

Installation and Operations Manual

for the

Engle 310™ Operator System

Engle 320™ Operator System

(229-1046)

*Engle 310
with ComfortPlus™*



*Engle 320
with ComfortPlus™*



ENGLE
DENTAL SYSTEMS



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INSTALLATION AND OPERATION MANUAL

Customer Service:

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Warranty

Products sold to and installed by authorized Engle Dental Systems dealers are guaranteed against defects in materials and workmanship for a period of five (5) years after date of purchase. Engle 300 dental chair Electronic Positioning Components have a Limited Warranty of ten (10) years after date of purchase. Upholstery is guaranteed for one (1) year after date of purchase. All hand-piece illumination systems are guaranteed for six (6) months after date of purchase. This warranty does not cover light bulbs of any kind.

Faulty parts as determined by dealer service representative, will be repaired or replaced; no claim for labor or consequential damages will be allowed. Invoices for replacement parts may be subject to adjustment after the manufacturer has inspected the alleged defective parts.

The warranty does not cover normal wear, stains, cuts, or scratches of upholstery surface finishes, or parts sold to O.E.M. customers.

This warranty does not cover damage resulting from the use of cleaning, disinfecting, or sterilization chemicals and processes.

The warranty does not cover damage from improper installation or maintenance, accident, misuse, or accidents incurred in shipping and handling.

In the event of shipping damage, the purchaser must initiate all claims against the freight carrier in writing within twenty-four (24) hours after the damaged items are received. The claim is the responsibility of the customer.

PRODUCT MODIFICATIONS

Engle Dental Systems continually works to better our products. We reserve the right to make modifications without notice or obligation to modify previously manufactured products.

CLEANING AND DISINFECTING ENGLE EQUIPMENT

Infection control in the dental office continues to be a high priority for our customers and end users. O.S.H.A., the A.D.A., and the C.D.C. are also involved in this complex issue.

We will not attempt to specify the required intervals for disinfection nor can we state what is the overall best surface disinfectant. Please refer to the Infection Control Recommendations published by the American Dental Association for further reference.

Barrier Technique

ENGLE strongly advocates the barrier technique be used whenever possible to preserve the finish and appearance of the equipment. Wherever possible disposable barriers should be used and changed between patients. The barrier technique will ensure maximum long term durability of the surfaces and finishes of equipment.

Chemical Disinfection

Regardless of the chemical disinfectant used it is imperative that the equipment be thoroughly washed with mild soap and warm water at least once per day. This wash down will minimize the harmful effects of chemical disinfectant residues being allowed to accumulate on the equipment.

When using a chemical disinfectant, always pay strict attention to the manufacturer's application directions of the disinfectant. When using a concentrated disinfectant, always pay strict attention to the manufacturer's diluting directions of the disinfectant. *"Disinfectant solutions that are relatively harmless to surfaces at their recommended strengths can be corrosive at a higher/purer concentrate."*

Unacceptable Disinfectants

These disinfectants **WILL HARM** the surface finishes of ENGLE equipment and are **NOT RECOMMENDED**.
USE OF THESE PRODUCTS WILL VOID YOUR WARRANTY.

CHEMICAL COMPOSITION	TRADE NAMES
Strong Phenols/Phenol-Alcohol Combinations	Lysol, Lysol 2, Lysol Professional Coe Foam, Coe Spray Pump, Vitaphone, Omni II
Sodium Hypochlorite/Household Bleach	Clorox, Ajax, Purex
Alcohol	
Household Cleaners	

Conditionally Acceptable Disinfectants*

These disinfectants have been found to be the LEAST HARMFUL to the equipment surfaces.
None of these products are recommended for chair upholstery. Use the barrier technique.

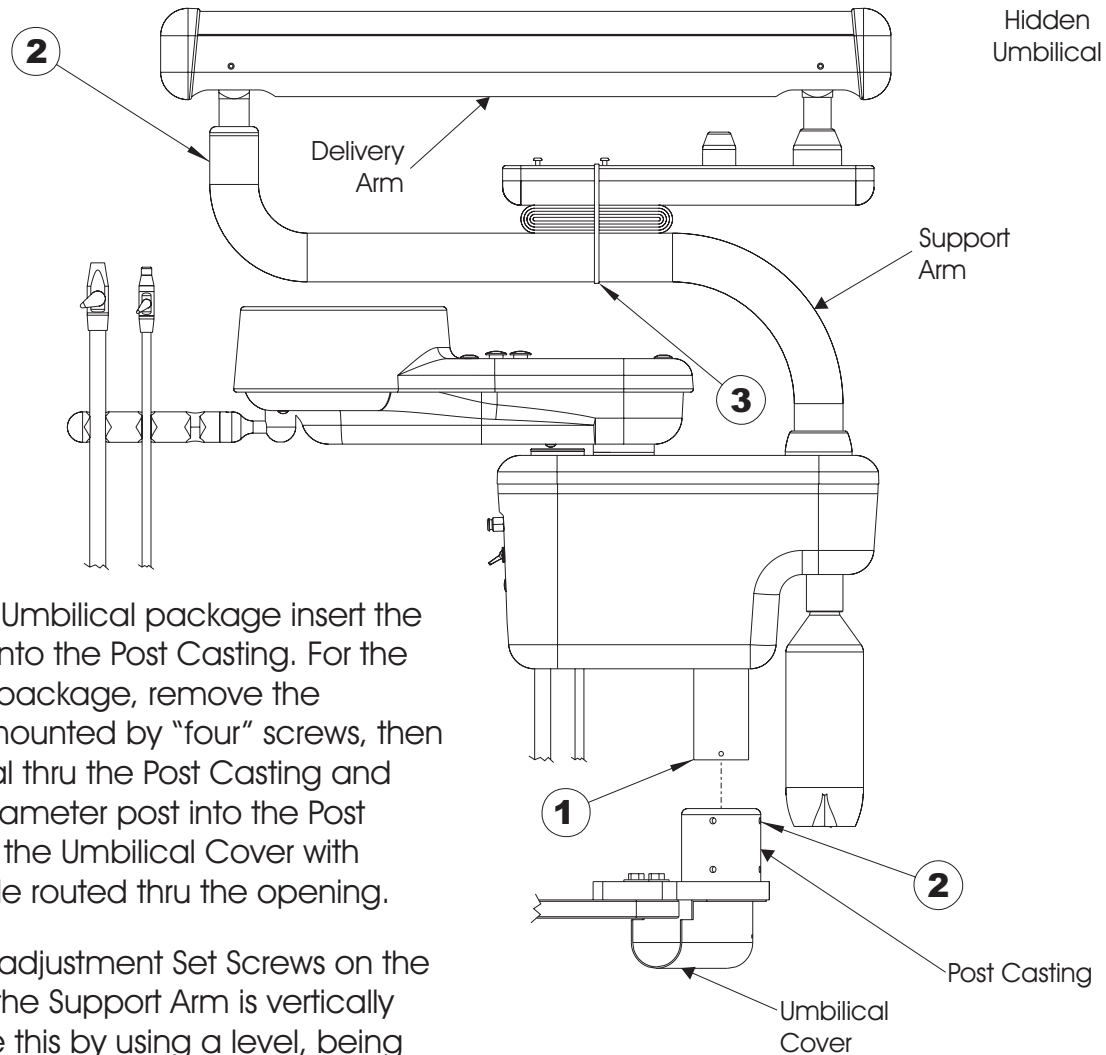
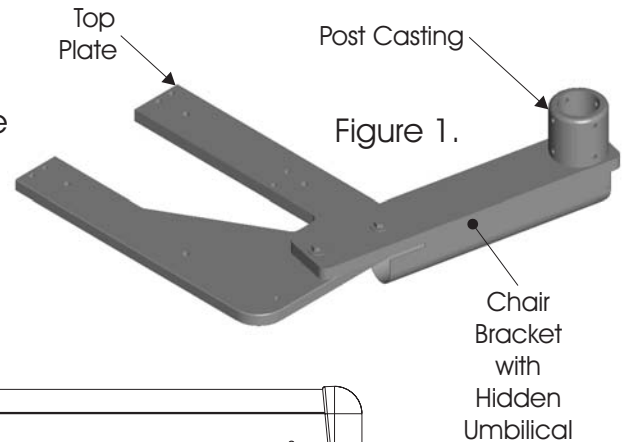
CHEMICAL COMPOSITION	TRADE NAMES
Iodophors**	Biocide, Aseptic-IDC Wescodyne, SD5, Promedyne, Ido-Five
Mild Phenols	Procide ES, Asepti-Steryl Aerosol
Glutaraldehyde/Phenol sprays	Sterall Spray, Coldspor
Synergized Super Quat	Dis-cide, Cavicide, Kleenaseptic
Phenol/Water Sprays	Top-Cide, Sporicidin Pump Spray, Birex se

* ENGLE DENTAL SYSTEMS makes no representation as to the disinfectant efficacy of these products. We make no warranty, expressed or implied, that these disinfectants will not damage the surface finishes. Damage and discoloration of the surface finishes is not covered under the warranty.

** Iodophor based disinfectants will cause yellow staining on many surfaces. Regular washing with soap and water will minimize this staining. Iodophor neutralizers such as Promedyne are also available.

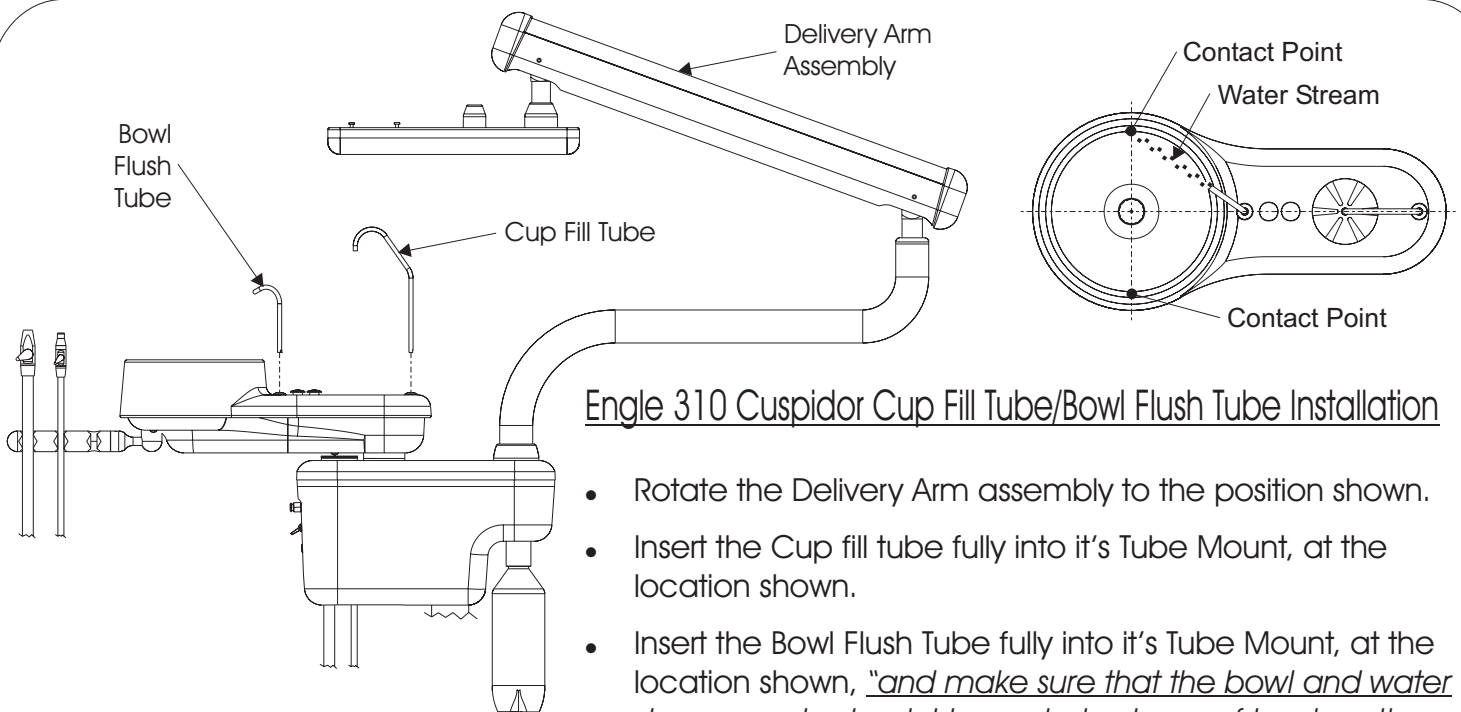
Pre-Setup:

- Using the provided bolts, install the pre-assembled Chair Bracket and Post Casting on the left or right side of the Top Plate on the chair, located in front, below the Seat assembly and above the Base Linkage assembly. See figure 1.
- Remove your Utility Center Package from the shipping box.



- 1 For a non-hidden Umbilical package insert the 2" diameter post into the Post Casting. For the hidden Umbilical package, remove the Umbilical Cover mounted by "four" screws, then route the Umbilical thru the Post Casting and insert the 2-1/4" diameter post into the Post Casting. Re-install the Umbilical Cover with the Umbilical inside routed thru the opening.
- 2 Adjust the "eight" adjustment Set Screws on the Post Casting until the Support Arm is vertically plumb. Determine this by using a level, being sure to check that the Support Arm is vertically plumb in all directions. Tighten the adjustment screws evenly and re-check the Support Arm to ensure that it is still plumb. *Note: It is extremely important that the Support Arm is vertically plumb, as this determines whether or not the Cuspidor, Delivery Arm, Tray and the Light will be plumb, and therefore function properly.*

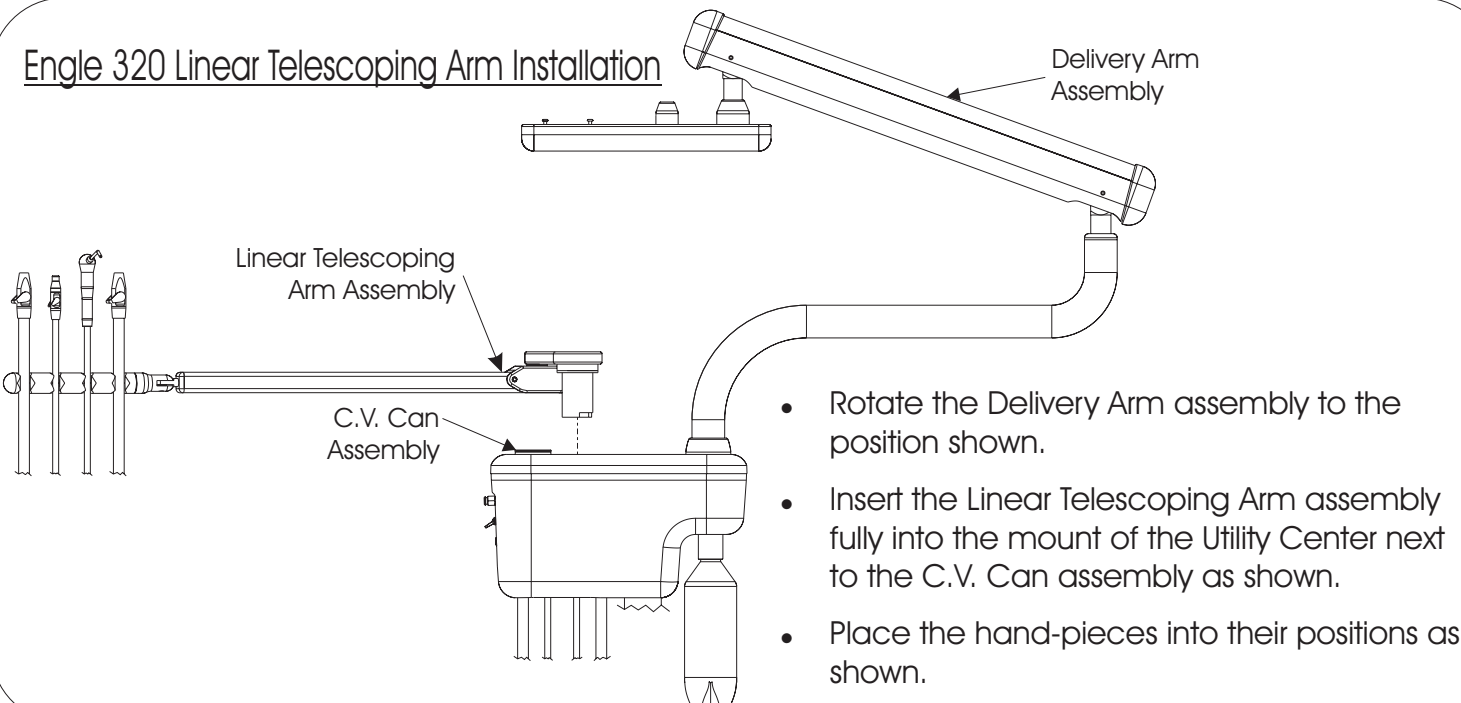
- 3 The Delivery Arm is under tension due to the Packing Band. While securing the Delivery Arm with one hand, cut the packing band. *Warning: If the band is removed without securing the Delivery Arm, the Delivery Arm will rise up unexpectedly and could cause damage or injury.*



Engle 310 Cuspidor Cup Fill Tube/Bowl Flush Tube Installation

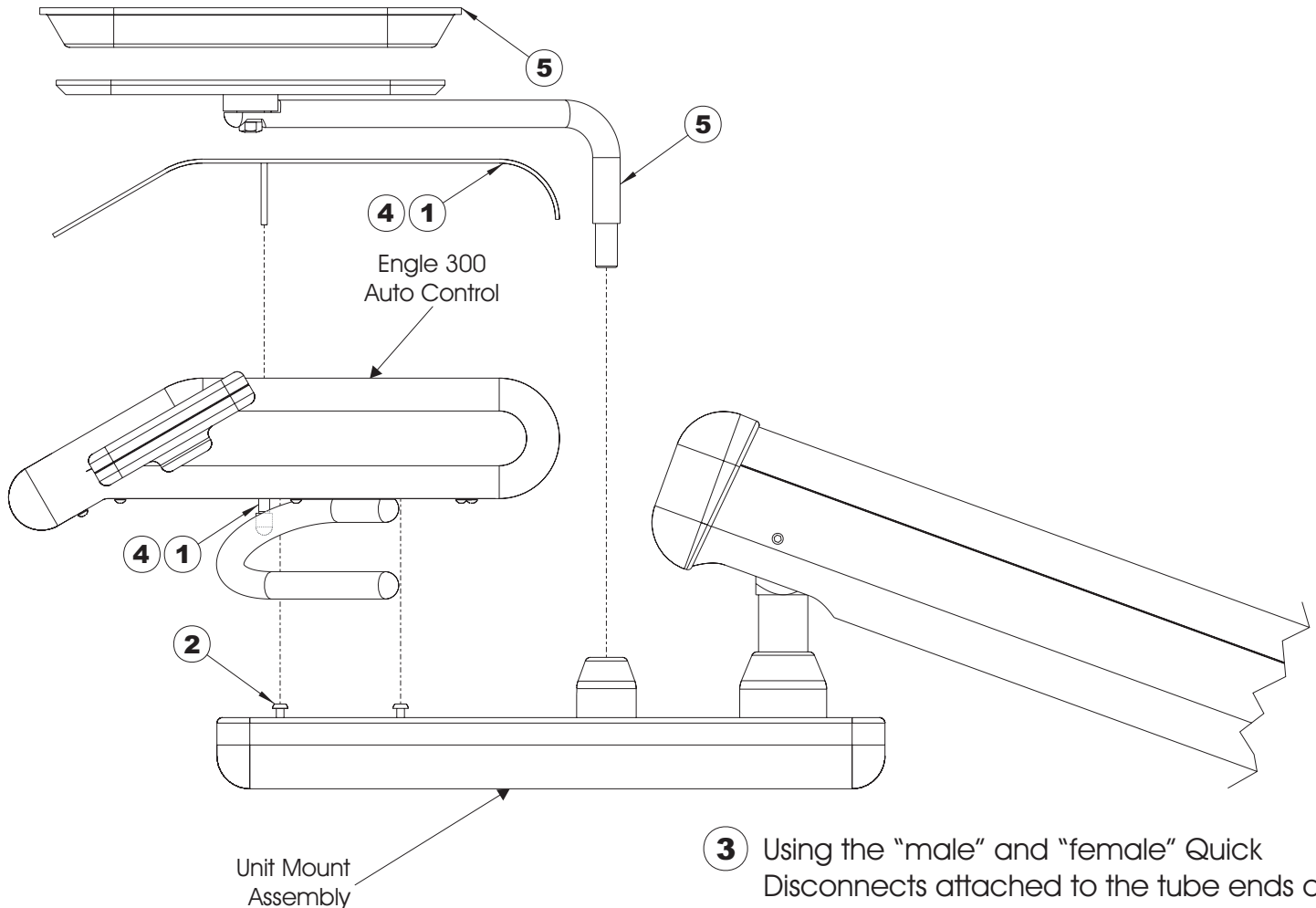
- Rotate the Delivery Arm assembly to the position shown.
- Insert the Cup fill tube fully into it's Tube Mount, at the location shown.
- Insert the Bowl Flush Tube fully into it's Tube Mount, at the location shown, *"and make sure that the bowl and water stream contact point is precisely at one of two locations shown, Choose the location closest to patient"*.

Engle 320 Linear Telescoping Arm Installation



- Rotate the Delivery Arm assembly to the position shown.
- Insert the Linear Telescoping Arm assembly fully into the mount of the Utility Center next to the C.V. Can assembly as shown.
- Place the hand-pieces into their positions as shown.

Engle 300 Auto Control Assembly and Tray Mount Assembly Installation



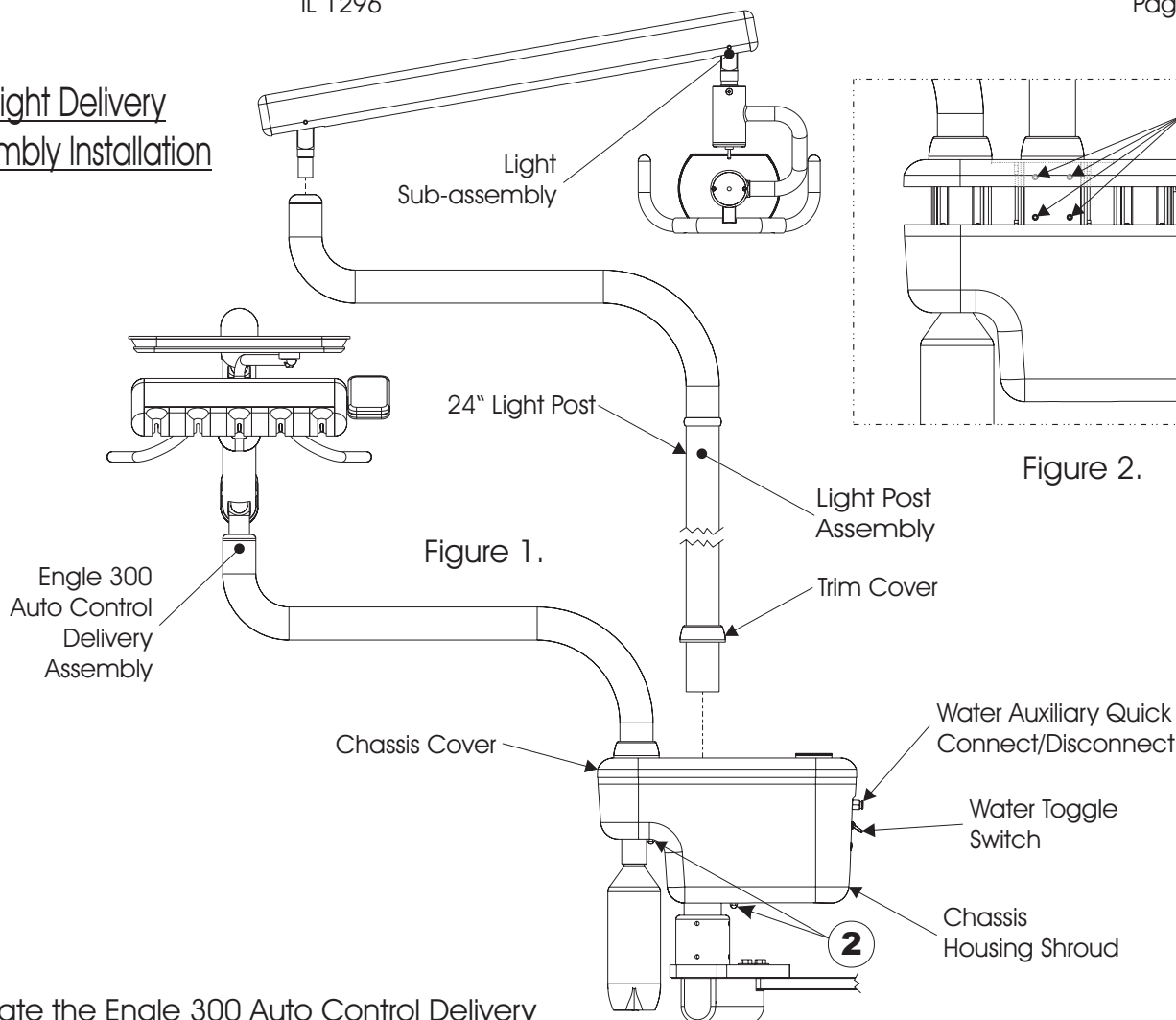
- 1** Remove the Top Plate of the Engle 300 Auto Control assembly by loosening the "two" Access Nuts attached to the underside of the assembly.
- 2** Route the Umbilical from the Unit Mount assembly / Delivery Arm Assembly through the 2" X 2" square hole, located at the underside of the Engle 300 Auto Control. Install the Engle 300 Auto Control to the Unit Mount assembly by locking and tightening the "four" mounting screws into the "four" keyholes surrounding the 2" X 2" square hole.

- 3** Using the "male" and "female" Quick Disconnects attached to the tube ends of the Umbilical and Engle 300 Auto Control, match the tubes regarding "size" and "color" and SECURELY connect the "male" and "female" Quick Disconnects by twisting them together.

EXAMPLE: 1/4" diameter gray tubing from the Umbilical would connect with 1/4" diameter gray tubing from the Engle 300 Auto Control.

- 4** Re-install the Top Plate of the Engle 300 Auto Control.
- 5** Insert the Tray Holder assembly fully into the Unit Mount assembly as shown. The Tray rests on top of the Tray Holder assembly.

Light Delivery
Assembly Installation



- 1** Rotate the Engle 300 Auto Control Delivery assembly so that it will not interfere with the Light Delivery assembly installation.
- 2** Partially move the Chassis Housing Shroud down by removing the "four" Acorn Nuts located at its underside. *Caution:* The tubes for the Water Toggle Valve and Water Auxiliary Quick Connect/Disconnect are attached to there source. Carefully slide the chassis housing downward until the "four" Light Post adjustment Set Screws on the Utility Center Post Mount are accessible, see Figure 2.
- 3** Route the power cord from the Light Sub-assembly, through the Light Post assembly using the pre-assembled routing string and insert the Light sub-assembly fully into the to the Light Post assembly. See Figure 1.
- 4** Route the power cord from the Light Post assembly to the Utility Center.
- 5** Place the Trim Cover around the 24" Light Post and install the Light Delivery assembly fully into the mount of the Utility Center next to the Engle 300 Control Delivery assembly, as shown on [Figure 1.]. Adjust the "four" Light Post adjustment Set Screw see [Figure 2.], making sure that the 24" Light Post is vertically plumb. **CAUTION: DO NOT OVER TIGHTEN SET SCREWS.**
- 6** Connect the routed power cord of the Light Sub-assembly to the power cord from the Umbilical inside the Utility Center and re-install the Chassis Housing Shroud.
- 7** Finally, for a Non-Hidden Umbilical, connect the Umbilical to the junction box, see [IL 160 in this manual]. For a Hidden Umbilical, see [IL 1600 in this manual].

Engle Dental Systems has simplified the connection of utilities within the Junction Box. Refer to (IL 250 "Large Junction Box Installation Diagram") of this manual throughout this installation process.

NOTE: Actual size (1:1 SCALE) of IL 250 "Large Junction Box Installation Diagram" to be used as a template are available upon request when a layout is required.

- A 1/2" threaded water supply pipe and a 1/2" threaded air supply pipe must be 1" tall maximum, above the finished floor. Using the proper thread sealant, install the "two" included Supply Stop Valves to the 1/2" threaded pipes, one each pipe. Once set, use these valves to purge the water and air supply pipes to remove any supply line debris. (See Figure 1.)
- The supplied Air Regulator Filter assembly and Water Regulator Filter assembly are *PRE-ADJUSTED*. Insert the nipple of each assembly into the compression fitting of it's designated Manual Shut-off Valve ("A" for air) ("W" for water), and tighten. (See Figure 2.)
- Remove the Cover from the frame of the Junction Box assembly, and place the frame on the floor as shown on the IL 250 "Large Junction Box Installation Diagram". *Make sure the Umbilical mount of the Frame that fits your Umbilical is facing the correct direction.* Secure the Frame to the floor with the "eight" provided screws. (See Figure 3.)
- Determine the length required for the Umbilical to be routed from the Utility Center to the Junction Box, then cut off the extra length of Umbilical and insert that Umbilical end into the correct Umbilical mount of the Frame.
- Connect the 1/8" clear tubing from the Water Regulator Filter assembly to the 1/8" clear tubing from the Air Regulator Filter assembly. To do this *SECURELY* connect the "male" and "female" Quick Disconnects by twisting them together.
- Connect the 3/4" diameter gray ribbed tubing from the Umbilical to the office Central Vacuum within the Junction Box, and the 3/4" diameter clear tubing from the Umbilical to the office Gravity Drain within the Junction Box. See IL 250 "Large Junction Box Installation Diagram".
- Using the "male" and "female" Quick Disconnects attached to the tube ends of the Umbilical and both Air and Water Regulator assemblies, match the tubes regarding "size" and "color" and *SECURELY* connect the "male" and "female" Quick Disconnects by twisting them together.

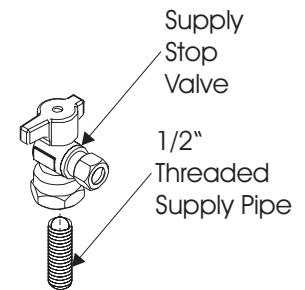


Figure 1.

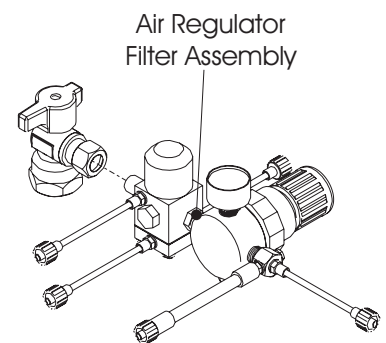


Figure 2.

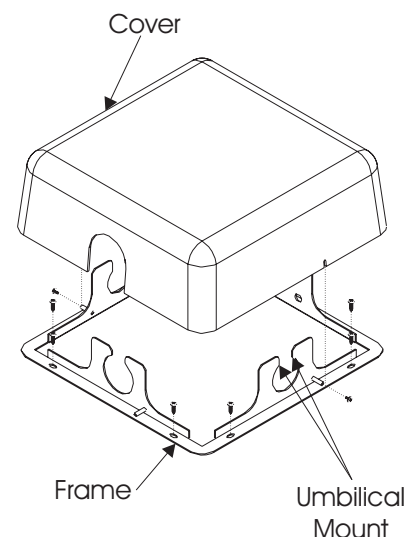


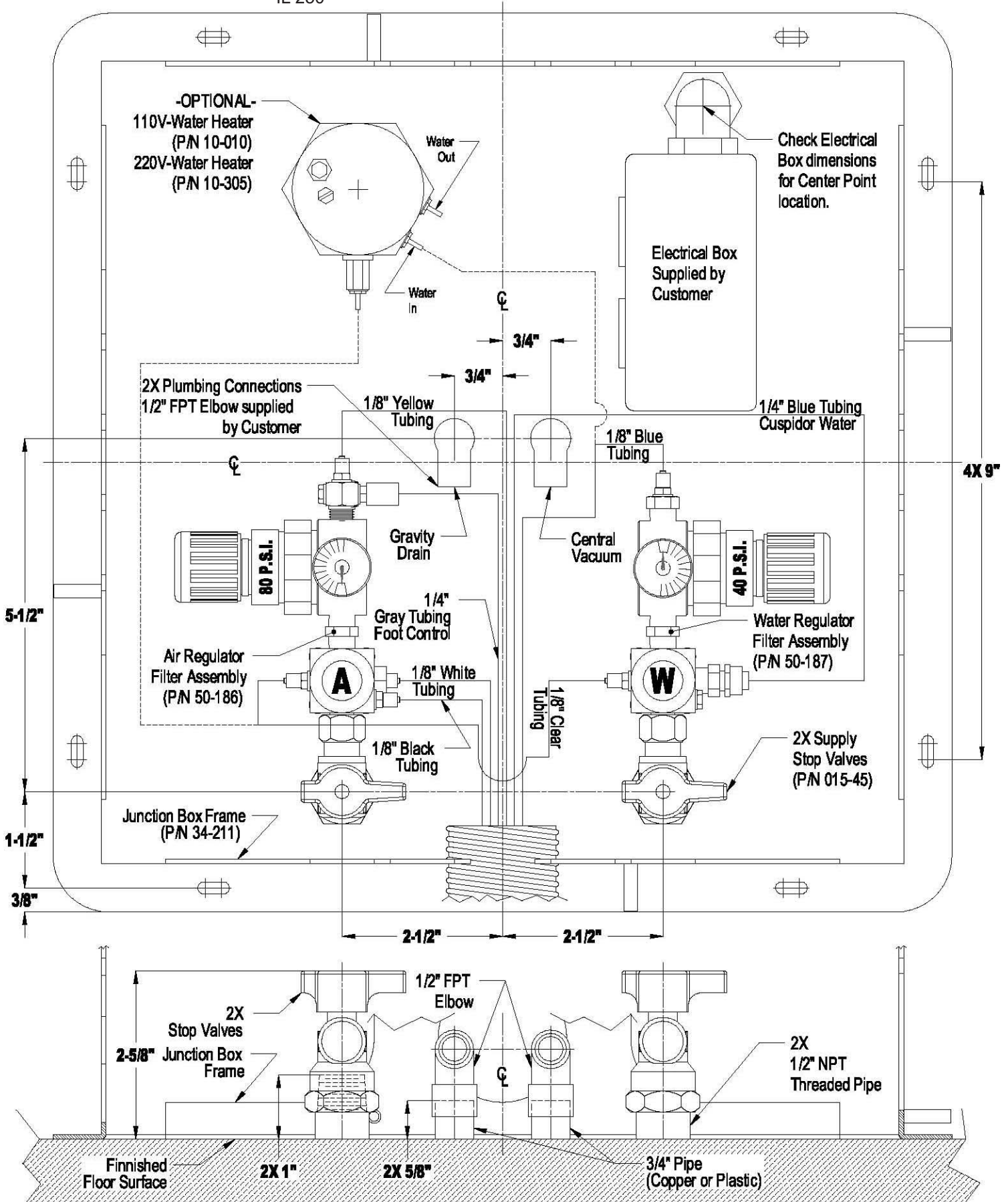
Figure 3.

EXAMPLE: 1/8" diameter yellow tubing from the Umbilical would connect With 1/8" diameter yellow tubing from the Water Regulator assembly.

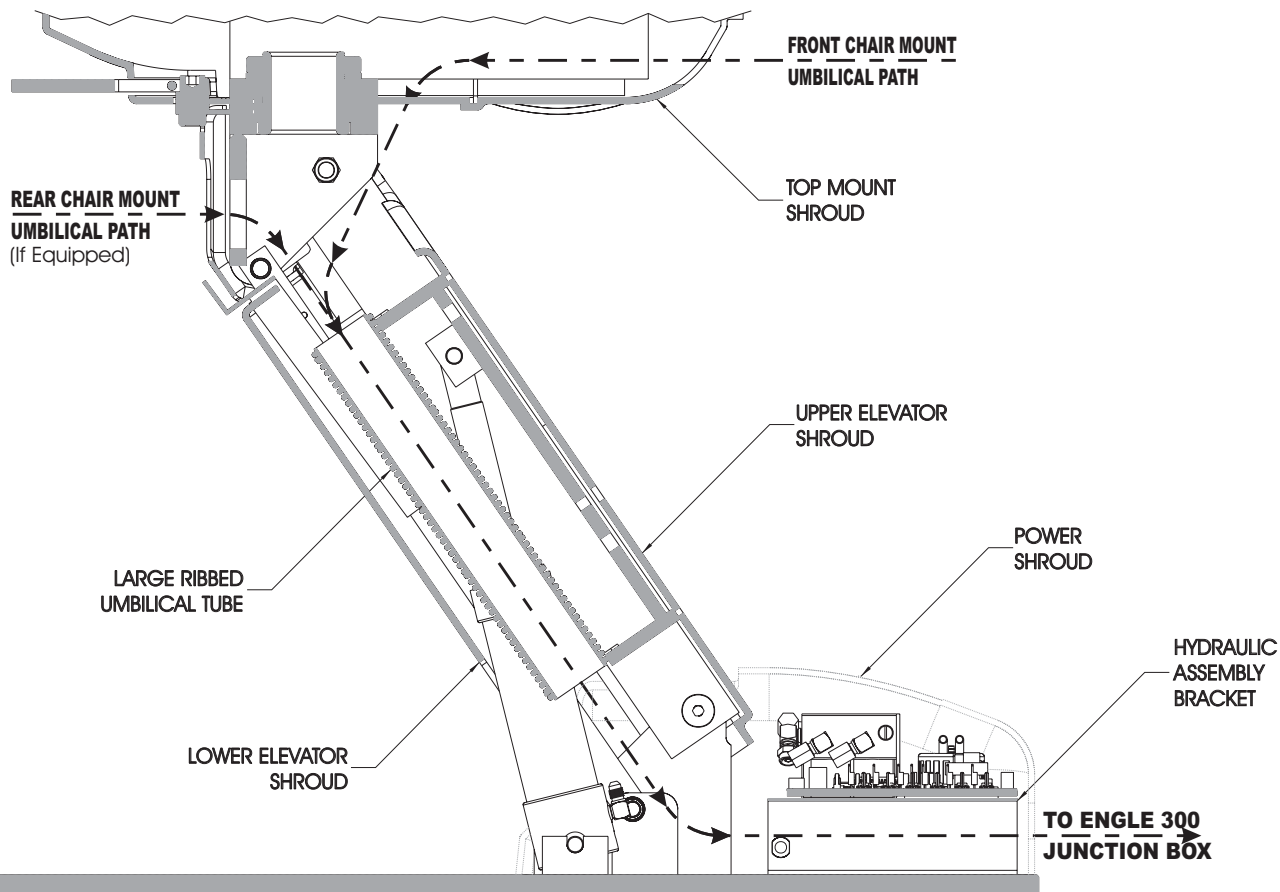
- Plug the Power Cord from the Umbilical into the Electrical Box.
- Re-install the Cover to the Frame of the Junction Box.

Large Junction Box Installation Diagram (34-005)

IL 250



Before routing the Umbilical, position the chair so that the base is all the way up as shown.
Turn the power switch off and un-plug the Power Cord from the power source.



- 1** Now that the chair's power cord is un-plugged from it's power source. Remove the Power Shroud by un-installing the "two" mounting screws, one each side. Remove the Upper Elevator Shroud by un-installing the "two" mounting screws, in front. Un-install the Lower Elevator Shroud by slightly pulling one mounting bracket outwards and sliding it off the "two" mounting pins then slide the opposite mounting bracket of the remaining "two" mounting pins.
- 2** Route the Umbilical as shown. Caution: For the Engle 360 System make sure the Auto Control Delivery, Engle Light Delivery, and Rear Vacuum Group Delivery can "fully" articulate without any articulation stress to it's Umbilical. From the front chair mount, make sure the Umbilical goes in thru the front 1-1/2" wide slot, and out the underside large rectangular opening, of the Top Mount Shroud. Then, in thru the large Ribbed Umbilical Tube. Finally thru the center tunnel of the Hydraulic Assembly Bracket. From the rear chair mount (IF EQUIPPED), make sure the Umbilical goes thru the 2-1/8" thru hole, and thru the large Ribbed Umbilical Tube. Finally thru the center tunnel of the Hydraulic Assembly Bracket.
- 3** Re-install the "three" shrouds previously removed, using step one in reverse order. NOTE: The Hidden Umbilical length is pre-measured, once installation to the Engle 300 Junction Box is complete, adjust the Umbilical slack where needed to prevent it from articulation stress. See (IL 1160 "Hidden Umbilical/Junction Box-Installation Instructions") in this manual and connect the Umbilical to the Engle 300 Junction Box assembly.

Engle Dental Systems has simplified the connection of utilities within the Junction Box, it is important that the pre-installation of utilities for the Hidden Umbilical Engle 300 chair package is at the service location of the chair as shown in (IL 1250 "Engle 300 Junction Box Installation Diagram") of this manual, refer to IL 1250 throughout this installation page.

NOTE: Actual size (1:1 SCALE) of IL 1250 "Engle 300 Junction Box Installation Diagram" to be used as a template are available upon request when a layout is required.

- A 1/2" threaded water supply pipe and a 1/2" threaded air supply pipe must be 1" tall maximum, above the finished floor. Using the proper thread sealant, install the "two" included Supply Stop Valves to the 1/2" threaded pipes, one each pipe. Once set, use these valves to purge the water and air supply pipes to remove any supply line debris. (See Figure 1.)
- The supplied Air Regulator Filter assembly and Water Regulator Filter assembly are *PRE-ADJUSTED*. Insert the nipple of each assembly into the compression fitting of it's designated Manual Shut-off Valve ("A" for air) ("W" for water), and tighten. (See Figure 2.)
- Remove the Cover from the frame of the Engle 300 Junction Box assembly, and place the frame on the floor, in front, and centered to the Engle 300 chair Base Plate as shown on the IL 1250 "Engle 300 Junction Box Installation Diagram". Secure the Frame to the finished floor with the "four" provided screws. (See Figure 3.)
- Insert and secure the Umbilical from the Engle 300 chair into the Umbilical mount of the Frame.
- Connect the 1/8" clear tubing from the Water Regulator Filter assembly to the 1/8" clear tubing from the Air Regulator Filter assembly. To do this *SECURELY* connect the "male" and "female" Quick Disconnects by twisting them together.
- Connect the 3/4" diameter gray ribbed tubing from the Umbilical to the office Central Vacuum within the Junction Box, and the 3/4" diameter clear tubing from the Umbilical to the office Gravity Drain within the Junction Box. IL 1250 "Engle 300 Junction Box Installation Diagram".
- Using the "male" and "female" Quick Disconnects attached to the tube ends of the Umbilical and both Air and Water Regulator assemblies, match the tubes regarding "size" and "color" and *SECURELY* connect the "male" and "female" Quick Disconnects by twisting them together.

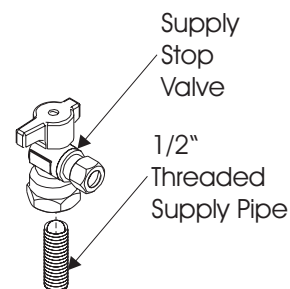


Figure 1.

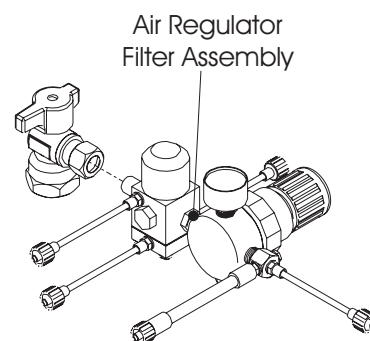


Figure 2.

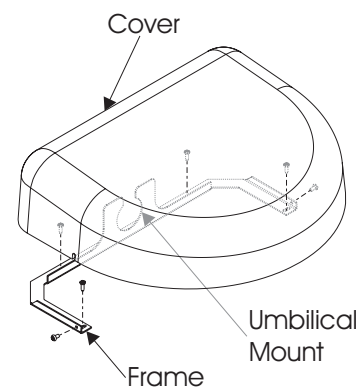
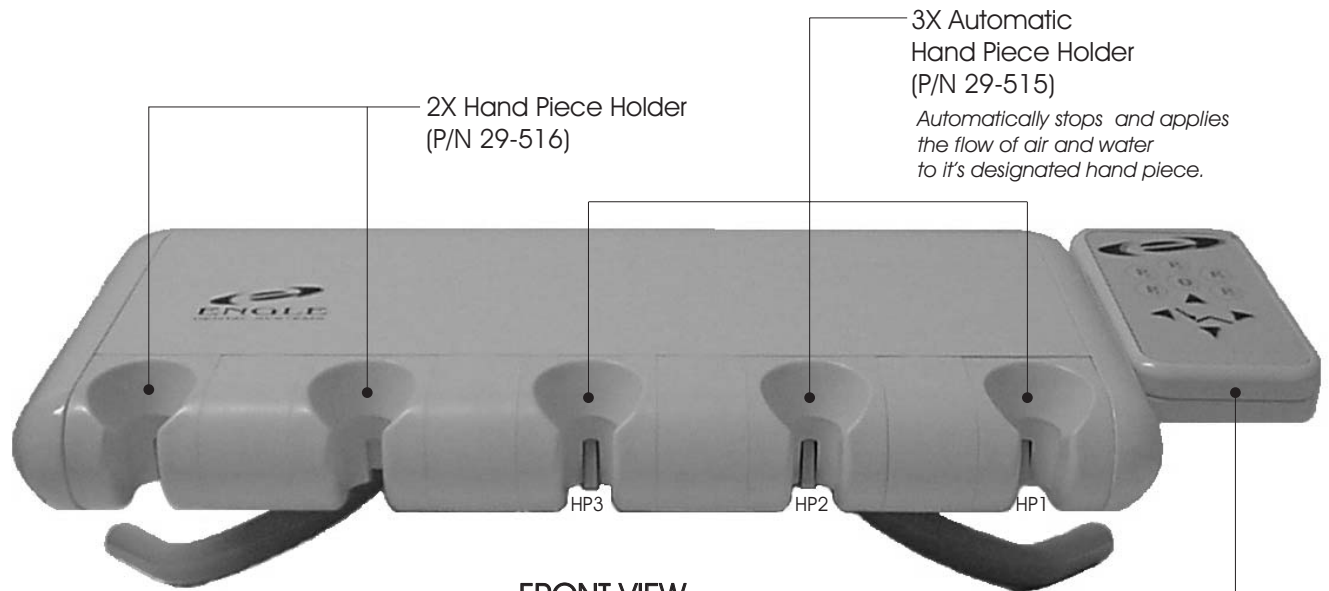


Figure 3.

EXAMPLE: 1/8" diameter yellow tubing from the Umbilical would connect With 1/8" diameter yellow tubing from the Water Regulator assembly.

- Plug the Power Cord from the Umbilical into the Electrical Box.
- Re-install the Cover to the Frame of the Engle 300 Junction Box.



FRONT VIEW

Engle 300 A.C. Touch Pad Assembly
(P/N 96-530)

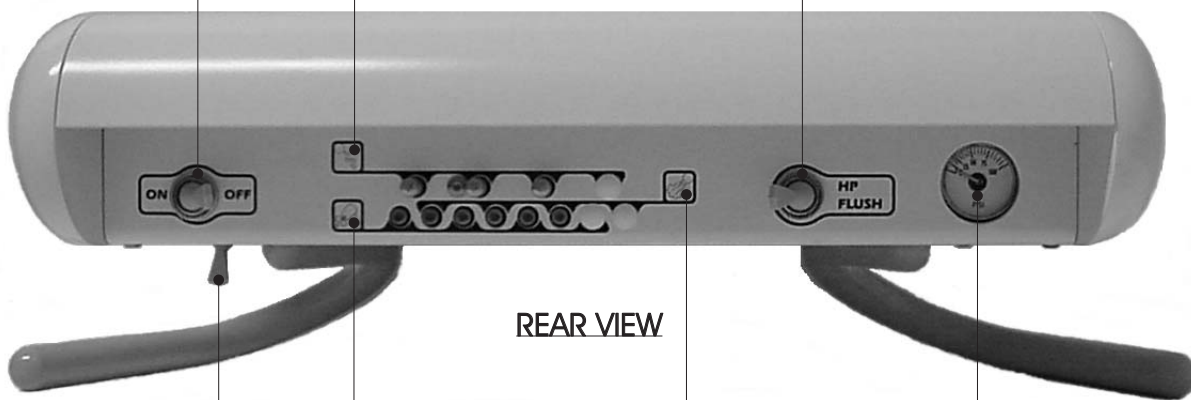
*Positions dental chair
automatically and manually.*

*Automatically stops and applies
the flow of air and water
to it's designated hand piece.*

**ON/OFF
Master Switch
(P/N 015-27)**
*Master Air and Water
Solenoids Off and On.
When not in use, turn
this switch to the
Off position.*

**Water Coolant
Flow Valve**
*Controls the amount
of Water Coolant to
each individual hand piece.*

**Hand Piece
Flush Valve
(P/N 015-16)**
*Flushes hand piece
in use with water.*



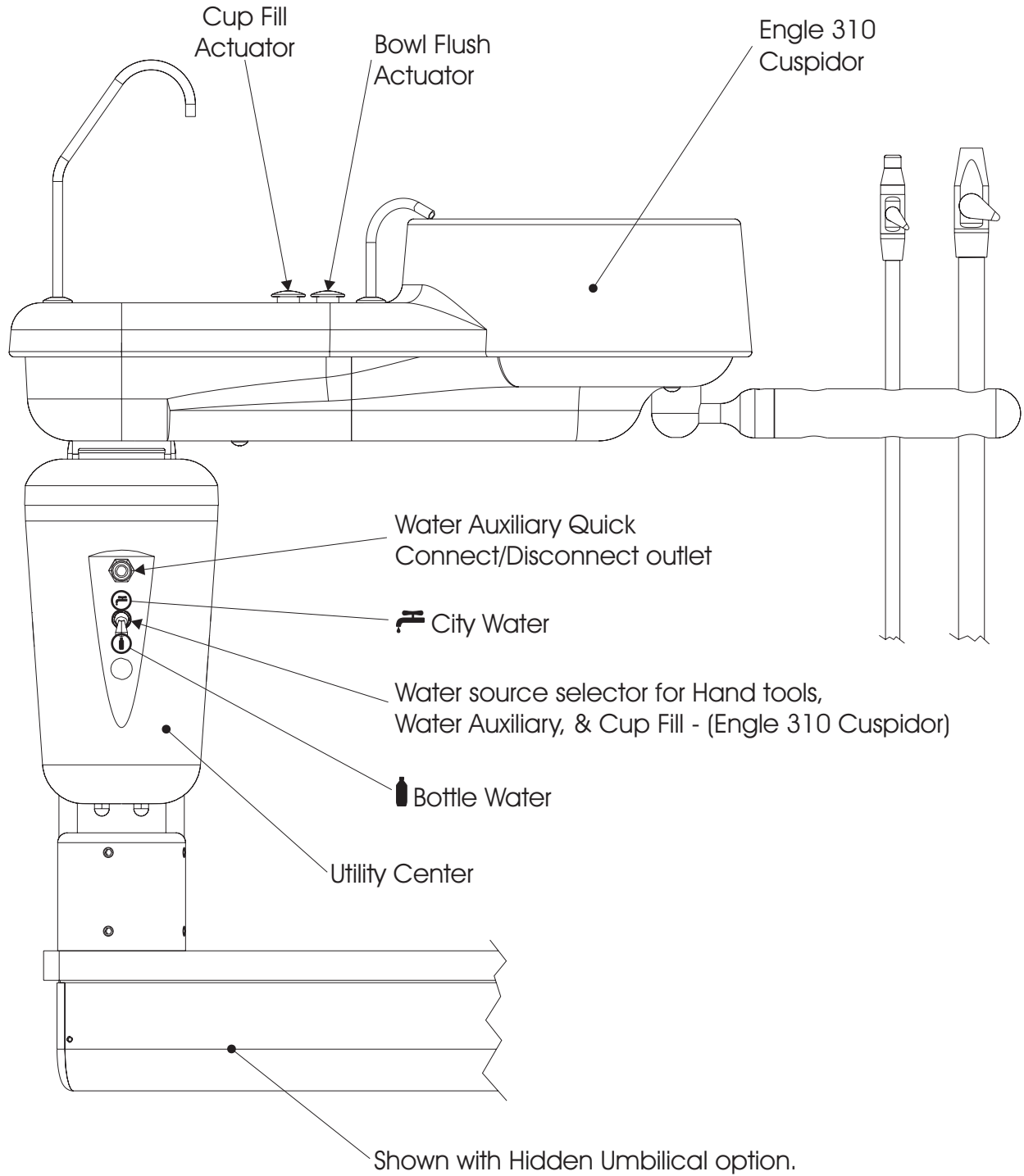
REAR VIEW

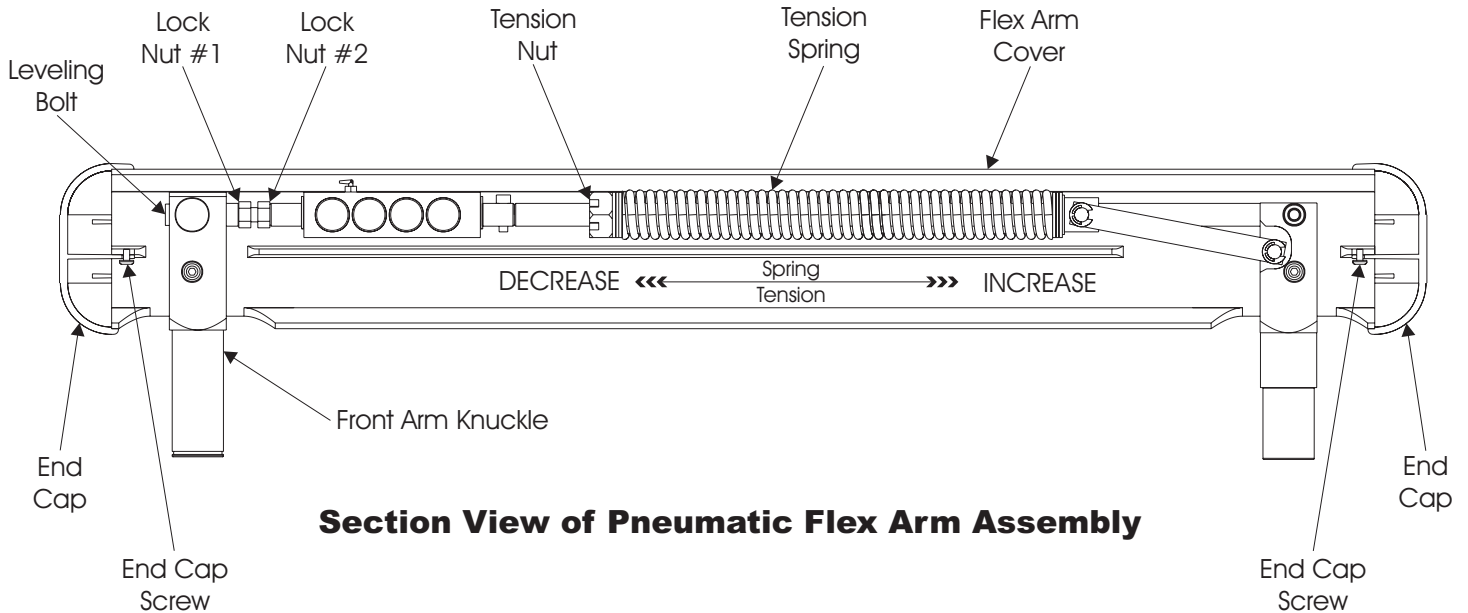
**Arm Brake
Switch
(P/N 015-27)**
*Activates the
locking and
un-locking of
the Flex Arm's
vertical
movement.*

**Drive Air
Pressure
Adjust**
*Controls the
amount of air
pressure to
drive each
individual
hand piece.*

**Air Coolant
Flow Valve**
*Controls the amount
of Air Coolant to
each individual
hand piece.*

**Drive Air
Pressure Gauge
(P/N 015-85)**
*Air pressure
reading for the
hand piece in use.*





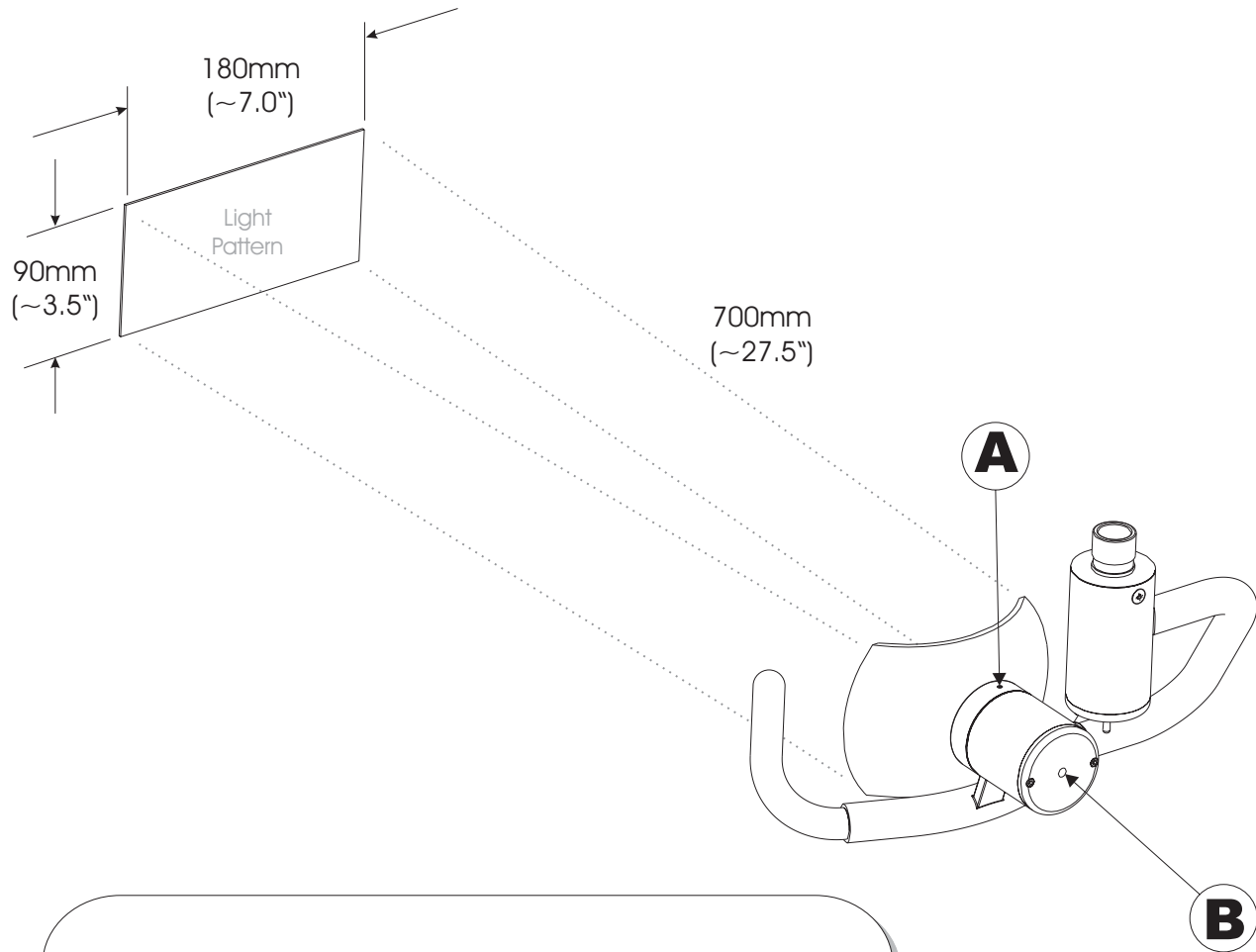
Section View of Pneumatic Flex Arm Assembly

Spring Tension Adjustment:

1. Remove both End Caps, and Flex Arm Cover by un-installing the "two" End Cap Screws.
2. Use a 3/16" Allen wrench, insert it into a Slot of the Tension Nut and rotate it to increase or decrease tension on the Tension Spring. Looking from the Front Arm Knuckle side of the Flex Arm assembly, rotating the Tension Nut clockwise will increase tension and counter-clockwise will decrease tension.
3. With the complete service load of the Auto Control assembly, adjust the spring tension so that the Flex Arm will maintain all of the Auto Control's vertical positions when left unattended.
4. Re-install the Flex Arm Cover and both End Caps with the "two" End Cap Screws.

Front Arm Knuckle Pitch Adjustment:

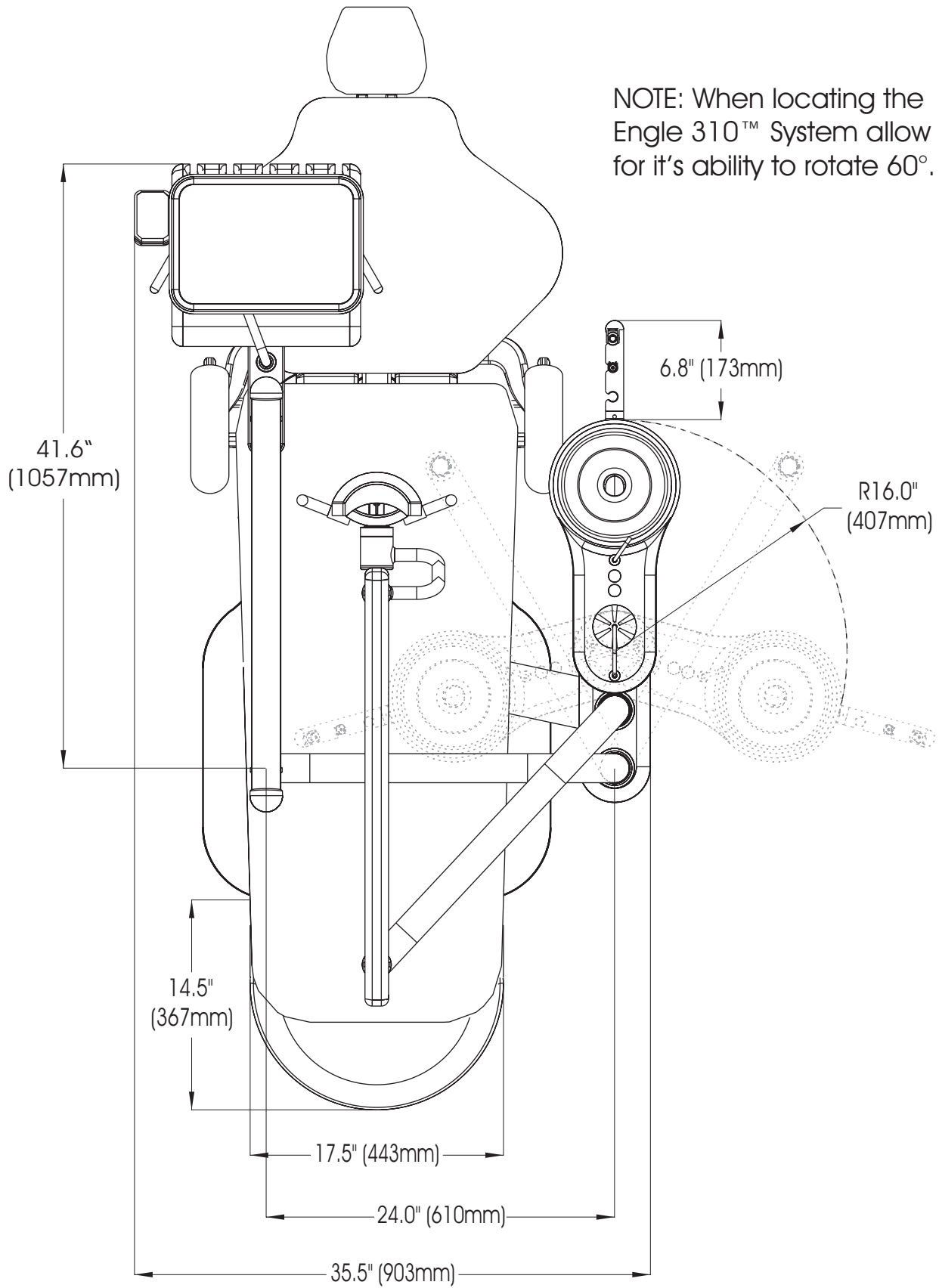
1. Remove both End Caps, and Flex Arm Cover by un-installing the "two" End Cap Screws.
2. Loosen and back away Lock Nut #2.
3. Adjust the Leveling Bolt until the desired pitch of the Auto Control assembly is achieved.
4. Tighten Lock Nut #2 and check to make sure Lock Nut #1 is still tight, as shown.
5. Re-install the Flex Arm Cover and both End Caps with the "two" End Cap Screws.



1. Loosen the set screw marked "A" $\frac{1}{2}$ turn, using a 1.5mm allen wrench. Over loosening this set screw will require taking the light head apart.

2. Adjust the screw marked "B", using a 4mm allen wrench, until the desired light pattern is achieved.

3. Tighten the set screw marked "A" until you feel slight pressure on the set screw.



NOTE: When locating the Engle 320™ System allow for it's ability to rotate 60°.

