AMSCO Maintenance Manual

**ORBITER™**

**Equipment Management System**

**(12/92)** **P-764323-601**



# Table of Contents

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# List of Illustrations

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# List of Illustrations (continued)

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# Section 1: Summary of Safety Warnings and Cautions and General Information

## 1.1 SUMMARY OF SAFETY WARNINGS AND CAUTIONS

The following is a summary of the safety precautions which must be observed when operating or servicing this equipment. **WARNINGS** indicate **potential danger to personnel**, and **CAUTIONS** indicate **potential damage to equipment**. These precautions are repeated, where applicable, throughout the manual.

Observance of these safety precautions will minimize the risk of personal injury and/or the possibility of unit damage. It is important to understand that these precautions are not exhaustive. AMSCO could not possibly know, evaluate and advise maintenance departments of all conceivable ways in which maintenance might be done or the possible hazardous consequences of each way.

The operation and maintenance procedures recommended by AMSCO are described in this manual. Only these recommended maintenance procedures should be followed.

### WARNINGS —

**PERSONAL INJURY HAZARD:**

⚠ **Before using on a patient**, check for proper equipment operation and acceptable gas flows.

⚠ **When positioning unit over patient**, raise and lower unit carefully.

**EXPLOSION HAZARD:**

⚠ **Before operating equipment**, check that area is free of flammable anesthetics. This equipment is not designed for use in a hazardous location as defined in NFPA's Flammable Anesthetics Code.

**ELECTRIC SHOCK HAZARD:**

⚠ **When adjusting RAISE/LOWER limit switches**, use extreme caution. Electrical supply is connected to unit and disconnect switch is in ON position during entire adjustment procedure.

**ELECTRIC SHOCK AND/OR EQUIPMENT DAMAGE HAZARD:**

⚠ **Before cleaning unit**, lock building electrical supply disconnect switch to OFF position. When cleaning unit, avoid touching electrical outlets and gas connections with damp cloth.

⚠ **Before performing any service on the unit**, lock building electrical supply disconnect switch to OFF position.

**PERSONAL INJURY AND/OR EQUIPMENT DAMAGE HAZARD:**

⚠ **When installing clinical instrumentation**, securely attach instrumentation to platform and support shelves. Instrumentation could fall off platform and shelves during unit positioning if not fastened securely.

⚠ **Safe and reliable operation of this equipment requires** regularly scheduled preventive maintenance, in addition to the faithful performance of routine maintenance. Contact AMSCO Engineering Service to schedule preventive maintenance.

⚠ **Repairs and adjustments to this equipment should be made only by fully qualified service personnel**. Non-routine maintenance performed by inexperienced, unqualified personnel or installation of unauthorized parts could cause personal injury, invalidate the warranty, or result in costly damage. Contact your AMSCO Engineering Service representative regarding service options.

**CAUTIONS —**

- ⚠ Weight of clinical instrumentation installed on platform and support shelves cannot exceed the allowable load capacity and shelf dimensions. Excessive weight and/or size can cause structural damage and equipment failure.
- ⚠ Adjust rotational stops to avoid unit from swinging into wall or other obstructions.
- ⚠ Carefully rotate suspension arm/support head when adjusting rotational stops. Rotating arm/support head completely around (360°) will twist and kink gas lines and electrical wires located inside the column.
- ⚠ Motorized models are also equipped with mechanical stops to limit the vertical range of motion. If limit switches are adjusted to increase this range of motion, make sure limit switches shut off the motor before mechanical stops are reached.
- ⚠ Use extreme caution when routing new medical air/gas lines through support head assembly. Lines may twist and kink.
- ⚠ Use extreme caution when replacing gas outlet assembly. Medical air and gas lines may twist and kink.



## 1.2 GENERAL

The Orbiter™ Equipment Management System product line has undergone several changes in model designation (number) since introduction of the equipment. Table 1-1 indicates the basic description of each model, the different model designations used and a description of the support head used for that model designation.

*NOTE: Throughout the manual, the basic description is used for reference to a particular model.*

The product literature included in this section contains factual data relating to the principle characteristics of the Orbiter.

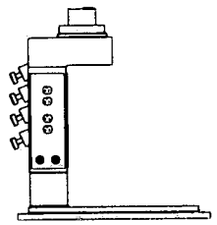
This literature is informative rather than instructional. It provides and conveys, through text and illustrations, a general concept of the equipment, its purpose, capabilities, limitations and technical specifications.

**Table 1-1. Model Descriptions**

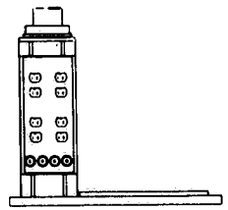
| Basic Description | Model Designation Used | Support Head Style |
|---|---|---|
| Column Fixed Height | 050F | L-shaped |
| | 155 | L-shaped with Adjustable Platform (current style) |
| Single Arm Fixed Height | 150F | L-shaped |
| | 245 | L-shaped with Adjustable Platform (current style) |
| Double Arm Fixed Height | 250F | L-shaped |
| | 265 | L-shaped with Adjustable Platform (current style) |
| Heavy Duty Double Arm Fixed Height | 255F | L-shaped |
| | 425 | L-shaped with Adjustable Platform (current style) |
| Single Arm Motorized | 703M or 130M | C-shaped |
| | 150M | L-shaped |
| | 705M | L-shaped with Adjustable Platform (current style) |
| Double Arm Motorized | 803M or 230M | C-shaped |
| | 250M | L-shaped |
| | 905M | L-shaped with Adjustable Platform (current style) |

*NOTE: Model designation can be found on equipment data plate.*

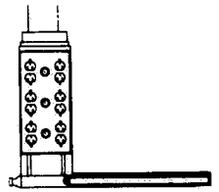
**SUPPORT HEAD STYLES**



**C-shaped**



**L-shaped**



**L-shaped with Adjustable Platform**

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# AMSCO ORBITER™ Equipment Management System

## Fixed Height

### DESCRIPTION

Orbiter fixed height, overhead system is designed to support physiological monitoring, arthroscopy, video endoscopy and related instrumentation (by others) used during anesthesia and/or surgical procedures. Orbiter supports instrumentation from the ceiling, providing an uncluttered floor area for more economic use of floor space and greater flexibility in operating room utilization.

Orbiter is equipped with gas/medical air outlets, duplex electrical receptacles and low voltage module to conveniently dispense required utility services.

Four fixed height models are available:

- **Column (155)** – support head attached to vertical suspension tube.
- **Single Arm (245)** – one horizontally articulating main suspension arm bearing support head. Horizontal range of 58 inches (1473 mm).
- **Double Arm (265)** – two horizontally articulating suspension arms bearing support head. Horizontal range of 80 inches (2032 mm).
- **Heavy Duty Double Arm (425)** – two heavy-duty, horizontally articulating suspension arms bearing support head. Capable of supporting heavier loads than Double Arm model. Horizontal range of 83 inches (2108 mm).

When not in use, single arm and double arm models can be moved out of the way, clearing the area for other uses.

### APPLICATION

For use in surgical suites, surgical theaters and wherever there is a need for ready access to specialized anesthesia and/or surgical monitoring equipment, gases/medical air, electrical power and communication service.

Orbiter fixed height models are designed for areas where vertical articulation is not necessary or where space limitations prohibit vertical movement.

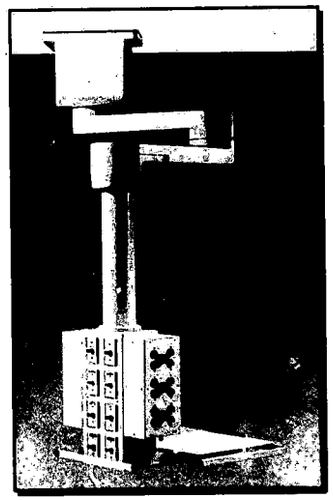
### STANDARDS

Orbiter support systems are tested and designed for compliance with the following codes:

- UL Code 544, Second Edition
- NFPA 99
- NEC
- IOC 601 (TUV)

Orbiter support systems are listed by:

- ETL Testing Laboratories, Inc.
- Canadian Standards Association (CSA)



Typical only – some details may vary

**THE SELECTIONS BELOW APPLY TO THIS EQUIPMENT**

**MODEL**

- ❑ Column Fixed Height (155)
- ❑ Single Arm Fixed Height (245)
- ❑ Double Arm Fixed Height (265)
- ❑ Heavy Duty Double Arm Fixed Height (425)

**ACCESSORIES**

*See Tech Data SD-457 for Orbiter Accessories.*

Item _____

Location(s) _____

_____

## CUSTOM BUILT

Orbiter equipment management systems are assembled per customer specifications. Each unit can be customized beyond the standard configuration of eight gas/medical air outlets and six duplex receptacles. Other features such as platform size and length of suspension arm(s) can also be adjusted to meet customer needs.

## DESIGN FEATURES

Obiter equipment management systems are designed with the following components:

- **Support Head** – is equipped with a depth-adjustable platform to hold anesthesia/surgical monitoring equipment. Platform can be positioned up to 8 inches (203 mm) away from the support head. Support head rotates 320 degrees. Rear of support head is equipped with the typical eight gas outlet configuration. Left side panel is furnished with duplex electrical receptacles and grounding plugs. Right side panel is available for low voltage data/communication connections.
- **Suspension Tube** – connects to support head and platform. Length of vertical tube determines height of support head from floor. Customer must specify desired distance from floor to support head platform when ordering (not adjustable in field).
- **Main Suspension Arm (all models except Column Fixed Height model)** – suspends from ceiling plate on the Single Arm model or from lower link of upper suspension arm on both double arm models. Rotation radius of main suspension arm is 34 inches (865 mm) for Single Arm and Double Arm models, and 29 inches (705 mm) for Heavy Duty Double Arm model. For Single Arm and Double Arm models, arm moves in a nominal 320 degree arc with infinitely variable reduction to 0 degrees. Suspension arm on the Heavy Duty Double Arm model moves in a 270 degree arc.
- **Upper Suspension Arm (double arm models only)** – for Double Arm model, extends the reach 24 inches (600 mm) and allows additional horizontal rotation of 24 inches (600 mm) in a 320 degree arc. For Heavy Duty Double Arm model, upper arm extends the reach 29 inches (725 mm) and allows additional horizontal rotation of 29 inches (725 mm) in a 270 degree arc.
- **Adjustable Rotational Stops** – limit the horizontal range of rotation of each arm to less than a full rotation to prevent gas hoses and electrical wires, located inside the suspension tube, from becoming twisted and damaged.
- **Compressed Air Brakes (double arm models only)** – allow operator to precisely position each arm.

## UTILITY SERVICES

### Gas/Medical Air Services

Gas/medical air services are dispensed from the back of the support head. The following gas services are available and arranged to meet customer specifications.

- Oxygen
- Vacuum
- Nitrogen – available with DISS connector only
- Nitrous Oxide
- Medical Air
- Evacuation
- Carbon Dioxide – available with DISS connector only

*NOTE: Compressed air is required in double arm models to operate the brakes.*

Each gas/medical air connector is distinctly marked and color-coded. Four standard types of gas connectors are available:

- DISS (Diameter Index Safety System)
- Chemetron (compatible) Quick Disconnect
- Ohio Medical (compatible) Quick Disconnect
- Puritan-Bennett Quick Disconnect

*IMPORTANT: Customer must specify gas/medical air services and corresponding connectors required. Consult Equipment Drawings for exact gas/medical air configuration.*

### Electrical Service

Duplex electrical receptacles and grounding plugs are located on left side panel of support head. Typical configuration is six 120-volt duplex receptacles and three grounding studs.

### Data/Communications Service

Unit is equipped with two low voltage 1/2-inch ID conduits and junction box, located above the bearing plate. Low voltage conduits can be run to right side panel of support head during installation procedure for connection to data/communication cables (by others).

## SUPPORT CAPABILITY

Standard adjustable support head platform is 16-1/2 x 23-1/2 inches (420 x 600 mm) and can support up to 110 lbs (50 kg) of instrumentation. Optional platform sizes of 31-1/2 x 19-1/2 inches (800 x 500 mm) and 39 x 19-1/2 inches (1000 x 500 mm) are available by special order. Extra shelves and accessories can be installed on the unit to support additional weight up to the maximum allowable load capacity for each model (specified in table below).

| Model | Allowable Load Capacity for Non-seismic Locations* lbs (kg) |
|---|---|
| Column (155) | 737 (335) |
| Single Arm (245) | 377 (171.5) |
| Double Arm (265) | 197 (89.6) |
| Heavy Duty Double Arm (425) | 512 (232.9) |

** Consult Equipment Drawing for Seismic Location Allowable Load Capacity.*



*NOTE: The addition of accessories to the unit will reduce the allowable load capacity, thus reducing the load of instrumentation that a unit can support.*

## CONSTRUCTION

Metal housing is finished in durable, easy-to-clean, textured paint. Stainless steel surfaces have a matte finish. Aluminum surfaces are anodized. Interior faces have a corrosion-resistant coating.

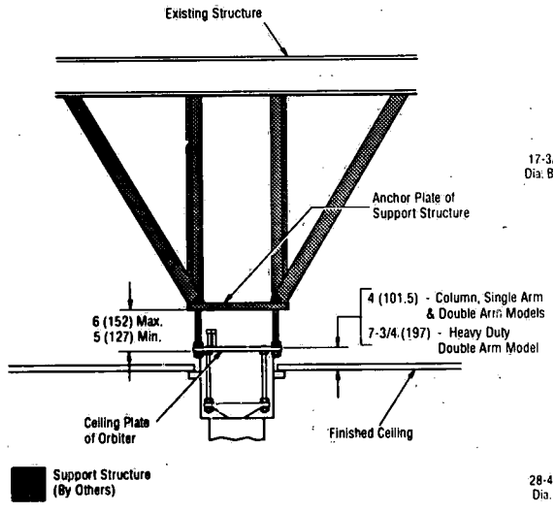
## MOUNTING ARRANGEMENT

Orbiter is mounted to a ceiling plate provided by AMSCO (see illustrations below). Ceiling plate is attached to a ceiling support structure (by others, see sample illustration below), located above the finished ceiling.

Customer must specify the floor to ceiling height (minimum of 108 inches [2743 mm]; maximum of 132 inches [3352 mm]) and the desired distance from floor to support head platform.

For Column, Single Arm and Double Arm models, the ceiling plate must be mounted 4 inches (101 mm) above the finished ceiling. For Heavy Duty Double Arm model, the ceiling plate must be mounted 7-3/4 inches (197 mm) above the finished ceiling.

*IMPORTANT: Consult a structural engineer for specific above-ceiling support.*




**ABOVE-CEILING SUPPORT**
**(Not to Scale - Sample Only - Consult Structural Engineer)**

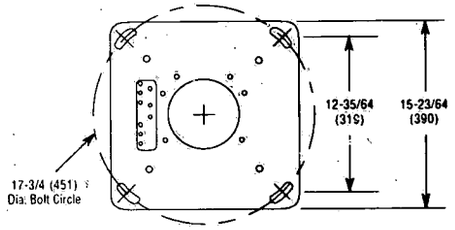
## WARRANTY

American Sterilizer Company warrants that each Orbiter equipment management system is carefully tested, inspected and leaves the factory in proper working condition, free of visible defects. Coverage includes one year on parts (except expendables) and labor. See warranty language for specific coverage and limitations. AMSCO representatives can provide full details of warranty upon request.

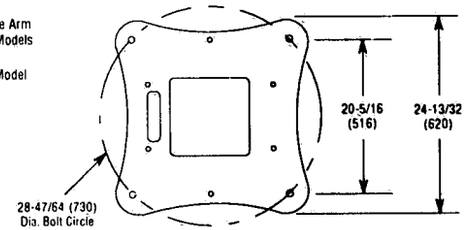
## PREVENTIVE MAINTENANCE

A coast-to-coast network of skilled competent specialists can provide periodic inspection and adjustment to assure low-cost peak performance. AMSCO representatives can provide information regarding the optional Preventive Maintenance Agreement (PMA).

| Model | Approximate Unit Weight lbs (kg) | Static Bending Moment at Ceiling Plate ft-lbs (Nm) |
|---|---|---|
| Column (155) | 108 (49) | 4425 (6000) |
| Single Arm (245) | 160 (73) | 4425 (6000) |
| Double Arm (265) | 200 (91) | 4425 (6000) |
| Heavy Duty Double Arm (425) | 477 (216) | 6638 (9000) |



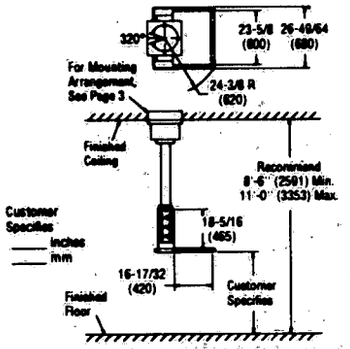

**CEILING PLATE**
**(Column, Single Arm & Double Arm Models)**



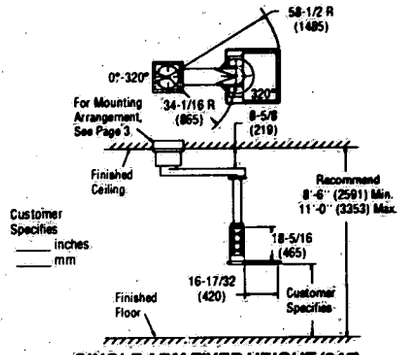

**CEILING PLATE**
**(Heavy Duty Double Arm Model)**

### SPECIFICATION WORKSHEET

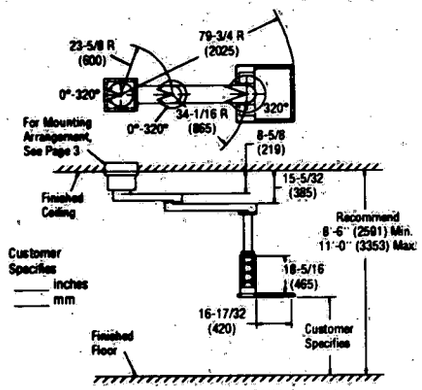
Item_____: Furnish an AMSCO Orbiter Fixed Height, Equipment Management System per Tech Data Sheet SD-453. Supply ☐ Column Fixed Height Model (155) or ☐ Single Arm Fixed Height Model (245) or ☐ Double Arm Fixed Height Model (265) or ☐ Heavy Duty Double Arm Fixed Height Model (425). Provide support head with adjustable platform, gas/medical air outlets, duplex receptacles and provisions for low voltage data/communication lines as specified. Furnish system with accessories specified for mounting anesthesia/surgical monitoring and related equipment.



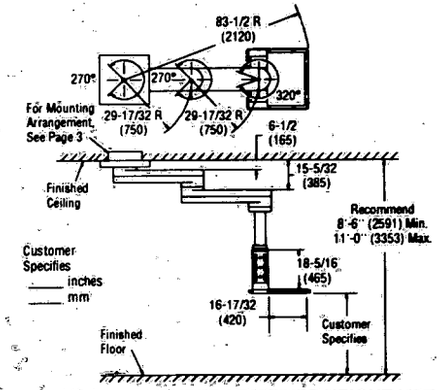

**FIXED HEIGHT COLUMN (155)**




**SINGLE ARM FIXED HEIGHT (245)**




**DOUBLE ARM FIXED HEIGHT (265)**




**HEAVY DUTY DOUBLE ARM FIXED HEIGHT (425)**

**DIMENSIONS ARE INCHES (MILLIMETERS) - DRAWING IS NOT TO SCALE**

**This print is for guidance when planning space and utility services. Actual installation prints and equipment drawings may be obtained from any AMSCO office representative.**

## OPERATING REQUIREMENTS

Service connections (3/8" OD tubing) must be supplied above ceiling plate. All connections shall be in accordance with NFPA 99 and local codes.

① ELECTRICITY – Typical: two 120 VAC, 20 amp, 1-phase lines and one ground line to be connected in dedicated junction boxes. Consult Equipment Drawing for specifics. Wiring must be in accordance with NEC codes.

② GAS/AIR – refer to Equipment Drawing for detailed gas configuration and requirements.

- Carbon Dioxide – 160 psig
- Compressed Air for brakes (double arm models only) – 50-55 psig
- Evacuation (Anesthetic Gas) – 0.5 cm $H_2O$ vacuum
- Medical Air – 50-55 psig
- Nitrogen – 160 psig
- Nitrous Oxide – 50-55 psig
- Oxygen – 50-55 psig
- Vacuum – 15-20 in. Hg

**. . .CHECK LOCAL CODES. . .**

## NOTES

1. AMSCO recommends installation during early phase of construction.
2. Four 3/4-10 UNC Grade 8 bolts (not by AMSCO) recessed 1 to 1-1/2" (25 to 38 mm) above finished ceiling (not by AMSCO) are required for installation of Column, Single Arm and Double Arm Fixed Height models. Four 1-8 UNC Grade 8 bolts (not by AMSCO) recessed 5 to 5-1/2" (127 to 140 mm) above finished ceiling (not by AMSCO) are required for installation of Heavy Duty Double Arm Fixed Height model.
3. A 24" (610 mm) square access panel (not by AMSCO) is required for service (installation on manifold assembly side of ceiling plate required).
4. Opening in finished ceiling shall not exceed 14-1/2" (368 mm) square for Column, Single Arm and Double Arm Fixed Height models; and shall not exceed 21" (533 mm) square for Heavy Duty Double Arm Fixed Height model.
5. Clearance of 5" (127 mm) minimum to 6" (152 mm) maximum is required between ceiling plate and anchor plate for gas/medical air and electrical connections. If space between ceiling plate and anchor plate exceeds 6" (152 mm), an intermediate support structure (not by AMSCO) is required. **Consult a qualified structural engineer.**

AMSCO





# AMSCO ORBITER™ Equipment Management System Motorized, Adjustable Height

## DESCRIPTION

Orbiter adjustable height, overhead system is designed to support physiological monitoring, arthroscopy, video endoscopy and related instrumentation (by others) used during anesthesia and/or surgical procedures. Orbiter supports instrumentation from the ceiling, providing an uncluttered floor area for more economic use of floor space and greater flexibility in operating room utilization.

Orbiter is equipped with gas/medical air outlets, duplex electrical receptacles and low voltage module to conveniently dispense required utility services.

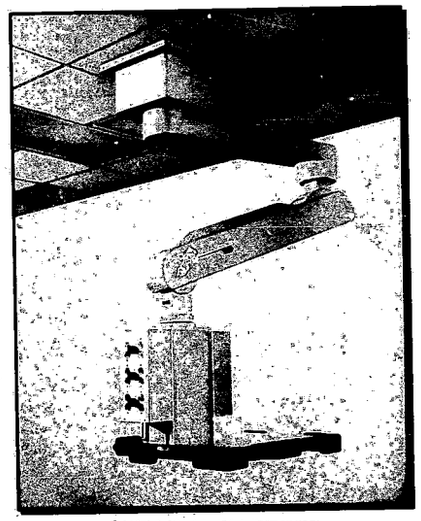
Two motorized, vertically adjustable models are available:

- **Single Arm (705M)** – one horizontally articulating, vertically adjustable main suspension arm bearing support head. Horizontal range of 60 inches (1524 mm) and vertical range of 28 inches (711 mm).
- **Double Arm (905M)** – one horizontally articulating, fixed height upper suspension arm and one horizontally articulating, vertically adjustable main suspension arm bearing support head. Horizontal range of 94 inches (2388 mm) and vertical range of 28 inches (711 mm).

Orbiter is easily maneuvered into position and adjusted as needed. When not in use, motorized models can be moved out of the way, clearing the area for other uses.

## APPLICATION

For use in surgical suites, surgical theaters and wherever there is a need for ready access to specialized anesthesia and/or surgical monitoring equipment, gases/medical air, electrical power and communication service.



Typical only – some details may vary

**THE SELECTIONS BELOW APPLY TO THIS EQUIPMENT**

**MODEL**

- ❑ Single Arm Motorized (705M)
- ❑ Double Arm Motorized (905M)

**ACCESSORIES**

*See Tech Data SD-457 for Orbiter Accessories.*

Item _____

Location(s) _____

_____

**Tech Data SD-455R4**

## STANDARDS

Orbiter support systems are tested and designed for compliance with the following codes:

- UL Code 544, Second Edition
- NFPA 99
- NEC
- IOC 601 (TUV)

Orbiter support systems are listed by:

- ETL Testing Laboratories, Inc.
- Canadian Standards Association (CSA)

## CUSTOM BUILT

Orbiter equipment management systems are assembled per customer specifications. Each unit can be customized beyond the standard configuration of eight gas/medical air outlets and six duplex receptacles. Other features such as platform size and length of suspension arm(s) can also be adjusted to meet customer needs.

## DESIGN FEATURES

Obiter equipment management systems are designed with the following components:

- **Motorized Main Suspension Arm** – suspends from ceiling plate on the Single Arm model or from lower link of upper suspension arm on Double Arm model. Rotation radius of main suspension arm is 34 inches (865 mm). Arm moves in a nominal 320 degree arc with infinitely variable reduction to 0 degrees. Main suspension arm is driven by a 110 V, 60 Hz motor, controlled by a rocker switch located on the hand-rail of the support head platform. Motor allows vertical movement of arm up to 28 inches (711 mm), and is not affected by equipment loads up to 175 lbs (79.6 kg).
- **Upper Suspension Arm (Double Arm model only)** – extends the reach 34 inches (864 mm) and allows additional horizontal rotation of 34 inches (864 mm) in a 320 degree arc with infinitely variable reduction to 0 degrees. Height of upper suspension arm is fixed.
- **Support Head** – is equipped with a depth-adjustable platform to hold anesthesia/surgical monitoring equipment. Platform can be positioned up to 8 inches (203 mm) away from the support head. Support head rotates 320 degrees. Rear of support head is equipped with the typical eight gas outlet configuration. Left side panel is furnished with duplex electrical receptacles and grounding plugs. Right side panel is available for low voltage data/communication connections.
- **Adjustable Rotational Stops** – limit the horizontal range of rotation of each arm to less than a full rotation to prevent gas hoses and electrical wires, located inside the suspension tube, from becoming twisted and damaged.
- **Compressed Air Brakes (Double Arm model only)** – allow operator to precisely position each arm.

## UTILITY SERVICES

### Gas/Medical Air Services

Gas/medical air services are dispensed from the back of the support head. The following gas services are available and arranged to meet customer specifications.

- Oxygen
- Vacuum
- Nitrogen – available with DISS connector only
- Nitrous Oxide
- Medical Air
- Evacuation
- Carbon Dioxide – available with DISS connector only

*NOTE: Compressed air is required in double arm model to operate the brakes.*

Each gas/medical air connector is distinctly marked and color-coded. Four standard types of gas connectors are available:

- DISS (Diameter Index Safety System)
- Chemetron (compatible) Quick Disconnect
- Ohio Medical (compatible) Quick Disconnect
- Puritan-Bennett Quick Disconnect

*IMPORTANT: Customer must specify gas/medical air services and corresponding connectors required. Consult Equipment Drawings for exact gas/medical air configuration.*

### Electrical Service

Duplex electrical receptacles and grounding plugs are located on left side panel of support head. Typical configuration is six 120-volt duplex receptacles and three grounding studs.

### Data/Communications Service

Unit is equipped with one low voltage 1/2-inch ID conduit and junction box, located above the bearing plate. Low voltage conduit can be run to right side panel of support head during installation procedure for connection to data/communication cables (by others).

## SUPPORT CAPABILITY

Standard adjustable support head platform is 16-1/2 x 23-1/2 inches (420 x 600 mm) and can support up to 110 lbs (50 kg) of instrumentation. Optional platform sizes of 31-1/2 x 19-1/2 inches (800 x 500 mm) and 39 x 19-1/2 inches (1000 x 500 mm) are available by special order. Extra shelves and accessories can be installed on the unit to support additional weight up to the maximum allowable load capacity for each model (specified in table below).

| Model | Allowable Load Capacity for Non-seismic Locations* lbs (kg) |
|---|---|
| Single Arm (705M) | 175 (79.6) |
| Double Arm (905M) | 175 (79.6) |

** Consult Equipment Drawing for Seismic Location Allowable Load Capacity.*



*NOTE: The addition of accessories to the unit will reduce the allowable load capacity, thus reducing the load of instrumentation that a unit can support.*

## CONSTRUCTION

Metal housing is finished in durable, easy-to-clean, textured paint. Stainless steel surfaces have a matte finish. Aluminum surfaces are anodized. Interior faces have a corrosion-resistant coating.

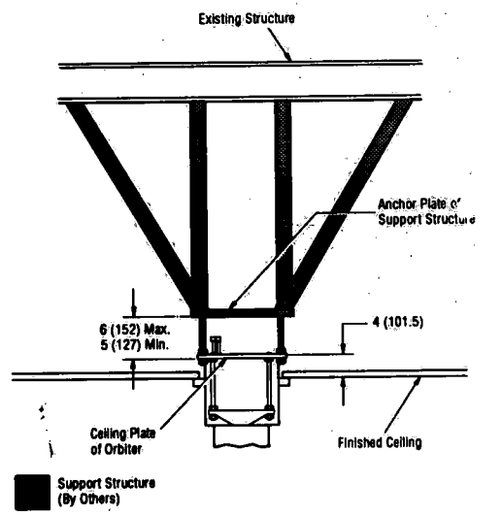
## MOUNTING ARRANGEMENT

Orbiter is mounted to a ceiling plate provided by AMSCO (see illustration below). Ceiling plate is attached to a ceiling support structure (by others, see sample illustration below), located above the finished ceiling.

Minimum finished ceiling height is 108 inches (2743 mm), and maximum finished ceiling height is 132 inches (3353 mm). Ceiling plate must be mounted 4 inches (101 mm) above the finished ceiling.

Required clearance between the ceiling plate and structural ceiling is a minimum of 5 inches (127 mm) and a maximum of 6 inches (152 mm) to allow for gas and electric connections. If space between ceiling plate and structural ceiling exceeds 6 inches (152 mm), an intermediate support structure (not by AMSCO) is required.

*IMPORTANT: Consult a structural engineer for specific above-ceiling support.*




**ABOVE-CEILING SUPPORT**
**(Not to Scale - Sample Only - Consult Structural Engineer)**

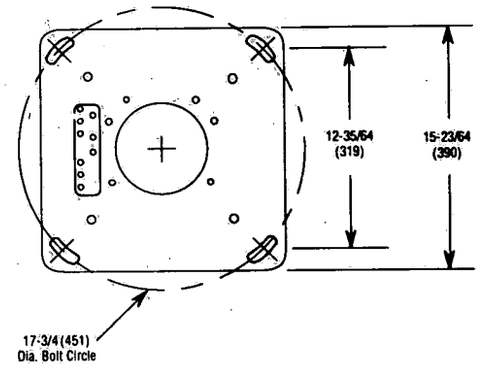
## WARRANTY

American Sterilizer Company warrants that each Orbiter equipment management system is carefully tested, inspected and leaves the factory in proper working condition, free of visible defects. Coverage includes one year on parts (except expendables) and labor. See warranty language for specific coverage and limitations. AMSCO representatives can provide full details of warranty upon request.

## PREVENTIVE MAINTENANCE

A coast-to-coast network of skilled competent specialists can provide periodic inspection and adjustment to assure low-cost peak performance. AMSCO representatives can provide information regarding the optional Preventive Maintenance Agreement (PMA).

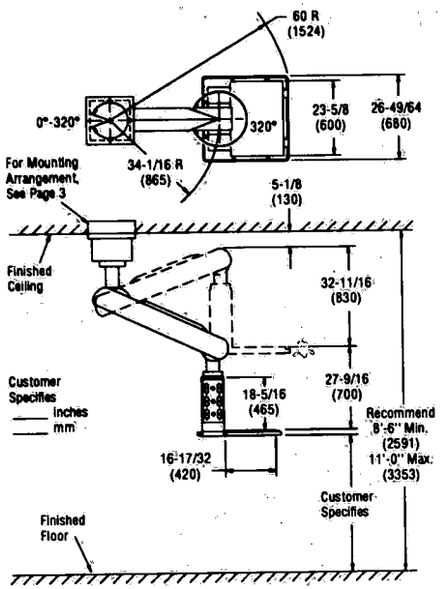
| Model | Approximate Unit Weight lbs (kg) | Static Bending Moment at Ceiling Plate ft-lbs (Nm) |
|---|---|---|
| Single Arm (705M) | 198 (90) | 4425 (6000) |
| Double Arm (905M) | 250 (113) | 4425 (6000) |



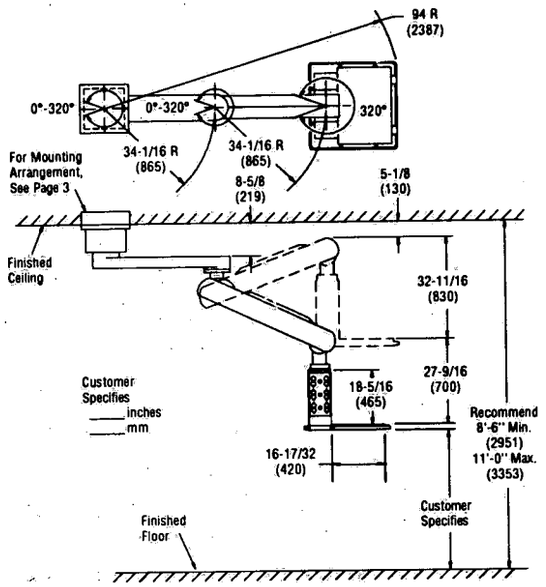

**CEILING PLATE**

**SPECIFICATION WORKSHEET**

Item_____: Furnish an AMSCO Orbiter Motorized, Adjustable Height, Equipment Management System per Tech Data Sheet SD-455. Supply ☐ Single Arm Motorized Model (705M) or ☐ Double Arm Motorized Model (905M). Provide support head with adjustable platform, gas/medical air outlets, duplex receptacles and provisions for low voltage data/communication lines as specified. Furnish system with accessories specified for mounting anesthesia/surgical monitoring and related equipment.




SINGLE ARM MOTORIZED (705M)




DOUBLE ARM MOTORIZED (905M)

**DIMENSIONS ARE INCHES (MILLIMETERS) - DRAWING IS NOT TO SCALE**

**This print is for guidance when planning space and utility services. Actual installation prints and equipment drawings may be obtained from any AMSCO office representative.**

## OPERATING REQUIREMENTS

Service connections (3/8" OD tubing) must be supplied above ceiling plate. All connections shall be in accordance with NFPA 99 and local codes.

① ELECTRICITY – Typical: two 120 VAC, 20 amp, 1-phase lines and one ground line to be connected in dedicated junction boxes. Consult Equipment Drawing for specifics. Wiring must be in accordance with NEC codes.

② GAS/AIR – refer to Equipment Drawing for detailed gas configuration and requirements.

- Carbon Dioxide – 160 psig
- Compressed Air for brakes (Double Arm model only) – 50-55 psig
- Evacuation (Anesthetic Gas) – 0.5 cm $H_2O$ vacuum
- Medical Air – 50-55 psig
- Nitrogen – 160 psig
- Nitrous Oxide – 50-55 psig
- Oxygen – 50-55 psig
- Vacuum – 15-20 in. Hg

. . .CHECK LOCAL CODES. . .

## NOTES

1. AMSCO recommends installation during early phase of construction.
2. Four 3/4-10 UNC Grade 8 bolts (not by AMSCO) recessed 1 to 1-1/2" (25 to 38 mm) above finished ceiling (not by AMSCO) are required for installation.
3. A 24" (610 mm) square access panel (not by AMSCO) is required for service (installation on manifold assembly side of ceiling plate required).
4. Opening in finished ceiling shall not exceed 14-1/2" (368 mm) square.
5. Clearance of 5" (127 mm) minimum to 6" (152 mm) maximum is required between ceiling plate and anchor plate for medical air/gas and electrical connection. If space between ceiling plate and anchor plate exceeds 6" (152 mm), an intermediate support structure (not by AMSCO) is required. Consult a qualified structural engineer.

AMSCO

AMSCO HEALTHCARE • TWO CHATHAM CTR., STE. 1100 • 112 WASHINGTON PL. • PITTSBURGH, PA 15219




# Section 2: Operating Instructions

## 2.1 PREPARING UNIT FOR INITIAL USE

**⚠ WARNING ⚠**

**PERSONAL INJURY AND/OR EQUIPMENT DAMAGE HAZARD: When installing clinical instrumentation, securely attach instrumentation to platform and support shelves. Instrumentation could fall off platform and shelves during unit positioning if not fastened securely.**

1. Ensure instrumentation installed on platform and support shelves is level, secure and adequately supported.
2. Become familiar with articulating the unit using the control buttons located on front of support head platform (see Figures 2-1 and 2-2).

   Control buttons on earlier production units (Figure 2-1) are as follows. Table 2-1 lists the control buttons provided on each model.

   - Left Inside Button — releases air brake and allows rotation of main (lower) suspension arm.
   - Right Inside Button — releases air brake and allows rotation of upper suspension arm.
   - Left Outside Button — lowers motorized (main) suspension arm (Motorized models only).
   - Right Outside Button — raises motorized (main) suspension arm (Motorized models only).

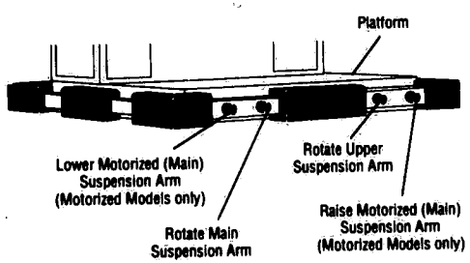
*NOTE: Remember that Left Lowers and Right Raises.*

**Table 2-1. Control Buttons**

| Model | Control Buttons |
|---|---|
| Column Fixed Height | No Buttons |
| Single Arm Fixed Height | No Buttons |
| Double Arm Fixed Height | Main and Upper Brake Control Buttons |
| Heavy Duty Double Arm Fixed Height | Main and Upper Brake Control Buttons |
| Single Arm Motorized | Raise and Lower Motor Controls |
| Double Arm Motorized | Main and Upper Brake Control Buttons<br>Raise and Lower Motor Controls |

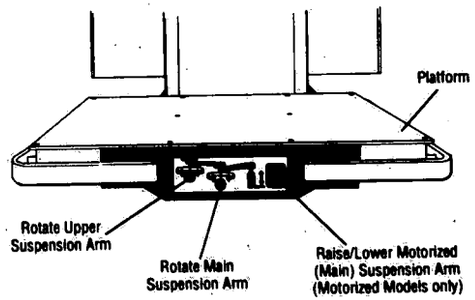
Control buttons on later production units (Figure 2-2) are as follows:

- Outside Button — releases air brake and allows rotation of upper suspension arm.
- Inside Button — releases air brake and allows rotations of main (lower) suspension arm.
- Rocker Switch — raises and lowers motorized (main) suspension arm (Motorized models only).




**Double Arm Motorized Model Shown**

**Figure 2-1. Control Buttons Earlier Production Units**




**Double Arm Motorized Model Shown**

**Figure 2-2. Control Buttons Later Production Units**

3. Try full range of horizontal motions to assure that rotational stops are set so that unit will not strike a wall or other obstructions. Adjust rotational stops if necessary, refer to Section 3.2.

*NOTE: Make sure a "click" is audible when rotation control buttons are pressed (Double Arm models only).*

4. If Motorized model, try full range of vertical motions to assure unit does not strike down on surgical table or other equipment. If Double Arm Motorized model, assure motorized arm does not rise up and strike bottom of upper suspension arm or cause equipment on platform to do so.

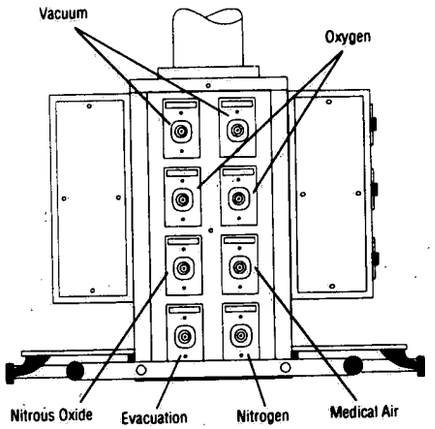
## 2.2 LOCATING GAS, AIR AND ELECTRICAL CONNECTIONS

**WARNING**

**EXPLOSION HAZARD: Before operating equipment, check that area is free of flammable anesthetics. This equipment is not designed for use in a hazardous location as defined in NFPA's Flammable Anesthetics Code.**

1. Gas and air connections are located on back side of support head (see Figure 2-3). Each gas/air connection is marked and color-coded as indicated in Table 2-2. The typical unit is equipped with eight gas/air connections as shown in Figure 2-3.

*NOTE: Four types of gas connections are available: DISS, Chemetron Compatible, Ohio Medical Compatible and Puritan-Bennett (see Figure 2-4).*

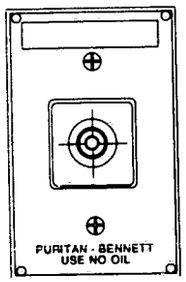



**DISS Connections Shown**

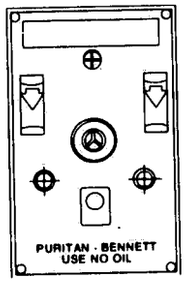
**Figure 2-3. Typical Gas and Air Connections**

**Table 2-2. Color-coding of Gas Connections**

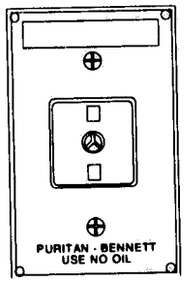
| Connection | U.S.A. Color | Canadian Color |
|---|---|---|
| Vacuum | White | Yellow |
| Oxygen | Green | White |
| Nitrous Oxide | Blue | Blue |
| Medical Air | Yellow | Black/White |
| Evacuation | White | Yellow/Purple |
| Nitrogen | Black | Black |
| Carbon Dioxide | Gray | Gray |



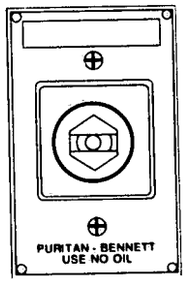

**DISS**




**Chemetron Compatible**




**Ohio Medical Compatible**




**Puritan-Bennett Compatible**

**Figure 2-4. Types of Connectors Available**



2. Grounded 120 VAC, electrical receptacles (four duplexes on earlier production units; six duplexes on later production units) and patient grounding plugs (four on earlier production units; three on later production units) are located along the left side of the support head (see Figure 2-5).

3. Low voltage conduit containing pull cord is provided behind the side access panel, along right side of support head (see Figure 2-5). This can be used, if desired, for data/communication service (by others).

## 2.3 OPERATING THE UNIT

1. Ensure that instrumentation on platform and support shelves are secured and operational.

**WARNING**

**PERSONAL INJURY HAZARD: Before using on a patient, check for proper equipment operation and acceptable gas flows.**

2. Connect other desired equipment to the proper electrical or gas outlet. Check for proper operation.

3. If required, attach accessories to platform railing.

**WARNING**

**PERSONAL INJURY HAZARD: When positioning unit over patient, raise and lower unit carefully.**

4. Depending on the model, position unit either by using control buttons on front of platform or by applying pressure to support head.

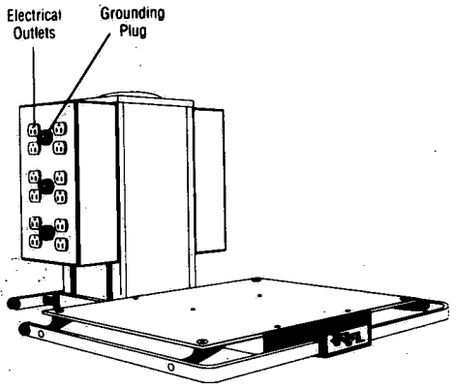



**Figure 2-5. Electrical Outlets**

*NOTE: Unit will move without releasing air brake (pushing rotation control button). This safety feature allows some "give" to minimize injury or damage in case the unit is bumped while stationary.*

5. Position platform by applying pressure anywhere on platform railing.

*NOTE: Ranges of rotation are limited by adjustable or fixed rotational stops to prevent damage of internal hoses and wires. These stops should be adjusted to prevent swinging unit into wall or other obstructions. Refer to Section 3.2 for rotational stop adjustment.*

## 2.4 LOADING THE UNIT

### 2.4.1 Allowable Load Capacity

The allowable load capacity is the maximum weight that each model can support (see Table 2-3).

*NOTE: The maximum weight that the support head platform can hold is 110 lbs (49.6 kg). Install appropriate accessories to support additional weight up to the allowable load capacity for each model (see Figure 2-6).*

The allowable load capacities listed in Table 2-3 are for units with no accessories attached. The addition of accessories (see Table 2-4) to the unit will reduce the allowable load capacity, thus reducing the load of instrumentation that the unit can support.

For example, a Double Arm Motorized model (allowable load capacity: 175 lbs) may be equipped with an IV Support Arm System (weight: 3.3 lbs) and a Secondary Shelf (weight: 11 lbs). The maximum load (weight) of instrumentation that can be installed on this unit is:

175 lbs - 3.3 lbs - 11 lbs = **160.7 lbs**

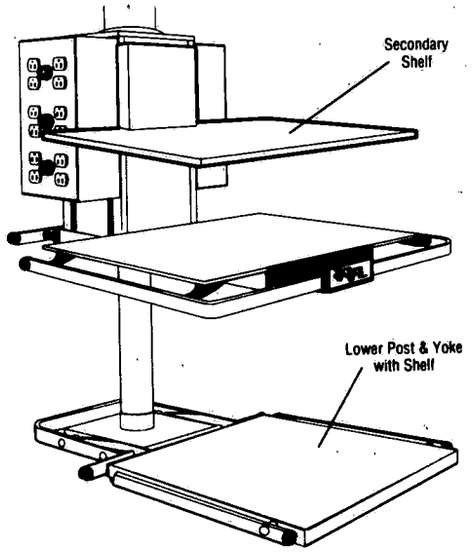



**Figure 2-6. Typical Acessories**

**Table 2-3. Allowable Load Capacities**

| Model | Allowable Load Capacity* - lbs (kg) |
|---|---|
| Column Fixed Height | 737 (335) |
| Single Arm Fixed Height | 377 (171.5) |
| Double Arm Fixed Height | 197 (89.6) |
| Heavy Duty Double Arm Fixed Height | 512 (232.9) |
| Single Arm Motorized | 175 (79.6) |
| Double Arm Motorized | 175 (79.6) |

**Capacities given are for non-seismic locations.*

**Table 2-4. Weights and Maximum Loads of Accessories**

| Accessory | Weight lbs (kg) | Maximum Load lbs (kg) |
|---|---|---|
| Suction Canister Adapter | 3.5 (1.6) | Note 1 |
| IV Support Arm System | 3.3 (1.5) | 11 (5) |
| Cable Support Arm | 1.5 (0.7) | Note 2 |
| Side Shelf | 2.6 (1.2) | 6.6 (3) |
| Tilting Writing Surface | 9.2 (4.2) | Note 3 |
| Tilting Keyboard Shelf | 9.2 (4.2) | Note 3 |
| Tilting Storage Drawer | 9.2 (4.2) | Note 3 |
| Tilt Swivel Mount | 11 (5) | 99 (45) |
| Secondary Shelf | 11 (5) | 30 (14) |
| Lower Post With Yoke Mount | 16.5 (7.5) | Note 4 |
| Additional Yoke Mount | 9.5 (4.3) | Note 4 |
| Painted Shelf for Yoke Mount | 12 (5.5) | 80 (36) |
| Dual Drawers for Yoke Mount | 40 (18) | 79 (36) per module<br>22 (10) per drawer |
| Infusion Holder | 13 (6) | Note 5 |

*NOTE 1: Used to support suction canister brackets only. Not designed to support clinical instrumentation.*

*NOTE 2: Used to support cables/lines only. Not designed to support clinical instrumentation.*

*NOTE 3: Used as writing surface or for storage of keyboard/writing supplies only. Not designed to support clinical instrumentation.*

*NOTE 4: Used to support other accessories only. Not designed to support clinical instrumentation.*

*NOTE 5: Used to support infusion pumps/bags only. Not designed to support clinical instrumentation.*



The platform and accessories are also limited to the amount of weight each can support. The platform can support a maximum load of 110 lbs (46.6 kg). See Table 2-4 for the maximum load that each accessory can support.

*NOTE: Refer to Uncrating/Installation Instructions, P-129361-607, for installation of accessories.*

### 2.4.2 Installing or Changing Shelf Load

**CAUTION**

**Weight of clinical instrumentation installed on platform and support shelves cannot exceed the allowable load capacity and shelf dimensions. Excessive weight and/or size can cause structural damage and equipment failure.**

1. Assure that weight and size of load are within limitations allowed for each model (see Table 2-3).
2. If necessary, install support shelves (available as accessories) to accommodate the load. Check that the vertical clearance is adequate if installing an accessory below the platform.

*NOTE: Platform load plus accessory weight cannot exceed allowable load capacity (see Tables 2-3 and 2-4).*

3. Make sure instrumentation (load) is centered on platform with weight evenly distributed. Instrumentation must not extend beyond lip-edge of platform (see Figure 2-7).
4. Use equipment anchors to secure instrumentation to platform so that no slippage will occur (see Figure 2-7).

## 2.5 AFTER USING UNIT

1. Guide unit out of the way or leave in position, as desired.
2. Clean unit as described in Section 3.1.
3. If necessary, change instrumentation on platform and support shelves as described in Section 2.4.2.

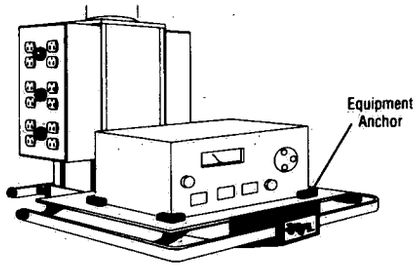



**Figure 2-7. Secure Instrumentation to Platform**

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# Section 3: Cleaning and Adjustment Procedures

**WARNING**

**PERSONAL INJURY AND/OR EQUIPMENT DAMAGE HAZARD: Safe and reliable operation of this equipment requires regularly scheduled preventive maintenance, in addition to the faithful performance of routine maintenance. Contact AMSCO Engineering Service to schedule preventive maintenance.**

Procedures described in this section should be performed at regular intervals as indicated. The interval frequency should be increased with increased usage of the equipment. Should a problem occur, refer to Section 5, Troubleshooting.

A Preventive Maintenance Agreement is available to assure peak equipment performance and avoid unscheduled downtime. The agreement includes maintenance, adjustments, and replacement of worn parts by a qualified technician on a scheduled basis. Contact your AMSCO representative if interested.

**WARNING**

**ELECTRIC SHOCK AND/OR EQUIPMENT DAMAGE HAZARD: Lock building electrical supply disconnect switch to OFF position before cleaning unit. When cleaning unit, avoid touching electrical outlets and gas connections with damp cloth.**

## 3.1 CLEANING PROCEDURES

### 3.1.1 Beginning of Day

At the beginning of each day, damp dust exposed surfaces with a clean cloth moistened with a detergent-germicide or disinfectant solution.

### 3.1.2 Conclusion of Each Procedure

1. Clean evacuation connection.
   a. Disconnect evacuation connection. Spot-clean connection surfaces with detergent-germicide or disinfectant solution.
   b. Reconnect evacuation connection.
2. Wipe down unit surfaces with detergent-germicide or disinfectant solution. Pay particular attention to places which may have been splashed during surgery (e.g. underside of platform and shelves).

### 3.1.3 End of Day

*NOTE: Follow manufacturers' recommendations regarding cleaning procedures of equipment on platform and support shelves (if installed).*

Thoroughly clean all surfaces with a chemical disinfectant.

### 3.1.4 Weekly

1. Unplug and carefully remove equipment from platform and support shelves (if installed).
2. Clean platform and shelves with detergent-germicide or disinfectant solution.
3. Place equipment on platform and shelves and plug in. Make sure equipment is securely attached to platform and support shelves (if installed).

**WARNING**

**PERSONAL INJURY AND/OR EQUIPMENT DAMAGE HAZARD: Repairs and adjustments to this equipment should be made only by fully qualified service personnel. Non-routine maintenance performed by inexperienced, unqualified personnel or installation of unauthorized parts could cause personal injury, invalidate the warranty, or result in costly damage. Contact your AMSCO Engineering Service representative regarding service options.**

## 3.2 ADJUST ROTATIONAL STOPS

**CAUTION**

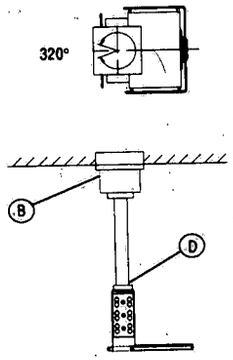
**Adjust rotational stops to avoid unit from swinging into wall or other obstructions.**

The horizontal ranges of rotation for each model are set by rotational stops. Range of rotation is either adjustable from 0° to 320° or fixed, depending on the model and type of rotational stop.

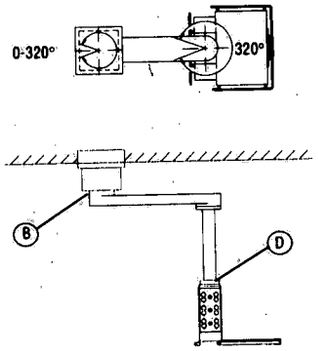
*NOTE: Range of rotation is limited to a maximum of 320° to prevent gas hoses and electrical wires, located inside the column, from becoming twisted and damaged.*

Regardless of the type of rotational stop, the area of non-rotation or "dead band" can be shifted to a different position.

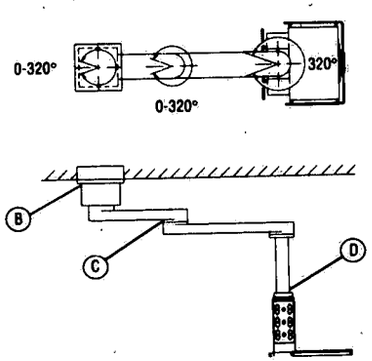
Figures 3-1 and 3-2 illustrate each model and identify its range of rotation and the location and type of its rotational stops (denoted by A, B, C or D). To adjust a rotational stop (shift the "dead band"), identify the appropriate model and rotational stop using Figures 3-1 and 3-2. Then follow the adjustment procedure, also denoted by A, B, C or D, which corresponds to the rotational stop to be adjusted.



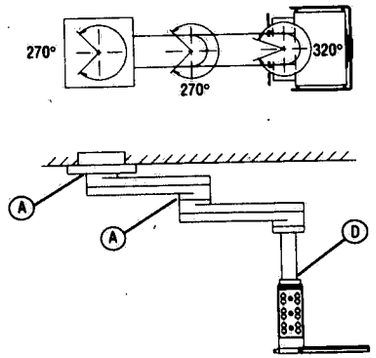

Column Fixed Height Model




Single Arm Fixed Height Model



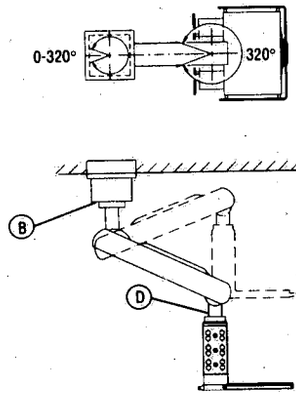

Double Arm Fixed Height Model



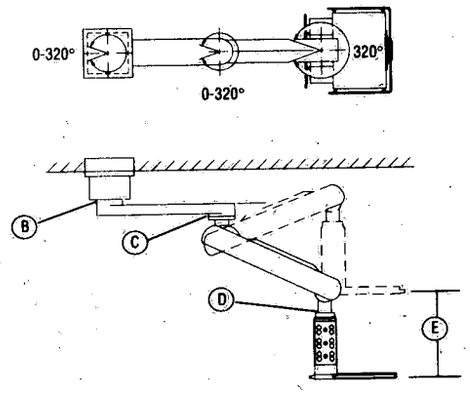

Heavy Duty, Double Arm Fixed Height Model

Figure 3-1. Orbiter Fixed Height Models






Single Arm Motorized Model




Double Arm Motorized Model

Figure 3-2. Orbiter Motorized Models

### 3.2.1 Adjustment Procedure A

The range of rotation for rotational stop "A" is 270°, and is adjustable in increments of 45 degrees.

1. Ensure compressed air and electrical supplies are disconnected before working on unit.
2. Remove three screws from brake cover, on bottom of suspension arm (see Figure 3-3). Lower brake cover from suspension arm and set aside.
3. Remove eight sockethead screws from stop ring (see Figure 3-4).

**CAUTION**

**Carefully rotate suspension arm/support head when adjusting rotational stops. Rotating arm/support head completely around (360°) will twist and kink gas lines and electrical wires located inside the column.**

4. Manually position suspension arm to one end of the 270° range of rotation. Rotate stop ring until fixed stop is touching the piston/bladder air brake (see Figure 3-4).
5. Insert sockethead screws through stop ring and tighten. Attach brake cover to bottom of suspension arm with screws previously removed.
6. Manually guide suspension arm through its full range of horizontal motion. Verify rotational stop is set so that suspension arm will not strike a wall or other obstruction.

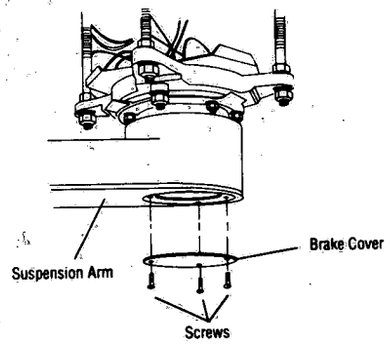



Figure 3-3. Remove Brake Cover

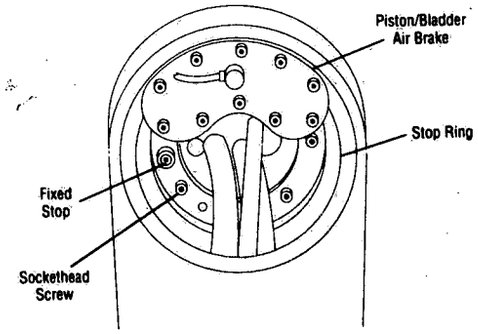
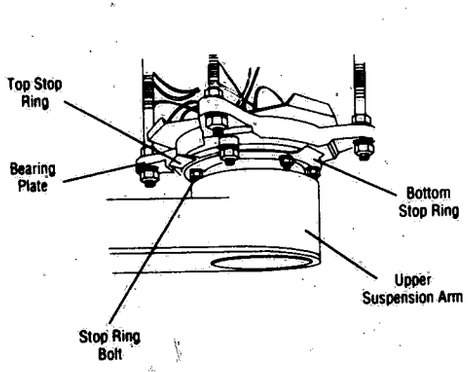
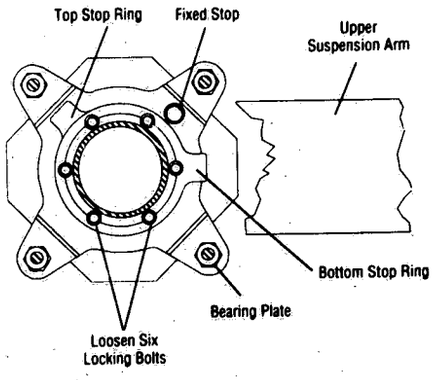



Figure 3-4. Rotational Stop "A"




Side View




View from Below Bearing Plate (Suspension/Motorized Arm Broken Away for Clarity)

**Figure 3-5. External Rotational Stop "B"**

### 3.2.2 Adjustment Procedure B

There are two variations of rotational stop "B", external stops and internal stops. The external stops (stop rings) are easily visible as shown in Figure 3-5 and can be accessed without removing brake housings. Internal stops require brake housings to be removed for access.

If rotational stop "B" is visible (external stops), follow the External Rotational Stops adjustment procedure listed below. If rotational stop "B" is not visible, then follow the adjustment procedure listed under Internal Rotational Stops.

- **External Rotational Stops**

1. Ensure compressed air (if applicable) and electrical supplies are disconnected before working on unit.
2. Locate external stops and loosen bolts on bottom stop ring (see Figure 3-5).

*NOTE: The distance between the fixed stop and each stop ring determines the range of rotation.*

**CAUTION**

**Carefully rotate suspension arm/support head when adjusting rotational stops. Rotating arm/support head completely around (360°) will twist and kink gas lines and electrical wires located inside the column.**

3. Manually position suspension arm so that arm is on (at) the edge of the area that will be designated as "dead band."
4. Move stop rings to establish the desired non-rotational area or "dead band." Non-rotational area can be 40 degrees or more.
5. Tighten bolts to lock stop rings in place.
6. Manually guide suspension arm through its full range of horizontal motion. Verify stop rings are set so that suspension arm will not strike a wall or other obstruction.



- **Internal Rotational Stops**

Internal stops may be provided in two variations. Refer to Figures 3-6 and 3-10 for identification of the internal stops installed in your unit.

**If internal stops are located below the brake plate** (see Figure 3-6), adjust the stops using the following procedure.

1. Ensure compressed air (if applicable) and electrical supplies are disconnected before working on unit.
   a. To release any trapped air pressure from the brake system, activate the control buttons (Section 2.1) several times.
2. Remove two 5 mm socket screws from each aluminum brake housing.

*NOTE: Single Arm models have one friction brake housing, and Double Arm models have two pneumatic (compressed air) brake housings.*

*NOTE: Shims may be located under brake housing(s). Be sure to hold onto shims when lifting brake housing(s) away from brake plate.*

3. Slide brake housing(s) away from brake plate (see Figure 3-7), leaving compressed air lines connected (if applicable).

*NOTE: If brake housing is lifted off, it may be difficult to realign brake pads when replacing brake housing.*

4. Loosen, do not remove, four 5 mm socket screws on brake plate (see Figure 3-6).
5. Locate two cushioned stops and fixed stop under brake plate (see Figure 3-6). Each cushioned stop is attached to a stop ring and the fixed stop is part of the bearing plate.

*NOTE: The distance between the fixed stop and each cushioned stop determines the range of rotation.*

6. Using a small screwdriver inserted between housing and brake plate, move each stop ring so that cushioned stop touches fixed stop (see Figure 3-6).

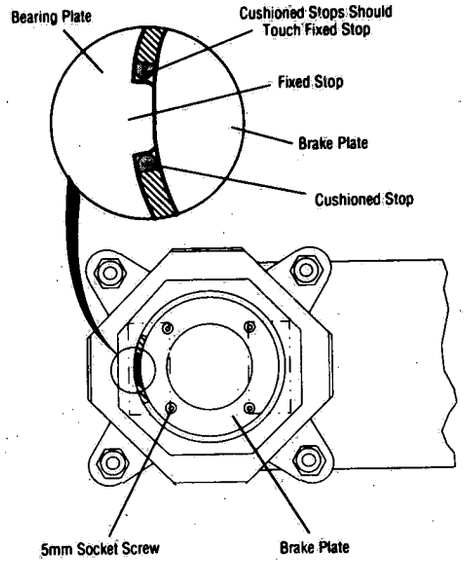
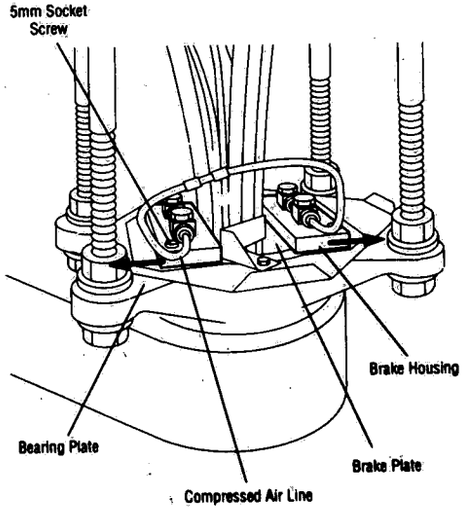



**Figure 3-6. Internal Stops Located Below Brake Plate**




**Double Arm Unit Shown**

**Figure 3-7. Brake Housings - Internal Rotational Stop "B"**

**CAUTION**

**Carefully rotate suspension arm/support head when adjusting rotational stops. Rotating arm/support head completely around (360°) will twist and kink gas lines and electrical wires located inside the column.**

7. Manually position suspension arm to one end of the desired range of rotation. Locate the cushioned stop which is still touching the fixed stop and mark the stop's position on top of the brake plate (see Figure 3-8).
8. Manually rotate suspension arm in opposite direction until other end of the desired range of rotation is reached (see Figure 3-9). Locate second cushioned stop. If second cushioned stop is not touching fixed stop, move appropriate stop ring, with small screwdriver, until second cushioned stop is touching fixed stop.
9. Mark second stop's position on top of the brake plate (see Figure 3-9). If first cushioned stop has moved from the first mark, move appropriate stop ring, with small screwdriver, until first stop is aligned with first mark.
10. When both cushioned stops are aligned with appropriate marks on top of brake plate, tighten four socket screws previously loosened to lock the stop rings in place.
11. Place aluminum brake housing(s) on brake plate and secure with socket screws previously removed.

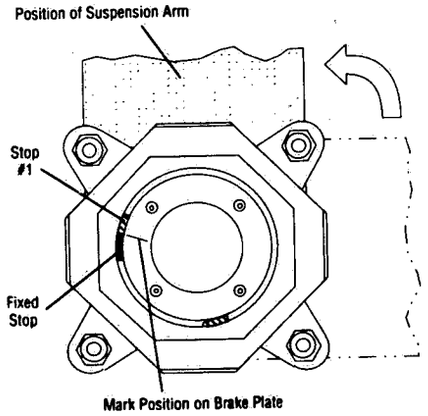



**Figure 3-8. Mark Position of First Cushioned Stop**

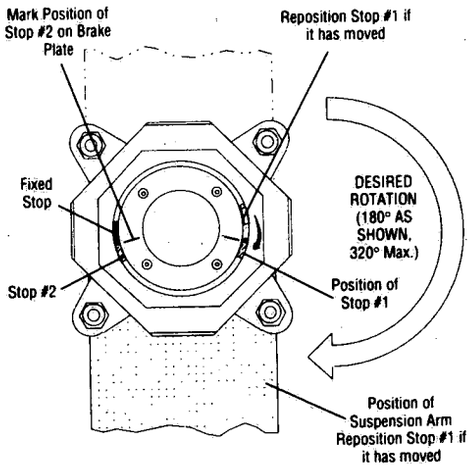



**Figure 3-9. Mark Position of Second Cushioned Stop**

12. Manually guide suspension arm through its full range of horizontal motion. Verify stop rings are set so that suspension arm will not strike a wall or other obstruction.

**If internal stops are accessed through the bottom cover** (see Figure 3-10), adjust the stops using the following procedure.

1. Ensure compressed air (if applicable) and electrical supplies are disconnected before working on unit.

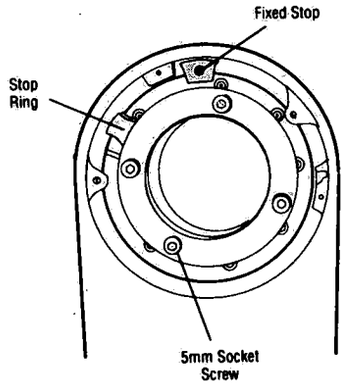



**Figure 3-10. Internal Stops Accessed Through Bottom Cover**



   a. To release any trapped air pressure from the brake system, activate the control buttons (Section 2.1) several times.
2. Remove three screws from cover, on bottom of suspension arm (see Figure 3-3). Lower cover from suspension arm and set aside.
3. Loosen, do not remove, four 5 mm socket screws on the plate (see Figure 3-10).
4. Locate two stops and fixed stop under brake plate (see Figure 3-10). Each stop is attached to a stop ring and the fixed stop is part of the bearing plate.

*NOTE: The distance between the fixed stop and each stop determines the range of rotation.*

5. Using a small screwdriver, move each stop ring so that stop touches the fixed stop.

**CAUTION**

**Carefully rotate suspension arm/support head when adjusting rotational stops. Rotating arm/support head completely around (360°) will twist and kink gas lines and electrical wires located inside the column.**

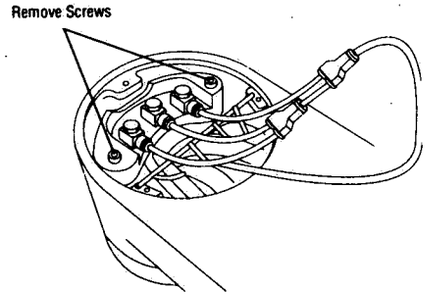
6. Manually position suspension arm to one end of the desired range of rotation. Locate the stop which is still touching the fixed stop and mark the stop's position on the plate (see Figure 3-8).
7. Manually rotate suspension arm in opposite direction until other end of the desired range of rotation is reached (see Figure 3-9). Locate second stop. If second stop is not touching fixed stop, move appropriate stop ring, with small screwdriver, until second stop is touching fixed stop.
8. Mark second stop's position on the plate. If first stop has moved from the first mark, move appropriate stop ring, with small screwdriver, until first stop is aligned with first mark.
9. When both stops are aligned with appropriate marks on the plate, tighten four socket screws previously loosened to lock the stop rings in place.
10. Attach cover to bottom of suspension arm with screws previously removed.
11. Manually guide suspension arm through its full range of horizontal motion. Verify stop rings are set so that suspension arm will not strike a wall or other obstruction.

### 3.2.3 Adjustment Procedure C

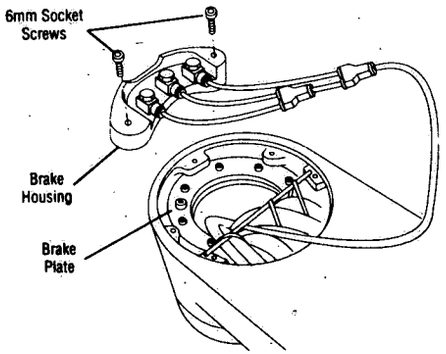
1. Ensure compressed air and electrical supplies are disconnected before working on unit.
   a. To release any trapped air pressure from the brake system, activate the control buttons (Section 2.1) several times.
2. Remove three screws from brake cover, on top of upper suspension arm's lower link. Lift brake cover away from top of upper suspension arm and set aside.

*NOTE: Shims may be located under brake housing. Be sure to hold onto shims when lifting brake housing away from brake plate.*

3. Remove two 6 mm socket screws from brake housing. Lift brake housing away from brake plate, leaving compressed air lines connected (see Figure 3-11).




**Remove Screws from Brake Housing**
**(Double Arm Motorized Model Shown - View from Top)**




**Lift Brake Housing Away from Brake Plate**
**(Double Arm Motorized Model Shown - View from Top)**

**Figure 3-11. Brake Housing - Rotational Stop "C"**

*NOTE: Use care when lifting brake housing as brake pads may fall out.*

4. Loosen, do not remove, four 5 mm socket screws on brake plate. If necessary, manually rotate main suspension arm to gain access to all four screws.
5. Locate two cushioned stops and fixed stop under brake plate (see Figure 3-6). Each cushioned stop is attached to a stop ring and the fixed stop is part of the bearing plate.

*NOTE: The distance between the fixed stop and each cushioned stop determines the range of rotation.*

6. Using a small screwdriver inserted between housing and brake plate, move each stop ring so that cushioned stop touches fixed stop (see Figure 3-6).

**CAUTION**

**Carefully rotate suspension arm/support head when adjusting rotational stops. Rotating arm/support head completely around (360°) will twist and kink gas lines and electrical wires located inside the column.**

7. Manually position main suspension arm to one end of the desired range of rotation. Locate the cushioned stop which is still touching the fixed stop and mark the stop's position on top of the brake plate (see Figure 3-8).
8. Manually rotate suspension arm in opposite direction until other end of the desired range of rotation is reached (see Figure 3-9). Locate second cushioned stop. If second cushioned stop is not touching fixed stop, move appropriate stop ring, with small screwdriver, until second cushioned stop is touching fixed stop.
9. Mark second stop's position on top of the brake plate (see Figure 3-9). If first cushioned stop has moved from the first mark, move appropriate stop ring, with small screwdriver, until first stop is aligned with first mark.
10. When both cushioned stops are aligned with appropriate marks on top of brake plate, tighten four socket screws previously loosened to lock the stop rings in place.
11. Place aluminum brake housing on brake plate and secure with socket screws previously removed.

*NOTE: Shims may be located under brake housing. Be sure to hold onto shims when placing brake housing onto brake plate.*

12. Fasten brake cover to top of upper suspension arm's lower link with screws previously removed.
13. Manually guide suspension arm through its full range of horizontal motion. Verify stop rings are set so that suspension arm will not strike a wall or other obstruction.

### 3.2.4 Adjustment Procedure D

Support head rotational stop is available in two variations, depending on model ordered.

- **All motorized models and some fixed height models** are equipped with a rotational stop adjusted by loosening a set screw in the collar (see Figure 3-12) as follows.

*NOTE: Fixed height models may be equipped with a set screw in the collar that acts as an adjustment for a friction brake. On these units, loosening the set screw will not change the stop position. Rotational stop must be adjusted by relocating a socket head bolt as described in the procedure listed under Other Fixed Height Models.*

1. Ensure compressed air (if applicable) and electrical supplies are disconnected before working on unit.
2. Loosen set screw in collar (see Figure 3-12).

**CAUTION**

**Carefully rotate suspension arm/support head when adjusting rotational stops. Rotating arm/support head completely around (360°) will twist and kink gas lines and electrical wires located inside the column.**

3. Manually rotate support head to desired location and tighten set screw.
4. Manually guide support head and platform through its full range of horizontal motion. Verify support head and platform do not strike a wall or other obstruction.

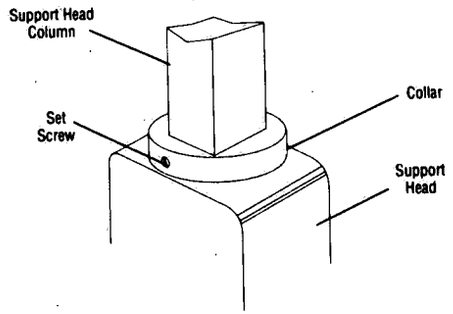



**Figure 3-12. Rotational Stop "D" - All Motorized Models**



- **Other fixed height models** are equipped with a rotational stop adjusted by relocating a socket head bolt inside the support head (see Figure 3-13) as follows.

1. Ensure compressed air (if applicable) and electrical supplies are disconnected before working on unit.
2. Remove attaching screws and front cover panel from front (platform side) of the support head assembly (see Figure 3-14).
3. Locate and remove the socket head bolt with the largest head (see Figure 3-13). The large-head bolt is in direct contact with the rotational stop inside the support head.

**CAUTION**

**Carefully rotate suspension arm/support head when adjusting rotational stops. Rotating arm/support head completely around (360°) will twist and kink gas lines and electrical wires located inside the column.**

4. Manually rotate support head to desired location.
5. Locate socket head bolt (small head) closest to the rotational stop. Replace this bolt with the large-head bolt previously removed. Install small-head bolt into previous position occupied by the large-head bolt.
6. Manually guide support head and platform through its full range of horizontal motion. Verify support head and platform do not strike a wall or other obstruction.

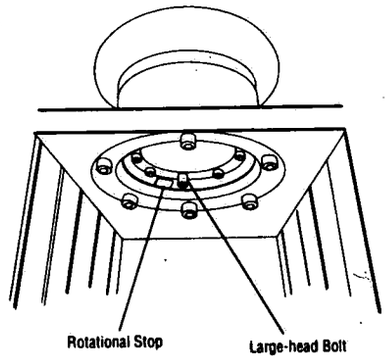



**Figure 3-13. Rotational Stop "D" - Selected Fixed Height Models**

## 3.3 ADJUST RAISE/LOWER LIMIT SWITCHES (ADJUSTMENT PROCEDURE E)

**WARNING**

**ELECTRICAL SHOCK HAZARD: When adjusting RAISE/LOWER limit switches, use extreme caution. Electrical supply is connected to unit and disconnect switch is in ON position during entire adjustment procedure.**

**CAUTION**

**Motorized models are also equipped with mechanical stops to limit the vertical range of motion. If limit switches are adjusted to increase this range of motion, make sure limit switches shut off motor before mechanical stops are reached.**

Limit switches control the motorized models' vertical range of motion (see Figure 3-2, denoted by E).

Limit switches are preset at the factory. If adjustment is required, follow the procedure listed below.

1. Ensure electrical supply is connected to unit and disconnect switch is on during the following adjustment procedure.
2. Remove two phillips screws from top of arm cover and two from bottom of cover. Using a flat-tip screwdriver, carefully pry apart cover halves from around arm.
3. Remove the two flathead phillips screws from motor cover (see Figure 3-15) and lift cover off of motor block.

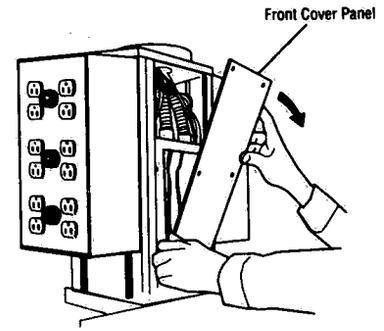
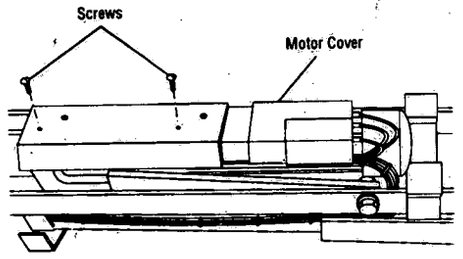


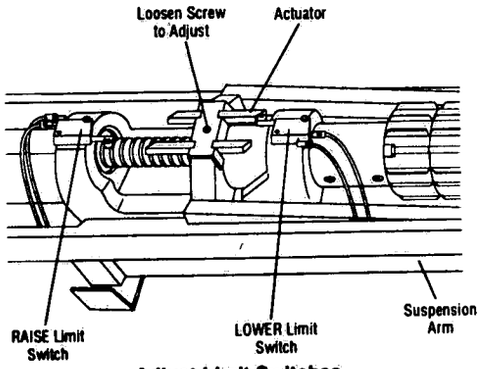

**Figure 3-14. Remove Front Cover Panel**

*NOTE: LOWER limit switch is located on motor end of motor block and RAISE limit switch is located on opposite end of motor block (see Figure 3-15).*

4. Using the appropriate controls, lower support head and platform to desired height.
5. Loosen adjusting screw, located on top of worm gear block (see Figure 3-15). Slide actuator towards LOWER limit switch until actuator activates limit switch.
6. Using the appropriate controls, raise support head and platform to desired height.
7. Slide other actuator towards RAISE limit switch until actuator activates limit switch.
8. Tighten adjusting screw. Attach motor cover to motor block with flathead phillips screws previously removed.
9. Place arm cover halves around arm and secure in place with four phillips screws previously removed. Make sure tabs on cover halves are securely fitted together.




**Remove Cover from Motorized Arm**




**Adjust Limit Switches**

**Figure 3-15. Motorized Arm**

10. Check operation of limit switches by automatically moving main suspension arm through its full range of vertical motion. If range of motion is not adjusted properly, repeat steps 1 through 9 until desired range is achieved.

## 3.4 ADJUST PLATFORM

Later production units are equipped with a platform that can be adjusted to accommodate a larger variety of equipment.

1. Ensure compressed air (if applicable) and electrical supplies are disconnected before working on unit.
2. Loosen four inside screws on top of platform (see Figure 3-16).
3. Push or pull platform to desired length.
4. Tighten screws to secure platform position.

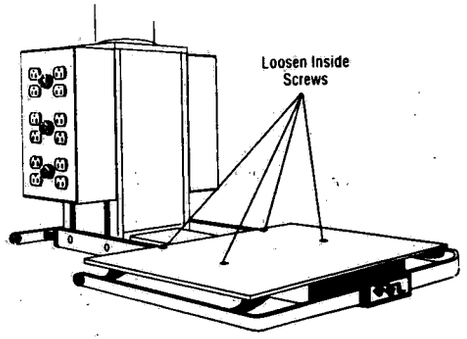



**Figure 3-16. Adjust Platform**

## 3.5 PREVENTIVE MAINTENANCE GUIDE

The form presented in Table 3-1 is be to used as a preventive maintenance record and, along with Section 3 instructions, as a guide to performing preventive maintenance.

(Circle "X" in column when service is performed.)



**Table 3-1. Preventive Maintenance Guide - Orbiter™ Equipment Management System**

| SERVICE PERFORMED: | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| **1.0 PREPARATION FOR PREVENTIVE MAINTENANCE** | | | | | | |
| 1.1 Discuss equipment operation with department personnel. | X | X | X | X | X | X |
| 1.2 Install test equipment. | X | X | X | X | X | X |
| **2.0 FUNCTIONAL TEST** | | | | | | |
| 2.1 Check horizontal rotation of unit. Verify rotational limit rings (rotational stops if Heavy Duty Double Arm Fixed Height model) are properly adjusted. | X | X | X | X | X | X |
| 2.2 If Fixed Height model or Single Arm Motorized model verify friction brakes hold unit in desired horizontal position. | X | X | X | X | X | X |
| 2.3 If Double Arm model, verify air brakes hold unit in desired horizontal position. | X | X | X | X | X | X |
| 2.4 If Motorized model, check vertical movement of unit. | X | X | X | X | X | X |
| 2.5 Verify smooth rotation of support head and platform. | X | X | X | X | X | X |
| **3.0 SUPPORT HEAD** | | | | | | |
| 3.1 Check that support head and platform are level. | X | X | X | X | X | X |
| 3.2 Check electrical receptacles for proper voltage. | X | | X | | X | |
| 3.3 Check grounding studs for impedance. | X | | X | | X | |
| 3.4 Check hose connections for twisting. | X | | X | | X | |
| **4.0 FINAL TEST** | | | | | | |
| 4.1 Inspect all wiring and terminal connections for damage or fraying. | X | X | X | X | X | X |
| 4.2 Remove all test equipment installed for this inspection. | X | X | X | X | X | X |
| 4.3 Replace any panel or cover removed during the inspection. | X | X | X | X | X | X |
| 4.4 Check work area to ensure removal of all materials used during inspection. | X | X | X | X | X | X |
| 4.5 Clean unit as described in Section 3, Cleaning and Adjustment Procedures. | X | X | X | X | X | X |

# Section 4: Field Test Procedures

**WARNING**

**PERSONAL INJURY AND/OR EQUIPMENT DAMAGE HAZARD: Repairs and adjustments to this equipment should be made only by fully qualified service personnel. Non-routine maintenance performed by inexperienced, unqualified personnel or installation of unauthorized parts could cause personal injury, invalidate the warranty, or result in costly damage. Contact your AMSCO Engineering Service representative regarding service options.**

## 4.1 GENERAL

Every unit must be tested and inspected according to this procedure whenever a part is adjusted, repaired or replaced. Items which do not comply to test procedures must be corrected or retested.

## 4.2 TEST INSTRUMENTATION REQUIRED

- Voltmeter
- Ohmmeter
- Calibrated test gauge - must read 0 to 200 psig (0 to 1373 kPa)

## 4.3 FUNCTIONAL TEST

1. Ensure compressed air (if applicable) and electrical supplies are connected to unit.
2. Verify rotational stops are set to allow the following ranges of rotation:
   - Column Fixed Height Model:
     Support Head - 320°
   - Single Arm Fixed Height Model:
     Main Suspension Arm - 0 to 320°
     Support Head - 320°
   - Double Arm Fixed Height Model:
     Upper Suspension Arm - 0 to 320°
     Main Suspension Arm - 0 to 320°
     Support Head - 320°
   - Heavy Duty Double Arm Fixed Height Model:
     Upper Suspension Arm - 270°
     Main Suspension Arm - 270°
     Support Head - 320°
   - Single Arm Motorized Model:
     Main (Motorized) Suspension Arm - 0 to 320°
     Support Head - 320°
   - Double Arm Motorized Model:
     Upper Suspension Arm - 0 to 320°
     Main (Motorized) Suspension Arm - 0 to 320°
     Support Head - 320°
3. If Motorized model, verify range of vertical motion. The maximum vertical range is 28" (700 mm).

## 4.4 ELECTRICAL TEST

1. Measure voltage at each electrical receptacle. Measured voltage should be equal to voltage supplied to unit.
2. Check each grounding stud for impedance (0.15 ohms maximum).

## 4.5 SUPPLY LINES CHECK

1. Check gases, medical air and compressed air pressures supplied to unit. Refer to Equipment Drawing for required pressures.
2. Check that the correct gases are supplied to proper corresponding outlets.
3. Inspect air lines for chafing or kinking.
4. Using a soapy mixture, check all line connections for leaks.

## 4.6 CLEANUP

Inspect work area to be sure all materials used during testing have been removed.



# Section 5: Troubleshooting

This section describes the types of unit malfunctions likely to occur, and indicates probable causes.

**WARNING**

**PERSONAL INJURY AND/OR EQUIPMENT DAMAGE HAZARD: Repairs and adjustments to this equipment should be made only by fully qualified service personnel. Non-routine maintenance performed by inexperienced, unqualified personnel or installation of unauthorized parts could cause personal injury, invalidate the warranty, or result in costly damage. Contact your AMSCO Engineering Service representative regarding service options.**

**WARNING**

**ELECTRIC SHOCK AND/OR EQUIPMENT DAMAGE HAZARD: Lock building electrical supply disconnect switch to OFF position before performing any service on the unit.**

If you are unable to correct the problem with use of the Troubleshooting Chart, or if a problem occurs that is not described on the chart, please call your local AMSCO representative. They will arrange to have your unit placed in proper working condition by a factory-trained service representative. ***Never permit unqualified persons to perform service on the unit.***

## 5.1 TROUBLESHOOTING CHART

Use the Troubleshooting Chart (Table 5-1) as follows:

- TROUBLE

  Select the problem you think is most appropriate to the particular trouble symptom.

- CAUSE/CORRECTION

  This column lists the specific conditions that should be checked to isolate and correct the one causing the malfunction. The conditions are presented in the order in which they should be checked.

- WHERE IN MANUAL

  Location of applicable instructions and/or illustrations are provided in this area. The illustrations or instructions are identified by figure number, section or table number.

*NOTE: In the Troubleshooting Chart, the basic description of each model has been abbreviated as follows:*

*CF - Column Fixed Height*
*SF - Single Arm Fixed Height*
*DF - Double Arm Fixed Height*
*HDF - Heavy Duty Double Arm Fixed Height*
*SM - Single Arm Motorized*
*DM - Double Arm Motorized*

**Table 5-1. Troubleshooting Chart**

| Trouble | Cause/Correction | Where To Find |
|---|---|---|
| 1. Horizontal rotational movement requires excessive force. Movement is choppy, not smooth. | 1. If DF or DM model, worn brake pad – replace brake pad. | Sec. 6.2.3; Fig. 7-20, 7-21, 7-22 & 7-23 |
| | 2. Supply hoses and electrical wiring are twisted inside suspension arm(s) – untwist hoses and wiring. | -- |
| | 3. Rotational limit rings (all models except HDF model) loosened and jammed – readjust rotational limit rings. | Sec. 3.2; Fig. 7-19, 7-20, 7-21, 7-22 & 7-23 |
| 2. If SM or DM model, no vertical movement. | 1. Building electrical supply disconnect switch (circuit breaker) OFF – position to ON. | -- |
| | 2. Blown fuse – replace fuse. | Sec. 6.3.1; Fig. 7-28, 7-31 or 7-32 |
| | 3. Bad condenser – replace condenser. | Fig. 7-28, 7-31 or 7-32 |

## Table 5-1. Troubleshooting Chart (continued)

| Trouble | Cause/Correction | Where To Find |
|---|---|---|
| 3. If SM or DM model, vertical movement is choppy, not smooth. | 1. Faulty limit switch – adjust or replace limit switch as necessary. | Sec. 6.3.4; Fig. 7-27 |
| | 2. Faulty control mechanism – replace control. | Fig. 7-28, 7-30 & 7-32 |
| | 3. Faulty motor – repair or replace motor as necessary. | Sec. 6.3; Fig. 7-27 |
| 4. Unit can be maneuvered into wall or other obstruction. | 1. Rotational limit rings (rotational stops on HDF model) not set properly – readjust limit rings. | Sec. 3.2; Fig. 7-19, 7-20, 7-21, 7-22 & 7-23 |
| 5. If DF, HDF or DM model, air released from compressed air brake is not audible when appropriate control button is pressed. | 1. Compressed air pressure is low – check compressed air pressure to unit. | Sec. 4.5 |
| 6. Support head and platform drift. | 1. Support head and platform not level – level support head and platform as explained in Uncrating/Installation Instructions. | -- |
| 7. Unit drifts. | 1. If CF, SF, DF or SM model, friction brake loosened – adjust medium weight friction brake. | Sec. 6.2.1; Fig. 7-18 & 7-19 |
| | 2. If HDF model, friction brake loosened – adjust heavy weight friction brake. | Sec. 6.2.2; Fig. 7-25 |
| | 3. Unit not level – level unit as explained in Uncrating/Installation Instructions. | -- |
| | 4. If DF, HDF or DM model, compressed air pressure is low – check compressed air supply pressure to unit. | Sec. 4.5 |
| 8. Power not available from support head electrical receptacles. | 1. Building electrical supply disconnect switch (circuit breaker) OFF – position to ON. | -- |
| | 2. Power failure – check building electrical supply. | -- |
| | 3. Low voltage to electrical receptacles – check voltage supplied to unit. | Sec. 4.4 |
| | 4. Loose electrical connection – check unit electrical system. | Table 5-2 |
| 9. Erratic performance of equipment positioned on platform or support shelves. | 1. Loose electrical connection – check unit electrical system. | Table 5-2 |
| 10. Static electricity is apparent. | 1. Grounding wire not connected – connect grounding wire to grounding stud. | -- |
| 11. Gas or compressed air not available from support head connections. | 1. Gas or compressed air pressure is low – check gas or compressed air supply pressure to unit. | Sec. 4.5 |
| | 2. Loose hose connection – check unit and building supply connections. | Sec. 4.5 |



## Table 5-2. Wiring Diagram Reference List

Listed below are reference drawings which are presented immediately after this table.

| Title | Sheet | Figure Number |
|---|---|---|
| Electrical Wiring — Motorized Models 130M and 230M | 1 of 1 | Figure 5-1 |
| Circuit Diagram — Motorized Models 150M and 250M | 1 of 1 | Figure 5-2 |
| Circuit Diagram — Motorized Models 705M and 905M | 1 of 1 | Figure 5-3 |
| High Voltage Wiring for Non-isolated Power Units (Earlier Production Units) | 1 of 1 | Figure 5-4 |
| High Voltage Wiring for Non-isolated Power Units (Later Production Units) | 1 of 1 | Figure 5-5 |

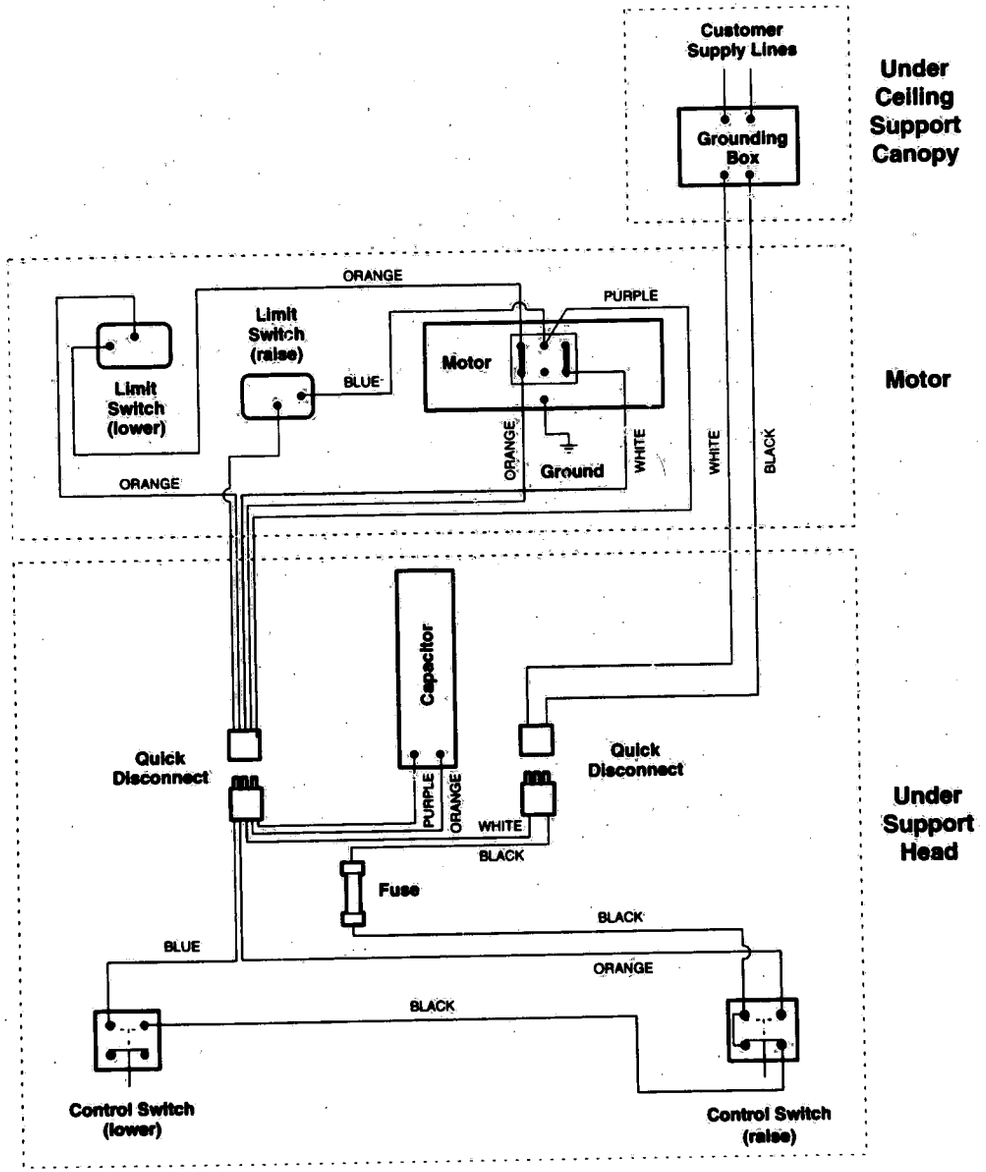



Figure 5-1. Electrical Wiring — Motorized Models 130M and 230M

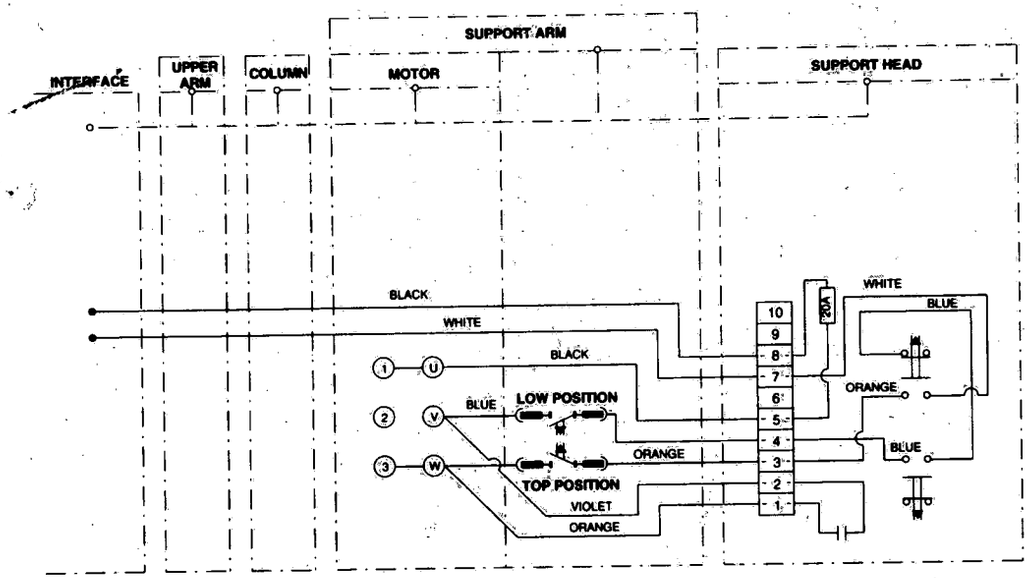



Figure 5-2. Circuit Diagram — Motorized Models 150M and 250M

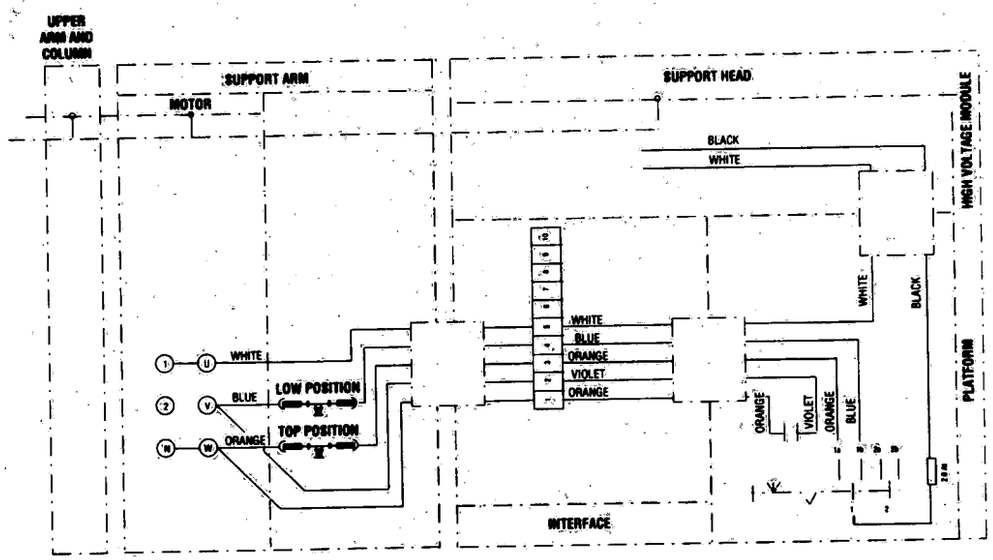
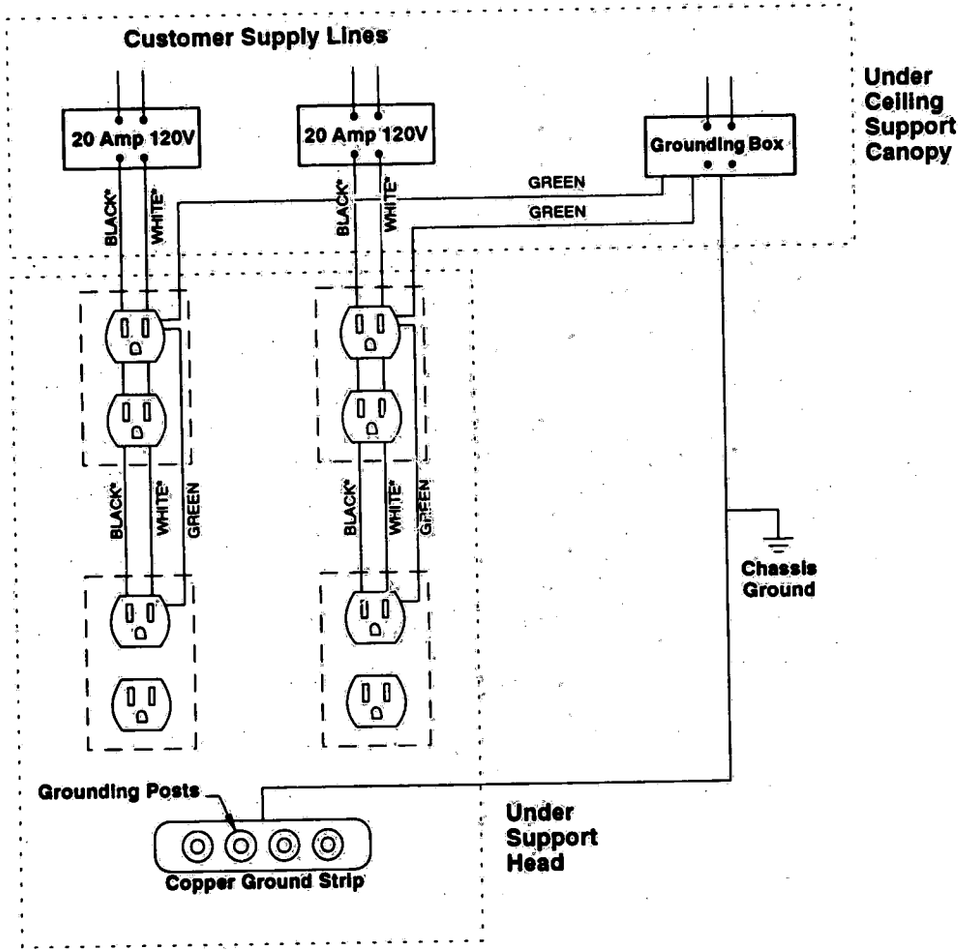



**Figure 5-3. Circuit Diagram — Motorized Models 705M and 905M**

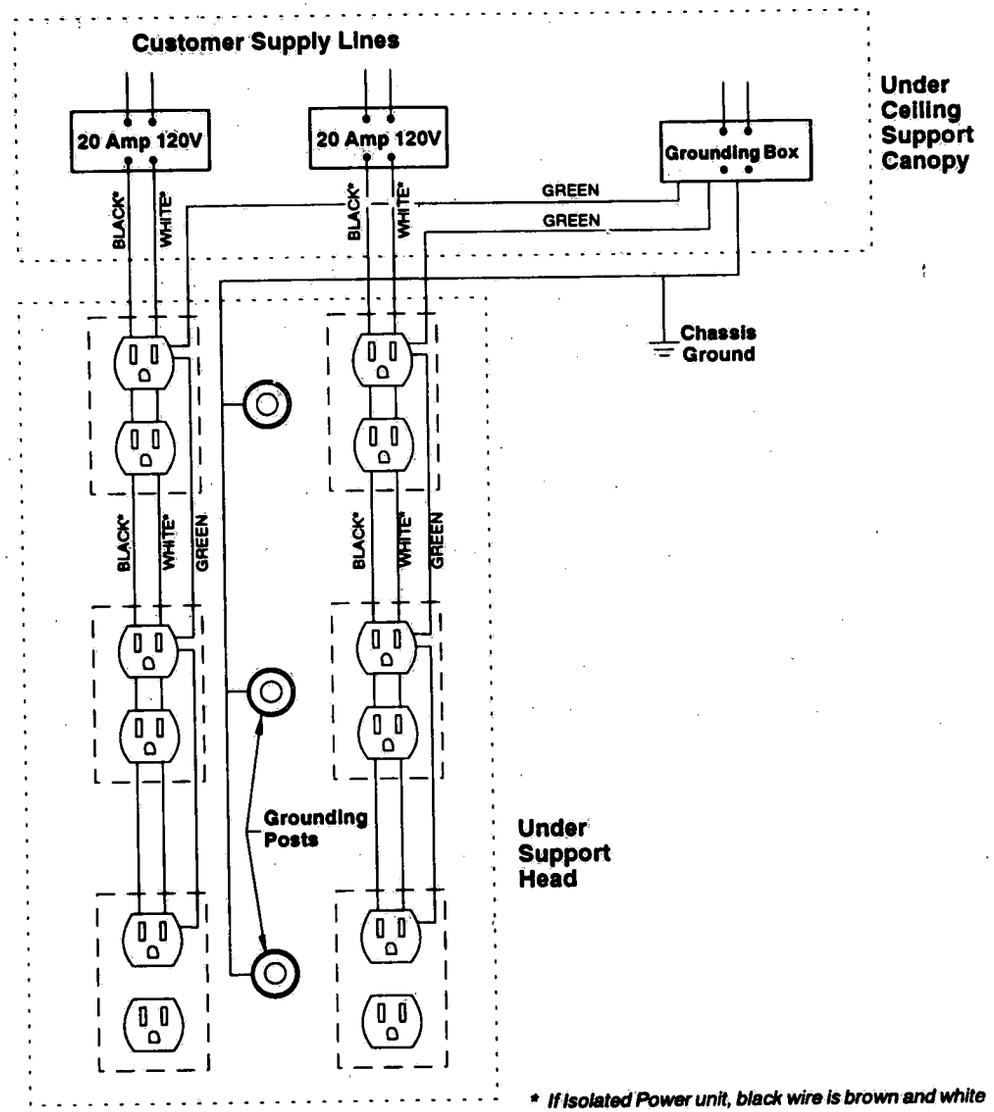





* *If Isolated Power unit, black wire is brown and white wire is orange.*

*NOTE: On Motorized units, 110 for motor is either separate 110 supply or tapped off one of the duplex receptacles.*

**Figure 5-4. High Voltage Wiring for Non-Isolated Power Units (Earlier Production Units)**




* *If Isolated Power unit, black wire is brown and white wire is orange.*

*NOTE: On Motorized units, 110 for motor is either separate 110 supply or tapped off one of the duplex receptacles.*

**Figure 5-5. High Voltage Wiring for Non-Isolated Power Units (Later Production Units)**



# Section 6: Component Repair and Replacement

**WARNING**

**PERSONAL INJURY AND/OR EQUIPMENT DAMAGE HAZARD: Repairs and adjustments to this equipment should be made only by fully qualified service personnel. Non-routine maintenance performed by inexperienced, unqualified personnel or installation of unauthorized parts could cause personal injury, invalidate the warranty, or result in costly damage. Contact your AMSCO Engineering Service representative regarding service options.**

**WARNING**

**ELECTRIC SHOCK AND/OR EQUIPMENT DAMAGE HAZARD: Before performing any service on the unit, lock building electrical supply disconnect switch to OFF position.**

This section includes instructions for the disassembly, repair and replacement of selected unit components. Exploded views and assembly drawings showing the various parts and assemblies referred to are included in Section 7, Exploded Views and Parts Lists.

Throughout this section, the basic description of each model has been abbreviated as follows:

- CF - Column Fixed Height
- SF - Single Arm Fixed Height
- DF - Double Arm Fixed Height
- HDF - Heavy Duty Double Arm Fixed Height
- SM - Single Arm Motorized
- DM - Double Arm Motorized

*NOTE: Before performing any maintenance procedures on unit, remove all equipment from platform and support shelves (if installed).*

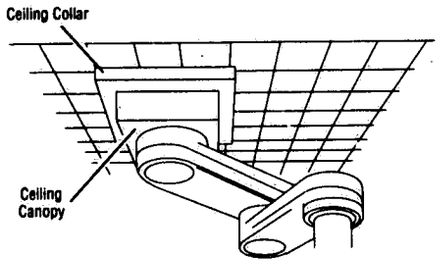



**Figure 6-1. Ceiling Collar and Canopy**

*NOTE: Fasteners used in the construction of this unit are metric standard sizes, therefore, it is necessary to reuse the original fasteners when components are replaced. The following metric tools are required for maintenance procedures: 2 through 8 mm hex wrenches and 7 through 22 mm open end/box wrenches.*

## 6.1 MANIFOLD ASSEMBLY (see Figure 7-17)

### 6.1.1 O-ring Replacement

1. Lock building electrical supply disconnect switch in OFF position. Close unit gas and compressed air supply valves.
2. Bleed any remaining pressure from unit gas and compressed air lines to prevent damage to O-rings. Bleed air brakes by pressing rotation control buttons.
3. Remove ceiling collar and canopy, exposing manifold assembly (see Figure 6-1).

*NOTE: Heavy Duty Double Arm Fixed Height model is not equipped with a ceiling collar.*

4. Remove three screws and washers from bottom of manifold. Lower tubing terminal block and rest on metal plate (see Figure 6-2).

*NOTE: Top section of manifold assembly, including tubes, will remain attached to ceiling plate when tubing terminal block is lowered.*

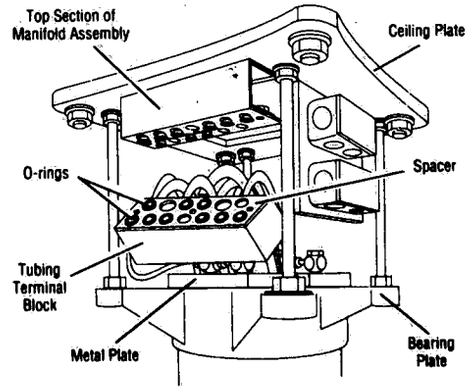



**Figure 6-2. Manifold Assembly**

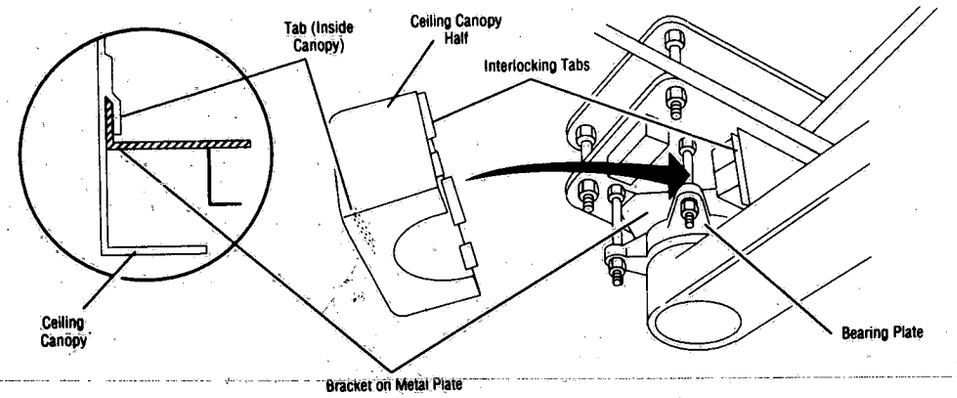



**Figure 6-3. Reinstall Ceiling Canopy**

5. Lift spacer off tubing terminal block and replace worn O-ring with new one.
6. Replace spacer on top of block. Make sure cutouts in spacer are positioned over O-rings.
7. Lift tubing terminal block up and correctly position under top section of manifold assembly. Secure block to bottom of manifold assembly with washers and screws previously removed.
8. Open unit gas and compressed air supply valves. Unlock building electrical supply disconnect switch and set in ON position. Check manifold assembly for leaks.
9. Reinstall ceiling collar and canopy. Make sure tabs inside canopy halves are fastened over brackets on metal plate (see Figure 6-3).

## 6.2 BRAKES

### 6.2.1 Medium Weight Friction Brakes (CF, SF, DF and SM Models only) (see Figures 7-18 and 7-19)

*NOTE: If Double Arm Fixed Height model, medium weight friction brake is located in main suspension's lower link. Remove brake cover from top of main suspension arm to gain access to friction brake.*

**Adjustment**

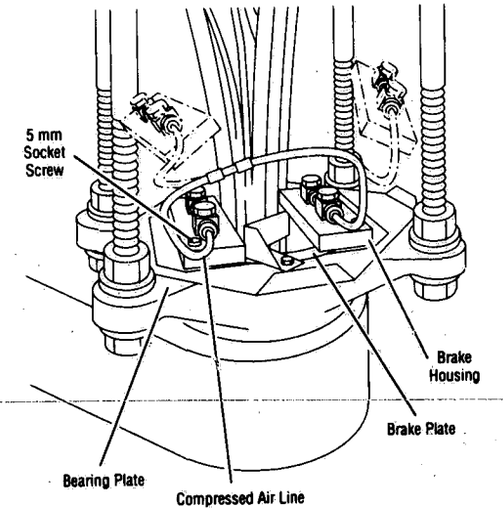
1. Lock building electrical supply disconnect switch in OFF position. Close unit gas and compressed air supply valves.
2. Remove ceiling collar and canopy, exposing bearing plate (see Figure 6-1).
3. As required—to increase or decrease braking—tighten or loosen set screw located inside fixed stop, part of the bearing plate.
4. Reinstall ceiling collar and canopy. Make sure tabs inside canopy halves are fastened over brackets on metal plate (see Figure 6-3).
5. Open unit gas and compressed air supply valves. Unlock building electrical supply disconnect switch and set in ON position. Check brake operation by guiding main suspension arm through its horizontal range of motion. Verify friction brakes securely hold suspension arm in desired position.

### 6.2.2 Heavy Weight Friction Brake (HDF Model only) (see Figure 7-25)

**Adjustment**

1. Lock building electrical supply disconnect switch in OFF position. Close unit gas and compressed air supply valves.
2. Pull collar down from bottom of main suspension's lower link, exposing friction brake.
3. Loosen stop collar and tighten or loosen hex head bolt as required, to increase or decrease braking.
4. Tighten stop collar. Push collar up under main suspension arm.
5. Open unit gas and compressed air supply valves. Unlock building electrical supply disconnect switch and set in ON position. Check brake operation by guiding suspension arm through its horizontal range of motion. Verify friction brake securely holds suspension arm in desired position.






*Model 230M Shown*

*Remove Screws From Brake Housings and Lift Brake Housings Away From Brake Plate*

**Figure 6-4. Brake Housings on Bearing Plate**

### 6.2.3 Compressed Air Brakes (DF and DM Models only)

**Bearing Plate Brake Lining Replacement** (see Figures 7-20 and 7-21)

1. Lock building electrical supply disconnect switch in OFF position. Close unit gas and compressed air supply valves.
2. Bleed compressed air lines by pressing rotation control buttons.
3. Remove ceiling collar and canopy, exposing bearing plate (see Figure 6-1).

*NOTE: Shims may be located under brake housings. Be sure to hold onto shims when lifting brake housings away from brake plate.*

4. Remove two 5 mm socket screws from aluminum brake housing. Lift brake housing away from brake plate, leaving air lines connected (see Figure 6-4).
5. Remove worn brake lining from underside of brake housing and place new brake lining against brake collar.
6. Place brake housing on brake plate and secure with socket screws previously removed.
7. Reinstall ceiling collar and canopy halves. Make sure tabs inside canopy halves are fastened over brackets on metal plate (see Figure 6-3).
8. Open unit gas and compressed air supply valves. Unlock building electrical supply disconnect switch and set in ON position. Check brake pad operation by guiding upper suspension arm through its horizontal range of motion. Verify air brakes securely hold upper suspension arm in desired position.

**Bearing Plate Brake Collar Replacement** (see Figures 7-20 and 7-21)

1. Lock building electrical supply disconnect switch in OFF position. Close unit gas and compressed air supply valves.
2. Bleed compressed air lines by pressing rotation control buttons.
3. Remove ceiling collar and canopy, exposing bearing plate (see Figure 6-1).

*NOTE: Shims may be located under brake housings. Be sure to hold onto shims when lifting brake housings away from brake plate.*

4. Remove two 5 mm socket screws from aluminum brake housing. Lift brake housing away from brake plate (see Figure 6-4).
5. Remove screw from air connection and remove brake lining and brake collar from underside of brake housing. Remove worn collar from around brake plunger.
6. Stretch new brake collar around brake plunger. Place new collar and brake lining on underside of brake housing and reattach air connection.
7. Place brake housing on brake plate and secure with socket screws previously removed.
8. Reinstall ceiling collar and canopy. Make sure tabs inside canopy halves are fastened over brackets on metal plate (see Figure 6-3).
9. Open unit gas and compressed air supply valves. Unlock building electrical supply disconnect switch and set in ON position. Check bladder operation by guiding upper suspension arm through its horizontal range of motion. Verify air brakes securely hold upper suspension arm in desired position.

**Upper Suspension Arm Brake Lining Replacement** (see Figures 7-22 and 7-23)

1. Lock building electrical supply disconnect switch in OFF position. Close unit gas and compressed air supply valves.

2. Bleed compressed air lines by pressing rotation control buttons.
3. Remove three screws from brake cover plate, on top of upper suspension arm's lower link. Lift brake cover plate away from top of upper suspension arm and set aside.

*NOTE: Shims may be located under brake housings. Be sure to hold onto shims when lifting brake housings away from brake plate.*

4. Remove two 6 mm socket screws from brake housing. Lift brake housing away from brake plate, leaving air lines connected (see Figure 6-5).
5. Remove worn brake lining from underside of brake housing and place new brake lining against brake collar.
6. Place brake housing on brake plate and secure with socket screws previously removed.
7. Fasten brake cover plate to top of upper suspension arm's lower link with three screws previously removed.
8. Open unit gas and compressed air supply valves. Unlock building electrical supply disconnect switch and set in ON position. Check brake pad operation by guiding main suspension arm through its horizontal range of motion. Verify air brakes securely hold main suspension arm in desired position.

**Upper Suspension Arm Brake Collar Replacement** (see Figures 7-22 and 7-23)

1. Lock building electrical supply disconnect switch in OFF position. Close unit gas and compressed air supply valves.
2. Bleed compressed air lines by pressing rotation control buttons.
3. Remove three screws from brake cover plate, on top of upper suspension arm's lower link. Lift brake cover plate away from top of upper suspension arm and set aside.

*NOTE: Shims may be located under brake housings. Be sure to hold onto shims when lifting brake housings away from brake plate.*

4. Remove two 6 mm socket screws from brake housing. Lift brake housing away from brake plate (see Figure 6-5).
5. Remove screw from air connection and remove brake lining and brake collar from underside of brake housing. Remove worn collar from around brake plunger.
6. Stretch new brake collar around brake plunger. Place new collar and brake lining on underside of brake housing and reattach air connection.
7. Place brake housing on brake plate and secure with socket screws previously removed.
8. Fasten brake cover plate to top of upper suspension arm's lower link with three screws previously removed.
9. Open unit gas and compressed air supply valves. Unlock building electrical supply disconnect switch and set in ON position. Check bladder operation by guiding main suspension arm through its horizontal range of motion. Verify air brakes securely hold main suspension arm in desired position.

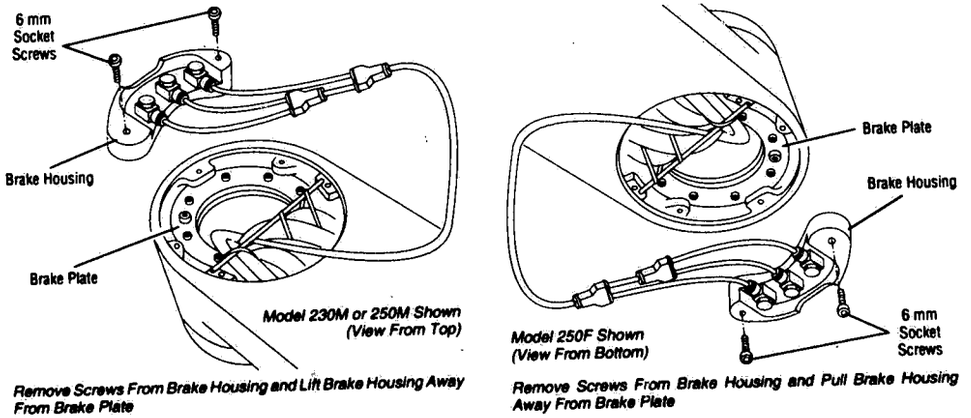



**Figure 6-5. Brake Housing in Upper Suspension Arm**



**6.2.4 Piston/Bladder Air Brakes (HDF Model only) (see Figure 7-24)**

**Bladder Replacement**

1. Lock building electrical supply disconnect switch in OFF position. Close unit gas and compressed air supply valves.
2. Bleed compressed air lines by pressing rotation control buttons.
3. Remove three screws from brake cover, on bottom of suspension arm. Lower brake cover away from bottom of suspension arm and set aside.
4. Remove ten screws from actuator plate and lift plate off brake housing, leaving air line connected.
5. Replace worn bladder with new one. Make sure cutouts in bladder are positioned over holes in brake housing.
6. Place actuator plate on brake housing and secure with screws previously removed.
7. Fasten brake cover to bottom of suspension arm.
8. Open unit gas and compressed air supply valves. Unlock building electrical supply disconnect switch and set in ON position. Check bladder operation by guiding main suspension arm through its horizontal range of motion. Verify brake securely holds main suspension arm in desired position.

## 6.3 MOTOR ASSEMBLY (MOTORIZED MODELS ONLY) (see Figure 7-27)

**6.3.1 Fuse Replacement (see Figures 7-28 and 7-32)**

Location of fuse will vary depending on model. In earlier production units, fuse is either located in the platform, under the platform shelf, or in the support head, behind the front cover panel. In later production units, fuse is accessible from side of the platform, without removing the platform shelf.

1. Lock building electrical supply disconnect switch in OFF position. Close unit gas and compressed air supply valves.
2. If necessary, remove front cover panel or platform shelf to access fuse.
3. Push in and turn quick-disconnect cap. Remove cap and fuse from fuse holder. Insert new fuse into holder and secure in place with cap.
4. If previously removed, replace front cover panel or platform shelf.
5. Open unit gas and compressed air supply valves. Unlock building electrical supply disconnect switch and set in ON position. Check fuse operation by guiding unit through its range of vertical motion.

**6.3.2 Motor Assembly Replacement (see Figures 7-26 and 7-27)**

*NOTE: Support head must be supported when motor assembly is being removed from unit.*

*NOTE: Motor assembly must be replaced as an assembly. Motor or drive assembly are not available separately.*

1. Lock building electrical supply disconnect switch in OFF position. Close unit gas and compressed air supply valves.

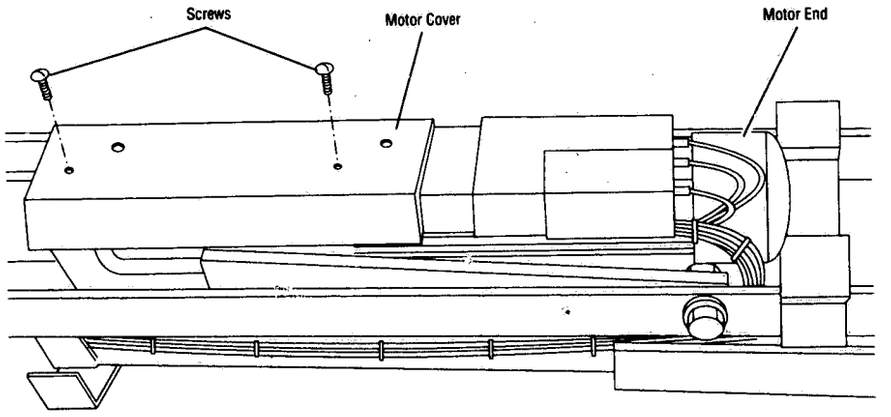



**Figure 6-6. Remove Motor Cover**

2. Remove two phillips screws from top of arm cover and two from bottom of cover. Using a flat tip screwdriver, carefully pry apart cover halves from around arm.
3. At lower end of main suspension arm, remove two screws from knuckle cover and lift off knuckle cover.
4. Remove two 5 mm allen screws attaching motor holder to motor block. Remove motor holder from motor assembly.
5. Remove draw bar screws from stabilizing bars, one on each bar. Remove two flathead phillips screws from motor cover (see Figure 6-6) and lift cover off motor block.

*NOTE: Do not remove round-head screws. The round-head screws attach limit switches to motor block.*

*NOTE: Make note of electrical connections for reassembly.*

6. Disconnect electrical connections from motor. Lift motor assembly out of arm before disconnecting ground wire. Ground wire is connected to back bracket, under motor assembly.
7. Remove motor assembly from unit by sliding assembly to the left, unlocking collar bolt from keyhole, and lifting assembly up and away from unit. If more room is needed to remove assembly, remove snap ring on end of left stabilizing bar.
8. Install new motor assembly into unit. Make sure assembly is locked in place (collar bolt locked in keyhole).
9. Reconnect all wiring.
10. Attach motor cover to motor block with flathead phillips screws previously removed. Fasten draw bar screws through stabilizing bars and draw bars. If necessary, reattach snap ring on end of left stabilizing bar.
11. Mount motor holder to front of motor block with allen screws previously removed. Make sure button on motor holder fits up through opening in arm (see Figure 7-26, "A").
12. Fasten knuckle cover over end of main suspension arm with screws previously removed.
13. Place arm cover halves around arm and secure in place with four phillips screws previously removed. Make sure tabs on cover halves are securely fitted together.
14. Open unit gas and compressed air supply valves. Unlock building electrical supply disconnect switch and set in ON position. Check worm gear operation. Using appropriate controls, move main suspension arm through its vertical range of motion. Verify smooth movement of suspension arm.

### 6.3.3 Limit Switch Replacement and Adjustment (see Figure 7-27)

**Replacement**

1. Lock building electrical supply disconnect switch in OFF position. Close unit gas and compressed air supply valves.
2. Remove two phillips screws from top of arm cover and two from bottom of cover. Using a flat tip screwdriver, carefully pry apart cover halves from around arm.
3. Remove two flathead phillips screws from motor cover (see Figure 6-6) and lift cover off motor block.

*NOTE: Make note of electrical connections for reassembly.*

4. Disconnect electrical connections from limit switch.

*NOTE: Insulator is fastened in place between limit switch and motor block with round-head screw. Be sure to hold onto insulator when lifting limit switch off of motor block.*

5. Unscrew round-head screw from limit switch and remove limit switch from motor block.
6. Fasten new limit switch to motor block with round-head screw previously removed. Make sure insulator is inserted between motor block and limit switch.
7. Reconnect all wiring.
8. Attach motor cover to motor block with flathead phillips screws previously removed.
9. Place arm cover halves around arm and secure in place with four phillips screws previously removed. Make sure tabs on cover halves are securely fitted together.
10. Open unit gas and compressed air supply valves. Unlock building electrical supply disconnect switch and set in ON position. Check limit switch operation. Using appropriate controls, move main suspension arm through its vertical range of motion. To adjust desired vertical range of motion, adjust limit switch as explained in the following section.



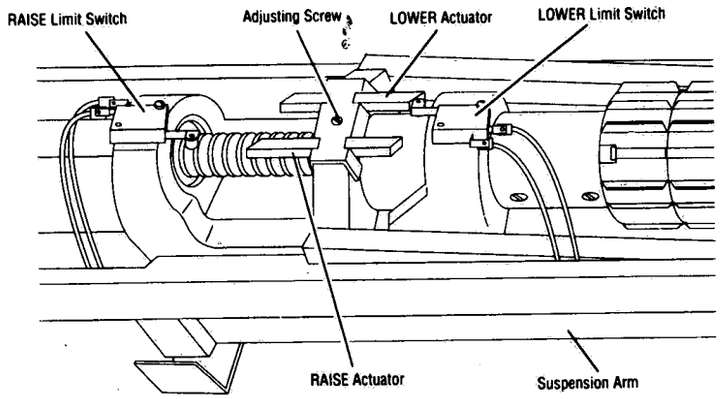



**Figure 6-7. Adjust Limit Switches**

**Adjustment**

**WARNING**

**ELECTRICAL SHOCK HAZARD: When adjusting RAISE/LOWER limit switches, use extreme caution. Electrical supply is connected to unit and disconnect switch is in ON position during entire adjustment procedure.**

**CAUTION**

**Motorized models are also equipped with mechanical stops to limit the vertical range of motion. If limit switches are adjusted to increase this range of motion, make sure limit switches shut off motor before mechanical stops are reached.**

1. Ensure electrical supply is connected to unit and disconnect switch is on during the following adjustment procedure.
2. Remove two phillips screws from top of arm cover and two from bottom of cover. Using a flat tip screwdriver, carefully pry apart cover halves from around arm.
3. Remove two flathead phillips screws from motor cover (see Figure 6-6) and lift cover off motor block.

*NOTE: LOWER limit switch is located on motor end of motor block and RAISE limit switch is located on opposite end of motor block (see Figure 6-7).*

4. Using appropriate controls, lower support head and platform to desired height.
5. Loosen adjusting screw, located on top of worm gear block (see Figure 6-7). Slide actuator towards LOWER limit switch until actuator activates limit switch.
6. Using appropriate controls, raise support head and platform to desired height.
7. Slide other actuator towards RAISE limit switch until actuator activates limit switch.
8. Tighten adjusting screw. Attach motor cover to motor block with flathead phillips screws previously removed.
9. Place arm cover halves around arm and secure in place with four phillips screws previously removed. Make sure tabs on cover halves are securely fitted together.
10. Check operation of limit switches by automatically moving main suspension arm through its vertical range of motion. If range of motion is not adjusted properly, repeat steps 1 through 9 until desired range is achieved.

## 6.4 GAS OUTLET ASSEMBLY (see Figures 7-34 and 7-35)

The gas outlet assembly is complex and should not be removed for routine maintenance. In earlier production units, the presence of a condenser jacket in the support head severely restricts the area in which the medical air and gas lines can be contained (see Figure 6-8). Only fully qualified service personnel should make repairs and adjustments to the gas outlet assembly.

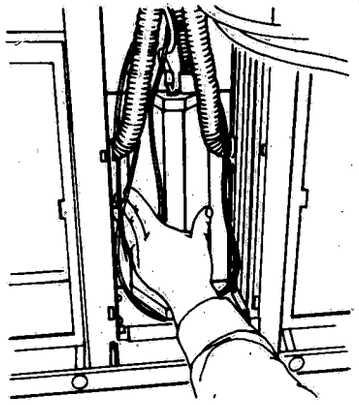


**Figure 6-8. Condenser Jacket - Earlier Production Units Only**

*NOTE: The following steps refer to the front and back (rear) of the support head assembly. The platform is referred to as the front; the gas outlet assembly is referred to as the back (rear).*

### 6.4.1 Rough-in and Latch Valve Replacement

If a rough-in or latch valve is faulty, replacement of part is recommended instead of repair.

Rough-ins are connected to gas lines with a factory-installed crimp connector. To replace rough-in, crimp connector must be removed using a special crimping tool (P/N 764326-080). Connect new rough-in to existing medical air/gas line with a hose clamp. (*See IPB section for appropriate hose clamp*).

*NOTE: Following the replacement of any gas outlet, local codes may require testing of gas lines. Verify that all connections are in accordance with NFPA 99 and local codes.*

### 6.4.2 Medical Air/Gas Line Replacement

**CAUTION**

**Use extreme caution when routing new medical air/gas lines through support head assembly. Lines may twist and kink.**

Medical air/gas lines are connected to rough-ins with a factory-installed crimp connector. To replace line, crimp connector must be removed using a special crimping tool (P/N 764326-080). Connect new line to existing rough-in with a hose clamp (provided by others).

*NOTE: Local codes may require testing of gas lines following line replacement. Verify that all connections are in accordance with NFPA 99 and local codes.*

### 6.4.3 Gas Outlet Assembly Reattachment

**Earlier Production Units**

**CAUTION**

**Use extreme caution when replacing gas outlet assembly. Medical air and gas lines may twist and kink.**

1. Position the bottom of the gas outlet assembly at the rear base of the support head assembly (see Figure 6-9) and lock hinges in place (see Figure 6-10).

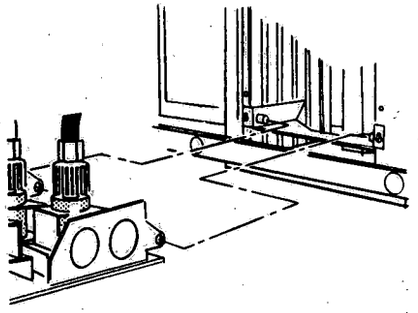


**Figure 6-9. Position Gas Outlet Assembly**

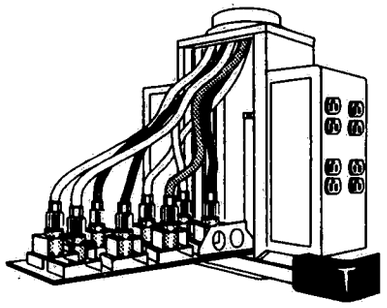


**Figure 6-10. Lock Hinges**



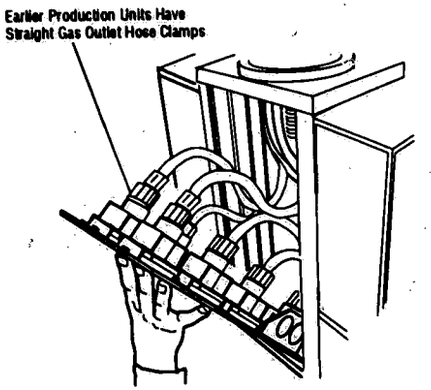



**Figure 6-11. Guide Lines into Support Head Assembly Cavity**

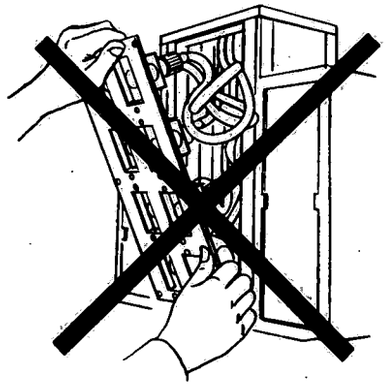


**Figure 6-12. Incorrect Reinstallation of Gas Outlet Assembly - Lines Likely to Kink**

2. Raise the top of the gas outlet assembly approximately 45 degrees from the horizontal and carefully guide the gas lines into the support head assembly cavity (see Figure 6-11). Ensure gas lines do not crimp or kink.

   Figure 6-12 is an example of how the long lines can easily be crimped if extreme care is not taken in reinserting the lines.

*NOTE: The lines at the top of the gas outlet assembly are extra long and, therefore, most likely to kink.*

3. Reach in front (platform side) of the support head assembly and gently pull the excess length of each line through the opening above the capacitor jacket (see Figure 6-13).
4. Continue pulling the excess length of lines through the opening until the top of the gas outlet assembly is almost flush with the top of the support head assembly (see Figure 6-14).
5. Carefully inspect all of the lines for crimping or kinks.
6. Remount the gas outlet assembly and secure it into position with its six attaching screws (see Figure 6-15).

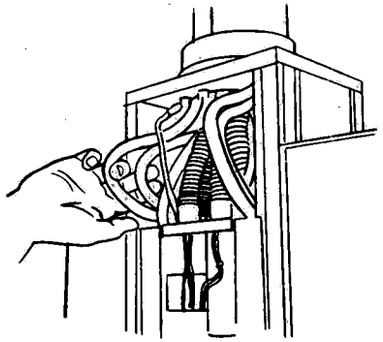


**Figure 6-13. Support Head Assembly Front View**

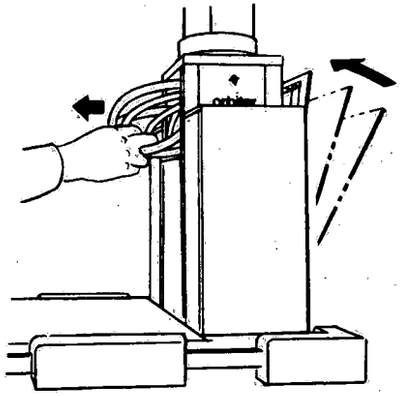


Figure 6-14. Support Head Assembly Side View

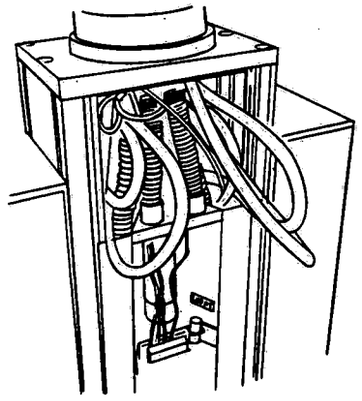


Figure 6-16. Support Head Assembly - Front View Showing Gas Lines Protruding

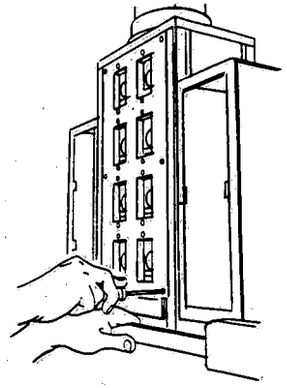


Figure 6-15. Reattach Gas Outlet Assembly

*NOTE: The front (platform side) of the support head assembly should now resemble Figure 6-16 with the excess length of lines protruding from the opening above the condenser jacket.*

7. Inspect all lines to ensure no crimping or kinking has occurred.

*NOTE: The following steps are a general guide which will prevent crimping or kinking if it is understood that the exact manner in which the lines fit into the support head assembly cavity will differ slightly with each unit.*

8. Starting with one of the lines protruding from the front of the support head assembly, make a flowing bend as shown in Figure 6-17. Shape the bend so that it can be inserted into the support head assembly without forcing it.

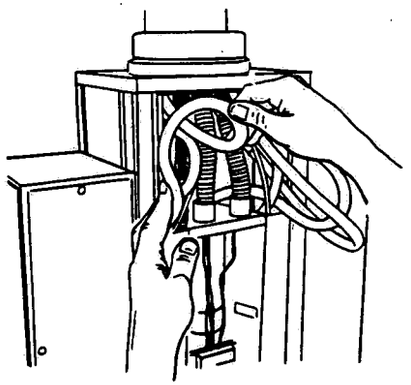


Figure 6-17. Shaping Gas Lines



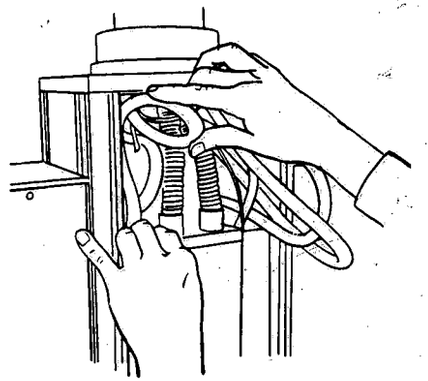


Figure 6-18. Inserting Shaped Lines

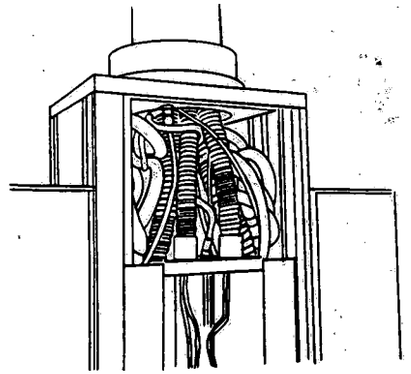


Figure 6-19. Lines Properly Positioned

9. Place (but do not force) the shaped line into the cavity as shown in Figure 6-18.
10. Inspect for crimping or kinks.

*NOTE: If the line crimps or kinks, or cannot be placed into the cavity without forcing it, repeat steps 8, 9 and 10, trying different shapes until one fits.*

11. Repeat steps 8, 9 and 10 for the remaining lines.
12. Ensure that all lines are contained within the support head assembly cavity (see Figure 6-19) and that none are crimped or kinked.
13. Replace front cover panel (see Figure 6-20) and secure with attaching screws (see Figure 6-21).
14. Test all outlets for proper pressure and flow.

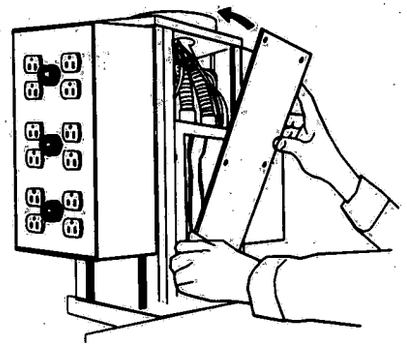


Figure 6-20. Positioning Front Cover Panel

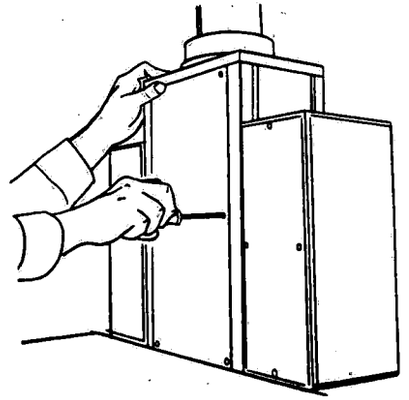


Figure 6-21. Securing Front Panel

**Later Production Units**

**CAUTION**

**Use extreme caution when replacing gas outlet assembly. Medical air and gas lines may twist and kink.**

1. Position the bottom of the gas outlet assembly at the rear base of the support head assembly (see Figure 6-9) and lock hinges in place (see Figure 6-10).
2. Raise the top of the gas outlet assembly and carefully guide the gas lines into the support head assembly cavity (see Figure 6-22). Ensure gas lines do not crimp or kink.
3. Remount the gas outlet assembly and secure it into position with its six attaching screws (see Figure 6-15).
4. Test all outlets for proper pressure and flow.

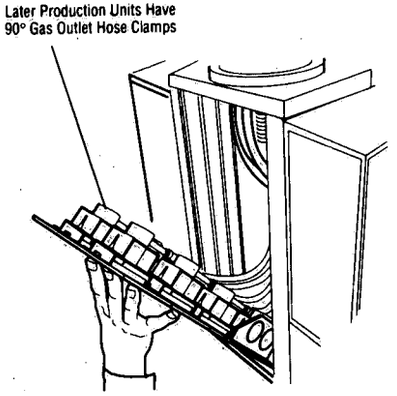
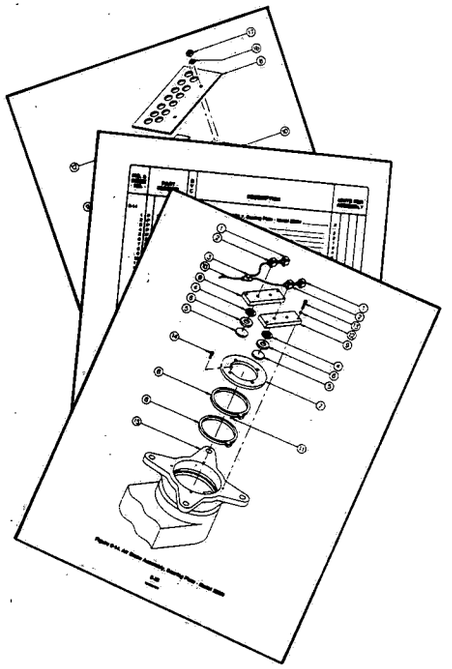



**Figure 6-22. Guide Lines into Support Head Assembly Cavity**



# Section 7: Exploded Views and Parts Lists

Assemblies and components of the Orbiter, equipment management system, are illustrated and identified on the following pages. The part number, the description and the quantity required for each usage are given. Each indentation in the description represents the assembly level. The UNITS PER ASSEMBLY column is specific for the given assembly or subassembly level.



**How to Use the Illustrated Parts Breakdown**

1. Determine the function and application of the part required. Turn to the list of illustrations and select the most appropriate title. Note the illustration page number.
2. Turn to the page indicated and locate the desired part on the illustration.
3. From the illustration, obtain the index number assigned to the part desired. Refer to the accompanying description for specific information regarding the part.

**Typical Indentation Example**

**No indentation** – part of top assembly

**One indentation** – first subassembly, part of assembly under which it is indented

| | | | | |
|---|---|---|---|---|
| | P | 764323 | 320 | BUMPER SET |
| 1 | P | 764323 | 627 | • BUMPER, Corner |
| 2 | P | 764323 | 628 | • BUMPER, Straight |
| 3 | P | 764323 | 675 | PANEL |
| 4 | P | 764323 | 692 | PANEL, Electrical |
| 5 | P | 764323 | 349 | RAIL, Grounding |
| 6 | P | 764323 | 609 | WASHER |
| 7 | P | 56938 | 116 | OUTLET, Electrical (Duplex) |
| 8 | P | 764323 | 347 | COVER, Pin |
| 9 | P | 764323 | 348 | PLATE, Marker |
| 10 | P | 764323 | 350 | PIN, Grounding |
| 11 | | | | NUT |

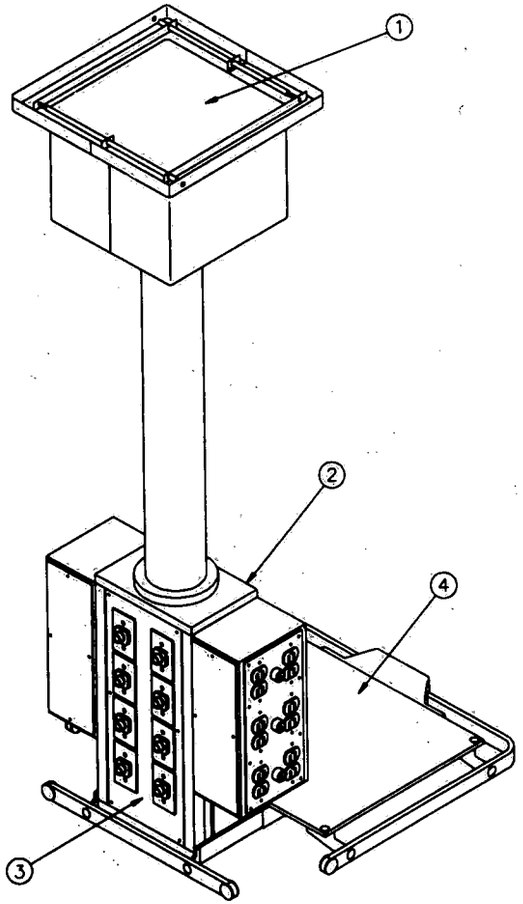



**Figure 7-1. Column Fixed Height — Model 155**



| FIG. & INDEX NO. | PART NUMBER | SVC | DESCRIPTION | UNITS PER ASSEMBLY |
|---|---|---|---|---|
| 7-1 | | | COLUMN FIXED HEIGHT — Model 155 | X |
| 1 | | | HARDWARE, Ceiling (See Figure 7-15) | 1 |
| 2 | | | ASSEMBLY, Support Head (See Figure 7-29) | 1 |
| 3 | | | ASSEMBLY, Gas Outlet, Domestic (See Figure 7-34) | A/R |
| | | | ASSEMBLY, Gas Outlet, Canadian (See Figure 7-35) | A/R |
| 4 | | | ASSEMBLY, Control | 1 |

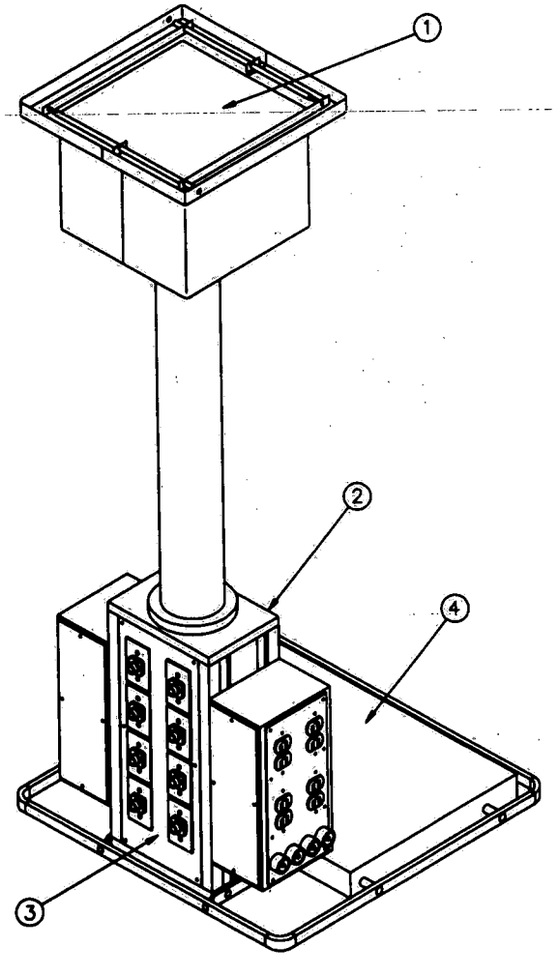



**Figure 7-2. Column Fixed Height – Model 050F**



| FIG. & INDEX NO. | PART NUMBER | SVC | DESCRIPTION | UNITS PER ASSEMBLY |
|---|---|---|---|---|
| 7-2 | | | COLUMN FIXED HEIGHT — Model 050F | X |
| 1 | | | HARDWARE, Ceiling (See Figure 7-16) | 1 |
| 2 | | | ASSEMBLY, Support Head (See Figure 7-31) | 1 |
| 3 | | | ASSEMBLY, Gas Outlet, Domestic (See Figure 7-34) | A/R |
| | | | ASSEMBLY, Gas Outlet, Canadian (See Figure 7-35) | A/R |
| 4 | | | ASSEMBLY, Control | 1 |

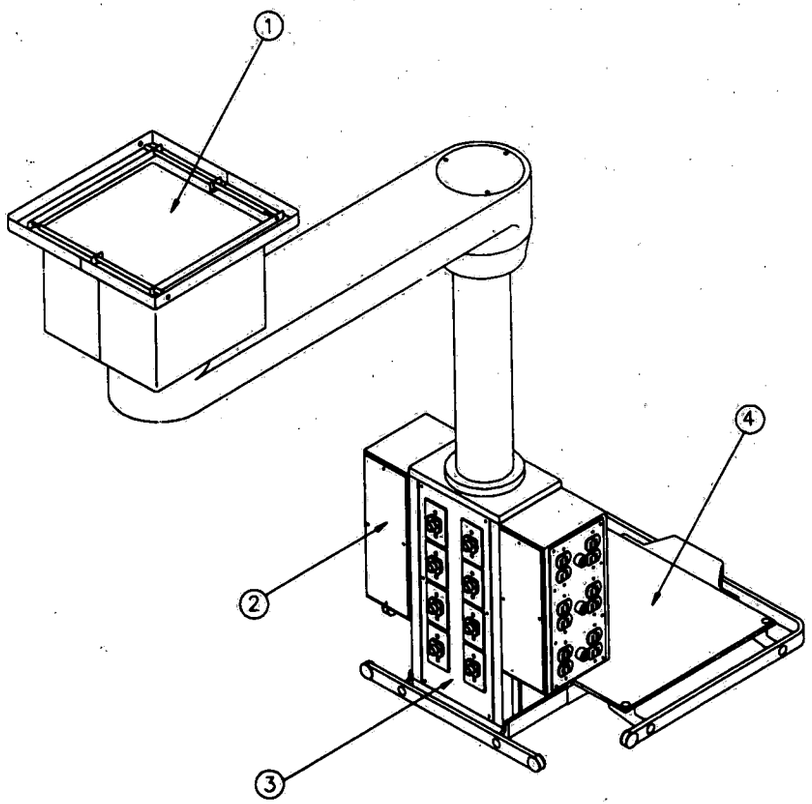



**Figure 7-3. Single Arm Fixed Height — Model 245**



| FIG. & INDEX NO. | PART NUMBER | SVC | DESCRIPTION | UNITS PER ASSEMBLY |
|---|---|---|---|---|
| 7-3 | | | SINGLE ARM FIXED HEIGHT — Model 245 | X |
| 1 | | | HARDWARE, Ceiling (See Figure 7-15) | 1 |
| 2 | | | ASSEMBLY, Support Head (See Figure 7-29) | 1 |
| 3 | | | ASSEMBLY, Gas Outlet, Domestic (See Figure 7-34) | A/R |
| | | | ASSEMBLY, Gas Outlet, Canadian (See Figure 7-35) | A/R |

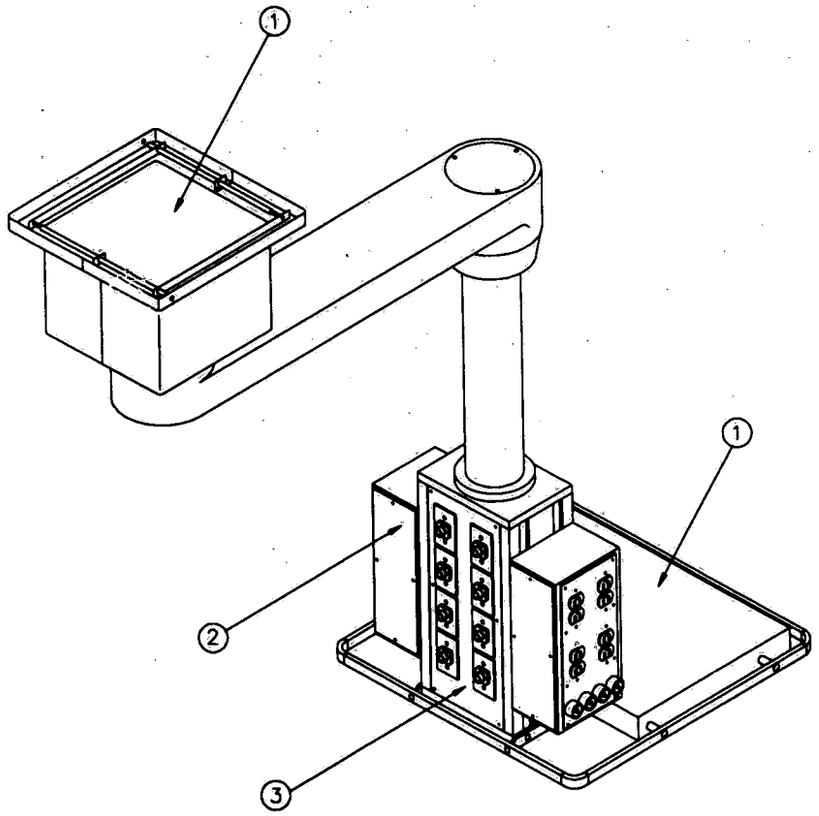



**Figure 7-4. Single Arm Fixed Height — Model 150F**



| FIG. & INDEX NO. | PART NUMBER | SVC | DESCRIPTION | UNITS PER ASSEMBLY |
|---|---|---|---|---|
| 7-4 | | | SINGLE ARM FIXED HEIGHT — Model 150F | X |
| 1 | | | HARDWARE, Ceiling (See Figure 7-16) | 1 |
| 2 | | | ASSEMBLY, Support Head (See Figure 7-31) | 1 |
| 3 | | | ASSEMBLY, Gas Outlet, Domestic (See Figure 7-34) | A/R |
| | | | ASSEMBLY, Gas Outlet, Canadian (See Figure 7-35) | A/R |
| 4 | | | ASSEMBLY, Control (See Figure 7-30) | 1 |

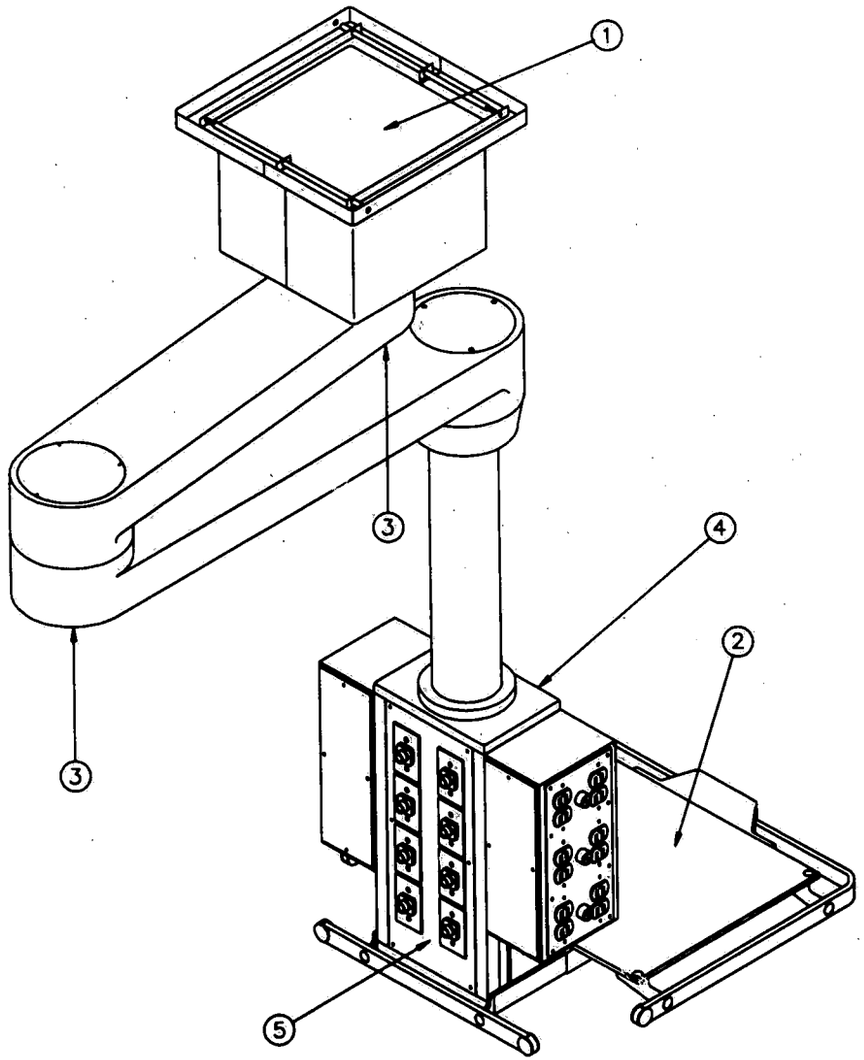



**Figure 7-5. Double Arm Fixed Height — Model 265**



| FIG. & INDEX NO. | PART NUMBER | SVC | DESCRIPTION | UNITS PER ASSEMBLY |
|---|---|---|---|---|
| 7-5 | | | DOUBLE ARM FIXED HEIGHT — Model 265 | X |
| 1 | | | HARDWARE, Ceiling (See Figure 7-15) | 1 |
| 2 | | | ASSEMBLY, Control (See Figure 7-28) | 1 |
| 3 | | | ASSEMBLY, Air Brake (See Figure 7-23) | 2 |
| 4 | | | ASSEMBLY, Support Head (See Figure 7-29) | 1 |
| 5 | | | ASSEMBLY, Gas Outlet, Domestic (See Figure 7-34) | A/R |
| | | | ASSEMBLY, Gas Outlet, Canadian (See Figure 7-35) | A/R |

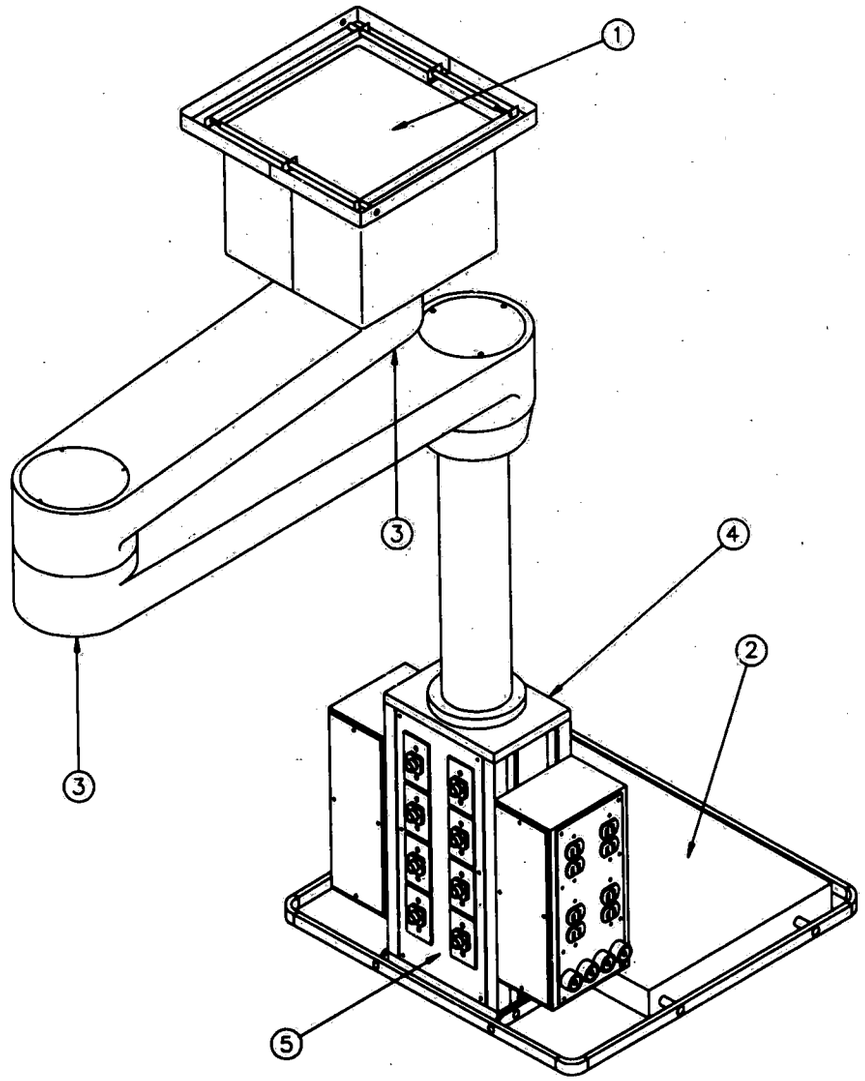



**Figure 7-6. Double Arm Fixed Height — Model 250F**



| FIG. & INDEX NO. | PART NUMBER | SVC | DESCRIPTION | UNITS PER ASSEMBLY |
|---|---|---|---|---|
| 7-6 | | | DOUBLE ARM FIXED HEIGHT — Model 250F | X |
| 1 | | | HARDWARE, Ceiling (See Figure 7-16) | 1 |
| 2 | | | ASSEMBLY, Control (See Figure 7-30) | 1 |
| 3 | | | ASSEMBLY, Air Brake (See Figure 7-23) | 2 |
| 4 | | | ASSEMBLY, Support Head (See Figure 7-31) | 1 |
| 5 | | | ASSEMBLY, Gas Outlet, Domestic (See Figure 7-34) | A/R |
| | | | ASSEMBLY, Gas Outlet, Canadian (See Figure 7-35) | A/R |

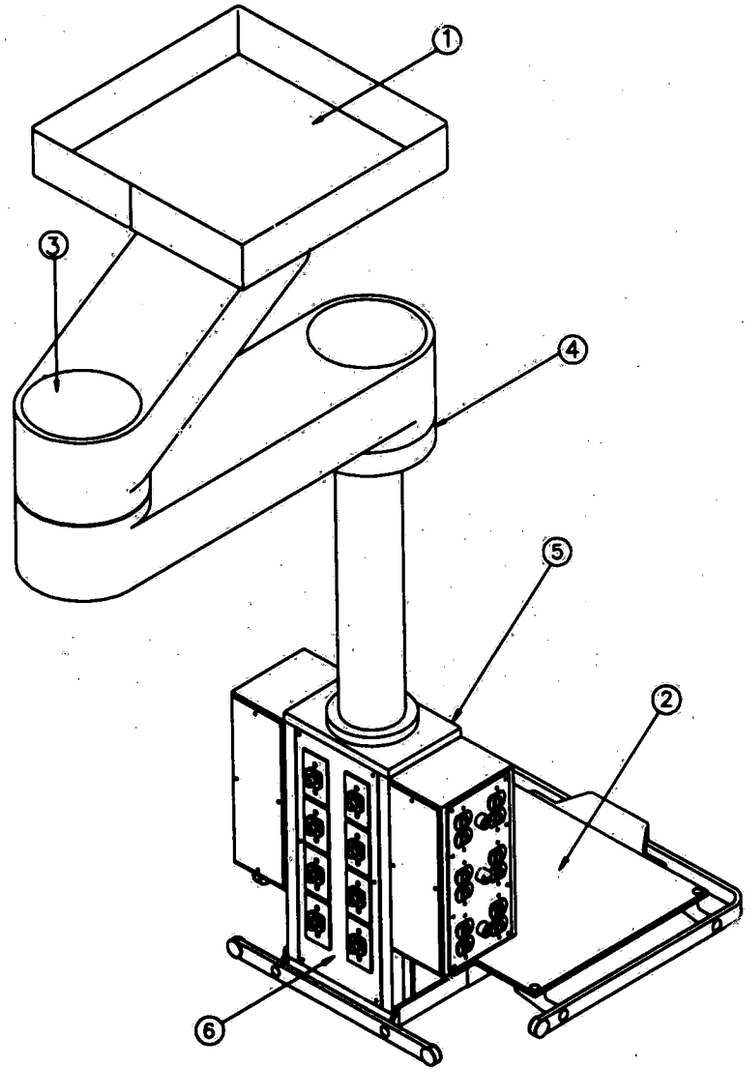



**Figure 7-7. Heavy Duty Double Arm Fixed Height — Model 425**



| FIG. & INDEX NO. | PART NUMBER | SVC | DESCRIPTION | UNITS PER ASSEMBLY |
|---|---|---|---|---|
| 7-7 | | | HEAVY DUTY DOUBLE ARM FIXED HEIGHT — Model 425 | X |
| 1 | | | HARDWARE, Ceiling (See Figure 7-15) | 1 |
| 2 | | | ASSEMBLY, Control (See Figure 7-28) | 1 |
| 3 | | | ASSEMBLY, Air Brake, Piston/Bladder (See Figure 7-24) | 2 |
| 4 | | | ASSEMBLY, Friction Brake, Heavy Weight (See Figure 7-25) | 1 |
| 5 | | | ASSEMBLY, Support Head (See Figure 7-29) | 1 |
| 6 | | | ASSEMBLY, Gas Outlet, Domestic (See Figure 7-34) | A/R |
| | | | ASSEMBLY, Gas Outlet, Canadian (See Figure 7-35) | A/R |

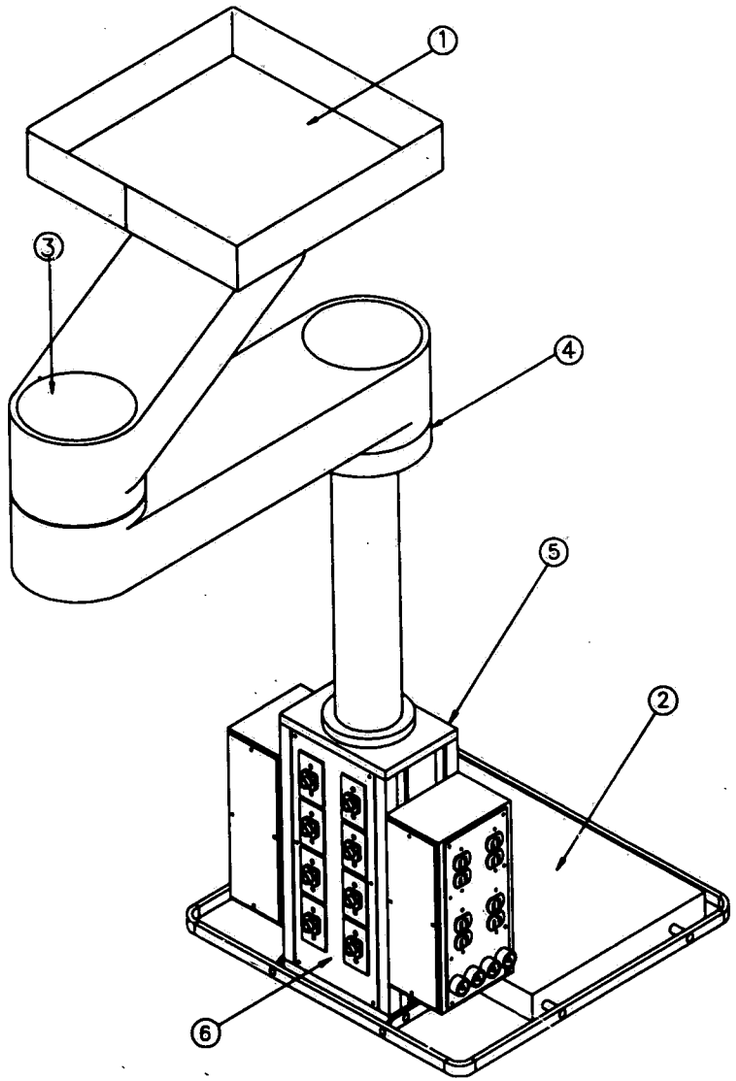



**Figure 7-8. Heavy Duty Double Arm Fixed Height — Model 255F**



| FIG. & INDEX NO. | PART NUMBER | SVC | DESCRIPTION | UNITS PER ASSEMBLY |
|---|---|---|---|---|
| 7-8 | | | HEAVY DUTY DOUBLE ARM FIXED HEIGHT — Model 255F ..... | X |
| 1 | | | HARDWARE, Ceiling (See Figure 7-16) ..... | 1 |
| 2 | | | ASSEMBLY, Control (See Figure 7-30) ..... | 1 |
| 3 | | | ASSEMBLY, Air Brake, Piston/Bladder (See Figure 7-24) ..... | 2 |
| 4 | | | ASSEMBLY, Friction Brake, Heavy Weight (See Figure 7-25) ..... | 1 |
| 5 | | | ASSEMBLY, Support Head (See Figure 7-31) ..... | 1 |
| 6 | | | ASSEMBLY, Gas Outlet, Domestic (See Figure 7-34) ..... | A/R |
| | | | ASSEMBLY, Gas Outlet, Canadian (See Figure 7-35) ..... | A/R |

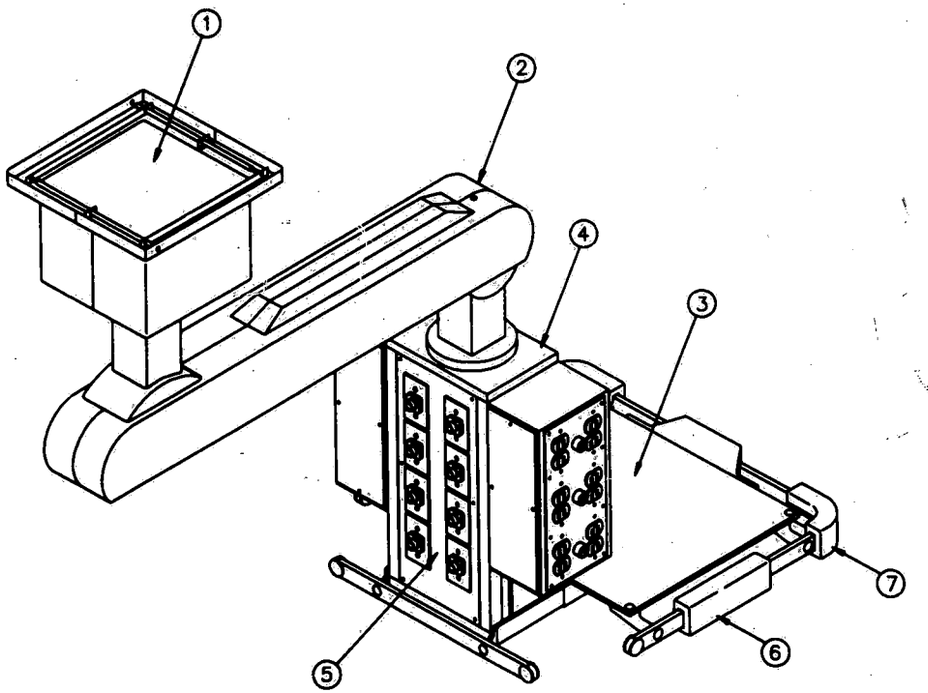



**Figure 7-9. Single Arm Motorized — Model 705M**



| FIG. & INDEX NO. | | PART NUMBER | | SVC | DESCRIPTION | UNITS PER ASSEMBLY |
|---|---|---|---|---|---|---|
| 7-9 | | | | | SINGLE ARM MOTORIZED — Model 705M | X |
| | 1 | | | | HARDWARE, Ceiling (See Figure 7-15) | 1 |
| | 2 | | | | ASSEMBLY, Motorized Arm (See Figure 7-26) | 1 |
| | 3 | | | | ASSEMBLY, Control (See Figure 7-28) | 1 |
| | 4 | | | | ASSEMBLY, Support Head (See Figure 7-29) | 1 |
| | 5 | | | | ASSEMBLY, Gas Outlet, Domestic (See Figure 7-34) | A/R |
| | | | | | ASSEMBLY, Gas Outlet, Canadian (See Figure 7-35) | A/R |
| | | P | 764323 | 320 | BUMPER SET | |
| | 6 | P | | | • Bumper, Straight | |
| | 7 | P | | | • Bumper, Corner | |

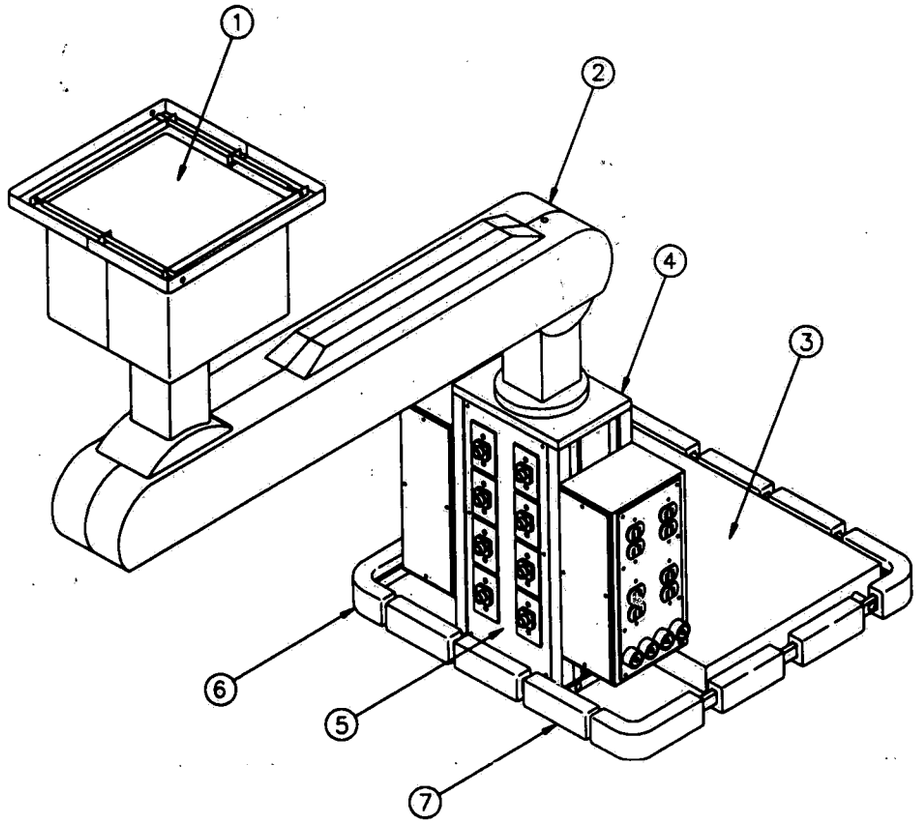



**Figure 7-10. Single Arm Motorized — Model 150M**



| FIG. & INDEX NO. | PART NUMBER | SVC | DESCRIPTION | UNITS PER ASSEMBLY |
|---|---|---|---|---|
| 7-10 | | | SINGLE ARM MOTORIZED — Model 150M | X |
| 1 | | | HARDWARE, Ceiling (See Figure 7-16) | 1 |
| 2 | | | ASSEMBLY, Motorized Arm (See Figure 7-26) | 1 |
| 3 | | | ASSEMBLY, Control (See Figure 7-30) | 1 |
| 4 | | | ASSEMBLY, Support Head (See Figure 7-31) | 1 |
| 5 | | | ASSEMBLY, Gas Outlet, Domestic (See Figure 7-34) | A/R |
| | | | ASSEMBLY, Gas Outlet, Canadian (See Figure 7-35) | A/R |
| | P 764323 320 | | BUMPER SET | |
| 6 | P 764323 627 | | • BUMPER, Corner | 4 |
| 7 | P 764323 628 | | • BUMPER, Straight | 9 |

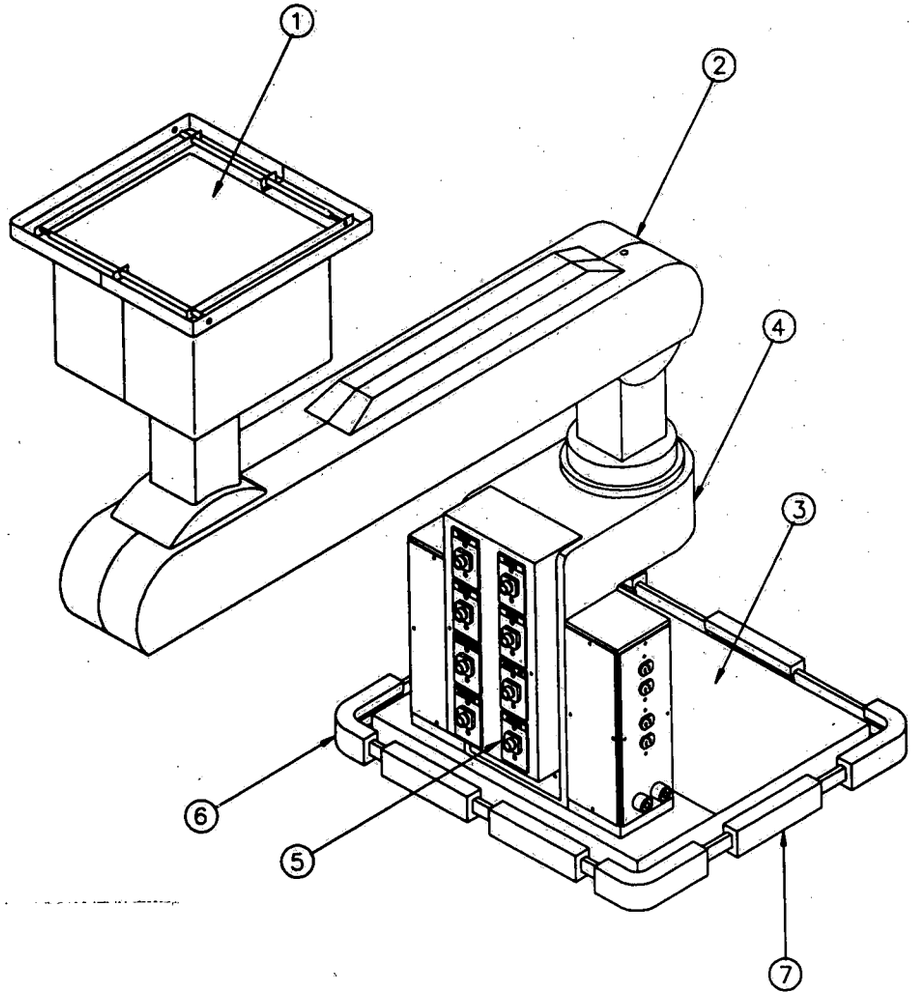



**Figure 7-11. Single Arm Motorized — Model 130M or 703M**



| FIG. & INDEX NO. | PART NUMBER | SVC | DESCRIPTION | UNITS PER ASSEMBLY |
|---|---|---|---|---|
| 7-11 | | | SINGLE ARM MOTORIZED — Model 130M or 703M | X |
| 1 | | | HARDWARE, Ceiling (See Figure 7-16) | 1 |
| 2 | | | ASSEMBLY, Motorized Arm (See Figure 7-26) | 1 |
| 3 | | | ASSEMBLY, Control (See Figure 7-32) | 1 |
| 4 | | | ASSEMBLY, Support Head (See Figure 7-33) | 1 |
| 5 | | | ASSEMBLY, Gas Outlet, Puritan Bennett (See Figure 7-34) | 1 |
| | P 764323 | 320 | BUMPER SET | |
| 6 | P 764323 | 627 | • BUMPER, Corner | 4 |
| 7 | P 764323 | 628 | • BUMPER, Straight | 5 |

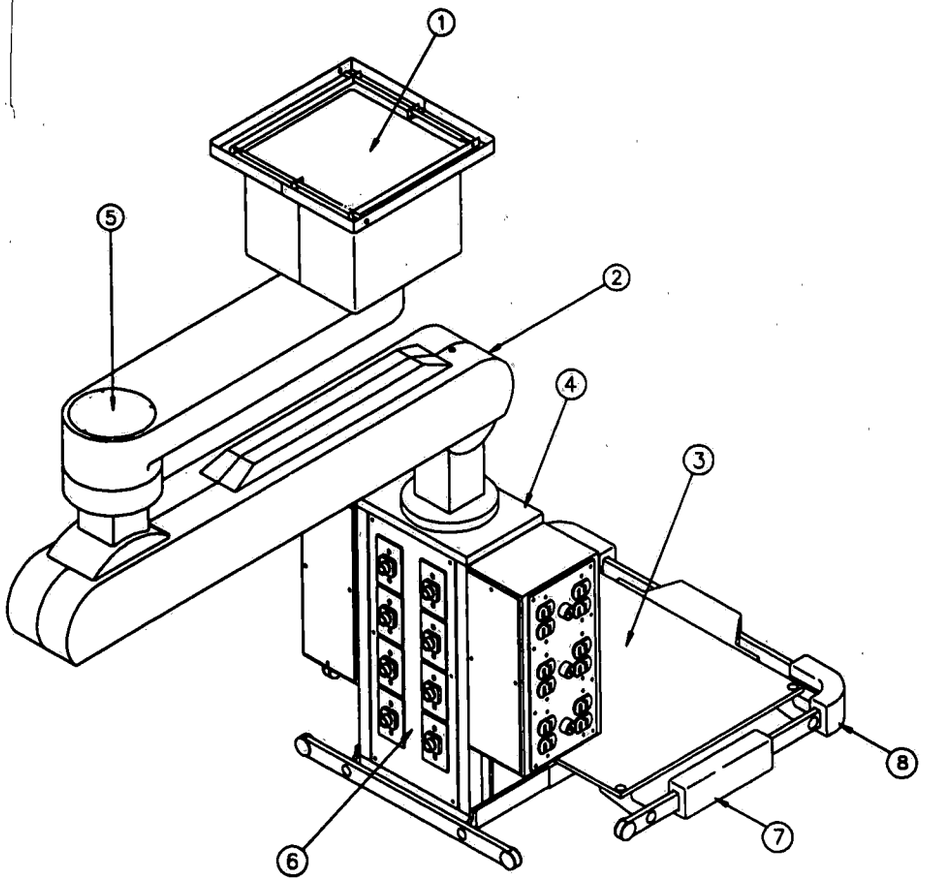



**Figure 7-12. Double Arm Motorized — Model 905M**



| FIG. & INDEX NO. | | PART NUMBER | SVC | DESCRIPTION | UNITS PER ASSEMBLY |
|---|---|---|---|---|---|
| 7-12 | | | | DOUBLE ARM MOTORIZED — Model 905M | X |
| | 1 | | | HARDWARE, Ceiling (See Figure 7-15) | 1 |
| | 2 | | | ASSEMBLY, Motorized Arm (See Figure 7-26) | 1 |
| | 3 | | | ASSEMBLY, Control (See Figure 7-28) | 1 |
| | 4 | | | ASSEMBLY, Support Head (See Figure 7-29) | 1 |
| | 5 | | | ASSEMBLY, Air Brake, Upper Suspension Arm (See Figure 7-22) | 1 |
| | 6 | | | ASSEMBLY, Gas Outlet, Domestic (See Figure 7-34) | A/R |
| | | | | ASSEMBLY, Gas Outlet, Canadian (See Figure 7-35) | A/R |
| | P | 764323 | 320 | BUMPER SET | |
| | 7 P | | | • BUMPER, Straight | |
| | 8 P | | | • BUMPER, Corner | |

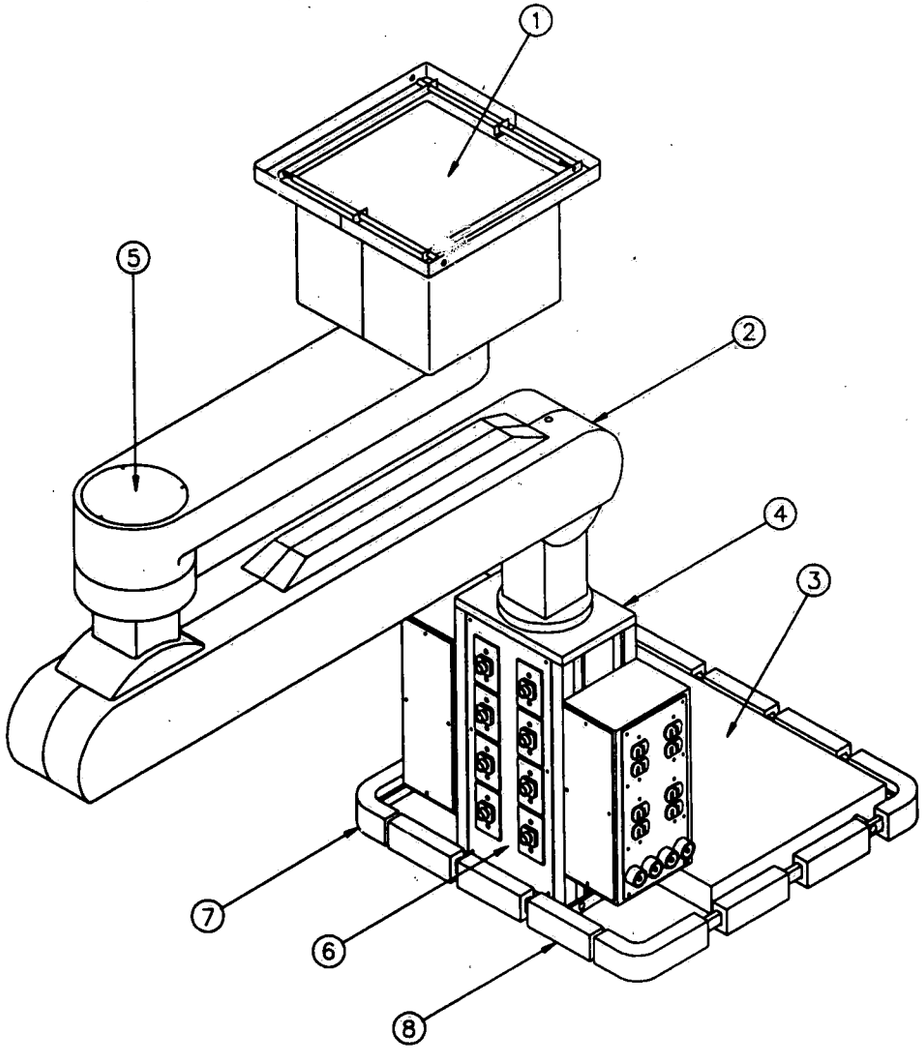



**Figure 7-13. Double Arm Motorized — Model 250M**



| FIG. & INDEX NO. | PART NUMBER | SVC | DESCRIPTION | UNITS PER ASSEMBLY |
|---|---|---|---|---|
| 7-13 | | | DOUBLE ARM MOTORIZED — Model 250M | X |
| 1 | | | HARDWARE, Ceiling (See Figure 7-16) | 1 |
| 2 | | | ASSEMBLY, Motorized Arm (See Figure 7-26) | 1 |
| 3 | | | ASSEMBLY, Control (See Figure 7-30) | 1 |
| 4 | | | ASSEMBLY, Support Head (See Figure 7-31) | 1 |
| 5 | | | ASSEMBLY, Air Brake, Upper Suspension Arm (See Figure 7-22) | 1 |
| 6 | | | ASSEMBLY, Gas Outlet, Domestic (See Figure 7-34) | A/R |
| | | | ASSEMBLY, Gas Outlet, Canadian (See Figure 7-35) | A/R |
| | P 764323 320 | | BUMPER SET | |
| 7 | P 764323 627 | | • BUMPER, Corner | 4 |
| 8 | P 764323 628 | | • BUMPER, Straight | 9 |

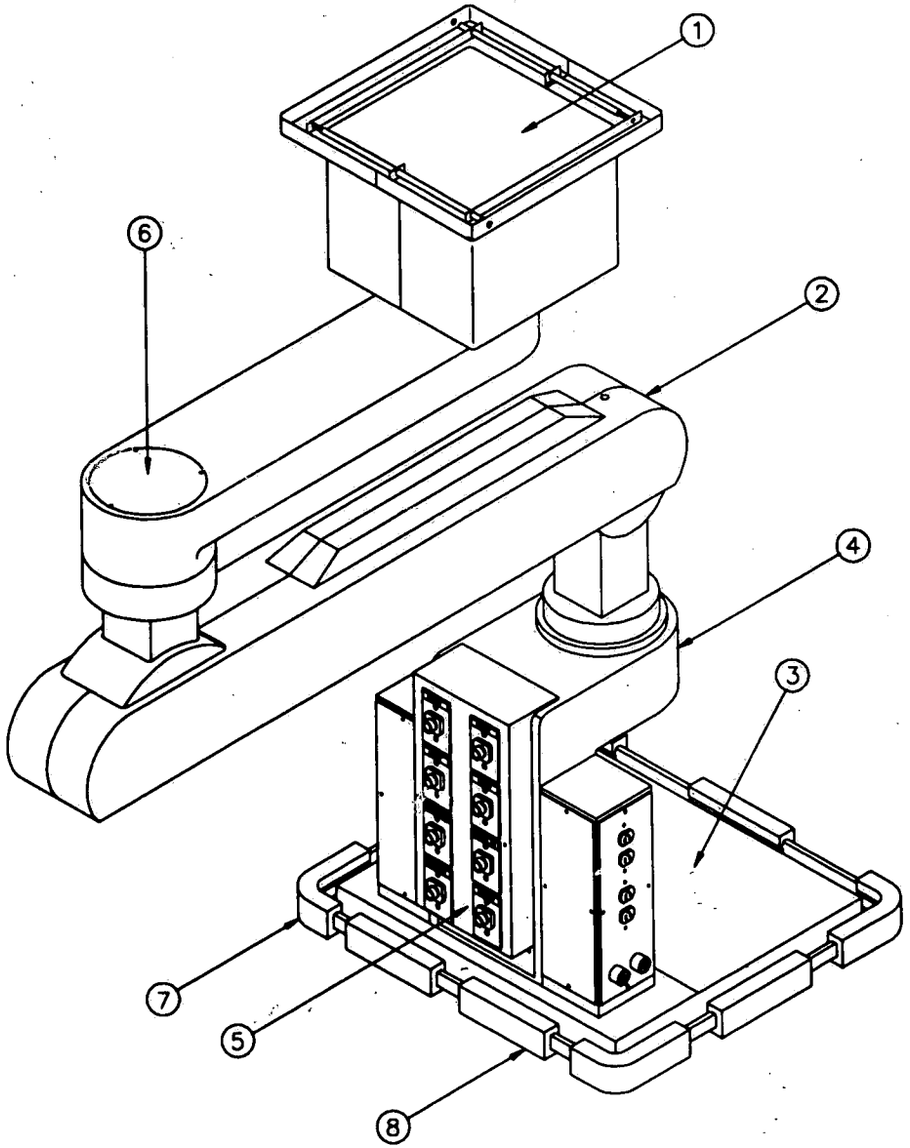



**Figure 7-14. Double Arm Motorized — Model 230M or 803M**



| FIG. & INDEX NO. | PART NUMBER | | | SVC | DESCRIPTION | UNITS PER ASSEMBLY |
|---|---|---|---|---|---|---|
| 7-14 | | | | | DOUBLE ARM MOTORIZED — Model 230M or 803M | X |
| 1 | | | | | HARDWARE, Ceiling (See Figure 7-16) | 1 |
| 2 | | | | | ASSEMBLY, Motorized Arm (See Figure 7-26) | 1 |
| 3 | | | | | ASSEMBLY, Control (See Figure 7-30) | 1 |
| 4 | | | | | ASSEMBLY, Support Head (See Figure 8-31) | 1 |
| 5 | | | | | ASSEMBLY, Gas Outlet, Puritan Bennett (See Figure 7-34) | 1 |
| 6 | | | | | ASSEMBLY, Air Brake, Upper Suspension Arm (See Figure 7-22) | 1 |
| | P | 764323 | 320 | | BUMPER SET | |
| 7 | P | 764323 | 627 | | • BUMPER, Corner | 4 |
| 8 | P | 764323 | 628 | | • BUMPER, Straight | 5 |

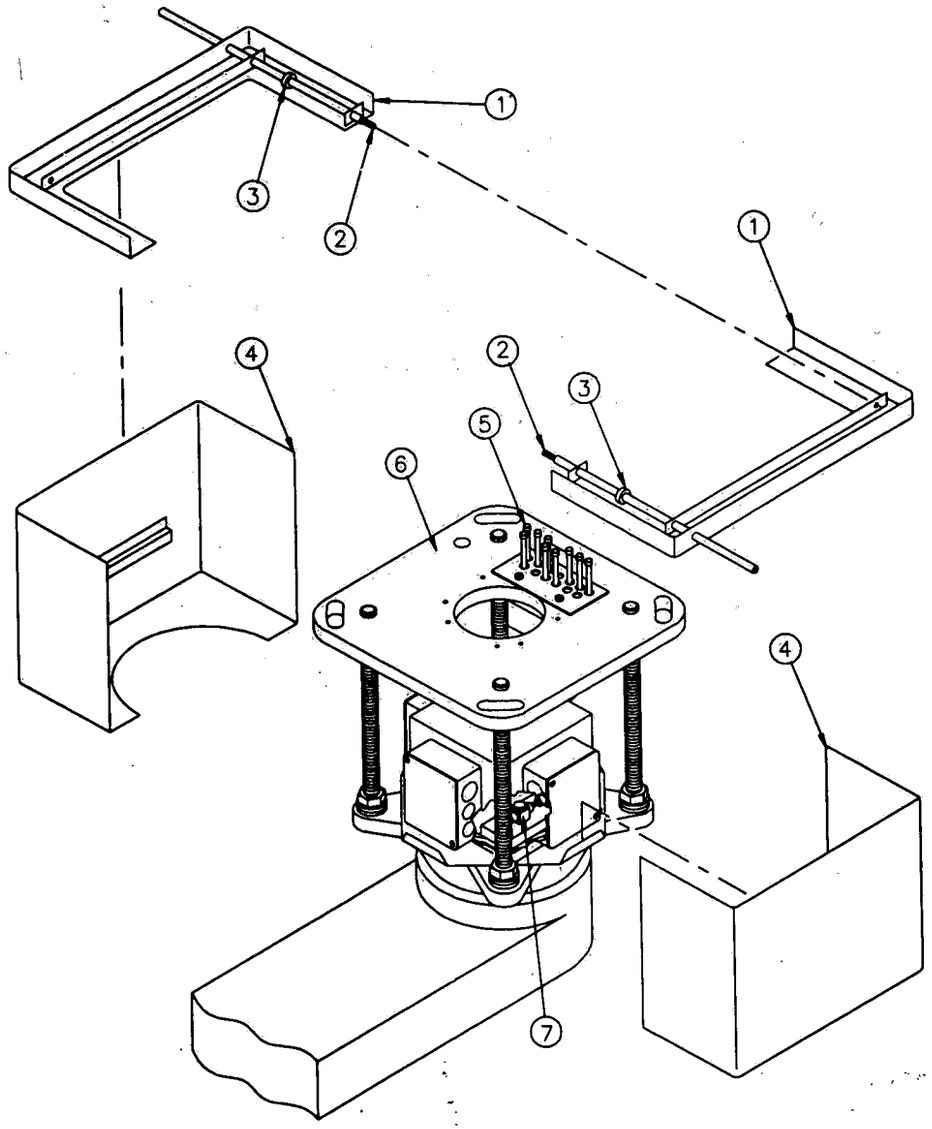



**Fig. 7-15. Ceiling Hardware — Later Production Units (Model 905M Shown)**



| FIG. & INDEX NO. | PART NUMBER | | SVC | DESCRIPTION | UNITS PER ASSEMBLY | | | |
|---|---|---|---|---|---|---|---|---|
| 7-15 | | | | CEILING HARDWARE — Later Production Units | | | | |
| | | | | Models 155 and 265 | X | | | |
| | | | | Models 245 and 705M | | X | | |
| | | | | Model 905M | | | X | |
| | | | | Model 425 | | | | X |
| 1 | P | 764323 | 682 | COLLAR | 2 | 2 | 2 | |
| 2 | P | 764323 | 686 | BUSHING | 2 | 2 | 2 | |
| 3 | P | 764323 | 684 | BAR, Stay | 2 | 2 | 2 | |
| 4 | P | 764323 | 685 | CANOPY | 2 | 2 | 2 | |
| | | | | CANOPY | | | | 2 |
| 5 | P | 134470 | 220 | ASSEMBLY, Manifold (See Figure 7-17) | 1 | 1 | 1 | 1 |
| 6 | P | 56938 | 287 | PLATE, Ceiling | 1 | 1 | 1 | |
| | P | 134470 | 214 | PLATE, Ceiling, Heavy Duty | | | | 1 |
| 7 | | | | ASSEMBLY, Air Brake, Bearing Plate (See Figure 7-20) | | | 1 | |
| | | | | ASSEMBLY, Friction Brake, Medium Weight (See Figure 7-18) | | 1 | | |

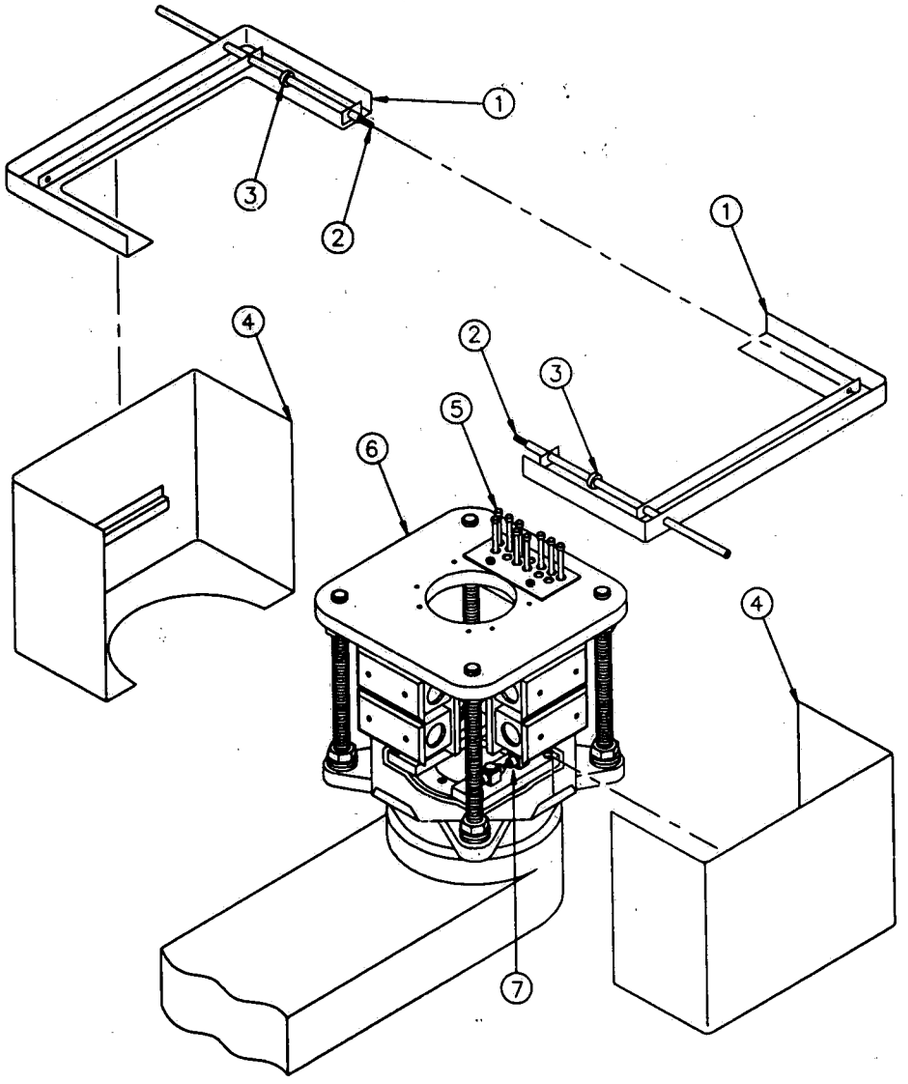



**Figure 7-16. Ceiling Hardware — Earlier Production Units (Model 230M Shown)**



| FIG. & INDEX NO. | PART NUMBER | SVC | DESCRIPTION | UNITS PER ASSEMBLY | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 7-16 | | | CEILING HARDWARE — Earlier Production Units | | | | | | |
| | | | Model 130M | X | | | | | |
| | | | Model 230M | | X | | | | |
| | | | Models 150F and 150M | | | X | | | |
| | | | Models 050F and 250F | | | | X | | |
| | | | Model 250M | | | | | X | |
| | | | Model 255F | | | | | | X |
| 1 | P 764323 682 | | COLLAR | 2 | 2 | 2 | 2 | 2 | |
| 2 | P 764323 686 | | BUSHING | 2 | 2 | 2 | 2 | 2 | |
| 3 | P 764323 684 | | BAR, Stay | 2 | 2 | 2 | 2 | 2 | |
| 4 | P 764323 685 | | CANOPY | 2 | 2 | 2 | 2 | 2 | |
| | | | CANOPY | | | | | | 2 |
| 5 | P 764323 654 | | ASSEMBLY, Manifold (See Figure 7-17) | 1 | 1 | 1 | 1 | 1 | 1 |
| 6 | P 56938 287 | | PLATE, Ceiling | 1 | 1 | 1 | 1 | 1 | |
| | | | PLATE, Ceiling | | | | | | 1 |
| 7 | | | ASSEMBLY, Air Brake, Bearing Plate (See Figure 7-21) | | 1 | | | | |
| | | | ASSEMBLY, Air Brake, Bearing Plate (See Figure 7-20) | | | | | 1 | |
| | | | ASSEMBLY, Friction Brake, Medium Weight (Fig. 7-19) | 1 | | | | | |
| | | | ASSEMBLY, Friction Brake, Medium Weight (Fig. 7-18) | | | 1 | | | |

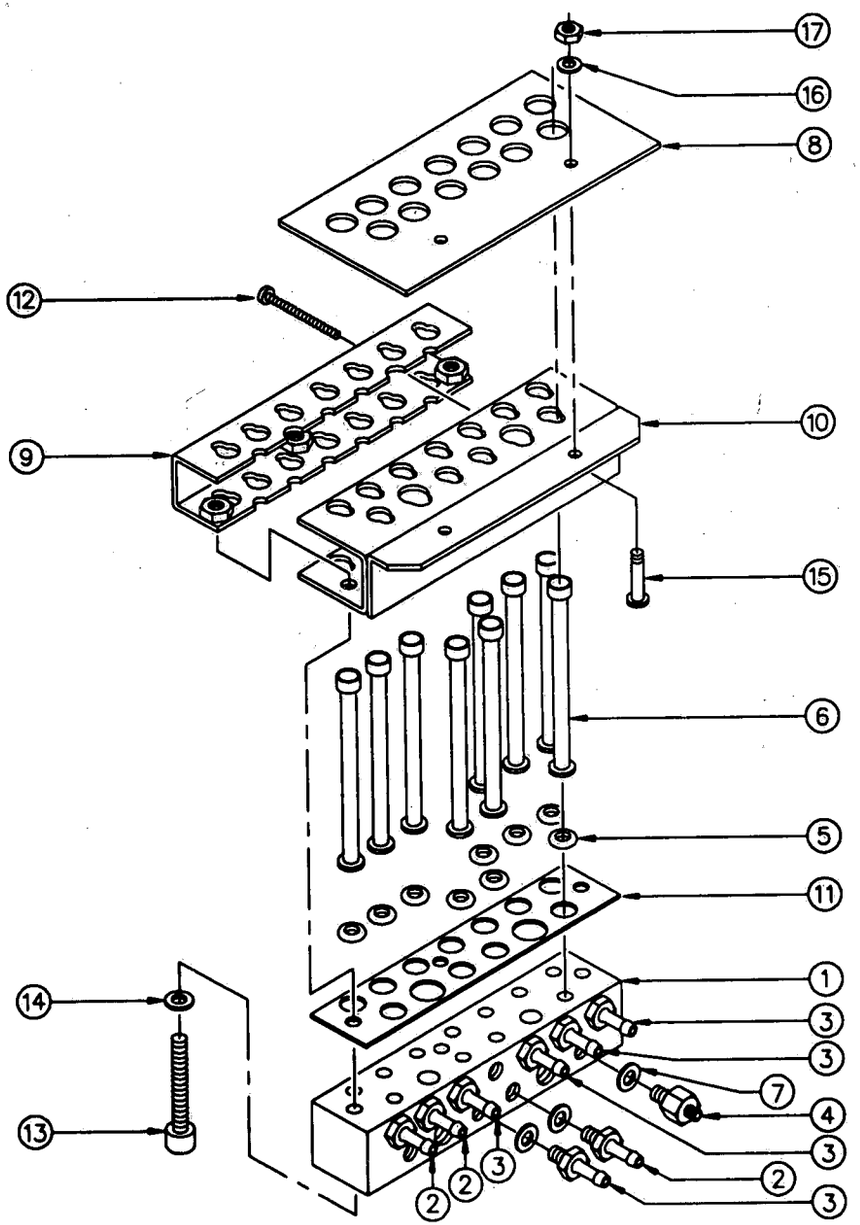



**Figure 7-17. Manifold Assembly**



| FIG. & INDEX NO. | | PART NUMBER | | S V C | DESCRIPTION | UNITS PER ASSEMBLY | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 7-17 | | | | | MANIFOLD ASSEMBLY | | | | | |
| | P | 134470 | 220 | | Later Production Units | X | | | | |
| | P | 764323 | 654 | | Earlier Production Units | | X | | | |
| 1 | P | 56938 | 304 | | BLOCK, Tubing Terminal | 1 | | | | |
| | P | 764323 | 621 | | BLOCK, Tubing Terminal | | 1 | | | |
| 2 | P | | | | FITTING | | | | | |
| | P | 764323 | 613 | | FITTING | | 3 | | | |
| 3 | P | | | | FITTING | | | | | |
| | P | 764323 | 632 | | FITTING | | 5 | | | |
| 4 | P | 150824 | 638 | | FITTING, Large | 1 | | | | |
| | P | 764323 | 612 | | FITTING, Large | | 1 | | | |
| 5 | P | 150824 | 548 | | O-RING | 11 | | | | |
| | P | 764323 | 633 | | O-RING | | 9 | | | |
| 6 | P | 764323 | 611 | | TUBE | 9 | 9 | | | |
| 7 | P | 764323 | 634 | | RING, Sealing | 9 | 9 | | | |
| 8 | P | | | | NAMEPLATE, Gas Manifold | 1 | | | | |
| | P | 764323 | 610 | | NAMEPLATE, Gas Manifold | | 1 | | | |
| 9 | P | 764323 | 630 | | BRACKET, Clamping | 1 | 1 | | | |
| 10 | P | 764323 | 614 | | BRACKET, Clamping | 1 | 1 | | | |
| 11 | P | 764323 | 615 | | SPACER, O-Ring | 1 | 1 | | | |
| 12 | P | | | | SCREW | | | | | |
| | P | | | | SCREW | | 2 | | | |
| 13 | P | | | | SCREW | | | | | |
| | P | | | | SCREW | | 3 | | | |
| 14 | P | | | | WASHER | | | | | |
| | P | | | | WASHER | | 3 | | | |
| 15 | P | 150824 | 507 | | SCREW | 2 | | | | |
| | P | | | | SCREW | | 2 | | | |
| 16 | P | 150824 | 508 | | LOCKWASHER | 2 | | | | |
| | P | | | | WASHER | | 4 | | | |
| 17 | P | | | | NUT | | | | | |
| | P | | | | NUT | | 2 | | | |

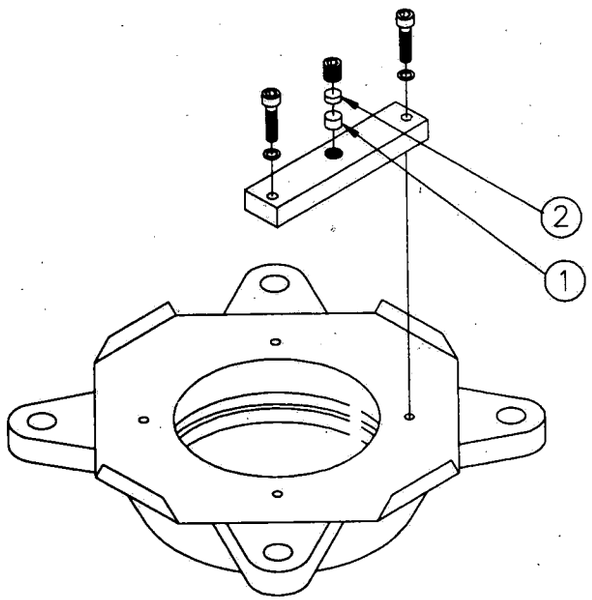



**Figure 7-18. Friction Brake Assembly, Medium Weight — Models 245, 150F, 705M and 150M**



| FIG. & INDEX NO. | PART NUMBER | | SVC | DESCRIPTION | UNITS PER ASSEMBLY |
|---|---|---|---|---|---|
| 7-18 | | | | FRICTION BRAKE ASSEMBLY, Medium Weight Models 245, 150F, 705M and 150M | X |
| 1 | P | 764323 647 | | PAD, Pressure | 1 |
| 2 | P | 764323 648 | | PAD, Pressure | 1 |

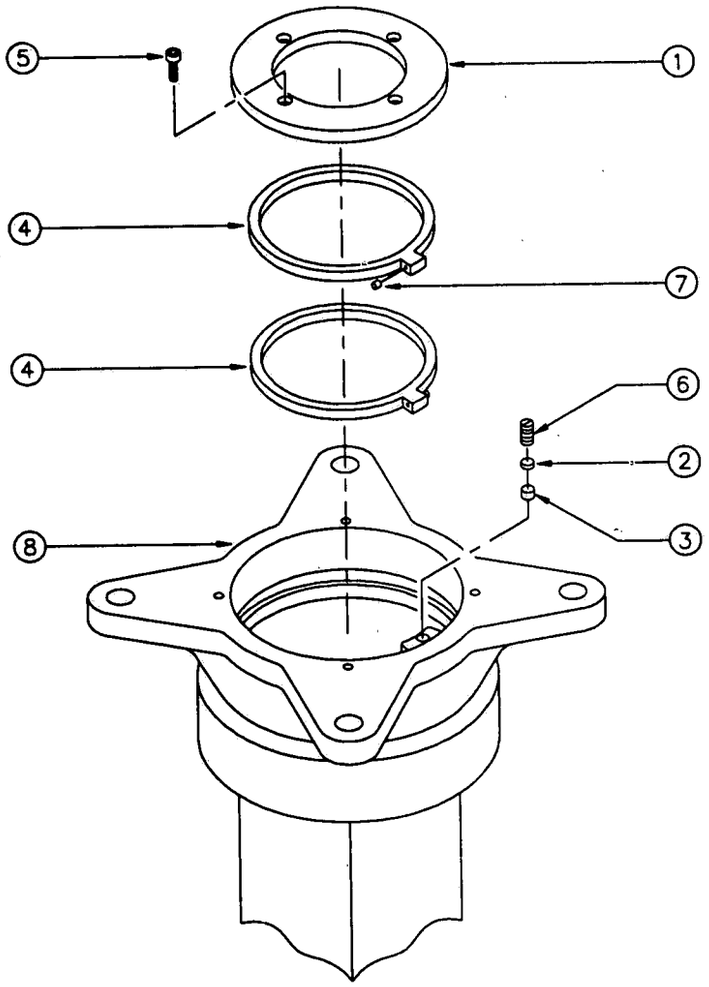



**Figure 7-19. Rotational Stop and Friction Brake Assembly, Medium Weight — Model 130M**



| FIG. & INDEX NO. | PART NUMBER | | SVC | DESCRIPTION | UNITS PER ASSEMBLY |
|---|---|---|---|---|---|
| 7-19 | | | | ROTATIONAL STOP AND FRICTION BRAKE ASSEMBLY, Medium Weight — Model 130M | X |
| 1 | P | 764323 646 | | PLATE, Brake | 1 |
| 2 | P | 764323 648 | | PAD, Pressure | 1 |
| 3 | P | 764323 647 | | PAD, Pressure | 1 |
| 4 | P | 764323 649 | | LIMIT RING, Rotational | 2 |
| 5 | | | | SCREW | 4 |
| 6 | | | | SCREW, Headless | 1 |
| 7 | P | 764323 652 | | STOP, Cushioned | 2 |
| 8 | P | 764323 616 | | PLATE, Bearing | 1 |

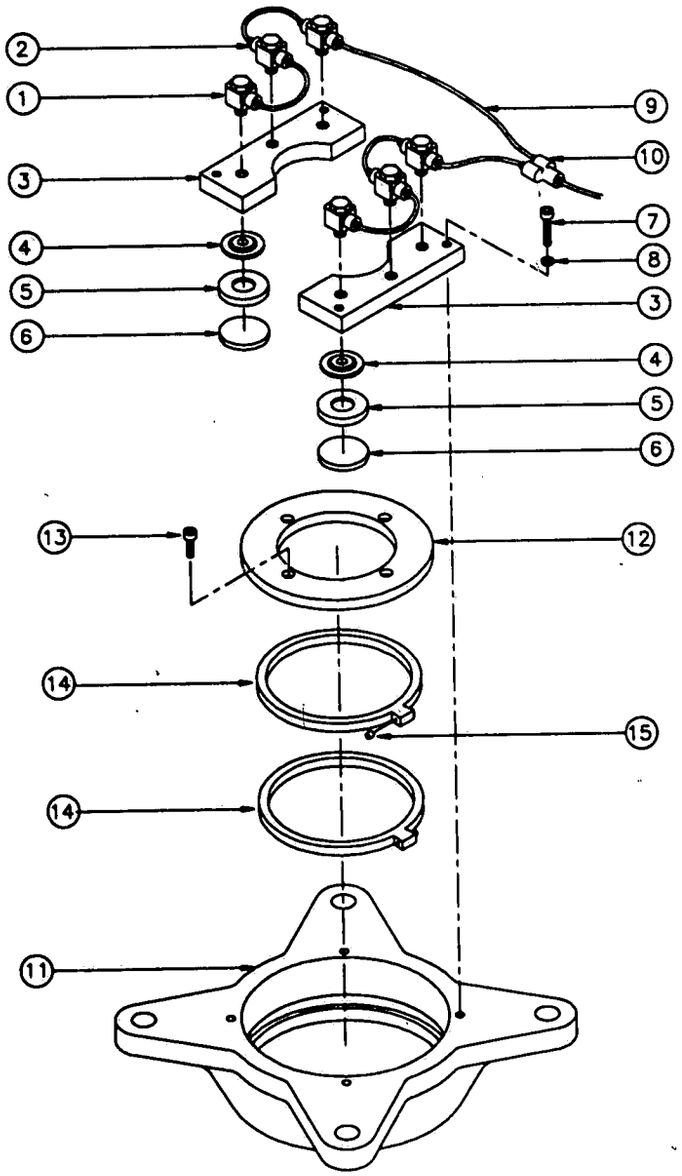
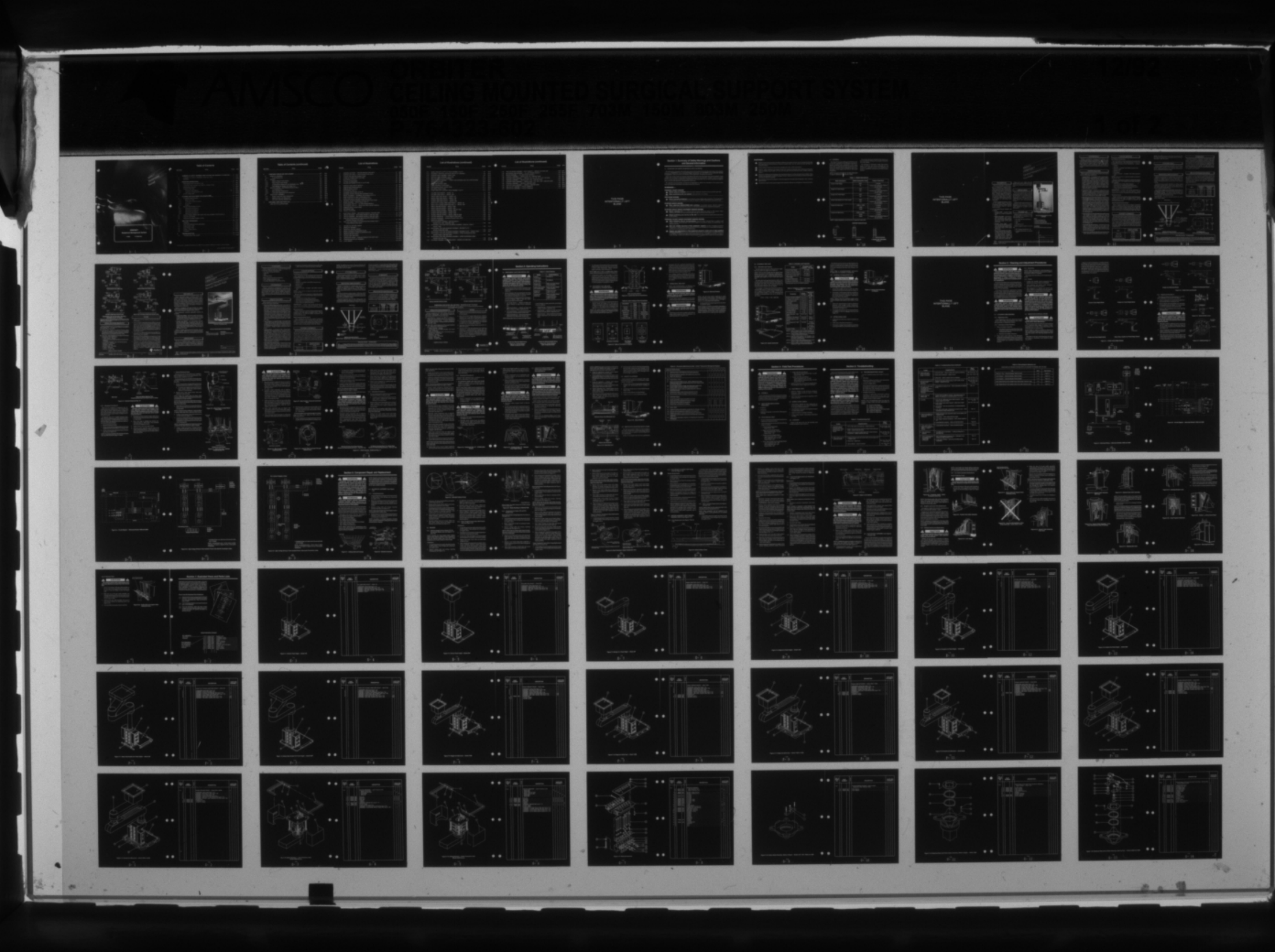



**Figure 7-20. Rotational Stop and Air Brake Assembly, Bearing Plate — Models 905M and 250M**

| FIG. & INDEX NO. | PART NUMBER | | SVC | DESCRIPTION | UNITS PER ASSEMBLY |
|---|---|---|---|---|---|
| 7-20 | | | | ROTATIONAL STOP AND AIR BRAKE ASSEMBLY, Bearing Plate Models 905M and 250M | X |
| 1 | P 764323 | 623 | | CONNECTOR, Elbow | 2 |
| 2 | P 764323 | 617 | | CONNECTOR, Tee | 4 |
| 3 | P 764324 | 184 | | HOUSING, Brake | 2 |
| 4 | P 764323 | 618 | | PLUNGER, Brake | 6 |
| 5 | P 764323 | 619 | | COLLAR, Brake | 6 |
| 6 | P 764323 | 620 | | LINING, Brake | 6 |
| 7 | | | | SCREW | 4 |
| 8 | | | | WASHER | 4 |
| 9 | P 764324 | 059 | | TUBING | A/R |
| 10 | P 764323 | 650 | | CONNECTOR, Y | 1 |
| 11 | P 764323 | 616 | | PLATE, Bearing | 1 |
| 12 | P | | | SCREW | 4 |
| 13 | P 764323 | 621 | | PLATE, Brake | 1 |
| 14 | P 764323 | 649 | | LIMIT RING, Rotational | 2 |
| 15 | P 764323 | 652 | | STOP, Cushioned | 2 |


AMSC
CEILING MOUNTED SURGICAL SUPPORT SYSTEM

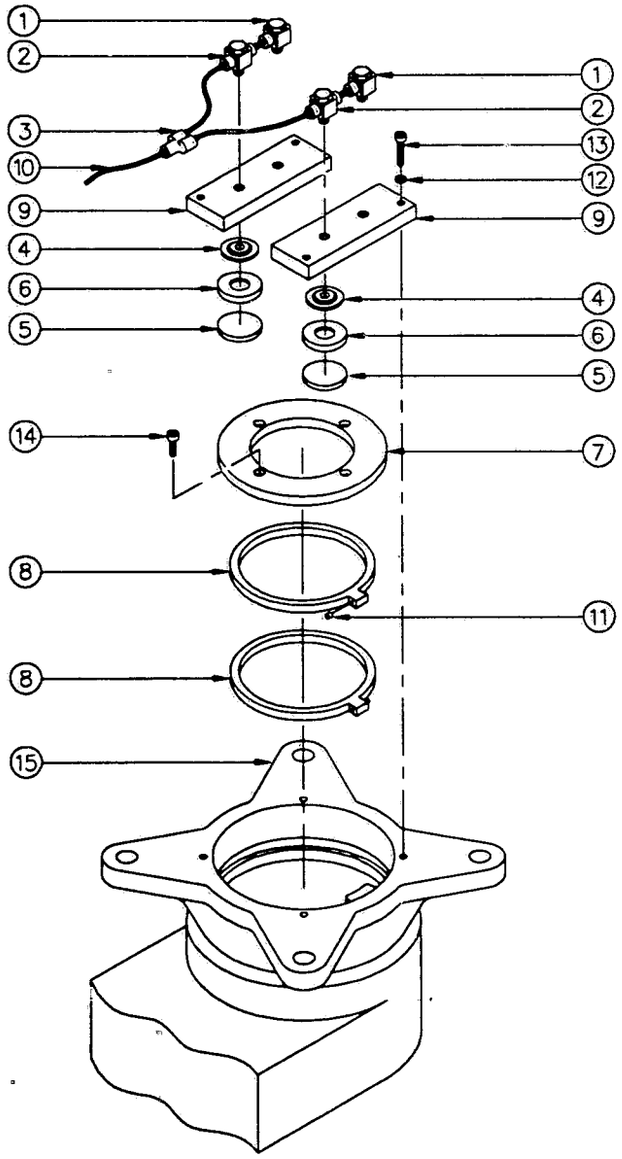



**Figure 7-21. Rotational Stop and Air Brake Assembly, Bearing Plate — Model 230M**



| FIG. & INDEX NO. | PART NUMBER | | | SVC | DESCRIPTION | UNITS PER ASSEMBLY |
|---|---|---|---|---|---|---|
| 7-21 | | | | | ROTATIONAL STOP AND AIR BRAKE ASSEMBLY, Bearing Plate Model 230M | X |
| 1 | P | 764323 | 623 | | CONNECTOR, Elbow | 2 |
| 2 | P | 764323 | 617 | | CONNECTOR, Tee | 2 |
| 3 | P | 764323 | 650 | | CONNECTOR, Y | 1 |
| 4 | P | 764323 | 618 | | PLUNGER, Brake | 4 |
| 5 | P | 764323 | 620 | | LINING, Brake | 4 |
| 6 | P | 764323 | 619 | | COLLAR, Brake | 4 |
| 7 | P | 764323 | 621 | | PLATE, Brake | 1 |
| 8 | P | 764323 | 649 | | LIMIT RING, Rotational | 2 |
| 9 | P | 764323 | 653 | | HOUSING, Brake | 2 |
| 10 | P | 764324 | 059 | | TUBING, 5/32 OD | A/R |
| 11 | P | 764323 | 652 | | STOP, Cushioned | 2 |
| 12 | | | | | WASHER | 4 |
| 13 | | | | | SCREW | 4 |
| 14 | | | | | SCREW | 4 |
| 15 | P | 764323 | 616 | | PLATE, Bearing | 1 |

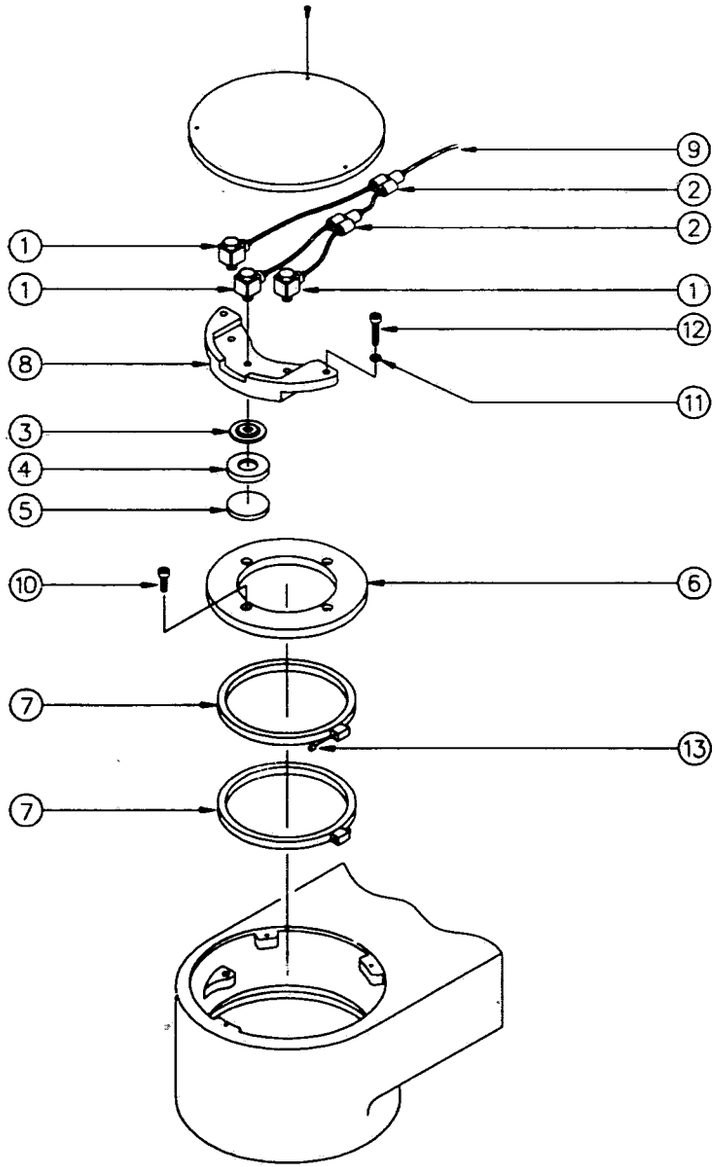



**Figure 7-22. Rotational Stop and Air Brake Assembly, Upper Suspension Arm Models 803M, 905M, 250M and 230M**



| FIG. & INDEX NO. | PART NUMBER | | | SVC | DESCRIPTION | UNITS PER ASSEMBLY |
|---|---|---|---|---|---|---|
| 7-22 | | | | | ROTATIONAL STOP AND AIR BRAKE ASSEMBLY, Upper Suspension Arm — Models 803M, 905M, 250M & 230M ... | X |
| 1 | P | 764323 | 623 | | CONNECTOR, Elbow | 3 |
| 2 | P | 764323 | 650 | | CONNECTOR, Y | 2 |
| 3 | P | 764323 | 618 | | PLUNGER, Brake | 3 |
| 4 | P | 764323 | 619 | | COLLAR, Brake | 3 |
| 5 | P | 764323 | 620 | | LINING, Brake | 3 |
| 6 | P | 764323 | 621 | | PLATE, Brake | 1 |
| 7 | P | 764323 | 649 | | LIMIT RING, Rotational | 2 |
| 8 | P | 764323 | 624 | | HOUSING, Brake | 1 |
| 9 | P | 764324 | 059 | | TUBING, 5/32 OD | A/R |
| 10 | | | | | SCREW | 4 |
| 11 | | | | | WASHER | 2 |
| 12 | | | | | SCREW | 2 |
| 13 | P | 764323 | 652 | | STOP, Cushioned | 2 |

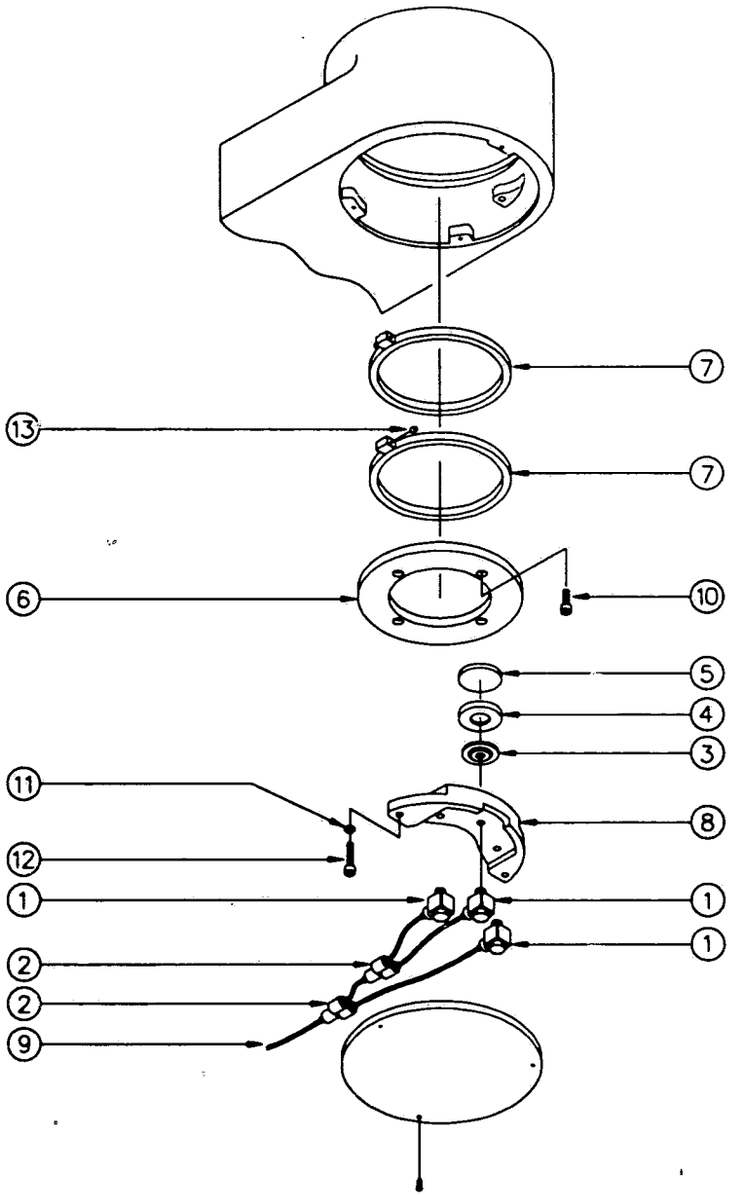



**Figure 7-23. Rotational Stop and Air Brake Assembly, Upper Suspension Arm — Models 265 and 250F**



| FIG. & INDEX NO. | PART NUMBER | | | SVC | DESCRIPTION | UNITS PER ASSEMBLY |
|---|---|---|---|---|---|---|
| 7-23 | | | | | ROTATIONAL STOP AND AIR BRAKE ASSEMBLY, Upper Suspension Arm — Models 265 and 250F | X |
| 1 | P | 764323 | 623 | | CONNECTOR, Elbow | 3 |
| 2 | P | 764323 | 650 | | CONNECTOR, Y | 2 |
| 3 | P | 764323 | 618 | | PLUNGER, Brake | 3 |
| 4 | P | 764323 | 619 | | COLLAR, Brake | 3 |
| 5 | P | 764323 | 620 | | LINING, Brake | 3 |
| 6 | P | 764323 | 621 | | PLATE, Brake | 1 |
| 7 | P | 764323 | 649 | | LIMIT RING, Rotational | 2 |
| 8 | P | 764323 | 624 | | HOUSING, Brake | 1 |
| 9 | P | 764324 | 059 | | TUBING | A/R |
| 10 | | | | | SCREW | 4 |
| 11 | | | | | WASHER | 2 |
| 12 | | | | | SCREW | 2 |
| 13 | P | 764323 | 652 | | STOP, Cushioned | 2 |

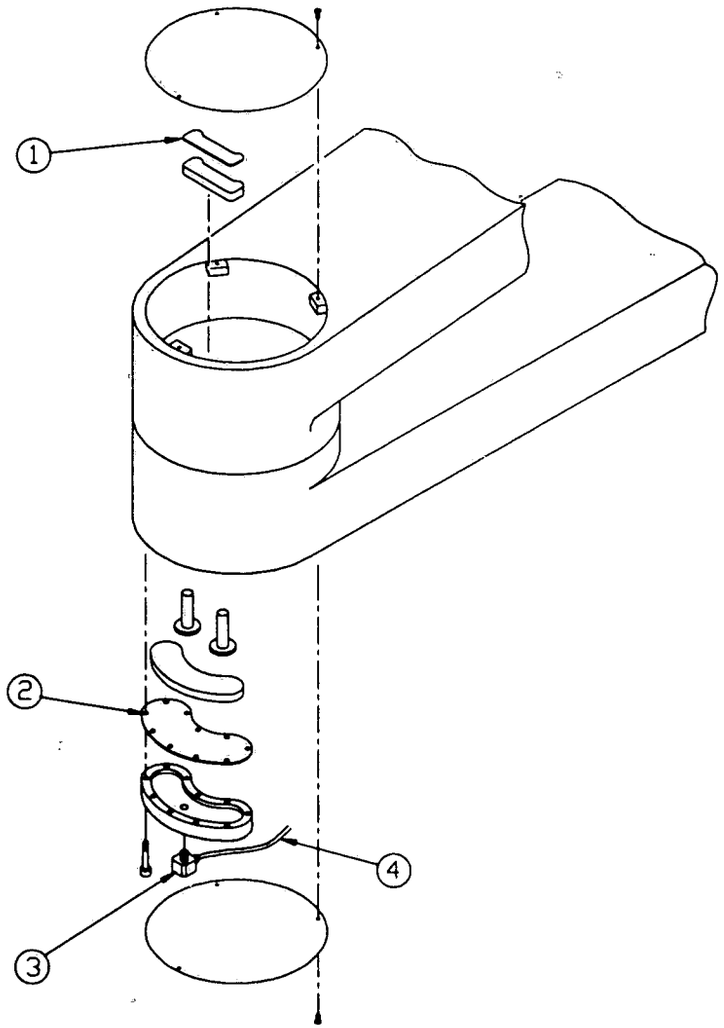



**Figure 7-24. Air Brake Assembly, Piston/Bladder — Models 425 and 255F**



| FIG. & INDEX NO. | PART NUMBER | | | SVC | DESCRIPTION | UNITS PER ASSEMBLY |
|---|---|---|---|---|---|---|
| 7-24 | | | | | AIR BRAKE ASSEMBLY, Piston/Bladder Models 425 and 255F ..... | X |
| 1 | P | 764323 | 717 | | LINING, Brake | |
| 2 | P | 755716 | 011 | | DIAPHRAGM, Brake | |
| 3 | P | 764323 | 623 | | CONNECTOR, Elbow | |
| 4 | P | 764324 | 059 | | TUBING, 5/32 OD | |

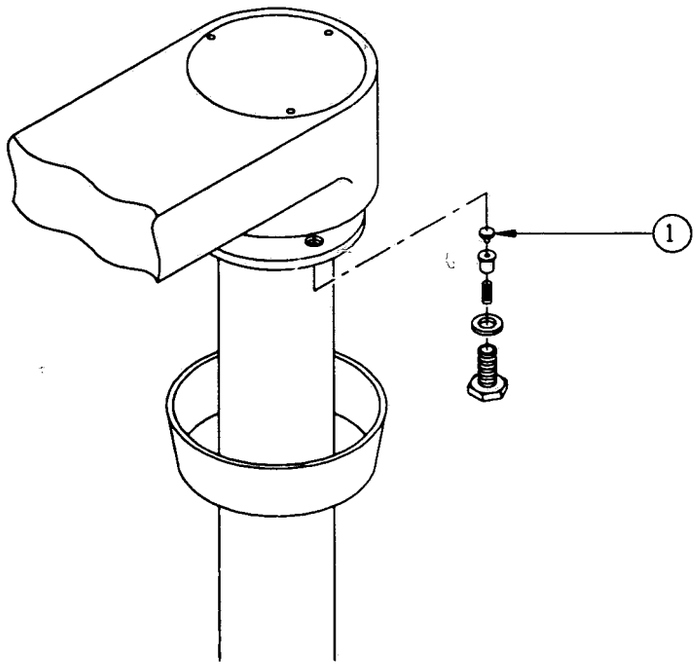



**Figure 7-25. Friction Brake Assembly, Heavy Weight — Models 425 and 255F**



| FIG. & INDEX NO. | PART NUMBER | | | SVC | DESCRIPTION | UNITS PER ASSEMBLY |
|---|---|---|---|---|---|---|
| 7-25 | | | | | FRICTION BRAKE ASSEMBLY, Heavy Weight Models 425 and 255F ..... | X |
| 1 | P | 764323 | 718 | | PAD, Brake | |

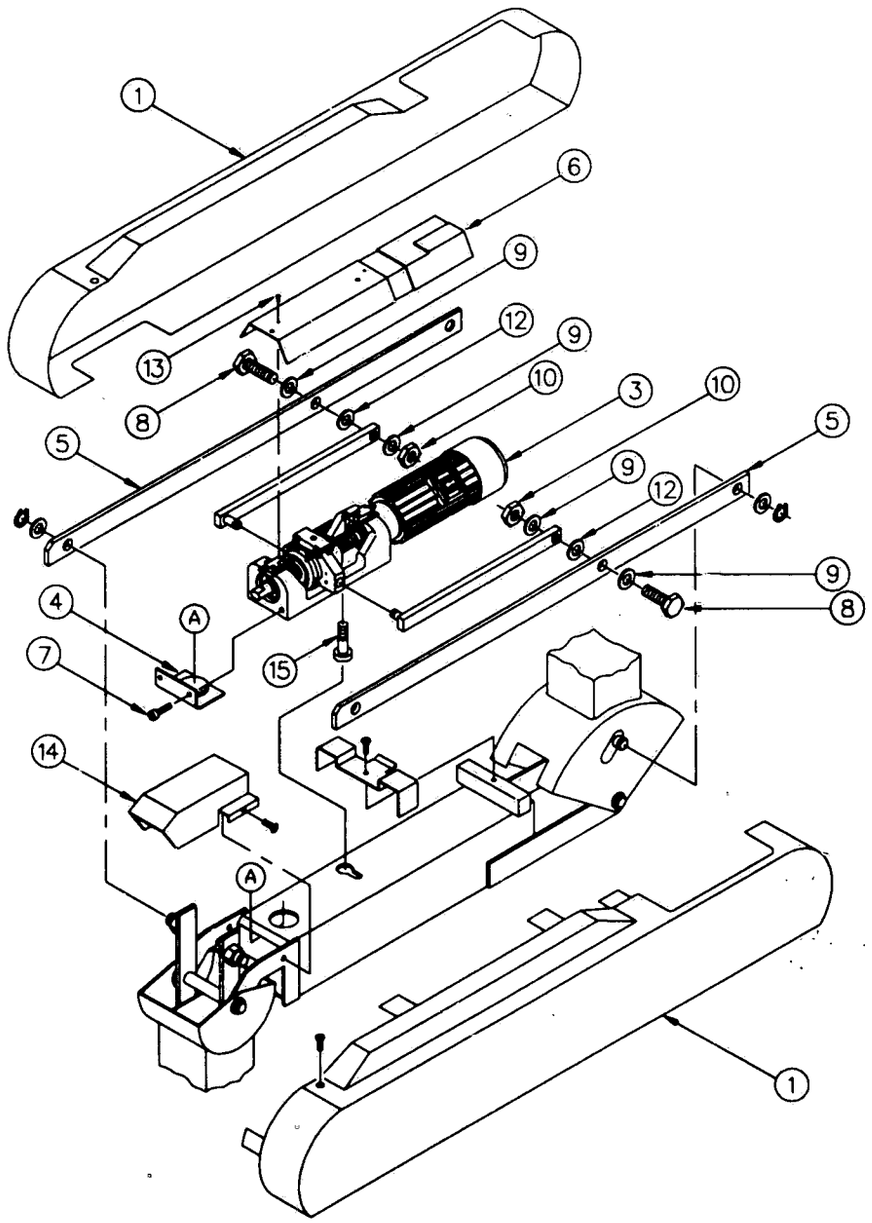



**Figure 7-26. Motorized Arm Assembly — All Motorized Models**



| FIG. & INDEX NO. | | PART NUMBER | | SVC | DESCRIPTION | UNITS PER ASSEMBLY |
|---|---|---|---|---|---|---|
| 7-26 | | | | | MOTORIZED ARM ASSEMBLY — All Motorized Models | X |
| 1 | P | 755716 | 108 | | ASSEMBLY, Cover, Left/Right | 1 |
| 2 | P | | | | NOT USED | |
| 3 | P | 764323 | 680 | | ASSEMBLY, Motor (Fig. 7-27) | 1 |
| 4 | P | 764323 | 656 | | HOLDER, Motor | 1 |
| 5 | P | 764323 | 659 | | BAR, Stabilizing | 2 |
| 6 | P | 764323 | 658 | | COVER, Motor | 1 |
| 7 | | | | | SCREW | 2 |
| 8 | P | 764323 | 668 | | SCREW, Draw Bar | 2 |
| 9 | | | | | WASHER | 6 |
| 10 | | | | | NUT | 2 |
| 12 | | | | | SPACER | 2 |
| 13 | | | | | SCREW, Flathead, Phillips | 2 |
| 14 | | | | | COVER, Knuckle | 1 |
| 15 | | | | | BOLT, Collar | 1 |

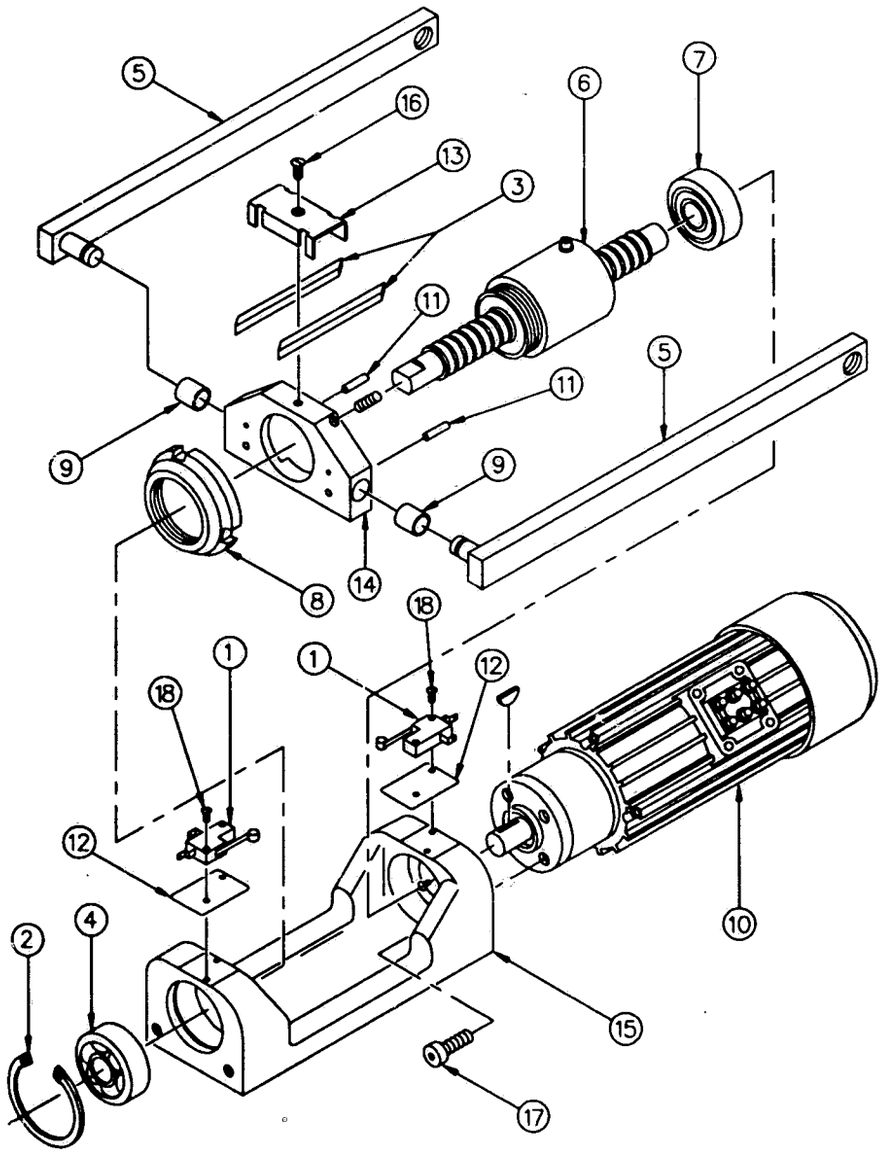



**Figure 7-27. Motor Assembly — All Motorized Models**



| FIG. & INDEX NO. | PART NUMBER | | | SVC | DESCRIPTION | UNITS PER ASSEMBLY |
|---|---|---|---|---|---|---|
| 7-27 | P | 764323 | 680 | | MOTOR ASSEMBLY — All Motorized Models | X |
| | | | | | **NOTE: Available as Assembly Only.** | |
| 1 | P | 764323 | 660 | | SWITCH, Limit | 2 |
| 2 | | | | | RING, Safety | 1 |
| 3 | | | | | ACTIVATOR, Limit Switch | 2 |
| 4 | | | | | BEARING, Roller (Front) | 1 |
| 5 | | | | | BAR, Draw | 2 |
| 6 | | | | | GEAR, Worm | 1 |
| 7 | | | | | BEARING, Thrust | 1 |
| 8 | | | | | NUT, Worm Gear Support | 1 |
| 9 | | | | | BUSHING | 2 |
| 10 | | | | | MOTOR | 1 |
| 11 | | | | | PIN, Kerf | 2 |
| 12 | | | | | INSULATION | 2 |
| 13 | | | | | HOLDER, Actuator | 1 |
| 14 | | | | | SUPPORT, Worm Gear | 1 |
| 15 | | | | | BLOCK, Motor Mounting | 1 |
| 16 | | | | | SCREW | 1 |

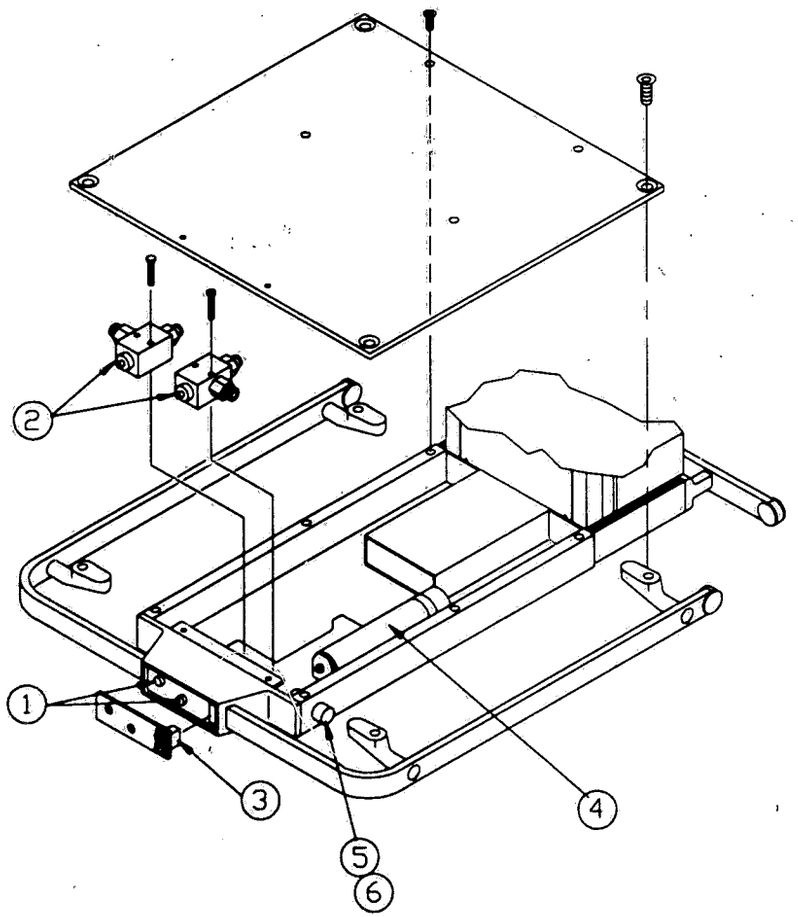



**Figure 7-28. Control Assembly — Models 265, 425, 705M and 905M**



| FIG. & INDEX NO. | | PART NUMBER | | S V C | DESCRIPTION | UNITS PER ASSEMBLY | | | |
|---|---|---|---|---|---|---|---|---|---|
| 7-28 | | | | | CONTROL ASSEMBLY | | | | |
| | | | | | Model 265 | X | | | |
| | | | | | Model 425 | | X | | |
| | | | | | Model 705M | | | X | |
| | | | | | Model 905M | | | | X |
| 1 | P | 764323 | 651 | | PIN, Latch/Pressure | 2 | 2 | 1 | 2 |
| 2 | P | 764323 | 683 | | SWITCH, Air Brake | 2 | 2 | 1 | 2 |
| 3 | P | 764323 | 392 | | SWITCH, Rocker | | | 1 | 1 |
| 4 | P | 764323 | 676 | | CONDENSOR | | | 1 | 1 |
| 6 | P | 764317 | 771 | | FUSE,2 Amp (Box of 5) | | | 1 | 1 |
| 7 | P | 764323 | 677 | | HOLDER, Fuse | | | 1 | 1 |

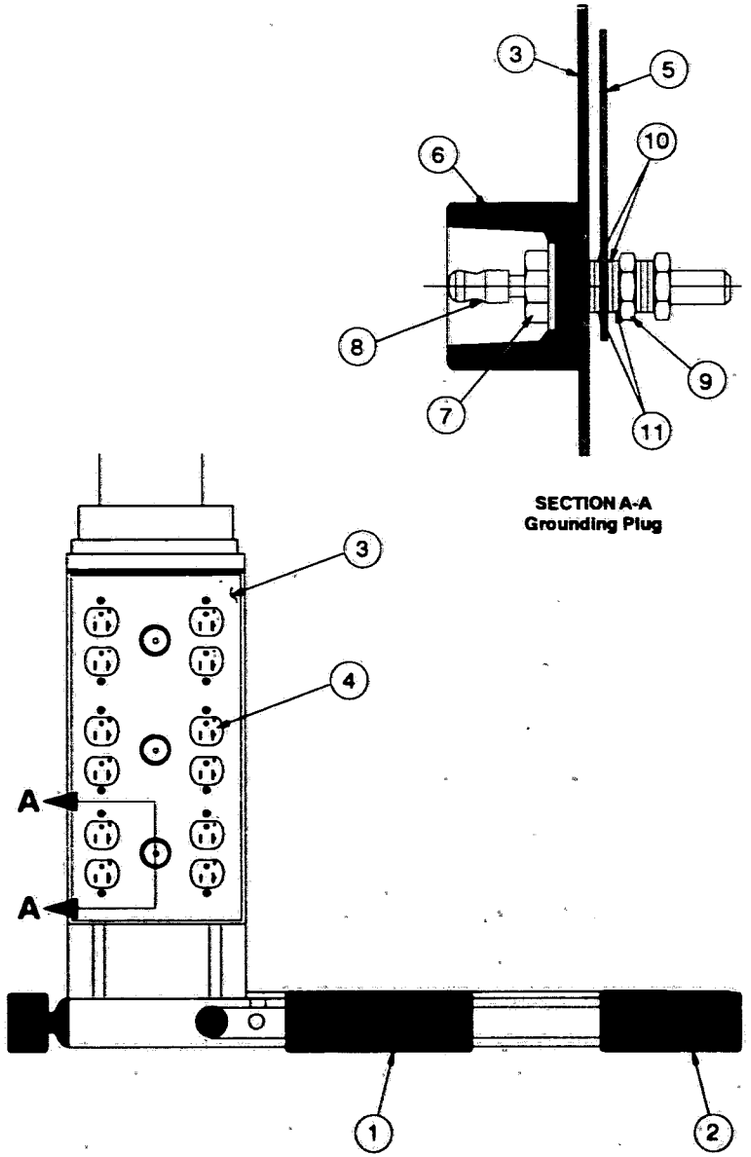



Figure 7-29. Support Head Assembly — Models 155, 245, 265, 425, 705M and 905M



| FIG. & INDEX NO. | | PART NUMBER | | S V C | DESCRIPTION | UNITS PER ASSEMBLY |
|---|---|---|---|---|---|---|
| 7-29 | | | | | SUPPORT HEAD ASSEMBLY<br>Models 155, 245, 265, 425, 705M and 905M | X |
| | P | | | | BUMPER SET | 1 |
| 1 | P | | | | • BUMPER, Straight | |
| 2 | P | | | | • BUMPER, Corner | |
| 3 | P | 134470 | 242 | | SIDE PANEL, Electrical | 1 |
| 4 | P | 56938 | 116 | | OUTLET, Electrical (Duplex), Ivory | 6 |
| 5 | P | 56938 | 415 | | STRIP, Ground | 1 |
| 6 | P | 764323 | 347 | | COVER, Pin | 3 |
| 7 | P | 764323 | 348 | | PLATE, Marker | 3 |
| 8 | P | 764323 | 350 | | PIN, Grounding | 3 |
| 9 | P | 150824 | 542 | | NUT, Hex (M6) | 4 |
| 10 | P | 150824 | 628 | | WASHER, Flat (M6) | 8 |
| 11 | P | 150824 | 544 | | WASHER, Extension Tooth (M6) | 7 |

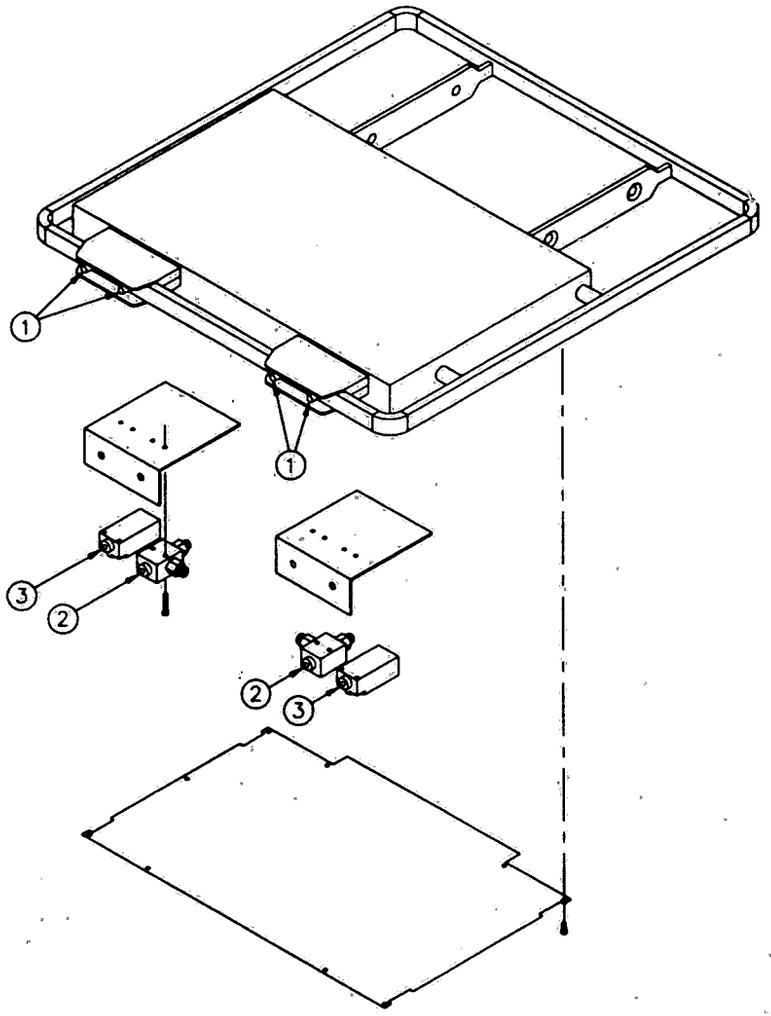



**Figure 7-30. Control Assembly — Models 250F, 255F, 150M and 250M**



| FIG. & INDEX NO. | | PART NUMBER | | S V C | DESCRIPTION | UNITS PER ASSEMBLY | | | |
|---|---|---|---|---|---|---|---|---|---|
| 7-30 | | | | | CONTROL ASSEMBLY | | | | |
| | | | | | Model 150M | X | | | |
| | | | | | Model 250M | | X | | |
| | | | | | Models 250F and 255F | | | X | |
| 1 | P | 764323 | 651 | | PIN, Latch/Pressure | 2 | 2 | | |
| 2 | P | 764323 | 683 | | SWITCH, Air Brake (3 Way) | | 2 | 2 | |
| 3 | P | 764323 | 679 | | SWITCH, Motor | 2 | 2 | | |

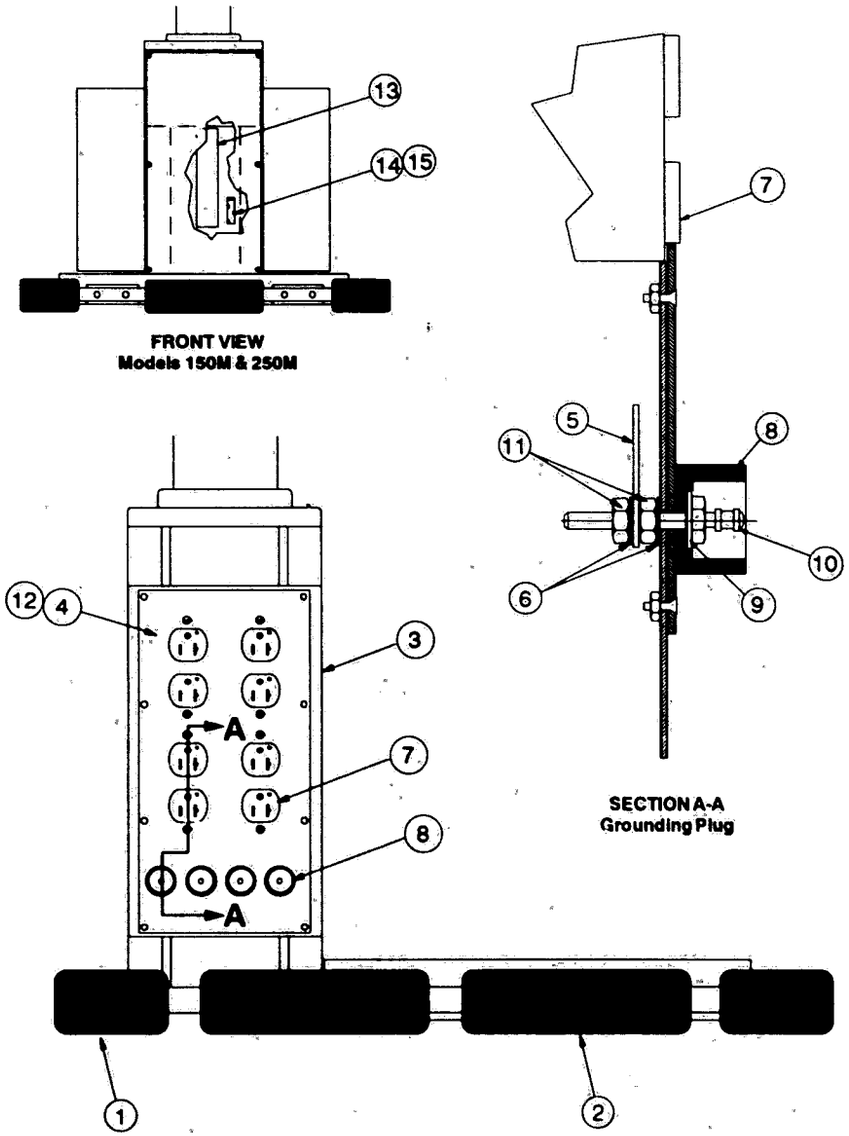



**Figure 7-31. Support Head Assembly — Models 050F, 150F, 250F, 255F, 150M and 250M**



| FIG. & INDEX NO. | | PART NUMBER | | S V C | DESCRIPTION | UNITS PER ASSEMBLY | | | |
|---|---|---|---|---|---|---|---|---|---|
| 7-31 | | | | | SUPPORT HEAD ASSEMBLY | | | | |
| | | | | | Models 050F, 150F, 250F, 255F | X | | | |
| | | | | | 150M and 250M | | X | | |
| | P | 764323 | 320 | | BUMPER SET | A/R | 1 | | |
| 1 | P | 764323 | 627 | | • BUMPER, Corner (Optional on 050F, 150F, 250F, 255F) | 4 | 4 | | |
| 2 | P | 764323 | 628 | | • BUMPER, Straight (Optional on 050F, 150F, 250F, 255F) | 7 | 7 | | |
| 3 | | | | | PANEL | 4 | 4 | | |
| 4 | P | 764323 | 692 | | PANEL, Electrical | 1 | 1 | | |
| 5 | P | 764323 | 349 | | RAIL, Grounding | 1 | 1 | | |
| 6 | P | 764323 | 609 | | WASHER | 8 | 8 | | |
| 7 | P | 56938 | 116 | | OUTLET, Electrical (Duplex), Ivory | 4 | 4 | | |
| 8 | P | 764323 | 347 | | COVER, Pin | 4 | 4 | | |
| 9 | P | 764323 | 348 | | PLATE, Marker | 4 | 4 | | |
| 10 | P | 764323 | 350 | | PIN, Grounding | 4 | 4 | | |
| 11 | | | | | NUT | 8 | 8 | | |
| 12 | P | 134470 | 242 | | PANEL | 1 | 1 | | |
| 13 | P | 764323 | 676 | | CONDENSER | | 1 | | |
| 14 | P | 764323 | 677 | | HOLDER, Fuse | | 1 | | |
| 15 | P | 764317 | 771 | | FUSE, 2 Amp (Box of 5) | | 1 | | |

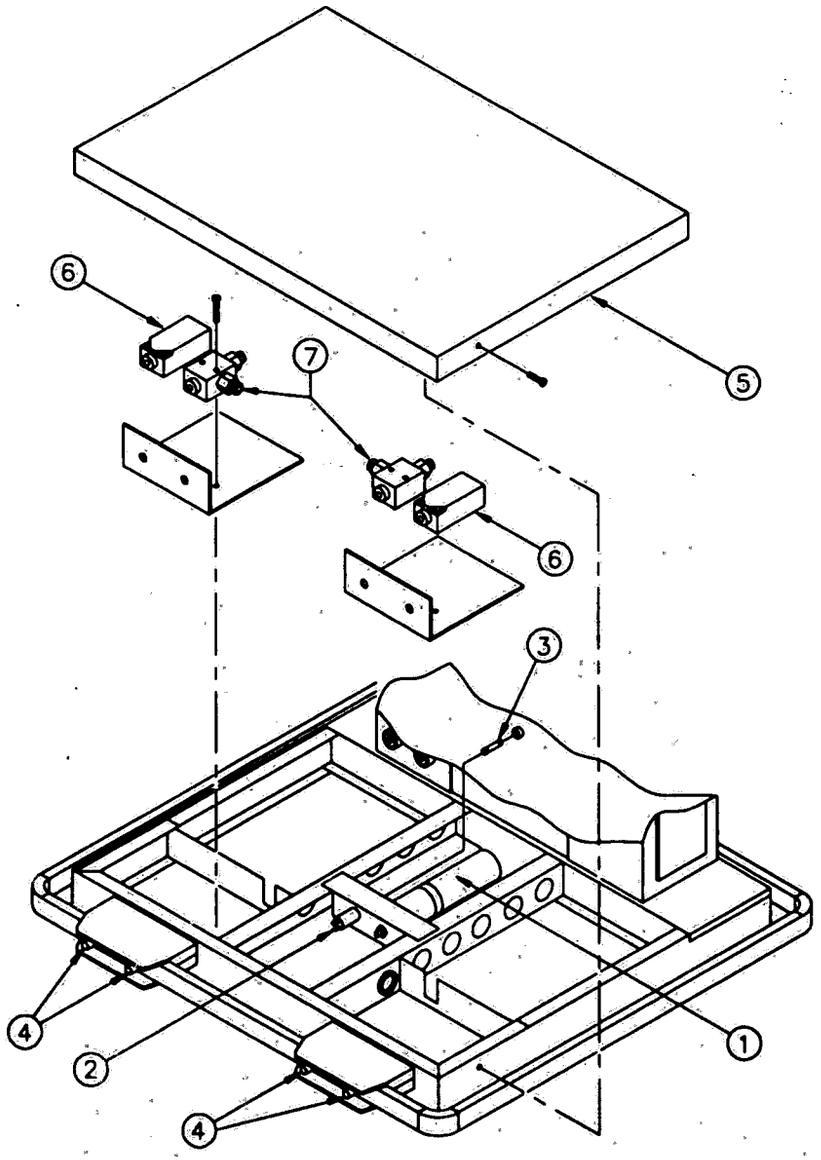



**Figure 7-32. Control Assembly — Models 130M and 230M**



| FIG. & INDEX NO. | | PART NUMBER | | SVC | DESCRIPTION | UNITS PER ASSEMBLY | | | |
|---|---|---|---|---|---|---|---|---|---|
| 7-32 | | | | | CONTROL ASSEMBLY | | | | |
| | | | | | Model 230M | X | | | |
| | | | | | Model 130M | | X | | |
| 1 | P | 764323 | 676 | | CONDENSER | 1 | 1 | | |
| 2 | P | 764323 | 677 | | HOLDER, Fuse | 1 | 1 | | |
| 3 | P | 764317 | 771 | | FUSE, 2 Amp (Box of 5) | 1 | 1 | | |
| 4 | P | 764323 | 651 | | PIN, Latch/Pressure | 4 | 2 | | |
| 5 | P | 764323 | 678 | | COVER, Platform | 1 | 1 | | |
| 6 | P | 764323 | 679 | | SWITCH, Motor | 2 | 2 | | |
| 7 | P | 764323 | 683 | | SWITCH, Air Brake (3 Way) | 2 | | | |

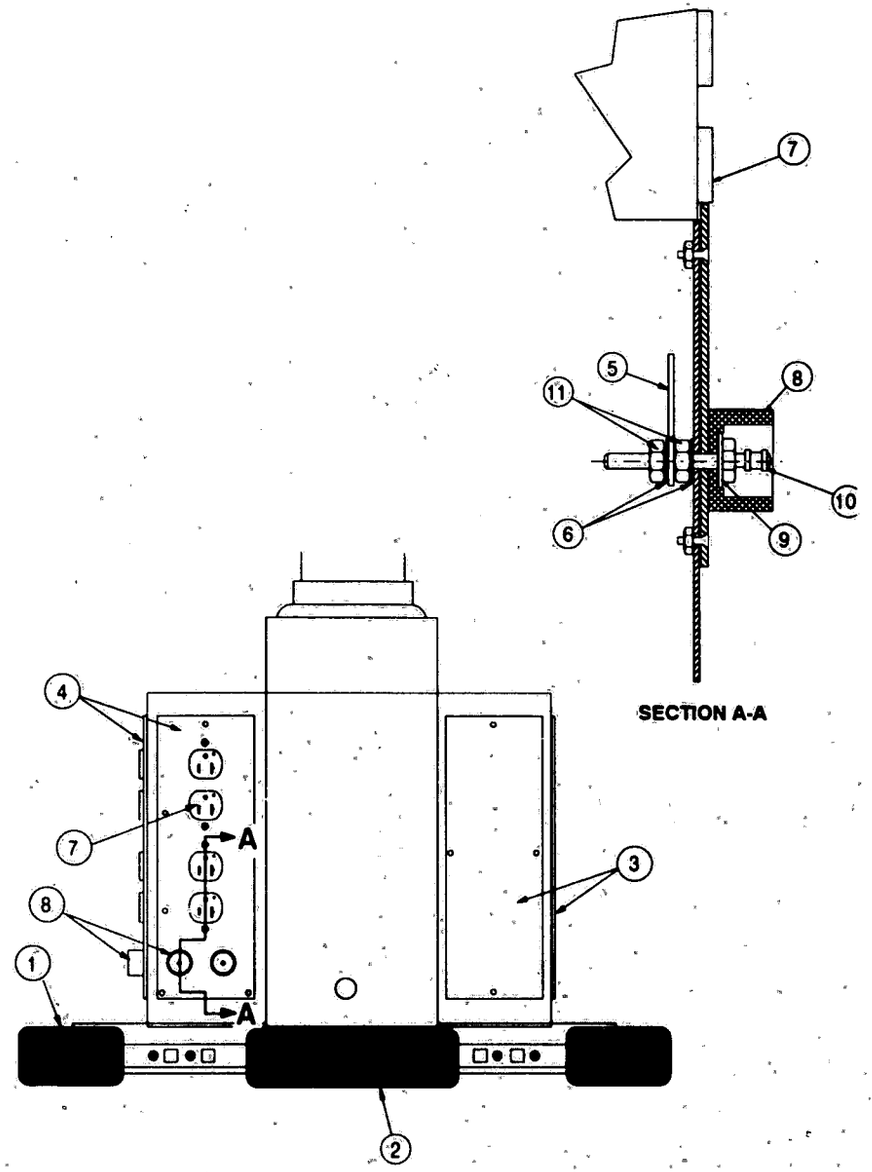



Figure 7-33. Support Head Assembly — Models 130M and 230M

| FIG. & INDEX NO. | PART NUMBER | | SVC | DESCRIPTION | UNITS PER ASSEMBLY |
|---|---|---|---|---|---|
| 7-33 | | | | SUPPORT HEAD ASSEMBLY — Models 130M and 230M | X |
| | P 764323 | 320 | | BUMPER SET | |
| 1 | P 764323 | 627 | | • BUMPER, Corner | 4 |
| 2 | P 764323 | 628 | | • BUMPER, Straight | 5 |
| 3 | P 764323 | 675 | | PANEL | 4 |
| 4 | P 764323 | 692 | | PANEL, Electrical | 2 |
| 5 | P 764323 | 349 | | RAIL, Grounding | 2 |
| 6 | P 764323 | 609 | | WASHER | 8 |
| 7 | P 56938 | 116 | | OUTLET, Electrical (Duplex), Ivory | 4 |
| 8 | P 764323 | 347 | | COVER, Pin | 4 |
| 9 | P 764323 | 348 | | PLATE, Marker | 4 |
| 10 | P 764323 | 350 | | PIN, Grounding | 4 |
| 11 | | - | | NUT | 8 |

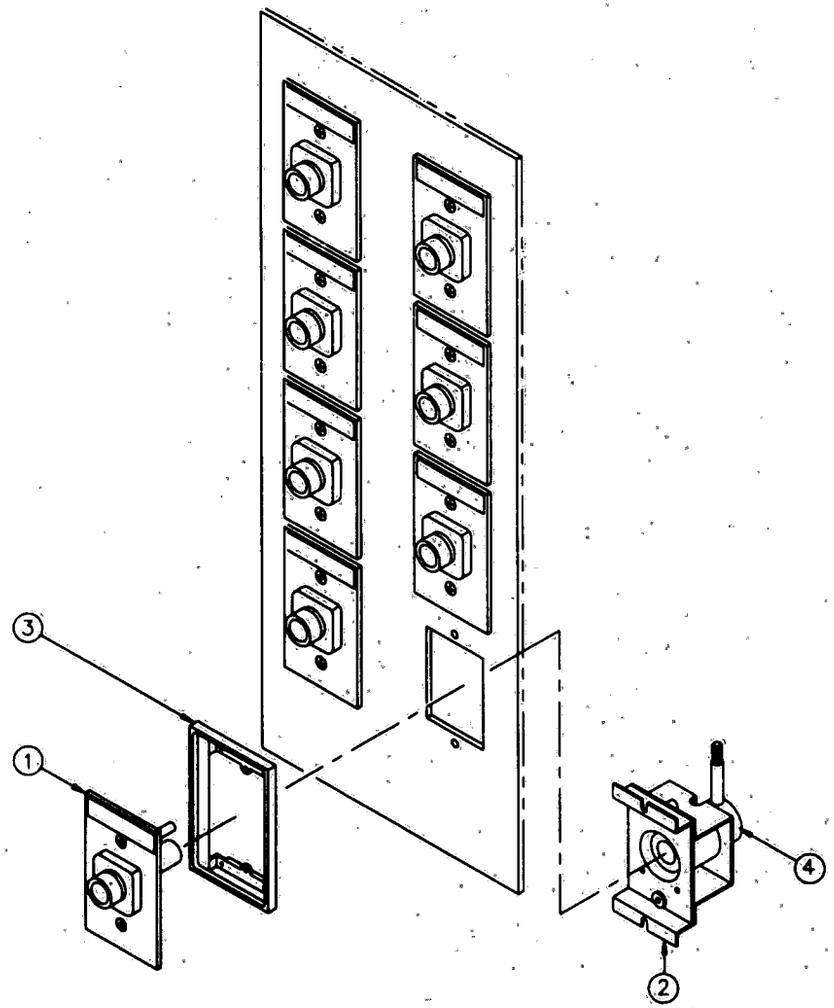



**Figure 7-34. Gas Outlet Assembly, Typical Domestic**



| FIG. & INDEX NO. | | PART NUMBER | | S V C | DESCRIPTION | UNITS PER ASSEMBLY |
|---|---|---|---|---|---|---|
| 7-34 | | | | | GAS OUTLET ASSEMBLY, TYPICAL DOMESTIC | |
| 1 | P | 136807 | 386 | | ROUGH IN, Vacuum (White) | |
| | P | 136807 | 389 | | ROUGH IN, Nitrogen (Black) | |
| | P | 136807 | 391 | | ROUGH IN, Medical Air (Yellow) | |
| | P | 136807 | 387 | | ROUGH IN, Oxygen (Green) | |
| | P | 136807 | 390 | | ROUGH IN, Nitrous Oxide (Blue) | |
| | P | 136807 | 388 | | ROUGH IN, Evacuation (White) | |
| | P | 136807 | 392 | | ROUGH IN, Carbon Dioxide (Gray) | |
| 2 | P | 136807 | 933 | | PURITAN BENNETT LATCH VALVE, Vacuum (White) | |
| | P | 136807 | 938 | | PURITAN BENNETT LATCH VALVE, Medical Air (Yellow) | |
| | P | 136807 | 934 | | PURITAN BENNETT LATCH VALVE, Oxygen (Green) | |
| | P | 136807 | 937 | | PURITAN BENNETT LATCH VALVE, Nitrous Oxide (Blue) | |
| | P | 136807 | 935 | | PURITAN BENNETT LATCH VALVE, Evacuation (White) | |
| | P | 136807 | 939 | | OHIO LATCH VALVE, Vacuum (White) | |
| | P | 136807 | 944 | | OHIO LATCH VALVE, Medical Air (Yellow) | |
| | P | 136807 | 940 | | OHIO LATCH VALVE, Oxygen (Green) | |
| | P | 136807 | 943 | | OHIO LATCH VALVE, Nitrous Oxide (Blue) | |
| | P | 136807 | 941 | | OHIO LATCH VALVE, Evacuation (White) | |
| | P | 136807 | 945 | | CHEMETRON LATCH VALVE, Vacuum (White) | |
| | P | 136807 | 950 | | CHEMETRON LATCH VALVE, Medical Air (Yellow) | |
| | P | 136807 | 946 | | CHEMETRON LATCH VALVE, Oxygen (Green) | |
| | P | 136807 | 949 | | CHEMETRON LATCH VALVE, Nitrous Oxide (Blue) | |
| | P | 136807 | 947 | | CHEMETRON LATCH VALVE, Evacuation (White) | |
| | P | 136807 | 951 | | DISS LATCH VALVE, Vacuum (White) | |
| | P | 136807 | 956 | | DISS LATCH VALVE, Medical Air (Yellow) | |
| | P | 136807 | 952 | | DISS LATCH VALVE, Oxygen (Green) | |
| | P | 136807 | 955 | | DISS LATCH VALVE, Nitrous Oxide (Blue) | |
| | P | 136807 | 953 | | DISS LATCH VALVE, Evacuation (White) | |
| | P | 136807 | 954 | | DISS LATCH VALVE, Nitrogen (Black) | |
| | P | 136807 | 936 | | DISS LATCH VALVE, Carbon Dioxide (Gray) | |
| 3 | P | 93910 | 058 | | FRAME | |
| 4 | P | 756769 | 091 | | CLAMP, Hose | |
| | R | 3500 | 060 | | HOSE, Nitrous Oxide (Blue) | |
| | R | 3500 | 062 | | HOSE, Medical Air (Yellow) | |
| | R | 3500 | 063 | | HOSE, Nitrogen (Black) | |
| | R | 3500 | 065 | | HOSE, Oxygen (Green) | |
| | R | 3500 | 071 | | HOSE, Evacuation/Vacuum (White) | |
| | R | 3500 | 066 | | HOSE, Carbon Dioxide (Gray) | |
| | P | 93910 | 059 | | Plate, Blind | |

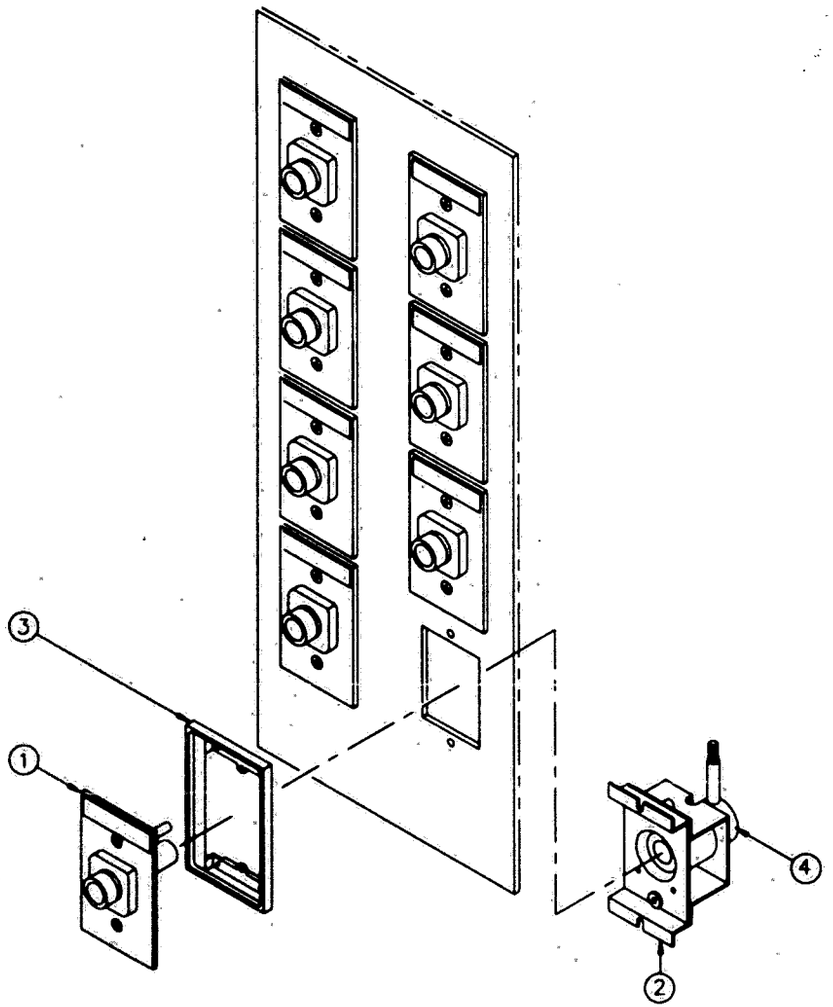



**Figure 7-35. Gas Outlet Assembly, Typical Canadian**



| FIG. & INDEX NO. | | PART NUMBER | | S V C | DESCRIPTION | UNITS PER ASSEMBLY |
|---|---|---|---|---|---|---|
| 7-35 | | | | | GAS OUTLET ASSEMBLY, TYPICAL CANADIAN | |
| 1 | P | 136807 | 386 | | ROUGH IN, Vacuum (Yellow) | |
| | P | 136807 | 389 | | ROUGH IN, Nitrogen (Black) | |
| | P | 136807 | 391 | | ROUGH IN, Medical Air (Black/White) | |
| | P | 136807 | 387 | | ROUGH IN, Oxygen (White) | |
| | P | 136807 | 390 | | ROUGH IN, Nitrous Oxide (Blue) | |
| | P | 136807 | 388 | | ROUGH IN, Evacuation (Yellow/Purple) | |
| | P | 136807 | 392 | | ROUGH IN, Carbon Dioxide (Gray) | |
| 2 | P | 136807 | 957 | | PURITAN BENNETT LATCH VALVE, Vacuum (Yellow) | |
| | P | 136807 | 959 | | PURITAN BENNETT LATCH VALVE, Medical Air (Black/White) | |
| | P | 136807 | 958 | | PURITAN BENNETT LATCH VALVE, Oxygen (White) | |
| | P | 136807 | 937 | | PURITAN BENNETT LATCH VALVE, Nitrous Oxide (Blue) | |
| | P | 136807 | 935 | | PURITAN BENNETT LATCH VALVE, Evacuation (Yellow/Purple) | |
| | P | 136907 | 960 | | OHIO LATCH VALVE, Vacuum (Yellow) | |
| | P | 136807 | 962 | | OHIO LATCH VALVE, Medical Air (Black/White) | |
| | P | 136807 | 961 | | OHIO LATCH VALVE, Oxygen (White) | |
| | P | 136807 | 943 | | OHIO LATCH VALVE, Nitrous Oxide (Blue) | |
| | P | 136807 | 941 | | OHIO LATCH VALVE, Evacuation (Yellow/Purple) | |
| | P | 136807 | 963 | | CHEMETRON LATCH VALVE, Vacuum (Yellow) | |
| | P | 136807 | 965 | | CHEMETRON LATCH VALVE, Medical Air (Black/White) | |
| | P | 136807 | 964 | | CHEMETRON LATCH VALVE, Oxygen (White) | |
| | P | 136807 | 949 | | CHEMETRON LATCH VALVE, Nitrous Oxide (Blue) | |
| | P | 136807 | 947 | | CHEMETRON LATCH VALVE, Evacuation (Yellow/Purple) | |
| | P | 136807 | 966 | | DISS LATCH VALVE, Vacuum (Yellow) | |
| | P | 136807 | 968 | | DISS LATCH VALVE, Medical Air (Black/White) | |
| | P | 136807 | 967 | | DISS LATCH VALVE, Oxygen (White) | |
| | P | 136807 | 955 | | DISS LATCH VALVE, Nitrous Oxide (Blue) | |
| | P | 136807 | 953 | | DISS LATCH VALVE, Evacuation (Yellow/Purple) | |
| | P | 136807 | 954 | | DISS LATCH VALVE, Nitrogen (Black) | |
| | P | 136807 | 936 | | DISS LATCH VALVE, Carbon Dioxide (Gray) | |
| 3 | P | 93910 | 058 | | FRAME | |
| 4 | P | 756769 | 091 | | CLAMP, Hose | |
| | R | 3500 | 060 | | HOSE, Nitrous Oxide (Blue) | |
| | R | 3500 | 062 | | HOSE, Medical Air (Black/White) | |
| | R | 3500 | 063 | | HOSE, Nitrogen (Black) | |
| | R | 3500 | 065 | | HOSE, Oxygen (White) | |
| | R | 3500 | 071 | | HOSE, Evacuation/Vacuum (Yellow/Purple) | |
| | R | 3500 | 066 | | HOSE, Carbon Dioxide (Gray) | |
| | P | 93910 | 059 | | Plate, Blind | |

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