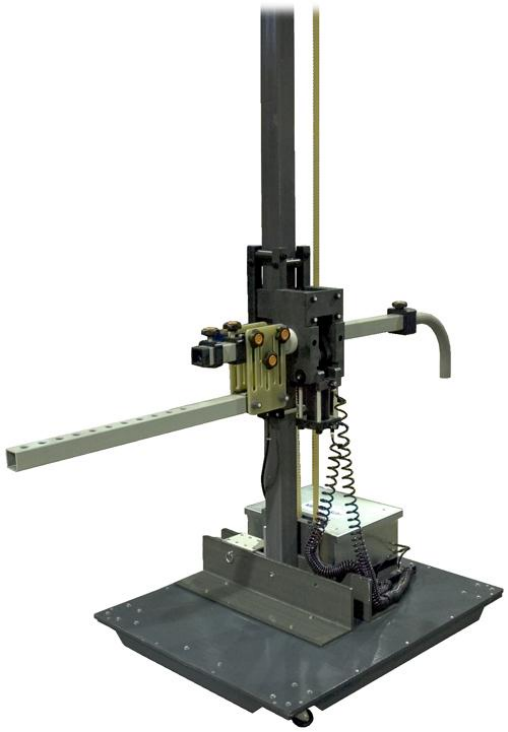
Model 2070B / Model 2071B

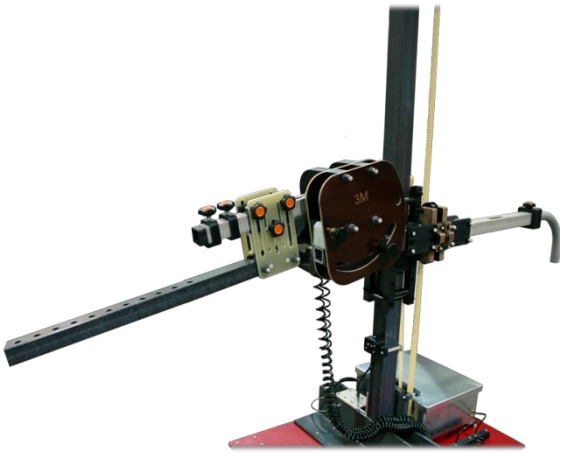
Antenna Positioning Tower

User Manual



Model 2070B with partial mast shown

(Non bore sight model)



Model 2071B with partial mast shown

(Bore sight model)

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Revision Record | MANUAL,2070B 2071B POSITIONING MAST | Part #399306, Rev. D

Revision	Description	Date
A	Initial Release	October, 2009
B	Added Model 2071B content	July, 2010
C	Added *EC Declaration of Conformity*; updated *Assembly Steps*	September, 2011
D	Updated height in *Specifications*; updated measurements in *Boom Load Limitations*; updated 114317 drawing in back of manual	March, 2013

Table of Contents

Notes, Cautions, and Warnings

	**Note:** Denotes helpful information intended to provide tips for better use of the product.
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.**

See the ETS-Lindgren *Product Information Bulletin* for safety, regulatory, and other product marking information.

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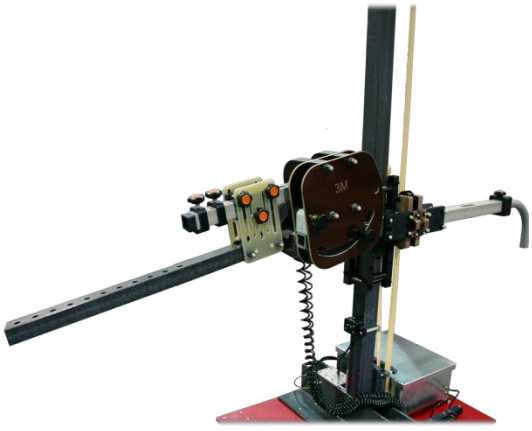
1.0 Introduction

The **ETS-Lindgren Model 2070B (non bore sight) and Model 2071B (bore sight) Antenna Positioning Towers** are portable mast and platform systems designed for use in EMI compliance testing at elevations from one to four meters above the ground level.

The mast, carrier, boom, platform, drive belts, and guying system are non-conductive and non-magnetic. The carrier is raised and lowered by a fractional horsepower electric motor with a gear reducer and electric brake. The electronics are contained in a shielded enclosure and the unit receives signals through fiber optic cables. The electric drive unit is located at the base of the tower.

Model 2070B non bore sight (partial mast shown)

The single-piece mast is constructed of square fiberglass tubing for strength, rigidity, and weatherability. Mylar rope guy lines are provided for outdoor installations and must be firmly anchored to provide vertical stability. The carrier is made of non-metallic material, primarily nylon and delrin.



Model 2071B bore sight (partial mast shown)

The motor system drives the carrier up and down using a polyurethane KEVLAR® reinforced timing belt. Rollers on the carrier provide friction-free, smooth travel. The motor typically positions the carrier within two centimeters of the desired location.

Fiber optic limit switches mechanically limit the travel of the carrier. The upper limit is at a fixed location to stop the carrier at its maximum height. The lower limit is adjustable to fit test requirements. In addition, the Model 2090 Series Multi-Device Controller allows programming two upper and two lower limit settings. For more information on the Model 2090, see page 11.

The Model 2070B/2071B features centerline air polarization, which enhances measurement accuracy.

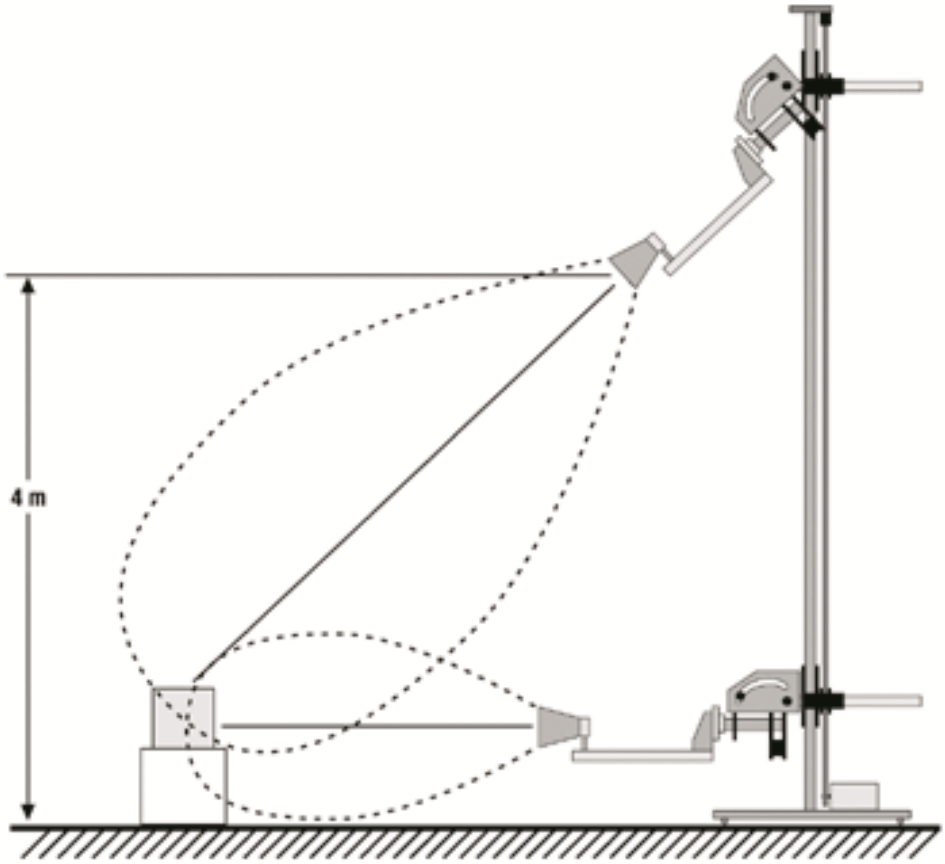
See *Mounting Antennas* on page 42 for information on the types of antenna mounts accepted by the Model 2070B/2071B.

About Bore Sight

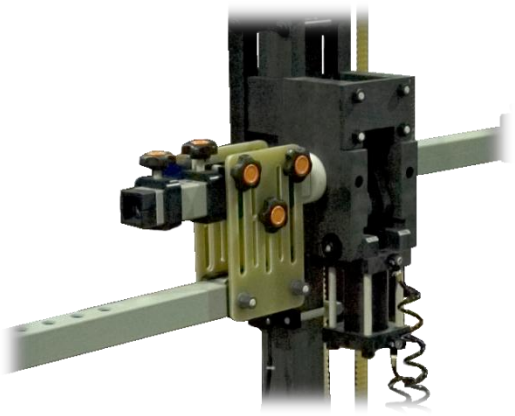
The Model 2071B provides the ETS-Lindgren patented bore sight system to provide direct antenna aim on Equipment Under Test (EUT) during scanning. This bore sight meets the requirements of ANSI C63.4 2003 and 2009 for compliance with FCC measurements above 1 GHz.

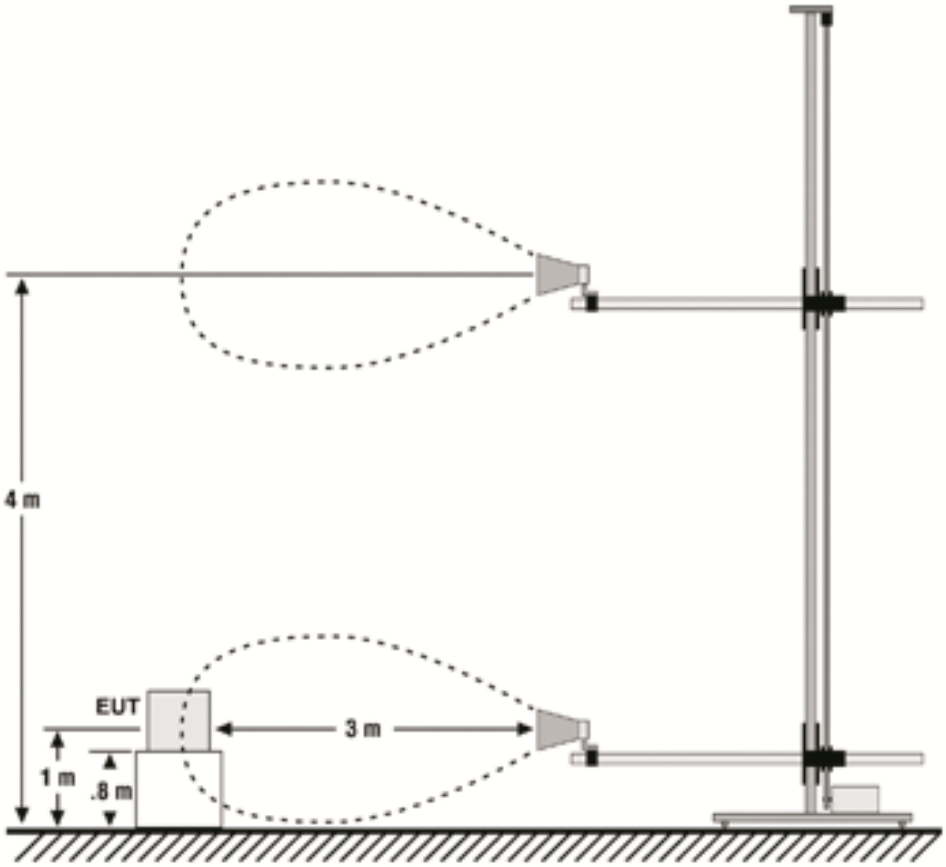
During scans, the bore sight system maintains constant directional antenna positioning while varying the angle between the antenna and the mast. This is particularly important when using higher gain antennas of more than 3 dBi. As the antenna is raised above the ground, the tilting of the antenna will maintain the EUT within the half power (-3 dB) beamwidth.

BORE SIGHT



NON BORE SIGHT





Standard Configuration

Feature	Model 2070B (Non Bore Sight)	Model 2071B (Bore Sight)
Variable Speed Motor, 220V Single Phase Input	☑	☑
Castered Platform for Portability	☑	☑
Single-Piece Mast for Rigidity	☑	☑
Fixed Boom with Centerline Pneumatic Polarization	☑	—
Bore Sight with Centerline Pneumatic Polarization	—	☑
Infrared (IR) Remote Controller (see page 39)	☑	☑
10-Meter Fiber Optic Control Cable	☑	☑
Fiber Optic Shield Room Penetration Kit routes the fiber optic control cable from the control room to the shield room while maintaining shielding attenuation. The pieces are made of brass for conductivity and provide attenuation of greater that 100 dB at 10 GHz. A single 25-mm (1.0-in) hole is required for mounting.	☑	☑

Optional Items

MODEL 2090 SERIES MULTI-DEVICE CONTROLLER

The Model 2090 (or next generation ETS-Lindgren controller, if applicable) is a separate component required for Model 2070B/2071B operation.

The Model 2090 requires firmware revision 3.12 or higher.

The Model 2090 Series Multi-Device Controller provides control for two separate devices, such as ETS-Lindgren towers and turntables, plus the control of four auxiliary devices through a fiber optic interface. The Model 2090 includes a GPIB bus and is compatible with most popular EMI measurement software.

ADDITIONAL FIBER OPTIC CABLE

Various lengths of fiber optic cable are available by custom order. The standard length provided is 10 m (32.8 ft).

ETS-Lindgren Product Information Bulletin

See the ETS-Lindgren *Product Information Bulletin* included with your shipment for the following:

- Warranty information
- Safety, regulatory, and other product marking information
- Steps to receive your shipment
- Steps to return a component for service
- ETS Lindgren calibration service
- ETS Lindgren contact information

2.0 Maintenance

WARNING

Before performing any maintenance, follow the safety information in the ETS-Lindgren *Product Information Bulletin* included with your shipment.

Do not attempt to service this unit until all electrical power has been disconnected.

This equipment should be operated and maintained by qualified personnel.

Disconnect all air supply lines when servicing pneumatic components.

Service equipment in accordance with the maintenance schedule provided.

Periodically check guy ropes and belt for wear.

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

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

Maintenance of the Model 2070B and Model 2071B Antenna Positioning Towers is limited to the instructions provided in the next section, *Maintenance Schedule*. If you have any questions concerning maintenance, contact ETS-Lindgren Customer Service.

Maintenance Schedule

EVERY THREE MONTHS

- Inspect belt for wear, tension, and cracking.
- Check all screws and bolts to confirm that are tight per assembly instructions.
- Inspect bolts and hardware for breakage.

EVERY SIX MONTHS

- Check guy ropes for tightness, cracking, and delamination, if applicable.
- Check connecting control and all cables for degradation from environment and use. If necessary, replace per safety per local electrical codes.

EVERY TWELVE MONTHS

Use high-grade silicone grease on all carrier rollers and the encoder center shaft (located inside motor cover).

Service Procedures

For the steps to return a system or system component to ETS-Lindgren for service, see the *Product Information Bulletin* included with your shipment.

3.0 Specifications

Electrical Specifications

Voltage:	220
Amp:	4.0
Line Frequency:	50/60
Phase:	Single

Physical Specifications

Polarization:	30° per second
Scan Height:	4.0 m (157.48 in)
Weight (approximate):	79.38 kg (175.0 lb)
Cross-Boom Loading:	10.4 kg (23.0 lb)
Linear Velocity:	3 cm/sec–22 cm/sec
Overall Height:	• **Model 2070B:** 4.6 m (180.7 in) • **Model 2071B:** 5.2 m (204.4 in)
Base Dimensions:	1.1 m (42.5 in) x 0.9 m (35.5 in)

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4.0 Electrical Installation

WARNING

Before installing any components, follow the safety information in the ETS-Lindgren Product Information Bulletin included with your shipment.

Electrical installation must be performed by a qualified electrician, and in accordance with local and national electrical standards.

Make sure the power is off and secured before proceeding.

Wire Gauge

Whenever possible the motor should be powered from a separate branch circuit of adequate capacity to keep voltage drop to a minimum during startup and running. For longer runs, increase the wire size in accordance with the following wire selection guide.

Never use smaller than 14 AWG for any installation.

Length of Wire @ 220 V:	0-15.24 m (0-50 ft)	15.24-30.48 m (50-100 ft)	30.48-60.96 m (100-200 ft)
Wire Gauge Required:	14 AWG	14 AWG	14 AWG

Power Cord

The motor base is provided with an input AC power cord that is approximately 2.45 m (8 ft) long. This power cord is suitable for portable or indoor applications without modification.

Connecting the Model 2090

Any combination of primary devices (towers, turntables, reverberation paddles, MAPS, and so on) can be connected to the two device interface ports located on the rear panel of the Model 2090 Series Multi-Device Controller. For easy set up of an EMC facility, it is recommended that the Model 2070B and Model 2071B Antenna Positioning Towers be connected to the **Device 1** port. The default settings are for a tower connected to the **Device 1** port and a turntable connected to the **Device 2** port.

Primary device connection is accomplished with a dual fiber optic cable included with the device. This cable terminates into two ST connectors that are identical at both ends. The cable is symmetrical, so either end can be connected to the Model 2090. A fiber optic cable connected to the IN port of a device should be connected to the primary OUT port of the motor base at the other end. Similarly, a fiber optic cable connected to the OUT port of the device should be connected to the primary IN port of the motor base at the other end. Older motor base designs have only one fiber optic connector pair, but the newer motor base interface provides a secondary interface reserved for future expansion.

CAUTION

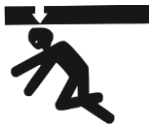
Fiber optic cabling for each device should not hang unsupported from the rear panel of the Model 2090. The fibers and connectors are easily broken if twisted or bent. Keep the fiber optic cables as straight as possible from the connector to the protective sheath.

5.0 Assembly Instructions

WARNING

Before connecting any components, follow the safety information in the ETS-Lindgren *Product Information Bulletin* included with your shipment.

This equipment should be installed, operated, and maintained by qualified personnel.



Stay clear of all moving components on this equipment.

Never stand beneath the carrier, whether moving or stationary.

See the ETS-Lindgren *Product Information Bulletin* included with your shipment for information on unpacking and acceptance procedures.

The Model 2070B and Model 2071B Antenna Positioning Towers should be assembled in the location where it will be used. If movement to another location is required after assembly, partial disassembly will be required for it to fit through most doorways.

Required Tools

- 300 mm adjustable wrench (included)
- 3/16-in Allen wrench (hex key)
- Sawhorse or work bench
- Medium-sized level

CAUTION

DO NOT DAMAGE FIBER OPTIC CABLES

- **During assembly do not pinch or damage the fiber optic cables.**
- **When inserting the mast into the lower mast section on the base, do not pinch or damage the fiber optic cables.**
- **When installing the mast locking pin, do not pinch or damage the fiber optic cables.**

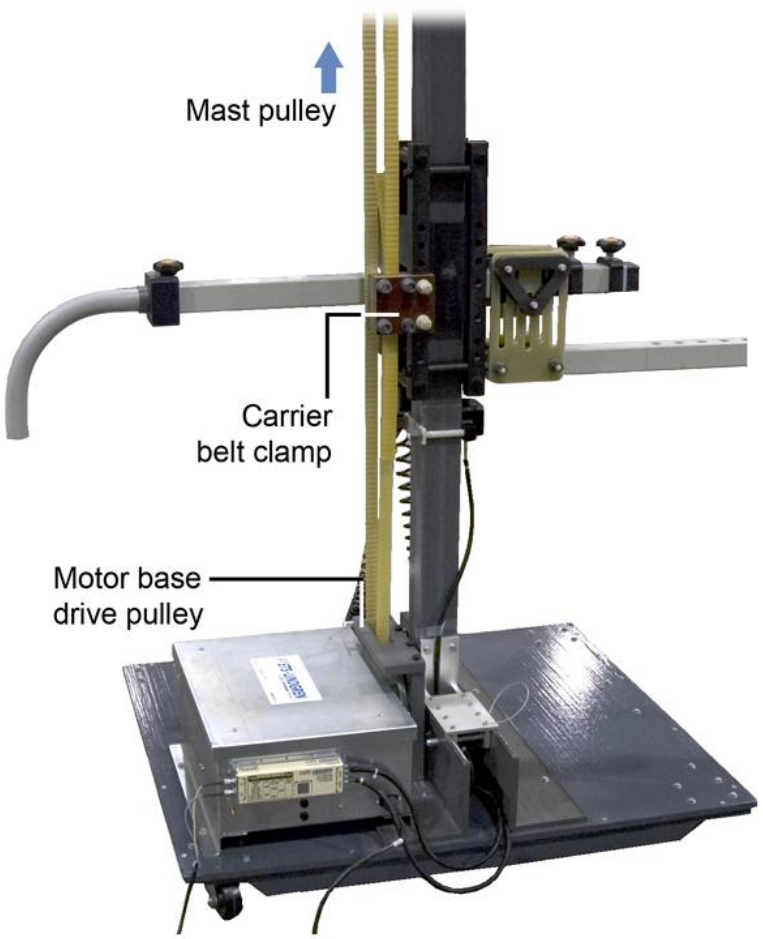
For illustrative purposes, the photos in this section show the Model 2070B/2071B partially and/or fully assembled. Follow the steps to assemble the Model 2070B/2071B.

1. Place the base of the Model 2070B/2071B in the chamber or other designated installation location.

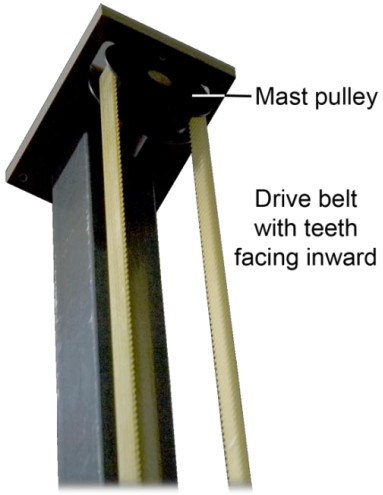
2. Place the mast horizontally onto an elevated, stable surface, such as sawhorses.

3. Carefully slide the carrier unit onto the mast. Orient the carrier so that when the mast is inserted into the base:

- The carrier belt clamp will be directly over the drive pulley on the motor base; and
- The carrier belt clamp is in line with the mast pulley.

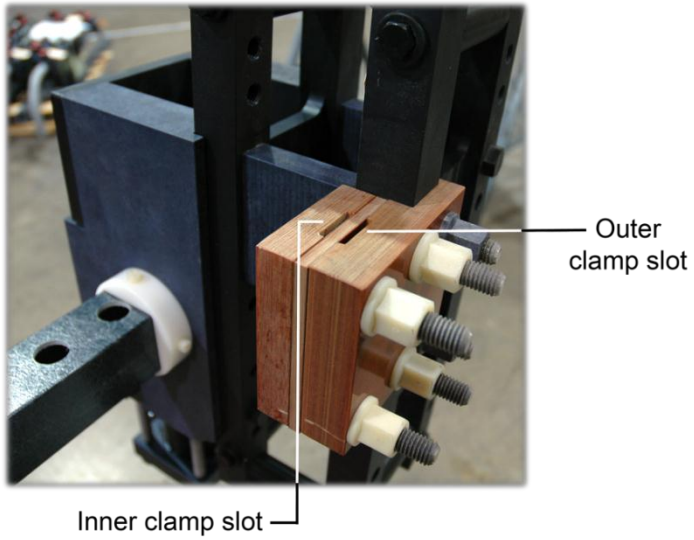


4. Install the drive belt with the teeth facing each other.



Feed the belt up through the outer clamp slot on the carrier belt clamp, around the mast pulley, and back down so both ends of the belt can be accessed when the tower is vertical. Leave approximately 0.5 m (1.5 ft) on both ends of the belt.

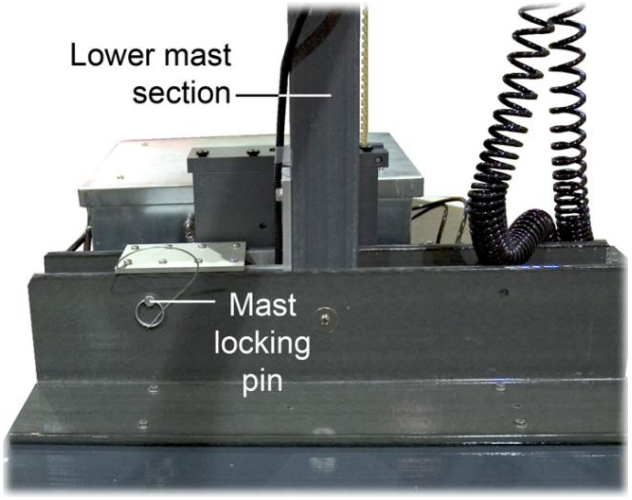
Temporarily tape the two ends together so the drive belt does not slide out of the pulley while the mast is being raised.



5. Remove the mast locking pin and pivot the lower mast section down and horizontal to the floor.

6. With the mast and lower mast section in horizontal position, insert the mast into the lower mast section, aligning the pulley at the top of the mast with the pulley on the motor.

7. Raise the mast and lower mast section to a vertical position and re-insert the mast locking pin.



8. Connect fiber optic cables between the motor and the Model 2090 Series Multi-Device Controller (or next generation ETS-Lindgren controller, if applicable) and supply power to the controller and the motor.

The fiber optic cable must be looped through the P clip installed on the front panel of the motor base. Failure to do so will increase the chance of the fiber optic cable being accidentally pulled and breaking the fiber optic connectors and/or causing damage to the cable.

If you have a hand-held controller, you may connect it at this time.

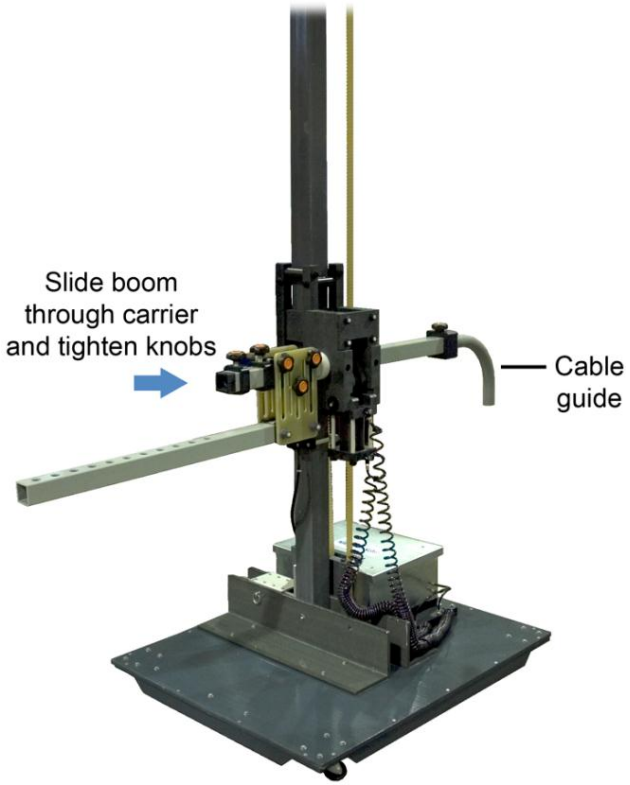
9. Attaching the boom:

MODEL 2070B ONLY

TIP | Run the antenna cables through the boom sections while assembling the boom. Be careful not to pinch or damage the cables.

Attached to one end of the boom unit is a cable guide that reduces the stress on the antenna feed cable; this cable guide must be removed to install the boom.

- Remove the bolts that hold the cable guide in place, and set the unit to the side.
- Slide the end of the boom where the cable guide was attached through the receptacle hole on the carrier so that the cable guide will be on the same side of the tower as the motor base.
- When the center block reaches the carrier, tighten the hand knobs to secure the boom in place.
- Reinstall the cable guide.

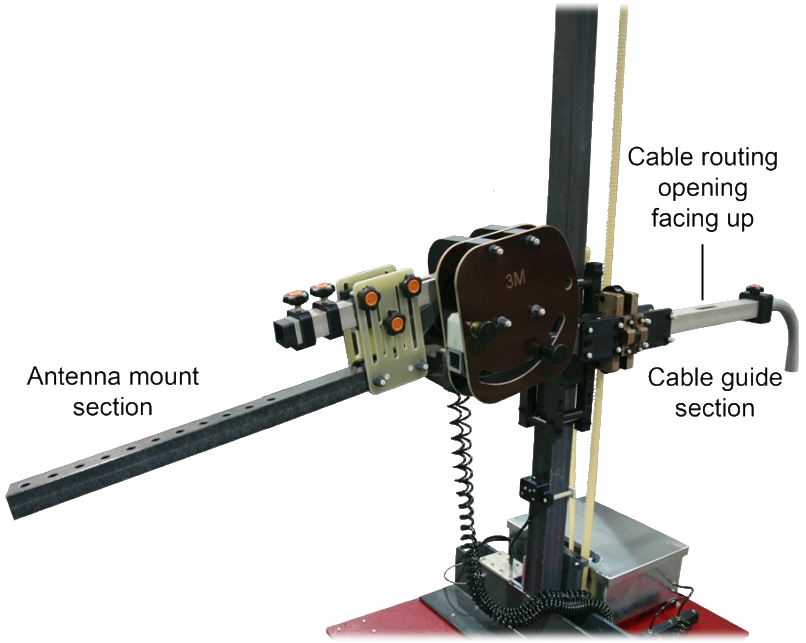


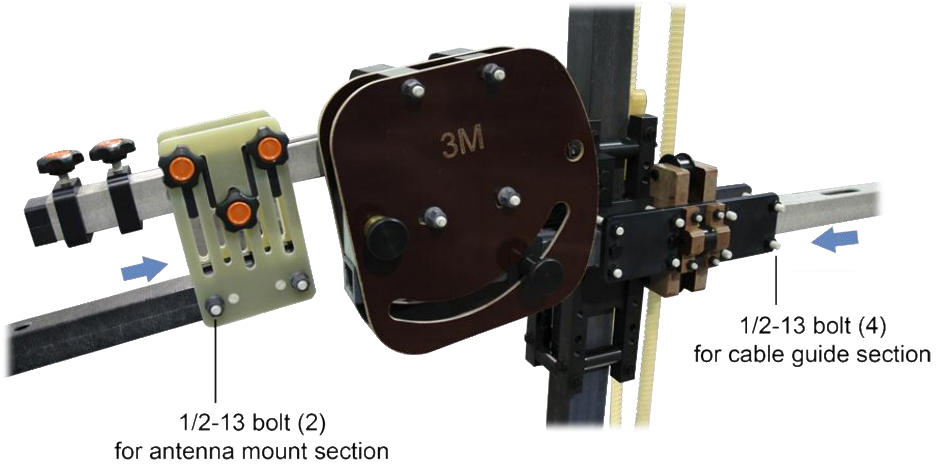
MODEL 2071B ONLY

TIP | Run the antenna cables through the boom sections while assembling the boom. Be careful not to pinch or damage the cables.

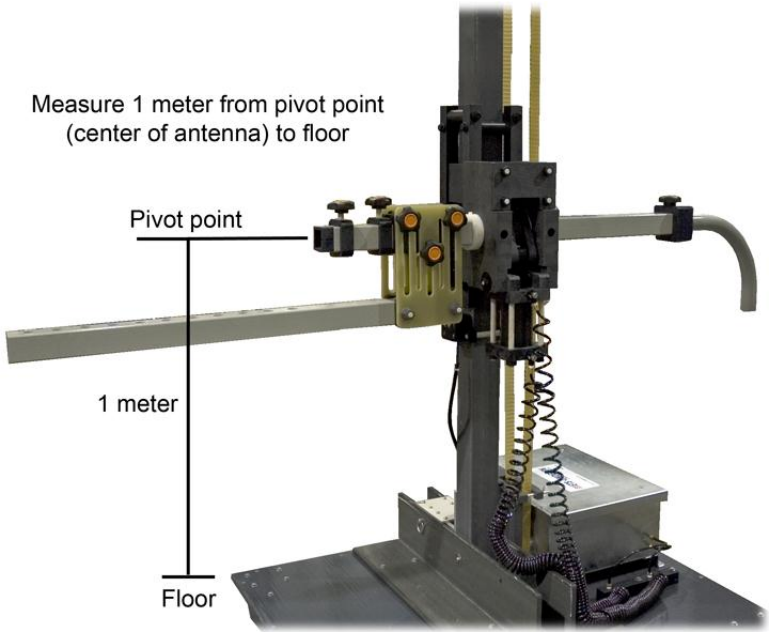
The boom assembly ships with the antenna mount section separated from the cable guide section. To assemble and install the boom:

- **Install cable guide section:** Loosen the four 1/2–13 bolts, and then slide the cable guide section into the boom slot, making sure that the cable routing opening is facing up. Re-tighten the four bolts.
- **Install antenna mount section:** Remove the two 1/2–13 bolts from the carrier, and then slide the antenna mount section into the boom slot. Re-insert the two bolts, making sure they go through the antenna mount section. Tighten the two bolts.

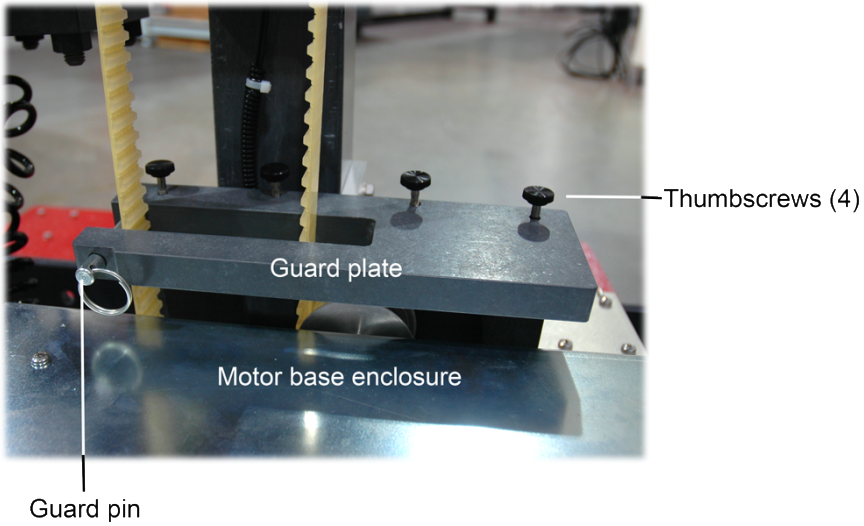


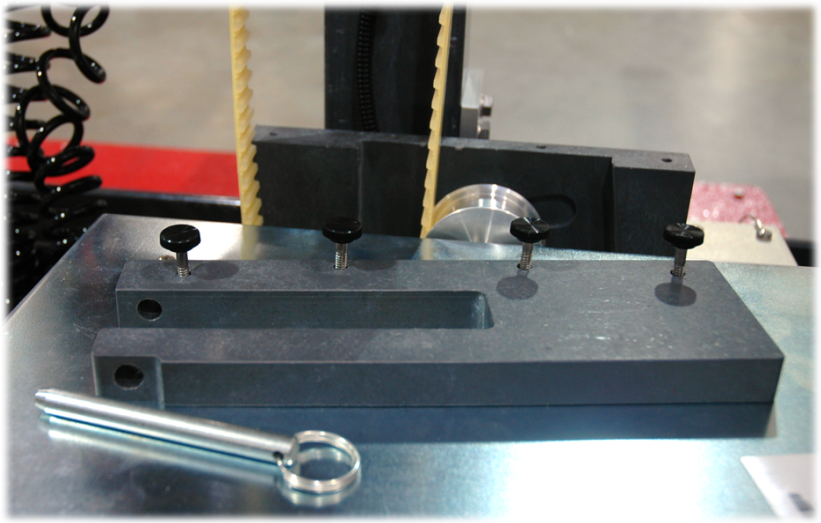


10. Block the carrier so that the reference point on the largest antenna you use will be set at one meter. Place a piece of wood under the carrier to support it at this height.

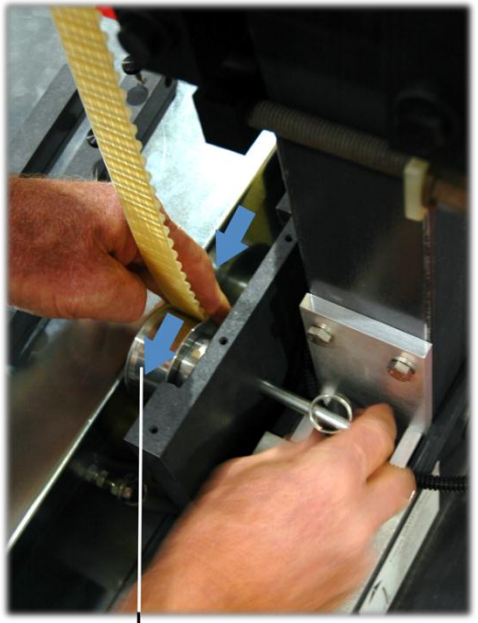


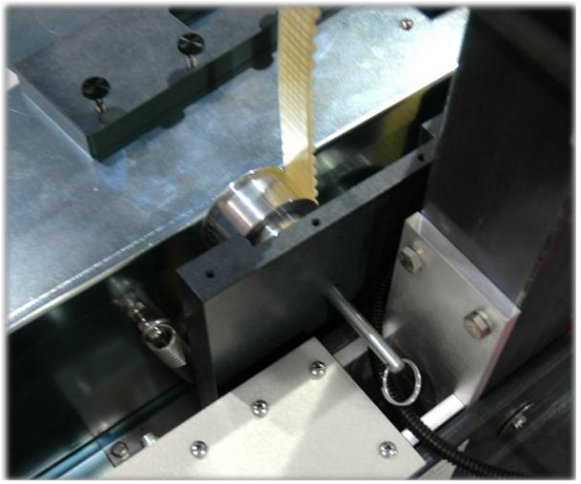
11. Remove the guard plate located behind the motor base enclosure. Rotate the four thumbscrews to loosen the guard plate, remove the guard pin, and then lift the plate to remove it.



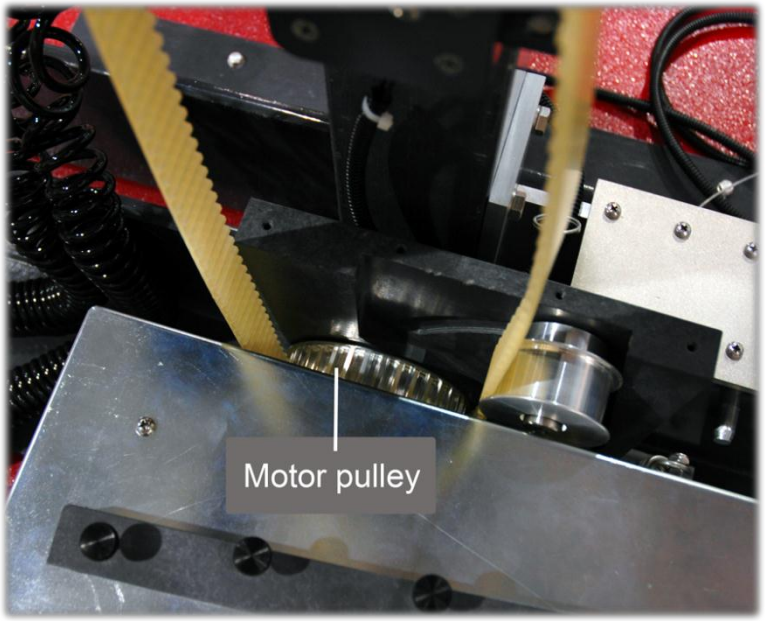


12. Remove spring tension by carefully pulling back the belt tension idler on the motor base. While holding back the belt tension idler, insert the guard pin through the hole on the back of the guard plate enclosure to secure it in place.



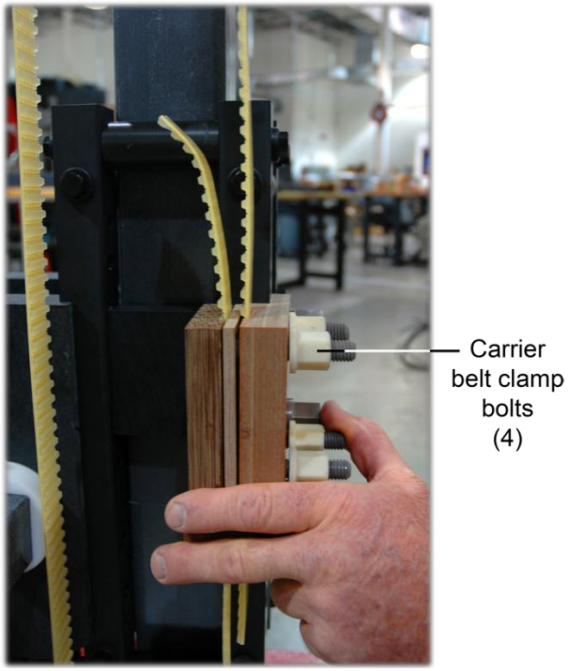


13. Continue routing the drive belt down and around the motor pulley and up through the inner clamp slot on the carrier belt clamp (see photo of inner clamp slot on page 22) until approximately 0.5 m (1.5 ft) of belt is through the clamp. Remove the tape you placed on the drive belt in step 4.



14. Hand-tighten the drive belt:

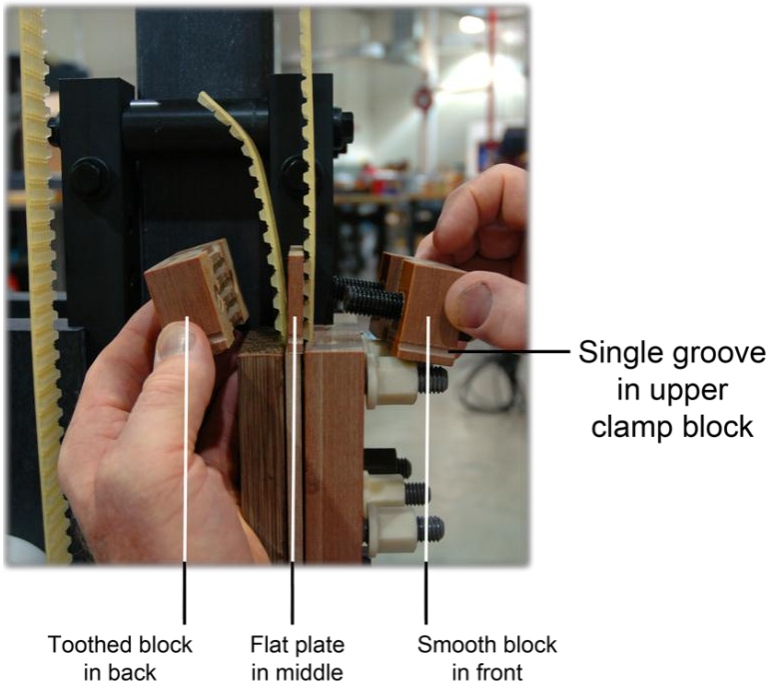
- Loosen the four bolts on the carrier belt clamp.
- Grasp both ends of the drive belt and pull them in opposite directions until the belt is as taut as possible.
- Re-tighten the four bolts on the carrier belt clamp.



15. Install the upper clamp block (the one with a single groove etched in the side) to lock one end of the drive belt in place. The upper clamp block is comprised of three parts; assemble the parts as follows on top of the carrier belt clamp:

- Place the flat plate between the drive belt and drive belt end.
- Place the smooth block on the outside of the drive belt with the drive belt between the smooth block and the flat plate.
- Place the toothed block on the other side of the flat plate with the drive belt end between the toothed block and the flat plate.

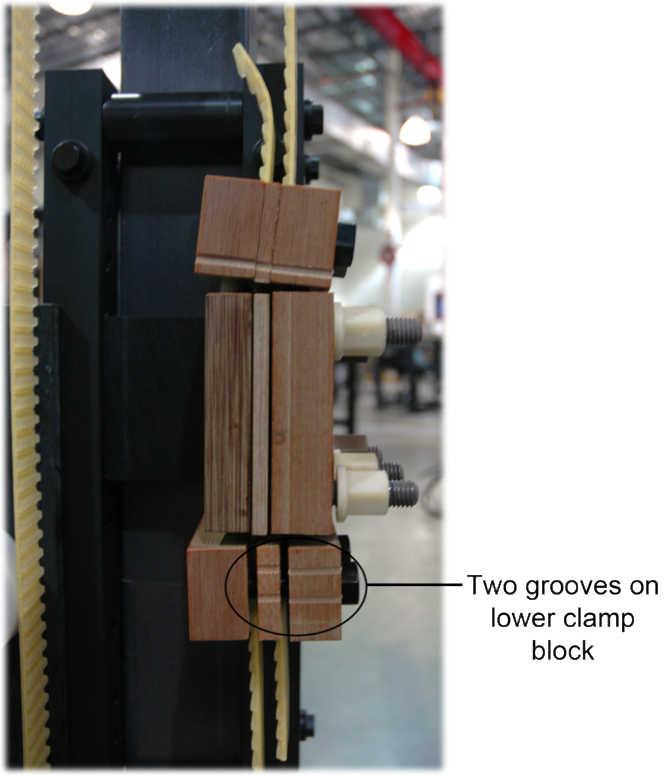
Insert two bolts through the smooth block and into all three parts; tighten.



16. Install the lower clamp block (the one with two grooves etched in the side) to lock one end of the drive belt in place.

Like the upper clamp block, the lower clamp block is comprised of three parts. Assemble it like the upper clamp block, but place the parts below the carrier belt clamp.

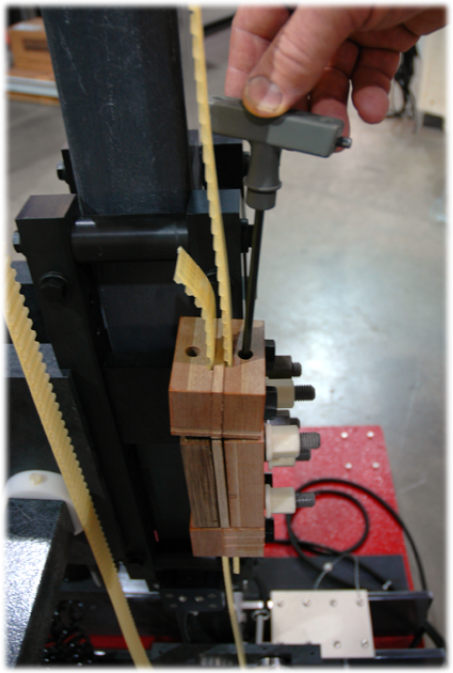
Tighten the two bolts on the lower clamp block.



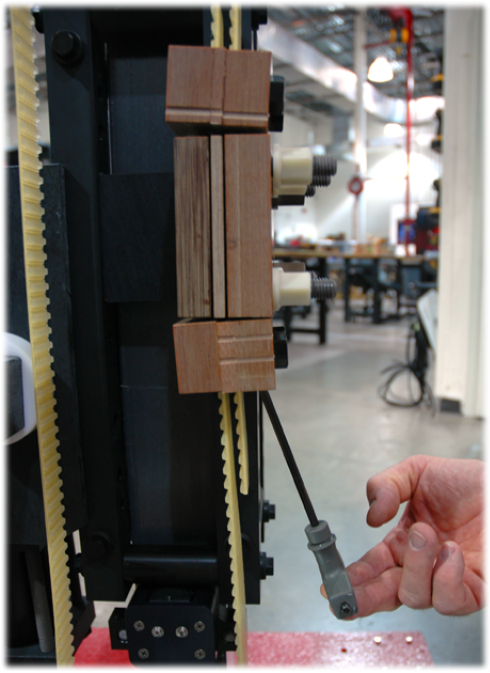
17. Loosen the four bolts on the carrier belt clamp.

18. Using a 3/16-in Allen wrench (hex key), tension the drive belt with approximately 100–150 lb of pull on each end.

Insert the Allen wrench into the hole in the front of the upper clamp block, and then into the hole in the lower clamp block.

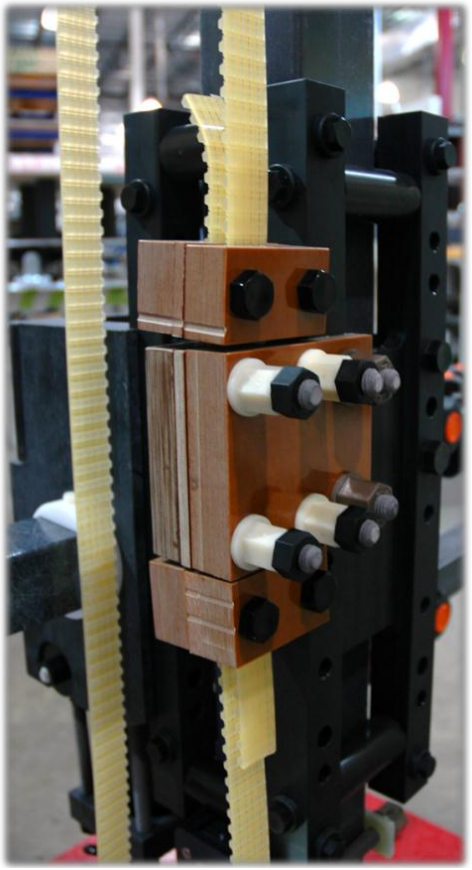


Upper clamp block

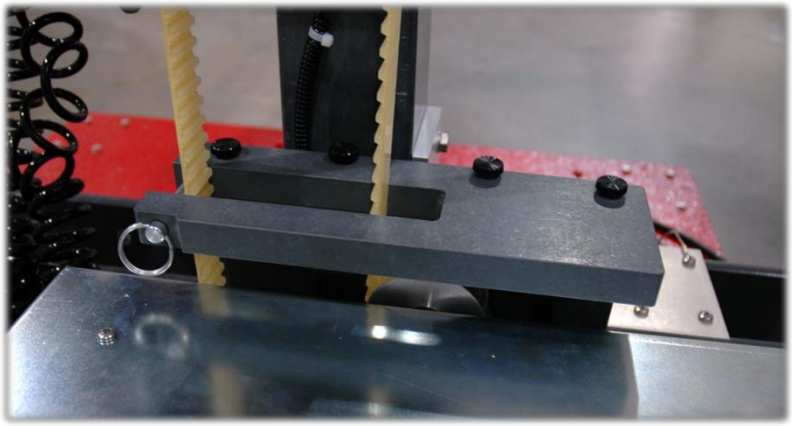


Lower clamp block

19. Re-tighten the four bolts on the carrier belt clamp using 11 N-m (100 in-lb) torque. Insert the four jam nuts and use approximately 7 N-m (60 in-lb) on the jam nuts.



20. Remove the guard plate pin from the back of the guard plate enclosure and replace the guard plate. Tighten the four thumbscrews and insert the pin in the front of the guard plate.

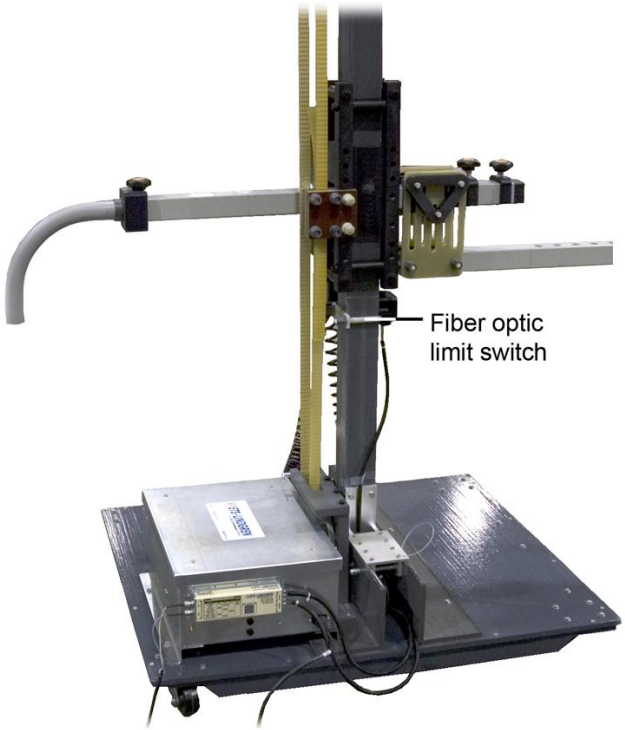


CAUTION

The fiber optic limit switch is designed to stop the boom from traveling beyond a safe distance and causing damage to the Model 2070B/2071B. You must implement additional safeguards to prevent damage to any antenna installed on the Model 2070B/2071B.

21. To install the fiber optic limit switch:

- With the carrier at 1 meter, clamp the fiber optic limit switch assembly to the mast.
- Slide the fiber optic limit switch to the 1 meter position.



22. Carefully move the belt tension idler into place against the drive belt and re-install the spring if it was removed. The tension idler should be free on its pivot and the spring should force it against the belt.

23. With the proper belt tension and with no load on the boom, the idler should be stopped at approximately 30 mm (1.2 in) from reaching the end of travel against the motor pulley.

If the idler is against the pulley, retighten the belt to prevent slack when loads are applied to the boom. As the boom is loaded the tension idler needs to move closer and take up the slack as the mast deflects under load.

Air Polarization Assembly

The automated air polarization assembly includes variable speed polarization cycling using flow control valves. The air cylinder is made of non-conductive material and will polarize the largest antenna recommended for the tower. The polarization speed range is 3^{o} to 30^{o} per second.

An air supply of 414-551 kPa (60-80 psi) is needed for this feature. It is important to have clean and dry air; so we recommend the use of a 40 micron filter in close proximity to the motor base.

Ten meters of UV stabilized air hose is included as well as a 1/8 inch NPT fitting. A metric fitting for a 4 mm tube may be supplied by the customer.

To connect the air line to the motor base, simply push the hose provided onto the fitting on the front of the motor base. The air supply pressure should be 414-551 kPa (60-80 psi). The air cylinder uses a special O-ring lubricant; during maintenance this lubricant should be applied to prevent excessive wear of the O-rings.

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6.0 Operation

WARNING

Before placing into operation, follow the safety information in the ETS-Lindgren *Product Information Bulletin* included with your shipment.

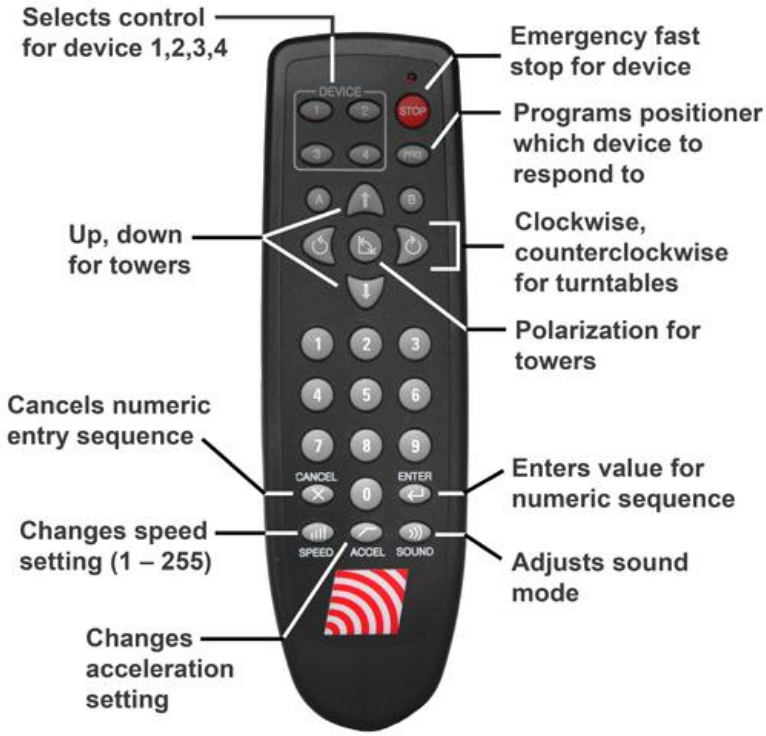
This equipment should be installed, operated, and maintained by qualified personnel.

Stay clear of all moving components on this equipment.

Never stand beneath the carrier, whether moving or stationary.

Infrared Remote Controller

The Model 2070B and Model 2071B Antenna Positioning Towers are infrared compatible, and can be used with a universal remote control programmed to a specific protocol, such as the ETS-Lindgren Infrared (IR) Remote Controller (included).



If you are unfamiliar with the operation of the Model 2090 (or next generation ETS-Lindgren controller, if applicable), see the manual included with the controller. The manual is also available for download from www.ets-lindgren.com.

With the assembly of the tower complete, the controller must be connected to the unit and power applied to both the motor base and controller. See the controller manual for information on connecting the fiber optic cable.

Use the controller to check the clockwise (CW) and counterclockwise (CCW) rotation in both directions by a few degrees. The position in degrees increases (+) in the CW direction and decreases (-) in CCW direction.

EDIT CONFIGURATION PARAMETERS

Key	Function
PARAM	To edit a configuration parameter: • Press PARAM key to display the current parameter. • Press PARAM key repeatedly to scroll through the parameter list, displaying each parameter.
STEP (INC/DEC)	To scroll up or down the parameter list while viewing a parameter. Reduces the effort necessary to scan through a long parameter list using the PARAM key.
LIMIT/POSITION	Press any of the LIMIT/POSITION selection keys to return the display to that selection. Press any of the remaining motion keys to return the display to the current position and execute that motion. Press the PARAM key again to return to the last displayed parameter in the list, allowing easy transition between parameter adjustment and device operation.

Key	Function
INCRM, DECRM, or ENTER	Once the desired limit, position, or parameter is visible in the display window, press INCRM, DECRM, or ENTER to toggle into edit mode. The lowest adjustable digit will flash on and off.
LOCAL	Press the LOCAL key for that device to 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.

Tower Encoder Calibration

Parameter **C** must be set to **2000** for the Model 2070B/2071B.

Parameter **C**, the encoder calibration parameter, is the setting that converts the encoder count values returned from a motor base into the corresponding centimeter or degree position reading. For towers, this represents the number of encoder counts per meter. This parameter allows a variety of standard, retrofit, and custom devices to be used.

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

1. Set the encoder calibration value to 1000.
2. Make sure the tower is positioned to allow at least one meter of travel in the upward direction at an easily measurable height, and then set the current position reading to **000.0**. To allow this, you must adjust the lower limit setting.
3. Use the STEP keys to adjust the height of the carrier until it is one meter above the start point.
4. Record the reading of the display, ignoring the decimal point. For example, **200.0** would be **2000**. This is the encoder calibration value.

If the value is below 1000, the resolution of the encoder is low and the Model 2090 will not provide 0.1-cm resolution, even though the display shows that digit. If the value is past 9999, the encoder has too many counts per meter and the controller cannot correct for it. In this case, contact ETS-Lindgren for assistance.

5. Enter the encoder calibration value and reset the limits and position information.

6. Test the tower by moving it a known distance and comparing the display to the measured distance traveled. It may be necessary to adjust the encoder calibration value up or down slightly depending on the result.

Mounting Antennas

The Model 2070B/2071B accepts antennas with the following mount types:

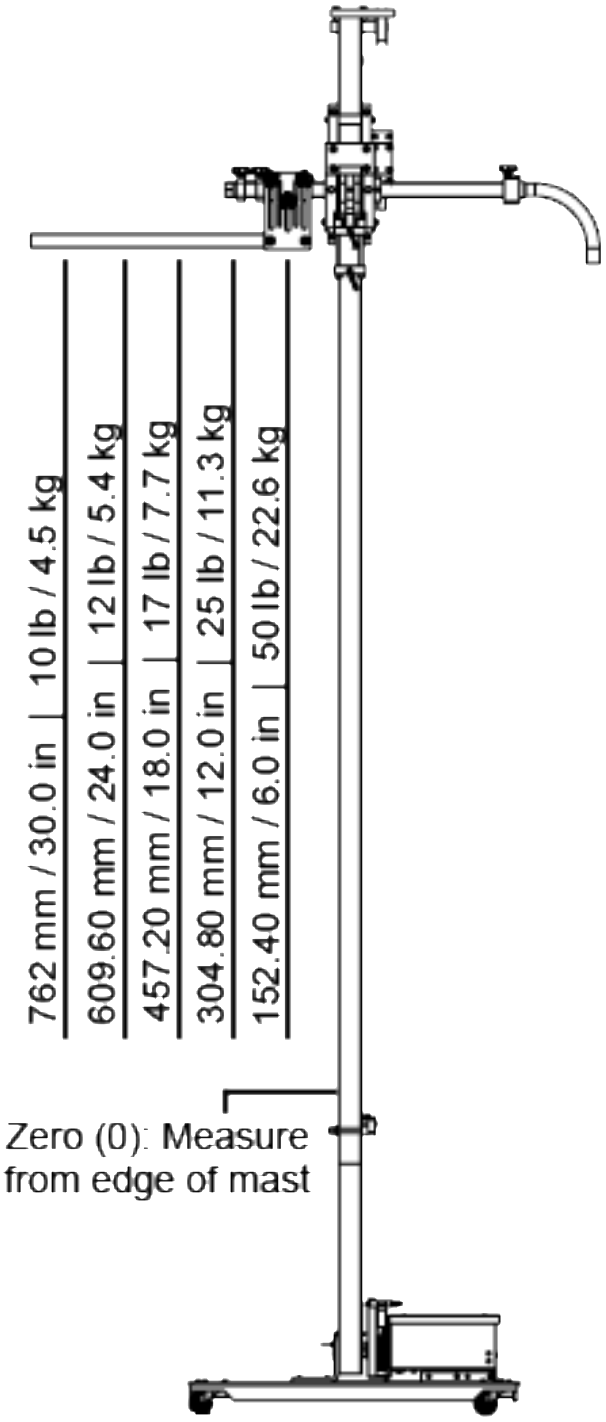
- Stinger mount
- 7/8–14 thread
- 1/4–20 thread

These mount types will maintain the centerline axis during polarization. The antenna should be mounted on the boom as close to the carrier as possible.

Insert the mounting knobs through the holes on the boom and align the mounting holes on the antenna with the threaded end of the mounting knobs. Secure the antenna in place by tightening the threaded knobs into the receptacle mounting holes on the antenna.

BOOM LOAD LIMITATIONS (MODEL 2070B / MODEL 2071B)

Boom loading at 25 ft lb (33.9 Nm) measured along the boom from the mast.



Pre-Operational Checklist

- ☐ Verify that the power lines are connected for the tower, controller, and any other equipment to be used for testing.
- ☐ Verify the fiber optic cables are connected.
- ☐ Verify the antenna connected to the boom is securely mounted.
- ☐ Connect the feed cable to the antenna.
- ☐ Before moving the carrier on the mast up or down, verify there are no people standing near the boom.

Start-Up and Shutdown

START-UP

If you are unfamiliar with the operation of the Model 2090 (or next generation ETS-Lindgren controller, if applicable), see the manual included with the controller. The manual is also available for download from www.ets-lindgren.com.

After completing the pre-operational checks, turn on the Model 2090 by pressing the power button.

SHUTDOWN

Move the carrier to an accessible height to remove the antenna and confirm the unit has come to a complete stop. Press the power button on the Model 2090 to turn it off.

Appendix A: Warranty

See the *Product Information Bulletin* included with your shipment for the complete ETS-Lindgren warranty for your Model 2070B or Model 2071B Antenna Positioning Tower.

DURATION OF WARRANTIES FOR MODEL 2070B / MODEL 2071B

All product warranties, except the warranty of title, and all remedies for warranty failures are limited to two years.

Product Warranted	Duration of Warranty Period
Model 2070B Antenna Positioning Tower	2 Years
Model 2071B Antenna Positioning Tower	2 Years

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Appendix B: EC Declaration of Conformity

ETS-LINDGREN
An ESCO Technologies Company

CE 05

Declaration of Conformity

We, ETS-Lindgren, L.P., 1301 Arrow Point Drive, Cedar Park, TX, 78613, USA, declare under sole responsibility that the:

Model/Part Number: 2175 / 2070B / 2071B

Model/Part Name: 2175 / 2070B / 2071B Antenna Mast with 2175 style motor base

Date of Declaration: 01 May, 2005

to which this declaration relates, meets the requirements and is in conformity with the relevant EC Directives listed below using the relevant section(s) of the following EC harmonized standards and other normative documents;

Applicable Directive(s):

Low Voltage Directive (LVD), 73/23/EEC and its amending directives

Electomagnetic Compatibility Directive (EMC), 2004/108/EC and its amending directives

Applicable harmonized standard(s) and/or normative document(s):

EN 55011: Electromagnetic emissions requirements for Industrial, Scientific and Medical (ISM) Equipment

EN 61000-4-11:1994 Electromagnetic compatibility Part 4, Testing and measurement techniques section 11: Voltage dips, short interruptions and voltage variations immunity tests

EN 61000-4-2:1995 Electromagnetic compatibility (EMC) -- Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test

EN 61000-4-3:1997 Electomagnetic compatibility for Electrical and Electronic Equipment, Part 3: Immunity to radiated, radio frequency, electromagnetic fields

EN 61000-4-4:1995 Electromagnetic compatibility for industrial process measurement and control equipment, Part 4: Elecrtrical fast transient/burst requirements

EN 61000-4-5:1995 Electomagnetic compatibility for electrical and electronic equipment, Part 5: Surge immunity requirements

EN 61010-1: Safety requirements for electrical equipment for measurement, control, and laboratory use

ENV 50204:1996 Radiated electromagnetic fields from digital radio telephones - Immunity test

Authorized Signatories:

ETS-Lindgren L.P.
Bryan Sayler, General Manager

ETS-Lindgren L.P.
James C. Psencik, Vice President of Engineering

The authorizing signatures on this Declaration of Conformity document authorizes ETS-Lindgren, L.P. to affix the CE mark to the indicated product. CE marks placed on these products will be distinct and visible. Other marks or inscriptions liable to be mistaken with the CE mark will not be affixed to these products.

ETS-Lindgren, L.P. has ensured that technical documentation shall remain available on premises for inspection and validation purposes for a period ending at least 10 years after the last product has been manufactured.

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Appendix C: Drawings

The following drawings are located in the pocket of the back cover of the manual:

114317: MODEL 2070B ANTENNA POSITIONING TOWER (2 PAGES)

114365: MODEL 2070B CARRIER ASSEMBLY (2 PAGES)

108983: MODEL 2070B CROSS BOOM

114671: MODEL 2071B ANTENNA POSITIONING TOWER (2 PAGES)

108803: MODEL 2071B BORE SITE CARRIER ASSEMBLY (4 PAGES)

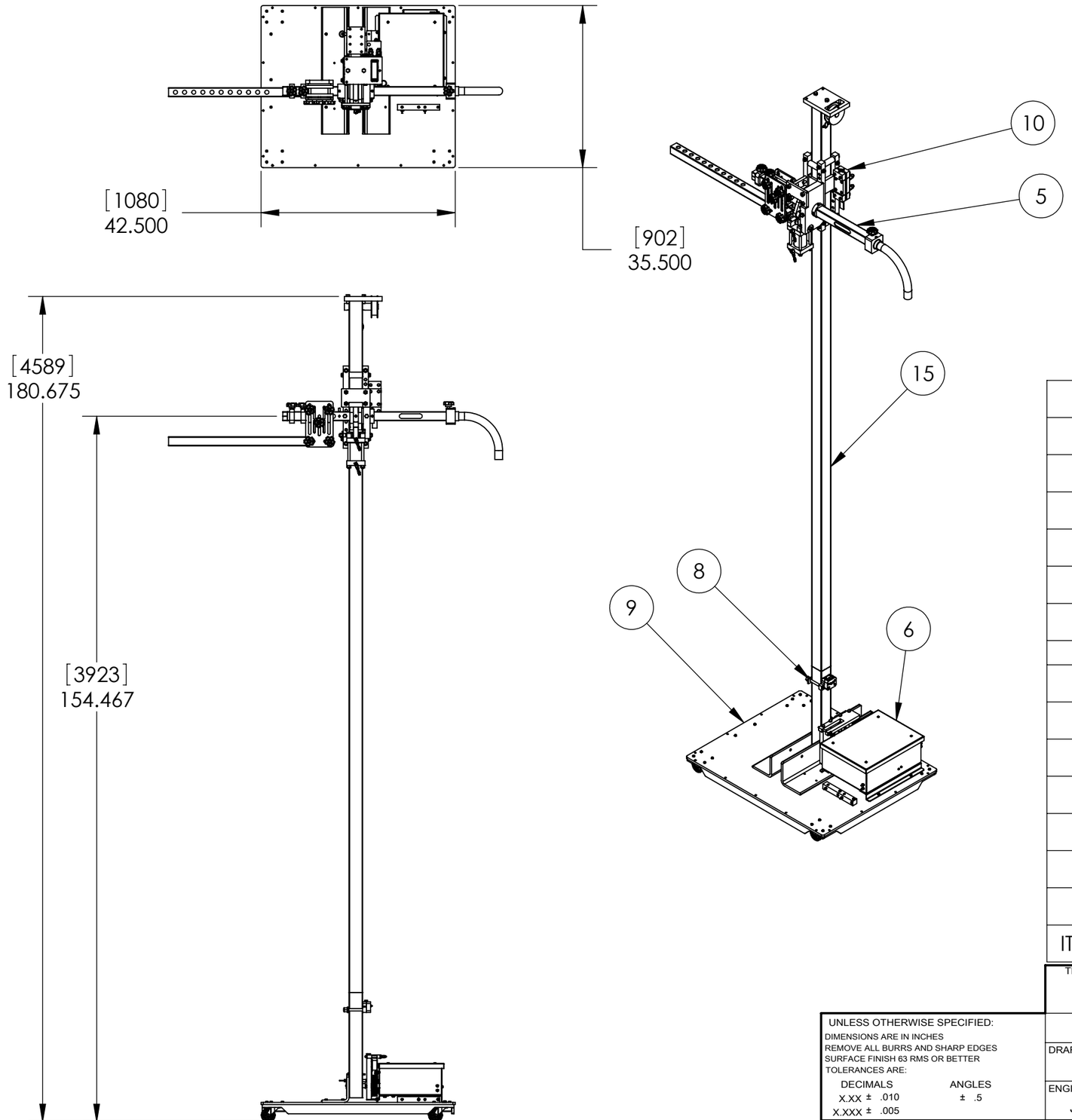
111580: MOTOR BASE (2 PAGES)

114260: LOWER LIMIT

114364: BASE (2 PAGES)

REF DRAWING

REVISIONS				
ECN	REV	DESCRIPTION	DATE	APPROVED
5711	A	RELEASE	XX/XX/XX	XXX
5734	B	4.6 MAST HEIGHT WAS 4.9	08/21/09	JSW
6131	C	RESTRUCTURE BOM	04/07/10	JSW



ITEM NO.	PART NUMBER	DESCRIPTION	Default/ QTY.
15	114368	MAST,4M,2070B,151.63"	1
14	708041	FIBER OPTIC CABLE LIMIT SWITCH 6.5M	1
13	920001	EPOXY KIT 2-PART RESIN T-88	.1
12	910641	SCREW,1/4-20 X 1/2,SLOT,FLAT,NYL	2
11	910579	BOLT,1/2-13 X 2.5",HEX,GF NYLON,BLACK	2
10	114365	CARRIER ASSY,PNEU,2070B	1
9	114364	BASE ASSY,2070B	1
8	114260	LIMIT,LOWER,2071B	1
7	111593	LIMIT,ASSEMBLED,2170	1
6	111580	MOTORBASE,2170,VARIABLE SPEED	1
5	108983	CROSS BOOM,ASSEMBLED	1
4	104165	PULLEY/BEARING ASSEMBLY BORE SITE	1
3	104047	BRACKET PULLEY TOWER	1
2	104046	SHAFT PULLEY TOWER	1
1	100715	MAST PIN	1

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
REMOVE ALL BURRS AND SHARP EDGES
SURFACE FINISH 63 RMS OR BETTER
TOLERANCES ARE:

DECIMALS	ANGLES
X.XX ± .010	± .5
X.XXX ± .005	

FINISH: NONE

	INITIAL	DATE
DRAFTING		
ENGINEERING	JSW	07/07/09

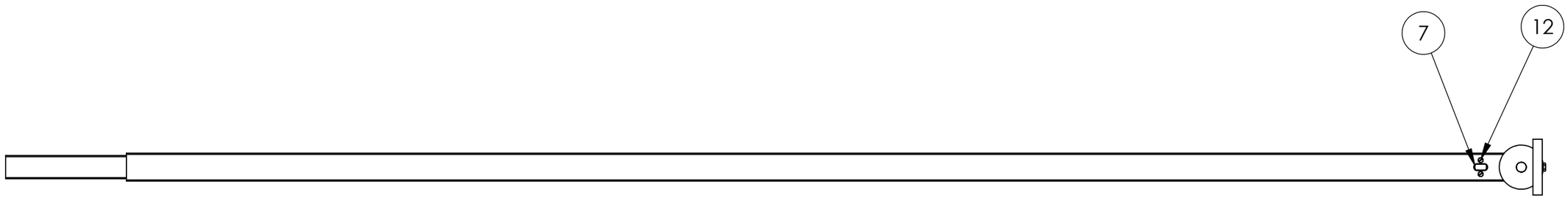
ETS•LINDGREN™
An ESCO Technologies Company

TITLE
TOWER,4M,PNEU POL,VAR SPEED

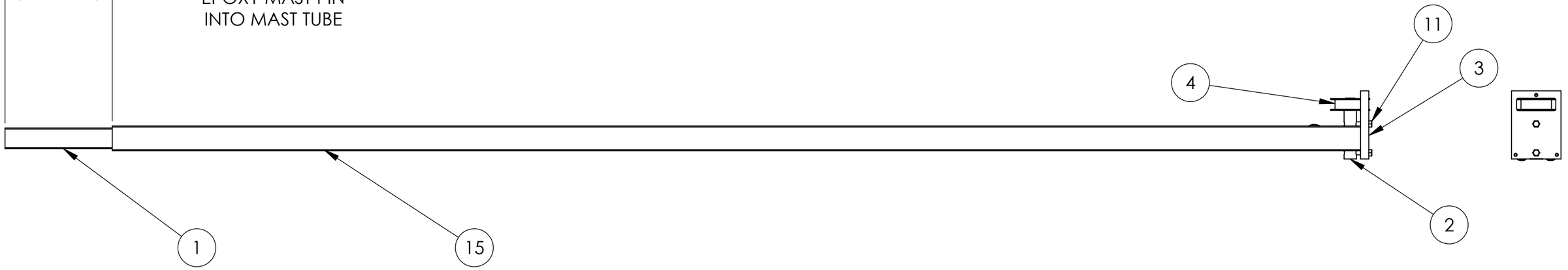
SIZE	SCALE	DWG. NO.	REV.
B	NONE	114317	C

DO NOT SCALE DRAWING

REF DRAWING



13.00
EPOXY MAST PIN
INTO MAST TUBE



THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
REMOVE ALL BURRS AND SHARP EDGES
SURFACE FINISH 63 RMS OR BETTER
TOLERANCES ARE:

DECIMALS	ANGLES
X.XX ± .010	± .5
X.XXX ± .005	

FINISH: NONE

	INITIAL	DATE
DRAFTING		
ENGINEERING	JSW	07/07/09

ETS•LINDGREN™
An ESCO Technologies Company

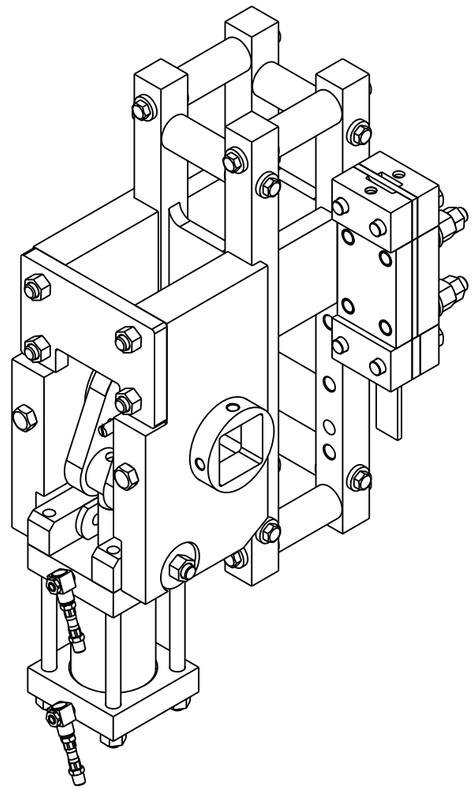
TITLE
TOWER,4M,PNEU POL,VAR SPEED

SIZE	SCALE	DWG. NO.	REV.
B	NONE	114317	C

DO NOT SCALE DRAWING | SHEET 2 OF 2

REF DRAWING

REVISIONS				
ECN	REV	DESCRIPTION	DATE	APPROVED
5711	A	RELEASE	XX/XX/XX	XXX



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
40	910827	NUT,1/2-13,HEX,FG,BROWN	4
39	910624	SET SCREW,SLTD NYLON, 3/8-16 X 3/4" FLAT	5
38	910591	BOLT,1/2-13 X 1.5",HEX,GF NYLON,BLACK	2
37	910584	NUT,1/2-13,HEX,GF NYLON,BLK	10
36	910582	BOLT,1/2-13 X 2.0",HEX,GF NYLON,BLACK	2
35	910579	BOLT,1/2-13 X 2.5",HEX,GF NYLON,BLACK	8
34	910577	BOLT,3/8-16 X 1.0",HEX,GF NYLON,BLACK	16
33	890477	BUSHING FLAT RUBBER	16
32	890469	HOSE COILED SINGLE 1" 1/4x1/8x30Ft A6460	2
31	890468	CONNECTOR MALE 28-4-2 PARKER	4
30	890464	NUT TUBE 5000-2 CLIPPARD	4
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
29	880393	BELT,TIMING,T10,25MM,ESD	30
28	105948-2	END PLATE ROTATING BOOM	1
27	105948-1	END PLATE ROTATING BOOM	1
26	105947	SPACER SLEEVE ROTATING BOOM 2070	1
25	105946	LONG STUDS 7.50" ROTATING BOOM	4
24	105945	DOWEL PIN .375 X 2.0 PHEN	2
23	105944	CYLINDER ROD PIN ROTATING BOOM	1
22	105943	CYLINDER ROD SLEEVE	1
24	105942	BRACKET PLATE ROTATING BOOM 2070	1
20	105937	ARM PIVOT ROTATING BOOM 2070	2
19	105935	BEARING SLEEVE ROTATING BOOM 2070	2
18	105934	DOWEL PIN .50 X 2.0 PHEN	2
17	105827	LOWER CLAMP PLATE TOWER BELT CLAMP	1
16	105826	LOWER TOOTH PLATE TOWER BELT CLAMP	1
15	105825	LOWER THRU PLATE TOWER BELT CLAMP	1
14	105824	UPPER THRU PLATE TOWER BELT CLAMP	1
13	105823	UPPER MIDDLE CLAMP PLATE TOWER BELT CLAM	1
12	105822	UPPER TOOTH PLATE TOWER BELT CLAMP	1
11	104160	STUD 2.375 BORE SIGHT	3
10	104135	WASHER SHOULDER BORE SIGHT	2
9	104036	BLOCK SQUARING ANT CARRIER III]	2
8	104034	STUD 3.625 ANT CARRIER III	4
7	104027	CLAMP 2 ANT CARRIER III	1
6	104022	ROLLER ANT CARRIER III	8
5	104020	AXLE 2 ANT CARRIER III	8
4	104011	CLAMP 3 ANT CARRIER III	1
3	104010	CLAMP 1 ANT CARRIER III	1
2	104007	PLATE CORNER ANT CARRIER III	2
18	103794	AIR CYLINDER ASSY III	1
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.

THIRD ANGLE PROJECTION

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UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
REMOVE ALL BURRS AND SHARP EDGES
SURFACE FINISH 63 RMS OR BETTER
TOLERANCES ARE:

DECIMALS	ANGLES
X.XX ± .010	± .5
X.XXX ± .005	

FINISH: NONE

	INITIAL	DATE
DRAFTING		
ENGINEERING	JSW	07/14/09

TITLE

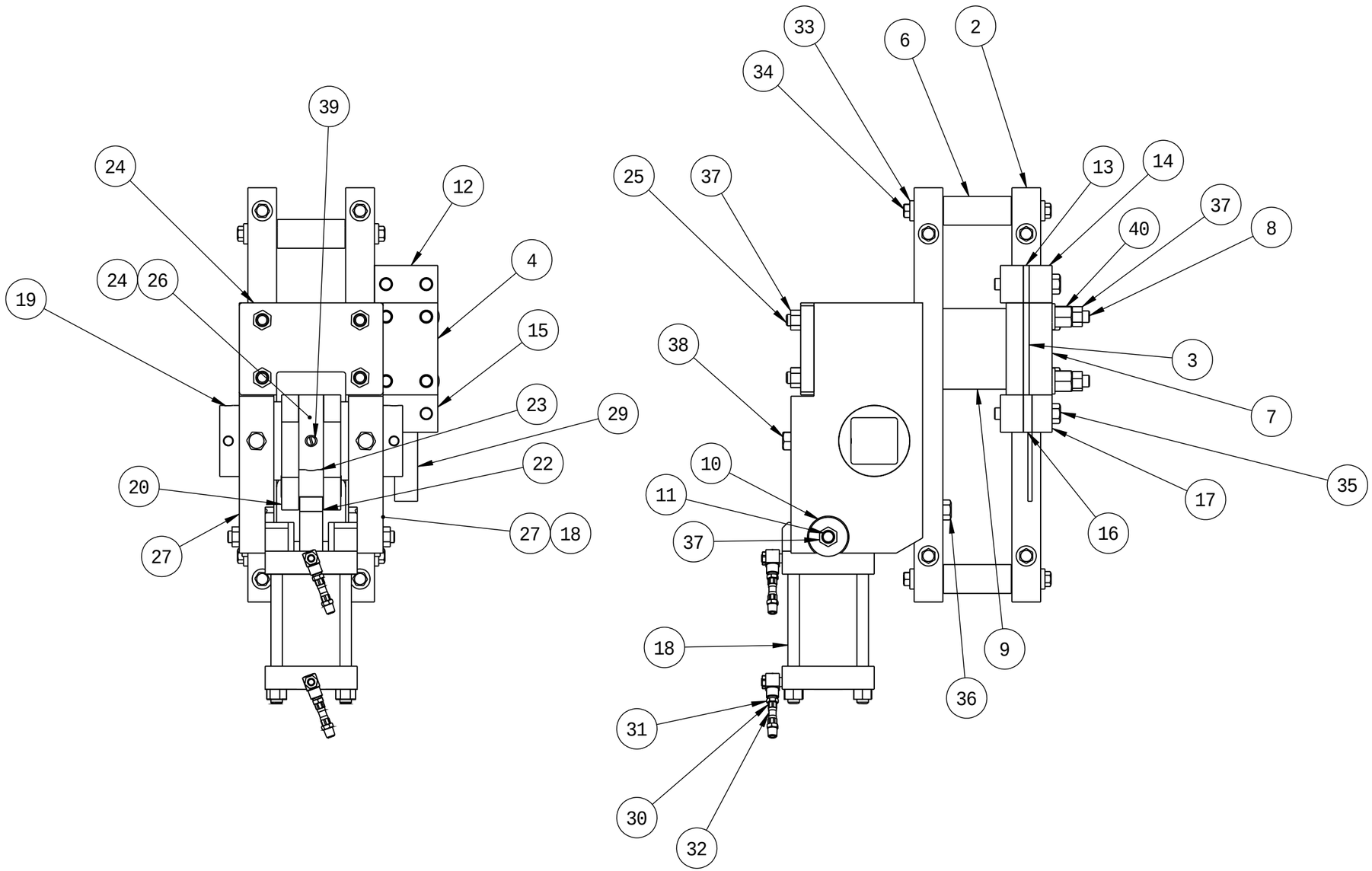
CARRIER ASSY,PNEU,2070B

SIZE	SCALE	DWG. NO.	REV.
B	NONE	114365	A

DO NOT SCALE DRAWING

SHEET 1 OF 2

REF DRAWING



THIRD ANGLE PROJECTION

ETS•LINDGREN™
An ESCO Technologies Company

UNLESS OTHERWISE SPECIFIED:	INITIAL	DATE
DIMENSIONS ARE IN INCHES REMOVE ALL BURRS AND SHARP EDGES SURFACE FINISH 63 RMS OR BETTER TOLERANCES ARE: DECIMALS: X.XX ± .010, X.XXX ± .005 ANGLES: ± .5	DRAFTING	
	ENGINEERING: JSW	07/14/09
FINISH: NONE		

TITLE

CARRIER ASSY,PNEU,2070B

SIZE	SCALE	DWG. NO.	REV.
B	NONE	114365	A

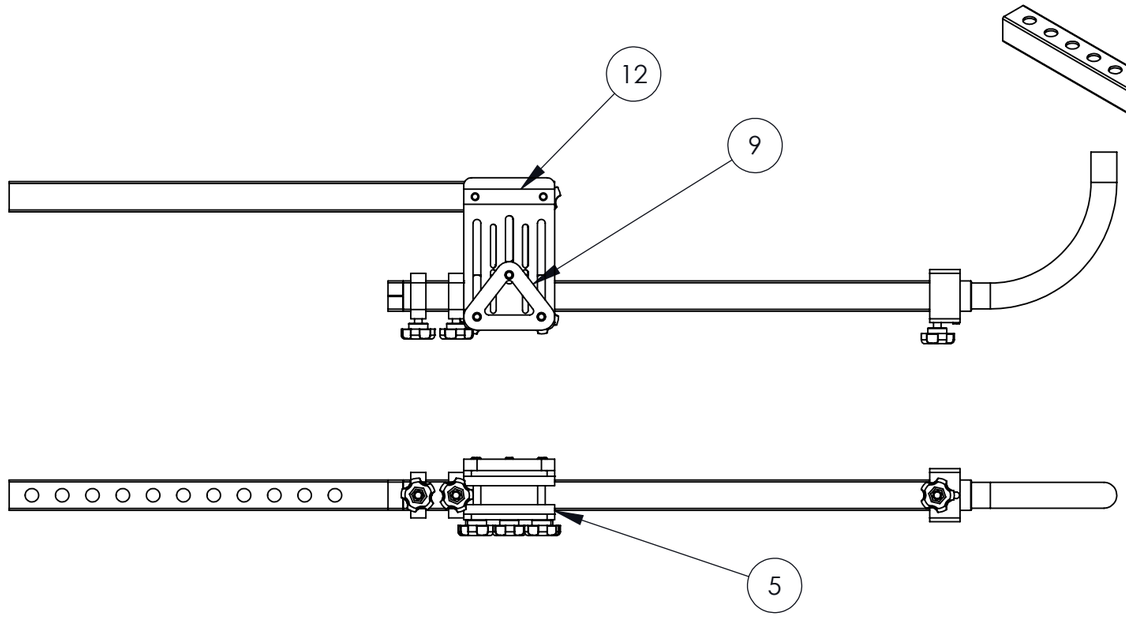
DO NOT SCALE DRAWING

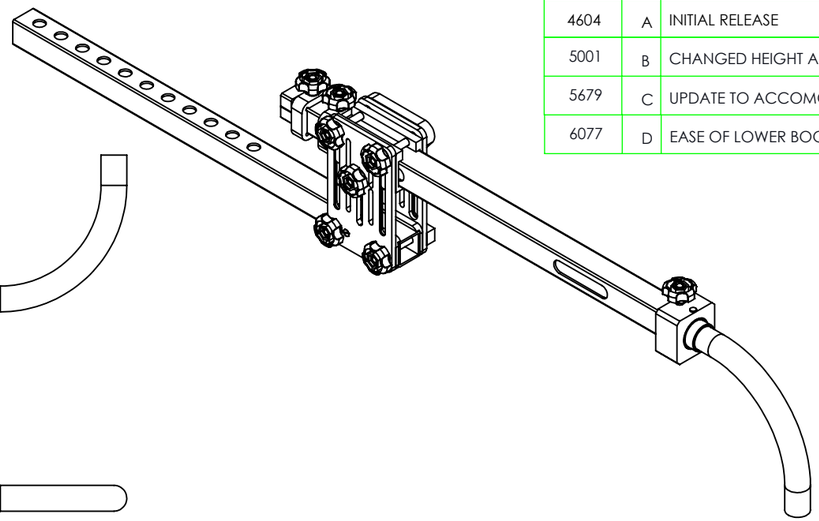
SHEET 2 OF 2

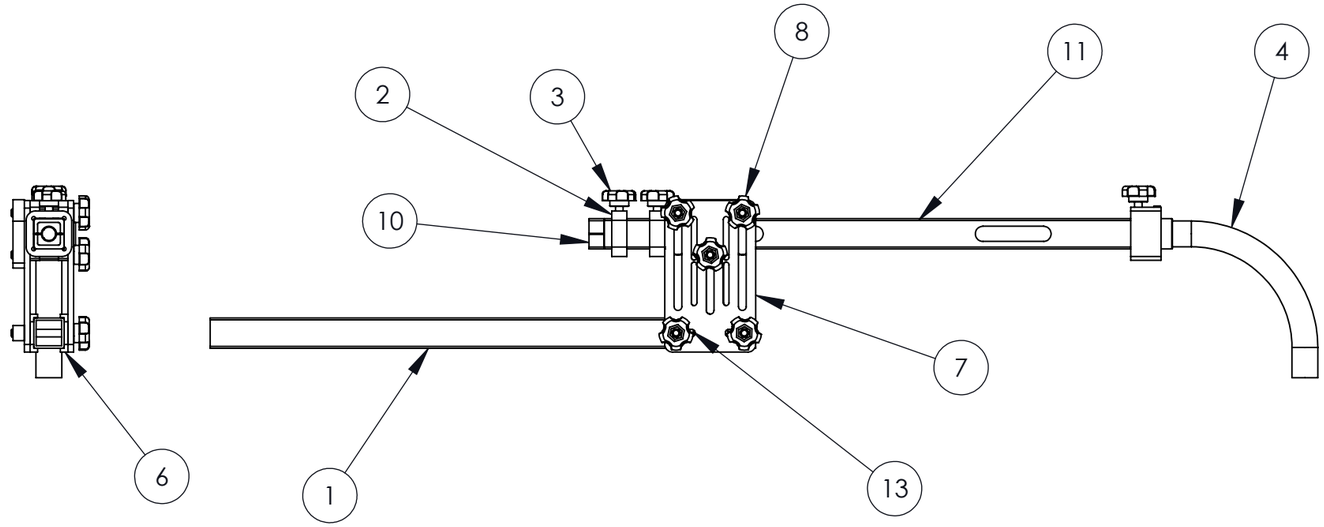
REF DRAWING

NOTES:

REVISIONS				
ECO#	REV	DESCRIPTION	DATE	APPROVED
4604	A	INITIAL RELEASE	03/14/05	SRK
5001	B	CHANGED HEIGHT ADJUSTMENT		SRK
5679	C	UPDATE TO ACCOMODATE 3142	05/05/09	JSW
6077	D	EASE OF LOWER BOOM REMOVAL	01/08/10	JSW







ITEM NO.	PART NUMBER	DESCRIPTION	108983/QTY.
13	910641	SCREW,1/4-20 X 1/2,SLOT,FLAT,NYL	4
12	114756	NUT PLATE,SLIDER,LOWER	1
11	113525	TUBE,BOOM,2170	1
10	113493	ASSY,BUSHING,6.0" STINGER	1
9	110222	NUT PLATE,SLIDER,2175	1
8	110221	KNOB,1/2-13 X 4.12,GLUED	5
7	110220	PLATE,OFFSET,2175	2
6	110219	BRACKET,FIXED,OFFSET,2175	2
5	110218	BRACKET,SLIDER,OFFSET,2175	2
4	109275	GUIDE,CONDUIT SWEEP	1
3	109034	KNOB,1/2-13 X 1.1,GLUED	2
2	108990	CLAMP,STINGER	2
1	108810	BOOM,ANTENNA,2175	1

ETS · LINDGREN ™

EMC Test Systems, L.P.
Cedar Park, TX

An ESCO Technologies Company

Lindgren-RF Enclosures
Glendale Hts, IL

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
DECIMALS: X.XX± .015, X.XXX± .005
ANGLES: ± .5

APPROVALS	DATE
DRAWN SRK	09/15/05
CHECKED RG	02/04/05

FINISH: NONE

MATERIAL: SEE BOM

TITLE: CROSS BOOM,ASSEMBLED

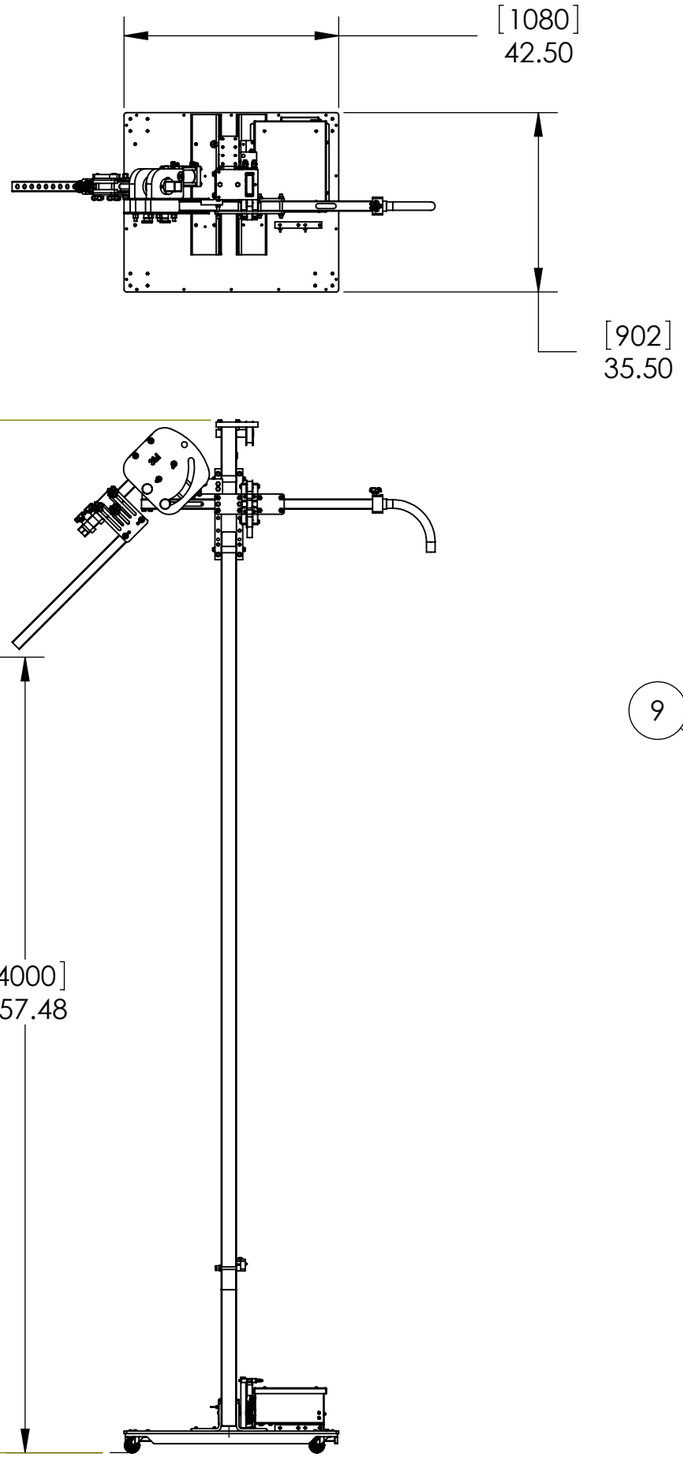
SIZE	SCALE	DWG. NO.	REV.
B	1:10	108983	D

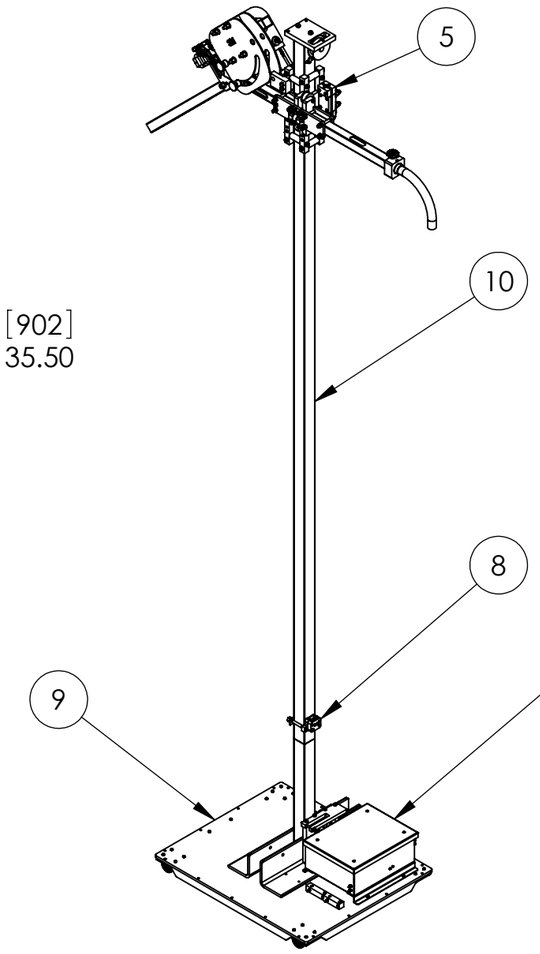
DO NOT SCALE DRAWING

SHEET 1 OF 1

REF DRAWING

REVISIONS				
ECN	REV	DESCRIPTION	DATE	APPROVED
6054	A	INITIAL BUILD	11/19/09	JSW
6131	B	RESTRUCTURE BOM	04/08/10	JSW





ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
14	880132C	BELT,TIMING,T10,25MM X 50' OPEN	1
13	920001	EPOXY KIT 2-PART RESIN T-88	1
12	910641	SCREW,1/4-20 X 1/2,SLOT,FLAT,NYL	2
11	910579	BOLT,1/2-13 X 2.5",HEX,GF NYLON,BLACK	2
10	114674	MAST,4M,2071B,171.00"	1
9	114364	BASE ASSY,2070B	1
8	114260	LIMIT,LOWER,2071B	1
7	111593	LIMIT,ASSEMBLED,2170	1
6	111580	MOTORBASE,2170,VARIABLE SPEED	1
5	108803	CARRIER ASSY,BORE SITE,4M	1
4	104165	PULLEY/BEARING ASSEMBLY BORE SITE	1
3	104047	BRACKET PULLEY TOWER	1
2	104046	SHAFT PULLEY TOWER	1
1	100715	MAST PIN	1

THIRD ANGLE PROJECTION

ETS•LINDGREN™
An ESCO Technologies Company

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
REMOVE ALL BURRS AND SHARP EDGES
SURFACE FINISH 63 RMS OR BETTER
TOLERANCES ARE:

DECIMALS	ANGLES
X.XX ± .010	± .5
X.XXX ± .005	

FINISH: NONE

	INITIAL	DATE
DRAFTING		
ENGINEERING	JSW	07/07/09

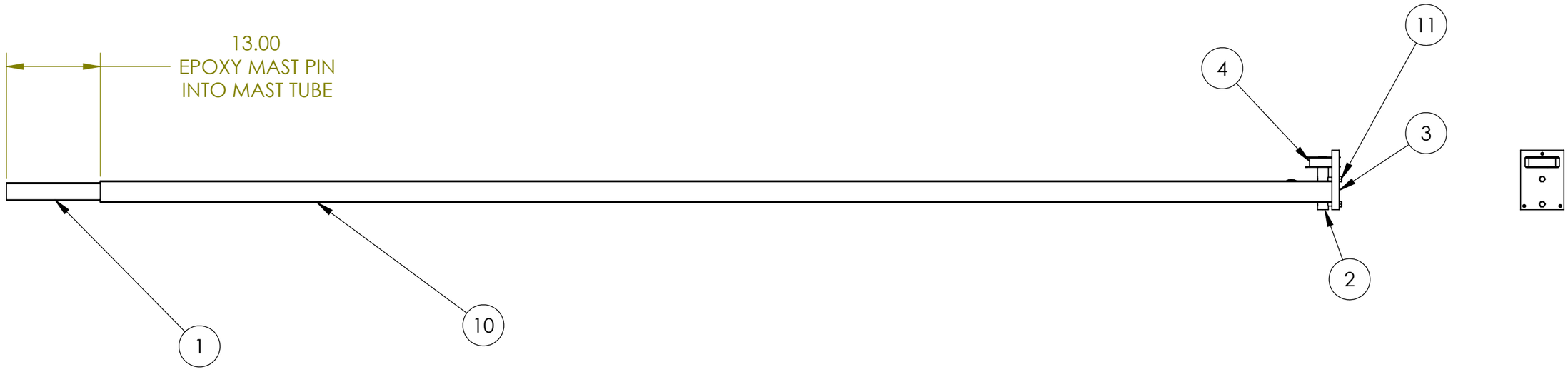
TITLE
TOWER,BORESITE,4M,PNEU POL,VAR SPEED

SIZE	SCALE	DWG. NO.	REV.
B	NONE	114671	B

DO NOT SCALE DRAWING

SHEET 1 OF 2

REF DRAWING



UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES REMOVE ALL BURRS AND SHARP EDGES SURFACE FINISH 63 RMS OR BETTER TOLERANCES ARE: DECIMALS X.XX ± .010 X.XXX ± .005 ANGLES ± .5	INITIAL / DATE	THIRD ANGLE PROJECTION
	DRAFTING	
	ENGINEERING JSW	07/07/09
FINISH NONE		

ETS•LINDGREN™
An ESCO Technologies Company

TITLE

TOWER,BORESITE,4M,PNEU POL,VAR SPEED

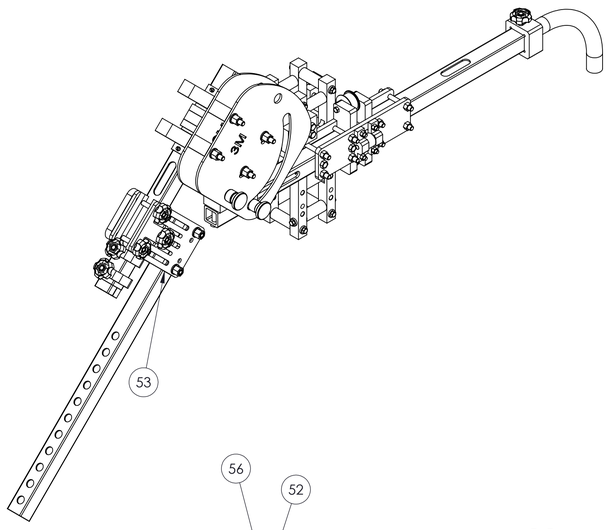
SIZE	SCALE	DWG. NO.	REV.
B	NONE	114671	B

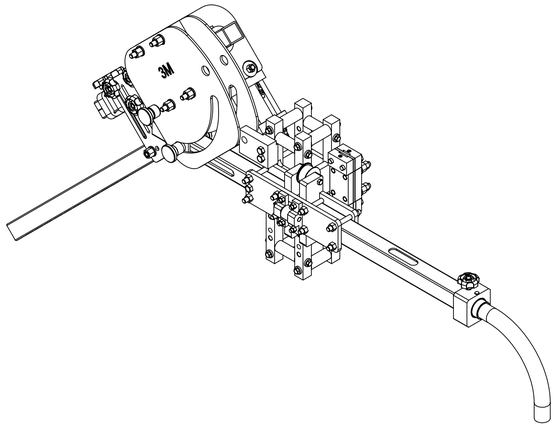
DO NOT SCALE DRAWING

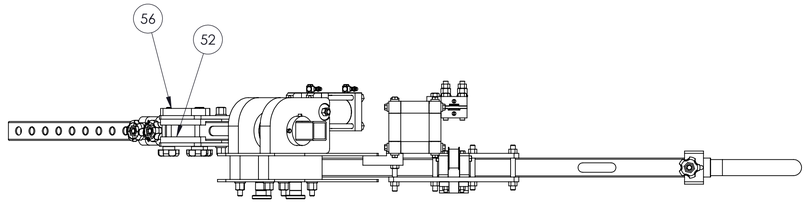
SHEET 2 OF 2

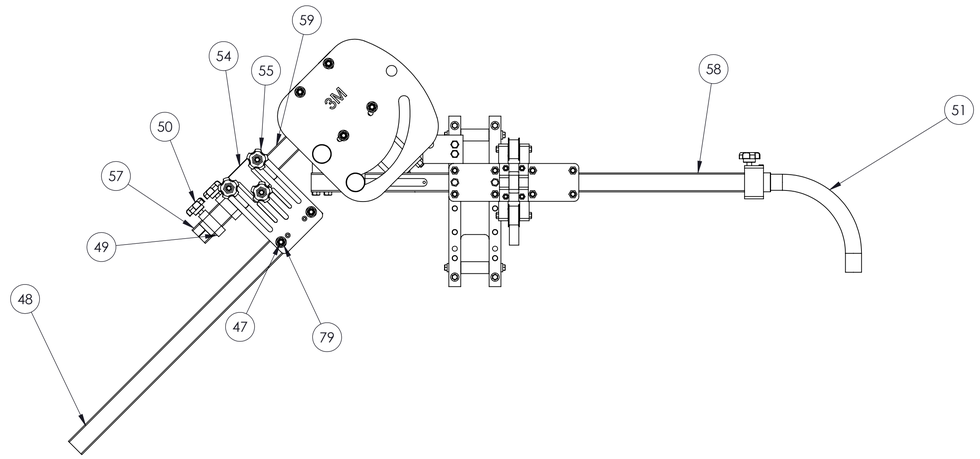
REF DRAWING

REVISIONS				
ECN	REV	DESCRIPTION	DATE	APPROVED
6054	D	CNG TO 2175 STYLE BOOM	11/16/09	JSW









PART NUMBER	ITEM NO.	DESCRIPTION	QTY.
AP164-57	85	BRACKET,CAM LOCK,2071 BORE SITE TOWER,4M	1
AP164-56	84	STUD,2071 BORE SITE TOWER,4M	4
AP164-53	83	BOOM 2,2071 BORE SITE TOWER,4M	1
AP164-51	82	SPACER,CAM,2071 BORE SITE TOWER,4M	2
AP164-21	81	ROLLER,.665	1
AP164-20	80	KNOB,1/2-13 X 2.27	1
910827	79	NUT,1/2-13,HEX,FG,BROWN	12
910717	78	SET SCREW,SLTD NYLON, 3/8-16 X 3/4" FLAT	5
910624	77	SET SCREW,SLTD NYLON, 3/8-16 X 1 1/2" FLAT	4
910589	76	BOLT,1/2-13 X 3.0",HEX,GF NYLON,BLACK	2
910584	75	NUT,1/2-13,HEX,GF NYLON,BLK	18
910583	74	NUT,3/8-16,HEX,GF NYLON,BLK	4
910582	73	BOLT,1/2-13 X 2.0",HEX,GF NYLON,BLACK	2
910581	72	BOLT,3/8-16 X 1-1/4",HEX,GF NYLON,BLACK	4
910580	71	BOLT,3/8-16 X 1-1/2",HEX,GF NYLON,BLACK	4
910579	70	BOLT,1/2-13 X 2.5",HEX,GF NYLON,BLACK	8
910577	69	BOLT,3/8-16 X 1.0",HEX,GF NYLON,BLACK	16
890478	68	SPRG URETHANE COMPR	2
890477	67	BUSHING FLAT RUBBER	16
890469	66	HOSE COILED SINGLE 1" 1/4x1/8x30Ft A6460	2
890468	65	CONNECTOR MALE 28-4-2 PARKER	4
890464	64	NUT TUBE 5000-2 CLIPPARD	4
880393	63	BELT,TIMING,T10,25MM,ESD	1
880146	62	BEARING,.625 X 1.0625 X .281	4
880131	61	BEARING,1.312 X 1.750 X .281	2
114684	60	CAM,TRACER,2071B,3M	2
114676	59	BOOM,ANTENNA ROTATE,2071B	1
114675	58	BOOM,CABLE MANAGEMENT,2071B	1
113493	57	ASSY,BUSHING,6.0" STINGER	1
110222	56	NUT PLATE,SLIDER,2175	1
110221	55	KNOB,1/2-13 X 4.12,GLUED	3
110220	54	PLATE,OFFSET,2175	2
110219	53	BRACKET,FIXED,OFFSET,2175	2
110218	52	BRACKET,SLIDER,OFFSET,2175	2
109275	51	GUIDE,CONDUIT SWEEP	1
109034	50	KNOB,1/2-13 X 1.1,GLUED	2
108990	49	CLAMP,STINGER	2
108810	48	BOOM,ANTENNA,2175	1
108374	47	STUD,1/2-13 X 5.00,FG	2
106319-2	46	PLATE VERT PIVOT RIGHT	1
106319-1	45	PLATE VERT PIVOT LEFT	1
106156	44	DOWEL PIN .50" X 1.98" PHEN	2
106155	43	CAP SCREW MODIFIED	2
106154	42	STUD 5.75" BORESIGHT	4
105947	41	SPACER SLEEVE ROTATING BOOM 2070	1
105945	40	DOWEL PIN .375 X 2.0 PHEN	2
105944	39	CYLINDER ROD PIN ROTATING BOOM	1
105937	38	ARM PIVOT ROTATING BOOM 2070	2
105935	37	BEARING SLEEVE ROTATING BOOM 2070	2
105827	36	LOWER CLAMP PLATE TOWER BELT CLAMP	1
105826	35	LOWER TOOTH PLATE TOWER BELT CLAMP	1
105825	34	LOWER THRU PLATE TOWER BELT CLAMP	1
105824	33	UPPER THRU PLATE TOWER BELT CLAMP	1
105823	32	UPPER MIDDLE CLAMP PLATE TOWER BELT CLAM	1
105822	31	UPPER TOOTH PLATE TOWER BELT CLAMP	1
105724	30	DOWEL PIN PHENOLIC .25 X 1.37	1
104164	29	STUD 1/2-13 BORE SIGHT	2
104160	28	STUD 2.375 BORE SIGHT	3
104153	27	BORE BRACKET 2 BORE SIGHT	1
104145	26	BORE BRACKET 1 BORE SIGHT	1
104142	25	KNOB 1/2-13 BORE SIGHT	3
104141	24	ROLLER BORE SIGHT	1
104140	23	SPACER BORE SIGHT	2
104135	22	WASHER SHOULDER BORE SIGHT	2
104036	21	BLOCK SQUARING ANT CARRIER IIII	2
104034	20	STUD 3.625 ANT CARRIER III	4
104033	19	STUD 2.250 BORE-SIGHT	4
104032	18	STUD 4.75" BORESIGHT	4
104030	17	PULLEY ASSY BORE-SIGHT	1
104028	16	SHAFT THREADED ANT CARRIER III	1
104027	15	CLAMP 2 ANT CARRIER III	1
104024	14	PLATE PINCH BORE-SIGHT	2
104023	13	ROLLER PINCH BORE-SIGHT	1
104022	12	ROLLER ANT CARRIER III	8
104020	11	AXLE 2 ANT CARRIER III	8
104016	10	IDLER	2
104015	9	PLATE HOUSING BORE-SIGHT	2
104013	8	WASHER THRUST BORE-SIGHT	4
104012	7	AXLE 1 BORE-SIGHT	2
104011	6	CLAMP 3 ANT CARRIER III	1
104010	5	CLAMP 1 ANT CARRIER III	1
104008-2	4	PLATE BOOM ANT CARRIER III	1
104008-1	3	PLATE BOOM ANT CARRIER III	1
104007	2	PLATE CORNER ANT CARRIER III	2
103794	1	AIR CYLINDER ASSY III	1
PART NUMBER	ITEM NO.	DESCRIPTION	QTY.

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
REMOVE ALL BURRS AND SHARP EDGES
SURFACE FINISH 63 RMS OR BETTER
TOLERANCES ARE:

DECIMALS	ANGLES
X.XX ± .015	± .5
X.XXX ± .005	

FINISH: NONE

	INITIAL	DATE
DRAFTING		
ENGINEERING	JSW	11/12/09

ETS•LINDGREN™
An ESCO Technologies Company

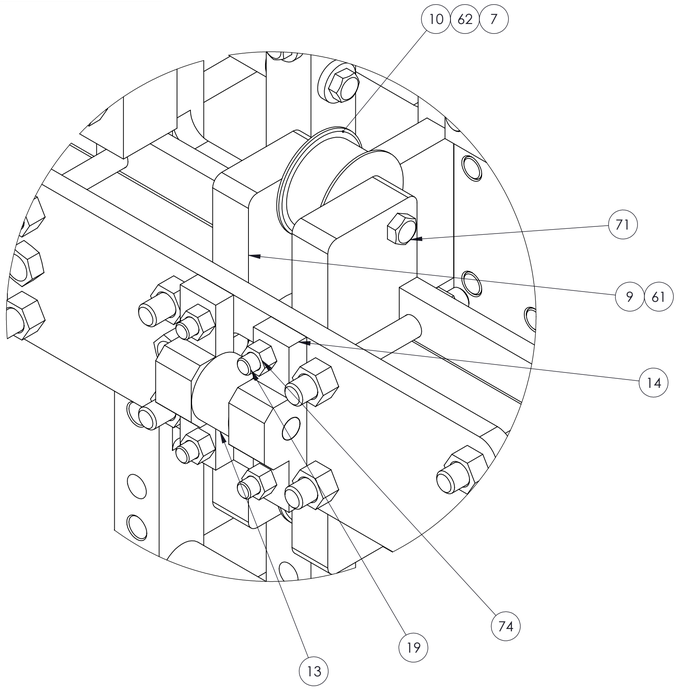
TITLE
CARRIER ASSY,BORE SITE,4M

SIZE	SCALE	DWG. NO.	REV.
D	1:8	108803	D

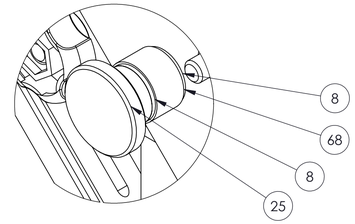
DO NOT SCALE DRAWING

SHEET 1 OF 4

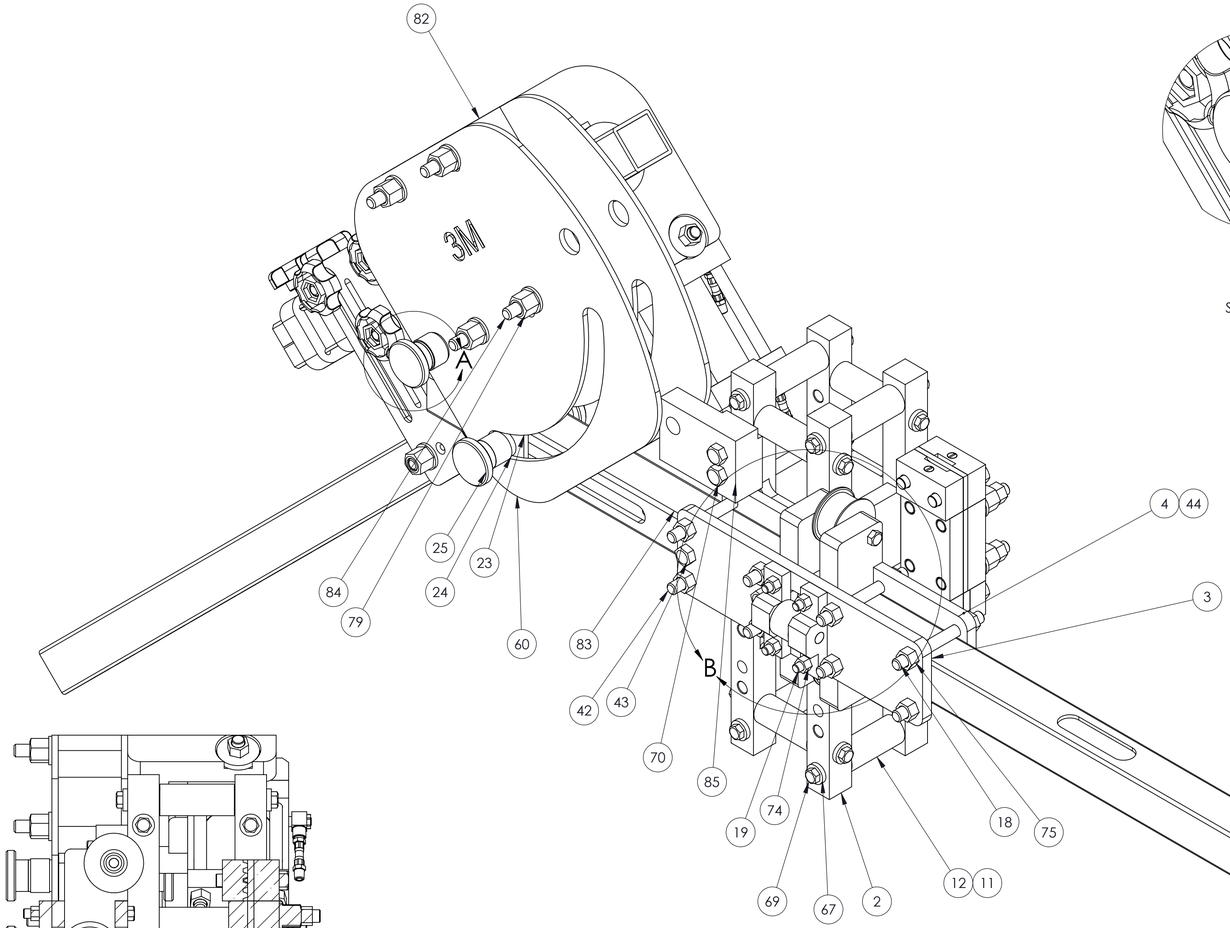
REF DRAWING

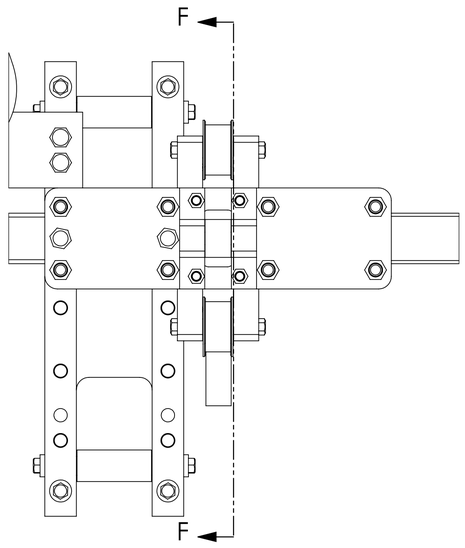


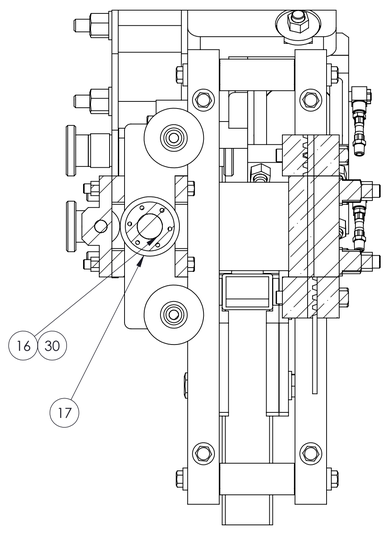
DETAIL B
SCALE 2 : 3



DETAIL A
SCALE 2 : 3







SECTION F-F

THIRD ANGLE PROJECTION

ETS•LINDGREN™
An ESCO Technologies Company

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
REMOVE ALL BURRS AND SHARP EDGES
SURFACE FINISH 63 RMS OR BETTER
TOLERANCES ARE:
DECIMALS ANGLES
X.XX ± .015 ± .5
X.XXX ± .005

FINISH: NONE

	INITIAL	DATE
DRAFTING		
ENGINEERING	JSW	11/12/09

TITLE

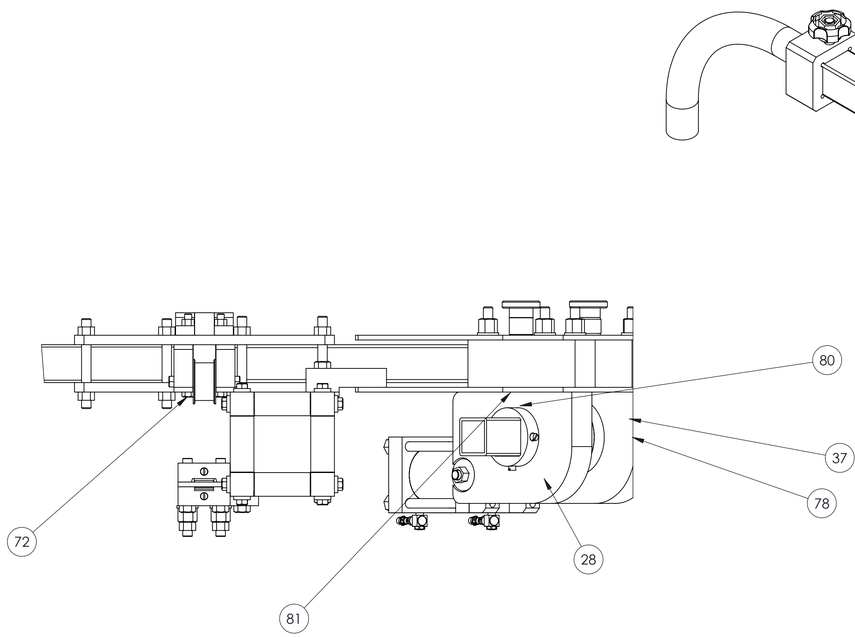
CARRIER ASSY,BORE SITE,4M

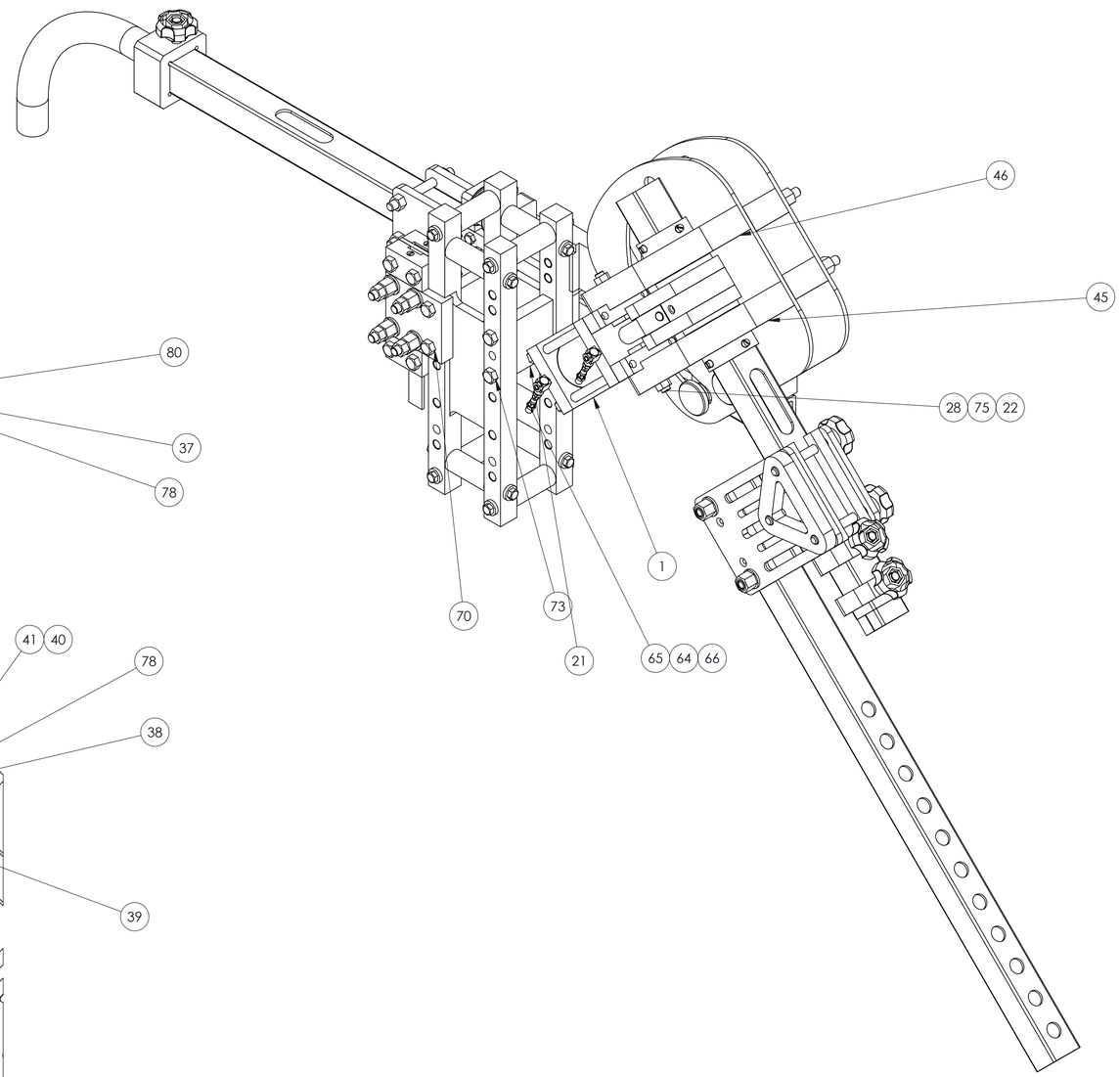
SIZE	SCALE	DWG. NO.	REV.
D	1:3	108803	D

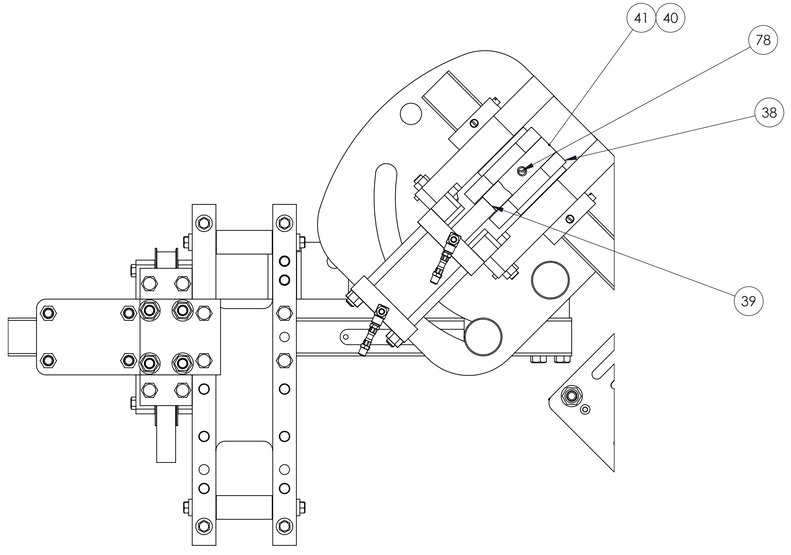
DO NOT SCALE DRAWING

SHEET 2 OF 4

REF DRAWING







THIRD ANGLE PROJECTION

ETS• LINDGREN™
An ESCO Technologies Company

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
REMOVE ALL BURRS AND SHARP EDGES
SURFACE FINISH 63 RMS OR BETTER
TOLERANCES ARE:

DECIMALS	ANGLES
X.XX ± .015	± .5
X.XXX ± .005	

FINISH: NONE

	INITIAL	DATE
DRAFTING		
ENGINEERING	JSW	11/12/09

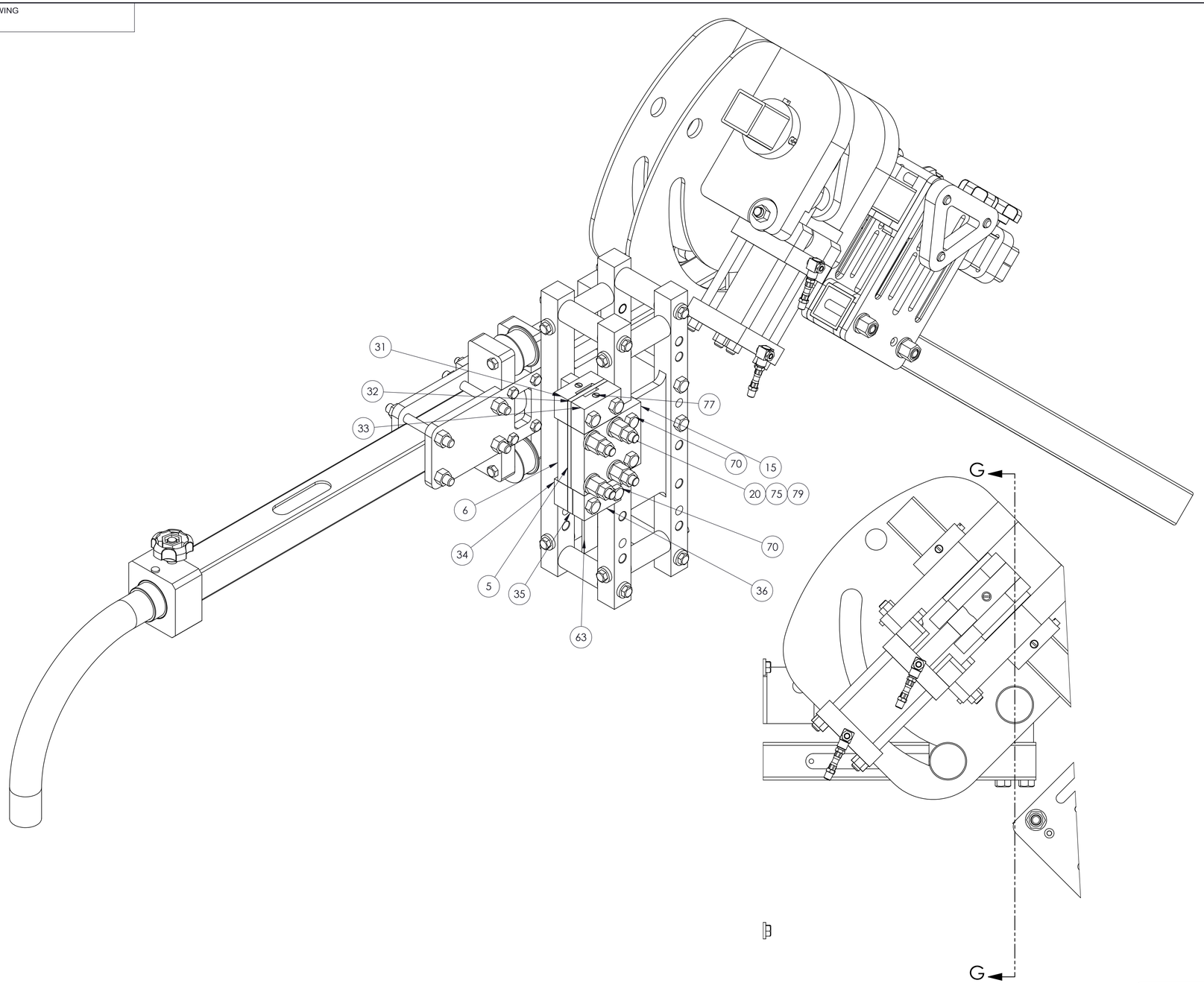
TITLE: CARRIER ASSY,BORE SITE,4M

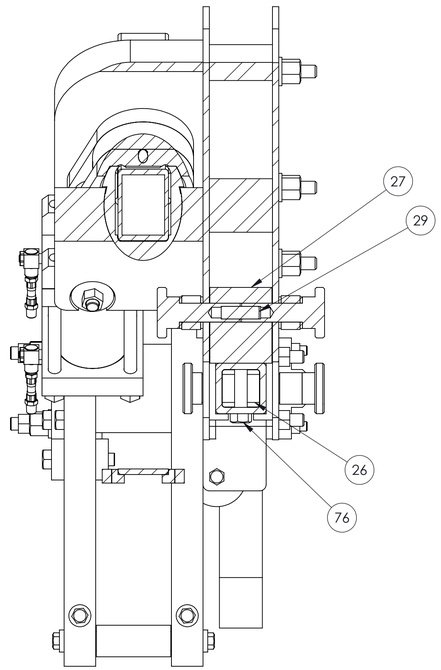
SIZE	SCALE	DWG. NO.	REV.
D	1:4	108803	D

DO NOT SCALE DRAWING

SHEET 3 OF 4

REF DRAWING





SECTION G-G

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
REMOVE ALL BURRS AND SHARP EDGES
SURFACE FINISH 63 RMS OR BETTER
TOLERANCES ARE:
DECIMALS: X.XX ± .015, X.XXX ± .005
ANGLES: ± .5

FINISH: NONE

	INITIAL	DATE
DRAFTING		
ENGINEERING	JSW	11/12/09

ETS•LINDGREN™
An ESCO Technologies Company

TITLE
CARRIER ASSY,BORE SITE,4M

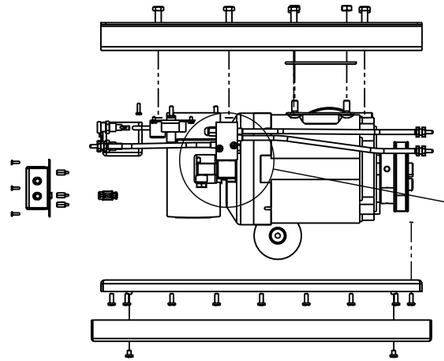
SIZE	SCALE	DWG. NO.	REV.
D	1:3	108803	D

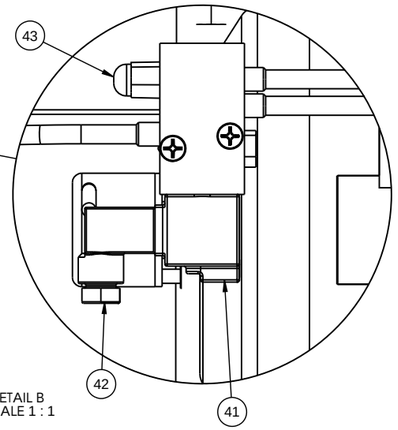
DO NOT SCALE DRAWING

SHEET 4 OF 4

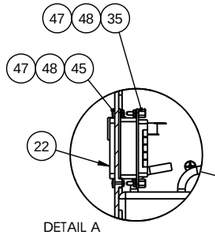
REF DRAWING

REVISIONS				
ECN	REV	DESCRIPTION	DATE	APPROVED
5721	A	RELEASE	07/27/09	JSW
5738	B	ADD OMITTED COMPONENTS	08/24/09	JSW

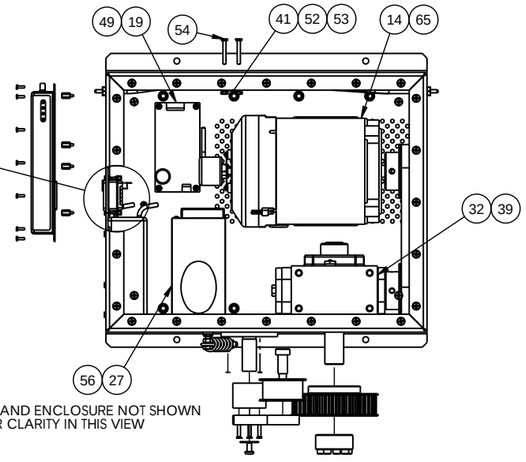




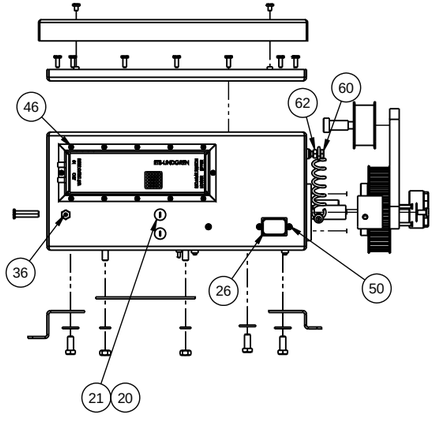
DETAIL B
SCALE 1 : 1

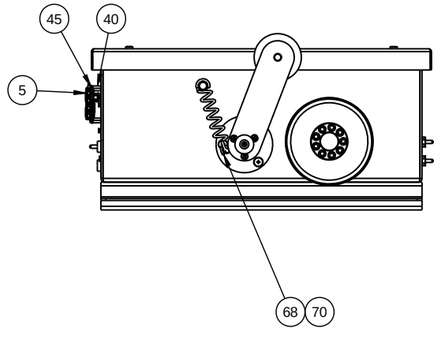


DETAIL A
SCALE 1 : 2

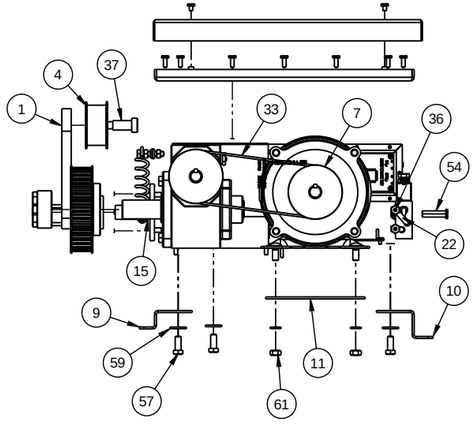


LID AND ENCLOSURE NOT SHOWN
FOR CLARITY IN THIS VIEW





ENCLOSURE NOT SHOWN FOR
CLARITY IN THIS VIEW



ITEM NO.	PART NUMBER	DESCRIPTION	111580/QTY
70	930681	NUT,M6,HEX,SS	1
69	930632	SCREW,M6 X 16MM,PHIL,FLAT,SS	3
68	930621	SCREW,M6 X 12MM,PHIL,PAN,SS	2
67	930452	SCREW,M4 X 20MM,PHIL,FLAT,SS	3
66	920319	LABEL, MOTORBASE CONTROLLER INTERFACE	1
65	910976	SCREW,5/16-18 X 3/4,CARRIAGE,GR5,ZN	4
64	910974	WASHER,1/4,FENDER,1" O.D.	1
63	910697	SCREW,1/4-20 X 1/2,PHIL,BIND,SS	1
62	910664	NUT,1/4-20,HEX,SS	2
61	910540	NUT,5/16-18,GR5,ZN	4
60	910449	BOLT,1/4-20 X 1-1/4,HEX,SS	1
59	910395	WASHER,5/16,FLAT,STL,ZN	10
58	910393	WASHER,5/16,LOCK,STL,ZN,SPLIT	4
57	910386	BOLT,5/16-18 X 3/4,HEX,GR5,ZN	10
56	910331	SCREW,10-32 X 1/2,PHIL,BIND,SS	26
55	910316	SCREW,10-32 X 1/4,PHIL,BIND,SS	4
54	910277	SCREW,8-32 X1-1/4,PHIL,BIND,SS	2
53	910269	NUT,8-32,HEX,SS	2
52	910228	WASHER,#8,LOCK,SS,SPLIT	2
51	910188	SCREW,6-32 X 1/2,PHIL,BIND,SS	1
50	910179	SCREW,6-32 X 3/8,PHIL,BIND,SS	3
49	910170	SCREW 6-32 X 1/4,PHIL,BIND,SS	4
48	910148	WASHER,#4,LOCK,SS,SPLIT	4
47	910147	NUT,4-40,HEX,SS,SMALL PATT.	4
46	910116	SCREW,4-40 X 3/8,PHIL,BIND,SS	12
45	910111	SCREW,4-40 X 1/4,PHIL,BIND,SS	8
44	910049	NUT,1/4-20,HEX,SS,NYLOK	1
43	905097	SILENCER HS32400-2000	1
42	905096	VALVE CONNECTOR H894101-2202	1
41	905095	VALVE 840 P26641-4 REXROTH	1
40	890984	STANDOFF,M/F,HEX,7/16L,4-40,ALUM	6
39	890741	BREATHER NPT PIPE PLUNGER	1
38	890483	SPRING,EXTENSION	1
37	890480	SHOULDER SCREW,SS,3/8-16 PZ-45-3 BERG	1
36	890467	UNION BULKHEAD 22BH-4-4 PARKER	3
35	890379	SCREW LOCK ASSY.,FEMALE	2
34	880327	HUB,LOCKING,1"	1
33	880326	BELT,3/8 PITCH,21" LENGTH,1/2" WIDTH	1
32	880283	GEARBOX,WORM,60:1	1
29	860140	TUBE,NYLON,.25 O.D. X .17O ID	2.5
27	700086	DRIVE,1HP,220V 1PH,VARIABLE FREQ.	1
26	690043	FILTER,IEC INPUT,6 AMP	1
25	675285	CABLE ASSEMBLY TOWER MOTORBASE	1
24	590094	TEMPERATURE SENSOR,LM35 TO-220	1
23	560049	DIODE 1N4002	1
22	514060	ADAPTER,FILTERED,25 PIN D-SUB	1
21	485011	FUSE HOLDER WATER TIGHT	2
20	480029	FUSE,5 X 20MM,3AMP	2
19	410053	POWER SUPPLY, UV420-7	1
18	398782	WIRING DIAGRAM TOWER MOTORBASE	1
17	113918	KIT,2070 F.O. LIMIT	1
16	111602	SPROCKET,36 TOOTH,10MM PITCH,1" BORE	1
15	111582	SHAFT,DRIVE,2170	1
14	111581	MOTOR,MODIFIED,2170	1
13	111579	LID,SOLID,2170	1
12	111578	LID,VENTED,2170	1
11	111577	PLATE,NUT,2170	1
10	111576	BRACKET,TALL,2170	1
9	111575	BRACKET,SHORT,2170	1
8	111574	ENCLOSURE,2170,RETRO-FIT	1
7	109060	PULLEY,3/8 PITCH,22 TEETH,5/8 BORE W/KEY	2
6	109055	ENCLOSURE,FRONT BOARD	-
5	108198	PCA,UNIVERSAL MOTORBASE V	1
4	104071	IDLER,TENSION,MOTOR BASE III	1
3	104070	PIVOT,TENSIONER,MOTOR BASE III	1
2	104069	BUSHING,TENSIONER,MOTOR BASE III	1
1	104068	ARM,IDLER,MOTOR BASE III	1

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
REMOVE ALL BURRS AND SHARP EDGES
SURFACE FINISH 63 RMS OR BETTER
TOLERANCES ARE:
DECIMALS: X.XX ± .015; X.XXX ± .005
ANGLES: ± .5

FINISH: NONE

	INITIAL	DATE
DRAFTING		
ENGINEERING	SRK	03/19/07

ETS•LINDGREN™
An ESCO Technologies Company

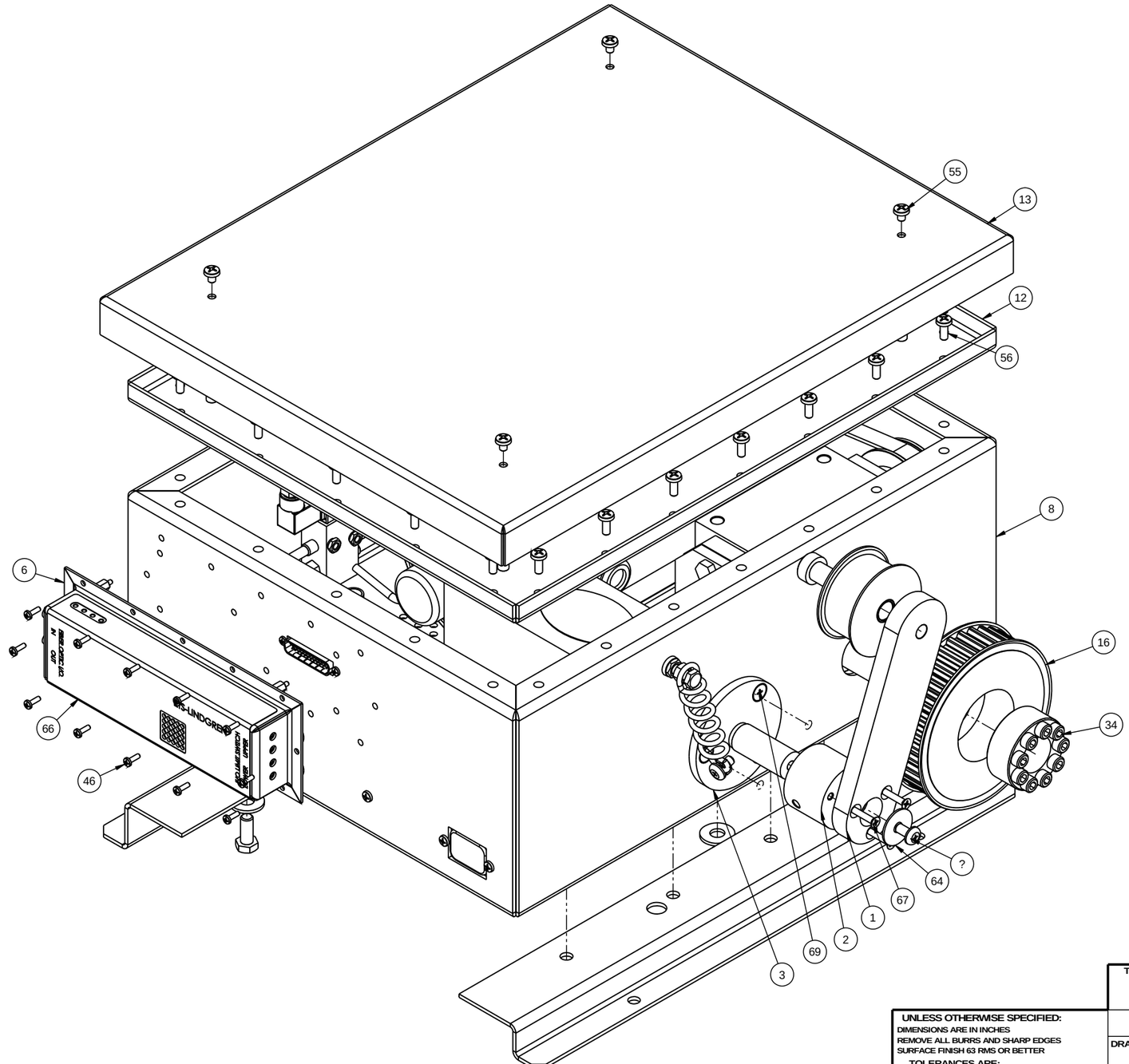
TITLE
MOTORBASE,2170,RETRO-FIT

SIZE	SCALE	DWG. NO.	REV.
D	1:4	111580	B

DO NOT SCALE DRAWING

SHEET 1 OF 2

REF DRAWING



THIRD ANGLE PROJECTION

ETS•LINDGREN™
An ESCO Technologies Company

UNLESS OTHERWISE SPECIFIED:	INITIAL	DATE
DIMENSIONS ARE IN INCHES REMOVE ALL BURRS AND SHARP EDGES SURFACE FINISH 63 RMS OR BETTER TOLERANCES ARE: DECIMALS: X.XX ± .015, X.XXX ± .005 ANGLES: ± .5	DRAFTING	
	ENGINEERING SRK	03/19/07
FINISH: NONE		

TITLE

MOTORBASE,2170,RETRO-FIT

PROPRIETARY INFORMATION	SIZE	SCALE	DWG. NO.	REV.
ANY DUPLICATION OF THIS DOCUMENT, WHOLE OR IN PART, WITHOUT EXPRESS WRITTEN PERMISSION OF ETS LINDGREN IS PROHIBITED.	D	1:1.5	111580	B
	DO NOT SCALE DRAWING		SHEET 2 OF 2	

REF DRAWING

REVISIONS				
ECN	REV	DESCRIPTION	DATE	APPROVED
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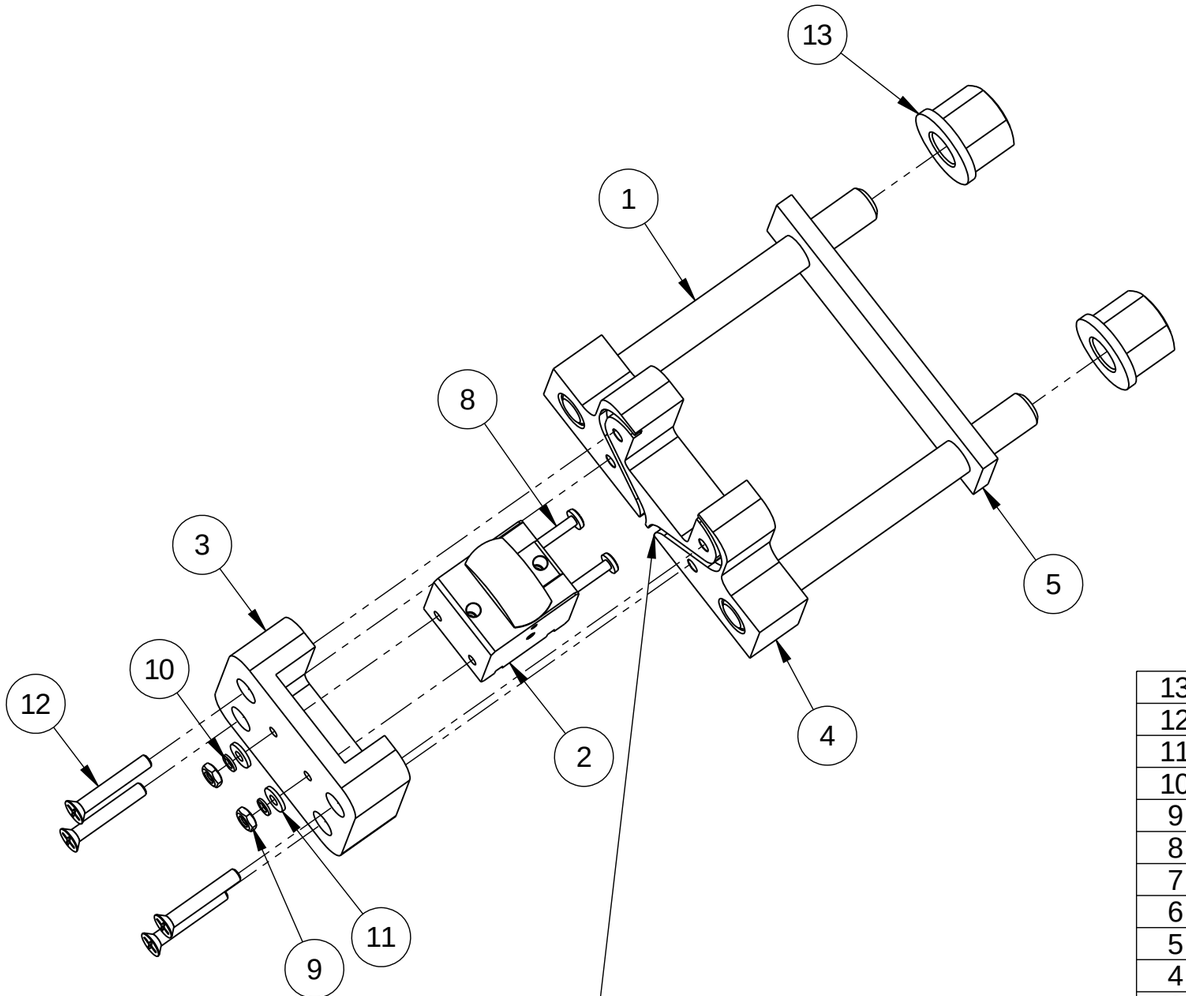


ROUTE 708040 THROUGH
BOTTOM, COVER REMAINDER
OF CABLES WITH 890983

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
13	910827	NUT,1/2-13,HEX,FG,BROWN	2
12	910809	SCREW,10-32 X 1-1/4,PHIL,FLAT,SS	4
11	910723	WASHER,#6,FLAT,SS	2
10	910220	WASHER,#6,LOCK,SS,SPLIT	2
9	910211	NUT,6-32,HEX,SS	2
8	910208	SCREW,6-32 X 1-1/2,PHIL,BIND,SS	2
7	890983	SLEEVING,SPLIT,CONVOLUTE,PE 1/4" ID	5
6	708040	FIBER OPTIC CABLE LIMIT SWITCH 1.5M	2
5	114259	CLAMP,LIMIT.2071B	1
4	114258	BASE,LIMIT,2071B	1
3	114257	COVER,LIMIT,2071B	1
2	109252	LIMIT,F.O. ASSEMBLY	1
1	108374	STUD,1/2-13 X 5.00,FG	2

THIRD ANGLE PROJECTION

ETS•LINDGREN™
An ESCO Technologies Company

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
REMOVE ALL BURRS AND SHARP EDGES
SURFACE FINISH 63 RMS OR BETTER
TOLERANCES ARE:

DECIMALS	ANGLES
X.XX ± .010	± .5
X.XXX ± .005	

FINISH: NONE

	INITIAL	DATE
DRAFTING		
ENGINEERING	SRK	06/04/09

TITLE: **LIMIT,LOWER,2071B**

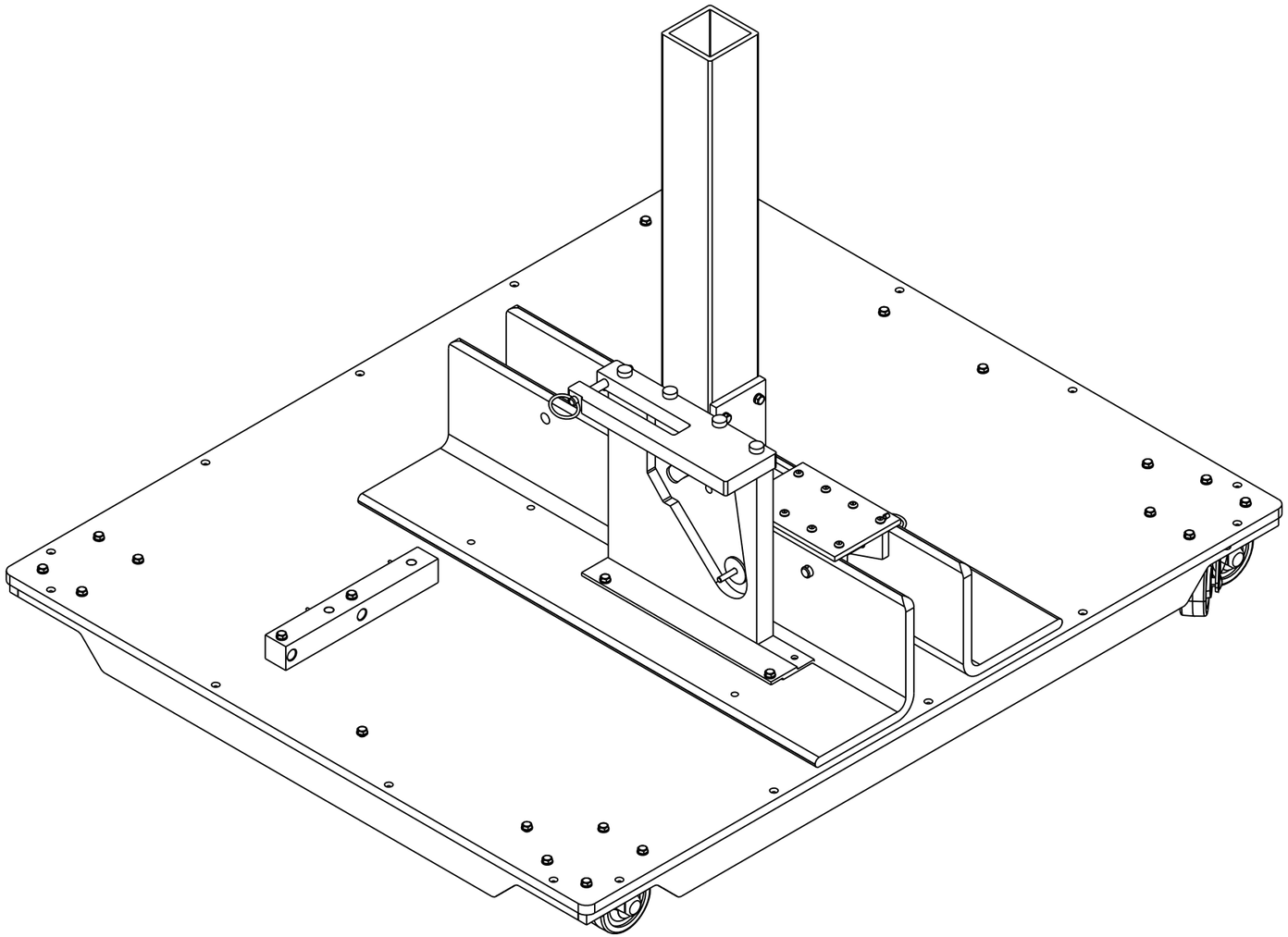
SIZE	SCALE	DWG. NO.	REV.
B	NONE	114260	A

DO NOT SCALE DRAWING

SHEET 1 OF 1

REF DRAWING

REVISIONS				
ECN	REV	DESCRIPTION	DATE	APPROVED
5711	A	RELEASE	XX/XX/XX	XXX



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
30	930693	WASHER,M6,LOCK,SPLIT,SS	4
29	930688	NUT,M6,HEX,SS,NYLOK	16
28	930682	WASHER,M6,FLAT,SS	45
27	930677	BOLT,M6 X 60,HEX,SS	6
26	930671	BOLT,M6 X 45,HEX,SS	2
25	930667	BOLT,M6 X 40,HEX,SS	5
24	930651	BOLT,M6 X 25,HEX,SS	21
23	930533	SCREW,M5 X 16MM,PHIL,PAN,SS	10
22	930531	SCREW,M6 X 16MM,PHIL,FLAT,SS	4
21	910603	SCREW,1/4-20 X 7/8,PHIL,FLAT,SS	4
20	910281	SCREW,10-24 X 1-1/4,SH,CAP,SS	4
19	910048	WASHER,1/4,FENDER,1 1/4" O.D.	2
18	890699	KNOB #10 SCREW	4
17	890692	PIN QUICK REL .38 X 3.0	1
16	890465	BARB HOSE 11924-1 CLIPPARD	2
15	890176	LANYARD 12" SS 90312A12 MCMASTER CARR	1
14	890175	PIN,1/2 X 4 GRIP LENGTH	1
13	890039	CASTER 3" SWIVEL	5
12	114371	BASE,BELT GUARD,2070B-2	1
11	114370	MAST BRACKET,2070B-2	2
10	114369	BASE,GLUED ASSY,2070B-2	1
9	106100	PLATE VERTICAL GUARD	1
8	106099	PLATE TOP GUARD	1
7	104176	MAST AXLE TOWER BASE III	1
6	104174	MAST BASE SECTION TOWER	1
5	103813	SUPPORT AIR LINE	1
4	102642	NUT PLATE 8MM MODEL 1070	1
3	102641	PLATE MOTOR BRACKET 1070	1
2	102640	BRACE MOTOR PLATE 1070	2
1	101543	MAST LOCK PLATE 1072	1

THIRD ANGLE PROJECTION

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SURFACE FINISH 63 RMS OR BETTER
TOLERANCES ARE:

DECIMALS	ANGLES
X.XX ± .010	± .5
X.XXX ± .005	

	INITIAL	DATE
DRAFTING		
ENGINEERING	JSW	06/16/09

FINISH: NONE

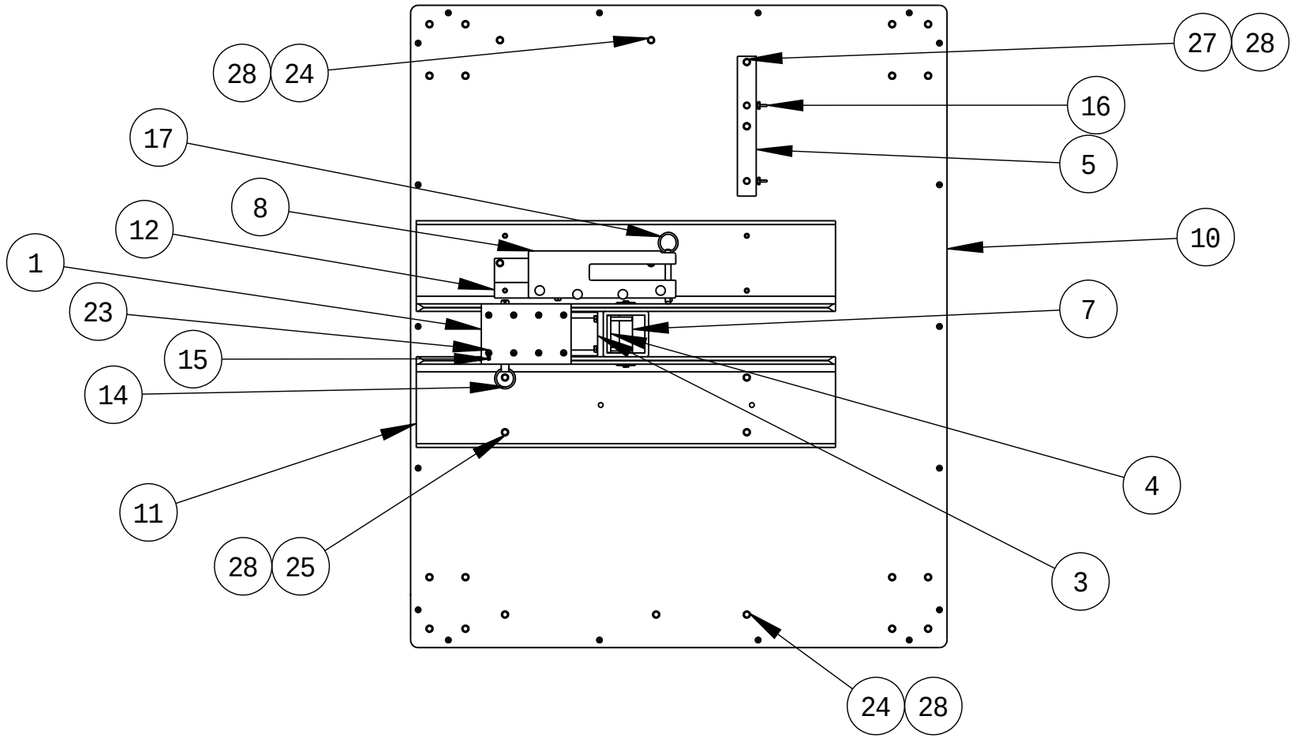
TITLE: **BASE ASSY,2070B**

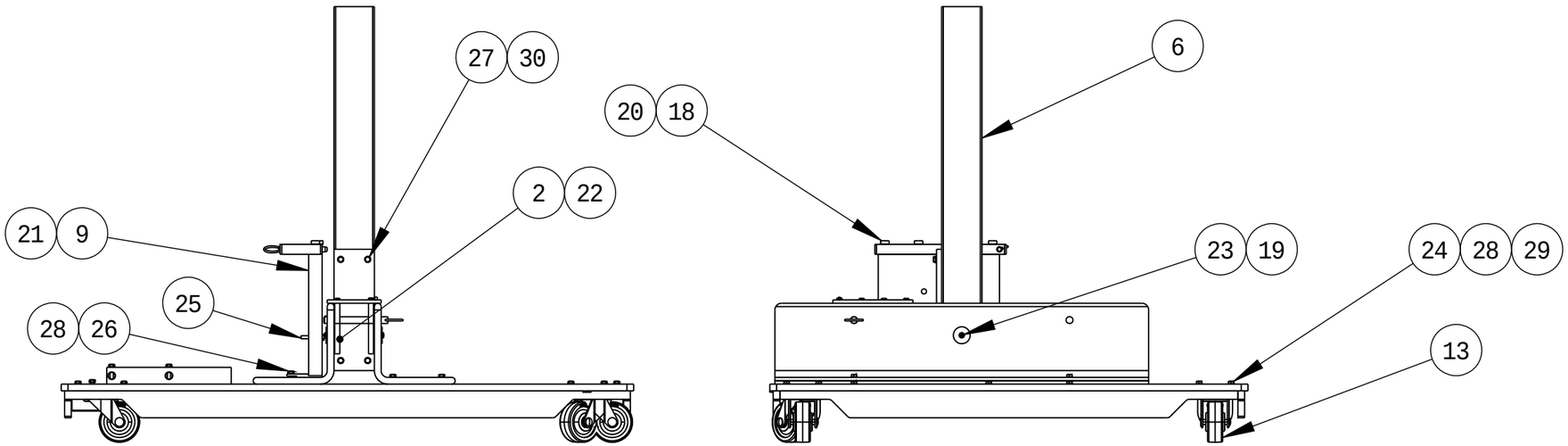
SIZE	SCALE	DWG. NO.	REV.
B	NONE	114364	A

DO NOT SCALE DRAWING

SHEET 1 OF 2

REF DRAWING





THIRD ANGLE PROJECTION

ETS•LINDGREN™
An ESCO Technologies Company

UNLESS OTHERWISE SPECIFIED:	INITIAL	DATE
DIMENSIONS ARE IN INCHES REMOVE ALL BURRS AND SHARP EDGES SURFACE FINISH 63 RMS OR BETTER TOLERANCES ARE:	DRAFTING	
DECIMALS: X.XX ± .010, X.XXX ± .005 — ANGLES: ± .5	ENGINEERING: JSW	06/16/09
FINISH: NONE		

TITLE

BASE ASSY,2070B

SIZE	SCALE	DWG. NO.	REV.
B	NONE	114364	A

DO NOT SCALE DRAWING — SHEET 2 OF 2