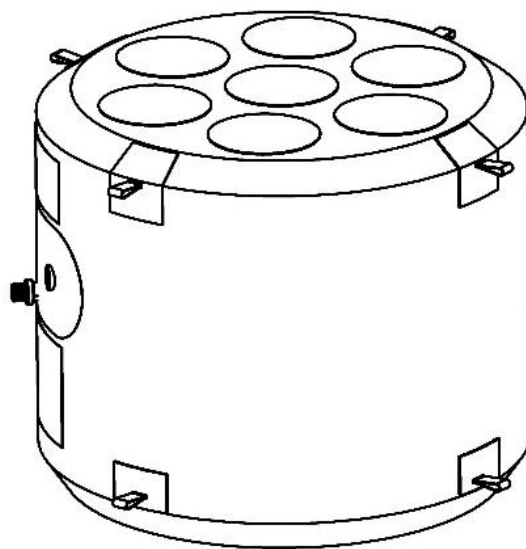




**OPERATION MANUAL**  
**FOR**  
**RESCUE AIR CUSHIONS**  
**SERIES A/K - D/K**  
**MEDIUM PRESSURE (14.5 PSI / 1.0 Bar)**



**08 FEB 2016**  
**PN 22-887071**

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# VALIDATION CERTIFICATE

**TECHNICAL MANUAL TITLE**

OPERATION MANUAL FOR RESCUE AIR CUSHIONS SERIES A/K - D/K MEDIUM PRESSURE (14.5 PSI / 1.0 Bar)

**TECHNICAL MANUAL NUMBER**

P/N 22-887071

**DATE**

08 February 2016

**CONTRACT/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****Ken Nielsen**

Chief Operating Officer

Paratech Incorporated  
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**SIGNATURE OF PUBLICATIONS QUALITY ASSURANCE OFFICER**

SIGNATURE ON FILE

**DATE**

QAP20/002/B

### Change Record

<b>Change No.</b>	<b>Date</b>	<b>Title or Brief Description</b>	<b>Signature of Validating Officer</b>
1	08 FEB 2016	Removed all data and reference to D1/K, D2/K, J3/K Cushions. Updated Format and added RAC Limited Warranty. Page 3; Updated Data Table Page 4, 6, and 7; Updated images and description to reflect current Dual Cushion 1 Bar Controller. Page 8; Removed Claw Couplings. Page 10; Added leak rate and test procedure for pressure drop testing.	SIGNATURE ON FILE

## 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

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

## TABLE OF CONTENTS

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

Chapter 1 - Safety Summary

Chapter 2 - Introduction

Chapter 3 - Operational Use

Chapter 4 - Care and Maintenance

## CHAPTER 1 - SAFETY SUMMARY

The following are general safety precautions to be adhered to during the set-up, operation, and disassembly of the SERIES A/K - D/K Air Cushion Systems. These are recommended precautions that personnel must understand and apply during many phases of operation and maintenance.

Ensure equipment is used **only** by trained and qualified personnel.

All personnel using and assisting must wear proper safety equipment, including head, eye, hand, body, and foot protection.

All non-essential personnel must be kept clear of the operating area. Always block and secure the load as it is being lifted. Never work under a load that is supported only by Air Cushions. Remain clear of operating area of Air Cushions. Never operate the Air Cushions without a safety controller.

### OPERATIONAL USE

1. Safe lifts depend on preservation of stability.
2. Successful lifts depend on careful assessment and observation.
3. Take all the normal precautions against the danger of outbreak of fire, such as laying out **charged** line of hose or foam branch as appropriate.
4. Look carefully to assess the situation to determine priorities. Think how safe lifts may be achieved, then only, ACT.
5. Determine the best location for inserting air cushions. Avoid contact with sharp or jagged surfaces, particularly on side walls; hot exhausts should be covered with a folded fire and heat resistant blanket.
6. Ensure delivery hoses are well-laid and not "kinked". Position cushions as far as possible under load but, if this is impractical, inflate to obtain clearance, crib and reposition cushions.
7. Connect delivery hoses to controller maintaining clear line to respective cushions.
8. Air sources other than regulated cylinder supply should not exceed 145 PSI / 10 Bar.
9. Before actually inflating, consider the effect of lift on **stability**. Remember, a three-point lift is the safest, i.e. one side or end of a vehicle in contact with the ground and two air cushions wherever possible.
10. Commence inflation by activating appropriate valves, balancing air input by paying attention to controller gauges
11. Crib and block as lift proceeds, taking care to see cribbing is placed so that, if necessary they can support the load.
12. Web loops are provided on A-D Rescue Air Cushions to secure the cushions.

13. Paratech 14.5 PSI / 1.0 Bar cushions have been successfully used to raise submerged vehicles, small cruisers etc. Exercise caution with respect to thrust and strength of bulkheads.

14. Extension delivery hose lengths should be made available for 12. and 13.

15. **The following precautions should always be observed and are reported here for emphasis:**

Ensure equipment is used **only** by trained and qualified personnel.

Series A/K – D/K Cushion should never be inflated without the control equipment supplied.

Keep clear of load unsupported by blocks during lifting operations.

Operator should be positioned away from the direction of anticipated ejection path.

Don not use hose or inflation port for retrieving or repositioning cushions.

The following Warnings appear in the text of this manual and are repeated here for emphasis:

**WARNING**

**ALWAYS OPEN HIGH PRESSURE AIR SOURCE SLOWLY. FAILURE TO DO SO MAY DAMAGE REGULATOR**

**WARNING**

**ALWAYS INFLATE RESCUE AIR CUSHIONS SLOWLY**

## CHAPTER 2 - INTRODUCTION

The Paratech Series A/K - D/K (14.5 PSI / 1.0 Bar) Medium Pressure Air Lift Systems are specially designed for Fire Service use and are mainly intended for the rescue of trapped personnel and a variety of operational situations encountered at road accidents, aircraft crashes, collapsed tunnels or trenches, where conventional jacking methods may be difficult or impossible to apply without lengthy preparation. The Air Cushions are particularly useful on soft, irregular or rubble strewn ground, during snowy or icy conditions.

The broad surfaces of Series A/K - D/K cushions ensure their suitability for exerting uniformly distributed lift pressure against accepted weak parts of vehicles e.g. sides, roof, wings, hood, trunk, etc., light aircraft, rescue of animals bogged down in pits or ponds. The height of lift enhances access possibilities for medical attention or extrication after ensuring chocks are in position.

**WARNING**

ALWAYS INFLATE AIR CUSHIONS SLOWLY TO MINIMIZE CHANCE OF SHIFTING

### Data

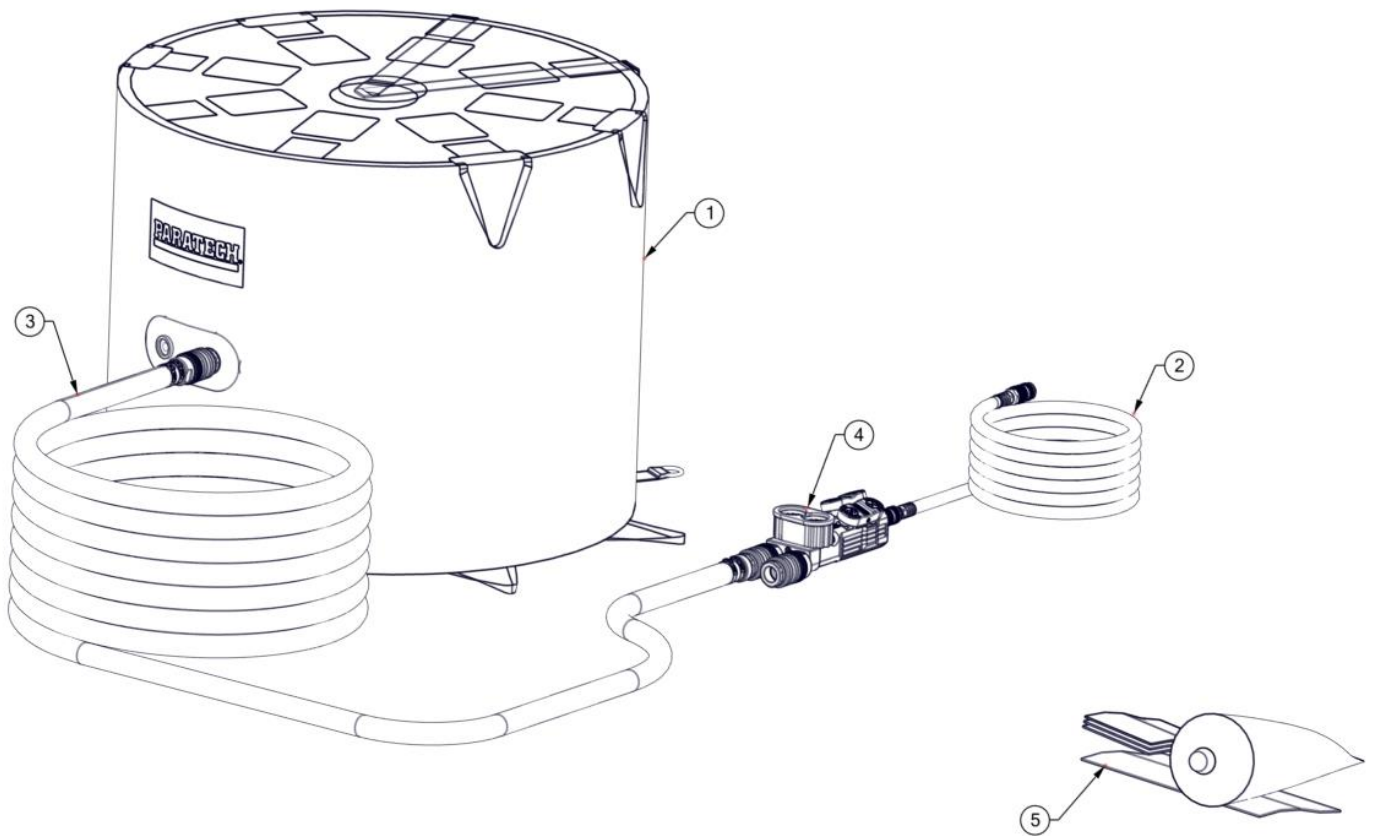
Type	<b>A/K</b>	<b>B/K</b>	<b>C/K</b>	<b>D/K</b>
Part Number	22-887005K	22-887010K	22-887015K	22-887020K
Diameter in (cm)	24 (61)	30 (76)	36 (91)	48 (122)
Lift @ Max. Pressure lbs. (kg)	6560 (2976)	10,252 (4650)	14,761 (6697)	26,241 (11,906)
Maximum Pressure psi (bar)	14.5 (1.0)	14.5 (1.0)	14.5 (1.0)	14.5 (1.0)
Height Inflated in (cm)	17 (43)	23 (58)	24 (61)	39.4 (100)
Height Deflated in (cm)	2 (5)	2 (5)	2 (5)	4 (10)
Air Requirement cu-ft (ltrs)	10.4 (295)	22.0 (623)	31.6 (895)	106 (3002)
Weight Packed lbs. (kg)	35 (16)	38 (17)	50 (23)	56 (25)



# PARATECH SERIES A/K - D/K RESCUE AIR CUSHION KITS

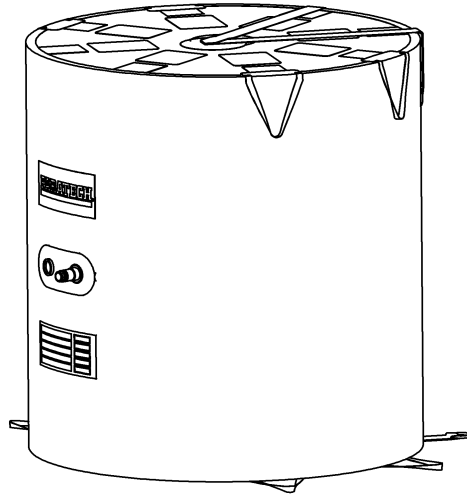
## COMPONENTS:

1. Series A/K - D/K Air Cushion (kits includes 2 cushions)
2. Air Hose 3/8in (10mm) dia. x 16ft (4.9m) black P/N 22-890513
3. Air Hose 1in (25mm) dia. x 20ft (6.1m) red P/N 22-887400 and 22-887401 20ft (6.1m) blue
4. Dual Cushion 1 Bar Controller with Gauges and Safety Relief Valves P/N 22-887305G2
5. Repair Kit
6. Carrying Case (not shown)



**Repair Kit**  
Tube of Adhesive  
Assorted Patches  
60 Grit Emory Cloth

# PARATECH SERIES A/K - D/K RESCUE AIR CUSHION



Working Surfaces.....	3-ply Neoprene-Coated Belt (0.2 in. / 5 mm. nominal thickness)
Inflation Port.....	Molded Threaded Fitting 1 <sup>1/16</sup> - 12
Inlet Nipple .....	P/N 22-887467
Restraint Webs.....	Nylon Web 2 in. / 51 mm. wide (9500 lb. / 4309 kg. breaking strain)
Side Wall.....	Heavy Coated Neoprene/Kevlar Fabric (coated both sides)

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## PARATECH SERIES A/K - D/K DELIVERY HOSE

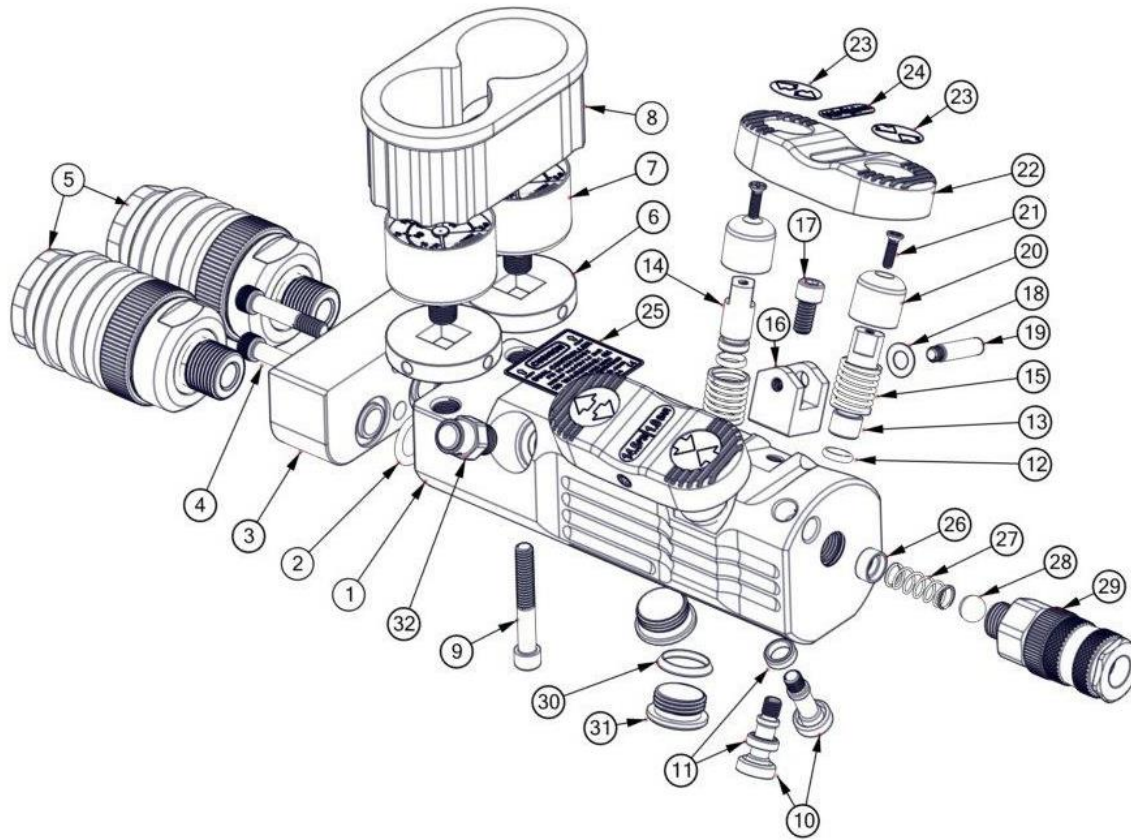
1 in. / 25 mm. Bore, fabric reinforced Thermoplastic hose. Max.  
Working Pressure @ 70° F (21° C) - 150 PSI (10.3 Bar)

Service Temperature Range - 14° F (-26° C) to 150° F (65° C)

Standard lengths supplied: 20 ft. / 6 M., 40 ft. / 12 M., and 60 ft. / 18 M.

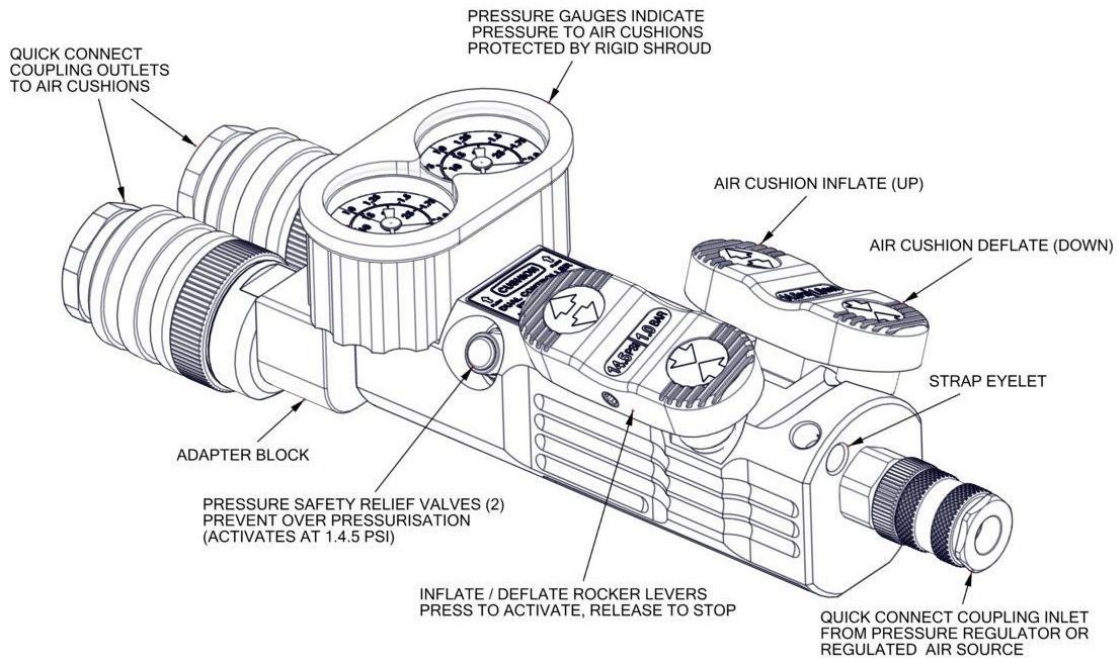
3/8 in. / 10 mm. diameter hose supplied in 16 ft. / 5M. length.

# DUAL CUSHION 1 BAR CONTROLLER P/N 887305G2



ITEM	QTY	PN	DESCRIPTION	ITEM	QTY	PN	DESCRIPTION
1	1	887307	BODY DUAL CUSHION CONTR. G2	17	2	670568	1/4-20 X 1/2" SCH CAP SCR SS
2	2	891153	O-RING AS-112 (1/2 X.103 NBR 70	18	2	890915	CURVED DISC SPRING 1/4" ID 7 LB SS
3	4	887308	BLOCK, DUAL CUSHION G2 CONTR	19	2	890913	SCREW SHAFT FOR ROCKER
4	2	670507	1/4-20 X 1.25" SOCHD CAP SS BLK	20	4	890911	BLIND BUTTON
5	2	550365	5/8 COUPLING X 1/4-18 NPSM	21	4	890930	SCR 6-32 PHI FLAT HD 1/2"LG SS
6	2	890922A	PLATE, GAUGE BOTTOM	22	2	890916G	ROCKER ARM, GREEN
7	2	890621	GAUGE 1.5" 14.5 PSI 1/8 BACK M	23	2	890934	LABELS: UP&DOWN PUSH BUTT SET
8	1	890922G	DOUBLE GAUGE SHROUD, GREEN	24	2	14.5PSI	LABEL 14.5 PSI FOR ROCKER
9	1	670561	SCR 1/4-20 X 1.75 SOCHD SS	25	1	887305G2L	LABEL, DUAL 14.5 PSI G2 CONTR
10	4	890919	STEM VALVE, DEADMAN	26	1	890955	SPRING SEAT FOR CONTROLLER
11	4	890940	TETRASEAL .301X.066WX.134 LG	27	1	796257	SPRING .360 OD X .026X 1"LG SS
12	4	550170	O-RING AS-011 (5/16X.070) BN70	28	1	015795	BALL 3/8 RIGID HDPE
13	2	890917	STEM BODY SHORT, DEADMAN	29	1	890703	CPLG 1/4"NPSM - OPEN W/SEAL
14	2	890918	STEM BODY LONG, DEADMAN	30	2	890946	O-RING AS-016 5/8X.070 BN 70
15	4	887317	SPRING, BUTTON C0600-049-1500S	31	2	890945	PLUG
16	2	890914	POST FOR ROCKER ARM	32	2	890579	VENT RELIEF VALVE 14.5 PSI

The Dual Cushion 1 Bar Controller is used to inflate and deflate the air cushions. The controller features two pressure relief valves that are factory pre-set at 14.5 PSI (1.0 Bar) to prevent over inflation of cushions. Separate rocker levers allow for safe, independent operation of 2 cushions.



The operation of the controller is as follows:

1. The 3/8 inch (10 mm) supply hose is connected from a regulated air source to the controller inlet. 1 inch (25 mm) hose attaches the controller outlet(s) to the air cushion. Pressing the rocker lever up allows air to flow into the cushion. Pressing the rocker lever down lets air out of the cushion.
2. If a load shift causes the cushion air pressure to increase over 14.5 psi (1.0 bar), indicated by the red zone of the pressure gauges, the safety relief valves will open and prevent over inflation.
3. To deflate an air cushion with the controller, press the rocker lever down until the desired amount of air has exited the system and it can be safely removed.

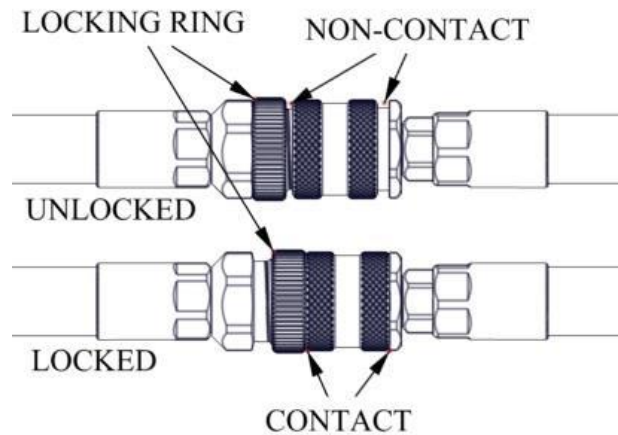
**NOTE: CUSHIONS WILL DEFLATE SLOWLY. IT IS DESIGNED IN THIS MANNER SO THAT THERE WILL NOT BE ANY QUICK MOVEMENTS TO HEAVY LOADS WHICH COULD THROW THEM OFF CENTER AND CAUSE DAMAGE OR INJURY.**

4. Operating the controller with 2 cushions connected allows for simultaneous and/or alternating, inflating and deflating.

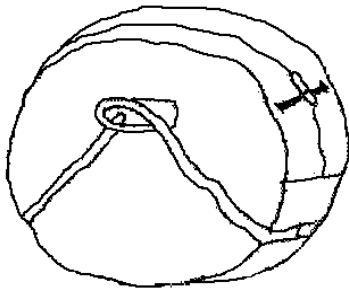
**NOTE: WHEN USING MORE THAN ONE AIR CUSHION, THE USE OF DIFFERENT COLORED AIR HOSES ENABLES THE OPERATOR TO RAPIDLY IDENTIFY THE AIR CUSHION THAT IS CONNECTED TO EACH SIDE OF THE CONTROLLER.**

## HOSES:

Hoses are used for delivery of air supply to the system. Additional lengths of hose can be attached to permit remote operation or additional bags and accessories. All hoses are equipped with Paratech's field replaceable quick connect couplings that prevent accidental disconnection of fitting. Be sure to turn the safety locking ring on all quick connect couplings to the locked position as shown below

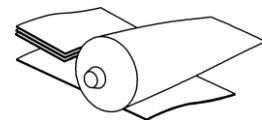


## SERIES A/K – D/K AIR CUSHION CARRYING CASE & REPAIR KIT



P.V.C. Coated Nylon  
Toggle Fastening  
2 in. / 51 mm. wide Nylon  
Carrying and Reinforcing Web

Repair Kit  
Tube of Adhesive  
Assorted Patches  
60 - Grit Emory Cloth



## CHAPTER 3 - OPERATIONAL USE

**The following notes are intended as guidance:**

1. Safe lifts depend on preservation of stability.
2. Successful lifts depend on careful assessment and observation.
3. Take all the normal precautions against the danger of outbreak of fire, such as laying out **charged** line of hose or foam branch as appropriate.
4. Look carefully to assess the situation to determine priorities. Think how safe lifts may be achieved, then only, ACT.
5. Ensure the side walls are folded inwards in regular fashion and that the upper working surface is "square" with the lower by reference to the web loops placed at quadrant positions.
6. Determine the best location for inserting air cushions. Avoid contact with sharp or jagged surfaces, particularly on side walls; hot exhausts should be covered with a folded fire and heat resistant blanket.
7. Ensure delivery hoses are well-laid and not "kinked". Position cushions as far as possible under load but, if this is impractical, inflate to obtain clearance, crib and reposition cushions.
8. Connect delivery hoses to controller maintaining clear line to respective cushions.
9. Air sources other than regulated cylinder supply should not exceed 145 PSI / 10 Bar.
10. Before actually inflating, consider the effect of lift on **stability**. Remember, a three-point lift is the safest, i.e. one side or end of a vehicle in contact with the ground and two air cushions wherever possible.
11. Commence inflation by activating appropriate valves, balancing air input by attention to controller gauges.
12. Crib and block as lift proceeds, taking care to see that cribbing is placed so that, if necessary, they can support the load.
13. Web loops are provided to "hang" cushions between shuttering, collapsed trenches, or vehicles, skips etc., tight to walls.
14. Paratech 14.5 PSI / 1.0 Bar cushions have been successfully used to raise submerged vehicles, small cruisers etc. Exercise caution with respect to thrust and strength of bulkheads.
15. Extension air delivery hose lengths are available
16. **The following precautions should be observed:** Ensure equipment is used only by trained personnel. Series A/K - D/K Cushions should never be inflated without the control equipment supplied.

Keep clear of load unsupported by chocks during lifting operations. Operator should be positioned away from the direction of anticipated ejection path.

Do not use hoses or inflation port for retrieving or re-positioning cushions.

## CHAPTER 4 - CARE AND MAINTENANCE

### **ROUTINE, PERIODICALLY, AND AFTER OPERATIONAL USE:**

Paratech Series A/K - D/K Air Cushions are constructed to a standard which effects a minimum burst pressure of three times working pressure, irrespective of size.

This design criterion is corroborated and certified by an independent source. Each cushion will have a label placed prominently on the cushion giving the following information;

1. Maximum Working Pressure
2. Date of Manufacture
3. Serial Number
4. Paratech Logo
5. Series Identification

**The following Maintenance and Test Procedure should be observed:**

### **QUARTERLY**

Check control equipment as detailed under item heading. Couple up and inflate cushions to working pressure, checking audible relief function with gauge read-out on controller.

Check delivery hose connections with brush and soapy water. Visually inspect cushions for integrity of seam adhesion.

The glue around the edges of the cushion is there to seal the material. If there are foamy patches where air is SLOWLY bubbling out, that means the cushion needs to be resealed. This DOES NOT affect the operation or integrity of the cushion.

To check pressure drop, inflate the cushion to 14.5 psi (1 bar) until vent relief valve(s) on the cushion and/or controller opens. Once the valve(s) have stopped venting and resealed, record the pressure (minimum 14.5 psi / 1.0 bar) in the system and ambient temperature of where the test is being conducted. Allow the cushion to sit for a 2 hour duration, then recheck the pressure and temperature. Pressure drop after 2 hours must not exceed 10% of the relief valve(s) set pressure of 14.5 psi (1.0 bar); minimum pressure remaining in the cushion should be 13.1 psi (0.9 bar). If there is a temperature variation of more than -3° F (-19° C) from the start and finish of the 2 hour test the results are deemed invalid (repeat test).

### **AFTER OPERATIONAL USE**

After drills and operational use, air cushions should be inflated to approximately 2 PSI / .14 Bar and thoroughly washed down using warm, soapy water. Wash down carrying case, ensuring no grit or gravel adheres to inner surface.

Check side walls thoroughly for evidence of scuffing by abrasion.

**Note:** The strength of the side wall fabric is essentially the nylon core. Using brush and soapy water, check for leaks, concentrating on the side wall. Mark off for repair action (see Repair Instructions). After repairs are effected, inflate to approximately 2 PSI / .14 Bar and check integrity of repairs using brush and soapy water.

If side panels have tears or abrasions and nylon core is damaged more than 1 in. / 25.4 mm. in either direction, return cushion to Paratech Incorporated.

### **STORAGE**

Air cushions in case should, where possible, be stowed on appliance with flat side on floor of locker, ensuring no damage is caused by proximity to other pieces of equipment.

## REPAIRS

Thoroughly clean surface around damaged area and mating surface of patch with fine emery paper.

Apply three coats of adhesive from repair kit to mating surfaces, allowing each coat to become tacky before applying the next. Press patch firmly into position and remove any air bubbles by using a spatula. Apply even pressure over patch by a suitable weight or clamp. Remove and lay flat in repair area and allow to cure overnight at room temperature 68° F (20° C).

### Dual Cushion Controller

Keep couplings clean and dry. Replace broken gauges. Refer to separate instruction manual provided.

### Pressure Regulator

Keep coupling clean and dry, inspect inlet nipple and seat for tightness and damage. Check for broken gauges, functioning on-off valve, vent relief valve, and pressure adjusting knob. Refer to separate instruction manual provided.

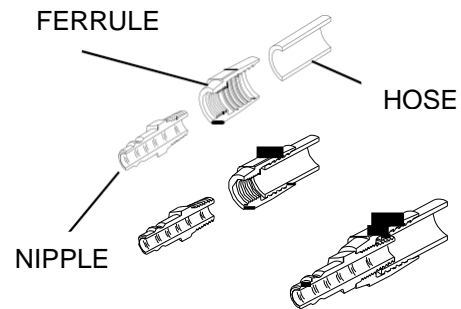
### Hoses

Keep couplings clean and dry. Broken hose must be re-coupled or replaced. Inspect for any cracks or nicks.

### Nipple Replacement

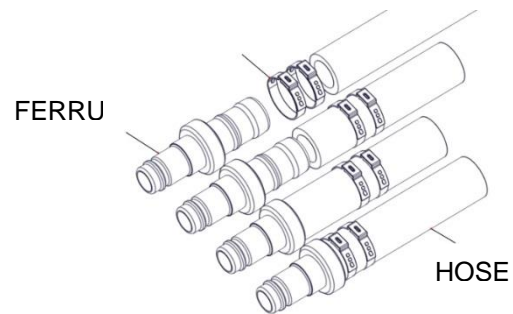
#### 3/8" High Pressure Hose

1. Gather hose and fittings.
2. Cut hose end squarely.
3. Install ferrule by threading counterclockwise. Leave 1/16 in. (1.6 mm) between hose end and ferrule inside shoulder.
4. Install nipple into ferrule by turning clockwise until seated.



#### 1" Medium Pressure Hose

1. Gather hose and fittings.
2. Cut hose end squarely.
3. Slide clamps over the end of the hose, then back along the hose.
4. Insert adapter into the end of the hose until the shoulder of the adapter seats against the hose end.
5. Slide clamps back down the hose and tighten in place 7/16" (11 mm) apart.





## RAC LIMITED WARRANTY

Each **RAC** or component thereof, manufactured by Paratech Incorporated, has been thoroughly inspected and properly adjusted before shipment to insure the highest quality and the greatest possible reliability.

Paratech Incorporated (hereinafter referred to as "Seller") hereby warrants the **RAC** or component thereof to the original retail buyer only against defects in material and workmanship under normal use and service for a period of one year from the date of purchase. This warranty shall constitute the sole warranty of the Seller with respect to the **RAC** or component thereof. **THE SELLER HEREBY DISCLAIMS AND EXCLUDES ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OR MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.** The Seller neither assumes nor authorizes any other person to assume for it any other obligations or liabilities in connection with the sale or use of this product.

Should there be any defects in the material or workmanship of the **RAC**, buyer should return the defective product to the factory for inspection with shipping prepaid within one year from the date of purchase. If inspection shows that the **RAC** or a component thereof is defective and that such defects were not caused by negligence, misuse, accident or unauthorized service, the product sold hereunder will be repaired or replaced at the option of the Seller, without charge, FOB at the factory, Frankfort, Illinois.

**THIS REMEDY SHALL BE THE EXCLUSIVE REMEDY FOR BREACH OF WARRANTY WITH RESPECT TO THE RAC OR COMPONENTS THEREOF. THE SELLER SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM ANY BREACH OF WARRANTY WITH RESPECT TO THE RAC AND COMPONENTS THEREOF FROM ANY DELAY IN THE PERFORMANCE OF THE REMEDY HEREUNDER.**

# **PARATECH®**

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