USER'S MANUAL

MODEL: 3473-50
MODEL: 3473-70

150MM ELECTROMAGNET

Date Sold: _____

Serial number: _____

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Section 1
SPECIFICATIONS
Table 1. Model 3473-50 Specifications

Pole Diameter:	150mm (6 inch)
Pole Gap:	0 - 127mm (0 to 5 inch)
Standard Pole Caps:	150mm (6 inch) cylindrical 100mm (4 inch) tapered 75mm (3 inch) tapered 50mm (2 inch) tapered 25mm (1 inch) tapered
Coils (series connection)	
coil resistance (20°C)	0.72 Ohm
max resistance (hot)*	0.87 Ohm
max power (air)	20A/17V (0.5kW)
max power (water)	50A/44V (2.2kW)
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 11801281 686mm W x 405mm D x 570mm H (27.0 inch W x 16.0 inch D x 22.4 inch H)
Weight	600 kg (1320 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 3473-70 Specifications

Pole Diameter	150mm (6 inch)
Pole Gap	0 - 96mm (0 to 3.8 inch)
Standard Pole Caps	150mm (6 inch) cylindrical 100mm (4 inch) tapered 75mm (3 inch) tapered 50mm (2 inch) tapered 25mm (1 inch) tapered
Coils (series connection)	
coil resistance (20°C)	0.72 Ohm
max resistance (hot)*	0.87 Ohm
max power (air)	20A/17V (0.5kW)
max power (water)	70A/59V (4.1kW)
Self Inductance	
Water Cooling (18°C)	6 liters/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 *l*/min (1.1 USgpm).
Dimensions	Drawing 11801282 686mm W x 405mm D x 570mm H (27.0 inch W x 16.0 inch D x 22.4 inch H)
Weight	610 kg (1340 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 3473-50/3473-70 Electrical and Water Connections

DC Current (as seen from the rear refer to Drawing 11801281/2)

Right hand terminal: Negative
Left hand terminal: Positive

Ground

An M6 screw (Item 40 on drawing 11801281/2) is provided near the Interlock 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 11801281/2)

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

Water (refer to Drawing 11801281/2)

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 50G (5mT) with the magnet power supply off or disconnected.

Section 3

INSTALLATION

Caution: This is a heavy system. All movement, lifting and installation of the 3473 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 18800361).

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. 900kg (2000 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.
5.

Rolling or Rolling/Rotating Base Mounting (refer to Drawing 11900110)

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 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 figure 5).
2. Slide rolling base or rolling/rotating base underneath, lower magnet to 12mm (0.5") above base top surface (refer to figure 5).
3. Position rolling base or rolling/rotating base so the tapped hole in the base are aligned with the 45° mounting bracket hole (refer to figure 5).
4. Lower magnet onto rolling base or rolling/rotating base assembly (refer to 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 figure 6).
6. Move magnet and rolling base or rolling/rotating base to desired location.

Continued….

Rolling or Rolling/Rotating Base Mounting (continued)

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 11801291/2)

Using the field uniformity and induction 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 11801281/2)

1. Turn off the power supply
2. Draw pole caps about 20mm into the pole sleeves.
3. Loosen the axial draw stud nut (item 35 on drawing 11801281/2).
4. Insert the hex key wrench into the end of the draw stud (item 6 on drawing 11801281/2).
5. Remove draw stud (item 6 on drawing 118801281/2) while supporting the pole cap.

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 equipment
damage.

The magnet has two coils which are connected in series, (11801281/2). Refer to drawing. The power supply cables should be connected directly to the dc current terminals marked + and -. Recommended current cable for the 3473-50 is stranded copper of 16mm² cross section (4 AWG). For the 3473-50 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.

Section 3

INSTALLATION

The 3473 Interlocks

The Model 3473-50 uses two thermostats, Elmwood 3450G Part Number 3450G611-1 L50C 89/16. They are wired in series and terminated in positions 3 and 4 on the Interlock Terminal block. The thermostats are normally closed, opening when the coil central cooling plate temperature exceeds 50°C +/3°C. The 3473-70 uses six thermostats. The 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 3473-50 and 4.01/min for the 3473-70.

Cooling

The Model 3473 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 thermostats 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 3473-50 magnet, and clean, cool (16°C - 20°C) water at 6 *l*/min at 2.0 bar (30 psid) for the 3473-70.

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.

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 3473-50 Electromagnet alone a suitable chiller is the Bay Voltex Model: RRS-0850 for the Model 3473-70 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 3473 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 3473-70 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 figures were determined with a water inlet temperature of <18°C.
3. Turn on the power supply and increase the current until the desired field is reached.

Calibration

The induction 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 induction curves refer to the field on the pole axis and at the center of the air gap (median plane).

Calibration - continued

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. Otherwise no particular maintenance is required. 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 defeat the protection mechanisms. Check the equipment periodically and use an appropriate corrosion protection when the magnet is stored for an extended period.

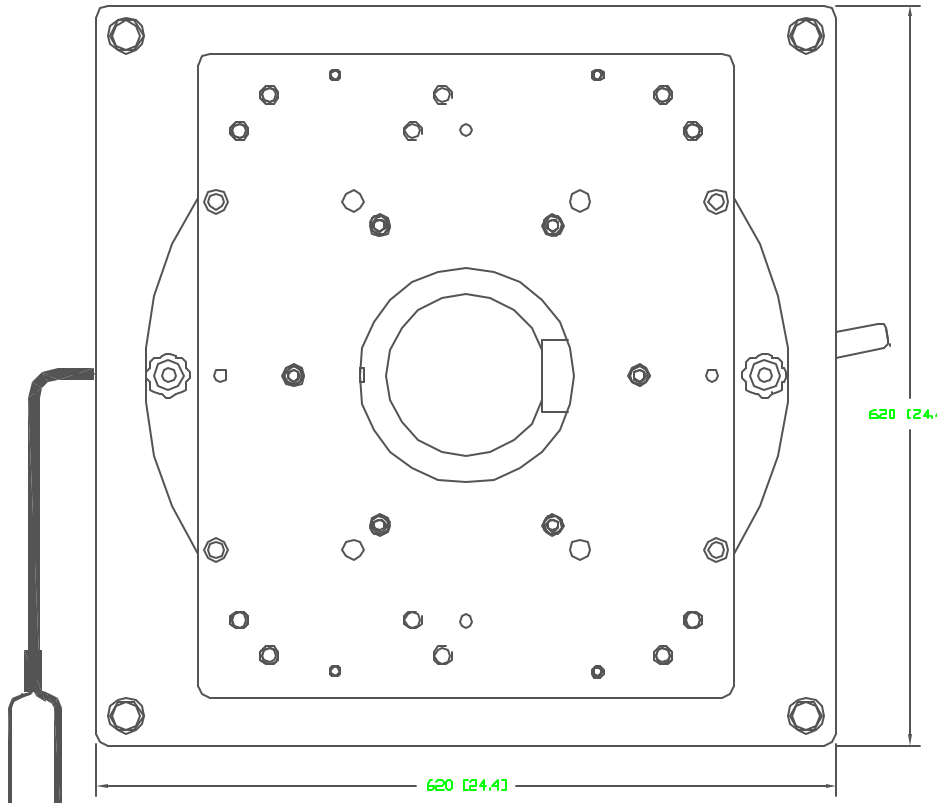
Section 6

STANDARD OPTIONS

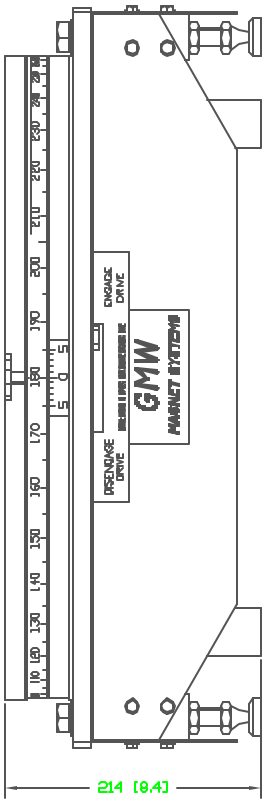
PROPRIETARY

TOP VIEW

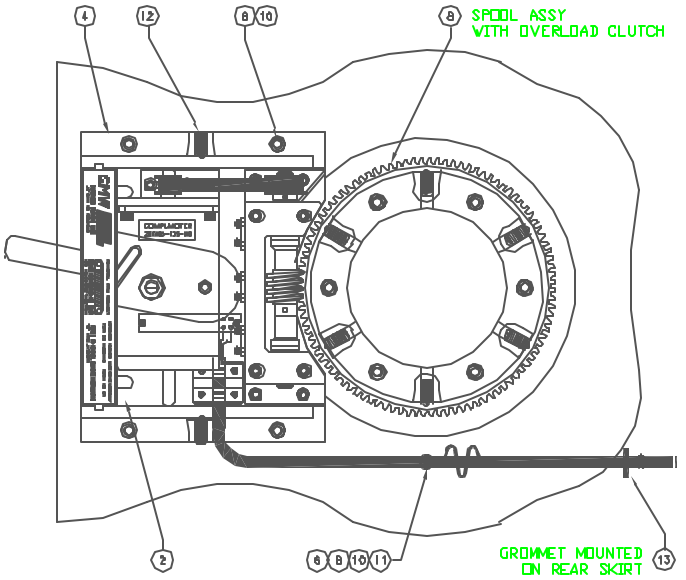
NOTE: ROTATING BASE SHOWN AT THE 180° POSITION



FRONT VIEW

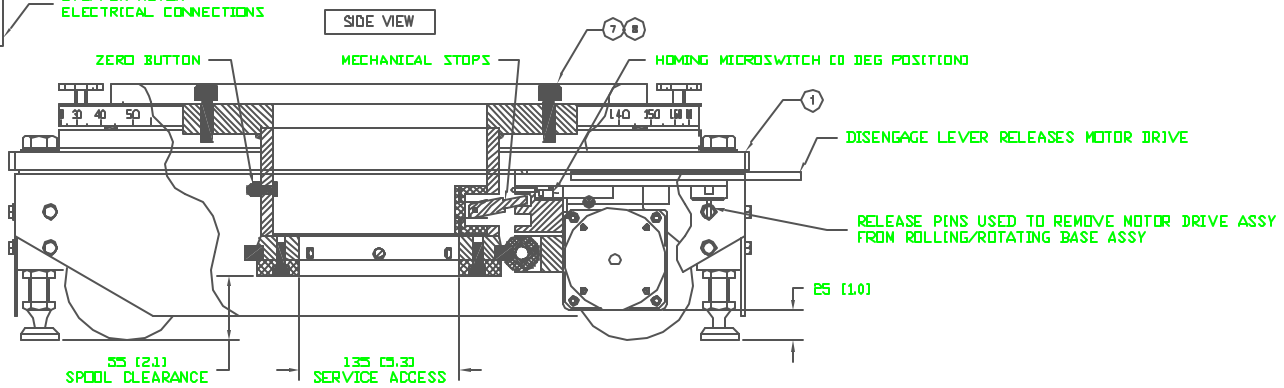


UNDERNEATH VIEW



STEPPER MOTOR
ELECTRICAL CONNECTIONS

SIDE VIEW



NOTE: ROTATING BASE SHOWN AT THE 180° POSITION

REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		02/11/01	G.DOUGLAS

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
13	1		GROMMET 25MM OD X 20MM ID	
12	2	SBNH-10N	BALL PLUNGER, M6 S/S	
11	1	DIN 433	WASHER, FLAT M8 X 1.8 S/S	
10	5	BN-792	WASHER, M8 X XX RIBBED SPRING/STEEL	
9	8	BN 792	WASHER, M10 X XX 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 CLAMP	
5	1	10900101	RELEASE/ENGAGE LABEL	
4	2	17901020	BASE PLATE GUIDES	
3	1	11900820	MR8 SPOOL ASSY	
2	1	11900811	MR8 MOTOR DRIVE ASSY	
1	1	11900980	ROLLING/ROTATING BASE ASSY	

PARTS LIST

DRAWN G.DOUGLAS	DATE 02/11/01	DO NOT SCALE FROM DRAWING DIMENSIONS & TOLERANCES UNLESS ELECTRONIC (PDF)	GMW P.O. Box 2578, Redwood City, CA 94064 Tel: (650)802-8292. Fax: (650)802-8288.
CHECK	DATE		
ENGINEERING	DATE		TITLE MOTORIZED ROT. DRIVE 3473/3472/5403
NEXT ASSY	USED ON	THIRD ANGLE PROJECTION	SIZE A1 DRAWING NO. 11900800 REV A
SOFTWARE AUTOCAD 13			SCALE 1:2 WT kg SHEET 1 OF 1

PROPRIETARY
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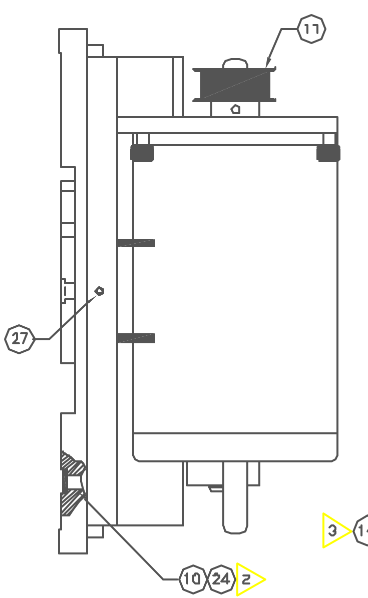
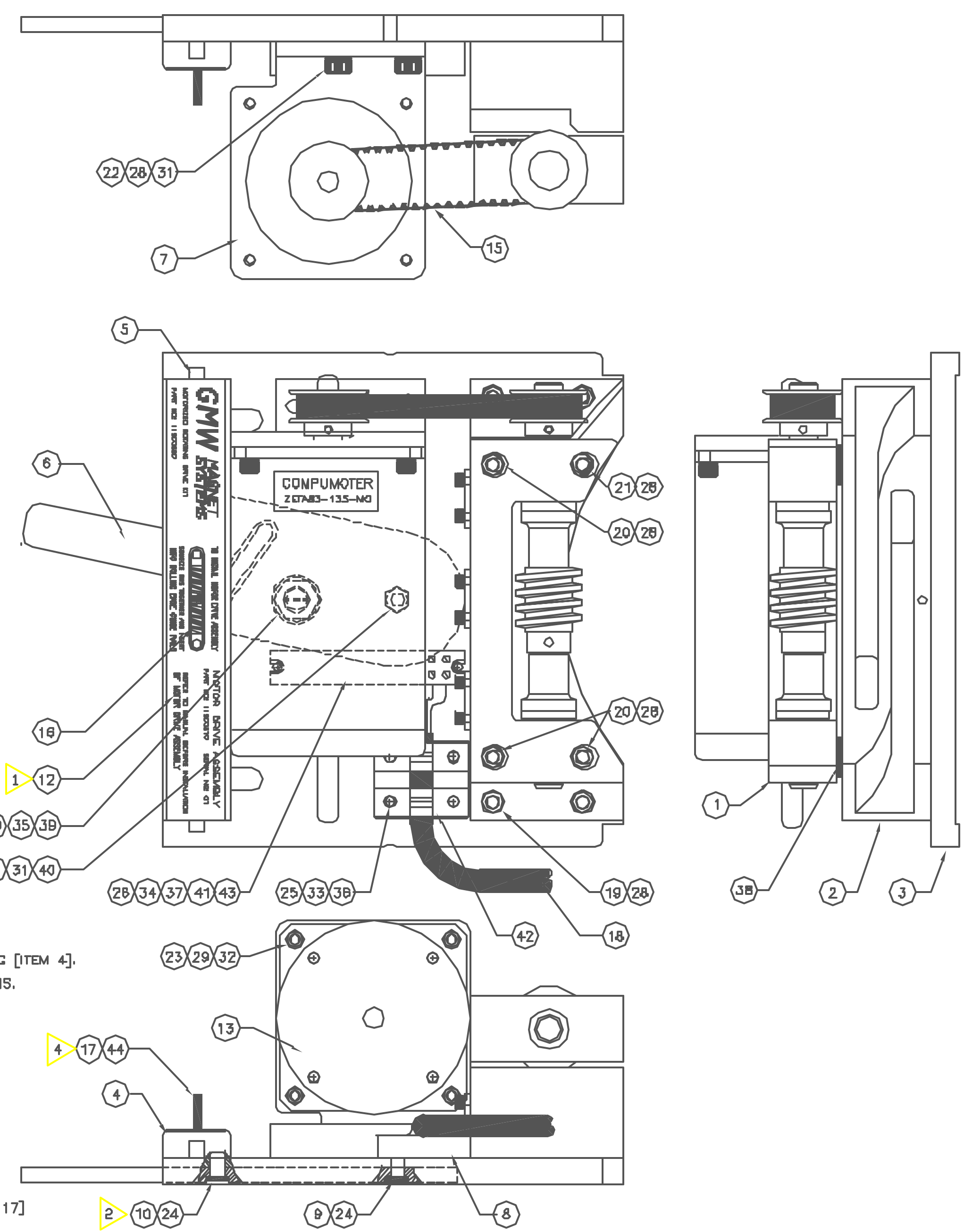
REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		07/07/97	G.DOUGLAS
B	ADD ITEMS 43,44, CHG NOTES, ITEM 13		11/21/97	G.DOUGLAS
C	CHG ITEM 11,44, ADD NOTE 4		04/07/98	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]

PARTS LIST

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
44	A/R		HEAT SHRINK SLEEVING, 4MM	
43	1	0.33uF	CAPACITOR	
42	2	OHS	SADLE, 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	12	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	
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	TB20EFB-50	BELT, TIMING, BERG 10" [250MM]	
14	1	SBNH-10N	BALL PLUNGER, M6	
13	1	12800052	MOTOR, STEPPER, COMPUMOTER	
12	1	10900070	LABEL, SPECIFICATION	
11	1	12800042	PULLEY,TIMING BELT 18 TEETH, 3/8 SHAFT	
10	1	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	

DRAWN G.DOUGLAS DATE 05/04/97
CHECK DATE
ENGINEERING DATE

NEXT ASSY	SYSTEM
11900800	3403
11900800	3472
11900800	3473

SOFTWARE AUTOCAD 13

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

GMW
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TITLE
MOTORIZED.ROT.DRIVE MOTOR DRIVE ASSY

SIZE A1 DRAWING NO. 11900810 REV C
SCALE 1:1 WT kg SHEET 1 OF 1

PROPRIETARY

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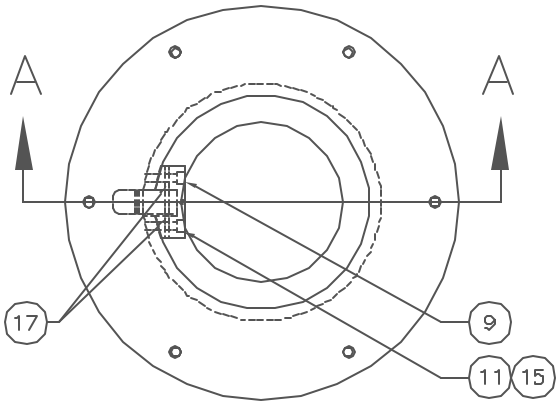
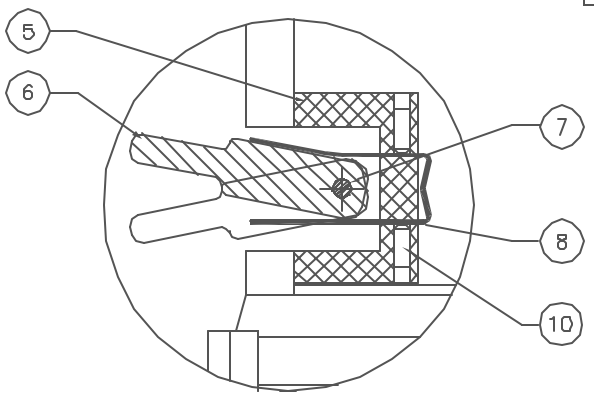
REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		07/07/97	G.DOUGLAS
B	ADD ITEM 17&18, MOD SPRING SHAPE		11/21/97	G.DOUGLAS

SCALE 4:1

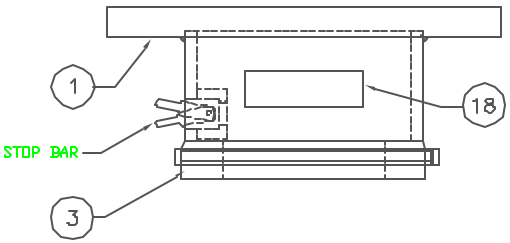
TOP VIEW

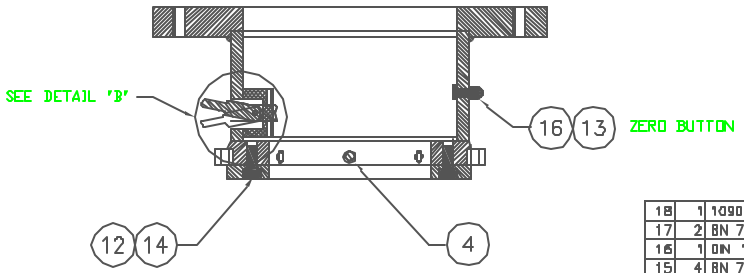




DETAIL "B"

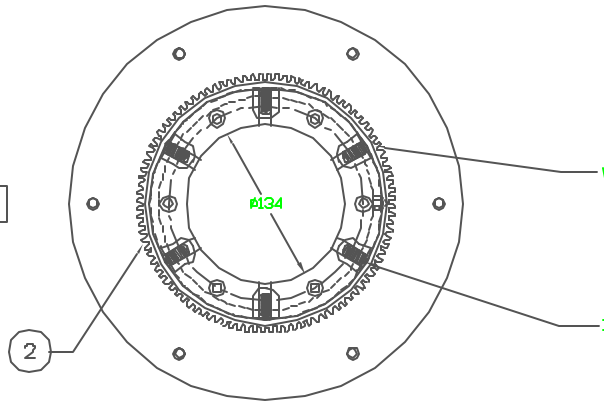
SIDE VIEW





SECTION A–A

BOTTOM VIEW



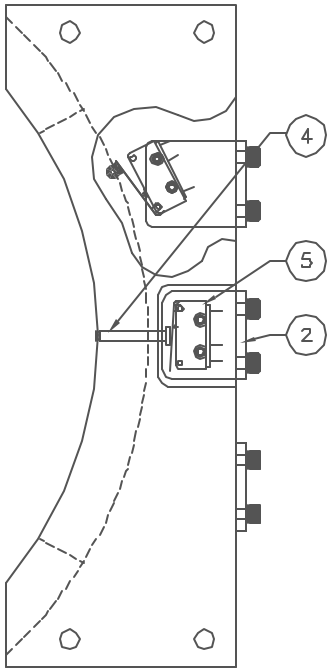
ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
18	1	10900170	LABEL, SPOOL IDENTIFICATION	
17	2	BN 792	WASHER, FLAT M6 X 1.6 S/S	
16	1	DIN 1587	NUT, HEX DOMED M6 X 12 S/S	
15	4	BN 792	WASHER, LOCK M8 X 1.2	
14	5	BN 792	WASHER, LOCK M8 X 1.4	
13	1	BN80	BOLT, M6 X 16 HEX NYLON	
12	5	DIN 912	SHCS M8 X 16 S/S	
11	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	SBNH-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

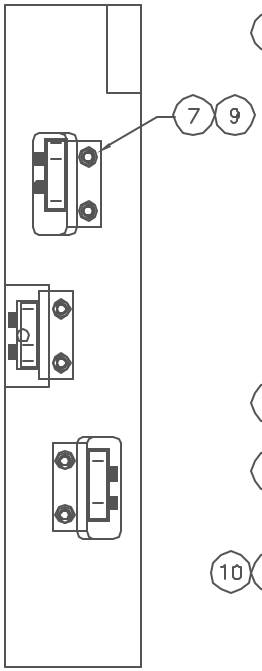
DRAWN G.DOUGLAS	DATE 01/21/97	DO NOT SCALE FROM DRAWING DIMENSIONS & TOLERANCES UNLESS ELECTRONIC DRAWING	GMW P.O. Box 2578, Redwood City, CA 94064 Tel: (650)802-8292. Fax: (650)802-8286.
CHECK	DATE		
ENGINEERING	DATE		
11900800			TITLE MOTORIZED.ROT.DRIVE SPOOL ASSEMBLY
NEXT ASSY	SYSTEM	THIRD ANGLE PROJECTION	SIZE A1 DRAWING NO. 11900820 REV B
SOFTWARE AUTOCAD 13			SCALE 1:2 WT kg SHEET 1 OF 1

REVISIONS

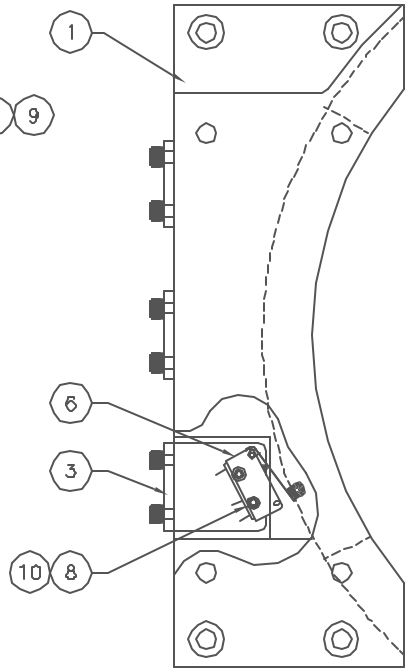
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		07/07/97	G.DOUGLAS



BOTTOM VIEW



REAR VIEW



TOP VIEW

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 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: (650)802-8292. Fax: (650)802-8298.

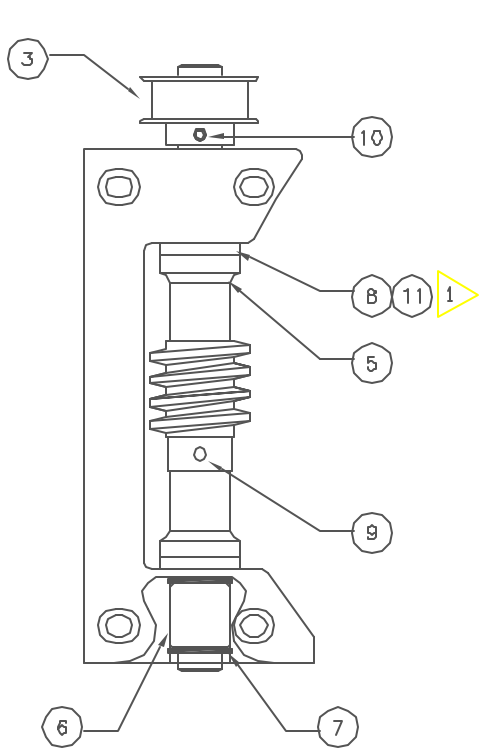
TITLE
MOTORIZED.ROT.DRIVE
STOP BLOCK ASSY

SIZE	DRAWING NO.	REV
A2	11900840	A

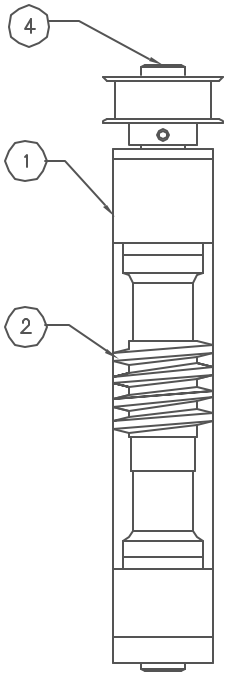
SCALE 1:1 | WT kg | SHEET 1 OF 1

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



TOP VIEW



FRONT VIEW

NOTE:

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

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
11	A/R	BN 748	SHIM WASHER, 14 X 26 X 0.1MM THICK	
10	1	DIN 1481	PIN, SPRING, M4 X 28L SP/S	
9	1	DIN 1481	PIN, SPRING M4 X 18L, SP/S	
8	2	BR5-3	BEARING, THRUST, BERG	
7	4	A 9Q28-6B	RETAINING RING [CIRCLIP], SDP	
6	2	S99NH2-BN1624	BEARING, NEEDLE ROLLER, SDP	
5	2	17901190	SPACER, WORM	
4	1	12900060	WORM SHAFT	
3	1	12900041	PULLEY, 18 TEETH [FOR 1/2" SHAFT]	
2	1	12900130	WORM	
1	1	17901080	WORM MOUNT	

PARTS LIST

DRAWN G.DOUGLAS DATE 05/03/97
CHECK DATE
ENGINEERING DATE
11800810
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: (650)802-8292. Fax: (650)802-8298.

TITLE
MOTORIZED.ROT.DRIVE WORM MOUNT ASSY

SIZE	DRAWING NO.	REV
A2	11900850	C

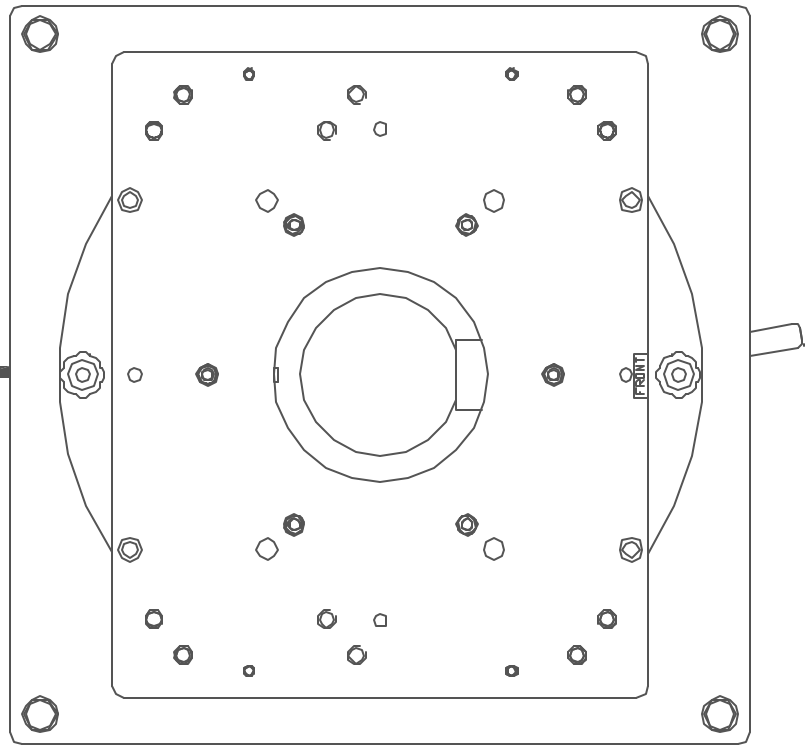
SCALE 1:1 | WT kg | SHEET 1 OF 1

PROPRIETARY

THE INFORMATION CONTAINED HEREIN IS PROPRIETARY TO GMW INC. IT MUST NOT BE REPRODUCED OR DISCLOSED TO OTHERS OR USED IN ANY OTHER WAY, IN WHOLE OR IN PART EXCEPT AS AUTHORIZED IN WRITING BY GMW INC.

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		02/17/98	G.DOUGLAS

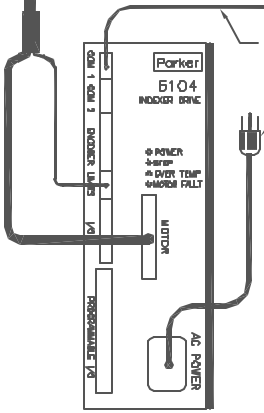
TOP VIEW



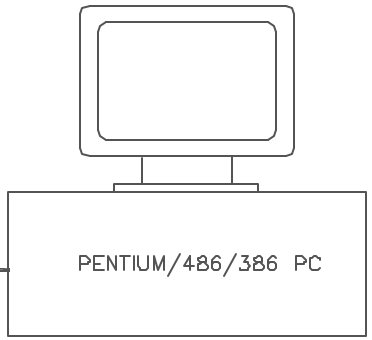
MOTOR AND LIMIT SWITCH CABLE PART NO 16900400

SERIAL COMMUNICATIONS CABLE PART NO 16900410

AC POWER INPUT



STEPPER MOTOR CONTROLLER



CONTROL COMPUTER

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE

PARTS LIST

DRAWN G.DOUGLAS	DATE 02/17/98	DO NOT SCALE FROM DRAWING DIMENSIONS & TOLERANCES UNLESS OTHERWISE SPECIFIED	GMW P.O. Box 2578, Redwood City, CA 94064 Tel: (650)802-8292. Fax: (650)802-8288.
CHECK	DATE		
ENGINEERING	DATE		

UNLESS OTHERWISE SPECIFIED	INCHES	mm
X.XXX	±.005	±0.1
X.XX	±.02	±0.5
X	±.06	±1
ANGL	±1°	±0.5
FINISH		

THIRD ANGLE PROJECTION

TITLE: MOTORIZED.ROT.DRIVE ELECTRICAL ASSY

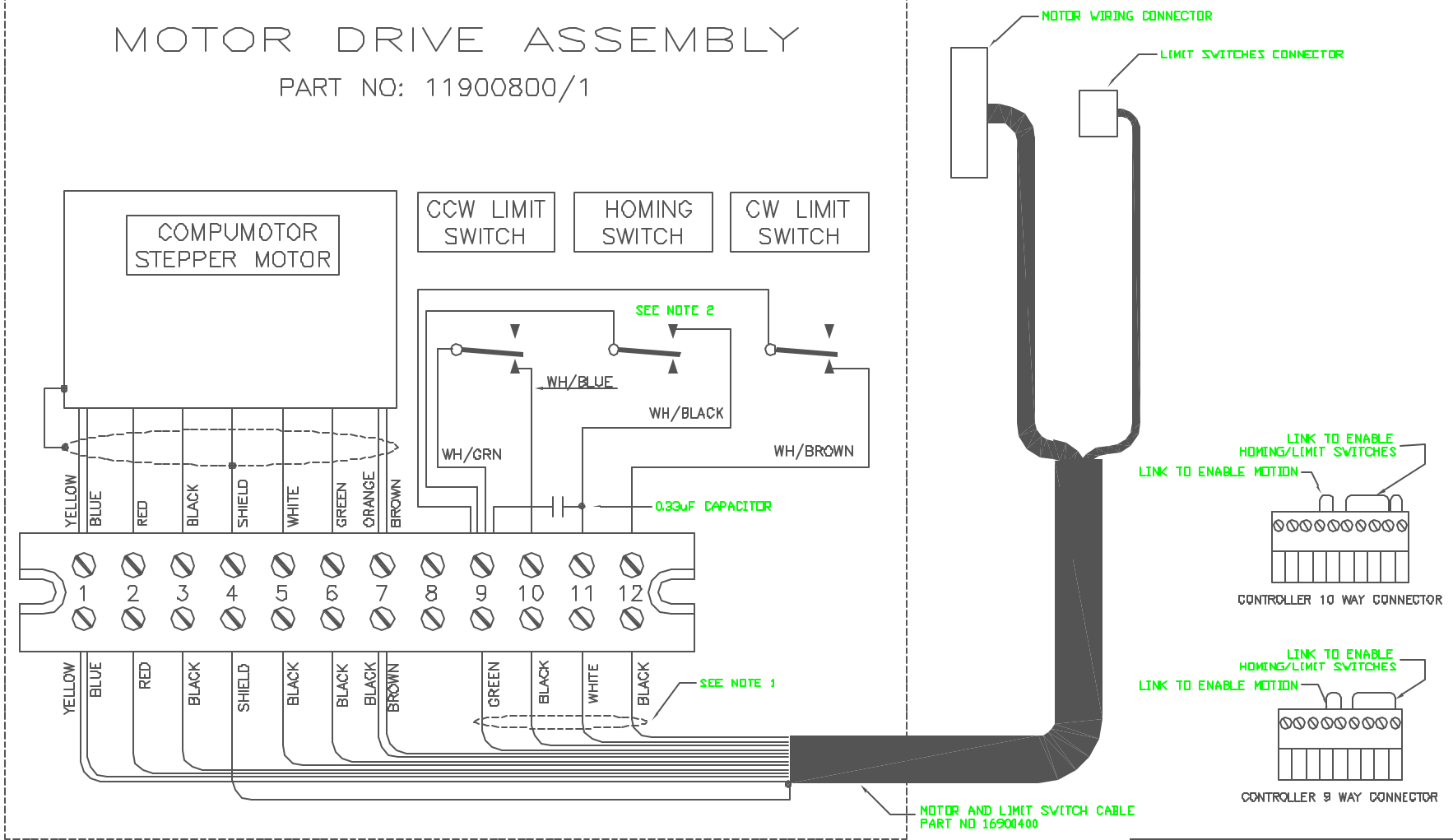
NEXT ASSY	SYSTEM	SIZE	DRAWING NO.	REV
SOFTWARE AUTOCAD 13		A1	11901020	A

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

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		02/13/01	G.DOUGLAS
B	ADD CONTROLLER CONNECTOR LINKING		11/12/01	G.DOUGLAS

MOTOR DRIVE ASSEMBLY

PART NO: 11900800/1



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. LIMIT SWITCHES USE NORMALLY CLOSED CONTACTS.

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE

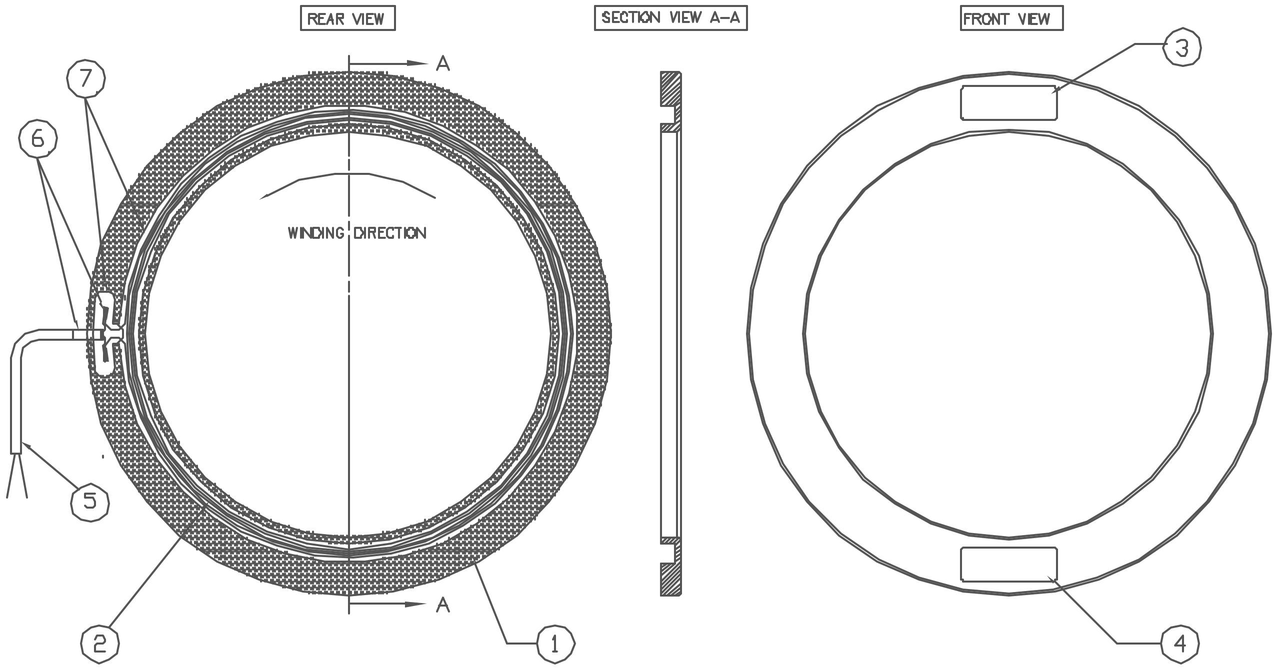
PARTS LIST

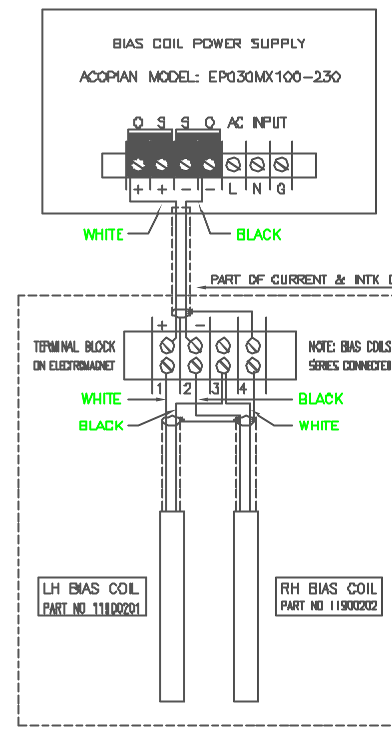
DRAWN G.DOUGLAS	DATE 02/13/01	DO NOT SCALE FROM DRAWING UNLESS OTHERWISE SPECIFIED	GMW P.O. Box 2578, Redwood City, CA 94064 Tel: (650)802-8292. Fax: (650)802-8288.
CHECK	DATE		
ENGINEERING	DATE		
			TITLE MOTORIZED.ROT.DRIVE ELECTRICAL WIRING
		FINISH 5870	SIZE A1 DRAWING NO. 13900350 REV B
NEXT ASSY	SYSTEM	THIRD ANGLE PROJECTION	
SOFTWARE AUTOCAD 13			SCALE 2:1 WT kg SHEET 1 OF 1

PROPRIETARY
THIS DRAWING CONTAINS CONFIDENTIAL INFORMATION PROPRIETARY TO GMW INC. IT MUST NOT BE REPRODUCED OR DISCLOSED TO OTHERS OR USED IN ANY OTHER WAY, IN WHOLE OR IN PART EXCEPT AS AUTHORIZED IN WRITING BY GMW INC.

REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		12/15/94	G.DOUGLAS





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 16.8 OHMS [series connected]
SPOOL ID: 170mm [6.69"]
SPOOL OD: 220mm [8.66"]
SPOOL WIDTH: 6mm [0.24"]
FIELD @ MAX POWER: 150 GAUSS.
[INSTALLED ON MODEL: 3473 WITH 16mm GAP]
MAX CURRENT: 1.0 AMPS.
MAX VOLTS: 60 VOLTS

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
7	A/R	521	POTTING COMPOUND, EVERCOAT	
6	A/R		HEATSHRINK SLEEVING 5mm	
5	1m	5810B2401	CABLE, ALPHA 2 CORE, BLACK PVC	
4	1	14900012	LABEL, SPECIFICATIONS [LH SIDE]	
3	1	14800011	LABEL, MODEL & SERIAL NO.	
2	1	17900250	WINDING [100 turns 26AWG magnet wire]	
1	1	17900240	SPOOL	

PARTS LIST

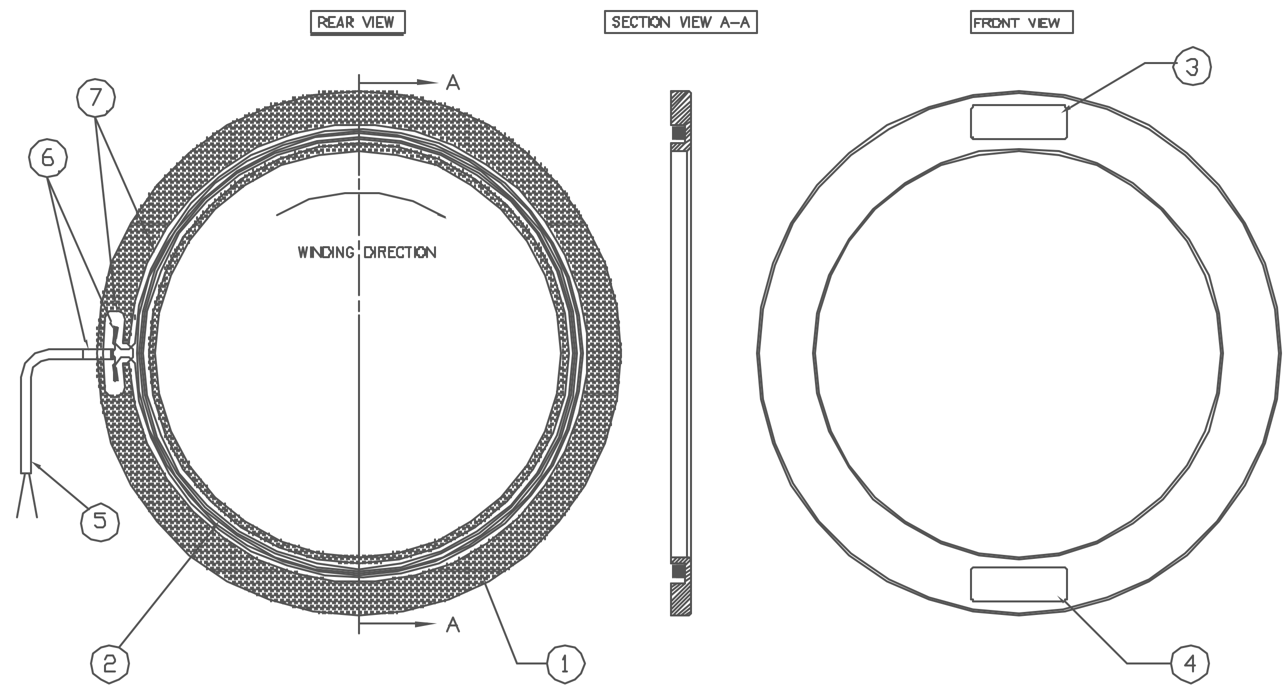
DRAWN G.DOUGLAS DATE 12/13/94
CHECK DATE
ENGINEERING DATE
DO NOT SCALE FROM DRAWING
NEXT ASSY 3473 SYSTEM
THIRD ANGLE PROJECTION
SOFTWARE: AUTOCAD 13

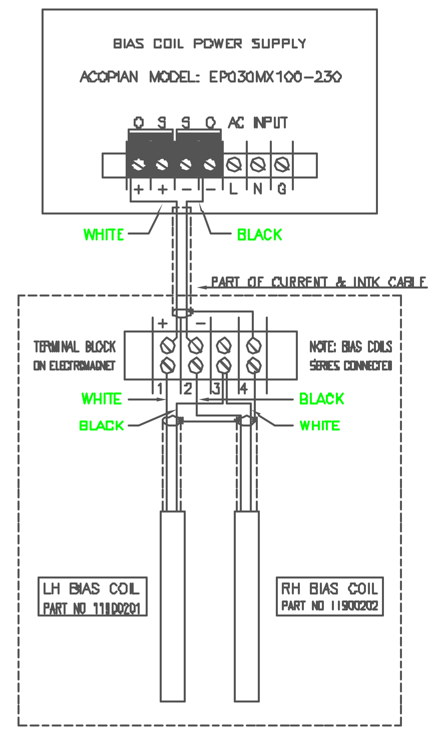
GMW
P.O. Box 2578, Redwood City, CA 94064
Tel: (415)802-8292, Fax: (415)802-8298.

TITLE: LH BIAS COIL ASSY MODEL: 5484
SIZE A1 DRAWING NO. 11900201 REV A
SCALE 1:1 SHEET 1 OF 1

REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		12/15/94	G.DOUGLAS





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 16.8 OHMS [series connected]
SPOOL ID: 170mm [6.69"]
SPOOL OD: 220mm [8.66"]
SPOOL WIDTH: 6mm [0.24"]
FIELD @ MAX POWER: 150 GAUSS.
[INSTALLED ON MODEL: 3473 WITH 15mm GAP]
MAX CURRENT: 1.0 AMPS.
MAX VOLTS: 50 VOLTS

PARTS LIST

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
7	A/R	521	POTTING COMPOUND, EVERCOAT	
6	A/R		HEATSHRINK SLEEVING 5mm	
5	1m	581082401	CABLE, ALPHA 2 CORE, BLACK PVC	
4	1	14900013	LABEL, SPECIFICATIONS [RH SIDE]	
3	1	14900011	LABEL, MODEL & SERIAL NO.	
2	1	17900250	WINDING [100 turns 26AWG magnet wire]	
1	1	17900240	SPOOL	

DRAWN G.DOUGLAS DATE 12/13/94
CHECK DATE
ENGINEERING DATE

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

NEXT ASSY 3473 SYSTEM
SOFTWARE: AUTOCAD 13
THIRD ANGLE PROJECTION

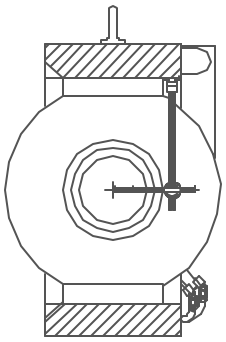
GMW
P.O. Box 2578, Redwood City, CA 94064
Tel: (415)802-8292, Fax: (415)802-8298.

TITLE RH BIAS COIL ASSY
MODEL: 5484

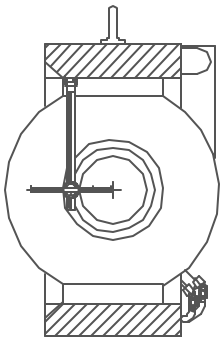
SIZE A1 DRAWING NO. 11900202 REV A
SCALE 1:1 WT kg SHEET 1 OF 1

REVISIONS

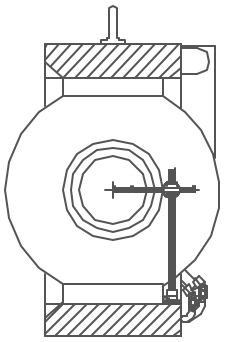
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		09/11/98	G.DOUGLAS



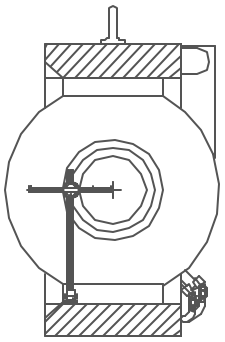
TOP/REAR INSTALLATION



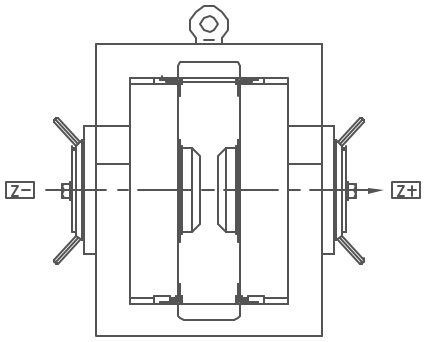
TOP/FRONT INSTALLATION



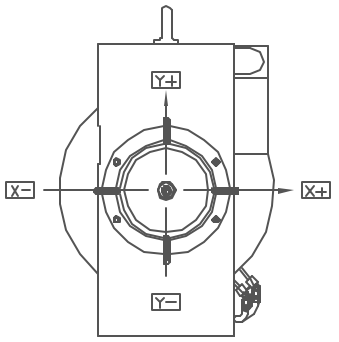
BOTTOM/REAR INSTALLATION



BOTTOM/FRONT INSTALLATION

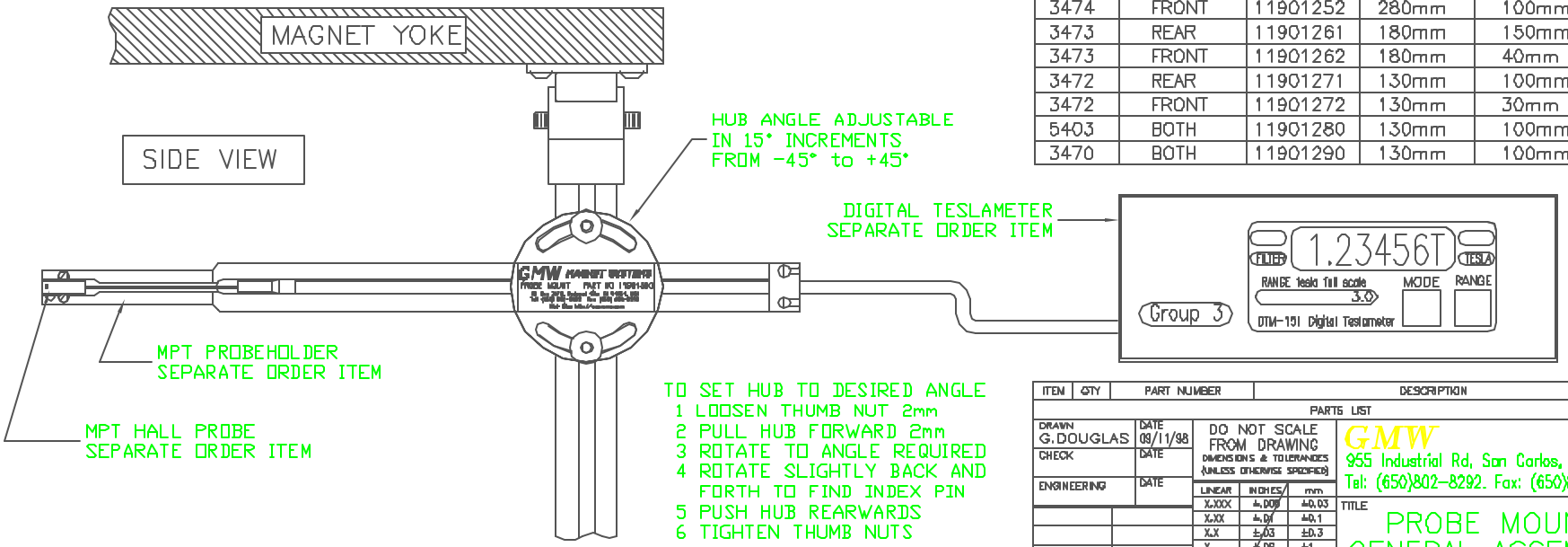


MAGNET FRONT VIEW



MAGNET SIDE VIEW

MAGNET MODEL	INSTALLATION POSITION	ASSEMBLY NUMBER	VERTICAL TRAVEL "Y"	HORIZONTAL TRAVEL "Z"
3474	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 13

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

	INCHES	mm
LINEAR		
X.XXX	±.003	±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.

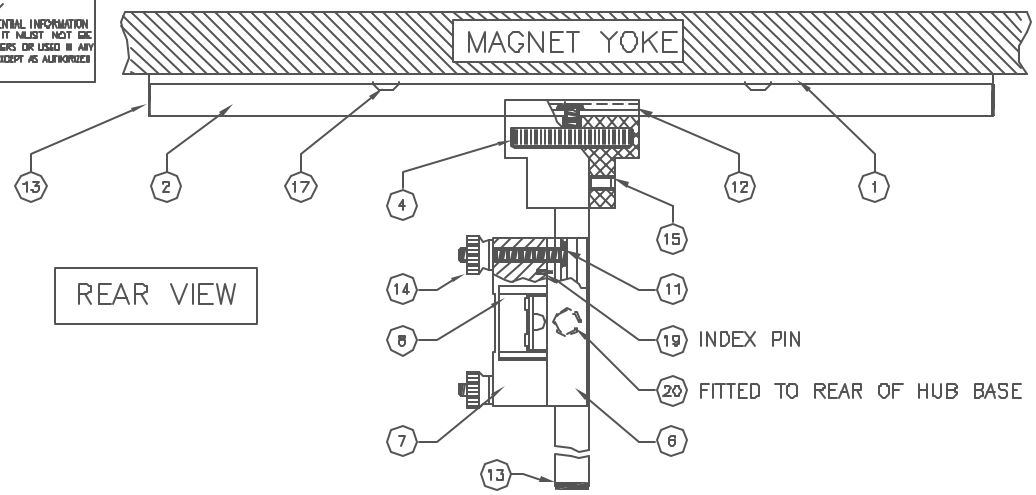
TITLE
PROBE MOUNT GENERAL ASSEMBLY

SIZE	DRAWING NO.	REV
A2	11901300	A

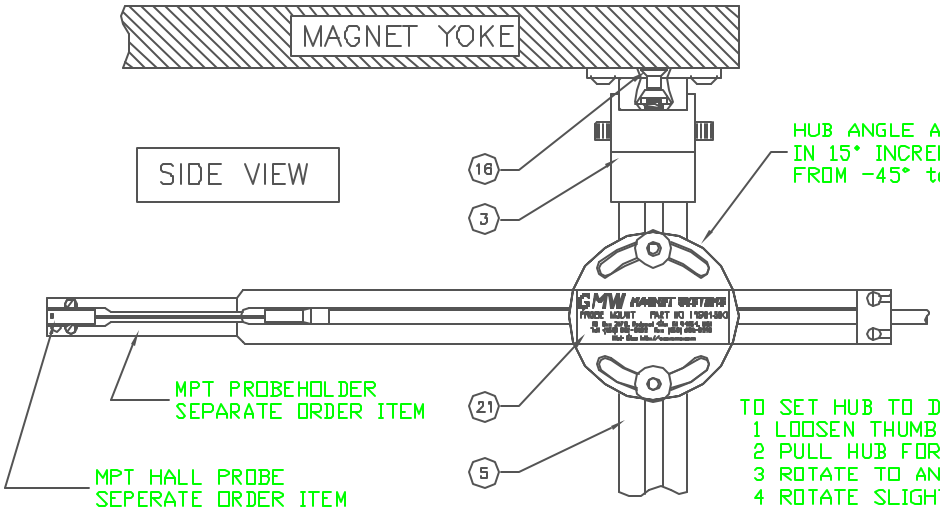
SCALE 1:1 | WT kg | SHEET 1 OF 1

REVISIONS

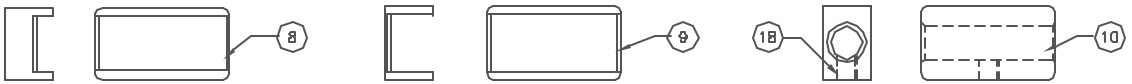
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		08/27/98	G.DOUGLAS



NOTE: THIS DRAWING SHOWS REAR INSTALLATION OF PROBE MOUNT
FOR FRONT INSTALLATION OF PROBE MOUNT SEE DRAWING NO 11901262



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



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	08M04X070TN	THUMB NUT, NYLON	
13	3	18-B30	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	17901944	VERTICAL MOUNTING EXTRUSION	
4	1	17901930	BASE NUT	
3	1	17901920	BASE SUPPORT	
2	1	17902050	BASE MOUNTING EXTRUSION	
1	1	17902040	BASE MOUNTING PLATE	

PARTS LIST

DRAWN	G.DOUGLAS 08/27/98
CHECK	DATE
ENGINEERING	DATE
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	±.08	±1
DEB.	±.5	±0.5
FINISH	63	1.6

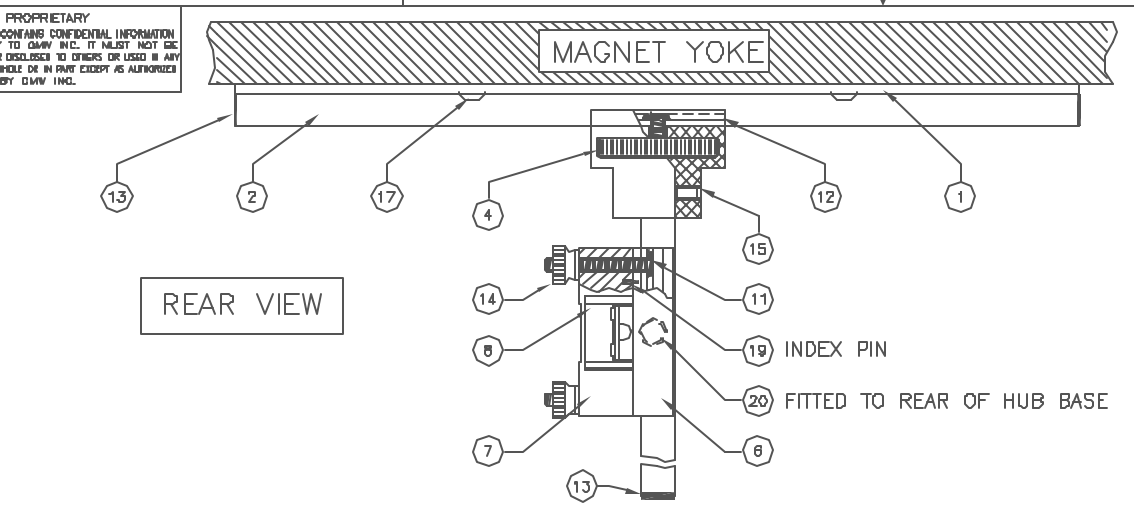
THIRD ANGLE PROJECTION

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

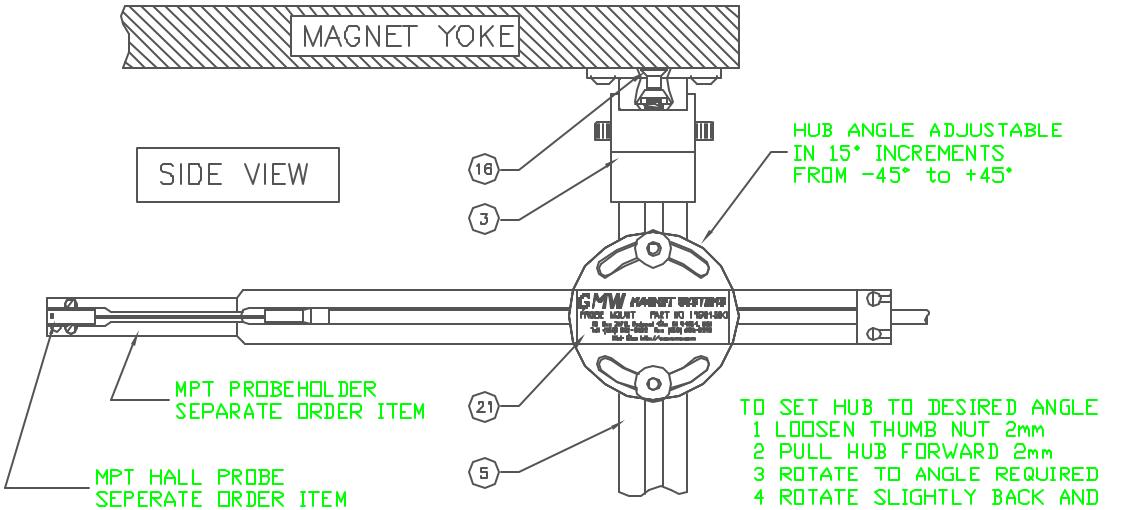
TITLE
PROBE MOUNT
MODEL: 3473

SIZE	DRAWING NO.	REV
A2	11901261	A

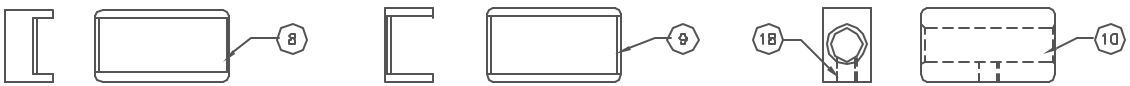
SCALE 1:1 | WT kg | SHEET 1 OF 1



NOTE: THIS DRAWING SHOWS FRONT INSTALLATION OF PROBE MOUNT
FOR REAR INSTALLATION OF PROBE MOUNT SEE DRAWING NO 11901261



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	SBMHB	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	08M04X070TN	THUMB NUT, NYLON	
13	3	18-B30	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	17901944	VERTICAL MOUNTING EXTRUSION	
4	1	17901930	BASE NUT	
3	1	17901920	BASE SUPPORT	
2	1	17902030	BASE MOUNTING EXTRUSION	
1	1	17902020	BASE MOUNTING PLATE	

PARTS LIST

DRAWN G.DOUGLAS 08/27/98
CHECK
ENGINEERING
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
DEB.	±.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
MODEL: 3473

SIZE A2 | DRAWING NO. 11901262 | REV A
SCALE 1:1 | WT kg | SHEET 1 OF 1

Section 7

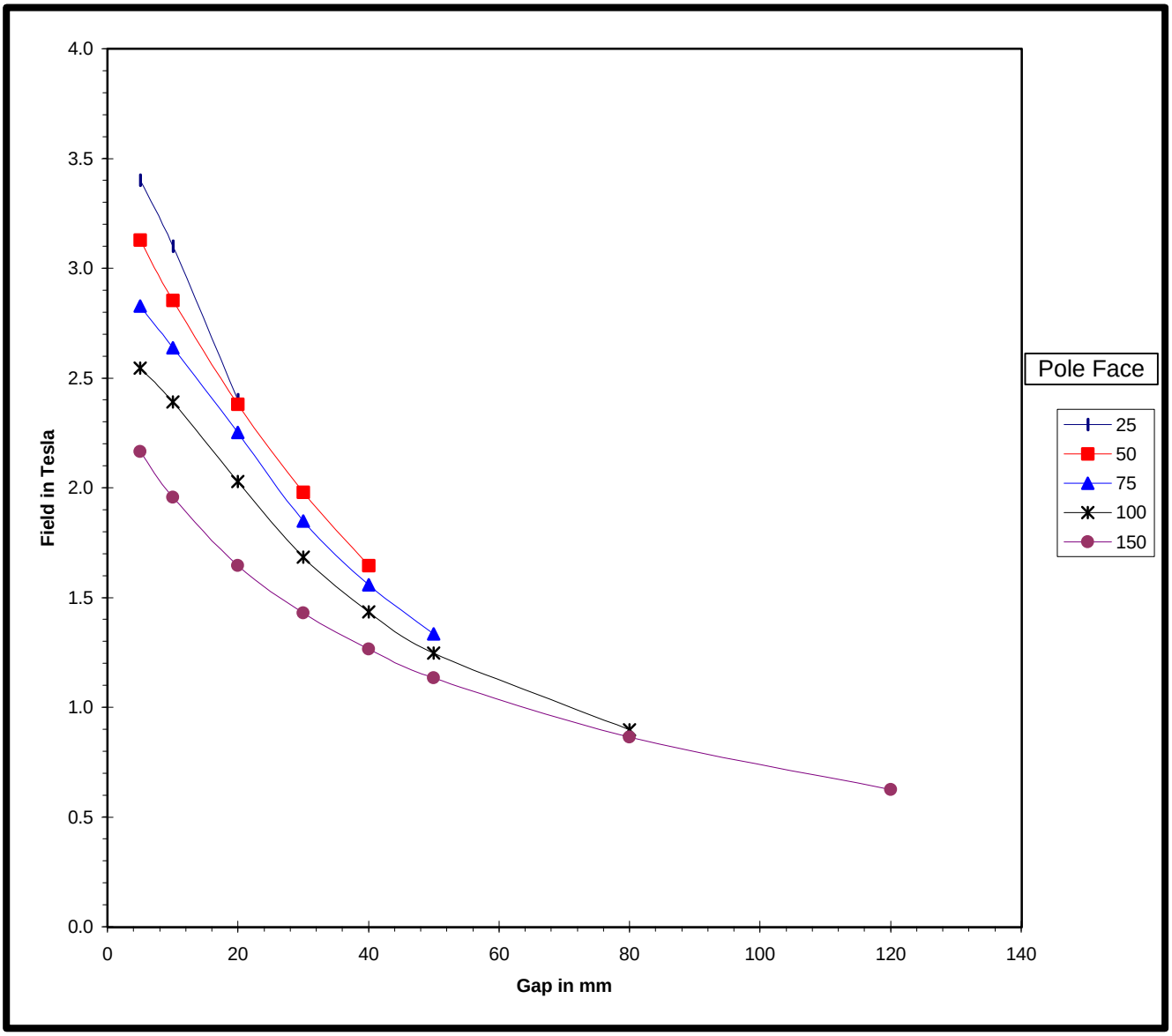
CUSTOM OPTIONS

Section 8

EXCITATION CURVES

GMW Associates
Electromagnet Excitation Plot
Field Vs Gap

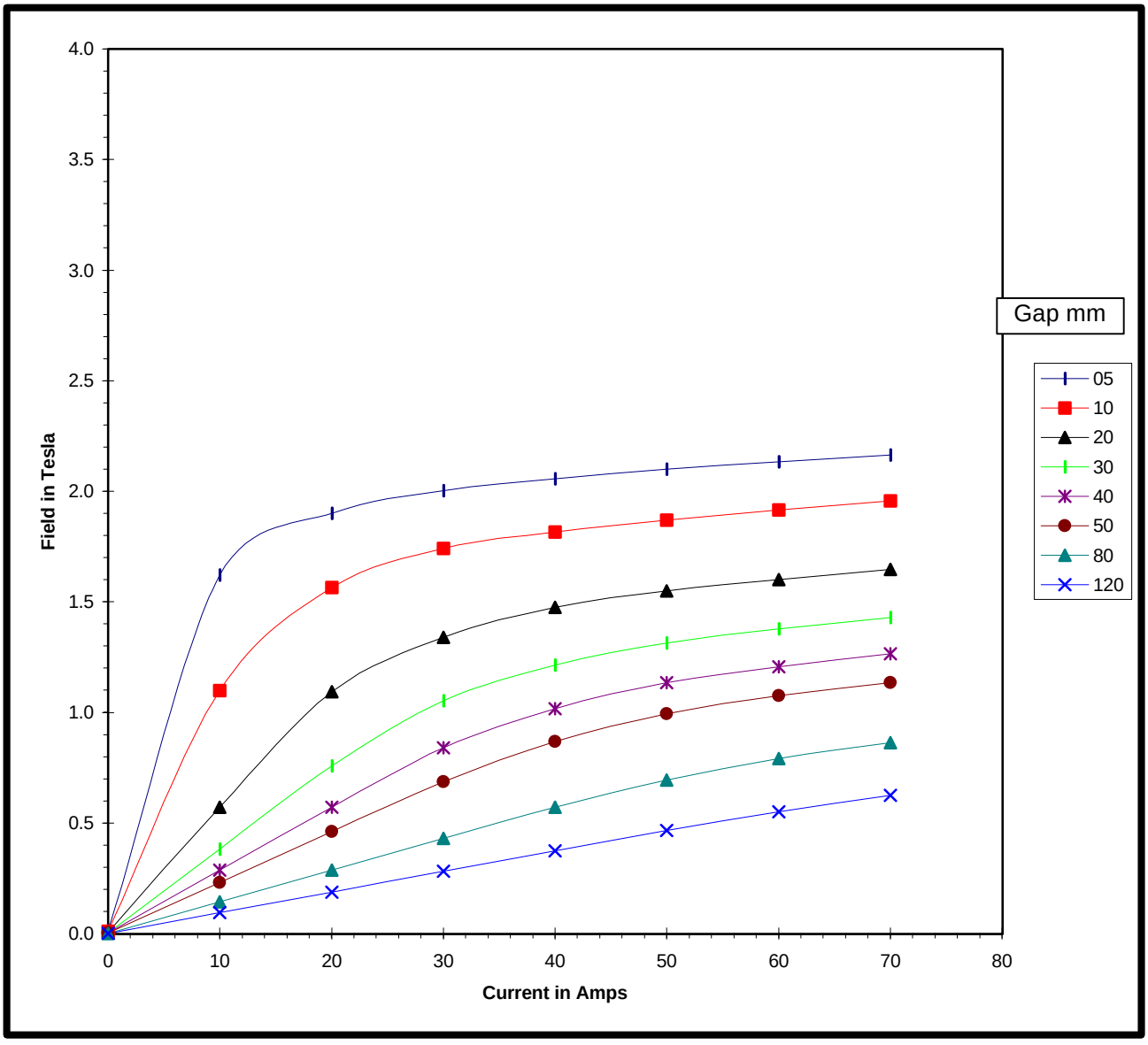
Contract No:		Page: 1 of 1		Date:	May 05,1994
Customer:				Engr:	R Yass
Model:	3473-70	Power Supply:	D/F 854 100-100	Set Current:	70 Amps
Serial No:	22	Serial No:	9101033	Target Field:	
Pole Face:	As per table below	Position:	X=0, Y=0, Z=0		
Serial No:	None	Notes:			
Pole Gap:	As per table below				
Pole Spacers:	None				



Filename: 3473 Gap-Field.xls

GMW Associates
Electromagnet Excitation Plot
Field Vs Current

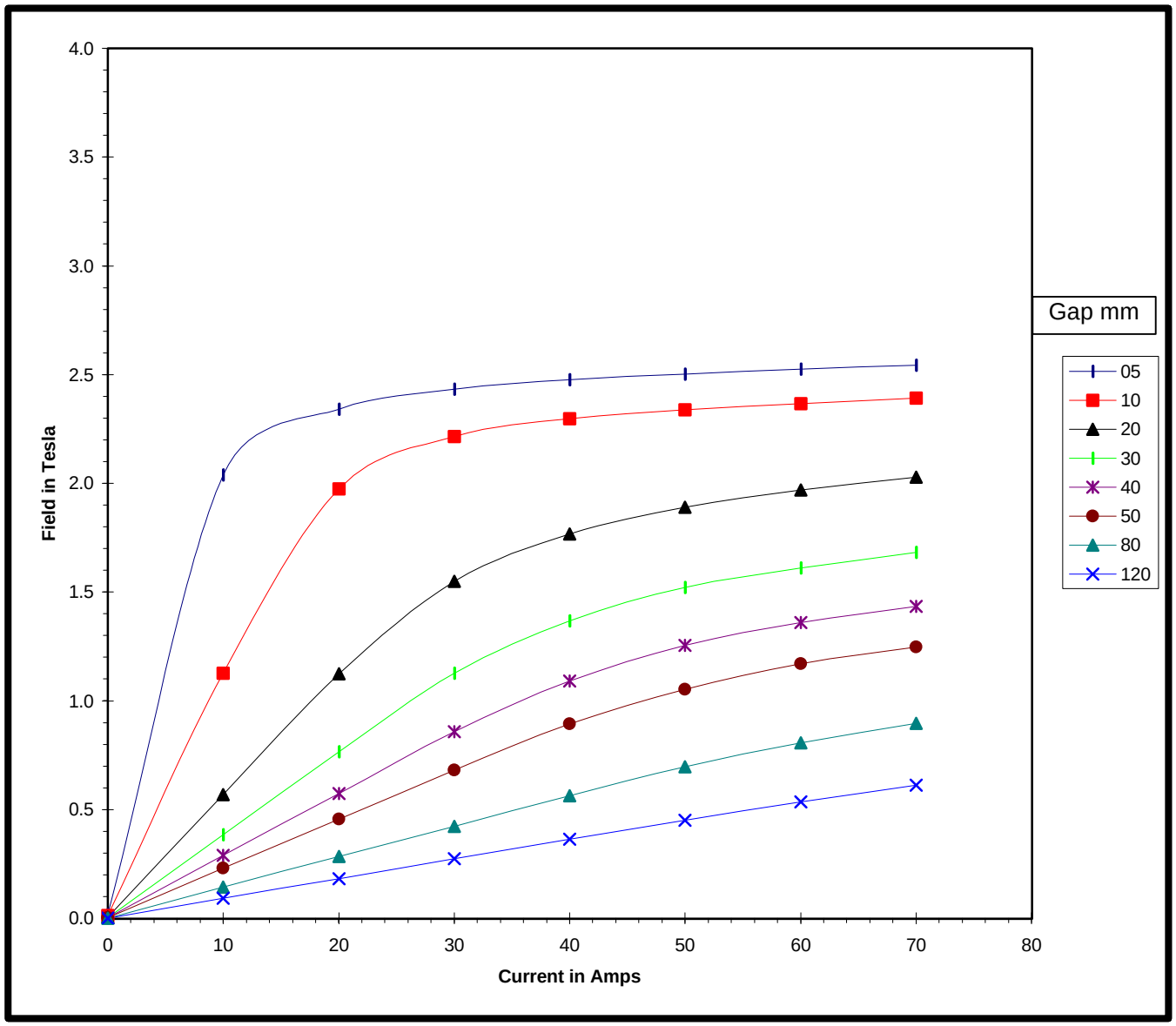
Contract N		Page: 1 of 5		Date:	May 05, 94
Customer:				Engr:	R Yass
Model:	3473-70	Power Supply:	D/F 854 100-100	Set Current:	
Serial No:	22	Serial No:	9101033	Target Field:	
Pole Face:	150	Position:	X=0, Y=0, Z=0		
Serial No:	None	Notes:			
Pole Gap:	As per table below				
Pole Space	None				



Filename: 3473 Ex 150-05-120.xls

GMW Associates
Electromagnet Excitation Plot
Field Vs Current

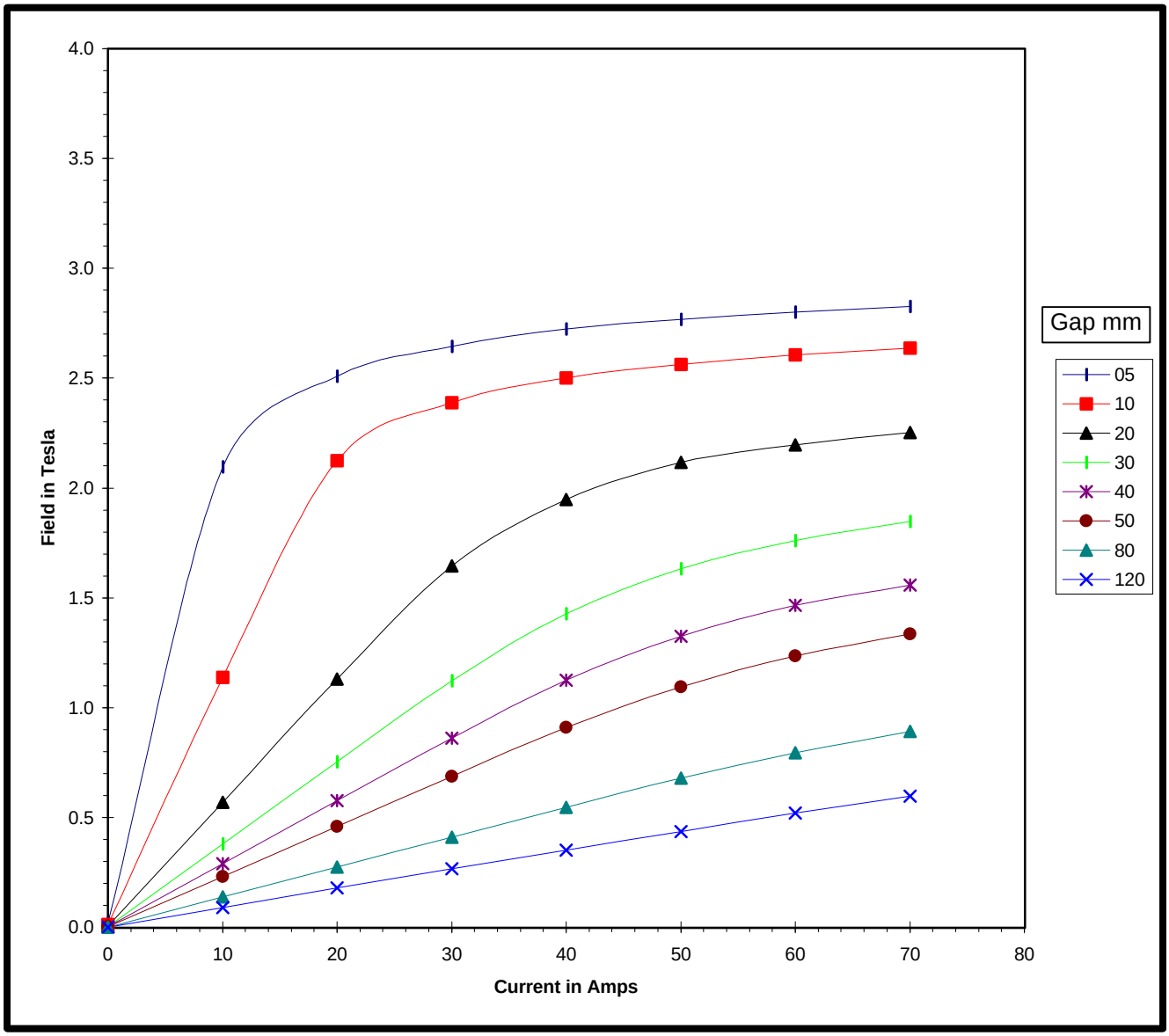
Contract No:		Page: 2 of 5		Date:	May 05, 94
Customer:				Engr:	R Yass
Model:	3473-70	Power Supply:	D/F 854 100-100	Set Current:	
Serial No:	22	Serial No:	9101033	Target Field:	
Pole Face:	100	Position:	X=0, Y=0, Z=0		
Serial No:	None	Notes:			
Pole Gap:	As per table below				
Pole Spacers:	None				



Filename: 3473 Ex 100-05-120.xls

GMW Associates
Electromagnet Excitation Plot
Field Vs Current

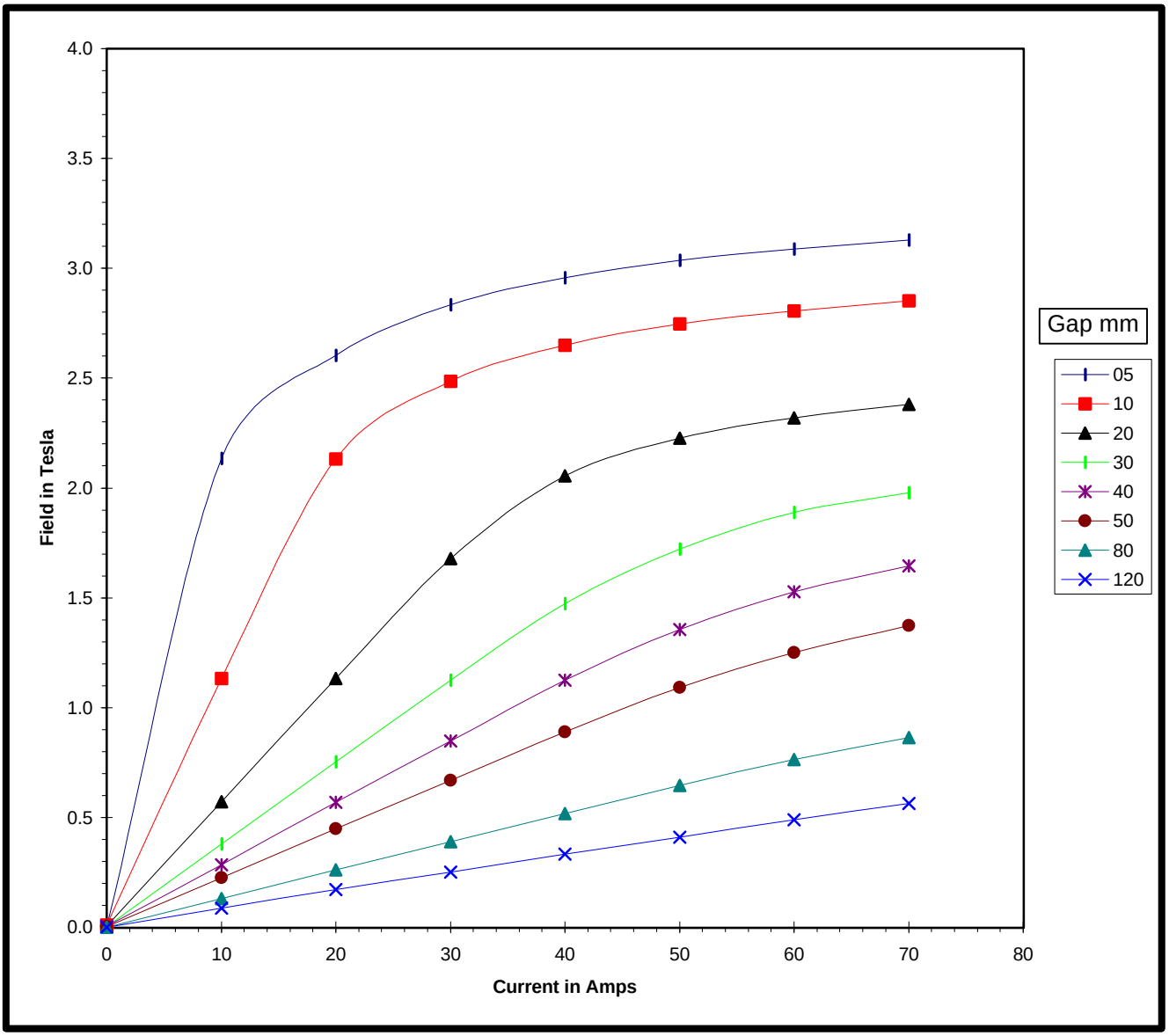
Contract No:		Page: 3 of 5		Date:	May 05, 94
Customer:				Engr:	R Yass
Model:	3473-70	Power Supply:	D/F 854 100-100	Set Current:	
Serial No:	22	Serial No:	9101033	Target Field:	
Pole Face:	75	Position:	X=0, Y=0, Z=0		
Serial No:	None	Notes:			
Pole Gap:	As per table below				
Pole Spacers:	None				



Filename: 3473 Ex 75-05-120.xls

GMW Associates
Electromagnet Excitation Plot
Field Vs Current

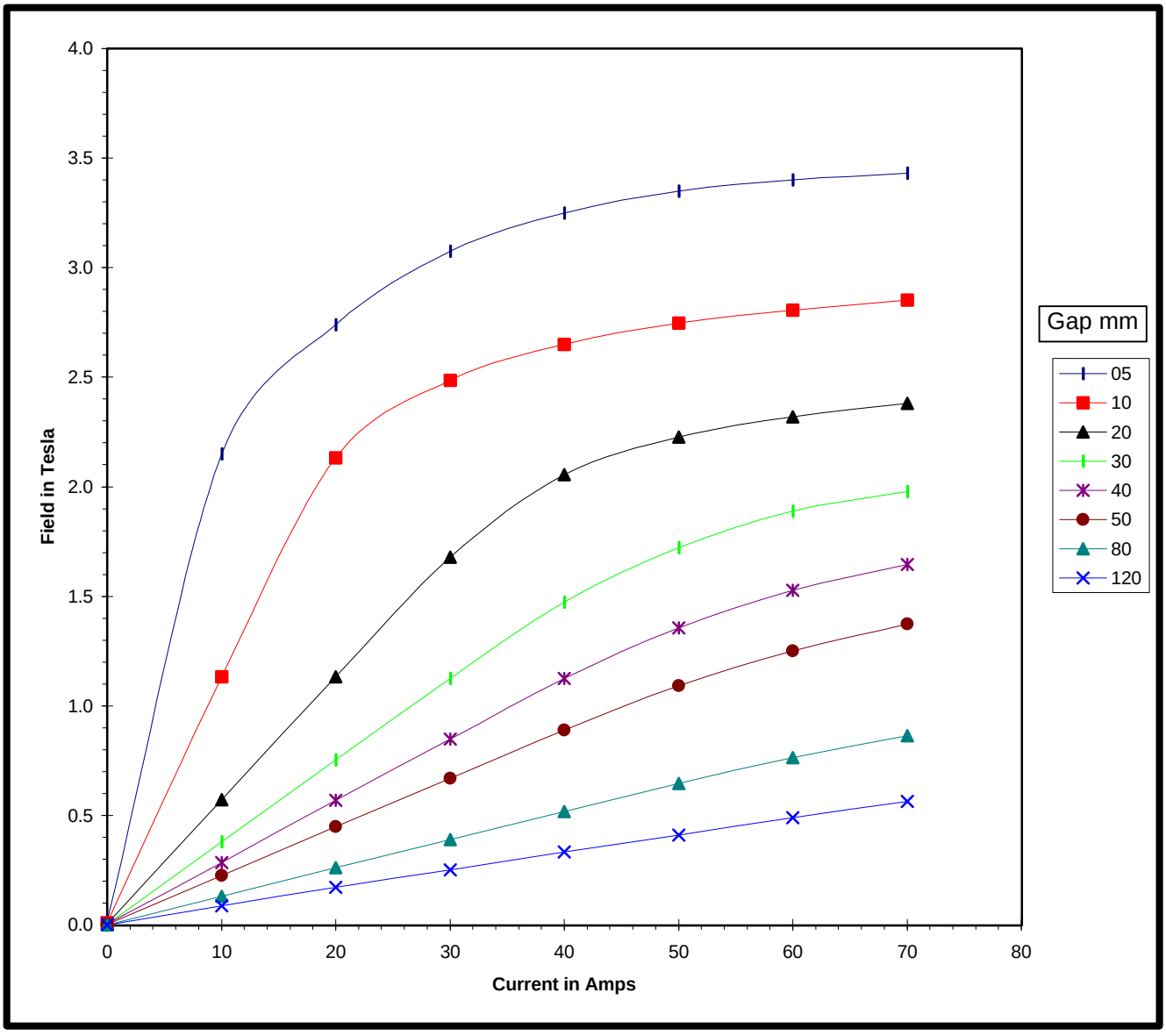
Contract No:		Page: 4 of 5		Date:	May 05, 94
Customer:				Engr:	R Yass
Model:	3473-70	Power Supply:	D/F 854 100-100	Set Current:	
Serial No:	22	Serial No:	9101033	Target Field:	
Pole Face:	50	Position:	X=0, Y=0, Z=0		
Serial No:	None	Notes:			
Pole Gap:	As per table below				
Pole Spacers:	None				



Filename: 3473 Ex 50-05-120.xls

GMW Associates
Electromagnet Excitation Plot
Field Vs Current

Contract No:		Page: 5 of 5		Date:	May 05, 94
Customer:				Engr:	R Yass
Model:	3473-70	Power Supply:	D/F 854 100-100	Set Current:	
Serial No:	22	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				

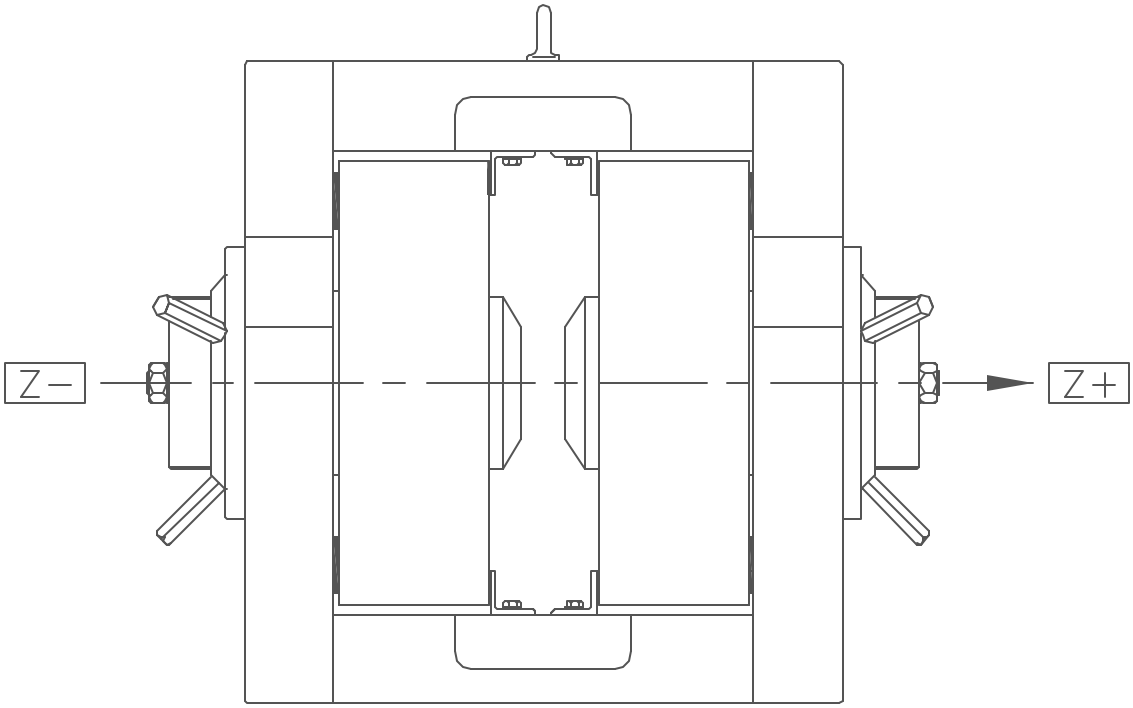


Filename: 3473 Ex 25-05-120.xls

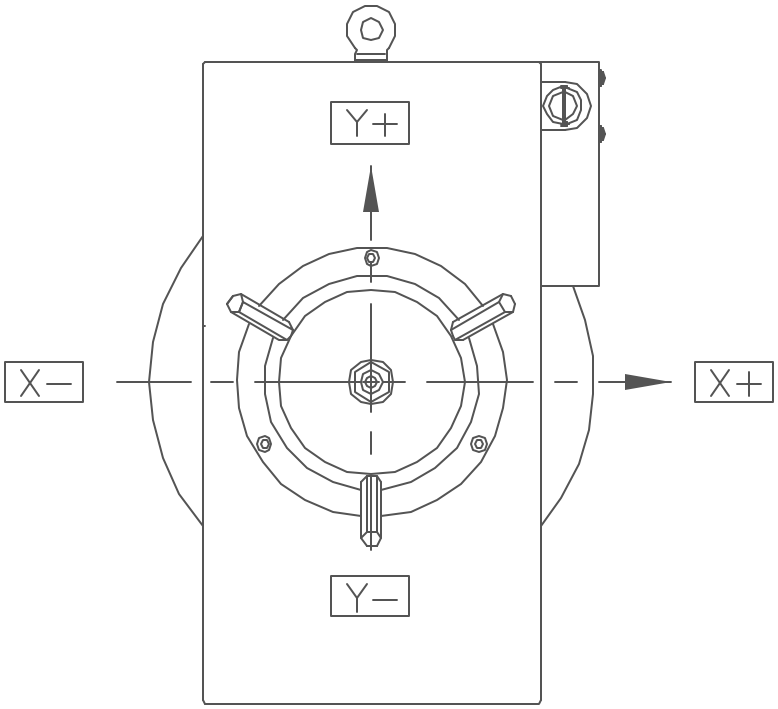
Section 9

TEST DATA

FRONT VIEW



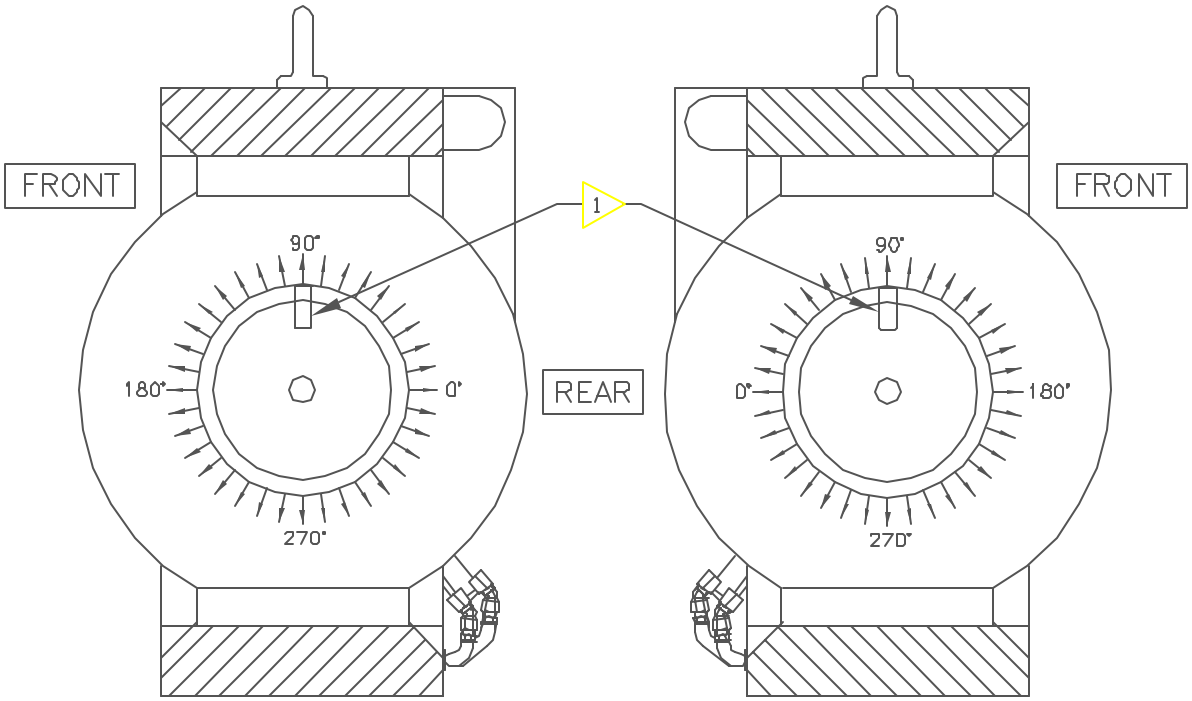
SIDE VIEW



MAGNETIC PLOTTING AXIS

80900020	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: _____

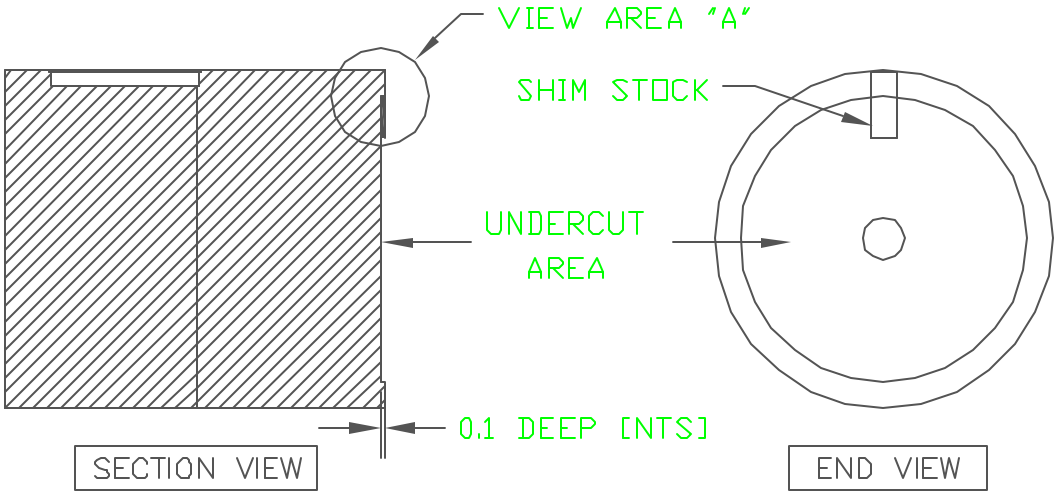
MAGNET SERIAL NO: _____

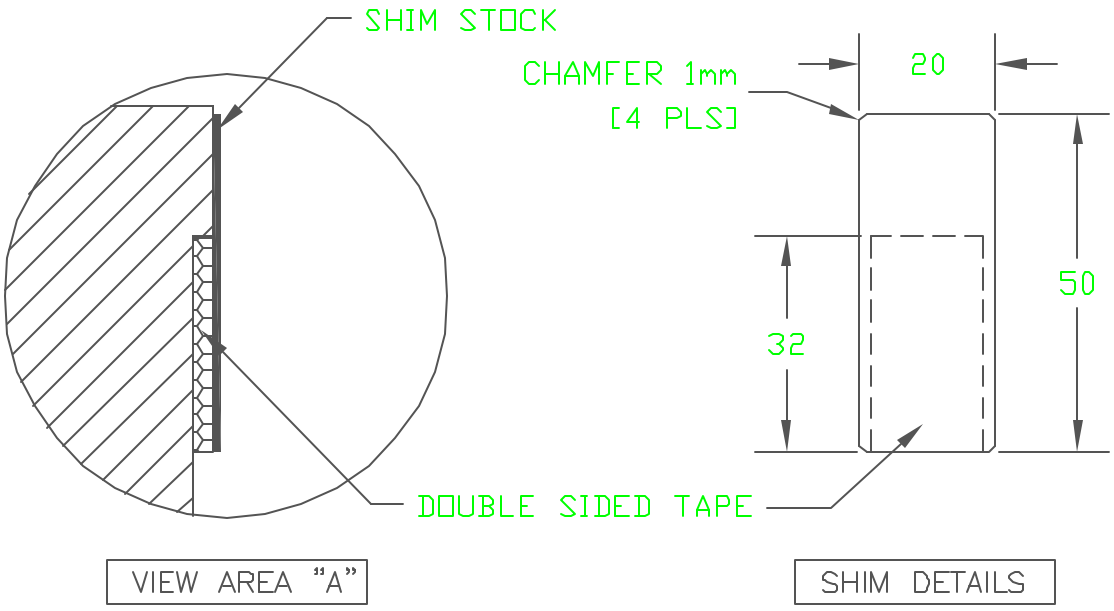
DATA LOGGED BY:_____

DATA LOGGED DATE:_____

MAGNET FINAL SHIMMING LOG

3474-0001 | C | SHEET 1 OF 1

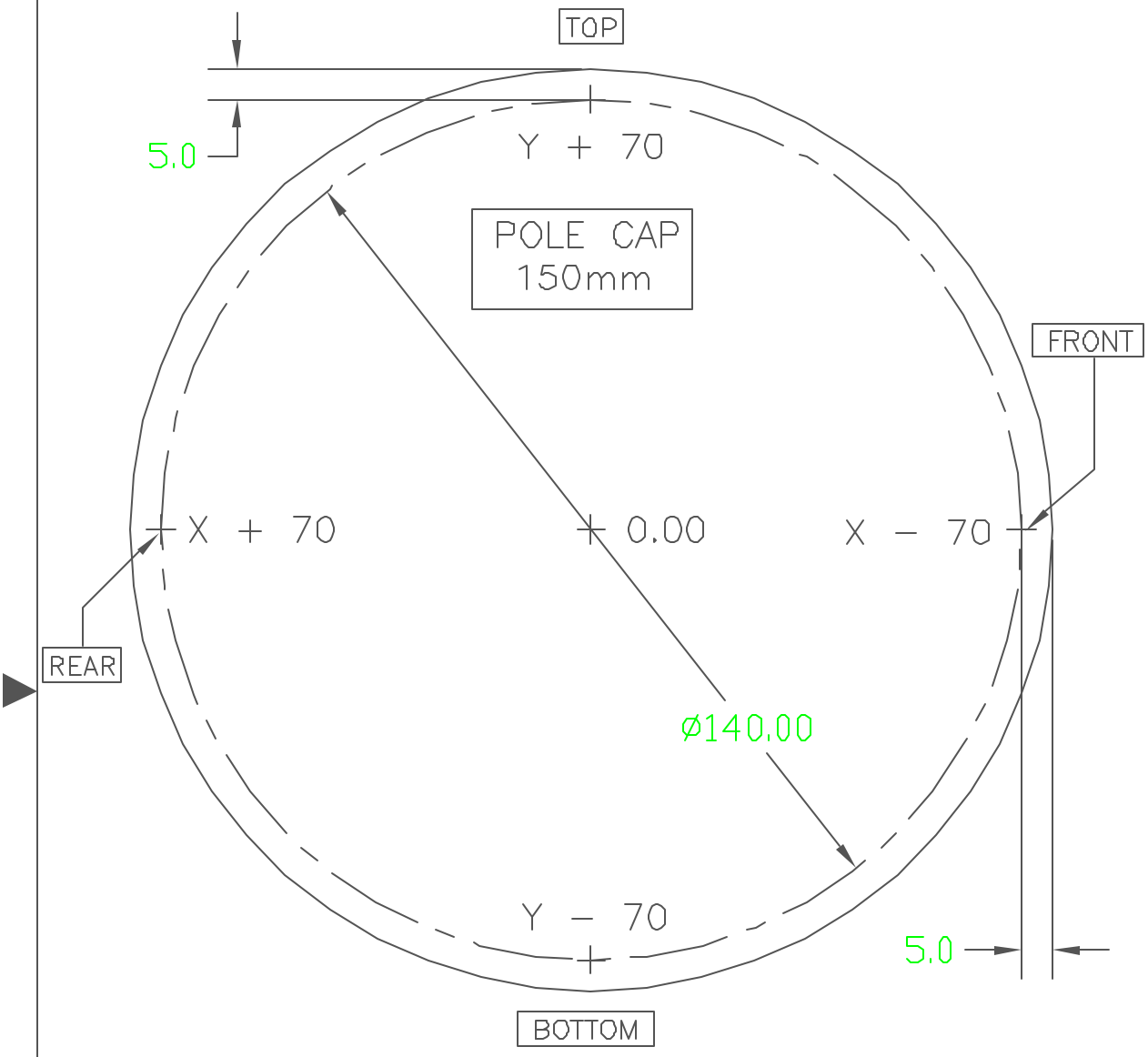




1. THROUGHLY CLEAN AND DEGREASE AREA WHERE SHIM IS TO BE FITTED.
2. CUT SHIM STOCK TO DIMENSIONS SHOWN.
3. APPLY DOUBLE SIDED TAPE 0.1mm THICK TO AREA SHOWN.
4. FIT SHIM TO POLE FACE, ENSURE TAPE IS KEPT WITHIN UNDERCUT AREA.
5. REASSEMBLE POLE CAPS ONTO MAGNET.
6. REMAP MAGNET, IF RESULTS WITHIN SPECIFICATION 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		
3474–0002	A	SHEET 1 OF 1

TAKE MEASUREMENTS OF GAP TAPER AT POINTS MARKED WITH BORE GAUGE. RECORD RESULTS BELOW



MAGNET GAP TAPER LOG			
X + 70		Y + 70	
X − 70		Y − 70	
X DIFF		Y DIFF	

MAGNET MODEL: _____

MAGNET SERIAL NO: _____

DATA LOGGED BY: _____

DATA LOGGED DATE: _____

MAGNET GAP TAPER TEST

80900120 | A | SHEET 1 OF 1

GMW ASSOCIATES
LABORATORY ELECTROMAGNET FIELD UNIFORMITY PL

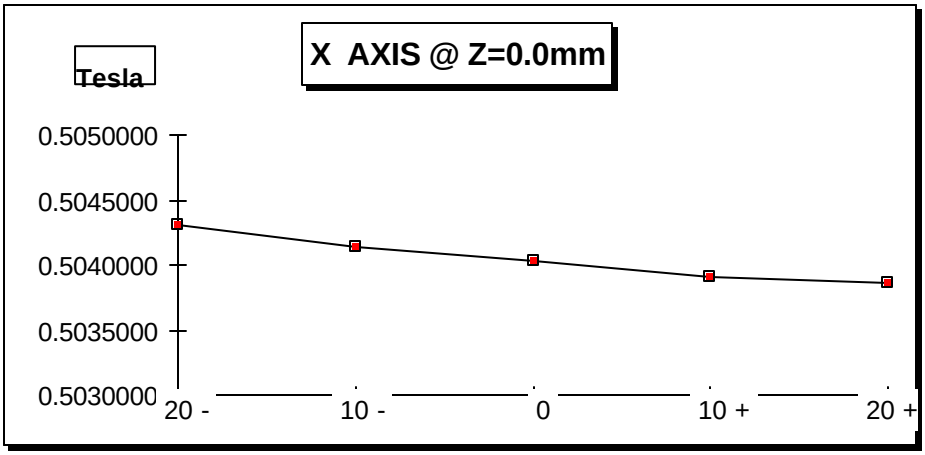
Model	3473	Pole Face 150 mm	Engr Greg Douglas
Serial No	16	Pole Gap 19 mm	Date Oct 13, 1992
Coil Set	70A Sn 1469&1470	Pole Shims 0.004 fitted	NMR Signal -650mV

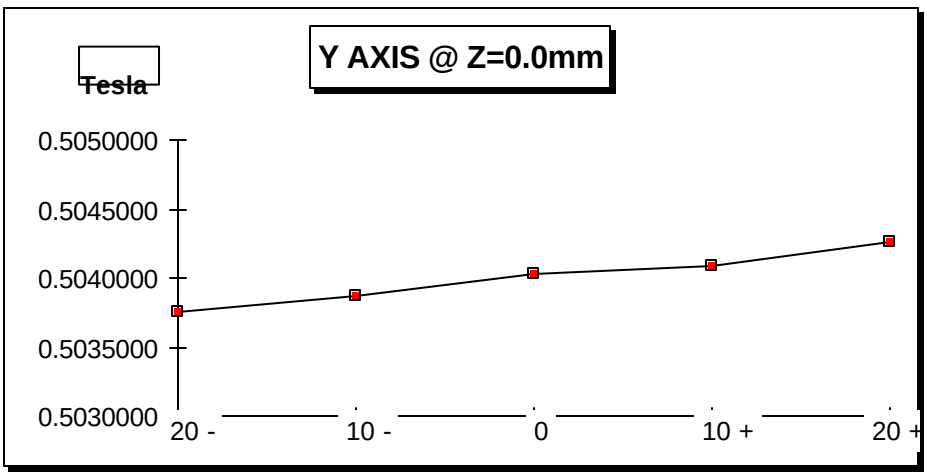
Power Supply 8.2 Amps 082000 ADC 8.2 % Current

Start Time 14:45
Start Field
0.5040260

Finish Time 15:10
Finish Field
0.5039170

Plot Z = 0.0					
Y	X (mm)				
	20 -	10 -	0	10 +	20 +
20 +	0.5040740	0.5039130	0.5037570	0.5036130	0.5035000
10 +	0.5041710	0.5040060	0.5038690	0.5037510	0.5036590
0	0.5043060	0.5041440	0.5040260	0.5039060	0.5038550
10 -	0.5043640	0.5042140	0.5040870	0.5039990	0.5039630
20 -	0.5045000	0.5043600	0.5042610	0.5041920	0.5041540





GMW ASSOCIATES
LABORATORY ELECTROMAGNET FIELD UNIFORMITY PL

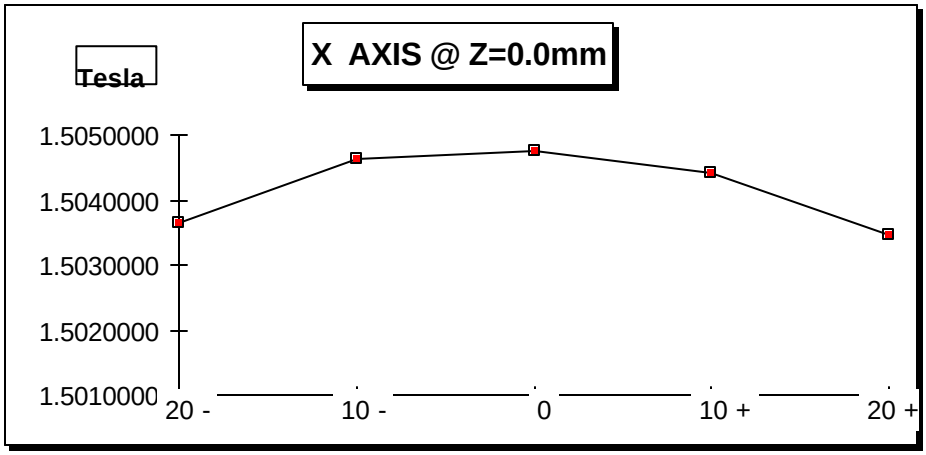
Model	3473	Pole Face 150 mm	Engr Greg Douglas
Serial No	16	Pole Gap 19 mm	Date Oct 13, 1992
Coil Set	70A Sn 1469&1470	Pole Shims 0.004 fitted	NMR Signal -200mV

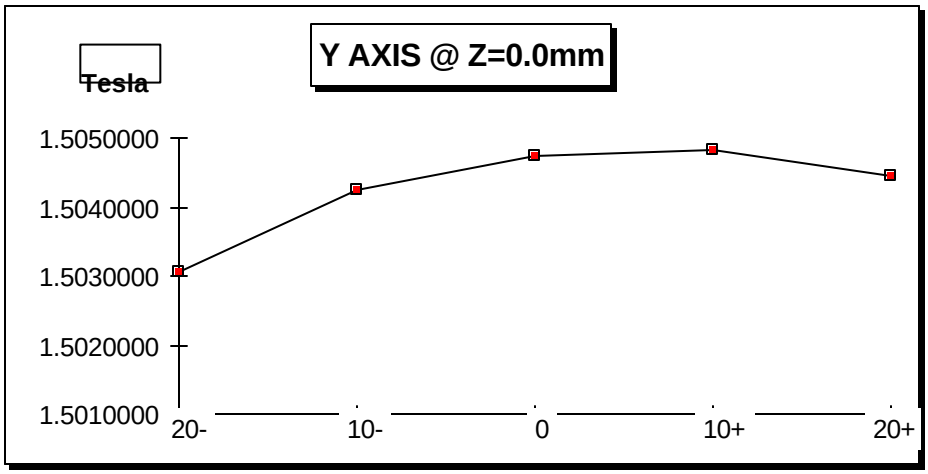
Power Supply 37.9 Amps 3796000 ADC 37.9 % Current

Start Time 11:35
Start Field
1.5047420

Finish Time 12:15
Finish Field
1.5046450

Plot Z = 0.0					
Y	X (mm)				
	20 -	10 -	0	10 +	20 +
20 +	n/s	n/s	1.5030600	1.5024200	n/s
10 +	1.5030500	1.5037000	1.5042400	1.5034500	n/s
0	1.5036400	1.5046300	1.5047420	1.5044000	1.5034600
10 -	1.5034100	1.5046500	1.5048250	1.5045230	1.5035300
20 -	n/s	1.5041300	1.5044600	1.5041000	n/s





GMW ASSOCIATES
LABORATORY ELECTROMAGNET FIELD UNIFORMITY PLOT

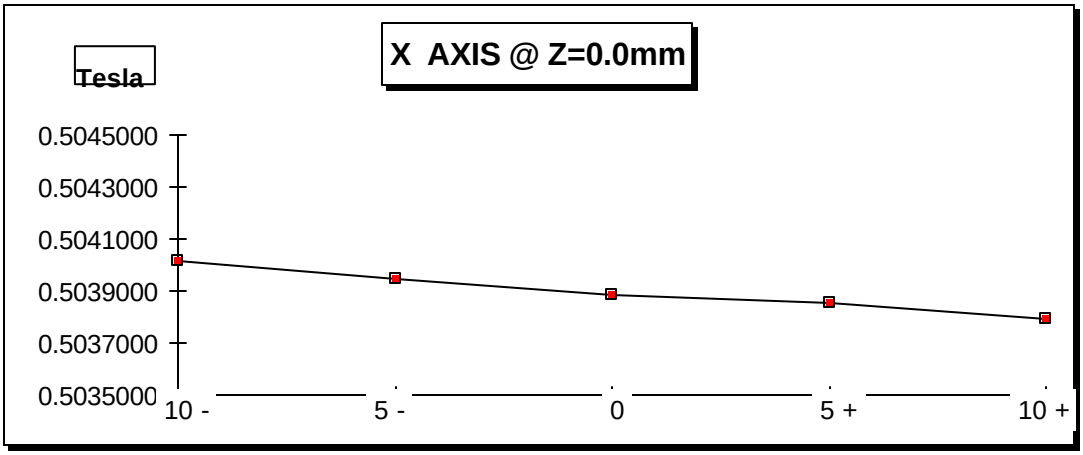
Model	3473	Pole Face 150 mm	Engr Greg Douglas
Serial No	16	Pole Gap 19 mm	Date Oct 13, 1992
Coil Set	70A Sn 1469&1470	Pole Shims 0.004 fitted	NMR Signal -650mV

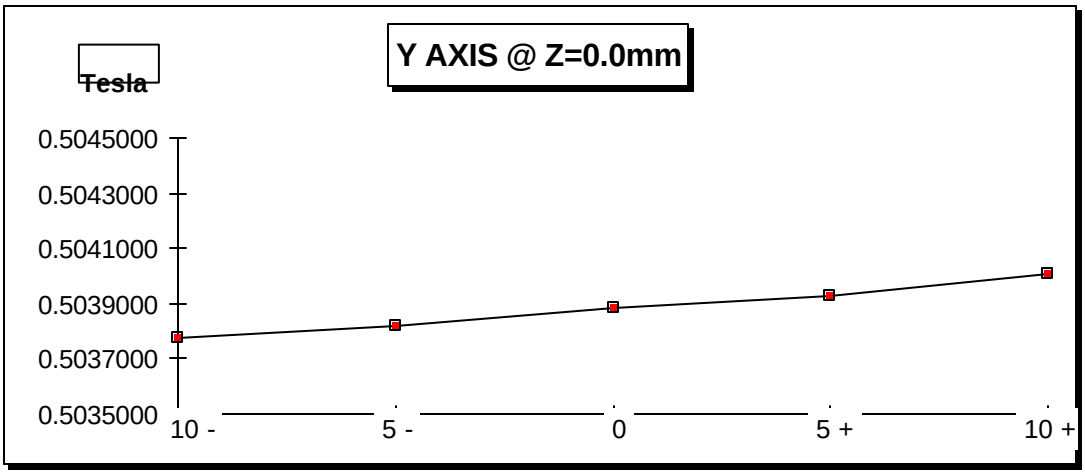
Power Supply 8.2 Amps 082000 ADC 8.2 % Current

Start Time 15:15
Start Field
0.5038870

Finish Time 15:35
Finish Field
0.5038540

Plot Z = 0.0					
Y	X (mm)				
	10 -	5 -	0	5 +	10 +
10 +	0.5039080	0.5038400	0.5037730	0.5037140	0.5036580
5 +	0.5039570	0.5038830	0.5038210	0.5037690	0.5037290
0	0.5040180	0.5039480	0.5038870	0.5038500	0.5037930
5 -	0.5040550	0.5039880	0.5039280	0.5038780	0.5038470
10 -	0.5041240	0.5040650	0.5040050	0.5039560	0.5039190





GMW ASSOCIATES
LABORATORY ELECTROMAGNET FIELD UNIFORMITY PLOT

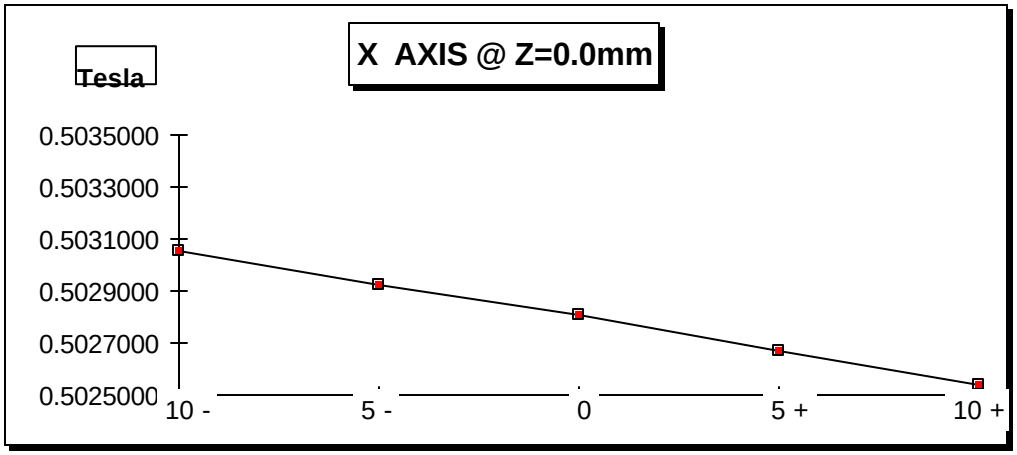
Model	3473	Pole Face 150 mm	Engr Greg Douglas
Serial No	16	Pole Gap 19 mm	Date Oct 13, 1992
Coil Set	70A Sn 1469&1470	Pole Shims none	NMR Signal -450mV

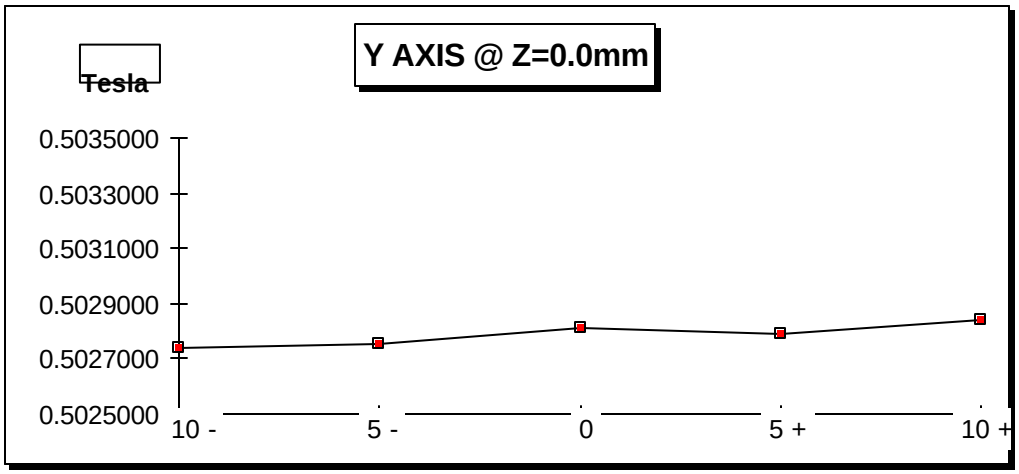
Power Supply 8.2 Amps 082000 ADC 8.2 % Current

Start Time 15:50
Start Field
0.5028100

Finish Time 16:05
Finish Field
0.5027600

Plot Z = 0.0					
Y	X (mm)				
	10 -	5 -	0	5 +	10 +
10 +	0.5029950	0.5028690	0.5027380	0.5026100	0.5024780
5 +	0.5030140	0.5028780	0.5027500	0.5026260	0.5025150
0	0.5030570	0.5029260	0.5028100	0.5026690	0.5025420
5 -	0.5030580	0.5029230	0.5027930	0.5026640	0.5025500
10 -	0.5030950	0.5029740	0.5028420	0.5027110	0.5025840





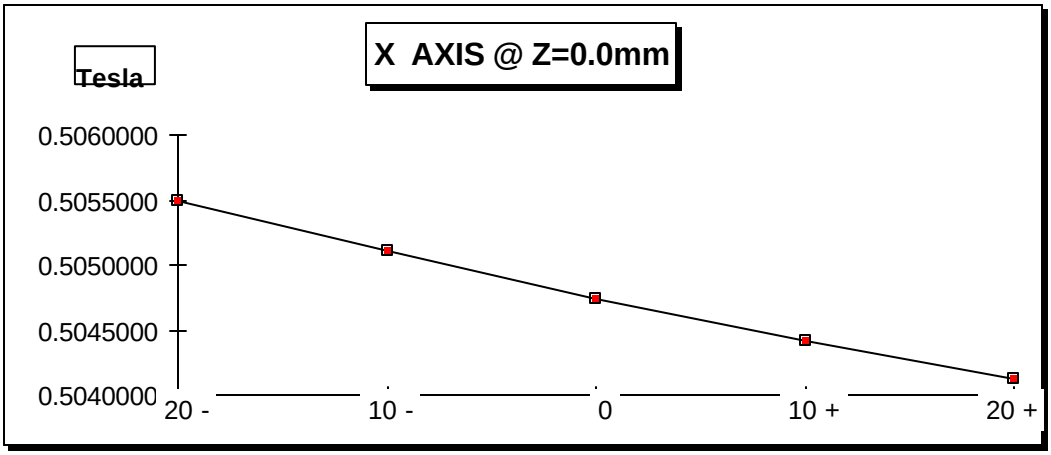
GMW ASSOCIATES
LABORATORY ELECTROMAGNET FIELD UNIFORMITY PLOT

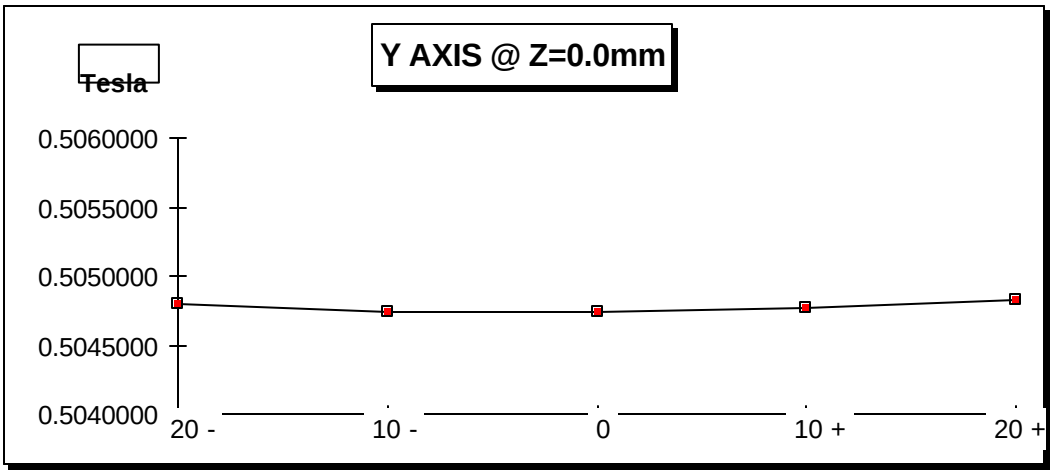
Model	3473	Pole Face 150 mm		Engr Greg Douglas
Serial No	16	Pole Gap 19 mm		Date Oct 16, 1992
Coil Set	50A Sn 654 & 655	Pole Shims none		NMR Signal -400mV
Power Supply	8.3 Amps	083000 ADC		8.3% Current

Start Time 13:30
Start Field
0.5047420

Finish Time 13:55
Finish Field
0.5047240

Plot Z = 0.0					
Y	X (mm)				
	20 -	10 -	0	10 +	20 +
20 +	0.5055160	0.5051560	0.5048040	0.5044870	0.5041900
10 +	0.5054800	0.5050930	0.5047410	0.5044160	0.5041430
0	0.5054890	0.5051020	0.5047420	0.5044200	0.5041160
10 -	0.5055200	0.5051300	0.5047730	0.5044360	0.5041290
20 -	0.5055450	0.5051880	0.5048200	0.5044670	0.5041300





GMW ASSOCIATES
LABORATORY ELECTROMAGNET FIELD UNIFORMITY PL

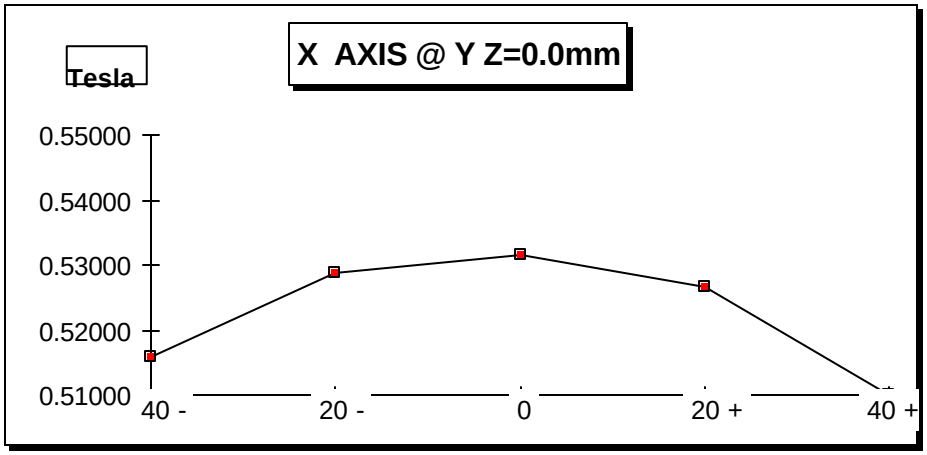
Model	3473	Pole Face 150 mm	Engr Greg Douglas
Serial No	16	Pole Gap 100 mm	Date Oct 15, 1992
Coil Set	50A Sn 654 & 655	Pole Shims none	Mapped with DTM-141

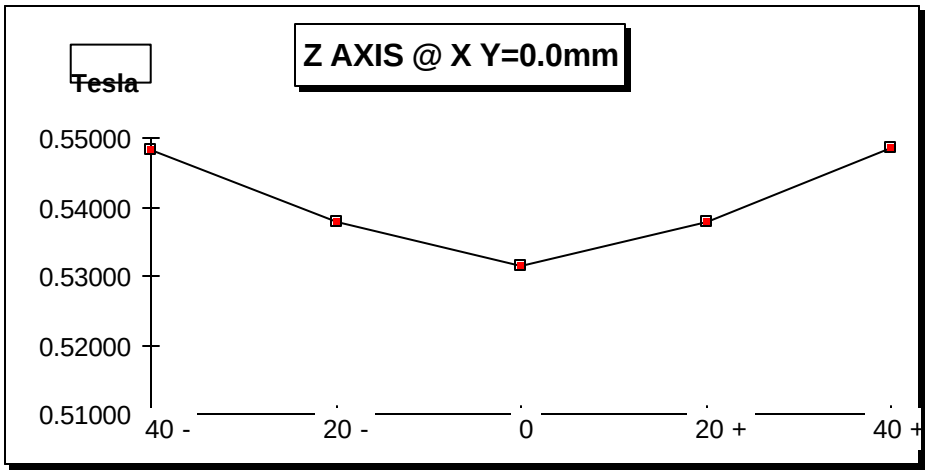
Power Supply 48.1 Amps 481300 ADC 48 % Current

Start Time 15:05
Start Field
0.53155

Finish Time 16:20
Finish Field
0.53155

Plot Y = 0.0					
Z	X (mm)				
	40 -	20 -	0	20 +	40 +
40 +			0.54814		
20 +			0.53776		
0	0.51588	0.52867	0.53155	0.52671	0.51005
20 -			0.53797		
40 -			0.54859		





GMW ASSOCIATES
LABORATORY ELECTROMAGNET FIELD UNIFORMITY PLOT

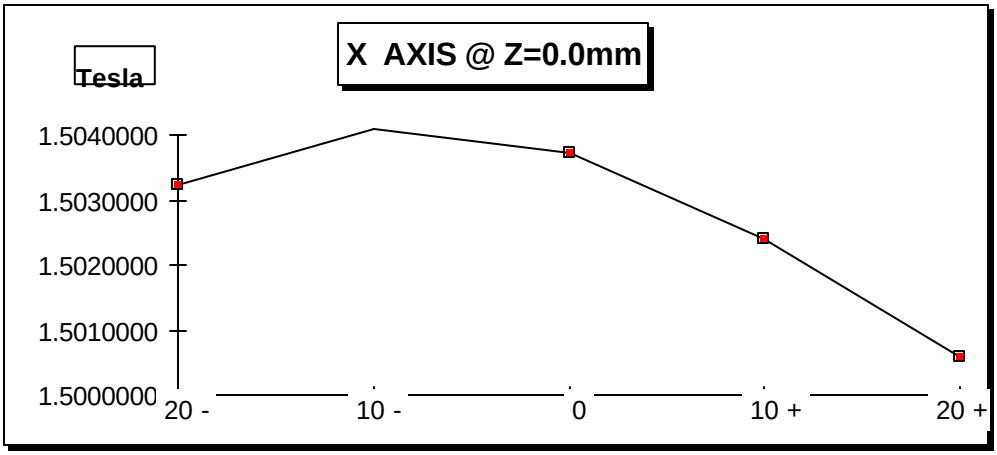
Model	3473	Pole Face 150 mm	Engr Greg Douglas
Serial No	16	Pole Gap 19 mm	Date Oct 11, 1992
Coil Set	70A Sn 1469 & 1470	Pole Shims none	NMR Signal -120mV

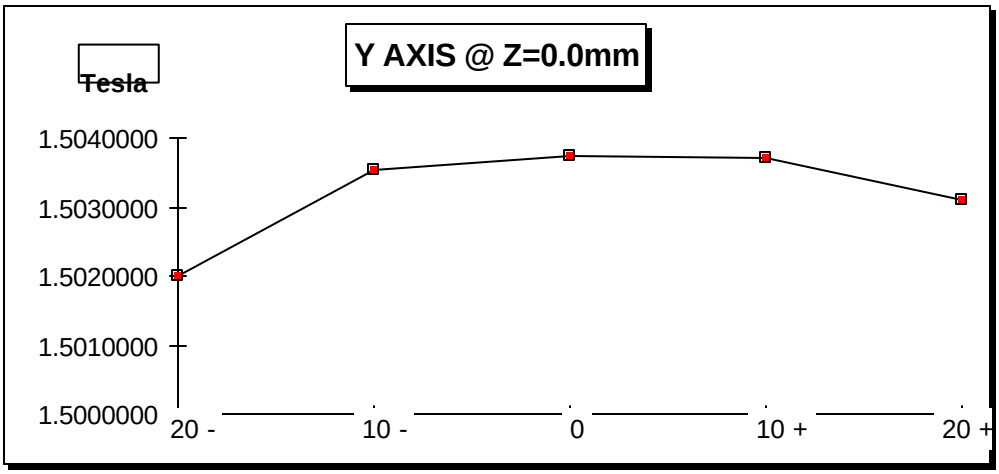
Power Supply 37.9 Amps 3796000 ADC 37.9 % Current

Start Time 17:50
Start Field
1.5037360

Finish Time 18:25
Finish Field
1.5037850

Plot Z = 0.0					
Y	X (mm)				
	20 -	10 -	0	10 +	20 +
20 +	N/S	1.5025020	1.5019890	1.5008900	N/S
10 +	1.5031490	1.5037200	1.5035380	1.5024180	1.5002480
0	1.5032360	1.5040800	1.5037360	1.5024040	1.5005940
10 -	1.5038260	1.5040260	1.5036990	1.5026320	1.5010500
20 -	1.5028900	1.5031800	1.5031150	1.5019500	1.5007600





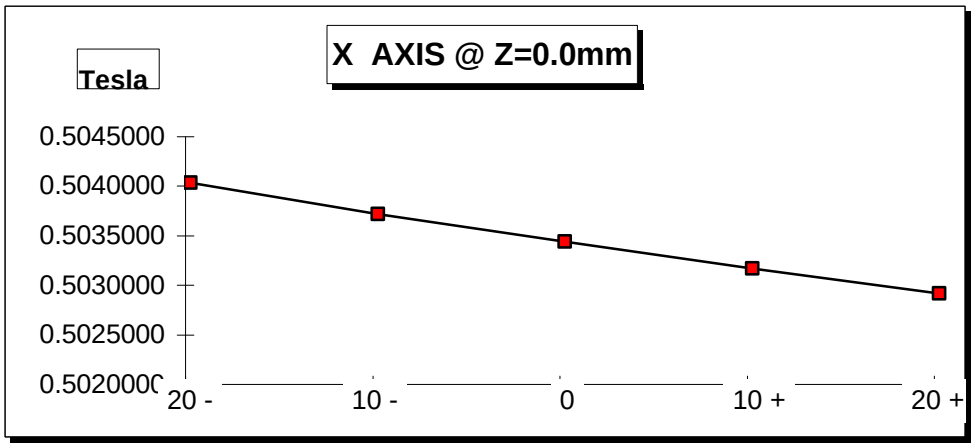
GMW ASSOCIATES
LABORATORY ELECTROMAGNET FIELD UNIFORMITY PLOT

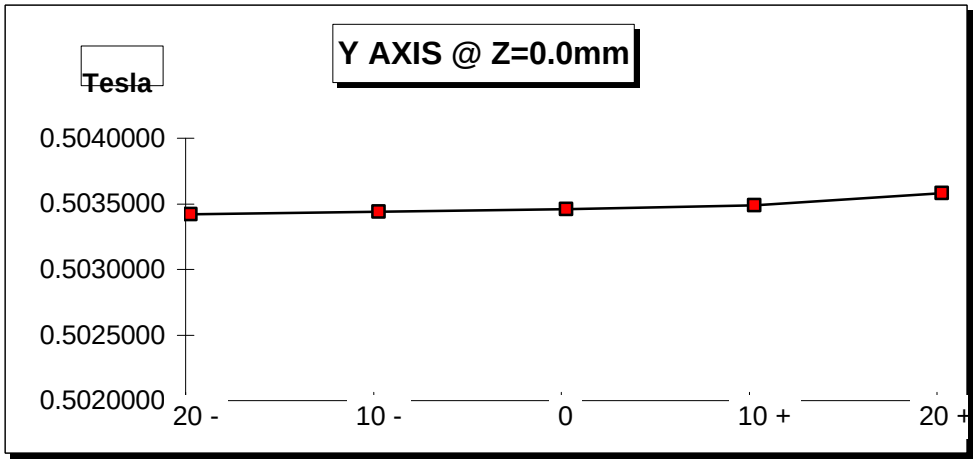
Model	3473		Pole Face 150 mm		Engr Greg Douglas
Serial No	16		Pole Gap 19 mm		Date Oct 11, 1992
Coil Set	70A Sn 1469 & 1470		Pole Shims none		NMR Signal -450mV
Power Supply		8.2 Amps		082000 ADC	8.2 % Current

Start Time 17:10
Start Field
0.5033240

Finish Time 17:35
Finish Field
0.5033110

Plot Z = 0.0					
Y	X (mm)				
	20 -	10 -	0	10 +	20 +
20 +	0.5038730	0.5035830	0.5032830	0.5029760	0.5026760
10 +	0.5038790	0.5035740	0.5033020	0.5030210	0.5027390
0	0.5039180	0.5036030	0.5033240	0.5030510	0.5028040
10 -	0.5039550	0.5036430	0.5033500	0.5030850	0.5028490
20 -	0.5040320	0.5037320	0.5034460	0.5031790	0.5029250





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GMW ASSOCIATES
LABORATORY ELECTROMAGNET FIELD UNIFORMITY PL

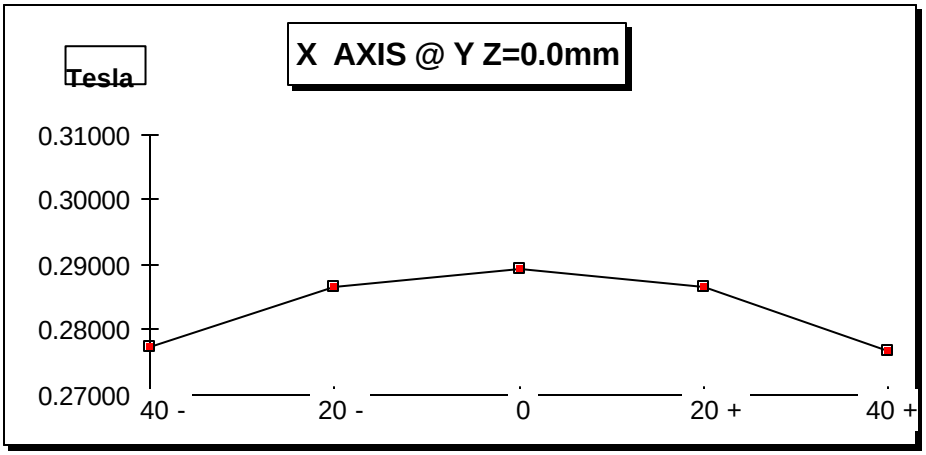
Model	3473	Pole Face 150 mm	Engr Greg Douglas
Serial No	18	Pole Gap 130 mm	Date Oct 22, 1992
Coil Set	50A Sn 1989 & 1988	Pole Shims none	Mapped with DTM-141

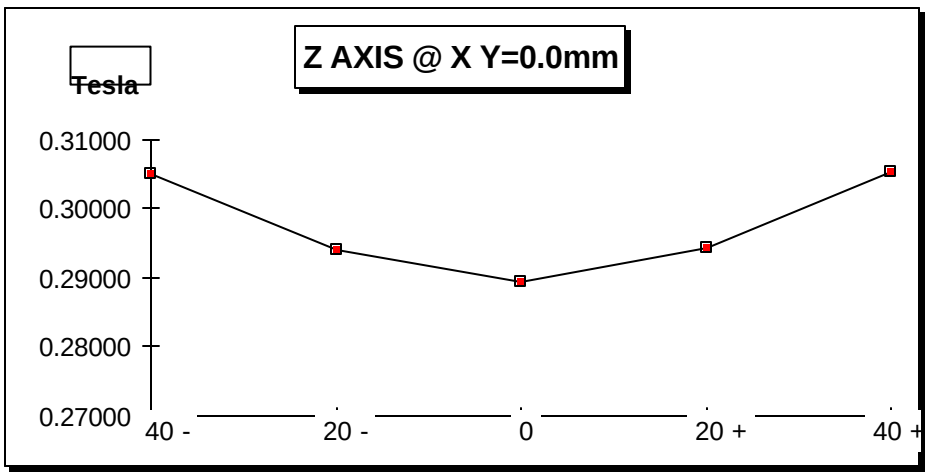
Power Supply 34.0 Amps 340546 ADC 34 % Current

Start Time 19:45
Start Field
0.28940

Finish Time 21:15
Finish Field
0.28940

Plot Y = 0.0					
Z	X (mm)				
	40 -	20 -	0	20 +	40 +
40 +	0.30815	0.30590	0.30498	0.30585	0.30864
20 +	0.28558	0.29238	0.29404	0.29223	0.28569
0	0.27730	0.28666	0.28940	0.28662	0.27683
20 -	0.28667	0.29304	0.29436	0.29259	0.28598
40 -	0.30934	0.30633	0.30541	0.30644	0.30918





GMW ASSOCIATES
LABORATORY ELECTROMAGNET FIELD UNIFORMITY PLOT

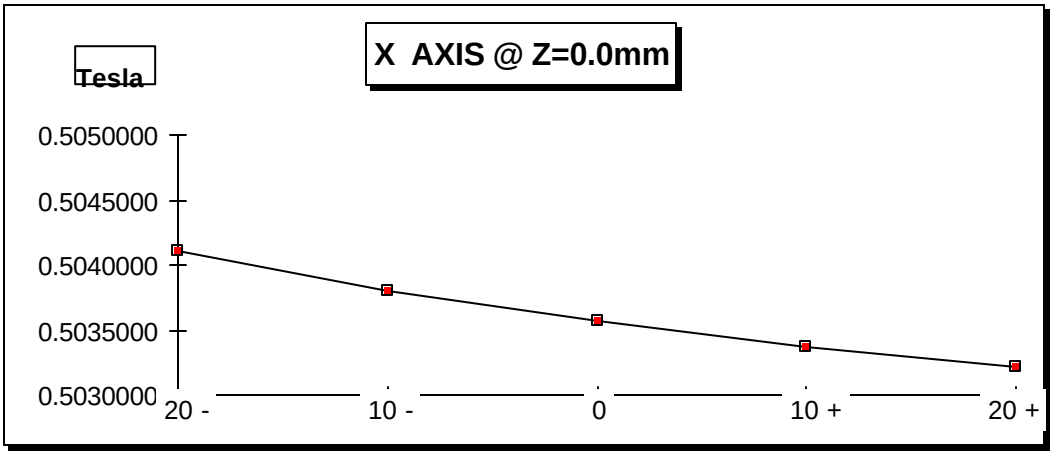
Model	3473	Pole Face 150 mm	Engr Greg Douglas
Serial No	18	Pole Gap 19 mm	Date Oct 22, 1992
Coil Set	50A Sn 1989 & 1988	Pole Shims none	NMR Signal -580mV

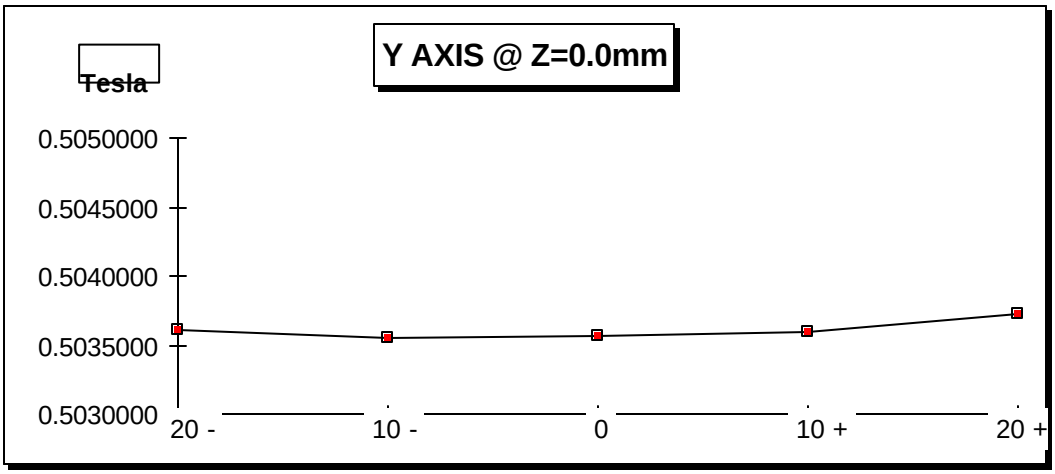
Power Supply 8.3 Amps 083000 ADC 8.3% Current

Start Time 20:50
Start Field
0.5035620

Finish Time 21:15
Finish Field
0.5035460

Plot Z = 0.0					
Y	X (mm)				
	20 -	10 -	0	10 +	20 +
20 +	0.5041230	0.5038590	0.5036100	0.5034100	0.5032640
10 +	0.5040940	0.5037800	0.5035480	0.5033540	0.5032270
0	0.5041090	0.5038000	0.5035620	0.5033640	0.5032230
10 -	0.5041470	0.5038500	0.5036000	0.5034120	0.5032600
20 -	0.5042370	0.5039750	0.5037280	0.5035320	0.5033600





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)

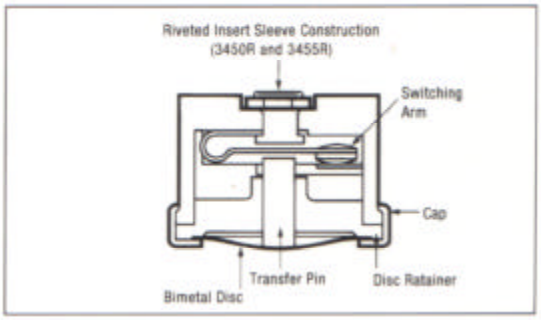
The Series 3450/3455R is a snap-acting, non-adjustable precision thermostat especially suited for industrial and electrical equipment.

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

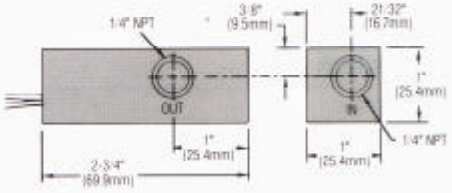
Specify Part Number based on flow setting and switch operation.

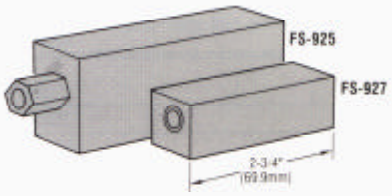
Liquids other than water: Special calibration is available from GEMS for media other than water. Please consult factory with your requirements, including flow media, operating pressure, flow set point and liquid viscosity (SSU).

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.

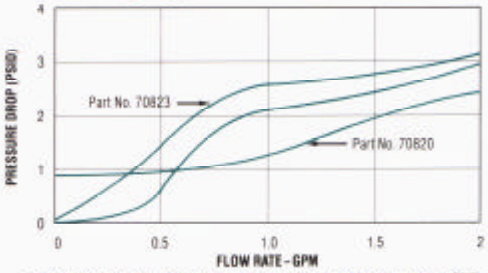
Dimensions





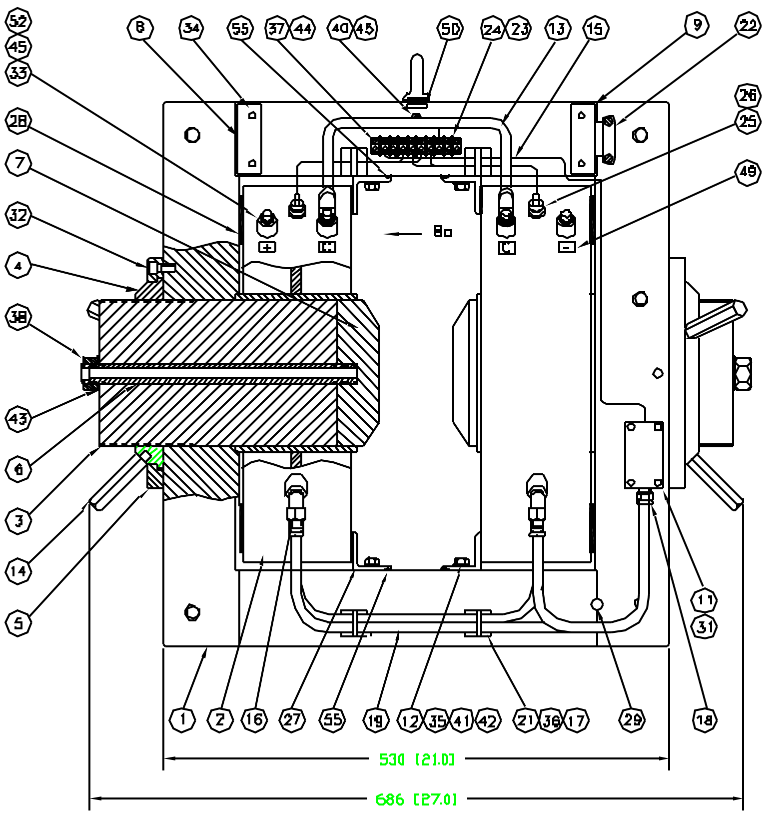
An FS-927 unit is shown silhouetted against the already small FS-925 unit. It illustrates just how little space is required to provide protection to your valuable OEM equipment.

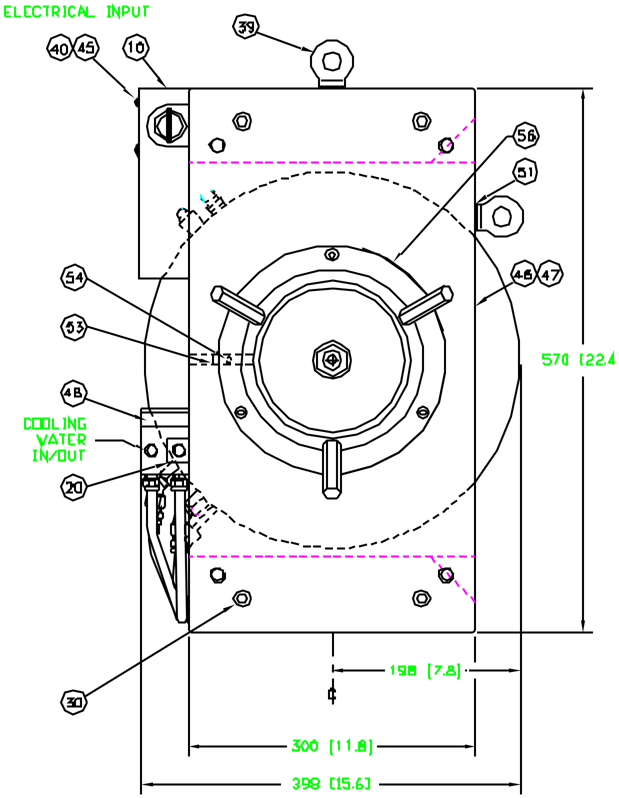
Pressure Drop – Typical



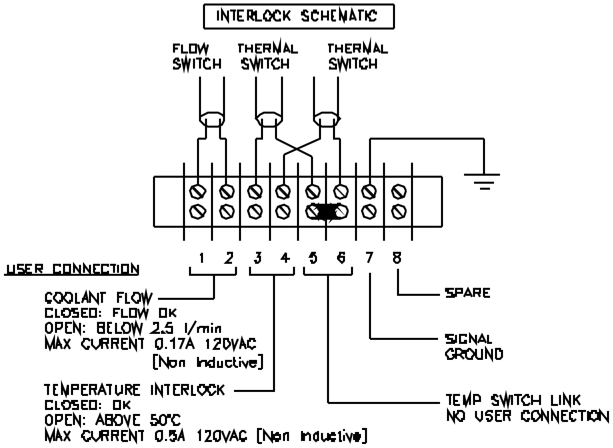
Tests conducted with units in a vertical position (lead wires up), with water at +70°F.

REAR VIEW OF MAGNET SHOWN WITH TERMINAL COVER (ITEM 10 REMOVED).





INTERLOCK SCHEMATIC



MAGNET SPECIFICATIONS

POLE DIAMETER 150 mm [6"]
POLE GAP 0-127 mm [5"]
POLE CAPS CYLINDRICAL 150 mm [6"]
TAPERED 100, 75, 50, 25 mm
[4"] [3"] [2"] [1"]
COILS [series connected]
MAX RESISTANCE 0.87 ohm
MAX POWER [air] 20A/17V
MAX POWER [water] 50A/44V
COOLING 3 l/min [0.8 gpm] @ 0.9 bar [12 psid]
THERMAL INTERLOCK: OPEN CIRCUIT ABOVE 50°C [122° F]
FLOW INTERLOCK: OPEN CIRCUIT BELOW 2.5 l/min [0.7 gpm]
WEIGHT: 600 kg [1320 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		04/18/01	A.MARTIN
B	ADD ITEMS 50,51,52. MOVE 19,21,22,37 ON. 13 UP.		05/24/04	G.DOUGLAS
C	ADD ITEM 53 AND 54		08/07/05	G.DOUGLAS
D	ADD ITEM 55. CORRECT ITEM 54		05/21/08	G.DOUGLAS
E	ADD ITEM 56. ADD LABEL PART NUMBERS		01/27/11	G.DOUGLAS

PARTS LIST

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
56	2	10900790	LABEL, OPEN GAP	
55	16		M4 X 10 SHCS BUTTON HD S/S [Probe Mount]	
54	2		M6 X 16 SHSS S/S	
53	7		DOWEL PIN Ø10 X 30 TAPPED M5 S/S	
52	4		M8 WASHER, SPRING S/S	
51	3		M16 WASHER FLAT M16 ID x M40 OD S/S	
50	1	10900770	LABEL, GROUND	
49	4		LABEL, + - C, BBL FITTED	
48	1	10900780	LABEL, WATER CONNECTION	
47	1	10900820	LABEL, CAUTION [RH SIDE]	
46	1	10900800	LABEL, MAGNET SPEC. [LH SIDE]	
45	9		M6 WASHER FLAT, S/S	
44	4		M3 WASHER FLAT, S/S	
43	2		M20 WASHER FLAT, S/S	
42	8		M8 WASHER SPRING, S/S	
41	8		M8 WASHER FLAT, S/S	
40	5		M6 x 10 PAN HD PHILLIPS SCREW S/S	
39	3		M16 LIFTING EYE [Ring ID 35mm]	
38	2		M20 NUT, S/S	
37	4		M3 X 16 PAN HEAD PHILLIPS SCREW, S/S	
36	4		M4 X 10 PAN HEAD PHILIPS SCREW, S/S	
35	8		M8 X 20 HEX BOLT, S/S	
34	4		M6 X 12 HEX BOLT, S/S [Bracket to Yoke]	
33	4		M6 X 10 SHCS, S/S	
32	8		M8 X 24 SHCS, S/S	
31	4		M4 X 50 SHCS, S/S	
30	8		M12 x 80 SHCS, S/S	
29	8		DOWEL Ø12 X 20 [4 X DUCHMAN, 4 X BLIND]	
28	A/R		PAD, NEOPRENE 5mm THK	
27	A/R		PAD, NEOPRENE 1.6mm THK	
26	2		WASHER, NEOPRENE 16 X 4 X 4 THK	
25	2	3450G611-1	SENSOR, 50°C ELMWOOD	
24	1	MS-8-140	MARKER STRIP, CINCH	
23	1	8-140	TERMINAL BLOCK, CINCH	
22	1	3304	CABLE CLAMP, T & B	
21	4	MB4A	CABLE MOUNTING PAD, TYTON	
20	1	FS927/70823	FLOW SWITCH, MID GEN SENSORS	
19	A/R	8704	HOSE 1/4", IMPERIAL EASTMAN	
18	6	KA04-04NB	HOSE COUPLING MALE 1/4" X 1/4"NPT, I/E	
17	4		CABLE TIE, NYLON	
16	4	124-804	45° STREET ELBOW 1/4"NPT, I/E	
15	A/R		CABLE, INTERLOCK	
14	6	17801290	HANDLE	
13	1	17801463	CABLE, CURRENT	
12	4	17801300	CLAMP, COIL	
11	1	17801840	MANIFOLD, FLOW SWITCH	
10	1	17802251	TERMINAL COVER [50 AMP COILS]	
9	1	17803041	BRACKET, TERMINAL COVER	
8	1	17803042	BRACKET, TERMINAL COVER	
7	2	17801350	POLE CAP [100mm tapered pole cap shown]	
6	2	17802990	STUD	
5	2	17802970	RETAINING RING	
4	2	17802960	NUT, POLE CAP ADJUST	
3	2	17802980	CORE	
2	2	11801381	COIL [50 AMP]	
1	1	17800680	YOKE	

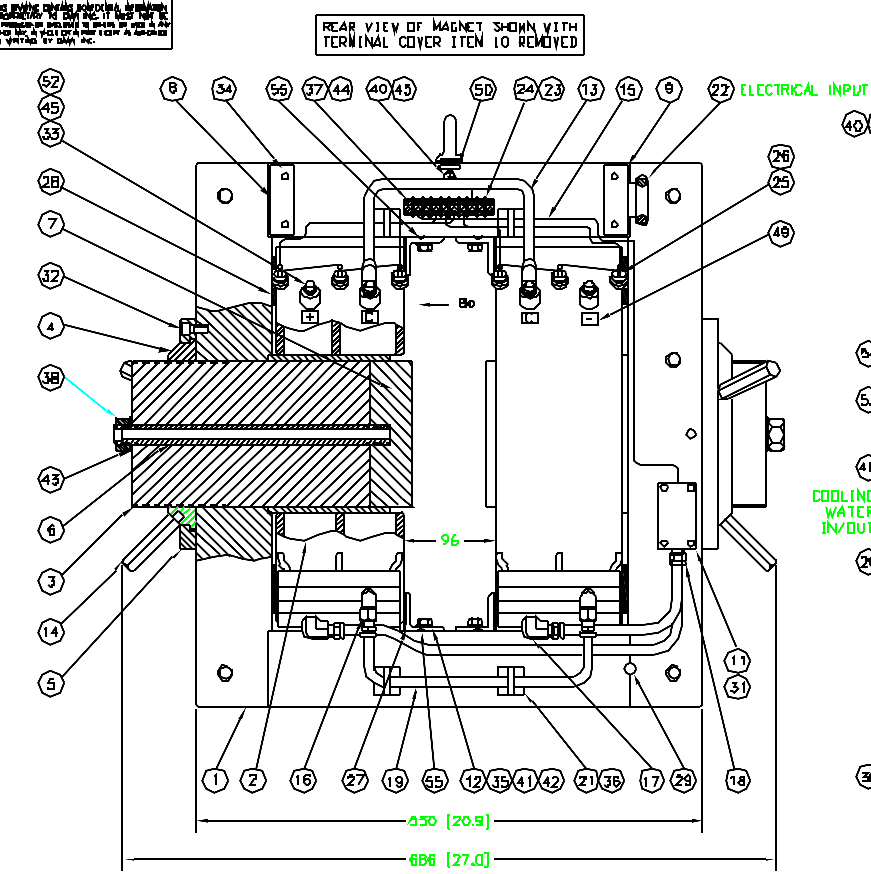
DRAWN A.MARTIN DATE 04/18/01
CHECK DATE
ENGINEERING DATE
DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES UNLESS OTHERWISE SPECIFIED

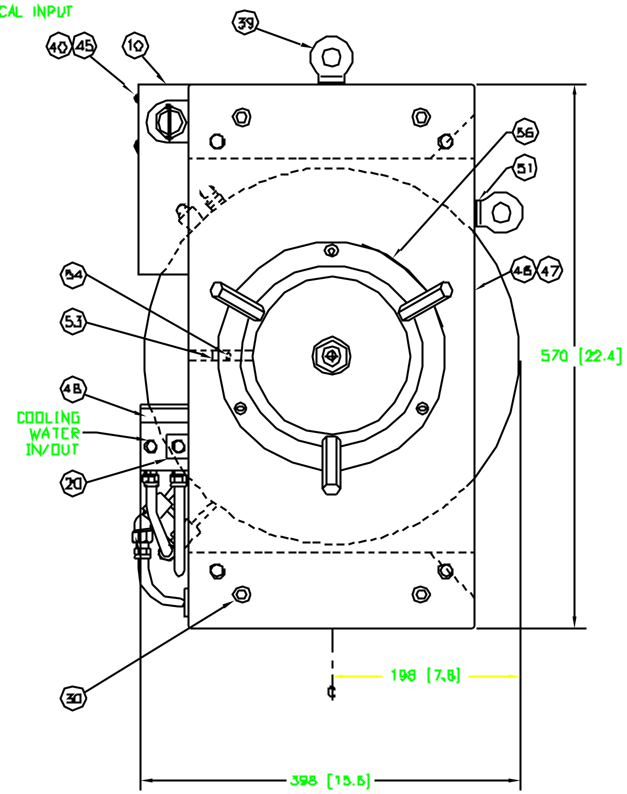
GMW
955 Industrial Rd, San Carlos, CA 94070
Tel: (650)802-8292. Fax: (650)802-8298.

TITLE MAGNET ASSEMBLY MODEL: 3473-50

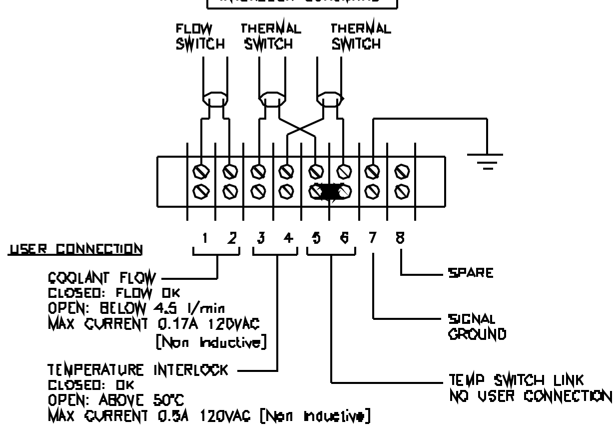
NEXT ASSY 3473-50 SYSTEM
SOFTWARE AUTOCAD 13
THIRD ANGLE PROJECTION
SIZE A1 DRAWING NO. 11801281 REV D
SCALE 1:2.5 WT kg SHEET 1 OF 1

REAR VIEW OF MAGNET SHOWN WITH TERMINAL COVER ITEM 10 REMOVED





INTERLOCK SCHEMATIC



USER CONNECTION

COOLANT FLOW
CLOSED: FLOW OK
OPEN: BELOW 4.5 l/min
MAX CURRENT 0.17A 120VAC [Non Inductive]

TEMPERATURE INTERLOCK
CLOSED: OK
OPEN: ABOVE 50°C
MAX CURRENT 0.5A 120VAC [Non Inductive]

MAGNET SPECIFICATIONS

POLE DIAMETER:	150 mm [6"]
POLE GAP:	0-96 mm [3.8"]
POLE CAPS:	CYLINDRICAL 150 mm [6"] TAPERED 100, 75, 50, 25 mm [4"] [3"] [2"] [1"]
COILS [series connected]	
MAX RESISTANCE	0.87 ohm
MAX POWER [air]	20A/17V
MAX POWER [water]	70A/59V
COOLING:	6 liter/min [1.6 gpm] 2.0 bar [30 psid]
THERMAL INTERLOCK:	OPEN CIRCUIT ABOVE 50°C [122° F]
FLOW INTERLOCK:	OPEN CIRCUIT BELOW 4 liter/min [1.1 gpm]
WEIGHT:	610 kg [1340 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		05/08/91	A.MARTIN
B	ADD ITEMS 50,51,52. MOVE 19,21,22,37 DN. 1 3UP.		05/24/94	G.DOUGLAS
C	ADD ITEM 53 AND 54		08/07/95	G.DOUGLAS
D	ADD ITEM 55, CORRECT ITEM 54, AND MANIFOLD VIEW		05/21/98	G.DOUGLAS
E	ADD ITEM 56. ADD LABEL PART NUMBERS		01/27/01	G.DOUGLAS

PARTS LIST

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
56	2	10900790	LABEL, OPEN GAP	
55	16		M4 x 8 SHCS BUTTON HD [For Probe Mount]	
54	2		M6 X 16 SHSS S/S	
53	7		DOWEL PIN ø10 X 30 TAPPED M5 S/S	
52	4		M8 WASHER, SPRING S/S	
51	3		M16 WASHER FLAT M16 ID x M40 OD S/S	
50	1	10900770	LABEL, GROUND	
49	4		LABEL, + - C, BBL FITTED	
48	1	10900780	LABEL, WATER CONNECTION	
47	1	10900820	LABEL, CAUTION [RH SIDE]	
46	1	10900810	LABEL, MAGNET SPEC. [LH SIDE]	
45	9		M6 WASHER FLAT, S/S	
44	4		M3 WASHER FLAT, S/S	
43	2		M20 WASHER FLAT, S/S	
42	8		M8 WASHER SPRING, S/S	
41	8		M8 WASHER FLAT, S/S	
40	5		M6 x 10 PAN HD PHILLIPS SCREW S/S	
39	3		M16 LIFTING EYE [Ring ID 35mm]	
38	2		M20 NUT, S/S	
37	4		M3 X 16 PAN HEAD PHILLIPS SCREW, S/S	
36	4		M4 X 10 PAN HEAD PHILLIPS SCREW, S/S	
35	8		M8 X 20 HEX BOLT, S/S	
34	4		M6 X 12 HEX BOLT, S/S [Bracket to Yoke]	
33	4		M5 X 10 SHCS, S/S	
32	8		M8 X 24 SHCS, S/S	
31	4		M4 X 50 SHCS, S/S	
30	8		M12 x 80 SHCS, S/S	
29	8		DOWEL ø12 X 20 [4 X DUCHMAN, 4 X BLIND]	
28	A/R		PAD, NEOPRENE 5mm THK	
27	A/R		PAD, NEOPRENE 1.6mm THK	
26	6		WASHER, NEOPRENE 16 X 4 X 4 THK	
25	6	3450G611-1	SENSOR, 50°C ELMWOOD	
24	1	MS-8-140	MARKER STRIP, CINCH	
23	1	8-140	TERMINAL BLOCK, CINCH	
22	1	3304	CABLE CLAMP, T & B	
21	4	MB4A	CABLE MOUNTING PAD, TYTON	
20	1	FS927/70825	FLOW SWITCH, IMO GEN SENSORS	
19	A/R	B704	HOSE 1/4", IMPERIAL EASTMAN	
18	6	KA04-04NB	HOSE COUPLING MALE 1/4" X 1/4"NPT, I/E	
17	2	116-B04	90° STREET ELBOW 1/4"NPT, IMPERIAL EASTMAN	
16	2	124-B04	45° STREET ELBOW 1/4"NPT, IMPERIAL EASTMAN	
15	A/R		CABLE, INTERLOCK	
14	6	17801290	HANDLE	
13	1	17801463	CABLE, CURRENT	
12	4	17801300	CLAMP, COIL	
11	1	17801640	MANIFOLD, FLOW SWITCH	
10	1	17802252	TERMINAL COVER [70 AMP COILS]	
9	1	17803041	BRACKET, TERMINAL COVER	
8	1	17803042	BRACKET, TERMINAL COVER	
7	2	17801350	POLE CAP [150mm cylindrical pole caps shown]	
6	2	17802990	STUD	
5	2	17802970	RETAINING RING	
4	2	17802960	NUT, POLE CAP ADJUST	
3	2	17802980	CORE	
2	2	11801382	COIL [70 AMP]	
1	1	17800680	YOKE	

DRAWN A.MARTIN	DATE 05/08/91	DO NOT SCALE FROM DRAWING
CHECK	DATE	DIMENSIONS & TOLERANCES UNLESS OTHERWISE SPECIFIED
ENGINEERING	DATE	
NEXT ASSY 3473-70	SYSTEM	THIRD ANGLE PROJECTION
SOFTWARE AUTOCAD 13		

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

TITLE: MAGNET ASSEMBLY MODEL: 3473-70

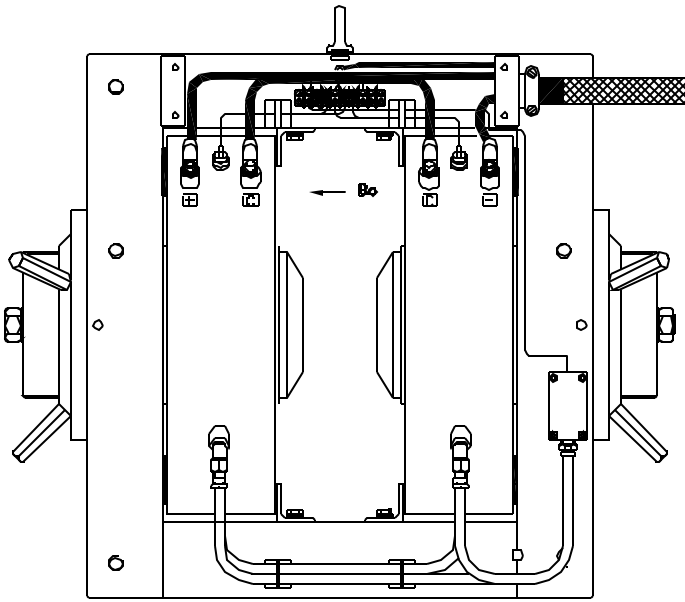
SIZE A1 DRAWING NO. 11801282 REV E

SCALE 1:2.5 kg SHEET 1 OF 1

PROPRIETARY

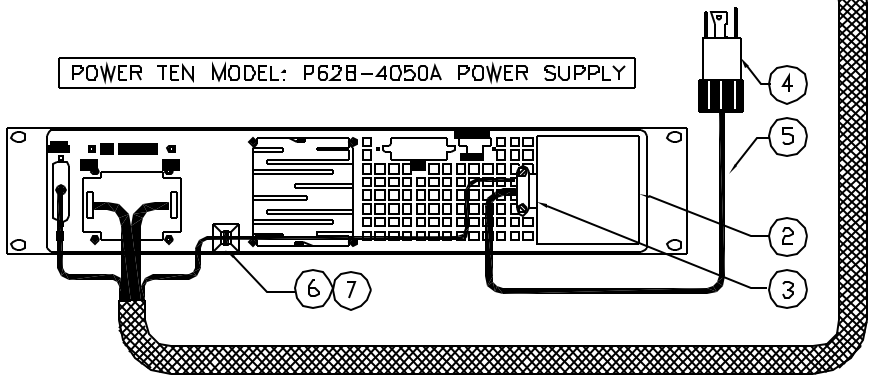
REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		05/15/07	G.DOUGLAS

MODEL: 3473-50 MAGNET



REAR VIEW TERMINAL COVER REMOVED

POWER TEN MODEL: P628-4050A 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 2 PHASE 208V AC INPUT
2. REFER TO TABLE ON DWG 13900210 FOR AC INPUT RATINGS OTHER THAN 2 PHASE 208V

N/S = NOT SUPPLIED

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	12900D10	AC TERMINAL BOX	
1	1	16900D160	CURRENT & INTERLOCK CABLE 80A	
ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE

PARTS LIST

DRAWN G.DOUGLAS 05/11/07
CHECK
ENGINEERING
DO NOT SCALE FROM DRAWING DIMENSIONS & TOLERANCES PER ASME Y14.5M-1994
UNLESS OTHERWISE SPECIFIED
NEXT ASSY 3473-50
SOFTWARE: AUTOCAD 13
THIRD ANGLE PROJECTION

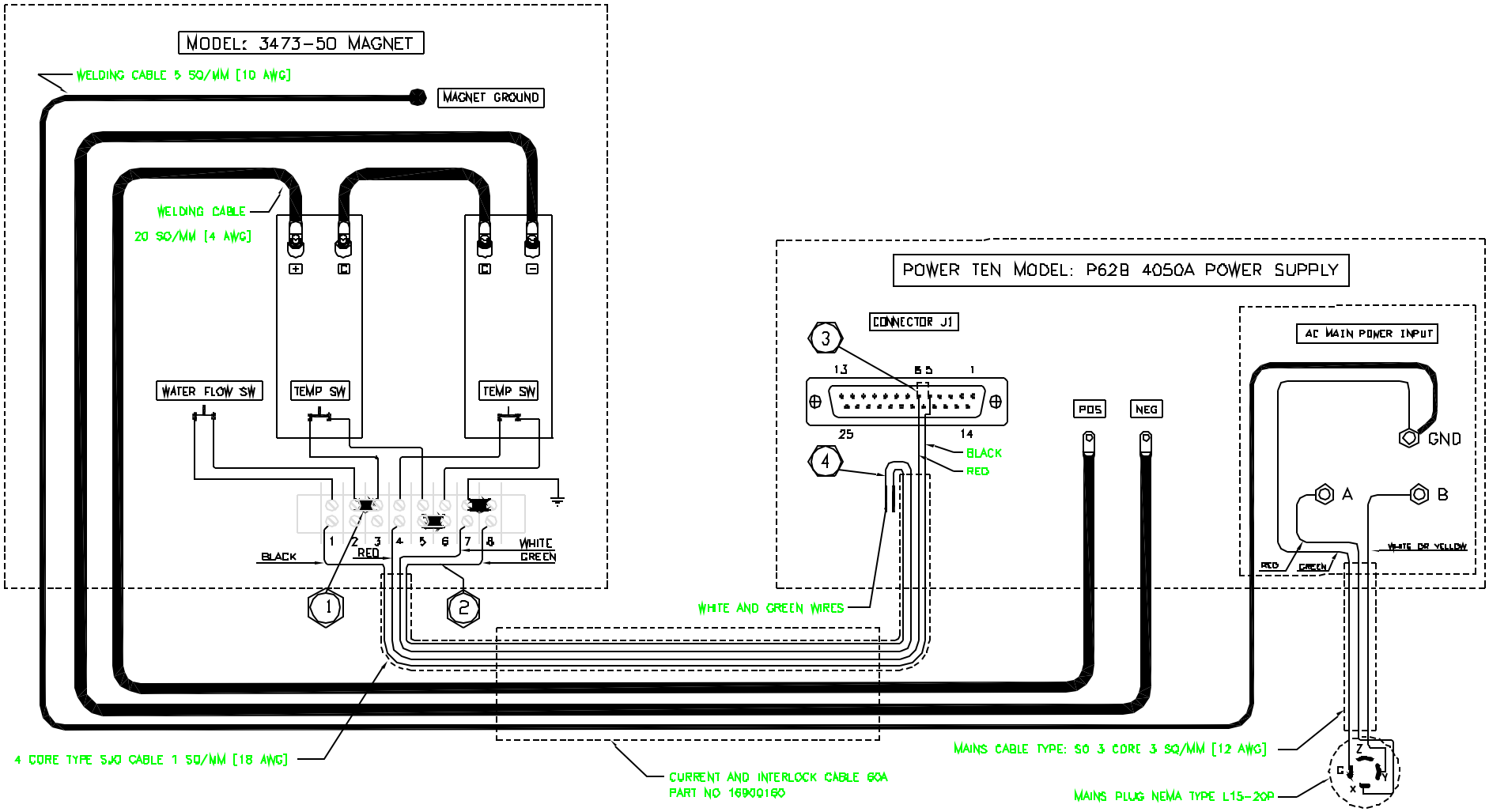
GMW
P.O. Box 2578, Redwood City, CA 94064
Tel: (415)802-8292, Fax: (415)802-8298

TITLE
ELECTRICAL WIRING
3473-50/P62-4050

SIZE A1 | DRAWING NO. 11900710 | REV A
SCALE NTS | WT kg | SHEET 1 OF 1

PROPRIETARY

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		05/15/97	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	15	-	-
RECOMMENDED MAIN AC BREAKER	20	-	-
RECOMMENDED AC POWER OUTLET	L15-20R	-	-
RECOMMENDED AC CABLE SIZE	3 SQ/MM	-	-
NOTE: DRAWING SHOWS POWER SUPPLY FOR L15 208V AC POWER			

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE

PARTS LIST

DRAWN G.DOUGLAS DATE 05/13/97
CHECK DATE
ENGINEERING DATE
NEXT ASSY 3473-50 SYSTEM
SOFTWARE: AUTOCAD 13

DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES PER ASME Y14.5M-1994

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

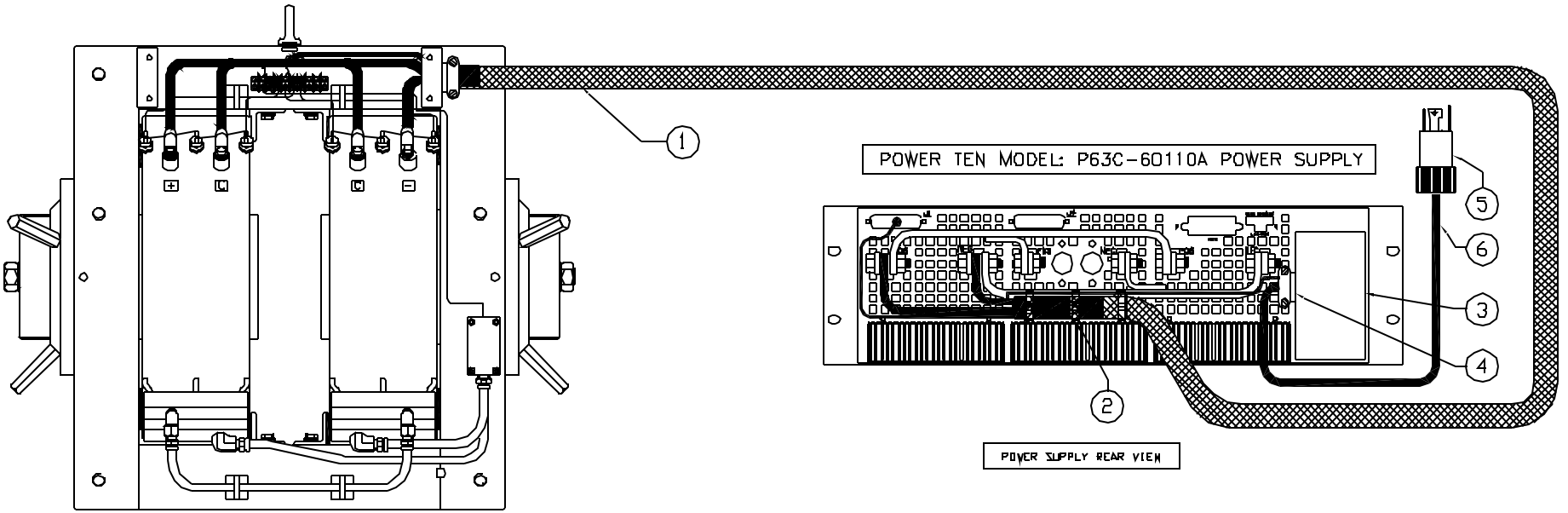
TITLE
ELECTRICAL WIRING
3473-50/P62-4050

SIZE A1 | DRAWING NO. 13900210 | REV A
SCALE NTS | WT kg | SHEET 1 OF 1

PROPRIETARY

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		03/08/07	G.DOUGLAS

MODEL: 3473-70 MAGNET



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 13900200 FOR AC INPUT RATINGS OTHER THAN 3 PHASE 208V

N/S = NOT SUPPLIED

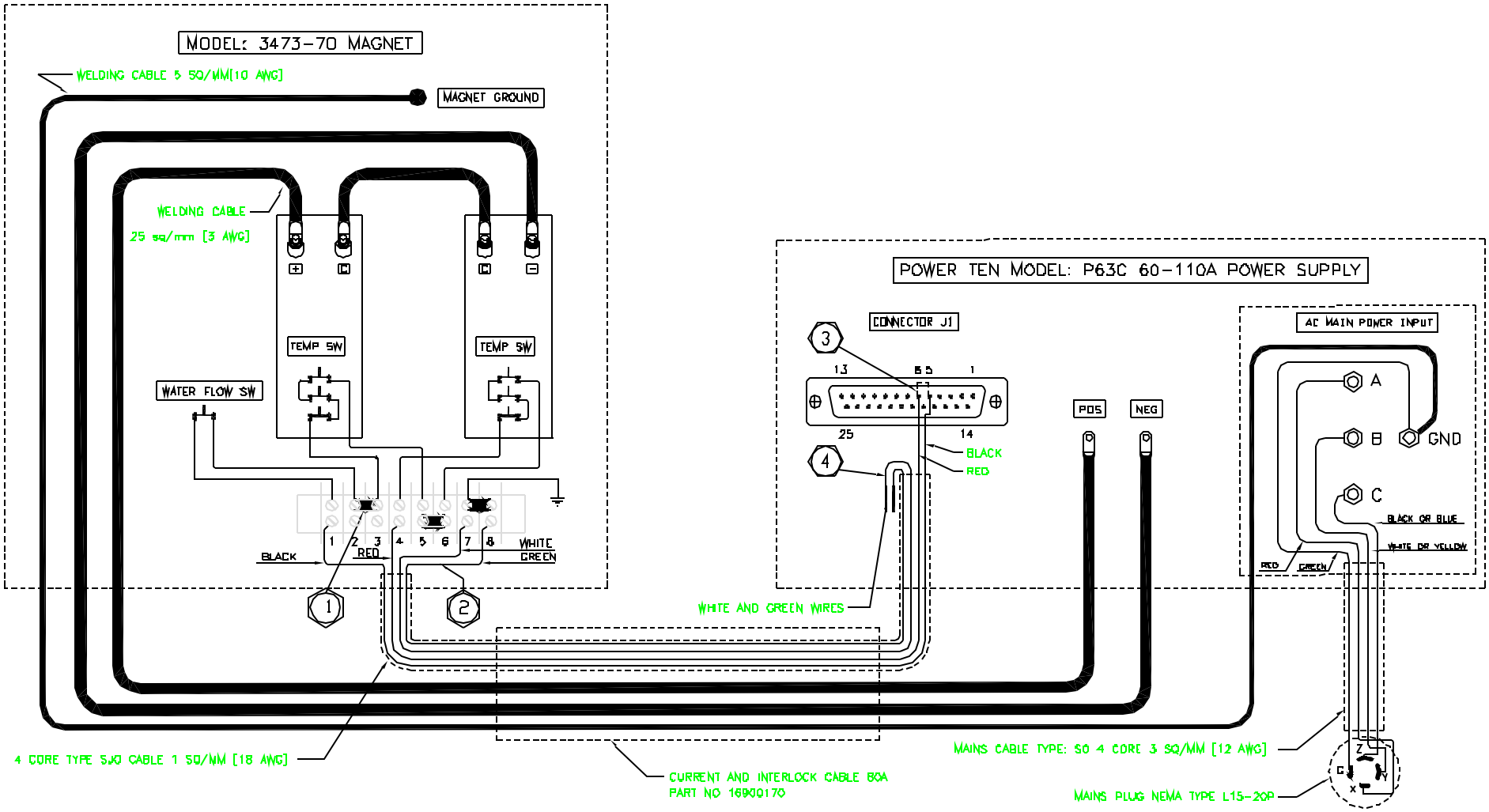
ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
6	1	4A-1204	POWER CORD, TYPE SO 4 CORE 12AWG	N/S
5	1	L15-20P	PLUG 3PHASE/20A, NYLON, BRYANT	N/S
4	1	3303	CABLE CLAMP THOMAS & BETTS	
3	1	12900200	AC TERMINAL BOX	
2	3	10364	CABLE TIE, NYLON 6mm WIDE, BAR-LOK	
1	1	16900170	CURRENT & INTERLOCK CABLE 80A	

PARTS LIST

DRAWN G.DOUGLAS	DATE 03/08/07	DO NOT SCALE FROM DRAWING DIMENSIONS & TOLERANCES UNLESS SPECIFIED	GMW P.O. Box 2578, Redwood City, CA 94064 Tel: (415)802-8292, Fax: (415)802-8298
CHECK	DATE		
ENGINEERING	DATE		
			TITLE ELECTRICAL ASSY 3473-70/P63-60110
	3473-70		SIZE A1 DRAWING NO. 11900700 REV A
NEXT ASSY	USED ON	THIRD ANGLE PROJECTION	
SOFTWARE: AUTOCAD 13			SCALE NTS WT kg SHEET 1 OF 1

PROPRIETARY

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		03/15/07	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	18	-	-
RECOMMENDED MAIN AC BREAKER	20	-	-
RECOMMENDED AC POWER OUTLET	L15-20R	-	-
RECOMMENDED AC CABLE SIZE	3 SQ/MM	-	-
NOTE: DRAWING SHOWS POWER SUPPLY FOR L15 208V AC POWER			

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
PARTS LIST				

DRAWN G.DOUGLAS 03/13/07 | CHECK | ENGINEERING | DO NOT SCALE FROM DRAWING. DIMENSIONS & TOLERANCES UNLESS SHOWN AS BASIC OR REFERENCE DIMENSIONS

GMW
P.O. Box 2578, Redwood City, CA 94064
Tel: (650)802-8292, Fax: (650)802-8298.

TITLE: ELECTRICAL WIRING 3473-70/PT63.60110

NEXT ASSY	USED ON
SOFTWARE AUTOCAD 13	THIRD ANGLE PROJECTION

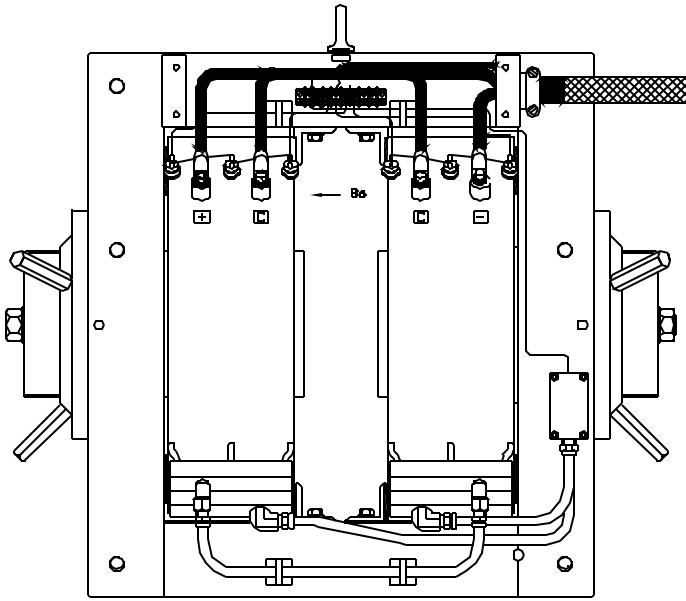
SIZE	DRAWING NO.	REV
A1	13900200	A

SCALE NTS | WT kg | SHEET 1 OF 1

PROPRIETARY

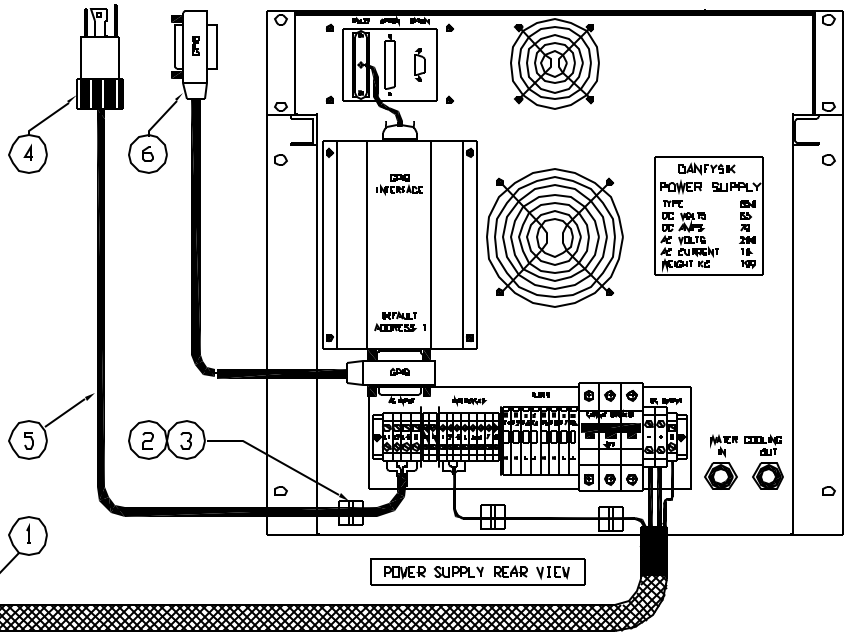
REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		03/06/05	G.DOUGLAS

MODEL: 3473-70 ELECTROMAGNET



REAR VIEW TERMINAL COVER REMOVED

DANFYSIK MODEL: 858 65V/70A POWER SUPPLY



POWER SUPPLY REAR VIEW

DANFYSIK MODEL: 858 GPIB SWITCH SETTINGS

POWER SUPPLY MOTHER BOARD

DIP SWITCH SW3

1	OFF
2	ON
3	ON

DIP SWITCH SW4

1	OFF
2	OFF
3	OFF
4	ON
5	OFF
6	OFF
7	ON
8	OFF

DIP SW1 AND SW2 LOCATED ON M/B
NOT USED FOR GPIB INTERFACE
SW3/SW4 USE NORMAL LOGIC OFF=0

GPIB INTERFACE BOARD

DIP SWITCH SW1

1	OFF	LSB
2	ON	ADDRESS SWITCHES
3	ON	ADDRESS SWITCHES
4	ON	ADDRESS SWITCHES
5	ON	MSB
6	OFF	
7	OFF	
8	OFF	

DIP SWITCH SW2

1	OFF
2	OFF
3	ON
4	OFF
5	ON
6	ON
7	ON
8	ON

DIP SW1 SHOWN SET TO ADDRESS 1 [Default]
SW1 1-5 USES INVERSE LOGIC OFF=1
SW4 USES NORMAL LOGIC OFF=0

NOTE

1. POWER SUPPLY SHOWN WITH US 3 PHASE 208V AC INPUT
2. GPIB INTERFACE IS OPTIONAL EQUIPMENT
3. REFER TO TABLE ON DWG 1390100 FOR AC INPUT RATINGS OTHER THAN 3 PHASE 208V AC
4. GPIB INTERFACE FITTED INTERNALLY ON LATER MODELS OF 858

N/S=NOT SUPPLIED

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

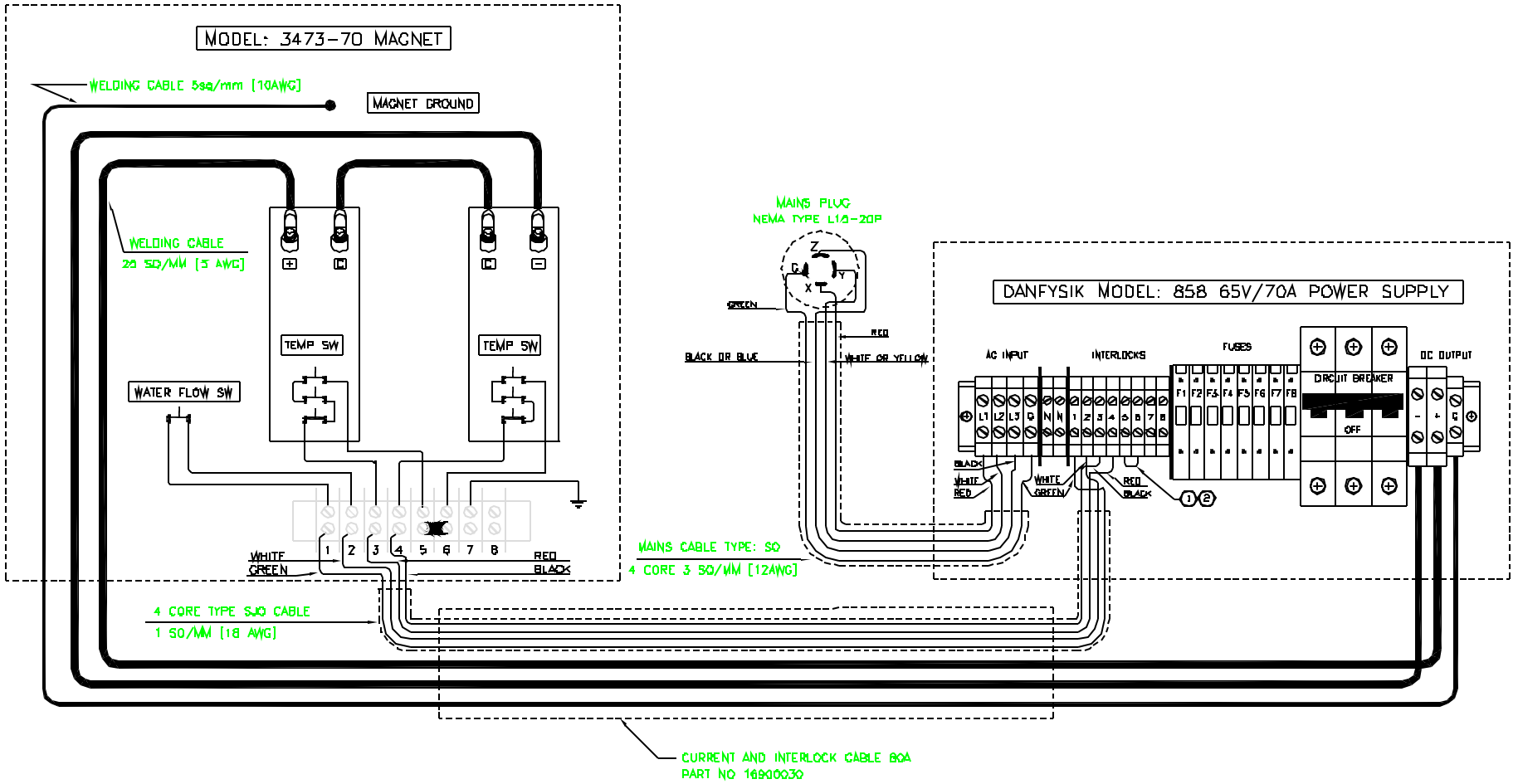
ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
6	1	L900 001-1-3	GPIB INTERFACE CABLE	N/S
5	1	4A-1204	POWER CORD, TYPE SO 4 CORE 12AWG	N/S
4	1	L15-20P	PLUG 3PHASE/20A, NYLON. BRYANT	N/S
3	3	08461	CABLE TIE ADHESIVE MTG, NYL BAR-LOK	
2	3	10364	CABLE TIE, NYLON 6mm WIDE. BAR-LOK	
1	1	16900D30	CURRENT & INTERLOCK CABLE 80A	

PARTS LIST

DRAWN G.DOUGLAS	DATE 03/06/05	DO NOT SCALE FROM DRAWING UNLESS A PURPOSE IS SPECIFIED	GMW P.O. Box 2578, Redwood City, CA 94064 Tel: (650)802-8292. Fax: (650)802-8298.
CHECK	DATE		
ENGINEERING	DATE		TITLE ELECTRICAL ASSEM 3473-70/DF858
NEXT ASSY	SYSTEM	THIRD ANGLE PROJECTION	SIZE A1 DRAWING NO. 11900220 REV A
SOFTWARE AUTOCAD 13			SCALE NTS MASS kg SHEET 1 OF 1

PROPRIETARY

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		03/06/05	G.DOUGLAS



NOTE:

1. REMOVE LINK BETWEEN TERM 1 & TERM 2 AND TERM 3 & TERM 4 ON POWER SUPPLY AND CONNECT INTERLOCKS WIRES AS SHOWN
2. DO NOT REMOVE LINK BETWEEN TERM 5 & TERM 6 UNLESS EMERGERGY STOP CONTROL IS CONNECTED TO THESE TERMINALS.

ELECTROMAGNET SYSTEM ELECTRICAL REQUIREMENTS			
AC INPUT POWER 3 PHASE, 45 to 62HZ	208V	400V	440V
AC INPUT FULL LOAD CURRENT	18A	10A	9A
RECOMMENDED MAIN AC BREAKER	20A	15	15
RECOMMENDED AC POWER OUTLET	L15-20R	-	-
RECOMMENDED AC CABLE SIZE	5 SQ/MM	2.5 SQ/MM	2.5 SQ/MM
NOTE: DRAWING SHOWS POWER SUPPLY FOR US 3 PHASE 208V AC POWER			

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
PARTS LIST				

DRAWN G.DOUGLAS 03/01/05
CHECK
ENGINEERING
DO NOT SCALE FROM DRAWING
UNLESS ELECTRONIC DRAWING

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

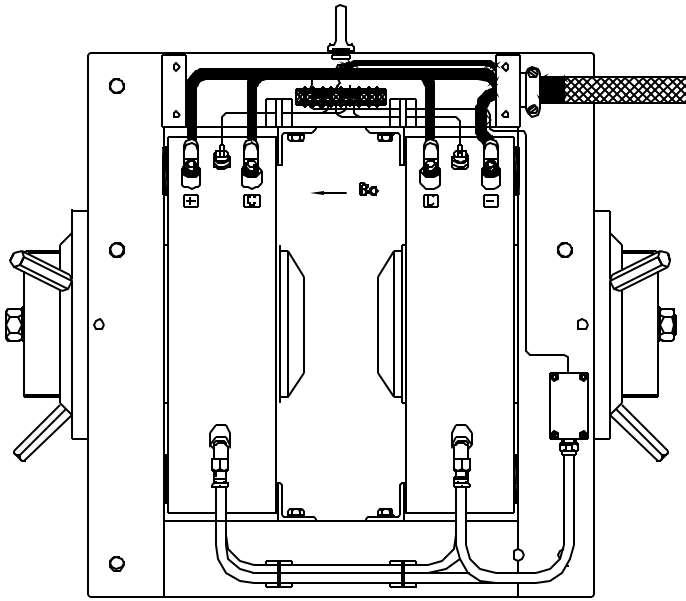
TITLE: ELECTRICAL WIRING 3473-70/DF858

NEXT ASSY: 3473-70 SYSTEM
SOFTWARE: AUTOCAD 13
THIRD ANGLE PROJECTION
SIZE: A1
DRAWING NO. 13900100
REV: A
SCALE: NTS | M1 kg
SHEET 1 OF 1

REVISIONS

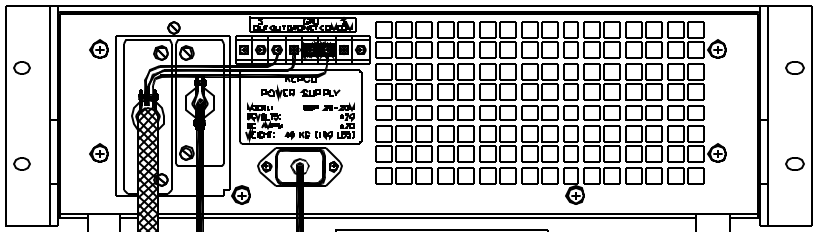
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		03/24/05	G.DOUGLAS

MODEL: 3473-50 MAGNET



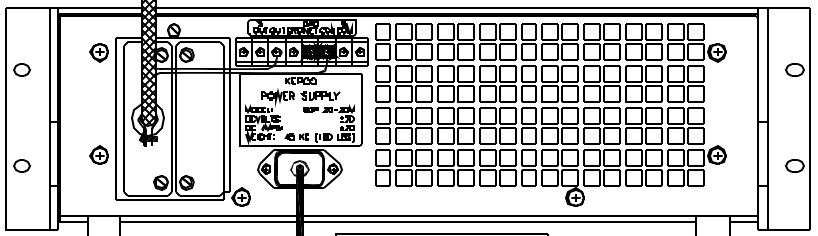
REAR VIEW TERMINAL COVER REMOVED

KEPCO MODEL: BOP 20-20M BIPOLAR POWER SUPPLY



MASTER SUPPLY REAR VIEW

KEPCO MODEL: BOP 20-20M BIPOLAR POWER SUPPLY



SLAVE 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 115V AC INPUT
2. GPIB INTERFACE IS OPTIONAL EQUIPMENT
3. REFER TO TABLE ON DWG 13900080 FOR AC INPUT RATINGS OTHER THAN 115V AC INPUT

N/S=NOT SUPPLIED

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	SNO 488-2	GPIB CABLE [2M LONG]	2
1	1	16900040	CURRENT & INTERLOCK CABLE 40A	

PARTS LIST

DRAWN G.DOUGLAS	DATE 03/24/05	DO NOT SCALE FROM DRAWING DIMENSIONS & TOLERANCES PER ASME Y14.5M-1994
CHECK	DATE	
ENGINEERING	DATE	
NEXT ASSY	3473 SYSTEM	
SOFTWARE: AUTOCAD 13		THIRD ANGLE PROJECTION

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

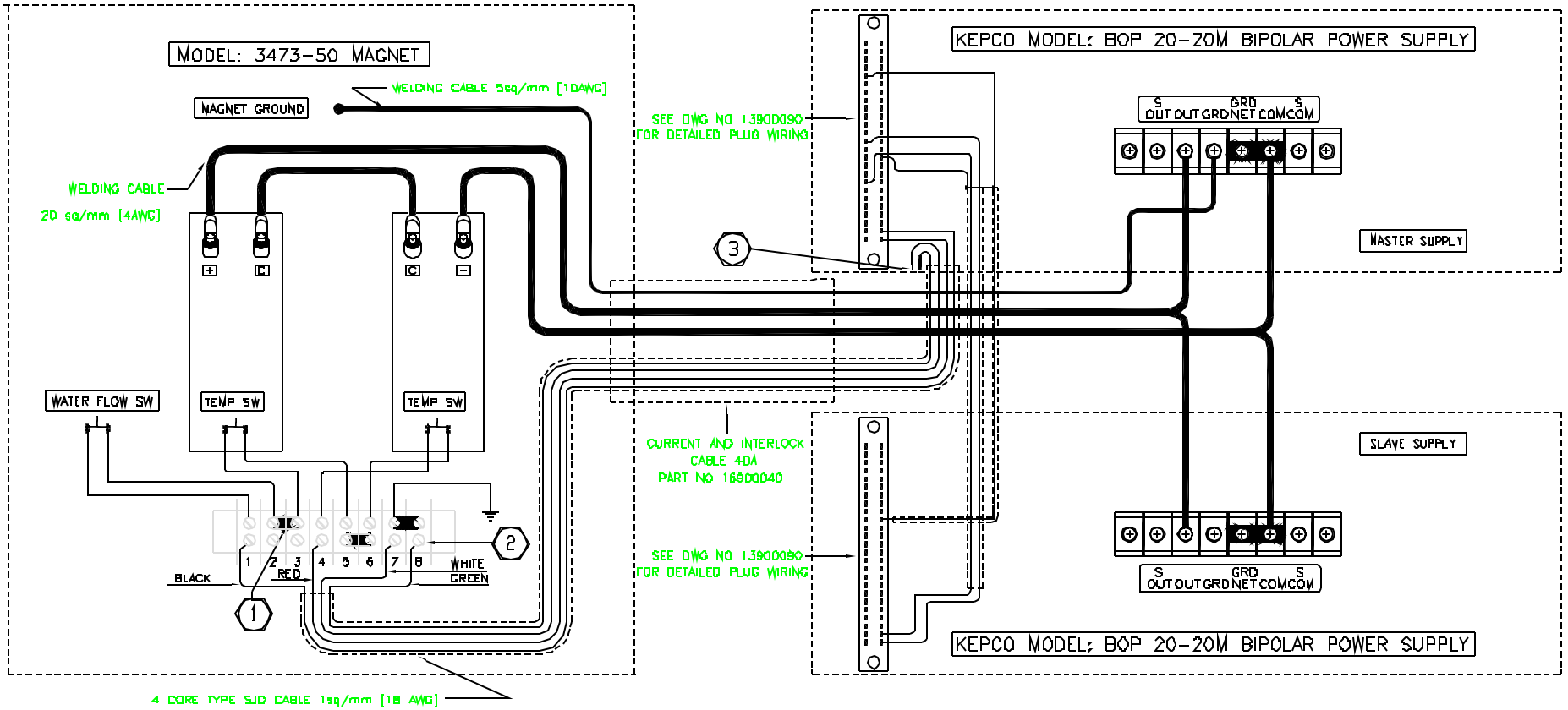
TITLE
ELECTRICAL ASSY
3473-50/BOP20-40

SIZE	DRAWING NO.	REV
A1	11900230	A

SCALE NTS | WT kg | SHEET 1 OF 1

PROPRIETARY

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		03/24/05	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 60HZ	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

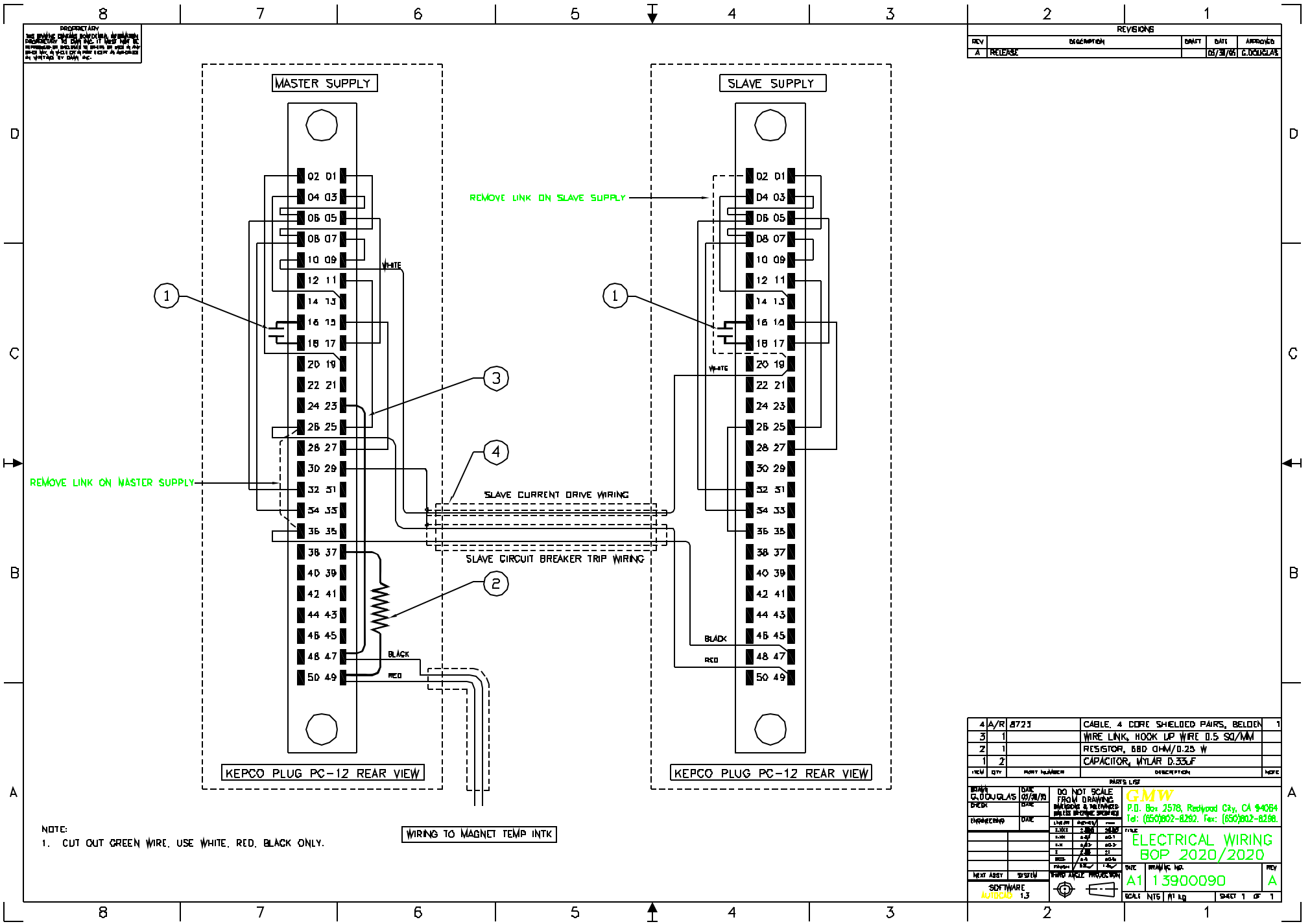
PARTS LIST

DRAWN G.DOUGLAS 03/21/03
CHECK
ENGINEERING
DO NOT SCALE FROM DRAWING
UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES

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

TITLE
ELECTRICAL WIRING
3473-50/BOP20-40

NEXT ASSY 3473
SYSTEM
SOFTWARE: AUTOCAD 13
THIRD ANGLE PROJECTION
SIZE A1
DRAWING NO. 13900080
REV A
SCALE NTS | M1 kg
SHEET 1 OF 1



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

REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		03/31/05	G.DOUGLAS

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, 68Ω OHM/0.25 W	
1	2		CAPACITOR, MYLAR 0.33uF	

PARTS LIST

DRAWN G.DOUGLAS 03/31/05
CHECK
ENGINEERING

DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES PER ASME Y14.5M-1994

GMW
P.O. Box 2578, Redwood City, CA 94064
Tel: (650)802-8292. Fax: (650)802-8298.

TITLE
ELECTRICAL WIRING
BOP 2020/2020

NEXT ASSY | USED ON

SOFTWARE AUTOCAD 13

THIRD ANGLE PROJECTION

SIZE A1 | DRAWING NO. 13900090 | REV A

SCALE NTS | WT kg | SHEET 1 OF 1

ASSEMBLY SEQUENCE MODEL: 3473 ELECTROMAGNET ON TO 45° MOUNTING AND ROLLING/ROTATING BASE

FIGURE 1

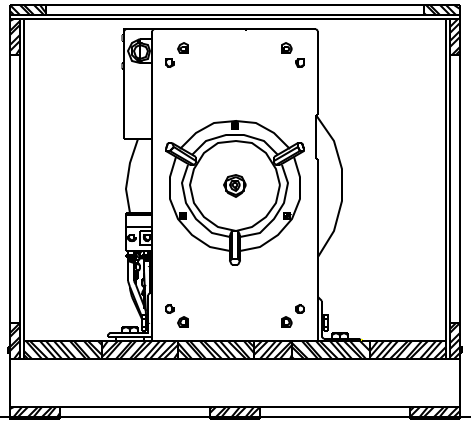


FIGURE 2

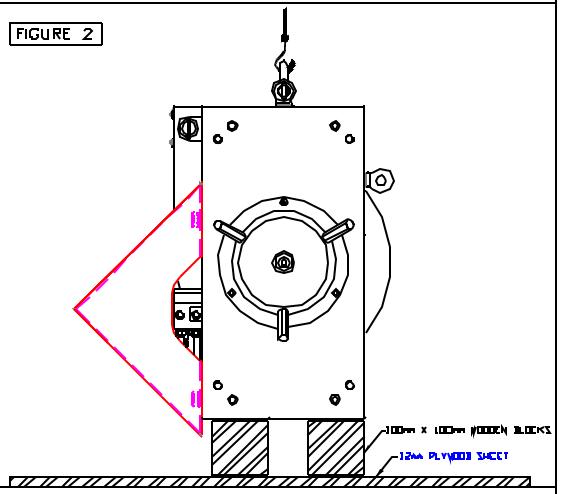


FIGURE 3

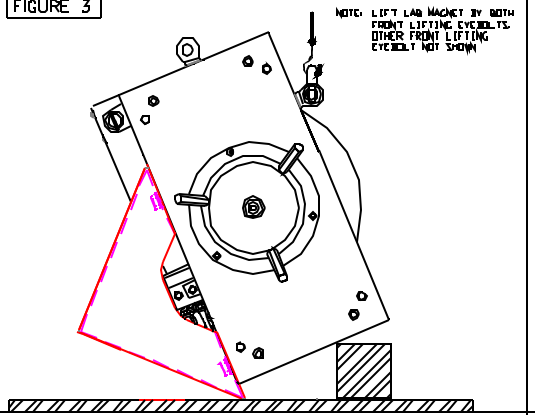


FIGURE 4

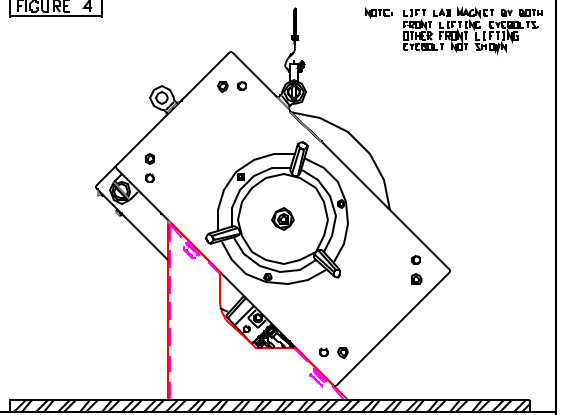


FIGURE 5

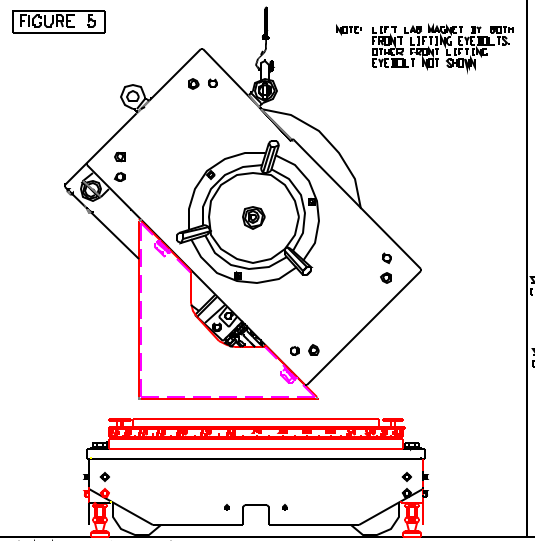
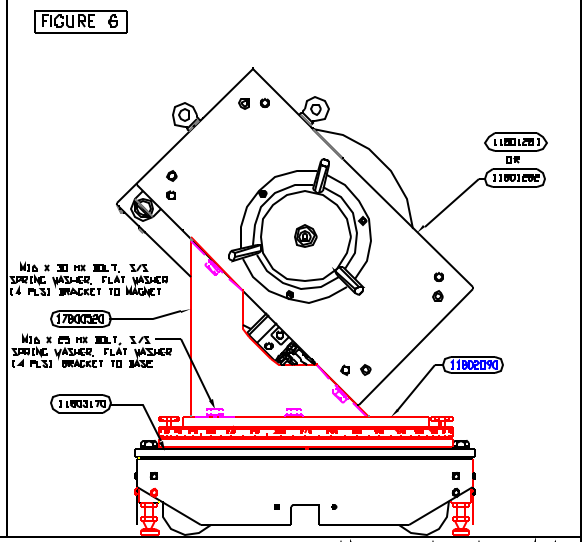


FIGURE 6

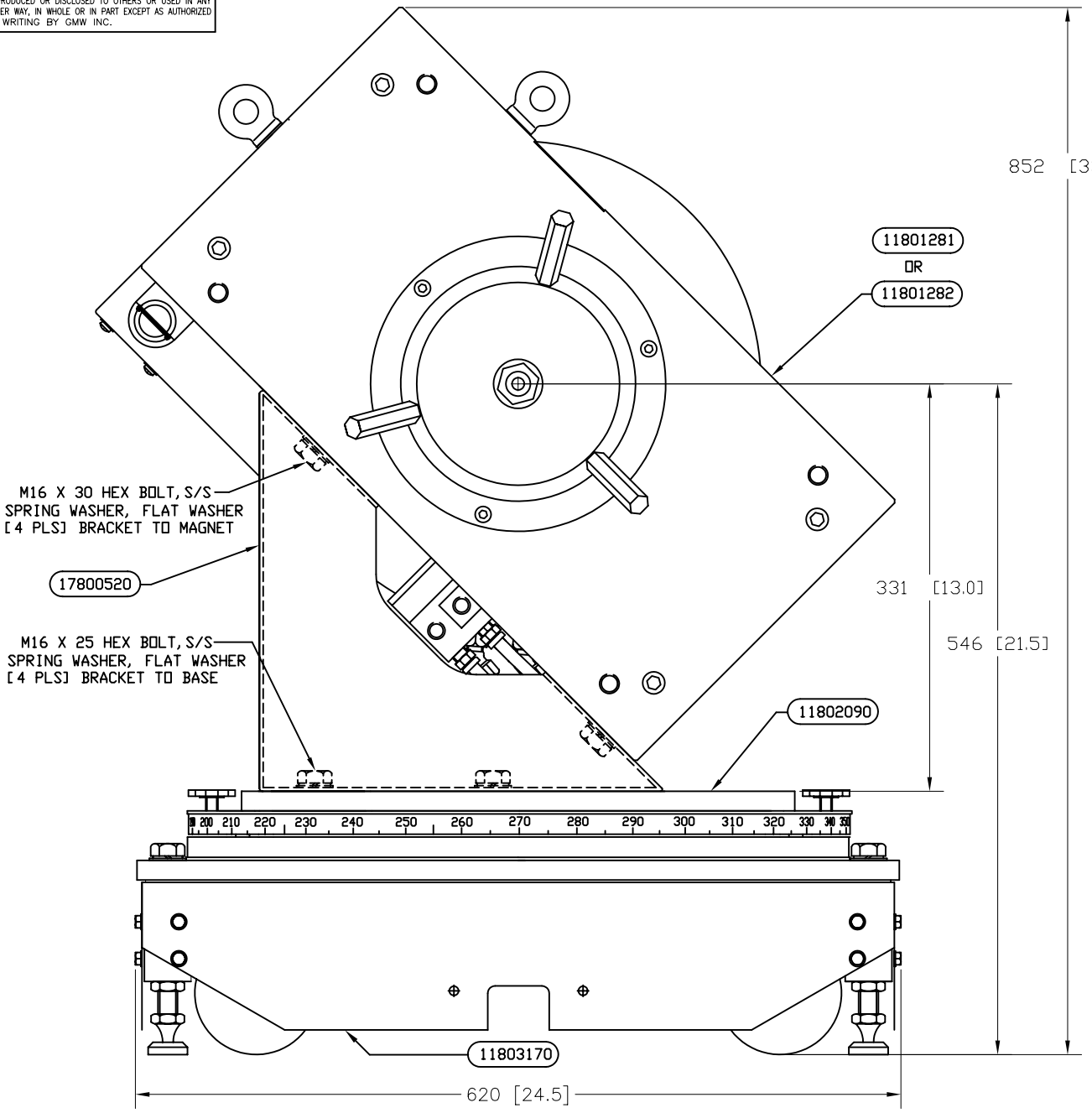


DRAWING NO 11900110 REV A

DRAWN BY: G. DOUGLAS DATE: 05/24/94

REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		11/09/03	A.MARTIN
B	NEW T/B, ROTATE DWG 90°, ADD DIMS		05/11/94	G.DOUGLAS
C	ADD VERT DIM MAG C/L TO ROT BASE TOP		02/18/03	G.DOUGLAS



ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE

PARTS LIST

DRAWN	A.MARTIN	DATE 11/09/03
CHECK		DATE
ENGINEERING		DATE
	3473	
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
ROLL/ROTATING BASE
MODEL: 3473 45°MTG

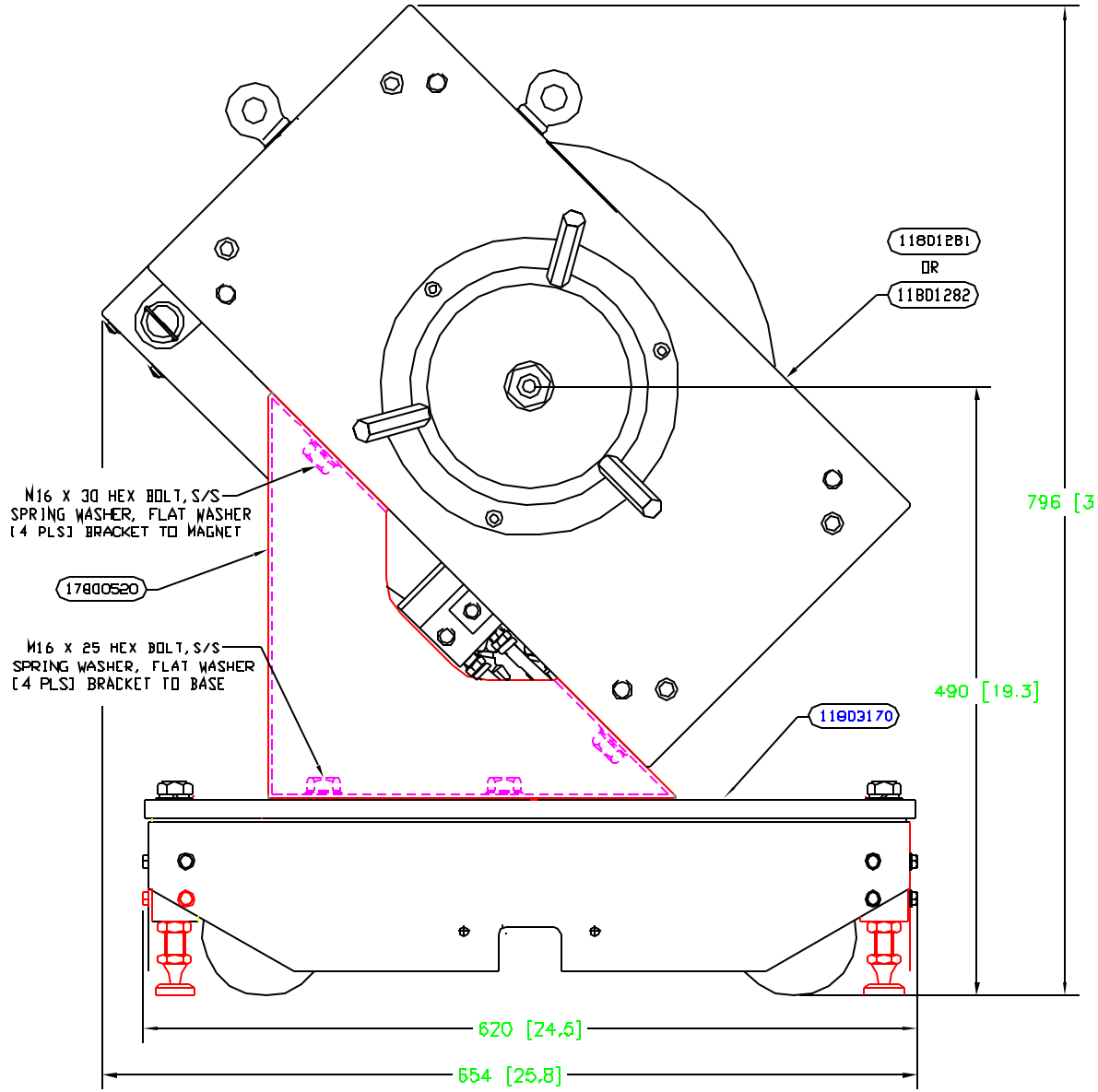
SIZE	DRAWING NO.	REV
A2	11803230	C

SCALE 1:2.5 WT kg SHEET 1 OF 1

PROPRIETARY

THIS DRAWING CONTAINS CONFIDENTIAL INFORMATION PROPRIETARY TO GMW INC. IT MUST NOT BE REPRODUCED OR DISCLOSED TO OTHERS OR USED IN ANY OTHER WAY, IN WHOLE OR IN PART EXCEPT AS AUTHORIZED IN WRITING BY GMW INC.

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
B	RELEASE		11/09/93	A.MARTIN
B	NEW T/B, ROTATE DWG 90°, ADD DIMS		05/11/94	G.DOUGLAS



ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE

PARTS LIST

DRAWN	A.MARTIN	DATE	11/09/93
CHECK		DATE	
ENGINEERING		DATE	
		3473	
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	64	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
MODEL:3473 45° MTG

SIZE	DRAWING NO.	REV
A2	11803200	B

SCALE 1:2.5 WT kg SHEET 1 OF 1

PROPRIETARY

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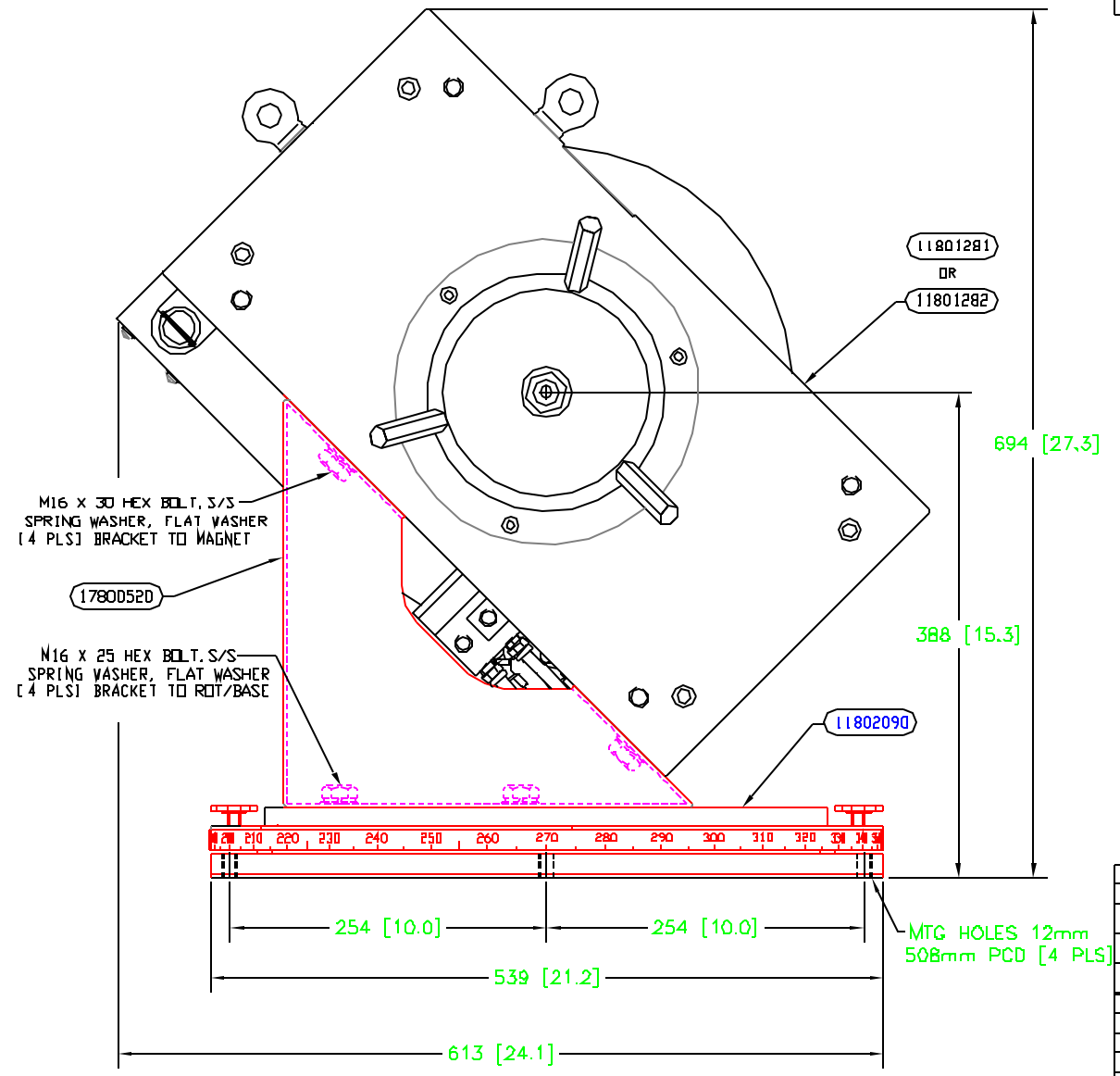
REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		11/09/93	A.MARTIN
B	NEW T/B, ROTATE BASE DWG 90°, ADD DIMS		05/11/94	G.DOUGLAS
C	REMOVE ROLL/BASE PLATE, ADD ROT BASE MTG HOLES		04/17/95	G.DOUGLAS



ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE

PARTS LIST

DRAWN A.MARTIN	DATE 11/09/93	DO NOT SCALE FROM DRAWING	GMW
CHECK	DATE	DIMENSIONS & TOLERANCES UNLESS OTHERWISE SPECIFIED	P.O. Box 2578, Redwood City, CA 94064
ENGINEERING	DATE		Tel: (415)802-8292 Fax: (415)802-8298.
		3473	TITLE: ROTATING BASE MODEL: 3473 45°MTG
NEXT ASSY	SYSTEM	THIRD ANGLE PROJECTION	SIZE A2 / DRAWING NO. 11803210 / REV C
SOFTWARE: AUTOCAD 13			SCALE 1:2.5 WT kg / SHEET 1 OF 1

	LINEAR	INCHES	mm
	X.XXX	±.005	±0.05
	X.XX	±.01	±0.1
	X.X	±.03	±0.3
	X	±.06	±1
	DEG.	±.5	±0.5
	FINISH	64	1.6

PROPRIETARY

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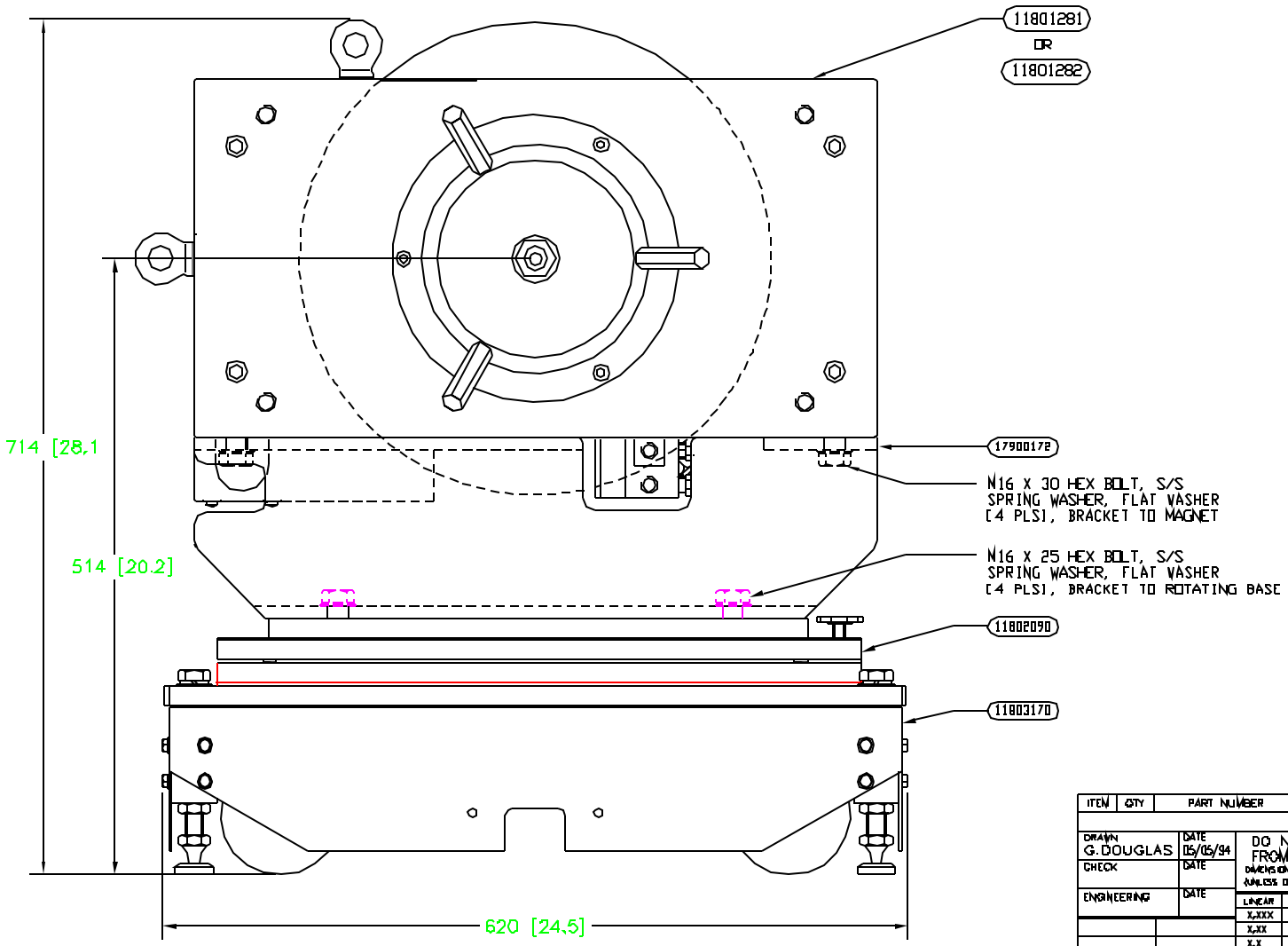
REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		05/11/94	G.DOUGLAS



ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE

PARTS LIST

DRAWN G.DOUGLAS DATE 05/05/94
CHECK DATE
ENGINEERING DATE
3473
NEXT ASSY SYSTEM
SOFTWARE: AUTOCAD 13

DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES UNLESS OTHERWISE SPECIFIED

LINEAR	INCHES	mm
X.XXX	±.005	±0.05
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	64	1.6

THIRD ANGLE PROJECTION

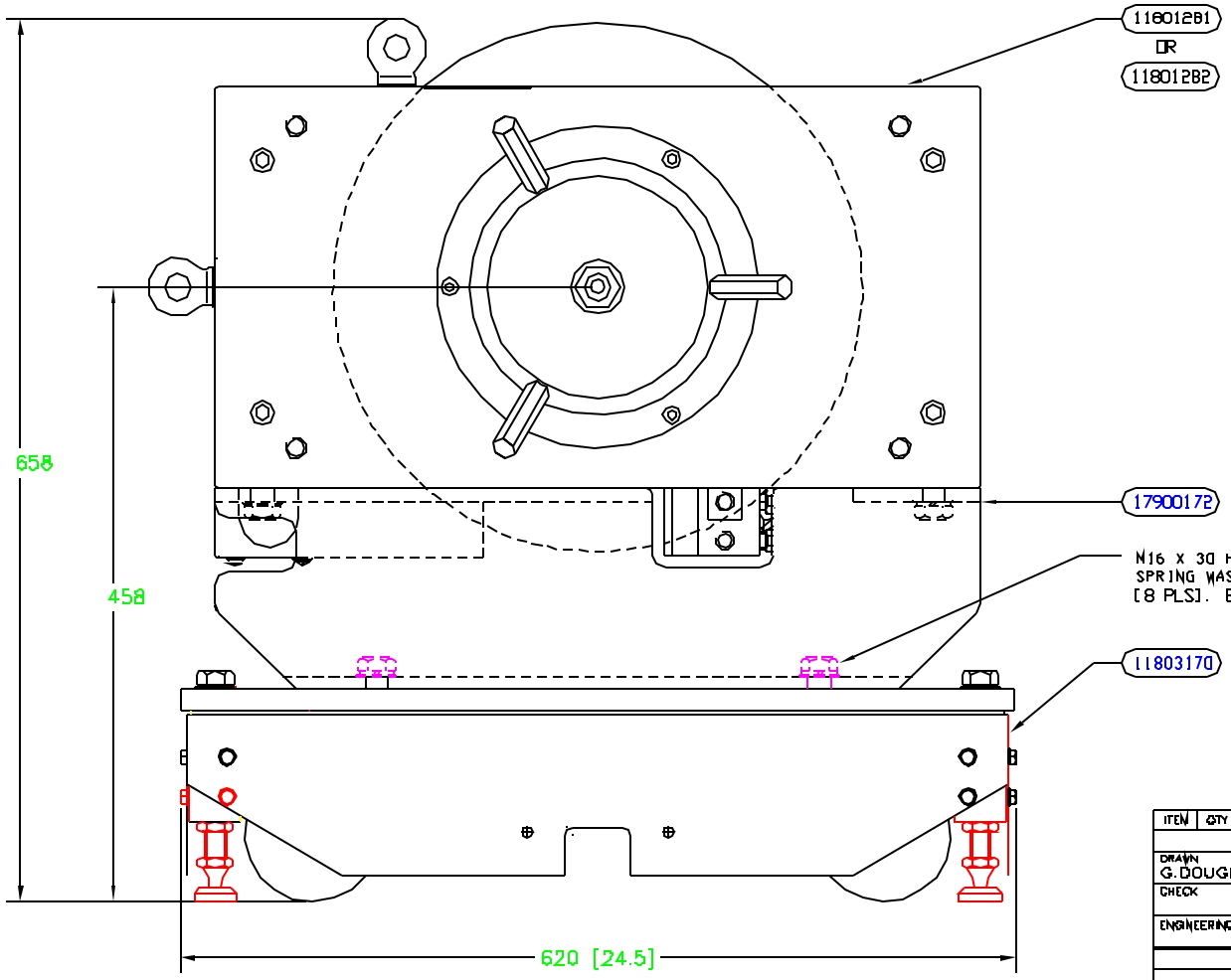
GMW
P.O. Box 2578, Redwood City, CA 94064
Tel: (415)802-8292 Fax: (415)802-8298.

TITLE
ROL/ROT BASE ASSY
MODEL: 3473/H MTG

SIZE A2 | DRAWING NO. 11900090 | REV A

SCALE 1.2.5 WT kg | SHEET 1 OF 1

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		05/11/94	



ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
PARTS LIST				

DRAWN G.DOUGLAS DATE 05/05/94
CHECK DATE
ENGINEERING DATE
3473
NEXT ASSY SYSTEM
SOFTWARE: AUTOCAD 13

DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES UNLESS OTHERWISE SPECIFIED

	INCHES	mm
LINEAR		
X.XXX	±.005	±0.05
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	64	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: 3473/H MTG

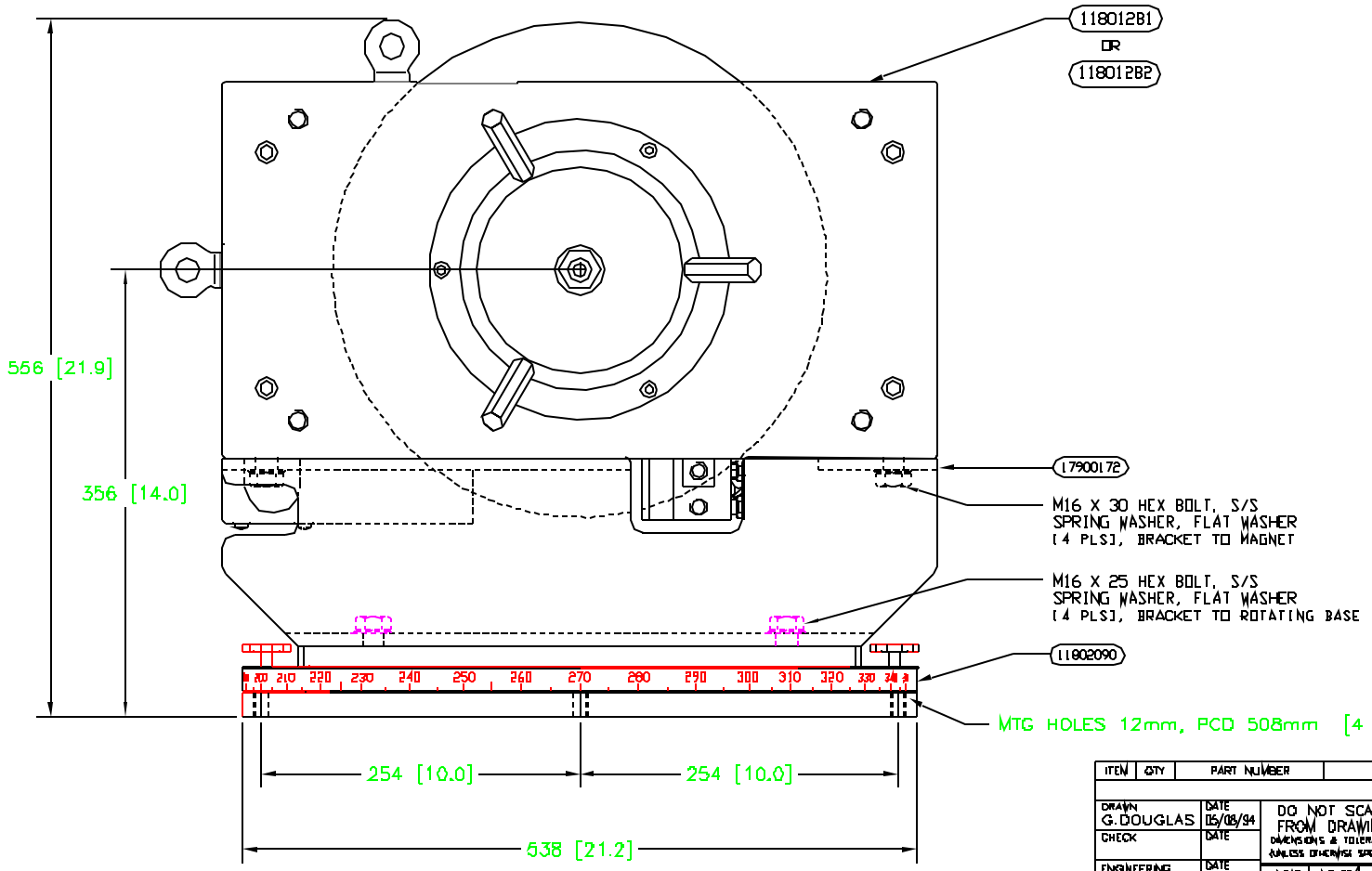
SIZE A2 | DRAWING NO. 11900080 | REV A

SCALE 1:2.5 WT kg | SHEET 1 OF 1

PROPRIETARY

THIS DRAWING CONTAINS CONFIDENTIAL INFORMATION PROPRIETARY TO GMW INC. IT MUST NOT BE REPRODUCED OR DISCLOSED TO OTHERS OR USED IN ANY OTHER WAY, IN WHOLE OR IN PART EXCEPT AS AUTHORIZED IN WRITING BY GMW INC.

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		05/08/94	G.DOUGLAS
B	REMOVE ROLL/BASE PLATE, ADD ROT BASE MTG HOLES		04/17/95	G.DOUGLAS



ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE

PARTS LIST

DRAWN	G.DOUGLAS	DATE	05/08/94
CHECK		DATE	
ENGINEERING		DATE	
			3473
NEXT ASSY			SYSTEM

SOFTWARE: AUTOCAD 13

DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES UNLESS OTHERWISE SPECIFIED

	INCHES	mm
LINEAR		
X.XXX	±.005	±0.05
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	64	1.6

THIRD ANGLE PROJECTION

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

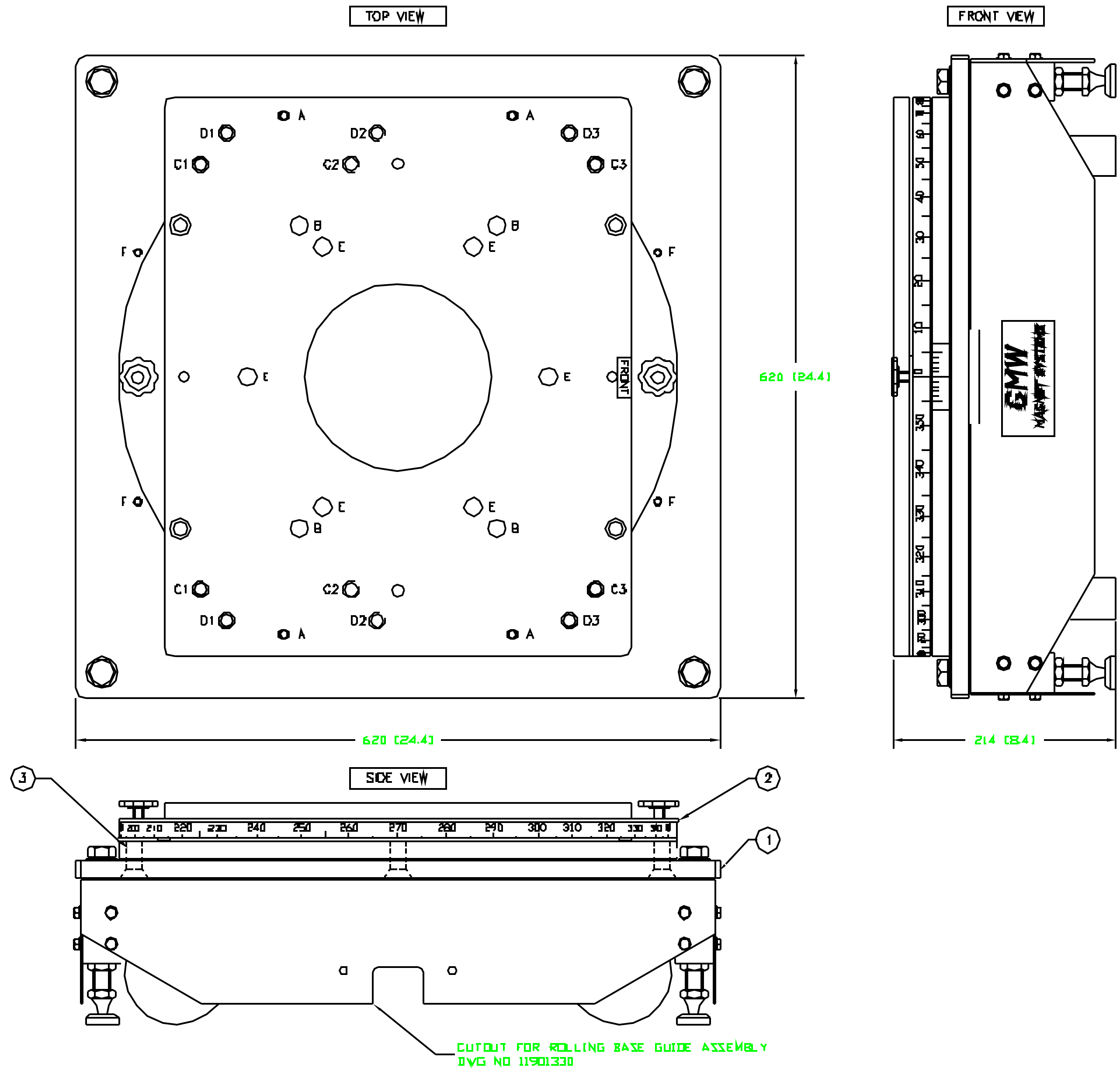
TITLE
ROTATING BASE ASSY
MODEL:3473/H MTG

SIZE	DRAWING NO.	REV
A2	11900100	B

SCALE 1:2.5 WT kg SHEET 1 OF 1

REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		04/27/94	C.DOUGLAS
B	ADD 5403 MTG HOLES		05/13/95	C.DOUGLAS
C	ADD MOTORIZED ROTATING BASE HOLES		07/05/97	C.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=MRD SPOOL MOUNTING
F=MRD MOTOR DRIVE MOUNTING
NOTE: 2 HOLES HIDDEN UNDER ROTATING BASE

PARTS LIST

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	

DRAWN C.DOUGLAS DATE 04/27/94
CHECK DATE
ENGINEERING DATE
NEXT ASSY SYSTEM
SOFTWARE AUTOCAD 13

DO NOT SCALE FROM DRAWING
THIRD ANGLE PROJECTION

GMW
P.O. Box 2578, Redwood City, CA 94064
Tel: (650)802-8292. Fax: (650)802-8298.

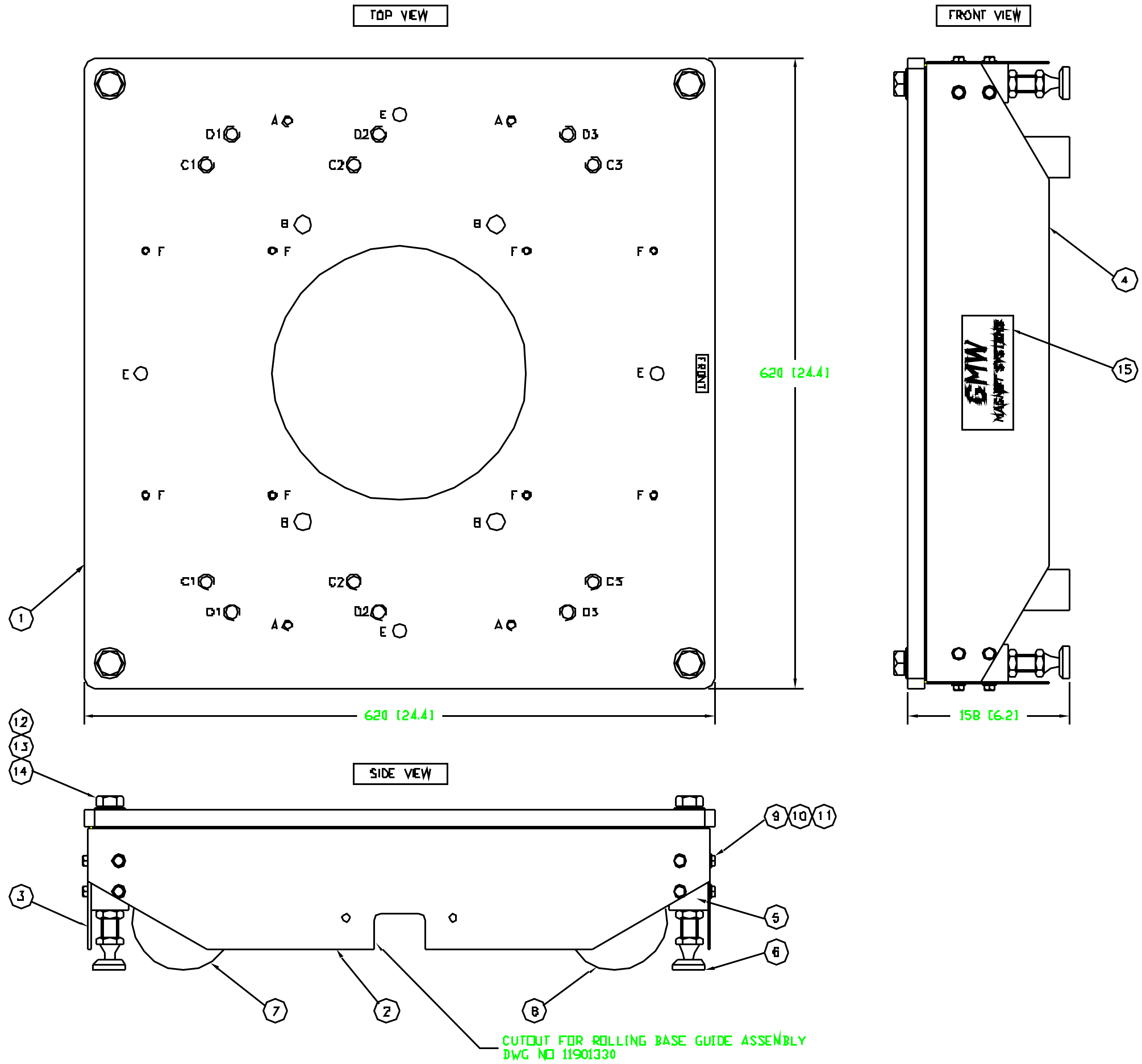
TITLE ROT/ROLLING BASE 3473/3472/5403

SIZE A1 DRAWING NO. 11803430 REV C

SCALE 1:2 WT kg SHEET 1 OF 1

REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		08/04/01	A.MARTIN
B	NEW T/B, ADD ITEM 15, MOVE 2,6, SHIFT "A" HOLES		04/29/04	G.DOUGLAS
C	ADD MAGNET HORIZONTAL MOUNTING HOLES		05/08/04	G.DOUGLAS
D	ADD 5403 MTG HOLES		05/15/06	G.DOUGLAS
E	ADD MRD MOTOR DRIVE MOUNTING HOLES		10/27/08	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=ROTATING BASE MOUNTING
F=MRD MOTOR DRIVE MOUNTING

NOTE 1. PARTS FITTED AT GMW

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
15	1		LABEL, GMW MAGNET SYSTEMS	1
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	LEVELLING FOOT	
5	4	17802160	SUPPORT LEG	
4	1	17802125	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 08/04/01
CHECK DATE
ENGINEERING DATE

DO NOT SCALE FROM DRAWING. DIMENSIONS & TOLERANCES UNLESS OTHERWISE SPECIFIED

NEXT ASSY / SYSTEM
THIRD ANGLE PROJECTION
SOFTWARE AUTOCAD 13

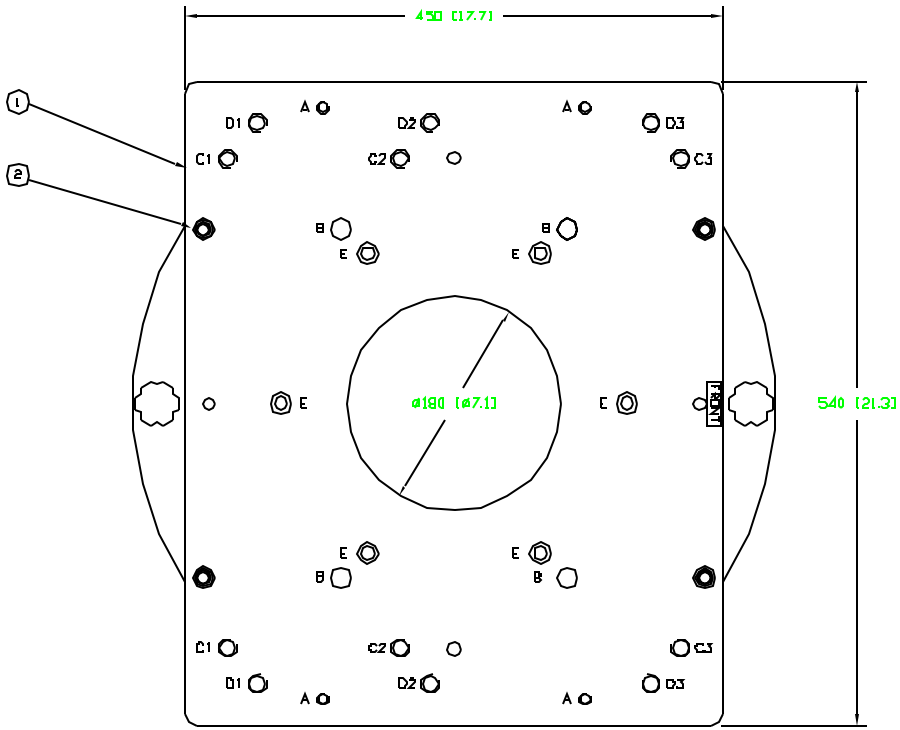
GMW
955 Industrial Rd, San Carlos, CA 94070
Tel: (650)802-8292. Fax: (650)802-8298.

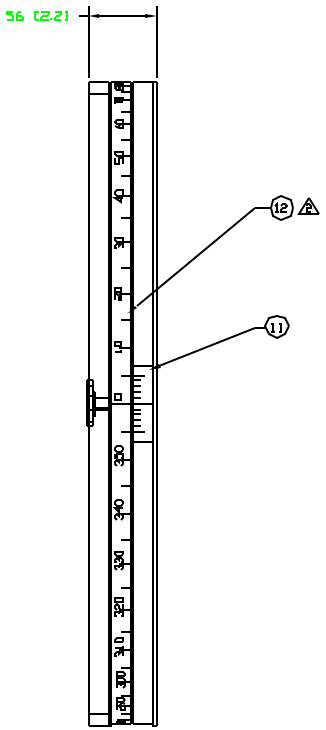
TITLE
ROLLING BASE ASSY 3473/3472/5403

SIZE A1 DRAWING NO. 11803170 REV E
SCALE 1:2 kg SHEET 1 OF 1

PROPRIETARY

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		04/26/95	G.DOUGLAS
E	ADD MOTORISED ROT BASE SPOOL HOLES @ C7		08/31/97	G.DOUGLAS
F	CHG ITEM 9 AND ITEM 13		07/21/98	G.DOUGLAS

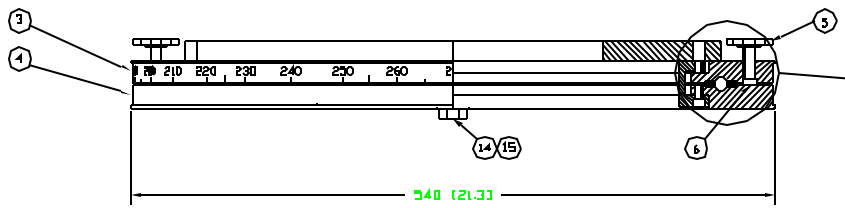


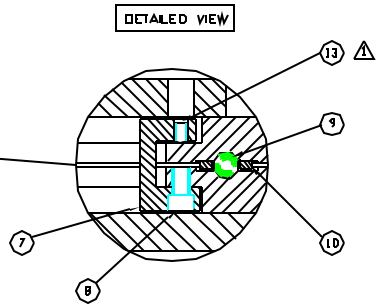


MOUNTING HOLES
A=5403 DIRECT MOUNTING
B=3473/3472 DIRECT MOUNTING
C1/C2=3472 45° MOUNTING
D1/D2=3473 45° MOUNTING
C1/C3=3472 HORZ MOUNTING
D1/D3=3473 HORZ MOUNTING
E=MOTORISED ROT BASE SPOOL

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
15	4	DIN 7980	WASHER, M12 SPRING, S/S	4
14	4	DIN 933	BOLT, M12 x 35 HEX HD, S/S	4
13	4	DIN 913	SCREW, M6 x 8 SHSS , OVAL PT S/S	
12	1		LABEL, ANGLE GRADUATIONS 0-360°	
11	1		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	17802152	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
DO NOT SCALE FROM DRAWING. DIMENSIONS & TOLERANCES UNLESS SPECIFIED

GMW
P.O. Box 2578, Redwood City, CA 94064
Tel: (650)802-8292. Fax: (650)802-8298.

TITLE
ROTATING BASE
3473/3472/5403

NEXT ASSY | SYSTEM
SOFTWARE AUTOCAD 13

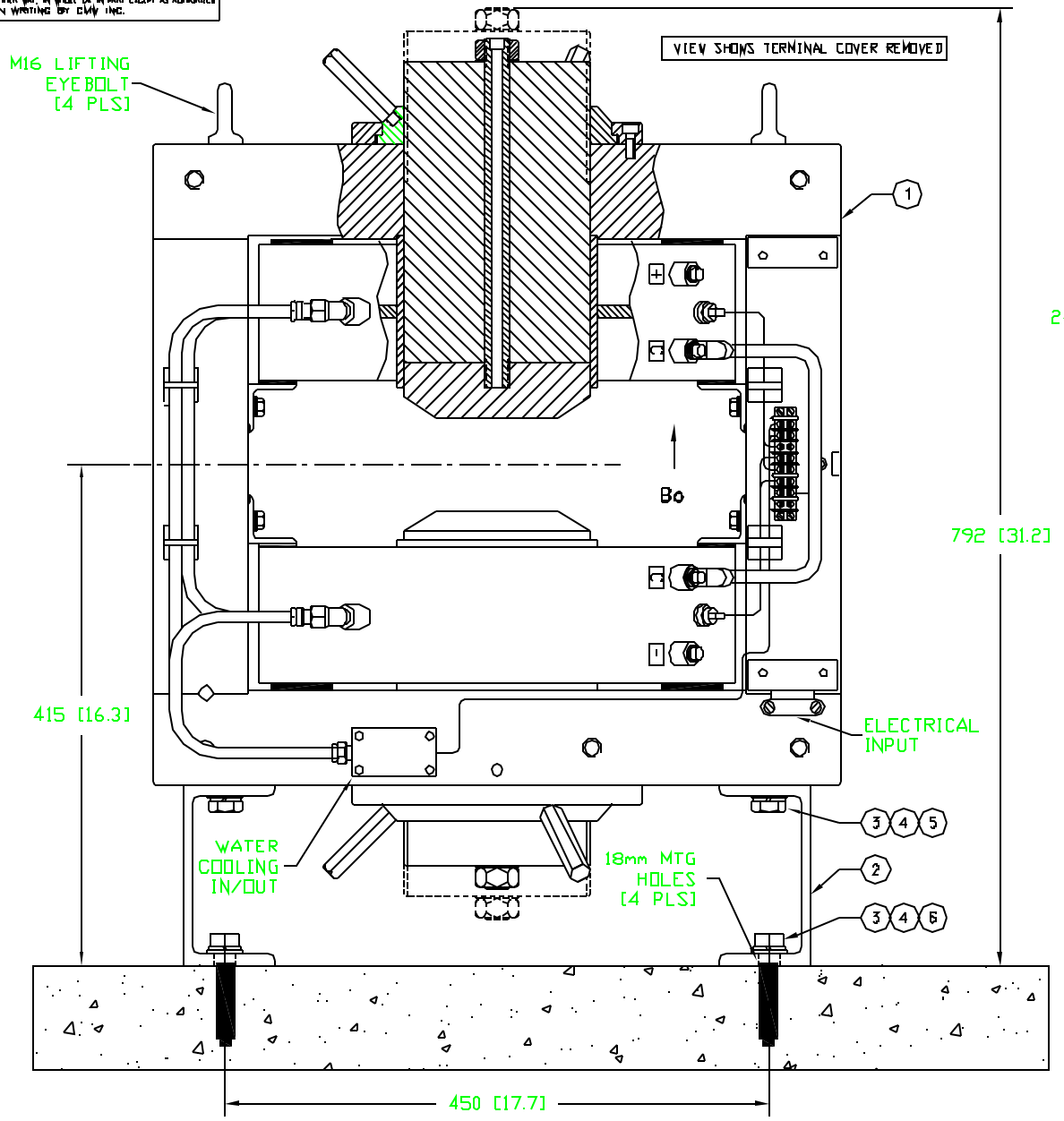
THIRD ANGLE PROJECTION

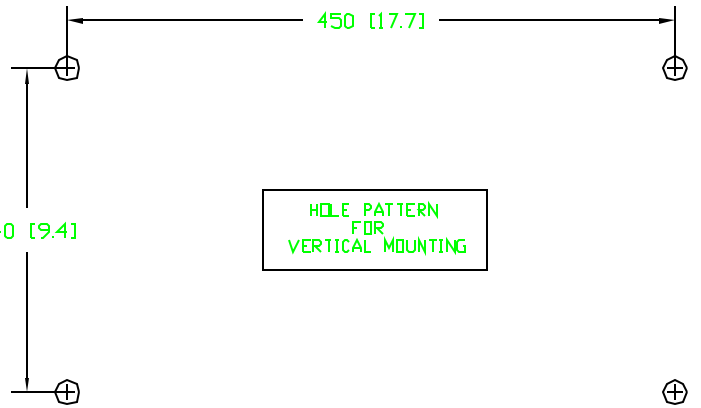
SIZE A1 | DRAWING NO. 11802090 | REV F

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

PROPRIETARY
THIS DRAWING CONTAINS CONFIDENTIAL INFORMATION PROPRIETARY TO GMW INC. IT MUST NOT BE REPRODUCED OR DISCLOSED TO OTHERS OR USED IN ANY OTHER WAY, IN WHOLE OR IN PART EXCEPT AS AUTHORIZED IN WRITING BY GMW INC.

ELECTROMAGNET REAR VIEW





***** WARNING *****
WHEN THE 3473 ELECTROMAGNET IS VERTICALLY MOUNTED IT MUST BE BOLTED TO THE FLOOR SECURELY AS SHOWN.

REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		09/12/93	G.DOUGLAS
B	ADD DIMS, AND MOUNTING HOLE DETAILS		05/11/94	G.DOUGLAS
C	SHOW REAR OF MAGNET WITH WATER/ELECT CONNECTIONS		08/25/99	G.DOUGLAS

PARTS LIST

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
6	4		BOLT, M16 or 5/8" EXPANSION	
5	4	DIN 933	BOLT, M16 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	17803180	VERTICAL MOUNTING BRACKET	
1	1	3473	ELECTROMAGNET, 150MM 50A or 70A	

DRAWN A.MARTIN DATE 09/12/93
CHECK DATE
ENGINEERING DATE
3473
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	64	1.6

THIRD ANGLE PROJECTION

GMW
P.O Box 2578, Redwood City, CA 94064
Tel: (650)802-8292. Fax: (650)802-8298.

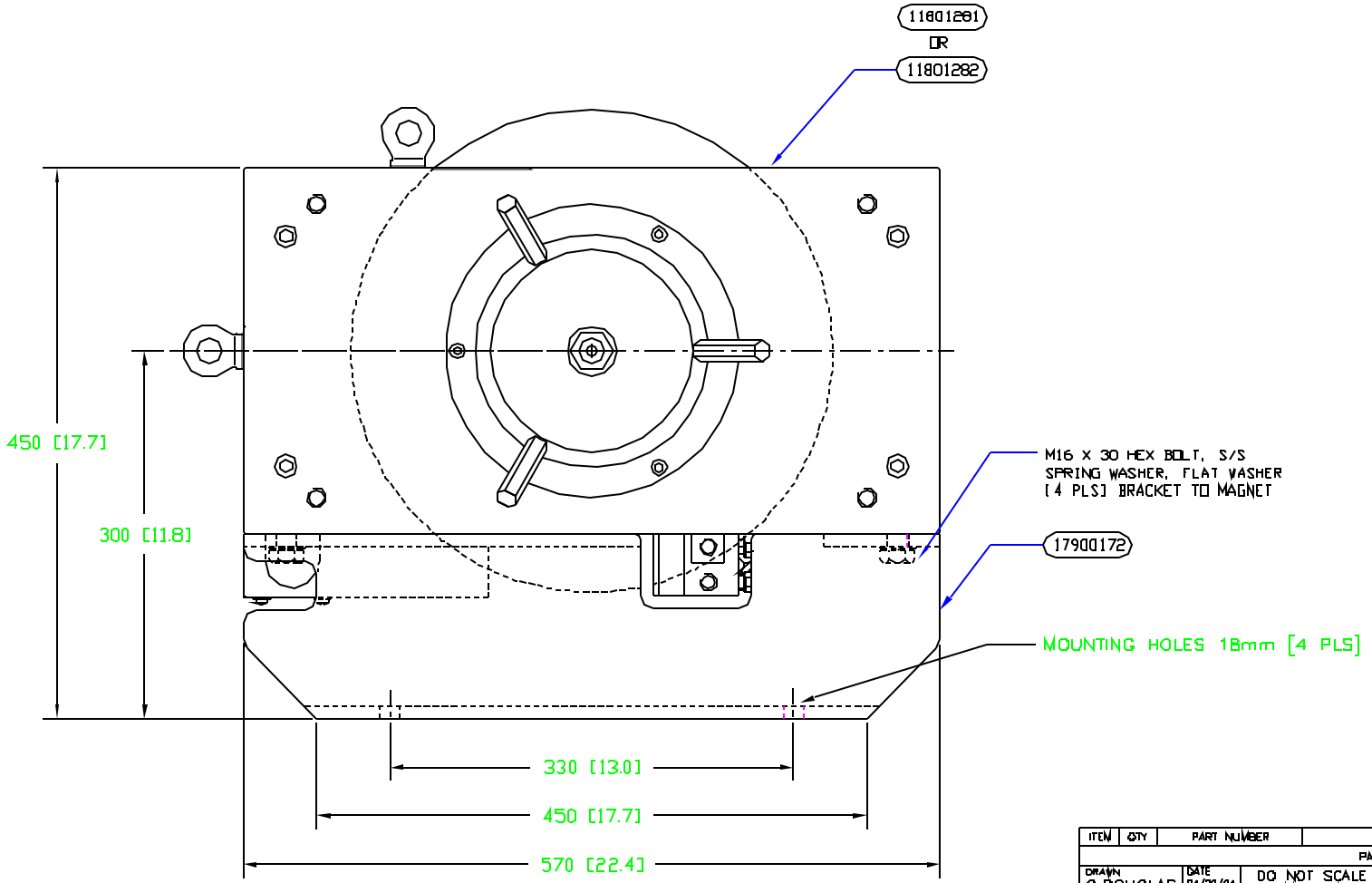
TITLE
VERTICAL MGT ASSY
MODEL: 3473

SIZE A2 | DRAWING NO. 11803250 | REV C
SCALE 1:2.5 WT kg | SHEET 1 OF 1

PROPRIETARY

THIS DRAWING CONTAINS CONFIDENTIAL INFORMATION PROPRIETARY TO GMW INC. IT MUST NOT BE REPRODUCED OR DISCLOSED TO OTHERS OR USED IN ANY OTHER WAY, IN WHOLE OR IN PART EXCEPT AS AUTHORIZED IN WRITING BY GMW INC.

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		04/30/94	G.DOUGLAS
B	REVISE HORZ MTG BRACKET HOLES, ADD CHAMFER		05/08/94	G.DOUGLAS



NOTES

RH BRACKET PART No 17900171 NOT SHOWN ON THIS DRAWING.

RH BRACKET PART No 17900171 MIRROR IMAGE OF LH BRACKET PART No17900172.

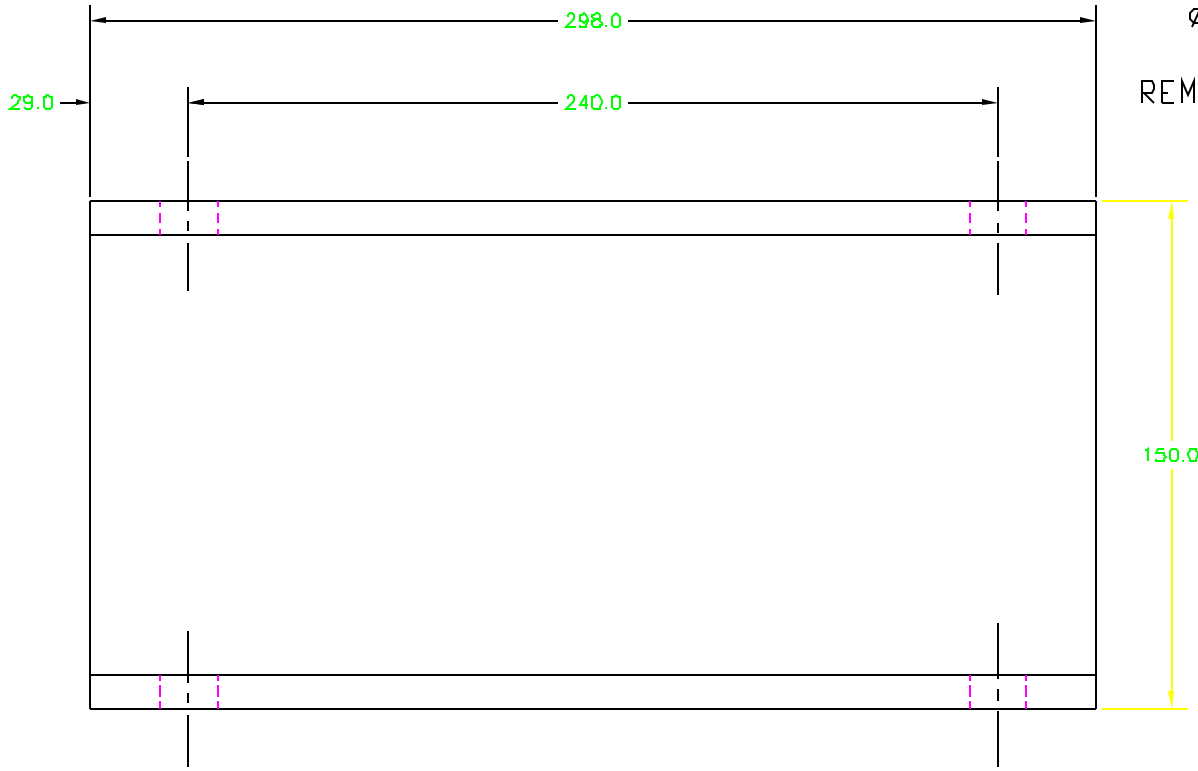
ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE

PARTS LIST

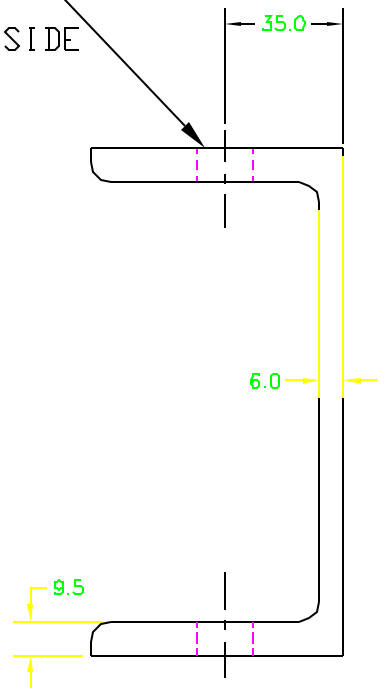
DRAWN G.DOUGLAS	DATE 04/29/94	DO NOT SCALE FROM DRAWING DIMENSIONS & TOLERANCES UNLESS OTHERWISE SPECIFIED	GMW P.O. Box 2578, Redwood City, CA 94064 Tel: (415)802-8292 Fax: (415)802-8298.
CHECK	DATE		
ENGINEERING	DATE		TITLE HORZ MTG ASSY MODEL: 3473
		3473	SIZE A2 / DRAWING NO. 11900070 / REV B
NEXT ASSY	SYSTEM		SCALE 1.2.5 WT kg / SHEET 1 OF 1
SOFTWARE: AUTOCAD 13		THIRD ANGLE PROJECTION	

LINEAR	INCHES	mm
X.XXX	±.005	±0.05
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	64	1.6

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		09/11/93	A.MARTIN
B	NEW T/B, INCREASE HOLE SIZE TO 18MM		05/08/94	G.DOUGLAS



ø18.0 [4 PLS]
.5 X 45° C/SK
REMOVE BURR ON INSIDE



NOTES

1 MATERIAL: 150 X 75 X 6mm M.S CHANNEL

2 PAINT INSTRUMENT TAN TO BSL TP8580010

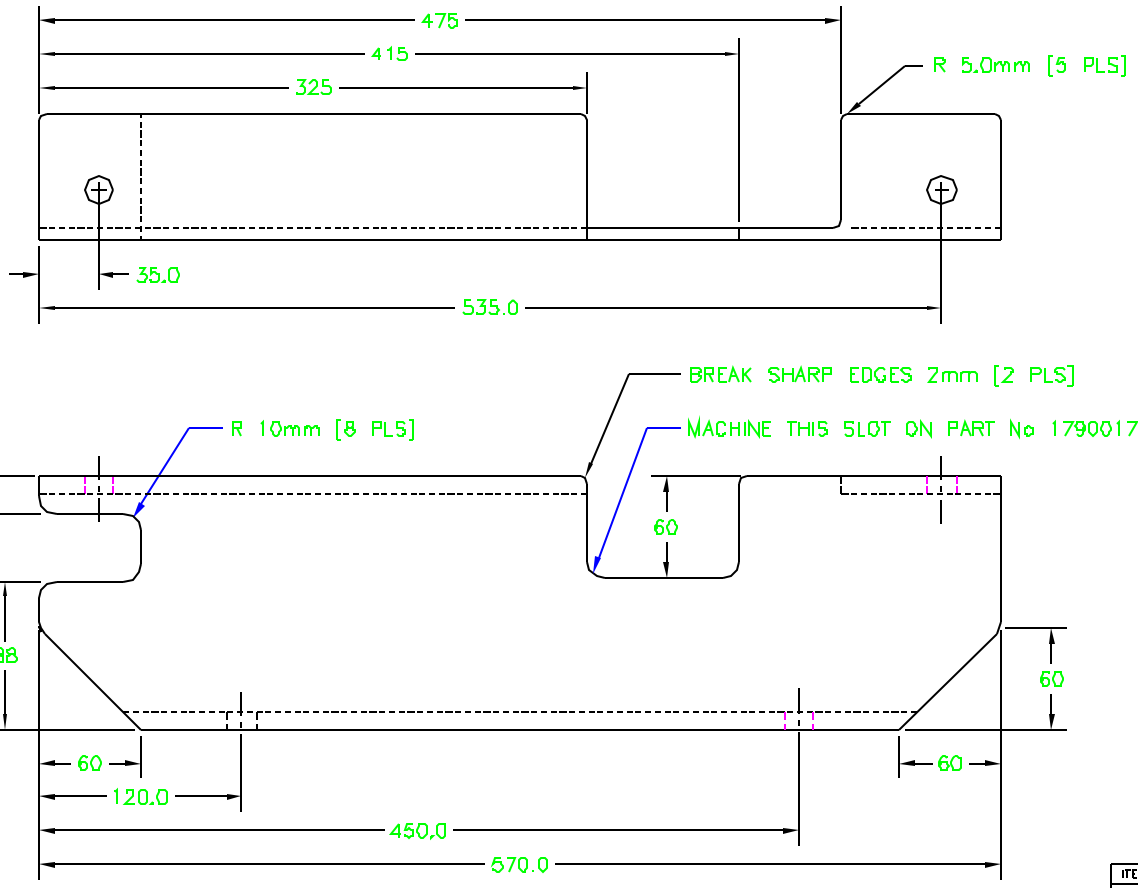
ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
PARTS LIST				

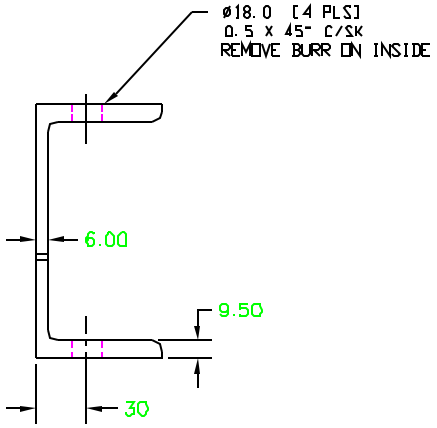
DRAWN A.MARTIN	DATE 09/11/93	DO NOT SCALE FROM DRAWING DIMENSIONS & TOLERANCES UNLESS OTHERWISE SPECIFIED	GMW P.O. Box 2578, Redwood City, CA 94064 Tel: (415)802-8292 Fax: (415)802-8298.
CHECK	DATE		
ENGINEERING	DATE		TITLE VERT MTG BRACKET MODEL: 3473
		3473	SIZE A2 / DRAWING NO. 17803180 / REV B
NEXT ASSY	SYSTEM		
SOFTWARE: AUTOCAD 13		THIRD ANGLE PROJECTION	SCALE 1:1 / WT kg / SHEET 1 OF 1

	LINEAR	INCHES	mm
	X.XXX	±.005	±0.05
	X.XX	±.01	±0.1
	X.X	±.03	±0.3
	X	±.06	±1
	DEG.	±.5	±0.5
	FINISH	64	1.6

PART No 17900172 [LH] BRACKET

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		04/22/94	G.DOUGLAS
B	REVISE BOTTOM MTG HOLES, ADD CHAMFER		05/05/94	G.DOUGLAS





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 17900172 [LH] AS DRAWN
PART No 17900171 [RH] MIRROR IMAGE

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE

PARTS LIST

DRAWN G.DOUGLAS DATE 04/22/94
CHECK DATE
ENGINEERING DATE
3473
NEXT ASSY SYSTEM
SOFTWARE: AUTOCAD 13

DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES UNLESS OTHERWISE SPECIFIED

	INCHES	mm
LINEAR	.XXX ±.005	±0.05
	.XX ±.01	±0.1
	.X ±.03	±0.3
	X ±.06	±1
ANG.	±.5	±0.5
FINISH	64	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 BRACKET
MODEL: 3473

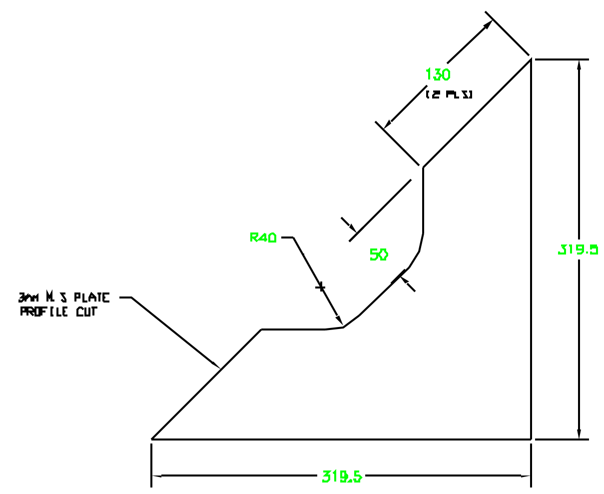
SIZE A2 | DRAWING NO. 17900170 | REV B

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

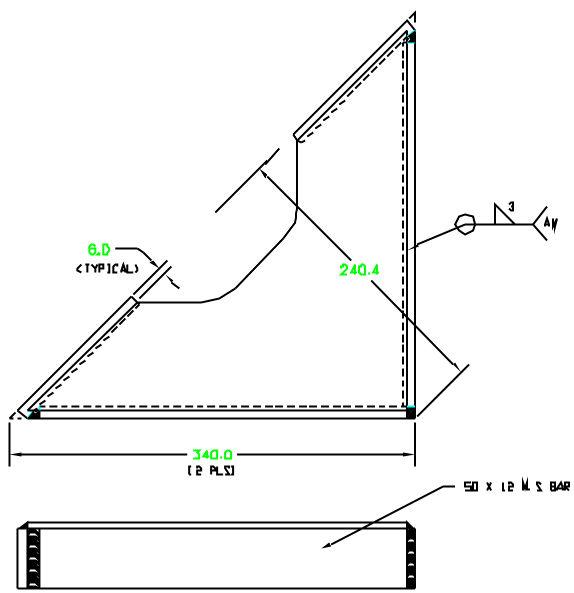
PROPRIETARY

REVISIONS

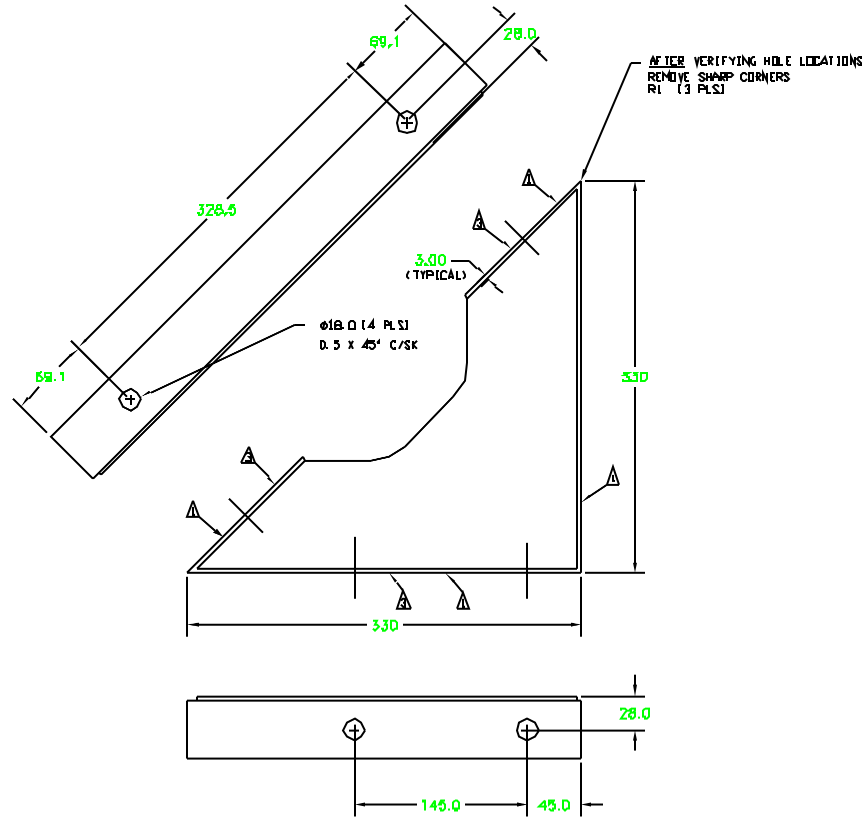
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		08/11/03	A.MARTIN
B	NEW T/B, ADD DIM AT C4		07/28/04	G.DOUGLAS



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 08/11/03

CHECK DATE

ENGINEERING DATE

DO NOT SCALE FROM DRAWING

NEXT ASSY 3473/2 SYSTEM

THIRD ANGLE PROJECTION

SOFTWARE: AUTOCAD 13

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

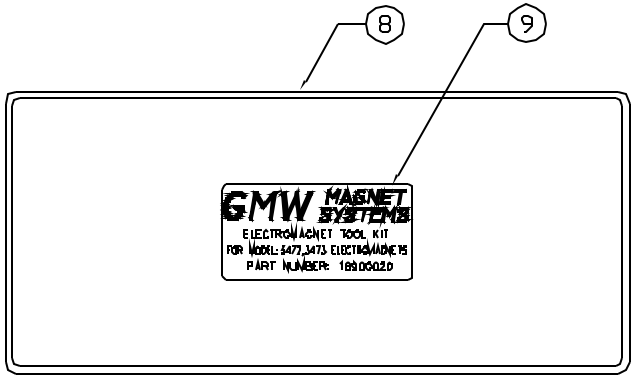
TITLE 45° MTG BRACKET MODEL: 3473/3472

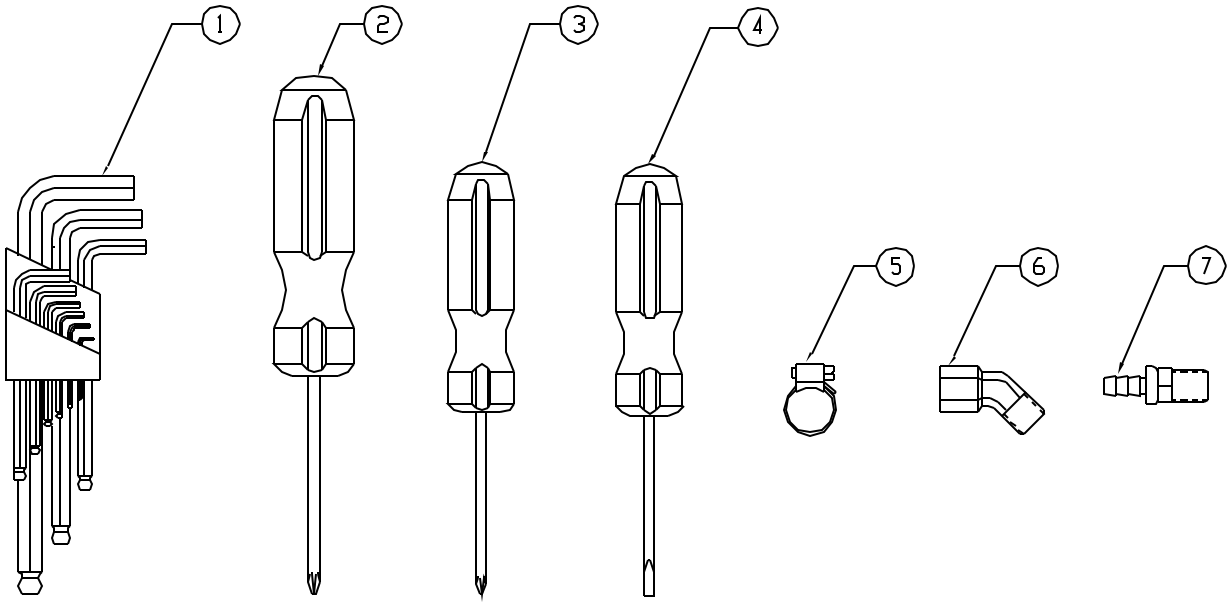
SIZE A1 DRAWING NO. 17800520 REV B

SCALE 1:2 SHEET 1 OF 1

REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		07/28/94	E. 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"D HOSE COUPLING, BRASS 1/4NPT	
6	2	124-8-04	45° ELBOW, BRASS 1/4NPT, IE	
5	2	350-0016	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 DATE: 07/28/94
CHECK: DATE:
ENGINEERING: DATE:
NEXT ASSY: SYSTEM:
SOFTWARE: AUTOCAD 13

DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES CONFORM TO ASME Y14.5M-1994
THIRD ANGLE PROJECTION

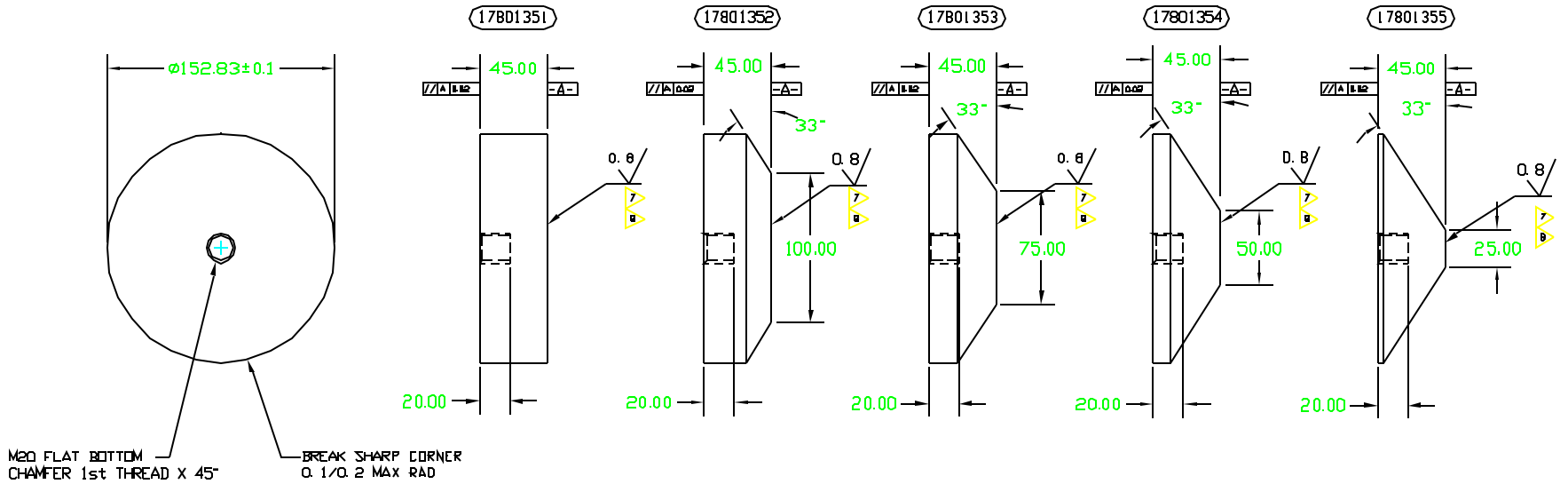
GMW
P.O. Box 2578, Redwood City, CA 94064
Tel: (415)802-8292, Fax: (415)802-8298

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 ø156 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		02/25/93	A.MARTIN
B	CHANGE PART NUMBERS		05/08/94	G.DOUGLAS
C	ADD NOTE ABOUT ELECTROCLEAN ONLY AFTER GRINDING		06/20/01	G.DOUGLAS



ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE

PARTS LIST

DRAWN A.MARTIN DATE 02/25/93
CHECK DATE
ENGINEERING DATE
3473
NEXT ASSY SYSTEM
SOFTWARE AUTOCAD 13

DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES UNLESS OTHERWISE SPECIFIED

LINEAR	INCHES	mm
X.XXX	±.005	±0.05
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	64	1.6

THIRD ANGLE PROJECTION

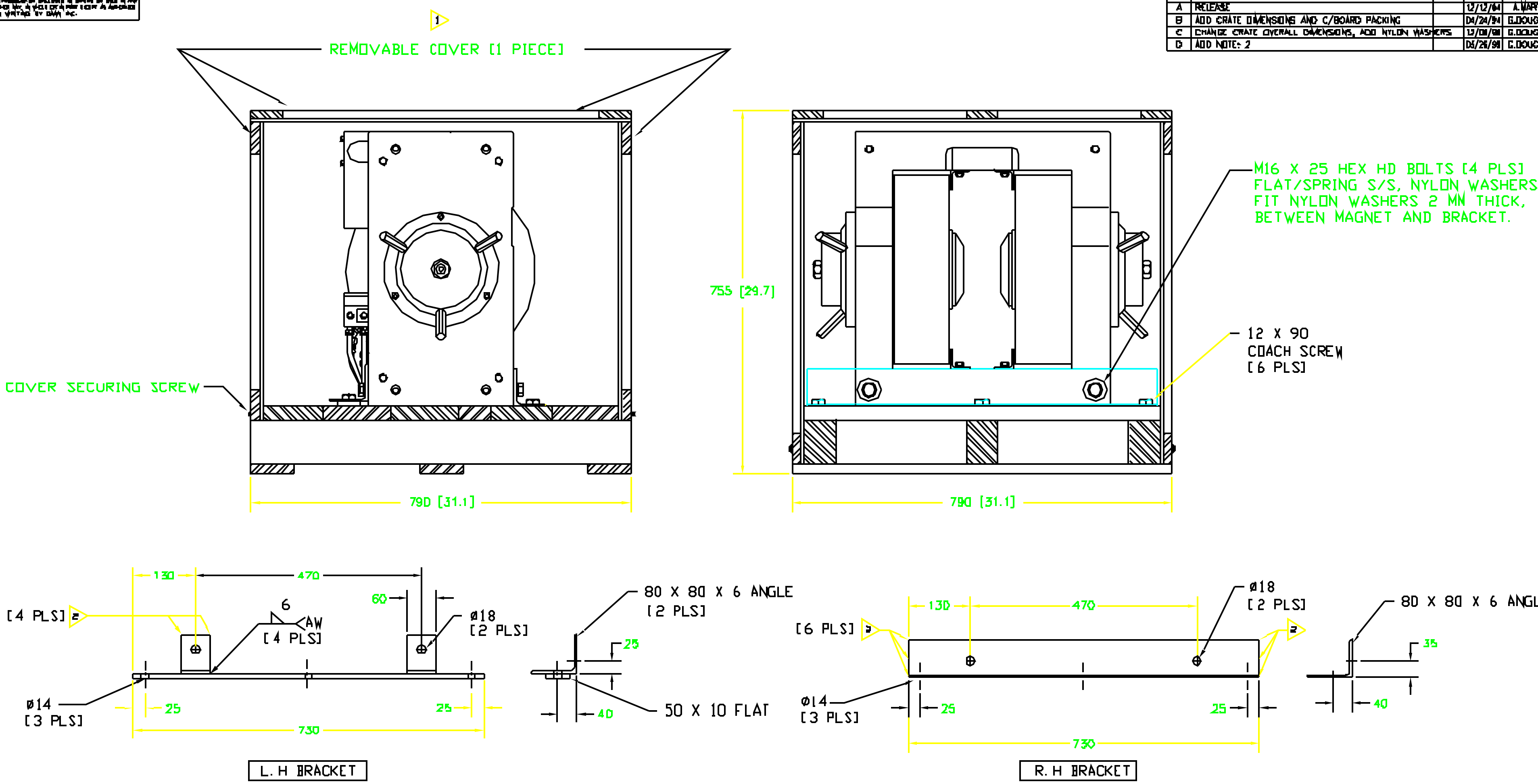
GMW
955 Industrial Rd, San Carlos, CA 94070
Tel: (650)802-8292. Fax: (650)802-8298.

TITLE
POLE CAPS
MODEL: 3473

SIZE A2 | DRAWING NO. 17801350 | REV C
SCALE 1:2 | WT kg | SHEET 1 OF 1

PROPRIETARY

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		12/12/94	A.MARTIN
B	ADD CRATE DIMENSIONS AND C/BOARD PACKING		04/24/94	G.DOUGLAS
C	CHANGE CRATE OVERALL DIMENSIONS, ADD NYLON WASHERS		12/08/98	G.DOUGLAS
D	ADD NOTE: 2		06/26/98	G.DOUGLAS



NOTE:
1. THE 3473 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

SHIPPING WEIGHT 660 kG [1,450 lbs]

PARTS LIST

DRAWN A.MARTIN 12/12/94
DO NOT SCALE FROM DRAWING

GMW
P.O. Box 2578, Redwood City, CA 94064
Tel: (650)802-8292. Fax: (650)802-8298.

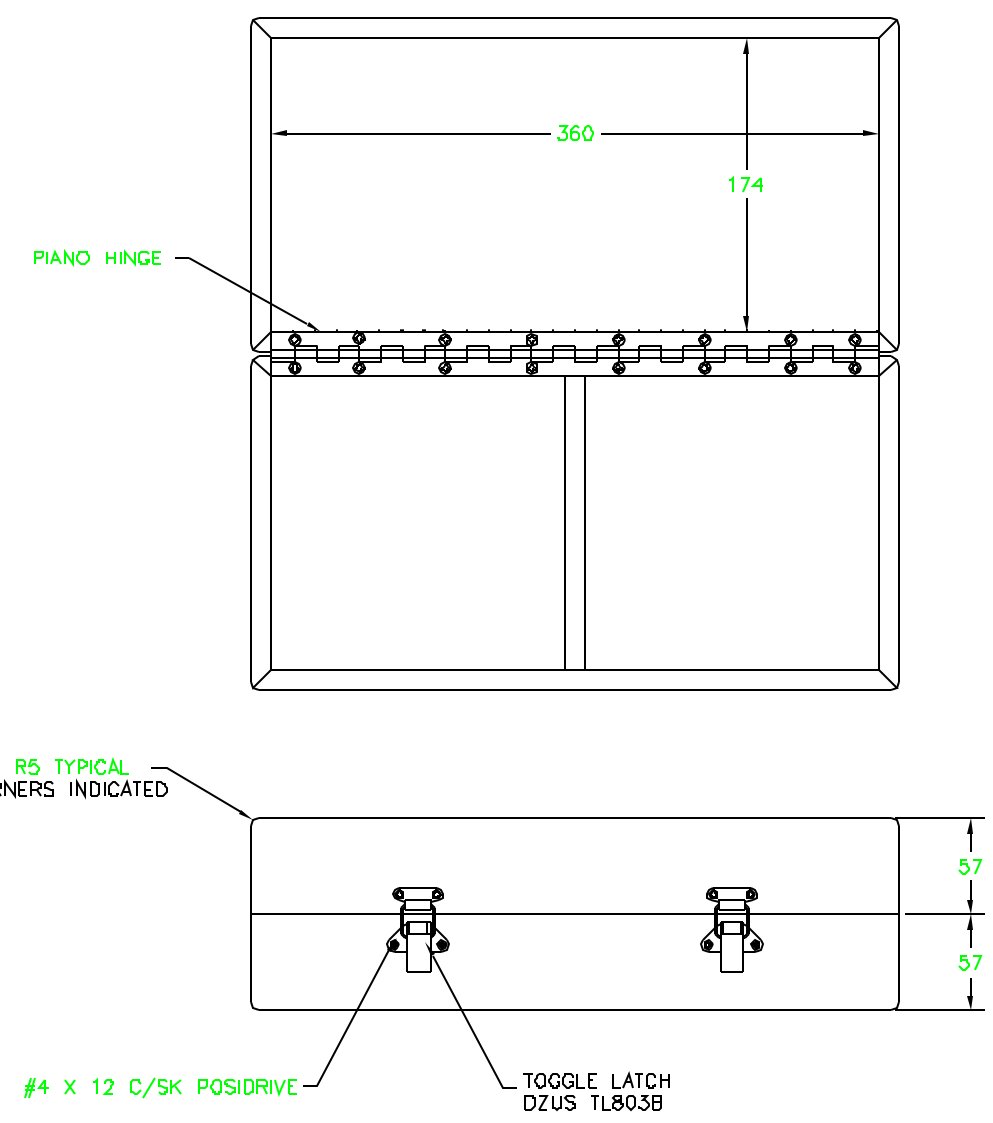
TITLE: SHIP CRATE ASSY MODEL: 3473

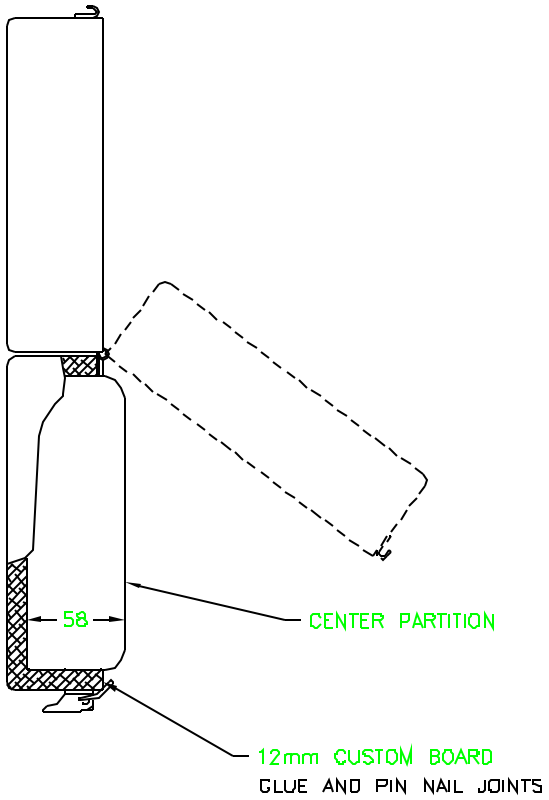
NEXT ASSY 3473 | SYSTEM
SOFTWARE AUTOCAD 13

SIZE A1 | DRAWING NO. 18800361 | REV D
SCALE 1:4 | SHEET 1 OF 1

REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		08/01/94	A.MARTIN
B	CORRECT TOGGLE LATCH VIEW [INVERT]		08/17/99	G.DOUGLAS





ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
PARTS LIST				

DRAWN A.MARTIN DATE 08/01/94
CHECK DATE
ENGINEERING DATE
NEXT ASSY 3473 SYSTEM
SOFTWARE AUTOCAD 13

DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES UNLESS OTHERWISE SPECIFIED

LINEAR	INCHES	mm
X.XXX	±.005	±0.05
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	64	1.6

THIRD ANGLE PROJECTION

GMW
P.O Box 2578, Redwood City, CA 94064
Tel: (650)802-8292. Fax: (650)802-8298.

TITLE
POLE PACKING BOX
3473 POLE CAP PAIR

SIZE A2 | DRAWING NO. 18800410 | REV B

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