USER'S MANUAL

MODEL: 5403EG-20 (Air Cooled)
MODEL: 5403EG-50 (Water Cooled)

76MM ELECTROMAGNET

Date Sold: _____

Serial number: _____

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

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Section 1
SPECIFICATIONS
Table 1. Model 5403EG-20 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)	20A/10V (0.20kW)
max power (peak)	75A/40V (3.0kW)
duty cycle (at peak power)	5%, 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	135 kg (297 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 5403EG-50 Specifications

Pole Diameter:	76mm (3 inch)
Pole Gap: [fixed, adjustable with spacers]	40mm (1.6 inch) minimum 130mm (5.1 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, air cooled)	20A/10V (0.20kW)
max power (continuous, water cooled)	50A/25V (1.25kW)
max power (peak)	75A/40V (3.0kW)
duty cycle(at peak power)	30%, 120 sec max on
Self Inductance	60mH
Water Cooling (18°C)	2 liters/m (0.5 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.
Dimensions	Drawing 11901080 582mm W x 282mm D x 359mm H 22.9 inch W x 11.1 inch D x 14.1 inch H
Weight	141 kg (310 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 5403EG Electrical and Water Connections

DC Current (as seen from the front refer to Drawing 11901050/11901080)

Right hand terminal:	Negative
Left hand terminal:	Positive

Ground

An M6 screw (Item 16 on drawing 11901050/11901080) 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 11901050/11901080).

The temperature interlock wiring connections are made directly onto the temperature thermostats (Item 10 on drawing 11901050/11901080).

Water (refer to Drawing 11901080 5403EG-50 only).

Outlet	1/8 inch NPT
Inlet	1/8 inch NPT
	(mating couplings for 6mm [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.

3 Ferromagnetic Objects

During operation the magnet exerts strong magnetic attraction towards ferromagnetic objects in the near vicinity of the 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.

Section 3

INSTALLATION

Minimum Facility Requirements for Bipolar and Unipolar Systems installed in North America

Floor Space:

Magnet floor area: 604 x 270mm
Total Mass: 141kg (310lb)
Power Supply & Rack floor area: 700 x 900mm
Total Mass: 100kg (220lb)
An area for access to the Magnet and Power Supply must be provided. The total area for the system and comfortable operation is about 2 x 2m (6 x 6ft). The area should be clean and free from obstructions.

Electrical Service:

	Bipolar System	Unipolar System
MPS Power:		
Power Supply:	2 x Kepco 20-20M	1 x Power10 P62B-3066
Voltage:	115Vac, Single Phase 50 – 60Hz	190 – 253Vac, Single Phase 50 – 60Hz
Current:	11A / Supply (22 Amps Total)	20 Amps
Power Cable:	Provided with Power Supply	3 Conductor, 12AWG Min.
Mains Outlet:	Nema 5-15R (US Standard) Or 6-15R if used with GMW Rack	Nema L6-20R or equivalent
Mating Plug:	Provided with Power Supply	Nema L6-20P or equivalent
Auxiliary Power for Rack:		
Voltage:	115Vac, Single Phase	115Vac, Single Phase
Current:	30A	15A
Plug:	Nema L5-30P	Nema 5-15P
Mating Receptacle:	Nema L5-30R	Nema 5-15R

Note: Due to liability and insurance reasons, the mains power installation and connections for the Unipolar system must be completed by the facility electrician.

Water Cooling:

Water Temperature: 18°C
Flow Rate: 2 liters / minute
Pressure: 0.5 bar (8 PSID)
Water Hose: 6mm I.D., rubber, 2 x 5m long minimum
Plumbing Fittings: To connect 6mm hose to water source and drain. (It is recommended to have a water filter to trap debris on the facility water source and shutoff valves on the water source and drain.)

System Computer (if not provided by GMW):

Processor: Intel Pentium III, 500MHz PC or better
Memory: 128MB RAM
Free Drive Space: 500MB
Interface: IEEE-488 (GIPB)
Monitor Resolution: 1024 x 768 or better
Operating System: Windows ME / 2000 / XP pro / NT4

Lifting Equipment for Installation:

Forktruck or other lifting device with minimum safe lifting capacity of 250kg
Nylon Slings with minimum safe lifting capacity of 250kg

Model 5403 System Installation; Equipment Check List

General:

Please provide this manual to the person who will be responsible for the System installation. If you need to discuss details of the installation please call GMW. If a GMW Engineer is to supervise the installation any delays caused by inadequate preparation may result in additional charges for Engineering Time.

Site:

___ Floor space and work space cleared and ready for equipment.

___ Appropriate electrical services installed

Materials Required:

___ Power Plugs

___ Power Cable

___ Cooling water supply installed with shut-off valves

Materials Required:

___ 6mm I.D. water hose, 5m for source and 5m for drain.

___ Water hose fittings appropriate for installed plumbing.

___ Water hose clamps.

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 11901050/11901080).

Section 3

INSTALLATION

Pole Installation and Setting Pole Gap (Refer to drawing 11901050 for the Model: 5403EG-20 (air cooled) and drawing no11901080 for the 5403EG-50 (water cooled))

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

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

Pole removal (Refer to drawing 11901050/11901080).

1. Turn off the power supply.
2. Loosen and remove the four pole retaining bolts and washers (item 12 & 18 on drawing 11901050/11901080).
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 11901050/11901080).

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 11901050/11901080). 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 at the center of the coil between the DC terminals and wired in series. The thermostats are normally closed, opening when the coil central cooling plate temperature exceeds 50°C +/3°C.

Section 3

INSTALLATION

Cooling

The Model 5403EG-20/5403EG-50 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

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.

5403EG-50 [with water cooling]

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 if fitted.

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 5403EG-50 electromagnet alone a suitable chiller is the Bay Voltex Model: Mercury MC-50-E1-H1 with Flow Switch and Particle Filter Options.

For recirculating cooling systems 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.

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 (item 4 drawings no 11901050/11901080). 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).

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

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, operation with cooling water at an inlet temperature below the dew point, 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 surfaces since this may degrade the magnetic field uniformity in the gap.

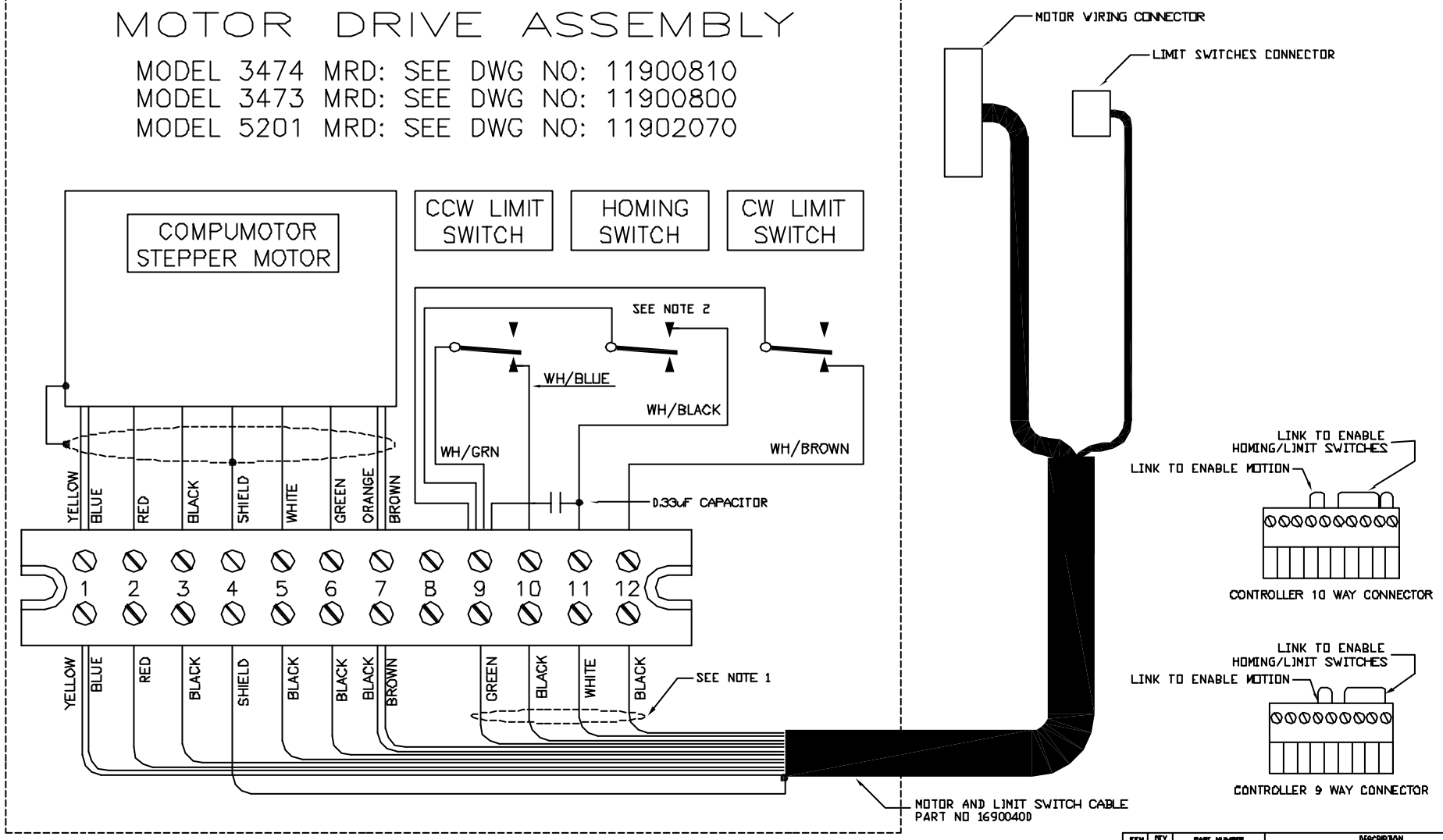
Section 6

STANDARD OPTIONS

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		02/13/98	G.DOUGLAS
B	ADD CONTROLLER CONNECTOR LINKING		10/12/01	G.DOUGLAS

MOTOR DRIVE ASSEMBLY

MODEL 3474 MRD: SEE DWG NO: 11900810
MODEL 3473 MRD: SEE DWG NO: 11900800
MODEL 5201 MRD: SEE DWG NO: 11902070



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 02/13/98
CHECK	DATE
ENGINEERING	DATE
11902070	5201
11900800	3473
11900810	3474
NEXT ASSY	SYSTEM
SOFTWARE	AUTOCAD 2000

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

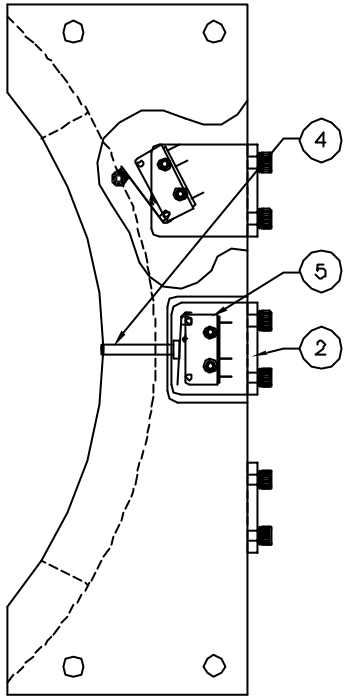
GMW
955 Industrial Rd San Carlos, CA 94070
Tel: (650)802-8292. Fax: (650)802-8298.

TITLE: MOTORIZED.ROT.DRIVE ELECTRICAL WIRING

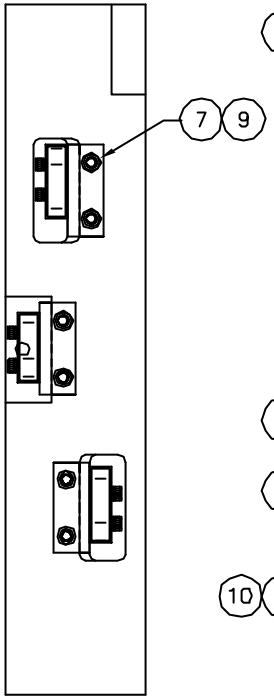
SIZE	DRAWING NO.	REV
A1	13900350	B

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

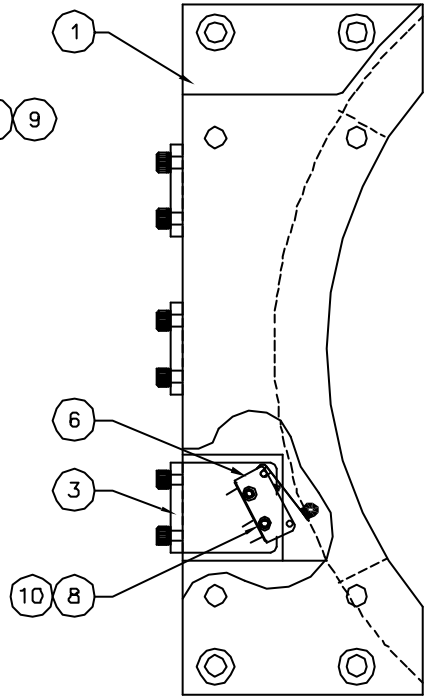
REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		07/07/97	G.DOUGLAS



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 2000

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

LINEAR	INCHES	mm
X.XXX	±.005	±0.13
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.

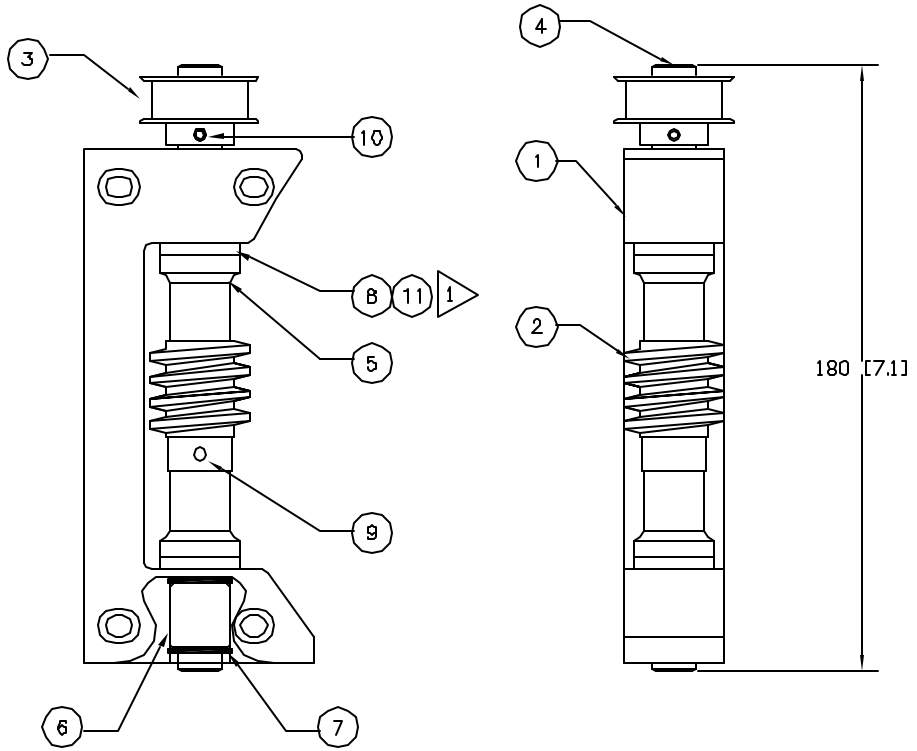
TITLE
MOTORIZED.ROT.DRIVE
STOP BLOCK ASSY

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

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 9Q28-68	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

NOTE:

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

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

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

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

THIRD ANGLE PROJECTION

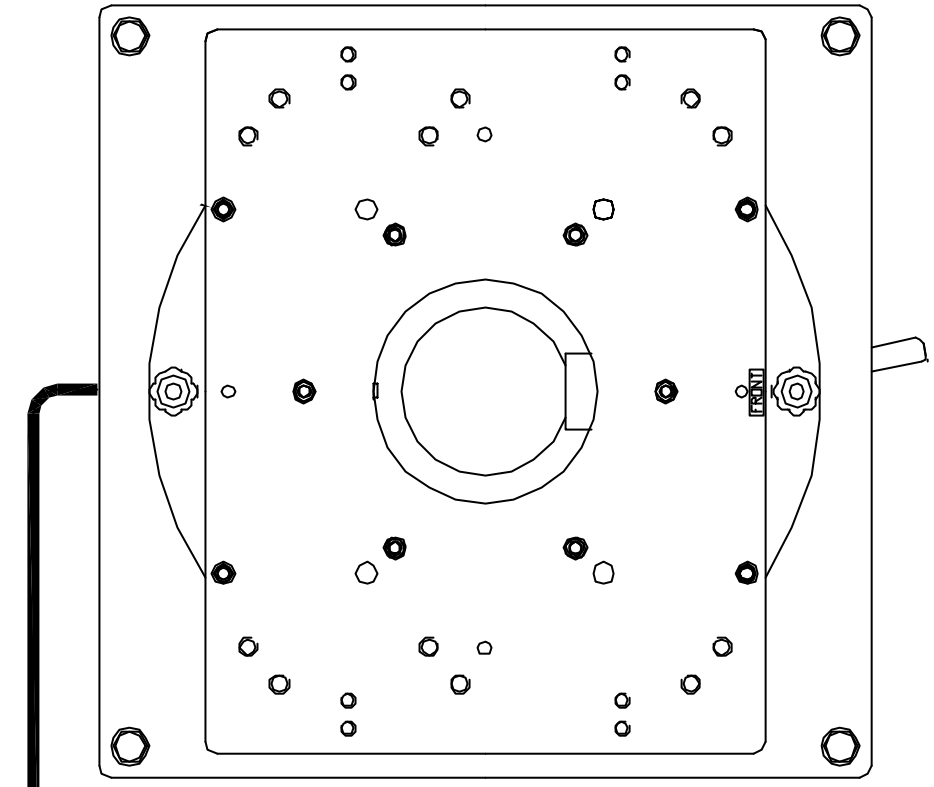
GMW
955 Industrial Rd, San Carlos, CA 94070
Tel: (650)802-8292. Fax: (650)802-8298.

TITLE
MOTORIZED.ROT.DRIVE
WORM MOUNT ASSY

SIZE	DRAWING NO.	REV
A2	11900850	C

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

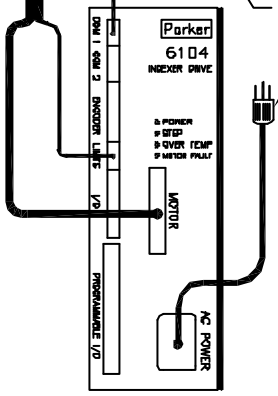
TOP VIEW



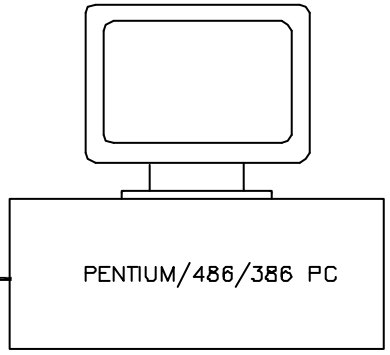
MOTOR AND LIMIT SWITCH CABLE PART NO 16900400

SERIAL COMMUNICATIONS CABLE PART NO 16900410

AC POWER INPUT



STEPPER MOTOR CONTROLLER



CONTROL COMPUTER

REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		02/17/98	G.DOUGLAS
B	INCR SIZE OF TRANSISTION PLATE, ADD 5403EC MTB HOLES		97/02/13	G.DOUGLAS

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE

PARTS LIST

DRAWN G.DOUGLAS DATE 02/17/98
CHECK DATE
ENGINEERING DATE
NEXT ASSY SYSTEM
SOFTWARE AUTOCAD 2000

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

	LINEAR	INCHES	MM
	X.XX	±.010	±0.02
	X.XX	±.01	±0.1
	X.X	±.05	±0.3
	X	±1.0	±1
	DEG.	±.5	±0.5
	FINISH	63	1.6

THIRD ANGLE PROJECTION

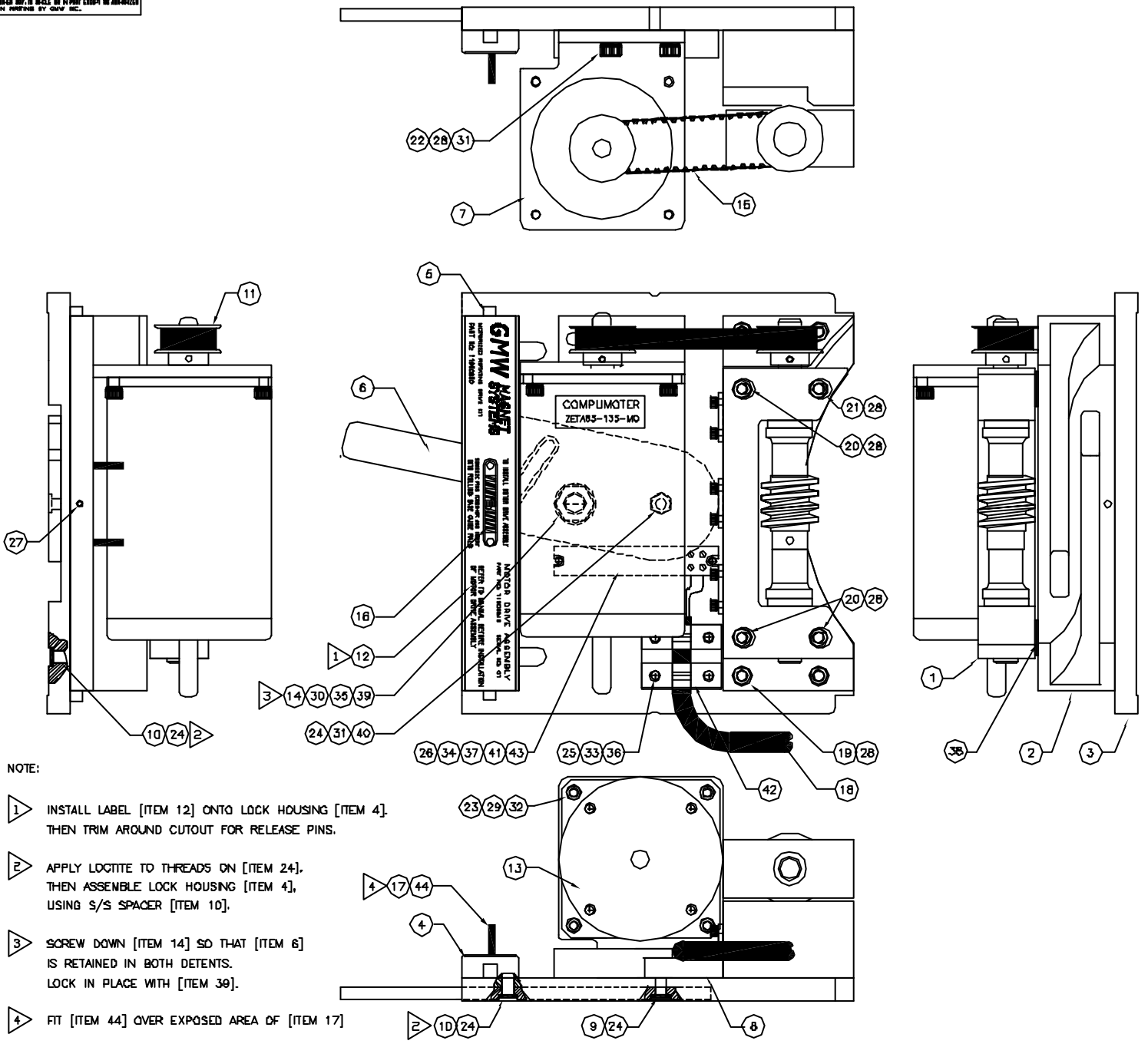
GMW
955 Industrial Rd, San Carlos, CA 94070
Tel: (650)802-8292, Fax: (650)802-8298.

TITLE
MOTORIZED.ROT.DRIVE
ELECTRICAL ASSY

SIZE A1 | DRAWING NO. 11901020 | REV B

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

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		07/07/17	G.DOUGLAS
B	ADD ITEMS 43,44, CHG NOTE8, ITEM 13		11/29/17	G.DOUGLAS
C	CHG ITEM 11,44, ADD NOTE: 4		04/07/18	G.DOUGLAS



ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
44	A/R		HEAT SHRINK SLEEVING, 4MM	
43	1	0.33uF	CAPACITOR	
42	2	CHS	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	18	BN 748	WASHER, SHIM M8 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, M6 X 1.1, RIBBED SPRING/STEEL	
28	12	BN 792	WASHER, M8 X 1.2, RIBBED SPRING/STEEL	
27	1	DIN 816 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, M8 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-5D	BELT, TIMING, BERG 10" [250MM]	
14	1	SBMH-10N	BALL PLUNGER, M6	
13	1	12900052	MOTOR, STEPPER, COMPUMOTOR	
12	1	10900070	LABEL, SPECIFICATION	
11	1	12900042	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	

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
DATE	05/04/17
CHECK	
DATE	
ENGINEERING	
DATE	
NEXT ASSY	
SYSTEM	
SOFTWARE	AUTOCAD 2000

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

	LINEAR	INCHES	MM
	X.XX	±.010	±0.25
	X.XX	±.01	±0.1
	X.X	±.05	±1.3
	DEG.	±.5	±0.5
	FINISH	63	1.6

THIRD ANGLE PROJECTION

11900800	6403
11900800	3472
11900800	3473

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

TITLE: MOTORIZED.ROT.DRIVE MOTOR DRIVE ASSY

SIZE	DRAWING NO.	REV
A1	11900810	C

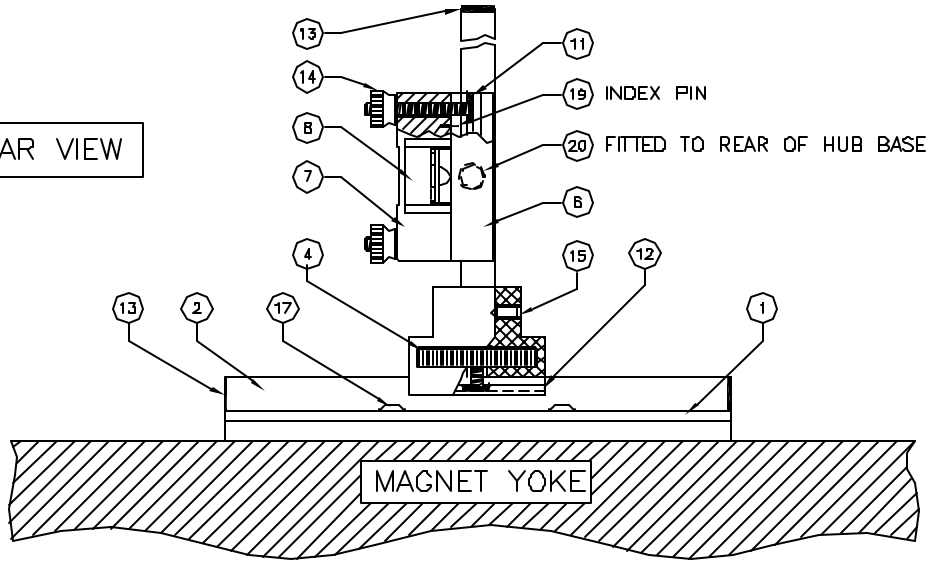
SCALE 1:1 | WT kg | SHEET 1 OF 1

ISO 7380

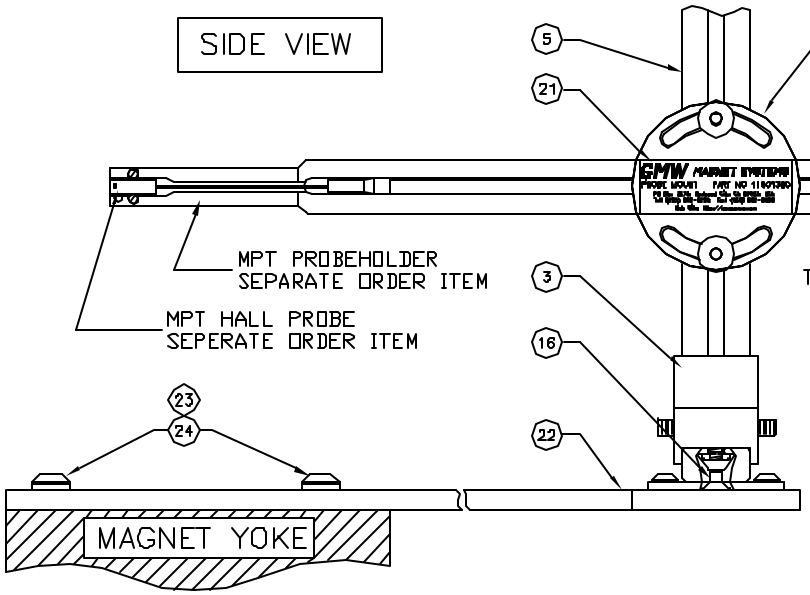
REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		08/16/98	G.DOUGLAS

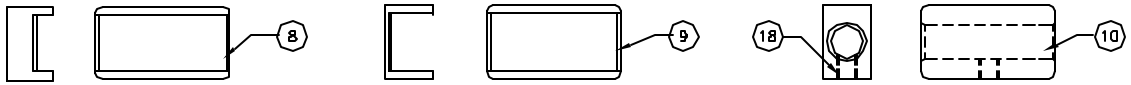
REAR VIEW



SIDE VIEW



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



ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
24	4	ISO 7380	SHCS M6 X 12 BUTTON HD S/S	
23	4	DIN 433	WASHER, M6 X 1.6 FLAT S/S	
22	1	17903000	MAGNET MOUNTING PLATE	
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	17901943	VERTICAL MOUNTING EXTRUSION	
4	1	17901930	BASE NUT	
3	1	17901920	BASE SUPPORT	
2	1	17902090	BASE MOUNTING EXTRUSION	
1	1	17902080	BASE MOUNTING PLATE	

PARTS LIST

DRAWN G.DOUGLAS	DATE 08/16/98	
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	±.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: 5403

SIZE	DRAWING NO.	REV
A2	11901280	A

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

Section 7

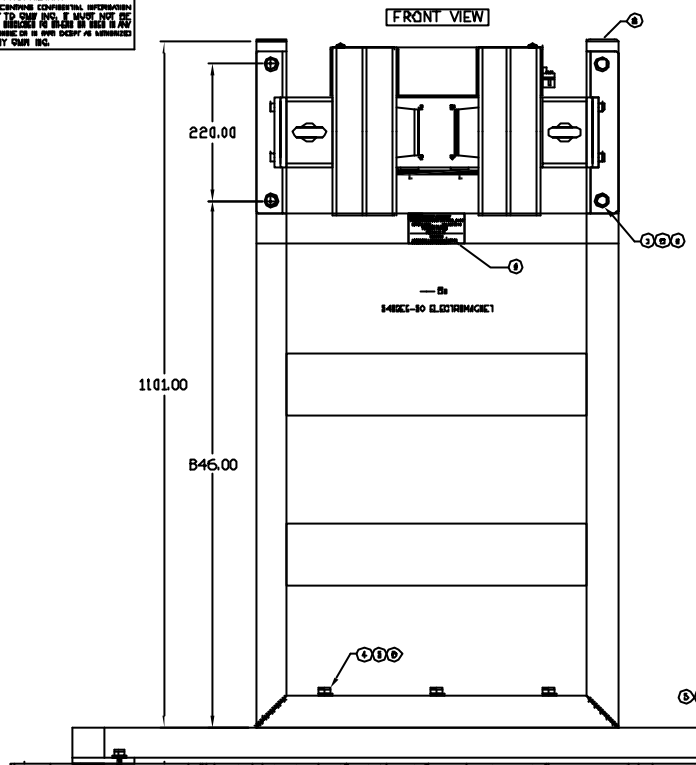
CUSTOM OPTIONS

PROPRIETARY

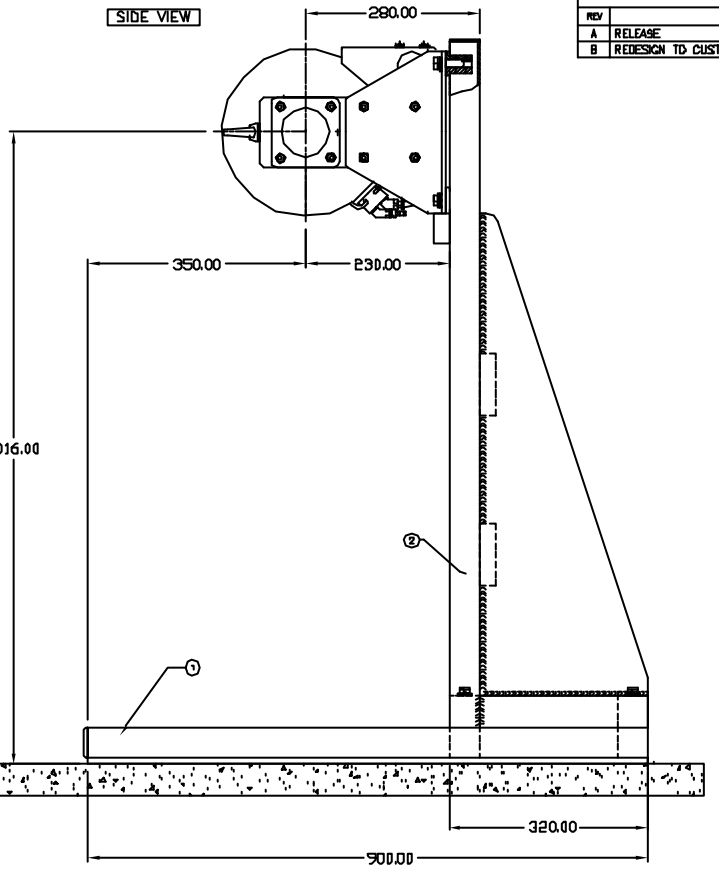
THIS DRAWING CONTAINS CONFIDENTIAL INFORMATION CONFIDENTIALITY TO GMW INC. IT MUST NOT BE REPRODUCED OR DISCLOSED TO OTHERS OR USED FOR ANY OTHER PURPOSE THAN THAT FOR WHICH IT IS LOANED WITHOUT THE PRIOR WRITTEN CONSENT OF GMW INC.

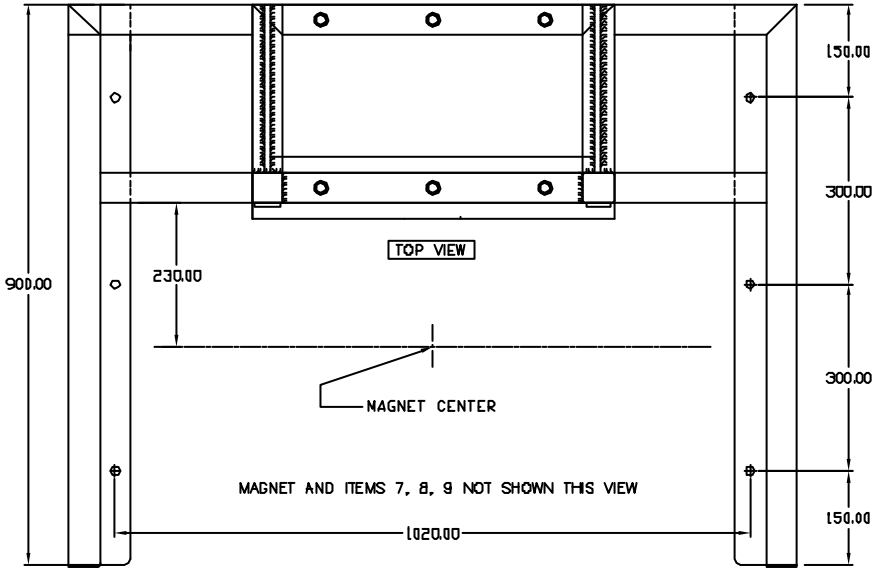
REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		03/11/03	G.DOUGLAS
B	REDESIGN TO CUSTOMER SPECIFICATIONS		04/14/03	G.DOUGLAS

FRONT VIEW



SIDE VIEW





TOP VIEW

NAGNET CENTER

MAGNET AND ITEMS 7, 8, 9 NOT SHOWN THIS VIEW

MOUNTING KIT [NOTE 1]

CONSISTS OF ITEMS 5, 6, AND 7 [QTY 6 OF EACH]

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
9	1	1091028D	LABEL, IDENTIFICATION	
8	4	FP05DR	CAP, PLASTIC, KELVINDALE	
7	6		BOLT, M12 or 1/2" EXPANSION	1
6	16	DIN 7980	WASHER, LOCK M12 x 2.5 S/S	1
5	16	DIN 433	WASHER, FLAT M12 x 24 x 2.5 S/S	1
4	6	DIN 961	SCREW M12 x 80 HEX HD S/S	
3	4	DIN 961	SCREW M12 x 35 HEX HD S/S	
2	1	17901690	TOP STRUCTURE	
1	1	17901580	BOTTOM STRUCTURE	

PARTS LIST

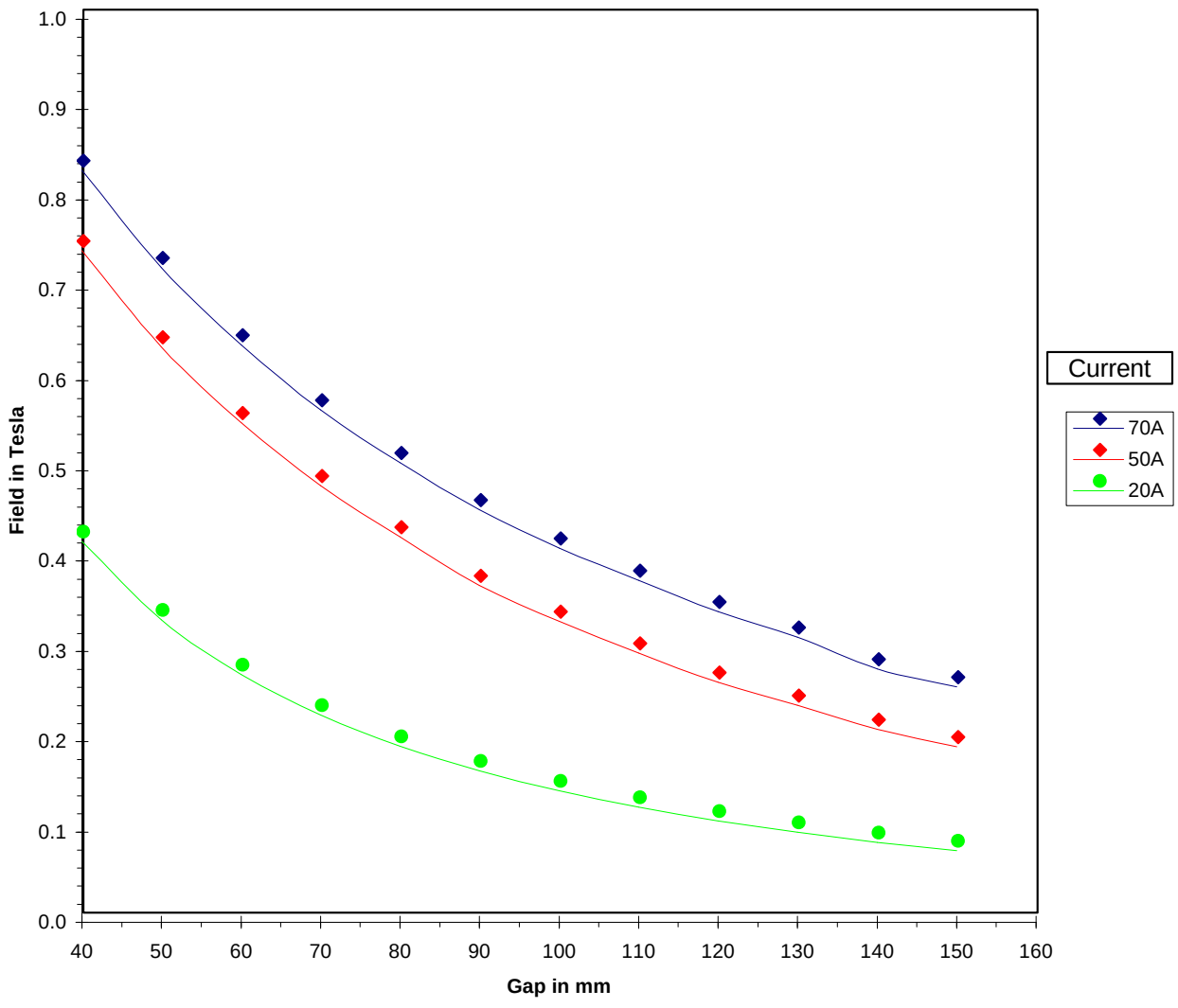
DRAWN G.DOUGLAS	DATE 03/11/03	DO NOT SCALE FROM DRAWING DIMENSIONS & TOLERANCES UNLESS OTHERWISE SPECIFIED	GMW 955 Industrial Rd, San Carlos, CA 94070 Tel: (650)802-8292. Fax (650)802-8298.
CHECK	DATE		
ENGINEERING	DATE		TITLE HORIZONTAL MOUNT MODEL: 5403EG
		5403	SIZE A1 DRAWING NO. 11901090 REV B
NEXT ASSY	SYSTEM	THIRD ANGLE PROJECTION	SCALE 1:4 WT kg SHEET 1 OF 1
SOFTWARE AUTOCAD 2000			

Section 8

EXCITATION CURVES

GMW Associates
Electromagnet Excitation Plot
Field Vs Gap

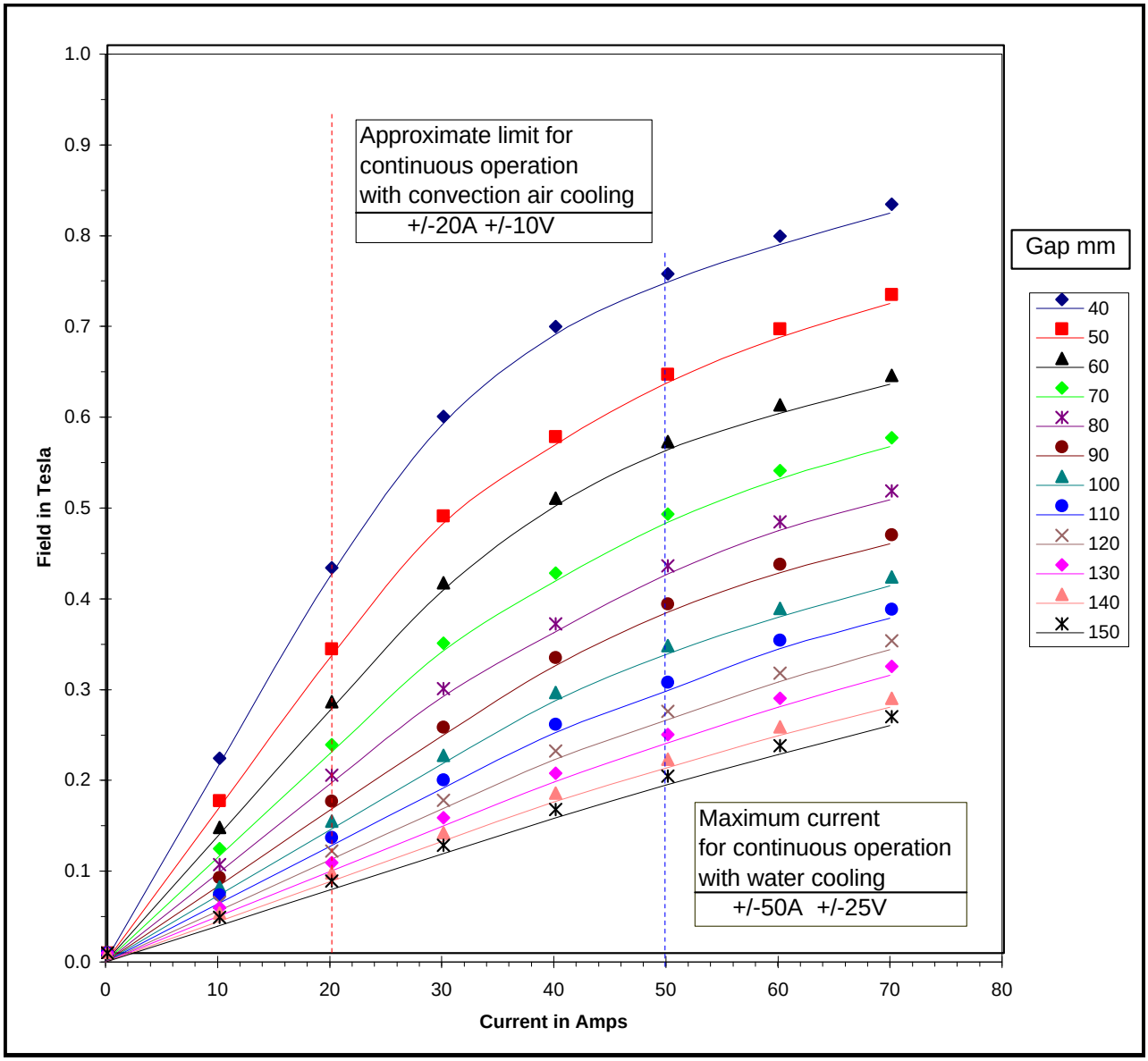
Contract No:		Page: 1 of 2		Date:	May 29,2003
Customer:				Engr:	G.Douglas
Model:	5403EG	Power Supply:		Set Current:	
Serial No:	01	Serial No:		Target Field:	
Pole Face:	76 mm	Position:	X=0, Y=0, Z=0		
Serial No:	None	Notes:			
Pole Gap:					
Pole Spacers:	None				



Filename: 5403EG Gap-Field

GMW Associates
Electromagnet Excitation Plot
Field Vs Current

Contract No:		Page: 2 of 2		Date:	June 25, 03
Customer:				Engr:	G.Douglas
Model:	5403EG	Power Supply:		Set Current:	
Serial No:		Serial No:		Target Field:	
Pole Face:	76	Position:	X=0, Y=0, Z=0		
Serial No:	None	Notes:			
Pole Gap:	As per table below				
Pole Spacers:	None				



Filename: 5403EG Ex 76-40-90

Section 9

TEST DATA

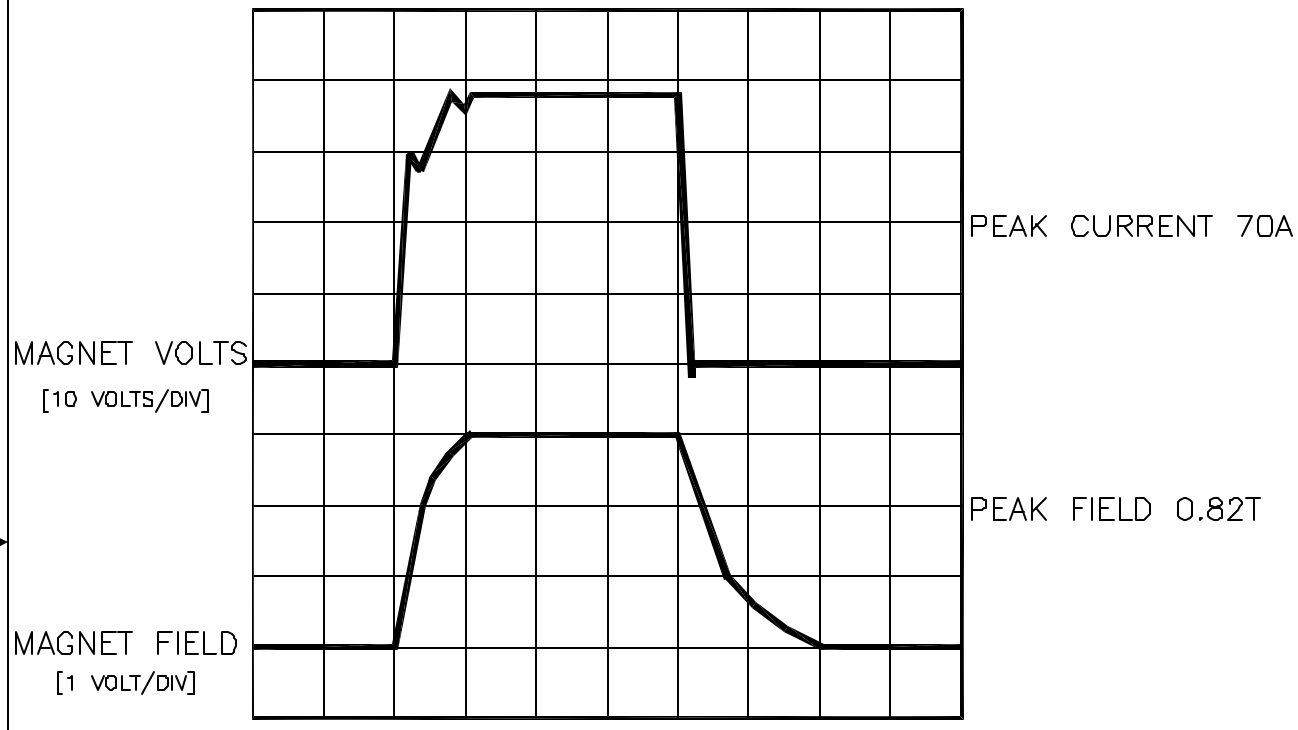
MEASUREMENT RESULT

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
955 Industrial Rd, San Carlos CA 94070
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.
E.SCHULZE	02/04/98	

PREPARED BY	DATE
G.DOUGLAS	02/27/98

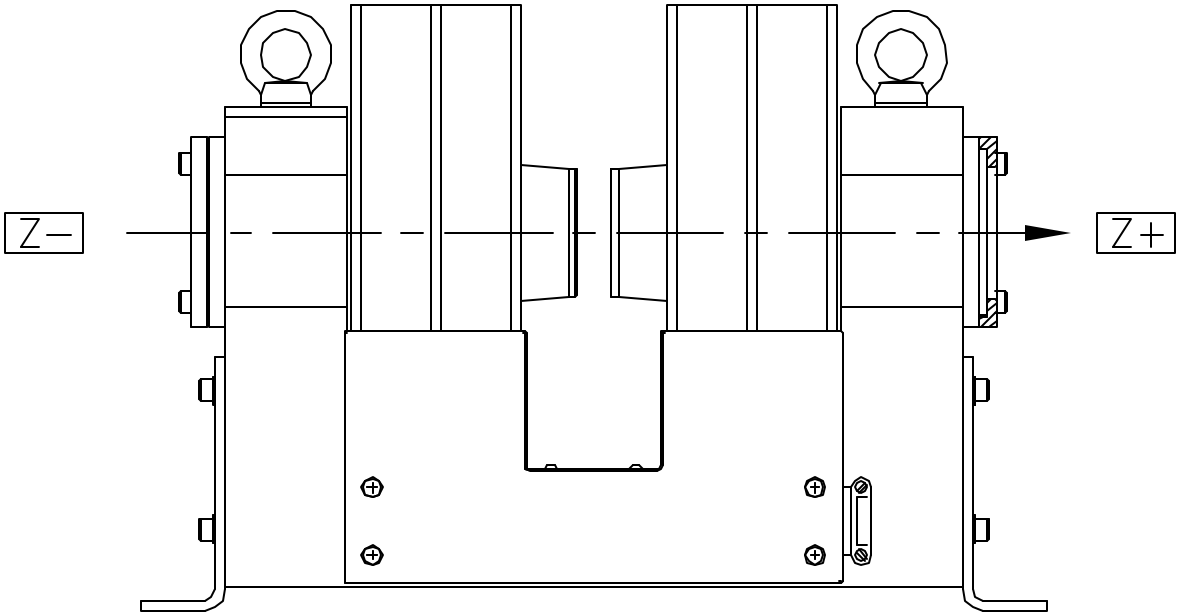
APPLIES TO ASSY No.
11901050

COMPANY
GMW ASSOCIATES

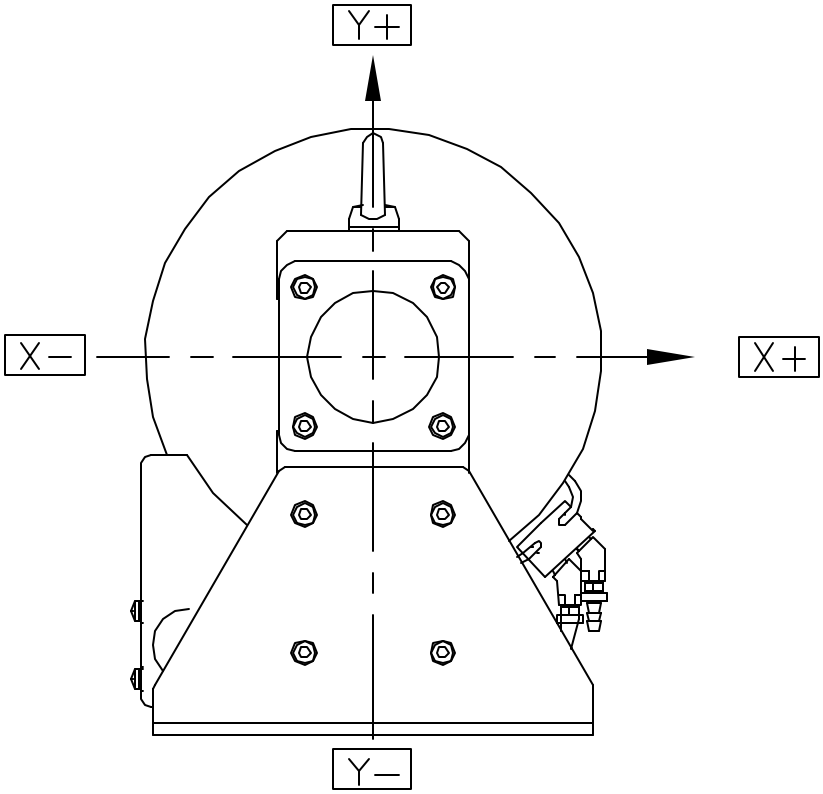
APPROVED BY | DATE

SHEET 1 OF 1

FRONT VIEW



SIDE VIEW



MAGNETIC PLOTTING AXIS

11901130	A	SHEET 1 OF 1

Section 10

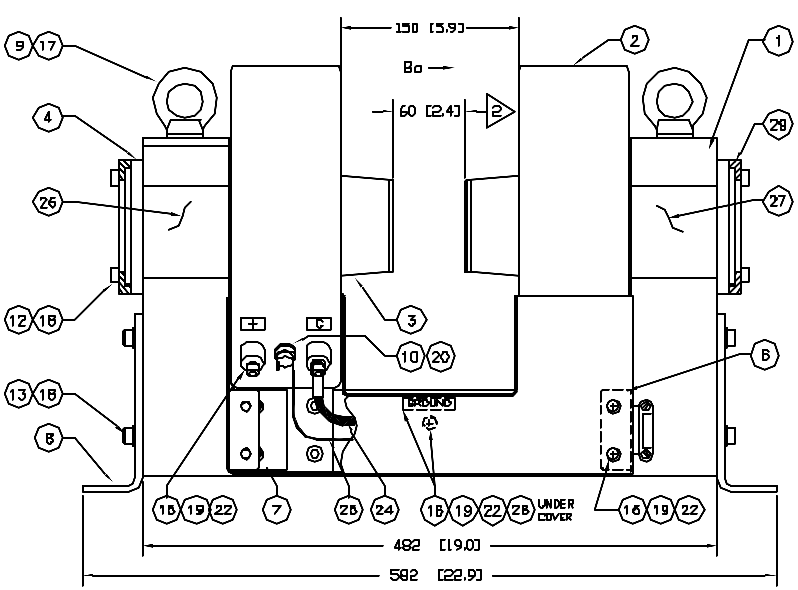
DRAWINGS

PROPRIETARY

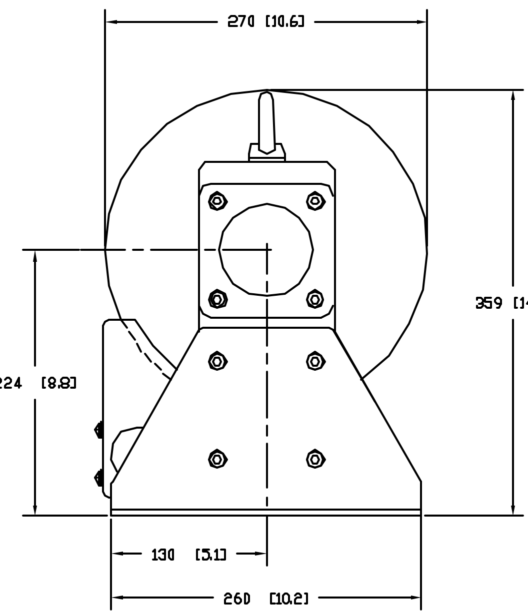
THIS DRAWING CONTAINS CONFIDENTIAL INFORMATION PROPRIETARY TO GMW INC. IT MUST NOT BE REPRODUCED OR DISCLOSED TO OTHERS OR USED IN ANY OTHER WAY, IN WHOLE OR IN PART EXCEPT AS AUTHORIZED IN WRITING BY GMW INC.

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE			
B	CHG POLE DESIGN, ADD POLE RETAINER [ITEM 29]		12/12/97	G.DOUGLAS
C	CHG COIL POWER SPECIFICATIONS		08/24/00	G.DOUGLAS
D	WEIGH MAGNET, ADD CORRECT MASS TO SPECIFICATIONS		08/08/03	G.DOUGLAS
E	REAR VIEW OF MAGNET NOW CHANGED TO FRONT VIEW		08/12/03	G.DOUGLAS

FRONT VIEW

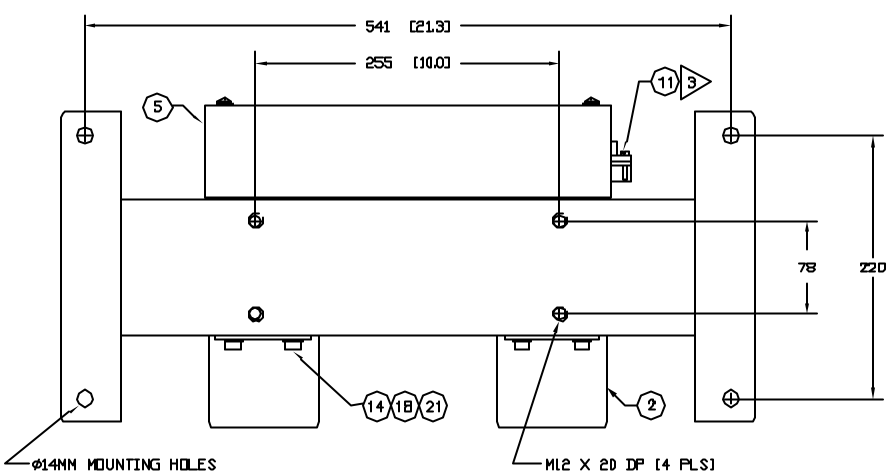


SIDE VIEW



NOTES:

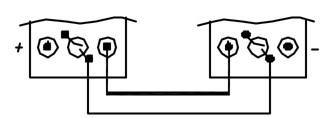
1. BOLTS USED TO SECURE POLE WITHOUT SPACER. [ITEM 4] x SHSC M8 x 16 LONG [NOT SHOWN]
2. POLE GAP FIXED BY POLE SPACERS [ITEM 4] MIN GAP 40 mm MAGNET SHOWN WITH 10 mm POLE SPACERS FOR 60 mm GAP
3. RH SIDE CABLE ENTRY SHOWN. LH ENTRY OPTIONAL



BOTTOM VIEW

MAGNET WIRING SCHEMATIC

FRONT VIEW



MAGNET SPECIFICATIONS

POLE FACE DIAMETER	76 mm
POLE GAP	40 mm, MINIMUM, 150mm MAXIMUM
COILS [series connected]	
MAX RESISTANCE	0.55 Ohm
MAX POWER [continuous]	20A/10V, [0.20 kW]
PEAK POWER	75A/40V, [3.0 kW] [20 sec max on 5% duty cycle]
SELF INDUCTANCE	60 mH
COOLING	AIR CONVECTION
THERMAL INTERLOCK	OPEN CIRCUIT ABOVE 50°C [122°F]
MASS	135 kg [297 lbs]

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

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
29	2	17901470	POLE RETAINER	
28	1	10800720	LABEL, GROUND [Fitted under Cover]	
27	1	10900240	LABEL, CAUTION [RH Side]	
26	1	10800230	LABEL, SPECIFICATION [LH side]	
25	1	16900250	CABLE ASSY, INTERLOCK LINK	
24	1	16800240	CABLE ASSY, CURRENT LINK	
23	5	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	6	BN 737	WASHER, M6 X 16 X 1.6 FLAT S/S	
18	32	BN 737	WASHER, M8 X 15 X 1.8 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, M6 X 12 S/S	
14	24	DIN 912	SHCS, M8 X 16 S/S	
13	8	DIN 912	SHCS, M8 X 20 S/S	1
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	9-0503	EYEBOLT, M12	
8	2	17901450	ANGLE BRACKET	
7	1	17801432	TERMINAL COVER BRACKET [WITHOUT HOLE]	
6	1	17901431	TERMINAL COVER BRACKET, [WITH HOLE]	
5	1	17801420	TERMINAL COVER	
4	2	17901400	POLE SPACER, 10MM THICK	
3	2	17801390	POLE, 76NN FACE	
2	2	11901060	COIL ASSEMBLY	
1	1	17801380	YOKE	

PARTS LIST

DRAWN G.DOUGLAS	DATE 11/24/97	DO NOT SCALE FROM DRAWING
CHECK	DATE	DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)
ENGINEERING	DATE	

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	63	1.6

NEXT ASSY: | SYSTEM: 5403EG

SOFTWARE AUTOCAD 2000

THIRD ANGLE PROJECTION

GMW

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

TITLE: MAGNET ASSEMBLY MODEL: 5403EG-20

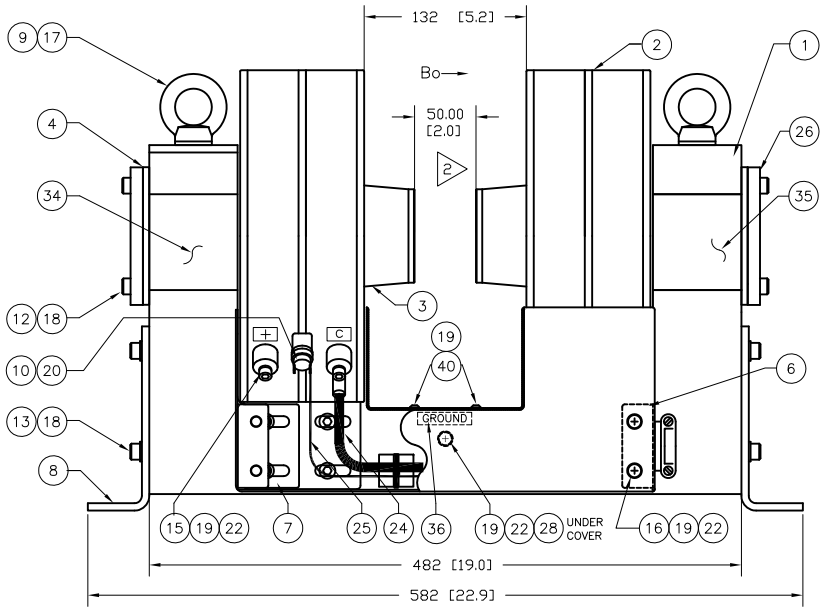
SIZE A1 | DRAWING NO. 11901050 | REV E

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

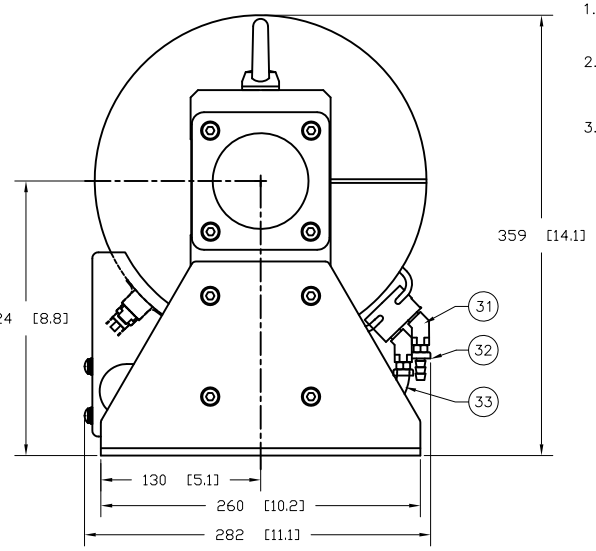
REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		02/24/03	G.DOUGLAS
B	ADD ITEM 40, INCREASE ITEM 19, CHG ITEM 34, 35		03/18/03	G.DOUGLAS
C	CHG ITEM 37 DRAWING NO, CORRECT WEIGHT ADDED		06/04/03	G.DOUGLAS

FRONT VIEW

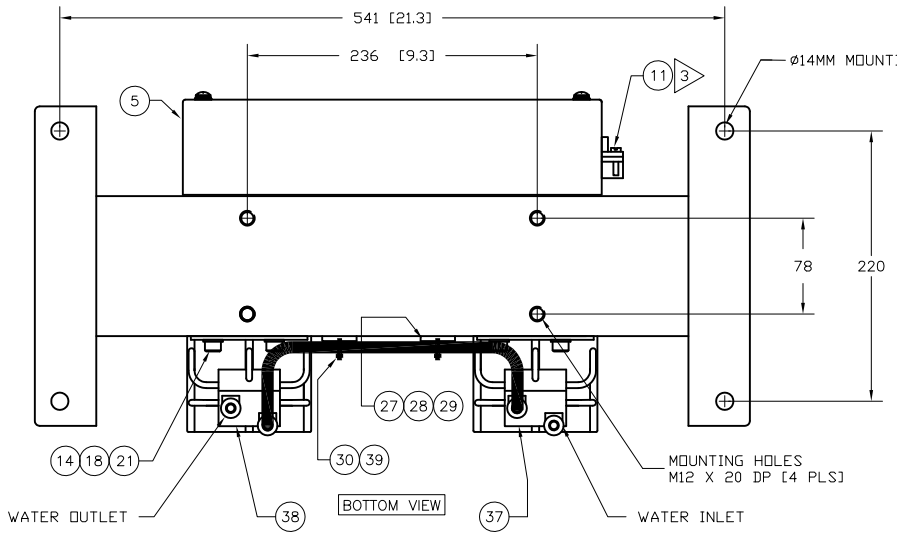


SIDE VIEW



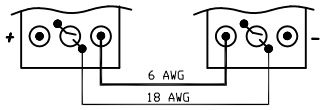
NOTES:

1. BOLTS USED TO SECURE POLE WITHOUT SPACER. [ITEM 14] x SHSC M6 x 16 LONG [NOT SHOWN]
2. POLE GAP FIXED BY POLE SPACERS [ITEM 4] MIN GAP 40 mm MAXIMUM GAP 130 mm. SUFFIX ON MAGNET DWG NO REFERS TO POLE GAP. 11901080–50 = 50mm POLE GAP.
3. RH SIDE CABLE ENTRY SHOWN. LH ENTRY OPTIONAL



MAGNET WIRING SCHEMATIC

FRONT VIEW



MAGNET SPECIFICATIONS

POLE GAP	40 mm, MINIMUM, 130 MAXIMUM
POLE FACE	CYLINDRICAL ø76mm [3"] TAPERED ø38mm [1.5"]
COILS [series connected]	
MAX RESISTANCE	0.55 Ohm
MAX POWER [air]	20A/10V, [0.20 kW]
MAX POWER [water]	50A/25V, [1.25 kW]
PEAK POWER	75A/40V, [3.0 kW] [120 sec max on 30% duty cycle]
SELF INDUCTANCE	60 mH
COOLING:	2 l/min [0.6 GPM] @ 0.5 BAR [8 PSID]
THERMAL INTERLOCK	OPEN CIRCUIT ABOVE 50°C [122°F]
MASS	141kg [310 lbs]

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

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
40	4		M6 X 16 SHCS BUTTON HD S/S	
39	4	3304	CABLE TIE T & B	
38	1	10900880	LABEL, MANIFOLD [LH Side]	
37	1	10900890	LABEL, MANIFOLD [RH Side]	
36	1	10900720	LABEL, GROUND [Fitted under Cover]	
35	1	10900270	LABEL, CAUTION [RH Side]	
34	1	10900260	LABEL, SPECIFICATION [LH side]	
33	A/R	B704	HOSE, 1/4" ID, RUBBER I/E	
32	4	KA04–02MB	HOSE COUPLING 6.0mm HOSE 1/8 NPT I/E	
31	4	BF34004502	ELBOW 45°, BRASSFIT	
30	4	MB4A	MOUNTING PAD TYTON	
29	8	BN 737	WASHER, M4 X 8 X 0.5 FLAT S/S	
28	8	DIN 6797	WASHER, M4 X 0.7 INT LOCK, S/S	
27	8	DIN 7985A	SCREW, M4 X 8 PAN S/S	
26	2	17901470	POLE RETAINER	
25	1	16900250	CABLE ASSY, INTERLOCK LINK	
24	1	16900240	CABLE ASSY, CURRENT LINK	
23	5	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 2.0 SPRING LOCK, S/S	
20	2		WASHER, M5 X 15 X 3, NEOPRENE	
19	9	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, M6 X 12 S/S	
14	24	DIN 912	SHCS, M8 X 16 S/S	
13	8	DIN 912	SHCS, M8 X 20 S/S	1
12	8	DIN 912	SHCS, M8 X 25 S/S	
11	1	3304	CABLE CLAMP, T & B	
10	2	3450G611–1	TEMP SENSOR, 50°C 10–32UNF ELMWOOD	
9	2	9–0503	EYEBOLT, M12	
8	2	17901450	ANGLE BRACKET	
7	1	17901422	TERMINAL COVER BRACKET [WITHOUT HOLE]	
6	1	17901421	TERMINAL COVER BRACKET, [WITH HOLE]	
5	1	17901480	TERMINAL COVER	
4	2	17901400–05	POLE SPACER, 05mm THICK	
3	2	17901390	POLE, 76MM FACE	
2	2	11901110	COIL ASSEMBLY	
1	1	17901380	YOKE	

PARTS LIST

DRAWN	G.DOUGLAS 02/24/03
CHECK	DATE
ENGINEERING	DATE
	5403EG
NEXT ASSY	SYSTEM
SOFTWARE	AUTOCAD 2000

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

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

THIRD ANGLE PROJECTION

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

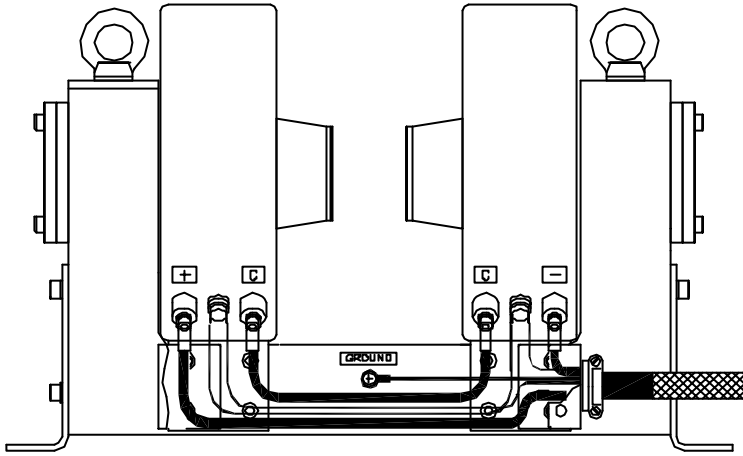
TITLE
MAGNET ASSEMBLY
MODEL: 5403EG–50

SIZE	DRAWING NO.	REV
A1	11901080–50	C

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

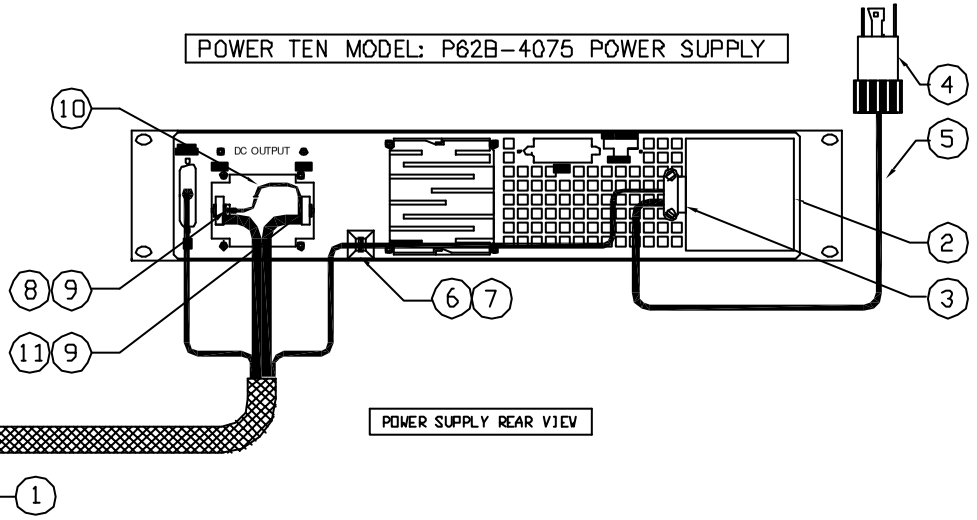
REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		12/07/97	G.DOUGLAS
B	ADD PROTECTION DIODE, CHG REAR TO FRONT VIEW		04/28/03	G.DOUGLAS

MODEL 5403/5403EG ELECTROMAGNET



FRONT VIEW TERMINAL COVER REMOVED

POWER TEN MODEL: P62B-4075 POWER SUPPLY



POWER SUPPLY REAR VIEW

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
11	1		CRIMPLUG	
10	A/R		WIRE, 16 AWG PVC BLACK	
9	1		HEATSHRINK 12mm 1/2" SLEEVING, BLACK	
8	1	NTE6076	RECTIFIER DIODE [Protection Diode] NTE	
7	1	08432	CABLE TIE, NYLON 2.5MM WIDE, BAR-LOCK	
6	1	08461	CABLE TIE MOUNT, ADHESIVE, BAR-LOCK	
5	1	4A-1203	POWER CORD, TYPE SO 3 CORE 12AWG	N/S
4	1	L15-20P	PLUG 3PHASE/20A, NYLON. BRYANT	N/S
3	1	3303	CABLE CLAMP THOMAS & BETTS	
2	1	12900010	AC TERMINAL BOX	
1	1	16900230	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 13900430 FOR AC INPUT RATINGS OTHER THAN 2 PHASE 208V
3. 5403EG-20 ELECTROMAGNET SHOWN. 5403EG-50/5403 HAS SAME ELECTRICAL CONNECTIONS.

N/S = NOT SUPPLIED

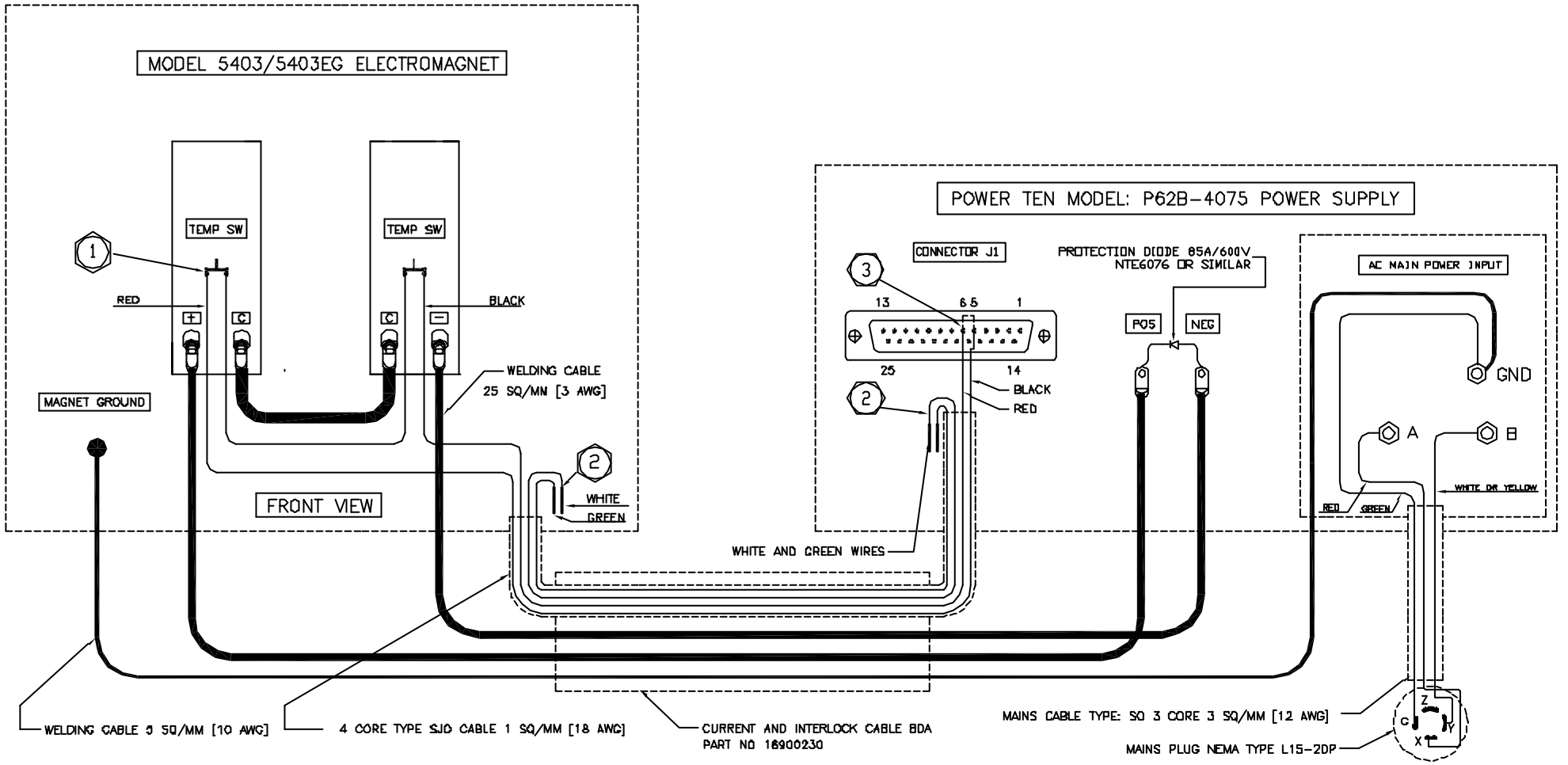
DRAWN G.DOUGLAS 12/07/97
CHECK
ENGINEERING
DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)
5403EG-50
5403EG-20
NEXT ASSY
SYSTEM
SOFTWARE AUTOCAD 2000
THIRD ANGLE PROJECTION

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

TITLE
ELECTRICAL WIRING
5403/P62B-4075

SIZE A1 | DRAWING NO. 11901070 | REV B
SCALE NTS | WT kg | SHEET 1 OF 1

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		12/07/97	G.DOUGLAS
B	CORRECT WIRING ERROR		02/03/98	G.DOUGLAS
C	ADD PROTECTION DIODE, CHG REAR TO FRONT VIEW		06/26/03	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 2 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			

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
		PARTS LIST		

DRAWN G.DOUGLAS 12/07/97 | CHECK | ENGINEERING | DATE

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

	INCHES	MM
X.XX	±.010	±0.02
X.XX	±.01	±0.1
X.X	±.05	±1.3
X	±.06	±1
DECIMAL	±.5	±0.5
FINISH	63	1.6

THIRD ANGLE PROJECTION

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

TITLE
ELECTRICAL WIRING
5403/P62B-4075

NEXT ASSY: 5403EG | SYSTEM

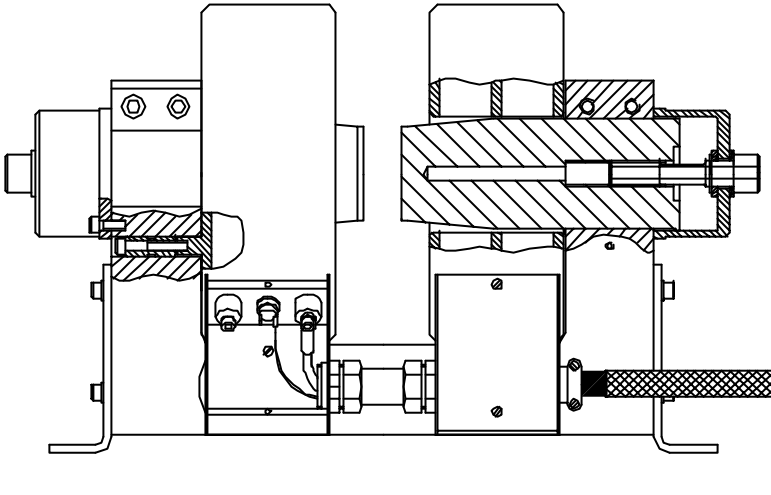
SOFTWARE AUTOCAD 2000

SIZE A1 | DRAWING NO. 13900430 | REV C

SCALE NTS | WT kg | SHEET 1 OF 1

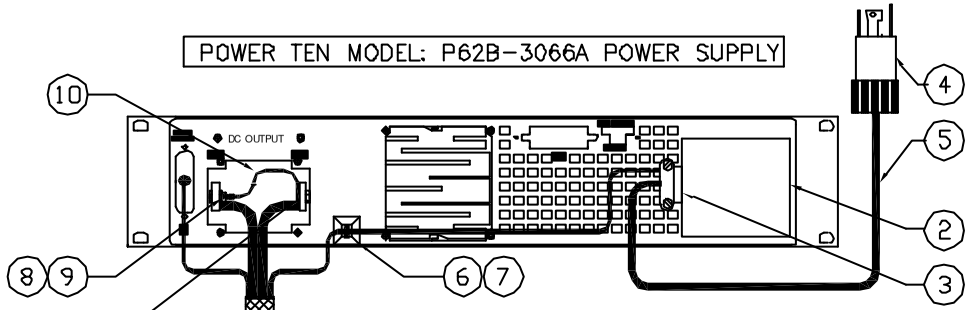
REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		03/19/97	G.DOUGLAS
B	ADD PROTECTION DIODE		04/12/13	G.DOUGLAS

MODEL 5403/5403EG ELECTROMAGNET



FRONT VIEW LH TERMINAL COVER REMOVED

POWER TEN MODEL: P62B-3066A 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 13900240 FOR AC INPUT RATINGS OTHER THAN 2 PHASE 208V
3. 5403 ELECTROMAGNET SHOWN. 5403EG-50/5403EG-20 SAME ELECTRICAL CONNECTIONS.

N/S = NOT SUPPLIED NOTE

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
11	1		CRIMPLUG	
10	A/R		WIRE, 16 AWG PVC BLACK	
9	1		HEATSHRINK 12mm 1/2" SLEEVING, BLACK	
8	1	NTE6076	RECTIFIER DIODE [Protection Diode] NTE	
7	1	08461	CABLE TIE ADHESIVE MTG, NYL BAR-LOK	
6	1	08432	CABLE TIE, NYLON 2.5mm WIDE. BAR-LOK	
5	1	4A-1203	POWER CORD, TYPE SO 3 CORE 12AWG	N/S
4	1	L15-20P	PLUG 3PHASE/20A, NYLON. BRYANT	N/S
3	1	3303	CABLE CLAMP, THOMAS & BETTS	
2	1	12900010	AC TERMINAL BOX	
1	1	16900150	CURRENT & INTERLOCK CABLE 50A	

PARTS LIST

DRAWN G.DOUGLAS DATE 03/19/97
CHECK DATE
ENGINEERING DATE
NEXT ASSY SYSTEM
SOFTWARE AUTOCAD 2000

DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)
LINEAR INCHES MM
X.XX ±.02 ±0.5
X.XX ±.01 ±0.1
XX ±.03 ±0.8
X ±1/64 ±1
DEG. ±.5 ±0.5
FINISH 63 1.6

THIRD ANGLE PROJECTION

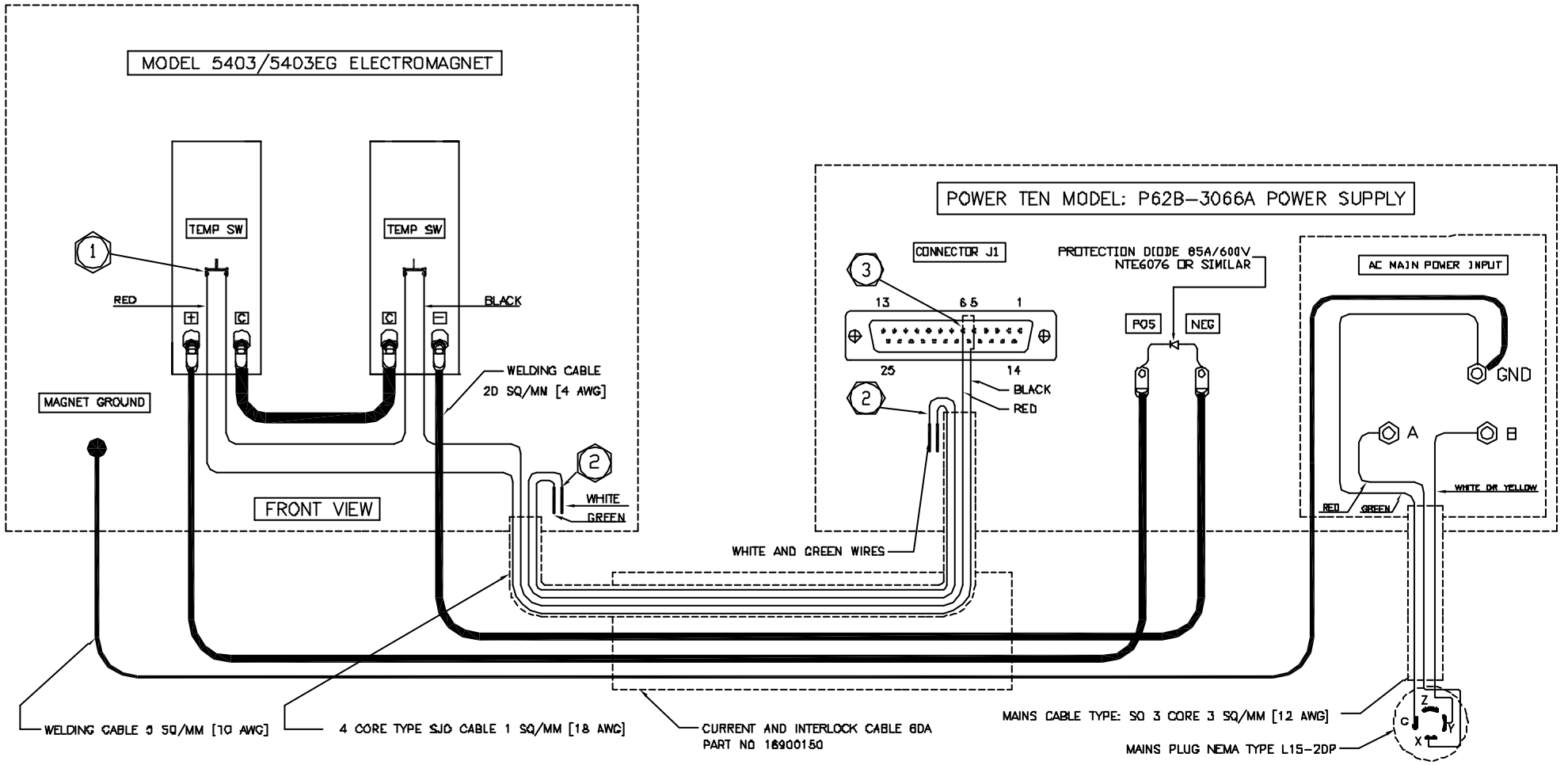
GMW
955 Industrial Rd, San Carlos, CA 94070
Tel: (650)802-8292. Fax: (650)802-8298.

TITLE
ELECTRICAL ASSEM
5403/P62B-3066A

SIZE A1 | DRAWING NO. 11900740 | REV B
SCALE NTS | WT kg | SHEET 1 OF 1

PROPRIETARY

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		03/19/97	G.DOUGLAS
B	ADD PROTECTION DIODE		04/12/03	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 2 PHASE, 47 to 63HZ	208V	–	–
AC INPUT FULL LOAD CURRENT	19	–	–
RECOMMENDED MAIN AC BREAKER	20	–	–
RECOMMENDED AC POWER OUTLET	L15-20R	–	–
RECOMMENDED AC CABLE SIZE	3 SQ/MM	–	–
NOTE: DRAWING SHOWS POWER SUPPLY FOR US 208V AC POWER			

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
PARTS LIST				

DRAWN G.DOUGLAS 03/19/97 | CHECK | ENGINEERING | DATE

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

	LINEAR	INCHES	mm
	X.XX	±.03	±0.8
	X.XX	±.01	±0.3
	X.X	±.05	±1.3
	X	±.1	±2.5
	ANG.	±.5	±0.5
	FINISH	63	1.6

THIRD ANGLE PROJECTION

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

TITLE: ELECTRICAL WIRING 5403/P62B-3066A

5403EB-30 | 5403EB-20 | 5403

NEXT ASSY | SYSTEM

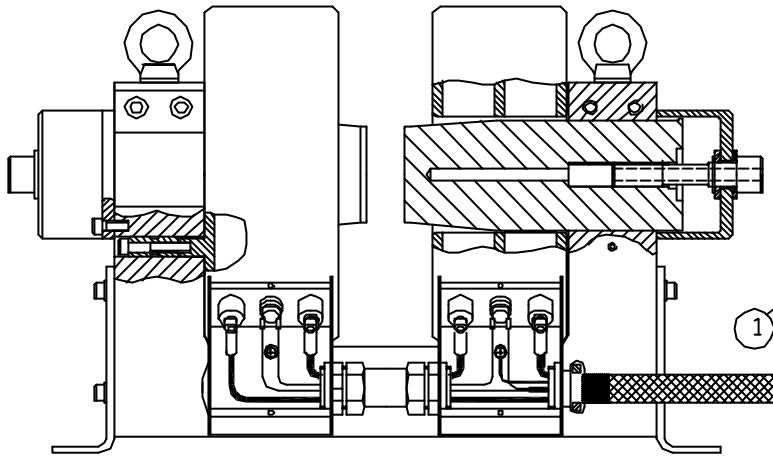
SOFTWARE AUTOCAD 2000

SIZE A1 | DRAWING NO. 13900240 | REV B

SCALE NTS | WT kg | SHEET 1 OF 1

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		04/18/05	G.DOUGLAS

MODEL: 5403 ELECTROMAGNET



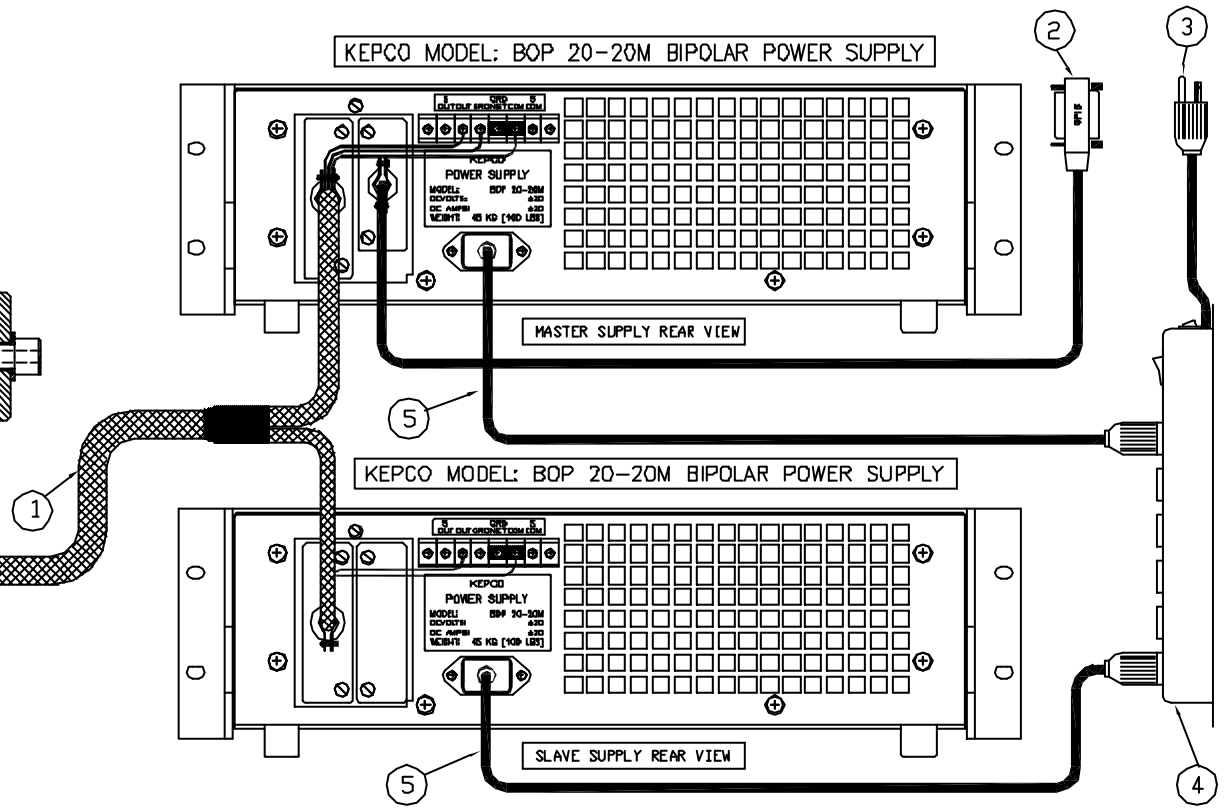
FRONT VIEW TERMINAL COVER REMOVED

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 13900110 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	VLB20-15	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	15900070	CURRENT & INTERLOCK CABLE 40A	

PARTS LIST

DRAWN G.DOUGLAS 04/18/05
CHECK
ENGINEERING
DO NOT SCALE FROM DRAWING DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)
5403EC-50
5403EC-20
5403
NEXT ASSY
SYSTEM
SOFTWARE AUTOCAD 2000
THIRD ANGLE PROJECTION

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

TITLE: ELECTRICAL ASSEM 5403/BOP20-40

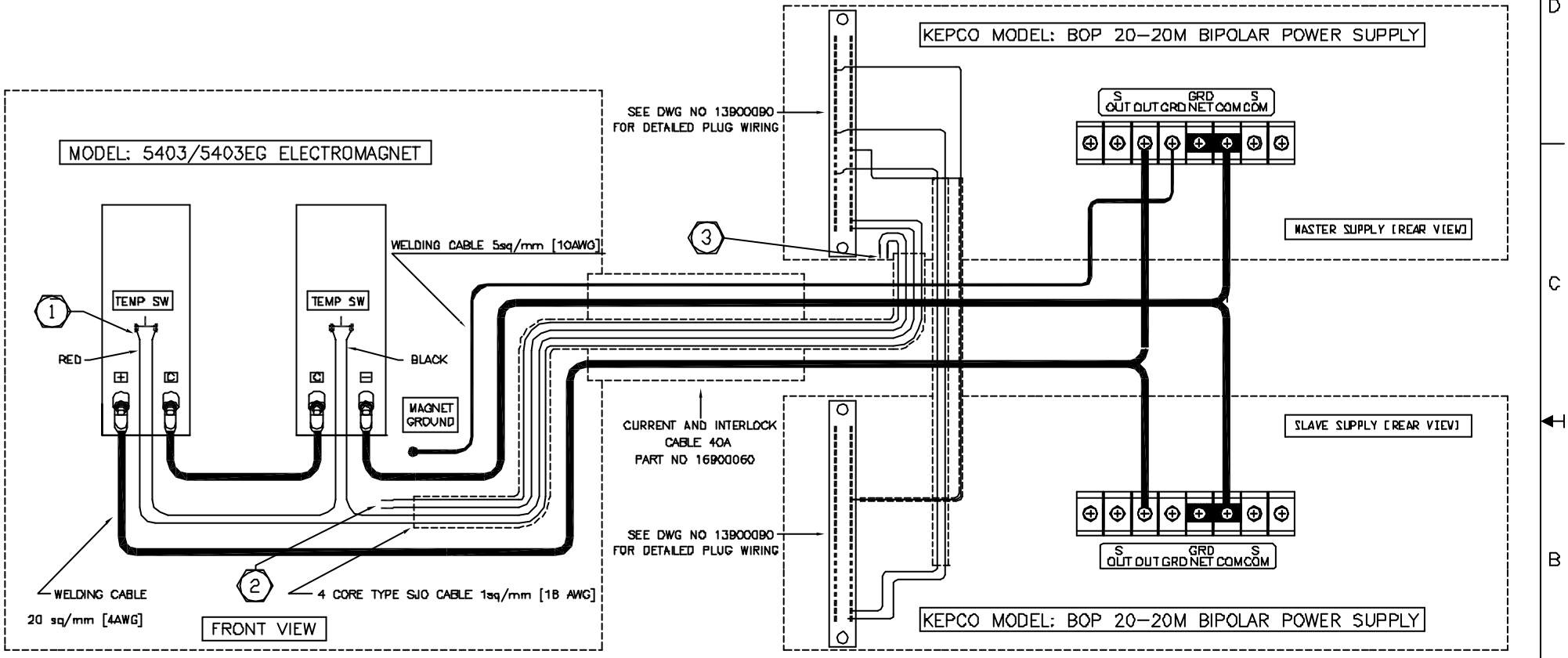
SIZE A1 | DRAWING NO. 11900240 | REV A

SCALE NTS | 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 WAY WITHOUT THE PRIOR WRITTEN CONSENT OF GMW INC.

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		04/20/16	G.DOUGLAS



NOTE:

1. CONNECT MAGNET TEMPERATURE INTERLOCK WIRING DIRECTLY ONTO QC TABS ON TEMP THERMOSTATS
2. LEAVE WHITE AND GREEN WIRES FULL LENGTH AND INSULATE WITH HEAT SHRINK SLEEVING CAN BE USED FOR WATER FLOW SWITCH INTERLOCK [OPTION]
3. INSULATE WHITE AND GREEN WIRES WITH HEAT SHRINK SLEEVING [not used]

ELECTROMAGNET SYSTEM ELECTRICAL REQUIREMENTS			
AC INPUT POWER 1 PHASE, 30 to 65HZ	115V	208V	230V
AC INPUT FULL LOAD CURRENT	11.0*	6.5*	6.0*
RECOMMENDED MAIN AC BREAKER	25	15	15
RECOMMENDED AC POWER OUTLET	5-20R	–	–
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
* RATING GIVEN FOR EACH POWER SUPPLY, TOTAL SYSTEM CURRENT DOUBLE VALUES SHOWN

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE

PARTS LIST

DRAWN G.DOUGLAS 04/20/16 DATE
CHECK DATE
ENGINEERING DATE

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

	LINEAR INCHES	LINEAR MM
X.XX	±.010	±0.25
X.XX	±.01	±0.1
XX	±.03	±0.8
X	±1/64	±0.1
DECIMAL	±.5	±0.5
FINISH	63 ✓	1.6 ✓

THIRD ANGLE PROJECTION

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

TITLE
ELECTRICAL WIRING
5403/BOP20-40

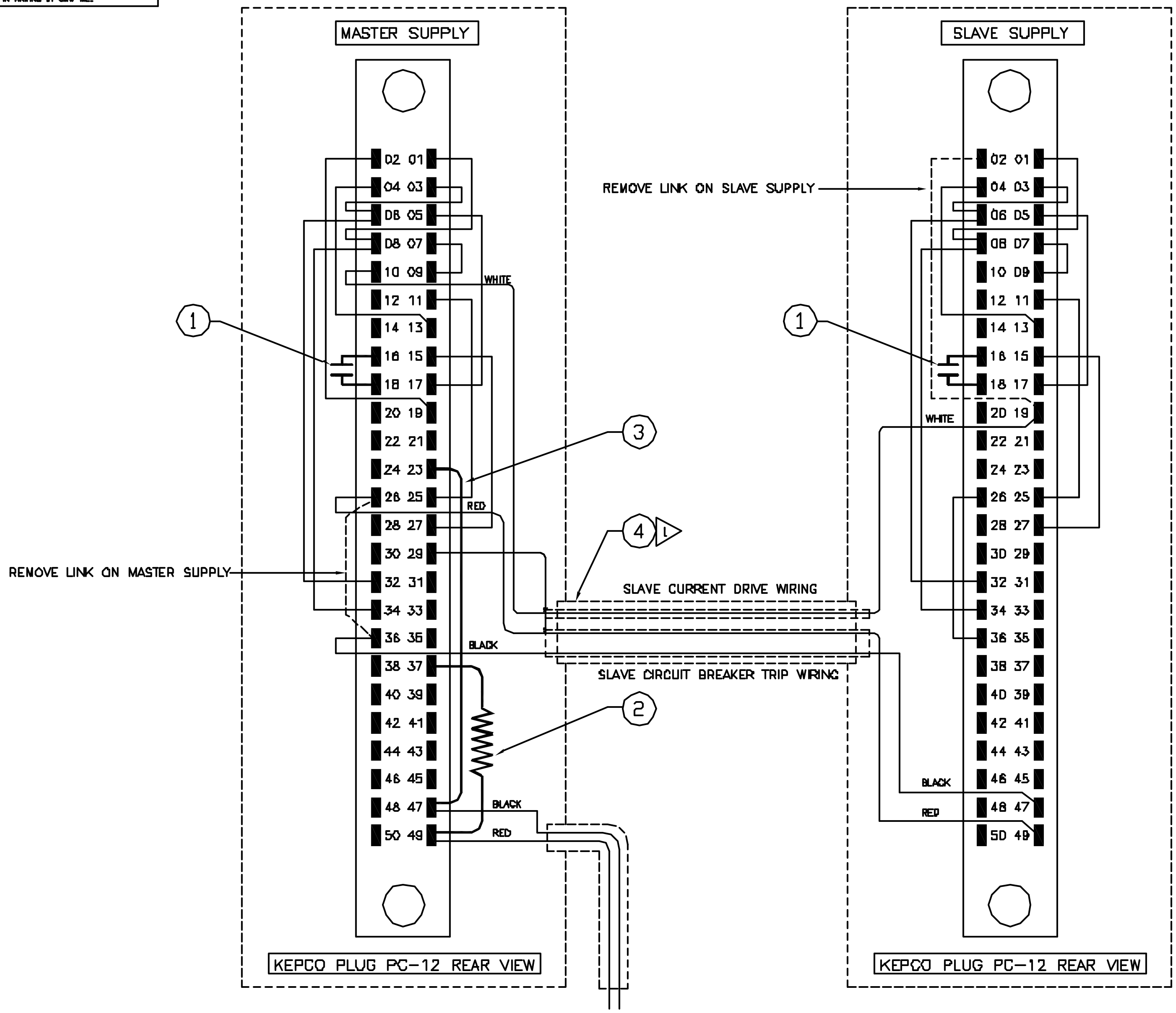
NEXT ASSY	SYSTEM
	5403-80
	5403EG-20
	5403

SOFTWARE AUTOCAD 2000

SIZE A1 | DRAWING NO. 13900110 | REV A

SCALE NTS | WT kg | SHEET 1 OF 1

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		03/30/05	G.DOUGLAS



NOTE:

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

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

PARTS LIST

DRAWN G.DOUGLAS DATE 03/30/05
CHECK DATE
ENGINEERING DATE

DO NOT SCALE FROM DRAWING

NEXT ASSY 5403 SYSTEM

SOFTWARE AUTOCAD 2000

THIRD ANGLE PROJECTION

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

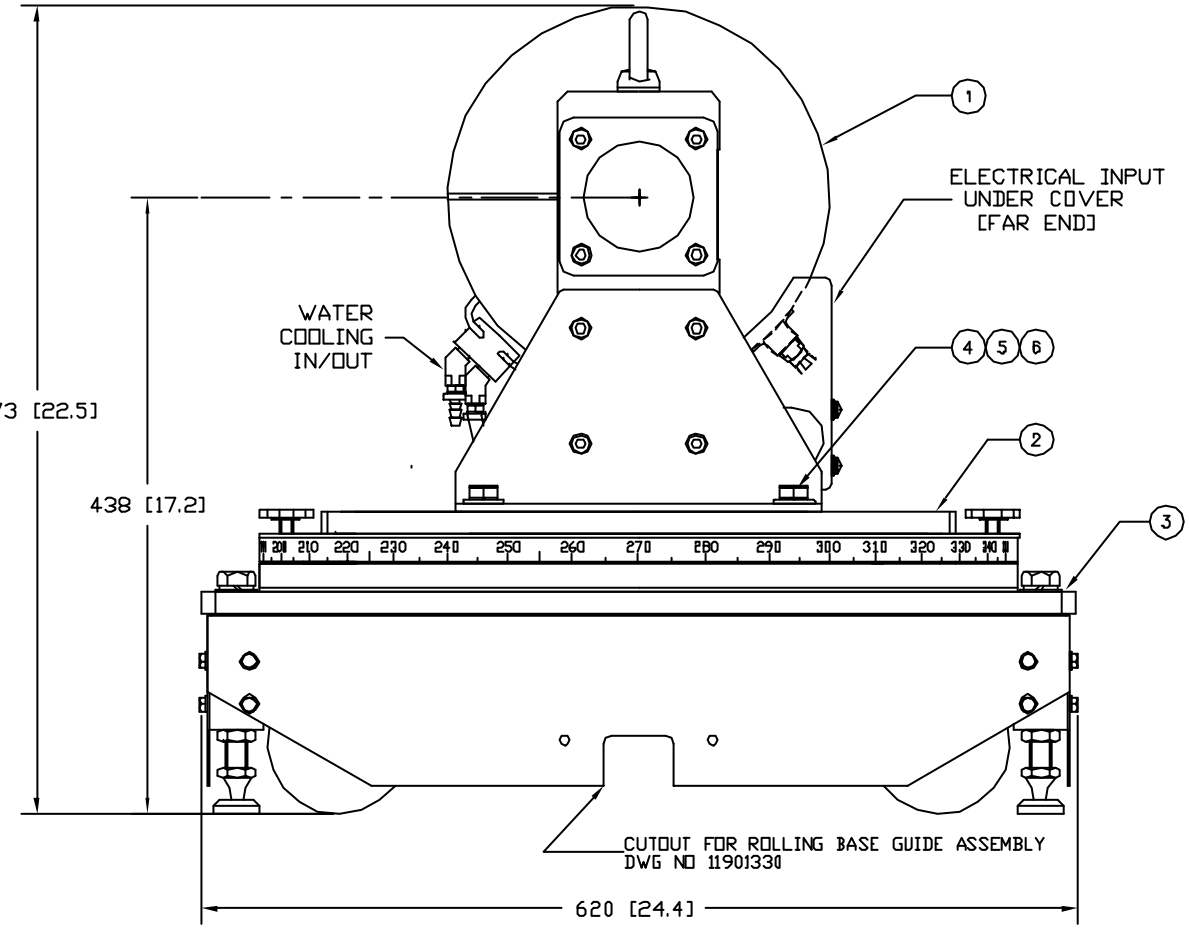
TITLE: ELECTRICAL WIRING BOP 2020/2020

SIZE A1 | DRAWING NO. 13900090 | REV A

SCALE NTS | WT kg | SHEET 1 OF 1

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		06/28/03	G.DOUGLAS

SIDE VIEW



ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
6	4	DIN 127 B	WASHER, M12 SPRING LOCK, S/S	
5	4	DIN 125 A	WASHER, M12 FLAT, S/S	
4	4	DIN 933	BOLT, HEX HD M12 x 25 S/S	
3	1	11803170	ROLLING BASE	
2	1	11802090	ROTATING BASE	
1	1	5403/5403EG	ELECTROMAGNET, 76MM	

PARTS LIST

DRAWN G.DOUGLAS DATE 06/28/03
CHECK DATE
ENGINEERING DATE
NEXT ASSY SYSTEM
SOFTWARE AUTOCAD 2000

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

LINEAR	INCHES	mm
X.XXX	±.005	±0.13
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.

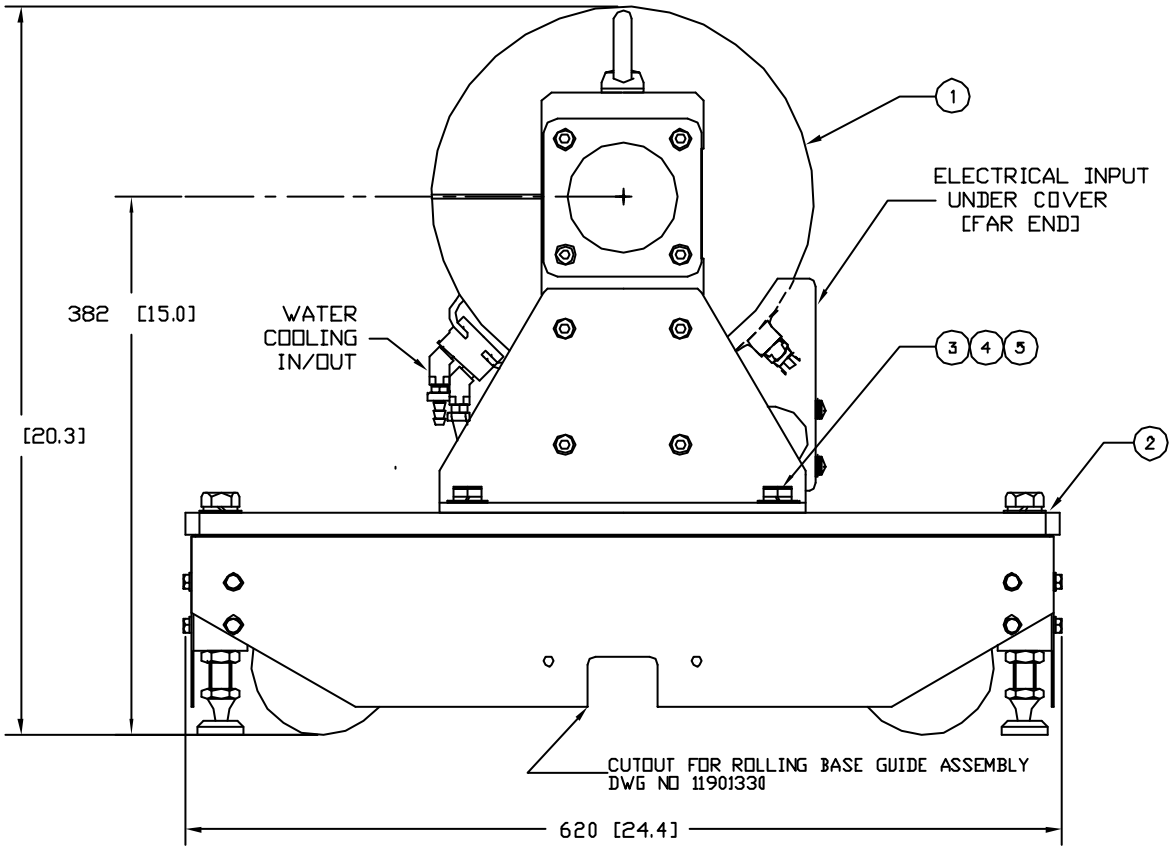
TITLE
ROL/ROT BASE ASSY
MODEL:5403/5403EG

SIZE A2 | DRAWING NO. 11901180 | REV A

SCALE 1:2.5 WT kg | SHEET 1 OF 1

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		06/28/03	G.DOUGLAS

SIDE VIEW



ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
5	4	DIN 127 B	WASHER, M12 SPRING LOCK, S/S	
4	4	DIN 125 A	WASHER, M12 FLAT, S/S	
3	4	DIN 933	BOLT, HEX HD M12 x 25 S/S	
2	1	11803170	ROLLING BASE	
1	1	5403/5403EG	ELECTROMAGNET, 76MM	

PARTS LIST

DRAWN G.DOUGLAS DATE 06/28/03
CHECK DATE
ENGINEERING DATE
NEXT ASSY SYSTEM
SOFTWARE AUTOCAD 2000

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

LINEAR	INCHES	mm
X.XXX	±.005	±0.13
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	63	1.6

THIRD ANGLE PROJECTION

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

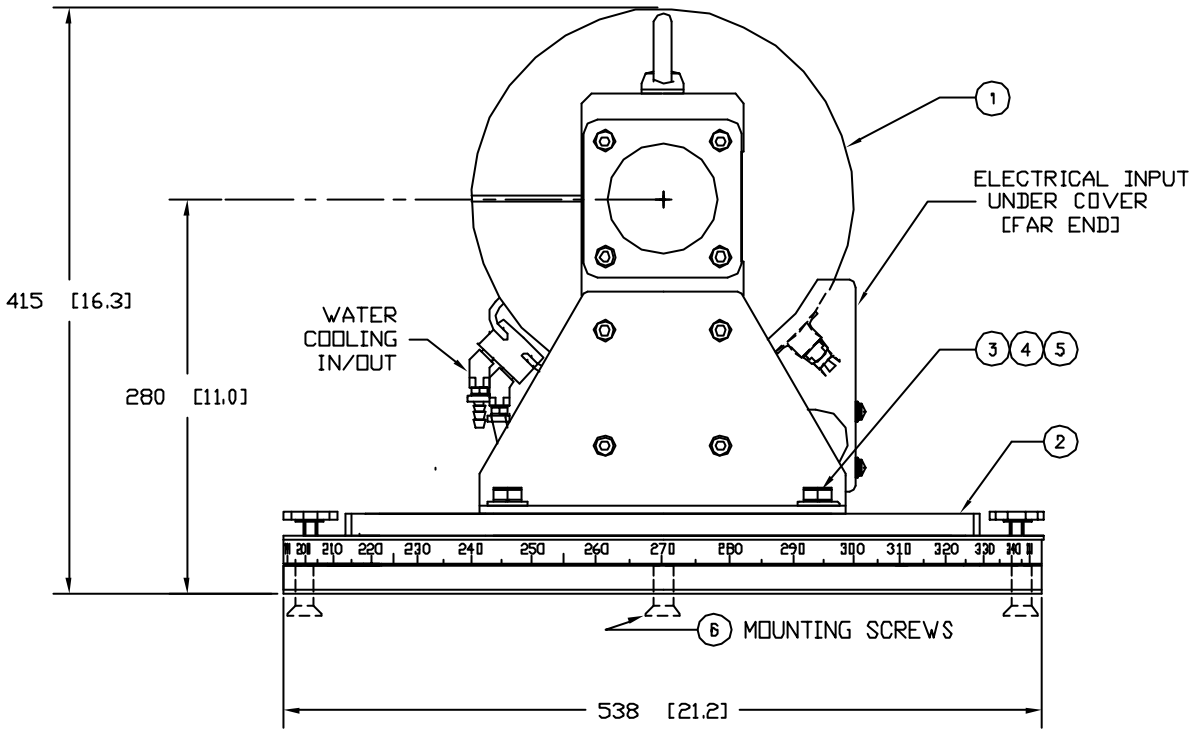
TITLE
ROLLING BASE ASSY
MODEL:5403/5403EG

SIZE	DRAWING NO.	REV
A2	11901160	A

SCALE 1:2.5 WT kg SHEET 1 OF 1

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		06/30/03	G.DOUGLAS

SIDE VIEW



ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
6	4	DIN 7991	SHCS, M12 X 35 FLAT HD S/S	
5	4	DIN 127 B	WASHER, M12 SPRING LOCK, S/S	
4	4	DIN 125 A	WASHER, M12 FLAT, S/S	
3	4	DIN 933	BOLT, HEX HD M12 x 25 S/S	
2	1	11802090	ROTATING BASE	
1	1	5403/5403EG	ELECTROMAGNET, 76MM	

PARTS LIST

DRAWN G.DOUGLAS DATE 06/30/03
CHECK DATE
ENGINEERING DATE
NEXT ASSY SYSTEM
SOFTWARE AUTOCAD 2000

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

	INCHES	mm
LINEAR		
X.XXX	±.005	±0.13
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	63	1.6

THIRD ANGLE PROJECTION

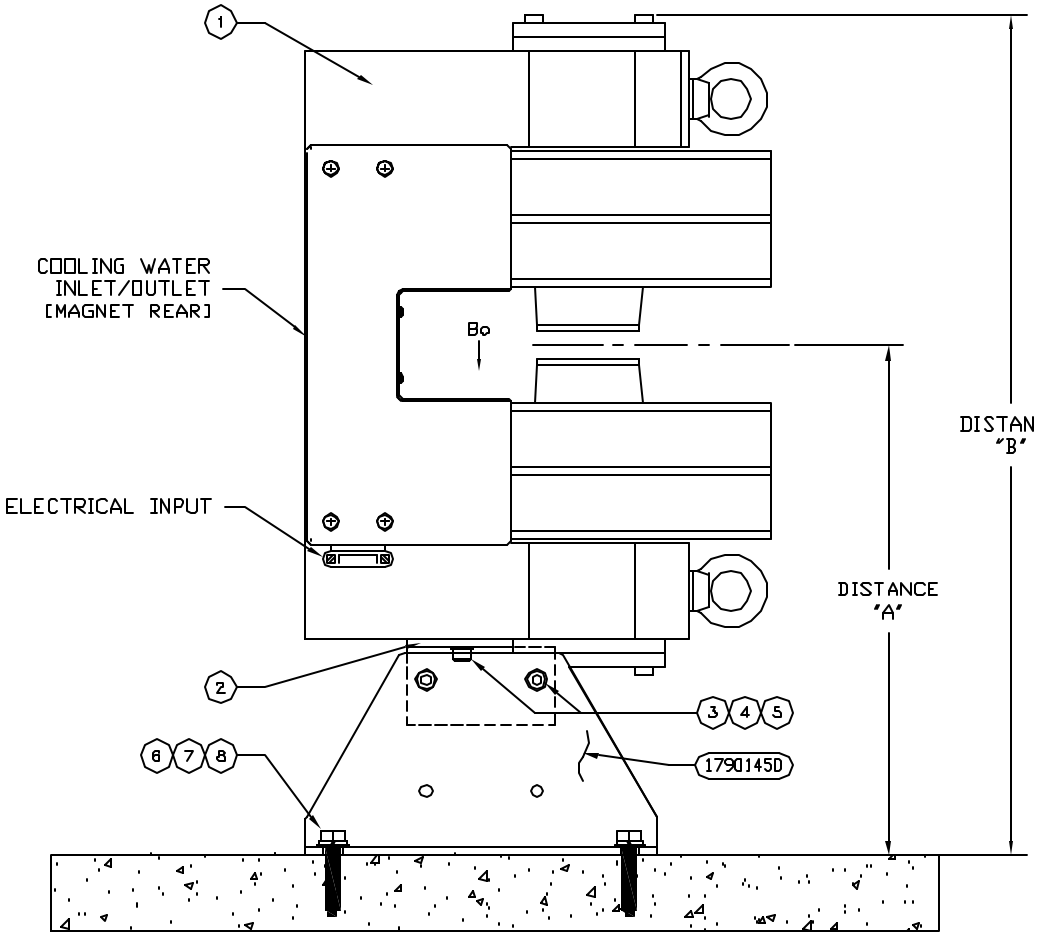
GMW
955 Industrial Rd, San Carlos, CA 94070
Tel: (650)802-8292. Fax: (650)802-8298.

TITLE
ROTATING BASE ASSY
MODEL:5403/5403EG

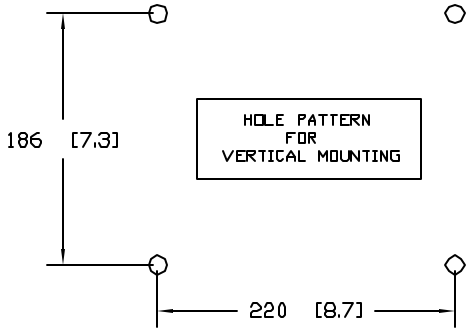
SIZE A2 | DRAWING NO. 11901170 | REV A

SCALE 1:2.5 WT kg | SHEET 1 OF 1

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		06/30/03	G.DOUGLAS



MODEL	DISTANCE "A"	DISTANCE "B"
5403	378mm [14.9"]	623mm [24.5"]
5403EG	390mm [15.3"]	646mm [25.4"]



HOLE PATTERN
FOR
VERTICAL MOUNTING

*** WARNING ***
WHEN THE 5403 ELECTROMAGNET IS VERTICALLY MOUNTED
IT MUST BE BOLTED TO THE FLOOR SECURELY AS SHOWN.

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
8	4		BOLT, M12 or 1/2" EXPANSION	
7	4	DIN 127 B	WASHER, M12 SPRING LOCK, S/S	
6	4	DIN 125 A	WASHER, M12 FLAT, S/S	
5	6	DIN 912	SHCS, M8 X 16 S/S	
4	6	DIN 127 B	WASHER, M8 SPRING LOCK, S/S	
3	6	DIN 125 A	WASHER, M8 FLAT, S/S	
2	1	17612640	VERTICAL MOUNTING BRACKET	
1	1	5403/5403EG	ELECTROMAGNET, 76MM	

PARTS LIST

DRAWN G.DOUGLAS DATE 06/30/03
CHECK DATE
ENGINEERING DATE
NEXT ASSY SYSTEM
SOFTWARE AUTOCAD 2000

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

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

THIRD ANGLE PROJECTION

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

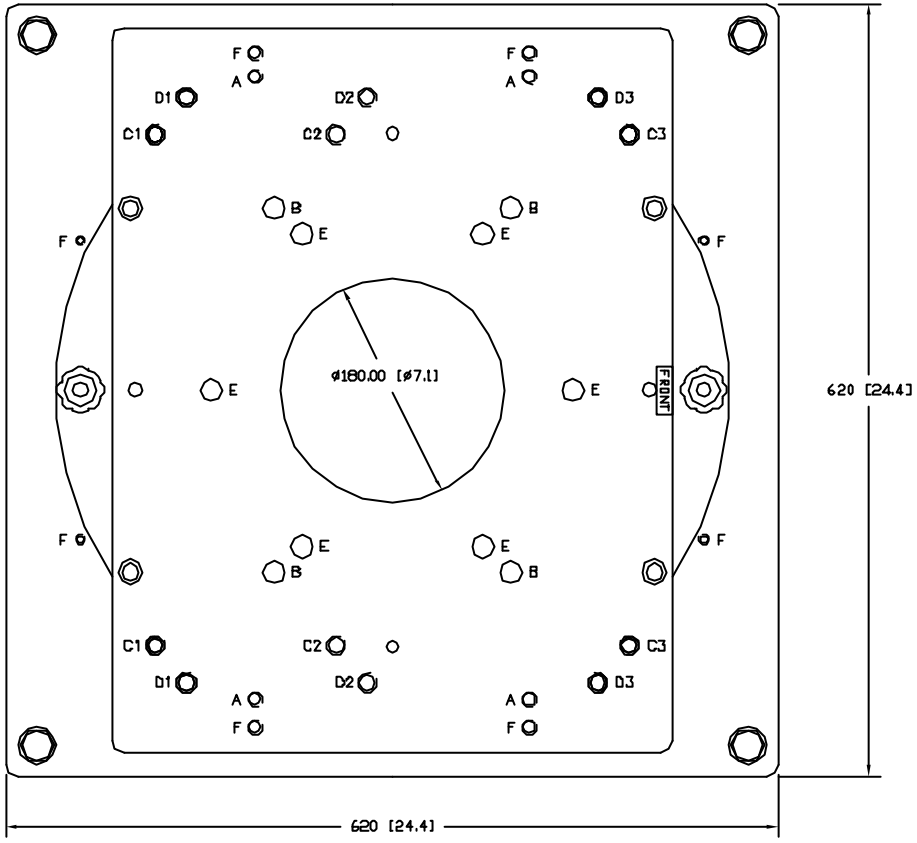
TITLE
VERTICAL MTG ASSY
MODEL:5403/5403EG

SIZE A2 | DRAWING NO. 11901190 | REV A

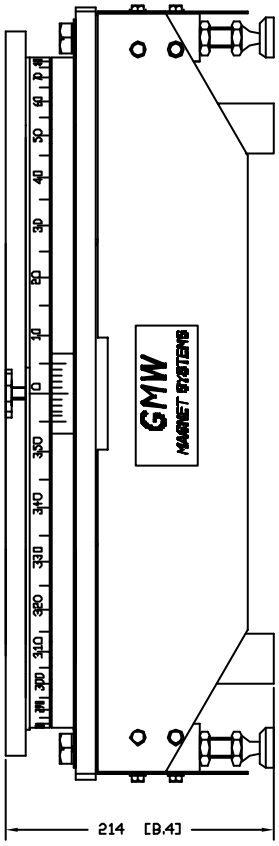
SCALE 1:2.5 WT kg | SHEET 1 OF 1

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		04/27/94	G.DOUGLAS
B	ADD 5403 MTG HOLES		06/13/96	B.DOUGLAS
C	ADD MOTORIZED ROTATING BASE HOLES		07/06/17	B.DOUGLAS

TOP VIEW

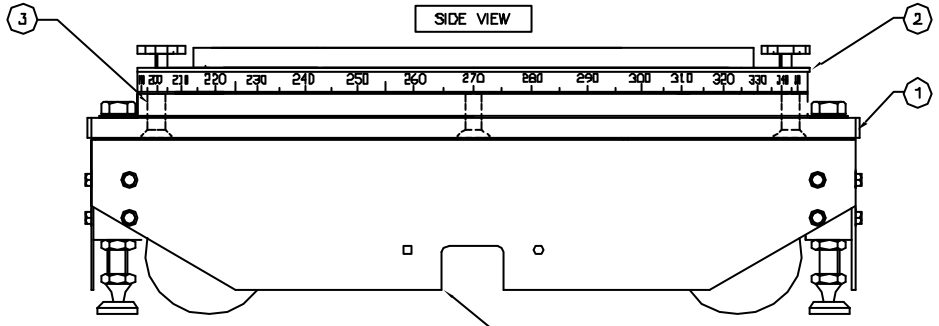


FRONT VIEW



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

SIDE VIEW



ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
3	4	DIN 7991	SHCS, M12 X 35 FLAT HD 5/S	
2	1	11802090	ROTATING BASE ASSEMBLY	
1	1	11803170	ROLLING BASE ASSEMBLY	

PARTS LIST

DRAWN G.DOUGLAS DATE 04/27/94
CHECK DATE
ENGINEERING DATE

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

LINEAR	INCHES	MM
X.XX	±.005	±0.03
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DRILL	±.01	±0.0
FINISH	63	1.6

THIRD ANGLE PROJECTION

NEXT ASSY | SYSTEM
SOFTWARE AUTOCAD 2000

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

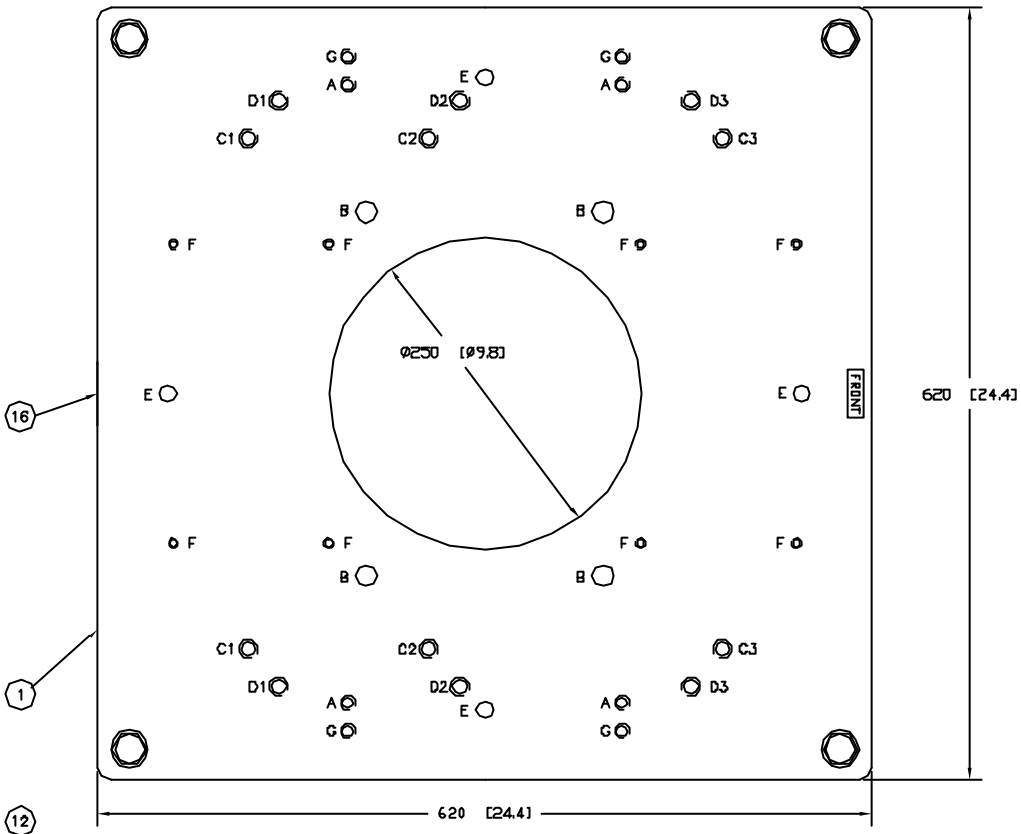
TITLE
ROT/ROLLING BASE
3473/3472/5403

SIZE A1 | DRAWING NO. 11803430 | REV D

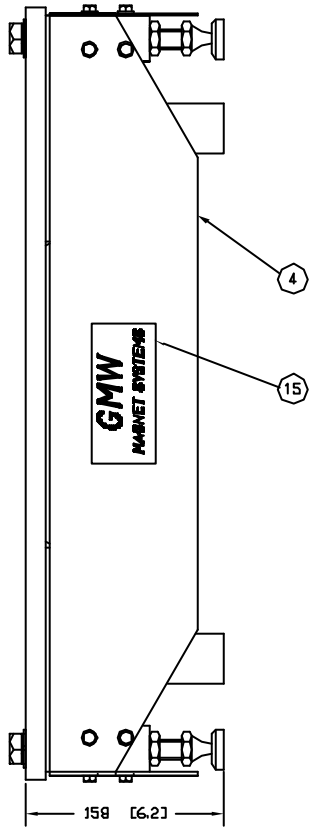
SCALE 1:2 | WT kg | SHEET 1 OF 1

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		08/06/93	A.MARTIN
B	NEW T/B, ADD ITEM 15, MOVE 2,3, SHIFT "A" HOLES		04/29/94	B.DOUGLAS
C	ADD MAGNET HORIZONTAL MOUNTING HOLES		05/08/94	B.DOUGLAS
D	ADD 5403 MTG HOLES		09/13/95	B.DOUGLAS
E	ADD MRD MOTOR DRIVE MOUNTING HOLES		10/21/98	B.DOUGLAS
F	ADD ITEM 16, AND "G" 5403EG MOUNTING HOLES		09/28/99	B.DOUGLAS

TOP VIEW

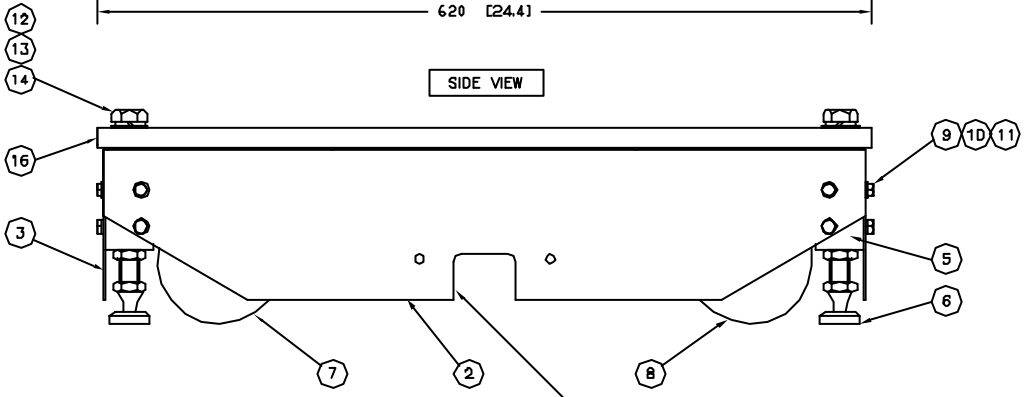


FRONT VIEW



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

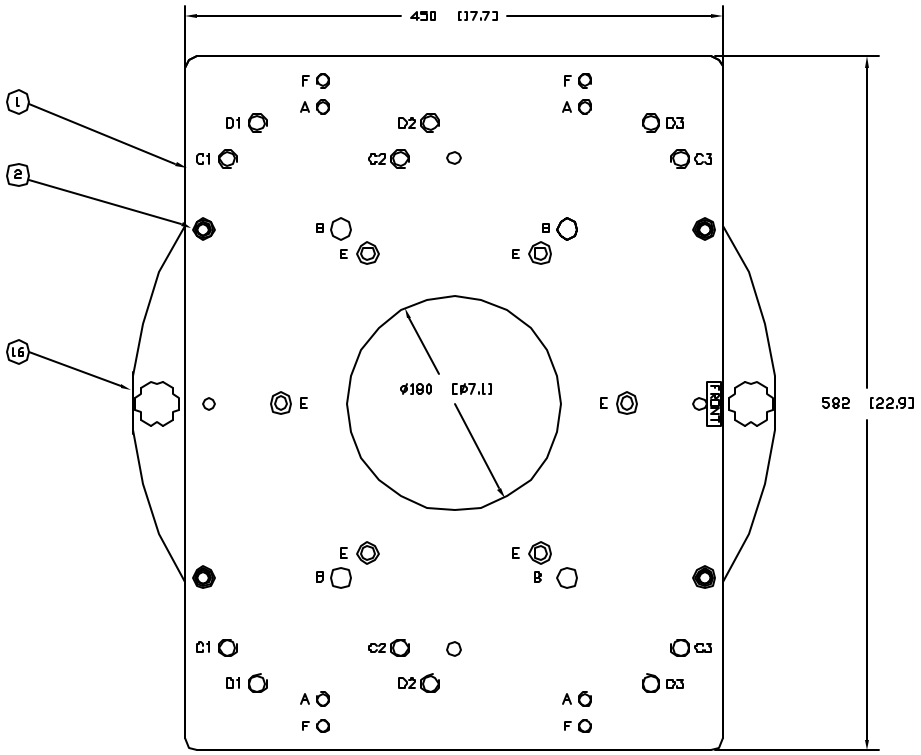
SIDE VIEW

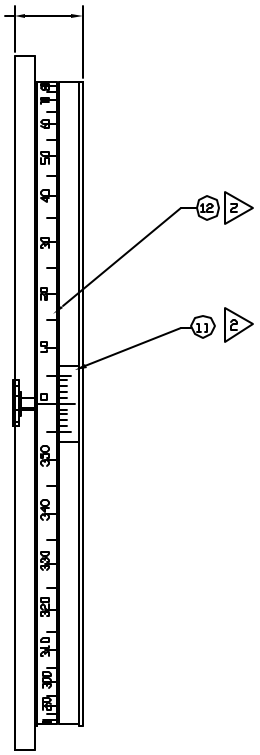


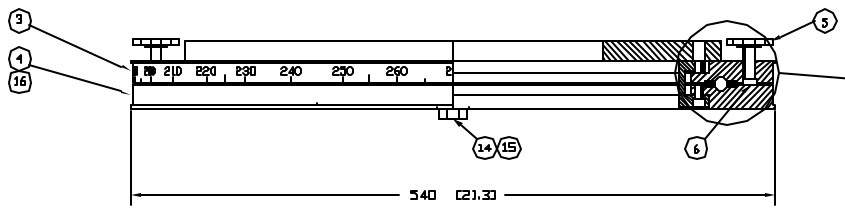
ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
16	1	10901110	LABEL, IDENTIFICATION	
15	1	10901120	LABEL, GMW MAGNET SYSTEMS	
14	4	DIN 125 A	M16 X 3 THICK WASHER, FLAT S/S	
13	4	DIN 127 B	M16 WASHER, SPRING S/S	
12	4	DIN 933	M16 X 40 HEX HD BOLT, S/S	
11	16	DIN 127 B	M6 WASHER, SPRING S/S	
10	16	DIN 433	M6 WASHER, FLAT S/S	
9	16	DIN 933	M6 x 8 HEX HD BOLT S/S	
8	2	REX CHDS 4RT	CASTER, SWIVEL	
7	2	REX CHDF 4RT	CASTER, FIXED	
6	4	17B02180	LEVELLING FOOT	
5	4	17B02160	SUPPORT LEG	
4	1	17B02123	SKIRT PANEL, FRONT	
3	1	17B02122	SKIRT PANEL, REAR	
2	2	17B02121	SKIRT PANEL, SIDE	
1	1	17B02110	BASE PLATE	

PARTS LIST

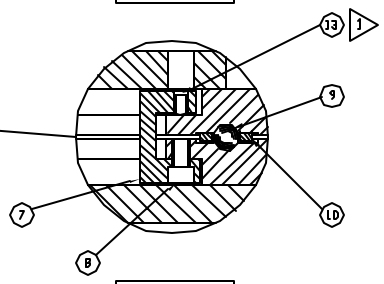
DRAWN A.MARTIN	DATE 08/04/93	DO NOT SCALE FROM DRAWING DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)	GMW 955 Industrial Rd, San Carlos, CA 94070 Tel: (650)802-8292. Fax: (650)802-8296.
CHECK	DATE		
ENGINEERING	DATE		TITLE ROLLING BASE ASSY 3473/3472/5403
NEXT ASSY	SYSTEM	THIRD ANGLE PROJECTION	SIZE A1 DRAWING NO. 11803170 REV F
SOFTWARE AUTOCAD 2000			SCALE 1:2 WT kg SHEET 1 OF 1







DETAILED VIEW



SCALE: 2:1

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		04/27/94	A.MARTIN
B	NEW T/B, SHIFT ITEM 11 & 12 TO FRONT OF BASE.		04/28/94	B.DOUGLAS
C	ADD HORIZONTAL MTG HOLES @ D6/D5		05/10/94	B.DOUGLAS
D	ADD 5403 MTG HOLES, DELETE BASE PLATE		04/28/96	C.DOUGLAS
E	ADD MOTORISED ROT BASE SPOOL HOLES @ C7		09/30/97	B.DOUGLAS
F	CHG ITEM 9 AND ITEM 13		07/29/98	C.DOUGLAS
G	ADD ITEM 16, "F" HOLES, INCR TRANSITION PLATE SIZE		04/27/00	B.DOUGLAS

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

NOTES

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

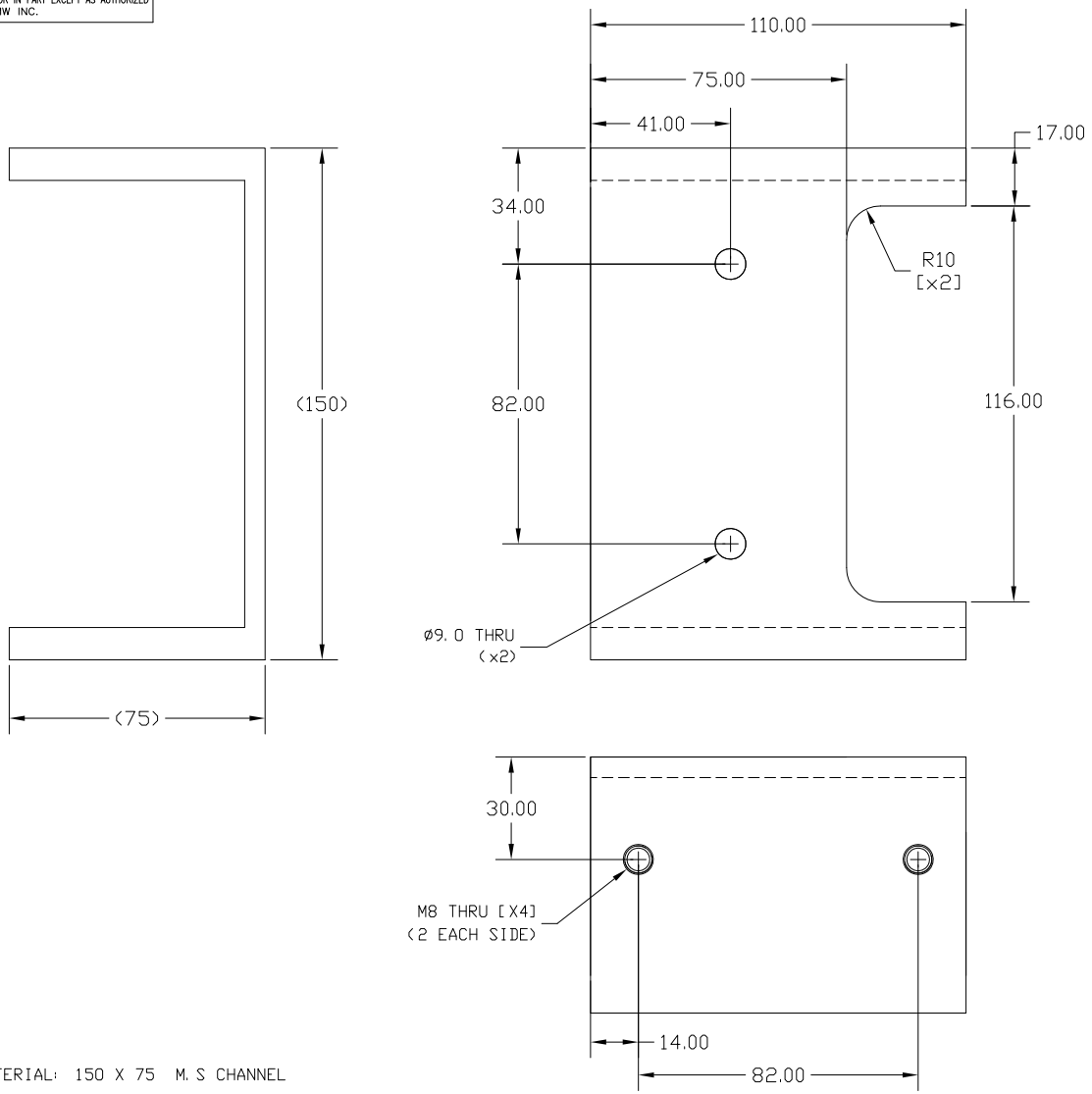
ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
16	1	10801140	LABEL, IDENTIFICATION	
15	4	DIN 7980	WASHER, M12 SPRING, S/S	4
14	4	DIN 933	BOLT, M12 x 35 HEX HD, S/S	4
13	4	DIN 913	SCREW, M6 x 8 SHSS , OVAL PT S/S	
12	1	10801150	LABEL, ANGLE GRADUATIONS 0-360°	
11	1	10801160	LABEL, VERNIER INDEX	
10	1	17802140	SPACER, BEARING	
9	32	RB-11.906	BALL BEARING 11.91mm [15/32"] DIA SKF	
8	4	DIN 912	SCREW, M6 x 10 SK HD CAP, S/S	
7	4	17802150	CLAMP, RETAINING	
6	2	17901340	CLAMP PAD	
5	2	17802170	HANDWHEEL, M10	
4	1	17802132	LOWER THRUST BEARING PLATE	
3	1	17802131	UPPER THRUST BEARING PLATE	
2	4	DIN 912	SCREW, M12 x 20 SK HD CAP S/S	
1	1	17802100	TRANSITION PLATE	

PARTS LIST

DRAWN A.MARTIN	DATE 01/27/94	DO NOT SCALE FROM DRAWING DIMENSIONS & TOLERANCES PER ASME Y14.5M-1994	GMW 955 Industrial Rd, San Carlos, CA 94070 Tel: (650)802-8292. Fax: (650)802-8298.
CHECK	DATE		
ENGINEERING	DATE		TITLE: ROTATING BASE 3473/3472/5403
NEXT ASSY	SYSTEM	THIRD ANGLE PROJECTION	SIZE A1 · DRAWING NO. 11802090 · REV G
SOFTWARE AUTOCAD 2000			SCALE 1:2 · WT kg · SHEET 1 OF 1

REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE, REDRAWN FROM DWG NO 17612640		07/01/03	G.DOUGLAS
B	CHG PAINTING SPECIFICATION		04/16/04	G.DOUGLAS
C	ADD CUTOUT 35 x 22 @ B2		11/21/06	G.DOUGLAS
D	NEW DESIGN, INCREASED CHANNEL SIZE FROM 125x67		12/02/08	G.DOUGLAS
E	ADDED NOTE 4		28 Jan, 09	M. Duffy



NOTES

1. MATERIAL: 150 X 75 M.S CHANNEL
2. DE BURR & BREAK SHARP EDGES 0.5mm
3. FINISH: PAINT PRECISION TAN [NO TEXTURE] TO BSL: TP85800010
4. WHEN LIFTING 5403 USE LIFTING BRACKET P/N: 17907-0144-0.

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE

PARTS LIST

DRAWN G.DOUGLAS	DATE 07/01/03
CHECK	DATE
ENGINEERING	DATE

11901050	5403EG-20
11901080	5403EG-50
11901200	5403
11901100	5403
NEXT ASSY	SYSTEM

SOFTWARE AUTOCAD 2000

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

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

THIRD ANGLE PROJECTION

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

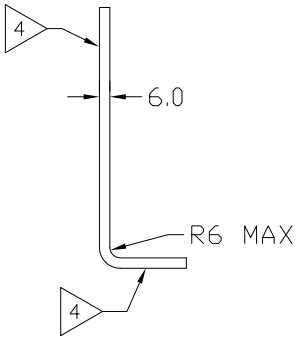
TITLE
VERT MTG BRK
MODEL:5403/5403EG

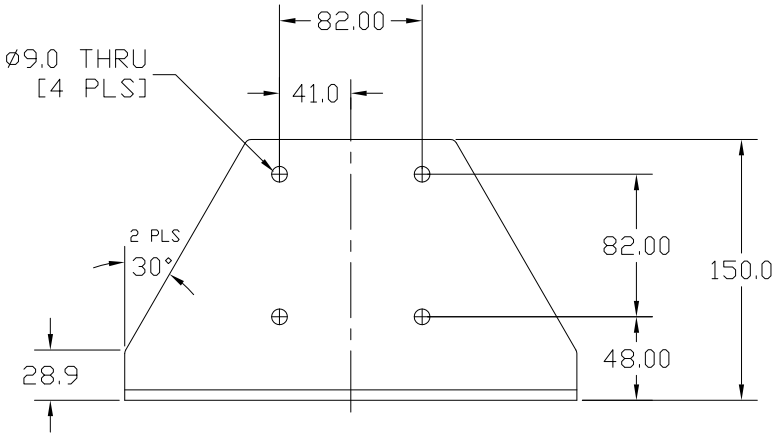
SIZE	DRAWING NO.	REV
A2	17901610	E

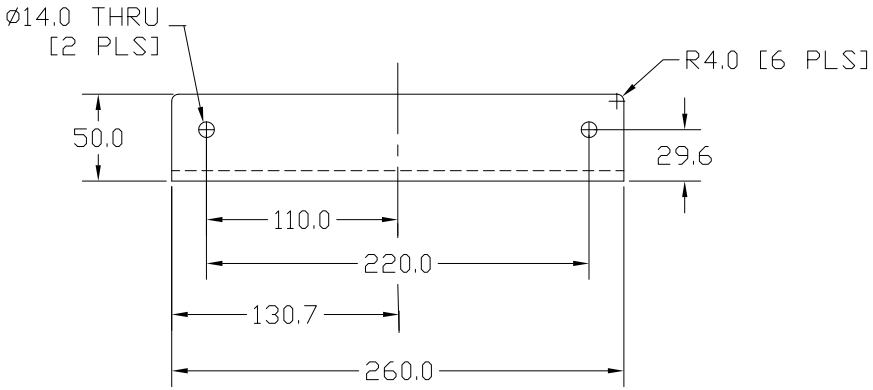
SCALE 1:1 | WT kg | SHEET 1 OF 1

REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		11/25/97	G.DOUGLAS
B	CHANGE PAINTING SPECIFICATION		06/08/04	G.DOUGLAS







NOTES

1. MATERIAL: M/S PLATE 6mm THICK
2. DE BURR & BREAK SHARP EDGES 0.2mm
3. FINISH: PAINT PRECISION TAN MEDIUM TEXTURE TO BSL: TP85800010
4. NO TEXTURE ON THESE SURFACES
5. NO REQD: 2 PER MAGNET.

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
		PARTS LIST		
1	1	11901050	5403EG-20	
2	1	11901080	5403EG-50	
3	1	11901200	5403	
4	1	11901100	5403	

DRAWN G.DOUGLAS DATE 11/25/97
CHECK DATE
ENGINEERING DATE
NEXT ASSY SYSTEM
SOFTWARE AUTOCAD 2000

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

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

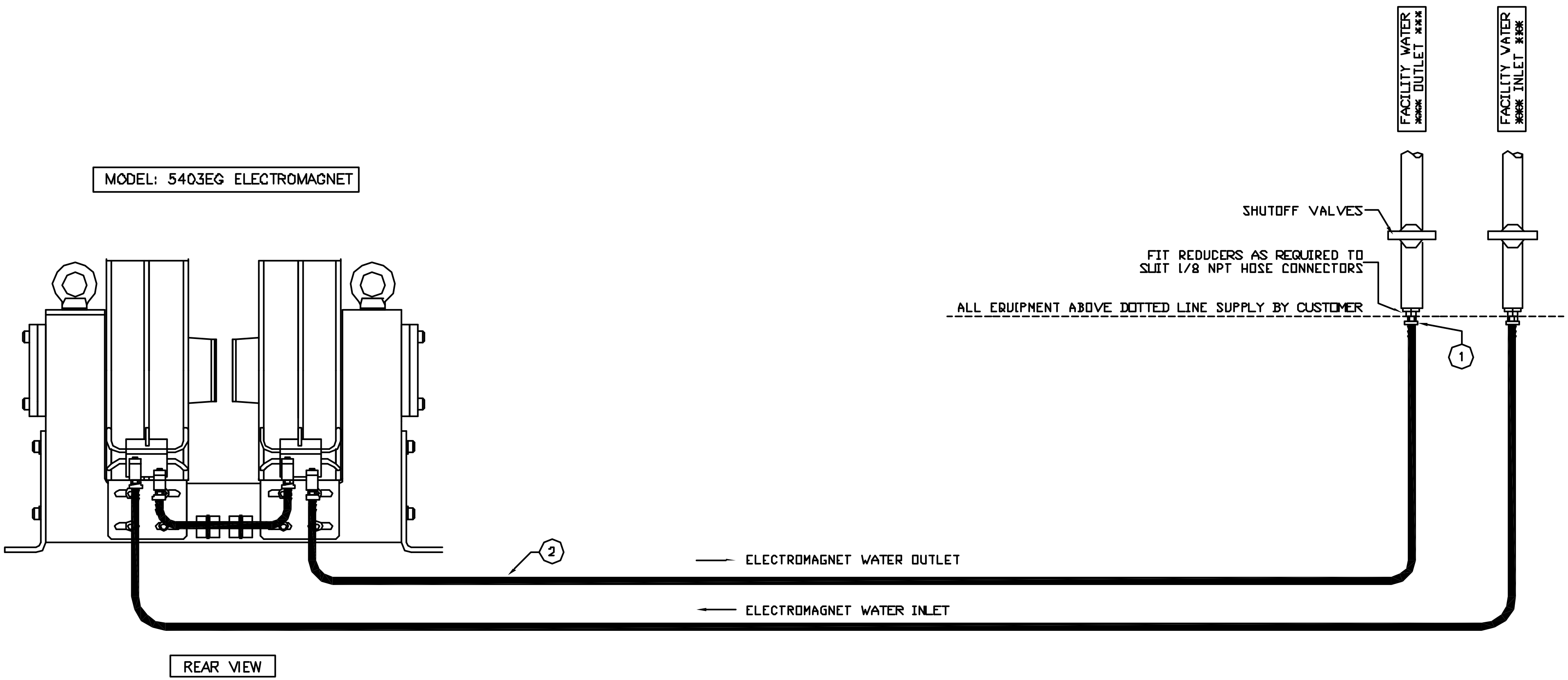
THIRD ANGLE PROJECTION

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

TITLE
MODEL: 5403/5403EG/5403AC
ANGLE BRACKET

SIZE A2 | DRAWING NO. 17901450 | REV B

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



COOLING SYSTEM SPECIFICATIONS			
SUBSYSTEM NAME	FLOW RATE (liter/min)	PRESSURE (bar)	TEMPERATURE (deg C)
ELECTROMAGNET	2	0.5	18-25

REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		04/08/03	G.DOUGLAS

PARTS LIST

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
1	2	KA-04-02-MB	HOSE COUPLING, 1/4 HOSE 1/8 NPT I.E	
2	10m	B704	HOSE, RUBBER ø6mm [0.25"] I.E	

DRAWN: G.DOUGLAS DATE: 03/08/03
CHECK DATE
ENGINEERING DATE
NEXT ASSY: SYSTEM 5403
SOFTWARE AUTOCAD 2000

DO NOT SCALE FROM DRAWING
THIRD ANGLE PROJECTION

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

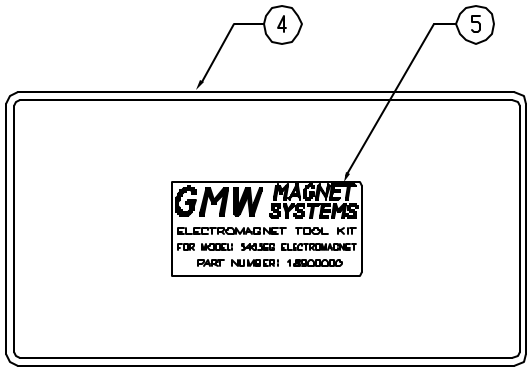
TITLE: COOLING SYSTEM 5403/5403EG

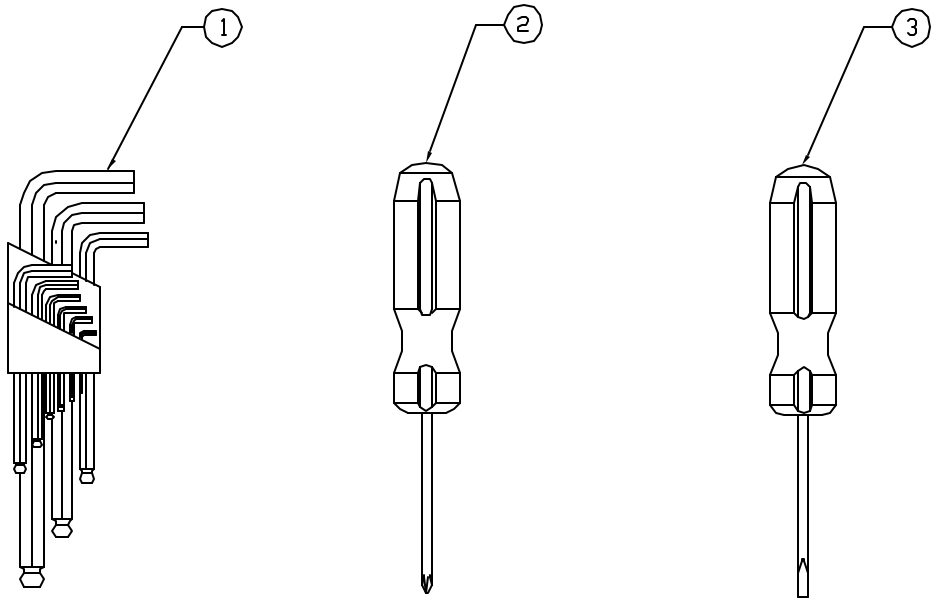
SIZE: A1 DRAWING NO. 11901140 REV A
SCALE NTS WT kg SHEET 1 OF 1

PROPRIETARY

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPRIETARY OF GMW INC. IT MUST NOT BE REPRODUCED OR DISCLOSED TO OTHERS OR USED IN ANY WAY WITHOUT THE EXPRESS WRITTEN PERMISSION OF GMW INC.

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		12/18/97	G.DOUGLAS



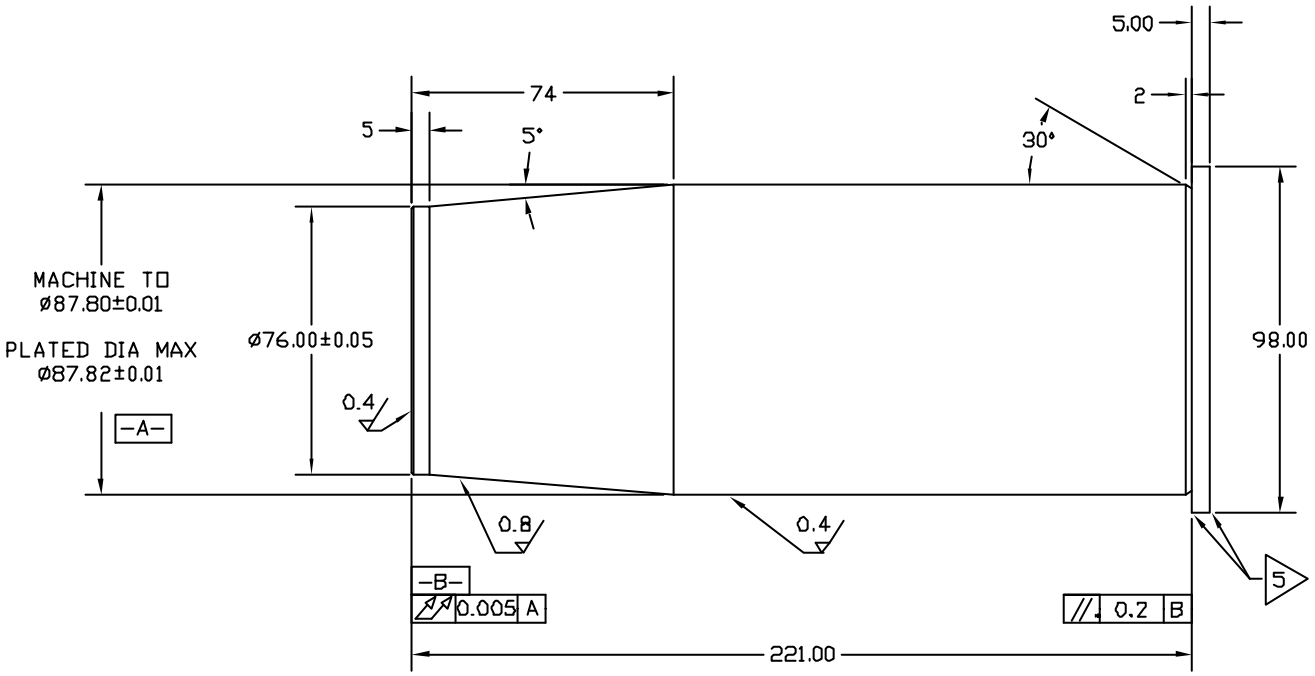


ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
5	1		LABEL, TOOL KIT	
4	1	V401	STORAGE BOX, PLASTIC, FLAMBEAU	
3	1	82-133	SCREWDRIVER, SLOTTED, STANLEY	
2	1	82-021	SCREWDRIVER, PHILLIPS, STANLEY	
1	1	BLX 9mm	HEX KEY WRENCH SET, BONDHUS	

PARTS LIST

DRAWN G.DOUGLAS	DATE 12/18/97	DO NOT SCALE FROM DRAWING 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: MAGNET TOOL KIT MODEL: 5403EG
		5403EB	
NEXT ASSY	SYSTEM		SIZE A1 DRAWING NO. 18900000 REV A
SOFTWARE: AUTOCAD 2000		THIRD ANGLE PROJECTION	SCALE 1:1 WT kg 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				
11901080		5403EG-5D		
11901050		5403EG-2D		

DRAWN G.DOUGLAS DATE 11/25/97
CHECK DATE
ENGINEERING DATE
NEXT ASSY SYSTEM
SOFTWARE AUTOCAD 2000

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

	INCHES	mm
LINEAR		
X.XXX	±.005	±0.13
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	63	1.6

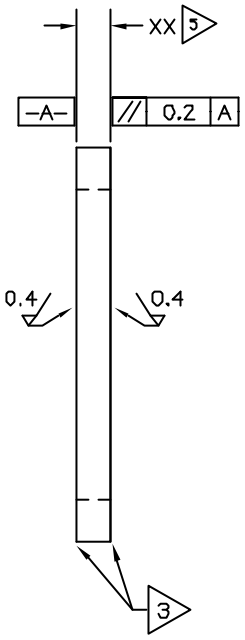
THIRD ANGLE PROJECTION

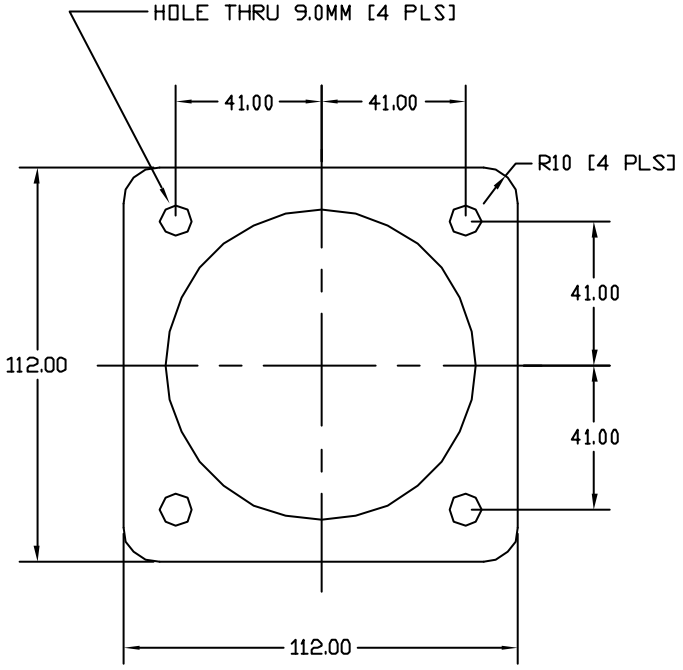
GMW
955 Industrial Rd, San Carlos, CA 94070
Tel: (650)802-8292. Fax: (650)802-8298.

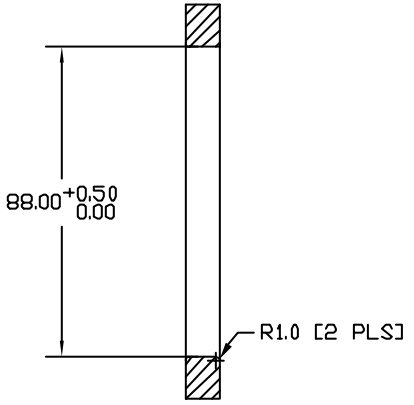
TITLE
POLE 76MM
MODEL: 5403EG

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

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		11/24/97	G.DOUGLAS
B	CHANGE HOLE SIZE & TOL		05/01/02	G.DOUGLAS
C	ADD NOTE: 5		08/09/03	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
5. SPACER THICKNESS SPECIFIED BY PART NO SUFFIX.
   10mm THICK SPACER = PART NO 17901400-10
   12.5mm THICK SPACER = PART NO 17901400-12.5

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
PARTS LIST				
11901080		5403EG-50		
11901050		5403EG-20		

DRAWN G.DOUGLAS DATE 11/24/97
CHECK DATE
ENGINEERING DATE
NEXT ASSY SYSTEM
SOFTWARE AUTOCAD 2000

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

LINEAR	INCHES	mm
X.XXX	±.005	±0.13
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	63	1.6

THIRD ANGLE PROJECTION

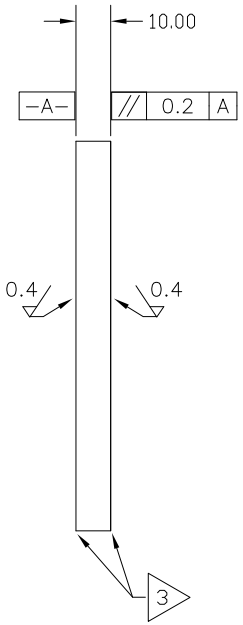
GMW
955 Industrial Rd, San Carlos, CA 94070
Tel: (650)802-8292. Fax: (650)802-8298.

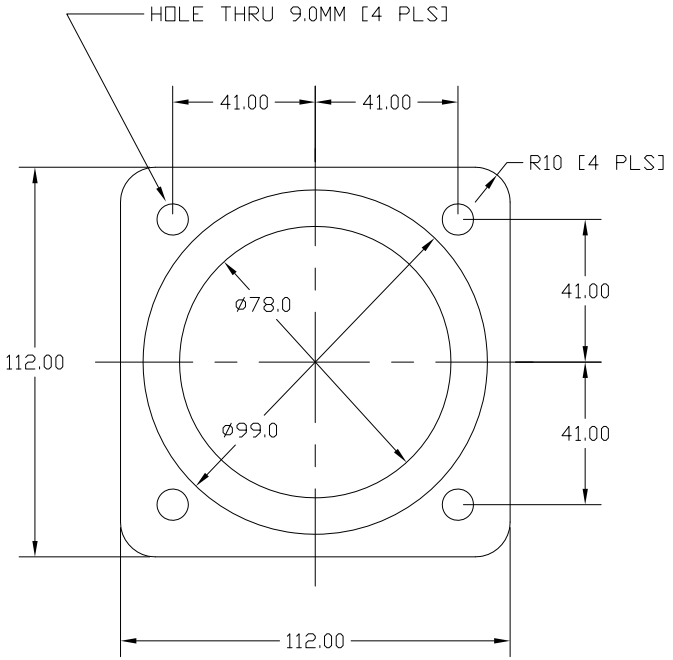
TITLE
POLE SPACER
MODEL: 5403EG

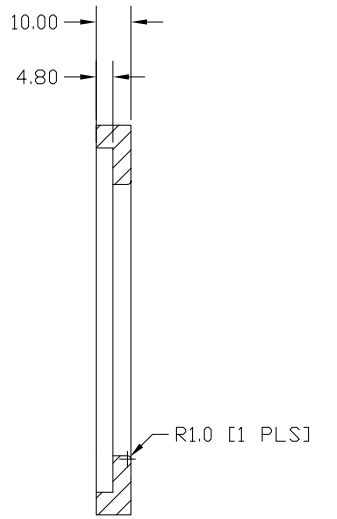
SIZE A2 | DRAWING NO. 17901400 | REV C
SCALE 1:1 | WT kg | SHEET 1 OF 1

REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		12/12/97	G.DOUGLAS
B	CORRECT MATERIAL CALLOUT		04/16/04	G.DOUGLAS







SECTION VIEW

NOTES:

1. MATERIAL: 1018 MILD 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		
		11901080	5403EG-50	
		11901050	5403EG-20	
		11901100	5403	

DRAWN G.DOUGLAS DATE 12/12/97
CHECK DATE
ENGINEERING DATE
NEXT ASSY SYSTEM
SOFTWARE AUTOCAD 2000

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

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

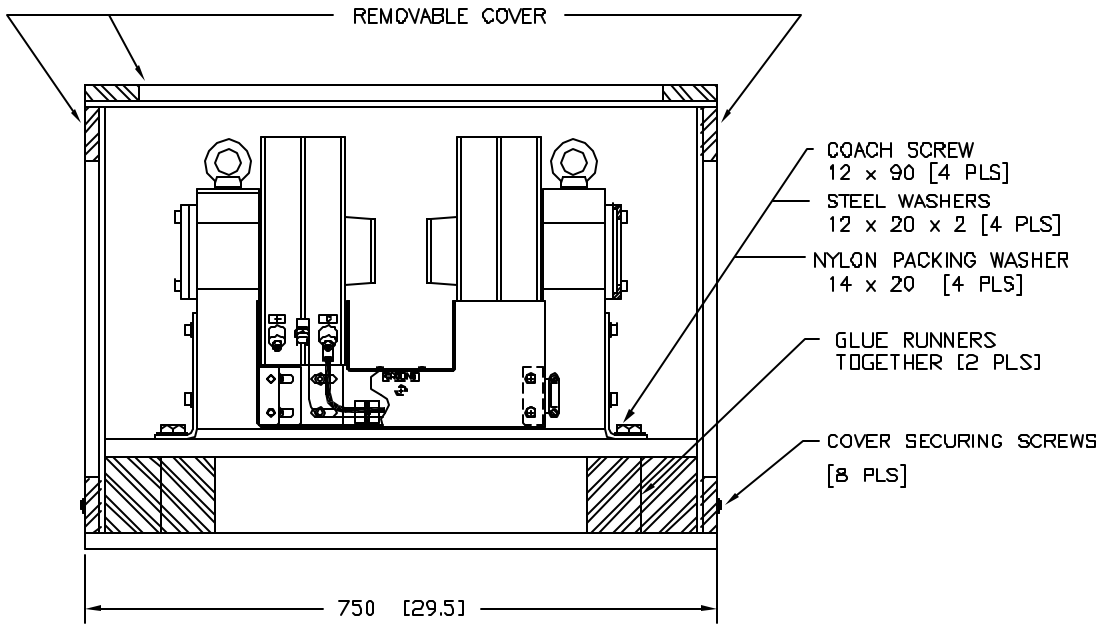
THIRD ANGLE PROJECTION

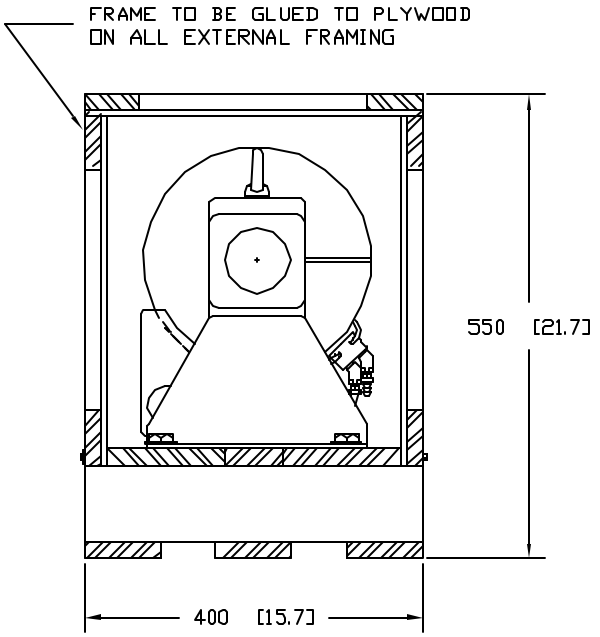
GMW
955 Industrial Rd, San Carlos, CA 94070
Tel: (650)802-8292. Fax: (650)802-8298.

TITLE
POLE RETAINER
MODEL: 5403

SIZE A2 | DRAWING NO. 17901470 | REV B
SCALE 1:1 | WT kg | SHEET 1 OF 1

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		12/10/97	G.DOUGLAS
B	ADD DOUBLE RUNNER, AND INCREASE CRATE SIZE		04/24/03	G.DOUGLAS





NOTE: DO NOT GLUE or STAPLE TOP COVER TO PALLET

5403EG-50 SHIPPING WEIGHT: 153 Kg [337 lbs]

5403EG-20 SHIPPING WEIGHT: 147 Kg [323 lbs]

NOTE:

1. THE 5403EG SHIPPING CRATE HAS A ONE PIECE COVER
2. SAME SHIPPING CRATE USED FOR 5403EG-20, AND STANDARD 5403
3. ABOVE DRAWING SHOWS 5403EG-50.

COVER REMOVAL:

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

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE

PARTS LIST

DRAWN	G.DOUGLAS
DATE	12/10/97
CHECK	
DATE	
ENGINEERING	
DATE	
	5403EG-50
	5403EG-20
	5403
NEXT ASSY	SYSTEM
SOFTWARE	AUTOCAD 2000

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

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

THIRD ANGLE PROJECTION

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

TITLE
SHIP CRATE ASSY
MODEL: 5403EG

SIZE	DRAWING NO.	REV
A2	18800282	C

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