USER'S MANUAL

MODEL: 5403EG

76MM ELECTROMAGNET

Date Sold: _____

Serial number: _____

GMW *955 Industrial Road, San Carlos, CA 94070 Tel: (650) 802-8292 Fax: (650) 802-8298*
Web site: http://www.gmw.com

TABLE OF CONTENTS

Section 1
SPECIFICATIONS
Table 1. Model 5403EG Specifications

Pole diameter:	76mm (3 inch)
Pole gap: [fixed, adjustable with spacers]	40mm (1.6 inch) minimum 150mm (5.9 inch) maximum
Standard Pole Face:	76mm (3 inch) cylindrical 38mm (1.5 inch) tapered
Coils (series connection)	
coil resistance (20°C)	0.45 Ohm
max resistance (hot)*	0.55 Ohm
max power (continuous, with convection air-cooling)	20A/10V (200W)
max power (peak, with convection air-cooling, intermittent operation)	75A/40V (3.0kW)
duty cycle (at peak power)	7% duty cycle, 20 sec max on
Self Inductance	60mH
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.
Dimensions	Drawing 11901050 582mm W x 270mm D x 359mm H 22.9 inch W x 10.6 inch D x 14.1 inch H
Weight	124 kg (275 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 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.

3 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!

4 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.

5 Coil Hot Resistance

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

6 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.

7 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.

Table 2. Model 5403EG Electrical and Water Connections

DC Current (as seen from the rear refer to Drawing 11901050)

Right hand terminal:	Positive
Left hand terminal:	Negative

Ground

An M6 screw (Item 16 on drawing 11901050) is inside the terminal cover 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 11901050).

The temperature interlock wiring connections are made directly onto the temperature thermostats (Item 10 on drawing 11901050).

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 3

INSTALLATION

Caution: This is a heavy system. All movement, lifting and installation of the 5403EG 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 18800282).

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. Grip the side panels of the Crate Top Cover. Lift "Crate Top Cover" high enough to clear top of electromagnet, walk cover sideways to a 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 M12 Hex Head Coach Bolts that secure the magnet to the shipping crate base".

6. Install M10 lifting eye and washer to top of magnet yoke, screw down firmly.

7. The magnet is now prepared for final installation. Follow the appropriate procedure for direct or base mounting listed below.

Direct Mounting

1. With suitable lifting equipment e.g. 250kg (550 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 bolt magnet down through the four mounting holes provided in the magnet angle bracket (Item 8 on drawing 11901050).

Pole Installation and Setting Pole Gap (Refer to drawing 11901050).

The 5403EG Electromagnet is designed for applications requiring a relatively small Electromagnet with a large pole gap of over about 40mm with a large Coil spacing of 150mm. For smaller gaps the Model 5403 Electromagnet should be considered.

Pole removal (refer to drawing 11901050).

1. Turn off the power supply.
2. Loosen and remove the four pole retaining bolts and washers (item 12 & 18 on drawing 11901050).
3. Remove the pole taking care that the pole face is not damaged by contacting the magnet yoke.
4. Repeat this operation for the other pole.

Pole fitting (refer to drawing 11901050).

1. Ensure the poles and pole sleeves are clean and free from debris.
2. Slide on a pole spacer of the appropriate thickness to achieve the desired pole gap.
3. Reverse the above pole removal sequence above.

Electrical Circuit

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

The magnet has two coils which are connected in series, (Refer to drawing 11901050). The power supply cables should be connected directly to the dc current terminals marked + and -. Recommended current cable for the 5403EG is stranded copper of 16mm² cross section (4 AWG).

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

The 5403EG Interlocks

The Model 5403EG has two thermostats, Elmwood 3450G Part Number 3450G611-1 L50C 89/16. They are located on the center coil cooling plate and wired in series. The thermostats are normally closed, opening when the coil central cooling plate temperature exceeds 50°C +/3°C.

Cooling

The Model 5403EG has convection air-cooled coils and can be operated to an average coil temperature of 70°C. Assuming an ambient laboratory temperature of 20°C and a temperature coefficient of resistivity for copper of 0.0039/°C, the hot resistance of the coil should not exceed 20% more than the ambient temperature "cold" resistance. The coil thermostat will open when either coil temperature exceeds 50°C

In a typical laboratory environment the Model 5403EG can be operated continuously within the allowed coil temperature with excitation currents to about 20A. The power dissipation is about 20A at 10V or 200W. If forced air cooling is provided by an external fan (or fans) this current may be increased to about 25A.

For intermittent operation the Model 5403EG can be excited at currents to about 75A to achieve higher fields. For convection air cooling the average power should be limited to about 200W and the on-period should be limited to about 60,000W.s (Joule). For example, at an excitation current of 75A with a terminal voltage of 40V (3000W) the on time should be limited to about 20 seconds. To maintain the average power at less than 200W, the on-off duty cycle has to be less than about 7%.

During operation the resistance can be checked using a voltmeter across the series-connected coils. The instantaneous voltage divided by the instantaneous current should be less than the maximum resistance of 0.55 Ohm.

Section 4

OPERATION

General

The magnet operates as a conventional electromagnet.

1. Set the poles to the desired gap using the appropriate thickness Pole Spacer. Use equal spacers on each pole to maintain the pole faces symmetrical about the magnet center line. The minimum gap with standard poles in 40mm.

2. 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 teslameter 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).

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).

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

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

Be very careful not to damage the relatively soft pole surface since this may degrade the magnetic field uniformity in the gap.

Section 6

STANDARD OPTIONS

PROPRIETARY

TOP VIEW

NOTE: ROTATING BASE SHOWN AT THE 180° POSITION

FRONT

620 [24.4]

620 [24.4]

FRONT VIEW

214 [8.4]

UNDERNEATH VIEW

SPOOL ASSY WITH OVERLOAD CLUTCH

GROMMET MOUNTED ON REAR SKIRT

STEPPER MOTOR ELECTRICAL CONNECTIONS

SIDE VIEW

ZERO BUTTON

MECHANICAL STOPS

HOMING MICROSWITCH (0 DEG POSITION)

DISENGAGE LEVER RELEASES MOTOR DRIVE

RELEASE PINS USED TO REMOVE MOTOR DRIVE ASSY FROM ROLLING/ROTATING BASE ASSY

25 [1.0]

55 [2.1] SPOOL CLEARANCE

135 [5.3] SERVICE ACCESS

NOTE: ROTATING BASE SHOWN AT THE 180° POSITION

REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		07/15/98	G.DOUGLAS
B	CORRECT 45° M10 HOLES LOCATION		10/29/98	G.DOUGLAS

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
13	1		GROMMET 25MM OD X 20MM ID	
12	2	SBNH-ION	BALL PLUNGER, M8 S/S	
11	1	DIN 433	WASHER, FLAT M8 X 1.6 S/S	
10	5	BN-792	WASHER, M8 X XX RIBBED SPRING/STEEL	
9	6	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	1090D181	RELEASE/ENGAGE LABEL	
4	2	17901220	BASE PLATE GUIDES	
3	1	11900B20	SPOOL ASSY	
2	1	11900B10	MOTOR DRIVE ASSY	
1	1	11900B80	ROLLING/ROTATING BASE ASSY	

PARTS LIST

DRAWN	G.DOUGLAS	07/15/98
CHECK		
ENGINEERING		

DO NOT SCALE FROM DRAWING. DIMENSIONS & TOLERANCES UNLESS SPECIFIED

11900800	5403	
11900500	3472	
11900B09	3473	
NEXT ASSY	SYSTEM	

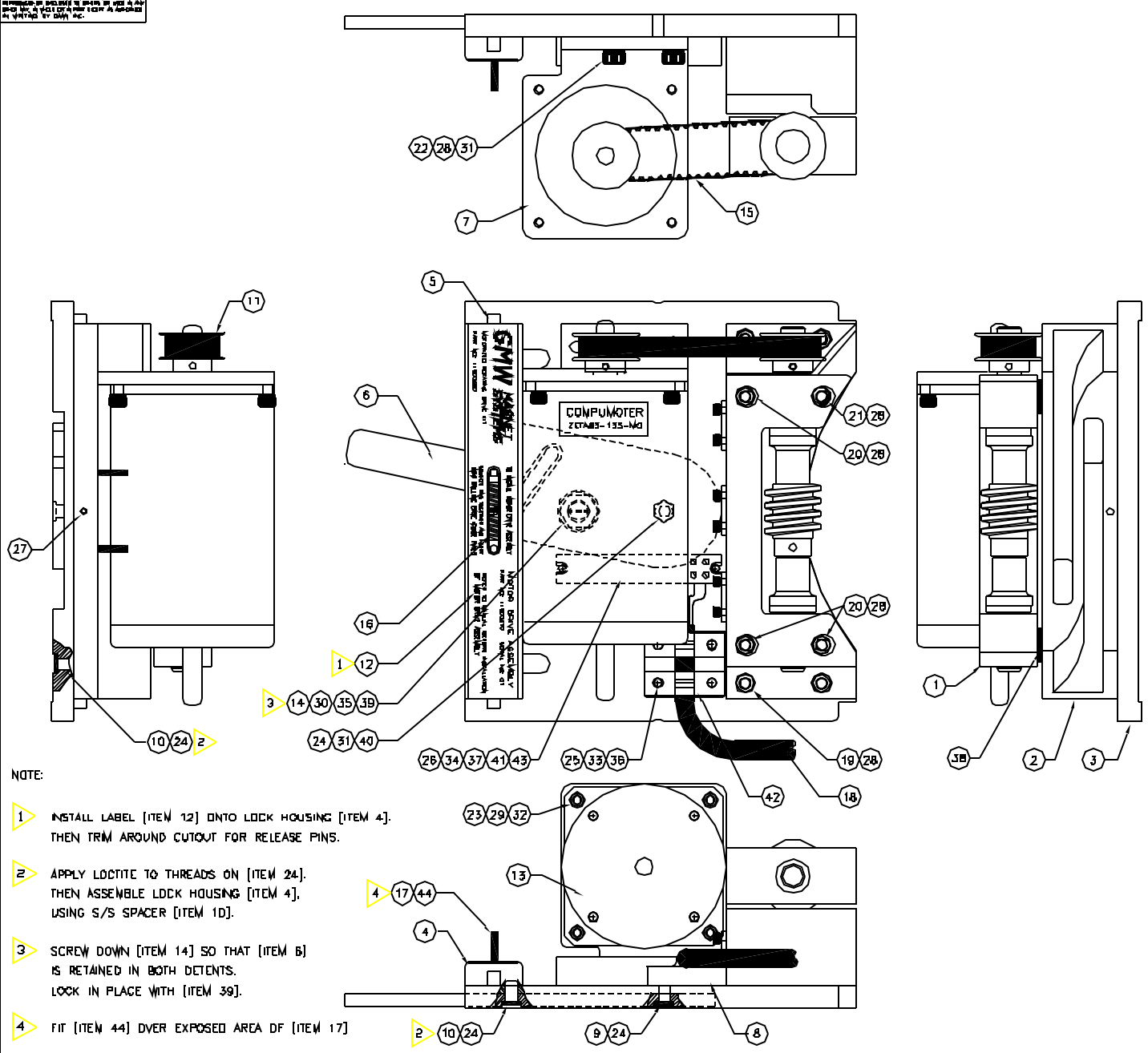
SOFTWARE AUTOCAD 13

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

TITLE: MOTORIZED ROT. DRIVE 3473/3472/5403

SIZE	DRAWING NO.	REV
A1	11900800	B

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



PROPRIETARY

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		07/07/97	G.DOUGLAS
B	ADD ITEMS 43,44, CHG NOTES, ITEM 13		11/28/97	G.DOUGLAS
C	CHG ITEM 11,44, ADD NOTE: 4		04/07/98	G.DOUGLAS

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 1.5 S/S	
30	1	DIN 433	WASHER, FLAT M10 X 1.6 S/S	
29	4	BN 792	WASHER, M3 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	HI	SPRING, COMPRESSION, 6MM DIA X 30L	
15	1	T820EF6-50	BELT, TIMING, BERG 10" [250MM]	
14	1	SBMH-10N	BALL PLUNGER, M6	
13	1	12900D52	MOTOR, STEPPER, COMPUMOTER	
12	1	10900D70	LABEL, SPECIFICATION	
11	1	12900D42	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	17901D60	MOTOR MOUNT	
6	1	17901D51	DISENGAGE LEVER [For Model 3473 base]	
5	2	17901D40	LOCK BAR	
4	1	17901D30	LOCK HOUSING	
3	1	17901D10	BASE PLATE	
2	1	11900B40	STOP BLOCK ASSEMBLY	
1	1	11900B50	WORM MOUNT ASSEMBLY	

PARTS LIST

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]

DRAWN G.DOUGLAS 07/07/97
CHECK
ENGINEERING
DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES PER ASME Y14.5M-1994
UNLESS OTHERWISE SPECIFIED

11900800	3403		
11900800	3472		
11900800	3473		

NEXT ASSY | USED ON

SOFTWARE AUTOCAD 13

THIRD ANGLE PROJECTION

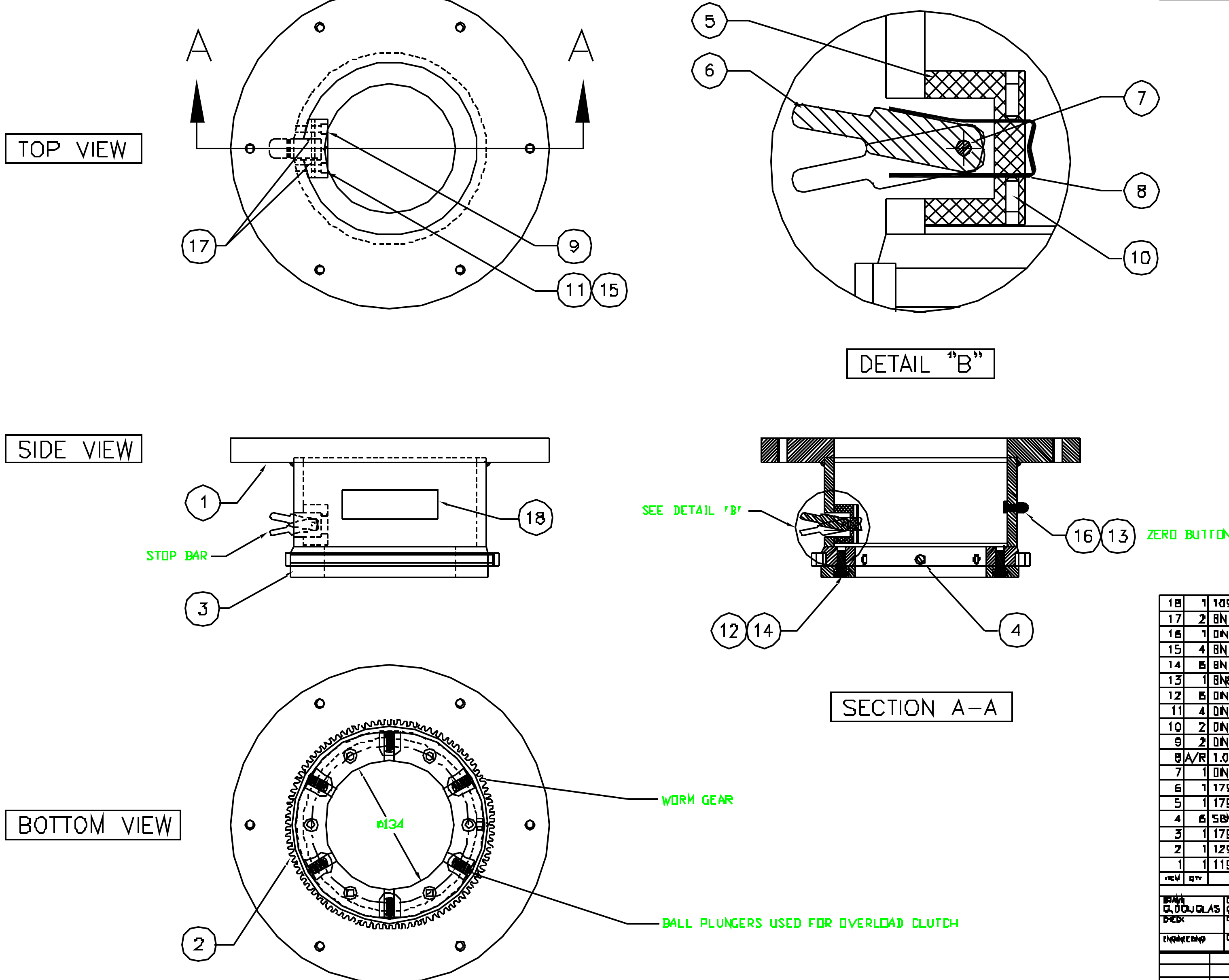
GMW
P.O. Box 2578, Redwood City, CA 94064
Tel: (650)802-8292, Fax: (650)802-8298

TITLE
MOTORIZED,ROT,DRIVE
MOTOR DRIVE ASSY

SIZE A1 | DRAWING NO. 11900810 | REV C

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

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



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 M6 X 1.2	
14	6	BN 792	WASHER, LOCK M8 X 1.4	
13	1	BN80	BOLT, M6 X 16 HEX NYLON	
12	6	DIN 912	SHCS M8 X 16 S/S	
11	4	DIN 912	SHCS M6 X 25 S/S	
10	2	DIN 913 A2	SHSS M3 X 10 S/S	
9	2	DIN 913 A2	SHSS M4 X 12 S/S	
8	A/R	1.0MM	PIANO WIRE S/S	
7	1	DIN 6325	DOWEL PIN, M6 X 60	
6	1	17901090	STOP BAR	
5	1	17901100	STOP BAR GUIDE	
4	6	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 04/21/97
CHECK DATE
ENGINEERING DATE

DO NOT SCALE FROM DRAWING

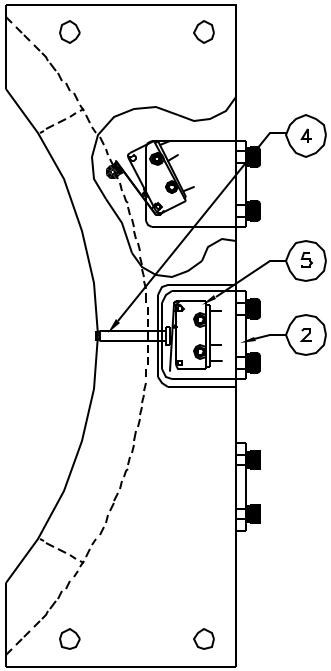
GMW
P.O. Box 2578, Redwood City, CA 94064
Tel: (650)802-8292. Fax: (650)802-8298.

TITLE
MOTORIZED,ROT,DRIVE SPOOL ASSEMBLY

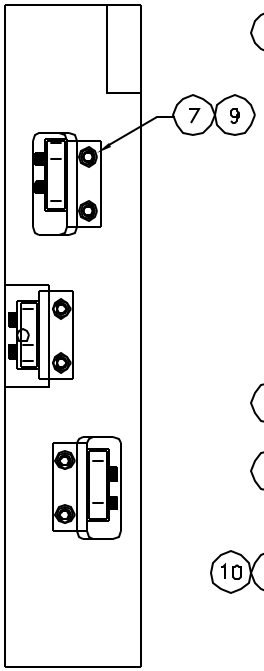
11900800
NEXT ASSY | SYSTEM
SOFTWARE AUTOCAD 13
THIRD ANGLE PROJECTION

SIZE A1 | DRAWING NO. 11900820 | REV B
SCALE 1:2 | SHEET 1 OF 1

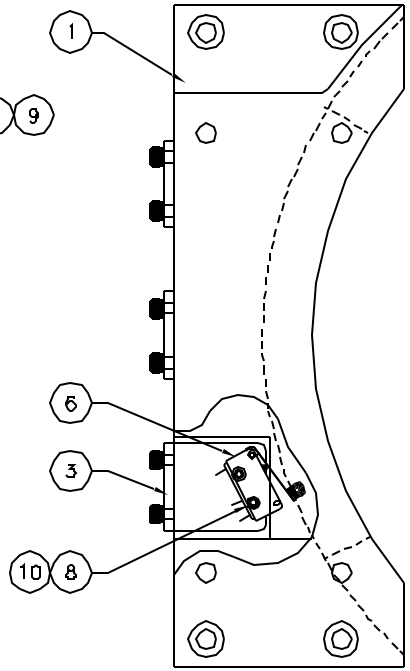
REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		07/07/97	G.DOUGLAS



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	±0.05
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	64	1.6

THIRD ANGLE PROJECTION

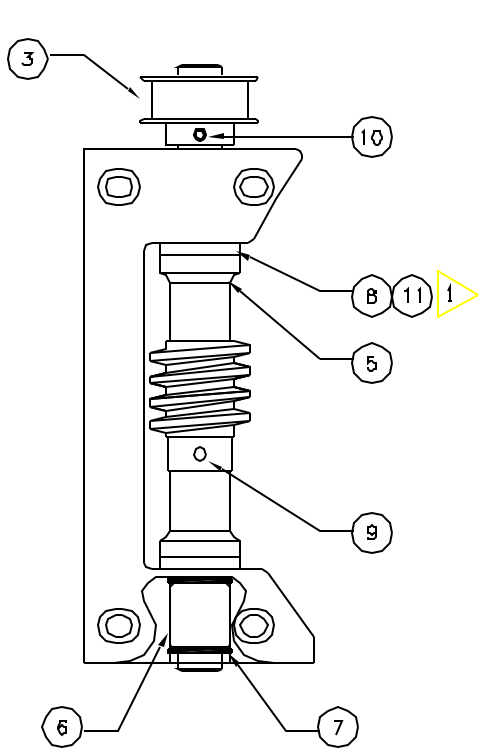
GMW
P.O Box 2578, Redwood City, CA 94064
Tel: (650)802-8292. Fax: (650)802-8298.

TITLE
MOTORIZED.ROT.DRIVE
STOP BLOCK ASSY

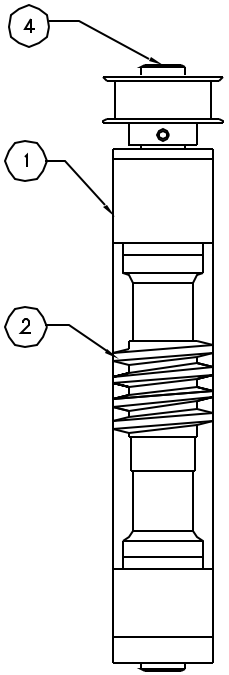
SIZE	DRAWING NO.	REV
A2	11900840	A

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 74B	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	±0.05
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.

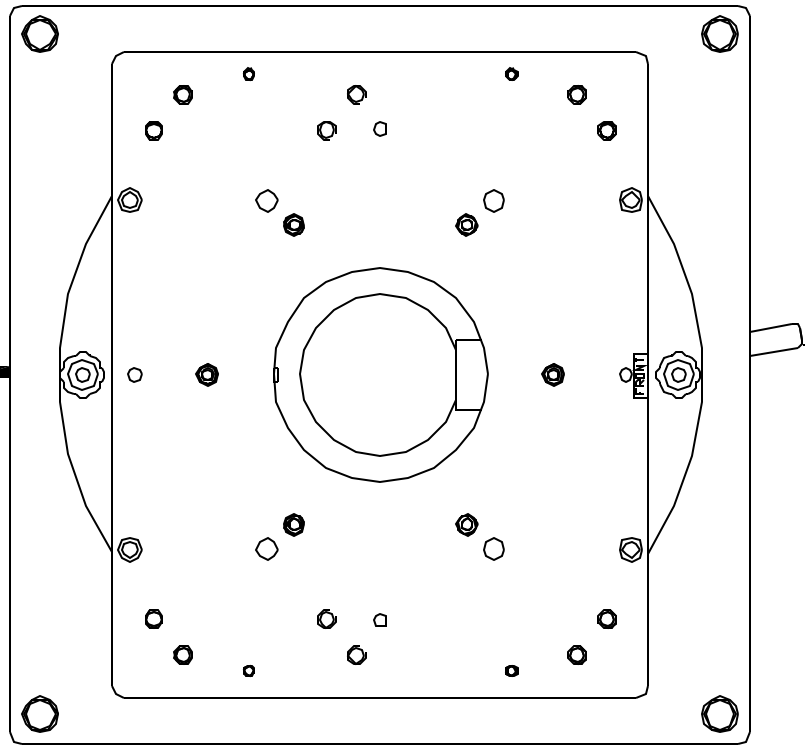
TITLE
MOTORIZED.ROT.DRIVE WORM MOUNT ASSY

SIZE	DRAWING NO.	REV
A2	11900850	C

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

PROPRIETARY

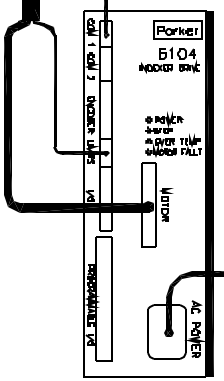
TOP VIEW



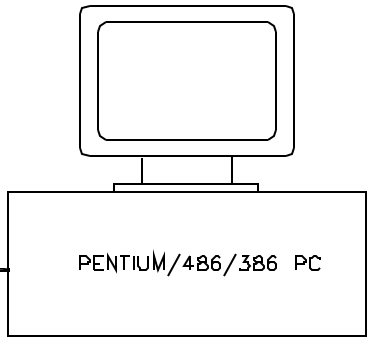
MOTOR AND LIMIT SWITCH CABLE PART NO 16900400

SERIAL COMMUNICATIONS CABLE PART NO 16900410

AC POWER INPUT



STEPPER MOTOR CONTROLLER



CONTROL COMPUTER

REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		07/17/98	G.DOUGLAS

PARTS LIST

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE

DRAWN G.DOUGLAS 07/17/98
CHECK
ENGINEERING
DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES PER ASME Y14.5M-1994
THIRD ANGLE PROJECTION
NEXT ASSY
SOFTWARE AUTOCAD 13

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

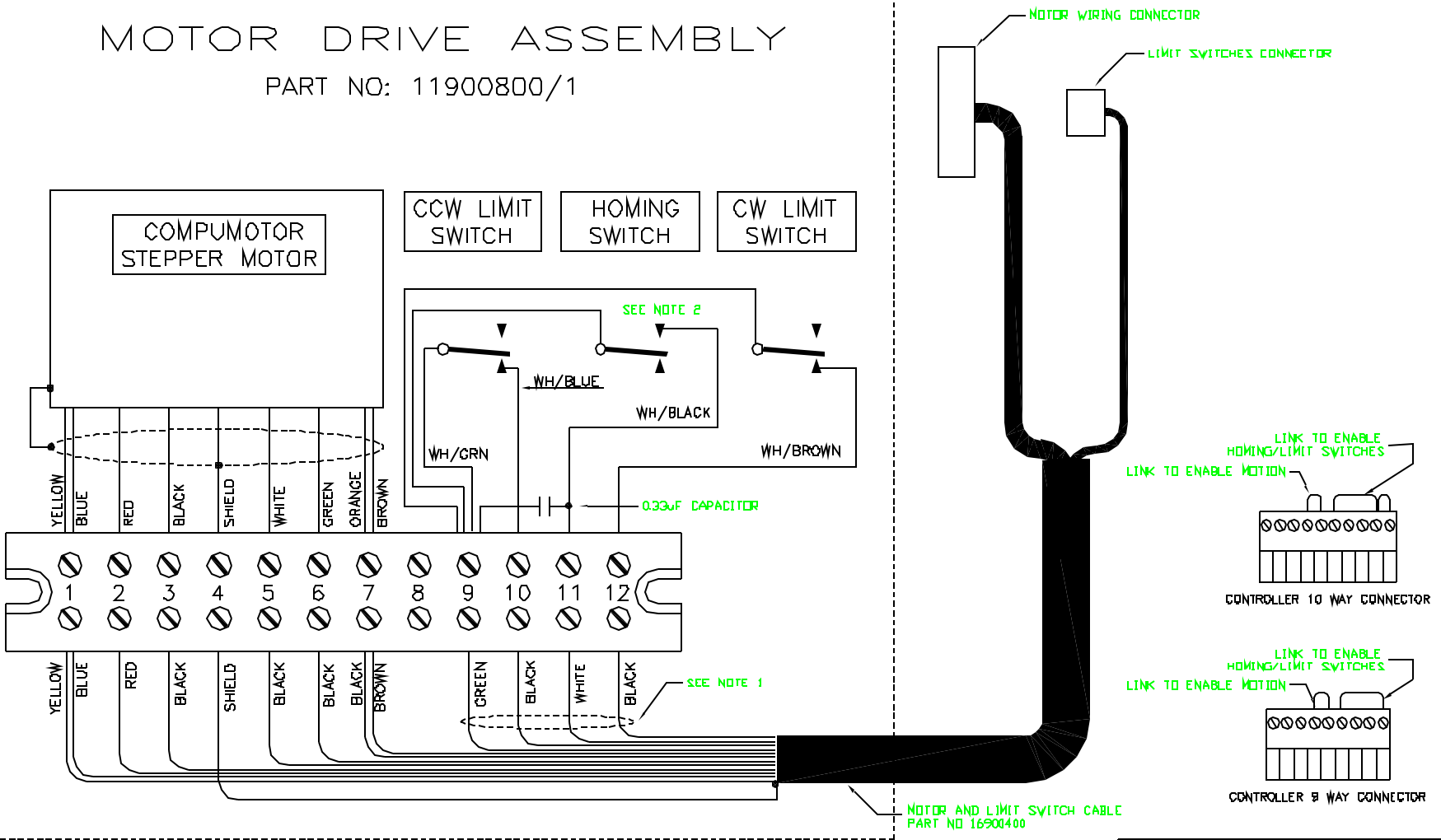
TITLE
MOTORIZED,ROT,DRIVE
ELECTRICAL ASSY

SIZE A1 | DRAWING NO. 11901020 | REV A
SCALE 1:2 | WT kg | SHEET 1 OF 1

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		07/11/91	G.DOUGLAS
B	ADD CONTROLLER CONNECTOR LINKING		11/12/91	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 07/11/91
CHECK
ENGINEERING
DO NOT SCALE FROM DRAWING
UNLESS OTHERWISE SPECIFIED

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

TITLE
MOTORIZED ROT. DRIVE ELECTRICAL WIRING

NEXT ASSY	SYSTEM
	5870

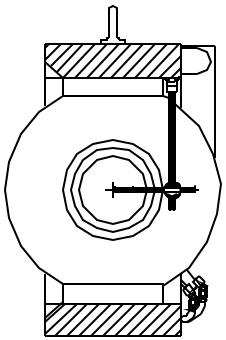
SOFTWARE AUTOCAD 13

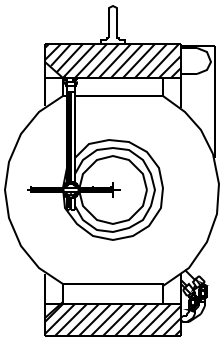
THIRD ANGLE PROJECTION

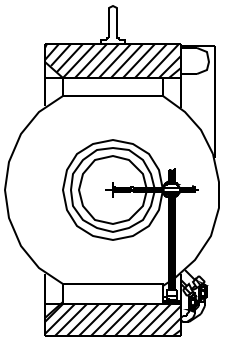
SIZE A1 DRAWING NO. 13900350 REV B

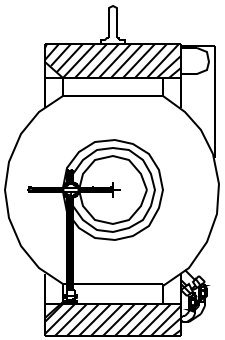
SCALE 2:1 WT kg SHEET 1 OF 1

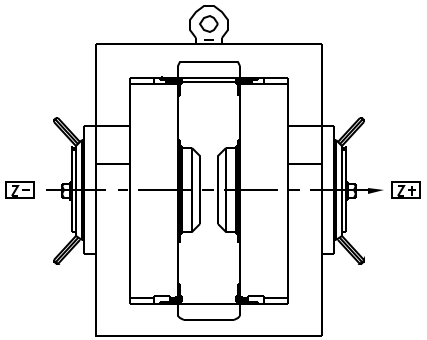
REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		09/11/98	G.DOUGLAS


TOP/REAR INSTALLATION

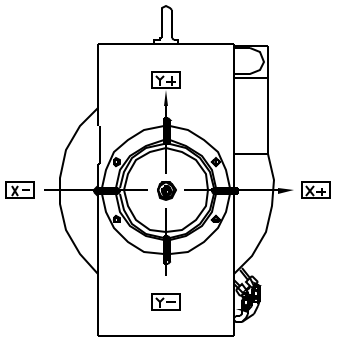

TOP/FRONT INSTALLATION


BOTTOM/REAR INSTALLATION


BOTTOM/FRONT INSTALLATION

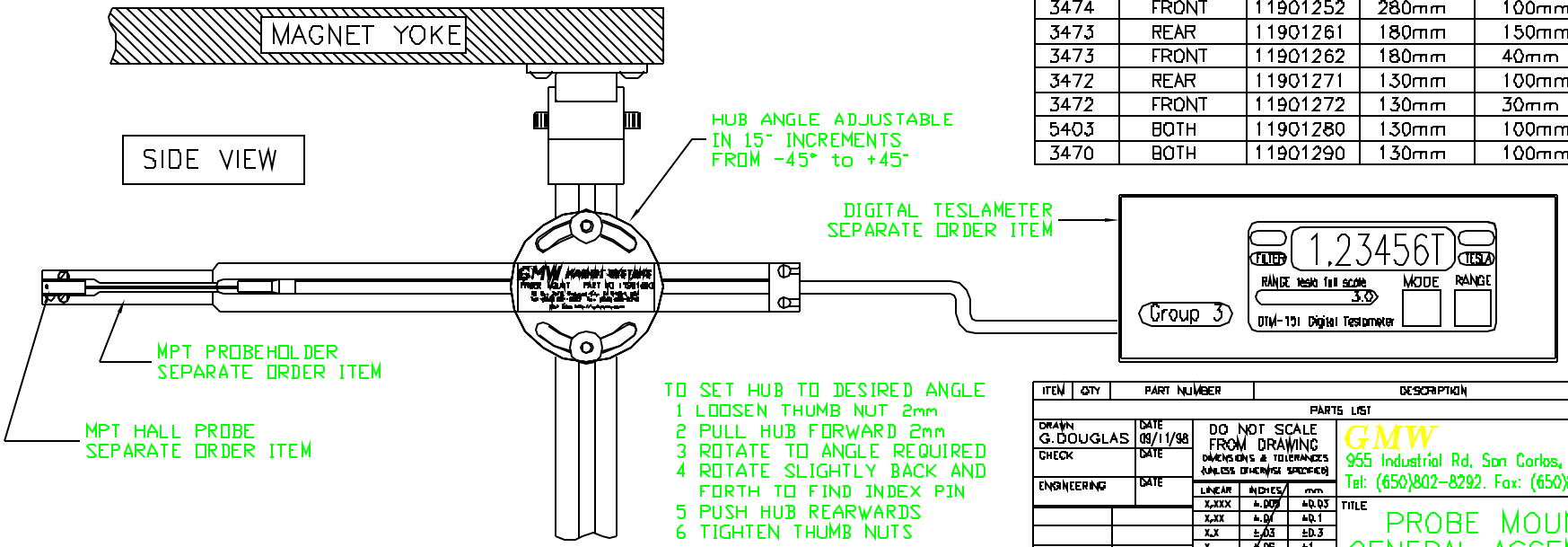


MAGNET FRONT VIEW



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

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
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

Section 7

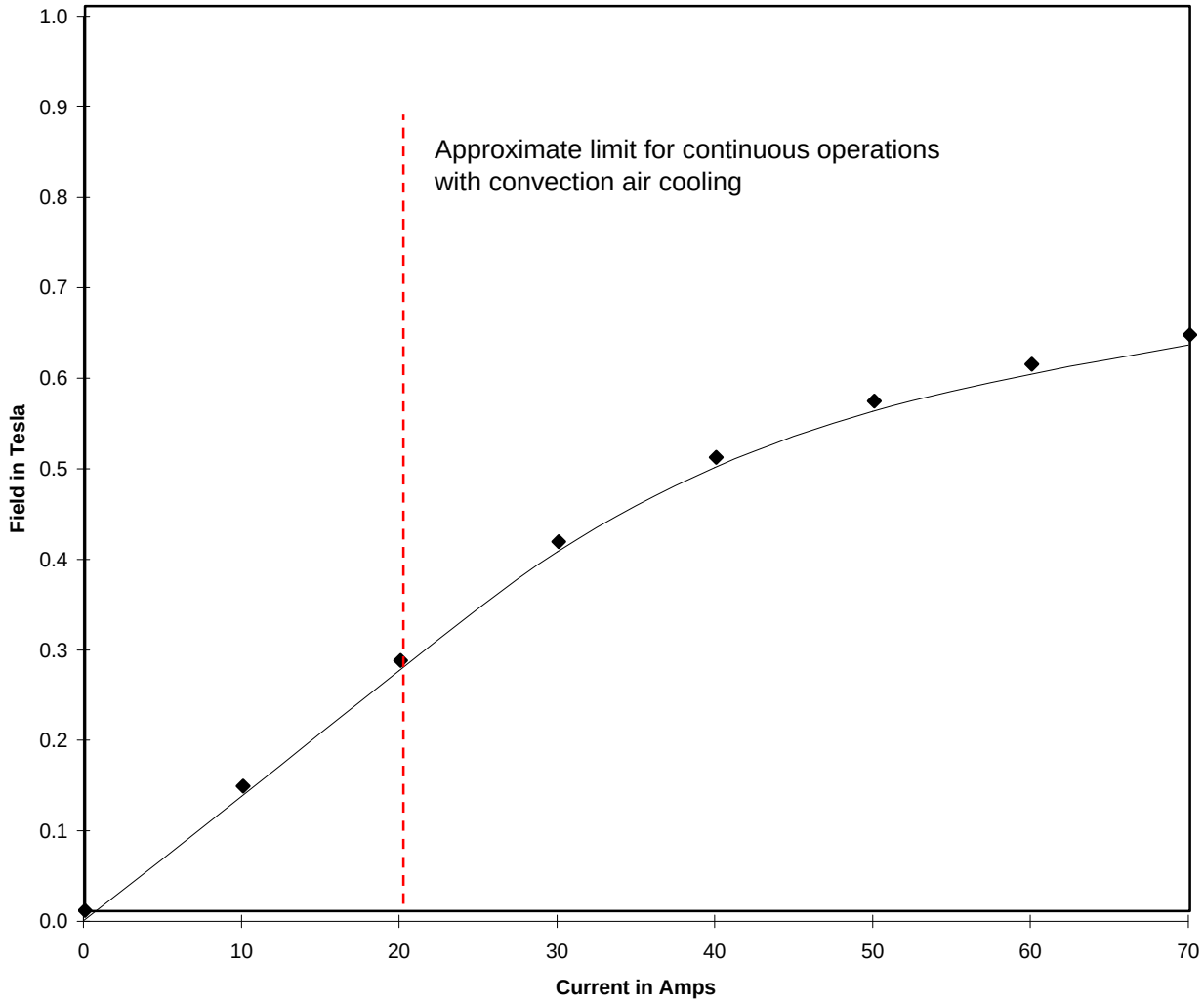
CUSTOM OPTIONS

Section 8

EXCITATION CURVES

GMW Associates
Electromagnet Excitation Plot
Current Vs Field

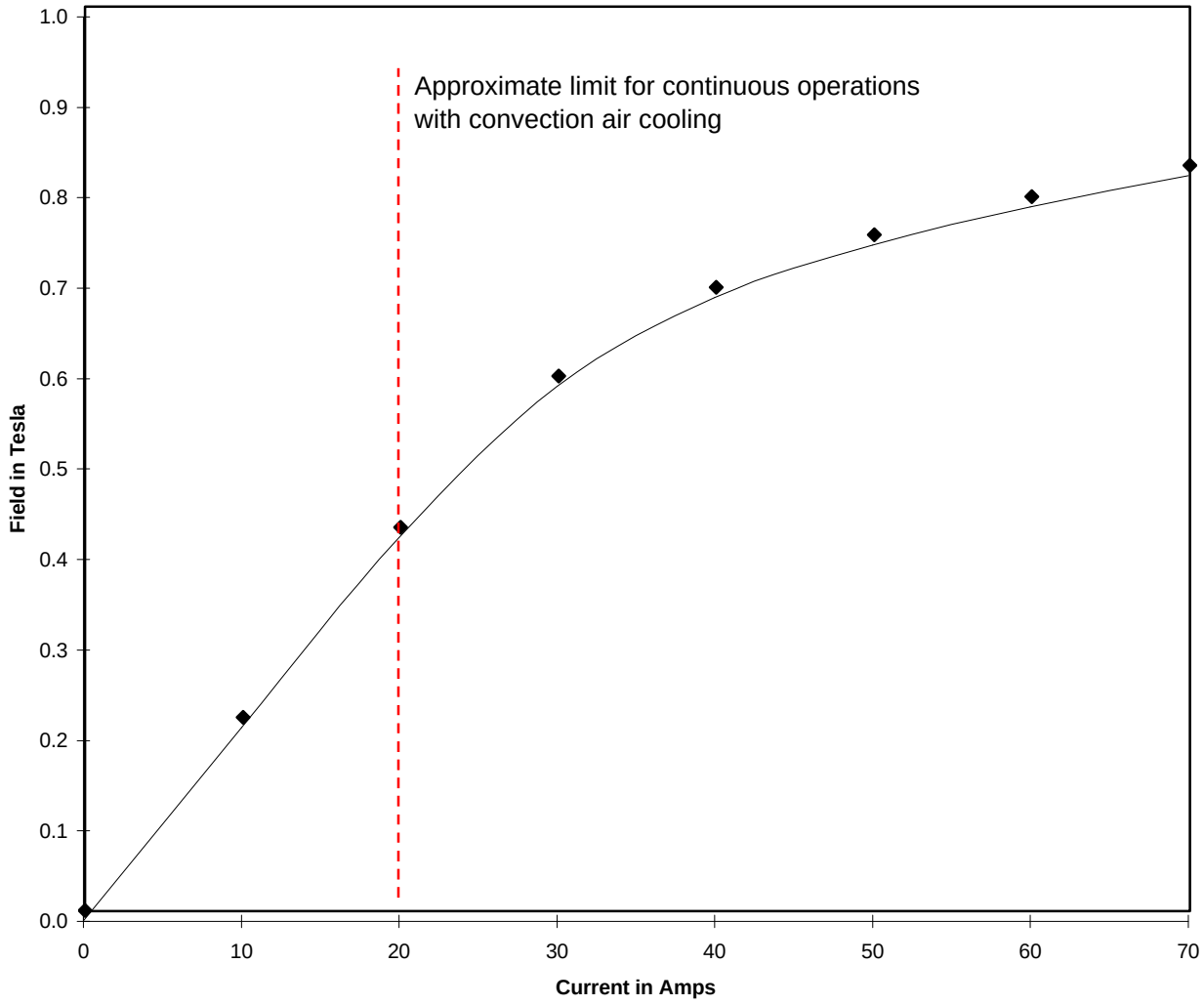
Contract No:		Page: 1 of 10		Date:	29 Jan, 98
Customer:				Engr:	E. Schulze
Model:	5403 EG	Power Supply:	P62B-4075	Set Current:	
Serial No:	01	Serial No:	1007626	Target Field:	
Pole Face:	76mm	Position:	X=0, Y=0, Z=0		
Serial No:	None	Notes:			
Pole Gap:	60mm				
Pole Spacers:	None				



Filename: 5403EG Ex 76-60

GMW Associates
Electromagnet Excitation Plot
Current Vs Field

Contract No:		Page: 6 of 10		Date:	03 Feb, 98
Customer:				Engr:	E. Schulze
Model:	5403 EG	Power Supply:	P62B-4075	Set Current:	
Serial No:	01	Serial No:	100726	Target Field:	
Pole Face:	76mm	Position:	X=0, Y=0, Z=0		
Serial No:	None	Notes:			
Pole Gap:	40mm				
Pole Spacers:	None				



Filename: 5403EG Ex 76-401

Section 9

TEST DATA

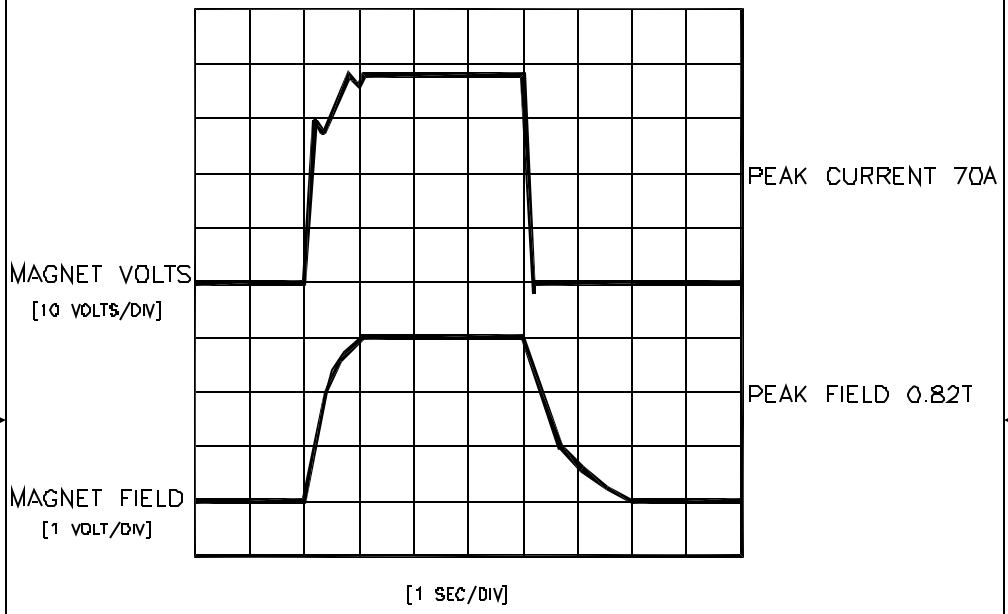
MEASUREMENT RESULT

ELECTROMAGNET

MODEL: 5403EG
SERIAL NO: 01
POLE CAP DIA: 76MM
POLE CAP: 40MM

POWER SUPPLY

MANUFACTURER: POWER TEN
MODEL: P62B-4075
SERIAL NO: 1007626
OUTPUT: 40 VOLTS @ 75 AMPS



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

DOCUMENT TITLE
AC RESPONCE
MODEL: 5403EG

DOCUMENT NO.	DOCUMENT REV.
88900002	A

MEASUREMENTS MADE BY	DATE	SERIAL NO.	PREPARED BY	DATE	APPLIES TO ASSY No.
E.SCHULZE	02/04/98		G.DOUGLAS	02/27/98	11901050
COMPANY			APPROVED BY	DATE	SHEET 1 OF 1
GMW ASSOCIATES					

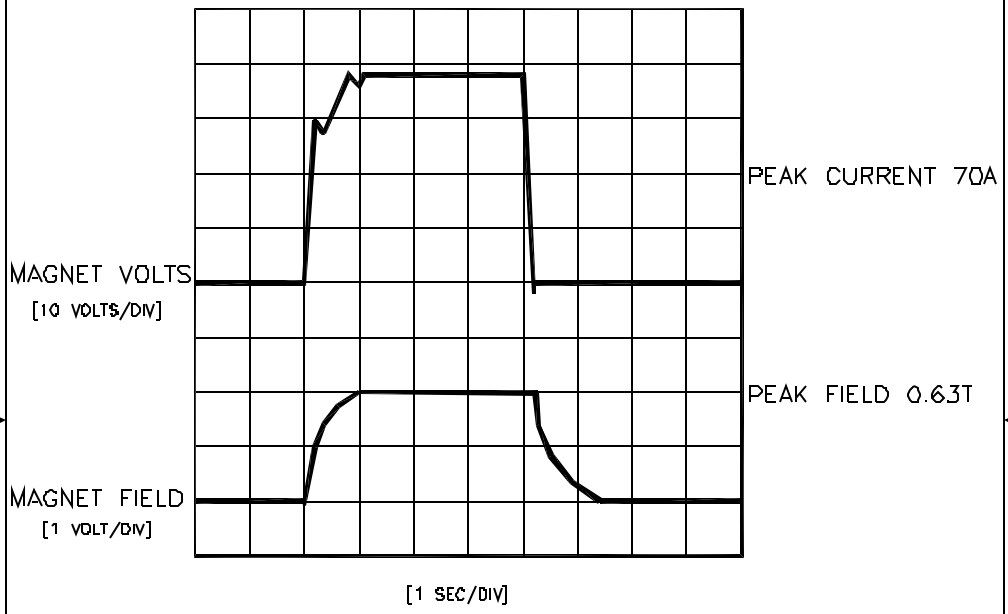
MEASUREMENT RESULT

ELECTROMAGNET

MODEL: 5403EG
SERIAL NO: 01
POLE CAP DIA: 76MM
POLE CAP: 60MM

POWER SUPPLY

MANUFACTURER: POWER TEN
MODEL: P62B-4075
SERIAL NO: 1007626
OUTPUT: 40 VOLTS @ 75 AMPS



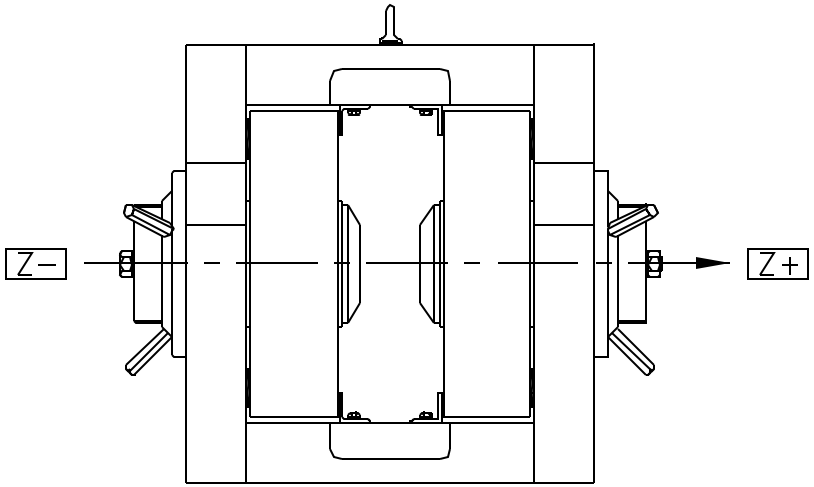
GMW
P.O. Box 2578, Redwood City, CA 94064
Tel: (650)802-8292. Fax: (650)802-8298

DOCUMENT TITLE
AC RESPONCE
MODEL: 5403EG

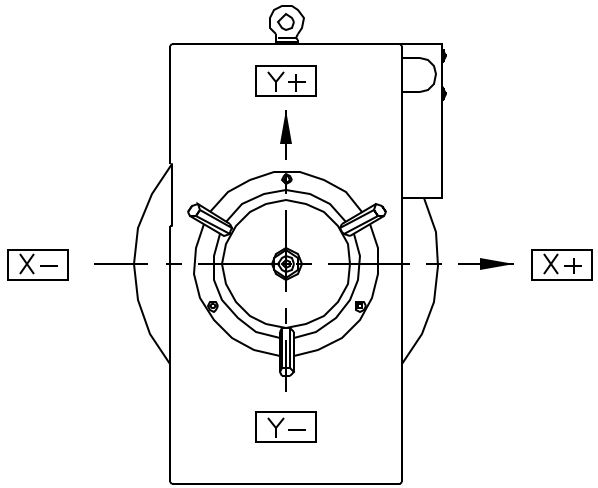
DOCUMENT NO.	DOCUMENT REV.
88900001	A

MEASUREMENTS MADE BY	DATE	SERIAL NO.	PREPARED BY	DATE	APPLIES TO ASSY No.
E.SCHULZE	02/04/98		G.DOUGLAS	02/27/98	11901050
COMPANY			APPROVED BY	DATE	SHEET 1 OF 1
GMW ASSOCIATES					

FRONT VIEW



SIDE VIEW

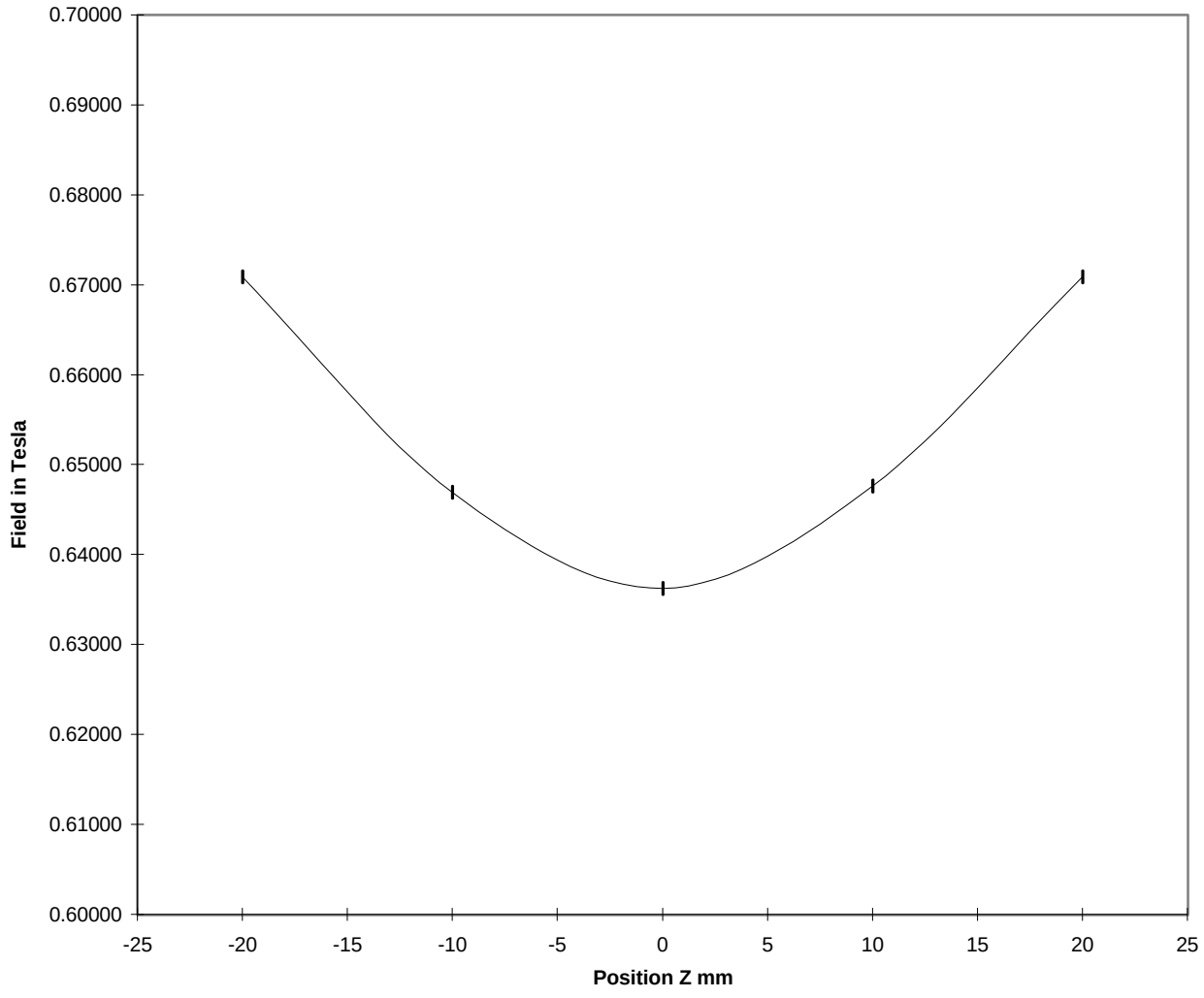


MAGNETIC PLOTTING AXIS

11901030	A	SHEET 1 OF 1

GMW Associates
Electromagnet Uniformity Plot
Field Vs Position

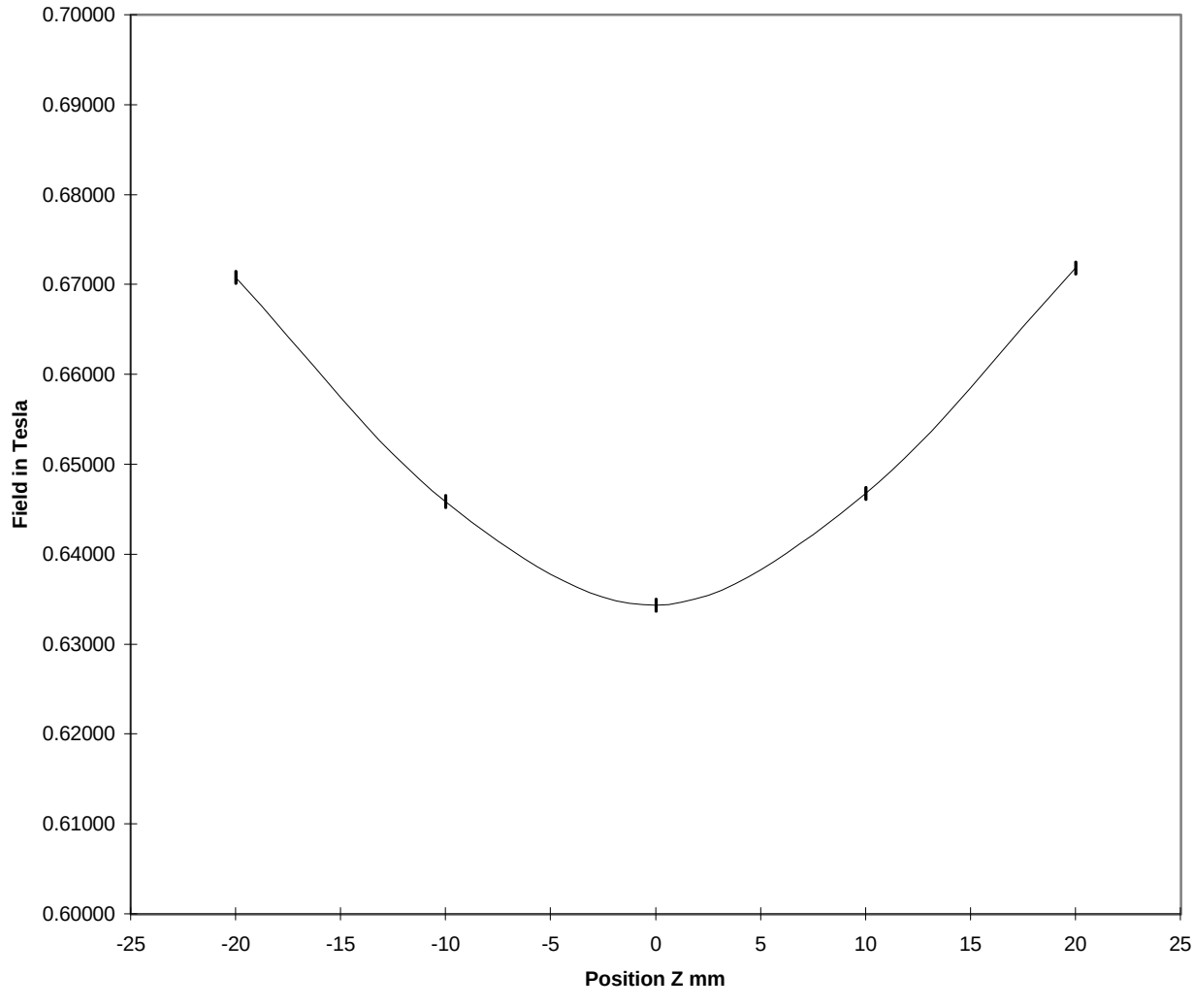
Contract No:		Page: 2 of 10		Date:	29 Jan, 98
Customer:				Engr:	E Schulze
Model:	5403 EG	Power Supply:	P62B-4075	Set Current:	70Amps
Serial No:	01	Serial No:	1007626	Target Field:	
Pole Face:	76mm	Fixed Axis:	X=0, Y=0		
Serial No:	None	Notes:			
Pole Gap:	60mm				
Pole Spacers:	None				



Filename: 5403 EG Un 70A Z 75-60.xls

GMW Associates
Electromagnet Uniformity Plot
Field Vs Position

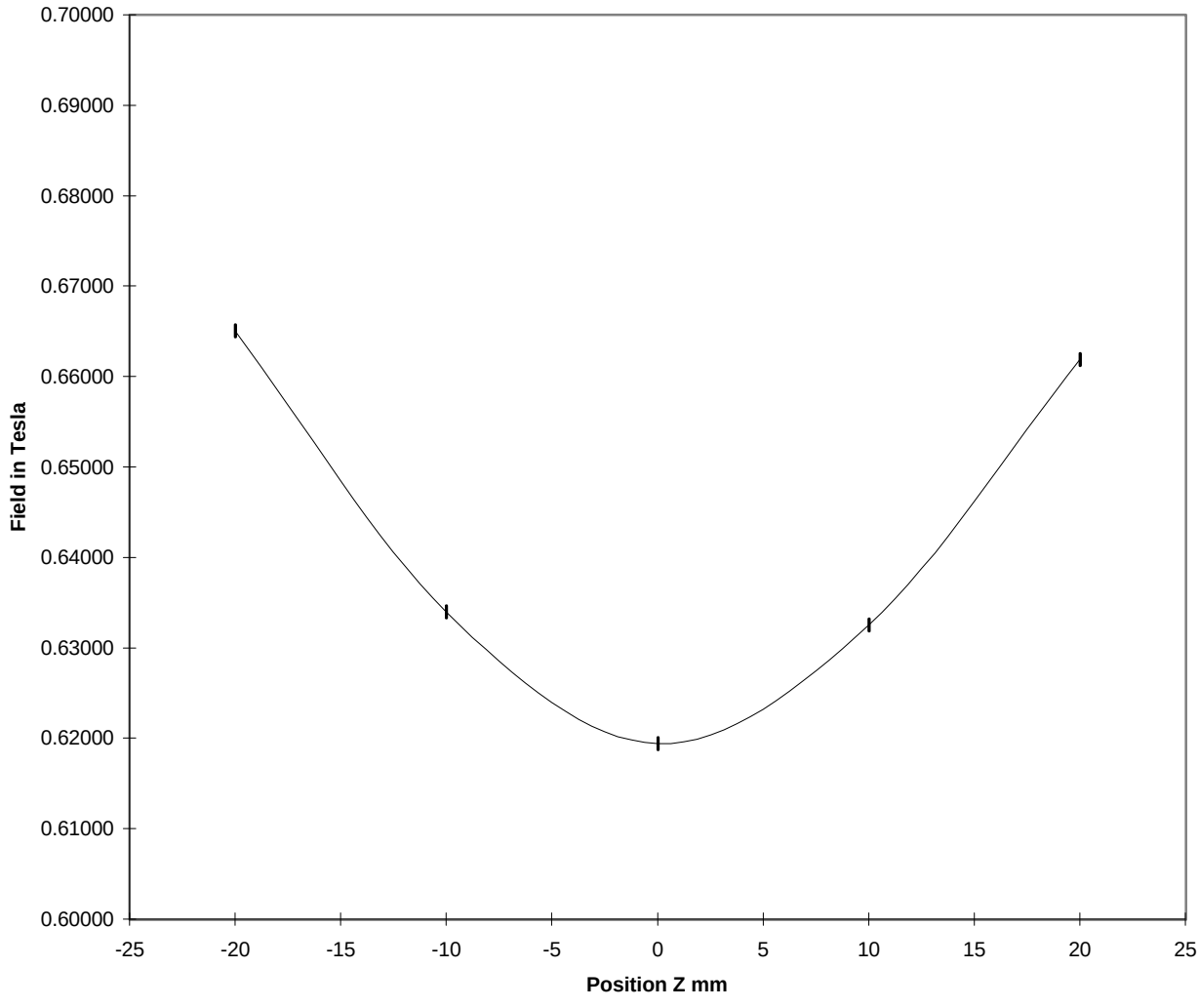
Contract No:		Page: 3 of 10		Date:	29 Jan, 98
Customer:				Engr:	E Schulze
Model:	5403 EG	Power Supply:	P62B-4075	Set Current:	70 Amps
Serial No:	01	Serial No:	1007626	Target Field:	
Pole Face:	76mm	Fixed Axis:	X=0 Y=5		
Serial No:	None	Notes:			
Pole Gap:	60mm				
Pole Spacers:	None				



Filename: 5403 EG Un 70A Z Y=5 X=0 75-60.xls

GMW Associates
Electromanget Uniformity Plot
Field Vs Position

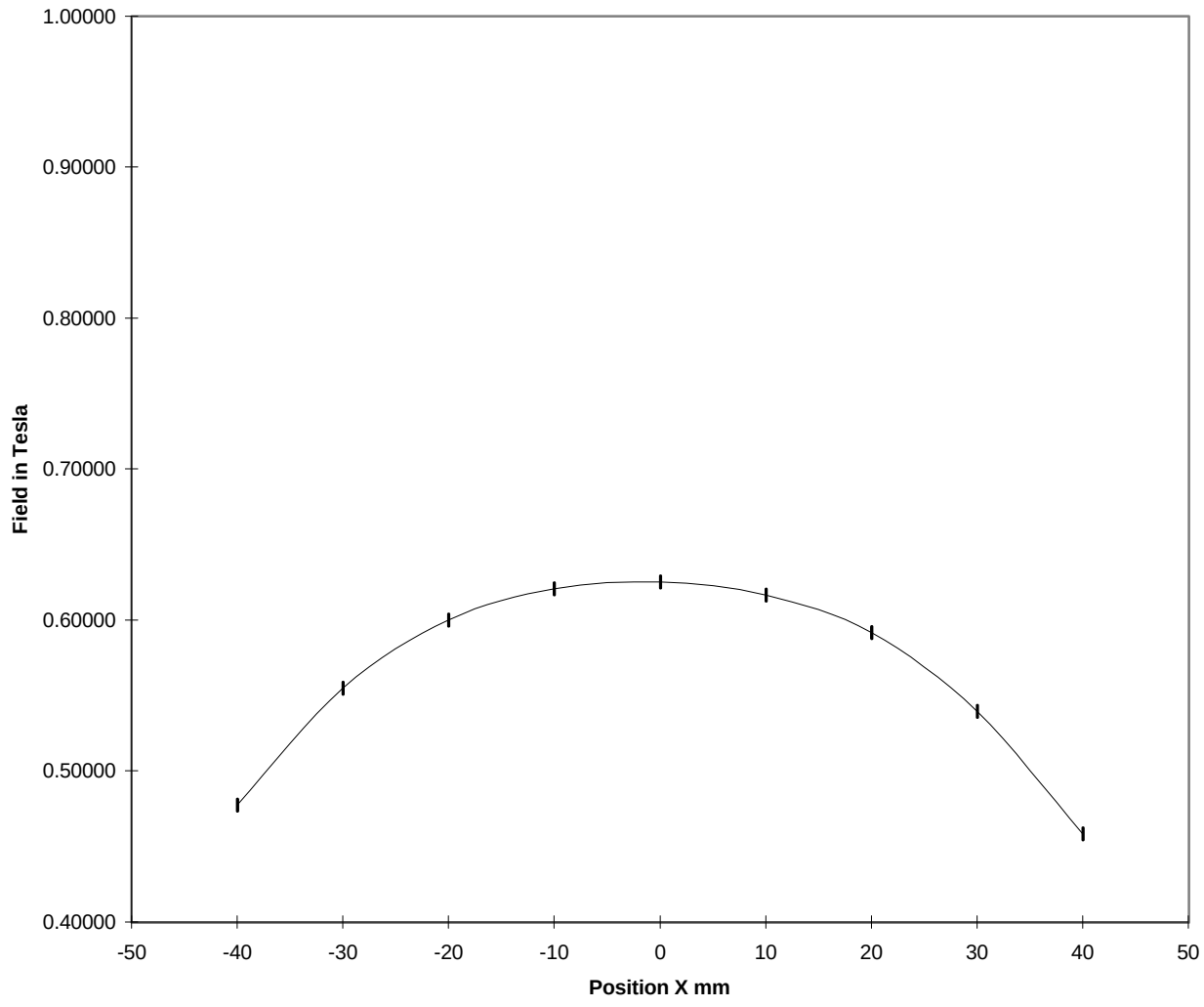
Contract No:		Page: 4 of 10		Date:	29 Jan, 98
Customer:				Engr:	E Schulze
Model:	5403 EG	Power Supply:	P62B-4075	Set Current:	70Amps
Serial No:	01	Serial No:	1007626	Target Field:	
Pole Face:	76mm	Fixed Axis:	X=0 Y=10		
Serial No:	None	Notes:			
Pole Gap:	60mm				
Pole Spacers:	None				



Filename: 5403 EG Un 70A Z Y=10 X=0 75-60.xls

GMW Associates
Electromagnet Uniformity Plot
Field Vs Position

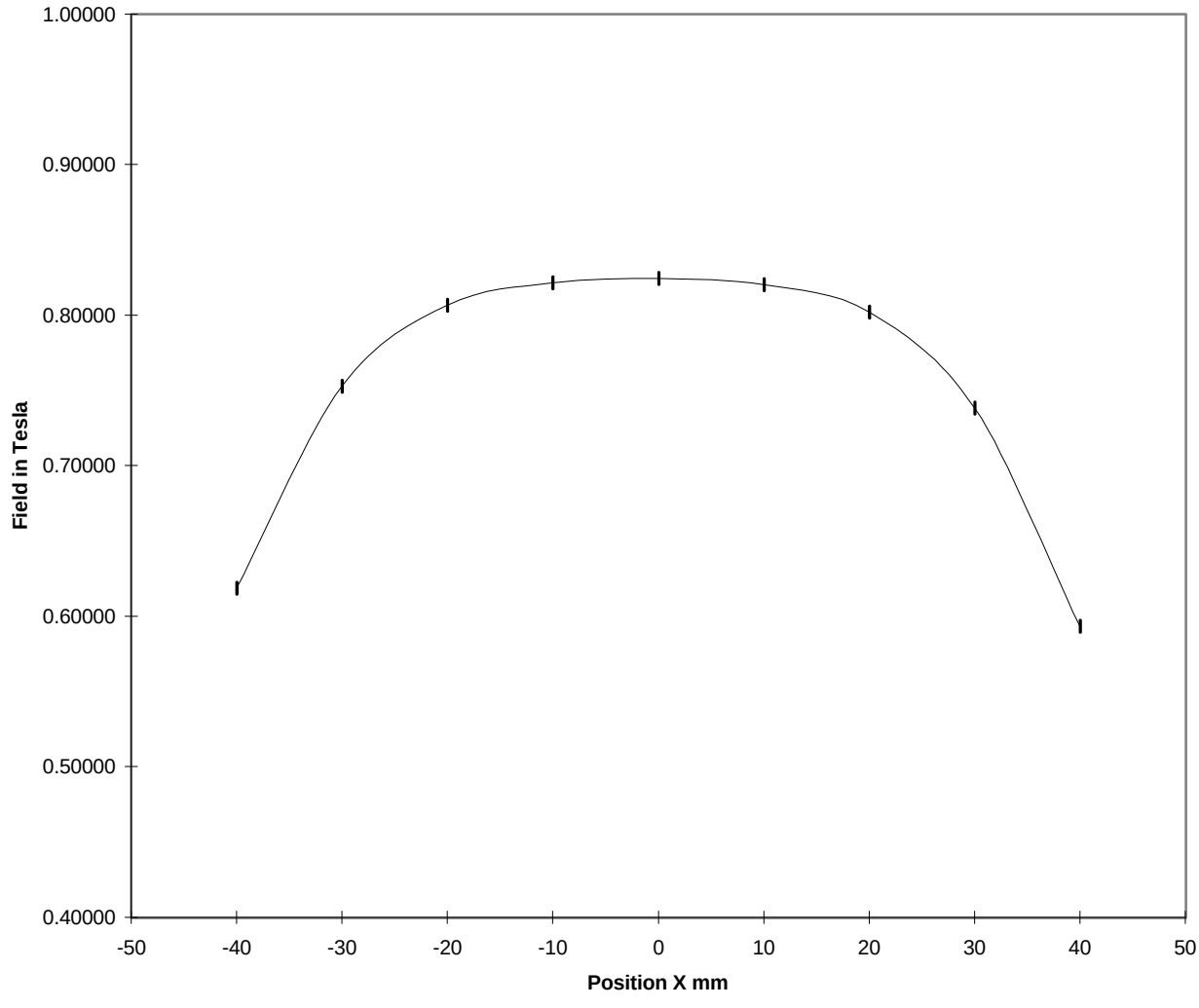
Contract No:		Page: 5 of 10		Date:	29 Jan 98
Customer:				Engr:	E Schulze
Model:	5403 EG	Power Supply:	P62B-4075	Set Current:	70 Amps
Serial No:	01	Serial No:	1007626	Target Field:	
Pole Face:	76mm	Fixed Axis:	Y=0 Z=0		
Serial No:	None	Notes:			
Pole Gap:	60mm				
Pole Spacers:	None				



Filename: 5403 EG Un 70A X Y=0 Z=0 75-60.xls

GMW Associates
Electromagnet Uniformity Plot
Field Vs Position

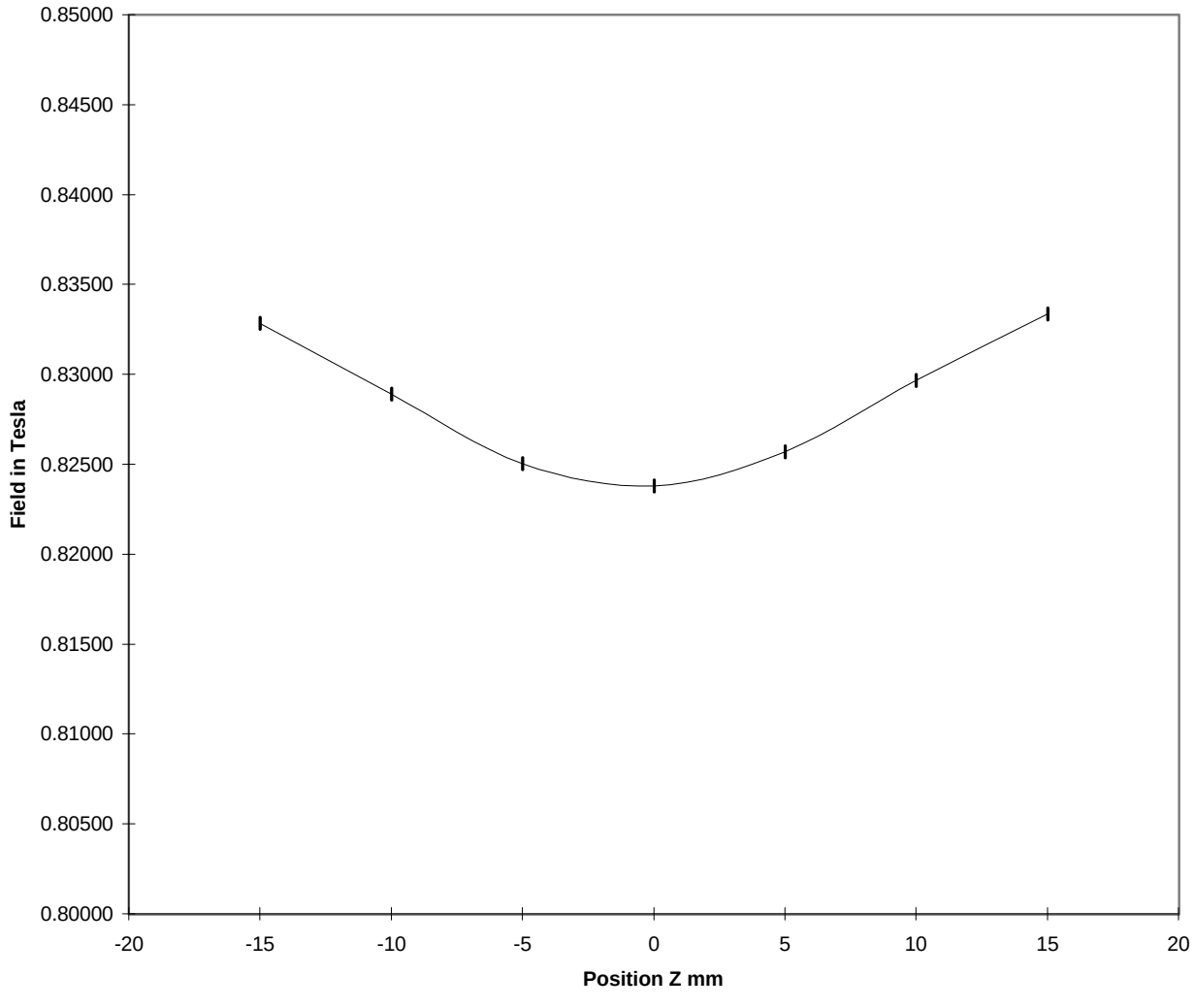
Contract No:		Page: 7 of 10		Date:	29 Jan, 98
Customer:				Engr:	E Schulze
Model:	5403 EG	Power Supply:	P62B-4075	Set Current:	70 Amps
Serial No:	01	Serial No:	1007626	Target Field:	
Pole Face:	76mm	Fixed Axis:	Y=0 Z=0		
Serial No:	None	Notes:			
Pole Gap:	40mm				
Pole Spacers:	None				



Filename: 5403 EG Un 70A X Y=0 Z=0 75-40.xls

GMW Associates
Electromagnet Uniformity Plot
Field Vs Position

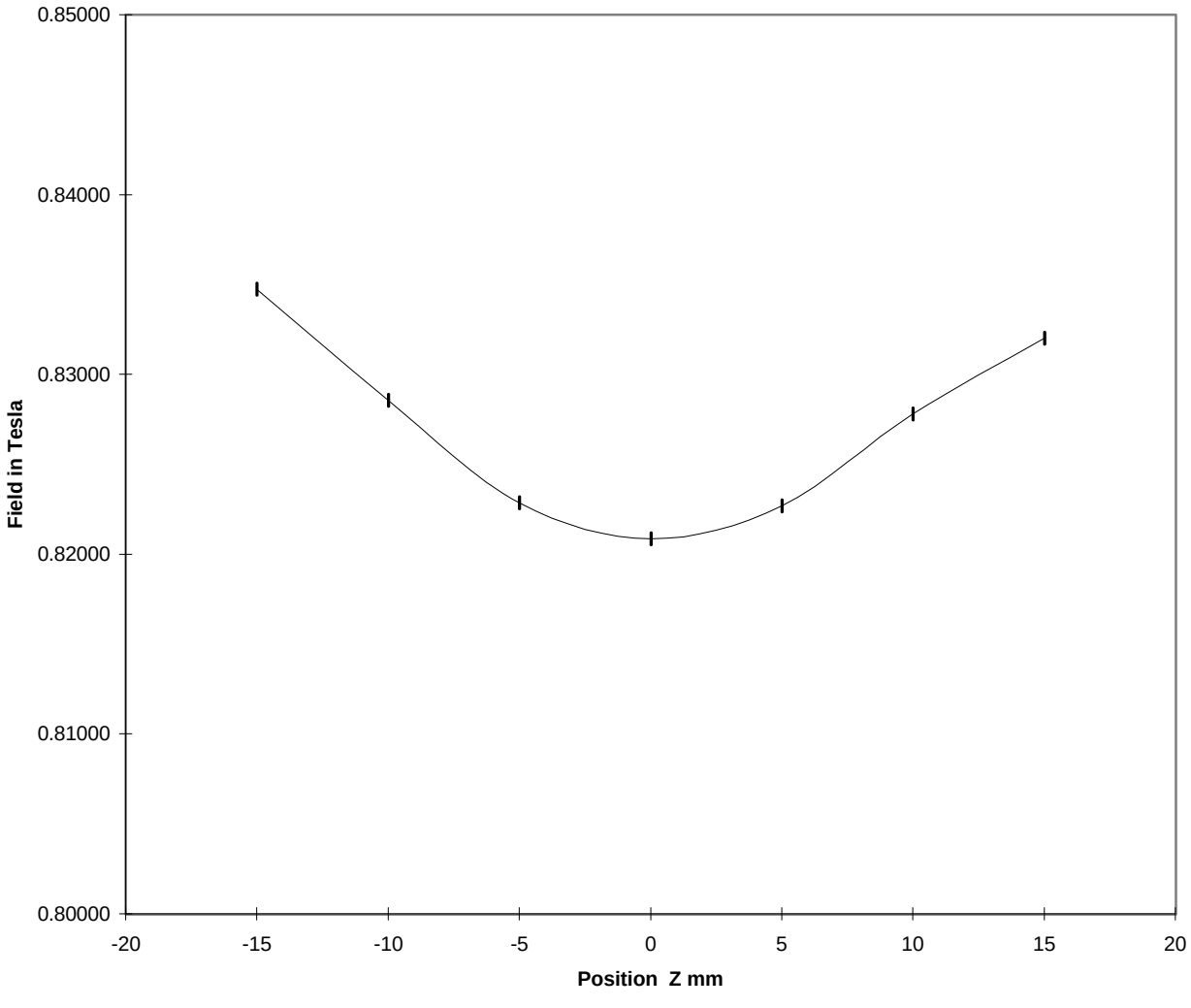
Contract No:		Page: 8 of 10		Date:	Jan 29, 98
Customer:				Engr:	E Schulze
Model:	5403 EG	Power Supply:	P62B-4075	Set Current:	70 Amps
Serial No:	01	Serial No:	1007626	Target Field:	
Pole Face:	76mm	Fixed Axis:	Y=5 X=0		
Serial No:	None	Notes:			
Pole Gap:	40mm				
Pole Spacers:	None				



Filename: 5403 EG Un 70A Z Y=5 X=0 75-40.xls

GMW Associates
Electromagnet Uniformity Plot
Field Vs Position

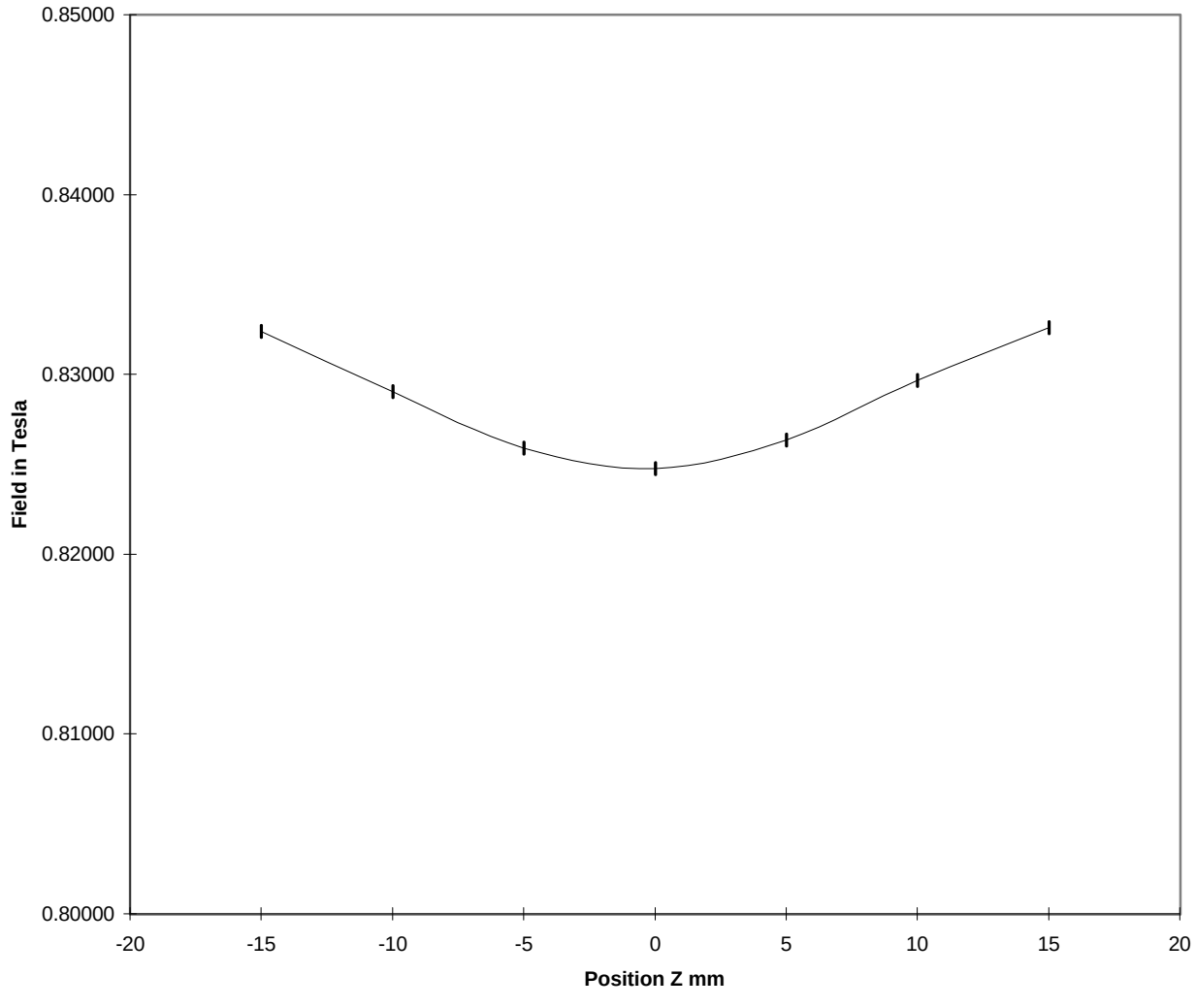
Contract No:		Page: 9 of 10		Date:	29 Jan, 98
Customer:				Engr:	E Schulze
Model:	5403 EG	Power Supply:	P62B-4075	Set Current:	70 Amps
Serial No:	01	Serial No:	1007626	Target Field:	
Pole Face:	76mm	Fixed Axis:	Y=10 X=0		
Serial No:	None	Notes:			
Pole Gap:	40mm				
Pole Spacers:	None				



Filename: 5403 EG Un 70A Z Y=10 X=0 75-40.xls

GMW Associates
Electromagnet Uniformity Plot
Field Vs Position

Contract No:		Page: 10 of 10		Date:	29 Jan, 98
Customer:				Engr:	E Schulze
Model:	5403 EG	Power Supply:	P62B-4075	Set Current:	70 Amps
Serial No:	01	Serial No:	1007626	Target Field:	
Pole Face:	76mm	Fixed Axis:	Y=0 X=0		
Serial No:	None	Notes:			
Pole Gap:	40mm				
Pole Spacers:	None				



Filename: 5403 EG Un 70A Z Y=0 X=0 75-40.xls

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)

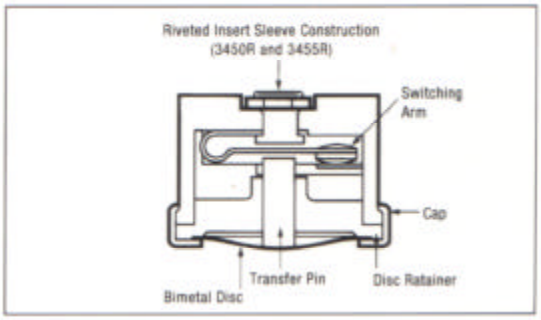
The Series 3450/3455R is a snap-acting, non-adjustable precision thermostat especially suited for industrial and electrical equipment.

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

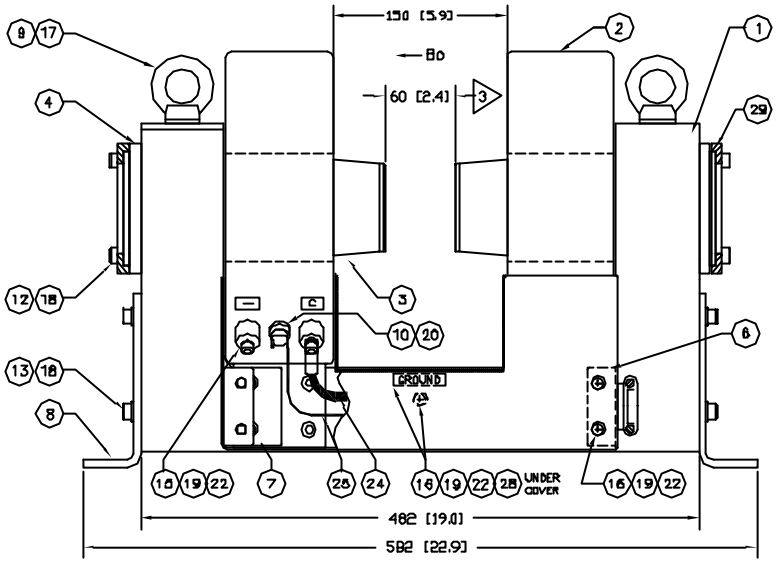
UL and CSA Listings are for use in equipment where the acceptability of the combination of the thermostat and equipment is determined by Underwriters' Laboratories, Inc. and/or the Canadian Standards Association.

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

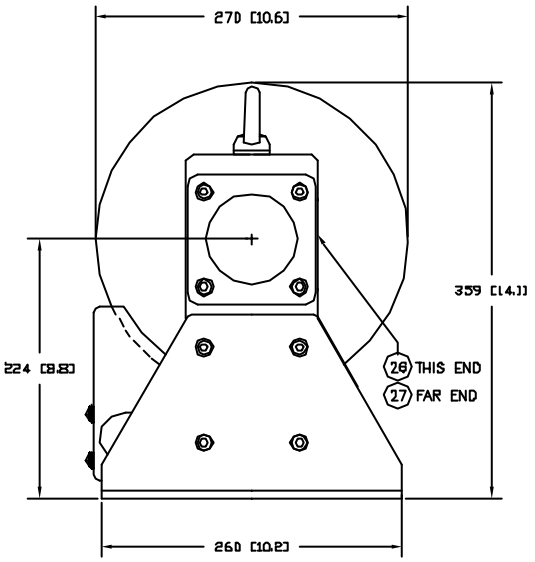
REVISIONS

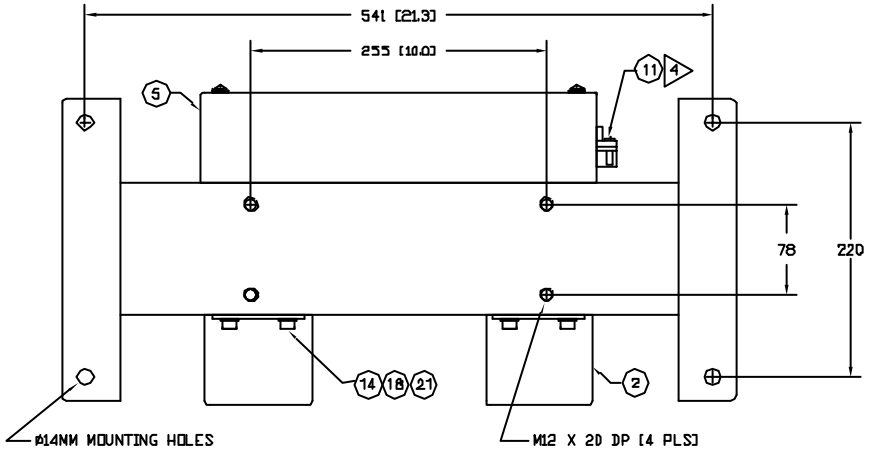
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE			
B	CHG POLE DESIGN, ADD POLE RETAINER [ITEM 29]		11/13/97	G.DOUGLAS
C	CHG COIL POWER SPECIFICATIONS		08/24/02	G.DOUGLAS

REAR VIEW



SIDE VIEW

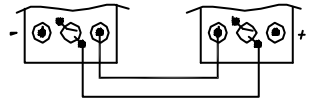




BOTTOM VIEW

MAGNET WIRING SCHEMATIC

REAR VIEW



MAGNET SPECIFICATIONS

POLE FACE DIAMETER	76 mm
POLE GAP	40 mm MINIMUM
COILS [series connected]	
MAX RESISTANCE	0.35 Ohm
MAX POWER [continuous]	20A/10V, 200W
PEAK POWER	75A/40V, 3000W [20 sec max On 7% duty cycle]
SELF INDUCTANCE	60 mH
COOLING	AIR CONVECTION
THERMAL INTERLOCK	OPEN CIRCUIT ABOVE 50°C [122°F]
MASS	124 kg [275 lbs]

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

NOTES:
1. PARTS FITTED AT GMW
2. BOLTS USED TO SECURE POLE WITHOUT SPACER.[NOT SHOWN]
3. POLE CAP 4.0MM WITHOUT POLE SPACER [ITEM 4] FITTED
4. RH SIDE CABLE ENTRY SHOWN. LH ENTRY OPIONAL

PARTS LIST

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
29	2	17901470	POLE RETAINER	1
28	1	10900280	LABEL, GROUND [Fitted under Cover]	1
27	1	10900240	LABEL, CAUTION [RH Side]	1
26	1	10900230	LABEL, SPECIFICATION [LH side]	1
25	1	16800250	CABLE ASSY, INTERLOCK LINK	
24	1	16900240	CABLE ASSY, CURRENT LINK	
23	8	DIN 6797	WASHER, M6 X 0.7 INT LOCK, S/S	
22	4	DIN 1780	WASHER, M6 X 1.6 SPRING LOCK, S/S	
21	16	DIN 1780	WASHER, M8 X 2 SPRING LOCK, S/S	
20	2		WASHER, M5 X 15 X 3, NEOPRENE	
19	5	BN 737	WASHER, M6 X 16 X 1.6 FLAT S/S	
18	32	BN 737	WASHER, M8 X 15 X 1.6 FLAT S/S	
17	2	DIN 433	WASHER, M12 X 13 X 2 FLAT S/S	
16	5	DIN 7985A	SCREW, M6 X 12 PAN S/S	
15	4	DIN 912	SHCS, M8 X 12 S/S	
14	24	DIN 912	SHCS, M8 X 16 S/S	
13	8	DIN 912	SHCS, M8 X 20 S/S	2
12	8	DIN 912	SHCS, M8 X 30 S/S	
11	1	3304	CABLE CLAMP, T & B	
10	2	3450G611-1	TEMP SENSOR, 50°C 10-32UNF ELMWOOD	
9	2	B-0503	EYEBOLT, M12	
8	2	17901450	ANGLE BRACKET	
7	1	17901432	TERMINAL COVER BRACKET [WITHOUT HOLE]	
6	1	17901431	TERMINAL COVER BRACKET, [WITH HOLE]	
5	1	17901420	TERMINAL COVER	
4	2	17901400	POLE SPACER, 10MM THICK	
3	2	17901380	POLE, 76MM FACE	
2	2	11901060	COIL ASSEMBLY	
1	1	17901380	YOKE	

DRAWN G.DOUGLAS 11/24/97
CHECK
ENGINEERING
DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)
LINEAR INCH/MM
.XXX ±.005 ±0.08
.XX ±.01 ±0.1
.X ±.03 ±0.5
DEG ±1 ±1.0
FINISH 63 1.6
THIRD ANGLE PROJECTION
5403EG
NEXT ASSY SYSTEM
SOFTWARE AUTOCAD 13

GMW
955 Industrial Rd, San Carlos, CA 94070
Tel: (650)802-8292, Fax: (650)802-8218.

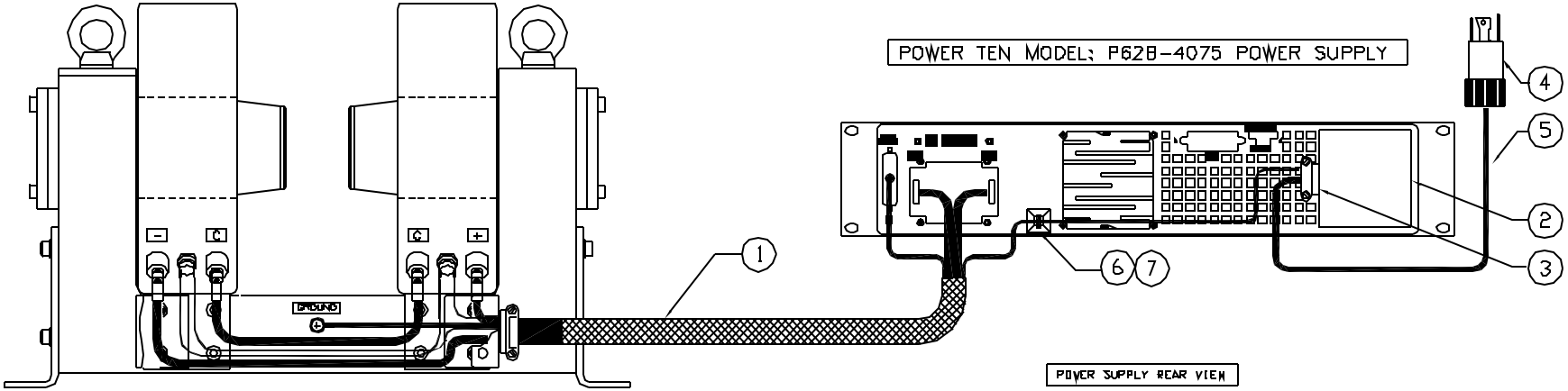
TITLE
MAGNET ASSEMBLY
MODEL: 5403EG

SIZE A1 | DRAWING NO. 11901050 | REV C
SCALE 1:2 | WT kg | SHEET 1 OF 1

PROPRIETARY

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		12/07/01	G.DOUGLAS

MODEL: 5403EG ELECTROMAGNET



REAR VIEW TERMINAL COVER REMOVED

POWER TEN MODEL: P628-4075 POWER SUPPLY

POWER SUPPLY REAR VIEW

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
7	1	08432	CABLE TIE, NYLON 2.5MM WIDE, BAR-LOCK	
6	1	08461	CABLE TIE MOUNT, ADHESIVE, BAR-LOCK	
5	1	4A-1203	POWER CORD, TYPE SO 3 CORE 12AWG	N/S
4	1	L15-20P	PLUG 3PHASE/20A, NYLON, BRYANT	N/S
3	1	3303	CABLE CLAMP THOMAS & BETTS	
2	1	129000010	AC TERMINAL BOX	
1	1	169000230	CURRENT & INTERLOCK CABLE 80A INT	

PARTS LIST

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

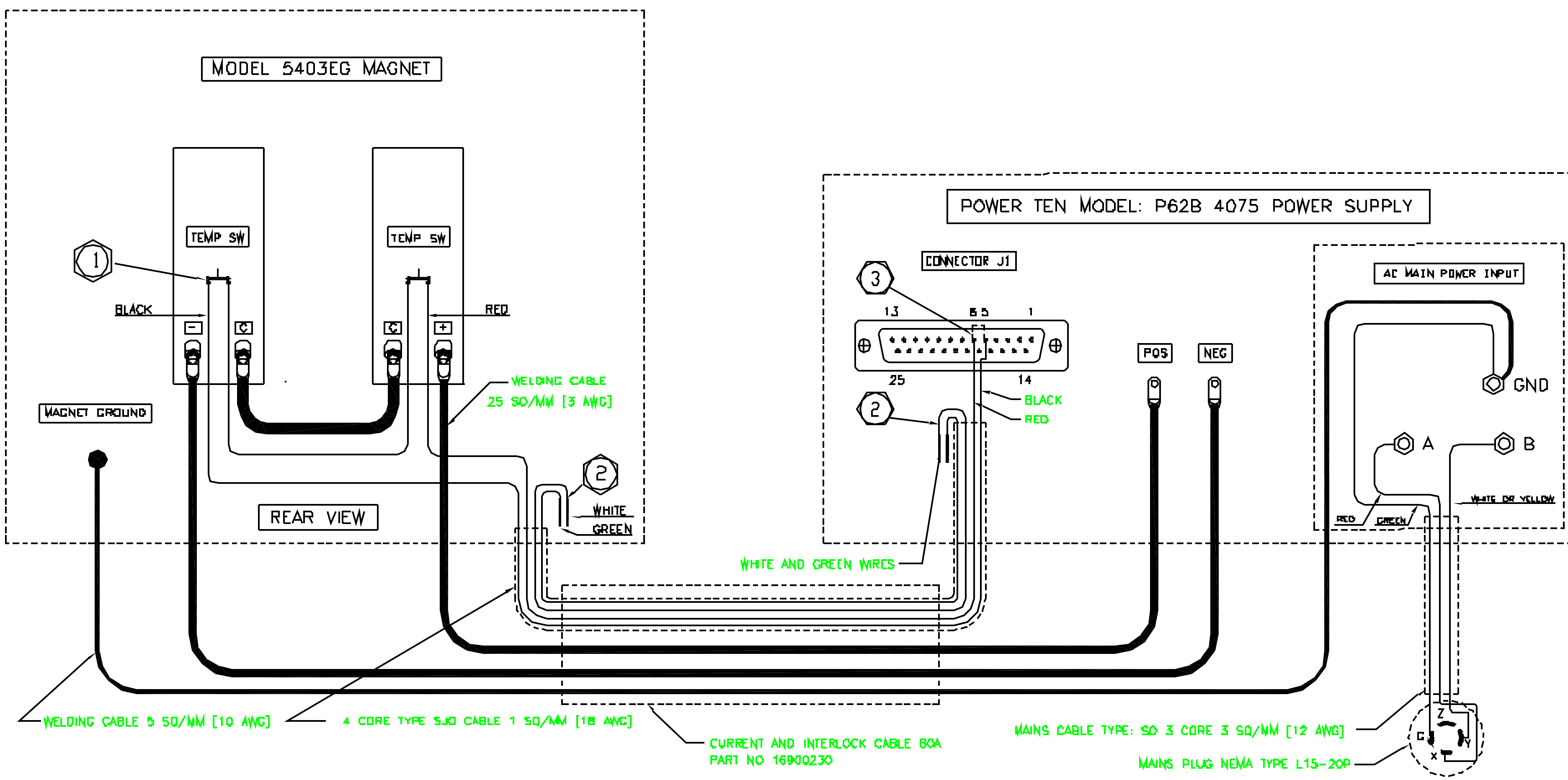
NOTE

1. POWER SUPPLY SHOWN WITH 2 PHASE 208V AC INPUT
2. REFER TO TABLE ON DWG 139000430 FOR AC INPUT RATINGS OTHER THAN 2 PHASE 208V

N/S = NOT SUPPLIED

DRAWN G.DOUGLAS	DATE 12/07/01	DO NOT SCALE FROM DRAWING	GMW P.O. Box 2578, Redwood City, CA 94064 Tel: (650)802-8292, Fax: (650)802-8298
CHECK	DATE		
ENGINEERING	DATE		
			TITLE ELECTRICAL WIRING 5403EG/P628-4075
		5403EG	SIZE A1 DRAWING NO. 11901070 REV A
NEXT ASSY	SYSTEM	THIRD ANGLE PROJECTION	SCALE NTS WT kg SHEET 1 OF 1
SOFTWARE: AUTOCAD 13			

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		12/07/97	G.DOUGLAS
B	CORRECT WIRING ERROR		02/06/98	G.DOUGLAS



NOTE:
1. CONNECT MAGNET TEMPERATURE INTERLOCK WIRING DIRECTLY ONTO QC TABS ON TEMP SWITCHES
2. LEAVE WHITE AND GREEN WIRES FULL LENGTH AND INSULATE WITH HEAT SHRINK SLEEVING. CAN BE USED FOR WATER FLOW SWITCH INTERLOCK [OPTIONAL]
3. REMOVE LINK BETWEEN PIN 5 AND PIN 6 ON POWER SUPPLY AT J1. CONNECT INTERLOCK WIRES AS SHOWN.

ELECTROMAGNET SYSTEM ELECTRICAL REQUIREMENTS			
AC INPUT POWER 3 PHASE, 47 to 63HZ	208V	-	-
AC INPUT FULL LOAD CURRENT	19	-	-
RECOMMENDED MAIN AC BREAKER	25	-	-
RECOMMENDED AC POWER OUTLET	L15-20R	-	-
RECOMMENDED AC CABLE SIZE	3 SQ/MM	-	-
NOTE: DRAWING SHOWS POWER SUPPLY FOR US 208V AC POWER			

PARTS LIST

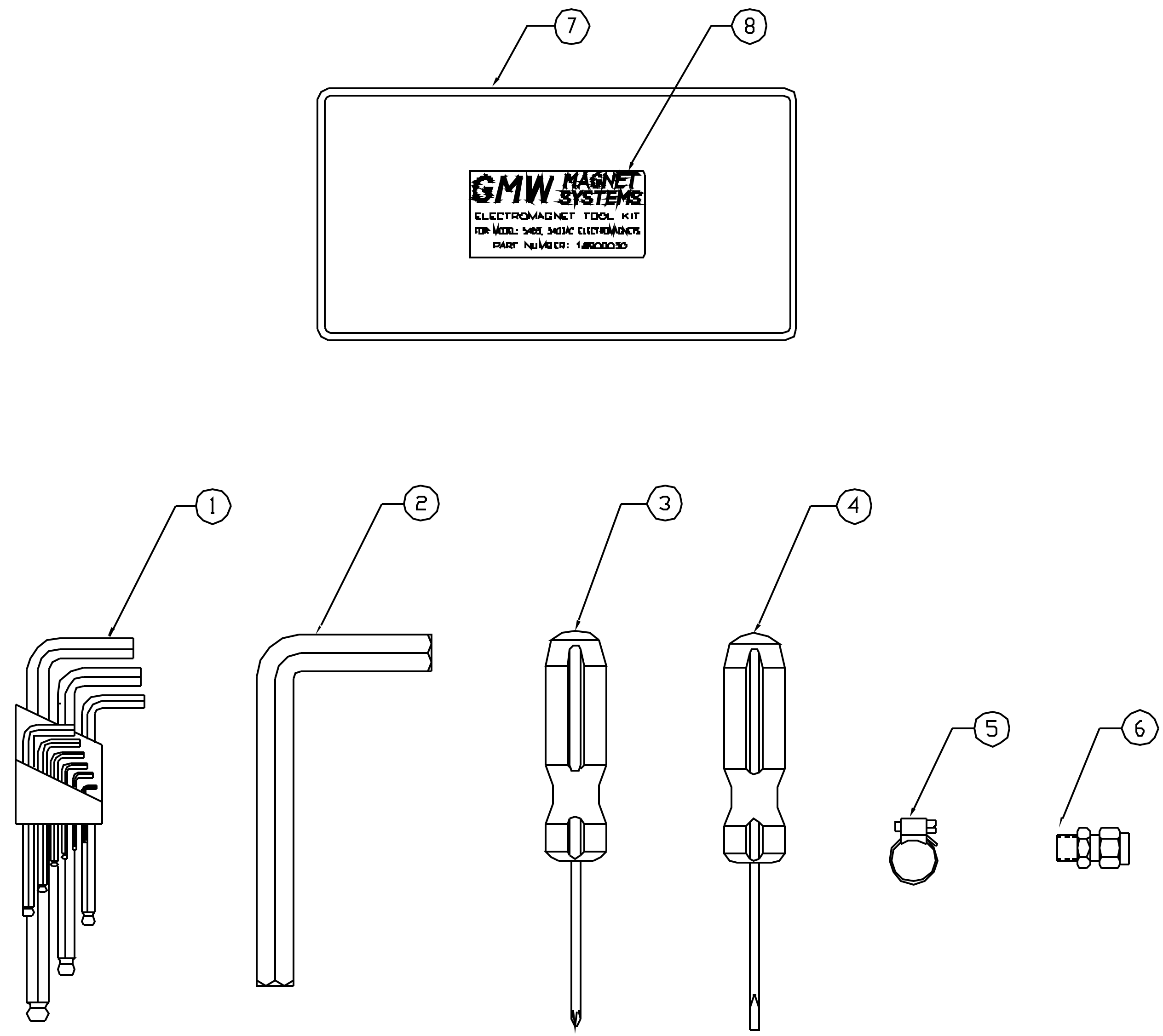
ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE

DRAWN G.DOUGLAS DATE 12/07/97
CHECK DATE
ENGINEERING DATE
DO NOT SCALE FROM DRAWING
NEXT ASSY 5403EG SYSTEM
SOFTWARE: AUTOCAD 13
THIRD ANGLE PROJECTION

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

TITLE: ELECTRICAL WIRING 5403EG/P62B-4075

SIZE A1 DRAWING NO. 13900430 REV B
SCALE NTS 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		12/11/97	G.DOUGLAS

PARTS LIST

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
8	1		LABEL, TOOL KIT	
7	1	V401	STORAGE BOX, PLASTIC, FLAMBEAU	
6	2	NY-400-1-2	TUBE COUPLING, NYLON 1/4" 1/8NPT	
5	2	350-006	HOSE CLIP, TRIDON	
4	1	62-135	SCREWDRIVER, SLOTTED, STANLEY	
3	1	62-D21	SCREWDRIVER, PHILLIPS, STANLEY	
2	1		HEX KEY WRENCH, 17mm	
1	1	BLX 9mm	HEX KEY WRENCH SET, BONDHUS	

DRAWN G.DOUGLAS DATE 12/11/97
CHECK DATE
ENGINEERING DATE

DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES UNLESS OTHERWISE SPECIFIED

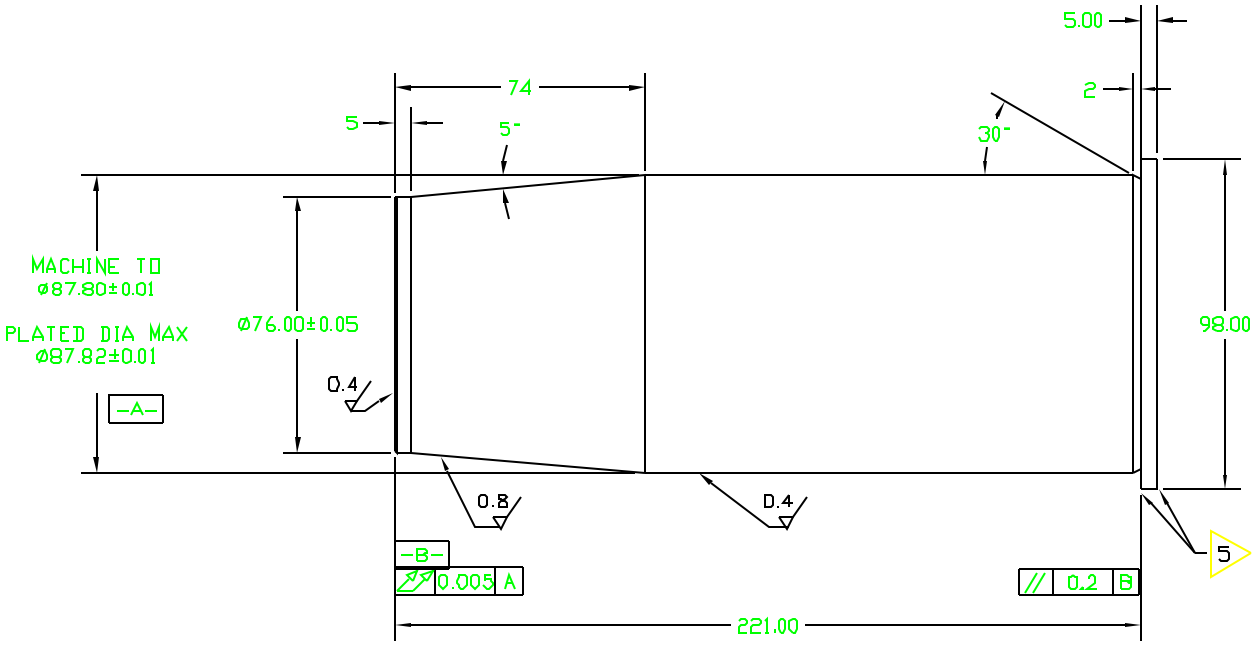
NEXT ASSY 5403EG
SYSTEM
THIRD ANGLE PROJECTION
SOFTWARE: AUTOCAD 13

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

TITLE
TOOL KIT
MODEL: 5403EG

SIZE A1 DRAWING NO. 18900000 REV A
SCALE 1:1 SHEET 1 OF 1

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		11/25/97	G.DOUGLAS
B	CHG FLANGE AND TAPER OF POLE		12/15/97	G.DOUGLAS
C	CHG DIAMETER OF POLE @ C4		03/06/98	G.DOUGLAS



NOTES:

1. MATERIAL: 1008 LOW CARBON STEEL
2. MATERIAL MUST BE CUT WITH THE AXIS OF THE RUNNING IN THE SAME DIRECTION AS THE RAW PLATE GRAIN
3. ROUGH MACHINE THEN ANNEAL TO BSL: TP85800040
4. FINISH: E.N PLATE 0.01MM THICK TO BSL TP85800120
5. BREAK ALL SHARP EDGES 0.2MM.
6. NO REQD: 2 PER MAGNET

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
PARTS LIST				

DRAWN: G.DOUGLAS — DATE: 11/25/97
CHECK — DATE
ENGINEERING — DATE
11901050 5403EG
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

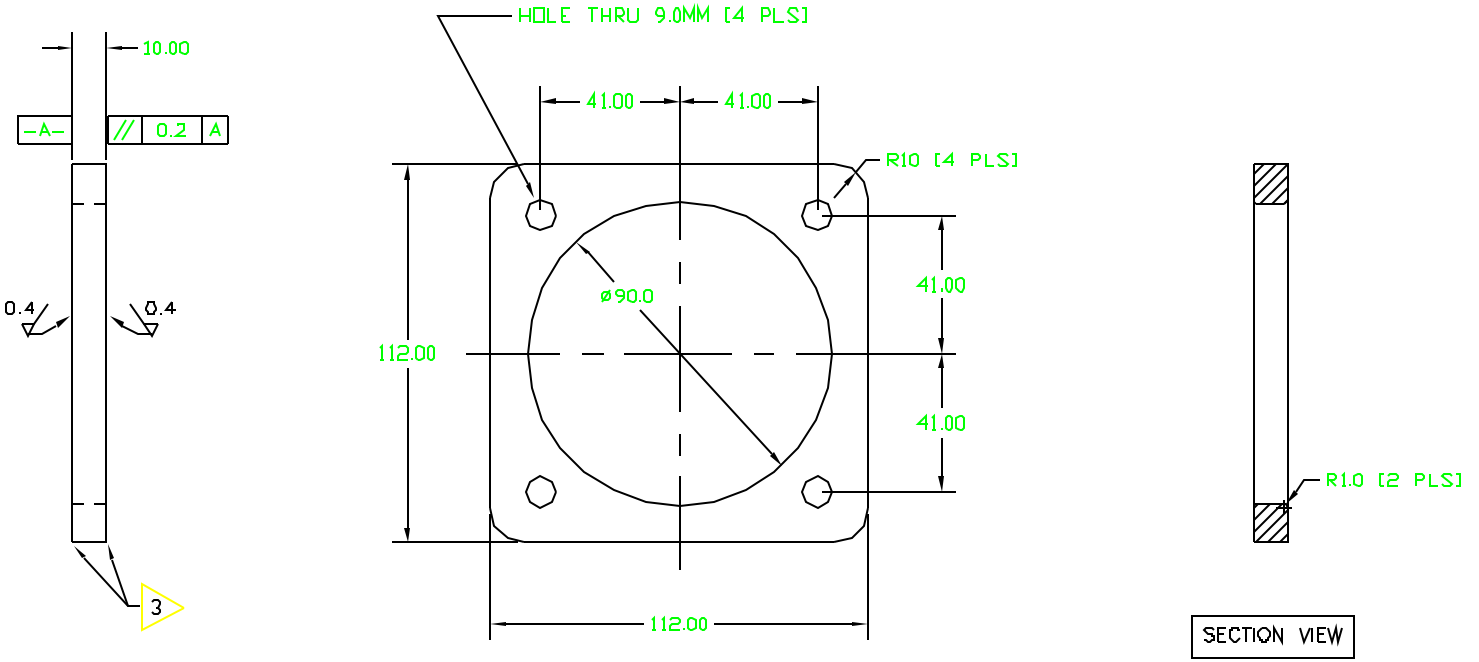
THIRD ANGLE PROJECTION

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

TITLE
POLE 76MM
MODEL: 5403EG

SIZE A2 | DRAWING NO. 17901390 | REV C
SCALE 1:1 | WT kg | SHEET 1 OF 1

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		11/25/97	G.DOUGLAS



SECTION VIEW

NOTES:

1. MATERIAL: 1008 LOW CARBON STEEL
2. FINISH: E.N PLATE 0.01MM THICK TO BSL TP85800120
3. BREAK ALL SHARP EDGES 0.2MM.
4. NO REQD: 2 PER MAGNET

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
PARTS LIST				

DRAWN	G.DOUGLAS
DATE	11/24/97
CHECK	
DATE	
ENGINEERING	
DATE	
11901050	5403EG
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

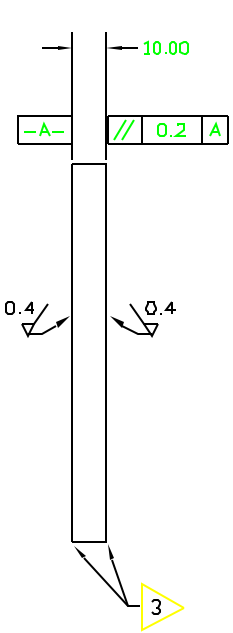
GMW
P.O. Box 2578, Redwood City, CA 94064
Tel: (650)802-8292 Fax: (650)802-8298.

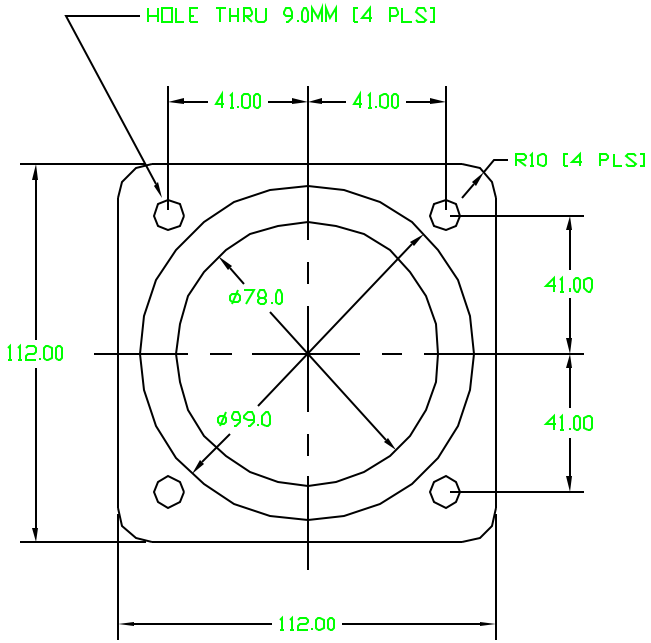
TITLE
POLE SPACER
MODEL: 5403EG

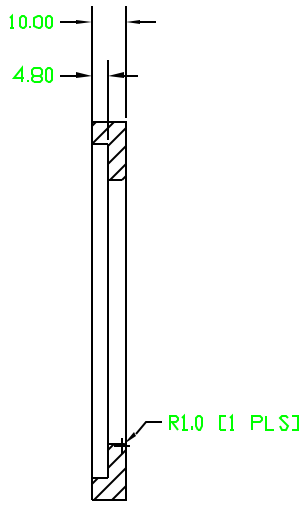
SIZE	DRAWING NO.	REV
A2	17901400	A

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

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		12/12/97	G.DOUGLAS







SECTION VIEW

NOTES:

1. MATERIAL: 1008 LOW CARBON STEEL
2. FINISH: E.N PLATE 0.01MM THICK TO BSL TP85800120
3. BREAK ALL SHARP EDGES 0.2MM.
4. NO REQD: 2 PER MAGNET

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE

PARTS LIST

DRAWN	G.DOUGLAS
DATE	12/12/97
CHECK	
DATE	
ENGINEERING	
DATE	
11901050	5403EG
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

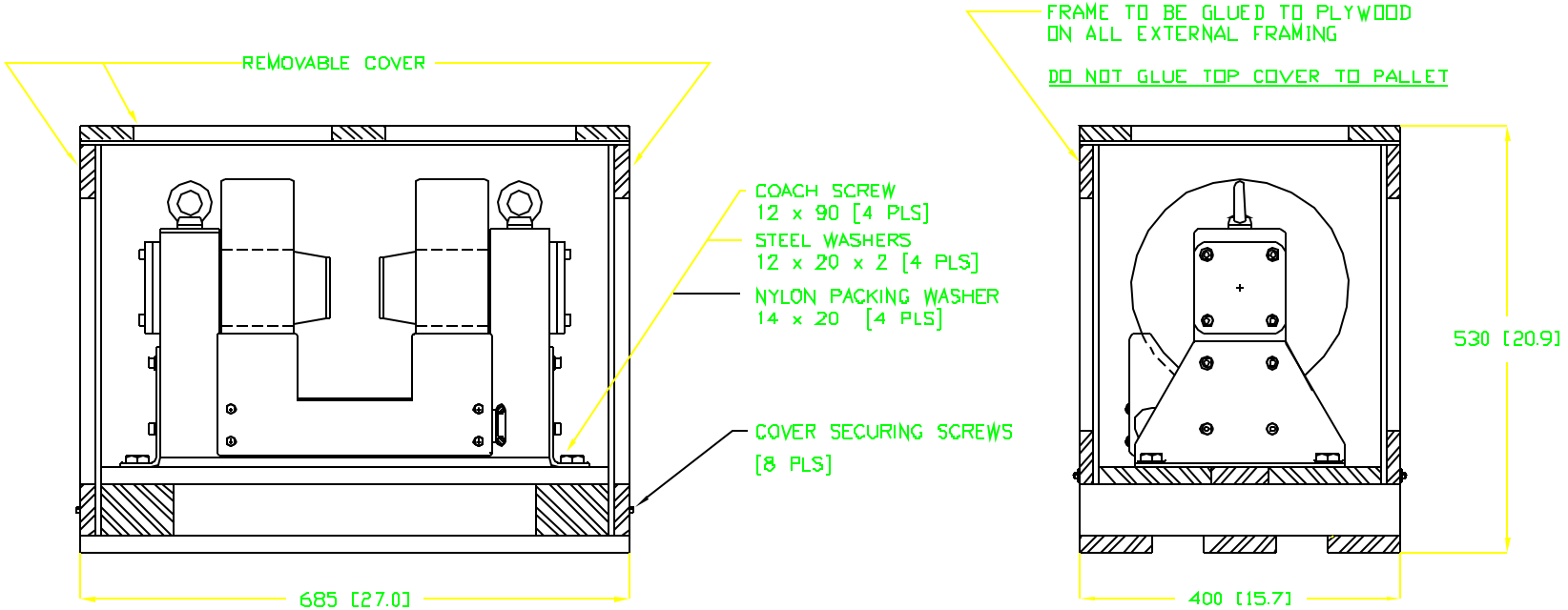
GMW
P.O. Box 2578, Redwood City, CA 94064
Tel: (650)802-8292 Fax: (650)802-8298.

TITLE
POLE RETAINER
MODEL: 5403EG

SIZE	DRAWING NO.	REV
A2	17901470	A

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

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		12/10/97	G.DOUGLAS



SHIPPING WEIGHT: 150 Kg [330 lbs]

NOTE:

1. THE 5403 SHIPPING CRATE HAS A ONE PIECE COVER

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE

PARTS LIST

DRAWN	G.DOUGLAS	DATE	12/10/97
CHECK		DATE	
ENGINEERING		DATE	
			5403EG
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: (650)802-8292 Fax: (650)802-8298.

TITLE
SHIP CRATE ASSY
MODEL: 5403EG

SIZE	DRAWING NO.	REV
A2	18800282	A

SCALE 1:4 | WT kg | SHEET 1 OF 1