GMW

USER'S MANUAL

MODEL: 3473-MRD & 3474-MRD

MOTORIZED ROTATING DRIVE

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SPECIFICATIONS

Table 1. Model 3473-MRD Specifications

Rotation angle [from zero point]	+/- 200 deg max
Rotation repeatability	+/- 0.1 deg max
Rotation accuracy	+/- 0.2 deg max
Mechanical stops	+/- 200 deg max
Limit switches	+/- 195 deg max
Homing switch	0.0 deg
Drive system	
Gear type	Worm/Worm Gear
Mechanical reduction	100:1
Stepper motor	
Motor type	Zeta 83-135
Motor part no	ES33B-DFR10
Motor torque	2.7N.m (382 oz.in)
Motor frame size	34
Stepper motor controller	Compumotor Zeta 6104
Rotation axis scaling	approx. 6944 steps/deg

Software

Motion architect [Supplied by Parker Hannifin]
LabVIEW driver [Supplied by GMW Associates]

SPECIFICATIONS

Table 1. Model 3474-MRD Specifications

Rotation angle [from zero point]	+/- 200 deg max
Rotation repeatability	+/- 0.2 deg max
Rotation accuracy	+/- 0.3 deg max
Mechanical stops	+/- 200 deg max
Limit switches	+/- 195 deg max
Homing switch	0.0 deg
Drive system	
Gear type	Worm/Worm gear
Mechanical reduction	100:1
Stepper motor controller	Compumotor Zeta 6104
Stepper motor	
Motor type	Zeta 83-135
Motor part no	ES33B-DFR10
Motor torque	2.7N.m (382 oz.in)
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Rotation axis scaling	approx. 6944 steps/deg
Software	
Motion architect [Supplied by Parker Hannifin]	
LabVIEW driver [Supplied by GMW Associates]	

WARNINGS

[Refer to this section before operating motorized rotating drive]

Motorized rotating drive and electromagnet are under computer control.
They may rotate at any time, personnel must remain clear.

Do not operate motorized rotating drive with the rolling base skirt panels removed.

Do not operate rolling/rotating base until it is secured in its final location.

It is recommended the rolling/rotating base is secured to an adequate concrete floor to prevent movement and possible injury to personnel during an earthquake.

Arrange cables and hoses so that they do not foul the worm/worm gear on the motor drive mechanism.

MOTORIZED ROTATING DRIVE INSTALLATION
Hardware
[Refer to this section only if MRD is not installed by GMW]

Introduction
The procedure to install the Motorized Rotating Drive Option onto an existing rolling/rotating base, is similar for either the 3473/3472/5403 or 3474 systems. Only one system installation is described in this manual. Refer to drawing no 11900800 for the 3473/3472/5403 system, and drawing no 11900801 for the 3474 system.

Installation of Spool Assembly and alignment to Rolling/Rotating Base

1. Firstly remove all the skirt panels from the rolling base.

2. Remove the M12 SHCS at locations 1 to 4 on the transition plate.

3. Install two M16 lifting eyebolts into two diagonal opposite corners of the transition plate.

4. Place spool assembly dwg no: 11900820 on top of assembly table, with the worm gear closest to table surface. Take care not to damage the worm gear.

5. Fit item 4 on drawing 11900801 Spool Spacer on top of spool assembly [3474 system only].

6. Using suitable lifting equipment raise the transition plate, and place on top of spool/spool spacer assembly. Check transition plate is correct side up. Counter bored holes should be on the top side.

7. Ensure the zero button on the spool assembly faces the front of the transition plate.

8. Secure the spool assembly to the transition plate with three M10 SHCS and lock washers at locations marked A, C, and E, on dwg no: 11900800/11900801. Tighten finger tight only.

9. Install spool alignment bush onto M10 SHCS and washer as shown on Drawing no: 11902640. Note wide end of alignment bush and washer fit under M10 SHCS head.

10. Fit alignment bush and M10 SHCS into the remaining spool assembly securing locations. They are marked B, D, and F, on dwg no: 11900800/11900801. Tighten finger tighten only.

11. Undo the rotation locks and rotate the rotating ring of the rotating base so that it is set to 0 deg. Then lock in place with the rotation locks.

12. Using suitable lifting equipment raise the transition plate and spool assembly, and move above the rolling/rotating base.

13. Rotate the transition plate and spool assembly so that the zero button is aligned with the rotating base top ring 0 deg position.

Installation of Spool Assembly and alignment to Rolling/Rotating Base [continued]

14. Slowly lower the transition plate spool assembly into the hole through the rotation base and rolling base assemblies. Take care not to damage the bronze worm gear at the bottom of the spool assembly.

15. Recheck the zero button is aligned with the 0 deg on the rotating ring of the rotating base.

16. Secure the spool /transition plate assembly with two M12 SHCS and M12 lock washers at locations marked 1, and 3. on dwg no: 11900800/11900801.Tighten finger tight only.

17. Install transition plate alignment bush onto M12 SHCS and washer as shown on Drawing no: 11902640. Note wide end of alignment bush and washer fit under M12 SHCS head

18. Fit transition plate alignment bush and M12 SHCS into the holes marked at locations 2 and 4 on dwg no: 11900800/11900801. Tighten finger tight only.

19. Next step is to align the spool assembly to the transition plate. Tighten the three M10 SHCS and spool alignment bushes at locations marked B, D, and F.

20. Fully tighten the three M10 SHCS at locations marked A, C, and E.

21. Remove the M10 SHCS and the spool alignment bushes at locations marked B, D, and F.

22. Install correct length M10 screws and lock washers, at locations B, D, and F and fully tighten.

23. Tighten the two M12 SHCS and transition plate alignment bushes at locations marked 2 and 4. Then tighten the two remaining M12 SHCS at locations 1 and 3.

24. Attach a dial indicator with a magnetic clamp to the underside of the rolling base top plate. Position the dial indicator probe so that it contacts the spool outer surface.

25. Undo the rotational locks. Rotate the rotating base from 0 through 360 deg and check the runout with the dial indicator. Maximum runout should be within: +/- 0.2mm.

26.Remove the two M12 SHCS and alignment bushes at locations 2 and 4, and reinstall original M12 SHCS and lock washers.

27. If no further alignment is required then fully tighten the M12 SHCS at locations 1 thru 4.

28. If further alignment is required loosen the four M12 SHCS at locations 1 thru 4 and set so that they are finger tight.

29. Tap edge of transition plate to move as required to achieve runout specifications above. When runout specifications are met, fully tighten the M12 SHCS at locations 1 thru 4

MOTORIZED ROTATING DRIVE INSTALLATION
Hardware
[Refer to this section only if MRD is not installed by GMW]

Installation of Motor Drive Assembly to Rolling/Rotating Base (see drawing no 11900800/1)

1. Firstly install the ball plungers into the motor drive assembly guides. Note only the ball part of the plunger should protrude into the inside surface of the guide.

2. Fit the motor drive assembly guides to the underneath side of the rolling base using M8 SHCS and M8 ribbed lock washer. Note the locking detents must face to the front edge of the rolling base. Leave the M8 SHCS screws finger tight.

3. Place the disengage lever in the released position on the motor drive assembly.

4. Undo the rotational locks on the rotating base and rotate to the 0 deg position.

5. Slide the motor drive assembly into the motor drive guides . (Located on the front underneath surface of the rolling base

6. Squeeze the two release pins together and slide the motor drive assembly forward slowly until the lock bars just enter the motor drive assembly guides.

7. Move the motor drive assembly slowly inward with the release pins unrestrained until the motor drive assembly locks into the motor drive assembly guides detents.

8. Move the disengage lever to the engaged position while rocking the rotating base backwards and forwards slightly. The worm on the motor drive assembly will engage the worm gear on the spool assembly.

9. Fit G clamps to the outside surface of both the motor drive assembly guides. Adjust pressure to remove excessive play between the guides and the motor drive assembly. Tighten the M8 SHCS mounting screws. Move the disengage lever to the engage and disengage positions it should move freely. Readjust as required.

10. Measure the difference between the worm drive shaft centerline and the worm gear tooth centerline on the spool assembly. Record the difference, it will be within the range of 0 to 3mm.

11. Remove the motor drive assembly by squeezing the two release pins together and then sliding the motor drive assembly out of the motor drive assembly guides.

12. Refer to drawing no: 11900810/1. The worm and worm gear must be aligned on the same centerline to ensure correct gear meshing. Undo the four M6 SHCS and remove the worm drive and timing belt. Remove or add shim washers in four equal stacks to obtain the correct height required for the worm assembly. Reassemble the worm drive assembly using the four M6 SHCS and ribbed lockwashers, but leave finger tight. Do not refit the timing belt at this stage.

MOTORIZED ROTATING DRIVE INSTALLATION
Hardware
[Refer to this section only if MRD is not installed by GMW]

Installation of Motor Drive Assembly to Rolling/Rotating Base (see drawing no 11900800/1)
13. Reinstall the motor drive assembly refer to steps 5, 6, 7, and 8 above.

14. Slide the worm mount on the motor drive assembly forward until it is fully meshed into the teeth of the worm gear on the spool assembly. Tighten the four M6 worm assembly mounting screws.

15. Rotate the rotating base back and forth by slight hand force. If correct there should be no backlash in the system. If excessive backlash is found readjust as described above.

16. Remove the motor drive assembly by squeezing the two release pins together and then sliding the motor drive assembly out of the motor drive assembly guides.

17. Mark the position of the worm drive assembly relative to the stop block assembly.

18. Loosen the four M6 mounting screws and move the worm drive assembly backwards 0.1 to 0.2mm. This is the system backlash.

19 Retighten the four M6 mounting screws on the worm drive assembly.

20. Loosen the two M6 SHCS securing the stepper motor mounting bracket to the base plate.

21. Move the stepper motor towards the worm mount assembly.

22. Fit the timing belt.

23. Slide the motor away from the worm mount assembly until the belt is tight.

24. While holding the motor away from the worm mount assembly, tighten the motor mounting bracket M6 securing screws.

25. To check belt tension apply slight finger force in the middle of the belt. It should deflect approximately 3mm. Readjust if required as described above.

26. Reinstall motor drive assembly as described above.

27. Install the cable support with the M8 SHCS, flat and lockwasher as shown on dwg no: 11900800 and dwg no: 11900801.

28. Rotate the motor drive assembly cable around the cable support so that the cable enters the inside of the cable support. The cable should be free to slide within the cable support.

MOTORIZED ROTATING DRIVE INSTALLATION
Hardware
[Refer to this section only if MRD is not installed by GMW]

29. Recheck the motor drive assembly guide securing screws are tight.

30. Apply grease to the worm/worm gear as detailed on dwg no: 11900800/1

31. Refit both side skirt panels to the rolling base.

32. Located on the rear shirt panel is a rubber blank grommet. Remove grommet and cut center out and split along the radius.

33. Open grommet along radial split. Thread motor drive cable into grommet.

34. Push grommet into rear skirt panel cutout located in the middle of the skirt panel.

35. Refit rear skirt panel to rolling base. Take care not to trap the cable between the rolling base and the skirt panel.

36. Fit the disengage/engage label to the front skirt panel.

37. Fit the front skirt panel to the rolling base.

38. Fit the two caution labels to the rolling base top plate surface as shown.

Running In Motorized Rotating Drive system.
1. Remove Stop Block assembly from inside spool assembly. Undo four SHCS and lockwashers on the stop block assembly and remove. Refer dwg no: 11900820.

2. Run the MRD system at fast velocity setting i.e 2 to 5 for approximately one hour to bed in the worm and worm gear.

3. Finally reinstall the stop block assembly.

The motorized rotating drive option is now fully installed, refer to the following sections for operating instructions.

MOTORIZED ROTATING DRIVE INSTALLATION
Hardware

Motor Drive Assembly Removal (see drawing no 11900800/1)
1. Remove front and rear skirt panels on rolling base.

2. Place the disengage lever in the released position.

3. Squeeze the two release pins together and slide the motor drive assembly outward until the motor drive assembly clears the mounting guides..

4. Rotate the motor drive assembly cable around the cable support so that the cable releases from the cable support.

Motor Drive Assembly Fitting (see drawing no 11900800/1)
1. Slide the motor drive assembly into the motor drive guides .

2. Squeeze the two release pins together and slide the motor drive assembly forward slowly until the lock bars just enter the motor drive assembly guides.

3. Move the motor drive assembly slowly inward with the release pins unrestrained until the motor drive assembly locks into the motor drive assembly guides detents.

4. Rotate the motor drive assembly cable around the cable support so that the cable enters the inside of the cable support. The cable should be free to slide within the cable support.

5. Fit motor drive assembly cable into grommet on rear skirt panel.

6. Replace back skirt panel on rolling base.

7. Replace front skirt on rolling base.

8. Move the disengage lever to the engaged position while rotating the electromagnet slightly and slowly back and forth. The lever will lock in the engaged position.

Rolling/Rotating Base Installation (refer to electromagnet user's manual for more details).
1. First fit electromagnet to rolling/rotating base, and move to desired location.

2. If magnet cable and hoses enter rotating base from floor it is recommended to fit floor spacers to provide additional clearance for the hoses and cables. See drawing no: 11902620 and 11902621. Level the base as detailed below.

3. If cables and hoses enter from above magnet/rolling/rotating base then the floor spacers are not needed. It is important that the base is leveled in its final location. Screw down the four support legs located on each corner of the rolling or rolling/rotating base until the wheels clear the floor by 6mm (.25"). Check the base is level in both directions. Then secure the support legs with the locknut.

4. Secure rolling/rotating base to an adequate concrete floor to prevent movement and possible injury to personnel during an earthquake.

MOTORIZED ROTATING DRIVE INSTALLATION
Hardware

Stepper Motor Controller Installation (see drawing no 11901020)

1. Connect the motor drive assembly cable to the stepper motor controller. Cable has two plugs, one connects the motor power and the other connects the limit and homing wiring to the controller.

2. Connect the serial communications cable into Com 1 on the stepper motor controller.

3. Connect the other end of the serial communications cable into the control computer's serial port.

4. Check the Controller input power requirement, normally 115V. Connect the AC power cord to the stepper motor controller and the other end to the correct voltage outlet.

MOTORIZED ROTATING DRIVE SETUP
Software

Software Requirements

- PC with Intel Pentium/Celeron family, or AMD K6/Athlon/Duron family, or compatible processor, 300 megahertz or higher processor clock speed recommended
- 512Mb RAM memory required, 1Gb RAM memory or more recommended.
- CD-ROM drive or DVD drive for software installation.
- USB 2.0 port for using USB-RS232 converter. If native Serial port present, USB port is not required for Motorized Rotating Drive Software.
- SVGA monitor running 1024 x 768 pixels. [Note1]
- Windows XP Operating System software.
- LabVIEW for Windows V8.2 or later. [Note 2]
  Motorized Rotating Drive software can also be supplied as an executable file and run directly from the Windows Operating System. In this case LabVIEW for Windows V8.2 is not required.

Software Installation

The Motorized Rotating Drive LabVIEW driver and support files are all located in a directory called MRDrive.

To install the driver follow the directions given below.

1. Insert CD of the Motorized Rotating Drive software into CD-ROM Drive.
2. Open the Windows Explorer to access the software in CD.
   The software on the CD is located at directory CD drive:\MRDRIVE\LabVIEW 8.2
   MRD.prg Setup file for Zeta stepper motor controller.
   MRD V2.0a.llb MRD driver library file. [All sub VI's are inside the llb file]
   The top level vi is: MRD Driver.V2.0a.vi
3. Copy the files on CD to computer hard drive in a proper directory.
   Note: MRD.prg and MRD V2.0a.llb must be in same directory.

Before running the Motorized Rotating Drive software set the Com Port control to match the Com Port being used on the control computer.

Note:

1. Using screen resolutions other than 1024 x 768 means all items on the LabVIEW front panels will have to be resized by the end user.
2. **The executable program file cannot be altered by the end user**. Consult GMW if the Motorized Rotation Drive software is required as an executable file.

MOTORIZED ROTATING DRIVE OPERATION

To Start the Motorized Rotating Drive Software
Click the LabVIEW **Run** button or use CTRL+R on the keyboard.

When the software starts running, message "Sending Setup File to Zeta Controller *Please Wait*" appears. It should stay on for several seconds. Do not operate the software at this stage. After several seconds another message should appear: "System Running. The system is then ready for accepting commands.

To Stop the Motorized Rotating Drive Software
Click the blue **STOP PROGRAM** button located at the lower RH corner of the screen. Use this button to stop the software at all times if possible. Any other way of terminating the software will possibly cause serial port communications problems. To restore communications sometimes requires rebooting the host computer.

Motorized Rotating Drive Software Default Settings
The Magnet Control System software will open with all parameters set to the default settings. To change the default of a control follow the instructions listed below.

1. First stop the software by clicking on the STOP PROGRAM button.
2. Then set the control to the desired default value.
3. Right mouse click on the control and select Data Operation.
4. Click on the selection Make Current Value Default. Save the new setting.
5. Restart the Motorized Rotating Drive Software by clicking on the LabVIEW run arrow at the top left screen.

Motorized Rotating Drive Software Help
On screen help is available. To use the on line help use a **CTRL + H** from the keyboard to open the help window, and then move the cursor over the control or indicator on the front panel. A description of the control or indicator function will appear in the help window.

SETUP PANEL

MRD Port:	Click on the Drop-Down arrow button. Selects the computer serial port used to communicate with the stepper motor controller.
Motor Controls:	Sets the velocity value, acceleration value of the stepper motor.
Home Motion Controls:	Sets the acceleration, deceleration and velocity of the stepper motor when homing to the 0.0 deg position.
AUTO START ON/OFF:	When AUTO START is set to **ON** the Set Position [deg] is controlled by the Up an Down arrows on the computer keyboard. A position value can also be directly entered from the numeral keypad. By default the lowest significant digit is controlled and rolls over to the next highest digit. Roll over occurs between the lowest to the most significant digit. Press the ENTER key to start rotation to the set position.
GO TO SET POSITION:	Click on the GO TO SET POSITION button will start the motion to the position defined by Set Position [deg] control.

MOTORIZED ROTATING DRIVE OPERATION
[Continued]

MAGNET ROTATION CONTROLS

Home CW Control: Makes the motorized rotating Drive rotate in a clockwise direction until it finds the home position at 0.0 deg and resets the current position counter to 0.0 deg. [See initial setup information below]

Home CCW Control: Makes the motorized rotating Drive rotate in a counterclockwise direction until it finds the home position at 0.0 deg and resets the current position counter to 0.0 deg. [See initial setup information below]

Counter Reset Control: Resets the current position counter to 0.0 deg.

Velocity Value Control: Sets the velocity of the stepper motor.

Acceleration Value Control: Sets the acceleration of the stepper motor.

Note: Velocity and Acceleration value settings only change while motor is in motion. The values for both velocity and acceleration are relative values, not absolute value.

Start Motion CCW Control: Starts the motorized rotating drive rotating in a counterclockwise direction until limit switch is reached, or the **Stop Motion** button in pushed.

Start Motion CW Control: Starts the motorized rotating drive rotating in a clockwise direction until limit switch is reached, or the **Stop Motion** button in pushed.

Stop Motion Control: Stops the motorized rotating drive rotating at any time.

Emergency Stop Control: Stops the motorized rotating drive rotating INSTANTLY. Since this action puts high stain on all mechanical components, only use in an emergency.

Stop Program Control: Stops the motorized rotation drive software running.

MAGNET ROTATION STATUS

Actual Position Indicator: Shows the motorized rotation drive current position on a digital display. Units are in degrees from the initialized zero position.

System Initial Setup

Press either the Home CW or Home CCW button. The base will rotate to approximately the 0 deg position and stop. Set the Velocity to 0.1 and move the base to exactly the 0 deg position using either the CW or CCW buttons. Once the base is aligned on the 0 deg position, press the Counter Reset button. The system is ready to be used. Note if the stepper motor controller is reset then this process must be repeated.

Hardware Limits

The hardware CCW and CW limit switches operate at approximately -195 deg and +195 deg respectively. After the limit switch has operated the rotation of the motorized rotating drive will decelerate at the same rate as set by the software acceleration control setting and then stop. A 5 deg overrun has been allowed for before the mechanical stops operate.

Mechanical Stops

The mechanical stops operate at -200 deg and +200 deg stopping any rotation beyond these positions.

Troubleshooting

Symptom 1: Clicking sound coming from stepper motor while base is rotating [motor stalling].

Cause of Problem:
[a] Worm/Worm Gear not lubricated.
[b] Timing belt not set to correct tension, causing belt to slip during operation.
[c] Spool assembly not running concentrically with rotating base.
[d] Worm/Worm Gear not aligned with each others centerline.
[e] Worm/Worm Gear meshed too tight together.
[f] Pulley slipping on either stepper motor, or worm assembly shaft.
[g] Rolling/Rotating base is not level.
[h] Too much friction in the rotating base.
[i] Cables or hoses stopping free rotation of rotating base.
[j] Running stepper motor at too higher speed.
Recommend velocity setting of 0.5 for 3474 MRD, and 1.0 for 3473 MRD.

Remedy: Diagnose fault, and refer to the appropriate section of this manual for corrective action.

Symptom 2: Rotating Base does not rotate to correct position.

Cause of Problem:
[a] Controller has lost rotational reference point.

Remedy: Follow instructions for System Initial Setup.

Symptom 3: No rotation from rotating base.

Cause of Problem:
[a] No AC power to Zeta controller.
[b] Serial communications cable not connected to host computer.
[c] Motor and limit switch cable not connected to Zeta controller.

Remedy: Check system wiring and AC power.

TROUBLESHOOTING/ TECHNICAL SUPPORT

Technical Support:
Technical support is available by contacting GMW by Telephone, Fax or Email.

GMW Associates
955 Industrial Rd.
San Carlos, CA 94070
USA

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

Email: sales@gmw.com.

User Comments: Please forward comments on this product to GMW at the above address
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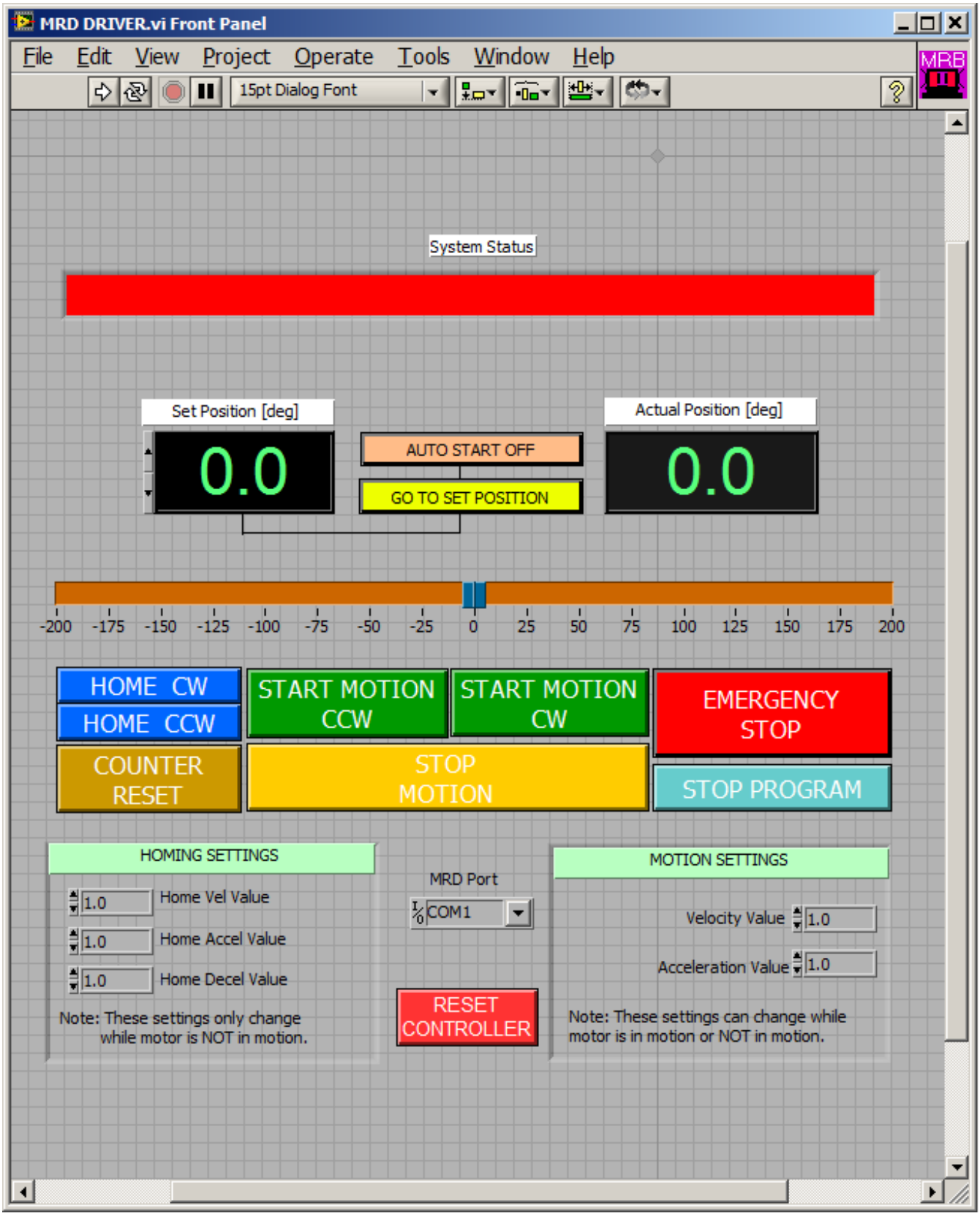
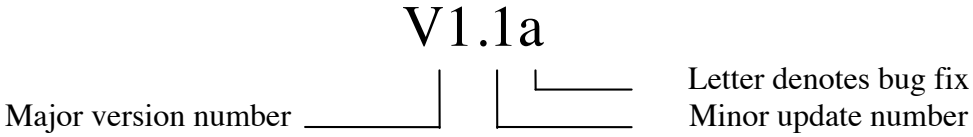
MOTORIZED ROTATING DRIVE SOFTWARE


MRD DRIVER.vi Front Panel
File Edit View Project Operate Tools Window Help
15pt Dialog Font
System Status
Set Position [deg]
0.0
AUTO START OFF
GO TO SET POSITION
Actual Position [deg]
0.0
-200 -175 -150 -125 -100 -75 -50 -25 0 25 50 75 100 125 150 175 200
HOME CW
HOME CCW
START MOTION CCW
START MOTION CW
EMERGENCY STOP
COUNTER RESET
STOP MOTION
STOP PROGRAM
HOMING SETTINGS
1.0
Home Vel Value
1.0
Home Accel Value
1.0
Home Decel Value
Note: These settings only change while motor is NOT in motion.
MRD Port
COM1
RESET CONTROLLER
MOTION SETTINGS
Velocity Value
1.0
Acceleration Value
1.0
Note: These settings can change while motor is in motion or NOT in motion.

MOTORIZED ROTATING DRIVE SOFTWARE DOCUMENTATION

SOFTWARE REVISION LIST

The Software revision number has the following format.



V1.0 First release.

V1.1 Fix communications bug.
Add speed ramp down on approaching soft limit.

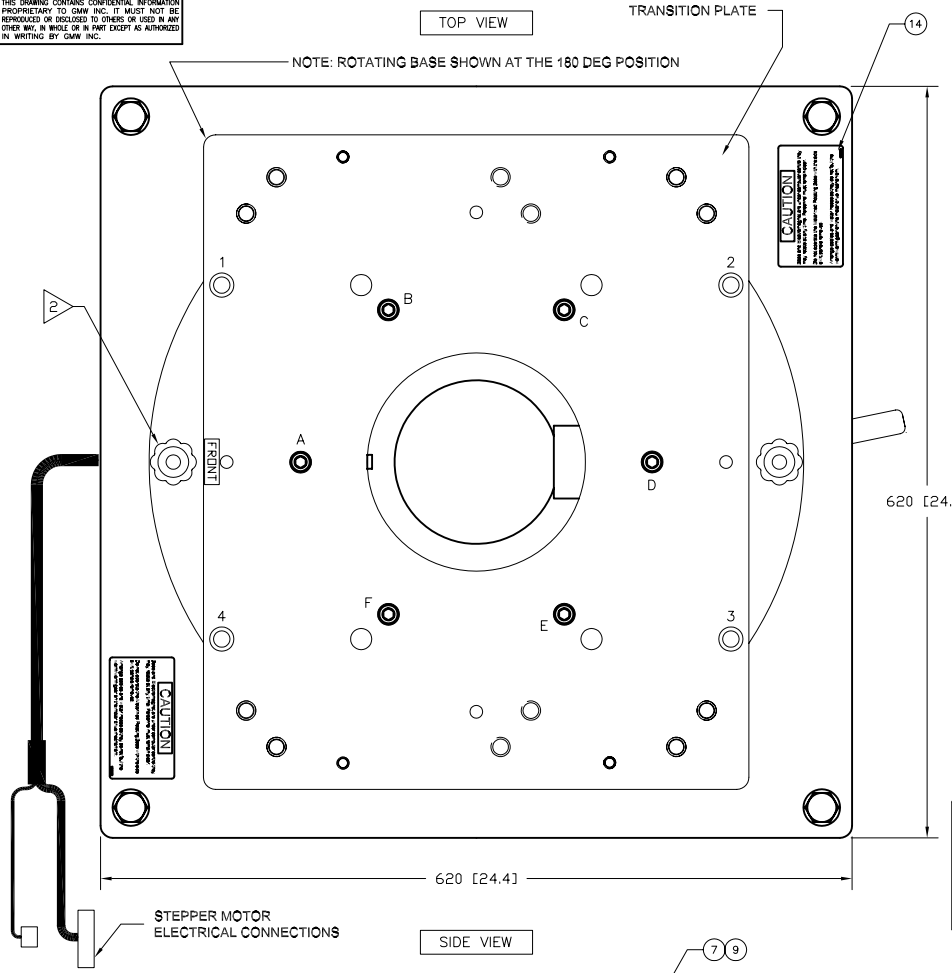
V2.0 Rewrite MRD software driver using Labview Visa port drivers.

DRAWINGS

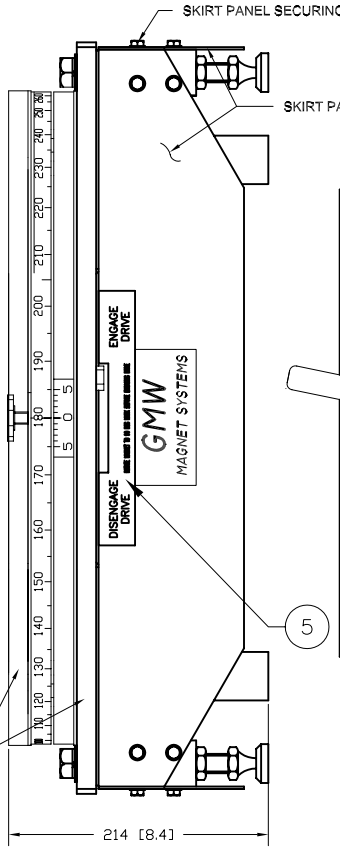
REVISIONS

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

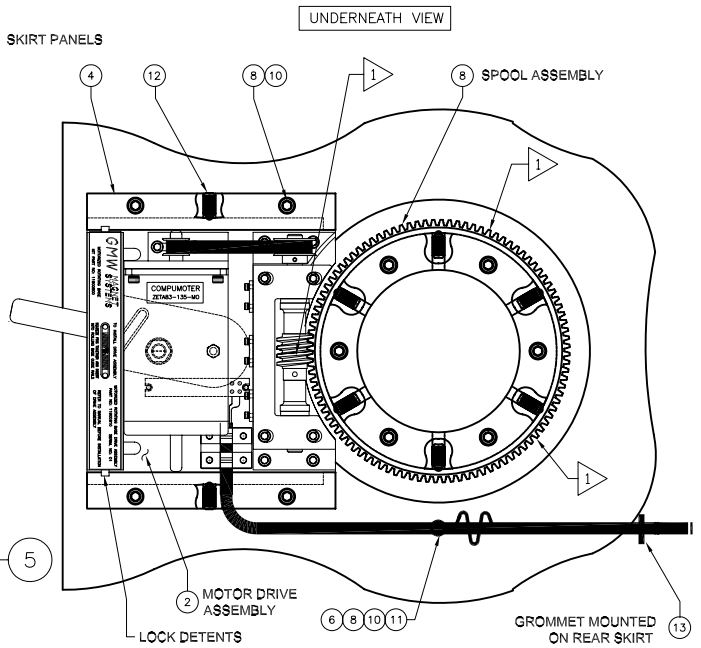
TOP VIEW



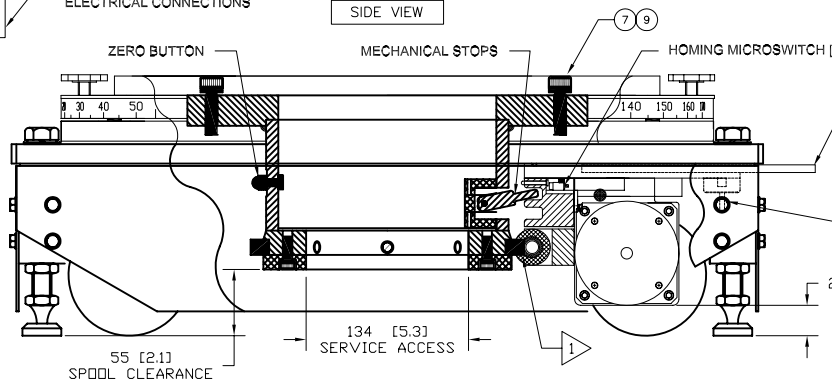
FRONT VIEW



UNDERNEATH VIEW



SIDE VIEW



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

NOTE: ROTATING BASE SHOWN AT THE 180 DEG POSITION

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

PARTS LIST

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

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

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

THIRD ANGLE PROJECTION

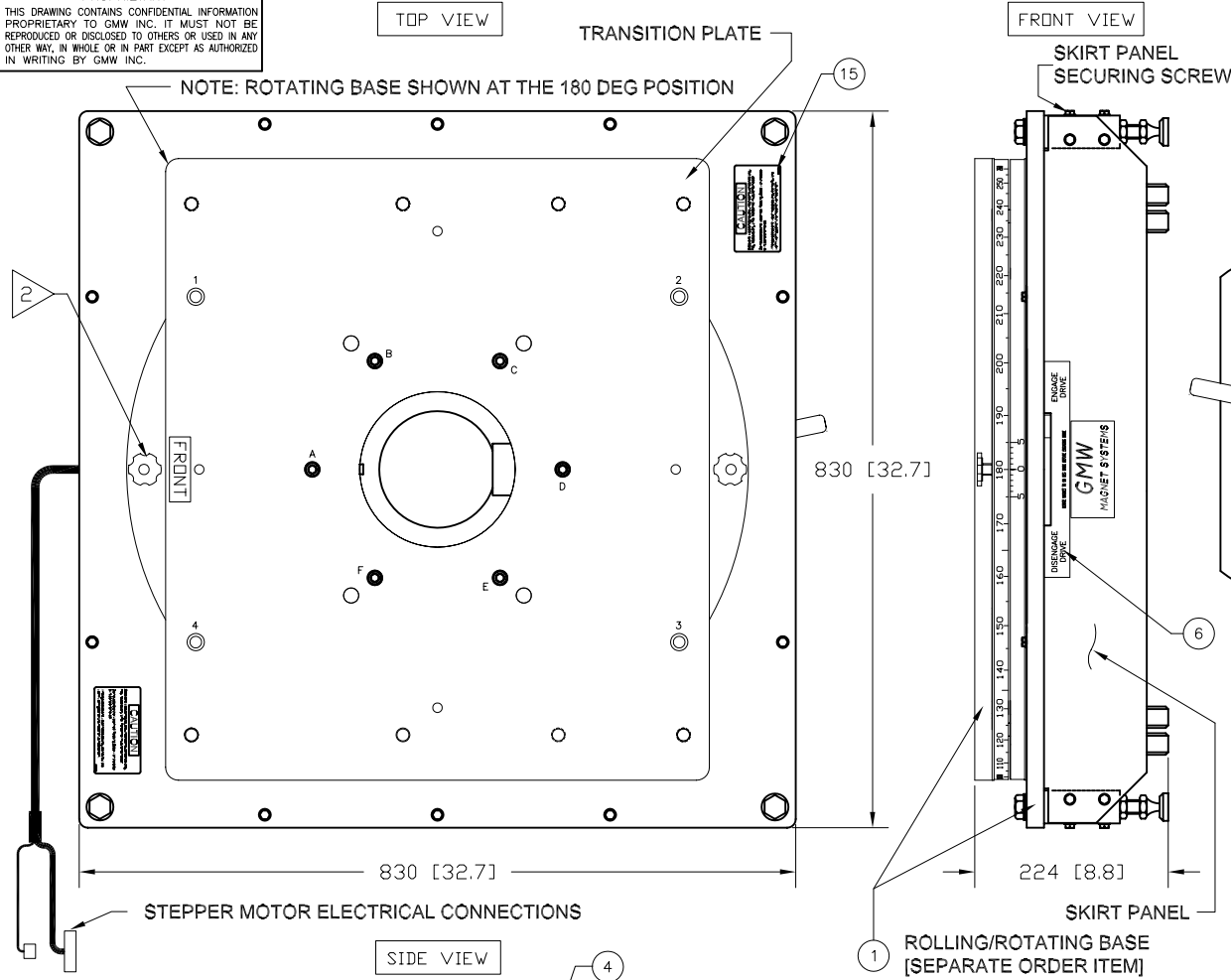
GMW
955 Industrial Rd, San Carlos, CA 94070
Tel: (650)802-8292. Fax: (650)802-8298.

TITLE
MOTORIZED ROTATING DRIVE
3473/3472/5403

SIZE A1 | DRAWING NO. 11900800 | REV D

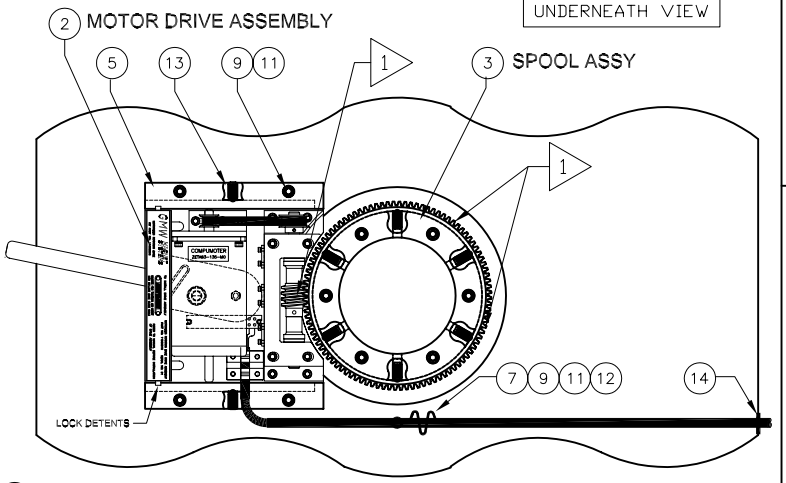
SCALE 1:2 | WT kg | SHEET 1 OF 1

TOP VIEW

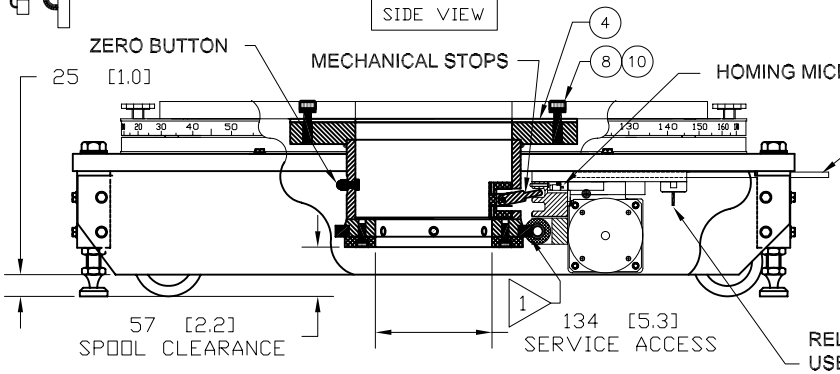


FRONT VIEW

UNDERNEATH VIEW



SIDE VIEW



NOTE: ROTATING BASE SHOWN AT THE 180 DEG POSITION

REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		11/30/97	G.DOUGLAS
B	CHG 45° MTG HOLES, ITEM 9 LENGTH TO 25MM		10/20/98	G.DOUGLAS
C	ADD ITEM 1 NOTES		04/10/08	G.DOUGLAS
D	ADD NOTE 2, ITEM 15		08/21/08	G.DOUGLAS

PARTS LIST

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
15	2	10900180	CAUTION LABEL	
14	1		GROMMET 25MM OD X 20MM ID	
13	2	SBMH-ION	BALL PLUNGER, M6 S/S	
12	1	DIN 433	WASHER. FLAT M8 X 1.6 S/S	
11	5	BN 792	WASHER, M8 x 1.4 RIBBED SPRING/STEEL	
10	6	BN 792	WASHER, M10 x 1.6 RIBBED SPRING/STEEL	
9	5	DIN 912	SHCS, M8 X 25 S/S	
8	6	DIN 912	SHCS M10 X 35 S/S	
7	1	17901230	CABLE SUPPORT	
6	1	10900161	DISENGAGE/ENGAGE LABEL	
5	2	17901020	MOTOR DRIVE ASSEMBLY GUIDES	
4	1	17901210	SPOOL SPACER	
3	1	11900820	SPOOL ASSY	
2	1	11900811	MOTOR DRIVE ASSY	
1	1	11900980	ROLLING/ROTATING BASE ASSY	

DRAWN	G.DOUGLAS
DATE	11/30/97
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	±.0	±0.1
	X.X	±.03	±0.3
	X	±.06	±1
	DEG.	±.5	±0.5
	FINISH	63	1.6

THIRD ANGLE PROJECTION

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

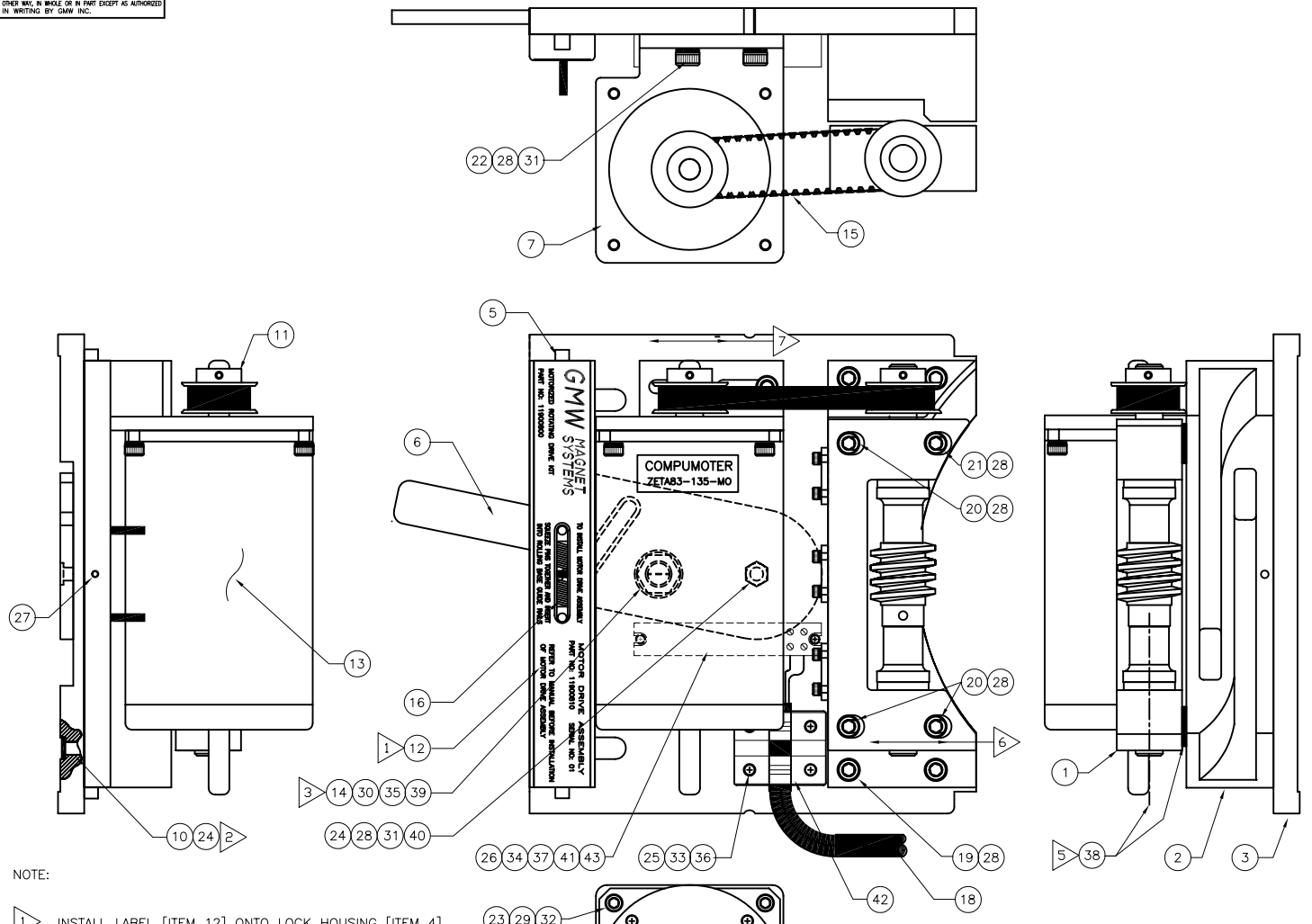
TITLE
MOTORIZED ROTATING DRIVE
MODEL: 3474

SIZE	DRAWING NO.	REV
A2	11900801	D

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

REVISIONS

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



NOTE:

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

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

PARTS LIST

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

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

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

THIRD ANGLE PROJECTION

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

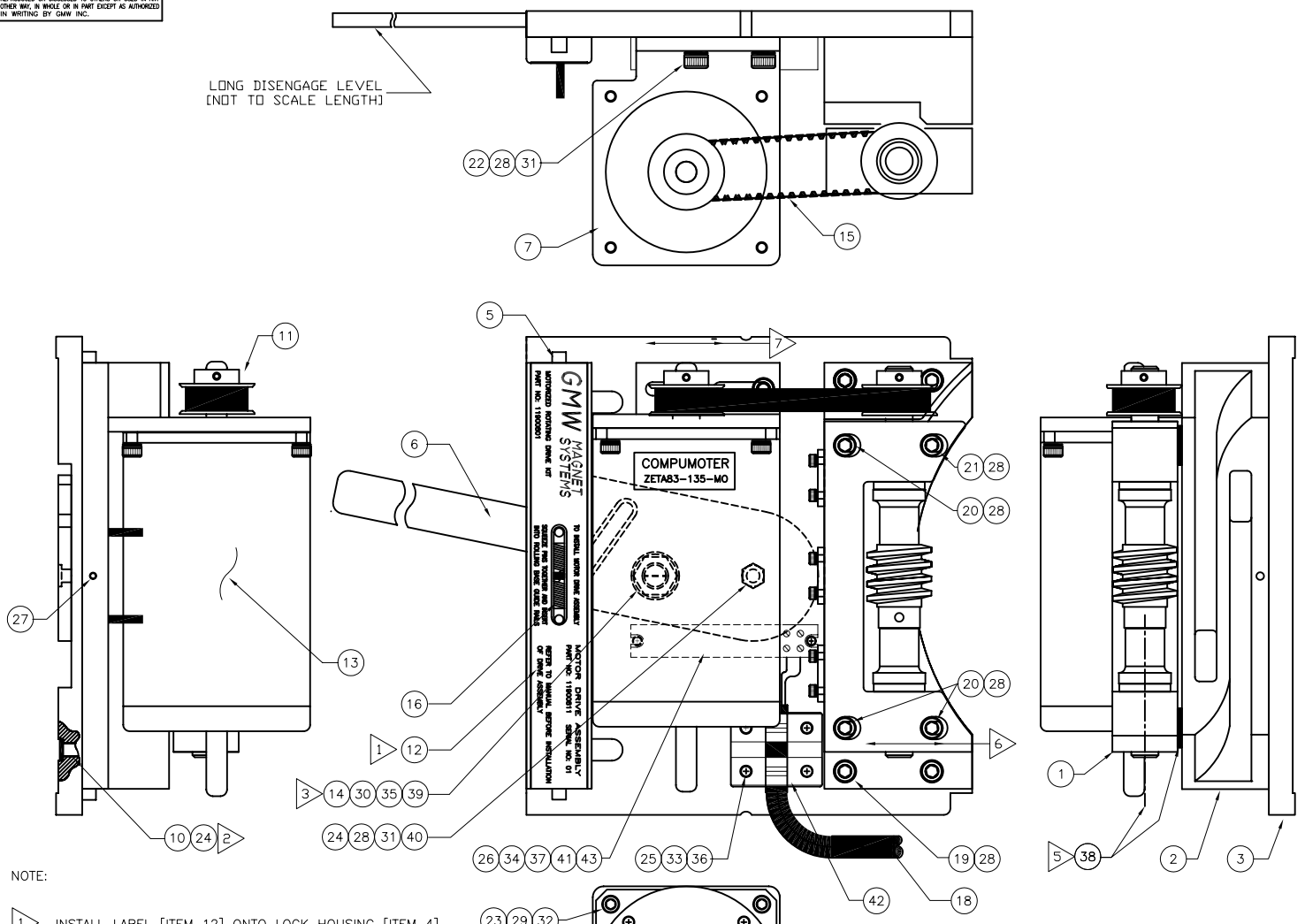
TITLE: MOTORIZED ROTATING DRIVE MOTOR DRIVE ASSEMBLY 3473

SIZE A1 | DRAWING NO. 11900810 | REV E

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

REVISIONS

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



ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
45	1	17906300	LOCK HOUSING PLATE	
44	A/R		HEAT SHRINK SLEEVING, 4MM	
43	1	0.33uF	CAPACITOR	
42	2	OHS	PIPE SADDLE, COPPER 3/8" 10MM	
41	1	2412.6	TERMINAL BLOCK, 12 WAY WEIDMULLER	
40	1	DIN 934	NUT, M6, HEX HD B S/S	
39	1	DIN 934	NUT, M10, HEX HD S/S	
38	16	BN 748	WASHER, SHIM M6 X 18 X 0.5 S/S	
37	2	DIN 6797	WASHER, INT LOCK M3 X 0.4 S/S	
36	4	DIN 6797	WASHER, INT LOCK M4 X 0.5 S/S	
35	1	DIN 6797	WASHER, INT LOCK M10 X 0.5 S/S	
34	2	DIN 433	WASHER, FLAT M3 X 0.5 S/S	
33	4	DIN 433	WASHER, FLAT M4 X 0.5 S/S	
32	4	DIN 433	WASHER, FLAT M5 X 1.0 S/S	
31	3	DIN 433	WASHER, FLAT M6 X 1.6 S/S	
30	1	DIN 433	WASHER, FLAT M10 X 1.6 S/S	
29	4	BN792	WASHER, M5 X 1.1, RIBBED SPRING/STEEL	
28	11	BN792	WASHER, M6 X 1.2, RIBBED SPRING/STEEL	
27	1	DIN 916 A2	SHSC M3 X 16 S/S	
26	2	DIN 7985A	SCREW, PAN HD M3 X 16 S/S	
25	4	DIN 7985A	SCREW, PAN HD M4 X 16 S/S	
24	5	BN 1206	SHCS, M6 X 16, LOW PROFILE HD #1415670	
23	4	DIN 912	SHCS M5 X 12 S/S	
22	2	DIN 912	SCHS 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	3	DIN 1481	SPRING PIN, M4 X 26L	
16	1	IHI	SPRING, COMPRESSION, 6MM DIA X 50L	
15	1	TB20EF6-55	BELT, TIMING, BERG 11" [280MM]	
14	1	SBMH-10N	BALL PLUNGER, M10 [heavy pressure] VLIER	
13	1	ES33B-DFR10	MOTOR, STEPPER, ZETA, COMPUMOTER	
12	1	10900151	LABEL, SPECIFICATION	
11	1	TP20A6W6-18	PULLEY, TIMING BELT 18 TEETH BERG	
10	5	17901202	SPACER, 9MM LONG S/S	
9	1	17901201	SPACER, 4MM LONG S/S	
8	1	17901180	SPACER, CABLE CLAMP	
7	1	17901060	MOTOR MOUNT	
6	1	17901052	DISENGAGE LEVER [For Model 3474 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:

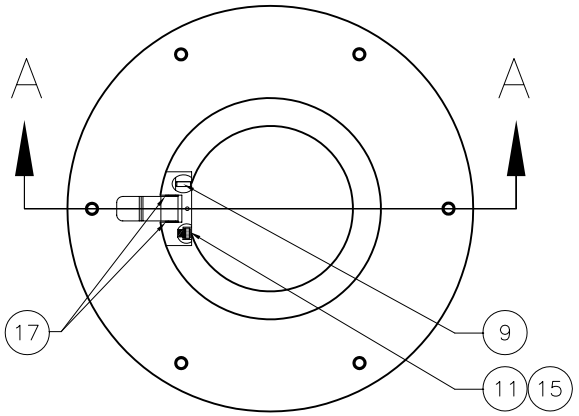
1. INSTALL LABEL [ITEM 12] ONTO LOCK HOUSING [ITEM 4]. THEN TRIM AROUND CUTOUT FOR RELEASE PINS.
2. APPLY LOCTITE TO THREADS ON [ITEM 24]. THEN ASSEMBLE LOCK HOUSING [ITEM 4], USING S/S SPACER [ITEM 10].
3. SCREW DOWN [ITEM 14] SO THAT [ITEM 6] IS RETAINED IN BOTH DETENTS. LOCK IN PLACE WITH [ITEM 39].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

DRAWN G.DOUGLAS	DATE 05/07/97	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	LINEAR: X.XXX ±.005 (±0.03); X.XX ±.02 (±0.1); X.X ±.03 (±0.3); X ±.06 (±1); INCHES / mm	TITLE: MOTORIZED ROTATING DRIVE MOTOR DRIVE ASSEMBLY 3474
		DEG. ±.5 (±0.5)	
11900801	3474	FINISH 63	SIZE A1 DRAWING NO. 11900811 REV E
NEXT ASSY	SYSTEM	THIRD ANGLE PROJECTION	
SOFTWARE AUTOCAD 2000			SCALE 1:1 WT kg SHEET 1 OF 1

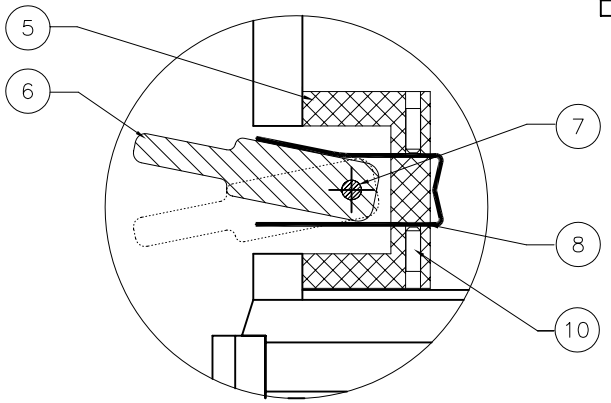
REVISIONS

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

TOP VIEW

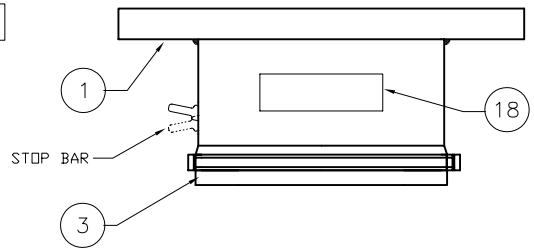


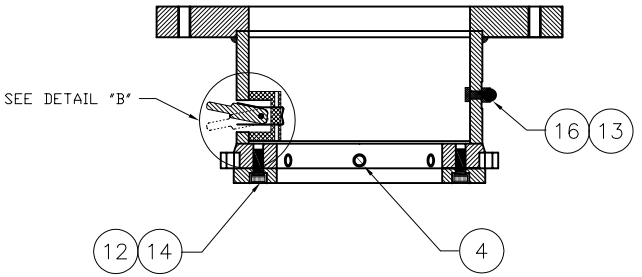
SCALE 4:1



DETAIL "B"

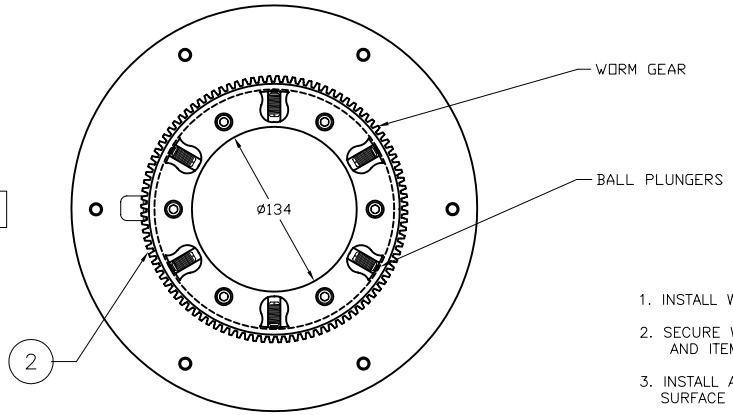
SIDE VIEW





SECTION A–A

BOTTOM VIEW



ASSEMBLY NOTES

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

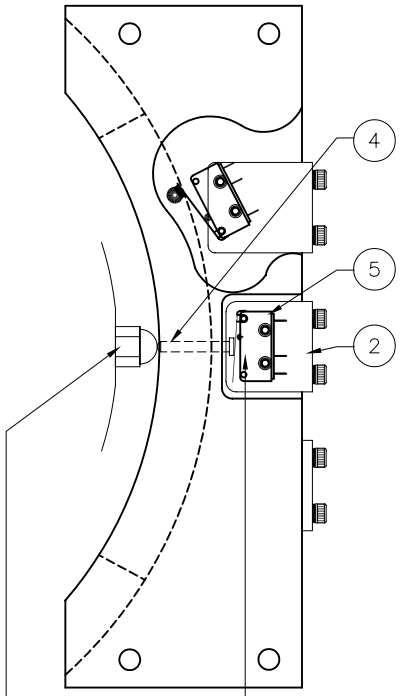
ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
18	1	10900170	LABEL, SPOOL IDENTIFICATION	
17	2	DIN 137	WASHER, CURVED 6 x 11x 0.5 S/S	
16	1	DIN 1587	NUT, HEX DOMED M6 X 12 S/S	
15	4	BN 792	WASHER, LOCK M6 X 1.2	
14	6	BN 792	WASHER, LOCK M8 X 1.4	
13	1	BN80	BOLT, M6 X 16 HEX NYLON	
12	6	DIN 912	SHCS M8 X 16 S/S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

PARTS LIST

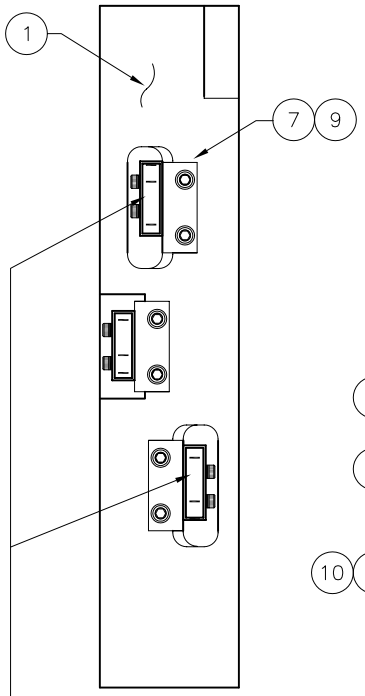
DRAWN G.DOUGLAS	DATE 04/27/97	DO NOT SCALE FROM DRAWING	GMW
CHECK	DATE	DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)	955 Industrial Rd, San Carlos, CA 94070
ENGINEERING	DATE	LINEAR: INCHES / mm; X.XXX ±.005 / ±0.03; X.XX ±.01 / ±0.1; X.X ±.03 / ±0.3; X ±.06 / ±1; DEG. ±.5 / ±0.5; FINISH 63 / 1.6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

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

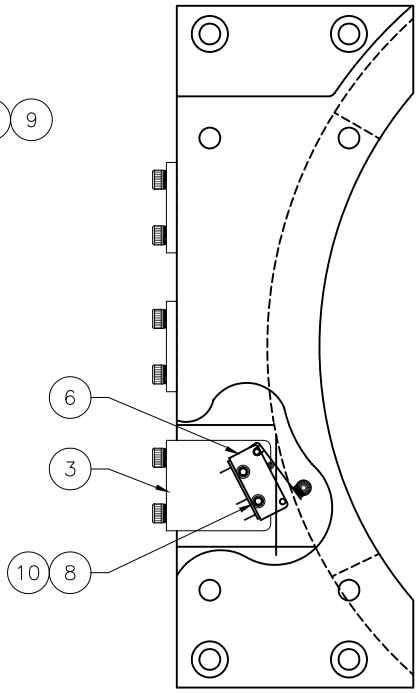
BOTTOM VIEW



REAR VIEW



TOP VIEW



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

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

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

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

PARTS LIST

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

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

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

THIRD ANGLE PROJECTION

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

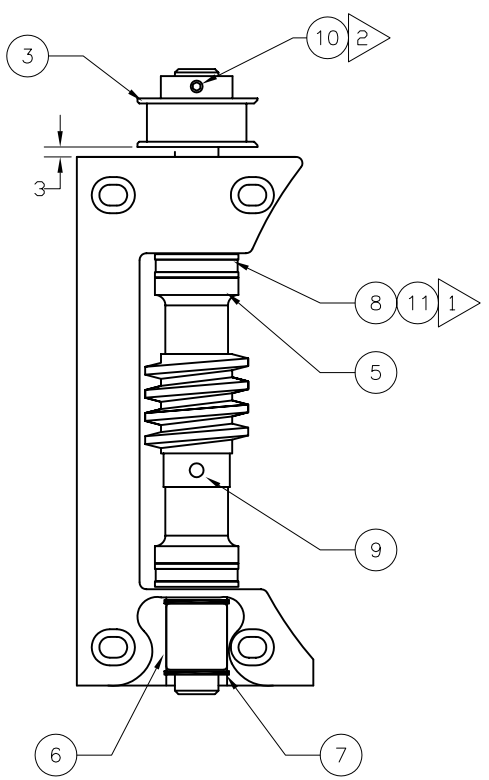
TITLE
MOTORIZED.ROT.DRIVE
STOP BLOCK ASSY

SIZE	DRAWING NO.	REV
A2	11900840	B

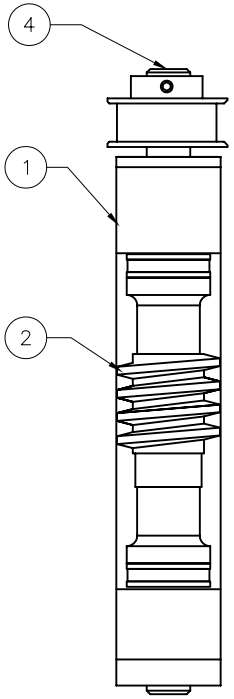
SCALE 1:1 | WT kg | SHEET 1 OF 1

REVISIONS

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



TOP VIEW



FRONT VIEW

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

PARTS LIST

NOTE:

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

2. ENSURE SETSCREW FITS ONTO SHAFT FLAT SURFACE.

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

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

	LINEAR INCHES	mm
	X.XXX ±.005	±0.03
	X.XX ±.0	±0.1
	X.X ±.03	±0.3
	X ±.06	±1
	DEG. ±.5	±0.5
	FINISH 63	1.6

THIRD ANGLE PROJECTION

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

TITLE
MOTORIZED.ROT.DRIVE
WORM MOUNT ASSY

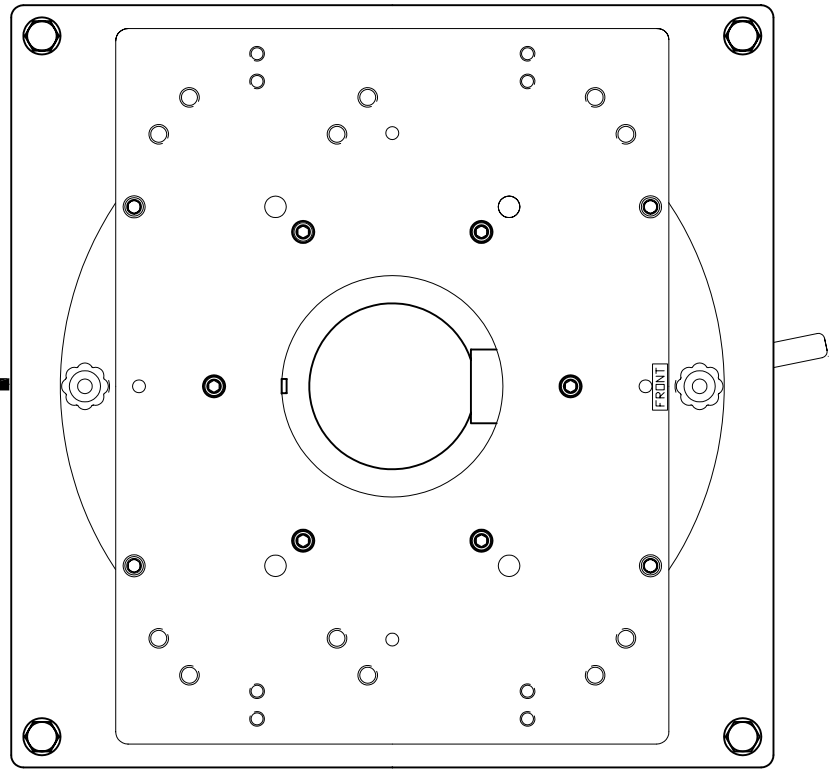
SIZE	DRAWING NO.	REV
A2	11900850	E

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

REVISIONS

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

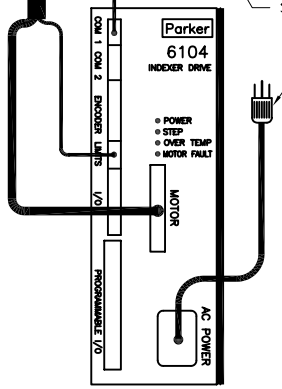
TOP VIEW



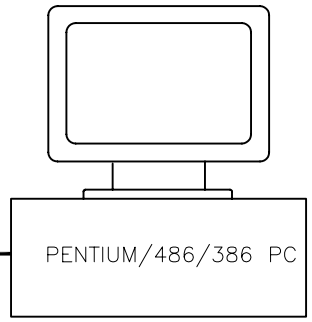
MOTOR AND LIMIT SWITCH CABLE PART NO 16900400

SERIAL COMMUNICATIONS CABLE PART NO 16900410

AC POWER INPUT



STEPPER MOTOR CONTROLLER



CONTROL COMPUTER

NOTE

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

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE

PARTS LIST

DRAWN G.DOUGLAS	DATE 02/17/98	DO NOT SCALE FROM DRAWING (UNLESS OTHERWISE SPECIFIED)	GMW 955 Industrial Rd, San Carlos, CA 94070 Tel: (650)802-8292. Fax: (650)802-8298.
CHECK	DATE		
ENGINEERING	DATE		

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

TITLE: MOTORIZED.ROT.DRIVE ELECTRICAL ASSY

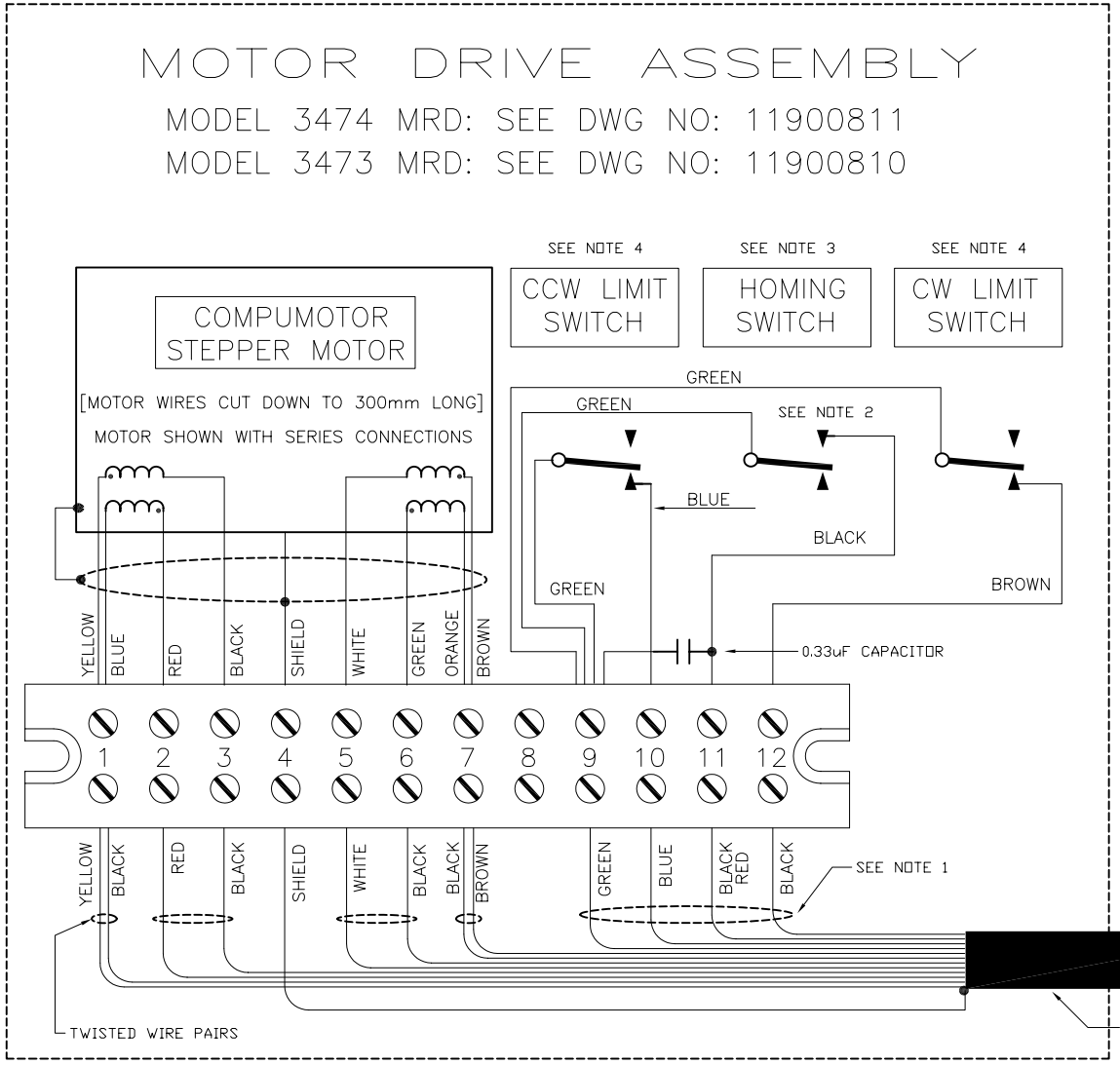
NEXT ASSY	SYSTEM	THIRD ANGLE PROJECTION	SIZE	DRAWING NO.	REV
SOFTWARE AUTOCAD 2000			A1	11901020	B

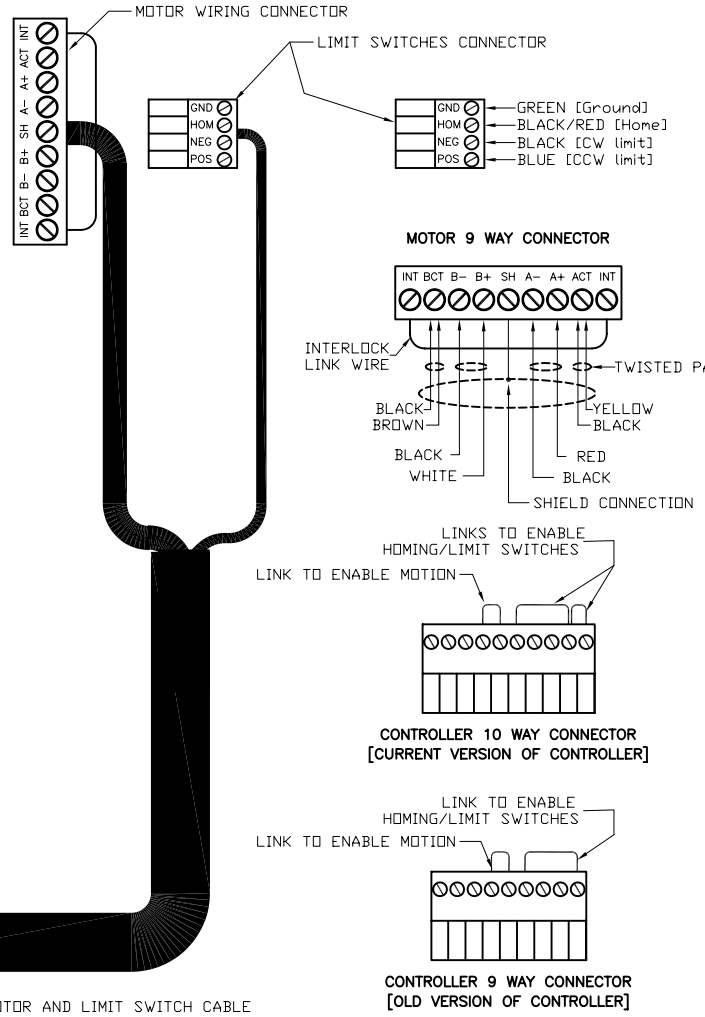
SCALE 1:2 | WT kg | SHEET 1 OF 1

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

MOTOR DRIVE ASSEMBLY

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





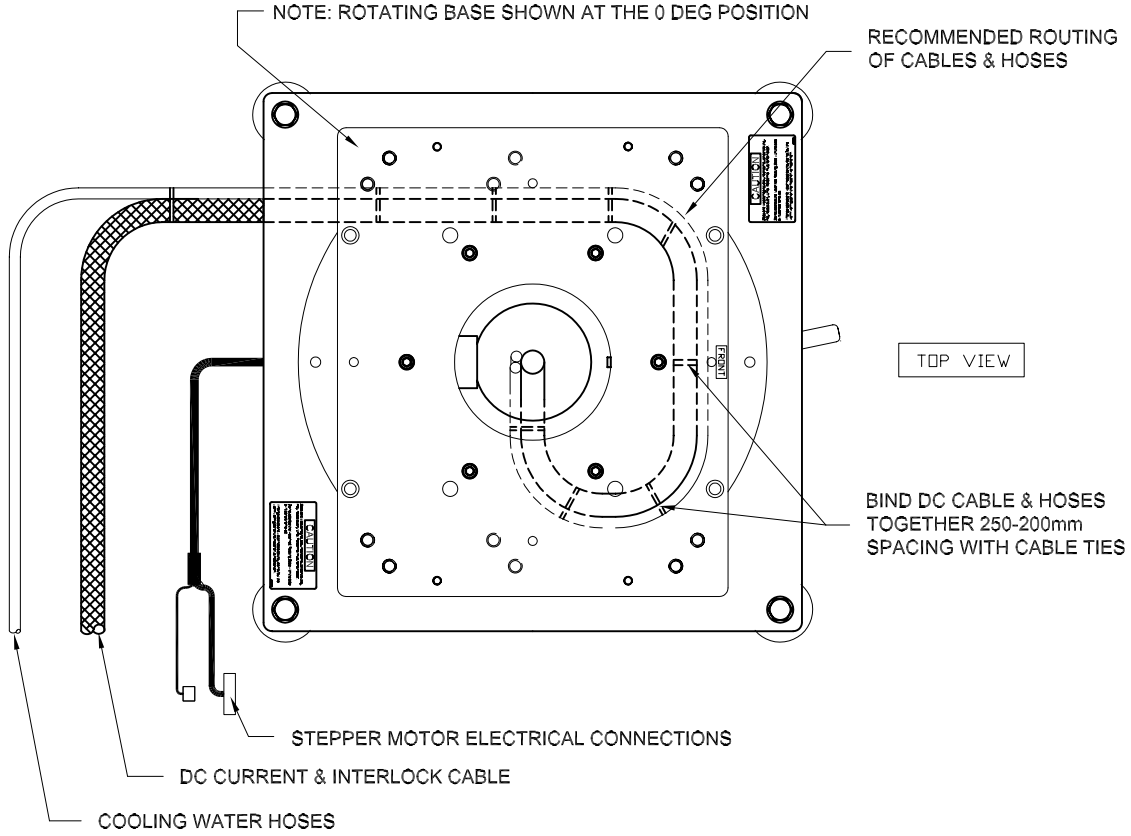
NOTE:
1 USE BLACK WIRES FROM GREEN AND WHITE PAIRS. DO NOT MIX WITH BLACK WIRES USED FOR STEPPER MOTOR.
2. HOMING SWITCH USES NORMALLY OPEN CONTACT. CCW/CW LIMIT SWITCHES USE NORMALLY CLOSED CONTACTS.
3. WHEN HOMING COMMAND IS GIVEN ROTATING BASE RETURNS TO ZERO DEG POSITION AND STOPS.
4. ROTATION DIRECTIONS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

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
		PARTS LIST		

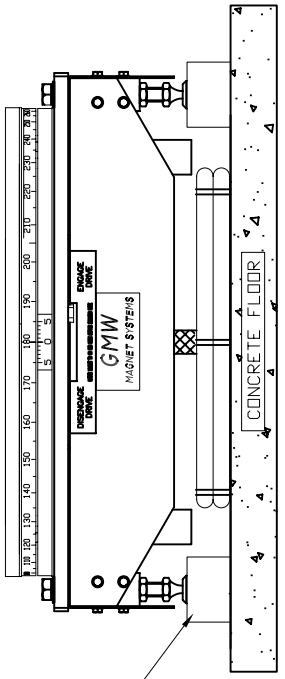
DRAWN G.DOUGLAS	DATE 02/13/98	DO NOT SCALE FROM DRAWING	GMW
CHECK	DATE	DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)	955 Industrial Rd San Carlos, CA 94070
ENGINEERING	DATE	LINEAR: INCHES / mm; X.XXX ±.003 / ±0.03; X.XX ±.01 / ±0.1; X.X ±.03 / ±0.3; X ±.06 / ±1; DEG. ±.5 / ±0.5; FINISH 63 / 1.6	Tel: (650)802-8292. Fax: (650)802-8298.
11900800	5201		TITLE: MOTORIZED.ROT.DRIVE ELECTRICAL WIRING
11900800	3473		
11900801	3474		
NEXT ASSY	SYSTEM	THIRD ANGLE PROJECTION	SIZE A1 / DRAWING NO. 13900350 / REV C
SOFTWARE AUTOCAD 2000			SCALE 2:1 / WT kg / SHEET 1 OF 1

REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		08/21/08	G.DOUGLAS

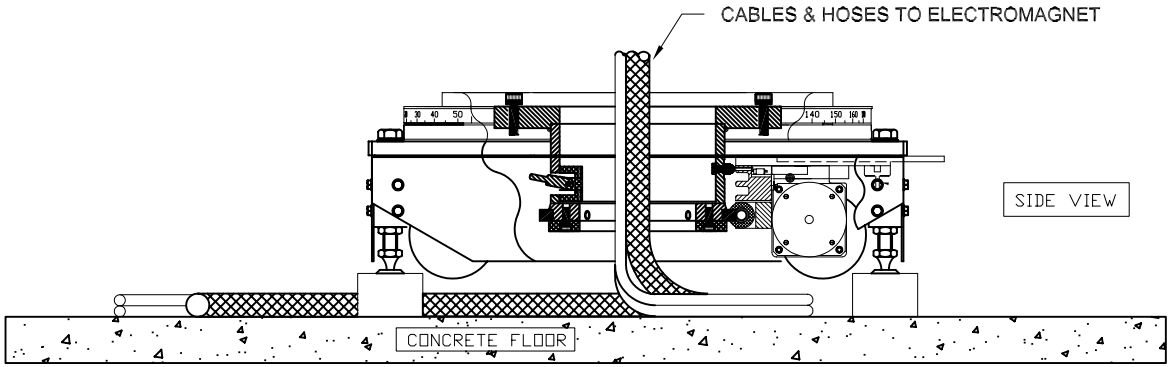


TOP VIEW



FRONT VIEW

BASE FLOOR SPACER
PART NO: 17906330



SIDE VIEW

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE

PARTS LIST

DRAWN	G.DOUGLAS	DATE 08/21/08
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.

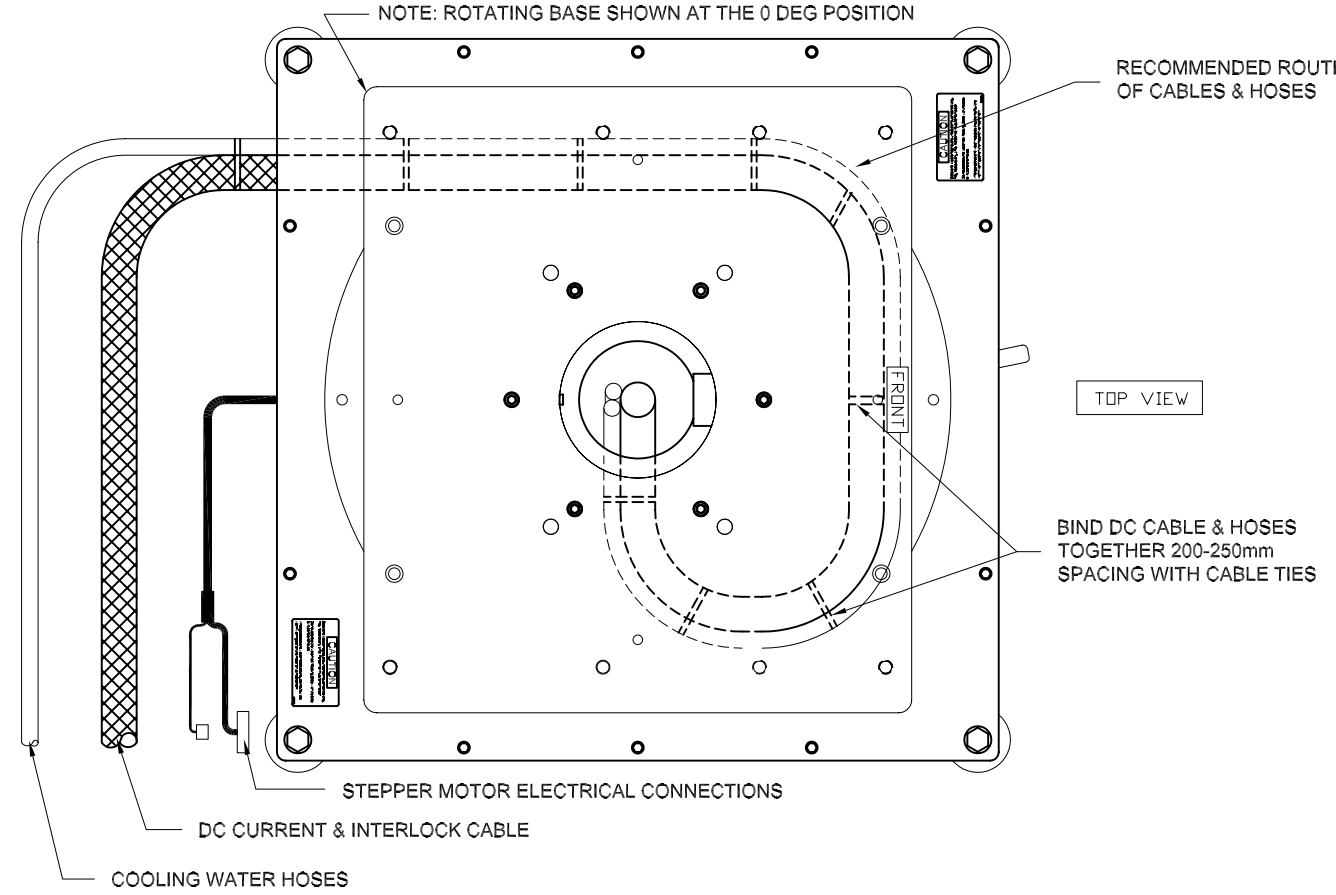
TITLE
MOTORIZED ROTATING DRIVE
MODEL: 3473 INSTALLATION

SIZE	DRAWING NO.	REV
A2	11902620	A

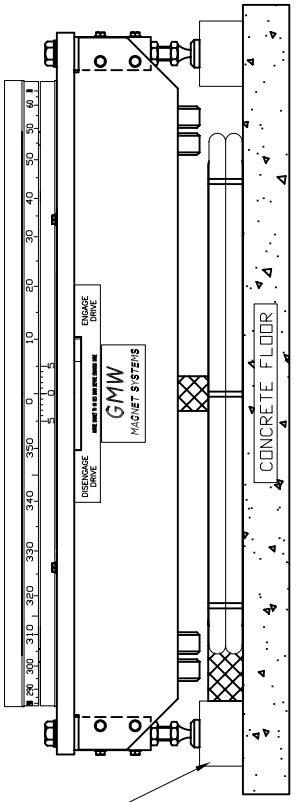
SCALE 1:4 | WT kg | SHEET 1 OF 1

REVISIONS

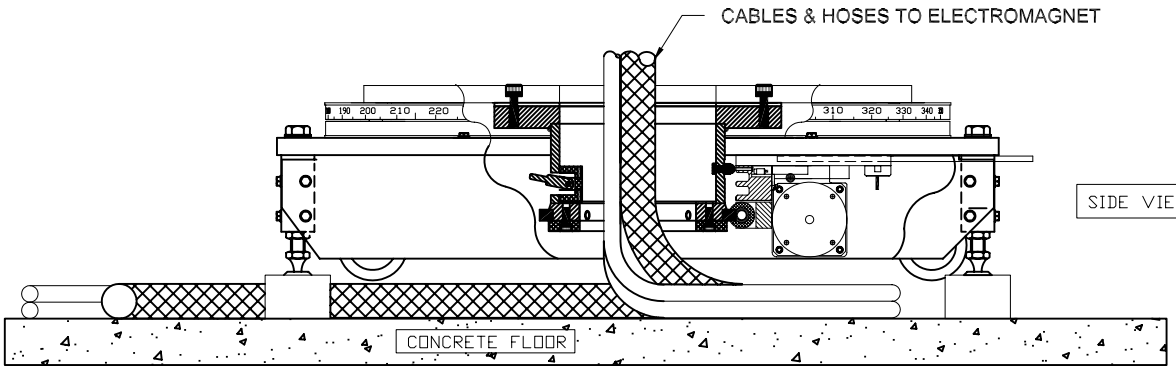
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		08/18/08	G.DOUGLAS



TOP VIEW



FRONT VIEW



SIDE VIEW

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE

PARTS LIST

DRAWN	G.DOUGLAS	DATE	08/18/08
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

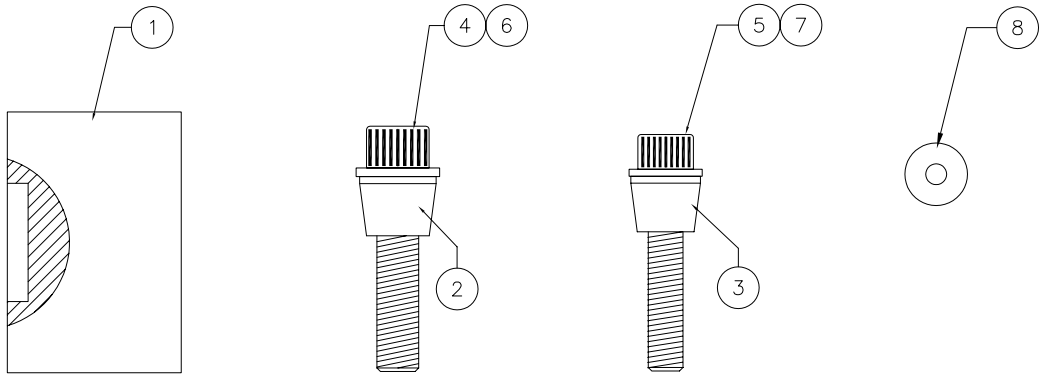
GMW
955 Industrial Rd, San Carlos, CA 94070
Tel: (650)802-8292. Fax: (650)802-8298.

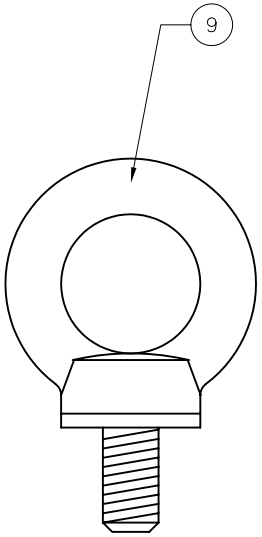
TITLE
MOTORIZED ROTATING DRIVE
MODEL: 3474 INSTALLATION

SIZE	DRAWING NO.	REV
A2	11902621	A

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

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		08/24/08	G.DOUGLAS





ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
9	2		EYEBOLT, M16	
8	16	BN 748	WASHER, SHIM 6 x 18 x 0.5 THICK BOSSARD	
7	3	DIN 433	WASHER, M10 x 1.6 THICK	
6	3	DIN 433	WASHER M12 x 2 THICK	
5	3	DIN 912	SHSC M10 x 40 S/S	
4	3	DIN 912	SHSC M12 x 40 S/S	
3	3	17906310	SPOOL ALIGNMENT BUSH	
2	3	17906320	TRANSITION PLATE ALIGNMENT BUSH	
1	4	17906330	BASE FLOOR SPACER	

PARTS LIST

DRAWN	G.DOUGLAS	DATE 08/24/08
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

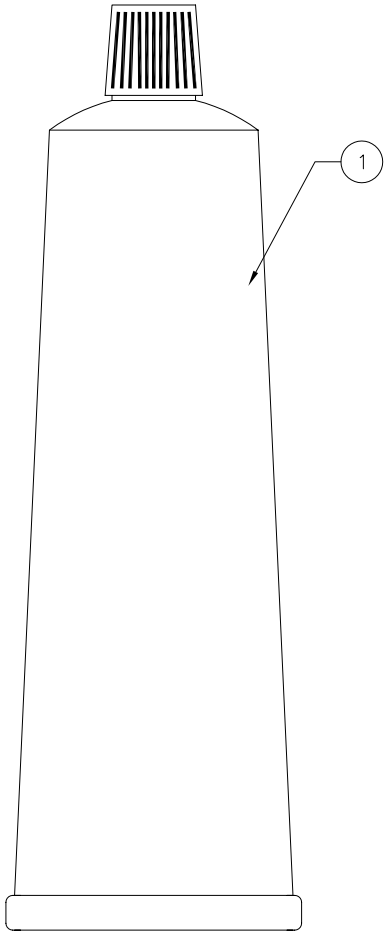
GMW
955 Industrial Rd, San Carlos, CA 94070
Tel: (650)802-8292. Fax: (650)802-8298.

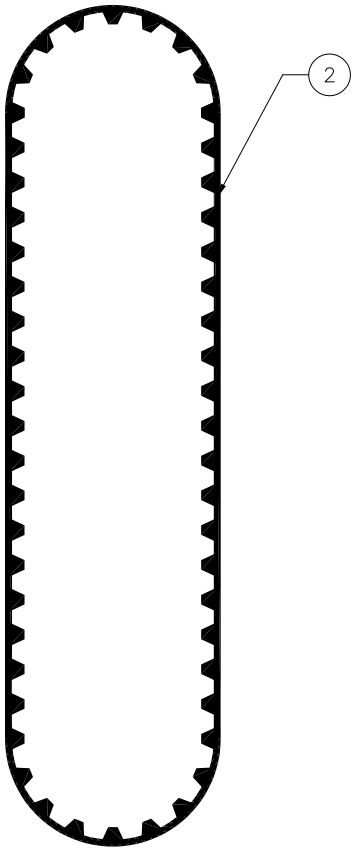
TITLE
MOTORIZED ROTATING DRIVE INSTALLATION KIT

SIZE	DRAWING NO.	REV
A2	11902640	A

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

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		08/24/08	G.DOUGLAS





ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
2	1	TB20EF6-55	BELT,TIMING, 250mm [11"] Long BERG	
1	1	RS# 118-0567	GREASE, MULTIPURPOSE, 50ml Tube	

PARTS LIST

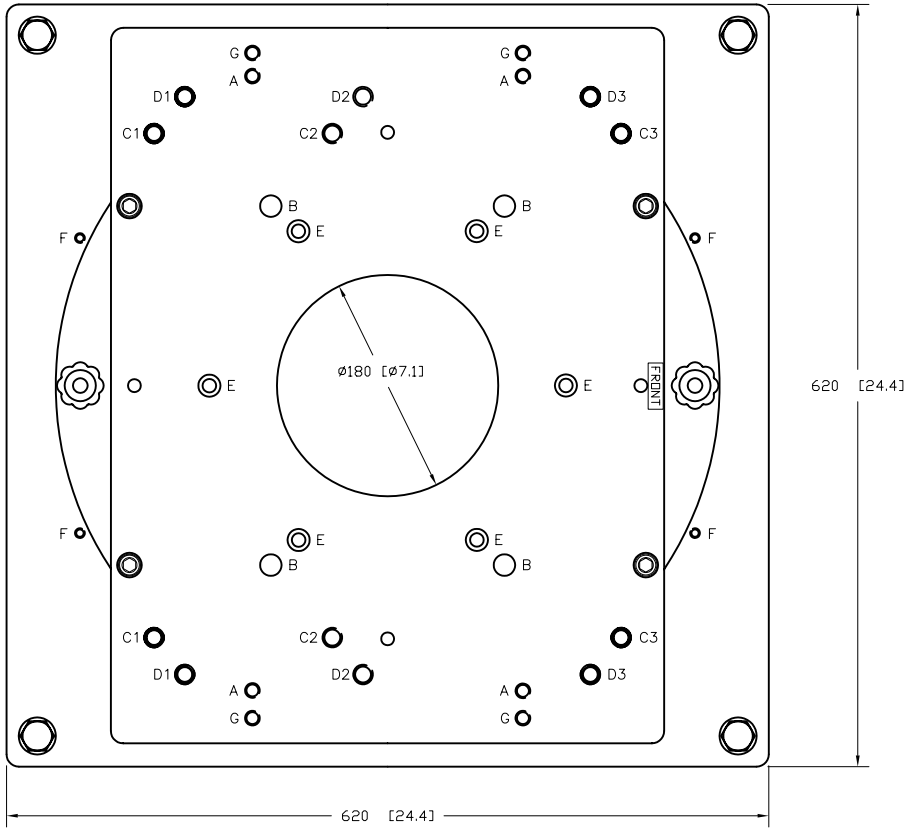
DRAWN G.DOUGLAS	DATE 08/24/08	DO NOT SCALE FROM DRAWING	GMW
CHECK	DATE	DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)	955 Industrial Rd, San Carlos, CA 94070
ENGINEERING	DATE		Tel: (650)802-8292. Fax: (650)802-8298.

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

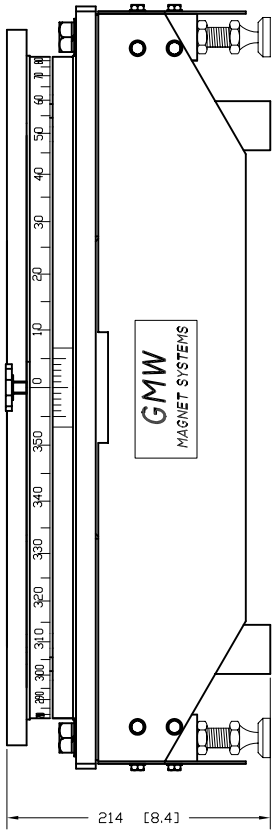
TITLE: MOTORIZED ROTATING DRIVE SPARE PARTS KIT

NEXT ASSY	SYSTEM	THIRD ANGLE PROJECTION	SIZE	DRAWING NO.	REV
SOFTWARE AUTOCAD 2000			A2	11902650	A
			SCALE 1:1	WT kg	SHEET 1 OF 1

TOP VIEW



FRONT VIEW



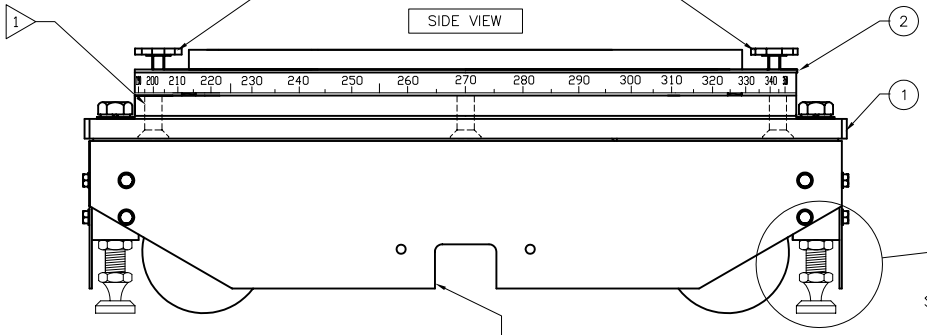
REVISIONS

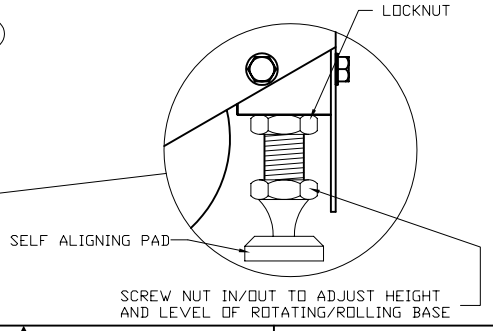
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		04/27/94	G.DOUGLAS
B	ADD 5403 MTG HOLES		05/13/95	G.DOUGLAS
C	ADD MOTORIZED ROTATING BASE HOLES		07/05/97	G.DOUGLAS
D	ADD "G" HOLES, INCR TRANSISTION PLATE SIZE		06/27/03	G.DOUGLAS
E	CORRECT TRANSISTION PLATE HOLE CALLOUT, ADD FOOT	VIEW	04/14/04	G.DOUGLAS
F	DELETE ITEM 3, ADD ROTATION LOCK NOTE & NOTE 1		08/29/08	G.DOUGLAS

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

ROTATION LOCKS
UNDO TO ALLOW ROTATION
TIGHTEN TO STOP ROTATION

SIDE VIEW





NOTE

1. PART OF ROTATING BASE ASSY SEE DWG NO: 11802090

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
2	1	11802090	ROTATING BASE ASSEMBLY	
1	1	11803170	ROLLING BASE ASSEMBLY	

PARTS LIST

DRAWN G.DOUGLAS 04/27/94
CHECK
ENGINEERING
DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)

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

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.

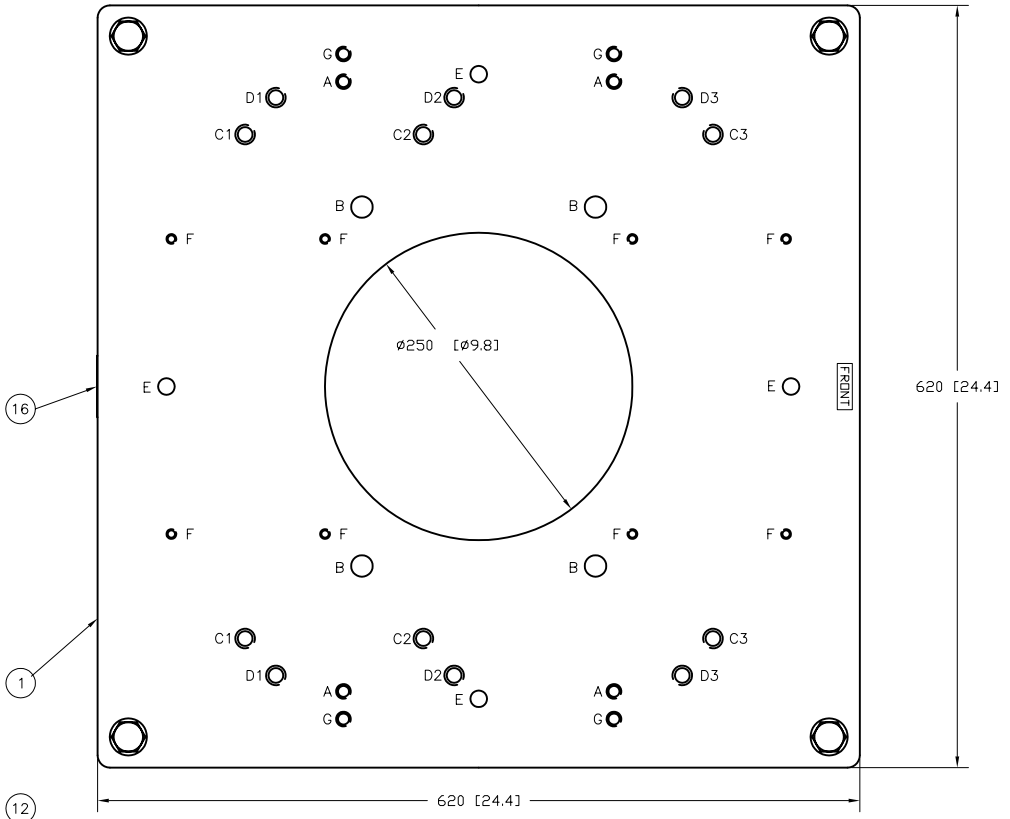
TITLE
ROT/ROLLING BASE
3473/3472/5403

SIZE A1 | DRAWING NO. 11803430 | REV F
SCALE 1:2 | WT kg | SHEET 1 OF 1

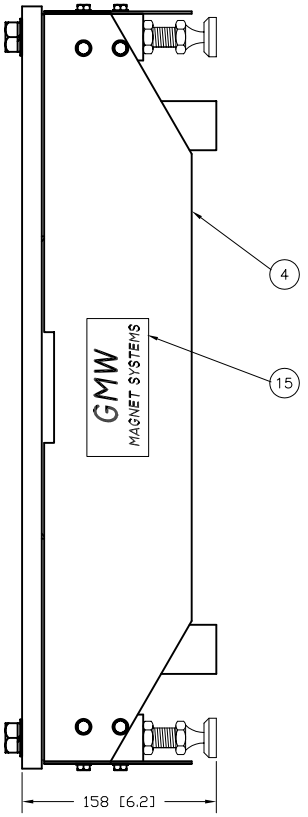
REVISIONS

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

TOP VIEW



FRONT VIEW



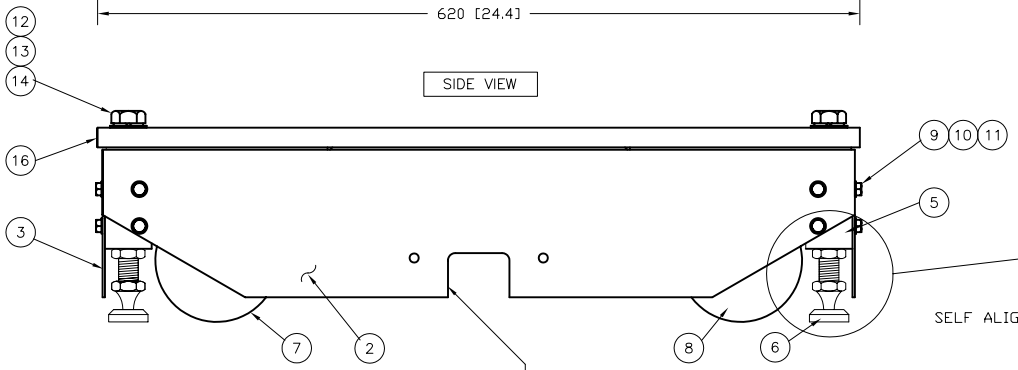
MOUNTING HOLES

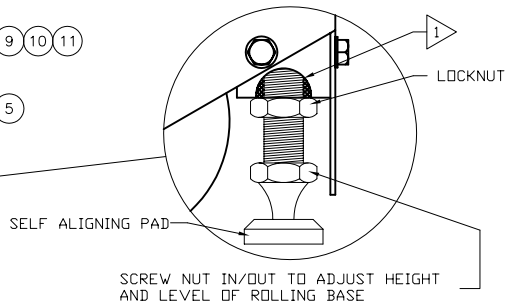
A=5403 DIRECT MOUNTING
B=3473/3472 DIRECT MOUNTING
C1/C2=3472 45° MOUNTING
D1/D2=3473 45° MOUNTING
C1/C3=3472 HORZ MOUNTING
D1/D3=3473 HORZ MOUNTING
E=ROTATING BASE MOUNTING
F=MRD MOTOR DRIVE MOUNTING
G=5403EG DIRECT MOUNTING

NOTE

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

SIDE VIEW



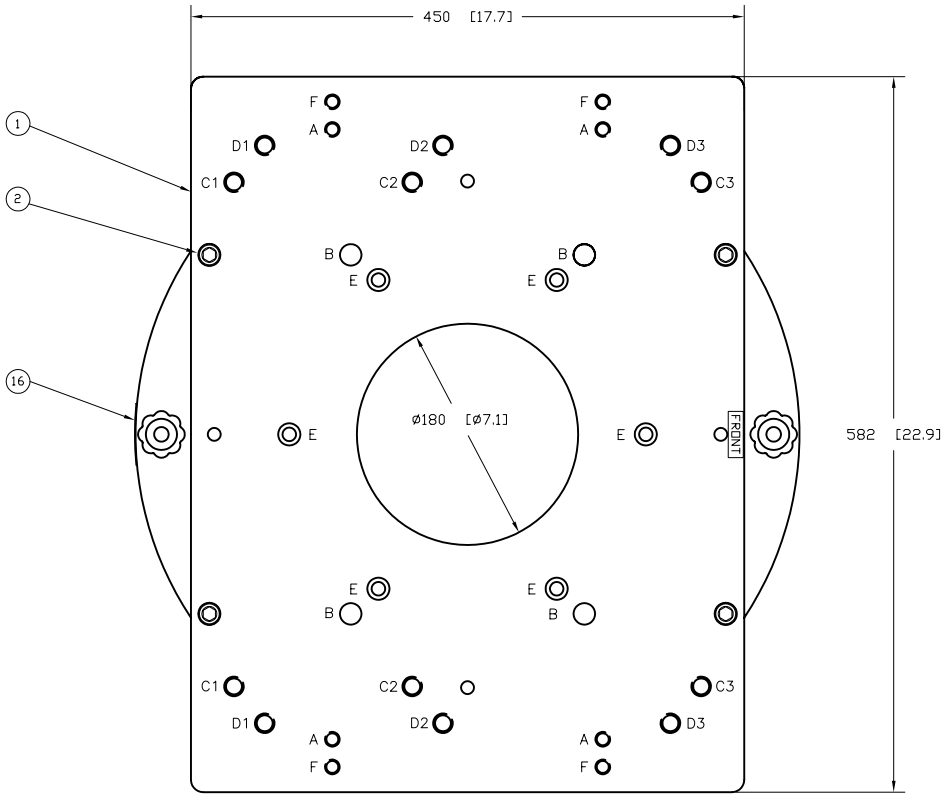


ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
16	1	10901110	LABEL, IDENTIFICATION	
15	1	10900200	LABEL, GMW MAGNET SYSTEMS	
14	4	DIN 125 A	M16 X 3 THICK WASHER, FLAT S/S	
13	4	DIN 127 B	M16 WASHER, SPRING S/S	
12	4	DIN 933	M16 X 40 HEX HD BOLT, S/S	
11	16	DIN 127 B	M6 WASHER, SPRING S/S	
10	16	DIN 433	M6 WASHER,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

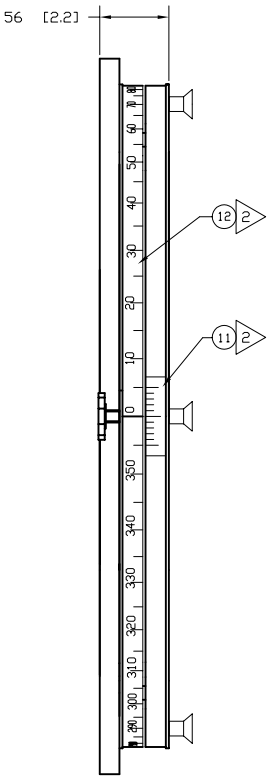
PARTS LIST

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

TOP VIEW



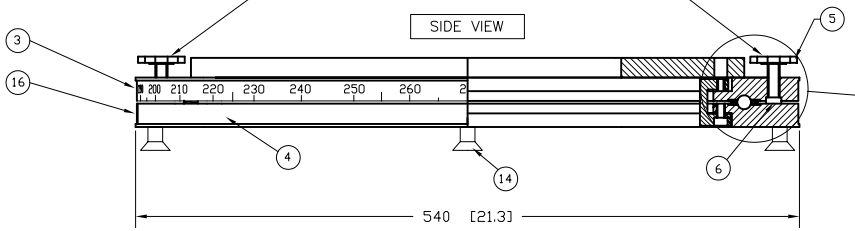
FRONT VIEW



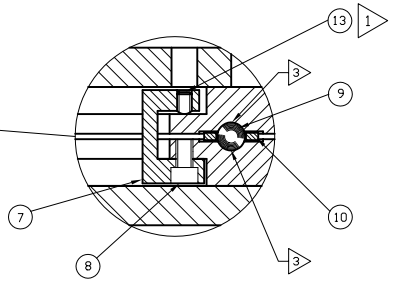
ROTATION LOCKS

UNDO TO ALLOW ROTATION
TIGHTEN TO STOP ROTATION

SIDE VIEW



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.		04/29/94	G.DOUGLAS
C	ADD HORIZONTAL MTG HOLES @ B6/D6		05/10/94	G.DOUGLAS
D	ADD 5403 MTG HOLES, DELETE BASE PLATE		04/28/95	G.DOUGLAS
E	ADD MOTORISED ROT BASE SPOOL HOLES @ C7		09/30/97	G.DOUGLAS
F	CHG ITEM 9 AND ITEM 13		07/29/98	G.DOUGLAS
G	ADD ITEM 16, "F" HOLES, INCR TRANSISTION PLATE SIZE		06/27/03	G.DOUGLAS
H	CHG ITEM 14 TO SHCS		04/15/04	G.DOUGLAS
I	ADD NOTE @ A7, CHG ITEM 14, DELETE 15		08/29/08	G.DOUGLAS

MOUNTING HOLES

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

NOTES

1. ADJUST SET SCREW FOR MINIMUM CLEARANCE ALLOWING FOR FULL FREE ROTATION; AND LOCTITE IN PLACE.
2. FORM DECAL TO PLATE DIA TO PREVENT ENDS FROM SPRINGING LOOSE.
3. APPLY GREASE TO BEARING SURFACES BEFORE ASSEMBLY.

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
16	1	10901140	LABEL, IDENTIFICATION	
15			DELETED	
14	4	DIN 7991	SCREW, M12 x 35 SK FLAT HD CAP S/S	
13	4	DIN 913	SCREW, M6 x 8 SHSS , OVAL PT S/S	
12	1	10901150	LABEL, ANGLE GRADUATIONS 0–360°	
11	1	10901160	LABEL, VERNIER INDEX	
10	1	17802140	SPACER, BEARING	
9	32	RB–11.906	BALL BEARING 11.91mm [15/32"] DIA SKF	
8	4	DIN 912	SCREW, M6 x 10 SK HD CAP, S/S	
7	4	17802150	CLAMP, RETAINING	
6	2	17901340	CLAMP PAD	
5	2	17802170	HANDWHEEL, M10	
4	1	17802132	LOWER THRUST BEARING PLATE	
3	1	17802131	UPPER THRUST BEARING PLATE	
2	4	DIN 912	SCREW, M12 x 20 SK HD CAP S/S	
1	1	17802100	TRANSITION PLATE	

PARTS LIST

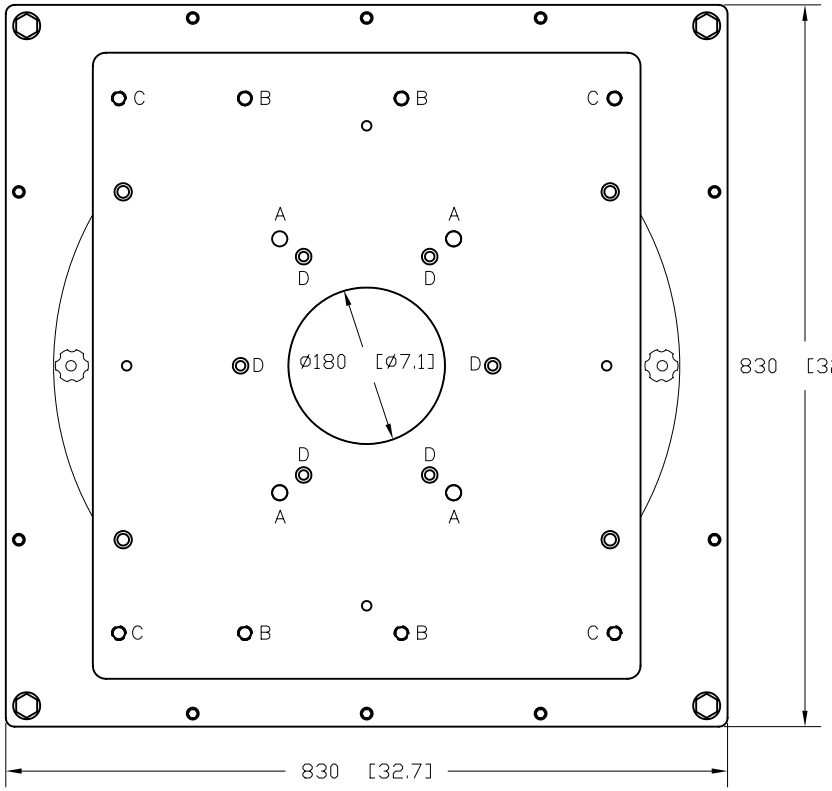
DRAWN A.MARTIN 04/27/94
CHECK
ENGINEERING
DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)
LINEAR: INCHES / mm
X.XXX ±.005 / ±0.03
X.XX ±.01 / ±0.1
X.X ±.03 / ±0.3
X ±.06 / ±1
DEG. ±.5 / ±0.5
FINISH 63 / 1.6
NEXT ASSY
SYSTEM
SOFTWARE AUTOCAD 2000
THIRD ANGLE PROJECTION

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

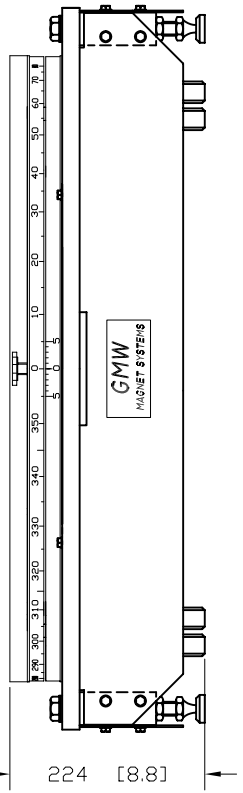
TITLE: ROTATING BASE 3473/3472/5403
SIZE: A1
DRAWING NO.: 11802090
REV: I
SCALE 1:2
WT kg
SHEET 1 OF 1

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		11/17/93	G.DOUGLAS
B	ADD ROTATION LOCK NOTE @ B4, VIEW @ A2		08/29/08	G.DOUGLAS

TOP VIEW



FRONT VIEW



MOUNTING HOLES
A=3474 DIRECT MOUNTING
B=3474 45 DEG MOUNTING
C=3474 HORZ MOUNTING
D= MRB SPOOL MOUNTS

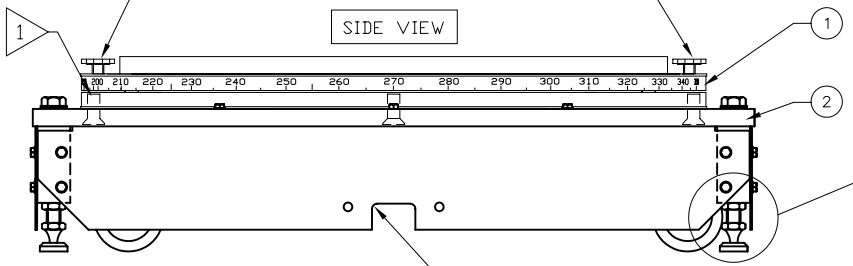
NOTE

1. PART OF ROTATING BASE ASSY SEE DWG NO: 11900990

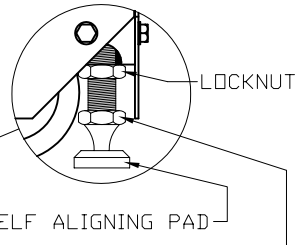
ROTATION LOCKS

UNDO TO ALLOW ROTATION
TIGHTEN TO STOP ROTATION

SIDE VIEW



CUTOUT FOR ROLLING BASE GUIDE
ASSEMBLY DWG NO 11901320



SCREW NUT IN/OUT TO ADJUST
HEIGHT AND LEVEL OF ROLLING BASE

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
2	1	11801800	ROLLING BASE ASSY	
1	1	11900990	ROTATING BASE ASSY	

PARTS LIST

DRAWN G.DOUGLAS	DATE 11/17/93	
CHECK	DATE	
ENGINEERING	DATE	
NEXT ASSY	SYSTEM	

SOFTWARE
AUTOCAD 2000

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

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

THIRD ANGLE PROJECTION

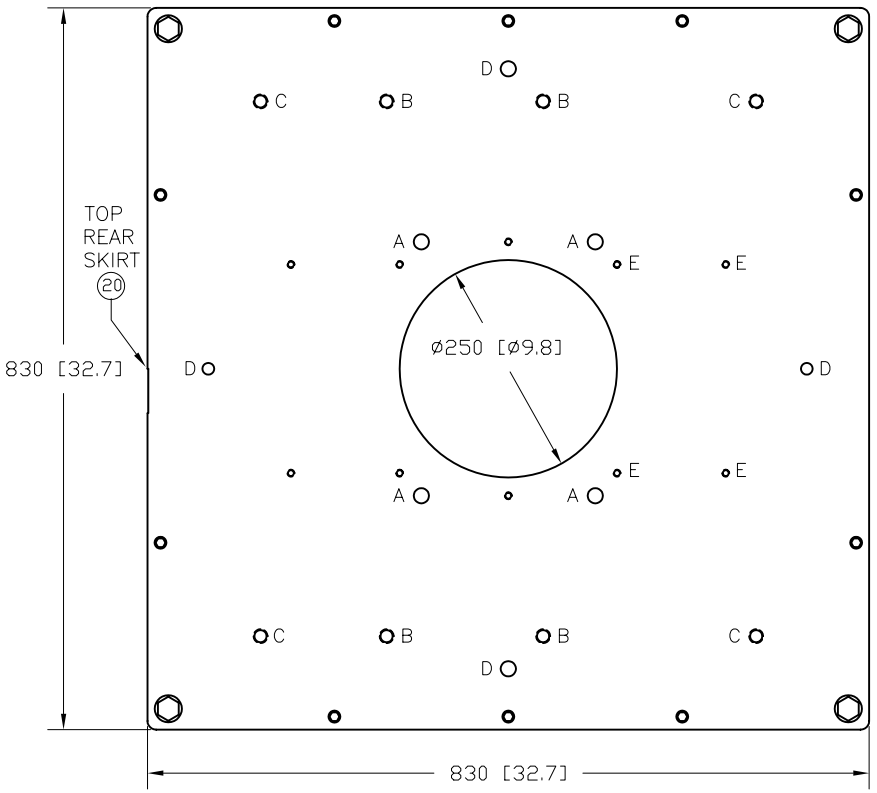
GMW
955 Industrial Rd, San Carlos, CA 94070
Tel: (650)802-8292. Fax: (650)802-8298.

TITLE
ROLLING/ROTATING BASE ASSY
MODEL: 3474

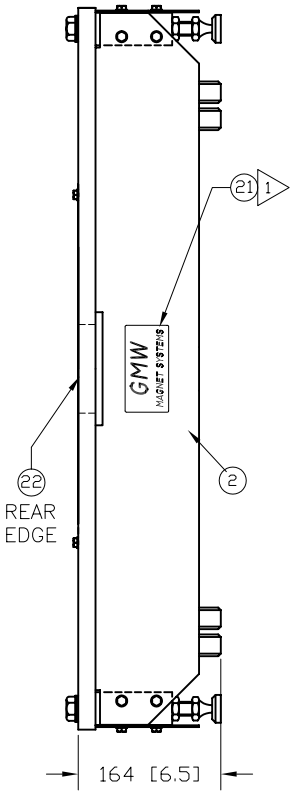
SIZE	DRAWING NO.	REV
A2	11900980	B

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

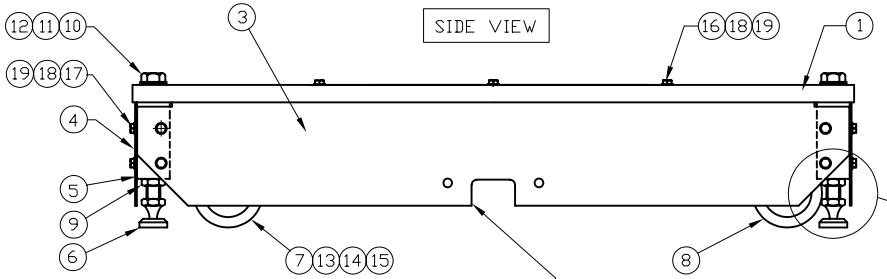
TOP VIEW

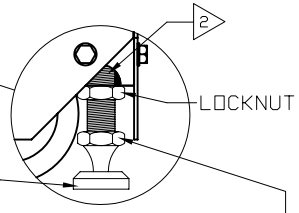


FRONT VIEW



SIDE VIEW





REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
B	REDRAWN		12/06/92	A.MARTIN
C	ADD TOP VIEW, HORZ/MTG HOLES "C"		03/04/97	G.DOUGLAS
D	ADD MRD MOUNTING HOLES, CHG PARTS LIST		11/13/97	G.DOUGLAS
E	CHG POSITION OF ITEM 22, ITEMS 7 & 8 NOW FITTED	AT B/S	07/21/03	G.DOUGLAS
F	ADD DETAIL @ A2, AND NOTE 2		09/29/08	G.DOUGLAS

MOUNTING HOLES
A=3474 DIRECT MOUNTING
B=3474 45 DEG MOUNTING
C=3474 HORZ MOUNTING
D=ROTATING BASE MOUNTING
E= MRD MOTOR DRIVE MOUNTS

1 FIT LABEL ON CENTER LINE 35mm UP FROM BOTTOM OF SKIRT

2 APPLY GENERAL PURPOSE GREASE TO INTERNAL THREAD [x4]

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
22	1	10900210	LABEL, IDENTIFICATION	
21	1	10900200	LABEL, GMW MAGNET SYSTEMS	
20	1	605-677	RUBBER PLUG, 30MM DIA OD R-S	
19	26	DIN 127 B	WASHER, SPRING M6, S/S	
18	26	DIN 125 A	WASHER, FLAT M6, S/S	
17	16	DIN 933	BOLT, HEX M6 X 12, S/S	
16	10	DIN 933	BOLT, HEX M6 X 30, S/S	
15	16	DIN 127 B	WASHER, LOCK M10, S/S	
14	16	DIN 125 A	WASHER, FLAT M10, S/S	
13	16	DIN 933	BOLT, HEX M10 X 20, S/S	
12	4	DIN 127 B	WASHER, LOCK M16, S/S	
11	4	DIN 125 A	WASHER, FLAT M16, S/S	
10	4	DIN 933	BOLT, HEX M16 x 30, S/S	
9	4	DIN 439 B	NUT, M16 HALF S/S	
8	2		CASTER, SWIVEL ALBION 2-72-TM-03101-S	
7	2		CASTER, FIXED ALBION 2-72-TM-013101-R	
6	4	17904540	LEVELING FOOT	
5	4	17801820	SUPPORT LEG	
4	1	17801793	SKIRT PANEL, REAR	
3	2	17801792	SKIRT PANEL, LH & RH SIDE	
2	1	17801791	SKIRT PANEL, FRONT SIDE	
1	1	17801810	BASE PLATE	

PARTS LIST

DRAWN A.MARTIN	DATE 12/06/92	
CHECK	DATE	
ENGINEERING	DATE	
	3474	
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

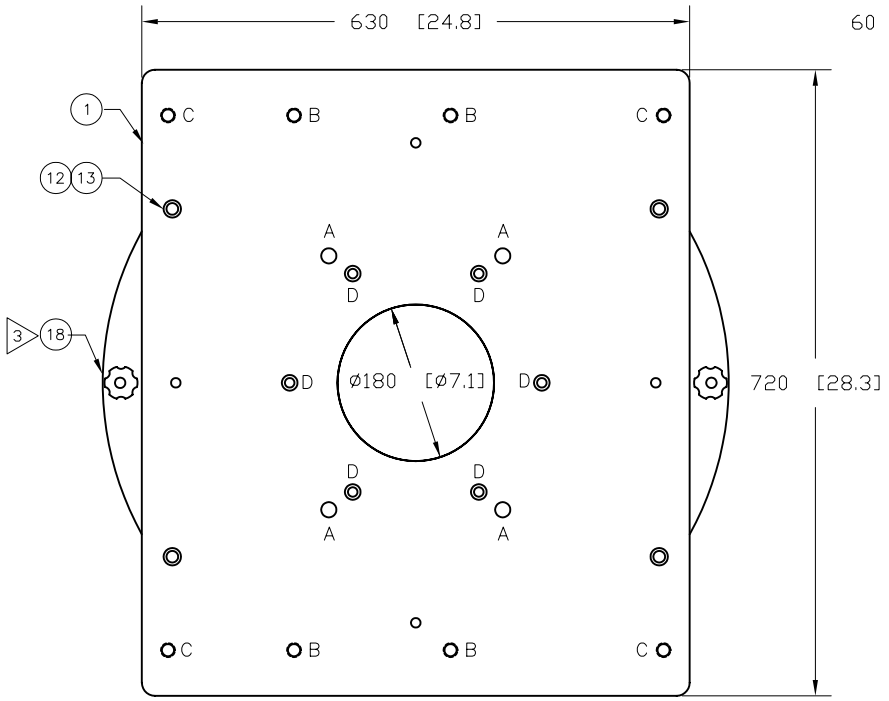
GMW
955 Industrial Rd, San Carlos, CA 94070
Tel: (650)802-8292. Fax: (650)802-8298.

TITLE
ROLLING BASE ASSY
MODEL: 3474

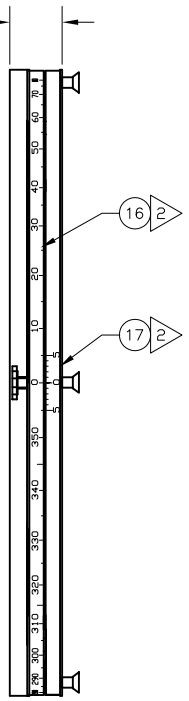
SIZE	DRAWING NO.	REV
A2	11801800	F

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

TOP VIEW



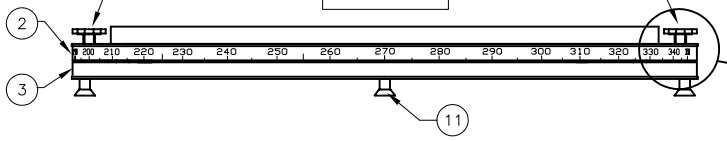
FRONT VIEW



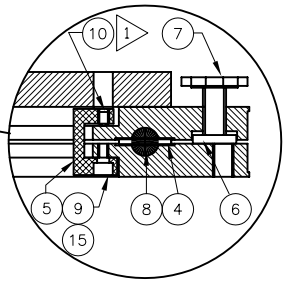
ROTATION LOCKS

UNDO TO ALLOW ROTATION
TIGHTEN TO STOP ROTATION

SIDE VIEW



DETAILED VIEW



SCALE 2:1

NOTES:

1. ADJUST SET SCREW FOR MINIMUM CLEARANCE. ALLOW FOR ROTATION WITHOUT BINDING, THEN LOCTITE SHSC.
2. FORM LABEL TO RING DIA, CLEAN SURFACE BEFORE FITTING.
3. FIT ITEM 18 DIRECTLY OPPOSITE ITEM 17 ON LOWER TRUST RING.
4. APPLY GREASE TO BEARING SURFACES BEFORE ASSEMBLY.

REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		11/15/93	G.DOUGLAS
B	CHG BALL GROVE AND ITEM 8 FROM 15.00 TO 15.88		07/28/98	G.DOUGLAS
C	ADD ROTATION LOCK NOTE @ B4, DELETE ITEM 14		08/29/08	G.DOUGLAS

MOUNTING HOLES

A=3474 DIRECT MOUNTING
B=3474 45 DEG MOUNTING
C=3474 HORZ MOUNTING
D= MRB SPOOL MOUNTS

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
18	1	10900140	LABEL, INDENTIFICATION	
17	1	10900130	LABEL, INDEX	2
16	1	10900120	LABEL, GRADUATIONS 0–360°	2
15	4	BN 792	WASHER, M6 INT RIBBED LOCK SP/S	
14			DELETED	
13	4	BN 792	WASHER, M12 INT RIBBED LOCK SP/S	
12	4	DIN 912	SHCS, M12 X 25 S/S	
11	4	DIN 7991	SHCS, M12 X 35 FLAT HEAD S/S	
10	4	DIN 916 A2	SHSS, M6 X 8 OVAL POINT S/S	1
9	4	DIN 912	SHCS, M6 X 10 S/S	
8	64	RB-15.875	BALL BEARING, 15.88MM DIA, [5/8"]SKF	
7	2	17802170	HANDWHEEL, M10	
6	2	17901330	CLAMP PAD	
5	4	17802150	RETAINING CLAMP	
4	1	17901320	BEARING SPACER	
3	1	17901312	LOWER THRUST RING	
2	1	17901311	UPPER THUST RING	
1	1	17901300	TRANSISION PLATE	

PARTS LIST

DRAWN G.DOUGLAS	DATE 11/15/93	
CHECK	DATE	
ENGINEERING	DATE	
NEXT ASSY	SYSTEM	
SOFTWARE AUTOCAD 2000		

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

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

THIRD ANGLE PROJECTION

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

TITLE
ROTATING BASE ASSY
MODEL: 3474

SIZE	DRAWING NO.	REV
A2	11900990	C

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