
OPERATION AND MAINTENANCE MANUAL FOR RESCUE SUPPORT SYSTEMS

(LOCKSTROKE STRUT SYSTEM)

(ACME THREAD STRUT SYSTEM)

(LOW CLEARANCE SUPPORT SYSTEM)

PARATECH INCORPORATED
P.O. BOX 1000
1025 LAMBRECHT ROAD
FRANKFORT, ILLINOIS 60423-7000
TELEPHONE (815) 469-3911
FAX (815) 469-7748
paratech@paratech.us
www.paratech.us

P/N 22-796198

26 APR 2006

QAP20/130/A

VALIDATION CERTIFICATE

TECHNICAL MANUAL TITLE

OPERATION AND MAINTENANCE MANUAL FOR RESCUE SUPPORT SYSTEMS
(LOCKSTROKE STRUT SYSTEM) (ACME THREAD STRUT SYSTEM) LOW CLEARANCE SUPPORT SYSTEM)

TECHNICAL MANUAL NUMBER

QAP20/130/A

DATE

15 June 2001

CONTRACT/TMCR NO.

I - VALIDATION

Except as stated in II, the technical manual identified above has been satisfactorily validated in accordance with all requirements of the applicable contract. The technical manual is hereby certified to be accurate and complete, and the information, instructions, text, and illustrations conform in all respects to the applicable general and detailed specifications.

II - EXCEPTIONS

EXCEPTIONS

NONE

AUTHORIZED BY

Peter Nielsen
Director

Paratech Incorporated
1025 Lambrecht Road
Frankfort, Illinois 60423-7000

SIGNATURE OF PUBLICATIONS QUALITY ASSURANCE OFFICER

DATE

CHANGE RECORD

Change No.	Date	Title and/or Brief Description	Signature of Validating Officer
1	6/15/95	15/95 Page 2-3: Table 2-2 Min. Max. Lengths with bases added	
2	6/15/95	Page 2-10 added	
3	8/15/95	Text and Table 2-8 (p.2-9) simplified	
4	9/05/95	Tables 2-4, 2-5, 2-6 modified	
5	5/23/01	Text Paragraph 1.6 a., b., c., g.	
6	2/2/02	Text to warning #2 in Safety Summary p. iii	
7	4/26/06	Removed Figure 1-24, 1-25 and accompanying text 1-6.2.a relief valve pressure changed from 350 psi to 250 2-3.1.c delivery pressure changed from 350 psi to 300 Table 2-3 activation pressure 300 and 350 psi removed	

FOREWORD

This technical manual conforms to Military Specifications MIL-M-38784, General Style and Format Requirements, MIL-M-7298 Commercial Equipment Technical Manual and MIL-M-15071 Equipment and Systems Content Requirements for Technical Manuals. The manual contains description, operating instructions, theory of operation, scheduled maintenance recommendations, troubleshooting, corrective maintenance and parts lists for the Lockstroke Strut, Acme Thread Strut and Low Clearance Support Rescue Support Systems manufactured by Paratech Incorporated, 1025 Lambrecht Road, Frankfort, Illinois 60423-1648.

All pertinent data relative to the Rescue Support Systems is contained herein without specific reference to other publications. Refer to the table of contents for the arrangement of the contents within this publication.

This manual consists of one volume arranged in four chapters as follows:

Chapter 1 - General Information and Safety Precautions

Chapter 2 - Operation

Chapter 3 - Scheduled Maintenance

Chapter 4 - Parts List

TABLE OF CONTENTS

Chapter/Paragraph	Title	Page
1.	GENERAL INFORMATION AND SAFETY PRECAUTIONS	
1-1	Safety Precautions.....	1-1
1-2	Introduction.....	1-1
1-3	Equipment Description.....	1-1
1-3.1	Lockstroke Strut System	1-1
1-3.2	Acme Thread Strut System.....	1-1
1-3.3	Low Clearance Support System	1-2
1-3.4	Base Plates/End Plates/Fittings	1-2
1-4	Relationship of Units.....	1-4
1-5	Reference Data.....	1-4
1-6	Equipment, Accessories and Documents Supplied	1-4
1-6.1	Equipment Supplied	1-4
1-6.2	Accessories Supplied	1-6
1-6.3	Documents Supplied	1-8
2.	OPERATION	
2-1	Introduction.....	2-1
2-2	Preparation for Use	2-1
2-2.1	Low Clearance Support System	2-1
2-2.2	Lockstroke and Acme Thread Strut Systems.....	2-1
2-3	Controls and Indicators	2-4
2-3.1	Controls.....	2-4
2-3.2	Indicators	2-5
2-4	Normal Operating Procedure.....	2-5
2-4.1	Low Clearance Supports	2-5
2-4.2	Lockstroke and Acme Thread Struts	2-5
2-5	Takedown.....	2-7
2-6	Shutdown	2-7
2-7	Capacities and Safety Limit Charts	2-9
2-7.1	Activation Force.....	2-9
2-7.2	Spacing Charts	2-9
2-7.3	Load Chart	2-10
3.	SCHEDULED MAINTENANCE	
3-1	Introduction.....	3-1
3-2	Maintenance Plan.....	3-1
3-3	General Maintenance	3-1
3-3.1	General.....	3-1
3-3.2	Surface Cleaning	3-1
3-3.3	Inspection.....	3-1
3-3.4	Replacement of Base Locking Pin Assembly	3-1
4.	PARTS LIST	
4-1	Introduction.....	4-1
4-2	List of Major Components	4-1
4-3	Parts List Tables.....	4-1
4-4	List of Manufacturers	4-1

LIST OF ILLUSTRATIONS

Figure	Title	Page
1-1	Lockstroke Strut System	1-1
1-2	Acme Thread Strut System.....	1-1
1-3	Low Clearance Support System	1-2
1-4	3" (7.6 cm) Standard Base.....	1-2
1-5	Steel Cone Point Base	1-2
1-6	V-Base	1-2
1-7	Angle Base	1-2
1-8	Rigid Base.....	1-3
1-9	Swivel Base.....	1-3
1-10	Hinged Base	1-3
1-11	4" (10.2 cm) x 4" (10.2 cm) Channel Base.....	1-3
1-12	6" (15.2 cm) x 6" (15.2 cm) Channel Base.....	1-3
1-13	Spring Loaded Connector.....	1-3
1-14	Threaded Adjustable Connector	1-4
1-15	Single Pushbutton Controller	1-6
1-16	Dual Deadman Controller	1-7
1-17	Pressure Regulator	1-7
1-18	Manual Compressor	1-7
1-19	10 Ton Hydraulic Cylinder and Pump.....	1-7
1-20	Strut Extensions	1-7
1-21	Ground Plate	1-8
1-22	Non-Slip Neoprene Pad.....	1-8
1-23	Working Air Cylinders.....	1-8
2-1	Typical Rescue Support System Hook-Up	2-1
2-2	Typical Rescue Support System Applications	2-5
2-3	Bound Strut Removal	2-8
4-1	Lockstroke Strut, Exploded View.....	4-1
4-2	Acme Thread Strut, Exploded View.....	4-3
4-3	Low Clearance Supports, Extensions, Base Plates and Connectors	4-6
4-4	Locking Pin Assembly, Exploded View.....	4-7

LIST OF TABLES

Number	Title	Page
1-1	Reference Data.....	1-4
1-2	Dimensions, Weight and Volumes	1-5
2-1	Low Clearance Supports Overall Lengths	2-2
2-2	Minimum - Maximum Lengths of Struts with Assorted Bases	2-3
2-3	Activation Force.....	2-9
2-4	Trench Work Collapse Spacing Chart - Type A Soils.....	2-9
2-5	Trench Work Collapse Spacing Chart - Type B Soils.....	2-9
2-6	Trench Work Collapse Spacing Chart - Type C Soils.....	2-10
2-7	Collapse/Rescue Working Load Chart	2-10
3-1	Maintenance Schedule.....	3-1
4-1	Lockstroke Strut Parts List	4-2
4-2	Acme Thread Strut Parts List	4-3
4-3	Low Clearance Supports, Extensions, Base Plates and Connectors Parts List	4-5
4-4	Locking Pin Assembly Parts List	4-7
4-5	Code to Name List	4-7

SAFETY SUMMARY

The following are general safety precautions that are not related to any specific procedures, and therefore do not appear elsewhere in this publication. These are recommended precautions that personnel must understand and apply during many phases of operation and maintenance.

The Rescue Support Systems covered in this publication should be used only by trained and qualified personnel familiar with collapse and containment procedures.

Before using this equipment, read and understand these instructions.

Personnel not directly involved in operation or maintenance of a rescue support system should keep a safe distance from the work area.

Installation/operation of a rescue support system by unauthorized personnel or minors is prohibited.

Wear proper apparel and safety goggles during operation and maintenance of a safety support system.

During operation, do not over reach. Maintain a stable footing and balance at all times.

Do not connect any pressurized hose to a strut. Bleed off any pressure from the strut and/or hose before connecting or disconnecting hoses.

Never point a strut toward yourself or other personnel. Accidental activation could cause the strut to extend rapidly and forcefully resulting in serious injury or possible death. Do not activate a strut unless it is between two work surfaces.

All struts used in trench shoring and rescue operations must be used in accordance with OSHA 1926.650 - 1926.652 subpart P regulations for excavations.

When struts are used in structural collapse, always use the lowest activating pressure possible so as not to disturb the collapsed structure.

Keep the work area clean when maintaining or repairing a rescue support system. The following warnings and cautions appear in the text of this manual, and are repeated here for emphasis:

WARNING

Do not use any accessory that exhibits an air leakage condition. Any reduction of air pressure could result in collapse and endangerment of personnel.

WARNING

Do not adjust pressure regulator to exceed the maximum pressure rating of any component in the system apparatus.

WARNING

In collapse rescue situations struts are not designed to accept more than 2 extensions totaling 3 feet (91.44 cm) in length.

WARNING

Do not use struts as a ladder in trenching operations.

CHAPTER 1
GENERAL INFORMATION AND SAFETY PRECAUTIONS

1-1 SAFETY PRECAUTIONS.

Refer to the Safety Summary preceding Chapter 1, General Information and Safety Precautions, for safety precautions necessary for the protection of personnel and equipment.

1-2 INTRODUCTION.

This technical manual provides instructions for the installation, operation, maintenance and parts support for Rescue Support Systems (RSS) manufactured by Paratech Incorporated, 1025 Lambrecht Road, Frankfort, Illinois 60423.

The RSS are designed for use in rescue situations involving collapse, containment or stabilization. These situations include such diverse incidents as building collapse, structural containment, vehicular extrications, industrial entrapment, and excavation collapse and containment.

The RSS are manufactured from aluminum alloys for light weight and strength. They are designed to be used in place of or in conjunction with wood cribbing, or other shoring or support devices.

The RSS meets OSHA requirements when used in accordance with OSHA 1926.650 - 1926.652 subpart P regulations for excavations.

1-3 EQUIPMENT DESCRIPTION.

1-3.1 LOCKSTROKE STRUT SYSTEM. The Lockstroke Strut System, Figure 1-1, consists of various sizes of extendible struts plus various base plates, end plates and extensions. Each strut consists of a 3" (7.6cm) diameter aluminum alloy tube with a solid 2-1/2" (6.4cm) diameter aluminum alloy moveable grooved shaft. The struts are extended manually or from a pneumatic pressure source such as air, carbon dioxide, or nitrogen.

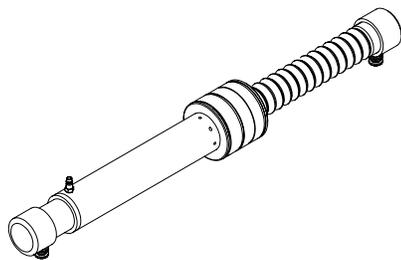


Figure 1-1. Lockstroke Strut System

The lockstroke extendible strut locks automatically in increments of 0.400" (1 cm) without the necessity of manually inserting a locking pin. This feature permits the extension and locking of the lockstroke support system from a remote location. Hands free locking occurs through integration of a double row ball lock coupling. The strut axial crush strength exceeds 50,000 pounds (22,680 kg).

Take down and repositioning is accomplished by removing the load pressure and then manually operating the release ring to permit collapsing of the strut. If during take down, a load shift begins to forcibly collapse the strut, simply letting go of the release ring will again lock the strut in the extended position at the time the release ring was released.

1-3.2 ACME THREAD STRUT SYSTEM. The Acme Thread Strut System, Figure 1-2, consists of various sizes of extendible struts plus various base plates, end plates and extensions. Each strut consists essentially of a 2-1/2" (6.4cm) diameter aluminum alloy inner movable acme threaded shaft and a 3" (7.6cm) diameter aluminum alloy outer tube. The struts are extended manually or from a pneumatic pressure source such as air, carbon dioxide, or nitrogen.

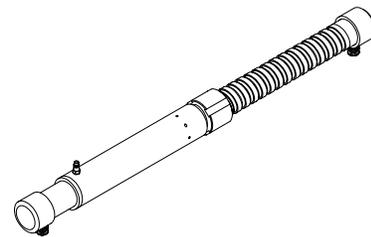
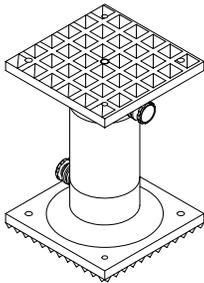


Figure 1-1. Acme Thread Strut System

The design of the acme thread strut permits "soft" placement with sensitive positioning, and locking at an infinite number of extended positions within the range of the strut. When the strut is extended manually or pneumatically to the desired extension, an acme threaded nut moves with the inner, acme threaded shaft. The nut can be manually turned down the inner shaft and secured against the outer tube to lock the strut in any desired extended position. This feature permits the acme thread strut to lock at any desired set point rather than at a predetermined specific set point resulting in the gentle yet secure support of an area with a minimum of shock and displacement of the load. The strut axial crush strength exceeds 50,000 pounds (22,680 kg).

Take down and repositioning is accomplished by removing the load pressure and then manually turning the nut up the inner shaft. If during release, a load shift begins to forcibly collapse the strut, simply releasing the nut will again lock the strut in that extended position where the nut was released.

1-3.3 LOW CLEARANCE SUPPORT SYSTEM. The Low Clearance Support System, Figure 1-3, consists of a series of bases and solid extensions. Low clearance supports are designed as pre-rescue devices where support of a 3" (7.6cm) to 15" (53.1cm) void (separation) is required before rescue work can commence. The system functions in conjunction with close clearance lifting devices such as air bags, hydraulic or manual tools. In addition, through the use of strut extensions, the low clearance support system provides support up to 46" (116.8 cm) without the use of any other auxiliary equipment.



1-3.4 BASE PLATES/END PLATES/FITTINGS. The following base plates/end plates/fittings are available to enhance the versatility of the RSS. All base plates/end plates/fittings are equipped with a pull and twist locking pin to provide for their easy and rapid installation and removal.

a. **3" (7.6 cm) Standard Base.** The standard base (Figure 1-4) is basically a 3" (7.6 cm) diameter cap 2" (5.1 cm) long. It covers both ends of a strut to provide protection during bracing operations.



Figure 1-4. 3" (7.6 cm) Standard Base
Part Number 22-796050

b. **Steel Cone Point Base.** The steel cone point base (Figure 1-5) is basically a 3" (7.6 cm) standard base with a 3/4" (1.9 cm) pointed steel cone secured to the center of

the base. The steel cone point base is primarily used to secure struts at a slight angle against smooth surfaces

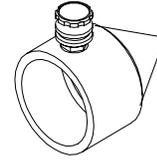


Figure 1-5. Steel Cone Point Base
Part Number 22-796080

c. **V-Base.** The V-base (Figure 1-6) is basically a 3" (7.6 cm) diameter cylindrical base with a 90° "V" machined approximately 1" (2.5 cm) deep at its center. The V-base is primarily used to stabilize anything with a corner or angle at the point of support.

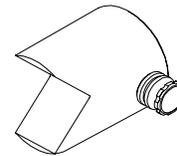


Figure 1-6. V-Base
Part Number 22-796090

d. **Angle Base.** The angle base (Figure 1-7) incorporates a 2-3/4" (7.0 cm) lip to hang a strut for hands-free operation. Typically used at a trench cave-in where wales must be rebraced before personnel are permitted to enter the excavation.

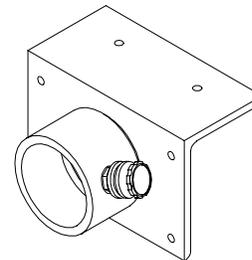


Figure 1-7. Angle Base
Part Number 22-796092

e. **Rigid Base.** The rigid base (Figure 1-8) is a 6" (15.2 cm) square with a non-skid grooved surface secured to a 3" (7.6 cm) standard base. The rigid base provides greater stability than the 3" (7.6 cm) standard base and functions well against solid surfaces.

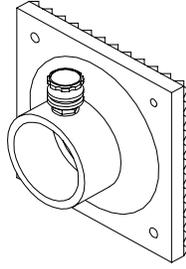


Figure 1-8. Rigid Base
Part Number 22-796070

f. **Swivel Base.** The swivel base (Figure 1-9) is similar to the rigid base but incorporates a swivel cap that can rotate 20° in any direction. The swivel base is utilized in situations where objects to be braced are not in direct alignment with each other or in situations where the possibility of slight load shifting may cause an alteration in the alignment.

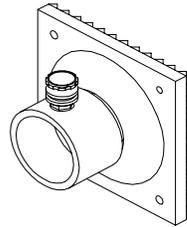


Figure 1-9. Swivel Base
Part Number 22-796060

g. **Hinged Base.** The hinged base (Figure 1-10) is similar to the rigid base except it will pivot 45° from vertical in either direction about the pivot pin axis making the strut an initial safety rake shore at 45°

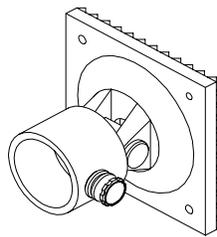


Figure 1-10. Hinged Base
Part Number 22-796140

h. **4" (10.2 cm) x 4" (10.2 cm) Channel Base.** The 4" (10.2 cm) x 4" (10.2 cm) channel base (Figure 1-11) is essentially a 3" (7.6 cm) standard base secured to a 4" (10.2 cm) x 4" (10.2 cm) channel. The channel is 6" (15.2 cm) long x 2-3/4" (7.0 cm) high x 3-1/2" (8.9 cm) wide. The channel base is designed specifically for shoring operations. It fits snugly over 4 x 4 shoring lumber where it can be anchored with screws or nails.

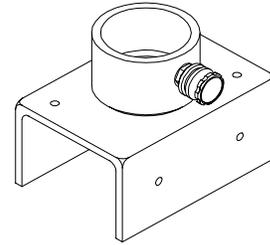


Figure 1-11. 4" (10.2 cm) x 4" (10.2 cm) Channel Base
Part Number 22-796134

i. **6" (15.2 cm) x 6" (15.2 cm) Channel Base.** The 6" (15.2 cm) x 6" (15.2 cm) channel base (Figure 1-12) is essentially a 3" (7.6 cm) standard base secured to a 6" (15.2 cm) x 6" (15.2 cm) channel. The channel is 7" (17.7 cm) long x 4" (10.2 cm) high x 5-1/2" (14.0 cm) wide. The channel base is designed specifically for shoring operations. It fits snugly over 6 x 6 shoring lumber where it can be anchored with screws or nails.

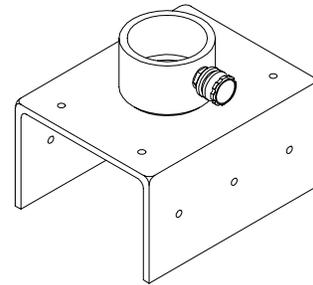


Figure 1-12. 6" (15.2 cm) x 6" (15.2 cm) Channel Base
Part Number 22-796136

j. **Spring Loaded Connector.** The spring loaded connector (Figure 1-13) was developed for use with lockstroke struts. The connector permits snug positioning of a lockstroke strut on a non-yielding surface and maintains strut compression even if slight movement occurs. A coil spring with a travel length of approximately 1/2" (1.3 cm) is used to compensate for the space between the locking grooves on the lockstroke strut.

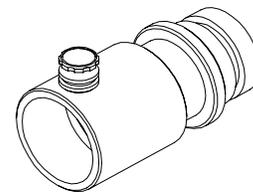


Figure 1-13. Spring Loaded Connector
Part Number 22-796170

k. **Threaded Adjustable Connector.** The threaded adjustable connector (Figure 1-14) was developed for use with lockstroke struts under conditions where any forceful movement could be dangerous. The connector permits final “soft” positioning of a lockstroke strut on a non-yielding surface. A 1/2” (1.3 cm) threaded extension is used to finely adjust and compensate for the space between the locking grooves on the lockstroke strut.

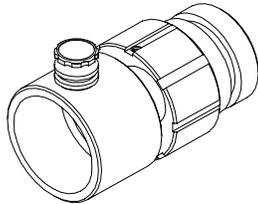


Figure 1-14. Threaded Adjustable Connector
Part Number 22-796160

1-4 RELATIONSHIP OF UNITS.

Refer to figures 1-1 through 1-3 for pictorial illustrations of the lockstroke strut system, the acme thread strut system and the low clearance support system respectively.

1-5 REFERENCE DATA.

Reference data pertaining to the RSS components are summarized for quick reference in table 1-1.

Table 1-1. Reference Data

Manufacturer Paratech, Incorporated
1025 Lambrecht Road
Frankfort, Illinois 60423-1648
CAGE Code30978

LOCKSTROKE STRUT SUPPORTS (With 3” (7.6 cm) Standard Base-Both Ends)

- 16.1" - 22.5" (40.9 cm - 57.2 cm) Support
 - Part Number 22-796006
 - Stroke6" (15.2 cm)
 - Net Weight 10.4 lb (4.7 kg)
- 24.3" - 36.3" (61.7 cm - 92.2 cm) Support
 - Part Number 22-796000
 - Stroke12" (30.5 cm)
 - Net Weight 15.6 lb (7.1 kg)
- 36.2" - 57.8" (92.0 cm - 146.8 cm) Support
 - Part Number 22-796002
 - Stroke24" (61.0 cm)
 - Net Weight 23.2 lb (10.5 kg)
- 55.2" - 90.8" (140.2 cm - 230.6 cm) Support
 - Part Number 22-796004
 - Stroke36" (91.4 cm)
 - Net Weight 37.1 lb (16.8 kg)

ACME THREAD STRUT SUPPORTS (With 3” (7.6 cm) Standard Base-Both Ends)

- 16.2" - 22.1" (41.2 cm - 56.1 cm) Support
 - Part Number 22-796206
 - Stroke 6" (15.2 cm)
 - Net Weight 9.3 lb (4.2 kg)
- 24.6" - 36.3" (62.5 cm - 92.2 cm) Support
 - Part Number 22-796200
 - Stroke11.75" (29.9 cm)
 - Net Weight 14.1 lb (6.4 kg)
- 36.3" - 58.3" (92.2 cm - 148.1 cm) Support
 - Part Number 22-796202
 - Stroke 22" (55.9 cm)
 - Net Weight 21.6 lb (9.8 kg)
- 55.3" - 87.2" (140.5 cm - 221.5 cm) Support
 - Part Number 22-796204
 - Stroke 32" (81.3 cm)
 - Net Weight 35.6 lb (16.2 kg)

STRUT EXTENSIONS

- 12" (30.5 cm) Extension
 - Part Number 22-796012
 - Nominal Diameter 3" (7.6 cm)
 - Net Weight 4.6 lb (2.1 kg)
- 24" (61.0 cm) Extension
 - Part Number 22-796024
 - Nominal Diameter 3" (7.6 cm)
 - Net Weight 7.1 lb (3.2 kg)
- 36" (91.4 cm) Extension
 - Part Number 22-796036
 - Nominal Diameter 3" (7.6 cm)
 - Net Weight 9.7 lb (4.4 kg)
- Extension Converter
 - Part Number 22-796035
 - Nominal Diameter 3" (7.6 cm)
 - Net Weight 2.81 lb (1.28 kg)

LOW CLEARANCE SUPPORT

- 1" (2.5 cm) Rigid Strut
 - Part Number 22-796031
 - Net Weight 3.6 lb (1.6 kg)
- 3" (7.6 cm) Rigid Strut
 - Part Number 22-796032
 - Net Weight 5 lb (2.3 kg)
- 5" (12.7 cm) Rigid Strut
 - Part Number 22-796033
 - Net Weight 6.4 lb (2.9 kg)
- 7" (17.8 cm) Rigid Strut
 - Part Number 22-796034
 - Net Weight 7.7 lb (3.5 kg)

1-6 EQUIPMENT, ACCESSORIES AND DOCUMENTS SUPPLIED.

1-6.1 **EQUIPMENT SUPPLIED.** Data pertaining to the dimensions and weight of the basic RSS are presented in table 1-2.

Table 1-2. Dimensions, Weights and Volumes

Quantity	Item Name or Nomenclature	CID Number RIC Number or Unit Number	Dimensions in Inches (Centimeters)		Overall Weight in Pounds (Kilograms)		Volume in Cubic Inches (Cubic Centimeters)	
			Uncrated	Crated	Uncrated	Crated	Uncrated	Crated
1	Lockstroke Strut	22-796006	15.4 long (39.1) 4 wide (10.2) 4 high (10.2)	17 long (43.2) 6 wide (15.4) 6 high (15.4)	10.4 (4.7)	11 (5)	246 (4,031)	612 (10,029)
1	Lockstroke Strut	22-796000	23.6 long (59.9) 4 wide (10.2) 4 high (10.2)	29 long (73.7) 6 wide (15.4) 6 high (15.4)	15.6 (7.1)	17 (7.7)	378 (6,194)	1,044 (17,108)
1	Lockstroke Strut	22-796002	35.4 long (89.9) 4 wide (10.2) 4 high (10.2)	37 long (94) 6 wide (15.4) 6 high (15.4)	23.2 (10.5)	24 (11)	566 (9,275)	1,332 (21,827)
1	Lockstroke Strut	22-796004	54.5 long (138.4) 4 wide (10.2) 4 high (10.2)	56 long (142) 6 wide (15.4) 6 high (15.4)	37.1 (16.8)	38 (17.2)	872 (14,290)	2,016 (33,036)
1	Acme Thread Strut	22-796206	15.5 long (39.4) 3.3 wide (8.4) 3.3 high (8.4)	17 long (43.2) 4 wide (10.2) 4 high (10.2)	9.3 (4.2)	10 (4.5)	169 (2,766)	272 (4,457)
1	Acme Thread Strut	22-796200	23.9 long (60.7) 3.3 wide (8.4) 3.3 high (8.4)	28 long (71.1) 4 wide (10.2) 4 high (10.2)	14.1 (6.4)	16 (7.2)	260 (4,261)	448 (7,341)
1	Acme Thread Strut	22-796202	35.5 long (90.2) 3.3 wide (8.4) 3.3 high (8.4)	37 long (94) 4 wide (10.2) 5 high (12.7)	21.6 (9.8)	23 (10.4)	387 (6,342)	740 (12,126)

NOTE: Length dimensions assume strut is fully collapsed (retracted).

Table 1-2. Dimensions, Weights and Volumes (Continued)

Quantity	Item Name or Nomenclature	CID Number RIC Number or Unit Number	Dimensions in Inches (Centimeters)		Overall Weight in Pounds (Kilograms)		Volume in Cubic Inches (Cubic Centimeters)	
			Uncrated	Crated	Uncrated	Crated	Uncrated	Crated
1	Acme Thread Strut	22-796204	54.6 long (138.7) 3.3 wide (8.4) 3.3 high (8.4)	56 long (142) 6 wide (15.4) 6 high (15.4)	35.6 (16.2)	37 (17)	595 (9,750)	2,036 (33,036)
1	1" (2.54 cm) Low Clearance Support	22-796031	4 long (10.2) 3 wide (7.62) 3 high (7.62)	5 long (12.7) 4 wide (10.2) 4 high (10.2)	3.6 (1.63)	4.6 (2.09)	28.3 (463)	80 (1,311)
1	3" (7.62 cm) Low Clearance Support	22-796032	6 long (15.24) 3 wide (7.62) 3 high (7.62)	7 long (17.8) 4 wide (10.2) 4 high (10.2)	5 (2.27)	6 (2.72)	42.4 (695)	112 (1,835)
1	5" (12.7 cm) Low Clearance Support	22-796033	8 long (20.3) 3 wide (7.62) 3 high (7.62)	9 long (22.9) 4 wide (10.2) 4 high (10.2)	6.4 (2.9)	7.7 (3.49)	56.55 (927)	144 (2,360)
1	7" (17.78 cm) Low Clearance Support	22-796034	10 long (25.4) 3 wide (7.62) 3 high (7.62)	11 long (28) 4 wide (10.2) 4 high (10.2)	7.7 (3.49)	8.7 (3.95)	70.7 (1,159)	176 (2,884)

1-6.2 **ACCESSORIES SUPPLIED.** No accessories are supplied with RSS. However, the following accessories are designed for use with and are required to obtain full utilization of the Lockstroke Strut and Acme Thread Strut Systems:

a. **Single Pushbutton Controller** - Part Number 22-796100 (Figure 1-15). Single input/single output controller incorporating quick disconnect hose fittings and a bypass valve to permit a constant air flow to the strut when necessary. A pressure gauge is provided to monitor the air pressure applied to the strut and a 250 psi (17.2 bar) relief valve is incorporated to limit the applied air pressure.

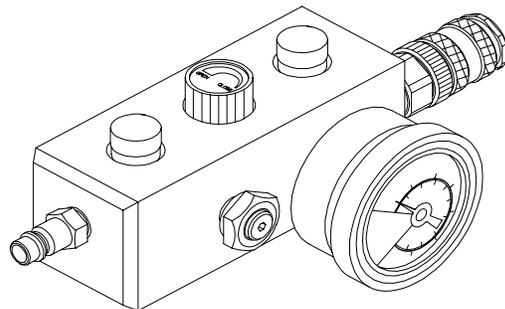


Figure 1-15. Single Pushbutton Controller

b. **Dual Deadman Controller** - Part Number 22-796103 (Figure 1-16). Single input/dual output controller incorporating quick disconnect hose fittings and dual pushbutton controls to apply and release air pressure to either one or two struts. Two gauges are provided to monitor the air pressure applied to either one or two strut(s) and a 250 psi (17.2 bar) relief valve is incorporated to limit the applied air pressure. An adjustable strap permits attachment to the operator.

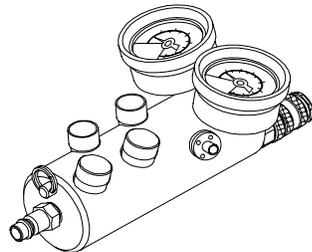


Figure 1-16. Dual Deadman Controller

c. **Pressure Regulator** - Part Number 22-895400 (Figure 1-17). The pressure regulator is a self-contained, direct-acting, pressure-reducing type designed primarily for use with a SCBA (self-contained breathing apparatus) air cylinder. Inlet pressures up to 6,000 psi (413.7 bar) are adjustable to constant working pressures up to 250 psi (17.2 bar). The pressure regulator is designed to mate with a CGA-346/347 adapter fitting.

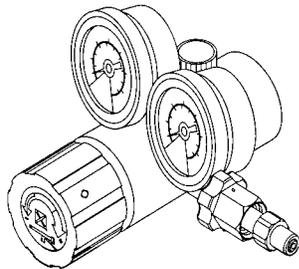


Figure 1-17. Pressure Regulator

d. **Manual Compressor** - Part Number 22-800400 (Figure 1-18). The two cylinder, 49 cubic inch (800 cubic centimeter) manual compressor provides a source of compressed air to extend the strut(s). Incorporated on the compressor is a spring loaded foot pedal, a quick disconnect fitting and a sliding, two-stage valve collar to isolate one cylinder thereby increasing delivered pressure and decreasing delivered volume by a factor of 2.

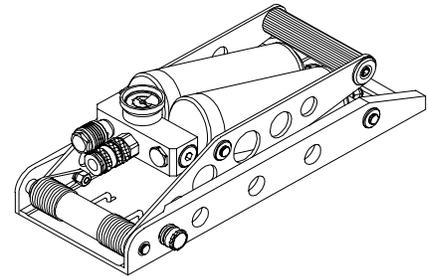


Figure 1-18. Manual Compressor

e. **10 Ton Hydraulic Cylinder and Pump**. The 10 ton hydraulic cylinder and pump is available with either a 4" (10.2 cm) (Part Number 22-796600) or a 6" (15.2 cm) (Part Number 22-796700) stroke. The cylinder is used as an extendible jacking device and is normally installed between extensions and base plates as shown in figure 1-19.

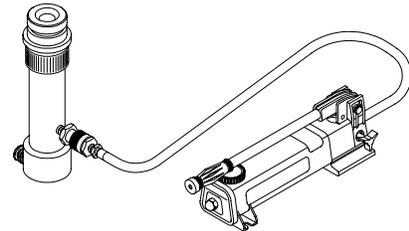


Figure 1-19. 10 Ton Hydraulic Cylinder and Pump

f. **Strut Extensions**. When combined with base plates and/or end plates, strut extensions are designed to function independently as rigid support devices. They also can be integrated with either lockstroke or acme thread struts to add length. Struts are not designed to accept more than two extensions with a total combined length of 36" (91.4 cm). Refer to table 1-1 and figure 1-20.

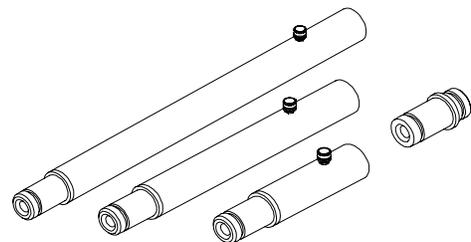


Figure 1-20. Strut Extensions

g. **Air Supply Hose**. Three lengths, each 3/8" (9.5 mm) inside diameter, of air supply hose in a variety of colors (refer to table 1-3) with quick disconnect hose fittings provides the interconnection between the air supply and controller, and the controller and strut(s). The hose is designed for a working pressure of 250 psi (17.2 bar) and a temperature of -40°F (°-40C) to +150°F (°65.6C).

Table 1-3. Air Supply Hose

COLOR	16 FT (5M)	32 FT (10M)	50 FT (15M)
Red	890516	890521	890541
Yellow	890515	890520	890542
Gray	890518	890525	890545
Blue	890514	890523	890543
Black	890513	890522	890546
Green	890517	890524	890544

h. **Ground Plates.** Ground plates are used in conjunction with standard base plates to provide increased load distribution over a greater area. They are used on asphalt, sandy soil and uneven surfaces. The ground plate shown in figure 1-21 is available in 12" (30.5 cm), 14" (35.6 cm) and 16" (40.6 cm) squares.

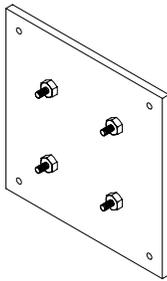


Figure 1-21. Ground Plate

i. **Non-Slip Neoprene Pad.** The 15" (38.1 cm) square x 1" (2.5 cm) thick non-slip neoprene pad shown in figure 1-22 is used on smooth concrete and metal surfaces as well as where water and/or lubricants are present. The pad also eliminates a potential sparking condition in an explosive atmosphere by eliminating metal-to-metal contact in certain strut placements.

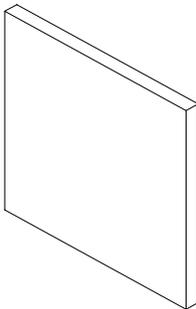


Figure 1-22. Non-Slip Neoprene Pad

j. **Working Air Cylinders.** Three sizes of working air cylinders (figure 1-23) are available to pressurize the RSS; 13 cubic feet (0.4 cubic meters), 50 cubic feet

(1.4 cubic meters) and 80 cubic feet (2.3 cubic meters). The flat bottom and stand-up design permits vertical mounting in a 30" (76.2 cm) compartment.

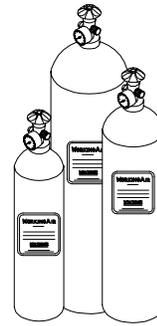


Figure 1-23 Working Air Cylinders

k. **Acme Thread Strut Collar Handle.** The collar handle shown in figure 1-24 provides increased torque to turn the acme thread strut collar in addition to providing a semi-permanent attachment to the collar during a collapse operation. Three sizes of acme thread strut collar handles are available; 4" (10.2 cm), 6" (15.2 cm) and 8" (20.3 cm).

1-6.3 **DOCUMENTS SUPPLIED.** No documents other than this publication and OSHA 1926.650 - 1926.652 subpart P regulations are required as supporting literature for the RSS.

CHAPTER 2 OPERATION

2-1 INTRODUCTION.

The Rescue Support Systems are designed for use in rescue situations involving collapse, containment or stabilization. These situations include such diverse incidents as building collapse, structural containment, rescue from transportation accidents, industrial emergencies, and excavation collapse and containment.

The specific situation requiring use of a RSS will generally determine whether low clearance support(s) alone are required, whether lockstroke strut(s) or acme thread strut(s) alone are required, or whether supports and struts are required to be utilized in combination with each other.

2-2 PREPARATION FOR USE.

2-2.1 LOW CLEARANCE SUPPORT SYSTEM.

- a. Low clearance supports are pre-rescue devices that are used where support is required before rescue work can commence. Refer to paragraph 1-3.4 for the optional base plates available for use with low clearance supports. Low clearance fixed supports

function in conjunction with close clearance lifting devices such as air bags, hydraulic or manual jacks.

- b. Once the proper support configuration is determined and the individual components (rigid strut/extension and base(s) and/or base plug) selected, it is only necessary to clean, where required, the individual components sufficiently to clear them of any contaminants that would prevent their full engagement and proper locking to each other. Refer to Table 2-1 for the overall lengths of low clearance supports when used with various bases and extensions.

2-2.2 LOCKSTROKE AND ACME THREAD STRUT SYSTEMS. (Refer to Figure 2-1 for Typical Hook-Up).

- a. Lockstroke struts consist of extendible struts plus the optional base plates, refer to paragraph 1-3.4, and the strut extensions designated in paragraph 1-6.2.f. The lockstroke extendible strut automatically locks in increments of 0.400" (1 cm). This feature permits the comparatively coarse extension and hands free locking of the lockstroke support system from a remote location.

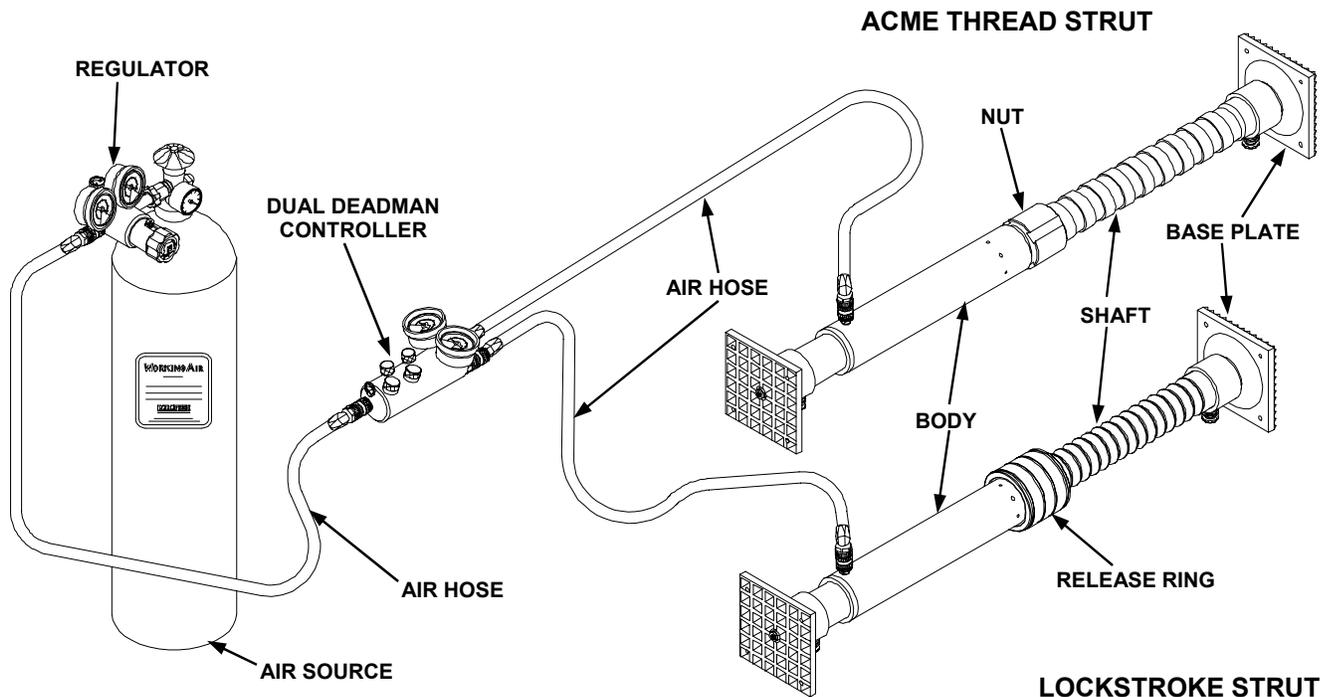


Figure 2-1. Typical Rescue Support System Hook-Up

Table 2-1 Low Clearance Supports Overall Lengths

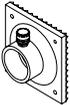
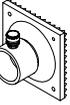
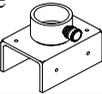
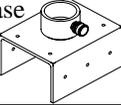
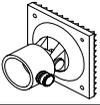
OVERALL HEIGHT USING:	RIGID STRUTS				EXTENSIONS WITH CONVERTER		
	1" (2.54 cm)	3" (7.62 cm)	5" (12.7 cm)	7" (17.78 cm)	12" (30.48 cm)	24" (61.96 cm)	36" (91.44 cm)
Rigid Base 	6.3" (16.00 CM)	8.3" (21.08 CM)	10.3" (26.16 CM)	12.3" (31.24 cm)	14.3" (36.32 cm)	26.3" (66.80 cm)	38.3" (97.28 cm)
Swivel Base 	9.3" (23.62 cm)	11.3" (28.70 cm)	13.3" (33.78 cm)	15.4" (39.12 cm)	16.3" (41.40 cm)	28.3" (71.88 cm)	40.3" (102.36 cm)
Angle Base 	6.5" (16.51 cm)	8.5" (21.59 cm)	10.5" (26.67 cm)	12.5" (31.75 cm)	13.5" (34.29 cm)	25.5" (64.77 cm)	37.5" (95.25 cm)
V-Base 	8.9" (22.61 cm)	10.9" (27.69 cm)	12.9" (32.77 cm)	14.9" (37.85 cm)	15.9" (40.39 cm)	27.9" (70.87 cm)	39.9" (101.35 cm)
3" Standard Base 					13" (33.02 cm)	25" (63.50 cm)	37" (93.98 cm)
Cone Base 					14.5" (36.83 cm)	26.5" (67.31 cm)	38.5" (97.79 cm)
4x4 Channel Base 					16.8" (42.67 cm)	28.8" (73.15 cm)	40.8" (103.63 cm)
6X6 Channel Base 					16.8" (42.67 cm)	28.8" (73.15 cm)	40.8" (103.63 cm)
Hinged Base 					21.7" (55.12 cm)	33.7" (85.60 cm)	45.7" (116.08 cm)

Table 2-2 Minimum - Maximum Lengths of Struts with Assorted Bases

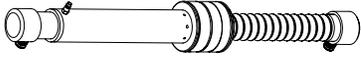
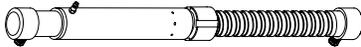
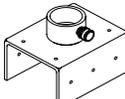
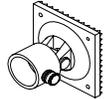
MIN. - MAX LENGTH	LOCKSTROKE STRUT				ACME THREAD STRUT			
								
USING:	22-796006 6" Stroke	22-79600 12" Stroke	22-796002 24" Stroke	22-796004 36" Stroke	22-796206 6" Stroke	22-796200 12" Stroke	22-796202 24" Stroke	22-796204 36" Stroke
No Bases	15.3 - 21.8 (39.1 - 55.4)	23.6 - 35.6 (59.9 - 90.4)	35.4 - 57.1 (89.9 - 145.0)	54.5 - 90.1 (138.4 - 228.8)	15.5 - 21.4 (39.4 - 54.4)	23.9 - 35.5 (60.7 - 90.2)	35.5 - 57.5 (90.2 - 146.1)	54.6 - 86.5 (138.7 - 219.7)
Rigid Base 	17.4 - 23.8 (44.1 - 60.4)	25.6 - 37.6 (65.0 - 95.5)	37.4 - 59.1 (95.1 - 150.0)	56.5 - 92.1 (143.5 - 233.9)	17.5 - 23.4 (44.3 - 59.4)	25.9 - 37.5 (65.7 - 95.3)	37.5 - 59.5 (95.4 - 151.2)	56.6 - 88.5 (143.7 - 224.7)
Swivel Base 	19.4 - 25.8 (49.3 - 65.6)	27.6 - 39.6 (70.1 - 100.6)	39.5 - 61.1 (100.2 - 155.2)	58.5 - 94.1 (148.6 - 239.1)	19.5 - 25.4 (49.5 - 64.6)	27.9 - 39.5 (70.9 - 100.4)	39.6 - 61.6 (100.5 - 156.4)	58.6 - 90.5 (148.9 - 229.9)
Angle Base 	15.5 - 21.9 (39.4 - 55.6)	23.7 - 35.7 (60.2 - 90.7)	35.6 - 60.8 (90.3 - 154.5)	54.6 - 90.2 (138.7 - 229.2)	15.6 - 21.5 (39.6 - 54.6)	24.0 - 35.6 (61.0 - 90.5)	35.7 - 57.7 (90.6 - 146.5)	54.7 - 86.6 (139.0 - 220.0)
V-Base 	19.0 - 25.4 (48.4 - 64.6)	27.2 - 39.2 (69.2 - 99.7)	39.1 - 60.7 (99.3 - 154.2)	58.1 - 93.8 (147.7 - 238.1)	19.1 - 25.0 (48.5 - 63.6)	27.5 - 39.2 (69.9 - 99.5)	39.2 - 61.2 (99.6 - 155.5)	58.2 - 90.1 (147.9 - 229.0)
3" Standard Base 	16.1 - 20.5 (41.0 - 57.2)	24.3 - 36.3 (61.8 - 92.2)	36.2 - 57.8 (91.9 - 146.8)	55.2 - 90.4 (140.3 - 230.7)	16.2 - 22.1 (41.2 - 56.2)	24.6 - 36.3 (62.5 - 92.1)	36.3 - 58.3 (92.2 - 148.1)	55.0 - 87.2 (140.5 - 221.6)
Cone Base 	18.4 - 24.8 (46.7 - 62.9)	26.6 - 38.6 (67.5 - 98.0)	38.4 - 60.1 (97.6 - 152.5)	57.5 - 93.1 (146.0 - 236.5)	18.5 - 24.4 (46.9 - 61.9)	26.9 - 38.5 (68.3 - 97.8)	38.5 - 60.5 (97.9 - 153.8)	57.6 - 90.1 (147.9 - 227.3)
4" X 4" Channel Base 	16.5 - 22.9 (42.0 - 58.2)	24.7 - 36.7 (62.8 - 93.3)	36.6 - 58.2 (93.9 - 147.8)	55.6 - 91.2 (141.3 - 231.7)	16.6 - 22.5 (42.1 - 57.2)	25.0 - 36.6 (63.5 - 93.1)	36.7 - 58.7 (93.2 - 149.1)	55.7 - 87.6 (141.5 - 222.6)
6" X 6" Channel Base 	16.5 - 22.9 (42.0 - 58.2)	24.7 - 36.7 (62.8 - 93.3)	36.6 - 58.2 (93.9 - 147.8)	55.6 - 91.2 (141.3 - 231.7)	16.6 - 22.5 (42.1 - 57.2)	25.0 - 36.6 (63.5 - 93.1)	36.7 - 58.7 (93.2 - 149.1)	55.7 - 87.6 (141.5 - 222.6)
Hinged Base 	21.6 - 28.0 (54.9 - 71.1)	29.8 - 41.8 (75.7 - 106.2)	41.7 - 63.3 (105.8 - 160.7)	60.7 - 96.3 (154.2 - 244.6)	21.7 - 27.6 (55.0 - 70.1)	30.1 - 41.7 (76.4 - 106.0)	41.8 - 63.8 (106.1 - 162.0)	60.8 - 92.7 (154.4 - 235.5)

Table 2-1 Low Clearance Supports Overall Lengths

- b. Acme thread struts consist of extendible struts plus the optional base plates, refer to paragraph 1-3.4, and the strut extensions designated in paragraph 1-6.2.f. The design of the acme thread strut permits placement with sensitive “soft” positioning, and locking at an infinite number of extended positions within the range of the strut.
- c. Once the proper support configuration is determined and the individual components (extendible strut, extension, if necessary, and base plates) selected, it is only necessary to clean, where required, the individual components (strut components in addition to pressurizing components) sufficiently to clear them of any contaminants that would prevent their full engagement and proper locking to each other.



Do not use any accessory that exhibits an air leakage condition. Any reduction of air pressure could result in collapse and endangerment of personnel.

- d. Depending upon the optional accessories being used, inspect the inlet and outlet fittings on the interconnecting hoses, pressure regulator, single pushbutton controller/dual deadman controller and manual compressor/air cylinder for any damage that will permit air leakage. Do not use any accessory that exhibits an air leakage condition.
- e. If using an optional pressure regulator, close the outlet shut-off valve assembly and turn the adjusting knob assembly full counterclockwise to close the internal needle valve (no flow through the pressure regulator).
- f. If using an optional single pushbutton controller/dual deadman controller, depress the "DOWN" pushbuttons to prevent flow through the controller.
- g. Connect the pressure regulator to the optional manual compressor/air cylinder. Be sure the hand tightening knob/nut on the pressure regulator is tightened sufficiently to prevent leakage.
- h. Connect the desired length delivery hose to the pressure regulator outlet quick disconnect delivery nipple and the single pushbutton controller/dual deadman controller inlet quick disconnect delivery nipple. Be sure each quick disconnect mechanism is fully engaged and locked in position to assure a leak-free connection.
- i. Connect one or two desired length delivery hose(s) to the single pushbutton controller/dual deadman controller outlet quick disconnect delivery nipple(s). Be sure each quick disconnect mechanism is fully engaged and locked in position to assure a leak-free connection. Do not connect the lockstroke/acme thread strut(s) inlet quick disconnect delivery nipple(s) to the delivery hose(s) until the complete configuration of the strut(s) is determined, the components assembled and the assembled strut is ready for placement.

2-3 CONTROLS AND INDICATORS.

2-3.1 **CONTROLS.** No controls are used on any components of any RSS. However, the optional accessories required for use in conjunction with the RSS do contain the operational controls indicated below:

- a. **Manual Compressor.** The only controls on the manual compressor are the foot lever used to deliver pressure and a lever that permits isolating one of the two cylinders thereby increasing the delivered pressure and decreasing the delivered volume by a factor of 2.
- b. **Air Bottle.** The only control on the air bottle is the shut-off valve that permits or prevents the flow of compressed air
- c. **Pressure Regulator.** The only controls on the pressure regulator are the shut-off valve assembly and the pressure adjusting knob assembly. The shut-off valve assembly is either opened to permit regulated delivery air to pressurize the system or closed to prevent (seal off) regulated delivery air from pressurizing the system. The pressure adjustment knob is turned to control the delivery pressure up to 300 psi (20.7 bar) maximum.
- d. **Single Pushbutton Controller.** The only controls on the single pushbutton controller are the "UP" and "DOWN" control valve assemblies. The control valve assemblies are either independently opened ("UP") to permit regulated air to pressurize the strut or closed ("DOWN") to relieve system air and prevent regulated air from pressurizing the system. Each of the "UP" and "DOWN" shut-off valve assemblies operate independent of the other thereby permitting the application and release of air pressure to and from the strut.

e. **Dual Deadman Controller.** The only controls on the dual deadman controller are the two "UP" and "DOWN" control valve assemblies. The control valve assemblies are either independently opened ("UP") to permit regulated air to pressurize the struts or closed ("DOWN") to relieve system air and prevent regulated air to pressurize the struts or closed ("DOWN") to relieve system air and prevent regulated air from pressurizing the system. Each pair of "UP" and "DOWN" shut-off valve assemblies operate independent of the other thereby permitting the application and release of air pressure to and from the struts.

f. **10 Ton Hydraulic Cylinder and Pump.** The only control on the 10 ton hydraulic cylinder is the pump handle used to deliver pressure.

2-3.2 **INDICATORS.** No indicators are used on any components of any RSS. However, the optional accessories required for use in conjunction with the RSS do contain the operational controls indicated below:

a. **Pressure Regulator.** Two pressure gauges are provided; the supply pressure gauge and the delivery pressure gauge. The supply pressure gauge is marked in 1000 psi increments from 1000 psi to 6000 psi and is scribed each 200 psi. The supply pressure gauge is also marked each 10,000 kPa from 10,000 kPa to 40,000 kPa and is scribed each 1000 kPa. The delivery pressure gauge is marked in 50 psi increments from 50 psi to 400 psi and is scribed each 10 psi.

b. **Single Pushbutton Controller.** A delivery pressure gauge is provided for the "UP"/"DOWN" control valve assembly. The gauge is marked in 20 psi increments from 0 psi to 400 psi and is scribed each 10 psi. The pressure gauge is also marked each 400 kPa from 0 to 2800 kPa and is scribed each 50 kPa.

c. **Dual Deadman Controller.** Two delivery pressure gauges are provided; one associated with each "UP"/"DOWN" control valve assembly; one therefore each of two struts. Each gauge is marked in 50 psi increments from 0 psi to 400 psi and is scribed each 10 psi. The pressure gauge is also marked each 400 kPa from 0 to 2800 kPa and is scribed each 50 kPa.

d. **Manual Compressor.** A delivery pressure gauge is provided on the manual compressor. The gauge is marked in 20 psi increments from 0 psi to 200 psi and is scribed each 2 psi.. The pressure gauge is also marked each 200 kPa from 0 to 1400 kPa and is scribed each 20 kPa.

e. **Air Bottle.** A supply pressure gauge is provided on the air bottle. The gauge is marked in 500 psi increments from 500 psi to 4000 psi and is scribed each 500 psi.

2-4 NORMAL OPERATING PROCEDURE.

2-4.1 LOW CLEARANCE SUPPORTS.

a. Determine the proper support configuration and select the individual components (rigid strut and base(s) and/or base plug) necessary to achieve the desired configuration and height. Refer to table 2-1 for examples of the possible support configurations.

b. Pull out the lock pin assembly knob on the selected base plate to retract the lock pin. Fully engage the components and then release the knob to lock the components together.

c. If required, secure the base plate(s) to any wood blocking being used.

d. Place the low clearance support in the desired position between the surfaces to be held apart and repeat steps a., b. and c. until all low clearance supports are in position and the close clearance lifting device(s) such as air bags, hydraulic or manual jacks can be repositioned/ removed in preparation for the placement of additional low clearance supports.

2-4.2 LOCKSTROKE AND ACME THREAD STRUTS.

a. Determine the proper support configuration and select the individual components (extendible lockstroke and/or acme thread struts, strut extensions and base plates) necessary to achieve the desired configuration and height/extension. Refer to figure 2-2 for examples of the possible strut configurations.

b. Pull out the lock pin assembly knob on the selected base plate to retract the lock pin. Fully engage the components and then release the knob to lock the components together.

c. If required, secure the base plate(s) with nails, screws or bolts to any wood blocking being used.

d. Place the lockstroke strut or acme thread strut in the desired position between the surfaces to be held apart. If a safe and stable condition exists, manually extend the strut until the base plates are in contact with the surfaces to be held apart. If an unstable

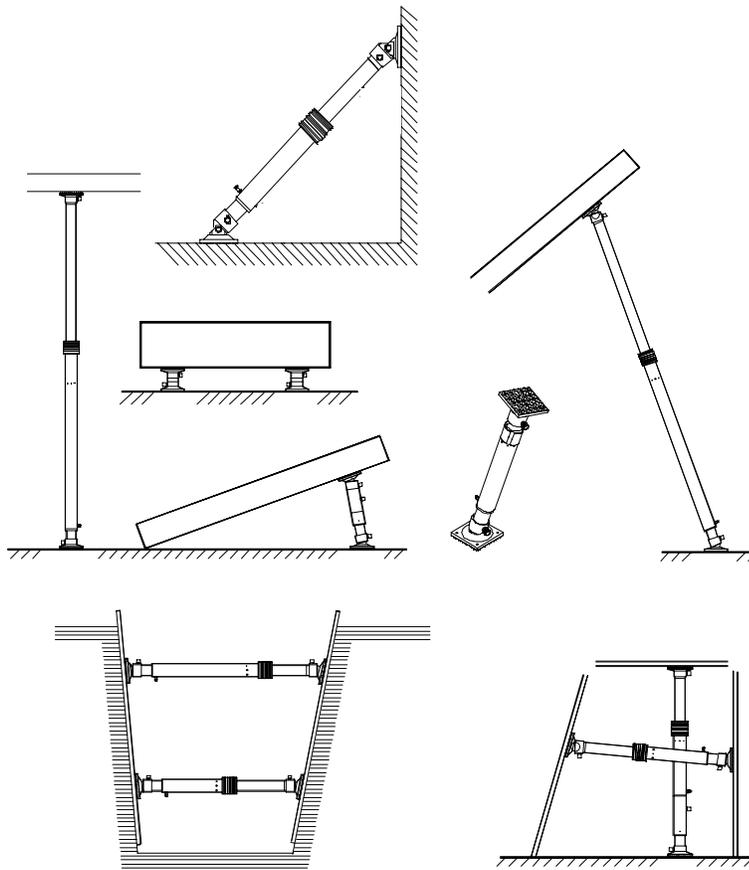
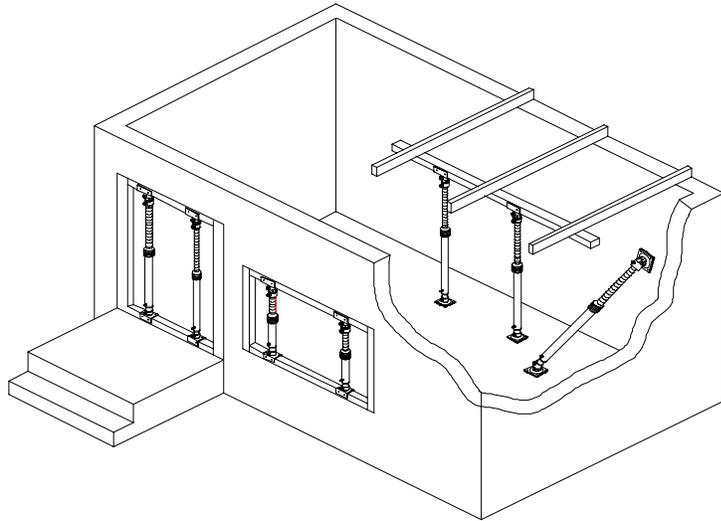


Figure 2-2. Typical Rescue Support System Applications

condition exists, permit air pressure alone to extend the strut.

- e. If a compressed air cylinder is being used, slowly open the air cylinder supply to the pressure regulator and follow steps f. through k. The supply pressure will be indicated on the air cylinder as well as the

pressure regulator supply pressure gauge. If a manual compressor is being used, interconnect the manual compressor and lockstroke strut/acme thread strut.

WARNING

Do not adjust the pressure regulator to exceed the maximum pressure rating of any component in the system apparatus.

- f. Slowly turn the pressure adjusting knob on the pressure regulator to obtain the desired regulated pressure to the single pushbutton controller/dual deadman controller as well as the lockstroke strut/acme thread strut. Make the final adjustment in the increase direction to provide the most accurate and consistent pressure settings.
- g. Open the delivery shut-off valve assembly on the pressure regulator to supply delivery air to the single pushbutton controller/dual deadman controller. The delivery pressure should indicate the regulated pressure set in preceding step f.
- h. **For a Lockstroke Strut.** Slowly press the green UP pushbutton on the single pushbutton controller/dual deadman controller until it is fully depressed to slowly extend the lockstroke strut. If rapid, forceable extension of the lockstroke strut is desired, press the UP pushbutton rapidly and fully. The strut will lock in 1/4" (0.6 cm) increments as it extends. When the strut is extended to its constrained length, press the red DOWN pushbutton to release air pressure from the strut.
- i. **For an Acme Thread Strut.** Slowly press the green UP pushbutton on the single pushbutton controller/dual deadman controller until it is fully depressed to slowly extend the acme thread strut. If rapid, forceable extension of the acme thread strut is desired, press the UP pushbutton rapidly and fully. The threaded portion of the strut and collar will extend and the base plates will exert force ("bite") against the work surfaces. When the strut is extended to its constrained length, manually turn the collar down the acme threaded shaft until it contacts the outer tube in order to lock the strut in its extended position. Press the red DOWN pushbutton to release air pressure from the strut.
- j. To stop providing delivery air to the lockstroke strut/acme thread strut, turn the air tank or pressure regulator delivery shut-off valve to the closed position or disconnect the air hose from the strut.
- k. Repeat steps a. through j. until all lockstroke struts or acme thread struts are in position.

2-5 TAKEDOWN.

- a. **For a Lockstroke Strut.** Take down and repositioning is accomplished by removing the load pressure and then manually operating the release ring to permit collapsing of the strut. If during take down, a load shift begins to forcibly collapse the strut, simply letting go of the release ring will again lock the strut in the extended position at the time the release ring was released.
- b. **For an Acme Thread Strut.** Take down and repositioning is accomplished by removing the load pressure and then manually turning the nut up the inner shaft. If during release, a load shift begins to forcibly collapse the strut, simply releasing the nut will again lock the strut in that extended position where the nut was released.
- c. **Bound Strut(s).** On occasion, load pressure may prevent either one or more lockstroke or acme thread strut(s) from being taken down (Figure 2-3A). When this occurs, an evaluation must be made to determine the safety of such removal. Before removing a bound strut(s) determine whether the bound strut(s) can be replaced with a more permanent strut(s) such as a timber or metal beam. If so, and safety will not be compromised, cut the permanent strut(s) to the proper replacement size. Then assemble a "takedown" strut using a combination of lockstroke or acme thread strut(s), extension(s) and a hydraulic cylinder that will fit next to the strut to be removed (Figure 2-3B). Extend the hydraulic cylinder until the bound strut can be removed (Figure 2-3C) and the permanent strut (timber or metal beam) inserted in its place (Figure 2-3D). Lower the hydraulic cylinder until the load rests on the permanent strut (Figure 2-3E). Repeat this procedure for each bound strut.

2-6 SHUTDOWN.

- a. At the conclusion of use, close the air cylinder supply valve.
- b. Disconnect the interconnecting hoses from their mating quick disconnects on the struts, controller and pressure regulator. Disconnect the air cylinder from the pressure regulator.
- c. Perform the after use maintenance specified in chapter 3.

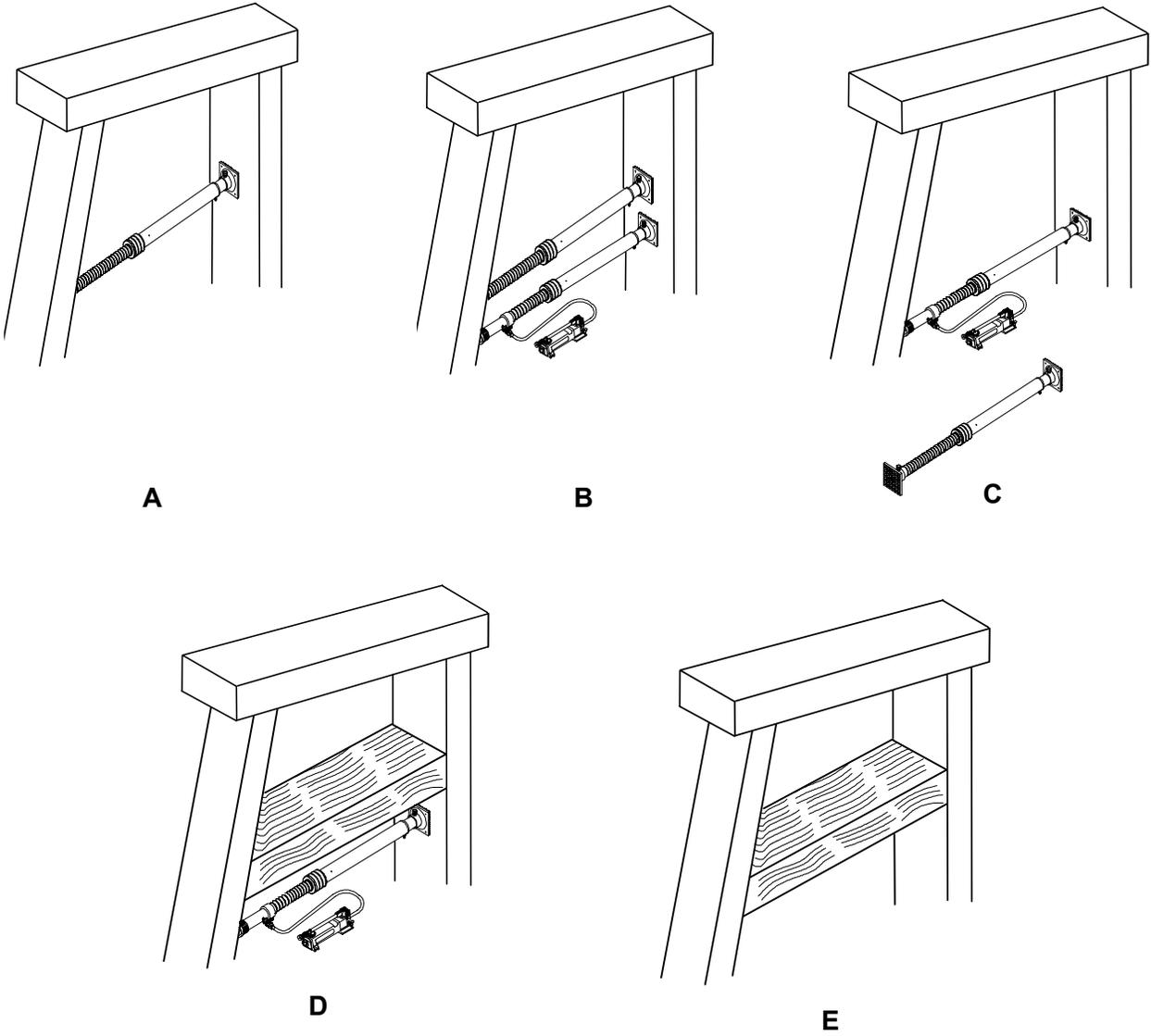


Figure 2-3. Bound Strut Removal

2-7. CAPACITIES AND SAFETY LIMIT CHARTS.

2-7.1 ACTIVATION FORCE. The lockstroke and acme thread struts have an axial crush strength in excess of 50,000 pounds (22,680 kg). When pneumatically activated, the struts will exert the forces in Table 2-3.

Table 2-3. Activation Force

Activation Pressure PSI (Bar)	Force Lb (kg)
50 (3.4)	245 (111)
100 (6.9)	491 (223)
150 (10.3)	736 (334)
200 (13.8)	982 (445)
250 (17.2)	1227 (557)

2-7.2 SPACING CHARTS. When used as horizontal struts for trench collapse work, refer to Tables 2-4 through 2-6 to determine maximum spacing.

Table 2-5. Trench Work Collapse Spacing Chart
Type B Soils

Depth of Trench	Vertical Spacing	Width of Trench			
		Up to 4 ft. (1.2 m)	Over 4 ft. (1.2 m) To 6 ft. (1.8 m)	Over 6 ft. (1.8 m) To 8 ft. (2.4 m)	Over 8 ft. (2.4 m) To 10 ft. (3 m)
Horizontal Spacing					
Over 5 ft. (1.5 m)	4 ft. (1.2 m)	8 ft. (2.4 m)	8 ft. (2.4 m)	5 ft. (1.5 m)	6 ft. * (1.8 m)
Up to 10 ft. (3 m)	3 ft. (0.9 m)	8 ft. (2.4 m)	8 ft. (2.4 m)	6.5 ft. (2 m)	4 ft. * (1.2 m)
Over 10 ft. (3 m)	4 ft. (1.2 m)	8 ft. (2.4 m)	6 ft. (1.8 m)	3 ft. (0.9 m)	4 ft. * (1.2 m)
Up to 15 ft. (4.6 m)	3 ft. (0.9 m)	8 ft. (2.4 m)	8 ft. (2.4 m)	4 ft. (1.2 m)	3 ft. (0.9 m)
Over 15 ft. (4.6 m)	4 ft. (1.2 m)	8 ft. (2.4 m)	4.5 ft. (1.4 m)	5 ft. * (1.5 m)	
Up to 20 ft. (6.1 m)	3 ft. (0.9 m)	8 ft. (2.4 m)	6 ft. (1.8 m)	3.5 ft. (1.1 m)	4.5 ft. * (1.4 m)

Table 2-4. Trench Work Collapse Spacing Chart
Type A Soils

Depth of Trench	Vertical Spacing	Width of Trench			
		Up to 4 ft. (1.2 m)	Over 4 ft. (1.2 m) To 6 ft. (1.8 m)	Over 6 ft. (1.8 m) To 8 ft. (2.4 m)	Over 8 ft. (2.4 m) To 10 ft. (3 m)
Horizontal Spacing					
Over 5 ft. (1.5 m)	4 ft. (1.2 m)	8 ft. (2.4 m)	5.5 ft. (1.7 m)	3 ft. (0.9 m)	4 ft. * (1.2 m)
Up to 10 ft. (3 m)	3 ft. (0.9 m)	8 ft. (2.4 m)	7.5 ft. (2.3 m)	4 ft. (1.2 m)	5 ft. * (1.5 m)
Over 10 ft. (3 m)	4 ft. (1.2 m)	7.5 ft. (2.3 m)	3.5 ft. (1.1 m)	4 ft. * (1.2 m)	
Up to 15 ft. (4.6 m)	3 ft. (0.9 m)	8 ft. (2.4 m)	5 ft. (1.5 m)	5 ft. * (1.5 m)	3.5 ft. * (1.1 m)
Over 15 ft. (4.6 m)	4 ft. (1.2 m)	5.5 ft. (1.7 m)	2.5 ft. (0.8 m)	3 ft. * (0.9 m)	
Up to 20 ft. (6.1 m)	3 ft. (0.9 m)	7.5 ft. (2.3 m)	3.5 ft. (1.1 m)	4 ft. * (1.2 m)	

* Use 2 struts together

NOTE: A strut must be within 2 ft (0.6 m) of the top and bottom of the trench. Use 150 psi (10.3 Bar) installation pressure. For Table 2-4 (Type A Soil) and 200 psi (13.8 Bar) installation pressure for Table 2-5 (Type B Soils).

Table 2-6. Trench Work Collapse Spacing Chart
Type C Soils

Depth of Trench	Vertical Spacing	Width of Trench			
		Up to 4 ft. (1.2 m)	Over 4 ft. (1.2 m) To 6 ft. (1.8 m)	Over 6 ft. (1.8 m) To 8 ft. (2.4 m)	Over 8 ft. (2.4 m) To 10 ft. (3 m)
		Horizontal Spacing			
Over 5 ft. (1.5 m)	4 ft. (1.2 m)	7 ft. (2.1 m)	3 ft. (0.9 m)	3.8 ft. * (1.2 m)	
Up to 10 ft. (3 m)	3 ft. (0.9 m)	8 ft. (2.4 m)	4.5 ft. (1.4 m)	2.5 ft. (0.8 m)	3 ft. * (0.9 m)
Over 10 ft. (3 m)	4 ft. (1.2 m)	4.5 ft. (1.4 m)	4 ft. * (1.2 m)		
Up to 15 ft. (4.6 m)	3 ft. (0.9 m)	6 ft. (1.8 m)	3 ft. (0.9 m)	3 ft. * (0.9 m)	
Over 15 ft. (4.6 m)	4 ft. (1.2 m)	3 ft. (0.9 m)	3 ft. * (0.9 m)		
Up to 20 ft. (6.1 m)	3 ft. (0.9 m)	4 ft. (1.2 m)	4 ft. * (1.2 m)		

* Use 2 struts together

NOTE: A strut must be within 2 ft (0.6 m) of the top and bottom of the trench. Spacing is based on using wales with a section modulus of 3.5 cu in. (57.4 cu cm). Use 250 psi (17.2 Bar) installation pressure.

2-7.3. **LOAD CHART.** Each strut, depending on its length, has a maximum axial working load capacity of 20,000 pounds (9090 kg) to 3,500 pounds (1590 kg). When used for collapse/rescue stabilization, refer to Table 2-7 for capacity by length of strut.

Table 2-7. Collapse/Rescue Working Load Chart

Length of Strut Ft (Cm)	Working Load Lb (Kg)
2 (61)	20000 (9072)
3 (91)	20000 (9072)
4 (122)	20000 (9072)
5 (152)	13600 (6169)
6 (183)	9650 (4377)
7 (213)	7100 (3220)
8 (244)	5400 (2449)

NOTE: As the length of the strut increases, the working load decreases due to the ratio of the diameter to the length.

CHAPTER 3
SCHEDULED MAINTENANCE

3-1 INTRODUCTION.

The major components of the RSS and accessories require little maintenance to ensure optimum performance. This chapter provides preventative maintenance procedures.

3-2 MAINTENANCE PLAN.

Preventative maintenance of the RSS is accomplished in accordance with the RSS maintenance schedule, Table 3-1.

3-3 GENERAL MAINTENANCE.

3-3.1 GENERAL.

General maintenance shall be performed as detailed in this chapter using the maintenance schedule in Table 3-1. This chapter will provide the step-by-step procedures that are necessary to verify that the RSS and its accessories are operating satisfactorily.

3-3.2 SURFACE CLEANING.

- a. Keep the exterior of all components clean of all dirt, grit, oil and grease accumulations. Wipe exterior surfaces with a lint-free cotton machinery wiping towel lightly dampened with clean water. Then dry the surfaces thoroughly with a clean, dry lint-free cotton machinery wiping towel or low pressure compressed air. Compressed air may be used for cleaning in less accessible areas.

3-3.3 INSPECTION.

- a. Do not paint any of the RSS components. Check for loose hardware and cracked or deformed parts. Check for O-ring seal leakage while the system is pressurized.
- b. During operation, verify the delivery pressure gauge (s) reads a relatively constant pressure regardless of the inlet pressure and flow rate. Also check for air leakage around any connection or main housing fitting. Any leakage of air at these mating interfaces denotes either a loose connection or a defective O-ring seal that necessitates replacement.
- c. If during the last three (3) months struts and ancillary equipment have not been used for training or collapse incidents they should be field tested to ensure they do not leak and are fully operational in preparation for their next use.

3-3.4 LOCKING PIN ASSEMBLY REPLACEMENT.

To replace the locking pin assembly, pull up and turn the locking pin knob to expose the bonnet. Use a wrench on the bonnet hex and unscrew the defective locking pin assembly. Thread in by hand the replacement locking pin assembly, then pull up and turn the locking pin knob to expose the bonnet and use a wrench on the bonnet hex to fully tighten the locking pin assembly.

Table 3-1. Maintenance Schedule

Frequency	Maintenance Requirement	Applicable Paragraph
During Use	Check for erratic movement of the delivery pressure gauge needle. Check for air leakage at all connections and from all components.	3-3.3
After Use	Clean all dust, dirt , oil and grease from the RSScomponents and accessories.	3-3.2
Quarterly	If not used periodically for training or collapse incidents, the full complement of equipment shall be field tested to ensure its integrity and flawless operational capability.	2-4

CHAPTER 4 PARTS LIST

4-1 INTRODUCTION.

This chapter lists available standard and optional parts for the Lockstroke Strut, Acme Thread Strut and Low Clearance Support Rescue Support Systems. The parts list is used to identify and locate all repair parts, including all attaching hardware supplied. The parts should be ordered by part number when ordered from Paratech Incorporated, 1025 Lambrecht Road, Frankfort, Illinois 60423-1648.

4-2 LIST OF MAJOR COMPONENTS.

The Lockstroke Strut, Acme Thread Strut and Low Clearance Support Rescue Support Systems are comprised essentially of detail parts and contain no major components.

4-3 PARTS LIST TABLES.

The Lockstroke Strut, Acme Thread Strut and Low Clearance Support Rescue Support Systems parts are listed in tables 4-1 through 4-4. The tables contain five columns which are described below:

4-3.1 FIGURE AND INDEX NUMBER COLUMN. This column shows the figure and index number of each part listed. Tables 4-1 through 4-3 relate to illustrations contained in chapter 4. The index numbers which identify the individual parts are separated from the figure number by a hyphen. Index numbers run consecutively.

4-3.2 DESCRIPTION COLUMN. The DESCRIPTION column describes each part (by noun name and modifiers) in sufficient detail for clarity. Descriptions are successively indented to the right to show assembly and part relationship.

4-3.3 QUANTITY COLUMN. Quantities specified in the QUANTITY column are the total number of each part required per assembly.

4-3.4 CAGE COLUMN. The assembly and parts are identified by a five digit code. These code numbers are in accordance with Federal Supply Cataloging Handbook H-4-1. A cross reference between these codes and the manufacturer's is shown in table 4-5.

4-3.5 PART NUMBER COLUMN. The part number column contains an identifying number for each part listed. Vendor numbers are shown where applicable.

4-4 LIST OF MANUFACTURERS.

A list of all manufacturers' code numbers used in the parts list is shown in table 4-5. These codes are in accordance with Federal Supply Cataloging Handbook H-4-1.

Table 4-1. Lockstroke Strut Parts List

Figure and Index Number	Description	Quantity	CAGE	Part Number
4-1-	LOCKSTROKE STRUT, 16" - 22" (40.6 cm - 55.9 cm).....	1	30978	22-796006
4-1-	LOCKSTROKE STRUT, 24" - 36" (61.0 cm - 91.4 cm).....	1	30978	22-796000
4-1-	LOCKSTROKE STRUT, 36" - 58" (91.4 cm - 147.3 cm).....	1	30978	22-796002
4-1-	LOCKSTROKE STRUT, 55" - 91" (139.7 cm - 231.1 cm).....	1	30978	22-796004
	. HOUSING TUBE ASSEMBLY (Used on 16" - 22" strut only)	1	30978	22-796052
	. HOUSING TUBE ASSEMBLY (Used on 24" - 36" strut only)	1	30978	22-796040
	. HOUSING TUBE ASSEMBLY (Used on 36" - 58" strut only)	1	30978	22-796041
	. HOUSING TUBE ASSEMBLY (Used on 55" - 91" strut only)	1	30978	22-796043
-1	. . END COVER, Tube	1	30978	22-796067
-2	. . O-RING SEAL	1	30978	22-796049
-3	. . NIPPLE, Quick connect.....	1	30978	22-796065
-4	. . TUBE, Housing (Used on 16" - 22" strut only)	1	30978	22-796045
-4	. . TUBE, Housing (Used on 24" - 36" strut only)	1	30978	22-796046
-4	. . TUBE, Housing (Used on 36" - 58" strut only)	1	30978	22-796047
-4	. . TUBE, Housing (Used on 55" - 91" strut only)	1	30978	22-796048
	. LOCKSTROKE ASSEMBLY	1	30978	22-796120
-5	. . RING, Release	1	30978	22-796128
-6	. . SPRING.....	1	30978	22-796132
-7	. . RING, Housing	1	30978	22-796122
-8	. . RING, Pressure	1	30978	22-796124
-9	. . BALL, Chrome, 11/32" (0.9 cm)diameter	36	30978	22-550077
-10	. . RING, Unlocking.....	1	30978	22-796126
-11	. O-RING SEAL.....	1	30978	22-796018
-12	. SHAFT, Grooved (Used on 16" - 22" strut only)	1	30978	22-796055
-12	. SHAFT, Grooved (Used on 24" - 36" strut only)	1	30978	22-796056
-12	. SHAFT, Grooved (Used on 36" - 58" strut only)	1	30978	22-796057
-12	. SHAFT, Grooved (Used on 55" - 91" strut only)	1	30978	22-796058

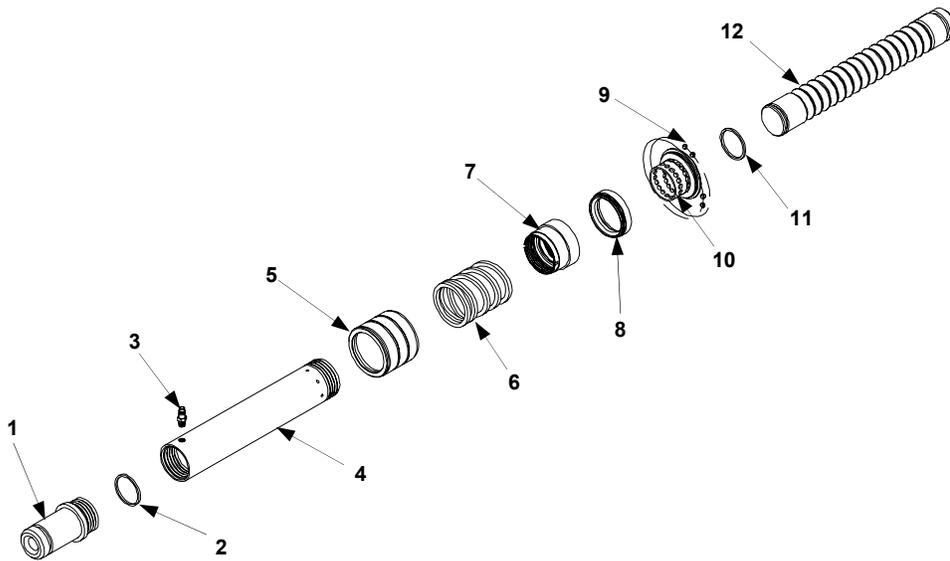


Figure 4-1. Lockstroke Strut, Exploded View

Table 4-2. Acme Thread Strut Parts List

Figure and Index Number	Description	Quantity	CAGE	Part Number
4-2-	ACME THREAD STRUT, 16" - 22" (40.6 cm - 55.9 cm).....	1	30978	22-796206
4-2-	ACME THREAD STRUT, 24" - 36" (61.0 cm - 91.4 cm)....	1	30978	22-796200
4-2-	ACME THREAD STRUT, 36" - 58" (91.4 cm - 147.3 cm).....	1	30978	22-796202
4-2-	ACME THREAD STRUT, 55" - 91" (139.7 cm - 231.1 cm).....	1	30978	22-796204
	. HOUSING TUBE ASSEMBLY (Used on 16" - 22" strut only)	1	30978	22-796218
	. HOUSING TUBE ASSEMBLY (Used on 24" - 36" strut only)	1	30978	22-796220
	. HOUSING TUBE ASSEMBLY (Used on 36" - 58" strut only)	1	30978	22-796222
	. HOUSING TUBE ASSEMBLY (Used on 55" - 91" strut only)	1	30978	22-796224
-1	. . END COVER, Tube.....	1	30978	22-796067
-2	. . O-RING SEAL.....	1	30978	22-796049
-3	. . NIPPLE, Quick connect.....	1	30978	22-796065
-4	. . TUBE, Housing (Used on 16" - 22" strut only).....	1	30978	22-796225
-4	. . TUBE, Housing (Used on 24" - 36" strut only).....	1	30978	22-796226
-4	. . TUBE, Housing (Used on 36" - 58" strut only).....	1	30978	22-796227
-4	. . TUBE, Housing (Used on 55" - 91" strut only).....	1	30978	22-796228
-5	. O-RING SEAL.....	1	30978	22-796018
	. SHAFT ASSEMBLY, Acme (Used on 16" - 22" strut only)....	1	30978	22-796233
	. SHAFT ASSEMBLY, Acme (Used on 24" - 36" strut only)....	1	30978	22-796230
	. SHAFT ASSEMBLY, Acme (Used on 36" - 58" strut only)....	1	30978	22-796231
	. SHAFT ASSEMBLY, Acme (Used on 55" - 91" strut only)....	1	30978	22-796232
-6	. . SHAFT, Acme threaded (Used on 16" - 22" strut only).....	1	30978	22-796237
-6	. . SHAFT, Acme threaded (Used on 24" - 36" strut only).....	1	30978	22-796234
-6	. . SHAFT, Acme threaded (Used on 36" - 58" strut only).....	1	30978	22-796235
-6	. . SHAFT, Acme threaded (Used on 55" - 91" strut only).....	1	30978	22-796236
-7	. . COLLAR.....	1	30978	22-796240
-8	. . PIN, Spring.....	1	30978	22-015047
-9	. . SCREW END, Male.....	1	30978	22-796239

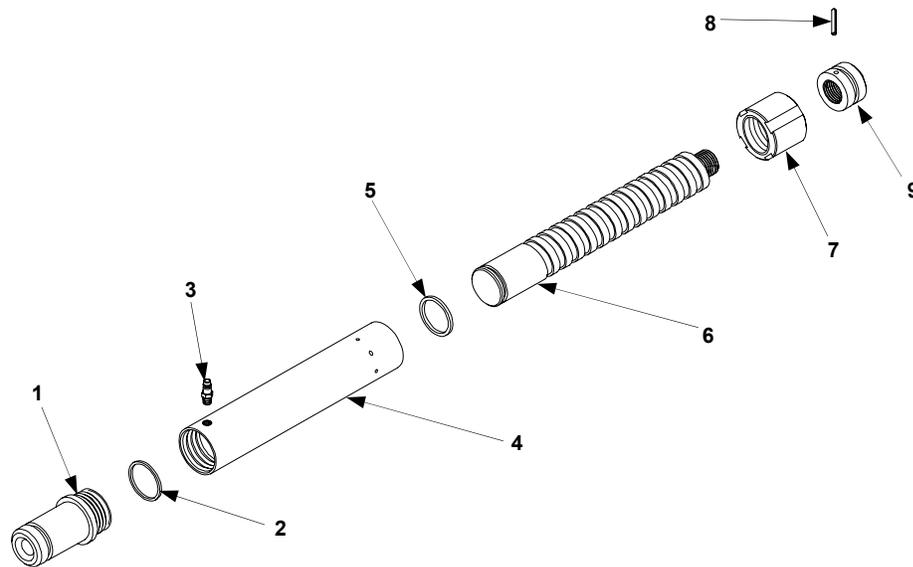


Figure 4-2. Acme Thread Strut, Exploded View

Table 4-3. Low Clearance Supports, Extensions, Base Plates and Connectors Parts List

Figure and Index Number	Description	Quantity	CAGE	Part Number
4-3-1	RIGID STRUT, 1" (2.5 cm)	1	30978	22-796031
-2	RIGID STRUT, 3" (7.6 cm)	1	30978	22-796032
-3	RIGID STRUT, 5" (12.7 cm)	1	30978	22-796033
-4	RIGID STRUT, 7" (17.78 cm)	1	30978	22-796034
-5	EXTENSION, 12" (30.5 cm)	1	30978	22-796012
-6	EXTENSION, 24" (61.0 cm)	1	30978	22-796024
-7	EXTENSION, 36" (91.4 cm)	1	30978	22-796036
-8	CONVERTER, Extension	1	30978	22-796035
-9	STANDARD BASE ASSEMBLY, 3" (7.6 cm)	1	30978	22-796050
-10	. LOCKING PIN ASSEMBLY (See figure 4-4 for breakdown) .	1	30978	22-796072
-10	. HUB, Plain	1	30978	22-796064
-11	STEEL CONE POINT BASE ASSEMBLY	1	30978	22-796080
-12	. LOCKING PIN ASSEMBLY (See figure 4-4 for breakdown) .	1	30978	22-796072
-12	. CONE POINT, Steel.....	1	30978	22-796069
-13	. HUB, Plain	1	30978	22-796064
-14	V-BASE ASSEMBLY	1	30978	22-796090
-14	. LOCKING PIN ASSEMBLY (See figure 4-4 for breakdown) .	1	30978	22-796072
-15	. V-BASE.....	1	30978	22-796091
-16	ANGLE BASE ASSEMBLY	1	30978	22-796092
-16	. LOCKING PIN ASSEMBLY (See figure 4-4 for breakdown) .	1	30978	22-796072
-17	. NUT, Self-locking, hexagon, 3/8"-16 thread	1	30978	22-796086
-18	. HUB, Plain	1	30978	22-796064
-19	. ANGLE	1	30978	22-796097
-20	. SCREW, Flat, socket head, 3/8"-16 x 1.125 long	1	30978	22-796083
-21	RIGID BASE ASSEMBLY	1	30978	22-796070
-21	. LOCKING PIN ASSEMBLY (See figure 4-4 for breakdown) .	1	30978	22-796072
-22	. SCREW, Machine, button head, 3/8"-16 thread, sst	1	30978	22-796082
-23	. WASHER, Lock, 3/8", sst	1	30978	22-796088
-24	. HUB, Plain	1	30978	22-796064
-25	. PRESSURE PLATE, Rigid	1	30978	22-796061
-26	SWIVEL BASE ASSEMBLY.....	1	30978	22-796060
-26	. LOCKING PIN ASSEMBLY (See figure 4-4 for breakdown) .	1	30978	22-796072
-27	. SCREW, Cap, hexagon head, 3/8"-16 thread, sst.....	1	30978	22-796084
-28	. WASHER, Spherical	1	30978	22-796074
-29	. NUT, Self-locking, hexagon, 3/8"-16	1	30978	22-796086
-30	. HUB, Swivel.....	1	30978	22-796066
-31	. PRESSURE PLATE, Rigid	1	30978	22-796062

Table 4-3. Low Clearance Supports, Extensions, Base Plates and Connectors Parts List (Continued)

Figure and Index Number	Description	Quantity	CAGE	Part Number
	HINGED BASE ASSEMBLY	1	30978	22-796140
4-3-32	. LOCKING PIN ASSEMBLY (See figure 4-4 for breakdown) .	1	30978	22-796072
-33	. RING, Retaining.....	2	30978	22-796148
-34	. PIN, Clevis	1	30978	22-796146
-35	. HUB, Clevis	1	30978	22-796142
-36	. CLEVIS	1	30978	22-796144
-37	. SCREW, Machine, button head, 3/8"-16 thread, sst	1	30978	22-796082
-38	. WASHER, Lock, 3/8", sst	1	30978	22-796088
-39	. PRESSURE PLATE, Rigid	1	30978	22-796061
	CHANNEL BASE ASSEMBLY, 4" (10.2 cm) square.....	1	30978	22-796134
-40	. LOCKING PIN ASSEMBLY (See figure 4-4 for breakdown) .	1	30978	22-796072
-41	. SCREW, Machine, pan head, 3/8"-16 thread x 1" long, sst	1	30978	22-796087
-42	. NUT, Self-locking, hexagon, 3/8"-16 thread	1	30978	22-796086
-43	. HUB, Plain	1	30978	22-796064
-44	. CHANNEL 4" (10.17 cm) square.....	1	30978	22-796135
	CHANNEL BASE ASSEMBLY, 6" (15.2 cm) square.....	1	30978	22-796136
-45	. LOCKING PIN ASSEMBLY (See figure 4-4 for breakdown) .	1	30978	22-796072
-46	. SCREW, Machine, pan head, 3/8"-16 thread x 1" long, sst	1	30978	22-796087
-47	. NUT, Self-locking, hexagon, 3/8"-16 thread	1	30978	22-796086
-48	. HUB, Plain	1	30978	22-796064
-49	. CHANNEL 6" (15.2 cm) square.....	1	30978	22-796137
	CONNECTOR, Threaded, adjustable.....	1	30978	22-796160
-50	. LOCKING PIN ASSEMBLY (See figure 4-4 for breakdown) .	1	30978	22-796072
-51	. END, Female	1	30978	22-796162
-52	. END, Male.....	1	30978	22-796164
-53	. SETSCREW, Hexagon socket head, 1/4"-20 thread x 5/8" long	1	30978	22-895292
	CONNECTOR, Spring Loaded	1	30978	22-796170
-54	. LOCKING PIN ASSEMBLY (See figure 4-4 for breakdown) .	1	30978	22-796072
-55	. SCREW	1	30978	22-796176
-56	. END, Female	1	30978	22-796172
-57	. SPRING, Compression	1	30978	22-796178
-58	. END, Male.....	1	30978	22-796174
-59	BASE PLUG.....	1	30978	22-796030

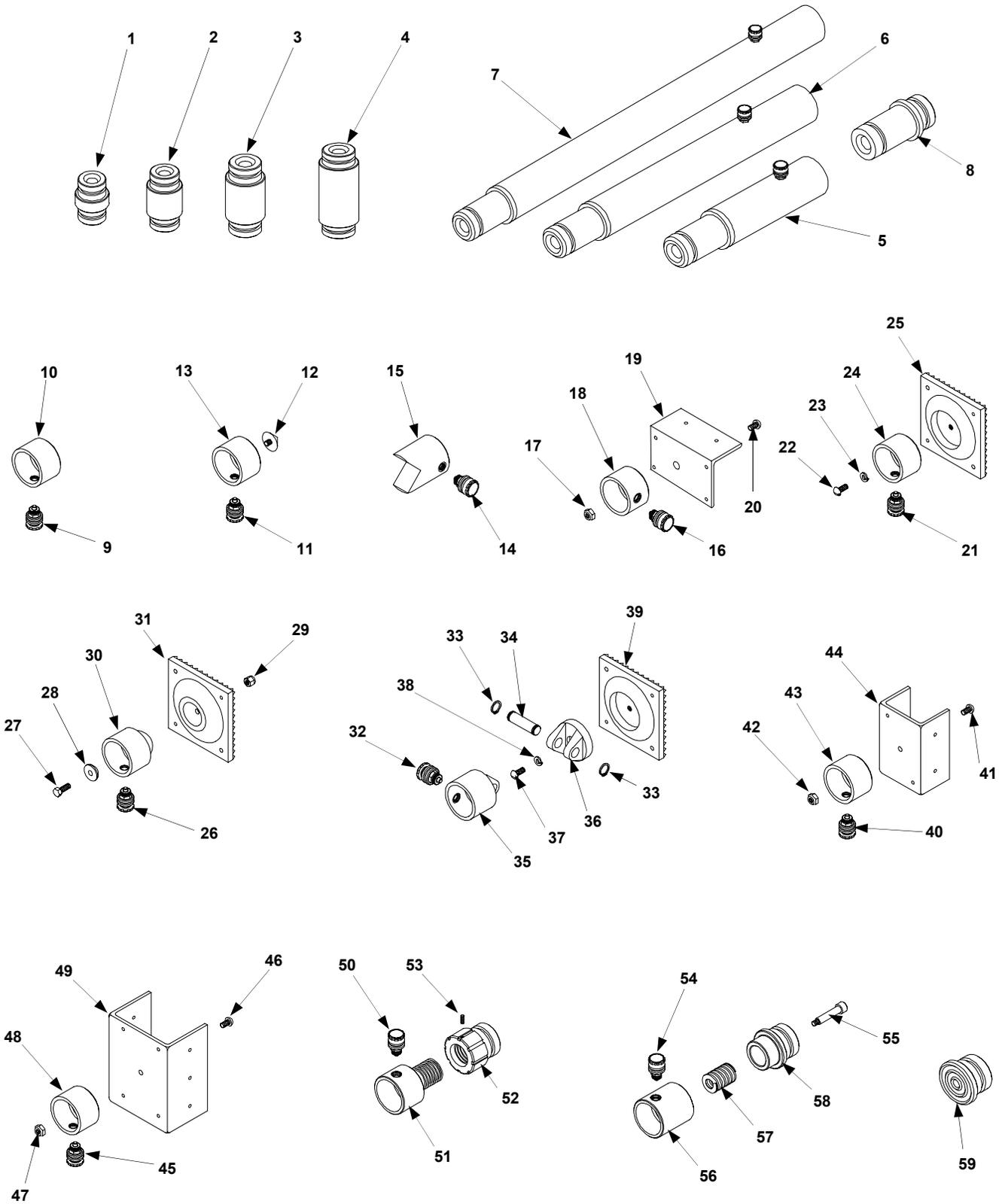


Figure 4-3. Low Clearance Supports, Extensions, Base Plates and Connectors

Table 4-4. Locking Pin Assembly Parts List

Figure and Index Number	Description	Quantity	CAGE	Part Number
4-4-	LOCKING PIN ASSEMBLY (See figure 4-3 for reference to.... next higher assembly)	REF	30978	22-796072
-1	. KNOB, Pull	1	30978	22-796075
-2	. PIN, Spring	1	30978	22-550025
-3	. BONNET	1	30978	22-796076
-4	. SPRING, Compression	1	30978	22-796089
-5	. LOCKING PIN	1	30978	22-796078

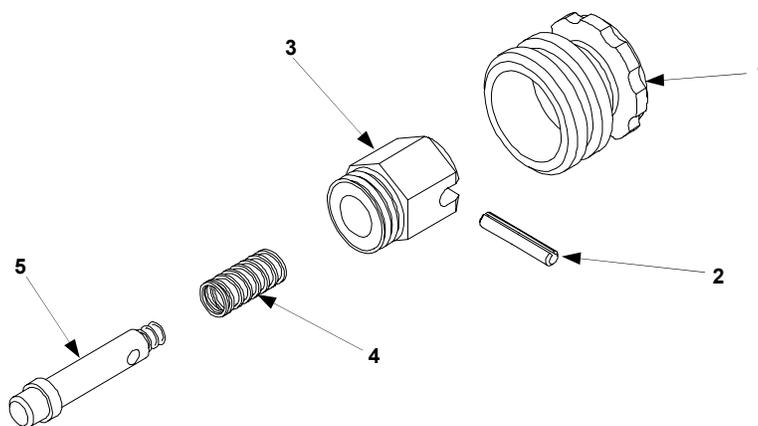


Table 4-5. Code to Name List

CAGE	Manufacturer's or Vendor's Name and Address
30978	Paratech Incorporated, 1025 Lambrecht Road, Frankfort, Illinois 60423

