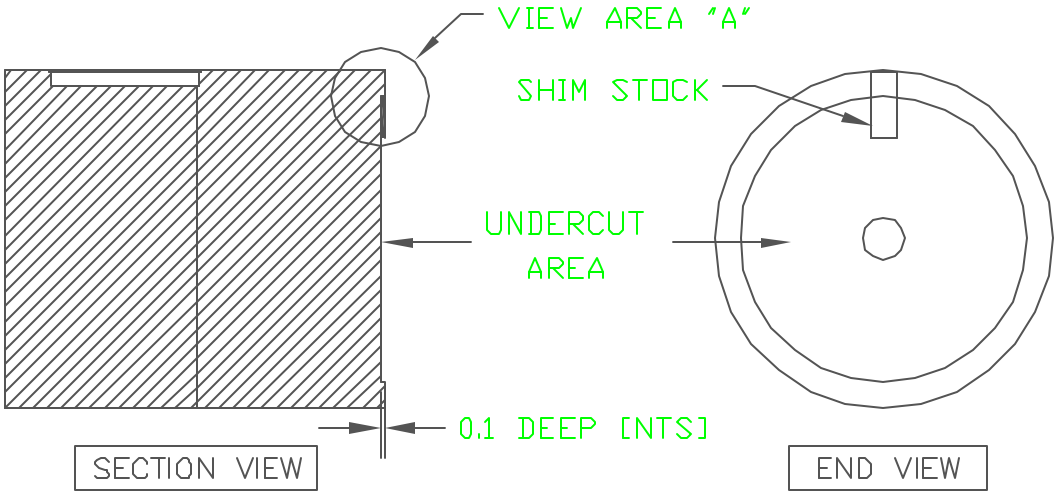
MAGNET SERIAL NO: _____

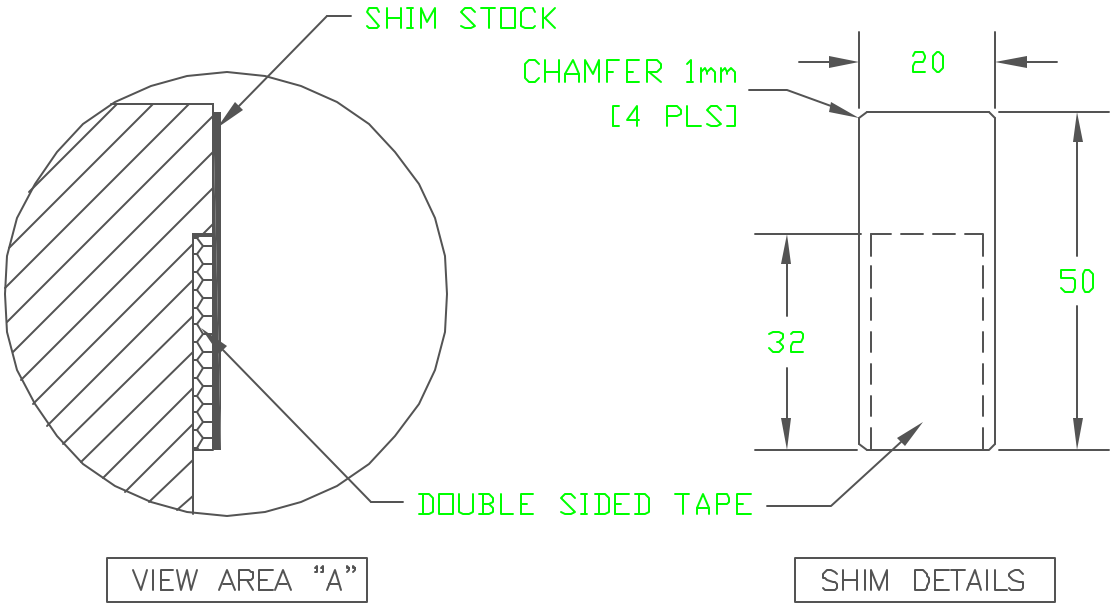
DATA LOGGED BY:_____

DATA LOGGED DATE:_____

MAGNET FINAL SHIMMING LOG

80900100 | C | SHEET 1 OF 1



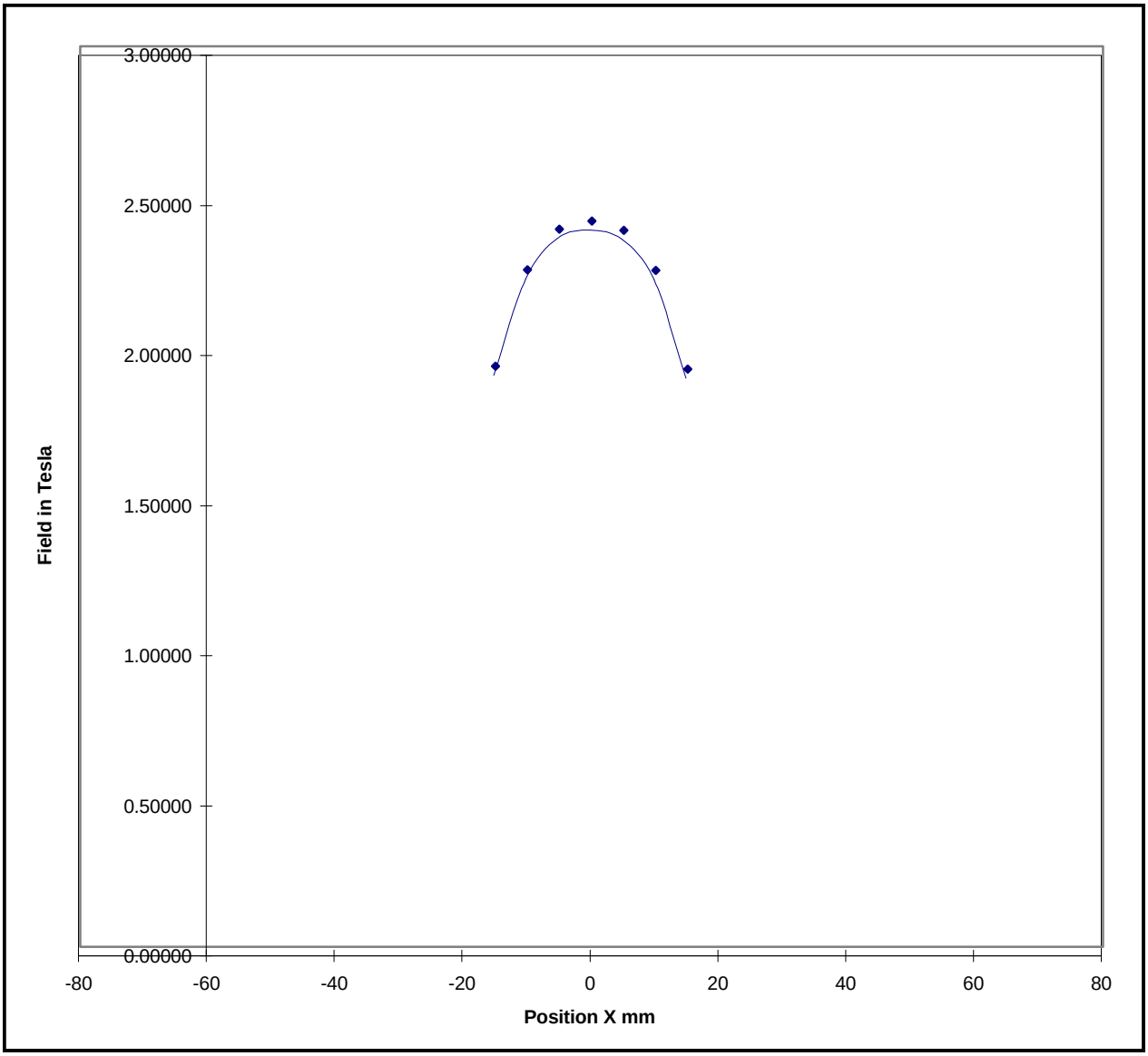


1. THROUGHLY CLEAN AND DEGREASE AREA WHERE SHIM IS TO BE FITTED.
2. CUT SHIM STOCK TO DIMENSIONS SHOWN.
3. APPLY DOUBLE SIDED TAPE 0.1mm THICK TO AREA SHOWN.
4. FIT SHIM TO POLE FACE, ENSURE TAPE IS KEPT WITHIN UNDERCUT AREA.
5. REASSEMBLE POLE CAPS ONTO MAGNET.
6. REMAP MAGNET, IF RESULTS WITHIN SPECIFICATION THEN GO TO ITEM 7. IF OUTSIDE SPECIFICATION ADJUST SHIMS, REMAP THEN GO TO ITEM 7.
7. FILL IN SHIMMING DETAILS ON SHEET NO 3474–0001.

FINAL SHIMMING METHOD		
80900110	A	SHEET 1 OF 1

GMW Associates
Electromagnet Uniformity Plot
Field Vs Position

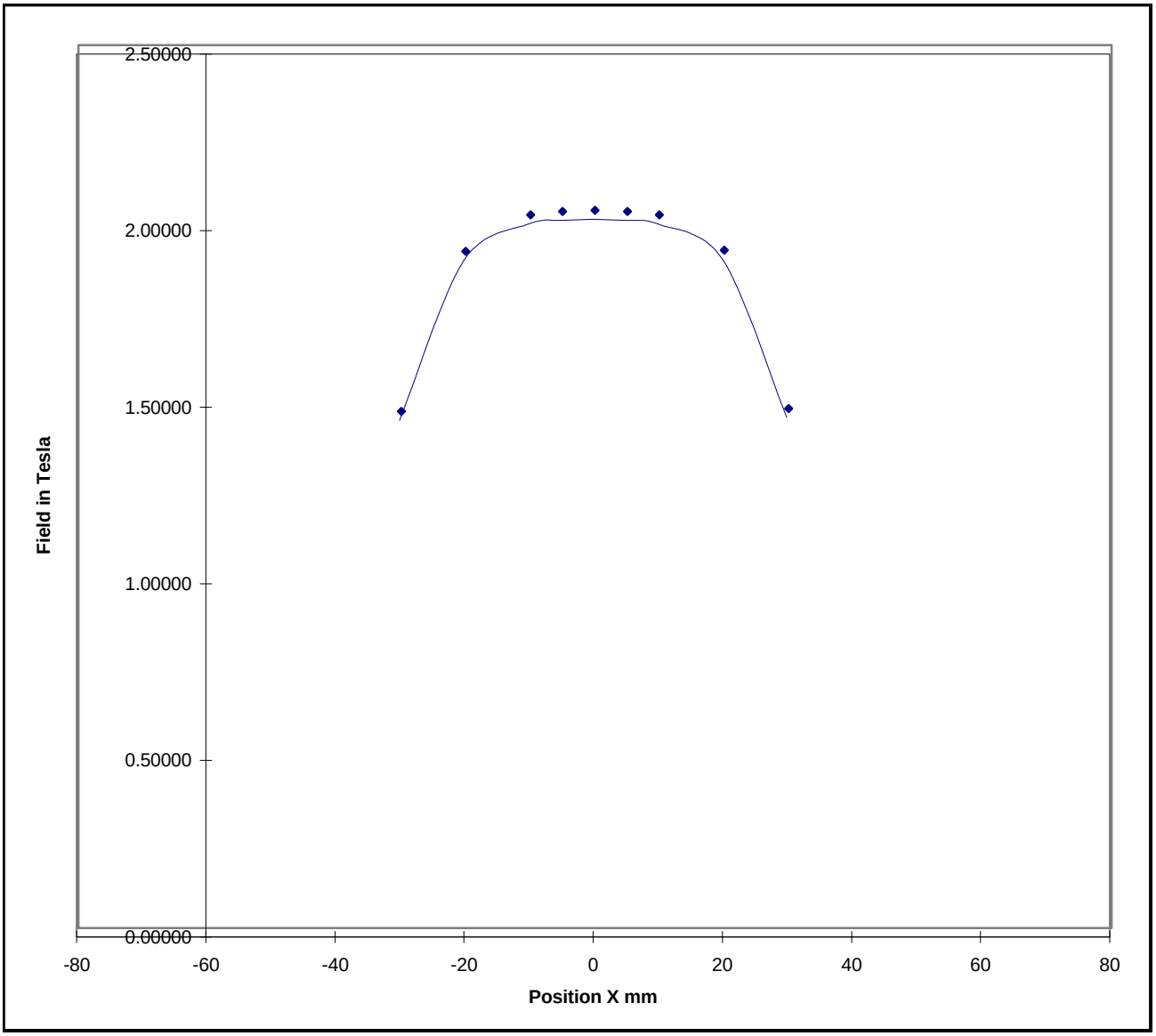
Contract No:		Page: 4 of 52		Date:	22 Jan, 1998
Customer:				Engr:	E Schulze
Model:	3472-70	Power Supply:	853-100A/100V	Set Current:	70 Amp
Serial No:	31	Serial No:	9101033	Target Field:	
Pole Face:	25mm	Fixed Axis:	Z=0, Y=0		
Serial No:	None	Notes:			
Pole Gap:	10mm				
Pole Spacers:	None				



Filename: 3472 Un 70A X 25-10

GMW Associates
Electromagnet Uniformity Plot
Field Vs Position

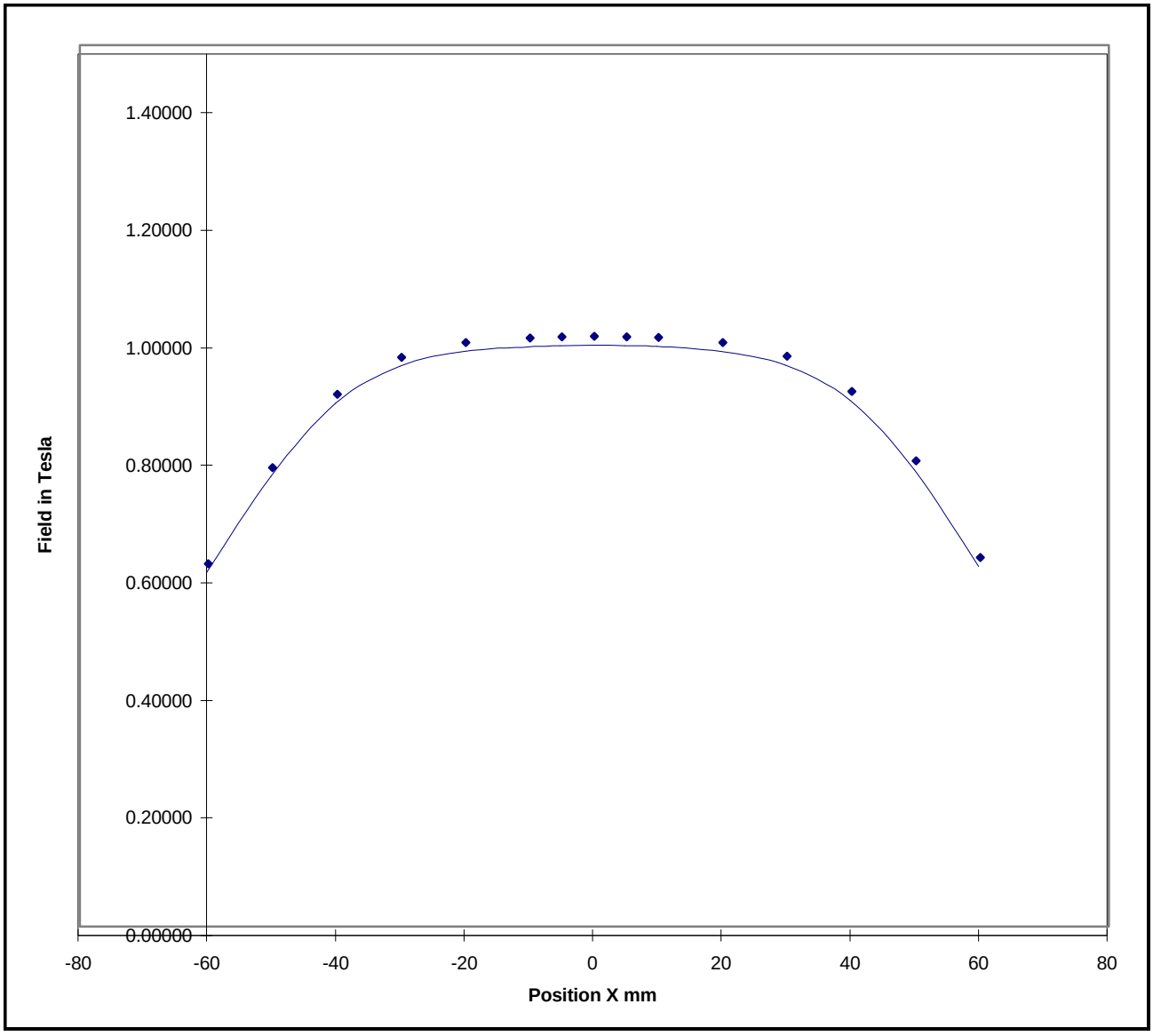
Contract No:		Page: 14 of 52		Date:	22 Jan, 1998
Customer:				Engr:	E Schulze
Model:	3472-70	Power Supply:	853-100A/100V	Set Current:	70Amp
Serial No:	31	Serial No:	9101033	Target Field:	
Pole Face:	50mm	Fixed Axis:	Z=0, Y=0		
Serial No:	None	Notes:			
Pole Gap:	20mm				
Pole Spacers:	None				



Filename: 3472 Un 70A X 50-20

GMW Associates
Electromagnet Uniformity Plot
Field Vs Position

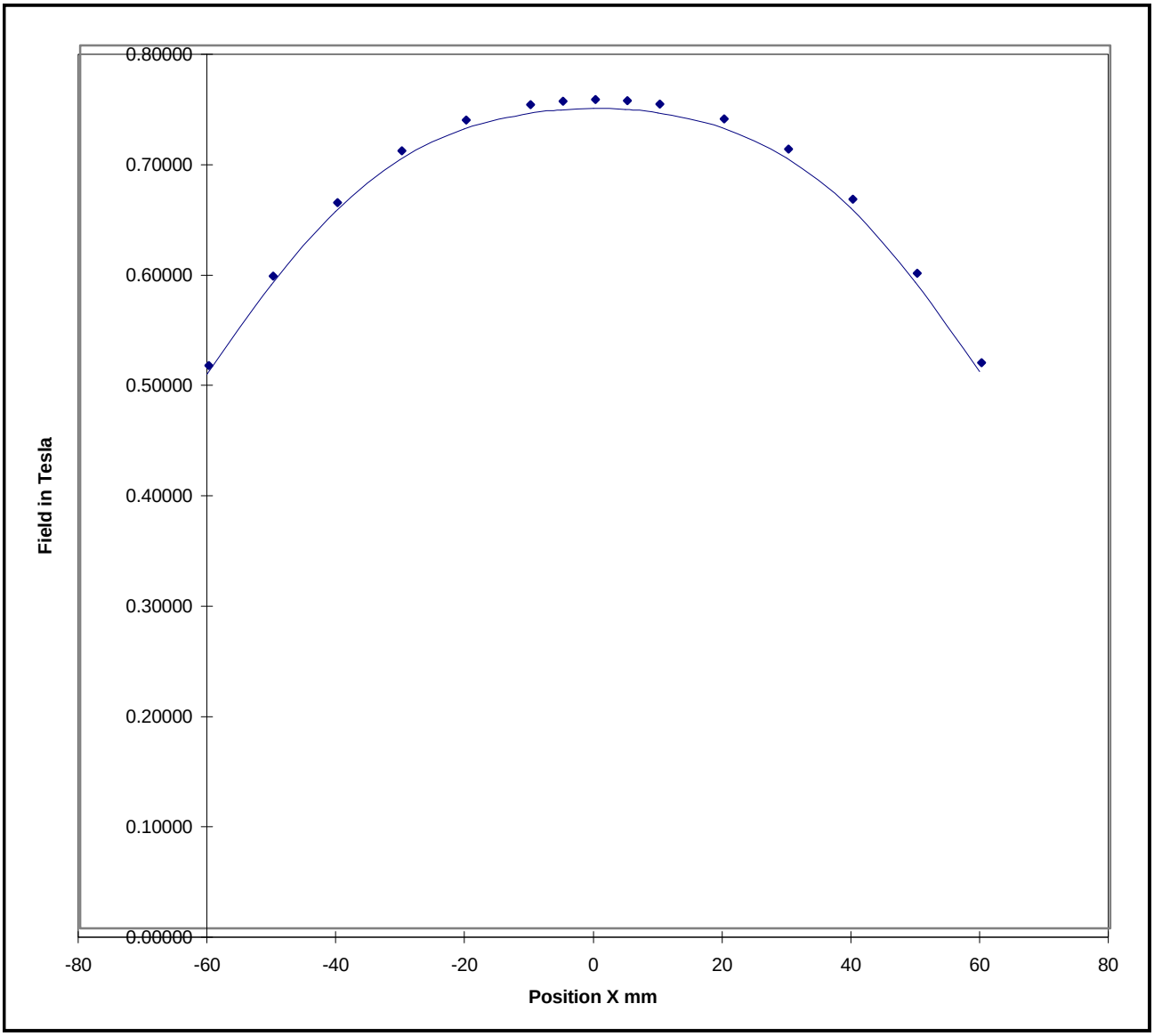
Contract No:		Page: 45 of 52		Date:	22 Jan, 1998
Customer:				Engr:	E Schulze
Model:	3472-70	Power Supply:	853-100A/100V	Set Current:	70Amp
Serial No:	31	Serial No:	9101033	Target Field:	
Pole Face:	100mm	Fixed Axis:	Z=0, Y=0		
Serial No:	None	Notes:			
Pole Gap:	50mm				
Pole Spacers:	None				



Filename: 3472 Un 70A X 100-50

GMW Associates
Electromagnet Uniformity Plot
Field Vs Position

Contract No:		Page: 51 of 52		Date:	22 Jan, 1998
Customer:				Engr:	E Schulze
Model:	3472-70	Power Supply:	853-100A/100V	Set Current:	70 Amp
Serial No:	31	Serial No:	9101033	Target Field:	
Pole Face:	100mm	Fixed Axis:	Z=0, Y=0		
Serial No:	None	Notes:			
Pole Gap:	80mm				
Pole Spacers:	None				



Filename: 3472 Un 70A X 100-80

Section 10

DRAWINGS

SERIES 3450/3450R/3455R/3455RBV 15 AMP THERMOSTATS

Typical Applications:

Power Supplies

Communication Equipment

Medical Equiopment

Computers (Where High AMP Loads are Present)

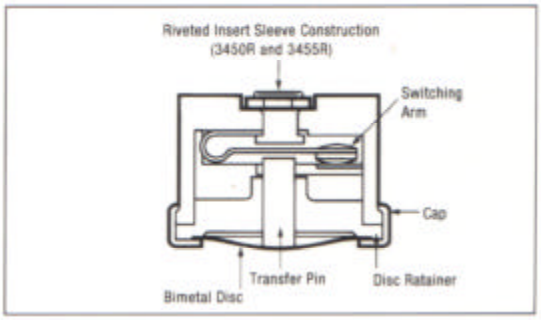
The Series 3450/3455R is a snap-acting, non-adjustable precision thermostat especially suited for industrial and electrical equipment.

The 3450 (.390" or 10mm overall) is ideal for applications that require precision control of high electric loads to 8 Amp resistive.

The 3450R and 3455R have a patented metal insert rivet construction.

The 3455R (.484" or 12.5mm) overall, has higher spacing as required by European approval agencies. Model 3455RBV is an epoxy overmold version of the 3455R, specifically designed for electrical insulation or protection in a high humidity environment. Consult factory for performance qualifications.

To insure that a safe combination of thermostat and application is achieved, the purchaser must determine product suitability for their individual requirements.



***Series 3450/3450R/3455R/3455RBV**

MODEL	ELECTRIC LIFE CYCLES	120 VAC	240 VAC	277VAC
3450	100,000	8.0A	-	-
3450R/	100,000	15A	8.3A	7.2A
3455R	100,000	4.4FLA 26.4LRA	2.2FLA 13.2LRA	-
	6,000	5.8FLA 34.8LRA	2.9FLA 17.4LRA	-
3455RBV	100,000	15A	8.3A	-
	6,000	5.8A 34.8LRA	2.9A 17.4LRA	-

A: Amps
FLA: Full Load Amps
LRA: Locked Rotor Amps
Contacts are available for millivolt and milliamp applications.
*Includes UL and CSA ratings.
Consult Elmwood Sensors for additional ratings.

Key Features:

- *Electric Rating to 15 Amp 120 VAC Resistive*
- *Environmental Exposure 0° to 350° F (–18° to 177° C)*
- *UL recognized and CSA certified and European Approved*
- *Single-Pole, Single-Throw (SPST)*
- *Pre-set and Tamperproof*
- *Variety of Mounting Brackets and Terminals Available*

SERIES 3450/3450R/3455R/3455RBV 15 AMP THERMOSTATS

Standard Temperature Characteristics

Operating Temperature Range The tightest specification determines the group	Tolerance Allowable* ± at mean temperature set points				Standard Mean Differential Nominal degrees between opening and closing points		Price Group*
	Open		Close				
	±°F	±°C	±°F	±°C	°F	°C	
32° to 79°F **0° to 25°C**	5	2.8	8	4.4	30-50	16-28	I
	5	2.8	7	3.9	25-29	14-16	II
	5	2.8	6	3.3	20-24	11-13	III
	5	2.8	6	3.3	15-19	8-11	IV
80° to 200°F **25° to 95°C**	5	2.8	8	4.4	30-50	16-28	I
	5	2.8	7	3.9	25-29	14-16	II
	5	2.8	6	3.3	20-24	11-14	III
	6	2.2	5	2.8	15-19	8-11	IV
201 to 250°F **96° to 120°C**	6	4.4	8	4.4	30-50	16-28	I
	6	3.9	7	3.9	25-29	14-16	II
	6	3.3	6	3.3	20-24	11-14	III
	6	2.8	6	2.8	15-19	8-11	IV
251 to 302°F **121.7° to 148.9°C**	7	3.9	8	4.4	30-50	16-28	I
	7	3.9	7	3.9	30-50	16-28	II
	7	3.9	7	3.9	20-29	11-16	III
	6	3.3	7	3.9	15-19	8-11	IV

*Grouped according to level of accuracy required. Group I with greatest latitude is less expensive than Group II, etc.
Please consult factory for temperature ranges, tolerances and differentials not noted. The operating temperature ranges include tolerances.
The ± tolerances shown have been established after careful review of many thermostat applications. Attempts should be made to establish the widest acceptable tolerance possible. For example, the chart may list a tolerance of ±5°F (±2.8°C); however, ±6°F (±3.3°C) may be acceptable for the application at reduced cost.
Note: Temperature checking methods may be slightly different, and allowance for a 1.8°F (1°C) variance should be considered.
See Section B of the Terminal and Bracket Guide for dimensional characteristics.

Operating Parameters

Dielectric Strength	Mil-STD-202 Method 301 -2000 VAC 60 Hz - Terminal to Case
Insulation Resistance	Mil-STD-202 Method 302 Cond. B - 500 Megohms - 500 Volts DC applied
Environmental Exposure	0° to 350°F (–18° to 177°C)
Operating Temp. Range	32° to 302°F (0° to 150°C)
Contact Resistance	Mil-STD-202, Method 307 - 50 Milliohms
Marking	Mil-STD-1285
Weight	6 Grams (Brackets and wire leads not included)
Materials	Base: Phelonic Terminals: Plated Brass or Steel Closure: Aluminum, Stainless Steel, or Brass Brackets: Aluminum, Stainless Steel, or Brass Contacts: Silver

UL and CSA Listings

UL and CSA Listings are for use in equipment where the acceptability of the combination of the thermostat and equipment is determined by Underwriters' Laboratories, Inc. and/or the Canadian Standards Association.

UL File E36103, UL File SA4469 (3455RBV only), UL File MH8267 (3455R only), CSA File 21048.

FS-927 Series – Small Design For Tight Instrumentation Packages

Flow Rate Settings: 0.10 GPM to 1.50 GPM
Port Size: 1/4" NPT
Primary Construction Material: Brass
Setting Type: Fixed

Measuring only 1" x 2-3/4" these compact switches are ideal for use where space is at a premium. Designed for use with water and oil, these switches are suitable for high volume OEM applications. They are ideal for coolant or lubricant flow monitoring in portable equipment and many other applications with space constraints.

U.L. Recognized — File No. E31926

Specifications

Wetted Materials	
Housing and Piston	Brass
Spring	316 Stainless Steel
Other Wetted Parts	Stainless Steel
Operating Pressure, Maximum	1000 PSIG
Operating Temperature	−20°F to +225°F (−29°C to +107°C)
Set Point Accuracy	±15% Maximum
Set Point Differential	20% Maximum
Switch*	SPST, 20 VA
Inlet/Outlet Ports	1/4" NPT
Electrical Termination	No. 18 AWG, 24" L., Polymeric Lead Wires

*See "Electrical Data" on Page 3 for more information.

How to Order – Standard Models

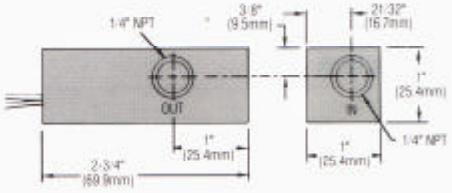
Specify Part Number based on flow setting and switch operation.

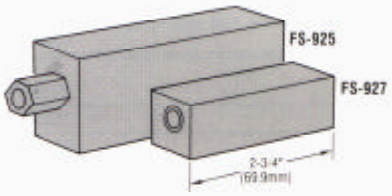
Liquids other than water: Special calibration is available from GEMS for media other than water. Please consult factory with your requirements, including flow media, operating pressure, flow set point and liquid viscosity (SSU).

Flow Setting GPM	Part Numbers	
	Normally Open @ No Flow	Normally Closed @ No Flow
0.10	70820	70826
0.25	70821	70827
0.50	70822	70828
0.75	70823	70829
1.00	70824	70830
1.50	70825	70831

Notes:
1. Flow settings are calibrated using water @ +70°F on increasing flow, with units in a vertical position (lead wires up).
2. Care should be taken by specifiers to ensure fluid compatibility with the above listed wetted materials.
3. Use of 50 micron filtration is recommended.

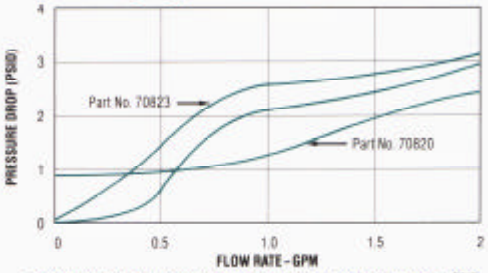
Dimensions





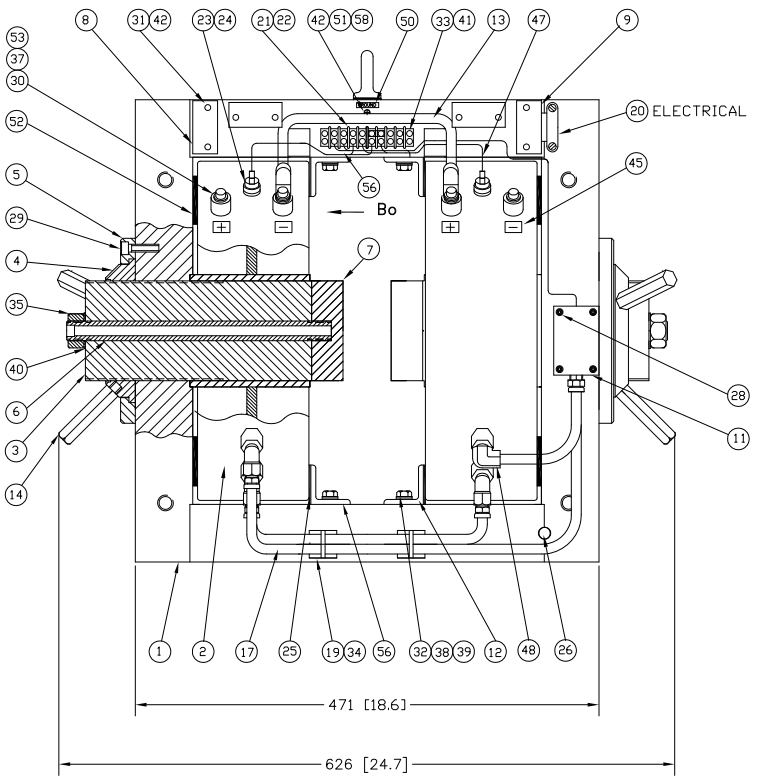
An FS-927 unit is shown silhouetted against the already small FS-925 unit. It illustrates just how little space is required to provide protection to your valuable OEM equipment.

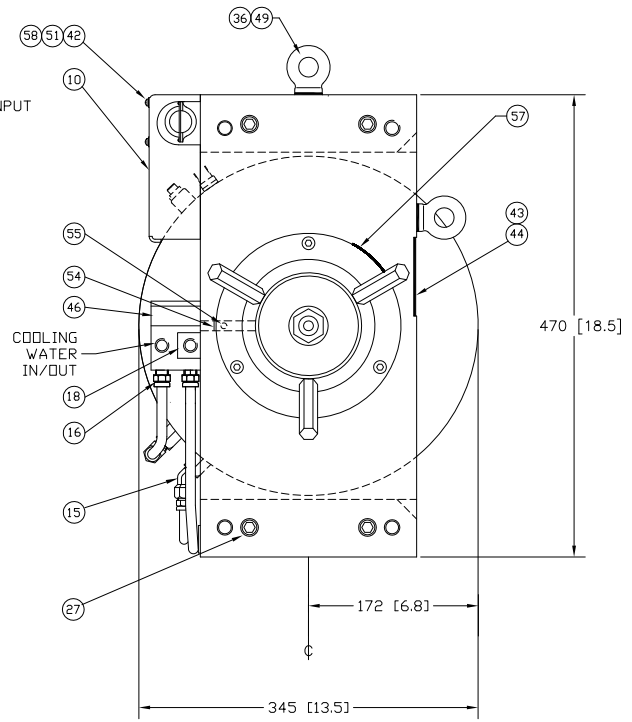
Pressure Drop – Typical



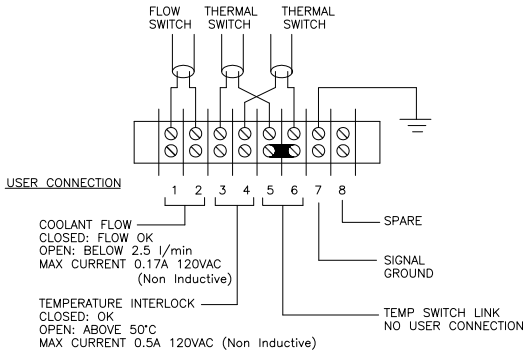
Tests conducted with units in a vertical position (lead wires up), with water at +70°F.

TERMINAL COVER ITEM 10
OMITTED FROM THIS VIEW





INTERLOCK SCHEMATIC



MAGNET SPECIFICATIONS

POLE DIAMETER:	100 mm [4"]
POLE GAP:	0 to 115 mm [0 to 4.5"]
COIL GAP:	118 mm
POLE CAPS:	CYLINDRICAL 100 mm [4"] TAPERED 75, 50, 25. [3"],[2"],[1"]
COILS (series connected)	
MAX RESISTANCE	0.71 ohm
MAX POWER (air)	20A/14V
MAX POWER (water)	50A/36V
WATER COOLING (18°C):	0.8 BAR [12 PSID], 3 L/MIN [0.8 GPM]
THERMAL INTERLOCK:	OPEN CIRCUIT ABOVE 50°C [122°C]
FLOW INTERLOCK:	OPEN CIRCUIT BELOW 2.5 L/MIN [0.7 GPM]
MASS:	325 kG [715 lbs]

NOTE: DO NOT EXCEED THE MAXIUM SPECIFIED COIL RESISTANCE OR COIL OVERHEATING AND POSSIBLE DAMAGE NAY OCCUR

REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		07/14/93	A.MARTIN
B	CHANGED MAGNET SPECIFICATION		08/16/93	G.DOUGLAS
C	ADD ITEMS 49,50,51,52,53, MOVE 17,19,20,21,22,34		07/25/94	G.DOUGLAS
D	ADD ITEMS 54 AND 55		09/13/95	G.DOUGLAS
E	ADD ITEM 56, CORRECT ITEM 55		03/23/99	G.DOUGLAS
F	ADD ITEM 57, ADD LABEL PART NUMBERS		03/05/01	G.DOUGLAS
G	CHANGE ITEM 10,15,16,17, 48, ADD ITEM 58		11/15/04	G.DOUGLAS
H	CHANGE COIL LABELS TO + AND −		03/13/09	G.DOUGLAS

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
58	5		M5 WASHER SPRING, S/S	
57	2	10900790	LABEL, OPEN GAP	
56	16		M4 X 8 SHCS BUTTON HD S/S [For Probe Mount]	
55	2		M6 X 16 SHSS S/S	
54	2		DOWEL PIN ø10 X 42 TAPPED M5 S/S	
53	4		M6 WASHER SPRING, S/S	
52	A/R		PAD, NEOPRENE 5mm THK	
51	5		M5 x 10 PAN HD PHILLIPS SCR S/S	
50	1		LABEL,GROUND GMW FITTED	
49	3		M16 WASHER FLAT, S/S	
48	1	1202P-4-4	90° STREET ELBOW,BRASS, PARKER	
47	A/R		CABLE, INTERLOCK	
46	1	10900780	LABEL, WATER MANIFOLD	
45	4		LABEL, + −, BSL FITTED	
44	1	10900770	LABEL, CAUTION [RH SIDE]	
43	1	10900750	LABEL, MAGNET SPEC'S [LH SIDE]	
42	12		M5 WASHER FLAT, S/S	
41	4		M3 WASHER FLAT, S/S	
40	2		M20 WASHER FLAT, S/S	
39	8		M8 WASHER SPRING, S/S	
38	8		M8 WASHER FLAT, S/S	
37	4		M6 WASHER FLAT, S/S	
36	3		M16 LIFTING EYE [Ring I.D 35mm]	
35	2		M20 NUT, S/S	
34	8		M4 X 10 PAN HD PHILLIPS SCR, S/S	
33	4		M3 X 16 PAN HD PHILLIPS SCR, S/S	
32	8		M8 X 20 HX BOLT, S/S	
31	4		M5 X 12 HX BOLT, S/S [Bracket to Yoke]	
30	4		M6 X 10 SHCS, S/S	
29	6		M8 X 20 SHCS, S/S	
28	4		M4 X 50 SHCS, S/S	
27	8		M12 X 60 SHCS, S/S	
26	8		DOWEL ø12 X 24 [4 X DUCHMAN, 4 X BLIND]	
25	A/R		PAD, NEOPRENE 1.6 THK	
24	2		WASHER, NEOPRENE 16 X 4 X 4	
23	2	3450G611-1	SENSOR 50°C, ELMWOOD	
22	1	MS-8-140	MARKER STRIP, CINCH	
21	1	8-140	TERMINAL BLOCK, CINCH	
20	1	3304	CABLE CLAMP, T & B	
19	4	MB4A	CABLE MOUNTING PAD, TYTON	
18	1	FS927/70823	FLOW SWITCH IMO GEM SENSORS	
17	A/R	PB-4-BK	HOSE, PUSH ON 1/4 ø SWAGELOK	
16	6	30182-4-4B	HOSE COUPLING, 1/4 HOSE,1/4 NPT, BRASS, PARKER	
15	3	2214P-4-4	45° STREET ELBOW 1/4 NPT, BRASS, PARKER	
14	6	17801290	HANDLE	
13	1		CURRENT CABLE	
12	4	17801300	CLAMP, COIL	
11	1	17801840	MANIFOLD, FLOW SWITCH	
10	1	11902291	TERMINAL COVER ASSEMBLY [50 AMP COILS]	
9	1	17803101	BRACKET, TERMINAL COVER	
8	3	17803102	BRACKET, TERMINAL COVER	
7	2	17801880	POLE CAP [100mm cylindrical pole cap shown]	
6	2	17803030	STUD	
5	2	17803020	RETAINING RING	
4	2	17803000	NUT, POLE CAP ADJUST	
3	2	17803010	CORE	
2	2	11901961	COIL [50 AMP]	
1	1	17800560	YOKE	

PARTS LIST

DRAWN	A.MARTIN	DATE	07/14/93
CHECK		DATE	
ENGINEERING		DATE	
NEXT ASSY		SYSTEM	3472-50
SOFTWARE	AUTOCAD 2000		

DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)

LINEAR	INCHES	mm
X.XXX	±.005	±0.03
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	63	1.6

THIRD ANGLE PROJECTION

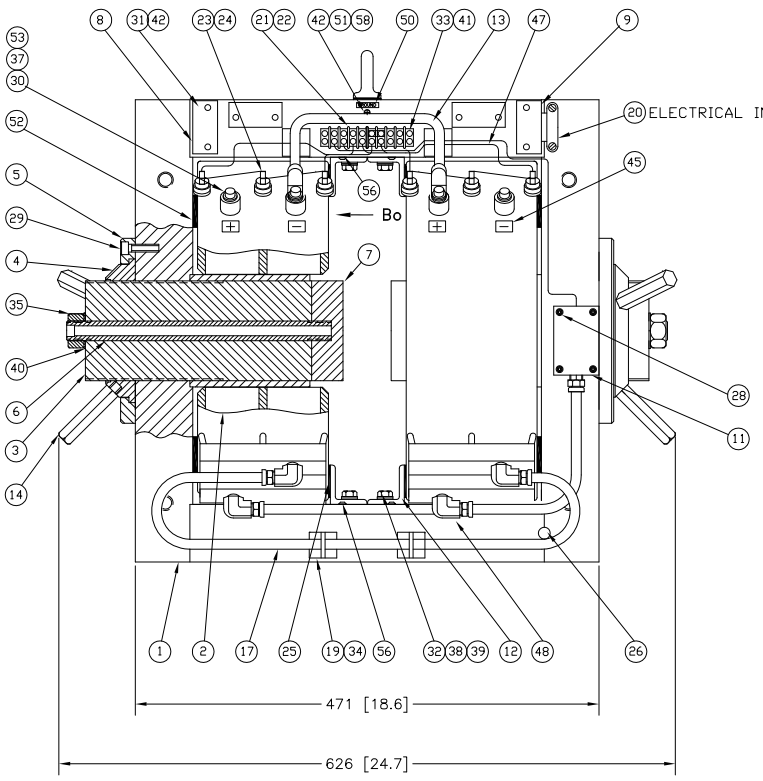
GMW
955 Industrial Rd, San Carlos, CA 94070
Tel: (650)802-8292. Fax: (650)802-8298.

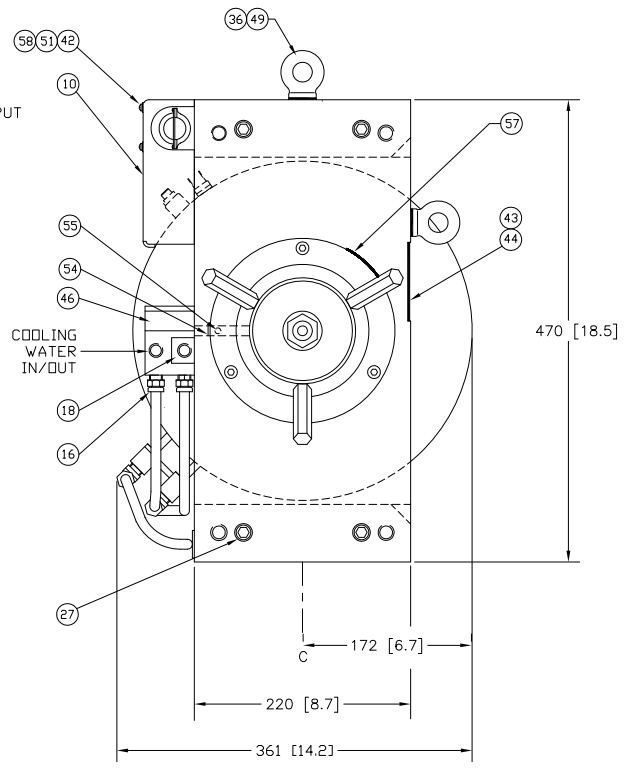
TITLE
MAGNET ASSEMBLY
MODEL: 3472-50

SIZE	DRAWING NO.	REV
A1	11801851	H

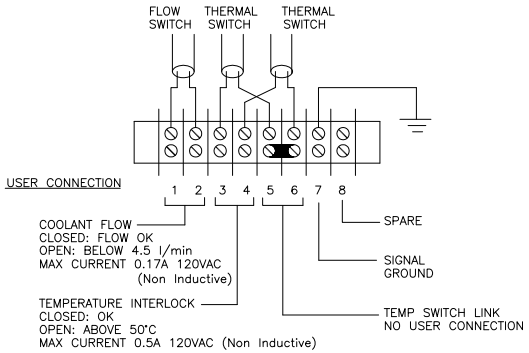
SCALE 1:2.5 WT kg SHEET 1 OF 1

TERMINAL COVER ITEM 10
OMITTED FROM THIS VIEW





INTERLOCK SCHEMATIC



MAGNET SPECIFICATIONS

POLE DIAMETER:	100 mm [4"]
POLE GAP:	0 to 82 mm [0 to 3.2"]
COIL GAP:	78 mm
POLE CAPS:	CYLINDRICAL 100 mm [4"]
	TAPERED 75, 50, 25. [3"],[2"],[1"]
COILS (series connected)	
MAX RESISTANCE:	0.71 ohm
MAX POWER (air):	20A/14V
MAX POWER (water):	70A/50V
WATER COOLING (18°C):	2.0 BAR [30 PSID], 6 L/MIN [1.6 GPM]
THERMAL INTERLOCK:	OPEN CIRCUIT ABOVE 50°C [122°C]
FLOW INTERLOCK:	OPEN CIRCUIT BELOW 4.5 L/MIN [1.2 GPM]
MASS:	335 kG [737 lbs]

NOTE: DO NOT EXCEED THE MAXIMUM SPECIFIED COIL RESISTANCE OR COIL OVERHEATING AND POSSIBLE DAMAGE MAY OCCUR.

REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		07/14/93	A.MARTIN
B	CHANGED MAGNET SPECIFICATIONS		08/16/93	A.MARTIN
C	ADD ITEMS 49,50,51,52,53, MOVE 17,19,20,21,22,34		07/25/94	G.DOUGLAS
D	ADD ITEMS 54 AND 55		09/13/95	G.DOUGLAS
E	ADD ITEM 56, CORRECT ITEM 55, AND LH COIL MANIFOLD VIEW		03/23/99	G.DOUGLAS
F	ADD ITEM 57, CHG WATER FITTINGS/HOSE LAYOUT @ C7		03/14/01	G.DOUGLAS
G	COIL HAS CHAMFER ADDED TO ID		04/30/04	G.DOUGLAS
H	CHANGE ITEM 10,16,17,48, ADD ITEM 58		11/15/05	G.DOUGLAS
I	MOVE COIL MANIFOLD, CHG COIL LABELS TO + AND −		03/13/09	G.DOUGLAS

PARTS LIST

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
58	5		M5 WASHER SPRING, S/S	
57	2	10900790	LABEL, OPEN GAP	
56	16		M4 X 8 SHCS BUTTON HD S/S [For Probe Mount]	
55	2		M6 X 16 SHSS S/S	
54	2		DOWEL PIN ø10 X 42, TAPPED M5 S/S	
53	4		M6 WASHER SPRING, S/S	
52	A/R		PAD, NEOPRENE 3mm THK	
51	5		M5 x 10 PAN HD PHILLIPS SCR S/S	
50	1		LABEL, GROUND GMW FITTED	
49	3		M16 WASHER FLAT, S/S	
48	4	1202P-4-4	90° STREET ELBOW 1/4 NPT, BRASS, PARKER	
47	A/R		CABLE, INTERLOCK	
46	1	10900780	LABEL, WATER MANIFOLD	
45	4		LABEL, + −, BSL FITTED	
44	1	10900770	LABEL, CAUTION [RH SIDE]	
43	1	10900760	LABEL, MAGNET SPEC'S [LH SIDE]	
42	8		M5 WASHER FLAT, S/S	
41	4		M3 WASHER FLAT, S/S	
40	2		M20 WASHER FLAT, S/S	
39	8		M8 WASHER SPRING, S/S	
38	8		M8 WASHER FLAT, S/S	
37	4		M6 WASHER FLAT, S/S	
36	3		M16 LIFTING EYE [Ring I.D 35mm]	
35	2		M20 NUT, S/S	
34	8		M4 X 10 PAN HD PHILLIPS SCR, S/S	
33	4		M3 X 16 PAN HD PHILLIPS SCR, S/S	
32	8		M8 X 20 HX BOLT, S/S	
31	4		M5 X 12 HX BOLT, S/S [Bracket to Yoke]	
30	4		M6 X 10 SHCS, S/S	
29	6		M8 X 20 SHCS, S/S	
28	4		M4 X 50 SHCS, S/S	
27	8		M12 X 60 SHCS, S/S	
26	8		DOWEL ø12 X 24 [4 X DUCHMAN, 4 X BLIND]	
25	A/R		PAD, NEOPRENE 1.6 THK	
24	6		WASHER, NEOPRENE 16 X 4 X 4	
23	6	3450G611-1	SENSOR 50°C, ELMWOOD	
22	1	MS-8-140	MARKER STIP, CINCH	
21	1	8-140	TERMINAL BLOCK, CINCH	
20	1	3304	CABLE CLAMP, T & B	
19	4	MB4A	CABLE MOUNTING PAD, TYTON	
18	1	FS927/70825	FLOW SWITCH IMO GEM SENSORS	
17	A/R	PB-4-BK	PUSH ON HOSE 1/4 ø SWAGELOK	
16	6	30182-4-4B	HOSE COUPLING 1/4 HOSE 1/4 NPT, BRASS, PARKER	
15			DELETED	
14	6	17801290	HANDLE	
13	1		CURRENT CABLE	
12	4	17801300	CLAMP, COIL	
11	1	17801840	MANIFOLD, FLOW SWITCH	
10	1	11902291	TERMINAL COVER ASSEMBLY [70 AMP COILS]	
9	1	17803101	BRACKET, TERMINAL COVER	
8	3	17803102	BRACKET, TERMINAL COVER	
7	2	17801880	POLE CAP [100mm cylindrical pole cap shown]	
6	2	17803030	STUD	
5	2	17803020	RETAINING RING	
4	2	17803000	NUT, POLE CAP ADJUST	
3	2	17803010	CORE	
2	2	11901862	COIL [70 AMP]	
1	1	17800560	YOKE	

DRAWN	A.MARTIN	DATE	07/14/93
CHECK		DATE	
ENGINEERING		DATE	
NEXT ASSY		SYSTEM	
SOFTWARE	AUTOCAD 2000		

DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)

LINEAR	INCHES	mm
X.XXX	±.005	±0.03
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	63	1.6

THIRD ANGLE PROJECTION

GMW
955 Industrial Rd, San Carlos, CA 94070
Tel: (650)802-8292. Fax: (650)802-8298.

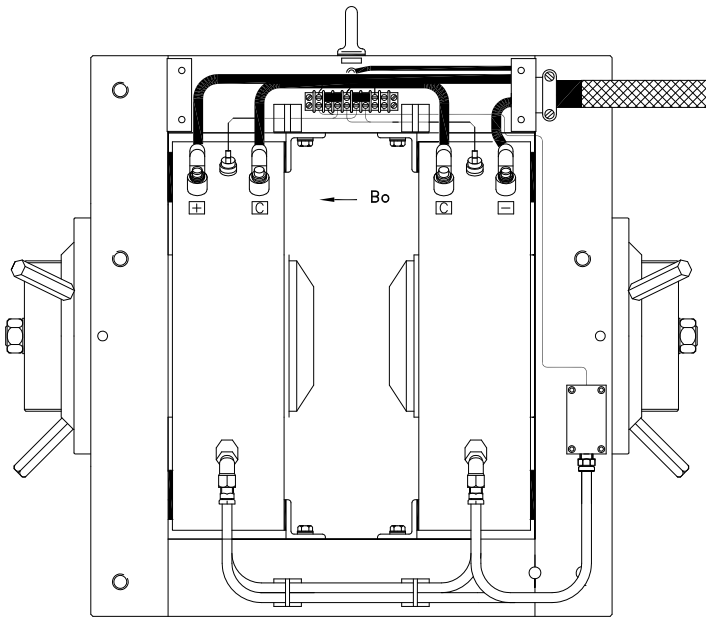
TITLE
MAGNET ASSEMBLY
MODEL: 3472-70

SIZE	DRAWING NO.	REV
A1	11801852	I

SCALE 1:2.5 WT kg SHEET 1 OF 1

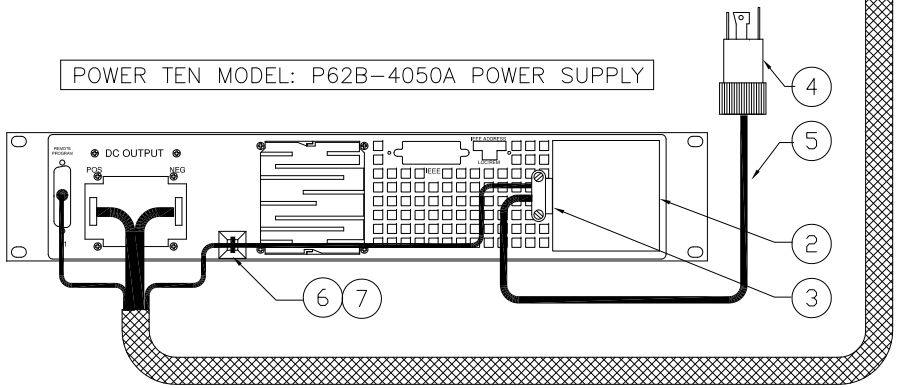
REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		03/17/97	G.DOUGLAS

MODEL: 3472–50 ELECTROMAGNET



REAR VIEW TERMINAL COVER REMOVED

POWER TEN MODEL: P62B–4050A POWER SUPPLY



POWER SUPPLY REAR VIEW

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
7	1	08432	CABLE TIE, NYLON 2.5mm WIDE, BAR–LOCK	
6	1	08461	CABLE TIE MOUNT, ADHESIVE, BAR–LOCK	
5	1	4A–1203	POWER CORD, TYPE SO 3 CORE 12AWG	N/S
4	1	L15–20P	PLUG 3PHASE/20A, NYLON. BRYANT	N/S
3	1	3303	CABLE CLAMP THOMAS & BETTS	
2	1	12900010	AC TERMINAL BOX	
1	1	16900160	CURRENT & INTERLOCK CABLE 60A	

PARTS LIST

*** WARNING ***
CHECK AC POWER VOLTAGE AND FREQUENCY MATCH POWER SUPPLY SPECIFIED REQUIREMENTS BEFORE APPLYING AC INPUT POWER

NOTE

1. POWER SUPPLY SHOWN WITH 2 PHASE 208V AC INPUT
2. REFER TO TABLE ON DWG 13900230 FOR AC INPUT RATINGS OTHER THAN 2 PHASE 208V

N/S = NOT SUPPLIED

DRAWN	G.DOUGLAS	DATE	03/17/97
CHECK		DATE	
ENGINEERING		DATE	
	3472–50		
NEXT ASSY		SYSTEM	
SOFTWARE: AUTOCAD 13			

DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)

	LINEAR INCHES	LINEAR mm
X.XXX	±.005	±0.03
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	63 ✓	1.6 ✓

THIRD ANGLE PROJECTION

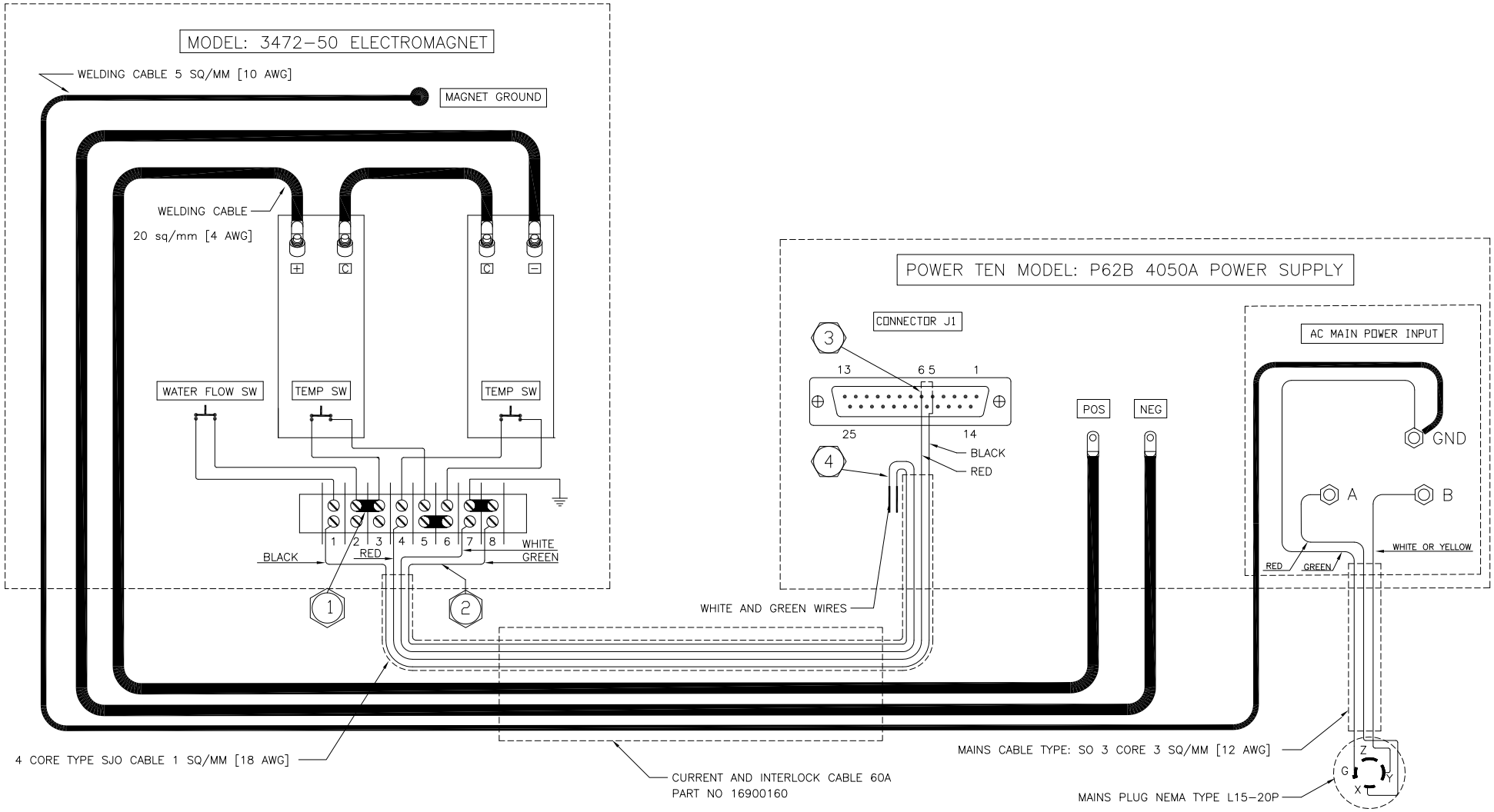
GMW
P.O. Box 2578, Redwood City, CA 94064
Tel: (415)802–8292. Fax: (415)802–8298.

TITLE
ELECTRICAL WIRING
3472–50/P62–4050

SIZE	DRAWING NO.	REV
A1	11900730	A

SCALE NTS | WT kg | SHEET 1 OF 1

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		03/17/97	G.DOUGLAS



NOTE:

1. MAGNET WATER FLOW AND TEMP INTERLOCKS LINKED IN SERIES ON MAGNET.
2. WHITE AND GREEN WATER FLOW INTERLOCK WIRES TIED TO TERM 7 & TERM 8.
3. REMOVE LINK BETWEEN PIN 5 & PIN 6 ON POWER SUPPLY AT J1, AND CONNECT INTERLOCKS WIRES AS SHOWN.
4. INSULATE WHITE AND GREEN WIRES WITH HEAT SHRINK SLEEVING [not used].

ELECTROMAGNET SYSTEM ELECTRICAL REQUIREMENTS			
AC INPUT POWER 2 PHASE, 47 to 63HZ	208V	–	–
AC INPUT FULL LOAD CURRENT	14	–	–
RECOMMENDED MAIN AC BREAKER	20	–	–
RECOMMENDED AC POWER OUTLET	L15-20R	–	–
RECOMMENDED AC CABLE SIZE	3 SQ/MM	–	–
NOTE: DRAWING SHOWS POWER SUPPLY FOR US 208V AC POWER			

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
PARTS LIST				

DRAWN G.DOUGLAS 03/17/97
CHECK
ENGINEERING
DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)

LINEAR	INCHES	mm
X.XXX	±.005	±0.03
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	63	1.6

3472-50
NEXT ASSY | SYSTEM
SOFTWARE: AUTOCAD 13
THIRD ANGLE PROJECTION

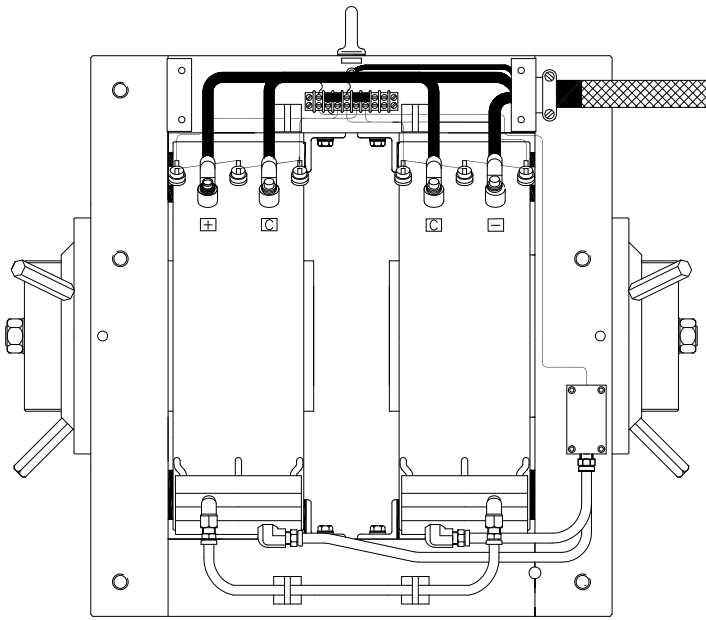
GMW
P.O. Box 2578, Redwood City, CA 94064
Tel: (415)802-8292. Fax: (415)802-8298.

TITLE
ELECTRICAL WIRING
3472-50/P62-4050

SIZE A1 | DRAWING NO. 13900230 | REV A
SCALE NTS | WT kg | SHEET 1 OF 1

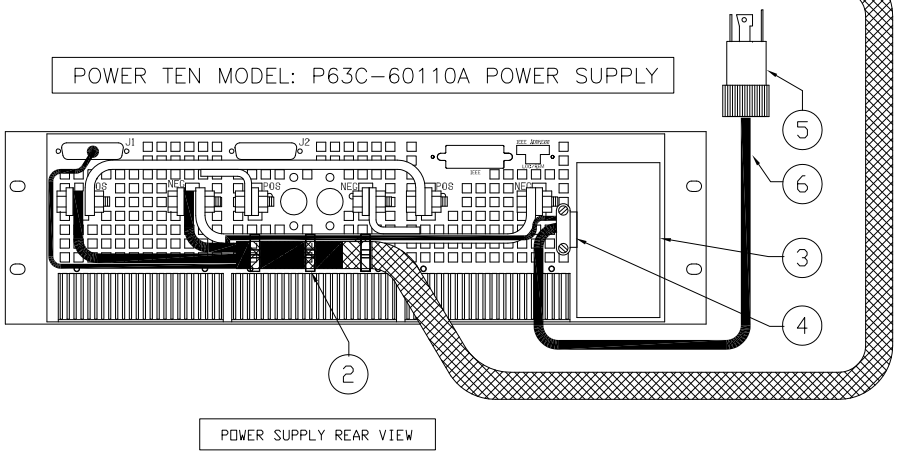
REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		03/17/97	G.DOUGLAS

MODEL: 3472-70 ELECTROMAGNET



REAR VIEW TERMINAL COVER REMOVED

POWER TEN MODEL: P63C-60110A POWER SUPPLY



POWER SUPPLY REAR VIEW

*** WARNING ***
CHECK AC POWER VOLTAGE AND FREQUENCY MATCH POWER SUPPLY SPECIFIED REQUIREMENTS BEFORE APPLYING AC INPUT POWER

NOTE

1. POWER SUPPLY SHOWN WITH 3 PHASE 208V AC INPUT
2. REFER TO TABLE ON DWG 13900220 FOR AC INPUT RATINGS OTHER THAN 3 PHASE 208V

N/S = NOT SUPPLIED

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
6	1	4A-1204	POWER CORD, TYPE SO 4 CORE 12AWG	N/S
5	1	L15-20P	PLUG 3PHASE/20A, NYLON. BRYANT	N/S
4	1	3303	CABLE CLAMP THOMAS & BETTS	
3	1	12900000	AC TERMINAL BOX	
2	3	10364	CABLE TIE, NYLON 5mm WIDE. BAR-LOK	
1	1	16900170	CURRENT & INTERLOCK CABLE 80A	

PARTS LIST

DRAWN G.DOUGLAS 03/17/97
CHECK
ENGINEERING
NEXT ASSY 3472-70 SYSTEM
SOFTWARE: AUTOCAD 13

DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)

LINEAR	INCHES	mm
X.XXX	±.005	±0.03
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	63	1.6

THIRD ANGLE PROJECTION

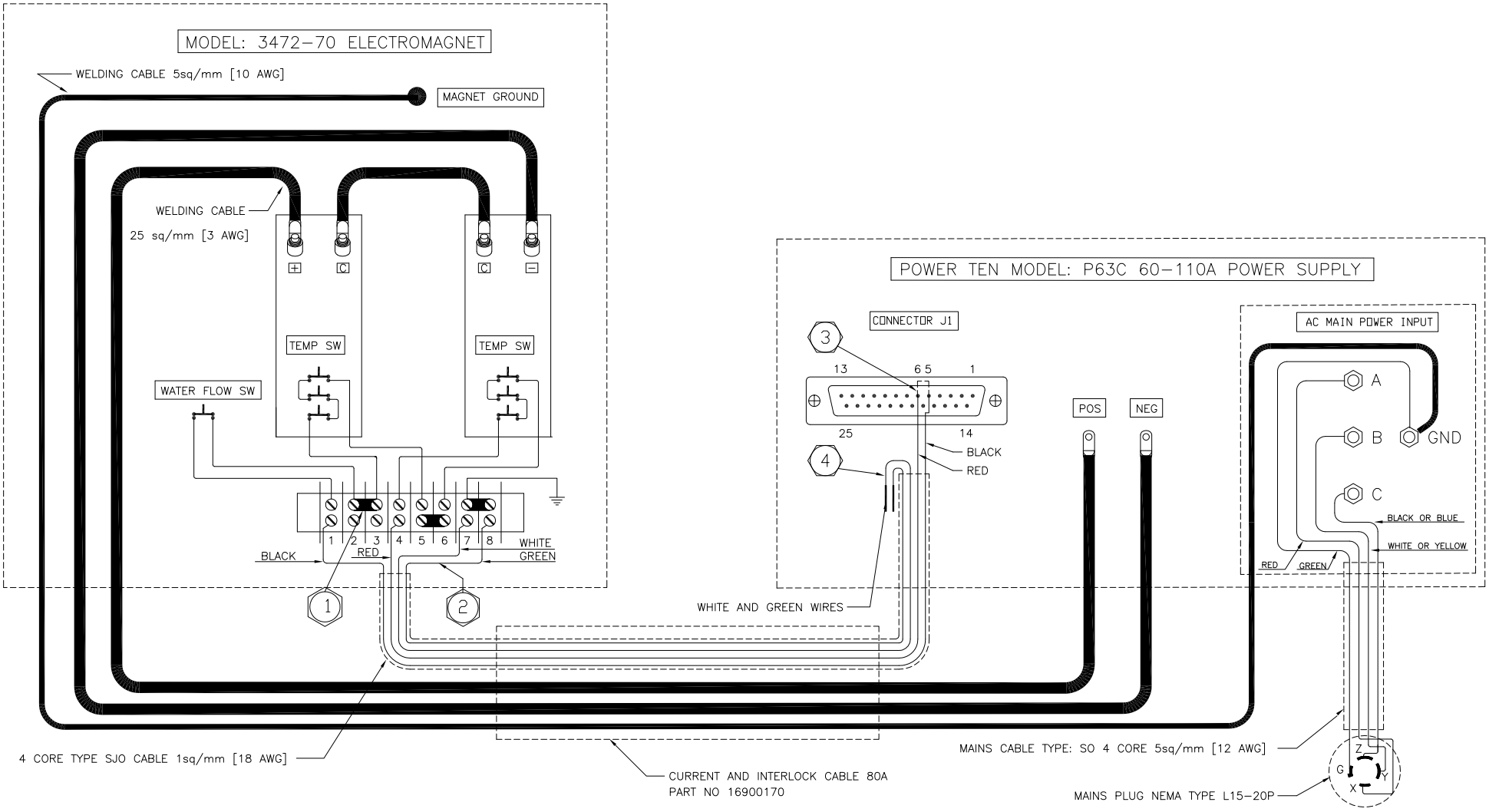
GMW
P.O. Box 2578, Redwood City, CA 94064
Tel: (415)802-8292. Fax: (415)802-8298.

TITLE
ELECTRICAL ASSY
3472-70/P63-60110

SIZE A1 | DRAWING NO. 11900720 | REV A

SCALE NTS | WT kg | SHEET 1 OF 1

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		03/17/97	G.DOUGLAS



NOTE:

1. MAGNET WATER FLOW AND TEMP INTERLOCKS LINKED IN SERIES ON MAGNET.
2. WHITE AND GREEN WATER FLOW INTERLOCK WIRES TIED TO TERM 7 & TERM 8.
3. REMOVE LINK BETWEEN PIN 5 & PIN 6 ON POWER SUPPLY AT J1, AND CONNECT INTERLOCKS WIRES AS SHOWN.
4. INSULATE WHITE AND GREEN WIRES WITH HEAT SHRINK SLEEVING [not used].

ELECTROMAGNET SYSTEM ELECTRICAL REQUIREMENTS			
AC INPUT POWER 3 PHASE, 47 to 63HZ	208V	–	–
AC INPUT FULL LOAD CURRENT	16	–	–
RECOMMENDED MAIN AC BREAKER	20	–	–
RECOMMENDED AC POWER OUTLET	L15-20R	–	–
RECOMMENDED AC CABLE SIZE	5 SQ/MM	–	–
NOTE: DRAWING SHOWS POWER SUPPLY FOR US 208V AC POWER			

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
PARTS LIST				

DRAWN G.DOUGLAS 03/17/97 | CHECK | ENGINEERING | DO NOT SCALE FROM DRAWING DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)

LINEAR	INCHES	mm
X.XXX	±.005	±0.03
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	63	1.6

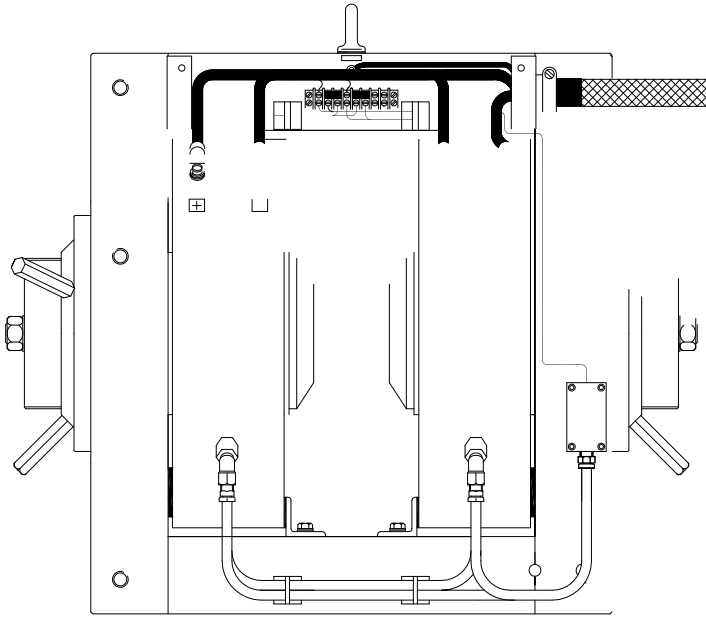
3472-70 | NEXT ASSY | SYSTEM | SOFTWARE: AUTOCAD 13 | THIRD ANGLE PROJECTION

GMW
P.O. Box 2578, Redwood City, CA 94064
Tel: (415)802-8292. Fax: (415)802-8298.

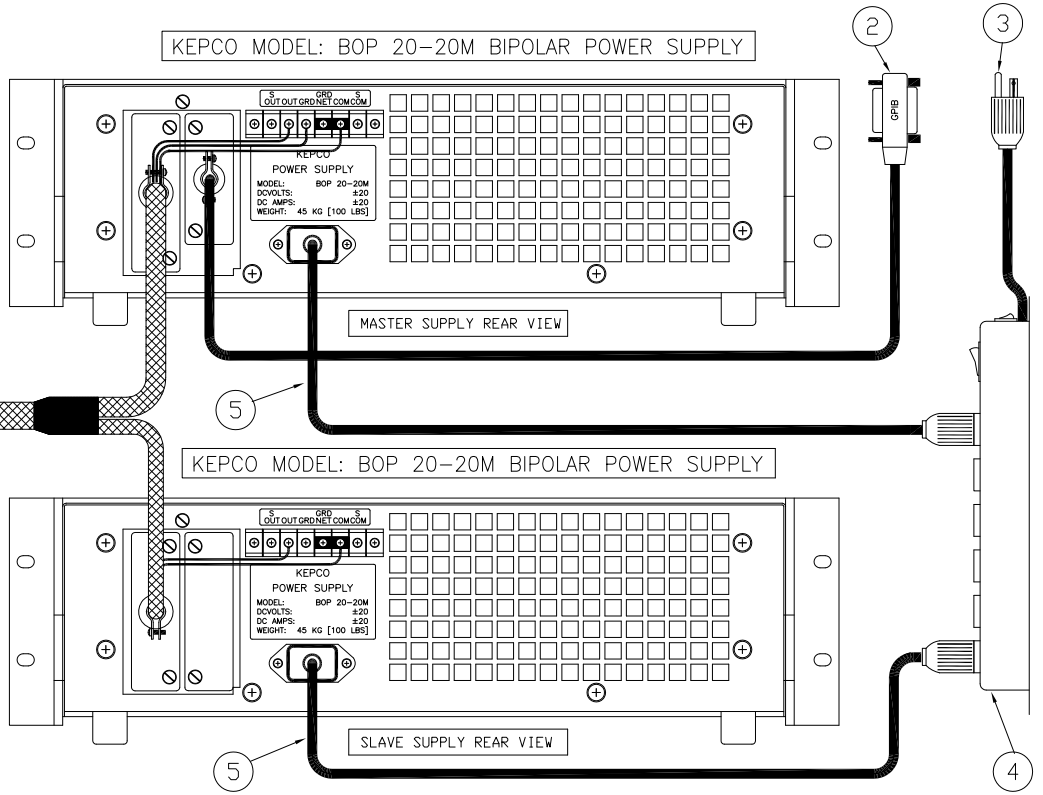
TITLE: ELECTRICAL WIRING 3472-70/P63-60110

SIZE A1 | DRAWING NO. 13900220 | REV A | SCALE NTS | WT kg | SHEET 1 OF 1

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		09/13/95	G.DOUGLAS



REAR VIEW TERMINAL COVER REMOVED



ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
5	2	KEPCO	AC POWER CORD [115V US TYPE]	
4	1	UL620-15	WABER; POWER OUTLET STRIP 20A	N/S
3	1	5-20P	AC POWER PLUG 20A [Part of Item 4]	N/S
2	1	SNQ 488-2	GPIB CABLE [2M LONG]	2
1	1	16900040	CURRENT & INTERLOCK CABLE 40A	

PARTS LIST

*** WARNING ***
CHECK AC POWER VOLTAGE AND FREQUENCY MATCH POWER SUPPLY SPECIFIED REQUIREMENTS BEFORE APPLYING AC INPUT POWER

NOTE

1. POWER SUPPLY SHOWN WITH 115V AC INPUT
2. GPIB INTERFACE IS OPTIONAL EQUIPMENT
3. REFER TO TABLE ON DWG 13900150 FOR AC INPUT RATINGS OTHER THAN 115V AC INPUT

N/S=NOT SUPPLIED

DRAWN	G.DOUGLAS	DATE	09/13/95
CHECK		DATE	
ENGINEERING		DATE	
NEXT ASSY	3472	SYSTEM	
SOFTWARE:	AUTOCAD 13		

DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)

LINEAR	INCHES	mm
X.XXX	±.005	±0.03
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	63	1.6

THIRD ANGLE PROJECTION

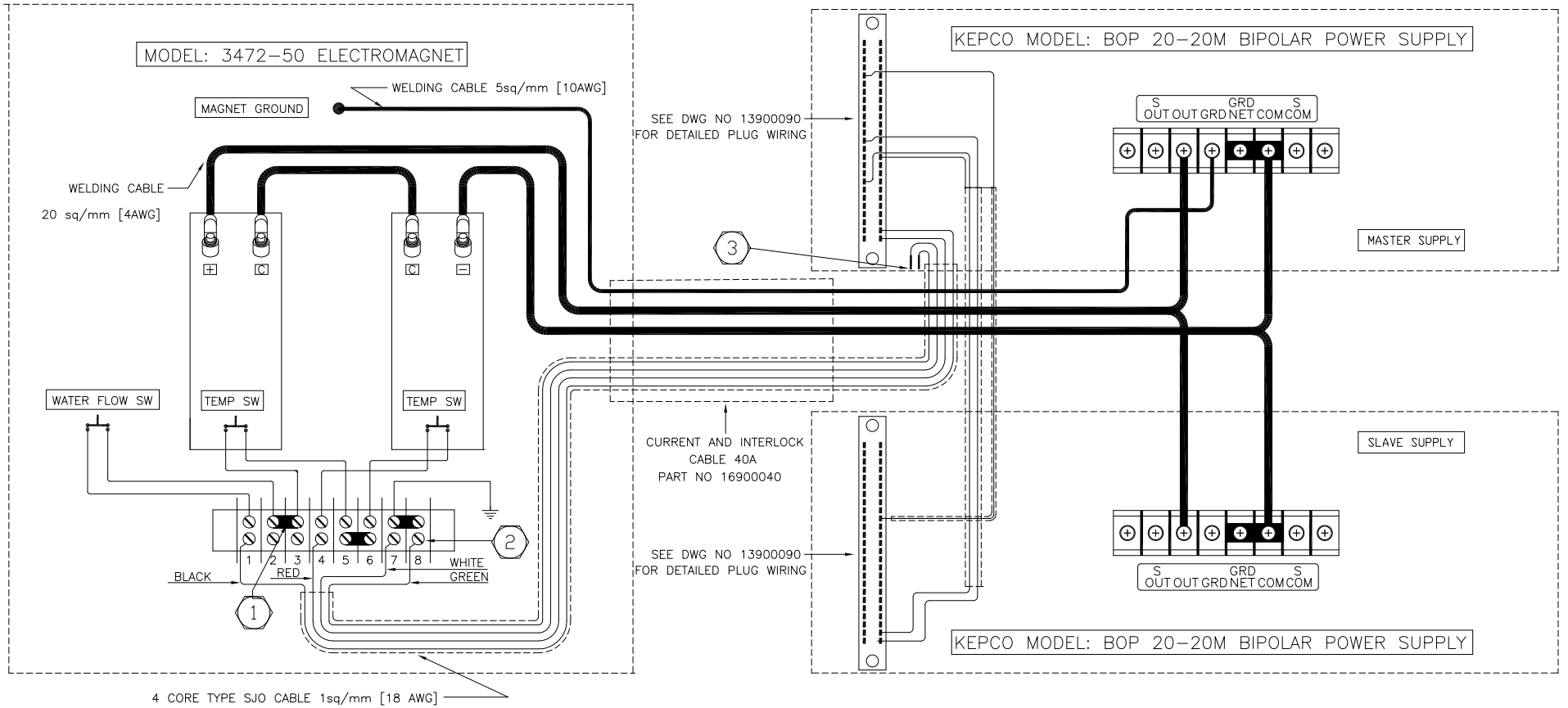
GMW
P.O. Box 2578, Redwood City, CA 94064
Tel: (415)802-8292. Fax: (415)802-8298.

TITLE
ELECTRICAL ASSY
3472-50/BOP20-40

SIZE	DRAWING NO.	REV
A1	11900320	A

SCALE NTS | WT kg | SHEET 1 OF 1

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		08/13/95	G.DOUGLAS



NOTE:

1. MAGNET WATER FLOW AND TEMP INTERLOCKS LINKED IN SERIES ON MAGNET.
2. WHITE AND GREEN WATER FLOW INTERLOCK WIRES TIED TO TERM 7 & TERM 8.
3. INSULATE WHITE AND GREEN WIRES WITH HEAT SHRINK SLEEVING [not used].

ELECTROMAGNET SYSTEM ELECTRICAL REQUIREMENTS			
AC INPUT POWER 1 PHASE, 50 to 65HZ	115V	208V	230V
AC INPUT FULL LOAD CURRENT	11.0	6.5	6.0
RECOMMENDED MAIN AC BREAKER	25	15	15
RECOMMENDED AC POWER OUTLET	5-20S	–	–
RECOMMENDED AC CABLE SIZE	1.5 SQ/MM	1.0 SQ/MM	1.0 SQ/MM
NOTE: DRAWING SHOWS POWER SUPPLY SETUP FOR 1 PHASE 115V AC POWER			

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
PARTS LIST				

DRAWN G.DOUGLAS 08/13/95 | CHECK | ENGINEERING | NEXT ASSY 3472 SYSTEM | SOFTWARE: AUTOCAD 13

DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)

LINEAR	INCHES	mm
X.XXX	±.005	±0.03
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	63	1.6

THIRD ANGLE PROJECTION

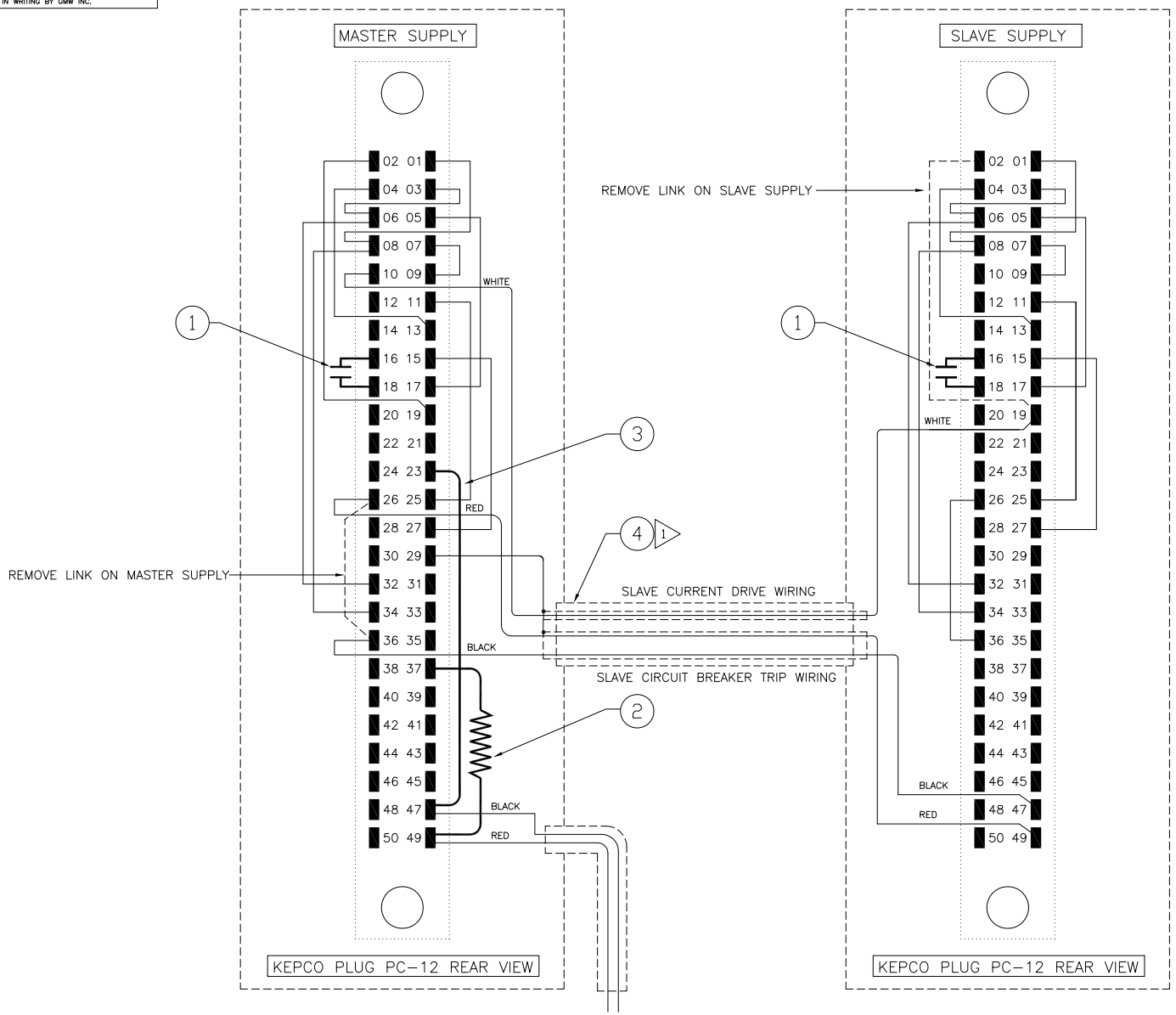
GMW
P.O. Box 2578, Redwood City, CA 94064
Tel: (415)802-8292. Fax: (415)802-8298.

TITLE: ELECTRICAL WIRING 3472-50/BOP20-40

SIZE A1 | DRAWING NO. 13900170 | REV A

SCALE NTS | WT kg | SHEET 1 OF 1

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		03/30/95	G.DOUGLAS



NOTE:

1. CUT OUT GREEN WIRE, USE WHITE, RED, BLACK ONLY.

WIRING TO MAGNET TEMP INTK

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
4	A/R	8723	CABLE, 4 CORE SHIELDED PAIRS, BELDEN	1
3	1		WIRE LINK, HOOK UP WIRE 0.5 SQ/MM	
2	1		RESISTOR, 680 OHM/0.25 W	
1	2		CAPACITOR, MYLAR 0.33uF	

PARTS LIST

DRAWN	G.DOUGLAS	DATE	03/30/95
CHECK		DATE	
ENGINEERING		DATE	
NEXT ASSY	5403	SYSTEM	
SOFTWARE	AUTOCAD 2000		

DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)

LINEAR	INCHES	mm
X.XXX	±.005	±0.03
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	63	1.6

THIRD ANGLE PROJECTION

GMW
955 Industrial Rd, San Carlos, CA 94070
Tel: (650)802-8292. Fax: (650)802-8298.

TITLE
ELECTRICAL WIRING BOP 2020/2020

SIZE	DRAWING NO.	REV
A1	13900090	A

SCALE	WT kg	SHEET 1 OF 1
NTS		

ASSEMBLY SEQUENCE MODEL: 3472 LAB MAGNET ON TO 45° MOUNTING AND ROLLING/ROTATING BASE

FIGURE 1

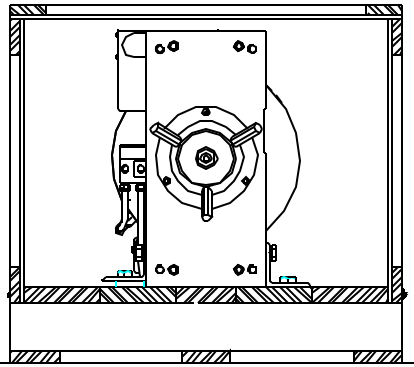


FIGURE 2

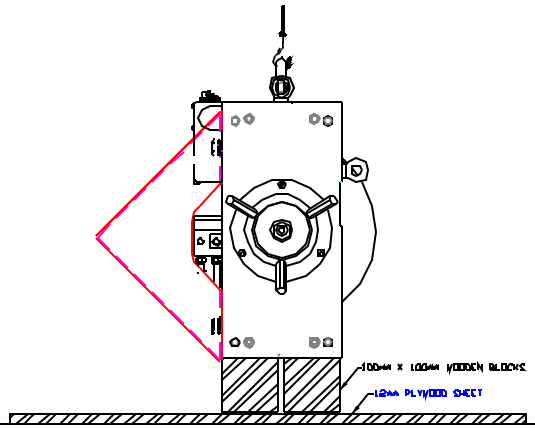


FIGURE 3

NOTE: LIFT LAB MAGNET BY BOTH FRONT LIFTING EYEBOLTS. OTHER FRONT LIFTING EYEBOLT NOT SHOWN

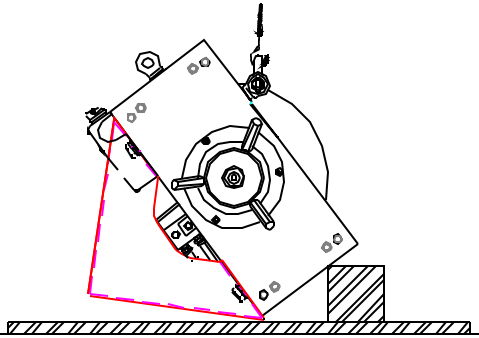


FIGURE 4

NOTE: LIFT LAB MAGNET BY BOTH FRONT LIFTING EYEBOLTS. OTHER FRONT LIFTING EYEBOLT NOT SHOWN

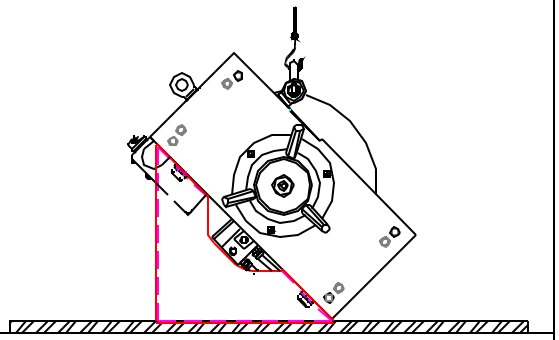


FIGURE 5

NOTE: LIFT LAB MAGNET BY BOTH FRONT LIFTING EYEBOLTS. OTHER FRONT LIFTING EYEBOLT NOT SHOWN

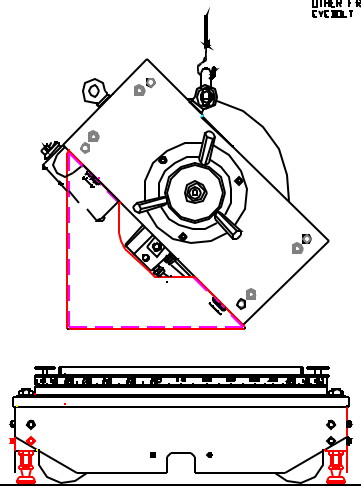
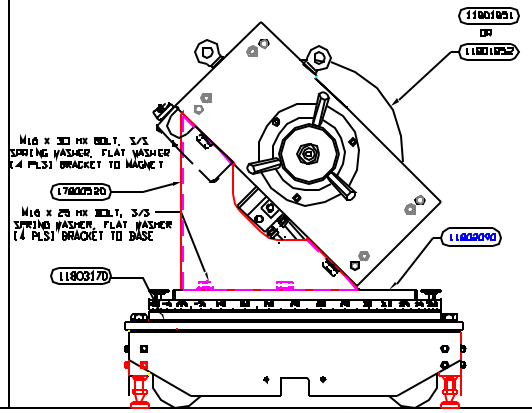


FIGURE 6

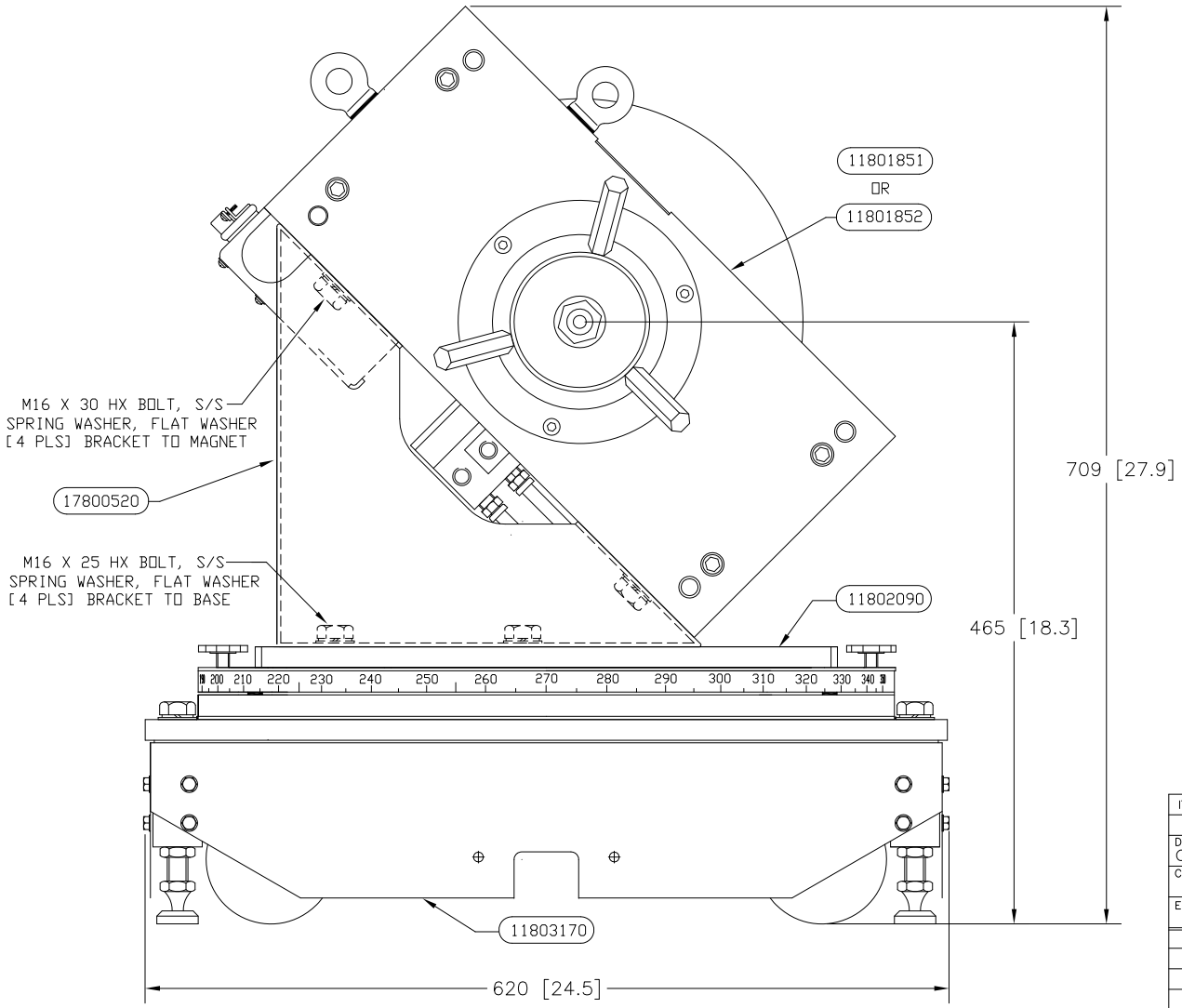


DRAWING NO 11900150 REV A

DRAWN BY: D. DOUGLAS DATE: 08/14/94

REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		07/27/94	G.DOUGLAS
B	NEW T/B, ROTATE DWG 90°, ADD DIMS		07/27/94	G.DOUGLAS



ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE

PARTS LIST

DRAWN G.DOUGLAS — DATE 07/27/94
CHECK — DATE
ENGINEERING — DATE
3472
NEXT ASSY — SYSTEM
SOFTWARE: AUTOCAD 13

DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)

	INCHES	mm
LINEAR X.XXX	±.005	±0.03
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	63	1.6

THIRD ANGLE PROJECTION

GMW
P.O. Box 2578, Redwood City, CA 94064
Tel: (415)802-8292 Fax: (415)802-8298.

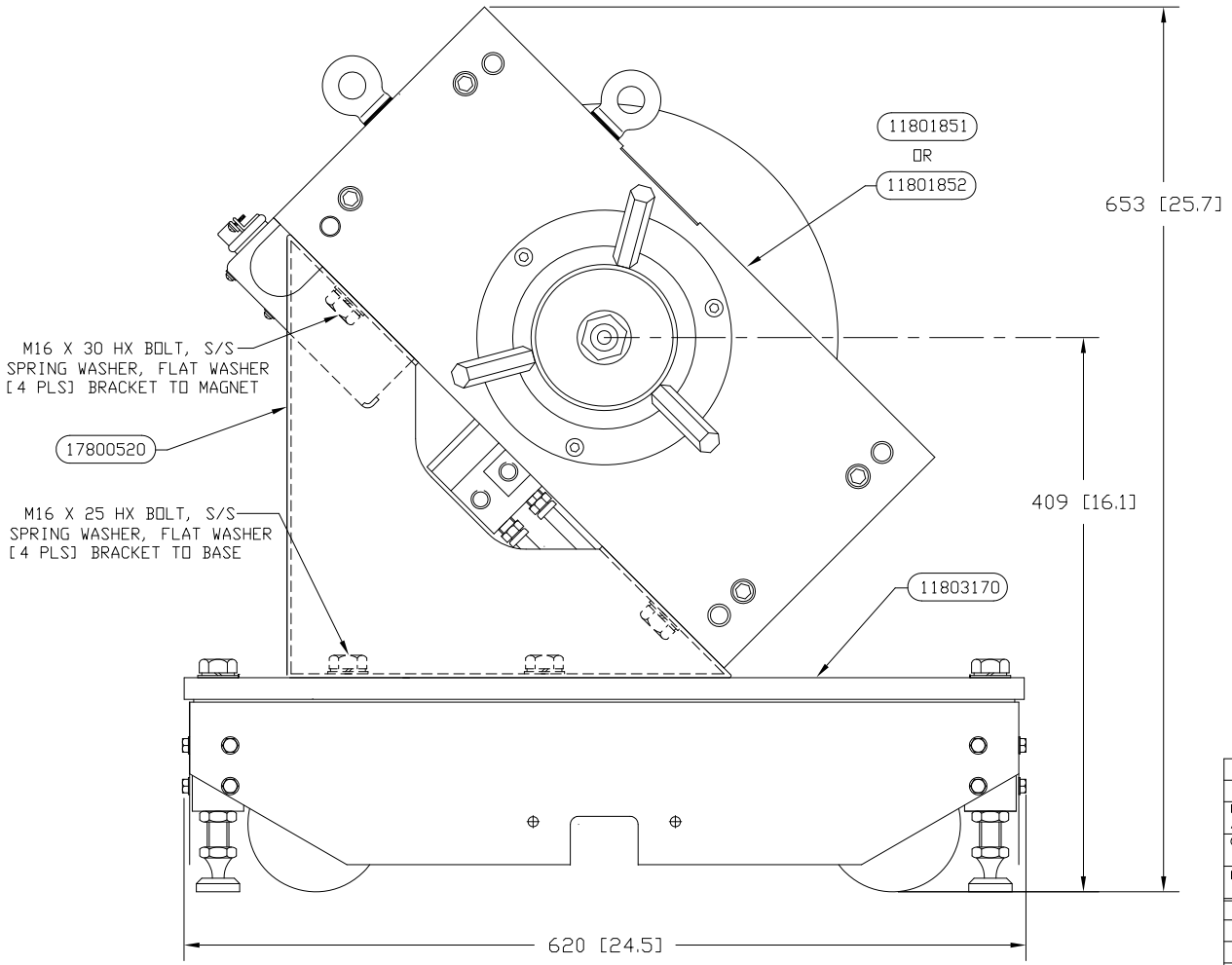
TITLE
ROLL/ROTATING BASE
MODEL: 3472/45°MTG

SIZE A2 | DRAWING NO. 11803240 | REV A

SCALE 1:2.5 WT kg | SHEET 1 OF 1

REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		07/26/94	A.MARTIN
B	NEW T/B, ADD DIMS		07/27/94	G.DOUGLAS



ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE

PARTS LIST

DRAWN A.MARTIN DATE 07/26/94
CHECK DATE
ENGINEERING DATE
NEXT ASSY SYSTEM
SOFTWARE AUTOCAD 13

DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)

LINEAR	INCHES	mm
X.XXX	±.005	±0.03
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	63	1.6

THIRD ANGLE PROJECTION

GMW
955 Industrial Rd, San Carlos, CA 94070
Tel: (650)802-8292. Fax: (650)802-8298.

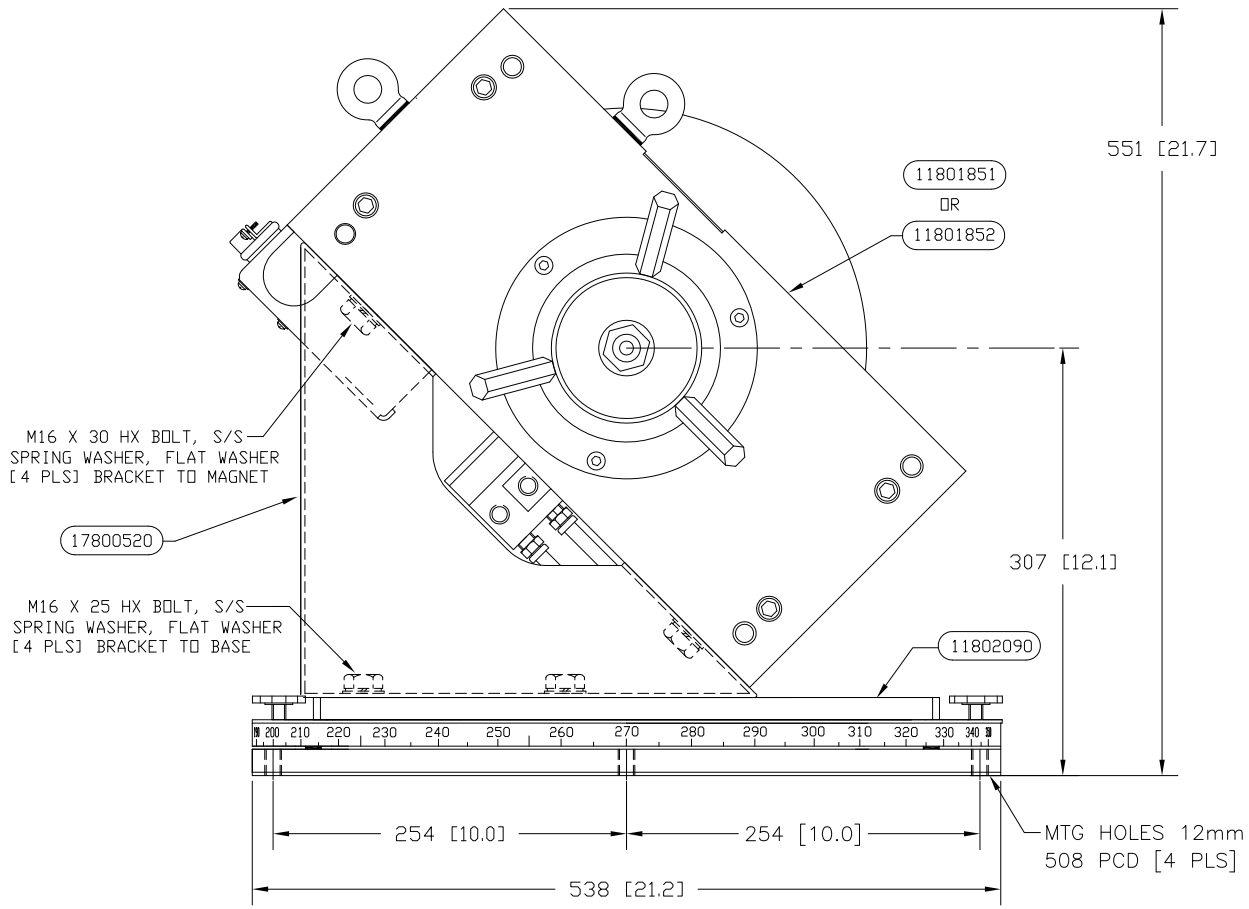
TITLE
ROLLING BASE
MODEL: 3472/°MTG

SIZE A2 | DRAWING NO. 11803190 | REV B

SCALE 1:2.5 WT kg | SHEET 1 OF 1

REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		09/11/93	A.MARTIN
B	NEW T/B, ADD DIMS		07/27/94	G.DOUGLAS
C	REMOVE ROLL/BASE PLATE, ADD ROT BASE MTG HOLES		10/26/95	G.DOUGLAS



ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE

PARTS LIST

DRAWN A.MARTIN DATE 09/11/93
CHECK DATE
ENGINEERING DATE
NEXT ASSY SYSTEM
SOFTWARE AUTOCAD 13

DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)

LINEAR	INCHES	mm
X.XXX	±.005	±0.03
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	63	1.6

THIRD ANGLE PROJECTION

GMW
955 Industrial Rd, San Carlos, CA 94070
Tel: (650)802-8292. Fax: (650)802-8298.

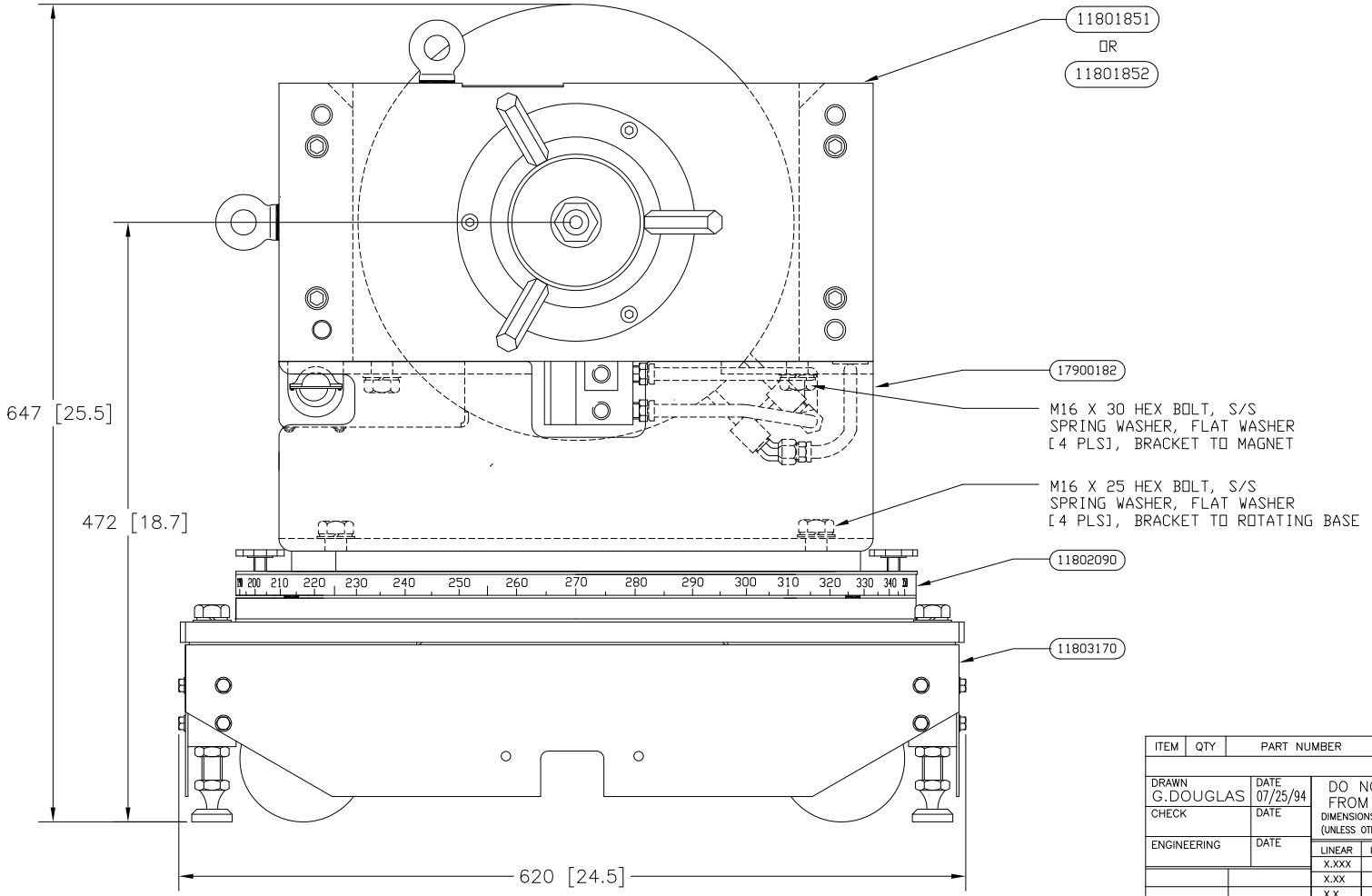
TITLE
ROTATING BASE
MODEL: 3472/45°MTG

SIZE A2 | DRAWING NO. 11803220 | REV C

SCALE 1:2.5 WT kg | SHEET 1 OF 1

REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		07/25/94	G.DOUGLAS



ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE

PARTS LIST

DRAWN G.DOUGLAS	DATE 07/25/94	
CHECK	DATE	
ENGINEERING	DATE	
	3472	
NEXT ASSY	SYSTEM	

SOFTWARE: AUTOCAD 13

DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)

LINEAR	INCHES	mm
X.XXX	±.005	±0.03
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	63	1.6

THIRD ANGLE PROJECTION

GMW
P.O. Box 2578, Redwood City, CA 94064
Tel: (415)802-8292 Fax: (415)802-8298.

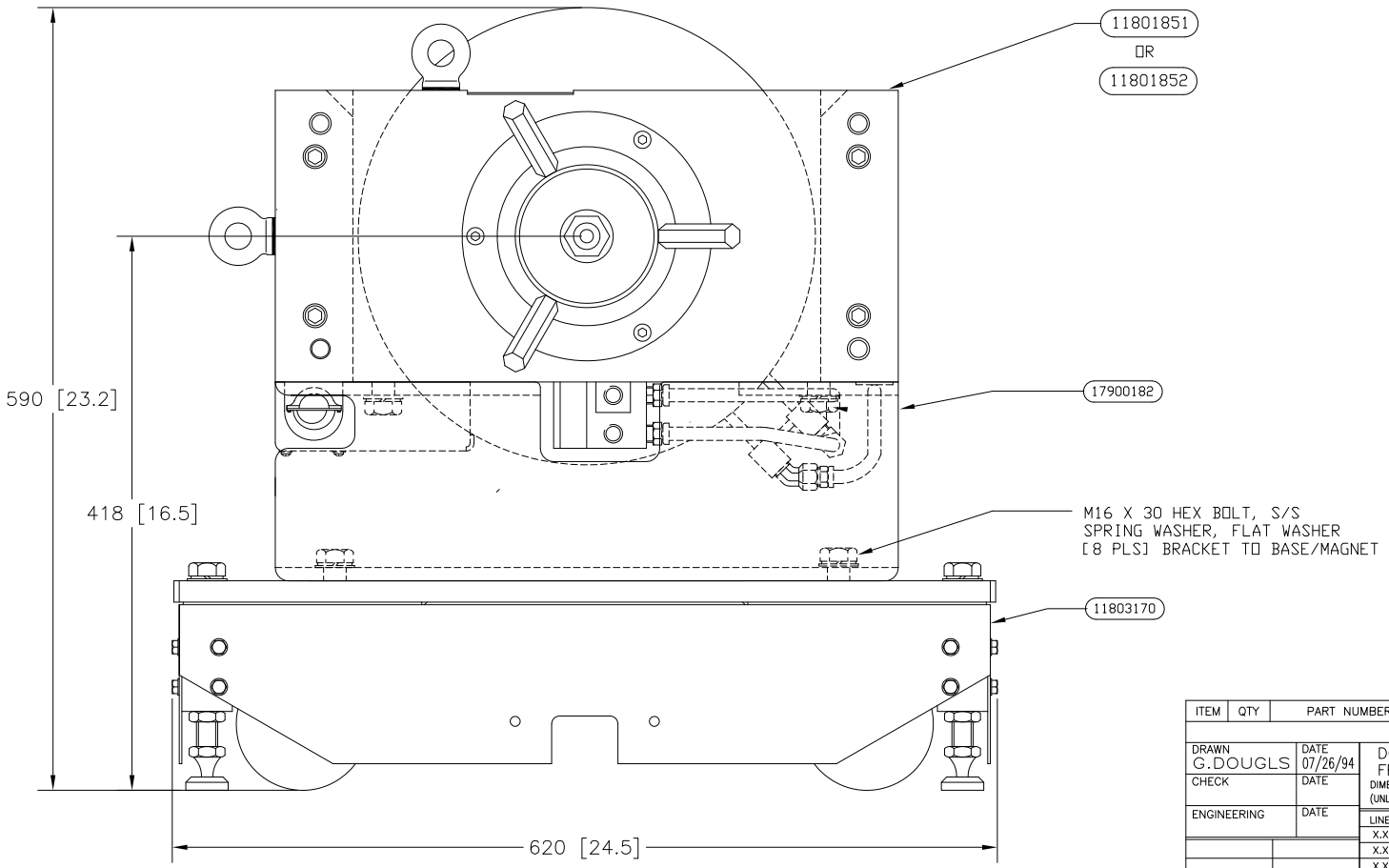
TITLE
ROL/ROT BASE ASSY
MODEL:3472/H MTG

SIZE	DRAWING NO.	REV
A2	11900170	A

SCALE 1:2.5 WT kg | SHEET 1 OF 1

REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		07/26/94	G.DOUGLAS



ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE

PARTS LIST

DRAWN G.DOUGLS — DATE 07/26/94
CHECK — DATE
ENGINEERING — DATE

3472
NEXT ASSY — SYSTEM

SOFTWARE: AUTOCAD 13

DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)

	LINEAR INCHES	LINEAR mm
X.XXX	±.005	±0.03
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	63	1.6

THIRD ANGLE PROJECTION

GMW
P.O. Box 2578, Redwood City, CA 94064
Tel: (415)802-8292 Fax: (415)802-8298.

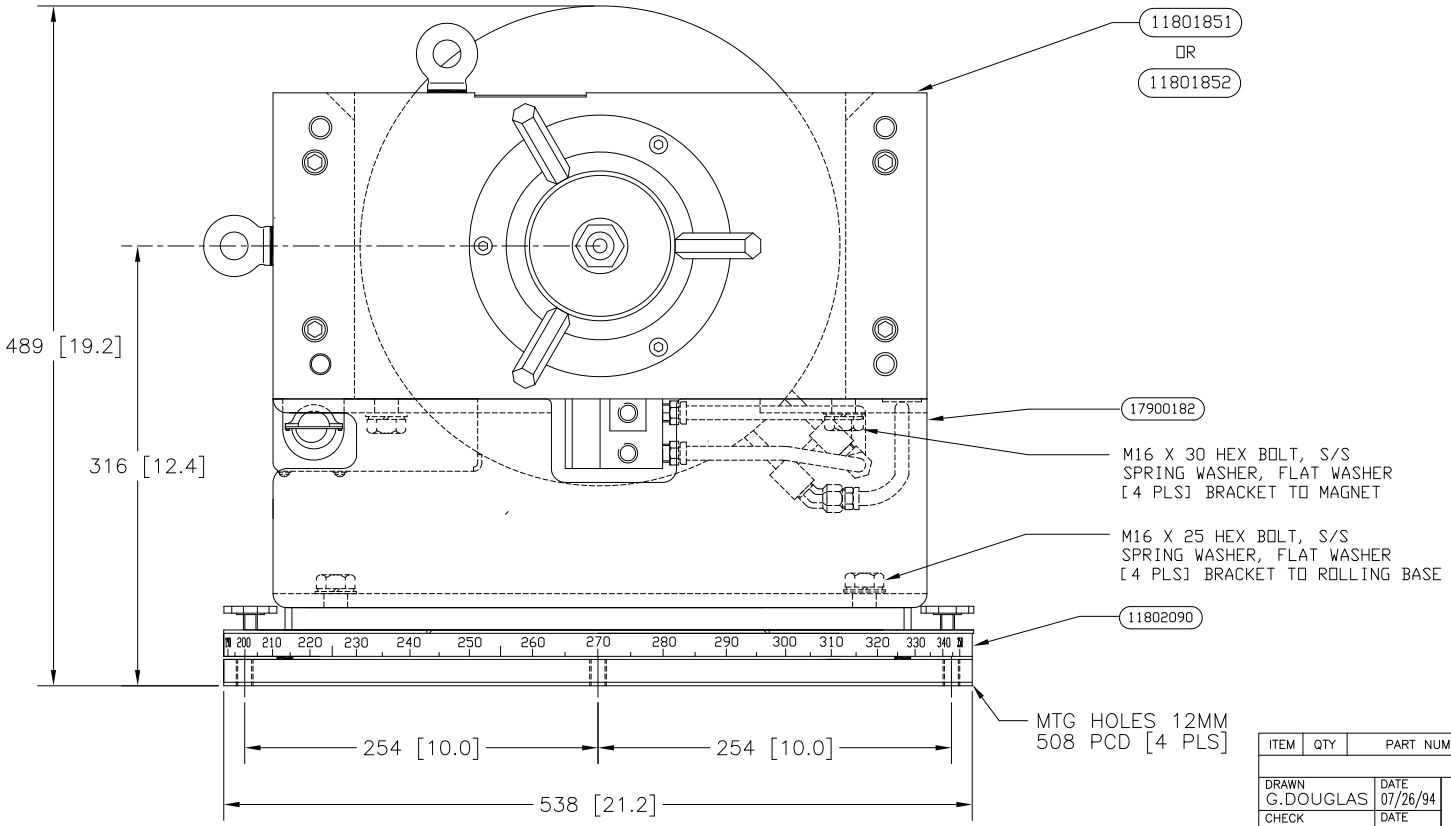
TITLE
ROLLING BASE ASSY
MODEL:3472/ H MTG

SIZE	DRAWING NO.	REV
A2	11900160	A

SCALE 1:2.5 WT kg — SHEET 1 OF 1

REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		07/26/94	G.DOUGLAS
B	REMOVE ROLL/BASE PLATE, ADD ROT BASE MTG HOLES		10/26/95	G.DOUGLAS



ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE

PARTS LIST

DRAWN G.DOUGLAS DATE 07/26/94
CHECK DATE
ENGINEERING DATE

DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)

LINEAR	INCHES	mm
X.XXX	±.005	±0.03
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	63	1.6

THIRD ANGLE PROJECTION

GMW
P.O. Box 2578, Redwood City, CA 94064
Tel: (415)802-8292 Fax: (415)802-8298.

TITLE
ROTATING BASE ASSY
MODEL:3472/H MTG

3472
NEXT ASSY SYSTEM

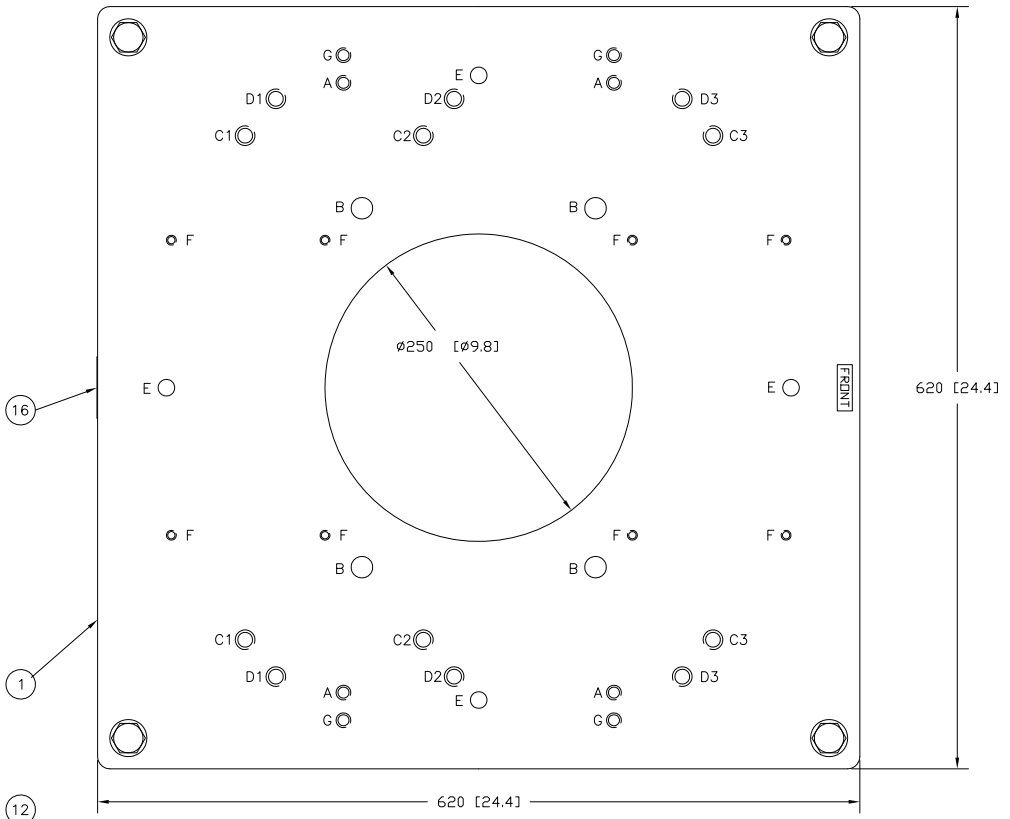
SOFTWARE:
AUTOCAD 13

SIZE A2 | DRAWING NO. 11900180 | REV B

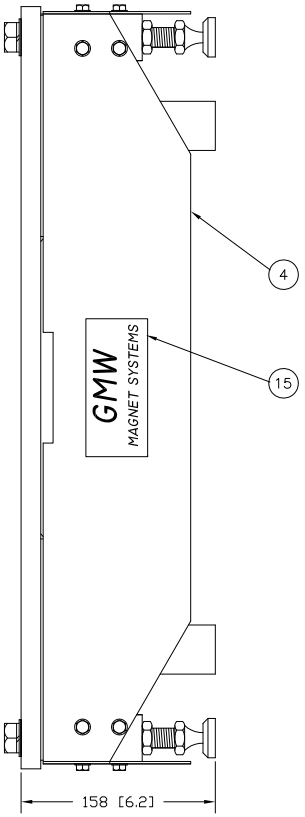
SCALE 1:2.5 WT kg | SHEET 1 OF 1

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		08/04/93	A.MARTIN
B	NEW T/B, ADD ITEM 13, MOVE 2,3, SHIFT "A" HOLES		04/29/94	G.DOUGLAS
C	ADD MAGNET HORIZONTAL MOUNTING HOLES		05/08/94	G.DOUGLAS
D	ADD 5403 MTG HOLES		05/13/95	G.DOUGLAS
E	ADD MRD MOTOR DRIVE MOUNTING HOLES		10/21/98	G.DOUGLAS
F	ADD ITEM 16, AND "G" 5403EG MOUNTING HOLES		06/28/03	G.DOUGLAS
G	ADD ENLARGED FOOT VIEW, NOTE 1		04/14/04	G.DOUGLAS
H	CHANGE ITEM 15 PART NO		11/16/05	G.DOUGLAS

TOP VIEW



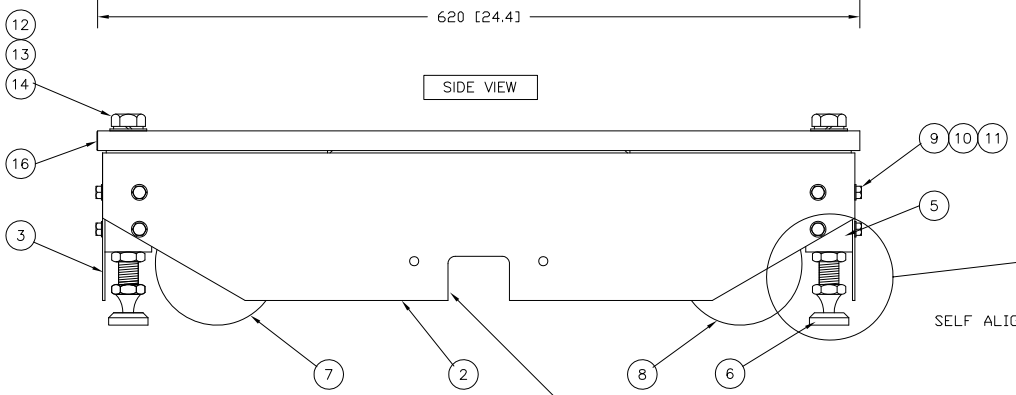
FRONT VIEW

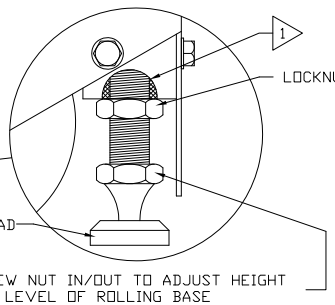


MOUNTING HOLES
A=5403 DIRECT MOUNTING
B=3473/3472 DIRECT MOUNTING
C1/C2=3472 45° MOUNTING
D1/D2=3473 45° MOUNTING
C1/C3=3472 HORZ MOUNTING
D1/D3=3473 HORZ MOUNTING
E=ROTATING BASE MOUNTING
F=MRD MOTOR DRIVE MOUNTING
G=5403EG DIRECT MOUNTING

NOTE:
1. APPLY GENERAL PURPOSE GREASE TO INTERNAL THREAD IN AREA SHOWN DURING ASSEMBLY [4 PLS]

SIDE VIEW





ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
16	1	10901110	LABEL, IDENTIFICATION	
15	1	10900200	LABEL, GMW MAGNET SYSTEMS	
14	4	DIN 125 A	M16 X 3 THICK WASHER, FLAT S/S	
13	4	DIN 127 B	M16 WASHER, SPRING S/S	
12	4	DIN 933	M16 X 40 HEX HD BOLT, S/S	
11	16	DIN 127 B	M6 WASHER, SPRING S/S	
10	16	DIN 433	M6 WASHER, FLAT S/S	
9	16	DIN 933	M6 x 8 HEX HD BOLT S/S	
8	2	REX CHDS 4RT	CASTER, SWIVEL	
7	2	REX CHDF 4RT	CASTER, FIXED	
6	4	17802180	LEVELING FOOT	
5	4	17802160	SUPPORT LEG	
4	1	17802123	SKIRT PANEL, FRONT	
3	1	17802122	SKIRT PANEL, REAR	
2	2	17802121	SKIRT PANEL, SIDE	
1	1	17802110	BASE PLATE	

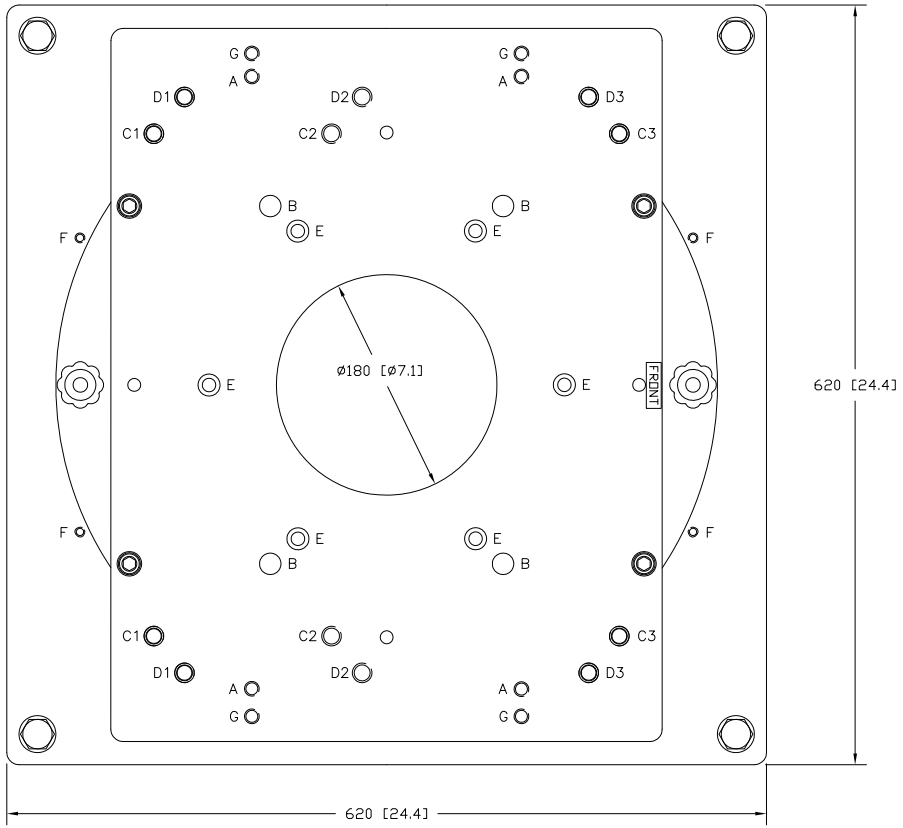
PARTS LIST

DRAWN A.MARTIN	DATE 08/04/93	DO NOT SCALE FROM DRAWING	GMW
CHECK	DATE	DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)	955 Industrial Rd, San Carlos, CA 94070
ENGINEERING	DATE	LINEAR: INCHES / mm; X.XXX ±.005 / ±0.03; X.XX ±.01 / ±0.1; X.X ±.03 / ±0.3; X ±.06 / ±1; DEG. ±.5 / ±0.5; FINISH 63 / 1.6	Tel: (650)802-8292. Fax: (650)802-8298.
			TITLE: ROLLING BASE ASSY 3473/3472/5403
NEXT ASSY	SYSTEM	THIRD ANGLE PROJECTION	SIZE A1 · DRAWING NO. 11803170 · REV H
SOFTWARE AUTOCAD 2000			SCALE 1:2 · WT kg · SHEET 1 OF 1

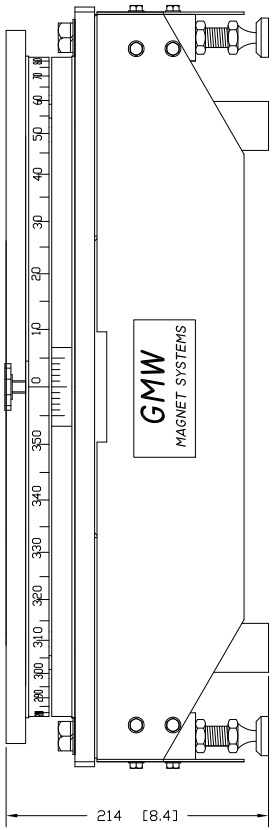
REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		04/27/94	G.DOUGLAS
B	ADD 5403 MTG HOLES		05/13/95	G.DOUGLAS
C	ADD MOTORIZED ROTATING BASE HOLES		07/05/97	G.DOUGLAS
D	ADD "G" HOLES, INCR TRANSISTION PLATE SIZE		06/27/03	G.DOUGLAS
E	CORRECT TRANSISTION PLATE HOLE CALLOUT, ADD FOOT	VIEW	04/14/04	G.DOUGLAS

TOP VIEW



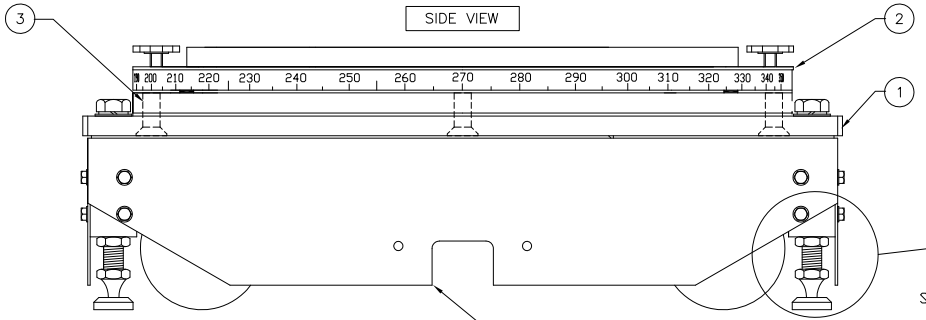
FRONT VIEW

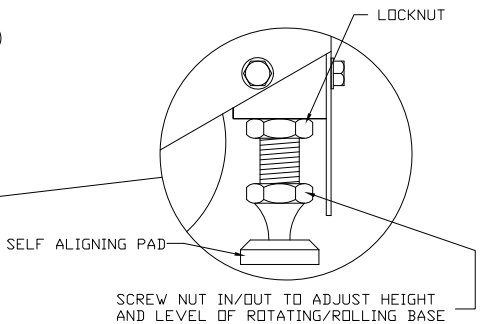


MOUNTING HOLES

A=5403 DIRECT MOUNTING
B=3473/3472 DIRECT MOUNTING
C1/C2=3472 45° MOUNTING
D1/D2=3473 45° MOUNTING
C1/C3=3472 HORZ MOUNTING
D1/D3=3473 HORZ MOUNTING
E=MRD SPOOL MOUNTING
F=MRD MOTOR DRIVE MOUNTING
G=5403EG DIRECT MOUNTING

SIDE VIEW





ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
3	4	DIN 7991	SHCS, M12 X 35 FLAT HD S/S	
2	1	11802090	ROTATING BASE ASSEMBLY	
1	1	11803170	ROLLING BASE ASSEMBLY	

PARTS LIST

DRAWN	G.DOUGLAS	DATE 04/27/94
CHECK		DATE
ENGINEERING		DATE
NEXT ASSY		SYSTEM
SOFTWARE	AUTOCAD 2000	

DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)

	LINEAR INCHES	LINEAR mm
X.XXX	±.005	±0.03
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	63 ✓	1.6✓

THIRD ANGLE PROJECTION

GMW
955 Industrial Rd, San Carlos, CA 94070
Tel: (650)802-8292. Fax: (650)802-8298.

TITLE
ROT/ROLLING BASE
3473/3472/5403

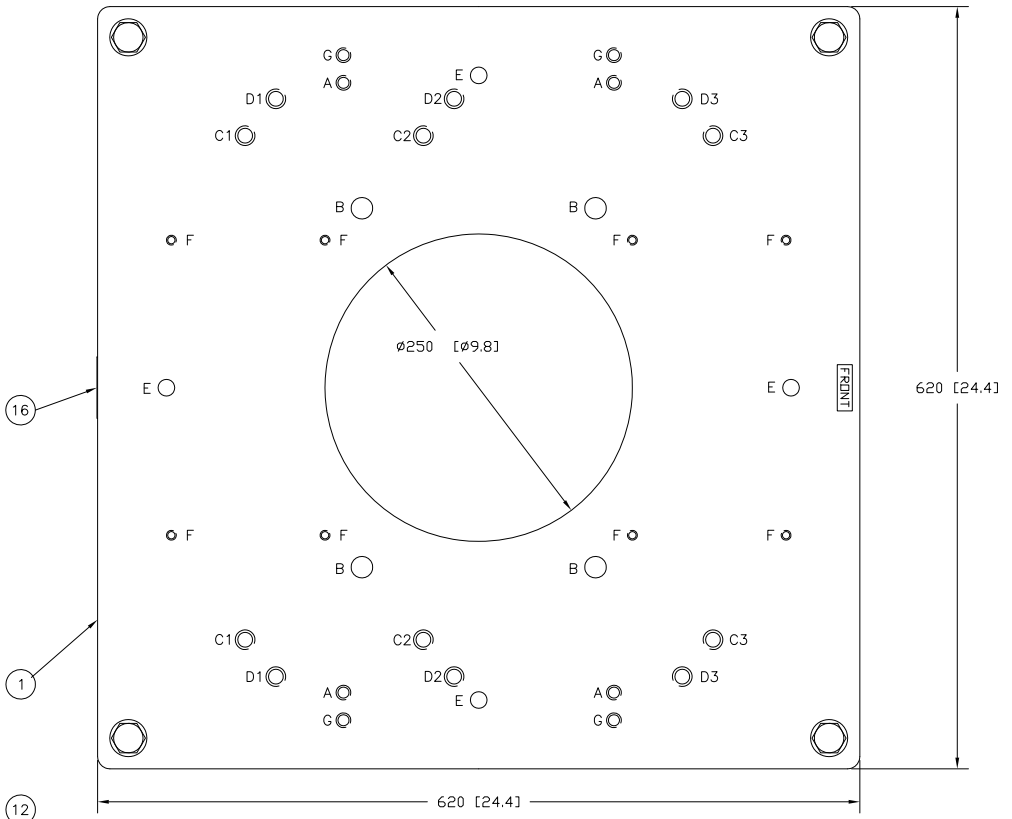
SIZE	DRAWING NO.	REV
A1	11803430	E

SCALE 1:2 | WT kg | SHEET 1 OF 1

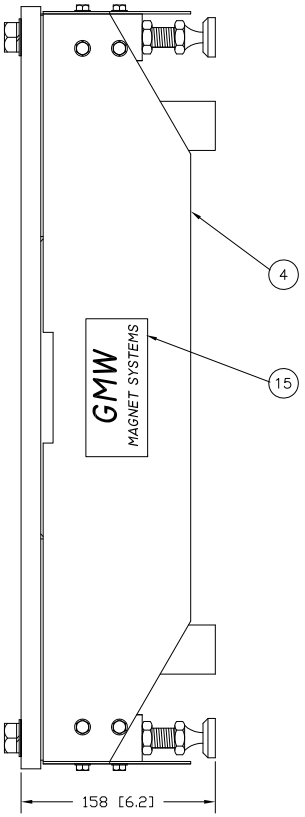
REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		08/04/93	A.MARTIN
B	NEW T/B, ADD ITEM 13, MOVE 2,3, SHIFT "A" HOLES		04/29/94	G.DOUGLAS
C	ADD MAGNET HORIZONTAL MOUNTING HOLES		05/08/94	G.DOUGLAS
D	ADD 5403 MTG HOLES		05/13/95	G.DOUGLAS
E	ADD MRD MOTOR DRIVE MOUNTING HOLES		10/21/98	G.DOUGLAS
F	ADD ITEM 16, AND "G" 5403EG MOUNTING HOLES		06/28/03	G.DOUGLAS
G	ADD ENLARGED FOOT VIEW, NOTE 1		04/14/04	G.DOUGLAS
H	CHANGE ITEM 15 PART NO		11/16/05	G.DOUGLAS

TOP VIEW



FRONT VIEW

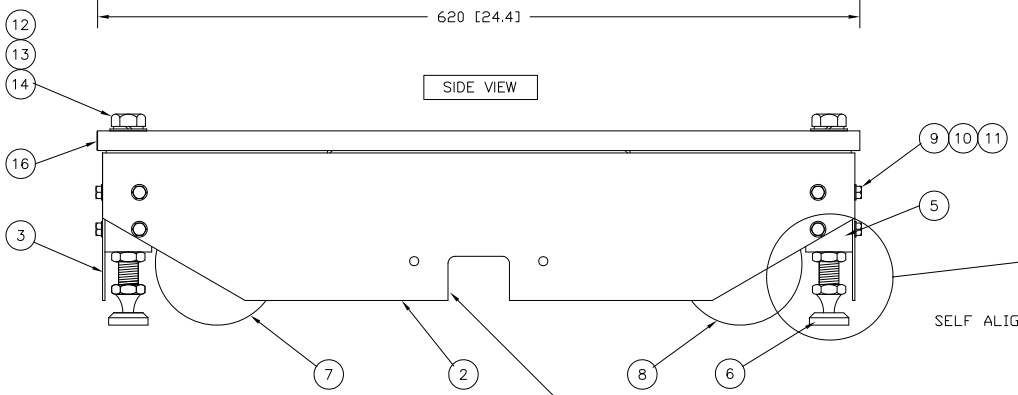


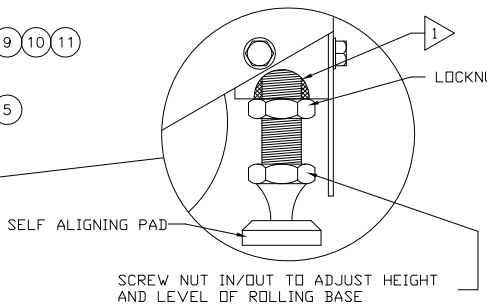
MOUNTING HOLES

A=5403 DIRECT MOUNTING
B=3473/3472 DIRECT MOUNTING
C1/C2=3472 45° MOUNTING
D1/D2=3473 45° MOUNTING
C1/C3=3472 HORZ MOUNTING
D1/D3=3473 HORZ MOUNTING
E=ROTATING BASE MOUNTING
F=MRD MOTOR DRIVE MOUNTING
G=5403EG DIRECT MOUNTING

NOTE:
1. APPLY GENERAL PURPOSE GREASE TO INTERNAL THREAD IN AREA SHOWN DURING ASSEMBLY [4 PLS]

SIDE VIEW





ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
16	1	10901110	LABEL, IDENTIFICATION	
15	1	10900200	LABEL, GMW MAGNET SYSTEMS	
14	4	DIN 125 A	M16 X 3 THICK WASHER, FLAT S/S	
13	4	DIN 127 B	M16 WASHER, SPRING S/S	
12	4	DIN 933	M16 X 40 HEX HD BOLT, S/S	
11	16	DIN 127 B	M6 WASHER, SPRING S/S	
10	16	DIN 433	M6 WASHER, FLAT S/S	
9	16	DIN 933	M6 x 8 HEX HD BOLT S/S	
8	2	REX CHDS 4RT	CASTER, SWIVEL	
7	2	REX CHDF 4RT	CASTER, FIXED	
6	4	17802180	LEVELING FOOT	
5	4	17802160	SUPPORT LEG	
4	1	17802123	SKIRT PANEL, FRONT	
3	1	17802122	SKIRT PANEL, REAR	
2	2	17802121	SKIRT PANEL, SIDE	
1	1	17802110	BASE PLATE	

PARTS LIST

DRAWN A.MARTIN 08/04/93
CHECK DATE
ENGINEERING DATE
NEXT ASSY SYSTEM
SOFTWARE AUTOCAD 2000

DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)

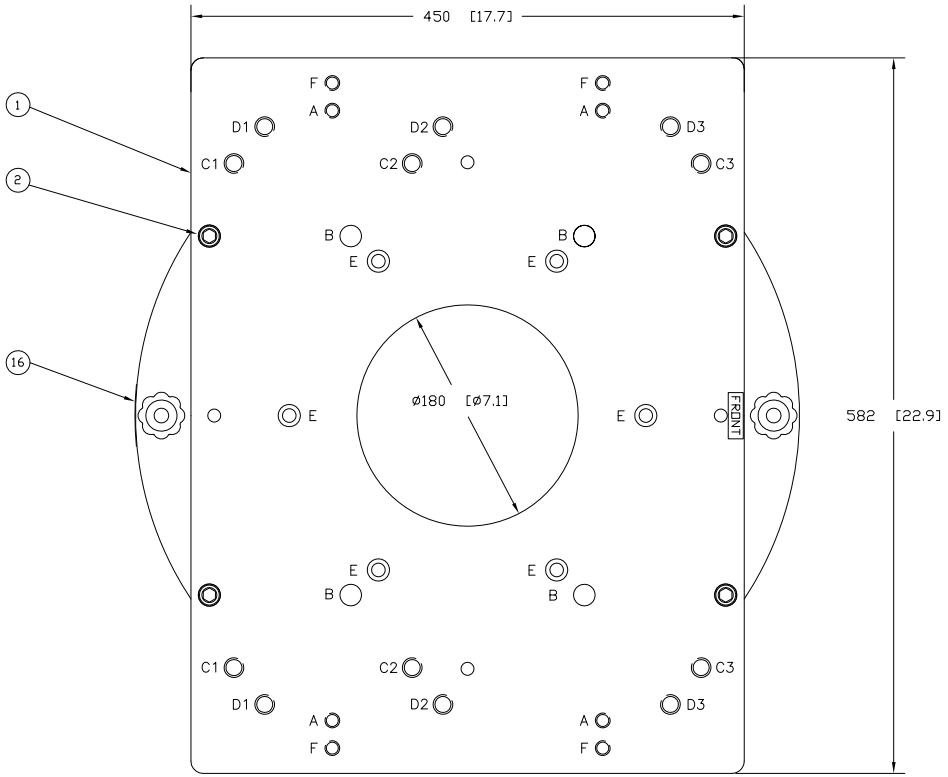
	LINEAR INCHES	LINEAR mm
X.XXX	±.005	±0.03
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	63	1.6

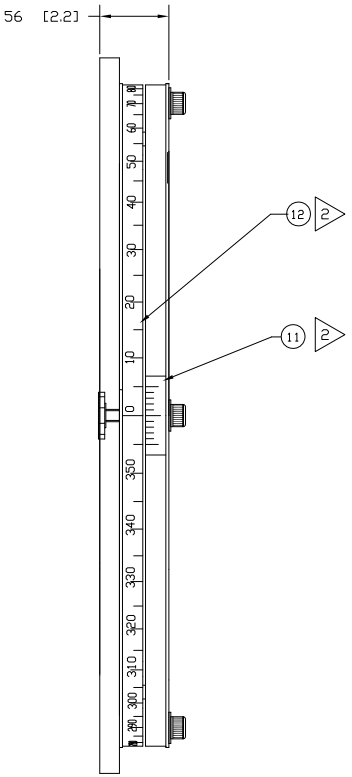
THIRD ANGLE PROJECTION

GMW
955 Industrial Rd, San Carlos, CA 94070
Tel: (650)802-8292. Fax: (650)802-8298.

TITLE
ROLLING BASE ASSY
3473/3472/5403

SIZE A1 | DRAWING NO. 11803170 | REV H
SCALE 1:2 | WT kg | SHEET 1 OF 1



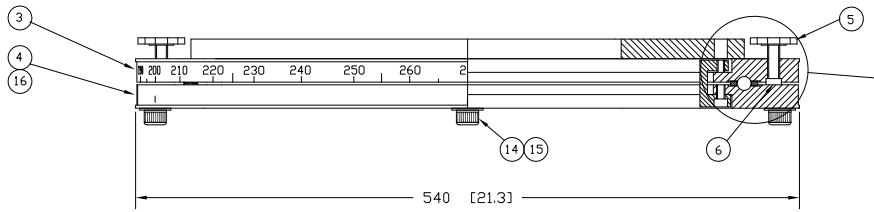


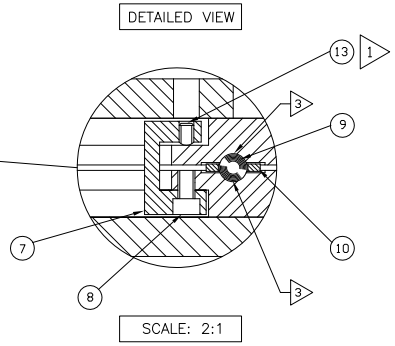
REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		04/27/94	A.MARTIN
B	NEW T/B, SHIFT ITEM 11 & 12 TO FRONT OF BASE.		04/29/94	G.DOUGLAS
C	ADD HORIZONTAL MTG HOLES @ B6/D6		05/10/94	G.DOUGLAS
D	ADD 5403 MTG HOLES, DELETE BASE PLATE		04/28/95	G.DOUGLAS
E	ADD MOTORISED ROT BASE SPOOL HOLES @ C7		09/30/97	G.DOUGLAS
F	CHG ITEM 9 AND ITEM 13		07/29/98	G.DOUGLAS
G	ADD ITEM 16, "F" HOLES, INCR TRANSISTION PLATE SIZE		06/27/03	G.DOUGLAS
H	CHG ITEM 14 TO SHCS		04/15/04	G.DOUGLAS

MOUNTING HOLES
A=5403 DIRECT MOUNTING
B=3473/3472 DIRECT MOUNTING
C1/C2=3472 45° MOUNTING
D1/D2=3473 45° MOUNTING
C1/C3=3472 HORZ MOUNTING
D1/D3=3473 HORZ MOUNTING
E=MOTORISED ROT BASE SPOOL
F=5403EG DIRECT MOUNTING

NOTES

1. ADJUST SET SCREW FOR MINIMUM CLEARANCE ALLOWING FOR FULL FREE ROTATION; AND LOCTITE
2. FORM DECAL TO PLATE DIA TO PREVENT ENDS FROM SPRINGING LOOSE
3. GREASE BEARING SURFACES BEFORE ASSEMBLY
4. ITEM 14 AND ITEM 15 ONLY USED IF ROTATING BASE SOLD SEPARATELY. SEE DWG NO 11803430 FOR DETAILS ON MOUNTING ROTATING BASE TO ROLLING BASE





ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
16	1	10901140	LABEL, IDENTIFICATION	
15	4	DIN 7980	WASHER, M12 SPRING, S/S	4
14	4	DIN 912	SCREW, M12 x 25 SK HD CAP S/S	4
13	4	DIN 913	SCREW, M6 x 8 SHSS , OVAL PT S/S	
12	1	10901150	LABEL, ANGLE GRADUATIONS 0–360°	
11	1	10901160	LABEL, VERNIER INDEX	
10	1	17802140	SPACER, BEARING	
9	32	RB–11.906	BALL BEARING 11.91mm [15/32"] DIA SKF	
8	4	DIN 912	SCREW, M6 x 10 SK HD CAP, S/S	
7	4	17802150	CLAMP, RETAINING	
6	2	17901340	CLAMP PAD	
5	2	17802170	HANDWHEEL, M10	
4	1	17802132	LOWER THRUST BEARING PLATE	
3	1	17802131	UPPER THRUST BEARING PLATE	
2	4	DIN 912	SCREW, M12 x 20 SK HD CAP S/S	
1	1	17802100	TRANSITION PLATE	

PARTS LIST

DRAWN A.MARTIN DATE 04/27/94
CHECK DATE
ENGINEERING DATE
NEXT ASSY SYSTEM
SOFTWARE AUTOCAD 2000

DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)

LINEAR	INCHES	mm
X.XXX	±.005	±0.03
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	63	1.6

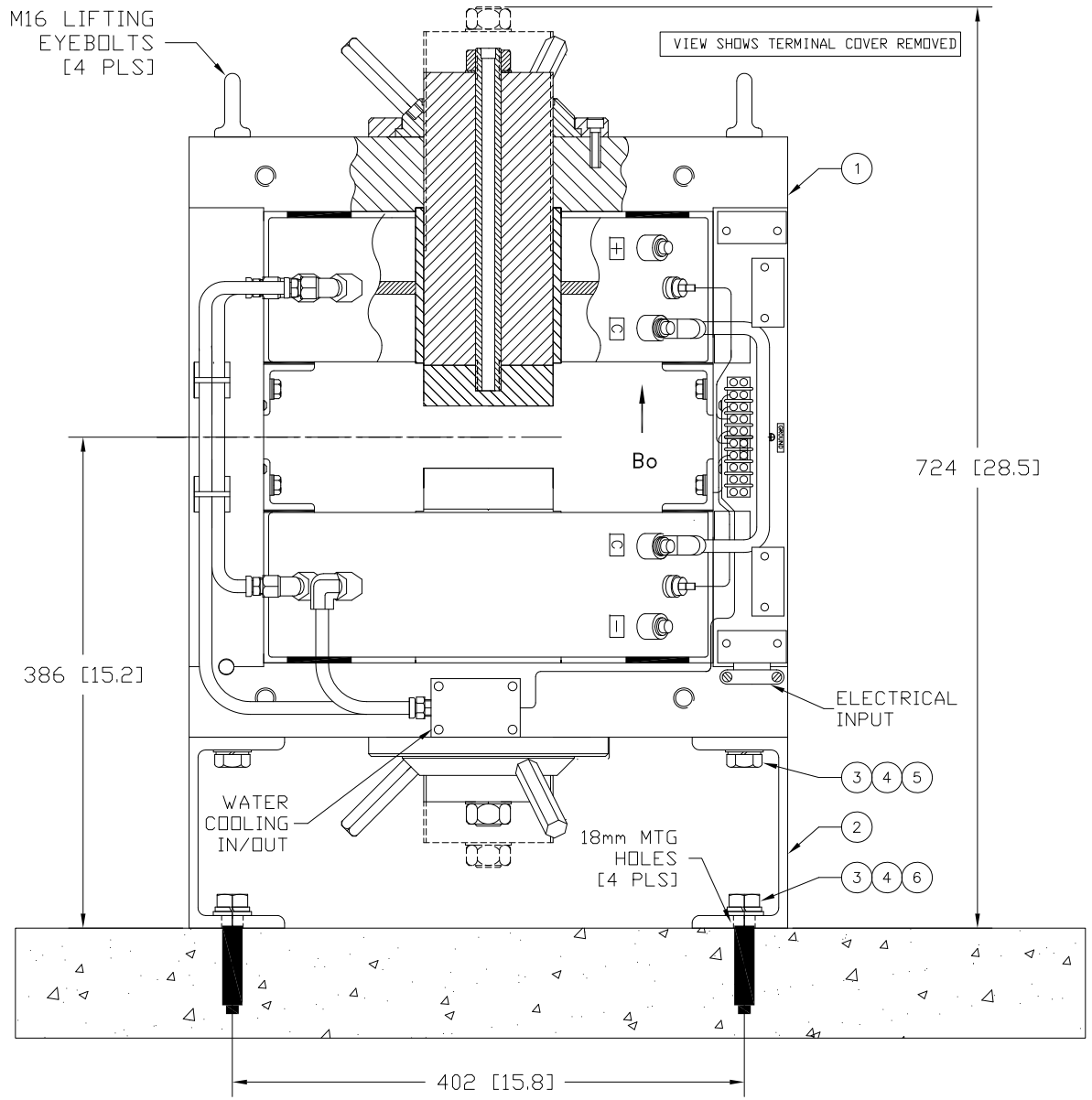
THIRD ANGLE PROJECTION

GMW
955 Industrial Rd, San Carlos, CA 94070
Tel: (650)802–8292. Fax: (650)802–8298.

TITLE
ROTATING BASE
3473/3472/5403

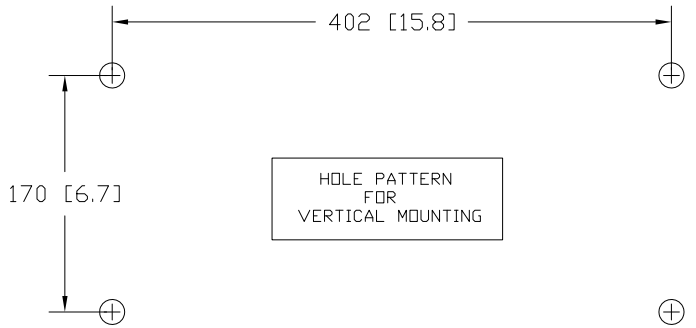
SIZE A1 | DRAWING NO. 11802090 | REV H
SCALE 1:2 | WT kg | SHEET 1 OF 1

ELECTROMAGNET REAR VIEW



REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		07/27/94	A.MARTIN
B	NEW T/B, ADD DIMS, YOKE CUTOUTS		07/27/94	G.DOUGLAS
C	SHOW REAR OF MAGNET WITH WATER/ELECT CONNECTIONS		08/26/99	G.DOUGLAS



HOLE PATTERN FOR VERTICAL MOUNTING

*** WARNING ***
WHEN THE 3472 ELECTROMAGNET IS VERTICALLY MOUNTED IT MUST BE BOLTED TO THE FLOOR SECURELY AS SHOWN.

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
6	4		BOLT, MI6 or 5/8" EXPANSION	
5	4	DIN 933	BOLT, MI6 x 30 HEX HD S/S	
4	8	DIN 127 B	WASHER, M16 SPRING LOCK, S/S	
3	8	DIN 125 A	WASHER, M16 FLAT, S/S	
2	2	17802560	VERTICAL MOUNTING BRACKET	
1	1	3472	ELECTROMAGNET, 150MM 50A or 70A	

PARTS LIST

DRAWN A.MARTIN DATE 07/27/94
CHECK DATE
ENGINEERING DATE
3472
NEXT ASSY SYSTEM
SOFTWARE AUTOCAD 13

DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)

	LINEAR INCHES	LINEAR mm
X.XXX	±.005	±0.03
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	63	1.6

THIRD ANGLE PROJECTION

GMW
955 Industrial Rd, San Carlos, CA 94070
Tel: (650)802-8292. Fax: (650)802-8298.

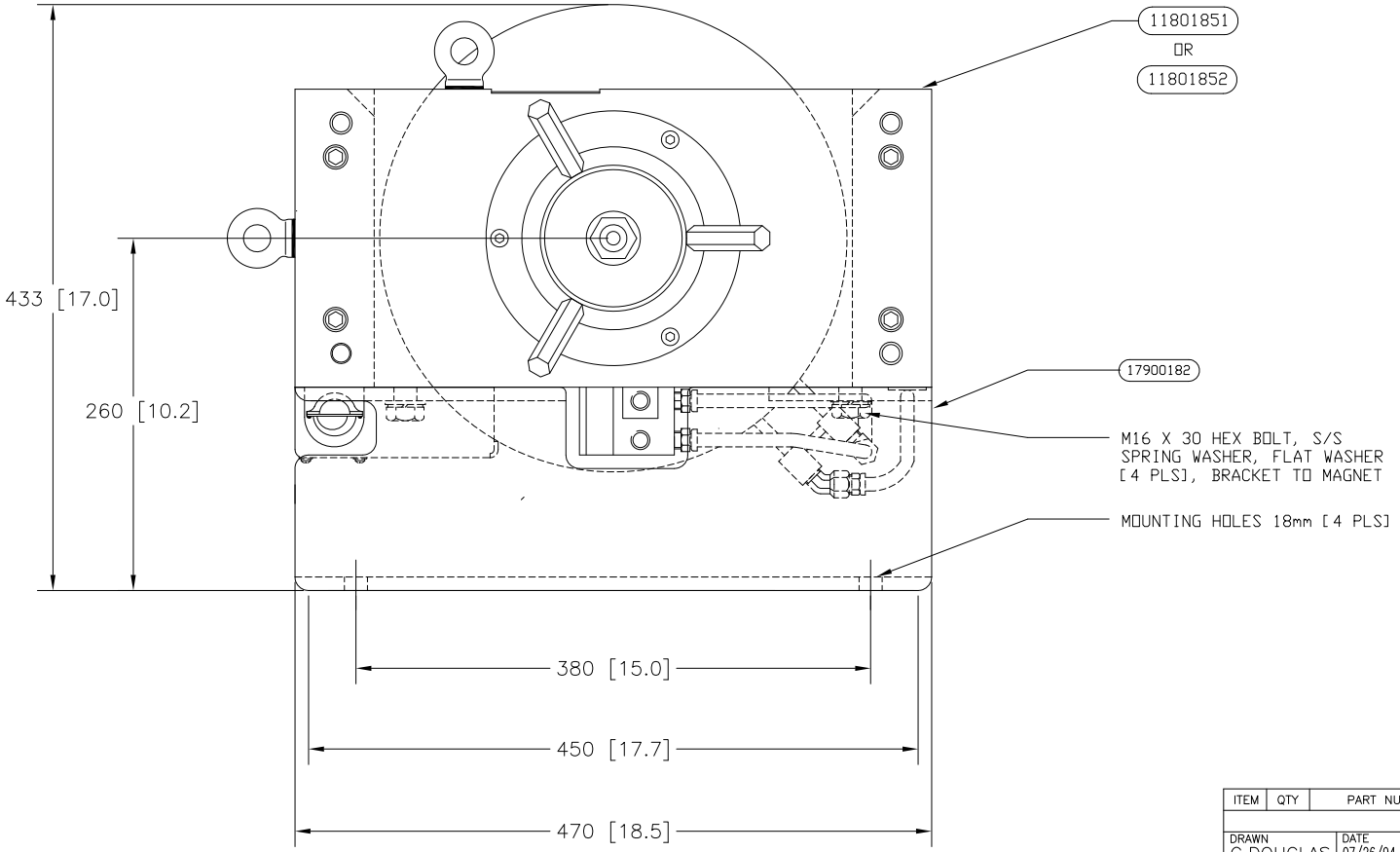
TITLE
VERTICAL MTG ASSY
MODEL: 3472

SIZE A2 | DRAWING NO. 11803260 | REV C

SCALE 1:2.5 WT kg | SHEET 1 OF 1

REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		07/26/94	G.DOUGLAS



ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE

PARTS LIST

DRAWN G.DOUGLAS — DATE 07/26/94
CHECK — DATE
ENGINEERING — DATE
3472
NEXT ASSY — SYSTEM
SOFTWARE: AUTOCAD 13

DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)

	INCHES	mm
LINEAR		
X.XXX	±.005	±0.03
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	63	1.6

THIRD ANGLE PROJECTION

GMW
P.O. Box 2578, Redwood City, CA 94064
Tel: (415)802-8292 Fax: (415)802-8298.

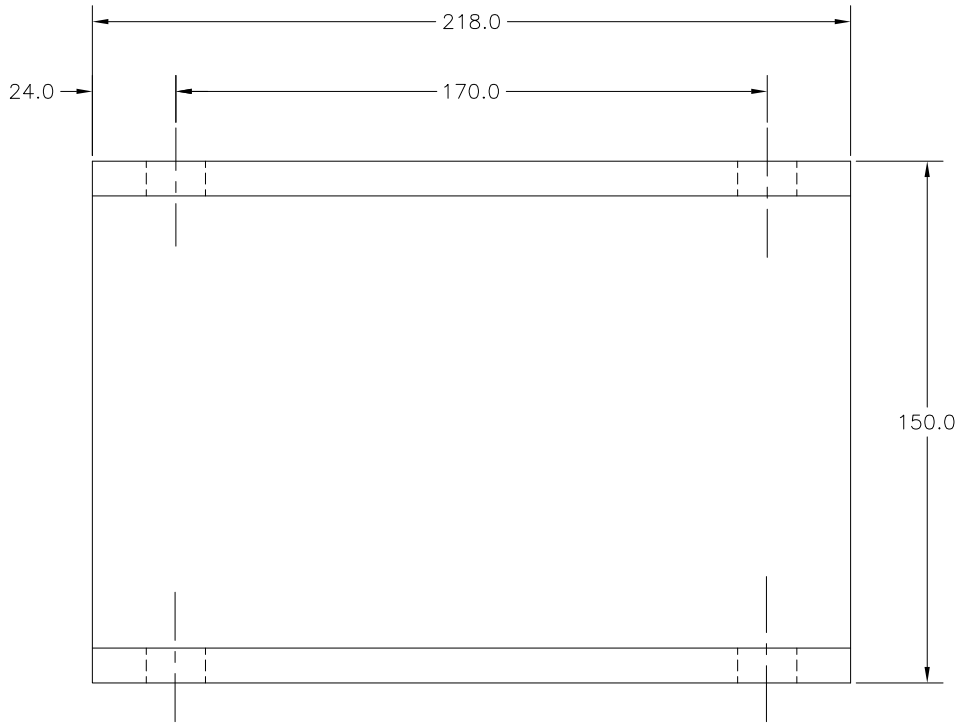
TITLE
HORZ MTG ASSY
MODEL: 3472

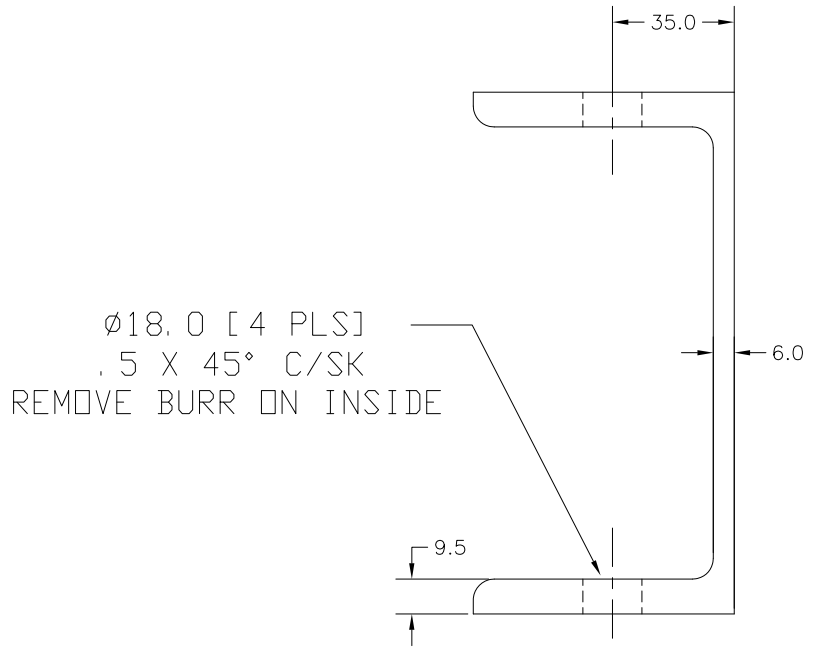
SIZE A2 | DRAWING NO. 11900150 | REV A

SCALE 1:2.5 WT kg | SHEET 1 OF 1

REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		07/28/94	A.MARTIN
B	NEW T/B, CHANGE HOLE POSITION & SIZE AT C1		07/28/94	G.DOUGLAS





NOTES

1 MATERIAL: 150 X 75 M.S CHANNEL

2 PAINT INSTRUMENT TAN TO BSL TP8580010

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE

PARTS LIST

DRAWN A.MARTIN	DATE 07/28/94	
CHECK	DATE	
ENGINEERING	DATE	
		3472
NEXT ASSY	SYSTEM	

SOFTWARE: AUTOCAD 2000

DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)

LINEAR	INCHES	mm
X.XXX	±.005	±0.03
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	63	1.6

THIRD ANGLE PROJECTION

GMW
P.O. Box 2578, Redwood City, CA 94064
Tel: (415)802-8292 Fax: (415)802-8298.

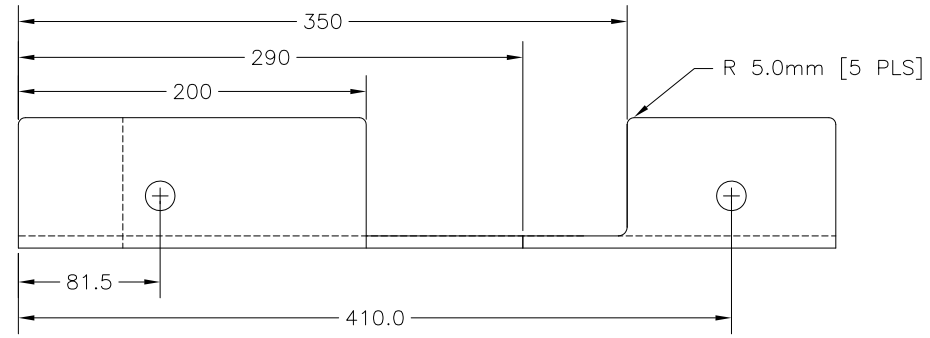
TITLE
VERT MTG BRACKET
MODEL: 3472

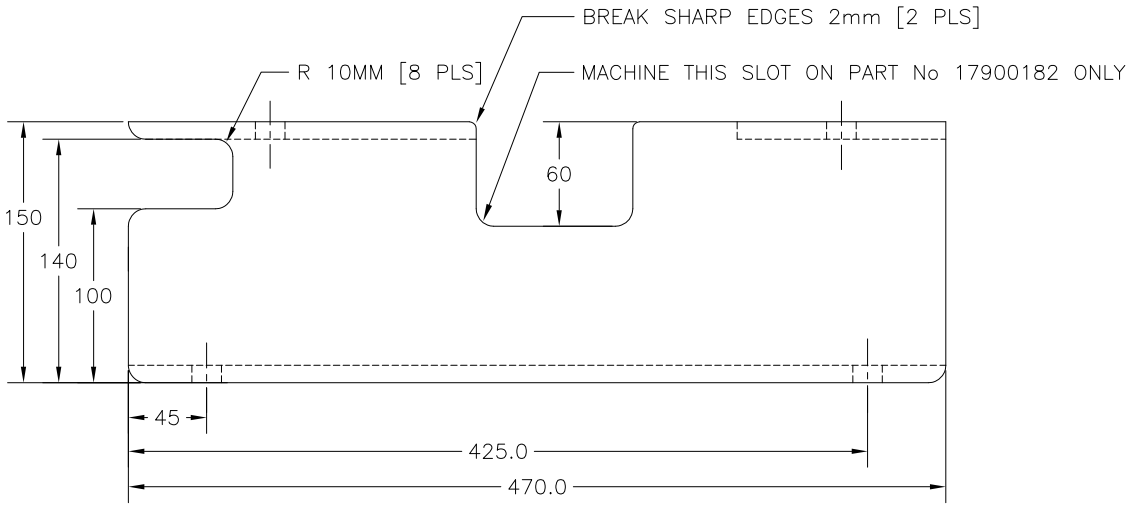
SIZE	DRAWING NO.	REV
A2	17802560	A

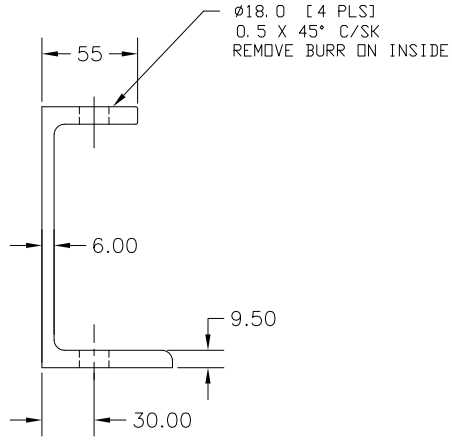
SCALE 1:1 | WT kg | SHEET 1 OF 1

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		07/21/94	G.DOUGLAS

PART No 17900182 [LH] BRACKET







NOTES

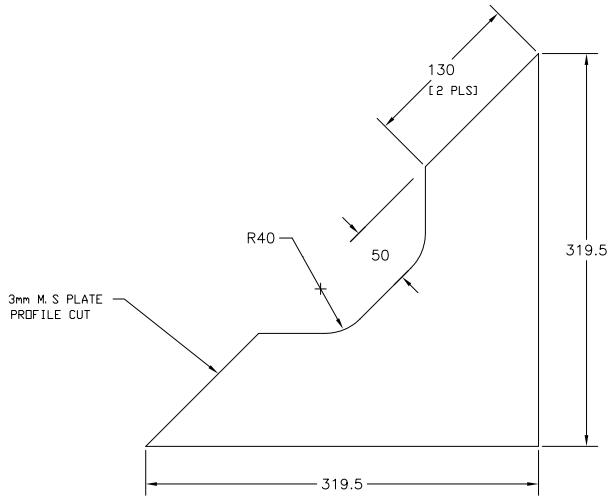
1 MATERIAL: 150 X 75 X 6mm MS CHANNEL
2 PAINT INSTRUMENT TAN TO BSL TP8580010
3 BREAK ALL SHARP EDGES 1mm

PART No 17900182 [LH] AS DRAWN
PART No 17900181 [RH] MIRROR IMAGE

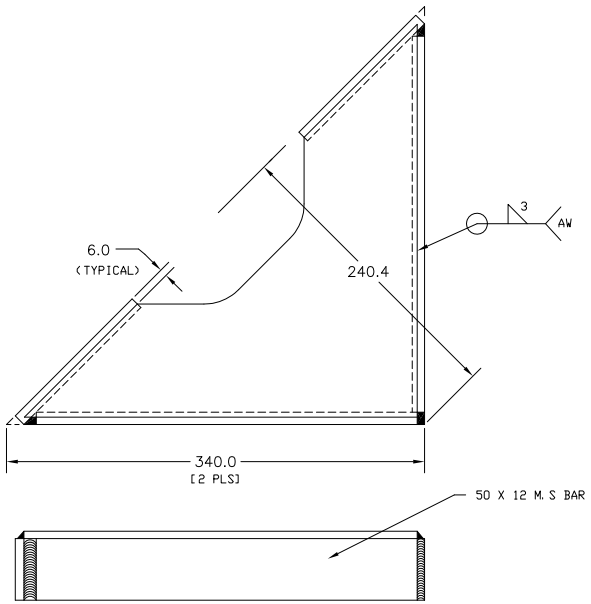
ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
PARTS LIST				

DRAWN G.DOUGLAS	DATE 07/21/94	DO NOT SCALE FROM DRAWING	GMW	
CHECK	DATE	DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)	P.O. Box 2578, Redwood City, CA 94064	
ENGINEERING	DATE	LINEAR: INCHES / mm	Tel: (415)802-8292 Fax: (415)802-8298.	
		X.XXX ±.005 ±0.03	TITLE	
		X.XX ±.01 ±0.1	HORZ MTG BRACKET	
		X.X ±.03 ±0.3	MODEL: 3472	
		X ±.06 ±1		
		DEG. ±.5 ±0.5		
	3472	FINISH 63 1.6	SIZE A2	DRAWING NO. 17900180 REV A
NEXT ASSY	SYSTEM	THIRD ANGLE PROJECTION		
SOFTWARE: AUTOCAD 13			SCALE 1:2	WT kg SHEET 1 OF 1

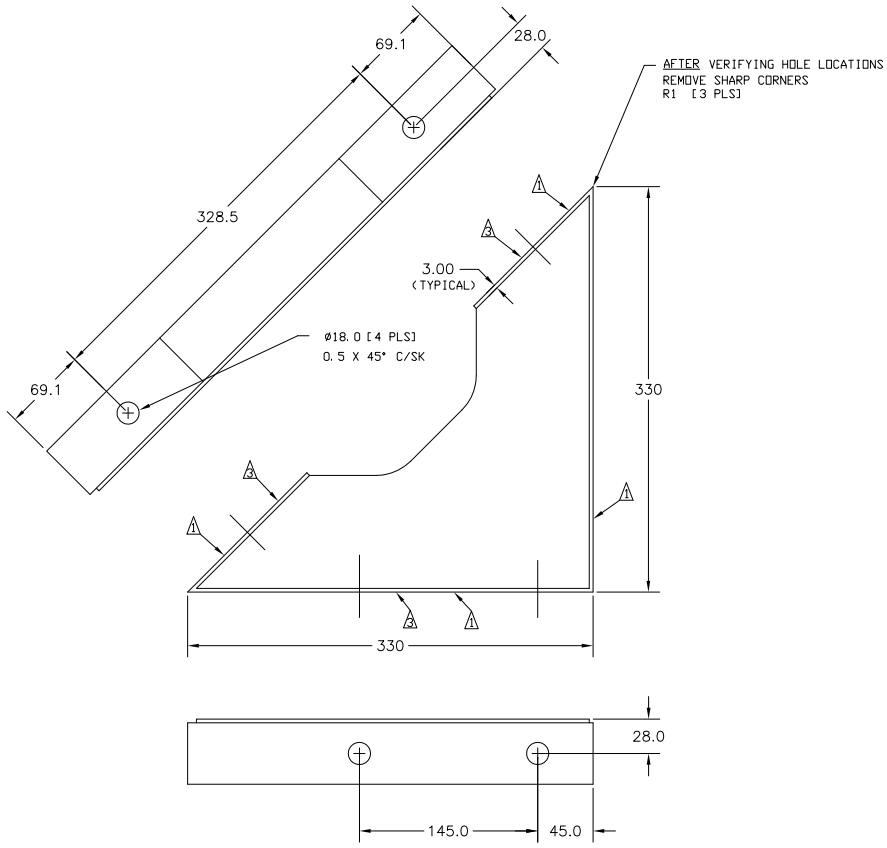
REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		08/11/93	A.MARTIN
B	NEW T/B, ADD DIM AT C4		07/28/94	G.DOUGLAS



GUSSET - PROFILE CUT



FABRICATION DETAIL.



MACHINING DETAIL

NOTES

1. EDGE PROFILE MACHINED ALL ROUND
2. PAINT INSTRUMENT TAN TO BSL TP85800010
3. DO NOT TEXTURE THESE SURFACES

PART No 17800521 AS DRAWN

PART No 17800522 MIRROR IMAGE

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
PARTS LIST				

DRAWN	A.MARTIN	DATE	08/11/93
CHECK		DATE	
ENGINEERING		DATE	
			3473/2
NEXT ASSY		SYSTEM	
SOFTWARE AUTOCAD 13			

DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)

	LINEAR INCHES	LINEAR mm
X.XXX	±.005	±0.03
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	63	1.6

THIRD ANGLE PROJECTION

GMW
955 Industrial Rd, San Carlos, CA 94070
Tel: (650)802-8292. Fax: (650)802-8298.

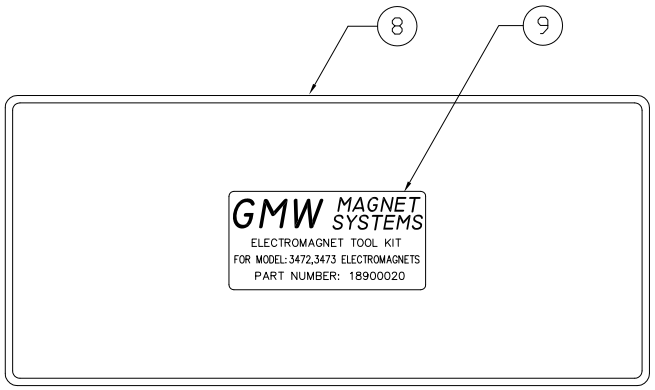
TITLE
45° MTG BRACKET
MODEL: 3473/3472

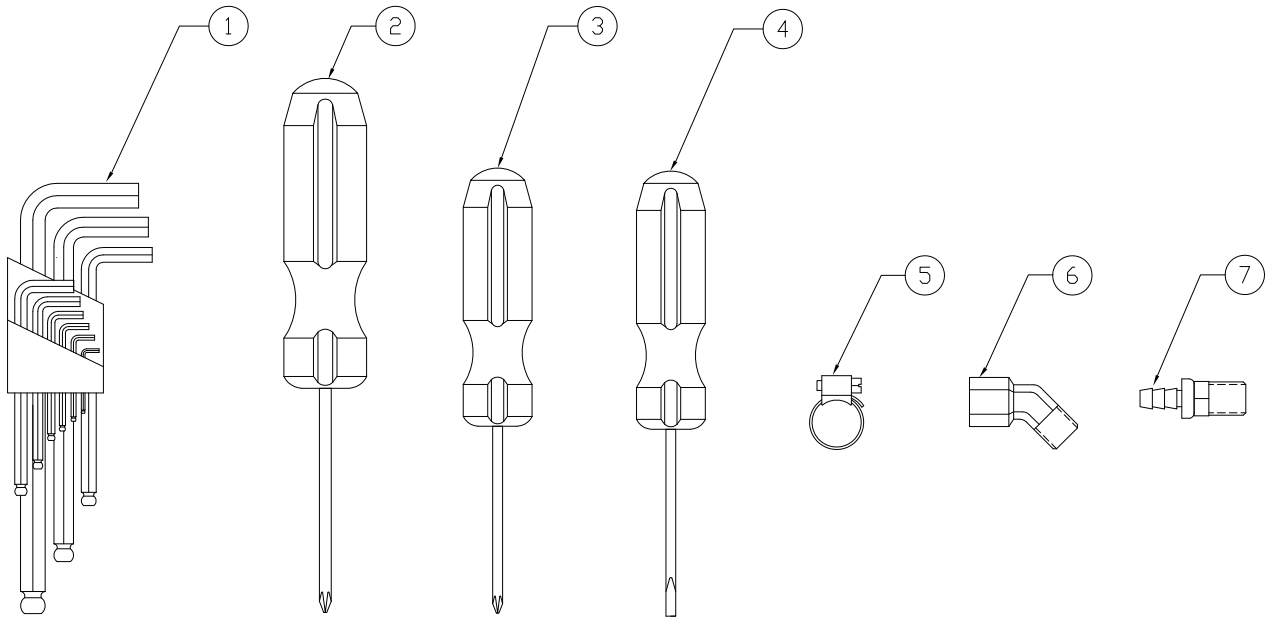
SIZE	DRAWING NO.	REV
A1	17800520	B

SCALE 1:2 | WT kg | SHEET 1 OF 1

REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		07/28/94	G.DOUGLAS





ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
9	1		LABEL, TOOL KIT	
8	1	V501	STORAGE BOX, PLASTIC. FLAMBEAU	
7	2	KA04-04MB	1/4"ID HOSE COUPLING, BRASS 1/4NPT	
6	2	124-B-04	45° ELBOW, BRASS 1/4NPT. IE	
5	2	350-006	HOSE CLIP, TRIDON	
4	1	62-133	SCREWDRIVER, SLOTTED. STANLEY	
3	1	62-021	SCREWDRIVER, PHILLIPS. STANLEY	
2	1	62-022	SCREWDRIVER, PHILLIPS, STANLEY	
1	1	BLX 9mm	HEX KEY WRENCH SET, BONDHUS	

PARTS LIST

DRAWN G.DOUGLAS 07/28/94
CHECK DATE
ENGINEERING DATE
NEXT ASSY SYSTEM
SOFTWARE: AUTOCAD 2000

DO NOT SCALE FROM DRAWING
(DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED))

LINEAR	INCHES	mm
X.XXX	±.005	±0.03
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	63	1.6

THIRD ANGLE PROJECTION

GMW
P.O. Box 2578, Redwood City, CA 94064
Tel: (415)802-8292. Fax: (415)802-8298.

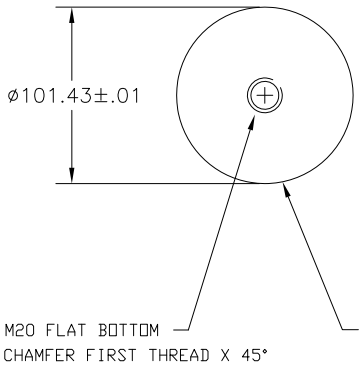
TITLE
TOOL KIT
MODEL: 3473/3472

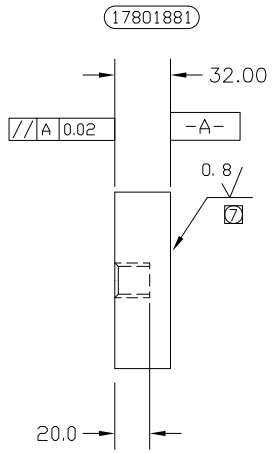
SIZE A1 | DRAWING NO. 18900020 | REV A

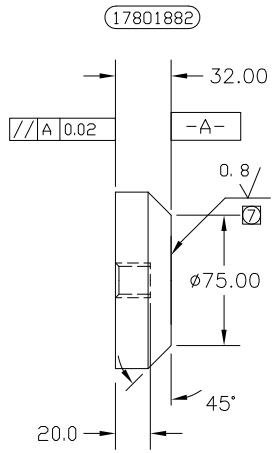
SCALE 1;1 | WT kg | SHEET 1 OF 1

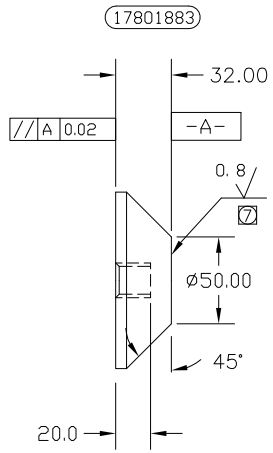
1 MATERIAL: 1006 LOW CARBON PLATE
2 MATERIAL MUST BE CUT WITH THE AXIS OF THE PART RUNNING IN THE SAME DIRECTION AS THE RAW PLATE GRAIN
3 POLE PIECES FOR EACH PRODUCTION RUN ARE TO BE CUT FROM THE SAME RAW PLATE FROM THE SAM PROXIMITY
4 ROUGH MACHINE RAW MATERIAL TO ø105 THEN FULLY ANNEAL TO BSL TP85800040
5 ANY VOID LAMINATIONS OR OTHER SUCH DEFECTS WHICH BECOME APPARENT DURING MACHINING WILL BE CAUSE TO REJECT THE PART
6 STAMP BACK FACE WITH CURRENT S/No AS DIRECTED
7 SURFACE GRIND BOTH FACES. GRIND POLE FACE LAST TO AVOID SCRATCHING
8 "ELECTROCLEAN ONLY AFTER GRINDING" TO BSL 85800120
DO NOT BEAD BLAST, OR ORBITAL SAND SURFACES.
9 FINISH: EN PLATE .01 THICK TO BSL TP85800120
10 DIMENSIONS ARE PRIOR TO PLATING

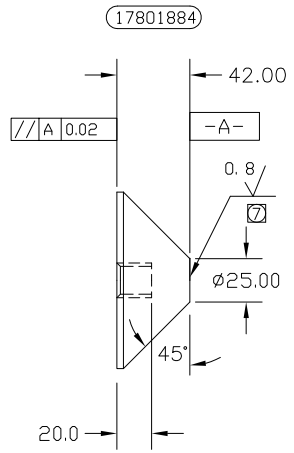
REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		06/29/93	A.MARTIN
B	ADD 75mm POLE CAP		03/08/93	A.MARTIN
C	CHANGE PART NO's OF POLE CAPS		07/28/94	G.DOUGLAS
D	ROUND POLE FACE TO 50.00 AND 25.00		11/21/01	G.DOUGLAS
E	CHANGE/ADD NOTE ELECTROCLEAN FINISH ONLY		10/19/02	G.DOUGLAS











ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
PARTS LIST				

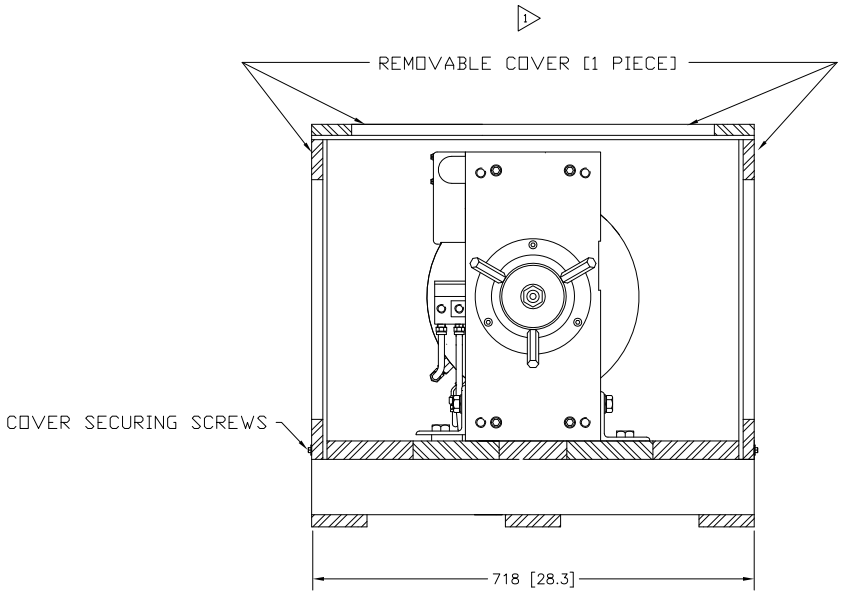
DRAWN A.MARTIN	DATE 06/29/93	DO NOT SCALE FROM DRAWING	GMW
CHECK	DATE	DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)	955 Industrial Rd, San Carlos, CA 94070
ENGINEERING	DATE		Tel: (650)802-8292. Fax: (650)802-8298.

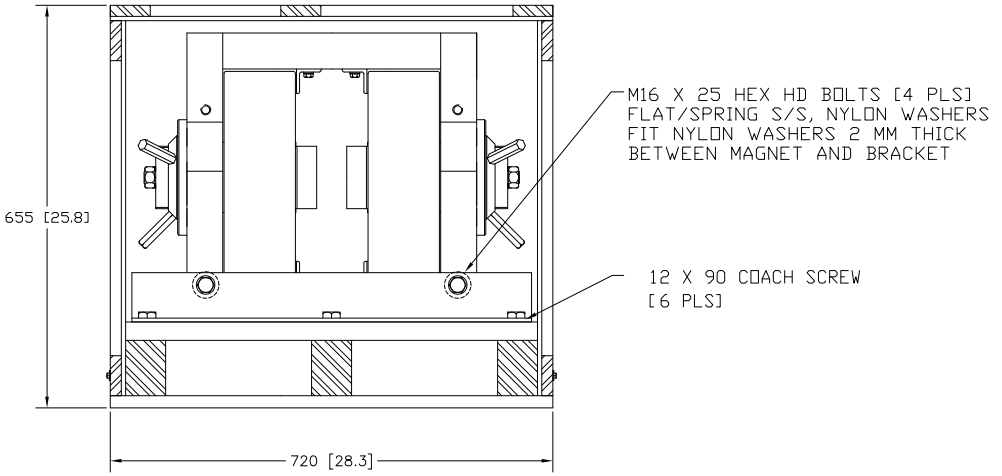
LINEAR	INCHES	mm
X.XXX	±.005	±0.03
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	63	1.6

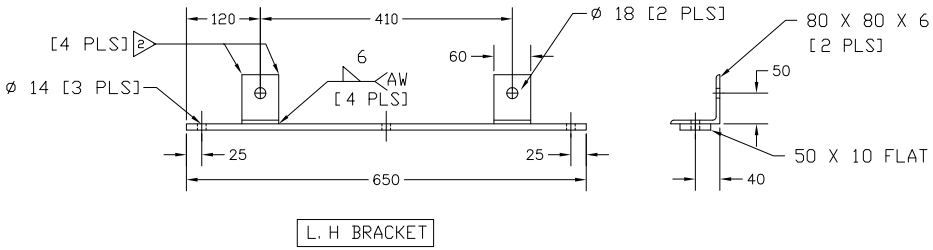
TITLE: POLE CAPS MODEL: 3472

11801850	3472	SIZE A2	DRAWING NO. 17801880 REV E
NEXT ASSY	SYSTEM	THIRD ANGLE PROJECTION	
SOFTWARE AUTOCAD 2000		SCALE 1:2	WT kg SHEET OF

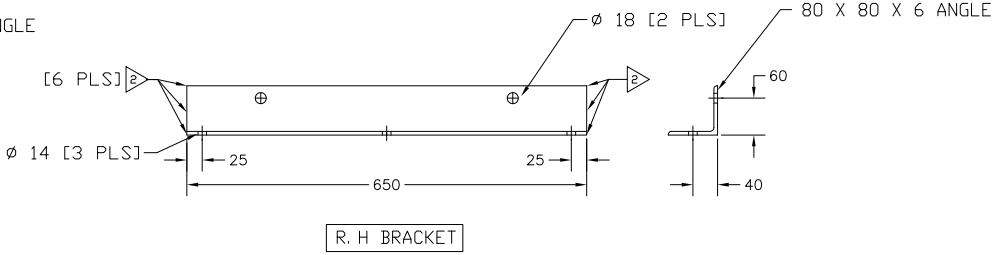
REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		10/12/93	A.MARTIN
B	ADD NOTE 2		08/23/99	G.DOUGLAS







L. H BRACKET



R. H BRACKET

SHIPPING WEIGHT 350kg [770lbs]

NOTE:
1. THE 3472 SHIPPING CRATE HAS A ONE PIECE COVER
2. REMOVE ALL SHARP EDGES 0.2mm

COVER REMOVAL:
1. REMOVE THE COVER SECURING SCREWS
2. GRIP THE COVER AT THE TOP LH AND RH CORNERS
3. LIFT THE COVER VERTICALLY HIGH ENOUGH TO CLEAR THE MAGNET
4. MOVE THE COVER SIDEWAYS AND PLACE ON FLOOR

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE

PARTS LIST

DRAWN A.MARTIN DATE 10/12/93
CHECK DATE
ENGINEERING DATE
NEXT ASSY 3472 SYSTEM
SOFTWARE AUTOCAD 13

DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)

	LINEAR INCHES	LINEAR mm
X.XXX	±.005	±0.03
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	63	1.6

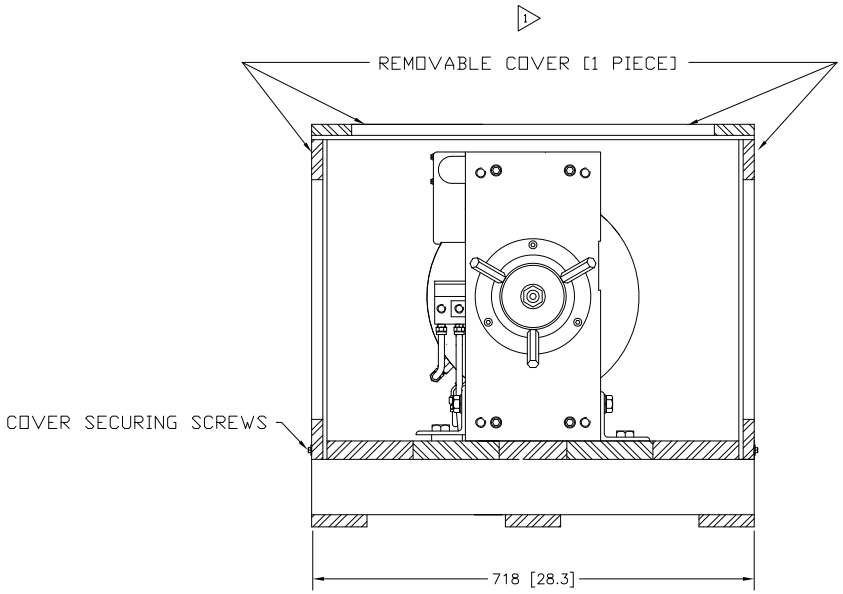
THIRD ANGLE PROJECTION

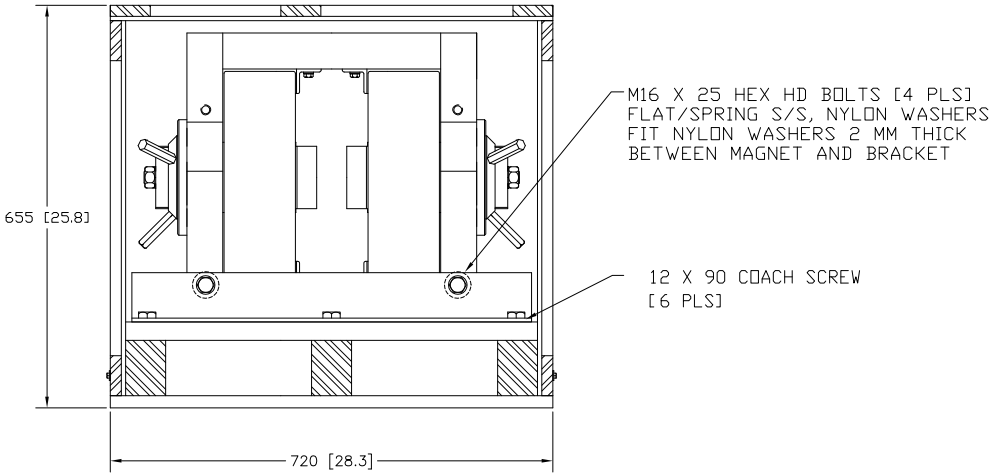
GMW
955 Industrial Rd, San Carlos, CA 94070
Tel: (650)802-8292. Fax: (650)802-8298.

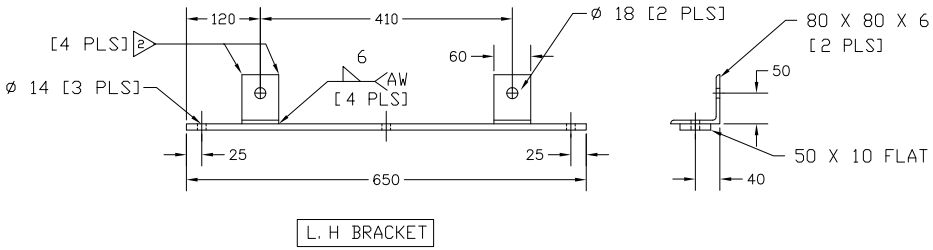
TITLE
SHIP CRATE ASSY
MODEL: 3472

SIZE A1 | DRAWING NO. 18800371 | REV B
SCALE 1:4 | WT kg | SHEET 1 OF 1

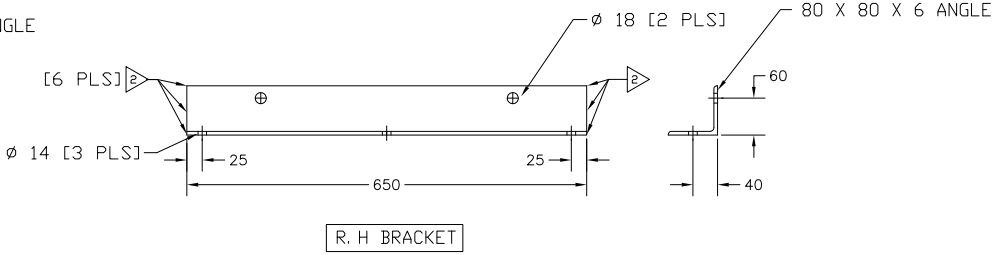
REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		10/12/93	A.MARTIN
B	ADD NOTE 2		08/23/99	G.DOUGLAS







L. H BRACKET



R. H BRACKET

SHIPPING WEIGHT 350kg [770lbs]

NOTE:
1. THE 3472 SHIPPING CRATE HAS A ONE PIECE COVER
2. REMOVE ALL SHARP EDGES 0.2mm

COVER REMOVAL:
1. REMOVE THE COVER SECURING SCREWS
2. GRIP THE COVER AT THE TOP LH AND RH CORNERS
3. LIFT THE COVER VERTICALLY HIGH ENOUGH TO CLEAR THE MAGNET
4. MOVE THE COVER SIDEWAYS AND PLACE ON FLOOR

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE

PARTS LIST

DRAWN A.MARTIN DATE 10/12/93
CHECK DATE
ENGINEERING DATE
NEXT ASSY 3472 SYSTEM
SOFTWARE AUTOCAD 13

DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)

	LINEAR INCHES	LINEAR mm
X.XXX	±.005	±0.03
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	63	1.6

THIRD ANGLE PROJECTION

GMW
955 Industrial Rd, San Carlos, CA 94070
Tel: (650)802-8292. Fax: (650)802-8298.

TITLE
SHIP CRATE ASSY
MODEL: 3472

SIZE A1 | DRAWING NO. 18800371 | REV B
SCALE 1:4 | WT kg | SHEET 1 OF 1