OPERATION & SERVICE MANUAL

Model: 8578-5A
Modified Type MD-1 Towbar

NSN: 1730-21-889-6531

06/2023 – Rev. 02

For Spare Parts, Operations & Service Manuals or Service Needs
Scan the QR code or visit Tronair.com/aftermarket

Malabar International
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REVISION	DATE	TEXT AFFECTED
01	12/2022	Original release
02	06/2023	Modified Hydraulic Running Gear Parts List

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This product can not be modified without the written approval of Tronair, Inc. Any modifications done without written approval voids all warranties and releases Tronair, Inc., it suppliers, distributors, employees, or financial institutions from any liability from consequences that may occur. Only Tronair OEM replacement parts shall be used.

CAUTION!

Aircraft manufacturer's specifications and instructions must be followed. In the event of contradiction between aircraft manufacturer's specifications and Malabar's, aircraft manufacturer's will prevail.

1.0 PRODUCT INFORMATION

1.1 DESCRIPTION

The modified type MD-1 may be adjusted to tow a wide range of aircraft types. Handcranks operate the adjustment of the towbar arms. The towbar is equipped with auxiliary plugs for towing aircraft with recessed axles or may be hooked or pinned to the towing feature of the aircraft.

1.2 MODEL & SERIAL NUMBER

Reference nameplate on unit

1.3 MANUFACTURER

Malabar International
1 Air Cargo Pkwy East
Swanton, Ohio 43558 USA

Telephone: (419) 866-6301 or 800-426-6301
E-mail: sales@malabar.com
Website: www.malabar.com

1.4 SPECIFICATIONS

Length	288 in (7315 mm)
Width	42 in (1067 mm)
Weight	500 lbs (227 kg)
Adjustment range	0 to 26 inches (0 to 660 mm)
Tire Size	4.10/3.50 x 6 ply
Hydraulic Fluid	MIL-H-5606
Hand Pump Relief Valve Setting	3400-3600 psig (239-253 kg/sq cm)

2.0 SAFETY INFORMATION

2.1 USAGE AND SAFETY INFORMATION

To insure safe operations please read the following statements and understand their meaning. Also refer to your equipment manufacturer's manual for other important safety information. This manual contains safety precautions which are explained below. Please read carefully.

WARNING!

Warning is used to indicate the presence of a hazard that can cause ***severe personal injury, death, and/or substantial property damage*** if the Warning Notice is ignored.

CAUTION!

Caution is used to indicate the presence of a hazard, which will or can cause ***minor personal injury or property damage*** is the Caution Notice is ignored.

3.0 PREPARATION FOR USE

The Towbar is disassembled for shipment. Assemble the towbar as follows (see figure 1):

1. Assemble tube assemblies (items 41) using hardware (items 37, 38 and 39)
2. Lubricate towbar as required, see LUBRICATION (page 2). Turn handcranks through full travel to ensure moving parts are well lubricated.
3. Inflate tires to 50 psig

4.0 TRAINING

4.1 TRAINING REQUIREMENTS

The employer of the operator is responsible for providing a training program sufficient for the safe operation of the unit.

4.2 TRAINING PROGRAM

The employer provided operator training program should cover safety procedures concerning use of the unit in and around the intended aircraft at the intended aircraft servicing location.

4.3 OPERATOR TRAINING

The operator training should provide the required training for safe operation of the unit.

NOTE: Maintenance and Trouble Shooting are to be performed by a skilled and trained technician.

5.0 OPERATION

To raise towbar (lower landing gear):

1. Close release valve located on hand pump assembly.
2. Operate hand pump handle to raise towbar.

To lower towbar (raise landing gear):

1. Slowly open release valve. The speed of lowering the towbar is controlled by the amount the release valve is opened.
2. Close release valve.

To engage towbar at aircraft nose gear:

CAUTION!

Follow aircraft manufacturer's recommendations for towbar connecting procedure.

1. Hook eye of towbar onto pintle or other towing attachment of towing vehicle.
2. Raise towbar and tow into position.
3. Rotate arm adjusting crank to position arms wider than aircraft nose wheel axle. Raise or lower towbar landing gear to position towbar arms so that head assemblies are approximately level with aircraft axle.
4. For recessed-type axle, remove auxiliary plugs from stored position on cross tube support and install them on pins of head assemblies. Use arm adjusting crank to securely lock plugs into position.
5. For other types of axles, the towbar may be locked directly to the nose landing gear.

CAUTION!

Failure to securely lock towbar on nose landing gear before towing may result in damage to both aircraft and towbar.

6. Retract towbar landing gear to a position well clear of the ground. Tow aircraft with wheels retracted.

CAUTION!

Failure to raise landing gear may cause damage to both aircraft and towbar.

7. After towing, lower wheels and disengage towing arms from aircraft.

6.0 TRANSPORTATION

6.1 PREPARATION FOR SHIPMENT:

To prepare the towbar for shipment, disassemble into two assemblies: adjustable arm assembly with landing gear assembly and tube assembly with towing eye attached. Skid the above assemblies and ensure that towing arms, tires, and towbar tubes are securely blocked. Preserve, package, and pack in accordance with MIL-STD-794 to the level required

7.0 TROUBLE SHOOTING

TROUBLE	PROBABLE CAUSE	REMEDY
Towbar settles to the ground	Release valve on hand pump open	Close valve firmly
	Air in hydraulic system	Bleed hydraulic system
	Relief valve inside hand pump not seating properly	Remove valve assembly; Reseat valve
Landing gear will not fully retract upward while in towing mode	Accumulator's Nitrogen charge below normal pressure	Re-charge accumulator with Nitrogen per manual
	Accumulator's Hydraulic charge below normal pressure	Re-charge accumulator with MIL-H-5606 per manual
Towbar will not pump up to full height	Lack of oil	Re-fill hand pump, check for leaks
	Relief valve inside hand pump not seating properly	Remove valve assembly, Reseat valve
	Release valve on hand pump open	Close firmly

8.0 MAINTENANCE

8.1 CLEANING

Towbar may be cleaned with water and detergent MIL-C-25769. Use nonmetallic brush to clean adjusting mechanisms. Rinse detergent from towbar with clean water and dry unpainted surfaces with lint free cloth. Inspect for corrosion and treat in accordance with T.O. 1-1-2.

8.2 LUBRICATION

Cleaning and lubrication will be performed semiannually or more frequently as required by local conditions. Lubrication fittings are provided for pressure lubrication of cross tube supports and towbar axle. Universal gear lubricant MIL-L-2105, grade 90 is normally required for these bearings and for all threaded shafts. If towbar is being used in hot, rainy area, use MIL-L-2105, grade 140. Surfaces of cross tube will normally be lubricated with MIL-L-23398 and with MIL-L-2105, grade 140, or MIL-G-10924 when used in hot, rainy areas. Wheel bearings will be cleaned and lubricated annually or more frequently as required by local conditions. Wheel bearings should be hand packed using MIL-G-10924.

8.3 REPAIR AND REPLACEMENT

Replacement and limited repair procedure for components most subject to wear are included below.

1. Wheels and Tires: Repair wheels and tires per standard automotive procedures. If tires specified in parts list are not available, aircraft tires of proper size may be used.
2. Disassembly of Arm Adjusting Assembly: (see figure 1). Before removing any part of the arm adjusting assembly, adjust to widest position and support both towing arms (items 9). Remove crank handle (item 15). Remove cotter pin, nut, and washer (items 11, 12 and 13). Remove the eight capscrews and washers (items 4, 5 and 14) securing each end of cross tube assembly to right and left hand cross tube supports (items 26). Remove eight bolts and washers (items 4, 5, and 17) securing right and left hand cross tube supports to center tube support. Remove the eight capscrews and washers (items 5 and 28) securing each arm adjusting nut (items 29 and 30) to the towing arms and unscrew nuts from arm adjusting screw (item 33).
3. Assembly of Arm Adjusting Assembly: (see figure 1) To assemble, reverse the above procedure. When installing the arm adjusting nuts, take care to install each the same distance from the center of the arm adjusting screw. If cross tube keys are removed or replaced, screws (items 20) must be installed using Loctite 271. Thoroughly clean threaded area and prime with loctite primer. Install screws and stake two place 180 degrees apart. Remove any burrs with a fine file. Failure to secure screws may result in screw failure.
4. Adjusting Arm Bushing Replacement: (see figure 1) Bushings (items 10) are to be replaced when maximum inside diameter exceeds 4.030 inches or when vertical arm movement exceeds 0.66 inch or when side movement exceeds 0.50 inch. To replace bushings, remove pins (items 22), remove old bushings and install new bushings. Drill and ream holes in new bushings for pins and press in pins.
5. Repair Center Cross Tube Support: After long use of the towbar, the hole for the arm adjusting screw may become worn. If wear exceeds 1.060 inch, repair hole as follows: Machine hole to 1.250 to 1.251 inch. Press bushing MS35771-107 or equal, and ream to 1.030 to 1.040 inch.

8.3 REPAIR AND REPLACEMENT *(continued)*

6. Disassembly of Towbar Landing Gear: (see figure 2A) Towing landing gear should not be disassembled unless absolutely necessary. Always lower towbar before disassembling towbar landing gear. Open the release valve on hand pump assembly. Cut safety lock-wire and open the shut off valve (item 10), near the accumulator (item 14). Disconnect two hydraulic hoses (items 8 and 28) from 45 degree elbow (item 25) and 90 degree elbow (item 24). Remove eight 3/8" hex head bolts (items 18). The towbar landing gear now is in two halves.
7. Assembly of Towbar Landing Gear: To assemble, reverse the above procedure and charge hydraulic system per step 8 and step 9 below.

CAUTION!

Under no condition should the hydraulic pressure exceed four times the nitrogen pressure in the accumulator. Never apply any hydraulic pressure to an uncharged accumulator.

8. Recharging the accumulator with Nitrogen (GN_2).
   a. Lower towbar completely by opening release valve on hand pump assembly.
   b. Close release valve on hand pump assembly.
   c. Cut safety lock-wire and open shut-off valve (item 10).
   d. Slowly open release valve on hand pump assembly.
   e. Remove plug from charging port and install brass adapter Malabar P/N 490-017.
   f. Install nitrogen charging assembly Malabar P/N 490-027 to brass adapter.
   g. Charge accumulator with nitrogen until 735 ± 15 psig of pressure is achieved.
   h. Disconnnect brass adapter from accumulator first and replace plug.
   i. Disassemble brass adapter, test gauge, and charging hose and store in dry, clean area.
9. Recharging the accumulator with hydraulic fluid (MIL-H-5606) (DO NOT PROCEED WITH THIS PROCEDURE UNLESS ADDUMULATOR IS PROPERLY CHARGED WITH NITROGEN (SEE STEP 8).
   a. Lower towbar completely by opening release valve on hand pump assembly.
   b. Bleed all air out of hydraulic system. Complete bleeding is essential to properly operate sytem. NOTE: Bleeding required only if hydraulic system has been dismantled.
   c. Disconnect hand pump at tee fitting (item 6) by loosening tubing nuts. Remove mounting bolts (items 16) and hand pump is free.
   d. Stand hand pump on end and verify level of hydraulic fluid using dipstick at rear of pump. Fill as required with MIL-H-5606
   e. Remount hand pump and bleed at tee fitting (item 6). (Do not displace a large amount of fluid).
   f. Close release valve at hand pump assembly.
   g. Cut safety lock-wire and open shut off valve (item 10)
   h. Operate hand pump 15 to 17 full strokes.
   i. Firmly close shut off valve (item 10) and reinstall safety lock-wire.
   j. Open release valve at hand pump assembly.
   k. Towbar is now ready for use.
10. Tube and tube flange repair:
    a. Failure of tube flange may be repaired by welding. Welds should be made on both sides of failed weld.
    b. Holes in tube may become elongated after long use. Tube may be repaired by drilling new holes as follows. Remove flange. Scribe a line through the apparent center of the existing holes, at least 3 inches along the length of the tube. Locate and redrill the new holes 2.98 to 3.02 inches from the center of the old holes. Cut 3 inches off the end of the tube, deburr, and reinstall the flange.

9.0 PROVISION OF SPARES

9.1 SOURCE OF SPARE PARTS

Spare parts may be obtained from the manufacturer:

Malabar International
1 Air Cargo Pkwy East
Swanton, Ohio 43558 USA

Telephone: (419) 866-6301 or 800-426-6301
E-mail: sales@malabar.com
Website: www.malabar.com

For Spare Parts, Operations & Service Manuals or Service Needs:
Scan the QR code or visit Tronair.com/aftermarket

9.2 RECOMMENDED SPARE PARTS LISTS

Reference the following page(s) for Replacement Parts and Kits available.

10.0 IN SERVICE SUPPORT

Contact Malabar, Inc. for technical services and information. See Section 1.3 – Manufacturer.

11.0 GUARANTEES/LIMITATION OF LIABILITY

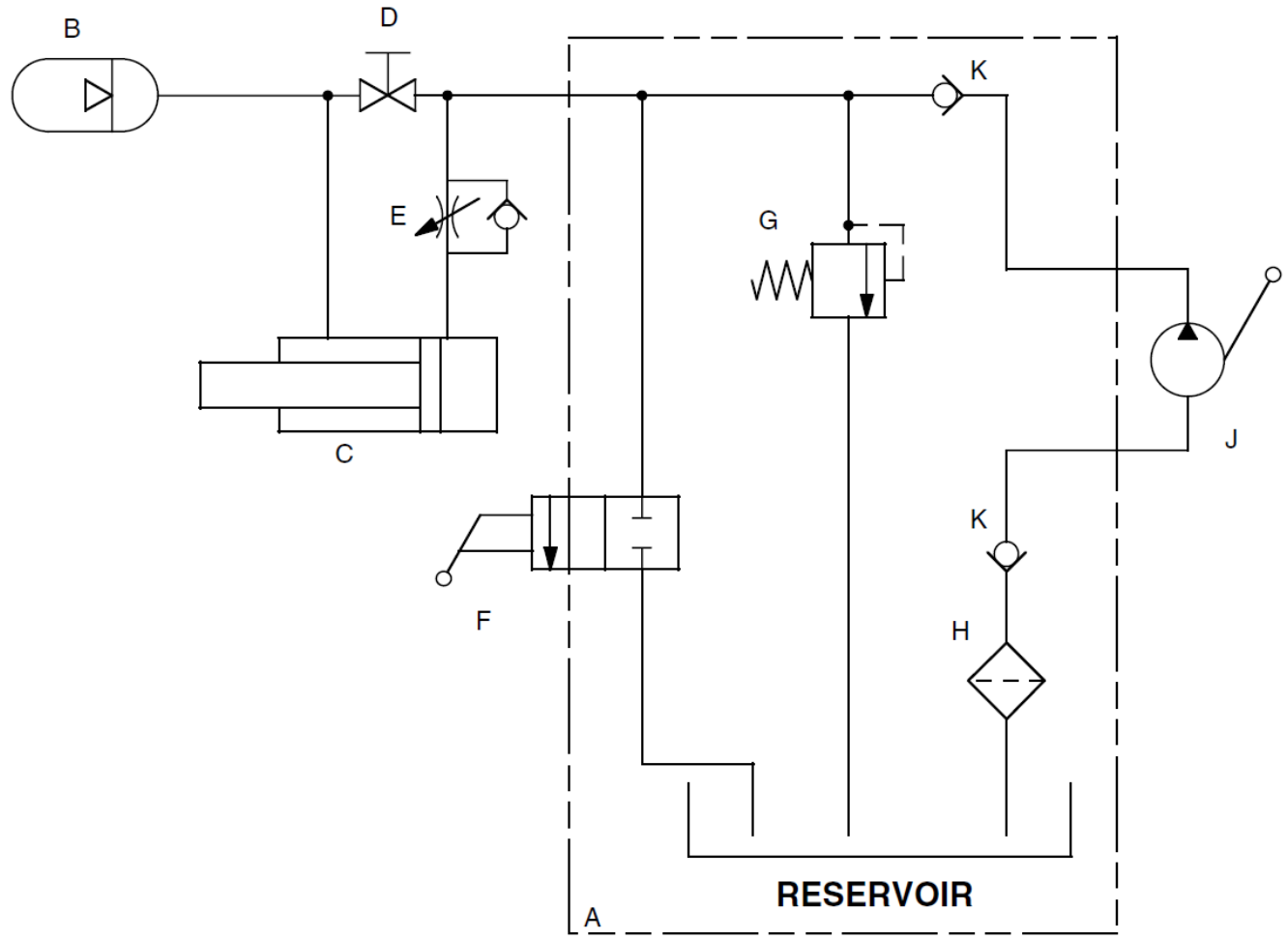
I. Seller warrants each new product of its manufacture to be free from defects in material or workmanship, under proper, reasonable, and normal use and service.

II. The warranty period shall be as follows:
   A. For Malabar equipment, with the exception of Tripod Jacks, the warranty period is one (1) year after date of shipment.
   B. For Malabar Tripod Jacks, the warranty period is three (3) years after date of shipment.

III. Where Buyer claims an alleged defect in material or workmanship and so advises Seller in writing within ten (10) days after discovery thereof, then and in such event, Buyer shall return said equipment, transportation prepaid, to the Seller, provided such return is timely and within the above-mentioned warranty period. This warranty and liability of the Seller is expressly limited solely to replacement or repair of defective parts or goods, and return at Buyer's expense to Buyer after finding by Seller the product was defective prior to original shipment or, at the option of Seller, to providing refund to Buyer of the purchase price for said product.

IV. It is further expressly understood and agreed that:
   A. THERE IS NO WARRANTY, REPRESENTATION OF CONDITION OF ANY KIND, EXPRESS OR IMPLIED, (INCLUDING NO WARRANTY OF MERCHANTABILITY OR OF FITNESS) EXCEPT THAT THE MATERIAL SHALL BE OF THE QUALITY SPECIFIED IN APPLICABLE SPECIFICATIONS, AND NONE SHALL BE IMPLIED BY LAW. Except as otherwise provided herein, quality shall be in accordance with Seller's specifications. Final determination of the material for the use contemplated by Buyer is the sole responsibility of Buyer and Seller shall have no responsibility in connection with such suitability, and
   B. Buyer's sole and exclusive remedy shall be repair or replacement of defective parts or goods by the Seller. Should the goods, in the judgment of Seller, preclude the remedying of the warranted defects by repair or replacement, the Buyer's sole and exclusive remedy shall be the refund of the purchase price, and
   C. Seller shall not be liable for prospective profits or special, indirect or consequential damages, nor shall any recovery of any kind against Seller be greater in amount than the purchase price of the specific material sold and causing the alleged loss, damage or injury. Buyer assumes all risk and liability for loss, damage or injury to persons or property of Buyer or others arising out of use or possession of any product or part sold hereunder, and
   D. Seller shall in no way be deemed or held to be obligated, liable or accountable upon or for any guarantees or warranties, express or implied, or created by statute or by operation of law or otherwise, in any manner of form beyond its express agreement above set forth, and
   E. No warranty herein shall apply to any product which shall have been repaired or altered, unless such alteration or repair has been made by Seller or if, after return to and inspection by Seller, the product is found by Seller to have been subject to misuse, negligence or accident, and
   F. No warranty of any nature is made by Seller as to any component forming a part of the product sold and Buyer shall receive only such warranties offered by such other manufacturer of such component, and
   G. Seller does not assume nor does Seller authorize any other person to assume for it any other liability or make any warranty in connection with the sale of its products.

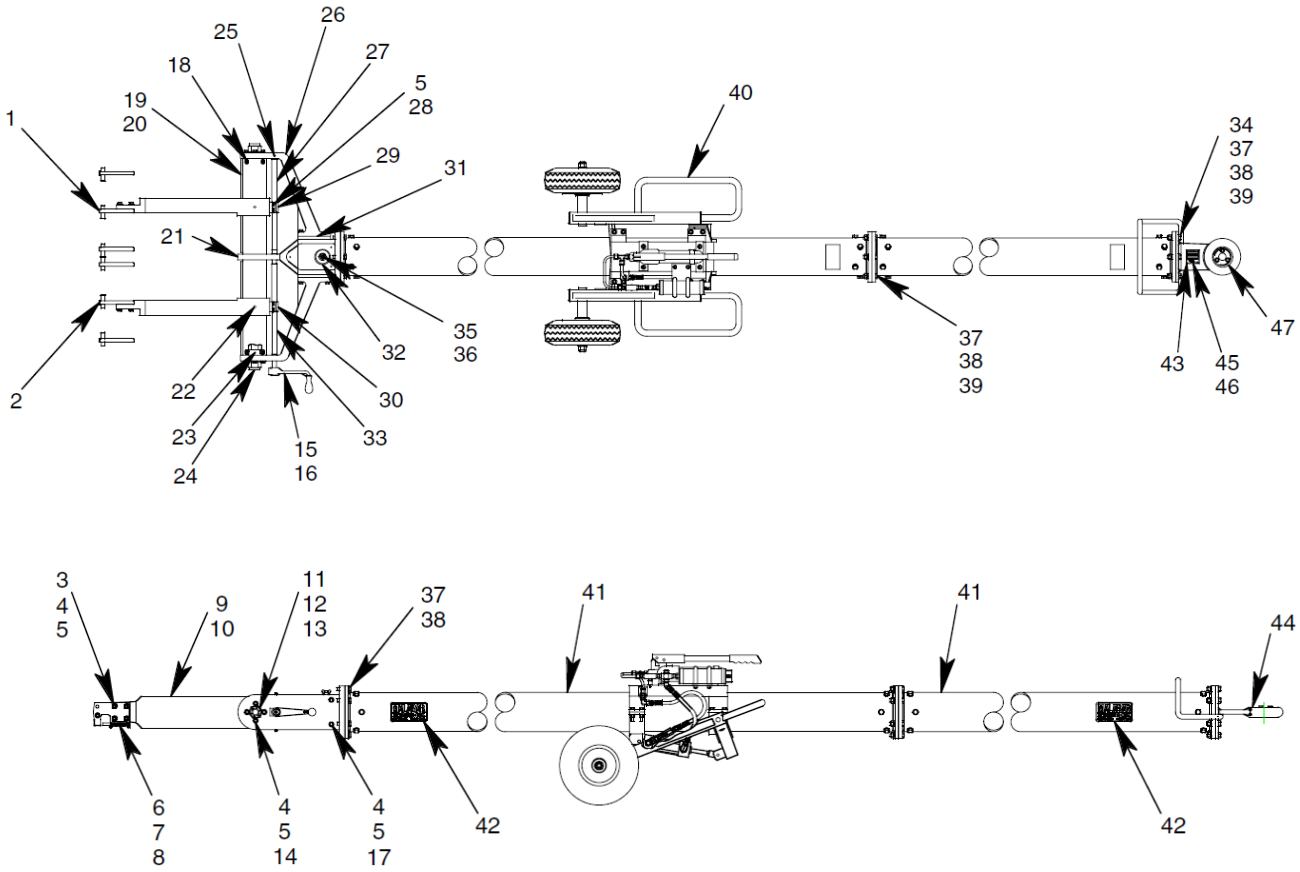
Pneumatic/Hydraulic Diagram



A - HAND PUMP ASSEMBLY
B - ACCUMULATOR
C - DOUBLE ACTING CYLINDER
D - SHUT OFF VALVE
E - FLOW CONTROL VALVE
F - RELEASE VALVE
G - RELIEF VALVE
H - OIL SCREEN
J - HAND PUMP
K - CHECK VALVE

Parts List – Figure 1

When ordering replacement parts/kits, please specify model, serial number and color of your unit.



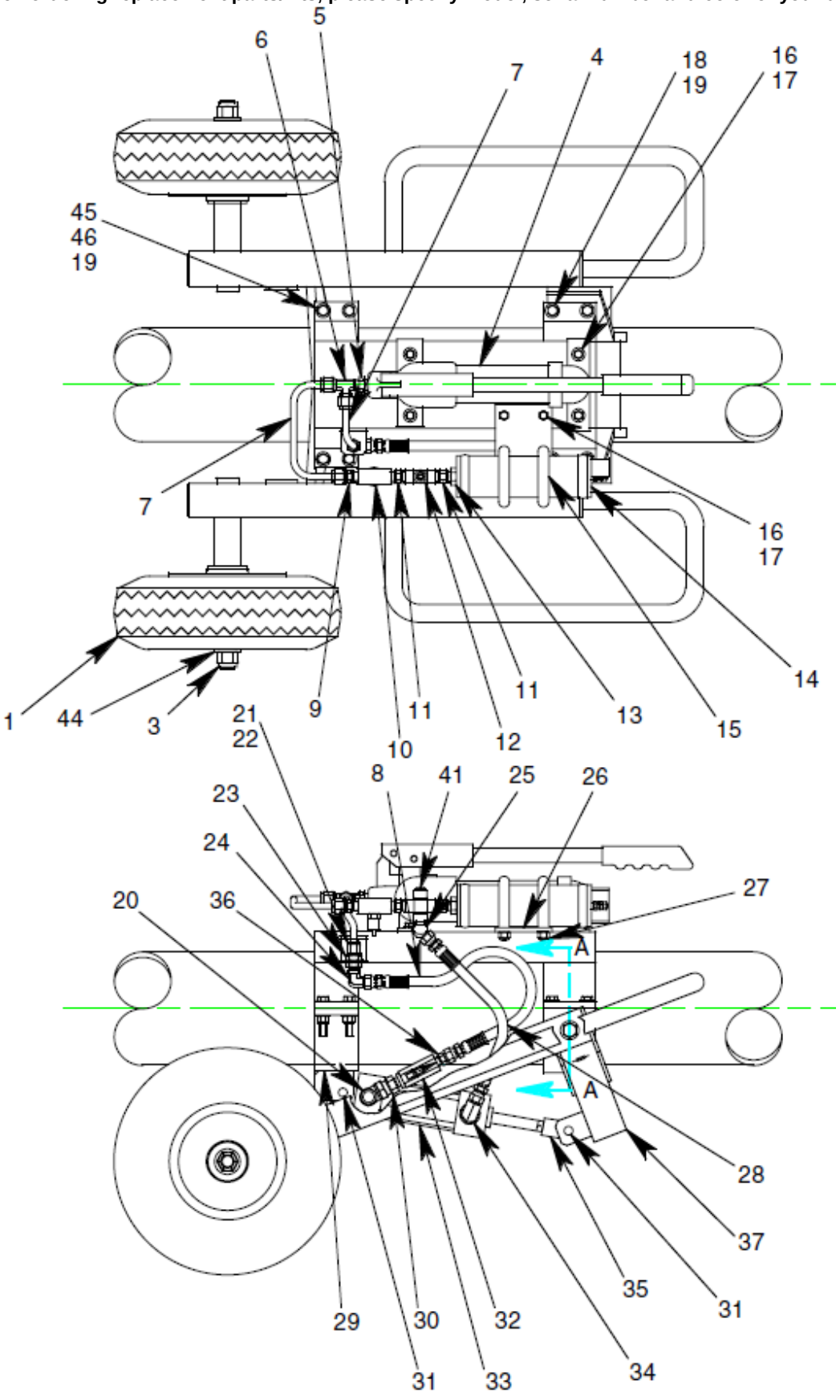
Parts List – Figure 1

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	857831-2	RIGHT HEAD	1
2	857831-1	LEFT HEAD	1
3	G-1100-107514	BOLT, 3/8-24 HEX HD GR 5	8
4	G-1250-1070N	FLATWASHER, 3/8 NARROW	24
5	G-1251-1070R	LOCK WASHER, 3/8 REGULAR	32
6	857838	HEAD PIN	2
7	857843	THUMB HEAD PIN	2
8	857837	SPRING	2
9	857857	ARM	2
10	857830	ARM BUSHING	2
11	G-1464-22	NUT, SLOTTED HEX 1- 1/4-12	2
12	AN960-2016	FLAT WASHER, 1- 1/4	2
13	372-006	COTTER PIN, 1/8 x 2 LG	2
14	G-1100-107020	BOLT, 3/8-16 HEX HD GR 5	8
15	857855	HANDLE	1
16	857844	MACHINE BOLT	1
17	G-1100-107022	BOLT, 3/8-16 HEX HD GR 5	8
18	344-009	CHCS, 3/8-24 X 5/8 LG	8
19	857836	CROSS FEED KEY	2
20	344-010	CHCS, 1/4-28 X 5/8 LG	20
21	857833	CENTER SUPPORT TUBE	1
22	G-1315-07-0.50	PIN, STL DOWEL 3/8 X 1/2	4
23	857833	CROSS PLUG	2
24	857828	CROSS SCREW	1
25	998-003	FREASE FITTING	2
26	857827	CROSS SUPPORT TUBE	2
27	857829	CROSS TUBE	1
28	G-1100-107010	BOLT, 3/8-16 HEX HD GR 5	8
29	857835-2	ARM NUT, RIGHT HAND THREAD	1
30	857835-1	ARM NUT, LEFT HAND THREAD	1
31	857824	SPACER	2
32	857841	AUXILIARY PLUG	2
33	857834	ARM SCREW	1
34	G-1250-1090N	FLATWASHER, 1/2 NARROW	6
35	857845	PLUG	1
36	358-003	WING NUT, 3/8-24	1
37	G-1100-109020	BOLT, 1/2-13 HEX HD GR 5	18
38	G-1251-1090R	LOCK WASHER, 1/2 REGULAR	18
39	G-1200-1090	NUT, 1/2-13 HEX	12
40	857810	HYDRAULIC RUNNING GEAR	1
41	857844	TOWBAR TUBE	2
42	55998	STICKER, MALABAR	4
43	397-005	SELF TAPPING SCREW, #4	4
44	857519	TOWING EYE WELDMENT	1
45	WF9-7035	NAMEPLATE	1
46	861206	NAMEPLATE (FOR CANADA)	1
47	857849	PINTLE ADAPTER ASSEMBLY	1

Parts List – Figure Hydraulic Running Gear

When ordering replacement parts/kits, please specify model, serial number and color of your unit.



Parts List – Figure Hydraulic Running Gear

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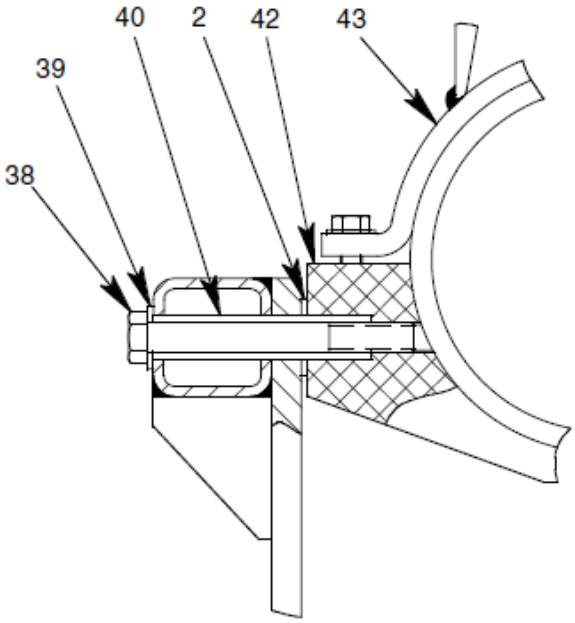

SECTION A-A

Parts List –Hydraulic Running Gear

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	492-127	WHEEL 4.10/6 TIRE	2
2	G-1255-11	WASHER, 3/4 AN	2
3	355-024	HEX LOCKNUT, 3/4-10	2
4	870760	HAND PUMP, MODIFIED	1
5	N-2210-05-S	REDUCER, 3/8 MPT X 1/4 FPT	1
6	723-009	TEE, RUN, 3/8 TUBE X 1/4 NPT	1
7	732-002	TUBE, 3/8 OD X .049 W X 18 LG	AR
8	870761-2	HOSE ASSY	1
9	721-009	CONN 3/8 TUBE X 1/4 MPT	1
10	424-029	SHUTOFF VALVE, 1/4 FPT	1
11	N-2203-04-S	NIPPLE, 1/4 NPT	2
12	N-2590-02	CROSS, STEEL PIPE	1
13	N-2202-02-S-B	ADAPTER	1
14	HC-2982	ACCUMULATOR, HYDRAULIC	1
15	G-1009-37	U-BOLT	2
16	G-1100-105006	BOLT, 1/4-20 HEX HD GR 5	6
17	G-1251-1050R	LOCK WASHER, 1/4 REGULAR	6
18	G-1100-107014	BOLT, 3/8-16 HEX HD GR 5	4
19	G-1250-1070N	FLATWASHER, 3/8 NARROW	12
20	722-088	ELBOW, 1/2 NPT X 5/8 O-RING	1
21	N-2000-05	NUT, #6 JIC X 37º	1
22	N-2019-05-S	SLEEVE, 3/8 TUBE	1
23	N-2450-05-S	LOCKNUT, BULKHEAD	1
24	N-2022-05-S	ELBOW, BULKHEAD #6 JIC	1
25	722-009	ELBOW, 45º, 3/8 TUBE X 1/4 MPT	1
26	J-8261	ACCUMULATOR PLATE	1
27	G-1202-1060	STOPNUT, 5/16-18 ELASTIC	4
28	870761-1	HOSE ASSY	1
29	857870	CYLINDER SUPPORT CLAMP	1
30	N-2203-08-S	NIPPLE, PIPE	1
31	426-020	PIN WITH RETAINERS, 1/2 DIA	2
32	422-054	FLOW CONTROL VALVE	1
33	426-018	HYDRAULIC CYLINDER, 1-1/2 BORE	1
34	722-083	ELBOW, 3/8 TUBE X 5/8 O-RING	1
35	426-019	ROD EYE, 7/16-20	1
36	N-2009-08-S	CONNECTOR, MALE	1
37	857898	ARM CARRIAGE	1
38	G-1100-109004	BOLT, 1/2-13 HEX HD GR 5	2
39	G-1250-1090N	FLATWASHER, 1/2 NARROW	2
40	870712	PIVOT SLEEVE	2
41	N-2205-03-S	PLUG, HOLLOW HEX	1
42	857872	CRADLE	1
43	857871	CARRIAGE CLAMP	1
44	G-1250-1110N	FLATWASHER, 3/4 NARROW	2
45	G-1100-107020	BOLT, 3/8-16 HEX HD GR 5	4
46	G-1202-1070	STOPNUT, 3/8-16 ELASTIC	4