

# Rugby Manufacturing Direct Mount Unit Manual

## Preface

### INSTALLATION & OPERATION MANUAL



## INTRODUCTION

*IMPORTANT!! Read this manual thoroughly prior to installation and operation. This manual outlines the installation and operation of a Direct Mount unit sold by Rugby Manufacturing Co. This manual should be kept readily accessible for any potential operator at all times. Should you have any questions or concerns, please contact your dealer or a Rugby Manufacturing customer service representative before use.*

Toll Free: 1-800-869-9162 • Office: 1-701-776-5722 • Fax: 1-701-776-6235  
Visit [www.rugbymfg.com](http://www.rugbymfg.com) for further information.

**Serial Number:** \_\_\_\_\_

**In Service Date:** \_\_\_\_\_

# Rugby Manufacturing Direct Mount Unit Manual

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# Rugby Manufacturing Direct Mount Unit Manual

## How to use this manual

This manual provides guidelines and instructions for correctly installing, operating, and maintaining your direct mount unit. Any and all people that own and operate this product must read and fully understand each section in this manual.

## Labels

Throughout this manual, the three following types of labels will be used: danger, warning, and caution. It is imperative that all labels are obeyed, for the safety of the operator.



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



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

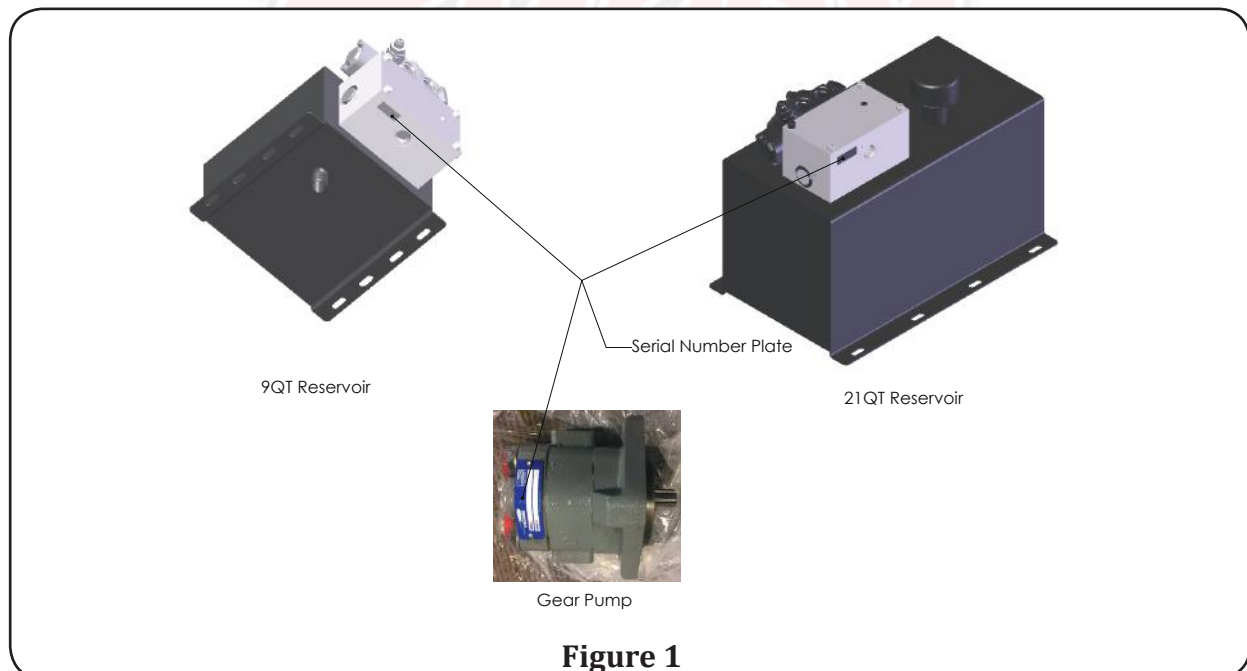


Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

## Reference Information

### Serial Number

This information is required for any warranty or service inquiries, and should be recorded on the front page of this manual for easy reference.



**Figure 1**

The valve serial number is located on the bottom of the valve manifold for a 9QT reservoir application, and on the side for a 21QT application (Figure 1). The gear pump serial number is located on the side of the unit (Figure 1).

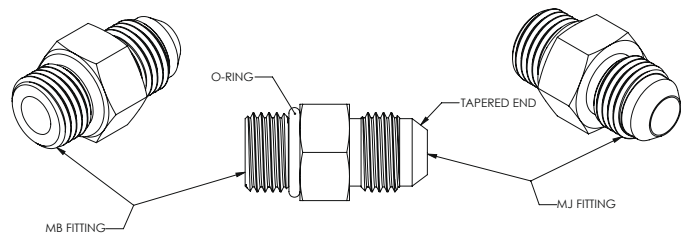
# Rugby Manufacturing Direct Mount Unit Manual

## Reference Information Cont.

### Special Designations

This manual contains descriptions of hydraulic fittings. In describing these fittings, special designations are used. These designations and their meanings are as follows:

Special Designations	
Abbreviation	Definition
MB	Male O-Ring Boss
FB	Female O-Ring Boss
MJ	Male JIC
FJ	Female JIC
FJX	Female JIC Swivel
FJX90	Female JIC Swivel Elbow
MP	Male Pipe Thread (NPT)
FP	Female Pipe Thread (NPT)
HB	Barb
<b>Dash Sizes</b>	<b>-4, -6, -8, -10, -12</b>



The type of fittings that are included will vary depending on the model of the hoist being installed. A restricted fitting is supplied in each kit and must be installed at the base end of the hoist cylinder.

### Specifications

The below fluid type specifications are recommended by the reservoir and valve supplier, Bucher Hydraulics:

- Fluid must be compatible with Buna-N sealing compounds.
- The pour point must be below the lowest anticipated temperature that will be encountered.
- It should contain Rust and Oxidation as well as other detergent type inhibitors.
- The Viscosity (SUS) should lie between 80 as a minimum and 375 as a maximum in the operating range, with ideal viscosity near 200 SUS.
- The viscosity index should be as high as possible. As an example, automatic transmission fluid has the following specifications as listed by most oil manufacturers:

Viscosity (SUS)

100°F 185 to 205

210°F 45 to 55

Pour Point -45°F to -35°F

Viscosity Index 145 to 165

**NOTE:** Be sure not to mix fluids that are not compatible with one another.

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## Assembly

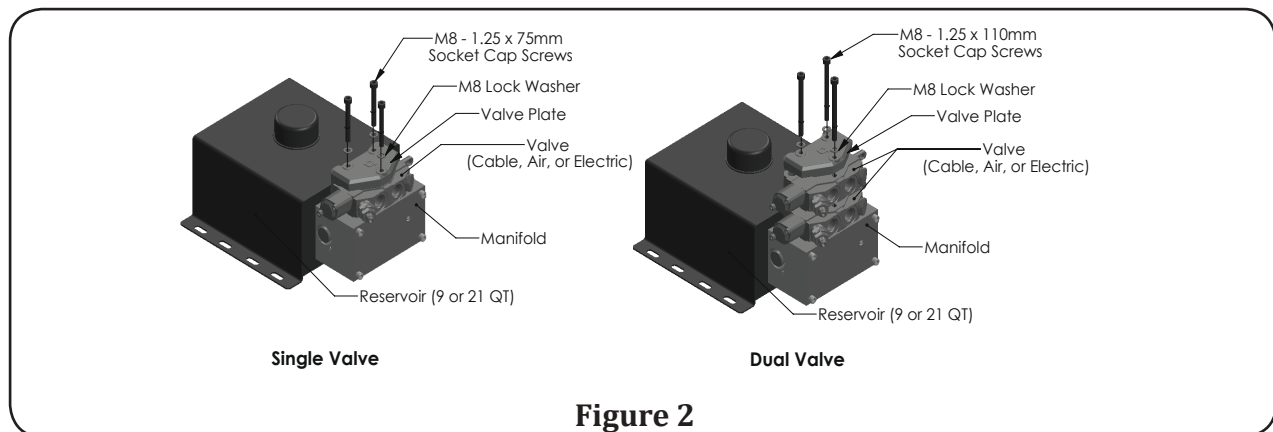


Figure 2

1. Assemble the valve body to the reservoir and manifold assembly using the provided hardware (Figure 2). If installing an auxiliary valve, stack the valves as shown and use the hardware provided in the dual valve kit (Figure 2).

NOTE: When installing the valve(s) and valve plate, ensure the o-rings are properly positioned to form a tight seal between the two surfaces.

## Installation

### Mounting & Hydraulics

1. Mount the reservoir and valve assembly to the location of choice.
  - For LR-series applications, the 9QT and 21QT reservoir/valve assembly will need to be mounted along the outer chassis rails within reach of the 9' suction hose.
  - For SR-series applications, the 9QT reservoir/valve assembly may be mounted on the sub-frame pump plate. The 21QT will need to be mounted along the outer chassis rails within reach of the 9' suction hose.
2. If applicable, install the PTO onto the vehicle's transmission, following the manufacturer's instructions.
3. Position the pump's splined shaft into the PTO and secure the pump to the PTO using the provided 3/8" x 1-1/4" hex cap screws and lock washers.
4. Install fittings and hydraulics as shown in the applicable Hydraulic Components Diagram.

### Cable Operated Valve

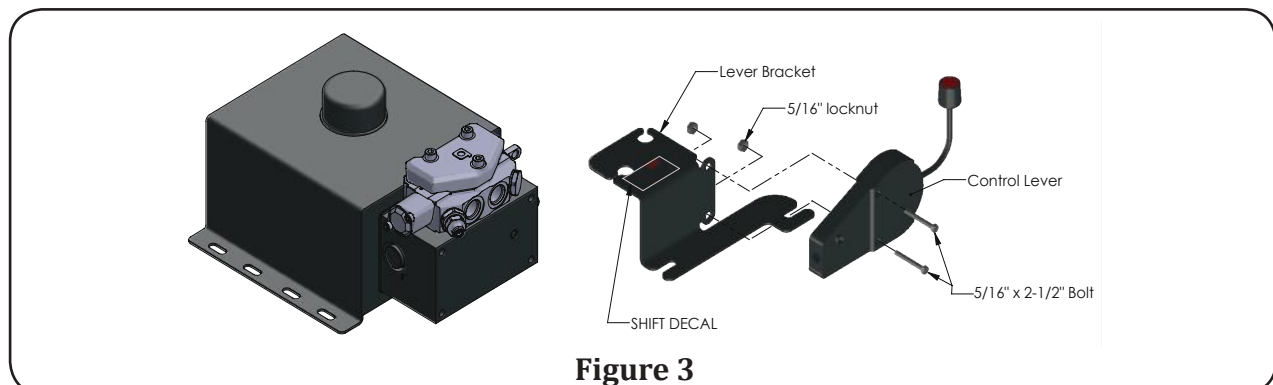


Figure 3

1. Install the control cable to the valve using the instructions provided with the remote valve control cable kit.

# Rugby Manufacturing Direct Mount Unit Manual

## Installation Cont.

2. Install the control lever bracket by drilling holes & fastening the lever bracket to the desired location inside the cab.
3. Using the provided 5/16" x 2-1/2" Gr 5 bolts and 5/16" locknuts, fasten the control lever to the bracket (Figure 3).
4. Install the control cable onto the control lever.

## Air Operated Valve

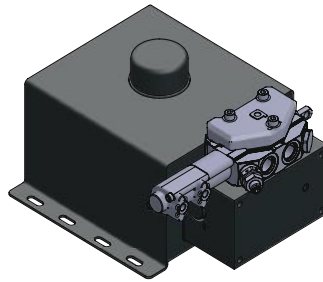


Figure 4

1. Install the air toggle switch bracket in the cab at the desired location. Fasten the toggle valve included with the air valve kit to the supplied bracket & finger guard.
2. Follow the air toggle switch manufacturer's instructions to route the air lines (not included) from the valve to the toggle switch.

**⚠ DANGER**

Remove jewelry and other objects that may conduct electricity before working with electrical systems.

## Electric Operated Valve

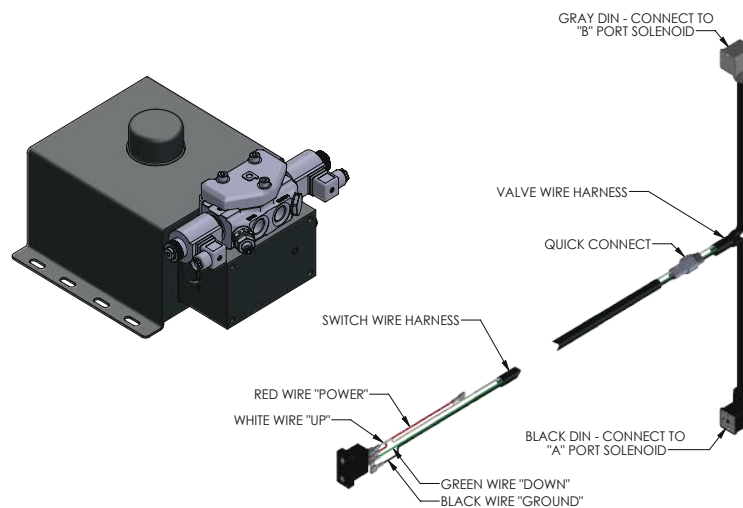


Figure 5

1. Connect the gray DIN connector of the valve wire harness to the "B" port solenoid, and the black DIN connector to the "A" port solenoid.

# Rugby Manufacturing Direct Mount Unit Manual

## Installation Cont.

2. Connect the valve wire harness to the switch wire harness and route the switch harness into the cab.

**NOTE:** Avoid routing wires/cables near sharp edges, pinch points, or high heat areas.

3. Install the switch mounting bracket by drilling holes & fastening the bracket to the desired location inside the cab. Next, install the rocker switch into the bracket.
4. Connect the white wire to the top prong of the rocker switch (power up), and the green wire to the bottom prong of the rocker switch (power down).
5. Connect the black wire to a direct ground, such as the vehicle's negative battery post. (Do not rely on the vehicles ground circuit.)
6. Connect one end of the red power wire to the center prong of the rocker switch, and the other end of the red wire to the vehicles 12VDC power source.

## Operation



Fluid under pressure can pierce the skin and enter the bloodstream, causing serious injury or death. Always wear eye protection and protective clothing when working around hydraulic systems.

1. Fill the reservoir with automatic transmission fluid (ATF Dexron II or equivalent. See "**Specifications**").



- During dumping operations, no one must be allowed to stand in or move through the area where the body and hoist operate or into an area where an upset load might fall.
- Controls must be in a safe location, and it must not be possible for the operator to be under body during dumping operation.
- Damaged or malfunctioning equipment may cause injury or death. Repair or replace any damaged or malfunctioning equipment before continuing its use.

2. Raise the hoist, following the steps in the applicable section below, and secure the body/hoist up with the body prop(s).

### Cable Operated Valve

- Engage the PTO from the cab.

**NOTE:** Do not operate the pump at more than 3400 RPM (PTO speed). The rate of your PTO speed and engine speed will depend on the gear ratio in the PTO driver installed in your truck transmission.

- To raise the hoist, push in the knob of the tower control lever and move the lever to the "Up" position. Adjust the engine speed to obtain the desired speed of lift.
- When the hoist reaches its raised limit, the pump will bypass. Care should be taken not to let the pump bypass for long periods, as it puts stress on the entire hydraulic system. To stop the pump from bypassing, return the control lever to the center "Neutral" position.
- To lower the hoist, push in the knob of the tower control lever and move the shift lever to the "Down" position.
- To lock the hoist against the truck frame when the hoist is in the down position, move the

# Rugby Manufacturing Direct Mount Unit Manual

## **Operation Cont.**

shifter lever to the “Down” position. When the pump bypasses, move the shifter lever to the center or “Neutral” position.

- Before transporting the truck, disengage the PTO drive shaft.

## **Air Operated Valve**

- Engage the PTO from the cab.
- To raise the hoist, hold the toggle lever at the “Up” position. Adjust the engine speed to obtain the desired speed of lift.
- When the hoist reaches its raised limit, the pump will bypass. Care should be taken not to let the pump bypass for long periods, as it puts stress on the entire hydraulic system. To stop the pump from bypassing, release the toggle lever to return the toggle back to the center position.
- To lower the hoist, hold the toggle lever at the “Down” position.
- To lock the hoist against the truck frame when the hoist is in the down position, hold the toggle lever at the “Down” position. When the pump bypasses, release the toggle lever to return the toggle back to the center position.
- Before transporting the truck, disengage the PTO drive shaft.

## **Electric Operated Valve**

- Engage the PTO from the cab.
  - To raise the hoist, hold the rocker switch at the “Up” position. Adjust the engine speed to obtain the desired speed of lift.
  - When the hoist reaches its raised limit, the pump will bypass. Care should be taken not to let the pump bypass for long periods, as it puts stress on the entire hydraulic system. To stop the pump from bypassing, release the rocker switch to return it to the center position.
  - To lower the hoist, hold the rocker switch at the “Down” position.
  - To lock the hoist against the truck frame when the hoist is in the down position, hold the rocker switch at the “Down” position. When the pump bypasses, release the rocker switch to return it to the center position.
  - Before transporting the truck, disengage the PTO drive shaft.
3. Operate the power unit several times starting with short cylinder strokes and increasing length-with each successive stroke.
  4. Recheck oil level often and add as necessary to keep pump from picking up air.
  5. After the hoist has been fully raised and lowered repeatedly to purge air from the cylinder, lower the hoist and check oil level in reservoir. With the hoist down, the reservoir should be full within 1.5” of the top. DO NOT OVERFILL.
  6. Install filler/breather cap in the reservoir fill hole.

**NOTE:** Do not use a solid plug or a filler cap without a breather element, as this will cause damage to the reservoir.

**NOTE:** Failure to disengage the PTO drive shaft can cause serious damage to the hydraulic pump.

Check the following monthly to ensure proper operation:



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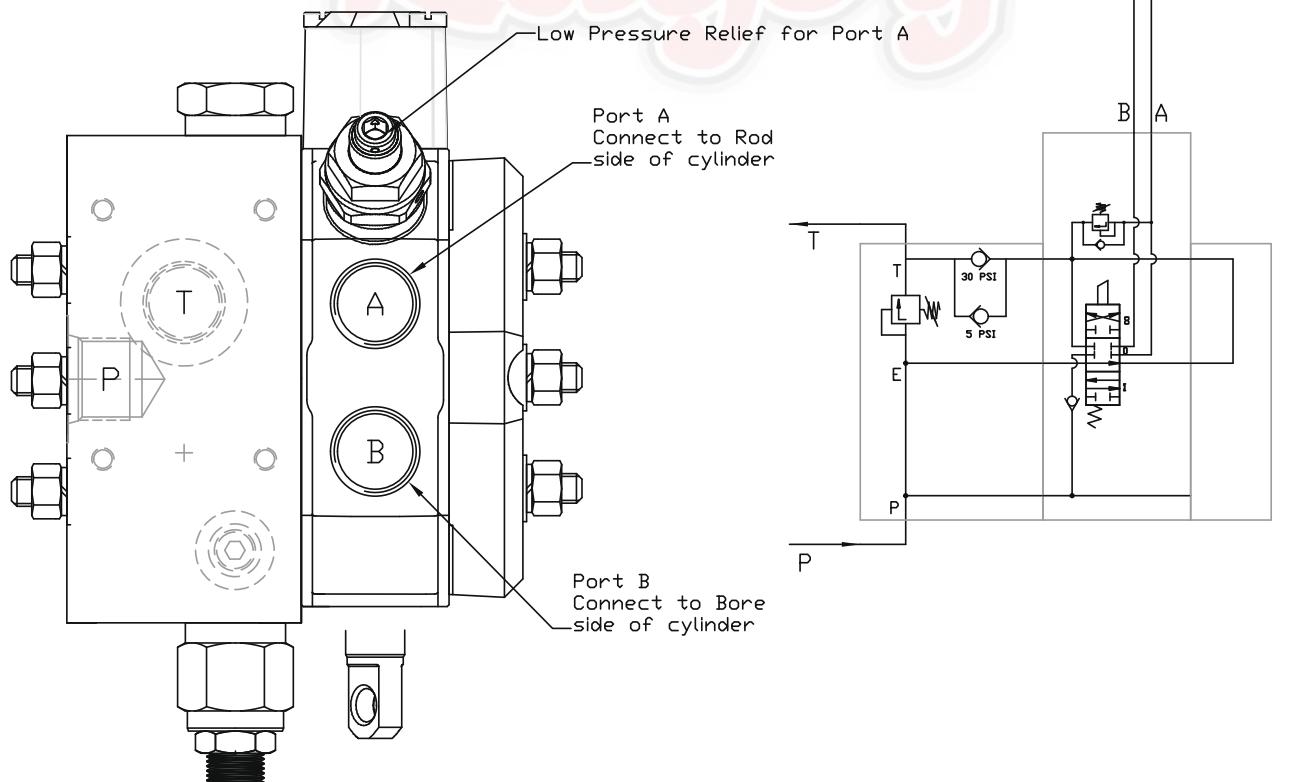
## Maintenance

1. Wiring, electrical connectors, power cables (positive & ground), valves, and coils for any corrosion, rust or loose hardware. Electrical components must be kept free of corrosion and rust in order to function properly.
2. Hoses & fittings for cracks, leaks or any other exterior damage. Tighten all fittings as needed.
3. Reservoir for leaks or other damage.
4. Vent cap for any dirt or debris.
5. Oil level should be at fill line/1.5" from the top. Change fluid annually to remove condensation and entrapped debris.

**NOTE:** Always use clean automatic transmission fluid in the power unit. Refer to "**Specifications**" for fluid type recommendations.

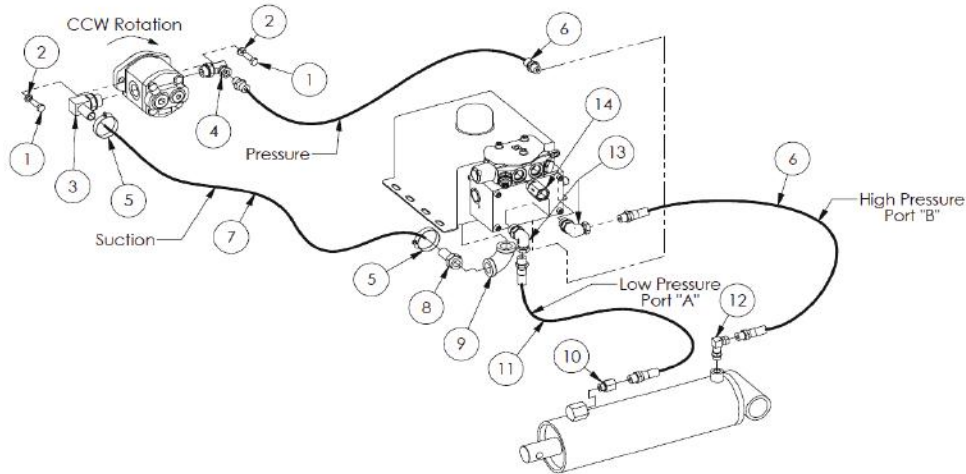
## Hydraulic Component Diagrams

ALL PORT CONNECTIONS SAE-10



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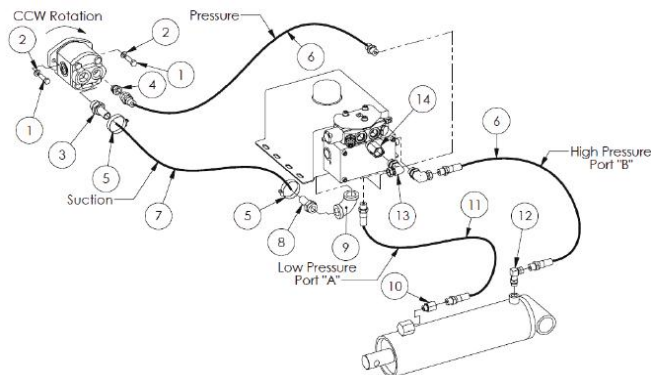
## Hydraulic Component Diagrams



4GPM/9QT/CCW/Side Ports							
ITEM	PART #	DESCRIPTION	QTY	ITEM	PART #	DESCRIPTION	QTY
1	1653808	HHC SCREW, 3/8-16 X 1-1/4, GR5, PLT	2	8	1653957	ADAPTER, 12HB-12MP	1
2	1653854	NUT, 3/8-16 GR5 ZP HEX	2	9	1653956	ADAPTER, 12FP-12FP90, BLACK IRON	1
3	1653959	ADAPTER, 12HB-12MB90	1	10	1653974	ADAPTER, 6FP-6MB W/CHAMFERED END	1
4	1653955	ADAPTER, 10MB-6FPX90	1	11	1653979	HOSE, 3/8" X 7' 6MP-6MP 100R17	1
5	1653907	CLAMP, HOSE #5024	2	12	1653966	ADAPTER, 6MB-6FPX90, FORGED ONLY	1
6	1653975	HOSE, 3/8" X 5' 6MP-6MP 100R17	2	13	1829025	ADAPTER, 10MB-06FPX90	2
7	1654015	HOSE, 3/4" X 6' 100R4	1	14	1829011	ADAPTER, 10MB-10FB	1

**Figure 6**

### 4GPM Pump - 9QT Reservoir - CCW PTO Rotation - Side Ports



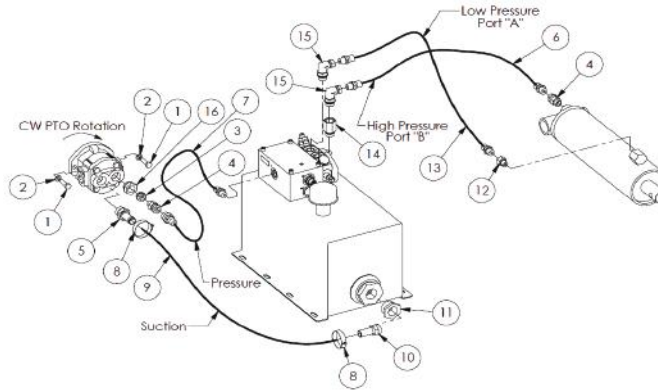
4GPM/9QT/CCW/Rear Ports							
ITEM	PART #	DESCRIPTION	QTY	ITEM	PART #	DESCRIPTION	QTY
1	1653808	HHC SCREW, 3/8-16 X 1-1/4, GR5, PLT	2	8	1653957	ADAPTER, 12HB-12MP	1
2	1653854	NUT, 3/8-16 GR5 ZP HEX	2	9	1653956	ADAPTER, 12FP-12FP90, BLACK IRON	1
3	1653959	ADAPTER, 12HB-12MB90	1	10	1653974	ADAPTER, 6FP-6MB W/CHAMFERED END	1
4	1653954	ADAPTER, 10MB-6FPX	1	11	1653979	HOSE, 3/8" X 7' 6MP-6MP 100R17	1
5	1653907	CLAMP, HOSE #5024	2	12	1653966	ADAPTER, 6MB-6FPX90, FORGED ONLY	1
6	1653975	HOSE, 3/8" X 5' 6MP-6MP 100R17	2	13	1829025	ADAPTER, 10MB-06FPX90	2
7	1654015	HOSE, 3/4" X 6' 100R4	1	14	1829011	ADAPTER, 10MB-10FB	1

**Figure 7**

### 4GPM Pump - 9QT Reservoir - CCW PTO Rotation - Rear Ports

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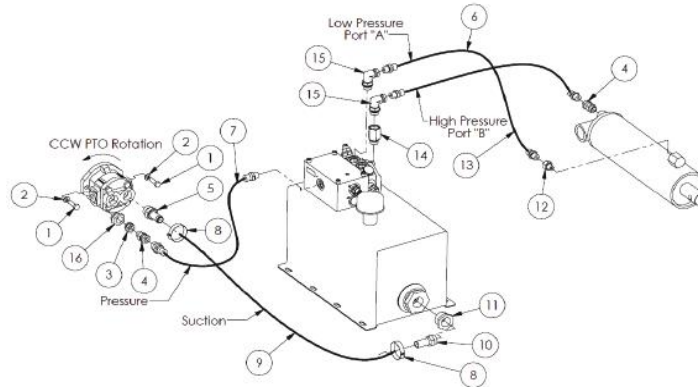
## Hydraulic Component Diagrams Cont.



6GPM/21QT/CW							
ITEM	PART #	DESCRIPTION	QTY	ITEM	PART #	DESCRIPTION	QTY
1	1653827	HHC SCREW, 1/2-13 X 1-1/2, GR5, PLT	2	9	1654017	HOSE, 1" X 8' 100R4	1
2	1653880	WASHER, 1/2 LOCK, PLATED	2	10	1653952	ADAPTER, 16MP-16HB	1
3	1653961	ADAPTER, 12MB-8FB	1	11	1653964	ADAPTER, 20MP-16FP, BLACK IRON	1
4	1653962	ADAPTER, 8MB-6FPX	2	12	1654508	ADAPTER, 6MB-6FPX	1
5	1653949	ADAPTER, 16HB-16MB	1	13	1653979	HOSE, 3/8" X 7' 6MP-6MP 100R17	1
6	1653975	HOSE, 3/8" X 5' 6MP-6MP 100R17	1	14	1829011	ADAPTER, 10MB-10FB	1
7	1654571	HOSE, 3/8" X 9' 6MP-6MP 100R17	1	15	1829025	ADAPTER, 10MB-06FPX90	2
8	1653907	CLAMP, HOSE #5024	2	16	1653953	ADAPTER, 16MB-12FB	1

Figure 8

## 6GPM Pump - 21QT Reservoir - CW PTO Rotation - Rear Ports



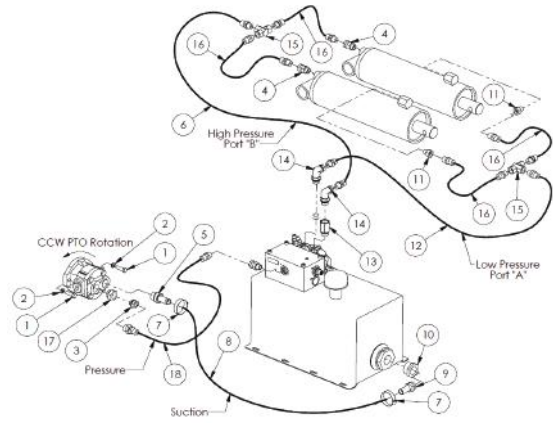
6GPM/21QT/CCW							
ITEM	PART #	DESCRIPTION	QTY	ITEM	PART #	DESCRIPTION	QTY
1	1653827	HHC SCREW, 1/2-13 X 1-1/2, GR5, PLT	2	9	1654017	HOSE, 1" X 8' 100R4	1
2	1653880	WASHER, 1/2 LOCK, PLATED	2	10	1653952	ADAPTER, 16MP-16HB	1
3	1653961	ADAPTER, 12MB-8FB	1	11	1653964	ADAPTER, 20MP-16FP, BLACK IRON	1
4	1653962	ADAPTER, 8MB-6FPX	2	12	1654508	ADAPTER, 6MB-6FPX	1
5	1653949	ADAPTER, 16HB-16MB	1	13	1653979	HOSE, 3/8" X 7' 6MP-6MP 100R17	1
6	1653975	HOSE, 3/8" X 5' 6MP-6MP 100R17	1	14	1829011	ADAPTER, 10MB-10FB	1
7	1654571	HOSE, 3/8" X 9' 6MP-6MP 100R17	1	15	1829025	ADAPTER, 10MB-06FPX90	2
8	1653907	CLAMP, HOSE	2	16	1653953	ADAPTER, 16MB-12FB	1

Figure 9

## 6GPM Pump - 21QT Reservoir - CCW PTO Rotation - Rear Ports

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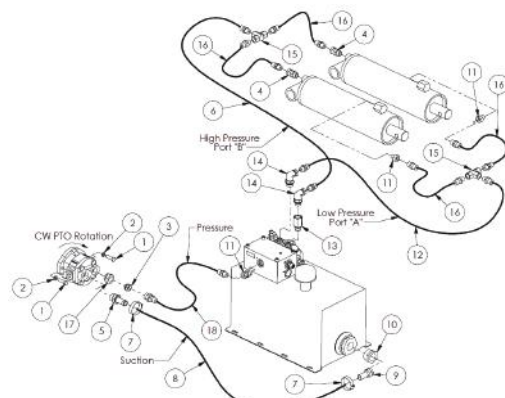
## Hydraulic Component Diagrams Cont.



11GPM/21QT/CCW							
ITEM	PART #	DESCRIPTION	QTY	ITEM	DESCRIPTION	QTY	
1	1653827	HHC SCREW, 3/8-16 X 1-1/4, GRS, PLT	2	10	1653964	ADAPTER, 20MP-16FP, BLACK IRON	1
2	1653880	NUT, 3/8-16 GRS ZP HEX	2	11	1654508	ADAPTER, 6MB-6FPX	2
3	1653950	ADAPTER, 12MB-8FP	1	12	1653983	HOSE, 1/2" X 7' 8MP-8MP 100R17	1
4	1653962/1653966	ADAPTER, 6MB-6FPX/ADAPTER, 6MB-6FPX90	2	13	1653997	HEX NIPPLE, 8MP-8MP	2
5	1653949	ADAPTER, 16MB-16MB	1	14	1829018	ADAPTER, 10MB-8FPX90	2
6	1653982	HOSE, 1/2" X 5' 8MP-8MP 100R17	1	15	1654003	TEE, 6FPX-8FP-6FPX	2
7	1653907	CLAMP, HOSE	2	16	1653980	HOSE, 3/8" X 15' 6MP-6MP 100R17	4
8	1654017	HOSE, 1" X 8' 100R4	1	17	1653953	ADAPTER, 16MB-12FB	1
9	1653952	ADAPTER, 16MP-16HB	1	18	1654570	HOSE, 1/2" X 9' 8MP-8MP 100R17	1

Figure 10

11GPM Pump - 21QT Reservoir - CCW PTO Rotation - Rear Ports



11GPM/21QT/CW							
ITEM	PART #	DESCRIPTION	QTY	ITEM	DESCRIPTION	QTY	
1	1653827	HHC SCREW, 3/8-16 X 1-1/4, GRS, PLT	2	10	1653964	ADAPTER, 20MP-16FP, BLACK IRON	1
2	1653880	NUT, 3/8-16 GRS ZP HEX	2	11	1654508	ADAPTER, 6MB-6FPX	2
3	1653950	ADAPTER, 12MB-8FP	1	12	1653983	HOSE, 1/2" X 7' 8MP-8MP 100R17	1
4	1653962/1653966	ADAPTER, 6MB-6FPX/ADAPTER, 6MB-6FPX90	2	13	1653997	HEX NIPPLE, 8MP-8MP	2
5	1653949	ADAPTER, 16MB-16MB	1	14	1829018	ADAPTER, 10MB-8FPX90	2
6	1653982	HOSE, 1/2" X 5' 8MP-8MP 100R17	1	15	1654003	TEE, 6FPX-8FP-6FPX	2
7	1653907	CLAMP, HOSE	2	16	1653980	HOSE, 3/8" X 15' 6MP-6MP 100R17	4
8	1654017	HOSE, 1" X 8' 100R4	1	17	1653953	ADAPTER, 16MB-12FB	1
9	1653952	ADAPTER, 16MP-16HB	1	18	1654570	HOSE, 1/2" X 9' 8MP-8MP 100R17	1

Figure 11

11GPM Pump - 21QT Reservoir - CW PTO Rotation - Rear Ports