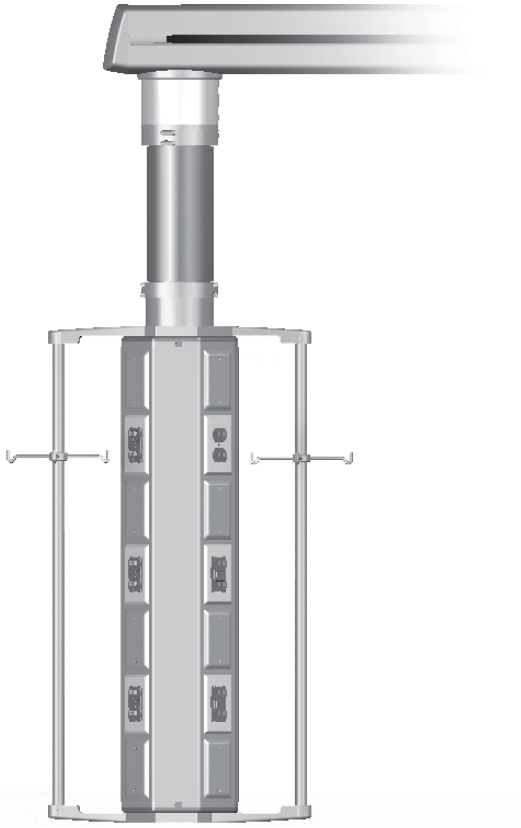
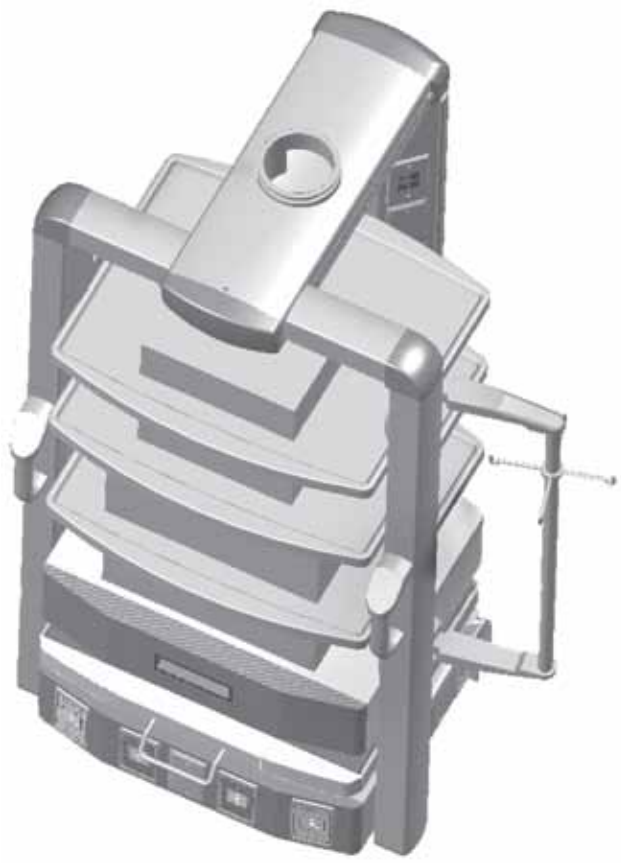
SKYTRON®

SERVICE MANUAL





SKYBOOM
ERGON SERIES

Read this manual before starting to work! This information is necessary for the safe and efficient maintenance of the equipment.

TEC-H-0046 REV0
5/12

TABLE OF CONTENTS

Although current at the time of publication, SKYTRON'S policy of continuous development makes this manual subject to change without notice.

TABLE OF CONTENTS (continued)

Title **Page**

Distributed by:

SKYTRON
5085 Corporate Exchange Blvd. S.E.
Grand Rapids, MI 49512 (616) 656-2900
www.skytron.us

Manufactured by:

IHB Operations B.V.
Floresstraat 52
8022 AD Zwolle
The Netherlands

SECTION I SPECIAL USER ATTENTION

1-1. Safety Precautions

To ensure the personal safety of the technicians, clinical users and patients:

- Always follow OSHA Safety Guidelines when operating this equipment to avoid personal injury / hazards.
- Hydraulic lines, fittings and joints are under high pressure. Release system pressure by lowering the arm to a full downward position.
- When disconnecting any part of hydraulic system, release system pressure and completely support the system to avoid personal injury.
- Room zone valve supplying medical gas lines must be disconnected and relieved of system pressure prior to servicing equipment.
- Disconnect electrical power supply using appropriate OSHA 10 check out procedures prior to servicing equipment.

The following is a summary of the important precautionary instructions:

DANGER

Indicates a hazardous situation that, if not avoided, will result in death or serious injury.

WARNING

Indicates a hazardous situation that, if not avoided, could result in death or serious injury.

CAUTION

Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

CAUTION

CAUTION without the safety alert symbol, is used to address practices not related to personal injury but with a possibility of damage to equipment.

NOTICE

Indicates important information not related to personal injury.

1-2. Special Tool List

1 WHITE LITHIUM GREASE
1 TRUE RMS DIGITAL MULTIMETER
1 SPANNER WRENCH, SKYTRON P/N H9-200-04
1 TORQUE WRENCH (MULTIPLIER) 660 ft.-lbs.
1 1-7/8" TORQUE SOCKET, 1" DRIVE

All tools and devices employed during the maintenance of this fixture must be calibrated to original manufacturers specifications.

1-3. End of Useful Life & Disposal

The end of the useful life for the SKYTRON Skyboom fixture is 20 years under normal operating conditions, service parts are available for this period.

Ensure the proper disposal methods whenever disposing of old or damaged Skyboom parts. Always follow compliance to regulatory standards pertaining to Federal, State and Local regulations.

SPECIAL USER ATTENTION

Equipment Weight Loading Capacity & Size Chart

Q Series Dual Arm — Equipment Carriers - Maximum Equipment Weight

Arm Length	Max Wt.	VBM 24" (610mm)	VBM 36" (914mm)	CM 24" (610mm)	CM 36" (914mm)	PM / KM 24" (610mm)	PM / KM 36" (914mm)
39½" (1000mm) / 31½" (800mm)	275 lbs (125 kg)	204 lbs (93 kg)	204 lbs (93 kg)	195 lbs (89 kg)	184 lbs (84 kg)	180 lbs (82 kg)	165 lbs (75 kg)

Dual Arm & Central Mount — Equipment Carriers - Maximum Equipment Weight

Arm Length	Max Wt.	VBM 24" (610mm)	VBM 36" (914mm)	VBM 48" (1219mm)	VBM 56" (1422mm)	CM 24" (610mm)	CM 36" (914mm)	CM 48" (1219mm)	CM 56" (1422mm)	PM / KM / XM 24" (610mm)	PM / KM / XM 36" (914mm)	PM / KM / XM 48" (1219mm)	PM / KM / XM 56" (1422mm)
39½" (1000mm) **31½"** (800mm)	380 lbs (173 kg)	300 lbs (136 kg)	300 lbs (136 kg)	285 lbs (130 kg)	280 lbs (127 kg)	295 lbs (134 kg)	285 lbs (130 kg)	275 lbs (125 kg)	265 lbs (120 kg)	280 lbs (127 kg)	265 lbs (120 kg)	250 lbs (113 kg)	240 lbs (109 kg)
44½" (1130mm) **31½"** (800mm)	380 lbs (173 kg)	300 lbs (136 kg)	300 lbs (136 kg)	285 lbs (130 kg)	280 lbs (127 kg)	295 lbs (134 kg)	285 lbs (130 kg)	275 lbs (125 kg)	265 lbs (120 kg)	280 lbs (127 kg)	265 lbs (120 kg)	250 lbs (113 kg)	240 lbs (109 kg)
51" (1300mm) **31½"** (800mm)	360 lbs (164 kg)	290 lbs (132 kg)	280 lbs (127 kg)	270 lbs (122 kg)	260 lbs (118 kg)	275 lbs (125 kg)	265 lbs (120 kg)	255 lbs (116 kg)	245 lbs (111 kg)	260 lbs (118 kg)	245 lbs (111 kg)	230 lbs (104 kg)	220 lbs (100 kg)
61" (1550mm) **31½"** (800mm)	325 lbs (148 kg)	250 lbs (113 kg)	240 lbs (109 kg)	230 lbs (104 kg)	220 lbs (100 kg)	235 lbs (106 kg)	225 lbs (102 kg)	215 lbs (98 kg)	210 lbs (95 kg)	220 lbs (100 kg)	205 lbs (93 kg)	195 lbs (88 kg)	180 lbs (81 kg)

Tandem Mount — Equipment Carriers - Maximum Equipment Weight

Upper Arm Length	Max Wt.	VBM 24" (610mm)	VBM 36" (914mm)	VBM 48" (1219mm)	VBM 56" (1422mm)	CM 24" (610mm)	CM 36" (914mm)	CM 48" (1219mm)	CM 56" (1422mm)	PM / KM / XM 24" (610mm)	PM / KM / XM 36" (914mm)	PM / KM / XM 48" (1219mm)	PM / KM / XM 56" (1422mm)
61" (1550mm) **31½"** (800mm)	325 lbs (148 kg)	250 lbs (113 kg)	240 lbs (109 kg)	230 lbs (104 kg)	220 lbs (100 kg)	235 lbs (106 kg)	225 lbs (102 kg)	215 lbs (98 kg)	210 lbs (95 kg)	220 lbs (100 kg)	205 lbs (93 kg)	195 lbs (88 kg)	180 lbs (81 kg)
44½" (1130mm) **31½"** (800mm)	380 lbs (173 kg)	300 lbs (136 kg)	300 lbs (136 kg)	285 lbs (130 kg)	280 lbs (127 kg)	295 lbs (134 kg)	285 lbs (130 kg)	275 lbs (125 kg)	265 lbs (120 kg)	280 lbs (127 kg)	265 lbs (120 kg)	250 lbs (113 kg)	240 lbs (109 kg)
Lower Arm Length													
48" (1220) **31½"** (800mm)	260 lbs (118 kg)	190 lbs (86 kg)	180 lbs (81 kg)	165 lbs (75 kg)	160 lbs (72 kg)	175 lbs (79 kg)	160 lbs (72 kg)	150 lbs (68 kg)	145 lbs (66 kg)	155 lbs (70 kg)	140 lbs (63 kg)	130 lbs (59 kg)	115 lbs (52 kg)
31½" (800mm) **31½"** (800mm)	260 lbs (118 kg)	190 lbs (86 kg)	180 lbs (81 kg)	165 lbs (75 kg)	160 lbs (72 kg)	175 lbs (79 kg)	160 lbs (72 kg)	150 lbs (68 kg)	145 lbs (66 kg)	155 lbs (70 kg)	140 lbs (63 kg)	130 lbs (59 kg)	115 lbs (52 kg)

SPECIAL USER ATTENTION

Be aware of the Skyboom Ergon series weight limits and Surgical Display size.

The maximum weight limit on each center aligned shelf is 100 lb (45 kg), on cantilevered shelves the maximum weight limit on each shelf is 70 lb (31 kg). Maximum equipment weight loading capacity refers to the maximum total weight that the system can support. Observe the following capacity guidelines.

Equipment Weight Loading Capacity & Size Chart	
	Max Wt.
Cantilevered Shelf	70 lbs (31 kg)
Center Aligned Shelf	100 lbs (45 kg)
Lightweight Utility Arm	80 lbs (36 kg)
Surgical Displays	**Max Size**
FC1	26” (660mm)
FS32	32” (812mm)
FC2	(2) 26” (660mm) monitors

Precautions for placement of Equipment on the shelves:

- Never exceed the maximum weight capacity on each shelf and observe the total equipment weight for the carrier.
- Ensure that each shelf is secured tightly
- Ensure that equipment is properly placed and level on each shelf
- Anchor and secure equipment in accordance with manufacturer’s recommendations
- There are equipment weight restrictions on the manual & powered height adjustable arms in combination with the VBM style carriers and cantilevered shelves, a maximum of 165 lbs. (75 kg) is allowed.

SECTION II EQUIPMENT SPECIFICATIONS

2-1. Permissible Environmental Conditions

DURING TRANSPORT AND STORAGE (IN ORIGINAL PACKAGING MATERIALS)

- AMBIENT TEMPERATURE: -10° - 60° C (14° - 140° F)
- RELATIVE AIR MOISTURE: 10% - 85%, NO CONDENSATE BUILD-UP
- AIR PRESSURE: 500 hPa - 1060 hPa (14 in-Hg - 31 in-Hg)

DURING USE - FOR DRY LOCATIONS

- AMBIENT TEMPERATURE: 15° - 30° C (60° - 85° F)
- RELATIVE AIR MOISTURE: 30% - 60% NON CONDENSING
- AIR PRESSURE: 700hPa - 1060 hPa (20.7 in-Hg - 31.3 in-Hg)

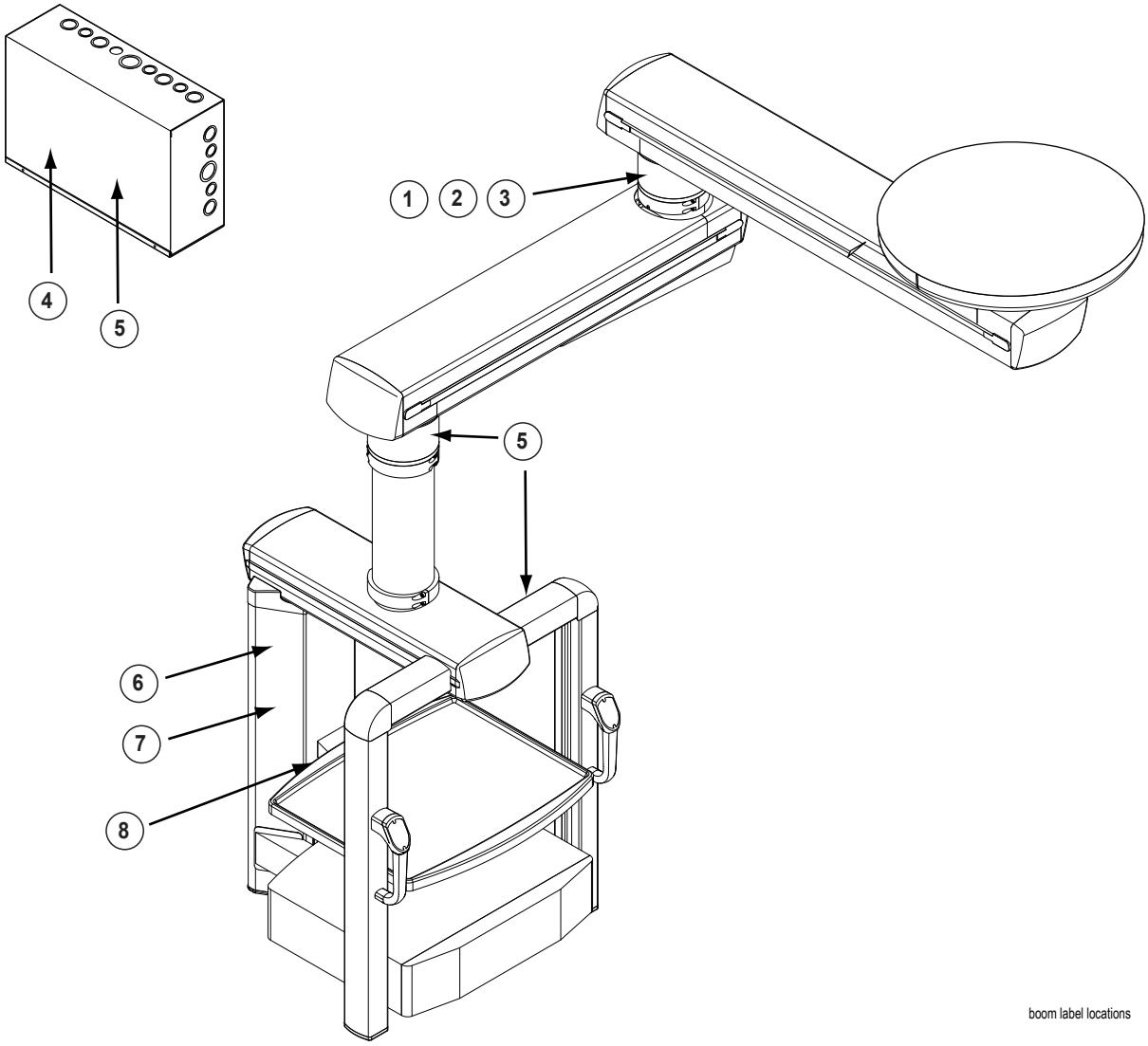
2-2. Certified by ETL to these standards:

Medical Electrical Equipment: Part 1:
General Requirements for Safety - UL 60601-1 (1st Ed., 25-Apr-03, Rev 30-Jun-03)

Medical Electrical Equipment: Part 1:
General Requirements for Safety - CAN/CSA C22.2 601.1-M90,
General Instruction No. 1 (1st Ed., 30-Nov-90, R2005) + Update No. 2 (30-Nov-03)

2-3. Model Identification & Equipment Labels

The figure below depicts the product identification label (#2) and it's respective placement on the fixture. The model number is shown as part of the overall identification number printed or stamped on the product identification label. Other advisory and informative labels are provided throughout the fixture and depicted in the illustration below.



boom label locations

1

WARNING
-MULTIPLE CIRCUITS-
DISCONNECT ALL CIRCUITS
PRIOR TO SERVICING

AVERTISSEMENT
-CIRCUITS MULTIPLES-
DÉBRANCHEZ TOUS LES CIRCUITS
AVANT D'EFFECTUER DU SERVICE
SUR LES ÉQUIPEMENTS

2

SKYTRON - GRAND RAPIDS, MI
MODEL
SERIAL NO.
120 VAC, 60 Hz, 1 Ph TYPE B
AMP 2.7 FUSE 5A F.A. CLASS I
Manufactured by IHB

3

ETL LISTED
CONFORMS TO
UL STD 60601-1
CERTIFIED TO
CAN/CSA STD C22.2 NO.601.1
Intertek
98115

4

THIS SIDE UP
115V .AC

5

SKYTRON
Serial No: 05-06-VS2S0011-2S
IP 20
IHB Operations BV
Floresstraat 52
NL-8022 AD Zwolle
2010

6

TOTAL CIRCUIT LOAD		AMPS
1	120 VAC, 60 Hz, 1 Ph	20 Max
2	120 VAC, 60 Hz, 1 Ph	20 Max
3	120 VAC, 60 Hz, 1 Ph	20 Max

7

CIRCUIT 1
120 VAC 60 Hz

8

SECTION III INTRODUCTION

The ERGON Skyboom Series from SKYTRON is a ceiling mounted Utilities and Equipment Dispensing System. Electrical, gas and communications services are provided to the patient treatment area through a flexible dispensing head attached to a rotating arm system.

The fixtures are single point ceiling mounted with up to a 330° rotation capability at the ceiling mount, the middle bearing on a dual radial arm model and the carrier. See figure 3-1. All rotation stops and the degree of rotation can be adjusted to meet specific needs.

The optional height adjustable radial arm can be raised or lowered for vertical travel capability of 24" (610mm) - 30" (762mm) for Lightweight Utility arms.

NOTICE

Skyboom configurations will vary depending on the number and type of options selected.

Model variations include single arm, dual arm, two dual arm sets or combinations of Skyboom fixtures and SKYTRON lighting fixtures from a single mounting hub.

The center hub mounted (upper) radial arms are fixed height and are available in various lengths. The secondary radial arms that are attached to the upper arms may be fixed height, powered height adjustable or manual height adjustable.

The utilities dispensing/equipment carriers available include a Utilities supply Box (UB), Vertical Utilities supply head (VBM) or a CM, KM, PM, XM equipment carrier in 24" (610mm), 36" (914mm), 48" (1219mm) or 56" (1422mm) lengths.

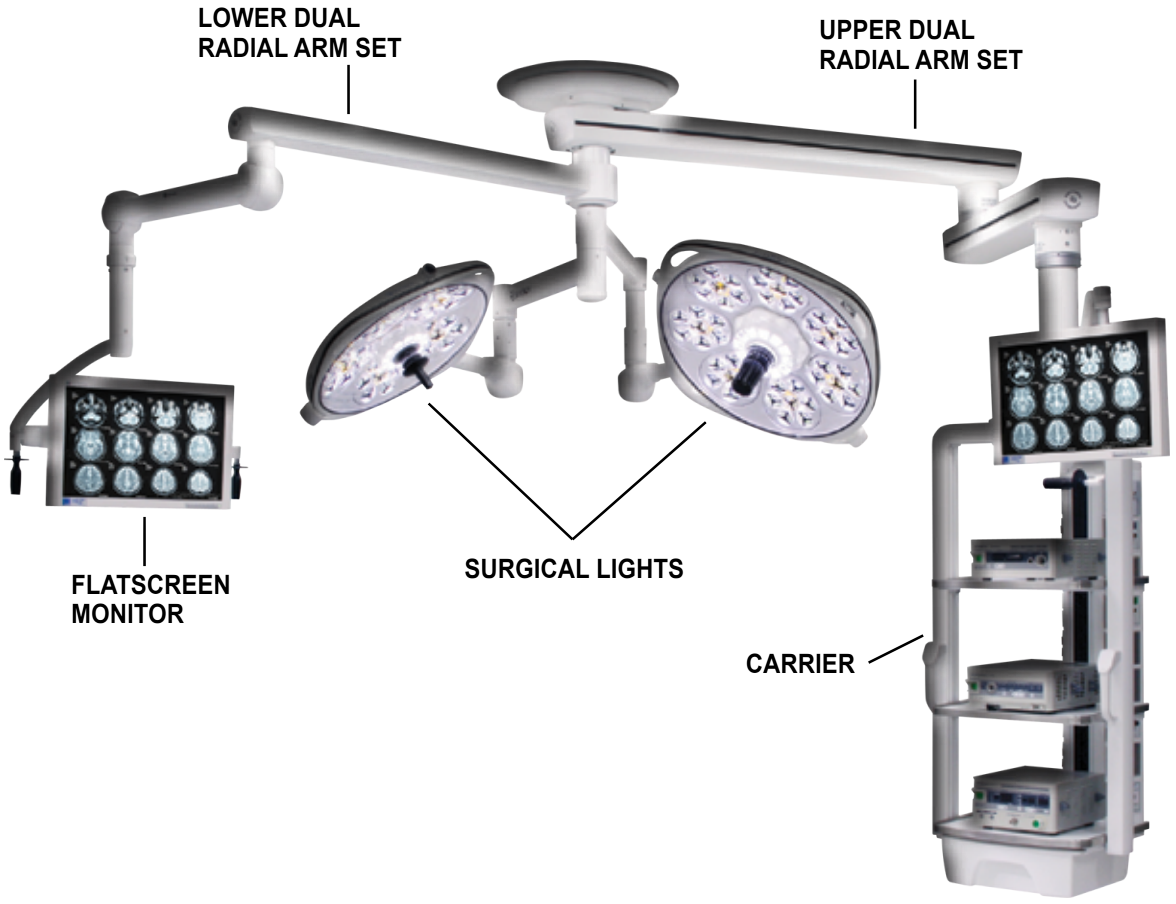


Figure 3-1. Typical Fixture Components

SECTION IV MAINTENANCE

4-1. Maintenance Matrix

The specific items listed in the MAINTENANCE MATRIX shall be inspected and repaired or replaced as necessary. The suggested time intervals are intended as a guideline only and actual maintenance will vary by use and conditions.

Component	6 Months	1 Year	10 Years
Mounting Plate Hardware (Tighten/Torque)		X	
Mounting Plate Level		X	
Inspect Gas Hose to Riser Connections		X	
Inspect Electrical Connections at Mounting Plate		X	
Upper Arm Covers & Attachment Hardware		X	
Lower Arm Covers & Attachment Hardware		X	
Carrier Shelf Securement & Hardware	X		
Side rail Tightness		X	
Positioning Handle		X	
Overall Aesthetic Condition	X		
Ceiling Cover Function		X	
Product Caution & Warning Labels		X	
Communication & A/V Lines	X		
Electrical Lines	X		**replace**
Medical Gas Lines	X		**replace**
Dropping Valve Adjustment		X	
Upper EL Limit Switch Setting		X	
Lower EL Limit Switch Setting		X	
Hydraulic Cylinder		X	
Hydraulic Pressure Pump		X	
Hydraulic Line		X	**replace**
Hydraulic Oil		X	
Rotation Stops (Stop Bolts)	X		
Friction Brakes	X		
Pneumatic Gas Cylinders (Gas Springs)		X	
Plumb Adjustment		X	
Plumb Hardware and Actuator		X	
Eccentric Parallel Pin & Hardware		X	
Pendant Control Unit	X		
Elevation Control Buttons	X		
Elevation Control PCB		X	
Bearings		X	
Dock-It Models		X	
Caster Wheel(s)	X		
Power Cord Assembly	X		

Component	6 Months	1 Year	10 Years
Light Weight Spring Arm Models		X	
Brake Block (Brass)		X	
Brake Key (Brass)		X	
Stop Key (Brass)		X	
Inspect & Lubricate Height Adjustable Arms	X		
Accessories		X	
Monitor Mount Adjustment	X		
Monitor Mount Cables	X		
Medical Gas Outlets	X		
Electrical Outlets	X		
Communications & A/V Outlets	X		
Fixture Ground Test	X		

4-2. Troubleshooting

PROBLEM	CAUSE	REMEDY
Arm or equipment carrier moves with difficulty.	Too much equipment on the carrier. Friction brakes to tight. Arms and fixture are not level.	Remove equipment that is not needed. Adjust the brakes. Check mounting plate.
Arm or equipment carrier will not stay in position.	Too much equipment on the carrier. Friction brake too loose. Arms and fixture are not level. Cables through the arms and bearings push the arm out of position.	Remove equipment that is not needed. Adjust the brakes. Check mounting plate. Check hose and cable routing.
Arms and carriers move instable.	Equipment is placed or attached eccentrically on the carrier. Too much play in the mounting fixture.	Place and attach equipment in the center of the carrier. Check the mounting plate.
Spring arm will not stay in position.	New or more equipment placed. Equipment is taken off. Spring tension is not balanced for the equipment load.	Remove equipment that is not needed. Place an equivalent in weight of other equipment. Adjust the spring tension or exchange the gas springs.
Hydraulic arm is lifting too slow.	Too much equipment on the carrier.	Remove equipment that is not needed.
Hydraulic arm is lowering too slow.	The hydraulic pump is not adjusted correctly.	Adjust the hydraulic pump.
Arms or equipment carriers collide.	Rotation area is not set correctly.	Adjust the rotation stops.
Paint damage.	Arms and carriers collide. Equipment has damaged the paint. Wear and tear.	Make sure that the paint damage cannot lead to hazards for the patient. Paint.
Arms or equipment carrier rotate more than 330°.	Rotation stop is missing or damaged.	**Do not use the Fixture!** Gas hoses and electrical wiring may be damaged. Repair and replace stops.
Service outlet not working properly.	Gas outlets not functioning or noise audible. Electrical outlet not functioning.	**Do not use the Fixture!** Gas hoses and electrical wiring may be damaged. Inspect and repair.

4-3. Preventive Maintenance Procedures

The following procedures should be done semi-annually or sooner as needed.

a. All attaching hardware (screws, nuts, etc.) should be physically checked for tightness. Any missing hardware MUST be replaced. Replacement hardware should use Blue Loctite®.

b. Rotate the radial arm assembly around the ceiling mount to check for proper stop operation and the ability of the arm to remain in any position through the entire range of movement. Adjust stops and friction brakes as needed.

c. Rotate the utilities dispensing head through its full range of movement to check for proper stop operation and for any signs of drifting. Adjust as needed.

d. The gas outlets and hose assemblies should be checked for any signs of leaks or signs of abrasion on the hoses at points of rotation. Check the outlets for wear and proper operation. Labels should be legible to ensure safe operation. Gas hoses must be replaced every 10 years. Exposed surfaces of outlets may be cleaned with a mild detergent solution or wiped with a disinfectant used for patient room surfaces that is compatible with acetal and nylon plastic, anodized aluminum and die cast zinc. Lubricate elastomer seals sparingly with a lubricant compatible with oxygen. Silicone lubricant, Dow Corning compound #4 or equivalent. DO NOT USE OIL. Follow National Fire Protection Association Standard 99, 99C "Gas and Vacuum Systems," and Canadian Standards Association, Standard Z 305.1 "Nonflammable Medical Gas Piping Systems" requirements and methods for periodic testing and maintenance of medical gas and vacuum systems. Refer to Beacon Medical Products Service Manual (included in this manual) for further service support information.

e. The electrical outlets should be inspected for any signs of damage and replaced if needed. The electrical system should be checked for shorts, leakage or any signs of abrasion on the electrical cables at points of rotation. Inspect equipment to ensure electrical circuit capacity is not exceeded. Refer to circuit amperage tag on the utilities dispensing head. It is recommended that electrical wiring be replaced every 10 years.

f. The communications and video connectors should be inspected for any signs of damage and for proper engagement. Inspect for any signs of abrasion on the cables at points of rotation.

SECTION V INSPECTION & ADJUSTMENTS

5-1. Hose, Fitting and Cable Inspection

During routine maintenance inspections, the hoses and cables should be inspected at all points of articulation for any signs of abrasion, twisting or pinching. Replacement is necessary if any damage is found. Electrical cables and flexible gas lines must be replaced every 10 years or in conformity with national codes regardless of appearance. D.I.S.S. fittings and connection points must be inspected for gas leaks using the appropriate equipment and recognized methods. Use the following procedure to inspect the hoses and cables that exit from the top of the upper radial arm or hub. Refer to figure 5-1.

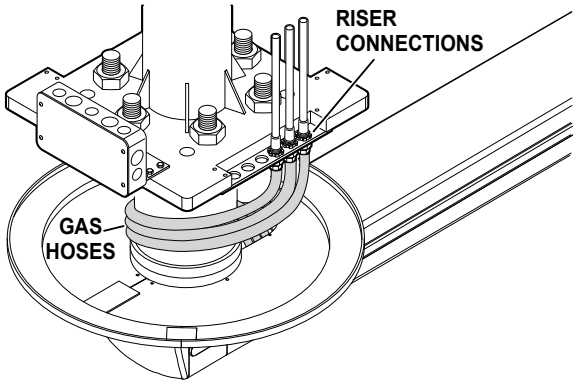


Figure 5-1.

a. Remove the two bolts retaining the lower ceiling cover halves and remove the lower ceiling cover.

b. Inspect the hoses and cables for any signs of damage. The hose and cable routing should be neat and comprised in a harness configuration. The harness should be fastened in a fashion that does not permit it to rub against the ceiling or other obstructions as it rotates with the arm.

c. Inspect the Gas Hose to Riser Connections for any loose fittings or signs of leaks.

d. Inspect all mounting hardware and physically check for tightness.

e. Inspect the Radial Arms for any signs of drifting. Check the tube of the mounting hub with a level to make sure it is plumb.

f. Using the torque multiplier, ensure the 1-1/4" mounting hub nuts are properly torqued to 660 ft. lbs.

5-2. Bearing Adjustments

As a part of periodic maintenance or as equipment changes are made, the bearing settings may require adjustment. Use the following procedures to adjust the bearings. During any stop adjustment, inspect the Stop Bolt for any indication of wear or damage.

a. Main Bearing Stop Assembly

The bearings contain an adjustable stop mechanism and a friction brake at the Hub, Center Bearing and Vertical Support Tube. The stop mechanism allows the radial arm Degree of Rotation to be set between 15° and 330° in 15° increments.

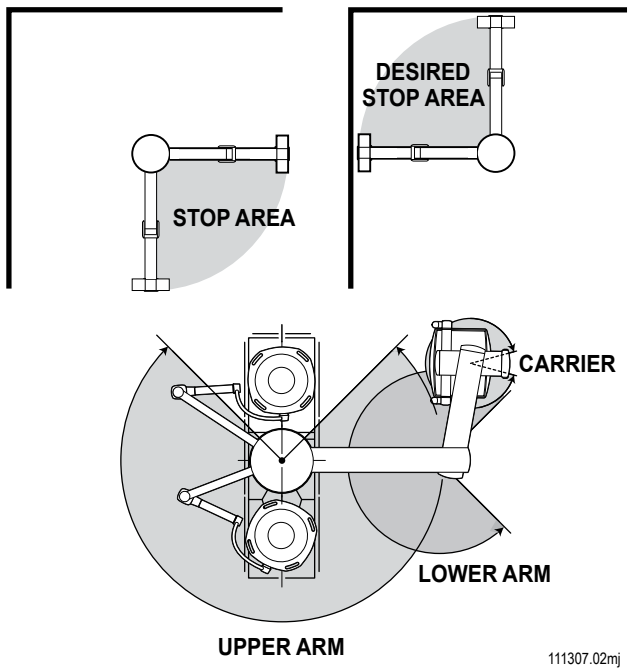


Figure 5-2.

Depending on arm model, end caps and covers may need to be removed for access.

To access the Stop Bolt and Friction Brake on the hub end of the upper radial arms, the End Cap and Cover will have to be removed. To remove them, carefully peel back the Trim Strip for access to the retaining screws. Refer to figure 5-3.

Remove the End Cap Screws and remove the End Cap. Loosen, but do not remove the Cover Retaining Screws and remove the cover.

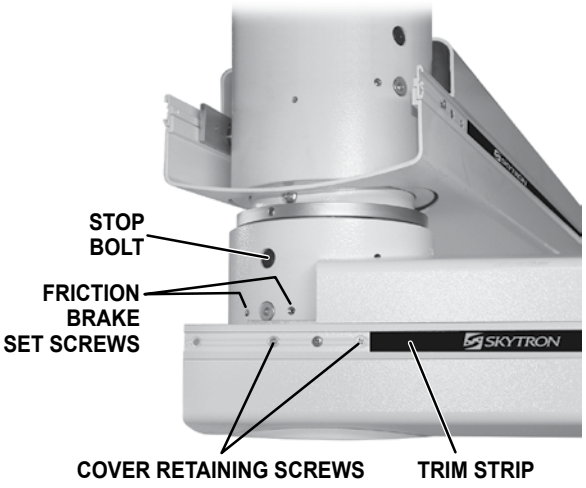


Figure 5-3.

The bearings use two Stop Balls and a Stop Bolt to set the rotation adjustment.

The Stop Bolt is located in the bearing as shown in figure 5-4.

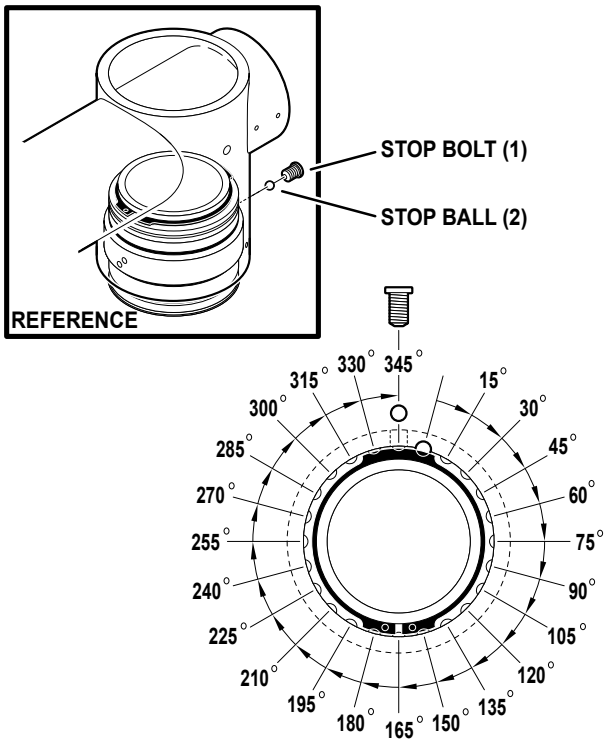


Figure 5-4.

Use figures 5-2 and 5-4 to determine the degree of rotation desired and the rotation position in relation to the radial arm.

If an adjustment is required, the Stop Bolt and one or both of the Stop Balls will have to be removed from the bearing. Use the following procedure to adjust the stops.

CAUTION

Do not rotate Radial Arms more than 360°. Damage to the equipment could occur.

1. Remove the Stop Bolt and one or both Stop Balls.

2. Rotate the arm or carrier to the first desired stop location and insert one of the Stop Balls.

3. Rotate the arm or carrier in the opposite direction to the second stop location and insert the second Stop Ball.

4. Rotate the arm or carrier back toward the first Stop Ball, install and tighten the Stop Bolt.

b. Friction Brake Adjustment

Prior to making any adjustments to the friction brakes to compensate for radial arm drift, make sure that the mounting structure has been properly constructed. Make sure that the fixture mounting hub is properly leveled and that the fixture mounting hardware is properly tightened.

Each bearing has a friction brake assembly that applies tension on the bearing to restrict the movement. The ideal adjustment is at the point of overcoming any "drift" while allowing relative ease of movement.

Proper adjustment of all of the friction brakes will aid in the positioning of the utilities carrier. Proper adjustment is with the mounting hub bearing movement adjusted to be the most restricted, then the center bearing and finally the end bearing. Refer to figure 5-5.

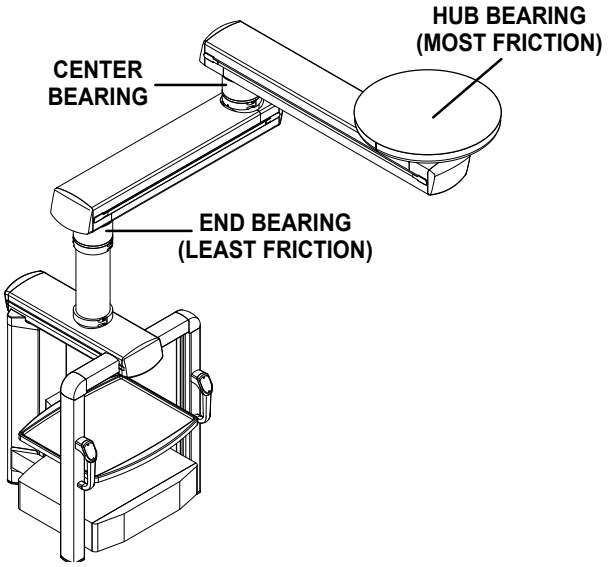


Figure 5-5.

Use the following procedure to adjust the friction brake. Refer to figure 5-6.

1. Loosen the center allen bolt.

2. Tighten the two small set screws evenly until desired resistance is met. Tighten the allen bolt.

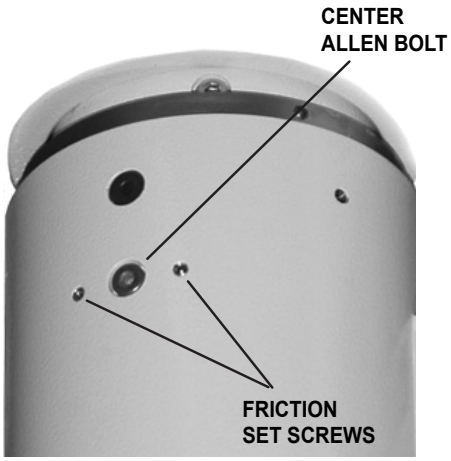


Figure 5-6.

3. Test the brake adjustment through the full range of rotation. Adjust as needed to attain proper movement.

4. Tighten Center Allen Bolt securely.

5-3. Powered Height Adjustable Arm

a. Pump Adjustments

Test the operation of the hydraulic pump and Height Adjustable Arm using the up/down buttons on the carrier handle or the pendant switch control.

The down movement of the arm is controlled by a dropping valve. When the valve is activated a return port to the reservoir is opened. The weight of the arm and carrier forces the hydraulic fluid from the cylinder back to the reservoir allowing the arm to descend. Speed should be equal when raising or lowering the arm.

The pump enclosure is mounted above the finished ceiling. To gain access to the pump, remove the pump enclosure cover.

WARNING

The pump enclosure contains 120VAC electrical service. Use extreme care when making pump adjustments.

The dropping speed of the radial arm can be adjusted at the hydraulic pump. To adjust the dropping speed of the arm, remove the plastic cover on the top of the pump assembly and use an allen wrench to turn the adjustment screw until the desired speed is achieved. Refer to figure 5-7. The dropping speed should equal the elevation speed. The elevation speed is dependant on the weight of the carrier and equipment. There is no elevation speed adjustment.

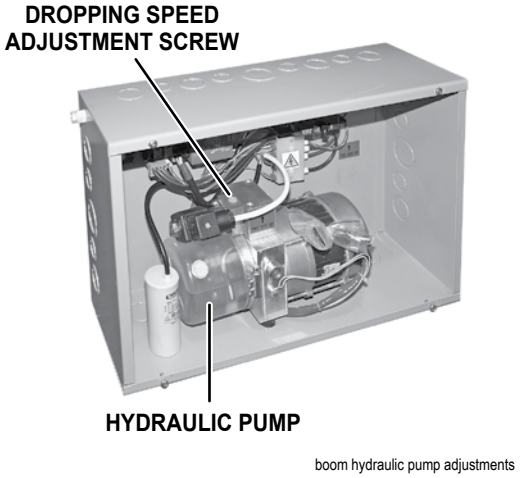


Figure 5-7. Hydraulic Pump Adjustments

WARNING

Hydraulic lines, fittings and joints may be under high pressure. Release system pressure by lowering and supporting arm.

Inspect the pump for any leaks at each plumbing connection. Inspect the oil level in the reservoir. The oil level should be within 1" of the filler cap with the arm in a full down position. Use SKYTRON Hydraulic Oil part number AZOLIAZS 46 if additional oil is required. The oil level can be an indication of the overall condition of the hydraulic circuit. Discoloration or low fluid level indicates other potential problems.

b. Cover Removal

To gain access within the arm assembly for adjustments, the outer covers must be removed. The center trim strip contains a clamping mechanism which holds the covers in place. Use the following procedure to remove the covers. Refer to figure 5-8.

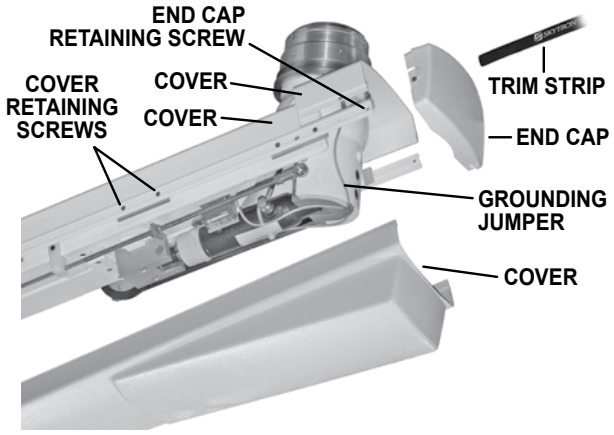


Figure 5-8. Covers

1. Using care not to damage the trim strip insert, remove the black trim strip insert from each side of the arm. Set aside for later installation.

2. Remove the end cap retaining screws and remove the end caps.

3. Support the lower arm covers and loosen, but do not remove the cover retaining screws.

4. Observe the placement of grounding jumpers from the covers to the arm chassis. It is important that each jumper is reinstalled to ensure proper grounding reliability. Remove the hardware as needed to disconnect the jumper and remove the cover.

c. Up Limit Switch Adjustment

The Height Adjustable radial arm will move to approximately 30° above horizontal. A Limit Switch is provided in the powered height adjustable arm to limit the upward travel of the arm. It is also used to prevent excessive hydraulic pressure build-up by preventing the hydraulic pump from continuing to operate after the cylinder has reached the end of its stroke. To restrict the upward movement of the arm, adjust the limit switch located in the hydraulic radial arm. See figure 5-9.

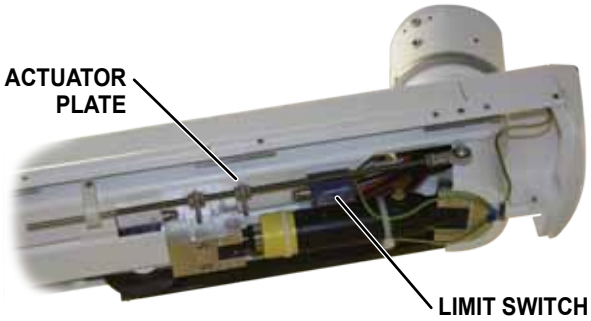


Figure 5-9. Up Limit Switch Adjustment

NOTICE

The UP limit switch must be set to stop the activation of the hydraulic pump even when not in use for height restriction.

1. Raise the arm to the desired height, loosen the two nuts securing the switch actuator plate to the arm.

2. Adjust the plate to activate the switch at the desired stopping point and tighten the nuts.

3. Make sure that the switch is adjusted so the hydraulic pump is shut off before the cylinder reaches the end of its stroke.

d. Down Limit Switch Adjustment

Dock-It systems employ two limit switches to restrict the movement in up and down positions of the arm. The down limit switch is set for proper docking height of the cart. Use the following procedure to adjust the down limit switch. See figure 5-10.

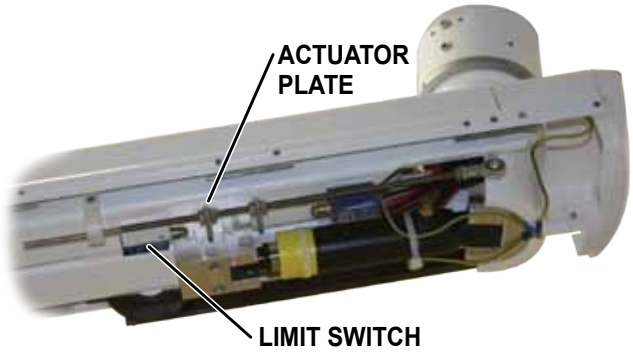


Figure 5-10. Down Limit Switch Adjustment

1. Lower the arm until the Dock-It Cart can be placed within the Attachment Head.

2. Loosen the Nuts and adjustable actuator plate to activate the switch and tighten the nuts.

3. Raise the arm to engage Dock-It Cart with Attachment Head and raise cart.

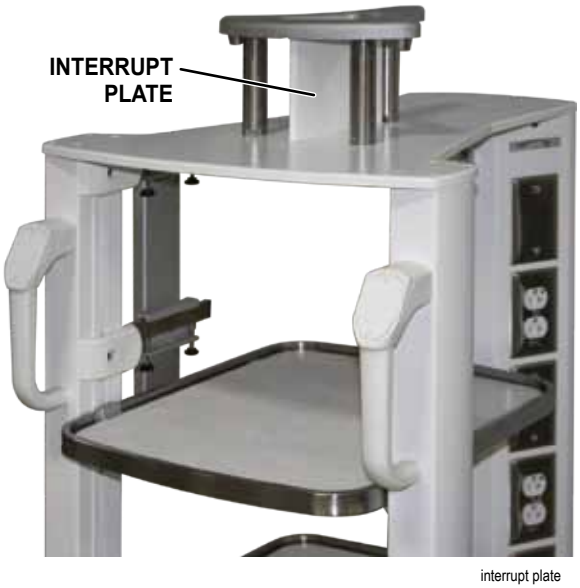
4. Lower the arm to verify the proper adjustment for cart removal.

5. Inspect hydraulic cylinder and hydraulic hose for any signs of abrasion, wear or leaks.

6. Replace all covers when adjustments are complete.

e. Dock-It Cart Adjustment

If the arm will not raise when the Dock-It Cart is in position, the Infrared Interrupt Plate may require adjustment. Use the following procedure to adjust the plate. See figure 5-11.



interrupt plate

Figure 5-11. Interrupt Plate

1. Place the cart in position within the attachment head.

2. Loossen the two screws conneting the plate to the cart.

3. Adjust the plate forward or backward as needed until arm will actuate and tighten the screws.

f. Plumb Adjustment

The lower vertical support tube (VST) and carrier should be perpendicular to the floor. This adjustment should be made with all the equipment set in place. The carrier/utilities dispensing end of the height adjustable radial arm has a cam adjuster for setting the plumb of the lower VST. Use the following procedure to set the plumb of the VST. Refer to figure 5-12.

Figure 5-12. Plumb Adjustment

1. Place the arm in the level position.

2. Using a spirit level, check the plumb of the VST with the level positioned under the radial arm.

3. If an adjustment is necessary, remove the end cap from the end of the arm and loosen the large retaining bolt. Turn the adjustment bolt as needed to obtain proper alignment. Tighten the retaining bolt securely once the adjustment is complete.

5-4. Manual Height Adjustable Arm Spring Tension Adjustment

The manual height adjustable arm uses gas spring cylinders to supply the tension to balance the arm. One or two gas springs may be required to balance the arm depending on the weight of the carrier and equipment being supported by the arm. Use the following charts (Figure 5-13.) to determine the proper gas spring configuration required. In addition to the carrier weight, make sure to include the weight of any accessories, monitors or equipment that may be mounted on shelves when determining the proper gas springs.

Gas Spring Weight Capacity

Spring	Weight Range LBS
2000N	23-56
2500N	40-76
3000N	52-117
3500N	68-143
4000N	75-146
4500N	111-160
5000N	133-183

Available Gas Springs

Spring Force	Part Number
1000N	H2-030-27
2000N	H9-502-09
2500N	H9-502-10

Carrier Weight

Carrier	Weight LBS
VBM24	31
VBM36	40
UB	68
UB-1	88
FCM3	77

Figure 5-13.

Use the following procedure to adjust the spring tension.

a. Support the arm and remove the bottom cover.

b. Course Adjustment - Remove the four bolts securing the cylinder mounting block. Move the block up to decrease the weight capacity, down to increase. Replace the four bolts to secure the cylinder mounting block.

c. Fine Adjustment - Loosen the middle set screw. Adjust the height of the center pin to balance the weight by adjusting the two cover screws. Tighten the middle set screw.

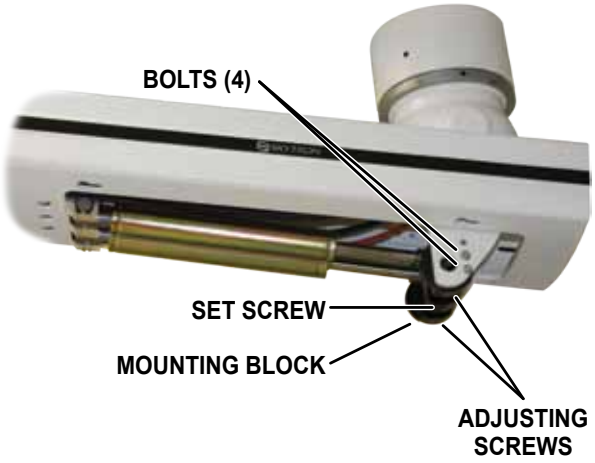


Figure 5-14. Spring Tension Adjustment

5-5. Carrier Shelf Adjustment

If equipment changes require repositioning the shelves, use the following procedures to move the shelves. Refer to figures 5-15 thru 5-17.

a. Center Aligned Shelves

Figure 5-15. Center Aligned Shelves

Center aligned shelves can be adjusted using the following procedure.

CAUTION

The maximum equipment weight for each Center Aligned shelf is 100 lbs. (45 kg.). Use caution when stacking more than one piece of equipment on the shelves. Unstable equipment may fall off the shelves during positioning of the carrier. Hold down straps may be required.

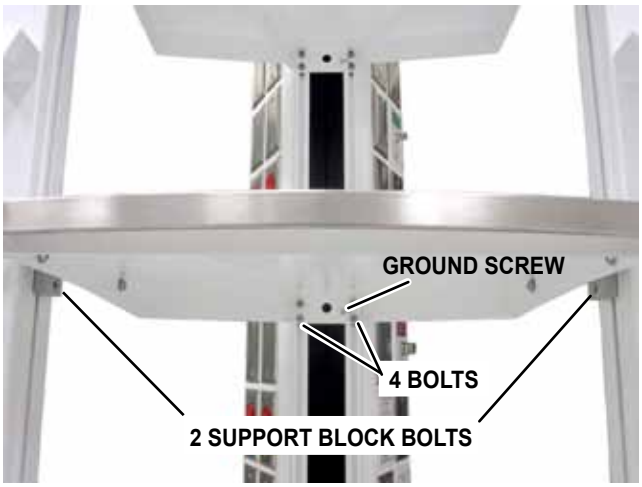


Figure 5-16.

Remove equipment from shelves to be adjusted and loosen the ground screws and the four bolts securing the rear of the shelf to the shelf track.

Avoid completely removing the bolts but loosen sufficiently to allow vertical travel necessary to facilitate the adjustment.

Loosen each bolt securing the shelf support blocks on the side shelf tracks.

Adjust the shelves in accordance with the space requirement needs necessary to accommodate the equipment to be placed on the shelves. Once the adjustment is complete, tighten the four bolts firmly and ensure that the shelf is secured. Tighten the ground screw and verify that the equipment rail has less than 0.1 Ω Earth resistance.

Install the equipment on the shelf ensuring that the equipment is stable and secured as necessary. Make the respective medical gas, electrical or A/V and data connections as needed.

b. Cantilevered Shelves

Figure 5-17. Cantilevered Shelves

CAUTION

The maximum equipment weight for each Cantilevered shelf is 70 lbs. (31 kg.). Use caution to avoid overloading when stacking more than one piece of equipment on the shelves. Unstable equipment may fall off the shelves during positioning of the carrier. Hold down straps may be required.

Remove equipment from shelves to be adjusted and loosen the four bolts found on the underside of the shelf, along with the grounding screw. Avoid completely removing the bolts but loosen sufficiently to allow vertical travel necessary to facilitate the adjustment.

Adjust the shelves in accordance with the space requirement needs necessary to accommodate the equipment to be placed on the shelves. Once the adjustment is complete, tighten the four bolts firmly and ensure that the shelf is secured, verify that the equipment rail has less than 0.1 Ω Earth resistance.

Install the equipment on the shelf ensuring that the equipment is stable and secured as necessary. Make the respective medical gas, electrical or A/V and data connections as needed.

5-6. AFS Flatscreen Arm Series Adjustments

During any maintenance or adjustment procedure, check all attaching hardware for proper tightness.

a. Flatsceen Arm Bearing Stop Assembly

CAUTION

It is necessary to support the arm assembly prior to removal of any hardware. Failure to do so will result in the inadvertent release of the arm.

1. Remove set screws securing Stop Collar. Refer to figure 5-18.

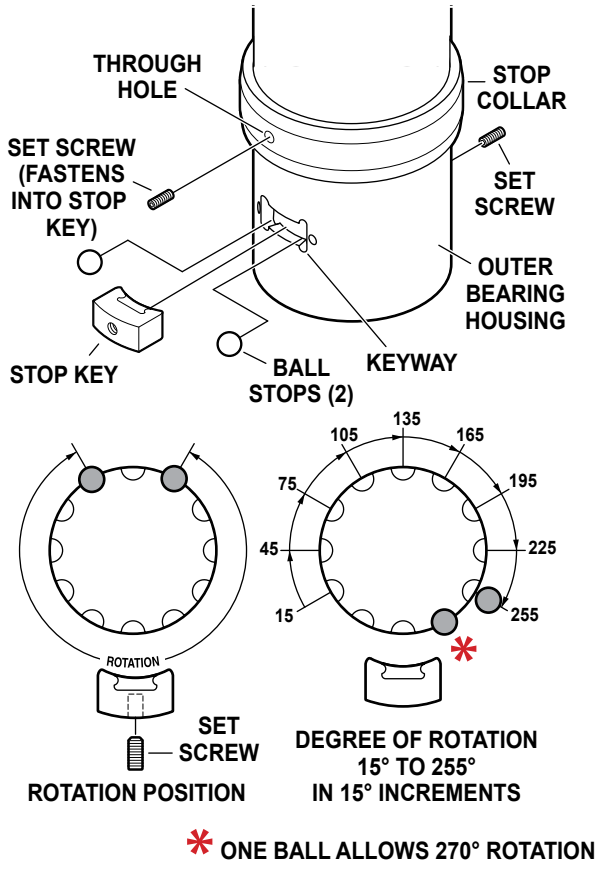


Figure 5-18.

2. Remove Stop Key and Stop Balls (2).

3. Determine new Stop Ball placement.

4. Install stop balls and stop key. Align the stop collar so the through hole lines up with the set screw hole in the stop key and install the set screw.

NOTICE

DO NOT overtighten the set screw, it is used to adjust the friction brake tension.

5. Tighten the set screw to set the friction brake. The flatscreen arm should move easily through its range of rotation without binding and hold its position when released.

b. Flatscreen Arm Tension Adjustment

Remove the lower end cap from the end of the arm to gain access to the spring tension screw. The end cap is secured by a screw located on the top side of the arm. Using an allen wrench, adjust spring tension by turning the spring tension adjustment screw clockwise to decrease tension and counter clockwise to increase tension. The arm should hold its position throughout its range of travel (figure 5-19). The vertical travel stop can be removed, if applicable, to achieve a full range of vertical travel. Remove the block by removing the allen bolt. Install end caps upon completing the adjustment.

CAUTION

Do not remove the vertical travel stop if the monitor is not installed. Removing the stop without the weight of the monitor will result in damage to the plumb adjustment system.

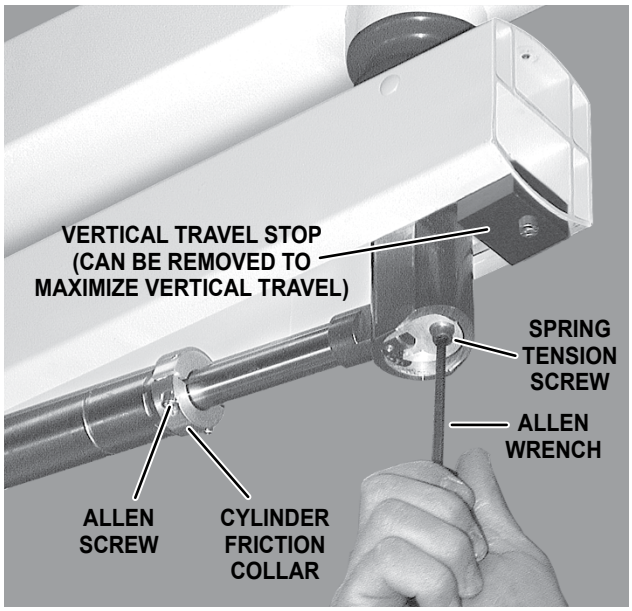


Figure 5-19.

c. Flatscreen Arm Plumb Adjustment

The Vertical Support Tube and flatscreen monitor should be aligned perpendicular to the floor throughout the range of vertical movement of the spring arm. Check the plumb of the Vertical Support Tube and use the following procedure to adjust if needed. Refer to figure 5-20.

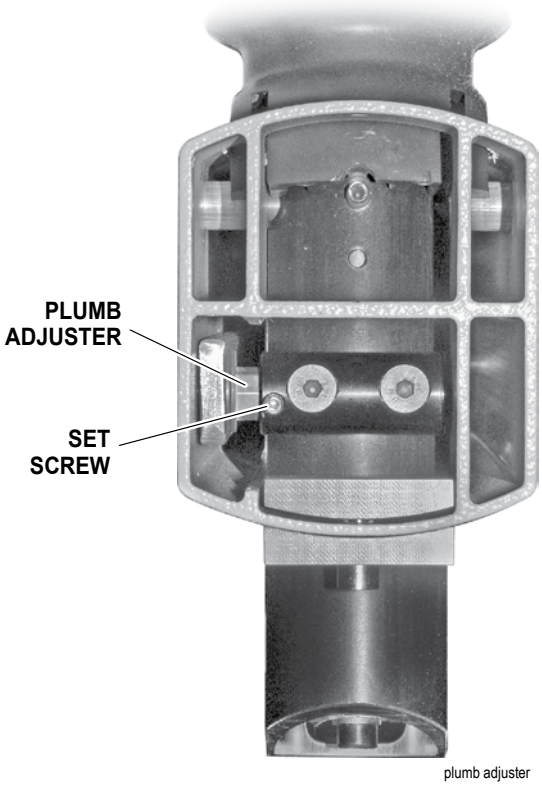


Figure 5-20.

1. Remove the end cap from the spring end of the Spring Arm.

2. Loosen the setscrew securing the plumb adjuster.

3. Using an open end wrench, turn the plumb adjuster until the desired adjustment has been achieved.

5-7. AFC Lightweight Utility Arm Series Adjustments

CAUTION

Removal of both Stop Pins could result in damage to internal cables and to equipment.

a. Upper Radial Arm Rotation Position Adjustment

The degree of rotation provided by the upper bearing stops can be positioned as desired for the relationship of the arm assembly to the room. Refer to figure 5-21. It is recommended that the upper arms rotate away from the surgical field and that the lower arms rotate underneath the upper arm.

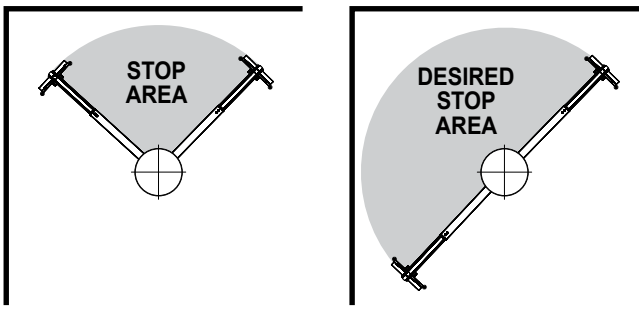


Figure 5-21.

To alter the position of the rotation stops for the mounting hub, use the following procedure.

1. Rotate the appropriate arm in the direction of the stop to be adjusted until it contacts the stop.

2. Remove the bolt that secures the Stop Plate and remove Stop Pin. Refer to figure 5-22.

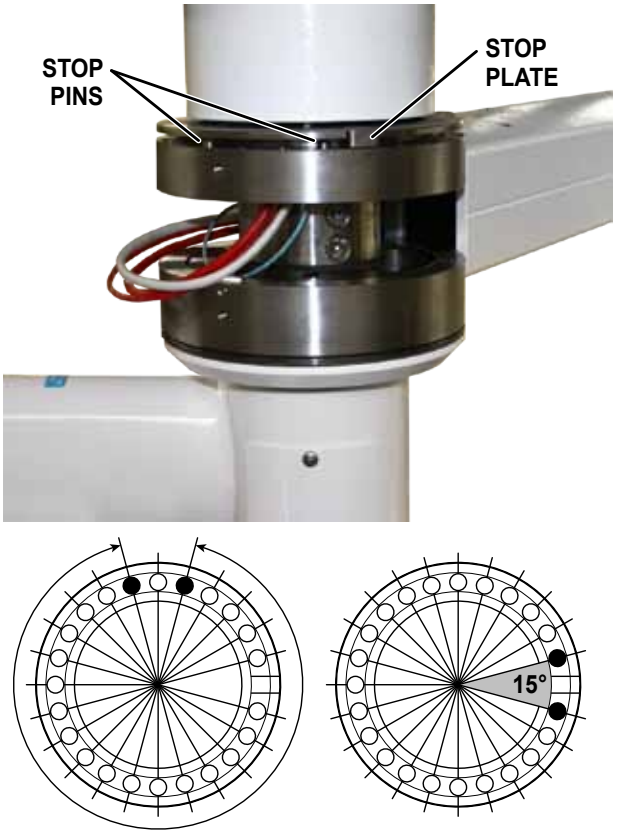


Figure 5-22.

3. Rotate the arm to the new stop position. Replace the Stop Pin, Stop Plate and secure with bolt.

4. Repeat steps 2 & 3 to adjust other stop if desired.

b. Upper Arm Level Adjustment

Level the upper arm with the monitor bracket, cables and flat screen monitors installed..

1. Loosen the two bolts (1) to allow adjusting the angle of the upper arm. Refer to figure 5-23.

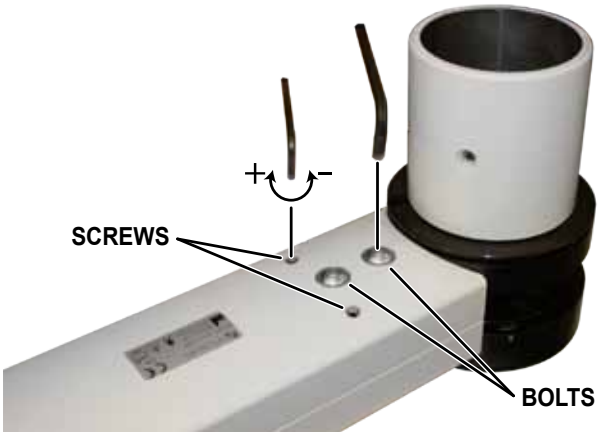


Figure 5-23.

2. Turn the two set screws (2) clockwise (+) to increase the angle of the arm and counter-clockwise (-) to decrease the angle. Make sure that both screws are adjusted with the same number of turns.

Verify that the arm is level with the installed equipment and tighten the bolts.

c. Upper Arm Friction Brake Adjustment

Do not adjust the Friction Brakes until all the fixtures are attached to the boom.

1. Using a screwdriver, remove two plastic Housing Screws and set aside. Remove the Left and Right Housing Cover and set aside. Refer to figure 5-24.

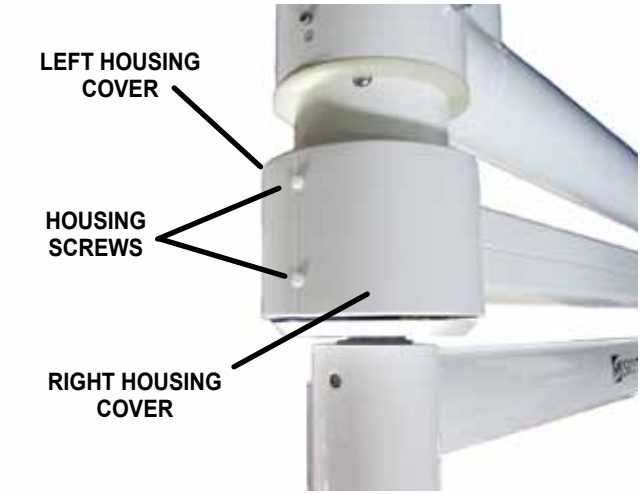


Figure 5-24.

2. Using an allen wrench, adjust three Allen Set Screws to the required friction level that allows the arm to move easily and not continue to move or drift when positioned. Refer to figure 5-25.

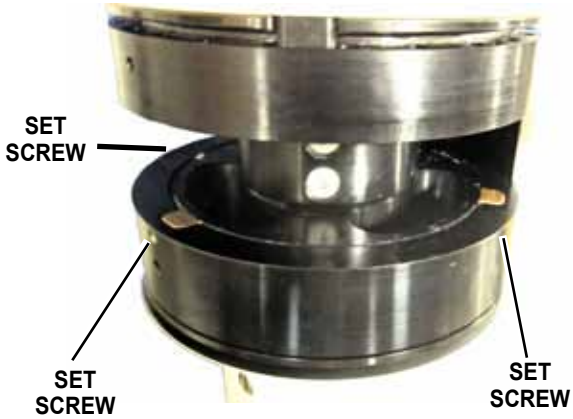


Figure 5-25.

3. Place the Left and Right Housing Cover back into position and secure with two Housing Screws.

d. Lower Radial Arm Rotation Position Adjustment

Determine Stop Ball placement for lower radial arm. The stop area should be as shown in figure 5-26.

CAUTION

Do not rotate Radial Arms more than 360° without setting the stops. Damage to the equipment could occur.

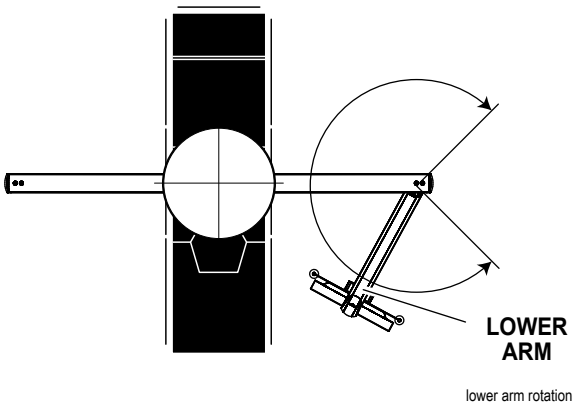


Figure 5-26.

CAUTION

It is necessary to support the arm assembly prior to removal of any hardware. Failure to do so will result in the inadvertent release of the arm.

NOTICE

The Brass Brake key is used to secure the lower arm to the upper arm.

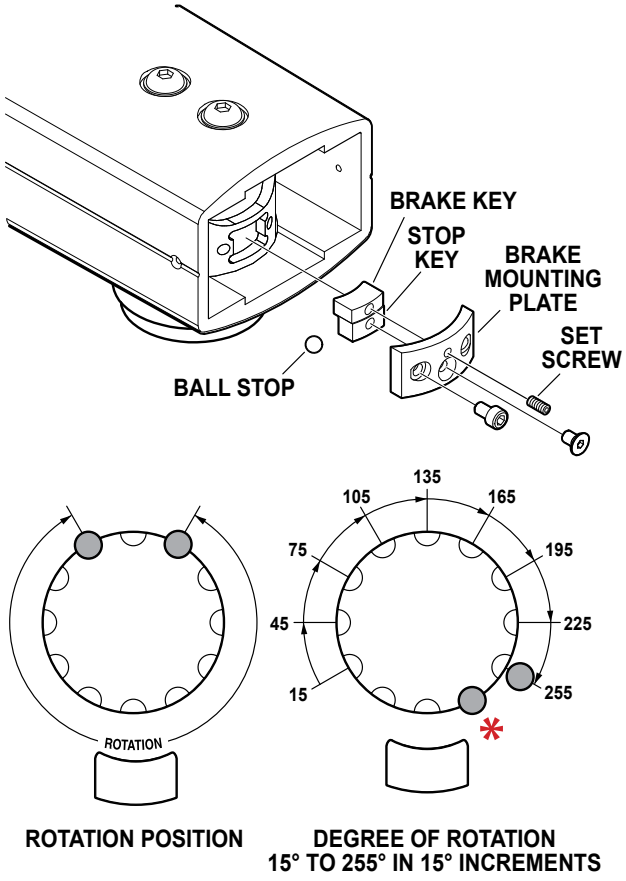


Figure 5-27.

5-8. AFC Series Manual Height Adjustable Arm

The height adjustable arm uses a gas spring cylinder to supply the tension to balance the arm. Three separate arm configurations are available to accommodate different equipment or Flatscreen Display weights.

The Standard AFC Arm will balance a weight of 32-75 lbs. (14-34 kgs).

The AFC-H Arm will balance a weight of 37-88 lbs. (17-40 kgs).

The AFC-M Arm will balance a weight of 17-33 lbs. (8-15 kgs).

The AFC-L Arm will balance a weight of 5-17 lbs. (2-8 kgs).

Use the following procedure to adjust the AFC Arms.

a. AFC Arm Tension Adjustment

This procedure should be performed with all brackets, equipment and cabling in place.

1. Place the arm in its full up position.

2. Remove the two screws securing side caps on the end opposite the equipment. See figure 5-28.

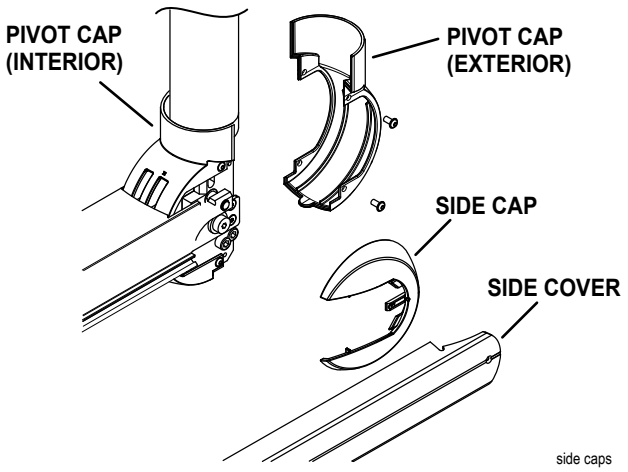


Figure 5-28. Side Caps

3. Remove the four allen bolts securing the exterior pivot cap and remove the cap. Remove the 4 allen bolts to loosen interior pivot cap.

4. Remove the 2 screws from Slider Cover and carefully remove Slider Cover.

5. Hold arm parallel to the floor (Neutral position) and turn Spring Arm Tension Bolt Clockwise 360°. A gap will appear between the Spring Arm Tension Bolt and the upper Bearing Assembly. See figure 5-29.

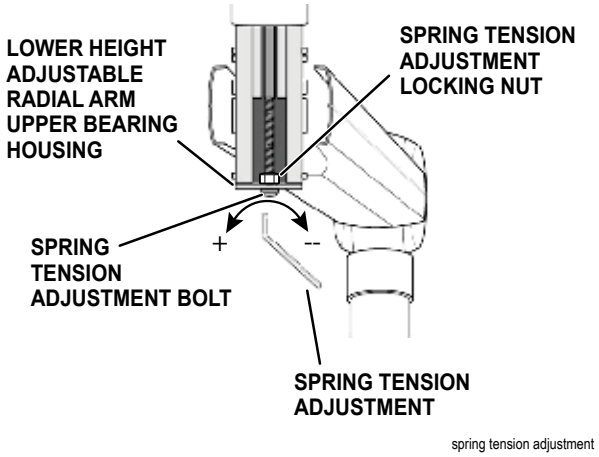


Figure 5-29. Spring Tension Adjustment

6. Lower arm toward the floor, then lift arm to full up position. Manually thread nut upward.

CAUTION

Do not turn spring tension bolt more than 2 turns at a time.

7. To decrease the tension turn the spring tension bolt clockwise, counter clockwise to decrease. After the bolt has been turned 2 turns, pull the opposite end of the arm downward until a snap sound is heard. This indicates that the Spring Tension Bolt is positioned properly.

8. Manually thread the Locking Nut down to remove the gap, do not tighten at this time.

9. Check the arm balance and repeat procedure as needed to achieve proper tension.

10. When proper tension is achieved, tighten the spring tension locking nut by manually threading nut down and turning bolt counter-clockwise to secure.

a. AFC Arm Limit Stops

The Arm has a stop mechanism that limits the upward movement to 20°. Use the following procedure to allow up to 40° of upward movement. Refer to figure 5-30.

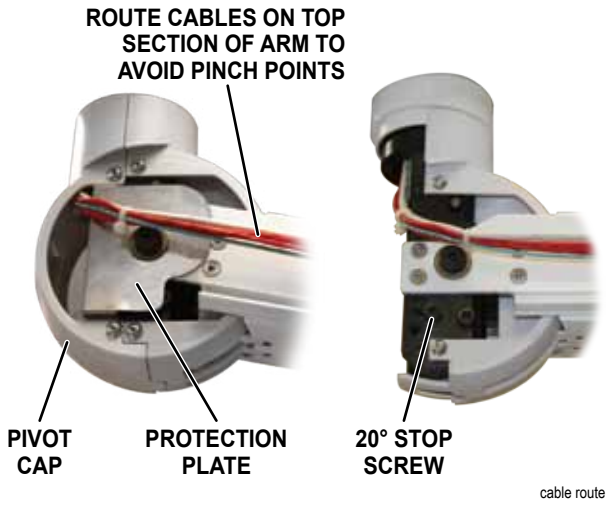


Figure 5-30. AFC Arm Limit Stops

1. Remove the two screws securing the side caps on the end opposite the equipment and remove the side caps.

2. Remove the attaching screws and remove the Pivot Cap and Protection Plate.

CAUTION

Do not remove the vertical travel stop bolts if the equipment is not installed. Removing the stop bolts without the weight of the equipment will result in damage to the plumb adjustment system.

3. Remove the two Stop Screws (one on each side).

4. Replace the side caps.

b. AFC Arm Plumb Adjustment

The Vertical Support Tube and flatscreen monitor or equipment should be aligned perpendicular to the floor throughout the range of movement of the height adjustable arm. Check the plumb of the Vertical Support Tube and use the following procedure to adjust if needed. Refer to figure 5-31.

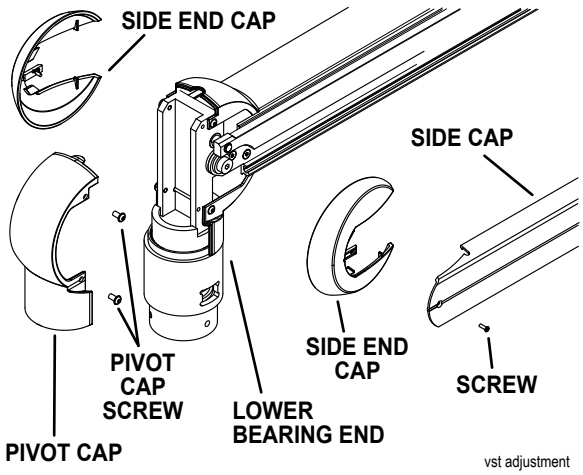


Figure 5-31. VST Adjustment.

The plumb adjustment should be done with all the equipment in place and after the spring tension has been adjusted.

1. Remove the screws securing the side caps on the equipment end of the arm and remove the side caps.

2. Remove the screws securing the side covers and remove the covers.

3. Place the arm parallel to the floor, check the arm position with a level placed on top of the arm. Place another level on the vertical support tube.

4. Loosen the retaining bolt on the opposite side of the Eccentric Cam Adjuster. Refer to figure 5-32.

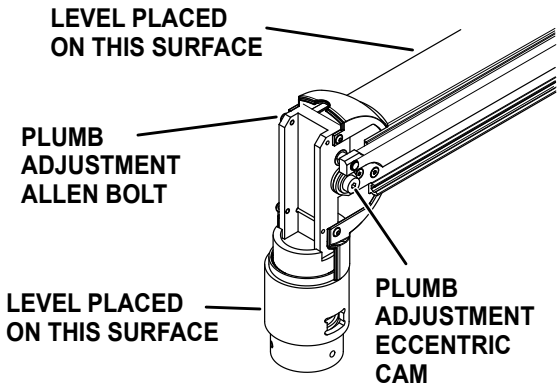


Figure 5-32. Eccentric Cam Adjuster

5. Using an open end wrench, adjust the eccentric cam until the level on the Vertical Support Tube indicates the tube is plumb.

6. Tighten the locking bolt and test the arm through its full range of motion. The Vertical Support Tube should remain plumb.

7. Replace all covers.

c. FC Monitor Mount

The tension for the FC Monitor Mount can be adjusted to achieve proper balance for the monitor. Use the following procedure to adjust the tension. Refer to figure 5-33.

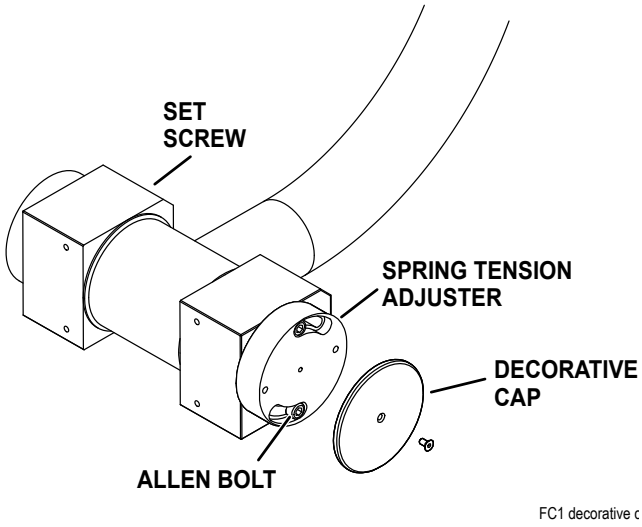


Figure 5- 33.

CAUTION

Do not adjust the set screw located on back side of the monitor bracket as this will internally damage the bracket and the bracket will need to be replaced.

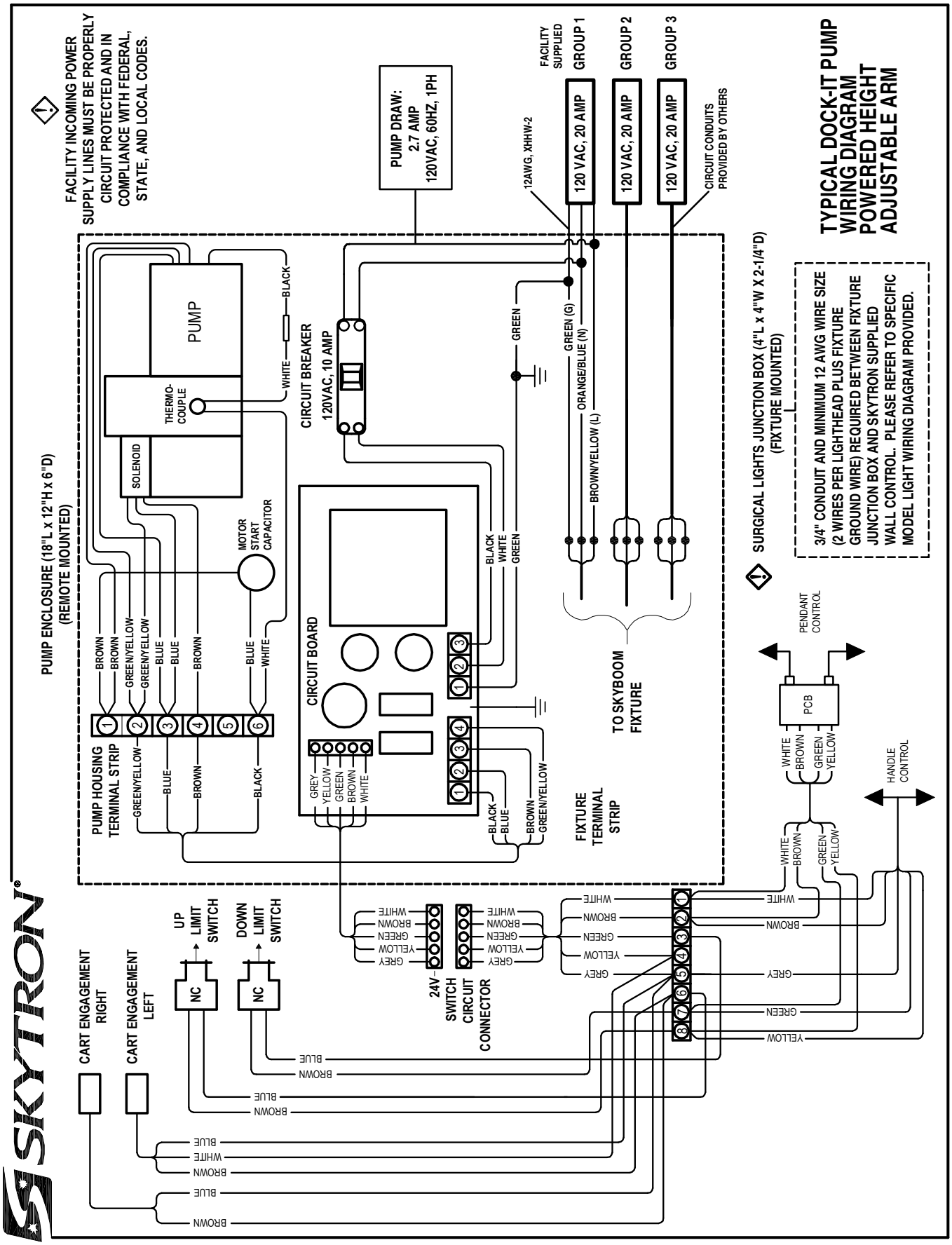
1. With the monitor installed, remove the 2 Decorative Cover Caps on the Monitor Arm Bracket to expose the Tension Adjuster.

2. Slightly loosen, but do not remove, the 4 allen bolts (2 on each side).

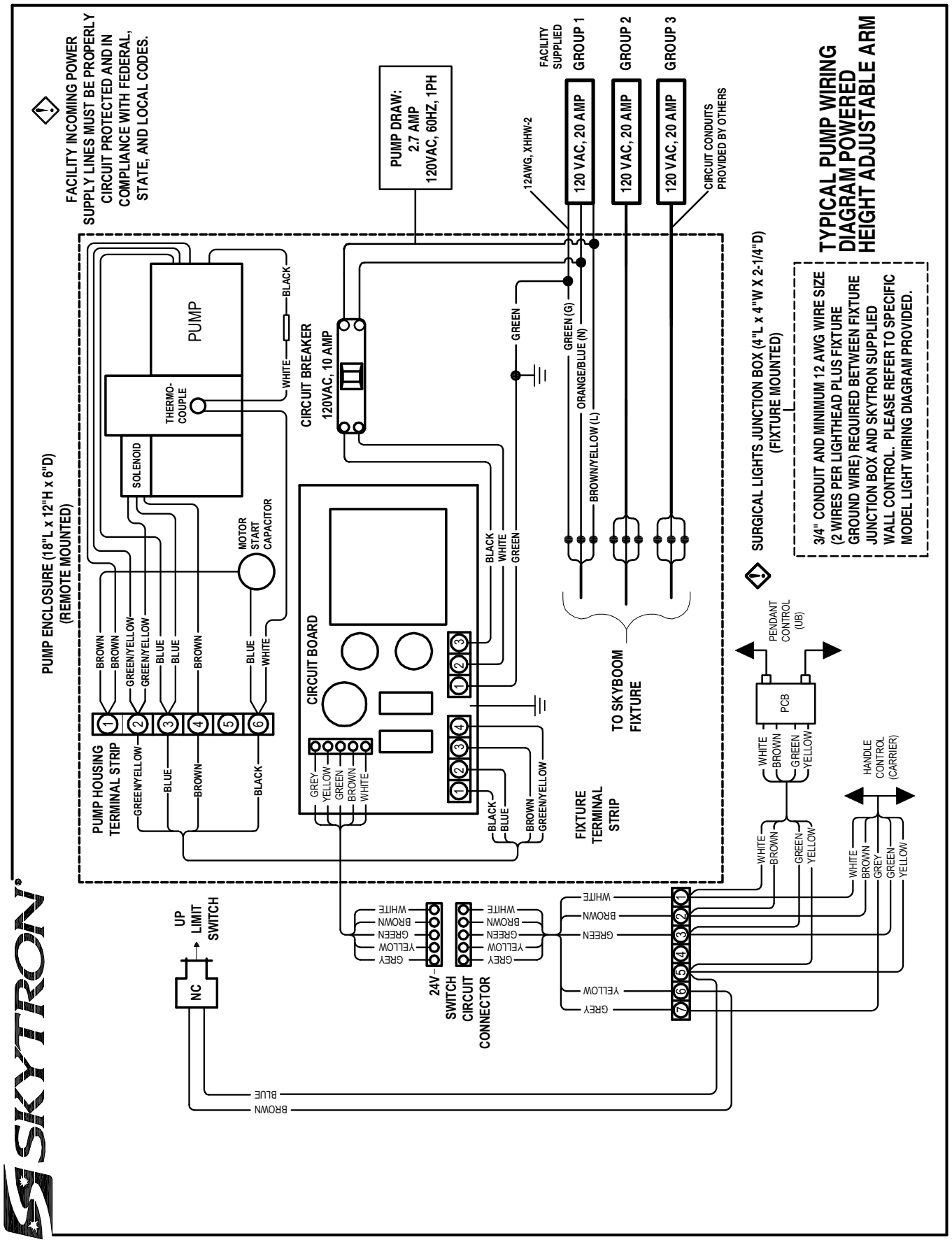
3. Turn the Spring Tension Adjuster clockwise for the right side and counterclockwise for the left side to increase tension (both sides should be adjusted evenly). Tighten the allen bolts to prevent the tension from decreasing.

4. Once the tension has been adjusted and the bolts tightened, install the Decorative Cover Caps.

TYPICAL DOCK-IT PUMP WIRING DIAGRAM



TYPICAL PUMP WIRING DIAGRAM



ADDENDUMS FOR THIS SERVICE MANUAL

- *Mounting Structure Pre-Installation Guide*
- *Boom and Gas Install Kit*
- *15 Series Column Op-Maint-Parts*

Click on any of the titles to the left to open.

Installation Instructions

- *Ergon Series w/Light weight Utility Arm & Ergon II Carriers*
- *Ergon Dual Arm*
- *Ergon Q-Line*
- *Ergon Boom/LFS*
- *15 Series Column Installation Manual*

Options & Accessories

Tether Brackets

- *H9-200-00 Dräger custom*
- *H9-200-07 Dräger*
- *H9-200-08 Dräger*
- *H9-200-09 Dräger*
- *H9-200-34 Dräger*
- *H9-200-05-01 Universal*
- *H9-200-05-02 Universal*
- *H9-200-21 Adjustable Dual Mount*
- *H9-200-30 Adjustable Dual Mount*

- *SKYLINK -parts*
- *EZ-GO IV TRANSPORT ADAPTER -parts*
- *EZ-GO IV TRANSPORT -operator's*
- *EZ-GO-HRC-TC - installation*
- *EZ-GO-SYK-CTA - installation*
- *EZ-GO-SYK-EPIC - installation*
- *EZ-GO-SYK-IT - installation*
- *POWER MATE - installation*
- *GCX Manual*
- *Beacon Medical Products Manual*

SKYTRON®
5085 Corporate Exchange Blvd. S.E.
Grand Rapids, MI 49512 • 1.616.656.2900 • FAX 1.616.656.2906