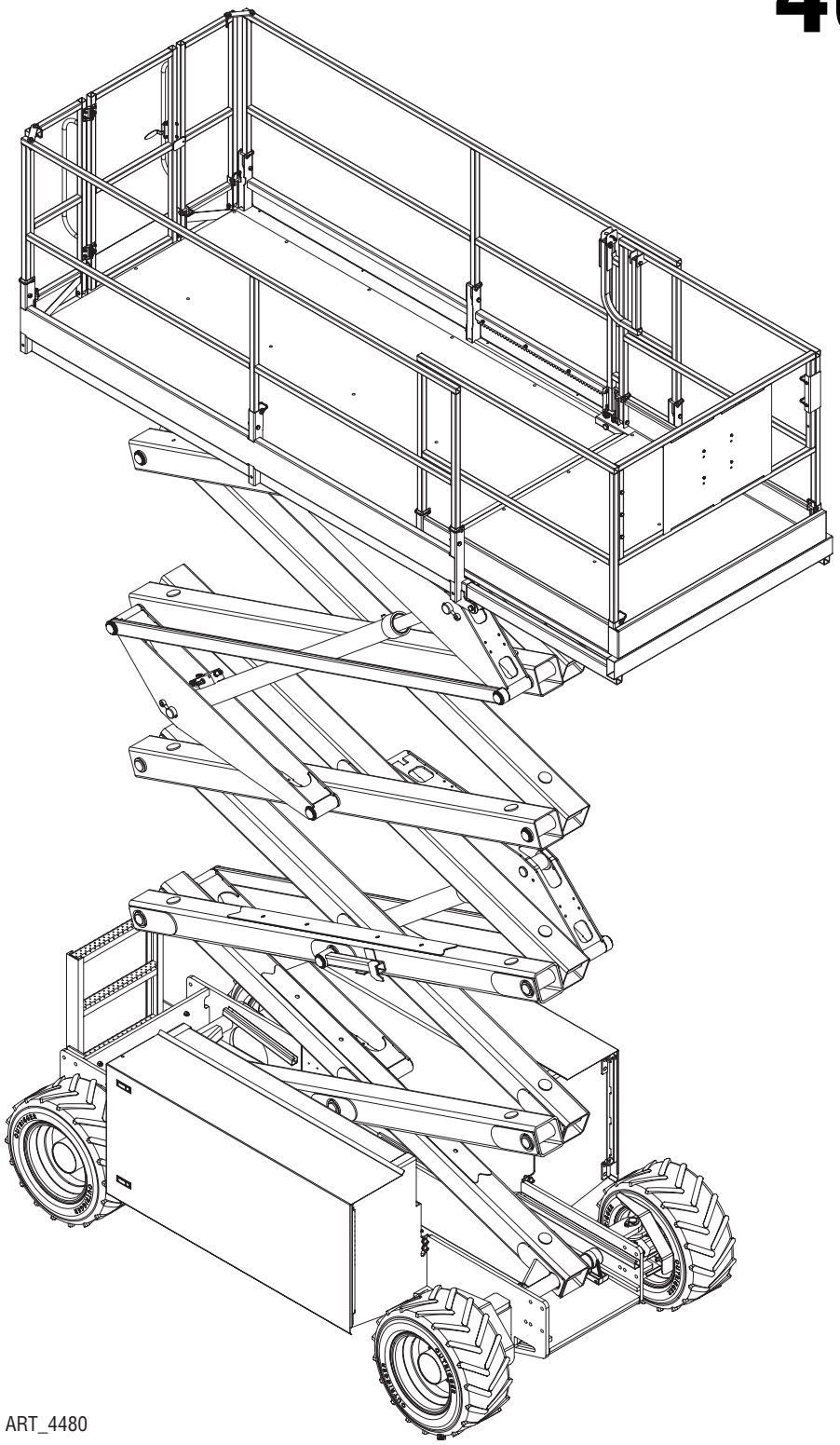
SERVICE AND PARTS MANUAL

4069RT



ART_4480

Serial Number Range
13500001 - Up

Part # 93080
September 2023

Revision History

Original Release Date: November 2013

Date	Reason for Update
November 2013	New Release

Aerial Platform Sales Corp.

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NOTES:

INTRODUCTION

This manual consists of Service and Illustrated Parts sections.

The Service Section of this manual is designed to provide you, the customer, with the instructions needed to properly maintain the MEC self-propelled aerial work platform. When used in conjunction with the Illustrated Parts Section and the Operators Manual (provided separately), this manual will assist you in making necessary adjustments and repairs, and identifying and ordering the correct replacement parts.

All parts represented here are manufactured and supplied in accordance with MEC quality standards.

We recommend that you use genuine MEC parts to ensure proper operation and reliable performance.

To obtain maximum benefits from your MEC Aerial Work Platform, always follow the proper operating and maintenance procedures. Only trained authorized personnel should be allowed to operate or service this machine. Service personnel should read and study the Operator's, Service and Parts Manuals in order to gain a thorough understanding of the unit prior to making any repairs.

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Machine Specifications

		4069RT	
Working Height*		46 ft	14 m
Platform Height		40 ft	12 m
Maximum Drive Height		40 ft	12 m
Stowed Height	Top Guardrail	95.5 in.	2.43 m
	Rails Folded	64 in.	1.63 m
	Platform Floor	51 in.	1.3 m
Guardrail Height		43.5 in.	1.11 m
Toeboard Height		6 in.	15 cm
Machine Weight** (Unloaded)		11,000 lb	4,990 kg
Lift Capacity	Total	900 lb	410 kg
	Platform	600 lb	274 kg
	Sheet Material Rack	300 lb	136 kg
Deck Extension Capacity		1 Person / 250 lb (113 kg)	
Maximum Occupants		2	
Length-Stowed (Overall)		126 in.	3.2 m
Length-Stowed (Without Step)		125 in.	3.18 m
Length-Stowed, with optional Outriggers		145 in.	3.64 m
Platform Length (Extended)		166 in.	4.22 m
Platform Length (Retracted)		118 in.	3 m
Width (Overall)		69 in.	1.75 m
Platform Width (Outside)		59 in.	1.5 cm
Sheet Rack Width		7 in.	18 cm
Wheel Base		94.5 in	2.4 m
Turning Radius--Inside		79 in.	2 m
Ground Clearance		10 in	25 cm
Drive Speed (Proportional)	Platform Stowed	0-3.4 mph	0-5.5 km/h
	Platform Elevated†	0-.5 mph max.†	0-.8 km/h max.†
Gradability		40%/21.8°	
Breakover Angle		42%/23°	
Optional Outrigger Range Of Motion		10° side to side	
Maximum Ground Pressure, Wheel		123 psi	8.6 kg/cm^2
Maximum Ground Pressure, Outrigger Pad		56 psi	3.9 kg/cm^2
Maximum Wheel Load		3540 lb	1605 kg
Maximum Operating Wind Speed		28 mph / 12.5 m/sec (45 km/h)	
Tire Size		26" x 12" / 66 cm x 33 cm	
Tire Pressure		55 psi	
Wheel Bolt Torque		55 ft/lb	74.6 Nm
Hydraulic Pressure	Drive System	3500 psi/ 240 bar	
	Lift System	3200 psi / 220 bar	
Hydraulic Fluid Capacity		14 gal / 53 liter	
System Voltage		12 Volt DC	
Fuel Capacity		15 gal/ 57 liter	
Battery		Type 31 1000CCA	
Engine		**Diesel** -- Kubota D1105 24.8 HP (18.8 kW) Tier 4 **Dual Fuel** -- Kubota DF752, 20HP (14.9 kW)	

Meets applicable requirements of ANSI A92.6-2006.

*Working Height adds 6 feet (2 m) to platform height. **Weight may increase with certain options.

†Drive speed while elevated is inversely proportional to platform height; the higher the platform is, the lower the maximum elevated drive speed. The machine is driveable at full height.

MEC Operator Policy

NOTE: The best method to protect yourself and others from injury or death is to use common sense. If you are unsure of any operation, don't start until you are satisfied that it is safe to proceed and have discussed the situation with your supervisor.

Service personnel and machine operators must understand and comply with all warnings and instructional decals on the body of the machine, at the ground controls, and platform control console.

DANGER

MODIFICATIONS OF THIS MACHINE FROM THE ORIGINAL DESIGN AND SPECIFICATIONS WITHOUT WRITTEN PERMISSION FROM MEC ARE STRICTLY FORBIDDEN. A MODIFICATION MAY COMPROMISE THE SAFETY OF THE MACHINE, SUBJECTING OPERATOR(S) TO SERIOUS INJURY OR DEATH.

MEC's policies and procedures demonstrate our commitment to Quality and our relentless ongoing efforts towards Continuous Improvement, due to which product specifications are subject to change without notice.

Any procedures not found within this manual must be evaluated by the individual to assure oneself that they are "proper and safe."

Your MEC Aerial Work Platform has been designed, built, and tested to provide many years of safe, dependable service. Only trained, authorized personnel should be allowed to operate or service the machine.

MEC, as manufacturer, has no direct control over machine application and operation. Proper safety practices are the responsibility of the user and all operating personnel.

If there is a question on application and/or operation contact:

MEC Aerial Work Platform

1401 S. Madera Avenue

Kerman, CA 93630 USA

Ph: 1-800-387-4575

www.mecAWP.com

Safety Symbols

To help you recognize important safety information, we have identified warnings and instructions that directly impact on safety with the following signals:

"DANGER" INDICATES AN IMMINENTLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, WILL RESULT IN DEATH OR SERIOUS INJURY.

THIS SIGNAL WORD IS LIMITED TO THE MOST EXTREME SITUATIONS.

"WARNING" INDICATES A POTENTIALLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, COULD RESULT IN DEATH OR SERIOUS INJURY.

"CAUTION" indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

"Caution" without alert symbol indicates a situation which, if not avoided, may result in property damage.

General Safety Tips

Regular inspection and conscientious maintenance is the key to efficient economical operation of your aerial work platform. It will help to assure that your equipment will perform satisfactorily with a minimum of service and repair.

The actual operating environment of the machine governs the inspection schedule. Correct lubrication is an essential part of the preventative maintenance to minimize wear on working parts and ensure against premature failure. By maintaining correct lubrication, the possibility of mechanical failure and resulting downtime is reduced to a minimum.

- Never leave hydraulic components or hoses open. They must be protected from contamination (including rain) at all times.
- Never open a hydraulic system when there are contaminants in the air.
- Always clean the surrounding area before opening hydraulic systems.
- Use only recommended lubricants. Improper lubricants or incompatible lubricants may be as harmful as no lubrication.
- Watch for makeshift “fixes” which can jeopardize safety as well as lead to more costly repair.

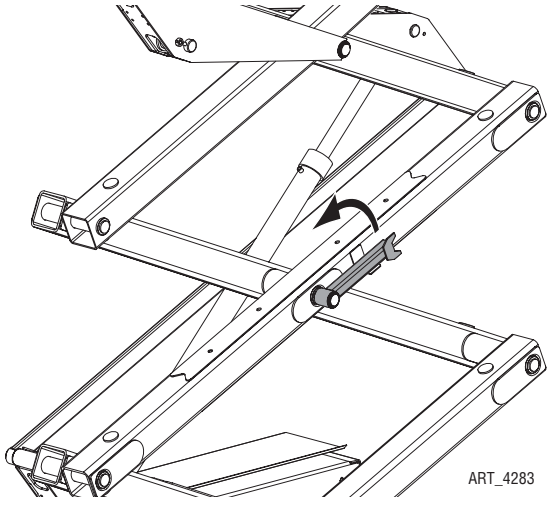
Maintenance Lock

WARNING

DEATH OR SERIOUS INJURY HAZARD!
NEVER PERFORM WORK OR INSPECTION ON THE MACHINE WITH THE PLATFORM ELEVATED WITHOUT FIRST BLOCKING THE SCISSOR ASSEMBLY WITH THE MAINTENANCE LOCK.

To set the Maintenance Lock, raise the platform enough to allow the Maintenance Lock to rotate to vertical. Carefully lower the platform until the pin above rests securely on the Maintenance Lock.

Figure 1-1: Support Platform



Hydraulic System

WARNING

HYDRAULIC FLUID UNDER PRESSURE CAN PENETRATE AND BURN SKIN, DAMAGE EYES, AND MAY CAUSE SERIOUS INJURY, BLINDNESS, AND EVEN DEATH.
CORRECT LEAKS IMMEDIATELY.

CAUTION

Hydraulic fluid leaks under pressure may not always be visible. Check for pin hole leaks with a piece of cardboard, not your hand.

Electrical System

CAUTION

Prevent damage to battery and/or electrical system;
• Always disconnect the negative battery cable first.
• Always connect the positive battery cable first.

When the negative cable is installed, a spark will occur if contact is made between the positive side of the battery and a metal surface on the machine. This can cause damage to the electrical system, battery explosion, and personal injury.

Total System

WARNING

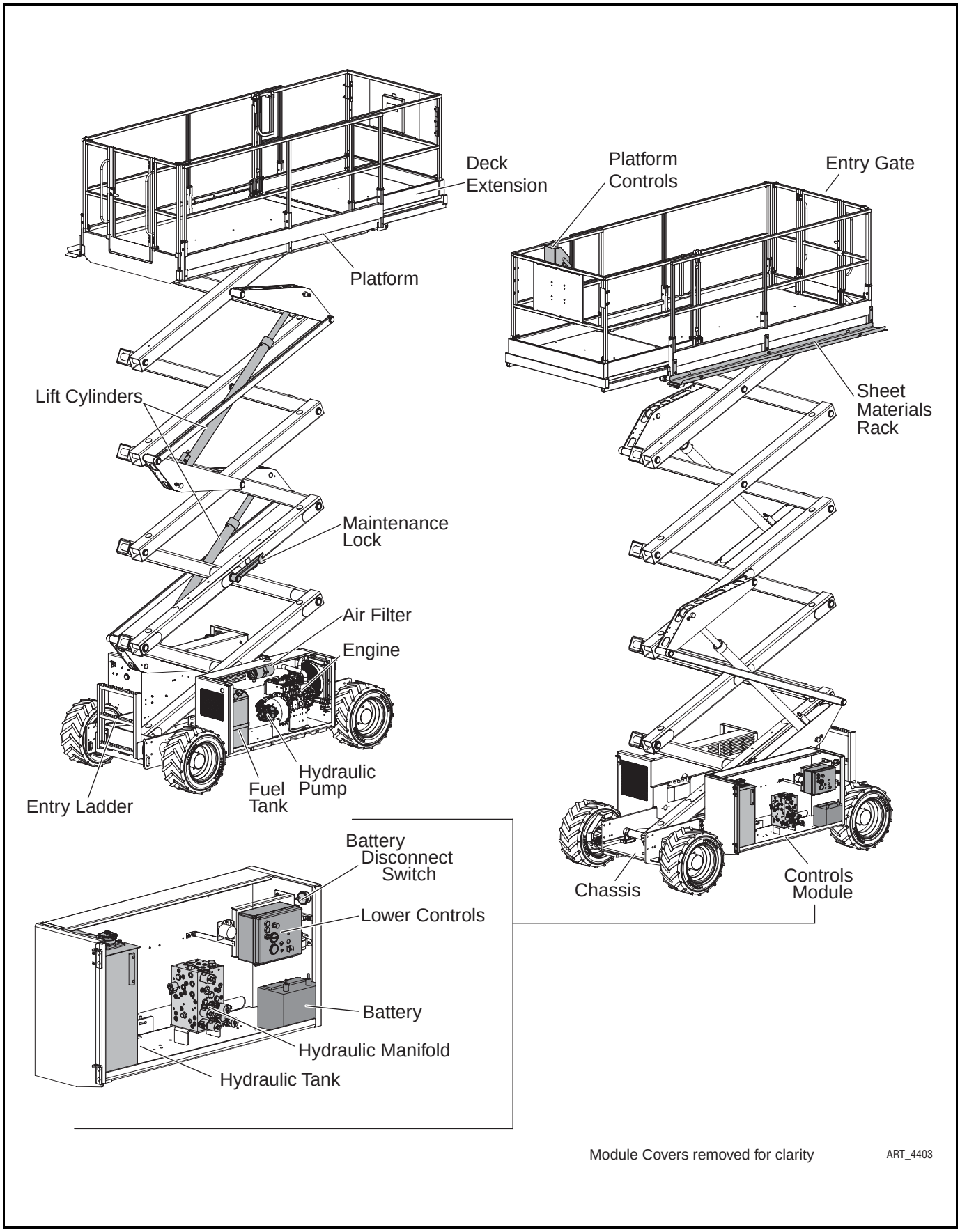
FAILURE TO PERFORM PREVENTIVE MAINTENANCE AT RECOMMENDED INTERVALS MAY RESULT IN THE UNIT BEING OPERATED WITH A DEFECT THAT COULD RESULT IN INJURY OR DEATH OF THE OPERATOR.

IMMEDIATELY REPORT TO YOUR SUPERVISOR ANY DEFECT OR MALFUNCTION. ANY DEFECT SHALL BE REPAIRED PRIOR TO CONTINUED USE OF THE AERIAL WORK PLATFORM.

INSPECTION AND MAINTENANCE SHOULD BE PERFORMED BY QUALIFIED PERSONNEL FAMILIAR WITH THE EQUIPMENT.

Primary Machine Components

Figure 1-2: Component Locations



Torque Specifications

Fasteners

Use the following values to apply torque unless a specific torque value is called out for the part being used.

AMERICAN STANDARD CAP SCREWS									METRIC CAP SCREWS							
SAE GRADE	5				8				METRIC GRADE	8.8				10.9			
CAP SCREW SIZE - inches -	TORQUE				TORQUE				CAP SCREW SIZE - millimeters-	TORQUE				TORQUE			
	FT. LBS		Nm		FT. LBS		Nm			FT. LBS		Nm		FT. LBS		Nm	
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
1/4 - 20	6.25	7.25	8.5	10	8.25	9.5	11	13	M6 X 1.00	6	8	8	11	9	11	12	15
1/4 - 28	8	9	11	12	10.5	12	14	16	M8 X 1.25	16	20	21.5	27	23	27	31	36.5
5/16 - 18	14	15	19	20	18.5	20	25	27	M10 X 1.50	29	35	39	47	42	52	57	70
5/16 - 24	17.5	19	23	26	23	25	31	34	M12 X 1.75	52	62	70	84	75	91	102	123
3/8 - 16	26	28	35	38	35	37	47.5	50	M14 X 2.00	85	103	115	139	120	146	163	198
3/8 - 24	31	34	42	46	41	45	55.5	61	M16 X 2.50	130	158	176	214	176	216	238	293
7/16 - 14	41	45	55.5	61	55	60	74.5	81	M18 X 2.50	172	210	233	284	240	294	325	398
7/16 - 20	51	55	69	74.5	68	75	92	102	M20 X 2.50	247	301	335	408	343	426	465	577
1/2 - 13	65	72	88	97.5	86	96	116	130	M22 X 2.50	332	404	450	547	472	576	639	780
1/2 - 20	76	84	103	114	102	112	138	152	M24 X 3.00	423	517	573	700	599	732	812	992
9/16 - 12	95	105	129	142	127	140	172	190	M27 X 3.00	637	779	863	1055	898	1098	1217	1488
9/16 - 18	111	123	150	167	148	164	200	222	M3 X 3.00	872	1066	1181	1444	1224	1496	1658	2027
5/8 - 11	126	139	171	188	168	185	228	251									
5/8 - 18	152	168	206	228	203	224	275	304									
3/4 - 10	238	262	322	255	318	350	431	474									
3/4 - 16	274	302	371	409	365	402	495	544									
7/8 - 9	350	386	474	523	466	515	631	698									
7/8 - 14	407	448	551	607	543	597	736	809									
1 - 8	537	592	728	802	716	790	970	1070									
1 - 14	670	740	908	1003	894	987	1211	1137									

Torque values apply to fasteneers as received from the supplier, dry or when lubricated with normal engine oil.
If special graphite grease, molydisulphide grease, or other extreme pressure lubricants are used, these torque values *do not apply*.

Hydraulic Components Torque Table

NOTE: Always lubricate threads with clean hydraulic fluid prior to installation.

Use the following values to torque hydraulic components when a specific value is not available. Always check for torque values in the following places before relying on the Hydraulic Components Torque Table:

- parts drawings and service instructions in this manual.
- packaging and instruction sheets provided with new parts.
- instruction manuals provided by the manufacturer of the component being serviced.

TYPE: SAE PORT SERIES	CARTRIDGE POPPET		FITTINGS		HOSES	
	FT. LBS	Nm	FT. LBS	Nm	FT. LBS	Nm
#4	N/A	N/A	N/A	N/A	135 - 145	15 - 16
#6	N/A	N/A	10 - 20	14 - 27	215 - 245	24 - 28
#8	25 - 30	31 - 41	25 - 30	34 - 41	430 - 470	49 - 53
#10	35 - 40	47 - 54	35 - 40	47 - 54	680 - 750	77 - 85
#12	85 - 90	115 - 122	85 - 90	115 - 122	950 - 1050	107 - 119
#16	130 - 140	176 - 190	130 - 140	176 - 190	1300 - 1368	147 - 155

Emergency Systems and Procedures

WARNING

IF THE CONTROL SYSTEM FAILS WHILE THE PLATFORM IS ELEVATED, HAVE AN EXPERIENCED OPERATOR USE THE EMERGENCY LOWERING PROCEDURE TO SAFELY LOWER THE PLATFORM.

DO NOT ATTEMPT TO CLIMB DOWN ELEVATING ASSEMBLY.

Emergency Stop

Figure 1-3: Emergency Stop Buttons

ART_3817

ART_3866

The machine is equipped with an EMERGENCY STOP switch at the base controls and at the platform control box.

- Press the EMERGENCY STOP switch at any time to stop all machine functions.
- Turn switch *clockwise* to reset.

Selector Switch set to PLATFORM

- Either switch will stop all machine functions.
- Both switches must be reset or machine will not operate.

Selector Switch is set to BASE

- The upper controls are locked out.
- The lower controls switch must be reset or the machine will not operate.
- The machine will not operate from the lower controls if the upper controls switch is tripped.

EMERGENCY LOWERING

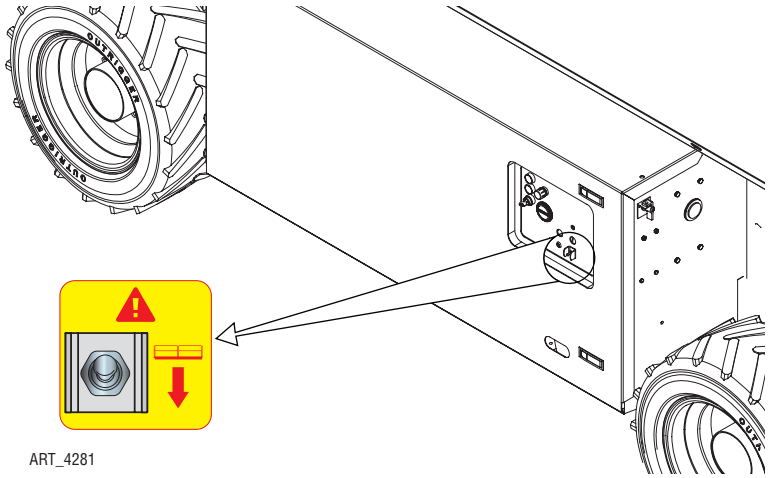
WARNING

IF THE CONTROL SYSTEM FAILS WHILE THE PLATFORM IS ELEVATED, USE THE EMERGENCY LOWERING PROCEDURE TO SAFELY LOWER THE PLATFORM.
DO NOT CLIMB DOWN THE ELEVATING ASSEMBLY OR EXIT THE PLATFORM.

Figure 1-4: Emergency Lowering

The Emergency Lowering System is used to lower the platform in case of power failure.

To lower the platform, push down on the Emergency Lowering Switch, located on the Base Control panel.



Free-Wheel Configuration For Winching or Towing

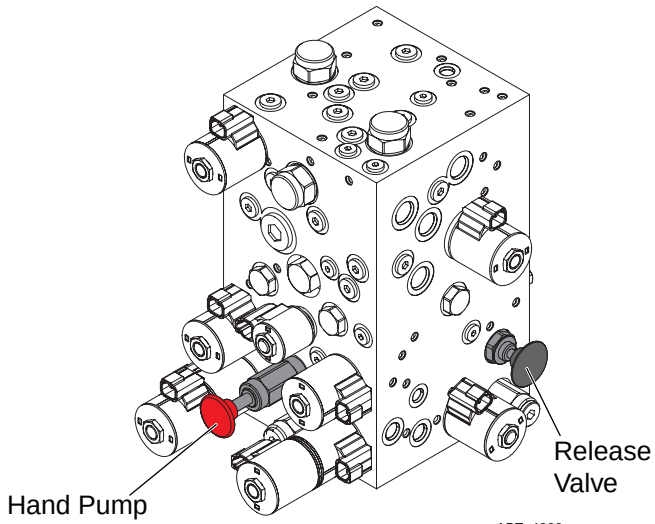
DANGER

RUNAWAY HAZARD!

AFTER RELEASING THE BRAKES THERE IS NOTHING TO STOP MACHINE TRAVEL. MACHINE WILL ROLL FREELY ON SLOPES.

ALWAYS CHOCK THE WHEELS BEFORE MANUALLY RELEASING THE BRAKES.

The machine can be winched or towed short distances at speeds not to exceed 5 MPH (8 km/h). Before towing or winching the machine, it is necessary to release the brakes. Reset the brakes after towing or winching.



Disengage Brakes before Towing or Winching

- Chock the wheels.
- Press and hold the Brake Release Valve, then slowly press the Hand Pump button on the Functions Manifold repeatedly until the brakes release (normally 8-10 full pump strokes).

Engage Brakes before Driving

The brakes reset automatically when the motor is started.

The brakes may be manually applied by pulling the Brake Release Valve out.

WARNING

BE SURE THAT THE BRAKES ARE ENGAGED BEFORE REMOVING THE WHEEL CHOCKS.

Lift and Support the Machine

DANGER

DEATH OR SERIOUS PERSONAL INJURY MAY RESULT FROM THE USE OF SUBSTANDARD LIFTING DEVICES AND/OR JACK STANDS. ENSURE THAT ALL LIFTING DEVICES AND JACK STANDS ARE OF ADEQUATE CAPACITY AND IN GOOD WORKING CONDITION BEFORE USE.

The following are needed to safely lift and support the machine;

- a jack with a lifting capacity of three (3) tons or more.
- jack stands with a rating of three (3) tons or more.

To raise the machine

1. Move machine to a firm level surface capable of supporting the weight of the machine.
2. Chock tires on one end of machine and raise the other end of machine.
3. If wheel is to be removed, break loose but ***do not remove*** the lug bolts before raising the machine.
4. Position a jack at the end of the machine to be lifted, under a solid lifting point in the center of the frame.
5. Raise the machine and place two (2) suitable jack stands under solid support points at the outer ends of the frame.
6. Lower the machine to rest on the jack stands and inspect for stability.

To lower the machine

1. Tighten lug bolts to proper torque (refer to machine specifications).
2. Raise machine slightly and remove jack stands.
3. Lower the machine and remove the jack.
4. Remove chocks.

SERVICE

Section 1

HYDRAULIC SYSTEM

CONTENTS

FIGURES PAGE

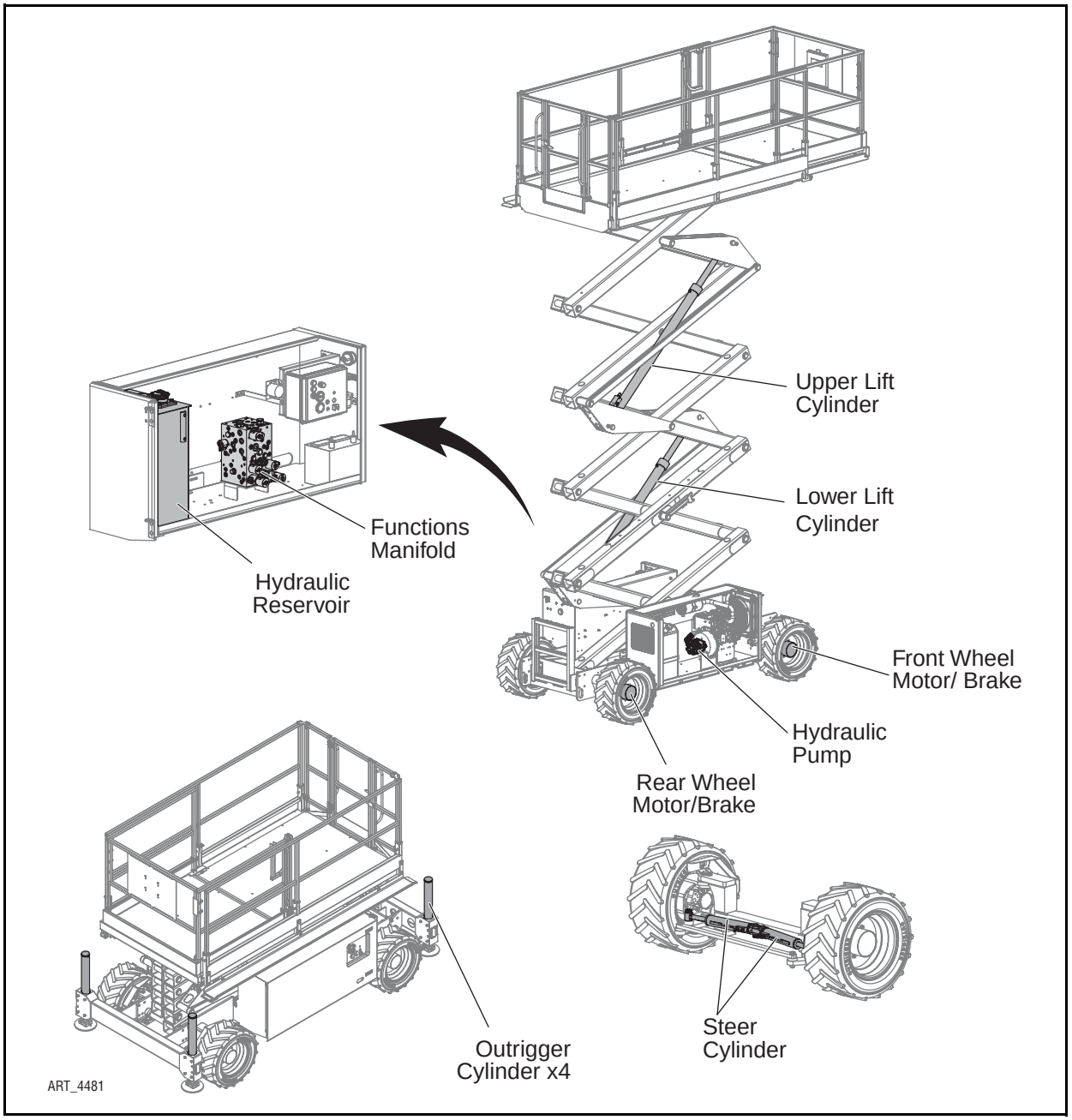
HYDRAULIC SYSTEM – GENERAL

The hydraulic integrated circuit, generally known as the valve-type manifold system is designed to control all or part of machine functions by integrating various hydraulic cartridge valves into a manifold to provide directional, pressure, flow, and load control.

The hydraulic system is a feedback, load-sensing type. Generally in this type of system, hydraulic fluid is provided by a variable displacement, pressure compensated, axial piston type pump which is directly coupled to the engine. As the engine turns, the hydraulic pump drains fluid from the reservoir and pumps this fluid to the Functions Manifold.

If no function is in use, the pump remains on standby and no fluid is pumped to the manifold. Each function has a maximum pressure control limit set by pressure relief valve.

Figure 1-1: Hydraulic System



HYDRAULIC ROADMAP

HYDRAULIC RESERVOIR

Hydraulic fluid is held in the reservoir for delivery to the various components and then returned to the reservoir. Returning hydraulic fluid is routed through a filter before entering the reservoir. The reservoir also serves as the oil cooling device.

PUMP

The pump delivers hydraulic fluid under pressure to the Functions Manifold.

FUNCTIONS MANIFOLD

The Functions Manifold directs the hydraulic fluid to the hydraulically operated components and returns fluid to the reservoir through the use of electronically operated solenoid valves.

DRIVE AND BRAKE SYSTEM

There are four (4) hydraulic gear wheel motors that provide power to all four wheels.

All wheel motors have integral spring-held brakes. The brakes are released by hydraulic pressure developed in the drive circuit when the drive functions is in use. A fixed orifice in the brake circuit controls the deceleration rate and initiates a smooth stop.

STEERING SYSTEM

Two (2) hydraulic cylinders control steering.

PLATFORM LIFT SYSTEM

The machine is equipped with two (2) hydraulic lift cylinder.

OUTRIGGER SYSTEM

On machines equipped with outriggers, four outrigger cylinders level the machine on uneven ground.

HYDRAULIC FLUID

HANDLING PRECAUTIONS

WARNING

PERSONS IN REGULAR CONTACT WITH MINERAL-BASED HYDRAULIC FLUID NEED TO BE AWARE OF THE IMPORTANCE OF THOROUGH HYGIENE AND THE PROPER METHODS FOR HANDLING MINERAL OILS, IN ORDER TO AVOID POTENTIAL HAZARDS TO HEALTH.

IF MINERAL-BASED HYDRAULIC FLUID IS SPLASHED INTO THE EYES, IT MUST BE WASHED OUT THOROUGHLY USING ABUNDANT QUANTITIES OF WATER. SEEK MEDICAL ATTENTION IF IRRITATION PERSISTS.

HYDRAULIC FLUID UNDER PRESSURE CAN PENETRATE AND BURN SKIN, DAMAGE EYES, AND MAY CAUSE SERIOUS INJURY OR BLINDNESS.

FLUID LEAKS UNDER PRESSURE MAY NOT ALWAYS BE VISIBLE.

BEWARE OF HOT FLUID. CONTACT WITH HOT FLUID MAY CAUSE SEVERE BURNS.

FLUID RECOMMENDATIONS

Do not substitute lower grade fluids as pump damage may result.

ITEM	SPECIFICATION	FREQUENCY
Hydraulic Fluid	**Normal ambient temperatures** Mobile Fluid DTE 10, DTE 13 M, or AW32 **Ambient temperatures below 0° F (-18° C)** Chevron Rando Premium MV **Do not substitute other fluids as pump damage may result.** Fill to the middle of the sight gauge with platform in the stowed position and outriggers retracted.	**Routine Maintenance** Check sight gauge level daily **Scheduled Maintenance** Change yearly or every 600 hours, whichever occurs first
Hydraulic Filter	Filter Element (located inside Hydraulic Reservoir)	**Scheduled Maintenance** **Normal Conditions** Change every six months or 300 hours, whichever occurs first **Severe Conditions--very dusty, exceptionally hot or exceptionally cold conditions** Change every three months or 150 hours, whichever occurs first

SYSTEM FLUSHING PROCEDURE

Dispose of used hydraulic fluid in accordance with local regulations.

1. With platform fully down, drain the hydraulic fluid from hydraulic reservoir into a clean, empty container.
2. When the hydraulic reservoir is empty, remove the hoses.
3. Flush the hoses with clean hydraulic fluid.

4. Flush out the reservoir with hoses removed from the hydraulic reservoir.
5. Change the hydraulic fluid filter.
6. Reinstall all hoses removed in previous steps.
7. Fill hydraulic reservoir with filtered, fresh hydraulic fluid (refer to Lubrication Chart).
8. Loosen output hose fittings at pump to flood with hydraulic fluid. Tighten fittings.
9. Start up the machine. Briefly operate all functions. Two or three lift cycles may be necessary to purge all air from lift cylinder(s).
10. When the above procedures have been completed, fill hydraulic reservoir to full mark on sight gauge.
11. Check all leaks and correct as necessary. Machine is now ready to be placed back in operation.

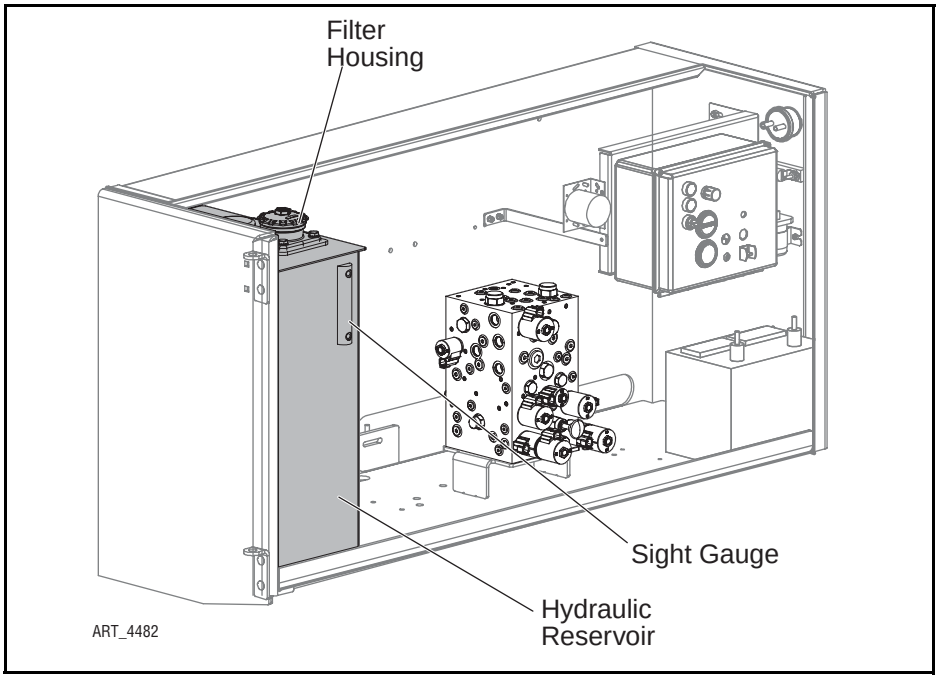
NOTE: Avoid mixing petroleum and synthetic base fluids. It is not advisable to mix fluids of different brands or types, except as recommended.

HYDRAULIC FLUID RESERVOIR

The Hydraulic Fluid Reservoir consists of the reservoir, a filler cap with breather, a return filter assembly, a drain plug, a suction strainer and a sight gauge. Check the reservoir for signs of leakage weekly.

Check the level of the Hydraulic Fluid Reservoir with the platform fully lowered. DO NOT overfill.

Figure 1-2: Hydraulic Fluid Reservoir



HYDRAULIC FILTER

WARNING

BEWARE OF HOT FLUID. CONTACT WITH HOT FLUID MAY CAUSE SEVERE BURNS.

All machines are equipped with a bypassing filter where the hydraulic fluid returns to the tank (see Figure 1-2). When the filter is clogged, hydraulic flow bypasses the filter element. The filter element must be changed every six months or 300 hours. Extremely dirty conditions may require the filter to be replaced more often.

To replace:

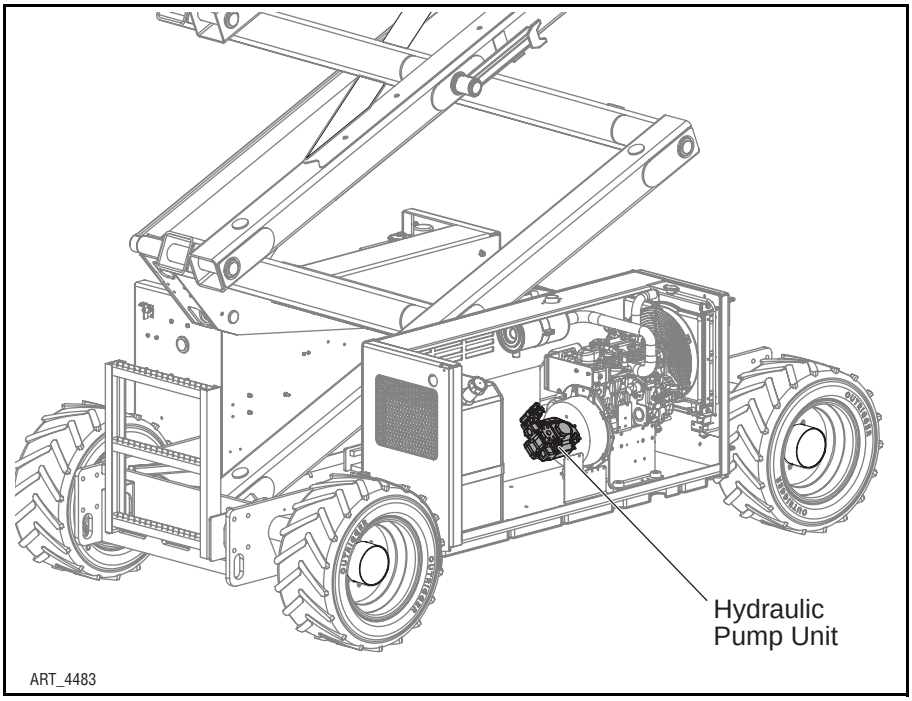
- Unscrew the filter assembly cap, then remove the filter
- Place the new filter into position and press firmly into place
- Carefully thread the filter assembly cap, then hand-tighten only.

HYDRAULIC PUMP

CAUTION

- **Clean all fittings before disconnecting hoses.**
- **Tag hoses for proper reassembly.**
- **Plug all openings to prevent contamination.**

Figure 1-3: Hydraulic Pump



An internal combustion engine drives a variable displacement axial piston pump.

REMOVE

1. Place a large container under the engine and pump to catch fluid that will be lost during pump replacement. Dispose of used fluid properly.
2. Tag and disconnect hydraulic hoses, and IMMEDIATELY cap or cover the openings to prevent contamination.
3. Remove the two bolts that hold the pump to the housing.
4. Remove the pump.

INSTALL

1. Install drive hub onto pump shaft. Torque bolt to 45 Ft. Lbs. (61 Nm).
2. Position the pump next to the housing. Turn the pump until the splines on the hub align allowing the pump to become flush with the housing.
3. Turn the pump until the bolt holes align with the mounting holes on the housing and install the bolts. Torque to 25-28 Ft. Lbs. (35-38 Nm).
4. Install the hydraulic hoses.
5. Check for leaks and check all hydraulic pressures.

HYDRAULIC PUMP SEALS

DRIVE SHAFT SEAL REPLACEMENT

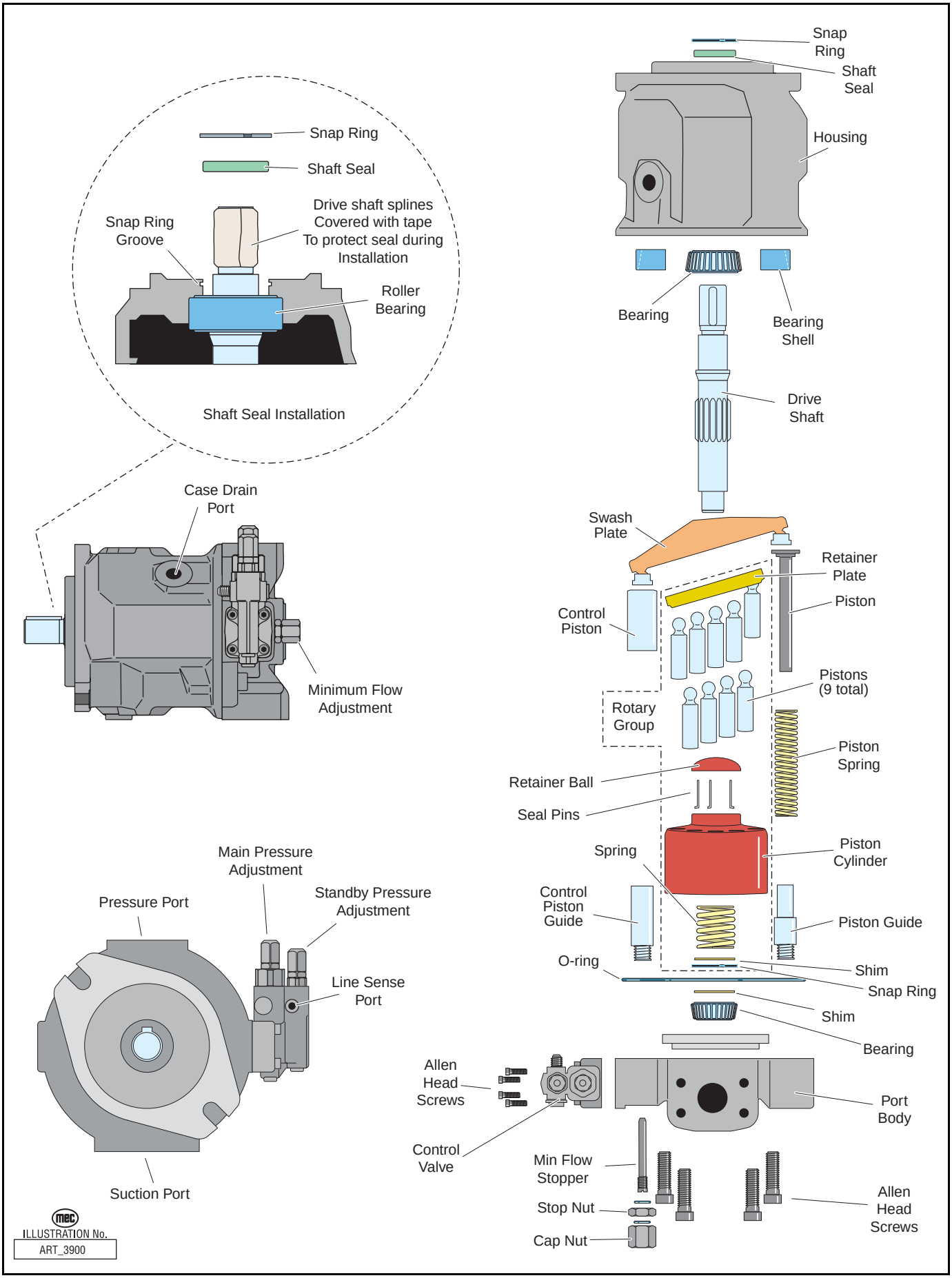
Caution: Be careful not to damage the drive shaft when removing the old seal.

1. Remove the shaft key.
2. Remove the snap ring.
3. Remove the shaft seal.
   - Check the surface of the shaft and the housing for imperfections.
4. Install new shaft seal.
   - Cover the keyway portion of the drive shaft with tape to prevent damage to the seal during installation.
   - Coat the shaft seal with grease.
   - Seat the shaft seal with a seal setting tool.
5. Install the snap ring.
6. Install the shaft key.

HYDRAULIC PUMP REBUILD

Pump rebuild should be performed only by a qualified mechanic. Contact MEC Technical Support before attempting to rebuild the pump.

Figure 1-4: Hydraulic Pump Seals



FUNCTIONS MANIFOLD & HYDRAULIC VALVES

NOTE: Refer to *Parts Section E*.
Tag all components as they are removed to aid in reassembly.

HYDRAULIC MANIFOLD REMOVAL

1. Disconnect the negative battery terminal.
2. Tag and disconnect the solenoid valve leads.
3. Tag and disconnect hydraulic hoses, and **immediately** cap the openings to prevent contamination.
4. Remove the mounting bolts from the manifold.
5. Remove the manifold.

DISASSEMBLY

1. Mark and remove the coils from solenoid valves.
2. Mark and remove valves.
3. Mark and remove fittings, plugs, springs, balls, and orifices.

CLEANING AND INSPECTION

1. Wash the manifold in cleaning solvent to remove built-up contaminants, then blow out all passages with clean compressed air.
2. Inspect the manifold for cracks, thread damage and scoring where O-rings seal against internal and external surfaces.
3. Wash and dry each component and check for thread damage, torn or cracked O-rings, and proper operation.
4. Replace defective parts and O-rings.

ASSEMBLY

NOTE: Lubricate all O-rings before installation to prevent damage to the O-ring. Seat balls in manifold block by lightly tapping on the ball with a brass drift punch.

1. Install fittings, plugs, springs, balls, and orifices. Use one drop of Loctite #424 or equivalent thread locker on each screw-in orifice.
2. Install valves.

INSTALLATION

1. Mount the manifold assembly using the mounting bolts.
2. Connect hydraulic hoses (as previously tagged). Be certain to tighten hoses.
3. Connect solenoid leads (as previously tagged).
4. Connect the battery.
5. Operate each hydraulic function and check for proper operation and leaks.
6. Adjust valve pressures.

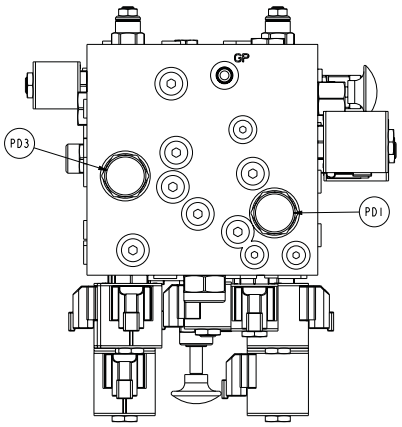
MANIFOLD & VALVE DIAGRAMS

See Section E of the Parts Section for component part numbers.

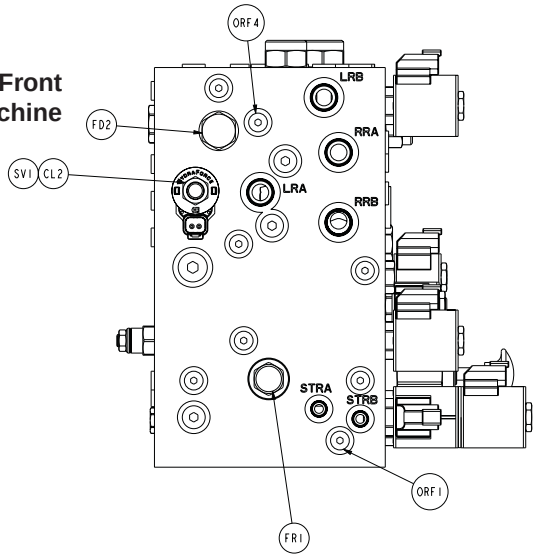
Figure 1-5: Functions Manifold - Components

CL2	COIL #10
CL1	COIL # 8
CV1	CHECK VALVE - ANTI CAVITATION
CV2	CHECK VALVE - ANTI CAVITATION
CV4	CHECK VALVE - ANTI CAVITATION
HP1	HAND PUMP – BRAKE RELEASE
SV1	SOLENOID VALVE – HIGH SPEED
SV2	SOLENOID VALVE – HIGH TORQUE
SV3	SOLENOID VALVE – OUTRIGGER DIRECTIONAL
SV4	SOLENOID VALVE – REAR WHEEL BYPASS
SV5	SOLENOID VALVE – REAR WHEEL BYPASS
SV6	SOLENOID VALVE – STEER DIRECTIONAL
SV7	SOLENOID VALVE – PLATFORM LIFT
SV8	SOLENOID VALVE – REAR WHEEL BYPASS
FD1	FLOW DIVIDER VALVE – DRIVE MID & LOW
FD2	FLOW DIVIDER VALVE – DRIVE MID & LOW
MP1	MANUAL OP. VALVE – BRAKE EMR. RELEASE

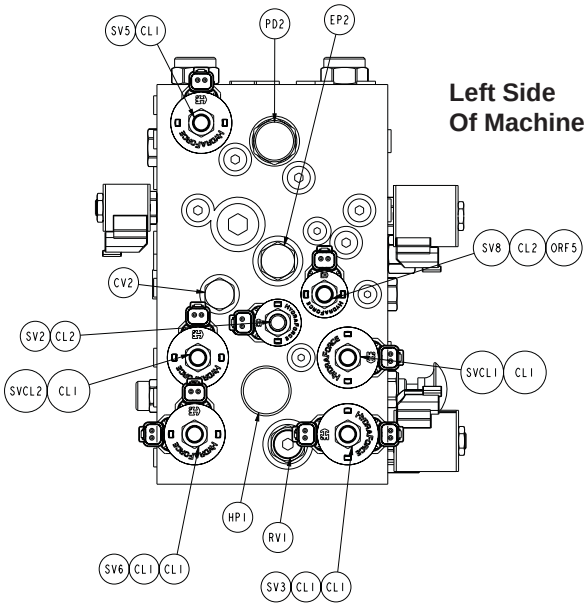
SVCL1	SOLENOID VALVE – DRIVE FORWARD
SVCL2	SOLENOID VALVE – DRIVE REVERSE
EP1	PILOT OP. VALVE – MID SPEED
EP2	PILOT OP. VALVE – LOW SPEED
RV1	RELIEF VALVE – MAIN
RV2	RELIEF VALVE – PLATFORM LIFT
FR1	FLOW REGULATING VALVE- BRAKE APPLY
HLS1	SHUTTLE VALVE – BRAKE RELEASE
ORF1	ORIFICE – STEER SPEED CONTROL
ORF3	ORIFICE – FLOW DIVDER BYPASS
ORF4	ORIFICE – FLOW DIVDER BYPASS
ORF5	ORIFICE – BYPASS CONTROL
PD1	PILOT OP. VALVE – HIGH TORQUE SHIFT
PD2	PILOT OP. VALVE – MID RANGE SHIFT
PD3	PILOT OP. VALVE – HIGH TORQUE SHIFT
CBV1	COUNTERBALANCE VALVE – DRIVE
CBV2	COUNTERBALANCE VALVE – DRIVE



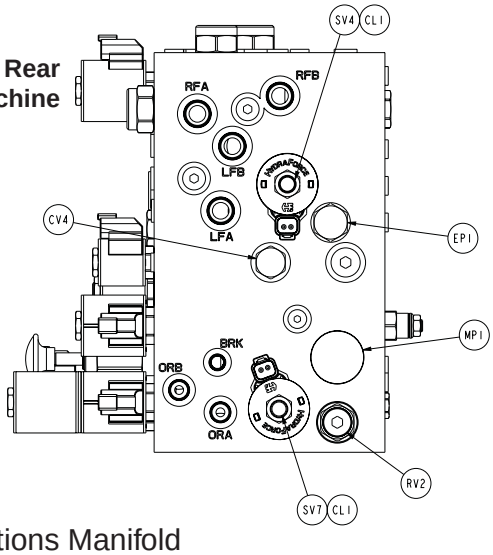
Front Of Machine



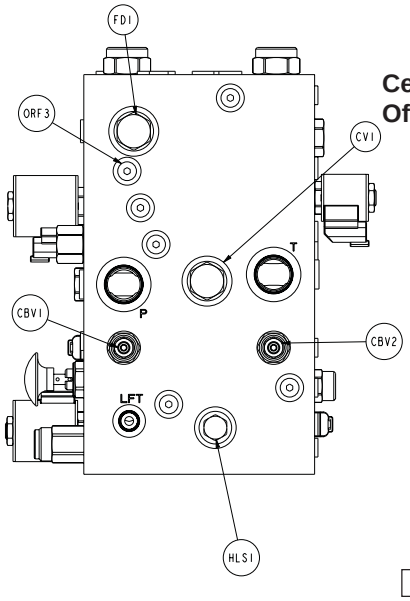
Left Side Of Machine



Rear Of Machine



Center Of Machine



Functions Manifold
4069

ILLUSTRATION No.
ART_4471

HYDRAULIC PRESSURE ADJUSTMENT

CAUTION

Do not operate pump with relief valve cap removed. Fluid will emit under pressure.

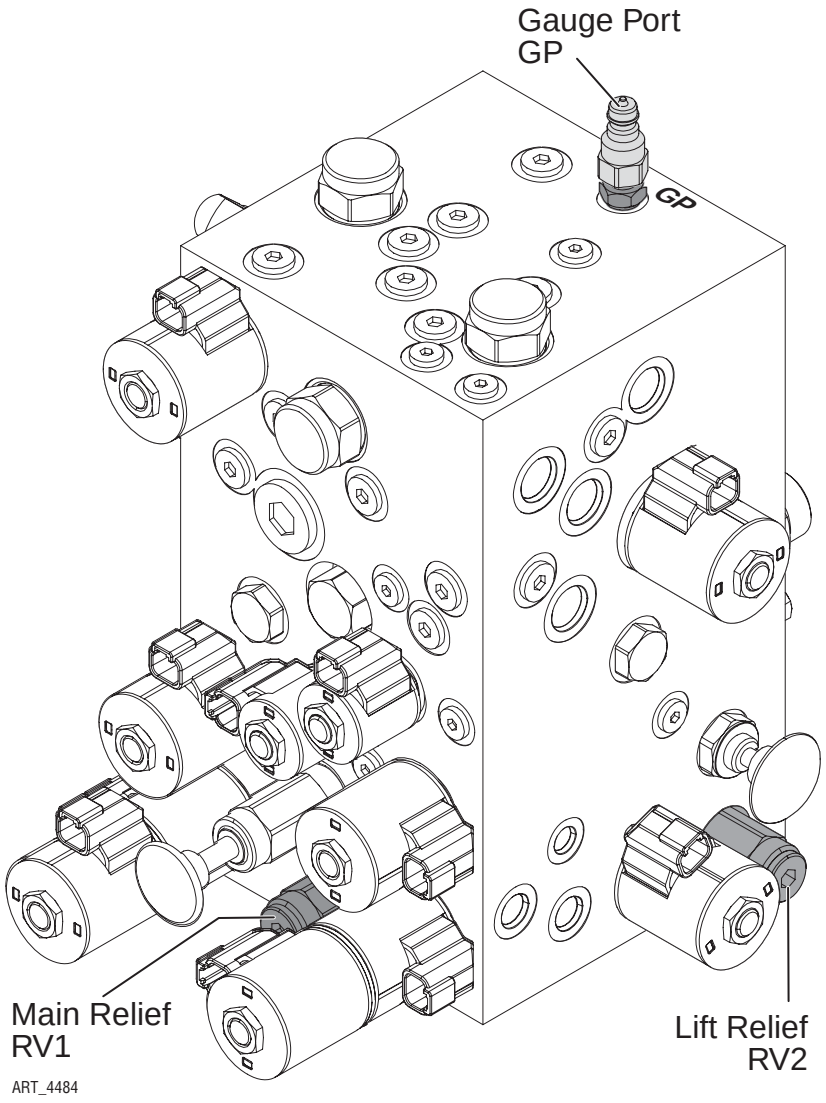
Relief and counterbalance valves should be checked during routine maintenance to ensure proper machine. It is necessary to remove the hex-head relief valve cap from the relief valve if adjustment is needed. Replace the caps before operating the machine.

Table 1-1: Hydraulic Pressure Settings

Main Relief RV1	Lift Relief RV2	Drive Counterbalance CBV1, CBV2
3500 PSI 246 bar	3200 PSI 220 bar	not adjustable

- Before attempting to check or adjust pressure relief valves, operate the machine for 15 minutes or long enough to sufficiently warm the hydraulic fluid.
- Insert a 0-5000 psi gauge into gauge adapter fitting at Port GP of the Functions Manifold.

Figure 1-6: Adjustable Valve Location



MAIN RELIEF (RV1)

1. Attach a 0-5000 psi gauge to Port GP.
2. Place a 4 inch x 4 inch (10cm x 10cm) wood block in front of each wheel.
3. Set the Drive Mode to High Speed. Using the Drive function, slowly push the control handle completely forward. Hold for 10 seconds.
4. If pressure is LOW, adjust main relief valve ¼ turn clockwise and recheck.
5. If pressure is HIGH, adjust main relief valve ¼ turn counterclockwise and recheck.

Repeat until the pressure is correct as listed in Table 1-1.

LIFT RELIEF (RV2)

1. Attach a 0-5000 psi gauge to Port GP.
2. **With no load on platform,** use the Lift function to raise the platform completely.
3. Press and hold the Lift switch for 10 seconds to get an accurate reading on the pressure gauge.
4. If pressure is LOW, adjust lift relief valve ¼ turn clockwise and recheck.
5. If pressure is HIGH, adjust lift relief valve ¼ turn counterclockwise and recheck.

Repeat until the pressure is correct as listed in Table 1-1.

DRIVE COUNTERBALANCE VALVES (CBV1, CBV2)

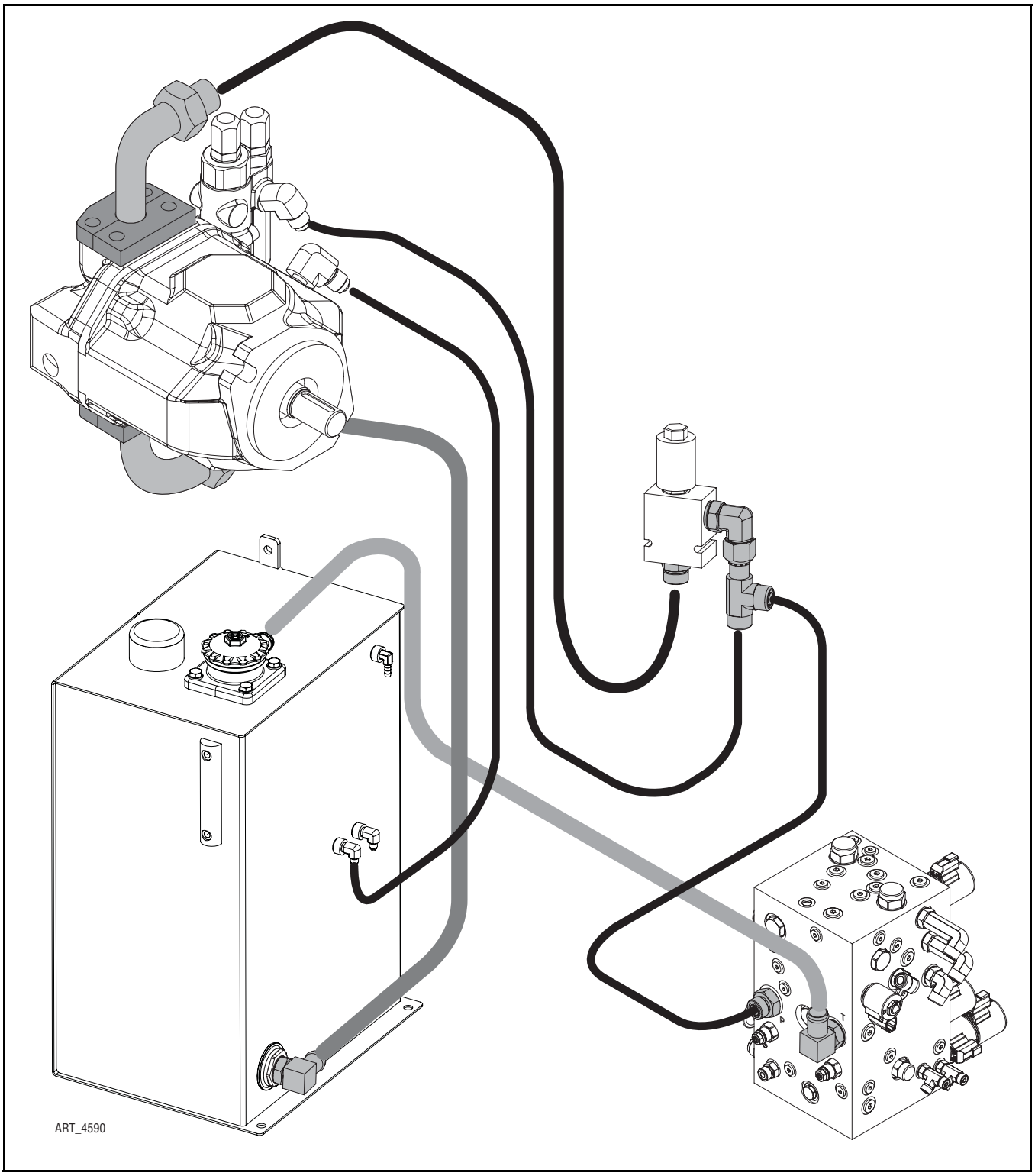
The Drive Counterbalance Valves are not adjustable and should be replaced if they are determined to be malfunctioning.

SYSTEM DESCRIPTIONS

PUMP CIRCUIT

Hydraulic fluid is pulled from the Hydraulic Tank to the suction port of the Hydraulic Pump. Pressurized fluid leaves the pump and goes to Proportional Valve. From the Proportional Valve, fluid goes to Port P of the Functions Manifold and to the Load Sense port of the pump. Unused fluid is routed back to the tank through Port T of the Functions Manifold. Pump case pressure drains back to the tank.

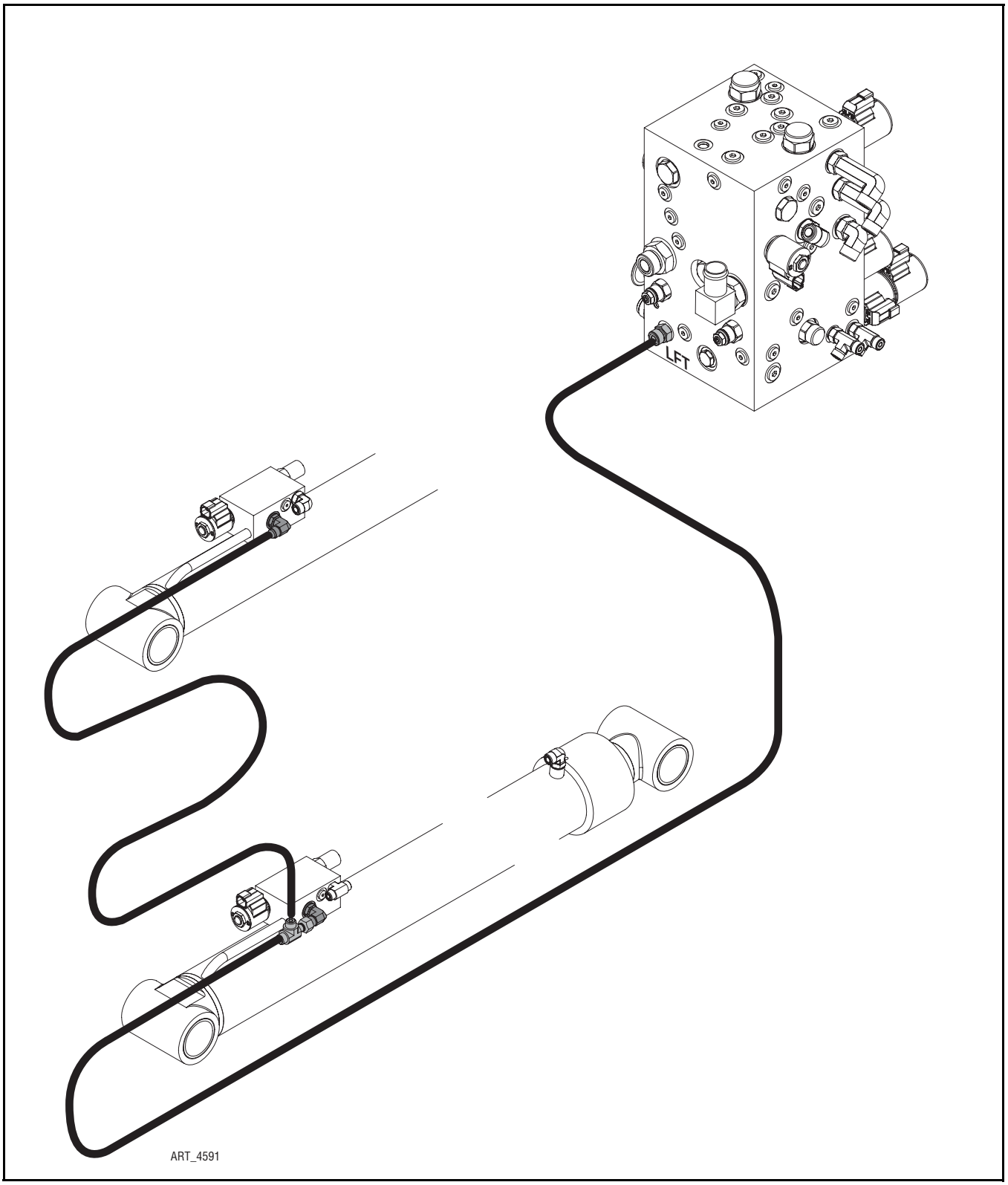
Figure 1-7: Pump Circuit



LIFT CIRCUIT

Hydraulic fluid flows to the lift cylinders from Port LFT on the Functions Manifold and is returned to the to the manifold through the same hose.

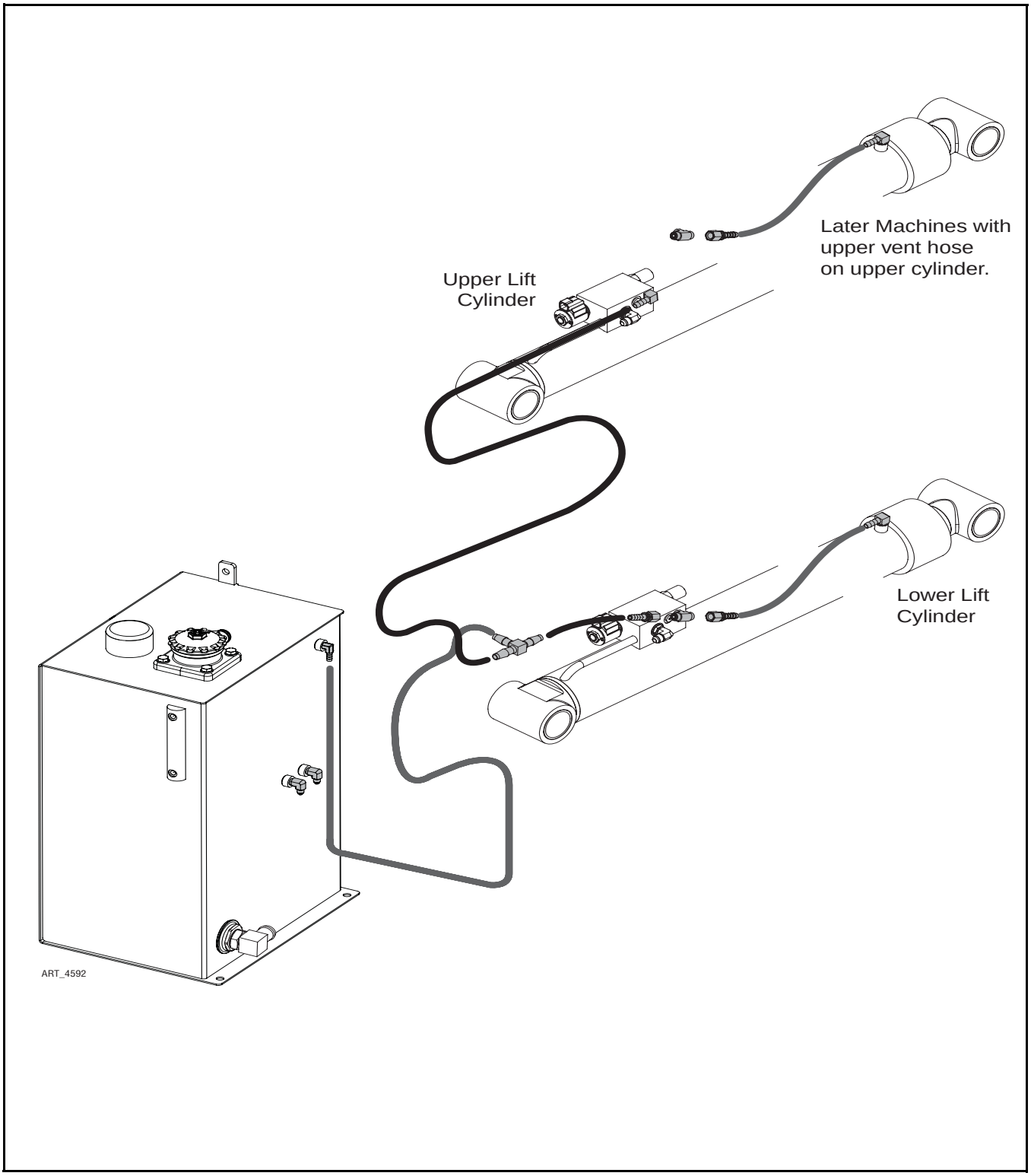
Figure 1-8: Lift Circuit



LIFT VENT CIRCUIT

Vent lines to both cylinders provide a path to the tank for unpressurized hydraulic fluid that has gone over the relief valves in the lift cylinders.

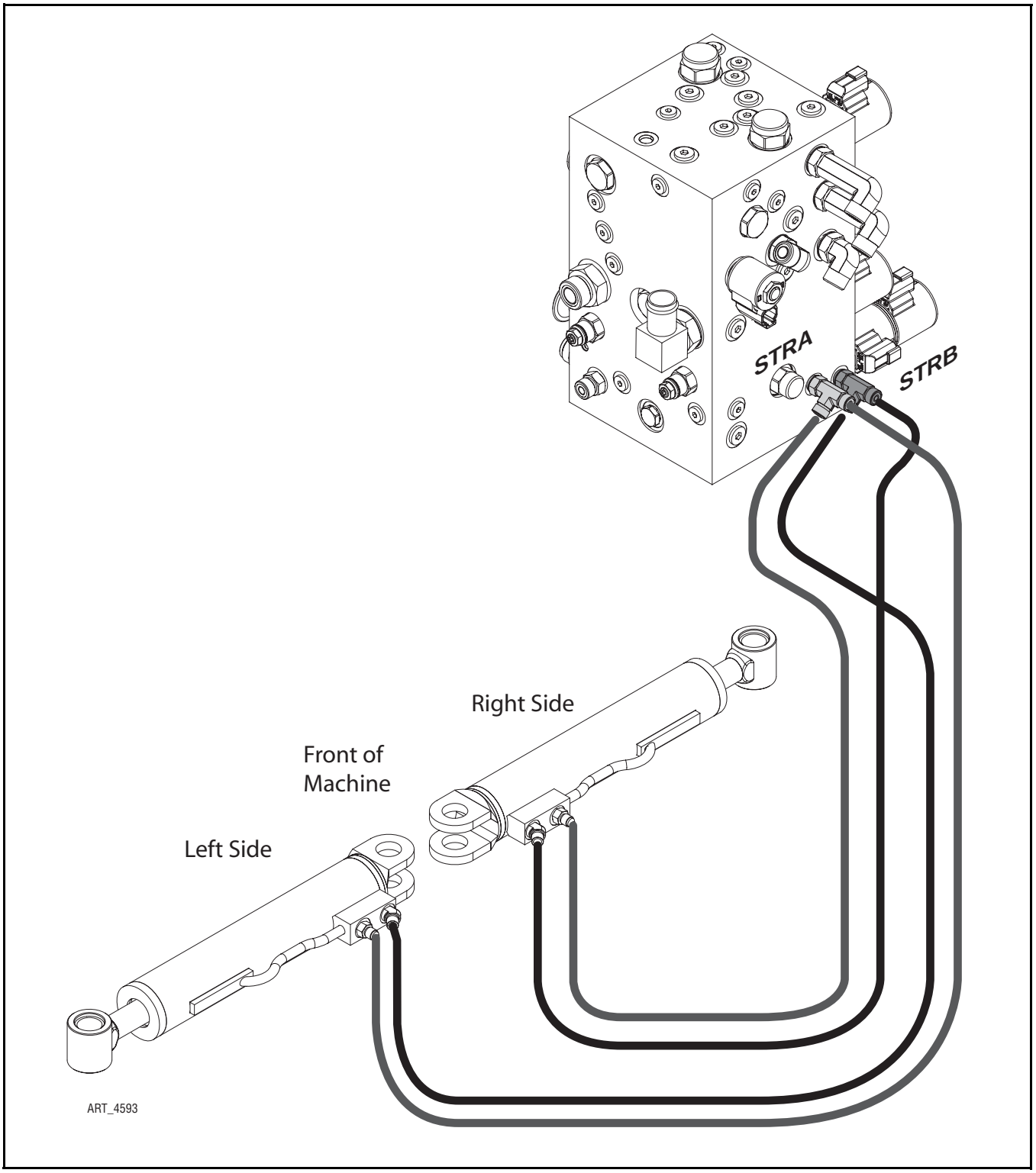
Figure 1-9: Lift Vent Circuit



STEERING CIRCUIT

Pressurized fluid is supplied to the Steer Cylinders from Ports STRA and STRB on the Functions Manifold as shown below.

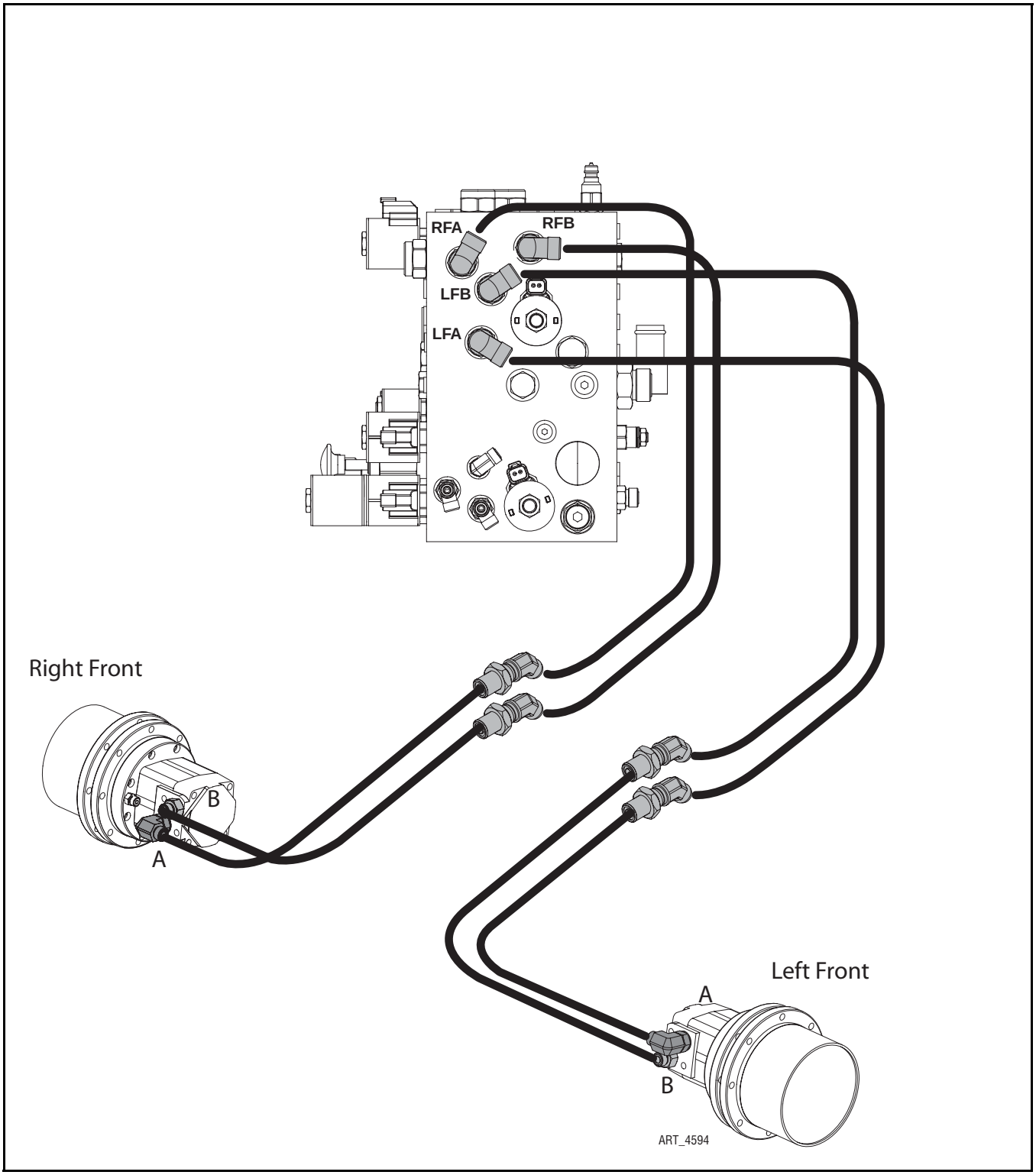
Figure 1-10: Steering Circuit



FRONT DRIVE CIRCUIT

Pressurized fluid is supplied to the front drive motors as shown below.

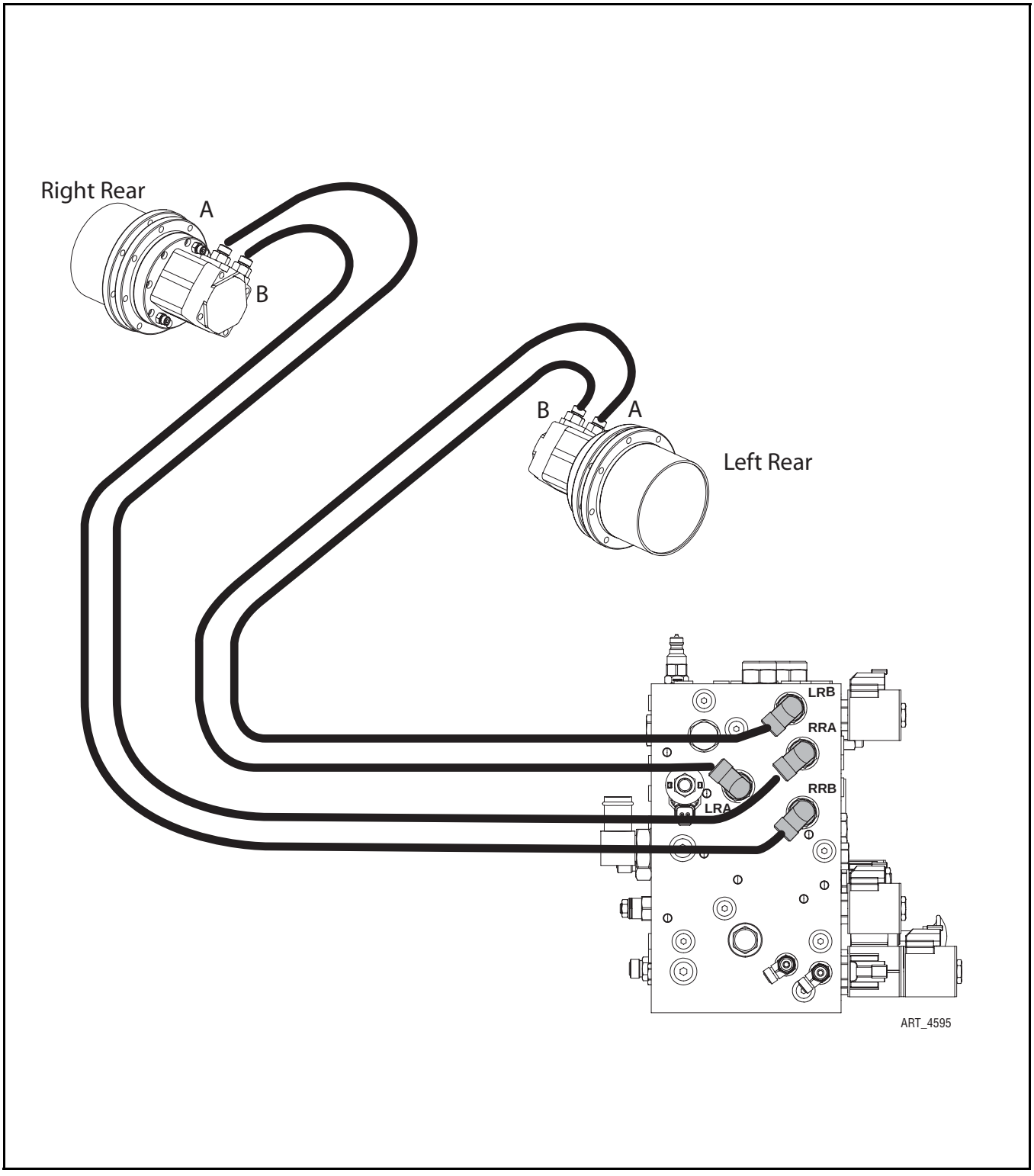
Figure 1-11: Front Drive Circuit



REAR DRIVE CIRCUIT

Pressurized fluid is supplied to the rear drive motors as shown below.

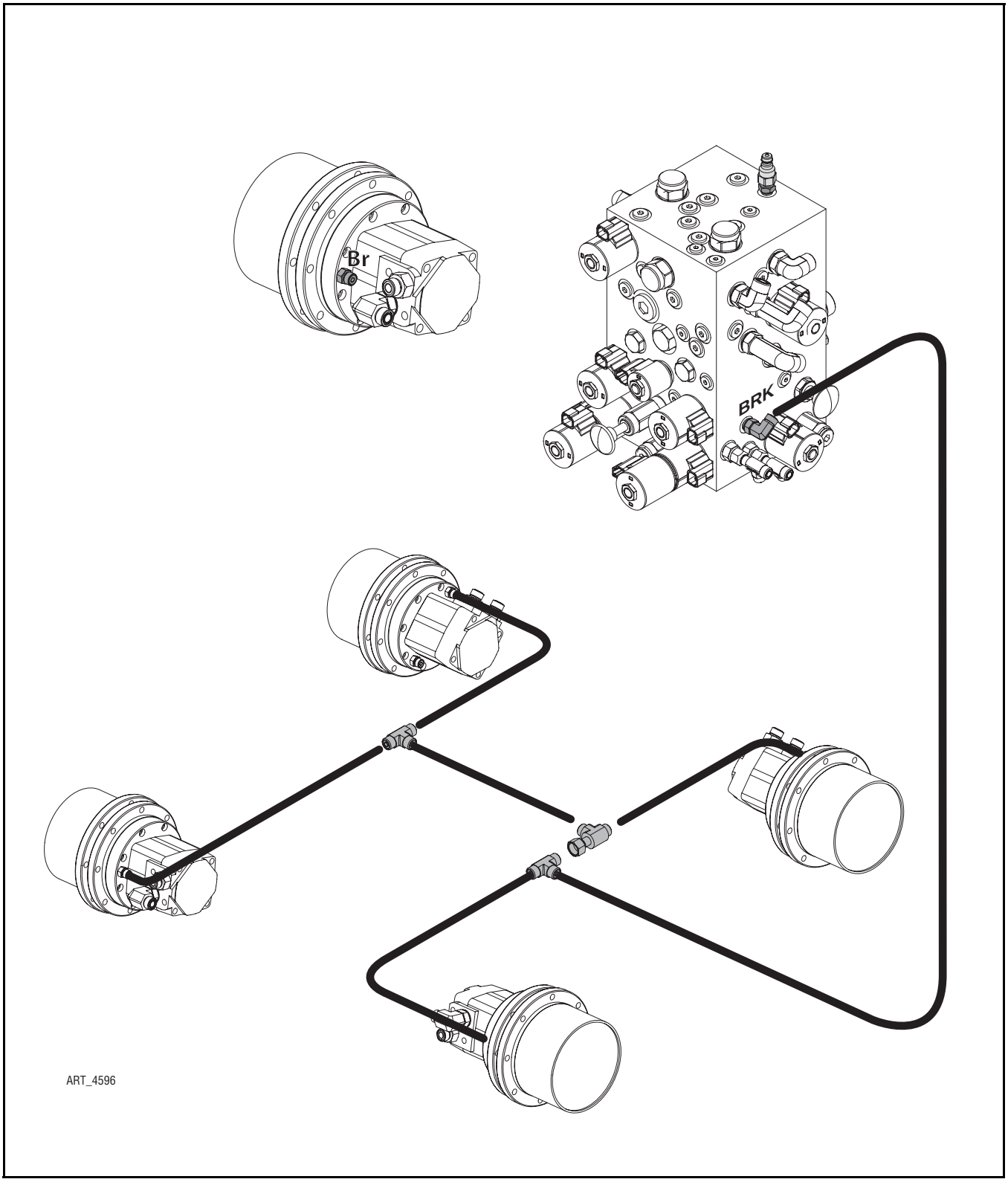
Figure 1-12: Rear Drive Circuit



BRAKE RELEASE CIRCUIT

Pressure from Port BRK on the Functions Manifold provides pressure to the Brake Release Circuit when the Drive function is enabled. When the Drive function is not enabled, fluid flows freely through it to Port T on the Functions Manifold, and from there returns to the tank.

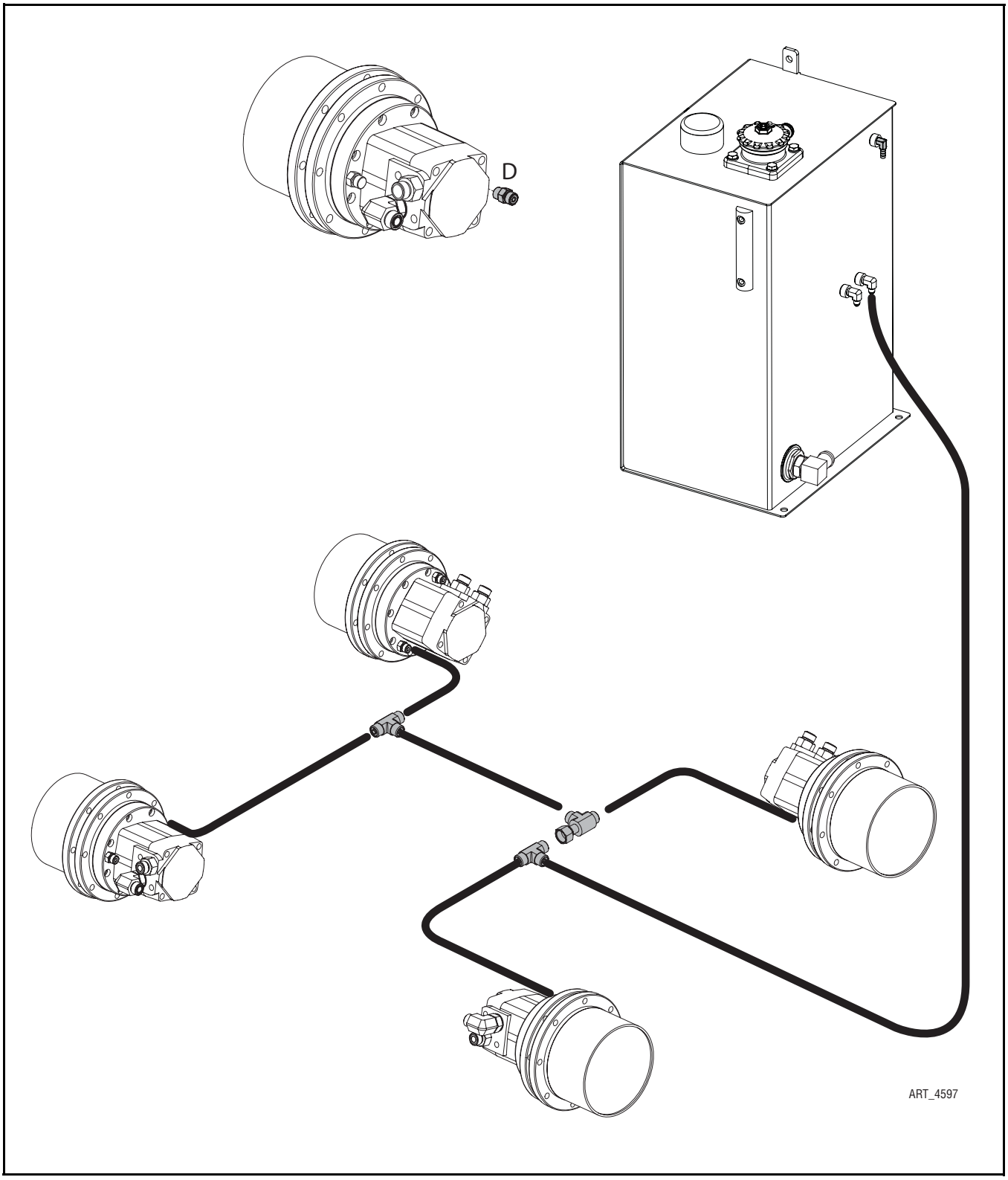
Figure 1-13: Brake Release Circuit



DRIVE CASE DRAIN CIRCUIT

Hoses connect the Case Drain ports of each wheel motor route the fluid back to the tank at the center return port of the Hydraulic Reservoir.

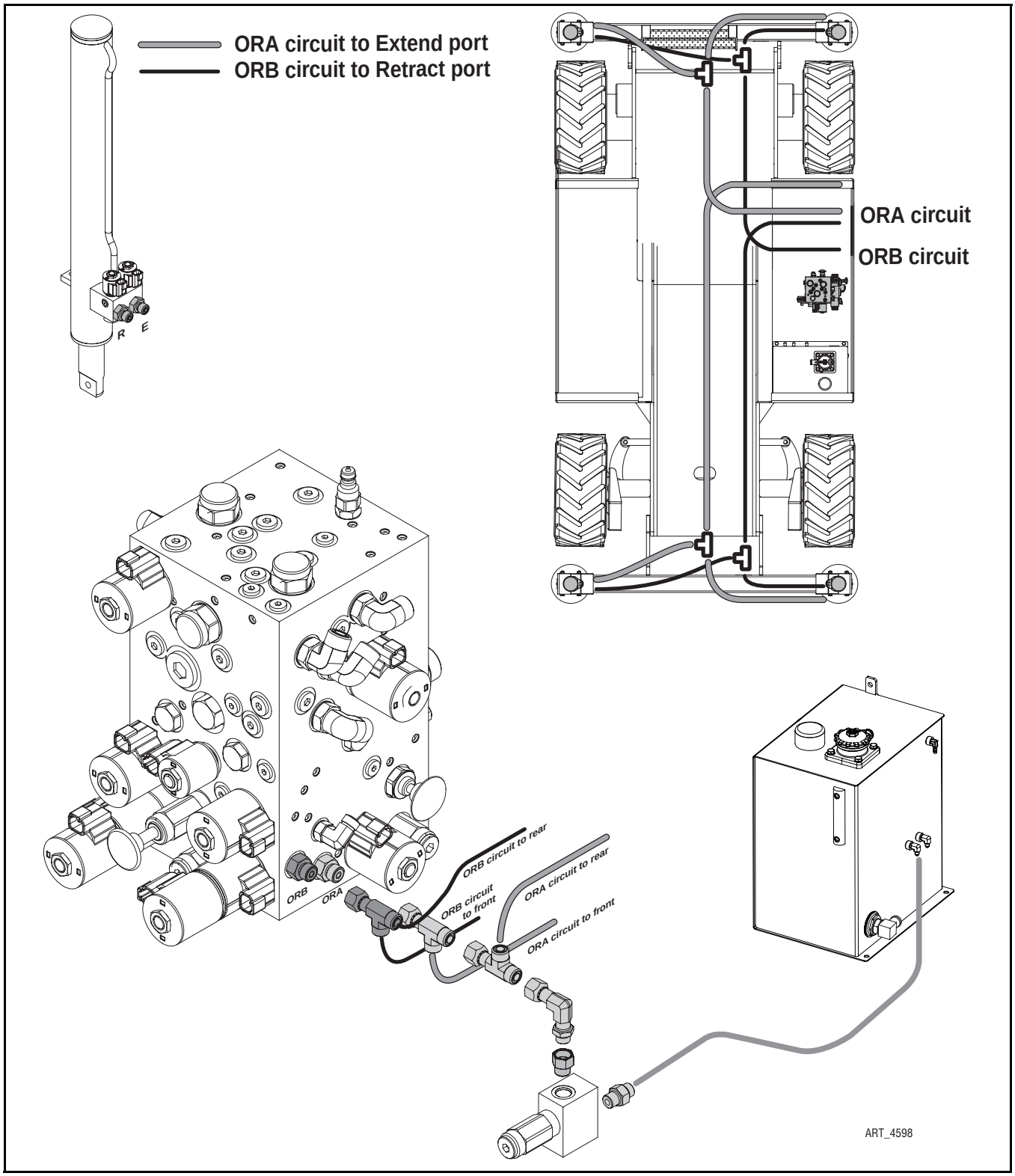
Figure 1-14: Drive Case Drain Circuit



OUTRIGGER CIRCUIT

The Outriggers Cylinders are controlled by Ports ORA and ORB on the Functions Manifold. Pressurized fluid from Port ORA extends the outrigger cylinders. Pressurized fluid from Port ORB retracts them.

Figure 1-15: Outrigger Circuit

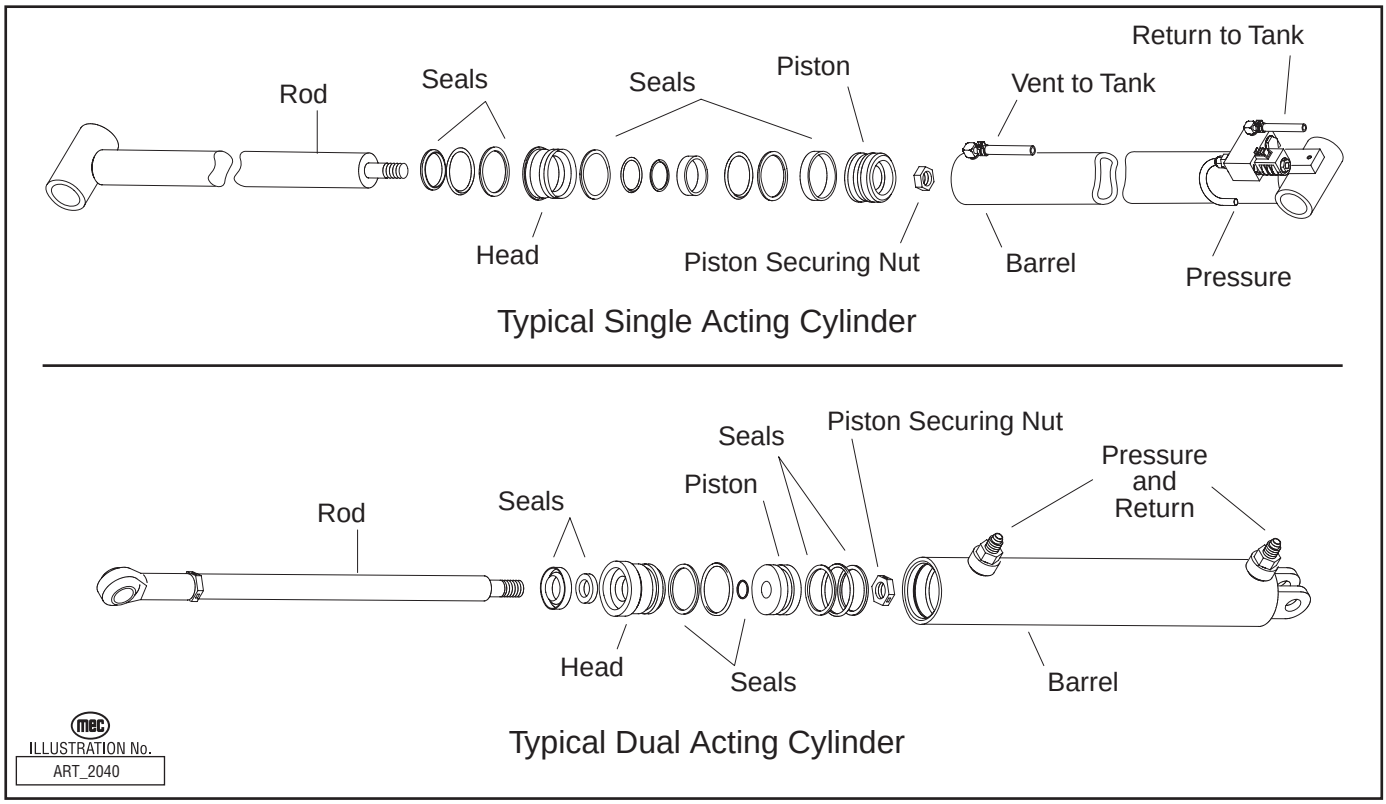


GENERAL CYLINDER REPAIR

WARNING

CYLINDERS ARE HEAVY. SUPPORT CYLINDERS BEFORE REMOVING HARDWARE THAT SECURES THE CYLINDER TO THE MACHINE.

Figure 1-16: Typical Cylinders, Exploded View



REMOVAL

NOTE: Refer to *Section 3* for Remove and Replace instructions, and the *Parts Manual* for a list of hardware specific to the cylinder being repaired.

1. Tag hoses for proper reassembly.
2. Disconnect hoses and IMMEDIATELY cap the openings to prevent contamination.
3. Remove cylinder from the machine as described in *Section 3*.

PREPARATION

CAUTION

Take precautions to protect the rod surface. Guard against dirt or other foreign objects entering system.

1. Drain all fluid from cylinder.
2. Clean all dirt and grit from outside of cylinder.
3. Insert cylinder into vise.

CYLINDER DISASSEMBLY

1. Remove the head from the cylinder body.
2. Remove the shaft assembly from the barrel, pulling in a straight line, so as not to scar the internal parts.
3. Insert shaft into a **soft jawed** vise so that the head and piston can be removed. Be sure the shaft and vise are both clean before using.
4. Loosen the set screw from the side of the piston. Using a piston removal tool, unscrew the piston from the rod. It may be necessary to heat the piston to 200° F
5. (93° C) to loosen the Loctite.
6. Remove all seals from the head and piston using a non-sharp seal tool. These tools are available from various seal suppliers.
7. Clean all fluid and debris off of the head, piston, shaft, collar and barrel using solvent, rags, and an air hose.
8. Inspect parts for scratches, pits or polishing. Check seal groves and sealing surfaces.
   a. Scratches or pits deep enough to catch the fingernail are unacceptable; replace the cylinder.
   b. Polishing is a sign of uneven loading. Check for roundness. If a polished surface is not round within .007 in. (0.18 mm) replace the cylinder.

Assembly is reverse of disassembly. Lubricate all seals with clean hydraulic fluid before assembly. Use Loctite when securing the piston to the rod.

Section 2

Electrical System

Contents

FIGURES PAGE

TABLES PAGE

ELECTRICAL SYSTEM – GENERAL

The electrical control system consists of lower controls located on the machine base and upper controls located on the machine platform. The emergency lowering switch is also located on the lower controls, and is electrically operated.

LOWER CONTROLS

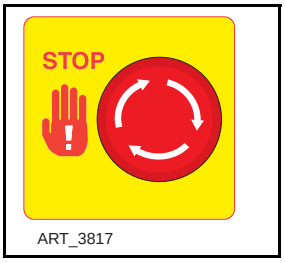
The lower controls operate the glow, start, emergency down, lift and lower functions.

UPPER CONTROLS

The upper controls operate all functions including drive, steer, lift, and lower, along with outrigger controls for machines equipped with outriggers. A momentary bi-directional rocker switch on the joystick provides the steering function. The joystick also has an enable bar switch that must be depressed to enable the Lift, Lower and Drive functions.The control system for operation of drive, steer, lift, and lower are electric-over-hydraulic type. The drive and lift systems are proportional systems controlled by position and direction of the upper controls joystick.

EMERGENCY STOP

Figure 2-1: Emergency Stop Switches



There are two red Emergency Stop switches: One located on the upper controls and one on the lower controls. Activation of either Emergency Stop switch will immediately cut electrical power to all controls, thereby stopping all machine functions. Press the switch to stop all electrical power and turn the switch clockwise to reset.

When both Emergency Stop switches are “set”, the controls have electrical power and the machine will operate.

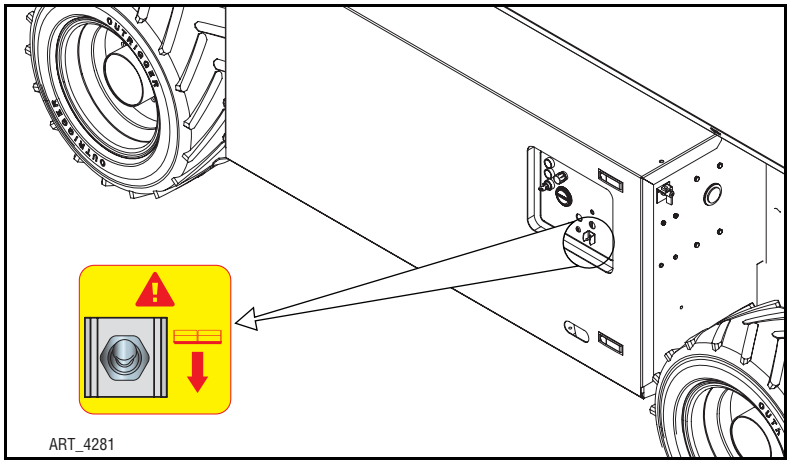
NOTE: Both switches must be set or the machine will not operate.

EMERGENCY LOWERING SWITCH

WARNING

IF THE CONTROL SYSTEM FAILS WHILE THE PLATFORM IS ELEVATED, USE THE EMERGENCY LOWERING PROCEDURE TO SAFELY LOWER THE PLATFORM.
DO NOT CLIMB DOWN THE SCISSOR ASSEMBLY OR EXIT THE PLATFORM.

Figure 2-2: Emergency Lowering Switch



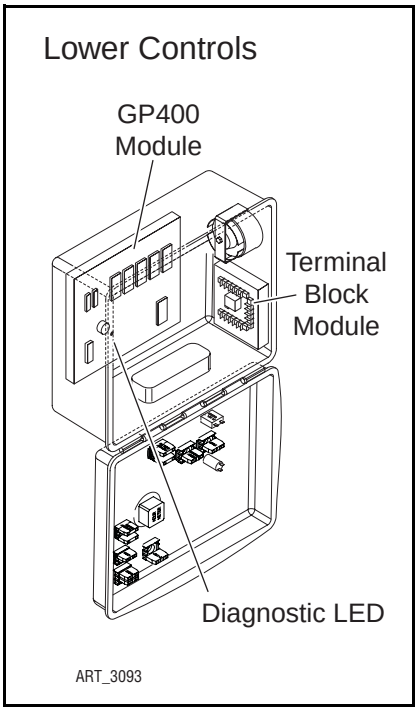
The Emergency Lowering System is used to lower the platform in case of power failure.

To lower the platform, push down on the Emergency Lowering Switch, located at the Lower Control Box.

DIAGNOSTIC LED

If the machine fails to operate, inspect the GP400 Module located inside the Lower Controls box. The LED located on the module should be *ON*. If the LED is *OFF* or FLASHING, refer to *Section 4: Troubleshooting*.

Figure 2-3: Diagnostic LED



BATTERIES

WARNING

CHARGING BATTERIES CREATE EXPLOSIVE HYDROGEN GAS. KEEP SPARKS, FLAMES AND SMOKING MATERIALS AWAY FROM BATTERIES.

ALWAYS WEAR SAFETY GLASSES WHEN WORKING WITH BATTERIES.

BATTERY FLUID IS CORROSIVE. THOROUGHLY RINSE SPILLED FLUID WITH CLEAN WATER.

REPLACE ONLY WITH MANUFACTURER-APPROVED BATTERIES.

BEFORE DISCONNECTING THE BATTERY NEGATIVE (–) LEAD, MAKE SURE THAT ALL SWITCHES ARE OFF. IF ON, A SPARK WILL OCCUR AT THE GROUND TERMINAL THAT COULD IGNITE HYDROGEN GAS.

CAUTION

Discharged batteries can freeze, causing damage to the battery and/or battery case. A broken battery case will allow electrolyte to leak out.

One 12V DC battery supplies the electrical power required to start the engine and operate the electrical circuits.

BATTERY MAINTENANCE (IN STORAGE)

Follow these procedures for maintenance of the battery on a machine that is not in use:

- Keep batteries clean. Electrolyte of batteries should be checked regularly and kept at proper level.
- Never stack one battery directly on top of another, as post or container damage may occur. If batteries are stored individually, place supporting boards between layers. Rotate stock so that the oldest batteries are used first.
- Batteries should be kept fully charged. A battery, while in storage, should be recharged to full charge at recommended intervals.

A BATTERY FULLY (100%) CHARGED AT 80°F (26.6°C)

- drops to 65% at 32°F (0°C)
- drops to 40% at 0°F (-32°C)

Table 2-1: Recommended Battery Charge Intervals

If Stored At	Recharge
Below 40°F (4°C)	Every week
40°-60°F (4°-15°C)	Every 2 weeks
Above 60°F (15°C)	Every month

BATTERY MAINTENANCE (IN USE)

Check batteries and surrounding area for signs of damage or corrosion.

Check battery terminals for:

- **Corrosion:** Regularly clean connections and apply a nonmetallic grease or protective spray to retard corrosion.
- **Loose connections:** Be sure all cable connections are tightly secured, and that good contact is made with terminals.
- **Broken or frayed cables:** Be sure all connections are good and that no loose or broken wires are exposed. Replace as necessary.

Check battery electrolyte level. Replenish the electrolyte, if necessary. Remove vent caps before filling, and USE ONLY DISTILLED WATER. DO NOT OVERFILL. Fill to level indicator (or ½ inch over the top of separators, if there is no level indicator). Fill after charging to prevent overflow of acid due to expansion. Do not use a hose to add water to batteries.

Allowing the electrolyte level to drop below the top of the separators will lead to shortened battery life.

Excessive water usage may indicate that a battery has been overcharged, has been subjected to excessively high temperatures, or is nearing the end of its service life.

BATTERY PREVENTATIVE MAINTENANCE:

15 hours after battery has been charged, spot-check the specific gravity of two or more cells. A fully charged battery should indicate 1.28 specific gravity. If low readings are noted, check the following:

- Check terminals for corrosion, loose connections and broken or frayed cables.
- Check all cells with a hydrometer for variance in specific gravity. A variation of 0.03 points or more between cells is a cause for concern. Mark the low cells.

Recheck specific gravity of all cells after recharging. Wash the top of the battery, making sure all vents are in place. Do not allow cleaning water or other foreign matter to enter the cells. Use a solution of bicarbonate soda (5 tsp. of baking soda per quart of warm water) and water to wash the battery if there is an accumulation of acid.

Table 2-2: Battery Specific Gravity and Voltage

	Specific Gravity	Volts DC	
	Each Cell	Per Cell	12V Battery
Fully Charged	1.280	2.10	12.60
Fully Discharged	1.130	1.75	10.50

BATTERY REPLACEMENT

CAUTION

To prevent damage to the battery and/or electrical system:

- **Always disconnect the negative battery cable first.**
- **Always connect the positive battery cable first.**

TO REMOVE A BATTERY;

1. Disconnect the negative battery cable, then the positive battery cable. Remove the battery hold-down hardware.
2. Lift the battery from the compartment, put the battery aside and dispose of properly.

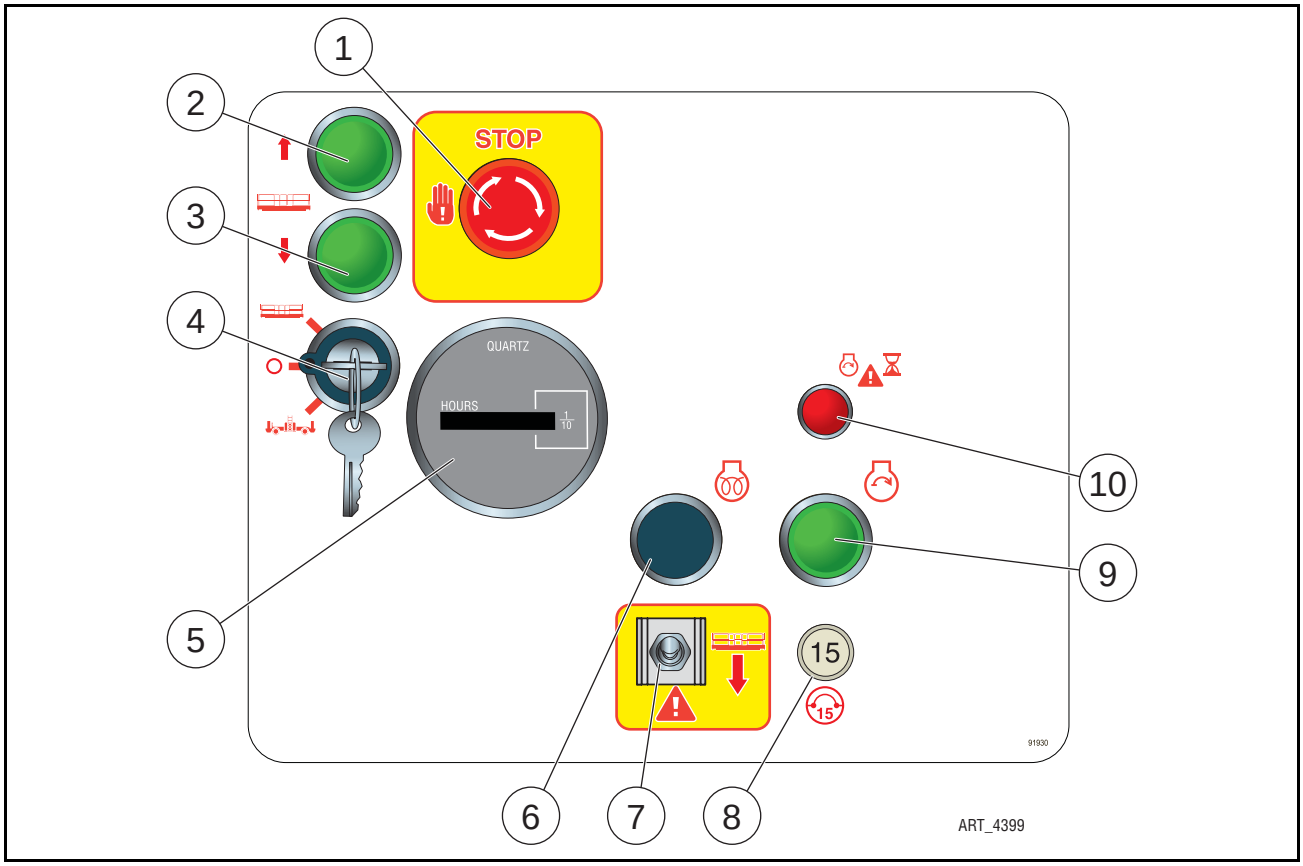
TO INSTALL A BATTERY;

1. Position the battery in the compartment and secure with hold-down hardware.
2. Connect the positive battery cable, then the negative battery cable.

CONTROLS

LOWER CONTROLS

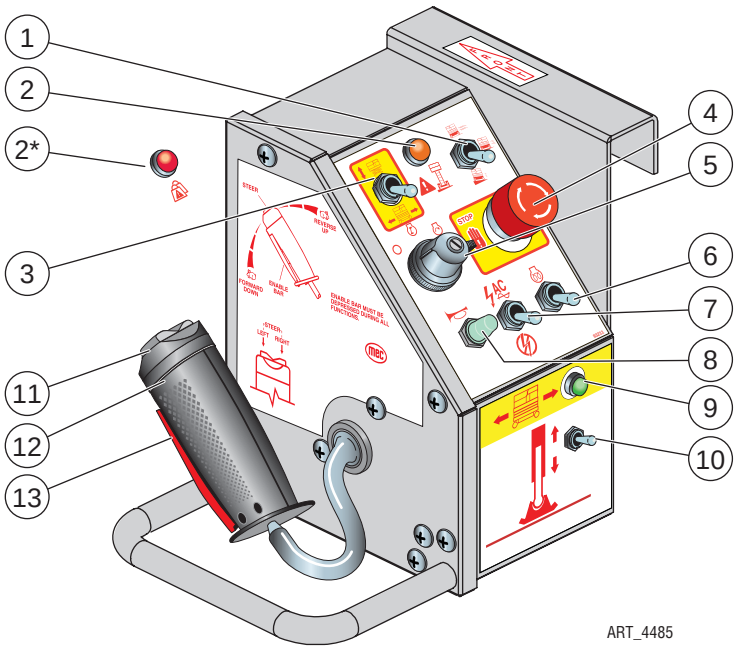
Figure 2-4: Lower Controls



	CONTROL	DESCRIPTION	
1	Emergency Stop Switch	Press the EMERGENCY STOP switch at any time to stop all machine functions. Turn switch *clockwise* to reset.	
2	Platform Lift Button	Press this button to lift the platform.	
3	Platform Lower Button	Press this button to lower the platform.	
4	Selector Switch	PLATFORM	Select to operate from the platform control panel.
		BASE	Select to operate from the base control panel.
		OFF	Select to stop operation from either control panel.
5	Hour Meter	Indicates total elapsed time of machine operation.	
6	Glow	Operate when starting in cold start conditions.	
7	Emergency Down Switch	Move this switch down to lower the platform in the event of an emergency or power loss.	
8	Circuit Breaker	Trips when there is excessive electrical load. Push to reset.	
9	Start Button	Press to start engine. Release when engine starts.	
10	Start Delay Light	Prevents over-cranking of engine. When lit, starter is disabled. After approximately 35 seconds the light will go out and starter will operate.	

UPPER CONTROLS

Figure 2-5: Upper Controls



	CONTROL	DESCRIPTION	
1	Speed/Torque Selector Switch	Move this switch to the up for high speed drive. Push this switch to down for high torque drive.	
2	Tilt Indicator Light (amber)	If illuminated, the machine is not level. Carefully lower the platform, then move the machine to a firm, level surface.	
	Overload Indicator Light (red)*	Platform overloaded when light is ON. An audible alarm will sound and all machine functions will stop. Remove weight from the platform to restore function and continue.	
3	Lift/Drive Switch	Move this switch UP to enable the Lift function. Move this switch DOWN to enable the Drive function.	
4	Emergency Stop Switch	Press the EMERGENCY STOP switch at any time to stop all machine functions. Turn switch *clockwise* to reset.	
5	Start Switch	Turn to far right to start engine. Switch will return to RUN position for normal operation. Turn to *OFF* to shut engine down.	
6	Glow	Operate when starting in cold start conditions.	
7	Generator (Option)	Starts and stops optional generator.	
8	Horn Button (Option)	Press to sound warning horn.	
9	Drive Enable Indicator (Outrigger Option)	Lamp ON Lamp OFF	Outriggers are retracted and machine will drive. Outriggers are extended and machine will not drive.
10	Extend/Retract (Outrigger Option)	Push the toggle switch DOWN to extend the outriggers. Continue pushing down until the outriggers stop automatically. Push the toggle switch UP to retract the outriggers.	
11	Steer Switch**	Using your thumb, press and hold the rocker switch to steer Left or Right.	
12	Control Handle**	DRIVE	Proportionally controls Forward and Reverse travel.
		LIFT	Proportionally controls Lift and Lower functions.
13	Enable Bar	Squeeze to enable DRIVE, STEER, and LIFT functions from the Joystick.	

*Machines equipped with optional Overload Sensing System

**These controls operate only when the Enable Bar (#13) is depressed. The Enable Bar must be depressed before operating the function for correct control system safety sequence.

ALARMS AND SWITCHES

MOVEMENT ALARM

The Movement Alarm is activated as soon as the DOWN operation is activated from either control station. This is the default setting. If desired, the movement alarm setting can be modified to activate the alarm during other functions (refer to *Section 4: Troubleshooting)*.

WARNING

THE MOVEMENT ALARM IS PROVIDED FOR YOUR PROTECTION, AND PROTECTION OF PERSONS WORKING IN THE IMMEDIATE AREA. DISABLING THIS IMPORTANT SAFETY DEVICE MAY RESULT IN SERIOUS INJURY OR DEATH.

Arm Guard Cutout – On machines equipped with the optional Overload Sensing System, the automatic Arm Guard Cutout function will stop the platform when lowering at approximately 2.5 meter platform height and will sound a fast intermittent beeping alarm. Release the Lower button or control handle.

A three second delay is provided for the operator to verify that there are no hazardous conditions or personnel near the machine. Lowering may resume after these 3 seconds have elapsed when the Lower button is engaged.

LEVEL SENSOR

The Level Sensor is integrated into the GP400 Control Module.

EZFIT ANGLE SENSOR

The EZfit Angle Sensor provides platform elevation information to the GP400 control module. When the GP400 reads certain outputs from the angle sensor it will:

- enable or disable tilt sensor operation.
- reduce drive speed for elevated drive.

On machines equipped with the optional Overload Sensing System, the Angle Sensor works in conjunction with the Pressure Transducer and a second redundant Angle Sensor located beside the first.

Figure 2-6: EZfit Angle Sensor

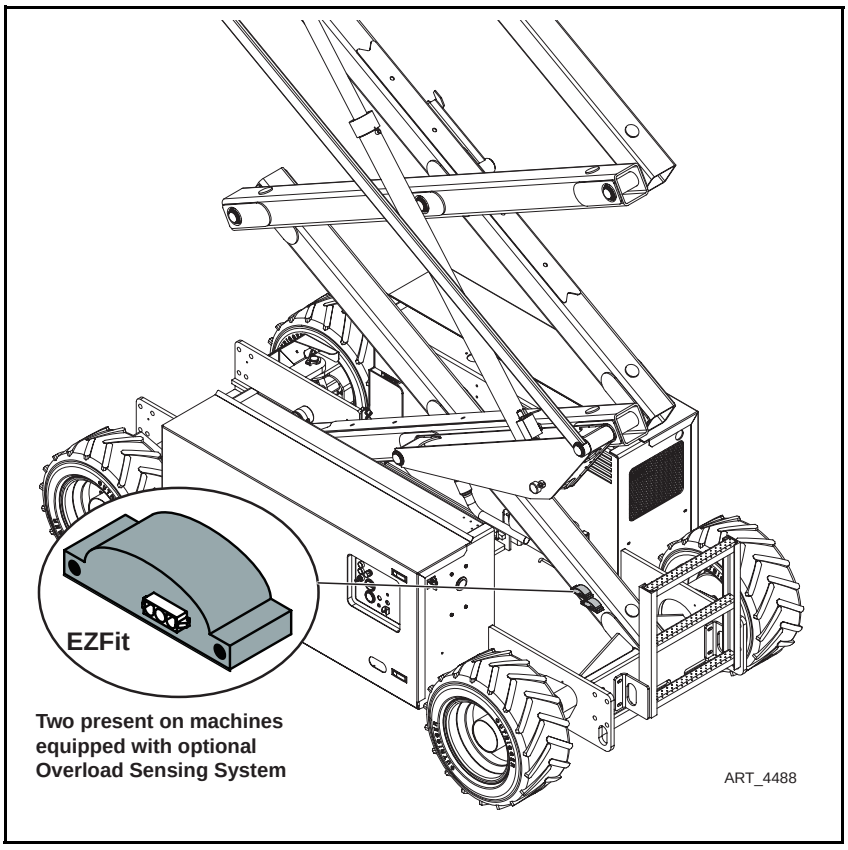
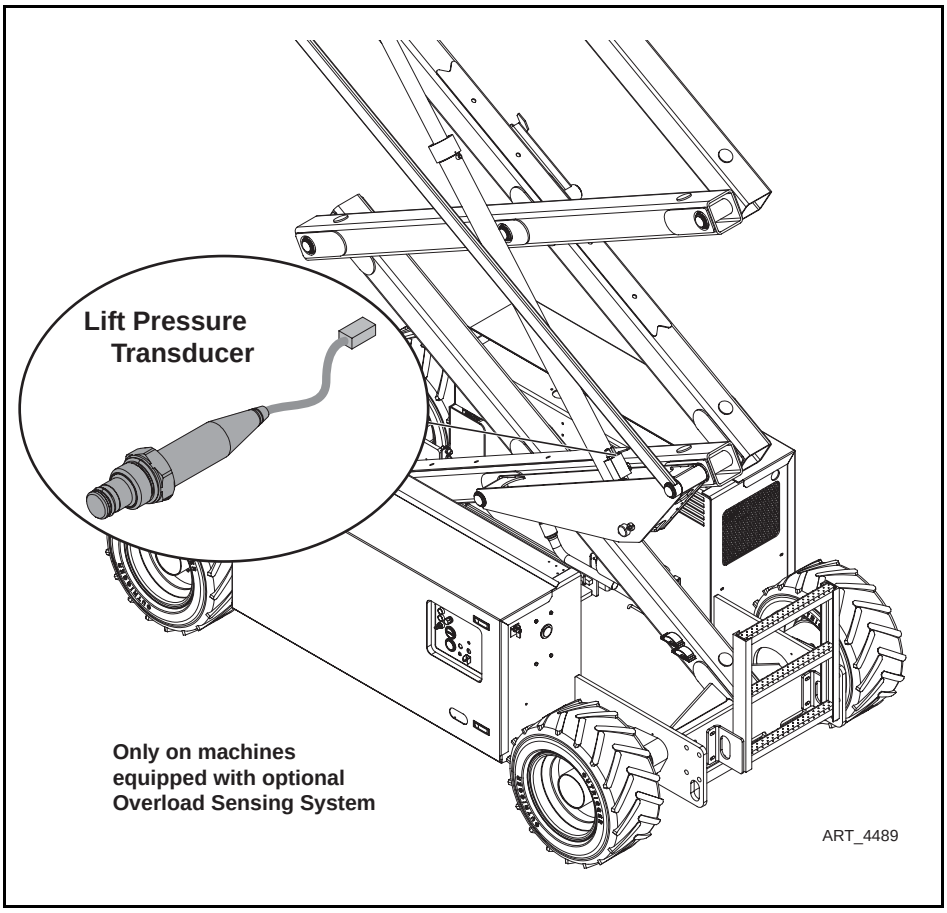


Figure 2-7: Pressure Transducer



LIFT PRESSURE TRANSDUCER

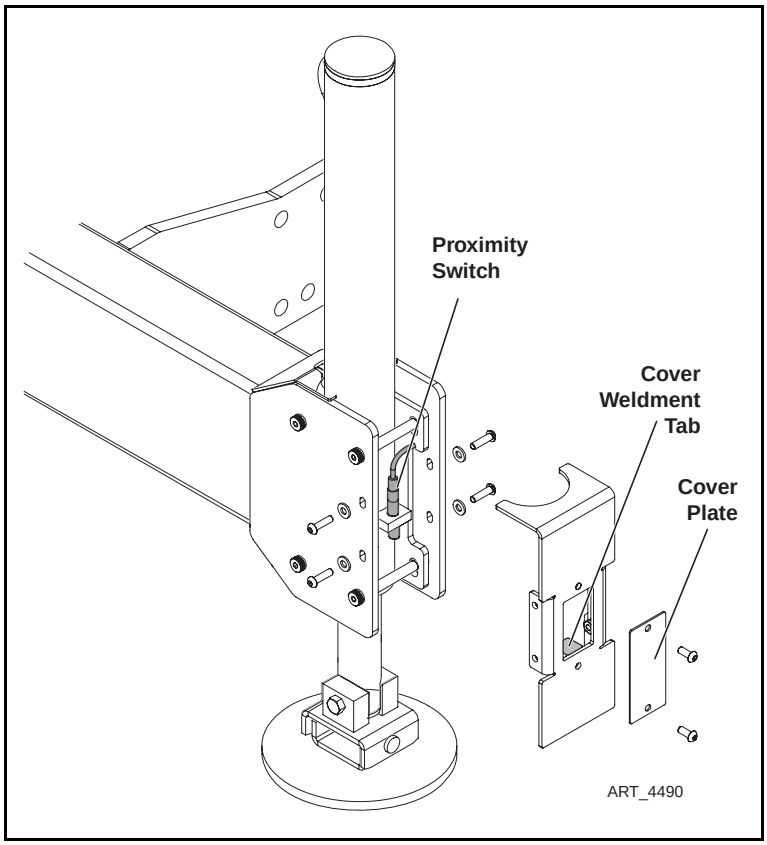
The Lift Pressure Transducer is used on machines equipped with the optional Overload Sensing System. It provides lift cylinder pressure information to the GP400 and works in conjunction with two EZfit Angle Sensors.

Excessive pressure indicates platform overload. When the GP400 reads a certain output from the pressure sensor it will:

- disable lift, lower and drive operation.
- sound audible alarms.
- turn ON the OVERLOAD light on the upper control panel.

Remove weight from the platform to restore function and continue.

Figure 2-8: Outrigger Proximity Sensor

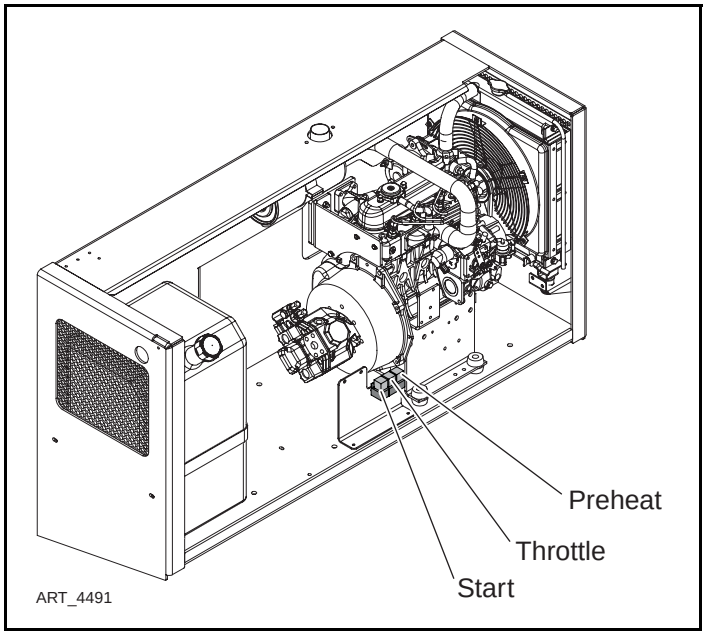


OUTRIGGER PROXIMITY SENSOR

On machines equipped with outriggers, each of the four outriggers has a

Proximity Sensor. Pressure from the outrigger cylinder lifts the cylinder slightly and moves this switch away from a tab on the Cover Weldment, indicating full deployment of the outrigger.

Figure 2-9: Relay Locations



RELAYS

Relays are located on the engine inside the power module. These relays reduce the current flow through the GP400 Control Module. Refer to the Section 5 for relay functions and interconnect.

START RELAY

Provides power to the starter solenoid.

THROTTLE RELAY

Provides power to the electric throttle solenoid.

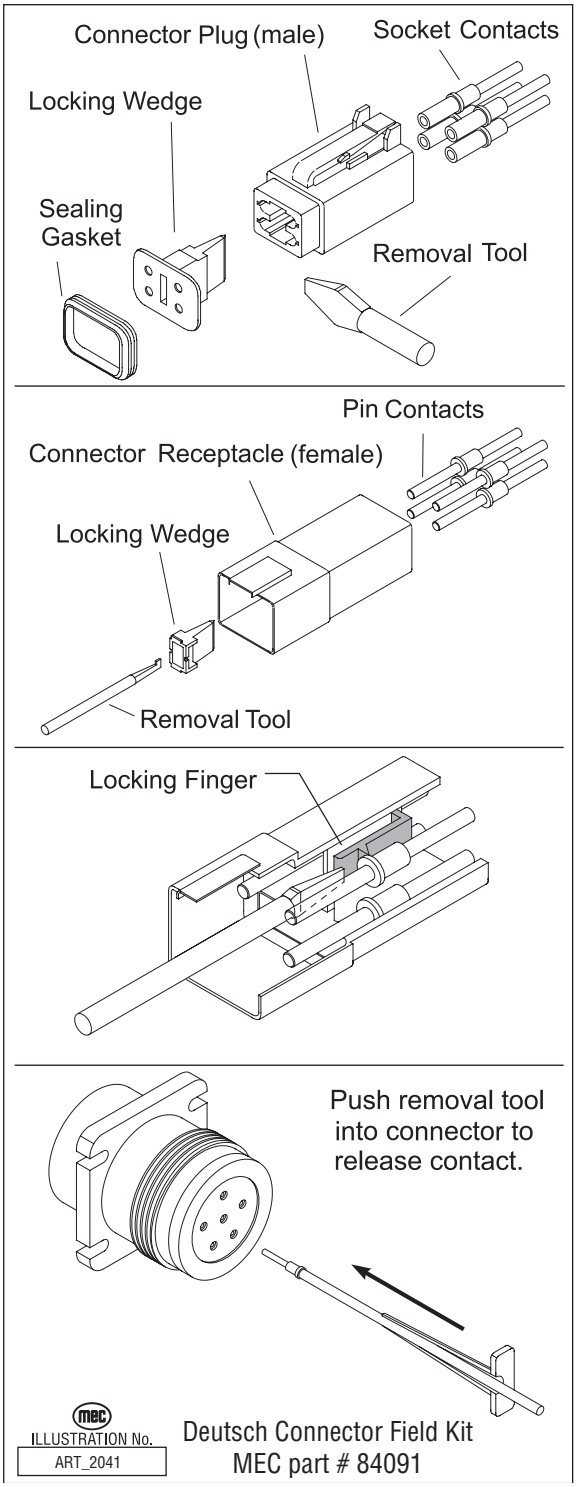
PREHEAT RELAY

Provides power to the diesel engine glow plugs.

DEUTSCH CONNECTORS

Deutsch connectors used on MEC equipment are designed so that individual parts may be replaced without replacing the entire component. Special tools and detailed instructions are provided in Deutsch Connector field kits, MEC part no. 84091.

Figure 2-10: Deutsch Connectors



MALE PLUG CONNECTOR

- Use the flat end of the Removal Tool or a flat blade screwdriver to pry the locking wedge from the connector, taking care not to damage the Sealing Gasket.
- Inspect and replace damaged parts.
- Replace or re-crimp wires and contacts.

FEMALE RECEPTACLE CONNECTOR

- Use the notched end of the removal tool or a wire hook to pull the locking wedge from the connector
- Replace worn or damaged parts
- Replace or re-crimp wires and contacts.

LOCKING FINGERS

- Remove the locking wedge as outlined above.
- Using the removal tool or a flat blade screwdriver, push the Locking Fingers aside to release the contact.
- Pull the wire and contact out of the connector.

HEAVY DUTY PLUG

- Slide the removal tool along the wire to be replaced and push into the connector to release the contact.
- Pull the wire and contact out of the plug.

CRIMPING

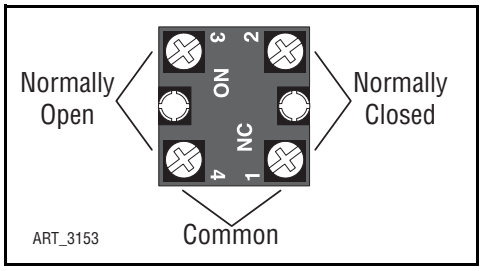
- Strip 1/4 in. (6 mm) insulation from the wire.
- Insert the contact into the crimping tool and insert the stripped wire into the contact making sure no wires are outside the contact barrel.
- Close the handles of the crimping tool, then release the handles to remove the crimped contact.

CONTINUITY CHECKS

SELECTOR SWITCH – ON-OFF

- Disconnect wires.
- Connect first probe of ohm meter to *common* terminal.
- Connect second probe to any normally open terminal.
- With switch OFF (open) there should be no reading.
- With the switch ON (closed) there should be a low reading.
- Repeat for each normally open terminal.

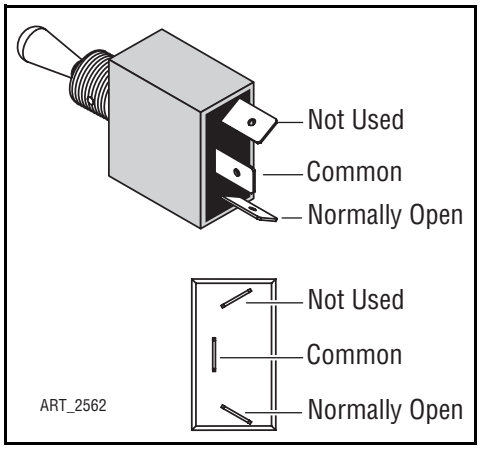
Figure 2-11: Selector Switch



TOGGLE SWITCH – ON-OFF

- Disconnect wires.
- Connect first probe of ohm meter to *common* terminal.
- Connect second probe to normally open terminal.
- With the switch turned OFF there should be no reading.
- With the switch turned ON there should be a low resistance.

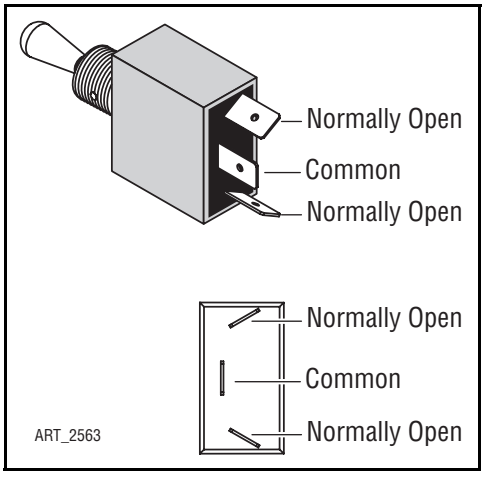
Figure 2-12: Toggle Switch, ON-OFF



TOGGLE SWITCH – 1-POLE 2-POSITION

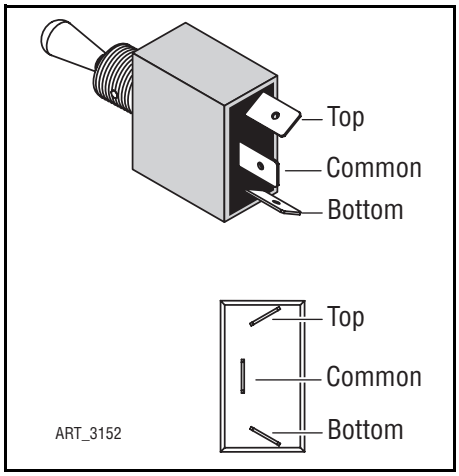
- Disconnect wires.
- Connect first probe of ohm meter to *common* terminal.
- Connect second probe to *top* normally open terminal.
- With toggle DOWN there should be no reading.
- With the toggle UP there should be a low resistance.
- Move second probe to *bottom* normally open terminal.
- With toggle UP there should be no reading.
- With the toggle DOWN there should be a low resistance.

Figure 2-13: Toggle Switch, 1-Pole 2-Position



TOGGLE SWITCH – 1-POLE 3-POSITION

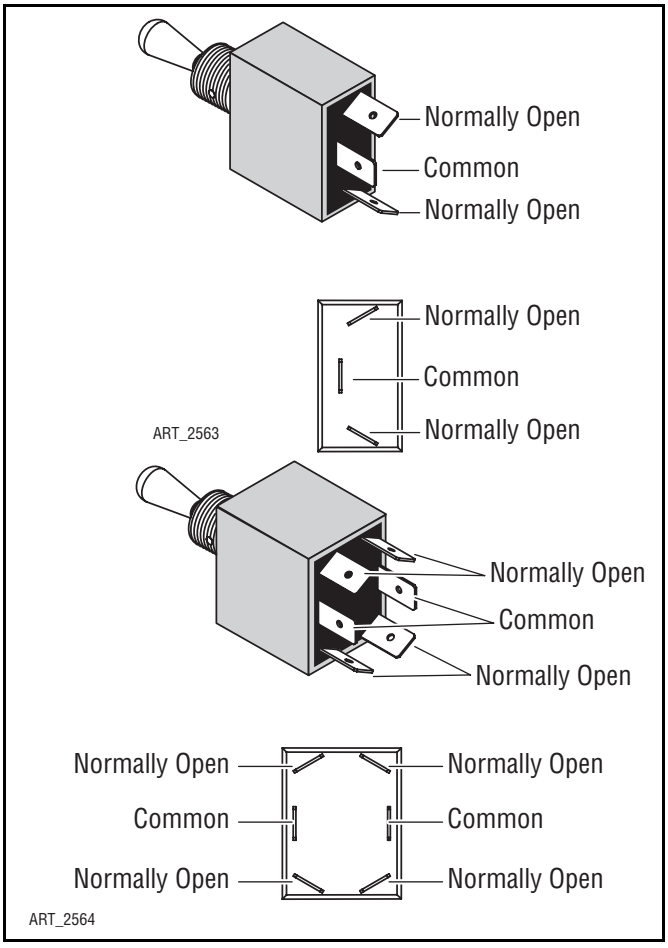
Figure 2-14: Toggle Switch, 1-Pole 3-Position



- Disconnect wires.
- Connect first probe of ohm meter to *common* terminal.
- Connect second probe of ohm meter to *top* terminal.
- With the toggle UP or MIDDLE there should be a low resistance.
- Move second probe to *bottom* terminal.
- With the toggle DOWN or MIDDLE there should be a low resistance.
- Connect first probe of ohm meter to *top* terminal.
- Connect second probe of ohm meter to *bottom* terminal.
- With toggle in ANY POSITION there should be no reading.

TOGGLE MOMENTARY SWITCH

Figure 2-15: Toggle Switch, Momentary



- Disconnect wires.
- Connect first probe of ohm meter to common terminal.

Test top position

- Connect second probe to *top* normally open terminal.
- With the toggle in the neutral (open) position there should be no reading.
- With the toggle UP (closed) there should be a low resistance.
- With the toggle DOWN (closed) there should be no reading.

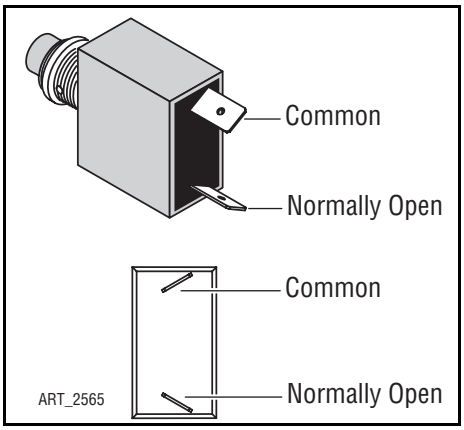
Test bottom position

- Move second probe to *bottom* normally open terminal.
- With the toggle in the neutral (open) position there should be no reading.
- With the toggle DOWN (closed) there should be a low resistance.
- With the toggle UP (closed) there should be no reading.
- Repeat for both rows of two-row switch.

MOMENTARY BUTTON SWITCH

- Disconnect wires.
- Connect one probe of ohm meter each terminal.
- With the button in the neutral (open) position there should be no reading.
- With the button pushed (closed) there should be a low resistance

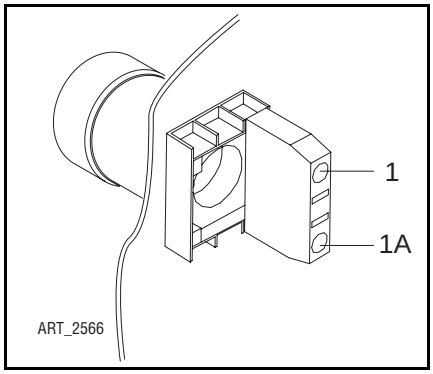
Figure 2-16: Button Switch, Momentary



EMERGENCY STOP BUTTON

- Disconnect wires.
- Connect one probe of ohm meter each terminal.
- With the button PRESSED there should be no reading.
- With the button RESET there should be a low resistance.

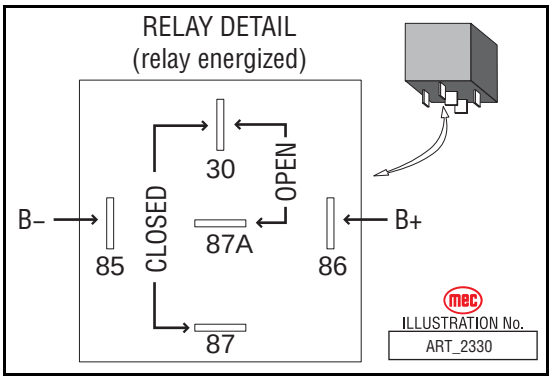
Figure 2-17: Emergency Stop Switch



RELAY

- With the #85 terminal grounded, apply voltage to #86 terminal connection.
- Confirm normally closed (#87A) contacts are opening. Continuity with #30 will be broken.
- Confirm normally open (#87) contacts are closing. Continuity with #30 will be made.

Figure 2-18: Relay Operation



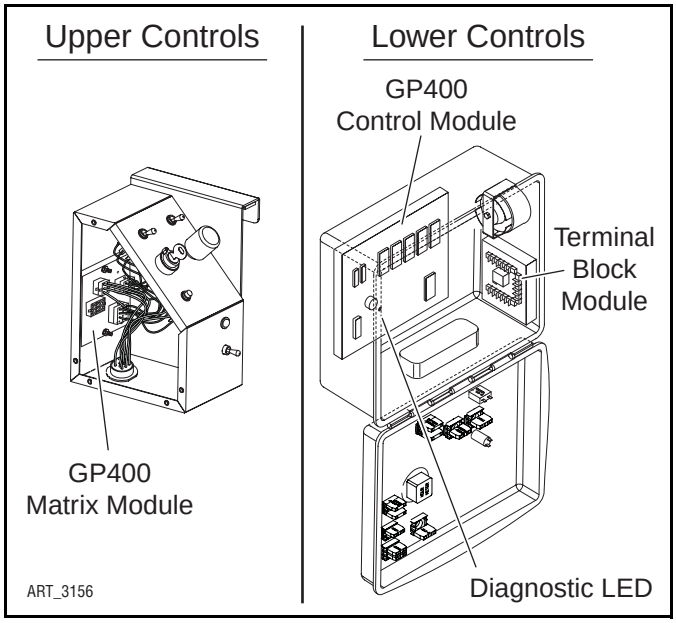
GP400 CONTROL MODULE SETUP

LOCATION

- The GP400 Control Module processor is located in the lower control box.
- The Matrix Module is located in the upper control box.

Diagnostic information can be found in *Section 4: Troubleshooting.*
Wiring information can be found in *Section 5: Schematics*.

Figure 2-19: Module Locations



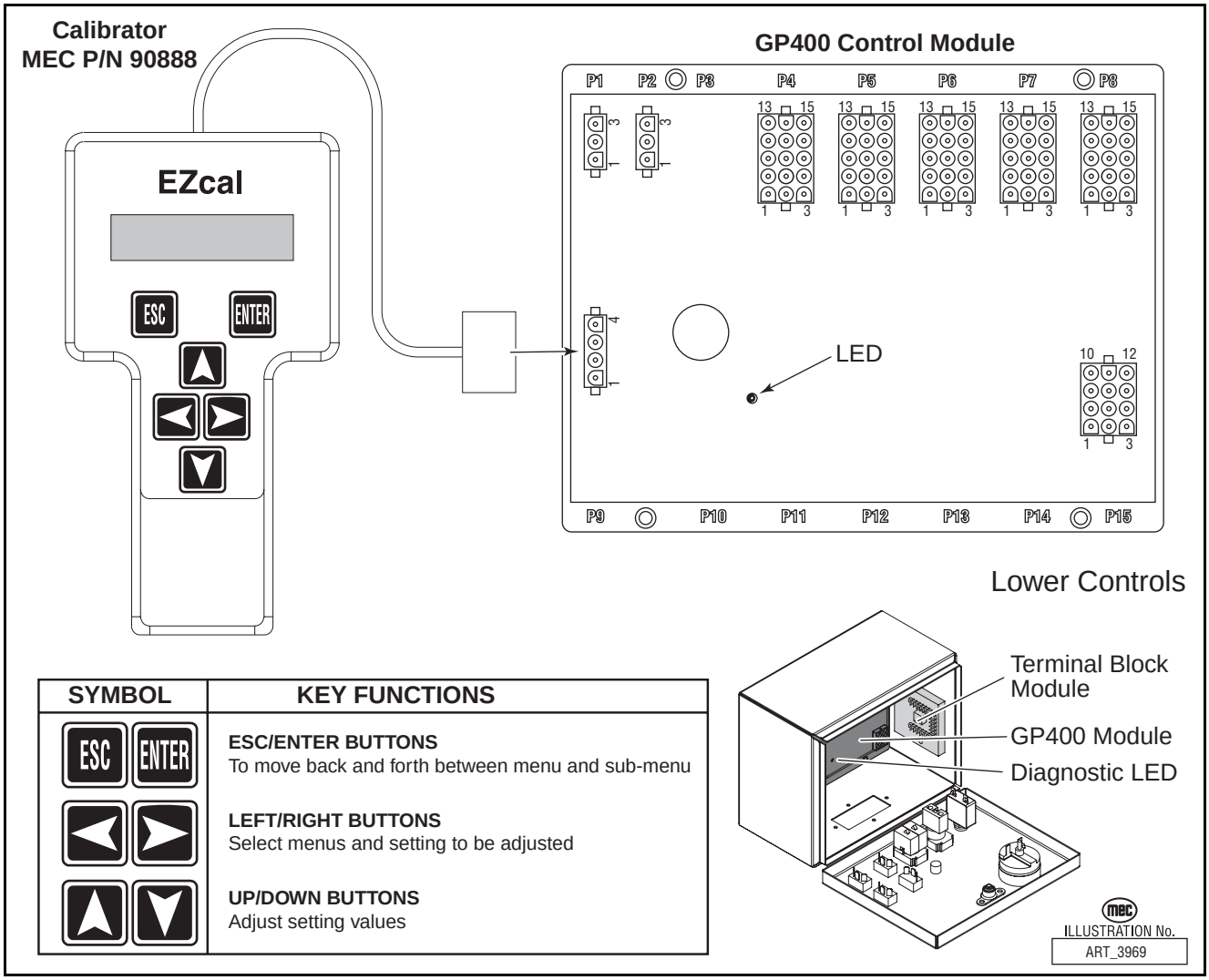
GENERAL DESCRIPTION

The GP400 control module uses a variety of sensors to maintain proper and safe operation of the machine.

In the event the GP400 requires replacement, a calibration process must be performed before the machine can be operated. The GP400 will operate initially in an “assembly mode” to provide basic machine operation. However, it will divert to a failure mode if not properly calibrated within a few start-up cycles.

Machines may be equipped with an optional Onboard EZ-Cal, which is different in appearance but functions similarly to the hand-held type. See Section 4 of this manual for details.

Figure 2-20: EZ-Cal Connection



SYMBOL	KEY FUNCTIONS
ESC ENTER	**ESC/ENTER BUTTONS** To move back and forth between menu and sub-menu
◀ ▶	**LEFT/RIGHT BUTTONS** Select menus and setting to be adjusted
▲ ▼	**UP/DOWN BUTTONS** Adjust setting values

GP400 CALIBRATION

WARNING

CALIBRATION OF THE GP400 MAY BE PERFORMED ONLY BY QUALIFIED, TRAINED AND AUTHORIZED PERSONNEL.
READ ALL INSTRUCTIONS CLOSELY BEFORE ATTEMPTING EACH STEP OF THE CALIBRATION PROCEDURE.

The EZ-Cal hand-held device (MEC part # 90888) is required to access the GP400 for troubleshooting and calibration.

The GP400 processor relies on sensors to monitor platform elevation at all times. These sensors send varied voltages to the GP400 that relate directly to their respective position. The calibration process is the means by which the GP400 equates these voltages to actual platform elevation.

For example, the Angle Transducer, used to monitor platform elevation, varies its output between 1 and 4 volts through 140 degrees of rotation. During calibration the GP400 may learn that 1.8 volts (fictional number used for explanation) represents the fully stowed position and 3.6 volts represents the fully elevated position and therefore voltages between those figures relate to various heights in between.

All machines are calibrated at the factory and should not require calibration unless the GP400 is replaced or displays a code that indicates the need to recalibrate.

Tilt Sensor Calibration is required on all machines regardless of installed options and must be performed first.

Height Calibration follows Tilt Sensor Calibration for machines not equipped with the Optional Overload Sensing System and consists of only height calibration. Skip this procedure if your machine is equipped with the optional Overload Sensing System.

Separate calibration is required of all machines outfitted with the optional Overload Sensing System. All steps in the Overload Sensing System calibration must be performed in the proper sequence before the GP400 will recognize complete and proper calibration. Begin with the Tilt Sensor Calibration, then proceed to the Optional Overload Sensing System Calibrations section.

If the calibration procedure is performed incorrectly or if there is a failure in one of the monitored circuits during the calibration, the GP400 will not allow the operator to continue with the calibration process. An error message will display on the EZ-cal indicating the reason for the interruption.

Additional details of these error messages can be found at the end of the calibration instructions.

This and other procedures can only be performed using an EZ-Cal scan tool. If you do not have an EZ-Cal, please contact MEC to obtain one.

Tilt Sensor Calibration

Correctly performing the following procedure will ensure that your machine will continue to auto-level correctly and operate safely.

The Tilt Sensor is located within the GP400 Control Module. It is used by the control system to monitor machine level status, and is used on machines equipped with outriggers for auto-leveling. Correctly performing the Tilt Sensor Calibration will ensure that the machine will operate safely and that the outriggers (if equipped) will continue to auto-deploy correctly.

1. Park machine on a flat level surface. Using a spirit level or framer's level, check that the machine is absolutely level, both fore-and-aft and side-to-side.
2. Check the tire pressure (see Specifications in the Introduction section), and check that the tires are in good condition. If the machine is equipped with foam-filled tires, be sure that all tires are in good condition and that the tires are all the same size.
3. Open the lower control box and plug the EZ-cal into plug J-9 (4-pin connector) on the GP400. The display should light up and read "HELP - PRESS ENTER.
   a. Press the right arrow to access "ACCESS LEVEL 3", press ENTER.
      - The display reads CODE 0000 with the cursor flashing.
   b. Press the Up and Right arrows to enter code 1775, Press Enter
      - Display reads "ACCESS LEVEL 2"
   c. Right arrow to SETUPS, Press Enter
      - Display reads 'CHANGE DEFAULTS"
   d. Right arrow to TILT SETUPS, Press Enter
      - Display reads "CALIBRATE LEVEL".
   e. Press Enter
      - Display reads "CALIBRATE LEVEL YES: ENTER NO: ESC"
   f. Press Enter
      - Display reads "CALIBRATE LEVEL YES: ENTER NO: ESC" plus has actual tilt percentages.
   g. Press Enter again.
      - The percentage numbers should be 0.0 - 0.0 (or very close).
   h. Level calibration is complete. Unplug the EZ-Cal or press ESC ESC ESC.

Height Calibration

Height calibration must be performed if the GP400 is replaced.
Skip this procedure if your machine is equipped with the optional Overload Sensing System.

For this procedure it is not necessary to place any load in the platform.

1. Drive machine to a flat level surface, in area where it can reach full elevation.
2. Turn selector switch to Base controls.
3. Plug **EZ-Cal** into connector P9 on GP400 Control Module. **EZ-Cal** display reads HELP: PRESS ENTER
4. Press right arrow to ACCESS LEVEL 3, Press Enter.
   - Display reads CODE 0000
5. Press Up and Right Arrow to enter code 1775. Press Enter.
   - Display reads ACCESS LEVEL 2.
6. Press Right Arrow to SETUPS, Press Enter.
   - Display reads CHANGE DEFAULTS

7. Press Right Arrow to HEIGHT SETUPS, Press Enter.
   - Display reads CALIBRATE HEIGHT
8. Press Enter.
   - Display reads PLATFORM DOWN? Verify that platform is fully lowered.
9. Press Enter.
   - Display reads PLEASE LIFT.
10. Hold lower controls switch in the up position until machine is fully elevated, then release switch.
    - Display reads PLEASE LOWER.
11. Hold switch in down position until platform is in the fully lowered position. Release switch.
    - Display reads FINISHED.

OPTIONAL OVERLOAD SENSING SYSTEM CALIBRATIONS

Do not perform this procedure UNLESS your machine is equipped with the optional Overload Sensing System.

Optional Overload *Sensing System* *Platform Load Calibration*

Perform the Tilt Sensor Calibration outlined at the beginning of this section (" Tilt Sensor Calibration" on page 2-20).

Platform Load Calibration must be performed any time the GP400 is replaced or significant repairs are made to the elevating assembly.

During the calibration procedure the platform is fully raised and lowered three times:

- "DYNAMIC" calibration – fully loaded platform raised & lowered in one continuous movement. DYNAMIC measurements are taken.
- "LOADED" calibration – fully loaded platform raised & lowered with stops to take measurements. STATIC measurements are taken.
- "EMPTY" calibration – unloaded platform raised & lowered with stops to take measurements. STATIC measurements are taken.

The following procedure must be followed COMPLETELY to calibrate the optional **Overload Sensing System**. If any problem is detected, the procedure stops and an Error Message will display on the EZ-Cal. Explanations of each message and suggested corrections can be found in the section of this manual following the calibration procedure.

NOTE: If the calibration procedure is interrupted, completed phases do not need to be repeated. A "REDO" prompt will appear – answer "NO" if there is no reason to repeat the phase, or "YES" if the phase must be repeated (for example because the wrong platform load was used on the previous phase).

1. Drive machine to a flat, level surface where it can reach full elevation. Choose a place where the rated load can be placed in the platform and later removed **without** moving the machine.
2. Place the rated load in platform (see platform labels or serial plate). The load must be evenly distributed on the platform.
3. Turn selector switch to Base controls.
4. Plug **EZ-Cal** into connector P9 on GP400 Control Module. **EZ-Cal** display reads HELP: PRESS ENTER
5. Press right arrow to ACCESS LEVEL 3, Press Enter.
   - Display reads CODE 0000

6. Press up and right arrow to enter code 1775, Press Enter.
   - Display reads ACCESS LEVEL 2.
7. Press Right Arrow to SETUPS, Press Enter.
   - Display reads CHANGE DEFAULTS
8. Press Right Arrow to LOAD SETUPS. Press Enter.
   - Display reads CALIBRATE LOAD
9. Press Enter.
   - Display reads PLATFORM DOWN? Verify that platform is fully lowered.
10. Press Enter.
    - Display reads PLATFORM LOADED? Verify that rated load is evenly distributed in platform.
11. Press Enter.
    - Display reads PLEASE LIFT.
12. Hold lower controls switch in the up position until machine is fully elevated, then release switch.
    - Display reads PLEASE LOWER.
13. Hold switch in down position until platform is in the fully lowered position. Release switch.
    - Display reads PLATFORM LOADED?
14. Ensure that the rated load is distributed evenly in the platform, then press Enter.
    - Display reads PLEASE LIFT.
15. Hold lower controls switch in the up position until machine is fully elevated, then release switch.
    - Display reads TOTAL DATA #XX, then PLEASE LOWER.

NOTE: The platform will rise incrementally during this phase on the calibration. Do not release the switch until fully elevated.

16. Hold switch in down position until platform is in the fully lowered position.

NOTE: The platform will lower incrementally during this phase on the calibration. Do not release the switch until fully lowered.

17. Release switch.
    - Display reads TOTAL DATA #XX, then PLATFORM EMPTY?
18. Remove the load from the platform.

NOTE: If you must switch to platform controls to move the machine, steps 1.] through 7.] must be repeated. Steps 12.] through 20.] will generate the REDO prompt. Answer NO. If machine was not moved, proceed to step 22.].

19. Press Enter.
    - Display reads PLEASE LIFT.
20. Hold lower controls switch in the up position until machine is fully elevated, then release switch.
    - Display reads TOTAL DATA #XX, then PLEASE LOWER.
21. Hold switch in down position until platform is in the fully lowered position.
    - Display reads TOTAL DATA #XX, then BUILDING TABLES, then CALDATE mm/dd/yy.
22. Enter current date using Up, Down and Right Arrows.
    - Display reads FINISHED.
23. Disconnect **EZ-Cal**.

The Platform Overload Sensing System is now calibrated.

Optional Overload Sensing System Height Calibration

For this procedure it is **not** necessary to place any load in the platform.

1. Drive machine to a flat, level surface where it can reach full elevation.
2. Turn selector switch to Base controls.
3. Plug **EZ-Cal** into connector P9 on GP400 Control Module.
   - Display reads HELP: PRESS ENTER
4. Press right arrow to ACCESS LEVEL 3. Press Enter.
   - Display reads CODE 0000
5. Press Up and Right Arrow to enter code 1775. Press Enter.
   - Display reads ACCESS LEVEL 2.
6. Press Right Arrow to SETUPS. Press Enter.
   - Display reads CHANGE DEFAULTS
7. Press Right Arrow to HEIGHT SETUPS. Press Enter.
   - Display reads CALIBRATE HEIGHT
8. Press Enter.
   - Display reads PLATFORM DOWN?
9. Verify that platform is fully lowered. Press Enter.
   - Display reads PLEASE LIFT.
10. Hold lower controls switch in the up position until machine is fully elevated, then release switch.
    - Display reads PLEASE LOWER.
11. Hold switch in down position until platform is in the fully lowered position. Release switch.
    - Display reads FINISHED.

CALIBRATION PROBLEMS

FAILURE MESSAGES

Various problems can be detected by the EZ-Cal that prevent successful calibration. These problems are reported with a flashing message including an “F” code. The following descriptions are helpful in solving the problem. References in parentheses refer to electrical schematic points.

F01:CHECK HWFS

This message is given if the startup tests have not completed.

Check HELP message for more information.

F02:NOT GROUND MODE

This message is given if the base/platform selector switch is not in ground mode (P7-2 must be high). Calibration can only be carried out in ground mode.

F03:NOT STOPPED

This message is given if any function switch is closed. Check DIAGNOSTICS / SWITCHES to see which function switch is closed.

F04:TILTED

This message is given if the machine is tilted. Calibration must be carried out with the machine level. If the machine is level, perform the Tilt Calibration procedure above.

F05:BAD HEIGHT

This message is given if the height sensor output (P8-2 and P8-6) is out of range at the start of calibration. The height sensor output must be between 1.0V and 4.0V. Check DIAGNOSTICS / SENSORS to see the output. A reading of 0V or 5V is probably due to a wiring problem.

F06:CHECK ELEV

This message is given if the elevation switch (P7-5) is open at the start of calibration, when the operator has confirmed the “PLATFORM DOWN?” question.

If the platform is down, check the elevation switch wiring.

F08:CHECK ELEV

This message is given if the elevation switch (P7-5) is closed at the end of the DYNAMIC lift, when the platform should be fully raised.

This message would occur if the UP switch was accidentally opened near the start of the DYNAMIC lift.

If the platform is fully raised, check the elevation switch wiring.

F09:BAD HEIGHT

This message is given if the height sensor output (P8-2 and P8-6) is out of range at the start of the DYNAMIC lift. The height sensor output must be between 1.0V and 4.0V. Check DIAGNOSTICS / SENSORS to see the output. This is usually due to a wiring problem.

F10:BAD HEIGHT

This message is given if the height sensor output (P8-2 and P8-6) is out of range at the end of the DYNAMIC lift. The height sensor output must be between 1.0V and 4.0V. Check DIAGNOSTICS / SENSORS to see the output. A reading of 0V or 5V is probably due to a wiring problem.

F11:NOT UP

This message occurs at the start of the DYNAMIC lift if the operator selects a function other than UP.

F12:TOO MANY

This message occurs if the DYNAMIC lift takes too long.

This message could occur if the UP switch was not released at the end of the dynamic lift.

F13:LOW HEIGHT RANGE

This message occurs at the end of the DYNAMIC lift if the height sensor output did not change sufficiently to give a reasonably accurate platform height estimate. DIAGNOSTICS / ANALOGS can be used to check the height sensor output (P8-2 and P8-6) when the platform is fully lowered and fully raised; a difference of at least 1V is to be expected.

This message could occur if the UP switch was accidentally opened too early (when the platform is not fully raised).

F14:BAD HEIGHT

This message occurs if the height sensor output (P8-2 and P8-6) is out of range during the DYNAMIC lift. The height sensor output must be between 1.0V and 4.0V. Check DIAGNOSTICS / SENSORS to see the output. A reading of 0V or 5V is probably due to a wiring problem.

F15:CHECK ELEV

This message is given if the elevation switch (P7-5) is open when the platform has been fully lowered after the DYNAMIC lift.

This message would occur if the DOWN switch was accidentally opened before the platform was fully lowered.

If the platform is fully lowered, check the elevation switch.

F16:LOW ELEV.OPEN

This message is given if the elevation switch (P7-5) opened during lift at too low of a height (below 5%). Check CALIBRATIONS / HEIGHT CALS. The “ElevUp” value shows the recorded height where the switch opened.

F17:HIGH ELEV.OPEN

This message is given if the elevation switch (P7-5) opened during lift at a too high height (above 25%).

Check CALIBRATIONS / HEIGHT CALS; the “ElevUp” value shows the recorded height where the switch opened.

F18:LOW ELEV.CLOSE

This message is given if the elevation switch (P7-5) closed during lower at a too low height (below 5%).

Check CALIBRATIONS / HEIGHT CALS; the “ElevDown” value shows the recorded height where the switch opened.

F19:HIGH ELEV.CLOSE

This message is given if the elevation switch (P7-5) closed during lower at a too high height (above 25%).

Check CALIBRATIONS / HEIGHT CALS; the “ElevUp” value shows the recorded height where the switch opened.

F20:HEIGHT<>0%
F21:HEIGHT<>0%

This message occurs if the platform height is not 0% after the platform has been fully lowered at the end of a calibration step. The platform must return to the same height each time it is fully lowered.

Check DIAGOSTICS / SYSTEM to check the height.

F22:HEIGHT<>100%
F23:HEIGHT<>100%

This message occurs if the platform height is not 100% after the platform has been fully raised during a calibration step. The platform must return to the same height each time it is fully raised. Check DIAGNOSTICS / SYSTEM to check the height.

F24:TOO MANY

This message occurs if too many static measurements are taken during a calibration step. In the rare event that this occurs, please call MEC for assistance.

F25:CHECK ELEV
F26:CHECK ELEV

This message indicates a problem with the elevation switch (P7-5) during the STATIC phases.

The switch is either staying closed to a higher height, or staying open to a lower height, than that recorded during the DYNAMIC phase.

F27:BAD HEIGHT

This message indicates a problem with the height sensor output (P8-2 and P8-6) during the STATIC calibration phases.

The height sensor output must be between 1.0V and 4.0V at all times.

Check DIAGNOSTICS / SENSORS to see the output. A reading of 0V or 5V is probably due to a wiring problem.

F30:BAD HEIGHTS

This message indicates that the recorded heights are not increasing during STATIC lift, or are not decreasing during STATIC lower.

This problem may be caused by repeatedly opening and closing the UP or DOWN switch during the STATIC phases.

F31:REJECT CURVE

The DYNAMIC pressure curve is unacceptable.

An initial pressure peak when the platform lifted cannot be found between 0% and 15% height.

Check for proper weight in the platform and check pressure sensor and lift cylinder hydraulics.

F32:REJECT CURVE

The DYNAMIC pressure curve is unacceptable.

There should be a lowest pressure about halfway through the lift (i.e.: near 50% height); the lowest pressure measured is at too low a height.

Check for proper weight in the platform and check pressure sensor and lift cylinder hydraulics.

F33:REJECT CURVE

The DYNAMIC pressure curve is unacceptable.

There should be a lowest pressure about halfway through the lift (i.e.: near 50% height); the lowest pressure measured is at too high a height.

Check for proper weight in the platform and check pressure sensor and lift cylinder hydraulics.

F34:REJECT CURVE

The DYNAMIC pressure curve is unacceptable.

There is not enough difference between the initial pressure peak and the minimum pressure.

Check for proper weight in the platform and check pressure sensor and lift cylinder hydraulics.

F40:REJECT DELTA

This message indicates that there is not enough difference between the loaded & empty pressure.

This message could occur if the platform were not properly loaded during the STATIC LOADED phase, or if the platform were not properly empty during the STATIC EMPTY phase.

This message could also occur if the wrong pressure sensor was fitted (e.g.: a 5000psi sensor when a 3000psi one is needed).

Check CALIBRATIONS / HEIGHT CALS; the “Height” indicates the first height at which there was insufficient difference and the “Up” and “Down” values show the loaded pressure (first) and the difference between loaded and empty pressure (second).

F42:LOW PRESSURE

This message indicates that the pressure is too low (0.5V or less) when the elevation switch opens during the DYNAMIC lift.

This message would occur if the pressure sensor was disconnected, or if there were some other wiring error.

Check DIAGNOSTICS / SENSORS to check the pressure.

F43:HIGH PRESSURE

This message indicates that the pressure is too high (4.5V or more) when the elevation switch opens during the DYNAMIC lift.

This message would occur if the wrong pressure sensor was fitted, or if there were some other wiring error.

Check DIAGNOSTICS / SENSORS to check the pressure.

F44:LOW PRESSURE

This message indicates that the pressure is too low (0.5V or less) at a STATIC measurement point.

This message would occur if the pressure sensor was disconnected, or if there were some other wiring error.

Check DIAGNOSTICS / SENSORS to check the pressure.

F45:HIGH PRESSURE

This message indicates that the pressure is too high (4.5V or more) at a STATIC measurement point.

This message would occur if the wrong pressure sensor was fitted, or if there were some other wiring error.

Check DIAGNOSTICS / SENSORS to check the pressure.

F46:CHECK ELEV

This message indicates that the elevation switch opened more than once during the DYNAMIC lift.

F47:CHECK ELEV

This message indicates that the elevation switch closed more than once during the DYNAMIC lower.

F48:BAD PRESSURE

This message is given if the pressure sensor output (P8-2 and P8-6) is out of range at the start of calibration.

The height sensor output must be between 0.5V and 4.5V.

Check DIAGNOSTICS / SENSORS to see the output. A reading of 0V or 5V is probably due to a wiring problem.

F52:NOT CALIBRATED

This message is a catch-all code which indicates an improper calibration sequence or that one of the phases of calibration was not completed. The skipped phase must be completed or the calibration sequence must be passed through in proper sequence before this message will clear. Re-start the calibration sequence and proceed through each sequence in the specified order.

A “Redo” prompt will appear before each sequence. Answer “NO” if there is no reason to repeat or “YES” if the phase must be completed.

INFORMATION MESSAGES

During calibration the following messages will be displayed. They are informational prompts only and do not indicate a failure.

BUILDING TABLES

This message indicates that the STATIC measurements are being used to build calibration data - the process should take no more than 5s.

CALDATE:

This message is prompting for the date to be entered; it is stored to identify when the machine was calibrated.

The last calibrate date can be viewed in DIAGNOSTICS / LOG.

Press LEFT & RIGHT to select the flashing digits.

Press UP & DOWN to change the flashing digits.

Press ENTER when the entry is complete.

IMPORTANT: The date 00/00/00 is not allowed!

FINISHED

This message confirms that calibration is complete and successful.

GO DOWN MORE!

This message occurs if the DOWN switch is released during either STATIC lowering phase, when more measurements are needed (before the platform is fully lowered).

GO UP MORE!

This message occurs if the UP switch is released during either STATIC lifting phase, when more measurements are needed (before the platform is fully raised).

LIFT EMPTY

This message is displayed during the STATIC empty phase while the platform is being raised to the next measurement height.

LIFT LOADED

This message is displayed during the STATIC loaded phase while the platform is being raised to the next measurement height.

LIFTING

This message is displayed during the DYNAMIC phase while the platform is being raised.

LOWER EMPTY

This message is displayed during the STATIC empty phase while the platform is being lowered to the next measurement height.

LOWER LOADED

This message is displayed during the STATIC loaded phase while the platform is being lowered to the next measurement height.

LOWERING

This message is displayed during the DYNAMIC phase while the platform is being lowered.

MEASURING #

This message is displayed when the platform is stopped during either STATIC phase, when the GP400 takes a measurement.

There will be a short delay while the machine is allowed to stabilize after movement is stopped.

MUST GO DOWN!

This message occurs if the wrong switch is operated when the GP400 is waiting for the platform to be lowered.

MUST GO UP!

This message occurs if the wrong switch is operated when the GP400 is waiting for the platform to be raised.

PLATFORM DOWN?

This message is prompting for confirmation that the platform is fully lowered. If necessary the DOWN switch can be activated to lower the platform.

Press ENTER to confirm when the platform is fully lowered.

PLATFORM EMPTY?

This message is prompting for confirmation that the platform is completely empty.

Press ENTER to confirm when the platform is empty.

PLATFORM LOADED?

This message is prompting for confirmation that the platform is loaded to rated load: 1500 lbs (US/CSA), 680 Kgs (CE/AU). (100% of the load rating listed on the serial plate).

Press ENTER to confirm when the platform is loaded.

PLEASE LIFT ...

This message is prompting for the platform to be raised.

The UP switch should be operated.

PLEASE LOWER ...

This message is prompting for the platform to be lowered.

The DOWN switch should be operated.

PLEASE WAIT

This message indicates that the is busy; the delay will be short (no more than 5s).

REDO DYNAMIC:

This message is displayed if the DYNAMIC phase of load calibration has previously been completed.

Press ENTER when “NO” is displayed if there is no need to redo the DYNAMIC phase.

Press UP or DOWN to display “YES” then press ENTER if it is necessary to redo the DYNAMIC phase.

If the previous DYNAMIC calibration was in error, or if the height or pressure sensor is replaced, it will be necessary to redo the DYNAMIC phase.

REDO EMPTY:

This message is displayed if the EMPTY phase of load calibration has previously been completed.

Press ENTER when “NO” is displayed if there is no need to redo the EMPTY phase.

Press UP or DOWN to display “YES” then press ENTER if it is necessary to redo the EMPTY phase.

If the previous EMPTY calibration was in error, or if the pressure sensor is replaced, it will be necessary to redo the EMPTY phase.

REDO LOADED:

This message is displayed if the LOADED phase of load calibration has previously been completed.

Press ENTER when “NO” is displayed if there is no need to redo the LOADED phase.

Press UP or DOWN to display “YES” then press ENTER if it is necessary to redo the LOADED phase.

If the previous LOADED calibration was in error, or if the pressure sensor is replaced, it will be necessary to redo the LOADED phase.

TOTAL DATA:

This message is displayed at the end of each phase, to confirm the number of measurements recorded by the GP400. No operator input is required during this process.

NOTES:

Section 3

Mechanical Components

Contents

FIGURES PAGE

BASE

CAUTION

When steam cleaning the base/undercarriage, cover electrical components to prevent water penetration.

Steam clean the base as necessary, and inspect all welds and brackets. Check for cylinder pins that have turned in their mounting, which may indicate sheared retaining pins.

TIRES AND WHEELS

Inspect for cuts, chunking, side-wall damage, or abnormal wear. **ANY TIRE FAULTS MUST BE CORRECTED** before further machine operation. Refer to Parts sections for replacement tires.

DANGER

FAILURE TO USE APPROVED PARTS MAY CAUSE DEATH OR SERIOUS PERSONAL INJURY.

REPLACE TIRES WITH THE CORRECT TIRES TO MAINTAIN THE RATING OF THE EQUIPMENT.

IF FOAM FILLED TIRES WERE FITTED AS ORIGINAL EQUIPMENT THEY MUST BE REPLACED WITH EQUIVALENT SPECIFICATION TIRES AND FOAM-FILL WEIGHT.

CHANGING TIRES

Refer to *"Lift and Support The Machine"* in the Introduction Section of this manual for instructions and safety precautions.

CAUTION

Always block the wheels before lifting the machine.

1. Chock tires on the end of machine opposite the tire to be changed.
2. Lift the end of machine requiring a tire change and support with jackstands of adequate capacity.
3. Remove lug bolts and pull the wheel off. Note the position of the centering washers.
4. Install the replacement wheel.
5. While ensuring the correct positioning of the centering washers, install lug bolts and torque to 55 lb-ft. (75 Nm).
6. Remove the chocks.

HOSES AND CABLES

NOTE: Refer to *Parts Section E* for detailed hydraulic hose diagrams.

Inspect all hoses and electrical cables for security and damage. Hoses and cables should be examined closely for rubbing and chafing.

Check all ties and clamps that keep hoses secure.

Check for leaks at fittings.

Replace any damaged hose or cable.

WHEN DISASSEMBLING ANY HYDRAULIC COMPONENT:

1. Clean the area of dirt and grease.
2. Tag hoses for proper reassembly.
3. Disconnect hydraulic hoses. Immediately cap and plug all openings to prevent contamination.
4. Torque hose fittings according to the Hydraulic Torque Specification Table. See the Introduction Section of this manual.

PLATFORM

NOTE: Refer to Parts Section B for detailed parts list and illustration.
Remove all tools and materials from the platform before performing this procedure.

REMOVAL

1. Raise the platform and support it with the maintenance lock (see the Introduction Section of this manual).
2. Connect an overhead crane to platform using appropriate slings. Arrange the rigging to avoid touching the guardrails and so that it runs **between** the toe board and the sheet materials rack. Apply slight lifting pressure.
3. Tag and disconnect all platform wires.
4. Remove the nuts from the two bolts on each side of the front of the platform (four nuts total). Press the bolts flush with the inner surface of the platform structure. It is not necessary to remove the bolts completely.
5. Remove any components that will obstruct the scissor slide path.
6. Remove the bolts from both fixed blocks at the rear of the platform.
7. Lift the rear of the platform until the fixed blocks are clear.
8. Slide the platform assembly backwards until the slide blocks clear the front of the platform.

WARNING

THE PLATFORM MAY SHIFT SUDDENLY WHEN IT CLEARS THE SLIDE BLOCKS.

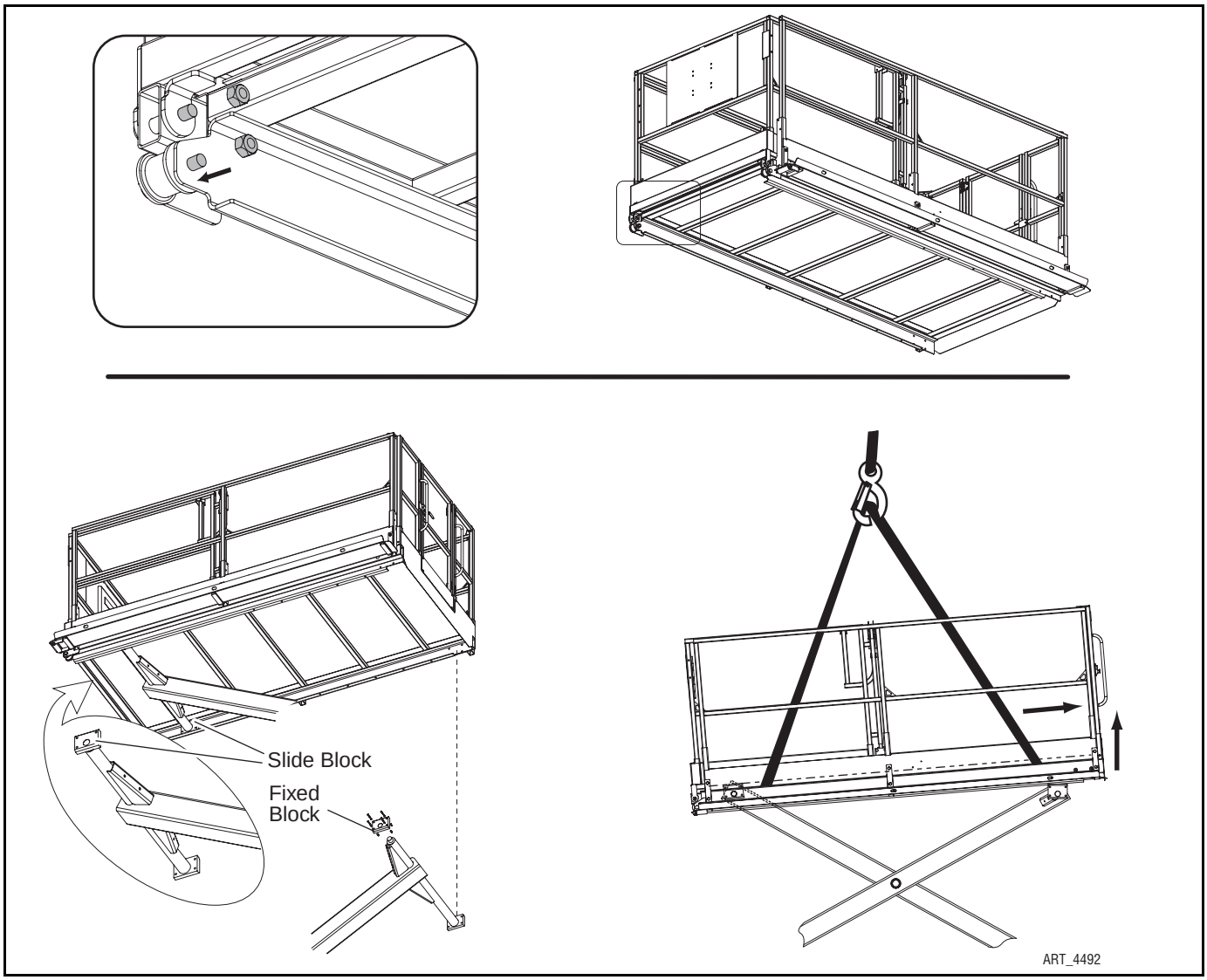
9. Remove the platform assembly.

Installation

Installation is reverse of removal.

- Use Loctite 242 or equivalent on mounting bolts.
- Torque all bolts to specifications listed in the Introduction Section of this manual.

Figure 3-1: Platform Removal



SCISSOR STACK

NOTE: Refer to Parts Section C for detailed parts list and illustration.

CAUTION

- **Clean all fittings before disconnecting hoses.**
- **Tag hoses for proper reassembly.**
- **Plug all openings to prevent contamination.**

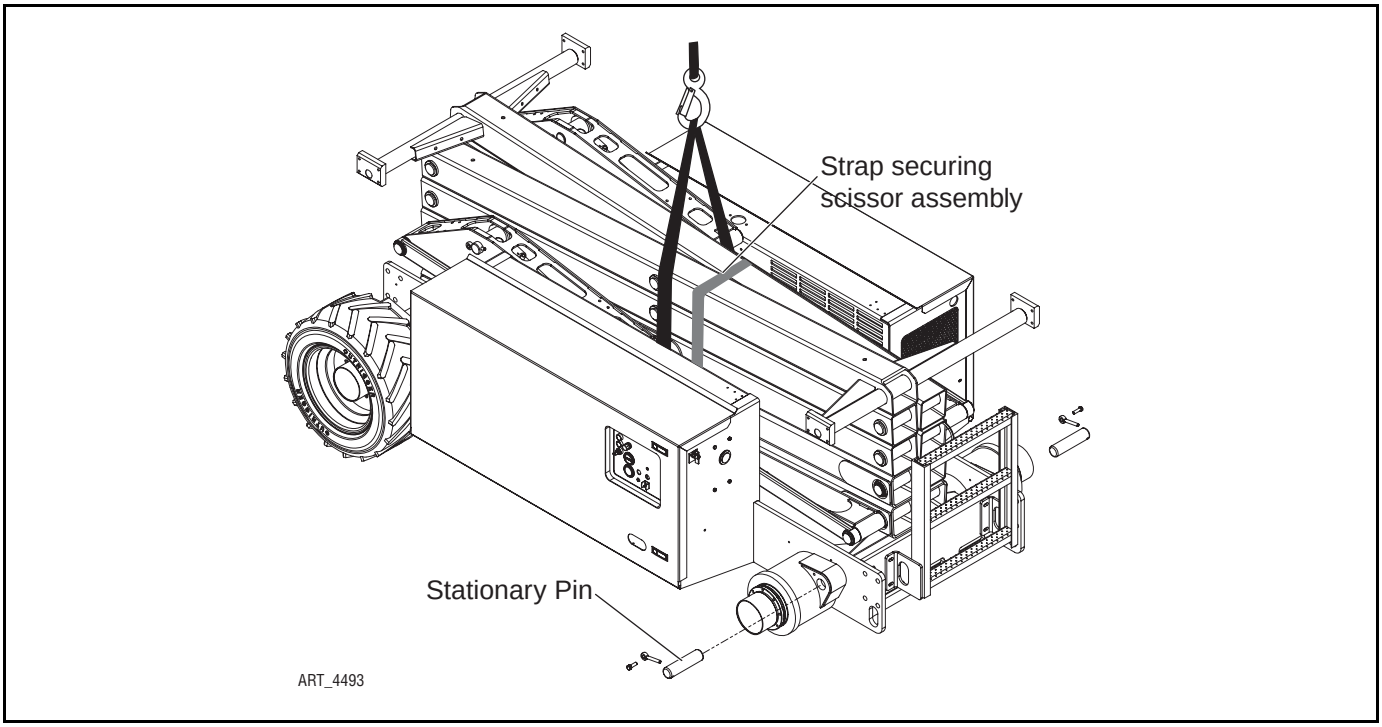
Clean the beams once a year or more often if necessary and inspect the beams' surfaces, especially welds and brackets.

Refer to *"Lift and Support The Machine"* in the *Introduction* section for instructions and safety precautions.

REMOVAL

1. Remove the platform and lower the scissor stack.
2. Raise and support the rear end of the machine. Remove the rear wheels.
3. Disconnect hydraulic hoses. Immediately cap and plug all openings to prevent contamination.
4. Tag and disconnect all cables.
5. Immobilize the scissor assembly by wrapping a strap tightly around it.
6. Attach a suitable lifting device to the scissor assembly. Apply slight lifting pressure.
7. Remove the stationary pins at the rear end of the machine.

Figure 3-2: Scissor Assembly Removal

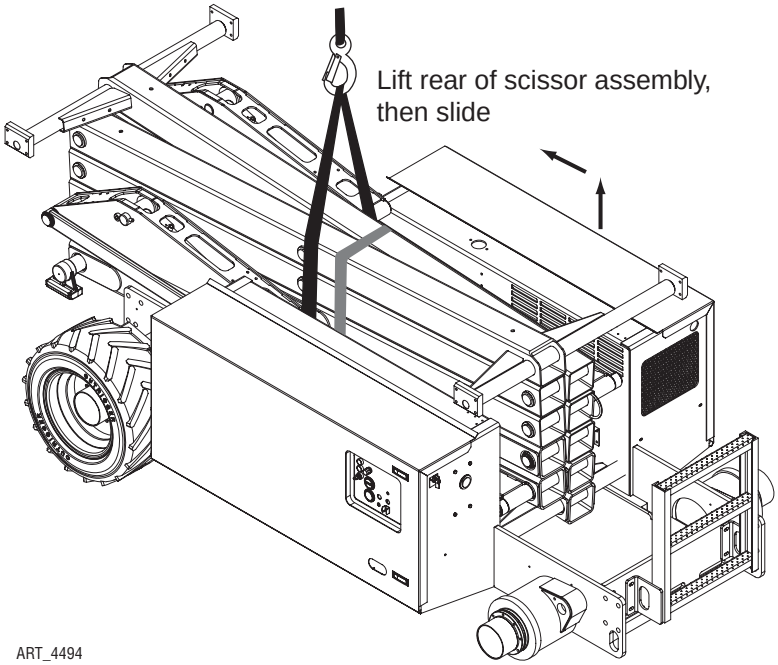


8. Carefully lift until the rear of the scissor is clear.
9. Slide the scissor assembly toward the front until the slide blocks reach the end of slide channel, then lift the scissor assembly.

WARNING

THE SCISSOR ASSEMBLY MAY SHIFT SUDDENLY UPON CLEARING THE SLIDE CHANNEL.

Figure 3-3: Scissor Assembly Removal, continued



Installation

Clean all parts before installation. Replace worn or damaged parts with new parts.

Installation is reverse of removal.

- Use Loctite 242 or equivalent on mounting bolts.
- Torque all bolts to specifications listed in the Introduction Section of this manual.

LIFT CYLINDERS

NOTE: Refer to Section 1 for seal replacement instructions.
Refer to Parts Section C and E for detailed parts list and illustration.

CAUTION

- **Clean all fittings before disconnecting hoses.**
- **Tag hoses for proper reassembly.**
- **Plug all openings to prevent contamination.**

The 4069 has two lift cylinders. This procedure covers removal of either cylinder without removing the entire scissor stack.

1. Raise the scissor arm assembly and support using the maintenance lock.
2. Remove the support beam.
   - Remove the upper and lower retaining rings.
   - Remove the upper and lower nylon washers.
3. Disconnect hoses, wires and cables from the lift cylinders.
4. Wrap a lift sling of adequate capacity completely around the barrel of the lift cylinder. Use a suitable lifting device to support the lift cylinder.

CAUTION

Attach the lifting device to the cylinder body. Lifting by the rod end will cause the cylinder to extend.

5. Remove the upper retaining pin, cylinder mount pin, and two nylon washers.
6. Remove the lower retaining pin.
7. While supporting the cylinder, carefully remove the cylinder mount pin and two nylon washers.

WARNING

THE CYLINDER MAY SHIFT SUDDENLY WHEN THE PIN IS REMOVED.

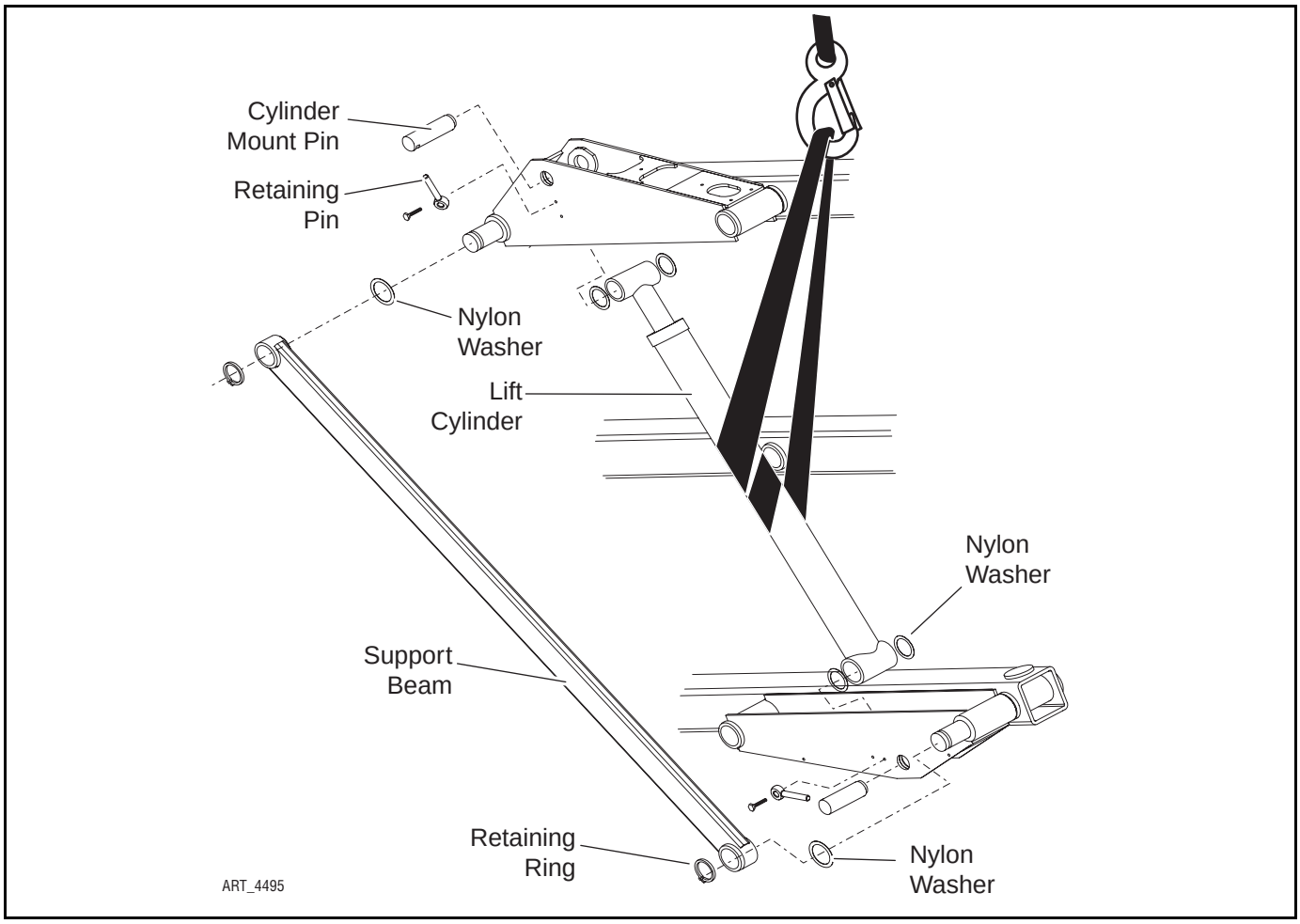
8. Lift the cylinder from the scissor assembly.

Installation

Clean all parts before installation. Replace worn or damaged parts with new parts. Installation is reverse of removal.

- Use Loctite 242 or equivalent on mounting bolts.
- Torque all bolts to specifications listed in the Introduction Section of this manual.

Figure 3-4: Lift Cylinder



STEER CYLINDERS

NOTE: Refer to Section 1 for seal replacement instructions.
Refer to Parts Section D and E for detailed parts list and illustration.

There are two double-acting steer cylinders on this machine. During operation, cylinder(s) should not leak, but a slight damping at the rod seal is acceptable. The pins and rod-end joints should be checked for wear.

CAUTION

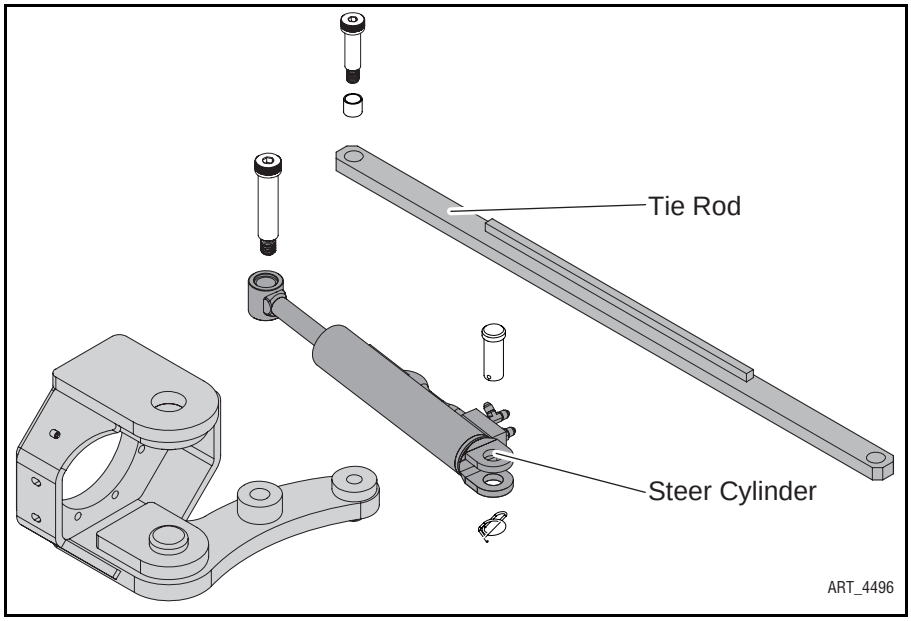
- **Clean all fittings before disconnecting hoses.**
- **Tag hoses for proper reassembly.**
- **Plug all openings to prevent contamination.**

Refer to *"Lift and Support The Machine"* in the *Introduction* section for instructions and safety precautions.

Removal

1. Raise and support the machine.
2. Disconnect hydraulic hoses. Immediately cap and plug all openings to prevent contamination.

Figure 3-5: Steer Cylinder



3. Remove the tie rod.
4. Remove the shoulder bolt that secures the rod end of the cylinder to the steering yoke. Swing the steering yoke out of the way.
5. Remove the locking cotter pin from the clevis pin that secures the barrel end of the cylinder to the chassis.
6. Support the cylinder, then remove the pin. Remove the cylinder.

Installation

Installation is reverse of removal.

- Use Loctite 242 or equivalent on mounting bolts.
- Torque all bolts to specifications listed in the Introduction Section of this manual.
- To purge air from cylinder, cycle the steering system fully left and right 4-5 times.

DRIVE MOTORS

NOTE: Refer to Section 1 for seal replacement instructions.
Refer to Parts Section D and E for detailed parts list and illustration.

There are four hydraulic drive motors on this machine. Repair or replace as necessary when damage or leaks occur.

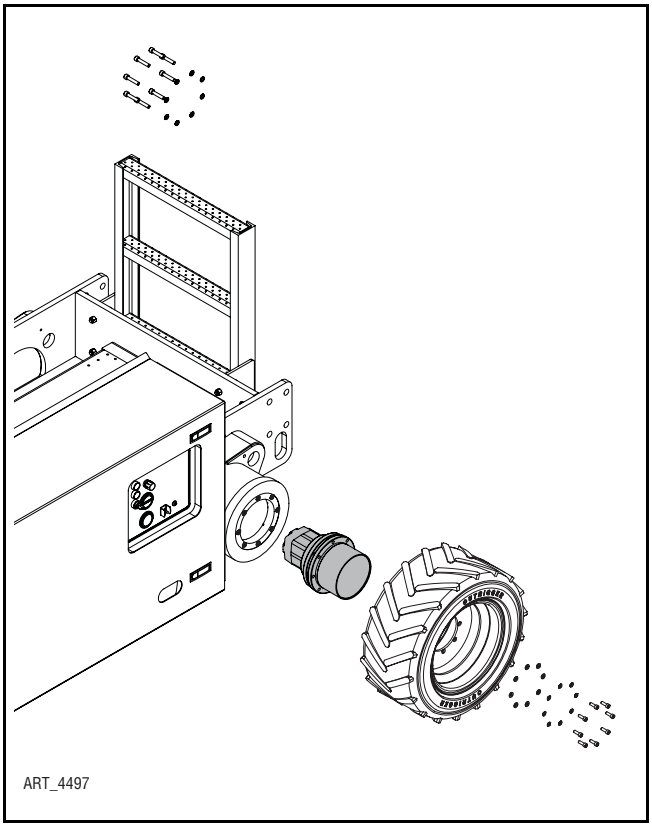
CAUTION

- **Clean all fittings before disconnecting hoses.**
- **Tag hoses for proper reassembly.**
- **Plug all openings immediately to prevent contamination.**

Refer to *"Lift and Support The Machine"* in the *Introduction* section for instructions and safety precautions.

REAR DRIVE MOTORS

Figure 3-6: Rear Drive Motor



Removal

1. Raise and support the rear end of machine.
2. Raise the scissor arm assembly and support using the maintenance lock.
3. Remove the wheel and tire assembly.
4. Disconnect hydraulic hoses. Immediately cap and plug all openings to prevent contamination.
5. Remove the bolts that attach the motor to the chassis.

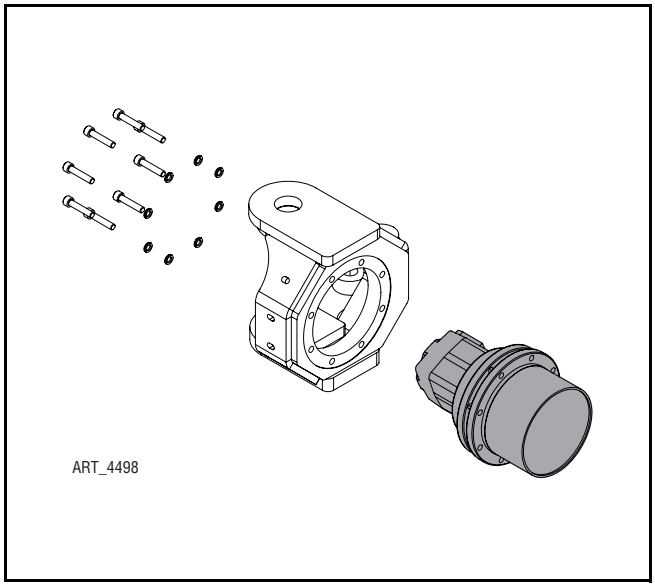
Installation

Installation is reverse of removal.

- Use Loctite 242 or equivalent on mounting bolts.
- Torque all bolts to 55 lb-ft (75Nm).

FRONT DRIVE MOTORS

Figure 3-7: Front Drive Motor



Removal

1. Raise and support the machine.
2. Disconnect hydraulic hoses. Immediately cap and plug all openings to prevent contamination.
3. Disconnect the steering tie bar and steer cylinder from the steering yoke.
4. Swing the steering yoke out to access the mounting bolts from behind.
5. Support the motor, then remove the bolts and carefully remove the drive motor from the steering yoke.

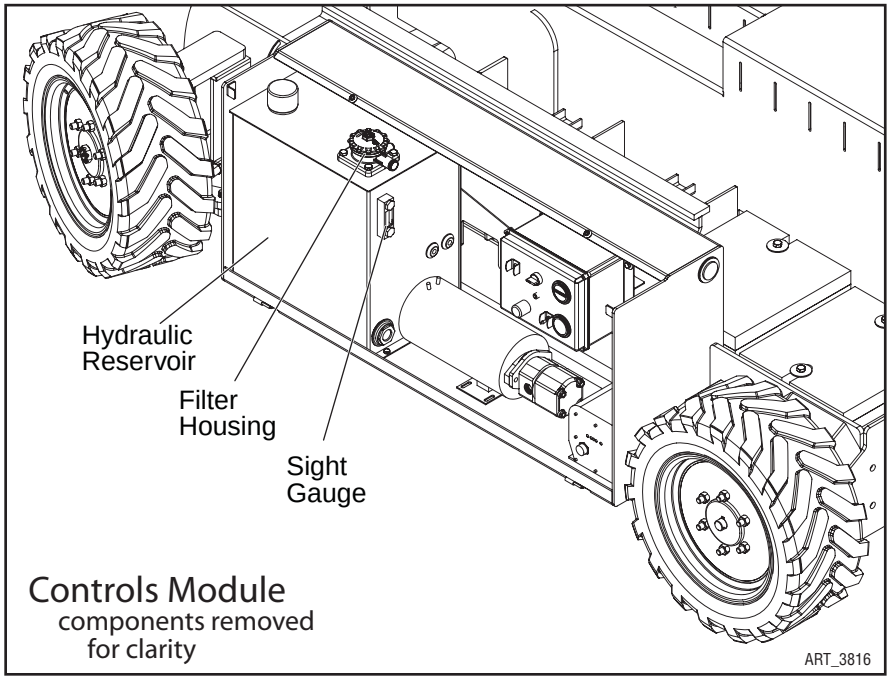
Installation

Installation is reverse of removal.

- Use Loctite 242 or equivalent on mounting bolts.
- Torque all bolts to 55 lb-ft (75Nm).

LUBRICATION

Figure 3-8: Lubrication Points



Lubrication

No.	ITEM	SPECIFICATION	FREQUENCY
1	Hydraulic Reservoir	**Normal ambient temperatures** Mobile Fluid DTE 10, DTE 13 M, or AW32 **Ambient temperatures below 0° F (-18° C)** Chevron Rando Premium MV **Do not substitute other fluids as pump damage may result.** Fill to the middle of the sight gauge with platform in the stowed position and outriggers retracted.	**Routine Maintenance** Check sight gauge level daily **Scheduled Maintenance** Change yearly or every 600 hours, whichever occurs first
2	Hydraulic Filter	Filter Element (located inside Hydraulic Reservoir)	**Scheduled Maintenance** **Normal Conditions** Change every six months or 300 hours, whichever occurs first **Severe Conditions--very dusty, exceptionally hot or exceptionally cold conditions** Change every three months or 150 hours, whichever occurs first

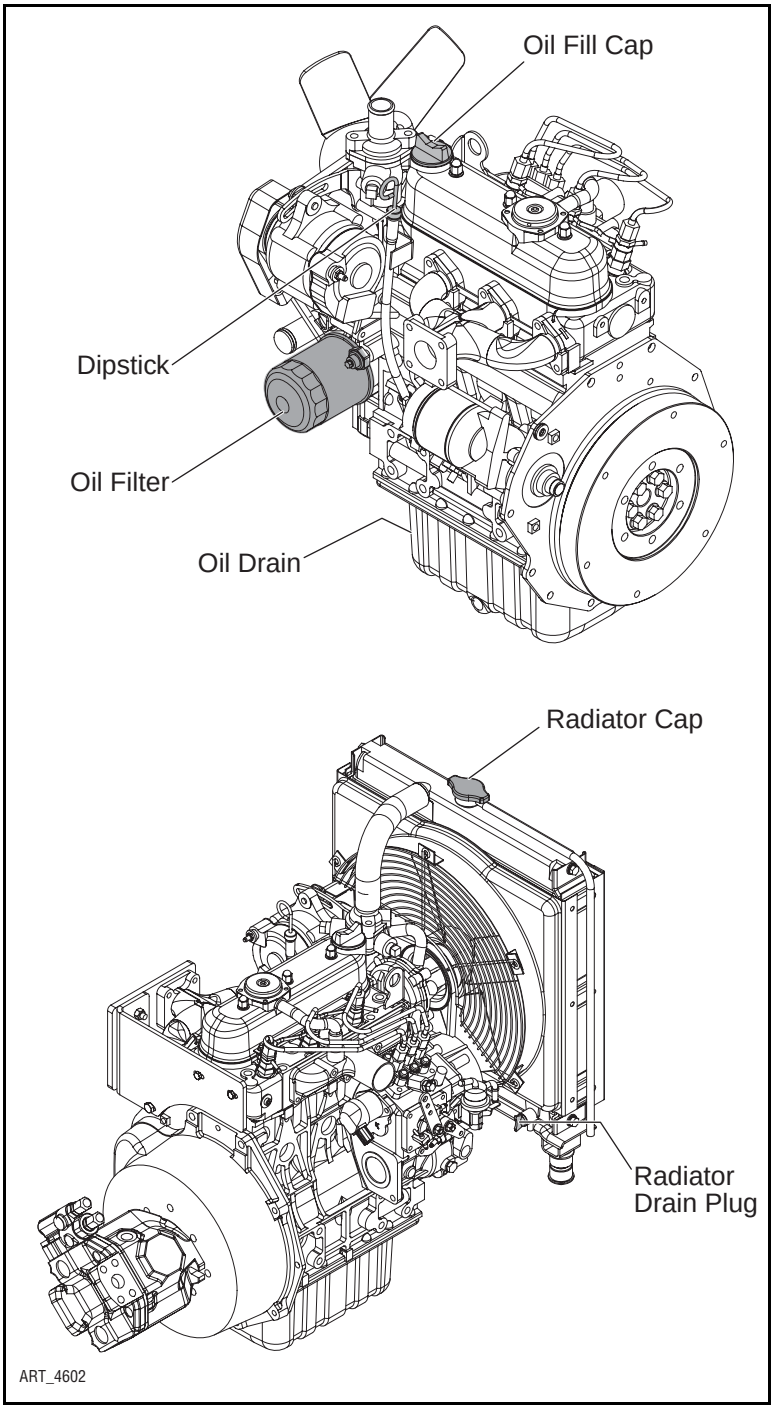
DIESEL ENGINE MAINTENANCE

For complete service information consult the engine manual that came with the machine.

CAUTION

Always wear protective eye-wear when working with fuel and oil. Engine should be OFF when replacing filter elements.

Figure 3-9: Engine



OIL AND OIL FILTER

Dispose of used oil and filters properly.

1. Use a suitable container to catch drained oil. Place the end of the oil drain hose into the container and open the oil drain valve. After oil has drained, close the oil drain valve.
2. Remove the old filter and wipe the filter seal contact surface with a clean towel. Coat the seal on the new filter with clean oil, then install and tighten by hand.
3. Fill engine with 10w-30 motor oil, API C/D or better, until the dipstick indicates FULL. Capacity is 5.4 US quarts (5,1 l). See Kubota engine manual for full oil specification.
4. Recheck dipstick after running engine. Fill as necessary.

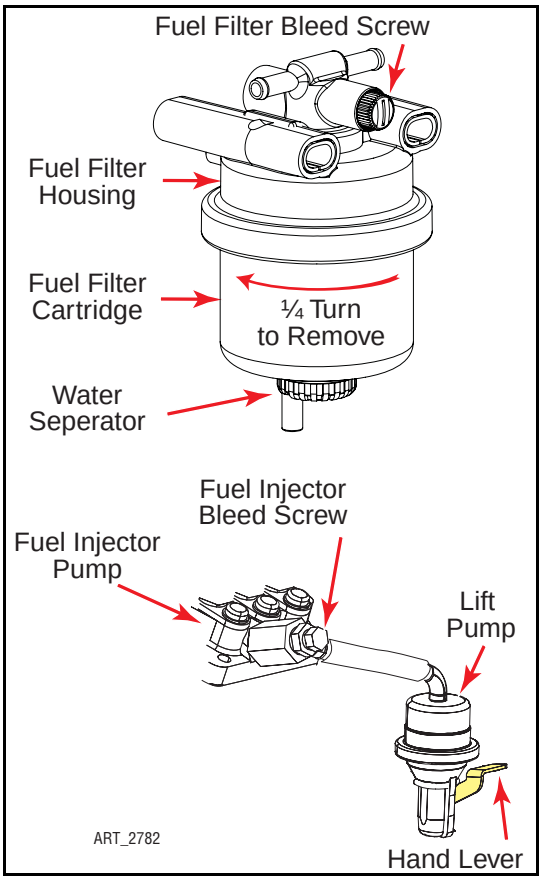
AIR FILTER ELEMENT

1. Remove the wing-bolt
2. Remove old filter and replace with a new filter.
3. Replace and tighten the wing-bolt. ***Do not run the engine with the air filter element removed.***

FUEL FILTER

The Fuel Filter is mounted beside the hydraulic pump at the rear of the engine.

Figure 3-10: Diesel Engine Fuel Filter



1. Turn OFF valve on bottom of fuel tank.
2. Place a suitable container beneath the fuel filter assembly to catch spilled fuel. Clean the filter area.
3. Turn filter cartridge ¼ counterclockwise remove. Wipe the filter seal contact surface with a clean towel and install a new filter.
4. Open valve at fuel tank and check for leaks.
5. Purge the air from the fuel system as follows;
   - Fill fuel tank to the fullest extent. Open valve on bottom of fuel tank.
   - Loosen bleed screw on top of fuel filter housing a few turns.
   - Close the bleed screw when there are no more bubbles.
   - Open the bleed screw on the fuel injector pump. Use the lift pump hand lever to pump fuel to the injectors. Close the bleed screw when there are no more bubbles.

NOTE: Do not attempt to start the engine until Step 5 has been performed.

6. If fuel becomes contaminated with water, use the Water Separator Valve at the bottom of the fuel cartridge to drain water.

IDLE SPEED ADJUSTMENT

1. Bring engine to operating temperature.
2. Slow engine to complete idle.
3. Adjust the Idle Stop Screw until the RPM is 950. Adjust slightly up or down to avoid vibrations.
4. Hold the Idle Stop Screw while tightening the jam nut to prevent change in adjustment.

HIGH SPEED ADJUSTMENT

IMPORTANT: **–** In order to prevent electrical system damage, check the Throttle Solenoid Adjustment after this procedure.

1. Bring engine to operating temperature.
2. Disconnect the Throttle Solenoid linkage at the clevis.
3. Manually pull the Throttle Lever until it contacts the High Speed Stop Screw.
4. Adjust the High Speed Stop Screw until the RPM is 3000 with the Throttle Lever against the High Speed Stop Screw.
5. Turn off the engine and reconnect the Throttle Solenoid linkage at the clevis.

6. Hold the High Speed Stop Screw while tightening the jam nut to prevent change in adjustment.

THROTTLE SOLENOID ADJUSTMENT

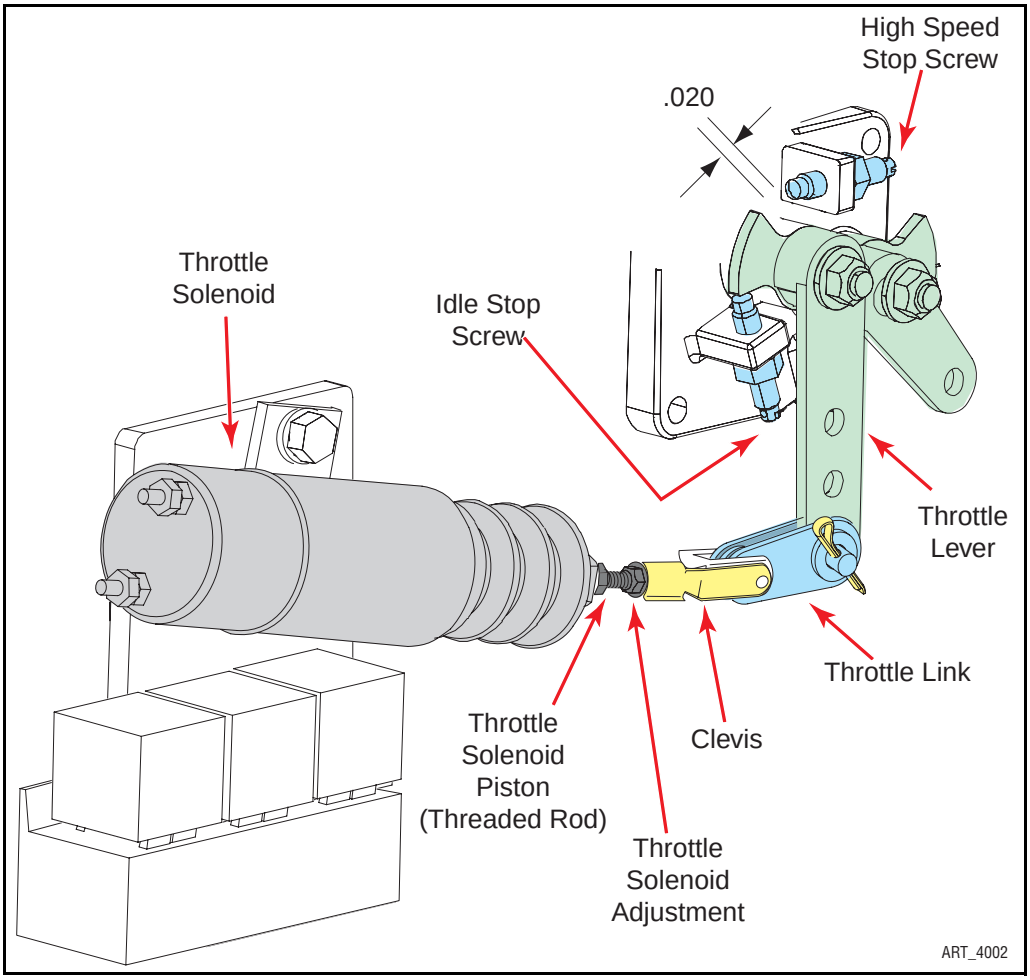
IMPORTANT: **–** This final adjustment must be made after all other throttle speed adjustments. The solenoid must be free to retract fully in order to turn OFF the High Amperage Pull Circuit. Improper adjustment will result in solenoid failure and may damage the electrical system.

1. With the engine OFF, manually retract the solenoid by grasping the piston, just ahead of the boot, and pull to the fully retracted position.

NOTE: The solenoid must retract and extend smoothly. If movement is impaired it may be necessary to reposition the solenoid to improvement alignment.

2. With the solenoid piston fully retracted measure the distance between the High Speed Stop Screw and the Throttle linkage using a .020 feeler gauge.
3. Adjust clearance at the Throttle Solenoid linkage only.
   Do not adjust the High Speed Stop Screw.
   - Disconnect the linkage at the clevis and turn the clevis to lengthen or shorten as necessary.
   - Reconnect the clevis and measure again. Repeat until the measurement is correct.

Figure 3-11: Diesel Engine Throttle Adjustments



DUAL FUEL ENGINE MAINTENANCE

For complete service information consult the engine manual that came with the machine.

CAUTION

Always wear protective eye-wear when working with fuel and oil. Engine should be OFF when replacing filter elements.

OIL AND OIL FILTER - DUAL FUEL

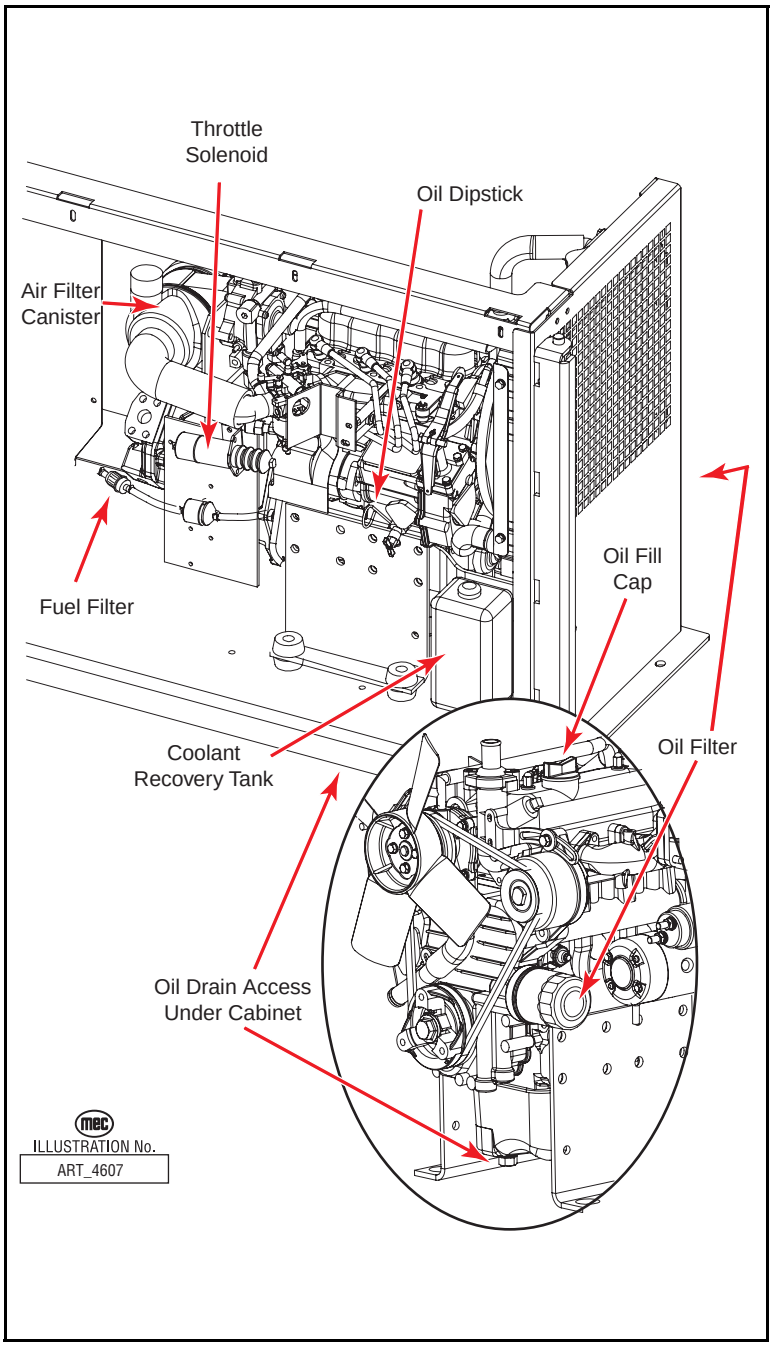
Dispose of used oil and filters properly.

1. Use a suitable container to catch drained oil. Remove the drain plug. After oil has drained, replace the drain plug.
2. Remove the old filter. Coat the seal on the new filter with clean oil, then install and tighten by hand.
3. Fill engine with 10w-30 motor oil until the dipstick indicates FULL. Capacity is 3.4 US quarts (3,25 l).
4. Recheck dipstick after running engine. Fill as necessary.

FUEL FILTER - DUAL FUEL

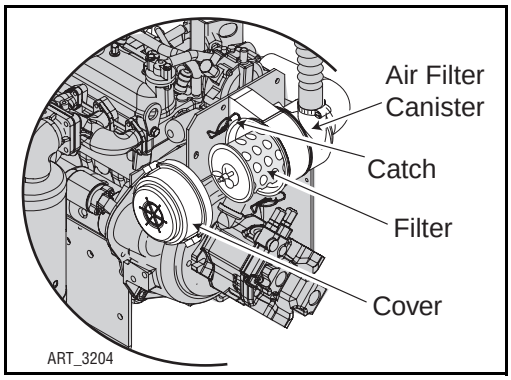
1. Turn OFF valve at fuel tank.
2. Loosen the hose clamps on the fuel lines and slide them away from the in-line fuel filter.
3. Remove the in-line fuel filter from the fuel lines.
4. Install a new in-line fuel filter.
   - There is an arrow, indicating direction of flow, on the body of the in-line fuel filter. Make sure that the arrow points ***from*** the fuel tank and ***to*** the engine.
5. Reposition and tighten the hose clamps.
6. Open valve at fuel tank and check for leaks.

Figure 3-12: Dual Fuel Engine - Oil and Fuel Filter



AIR FILTER ELEMENT - DUAL FUEL

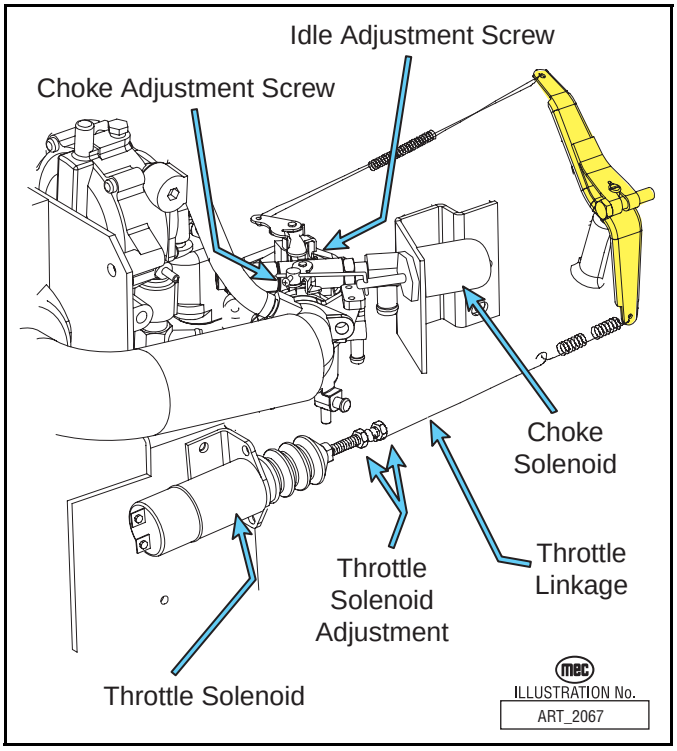
Figure 3-13: Dual Fuel Engine Air Filter Element



1. Unlock the catches holding the filter canister cover.
2. Remove the wing-nut from the filter assembly and remove the filter element.
3. Inspect the canister for debris and clean as necessary.
4. Install a new filter element and tighten the wing-nut.
5. Replace the canister cover and lock the catches.

ENGINE ADJUSTMENT - DUAL FUEL

Figure 3-14: Dual Fuel Engine Adjustments



The following adjustment points are sealed by the factory and cannot be adjusted.

- Carburetor Pilot Screw
- LPG Main Pressure Adjustment Screw
- LPG Idle Pressure Adjustment Screw
- Distributor Ignition Timing Adjustment Screw

CHOKE ADJUSTMENT - DUAL FUEL

1. Loosen the Choke Adjustment Screw until the linkage rod can move freely.
2. Manually retract the Choke Solenoid Piston until it stops.
3. While holding the solenoid fully retracted, close the choke plate until it stops in the fully closed position.
4. Allow the choke plate to open slightly and tighten the Choke Adjustment Screw.
5. Check Choke Solenoid operation to ensure that the choke plate travel does not prevent the Choke Solenoid from retracting fully.

IDLE SPEED ADJUSTMENT - DUAL FUEL

1. Bring the engine to operating temperature.
2. With the engine at idle, adjust the Throttle Stop Screw until the engine RPM is 1350±50.

HIGH SPEED ADJUSTMENT - DUAL FUEL

1. Bring the engine to operating temperature.
2. Loosen the adjusting nuts on the Throttle Solenoid.
3. Have an assistant press the enable trigger on the Upper Controls joystick.
4. Adjust the nuts on the Throttle Solenoid Piston until the engine RPM is 3400±50.
5. Tighten the nuts to secure the adjustment.

NOTES:

Section 4

TROUBLESHOOTING

CONTENTS — PAGE

FIGURES — PAGE

TABLES PAGE

GENERAL TROUBLESHOOTING TIPS

HYDRAULIC FLUID PUMP

The Hydraulic Drive Pump used in this model is a Variable Displacement, Axial Piston type pump. Proper adjustment is critical for normal operation of the machine. Refer to Section 1 of this manual.

Common Causes of Electrical System Malfunctions:

- Battery connections are loose or corroded
- Battery is not fully charged.
- Emergency Stop buttons are pushed (OFF position).
- Circuit breaker is in the tripped (OFF position).

Common Causes of Hydraulic System Malfunctions:

- Hydraulic fluid level is too low.
- Mixed incompatible hydraulic fluids, destroying the additives and causing varnish build-up and sticking valves.
- Water in the hydraulic fluid due to damp climate.
- Improper hydraulic fluid. Viscosity too high in cold climates. Viscosity too low in warm climates.
- Hydraulic fluid contaminated with debris--filter change interval neglected, or debris introduced into the hydraulic system.

CAUTION

In machines equipped with the optional cold climate package, MEC uses a multiple viscosity fluid that is light enough for cold climates and resists thinning in warm climates. Use only the recommended hydraulic fluid. Substituting with a lower grade fluid will result in pump failure. Refer to Section 1 of this manual.

Contamination always causes failure in any hydraulic system. It is very important to be careful not to introduce any contamination into hydraulic system during the assembly procedures. Please make sure all ports and cavities of the manifold and cylinders are properly capped or plugged during maintenance activities.

ELECTRICAL SYSTEM TROUBLESHOOTING

The electronic control system used on this machine was designed for low maintenance and long trouble free operation. The system consists of two microprocessor based modules; The Matrix Module and the GP400 Processor. They communicate through a low voltage digital signal called Can-Bus communication.

To protect against part failure or incorrect plug connections, the modules are fully short circuit and reverse polarity protected. All electrical plug connections are waterproof to promote longer trouble free operation and to increase terminal life.

WARNING

NEVER ATTEMPT TO SUPPLY BATTERY POWER, OR VOLTAGE HIGHER THAN 12 VOLTS TO ANY PART OR MODULE IN THIS SYSTEM, AS CATASTROPHIC FAILURE OF THE MODULES MAY RESULT.

USE OF HIGH PRESSURE WASHING EQUIPMENT DIRECTLY ON THE MODULES CAN FORCE WATER INTO SEALED CONNECTION AND CAN CAUSE A TEMPORARY SYSTEM SHUT-DOWN. HIGH PRESSURE WASHING WITHIN THE VICINITY OF THE MODULES IS HIGHLY DISCOURAGED.

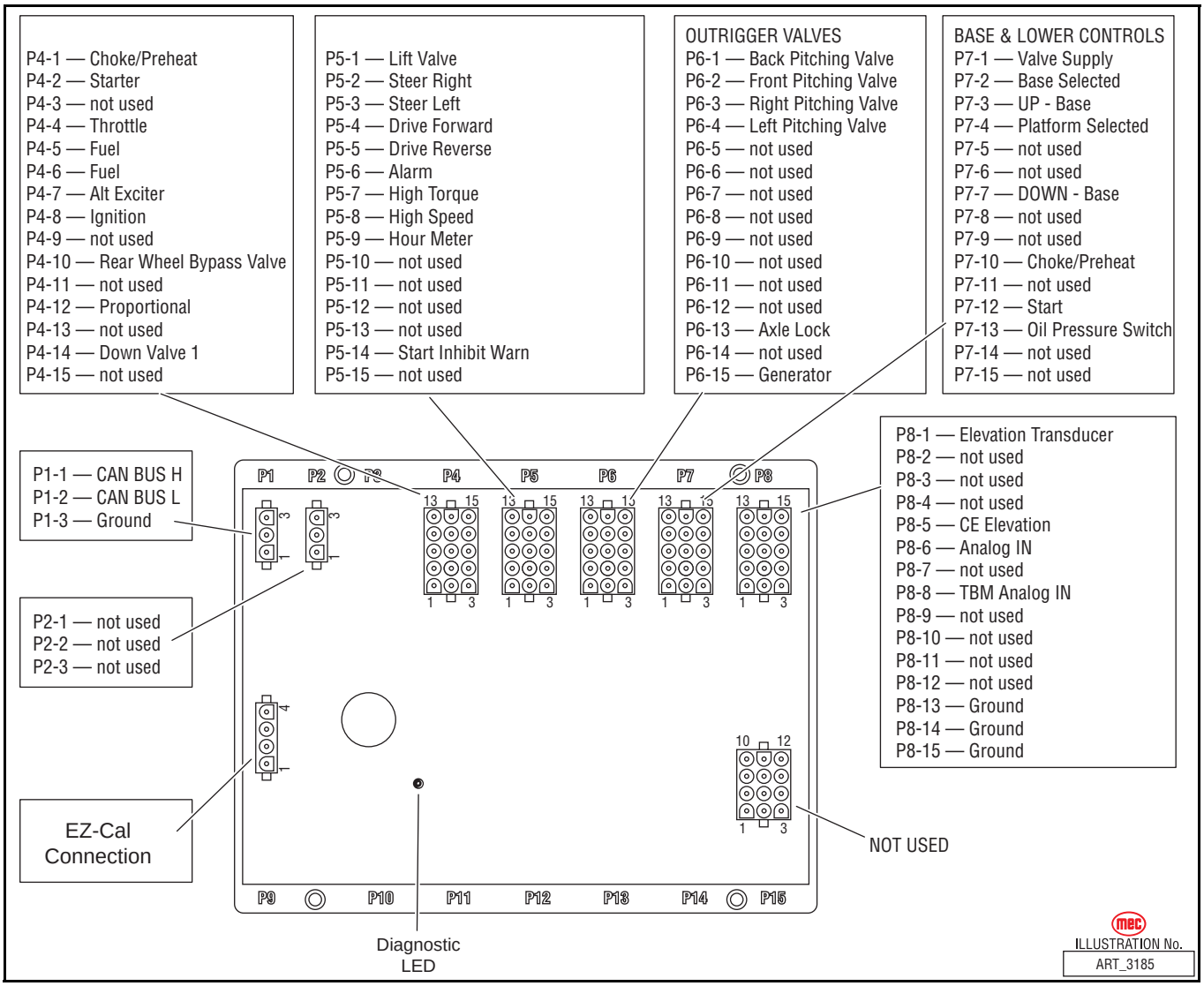
GP400 MODULE

The GP400 module is “the brains” of the system. It receives and processes a variety of inputs both from the machine and the operator, then controls all the operative functions of the machine. It also has a feature that allows the technician to access and monitor all functionality of the system, along with a technician-friendly series of fault messages that can be accessed through the use of the EZ-Cal scan tool. Flash codes are also provided in case an EZ-Cal scan tool is not available.

Such information can be used for preventative maintenance and troubleshooting should a problem arise. A comprehensive list of EZ-Cal accessible information can be found later in this section.

The GP400 operates on 12 volts DC and should never be probed or operated with voltage higher than 14 volts DC

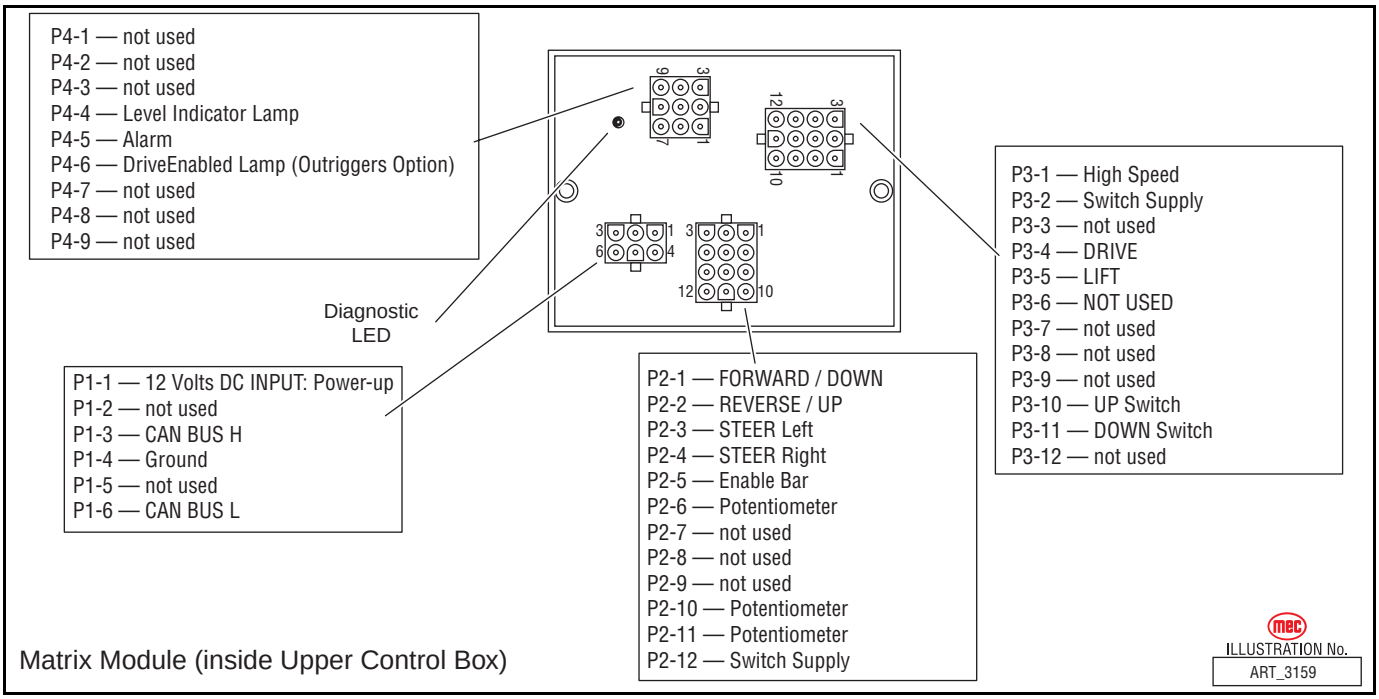
Figure 4a-1: GP400 Module



MATRIX MODULE

The Matrix Module is the remote module located inside the upper control box. It received inputs from the operator and relays them to the GP400.

Figure 4a-2: Matrix Module

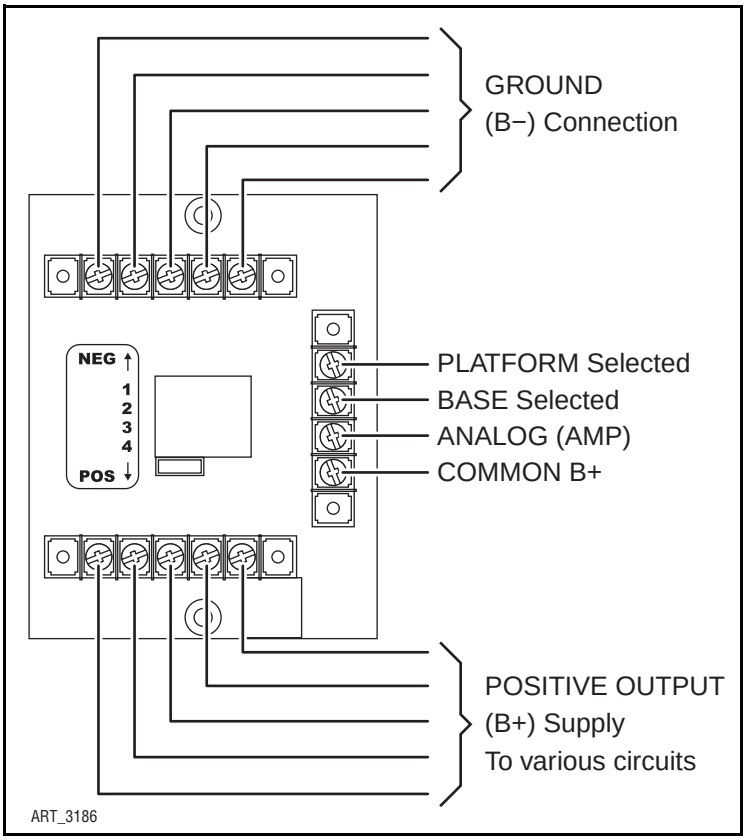


Matrix Module (inside Upper Control Box)

TERMINAL BLOCK MODULE (TBM)

Figure 4a-3: Terminal Block Module (TBM)

There is a module inside the lower control box, called a TBM (Terminal Block Module) that provides terminal point connections for both positive and ground circuits. A signal from the Emergency Stop circuit activates a load-reduction relay within the TBM that provides ample power to the B+ (positive) terminal strip. This arrangement protects the system against voltage drop conditions that can be detrimental to the electrical system.



EZ-CAL SCAN TOOL

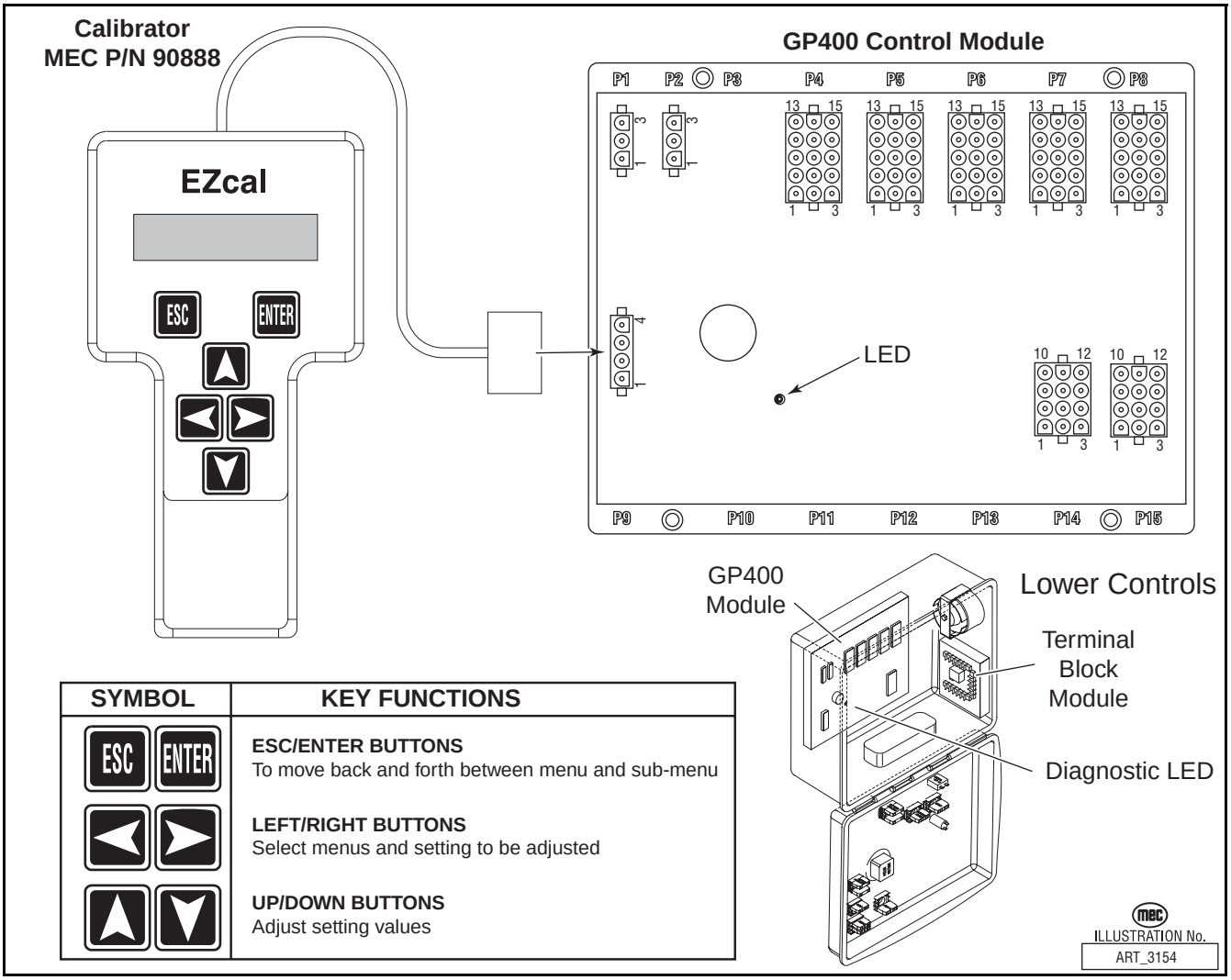
The EZ-Cal (MEC part # 90888; not part of the machine) is a hand-held scan tool that interfaces with the system to provide various information and adjustments. The EZ-cal receives its power from the GP400 when connected. The system must be powered up by closing the Battery disconnect switch and pulling both emergency stop switches. You must also select Base or Platform depending on the station you will operate from.

USING THE EZ-CAL SCAN TOOL

To operate the EZ-cal, plug the cable into the 4-terminal receptacle P9 on the GP400 and power the system up.

- The EZ-Cal display will illuminate and read “HELP: PRESS ENTER”. From this point, use the right and left arrows to scroll through the base menus.
- Once the desired base menu is obtained (i.e. *ADJUSTMENTS*) press Enter to access sub menus.
- Use the right and left arrows to scroll through sub menus, press Enter again.
- The up/down arrows are used to change settings only.
- Press ESC to back up one level.

Figure 4a-4: EZ-Cal Scan Tool Connections - GP400 Module

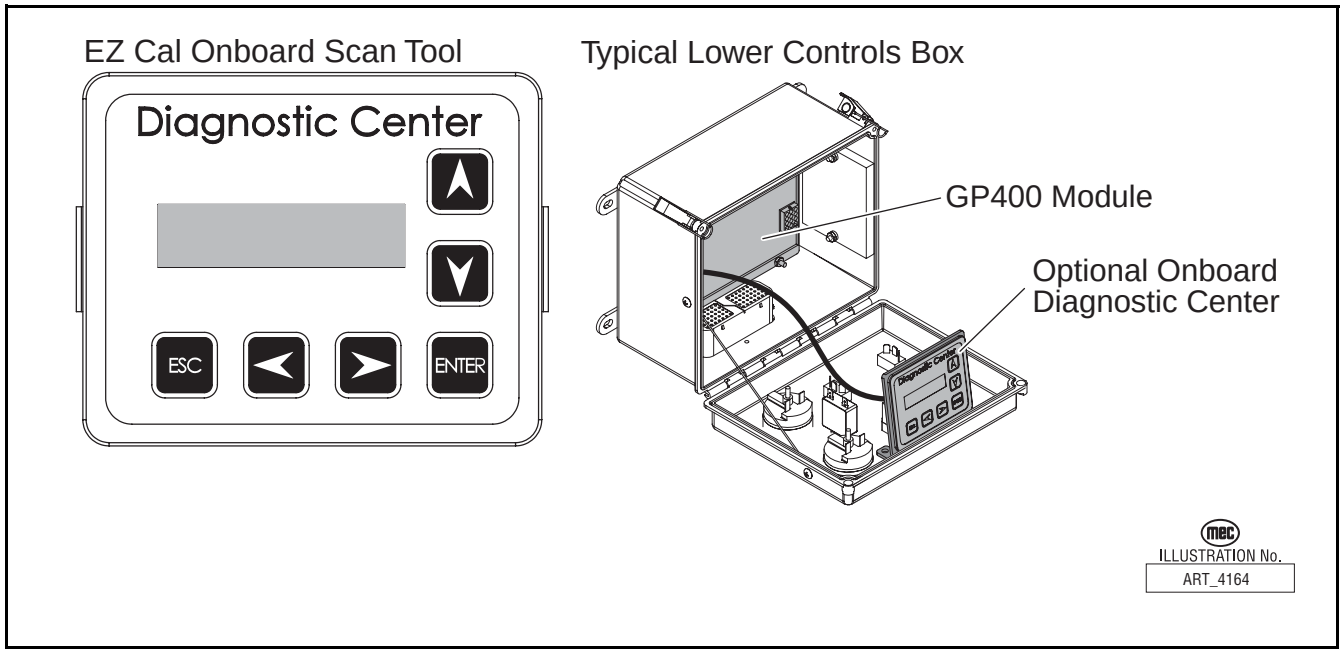


SYMBOL	KEY FUNCTIONS
ESC ENTER	**ESC/ENTER BUTTONS** To move back and forth between menu and sub-menu
◀ ▶	**LEFT/RIGHT BUTTONS** Select menus and setting to be adjusted
▲ ▼	**UP/DOWN BUTTONS** Adjust setting values

OPTIONAL ONBOARD EZ-CAL

To use and operate the onboard EZ-Cal, set the Base/Platform Key switch to Base or Platform, then open the door to the Lower Controls Box. The onboard EZ-Cal scan tool provides the same functionality as the hand-held unit.

Figure 4-5: Onboard EZ-Cal Scan Tool & GP400 Module



USING THE EZ-CAL SCAN TOOL

Figure 4-6: EZ-Cal Buttons

SYMBOL	KEY FUNCTIONS
ESC ENTER	**ESC/ENTER BUTTONS** To move back and forth between menu and sub-menu
◀ ▶	**LEFT/RIGHT BUTTONS** Select menus and setting to be adjusted
▲ ▼	**UP/DOWN BUTTONS** Adjust setting values

ART_3710

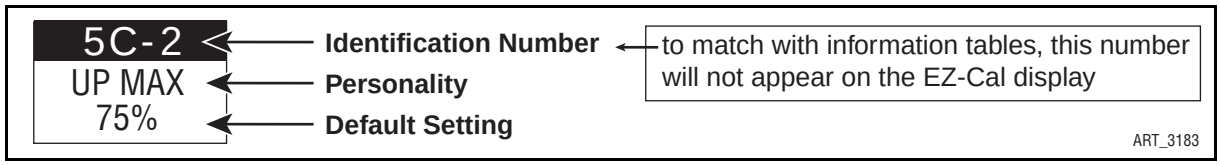
- Once, powered up, the EZ-Cal display will illuminate and read “HELP: PRESS ENTER”. From this point, use the right and left arrows to scroll through the base menus.
- Once the desired base menu is obtained (i.e. *ADJUSTMENTS*) press Enter to access sub menus.
- Use the right and left arrows to scroll through sub menus, then press Enter again to choose a sub menu.
- The up/down arrows are used to change settings only.

Press ESC to back up one level.

USING THE EZ-CAL WITH THE FLOW CHARTS

Use the EZ-cal Flow Charts as a guide to locate diagnostic information and make adjustments. Each box in the flow chart will have 3 bits of information.

Figure 4-7: EZ-Cal Display Example



The IDENTIFIER (5c2): – Used to locate this specific personality in the informational charts. Here you can obtain specific information on the individual personalities.

The PERSONALITY (Up Max): – Identifies the individual personalities.

The DEFAULT SETTING: – The factory setting. If adjustments are made, they must be returned to default setting.

WARNING

ACCESS LEVEL 1 PROVIDES ACCESS TO CHANGE PERSONALITIES NORMALLY PRESET AT THE FACTORY TO PROVIDE PROPER MACHINE MOVEMENT AT SAFE SPEEDS. PERSONALITIES MUST NOT BE CHANGED WITHOUT PRIOR AUTHORIZATION FROM MEC AND MAY ONLY BE RETURNED TO FACTORY SPECIFICATION AS LISTED IN THE FOLLOWING TABLES.

FLASH CODES

Flash Codes, provided from the GP400 red LED**,** will also assist in the event an EZ-cal is not available. However, the EZ-cal yields considerably more relevant information. Refer to *"EZ-Cal HELP Messages" on page 4-16* for flash coded error messages.

Figure 4-8: EZ-Cal Flow Chart: Adjustments and Setup

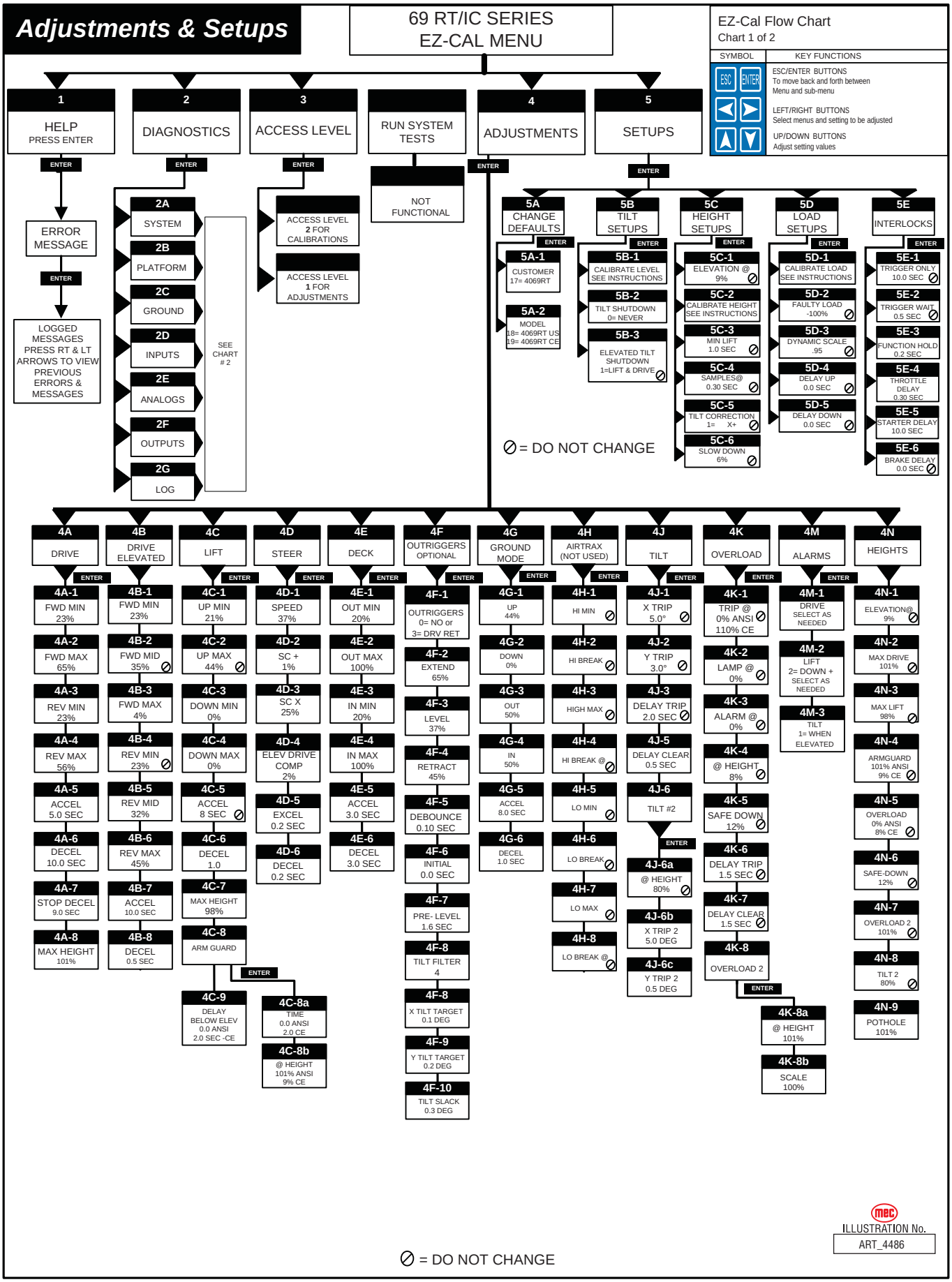


Figure 4-9: EZ-Cal Flow Chart: Diagnostics

DIAGNOSTIC

Use in conjunction with Diagnostic tables for Thorough explanation Of personalities and values

69 SERIES RT/IC
EZ-CAL MENU

2 DIAGNOSTICS

ENTER

EZ-Cal Flow Chart
Chart 2 of 2

SYMBOL	KEY FUNCTIONS
ESC ENTER ◀ ▶ ▲ ▼	ESC/ENTER BUTTONS To move back and forth between Menu and sub-menu LEFT/RIGHT BUTTONS Select menus and setting to be adjusted UP/DOWN BUTTONS Adjust setting values

2A SYSTEM (ENTER)
- 2A-1 MODE — PRESS ENTER FOR MESSAGES
- 2A-2 SUPPLY (ENTER)
- 2A-3 VALVE SUPPLY — ON/OFF
- 2A-4 MOTOR VOLTS — ACTUAL
- 2A-5 MOTOR AMPS — ACTUAL
- 2A-6 TEMPERATURE — OF P600 CONTROLLER
- 2A-7 TILT (ENTER)
  - 2A-8 TILTED — YES WHEN PAST 3 DEG. (ENTER)
    - 2A-9 HEIGHT — ACTUAL IN %
    - 2A-10 LOAD — OVERLOAD PROTECTION ONLY
    - 2A-11 OVERLOADED — YES or NO
    - 2A-12 LAST MOVED — NOT USED
    - 2A-13 ELEVATED — YES or NO
    - 2A-14 OUTRIGGERS — EXTENDED
    - 2A-15 OUTRIGGERS — RETRACTED
    - 2A-16 OUTRIGGERS — STATUS
    - 2A-17 OUTRIGGERS — AUTO-RETRACT
  - 2A-8A TILTED MORE — YES or NO

2B PLATFORM (ENTER)
- 2B-1 TRIGGER — ON/OFF
- 2B-2 DLD — ACTUAL
- 2B-3 JOYSTICK — ACTUAL DEG OF MOVEMENT
- 2B-4 FWD / UP — FWD JOYSTCK MOVEMENT
- 2B-5 REV / UP — REV JOYSTICK MOVEMENT
- 2B-6 LEFT(STEER) — ON/OFF
- 2B-7 RIGHT (STEER) — ON/OFF

2A-2A SUPPLY — 12 VOLTS DC

2A-2B SUPPLY — CAP BANK

2A-7A TILT FILTERED — NOT USED

2A-7B TILT LOCAL — ACTUAL IN DEGREES LEVEL

2C GROUND (ENTER)
- 2C-1 UP — ON/OFF
- 2C-2 DOWN — ON/OFF
- 2C-3 OUT — NOT USED
- 2C-4 IN — NOT USED

2D INPUTS (ENTER)
- 2D-1 P7-1 — 12 V SUPPLY
- 2D-2 P7-2 — BASE SELECTED
- 2D-3 P7-3 — UP SELECTED
- 2D-4 P7-4 — PLATFORM SELECTED
- 2D-5 P7-7 — DOWN SELECTED
- 2D-6 P7-10 — PREHEAT SWITCH
- 2D-7 P7-12 — START SWITCH
- 2D-8 P7-13 — OIL PRESSURE SWITCH
- 2D-9 P15-5 — O/R PRESSURE SWITCH
- 2D-10 P15-6 — O/R PRESSURE SWITCH
- 2D-11 P15-7 — O/R PRESSURE SWITCH
- 2D-12 P15-8 — O/R PRESSURE SWITCH

2E ANALOGS (ENTER)
- 2E-1A P8-2 — ANGLE TRANSDUCER 1
- 2E-1B P8-5 — ANGLE TRANSDUCER 2 CE ONLY
- 2E-1C P8-6 — PRESSURE TRANSDUCER CE ONLY
- 2E-1D P8-9 — TBM IN
- 2E-2 MATRIX ANALOGS — UPPER CONTROL (ENTER)
  - 2E-2A M2-6 — POTENTIOMETER

2F OUTPUTS (ENTER)
- 2F-1 P4-1 — PREHEAT/CHOKE
- 2F-2 P4-2 — STARTER
- 2F-3 P4-3 — REAR WHEEL BYPASS VALVE
- 2F-4 P4-4 — THROTTLE
- 2F-5 P4-6 — FUEL SOLENOID
- 2F-6 P4-7 — ALTERNATOR EXCITE
- 2F-7 P4-8 — IGNITION
- 2F-8 P4-10 — REAR WHEEL BYPASS VALVE
- 2F-9 P4-12 — PROPORTIONAL VALVE
- 2F-10 P4-14 — DOWN VALVE
- 2F-11 P5-1 — LIFT VALVE
- 2F-12 P5-2 — STEER RIGHT
- 2F-13 P5-3 — STEER LEFT
- 2F-14 P5-4 — DRIVE FORWARD
- 2F-15 P5-5 — DRIVE REVERSE
- 2F-16 P5-6 — ALARM
- 2F-17 P5-7 — HIGH TORQUE
- 2F-18 P5-8 — HIGH SPEED
- 2F-19 P5-9 — HOUR METER
- 2F-20 P5-10 — OUTRIGGER EXTEND VALVE
- 2F-21 P5-11 — OUTRIGGER RETRACT VALVE
- 2F-22 P5-14 — START INHIBIT WARNING LT
- 2F-23 P6-1 — OUTRIGGER R/F UP
- 2F-24 P6-2 — OUTRIGGER L/F UP
- 2F-25 P6-3 — OUTRIGGER R/R UP
- 2F-26 P6-4 — OUTRIGGER L/R UP
- 2F-27 P6-5 — OUTRIGGER R/F DOWN
- 2F-28 P6-6 — OUTRIGGER L/F DOWN
- 2F-29 P6-7 — OUTRIGGER R/R DOWN
- 2F-30 P6-8 — AMBER BEACON
- 2F-31 P6-10 — OUTRIGGER L/R DOWN
- 2F-32 P6-15 — A/C GENERATOR

2G LOG (ENTER)
- 2G-1 CALDATE — DATE OF CALIBRATION
- 2G-2 SOFTWARE — SOFTWARE VERSION NUMBER
- 2G-3 POWERED — ACCUMULATED HRS ON GP400
- 2G-4 MAX BATTERY — HIGHEST BATT VOLTAGE

NOTE: All other plug numbers that appear on the EZ-cal but not listed here are not used on this model

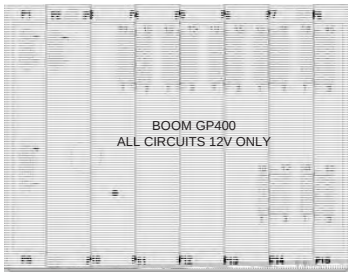


ILLUSTRATION No.
ART_4487

EZ-CAL ADJUSTMENTS

Refer to "Using the EZ-Cal Scan Tool" on page 4-8.

Adjustments are possible **only** in Access Level 1.

Before changing personalities, ensure that the Correct Customer and Model have been selected in the SETUPS menu. Any changes to settings will be lost when the model or customer is changed.

To reach ADJUSTMENTS, first access Level 1, then press --> for ADJUSTMENTS. Press Enter, then press --> to scroll through the sub-menus.

Once the desired sub-menu is found, press Enter again, then --> to scroll through the personalities. Press the Up or Down arrows to change the personality. Press ESC to go back one or more levels to reach other sub-menus.

EZ-CAL SETUP

Only authorized personnel may have access to and may make changes to personalities.

The Setups Menu is where machine and model settings may be changed. It is also the location where calibrations are performed.

Refer to "Using the EZ-Cal Scan Tool" on page 4-8.

EZ-CAL DIAGNOSTICS

The EZ-Cal Diagnostics menu provides the ability to view and test individual circuits for irregularities. Whether diagnosing a failure or testing functions during preventative maintenance, the *Diagnostics Menu* provides a quick view at the inputs and outputs as registered by the GP400 Control Module ***in real time***.

To reach DIAGNOSTICS menu from HELP;

- Press the right arrow and scroll to DIAGNOSTICS and press ENTER.
- Locate the desired sub menu and press ENTER.
- Press the right arrow to scroll through the test points.

NOTE: The ID number will not appear on the EZ-Cal display. It is shown in the *Diagnostics Menu* for reference only.

Press **ESC** to go back one level (necessary to change selection).

EZ-CAL RETRIEVE MODE AND HELP MESSAGES

NOTE: ***It is important to understand that an error message will only be available if the red Diagnostic LED is flashing. If the machine is not operating properly and the red Diagnostic LED is not flashing, the trouble may lie with something not monitored by the electronic control system, i.e. a switch, hydraulic valve or wiring damage.***

There are two different menus that you can access for message retrieval; MODE and HELP.

MODE MENU

Allows the technician to see the current state of the controller interlocks with a short description. Go to, DIAGNOSTICS/SYSTEM/MODE (EZ-Cal Flow Chart 2, ID# 2a1). Pressing ENTER a second time will provide additional information with certain messages.

HELP MENU

Provides various HELP messages to identify failure modes.

Some error messages may also be identified by counting the number of times the red LED flashes on the controller so that even without access to an EZ-Cal, some simple diagnostics are possible. However, the EZ-Cal provides a much higher level of diagnostic information. Do not rely on the LED alone.

MODE MESSAGE

- Connect the EZ-Cal (see illustration).
  The display will read, “HELP: PRESS ENTER”.
- Press the Right Arrow once, then press ENTER twice.
- Refer to the following list of messages to better understand the nature of the message or fault.
- If the GP400 does not register a fault, the display will read EVERYTHING OK.

LOGGED MESSAGE

Pressing ENTER twice will provide the current message, followed by a log of previous operations and/or errors that occurred immediately prior, starting with most recent.

Press the Right and Left Arrows to view all logged messages.

Other helpful menus available include **DIAGNOSTICS** which allows the technician to monitor specific plug input/output information. Refer to EZ-Cal Flow Chart 2 – Diagnostics.

MODE MESSAGES

The purpose of **MODE** is to indicate, in real time, the current state of the controller with a short description.

INITIALIZING

- The system is preparing to operate, immediately after power-on.

SHUTDOWN!

- The system cannot operate – for example both the PLATFORM & GROUND inputs are active together.

CHECK CANBUS

- The system cannot operate – CANBUS communications is not successful (for example wire damage to the platform)

PLATFORM, GROUND

- The system is ready to operate, from the upper or lower controls as indicated (selected by the Base/Platform selector switch)

GROUND UP, GROUND DOWN,

- A ground function is operating normally

GROUND UP LOCKED, GROUND DOWN LOCKED,

- A ground function is selected but not allowed (for example, the function switch was closed at power-on)

GROUND FAULTY

- Multiple ground function inputs are active at the same time

WAITING FOR TRIGGER

- A platform function is selected, but the joystick trigger switch is not closed (close the trigger switch to proceed)

TRIGGER CLOSED

- The joystick trigger switch is closed, but no function is selected (select a function to proceed)

TRIGGER LOCKED

- The joystick trigger switch was closed at power-on, or closed for too long with no function selected (check trigger switch)

FORWARD, REVERSE

- A platform drive function is operating normally

FORWARD (LEFT), FORWARD (RIGHT), REVERSE (LEFT), REVERSE (RIGHT)

- A platform drive function is operating normally, with steer also active

STEER LEFT, STEER RIGHT

- A platform steer function is operating normally (without drive)

UP, DOWN

- A platform lift/lower function is operating normally

FORWARD LOCKED, REVERSE LOCKED

- A platform drive function is selected but not allowed (for example, the switch was closed at power-on)

LEFT LOCKED, RIGHT LOCKED

- A platform steer function is selected but not allowed (for example, the switch was closed at power-on)

UP LOCKED, DOWN LOCKED

- A platform lift/lower function is selected but not allowed (for example, the switch was closed at power-on)

CHECK DRIVE/LIFT

- Neither platform drive nor platform lift select is active, or both are active at the same time

CHECK JOYSTICK

- Both platform joystick directions are active at the same time

STEER FAULTY

- Both platform steer directions are active at the same time

EXTENDING LEGS

- Outrigger legs are extending normally

RETRACTING LEGS

- Outrigger legs are extending normally

OUTRIGGERS LOCKED

- An outrigger function is selected but not allowed (for example, the switch was closed at power-ON)

*INTERLOCKED***

- An interlock shutdown is active, preventing one or more functions. The interlock can be due to many different causes …

Press <ENTER> from the **MODE display to see the precise cause of the interlock (listed below) – press <ESC> from that display to return to the **MODE** display:

TEST MODE

- The system test mode is active – switch power off and on again to clear

TILTED

- The vehicle is tilted beyond limits, descend, then move vehicle to a more level location

TOO HIGH

- The vehicle platform is too high to allow some functions – descend first

TOO HOT

- The EZLIFT heatsink has reached 75°c, preventing all functions except lowering. Functions will be allowed again when the heatsink cools to below 70°c.
- The heatsink temperature can be viewed in the DIAGNOSTICS/SYSTEM/ TEMPERATURE display, ID # 2a5.
- The heatsink must be bolted to a significant metal panel of the vehicle, capable of dissipating heat to the environment.

UNCALIBRATED

- The height and/or pressure sensors have not been calibrated see CALIBRATION OF OVERLOAD SYSTEM **(CE option only)**.
- If machine is not equipped with Overload system, refer to SETUPS table and change those personalities that do not match the figure listed in the table.

EXTERNAL ALL, EXTERNAL DRIVE, EXTERNAL LIFT

- An external cutout input is preventing functions – determine the cause of the external cutout (for example, a limit switch)

EZ-CAL HELP MESSAGES

In addition to the **MODE** messages detailed above, the GP400 provides a **HELP** message to identify failure modes. Some error messages may also be identified by counting the number of times the red LED flashes on the controller so that even without access to an EZ-Cal, some simple diagnostics are possible. However, it is recommended to use an EZ-Cal to diagnose problems, and not rely on the LED! The EZ-Cal provides a much higher detail of information.

- Connect the EZ-Cal (see illustration).
  The display will read, “HELP: PRESS ENTER”.
- Press Enter to display the current message.
- Refer to the following list of HELP messages to better understand the nature of the message or fault.
- If the GP400 does not register a fault, the display will read EVERYTHING OK.

Pressing ENTER twice will provide a scrolling message of the current message (if one exists) followed by a log of previous operations and/or errors that occurred immediately prior, starting with most recent. **All messages are cleared whenever the system is powered down.**

NOTE: When using the LED to attempt diagnosis, please note that a DUAL FLASH code is indicated. The LED will flash on/off a certain number of times, pause off for a short delay, then flash on/off a second certain number of times, followed by a much longer pause off. The sequence will then repeat.

INFORMATION ONLY MESSAGES

The following are “information only” HELP messages which are not indicative of any possible problem – there is no LED flash code (the LED remains on steady):

STARTUP! _____ ***(no flash code)***

- The system has just been powered on and is carrying out some initialization steps prior to being ready to operate. If you select a function during this time, it may be locked out until you release then re-select it.

EVERYTHING OK _____ ***(no flash code)***

- There is no problem with the system – it is ready to operate in platform mode when a function is selected.

NOTE: ***If this is the HELP message when a function is selected, check for open-circuit switches or wiring.***

GROUND MODE ACTIVE! _____ ***(no flash code)***

- There is no problem with the GP400 – it is ready to operate in ground mode when a function is selected.

CLOSE TRIGGER _____ ***(no flash code)***

- A platform function is selected but the trigger switch is not closed.

VEHICLE TILTED _____ ***(no flash code)***

- The vehicle is tilted beyond the limits, some functions may be prevented.

FUNCTION ACTIVE MESSAGES

The following **HELP** messages indicate that there is no problem with the GP400 but that a function is active – the vehicle should be moving as requested by the operator.

DRIVING! _____ ***(no flash code)***

LIFTING! _____ ***(no flash code)***

LOWERING! _____ ***(no flash code)***

STEERING! _____ ***(no flash code)***

EXTENDING OUTRIGGERS! _____ ***(no flash code)***

RETRACTING OUTRIGGERS! _____ ***(no flash code)***

CALIBRATION MESSAGES

The following are “calibration” HELP messages – until the machine is properly calibrated for height and/or pressure (as required), many functions will not be available.

NOT CALIBRATED _____ ***Flash Code: 1/1***

FUNCTIONS LOCKED - NOT CALIBRATED _____ ***Flash Code: 1/1***

- The height and/or pressure sensors have not been calibrated and are required because of the setup of the GP400.
- Calibration procedures are accessible from the **SETUPS/HEIGHT SETUPS** and **SETUPS/LOAD SETUPS** menus.

FAULT: CUSTOMER _____ ***Flash Code: 1/1***

- The system must be configured to the customer requirements – with the EZ-Cal in SETUPS/CHANGE DEFAULTS menu, scroll to the correct machine from this menu, the press Right Arrow to select the appropriate model.

NOTE: Selecting the incorrect customer or model will cause the machine to operate incorrectly or go into fault mode.

SHUTDOWN HELP MESSAGES

This section lists "shutdown" HELP messages – functions can be shut down to prevent them being used:

SHUTDOWN - CHECK EMS SWITCHES! _____ ***Flash Code: 2/1***

- The Base/Platform selector switch position indicates the mode in which the system must operate if both are active together; the system does not know how to function

FUNCTIONS LOCKED - TEST MODE SELECTED _____ ***Flash Code: 2/2***

- Test mode is not accessible with this system. Switch power off/on to reset to normal operation

FUNCTIONS LOCKED - TOO HIGH _____ ***Flash Code: 2/2***

- The platform is raised too high to allow some functions. Certain functions may not be allowed above certain elevations.
- Check operator's manual or ADJUSTMENTS/HEIGHTS/MAX DRIVE and MAX LIFT to see if drive and/or lift is allowed at all heights.

FUNCTIONS LOCKED - TILTED _____ ***Flash Code: 2/2***

- The vehicle is tilted too much to allow some functions.
- Check operator's manual or ADJUSTMENTS/TILT/Xtrip and Ytrip, which determine the maximum allowed vehicle tilt.
- Refer to EZ-Cal Flow Chart 1 – Adjustments and Setup.

FUNCTIONS LOCKED - EXTERNAL SHUTDOWN _____ ***Flash Code: 2/2***

- An external shutdown is preventing functions – check DIAGNOSTICS/SYSTEM/ MODE/INTERLOCK to see which external interlock is active.

CHECK GROUND INPUT SWITCHES! _____ ***Flash Code: 2/2***

- There is a problem with the ground function select switches – more than one is active at the same time.

SELECT DRIVE/LIFT MODE! _____ ***Flash Code: 2/2***

- There is a problem with the platform drive/lift select switch – neither mode is selected.

CHECK DRIVE/LIFT SELECT SWITCH! _____ ***Flash Code: 2/2***

- There is a problem with the platform drive/lift select switch – both modes are selected together.

CHECK JOYSTICK SWITCHES! _____ ***Flash Code: 2/2***

- There is a problem with the platform joystick switches – both directions are selected together.

RELEASE TRIGGER! _____ ***Flash Code: 2/2***

- The trigger was closed at power-on, or closed for too long with no function selected.

RELEASE GROUND SWITCHES! _____ ***Flash Code: 2/2***

- Ground function switches were closed at power-on.

RELEASE JOYSTICK SWITCHES! _____ ***Flash Code: 2/2***

- Platform joystick switches were closed at power-on, or closed for too long without trigger switch (see **SETUPS/INTERLOCKS/TRIGGERwait**).

RELEASE OUTRIGGER SWITCHES! _____ ***Flash Code: 2/2***

- Outrigger switches were closed at power-on.

WIRING MESSAGES

The following are “wiring” HELP messages – problems have been detected which are likely due to vehicle wiring issues:

FAULT: ENERGIZED VALVE - CHECK P5 WIRING! _____ Flash Code: 3/2

FAULT: VALVE FEEDBACK HIGH - CHECK VALVE WIRING!_____ Flash Code: 3/2

- There is a voltage on one or more valve outputs, when all outputs are off.
- Check each valve output to trace where the invalid supply is coming from.

FAULT: CAPBANK VOLTAGE TOO HIGH - CHECK LINE CONT! __ Flash Code: 3/3

- The voltage on the B+ stud of the controller (connected to an internal voltage stabilization capacitor bank) is too high when the line contactor is off. B+ stud voltage should be approximately 32 volts at idle.
- Check the line contactor tips are not welded, and check the power wiring for errors.

FAULT: ENERGIZED LINE CONTACTOR - CHECK P5 WIRING! __ Flash Code: 3/4

- There is a voltage on the line contactor coil output, when it is off.
- Check wiring to the line contactor coil to trace where the invalid supply is coming from.

FAULT: MOTOR OVERLOAD! _____ Flash Code: 3/5

- The power protection circuits in the controller have activated to protect from extreme overload.
- Check for short-circuit power wiring; check for a seized or shorted motor.

SUPPLY MESSAGES

The following are "supply" HELP messages – problems have been detected which are likely due to supply issues:

FAULT: LOW OIL PRESSURE! _____ ***Flash Code: 4/1***

- Engine oil pressure switch open after start sequence initiated. Engine stalled or unable to start.

FAULT: BAD INTERNAL 5V! _____ ***Flash Code: 4/2***

- The internal "5V slave" supply is out of range; if the fault remains, the controller may have to be replaced.

FAULT: BAD INTERNAL SLAVE! _____ ***Flash Code: 4/2***

- The internal "slave" is not operating correctly; if the fault remains, the controller may have to be replaced.

FAULT: BAD INTERNAL 12V! _____ ***Flash Code: 4/3***

- The internal "12V" supply is out of range;
- 12V Supply is generated by the Motor control module and supplied to the GP400. Check for wiring errors between the two modules. If the fault remains, the Motor Controller may have to be replaced.

FAULT: BATTERY VOLTAGE TOO LOW! _____ ***Flash Code: 4/4***

- The battery supply is too low – the batteries must be re-charged.

FAULT: BATTERY VOLTAGE TOO HIGH! _____ ***Flash Code: 4/4***

- The battery supply is too high – check that the correct battery and charger are installed.

FAULT: BAD 5V SENSOR SUPPLY - CHECK P2-1 WIRING! _____ ***Flash Code: 4/5***

- The "5V sensor" supply is out of range; this supply is available to power external 5V-powered sensors – check that is has not been overloaded or short-circuited to other wiring (CE models).

CANBUS MESSAGES

This section lists "CANBUS" HELP messages – problems have been detected with CANBUS communications between different modules (of course, only applicable if more than one module is connected together via CANBUS):

FAULT: CANBUS! _____ ***Flash Code: 6/6***

- There are problems with CANBUS communications between the different modules; messages expected from one or more module are not being received, or messages intended to one or more module cannot be transmitted.
- Check for open- and short- circuit problems with CANBUS wiring; ensure that the CANBUS is wired correctly pin-to-pin; ensure that the vehicle chassis is not erroneously shorted to the chassis (for example, due to insulator breakdown in the motor).

POWER WIRING MESSAGES

The following are "power wiring" HELP messages – problems have been detected which are likely due to power wiring errors:

FAULT: CAPBANK VOLTAGE TOO LOW - CHECK STUD WIRING! Flash Code: 7/7

- The voltage on the B+ stud of the controller (connected to an internal voltage stabilization capacitor bank) is too low (a pre-charge circuit in the module normally applies approximately 32 volts to the capacitor bank and B+ stud).
- Check the 300 amp fuse, line contactor or power wiring for errors. Also check DC motor for internal grounding. Possible motor controller failure.

OTHER MESSAGES

The following are other HELP messages:

SOME BIG BAD PROBLEM! _____ ***Flash Code: 9/9***

- This message should not occur!

FACTORY OVERRIDE _____ ***Flash Code: (fast flashing)***

- When the controller is first shipped, prior to initial calibration, it is configured in a special "factory override" state. In this state, none of the normal shutdowns or interlocks will occur – the vehicle can be freely lifted/lowered and driven irrespective of any calibration needs, vehicle tilt, etc.
- As soon as an EZ-Cal is connected to the controller, the factory override state is ended.
- If calibration does not occur, then the factory override state will recur if the EZ-Cal is disconnected and power is switched off/on.

IMPORTANT: **– Never use a vehicle in factory override; this state is ONLY intended for use during manufacture! While factory override is active, the LED is rapidly flashed on/off.**

TROUBLESHOOTING CHART

The following chart is a guide to help the technician find the area of a problem. In order to benefit from the information, you are advised to fully assess the symptoms by operating all machine functions. There may be some functions that operate while others may not. Record this information and proceed down the left-hand column until you find the failure scenario that best fits the problem. Refer to the information provided to the right for possible causes and remedies. This unit contains a Microprocessor based control system which contains various safety features designed to protect itself and the operator in the event of a failure.

The EZ-Cal scan tool will provide the technician with detailed information related to the failure. ***It is strongly recommended that the technician use the EZ-Cal to read any displayed messages before proceeding to use this Troubleshooting chart.***

Information on the use of the EZ-cal tool plus helpful Flow Charts and graphs can be found earlier in this troubleshooting section. Please read and familiarize yourself with all of the information provided in the troubleshooting section before attempting to diagnose or repair the machine.

Table 4-1: Troubleshooting Chart

PROBLEM	POSSIBLE CAUSE	REMEDY/SOLUTION
General Power Issue		
No operation from Upper or Lower control station	Main Battery Switch turned OFF	Located left of Lower Control Box
	Emergency Stop Switch pushed or Ignition Switch turned OFF	Upper or lower E-Stop will cut all power, as will the Ignition Switch in the Upper Control Box
	Battery discharged or faulty cables	Will receive 4-4 or 7-7 flash on GP400. Clean, service and charge battery - repair cables
	Circuit Breaker Tripped	Located in Lower Control Box Panel Look for short circuit and/or damage in wiring or high amperage draw at valve coils or engine actuators.
	Damaged Upper Control Box harness	Inspect the harnesses and harness plugs for damage or broken wires - May receive 6-6 flash code on GP-400 (CAN bus) or no power at all
	Blown supply fuse	Locate source of short circuit. Inspect/replace fuse located just below Main Battery Switch
	Other fault in system monitored by GP400	Check HELP message on EZ-cal or check Flash Code for error
Functions from Lower Controls but not from Upper Controls	Interlock Switch (Joystick)	Check power to red wire (power to switch) and power to purple wire (power out of switch) at the joystick plug
Lift/Lower		
Platform will not raise	Excessive weight on platform	Reduce weight to within platform capacity
	Lift Relief Valve out of adjustment	Adjust Relief Valve to rated platform capacity
	Lift Valve not energized	Check wiring to lift valve Check for EZ-cal message or flash code
	Lowering valve stuck open (located at base of lift cylinder	Check and remove contamination from valve
	Level sensor out of level (platform elevated above 10')	Reposition machine to firm level surface Check level sensor function using EZ-cal
	Main system pressure inadequate	Check pump output pressure
	Battery discharged - no charge output	Check battery voltage, alternator output (14.5 volts) Clean, service and charge battery
	System interruption	Check HELP messages using EZ-cal

Table 4-1: Troubleshooting Chart

PROBLEM	POSSIBLE CAUSE	REMEDY/SOLUTION
Platform will not lower or lowers slowly	Maintenance lock in maintenance position	Return maintenance lock to the stowed position
	Lowering valve not energized	Check wiring to lowering valve located on Lift Cylinder
	Lowering valve not shifting	Clean debris, check for damage, replace
	Lowering orifice/s plugged	Clean orifice/s located inside hose fitting on lift cylinder
	System interruption	Check HELP messages using EZ-cal
Lowers but not completely	Down valve on lift cylinder inoperative	Check lift valve coil
Emergency lowering not working	Lowering valve not shifting	Clean debris, check for damage, replace
	Lowering orifice plugged	Clean orifice/s located inside hose fitting on the lift cylinder
	Valve coil failed on cylinder	Test (6-8 ohms), replace
Drive		
No drive function	Lift/Drive select switch not in Drive position or not operational	Select Drive position (upper control box), Check switch Check switch position from GP400 with EZ-cal DLD
	Drive valve not shifting	Check connections at valve Check Drive Valve for contamination Check Drive output from GP400 (
	Proportional Valve not shifting	Check connections at valve Check Proportional valve for contamination Check proportional output from GP400
	Drive system shut down (interlock)	Check HELP and MODE message on EZ-Cal
No drive elevated	Unit out of level	Lower and operate Auto-level
	System Interruption (interlock)	Check HELP messages using EZ-Cal
Slow drive with platform stowed	High torque enabled	Check Speed/Torque switch on upper controls
	Malfunctioning rear wheel bypass valve	Located on rear wheel motors only Check electrical by disconnecting valves Check function by replacing valves
	Wheel motors not functioning correctly	Inspect wheel motors for excessive bypass
Poor gradeability or drive performance	High or mid speed enabled	Check Speed/Torque switch on upper controls
	Batteries discharged	Check battery voltage with multi-meter or EZ-Cal Clean, service, charge batteries
	Wheel motors not functioning correctly	Inspect wheel motors for excessive bypass
	Malfunctioning rear wheel bypass valve	Located on rear wheels only Check electrical by disconnecting valves Check function by replacing valves
	Malfunctioning series parallel valves	Located on top of main hydraulic manifold Remove and inspect
	Incorrectly adjusted or worn hydraulic pump	See Hydraulics section for pump adjustment Inspect or replace pump
Drive in one direction only	Drive valve not energized in one direction	Check 12 volts to appropriate coil Check coil Check valve function
	Counterbalance valve CBV1 or CBV2 not functioning correctly	Swap counterbalance valves to see if functioning direction changes
	No output from GP400	Check switch position output from GP400

Table 4-1: Troubleshooting Chart

PROBLEM	POSSIBLE CAUSE	REMEDY/SOLUTION
No low speed (high torque mode)	Speed/Torque switch inoperative	Check continuity through Speed Select switch with wires disconnected terminals 2 & 1
	Valve SV3 not functioning	Check for 12 volts and ground to valve Check for faulty valve spool Check switch position output from GP400 (See EZ-cal ID# 2f-17)
	EP1 poppet valve not functioning	Check or replace valve (see hyd schematic for location)
No Mid Speed	SV3 or SV4 powered and/or shifted	These valves should not have 12 volts In mid-speed, check valve function
	Speed/Torque selector switch malfunction	Terminals 1 or 3 are common with terminal 2 when switch is in mid position
No High Speed	Speed/Torque selector switch inoperative	Check continuity through Speed Select switch with wires disconnected terminals 2 & 3
	Valve not functioning	Check voltage and ground to valve Check for faulty valve spool Check switch position output from GP400
	EP2 poppet valve not functioning	Check or replace valve
No Speed Selection	Limit switch not functioning	Check limit switch located on left rear of base Check limit switch input with EZ-Cal
Steer		
No steer in either direction	Lift/Drive selector switch in the Lift position	Switch must be in Drive position for steer operation
	Joystick rocker switch inoperative	Check continuity through rocker switch on green and yellow wires (right & left) with blue wire (input).
	Steering valve inoperative	Check steering valve for power or damage Check switch position output from GP400
	System Interruption	Check HELP messages using EZ-Cal
	Hoses connected incorrectly	See hydraulic section for proper connection
	Pressure relief valve set too low	Set steer relief valve to 2000 p.s.i.
Steers in one direction only	Steering valve inoperative or stuck	Inspect – replace steering valve
	No power to steering coil	Check for power and ground in both directions. Repair wiring Check switch position output from GP400
	System Interruption	Check HELP and MODE message on EZ-Cal
Steers, but not fully, or steers slowly	One or both steering cylinder seals failed	Check steering cylinder seals – replace
	King pin/s seizing in the bore	Disassemble and inspect Repair Replace bushings
Outriggers deploy unevenly and/or unit will not level	Unit on excessive angle	Relocate machine to more level ground.
	Outrigger extend valve sticking	Inspect/replace deploy valve found at each outrigger cylinder.
	Proximity switch failed open or closed	Check proximity switches. Switches should be closed with outriggers retracted.
	Tilt sensor not properly calibrated	Recalibrate Level (see instructions in Section 2 of this manual).
	Damage to one or more outrigger legs	Inspect and replace as needed.
	Outrigger hoses connected incorrectly	See Section 1 of this manual for hose routing detail.
	Pressure relief valve set too low	Set main relief valve RV1 to 3500PSI.

Section 5

SCHEMATICS

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FIGURES — PAGE

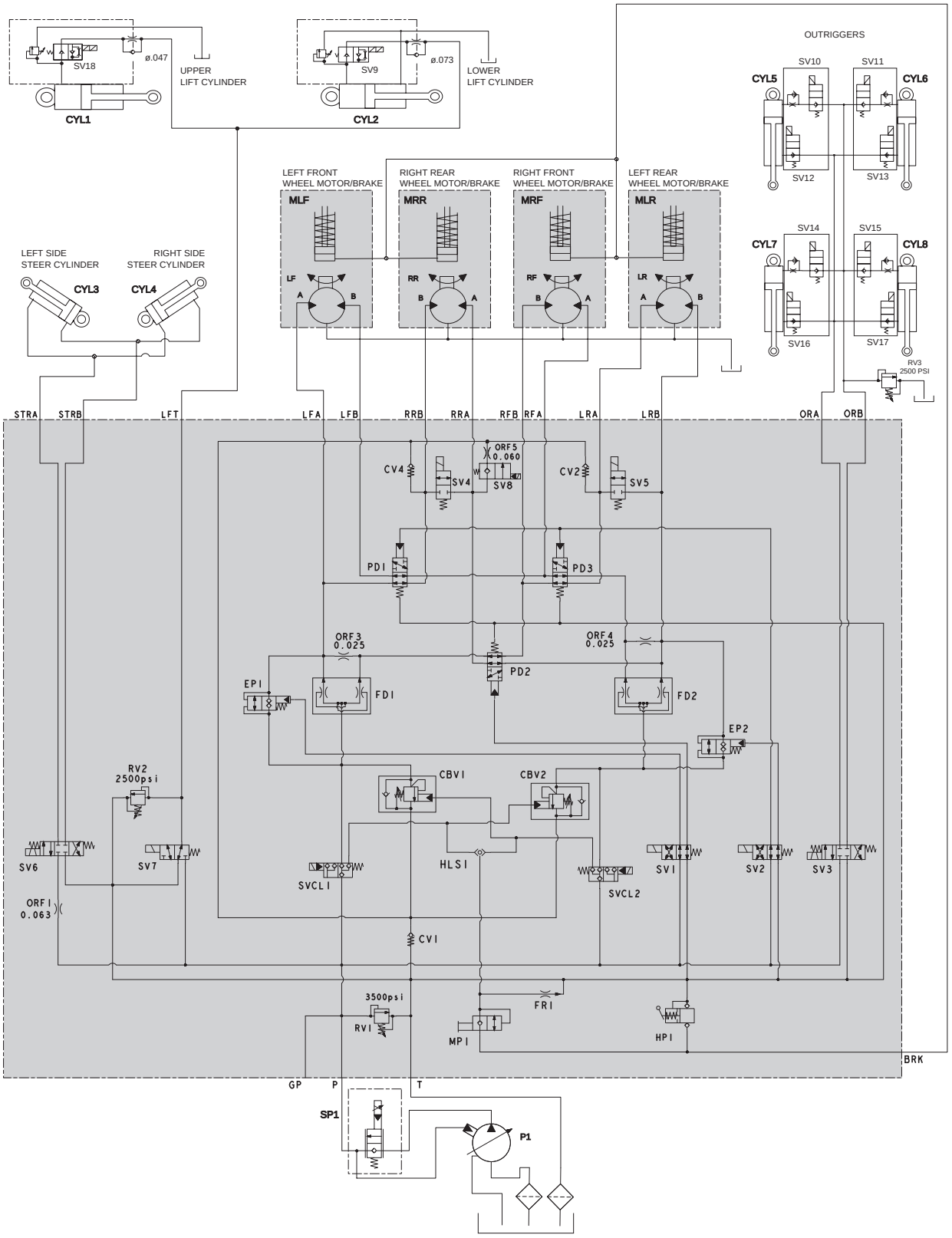
HYDRAULIC SCHEMATICS TABLE

Callout	Description
CBV1, CBV2	Counterbalance Valve, Drive
CV1	Check Valve
CV2	Check Valve
CV4	Check Valve
CYL1	Cylinder, Upper Lift
CYL2	Cylinder, Lower Lift
CYL3-CYL4	Cylinder, Steer
CYL5-8	Cylinder, Outrigger
EP1	Pilot Operated Valve, Mid Speed
EP2	Pilot Operated Valve, Low Speed
FD1	Flow Divider, Drive Mid & Low
FD2	Flow Divider, Drive Mid & Low
FR1	Flow Regulator Valve, Brake Apply
HLS1	Shuttle Valve, Brake Release
HP1	Hand Pump, Brake Release
MLF	Motor, Left Front
MLR	Motor, Left Rear
MP1	Manual Operated Valve, Brake Release
MRF	Motor, Right Front
MRR	Motor, Right Rear
ORF1	Orifice, Steer Speed .063
ORF3	Orifice, Flow Divider Bypass.025

Callout	Description
ORF4	Orifice, Flow Divider Bypass.025
ORF5	Orifice, Bypass Control .060
P1	Pump
PD1	Pilot Operated Valve, High Torque Shift
PD2	Pilot Operated Valve, Mid Range Shift
PD3	Pilot Operated Valve, High Torque Shift
RV1	Relief Valve, Main
RV2	Relief Valve, Lift
SP1	Proportional Solenoid Valve
SV1	Solenoid Valve, High Speed
SV10-SV17	Solenoid Valve, Outrigger
SV18	Solenoid Valve, Down Valve, Upper Lift Cyl
SV2	Solenoid Valve, High Torque
SV3	Solenoid Valve, Outrigger Directional
SV4	Solenoid Valve, Rear Wheel Bypass
SV5	Solenoid Valve, Rear Wheel Bypass
SV6	Solenoid Valve, Steer Directional
SV7	Solenoid Valve, Platform Lift
SV8	Solenoid Valve, Rear Wheel Bypass
SV9	Solenoid Valve, Down Valve, Lower Lift Cyl
SVCL1	Solenoid Valve, Drive Forward
SVCL2	Solenoid Valve, Drive Reverse

HYDRAULIC SCHEMATIC

Figure 5-1: Hydraulic Schematic



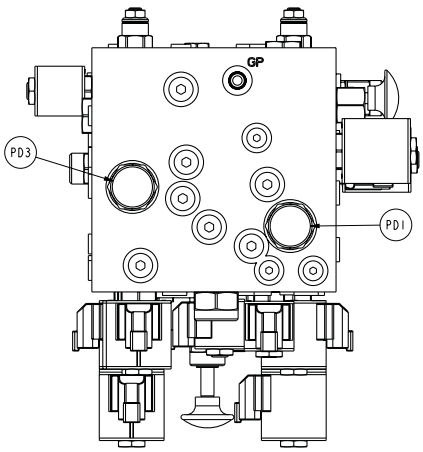
Hydraulic Schematic
4069 RT

ILLUSTRATION No.
ART_4467

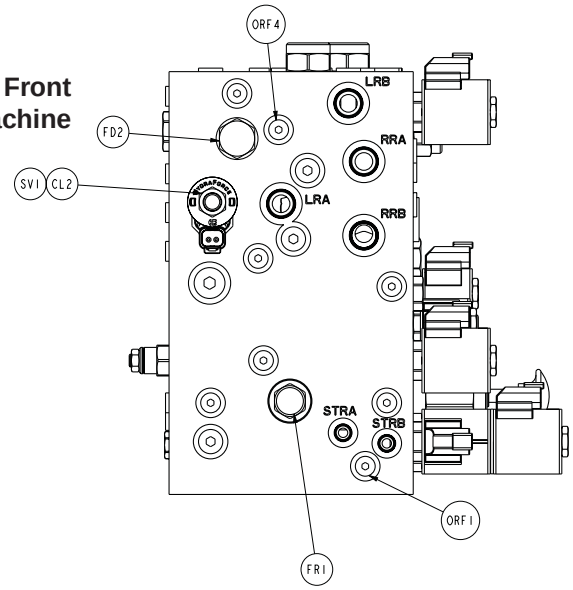
Figure 5-2: Functions Manifold

CL2	COIL #10
CL1	COIL # 8
CV1	CHECK VALVE - ANTI CAVITATION
CV2	CHECK VALVE - ANTI CAVITATION
CV4	CHECK VALVE - ANTI CAVITATION
HP1	HAND PUMP – BRAKE RELEASE
SV1	SOLENOID VALVE – HIGH SPEED
SV2	SOLENOID VALVE – HIGH TORQUE
SV3	SOLENOID VALVE – OUTRIGGER DIRECTIONAL
SV4	SOLENOID VALVE – REAR WHEEL BYPASS
SV5	SOLENOID VALVE – REAR WHEEL BYPASS
SV6	SOLENOID VALVE – STEER DIRECTIONAL
SV7	SOLENOID VALVE – PLATFORM LIFT
SV8	SOLENOID VALVE – REAR WHEEL BYPASS
FD1	FLOW DIVIDER VALVE – DRIVE MID & LOW
FD2	FLOW DIVIDER VALVE – DRIVE MID & LOW
MP1	MANUAL OP. VALVE – BRAKE EMR. RELEASE

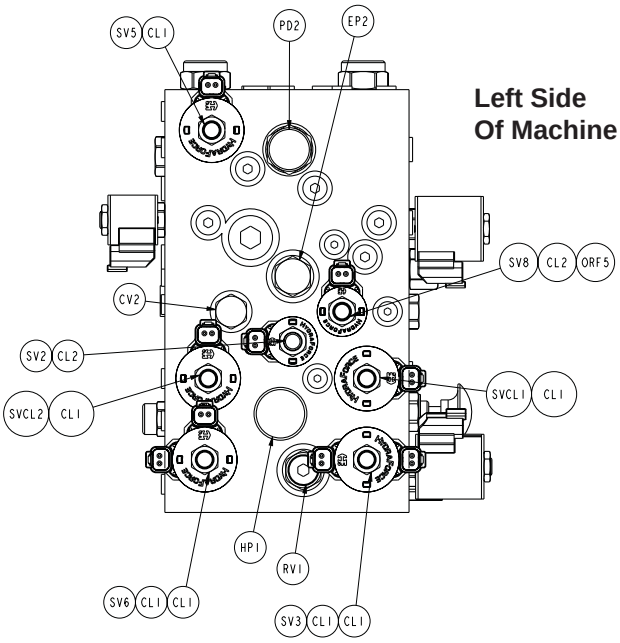
SVCL1	SOLENOID VALVE – DRIVE FORWARD
SVCL2	SOLENOID VALVE – DRIVE REVERSE
EP1	PILOT OP. VALVE – MID SPEED
EP2	PILOT OP. VALVE – LOW SPEED
RV1	RELIEF VALVE – MAIN
RV2	RELIEF VALVE – PLATFORM LIFT
FR1	FLOW REGULATING VALVE- BRAKE APPLY
HLS1	SHUTTLE VALVE – BRAKE RELEASE
ORF1	ORIFICE – STEER SPEED CONTROL
ORF3	ORIFICE – FLOW DIVDER BYPASS
ORF4	ORIFICE – FLOW DIVDER BYPASS
ORF5	ORIFICE – BYPASS CONTROL
PD1	PILOT OP. VALVE – HIGH TORQUE SHIFT
PD2	PILOT OP. VALVE – MID RANGE SHIFT
PD3	PILOT OP. VALVE – HIGH TORQUE SHIFT
CBV1	COUNTERBALANCE VALVE – DRIVE
CBV2	COUNTERBALANCE VALVE – DRIVE



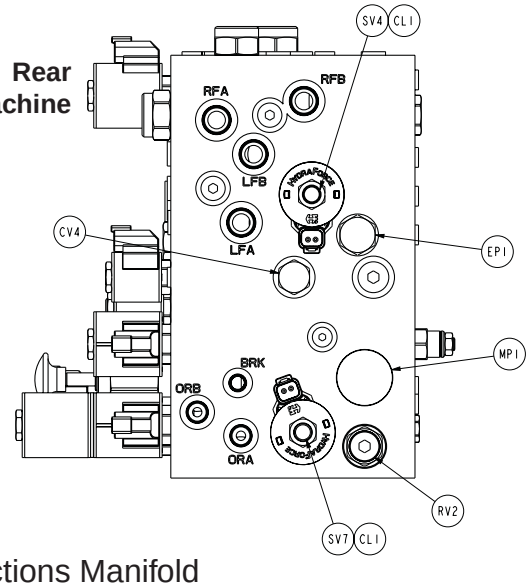
Front Of Machine



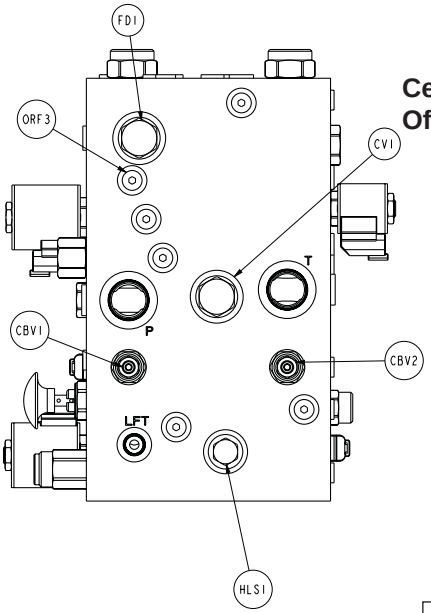
Left Side Of Machine



Rear Of Machine



Center Of Machine



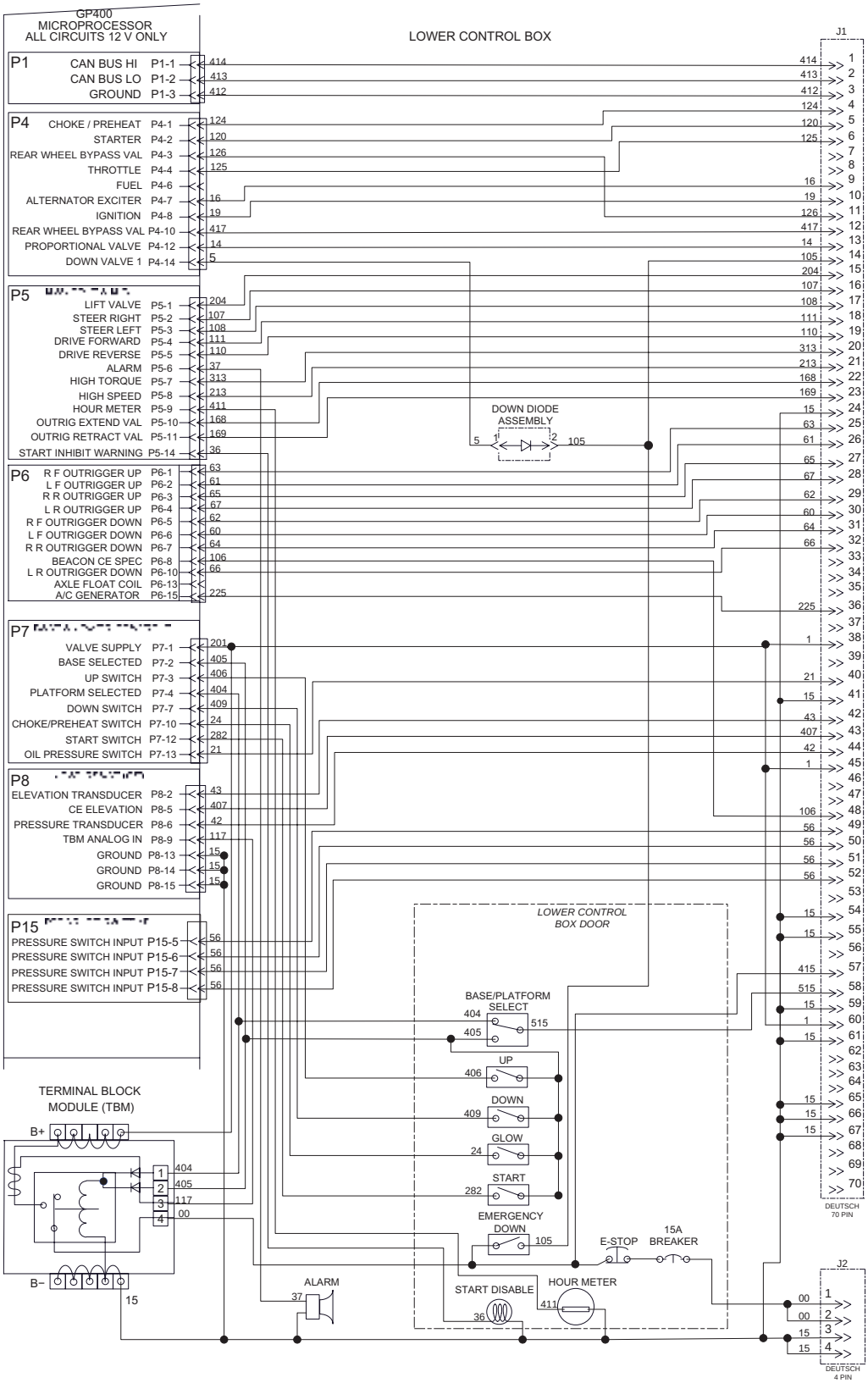
Functions Manifold
4069

ILLUSTRATION No.
ART_4471

NOTES:

ELECTRICAL SCHEMATICS

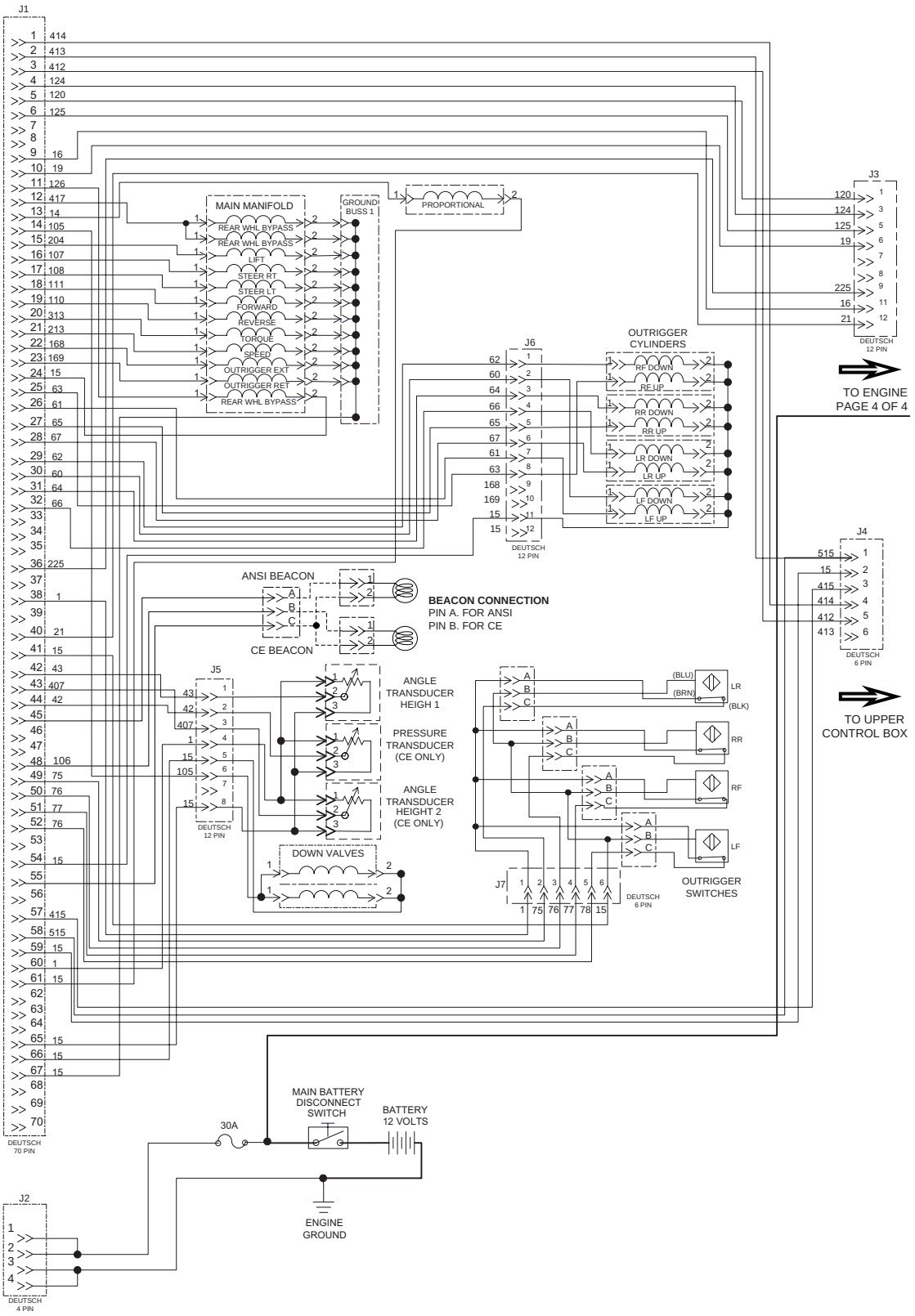
Figure 5-3: Electrical Schematic, 1 of 4



Electrical Schematic, 1 of 4
4069RT

ILLUSTRATION No.
ART_4468

Figure 5-4: Electrical Schematic, 2 of 4



Electrical Schematic, 2 of 4
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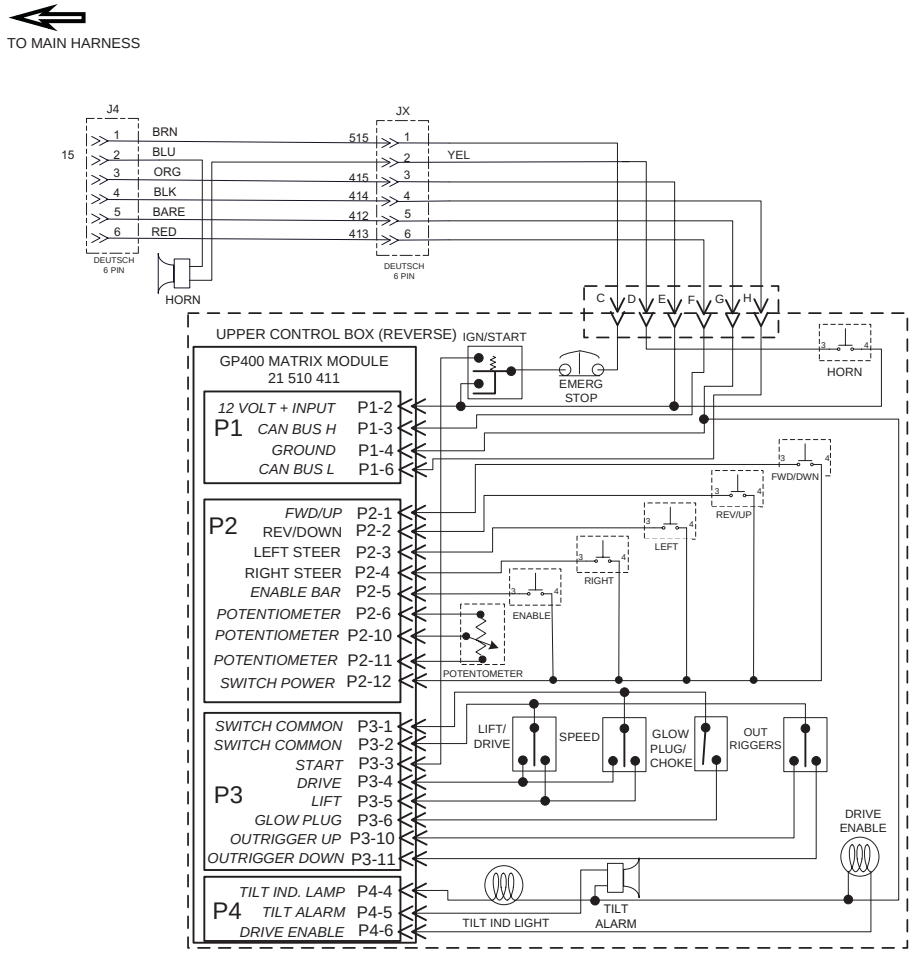
ILLUSTRATION No.
ART_4469

Figure 5-5: Electrical Schematic, 3 of 4



Electrical Schematic, 3 of 4
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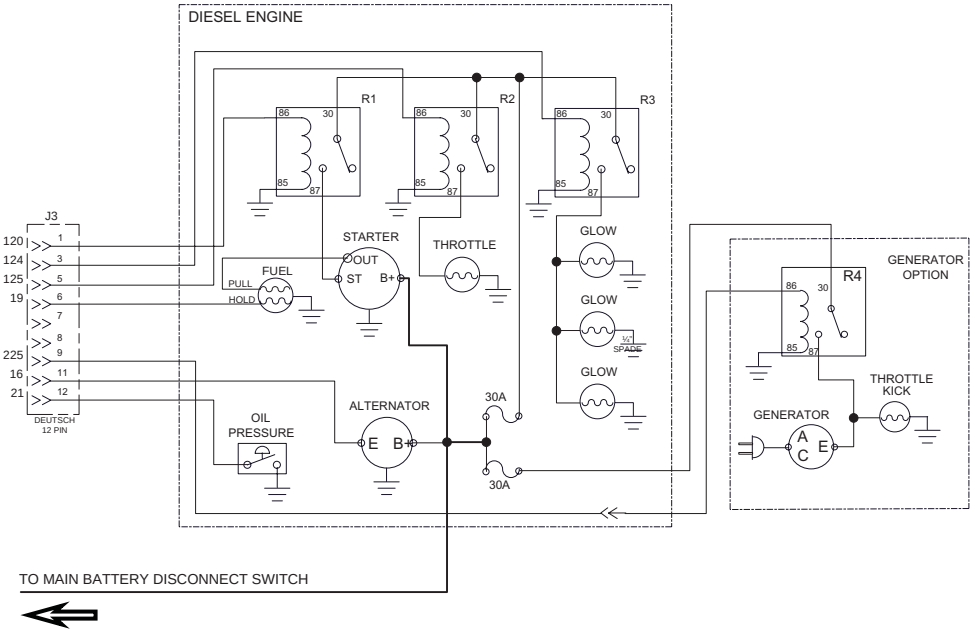
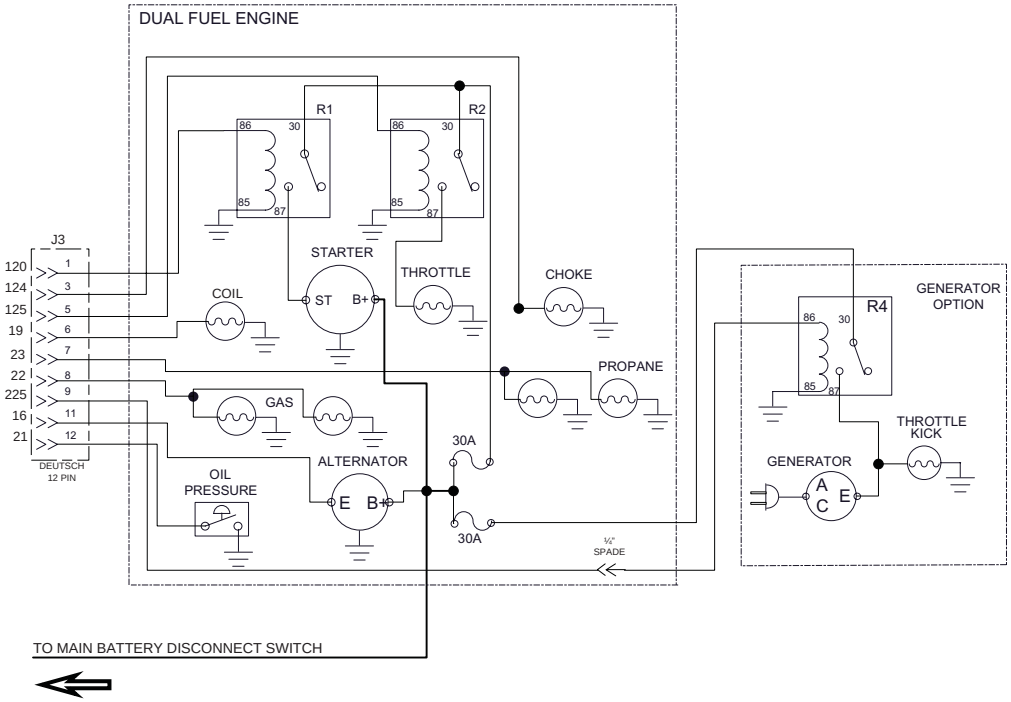
ILLUSTRATION No.
ART_4470

Figure 5-6: Electrical Schematic, 4 of 4



DIESEL ENGINE and optional Generator

DUAL FUEL ENGINE and optional Generator



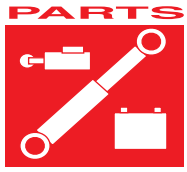
Electrical Schematic, 4 of 4
4069RT

ILLUSTRATION No.
ART_4603

NOTES:

Parts Table of Contents

Parts Table of Contents



SECTION A

CONTROLS

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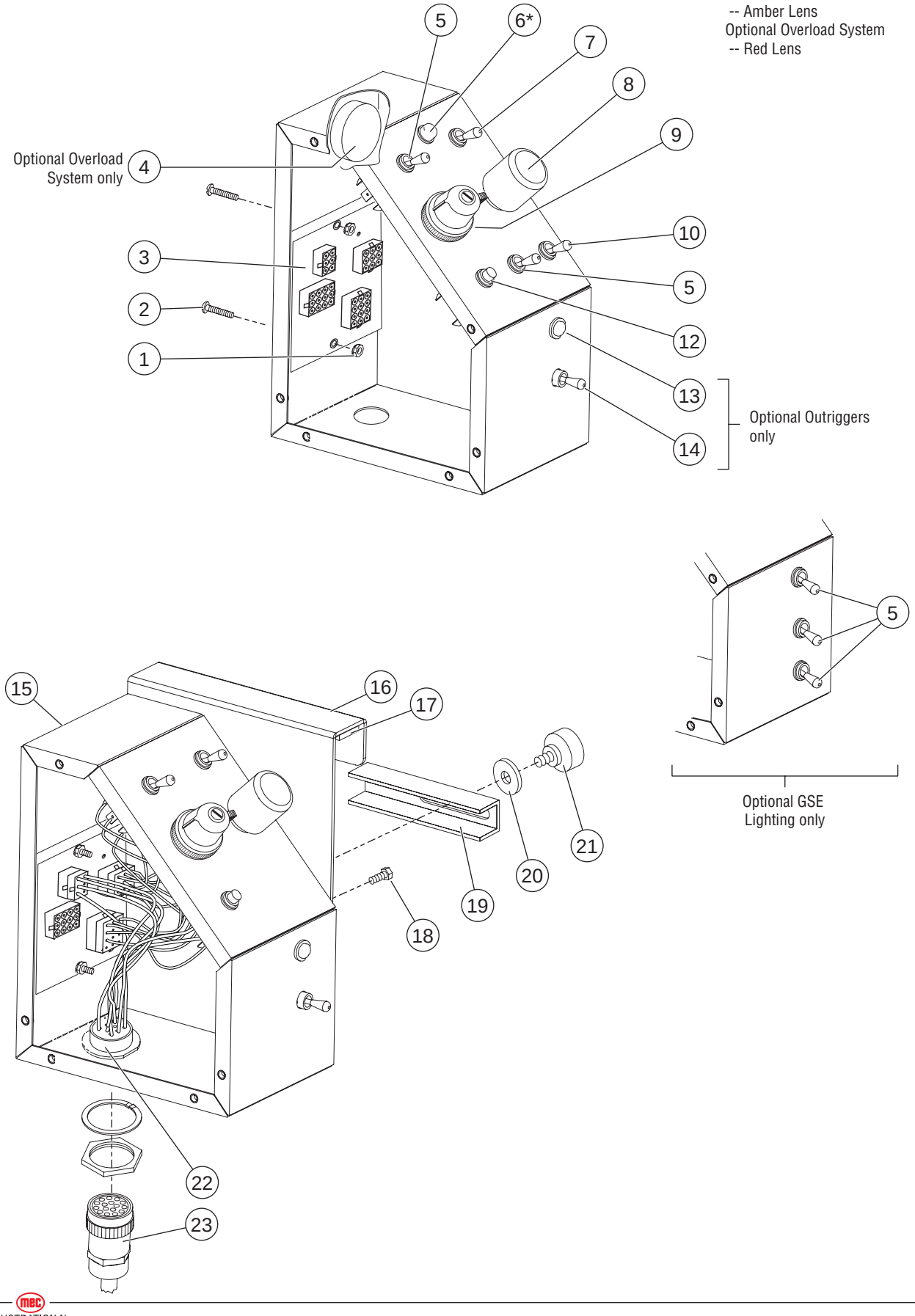


ILLUSTRATION No. ART_4086

4069RT

Upper Controls

Platform Controls

ITEM	PART NO.	QTY	DESCRIPTION
--	89058	--	Assy, Upper Control Box - RT - ANSI - No Options
--	89059	--	Assy, Upper Control Box - RT - ANSI - With Outriggers
--	89060	--	Assy, Upper Control Box - RT - ANSI - With Horn
--	89061	--	Assy, Upper Control Box - RT - ANSI - With Outriggers + Horn
--	89079	--	Assy, Upper Control Box - RT - CE - No Options
--	89080	--	Assy, Upper Control Box - RT - CE - With Outriggers
--	89083	--	Assy, Upper Control Box - RT - CE - GSE -
1	HDW90803	2	Nut
2	HDW90879	2	Screw
3	91663	1	Matrix Module
4	7553	1	**Optional Overload Sensing System --** Alarm, Overload Warning
5	6234	1	Switch, Toggle, 2-Position
6	9184	1	**Std. Machine --** Lens, Amber, Tilt Indicator
	9183	1	**Optional Overload Sensing System --** Lens, Red, Overload Indicator
	9188	1	Light, Bayonet, 14 Volt
	9179	1	Socket, Indicator Light
7	6905	1	Switch, Toggle, 3-Position
8	7800	1	Switch, Emergency Stop
9	91619	1	Switch, Start
10	7423	1	Switch, 2-Position Momentary
11	--	--	--
12	8044	1	Switch, Horn Button (Option)
13	90789	1	LED, Green, Drive Enabled (outrigger-equipped machines)
14	5694	1	Switch, Toggle (outrigger-equipped machines)
15	16242	1	Weldment, Control Box
16	13865	1	Bracket, Control Box Holder
17	6350	0.5 FT	Tape, Foam
18	HDW5724	1	Screw, 5/16–18
19	13864	1	Bracket, Control Box Holder
20	50350	1	Washer, Flat
21	8826	1	Thumb Screw, 5/16–18, Flower
22	REF	1	Harness, Removable (See Wire Harness, Section F)
23	REF	1	Cable, Removable (See Wire Harness, Section F)

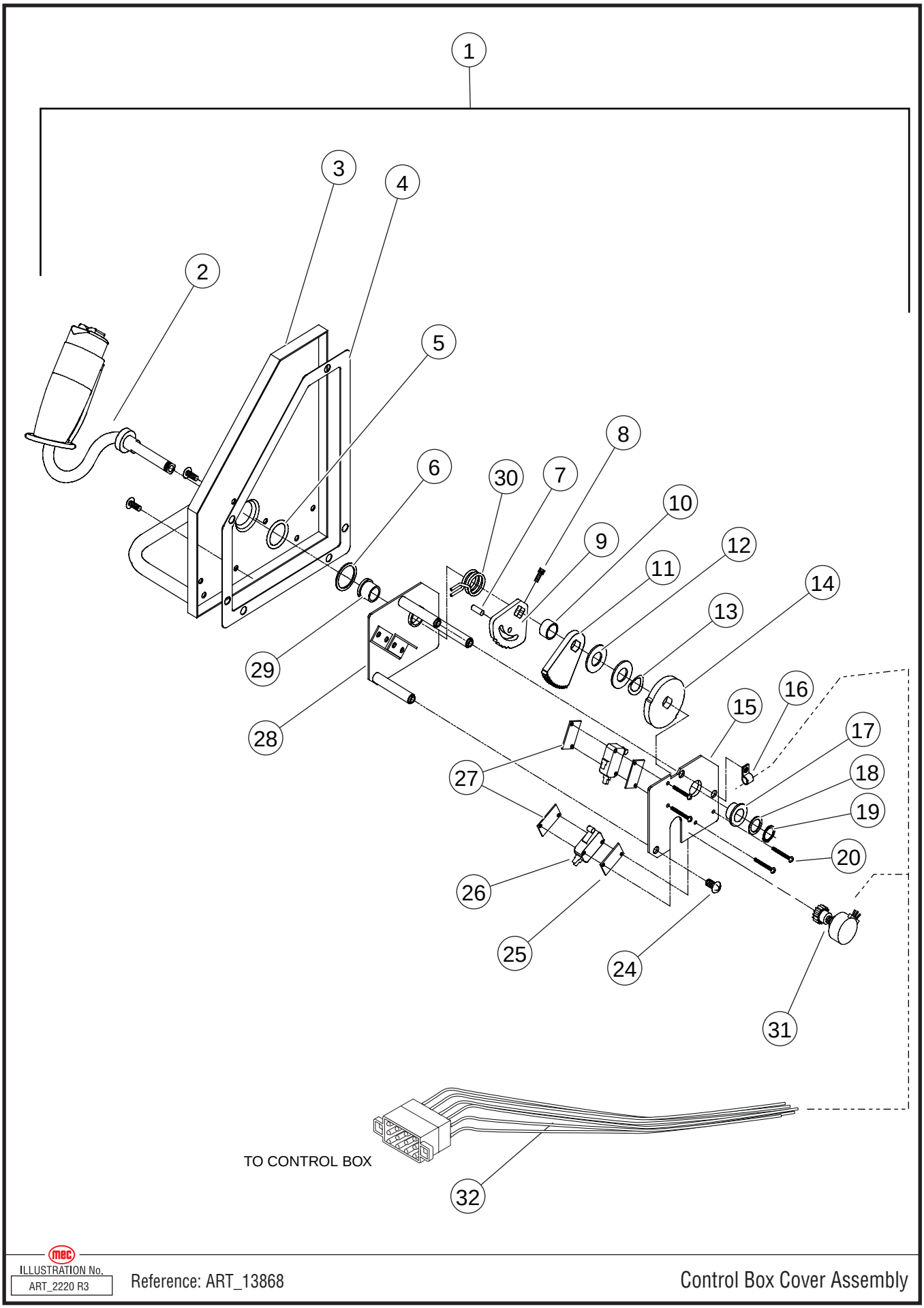


ILLUSTRATION No. ART_2220 R3

Reference: ART_13868

Control Box Cover Assembly

Upper Control Box Cover Assembly

ITEM	PART NO.	QTY	DESCRIPTION
1	83076	1	Control Box Cover Assembly
2	92199	1	Joystick Assembly
3	3772	1	Cover
4	7875	1	Gasket
5	7882	1	O-Ring
6	HDW3768	1	Washer, Flat
7	1008348	1	Pin, Hold Down
8	50155	1	Screw, 6–32 x 1/2 inch
9	13502	1	Bracket, Centering
10	3763	1	Spacer, Step
11	13402	1	Gear, large
12	HDW8531	2	Washer, Flat
13	HDW7881	1	Washer, Bevel
14	3782	1	Cam, Directional
15	13403	1	Plate, Bottom
16	6917	1	Clamp, Cable, 1/4 inch
17	7818	1	Bearing, Bronze, Flanged
18	HDW3771	1	Washer, Flat
19	5736	1	Ring, Retaining, 1/2 inch
20	50139	4	Screw, 4-40 x 5/8 inch
21	--	--	--
22	--	--	--
23	--	--	--
24	50191	12	Screw, 10–32 x 1/2 inch
25	3764	2	Plate, Spacer
26	8696	2	Switch, Limit, Micro V7
27	3765	2	Plate, Strap
28	3766	1	Plate, Top
29	7819	1	Bearing, Bronze, Flanged
30	8435	1	Spring, Joystick Centering
31	91824	1	Potentiometer Assembly
32	REF	1	Wire Harness, (see Wire Harness, Section F)

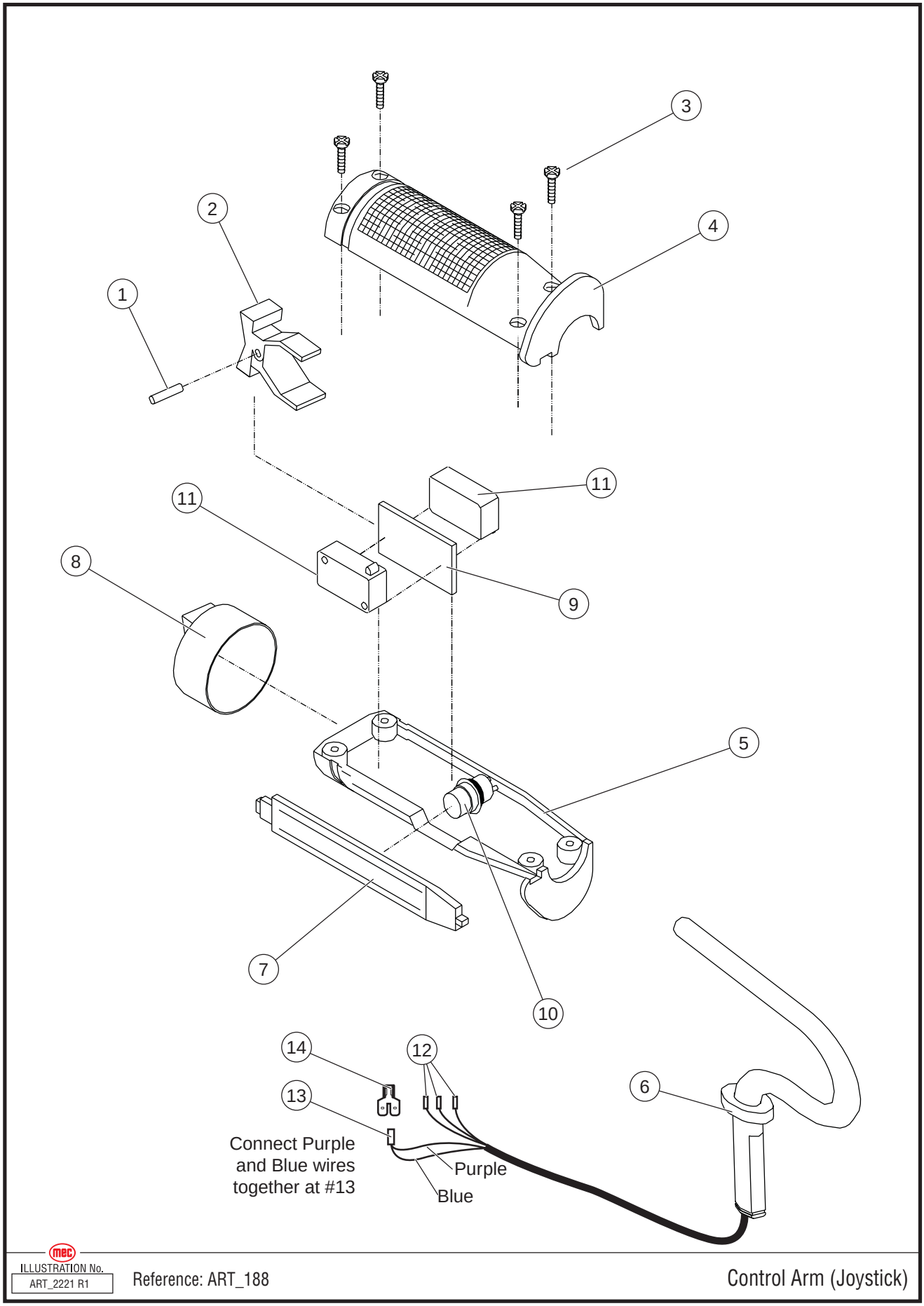


ILLUSTRATION No.
ART_2221 R1

Reference: ART_188

Control Arm (Joystick)

Upper Control Joystick

ITEM	PART NO.	QTY	DESCRIPTION
--	92199	--	Joystick Assembly
--	8630	--	Joystick Assembly without Control Arm (#6)
1	8750	1	Pin
2	8453	1	Switch Actuator
3	HDW8455	4	Screw
4	8752	1	Grip, Top Half
5	8751	1	Grip, Bottom Half
6	13638	1	Control Arm without wire
7	8748	1	Trigger
8	8456	1	Rocker Boot
9	8447	1	Switch Separator
10	8753	1	Motion Switch, OFF-ON
11	8448	2	Switch
12	91839	3	Amp Socket
13	92194	1	Push Connector, 3/16"
14	92198	1	Adapter, 2-to-1
--	8761	--	Switch Assembly (not shown) -- includes item #9, item #11 (x2), wire and connectors

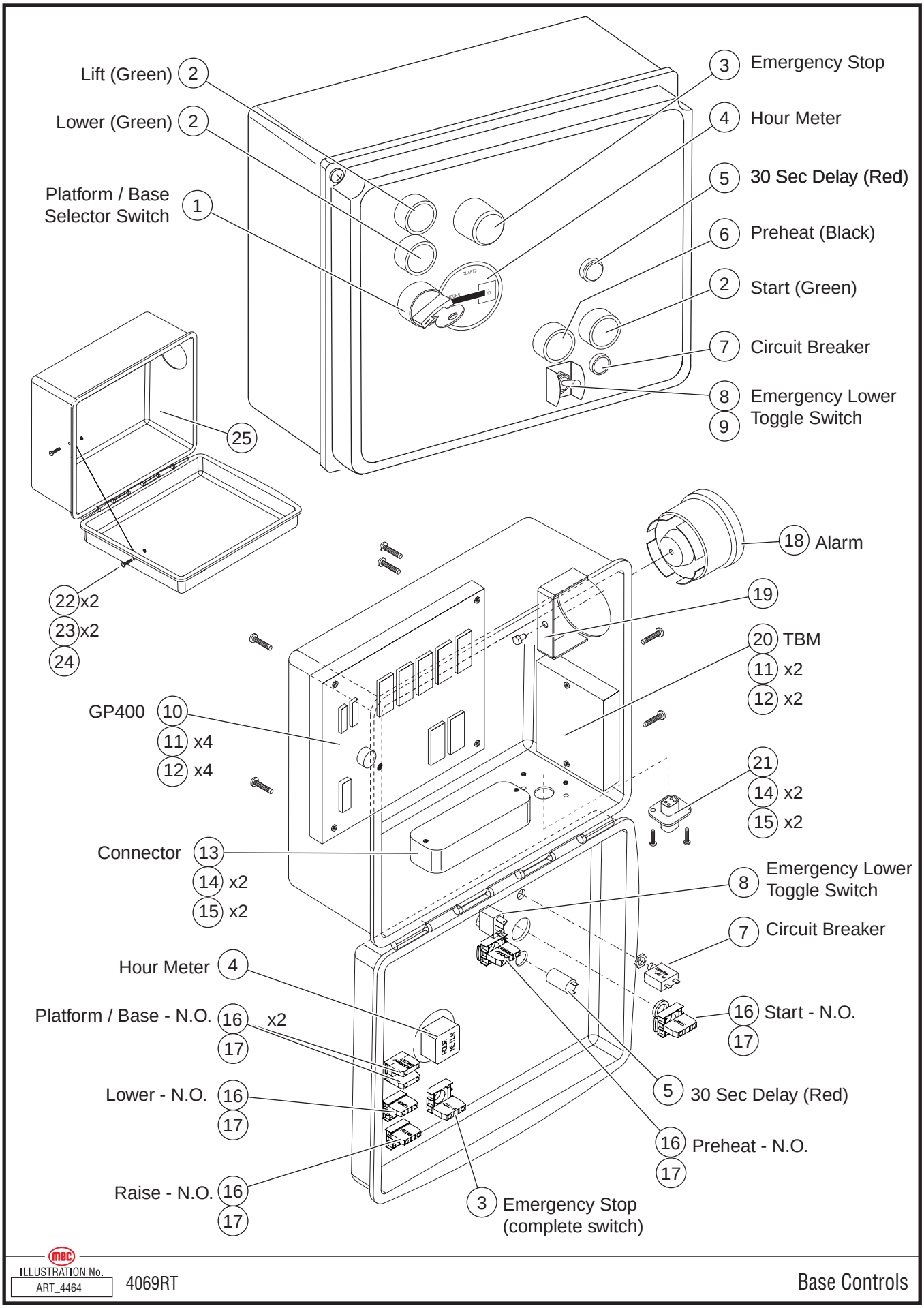


ILLUSTRATION No. ART_4464 4069RT Base Controls

Base Controls

ITEM	PART NO.	QTY	DESCRIPTION
--	REF	--	Harness -- See Section F
1	9549	1	Switch, 3-Position, Keyed
2	91667	3	Switch, Button, Green
3	7800	1	Switch, Emergency Stop
4	91704	1	Hour Meter
5	92254	1	Light, Red
6	91957	1	Switch, Button, Black
7	7235	1	Circuit Breaker
8	7423	1	Switch, Toggle, 1 Pole 2 Position, Emergency Down
9	1313	1	Switch Guard
10	91659	1	System Controller, GP400
11	50229	6	Screw, 10-24 x 1.00
12	50230	6	Nut, 10-24 Nylock
13	91887	1	Deutsch Connector, DRC 12 70P
14	50233	6	Screw, 8-32 x 1.00
15	50231	6	Nut, 8-32 Nylock
16	8082	6	Contact Block, N. O.
17	90714	6	Contact Base
18	91711	1	Alarm, 107dB
19	17082	1	Bracket, Alarm Mount
20	91838	1	Terminal Block Module (TBM)
21	91290	1	Deutsch Connection, DT14-4P-L012
22	92016C	1	Control Box
23	91921	1	Lanyard

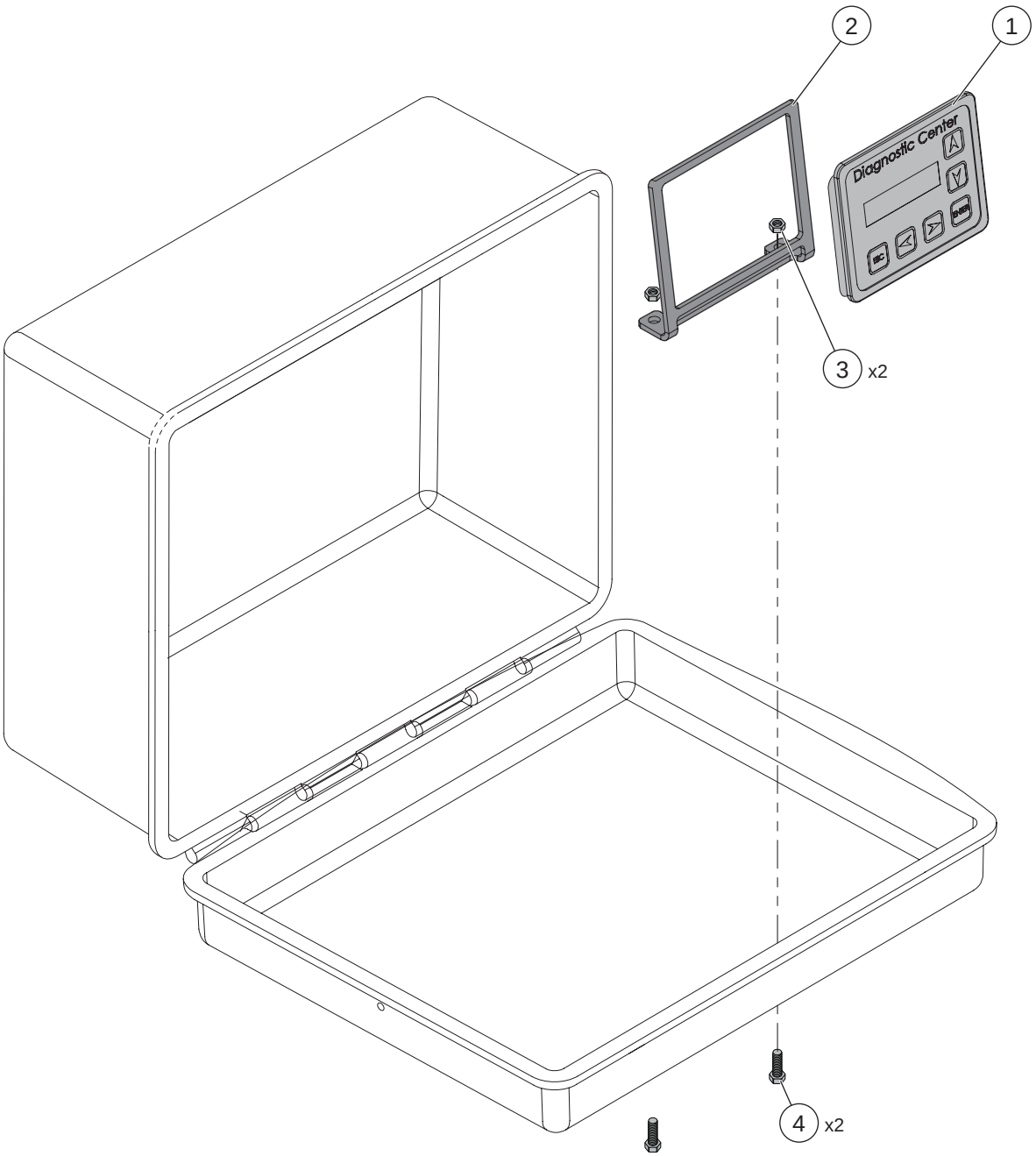


ILLUSTRATION No. ART_4465 4069

OPTION -- Onboard Diagnostic Center

Option -- Onboard Diagnostic Center

ITEM	PART NO.	QTY	DESCRIPTION
1	92003	1	Onboard Diagnostic Center
	92741	1	Onboard Diagnostic Center, OLED Display for Arctic Option
2	26571	1	Bracket, Onboard Diagnostics Center
3	50422	2	Screw, Button Head Cap M6 x 18
4	50047	2	Nut, M6 Nylock

NOTES:

SECTION B

PLATFORM

CONTENTS PAGE

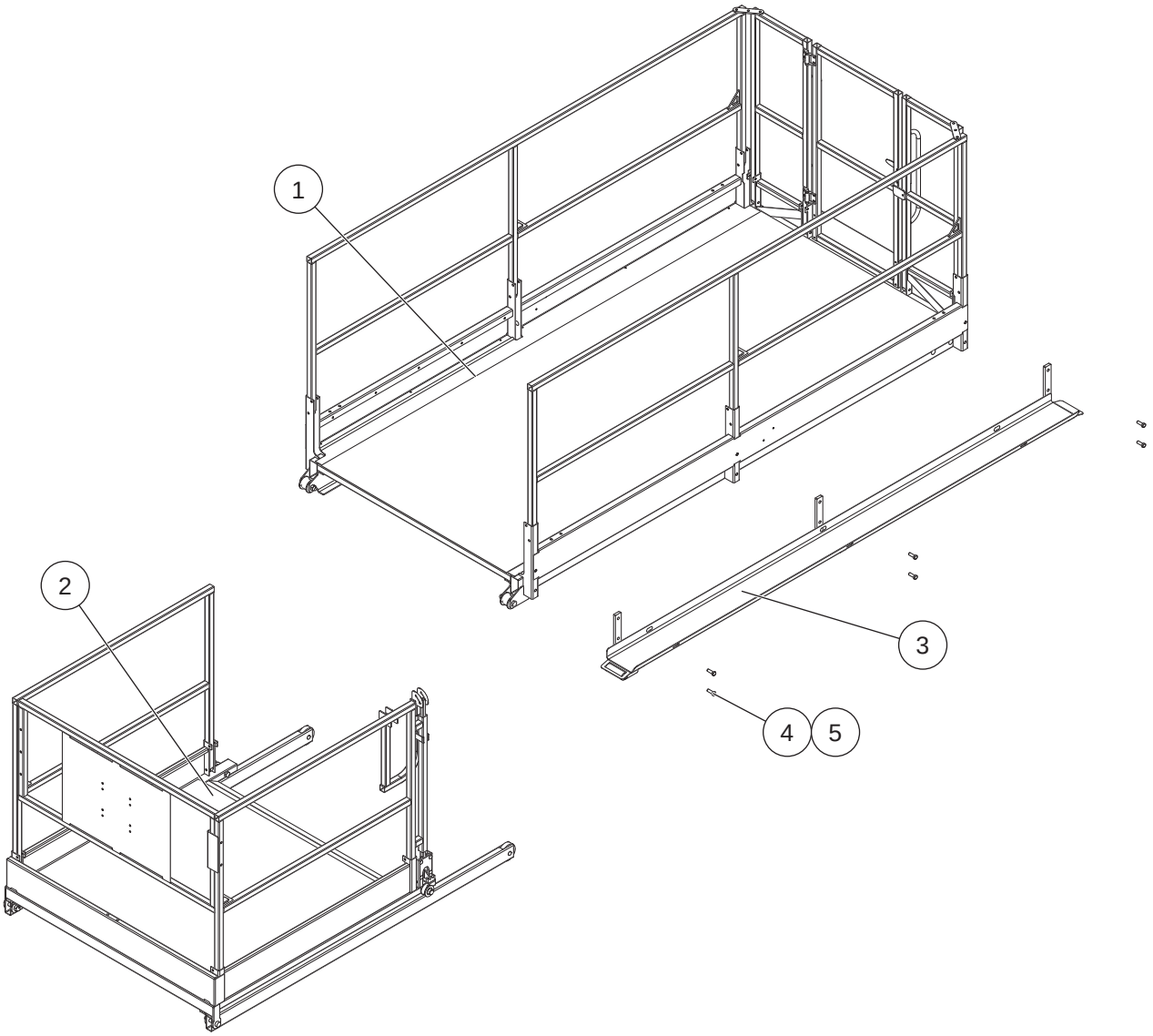


ILLUSTRATION No.
ART_4459

4069

Platform Assembly

Platform Assembly

ITEM	PART NO.	QTY	DESCRIPTION
1	89016	1	Main Platform Assembly
2	89015	1	Deck Extension Assembly
3	89009	1	Sheet Materials Rack
--	26382	1	Roller
--	50361	1	Bolt, Roller, M8 x 140
--	50048	1	Nut, Roller, M8 Nylock
4	50040	6	Bolt, M12 x 35
5	50050	6	Nut, M12 Nylock

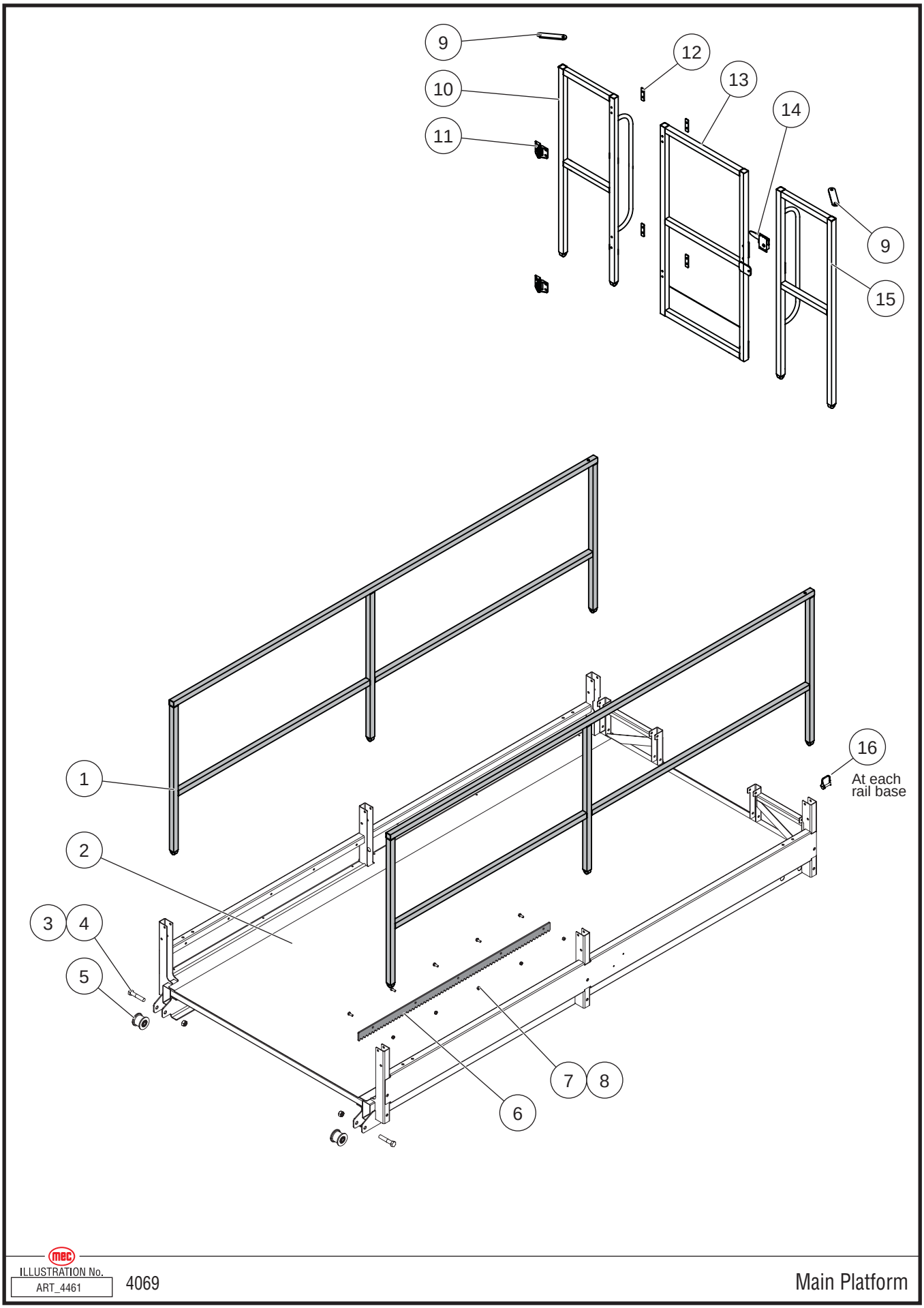


ILLUSTRATION No. ART_4461 4069

Main Platform

Main Platform

ITEM	PART NO.	QTY	DESCRIPTION
1	21386	2	Side Rail
2	21373	1	Main Platform Weldment, without deck plate
--	21389	1	Main Platform Deck Plate
3	50512	2	Bolt, 5/8 x 3.25
4	50398	2	Nut, 5/8 Nylock
5	87125	2	Roller
6	26564	1	Lock Plate
7	50030	5	Bolt, M8 x 20
8	50048	5	Nut, M8 Nylock
9	26566	2	Corner Brace
10	21391	1	Right Side Rear Rail
11	91888	2	Hinge
12	19239	4	Backup Plate
13	26342	1	Personnel Gate, without toe board
--	26347	1	Gate Toe Board
14	92836	1	Gate Latch
15	21390	1	Left Side Rear Rail
16	50182	10	Spring Clip

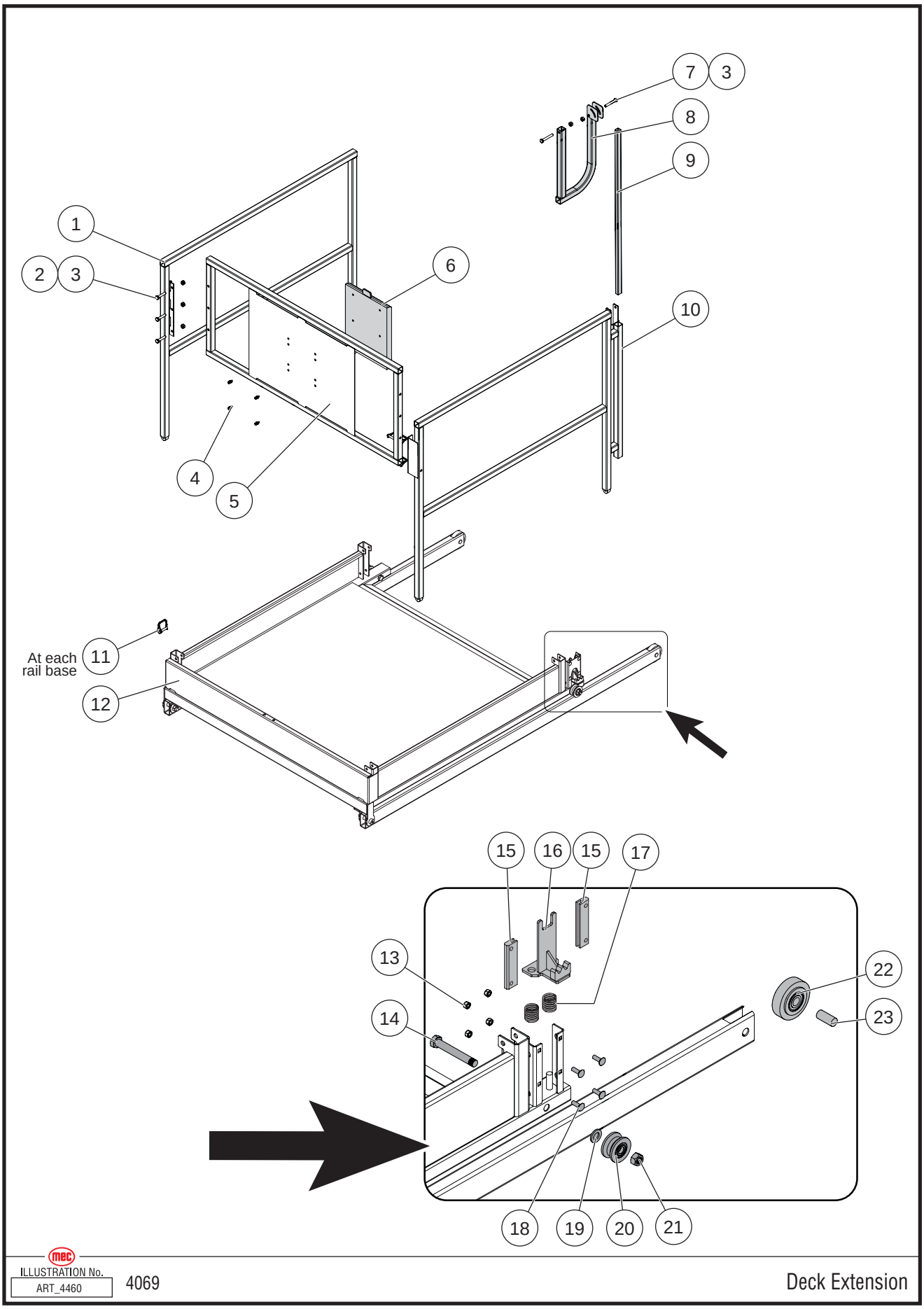


ILLUSTRATION No. ART_4460 4069

Deck Extension

Deck Extension

ITEM	PART NO.	QTY	DESCRIPTION
1	26348	1	Right Side Rail Weldment
2	50020	3	Bolt, M10 x 50
3	50049	5	Nut, M10 Nylock
4	50028	4	Bolt, M6 x 20
--	50000	4	Washer, M6 std.
--	50047	4	Nut, M6 Nylock
5	21394	1	Front Rail Weldment
6	8909	1	Manual Box
7	50022	2	Bolt, M10 x 70
8	26560	1	Extension Handle
9	26433	1	Extension Release Bar
10	26352	1	Left Side Rail Weldment
11	50182	4	Spring Clip
12	21374	1	Deck Extension Weldment, without deck plate
--	21466	1	Deck Extension Deck Plate
13	50048	4	Nut, M8 Nylock
14	50397	2	Bolt, 5/8 x 4.5
15	26239	2	Deck Release Guide
16	26326	1	Deck Release Weldment
17	92866	2	Spring
18	50418	4	Carriage Bolt, M8 x 25
19	50004	2	Washer M16 Std.
20	87125	2	Roller
21	50398	2	Nut, 5/8 Nylock
22	87124	2	Roller
23	26450	2	Pin

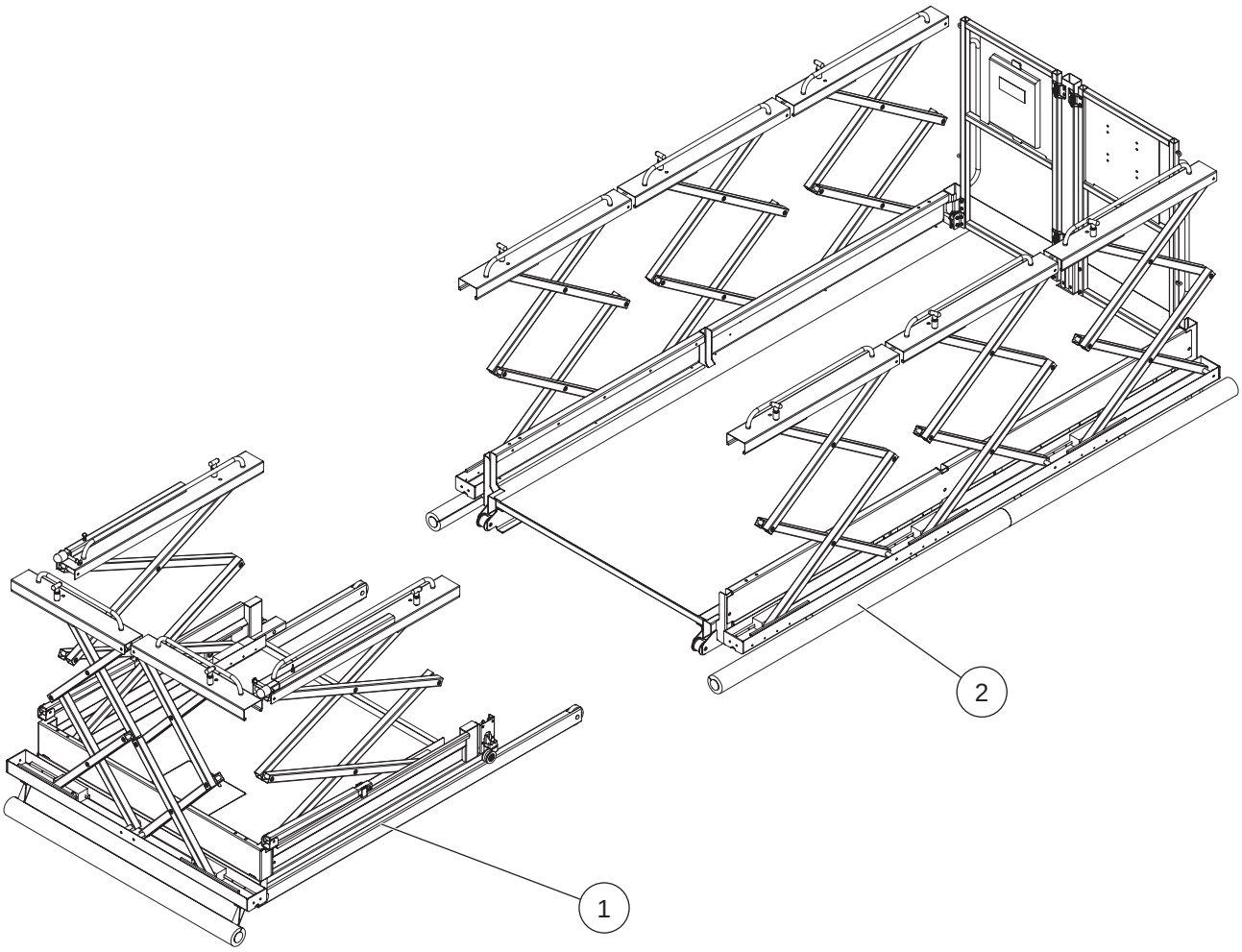


ILLUSTRATION No.
ART_4454

4069

OPTION -- GSE Platform

OPTION -- GSE Platform

ITEM	PART NO.	QTY	DESCRIPTION
--	21618	--	Platform, 4069 GSE Option
1	21617	1	Deck Extension
2	21615	1	Main Platform

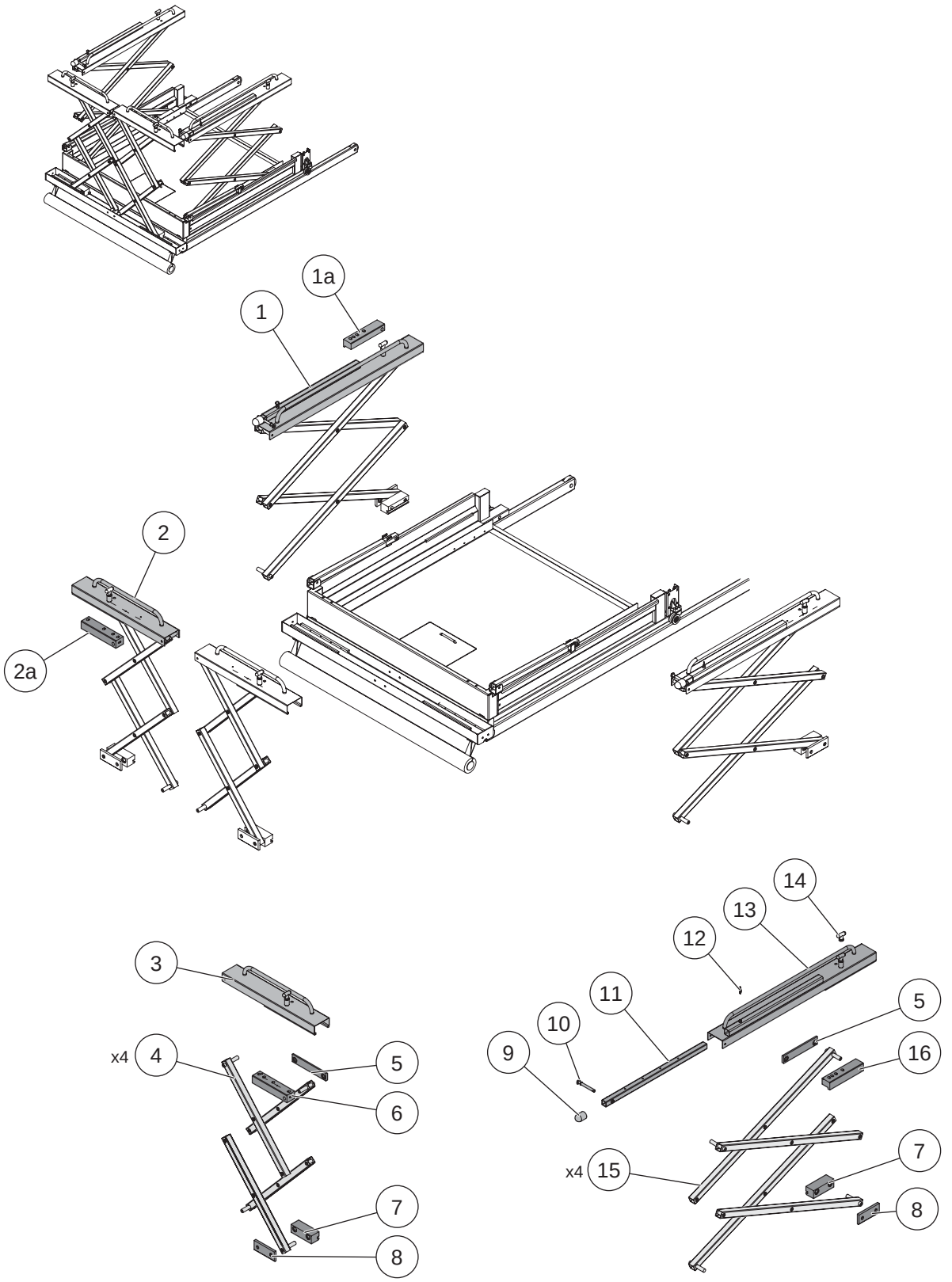


ILLUSTRATION No. ART_4455 4069

OPTION -- GSE Deck Extension, 1 of 2

OPTION -- GSE Deck Extension, 1 of 2

ITEM	PART NO.	QTY	DESCRIPTION
1	21575	1	Right Side Top Tray
1a	21510	1	Wear Pad, Large, Right Side Top
2	21577	1	Right Front Top Tray
2a	21512	1	Wear Pad, Top Front Right
3	21578	1	Left Front Top Tray
4	21521	8	Front Beam
5	21507	2	Front Wear Pad, Small
6	21513	1	Wear Pad, Top Front Left
7	21505	4	Wear Pad, Bottom large
8	21506	4	Wear Pads, Bottom Small
9	93450	2	Rubber Cap
10	93400	2	Pin
11	21609	2	Slide Tube
12	93399	2	Pull Pin
13	21576	1	Left Side Top Tray
14	93359	4	T-Handle
15	21520	8	Side Beam
16	21511	1	Wear Pad, Large, Left Side Top

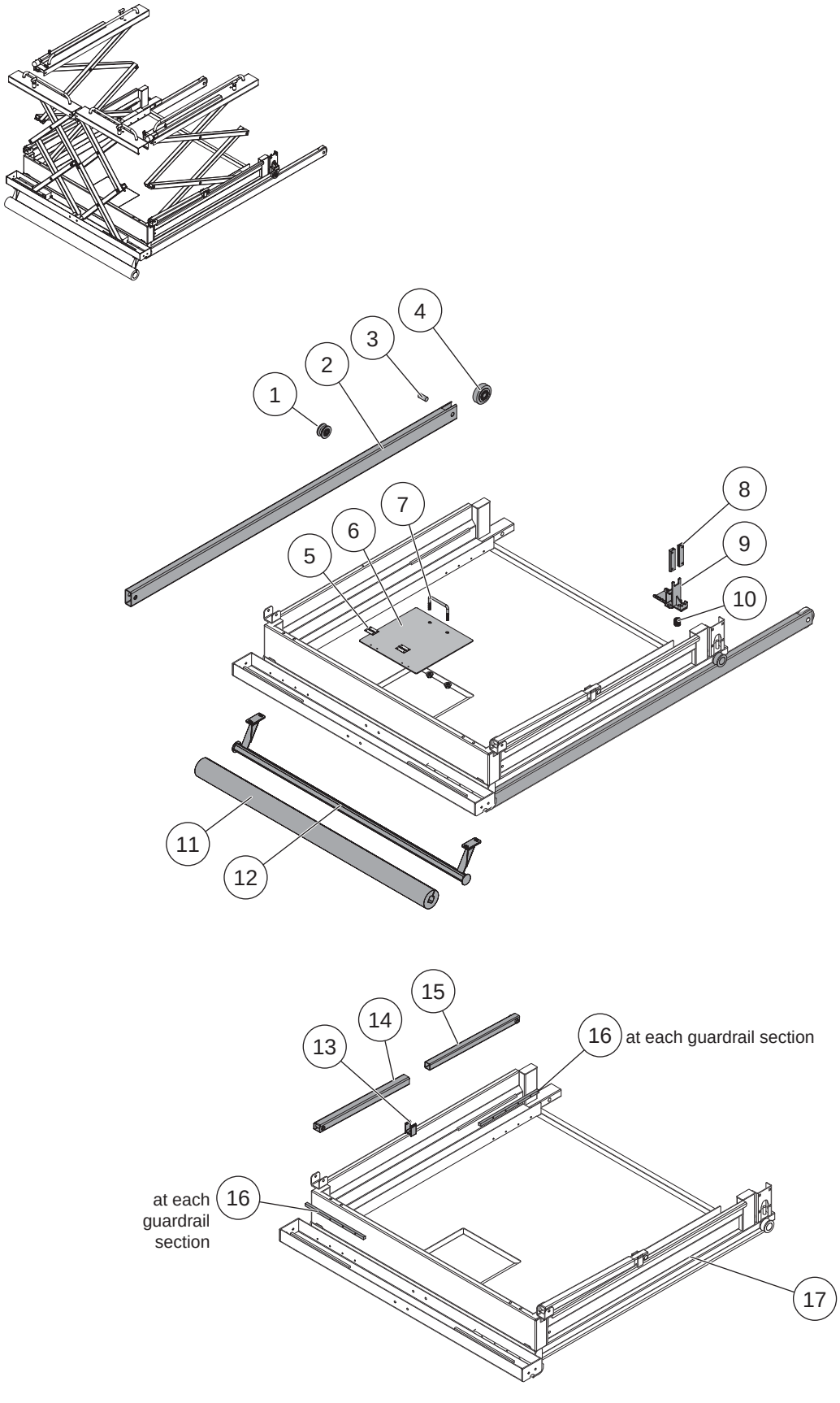


ILLUSTRATION No. ART_4456

4069

OPTION -- GSE Deck Extension, 2 of 2

OPTION -- GSE Deck Extension, 2 of 2

ITEM	PART NO.	QTY	DESCRIPTION
1	87126	2	Roller
2	21480	2	Slide Tube
3	26450	2	Pin
4	87124	2	Roller
5	92213	2	Hinge
6	21561	1	Door
7	93374	1	Square U-Bolt
8	26239	2	Deck Release Guide
9	21564	1	Release Weldment
10	92866	1	Spring
11	21599	1	Foam Bumper
12	21598	1	Bumper Weldment
13	93249	2	Tubing Clip
14	21611	2	Sliding Rail, Outer
15	21613	2	Sliding Rail, Inner
16	21505	4	Wear Pad Guide Rail
17	21541	1	Deck Extension Weldment, without deck plate
--	21583	1	Deck Plate

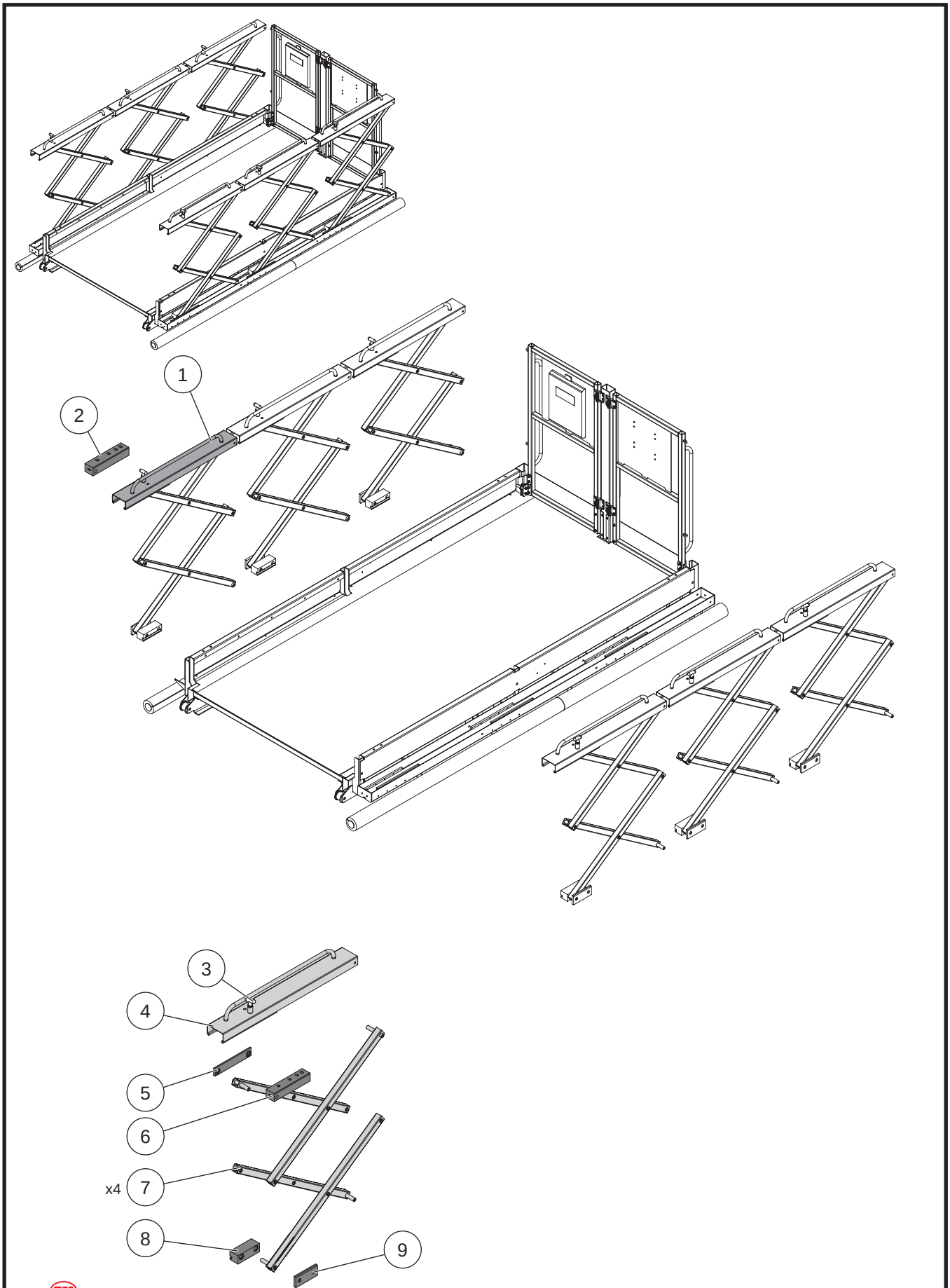


ILLUSTRATION No. ART_4457

4069

OPTION -- GSE Main Platform, 1 of 2

OPTION -- GSE Main Platform, 1 of 2

ITEM	PART NO.	QTY	DESCRIPTION
1	21573	3	Right Side Top Tray
2	21508	3	Wear Pad, Large, Right Side Top
3	93359	6	T-Handle
4	21574	3	Left Side Top Tray
5	21507	6	Wear Pad, Small Top
6	21509	3	Wear Pad, Large, Left Side Top
7	21519	24	Guard Rail Beam
8	21505	6	Wear Pad, Bottom Large
9	21506	6	Wear Pad, Bottom Small

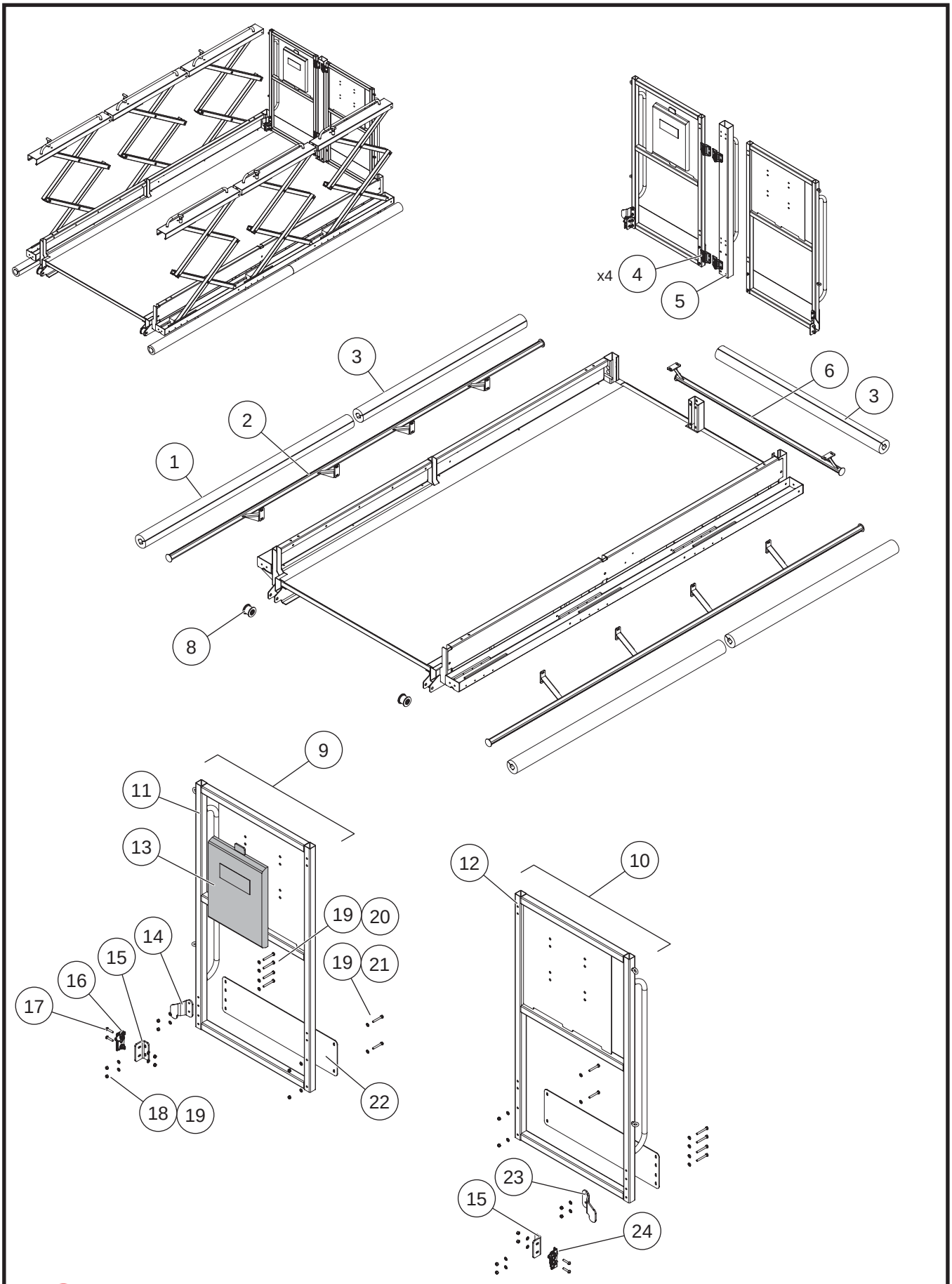


ILLUSTRATION No. ART_4458

4069

OPTION -- GSE Main Platform, 2 of 2

OPTION -- GSE Main Platform, 2 of 2

ITEM	PART NO.	QTY	DESCRIPTION
1	21593	2	Bumper, Long
2	21595	2	Bumper Weldment
3	21599	3	Bumper, Short
4	91888	4	Hinge
5	21594	1	Gate Post
6	21598	1	Bumper Weldment
7	--	--	--
8	87125	2	Roller
9	21587	1	Right Side Gate Assembly
10	21588	1	Left Side Gate Assembly
11	21585	1	Gate Weldment, Right
12	--	--	--
13	8909	1	Manuals Box
14	21580	1	Gate Stopper, Right
15	21579	2	Gate Latch Bracket
16	92302	1	Gate Latch, Right
17	50375	4	Bolt, M6 x 30 Button Head
18	50047	16	Nut, M6 Nylock
19	50000	28	Washer, M6 Std.
20	50262	8	Bolt, M6 x 50
21	50294	4	Bolt, M6 x 45
22	21586	2	Gate Toe Board
23	21589	1	Gate Stopper, Left
24	92251	1	Gate Latch, Left

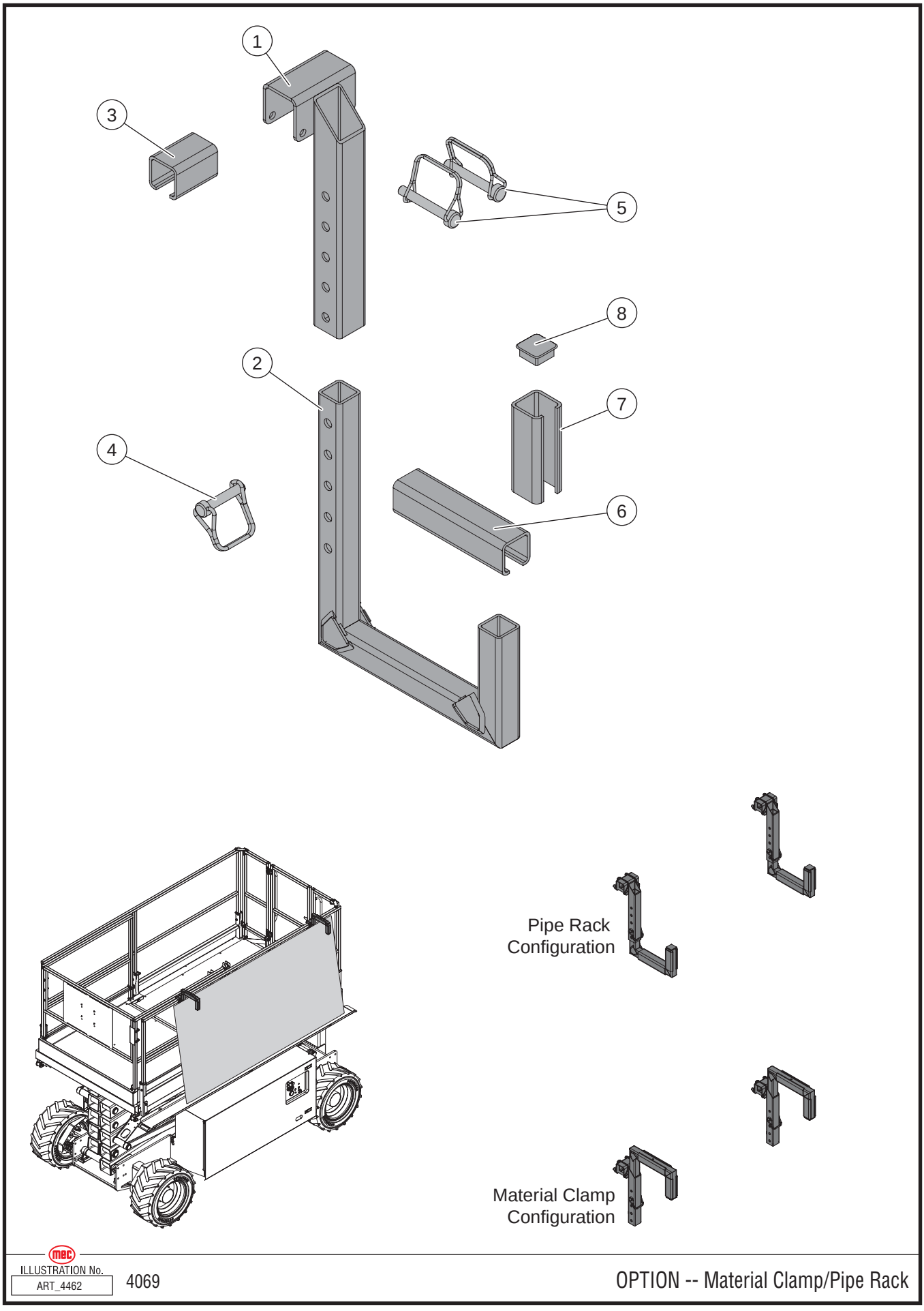


ILLUSTRATION No. ART_4462

4069

OPTION -- Material Clamp/Pipe Rack

OPTION -- Material Clamps/Pipe Racks

NOTE: Material Clamps/Pipe Racks may be used only on the standard platform equipped with the Sheet Material Rack. DO NOT use on the optional GSE platform. See the Operator's Manual for use instructions.

ITEM	PART NO.	QTY	DESCRIPTION
--	26458	--	Material Clamp/ Pipe Rack -- sold in pairs
1	26459	1	Top Weldment
2	26415	1	Sliding Tube Weldment
3	92840	1	Wear Strip
4	50182	1	Spring Clip
5	50401	2	Spring Clip
6	92852	1	Wear Strip
7	92863	1	Wear Strip
8	92942	1	Cap

NOTES:

SECTION C

SCISSOR ASSEMBLY

CONTENTS

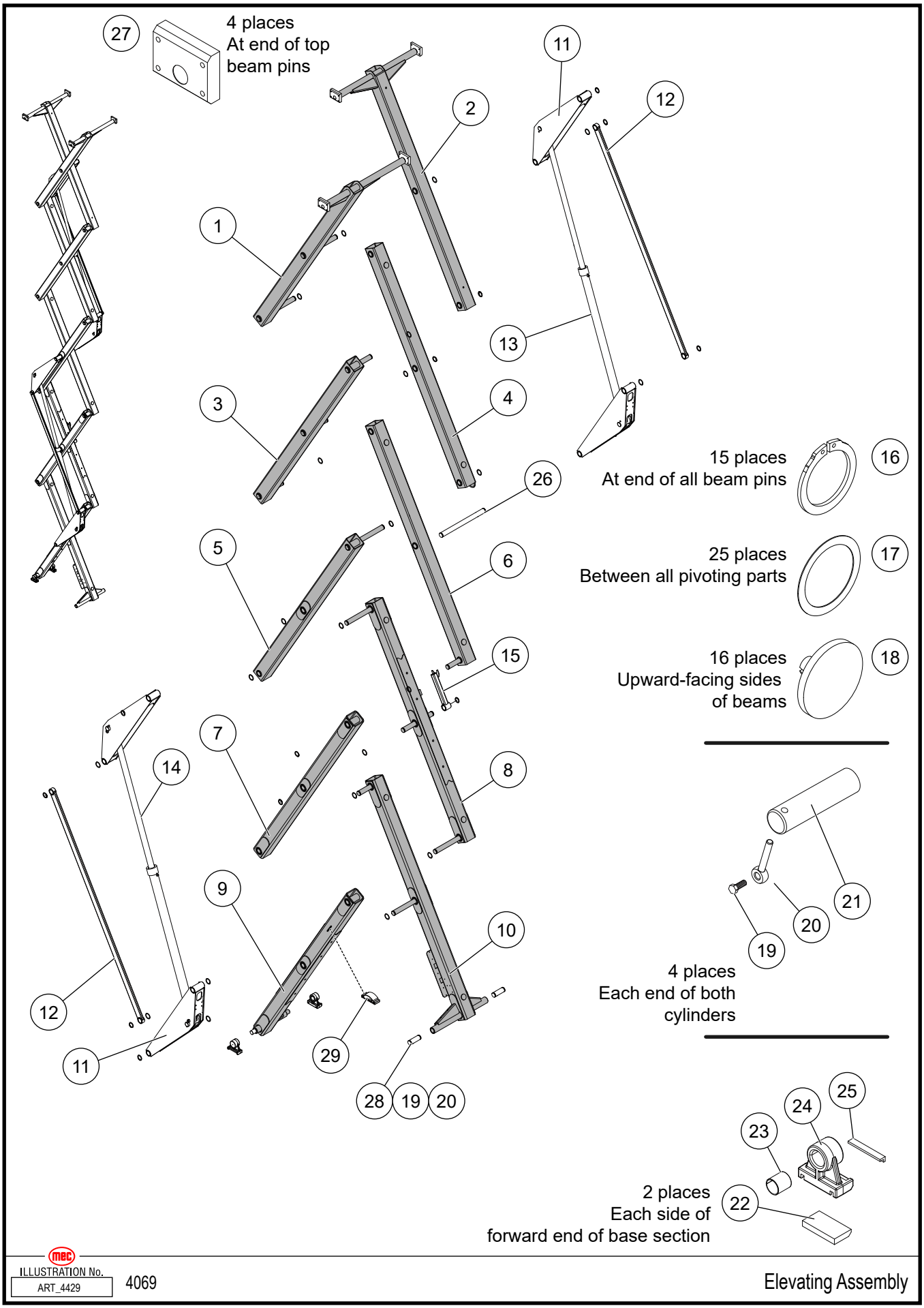


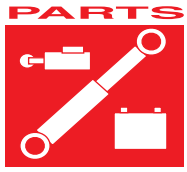
ILLUSTRATION No. ART_4429 4069

Elevating Assembly

Scissor Assembly

ITEM	PART NO.	QTY	DESCRIPTION
1	21420	1	**Standard Machine --** Scissor Beam
	21557	1	**GSE Spec/Centered Platform Machine --** Scissor Beam
2	21421	1	**Standard Machine --** Scissor Beam
	21558	1	**GSE Spec/Centered Platform Machine --** Scissor Beam
3	21419	1	Scissor Beam
4	21418	1	Scissor Beam
5	21416	1	Scissor Beam
6	21417	1	Scissor Beam
7	21414	1	Scissor Beam
8	21415	1	Scissor Beam
9	21413	1	Scissor Beam
10	21412	1	Scissor Beam
11	21422	4	Cylinder Mount Weldment
12	21288	2	Beam Support Weldment
13	REF	1	Upper Lift Cylinder -- See Section E
14	REF	1	Lower Lift Cylinder -- See Section E
15	21467	1	Maintenance Lock
16	6701	15	Retaining Ring
17	HDW13175	25	Washer, Nylon
18	25429	16	Rubber Spacer
19	50236	4	Bolt, M12 x 40
20	18152	4	Pin Retainer
21	21472	4	Cylinder Pin
22	9587	2	Lower Slide Pad
23	7160	2	Bearing
24	40301	2	Slide Casting
25	90235	2	Upper Slide Pad
26	30407	1	Pin
27	26449	4	Platform Block
28	21372	2	Stationary Pin
29	90844	1	Height Sensor (For Overload Sensing, use 2)

NOTES:



SECTION D

WHEEL ASSEMBLIES

CONTENTS PAGE

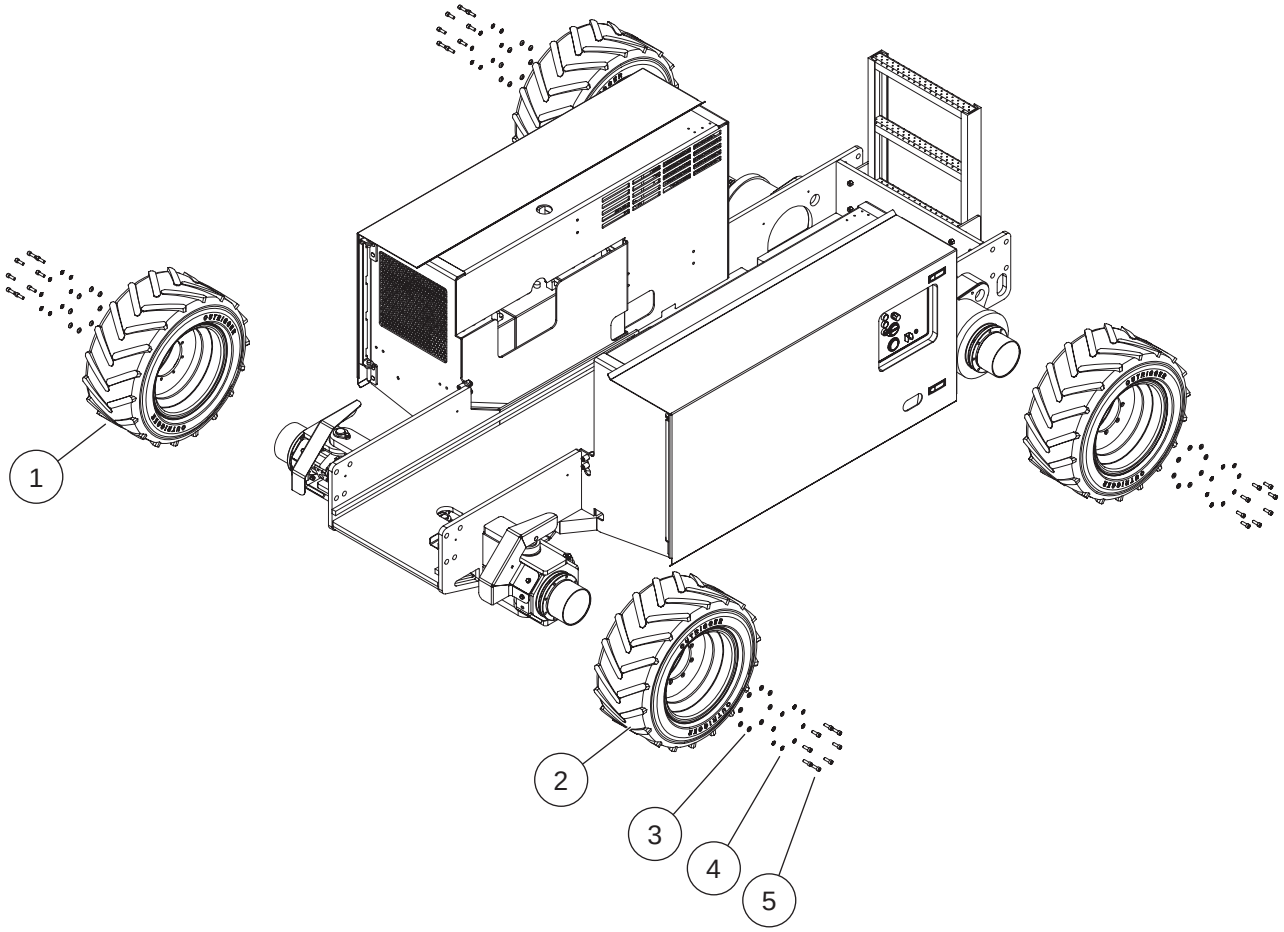
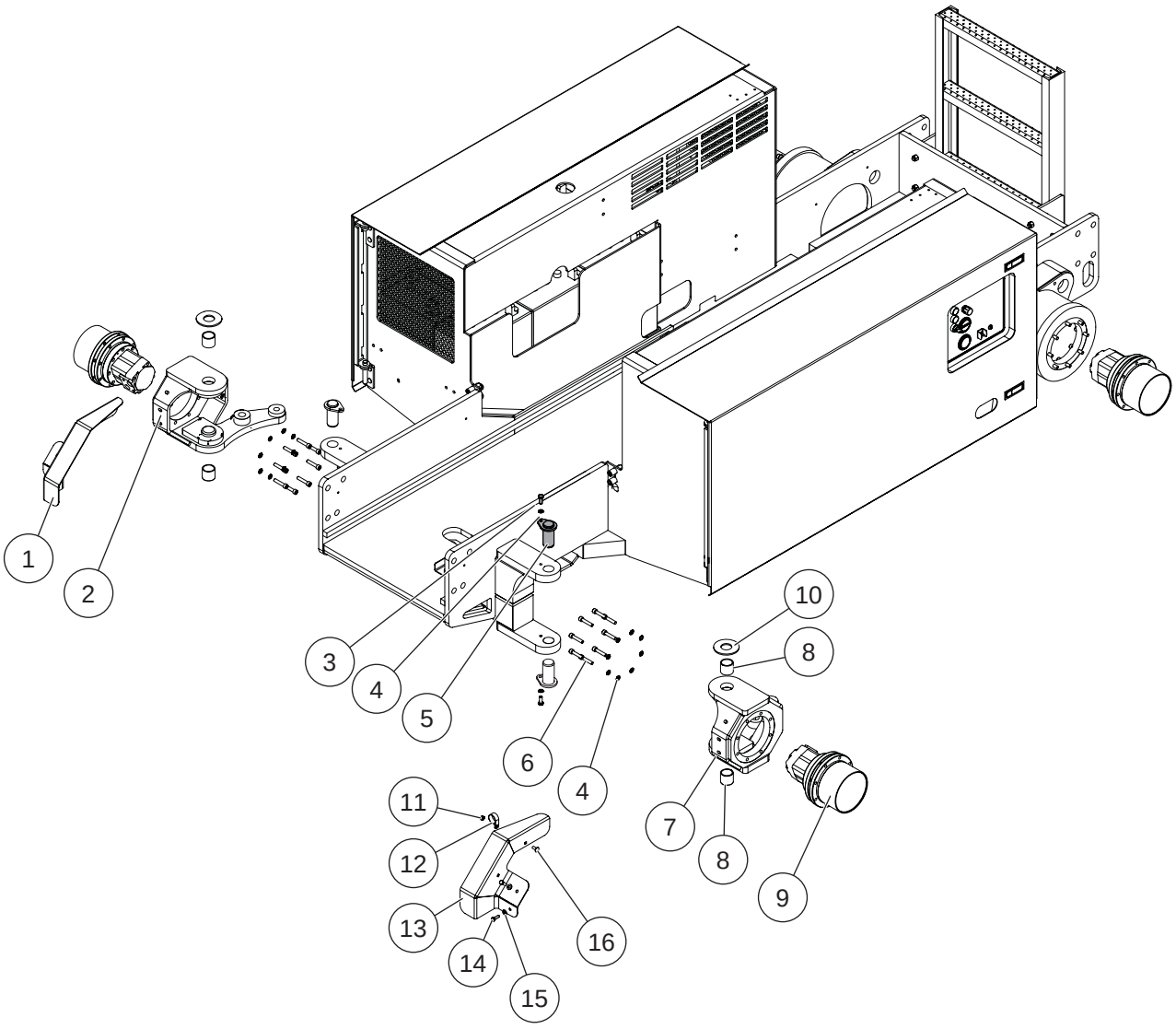


ILLUSTRATION No. ART_4431 4069 Tires/Wheels

Wheels & Hubs

ITEM	PART NO.	QTY	DESCRIPTION
1	21450	2	Right-Side Wheel/Tire Assembly, Pneumatic
	21452	2	Right-Side Wheel/Tire Assembly, Foam-Filled*
	21454	2	Right-Side Wheel/Tire Assembly, Non-Marking, Pneumatic
	21456	2	Right-Side Wheel/Tire Assembly, Non-Marking, Foam-Filled*
2	21451	2	Left-Side Wheel/Tire Assembly, Pneumatic
	21453	2	Left-Side Wheel/Tire Assembly, Foam-Filled*
	21455	2	Left-Side Wheel/Tire Assembly, Non-Marking, Pneumatic
	21457	2	Left-Side Wheel/Tire Assembly, Non-Marking, Foam-Filled*
--	91181	--	Tire Only, Black
--	92803	--	Tire Only, Non-Marking
--	21403	--	Rim Only, 4069
3	92977	32	Washer, Self-Aligning
4	50006	32	Washer, M10 Nordlock
5	50127	32	Lug Bolt, M10 x 30 Socket Head

*USE ONLY FOAM-FILLED FOR CE AND GSE-SPEC MACHINES.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Wheel Motors & Steering Yoke Components

ITEM	PART NO.	QTY	DESCRIPTION
1	21353	1	Hose Guard, Right Side
2	21344	1	Steering Yoke, Right Side
3	50033	4	Bolt, M10 x 25
4	50006	36	Washer, M10 Nordlock
5	26057	4	King Pin Weldment
6	50439	32	Bolt, M10 x 50 Socket Head
7	21345	1	Steering Yoke, Left Side
8	92360	4	Bearing
9	REF	4	Motor/Hub Assembly -- See Section E
10	92341	2	Thrust Washer
11	50048	2	Nut, M8 Nylock
12	92787	2	P-Clamp
13	21354	1	Hose Guard, Left Side
14	50031	4	Bolt, M8 x 25
15	50001	4	Washer, M8 Std
16	50025	2	Bolt, M8 Carriage

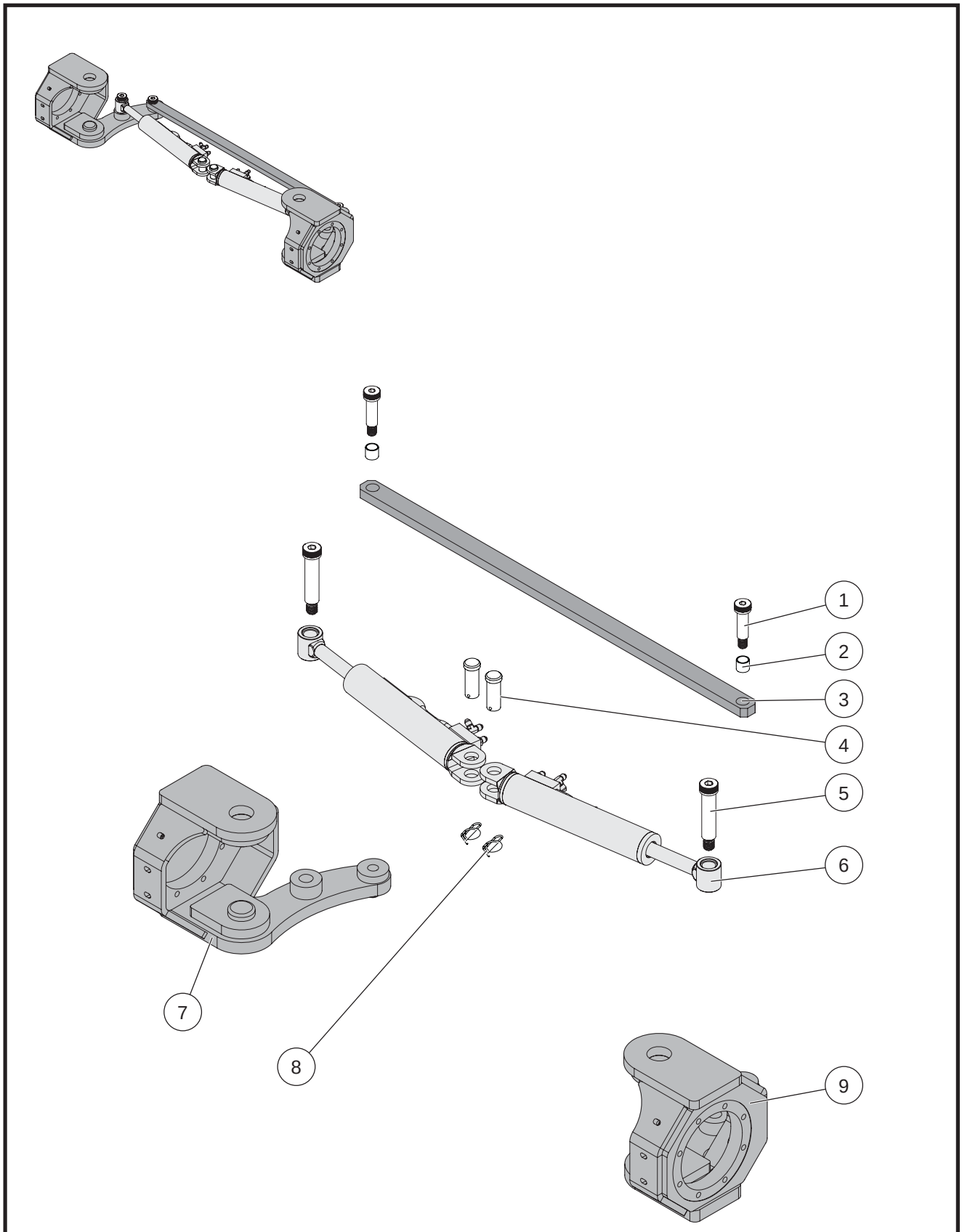


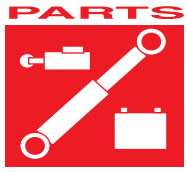
ILLUSTRATION No. ART_4430 4069

Steering Components

Steering Components

ITEM	PART NO.	QTY	DESCRIPTION
1	50433	2	Shoulder Bolt, M16 Thread Socket Head, M20 x 60 Shoulder
2	93044	2	Bronze Bearing
3	21337	1	Tie Rod
4	17491	2	Clevis Pin
5		2	Shoulder Bolt, 3/4" thread, 1 x 4 shoulder
6	REF	2	Steering Cylinder Assembly -- See Section E
7	21344	1	Steering Yoke, Right Side
8	17492	2	Pin Clip
9	21345	1	Steering Yoke, Left Side

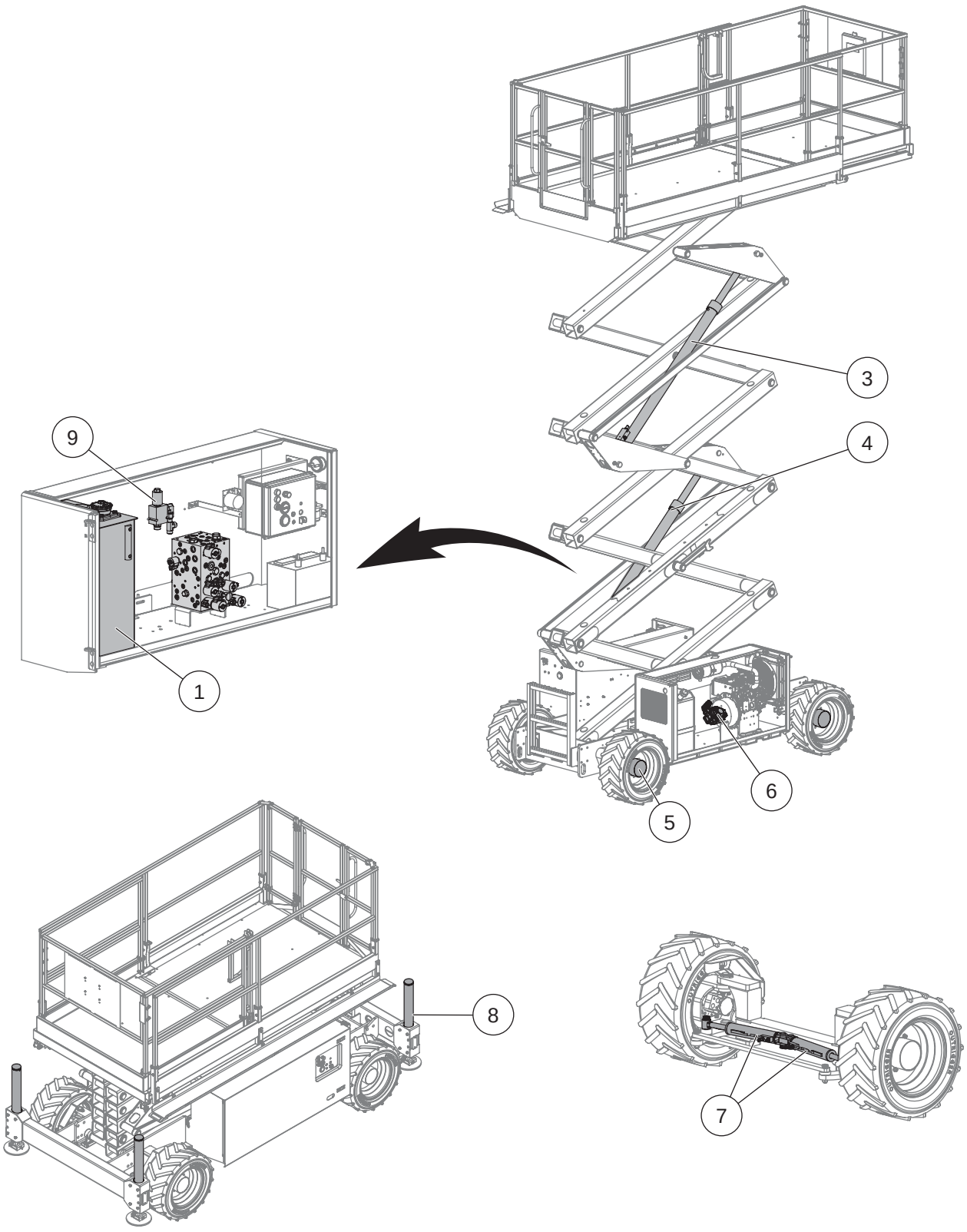
NOTES:



SECTION E

HYDRAULICS

CONTENTS PAGE



Machines equipped with optional Outriggers

ILLUSTRATION No. ART_4463

4069RT

Hydraulic Components

Hydraulic Components

ITEM	PART NO.	QTY	DESCRIPTION
1	89013	1	Hydraulic Reservoir
2	93145	1	Functions Manifold
3	21273	1	Upper Lift Cylinder
4	21272	1	Lower Lift Cylinder
5	93392	4	Wheel Motor/Brake Unit
6	91160	1	Hydraulic Pump
7	21398	2	Steer Cylinder
8	93031	4	Option -- Outrigger Cylinder
9	93280	1	Proportional Valve

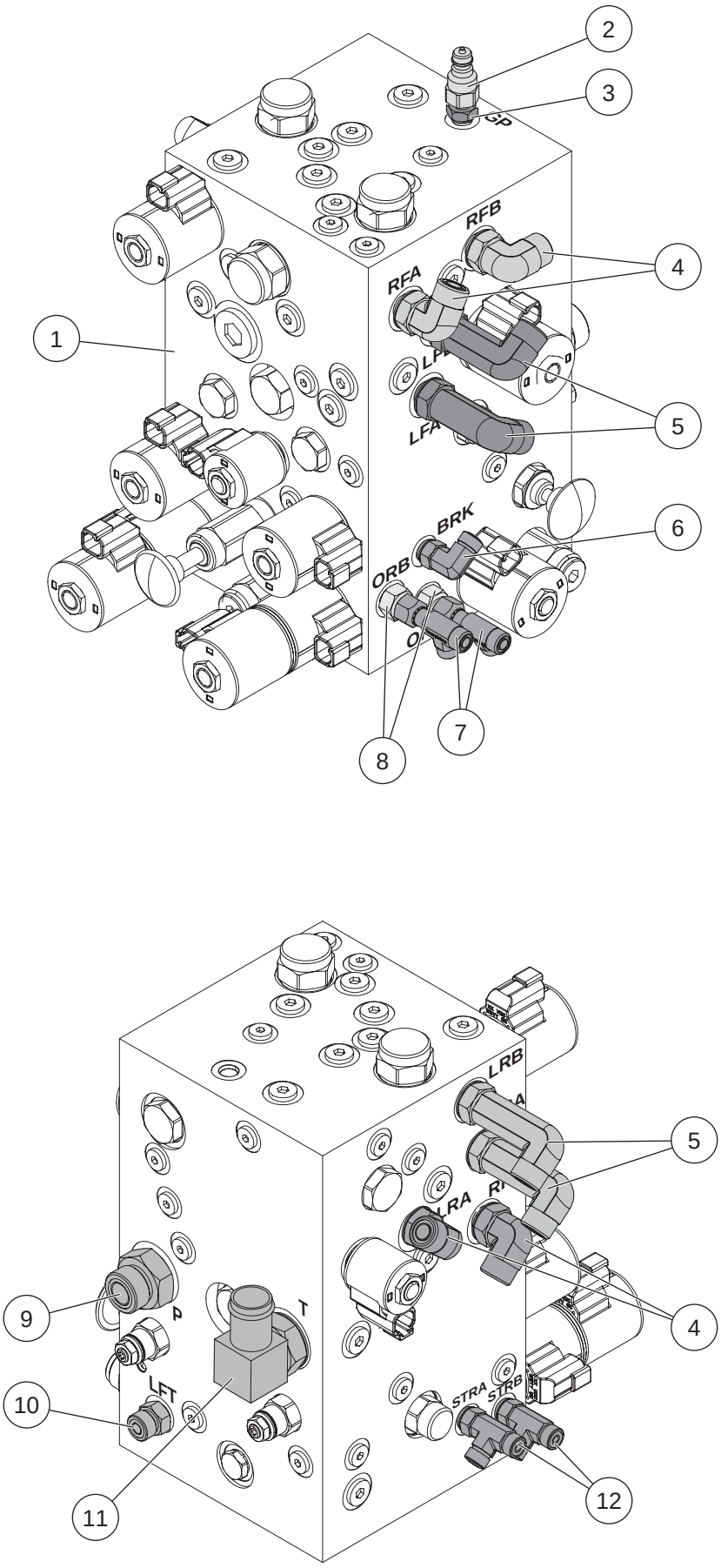


ILLUSTRATION No. ART_4476 4069

Functions Manifold, 1 of 2

Functions Manifold, 1 of 2

ITEM	PART NO.	QTY	DESCRIPTION
1	93145	1	Functions Manifold Assembly, without fittings
2	HDW7971	1	Fitting, Male Disconnect 1/4npt
3	50950	1	Fitting, MB-MP-4-4
4	50850	4	Fitting, MB-MFFOR90-8-8
5	50853	4	Fitting, MB-MFFOR90LL-8-8
6	50673	1	Fitting, MB-MFFOR90-4-4
7	50809	2	Fitting, MFFOR-MFFOR-FFORX-4
8	50832	2	Fitting, MB-MFFOR-6-4
9	50838	1	Fitting, MB-MFFOR-12-8
10	50835	1	Fitting, MB-MFFOR-6-6
11	51004	1	Fitting, MB-HB90-12-16
12	50858	2	Fitting, MB-MFFOR-MFFORT-4

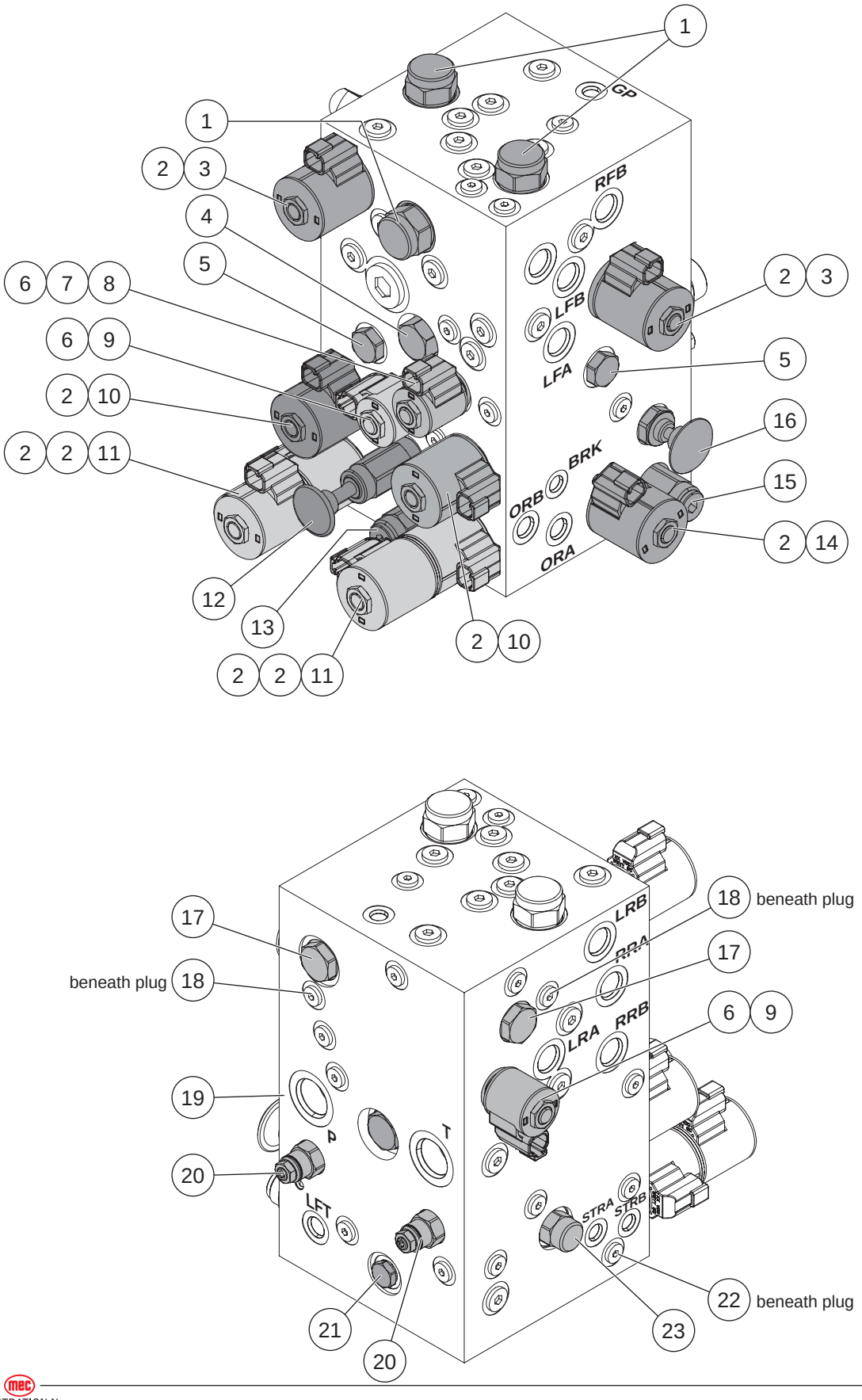


ILLUSTRATION No. ART_4478 4069

Functions Manifold, 2 of 2

Functions Manifold, 2 of 2

ITEM	PART NO.	QTY	DESCRIPTION
--	93145	--	Functions Manifold Assembly, without fittings
1	91151	3	Pilot-Operated Valve
2	91143	9	Coil
3	93502	2	Solenoid Valve, Rear Wheel Bypass
4	91152	2	Pilot-Operated Valve
5	91477	2	Check Valve
6	92173	3	Coil
7	91464	1	Solenoid Valve, Rear Wheel Bypass
8	93501	1	Orifice Disc, .060
9	91147	2	Solenoid Valve, High Torque/High Speed
10	93496	2	Solenoid Valve, Drive
11	91008	2	Solenoid Valve, Outrigger & Steering Directional
12	91015	1	Hand Pump
13	93497	1	Relief Valve
14	91145	1	Solenoid Valve, Lift
15	91009	1	Relief Valve
16	91012	1	Manual Brake Release Valve
17	93494	2	Flow Divider
18	93500	2	Orifice Plug, .025
19	93493	1	Check Valve
20	93503	2	Counterbalance Valve
21	93499	1	Shuttle Valve
22	93495	1	Orifice Plug, .063
23	93498	1	Flow Regulator

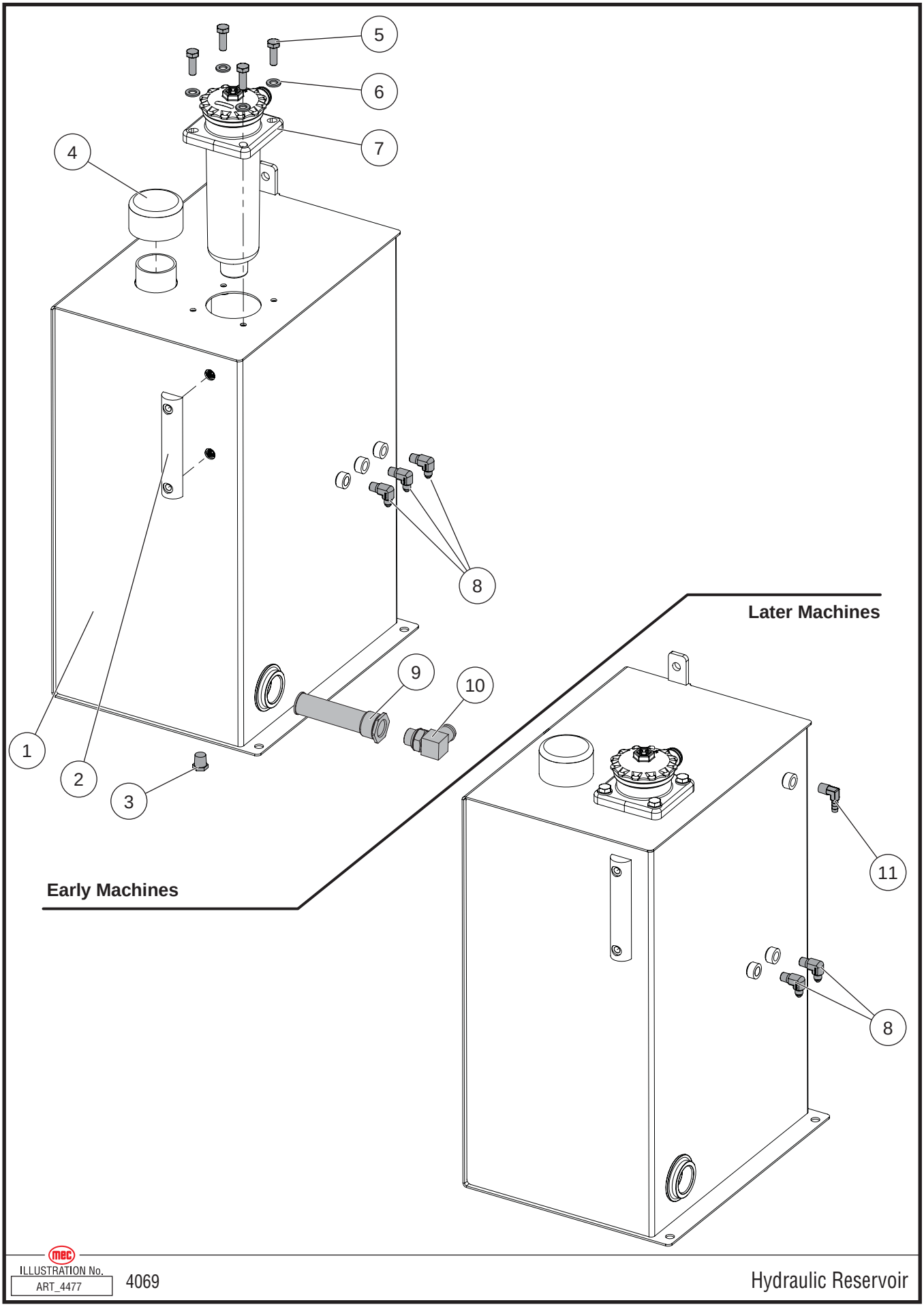


ILLUSTRATION No. ART_4477 4069

Hydraulic Reservoir

Hydraulic Reservoir

ITEM	PART NO.	QTY	DESCRIPTION
--	89013	--	Hydraulic Reservoir, Complete as shown
1	21355	1	Tank Weldment
2	9370	1	Sight Gauge
3	51006	1	Plug, 3/8 NPT
4	92335	1	Cap
5	50034	4	Bolt, M10 x 30
6	50002	4	Washer, M10 std.
7	92565	1	Filter Assembly
--	92924	--	Filter Element
8	50664	3	**Early Machines --**Fitting, MP-MJ-4-4
		2	**Later Machines --** Fitting, MP-MJ-4-4
9	92569	1	Suction Strainer
10	51004	1	Fitting, MB-HB90-12-16
11	HDW6727	1	Fitting, 1/4 NPT, 5/16 Barb

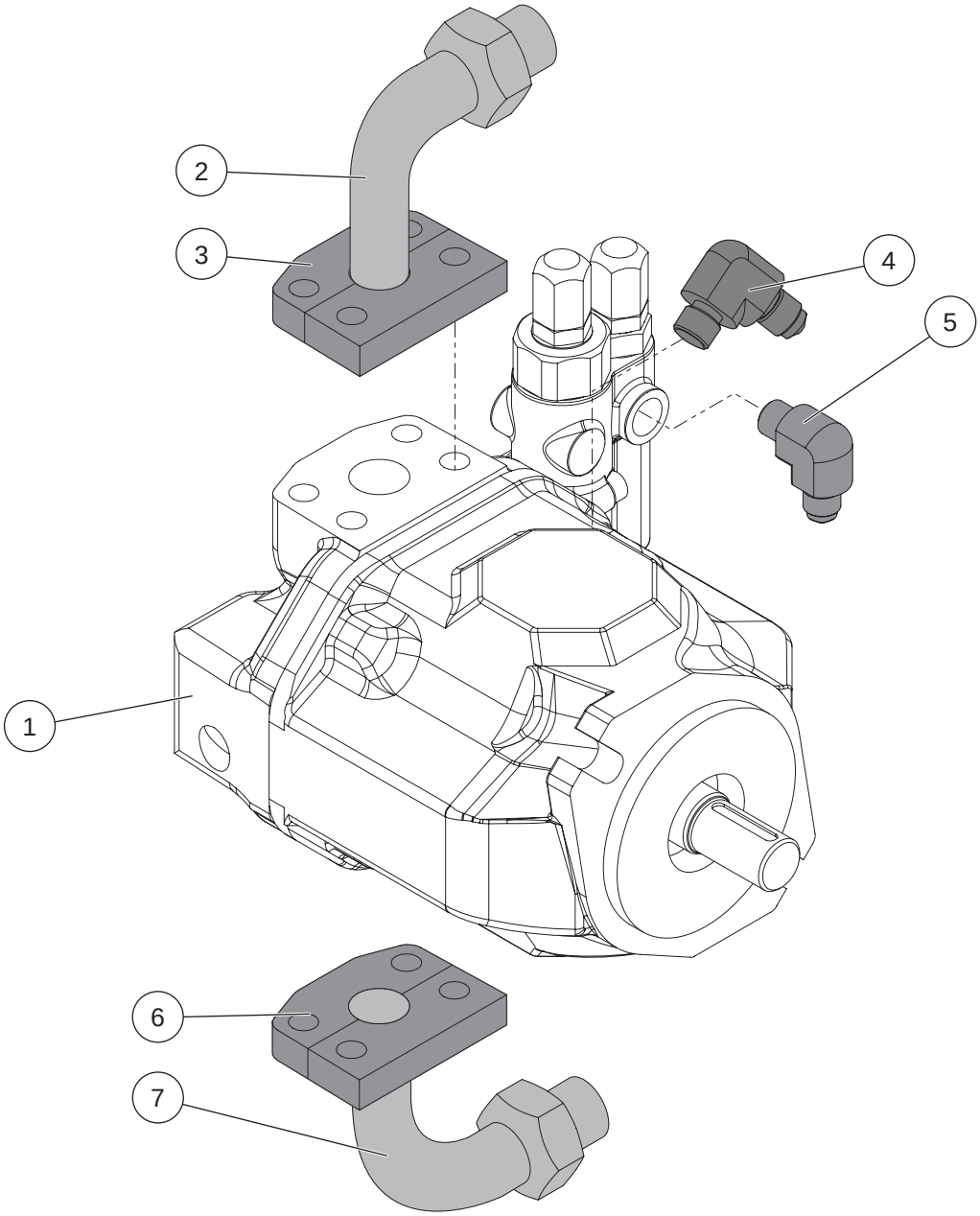


ILLUSTRATION No.
ART_4479

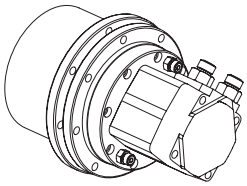
4069RT

Hydraulic Pump

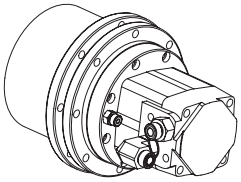
Hydraulic Pump

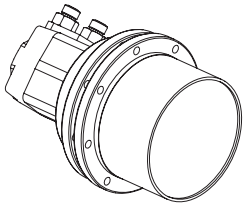
ITEM	PART NO.	QTY	DESCRIPTION
1	91160	1	Hydraulic Pump
2	91163	2	Pressure Fitting, FL-MJ90-12-12
3	91162	1	Flange Kit, Pressure (includes bolts)
4	50790	1	Fitting, MB-MJ90-6-6
5	50665	1	Fitting, MB-MJ90-4-4
6	91161	1	Flange Kit, Suction (includes bolts)
7	51012	1	Suction Fitting, FL-MJ90-16-16

Right Rear

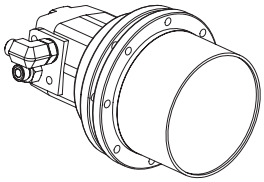


Right Front

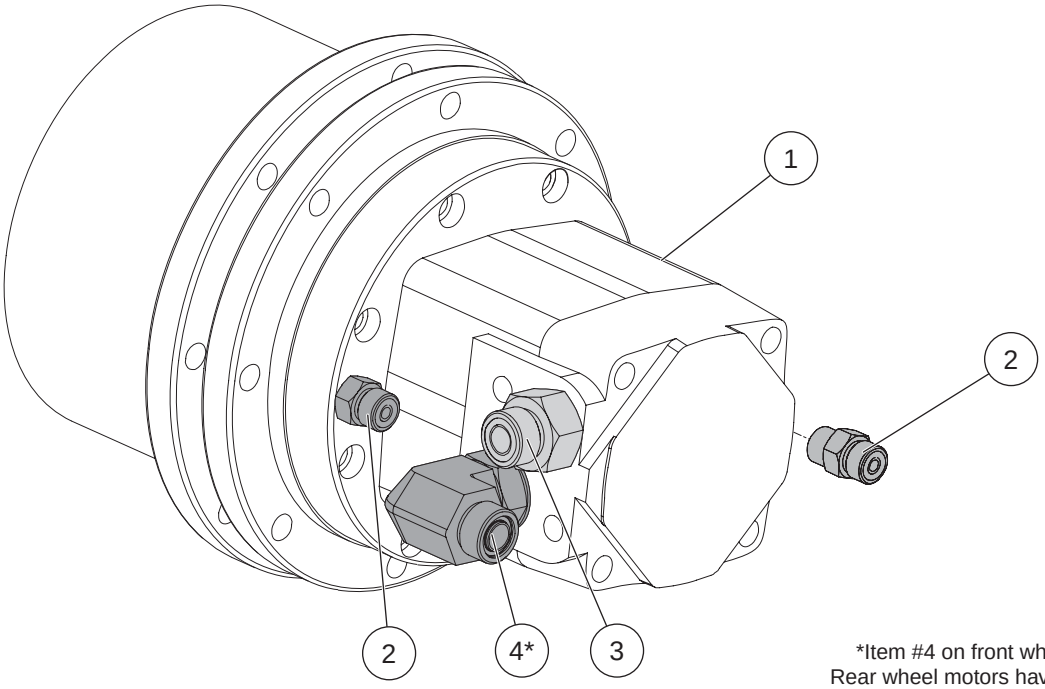




Left Rear



Left Front



*Item #4 on front wheel motors only.
Rear wheel motors have two of Item #3

ILLUSTRATION No.
ART_4475

4069

Wheel Motor/Brake Units

Wheel Motor/Brake Unit

ITEM	PART NO.	QTY	DESCRIPTION
1	93392	4	Wheel Motor/Brake Unit
2	51118	4	Fitting, MFFOR-MBSPP-04-02
3	50837	6	Fitting, MB-MFFOR-10-8
4	50980	2	Fitting, MB-MFFOR90-10-8

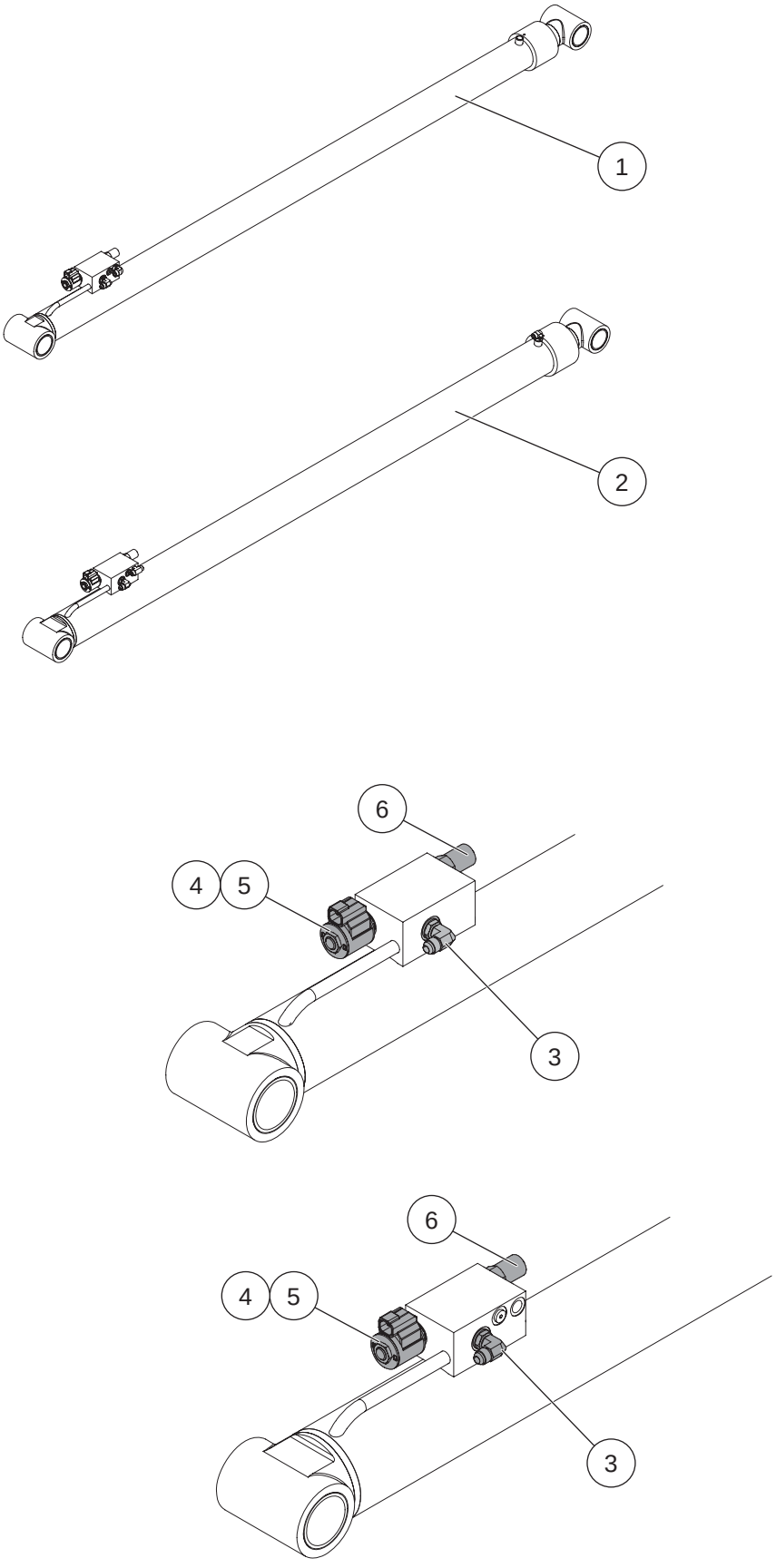


ILLUSTRATION No.
ART_4473

4069

Lift Cylinders

Lift Cylinders -- Old Style

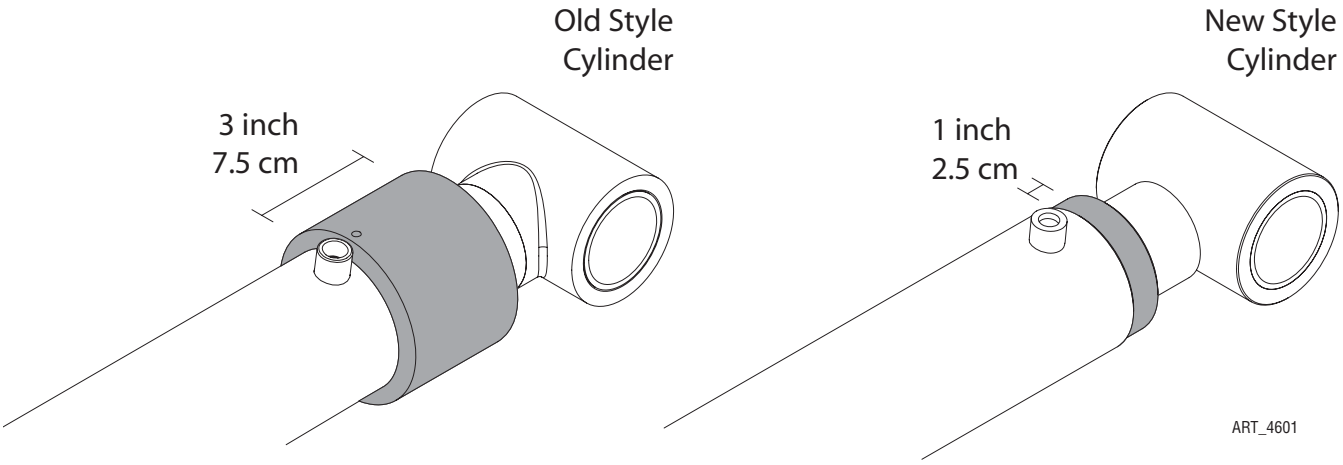
ITEM	PART NO.	QTY	DESCRIPTION
1	21273	1	Upper Lift Cylinder -- Old Style
--	93613	--	Seal Kit
2	21272	1	Lower Lift Cylinder -- Old Style
--	93614	--	Seal Kit
3	50790	2	Fitting, MB-MJ90-6-6
4	91464	2	Valve
5	93615	2	Coil
6	90969	2	Valve, Relief

Lift Cylinders -- New Style

1	93519	1	Upper Lift Cylinder -- New Style
--	93642	--	Seal Kit
2	93518	1	Lower Lift Cylinder -- New Style
--	93643	--	Seal Kit
3	50790	2	Fitting, MB-MJ90-6-6
4	91464	2	Valve
5	93615	2	Coil
6	90969	2	Valve, Relief

Examine the collar at the rod end of the cylinder to determine whether your machine is equipped with Old Style or New Style cylinders

- Old Style cylinders have a 3-inch (7.5 cm) collar.
- New Style cylinders have a 1-inch (2.5 cm) collar.



IMPORTANT -- Both cylinders must be changed out if an Old Style cylinder requires replacement. DO NOT pair a New Style cylinder with and Old Style cylinder.

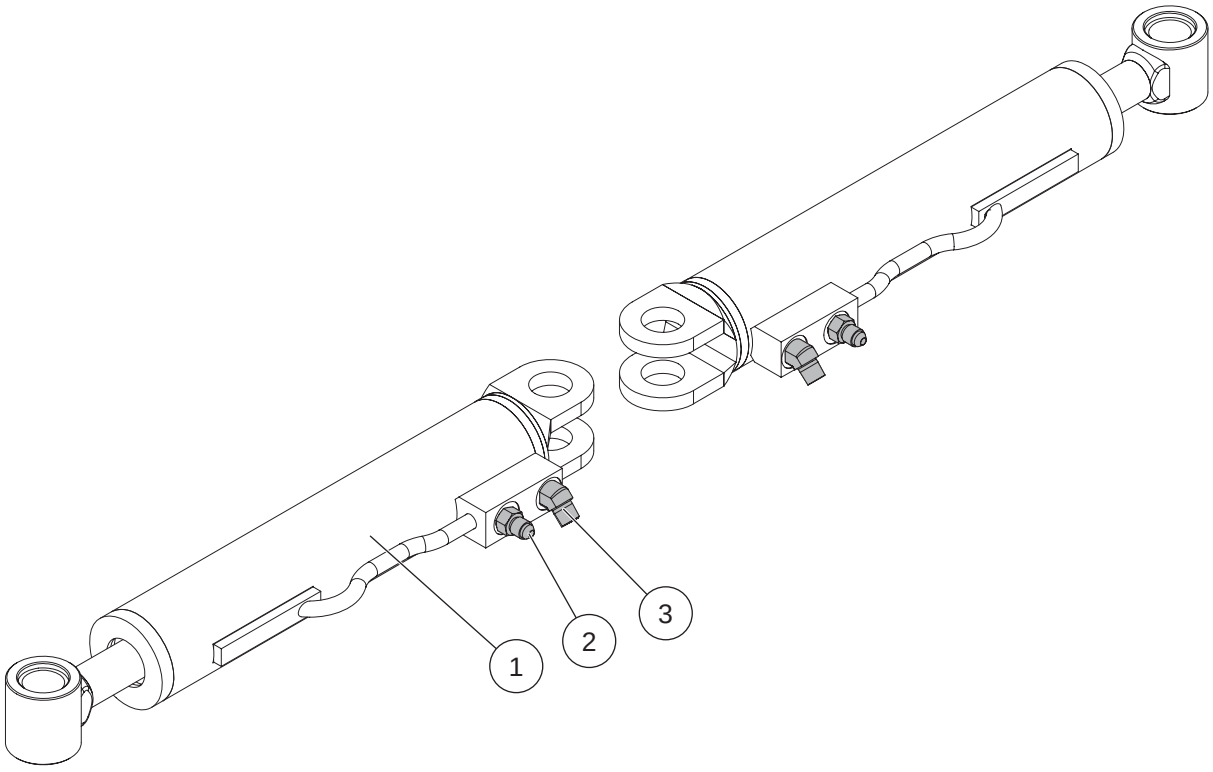


ILLUSTRATION No.
ART_4472

4069

Steer Cylinders

Steer Cylinders

ITEM	PART NO.	QTY	DESCRIPTION
1	21398	2	Steer Cylinder
--	93616	--	Seal Kit
2	50831	2	Fitting, MB-MFFOR-4-4
3	50675	2	Fitting, MB-MFFOR45-4-4

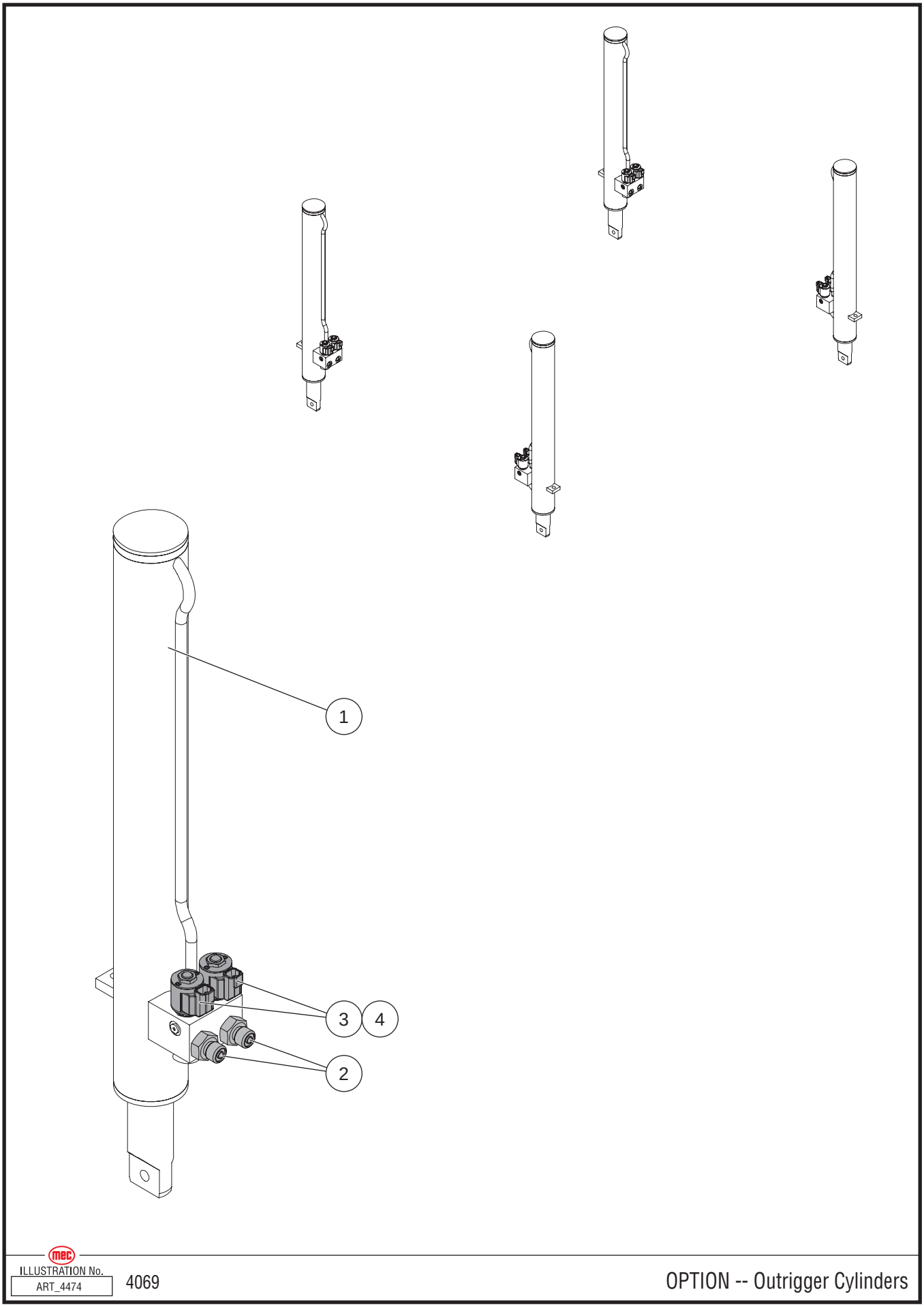


ILLUSTRATION No. ART_4474 4069

OPTION -- Outrigger Cylinders

OPTION -- Outrigger Cylinders

ITEM	PART NO.	QTY	DESCRIPTION
1	93031	4	Outrigger Cylinder
--	93617	--	Seal Kit
2	50832	8	MB-MFFORT-6-4
3	91464	8	Valve
4	93615	8	Coil

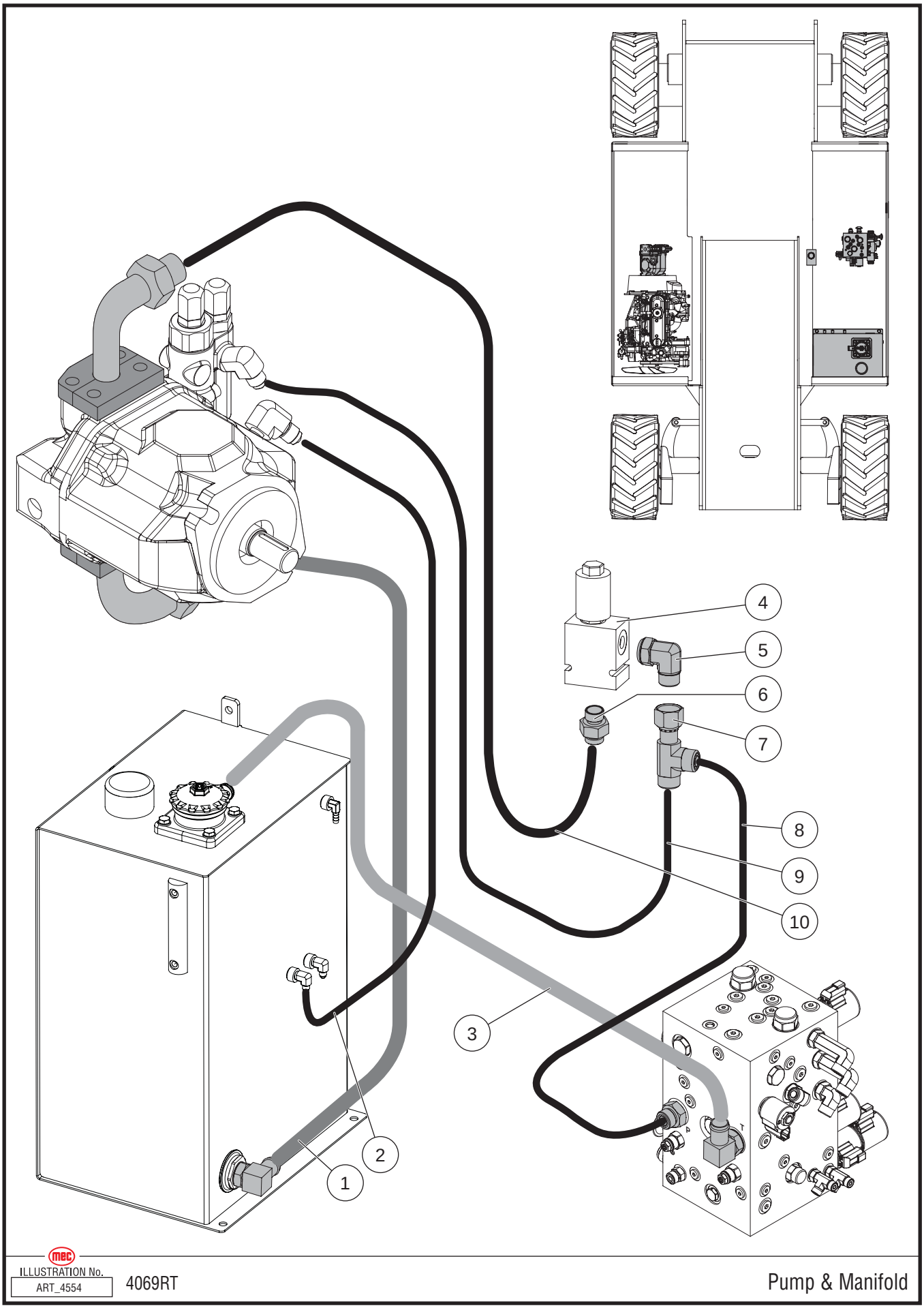


ILLUSTRATION No.
ART_4554

4069RT

Pump & Manifold

Hoses -- Pump & Manifold

ITEM	PART NUMBER	QTY.	DESCRIPTION	HOSE NAME
1	52484	1	Hose, 1” Premoflex x 75	S
2	52477	1	Hose Assy, 1/4 x 82 inch, 04G-04FFORX-04G-04FFORX90S	PP-CD
3	52483	1	Hose, 1” Premoflex x 44	MF-T-R
4	93280	1	Proportional Valve Manifold including Valve & Coil	
--	93618	--	Proportional Valve & Coil	
5	50980	1	Fitting, MB-MFFOR90-10-08	
6	50837	1	Fitting, MFFOR-MB-8-10	
7	50811	1	Fitting, MFFOR-FFORX-MFFOR-8	
8	52476	1	Hose Assy, 1/2 x 18 inch, 08G-08FFORX -08G-08FFORX90L	PV-MMP
9	52478	1	Hose Assy, 1/4 x 60 inch, 04G-04FFORX-04G-06FFORX	LS
10	52475	1	Hose Assy, 1/2 x 64 inch, 08G-08FFORX -08G-12FJX90S	PP-PV

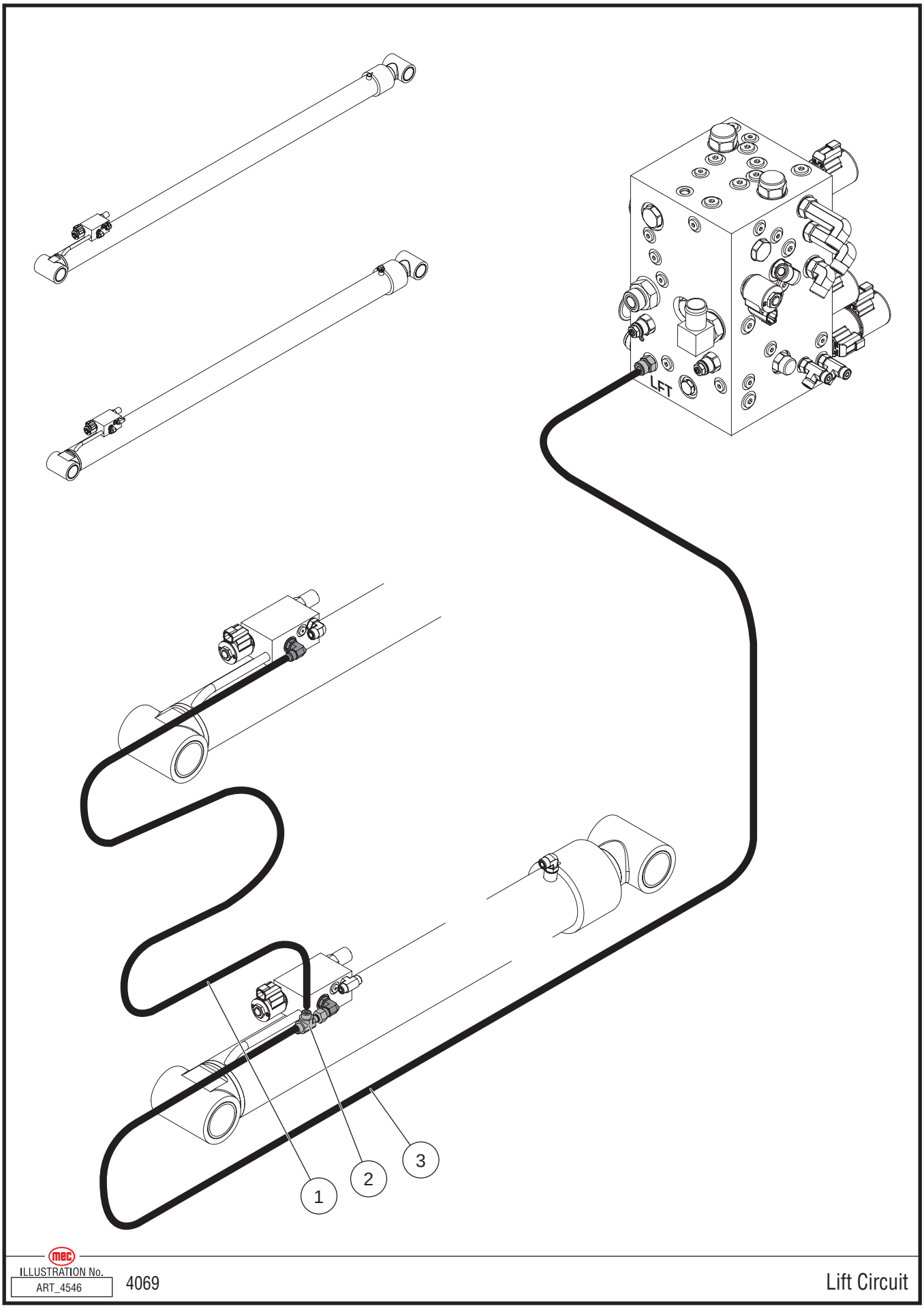


ILLUSTRATION No. ART_4546 4069 Lift Circuit

Hoses -- Lift Circuit

ITEM	PART NUMBER	QTY.	DESCRIPTION	HOSE NAME
1	52450	1	Hose Assy, 3/8 x 26'9" inch, 06G-06FJX - 06G-06FJX90	UPPER LIFT
2	50902	1	Fitting, MJ-MJ-FXT-6	
3	52451	1	Hose Assy, 3/8 x 161.5" inch, 06G-06FJX -06G-06FFORX90L	LWR LIFT

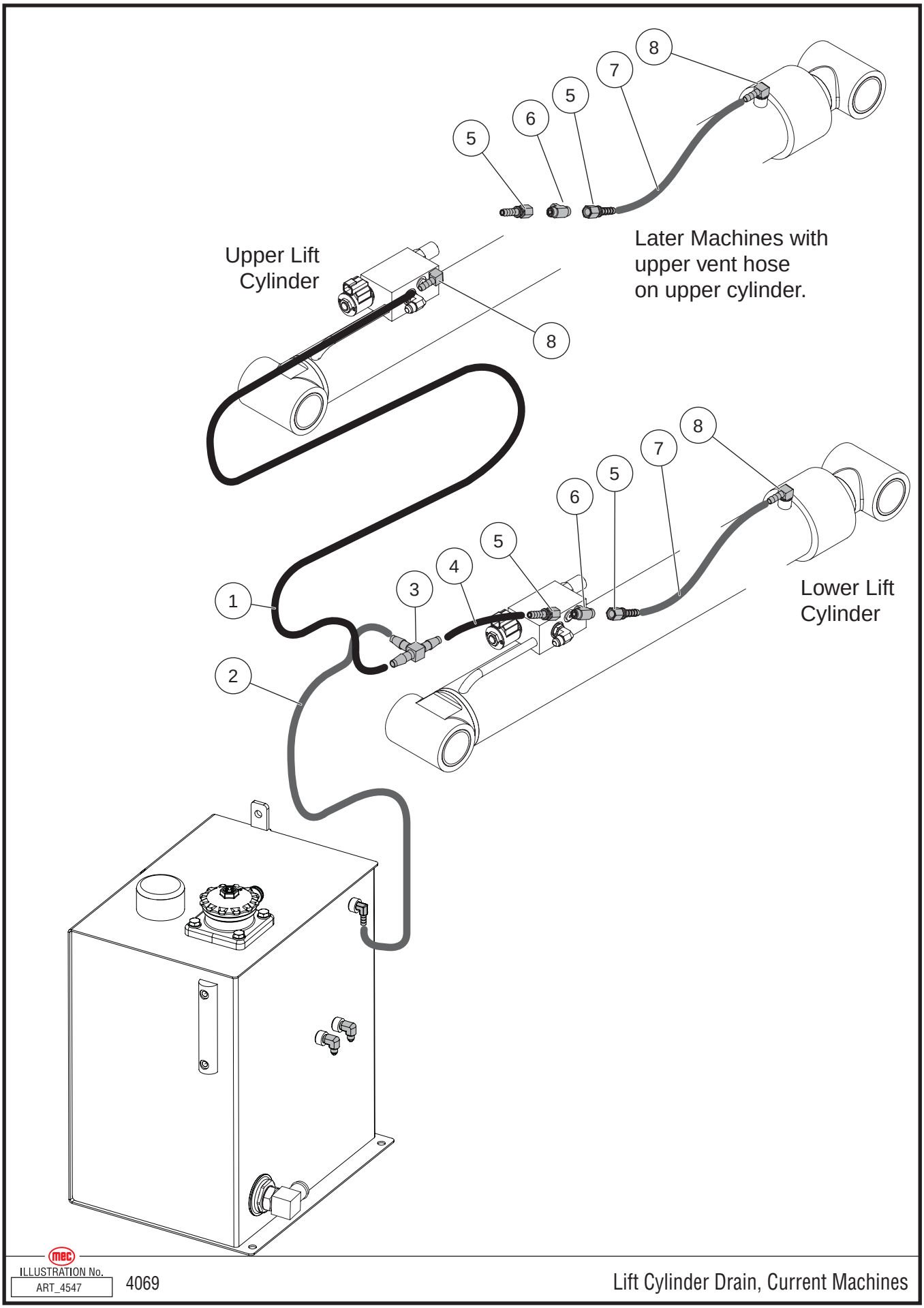


ILLUSTRATION No. ART_4547 4069

Lift Cylinder Drain, Current Machines

Hoses -- Lift Cylinder Drain, Current Machines

ITEM	PART NUMBER	QTY.	DESCRIPTION
1	50959	as req	Hose, 5/16” Fuel Line
2	50959	as req	Hose, 5/16” Fuel Line
3	HDW91249	1	Fitting, 5/16” Barbed Tee
4	50959	as req	Hose, 5/16” Fuel Line
5	HDW90945	2/4	Fitting, 5/16” Nipple
6	50905	1/2	Fitting, MJ-MJ-MPT-5-5-4
7	50959	as req	Hose, 5/16” Fuel Line
8	HDW6727	2	Fitting, 5/16 Barbed 90

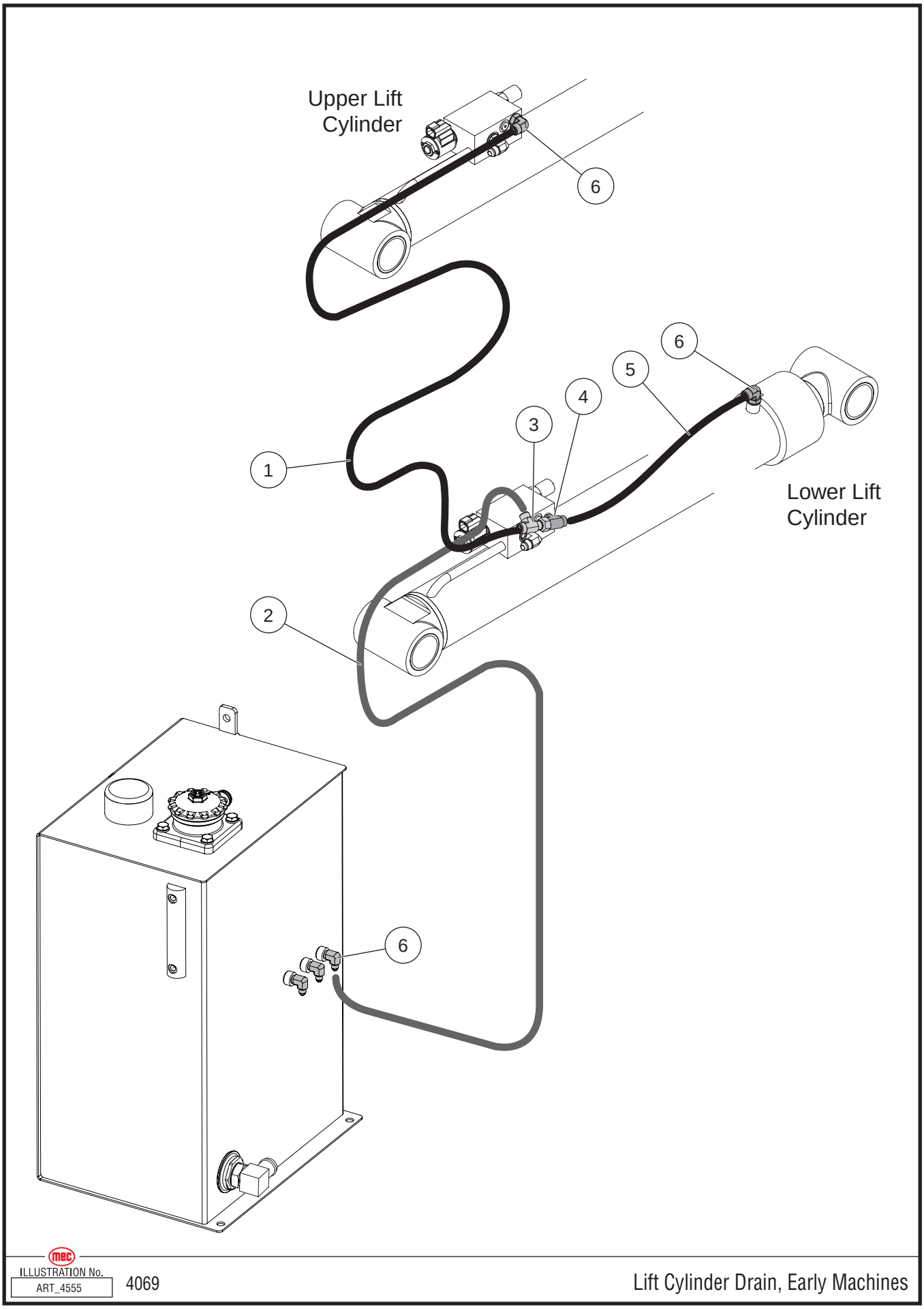


ILLUSTRATION No. ART_4555 4069

Lift Cylinder Drain, Early Machines

Hoses -- Lift Cylinder Drain, Early Machines

ITEM	PART NUMBER	QTY.	DESCRIPTION	HOSE NAME
1	52479	1	Hose Assy, 04G-04FJX-04G-04FJX, 322 inches	UPPER VENT
2	52481	1	Hose Assy, 04G-04FJX-04G-04FFORX90S, 198 inches	LOWER VENT
3	50892	1	Fitting, MJ-FJX-MJT-4-4-4	
4	51130	1	Fitting, MJ-MJ-MPT-4-4-4	
5	52480	1	Hose Assy, 04G-04FJX- 04G-04FJX45, 49.5 inches	JUMP VENT
6	50664	3	Fitting, MJ-MP90-4-4	

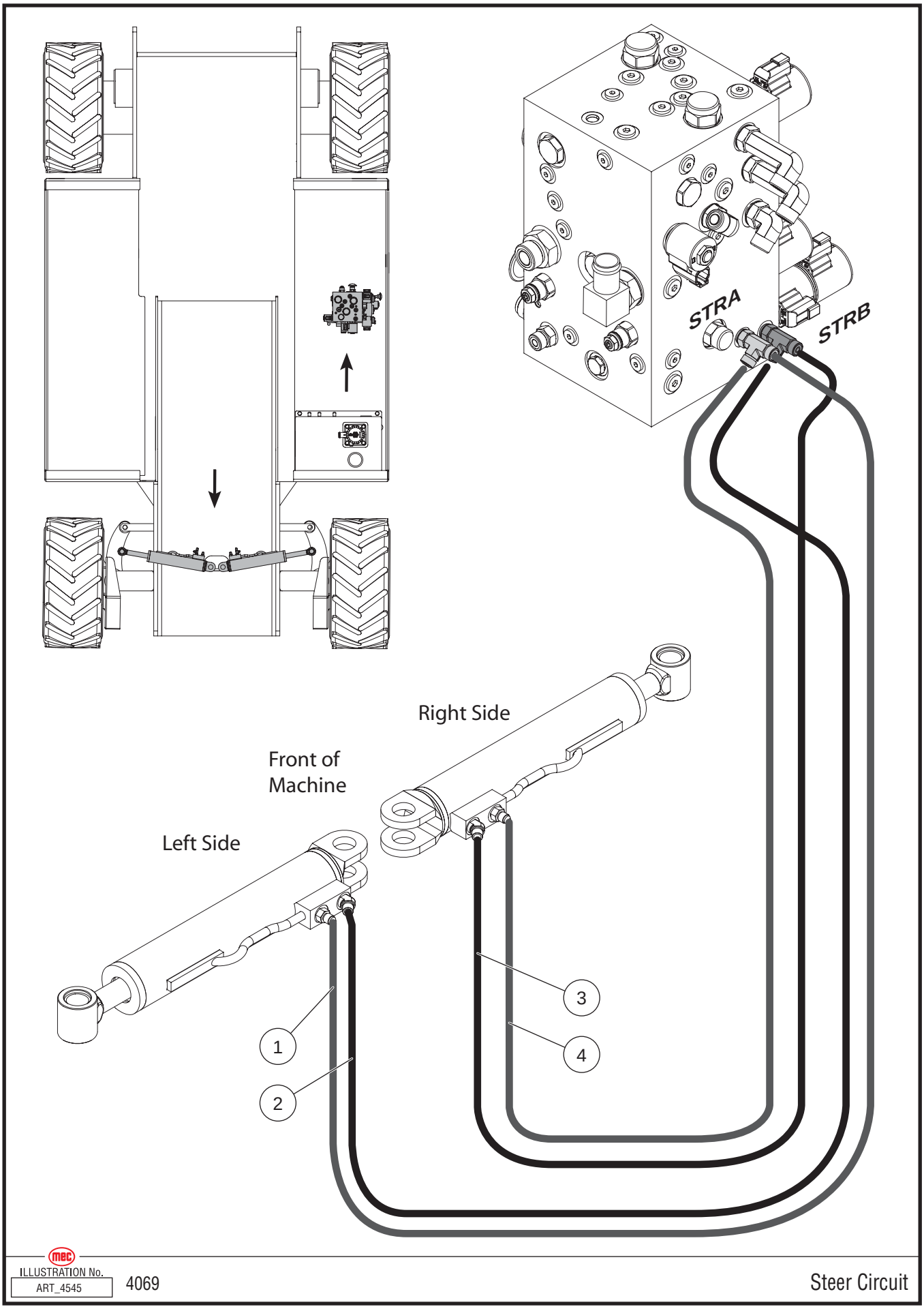


ILLUSTRATION No. ART_4545 4069

Steer Circuit

Hoses -- Steer Circuit

ITEM	PART NUMBER	QTY.	DESCRIPTION	HOSE NAME
1	52466	1	Hose Assy, 1/4 x 61.5 inch, 04G-04FFORX-04G-04FFORX90S	STL A
2	52460	1	Hose Assy, 1/4 x 60.5 inch, 04G-04FFORX-4G-4FFORX 45	STL B
3	52467	1	Hose Assy, 1/4 x 67 inch, 04G-04FFORX-04G-04FFORX90S	STR-B
4	52459	1	Hose Assy, 1/4 x 67.25 inch, 04G-04FFORX-4G-4FFORX 45	STR A

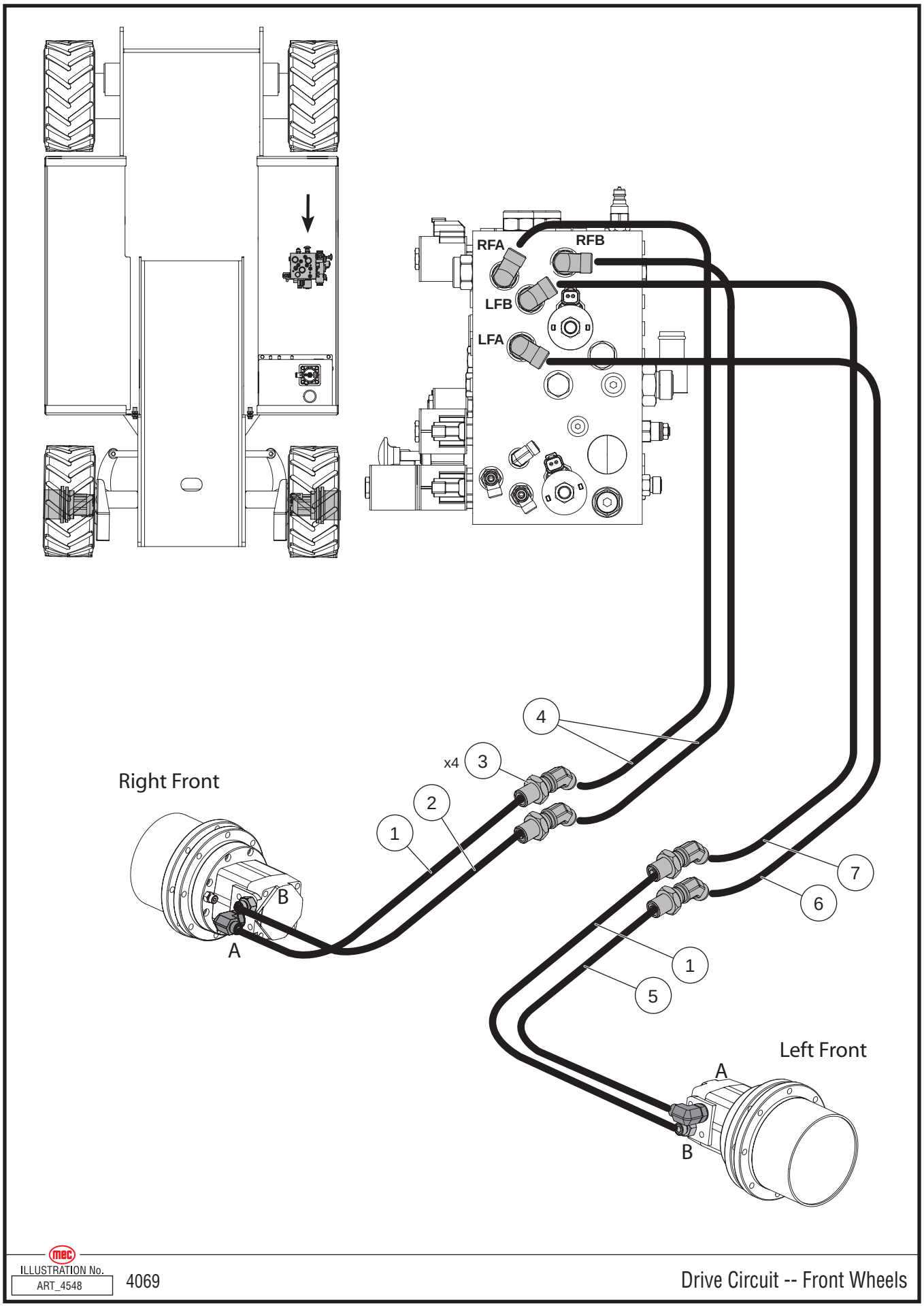


ILLUSTRATION No. ART_4548 4069

Drive Circuit -- Front Wheels

Hoses -- Drive Circuit, Front Wheels

ITEM	PART NUMBER	QTY.	DESCRIPTION	HOSE NAME
1	52444	2	Hose Assy, 1/2 x 36 inch, 08G-08FFORX -08G-08FFORX90S	D-LF-B-BH/RF-A-BH
2	52445	1	Hose Assy, 1/2 x 33 inch, 08G-08FFORX -08G-08FFORX90S	D-RF-B-BH
3	51112	4	Fitting, MFFOR-MB45-8-8 Bulkhead	
4	52448	2	Hose Assy, 1/2 x 80 inch, 08G-08FFORX -08G-08FFORX	D-RF-B-MF
5	52443	1	Hose Assy, 1/2 x 31.5 inch, 08G-08FFORX -08G-08FFORX90S	D-LF-A-BH
6	52447	1	Hose Assy, 1/2 x 55.5 inch, 08G-08FFORX -08G-08FFORX	D-LF-A-MF
7	52446	1	Hose Assy, 1/2 x 55.5 inch, 08G-08FFORX -08G-08FFORX45S	D-LF-B-MF

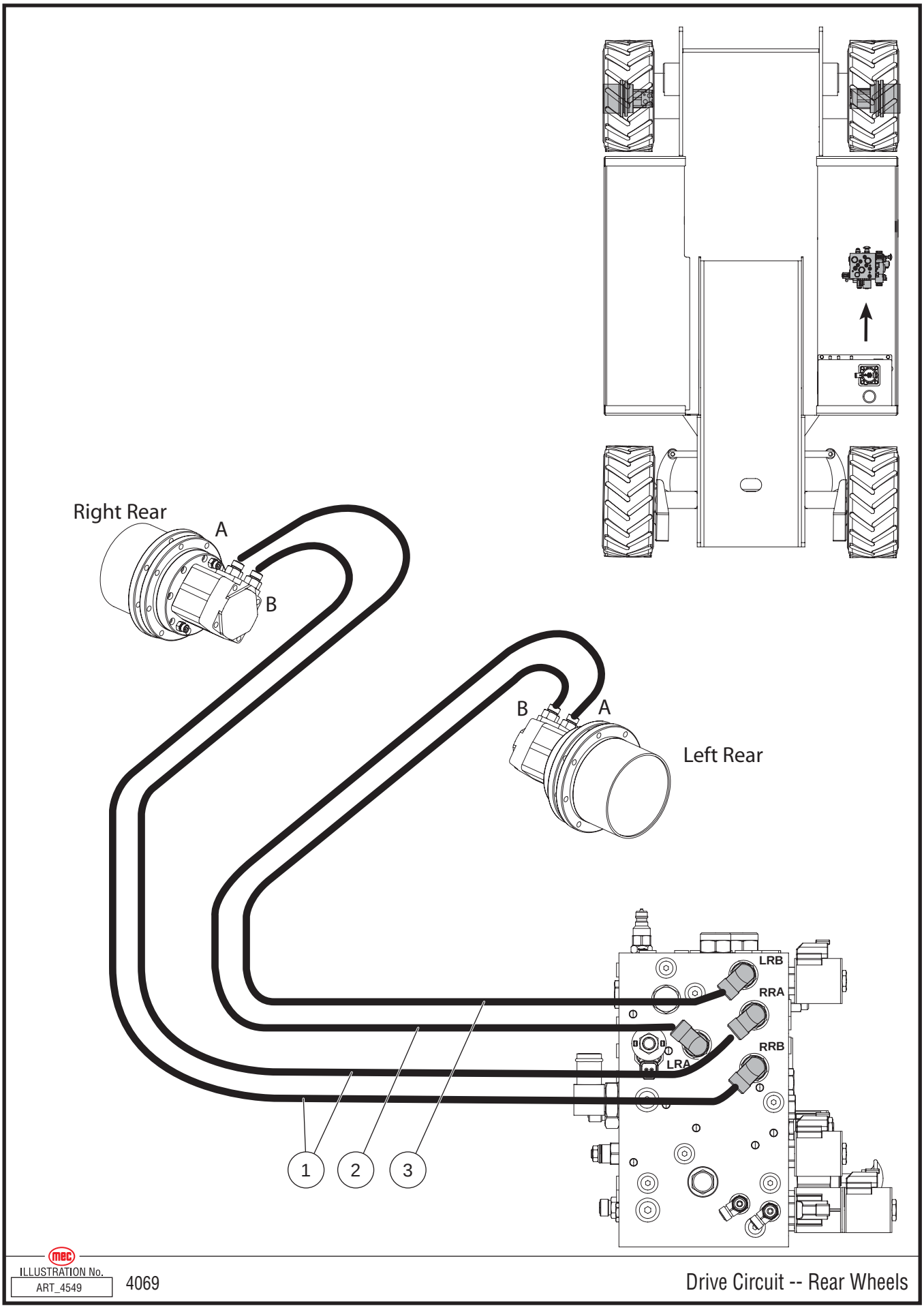


ILLUSTRATION No. ART_4549 4069

Drive Circuit -- Rear Wheels

Hoses -- Drive Circuit, Rear Wheels

ITEM	PART NUMBER	QTY.	DESCRIPTION	HOSE NAME
1	52442	2	Hose Assy, 1/2 x 90 inch, 08G-08FFORX -08G-08FFORX90S	D-RR-A/B
2	52440	1	Hose Assy, 1/2 x 66 inch, 08G-08FFORX -08G-08FFORX90S	D-LR-A
3	52441	1	Hose Assy, 1/2 x 67 inch, 08G-08FFORX -08G-08FFORX90S	D-LR-B

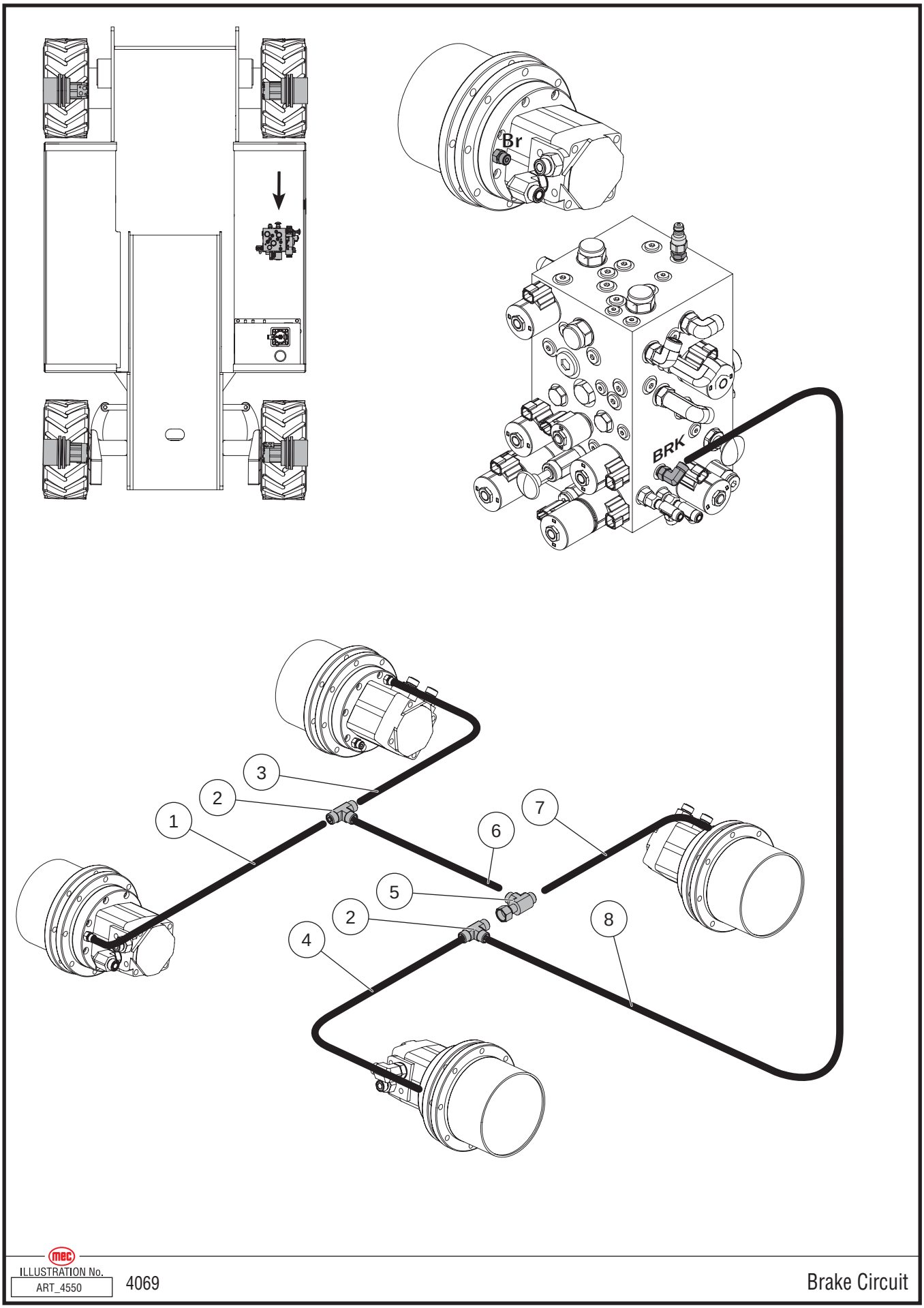


ILLUSTRATION No. ART_4550 4069

Brake Circuit

Hoses -- Brake Circuit

ITEM	PART NUMBER	QTY.	DESCRIPTION	HOSE NAME
1	52462	1	Hose Assy, 1/4 x 79 inch, 04G-04FFORX-4G-4FFORX 45	RF-BRK
2	50878	2	Fitting, MFFORT-4	
3	52464	1	Hose Assy, 1/4 x 45 inch, 04G-04FFORX-4G-4FFORX 45	RR-BRK
4	52461	1	Hose Assy, 1/4 x 73.5 inch, 04G-04FFORX-4G-4FFORX 45	LF-BRK
5	50864	1	Fitting, MFFOR-MFFOR-FFORX-4	
6	52468	1	Hose Assy, 1/4 x 30 inch, 04G-04FFORX-04G-04FFORX90S	R-BRK-CROSS
7	52463	1	Hose Assy, 1/4 x 48.5 inch, 04G-04FFORX-4G-4FFORX 45	LR-BRK
8	52465	1	Hose Assy, 1/4 x 22 inch, 04G-04FFORX-4G-4FFORX 45	MF-T-BRK

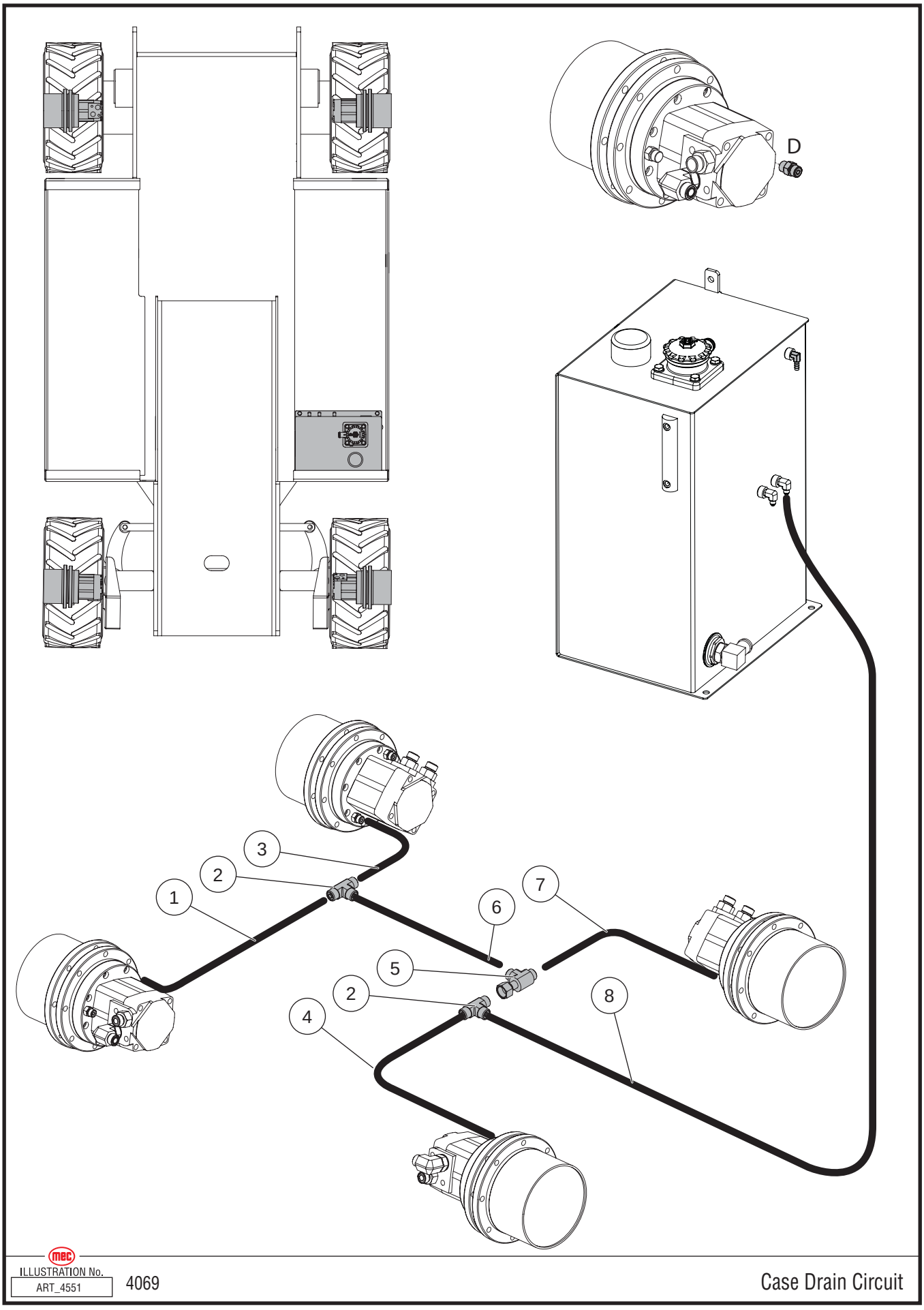


ILLUSTRATION No. ART_4551 4069

Case Drain Circuit

Hoses -- Case Drain Circuit

ITEM	PART NUMBER	QTY.	DESCRIPTION	HOSE NAME
1	52454	1	Hose Assy, 1/4 x 84.5 inch, 04G-04FFORX-04G-04FFORX	RF-CD
2	50878	2	Fitting, MFFORT-4	
3	52455	1	Hose Assy, 1/4 x 39 inch, 04G-04FFORX-04G-04FFORX	RR-CD
4	52452	1	Hose Assy, 1/4 x 65 inch, 04G-04FFORX-04G-04FFORX	LF-CD
5	50864	1	Fitting, MFFOR-MFFOR-FFORX-4	
6	52469	1	Hose Assy, 1/4 x 44 inch, 04G-04FFORX-04G-04FFORX90S	T-CD
7	52453	1	Hose Assy, 1/4 x 59 inch, 04G-04FFORX-04G-04FFORX	LR-CD
8	52470	1	Hose Assy, 1/4 x 18.25 inch, 04G-04FFORX-04G-04FFORX90S	TNK-CD

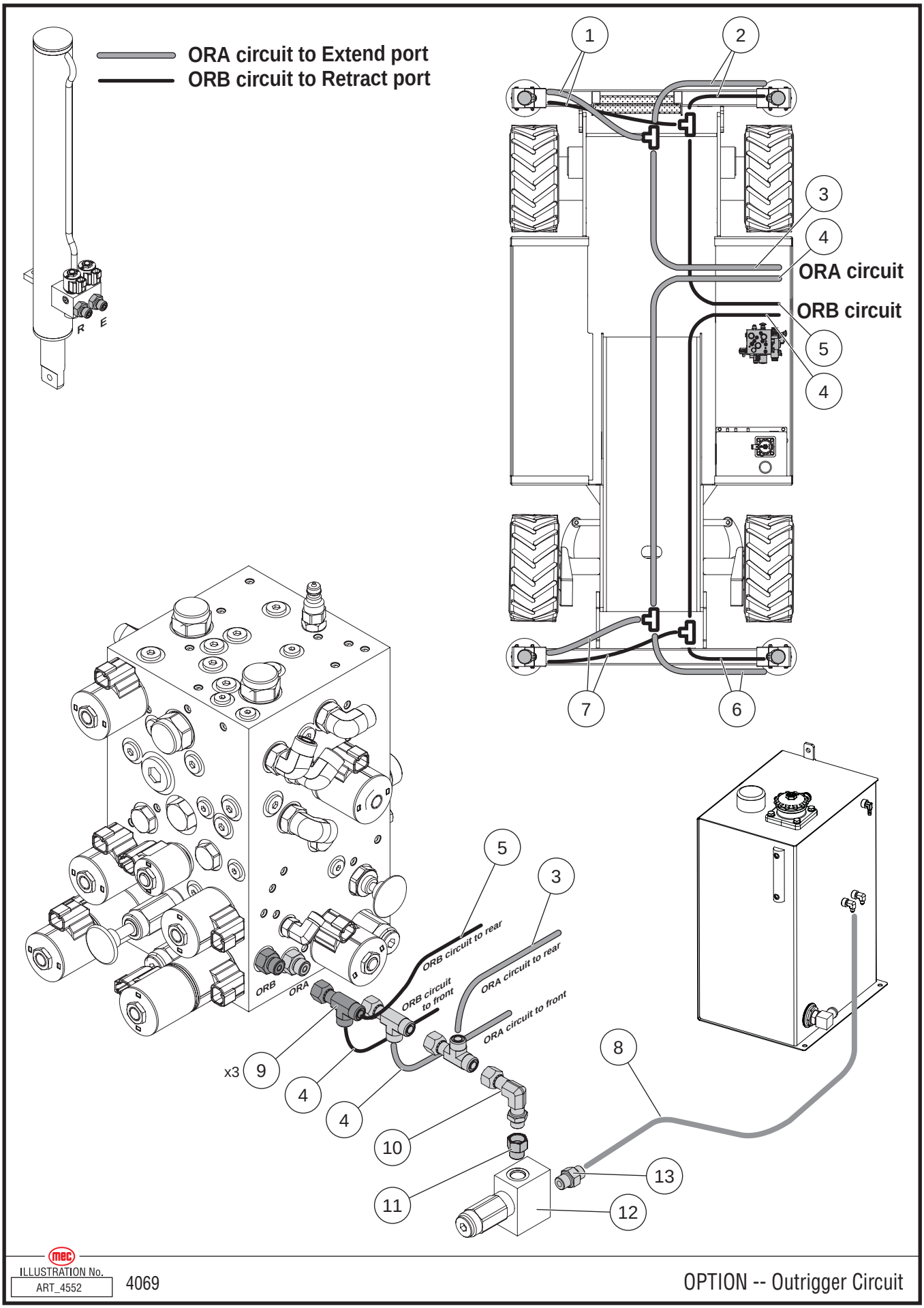


ILLUSTRATION No. ART_4552 4069

OPTION -- Outrigger Circuit

Hoses -- Outrigger Circuit

ITEM	PART NUMBER	QTY.	DESCRIPTION	HOSE NAME
1	52474	2	Hose Assy, 1/4 x 43.75 inch, 04G-04FFORX-04G-04FFORX90S	ORR-R-A/B
2	52458	2	Hose Assy, 1/4 x 17.5 inch, 04G-04FFORX-04G-04FFORX	ORR-L-A/B
3	52472	1	Hose Assy, 1/4 x 59 inch, 04G-04FFORX-04G-04FFORX90S	ORR-A
4	52456	2	Hose Assy, 1/4 x 86 inch, 04G-04FFORX-04G-04FFORX	ORF-B/A
5	52471	1	Hose Assy, 1/4 x 61.25 inch, 04G-04FFORX-04G-04FFORX90S	ORR-B
6	52457	2	Hose Assy, 1/4 x 20.5 inch, 04G-04FFORX-04G-04FFORX	ORF-L-A/B
7	52473	2	Hose Assy, 1/4 x 40 inch, 04G-04FFORX-04G-04FFORX90S	ORF-R-A/B
8		1	Hose Assy, 1/4 x 6 inch, 04G-04FFORX-04G-04FFORX90S	OR RET
9	50809	3	Fitting, MFFOR-FFORX-MFFOR-4	
10	51074	1	Fitting, FFORX-MB90-4-4	
11	51137	1	Fitting, MB-FB-6-4	
12	93288	1	Relief Valve Assembly	
13	51127	1	Fitting, MB-MFFOR-6-4	

NOTES:

SECTION F

BASE

CONTENTS PAGE

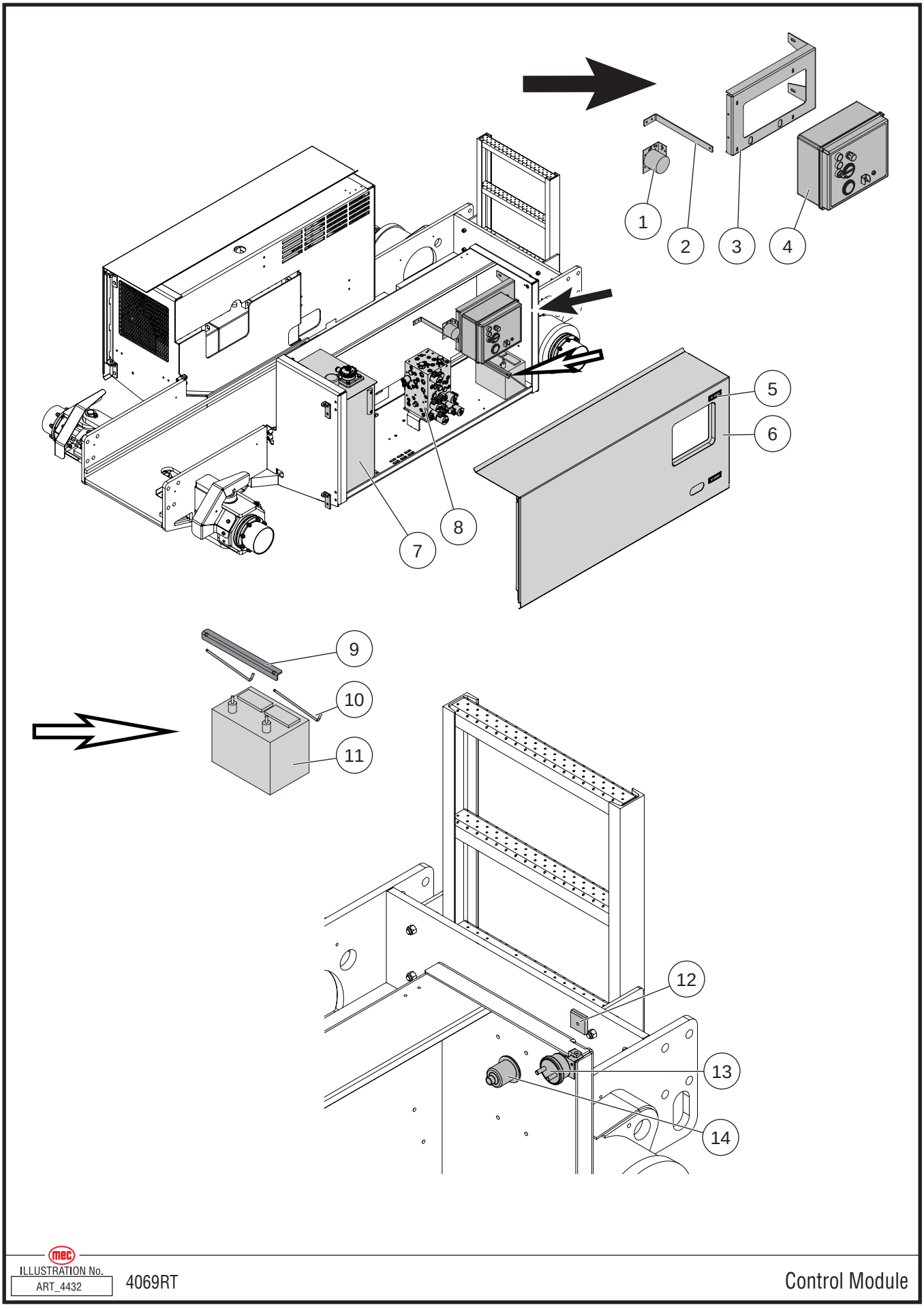


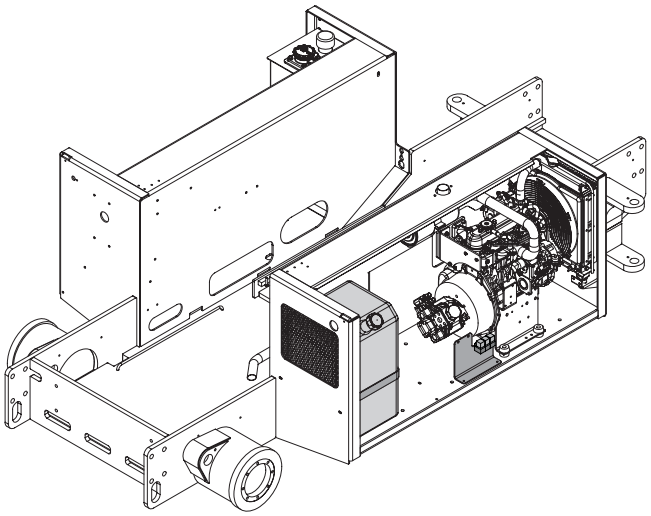
ILLUSTRATION No. ART_4432

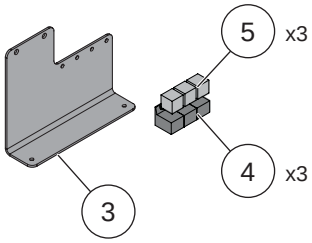
4069RT

Control Module

Control Module

ITEM	PART NO.	QTY	DESCRIPTION
1	91539	1	Alarm
2	21462	1	Brace
3	19271	1	Bracket
4	REF	1	Lower Controls -- See Section A
5	8386	1	Door Latch
6	21333	1	Controls Module Door
7	REF	1	Hydraulic Tank -- See Section E
8	REF	1	Functions Manifold -- See Section E
9	21496	1	Battery Hold-Down
10	22563	2	J-Bolt
--	HDW6110	2	Wing Nut
11	17966	1	Battery
12	14896	1	Door Slide Block
13	8841	1	Switch, Battery Cutoff
14	90749	1	Plug, Power To Platform





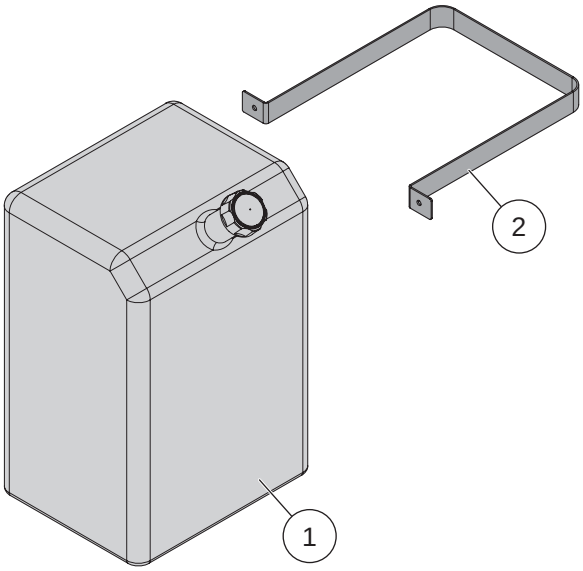


ILLUSTRATION No.
ART_4447

4069RT

Engine Module, 1 of 2

Engine Module

ITEM	PART NO.	QTY	DESCRIPTION
1	91023	1	Fuel Tank
--	91091	--	Filler Cap
2	21492	1	Bracket
3	21493	1	Relay Mount
4	92103	3	Relay Base
5	92400	3	Relay

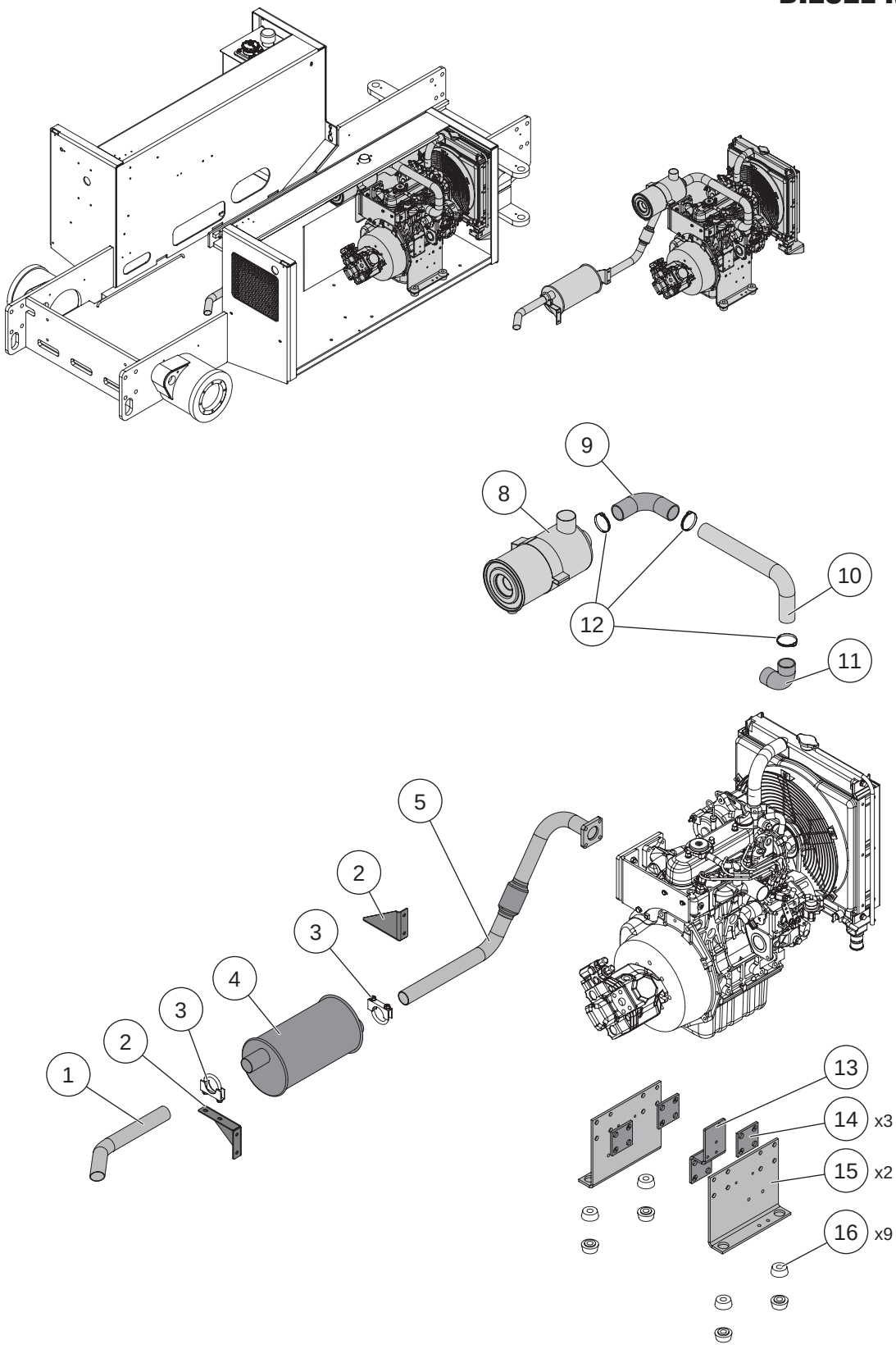


ILLUSTRATION No.
ART_4448

4069RT

Diesel Engine, 1 of 3

Diesel Engine, 1 of 3

ITEM	PART NO.	QTY	DESCRIPTION
1	21364	1	Exhaust Tube
2	21491	2	Mounting Bracket
3	93267	2	U-Bolt
4	92965	1	Muffler
5	21363	1	Exhaust Weldment, Diesel
6	--	--	--
7	--	--	--
8	91111	1	Air Filter Assembly
--	8667	--	Air Filter Element
9		1	Elbow
10	21495	1	Intake Tube
11		1	Elbow
12	7545	3	Hose Clamp
13	16207	1	Throttle Solenoid Plate
14	16210	3	Spacer Plate
15	16209	2	Mounting Plate
16	7736	8	Engine Mount

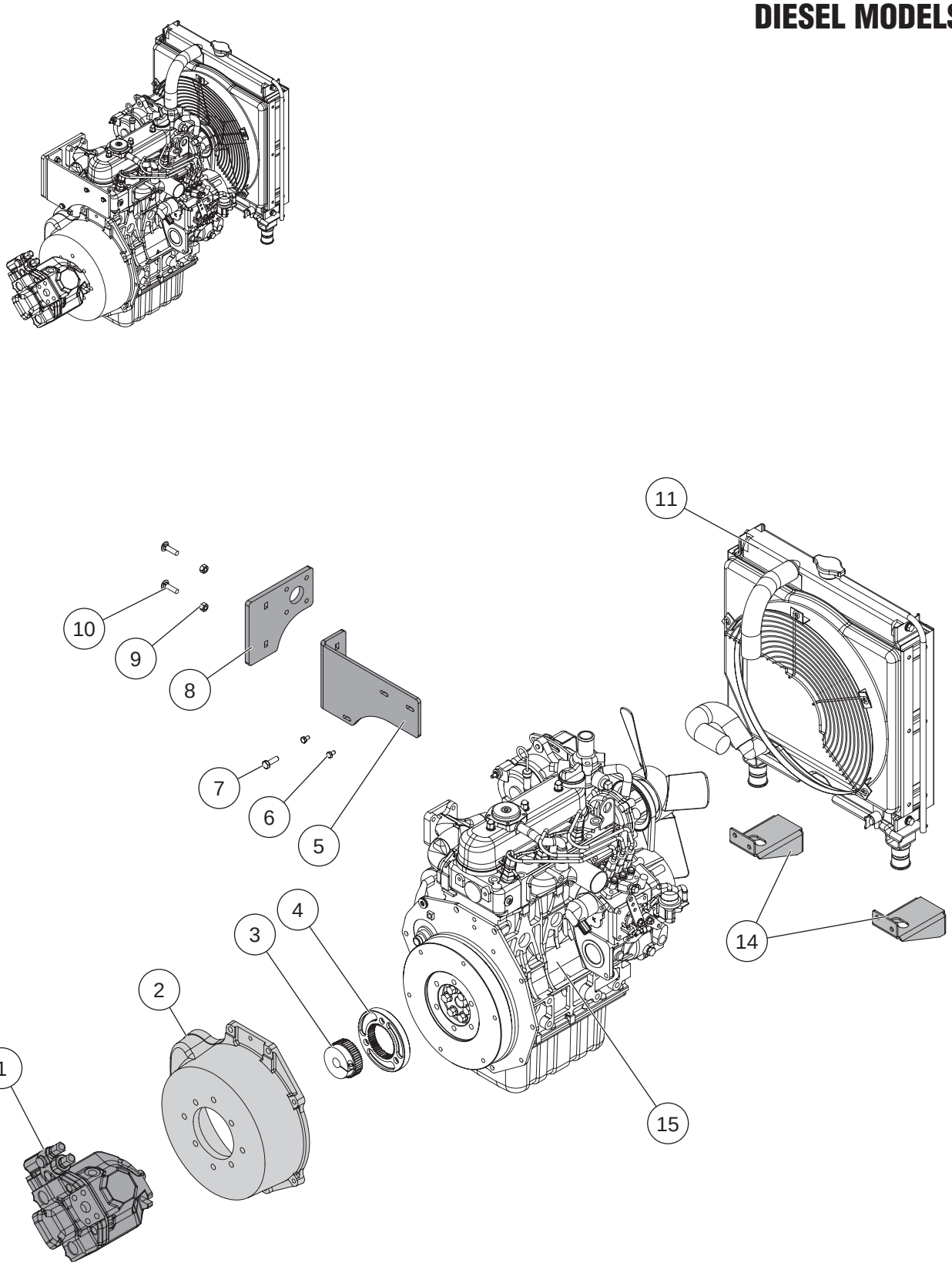


ILLUSTRATION No. ART_4449

4069RT

Diesel Engine, 2 of 3

Diesel Engine, 2 of 3

ITEM	PART NO.	QTY	DESCRIPTION
1	91160	1	Pump
2	91112	1	Bell Housing
3	91130	1	Hub
4	91572	1	Coupler
5	23990	1	Plate
6	50027	2	Bolt, M6 x 10
7	50031	1	Bolt, M8 x 25
8	23991	1	Bracket, Exhaust
9	50048	2	Nut, M8 Nylock
10	50474	2	Bolt, M8 x 20 Carriage
11	91113	1	Radiator
12	--	--	--
13	--	--	--
14	16345	2	Bracket, Radiator Mount
15	91429	1	Engine, Kubota D1105

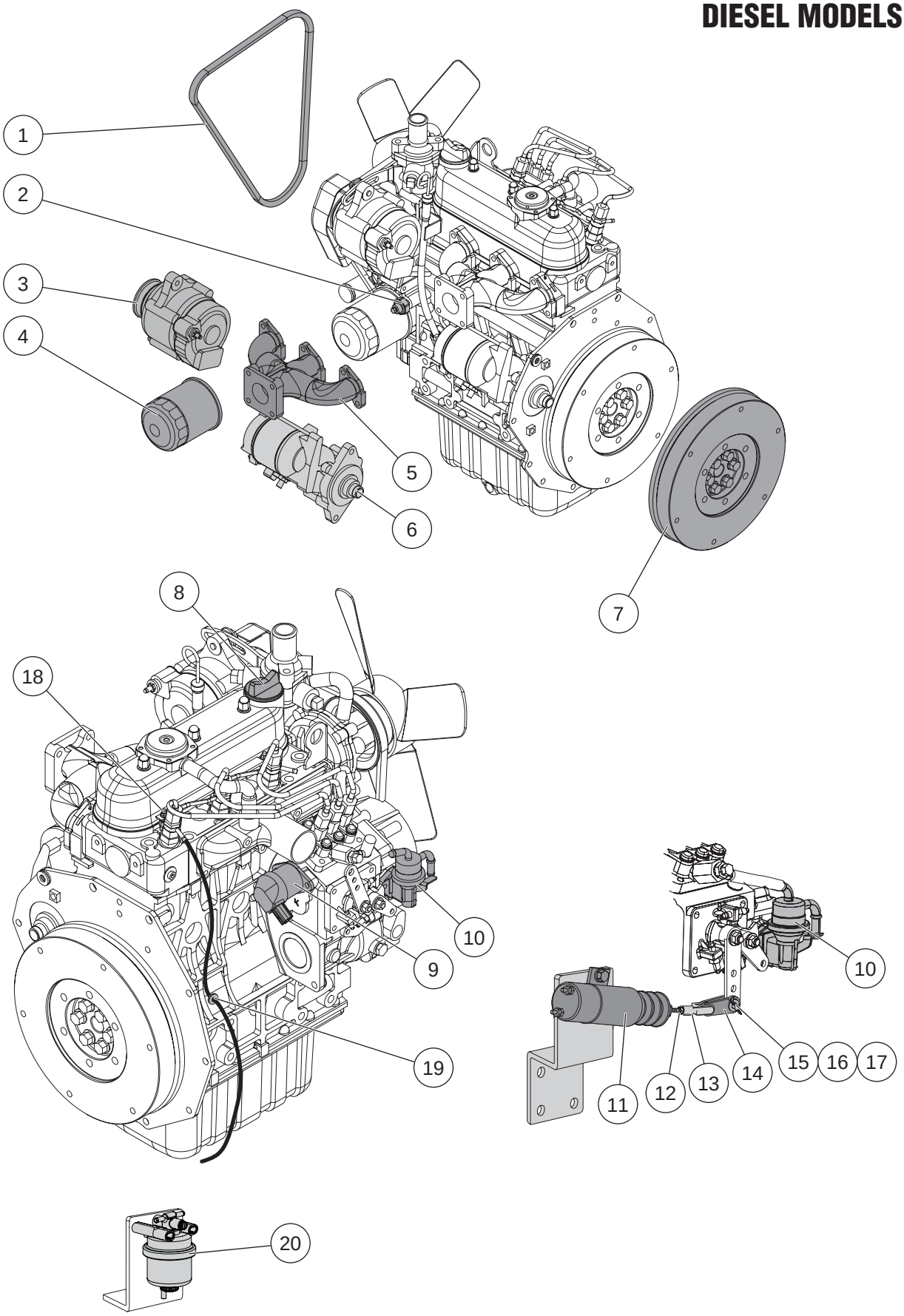


ILLUSTRATION No.
ART_4450

4069RT

Diesel Engine, 3 of 3

Diesel Engine, 3 of 3

ITEM	PART NO.	QTY	DESCRIPTION
1	93620	1	Belt
2	91175	1	Oil Pressure Switch
--	HDW91187	1	Fitting, 1/8” NPT MF -- between Oil Pressure Switch and engine
3	90227	1	Alternator
4	8665	1	Oil Filter
5	92486	1	Exhaust Manifold
6	8413	1	Starter
7	91630	1	Ring Gear
8	93621	1	Oil Fill Cap
9	91124	1	Fuel Solenoid
10	93619	1	Fuel Pump
11	91589	1	Throttle Solenoid
12	HDW91231	1	Jam Nut, 1/2-28
13	91117	1	Yoke
14	16347	2	Throttle Link
15	HDW5217	1	Washer, 5/16 Std.
16	HDW91590	1	Clevis Pin, 5/16 x 1
17	HDW5290	1	Cotter Pin, 1/8 x 1
18	9832	3	Glow Plug
19	91114	1	Fuel Return Check Valve
20	91116	1	Fuel Filter Assembly
--	91123	--	Fuel Filter Element

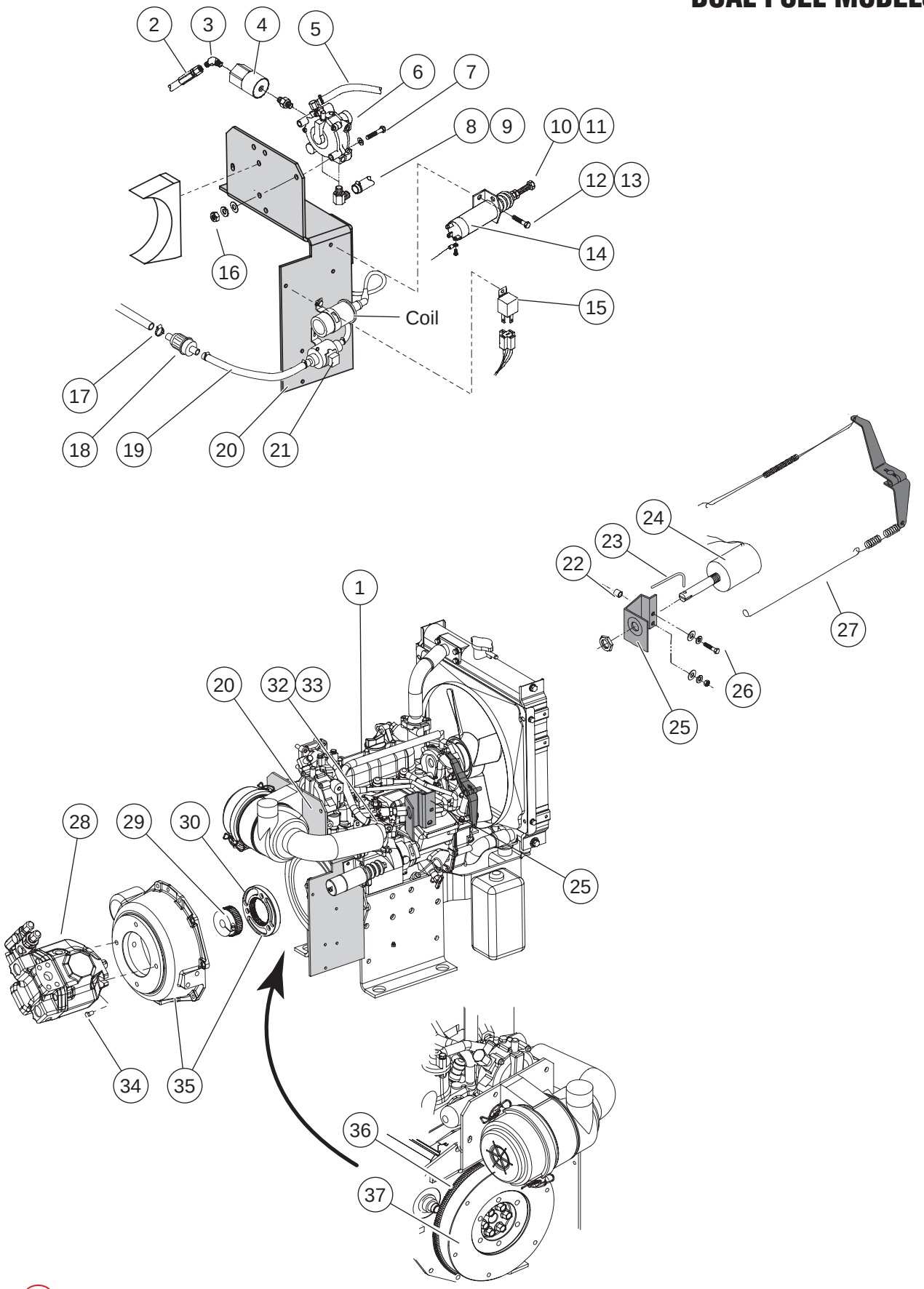


ILLUSTRATION No.
ART_4604

Dual Fuel Engine, 1 of 2

Dual Fuel Engine, 1 of 2

ITEM	PART NO.	QTY	DESCRIPTION
1	91125	1	Engine, Kubota DF752
2	7406	1	Hose Assembly, LP
3	HDW6894	1	Elbow, 90° Brass
4	91132	1	Valve, lockoff
5	91197	10 in	LP Hose, ½"
6	9833	1	LPG Regulator
7	50015	2	Screw, M8 x 50
8	91198	60 IN	Radiator Hose, 3/8"
9	91232	6	Hose Clamp, #8
10	HDW9247	1	Screw, Cap Socket Head, ¼–28 × 1.0"
11	HDW91231	2	Jam Nut, ¼–28
12	50028	6	Screw, M6 x 20
13	50047	6	Nut, M6 Nylock
14	91119	1	Solenoid, Throttle
15	91375	1	Relay, Throttle
16	50048	2	Nut, M8 Nylock
17	7788	5	Hose Clamp, 5/16
18	8514	1	Fuel Filter
19	6458	as req	Hose, Fuel, 5/16
20	21020	1	Bracket, Components
21	91177	1	Fuel Pump
22	20204	1	Spacer
23	9498	1	Choke Linkage
24	9502	1	Choke Solenoid
25	20212	1	Choke Bracket
26	HDW91283	1	Screw, M6–1.0 × 25
27	9252	1	Throttle Linkage
28	91160	1	hydraulic Pump
29	91130	1	Hub
30	91573	--	Coupler, Outer
31	--	--	--
32	91133	1	Carburetor Flange
33	91617	1	Carburetor Assembly
34	HDW6433	2	Screw, 3/8-16 × 1"
35	91129	1	KTR Housing Kit, DF752 -- Includes Item #30
36	91765	1	Ring Gear
37	91766	1	Flywheel

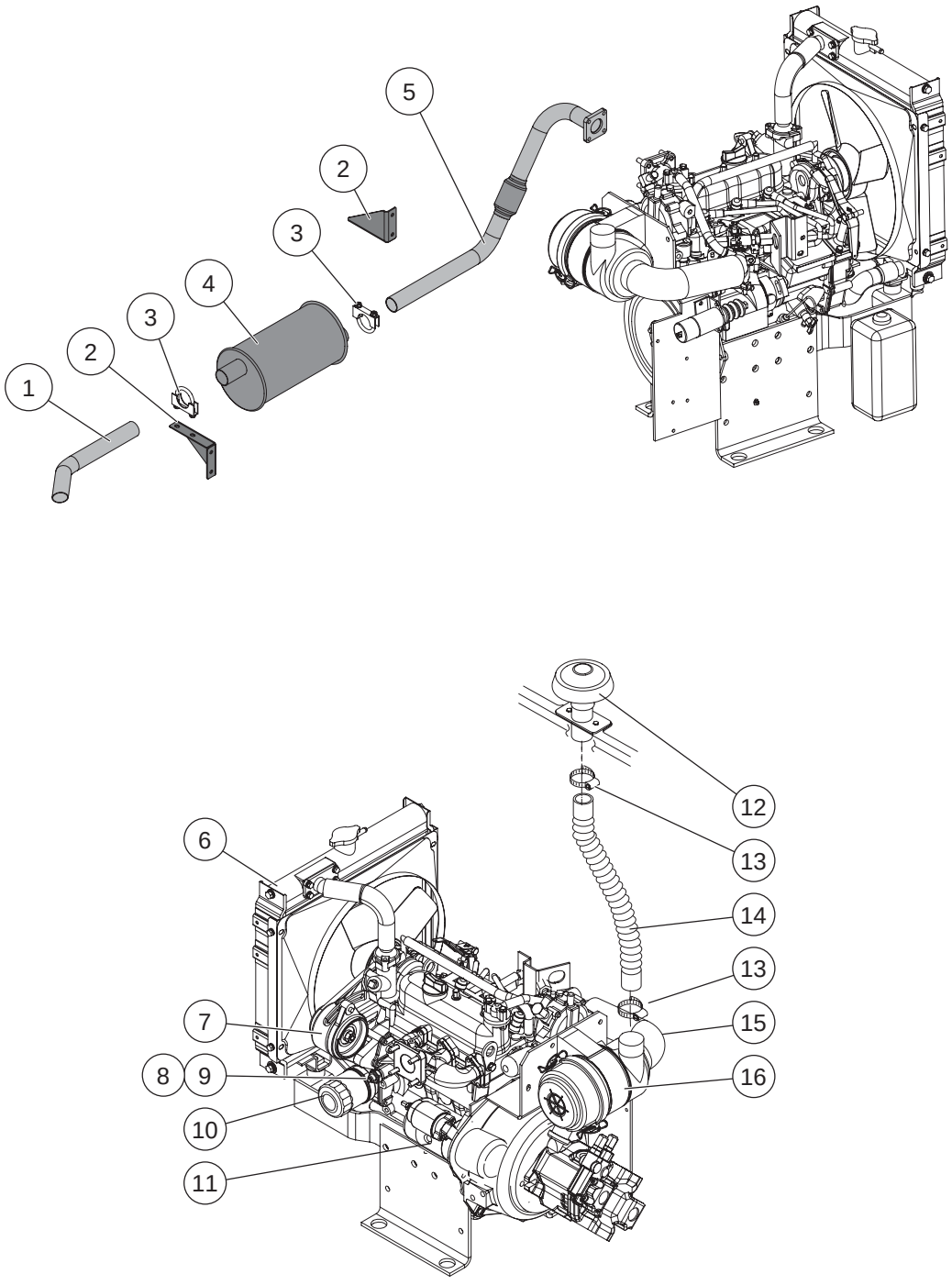


ILLUSTRATION No.
ART_4605

Dual Fuel Engine, 2 of 2

Dual Fuel Engine, 2 of 2

ITEM	PART NO.	QTY	DESCRIPTION
1	21364	1	Exhaust Tube
2	21491	2	Mounting Bracket
3	93267	2	U-Bolt
4	92965	1	Muffler
5	21635	1	Exhaust Weldment, Dual Duel
6	8472	1	Radiator
7	90227	1	Alternator, 40 AMP
8	91175	1	Oil Pressure Switch
9	HDW91187	1	Fitting, 1/8 NPT, M-F
10	8516	1	Oil Filter
11	8365	1	Starter
12	91799	1	Breather Cap
13	7545	2	Hose Clamp
14	91340	1	Hose, 2.00" I.D. Flex
15	91136	1	Air Filter Element
16	91188	1	Intake Hose

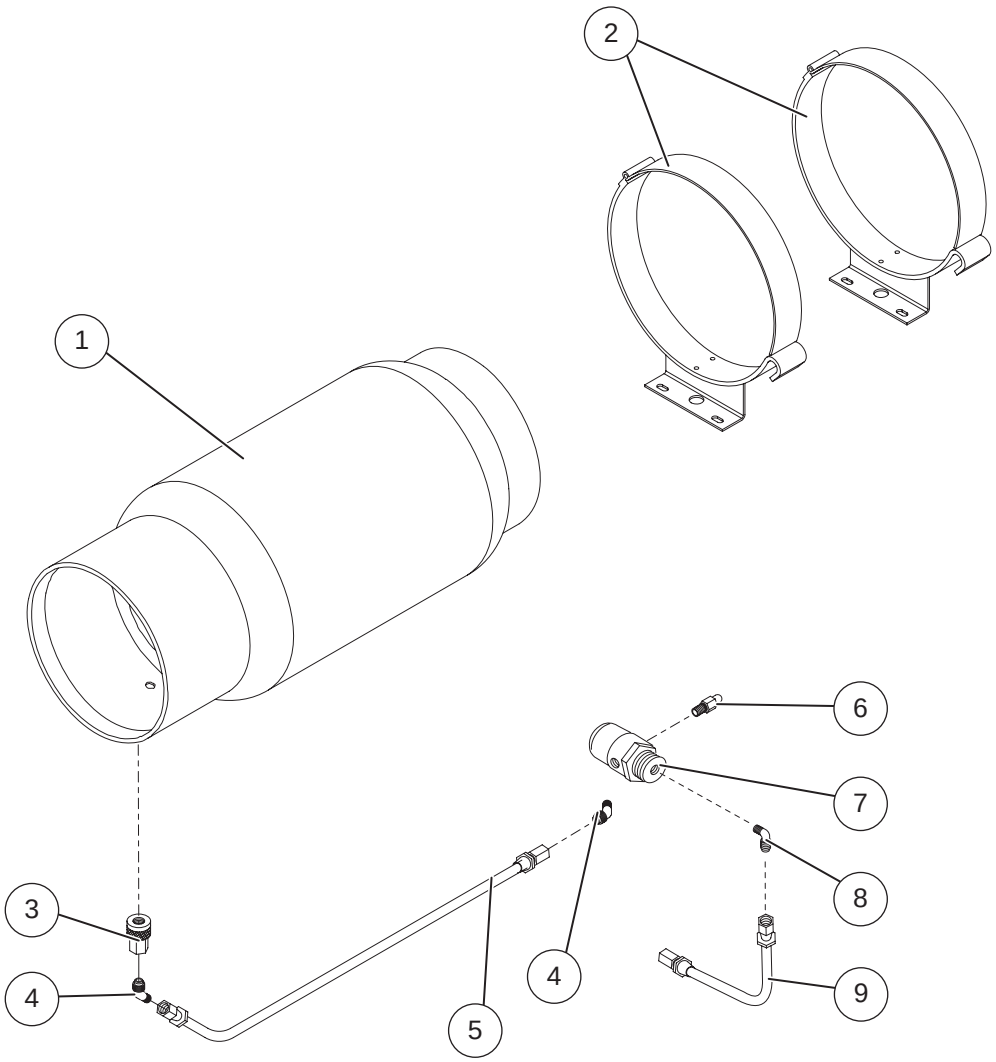


ILLUSTRATION No. ART_4606

4069RT

Dual Fuel LP Tank

Dual Fuel LP Tank

ITEM	PART NO.	QTY	DESCRIPTION
1	6859	1	LP Tank
2	6860	2	Bracket, Tank Mount
3	6868	1	Quick Disconnect
4	HDW6894	2	Elbow, Brass, NPT to SAE 45°
5	6890	1	Hose Assembly, 30”
6	6938	1	Relief Valve
7	6861	1	Bulkhead Filter
8	HDW6727	1	Elbow, Brass NPT to SAE 90
9	7406	1	Hose Assembly, 90”

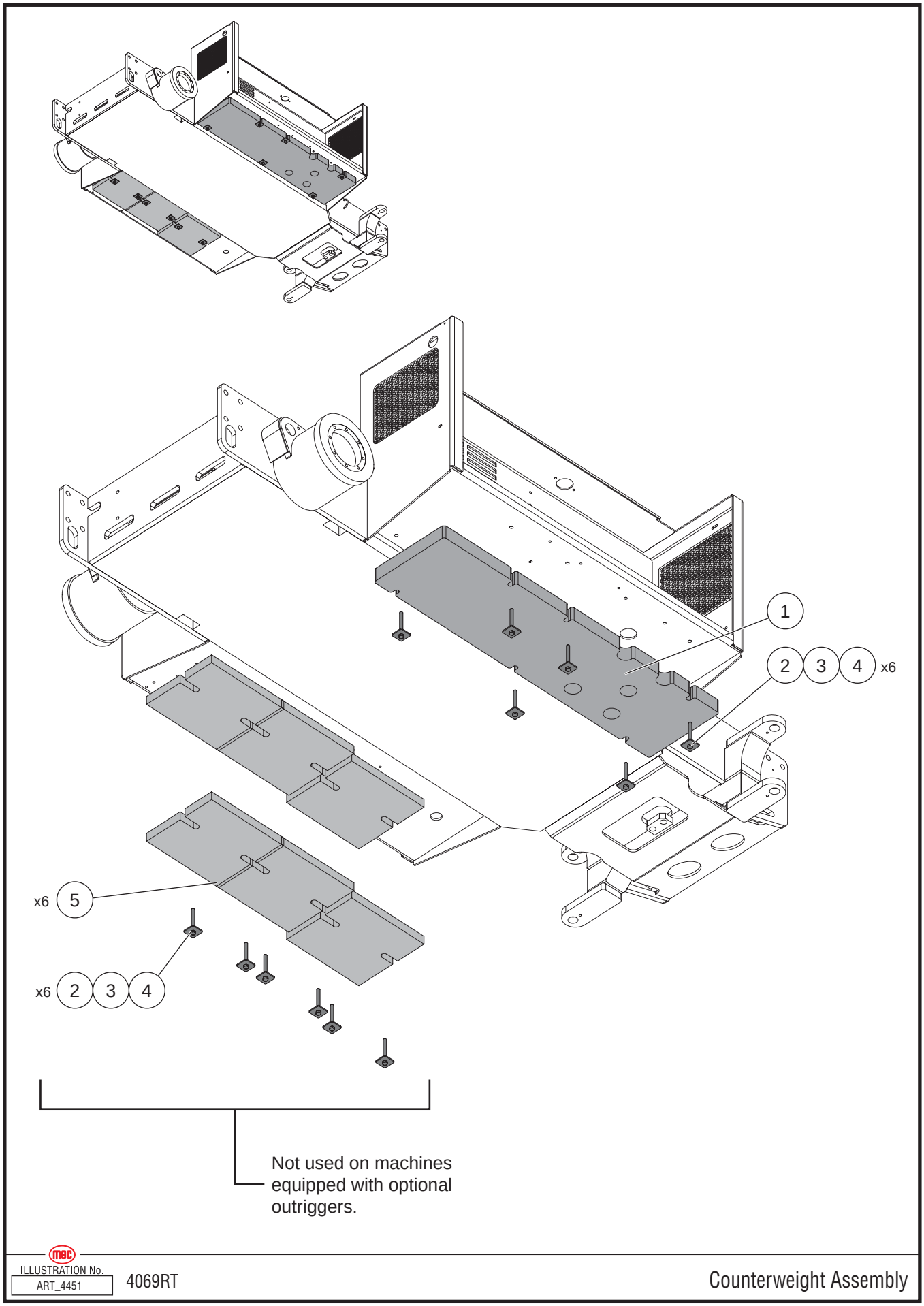


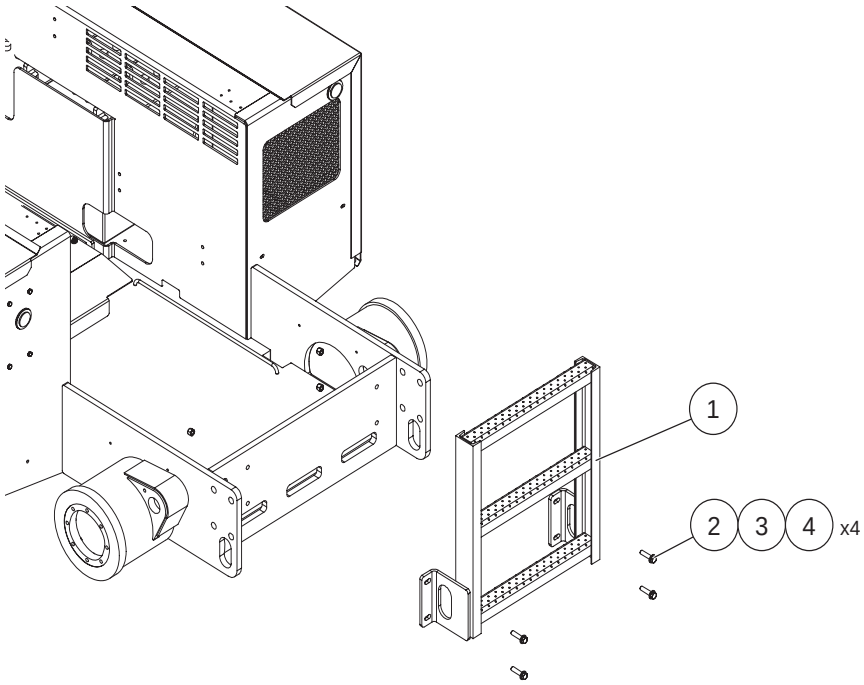
ILLUSTRATION No. ART_4451 4069RT

Counterweight Assembly

Counterweight Assembly

ITEM	PART NO.	QTY	DESCRIPTION
1	21494	1	Ballast Plate
2	50250	6/12	Bolt, M12 x 110
3	50417	6/12	Washer, Square, 5/8 x 3/16 x 2
4	50054	6/12	Nut, M12 Nylock
5	15140*	6	Ballast Plate

*Not used on machines equipped with optional outriggers.



Standard Machines without Outriggers

Machines with optional GSE Platforms

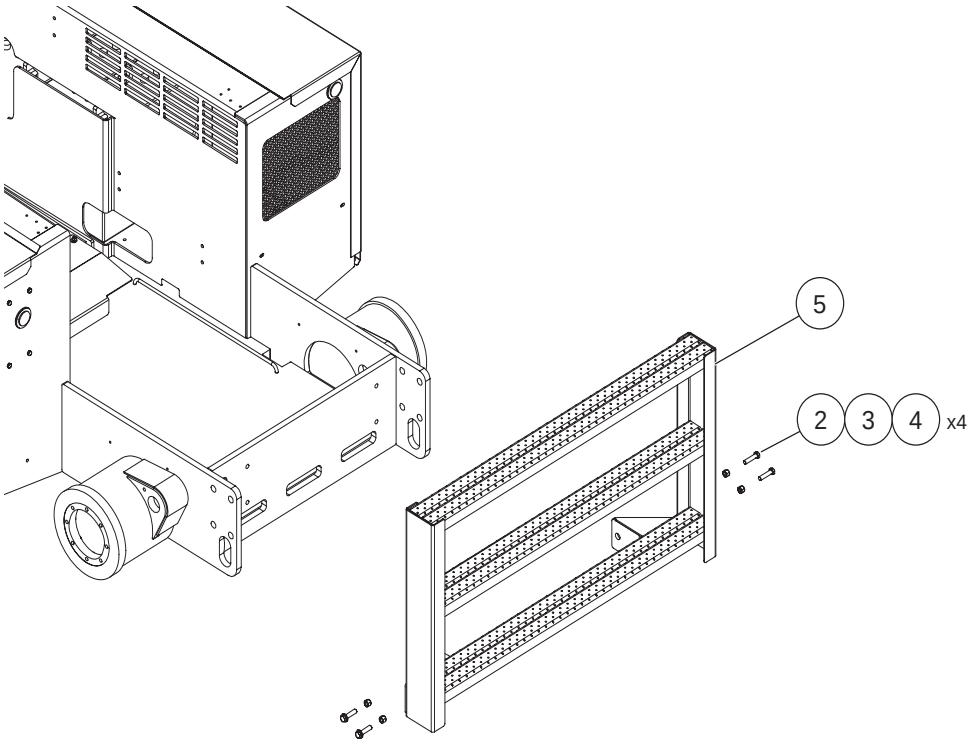
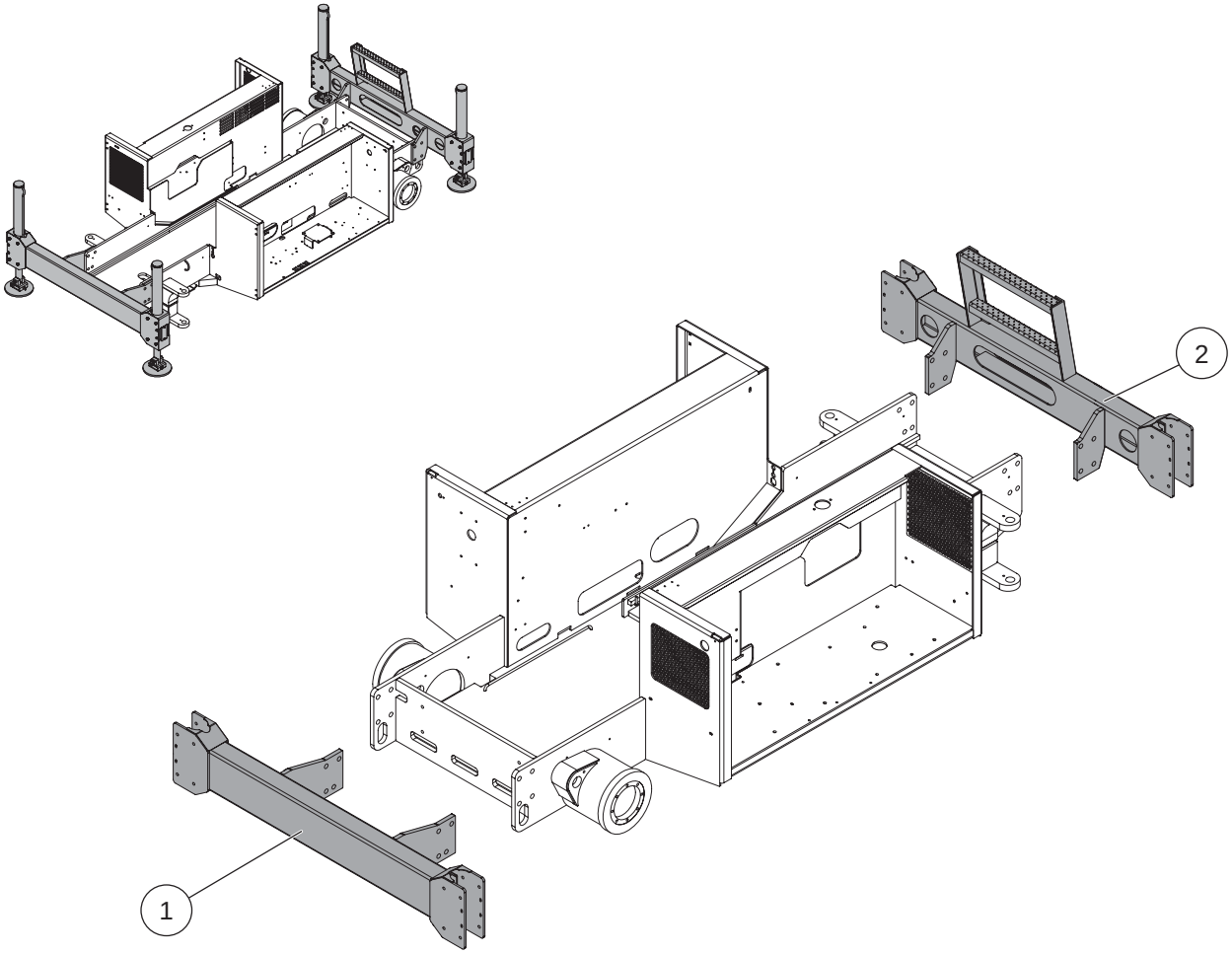


ILLUSTRATION No. ART_4453 4069 Ladders

Ladders

ITEM	PART NO.	QTY	DESCRIPTION
1	21338	1	Ladder Weldment, Standard
2	50250	4	Bolt, M12 x 50
3	50003	4	Washer, M12 Std
4	50050	4	Nut, M12 Nylock
5	21533	1	Ladder Weldment, GSE Option



Each Outrigger

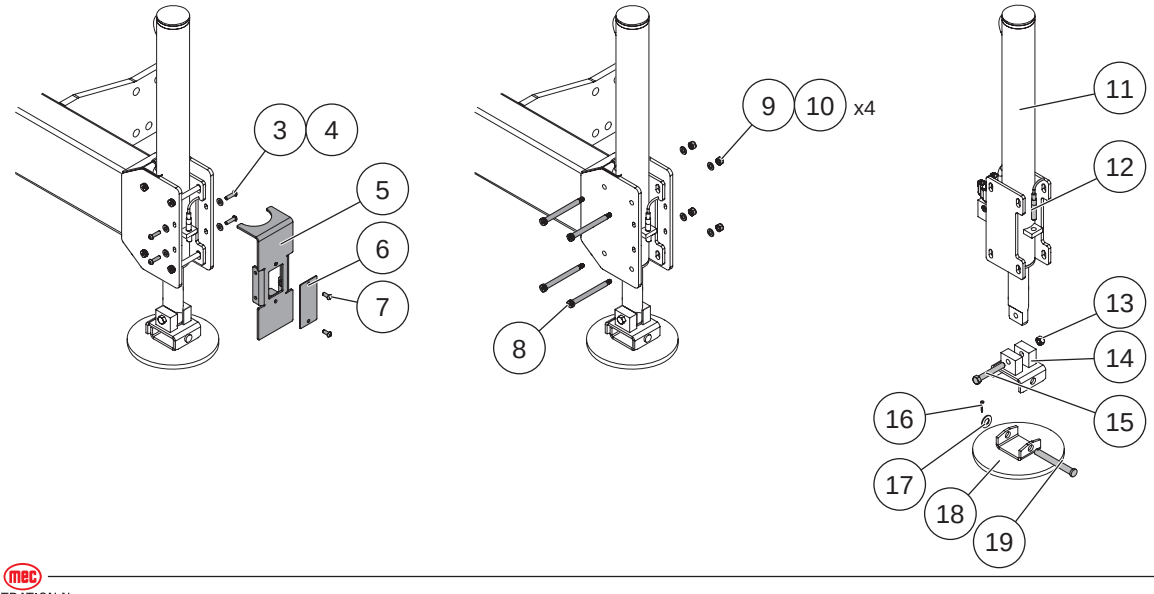


ILLUSTRATION No. ART_4452 4069

OPTION -- Outriggers

OPTION -- Outriggers

ITEM	PART NO.	QTY	DESCRIPTION
1	21428	1	Front Outrigger Weldment
2	21429	1	Rear Outrigger Weldment
3	50416	16	Bolt, M8 x 25 Button Head
4	50001	16	Washer, M8 Std.
5	21444	4	Outrigger Cover Weldment
6	21436	4	Outrigger Cover Plate
7	50415	8	Bolt, M8 x 20 Button Head
8	50446	16	Bolt, M12 x 120 Socket Head
9	50003	16	Washer, M12 Std
10	50050	16	Nut, M12 Nylock
11	REF	--	Outrigger Cylinder -- See Section E
12	92934	4	Proximity Sensor
13	HDW8457	4	Nut, 1/2 Nylock
14	20998	4	Outrigger Pivot Bracket
15	50074	4	Bolt, 1/2 x 3.5
16	HDW5920	4	Cotter pin, .120 x 1.00
17	HDW9219	4	Washer, 5/8 Std.
18	21477	4	Outrigger Foot Pad
19	HDW91395	4	Clevis Pin, 5/8 x 5

Wiring Harness Components

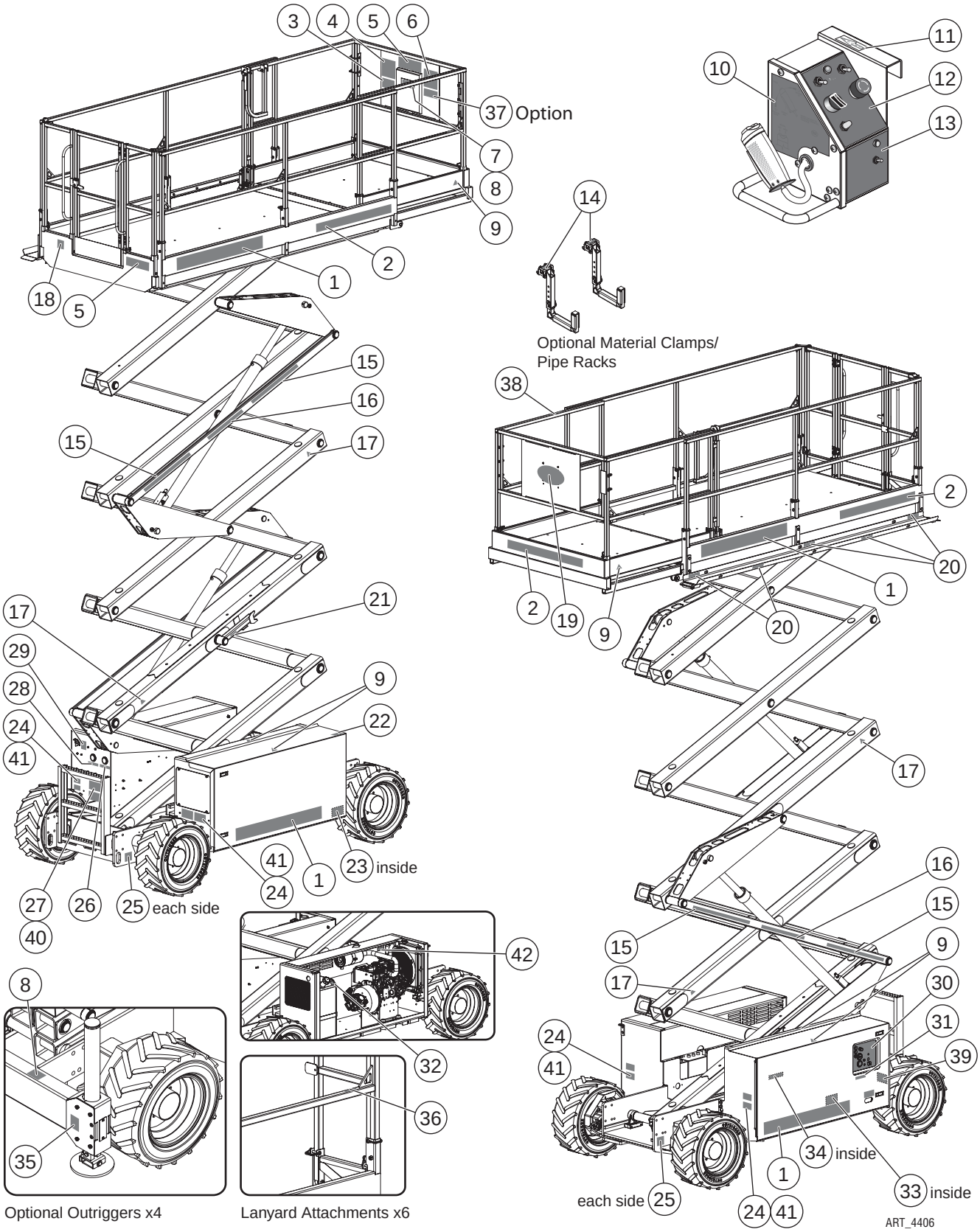
Harness plug designations (J#) and components listed in parentheses correspond to locations listed on the Electrical Schematics. See Section 5 of the Service portion of this manual.

ITEM	PART NO.	QTY	DESCRIPTION
1	21629	1	Harness, Lower Control Box Interior (Interior of Lower Control Box, J1, J2)
2	--	--	--
3	21630	1	Harness, Main Chassis (J1, J3, J4, J5, J6, J7, Functions Manifold)
4	92222	1	Harness, **Diesel Engine**
	92136	1	Harness, **Dual Fuel Engine**
5	21623	1	Harness, Communication Cable (J4, J8)
6	91780	1	Harness, Platform (J8, J9)
7	91761	1	Harness, Upper Control Box Interior
8	9441	71 ft.	Cable, Power To Platform (Plug at rear of Controls Module, Outlet at platform) This length also used to power platform work lights
	93251	75 ft.	Cable, Power To Platform, Arctic (Plug at rear of Controls Module, Outlet at platform)
9	21633	1	Elevating Assembly Harness (J5, Transducers, Down valves)
10	21631	1	OPTION -- Outrigger Harness (J6, J7, Outriggers)
11	91293	1	Harness, Joystick

SECTION G

DECALS, ANSI MODELS

CONTENTS


3
4
5
6
37 Option
7
8
9
2
1
18
5
10
11
12
13
14
Optional Material Clamps/
Pipe Racks
15
16
17
15
38
2
20
1
2
19
9
20
17
21
29
28
24
41
9
22
41
1
23 inside
24
27
26
25 each side
40
42
32
8
35
36
Optional Outriggers x4
Lanyard Attachments x6
16
15
15
9
17
30
31
24
41
39
34 inside
1
each side
25
24
41
33 inside
ART_4406

Decals, ANSI Specification

ITEM	PART NO.	QTY	DESCRIPTION
1	93209	4	Decal, 4069RT White
	93210	4	Decal, 4069RT Gray
2	92416	3	Decal, Website White
	92547	3	Decal, Website Gray
3	90730	1	Decal, Platform Warning
4	90721	1	Decal, Danger
5	93059	2	Decal, Platform Capacity
6	90722	1	Decal, Warning
7	8911	1	Decal, Manual Inside
8	6948	1	Decal, LPG -- Dual Fuel Only
9	91850	6	Decal, Crush
10	90729	1	Decal, Control Handle
11	7156	1	Decal, Front
12*	93211	1	Decal, Upper Controls
13	91730	1	Decal, Outrigger
14	92848	2	Decal, Pipe Rack
15	7982	4	Decal, Warning Stripe
16	8503	2	Decal, Keep Clear
17	9910	4	Decal, Pinch
18	90739	1	Decal, Made in USA
19	90719	1	Decal, MEC Oval, White
	93412	1	Decal, MEC Oval, Gray
20	93051	5	Decal, Material Rack Capacity
21	90717	1	Decal, Maintenance Lock
22	8779	1	Decal, Battery Explosion Hazard
23	90726	1	Decal, Battery Weight
24	90725	4	Decal, Tires
25	11026730	4	Decal, Tie Down
26	90751	1	Decal, Power To Platform
27	92767	1	Decal, Serial Plate
28	--	--	--
29	9052	1	Decal, Battery Disconnect
30*	91930	1	Decal, Lower Controls
31	90268	1	Decal, Platform Capacity Small
32*	91975	1	Decal, Diesel
33	92089	1	Decal, Brake Release
34	6873	1	Decal, Hydraulic Oil
35	9465	4	Decal, Crush
36	8605	6	Decal, Lanyard Point
37	8606	1	Decal, Lanyard Warning
38	7155	1	Decal, Locate
39	90732	1	Decal, Powerwash
40	92054	1	Decal, Patents Pending
41	8502	4	Decal, Inflate Tires
42	92119	1	Decal, Relays
*Substitute the following for machines equipped with optional Dual Fuel Engine:			
12	91158	1	Decal, Upper Controls, Dual Fuel
30	92414	1	Decal, Lower Controls, Dual Fuel
32	6872	1	Decal, Gasoline Only

• as req: as required • INCL: Included with assembly • NS: Not a Stock item • REF: Reference only

1 93209 (white), 93210 (dark gray)
4 Places

mec 4069 RT

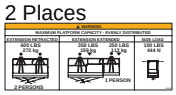
2 92416 (white), 92547 (dark gray)
3 Places

www.mecawp.com

3 90730

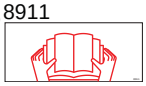
4 90721

5 93059
2 Places



6 90722

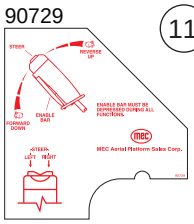
7 8911



8 6948 --
Dual Fuel Only

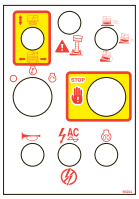
9 91850
6 Places

10 90729

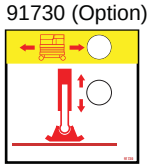


11 7156

12* 93211



13 91730 (Option)



14 92848 (Option)
2 Places

15 7982
4 Places

16 8503
2 Places

17 9910
4 Places

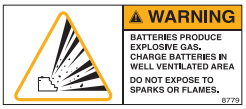
18 90739

19 90719 (white)
93020 (dark gray)

20 93051
5 Places

21 90717

22 8779



23 90726

24 90725
4 Places

25 11026730
4 Places

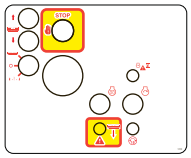
26 90751

27 92767

28 not used

29 9052

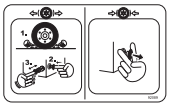
30* 91930



31 90268

32* 91975

33 92089

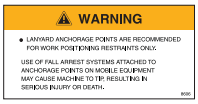


34 6873

35 9465 (Option)
4 Places

36 8605
6 Places

37 8606 (option)



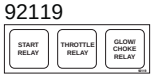
38 7155

39 90732

40 92054

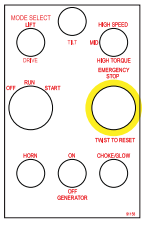
41 8502
4 Places

42 92119

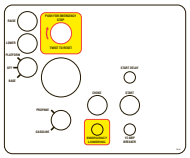


*Substitute the following for machines equipped with optional Dual Fuel Engine:

12 91158



30 92414



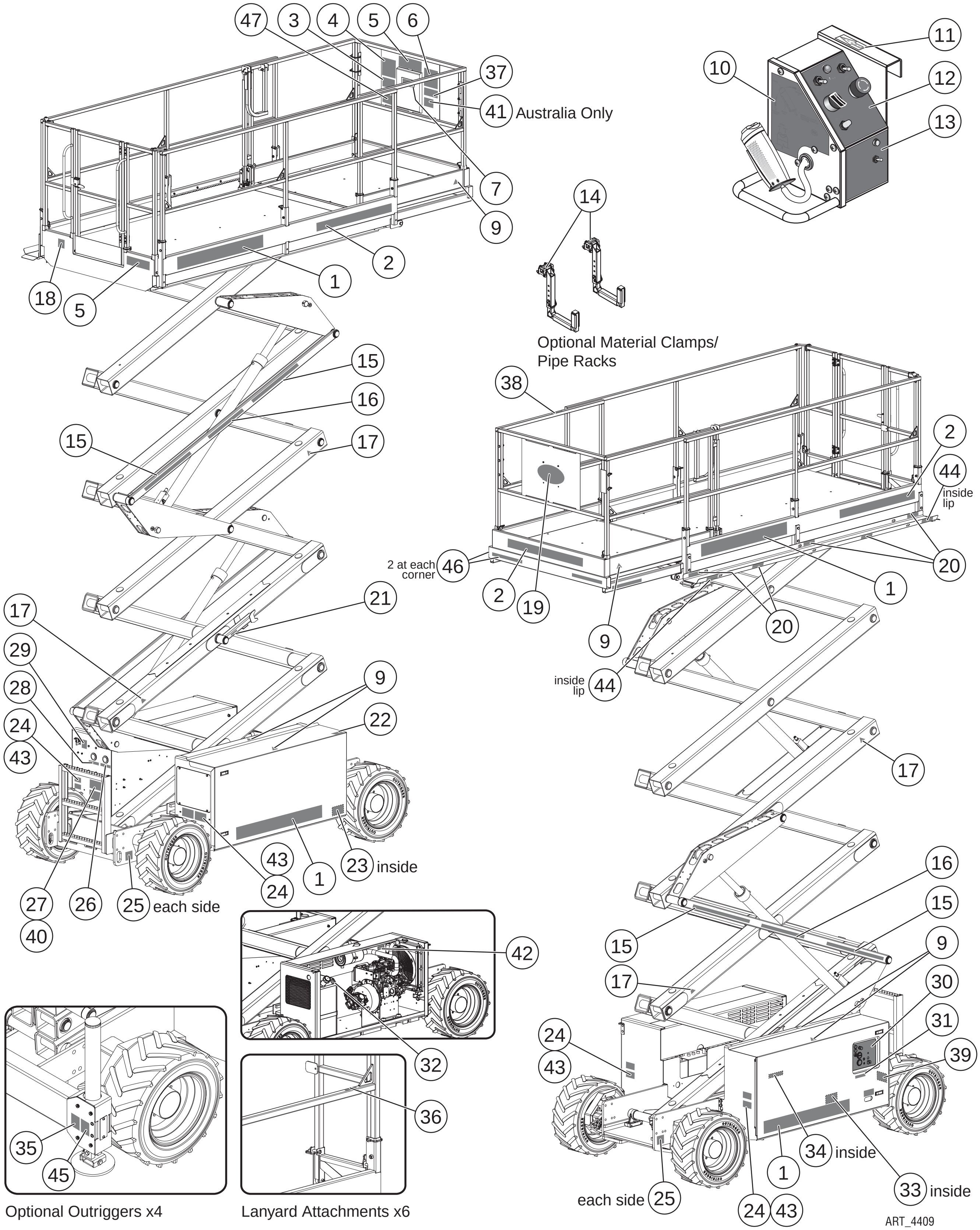
32 6872

ILLUSTRATION No.
ART_4405

SECTION H

DECALS, CE MODELS

CONTENTS PAGE


Australia Only
Optional Material Clamps/
Pipe Racks
inside
lip
2 at each
corner
inside
lip
inside
each side
Optional Outriggers x4
Lanyard Attachments x6
inside
each side
inside
ART_4409

Decals, CE Specification

ITEM	PART NO.	QTY	DESCRIPTION
1	93209	4	Decal, 4069RT White
	93210	4	Decal, 4069RT Gray
2	92416	3	Decal, Website White
	92547	3	Decal, Website Gray
3	90730	1	Decal, Platform Warning
4	90721	1	Decal, Danger
5	93204	2	Decal, Platform Capacity
6	90722	1	Decal, Warning
7	8911	1	Decal, Manual Inside
8	--	--	--
9	91850	6	Decal, Crush
10	90729	1	Decal, Control Handle
11	7156	1	Decal, Front
12	93215	1	Decal, Upper Controls
13	91730	1	Decal, Outrigger
14	92848	2	Decal, Pipe Rack
15	7982	4	Decal, Warning Stripe
16	8503	2	Decal, Keep Clear
17	9910	4	Decal, Pinch
18	90739	1	Decal, Made in USA
19	90719	1	Decal, MEC Oval, White
	93412	1	Decal, MEC Oval, Gray
20	93051	5	Decal, Material Rack Capacity
21	90717	1	Decal, Maintenance Lock
22	8779	1	Decal, Battery Explosion Hazard
23	90726	1	Decal, Battery Weight
24	90725	4	Decal, Tires
25	11026730	4	Decal, Tie Down
26	90751	1	Decal, Power To Platform
27	92768	1	Decal, Serial Plate
28	--	--	--
29	9052	1	Decal, Battery Disconnect
30	91930	1	Decal, Lower Controls
31	90268	1	Decal, Platform Capacity Small
32	91975	1	Decal, Diesel
33	92089	1	Decal, Brake Release
34	6873	1	Decal, Hydraulic Oil
35	9465	4	Decal, Crush
36	8605	6	Decal, Lanyard Point
37	8606	1	Decal, Lanyard Warning
38	7155	1	Decal, Locate
39	90732	1	Decal, Powerwash
40	92054	1	Decal, Patents Pending
41	91325	1	Decal, Danger Electrical (Australia only)
42	92119	1	Decal, Relays
43	93186	4	Decal, Wheel Load
44	92769	2	Decal, No Step
45	93188	4	Decal, Outrigger Load
46	7982	4	Decal, Warning Stripe (cut short to fit positions shown)

• as req: as required • INCL: Included with assembly • NS: Not a Stock item • REF: Reference only

1 93209 (white), 93210 (dark gray)
4 Places

mec 4069 RT

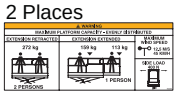
2 92416 (white), 92547 (dark gray)
3 Places

www.mecawp.com

3 90730

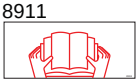
4 90721

5 93204
2 Places



6 90722

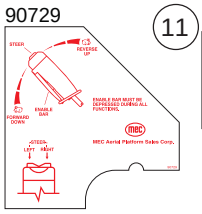
7 8911



8 not used

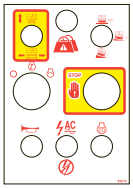
9 91850
6 Places

10 90729

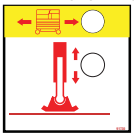


11 7156

12 93215



13 91730 (Option)



14 92848 (Option)
2 Places

15 7982
4 Places

16 8503
2 Places

17 9910
4 Places

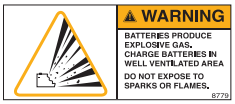
18 90739

19 90719 (white)
93412 (dark gray)

20 93051
5 Places

21 90717

22 8779



23 90726

24 90725
4 Places

25 11026730
4 Places

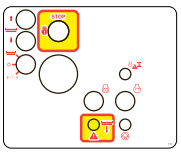
26 90751

27 92768

28 not used

29 9052

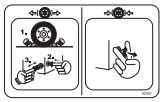
30 91930



31 90268

32 91975

33 92089



34 6873

35 9465 (Option)
4 Places

36 8605
6 Places

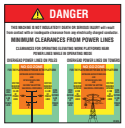
37 8606 (option)

38 7155

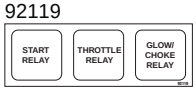
39 90732

40 92054

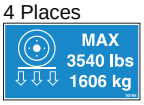
41 91325 Australia only



42 92119



43 93186
4 Places



44 92769
2 Places

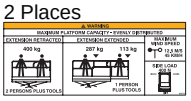
45 93188 (optional)
4 Places

46 7982 cut short to fit
4 Places

47 91388

Optional Centered Platform

5 93573
2 Places

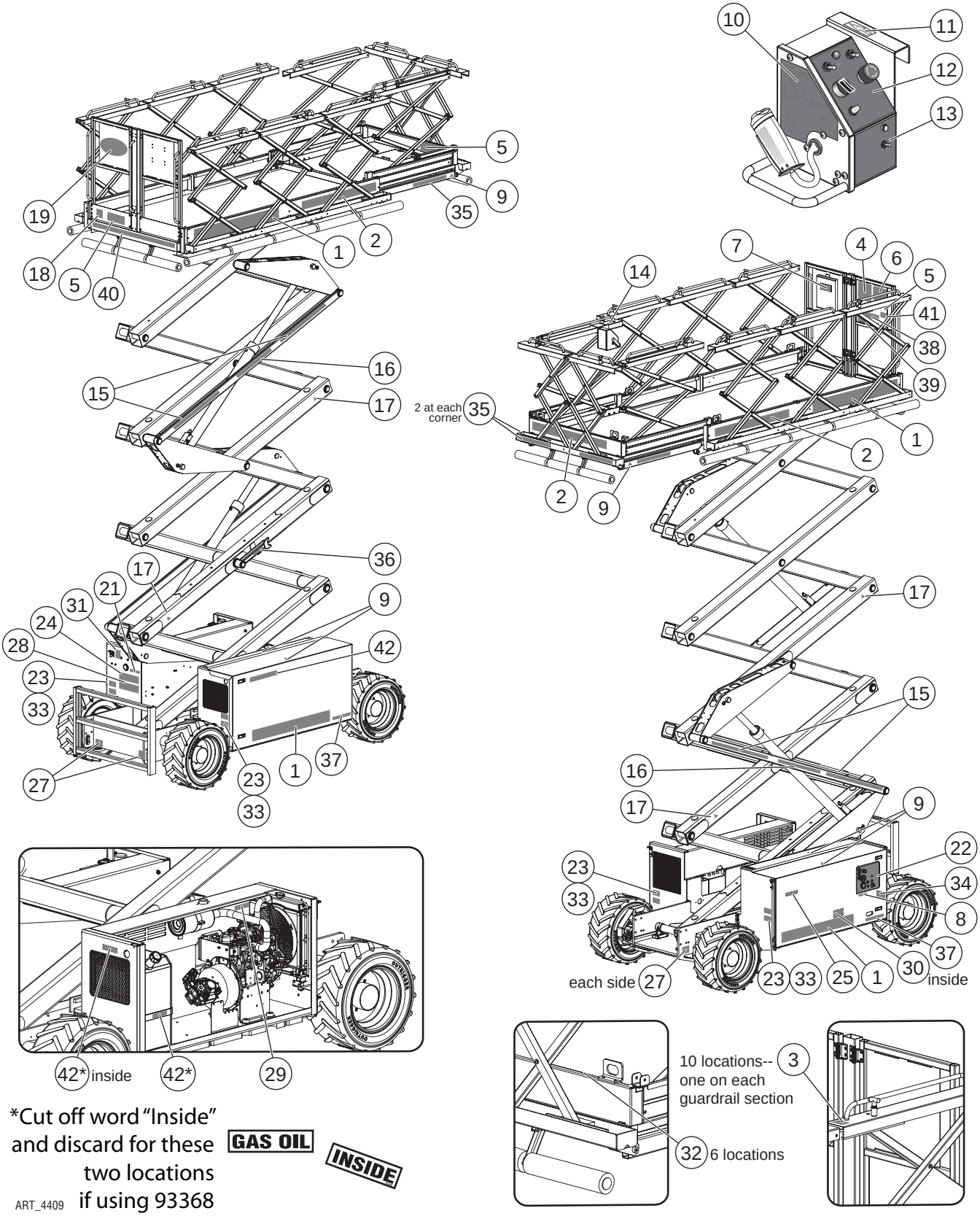


31 90577

Option omits items
#14, #20, #44

ILLUSTRATION No.
ART_4408

NOTES:


10
11
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5
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1
2
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17
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31
24
28
23
33
9
42
27
23
33
1
37
7
4
6
5
14
41
38
39
2 at each corner
35
2
9
1
2
17
15
16
17
9
22
34
8
37
23
33
each side
27
23
33
25
1
30
inside
42*
inside
42*
29
10 locations--
one on each
guardrail section
3
32
6 locations
*Cut off word "Inside"
and discard for these
two locations
if using 93368
GAS OIL
INSIDE
ART_4409

Decals, GSE Diesel Option, CE Specification

ITEM	PART NO.	QTY	DESCRIPTION
1	93403	4	Decal, 4069GSE Gray
2	92547	3	Decal, Website Gray
3	93370	10	Decal, Guardrail Pins
4	90721	1	Decal, Danger
5	93361	2	Decal, Platform Capacity 4069GSE
6	90722	1	Decal, Warning
7	8911	1	Decal, Manual Inside
8	93404	1	Decal, Platform Capacity Small
9	91850	6	Decal, Crush
10	90729	1	Decal, Control Handle
11	7156	1	Decal, Front
12	93215	1	Decal, Upper Controls
13	93214	1	Decal, Lights
14	7155	1	Decal, Locate
15	7982	4	Decal, Warning Stripe
16	8503	2	Decal, Keep Clear
17	9910	4	Decal, Pinch
18	90739	1	Decal, Made in USA
19	93412	1	Decal, MEC Oval, Gray
20	93051	5	Decal, Material Rack Capacity
21	90751	1	Decal, Power To Platform
22	91930	1	Decal, Lower Controls
23	90725	4	Decal, Tires
24	92768	1	Decal, Serial Plate
25	6873	1	Decal, Hydraulic Oil
26	--	--	--
27	11026730	4	Decal, Tie Down
28	92054	1	Decal, Patents Pending
29	92119	1	Decal, Relays
30	92089	1	Decal, Brake Release
31	9052	1	Decal, Battery Disconnect
32	8605	6	Decal, Lanyard Point
33	93186	4	Decal, Wheel Load
34	90732	1	Decal, Powerwash
35	7982	4	Decal, Warning Stripe (cut short to fit positions shown)
36	93368	3	Decal, Gas Oil Only
37	93369	2	Decal, Engineering
38	93401	1	Decal, Max Wind Speed
39	93402	1	Decal, Harnesses
40	93367	1	Decal, GSE Use Only
43	93186	4	Decal, Wheel Load
44	92769	2	Decal, No Step
45	93188	4	Decal, Outrigger Load
46	7982	4	Decal, Warning Stripe (cut short to fit positions shown)

1 93403
4 Places

mec 4069 GSE

2 92547 (dark gray)
3 Places
www.mecawp.com

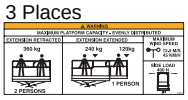
3 93370
10 places

ENSURE GUARDRAIL PINS ARE LATCHED BEFORE USE

YELLOW T-HANDLE MUST BE IN SEATED POSITION

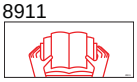
4 90721

5 93361
3 Places



6 90722

7 8911

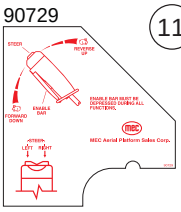


8 93404

PLATFORM CAPACITY
360 KG

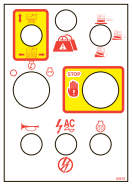
9 91850
6 Places

10 90729

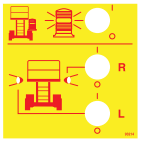


11 7156

12 93215



13 93214



14 7155

LOCATE CONTROL BOX HERE
FOR NORMAL OPERATION OF THIS UNIT

15 7982
4 Places

16 8503
2 Places

KEEP CLEAR

17 9910
4 Places

18 90739

19 93412

mec

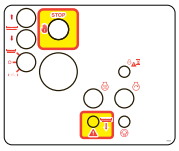
20 90717

MAINTENANCE LOCK
REFER TO PARTS AND SERVICE MANUAL FOR PROPER USE

21 90751

POWER TO PLATFORM

22 91930



23 90725
4 Places

WARNING

- REPLACE TIRES WITH MANUFACTURER'S EQUIPMENT ONLY.
- FAILURE TO USE MANUFACTURER'S TIRES MAY CAUSE MACHINE INSTABILITY.
- REFER TO SERVICE AND PARTS MANUAL FOR REPLACEMENT PART NUMBER.

24 92768

25 6873

HYDRAULIC OIL

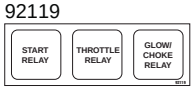
26 not used

27 11026730
4 Places

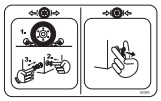
28 92054

Multiple Patents Pending

29 92119



30 92089

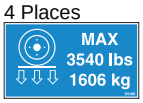


31 9052

32 8605
6 Places

CERTIFIED LANYARD ANCHORAGE POINT

33 93186
4 Places



34 90732

35 7982 cut short to fit
4 Places

36 not used

37 93369 -- 2 places

ENGINEERING 0208 562 7790

38 93401 -- 1 place

MAXIMUM WIND SPEED
20 KNOTS

39 93402 -- 1 place

HARNESSES MUST BE ATTACHED WHEN GUARDRAILS ARE LOWERED

40 93367 -- 1 place

FOR AIRCRAFT GROUND SUPPORT EQUIPMENT USE ONLY

41 91388

42 91975 -- 3 Places

OR

93368* -- 3 places

GAS OIL INSIDE

mec
ILLUSTRATION No.
ART_4421

*Cut off "INSIDE" for two locations inside Control Module if using 93368.

Service Parts Order Form
Fax to 559-400-6723

Please fill out completely

Date: _____ Ordered By: _____

Account: _____ Your Fax No.: _____

Bill to: _____ Ship to: _____

_____ _____

_____ _____

_____ _____

Purchase Order Number _____

**All orders MUST have a Purchase Order Number

Ship VIA_____

**Fed Ex shipments require Fed Ex account number

Part Number	Description	Quantity	Price

All back ordered parts will be shipped when available via the same ship method as original order unless noted below:

- Ship complete order only - no back orders
- Ship all available parts and contact customer on disposition of back ordered parts
- other (please specify)

_____

NOTES:

Limited Owner Warranty

MEC Aerial Platform Sales Corp. warrants its equipment to the original purchaser against defects in material and/or workmanship under normal use and service for one (1) year from date of registered sale or date the unit left the factory if not registered. MEC Aerial Platform Sales Corp. further warrants the structural weldments of the main frame and scissor arms to be free from defects in material or workmanship for five (5) years from date of registered sale or date unit left the factory if not registered. Excluded from such warranty is the battery(s) which carries a ninety (90) day warranty from described purchase date. Warranty claims within such warranty period shall be limited to repair or replacement, MEC Aerial Platform Sales Corp's option, of the defective part in question and labor to perform the necessary repair or replacement based on MEC Aerial Platform Sales Corp's then current flat rate, provided the defective part in question is shipped prepaid to MEC Aerial Platform Sales Corp. and is found upon inspection by MEC Aerial Platform Sales Corp. to be defective in material and/or workmanship. MEC Aerial Platform Sales Corp. shall not be liable for any consequential, incidental or contingent damages whatsoever. Use of other than factory authorized parts; misuse, improper maintenance, or modification of the equipment voids this warranty. The foregoing warranty is exclusive and in lieu of all other warranties, express or implied. All such other warranties, including implied warranties of merchantability and of fitness for a particular purpose, are hereby excluded. No Dealer, Sales Representative, or other person purporting to act on behalf of MEC Aerial Platform Sales Corp. is authorized to alter the terms of this warranty, or in any manner assume on behalf of MEC Aerial Platform Sales Corp. any liability or obligation which exceeds MEC Aerial Platform Sales Corp's obligations under this warranty.

Aerial Platform Sales Corp.

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