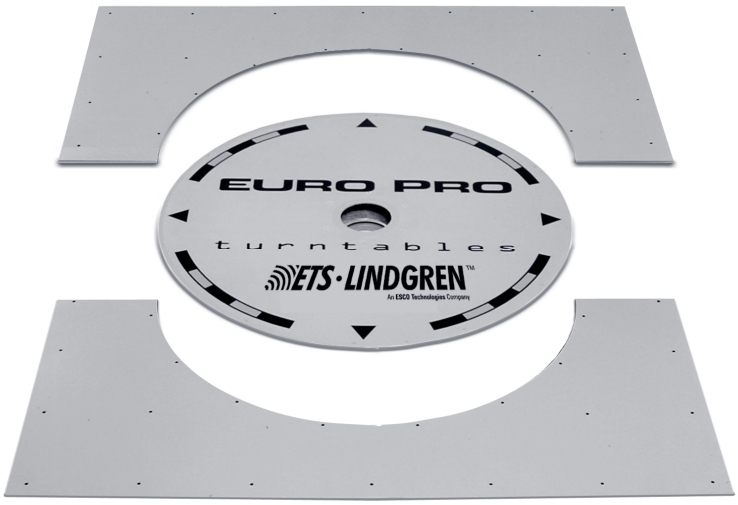
Model 2088 EuroPro™

Electric Powered Turntable

MANUAL



ETS·LINDGREN™
An ESCO Technologies Company

 REV C – PN 399253

Note: Optional Integrated Ground Plane Interface shown on cover.
European manufactured models include this option standard.

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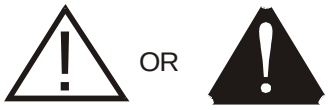
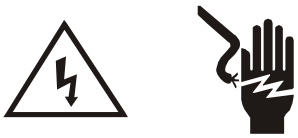
NOTICE: This product and related documentation must be reviewed for familiarization with safety markings and instructions before operation.

SAFETY SYMBOL DEFINITIONS



REFER TO MANUAL When product is marked with this symbol refer to instruction manual for additional information.



HIGH VOLTAGE Indicates presence of hazardous voltage. Unsafe practice could result in severe personal injury or death.

PROTECTIVE EARTH GROUND (SAFETY GROUND)
Indicates protective earth terminal. You should provide uninterruptible safety earth ground from the main power source to the product input wiring terminals, power cord, or supplied power cord set.

CAUTION

CAUTION Denotes a hazard. Failure to follow instructions could result in minor personal injury and/or property damage. Included text gives proper procedures.

WARNING

WARNING Denotes a hazard. Failure to follow instructions could result in SEVERE personal injury and/or property damage. Included text gives proper procedures.

GENERAL SAFETY CONSIDERATIONS

BEFORE POWER IS APPLIED TO THIS INSTRUMENT, GROUND IT PROPERLY through the protective conductor of the AC power cable to a power source provided with protective earth contact. Any interruption of the protective (grounding) conductor, inside or outside the instrument, or disconnection of the protective earth terminal could result in personal injury.

BEFORE SERVICING: CONTACT ETS-LINDGREN - servicing (or modifying) the unit by yourself may void your warranty. If you attempt to service the unit by yourself, disconnect all electrical power before starting. There are voltages at many points in the instrument which could, if contacted, cause personal injury. Only trained service personnel should perform adjustments and/or service procedures upon this instrument. *Capacitors inside this instrument may still be CHARGED even when instrument is disconnected from its power source.*

ONLY QUALIFIED PERSONNEL should operate (or service) this equipment.

STAY CLEAR of moving components during operation of equipment.

INTRODUCTION

The ETS-Lindgren Model 2088 EuroPro™ is an electric-powered variable-speed turntable platform system designed to be used with the Model 2090 Positioning Controller for EMI compliance testing. The Model 2088 is available in three diameters 1.23 meter, 1.53 meter and 2.03 meter. Designed for indoor use, the EuroPro turntable is perfect for installations in new or existing chambers where pit excavation is not an option or must be shallow.

The top is conductive with a continuous ground brush to better electrically couple the turntable to the ground plane. The ground brushes are attached directly to the top of the table and are in continuous contact with the floor-flange supplied with the ground ring option. The brushes point downward from the top of the table.

The drive motor and gearing are located beneath the platform. The Model 2088 Turntable utilizes a drive sprocket and sprocket drive with a gear reducer and electric motor. The top of the turntable is removable to provide easy access in the event that service is required. The electronics are located in a shielded enclosure. Signal I/O is via fiber-optic cable.

To prevent over-travel of the turntable in either direction of movement, “soft” electronic limits can be set using the Model 2090 Positioning Controller. Rotation speed can be varied from the front panel of the controller or through the IEEE-488 interface bus.

REV C – PN 399253

STANDARD CONFIGURATION

- Turntable Assembly
- Single-phase electric drive (208-230 VAC 50/60 Hz)
- Variable speed drive
- Conductive top
- Continuous rotation
- Ten meter fiber-optic control cables (standard)

MODEL 2088 OPTIONS

Model 2090 Positioning Controller: This controller provides control for two separate devices (EMCO towers and turntables) in any combination, plus the control of four auxiliary devices. The unit includes a GPIB bus and is compatible with most popular software. (Firmware revision 3.01 or higher required.)

Ground Plane Interface[1]: This interface is a square section of conductive flooring which has a pre-cut opening for the turntable. As a result, the difficult process of cutting a perfect diameter hole for the turntable is eliminated. The square edges of the interface connect to the chamber flooring using framing elements which provide a uniform and consistent clamping action. A pre-mounted ground ring is included with the interface. Together with the EuroPro's continuous brush system, they provide continuity with the ground plane.

Shield Room Feed-Through: This option allows the customer to take the fiber-optic control cable from the control room to the shield room and still maintain shielding attenuation. The unit is made of brass for conductivity and provides attenuation of greater than 100 dB at 10 GHz. A single 22.25 mm (.875") hole is required to mount this option.

Additional Fiber Optic Cable: Additional lengths of fiber optic cable may be ordered.

[1] European manufactured models include ground plane interface.

PRECAUTIONS

Read this manual completely before starting installation. This equipment should be installed and operated only by qualified personnel.

The electrical installation of this product should be accomplished by an individual who is authorized to so do by the appropriate local authority. The installation should be in compliance with local electrical safety codes.

Do not attempt to service unless qualified to do so. As with any electrical equipment, ensure unit electrical power has been disconnected and secured when performing scheduled maintenance or adjustments.

Do not make any modifications to this unit without consulting the factory directly.

Stay clear of all moving components on this equipment.

Do not operate turntable while someone is physically on the turntable top.

Do not, at any time, place hands or feet in the vicinity of the drive pinion on the turntable.

Regularly inspect all equipment and conduct scheduled maintenance in accordance with the factory recommendations provided.

Only use replacement parts and fasteners ordered directly from the factory.

TURNTABLE INSTALLATION CONSIDERATIONS

Pre-planning is essential for a successful installation. Be sure to discuss your requirements with your sales representative and request dimensional drawings prior to construction of your site.

POWER AND SIGNAL LINES

Conduit

Power and signal line paths should be planned in advance. Conduit should be in place before pouring concrete or installing the ground plane. Be sure to consider the size of the cable bundle when selecting conduit diameter.

Electrical Considerations

A qualified and licensed electrical contractor should be used to install power lines, and the installation should comply with all applicable regulatory agencies. A dedicated circuit should be used, with the shortest distance possible between the power source and the turntable.

Access

An access area underneath the turntable is advisable for large diameter installations. A service switch should be installed to deactivate the turntable during service.

INSTALLATION

The following instructions are for the installation of 1.23 and 1.53 meter EuroPro turntables.

The installation of turntables 2 meters and larger will be performed by a factory installation specialist or by individuals who have been authorized by ETS-Lindgren to do such work. Proper installation of the turntable directly affects performance. The following installation information is provided to familiarize the user of the turntable with the installation process.

CAUTION Ensure power is off and secured before proceeding further.

TOOLS REQUIRED

- 3/16” allen wrench
- 5/16” allen wrench
- 3/8” allen wrenches, qty 3
- 6 mm. allen wrench
- 3/8” ratchet wrench
- 12” crescent wrench
- 15 mm. 12 point socket for ½” square head screws
- 7/16” open/box end wrench
- ½” open/box end wrench
- ¾” open/box end wrench
- 0.120 drill bit for 6-32 self tapping screws
- “A” & “B” drill for ¼-20 self tapping flat head screws
- 27/64” drill bit for ½”-13 Tap
- 3/8” hand drill
- ½”–13 Tap
- #2 phillips screw bit
- #3 phillips screw bit
- Measuring tape
- Pry bar
- Level
- Square
- Hacksaw
- Black marker
- File
- WD 40

- 3/4“ pipe clamp ends
- 3/4“ pipe (length depends on table size 6 ft. will cover most tables)
- 1-1/2“ C-clamps, qty 8
- Cutting Oil
- Syringe for applying conductive grease
- Grease Gun
- Vacuum

Concrete Pit Installations

- 1/2“ hammer drill
- 1/2“ x 12 “ masonry bit
- 3/16" x 6” masonry bit
- 1/4" x 1-3/4“ Tapcon Screws or equivalent

1. The turntable installation will vary based on the host location. There are several installation options presented in some steps, please select the one that applies to your location.
2. Uncrate all parts. Check all parts for any shipping damage. Ensure a clear area is available to assemble the turntable unit safely.

   NOTE: Do not discard any packing material until the turntable is fully assembled.
3. Verify that that fiber optic cable is long enough to reach from the turntable to the control room. When working around the table avoid stepping on the fiber optic connectors located at the relay box.
4. If the turntable is to be installed in a pit, check pit depth and inside diameter and compare measurements with the drawings, for your turntable size, at the back of this manual.

   The inner diameter of the receptacle pit should be as follows:

   1.23 meter turntable = 50.44”
   1.53 meter turntable = 62.25”

   a. If you have a paneled floor, did not purchase the integrated ground plate interface option, and are installing the turntable into a pit in the ground plane a receptacle hole must be cut in the floor panels.

b. If you have purchased the Integrated Ground Plate Interface option. It should be installed prior to lowering the turntable into place.

5. Remove the bolts which attach the top onto the turntable drive assembly. Refer to the assembly drawing in the rear of this manual for more details.

CAUTION Lifting of the turntable assembly using a forklift or other lifting machinery should be performed by qualified personnel.

6. Using a forklift or other appropriate lifting device, place the turntable bottom into position. The relay box with the fiber optic connectors should point in the direction that the fiber optic cable will be installed. This will reduce the chance of the cable being kinked or bent.

7. Position the table as close as possible to the center by measuring from the bearing to the inner diameter of the raised floor. To be sure, measure in at least eight places and split the difference. Once you have found the center and are comfortable with the measurements, using a marker, mark around the perimeter of the table base. These marks may be used for reference if the assembly moves during placement of the floor shims or anchor plates. Also when positioning, attempt to make as many anchor holes miss the floor joint strips, as possible, if the table is being installed on a panel floor in a chamber.

8. Most 2088 models have floor anchor plates that will need to be placed under the base unit. The 1.5 and 2.0 meter models also have an outer ring of floor plates to support additional casters. There are connector strips that will be placed between the base unit and the outer plates to ensure proper spacing. Please refer to the drawings at the back of this manual for proper floor plate placement. Using a pry bar, carefully lift the table and place plates under the anchor holes around the edge on the turntable base. If you are installing your turntable in a welded chamber with steel pit and steel raised floor please refer to step 12.

9. Use ½-13 x 5” square head set screws and ½-13 flange nuts to hold the plates in place. Screw the plates to the floor using #14x1” #3 square socket flat head screws. Drill 1/8” pilot

holes for these screws and vacuum up shavings so that you have good contact with the floor. Continue mounting the rest of the plates.

10. Once all anchor plates are securely mounted, remove the ½-13 x 5" sets screws and then drill 27/64" pilot holes approximately ¾" deep into the paneled floor. **Be careful not to penetrate the bottom skin of the panel**. Vacuum out shavings and dust. Tap holes ½"-13 about ½" deep then install set screws back into the plate and floor. Do not drive the screws too far.

11. Now place plates at each caster as shown in the drawings at the back of this manual. Screw plates down as mentioned above using ½-13 set screws and flange nuts. Once all plates have been secured to the floor it is time to level the table to the raised floor.

12. When mounting to a steel pit and steel raised floor you will not need ¼" anchor/shim plates. You will need a ½-13 tap, 27/64" drill for tap, ½-13 x 5" square head set screw and flange nuts. Drill 27/64" dia. holes in the center hole of each group of 3 at the perimeter of the turntable base. (Model 2081-6x). Tap each hole as you drill it and then screw in ½-13 x 5" set screws so that the table does not move as you go around each location. Proceed with leveling instructions in step 13.

CAUTION: Before leveling make sure all ½-13 flange nuts are backed off all the way to avoid pulling plates off the floor.

13. Using a leveling instrument, (torpedo laser level or some other device), raise the table until it is between 1/8" and 3/16" above the raised floor, this is just a rough finish height. Do not lower the other leveling screws on the casters until after the floor flange has been mounted. Once you have one screw secured on the floor and the table is level, snug up the remaining leveling screws by the anchor bolts and lock down the flange nut to hold the table in place while the turntable floor flange is being mounted.

RAISED PANEL FLOOR FLANGE INSTALLATION

The ground ring assembly includes a floor flange which interfaces with the brush ring located on the perimeter of the turntable. The floor flange provides constant electrical contact with the ground plane and is usually installed with the turntable.

Mounting methods vary according to user specifications. Clearance holes are provided, at evenly spaced intervals, along the outside perimeter of the ground ring as a means of attaching the ring to a customer supplied ground plane. These instructions cover installation for a paneled floor, please see the section on "Rolled Steel Flange Mounting in Concrete Pit" for further instructions if that is where your flange will be mounted.

For this step you will need a pipe clamp and three 3/8" allen wrenches or some other piece of material that is 3/8" diameter. You will also need a hand drill, 5/32" drill bit, #3 phillips drive bit, a small square, marker, and ¼"x 1-3/4" phillips flat head, TAPCON screws, and a hacksaw.

The turntables described in this manual each have two floor flange pieces. All of the flanges are cut oversize for bending purposes and the only one that will need to be cut is the last flange installed.

Using a pipe clamp and 3/8" allen wrenches or 3/8" pin, place a spacer between the turntable and flange starting in three places in the center or on the flange. Once there is tension on all three wrenches, drill a 5/32" hole through the counter-sunk holes in the floor flange. Drill completely through the panel and place screws into the holes. Continue working around the flange doing 2 or 3 holes at a time.

NOTE: It is very important that this 3/8" gap between turntable and floor flange be held as close as possible so that the grounding brushes seat properly. Also make sure that the flange ends are flush with each other.

Typically the last flange will be too long. Turn the flange upside down, butt one end to the other and evenly mark off with the other end and trim to fit. Do not cut too much off. It is preferable to not have more than 1/16" gap between the butt joint when finished. Continue mounting as stated above until all screws have been installed. Some screws may fall between the floor panel joints. Try to position the flanges ensuring as few screws hit these points as possible, and making sure that the first or last hole in the flange is not too close to one of these joints. Also the top floor joint strips will need to be trimmed to fit up against the flange.

ROLLED STEEL FLANGE MOUNTING IN CONCRETE PIT

Mounting to concrete is the same with the exception of the mounting hardware. You should have ½-13 wedge type concrete anchors. Instead of the #14 x 1" square socket flat head screws, you will use 1/4 x 1-3/4. Phillips flat head TAPCON screws.

You will need a ½" hammer drill with a ½" x 12" hammer drill bit and a 3/16 x 6" hammer drill bit. Instead of the 1/4 x 1-3/4" tapcons, you will need ¼-20 x 1" phillips flat head thread rolling screws for mounting the flange to the rolled steel flange. The drill hole size for ¼-20 x 1" thread rolling screws is .238 - .242 (B or C drill). You will also want a small vacuum to clean up concrete dust so that it does not get into the screw threads making them hard to screw in.

NOTE: When drilling holes, watch out for buried conduit and pit drain pipes. Also drill ½" hole as deep as you can. Drill 3/16" holes about 3 to 4 inches deep.

INSTALLATION OF STAINLESS STEEL WEAR STRIP

It is very important that the floor around the turntable pit is level all the way around. If it is not, it will make the installation of the wear strip very difficult. For this step you will typically need eight small 1-1/2" C-clamps , 6-32x 3/8" thread rolling screws, a hand

drill, 0.120 dia. drill bits, a #2 phillips bit, and some cutting oil. Start the strip 1/8" below the surface of the flange at the end with the hole closest to the end of the strip. Also start with the first 2 holes in strip in between the casters. Place a clamp about 2” on either side of the hole on the strip in 4 places and then transfer drill 0.120 dia. holes into the aluminum floor flange and then screw in the 6-32 x 3/8” thread rolling screws.

NOTE: Some of the pre-drilled holes in the strip will be in the path of a caster. For these holes, casters will need to be removed by taking out the center axle of the caster. Be careful not to lose any washers or allow the washers to fall out.

NOTE: Be careful not to bend the stainless steel strip, this will make it difficult to install properly. Do not let the stainless steel strip come up above the top of floor flange since it may bend when something heavy is rolled over it. It may be beneficial to be slightly below the surface of the flange.

Continue installation around the turntable with the wear strip. When you get to the end, you will need to cut the strip to length. Let the strip overlap the fixed end, and using a square, mark a line even with the fixed end. The gap of the 2 joints should be less than 1/16”. Deburr the cut. You will need to drill the last hole to match the spacing on the other end of the wear strip.

GREASING CASTERS & BEARINGS

Using a synthetic grease, grease all casters. Mobil 1 synthetic is recommended, do not use a lithium grease.

NOTE: Some casters may not have grease fittings. These will be sealed bearings and will not require grease.

FINAL LEVELING OF TABLE

Lower all ½-13 leveling screws. Once the table is in place with the floor flange and wear strip mounted, install all remaining screws for the spacer plates and tighten. Once this is done, place shim plates in the center of the turntable and insert leveling screws to

support the center. When you are satisfied that the turntable is level, tighten all lock-nuts accompanying the leveling screws to lock the height of the turntable into place. Install the remaining top sections.

ELECTRICAL INSTALLATION

CAUTION: Electrical connection should only be performed by a qualified electrician and subject to local electrical codes.

The Model 2088 is designed to operate using 208-230 VAC single-phase 50 or 60Hz power.

The branch circuit supplying power to the motor base should be protected from excess current according to local electrical codes. ETS-Lindgren has provided integral circuit protection in the motor base assembly.

Check that the conductor size is adequate for the motor load and the distance from the mains source. Improperly sized conductors will lead to a high voltage drop in the power conductors and cause reduced starting torque and premature motor failure.

The motor base assembly is provided with an IEC-320 power inlet for connecting to the mains. Prior to servicing the turntable or the turntable motor base, remove the power connection for safety.

Connect the fiber-optic control cable and install the power connection per local electrical code. Please refer to the Model 2090 Positioning Controller manual for instructions on connecting the fiber optic cable. After the fiber optic cable is installed secure it with a wire tie to one of the leveling screws.

In order to feed the fiber optic connectors through the waveguide in a chamber it may be necessary to remove part of the protective sheath. The removal of a portion of the sheath will allow the connectors to fit through the hole without bending or kinking the fiber optic cable excessively. Find the spot in which you will need to remove the sheath and mark. A very sharp knife is needed to make the splice. Being very careful, cut around the outside of the sheath at each end of the area needing to be cut, cut very lightly so as to not cut into the fiber cables. You should then be able to bend the sheath back and forth until you can see the fiber cables.

Next you will need to make a cut down the length of sheath area, being careful not to cut into fiber cable. You should see two pieces of white string inside the sheath. Find the string and use it to split the sheath open. Now insert into the waveguide.

OPERATION

Please refer to the Model 2090 Positioning Controller manual if you are unfamiliar with the operation of the unit. A 2090 manual is included with each 2090 shipment and is also available for download from our website www.ets-lindgren.com .

With the assembly complete the Model 2090 controller will need to be connected to the unit and power applied to both the motor base and controller in order to continue. Refer to the electrical installation section if you have questions about how to connect the fiber optic cables.

Using the Model 2090 Positioning Controller check the CW and CCW rotation in both directions by a few degrees. The position in degrees increases (+) in the CW direction and decreases (-) in CCW direction.

The turntable is calibrated at the factory to read out 360 degrees (+ or - 1 degree) for one complete revolution. If the table is not within this accuracy, the unit can be re-calibrated per the instructions in the “Turntable Encoder Calibration” section.

APPLICATION OF CONDUCTIVE GREASE

Before placing an EUT on the turntable or configuring it for use. Using the turntable controller, position the table to the 0 degrees position. Make a straight line from the table to the flange to verify the encoder count and positioning of table. Then start the table in scan mode. Using a syringe, squeeze the contents of one tube of GC Electronics conductive grease into the barrel. While table is rotating slowly apply grease to the grounding brushes. Apply one tube per meter size of the diameter of the table. Run table for approximately 1 hour to validate proper operation and allow sufficient lubrication of moving parts.

EDITING MODEL 2090 POSITIONING CONTROLLER CONFIGURATION PARAMETERS

To edit a configuration parameter, press the PARAM key to display the current parameter. Pressing the PARAM key repeatedly will scroll down through the parameter list, showing each parameter in turn. While viewing a parameter, the STEP keys (INC/DEC) may be used to scroll up or down the parameter list. This reduces the effort necessary to scan through a long parameter list using the PARAM key. Pressing any of the LIMIT/POSITION selection keys will return the display to that selection. Pressing any of the remaining motion keys will return the display to the current position and execute that motion. Pressing the PARAM key again will return to the last displayed parameter in the list, allowing easy transition between parameter adjustment and device operation.

Once the desired limit, position or parameter is visible in the display window, pressing INCRM, DECRM, or ENTER will toggle into edit mode. The lowest adjustable digit will flash on and off. Pressing the LOCAL key for that device will switch the flashing digit to the next higher digit. In this way, it is possible to rapidly adjust any digit of a multi-digit parameter or limit.

SETTING TRAVEL LIMITS

The Model 2088 is not fitted with mechanically actuated or “hard” limit switches. It is essential that the user properly set the “soft” limits in the Model 2090 Controller should non-continuous operation be desired.

To set the counterclockwise rotational limit for the turntable, press the DOWN/CCW key under LIMIT. The indicator above this key will light. Set the limit by pressing the INCRM and DECRM keys under LIMIT until the desired limit is shown on the display. Then, press the ENTER key. To set the clockwise rotational limit for the turntable press the UP/CW key under LIMIT. The indicator light above this key will light. Set the limit by pressing the INCRM and

DECRM keys under LIMIT until the desired limit is shown on the display. Press the ENTER key.

WARNING: Ensure the current travel limit settings will not cause damage to existing cables and equipment located underneath the turntable.

Should continuous operation be desired, the Model 2090 Controller permits easy configuration to this type of operation from the front panel or through the IEEE-488 interface bus. Refer to the Model 2090 Manual for more information.

TURNTABLE ENCODER CALIBRATION

C Refers to the encoder calibration parameter. This setting is used to convert the encoder count values returned from a motor base into the corresponding centimeter or degree position reading. For turntables, this represents the number of encoder counts per revolution. The setting for the Model 2088 Turntable Series is:

5440

If the given value does not appear to work correctly, the encoder calibration value can be determined using the following procedure:

1. Set the encoder calibration value to 3600.
2. Insure that the turntable is positioned to allow more than a full revolution of travel in the clockwise direction and use the STEP keys to run the turntable clockwise a few degrees to remove any play in the table.
3. Mark the current location of the turntable against the ground ring (masking tape works well), and set the current position reading to 000.0.
4. Using the STEP keys, rotate the turntable clockwise until it is again aligned with the mark on the ground ring. For best results, the last motion should always be in the clockwise direction to insure that any play in the gearing between the motor and encoder is accounted for.

5. Record the reading of the display, ignoring the decimal point (i.e. 360.0 would be 3600). This is the encoder calibration value.

   NOTE: If the value is below 3600, the resolution of the encoder is low and thus the 2090 will not provide 0.1 degree resolution, even though the display shows that digit. If the value has gone past 9999, the encoder has too many counts per meter and the 2090 can not correct for it. In this case, contact ETS-Lindgren for assistance.

6. Enter this value for the encoder calibration value and reset the limits and position information.

7. Test the turntable by moving it a complete revolution and comparing the alignment marks. It may be necessary to adjust the encoder calibration value up or down slightly depending on the result.

   NOTE: When scanning between limits, it is not uncommon to have a small discrepancy between the absolute position of the table and the display on the 2090 Controller. This is because reversing the direction of rotation reverses any gear play between the encoder and the table top, allowing that play to be visible in the positioning accuracy.

TURNTABLE CALIBRATION EXAMPLE

The table is set at the 0 degree position. A piece of tape is placed on the edge of the turntable to line up with the edge of the gearbox cover. The table is stopped when the tape travels exactly 360 degrees around. The display on the 2090 now reads 356.3 degrees which is recorded.

The table is rotated CCW back to 0. The parameter button is set on the “C” setting. The “C” digits display 3430. A new “C” setting is now calculated:

New “C” = (356.3 divided into 360) times 3430 = 3395 (rounded off)

The decrement the C parameter to 3395 and “ENTER” is pressed.

Then the “current position” button is pressed to get back to operation mode.

The table is rotated from 0 to 360 and the mark is now within one degree of being one full turntable revolution. Calibration is complete.

SETTING CURRENT POSITION ON 2090

The Model 2088 Turntable is not equipped with mechanically actuated or “hard” limit switches. The stopped position of the turntable platform at 0 degrees may drift overtime depending on usage. The platform can be rotated periodically back to a desired position and the 2090 current position can be reset to 0.

To check the current position of the turntable on the Model 2090, press the CURRENT POSITION key under LIMIT. The indicator above this key will light and the device’s current position will appear on the display.

To change the current position setting on the Model 2090, press the CURRENT POSITION button then the INCRM or DECRM buttons to select the new setting. Press the ENTER button to save the new setting.

The “soft” travel limits (CW and CCW) on the 2090 will continue to function and may need to be reset to accommodate the new current position setting.

NOTE: The current position cannot be changed to a value greater than the upper limit or less than the lower limit.

CHANGING ROTATION SPEED

The Model 2088 Turntable is equipped with a variable speed drive. Firmware Revision 3.01 (or higher) must be installed in the Model 2090 Controller for proper operation of the Model 2088. The revision level is displayed on the front panel LED display during startup of the Model 2090 Controller. If the controller does not

have this or a later revision installed, consult the factory for an upgrade.

To select one of the four speeds, use the POLAR/SPEED button to toggle through the speed options. It is necessary to set the Model 2090 parameters to configure the controller to properly control the motor base. Refer to the Model 2090 Manual to the section which describes setting the parameters.

Specifically, parameter 2 must be set to the value 3 which is for variable speed control. Parameter C, which calibrates the encoder counts to the rotation of the turntable, should be set to the value 5440. This will insure that the position display will properly report the full 360 degrees of travel.

VARIABLE SPEED SETTINGS

The Model 2090 parameters S1-S4 control the variable speed settings for the turntable. These parameters are the continuous variable speed settings for each of the four speed selections described below. Each of these parameters can be set to any value from 1 to 255, with the resulting turntable speed being roughly an S/255 fraction of the maximum speed. Note that it is the nature of variable speed drives that there is a minimum speed at which the motor will operate. For the Model 2088 this minimum speed setting will be somewhere between 30-75 and should correspond to a value of 0.5 RPM or less. Below this setting, the motor will not be able to cause rotation, but will be active until a Motor Not Moving error (E002) occurs.

WARNING: Do not operate the turntable in a stalled condition. Doing so can cause damage to the drive unit and will invalidate your warranty! Always insure that the minimum speed setting specified in the S1-S4 parameters is above the minimum value at which your table will turn under normal load.

SPEED SELECTION

For the Variable Speed Turntable, the Polarization/Flotation button provides the ability to cycle between the four preset speeds described above. For each press of the button, the turntable will

change to the next speed setting. The polarization LEDs will light to indicate the speed selection in a binary fashion as shown below:
Speed 1: Both off
Speed 2: Top on, bottom off
Speed 3: Top off, bottom on
Speed 4: Both on
Each speed setting has its own individual overshoot compensation value to provide proper overshoot correction for each speed selection.

GPIB COMMANDS

The following GPIB commands have been added or modified:

Sn Select Speed, where n is 1 or 2 for a two speed turntable and 1-4 for a variable speed turntable.
S? Query speed selection. Returns 1 or 2 for a two speed turntable and 1-4 for a variable speed turntable.
SSn Set Speed Value, where n is 1-4. This command is valid only for a variable speed turntable. Valid speed values are from 1 to 255.

Command Usage: SSn <Speed>

Example: Output 708, "SS1 196;"

Query Speed Value, where n is 1-4. This command is valid only for a variable speed turntable. Returns a speed value from 1 to 255.

Command Usage: SSn?

Example: Output 708, "SS2?;"

HAND CONTROL UNIT

To connect the Hand Control Unit (HCU), remove the connector cap on the motor base. Plug the cable receptacle from the hand control unit into the electrical enclosure and screw connectors completely together. The HCU is now ready to operate. Be sure to coordinate use of the unit with the operator of the Model 2090 Positioning Controller.

CAUTION Do not plug the Hand Control Unit into the motor base while that device is in operation. Coordinate with the operator of the Model 2090 Positioning Controller before plugging in, using, or unplugging the HCU.

To allow the HCU to operate, push the control switch from MAIN to HAND. When the HCU is selected, the Model 2090 Positioning Controller is overridden until control is returned from the HCU. If the Model 2090 Positioning Controller is left on while the HCU is used, the Model 2090 Device Controller records all changes in position.

CAUTION Do not push the CW and CCW buttons at the same time. Be sure that the motor is completely stopped before reversing direction with the hand control unit.

When you are ready to change to automated testing, toggle the control switch from HAND to MAIN.

RECOMMENDED MAINTENANCE

CAUTION: Do not perform maintenance while turntable is operating. Disconnect the power connection for safety.

Regular maintenance will prolong the serviceable life of your turntable. Follow this recommended schedule.

EVERY SIX MONTHS

Grease the casters. Use a good quality bearing grease to lubricate the casters.

Inspect the ground brush for contaminates. Vacuum the brush to remove unwanted debris. Add a small amount of conductive lubricant to the brush interface if required.

Inspect the ground brush for wear. A well maintained ground brush should have a long serviceable life. Should it need to be replaced, replacement ground brushes for turntables are available in standard lengths that are straight and not trimmed. They are assembled at the factory into the predrilled aluminum extrusion that is attached around the edge of the turntable. During replacement the brush assembly is clamped in place using a pipe clamp in order to bend the brushes to conform to the edge of the turntable top. The replacement brushes have hole spacing that is machined exactly the same as the original.

EVERY 12 MONTHS

Lubricate the main bearing race. Use a grease gun with a good quality bearing grease. The grease fittings are located inside the race, 90 degrees apart, underneath the top. Three discharges from the grease gun in each fitting are adequate.

Grease the gear teeth. Apply a good quality grease to the gear teeth.

SPECIFICATIONS

ELECTRICAL

Nominal AC Voltage	230 VAC
Input Frequency	50/60 Hz
Phase	Single Phase
AMP	2.0
RPM	0.5/2.0 variable

MECHANICAL

Diameter	1.2 meter	1.53 meter	2.03 meter
Height	14.8 cm (5.8 in)	14.8 cm (5.8 in)	14.8 cm (5.8 in)
Distributed Load Rating*	500 kg (1100 lb)	1000 kg (2200 lb)	1000 kg (2200 lb)

*Distributed Load Rating is based on load being evenly distributed to each section. No point loads under 0.37 sq. m (4 sq. ft) should exceed 500 kg (1100 lb.); and not over 400 kg should be applied to a 45 degree segment outboard of the casters.

WARRANTY STATEMENT

ETS-Lindgren L.P., hereinafter referred to as the Seller, warrants that standard EMCO products are free from defect in materials and workmanship for a period of two (2) years from date of shipment. Standard EMCO Products include the following:

- Antennas, Loops, Horns
- GTEM cells, TEM cells, Helmholtz Coils
- LISNs, PLISNs, Rejection cavities & Networks
- Towers, Turntables, Tripods, & Controllers
- Field Probes, Current Probes, Injection Probes

If the Buyer notifies the Seller of a defect within the warranty period, the Seller will, at the Seller's option, either repair and/or replace those products that prove to be defective.

There will be no charge for warranty services performed at the location the Seller designates. The Buyer must, however, prepay inbound shipping costs and any duties or taxes. The Seller will pay outbound shipping cost for a carrier of the Seller's choice, exclusive of any duties or taxes. If the Seller determines that warranty service can only be performed at the Buyer's location, the Buyer will not be charged for the Seller's travel related costs.

This warranty does not apply to:

- Normal wear and tear of materials
- Consumable items such as fuses, batteries, etc.
- Products that have been improperly installed, maintained or used
- Products which have been operated outside the specifications
- Products which have been modified without authorization
- Calibration of products, unless necessitated by defects

THIS WARRANTY IS EXCLUSIVE. NO OTHER WARRANTY, WRITTEN OR ORAL, IS EXPRESSED OR IMPLIED, INCLUDING BUT NOT LMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE REMEDIES PROVIDED BY THIS WARRANTY ARE THE BUYER'S SOLE AND EXCLUSIVE REMEDIES. IN NO EVENT IS THE SELLER LIABLE FOR ANY DAMAGES WHATSOEVER, INCLUDING BUT NOT LIMITED TO, DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, WHETHER BASED ON CONTRACT, TORT, OR ANY OTHER LEGAL THEORY.

Note: Please contact the Seller's sales department for a Return Materials Authorization (RMA) number before shipping equipment to us.

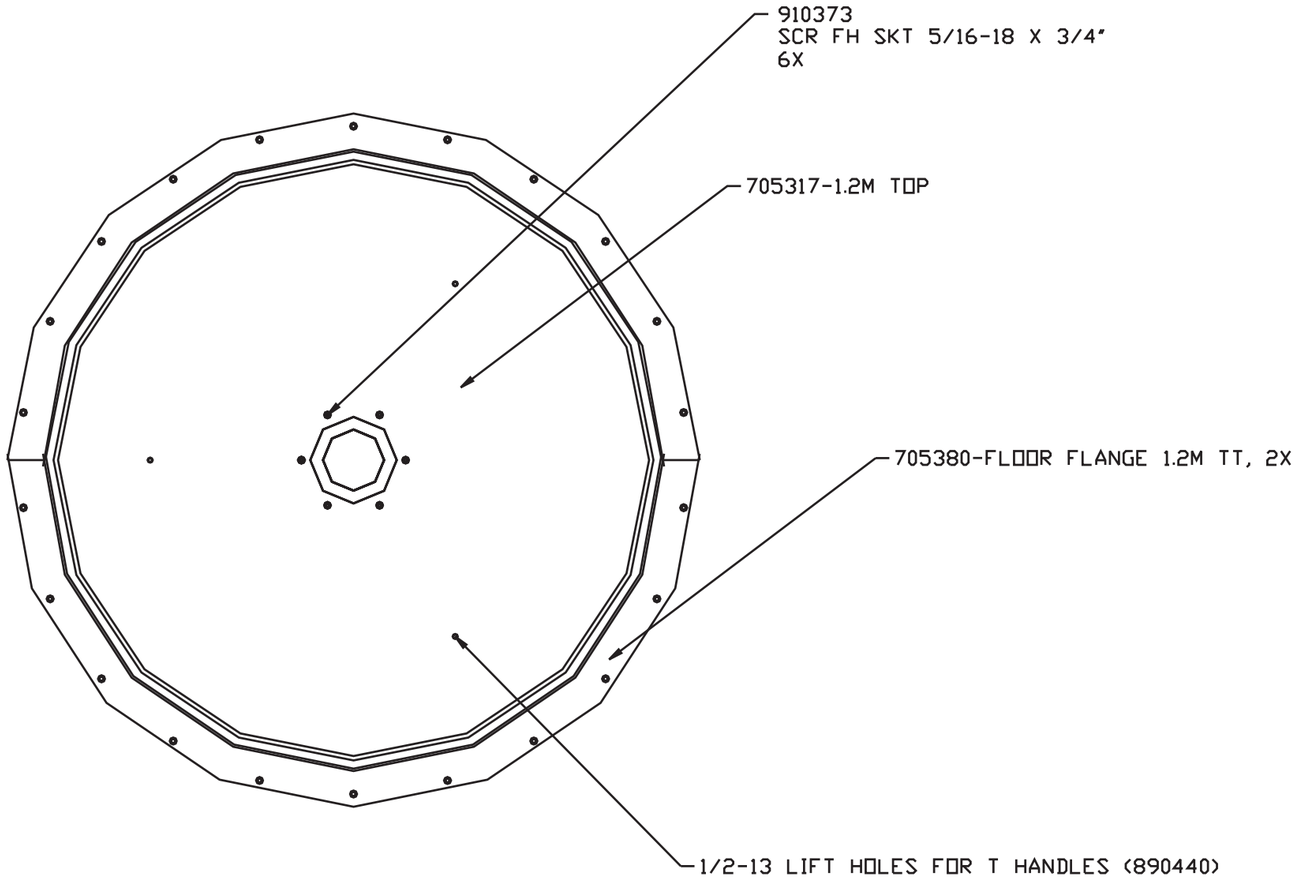
ILLUSTRATIONS

See assembly drawings on following pages.

DWG. NO. 2088-1.2M | SH 1 | REV. A

REVISIONS

ZONE	REV	DESCRIPTION	DATE	APPROVED
	A	INITIAL RELEASE		



SHIP LIST (LOOSE PARTS)

1	11 EA	106981	FLOOR PLATE 2
2	4 EA	106982	FLOOR PLATE 3
3	3 EA	890440	T HANDLE 1/2-13
4	12 EA	890790	C CLAMP #5133A11 MCARR
5	2 EA	705380	FLOOR FLANGE
6	1 EA	705381	WEAR STRIP
7	2 OZ	890706	CONDUCTIVE GREASE
8	30 EA	910159	SCR PAN HD SELF TAP 6-32 X 3/8
9	5 EA	910678	SCREW SQ HEAD 1/2 X 5"
10	5 EA	910367	HEX NUT 1/2"
11	60 EA	910682	WOOD SCREW 1/4 X 1"
12	1 EA	930993	#3 BIT
13	1 EA	930994	H S .120 (#31) DRILL
14			
15			
16			

NOTES:

4. ITEM 7 GREASE IS APPLIED TO BRUSH CONTACT AREA OF WEAR STRIP DURING INSTALLATION.

5. ITEM 4 C CLAMP CAN BE USED TO CLAMP THE BOTTOM 1" OF THE WEAR STRIP TO THE FLOOR FLANGE ITEM 5. THE 6-32 SHOULD ALSO BE USED IN TWO PLACES TO ANCHOR THE STRIP IN PLACE ALONG WITH THE C CLAMPS.

CONTRACT NO.

ETS•LINDGREN™
EMC Test Systems, L.P. Cedar Park, TX — An ESCO Technologies Company — Lindgren-RF Enclosures Glendale Hts. IL

APPROVALS	DATE
DRAWN FGR	3-14-01
CHECKED	
ISSUED	

TITLE: 2088-1.2M TURNTABLE ASSEMBLY

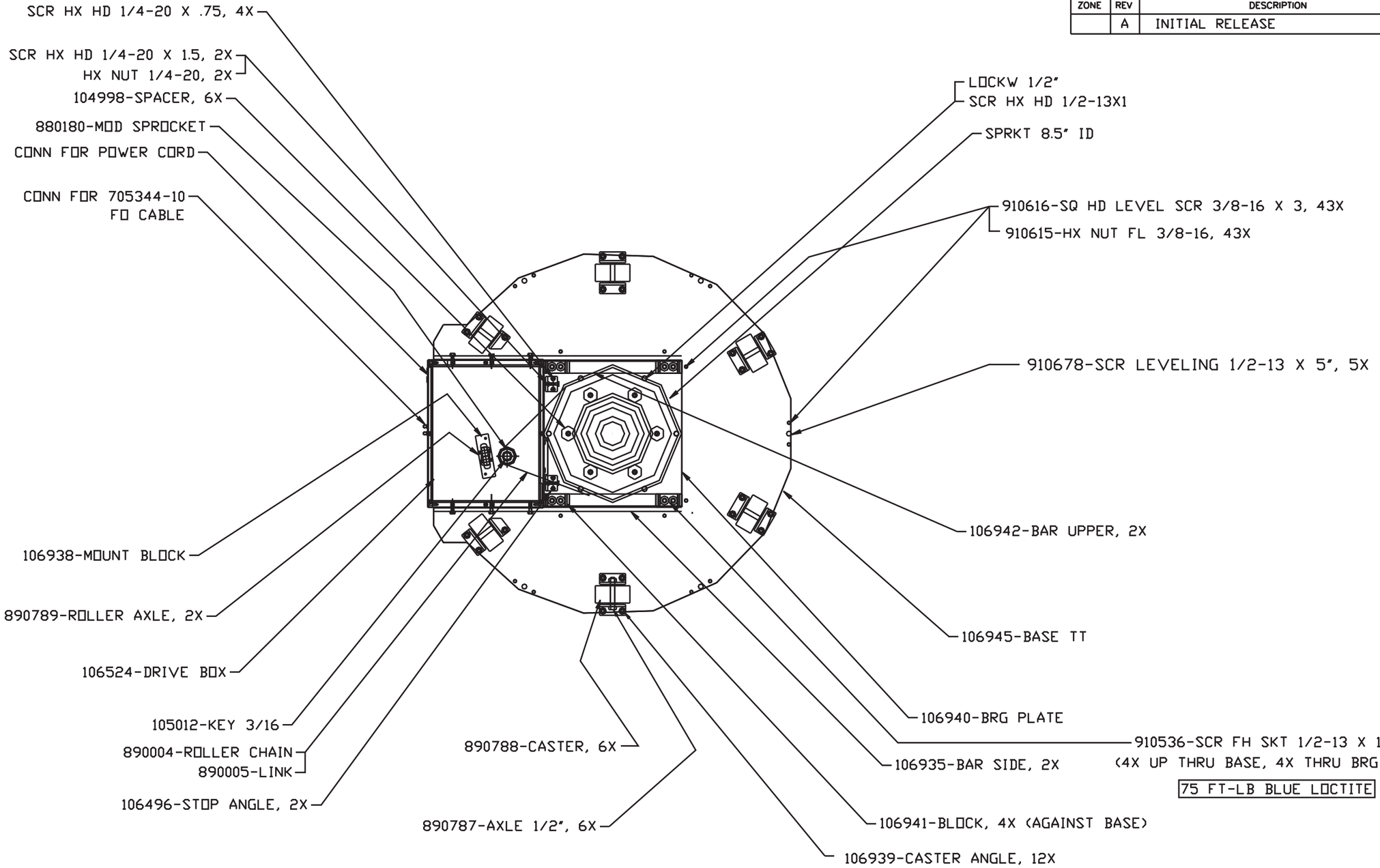
SIZE D | FSCM NO. | DWG. NO. 2088-1.2M | REV. A

SCALE | EMCO | SHEET 1 OF 4

X=X 7/96

REVISIONS

ZONE	REV	DESCRIPTION	DATE	APPROVED
	A	INITIAL RELEASE		



REF 1 : 6

CONTRACT NO.		ETS•LINDGREN™ EMC Test Systems, L.P. Cedar Park, TX — An ESCO Technologies Company — Lindgren-RF Enclosures Glendale Hts, IL
APPROVALS	DATE	TITLE: 2088-1.2M TURNTABLE ASSEMBLY
DRAWN FGR	3-14-01	
CHECKED		
ISSUED		SIZE D · FSCM NO. · DWG. NO. 2088-1.2M · REV. A
		SCALE · EMCO · SHEET 2 OF 4

X=X 7/96

DWG. NO. 2088-1.2M | SH 3 | REV. B

REVISIONS

ZONE	REV	DESCRIPTION	DATE	APPROVED
	B	INITIAL RELEASE		

[FOR FIELD INSTALL] MATCH DRILL FLOOR WITH PREDRILLED FLOOR FLANGE 705380. INSTALL 1/4" FLATHEAD SCREWS.

705380-FLOOR FLANGE SS, 2X

105122-GROUND RING EXTR, 2X

930551-SCR M5 X 25, 2X

106524-DRIVE BOX

106938-MOUNT BLOCK

890789-ROLLER AXLE, 2X

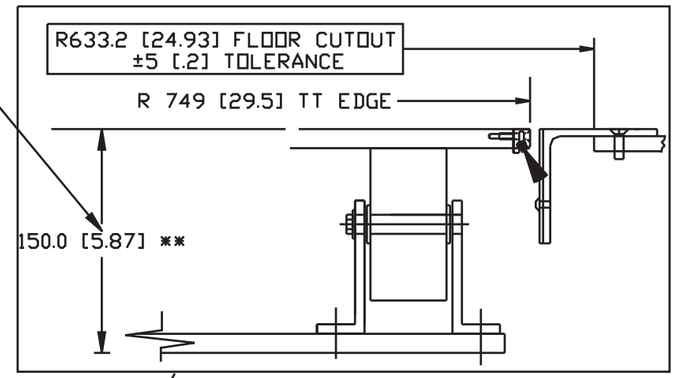
890005-LINK

890004-ROLLER CHAIN

104983-BEARING ASSY

910232-SCR SKT SET 8-32 X .5, 2X
BLUE LOCTITE

** THE FLOOR NEEDS TO BE 6.0-6.75 FOR LEVELING



104998-SPACER, 6X

SCR HX HD M8X30, 8X
LOCKWSHR, M8

106940-BRG PLATE

890788-CASTER, 6X

890787-AXLE W/ NUT, 6X

8-11 [.31-.44] GAP BEFORE INSTALLING WEAR STRIP
6.3-9.6 [.25-.38] GAP AFTER INSTALLING WEAR STRIP
REF NOTE - WEAR STRIP IS .06 THICK

890583-BRUSH

APPLY CONDUCTIVE GREASE TO WEAR STRIP CONTACT AREA ALL AROUND

705381-WEAR STRIP

890706-CONDUCTIVE GREASE

910159-SCR SELF TAP PHD 6-32X.5
INSTALL IN FIELD

OPT - ATTACH C CLAMP 5

106942-BAR UPPER, 2X

106941-BLOCK, 4X

106935-BAR SIDE, 2X

880180-SPRKT MODIFIED

910159-SCR SELF TAP PHD 6-32X.5
MATCH DRILL FLOOR FLANGE
WITH PREDRILLED WEAR STRIP
(USE 1/8" BIT) EVERY 12 INCHES.

106939-CASTER ANGLE, 12X

106945-BASE

BASE MUST BE RIGIDLY ANCHORED TO THE FLOOR

105012-KEY 3/16

SCR HX HD M8X30

WSHR M8

LOCKW M8

BLUE LOCTITE

CAUTION - TT MAY GET .25" FLOOR PLATES UNDER THE CASTER AND CENTER BASE PLATE FOR ATTACHING TO FLOOR. THESE NEED TO BE ADDED TO HEIGHT OF 2088 TT.

DIM'S - MM [INCHES]

CONTRACT NO.	
APPROVALS	DATE
DRAWN FGR	3/14/01
CHECKED	
ISSUED	

ETS•LINDGREN™
EMC Test Systems, L.P. Cedar Park, TX — An ESCO Technologies Company — Lindgren-RF Enclosures Glendale Hts, IL

TITLE: 2081-1.2M TURNTABLE ASSEMBLY

SIZE	FSCM NO.	DWG. NO.	REV.
D		2088-1.2M	B

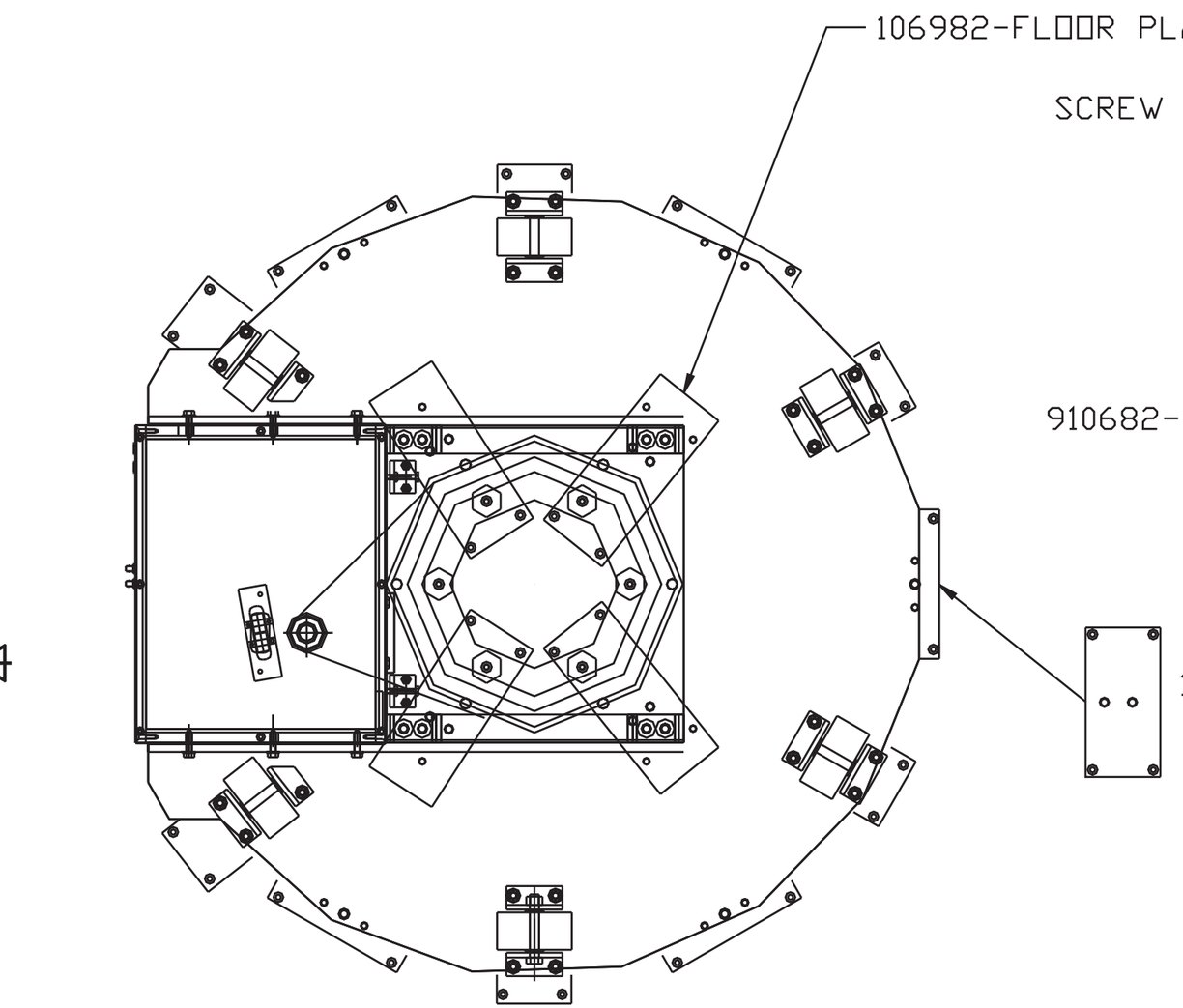
SCALE | EMCO | SHEET 3 OF 4

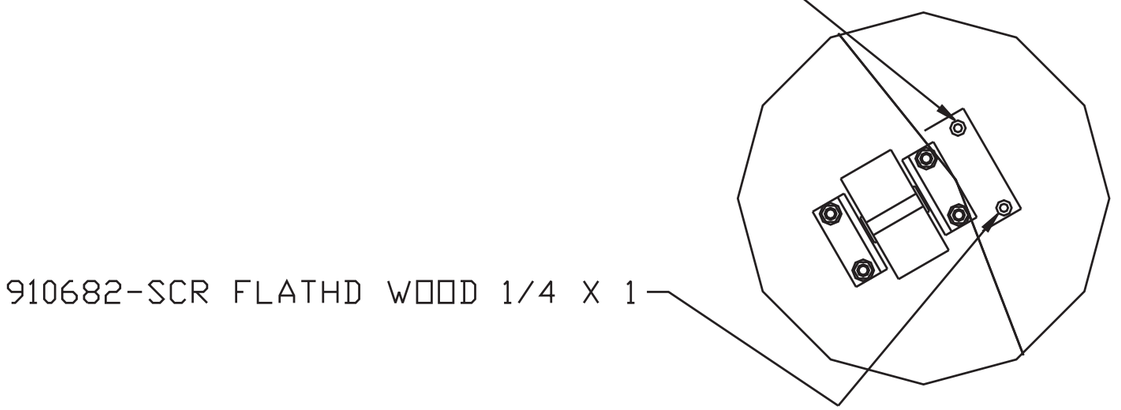
X=X 7/96

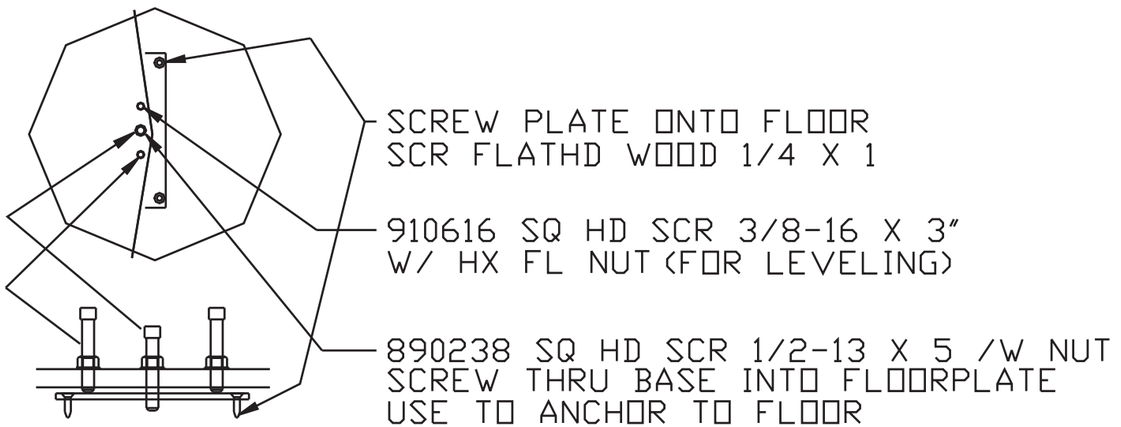
DWG. NO.	SH	REV.
2088-1.2M	4	A

REVISIONS

ZONE	REV	DESCRIPTION	DATE	APPROVED
	A	INITIAL RELEASE		







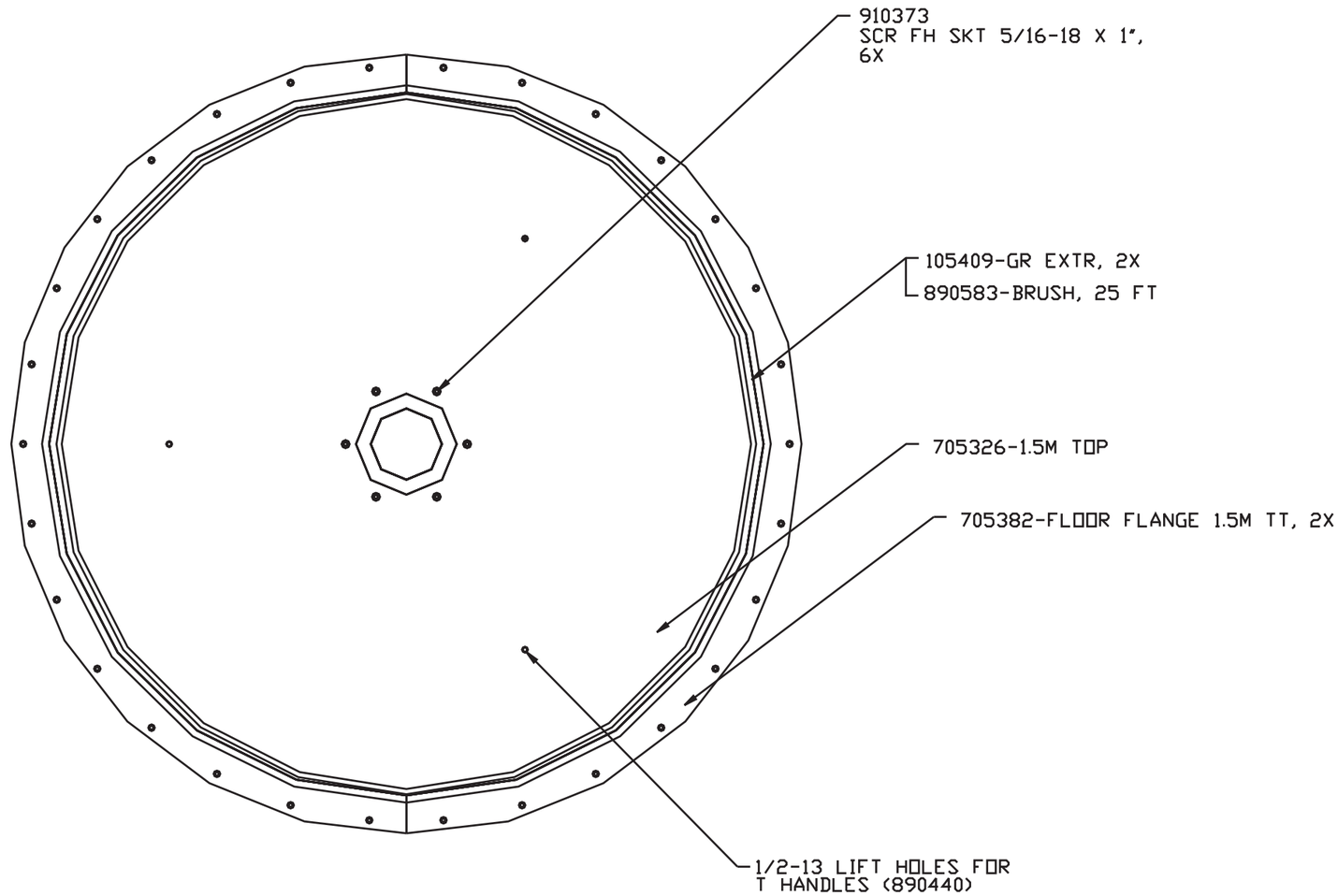
REF 1 : 6

CONTRACT NO.		ETS•LINDGREN™ EMC Test Systems, L.P. Cedar Park, TX — An ESCO Technologies Company — Lindgren-RF Enclosures Glendale Hts, IL
APPROVALS	DATE	TITLE: 2088-1.2M TURNTABLE ASSEMBLY
DRAWN FGR	3-14-01	
CHECKED		
ISSUED		SIZE D · FSCM NO. · DWG. NO. 2088-1.2M · REV. A
		SCALE · EMCO · SHEET 4 OF 4

X=X 7/96

DWG. NO. 2088-1.5M SH 1 REV. A

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	A	INITIAL RELEASE		



SHIP LIST (LOOSE PARTS)

8 EA	910373	SCR FH SKT 5/16-18 X 1
14 EA	910536	SCR FH SKT 1/2-13 X 1.5
3 EA	890440	T HANDLE 1/2-13
90 EA	910616	SCR SQ HD 3/8-16 X 3
15 EA	890790	C CLAMP
27 EA	106981	FLOOR PLATE 2
4 EA	106982	FLOOR PLATE 3
15 EA	910367	HEX NUT 1/2-13 SERRATED FLANGED
15 EA	890238	SCR SQ HD 1/2 X 5"
75 EA	910682	WOOD SCR #14 X 1" SQ DRIVE FLTHD
2 EA	705382	FLOOR FLANGE
1 EA	705383	WEAR STRIP
2 OZ	890706	CONDUCTIVE GREASE
40 EA	910159	SCR PAN HD SELF TAP 6-32 X 3/8
90 EA	910615	HX NUT FL 3/8-16
2 EA	930993	ROBERTSON BIT #3
2 EA	930994	HI SPEED .120(#31) DRILL
15 EA	910678	SCR SQ HD 1/2-13 X 5

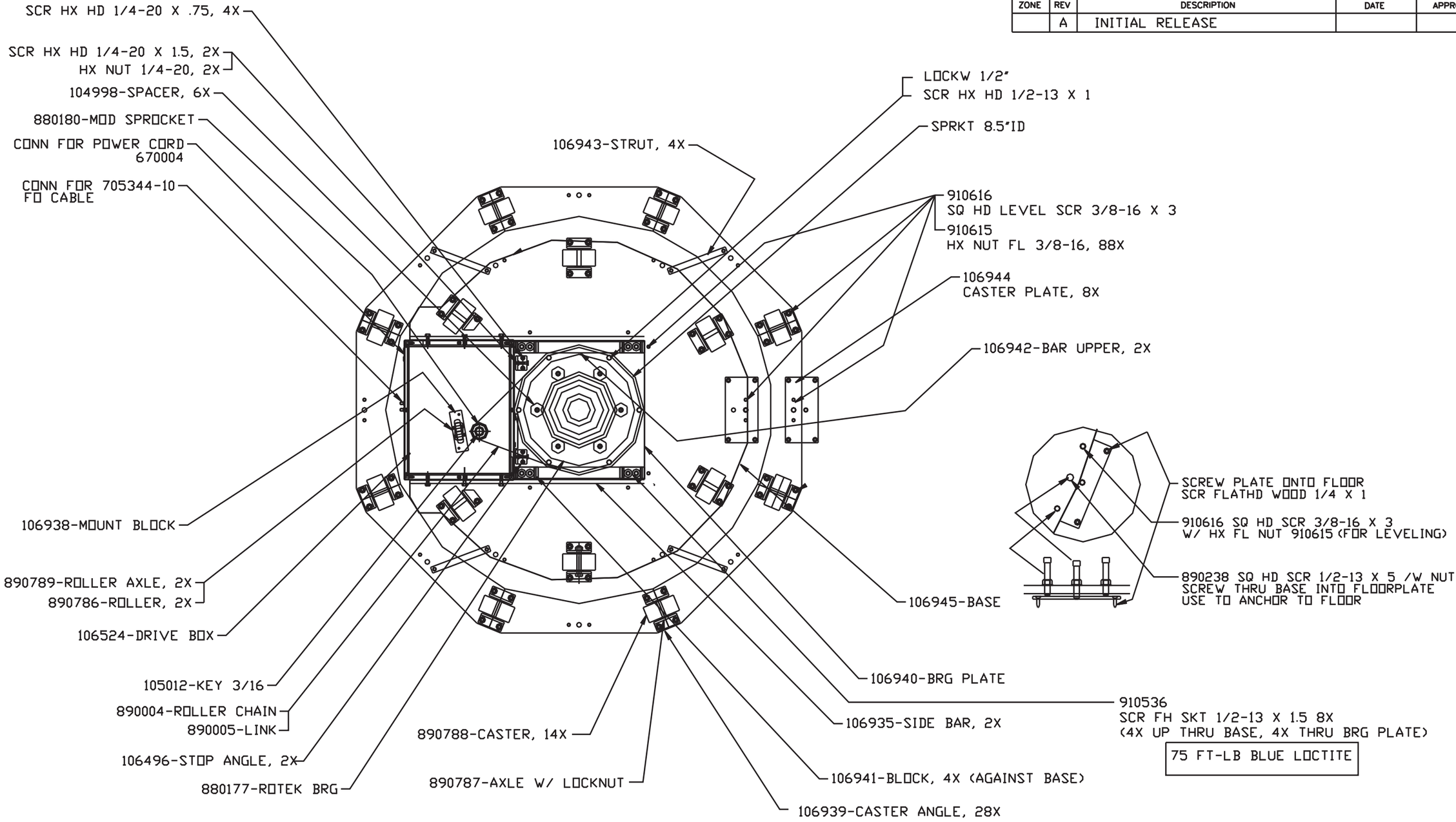
NOTES:

4. ITEM 16 GREASE IS APPLIED TO BRUSH CONTACT AREA OF WEAR STRIP DURING INSTALLATION.
5. ITEM 5 C CLAMP CAN BE USED TO CLAMP THE BOTTOM 1" OF THE WEAR STRIP TO THE FLOOR FLANGE ITEM 14. THE 6-32 SHOULD ALSO BE USED IN TWO PLACES TO ANCHOR THE STRIP IN PLACE ALONG WITH THE C CLAMPS.

CONTRACT NO.		ETS•LINDGREN™ EMC Test Systems, L.P. Cedar Park, TX — An ESCO Technologies Company — Lindgren-RF Enclosures Glendale Hts, IL
APPROVALS	DATE	TITLE: 2088-1.5 TT ASSEMBLY
DRAWN		
CHECKED		SIZE D · FSCM NO. · DWG. NO. 2088-1.5M · REV. A
ISSUED		SCALE · EMCO · SHEET 1 OF 4

X=X
7/96

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	A	INITIAL RELEASE		



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CONTRACT NO.	ETS•LINDGREN
APPROVALS / DATE	TITLE: 2088-1.5 TT ASSEMBLY
DRAWN	SIZE D · FSCM NO. · DWG. NO. 2088-1.5M · REV. A
CHECKED	SCALE · EMCO · SHEET 2 OF 4
ISSUED	

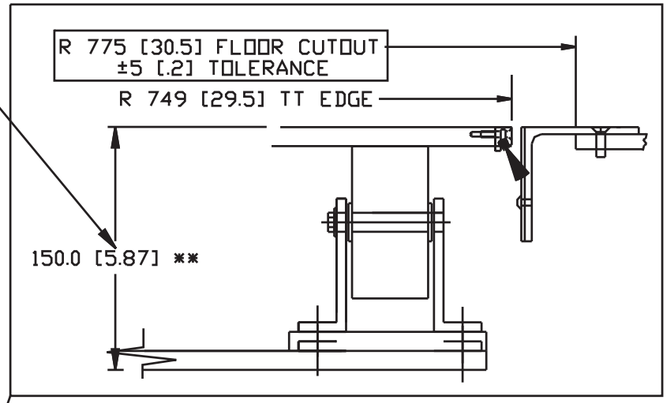
X=X 7/96

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	A	INITIAL RELEASE		

FOR FIELD INSTALLATION
MATCH DRILL FLOOR WITH PREDRILLED FLOOR
FLANGE 705369. INSTALL 1/4" FLAT HEAD SCREWS

705382-FLOOR FLANGE SS, 2X
105409-GROUND RING EXTR, 2X
106310-METAL TOP ASSY 1.5M
106524-DRIVE BOX
93055-SCR M5X25, 2X
106938-MOUNT BLOCK
890789-ROLLER AXLE, 2X
890005-LINK
890004-ROLLER CHAIN
880177-ROTEK BEARING
910232-SCR SKT SET
8-32 X 3/16, 2X
BLUE LOCTITE

** THE FLOOR NEEDS TO BE 6.0-6.75 FOR LEVELING



104998
SPACER, 6X
930740
SCR HX HD M8X30, 8X
930783
LOCKW M8, 8X
106940
BRG PLATE
890788-CASTER, 14X
890787-AXLE W/ NUT, 14X
8-11 [.31-.44] GAP BEFORE INSTALLING WEAR STRIP
6.3-9.6 [.25-.38] GAP AFTER INSTALLING WEAR STRIP
REF NOTE - WEAR STRIP IS .06 THICK

910159 SCR SELF TAP PHD 6-32X.5
MATCH DRILL FLOOR FLANGE
WITH PREDRILLED WEAR STRIP
(USE 1/8" BIT) EVERY 12 INCHES

890583 BRUSH
APPLY CONDUCTIVE GREASE TO
WEAR STRIP CONTACT AREA
ALL AROUND

705383-WEAR STRIP
890706-COND GREASE
910159-SCR SELF TAP PHD 6-32X.5
INSTALL IN FIELD
OPT - ATTACH C CLAMP 5

106942-BAR UPPER, 2X
106941-BLOCK, 4X
106935-BAR SIDE, 2X
880180-SPRKT MODIFIED
106945
BASE
106944
CASTER PLATE, 8X
106939
CASTER ANGLE, 28X

105012-KEY 3/16
SCR HX HD M8X30
WSHR M8
LOCKW M8
BLUE LOCTITE

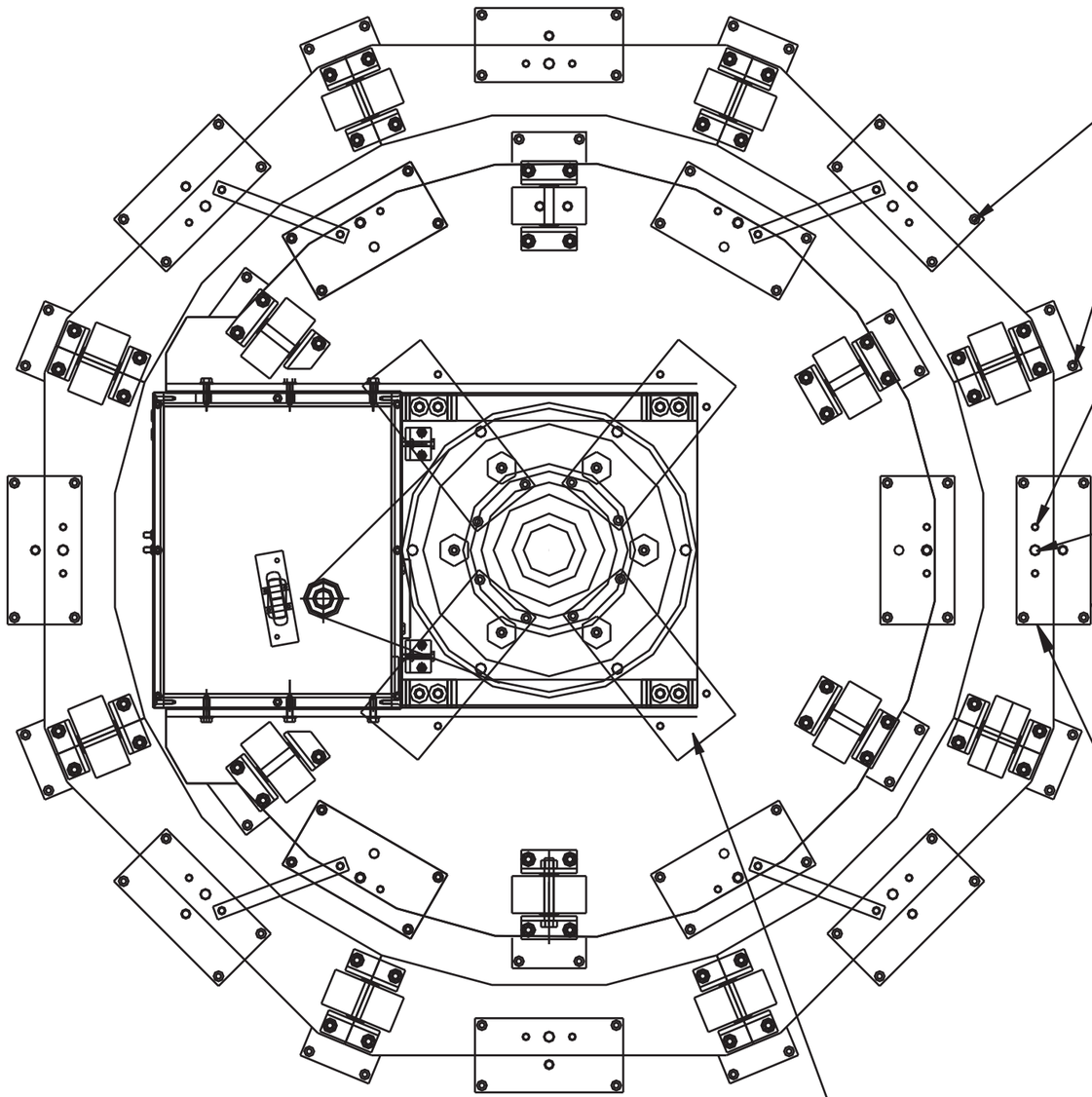
BASE MUST BE RIGIDLY ANCHORED TO THE FLOOR

CAUTION - TT MAY GET .25" FLOOR PLATES UNDER THE CASTER AND CENTER BASE PLATE FOR ATTACHING TO FLOOR. THESE NEED TO BE ADDED TO HEIGHT OF 2088 TT.

CONTRACT NO.		ETS•LINDGREN
APPROVALS	DATE	TITLE: 2088-1.5M ASSEMBLY
DRAWN FGR	11/24/99	
CHECKED		SIZE D · FSCM NO. · DWG. NO. 2088-1.5M · REV. A
ISSUED		SCALE · EMCO · SHEET 3 OF 4

X=X 7/96

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	A	INITIAL RELEASE		



(910682) SCR FH SKT 1/4 X 1 THRU FLOOR
PLATE INTO FLOOR PANEL OR CONCRETE
(USE 930993 SQ BIT #3)
2 PER FLOOR PLATE

SCR SQ HD 3/8 X 3 HEX NUT 3/8
SCREW THRU NUT AND BASE
AGAINST FLOOR PLATE
TURN SCREW TO ADJUST HEIGHT.
TIGHTEN JAM NUT AGAINST BASE.
2 PER FLOOR PLATE.

910678 SCR SQ HD 1/2 X 5 W/
910367 HX NUT
SCREW THRU NUT AND BASE
INTO FLOOR PL. TIGHTEN NUT AGAINST BASE.

106981
FLOOR PLATE 2, 27X

106981 FLOOR PLATE UNDER EACH ANCHOR
POINT. 8 OUTER AND 5 INNER.

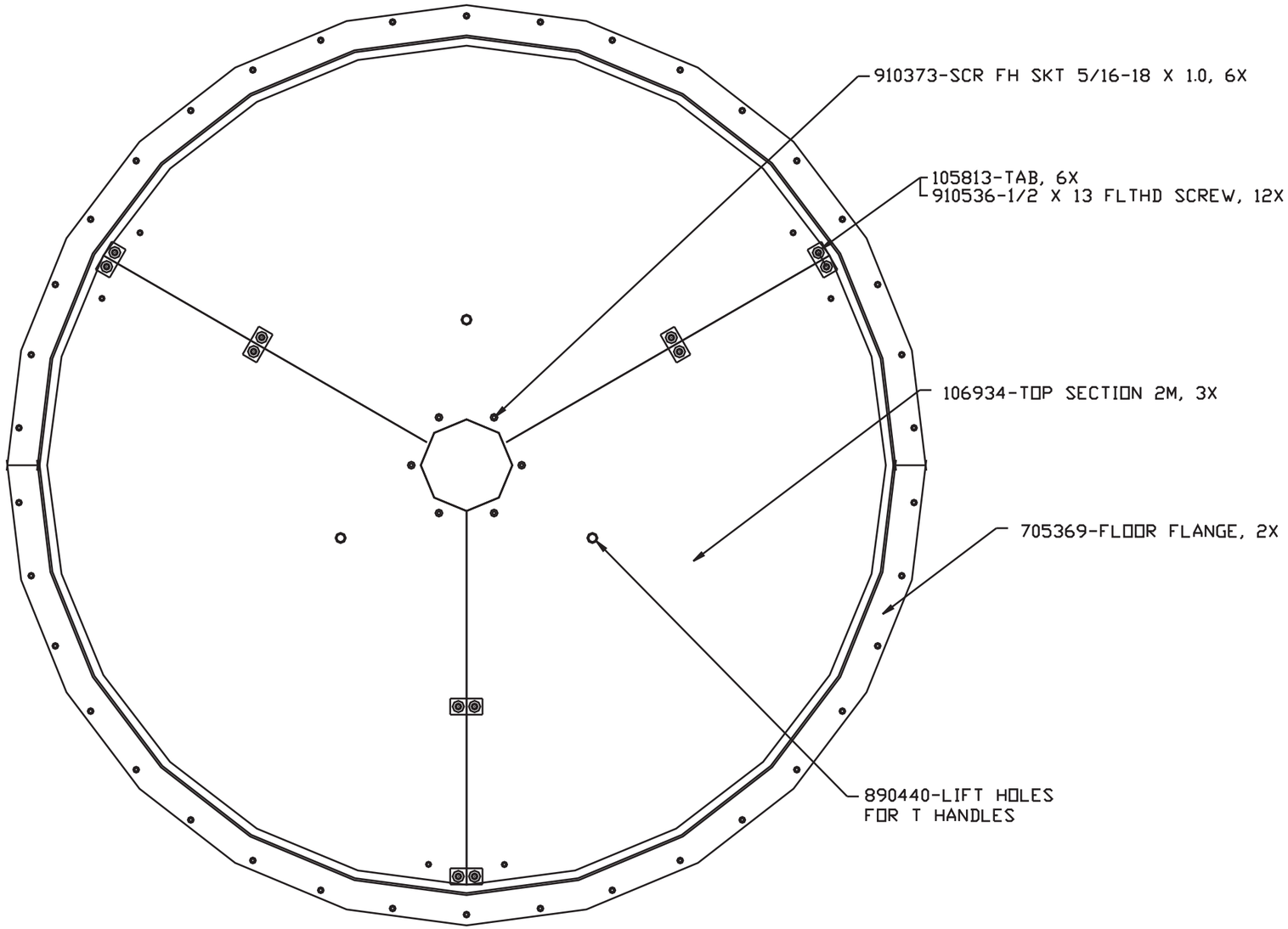
106982 FLOOR PLATE UNDER
BASE AT CENTER, 4X

CONTRACT NO.		ETS•LINDGREN™ EMC Test Systems, L.P. Cedar Park, TX — An ESCO Technologies Company — Lindgren RF Enclosures Glendale Hts, IL
APPROVALS	DATE	TITLE: 2088-1.5M ASSEMBLY
DRAWN FGR	11/24/99	
CHECKED		
ISSUED		SIZE D · FSCM NO. · DWG. NO. 2088-1.5M · REV. A
		SCALE · EMCO · SHEET 4 OF 4

X=X
7/96

DWG. NO. 2088-2M | SH 1 | REV. A

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	A	INITIAL RELEASE		



SHIP LIST (LOOSE PARTS)

8 EA	910373	SCR FH SKT 5/16-18 X 1
14 EA	910536	SCR FH SKT 1/2-13 X 1.5
3 EA	890440	T HANDLE 1/2-13
90 EA	910616	SCR SQ HD 3/8-16 X 3
15 EA	890790	C CLAMP
27 EA	106981	FLOOR PLATE 2
4 EA	106982	FLOOR PLATE 3
15 EA	910367	HEX NUT 1/2-13 SERRATED FLANGED
15 EA	890238	SCR SQ HD 1/2 X 5"
75 EA	910682	WOOD SCR #14 X 1" SQ DRIVE FLTHD
2 EA	705382	FLOOR FLANGE
1 EA	705383	WEAR STRIP
2 OZ	890706	CONDUCTIVE GREASE
40 EA	910159	SCR PAN HD SELF TAP 6-32 X 3/8
90 EA	910615	HX NUT FL 3/8-16
2 EA	930993	ROBERTSON BIT #3
2 EA	930994	HI SPEED .120(#31) DRILL
15 EA	910678	SCR SQ HD 1/2-13 X 5

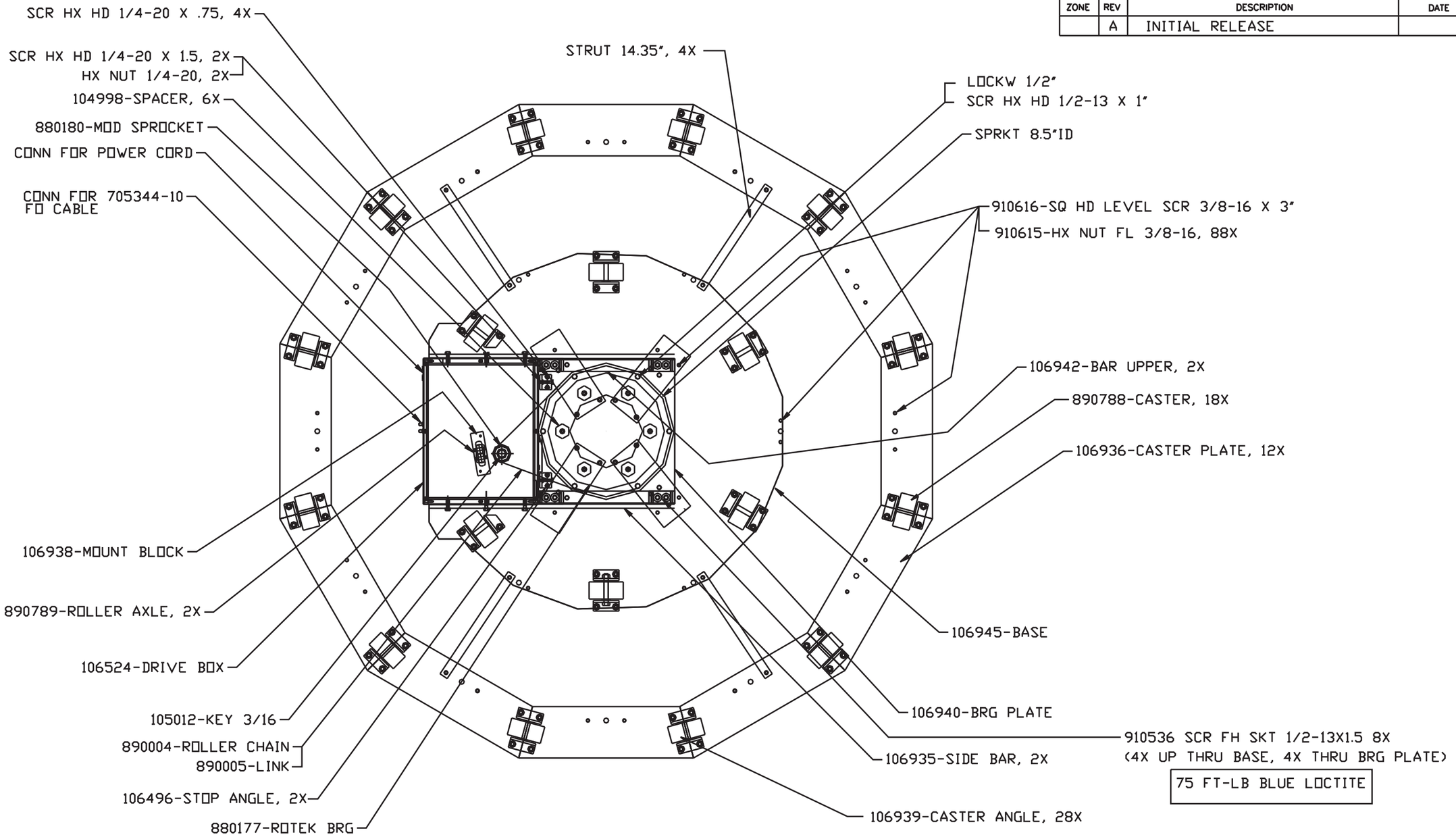
NOTES:

4. ITEM 16 GREASE IS APPLIED TO BRUSH CONTACT AREA OF WEAR STRIP DURING INSTALLATION.
5. ITEM 5 C CLAMP CAN BE USED TO CLAMP THE BOTTOM 1" OF THE WEAR STRIP TO THE FLOOR FLANGE ITEM 14. THE 6-32 SHOULD ALSO BE USED IN TWO PLACES TO ANCHOR THE STRIP IN PLACE ALONG WITH THE C CLAMPS.

CONTRACT NO.		ETS•LINDGREN™
		EMC Test Systems, L.P. Cedar Park, TX — An ESCO Technologies Company — Lindgren-RF Enclosures Glendale Hts, IL
APPROVALS	DATE	TITLE: 2088-2M ASSEMBLY
DRAWN FGR	6-28-00	
CHECKED		
ISSUED		SIZE D | FSCM NO. | DWG. NO. 2088-2M | REV. A
		SCALE | EMCO | SHEET 1 OF 4

X=X 7/96

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	A	INITIAL RELEASE		



REF 1 : 6

CONTRACT NO.		ETS•LINDGREN An EMCO Technologies Company
APPROVALS	DATE	TITLE: 2088-2M TURNTABLE ASSEMBLY
DRAWN FGR	6-28-00	
CHECKED		
ISSUED		SIZE D | FSCM NO. | DWG. NO. 2088-2M | REV. A
		SCALE | EMCO | SHEET 2 OF 4

X=X 7/96

DWG. NO. 2088-2M SH 3 REV. A

REVISIONS

ZONE	REV	DESCRIPTION	DATE	APPROVED
	A	INITIAL RELEASE		

FOR FIELD INSTALL
MATCH DRILL FLOOR WITH PREDRILLED FLOOR FLANGE 705369
INSTALL 1/4" FLAT HEAD SCREWS

705369-2M FLOOR FLANGE

103668-GROUND RING EXTRU, 2X

** THE FLOOR NEEDS TO BE 6.0-6.75 FOR LEVELING

R 1031.7 [40.62] FLOOR CUT ±5 [.2] TOLERANCE

R 1M [39.37] TT EDGE

150.00 [5.87] **

930551-SCR M5 X 25, 2X

106524-DRIVE BOX

106938-MOUNT BLOCK

890789-ROLLER AXLE, 2X

89000-LINK

890004-ROLLER CHAIN

104983-BEARING ASSY

910232-SCR SKT SET 8-32 X 3/16, 2X

BLUE LOCTITE

104998-SPACER, 6X

SCR HX HD M8X30, 8X

LOCKW M8, 8X

106940 BRG PLATE

890788-CASTER, 18X

890787-AXLE W/ NUT, 18X

8-11 [.31-.44] GAP BEFORE INSTALLING WEAR STRIP
6.3-9.6 .[25-.38] GAP AFTER INSTALLING WEAR STRIP
REF NOTE - WEAR STRIP IS .06 THICK

5.88

890583 BRUSH

910159 SCR SELF TAP PHD 6-32X.5
MATCH DRILL FLOOR FLANGE
WITH PREDRILLED WEAR STRIP
(USE #31 BIT) EVERY 12 INCHES

APPLY CONDUCTIVE GREASE TO WEAR STRIP CONTACT AREA ALL AROUND

106942-BAR UPPER, 2X

106941-BLOCK, 4X

106944-CASTER PLATE, 28X

705370 WEAR STRIP

890706 COND GREASE

910159-SCR SELF TAP PHD 6-32X.5
INSTALL IN FIELD

106935-BAR SIDE, 2X

106939-CASTER ANGLE, 28X

880180-SPRKT MODIFIED

106945-BASE

OPT - ATTACH C CLAMP 5

105012-KEY 3/16

BASE MUST BE RIGIDLY ANCHORED TO THE FLOOR

SCR HX HD M8X30

WSHR M8

LOCKW M8

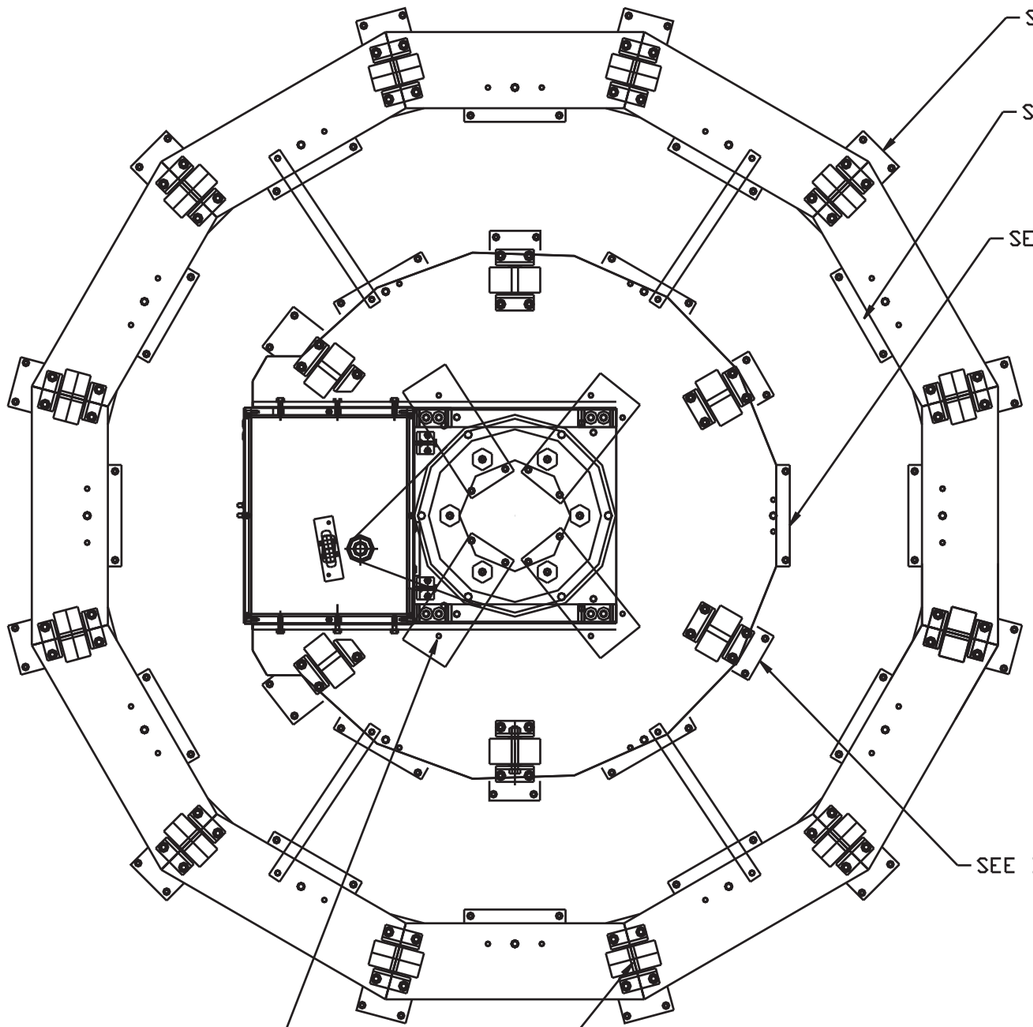
BLUE LOCTITE

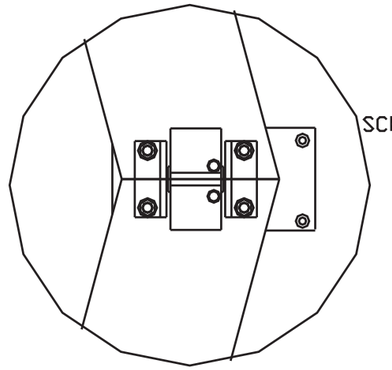
CAUTION - TT MAY GET .25" FLOOR PLATES UNDER THE CASTER AND CENTER BASE PLATE FOR ATTACHING TO FLOOR. THESE NEED TO BE ADDED TO HEIGHT OF 2088 TT.

CONTRACT NO.		ETS•LINDGREN
APPROVALS	DATE	TITLE: 2088-2M TURNTABLE ASSEMBLY
DRAWN FGR	6-28-00	
CHECKED		SIZE D · FSCM NO. · DWG. NO. 2088-2M · REV. A
ISSUED		SCALE · EMCO · SHEET 3 OF 4

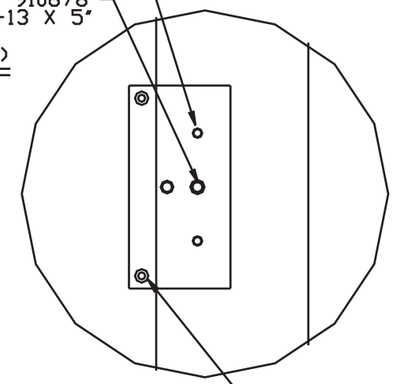
X=X 7/96

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	A	INITIAL RELEASE		



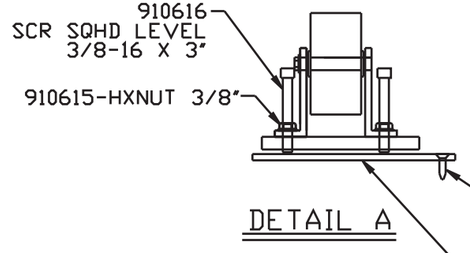


910616
SCR SQHD LEVEL 3/8-16 X 3"
910678
SCR SQ HD LEVEL 1/2-13 X 5"
(SAME AS DETAIL C)



910682
SCR FH SQDR 1/4 X 1"

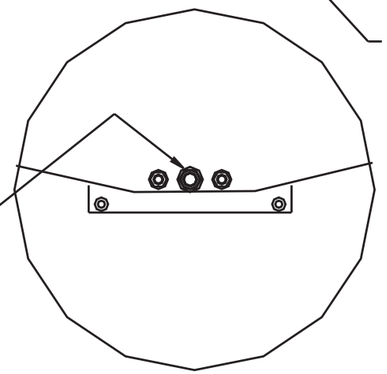
DETAIL B



DETAIL A

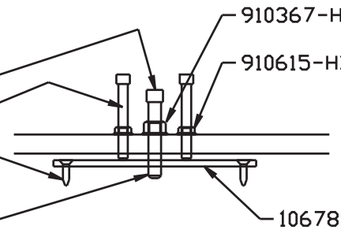
910682
SCR FH SQ DR
1/4 X 1"

106789-FLOOR PL

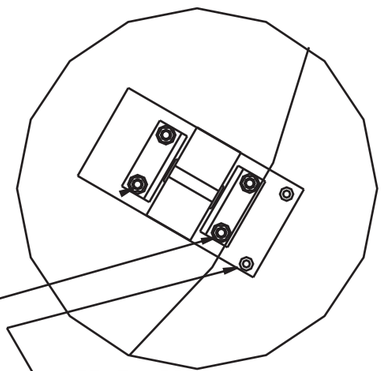


DRILL .422 X .75 MAX DEEP
THRU FLOOR PL INTO PANEL
TAP 1/2-13 THRU PANEL INTO FLOOR
INSTALL SCR THRU PANEL INTO FLOOR

890238-SCR SQ HD LEVEL 1/2-13 X 3"
910616-SCR SQHD LEVEL 3/8-16 X 3"
910682-SCR FH SQDR 1/4 X 1 LAG
INSTALL INTO ROOM PANEL



DETAIL C



DETAIL D

REF 1 : 6

CONTRACT NO.		ETS•LINDGREN™ EMC Test Systems, L.P. Cedar Park, TX — An ESCO Technologies Company — Lindgren RF Enclosures Glendale Hts, IL
APPROVALS	DATE	TITLE: 2088-2M ASSEMBLY
DRAWN FGR	6-28-00	
CHECKED		
ISSUED		SIZE D · FSCM NO. · DWG. NO. 2088-2M · REV. A
		SCALE · EMCO · SHEET 4 OF 4

X=X 7/96