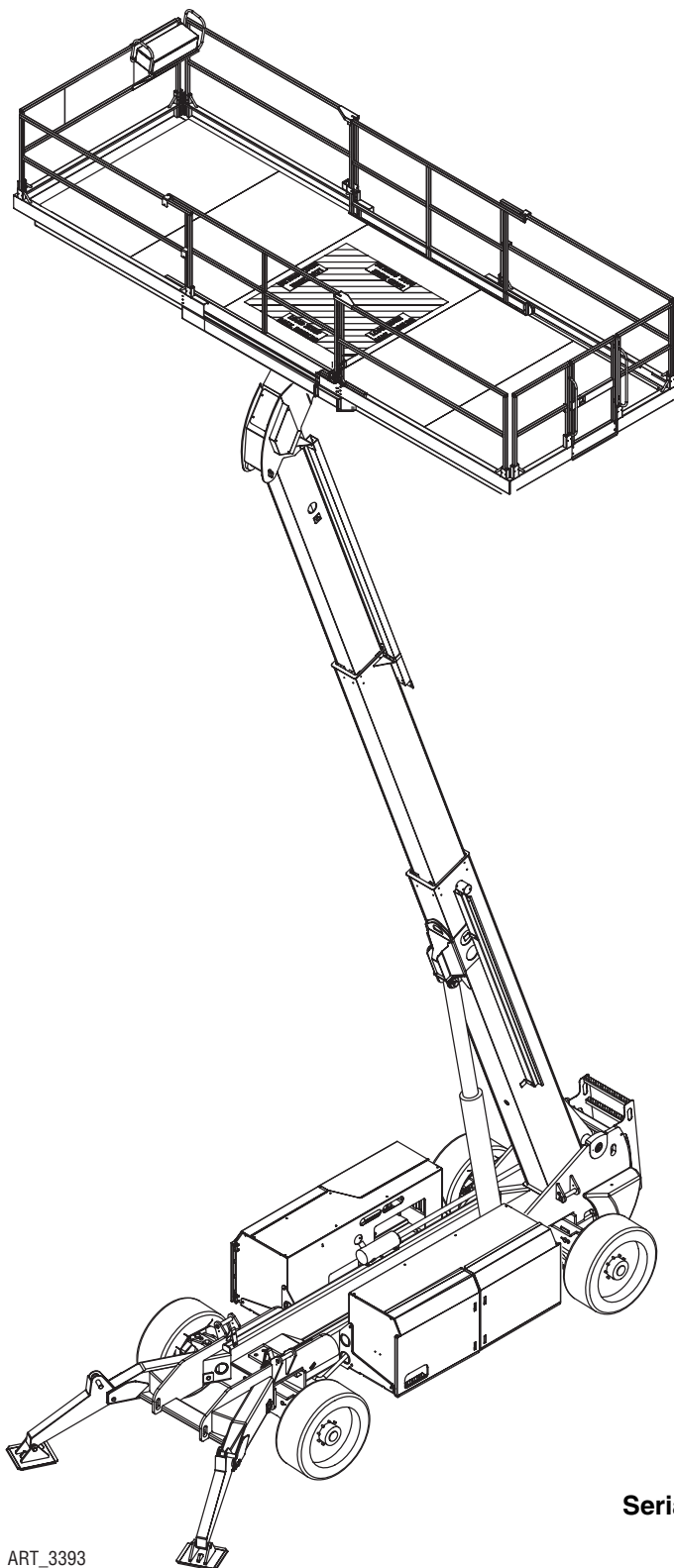




SERVICE AND PARTS MANUAL

Titan Boom 40-S



ART_3393

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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 - TITAN BOOM 40-S

| TITAN Boom™ 40-S | | | | |
|--|--------------------------------------|---------------------------------|-------------------------|---|
| Working Height* | 46 ft | 14.2 m | | |
| Platform Height | 40 ft | 12.2 m | | |
| Maximum Drive Height | 30 ft | 9.1 m | | |
| Maximum Forward Reach w/ Stabilizers | 26 ft 6 in | 8 m | | |
| Machine Weight** (Unloaded) | 24400 lb | 11065 kg | | |
| Lift Capacity | Total | 4000 lb | 1810 kg | |
| | Load Zone | 3000 lb | 1360 kg | |
| | Personnel & Tools Evenly Distributed | 1000 lb | 450 kg | |
| Maximum Occupants | | 4 | | |
| Stowed Height | Rails Up | 118 in | 3 m | |
| | Rails Folded Down | 84 in | 2.13 m | |
| Overall Length | | 22 ft 6 in | 6.9 m | |
| Overall Width | | 96 in | 2.44 m | |
| Wheel Base | | 152 in | 3.85 m | |
| Wheel Track | | 82 in | 2.08 m | |
| Platform Dimensions | Length | 22 ft | 6.7 m | |
| | Platform Width | 90 in | 2.28 m | |
| | Loading Height | 72 in | 1.83 m | |
| Turning Radius, | Inside | 8 ft | 2.4 m | |
| (4 Wheel Steer) | Outside | 19 ft | 5.8 m | |
| Ground Clearance | | 18 in | 46 cm | |
| Lift/Lower Speeds | | 50 sec/ 50 sec | | |
| Extend/Retract Speeds | | 30 sec/ 30 sec | | |
| Platform Translation Speed | | 15 sec | | |
| Drive Speed | Stowed | 0-4 mph | 0-6.4 km/h | |
| (Proportional) | Raised or extended | 0-.5 mph | 0-.8 km/h | |
| Gradeability | Stowed, downhill | 40%/22° | | |
| | Stowed, uphill | 40%/22° | | |
| Approach Angle | | 38%/21° | | |
| Breakover Angle | | 40%/22° | Engine | Kubota V2403-T |
| Platform Rotation | | 180° (+90°, -90°) | Fuel Type | Diesel |
| Frame Level | | 10° each side | Fuel Capacity | 32 gal 120 liter |
| Maximum Operating Wind Speed | | 28 mph 12.5 m/sec (45 km/h) | Alternator | 40 amp |
| Ground Pressure/Wheel (Maximum) | | 160 psi 11.2 kg/cm ² | Batteries | Two 1000 CCA 12V Group 31 |
| Maximum Wheel Load | | 9600 lbs 4350 kg | Noise Level | 86 dB(A) @ work station |
| Tire Size | | 37 in. od .94 m od | Control System | 12V DC |
| Wheel Lug Nut Torque | | 150 ft/lb 203 Nm | Brakes | 4 wheel multi disc |
| Hydraulic Pressure | Drive System | 4350 psi 300 bar | Maximum | does not exceed |
| | Main System | 3000 psi 207 bar | Vibration | 2.5 m/sec ² at operator's position |
| Hydraulic Fluid Capacity | | 40 gal 150 liter | Ambient Operating Range | -40° F (-40° C) minimum; 122° F (50° C) maximum |
| *Working Height adds 6 feet (2 m) to platform height. | | | | |
| **Weight may increase with certain options or country standards. | | | | |

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.



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 any question regarding application and/or operation contact:



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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.

MAINTENANCE TIPS

- 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.

SETTING THE MAINTENANCE CHOCK



NEVER PERFORM WORK OR INSPECTION ON THE MACHINE WITH THE PLATFORM ELEVATED WITHOUT FIRST BLOCKING THE BOOM ASSEMBLY WITH THE MAINTENANCE CHOCK.

THE MAINTENANCE CHOCK IS HEAVY. HOLD IT SECURELY DURING THE INSTALLATION AND REMOVAL PROCESS.

THE MAINTENANCE CHOCK MAY ROTATE AROUND THE CYLINDER ROD DURING MACHINE MOVEMENT AND MAY FALL IF IT IS NOT HELD SECURELY IN PLACE DURING INSTALLATION AND REMOVAL.

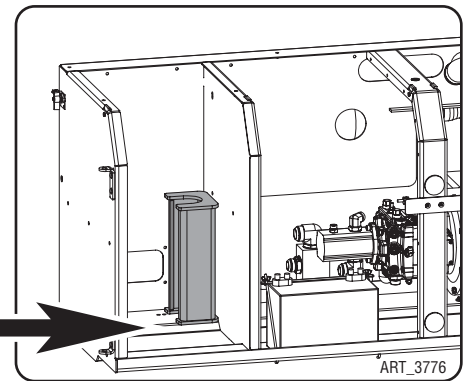
The Maintenance Chock fits over the lift cylinder rod, between the rod end and the end of the cylinder barrel.

INSTALLATION

- Remove the Maintenance Chock from the tool storage compartment of the Engine Module.
- Using the Boom Lift/Lower function, raise the platform to approximately 13 feet (4 m).
- Place the Maintenance Chock over the cylinder rod above the cylinder barrel.
- Using the Boom Lift/Lower function, slowly lower the boom until the Maintenance Chock is secure between the cylinder rod end and the cylinder barrel.

Maintenance Chock stowed in compartment beside engine

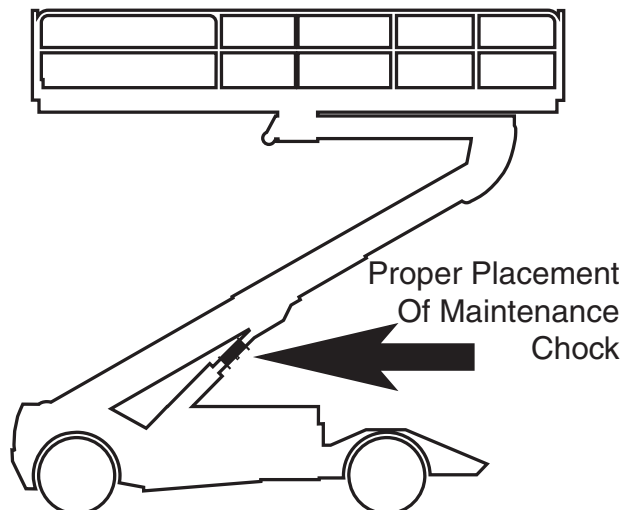
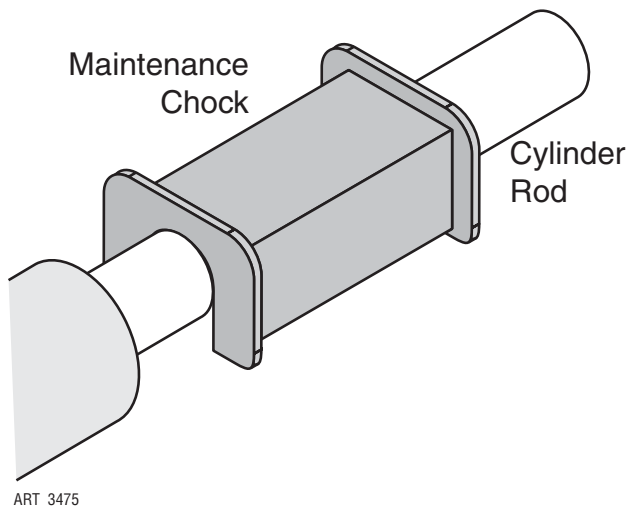
Figure 1-1: Maintenance Chock Stowage



REMOVAL

- Using the Boom Lift/Lower function, raise the platform to approximately 13 feet (4 m) until the Maintenance Chock moves freely.
- Remove the Maintenance Chock from the cylinder rod.
- Store the Maintenance Chock in the tool storage compartment of the Engine Module.

Figure 1-2: Maintenance Chock Installation



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

To 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 electrical system damage, battery explosion, and personal injury.

TOTAL SYSTEM



WARNING

ENGINE COOLANT LEVEL MUST BE CHECKED ONLY AFTER ENGINE HAS COOLED. IF RADIATOR CAP IS REMOVED WHILE THE COOLANT IS AT NORMAL OPERATING TEMPERATURE, PRESSURE WITHIN THE COOLANT SYSTEM WILL FORCE HOT LIQUID OUT THROUGH THE FILLER OPENING AND MAY CAUSE SEVERE SCALDING.



CAUTION

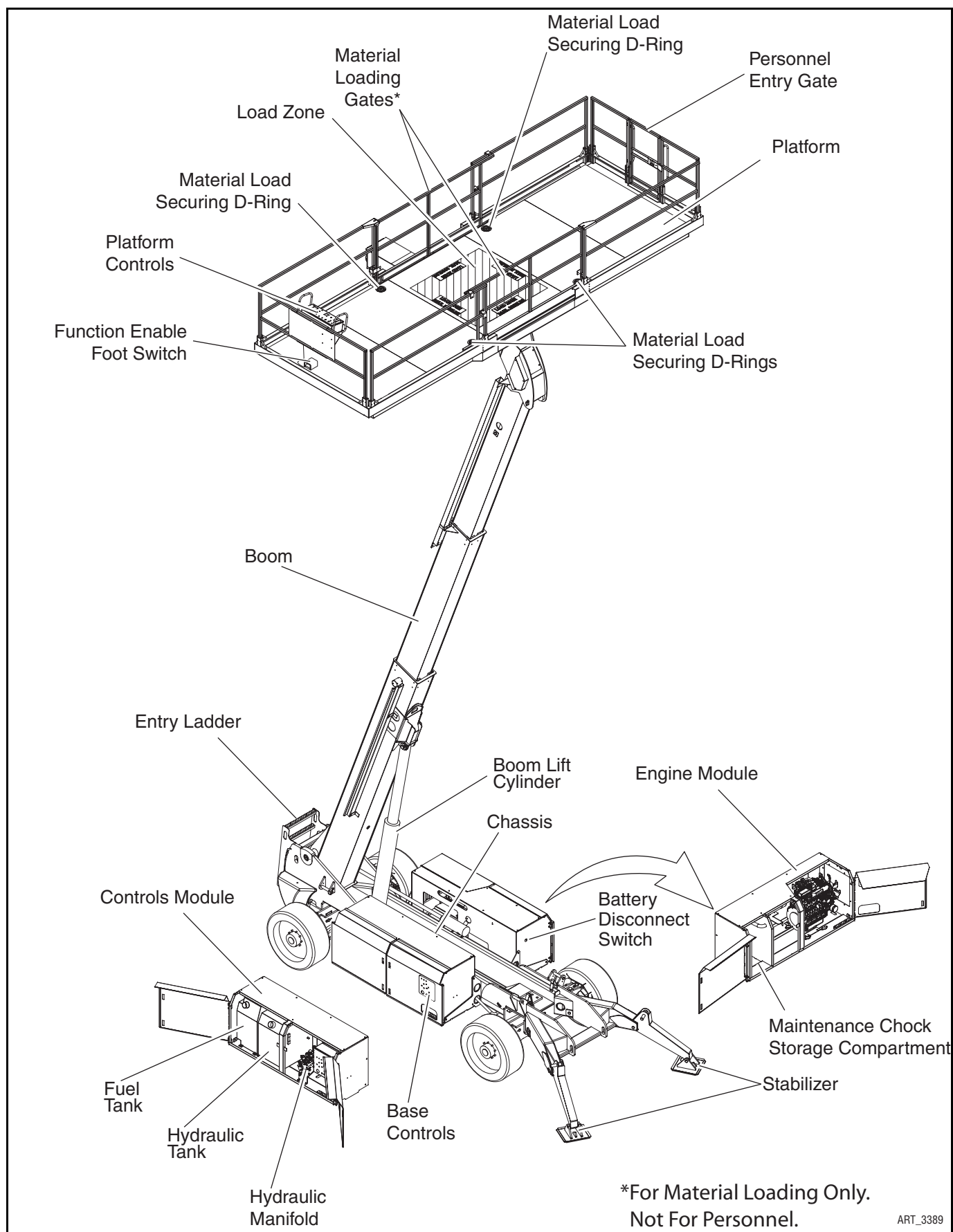
Failure to perform preventive maintenance at recommended intervals may result in the unit being operated with a defect that could result in injury or death of the operator.

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 1-3: 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 - |  | | | |  | | | | CAP SCREW SIZE - millimeters - |   | | | |   | | | |
| | TORQUE | | | | TORQUE | | | | | 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 | <p>Torque values apply to fasteners as received from the supplier, dry or when lubricated with normal engine oil.</p> <p>If special graphite grease, molydisulphide grease, or other extreme pressure lubricants are used, these torque values <i>do not</i> apply.</p> | | | | | | | | |
| 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 | | | | | | | | | |

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



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 1-4: Emergency Stop Switch

The machine is equipped with an EMERGENCY STOP switch on both control panels.

- 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 operate from the lower controls if the upper controls switch is tripped.



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EMERGENCY LOWERING



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 BOOM ASSEMBLY OR EXIT THE PLATFORM.

The Emergency Lowering System is used to lower the platform in case of power failure. To lower the platform, activate the Emergency Power Switch to run the Emergency Down auxiliary hydraulic pump.

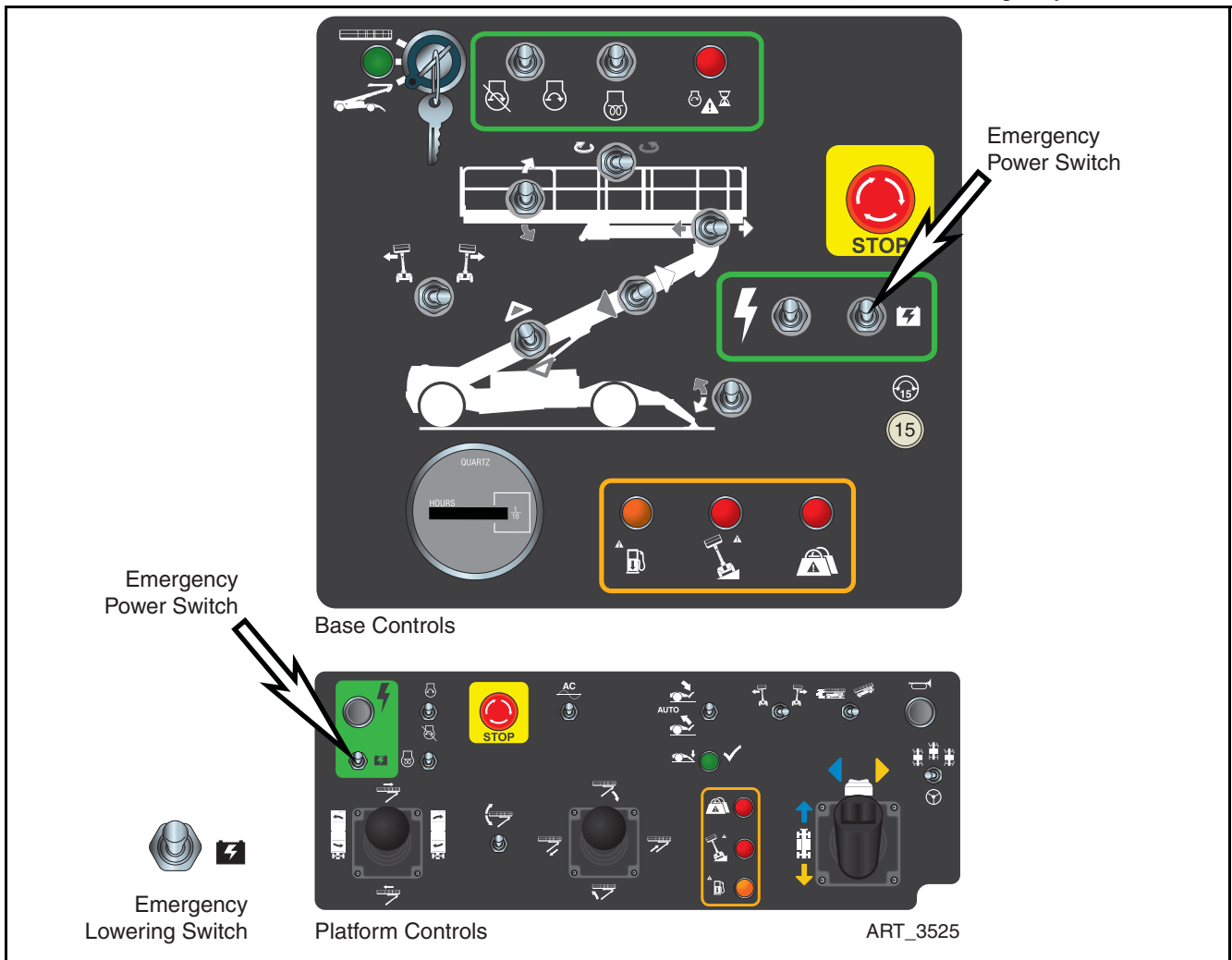
This function uses battery power from the auxiliary battery to lower the platform.

- Push and hold the Emergency Power Switch, then use the Boom Extend/Retract function to retract the boom.
- Continue to hold the Emergency Power Switch, then use the Boom Lift/Lower function to lower the boom.

NOTE: The Emergency Lowering System overrides the engine function. The engine will shut off when the Emergency Power Switch is engaged.

The Emergency Power Switch serves as an enable switch. It is not necessary to use the primary function enable switch.

Figure 1-5: Emergency Power Switch



FREE-WHEEL CONFIGURATION FOR WINCHING OR TOWING

The machine can be winched or moved short distances in case of power failure at speeds not to exceed 5 MPH (8.05 km/h). Before towing or winching the machine, it is necessary to release the brake. Reset the brakes after winching or towing.



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.

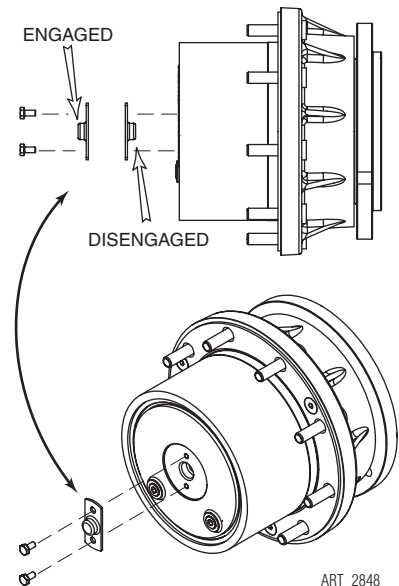
DISENGAGE BRAKES BEFORE TOWING OR WINCHING

- Chock the wheels.
- Remove the Brake Engage Cap and reinstall with the bump facing inward on all four (4) hubs.

ENGAGE BRAKES BEFORE DRIVING

- Remove the Brake Engage Cap and reinstall with the bump facing outward on all four (4) hubs.

Figure 1-6: Brake Release



LIFT AND SUPPORT THE MACHINE



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 seven (7) tons or more.
- jack stands with a rating of seven (7) 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 the tires on the end of machine opposite the end to be raised.
3. If wheel is to be removed, break loose but **do not remove** lug nuts 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 nuts to hold the wheel snug to the hub. Do not torque the lug nuts at this time.
2. Raise machine slightly and remove jack stands.
3. Lower the machine and remove the jack.
4. Tighten lug nuts to proper torque (refer to machine specifications).
5. Remove chocks.

TRANSPORTING THE MACHINE

SAFETY INFORMATION



THIS INFORMATION IS PROVIDED FOR REFERENCE AND DOES NOT SUPERSEDE ANY GOVERNMENT OR COMPANY POLICY REGARDING THE LOADING, TRANSPORT OR LIFTING OF MEC MACHINERY.

DRIVERS ARE RESPONSIBLE FOR LOADING AND SECURING MACHINES, AND SHOULD BE PROPERLY TRAINED AND AUTHORIZED TO OPERATE MEC MACHINERY.

DRIVERS ARE ALSO RESPONSIBLE FOR SELECTING THE CORRECT AND APPROPRIATE TRAILER ACCORDING TO GOVERNMENT REGULATIONS AND COMPANY POLICY.

DRIVERS MUST ENSURE THAT THE VEHICLE AND CHAINS ARE STRONG ENOUGH TO HOLD THE WEIGHT OF THE MACHINE (SEE THE SERIAL NUMBER PLATE FOR MACHINE WEIGHT).

DRIVING OR WINCHING ONTO OR OFF OF A TRANSPORT VEHICLE

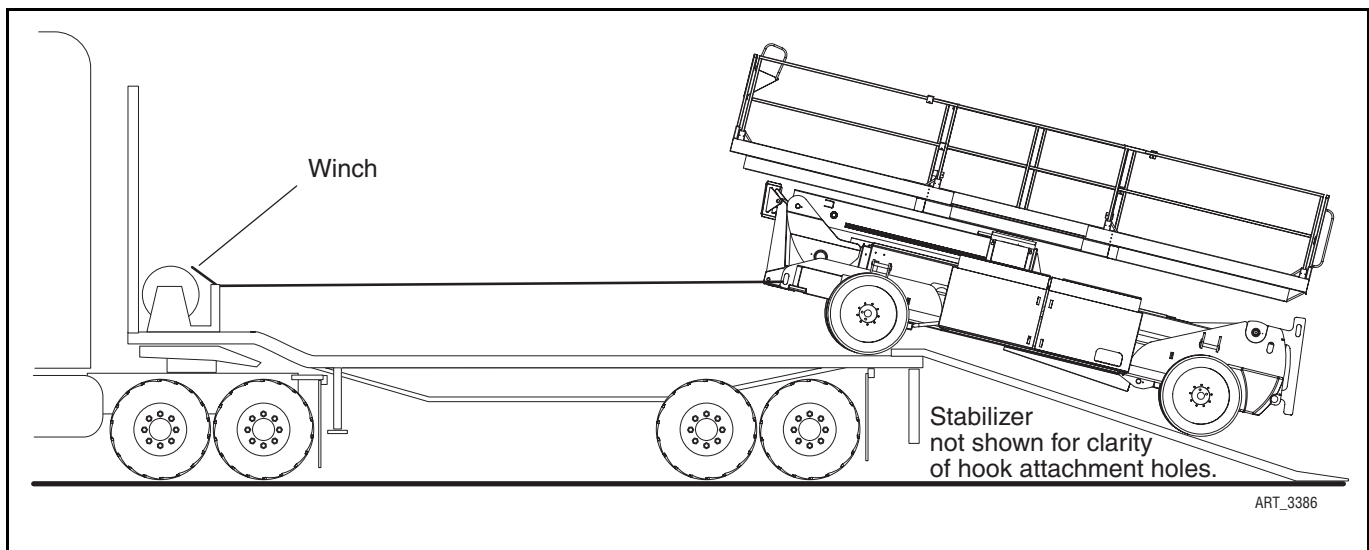


MEC DOES NOT RECOMMEND UNASSISTED LOADING OR UNLOADING.

ALWAYS ATTACH THE MACHINE TO A WINCH WHEN LOADING OR UNLOADING FROM A TRUCK OR TRAILER BY DRIVING.

Refer to the Operator's Manual for loading, unloading, driving and operating instructions.

Figure 1-7: Loading the Machine





Section 1

HYDRAULIC SYSTEM

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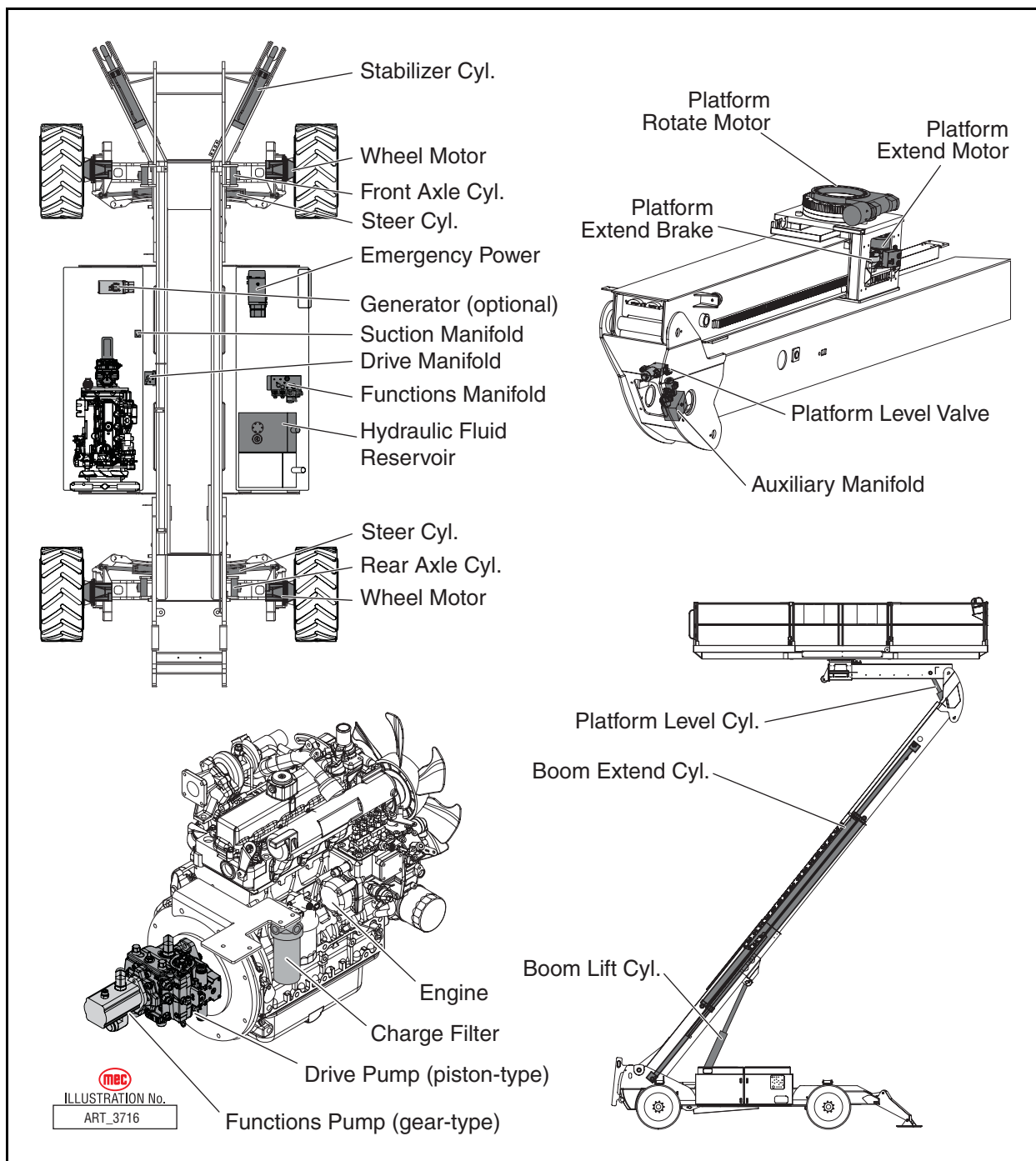
HYDRAULIC SYSTEM – GENERAL

The hydraulic integrated system is designed to control all or part of machine functions by integrating various hydraulic cartridge valves into three manifolds to provide directional, pressure, flow, and load control.

The hydraulic system is a feedback, load-sensing type. Hydraulic fluid is provided by a variable displacement, axial piston-type Drive Pump which is directly coupled to the engine, and by a fixed displacement gear-type Functions Pump mounted to the back of the piston pump. As the engine turns, the hydraulic pumps draw fluid from the reservoir and pump this fluid to the valve manifolds.

Each function has a maximum pressure control limit set by pressure relief valves.

Figure 1-1: Hydraulic System



HYDRAULIC ROADMAP

HYDRAULIC RESERVOIR

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

SUCTION MANIFOLD

The Suction Manifold takes fluid in from the Hydraulic Tank and sends it out the Drive Pump and Function Pump

DRIVE PUMP

The piston-type Drive Pump with infinitely variable proportional control delivers hydraulic fluid under pressure to the Drive Manifold.

FUNCTIONS PUMP

The tandem gear-type Functions Pump delivers hydraulic fluid under pressure to the Functions Manifold.

DRIVE MANIFOLD

The Drive Manifold directs hydraulic fluid to the Wheel Motors and contains valve circuitry that improves performance on slippery surfaces.

AUXILIARY MANIFOLD

The Auxiliary Manifold provides hydraulic fluid pressure to the Platform Level, Rotate and Slide functions.

FUNCTIONS MANIFOLD

The Functions Manifold directs the hydraulic fluid to the Boom Lift, Boom Extend, Stabilizer, Axle and Steering Cylinders through the use of electronically-operated solenoid valves.

WHEEL MOTORS

There are four 2-speed hydraulic wheel motors to provide power to all four wheels. The wheel motors turn gear hubs with integral spring-applied, hydraulically-released brakes. The brakes are released by hydraulic pressure from the Functions Manifold. The drive system is hydrostatic; deceleration is provided by the drive motor.

AXLE CYLINDERS

Four hydraulic cylinders control angle of the axles relative to the frame. The front axle cylinders move freely and allow the front axle to float when driving over rough terrain when the platform is stowed. When platform is elevated, the front axle cylinders lock in place to increase machine stability. The rear axle cylinders are used to level the frame before elevating. Each cylinder has an integral counterbalance valves for load-holding.

STEERING SYSTEM

This machine has three steering modes: 2-wheel, 4-wheel and Crab steer. Rear-wheel steering is not self-centering, and the rear wheels must be centered before selecting 2-wheel mode.

If the front and rear wheels become out of phase, place the machine in Crab steering mode, then press and hold the steering button until all four wheels are turned fully in one direction. Return the wheels to center before switching to 2-wheel or 4-wheel mode.

STABILIZER SYSTEM

Two hydraulic cylinders stabilize the machine in the fore-and-aft plane.



BOOM LIFT CYLINDER

One hydraulic lift cylinder raises and lowers the boom.

BOOM EXTEND CYLINDERS

Two cylinders mounted tandem are used to extend and retract the boom. No sequencing cables or chains are used.

PLATFORM LEVEL VALVE

This valve controls the flow of hydraulic fluid to the Platform Level Cylinder.

PLATFORM LEVEL CYLINDER

One hydraulic cylinder levels the platform as needed as the boom is raised and lowered.

PLATFORM ROTATE MOTOR

One hydraulic motor turns a worm gear to rotate the position of the platform relative to the chassis.

PLATFORM EXTEND MOTOR

One hydraulic motor slides the platform fore-and-aft along the platform beam using a spur gear and rack drive system.

PLATFORM EXTEND BRAKE

This brake unit prevents the platform from moving when the Platform Extend Motor is not in use.

EMERGENCY POWER UNIT

The Emergency Power Unit provides hydraulic fluid power to lower the platform in the event of engine failure or emergency.

GENERATOR SYSTEM -- OPTIONAL

If equipped, the generator is driven by a hydraulic motor which receives hydraulic fluid directly from the pressure port of the Functions Pump.

HYDRAULIC FLUID

HANDLING PRECAUTIONS



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.

FLUID RECOMMENDATIONS

MEC recommends only the use of the **Mobile Fluid** hydraulic fluids listed in the chart below, and each only in the operating temperatures listed in the chart. Do not substitute other fluids as pump damage may result, and use only the fluid appropriate to the ambient operating temperature.

Table 1-1: Hydraulic Fluid

| Recommended Hydraulic Fluid | |
|------------------------------|--------------------------|
| > 30° F (0° C) | Chevron 1000THF |
| 0° F (-18° C) ~ 30° F (0° C) | Chevron Rando Premium MV |
| < 0° F (-18° C) | Chevron Rando Premium MV |

SYSTEM FLUSHING PROCEDURE

1. With boom fully lowered and retracted, drain hydraulic fluid from hydraulic reservoir into a clean, empty container.
2. When the hydraulic reservoir is empty, remove suction strainer and hoses.
3. Remove the filter elements.
4. Flush the hoses with clean hydraulic fluid.
5. Discard old filter elements and replace.
6. Flush out the reservoir with hoses removed from the hydraulic reservoir.
7. Reinstall all hoses removed in the previous steps.
8. Fill hydraulic reservoir with filtered, fresh hydraulic fluid. Use only the appropriate hydraulic fluid as recommended in "Fluid Recommendations" on page 1-7.
9. Loosen the output hose fittings at the Functions Pump to flood with hydraulic fluid. Tighten fittings.
10. Perform the "Drive Pump Start-Up Procedure" on page 1-11.



DO NOT operate the Drive Pump until you have completed the "Drive Pump Start-Up Procedure" on page 1-11.
Severe damage will occur.

11. Start up the machine. Briefly operate all functions. Two or three complete cycles may be necessary to purge all air from Boom Lift and Boom Extend cylinder(s).
12. When the above procedures have been completed, lower the platform to the stowed position, completely retract the stabilizers, then fill hydraulic reservoir to the full mark on sight gauge.
13. Check for leaks and correct as necessary. Machine is now ready to be placed into operation.

HYDRAULIC FLUID RESERVOIR

The Hydraulic Fluid Reservoir Assembly consists of the reservoir, a lockable filler cap with breather, a drain plug, a sight gauge, and a bypass filter with a 10 micron filter element.

- Check reservoir for signs of leakage weekly.

HYDRAULIC FILTERS

The Hydraulic Fluid Reservoir contains a filter. Additionally, all machines have a Charge Filter Assembly attached to the engine.

When the filter is clogged, hydraulic flow bypasses the filter element.

Replace all filter elements every six (6) months or 500 hours. Extremely dirty conditions may require that the filter be replaced more often.



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

HYDRAULIC PUMPS

NOTE: Refer to *Parts Section E*.

An internal combustion engine drives the Drive Pump and the Functions Pump.

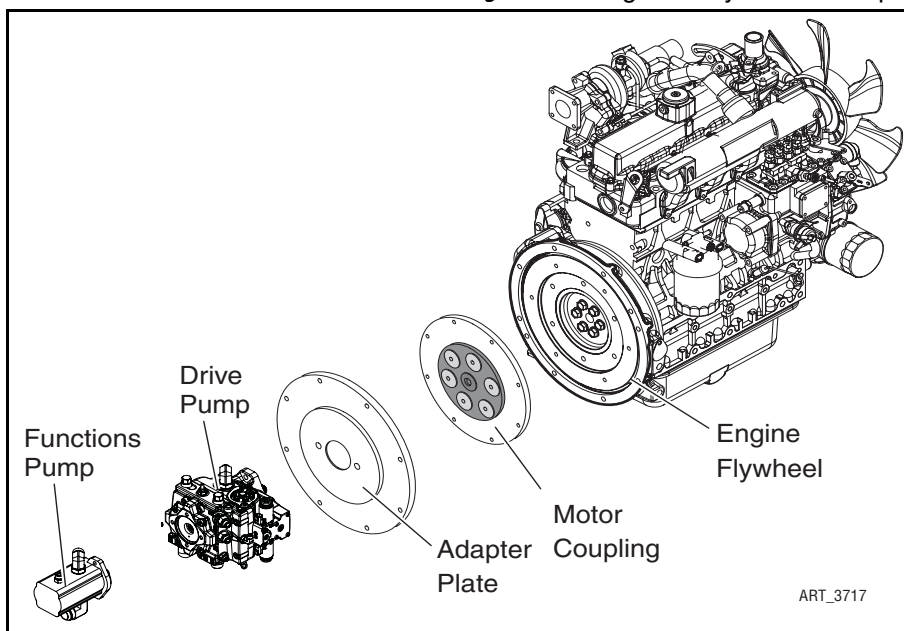
The Drive Pump is a variable displacement axial piston pump that provides hydraulic power to the Drive Motors. This is a hydrostatic drive system.

The Functions Pump is a gear pump that provides hydraulic power to the Functions Manifold.

Figure 1-2: Engine & Hydraulic Pumps

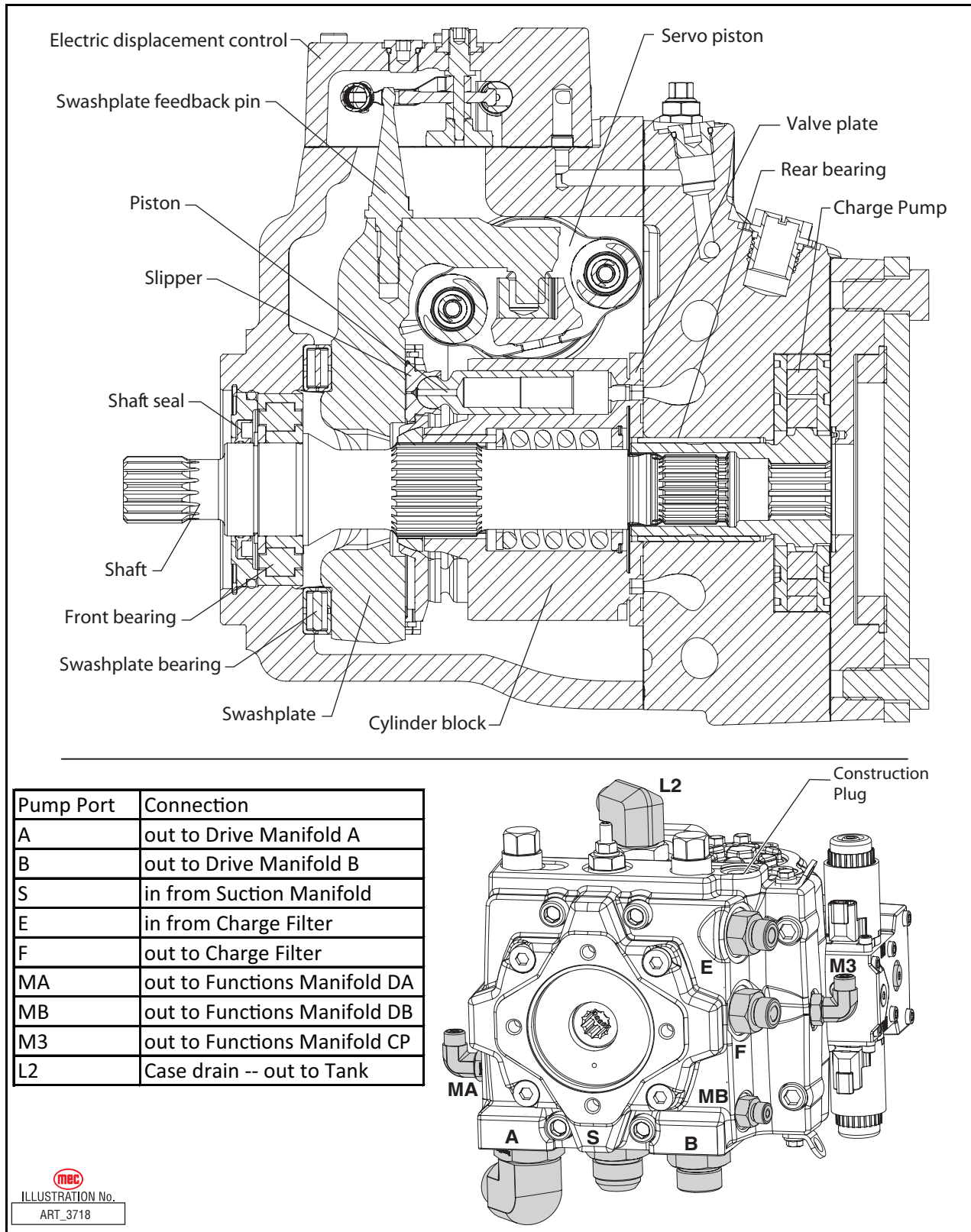
REMOVE

1. Turn the Battery Disconnect Switch (inside Control Module) to the OFF position.
2. Place a large container under the engine and pump to catch fluid that will be lost during pump replacement. Dispose of used fluid properly.
3. Close the ball valve on the Hydraulic Tank to prevent fluid loss when the hoses are removed.
4. Tag and disconnect hydraulic hoses, and IMMEDIATELY cap or cover the openings to prevent contamination.
5. Remove the two (2) bolts that hold the Functions Pump to the Drive Pump. Remove the gear pump.
6. Remove the two (2) bolts that hold the Drive Pump to the housing. Remove the piston pump.
7. Installation is reverse of removal. Apply one (1) drop of Loctite® 242 or equivalent to each mounting bolt.
8. Open the ball valve on the Hydraulic Tank.



Failure to open the ball valve on the Hydraulic Tank will result in damage to the pumps.

DO NOT operate the Drive Pump until you have completed the "Drive Pump Start-Up Procedure" on page 1-11. Severe damage will occur.

DRIVE PUMP**Figure 1-3: Drive Pump**

DRIVE PUMP START-UP PROCEDURE

Follow this procedure when restarting a machine on which the Drive Pump has been:

- Removed and re-installed, or
- Drained of fluid for any reason.



UNINTENDED MOVEMENT OF THE MACHINE OR MECHANISM MAY CAUSE INJURY. CHOCK THE WHEELS SECURELY BEFORE PERFORMING THIS PROCEDURE.

Inspect the pump for damage prior to installation. Use only the appropriate hydraulic fluid as recommended in "Fluid Recommendations" on page 1-7.

1. Ensure that the machine's hydraulic oil and system components (reservoir, hoses, valves, fittings, and heat exchanger) are clean and free of any foreign material.
2. Install new system filter element(s) if necessary. Check that inlet line fittings are properly tightened and that there are no air leaks.
3. Install the pump. Do not yet connect the hose between port L2 and the hydraulic fluid tank.
4. Install a 1000 psi (50 bar) gauge in the pressure gauge port GCP on the Functions Manifold.
5. Fill the housing by adding filtered hydraulic fluid in port L2. Open the Construction Plug to assist in air bleed.
6. Fill the reservoir with hydraulic fluid. Use a 10-micron filler filter. Fill the inlet line from reservoir to pump.
7. Fill the hydraulic hoses that connect ports E and F to the charge filter.
8. Connect the hose between port L2 to the hydraulic fluid tank. Close the Construction Plug removed in step 4.



After start-up the fluid level in the reservoir may drop due to system components filling. Damage to hydraulic components may occur if the fluid supply runs out. Ensure reservoir remains full of fluid during start-up.

Air entrapment in oil under high pressure may damage hydraulic components. Check carefully for inlet line leaks.

Do not run at maximum pressure until system is free of air and fluid has been thoroughly filtered.

9. Disable the engine to prevent it from starting by disconnecting the fuel shutoff solenoid. Crank the starter for several seconds. Do not to exceed the engine manufacturer's recommendation. Wait 30 seconds and then crank the engine a second time as stated above. This operation helps remove air from the system lines. Refill the reservoir to recommended full oil level.
10. When the gauge begins to register charge pressure, reconnect the fuel shutoff solenoid, then start engine. Let the engine run at low idle for a minimum of 30 seconds to allow the remaining air to work itself out of the system. Check for leaks at all line connections and listen for cavitation. Check for proper fluid level in reservoir.

11. When charge pressure rises above 160 psi (11 bar), increase engine speed to normal operating rpm to further purge residual air from the system.
12. Shut off the engine. Connect the pump control signal wires. Start the engine, checking to be certain pump remains in neutral. Run the engine at normal operating speed and carefully check for forward and reverse control operation.
13. Continue to cycle between forward and reverse for at least five minutes to bleed all air and to flush system contaminants out of loop.

NOTE: Normal charge pressure fluctuation will occur during forward and reverse operation.

14. Check that the reservoir is full. Remove the pressure gauge.
15. The pump is now ready for operation.

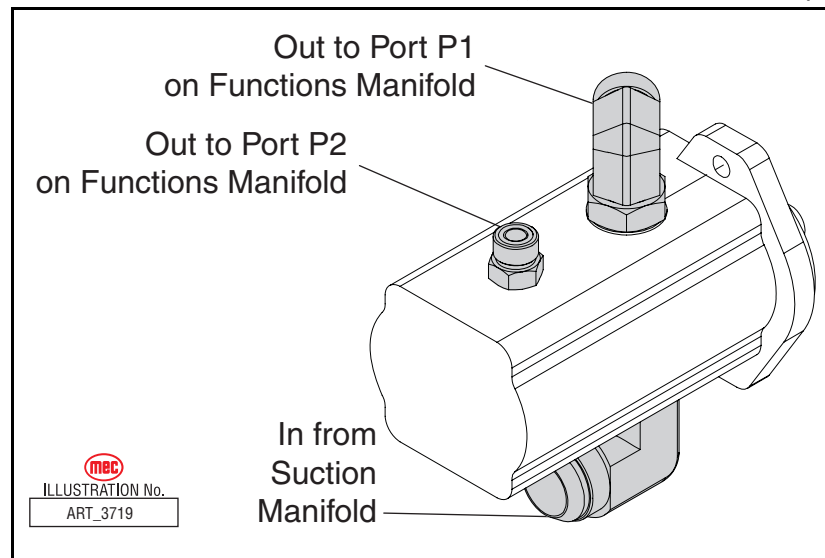
DRIVE PUMP SERVICE

MEC does not recommend end-user maintenance or repair of the Sauer Danfoss hydraulic pump. Contact MEC or Sauer Danfoss for the nearest service provider.

FUNCTIONS PUMP

The Functions Pump is a fixed-displacement gear pump. Power to functions is controlled by the proportional valves, and unused pressure is returned to the tank by the Flow Regulator (EPFR1).

Figure 1-4: Functions Pump



HYDRAULIC MANIFOLDS

NOTE: Refer to *Parts Section E*.

This machine has three hydraulic manifolds: the Functions Manifold, the Auxiliary Manifold and the Drive Manifold.



- **Clean all fittings before disconnecting hoses.**
- **Tag all hoses and wiring for proper reassembly.**
- **Plug all openings immediately to prevent contamination.**
- **Replace any O-rings and inspect all hoses for crack and damage before reassembly.**

REMOVAL

1. Disconnect the negative battery terminal.
2. Close the ball valve on the Hydraulic Tank to prevent fluid loss when the hoses are removed.
3. Tag and disconnect the solenoid valve electrical leads.
4. Tag and disconnect hydraulic hoses. Immediately cap the openings to prevent contamination.
5. Remove the bolts that hold the manifold to the mounting bracket.
6. Remove the manifold block.

DISASSEMBLY

1. Remove 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 242 or equivalent thread locker on each screw-in orifice.
2. Install valves.

INSTALLATION

1. Attach manifold assembly to mounting plate with mounting bolts.
2. Connect solenoid leads as previously tagged.
3. Connect hydraulic hoses as previously tagged. Be certain to tighten hoses.
4. Open the ball valve on the Hydraulic Tank.



Failure to open the ball valve on the Hydraulic Tank will result in damage to the pumps.

5. Connect the battery.
6. Operate each hydraulic function and check for leaks and for proper operation.
7. Adjust valve pressures.

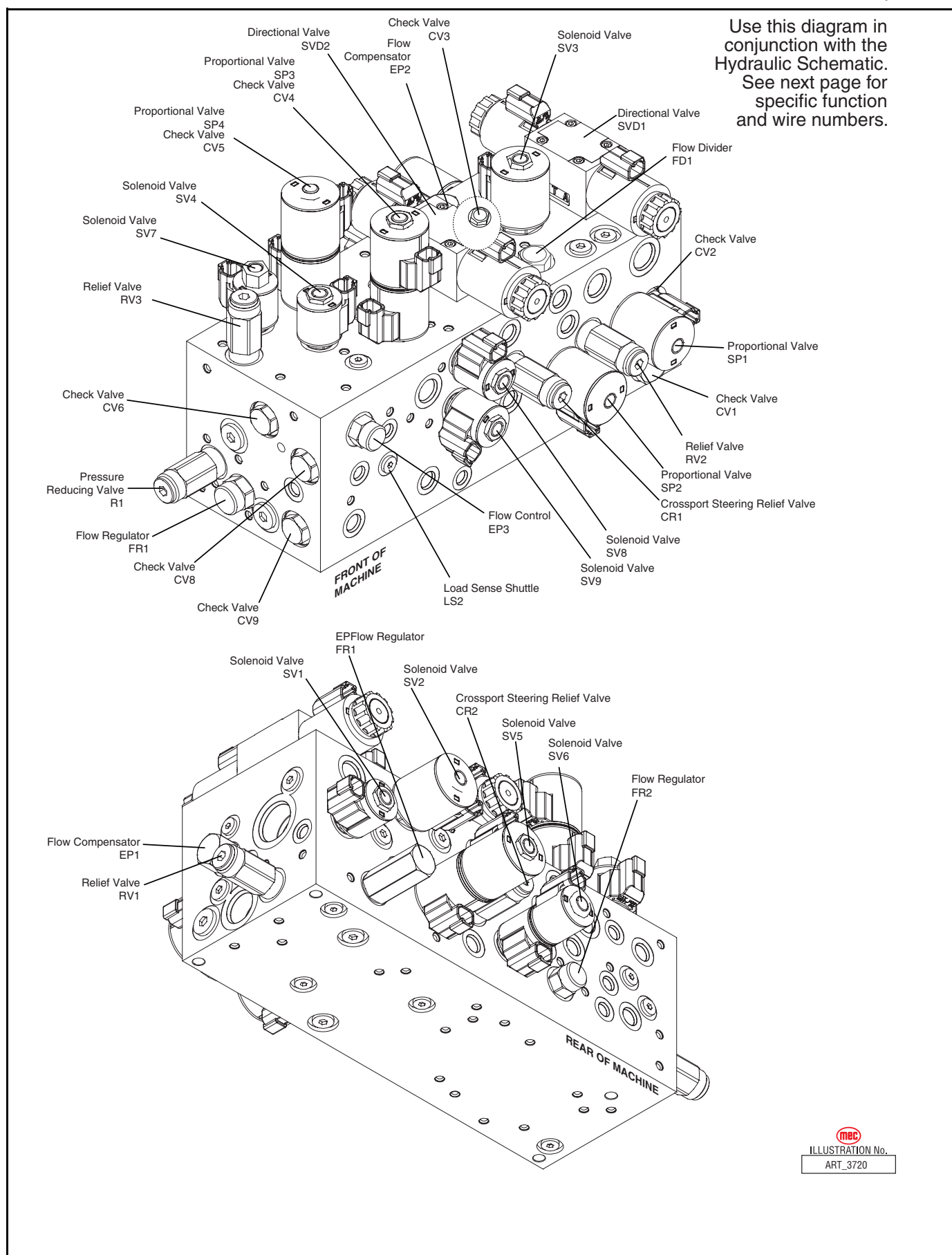
Figure 1-5: Functions Manifold, Components

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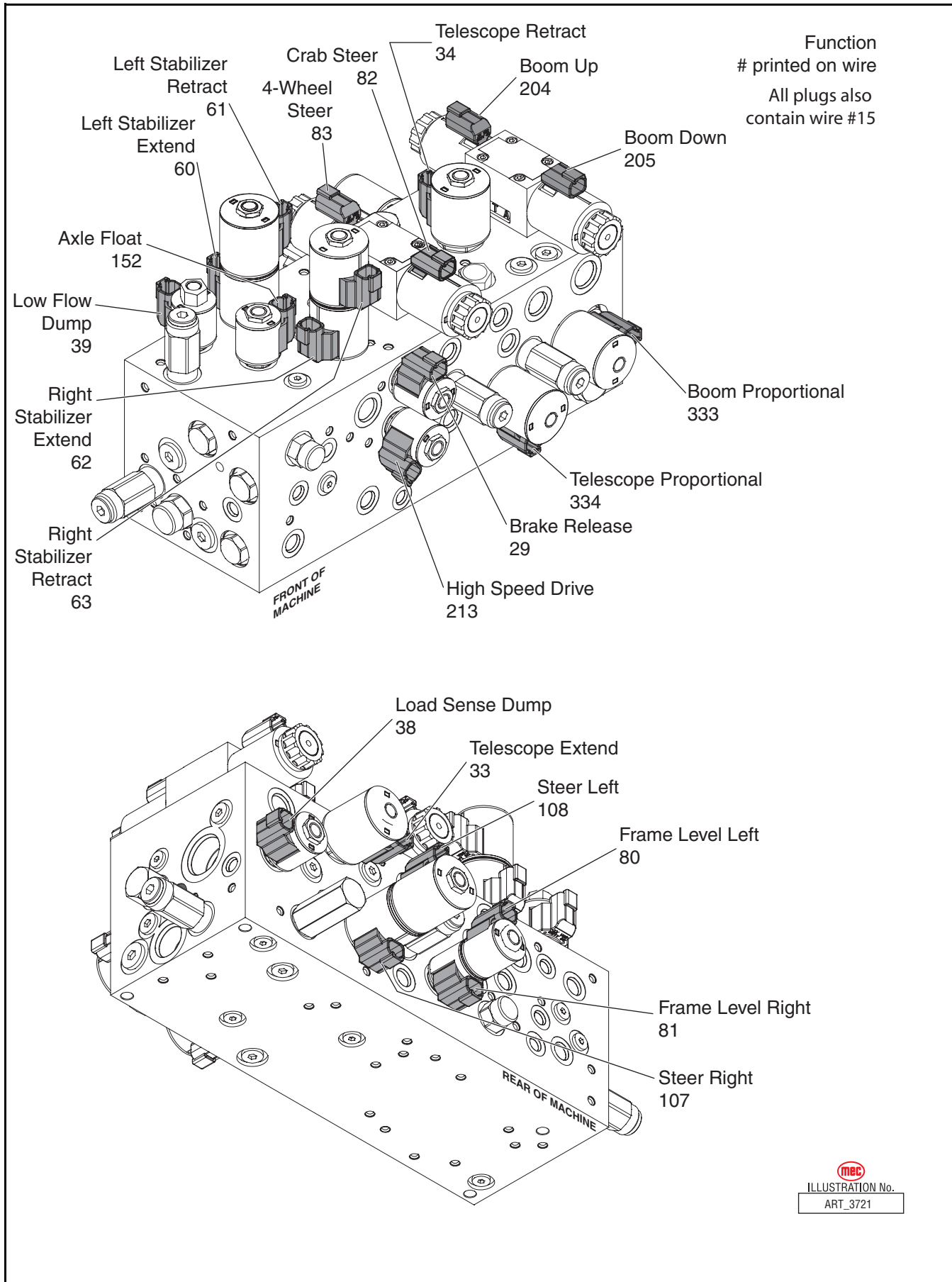
Figure 1-6: Functions Manifold, Wiring Harness Connections

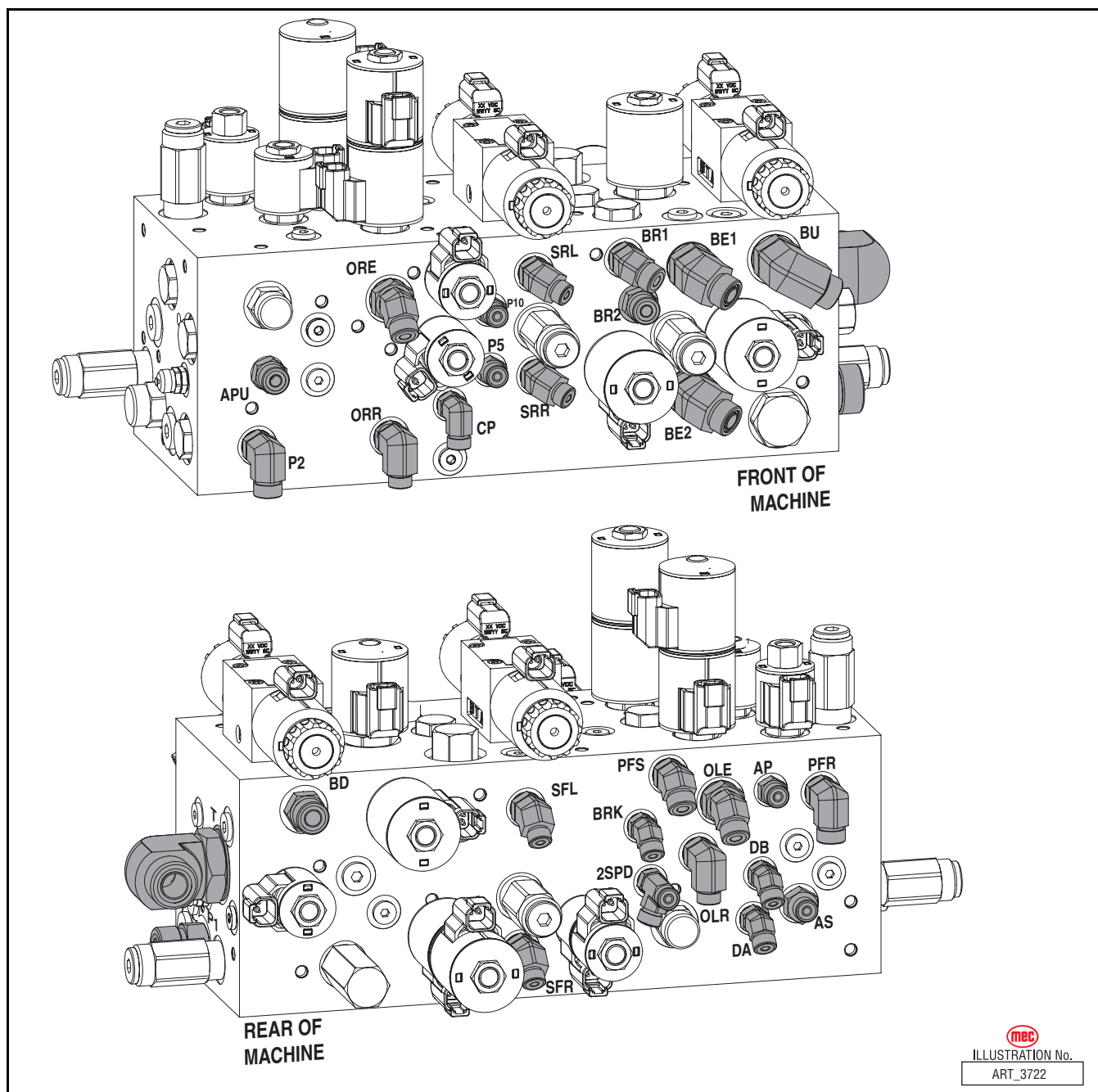
Figure 1-7: Functions Manifold, Fitting Orientation

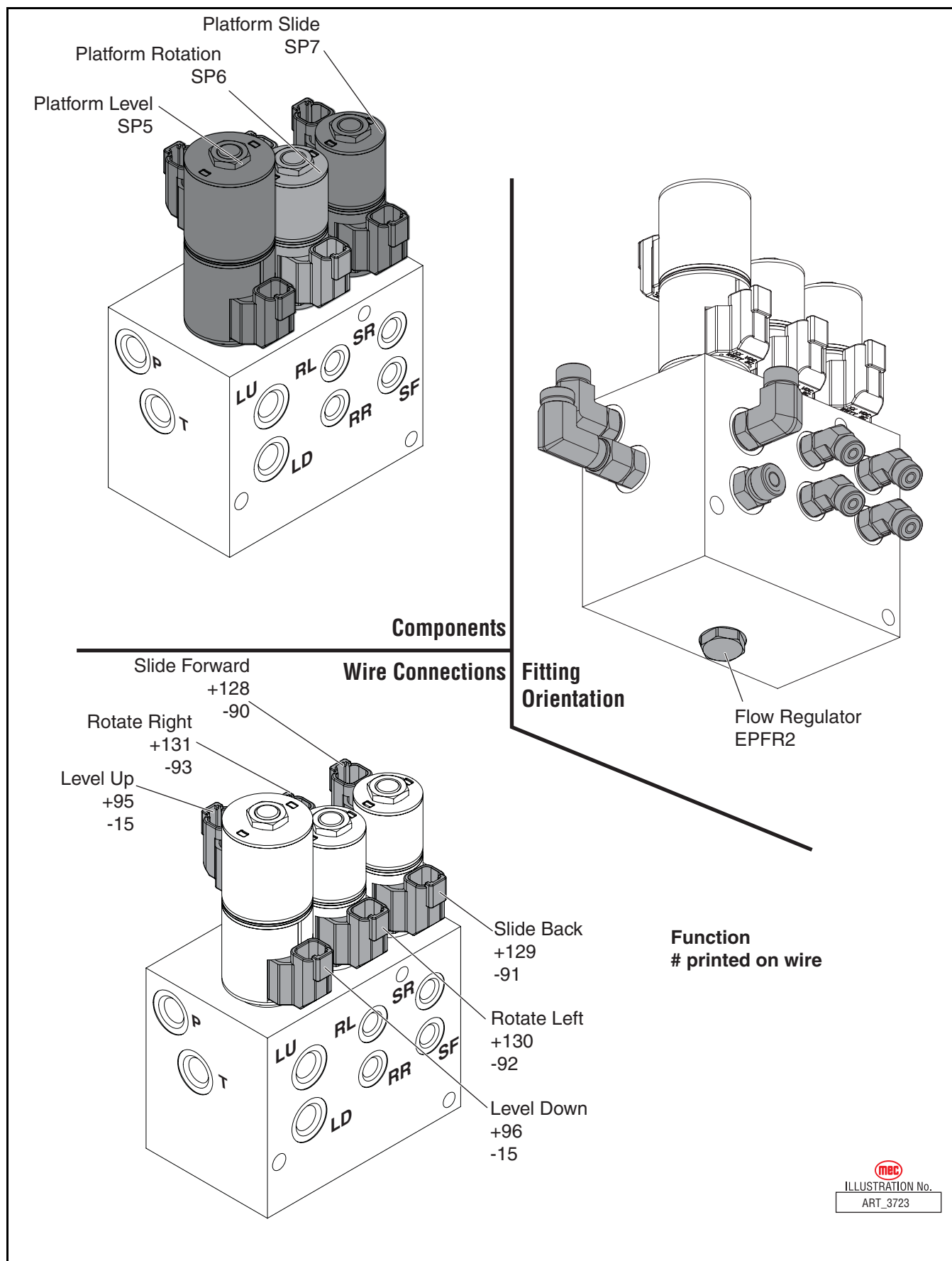
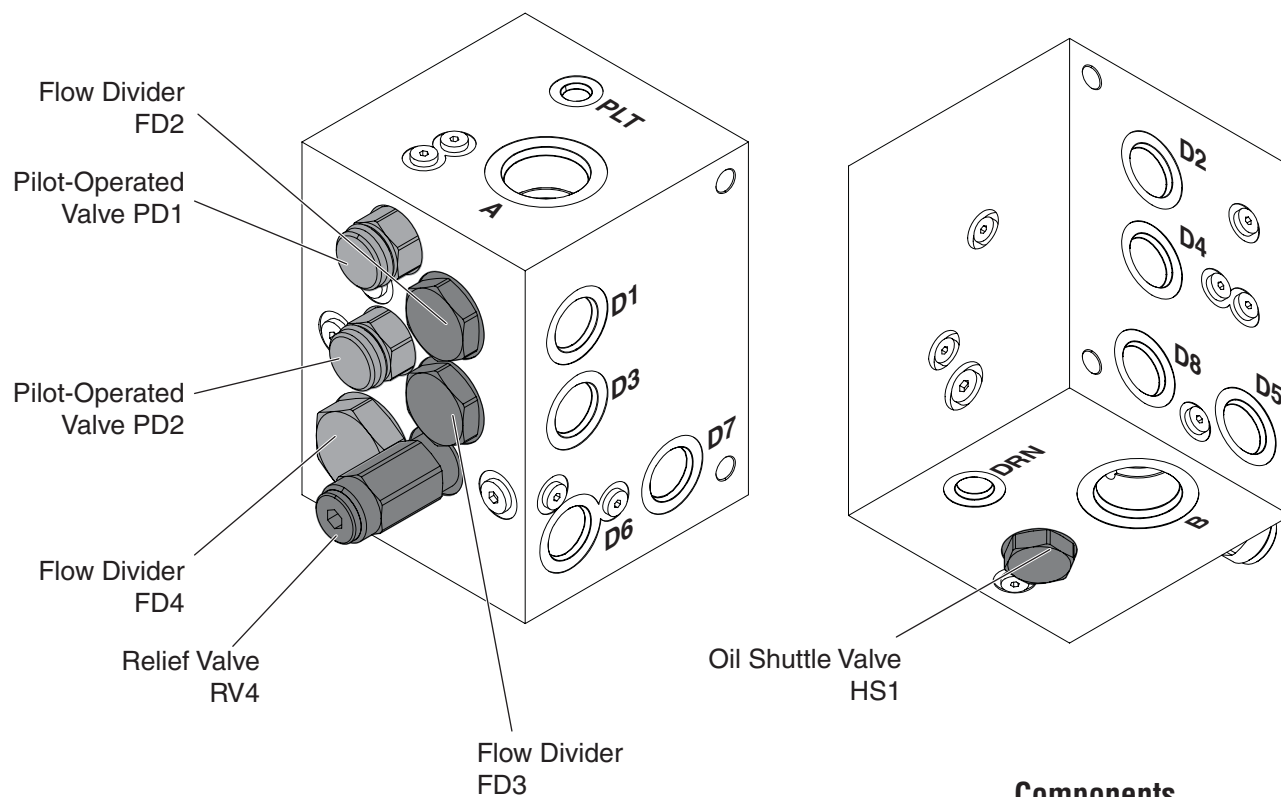
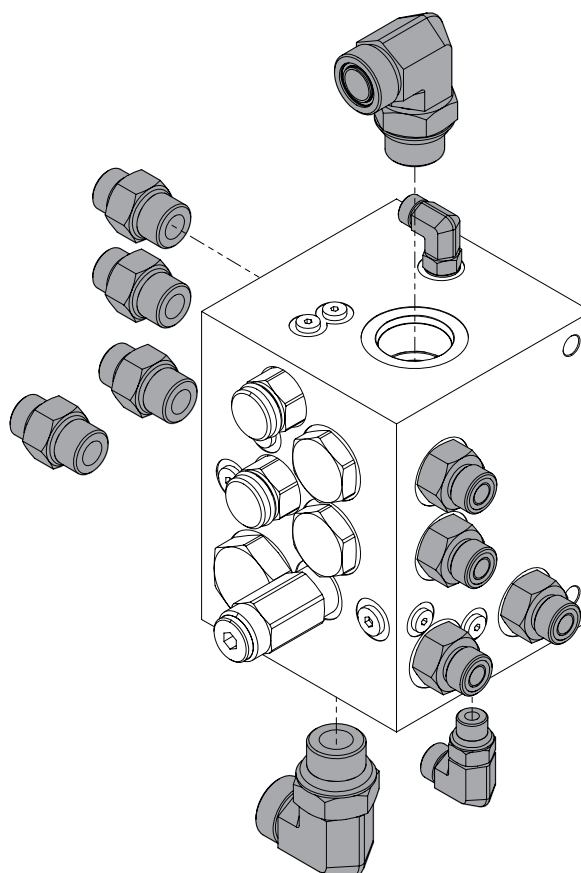
Figure 1-8: Auxiliary Manifold

Figure 1-9: Drive Manifold**Components****Fitting
Orientation**

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HYDRAULIC PRESSURE ADJUSTMENT

- Before attempting to check and/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 onto the appropriate pressure test port using gauge adapter fitting MEC part no. 50974
- When checking pressure at Ports GD, GLS and GCP, it is necessary to connect a test hose directly to the manifold after removing the existing cap. No test adapter is provided at these ports.

Table 1-2: Hydraulic Pressure Settings

| MODEL | | Drive System | | Charge Pressure | |
|---|---------|--|---------|---------------------------------------|---------|
| Titan Boom 40-S | | 4500 PSI | 310 bar | 348 PSI | 24 bar |
| | | Port GD of Functions Manifold | | Port GCP of Functions Manifold | |
| Boom Lift/Stabilizer -- RV1 | | Boom Extend -- RV2 | | Steer/Level/ Upper Manifold -- RV3 | |
| 3000 PSI | 207 bar | 2000 PSI | 138 bar | 3200 PSI | 221 bar |
| Port GP1 | | Port GLS | | Port GP2 | |
| Steering Cross-Port Relief--CR1, CR2 | | Traction Manifold Oil Supply -- RV4 | | Axle Float-- PR1 | |
| 1500 PSI | 103 bar | Do not adjust | | Do not adjust | |
| Port GP2 | | | | | |

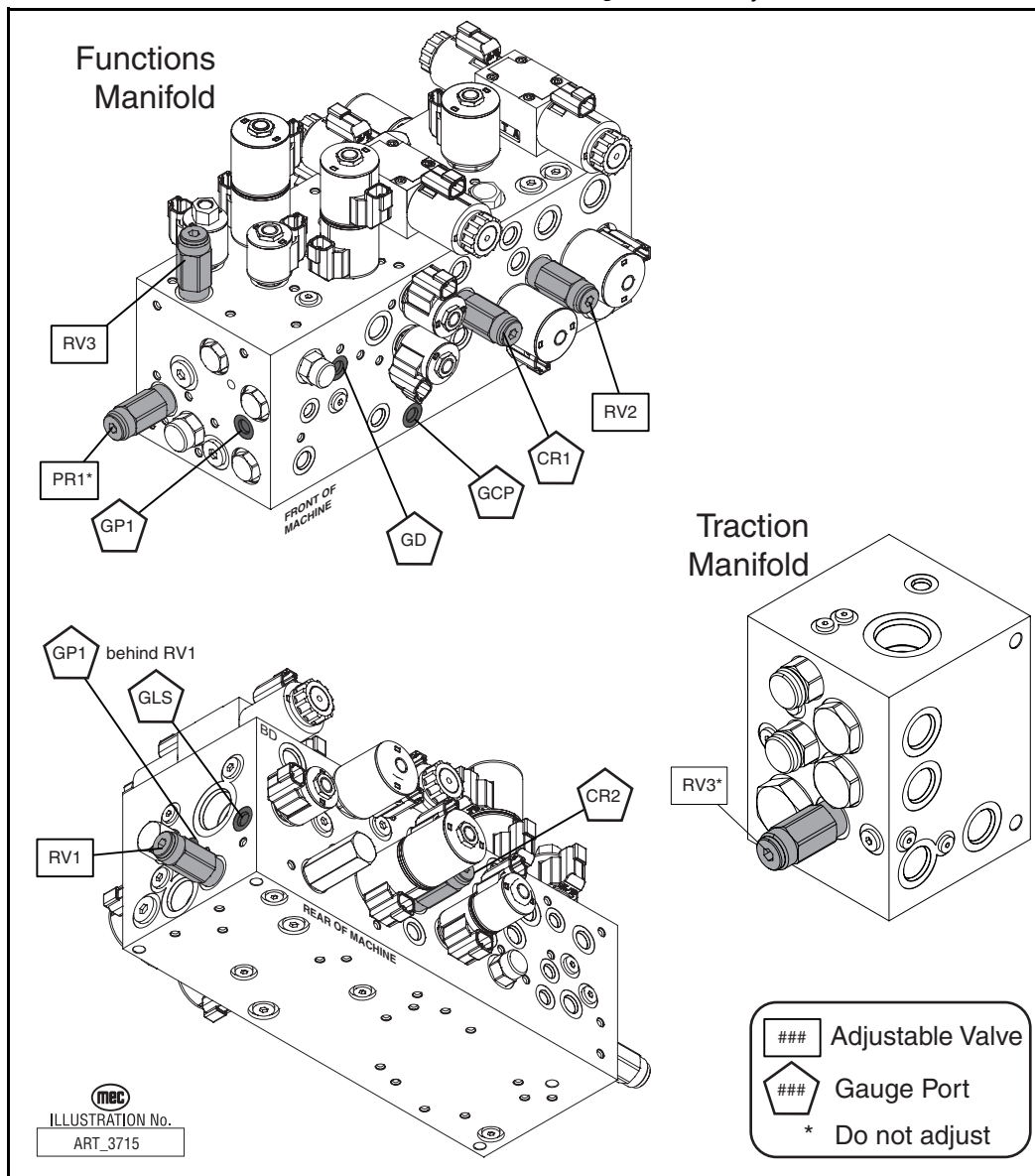
ADJUSTING RELIEF VALVES



CAUTION

Do not operate pump with tamper proof cap removed. Fluid will emit under pressure.

Figure 1-10: Adjustable Valves Location



ADJUSTMENTS

COUNTERBALANCE VALVES

The counterbalance valves located on many of the cylinders of the Titan Boom are set by the manufacturer and should not be adjusted for any reason.

Replace any counterbalance valve that shows evidence of adjustment or tampering.

BOOM LIFT/STABILIZER RELIEF (RV1)

The Boom Lift/Stabilizer Relief Valve (RV1) should be checked during routine maintenance to ensure proper lift capacity. It will be necessary to remove the cap from the relief valve if adjustment is necessary.

REMOVING THE CAP WHILE THE ENGINE IS RUNNING WILL RESULT IN FLUID LEAKAGE.

To check Boom Lift/Stabilizer Relief Valve setting, park the machine on a firm level surface free from overhead obstructions.

The Boom Lift/Stabilizer Relief Valve (RV1) should be set to 3000 psi (207 bar).

- Insert a 0-5000 psi gauge into the port GP1 of the Functions Manifold.
- **With no load on platform**, use the Boom Lower function to lower the boom completely.
- Press and hold the Boom Lower switch for 10 seconds to get an accurate reading on the pressure gauge.
- If pressure is LOW, adjust lift relief valve ¼ turn clockwise and recheck.
- If pressure is HIGH, adjust lift relief valve ¼ turn counterclockwise and recheck.
- Repeat until correct.

BOOM EXTEND RELIEF (RV2)

The Boom Extend Relief Valve (RV2) should be checked during routine maintenance to ensure proper steering function. It is necessary to remove the cap from the relief valve if adjustment is necessary.

REMOVING THE CAP WHILE THE ENGINE IS RUNNING WILL RESULT IN FLUID LEAKAGE.

To check the Boom Extend Relief Valve setting, park the machine on a firm level surface free from overhead and forward obstructions.

The Boom Extend Relief Valve (RV2) should be set to 2000 psi (138 bar).

- Insert a 0-5000 psi gauge into the port GLS of the Functions Manifold.
- **With no load on platform**, use the Boom Extend function to extend the boom completely.
- Press and hold the Boom Extend switch for 10 seconds to get an accurate reading on the pressure gauge.
- If pressure is LOW, adjust steering relief valve ¼ turn clockwise and recheck.
- If pressure is HIGH, adjust steering relief valve ¼ turn counterclockwise and recheck.
- Repeat until correct.

STEER/FRAME LEVEL/UPPER MANIFOLD RELIEF (RV3)

The Steer/Frame Level/Upper Manifold Relief Valve (RV3) should be checked during routine maintenance to ensure proper machine function. It is necessary to remove the cap from the relief valve if adjustment is necessary.

REMOVING THE CAP WHILE THE ENGINE IS RUNNING WILL RESULT IN FLUID LEAKAGE.

The Steer/Frame Level/Upper Manifold Relief Valve (RV3) should be set to 3200 psi (221 bar).

- Insert a 0-5000 psi gauge into the port GP2 of the Functions Manifold.
- Lower and retract the boom completely. Remove everything from the platform.
- Energize the Frame Level switch to full left.
- Press and hold the Frame Level switch for 10 seconds to get an accurate reading on the pressure gauge.
- If pressure is LOW, adjust Valve RV3 ¼ turn clockwise and recheck.
- If pressure is HIGH, adjust Valve RV3 ¼ turn counterclockwise and recheck.
- Repeat until correct.

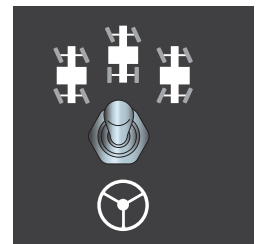
STEERING CROSS PORT RELIEF VALVES (CR1, CR2)

The Steering Cross Port Relief Valves (CR1 & CR2) should be checked during routine maintenance to ensure proper steering function. It is necessary to remove the cap from the relief valve if adjustment is necessary.

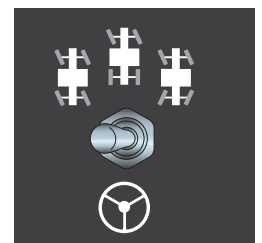
REMOVING THE CAP WHILE THE ENGINE IS RUNNING WILL RESULT IN FLUID LEAKAGE.

The Steering Cross Port Relief Valves (CR1 & CR2) should be set to 1500 psi (103 bar).

- Insert a 0-5000 psi gauge into the port GP2 of the Functions Manifold.
- Use the steering function to center all wheels.
- Place the machine in 2-WHEEL steer mode (center position).
- Steer the wheels fully left. Hold the switch for 10 seconds. This is the reading for CR2.
- If pressure is LOW, adjust Valve CR2 ¼ turn clockwise and recheck.
- If pressure is HIGH, adjust Valve CR2 ¼ turn counterclockwise and recheck.
- With the front wheels fully left, place the machine in CRAB steer mode (left position). Steer the machine fully left. The front wheels won't move, as they are already turned fully left.
- The rear wheels should turn until they are pointed fully left. If the rear wheels do not turn, Valve CR1 is set below the setting of Valve CR2
 - Adjust Valve CR1 1/8 turn clockwise and retry. Continue until wheels just begin to steer left.
- Steer the wheels fully left. Hold the switch 10 seconds. This is the reading for CR1.
- If pressure is HIGH, adjust Valve CR2 1/8 turn counterclockwise and recheck.



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DRIVE PUMP

Refer to *Section 3* for Remove and Install instructions.

Refer to *Parts Section E*.

DRIVE PUMP ADJUSTMENTS

This section offers instruction on inspection and adjustment of pump components. Read through the entire topic before beginning a service activity.



Contamination can damage internal components and void your warranty. Take precautions to ensure system cleanliness when removing and reinstalling system lines.

Standard Procedures

1. With the engine off, thoroughly clean the outside of the pump.
2. If removing the pump, tag each hydraulic line. When you disconnect hydraulic lines, immediately cap them and plug each open port to prevent contamination.
3. Ensure the surrounding area is clean and free of contaminants like dirt and grime.
4. Inspect the system for contamination.
5. Check the hydraulic fluid for signs of contamination: oil discoloration, foam in the oil, sludge, or metal particles.
6. If there are signs of contamination in the hydraulic fluid, replace all filters and drain the hydraulic system. Flush the lines and refill the reservoir with the correct filtered hydraulic fluid.
7. Before re-installing the pump, test for leaks.
8. See "Drive Pump Start-Up Procedure" on page 1-11 for start-up instructions

Charge Pressure Relief Valve Adjustment

This procedure explains how to check and adjust the charge pressure relief valve.

1. Install a 1000 psi (50 bar) pressure gauge in charge pressure gauge port GCP on the Functions Manifold. This gauge shows charge pressure.
2. Install a 100 psi (10 bar) gauge at case pressure port L1, L2, or L3. This gauge shows case pressure.
3. Operate the system with the pump in neutral (zero displacement) when measuring charge pressure.

NOTE: Ensure charge pressure is properly set before checking pressure limiter. See Section 1.

4. The charge pressure relief valve setting for this pump is 348 psi (24 bar). This pressure assumes 1800 rpm pump speed, charge flow of 7 gal/min. (26.5 l/min.), and reservoir temperature of 120°F (50°C). The charge pressure references case pressure.

NOTE: At higher pump speeds or higher charge flows the charge pressure will rise over the rated setting.

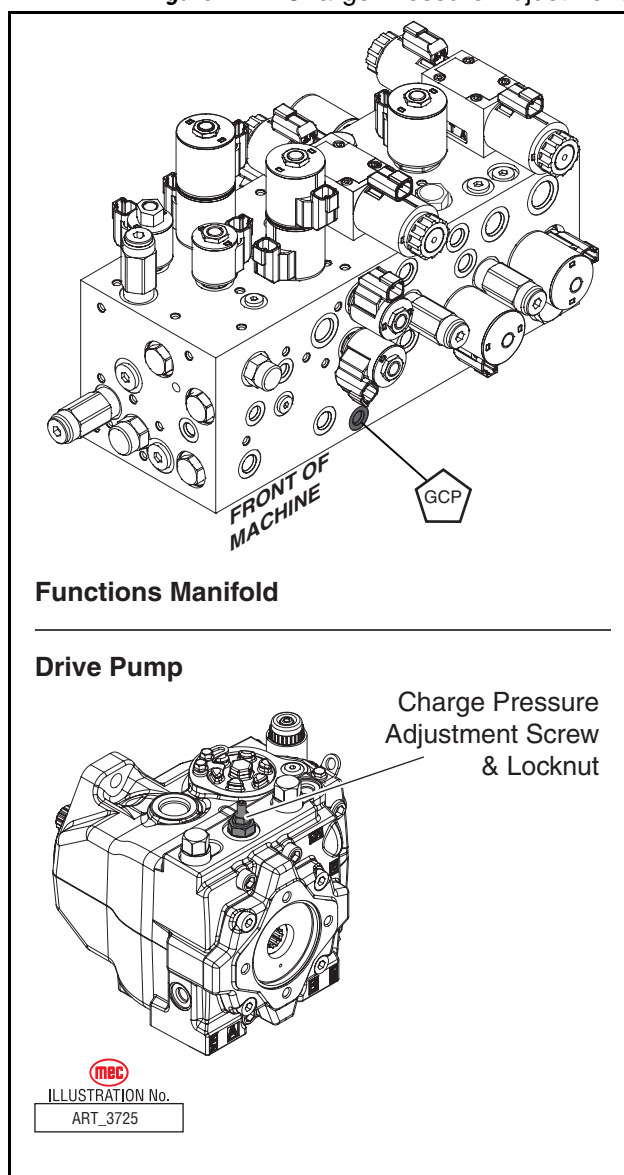
5. Rotate the adjusting screw clockwise to increase pressure, counter clockwise to decrease pressure.

Subtract the case pressure reading from the charge pressure reading to compute the actual charge pressure.

NOTE: Pressure change per turn is dependant on charge flow entering pump.

6. Hold the adjusting screw stationary while tightening the locknut to 13 lb-ft. (17 Nm).
7. When you achieve the desired charge pressure setting, remove the gauges and plug the ports.

Figure 1-11: Charge Pressure Adjustment

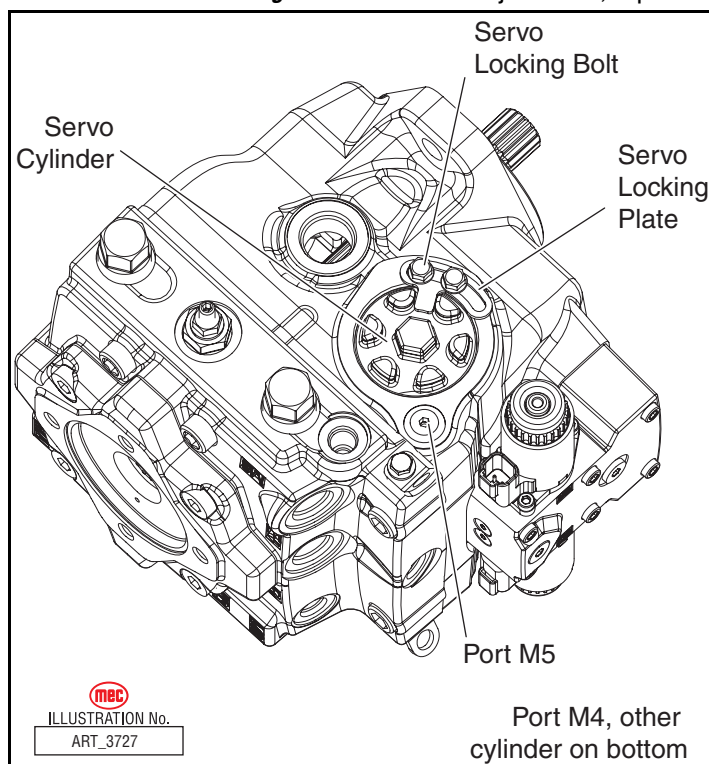


SERVO ADJUSTMENT

Servo adjustment should not be performed unless the pump is confirmed to be out of adjustment. Check all other possibilities before performing this procedure. Refer to Chapter 4 -- Troubleshooting.

1. Install a 1000 psi (50 bar) gauge in each of the two servo gauge ports (M4 and M5). Disconnect the external control input (electrical connections) from the control solenoids. Start the engine and operate at idle speed.
2. Run engine at 1800 rpm.
3. Check the servo pressure gauges. Ensure the differential between M4 and M5 is less than 22 psi (1.5 bar).
4. Using a 3/4 in hex deep socket, unthread both servo cylinders 2-3 turns. This step ensures the servo cylinders have no contact with the servo piston.
5. Stroke the pump by supplying current to solenoid C1, until the servo pressure at port M4 is 14–29 psi (1 to 2 bar) greater than at port M5 and the system pressure gauges indicate displacement. Pressure should be greater at port MB. This also indicates the servo piston is in contact with the servo cylinder on side M5.
6. Slowly thread the servo cylinder on the M5 side in until the system pressure differential starts to decrease. Maintain servo pressure differential between 14–29 psi (1 to 2 bar) during this step. Continue turning the servo cylinder in until the system pressure differential (between ports MA/MB) is less than 22 psi (1.5 bar). This procedure sets the servo and swash plate to mechanical neutral on the M5 side.
7. Repeat steps 1-5 but stroke the pump in the opposite direction by turning the eccentric screw in the opposite direction, or by supplying current to solenoid C2. Reverse gauge locations (M4 for M5, MB for MA) from those stated above since the pump is now stroking the other direction.
8. Remove all gauges and replace gauge port plugs.

Figure 1-12: Servo Adjustment, top view

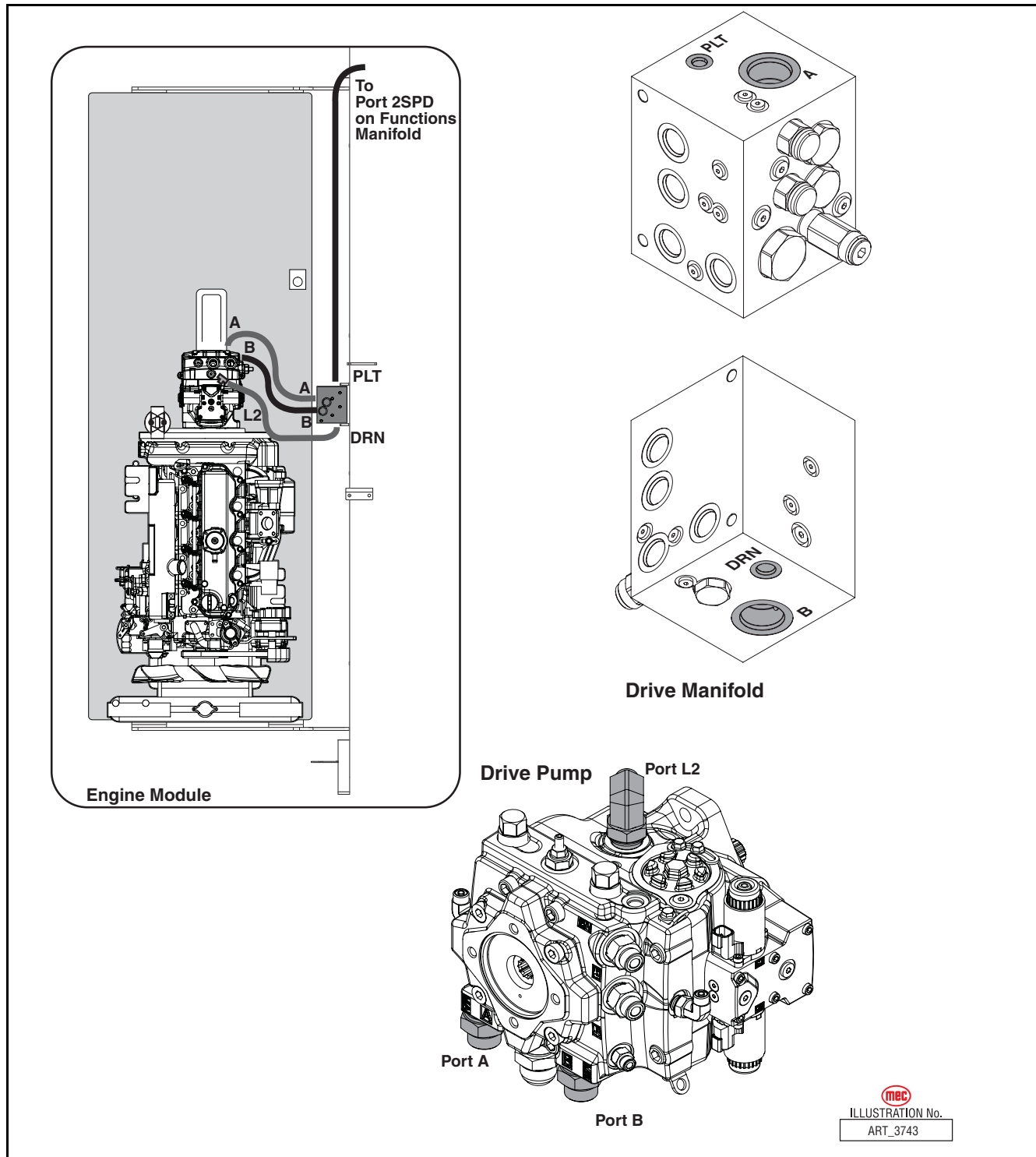


DRIVE PUMP/DRIVE MANIFOLD CONNECTIONS

Hydraulic hoses from Port A and Port B on the Drive Pump connect respectively to Ports A and B on the Drive Manifold and provide directional power to the wheel motors.

Port L2 on the Drive Pump connects by a T-fitting to Port DRN on the Drive Manifold. Port PLT on the Drive Manifold connects to a T-fitting at Port 2SPD of the Functions Manifold. These hoses allow fresh oil to pass into and out of the drive system.

Figure 1-13: Drive Pump/Drive Manifold Connections

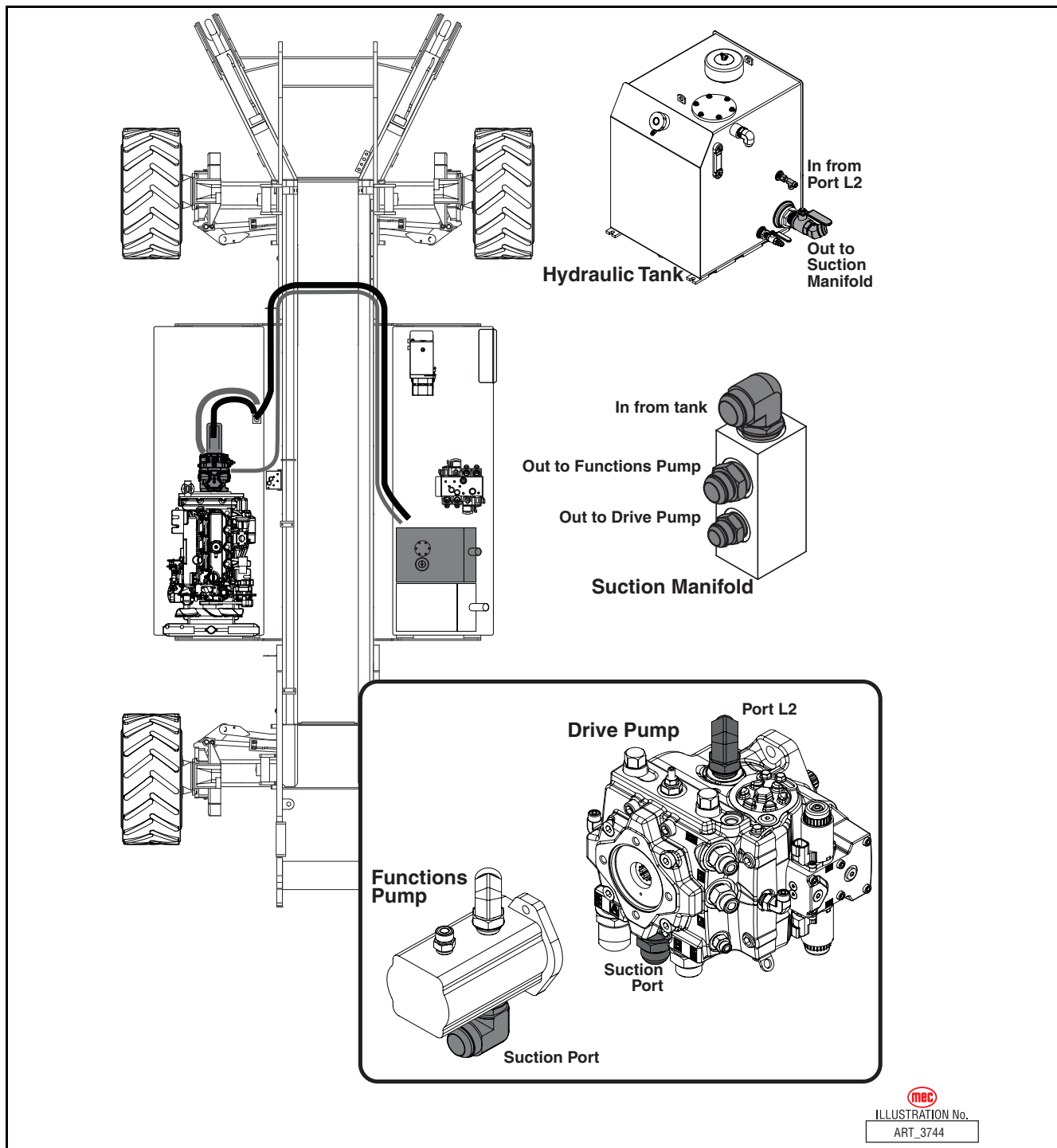


SUCTION & CASE DRAIN CONNECTIONS

The main suction line from the Hydraulic Tank connects to the top port of the Suction Manifold. The upper side port of the Suction Manifold then connects to the Suction Port of the Functions Pump. The lower side port of the Suction Manifold connects to the suction port of the Drive Pump.

Port L2 on the Drive Pump connects to the lower return port of the Hydraulic Tank.

Figure 1-14: Drive Pump/Drive Manifold Connections



DRIVE PUMP/FUNCTION MANIFOLD CONNECTIONS

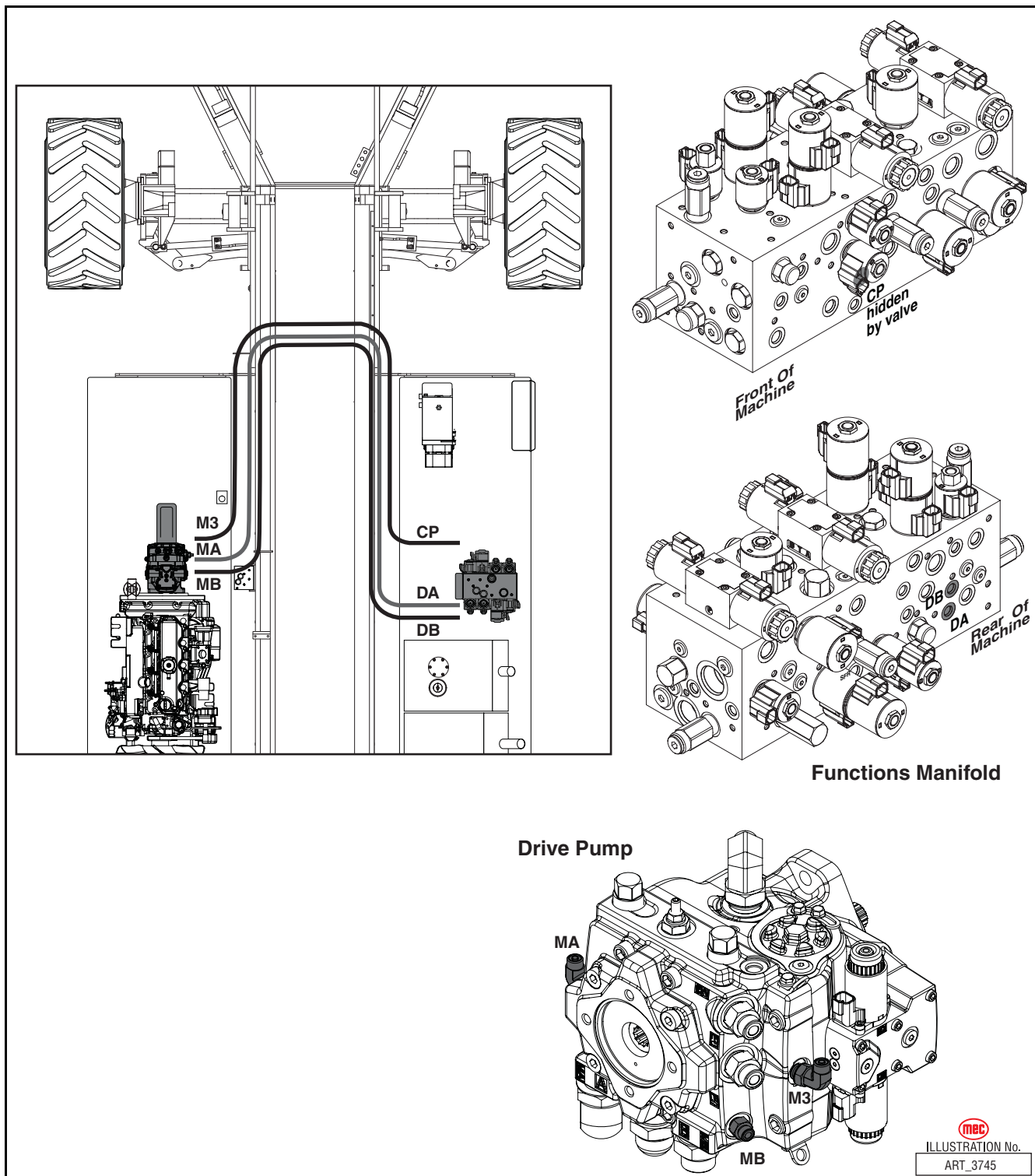
Three hoses connect the Drive Pump to the Functions Manifold.

Port M3 on the Drive Pump connects to Port CP on the Functions Manifold.

Port MA on the Drive Pump connects to Port DA on the Functions Manifold.

Port MB on the Drive Pump connects to Port DB on the Functions Manifold.

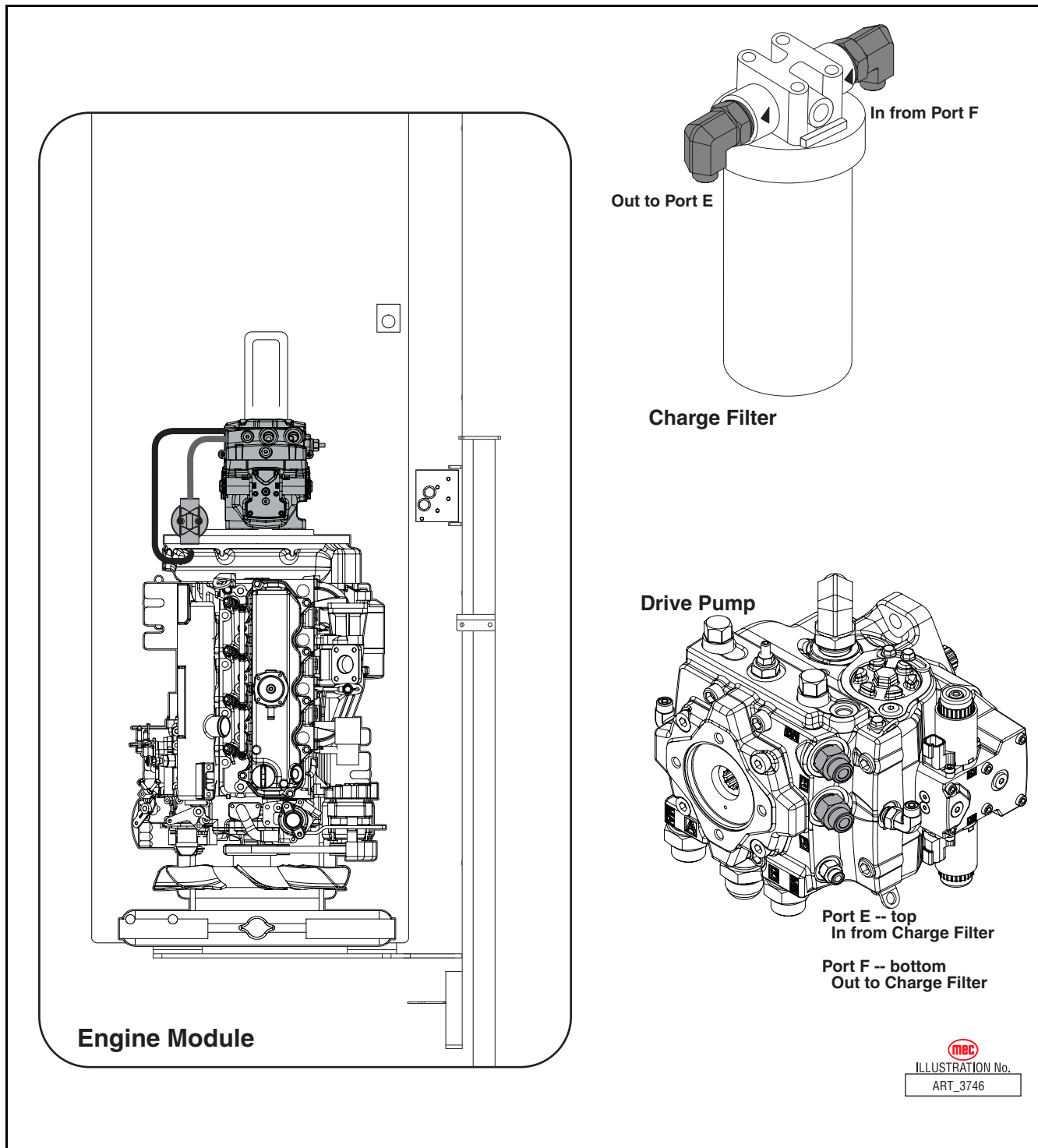
Figure 1-15: Drive Pump/Function Manifold Connections



CHARGE FILTER CIRCUIT

The Charge Filter provides make-up fluid supply to the Drive Pump. Fluid travels from Port F on the Drive Pump to the filter and re-enters the Drive Pump at Port E.

Figure 1-16: Charge Filter Circuit

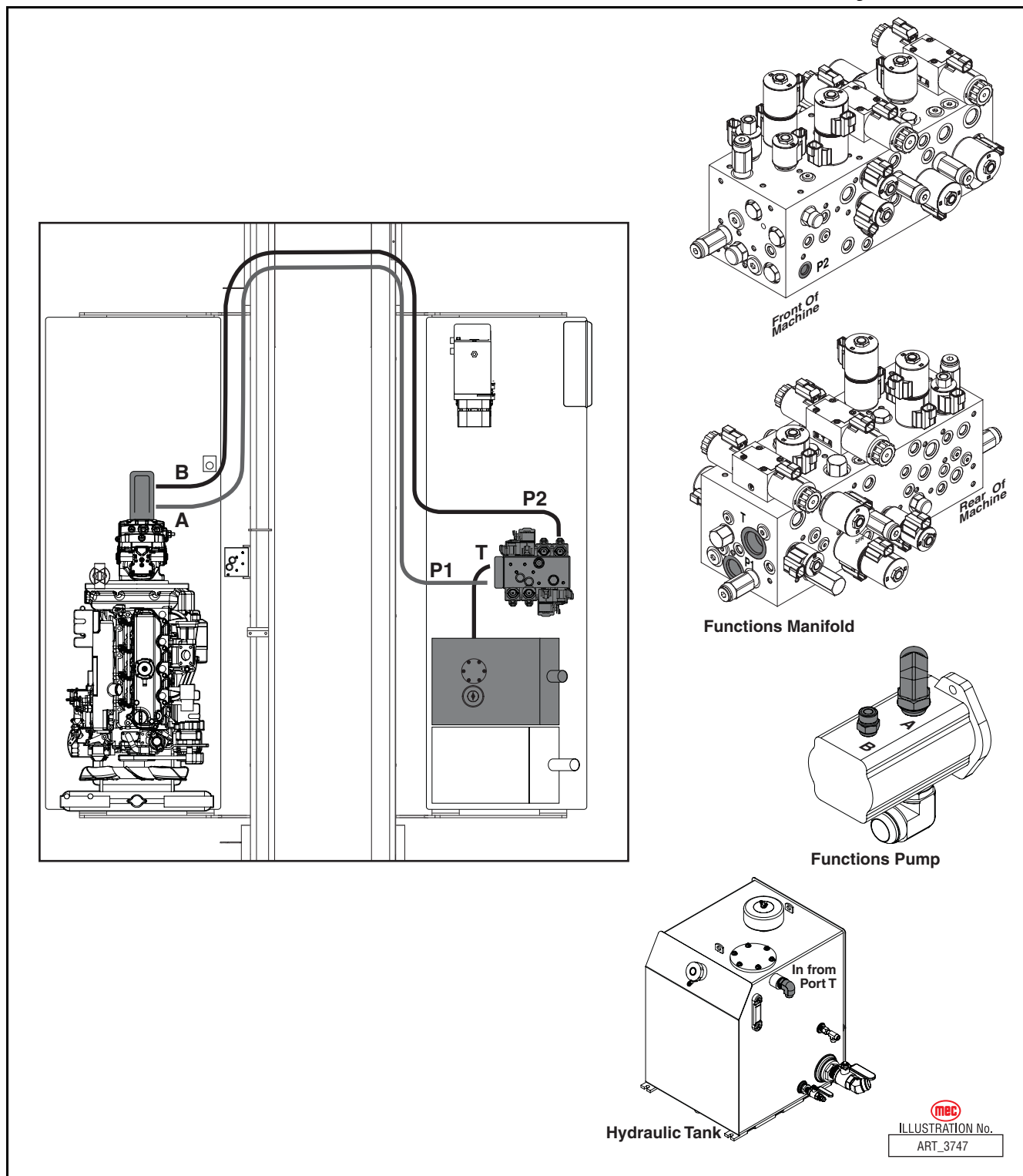


FUNCTIONS PUMP/FUNCTIONS MANIFOLD CONNECTIONS

The Functions Pump connects to the Functions Manifold through two hoses. Port A of the pump connects to Port P1 of the manifold. Port B of the pump connects to Port P2 of the manifold.

Port T of the Functions Manifold moves return oil to the Hydraulic Tank.

Figure 1-17: Drive Circuit



HYDRAULIC FUNCTIONS

Refer to *Section 3* for Remove and Install instructions.

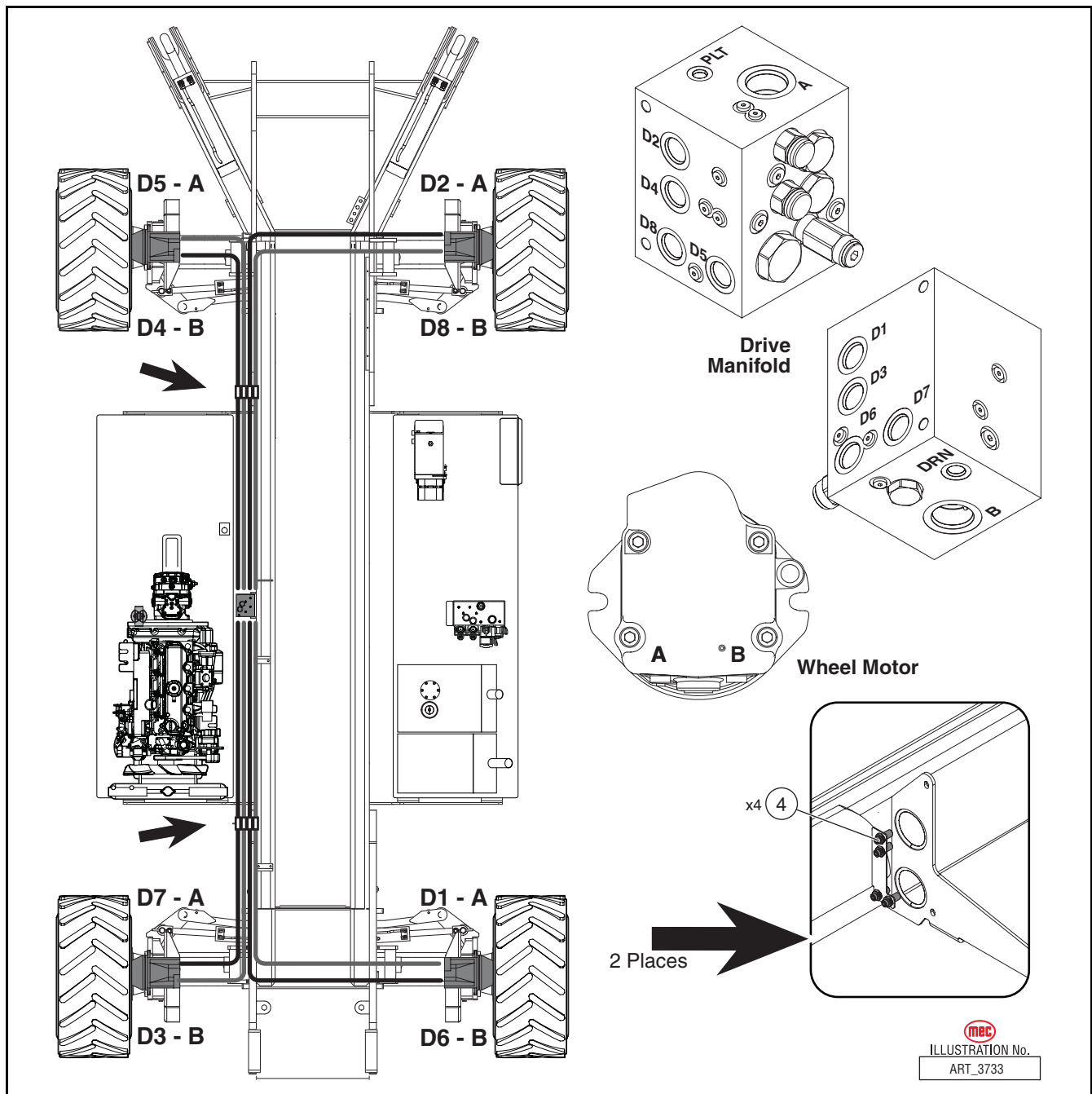
Refer to *Parts Section E*.

DRIVE FUNCTION

There are four (4) variable-displacement hydraulic Drive Wheel motors that provide power to all four wheels. Hydraulic fluid from the Drive Pump is delivered to the Drive Manifold. From the Drive Manifold, two hoses go to each wheel via bulkhead fittings.

This drive system is hydrostatic; the oil circulates from the pump to the drive motors and back to the pump in a loop. Traction is enhanced through the use of three flow divider valves located in the Drive Manifold. Approximately 10% of the drive system oil is circulated back to the hydraulic tank for cooling purposes.

Figure 1-18: Drive Circuit

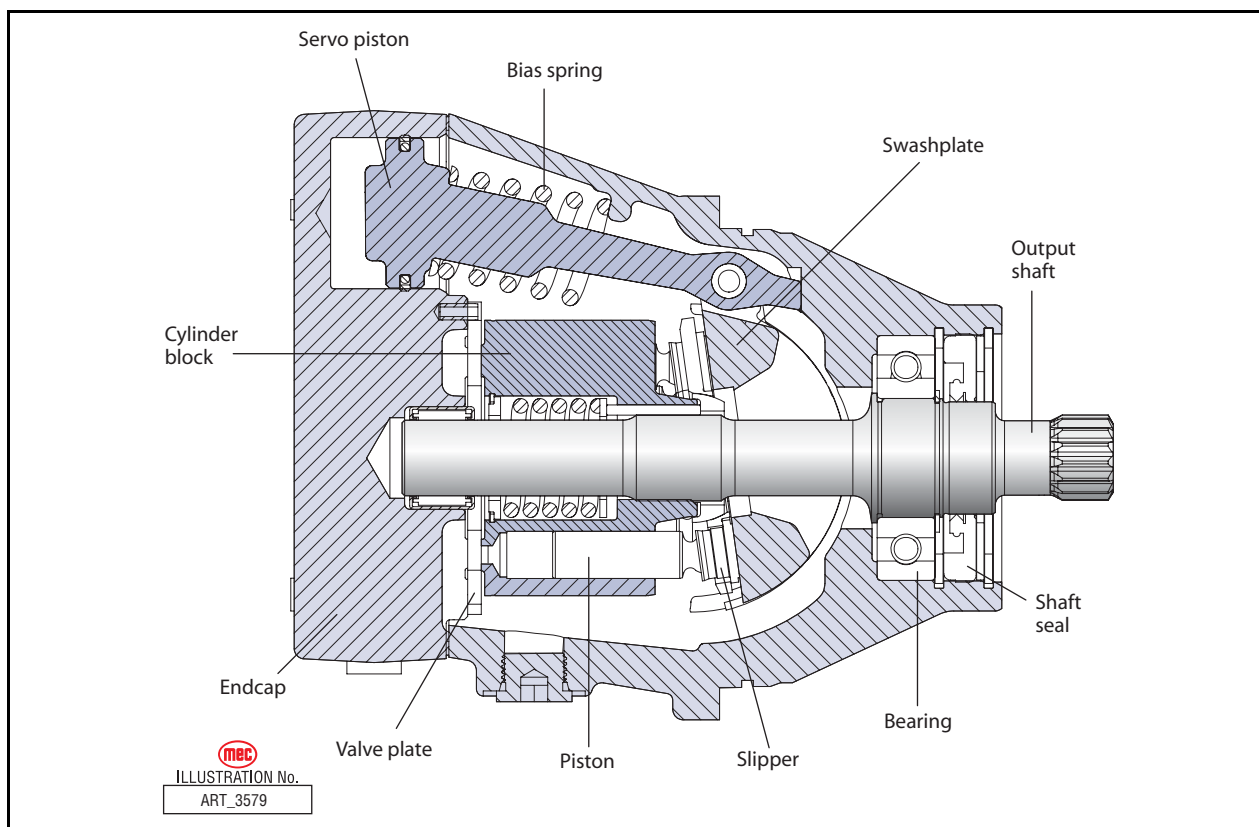


WHEEL MOTOR STARTUP PROCEDURE

Follow this procedure when restarting a machine on which the Drive Motors have been:

- Removed and re-installed, or
- Drained of fluid for any reason.

Figure 1-19: Drive Motor



**WARNING**

UNINTENDED MOVEMENT OF THE MACHINE OR MECHANISM MAY CAUSE INJURY. SECURE THE MACHINE BEFORE PERFORMING THIS PROCEDURE.

**CAUTION**

If oil has drained from the Drive Pump, DO NOT operate the Drive Pump until you have completed the "Drive Pump Start-Up Procedure" on page 1-11. Severe damage will occur.

Inspect each Drive Motor for damage prior to installation. Use only the appropriate hydraulic fluid as recommended in "Fluid Recommendations" on page 1-7.

1. Fill the reservoir with the appropriate hydraulic fluid as recommended in "Fluid Recommendations" on page 1-7. Always filter fluid through a 10 micron filter when pouring into the reservoir. Never reuse hydraulic fluid.
2. Fill the inlet line leading from the pump to the reservoir. Check the inlet line for properly tightened fittings and be certain it is free of restrictions and air leaks.
3. Fill the pump and motor housing with clean hydraulic fluid. Pour filtered oil directly into the upper most case drain port.
4. To ensure the pump and motor stay filled with oil, install case drain lines into the upper-most case drain ports.
5. Install a 0 to 35 bar [0 to 500 psi] gauge in the pressure gauge port (M3) of the pump to monitor system pressure during start up.
6. Follow recommendations in the machine operator's manual for engine start up procedures.
7. While watching the pressure gauge, jog the engine or run at the lowest possible speed until system pressure builds to normal levels (minimum 11 bar [160 psi]). Once system pressure is established, increase to full operating speed. If system pressure is not maintained, shut down the engine, determine cause, and take corrective action.
8. Operate the hydraulic system for at least fifteen minutes under light load conditions.
9. Check and adjust pump control settings as necessary after installation.
10. Shut down the engine and remove the pressure gauge. Replace hose and fitting at the pressure gauge port.
11. Check the fluid level in the reservoir; add clean filtered fluid if necessary.
12. The motor is now ready for operation.

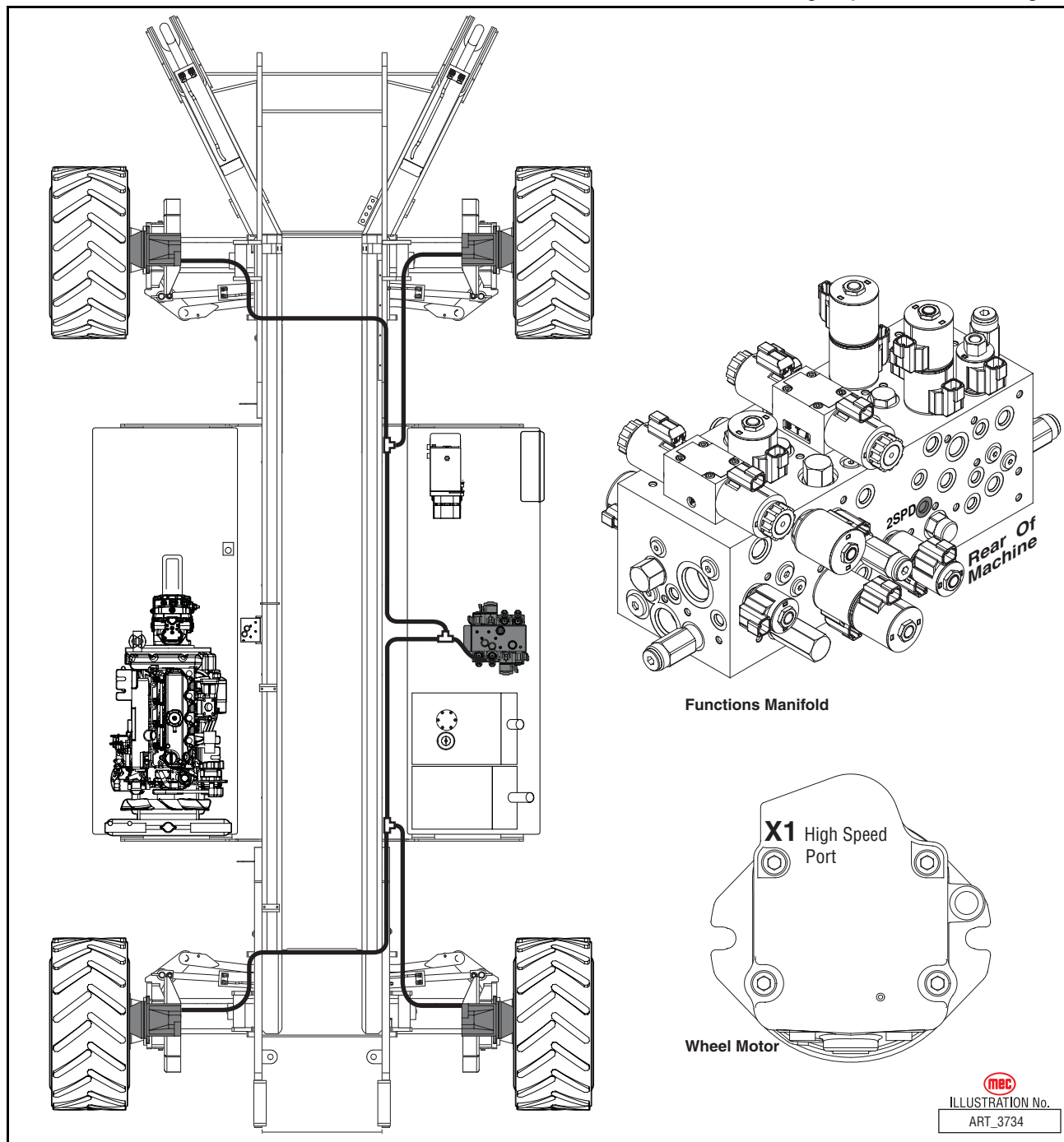
REPAIR

MEC does not recommend end-user maintenance or repair of the Sauer Danfoss drive motors. Contact MEC or Sauer Danfoss for the nearest service provider.

HIGH SPEED FUNCTION

High Speed Drive is activated by hydraulic pressure from Port 2SPD on the Functions Manual. Hoses routed from this port carry fluid to Port X1 on each wheel motor, providing pressure to push the servo piston, which in turn moves the swash plate to a less severe angle and decreases the wheel motor displacement. Smaller displacement means the wheel motor requires less flow per rotation. See Figure 1-19, page 33.

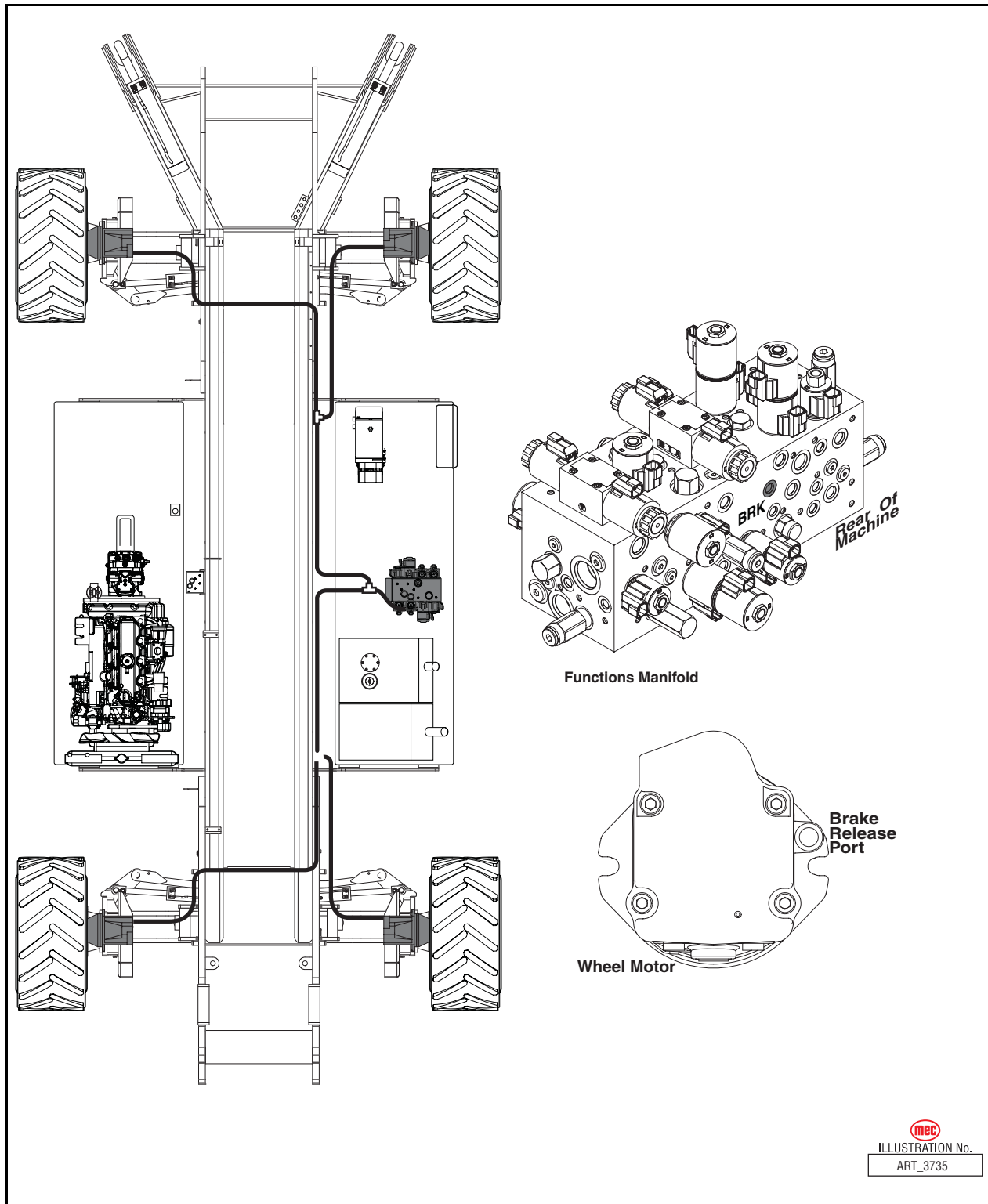
Figure 1-20: High Speed Hose Routing



BRAKE RELEASE FUNCTION

The Brake Release function is activated by hydraulic pressure from Port BRK on the Functions Manual. Hoses routed from this port carry fluid to Brake Release Port on each wheel motor. Fluid passes through the Wheel Motor to the Gear Hub to release the brakes.

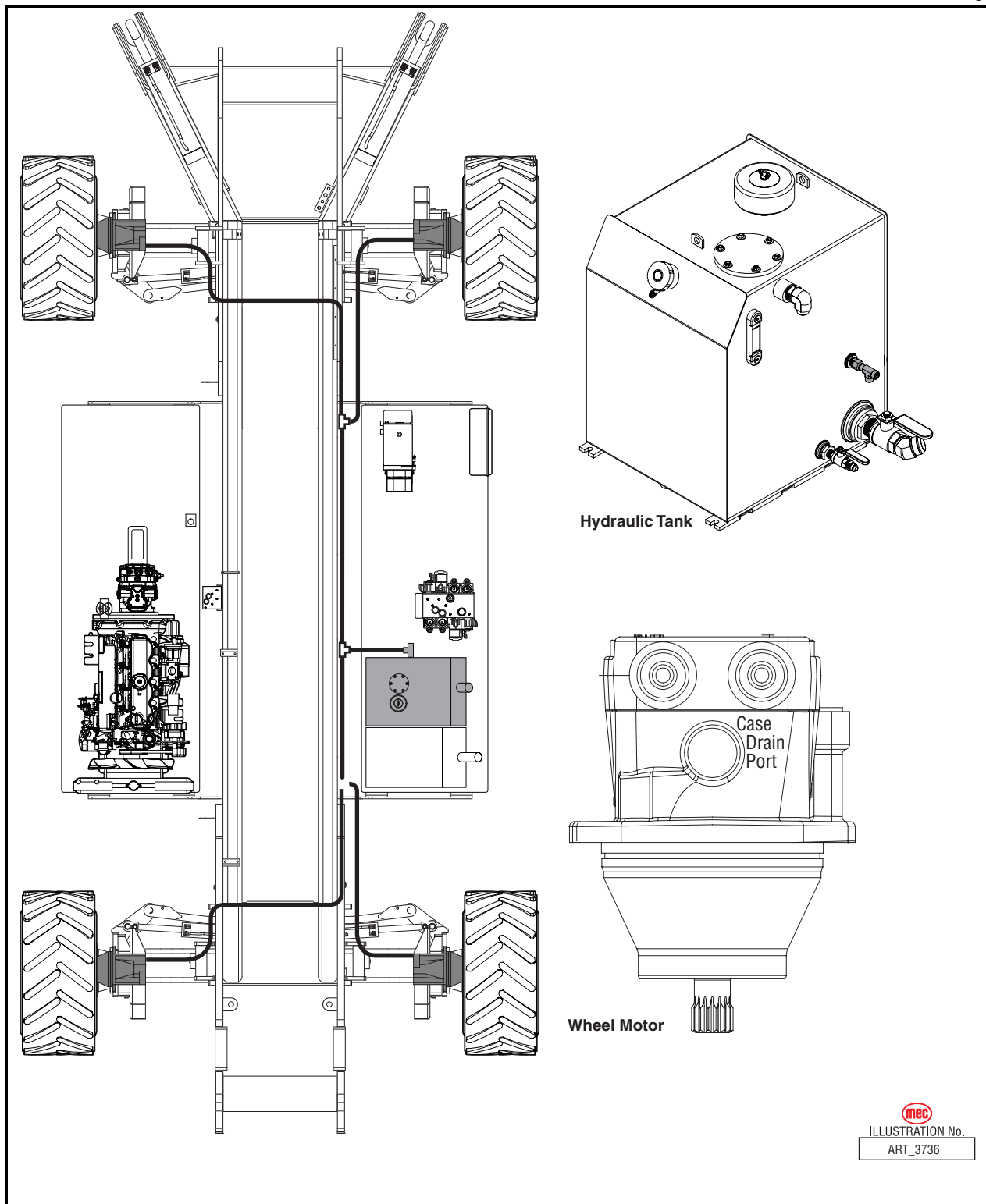
Figure 1-21: Brake Release Hose Routing



DRIVE CASE DRAIN FUNCTION

The Drive Motor Case Drain hoses lead from the Case Drain Port on each wheel motor to the Hydraulic Tank located in the Controls Module.

Figure 1-22: Drive Case Drain Hose Routing



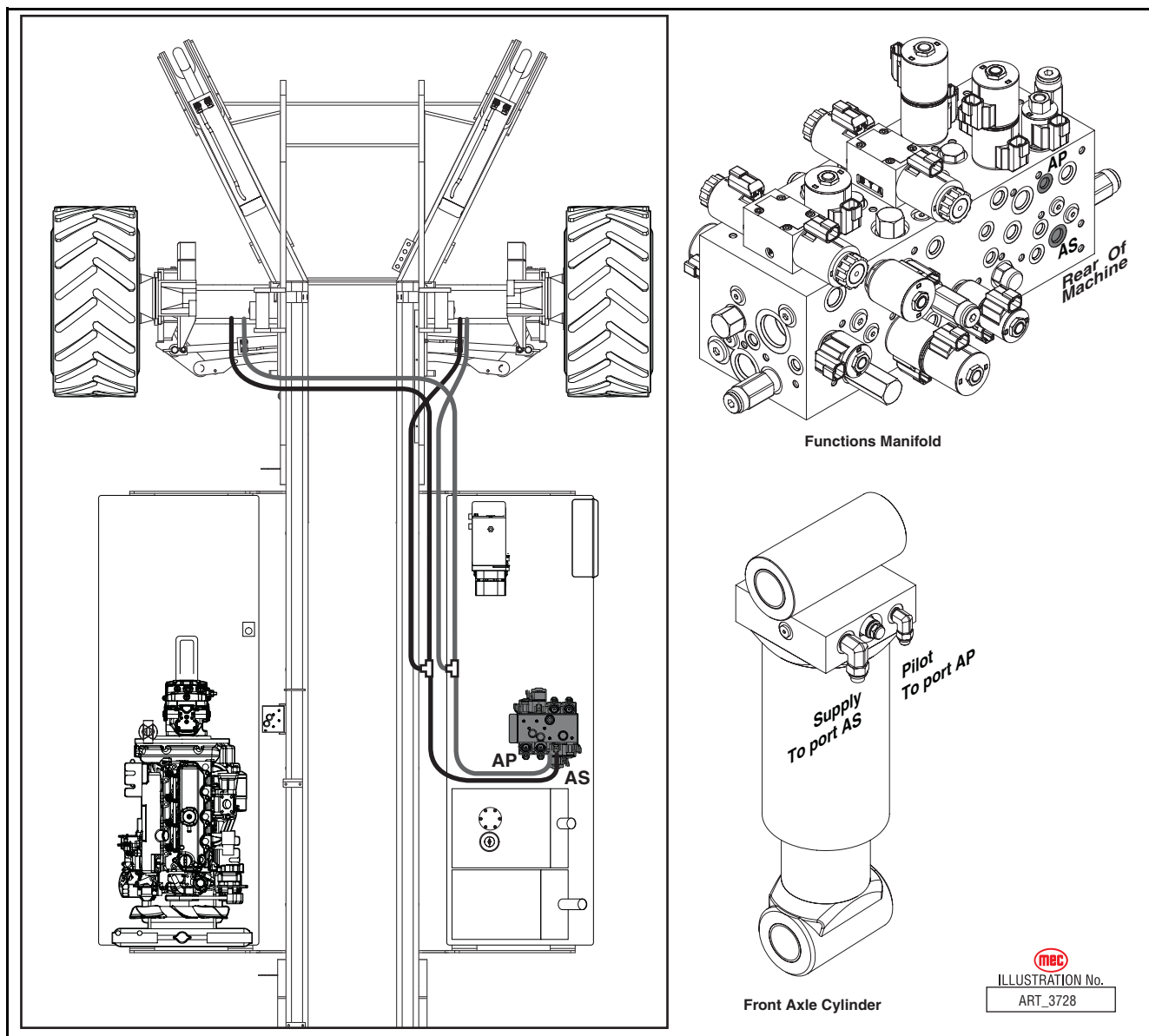
AXLE LOCK FUNCTION

The Axle Lock System allows the front axle oscillate over rough terrain when the platform is in the stowed position. The axle locks in position when the platform is elevated to enhance machine stability.

There are two (2) cylinders in the Axle Lock System. Pressure from Port AP on the Functions Manifold opens the counterbalance valve on each cylinder and allows fluid to freely flow in and out through Port AS while driving over rough terrain, provided that the platform is in the stowed position. The hoses connecting Port AS on the Functions Manifold to the Supply Port on each cylinder are pressurized to 100 psi (7 bar) to prevent cavitation in the cylinder, which can cause air to enter the system.

When the platform is elevated, the electrically-operated valve in the manifold closes, removing the pilot signal to the counterbalance valve, thereby locking the cylinders and preventing fluid flow.

Figure 1-23: Axle Lock Cylinders



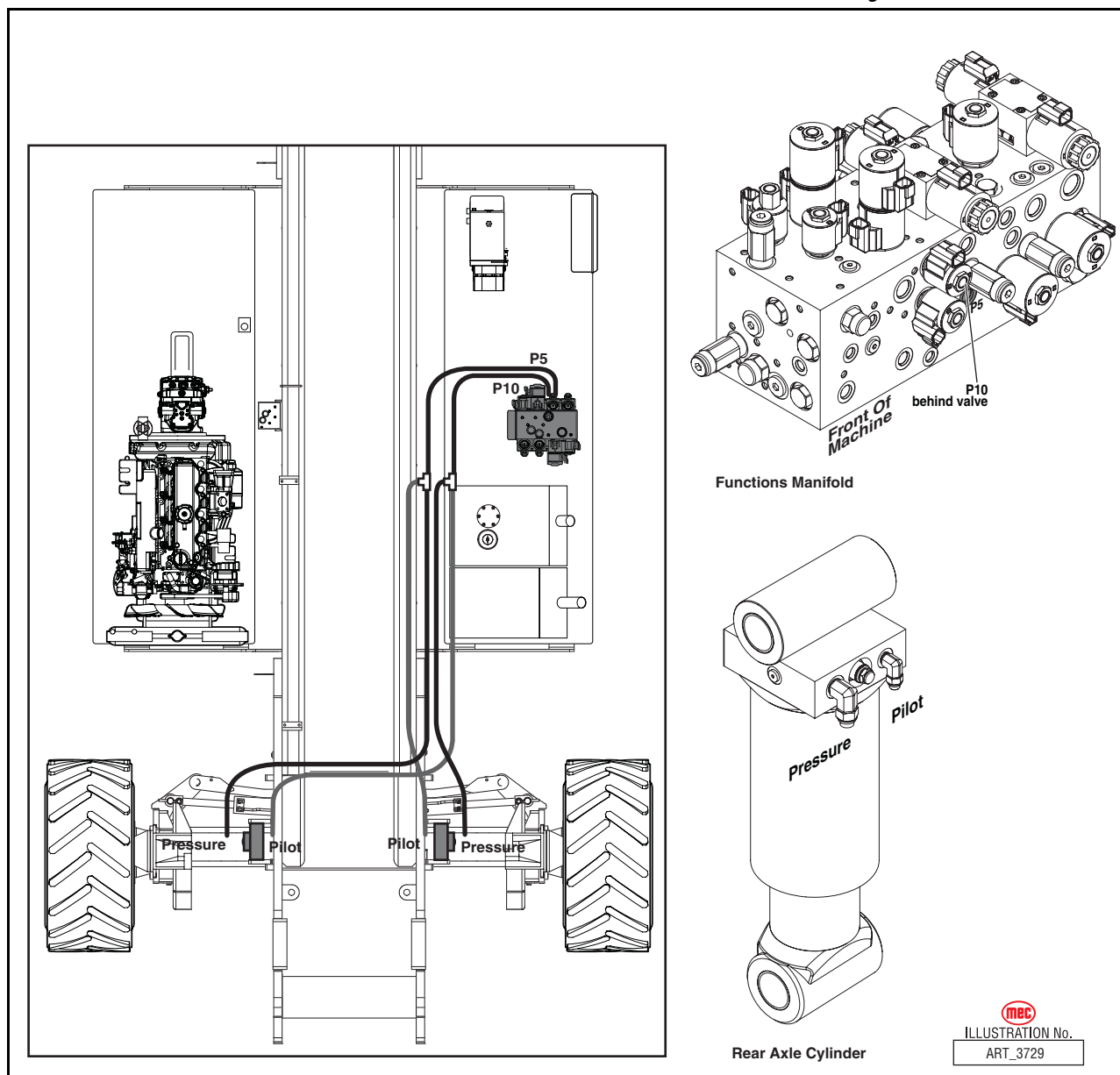
FRAME LEVEL FUNCTION

The Frame Level System allows the rear axle to move relative to the frame when auto-leveling on stabilizer deployment or when manually operated by the controls. This system allows side-to-side leveling of the machine.

There are two (2) single-acting cylinders in the Frame Level System. Pressure from Ports P5 and P10 provide power to the system. Pressure from Port P5 causes the left-side cylinder to extend while releasing the counterbalance valve of the right-side cylinder, causing the frame to tilt to the right. Pressure from Port P10 causes the right-side cylinder to extend while releasing the counterbalance valve of the left-side cylinder, causing the frame to tilt to the left.

The rear axle is locked in place when the Frame Level Function is not in use.

Figure 1-24: Frame Level Cylinders



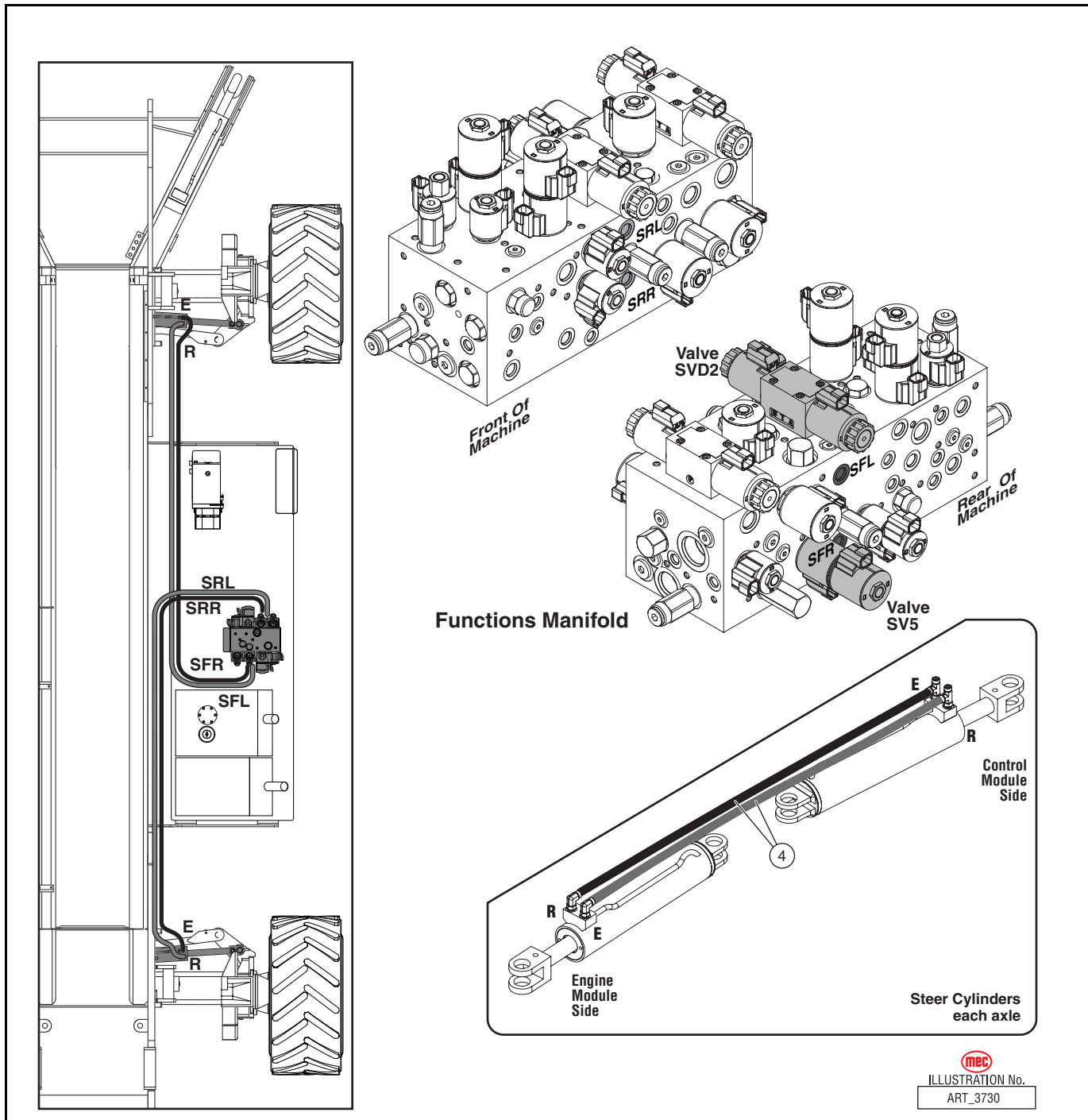
STEERING FUNCTION

The Steering System allows the operator to steer the machine in the following modes:

- 2-wheel -- front wheels only
- 4-wheel -- front and back wheels turn opposite directions
- Crab -- all wheels turn the same direction

Pressure from ports SFL, SFR, SRL and SRR supply the cylinders. Flow is controlled by Valve SV5 for right/left operation of the front steering cylinders. Valve SVD2 provides directional control of the rear steering cylinders, and works in conjunction with Valve SV5.

Figure 1-25: Steering Circuit



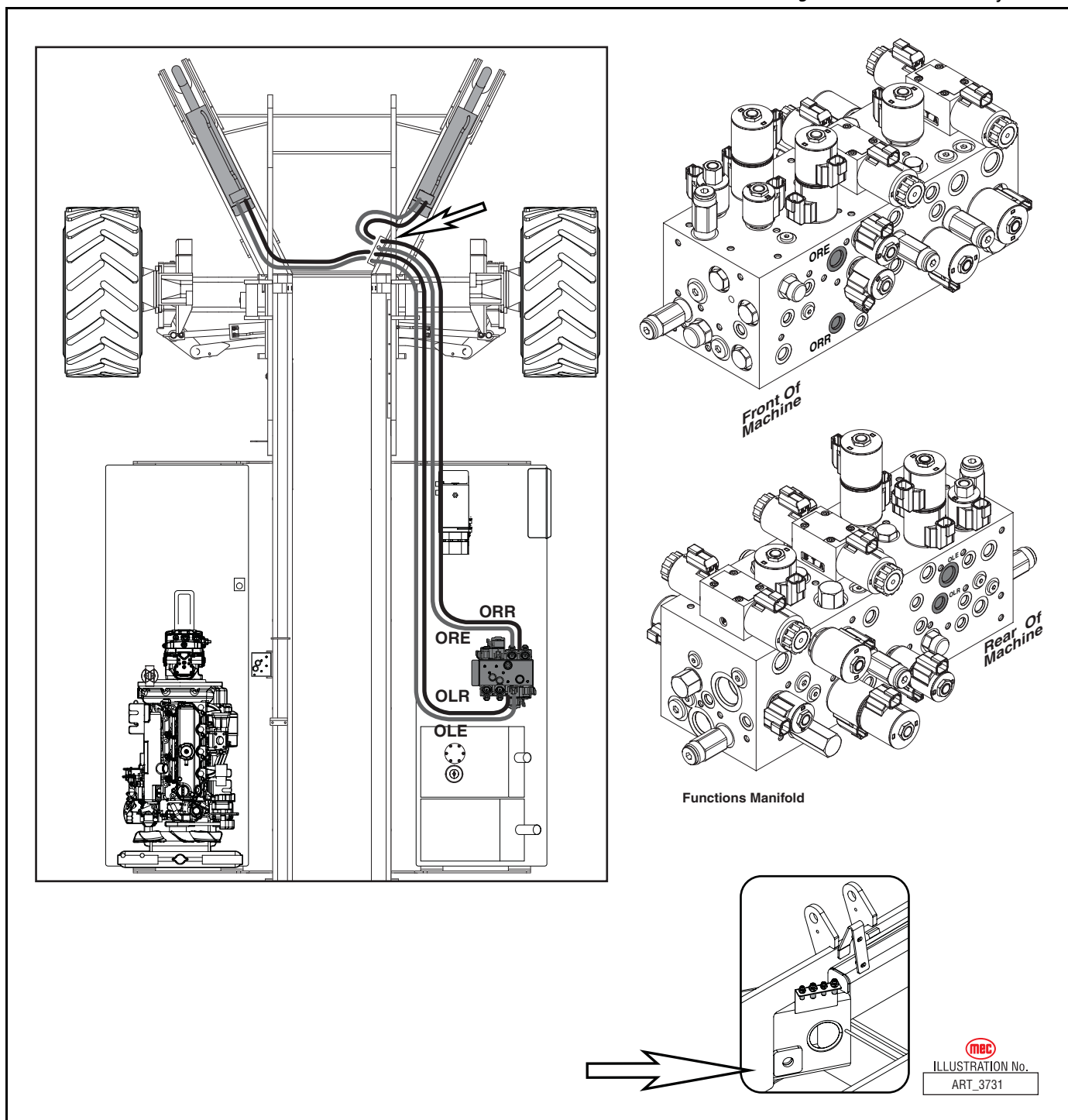
STABILIZER SYSTEM

There are two (2) Stabilizer Cylinders located at the front end of the machine. These cylinders provide stability to the machine when the boom is extended. Frame leveling is controlled automatically by the GP400 module.

Pressure from ports ORE and OLE extend the cylinders, while ports ORR and OLR control retraction. Hoses run from the Functions Manifold to bulkhead fittings at the base of the right stabilizer tube, and from there to the cylinders.

A pressure transducer mounted to each cylinder provides stabilizer pressure information to the GP400 Processor.

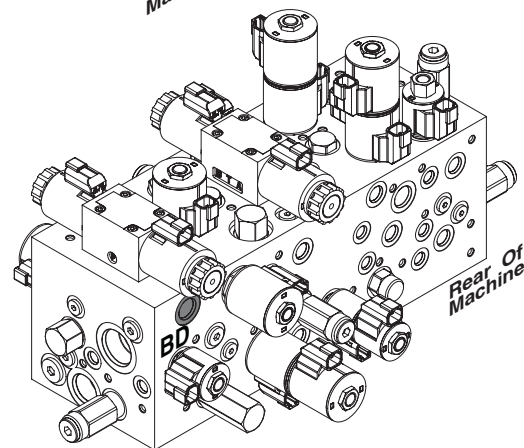
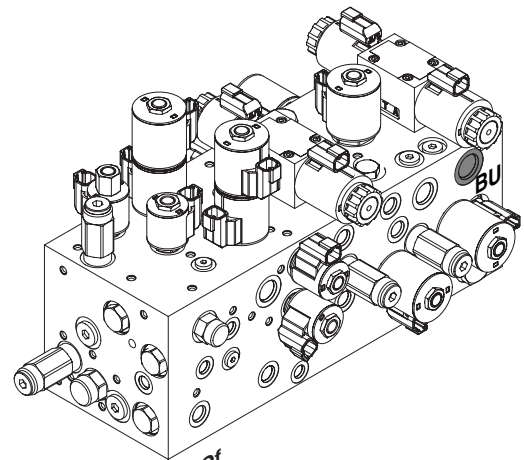
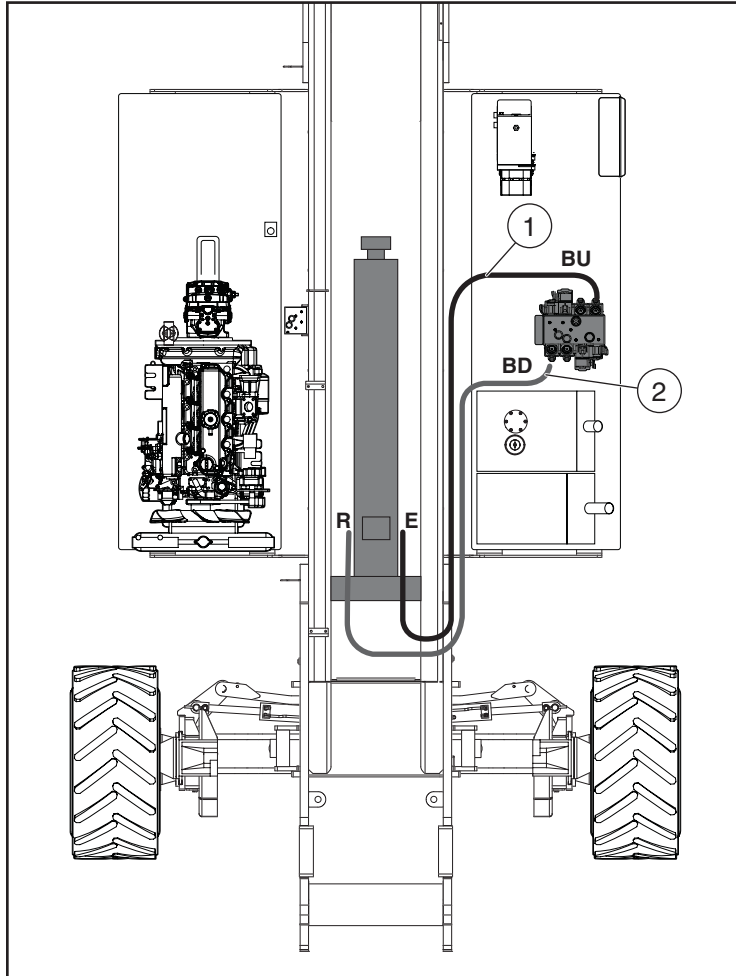
Figure 1-26: Stabilizer Cylinders



BOOM LIFT SYSTEM

The Boom Lift System uses one (1) double-acting hydraulic cylinder to lift and lower the boom. The counterbalance valve prevents retraction of the cylinder rod should a hydraulic line rupture or a leak develop between the cylinder and its related control valve.

Figure 1-27: Boom Lift Circuit



Functions Manifold

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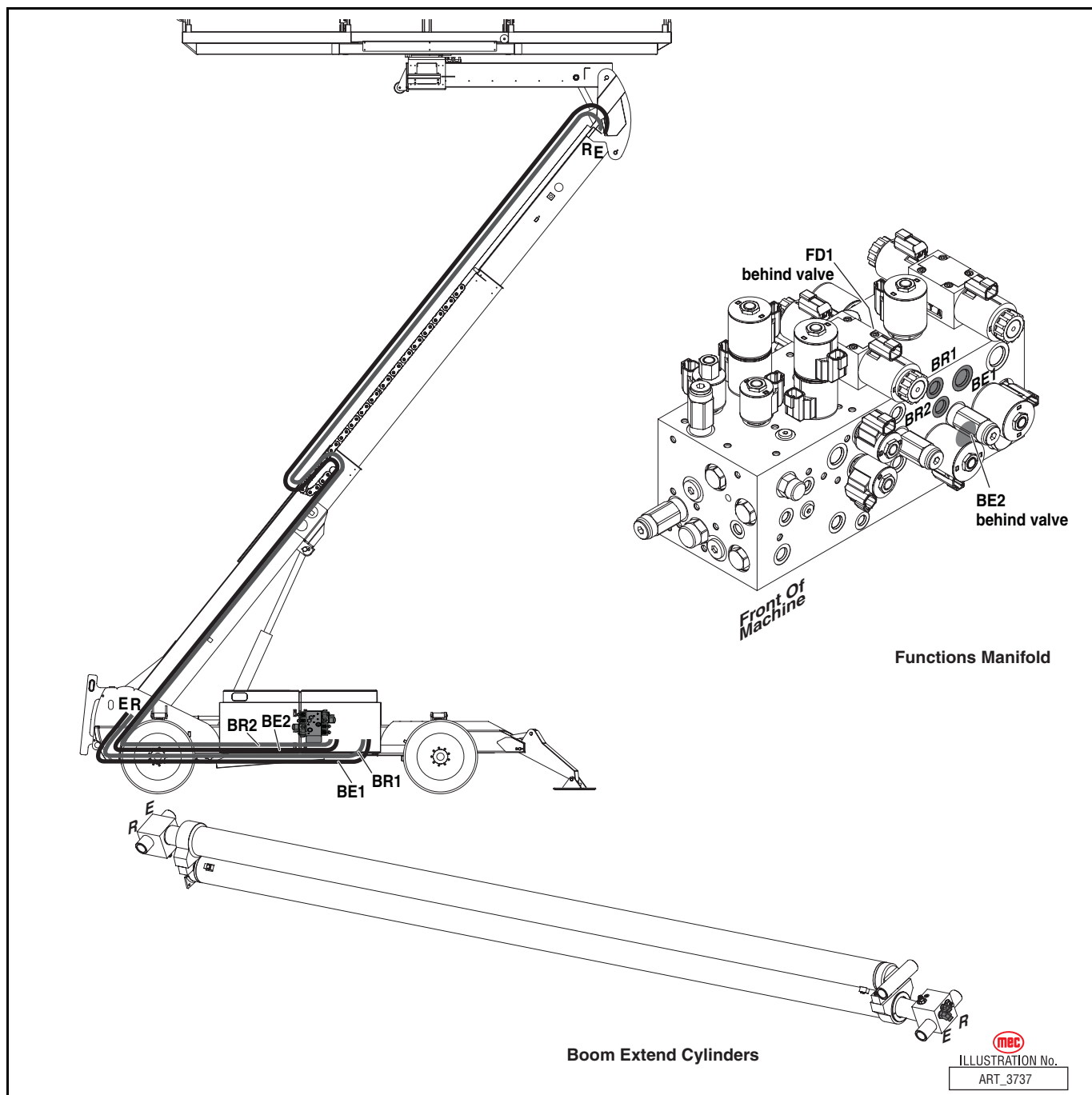
BOOM EXTEND SYSTEM

The boom extend system uses two (2) double acting hydraulic cylinders mounted back-to-back to extend each of the boom sections.

No sequencing chains or cable are used with this system. Extend and retract sequencing is achieved through the use of a flow divider valve (FD1) located in the main manifold.

Boom extend speed is enhanced by using a regenerative flow system which routes the return flow from the rod-end of the cylinder to combine with flow to the extend circuit. Counterbalance valves prevent the extension and retraction of the cylinder rods should a hydraulic line rupture or a leak develop between the cylinders and its related control valves.

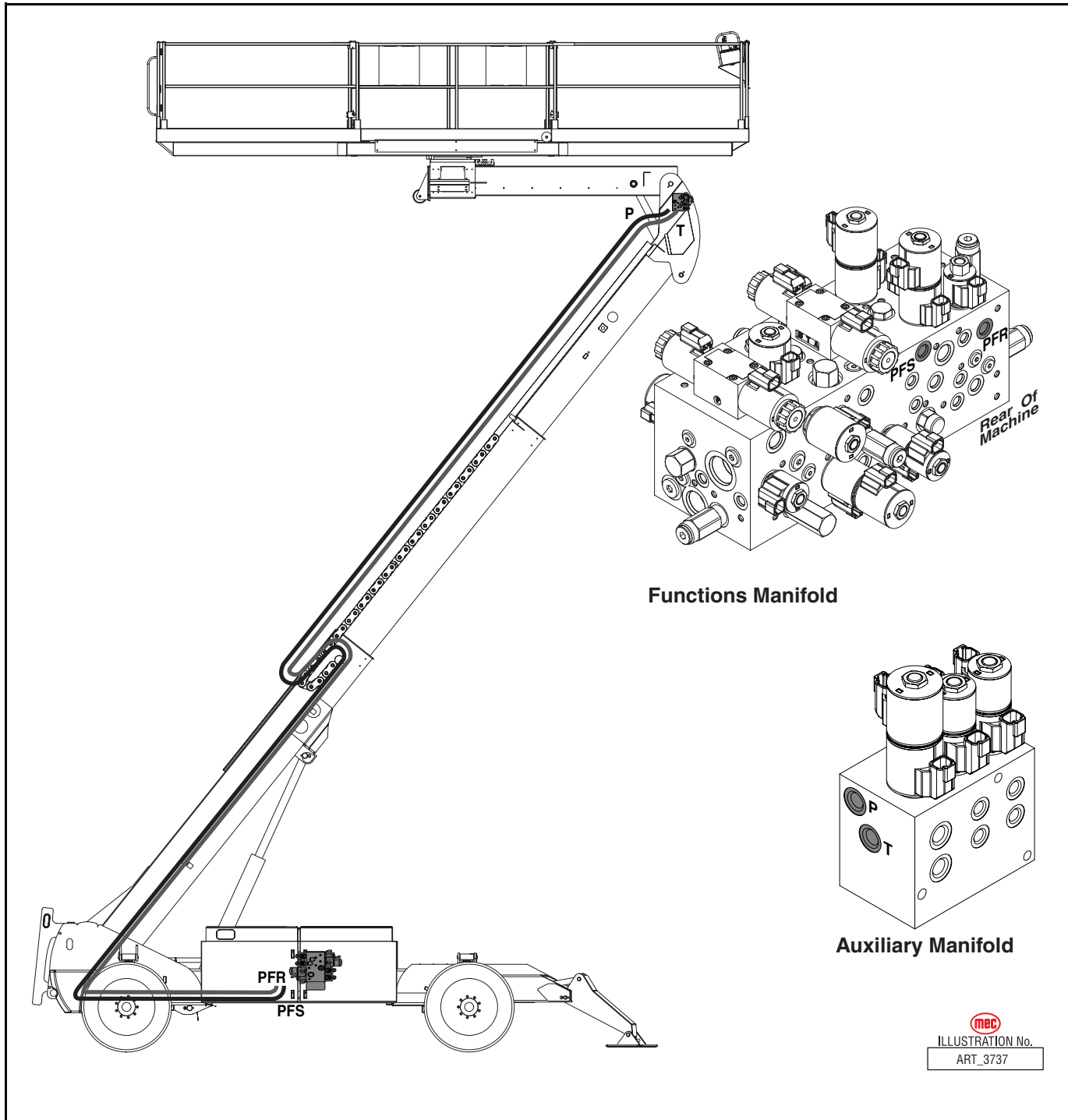
Figure 1-28: Boom Extend Circuit



AUXILIARY MANIFOLD SUPPLY

The Auxiliary Manifold provides hydraulic power for the Platform Level, Platform Rotate and Platform Slide functions, and is supplied by hoses from the PFS and PFR ports of the Functions Manifold.

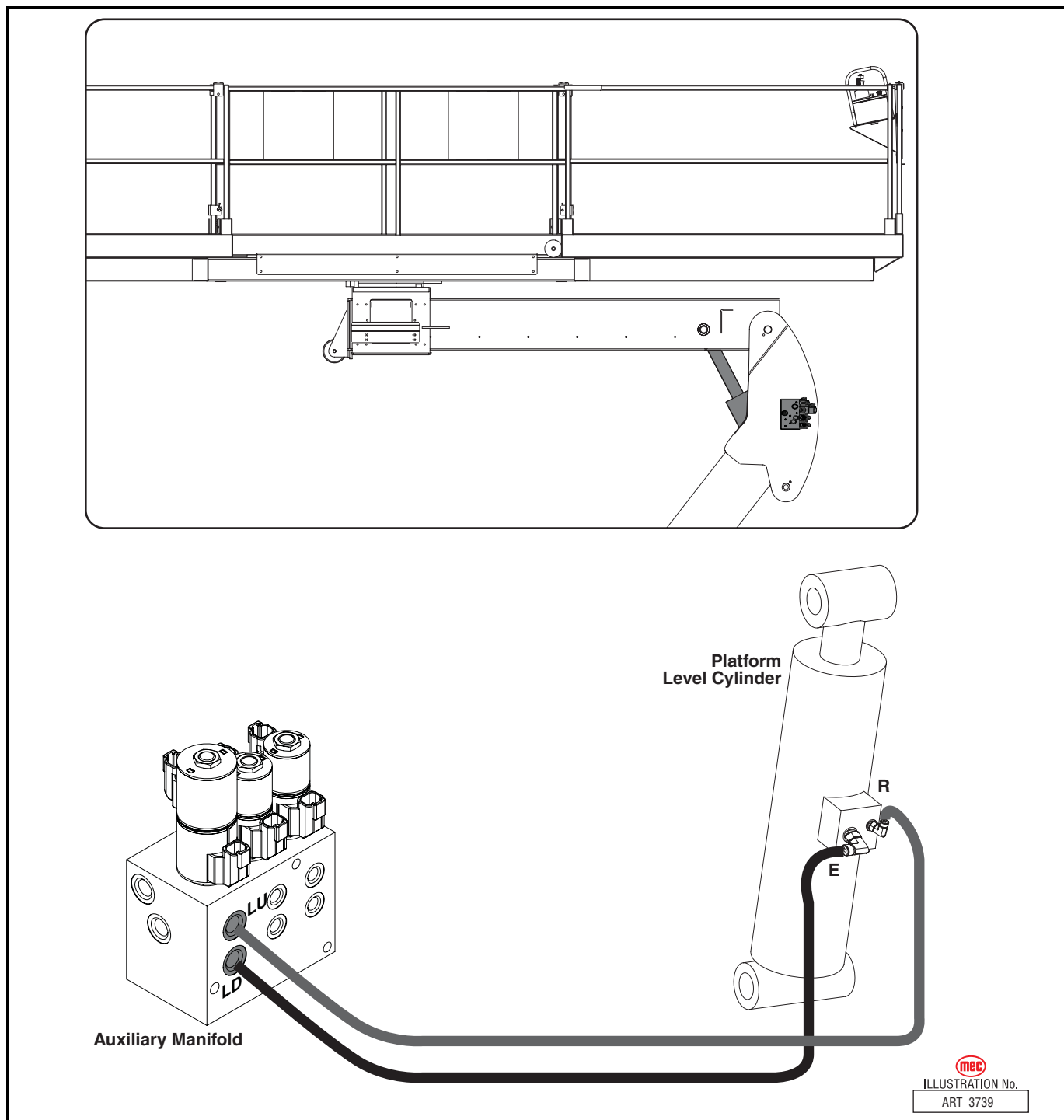
Figure 1-29: Auxiliary Manifold Supply Circuit



PLATFORM LEVEL FUNCTION

The Platform Level Function uses one (1) double-acting cylinder to control the leveling of the platform. Fluid from Port LD of the Auxiliary Manifold flows through the Platform Level Control Valve to the extend port of the cylinder. Fluid from Port LU flows to the retract port of the cylinder. The Auxiliary Manifold provides directional control, while the Platform Level Control Valve provides proportional control.

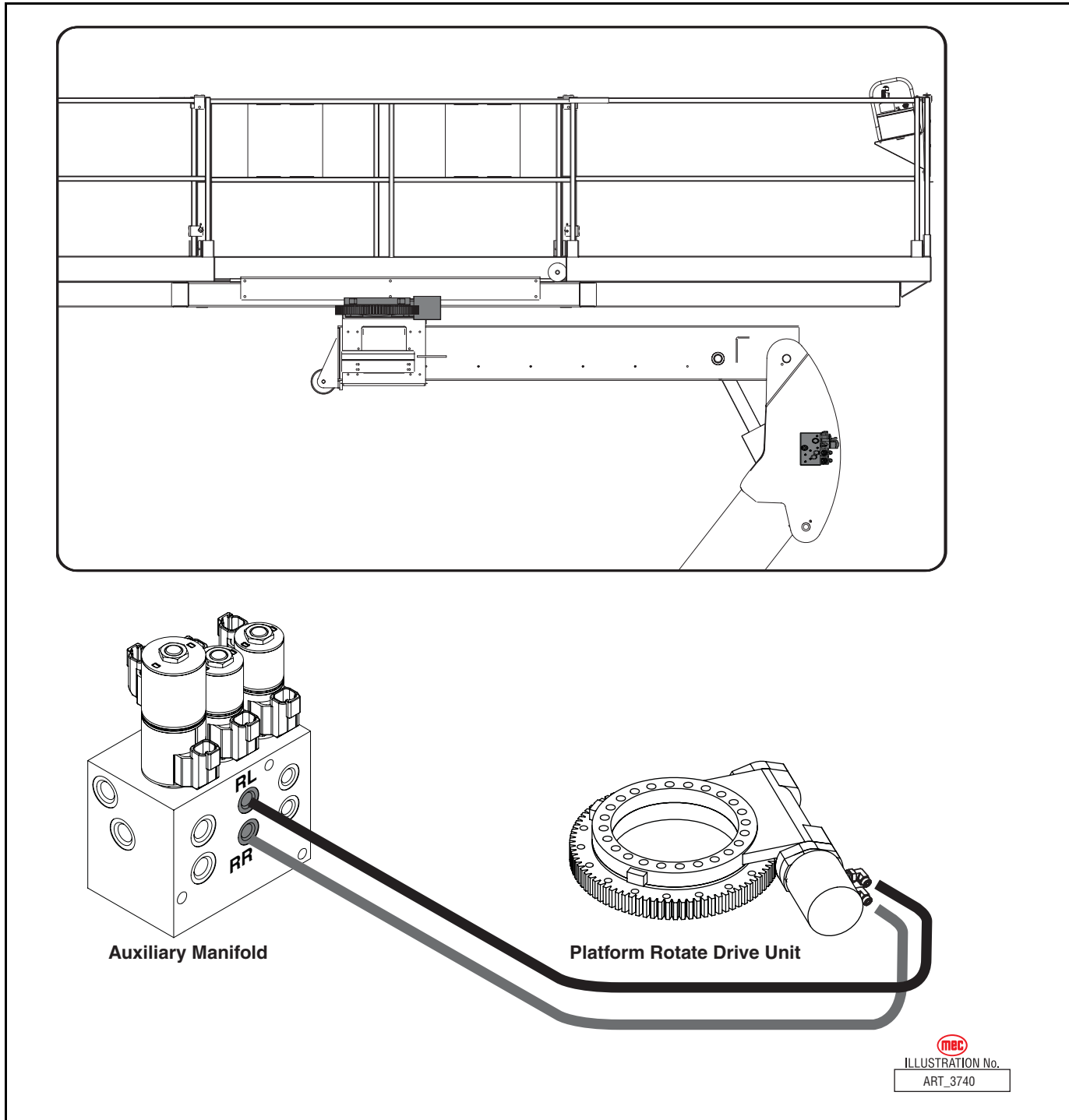
Figure 1-30: Platform Level Circuit



PLATFORM ROTATE FUNCTION

The Platform Rotate Function uses one (1) hydraulic motor and worm gear to control the rotation of the platform. Fluid from Port RL and Port RR of the Auxiliary Manifold flows to the Platform Rotate Drive Unit to rotate the platform. The Auxiliary Manifold valve provides directional control.

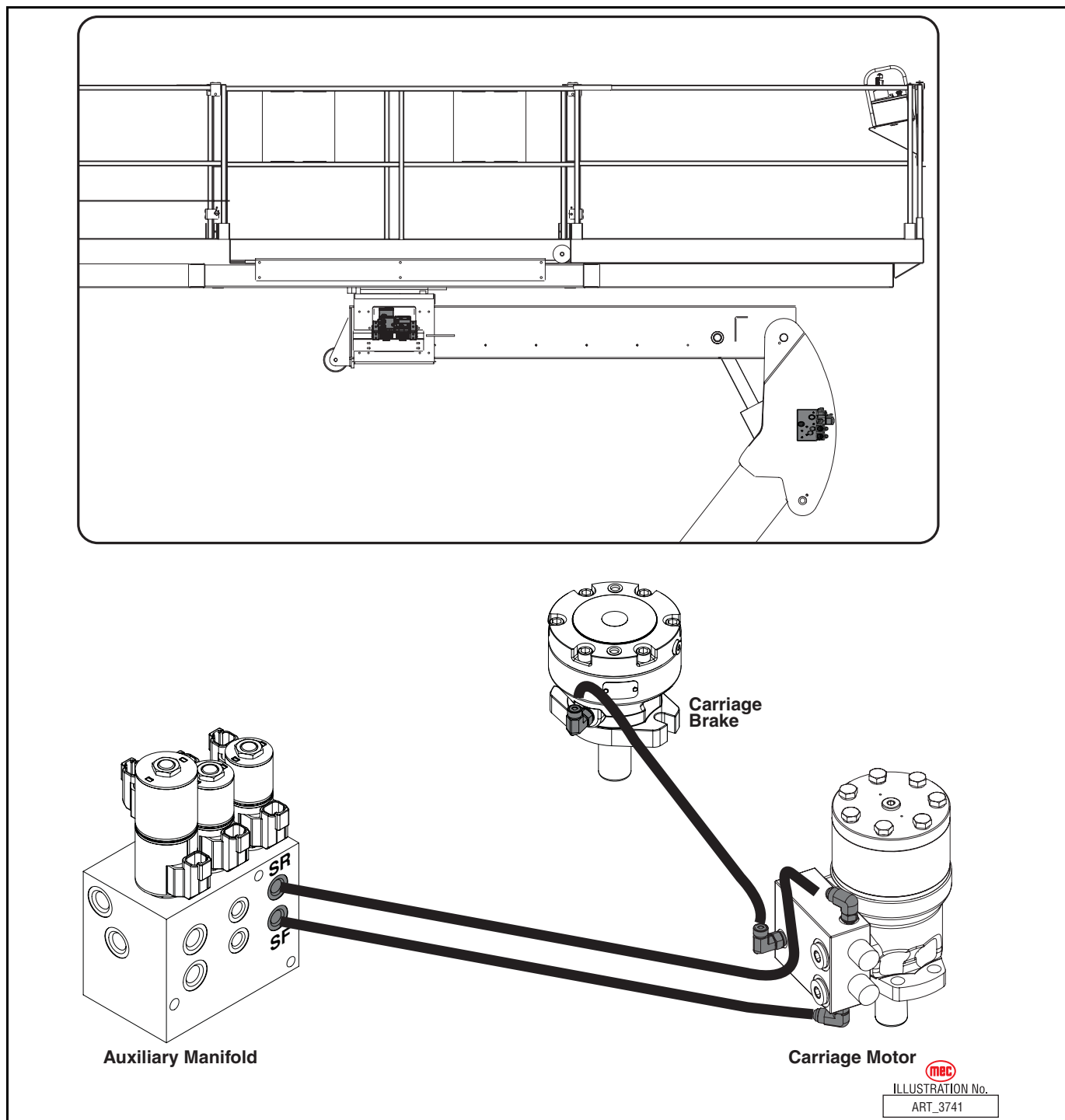
Figure 1-31: Platform Rotate Circuit



PLATFORM SLIDE FUNCTION

The Platform Slide Function uses one (1) hydraulic motor and gear rack to control the fore-and-aft motion of the platform. Fluid from Port SR and Port SF of the Auxiliary Manifold flows to the Carriage Motor to slide the platform. Pressure from the Carriage Motor's check valve circuit releases the Carriage Brake while the carriage is in motion.

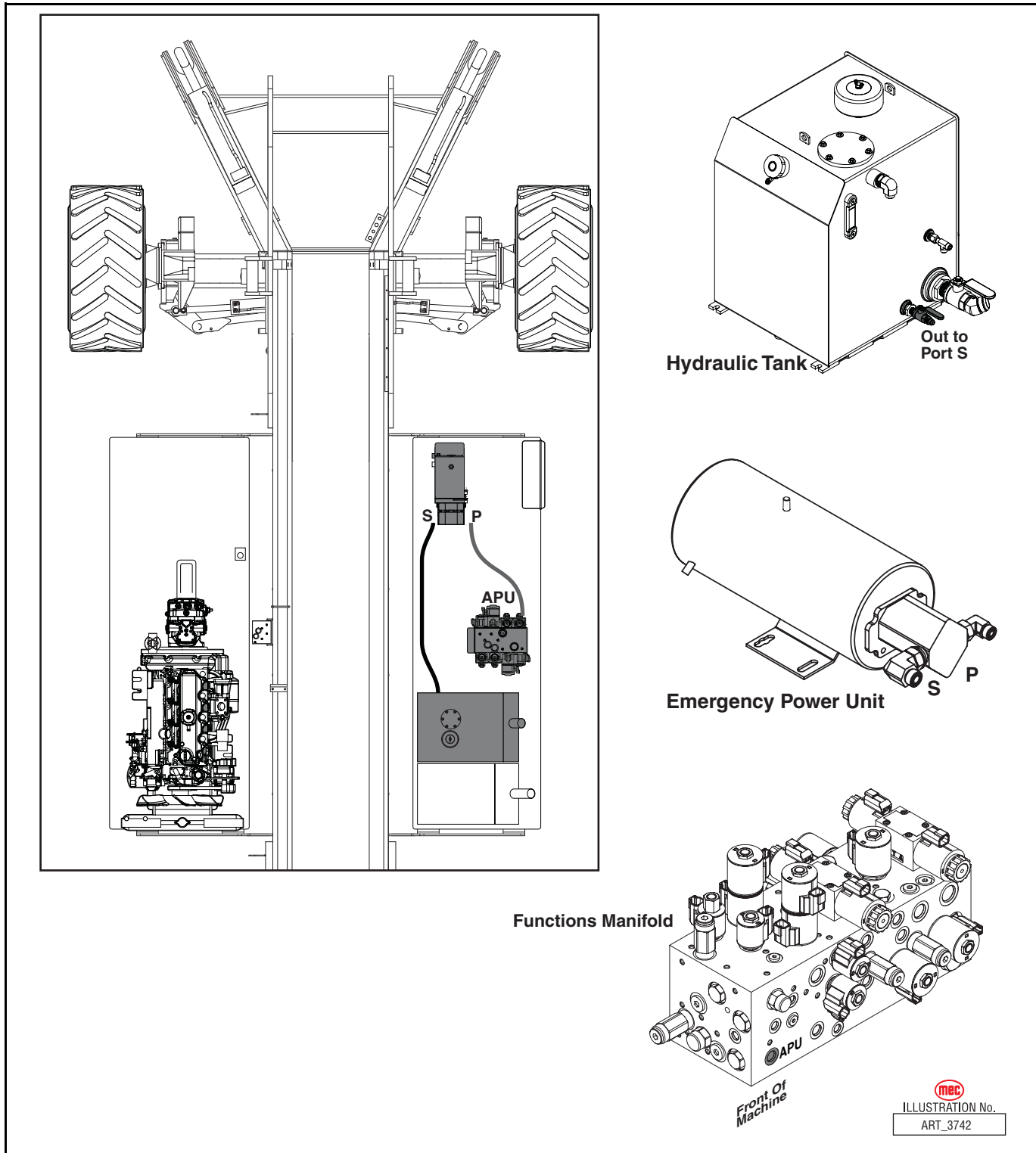
Figure 1-32: Platform Rotate Circuit



EMERGENCY POWER FUNCTION

The Emergency Power Function provides hydraulic power to lower the platform in the event of an emergency or failure of the engine. The Emergency Power Unit is activated electrically using battery power and provides pressure to lower and retract the boom.

Figure 1-33: Emergency Power Circuit



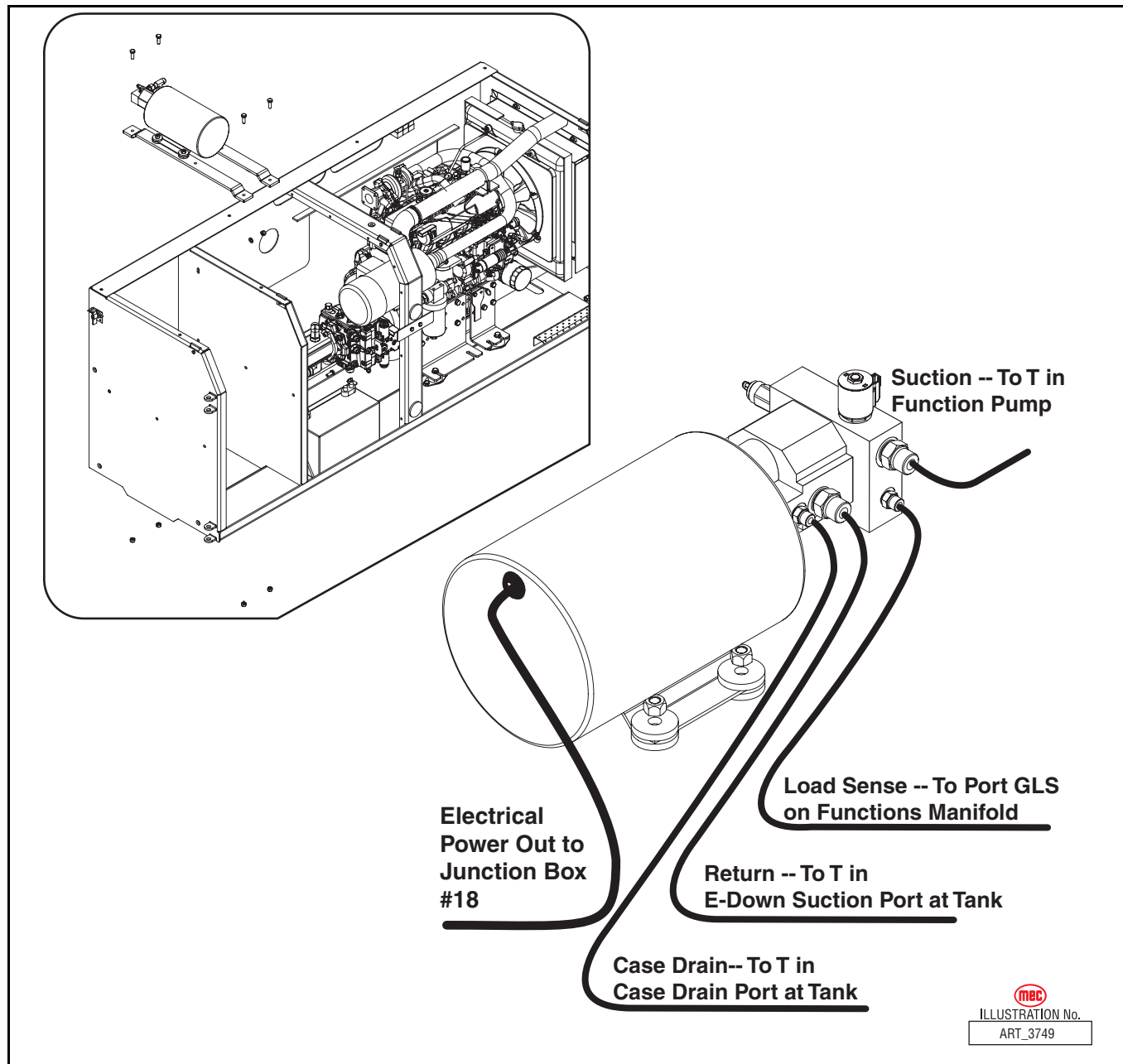
GENERATOR OPTION

The optional generator is driven by hydraulic pressure that takes pressure from the larger port of the Functions Pump. The return line connects to a T at the Emergency Power suction port of the Hydraulic Tank. A third line connects the top port of the Generator's motor to Port GLS on the Functions Manifold.

An electrically-operated solenoid valve located on the generator valve body turns the Generator on and off.

A short cord connects the generator to a junction box beside the Generator. From this box, another cord with a twist-loc end plugs into the Power To Platform connection at the front of the Control Module to provide electrical power to the platform.

Figure 1-34: Optional Generator



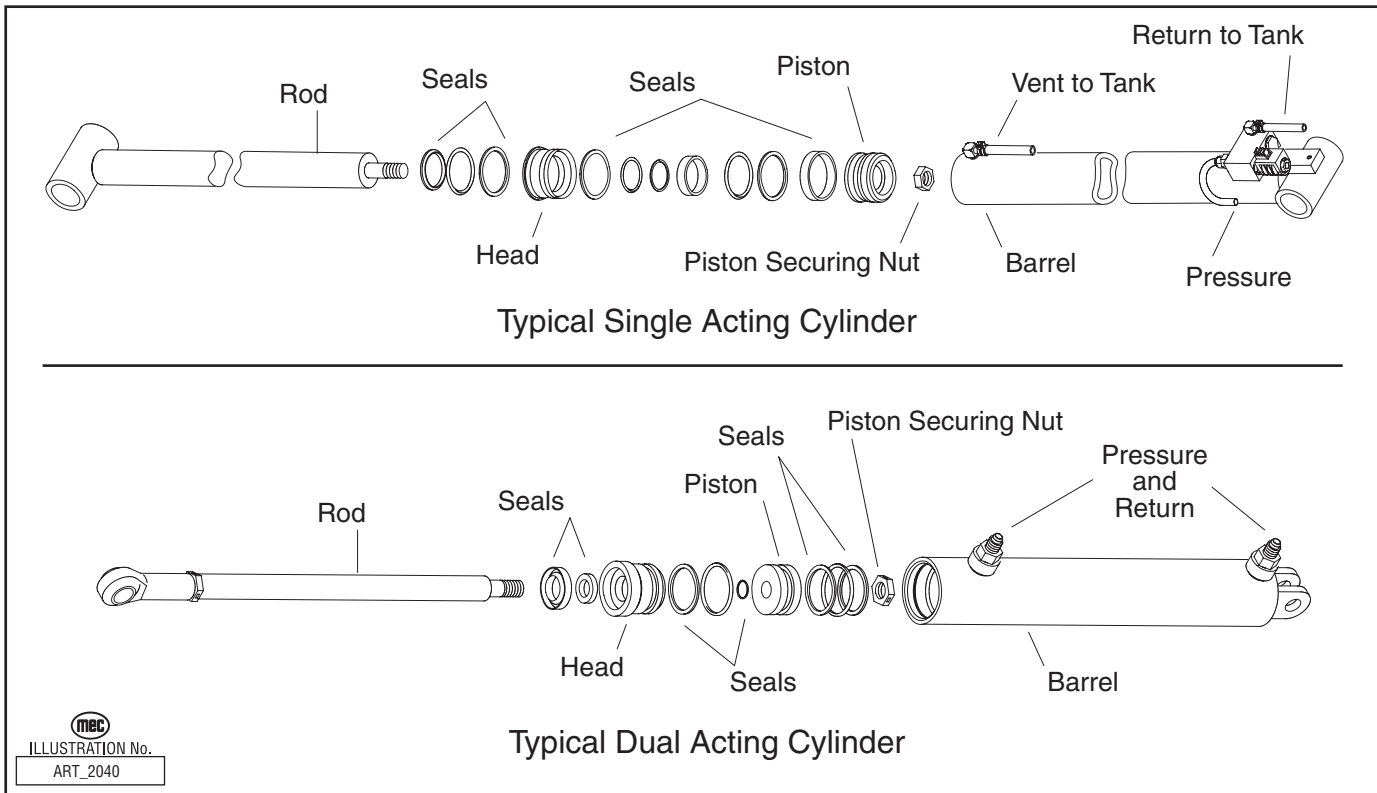
GENERAL CYLINDER REPAIR



WARNING

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

Figure 1-35: 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



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.



DO NOT overtighten the vise. Overtightening may damage the cylinder.

CYLINDER DISASSEMBLY

1. Remove solenoid valves or counterbalance valves, if the cylinder is equipped with them.
2. Remove the head from the cylinder body.
3. Remove the shaft assembly from the barrel, pulling in a straight line, so as not to scar the internal parts.
4. 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.
5. Remove nut at the end of the shaft and pull head and piston off of the rod.
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 grooves 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.

CYLINDER ASSEMBLY

CAUTION:

- To ensure a quality repair, cylinder parts must be thoroughly cleaned, dry, and free of solvents, and assembly must be performed in a clean area free of dust and contamination.
- Do not use sharp edged tools during seal replacement. After installing seals wait at least one hour before assembling the cylinder to allow the seals to return to their original shape.
- Torque all hardware according to the Hydraulic Components Torque Table unless otherwise specified.

1. Lubricate all components with clean hydraulic fluid.
2. Install new seal kit components. Install all seals on the head and piston using the non-sharp seal tool.
3. Place a small amount of fluid on the inside head seals. Reinstall the head on the shaft by slipping head over the piston end of the shaft. Be very careful not to damage the inside seals.
4. Place a small amount of fluid on the inside seals of the piston. Reinstall the piston on the shaft by slowly twisting the piston onto the threads of the shaft. Be very careful not to damage the inside seals.
5. Reinstall the shaft nut. Torque 1 ½" nut to 160 ft. lbs. (216 Nm).
6. Grease the outside seals of the head and piston.
7. Reinstall the shaft into the barrel of the cylinder and push in until groove of the head lines up with the slot in the barrel.
8. Reinstall the cylinder retainer. Installation is reverse of removal.
9. Reinstall any solenoid valves or counterbalance valve removed during disassembly.
10. Cycle the cylinder using air to check for proper operation.

NOTE: Keep all parts clean when working with hydraulic cylinders. Even one small piece of dirt or grit can damage the cylinder.

EXTEND CYLINDER DISASSEMBLY & ASSEMBLY

The Extend Cylinder Assembly used on the Titan Boom uses cylinders that pass hydraulic fluid down the center of the cylinder rod, with manifold connections at each rod end and blind cylinder barrels.

It is not necessary to separate the cylinder pair assembly when servicing one or both cylinders.

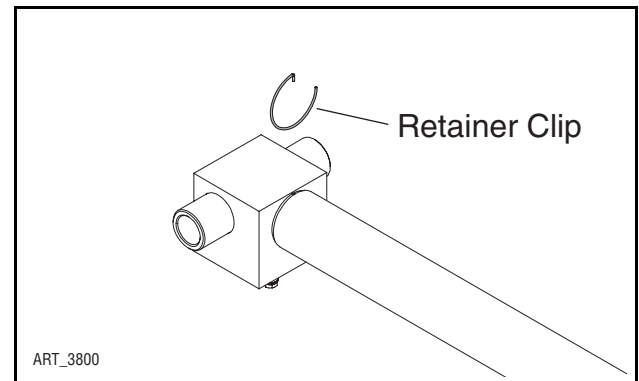
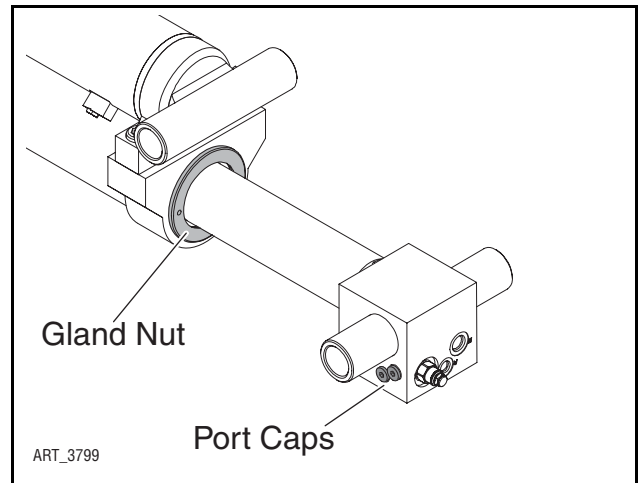
DISASSEMBLY

1. Place cylinder assembly on a bench or rack that will support the cylinder on both ends and in the middle.
2. Clean the cylinder assembly of all dirt, oil and debris before disassembly.
3. Place an oil drip pan under the end of the cylinder to be serviced to catch the oil upon disassembly of the cylinder. Approximately 3 gallons per cylinder will be lost.

IMPORTANT! Each cylinder is equipped with counterbalance valves that prevent cylinder extension/retraction except by hydraulic pressure. Remove the port plugs - located on the side of the cylinder manifold - on the cylinder to be serviced to allow cylinder rod extraction. It is not advised to remove counterbalance valves.

4. Remove cylinder gland nut from the cylinder using the appropriate spanner tool and extract the rod from the cylinder.
5. Place the cylinder rod on a flat surface, protecting it from damage and bending.
6. Remove the Retainer Clip located at the end of the rod (at the base of the cylinder manifold) by carefully lifting it out of the hole, then twisting it off the rod.
7. Using a strap wrench, hold the cylinder rod and unscrew the manifold from the rod end.

NOTE: The manifold is connected to a long tube that extends into the center of the cylinder rod. Use caution when removing the manifold from the cylinder, so as not to bend or damage this tube.



ASSEMBLY

1. Replace seals on piston and inside the gland nut, taking care not to damage the seals.
2. Coat the piston seals and bearings liberally with hydraulic assembly lubricant or clean hydraulic oil.
3. Install cylinder manifold (with tube) into the cylinder, ensuring that the tube fits into the o-ring port in the center of the piston at the far end of the rod.

NOTE: Alignment of the tube with the o-ring port can be assisted through the use of a clean, smooth bar approximately 18" long and 7/16" diameter maximum.

Feed the bar into o-ring port from outside the piston end of the rod. With assistance from a helper, guide the tube into the cylinder rod, fit the bar into the end of the tube and guide it into the o-ring port.

4. Thread the manifold onto the cylinder rod completely using a small amount of anti seize compound on the threads.
5. Locate both sides of the Retainer Clip hole (one side in the rod and the other side in the manifold) and align them by unthreading the manifold slightly. Once the holes are aligned, install the pin retainer.
6. Insert the rod into the cylinder. Take care not to damage the seals as they pass over the sharp edges at the cylinder opening.
7. Install the cylinder gland nut using a small amount of anti seize compound on the threads. Tighten sufficiently.

Repeat procedure on other cylinder if necessary.



Section 2

ELECTRICAL SYSTEM

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ELECTRICAL SYSTEM – GENERAL

The electrical control system consists of lower controls located on the machine base and upper controls located on the machine platform. Emergency lowering controls are also located on the machine base.

LOWER CONTROLS

The lower controls will operate all functions except the steer and drive functions.

UPPER CONTROLS

The upper controls will operate all machine functions. A momentary bi-directional rocker switch on the drive control handle provides the steering function. The control system for operation of drive, steer, lift, and lower is electric-over-hydraulic type. The lift, extend, rotate, slide and drive system is a proportional and is controlled by position and direction of the upper controls joysticks.

EMERGENCY STOP

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.

Figure 2-1: Emergency Stop Switch

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

The electric Emergency Lowering switch will continue to function when the Emergency Stop switches are depressed.



EMERGENCY LOWERING

The Emergency Lowering System is used to lower the platform in case of power failure. To lower the platform, activate the Emergency Power Switch to run the Emergency Down auxiliary hydraulic pump.

This function uses battery power from the auxiliary battery to lower the platform.

- Push and hold the Auxiliary Power switch, then use the Boom Extend/Retract function to retract the boom.
- Continue to hold the Auxiliary Power switch, then use the Boom Lift/Lower function to lower the boom.

NOTE: The Emergency Lowering System is disabled when the engine is running.

NOTE: The Emergency Power switch serves as an enable switch. It is not necessary to use the primary function enable switch.

DIAGNOSTIC LED & ONBOARD EZ-CAL DIAGNOSTIC TOOL

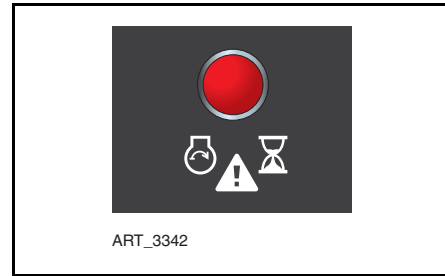
If the machine fails to operate, check the onboard EZ-Cal diagnostic tool located inside the Lower Controls Box. Also, check the diagnostic LED of the GP400 Module, located inside the control box. The LED on the module should be *ON*.

If the EZ-Cal has an error message, or if the LED is *OFF* or *FLASHING*, see Section 4 of this manual for assistance in troubleshooting.

STARTER CIRCUIT CUTOUT

To protect the starter motor, power will cut off to the starter circuit when the starter motor has run continuously for 10 seconds without starting the engine. The Starter Circuit Cutout indicator light on the Lower Controls Box will turn on during this time. Power to the starter circuit will reengage after 30 seconds.

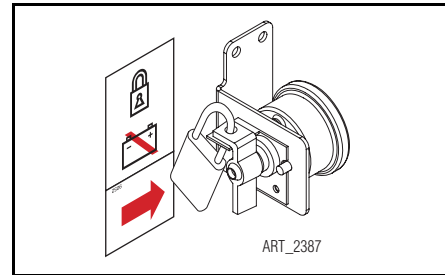
Figure 2-2: Master Disconnect Switch



BATTERY DISCONNECT SWITCH

All electrical power is routed through the Master Disconnect switch located in the Control Module. The switch can be locked in the OFF position with a padlock to prevent unauthorized use.

Figure 2-3: Master Disconnect Switch



BATTERIES

CAUTION

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

WARNING

BATTERIES UNDER CHARGE 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 OR FUEL VAPORS.

Two (2) battery (12 Volts DC) -- one supplies the electrical power required to start the engine and to operate the electrical circuits, while a second battery provides power for the Emergency Down power unit.

BATTERY MAINTENANCE (IN STORAGE)

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

- Keep battery clean. Electrolyte of batteries should be checked regularly and kept at proper level.
- Never stack one battery directly on top of another because post or container damage can result. 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 CHARGED (100%) 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 battery 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 can 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:

During quarterly maintenance (after battery has been charged), 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 | 6V Battery | 12V Battery |
| Fully Charged | 1.280 | 2.10 | 6.30 | 12.60 |
| Fully Discharged | 1.130 | 1.75 | 5.19 | 10.50 |

BATTERY REPLACEMENT



WARNING

TURN OFF THE BATTERY DISCONNECT SWITCH BEFORE REMOVING ANY BATTERY FROM THE MACHINE.

CAUTION

Prevent damage to the battery and/or electrical system;

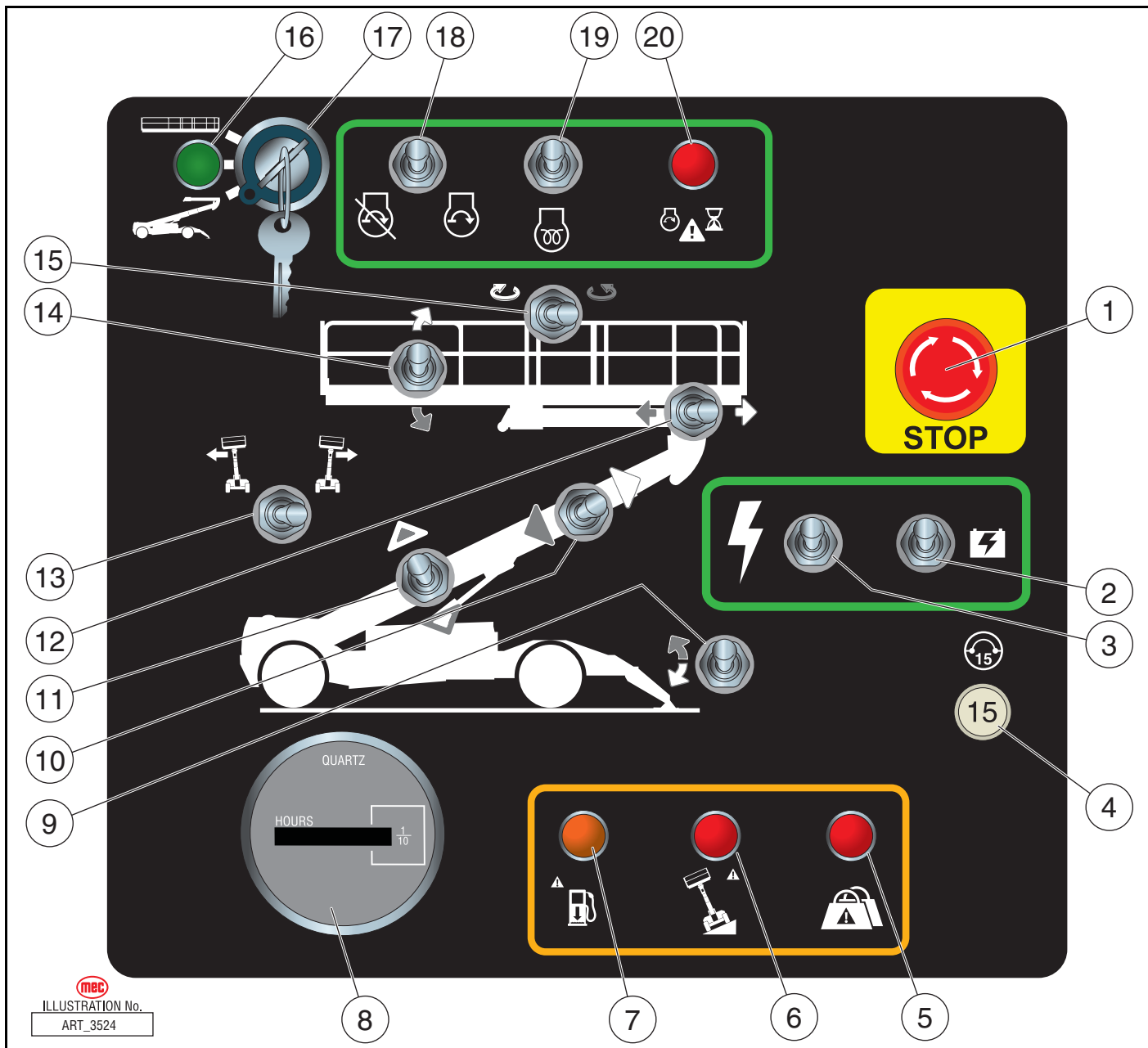
- **Always disconnect the negative battery cable first.**
- **Always connect the positive battery cable first.**

TO REMOVE A BATTERY:

1. Turn the Battery Disconnect switch to OFF.
2. Disconnect the battery cables and remove battery hold-down hardware.
3. Lift the battery from the compartment, put the battery aside and dispose of properly.

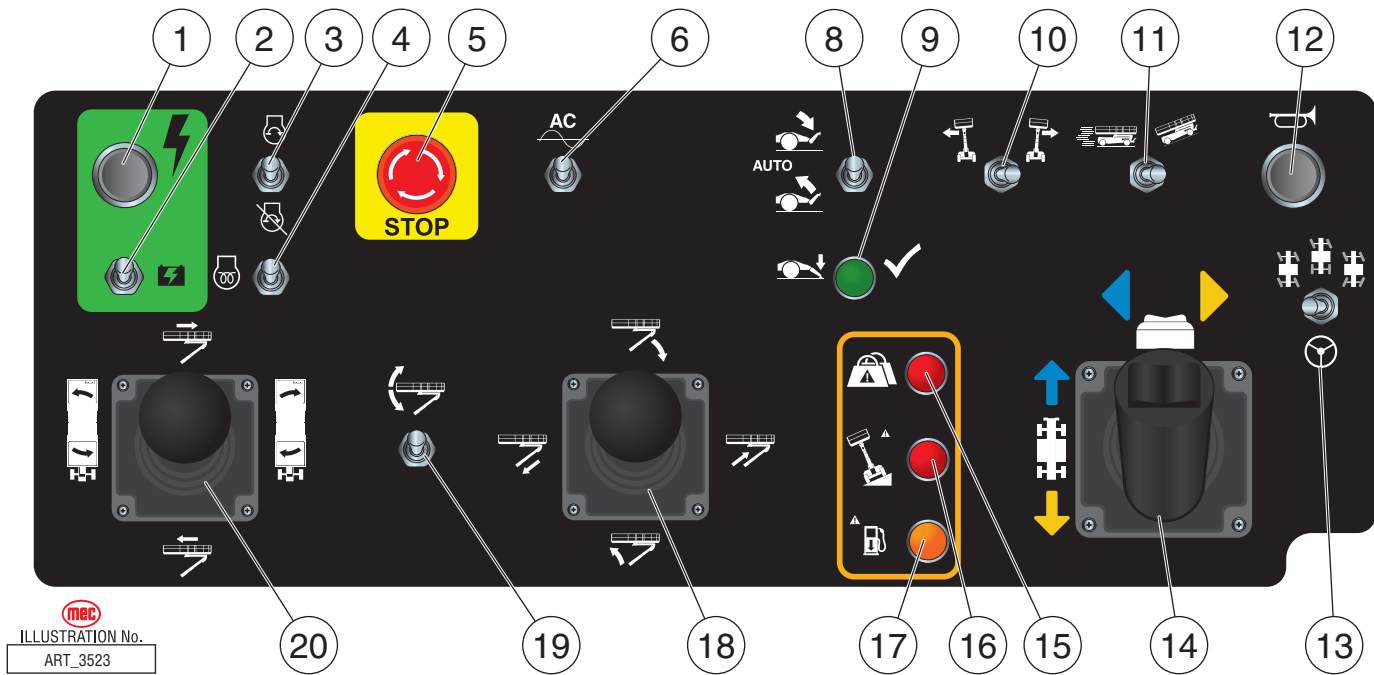
TO INSTALL A BATTERY:

1. Position the battery in the compartment and secure with hold-down hardware.
2. Connect battery cables.

CONTROLS**LOWER CONTROLS***Figure 2-4: Lower Controls***WARNING**

ALWAYS BE AWARE OF THE MACHINE'S POSITION AND OF YOUR SURROUNDINGS BEFORE ACTIVATING ANY CONTROL FUNCTION.

| CONTROL | | DESCRIPTION |
|---------|-----------------------------------|---|
| 1 | Emergency Stop Switch | Press the EMERGENCY STOP switch at any time to stop all machine functions. Turn switch <i>clockwise</i> to reset |
| 2 | Emergency Power Switch | If normal power fails, press and hold while using boom retract and boom lower functions. |
| 3 | Function Enable Switch | Press and hold this switch to enable boom, platform, frame level and stabilizer operations. Press down to operate the controls at slow speed. Press up to operate the controls at higher speed. |
| 4 | Circuit Breaker | Trips when there is excessive electrical load. Push to reset. |
| 5 | Overload Indicator Light (option) | Light ON indicates too much weight on the platform. An audible alarm will sound and all machine function will stop. Remove weight from the platform to restore function and continue. |
| 6 | Tilt Indicator Light | When this red light is illuminated, the machine is not level. Carefully retract the boom, then lower the boom, before leveling the machine, or move the machine to a firm, level surface. |
| 7 | Low Fuel Indicator Light | When this amber light is illuminated, the fuel level is low. Refuel soon. |
| 8 | Hour Meter | Indicates total elapsed time of machine operation. |
| 9 | Stabilizer Switch | Move and hold down until automatic stabilizer deployment stops automatically. Move and hold up to retract stabilizers. |
| 10 | Boom Extend/Retract | Move this switch right to extend the boom. Move this switch left to retract the boom. |
| 11 | Boom Lift/Lower | Move this switch up to lift the boom. Move this switch down to lower the boom. |
| 12 | Platform Slide Forward/Rearward | Move this switch right to move the platform forward along the platform support beam. Move this switch left to move the platform rearward along the platform support beam. |
| 13 | Frame Level Switch | Move this switch left to manually adjust the level position of the frame to the left. Move this switch right to manually adjust the level position of the frame to the right. |
| 14 | Platform Level Switch | Move this switch up to manually level the rear of the platform upward. Move this switch down to manually level the rear of the platform downward. |
| 15 | Platform Rotate Switch | Move this switch left to rotate the platform clockwise. Move this switch right to rotate the platform counterclockwise. The Platform Rotate function will stop when the platform reaches its detent center position. To continue to rotate the platform, return the switch to the neutral position, then push the switch to rotate the platform in the desired direction. |
| 16 | Power On Indicator Light | When this green light is illuminated, the Selector Switch (#17) is set to either platform or chassis. This light is not illuminated when the key is turned to the center (off) position or when an Emergency Stop Switch is pushed in. |
| 17 | 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. |
| 18 | Start/Stop Switch | Push switch up to start engine. Push switch down to stop engine. |
| 19 | Glow Switch | Press this switch up to activate glow plugs prior to starting. |
| 20 | Starter Time-out Indicator | When this red light is illuminated, the starter circuit is temporarily disabled. The starter circuit times out if the starter is run continuously for 10 seconds without the engine starting. The starter functions resets after 30 seconds. |

PLATFORM CONTROLS

ALWAYS BE AWARE OF THE MACHINE'S POSITION AND OF YOUR SURROUNDINGS BEFORE ACTIVATING ANY CONTROL FUNCTION.

| CONTROL | | DESCRIPTION |
|---------|---------------------------------------|--|
| 1 | Function Enable Button | Press and hold this button to enable platform level, frame level and stabilizer operations. |
| 2 | Emergency Power Switch | If normal power fails, press and hold while using boom retract and boom lower functions. |
| 3 | Start/Stop Switch | Move this switch up to start engine. Press this switch down to stop engine. |
| 4 | Glow Switch | Move this switch up to activate glow plugs prior to cold starting the engine. |
| 5 | Emergency Stop Switch | Press the EMERGENCY STOP switch at any time to stop all machine functions. Turn switch <i>clockwise</i> to reset |
| 6 | Generator Switch (Optional Equipment) | Turn switch ON to engage optional AC generator. Generator switches off in any other function is enabled. |
| 7 | -- | -- |
| 8 | Stabilizer Switch | Move and hold this switch up until stabilizer deployment stops automatically. Move and hold this switch down to retract stabilizers. |
| 9 | Stabilizers Set Indicator Light | Green light illuminates when the stabilizers are fully deployed and the full range of boom functions are enabled. |
| 10 | Frame Level Switch | Move this switch left or right to manually adjust the level position of the frame. |
| 11 | Speed/Torque Switch | Move this switch to the left for high speed drive. Push this switch to the right for high torque drive. |
| 12 | Horn Button | Press to sound warning horn. |

| CONTROL | | DESCRIPTION | |
|---------|-----------------------------------|---|---|
| 13 | Steering Mode Switch | Use this switch to set the steering mode: Left position: Crab Steer -- All four wheel turn in the same direction. Center position: 2-Wheel Steer -- Only the front two wheels steer. Right position: 4-Wheel Steer -- The front and rear wheels steer in opposite directions. | |
| 14 | Drive/Steer Control Lever | Depending on the placement of the control box and the orientation of the platform, the machine may move in unexpected directions when the Drive and Steer functions are activated. The color- and shape-coded arrows on the joystick decal correspond to similar arrow decals on the machine. Be sure to check the arrows on the machine before using the Drive or Steer functions. | |
| | | Drive Function | Push the control lever forward to go in the direction of the blue arrows on the machine, or backward to go in the direction of the yellow arrows on the machine. |
| | | Steer Function | Press the thumb switch on top of the control lever left to steer in the direction of the blue arrow on the machine, or right to steer in the direction of the yellow arrow on the machine. |
| 15 | Overload Indicator Light (option) | Light ON indicates too much weight on the platform. An audible alarm will sound and all machine function will stop. Remove weight from the platform to restore function and continue. | |
| 16 | Tilt Indicator Light | If this red light is illuminated, the machine is not level. Carefully retract the boom, then lower the boom, before leveling the machine, or move the machine to a firm, level surface. | |
| 17 | Low Fuel Indicator Light | If this amber light is illuminated, the fuel level is low. Refuel soon. | |
| 18 | Boom Function Control Lever | Boom Lift/Lower Function | Depress the enable button on top of the control lever, then pull the joystick backward to lift the boom. Depress the enable button on top of the control lever, then push the joystick forward to lower the boom. |
| | | Boom Extend/Retract Function | Depress the enable button on top of the control lever, then push the control lever right to extend the boom. Depress the enable button on top of the control lever, then push the control lever left to retract the boom. |
| 19 | Platform Level Switch | Press this switch up to manually level the rear of the platform upward. Press this switch down to manually level the rear of the platform downward. | |
| 20 | Platform Function Control Lever | Platform Slide Forward/Rearward Function | Press the enable button on top of the control lever, then push the control lever forward to slide the platform forward along the platform support beam. Press the enable button on top of the control lever, then pull the control lever backward to slide the platform rearward along the platform support beam. |
| | | Platform Rotate Function | Press the enable button on top of the control lever, then push the control lever left to rotate the platform counterclockwise. Press the enable button on top of the control lever, then push the control lever right to rotate the platform clockwise. The Platform Rotate function will stop when the platform reaches its detent center position. To continue to rotate the platform, return the joystick to the neutral position, then push the joystick to rotate the platform in the desired direction. |

SENSORS, RELAYS & ALARMS

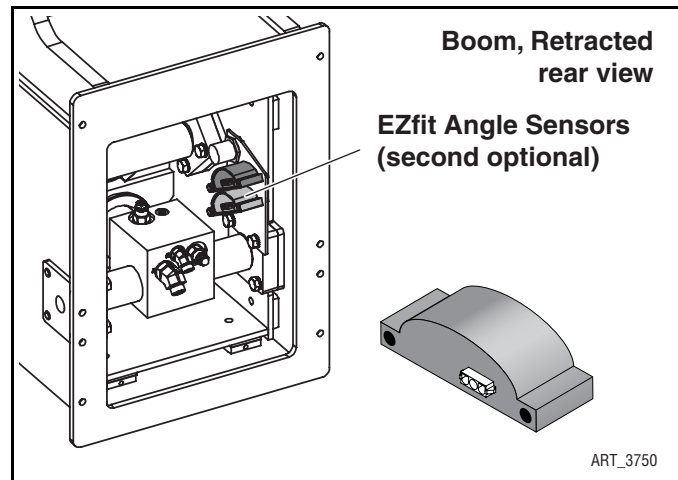
SENSORS

EZFIT ANGLE SENSOR

There is one EZfit Angle Sensor located at the base of the boom. A second redundant EZfit Angle Sensor will be present on machines equipped with the optional Overload Sensing System.

The EZfit Angle Sensor measures the absolute angle of the boom and compensates for the fore-and-aft angle of the chassis.

Figure 2-5: EZfit Angle Sensor



CAN-TILT ANGLE TRANSDUCERS

There are four (4) CAN-Tilt Angle Transducers on this machine. CAN-Tilt Angle Transducers **are not** interchangeable. Each is identified by number for communication with the GP400 Module. If removed, be sure that each returns to its original location. If replaced, be sure that the replacement has the same number as the original.

Figure 2-6: Platform Beam CAN-Tilts

Two CAN-Tilt Angle Transducers are located side-by-side at the front of the the Platform Beam. These measure the angle of the beam both fore-and aft and side-to-side.

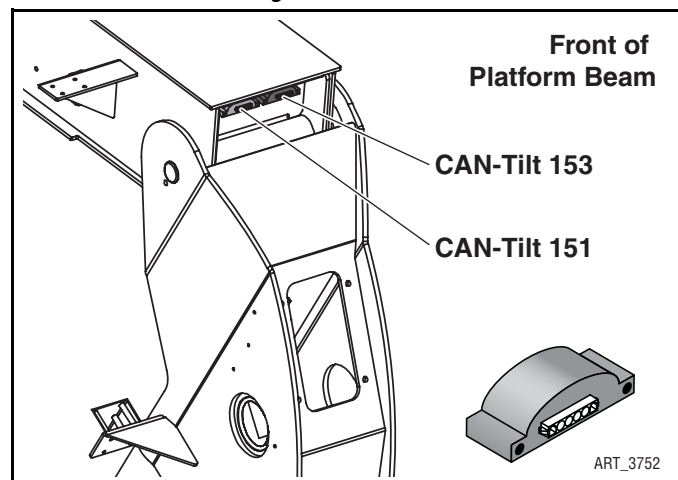
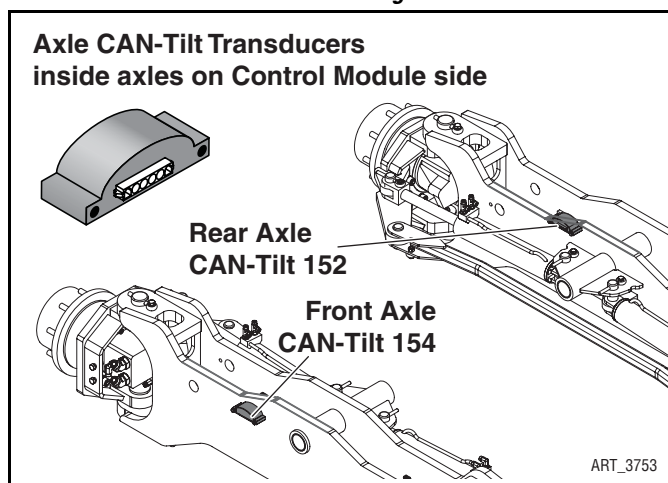


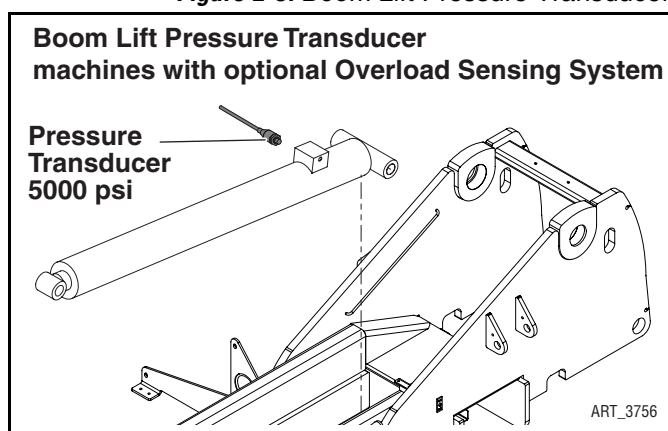
Figure 2-7: Axle CAN-Tilts

Each axle has a CAN-Tilt Angle Transducers mounted on the Control Module side. These measure the angle of their respective axle relative each other and to the GP400 module in the Base Controls Box.



PRESSURE TRANSDUCERS

The Boom Lift Cylinder is equipped with one 5000 psi Pressure Transducer on machines equipped with the optional Overload Sensing System.

Figure 2-8: Boom Lift Pressure Transducer

The Platform Level Cylinder is equipped with one 5000 psi Pressure Transducer on machines equipped with the optional Overload Sensing System.

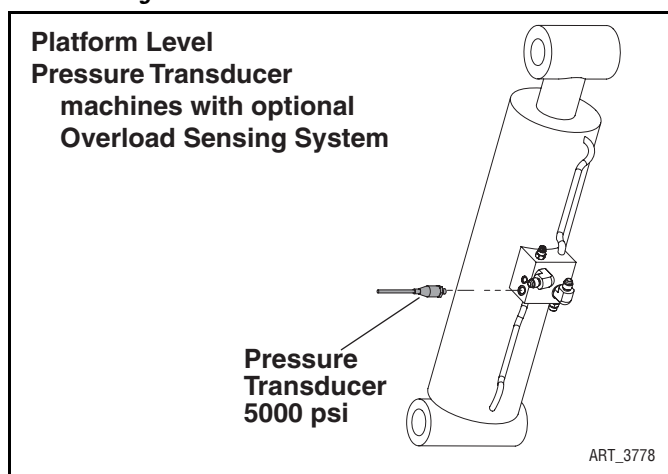
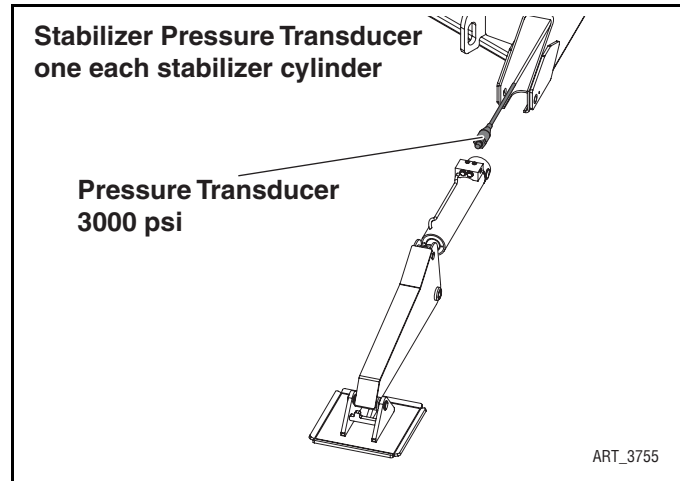
Figure 2-9: Platform Level Pressure Transducer

Figure 2-10: Stabilizer Pressure Transducers

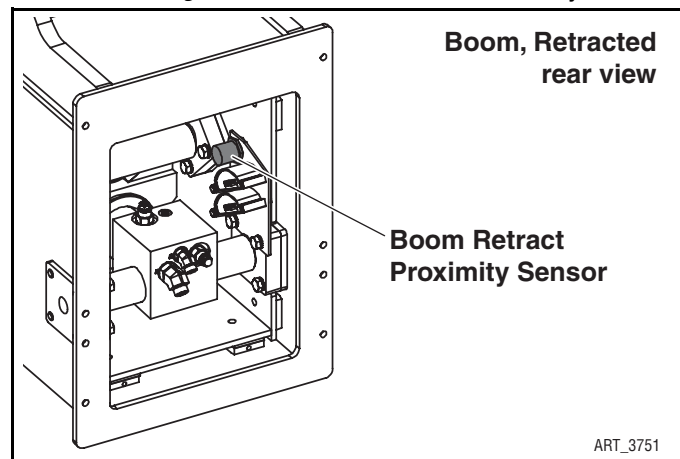
Each Stabilizer Cylinder is equipped with one 3000 psi Pressure Transducer. These measure pressure in the Stabilizer Cylinders to ensure that they are supporting the machine.



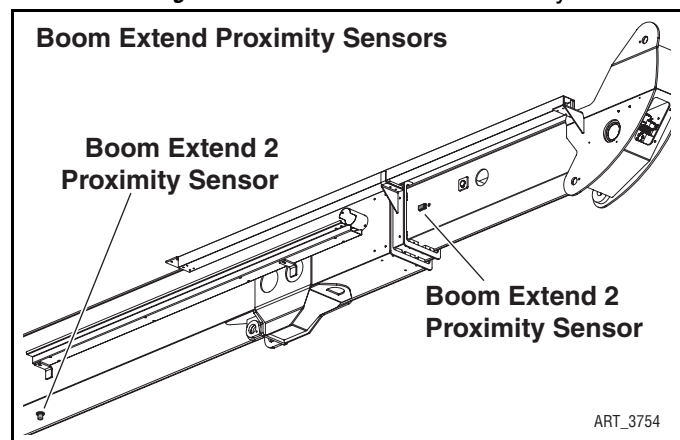
PROXIMITY SENSORS

There are three (3) Proximity Sensors on this machine.

The Boom Retract Proximity Sensor senses boom position to restrict drive speed and disable stabilizer operation when the boom is extended beyond approximately 4 inches (10 cm).

Figure 2-11: Boom Retract Proximity Sensor

The Boom Extend 1 and Boom Extend 2 Proximity Sensors sense boom position to stop motion when the stabilizers are not set. The boom must be retracted to re-enable operation.

Figure 2-12: Boom Extend Proximity Sensors

ROTATION SENSOR

The Rotation Sensor tracks the platform's position relative to centered, and cuts out Frame Level and Stabilizer functions when the platform is more than 10° out of centered position.

When rotating towards the centered position, the Rotation Sensor slows the platform as it approaches center, then stops rotation as the platform reaches center. Release the control handle, then re-engage it again to continue rotation.

Rotation Sensor Adjustment

1. Center the platform manually over the boom and platform beam so that the platform entrance aligns directly with the personnel ladder.
2. Remove the Load Zone Deck Plate.
3. Access the onboard EZ-Cal Diagnostic Tool mounted inside the Lower Control Box and proceed to DIAGNOSTICS>ANALOGS>GP440 ANALOGS>P8-1.

NOTE: See Section 4 of this manual for EZ-Cal navigation instructions.

4. With the platform centered, the reading on P8-1 should read 2.51V. If the reading is not 2.51V, adjust the Rotation Sensor Assembly by loosening the adjustment bolts and turning the assembly until it reads correctly. Tighten the adjustment bolts.
5. Rotate 90° in each direction, then return the platform to the centered position. The platform should automatically stop at the centered position.

CABLE EXTENSION TRANSDUCER

The Cable Extension Transducer measures boom extension on machines equipped with the optional Overload Sensing System.

Figure 2-13: Rotation Sensor

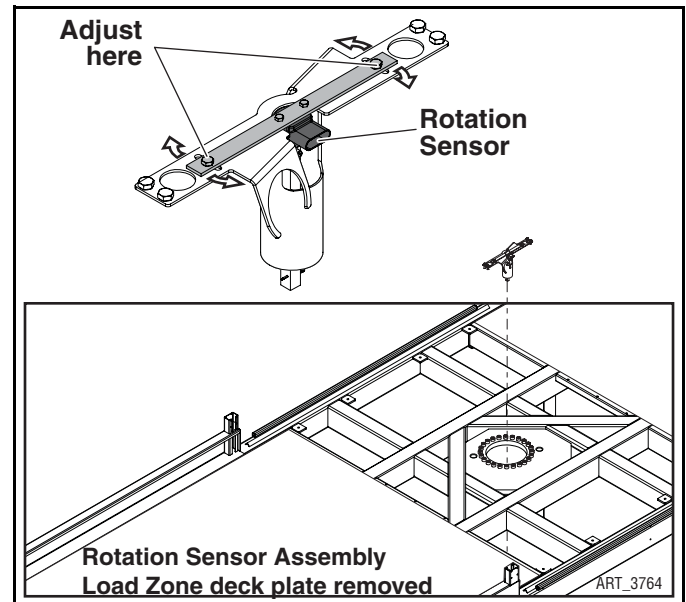
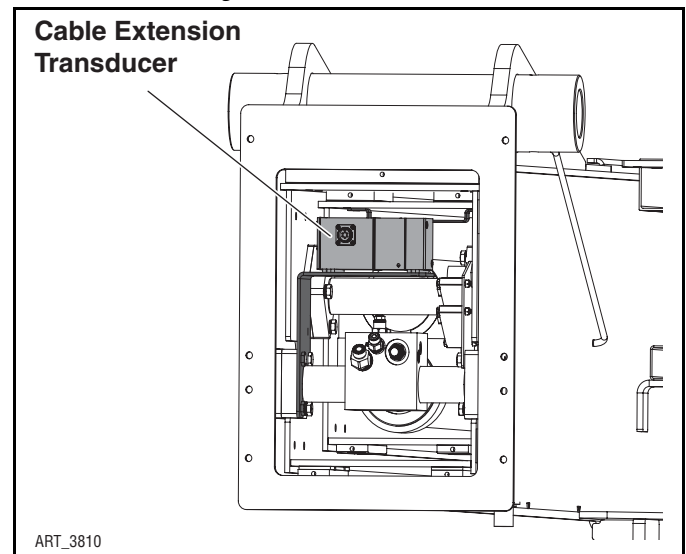


Figure 2-14: Cable Extension Transducer



RELAYS

ENGINE RELAYS

The Engine Relays are located beside the engine on the rear wall of the Engine Module. These relays reduce the current flow supplied by 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.

Glow/Preheat Relay

Provides power to the diesel engine glow plugs.

Figure 2-15: Engine Relays

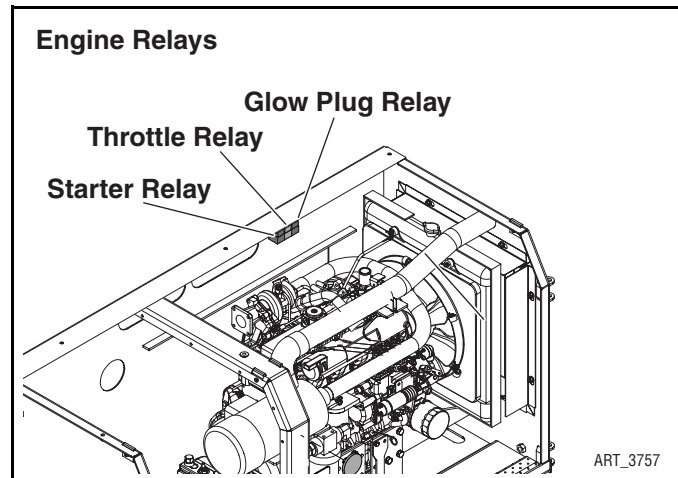


Figure 2-16: Charge Isolation Relay

CHARGE ISOLATION RELAY

The Charge Isolation Relay allows the alternator to charge the Emergency Power Battery while the engine is running and prevent the battery from discharging when the engine is off.

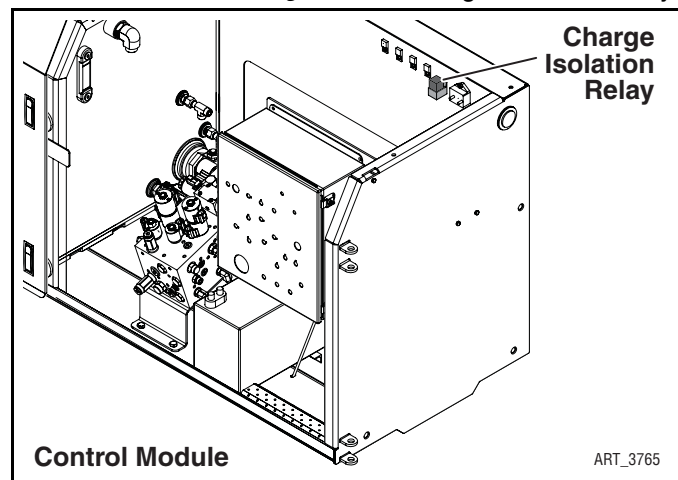
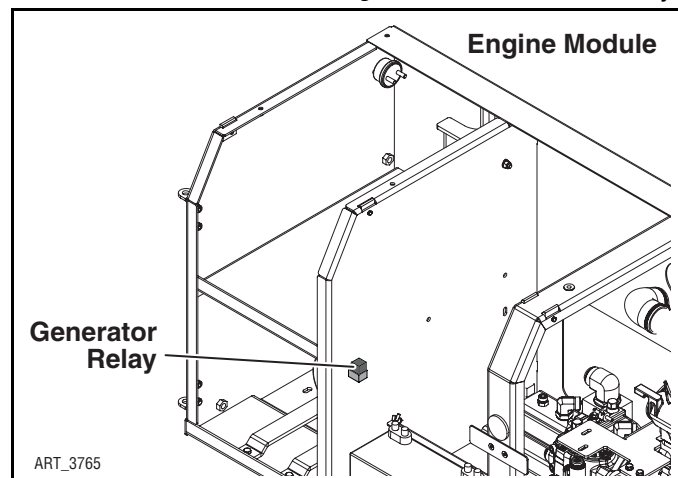


Figure 2-17: Generator Relay

GENERATOR RELAY

On machines equipped with the optional 3kVA Generator, this relay controls the solenoid valve that turns the generator on and off. It also provides power to the exciter for the generator.



ALARMS

TILT ALARM

The Tilt Alarm is a dual-tone alarm that sounds at the Base Controls Box when the angle of the platform is outside of acceptable levels of operation (as measured by the two CAN-Tilt Angle Transducers mounted at the front of the platform beam).

To Correct: – Use the Platform Level control switch to level the platform fore-and-aft. If the alarm continues to sound, the platform may be out of level side-to-side. If this is the case, center the platform, then retract and lower the boom until the platform is in the stowed position. Make sure the stabilizer pad is supported by a firm surface, then re-deploy the stabilizers before repositioning the platform.

OVERLOAD ALARM

The Overload Alarm is a dual-tone alarm that sounds at the Base Controls Box when the control system senses an overload situation. The Overload Alarm is installed on machines equipped with the optional Overload Sensing System.

To Correct: – Remove weight from the platform before operation can continue.

STABILIZER ALARM

The Stabilizer Alarm is a single-tone alarm that sounds at the Upper Controls Station when the Pressure Transducers on the stabilizer cylinders sense a drop in pressure when the boom is elevated and/or extended. When this alarm is sounding, movement is restricted to centering the platform, boom retraction, platform slide and lift 5% above current position. The boom will lower once it is fully retracted.

To Correct: – First retract and then lower the boom and move the platform as necessary to bring the platform to the stowed position. Reset the stabilizers and/or reposition the machine until the green Stabilizers Set indicator illuminates at the Upper Controls Station.

ALERT SOUNDS

- The Platform Descent Alarm is optional but may be required in certain areas of operation. This alarm sounds from the Base Controls Box.
- The All-Motion Alarm is optional and sounds at the Base Controls Box.
- The Horn is activated by button from the Upper Controls Station and sounds from the Base Controls Box.

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 2-18: 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

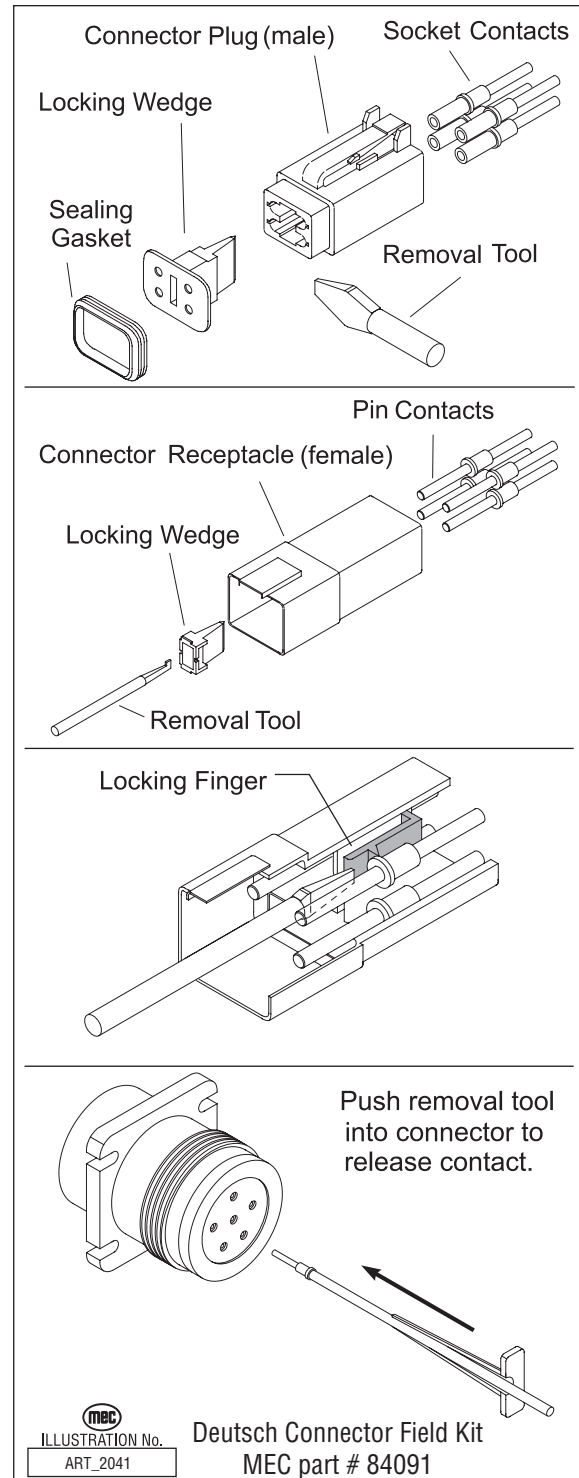
- Remove the locking wedge as outlined above.
- Using the removal tool or a flat blade screwdriver, push the Locking Fingers aside to release the contact.
- Pull the wire and contact out of the connector.

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.

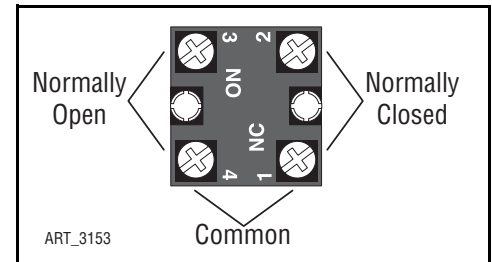


CONTINUITY CHECKS

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 resistance reading.
- Repeat for each normally open terminal.

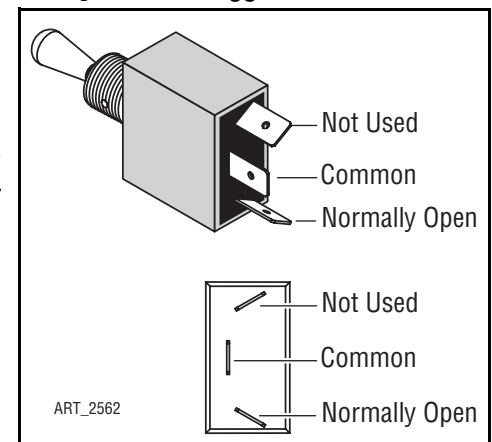
Figure 2-19: Selector Switch



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.

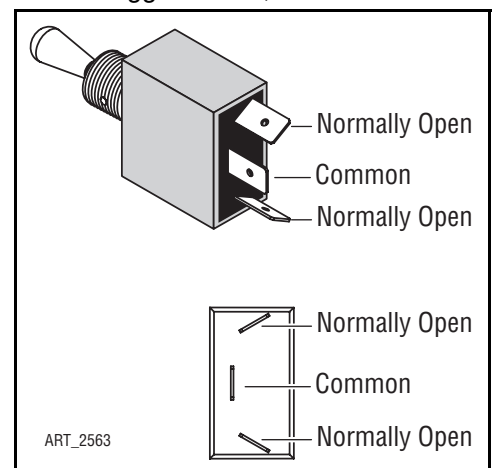
Figure 2-20: Toggle Switch, ON-OFF



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.

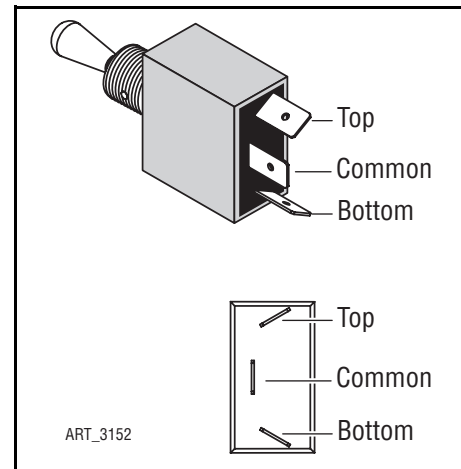
Figure 2-21: Toggle Switch, 1-Pole 2-Position



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.

Figure 2-22: Toggle Switch, 1-Pole 3-Position



TOGGLE MOMENTARY SWITCH

- 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.

Figure 2-23: Toggle Switch, Momentary

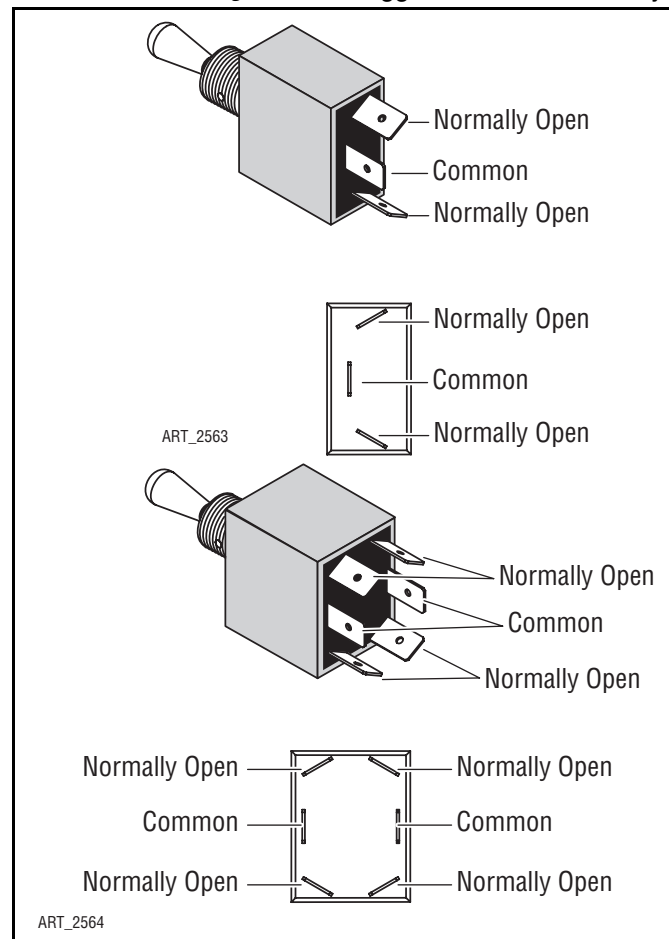
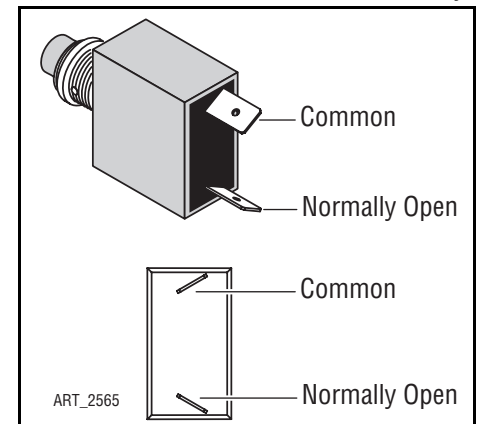
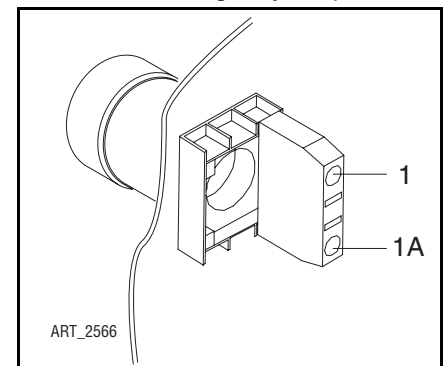


Figure 2-24: Button Switch, Momentary**MOMENTARY BUTTON SWITCH**

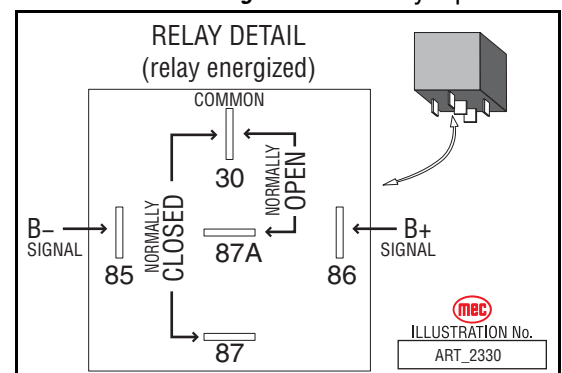
- Disconnect wires.
- Connect one probe of ohm meter each terminal.
- With the button in the neutral (open) position there should be no reading.
- With the button pushed (closed) there should be a low resistance

**Figure 2-25:** Emergency Stop Switch**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 2-26:** Relay Operation**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.



CONTROL SYSTEM

The GP400 Control System uses a variety of components and sensors to maintain proper and safe operation of the machine. This machine may be sold into many different countries that require a variety of monitoring equipment.

COMPONENTS & LOCATIONS

- GP400 Control Module processor -- Lower Controls Box
- GP440 Module -- Upper Controls Box
- Valve Current Control Module (VCCM) -- Inside forward end of boom
- Matrix Module (optional Overload Sensing System only) -- inside front cover of Lower Controls Box

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

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

Figure 2-27: GP400 Control Module Location

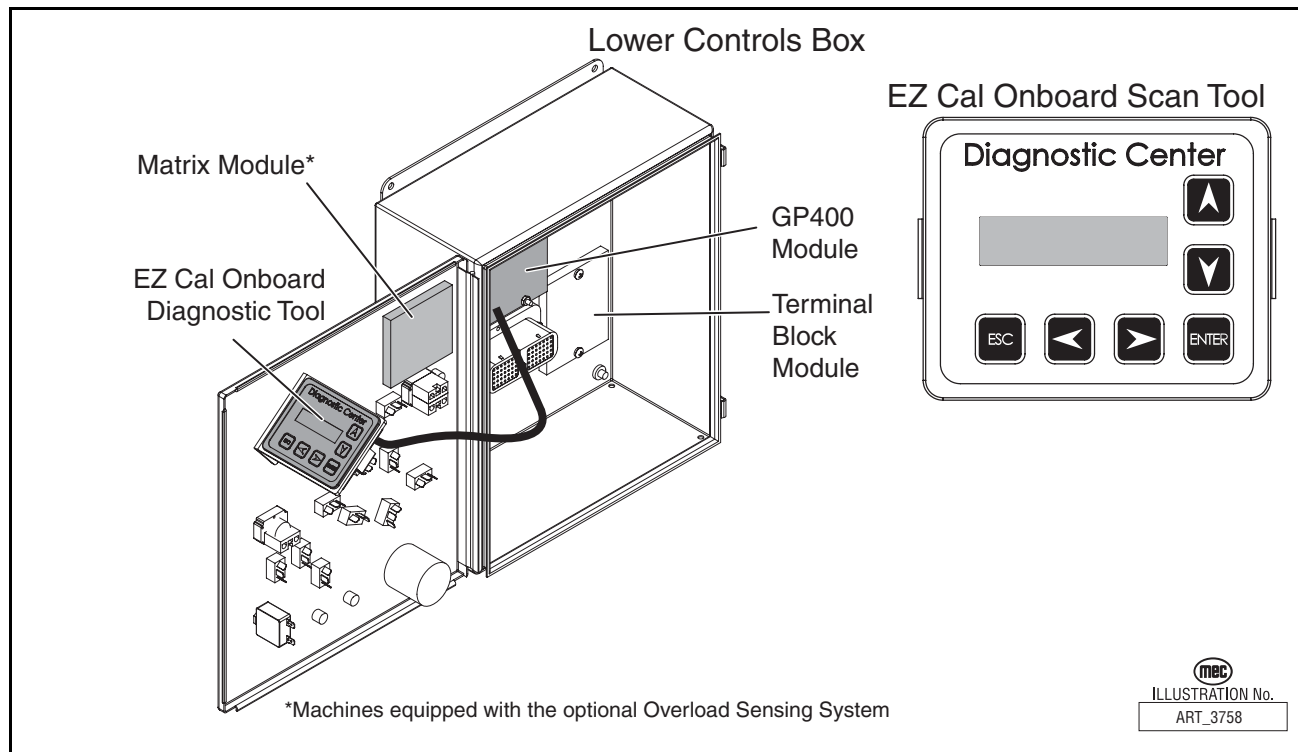
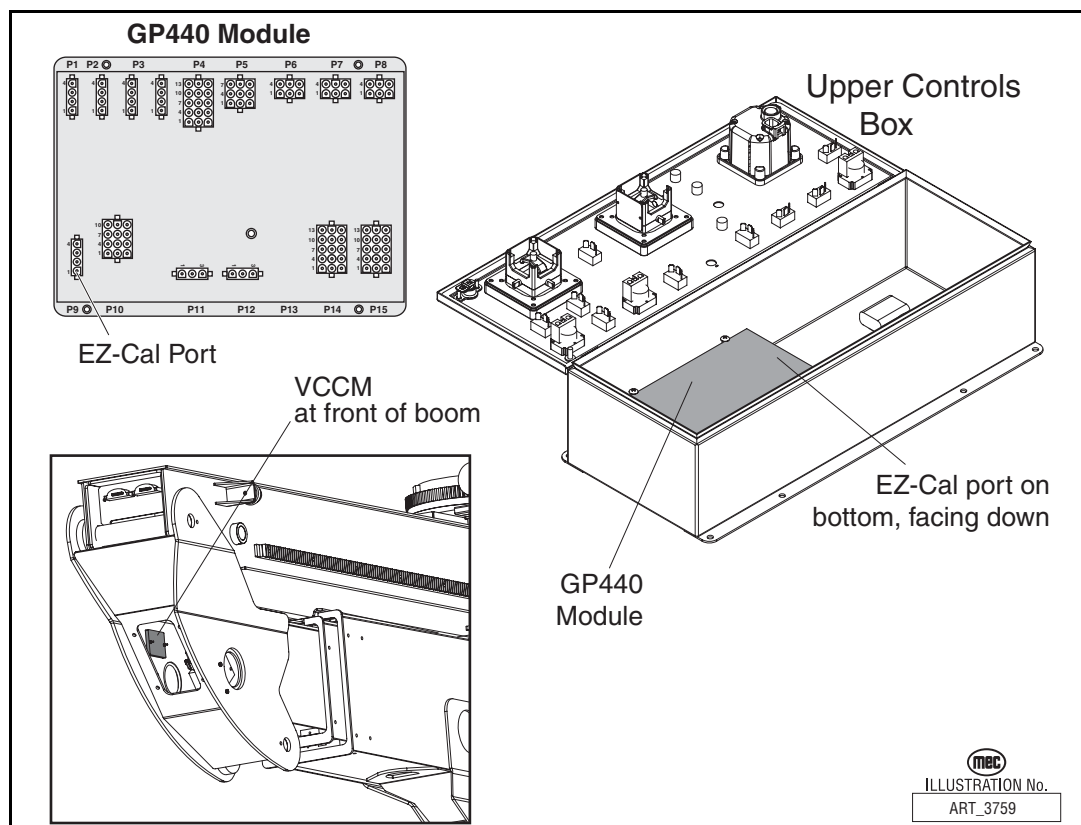


Figure 2-28: GP440 Module & VCCM Locations

GP400 CALIBRATION

This machine has an onboard EZ-Cal Diagnostic Tool mounted inside the Lower Controls Box. Use this to access the GP400 for troubleshooting and calibration.

The GP400 processor relies on angle sensor(s) 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 lowered 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 alerts to the need to recalibrate.

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.

GP400 CALIBRATION PROCEDURE



IMPROPER CALIBRATION OF THE TITAN CONTROL SYSTEM CAN RESULT IN MACHINE INSTABILITY LEADING TO DEATH OR SERIOUS PERSONAL INJURY. THE FOLLOWING OPERATION MUST BE PERFORMED IN ITS ENTIRETY AS DESCRIBED HEREIN TO PREVENT IMPROPER MACHINE OPERATION.

ONLY TRAINED AND AUTHORIZED PERSONNEL SHALL BE PERMITTED TO CALIBRATE THE PLATFORM OVERLOAD SENSING SYSTEM. READ ALL INSTRUCTIONS CLOSELY BEFORE ATTEMPTING EACH STEP OF THE CALIBRATION PROCEDURE.

In the event of a GP400 replacement, the GP400 must be calibrated before it will operate properly. Calibration is the process by which the GP400 receives points of reference of all the machine sensors or how it becomes acquainted with the machine.

Two calibrations must be performed for all models:

1. Level Sensor Calibration
2. Height Sensor Calibration

Machines equipped with the optional Overload Sensing System must perform two additional calibrations:

3. Extension Sensor Calibration
4. Load Calibration

These and other procedures require the use of the onboard EZ-Cal Diagnostic Tool located inside the Lower Controls Box. If the EZ-Cal is missing please contact MEC Aerials parts department to purchase one.

PRE-CALIBRATION SETUP

Park the machine on an absolute flat and level surface free from overhead obstructions that will prevent full boom elevation. Lower the boom completely into its cradle.

Level Sensors calibration must be performed first. When calibrating the level sensors, be aware that the following sensors are all calibrated simultaneously:

- GP400 Control Module's Integral Level Sensor that measures chassis angles
- Two dual-axis CAN-Tilt Angle Transducers that measure platform angle; both mounted at the front of the Platform Beam.
- Two single-axis CAN-Tilt Angle Transducers measuring axle position relative to the chassis; one on each of the axles.

Therefore, before calibration can begin:

- Park the machine on a flat level surface to allow the axles to be parallel with each other and square to the chassis.
- The PLATFORM must be leveled both fore-and-aft and side-to-side through the use of a framers or spirit level placed on the top or bottom side of the platform toe boards. Use the Platform Level toggle function to level the platform fore-and-aft. Use the Frame Level function to level the platform side-to-side.

After the platform has been confirmed to be absolutely level, proceed to the Level Sensors Calibration instructions.

The sensors used on the Titan are very sensitive and can detect even the slightest movement of the parts that they monitor. Therefore it is absolutely mandatory that the previous steps be performed with utmost care and precision before calibration.

LEVEL SENSORS CALIBRATION

1. Park machine on flat level surface and ensure that the chassis and platform are level, as described in Pre-Calibration Setup. Turn the engine off using the Start/Stop toggle switch.
2. Open the control module door, then open the lower control box door to access the Onboard EZ-Cal.
3. Power up the Titan control system by turning the Key Switch on the lower controls to Base. The EZ-cal display will read HELP PRESS ENTER.
4. Press the right arrow twice until the display reads, "ACCESS LEVEL 3". Press ENTER
5. Using the up arrow and right arrow, enter the numbers 1775, then press ENTER. The display should now read "ACCESS LEVEL 2"
6. Press the right arrow twice until the display reads "SETUPS". Press ENTER.
7. Press the right arrow once until the display reads "TILT SETUPS". Press ENTER.
8. The display will read "CALIBRATE LEVEL YES: ENTER NO: ESC"
9. Press ENTER, then press ENTER again. The State-of-Level indicator should now read 0.0 - 0.0 or within .1 degrees.

Level calibration is complete. Proceed to Height Calibration.

HEIGHT SENSOR CALIBRATION

1. If not already done, perform Pre-Calibration Set-up as described in the beginning of these instructions and the Level Sensors Calibration before proceeding.
2. With the EZ-cal menu remaining in the Level Calibration, press ESC once until the display reads "TILT SETUPS" or to start from the beginning follow steps 1 - 6 above of the Level Sensors Calibration procedure.
3. Press the right arrow until the display reads "HEIGHT SETUPS" and press ENTER.
4. Press the right arrow once until the display reads "CALIBRATE HEIGHT". Press ENTER. You will be asked if the boom is fully lowered. Press ENTER when it is.
5. Follow the instructions on the display exactly and operate lift and lower only when the display instructs to do so. DO NOT interrupt lifting or lowering during calibration, as doing so will result in a bad calibration or possible fault.
You will be instructed to operate Boom Up to full elevation then back down to fully stowed position. When the boom reaches full elevation and stops you must release the toggle switch before the calibration instructions can continue. This is also true when the boom reaches full stowed position. You will not be instructed to release the toggle switch.
6. After following the EZ-cal instructions and Height Calibration is complete, you will be prompted to enter the calibration date. Use the up arrow and right arrow to enter the day's date.
7. Once the CAL DATE has been entered, calibration is complete. Press ESC 3 times and/or turn off the machine.



The following two calibration procedures must and should only be performed on machines equipped with the optional Overload Sensing System.

Perform the previous calibration procedures before performing these.

EXTENSION SENSOR CALIBRATION

1. If not already done, perform Pre-Calibration Set-up as described in the beginning of these instructions and the Level Sensors and Height Sensor Calibrations before proceeding with Extension Sensor Calibration.
2. Access the EZ-cal by opening the Control Module door, then opening the Lower Control Box door. Attached to the Lower Control Box Door is an EZ-Cal interface display which will be used to perform the calibration.
3. Power the Titan system up. The EZ-cal display will read HELP PRESS ENTER.
4. Press the right arrow twice until the display reads, "ACCESS LEVEL 3".
5. Using the up arrow and right arrow, enter the numbers 1775 then press ENTER. The display should now read "ACCESS LEVEL 2"
6. Press the right arrow twice until the display reads "SETUPS". Press ENTER.
7. Press the right arrow three times until the display reads "EXTENSION SETUPS". Press ENTER.
8. Follow the instructions on the display exactly and operate extend and retract only when the display instructs to do so. You will be instructed to operate Boom Extend to full extension then back to the fully retracted position. When the boom reaches full extension and stops you must release the toggle switch before the calibration instructions can continue. This is also true when the boom reaches the fully retracted position. You will not be instructed to release the toggle switch.
9. After following the EZ-cal instructions and Extension Calibration is complete, you will be prompted to enter the calibration date. Use the up arrow and right arrow to enter the day's date. Once the CAL DATE has been entered, calibration is complete, press ESC 3 times and/or turn off the machine.

LOAD CALIBRATION

Weight required for Load Calibration:

(1) 1810 kg (4000 lbs)

1. If not already done, perform Pre-Calibration Set-up as described in the beginning of these instructions and the Level Sensors, Height and Extension Sensor Calibrations before proceeding with Load Calibration.
2. Place the machine on firm level ground, with the stabilizers deployed (green Stabilizers Set light will illuminate at Upper Controls box).
3. Load the 1810 kg (4000 lbs) weight in the center of the Load Zone and secure it from movement using the 4 tie-down points located in the platform floor.
4. Extend the boom horizontally to maximum outreach, then use the Platform Slide function to slide the platform fully forward. Do not elevate the boom.
5. Access the EZ-cal by opening the Control Module door, then opening the Lower Control Box door. Attached to the Lower Control Box Door is an EZ-Cal interface display which will be used to perform the calibration.
6. Power the Titan system up. The EZ-cal display will read HELP PRESS ENTER.

7. Press the right arrow twice until the display reads, "ACCESS LEVEL 3". Press ENTER.
8. Using the up arrow and right arrow, enter the numbers 1775 then press ENTER. The display should now read "ACCESS LEVEL 2"
9. Press the right arrow twice until the display reads "SETUPS". Press ENTER.
10. Press the right arrow until the display reads "LOAD SETUPS". Press ENTER.
11. Press the right arrow until the display reads "CALIBRATE LOAD". Press ENTER.
12. Follow the instructions on the EZ-cal display through a series of lift lower cycles. At the end of each lift and lower the switch must be released for procedure to continue.
13. The first calibration is the DYNAMIC calibration which is one complete lift and lower cycle.
14. After the DYNAMIC calibration is complete, the next calibration is the LOADED calibration. During this procedure the platform will lift to full elevation but will stop at various points along the lift and lower cycle to take static measurements.
15. After the LOADED calibration is complete, **DO NOT** do the EMPTY calibration. Escape out of the calibration. You will see an error message stating the calibration is not complete.
16. Retract the boom to the stowed position. Leave the platform in the forward-most position (platform at the front of the platform beam). Then retract the stabilizers so the machine is resting back on all four tires.
17. Go back into the SETUPS -> LOAD SETUPS -> CALIBRATE LOAD menu. The system will ask if you want to rerun the DYNAMIC and LOADED calibration, press ENTER until the display reads "REDO EMPTY?". Select YES (ENTER). Calibration will go through another lift and lower cycle, stopping at various points to take static measurements.
18. Once the calibration is complete, a screen should appear to enter the date. Enter the date that the machine was successfully calibrated and hit ENTER. You should now see "FINISHED!" appear on the screen. The machine is now calibrated and ready to be used.

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:CANNOT RUN

There is a shut-down fault on the controller. “EVERYTHING OK” *does not* show up when you try to calibrate.

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 Level Sensors 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.

(The Titan does not have an elevation switch)

F07:BAD HEIGHTS

The two Height Sensors are not in agreement at the end of Height Calibration (only on machines equipped with the optional Overload Sensing System).

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 HEIGHT1

F09:BAD HEIGHT2

This message is given if the height sensor output (P8-2) 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 / SYSTEM (2a-7) to see the output. This is usually due to a wiring problem.

F10:BAD HEIGHT1
F10:BAD HEIGHT2

This message is given if the height sensor output (P8-2) 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
F11:NOT DOWN

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) 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 HEIGHT1

This message occurs if EZfit#1 output 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. (The Titan has no elevation switch; check that the boom is fully retracted)

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. (The Titan has no elevation switch; check that the boom is fully retracted)

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. (The Titan has no elevation switch; check that the boom is fully retracted)

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. (The Titan has no elevation switch; check that the boom is fully retracted)

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. (The Titan has no elevation switch; check that the boom is fully retracted)

F20:HEIGHT1<>0%**F20:HEIGHT2<>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 DIAGNOSTICS / SYSTEM to check the height.

F22:HEIGHT1<>100%**F22:HEIGHT2<>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.

F27:BAD HEIGHT

This message indicates a problem with the height sensor output (P8-2) 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.

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 DOWN @**F40:REJECT DELTA UP @**

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 is out of range at the start of calibration.

The 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.

F49:TOO FEW

The minimum number of static calibration points was not achieved.

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.

F60:BAD EXTENSION

Extension has not been calibrated or is faulty at the start of Load Calibration.

F61:BAD EXTENSION

Extension is out of range at the start of Extension Calibration.

F62:BAD EXTENSION

Extension is out of range at the start of Extension Calibration.

F63:BAD EXTENSION

Extension is out of range at the end of Extension Calibration.

F64:BAD EXTENSION

Problem at the end of Extension Calibration -- not enough difference between start and end points

F65:BAD EXTENSION

Use Boom Extend function to calibrate extension.

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: For the Titan Boom 40-S, this is 3000 lbs (1360 kg) in the Load Zone, and 1000 lb (450kg) at the front of the platform (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.



Section 3

MECHANICAL COMPONENTS

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MECHANICAL COMPONENTS

This section describes the major components of the machine and the steps required to service them.

BASE



When steam cleaning or pressure washing 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 & 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.



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.

FOAM FILLED TIRES WERE FITTED AS ORIGINAL EQUIPMENT ON THIS MACHINE. TIRES MUST BE REPLACED WITH EQUIVALENT SPECIFICATION TIRES AND FOAM-FILL WEIGHT. CONTACT MEC SERVICE.

CHANGING TIRES

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



Always block the wheels before lifting the machine.

1. Chock tires on the end of machine opposite the tire to be changed.
2. Break loose but **do not remove** lug nuts before raising the machine.
3. Lift the end of machine requiring a tire change and support with jackstands of adequate capacity.
4. Remove lug nuts and pull the wheel off.
5. Install the replacement wheel.
6. Install lug nuts and tighten.
7. Lower the machine.
8. Tighten lug nuts to proper torque (Refer to machine specifications).
9. Remove the chocks.

DRIVE MOTORS & GEAR HUBS

NOTE: See Section D & Section E of the Parts portion of this manual for parts lists.
See Section 1: Hydraulics for proper hose connection.

There is one hydraulic drive wheel motor and one gear hub located at each wheel.



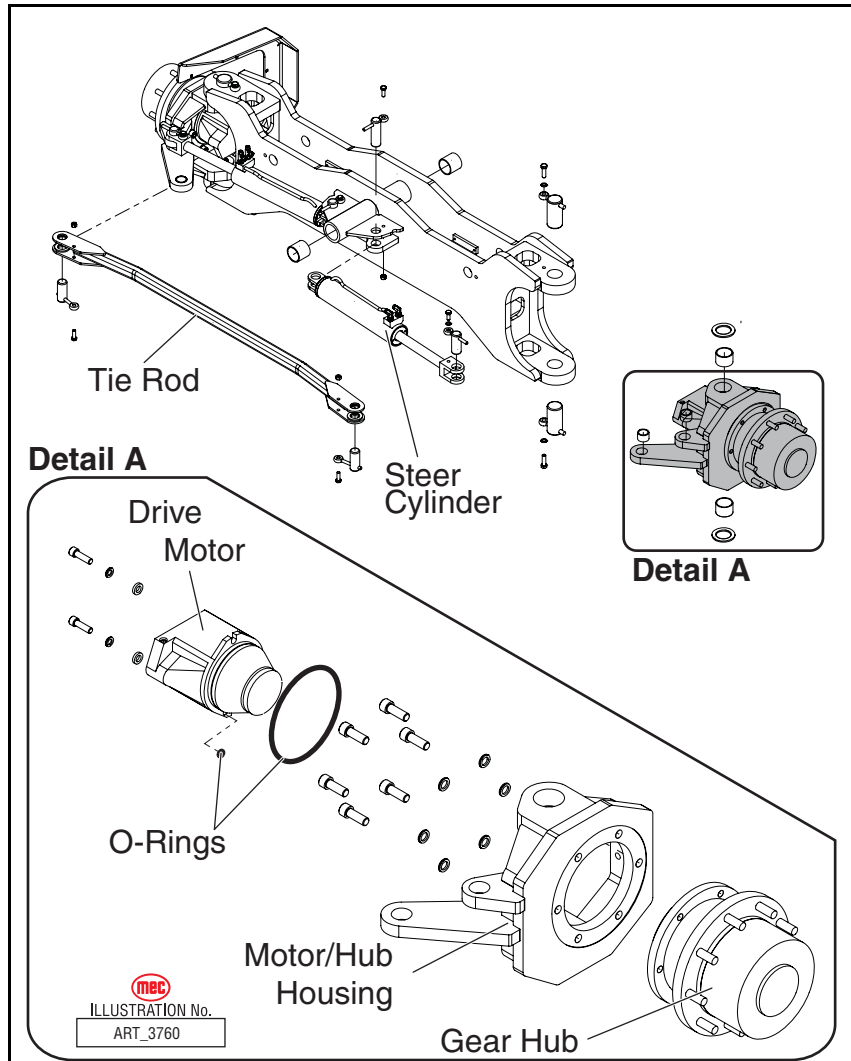
- Clean all fittings before disconnecting hoses.
- Tag hoses for proper reassembly.
- Immediately plug and cap all openings to prevent contamination.
- Replace any O-rings and inspect all hoses for crack and damage before reassembly.

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

Figure 3-1: Front Drive Motor

REMOVAL

1. Raise and support the front end of machine.
2. Remove the wheel and tire assembly.
3. Remove the retaining pins that secure the steer cylinder and the tie rod to the motor/hub housing. Rotate the housing to access the drive motor.
4. Clean all hydraulic fittings, then tag all hoses for proper reassembly.
5. Disconnect all hydraulic hoses. Immediately plug and cap all openings to prevent contamination.
6. Support the drive motor, then remove the two bolts connecting the drive motor to the gear hub. Remove the motor.
7. Support the gear hub, then remove the six bolts holding the gear hub to the motor/hub housing. Carefully remove the gear hub.



8. Installation is reverse of removal. Apply one (1) drop of Loctite® 242 or equivalent to mounting bolts. Replace the O-ring on the brake release port of the gear hub. Take great care that this O-ring is installed correctly. Use grease to hold the O-ring in place during installation.

DRIVE MOTORS

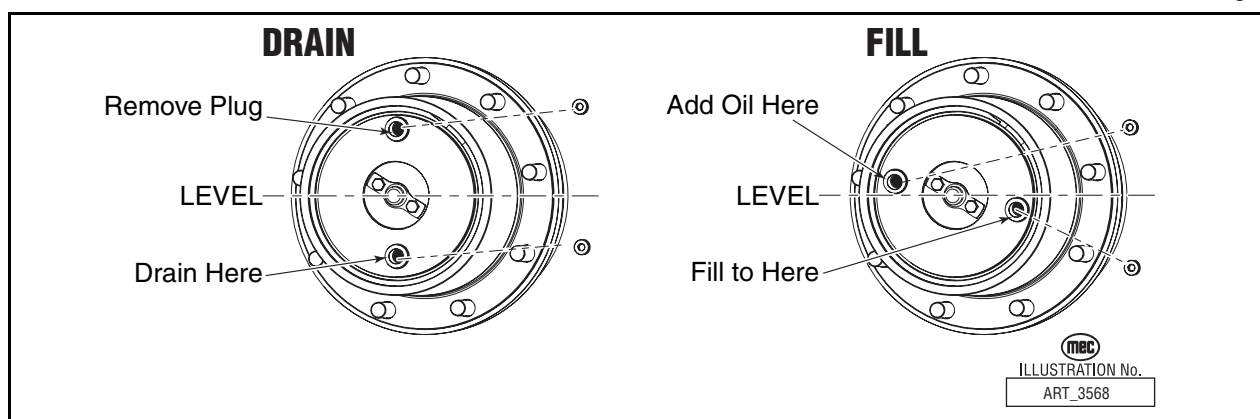
MEC does not recommend end-user maintenance or repair of the Sauer Danfoss drive motors. Contact MEC or Sauer Danfoss for the nearest service provider.

GEAR HUBS

Lubrication

- Change the oil after the first 100 hours of operation
- Change the oil every 2500 hours or every 12 months thereafter.
- Use SAE 90 Multipurpose Hypoid Gear Oil, API Service Classification GL5

Figure 3-2: Gear Hub Oil Change



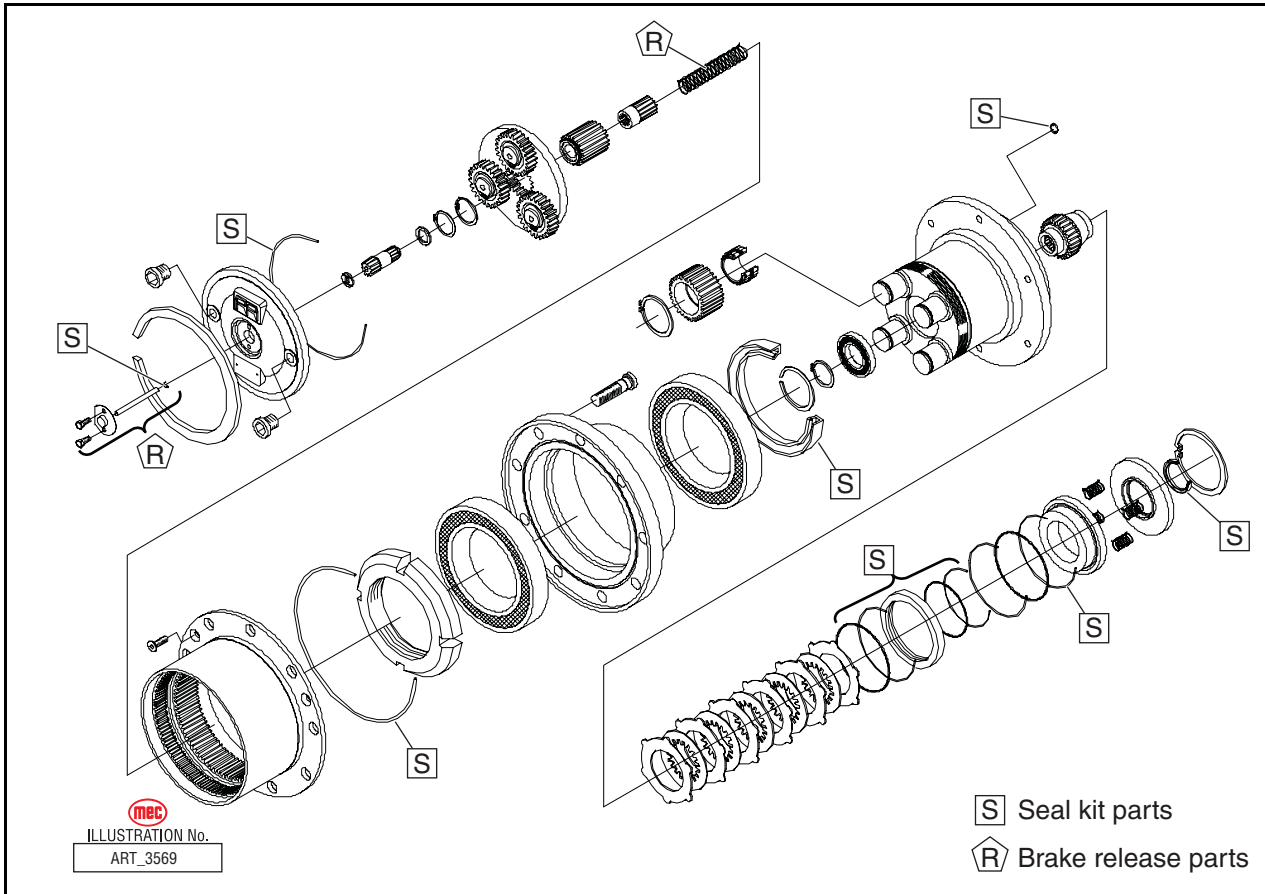
To change the oil in the gear hub:

1. Position the gear hub as shown at left.
2. Loosen and remove the both plugs and allow oil to drain.
3. Position the gear hub as shown at right.
4. Fill with oil until the level reaches the lower drain hole.
5. Replace the plugs, using new seals.

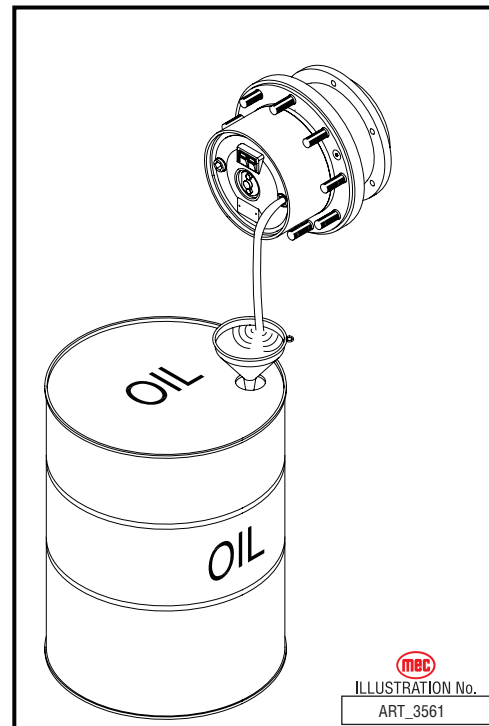
Disassembly

Disassembly may be necessary to replace the seals or repair the brake release mechanism.

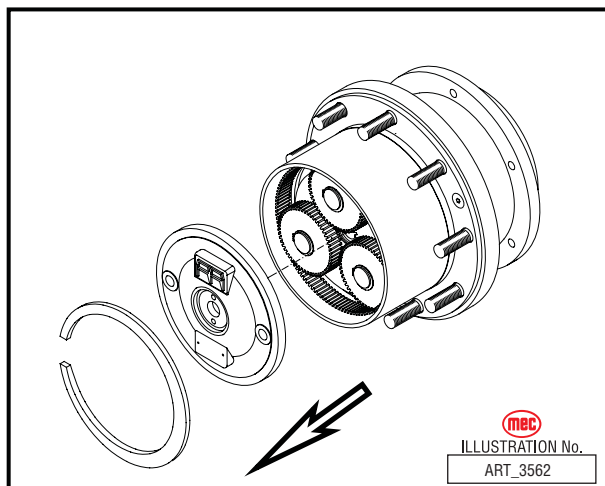
Figure 3-3: Gear Hub, Exploded View



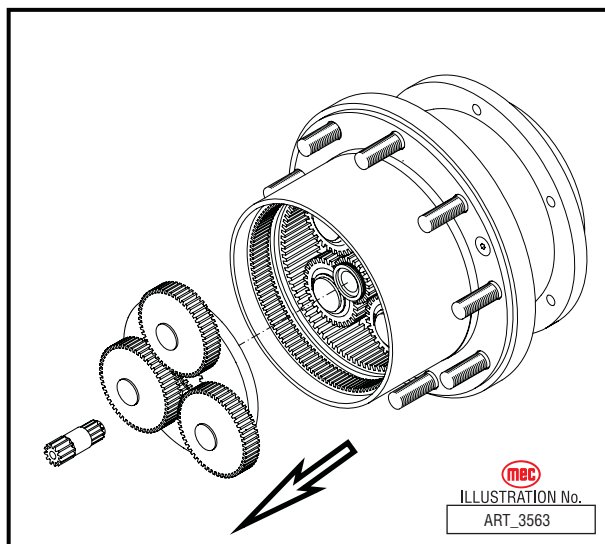
1. Unscrew the plug and drain the oil into a container. Dispose of used oil properly.



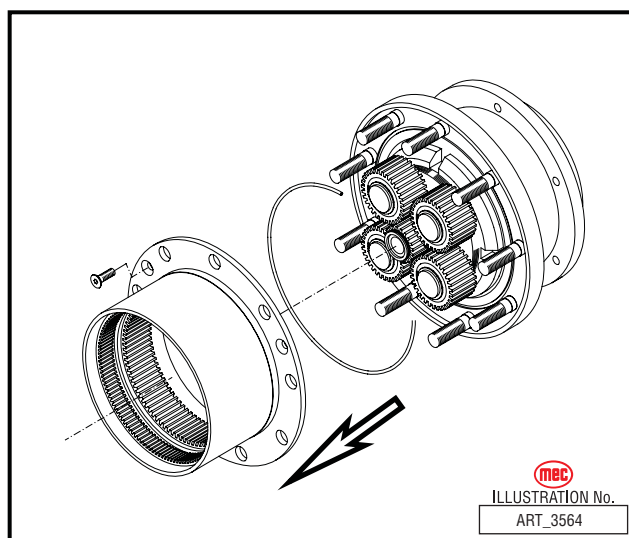
2. Remove the snap ring and cover.



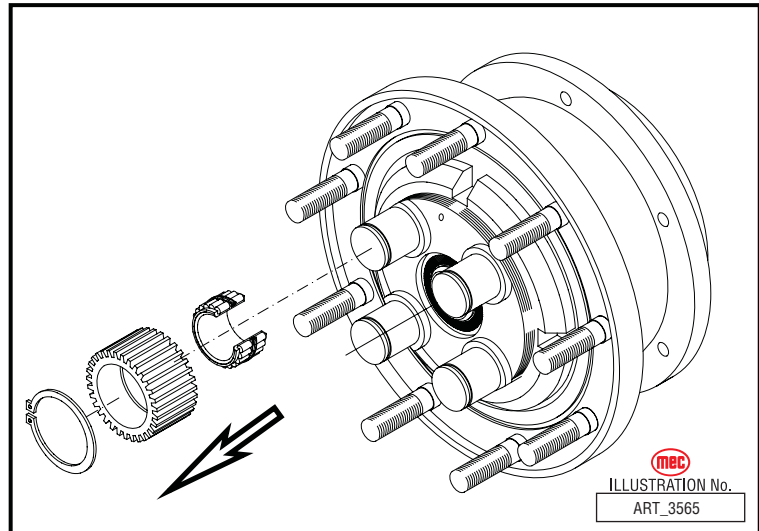
3. Pull out the pinion and the first stage reduction unit.



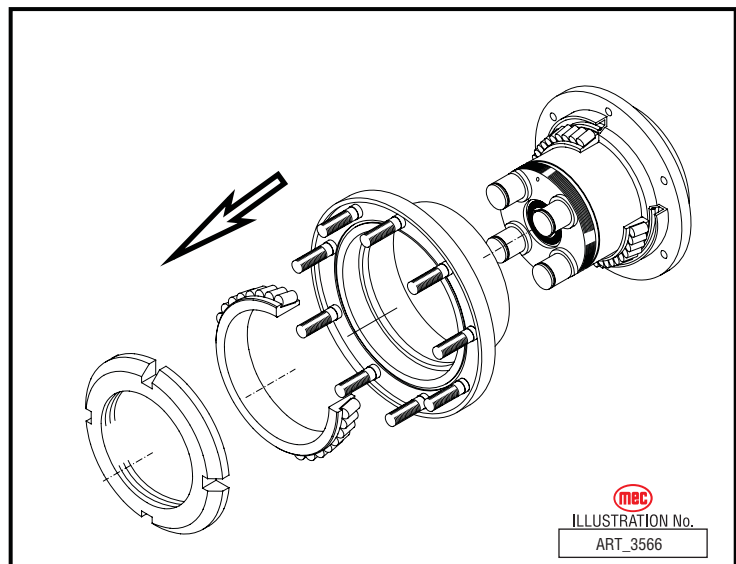
4. Remove the securing screws and remove the planetary ring.



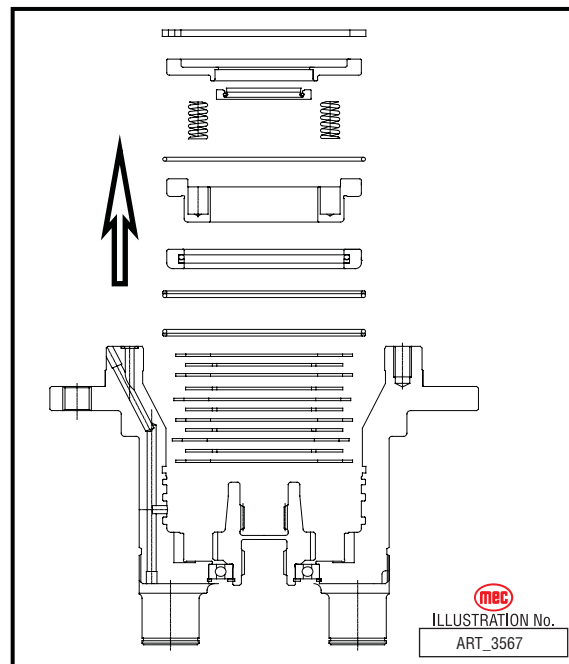
5. Remove the pinion and satellites of the second reduction unit stage.



6. Unscrew the locking ring and remove the spindle from the hub support.



7. Turn the spindle upside down and remove the brake unit.
8. Reassemble in reverse order, replacing seal kit and/or brake release kit components as you go. Use a light petroleum-based oil to lubricate parts and seals during reassembly.



HOSES & CABLES

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



- Clean all fittings before disconnecting hoses.
- Tag hoses for proper reassembly.
- Immediately plug and cap all openings to prevent contamination.
- Replace any O-rings and inspect all hoses for crack and damage before reassembly.

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

Check all ties and clamps that keep hoses secure.

Check for leaks at fittings. Replace any damaged hose or cable.

1. Tag hoses for proper reassembly.
2. Disconnect hydraulic hoses. Immediately cap and plug all openings to prevent contamination.
3. Torque hose fittings according to the Hydraulic Torque Specification Table located in the Introduction section of this manual.

STEER CYLINDERS

See Section D & Section E of the Parts portion of this manual for parts lists.

See Section 1: Hydraulics for proper hose routing.

There are two (2) double acting type steer cylinders on each axle of this machine (four per machine). During operation, cylinder(s) should not leak, but a slight damping at the rod seal is acceptable.

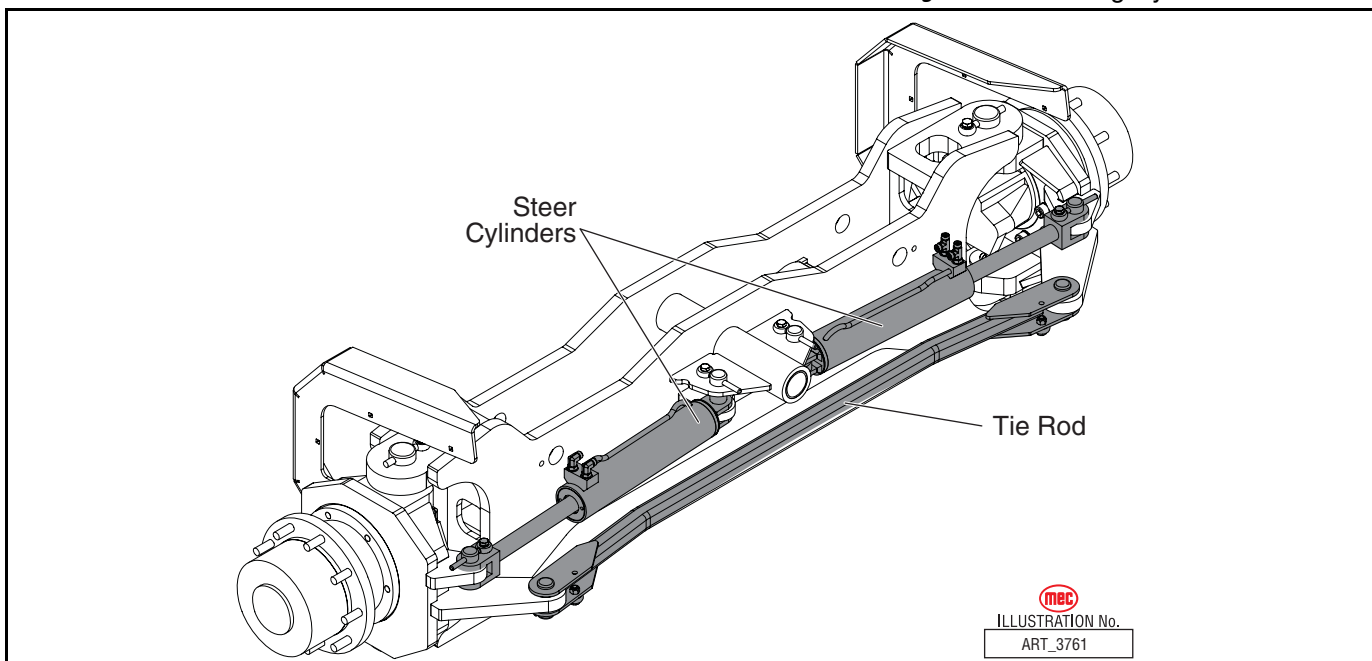
Check the pins periodically for wear.

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



- Clean all fittings before disconnecting hoses.
 - Tag hoses for proper reassembly.
 - Immediately plug and cap all openings to prevent contamination.
 - Replace any O-rings and inspect all hoses for crack and damage before reassembly.
1. Raise and support the front end of machine.
 2. Clean all hydraulic fittings, then tag all hoses for proper reassembly.
 3. Disconnect all hydraulic hoses. Immediately plug and cap all openings to prevent contamination.
 4. Remove the pin retainer and pivot pin holding the steer cylinder to the motor/hub housing.
 5. Remove the pin retainer and pivot pin holding the steer cylinder to the front axle.
 6. Carefully lift off the steer cylinder.
 7. Installation is reverse of removal.
 8. To purge air from cylinder, cycle the steering system fully left and right 5-6 times.

Figure 3-4: Steering Cylinder Installation



AXLE CYLINDERS

There are four Axle Cylinders on this machine.

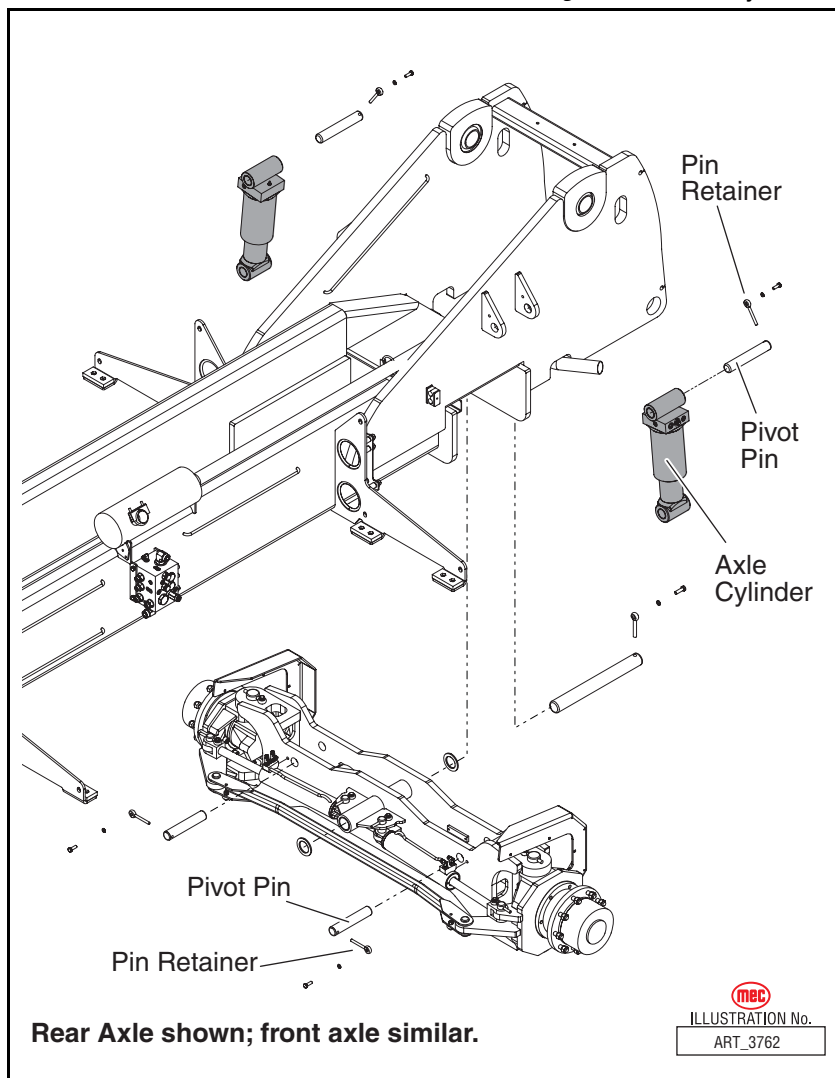
The two Axle Cylinders on the front axle control the floating axle function, which allows the axle to pivot as the machine drives over uneven terrain when the platform is stowed, and locks the axle in place when the platform is elevated.

The two Axle Cylinders on the rear axle control the frame level function and allow the operator or the control system to level the chassis in the side-to-side direction when the platform is stowed.

Figure 3-5: Axle Cylinders

REMOVE

1. Raise and support the rear end of machine.
2. Clean all hydraulic fittings, then tag all hoses for proper reassembly.
3. Disconnect all hydraulic hoses. Immediately plug and cap all openings to prevent contamination.
4. Remove the bolt and pin retainer that secures the pivot pin to the chassis. Remove the pivot pin.
5. Remove the bolt and pin retainer that secures the pivot pin to the axle. Support the cylinder, then remove the pivot pin.
6. Carefully remove the cylinder.
7. Installation is reverse of removal. Apply one (1) drop of Loctite® 242 or equivalent to the bolts that secure the pin retainers.



FRONT AXLE CYLINDER BLEED PROCEDURE

This operation must be performed whenever the Axle Lock or the Frame Tilt Cylinders have been removed or when the hoses are replaced.

Not bleeding or improper bleeding of entrapped air from the Axle Lock Cylinders or the Frame Tilt Cylinders will result in machine instability.

The following procedure explains the process for each Front Axle Cylinder.

1. If hoses were not replaced go to step 2. Loosen both hoses and operate frame tilt in both directions until all air is expelled from hoses. Tighten hoses.
2. Remove the plug located on the top of the cylinder. Fabricate and install a drain hose to direct emerging oil into a drain pan. The cylinder is prepared for a #4 O-Ring Boss (ORB) fitting.
3. Operate frame tilt in both directions, running the cylinder through its complete stroke in each direction until the emerging oil contains no air bubbles.
4. Remove the drain hose and install plug. See the Introduction section of this manual for proper torque specifications.
5. Repeat on next cylinder if required.

TESTING THE AXLE LOCK FUNCTION

This test is for the Floating Front Axle function only.

1. Place a block approximately 4 inches (10 cm) high behind one of the rear tires.
2. Elevate the platform to 10-11 feet (3-3.4 m).
3. Slowly drive the tire onto the block.
 - The axle lock cylinders should be locked (no movement).
 - The opposite tire should be off the ground.
4. Lower the platform.
 - The axle lock cylinders should release.
 - The suspended tire should lower to the ground.

REAR AXLE CYLINDER BLEED PROCEDURE

This operation must be performed whenever the Frame Tilt Cylinders have been removed or when the hoses are replaced.

Not bleeding or improper bleeding of entrapped air from the Frame Tilt Cylinders will result in machine instability.

The following procedure explains the process for each Rear Axle Cylinder. Each cylinder is bled from a fitting on the back of the cylinder approximately halfway up the barrel. Catch fluid with a pan under the cylinder, or with a shop rag beneath the bleed fitting.



DO NOT PLACE ANY PART OF YOUR HAND BETWEEN THE CYLINDER AND THE FRAME DURING THIS PROCEDURE. SERIOUS INJURY MAY OCCUR.

1. Start the engine.
2. Operate the Frame Tilt function and crack open the bleed fitting when the cylinder is retracting. Fluid will escape.

3. Close the fitting before the cylinder completes the retract stroke.
4. Repeat Step 2 and Step 3 until the fluid escaping the cylinder is clear and without any bubbles or froth.
5. Repeat on next cylinder if required.

STABILIZER CYLINDERS

There are two Stabilizer Cylinders, one located at each of the front corners of the machine.

Figure 3-6: Outrigger Cylinders

REMOVAL

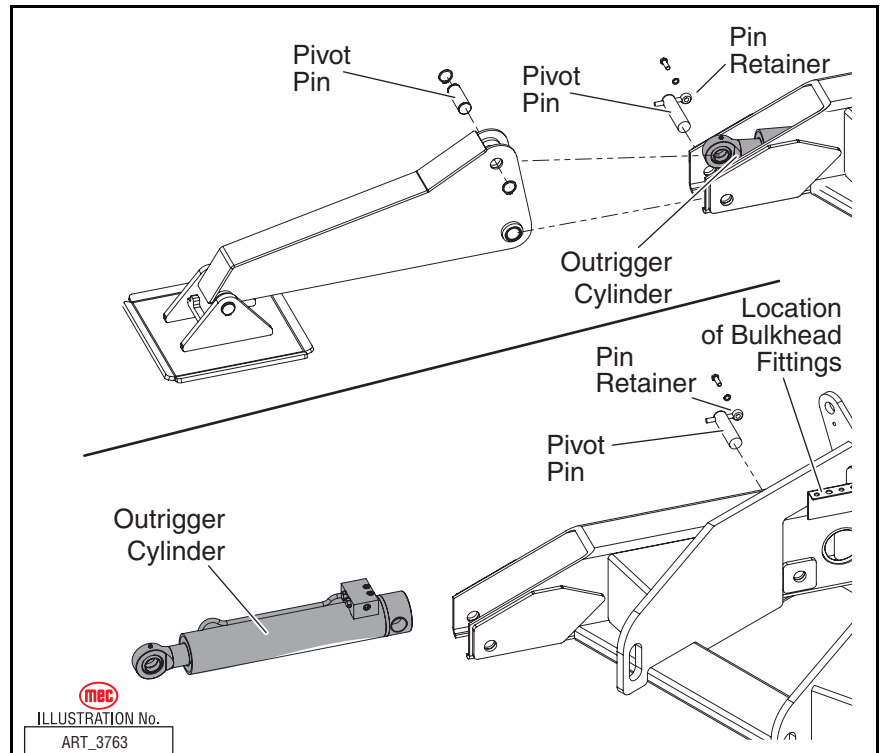
1. Park the machine on a firm, level surface.
2. With the boom fully retracted, elevate the boom and install Maintenance Chock (see decal on Lift Cylinder for Maintenance Chock instructions). **DO NOT** extend the boom.

NOTE: The Maintenance Chock is located inside the storage cabinet of the Engine Module.

3. Lower both stabilizers until the stabilizer pads are $\frac{1}{4}$ " (6mm) off the ground.
4. Remove the pin that connects the Stabilizer Arm to the rod end of the Stabilizer Cylinder to be removed.
5. Slide a small block of wood (approximately 2" x 4" x 8" or 38mm x 100mm x 200mm) under the barrel of the right stabilizer cylinder. This will be used as a fulcrum to aid in removing rear stabilizer cylinder pin.
6. Remove pin retainer and rear pivot pin that retains the barrel-end of the Stabilizer Cylinder. The cylinder is now loose but not ready for removal.
7. Remove both stabilizer hoses from the bulk-head fittings located just above and to the rear of the right stabilizer. Immediately plug and cap all openings to prevent contamination.

NOTE: On units not equipped with a bulkhead fittings as shown on the previous page, it will be necessary to remove the hoses from the valve manifold inside the Control Module.

8. Unplug the electrical connection for the right Stabilizer Pressure Sensor.
9. Carefully remove stabilizer cylinder from chassis. Ensure that the hoses and sensor plug clear the access opening and will be extracted with the cylinder.



10. Note the position of the hoses on the cylinder and remove the hoses and Sensor from the Stabilizer cylinder. Immediately plug and cap all openings to prevent contamination.

INSTALLATION

Apply one (1) drop of Loctite® 242 or equivalent to the bolts that secure the pin retainers.

1. Carefully insert the cylinder into the chassis. Ensure that the hoses and sensor wire remain to the rear of the cylinder and do not fold back under the cylinder as it slides back. Reach into the access hole at the rear of the cylinder tube and pull hoses and sensor plug from the chassis before allowing cylinder to move fully into its place.
2. Lift the cylinder and place the block of wood under it approximately in the middle. Using the wood as a fulcrum, push down on the cylinder rod to raise the rear of the cylinder enough to align the rear cylinder pivot hole with the pin hole in the chassis. Install rear cylinder pin and pin retainer. Torque Pin Retainer Fastener to 65 lb-ft. Remove the wood block.
3. Connect the hoses to the bulkhead fittings and connect Sensor plug to the wiring harness.
4. Start the engine and operate Stabilizer Extend function while watching the stabilizer cylinder extent toward the stabilizer arm connection point. Once the rod-end pin boss can be aligned with the stabilizer arm pin boss, install the rod-end pivot pin and snap rings.
5. Turn engine off.

Repeat if necessary for the other Stabilizer Cylinder.

Once finished, operate both stabilizers through 4-5 complete cycles to ensure all air is bled out of the cylinders and that there are no leaks. Remove and stow the Maintenance Chock.

PLATFORM REMOVAL & INSTALLATION



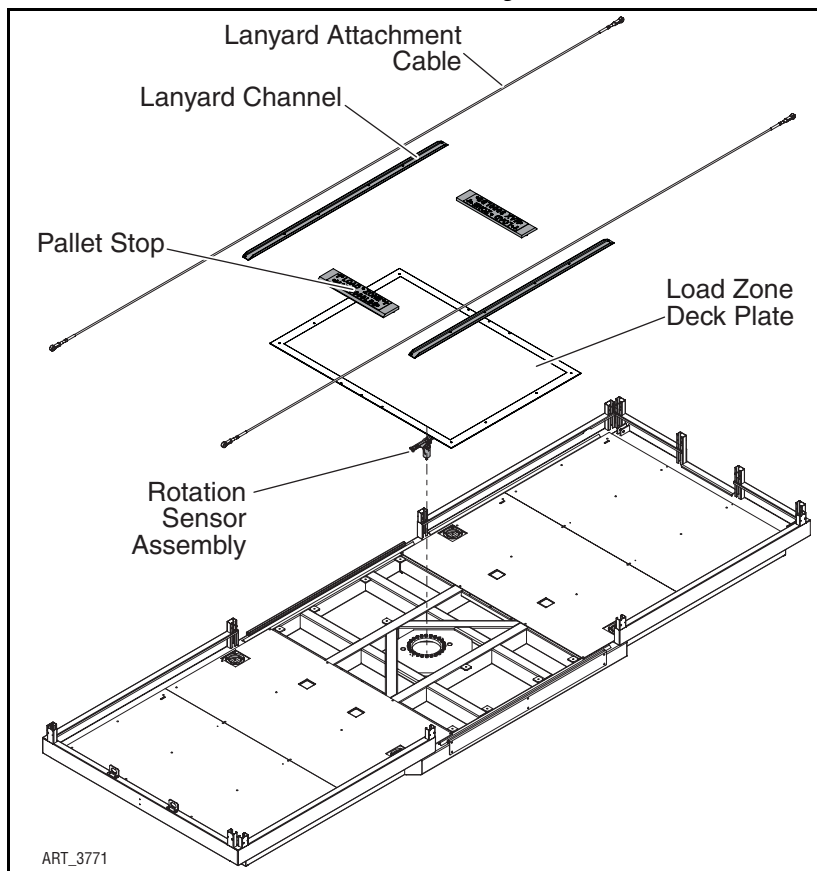
WARNING

THIS PROCESS REQUIRES SPECIFIC REPAIR SKILLS AND EXPERIENCE, APPROPRIATE LIFTING EQUIPMENT AND A PROPER WORKPLACE. DEATH, SERIOUS INJURY OR SIGNIFICANT MACHINE DAMAGE COULD OCCUR IF YOU ATTEMPT THIS PROCESS WITHOUT THE APPROPRIATE SKILLS AND EQUIPMENT.

Figure 3-7: Platform Removal

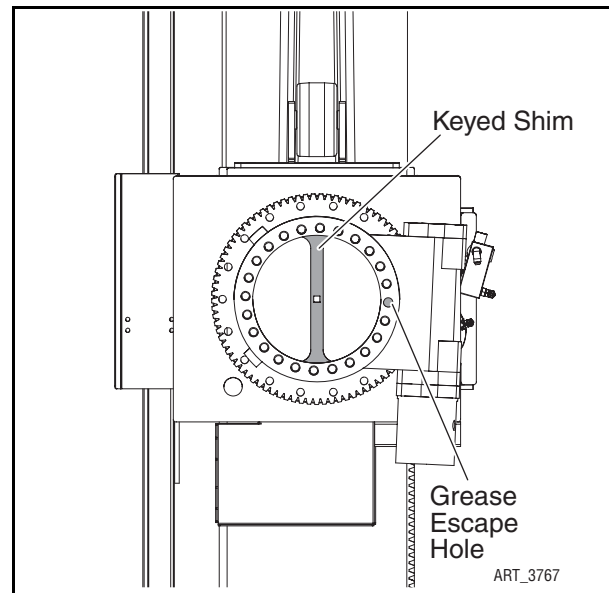
REMOVAL

1. Remove all guard rails and gates.
2. Remove the Lanyard Attachment Cables, the Lanyard Channels and the Pallet Stops.
3. Remove the Load Zone Deck Plate.
4. Unplug the cable connecting to the Rotation Sensor Assembly, then remove the Rotation Sensor Assembly.
5. Connect an overhead crane or appropriate lifting device to the platform. Do not lift at this time.
6. Tag all cables that connect the platform to the boom for proper reassembly, then disconnect the cables.
7. Break loose but do not remove the socket-head cap screws that secure the platform to the carriage.
8. Apply slight lifting pressure.
9. Remove the socket-head bolts that secure the platform to the carriage.
10. Carefully lift the platform away from the Platform Rotate Drive Unit assembly.



INSTALLATION

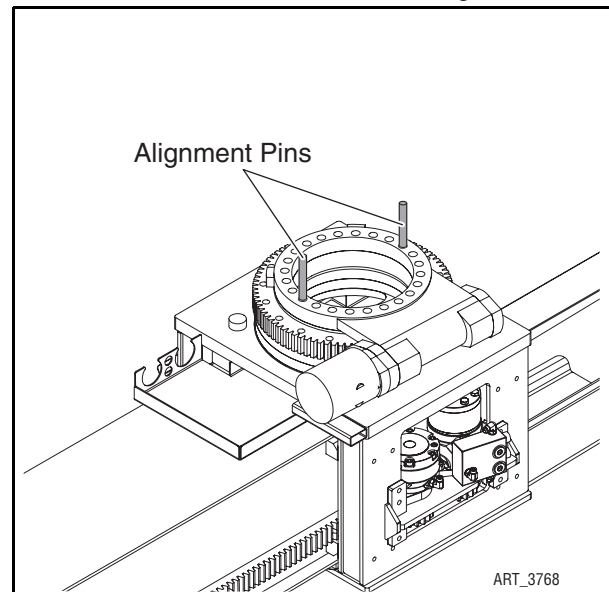
1. If the Platform Rotate Drive Unit was removed from the carriage, be sure that the Keyed Shim was installed parallel to the Boom and Platform Beam. Make sure the Drive Unit is correctly positioned relative to the Boom.

Figure 3-8: Keyed Shim Orientation

2. Thread in two Alignment Pins into the holes aligned with the Keyed Shim.

NOTE: Alignment pins may be made by cutting the heads off two M16-2.0 x 150 bolts.
DO NOT remove the Alignment pins until instructed to do so.

3. Carefully lower the Platform onto the Alignment Pins. Be sure the Platform is in line with the Boom.
4. Use Loctite® 242 or equivalent on all socket-head cap screws. Hand-thread the M16-2.0 x 110 socket-head cap screws and M16 hardened washers into all open holes except for the Grease Escape Hole, shown in Figure 3-8.

Figure 3-9: Alignment Pins**DO NOT USE STANDARD WASHERS.**

5. Snug the bolts with a wrench, then remove the alignment pins and replace them with M16-2.0 x 110 socket-head cap screws and M16 hardened washers.
6. Using a rotating criss-cross pattern, torque all socket-head cap screws to 285 lb/ft. (387 Nm).
7. Install the Rotation Sensor Assembly. Be sure that the square tip fits into the key hole on the Keyed Shim. **DO NOT** replace the Load Zone Deck Plate at this time.
8. Re-install all cables that connect the platform to the boom.
9. Start the machine and perform the adjustment procedure for the Rotation Sensor (see Section 2 of this manual).

10. Replace the Load Zone Deck Plate and all other platform components. Tighten all fasteners to proper torque.

PLATFORM ROTATE DRIVE UNIT



THIS PROCESS REQUIRES SPECIFIC REPAIR SKILLS AND EXPERIENCE, APPROPRIATE LIFTING EQUIPMENT AND A PROPER WORKPLACE. DEATH, SERIOUS INJURY OR SIGNIFICANT MACHINE DAMAGE COULD OCCUR IF YOU ATTEMPT THIS PROCESS WITHOUT THE APPROPRIATE SKILLS AND EQUIPMENT.

The Platform Rotate Drive Unit is located between the Platform and the Platform Carriage.

The Platform Rotate Drive Unit is normally removed only for repair or replacement.

A overhead hoist or fork lift is needed for this procedure. Two slings capable of lifting 1500 lbs (681 kg) are also needed.

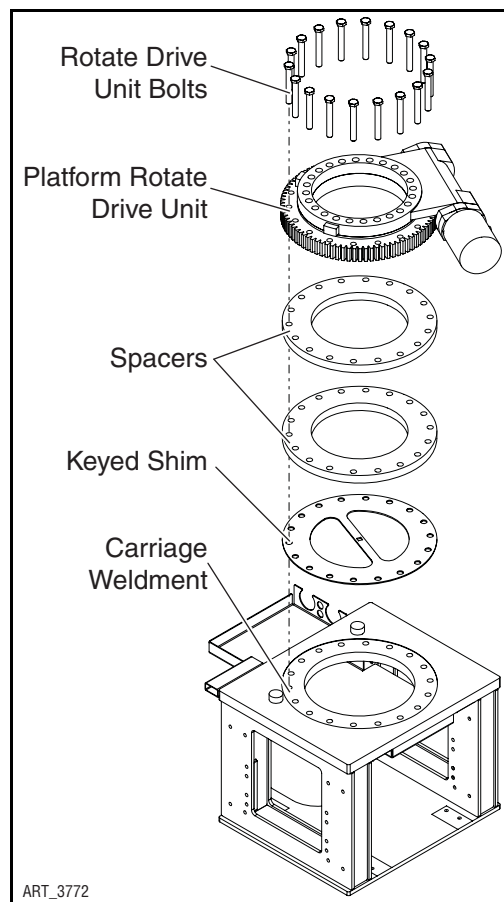
REMOVAL

Park the machine on a firm level surface.

Remove the Platform (see "Platform Removal & Installation" on Page 3-15).

1. Clean all hydraulic fittings, then tag all hoses for proper reassembly.
2. Disconnect all hydraulic hoses. Immediately plug and cap all openings to prevent contamination.
3. Remove the Rotate Drive Unit Bolts.
4. Lift the Platform Rotate Drive Unit by threading two M16-2.0 eyebolts into the threaded holes around the inner ring.

NOTE: Unit is heavy--use a lifting device of adequate capacity to move.

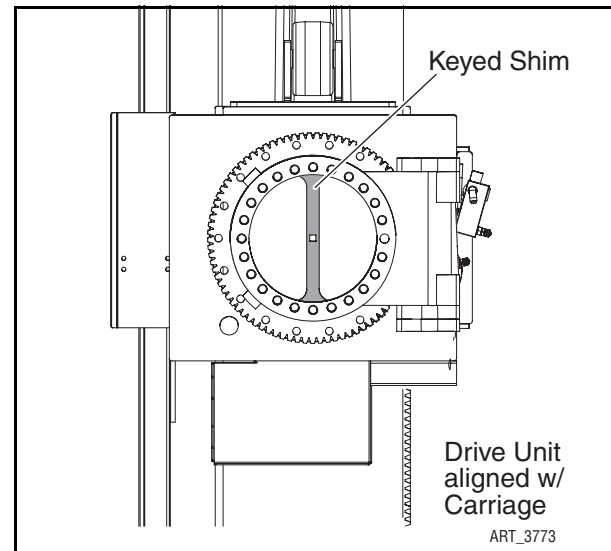


INSTALLATION

Installation is the reverse of the Removal procedure above, with the following items of note:

- Apply one (1) drop of Loctite 242 or equivalent to mounting bolts.
- Torque the Rotate Drive Unit Bolts to 285 lb/ft. (387 Nm).
- Make sure the Keyed Shim is oriented as shown in Figure 3-10.
- Set the Platform Rotate Drive Unit so that the edge of the hydraulic motor is aligned with and parallel to the side of the Carriage.

Figure 3-10: Keyed Shim Orientation



PLATFORM CARRIAGE



THIS PROCESS REQUIRES SPECIFIC REPAIR SKILLS AND EXPERIENCE, APPROPRIATE LIFTING EQUIPMENT AND A PROPER WORKPLACE. DEATH, SERIOUS INJURY OR SIGNIFICANT MACHINE DAMAGE COULD OCCUR IF YOU ATTEMPT THIS PROCESS WITHOUT THE APPROPRIATE SKILLS AND EQUIPMENT.

The Platform Carriage is located between the Platform and the Platform Beam. Its purpose is to move the Platform forwards and backwards in line with the Boom. It is not necessary to remove the Platform Rotate Drive Unit.

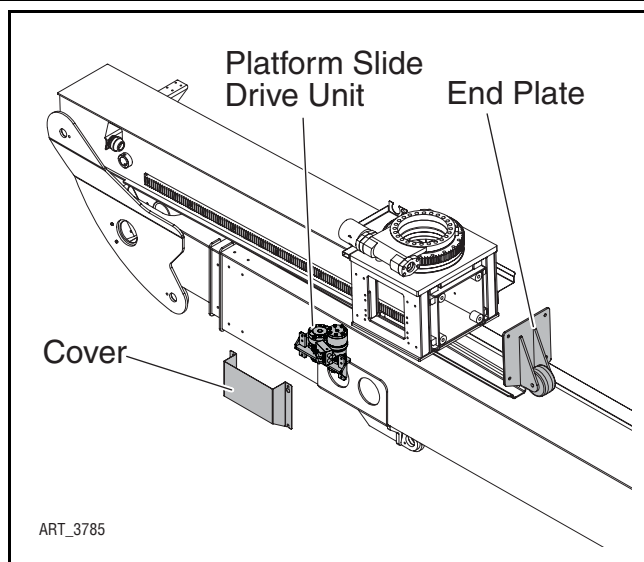
REMOVAL

Park the machine on a firm level surface.

Remove the Platform (see "Platform Removal & Installation" on Page 3-15).

1. Start the machine and use the Platform Slide function to slide the carriage all the way to the rear of the Platform Beam.
2. Use the Platform Level function to lift the rear end of the Platform Beam until the roller no longer touches the boom.
3. Clean all hydraulic fittings, then tag all hoses for proper reassembly.
4. Disconnect all hydraulic hoses. Immediately plug and cap all openings to prevent contamination.

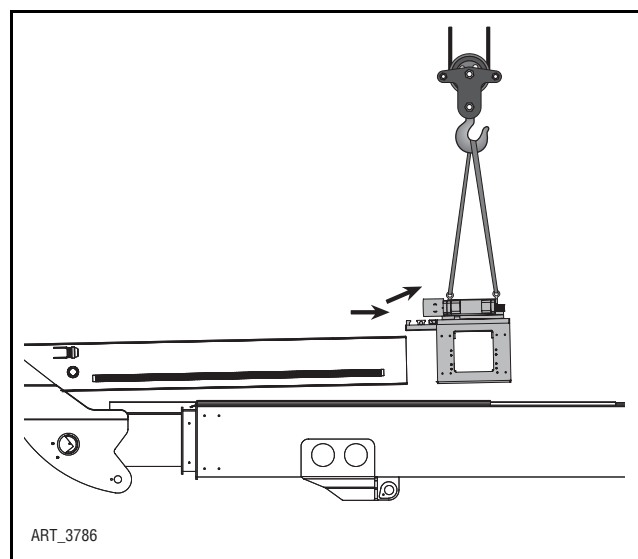
5. Remove the platform beam end plate.
6. Thread two M16-2.0 eyebolts into the threaded holes around the inner ring of the Platform Rotate Drive Unit. Attach lifting slings to these eyebolts.



7. Position an overhead hoist over the carriage and attach the slings. Apply just enough lifting force to tighten the slings.
8. Remove the Platform Slide Drive Unit and cover.

**WARNING**

BE SURE THAT SUFFICIENT LIFT FORCE EXERTED BY THE CRANE TO PREVENT THE CARRIAGE FROM SLIDING. THE PLATFORM SLIDE DRIVE UNIT CONTAINS THE BRAKE, WHICH PREVENTS THE CARRIAGE FROM SLIDING FREELY. REMOVING THIS UNIT WILL REMOVE THE BRAKE.



9. Move the overhead hoist towards the read of the machine until the carriage is free of the beam.
10. Installation is reverse of removal. Apply one (1) drop of Loctite 242 or equivalent to mounting bolts. See the Introduction section of this manual for proper torque specifications.

IMPORTANT! Perform the following Shim Procedure before returning the machine to service.

PLATFORM CARRIAGE/PLATFORM SLIDE DRIVE UNIT SHIM PROCEDURES

Before adjusting the slide carriage, it is necessary to locate the point on the Platform Beam where the wear pads are the tightest. To do so, operate the Platform Slide function in 3-4 inch (7-10 cm) increments and inspect the clearance between the side wear pads and side of the beam, and between the bottom wear pads and the bottom of the beam. Once the location of tightest clearance is identified, make note of the location(s) by marking the beam.

Carriage

1. Using regular machine controls, move the Carriage to the location where the SIDE wear pads are the tightest.
2. Remove the Platform Slide Drive Unit cover to gain access to the motor and brake assembly.
3. Loosen the mounting bolts that retain the Platform Slide Drive Unit to the carriage. This will prevent the motor or the brake from interfering with lateral shim adjustment.
4. Measure the clearance between the wear pads and the beam and record the measurements.
5. Add or remove shims to acquire a total clearance (both measurements added together) of .030" to .050" (.76-1.25 mm) space between the wear pads and the beam.

| Carriage Shims -- Side | |
|------------------------|------------|
| 22188 | Shim, .060 |
| 22194 | Shim, .030 |

6. Loosen the wear pad mounting bolts enough to slide the shim between the wear pad and the Carriage. Apply one (1) drop of Loctite 242 or equivalent to mounting bolts. See the Introduction section of this manual for proper torque specifications.
7. Perform Motor/Brake Pinion Depth Adjustment immediately following this section.
8. Using regular machine controls, move the Carriage to the location where the BOTTOM wear pads are the tightest.
9. Add or remove shims to acquire a .030" to .050" space between the wear pad and the beam.

| Carriage Shims -- Lower | |
|-------------------------|------------|
| 18235 | Shim, .060 |
| 18236 | Shim, .030 |

10. Loosen the wear pad mounting bolts enough to slide the shim between the wear pad and the Carriage. Apply one (1) drop of Loctite 242 or equivalent to mounting bolts. See the Introduction section of this manual for proper torque specifications.

Motor/Brake Pinion Depth Adjustment

1. Turn Engine off and turn the Battery Disconnect Switch off.
2. Remove the Platform Slide Drive Unit cover.

3. Loosen the four bolts that retain the Carriage Slide Motor/Brake and remove all but one shim on each side. Re-tighten all four bolts to proper torque.
4. Attempt to manually rotate the gears on both the motor and the brake. They should move a small amount freely. If the small amount of free play is observed on both the motor and the brake unit, adjustment is complete; skip to Step 6.
5. If no free play is observed, loosen all four bolts and add one more shim (**MEC part #22195**) on each side. Tighten all four bolts to proper torque and attempt to manually rotate the gears on both the motor and the brake. They should move a small amount freely. If the small amount of free play is observed on both the motor and the brake unit, adjustment is complete, move on to Step 6. If no free play is observed, repeat Step 5 until there is a small amount of free play in both the motor and the brake.
6. Apply one (1) drop of Loctite 242 or equivalent to mounting bolts. See the Introduction section of this manual for proper torque specifications.
7. Operate the Platform Slide function repeatedly in both direction to ensure proper slide action without slowing or sticking.
8. Install the Platform Slide Drive Unit cover.

PLATFORM BEAM & PLATFORM LEVEL CYLINDER



WARNING

THIS PROCESS REQUIRES SPECIFIC REPAIR SKILLS AND EXPERIENCE, APPROPRIATE LIFTING EQUIPMENT AND A PROPER WORKPLACE. DEATH, SERIOUS INJURY OR SIGNIFICANT MACHINE DAMAGE COULD OCCUR IF YOU ATTEMPT THIS PROCESS WITHOUT THE APPROPRIATE SKILLS AND EQUIPMENT.

REMOVAL

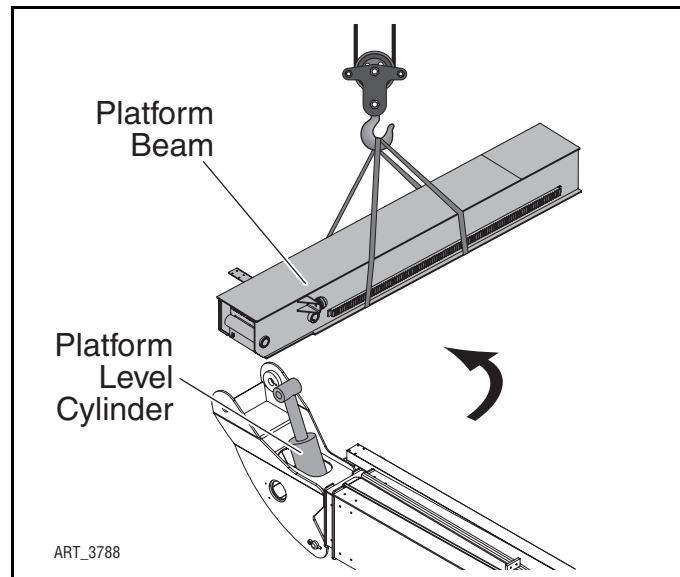
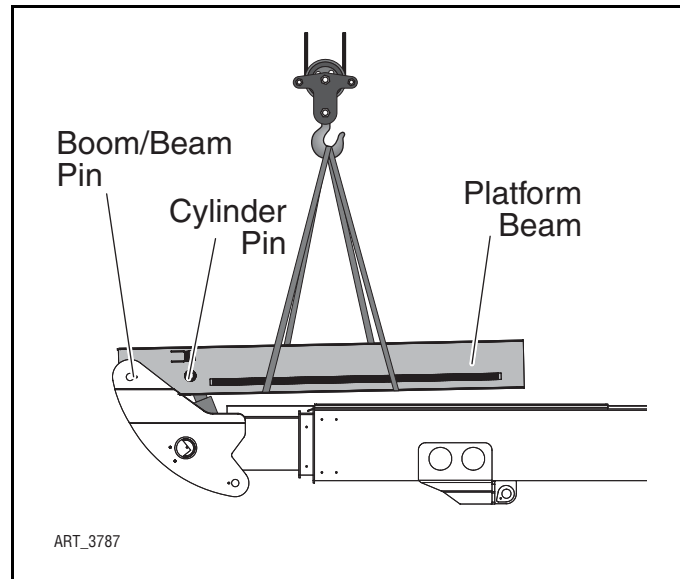
Park the machine on a firm level surface.

Remove the Platform (see "Platform Removal & Installation" on Page 3-15).

Remove the Platform Carriage (see "Platform Carriage" on Page 3-18)

A overhead hoist or fork lift is needed for this procedure. Two slings 16 feet (5 m) long capable of lifting 1500 lbs (681 kg) are also needed.

1. Position an overhead hoist over the carriage and attach the slings. Apply slight lifting pressure.
2. Clean all hydraulic fittings, then tag all hoses for proper reassembly.
3. Disconnect all hydraulic hoses. Immediately plug and cap all openings to prevent contamination.
4. Upper Platform Level Cylinder pin: remove the cylinder pin retainer, then remove the pin.
5. Boom/Platform Beam pivot pin: remove the cylinder pin retainer, then remove the pin.
6. It is necessary to turn the beam for the rod-end pin boss of the cylinder to clear the hole in the bottom of the Platform Beam. Carefully lift and turn the Platform beam while moving the overhead hoist forward and to the side of the machine.
7. When turned sufficiently, lift the beam off of the cylinder head.
8. Position the overhead hoist over the Platform lift cylinder and securely attach the sling. Apply slight lifting pressure.



9. Lower Platform Level Cylinder pin: remove the cylinder pin retainer, then remove the pin.
10. Carefully lift the Platform Level Cylinder out of the boom. It may be necessary to turn the cylinder slightly to allow the lower pin boss to fit through the hole in the boom.
11. Installation is reverse of removal. Apply one (1) drop of Loctite® 242 or equivalent to bolts securing the pin retainers. See the Introduction section of this manual for proper torque specifications.

EXTEND CYLINDER

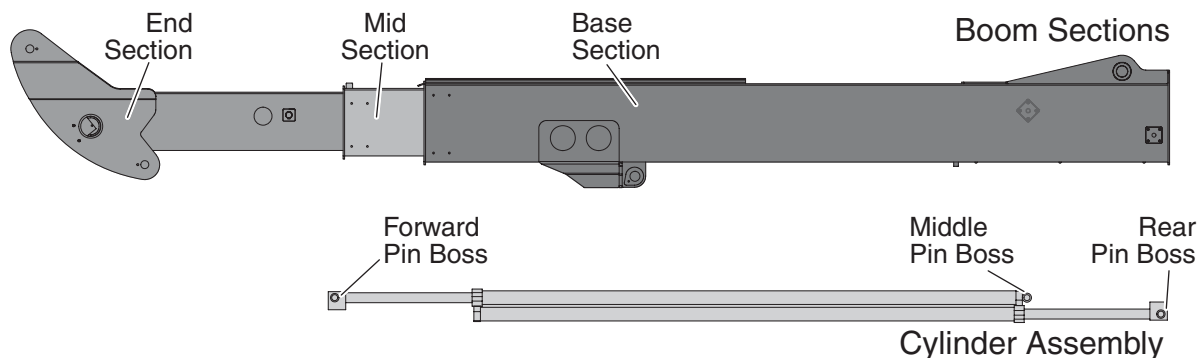


THIS PROCESS REQUIRES SPECIFIC REPAIR SKILLS AND EXPERIENCE, APPROPRIATE LIFTING EQUIPMENT AND A PROPER WORKPLACE. DEATH, SERIOUS INJURY OR SIGNIFICANT MACHINE DAMAGE COULD OCCUR IF YOU ATTEMPT THIS PROCESS WITHOUT THE APPROPRIATE SKILLS AND EQUIPMENT.

The Extend Cylinder assembly consists of 2 identical cylinders mounted together that extend in opposite directions.

REMOVAL

Park the machine on a firm level surface. Two overhead hoists or fork lifts are necessary to perform this procedure, as the cylinder assembly weight is 750 lbs (341 kg). A sling of 6 feet (2 m) approximate length capable of lifting 2000 lbs (908 kg) is also necessary.



ART_3789

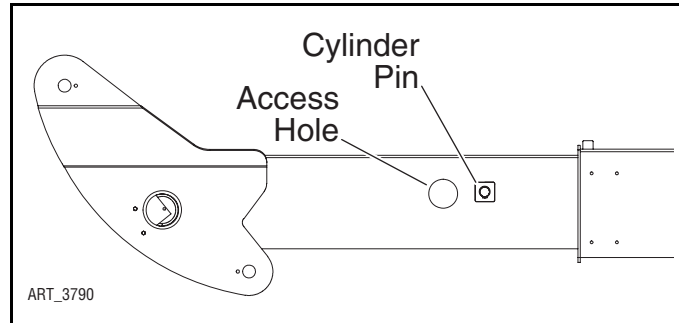
**WARNING**

BEFORE PERFORMING WORK ON THE EXTEND CYLINDER ASSEMBLY, EXTEND THE BOOM FAR ENOUGH THAT THE ACCESS HOLE IN THE END SECTION OF THE BOOM IS AT LEAST 18 INCHES (46 CM) FROM THE FRONT EDGE OF THE BOOM'S MID SECTION. SERIOUS INJURY MAY OCCUR IF THE ACCESS HOLE IS TOO CLOSE TO THE MID SECTION OF THE BOOM.

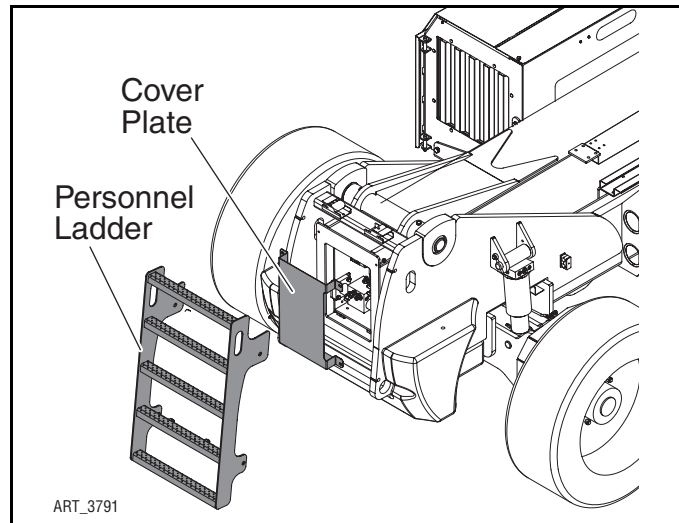
1. From the Lower Control Station, operate the Stabilizer Deploy function until the stabilizers are deployed (the legs will stop moving when fully deployed).

2. Extend the boom enough to expose the cylinder pin in the End Section.

3. Elevate the boom approximately 3 feet and place a boom support apparatus for the tip of the boom to rest on. Choose a boom support that is capable of holding the weight of the boom (approximately 8000 lbs [3628 kg]). Lower the boom gently onto the support and continue lowering slightly until the weight of the boom is no longer on the boom lift cylinder.



4. Remove the personnel ladder from the rear of the machine.
5. Remove the cover plate from the rear of the boom to provide access to the inside of the boom.
6. Remove hydraulic hoses from the Forward Cylinder. Access is gained through the round hole in the End Section just ahead of the pin boss. Immediately plug and cap all openings to prevent contamination.
7. Remove the snap rings from the cylinder pin, then remove the cylinder pin from the End Section.

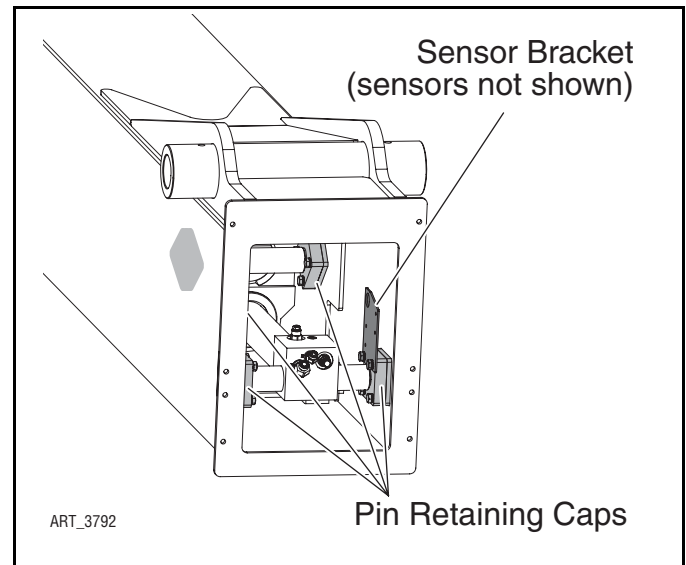


8. Remove the hoses from the Mid Section extension cylinder. Access these hoses from the rear of the boom. Immediately plug and cap all openings to prevent contamination.

9. Remove the pin retaining caps that secure the Extend Cylinder to the Base Section of the boom.

IMPORTANT! The cylinder retaining bolts also retain the sensor bracket containing fragile sensors. Carefully stow the sensor bracket to the side, out of the way of the cylinder extraction.

10. Remove the pin retaining caps that secure the Extend Cylinder to the Mid Section of the boom.
11. Secure a sling around the Rear Pin Boss and attach it to the hoist or fork lift.
12. Extract the Extend Cylinder Assembly from the rear of the boom by carefully pulling and lifting with the hoist or forklift. Once the Extend Cylinder has been extracted approximately 90%, use a second hoist or fork lift to support the end of the Extend Cylinder Assembly that remains inside the boom.
13. Carefully extract the cylinder completely.
14. Measure the distance that the cylinder rods protrude from each of the Extension Cylinders and record that number for installation preparation

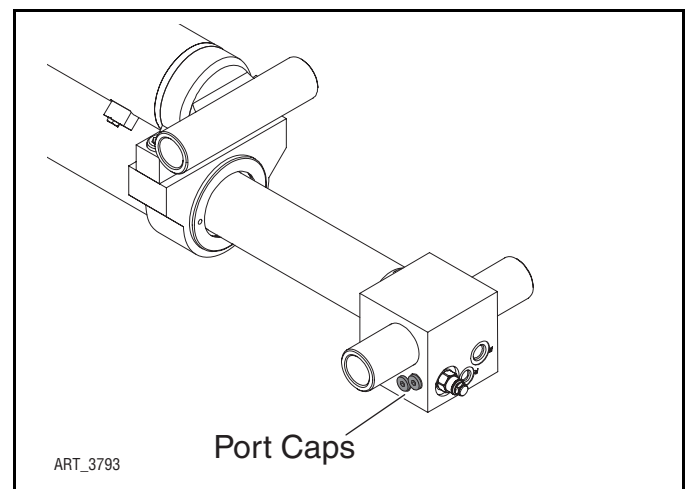


INSTALLATION

Before beginning installation procedure, refer to the measurements taken in Step 14 of the removal instructions and be sure the cylinders are extended the same length.

Each cylinder is equipped with counterbalance valves that will prevent the cylinders from extend and retracting without hydraulic pressure. Therefore if the cylinder rods require extension or retraction it will be necessary to remove port caps located on the side of the cylinder manifold block to allow movement of the cylinder rod.

Once the proper measurement is achieved, replace caps and torque to proper specification. See the Introduction section of this manual for proper torque specifications.



1. Stage the cylinder assembly at the rear of the boom. Use a fork lift or hoist to support the tip end at a height consistent with insertion into the End Section. Rest the rear of the cylinder on a support of similar height.
2. Secure a sling around the Rear Pin Boss and attach it to a second forklift or hoist with a short lead (1-2 foot [25-50 cm]). Remove the support.

3. Install the cylinder pins and pin retaining caps at the Middle Pin Boss and the Rear Pin Boss. Secure them with tape to hold them in position during installation.
4. Insert the forward end of the cylinder assembly into the boom tubes, ensuring that it enters the End Section section without catching on the lower edge.
5. Once the Forward Pin Boss aligns with the End Section pin hole, install the pin and snap rings.
6. Re-connect the hydraulic hoses to the extension cylinder in the End Section.
7. Lower the hoist to allow the cylinder to lay on the boom tube and remove sling.
8. Connect hoses to the rear-most cylinder.

Final alignment of the 2 rear pins to the boom sections may require hydraulic activation of the extension cylinders.

Use the Emergency Power pump and the Boom Extend/retract toggle switch to make final alignment adjustments, as this function will allow better control of cylinder movement.

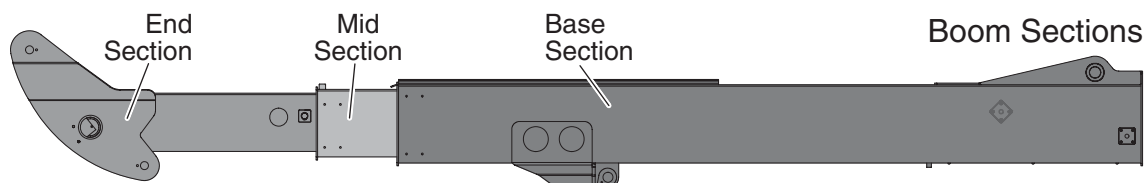
9. Once the Middle Pin Boss of the extension cylinder is aligned with the Mid Section mounting holes, remove the tape and install the pin retaining caps. Apply one (1) drop of Loctite 242 or equivalent to each of the mounting bolts. See the Introduction section of this manual for proper torque specifications.
10. Align the Rear Pin Boss of the extension cylinder with the mounting holes in the Base Section of the boom. Apply Loctite 242 or equivalent to the bolts and loosely install mounting bolts to the left-side mounting block.
11. Align the sensor bracket with mounting block holes and install the right side mounting bolts, using Loctite 242 or equivalent on the threads.
12. Tighten all mounting bolts. See the Introduction section of this manual for proper torque specifications.
13. Install rear cover and personnel ladder to the rear of the boom.
14. Raise boom slightly and remove boom support apparatus from the End Section.
15. Operate boom extend and retract through 5 complete cycles to purge air from the system.
16. Inspect for leaks and loose fasteners.

BOOM



THIS PROCESS REQUIRES SPECIFIC REPAIR SKILLS AND EXPERIENCE, APPROPRIATE LIFTING EQUIPMENT AND A PROPER WORKPLACE. DEATH, SERIOUS INJURY OR SIGNIFICANT MACHINE DAMAGE COULD OCCUR IF YOU ATTEMPT THIS PROCESS WITHOUT THE APPROPRIATE SKILLS AND EQUIPMENT.

DISASSEMBLY



ART_3794

Park the machine on a firm level surface.

Two overhead hoists or fork lifts are necessary to perform this procedure. Two slings 16 feet (5 m) long capable of lifting 1500 lbs (681 kg) are also necessary.

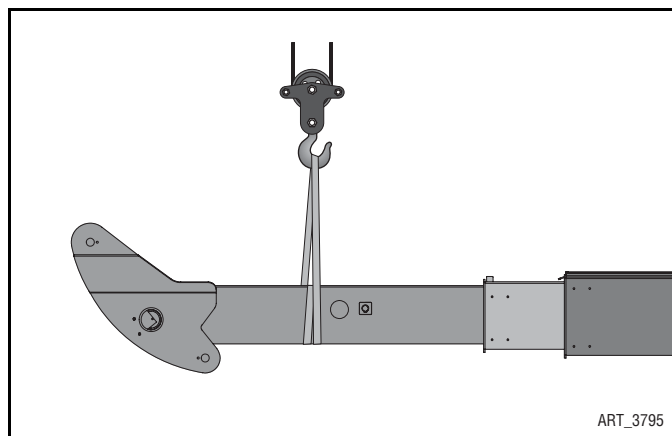
Remove the Platform (see “Platform Removal & Installation” on Page 3-15).

Remove the Platform Carriage (see “Platform Carriage” on Page 3-18).

Remove the Platform Beam and Platform Level Cylinder (see “Platform Beam & Platform Level Cylinder” on Page 3-22).

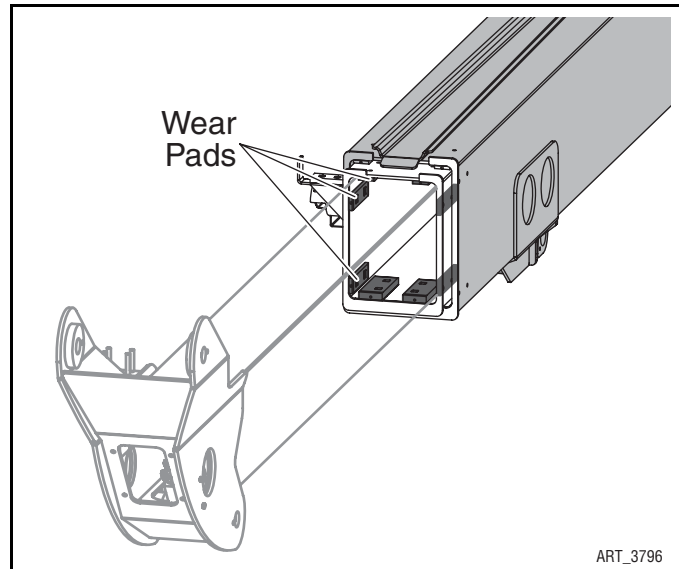
Remove the Extend Cylinder (see “Extend Cylinder” on Page 3-23).

1. Remove the cable track and associated machine parts from the boom. Lay all cable and hoses out of the way to avoid damage.
2. Slide the End Section of the boom out approximately 6 feet (2 m). Position an overhead hoist over the End Section and attach a sling.

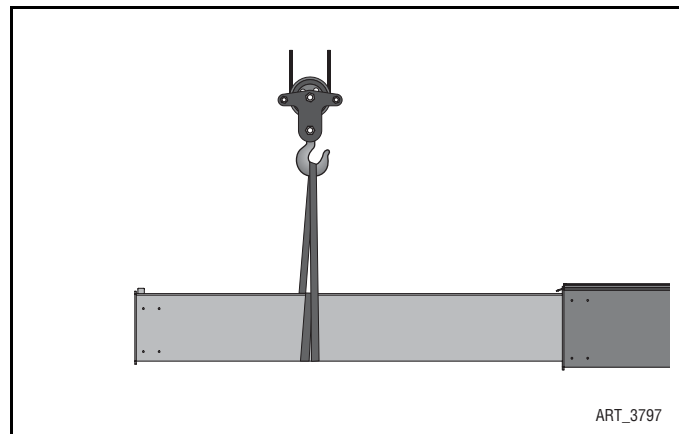


ART_3795

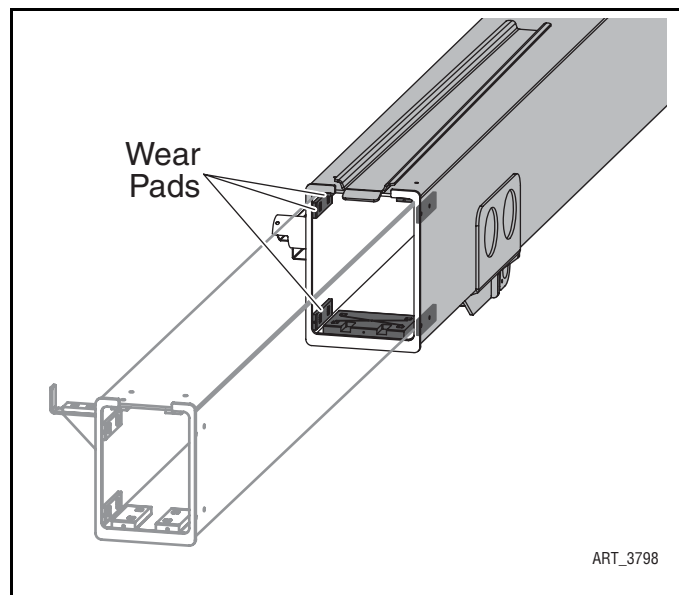
3. Remove the side and the top inner wear pads and shims from the front of the boom's Mid Section.
4. Apply slight lifting pressure.
5. Remove the bottom inner wear pads and shims from the front of the boom's Mid Section.
6. Extract the End Section from the front of the boom by carefully pulling and lifting with the hoist or forklift. Once the End Section has been extracted approximately 90%, use a second hoist or fork lift to support the end of the End Section that remains inside the boom.



7. Carefully extract the boom End Section completely.
8. Slide the Mid Section of the boom out approximately 6 feet (2 m). Position an overhead hoist over the Mid Section and attach a sling.



9. Remove the side and the top inner wear pads and shims from the front of the boom's Base Section.
10. Apply slight lifting pressure.
11. Remove the bottom inner wear pad and shim from the front of the boom's Base Section.
12. Extract the Mid Section from the front of the boom by carefully pulling and lifting with the hoist or forklift. Once the Mid Section has been extracted approximately 90%, use a second hoist or fork lift to support the end of the Mid Section that remains inside the boom.
13. Carefully extract the boom Mid Section completely.



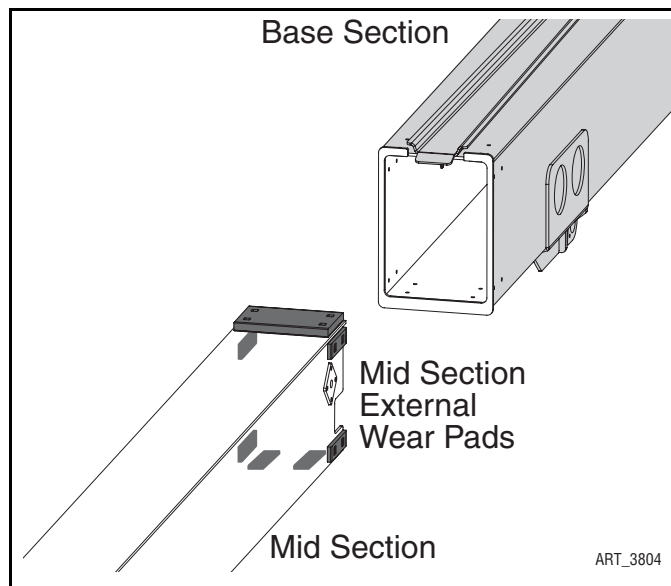
ASSEMBLY

The boom must be properly shimmed to function correctly. Each boom section must be shimmed to a clearance no greater than .030" (.762mm) at its tightest point of travel. It may be necessary to run each boom section in and out several times to properly identify the tightest point of travel, and to adjust the number of shims.

After the proper number of shims has been determined, tighten the mounting bolts for that set of wear pads before moving on to the next step. Apply one (1) drop of Loctite® 242 or equivalent to bolts securing wear pads and shims. See the Introduction section of this manual for proper torque specifications.

| Standard Shims -- Use unless otherwise noted | | Shims for Specific Location | |
|--|---------------------|-----------------------------|---|
| 22224 | Shim, .020" (.5 mm) | 22572 | Base Section Internal-- Bottom Wide Wearpad Shim; Mid Section External-- Top Wide Wearpad Shim |
| 11861977 | Shim, .040" (1mm) | | |
| 11861981 | Shim, .120" (3mm) | | |
| 11861982 | Shim, .200" (5mm) | 22574 | Mid Section Internal-- Bottom Offset Wearpad Shim End Section External-- Top Offset Wearpad Shim |
| 11861983 | Shim, .400" (10mm) | | |

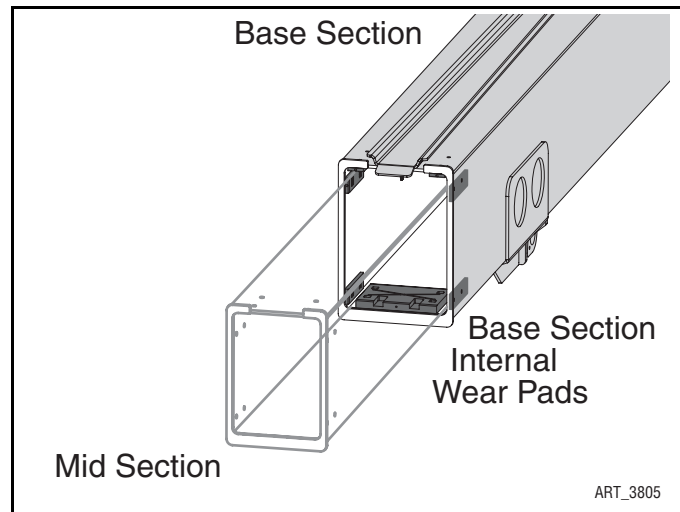
1. Use an overhead hoist or forklift to position the Mid Section of the boom in front of the Base Section.
2. With wearpads and shims in place, insert the Mid Section into the Base Section of the boom.
3. Keeping the sections as parallel as possible, slide the Mid Section into and out of the Base Section. Shim the Mid Section External Wearpads as needed to achieve proper clearance.
4. Tighten the wearpad mounting bolts. Apply one (1) drop of Loctite® 242 or equivalent per bolt. See the Introduction section of this manual for proper torque specifications. Insert the Mid Section into the Base Section of the boom.



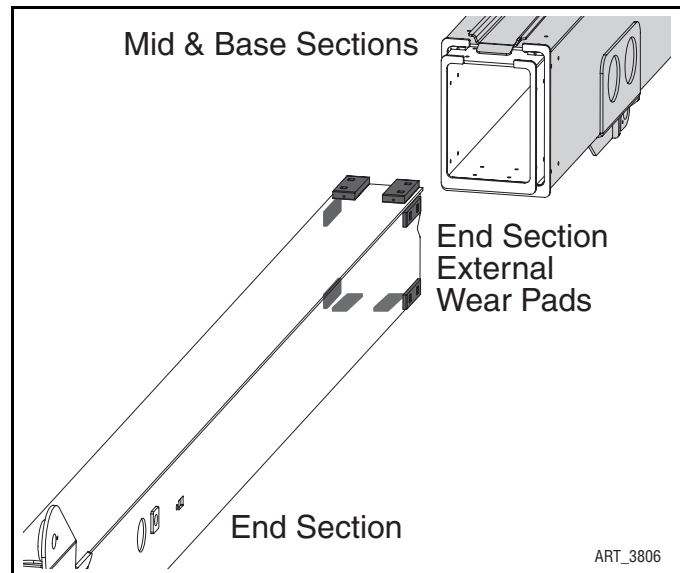
5. With the hoist still attached to the boom Mid Section, install the Base Section Internal Wear pads and shims. Use the hoist to position the Mid Section to provide clearance.

**WARNING**

DO NOT PLACE ANY PART OF YOUR BODY BETWEEN THE BOOM SECTIONS. USE TOOLS TO POSITION SHIMS AND WEARPADS.



6. Keeping the sections as parallel as possible, slide the Mid Section into and out of the Base Section. Shim the Base Section Internal Wearpads as needed to achieve proper clearance.
7. Tighten the wearpad mounting bolts. Apply one (1) drop of Loctite® 242 or equivalent per bolt. See the Introduction section of this manual for proper torque specifications. Push the Mid Section into the Base Section of the boom.
8. Use an overhead hoist or forklift to position the End Section of the boom in front of the Mid Section.
9. With wearpads and shims in place, insert the End Section into the Mid Section of the boom.
10. Keeping the sections as parallel as possible, slide the End Section into and out of the Mid Section. Shim the End Section External Wearpads as needed to achieve proper clearance.
11. Tighten the wearpad mounting bolts. Apply one (1) drop of Loctite® 242 or equivalent per bolt. See the Introduction section of this manual for proper torque specifications. Insert the Mid Section into the Base Section of the boom.



12. With the hoist still attached to the boom End Section, install the Mid Section Internal Wear pads and shims. Use the hoist to position the Mid Section to provide clearance.

**WARNING**

DO NOT PLACE ANY PART OF YOUR BODY BETWEEN THE BOOM SECTIONS. USE TOOLS TO POSITION SHIMS AND WEARPADS.

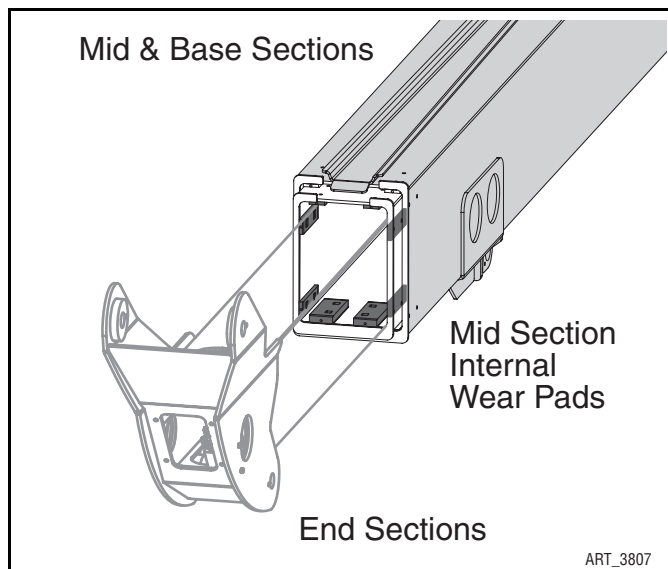
13. Keeping the sections as parallel as possible, slide the End Section into and out of the Mid Section. Shim the Mid Section Internal Wearpads as needed to achieve proper clearance.
14. Tighten the wearpad mounting bolts. Apply one (1) drop of Loctite® 242 or equivalent per bolt. See the Introduction section of this manual for proper torque specifications. Push the End Section into the Mid Section of the boom.

Install the Extend Cylinder.

Install the Platform Beam and Platform Level Cylinder.

Install the Platform Carriage.

Install the Platform.



BOOM LIFT CYLINDER



WARNING

THIS PROCESS REQUIRES SPECIFIC REPAIR SKILLS AND EXPERIENCE, APPROPRIATE LIFTING EQUIPMENT AND A PROPER WORKPLACE. DEATH, SERIOUS INJURY OR SIGNIFICANT MACHINE DAMAGE COULD OCCUR IF YOU ATTEMPT THIS PROCESS WITHOUT THE APPROPRIATE SKILLS AND EQUIPMENT.

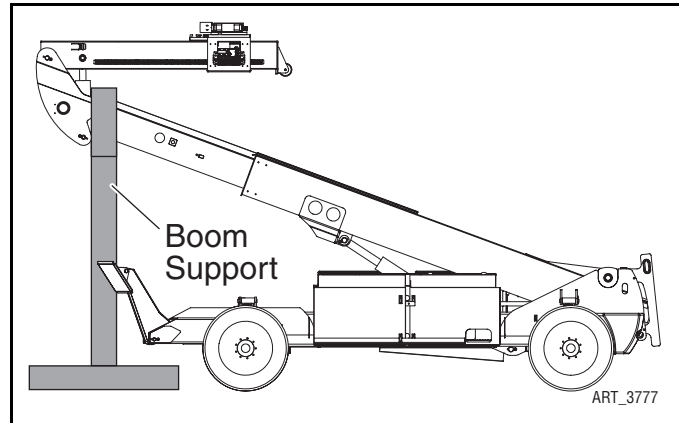
REMOVAL

Park the machine on a firm level surface.

Remove the Platform (see "Platform Removal & Installation" on Page 3-15).

A overhead hoist or fork lift is needed for this procedure, as the cylinder weight is 750 lbs (341 kg). A sling 16 feet (5 m) long capable of lifting 1500 lbs (681 kg) and two wood blocks approximately 3" x 3" x 8" (8 x 8 x 20 cm) are also needed.

1. Raise the boom high enough to access the upper pin of the Boom Lift Cylinder (approximately 6 feet (2 m)).
2. Extend the boom enough to allow clearance for a boom support apparatus for the tip of the boom to rest. Choose a boom support that is capable of holding the weight of the boom (approximately 8000 lbs [3628 kg]). Lower the boom gently onto the support and continue lowering slightly until the weight of the boom is no longer on the Boom Lift Cylinder.



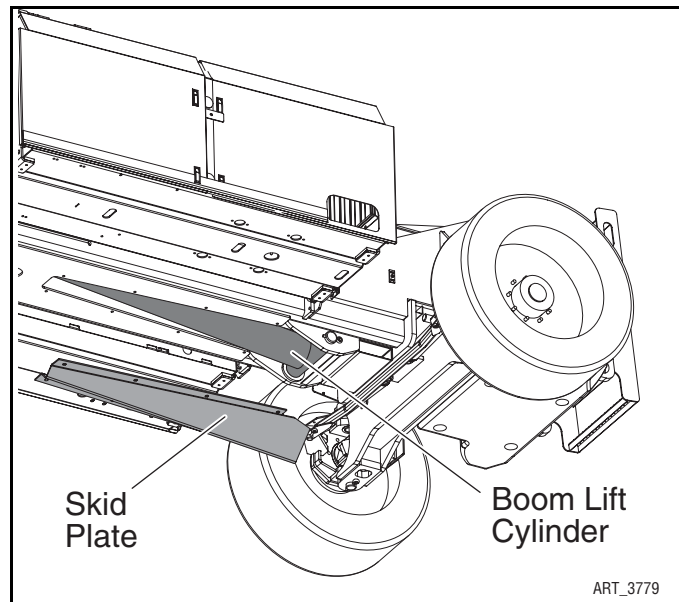
3. Remove skid plate from the bottom of the chassis to expose the lower portion of the Boom Lift Cylinder.



WARNING

THE SKID PLATE IS HEAVY. PROPERLY SUPPORT THE SKID PLATE BEFORE REMOVING THE FASTENERS.

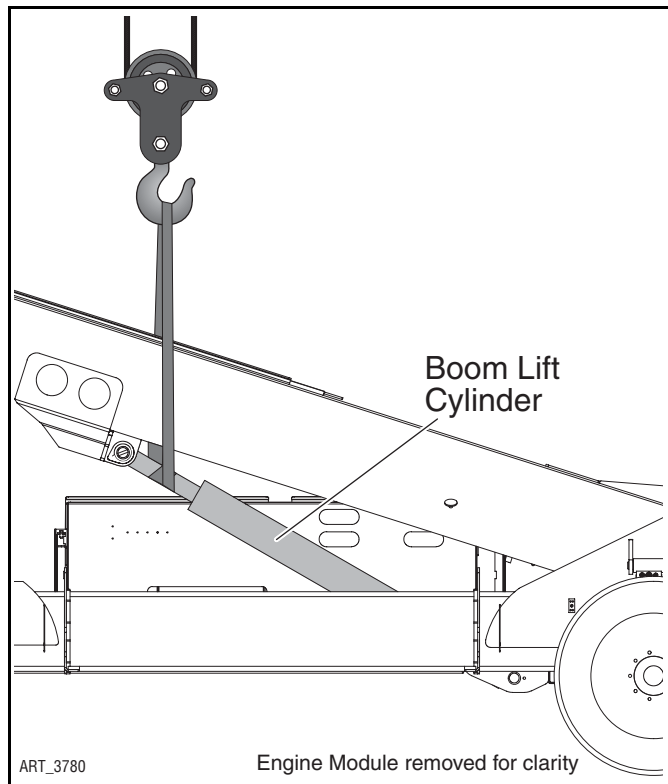
4. Place a drain pan under the cylinder and slowly remove each counterbalance valve (one at a time) just enough to release the pressure behind it. Retighten the counterbalance valves once the oil flow slows to just a drip.



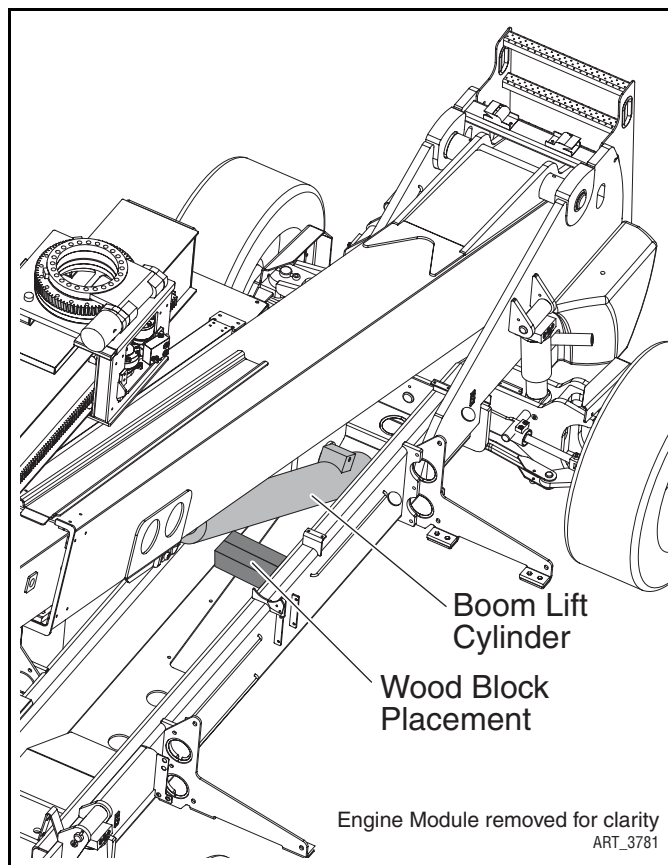
5. Clean all hydraulic fittings, then tag all hoses for proper reassembly
6. Remove both hoses. Immediately plug and cap all openings to prevent contamination. Wipe up any residual oil and remove the drain pan. Dispose of used oil properly.
7. Position an overhead hoist or forklift over the boom, just above the Boom Lift Cylinder. Wrap a sling around the rod of the lift cylinder just under the pin boss and lift the hoist enough to remove any slack in the sling.
8. Remove the pin retainer, then drive the upper pin out of the Boom Lift Cylinder.

**WARNING**

BE CAREFUL TO PREVENT THE LIFT CYLINDER FROM SHIFTING DURING PIN REMOVAL.



9. Place the wood blocks under the mid section of the cylinder barrel and across the frame. Carefully lower the hoist and lift cylinder onto the blocks.
10. Remove the sling from the rod portion of the Boom Lift Cylinder and wrap it around the cylinder barrel, just above the wood blocks. Wrap the sling twice around the barrel, leaving the ends of the sling available to hook onto the hoist.

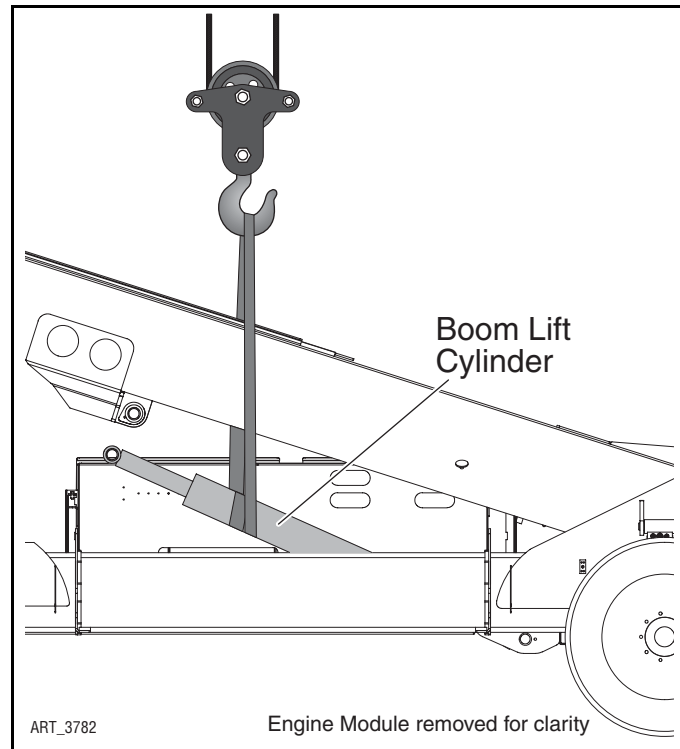


11. Place a suitable floor jack under the lower pin boss of the Boom Lift Cylinder and place a slight amount of upward pressure on the pin boss.
12. Raise the hoist enough to lift the Boom Lift Cylinder close to its original position on the boom. Examine the sling arrangement periodically during this lift to be sure it remains in place without sliding excessively up the cylinder barrel. Carefully remove the wood blocks.
13. Remove the lower pin retainer, then remove the lower lift cylinder pin.

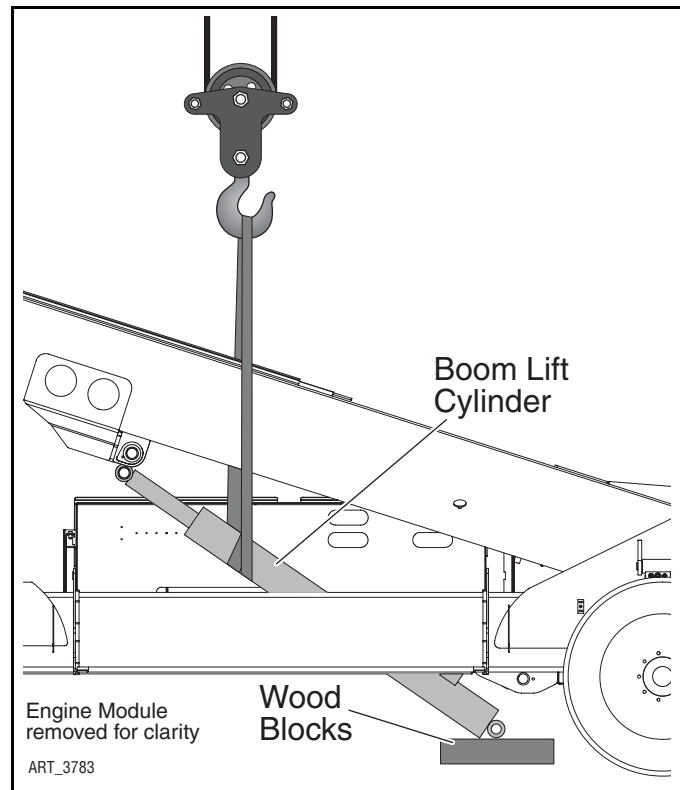
**WARNING**

PERSONNEL MUST STAY CLEAR OF THE AREA BELOW AND TO THE REAR OF THE CYLINDER WHEN THE LOWER PIN IS RELEASED.

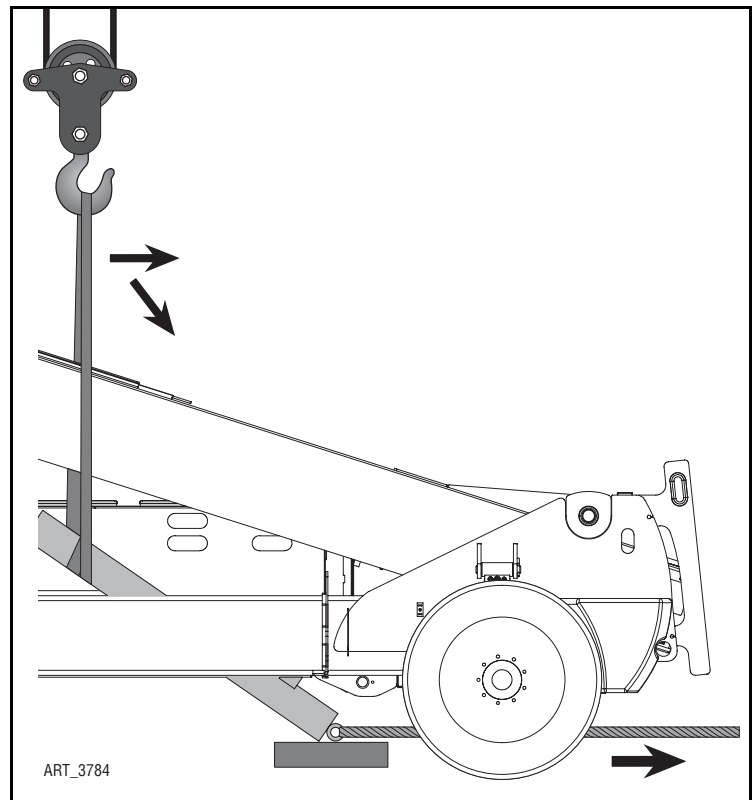
ENSURE THAT THE BOOM LIFT CYLINDER DOES NOT SHIFT OFF THE FLOOR JACK.



14. Place the wood blocks on the floor beneath the barrel end of the cylinder. Slowly lower the floor jack until the Boom Lift Cylinder rests on the wood blocks. Ensure that the sling remains in place.
15. Once the floor jack is released from the Boom Lift Cylinder, place a sling or heavy rope through the lower pin boss and route to the rear of the machine in preparation for pulling the cylinder from the rear of the machine.



16. Slowly and carefully lower the hoist and lift cylinder to the ground while pulling the cylinder to the rear of the machine.
17. Once the lift cylinder is completely lying on the ground, remove the sling from the barrel. Use the floor jack under the rod end pin boss to lift the cylinder off of the sling.
18. Pull the lift cylinder out from the rear of the machine.



INSTALLATION

1. Lay the Boom Lift Cylinder on the floor behind the chassis with the rod end pointing toward the front of the machine.
2. Tie a heavy rope or sling through the rod end pin boss and pull the cylinder under the machine until the rod end pin boss is below the boom tube pin boss.
3. Using a floor jack placed under the rod-end pin boss, lift the rod-end of the Boom Lift Cylinder and wrap the sling twice around the barrel, leaving the ends of the sling available to hook onto the hoist.
4. Carefully lift the lift cylinder up into its general location with the rod-end pin boss close to its assembled location at the boom tube pin boss.
5. Place a floor jack under the barrel-end pin boss. Carefully lift and move it into position.
6. Using alignment tools, align the lower pin bosses and install the lower pivot pin. Install the pin retainer, using a drop of Loctite 242 or equivalent on the threads of the bolt. See the Introduction section of this manual for proper torque specifications.
7. Install both hydraulic hoses onto the Boom Lift Cylinder.
8. From the Lower Control station, start the engine and operate Boom Lift Function to extend or retract the Boom Lift Cylinder to align the rod end pin boss with the boom tube pin boss. Move the hoist as necessary to assist in this alignment.
9. Using alignment tools, align the upper pin bosses and install the upper pivot pin. Install the pin retainer, using a drop of Loctite 242 or equivalent on the threads of the bolt. See the Introduction section of this manual for proper torque specifications.
10. From the Lower Control station, lift the boom slightly and remove the boom support.
11. Operate the Boom Lift Function up and down through 3-4 cycles to purge air from the system.
12. Check for leaks and wipe up any residual oil.

13. Install the skid plate. Using a drop of Loctite 242 or equivalent on the threads of each bolt. See the Introduction section of this manual for proper torque specifications.
14. With the boom stowed, fill the hydraulic tank to the proper level using the clean filtered hydraulic oil of the type specified in Section 1 of this manual.

ENGINE MAINTENANCE

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



Always wear protective eye-wear when working with fuel and oil.

Engine should be OFF when replacing filter elements.

Do not run the engine with the air filter element removed.

OIL AND OIL FILTER

Dispose of used oil and filters properly.

Use only oil with lubrication classifications CF, CF-4, CG-4, CH-4 and CI-4.

Oil used with this engine must have proper API and SAE Engine Oil classification according to ambient temperatures as shown below:

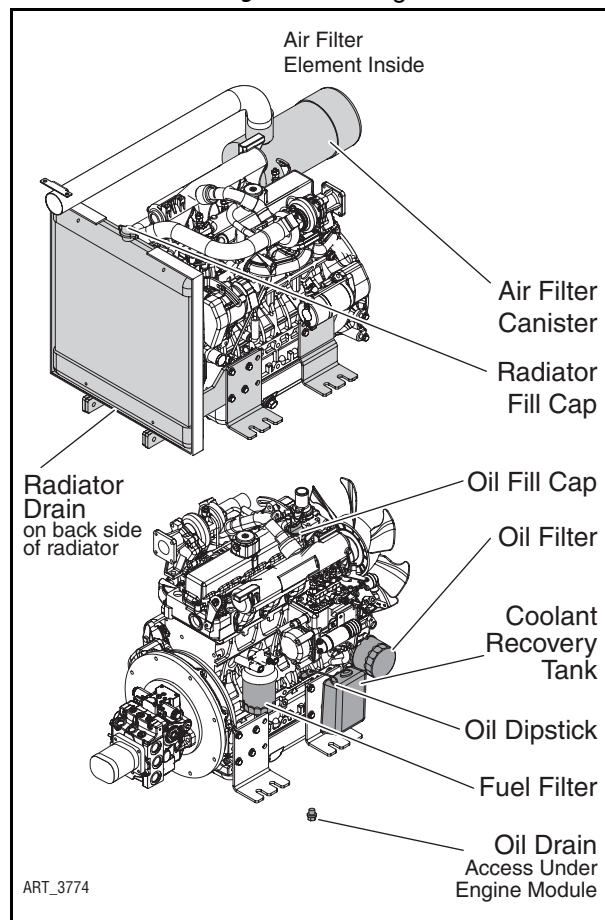
| | |
|-------------------------|-------------------------------|
| Above 77° F (25° C) | SAE30, SAE10W-30 or SAE15-40 |
| 32° ~ 77° F (0 ~ 25° C) | SAE20, SAE10W-30 or SAE15-40 |
| Below 32° F (0° C) | SAE10W, SAE10W-30 or SAE15-40 |

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 and wipe the filter seal contact surface with a clean towel.
3. Coat the seal on the new filter with clean oil, then install and tighten by hand.
4. Fill engine with 10w-30 motor oil until the dipstick indicates FULL. Capacity is 10 US quarts (9,5 l).
5. Recheck dipstick after running engine. Fill as necessary.

AIR FILTER ELEMENT

1. Clean the air filter canister before opening.
2. Remove the cap to the air filter canister.
3. Remove old filter and replace with a new filter.
4. Replace the cap to the air filter canister.

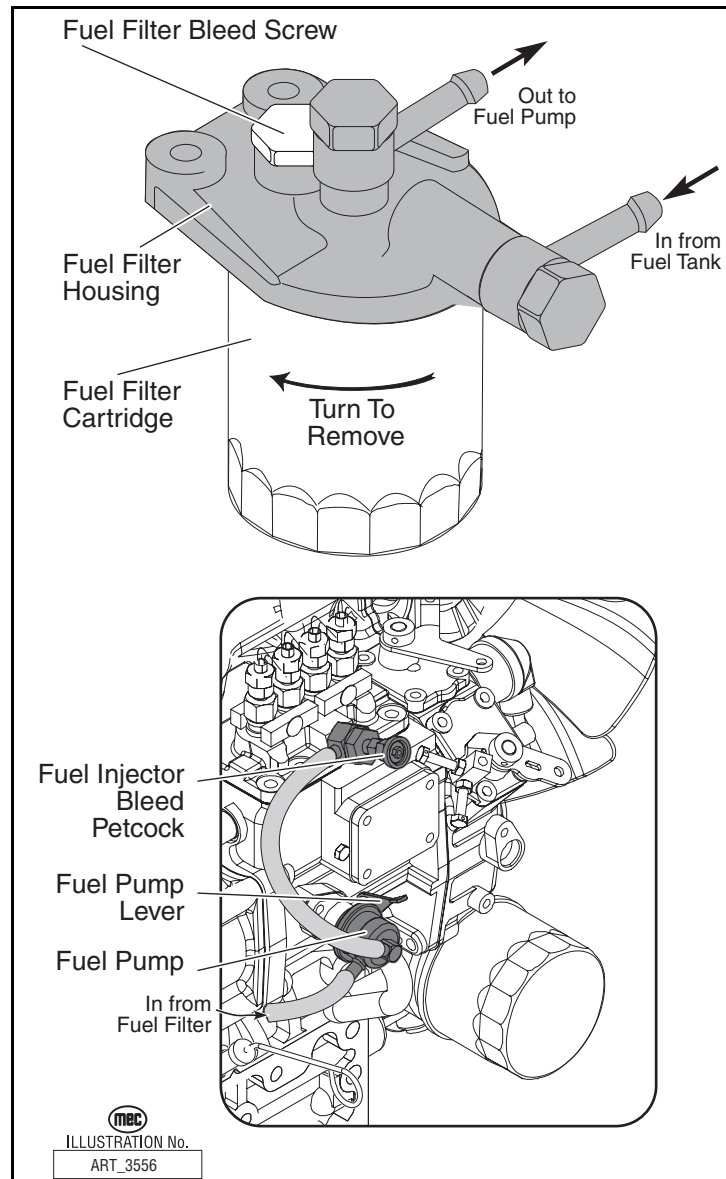
Figure 3-11: Engine Maintenance



FUEL FILTER

1. Turn OFF valve on bottom of fuel tank and clean the filter area before removing the filter.
2. Place a suitable container beneath the fuel filter assembly to catch spilled fuel.
3. Turn filter cartridge counter-clockwise to remove. Wipe the filter seal contact surface with a clean towel
4. Coat the seal on the new filter with clean oil, then install and tighten by hand.
5. Open valve at fuel tank and check for leaks.
6. Purge the air from the fuel system as follows;
 - Fill fuel tank to the fullest extent. Open valve on bottom of fuel tank.
 - Loosen Fuel Filter Bleed Screw on top of fuel filter housing a few turns. Close the bleed screw when fuel flows steadily and there are no more bubbles.
 - Open the Fuel Injector Bleed Petcock on the fuel injector pump.
 - Crank the engine for about 10 seconds, then stop it, **or** move the fuel feed pump lever by hand.
 - Start the engine. Close the Fuel Injector Bleed Petcock when the engine idles smoothly.

Figure 3-12: Fuel Filter & Fuel Pump



NOTE: The engine will crank for up to 10 seconds before the starter is cut out for a mandatory 30-second starter cool-down cycle. A red light will illuminate on the Base Control Station during the cool-down cycle.

THROTTLE ADJUSTMENT

Figure 3-13: Throttle Linkage

IDLE SPEED ADJUSTMENT

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

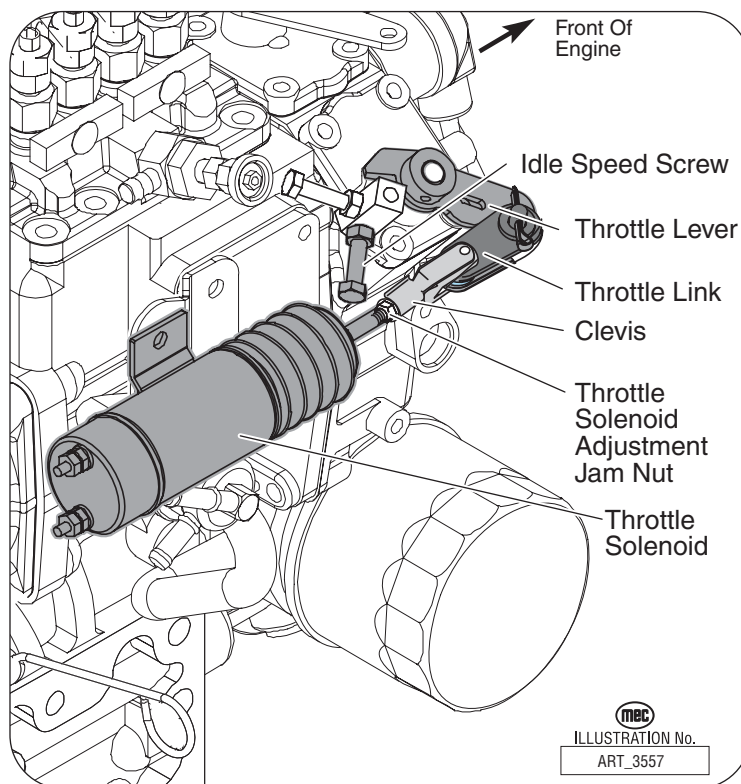
THROTTLE SOLENOID ADJUSTMENT

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 inch (.5 mm) 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.



LUBRICATION POINTS

BOOM WEAR PADS

Lower the stabilizers and extend the boom completely. Spread a thin, even coat of lithium-based grease on the areas where the wear pads rub -- top, bottom and sides of the End Section and Mid Section of the boom.

PLATFORM SLIDE CARRIAGE WEAR PADS

Spread a thin even coat of with lithium-based grease on the areas where the slide pads rub -- top, bottom and sides of Platform Beam.

PLATFORM ROTATE DRIVE UNIT

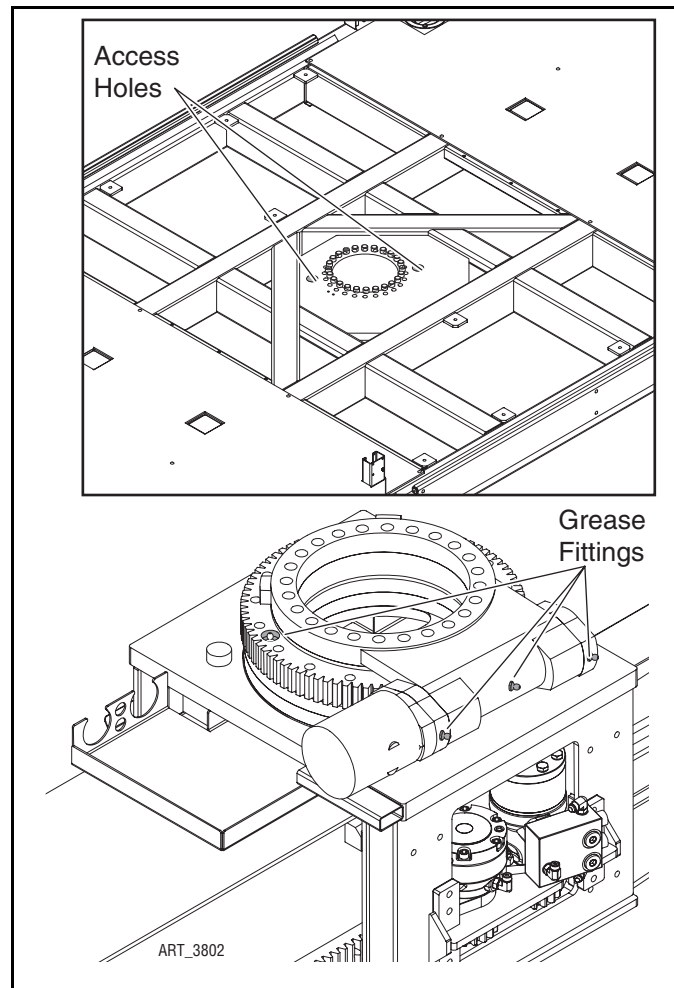
- Apply small amounts of lithium-based grease to approximately every 3rd tooth of the ring gear.
- Apply grease to 3 fittings located on the side of the Platform Rotate Drive Unit.
- Ring Gear Bearing: Remove the Load Zone Deck Plate. Rotate the platform until the access hole aligns with the grease fitting in the ring gear.

CABINET LATCHES AND HINGES

Apply spray lubricant to latches and hinges. Wipe off excess lubricant.

ENGINE

Apply spray lubricant to throttle solenoid linkage pivot points. See Figure 3-13 on page 3-39.





Section 4

TROUBLESHOOTING

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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.

The Functions/Lift pump is a tandem fixed-displacement gear-type pump attached to the rear of the Drive Pump.

Common Causes of Electrical System Malfunctions:

- Battery switch is turned OFF (located at the front of the engine module).
- Battery connections are loose or corroded
- Battery is not fully charged.
- Emergency Stop buttons are pushed (OFF position).
- Circuit breaker is tripped (OFF position).

Common Causes of Hydraulic System Malfunctions:

- Hydraulic fluid level is too low.
- Incompatible hydraulic fluids mixed, destroying the additives and causing varnish build up, resulting in the valves sticking.
- Water in the hydraulic fluid due to a damp climate.
- Improper hydraulic fluid used. Viscosity too high in cold climates. Viscosity too low in warm climates.
- Hydraulic fluid contaminated with debris - filter change interval neglected.

NOTE: 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 a lower grade fluid will cause the machine to operate incorrectly and may lead to pump and drive motor failure. Refer to "Lubrication" in Section 1 of this manual.

NOTE: 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. Make sure all ports and cavities of the manifold and cylinders are properly covered/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 GP440 Module in the upper controls box and the GP400 Processor, located in the lower controls box. 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.



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 onboard 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 4-1: GP400 Module, Standard Configuration

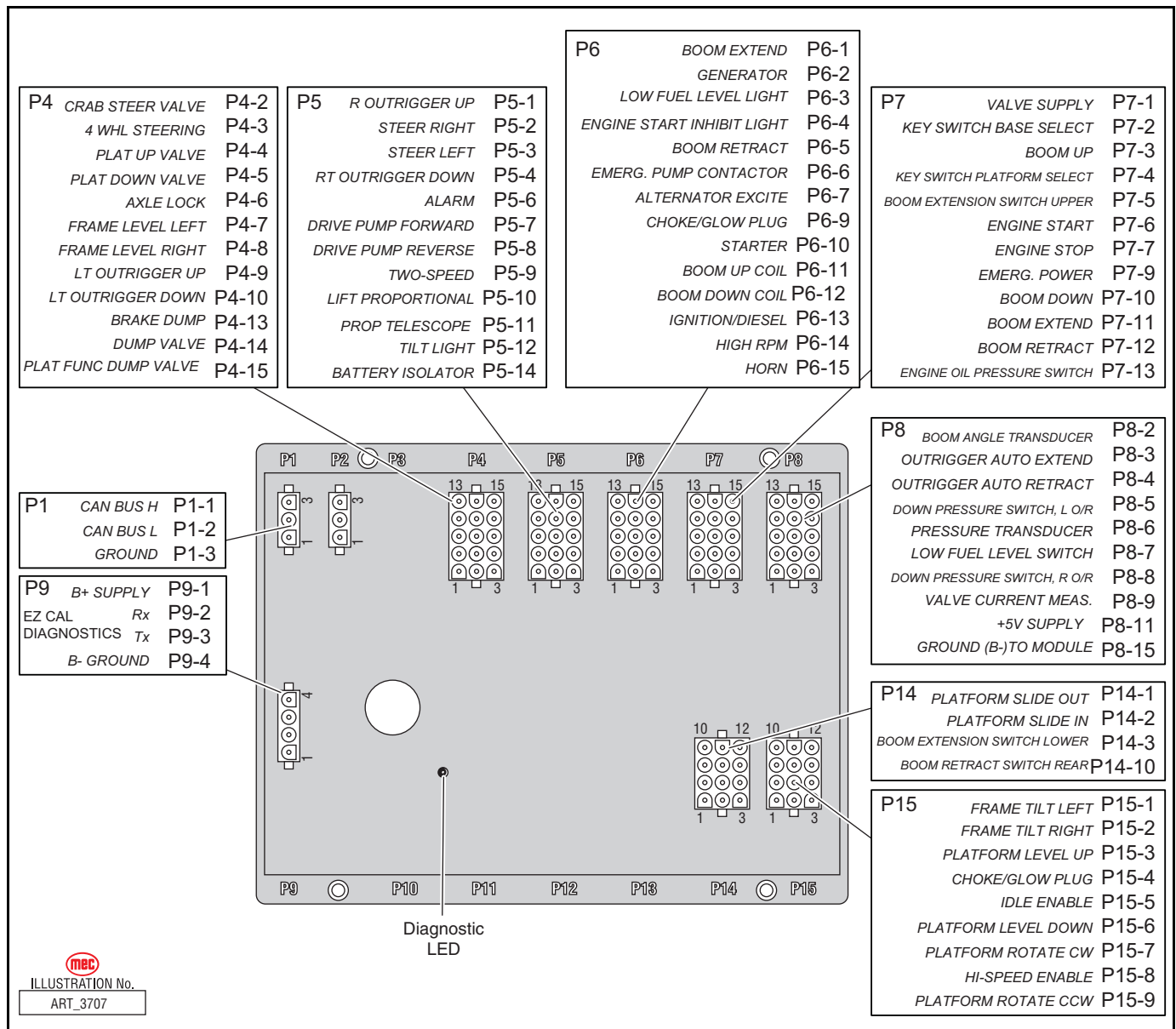
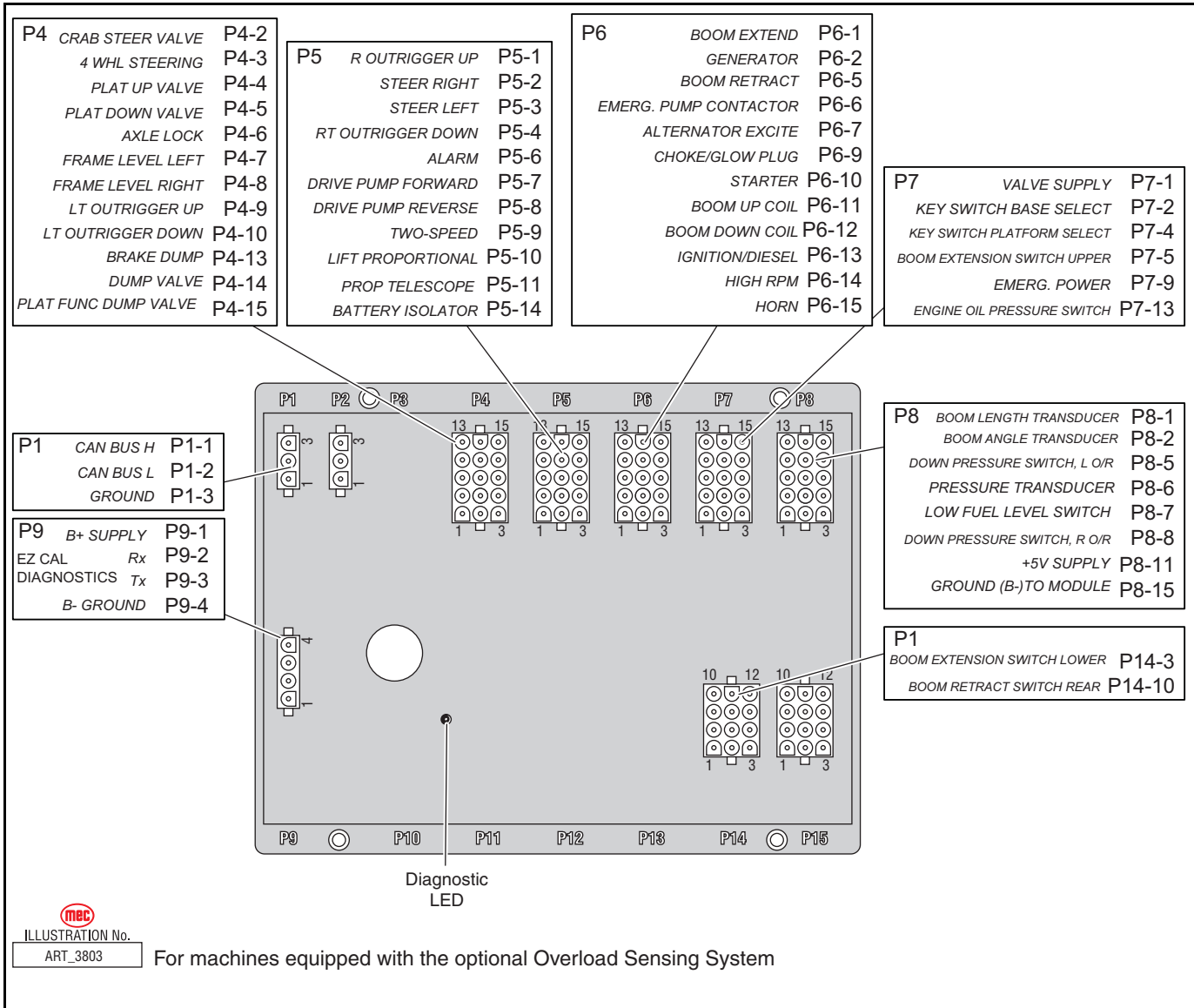


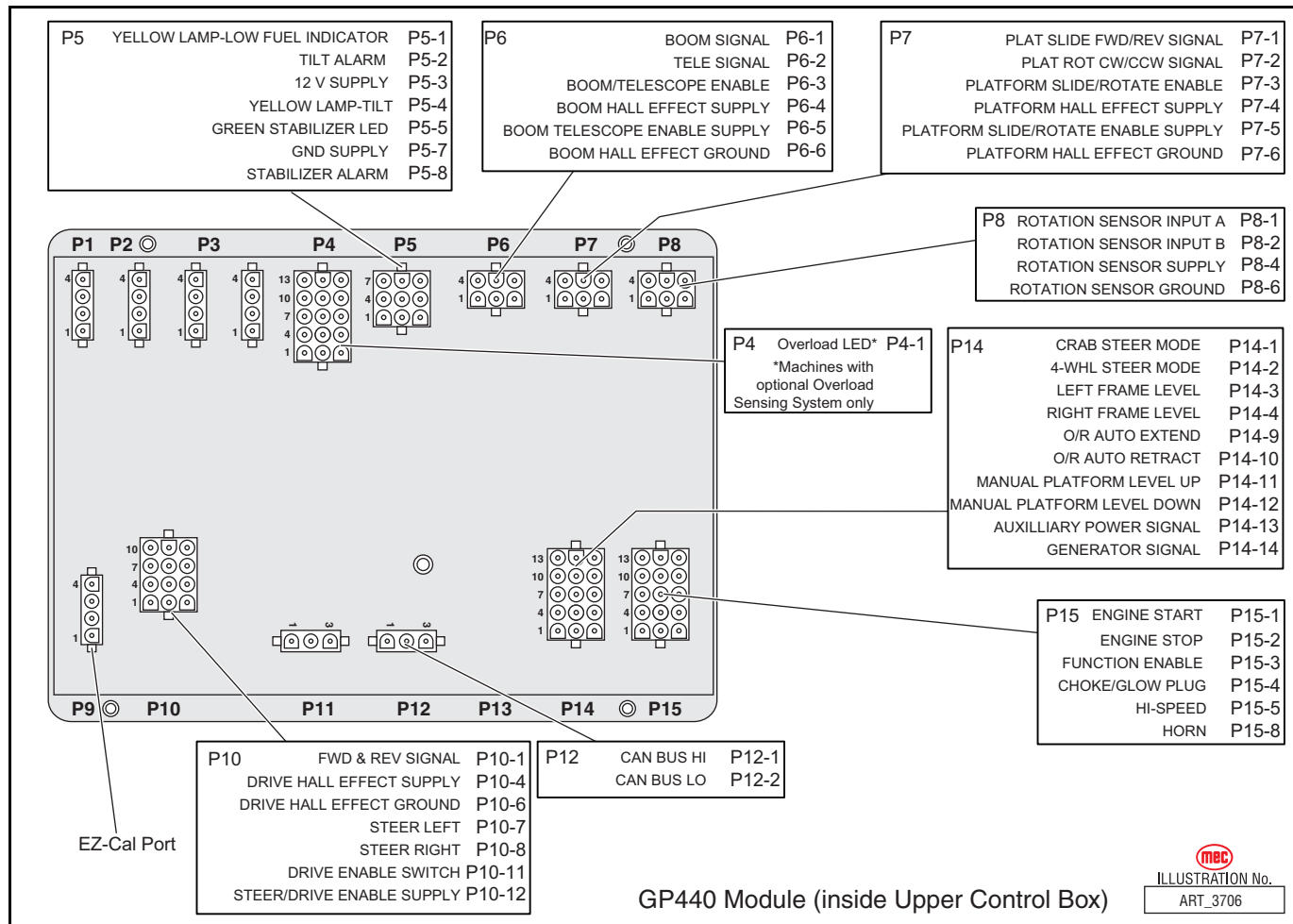
Figure 4-2: GP400 Module, Optional Overload Sensing System Configuration



GP440 MODULE

The GP440 Module is the remote module located inside the upper control box. It received inputs from the operator and relays them to the GP400.

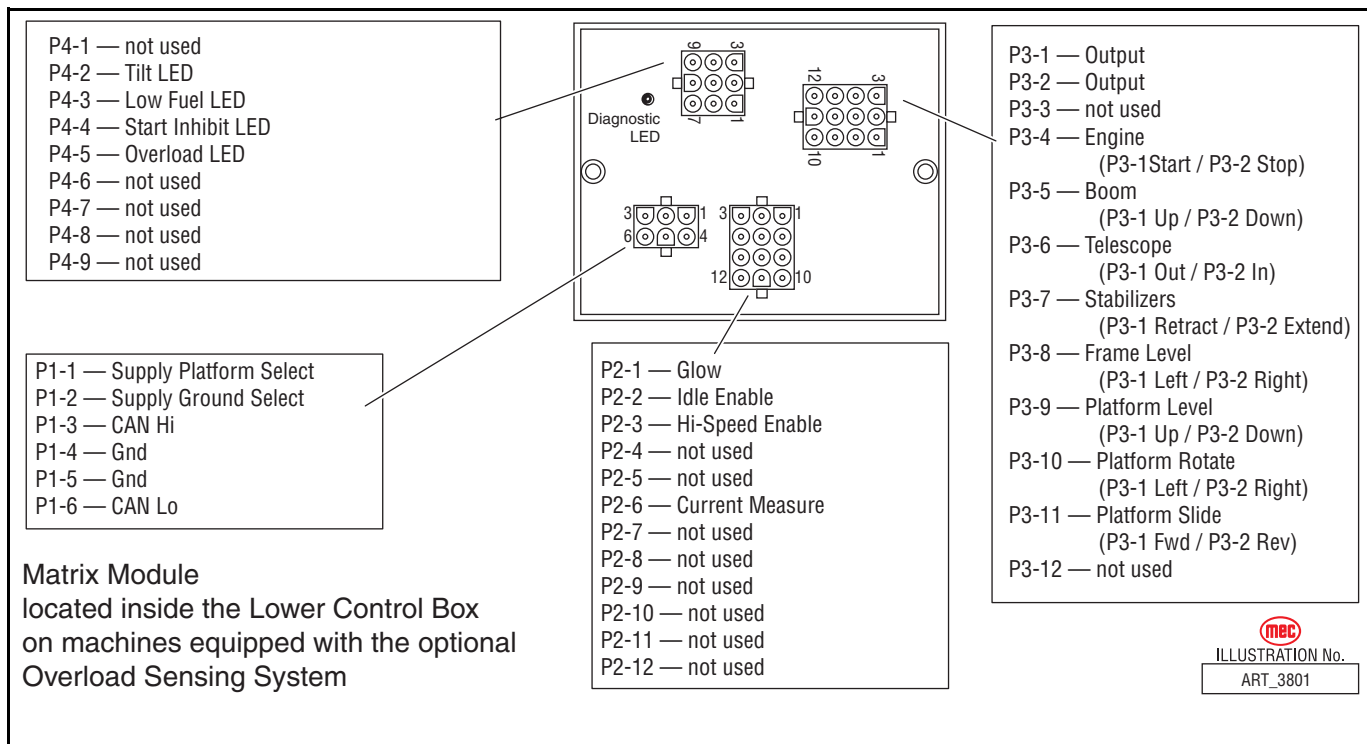
Figure 4-3: GP440 Module



MATRIX MODULE

The Matrix Module is an auxiliary module located inside the lower control box on machines equipped with the optional Overload Sensing System. It received inputs from the operator and relays them to the GP400.

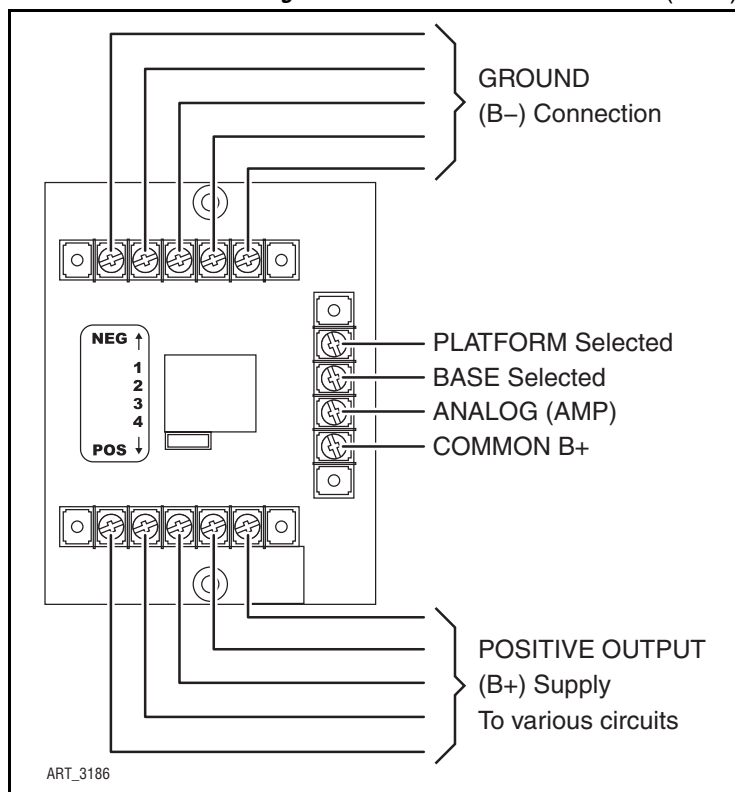
Figure 4-4: Matrix Module



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.

Figure 4-5: Terminal Block Module (TBM)



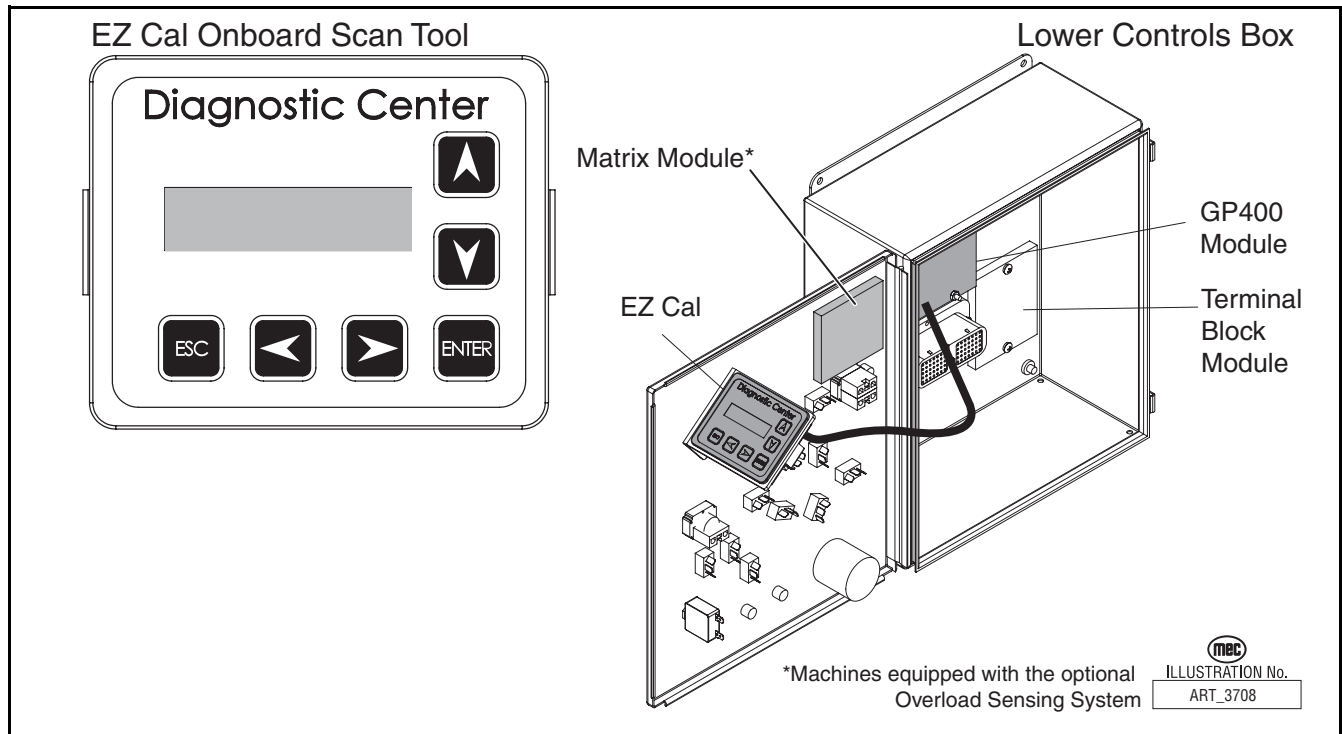
EZ-CAL SCAN TOOLS

The EZ-Cal Scan Tools interface with the machine's control system to provide system information and to allow adjustment. The EZ-Cal receives its power from the GP400 or GP440. The system must be powered up by closing the battery disconnect switch and pulling out both Emergency Stop Switches. You must also select Base or Platform depending on the station from which you will operate.

ONBOARD EZ-CAL -- LOWER CONTROLS BOX

To use and operate the onboard EZ-Cal, set the Base/Platform Key switch to Base, 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 4-6: Onboard EZ-Cal Scan Tool & GP400 Module



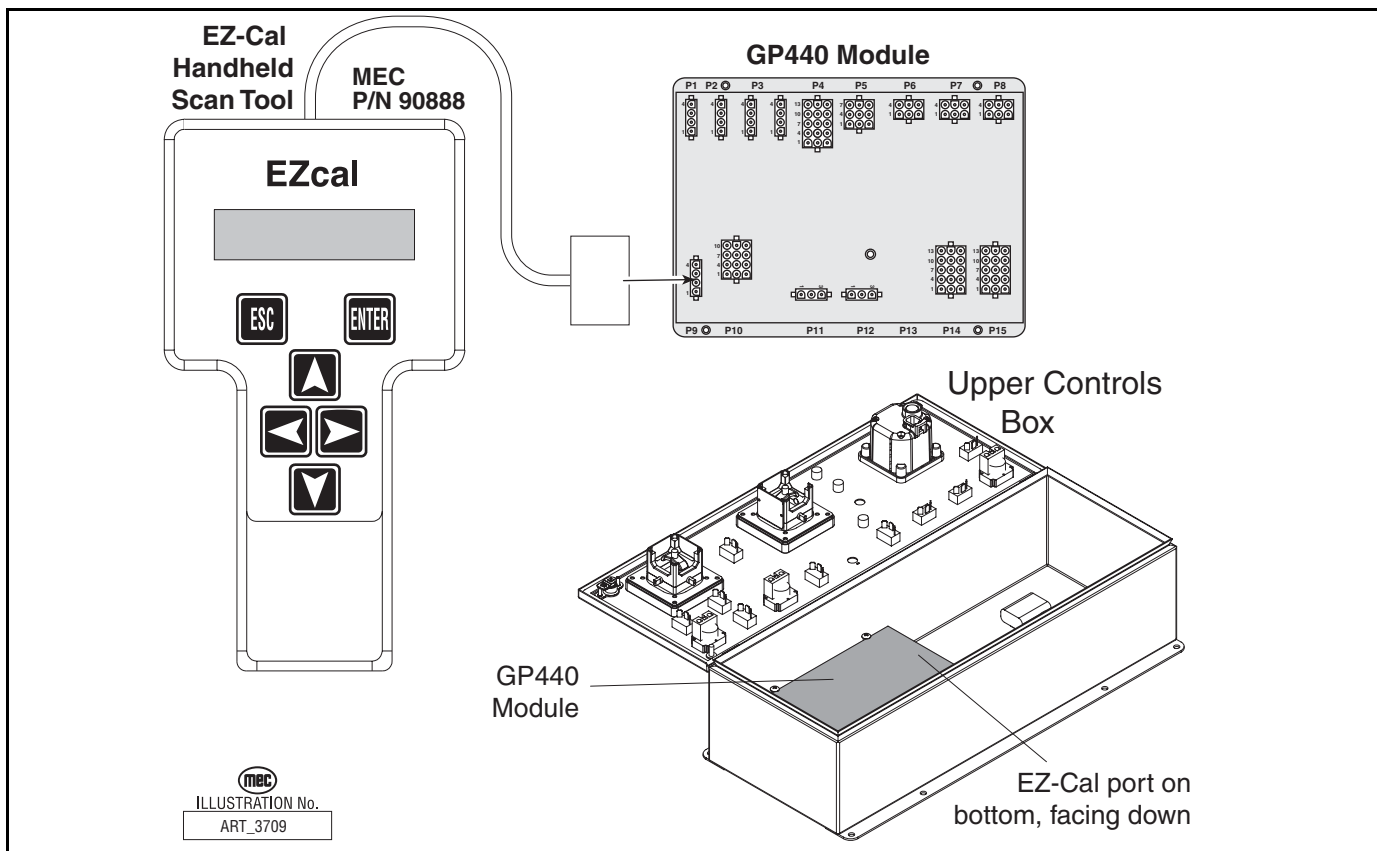
HANDHELD EZ-CAL -- UPPER CONTROLS BOX

The handheld EZ-Cal is not provided with the machine and is available from the MEC parts department (part #90888).

To use and operate the handheld EZ-Cal at the upper controls station:

- Set the Base/Platform Key Switch to Platform
- Open the lid to the Upper Controls Box
- Plug the EZ-Cal into port P9 of the GP440 module. This plug is on the right side of the module, facing down.

Figure 4-7: Handheld EZ-Cal Tool & GP440









USING THE EZ-CAL SCAN TOOL

- 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.

Figure 4-8: EZ-Cal Buttons

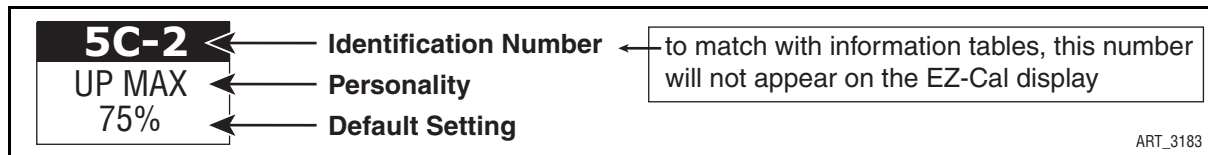
| SYMBOL | KEY FUNCTIONS |
|---|--|
|   | ESC/ENTER BUTTONS To move back and forth between menu and sub-menu |
|   | LEFT/RIGHT BUTTONS Select menus and setting to be adjusted |
|   | UP/DOWN BUTTONS Adjust setting values |

ART_3710

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 4-9: 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.



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.

ERROR MESSAGES

To obtain error messages from the EZ-Cal, access the EZ-Cal as mentioned above. The display will read, "HELP:PRESS ENTER". Press Enter to display the current error message. If an error message is present, use the following list of error messages to better understand the fault. If an error message is not present, the display will show the last operation performed.

Pressing Enter twice will provide a log of previous errors and operations that may have occurred within recent operation. The first message will be the most recent.

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 Messages" on page 4-24 for flash coded error messages.

Figure 4-11: EZ-Cal Flow Chart: Diagnostic, Standard Machines

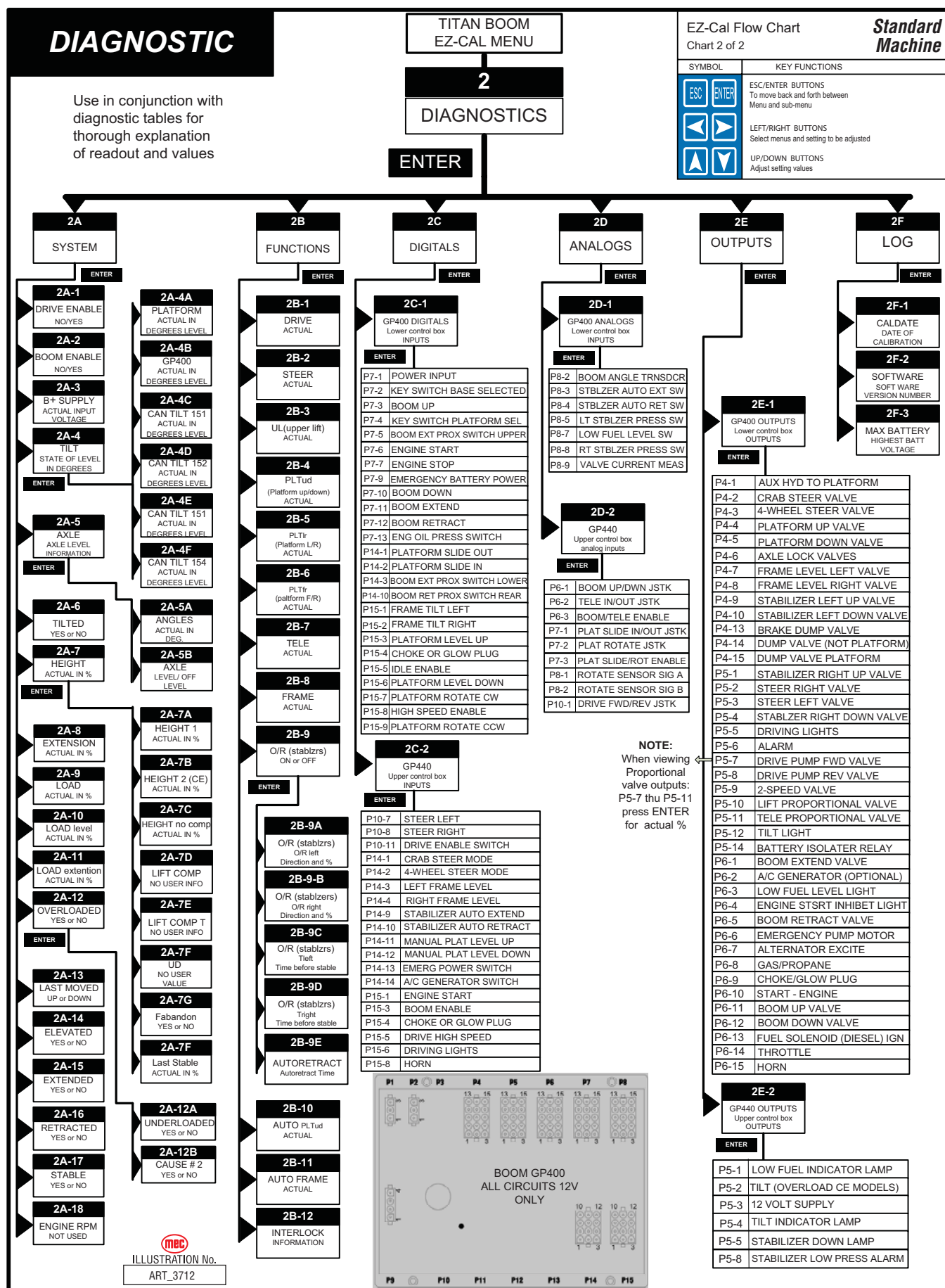


Figure 4-12: EZ-Cal Flow Chart: Adjustments and Setup, Machines w/ Optional Overload Sensing System

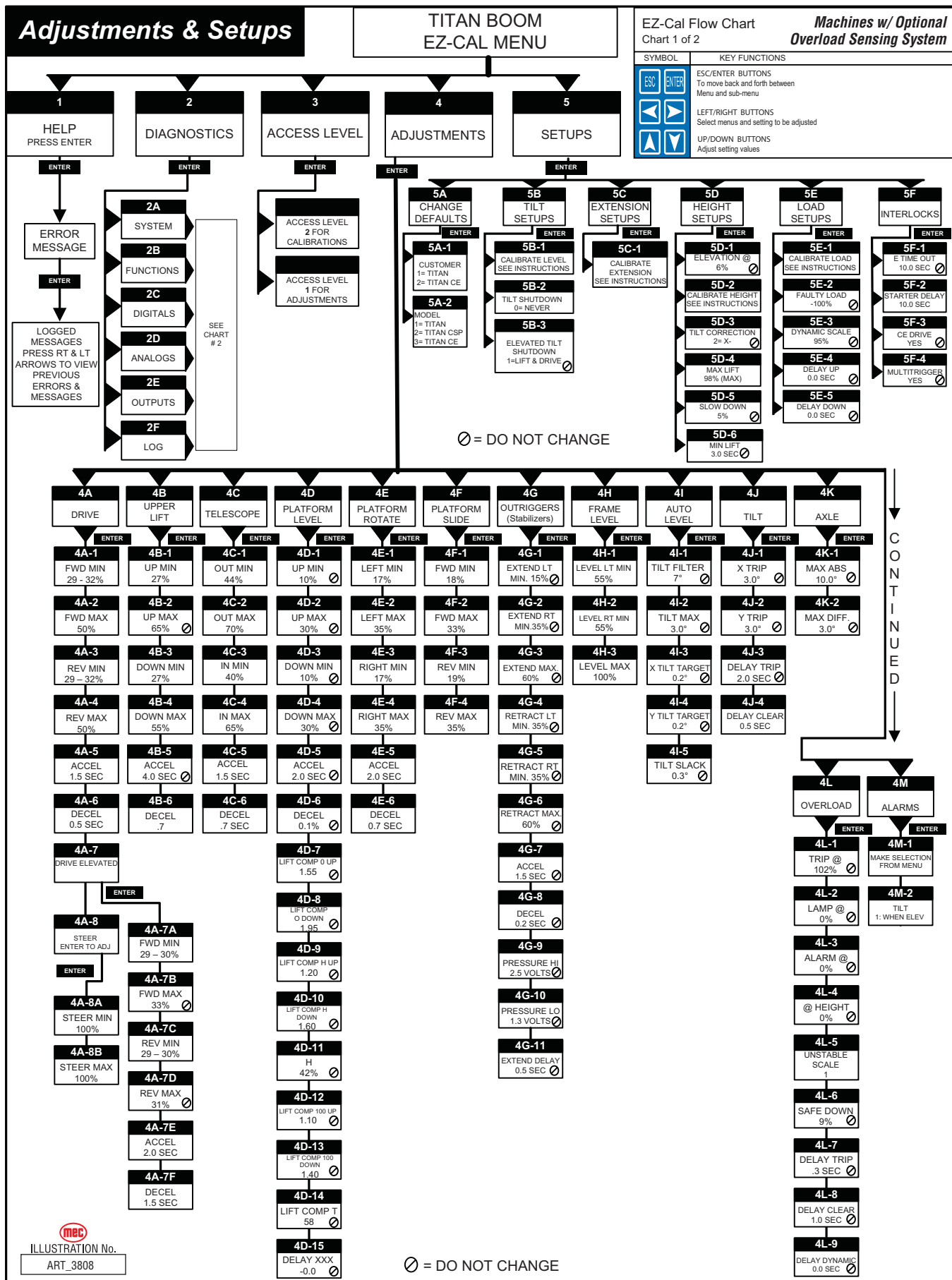
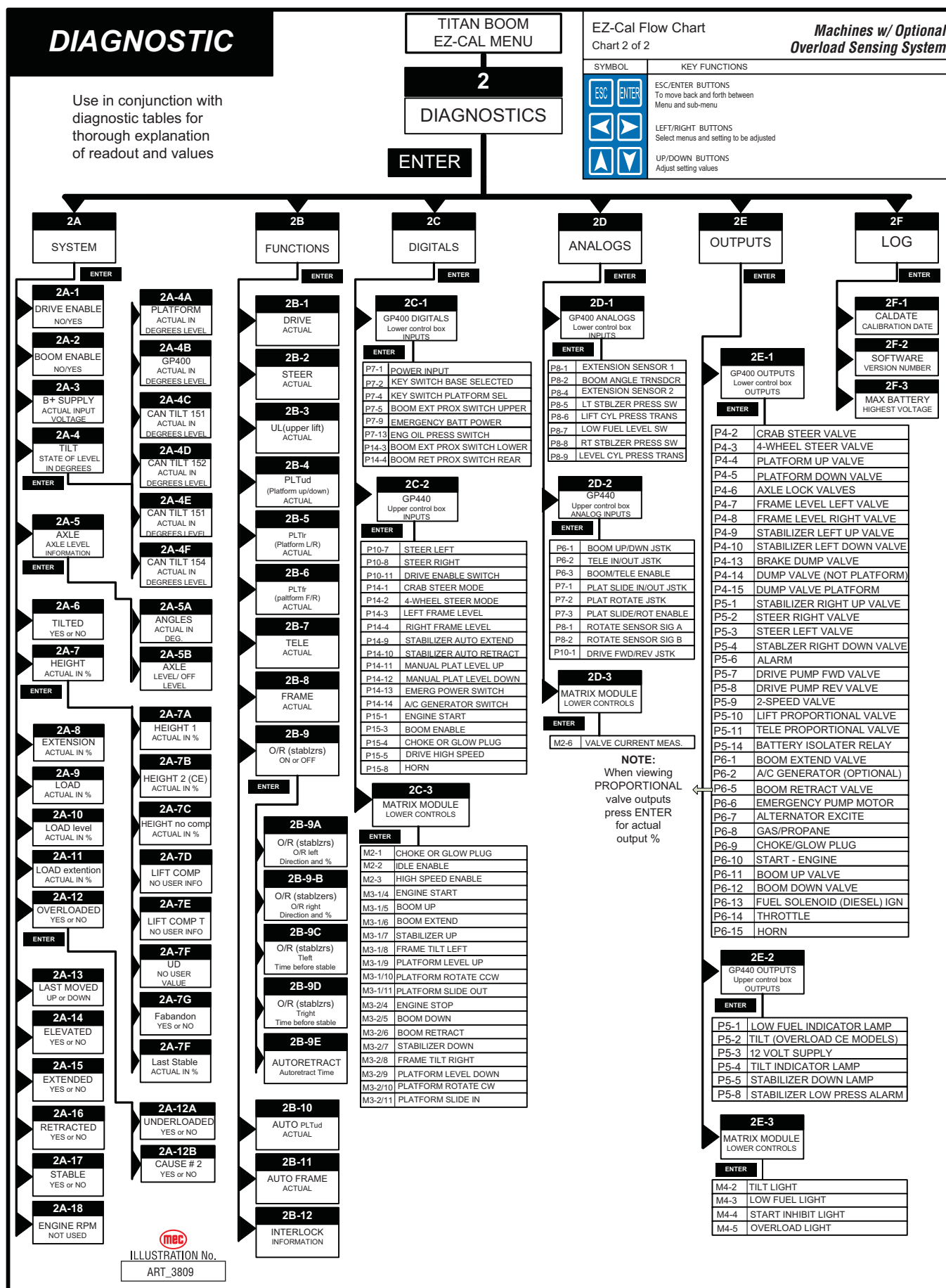


Figure 4-13: EZ-Cal Flow Chart: Diagnostic, Machines w/ Optional Overload Sensing System



EZ-CAL ADJUSTMENT

Refer to "Using the EZ-Cal Scan Tool" on page 4-10.

Adjustments are possible in Access Level 1 Only.

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.

Table 4-1: EZ-Cal Adjustment Table

| OPERATION | ID | PERSONALITY | Factory Setting | Explanation |
|--|------|----------------|-----------------|--|
| 4A DRIVE (platform Stowed) | 4A1 | Fwd Min | 29 - 32% | Slowest speed threshold |
| | 4A2 | Fwd Max | 55% | Maximum speed setting |
| | 4A3 | Rev Min | 29 - 32% | Slowest speed possible |
| | 4A4 | Rev Max | 55% | Maximum speed potential |
| | 4A5 | Accel | 1.5 sec. | Ramp up time to maximum |
| | 4A6 | Decel | .2 sec. | Ramp down to time stop |
| | 4A7 | DRIVE ELEVATED | Sub Menu | Press ENTER to access elev. drive settings |
| | 4A7a | Fwd Min | 29 - 30% | Slowest speed threshold |
| | 4A7b | Fwd Max | 33% | DO NOT CHANGE |
| | 4A7c | Rev Min | 29 - 30% | Slowest speed possible |
| | 4A7d | Rev Max | 32% | DO NOT CHANGE |
| | 4A7e | Accel | 2.0 sec. | Ramp up time to maximum |
| | 4A7f | Decel | 1.5 sec. | Ramp down to time stop |
| | 4A8 | STEER | Sub Menu | Press ENTER to access steer settings |
| | 4A8a | Steer Min | 100% | Steering speed adjustment |
| | 4A8b | Steer Max | 100% | Steering speed adjustment |
| 4B UPPER LIFT | 4B1 | Up Min | 24% | Slowest speed threshold |
| | 4B2 | Up Max | 65% | DO NOT CHANGE |
| | 4B3 | Down Min | 30% | Slowest speed threshold |
| | 4B4 | Down Max | 60% | DO NOT CHANGE |
| | 4B5 | Accel | 4.0 sec. | DO NOT CHANGE |
| | 4B6 | Decel | 0.7 sec. | Ramp down time to stop |
| 4C TELESCOPE | 4C1 | Out Min | 44% | Slowest speed threshold |
| | 4C2 | Out Max | 70% | Maximum speed setting |
| | 4C3 | In Min | 40% | Slowest speed threshold |
| | 4C4 | In Max | 65% | Maximum speed setting |
| | 4C5 | Accel | 1.5 sec. | Ramp up time to maximum |
| | 4C6 | Decel | 0.7 sec. | Ramp down time to stop |

| OPERATION | ID | PERSONALITY | Factory Setting | Explanation |
|--|------|--------------------|-----------------|---|
| 4D PLATFORM LEVEL | 4D1 | Up Min | 11% | DO NOT CHANGE |
| | 4D2 | Up Max | 30% | DO NOT CHANGE |
| | 4D3 | Down Min | 11% | DO NOT CHANGE |
| | 4D4 | Down Max | 30% | DO NOT CHANGE |
| | 4D5 | Accel | 2.0 sec. | DO NOT CHANGE |
| | 4D6 | Decel | 0.1 sec. | DO NOT CHANGE |
| | 4D7 | Lift Comp 0 up | 1.65 | DO NOT CHANGE |
| | 4D8 | Lift Comp 0 Down | 1.95 | DO NOT CHANGE |
| | 4D9 | Lift Comp H Up | 1.20 | DO NOT CHANGE |
| | 4D10 | Lift Comp H Down | 1.60 | DO NOT CHANGE |
| | 4D11 | H | 42% | DO NOT CHANGE |
| | 4D12 | Lift Comp 100 Up | 1.10 | DO NOT CHANGE |
| | 4D13 | Lift Comp 100 Down | 1.40 | DO NOT CHANGE |
| | 4D14 | Lift Comp T | 58 | DO NOT CHANGE |
| | 4D15 | Delay XXX | 0 | DO NOT CHANGE |
| 4E PLATFORM ROTATE | 4E1 | Left Min | 17 | Slowest speed threshold |
| | 4E2 | Left Max | 35 | Maximum speed setting |
| | 4E3 | Right Min | 17 | Slowest speed threshold |
| | 4E4 | Right Max | 35 | Maximum speed setting |
| | 4E5 | Accel | 2.0 sec. | Ramp up time to maximum |
| | 4E6 | Decel | 0.7 sec. | Ramp down time to stop |
| 4F PLATFORM SLIDE | 4F1 | Fwd Min | 18% | Slowest speed threshold |
| | 4F2 | Fwd Max | 33% | Maximum speed setting |
| | 4F3 | Rev Min | 18% | Slowest speed threshold |
| | 4F4 | Rev Max | 35% | Maximum speed setting |
| 4G OUTRIGGERS (STABILIZERS) | 4G1 | Extend Left Min | 36% | DO NOT CHANGE |
| | 4G2 | Extend Right Min | 36% | DO NOT CHANGE |
| | 4G3 | Extend Max | 60% | DO NOT CHANGE |
| | 4G4 | Extend Left Min | 35% | DO NOT CHANGE |
| | 4G5 | Extend Right Min | 35% | DO NOT CHANGE |
| | 4G6 | Retract Max | 60% | DO NOT CHANGE |
| | 4G7 | Accel | 1.5 s | DO NOT CHANGE |
| | 4G8 | Decel | 0.2 s | DO NOT CHANGE |
| | 4G9 | Pressure Hi | 2.5 volts | DO NOT CHANGE |
| | 4G10 | Pressure Lo | 1.3 Volts | DO NOT CHANGE |
| | 4G11 | Extend Delay | 0.5 Seconds | DO NOT CHANGE |
| 4H FRAME LEVEL | 4H1 | Level Min | 55% | Slowest speed threshold |
| | 4H2 | Level Left Max | 55% | Maximum speed setting |
| | 4H3 | Level Right Max | 100% | Maximum speed setting |
| 4I AUTO-LEVEL | 4I1 | Tilt Filter | 7 deg | DO NOT CHANGE |
| | 4I2 | Tilt Max | 4.2 deg | DO NOT CHANGE |
| | 4I3 | X Tilt Target | .2 deg | DO NOT CHANGE |
| | 4I4 | Y Tilt Target | .2 deg | DO NOT CHANGE |
| | 4I5 | Tilt Slack | .3 deg | DO NOT CHANGE |
| 4J TILT | 4J1 | X Trip | 3.0 deg | DO NOT CHANGE |
| | 4J2 | Y Trip | 3.0 deg | DO NOT CHANGE |
| | 4J3 | Delay Trip | 2.0 sec. | DO NOT CHANGE |
| | 4J4 | Delay Clear | 0.5 sec | Time before clear out-of-level shutdown |



| OPERATION | ID | PERSONALITY | Factory Setting | Explanation |
|--|-----|------------------|------------------|---|
| 4K AXLE | 4K1 | MAX ABS | 10.0 deg | DO NOT CHANGE |
| | 4K2 | Max Differential | 3.0 deg | DO NOT CHANGE |
| 4L OVERLOAD ANSI/ CE option | 4L1 | Trip @ | 0% | Standard machine DO NOT CHANGE |
| | | | 102% | Machine with optional Overload Sensing System DO NOT CHANGE |
| | 4L2 | Lamp @ | 0% | DO NOT CHANGE |
| | 4L3 | Alarm@ | 0% | DO NOT CHANGE |
| | 4L4 | @ Height | 0% | DO NOT CHANGE |
| | 4L5 | Load Level Scale | 1.20 | DO NOT CHANGE |
| | 4L6 | Safe Down | 9% | DO NOT CHANGE |
| | 4L7 | Delay Trip | 1.5 sec. | DO NOT CHANGE |
| | 4L8 | Delay Clear | 1.5 sec. | DO NOT CHANGE |
| | 4L9 | Delay Dynamic | 0.0 sec. | DO NOT CHANGE |
| 4M ALARMS | 4M1 | Motion | 0=NO | Select alarm setting to indiv. requirement |
| | 4M2 | Tilt Alarm | 1: When Elevated | selects when tilt alarm sounds |

EZ-CAL SETUP

Changes to Setups are possible in Access Level 1 only. Calibrations are possible in access level 2.



SEE "CALIBRATION INSTRUCTIONS" BEFORE ATTEMPTING CALIBRATIONS. INCORRECT CALIBRATION CAN CAUSE MACHINE INSTABILITY.

NOTE: Changing CUSTOMER (5a1) or MODEL (5a2) will return all settings and Adjustments to their default value possibly causing the machine to operate differently than desired (see Adjustment Flow Charts for default values)

Only authorized personnel have access to, and may make changes to personalities. The ID numbers are provided as a means to match personalities in the EZ-Cal Flow Chart and tables, they will not appear on the EZ-Cal display

Table 4-2: EZ-Cal Setup Menu

| OPERATION | ID | FUNCTION | Factory Setting | Explanation |
|--|-----|---|--------------------------------------|--|
| 5a CHANGE DEFAULTS | 5a1 | Customer | 1=TITAN 2=TITAN CE | Identifies Base Model - Must be set when GP400 is Replaced. CE denotes Overload Sensing option. |
| | 5a2 | Model | 1=TITAN 2=TITAN CSP 3=TITAN CE | Select from these choices. Titan CSP = Cold Start or Arctic option, CE = Overload Sensing Option |
| 5b TILT SETUPS | 5b1 | Calibrate Level? Y=ENTER, N=ESCAPE | | Pressing enter twice will calibrate all level sensors |
| | | WARNING! Refer to Tilt Sensor Calibration instructions before attempting calibration | | |
| | 5b2 | Tilt Shutdown | 0 = never | Function disabled when tilted (stowed) |
| | 5b3 | Elevated Tilt Shutdown | 1 = Lift and Drive | DO NOT CHANGE |
| 5c HEIGHT SETUP | 5c1 | Calibrate Extension? Y=ENTER N=ESCAPE | | ENTER to begin calibration of Extension sensor. |
| | | WARNING! Refer to Extension Calibration instructions before attempting calibration | | |
| 5d HEIGHT SETUP | 5d1 | Elevation @ | 6% | DO NOT CHANGE |
| | 5d2 | Calibrate Height? Y=ENTER, N=ESCAPE | | ENTER to begin calibration of height sensors |
| | | WARNING! Refer to Height Calibration instructions before attempting calibration | | |
| | 5d3 | Tilt Correction | 2=X- | DO NOT CHANGE |
| | 5d4 | Max Lift | 98% | DO NOT SET ABOVE 98% |
| | 5d5 | Slow down | 8% | DO NOT CHANGE |
| | 5d6 | Min Lift | 3.0 sec | DO NOT CHANGE |
| 5e LOAD SETUPS (optional Overload Sensing System only) | 5e1 | Calibrate Load? Y=ENTER N=ESCAPE | | ENTER to begin calibration of Overload Sensing System |
| | | WARNING! Refer to Load Calibration instructions before attempting calibration | | |
| | 5e2 | Faulty Load | -100% | DO NOT CHANGE |
| | 5e3 | Dynamic Scale | 95% | DO NOT CHANGE |
| | 5e4 | Delay Up | 0.0 sec | DO NOT CHANGE |
| | 5e5 | Delay Down | 0.0 sec | DO NOT CHANGE |
| 5f INTERLOCKS | 5f1 | E Time Out | 10 Seconds | DO NOT CHANGE |
| | 5f2 | Starter Delay | 10 Seconds | Amount of time starter will operate before 30 sec cool down |
| | 5f3 | CE Drive | YES | DO NOT CHANGE |
| | 5f4 | MultiTrigger | YES | Allows use of all enable triggers for any function |

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**. Using the EZ-Cal Diagnostic Flow Chart, compare ID number to this menu for circuit identification and result.

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.

Using the ID number, match specific personalities from the Diagnostic Flow Charts with this table for additional information.

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

Table 4-3: EZ-Cal Diagnostics Menu

| SELECTION | ID # | EZ-cal Readout | Explanation |
|-------------------------|------|--|--|
| 2A SYSTEM | 2A1 | Drive Enable Y or N | Drive enable switch open or closed |
| | 2A2 | Boom Enable Y or N | Boom enable switch open or closed |
| | 2A3 | B+ Supply (actual) | Supply voltage at GP200 |
| | 2A4 | Tilt (actual in degrees) | Platform tilt angle as read by 4-way can tilt |
| Sub Menu Press ENTER | 2A4a | Platform (actual in degrees) | Platform tilt angle as read by 4-way can tilt |
| | 2A4b | GP400 (actual in degrees) | Chassis tilt angle as read by GP400 |
| | 2A4c | CAN TILT 151 | Reading from Can Tilt in front of boom (Left) |
| | 2A4d | CAN TILT 152 | Reading from Can Tilt on Front axle |
| | 2A4e | CAN TILT 153 | Reading from Can Tilt in front of boom (Right) |
| | 2A4f | CAN TILT 154 | Reading from Can Tilt on Rear axle |
| | 2A5 | AXLE | Axle level information |
| Sub Menu Press ENTER | 2A5A | Angle - in degrees | Axle angle compared to GP400 angle |
| | 2A5b | Axle level/off level | State of axle angles |
| | 2A6 | Tilted Y or N | Tilted beyond trip angles |
| | 2A7 | Height (actual in deg) | As measured by rear angle transducer |
| Sub Menu Press ENTER | 2A7a | Height 1 | As measured by rear angle transducer #1 |
| | 2A7b | Height 2 (optional Overload Sensing System only) | As measured by rear angle transducer #2 |
| | 2A7c | Height No Comp | Height measurement not compensated for chassis angle |
| | 2A7d | Lift Comp | Formula used for controlling platform auto-level |
| | 2A7e | Lift Comp T | Formula used for controlling platform auto-level |
| | 2A7f | Platform UD | Actual output controlling auto-level |
| | 2A7g | F Abandon | Platform angle point when auto-level is abandoned |
| | 2A7h | Last Stable | Last recorded height when stabilizers were set. |

Table 4-3: EZ-Cal Diagnostics Menu

| SELECTION | ID # | EZ-cal Readout | Explanation |
|-------------------------|-------|---|---|
| | 2A8 | Extension (optional Overload Sensing System only) | As measured by Cable Extension Transducer (boom ext) |
| | 2A9 | Load (actual in %0 | State of load on platform (optional Overload Sensing System only) |
| | 2A10 | Load Level | Load calculation based on level cylinder pressure |
| | 2A11 | Load Extension | Load calculation based on ext & lift cylinder pressures |
| | 2A12 | Overloaded Y or N | Y when excessive weight in platform (optional Overload Sensing System only) |
| Sub Menu Press ENTER | 2A12a | Underloaded Y or N | Y when lift cyl pressure is below minimum |
| | 2A12b | Cause #2 Y or N | Level cylinder tripped overload |
| | 2A13 | Last Moved U or D | Operation working when overload tripped |
| | 2A14 | Elevated Y or N | Y when elevated above elevation @ setting |
| | 2A15 | Extended Y or N | Y when extended beyond 8 feet (2.6m) |
| | 2A16 | Retracted Y or N | Y when boom fully retracted |
| | 2A17 | Stable Y or N | Y when Stabilizers down and set |
| | 2A18 | Engine RPM | NOT USED |
| 2B FUNCTIONS | 2B1 | DRIVE | Actual state, direction and % |
| | 2B2 | STEER | Actual state, direction and % |
| | 2B3 | UL (upper Lift) | Actual state, direction and % main lift |
| | 2B4 | PLT ud (platform level) | Actual state, direction and % |
| | 2B5 | PLT lr | Actual state, direction and % platform rotate |
| | 2B6 | PLT fr | Actual state, direction and % platform slide |
| | 2B7 | TELE | Actual state, direction and % telescope |
| | 2B8 | FRAME | Actual state, direction and % frame level |
| | 2B9 | O/R (Stabilizers) | Actual state, direction and % stabilizers |
| Sub Menu Press ENTER | 2B9a | O/R O/R left | Actual state, direction and % left stabilizer |
| | 2B9b | O/R O/R right | Actual state, direction and % right stabilizer |
| | 2B9c | O/R T left | Time before stable |
| | 2B9d | O/R T right | Time before stable |
| | 2B9e | Auto Retract | Time that stabilizers auto-retract during initial drive. |
| | 2B10 | AUTO PLT ud | NOT USED |
| | 2B11 | AUTO FRAME | Actual state, direction and % frame level when Auto-leveling |
| | 2B12 | INTERLOCK | Information on interlocks (shut downs) |

Table 4-3: EZ-Cal Diagnostics Menu

| SELECTION | ID # | EZ-cal Readout | Explanation |
|-------------------------|------|---|--|
| 2C DIGITALS | 2C1 | GP400 DIGITAL INPUTS | Enter to view switch Inputs from lower controls |
| | | Individual input not displayed separately | Display change from OFF to On when operations are selected |
| | | | |
| | 2C2 | GP440 DIGITAL INPUTS | Enter to view switch Inputs from upper controls |
| | | Individual input not displayed separately | Display change from OFF to On when operations are selected |
| | | | |
| | 2C3 | MATRIX DIGITAL INPUTS (optional Overload Sensing System only) | Enter to view switch Inputs from lower controls |
| | | Individual input not displayed separately | Display change from OFF to On when operations are selected |
| | | | |
| 2D ANALOGS | 2D1 | GP400 ANALOG INPUTS | Enter to view inputs from chassis sensors and switches |
| | 2D1a | P8-2 Boom Angle Transducer | Actual position of boom elevation in % |
| Sub Menu Press ENTER | 2D1b | P8-3 Stabilizer Auto-Extend Switch | Battery voltage when switch selected |
| | 2D1c | P8-4 Stabilizer Auto-Retract Switch | Battery voltage when switch selected |
| | 2D1d | P8-5 Left Stabilizer Down Press Sensor | Actual pressure indicated between 1.5 and 4.5 volts |
| | 2D1e | P8-7 Low Fuel Level Sensor | On - off output from fuel tank sensor |
| | 2D1f | P8-8 Right Stabilizer Down Press Sensor | Actual pressure indicated between 1.5 and 4.5 volts |
| | 2D1g | P8-9 Valve Current Measurement | NOT USED |

Table 4-3: EZ-Cal Diagnostics Menu

| SELECTION | ID # | EZ-cal Readout | Explanation |
|-------------------------|------|---|--|
| | 2D2 | GP440 ANALOG INPUTS | Enter to view analog inputs from upper controls |
| Sub Menu Press ENTER | 2D2a | P6-1 Boom Up/ Down variable input | Actual position of Boom joystick between 1 and 5 volts |
| | 2D2b | P6-2 Tele in/out variable input | Actual position of Telescope joystick between 1 and 5 volts |
| | 2D2c | P6-3 Boom/Tele enable input | On - off output from Boom/Telescope joystick button |
| | 2D2d | P7-1 Platform Slide in/out variable input | Actual position of Plat Slide joystick between 1 and 5 volts |
| | 2D2e | P7-2 Platform Rotate variable input | Actual position of Rotate joystick between 1 and 5 volts |
| | 2D2f | P7-3 Platform Slide/Rot enable input | On - off output from Slide/Rotate joystick button |
| | 2D2g | P8-1 Rotation Sensor A input | States position of platform rotation in voltage ~2.5v = centered |
| | 2D2h | P8-2 Rotation Sensor B Input | States position of platform rotation in voltage ~2.5v = centered |
| | 2D2i | P10-1 Drive fwd/ Rev variable input | Actual position of Drive joystick between 1 and 5 volts |
| | 2D3 | MATRIX ANALOG INPUTS (optional Overload Sensing System only) | Enter to view inputs from chassis sensors and switches |
| | M2-6 | Valve Current Measurement | Currently not available |
| 2E OUTPUTS | 2E1 | GP400 OUTPUTS | Enter to view outputs from Lower control module |
| | | Individual input not displayed separately | Display changes from OFF to On when power signal is sent |
| | | | |
| | 2E2 | GP440 OUTPUTS | Enter to view outputs from Upper control module |
| | | Individual input not displayed separately | Display changes from OFF to On when power signal is sent |
| | | | |
| | 2E3 | MATRIX OUTPUTS (optional Overload Sensing System only) | Enter to view outputs from Lower control module |
| | | Individual input not displayed separately | Display changes from OFF to On when power signal is sent |
| 2F LOG | 2F1 | Cal Date | Date entered after last calibration completed |
| | 2F2 | Software | Software revision number |
| | 2F3 | Max Battery | Maximum battery voltage recorded. |

EZ-CAL MESSAGES

"Help Messages" will appear on the EZ-Cal scan tool as a means of explaining operating and non-operating function(s) and system errors or interruptions that are accompanied by flash codes. It can also be used for verifying system operation. On Titan models, the EZ-Cal is conveniently located inside the lower control box. Refer to the EZ-Cal Instruction page for additional help with EZ-Cal operation.

To access messages, power the system up, (it is not necessary to have the engine running) the EZ-Cal display will illuminate and read "HELP - PRESS ENTER". Press ENTER to view current message. Press ENTER a second time then use right and left arrow buttons to access up to 30 logged messages from the memory. Many messages simply detail operations being performed by the GP400; other messages detail occurrences that also take place during operation either normal or may be symptomatic of a malfunction.

OPERATIONAL MESSAGES

The following messages appear as result of normal operation and usually do not represent a problem.

EVERYTHING OK _____ **Flash Code: None**

- All circuits performing properly, no current operation performed.

GROUND MODE ACTIVE _____ **Flash Code: None**

- Base/Platform selector switch set to base control station.

STARTUP _____ **Flash Code: None**

- GP400 performing start up procedure, normally a short sequence.

MOVING FRAME _____ **Flash Code: None**

- Chassis level in progress.

MOVING PLATFORM _____ **Flash Code: None**

- Platform level in progress

TELESCOPING _____ **Flash Code: None**

- Boom extend/retract (telescope) in progress

LIFTING _____ **Flash Code: None**

- Boom lift up in progress

LOWERING _____ **Flash Code: None**

- Boom Lower down in progress

DRIVING _____ **Flash Code: None**

- Drive forward or reverse in progress

VEHICLE TILTED _____ **Flash Code: None**

- Chassis is tilted beyond pre-set maximum. Use auto-level feature to level chassis or re-position the machine.

CAN BUS RELATED MESSAGES

CAN bus communication system is the network by which the control modules and CAN Tilt modules communicate with the GP400.

NO DATA FROM CAN TILT #1 _____ **Flash Code: None**

- CAN Tilt module mounted to front of main boom (located behind panel, Left Module) has malfunctioned or wiring is damaged.

NO DATA FROM CAN TILT #2 _____ **Flash Code: None**

- CAN Tilt module mounted to Front axle has malfunctioned or wiring is damaged.

NO DATA FROM CAN TILT #3 _____ **Flash Code: None**

- CAN Tilt module mounted to front of main boom (located behind panel, Right Module) has malfunctioned or wiring is damaged.

NO DATA FROM CAN TILT #4 _____ **Flash Code: None**

- CAN Tilt module mounted to Rear axle has malfunctioned or wiring is damaged.

FAULT: CAN BUS! _____ **Flash Code: 6/6**

- The CAN bus cable may be damaged or disconnected from one or more of the modules. All modules must be connected to the CAN bus for machine operation.

CALIBRATION RELATED MESSAGES

The following messages appear when the GP400 microprocessor has not been calibrated or was improperly calibrated.

FACTORY OVERRIDE _____ **FAST FLASH**

- GP400 is shipped in this condition to allow temporary operation of the machine without interruption from the safety system so that calibration procedures can be performed. The GP400 must be prepared for the machine to which it will be installed, including calibration and Customer/model selection. See "GP400 Setup" for instructions. Once Calibrated, Factory Override is gone forever.



ALL SAFETY SETTINGS ARE INACTIVE WHEN THE GP400 IS IN FACTORY OVERRIDE, NEVER OPERATE MACHINE IN FACTORY OVERRIDE EXCEPT TO CALIBRATE THE GP400.

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

- The GP 400 microprocessor has not been calibrated. Operation will be restricted until calibration is completed. Refer to "Set up procedures" in this section for calibration information and instructions.

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

- The Height portion of the calibration has not been completed. Operation will be restricted until calibration is completed. Refer to "Set up procedures" in this section for calibration information and instructions.

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

- The GP 400 microprocessor has not been calibrated. Operation will be restricted until calibration is completed. Refer to "Set up procedures" in this section for calibration instructions.

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

- Customer vs. Model settings not correct. Using the EZ-Cal, go to SETUPS/CHANGE DEFAULTS/CUSTOMER to correct. Changing customer or model will require access level 1 code. NOTE: all adjustments and settings return to default value when Customer or Model is changed, ensure proper settings and adjustments after changing Customer or Model.

INTERLOCK MESSAGES

The following messages appear as result of perceived improper operation, machine positioning, or other incorrect operation. Interlock messages may be the result of a part failure if the part in question provides incorrect information to the GP400.

FUNCTIONS LOCKED - LIMIT REACHED _____ **Flash Code: 2/2**

- Rotating platform not centered; Certain operations require centered platform

Rotating platform at extreme CW or CCW; no further rotation possible in that direction

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

- Calibration in progress or internal test mode active. Cycle EMS to clear.

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

- Stabilizers must be set before operation is allowed.

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

- Platform overloaded - reduce weight in platform until alarms stop (Overload option only)

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

- Overload system detects less than normal lift cylinder pressure. Platform resting atop a fixed object, possible pressure switch failure or not calibrated correctly.

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

- Platform sensors indicate platform out of level; level platform or chassis until alarm stops or re-position machine

FUNCTIONS LOCKED - AUTO PLATFORM LEVEL _____ **Flash Code: 2/2**

- Auto Platform Level operation running, wait until completed to operate other functions.

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

- Elevation sensor indicating elevation beyond 98%. Height Calibration performed incorrectly; Angle Transducer loose or remounted incorrectly or extend proximity switch/s failure. Use EZ-Cal in conjunction with EZ-Cal Flow Charts to identify GP400 or GP440 for sensor's inputs to check sensor readings.

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

- Boom not retracted or axle/s off level. Boom must be retracted to allow frame level, drive or outrigger operation. Axles must be centered before drive is allowed when the platform is elevated. Also, drive will be interrupted if Stabilizer pressure sensor output is below 0.2 volts (possible sensor failure or sensor wiring issue).

CHECK DRIVE/STEER SWITCHES _____ **Flash Code: 2/2**

- Drive joystick output without enable or during power up. Check drive joystick analog output and steer switch digital output using the EZ-Cal.

CHECK LIFT SWITCHES _____ **Flash Code: 2/2**

- Lift joystick or toggle switch movement without enable or during power up. Check joystick analog output using the EZ-Cal.

CHECK PLATFORM SWITCHES _____ **Flash Code 2/2**

- Platform Rotate/slide joystick or toggle switch movement without enable or during power up. Check joystick analog output and switch digital outputs using the EZ-Cal.

CHECK TELE SWITCHES *Flash Code 2/2*

- Telescope joystick or toggle switch movement without enable or during power up. Check joystick analog output and switch digital output using the EZ-Cal.

RELEASE ENABLE SWITCH *Flash Code 2/2*

- One or more enable switches activated for extended period of time without corresponding function or during start up. Check enable switches digital outputs using the EZ-Cal.

OTHER MESSAGES

The following messages are the result of various possible failures or occurrences which may result in machine interruption.

FUNCTIONS LOCKED - NO VALVE SUPPLY! *Flash Code 2/3*

- GP400 detects no power on P7-1 of the GP400. Check wiring to plug connection; possible GP400 internal failure.

FAULT: ENERGIZED VALVE *Flash Code: 3/2*

- Power on valve output wire at GP400 plugs P4, P5 or P6. Unplug these connectors and cycle e-stop switch to clear code. Plug in one-at-a-time until code reappears then isolate the circuit (with voltage) within that plug. If code does not clear, possible GP400 failure. EZ-Cal not useful for this procedure.

FAULT: VALVE FEEDBACK HIGH! *Flash Code: 3/2*

- On start-up GP400 p-5 pin voltage incorrect, check P5-X wiring for voltage feed back. Possible GP400 internal fault

FAULT: BAD INTERNAL SAFETY SWITCH! *Flash Code: 3/4*

- At startup, internal feedback of output incorrect, possibly failed output driver; check wiring to P6-12/13/14/15; possible GP400 internal failure

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

- Oil pressure switch opened during operation or time out. Check oil pressure, pressure switch, wiring. Message will appear if engine stops running for reasons other than normal shut down.

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

- Malfunction within the GP400 possibly caused by a short circuit in the wiring or high voltage surge. replace GP400

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

- 5 volt circuit that provides voltage to sensors had failed. Possible short in the wiring or high voltage surge on supply.

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

- Charge battery and battery connections, check charging system and voltage source connections.

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

- GP400 input voltage should be 12 volts. Check battery and battery connections, alternator output.

FAULT: CHECK HEIGHT 2 SENSOR! *Flash Code 6/1*

- Height 2 sensor output over 4.5 volts or under .5 volts. Check height 2 sensor output using the EZ-Cal (height 2 sensor on CE option only). Possible sensor failure or wire connection failure.

FAULT: CHECK HEIGHT 1 SENSOR! _____ Flash Code 6/1

- Height 1 sensor output over 4.5 volts or under .5 volts. Check height 1 sensor output using the EZ-Cal. Possible sensor failure or wire connection failure.

FAULT: CHECK HEIGHT SENSORS! _____ Flash Code 6/1

- Voltage from Height sensors out of range, should be .5 volts to 4.5 volts

FAULT: CHECK PRESSURE SENSOR! _____ Flash Code 6/2

- Voltage from Pressure sensor out of range, should be .5 to 4.5 volts (Overload option only).

FAULT: CHECK ELEVATION SWITCH! _____ Flash Code 6/3

- This message should not occur on Titan models; check for incorrect GP 400 part.

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

A failure happened that has no message associated with it. This should never occur.

TROUBLESHOOTING CHART

The following chart describes the possible causes for inoperation of the different functions of the Titan 40-S. The *Causes* and *Solutions* columns list various points of references that can be found in the Hydraulic, Electrical, Schematics and Troubleshooting sections of this manual.

The majority of electrical troubleshooting on this model will require the use of the on-board EZ-Cal scan tool, located inside the lower control box door. Please refer to "EZ-Cal Scan Tools" on page 4-9 for further instructions on the use of the EZ-Cal scan tool.

Perform a full assessment of machine operations prior to troubleshooting this model and using this chart. This model is operated by a Microprocessor Control System equipped with a variety of built-in safety interlocks to prevent continued operation in the event of a failure or misoperation. Some interlocks may only be detected through the use of the EZ-Cal.

Table 4-4: 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 in; Ignition switch turned off; Faulty switches | Upper or lower e-stop switch or ignition switch will cut all power as will the ignition switch in the platform 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. Look for short circuit and/or damage in wiring or high amperage draw at valve coils or engine actuators. |
| | Damaged upper control box harness-- Should be able to operate from Lower Controls Box | 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 |
| Operates from lower controls but not from upper controls | Base/Platform select switch not set to Platform position or switch malfunction | Ensure that the switch is in the Platform position; Check switch function. |
| | Interlock switch (joystick) | Check power to red wire (power to switch) and power to purple wire (power out of switch) at joystick plug |
| | Damaged upper control box harness | Inspect the harnesses and harness plugs for damage or broken wires. |
| | Malfunctioning Matrix Module-- machines with optional Overload Sensing System only | Check help messages using the EZ-Cal tool. Also check for joystick inputs (see 2b1 - 2b7 in diagnostic chart) |
| | System interlock | Check EZ-Cal HELP messages for interlock |

Table 4-4: Troubleshooting Chart

| PROBLEM | POSSIBLE CAUSE | REMEDY/SOLUTION |
|---|---|--|
| ENGINE RELATED ISSUES | | |
| Starter will not crank from upper or lower stations | Battery discharged or faulty cables | Will receive 4-4 or 7-7 flash on GP400. Clean, service and charge battery; repair cables. |
| | Malfunctioning start relay or fuse | Test/replace relay located on left hand side of engine and fuse located near starter. |
| | Malfunctioning starter | Test/replace starter. |
| | Faulty start switch either location | Test; replace as necessary. |
| | Oil pressure switch failure | Check that oil pressure switch is not shorted, closed. |
| | Starter interrupt system initiated | Check for red "Start Disable" light on lower panel Starter may be operated for 10 seconds before a 30 second "cool down" is initiated. See "Starter cranks but engine will not start" below. |
| | Poor ground on GP400 | Check wiring and connections; replace |
| Starter cranks but engine will not start | Low fuel | Check/fill fuel reservoir. |
| | Air trapped in the fuel system | Purge air from the fuel system (see section 3 of this manual for instructions). |
| | Restriction in the fuel system | Replace Fuel Filter; Check fuel supply hoses . |
| | Malfunctioning fuel solenoid | Check/replace fuel solenoid located on the front of the engine, accessed from right hand side. |
| | Malfunctioning Glow plugs (cold climates) | Test/replace glow plug relay, fuse and glow plugs. |
| | Obstructed air filter | Clean/replace air filter. |
| | Contaminated fuel | Test/replace fuel. |
| | Other engine issues | See engine manufacturers troubleshooting guide. |
| No high throttle | Malfunctioning Throttle Relay, Solenoid or blown fuse | Test/replace throttle relay and/or throttle solenoid and fuse. |
| | Restriction in the fuel system | Replace Fuel Filter; Check fuel supply hoses . |
| | Obstructed air filter | Clean/replace air filter. |
| | Other engine issues | See engine manufacturers troubleshooting guide. |

Table 4-4: Troubleshooting Chart

| PROBLEM | POSSIBLE CAUSE | REMEDY/SOLUTION |
|--|---|--|
| BOOM LIFT/LOWER | | |
| Platform will not raise | Excessive weight on platform | Reduce weight to specified platform capacity |
| | Boom extended excessively with stabilizers not deployed | Retract boom until boom up/down operates. |
| | Main Relief Valve out of adjustment | Adjust Main Relief Valve to rated platform capacity located on function manifold - see hydraulic section. |
| | Lift Valve SVD1 not energized | Check wiring to lift valve, Check for EZ-Cal message or flash code. |
| | Lift Valve SVD1 not shifting | Clean debris, Check for damage, replace. |
| | Proportional valve SP1 not energizing | Check wiring to lift valve, Check for EZ-Cal message or flash code. |
| | Proportional valve SP1 not shifting | Clean debris; Check for damage; Replace. |
| | Solenoid Valve SV1 (load sense dump) not energized | Check wiring to valve; Check EZ-Cal ref. P4-14 for output. |
| | Solenoid Valve SV1 (load sense dump) not shifting | Clean debris; Check for damage; Replace. |
| | Level sensor out of level (platform elevated above 10 ft. (3m)) | Reposition or level platform using platform level toggle. Check level sensor signal using EZ-Cal ID#s 2a6 and 2a4. |
| | Main system pressure is inadequate | Check pump output flow and pressure. |
| | Lift/Lower joystick inoperative | Check joystick output using EZ-Cal ref. 2d-2, P6-1 for analog output signal. |
| | Battery discharged/No charge output | Check battery voltage, alternator output (14.5 volts). Check GP400 for 4-4 flash code. |
| | System interlock | Check EZ-Cal HELP messages for interlock. |
| Platform will not lower or lowers slowly | Maintenance lock in maintenance position | Return maintenance lock to the stowed position. |
| | Boom extended excessively with stabilizers not deployed | Retract boom until boom up/down operates . |
| | Lowering valve SVD1 not energized | Check wiring to lowering valve located inside control module - see Section 1 of this manual for exact location. |
| | Lowering valve SVD1 not shifting | Clean debris; Check for damage; Replace. |
| | System interlock | Check EZ-Cal HELP messages for interlock. |
| Emergency Lowering not working | Emergency Battery discharged/not charging | Check/charge battery; Check charge Isolator relay and fuse; Check alternator output (14.5 volts). |
| | Auxiliary power unit malfunction | Check Auxiliary power unit, located below lower control box. |
| | Emergency Down switch failure | Check/replace switch. |
| | Lowering valve not shifting | Clean debris; Check for damage; Replace. |
| | Battery discharged/No charge output | Check battery voltage, alternator output (14.5 volts); Clean, service and charge battery. |

Table 4-4: Troubleshooting Chart

| PROBLEM | POSSIBLE CAUSE | REMEDY/SOLUTION |
|------------------------------|---|--|
| BOOM EXTEND/ RETRACT | | |
| No Boom Extension | Excessive weight on Platform | Reduce weight to specified platform capacity. |
| | Boom extended too far without stabilizer deployment (Boom extension beyond approximately 8 ft. * (3m) * requires deployment) *7 ft (2.1 m) on machines equipped with optional Overload Sensing System. | Return boom to fully stowed position and deploy stabilizers before attempting to extend boom further. |
| | Level sensor out of level (platform elevated above 10 ft. (2.45 m)) | Reposition or level platform using platform level toggle. Check level sensor signal using EZ-Cal ID#s 2a7 and 2a4. |
| | Extend Relief Valve RV2 out of adjustment | Adjust Extend relief valve (see Section 1 - Hydraulics) located on function manifold. |
| | Proportional Valve SP2 not energized | Check wiring to lift valve, Check for EZ-Cal message or flash code. |
| | Solenoid Valve SV1 (load sense dump) not energized | Check wiring to valve, Check EZ-Cal ref.P4-14 for output. |
| | Proportional Valve SP2 not shifting | Clean debris; Check for damage; Replace. |
| | Ext/Retract joystick inoperative | Check Joystick output using EZ-Cal ref. 2d-2, P6-2 for upper control analog output signal. |
| | Battery discharged/No charge output | Check battery voltage, alternator output (14.5 volts) Check GP400 for 4-4 flash code. |
| | System interlock | Check EZ-Cal HELP messages for interlock. |
| Boom extends/retracts slowly | Excessive weight on Platform | Reduce weight to specified platform capacity. |
| | Extend Relief Valve RV2 out of adjustment | Adjust Extend Relief Valve (see hydraulics section) located on function manifold. |
| | Proportional Valve SP2 not shifting completely | Clean debris; Check for damage; Replace. |
| | Flow Control Valve EP2 not shifting completely | Clean debris; Check for damage; Replace. |
| | Joystick output restricted | Check Joystick output using EZ-Cal ref. 2d-2, P6-2 for upper control analog output signal. |
| No Boom Retract | Proportional Valve SP2 not energized | Check wiring to lift valve; Check for EZ-Cal message or flash code. |
| | Proportional valve SP2 not shifting | Clean debris; Check for damage; Replace. |
| | Solenoid Valve SV1 (load sense dump) not energized | Check wiring to valve; Check EZ-Cal ref. P4-14 for output. |
| | Solenoid Valve SV1 (load sense dump) not shifting | Clean debris; Check for damage; Replace. |
| | Ext/Retract joystick inoperative | Check Joystick output using EZ-Cal ref. 2d-2, P6-2 for upper control analog output signal. |
| | Battery discharged/No charge output | Check battery voltage, alternator output (14.5 volts) Check GP400 for 4-4 flash code. |
| | System interlock | Check EZ-Cal HELP messages for interlock. |

Table 4-4: Troubleshooting Chart

| PROBLEM | POSSIBLE CAUSE | REMEDY/SOLUTION |
|--|--|--|
| PLATFORM AUTO-LEVEL | | |
| Platform will not remain level while elevating or lowering platform (level cylinder not moving at all) | Platform Level solenoid valve not energized | Check wiring to valve, Check EZ-Cal ref. 2e1, P4-4 (up) and P4-5 (down) for output. |
| | Platform Level solenoid valve not shifting | Clean debris; Check for damage; Replace. |
| | Platform Level proportional valve SV10 not energized | Check wiring to valve from Valve Constant Current Module (VCCM). |
| | Platform Level proportional valve SV10 not shifting | Clean debris; Check for damage; Replace. |
| | Counterbalance valve CBV15 or CBV16 faulty | CBV15 (extend) CBV16 (retract) must not be adjusted, replace if suspected. |
| | Flow Compensator valve EP4 not shifting | Clean debris; Check for damage; Replace. Use GLS port on secondary manifold to test valve signal pressure. |
| | Flow Regulator valve EPFR2 not shifting | Clean debris; Check for damage; Replace. Use GLS port on secondary manifold to test valve signal pressure. |
| | Obstruction in Platform Level Valve | Clean debris; Check for damage; Replace. |
| | Platform Level Valve not energized | Check wiring to valve. |
| | Platform in excess of 7° out of level | Use the Manual Platform Level function to return the platform to level. |
| Platform will not remain level while elevating or lowering platform (level cylinder moving slowly) | Excessive weight on platform | Reduce weight to specified platform capacity. |
| | Low Flow Relief Valve RV3 out of adjustment | Adjust low flow relief valve (see Section of this manual) located on function manifold. |
| | Platform Level solenoid valve SP5 not shifting completely | Clean debris; Check for damage; Replace. |
| | Platform Level proportional valve SV10 not shifting completely | Clean debris; Check for damage; Replace. |
| | Flow Compensator valve EP4 not shifting completely | Clean debris; Check for damage; Replace. Use GLS port on secondary manifold to test valve signal pressure. |
| | Flow regulator valve EPFR2 not shifting completely | Clean debris; Check for damage; Replace. Use GLS port on secondary manifold to test valve signal pressure. |
| | Pump P2 faulty | Test; replace pump. |
| | Obstruction in Platform Level Valve | Clean debris; Check for damage; Replace. |
| | Platform Level Valve not energized | Check wiring to valve. |
| | Platform in excess of 7° out of level | Use the Manual Platform Level function to return the platform to level. |
| PLATFORM MANUAL LEVEL | | |
| Platform level operates automatically but not manually | Platform Level toggle switch inoperative | Check output from toggle using EZ-Cal --Lower Controls -- see I.D. #2c-1, P15-3 (up) or 2c-1, P15-6 (down) --Upper Controls -- see I.D. #2c-2, P14-11 (up) or 2c2, P14-12 (down) |
| | System Interlock | Check EZ-Cal HELP message for interlock . |
| PLATFORM ROTATE | | |

Table 4-4: Troubleshooting Chart

| PROBLEM | POSSIBLE CAUSE | REMEDY/SOLUTION |
|--|--|--|
| Platform will not rotate either direction | Rotate Valve SP6 not energizing | Check wiring to valve from Valve Constant Current Module (VCCM). |
| | Rotate Valve SP6 not shifting | Clean debris; Check for damage; Replace. |
| | Mechanical interference in rotator | Inspect, clean or repair. |
| | Flow Compensator valve EP4 not shifting | Clean debris; Check for damage; Replace. Use GLS port on secondary manifold to test valve signal pressure. |
| | Flow Regulator valve EPFR2 not shifting | Clean debris; Check for damage; Replace. Use GLS port on secondary manifold to test valve signal pressure. |
| | System interlock | Check EZ-Cal HELP messages for interlock. |
| Platform will rotate in one direction only | Rotate Valve SP6 not energizing | Check wiring to valve from Valve Constant Current Module (VCCM). |
| | Rotate Valve SP6 not shifting | Clean debris; Check for damage; Replace. |
| | Mechanical interference in rotator | Inspect, clean or repair. |
| | System interlock | Check EZ-Cal HELP messages for interlock. |
| PLATFORM SLIDE | | |
| Platform will not slide either direction | Excessive weight in platform or weight not distributed correctly | Reduce weight or redistribute weight in platform, not to exceed 3000 lbs in the load zone and 1000 lbs distributed evenly outside the load zone. |
| | Slide Valve SP7 not energizing | Check wiring to valve from Valve Constant Current Module (VCCM) |
| | Slide Valve SP7 not shifting | Clean debris; Check for damage; Replace. |
| | Mechanical interference on slide path | Inspect, clean or repair. |
| | Slide Brake BR5 not releasing | Check for hydraulic pressure to brake; Check brake unit for mechanical issue |
| | Flow Compensator valve EP4 not shifting | Clean debris; Check for damage; Replace. Use GLS port on secondary manifold to test valve signal pressure. |
| | Flow regulator valve EPFR2 not shifting | Clean debris; Check for damage; Replace. Use GLS port on secondary manifold to test valve signal pressure. |
| | System interlock | Check EZ-Cal HELP messages for interlock |
| | Shims too tight | Check shim clearance of Platform Carriage; should be .030" (.762 mm) total clearance top-to-bottom and side-to-side |
| Platform will slide in one direction only | Excessive weight in platform or weight not distributed correctly | reduce weight or redistribute weight in platform not to exceed 3000 lbs in the load zone and 1000 lbs distributed evenly |
| | Slide Valve SP7 not energizing | Check wiring to valve from Valve Constant Current Module (VCCM) |
| | Slide valve SP7 not shifting | Clean debris; Check for damage; Replace. |
| | Mechanical interference in slide path | Inspect, clean or repair |
| | System interlock | Check EZ-Cal HELP messages for interlock |
| | Shims too tight | Check shim clearance of Platform Carriage; should be .030" (.762 mm) total clearance top-to-bottom and side-to-side |

Table 4-4: Troubleshooting Chart

| PROBLEM | POSSIBLE CAUSE | REMEDY/SOLUTION |
|---|---|---|
| DRIVE | | |
| No drive operation | Stabilizers not raised off of ground | Return Boom to stowed position and raise stabilizers |
| Titan is drivable at full boom elevation and extended up to 8 ft. (2.45 m)*. Drive is disabled when the stabilizers are deployed. | Stabilizer pressure sensor/s inoperative | Check Stabilizer pressure sensors using EZ-Cal (see EZ-Cal I.D.# 2d1, P8-5 and 2d1, P8-8. Should should read 0.0 volts each. |
| | Planetary hub bypass engaged | Check bypass plates located in the center of each planetary hub, should be convex - turn over. |
| | Drive Valve (on drive pump) not shifting | Check drive output from GP400 (see EZ-Cal chart ID#s 2e1, P5-7 and P5-8). Check connections at valve located on top of drive pump. Check drive valve for contamination. |
| | Brakes not releasing | Check brake valve and brake pressure (see hydraulic diagram for location). |
| | Drive joystick output failure | Check drive joystick output from GP400 (see 2d2, P10-1) check joystick enable trigger operation, Check wire connections. |
| | System interlock | Check EZ-Cal HELP messages for interlock. |
| | Low pump stand-by pressure | Check at main manifold port GCP, (See Hydraulics section of this manual). Should be 300 PSI (21 bar) - Adjust stand-by pressure. |
| | Incorrectly adjusted or worn hydraulic drive pump | See Hydraulics section of this manual for pump adjustment, inspect or replace pump. |
| *7 ft. (2.13 m) on machines equipped with optional Overload Sensing System. | | |
| | | |
| | | |
| | | |
| No drive with platform elevated NOTE: Maximum elevated drive is 35 feet (10.7 m)*. | Unit out of level | Lower boom and operate on more level surfaces. |
| | Outriggers deployed | Lower platform and retract outriggers. |
| | Low pump stand-by pressure | Check at main manifold port GCP, (See Hydraulics section of this manual). Should be 300 PSI (21 bar) - Adjust stand-by pressure. |
| | System interlock | Check EZ-Cal HELP messages for interlock. |
| *34 ft. (10.4 m) on machines equipped with optional Overload Sensing System. | | |
| | | |
| | | |
| | | |
| Slow drive with Platform in stowed position | Slow speed enabled | Check speed switch in platform box; check 2-speed valve located on the main manifold (see Schematics section of this manual). |
| | Low pump stand-by pressure | Check at main manifold port GCP, (see Hydraulics section of this manual). Should be 300 PSI (21 bar) - Adjust stand-by pressure. |
| | FWD MAX, REV MAX setting incorrect | Reset drive speeds using EZ-Cal. |
| | Wheel motor not functioning correctly | Inspect wheel motors for damage or wear. |
| Poor Gradeability or Drive performance | High Speed enabled | Check Speed Switch. |
| | Wheel motor not functioning correctly | Inspect wheel motors for excessive bypass. |
| | Planetary hub bypass engaged | Check bypass plates located in the center of each planetary hub, should be convex - turn over. |
| | Low pump stand-by pressure | Check at main manifold port GCP, (see Hydraulics section of this manual). Should be 300 PSI (21 bar) - Adjust stand-by pressure. |
| | Incorrectly adjusted or worn hydraulic drive pump | See Hydraulics section of this manual for pump adjustment; inspect or replace pump. |
| Drive in one direction only | Drive valve not energizing in one direction | Check 12 volts to coil, check coil, check valve function (located on top of drive pump). |
| | No output from GP400 | Check switch position output from GP400 (see EZ-Cal ID# 2e1, P5-7 and P5-8). |

Table 4-4: Troubleshooting Chart

| PROBLEM | POSSIBLE CAUSE | REMEDY/SOLUTION |
|---|---|--|
| No High Speed | Speed selector switch inoperative | Check continuity through Speed Select switch with wires disconnected. |
| | 2-speed valve SV9 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# 2e1, P5-9). |
| Variable elevated speed | Variable hydraulic oil temperature | Out of the stowed position, each machine is set to drive 10m (33 ft) in 30 seconds with the hydraulic oil at 50° C (122° F), at a speed of .33 m/s (.74 mph). Through testing, this setting causes the speed to increase to 10m in 25 seconds [.40 m/s (.9 mph)] at an oil temperature of 20° C (68° F), and 10m in 18 seconds [.55 m/s (1.23 mph)] at an oil temperature of 0° C (32° F). Although colder ambient temperatures are likely, once the engine has started and hydraulic oil has been circulating, it very quickly reaches 0° C (32° F) and therefore the elevated driving speed should not exceed .7 m/s (1.57 mph). |
| STEER | | |
| No steer in either direction (2-wheel steer mode) | Stabilizers not raised off of ground | Return Boom to stowed position and raise stabilizers. |
| | Joystick rocker switch inoperative | Check continuity through micro-switch inside joystick handle using wires outside the handle. |
| | Steering valve inoperative | Check steering valve for power. Check for damage and contamination. check output from GP400 (see EZ-Cal ID # 2e1, P5-2 and P5-3). |
| | Hoses connected incorrectly | See Chapter 1 -- Hydraulics for correct connection. |
| | Steer Cross-Port Relief valve/s CR1 and CR2 set too low | Set steer relief valves to 1500 PSI (103 bar) (see hydraulic diagram for relief valves location). |
| | Low-flow system dump valve SV3 inoperative | Test; clean; replace. |
| Steer in one direction only | System interlock | Check EZ-Cal HELP messages for interlock. |
| | Steering Valve inoperative or stuck | Inspect and/or replace Steering Valve. |
| | No power to steering coil | Check for power and ground in both directions; repair wiring; check output from GP400 (see EZ-Cal I.D. #S. 2f-11 right & 2f-12 left). |
| Will steer but not fully, or slow steering | System interlock | Check EZ-Cal HELP messages for interlock. |
| | Failure of one or both steering cylinder internal seals | Check steering cylinder seals, replace. |
| | Steer Cross-Port Relief valve(s) set too low | Set steer relief valves to 1500 PSI (103 bar) (see hydraulic diagram for relief valves location). |
| | King pin(s) seizing in the bore | Disassemble and inspect, replace bushings. |
| | 4-wheel steer valve SVD2 not energizing | Check wiring to valve. Check EZ-Cal ref. 2e1, P4-2 and P4-3 for output. |
| | 4-wheel steer valve SVD2 not shifting | Clean debris; Check for damage; Replace. |
| | Steer Cross-Port Relief valve CR1 defect | Check, adjust, replace. |
| Rear Wheel Steer operates uncommanded | Rear axle steer cylinders damaged or internal seals leaking | Check cylinders, repair, replace. |
| | Steer select toggle switch failure | Check toggle switch. |
| | 4-Wheel Steer Valve SVD2 not shifting | Clean debris. Check for damage, replace. |

Table 4-4: Troubleshooting Chart

| PROBLEM | POSSIBLE CAUSE | REMEDY/SOLUTION |
|--|---|---|
| Stabilizers, Frame Leveling | | |
| No Stabilizer operation Note: Stabilizer operation is disabled when the boom is elevated above 6% and when boom is extended more than 1' (300mm). | System senses boom elevated to an angle above 6% | Return the boom to stowed position and try again. Check elevation status using the EZ-Cal (see I.D. # 2a10). Recalibration of Height may be necessary (see Calibration section for instruction). Also see EZ-Cal I.D. # 2a7 for analog input from height sensor in %. |
| | System senses boom is extended beyond 12" (300mm) | Retract boom completely and try again. Check Boom Retract status using the EZ-Cal (see I.D.# 2A-12). Also see # 2C-1 GP400 digitals--go to P14-4 for Retract Sensor output information. |
| | Unit on too extreme an angle side-to-side (chassis level must complete level cycle before stabilizers deploy) | EZ-Cal Help message will read "LEVELING". Relocate machine to a more level surface. |
| | Stabilizer/Auto-level switch inoperative | Check outrigger switch output (in the LOWER control box) using EZ-Cal; scan GP400 for switch inputs (see EZ-Cal I.D.# 2d1)--go to P8-3 and P8-4. Check outrigger switch in the UPPER control box using EZ-Cal, scan GP440 for switch inputs (see EZ-Cal I.D.# 2C-2 go to P14-9 & P14-10). |
| | Stabilizer Valve SP3 or SP4 not energizing | Check wiring to stabilizer valve. Check for EZ-Cal message or flash code. |
| | Stabilizer Valve SP3 or SP4 not shifting | Clean debris; Check for damage; Replace. |
| | Frame Level Valve not functioning (chassis level must complete level cycle before stabilizers deploy) | Located on function manifold. Inspect valve for power, inspect for damage, check output from GP400 (see EZ-Cal GP400 Outputs P4-7 (left) and P4-8 (right)). |
| Frame level operates but frame is not level when cycle is complete | Unit located on too extreme an angle side-to-side | Relocate unit to more level ground. |
| | Lower control box loose | Tighten four (4) lower control box mounting screws. |
| | Level sensor not properly calibrated (located inside the GP400). | See Calibration section for level sensor Calibration instructions. |

NOTES:



Section 5

SCHEMATICS

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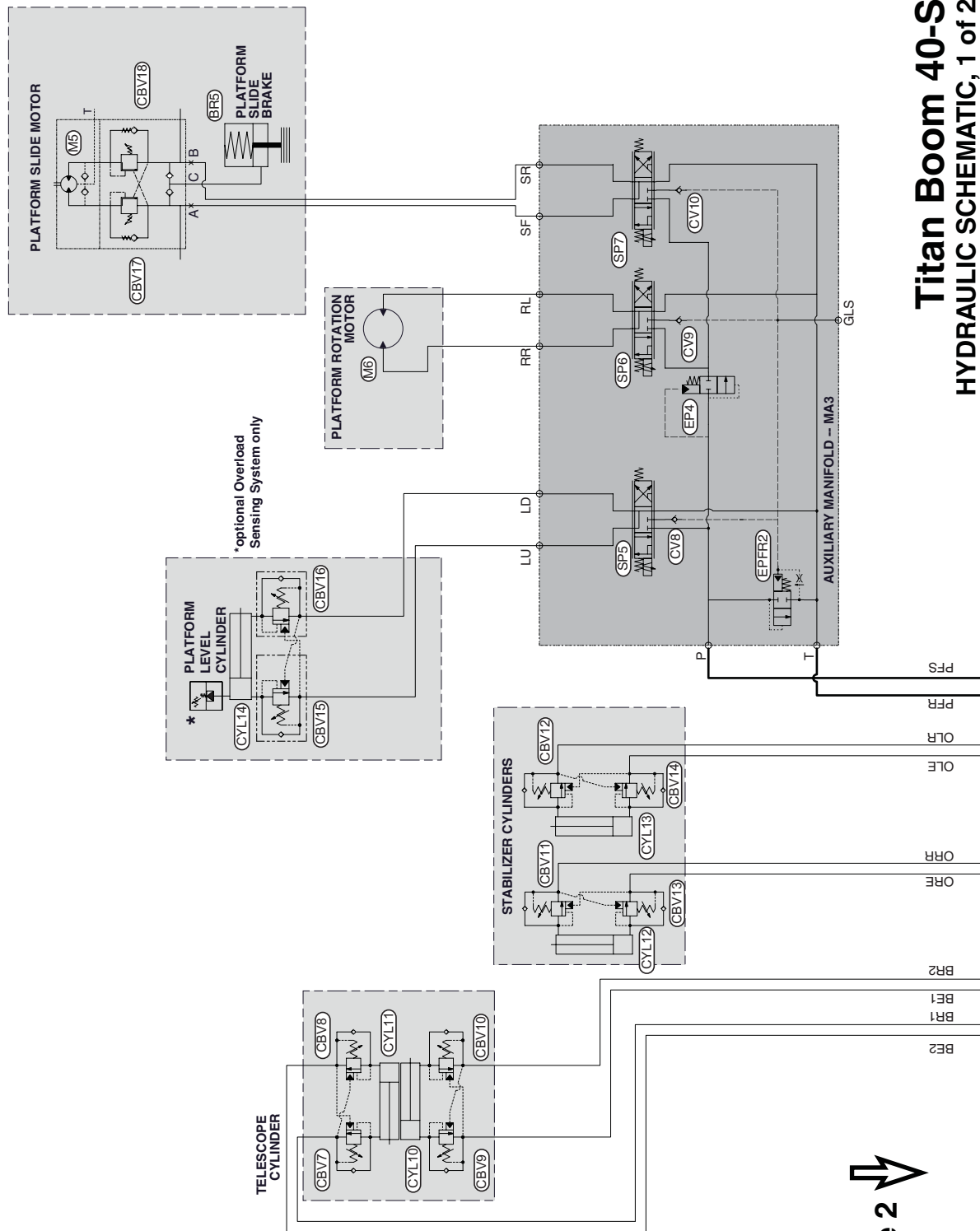
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HYDRAULIC SCHEMATICS

The following table applies to Figure 5-1 through Figure 5-5.

| Callout | Description | Callout | Description |
|-------------|--|-------------|---|
| BR1-BR4 | Wheel Brakes (located in gear hubs) | ORF1 | Orifice -- Brake Apply .040 |
| BR5 | Platform Slide Brake | ORF2 | Orifice -- Traction Manifold .052 |
| CBV1-CBV18 | Counterbalance Valves | ORF3 | Orifice -- Traction Manifold .052 |
| CR1-CR2 | Cross-Port Relief Valve | ORF4 | Orifice -- Traction Manifold .040 |
| CV1 | Check Valve, P1 | ORF5 | Orifice -- Traction Manifold .090 |
| CV2 | Check Valve -- Load Sense | ORF6 | Orifice -- Generator Option .030 |
| CV3 | Check Valve -- Load Sense | PD1 | Pilot-Operated Valve |
| CV4 | Check Valve -- Load Sense | PD2 | Pilot-Operated Valve |
| CV5 | Check Valve -- Load Sense | PFC1 | Priority Flow Control--5 gpm |
| CV6 | Check Valve -- Low to High Flow | PR1 | Pressure Reducing Valve |
| CV7 | Check Valve -- Auxiliary Manifold Supply | RV1 | Relief Valve -- High Flow |
| CV8 | Check Valve -- Platform Level | RV2 | Relief Valve -- Telescope |
| CV9 | Check Valve -- Platform Rotate | RV3 | Relief Valve -- Low Flow |
| CV10 | Check Valve -- Platform Slide | RV4 | Relief Valve -- Traction Manifold 300 psi |
| CYL1 | Boom Lift Cylinder | SP1 | Proportional Valve -- Boom |
| CYL2-CYL5 | Steer Cylinders | SP2 | Proportional Valve -- Telescope |
| CYL6-CYL9 | Axle Cylinders | SP3 | Proportional Valve -- Stabilizer |
| CYL10-CYL11 | Boom Extend Cylinders | SP4 | Proportional Valve -- Stabilizer |
| CYL12-CYL13 | Stabilizer Cylinders | SP5 | Proportional Valve -- Platform Level |
| CYL 14 | Platform Level Cylinder | SP6 | Proportional Valve -- Platform Rotate |
| EP1 | Flow Compensator -- Boom | SP7 | Proportional Valve -- Platform Slide |
| EP2 | Flow Compensator -- Telescope | SVD1 | Directional Valve -- Boom |
| EP3 | Flow Control -- Auxiliary Pump | SVD2 | Directional Valve -- Steer Select |
| EP4 | Flow Control -- Auxiliary Manifold | SV1 | Solenoid Valve -- L/S Dump Hi-Flow |
| EPFR1 | Flow Regulator | SV2 | Solenoid Valve -- Re-Gen, Tele Extend |
| EPFR2 | Flow Regulator | SV3 | Solenoid Valve -- Re-Gen, Tele Retract |
| F1 | Return Filter | SV4 | Solenoid Valve -- Axle Float |
| F2, F3 | Pressure Filter (OPTION) | SV5 | Solenoid Valve -- Steer Direction |
| FD1 | Flow Divider -- Telescope | SV6 | Solenoid Valve -- Frame Level |
| FD2 | Flow Divider -- Traction Manifold | SV7 | Solenoid Valve -- Low Flow Dump |
| FD3 | Flow Divider -- Traction Manifold | SV8 | Solenoid Valve -- Brake |
| FD4 | Flow Divider -- Traction Manifold | SV9 | Solenoid Valve -- 2-Speed Drive |
| FR1 | Flow Regulator -- Steer | | |
| FR2 | Flow Regulator -- Auxiliary Manifold | | |
| HS1 | Oil Shuttle Valve | | |
| LS2 | Load Sense Shuttle | | |
| LS3 | Load Sense Shuttle | | |
| M1-M4 | Motor -- Wheels | Gauge Ports | |
| M5 | Motor -- Platform Slide | GP1 | Gauge Port -- High Flow |
| M6 | Motor -- Platform Rotate | GP2 | Gauge Port -- Low Flow |
| MA1 | Functions Manifold | GCP | Gauge Port -- Charge Pressure |
| MA2 | Traction Manifold | GD | Gauge Port -- Drive Pressure |
| MA3 | Auxiliary Manifold | | |



Titan Boom 40-S

HYDRAULIC SCHEMATIC, 1 of 2

To Page 2

ILLUSTRATION No.
ART_3696

*Lift cylinder and platform level cylinder pressure transducers only on machines equipped with the optional Overload Sensing System.

Figure 5-2: Hydraulic Schematic, 2 of 2

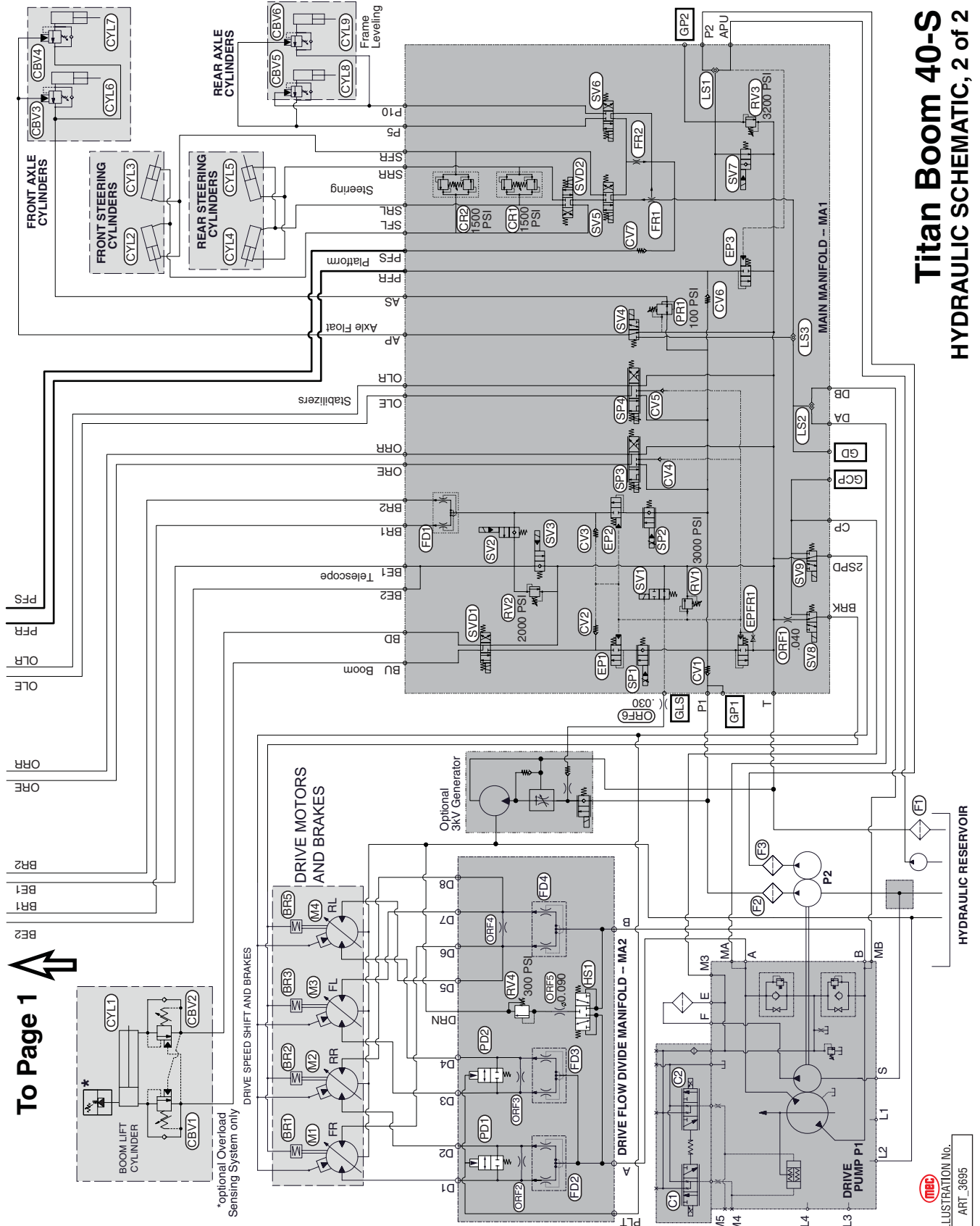
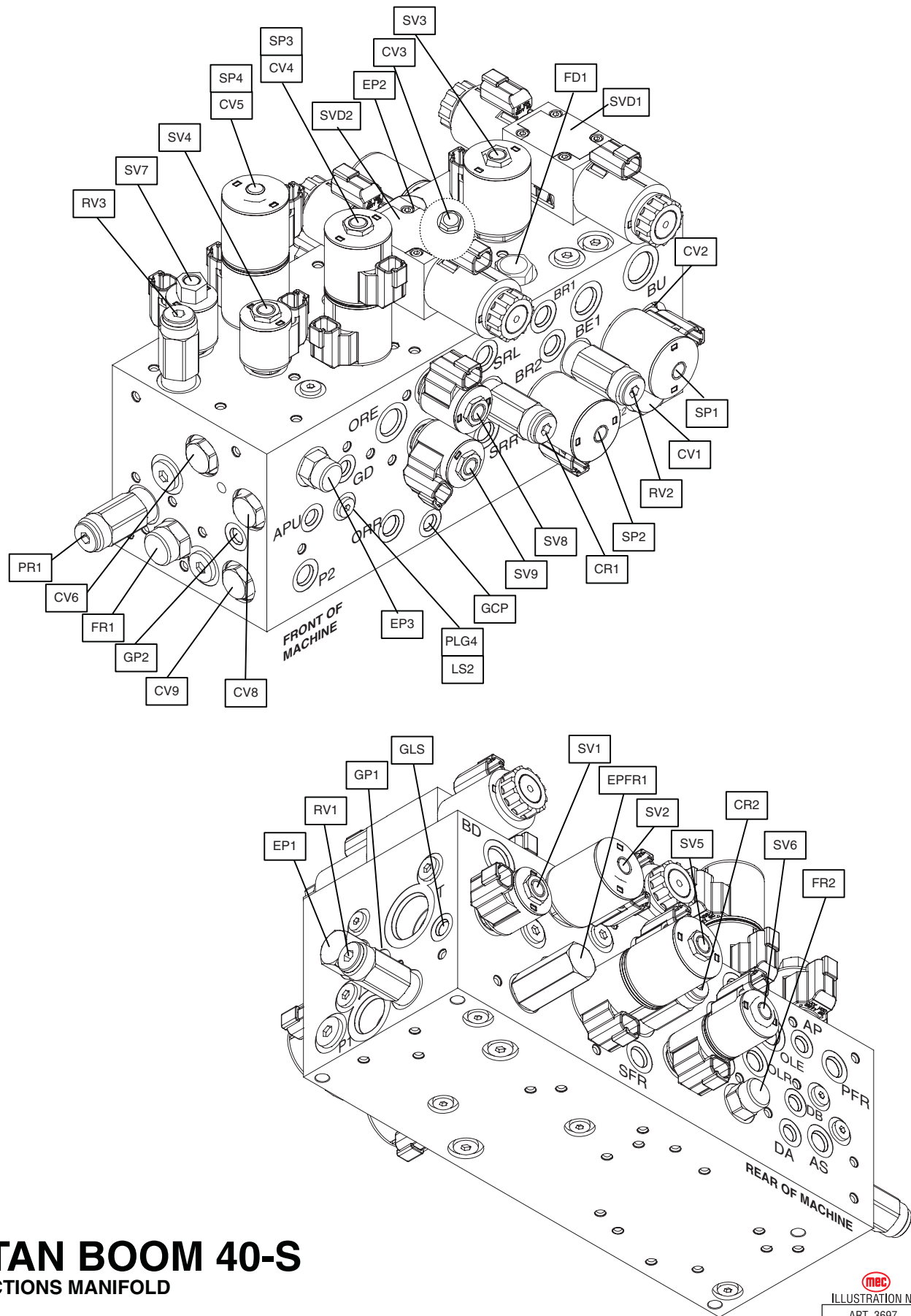


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Titan Boom 40-S HYDRAULIC SCHEMATIC, 2 of 2

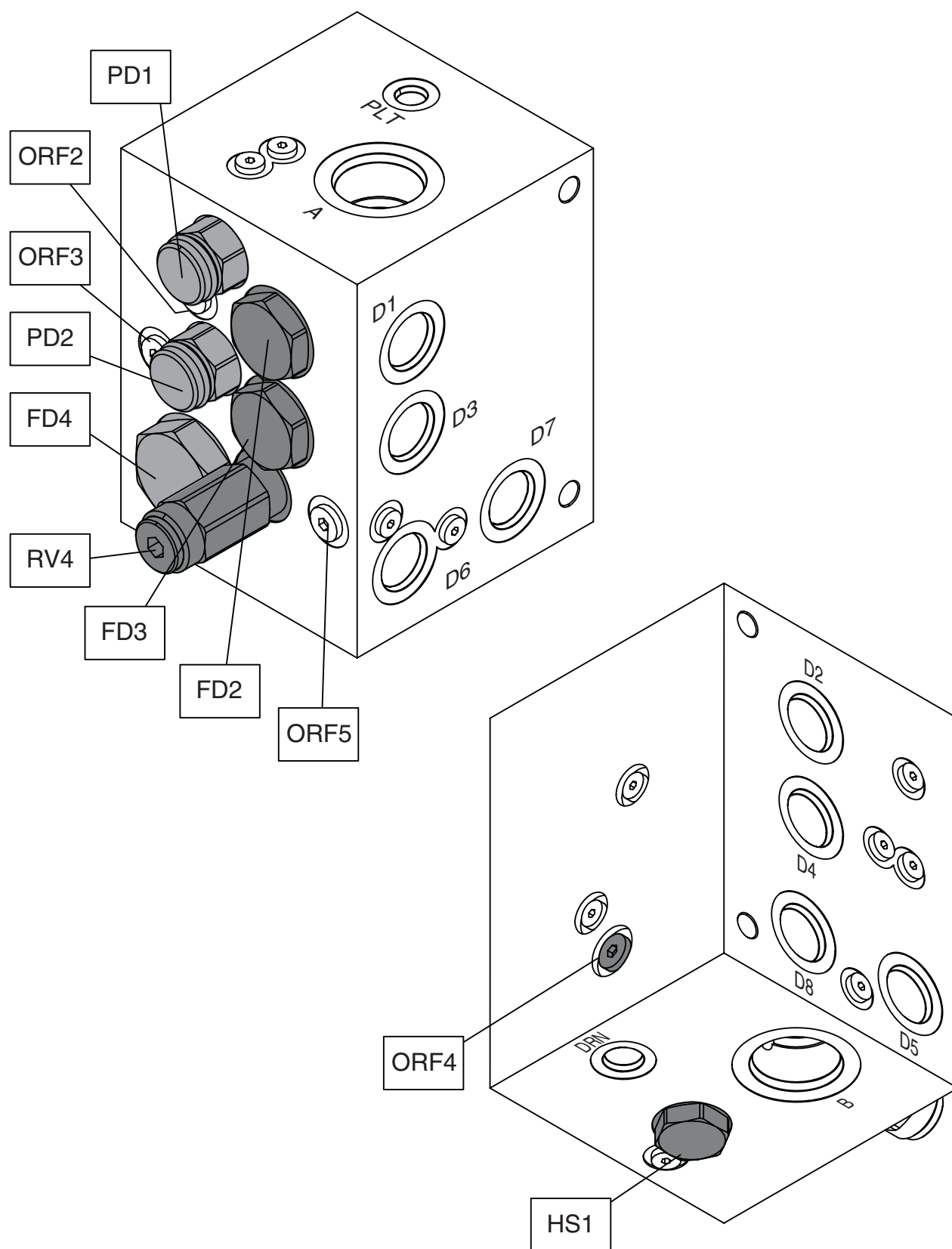
Figure 5-3: Function Manifold, MA1

TITAN BOOM 40-S

FUNCTIONS MANIFOLD

MA1

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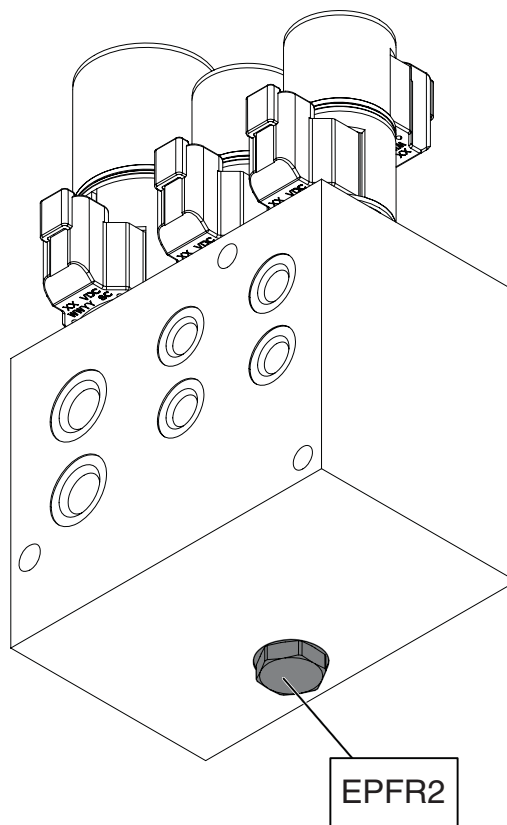
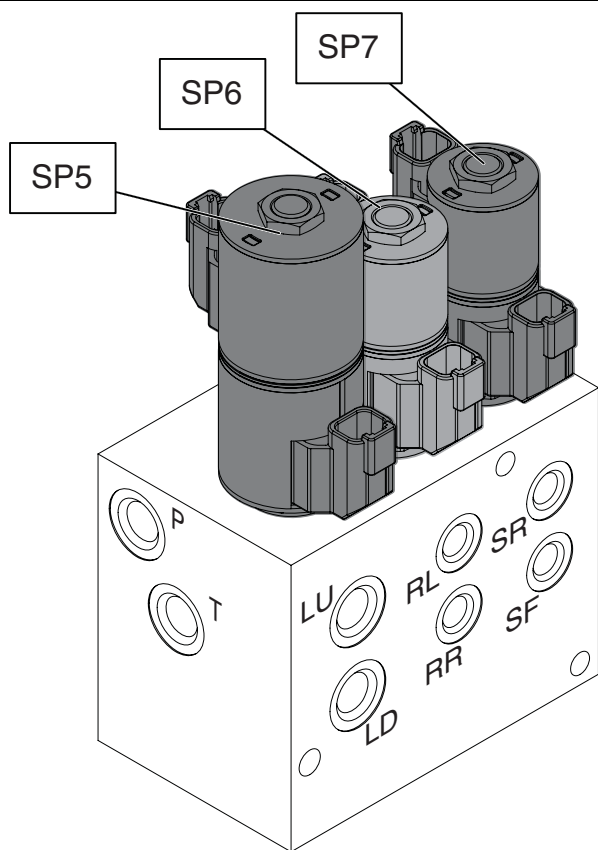
Figure 5-4: Drive Manifold, MA2

Titan Bom 40-S

DRIVE MANIFOLD
MA2

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Figure 5-5: Auxiliary Manifold, MA3

Titan Boom 40-S

AUXILLARY MANIFOLD
MA3


ILLUSTRATION No.
ART_3699

ELECTRICAL SCHEMATICS - STANDARD MACHINE

Figure 5-6: Electric Schematic, Lower Control Box, Standard Machines

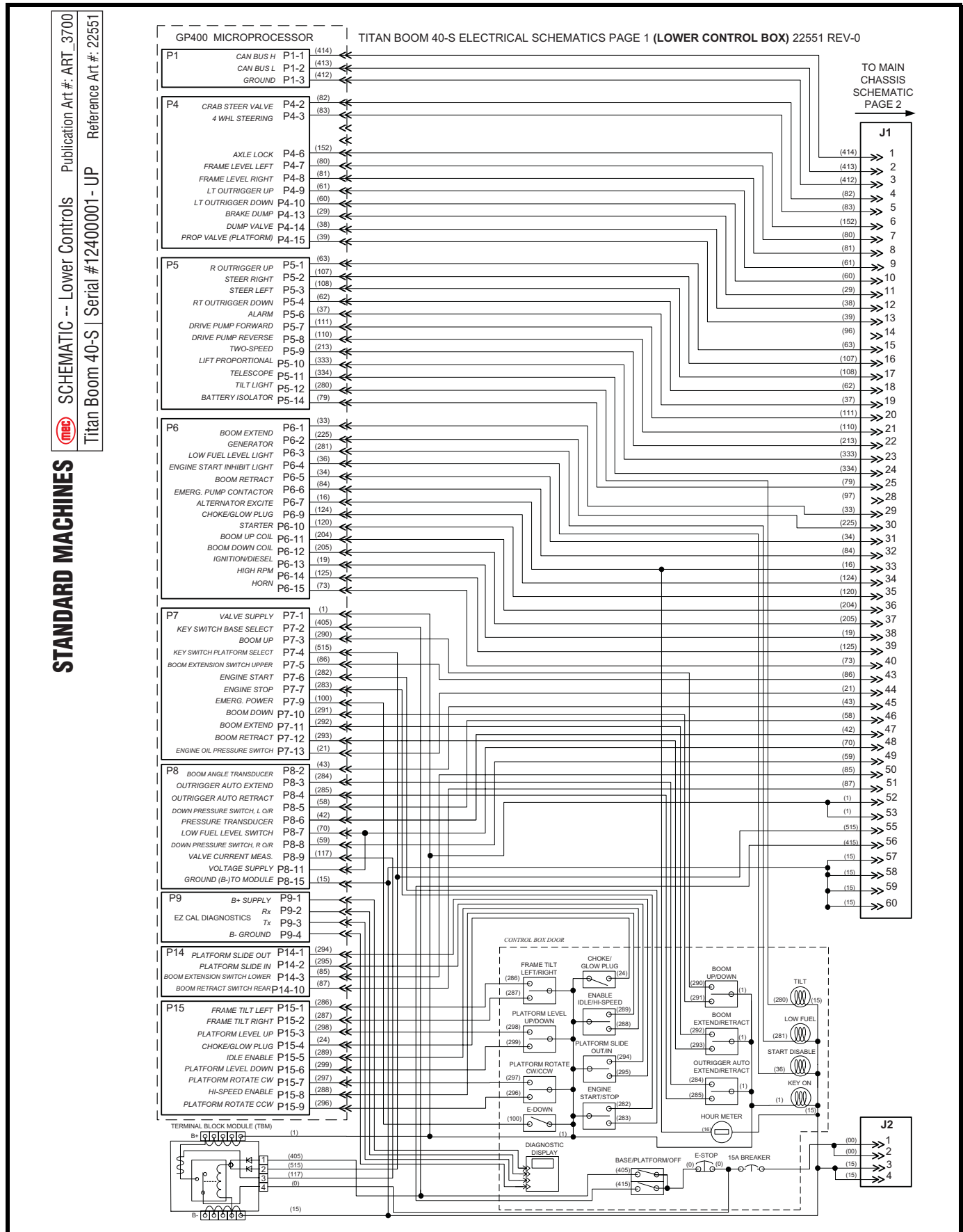


Figure 5-7: Electric Schematic, Chassis, Standard Machines

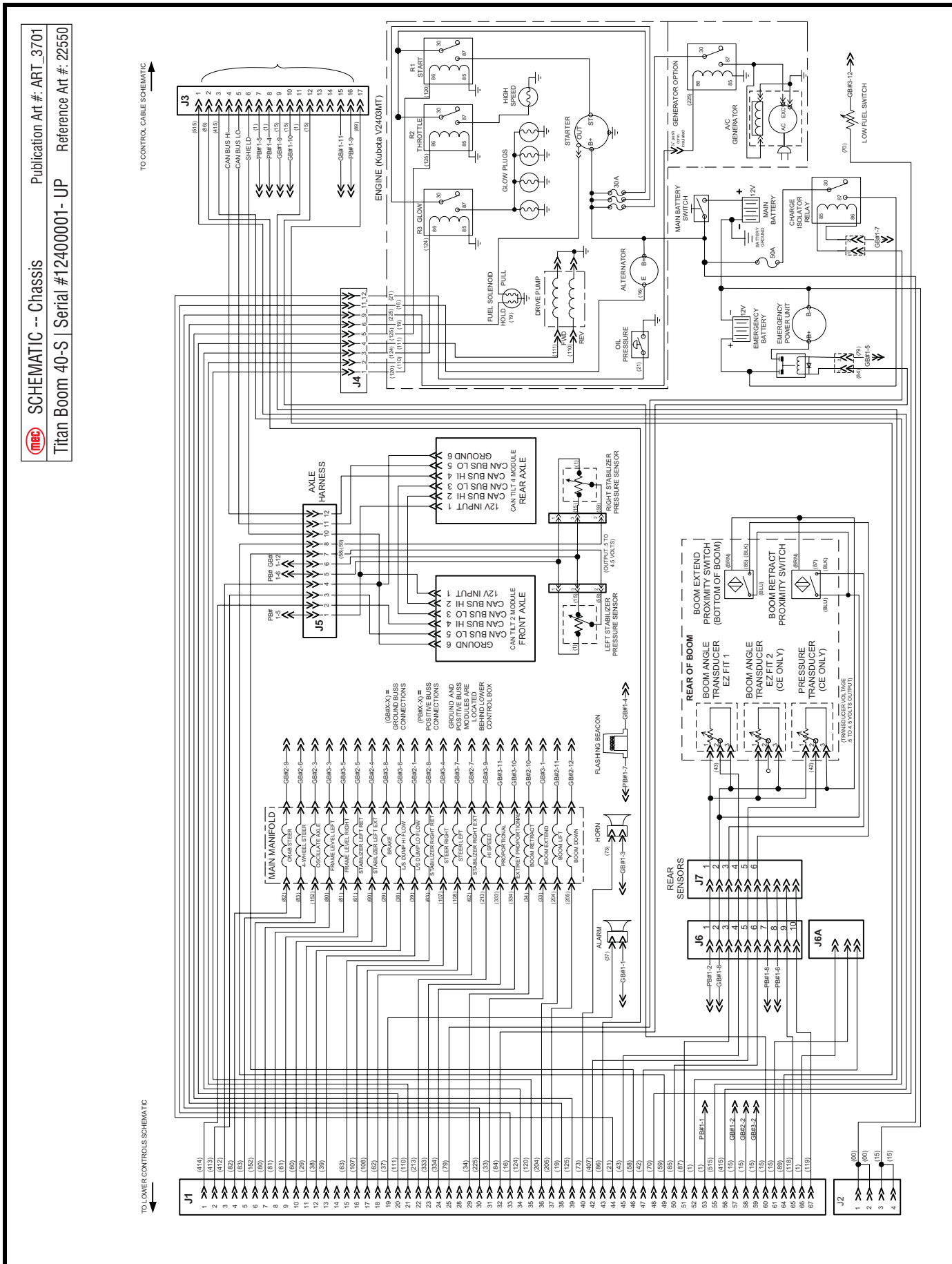


Figure 5-8: Electric Schematic, Control Cable, Standard Machines

STANDARD MACHINES

MEC SCHEMATIC -- Control Cable Publication Art #: ART_3702
Titan Boom 40-S | Serial #12400001- UP Reference Art #: 22555

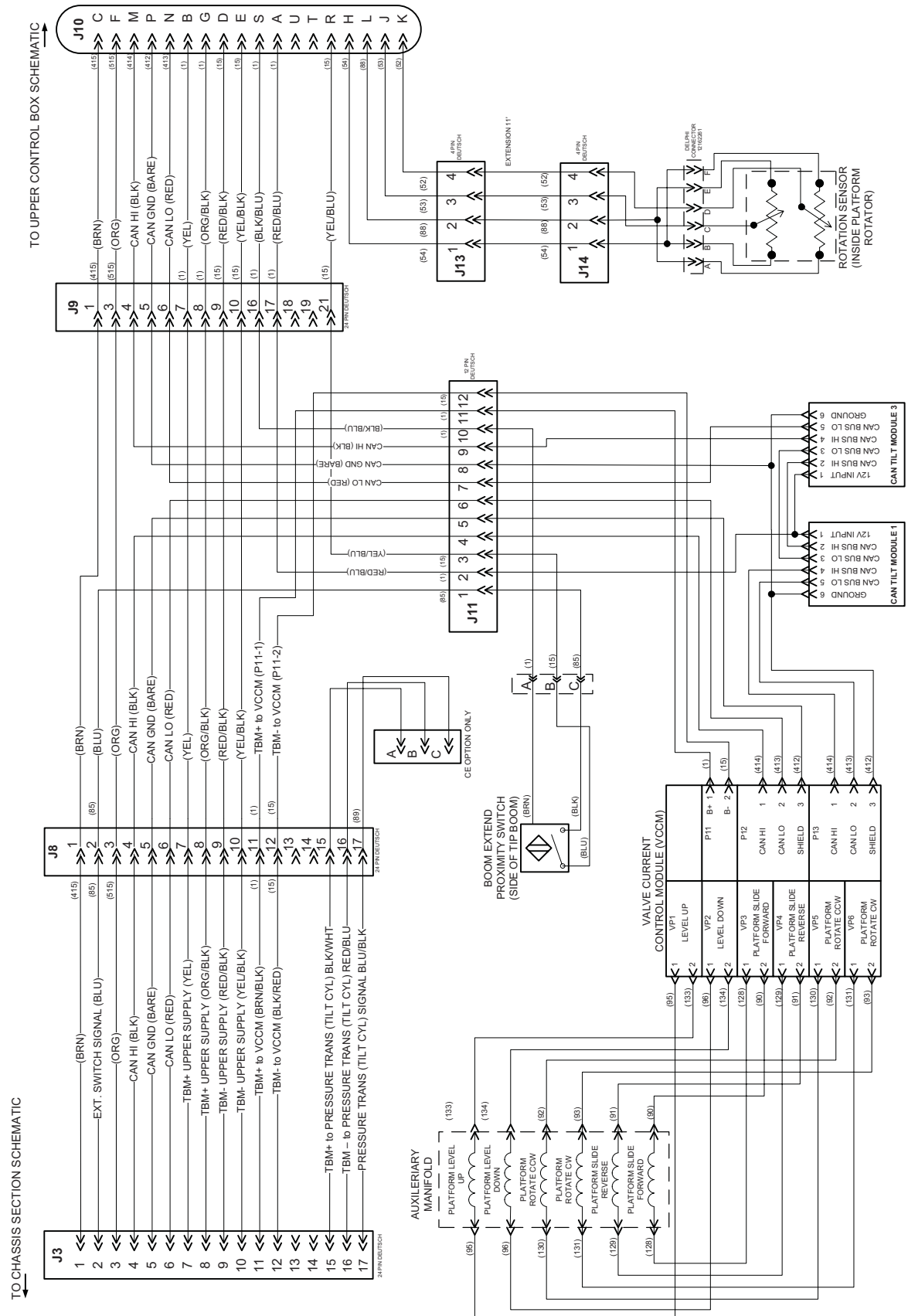
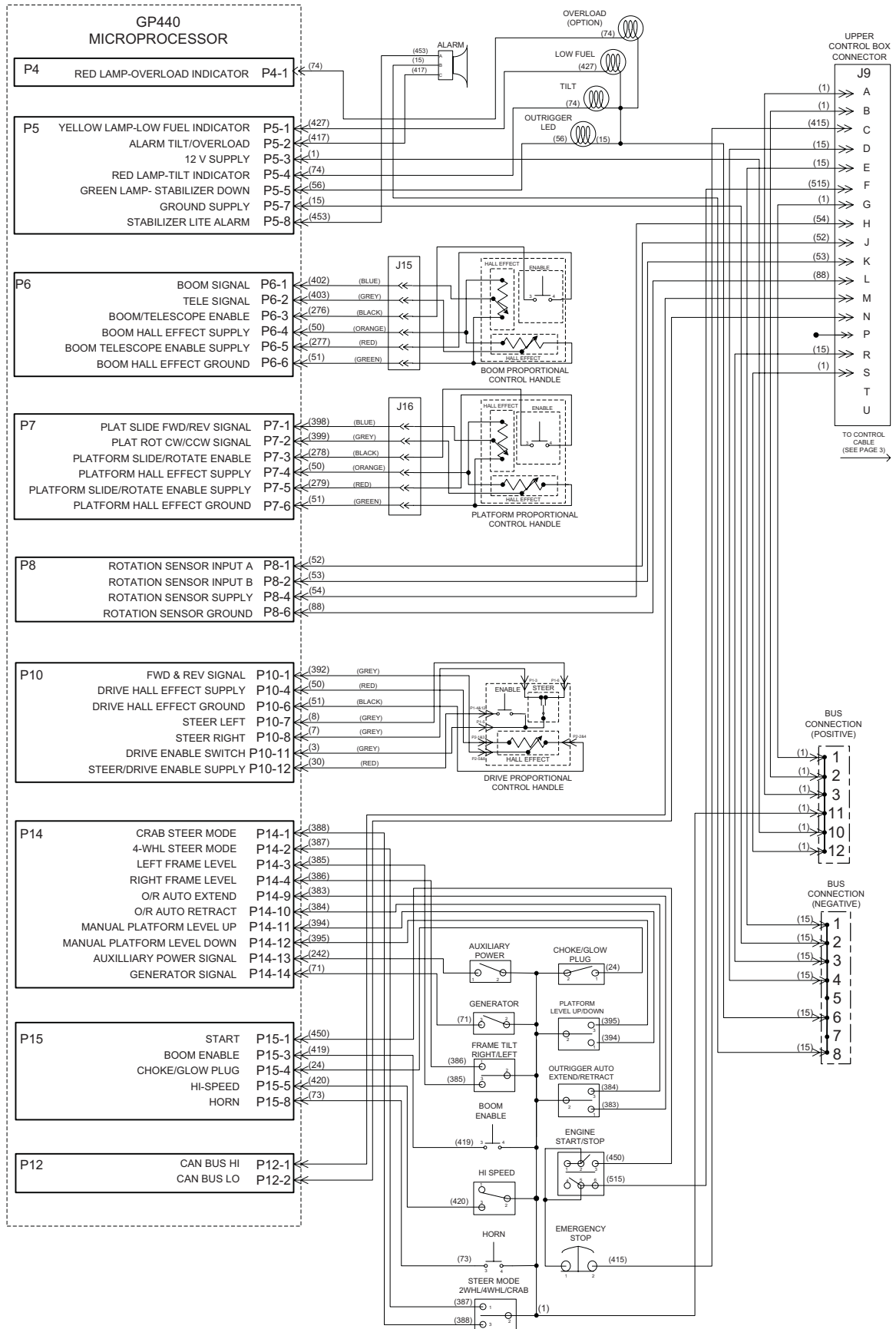


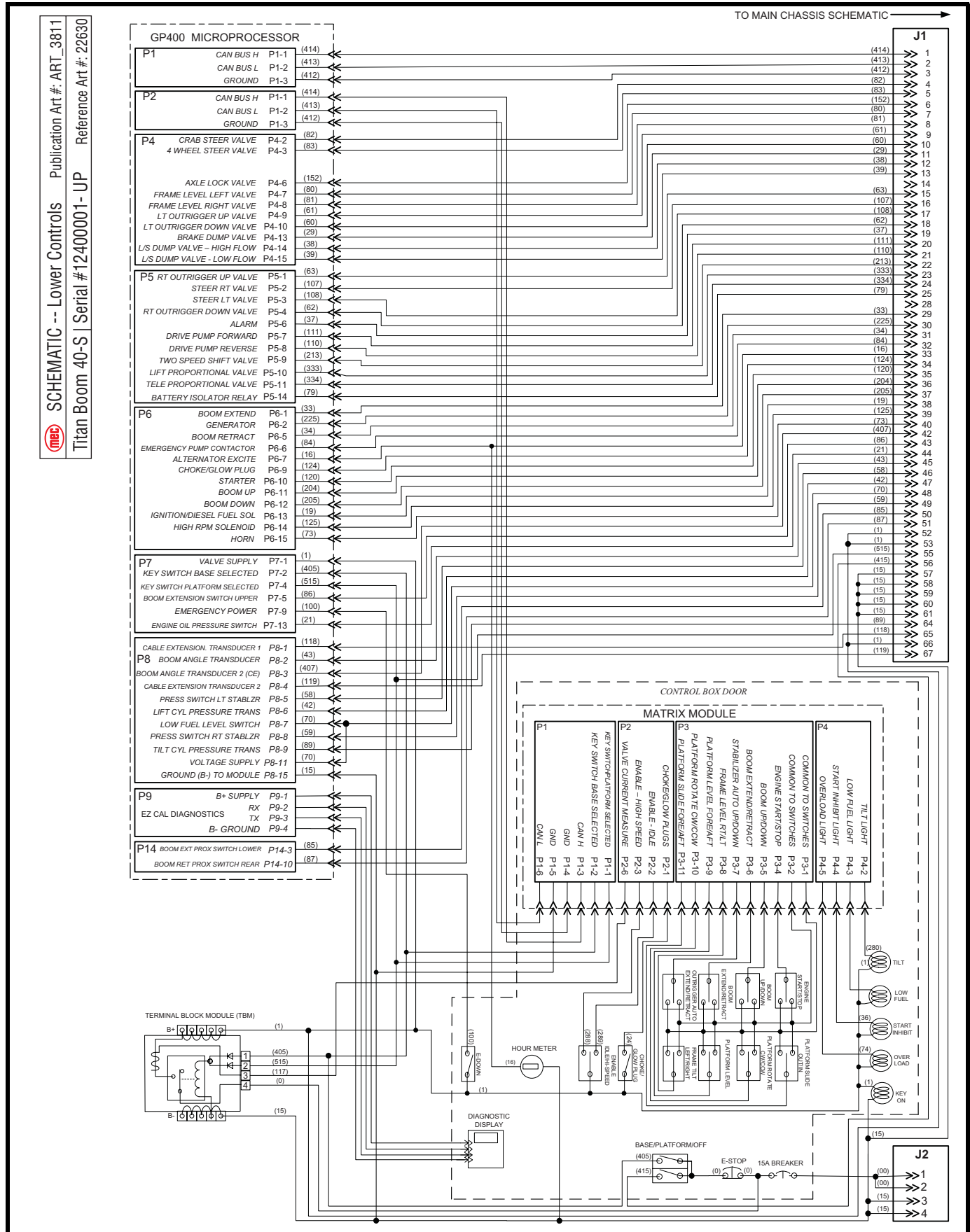
Figure 5-9: Electric Schematic, Upper Control Box, All Machines

SCHEMATIC -- Upper Controls Publication Art #: ART_3703
Titan Boom 40-S | Serial #12400001 - UP Reference Art #: 22552



ELECTRICAL SCHEMATICS - OPTIONAL OVERLOAD SENSING SYSTEM

Figure 5-10: Electric Schematic, Lower Control Box, Optional Overload Sensing System



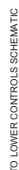
Titan Boom 40-S | Serial #12400001- UP
Reference Art #: 22631

Figure 5-12: Electric Schematic, Control Cable, Optional Overload Sensing System

OPTIONAL OVERLOAD SENSING SYSTEM

MEC SCHEMATIC --- Control Cable Publication Art #: ART_3841
Titan Boom 40-S | Serial #12400001-UP Reference Art #: 22632

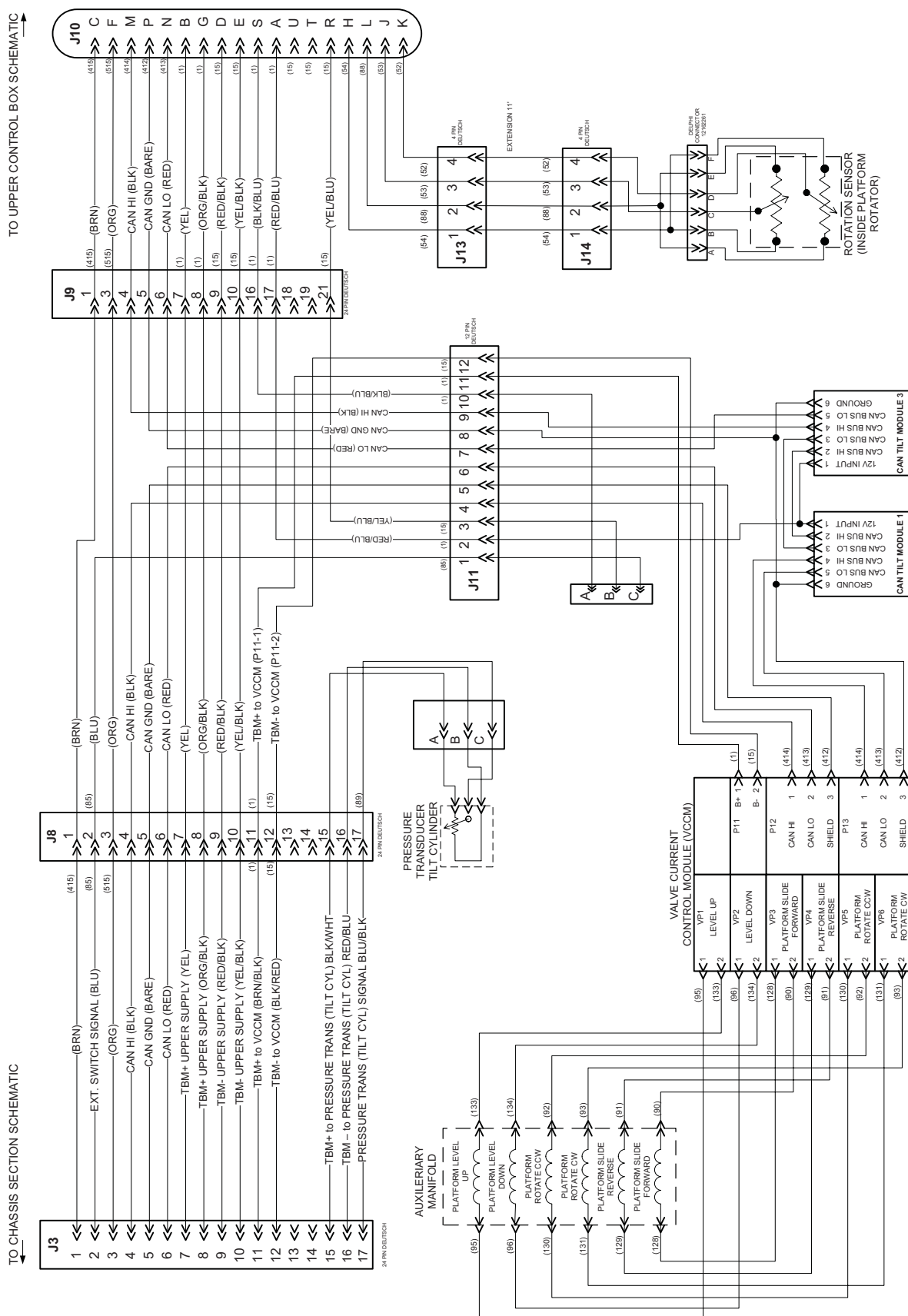


Figure 5-13: Electric Schematic, Upper Control Box, All Machines

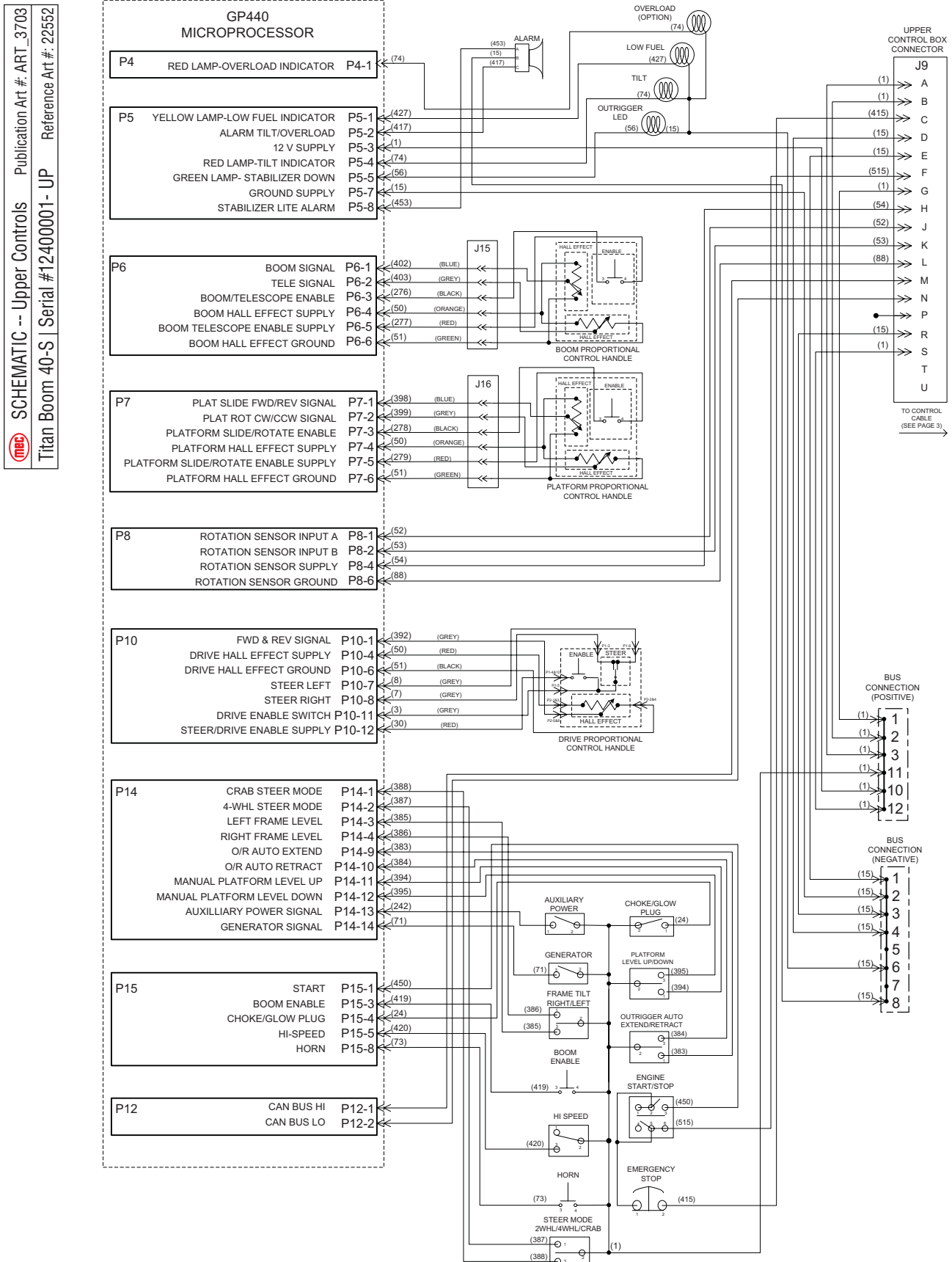
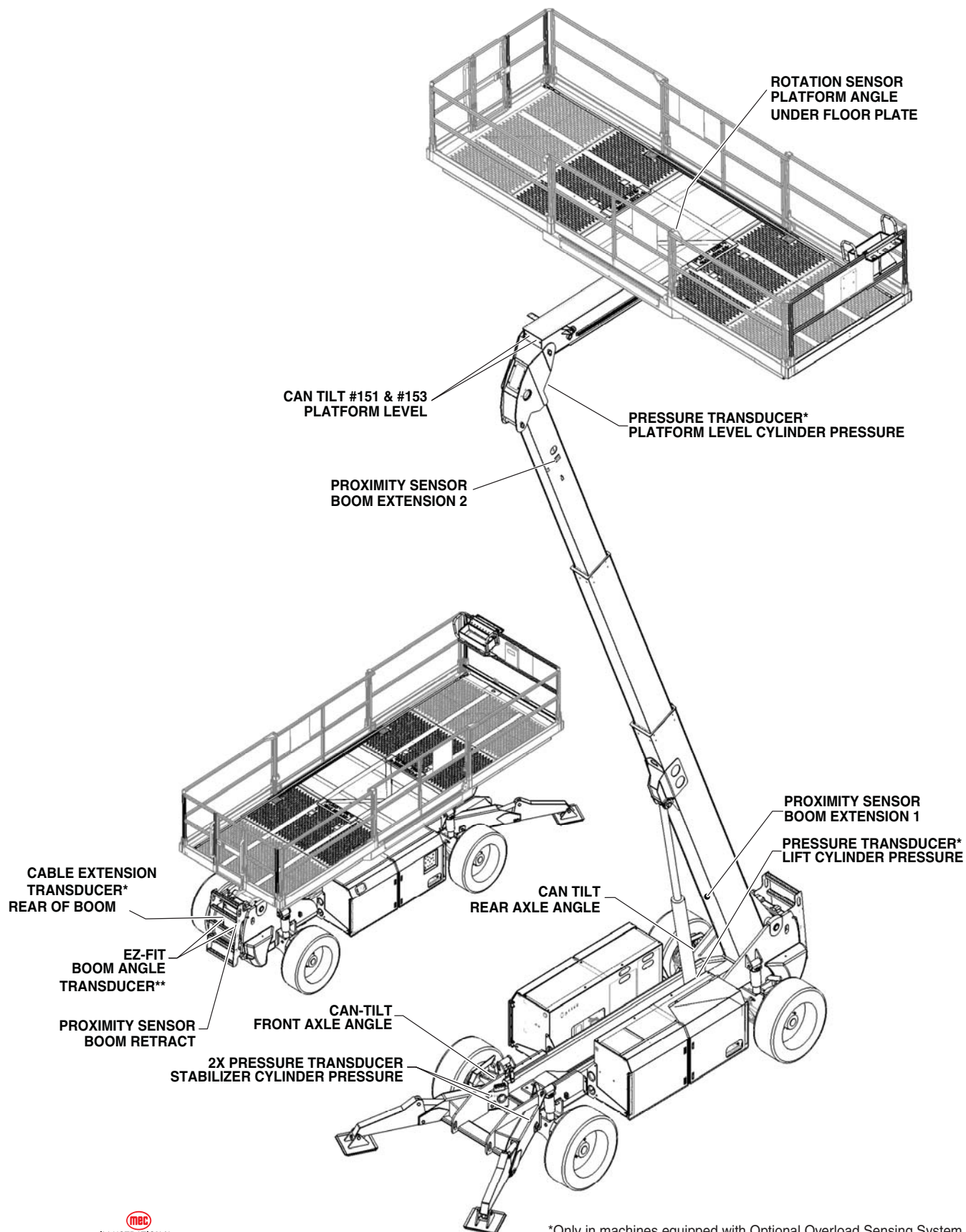


Figure 5-14: Sensor Locations

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ART_3705

*Only in machines equipped with Optional Overload Sensing System

**Two (2) present on machines equipped with Optional Overload Sensing System

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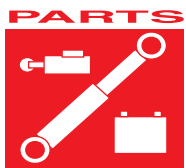
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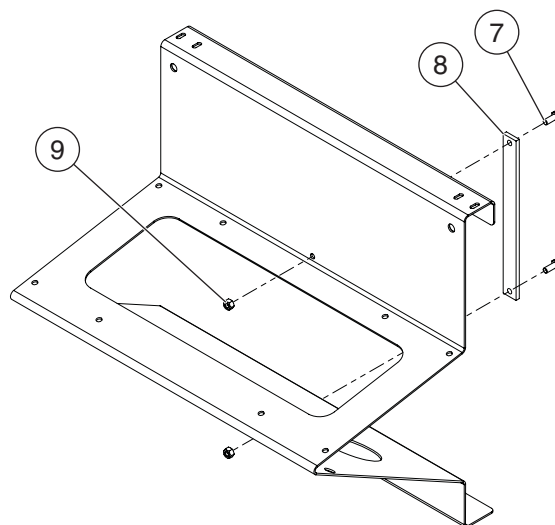
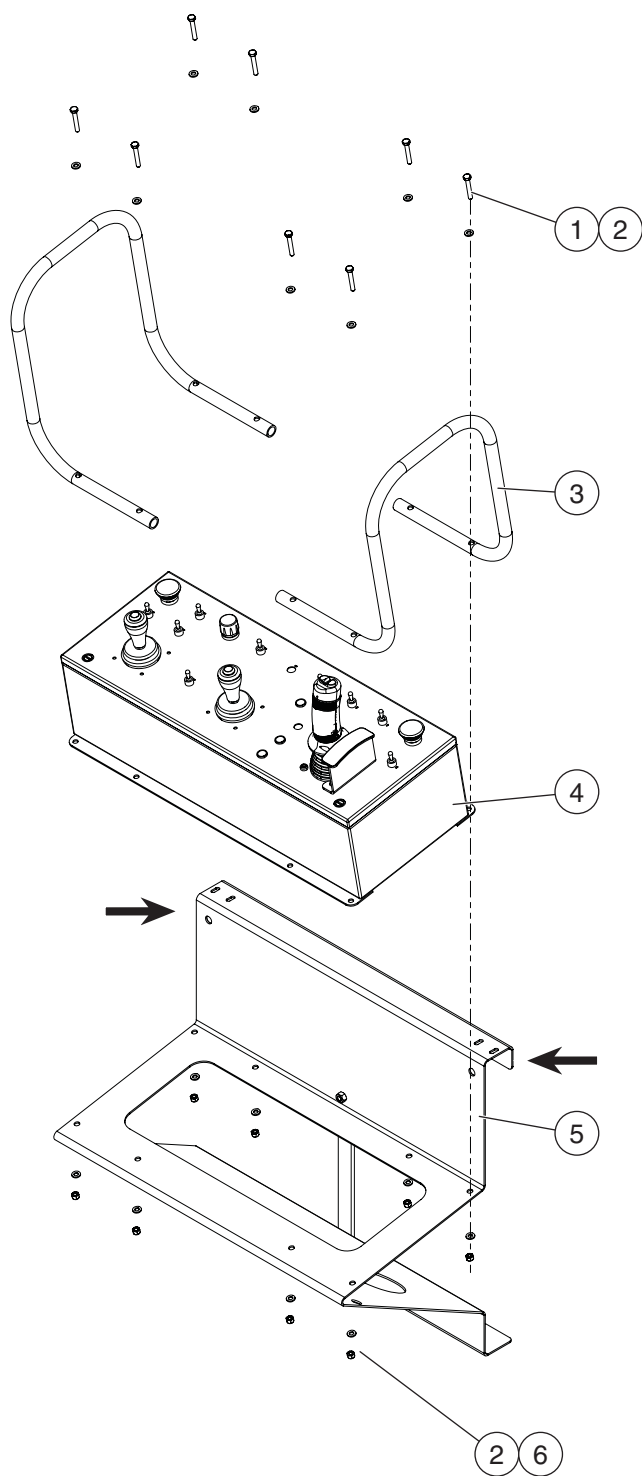
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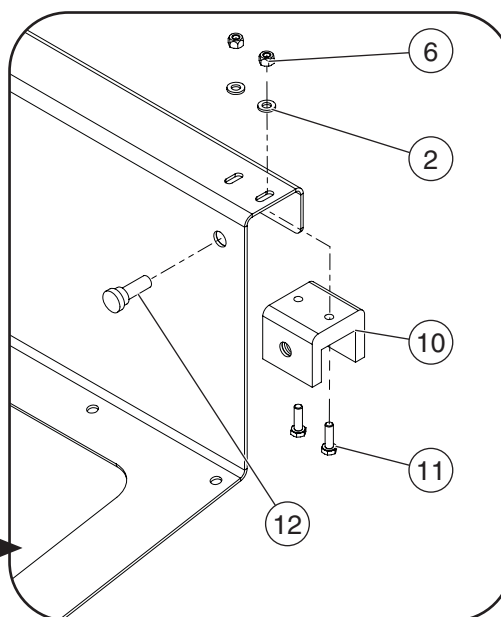
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2 Places



MEC
ILLUSTRATION No.
ART_3689

TITAN BOOM 40-S

Upper Control Station

Upper Controls Station

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|----------------------------|
| 1 | 50289 | 8 | Bolt, HHCS M6 x 40 |
| 2 | 50000 | 20 | Washer, M6 Std |
| 3 | 22228 | 2 | Rail, Upper Control Box |
| 4 | 84184 | 1 | Upper Control Box Assembly |
| 5 | 22227 | 1 | Bracket, Upper Control Box |
| 6 | 50047 | 8 | Nut, M6 Nylock |
| 7 | 50030 | 2 | Bolt, HHCS M8 x 20 |
| 8 | 22384 | 1 | Brace |
| 9 | 50048 | 2 | Nut, M8 Nylock |
| 10 | 22397 | 2 | Rail Pad |
| 11 | 50028 | 4 | Bolt, HHCS M6 x 20 |
| 12 | 92125 | 2 | Thumbscrew, Nylon |

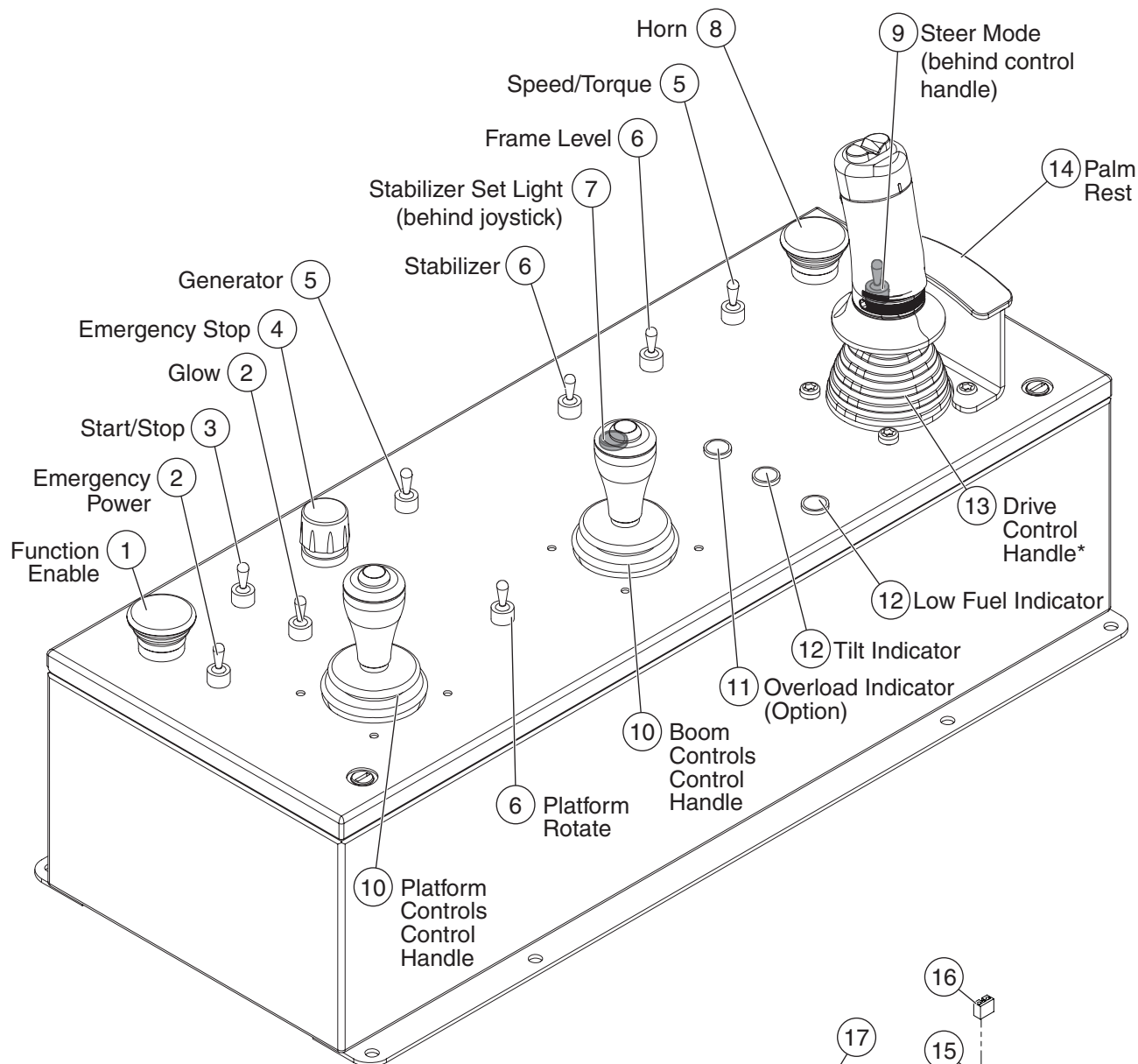


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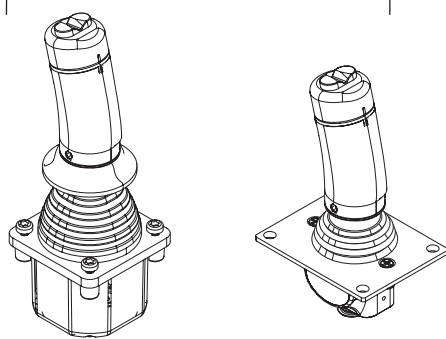
• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only



13 *See note on next page



Early Type

Later Type

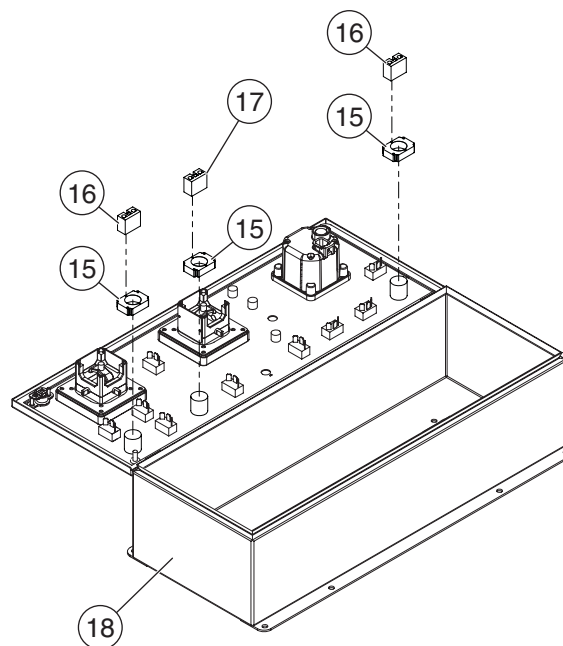


ILLUSTRATION No.
ART_3690

TITAN BOOM 40-S

Upper Control Box, 1 of 2

Upper Controls Box, 1 of 2

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|--|
| -- | 84184 | -- | Upper Controls Box Assembly |
| 1 | 92422 | 1 | Button, Green |
| 2 | 7423 | 2 | Switch, Toggle, On--Momentary |
| 3 | 92427 | 3 | Switch, Toggle, Off--On--Momentary |
| 4 | 7800 | 1 | Emergency Stop Button |
| 5 | 6234 | 2 | Switch, Toggle, On--On |
| 6 | 91954 | 2 | Switch, Toggle, Momentary--Off--Momentary |
| 7 | 92255 | 1 | Indicator Light, Green |
| 8 | 92421 | 1 | Button, Black |
| 9 | 6905 | 1 | Switch, Toggle, On--Off--On |
| 10 | 92165 | 2 | Control Handle |
| 11 | 92254 | 1 | Indicator Light, Red (Option) |
| 12 | 92253 | 2 | Indicator Light, Orange |
| 13 | 92786* | 1 | Drive Control Handle |
| -- | 22237 | -- | Adapter Plate, Drive Control Handle, New Style |
| 14 | 18494 | 1 | Palm Rest |
| 15 | 90714 | 3 | Switch/Button Mount |
| 16 | 8082 | 2 | Contact Block, N.O |
| 17 | 8083 | 1 | Contact Block, N.C |
| 18 | 22208 | 1 | Upper Control Box |

*Early type Drive Control Handles are no longer available. See the drawing at left to determine if your machine is equipped with the early or later type control handle.

If your machine is equipped with an early type control handle, you must replace it with the later type control handle (Item #13). You must also replace the Palm Rest (Item #14), as early versions of this item are not compatible with later control handles.

If your machine is equipped with a later type control handle, replace only the control handle (Item #13).



• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

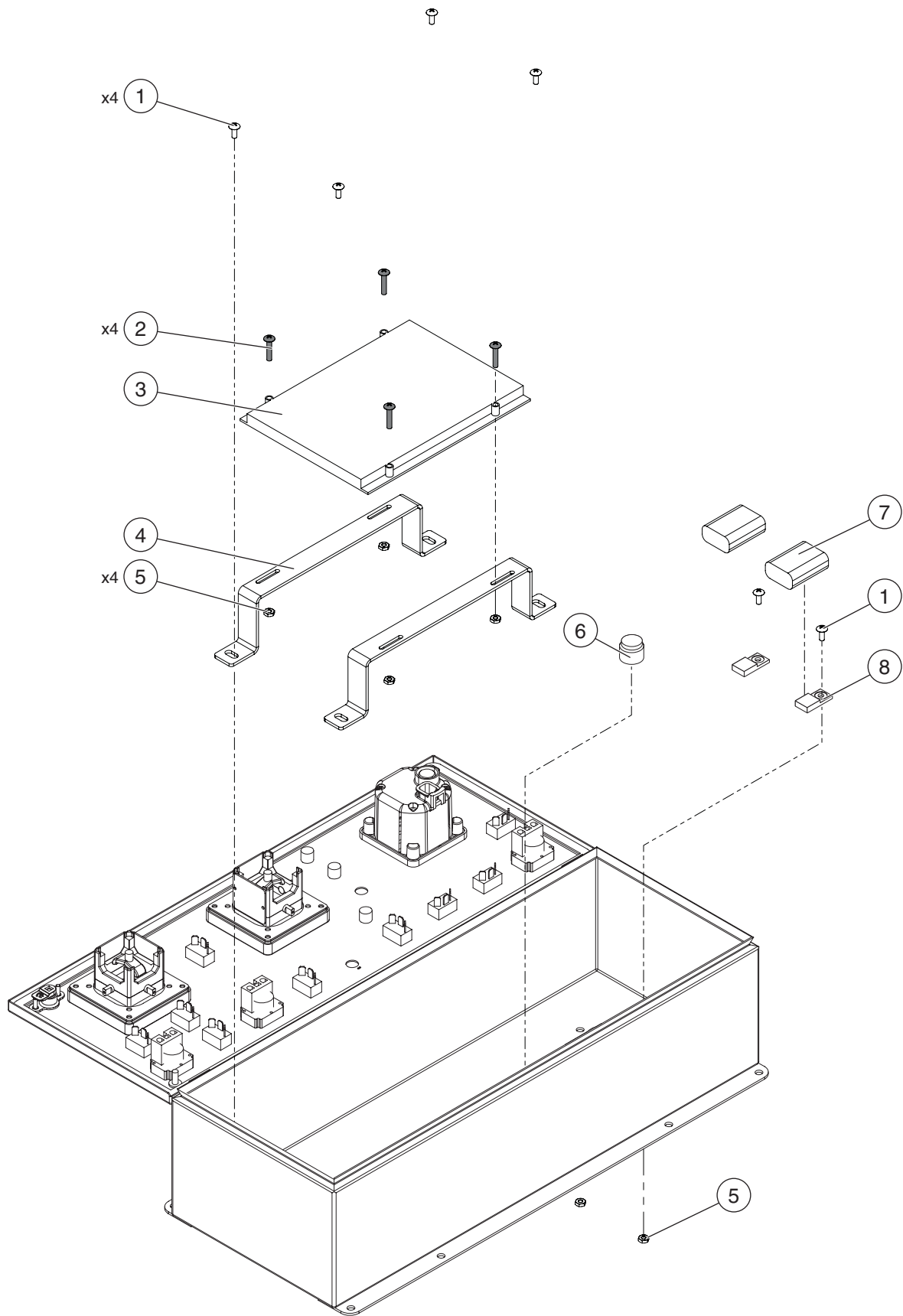


ILLUSTRATION No.
ART_3691

TITAN BOOM 40-S

Upper Control Box, 2 of 2

Upper Controls Box, 2 of 2

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|-------------------------|
| 1 | 50191 | 6 | Screw, THMS #10-32 x .5 |
| 2 | 50330 | 4 | Screw, THMS #10-32 x 1 |
| 3 | 92027 | 1 | GP440 Module |
| 4 | 22429 | 2 | Mount, GP440 |
| 5 | 50238 | 6 | Nut, #10-32 Nylock |
| 6 | 7553 | 1 | Alarm |
| 7 | 92033 | 2 | Buss |
| 8 | 91881 | 2 | Relay/Buss Mount |



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• NS: Not a Stock item

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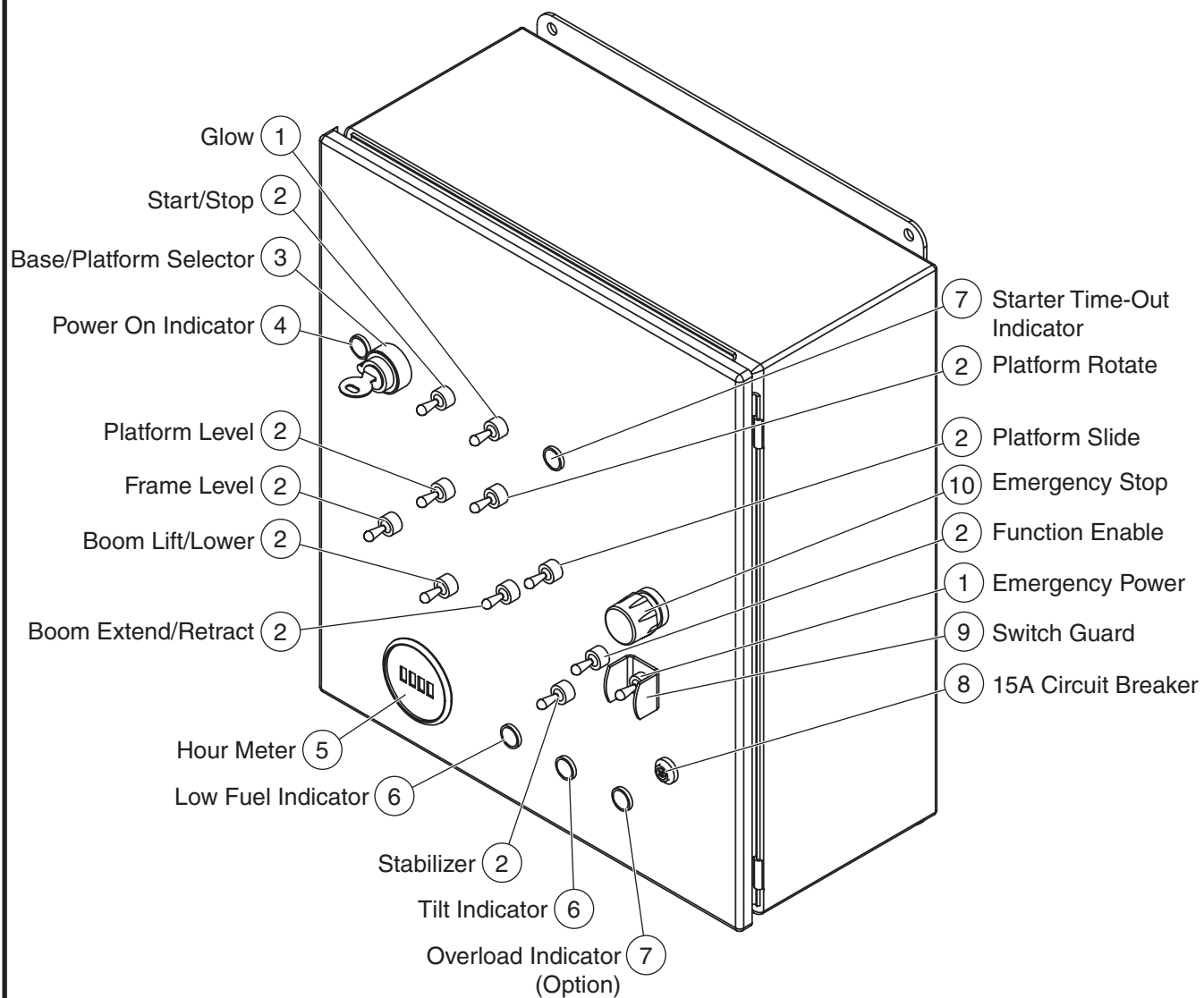


ILLUSTRATION No.
ART_3692

TITAN BOOM 40-S

Lower Control Box, 1 of 2

Lower Controls Box, 1 of 2

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|---|
| -- | 84181 | -- | Lower Controls Assembly |
| 1 | 7423 | 2 | Switch, Toggle, On--Momentary |
| 2 | 91954 | 9 | Switch, Toggle, Momentary--Off--Momentary |
| 3 | 9549 | 1 | Switch, Keyed Selector |
| 4 | 92255 | 1 | Indicator Light, Green |
| 5 | 91704 | 1 | Hour Meter |
| 6 | 92253 | 2 | Indicator Light, Orange |
| 7 | 92254 | 1 | Indicator Light, Red |
| | | 2 | Indicator Light, Red (Option) |
| 8 | 7235 | 1 | Circuit Breaker, 15 Amp |
| 9 | 1313 | 1 | Switch Guard |
| 10 | 7800 | 1 | Emergency Stop Button |



• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

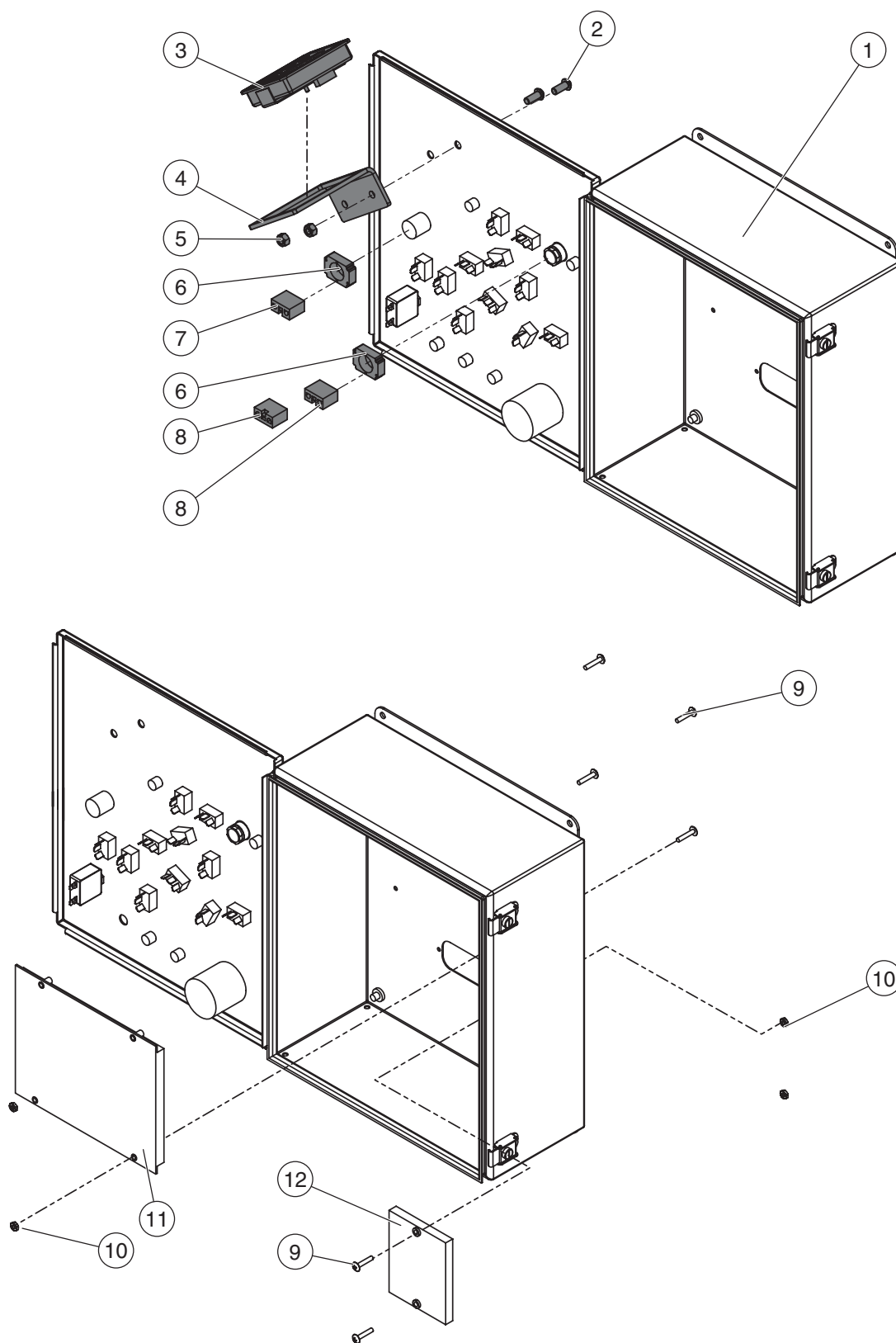


ILLUSTRATION No.
ART_3693

TITAN BOOM 40-S

Lower Control Box, 2 of 2



Lower Controls Box, 2 of 2

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|--------------------------------|
| 1 | 22252 | 1 | Lower Control Box |
| 2 | 50124 | 2 | Screw, BHCS M8 x 20 |
| 3 | 92003 | 1 | EZ Cal Diagnostic, Normal type |
| -- | 92741 | -- | EZ Cal Diagnostic, Arctic type |
| 4 | 22405 | 1 | Bracket, EZ Cal |
| 5 | 50048 | 2 | Nut, M8 Nylock |
| 6 | 90714 | 2 | Switch/Button Mount |
| 7 | 8083 | 1 | Contact Block, N.C. |
| 8 | 8082 | 2 | Contact Block, N.O. |
| 9 | 50330 | 6 | Screw, THMS #10-32 x 1 |
| 10 | 50238 | 6 | Nut, #10-32 Nylock |
| 11 | 92028 | 1 | GP400 Module |
| 12 | 92838 | 1 | Terminal Block Module |



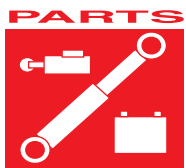
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• NS: Not a Stock item

• REF: Reference only

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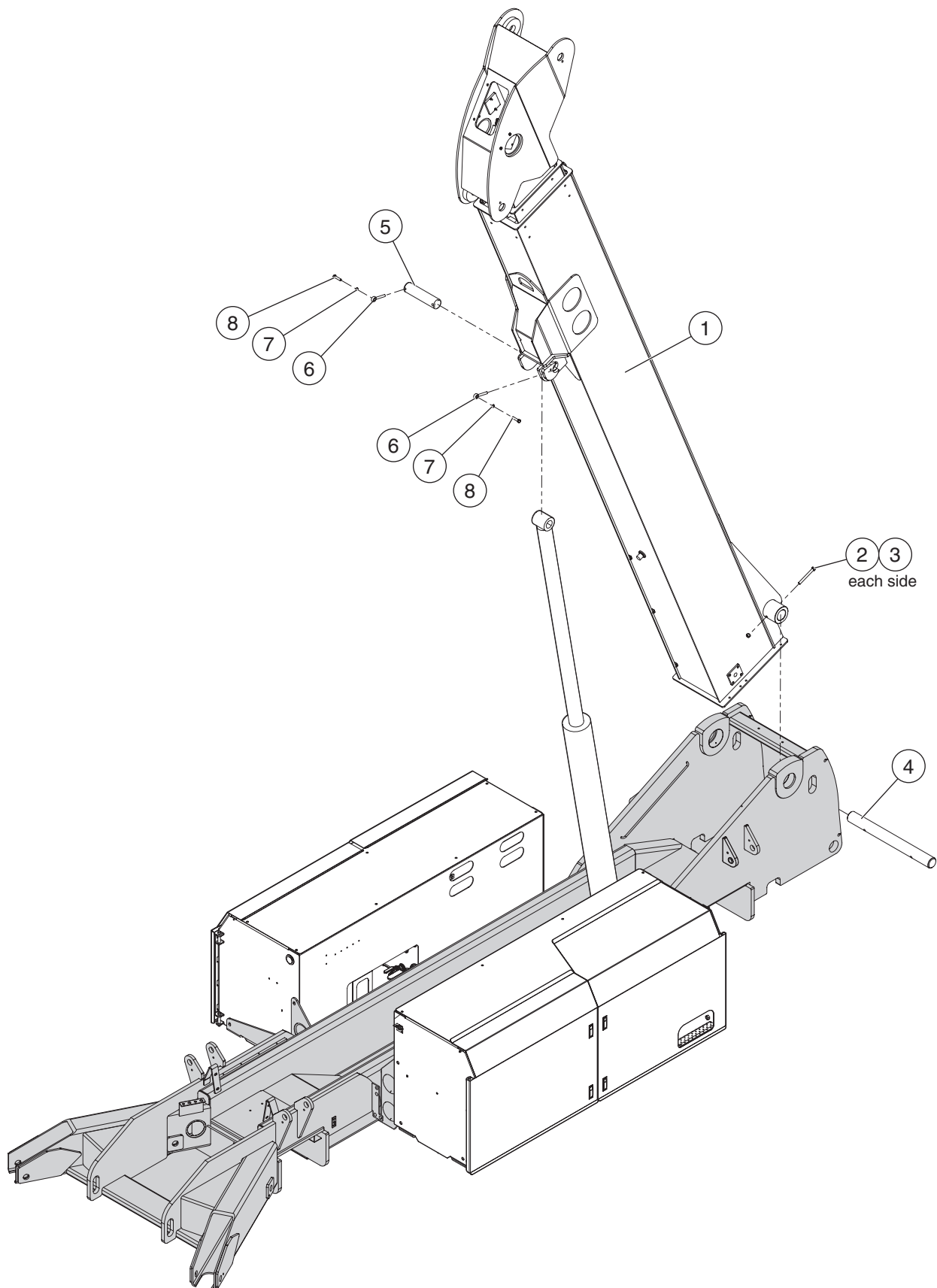


ILLUSTRATION No.
ART_3640

TITAN BOOM 40-S

Boom Installation

Boom Installation

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|------------------------|
| 1 | 84176 | 1 | Boom Assembly |
| 2 | 50302 | 2 | Bolt, HHCS M14 x 130 |
| 3 | 50303 | 2 | Nut, M14 Nylock |
| 4 | 22450 | 1 | Boom Pivot Pin |
| 5 | 22196 | 1 | Boom/Lift Cylinder Pin |
| 6 | 18152 | 2 | Pin Retainer |
| 7 | 50007 | 2 | Washer, M12 Nordlock |
| 8 | 50250 | 2 | Bolt, HHCS M12 x 50 |



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• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

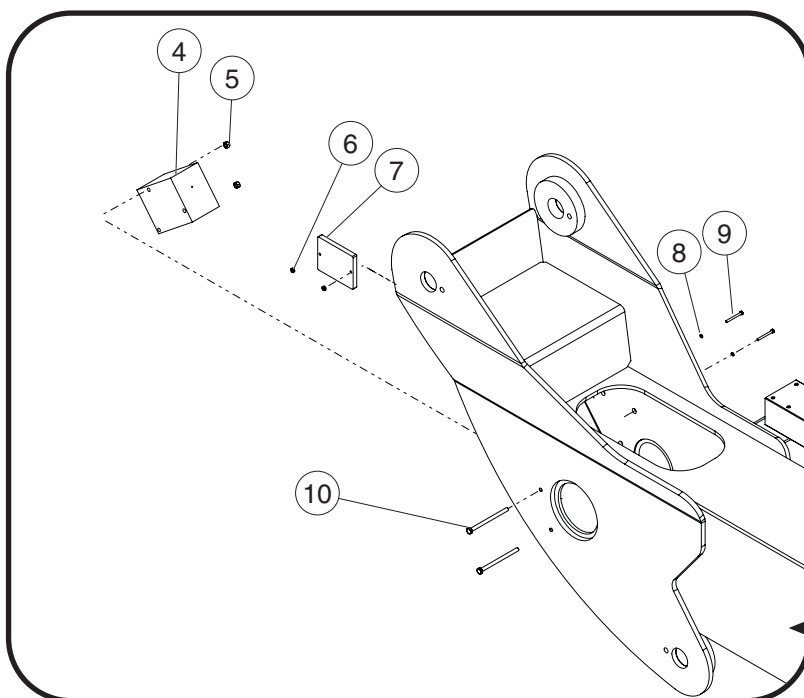
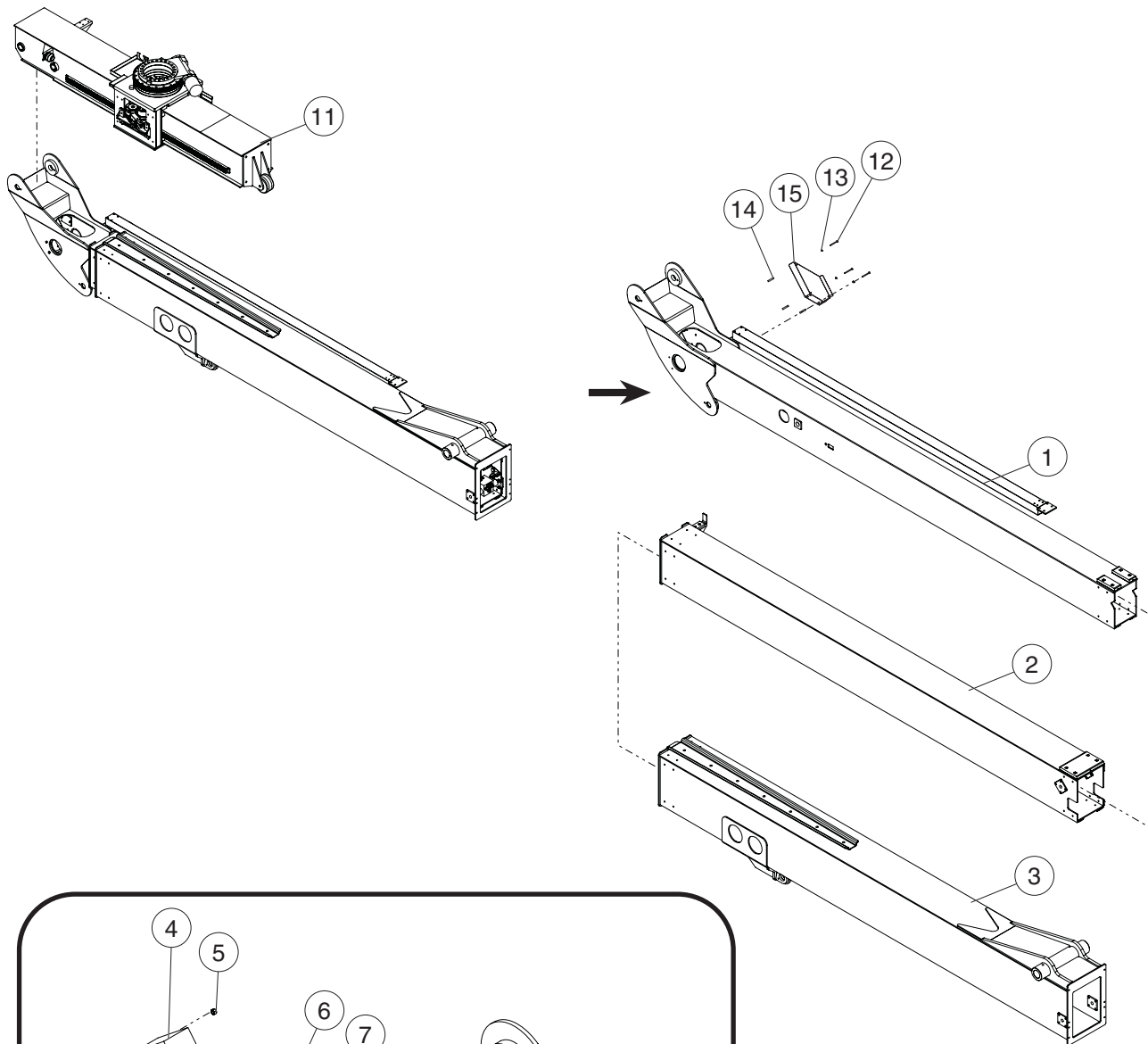


ILLUSTRATION No.
ART_3614

TITAN BOOM 40-S

Boom Assembly, 1 of 2

Boom Assembly, 1 of 2

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|--------------------------------------|
| -- | 84176 | -- | Boom Assembly |
| 1 | 84166 | 1 | End Boom Assembly |
| 2 | 84167 | 1 | Mid Boom Assembly |
| 3 | 84168 | 1 | Base Boom Assembly |
| 4 | 92082 | 1 | Manifold, Platform Level |
| 5 | 50048 | 2 | Nut, M08x1.25 08 Zp Nylock |
| 6 | 50238 | 2 | Nut, #10-32 05 Nylock |
| 7 | 91950 | 1 | Valve Current Control Module (VCCM) |
| 8 | 50280 | 2 | Washer, #10-32 Zp Standard Lock |
| 9 | 50298 | 2 | Bolt, HHCS #10-32x02.00 05 Z |
| 10 | 50268 | 2 | Bolt, HHCS M08-1.25x120 08 Zp P |
| 11 | REF | -- | Cantilever Assembly -- see page C-17 |
| 12 | 50237 | 3 | Bolt, HHCS M8 x 100 |
| 13 | 50200 | 3 | Washer, M8 Nordlock |
| 14 | 22385 | 3 | Spacer |
| 15 | 22321 | 1 | Hose Cover |



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• INCL: Included with assembly

• NS: Not a Stock item

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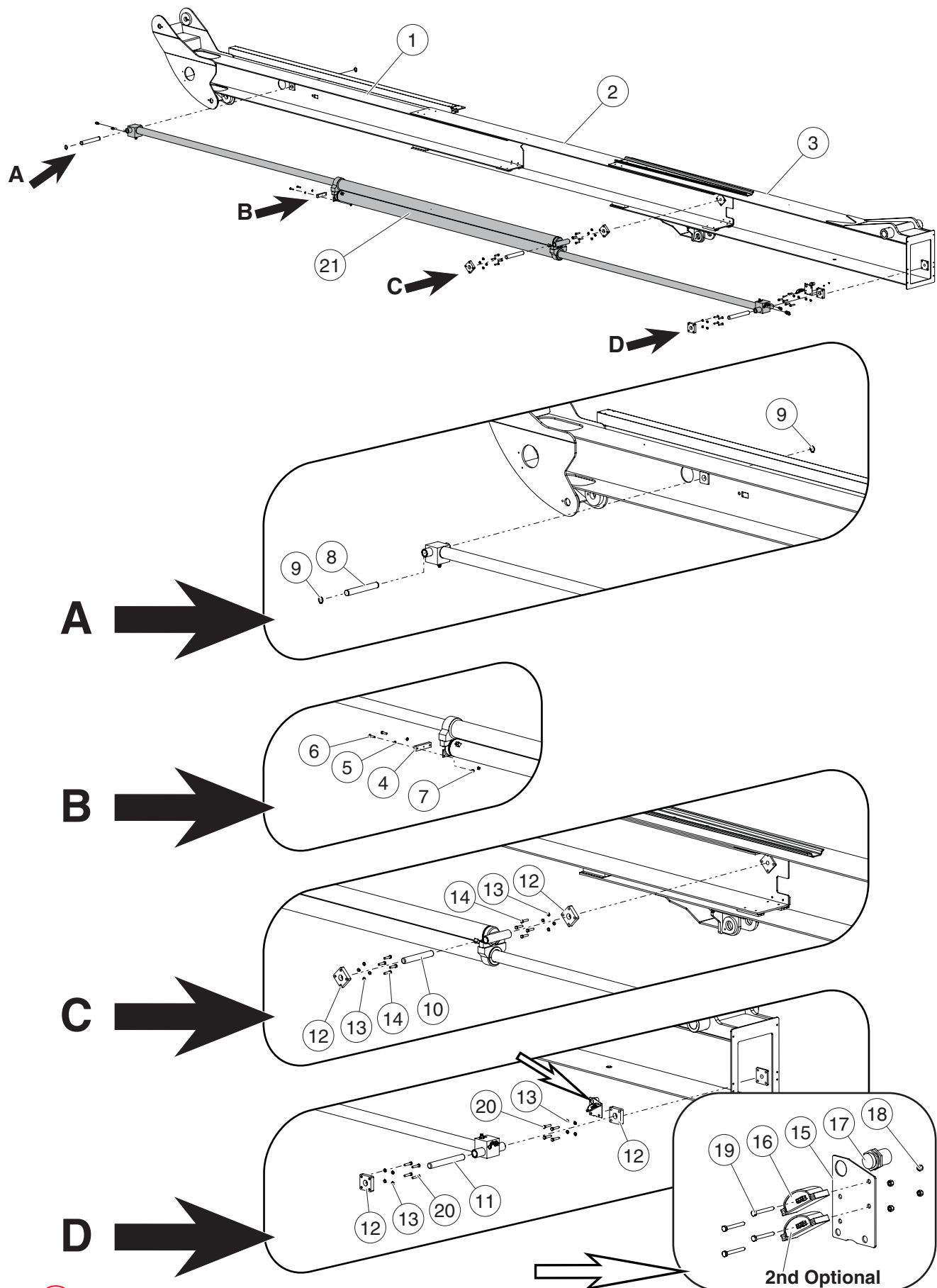


ILLUSTRATION No.
ART_3615

TITAN BOOM 40-S

Boom Assembly, 2 of 2

Boom Assembly, 2 of 2

| ITEM | PART NO. | QTY | DESCRIPTION |
|------------------|----------|--|---|
| -- | 84176 | -- | Boom Assembly |
| 1 | 84166 | 1 | End Boom Assembly |
| 2 | 84167 | 1 | Mid Boom Assembly |
| 3 | 84168 | 1 | Base Boom Assembly |
| 4 | 22219 | 1 | Slide Block |
| 5 | 50002 | 2 | Washer, M10 Zp Standard Flat |
| 6 | 50035 | 2 | Bolt, HHCS M10-1.50x040 08 Zp F |
| 7 | 50049 | 2 | Nut, M10 Nylock |
| 8 | 22206 | 1 | Pin, 1.500 X 11.063 |
| 9 | 92243 | 2 | Snap Ring, 1.50" X .109" Thick External |
| 10 | 22205 | 1 | Pin, 1.500 X 10.50 |
| 11 | 22204 | 1 | Pin, 1.500 X 12.375 |
| 12 | 22211 | 4 | Pin Keeper |
| 13 | 50007 | 16 | Washer, M12 Zp Nordlock |
| 14 | 50250 | 8 | Bolt, HHCS M12-1.75x050 |
| 15 | 22222 | 1 | Mounting Bracket |
| Standard Machine | | Machine w/optional Overload Sensing System | |
| 16 | 90844 | 1 | 2 Ez Fit Angle Sensor |
| 17 | 92032 | 1 | 2 Proximity Switch, 30mm |
| 18 | 50047 | 2 | 4 Nut M06 Nylock |
| 19 | 50262 | 2 | 4 Bolt, HHCS M06-1.00x050 |
| 20 | 50301 | 8 | Bolt, HHCS M12-1.75x055 |
| 21 | REF | 1 | Cylinder, Boom Extend -- See Section E |

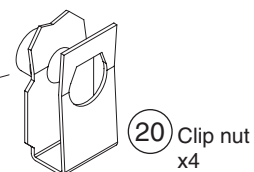
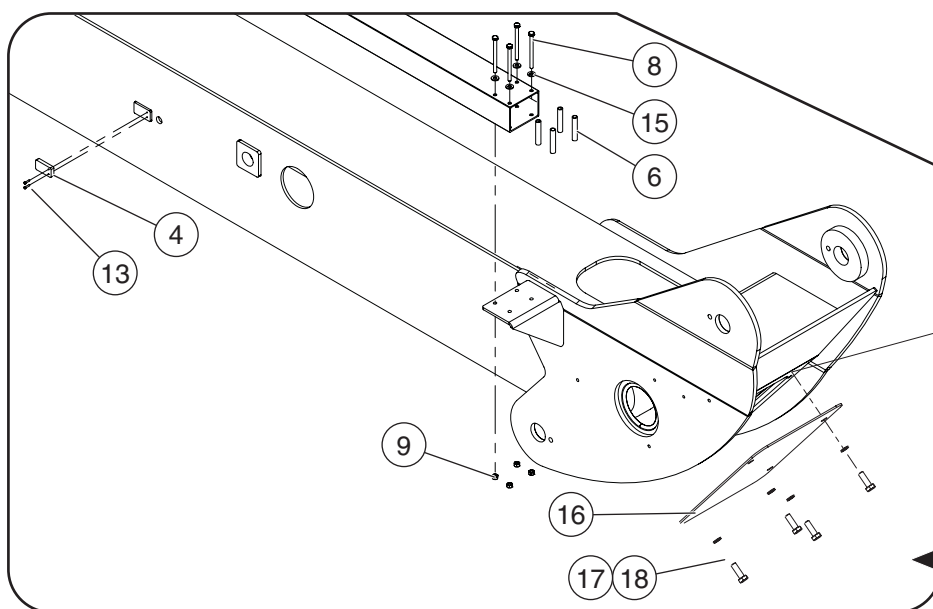
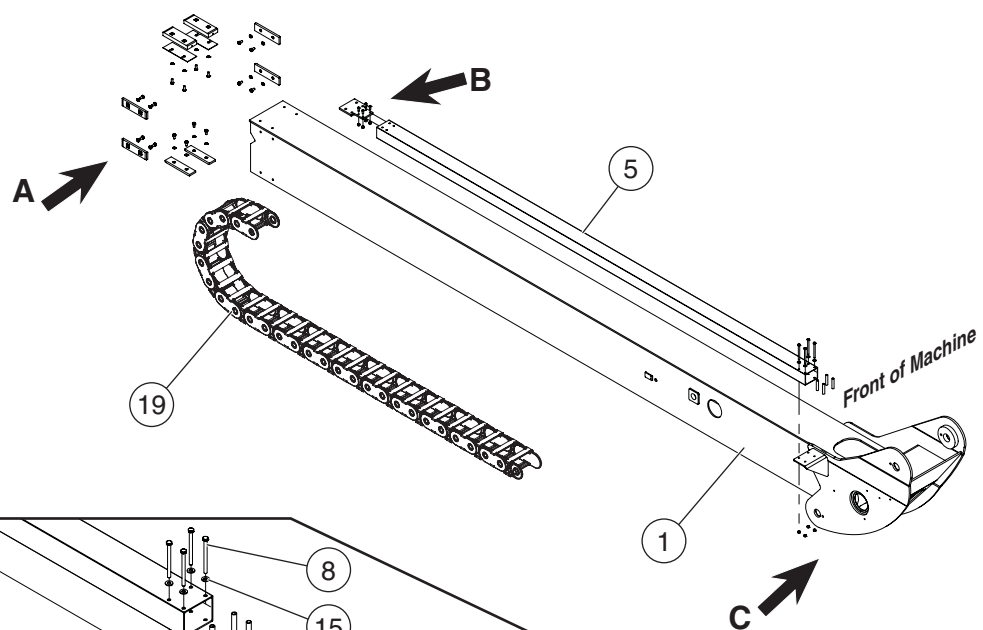
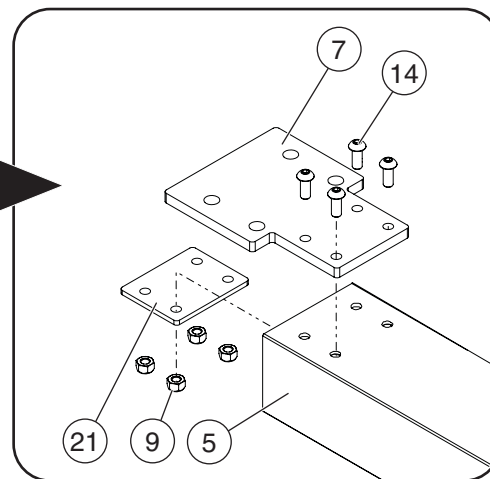
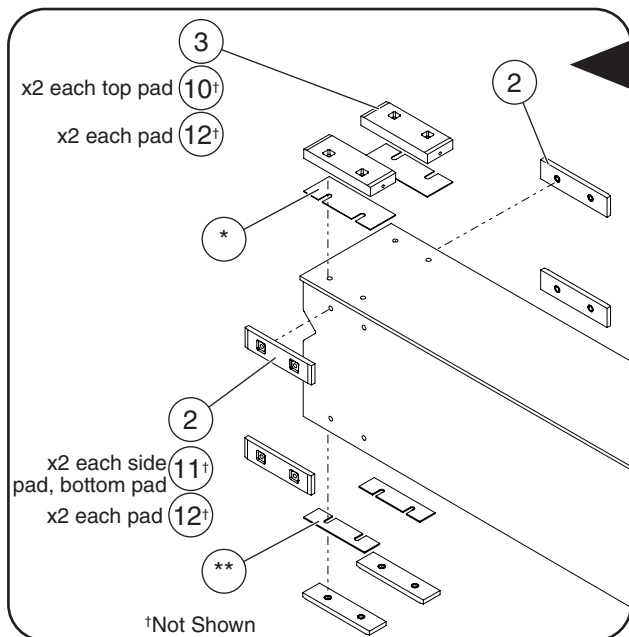


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• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only



End Boom Assembly

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|---------------------------------|
| -- | 84166 | -- | End Boom Assembly |
| 1 | 22048 | 1 | Inner Boom |
| 2 | 11861979 | 6 | Std. Wearpad |
| 3 | 22573 | 2 | Offset Wearpad |
| 4 | 92097 | 1 | Inner Boom Extension Sensor |
| 5 | 22264 | 1 | Cable Tube |
| 6 | 22386 | 4 | Hose Tube Support Tube |
| 7 | 22337 | 1 | Cable Track Mount Plate |
| 8 | 50237 | 4 | Bolt, HHCS M08-1.25x100 08 Zp P |
| 9 | 50048 | 8 | Nut, M08x1.25 08 Zp Nylock |
| 10 | 50033 | 4 | Bolt, HHCS M10-1.50x025 08 Zp F |
| 11 | 50215 | 12 | Bolt, HHCS M10-1.50x020 08 Zp F |
| 12 | 50006 | 16 | Washer, M10 Zp Nordlock |
| 13 | 50155 | 2 | Bolt, SHCS #06-32x00.50 08 Zp |
| 14 | 50124 | 4 | M8 X 1.25 X 20 Button Cap Screw |
| 15 | 50001 | 4 | Washer, M08 Zp Standard Flat |
| 16 | 22309 | 1 | Cover Plate |
| 17 | 50033 | 4 | Bolt, HHCS M10-1.5 x 25 |
| 18 | 50006 | 4 | Washer, M10 Nordlock |
| 19 | 92675† | 1 | Assembly, Cable Track, Metal† |
| 20 | 92098 | 4 | Clip Nut, M10-1.5 |
| 21 | 22769 | 1 | Backing Plate |

Boom sections must be shimmed to a total clearance of .030 inch (.762mm) in both side-to-side and top-to-bottom directions when the boom is in the tightest section.

*Use with the Offset Wearpads (#3) only

| | | | |
|----|-------|---|---------------------|
| -- | 22574 | 2 | Offset Wearpad Shim |
|----|-------|---|---------------------|

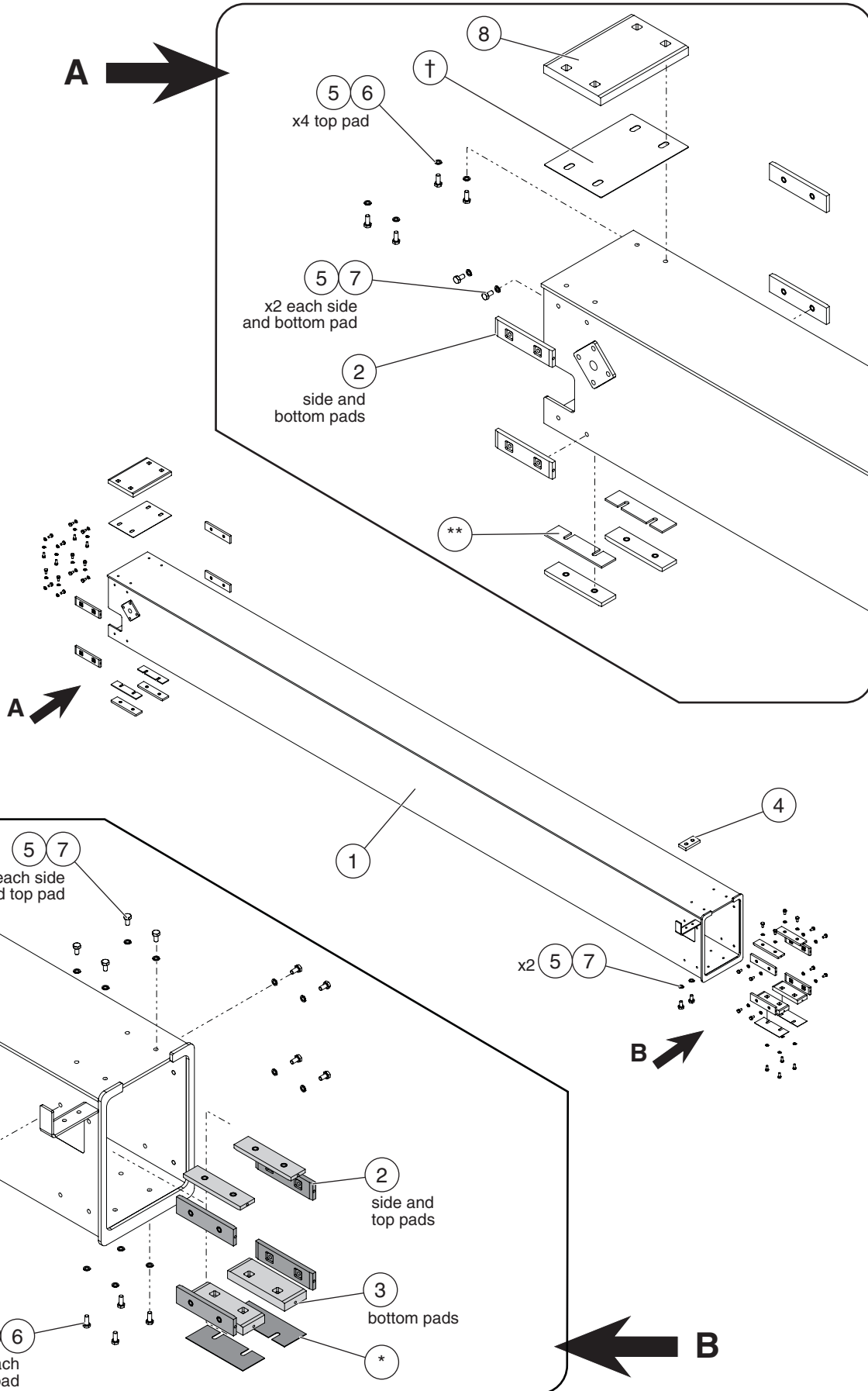
**Use with the Std. Wearpads (#2) only

| | | | |
|----|----------|---------|---------------------|
| -- | 22224 | as req. | Wearpad Shim (0.02) |
| -- | 11861977 | as req. | Wearpad Shim (1mm) |
| -- | 11861981 | as req. | Wearpad Shim (3mm) |
| -- | 11861982 | as req. | Wearpad Shim (5mm) |
| -- | 11861983 | as req. | Wearpad Shim (10mm) |

†Early machines were equipped with plastic cable tracks. If replacing the entire cable track, Items #19, #21 and #7 must be ordered together.

Plastic cable track service parts:

| | | | |
|----|-------|----|--|
| -- | 92327 | -- | 4-ft Replacement Section, Cable Track, Plastic |
| -- | 92328 | -- | Replacement Cross Bar, Plastic, Cable Track, Plastic |
| -- | 92329 | -- | Hub/Cover Kit, Cable Track, Plastic |



mecc
ILLUSTRATION No.
ART_3617

TITAN BOOM 40-S

Mid Boom Assembly

Mid Boom Assembly

| ITEM | PART NO. | QTY | DESCRIPTION |
|--|----------|---------|---------------------------------|
| -- | 84167 | -- | Mid Boom Assembly |
| 1 | 22042 | 1 | Mid Boom |
| 2 | 11861979 | 12 | Std. Wearpad |
| 3 | 22573 | 2 | Offset Wearpad |
| 4 | 22425 | 1 | Slide Block |
| 5 | 50006 | 34 | Washer, M10 Zp Nordlock |
| 6 | 50033 | 8 | Bolt, HHCS M10-1.50x025 08 Zp F |
| 7 | 50215 | 26 | Bolt, HHCS M10-1.50x020 08 Zp F |
| 8 | 22571 | 1 | Rear Wide Wearpad |
| Boom sections must be shimmed to a total clearance of .030 inch (.762mm) in both side-to-side and top-to-bottom directions when the boom is in its tightest section. | | | |
| †Use with the Rear Wide Wearpad (#8) only | | | |
| -- | 22572 | 1 | Wide Wearpad Shim |
| *Use with the Offset Wearpad (#3) only | | | |
| -- | 22574 | 2 | Offset Wearpad Shim |
| **Use with the Std. Wearpads (#2) only | | | |
| -- | 22224 | as req. | Wearpad Shim (.02) |
| -- | 11861977 | as req. | Wearpad Shim (1mm) |
| -- | 11861981 | as req. | Wearpad Shim (3mm) |
| -- | 11861982 | as req. | Wearpad Shim (5mm) |
| -- | 11861983 | as req. | Wearpad Shim (10mm) |

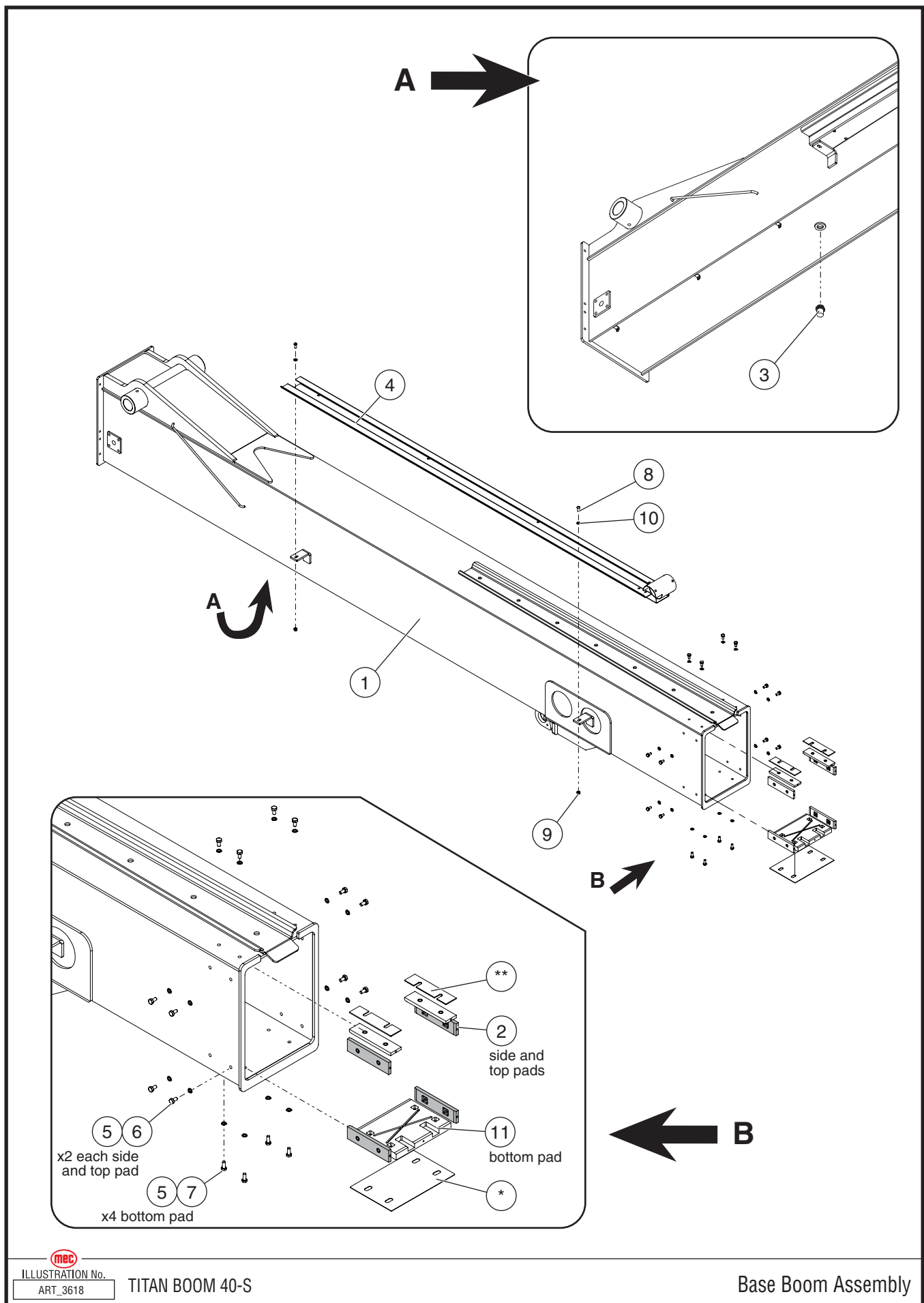


• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only



Base Boom Assembly

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|------------------------------|
| -- | 84168 | -- | Base Boom Assembly |
| 1 | 22024 | 1 | Base Boom |
| 2 | 11861979 | 6 | Top/Side Wearpad |
| 3 | 92032 | 1 | Boom Extend Proximity Switch |
| 4 | 22149 | 1 | Cable Track Carrier Weldment |
| 5 | 50006 | 16 | Washer, M10 Zp Nordlock |
| 6 | 50215 | 12 | Bolt, HHCS M10 x 20 |
| 7 | 50033 | 4 | Bolt, HHCS M10-1.50x25 |
| 8 | 50297 | 2 | Bolt, BHCS M10-1.5x25 |
| 9 | 50049 | 2 | Nut, M10x1.50 Nylock |
| 10 | 50002 | 2 | Washer, M10 Std |
| 11 | 22570 | 1 | Wide Front Wearpad |

Boom sections must be shimmed to a total clearance of .030 inch (.762mm) in both side-to-side and top-to-bottom directions when the boom is in its tightest section.

*Use with the Rear Wide Wearpad (#8) only

| | | | |
|---|-------|---|-------------------|
| * | 22572 | 1 | Wide Wearpad Shim |
|---|-------|---|-------------------|

**Use with the Std. Wearpads (#2) only

| | | | |
|----|----------|---------|---------------------|
| -- | 22224 | as req. | Wearpad Shim (0.02) |
| -- | 11861977 | as req. | Wearpad Shim (1mm) |
| -- | 11861981 | as req. | Wearpad Shim (3mm) |
| -- | 11861982 | as req. | Wearpad Shim (5mm) |
| -- | 11861983 | as req. | Wearpad Shim (10mm) |



• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

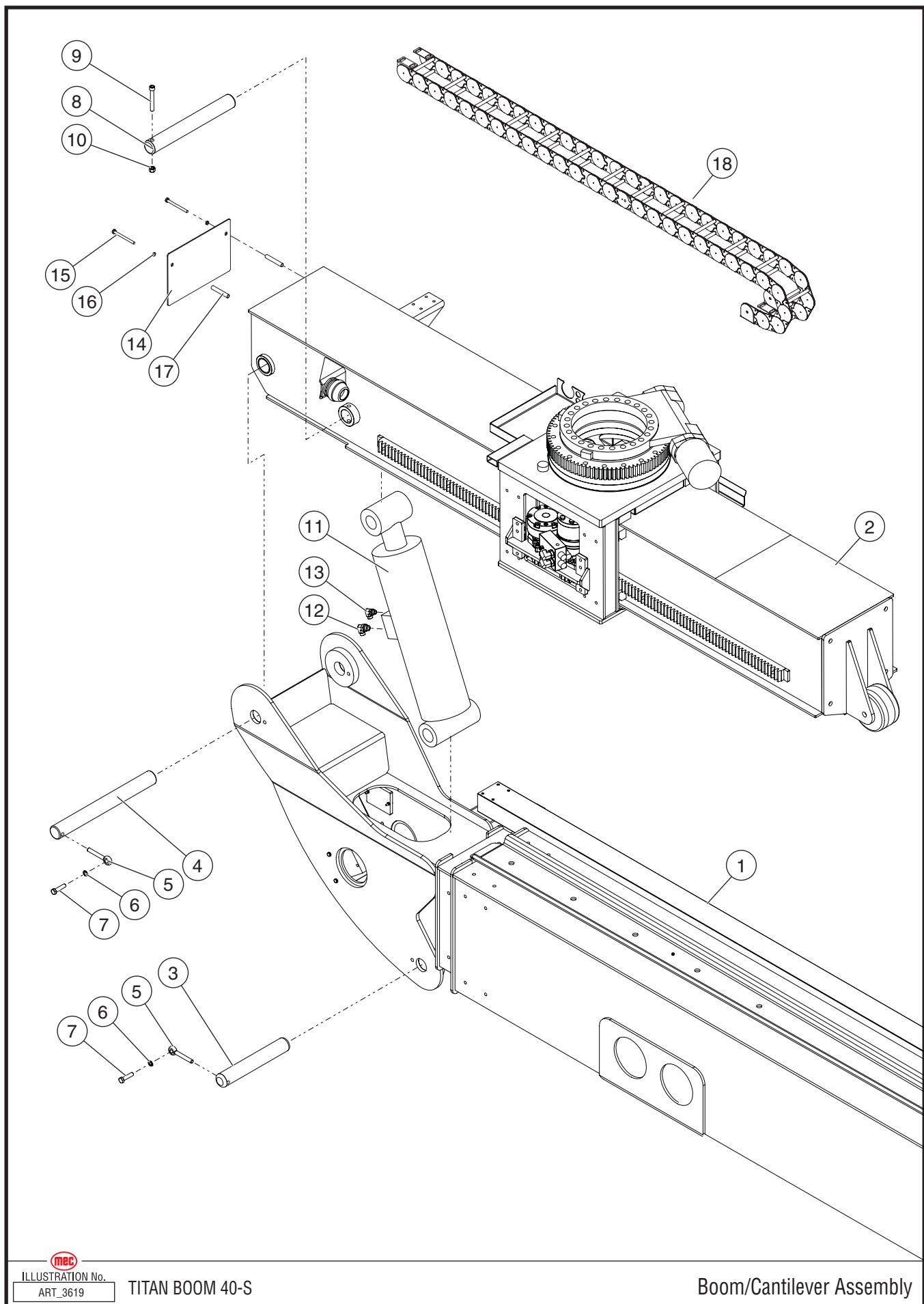


ILLUSTRATION No.
ART_3619

TITAN BOOM 40-S

Boom/Cantilever Assembly

Boom/Cantilever Assembly

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|---|
| -- | 84182 | -- | Boom/Cantilever Assembly |
| 1 | 84176 | 1 | Boom Assembly |
| 2 | 84170 | 1 | Cantilever Assembly |
| 3 | 19121 | 1 | Pin, 2.000 X 12.63 |
| 4 | 22200 | 1 | Pin, 2.000 X 18.75 |
| 5 | 18152 | 2 | Keeper Pin |
| 6 | 50007 | 2 | Washer, M12 Zp Nordlock |
| 7 | 50250 | 2 | Bolt, HHCS M12-1.75x050 10 Zp P |
| 8 | 22199 | 1 | Pin, 2.000 X 15.875 |
| 9 | 50105 | 1 | Bolt, SHCS M12-1.75x090 08 Zp P |
| 10 | 50050 | 1 | Nut, M12x1.75 08 Zp Nylock |
| 11 | 22153 | 1 | Leveling Cylinder |
| 12 | 50847 | 1 | Fitting, MFFOR-MB90-6-8 |
| 13 | 50674 | 1 | Fitting, MFFOR-MB90-06-06 |
| 14 | 22077 | 1 | Cover Plate |
| 15 | 50237 | 2 | Bolt, HHCS M8 x 100 |
| 16 | 50200 | 2 | Washer, M8 Nordlock |
| 17 | 22385 | 2 | Spacer |
| 18 | 92030 | 1 | Cable Track |
| -- | 92330 | -- | Crossbar Repair Kit for 92030 Cable Track |



• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

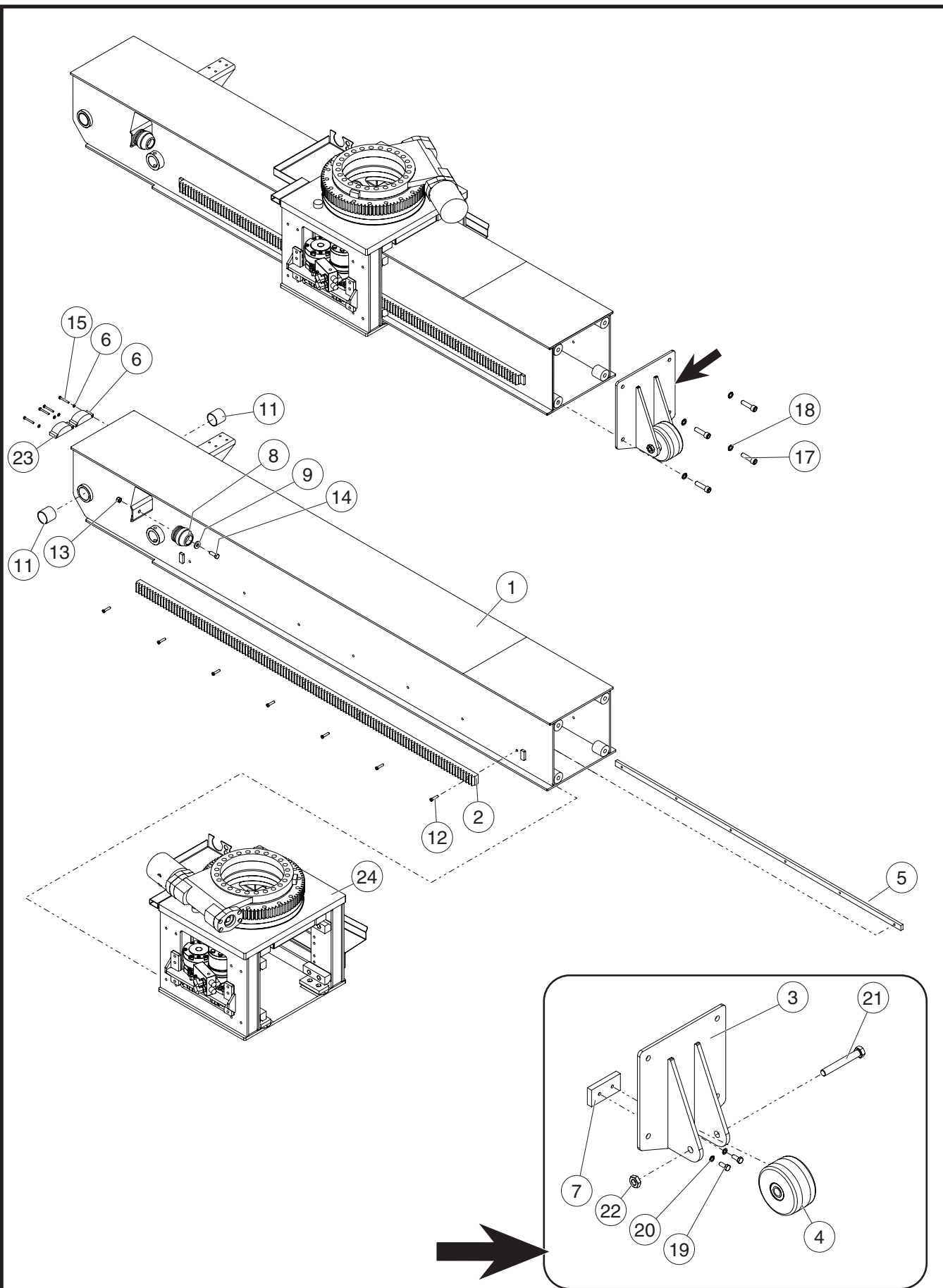


ILLUSTRATION No.
ART_3620

TITAN BOOM 40-S

Cantilever Assembly

Cantilever Assembly

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|--|
| -- | 84170 | -- | Cantilever Assembly |
| 1 | 22494* | 1 | Cantilever Beam |
| 2 | 22140 | 1 | Rack Gear |
| 3 | 22506 | 1 | Carriage Stop Weldment |
| 4 | 19047 | 1 | Roller Wheel |
| 5 | 22286 | 1 | Rack Bolt Plate |
| 6 | 92009 | 1 | SERIAL # ~12400101 -- Can Tilt 151 |
| | 92201 | 1 | SERIAL # 12400102~ -- Can Tilt 161 w/ Deutsch Connector |
| 7 | 22425 | 1 | Slide Block |
| 8 | 92096 | 1 | Bumper |
| 9 | 22473 | 1 | Bumper Washer |
| 10 | -- | -- | -- |
| 11 | 92110 | 2 | Bearing |
| 12 | 50260 | 7 | Bolt, SHCS M08-1.25x035 10 Zp P Low Head |
| 13 | 50050 | 1 | Nut, M12x1.75 08 Zp Nylock |
| 14 | 50040 | 1 | Bolt, HHCS M12-1.75x035 |
| 15 | 50262 | 4 | Bolt, HHCS M06-1.00x050 |
| 16 | 50000 | 4 | Washer, M06 Zp Standard Flat |
| 17 | 50011 | 4 | Bolt, SHCS M16-2.00x060 |
| 18 | 50249 | 4 | Washer, M16 Zp Nordlock 5/8 |
| 19 | 50033 | 2 | Bolt, HHCS M10-1.50x025 |
| 20 | 50006 | 2 | Washer, M10 Zp Nordlock |
| 21 | 50059 | 1 | Bolt, HHCS 03/04-10x05.50 |
| 22 | 50118 | 1 | Nut, 03/04-10 |
| 23 | 91960 | 1 | SERIAL # ~12400101 -- Can Tilt 153 |
| | 92203 | 1 | SERIAL # 12400102~ -- Can Tilt 163 w/ Deutsch Connector |
| 24 | 84171 | 1 | Carriage Assembly |

*Serial numbers up to 12400033:

When replacing Part #22494 Cantilever Beam, you must also replace:

- #22495 Carriage Weldment (qty 1)
- #22506 End Plate (qty 1)
- #22504 Top Carriage Wear Pad (qty 4)
- #50299 Bolt, Platform Rotate Ring (qty 18)

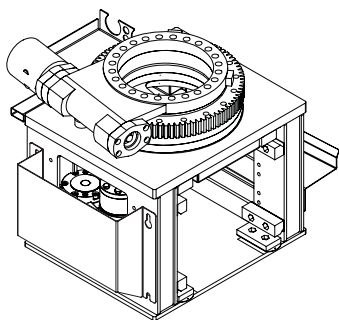


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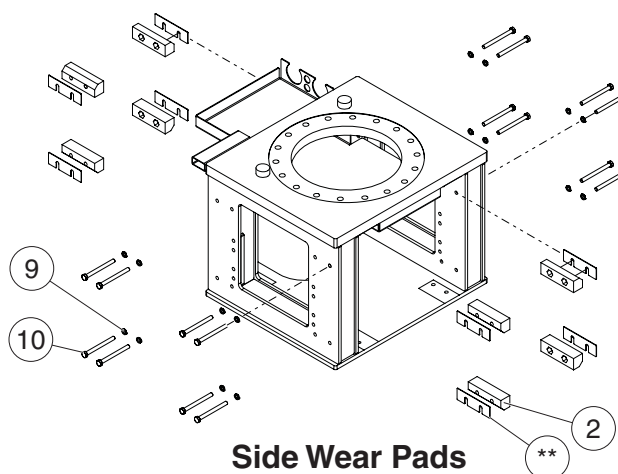
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• NS: Not a Stock item

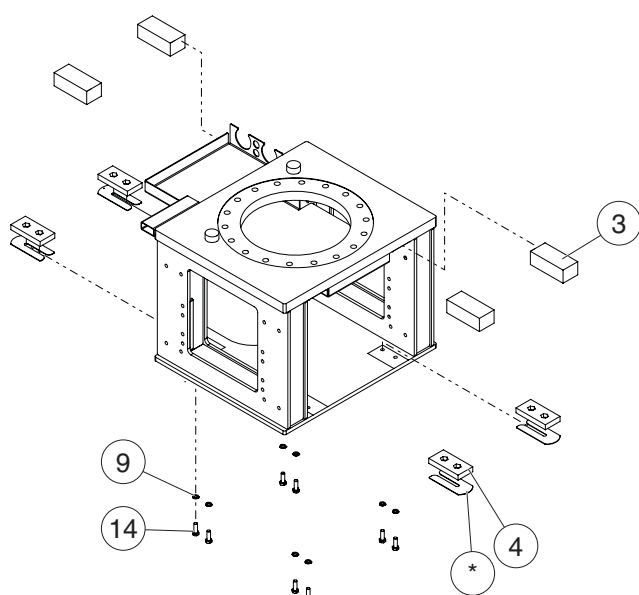
• REF: Reference only



Assembled



Side Wear Pads



**Top & Bottom
Wear Pads**

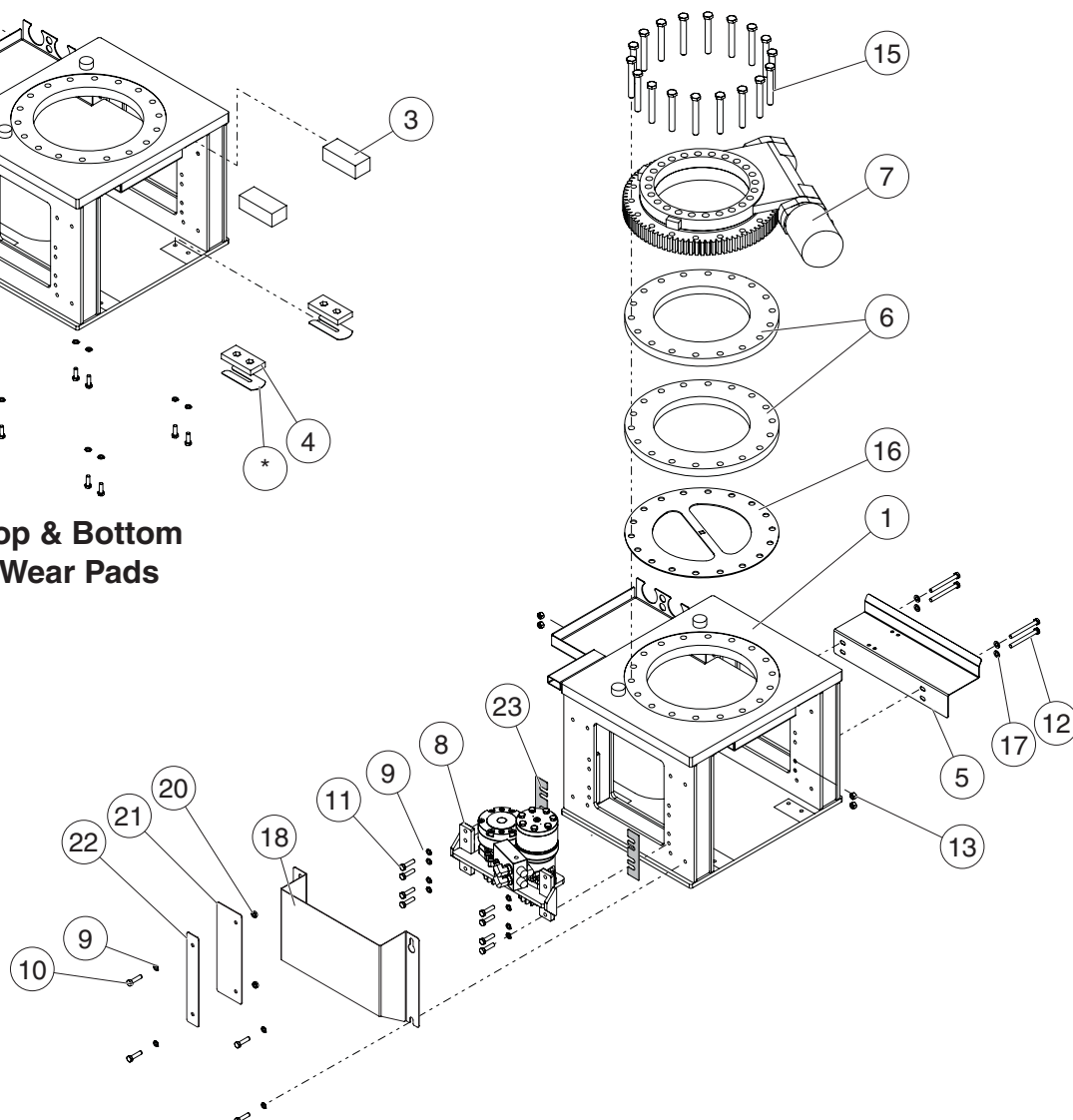


ILLUSTRATION No.
ART_3621

TITAN BOOM 40-S

Carriage Assembly

Carriage Assembly

| ITEM | PART NO. | QTY | DESCRIPTION |
|--|----------|-----------|---|
| -- | 84171 | -- | Carriage Assembly |
| 1 | 22495† | 1 | Carriage Weldment |
| 2 | 22248 | 8 | Carriage Side Wearpad |
| 3 | 22504 | 4 | Carriage Top Wearpad |
| 4 | 18138 | 4 | Carriage Lower Wearpad |
| 5 | 22138 | 1 | Carriage Track Mount |
| 6 | 22289 | 2 | Slew Drive Spacer |
| 7 | REF | 1 | Slew Drive -- See Section E |
| 8 | 84173 | 1 | Carriage Motor Assembly |
| 9 | 50006 | 36 | Washer, M10 Zp Nordlock |
| 10 | 50257 | 20 | Bolt, HHCS M10-1.50x110 08 Zp P |
| 11 | 50035 | 8 | Bolt, HHCS M10-1.50x040 08 Zp F |
| 12 | 50209 | 4 | Bolt, HHCS M10-1.50x100 08 Zp P |
| 13 | 50049 | 4 | Nut, M10x1.50 |
| 14 | 50034 | 8 | Bolt, HHCS M10-1.50x030 08 Zp F |
| 15 | 50299 | 18 | Outer Swing Bearing Bolt -- |
| 16 | 22539 | 1 | Platform Rotation Keyed Shim Plate |
| 17 | 50002 | 4 | Washer, M10 Zp Standard Flat |
| 18 | 22326 | 1 | Carriage Motor Cover |
| 19 | -- | -- | -- |
| 20 | 22620 | 2 | Spacer |
| 21 | 22618 | 1 | Carriage Guard Flap-- CE option package only |
| 22 | 22619 | 1 | Bracket, Carriage Guard Flap-- CE option package only |
| 23 | 22195 | As needed | Carriage Drive Shim -- Shim as needed so that the end of the gear teeth do not contact bottom of the teeth on the Cantilever Beam Rack Gear (Item #2 on previous page) |
| Carriage must be shimmed to a total clearance of .030 inch (.762mm) in both side-to-side and top-to-bottom directions when the carriage is in the tightest section of the platform beam. | | | |
| *Use with the Carriage Lower Wearpad (#4) only | | | |
| -- | 18235 | - | Small Wear Pad Shim (0.06) |
| -- | 18236 | - | Small Wearpad Shim (0.03) |
| **Use with the Carriage Side Wearpads (#2) only | | | |
| -- | 22188 | - | Carriage Wearpad Shim (0.06) |
| -- | 22194 | - | Carriage Wearpad Shim (0.03) |

†Serial numbers up to 12400033:

When replacing Part #22495 Carriage Weldment, you must also replace:

- #22494 Cantilever Beam (qty 1)
- #22506 End Plate (qty 1)
- #22504 Top Carriage Wear Pad (qty 4)
- #50299 Bolt, Platform Rotate Ring (qty 18)



• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

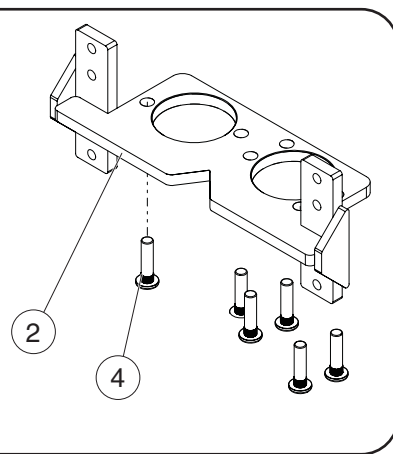
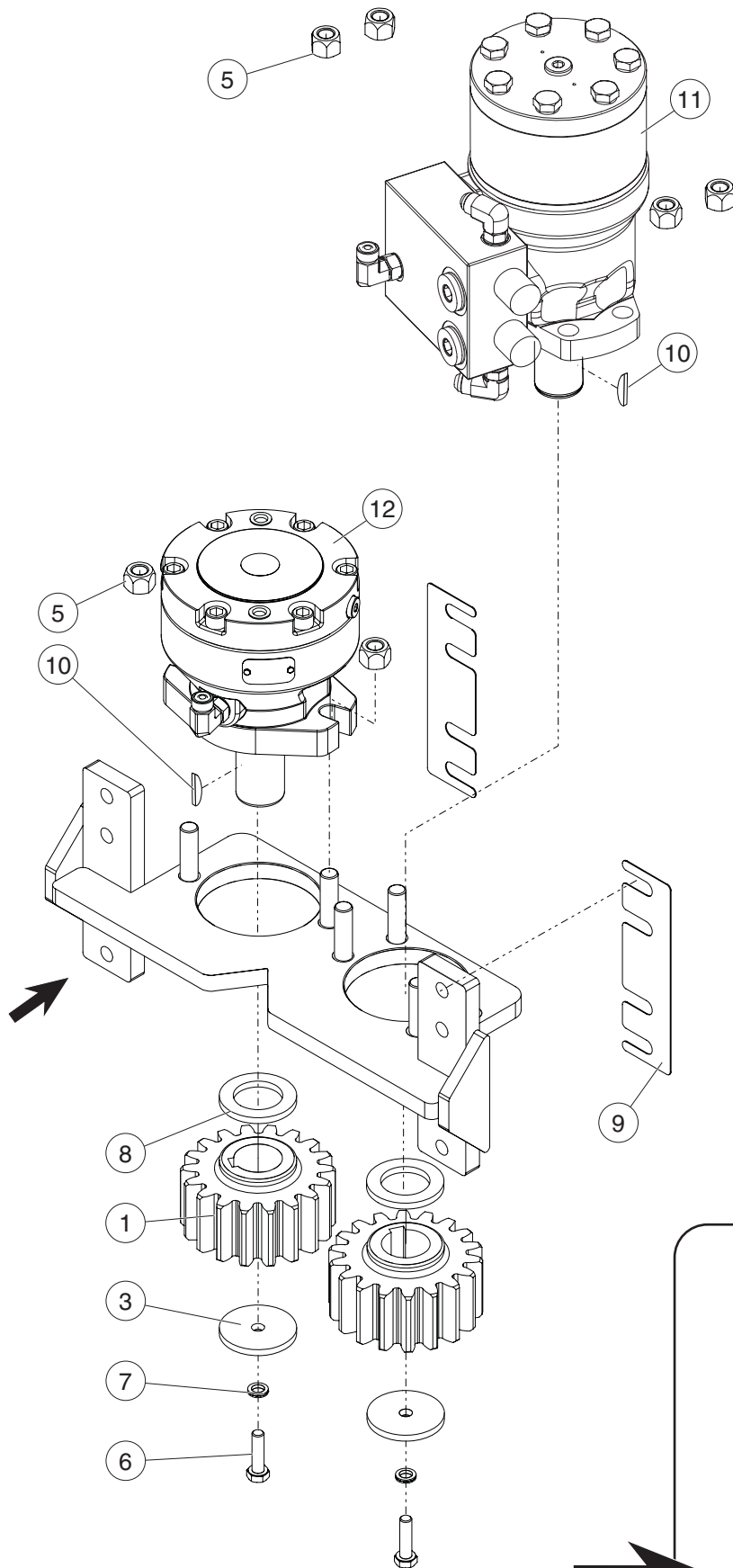



 ILLUSTRATION No.
 ART_3622

TITAN BOOM 40-S

Carriage Motor Assembly

Carriage Motor Assembly

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|--------------|--|
| -- | 84173 | -- | Carriage Motor Assembly |
| 1 | 22141 | 2 | Pinion Gear |
| 2 | 22086 | 1 | Carriage Drive Mounting Plate |
| 3 | 22320 | 2 | Pinion Retaining Washer |
| 4 | 92407 | 6 | M12-1.5x045 Wheel Stud |
| 5 | 50305 | 6 | Nut, M12x1.50 08 Zp Nylock |
| 6 | 50032 | 2 | Bolt, HHCS M08-1.25x030 08 Zp F |
| 7 | 50200 | 2 | Washer M08 Zp Nordlock |
| 8 | 22322 | 2 | Pinion Spacer |
| 9 | 22195 | As needed | Carriage Drive Shim -- Shim as needed so that the end of the gear teeth do not contact bottom of the teeth on the Cantilever Beam Rack Gear (Item #2 on page C-17) |
| 10 | 92658 | 2 | Shaft Key |
| 11 | REF | 1 | Carriage Motor -- See Section E |
| 12 | REF | 1 | Carriage Brake -- See Section E |



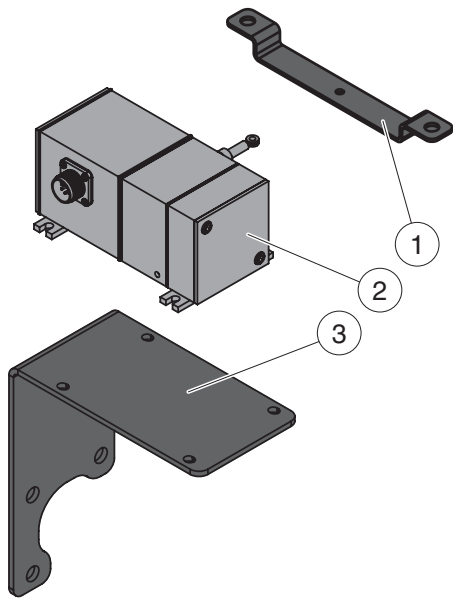
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• INCL: Included with assembly

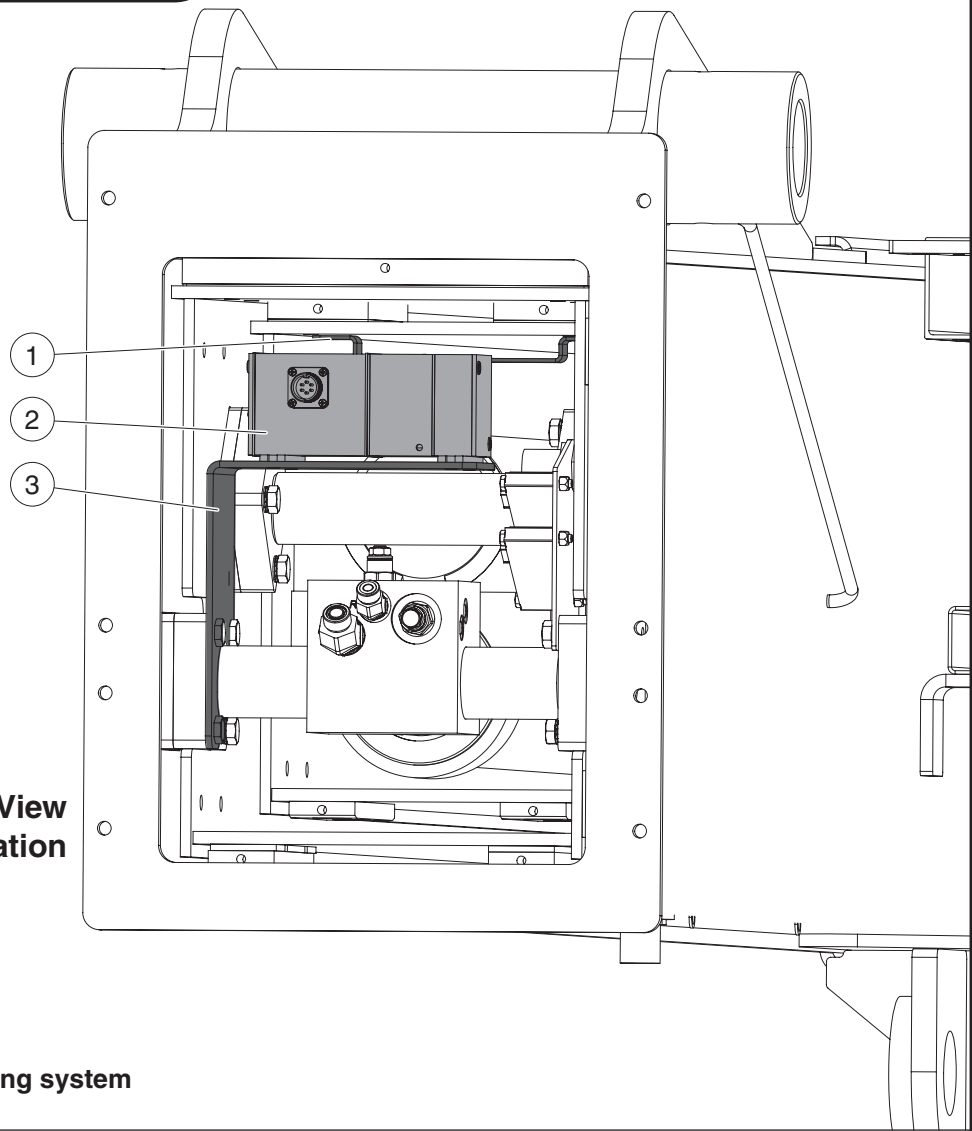
• NS: Not a Stock item

• REF: Reference only

Exploded View



Boom -- Rear View showing installation



**These parts are used only
on machines equipped with
the optional Overload Sensing system**



ILLUSTRATION No.
ART_3775

TITAN BOOM 40-S

Cable Extension Transducer Components

Cable Extension Transducer Components

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|-----------------------------------|
| 1 | 22239 | 1 | Bracket, Cable Extension Target |
| 2 | 92634 | 1 | Cable Extension Transducer |
| 3 | 22238 | 1 | Bracket, Cable Extension Mounting |

These parts are used only on machines equipped with the optional Overload Sensing System.



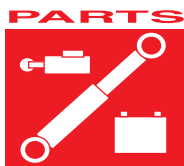
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• NS: Not a Stock item

• REF: Reference only

NOTES:



SECTION B

PLATFORM AND RAILS

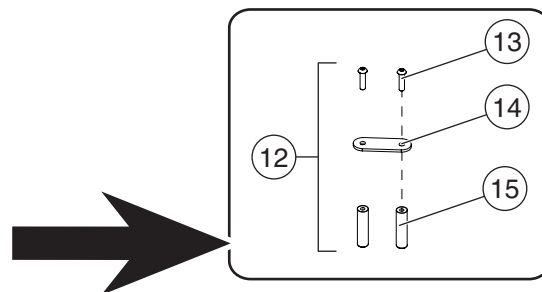
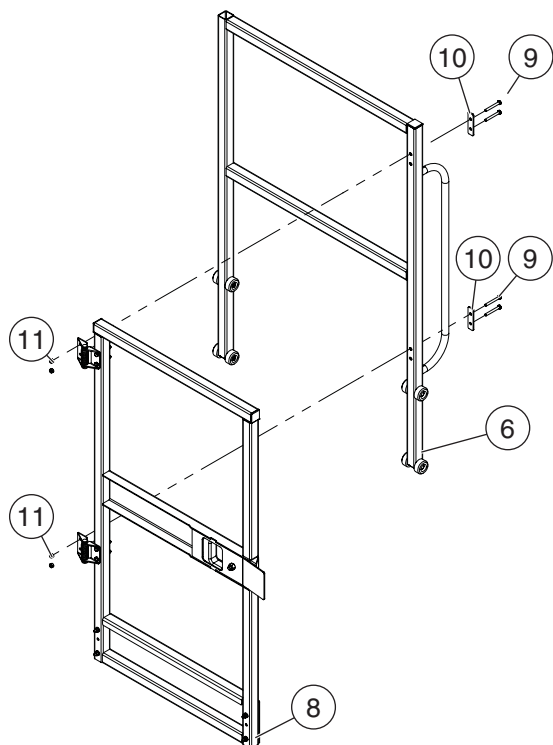
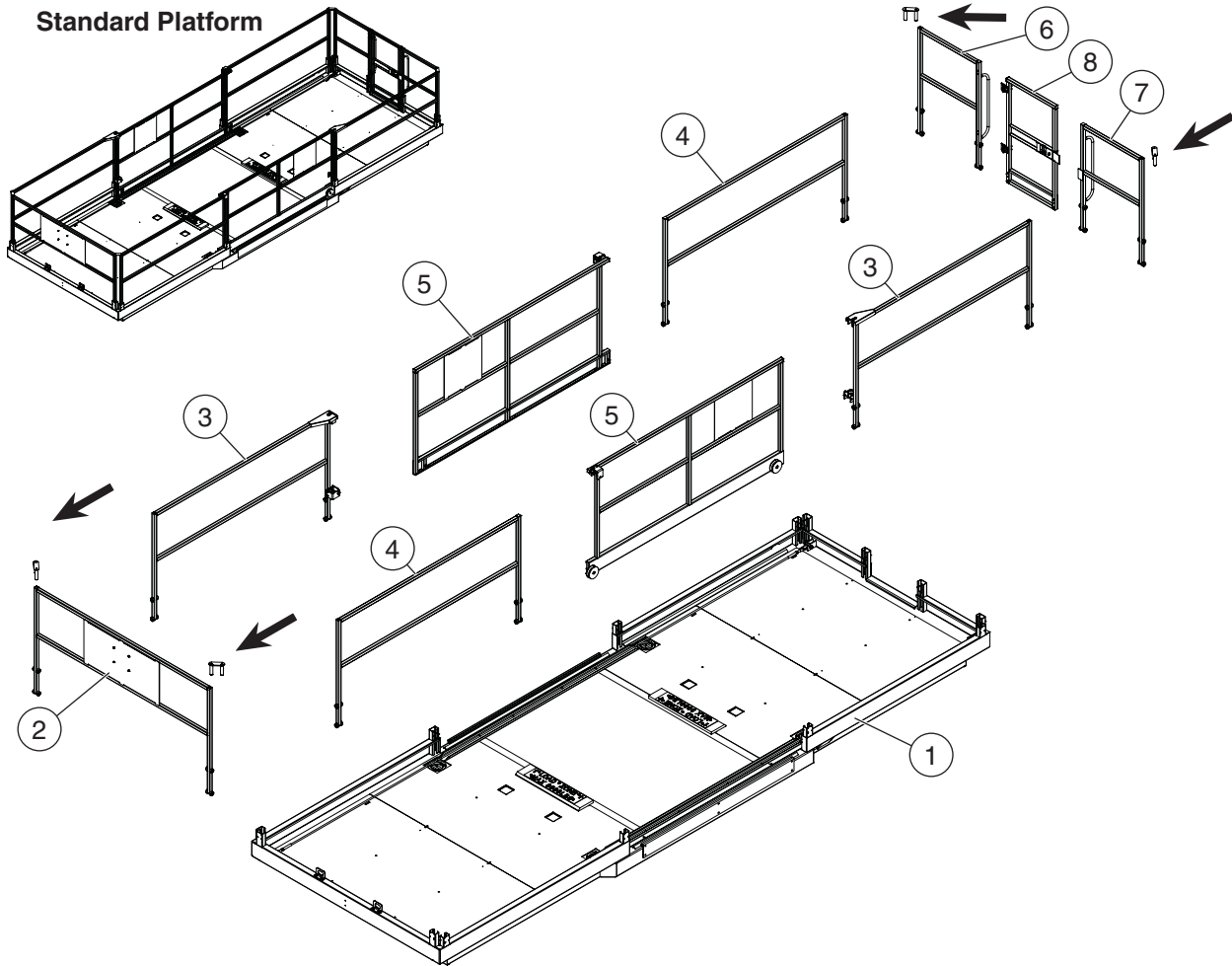
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Standard Platform



GUARD RAILS

ILLUSTRATION No.
ART_3603

TITAN BOOM 40-S

Standard Platform, Guardrails

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|-------------------------------|
| -- | 84158 | 1 | Platform/Guardrail Assembly |
| 1 | REF | 1 | Platform |
| 2 | 84159 | 1 | Front Rail Assembly |
| 3 | 84160 | 2 | Right Side Rail Assembly |
| 4 | 84161 | 2 | Left Side Rail Assembly |
| 5 | 84162 | 2 | Sliding Gate Assembly |
| 6 | 84164 | 1 | Right Rear Rail Assembly |
| 7 | 84165 | 1 | Left Rear Rail Assembly |
| 8 | 84163 | 1 | Personnel Entry Gate Assembly |
| 9 | 50262 | 4 | Bolt, HHCS M06-1.00 x 050 |
| 10 | 19239 | 2 | Hinge Spacer |
| 11 | 50047 | 18 | Nut, M06x1.00 08 Zp Nylock |
| 12 | 84148 | 4 | Rail Corner Reinforcement |
| 13 | 50286 | 8 | Bolt, BHCS M12-1.75 x 50 |
| 14 | 22458 | 8 | Rail Cap |
| 15 | 22459 | 4 | Rail Corner |



• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

Standard Platform

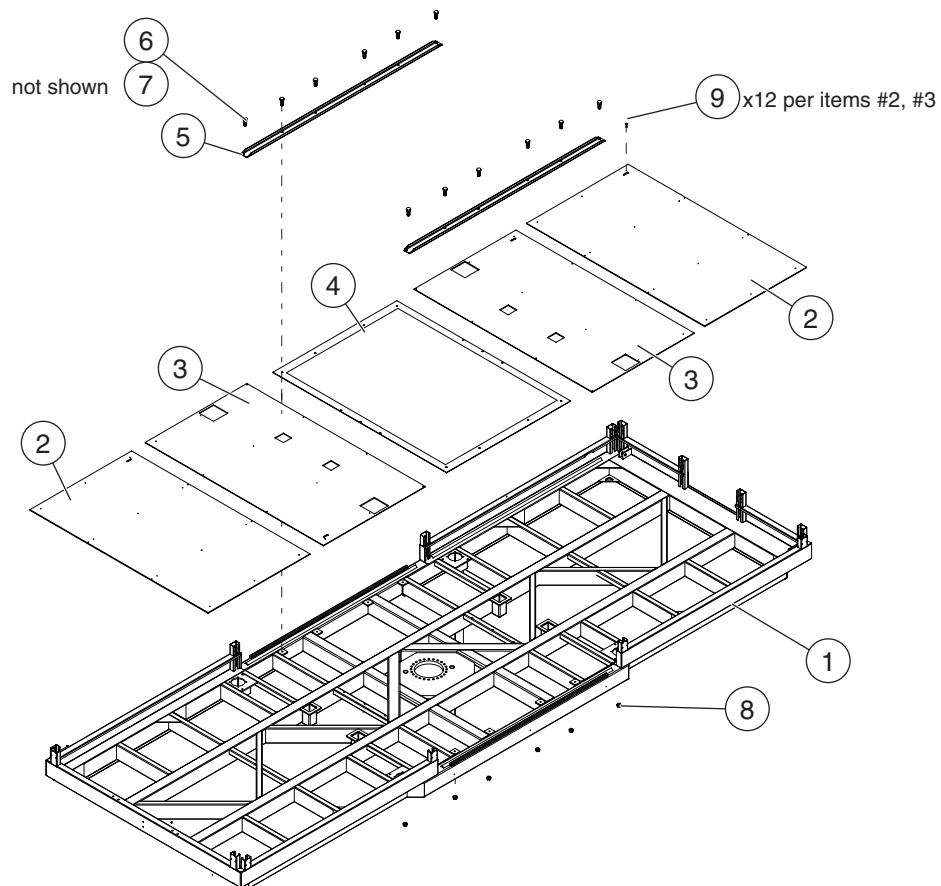
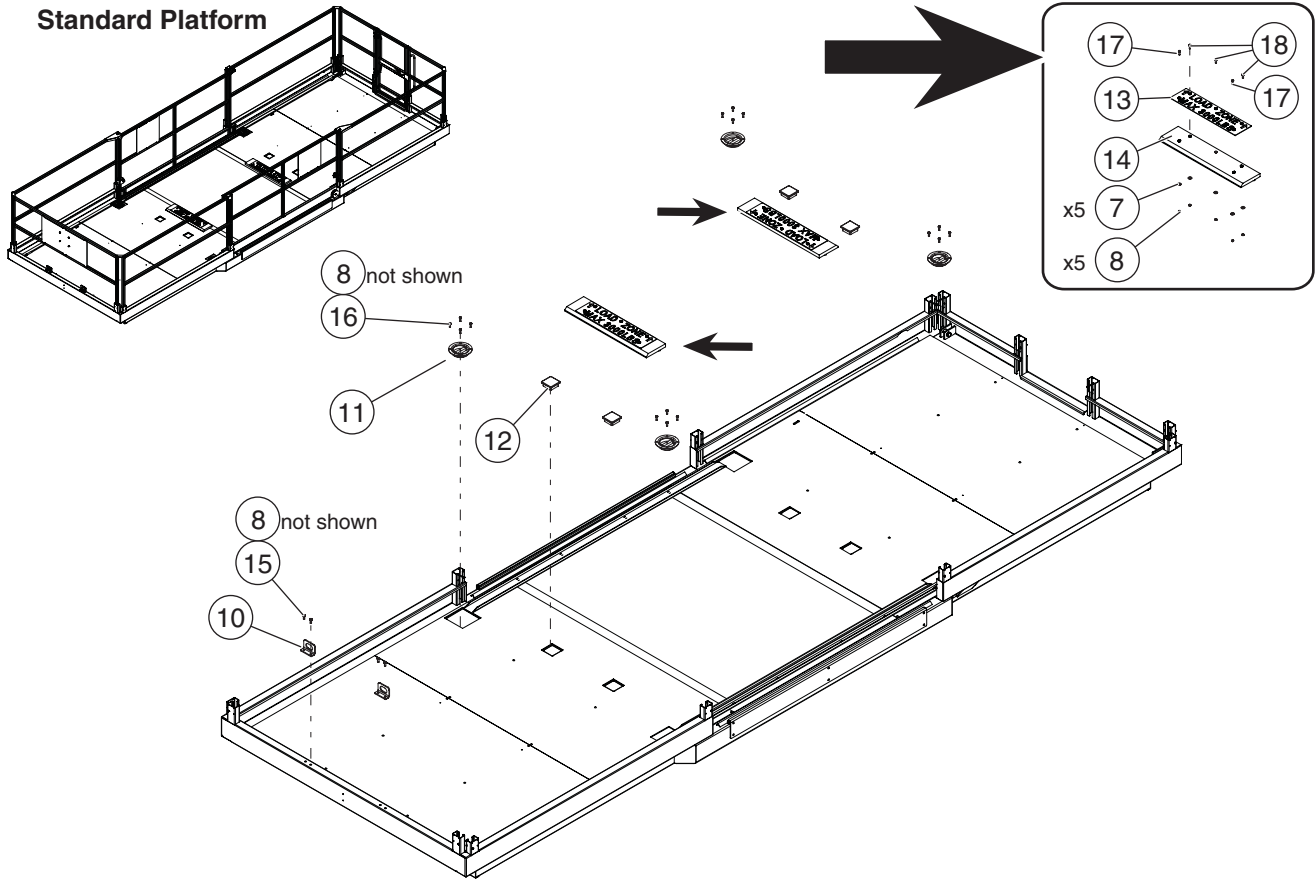


ILLUSTRATION No.
ART_3604

TITAN BOOM 40-S

Deck Components, 1 of 2

Standard Platform, Deck Components, 1 of 2

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|-----------------------|
| 1 | 22095 | 1 | Platform Weldment |
| 2 | 22420 | 2 | Deck Plate, Outer |
| 3 | 22419 | 2 | Deck Plate, Inner |
| 4 | 22281 | 1 | Deck Plate, Load Zone |
| 5 | 22463 | 2 | Channel, Lanyard |
| 6 | 50309 | 12 | Screw, BHCS M10 x 40 |
| 7 | 50002 | 17 | Washer, M10 Std |
| 8 | 50049 | 37 | Nut, M10 Nylock |
| 9 | 92251 | 48 | Rivet, SSB8-8S |
| 10 | 3923 | 2 | Bracket, Lanyard |
| 11 | 92090 | 4 | D-Ring, Swivel |
| 12 | 92454 | 4 | Socket Cap |
| 13 | 22484 | 2 | Plate, Load Zone |
| 14 | 22426 | 2 | Stop Block, Load Zone |
| 15 | 50033 | 4 | Bolt, HHCS M10 x 25 |
| 16 | 50031 | 16 | Bolt, HHCS M8 x 25 |
| 17 | 50036 | 6 | Bolt, HHCS M10 x 50 |
| 18 | 50209 | 4 | Bolt, HHCS M10 x 100 |



• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

Standard Platform

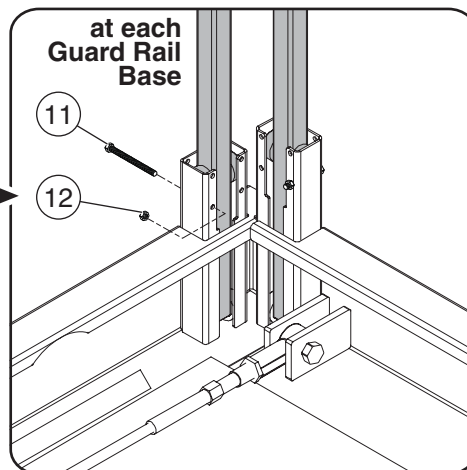
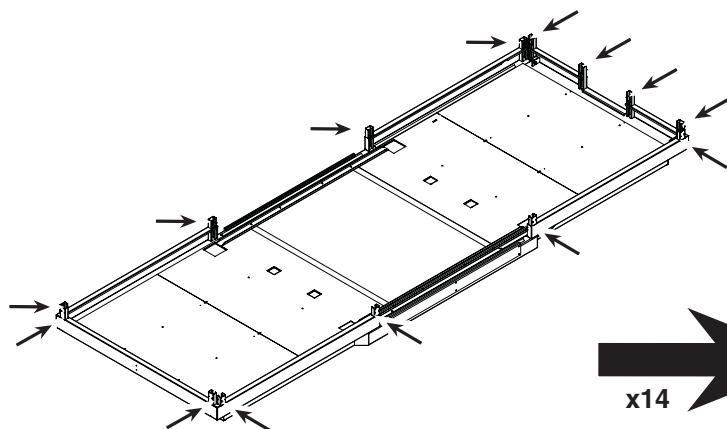
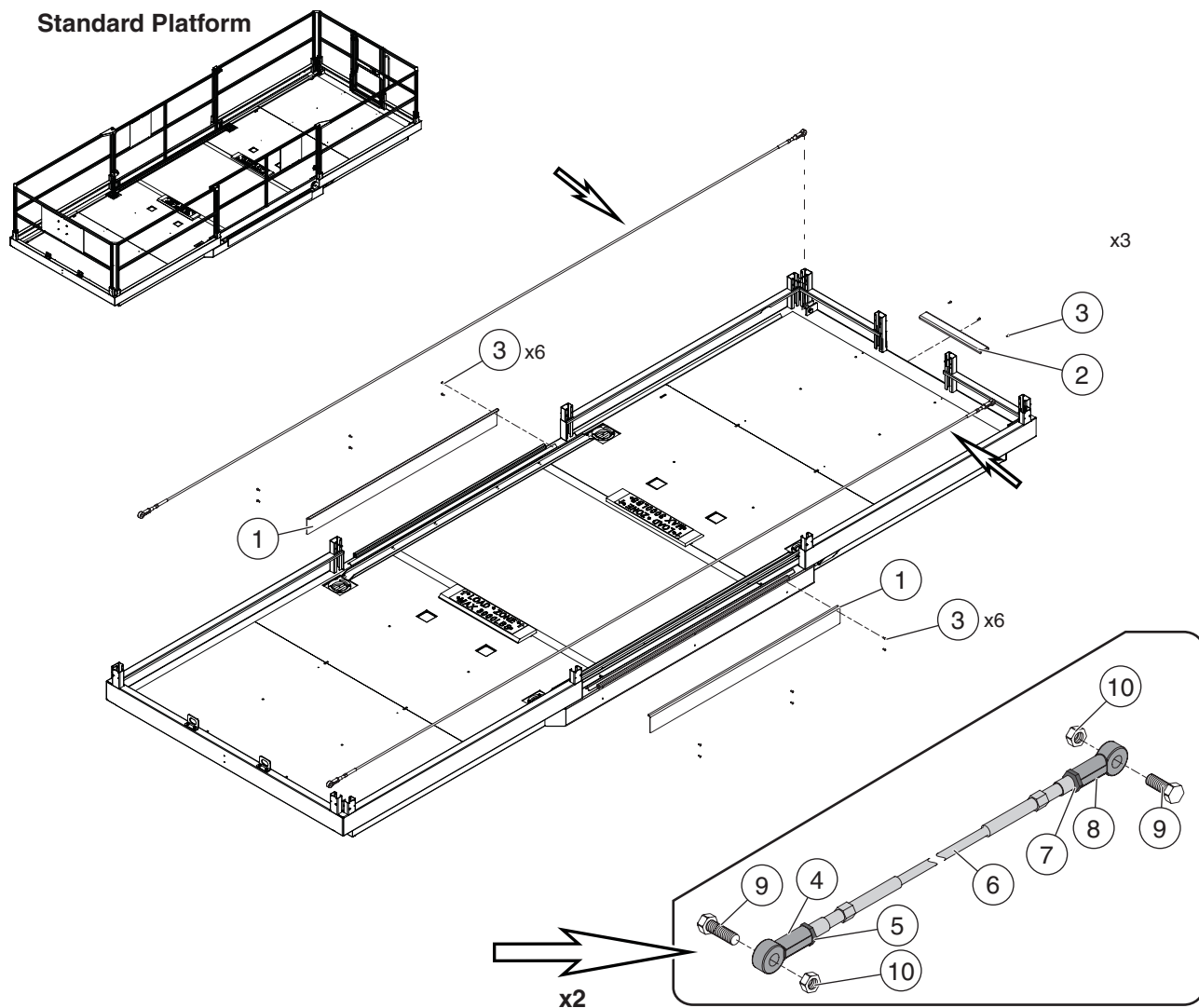


ILLUSTRATION No.
ART_3605

TITAN BOOM 40-S

Deck Components, 2 of 2



Standard Platform, Deck Components, 2 of 2

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|-----------------------------|
| 1 | 22379 | 2 | Trim, Loading Gate |
| 2 | 22545 | 1 | Raised Entry |
| 3 | 92251 | 15 | Rivet, SSB8-8S |
| 4 | 92091 | 2 | Heim Joint, 3/4" Right-Hand |
| 5 | 92094 | 2 | Jam nut, 3/4" Right-Hand |
| 6 | 92093 | 2 | Cable, Lanyard Attachment |
| 7 | 92095 | 2 | Jam nut, 3/4" Left-Hand |
| 8 | 92092 | 2 | Heim Joint, 3/4" Left-Hand |
| 9 | 50304 | 4 | Bolt, HHCS 3/4" x 2.5" |
| 10 | 50118 | 4 | Nut, 3/4" Nylock |
| 11 | 50125 | 14 | Bolt, HHCS M6 x 55 |
| 12 | 50047 | 14 | Nut, M6 Nylock |



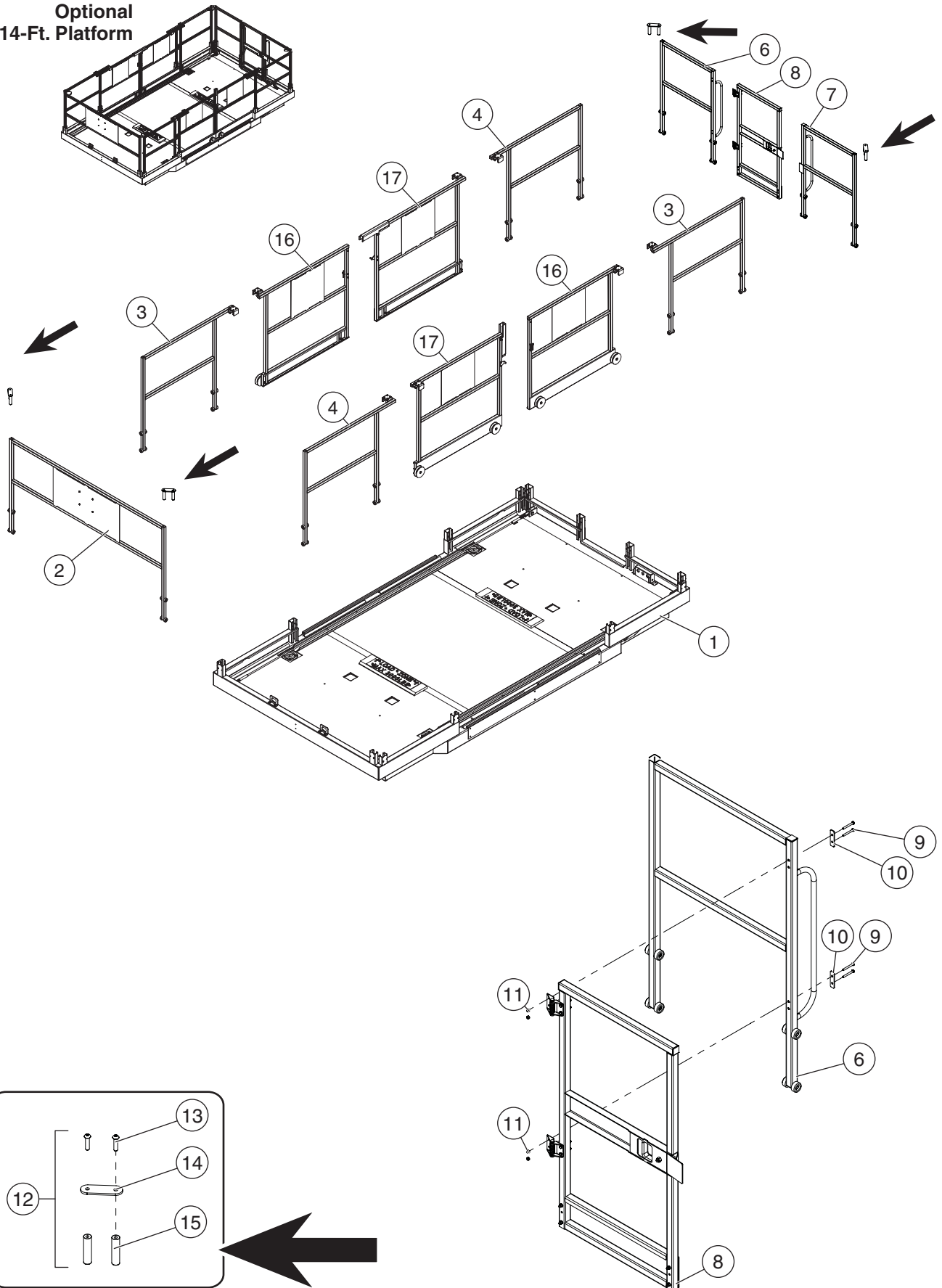
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• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

**Optional
14-Ft. Platform**



mecc
ILLUSTRATION No.
ART_4186

TITAN BOOM 40-S

OPTION -- 14ft. Platform -- GUARD RAILS

OPTION -- 14Ft. Platform, Guardrails

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|------------------------------------|
| -- | 84224 | 1 | 14-Ft. Platform/Guardrail Assembly |
| 1 | REF | 1 | Platform |
| 2 | 84159 | 1 | Front Rail Assembly |
| 3 | 84226 | 2 | Right Side Rail Assembly |
| 4 | 84229 | 2 | Left Side Rail Assembly |
| 5 | -- | -- | -- |
| 6 | 84164 | 1 | Right Rear Rail Assembly |
| 7 | 84165 | 1 | Left Rear Rail Assembly |
| 8 | 84163 | 1 | Personnel Entry Gate Assembly |
| 9 | 50262 | 4 | Bolt, HHCS M06-1.00 x 050 |
| 10 | 19239 | 2 | Hinge Spacer |
| 11 | 50047 | 18 | Nut, M06x1.00 08 Zp Nylock |
| 12 | 84148 | 4 | Rail Corner Reinforcement |
| 13 | 50286 | 8 | Bolt, BHCS M12-1.75 x 50 |
| 14 | 22458 | 8 | Rail Cap |
| 15 | 22459 | 4 | Rail Corner |
| 16 | 84227 | 2 | Left Side Gate Assembly |
| 17 | 84228 | 2 | Right Side Gate Assembly |

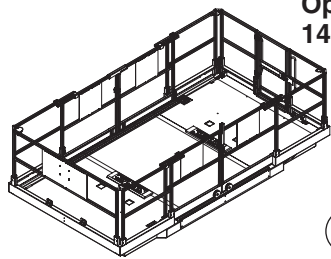


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• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only



Optional 14-Ft. Platform

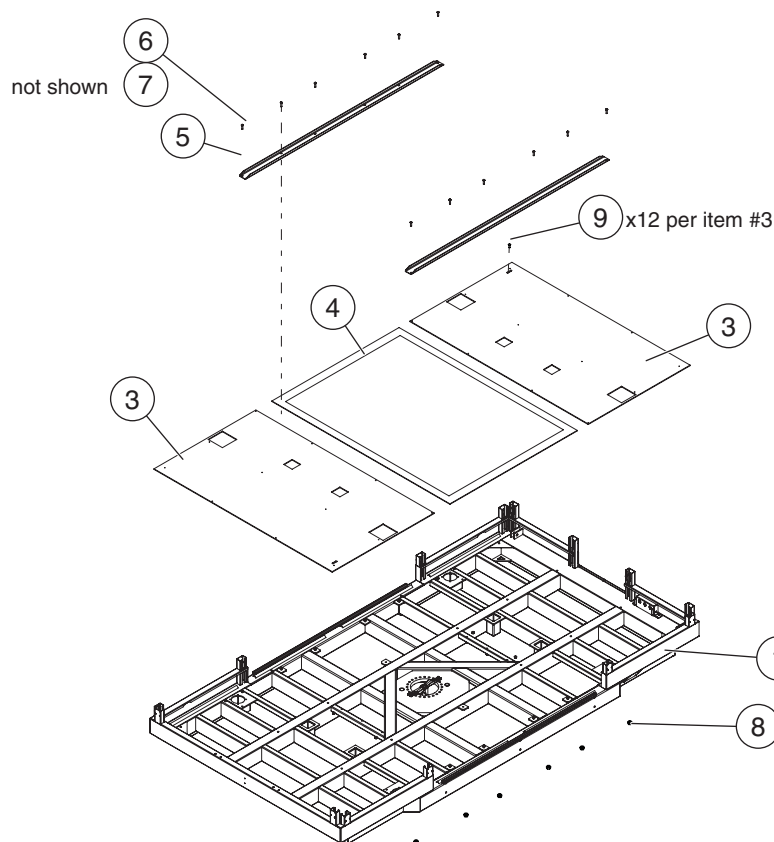
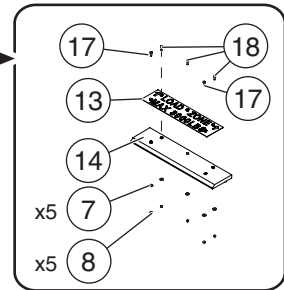
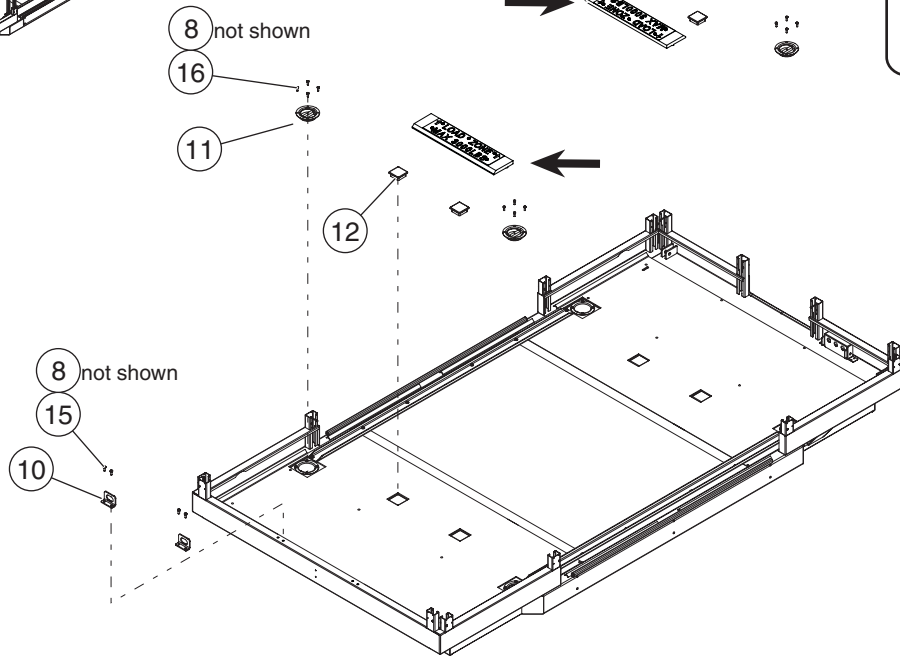


ILLUSTRATION No.
ART_4187

TITAN BOOM 40-S

OPTION -- 14ft. Platform -- Deck Components, 1 of 2

OPTION -- 14Ft. Platform, Deck Components, 1 of 2

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|-----------------------|
| 1 | 22701 | 1 | Platform Weldment |
| 2 | -- | -- | -- |
| 3 | 22419 | 2 | Deck Plate |
| 4 | 22281 | 1 | Deck Plate, Load Zone |
| 5 | 22463 | 2 | Channel, Lanyard |
| 6 | 50309 | 12 | Screw, BHCS M10 x 40 |
| 7 | 50002 | 17 | Washer, M10 Std |
| 8 | 50049 | 37 | Nut, M10 Nylock |
| 9 | 92251 | 24 | Rivet, SSB8-8S |
| 10 | 3923 | 2 | Bracket, Lanyard |
| 11 | 92090 | 4 | D-Ring, Swivel |
| 12 | 92454 | 4 | Socket Cap |
| 13 | 22484 | 2 | Plate, Load Zone |
| 14 | 22426 | 2 | Stop Block, Load Zone |
| 15 | 50033 | 4 | Bolt, HHCS M10 x 25 |
| 16 | 50031 | 16 | Bolt, HHCS M8 x 25 |
| 17 | 50036 | 6 | Bolt, HHCS M10 x 50 |
| 18 | 50209 | 4 | Bolt, HHCS M10 x 100 |



• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

**Optional
14-Ft. Platform**

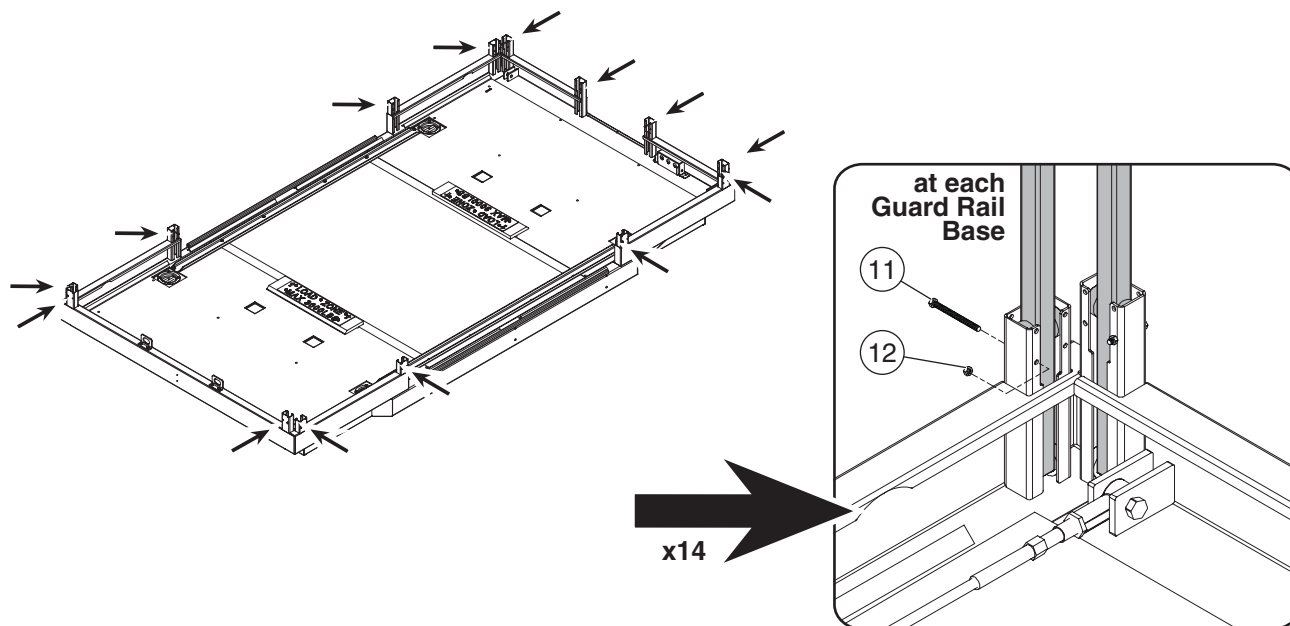
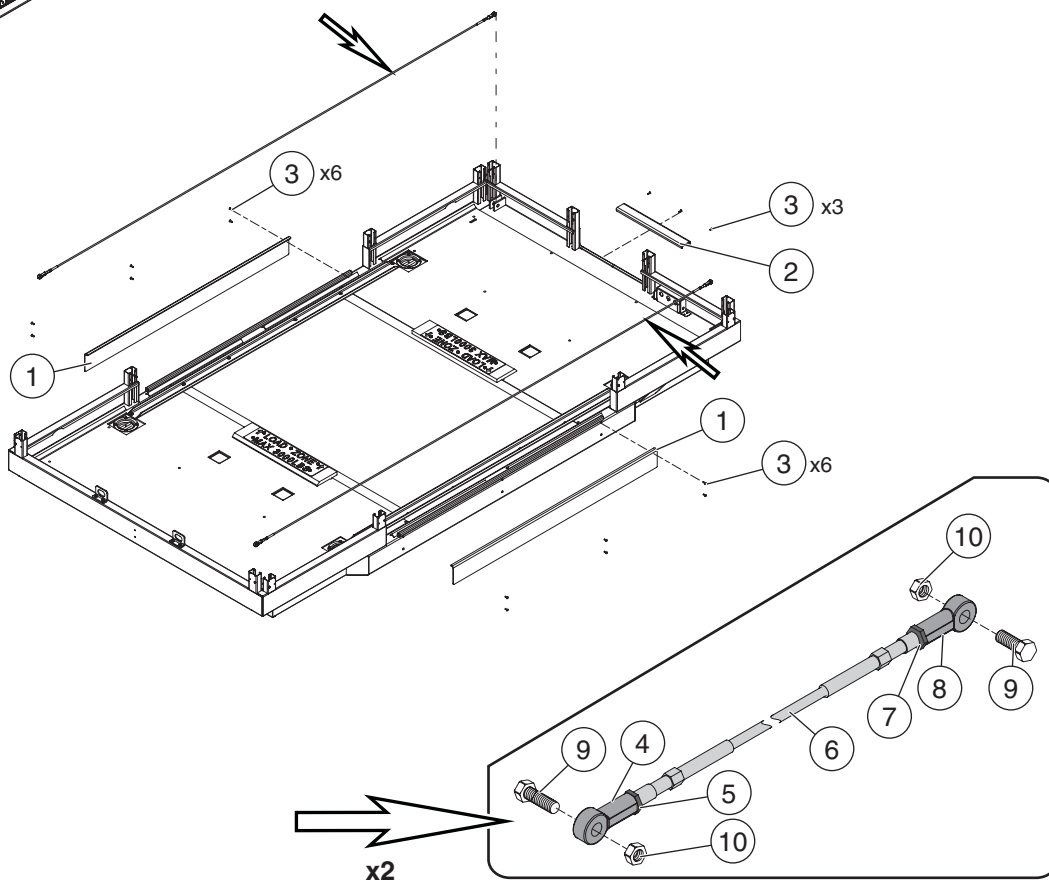
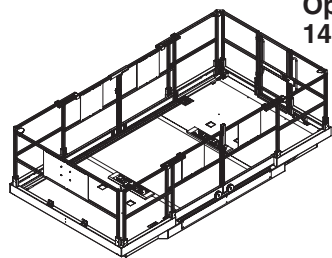


ILLUSTRATION No.
ART_4188

TITAN BOOM 40-S

OPTION -- 14ft. Platform -- Deck Components, 2 of 2

OPTION -- 14Ft. Platform, Deck Components, 2 of 2

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|-----------------------------|
| 1 | 22379 | 2 | Trim, Loading Gate |
| 2 | 22545 | 1 | Raised Entry |
| 3 | 92251 | 15 | Rivet, SSB8-8S |
| 4 | 92091 | 2 | Heim Joint, 3/4" Right-Hand |
| 5 | 92094 | 2 | Jam nut, 3/4" Right-Hand |
| 6 | 92862 | 2 | Cable, Lanyard Attachment |
| 7 | 92095 | 2 | Jam nut, 3/4" Left-Hand |
| 8 | 92092 | 2 | Heim Joint, 3/4" Left-Hand |
| 9 | 50304 | 4 | Bolt, HHCS 3/4" x 2.5" |
| 10 | 50118 | 4 | Nut, 3/4" Nylock |
| 11 | 50125 | 14 | Bolt, HHCS M6 x 55 |
| 12 | 50047 | 14 | Nut, M6 Nylock |



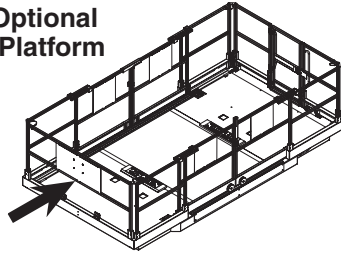
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• REF: Reference only

Optional
14-Ft. Platform



Standard Platform

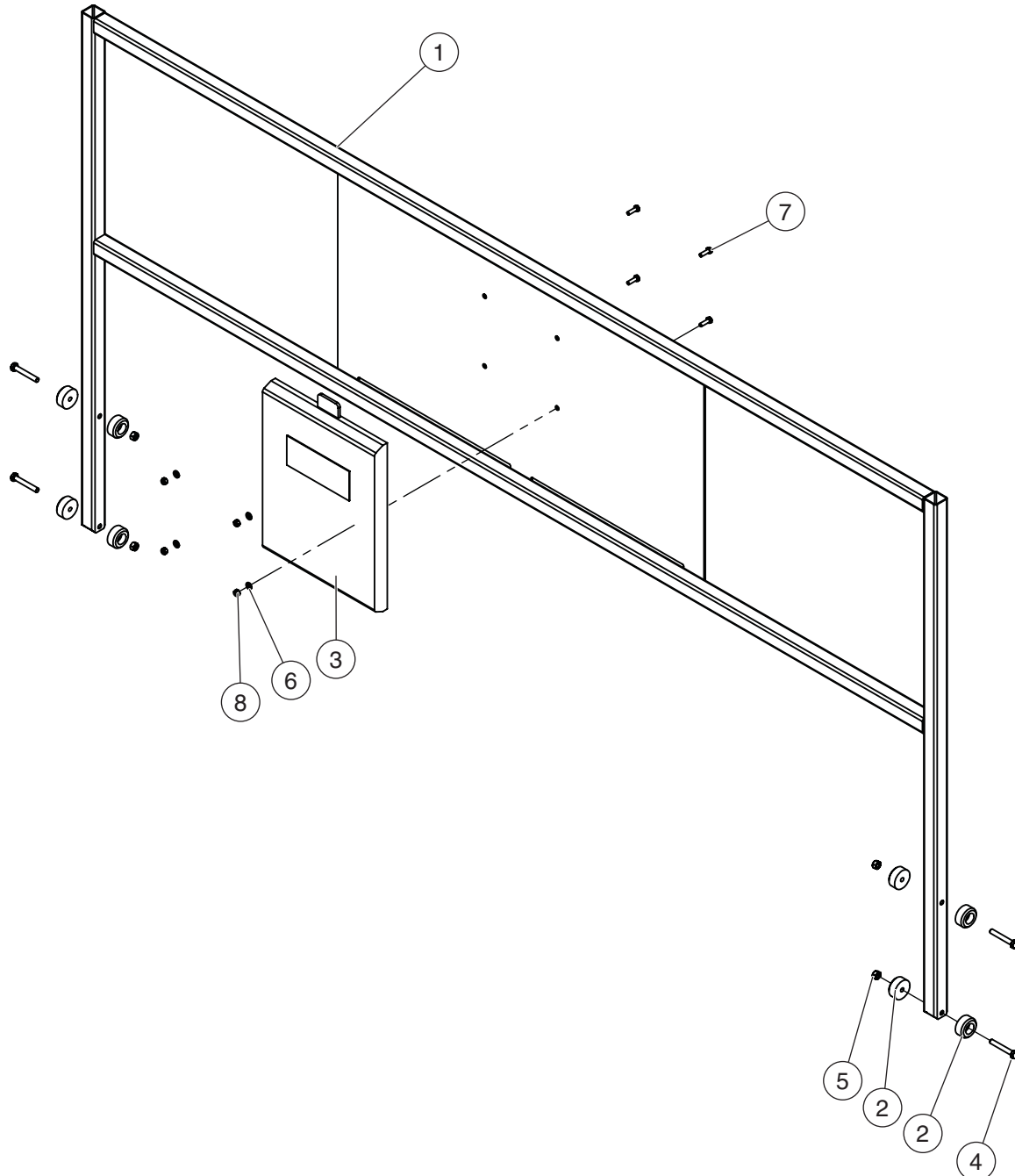
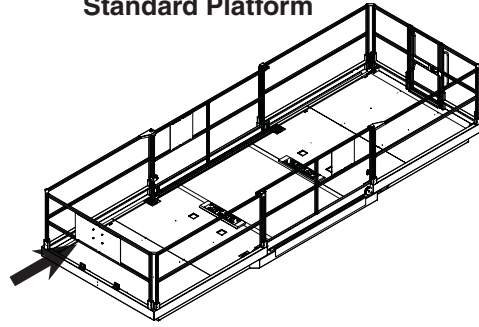


ILLUSTRATION No.
ART_3606

TITAN BOOM 40-S

Front Rail Assembly

Front Rail Assembly, All Machines

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|--------------------------|
| -- | 84159 | -- | Front Rail Assembly |
| 1 | 22363 | 1 | Front Rail Weldment |
| 2 | 19131 | 8 | Puck |
| 3 | 8909 | 1 | Enclosure Service Manual |
| 4 | 50016 | 4 | Bolt, HHCS M08-1.25X055 |
| 5 | 50048 | 4 | Nut, M08X1.25 Nylock |
| 6 | 50000 | 8 | Washer, M06 Std |
| 7 | 50028 | 4 | Bolt, HHCS M06-1.00X020 |
| 8 | 50047 | 4 | Nut, M06X1.00 Nylock |



• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

Optional
14-Ft. Platform

Standard Platform

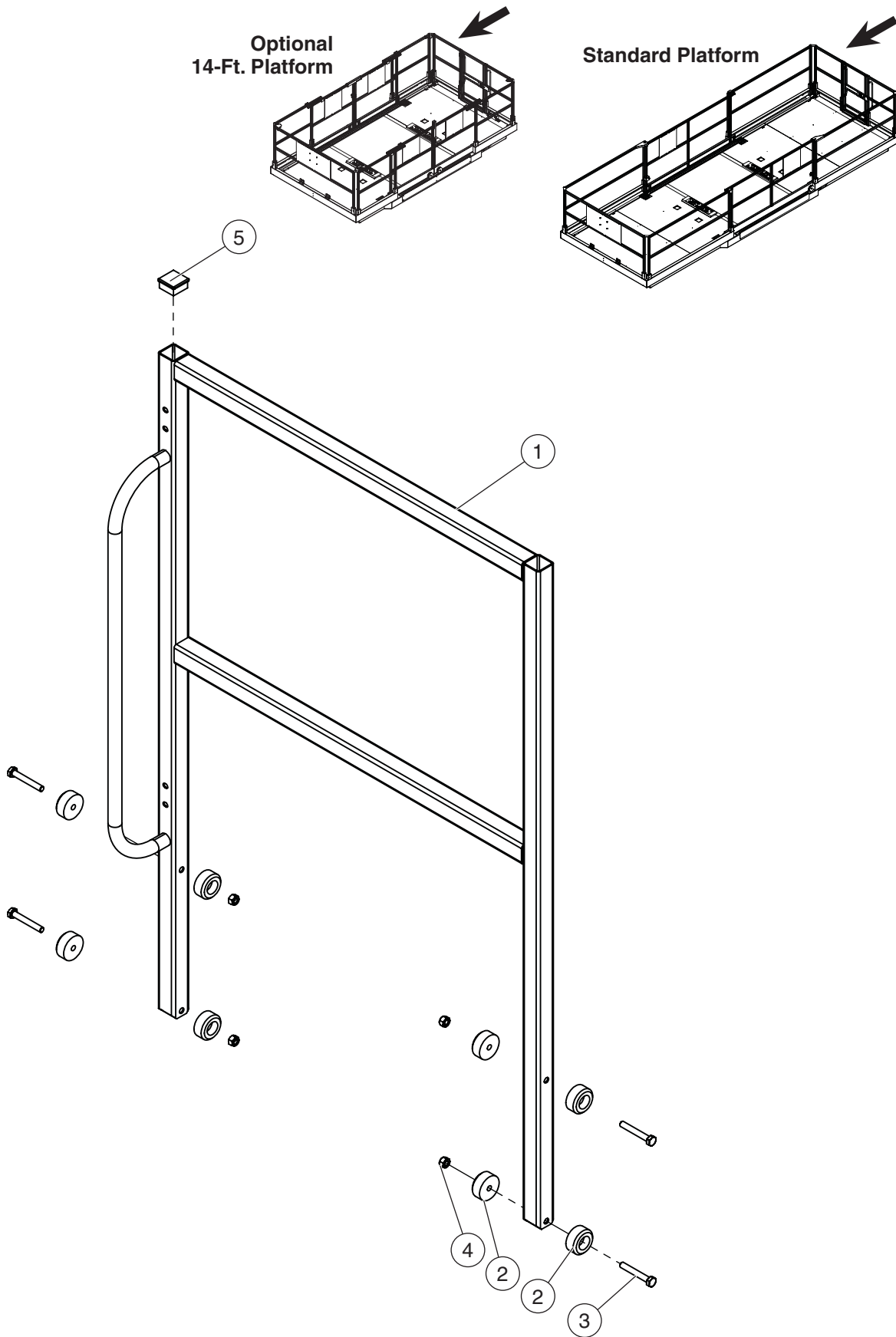


ILLUSTRATION No.
ART_3609

TITAN BOOM 40-S

Right Rear Rail Assembly

Right Rear Rail Assembly, All Machines

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|---------------------------------|
| -- | 84164 | -- | Right Rear Rail Assembly |
| 1 | 22361 | 1 | Right Rear Rail Weldment |
| 2 | 19131 | 8 | Puck |
| 3 | 50016 | 4 | Bolt, HHCS M08-1.25x055 08 Zp P |
| 4 | 50048 | 4 | Nut, M08x1.25 08 Zp Nylock |
| 5 | 6823 | 1 | Cap Plug 1-1/4" Sq. Tube |



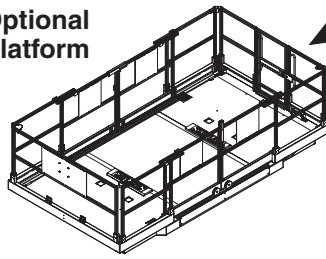
• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

Optional
14-Ft. Platform



Standard Platform

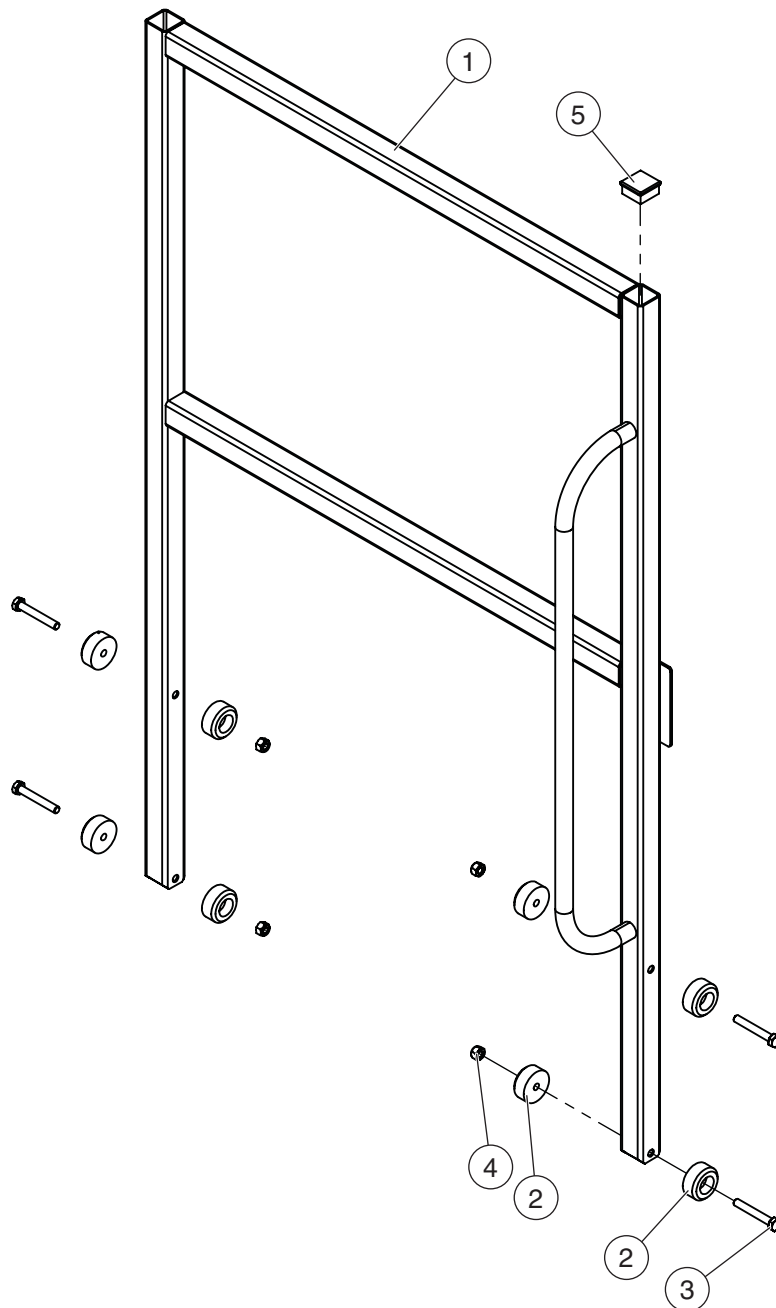
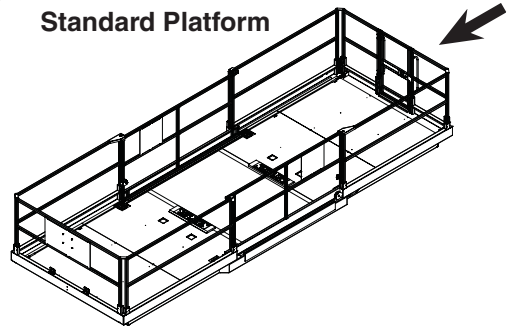


ILLUSTRATION No.
ART_3610

TITAN BOOM 40-S

Left Rear Rail Assembly

Left Rear Rail Assembly, All Machines

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|---------------------------------|
| -- | 84165 | -- | Left Rear Rail Assembly |
| 1 | 22355 | 1 | Left Rear Rail Weldment |
| 2 | 19131 | 8 | Puck |
| 3 | 50016 | 4 | Bolt, HHCS M08-1.25x055 08 Zp P |
| 4 | 50048 | 4 | Nut, M08x1.25 08 Zp Nylock |
| 5 | 6823 | 1 | Cap Plug 1-1/4" Sq. Tube |



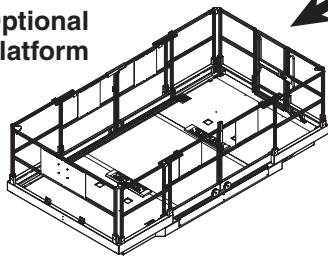
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• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

Optional
14-Ft. Platform



Standard Platform

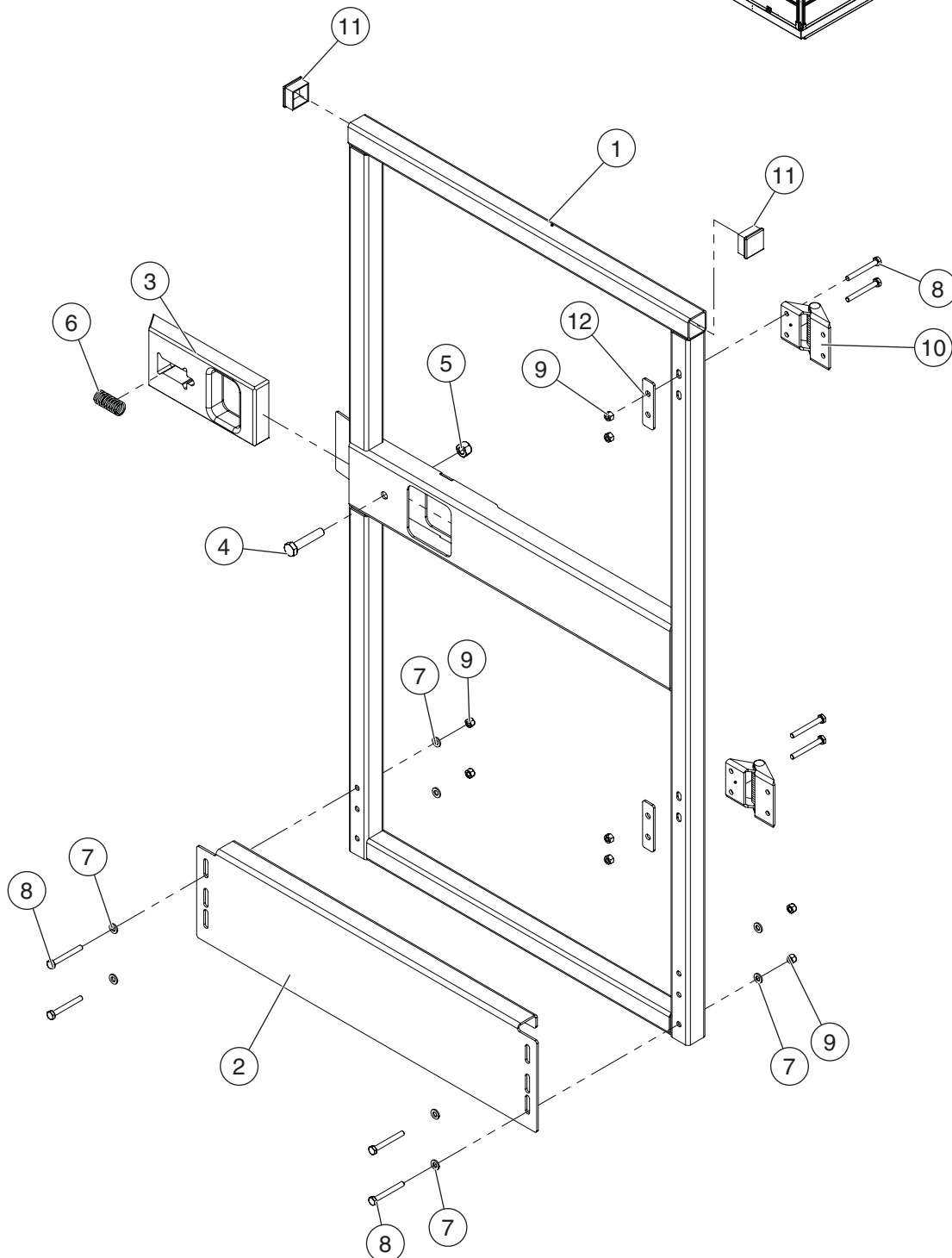
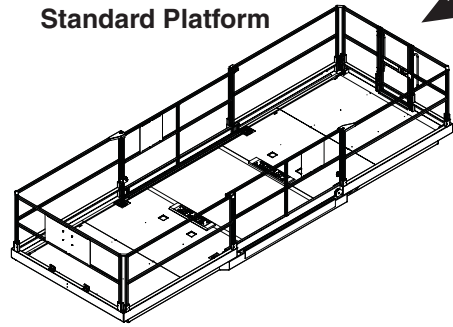


ILLUSTRATION No.
ART_3611

TITAN BOOM 40-S

Personnel Entry Gate Assembly

Personnel Entry Gate Assembly, All Machines

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|---------------------------------|
| -- | 84163 | -- | Entry Gate Assembly |
| 1 | 22366 | 1 | Weldment, Entry |
| 2 | 22372 | 1 | Formed, Entry |
| 3 | 16799 | 1 | Gate Latch |
| 4 | 50036 | 1 | Bolt, HHCS M10-1.50x050 08 Zp F |
| 5 | 50049 | 1 | Nut, M10x1.50 08 Zp Nylock |
| 6 | 7408 | 1 | Spring |
| 7 | 50000 | 8 | Washer M06 Zp Standard Flat |
| 8 | 50262 | 8 | Bolt, HHCS M06-1.00x050 08 Zp F |
| 9 | 50047 | 8 | Nut, M06x1.00 08 Zp Nylock |
| 10 | 91629 | 2 | Gate Hinge |
| 11 | 6823 | 2 | Cap Plug 1-1/4" Sq. Tube |
| 12 | 19239 | 2 | Hinge Spacer |



• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

Standard Platform

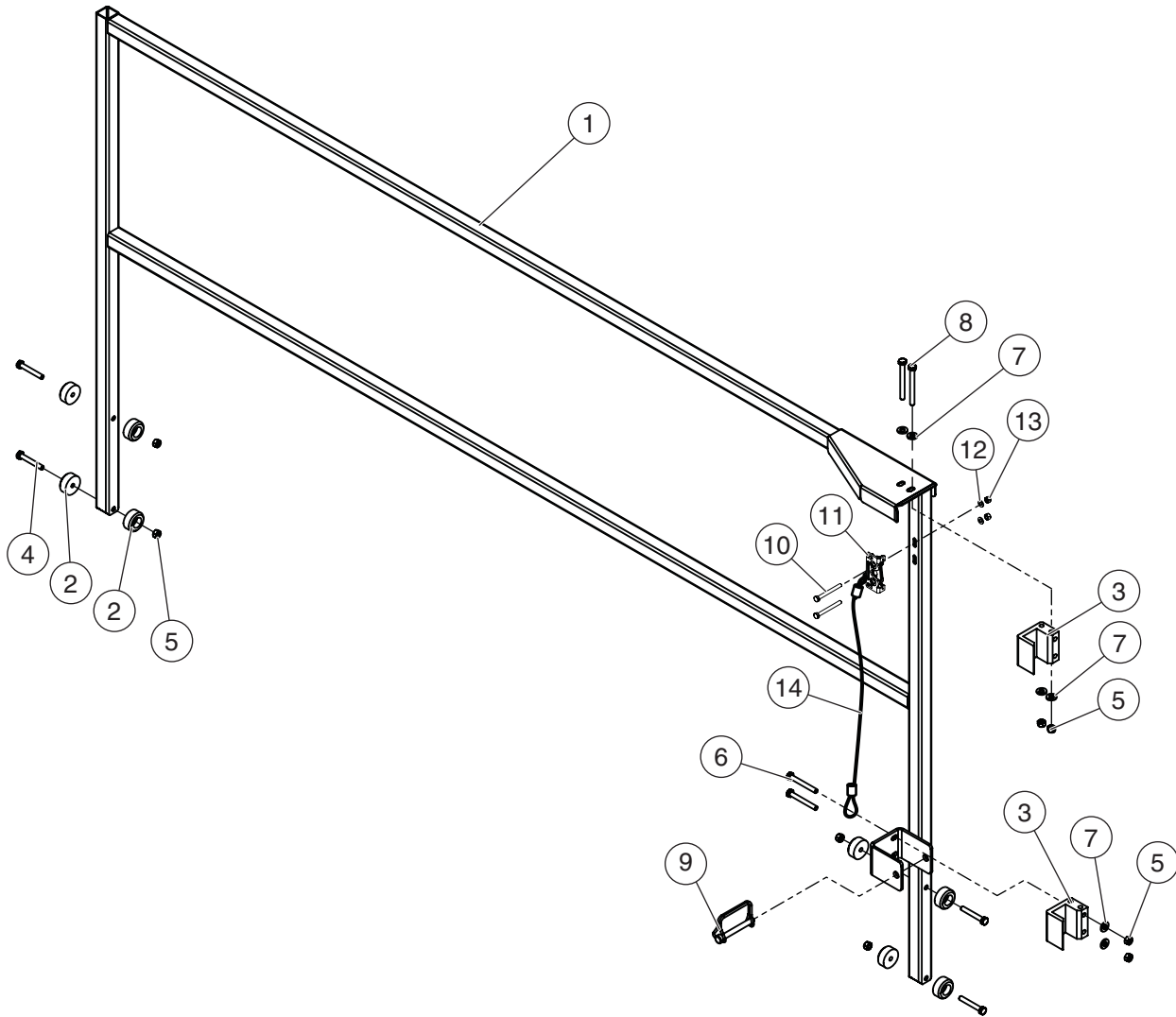
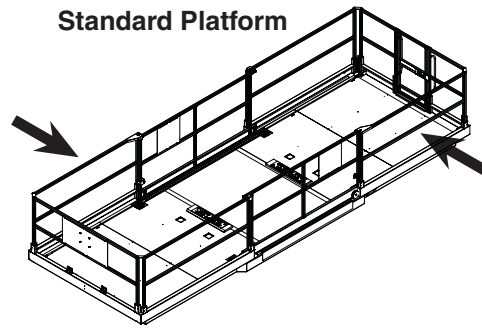


ILLUSTRATION No.
ART_3607

TITAN BOOM 40-S

Right Rail Assembly

Right Side Rail Assembly, Standard Platform

| ITEM | PART NO. | QTY | DESCRIPTION |
|--|----------|-----|----------------------------|
| -- | 84160 | -- | Right Side Rail Assembly |
| 1 | 22354 | 1 | Right Side Rail Weldment |
| 2 | 19131 | 8 | Puck |
| 3 | 22318 | 2 | Load Gate Guide |
| 4 | 50016 | 4 | Bolt, HHCS M08-1.25X055 |
| 5 | 50048 | 8 | Nut, M08x1.25 Nylock |
| 6 | 50251 | 2 | Bolt, HHCS M08-1.25x065 |
| 7 | 50001 | 8 | Washer, M08 Std |
| 8 | 50018 | 2 | Bolt, HHCS M08-1.25x080 08 |
| Machines will have either Item #9 or Items #10-#14 | | | |
| 9 | 50186 | 1 | Pin Wire Lock 0.375 X 3.25 |
| 10 | 50125 | 2 | Bolt, BHCS M6 x 55 |
| 11 | 92302 | 1 | Door Catch |
| 12 | 50000 | 2 | Washer, M6 Std |
| 13 | 50047 | 2 | Nut, M6 Nylock |
| 14 | 22628 | 1 | Cable |



• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

Standard Platform

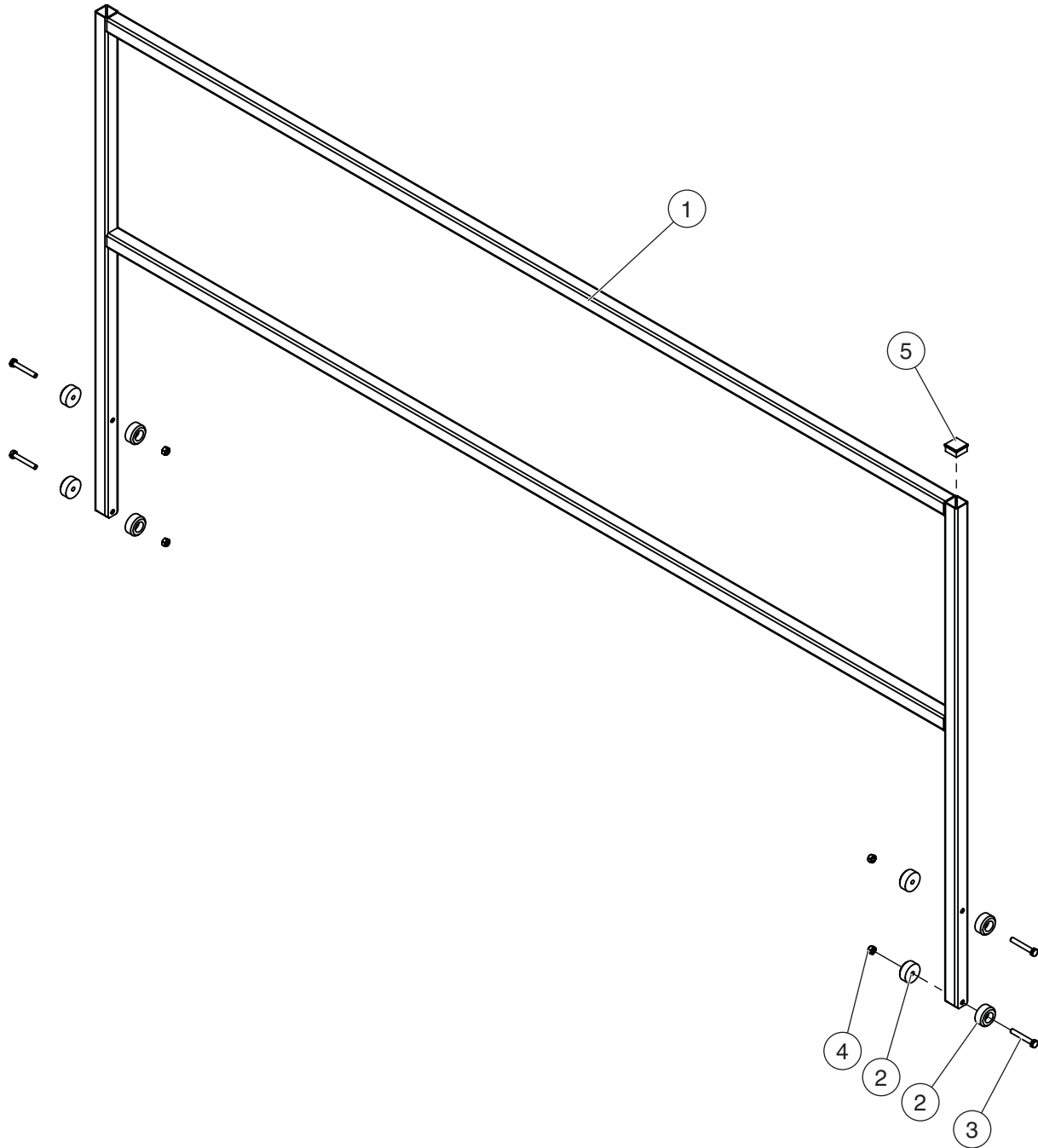
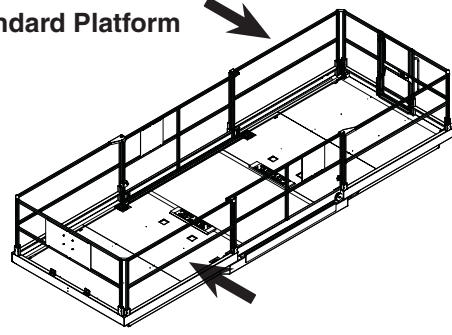


ILLUSTRATION No.
ART_3608

TITAN BOOM 40-S

Left Rail Assembly

Left Side Rail Assembly, Standard Platform

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|----------------------------|
| -- | 84161 | -- | Left Side Rail Assembly |
| 1 | 22350 | 1 | Weldment, Side |
| 2 | 19131 | 8 | Puck |
| 3 | 50016 | 4 | Bolt, HHCS M08-1.25x055 08 |
| 4 | 50048 | 4 | Nut, M08x1.25 08 Zp Nylock |
| 5 | 6823 | 1 | Cap Plug 1-1/4" Sq. Tube |



• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

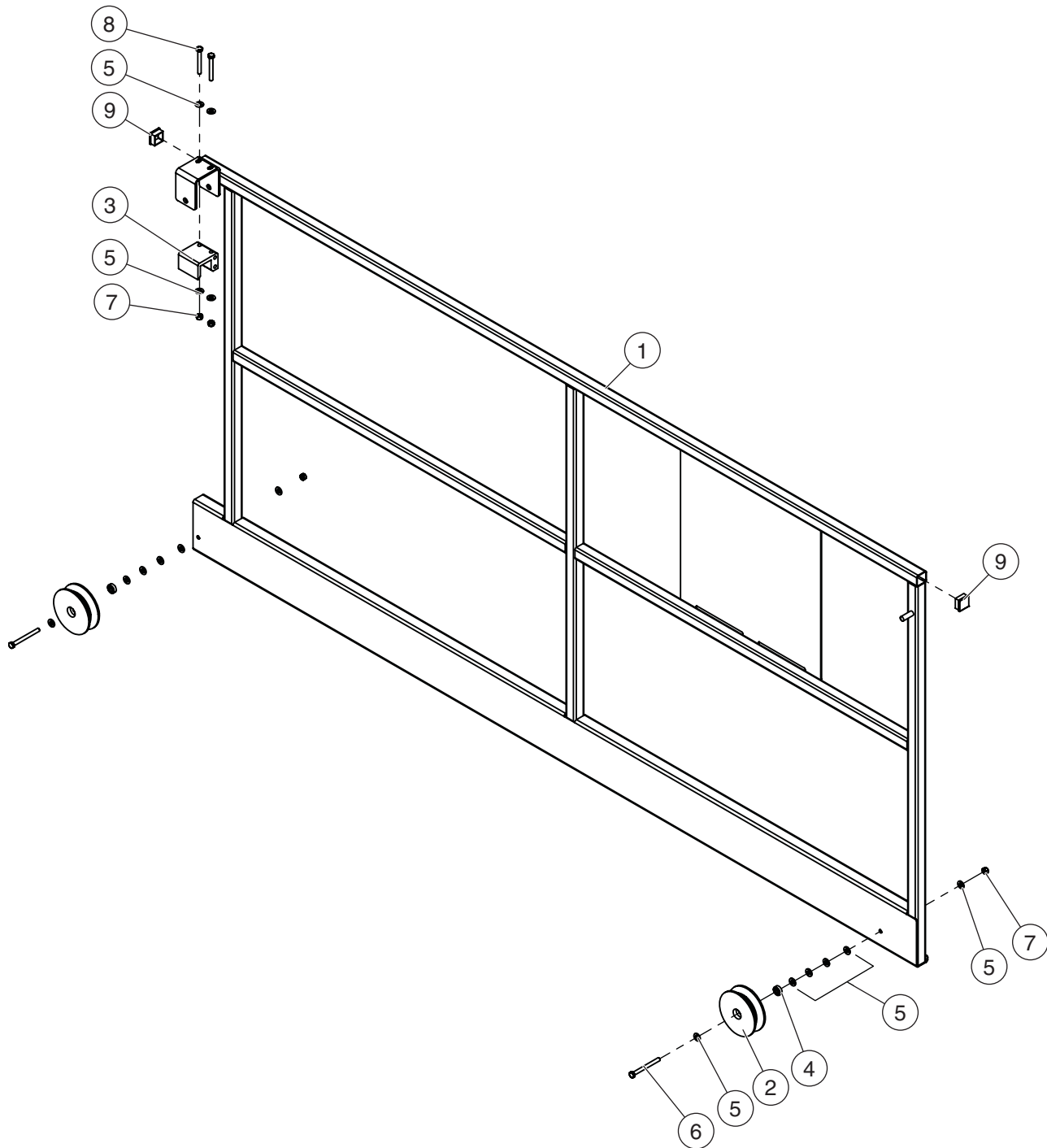
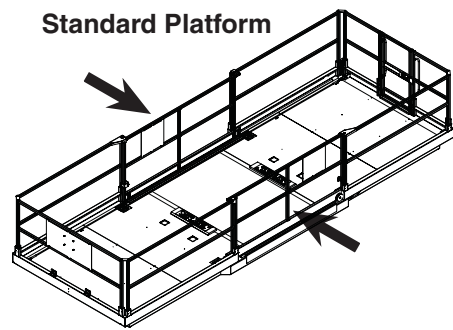


ILLUSTRATION No.
ART_3612

TITAN BOOM 40-S

Sliding Gate Assembly

Sliding Gate Assembly, Standard Platform

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|---------------------------------|
| -- | 84162 | -- | Sliding Gate Assembly |
| 1 | 22115 | 1 | Sliding Gate |
| 2 | 22325 | 2 | Gate Guide |
| 3 | 22318 | 1 | Load Gate Guide |
| 4 | 92250 | 2 | Bearing |
| 5 | 50001 | 16 | Washer, M08 Zp Standard Flat |
| 6 | 50019 | 2 | Bolt, HHCS M08-1.25x085 08 Zp P |
| 7 | 50048 | 4 | Nut, M08x1.25 08 Zp Nylock |
| 8 | 50251 | 2 | Bolt, HHCS M08-1.25x065 08 Zp P |
| 9 | 6823 | 2 | Cap Plug 1-1/4" Sq. Tube |



• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

**Optional
14-Ft. Platform**

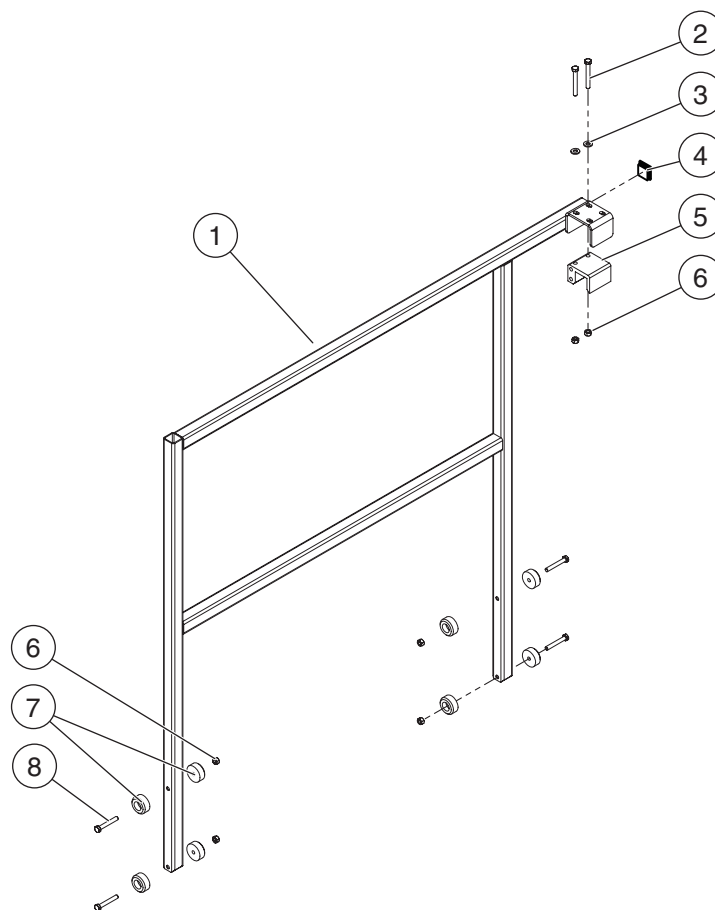
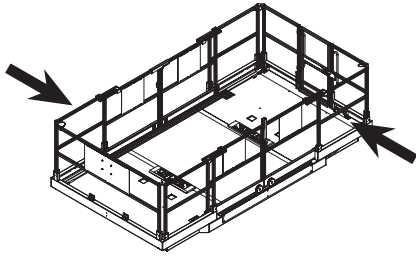


ILLUSTRATION No.
ART_4189

TITAN BOOM 40-S

Right Side Rail Assembly, Optional 14ft. Platform

Right Side Rail Assembly, Optional 14-Ft. Platform

| ITEM | PART NO. | QTY | QTY PER MACH | DESCRIPTION |
|------|----------|-----|--------------------|--------------------------|
| -- | 84226 | 1 | 2 | Right Side Rail Assembly |
| 1 | 22711 | 1 | 2 | Right Side Rail Weldment |
| 2 | 50251 | 2 | 4 | Bolt, HHCS M8 x 65 |
| 3 | 50001 | 2 | 4 | Washer, M8 Std. |
| 4 | 6823 | 1 | 2 | Cap, 1.25" square |
| 5 | 22318 | 1 | 2 | Guide, Load Gate |
| 6 | 50048 | 6 | 12 | Nut, M8 Nylock |
| 7 | 19131 | 4 | 8 | Puck |
| 8 | 50016 | 4 | 8 | Bolt, HHCS M8 x 55 |



• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

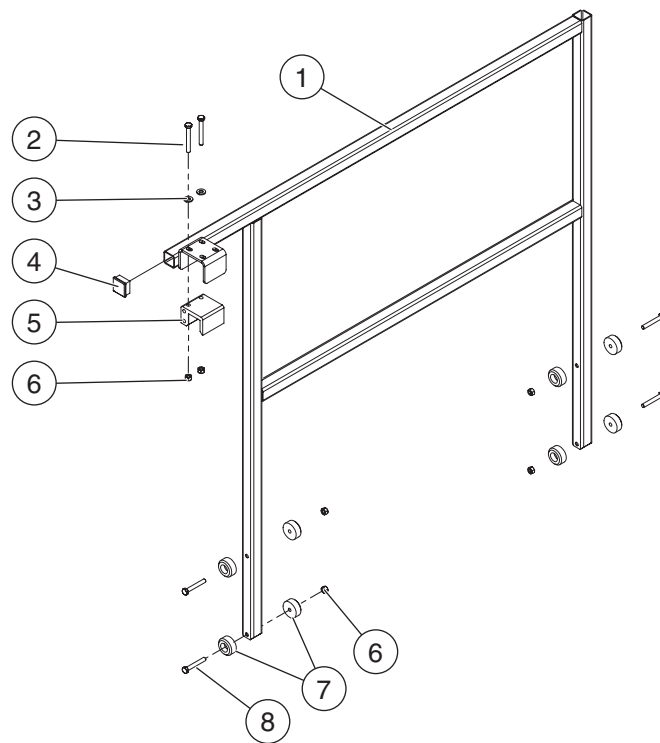
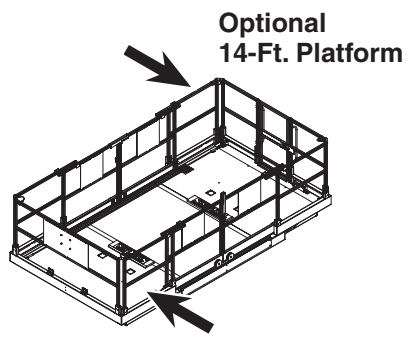


ILLUSTRATION No.
ART_4190

TITAN BOOM 40-S

Left Side Rail Assembly, Optional 14ft. Platform

Left Side Rail Assembly, Optional 14-Ft. Platform

| ITEM | PART NO. | QTY | QTY PER MACH | DESCRIPTION |
|------|----------|-----|--------------------|-------------------------|
| -- | 84229 | 1 | 2 | Left Side Rail Assembly |
| 1 | 22700 | 1 | 2 | Left Side Rail Weldment |
| 2 | 50251 | 2 | 4 | Bolt, HHCS M8 x 65 |
| 3 | 50001 | 2 | 4 | Washer, M8 Std. |
| 4 | 6823 | 1 | 2 | Cap, 1.25" square |
| 5 | 22318 | 1 | 2 | Guide, Load Gate |
| 6 | 50048 | 6 | 12 | Nut, M8 Nylock |
| 7 | 19131 | 4 | 8 | Puck |
| 8 | 50016 | 4 | 8 | Bolt, HHCS M8 x 55 |



• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

**Optional
14-Ft. Platform**

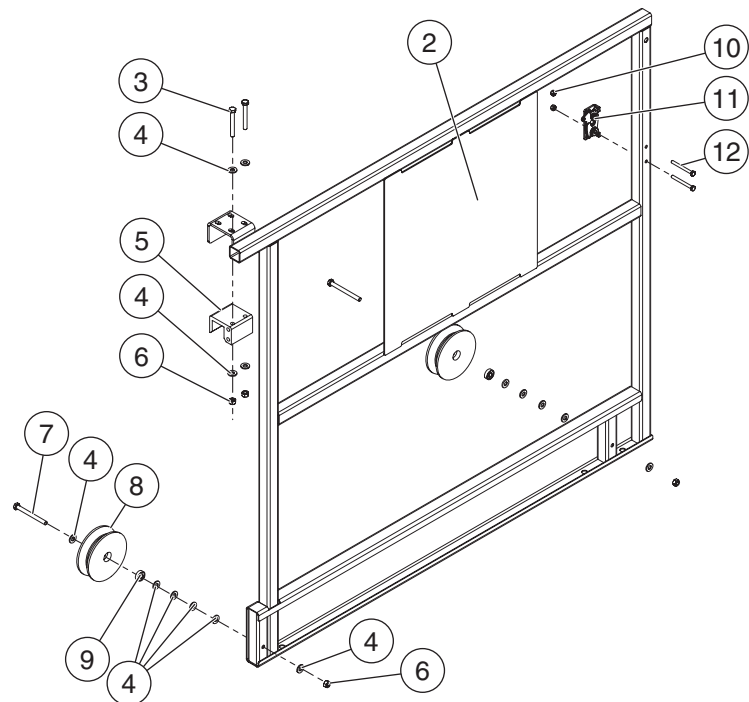
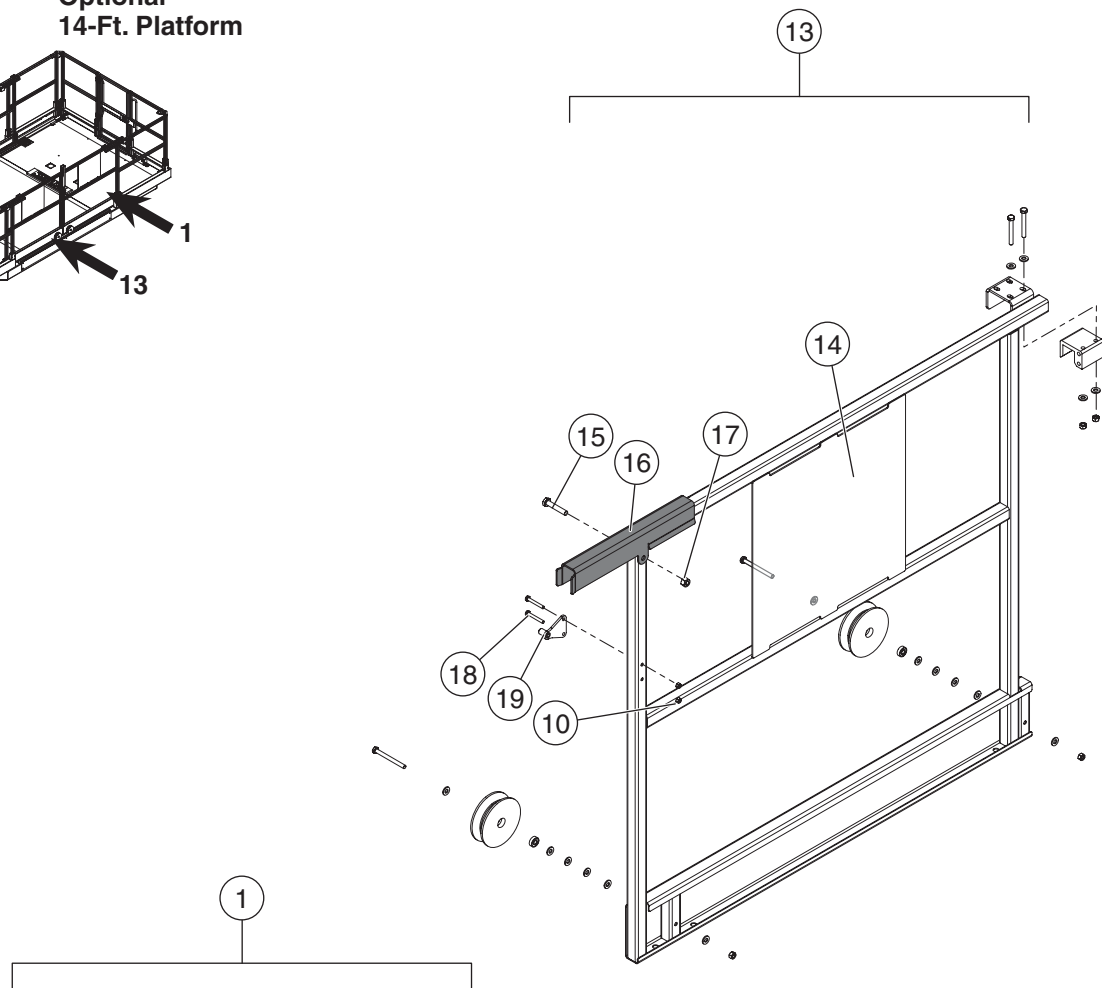
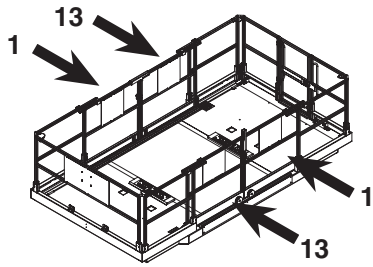


ILLUSTRATION No.
ART_4191

TITAN BOOM 40-S

Sliding Gate Assemblies, Optional 14ft. Platform

Sliding Gate Assemblies, Optional 14-Ft Platform

| ITEM | PART NO. | QTY | QTY PER MACH | DESCRIPTION |
|------|----------|-----|--------------------|--------------------------|
| 1 | 84227 | 1 | 2 | Left Side Gate Assembly |
| 2 | 22712 | 1 | 2 | Left Side Gate Weldment |
| 3 | 50251 | 4 | 8 | Bolt, HHCS M8 x 65 |
| 4 | 50001 | 32 | 64 | Washer, M8 Std |
| 5 | 22318 | 2 | 4 | Load Gate Guide |
| 6 | 50048 | 8 | 16 | Nut, M8 Nylock |
| 7 | 50019 | 4 | 8 | Bolt, HHCS M8 x 85 |
| 8 | 22325 | 4 | 8 | Guide Roller |
| 9 | 92250 | 4 | 8 | Bearing |
| 10 | 50047 | 4 | 8 | Nut, M6 Nylock |
| 11 | 92302 | 1 | 2 | Gate Latch |
| 12 | 50028 | 2 | 4 | Bolt, HHCS M6 x 20 |
| 13 | 84228 | 1 | 2 | Right Side Gate Assembly |
| 14 | 22722 | 1 | 2 | Right Side Gate Weldment |
| 15 | 50021 | 1 | 2 | Bolt, HHCS M10 x 55 |
| 16 | 22724 | 1 | 2 | Gate Support |
| 17 | 50049 | 1 | 2 | Nut, M10 Nylock |
| 18 | 50294 | 2 | 4 | Bolt, HHCS M6 x 45 |
| 19 | 22719 | 1 | 2 | Gate Striker |

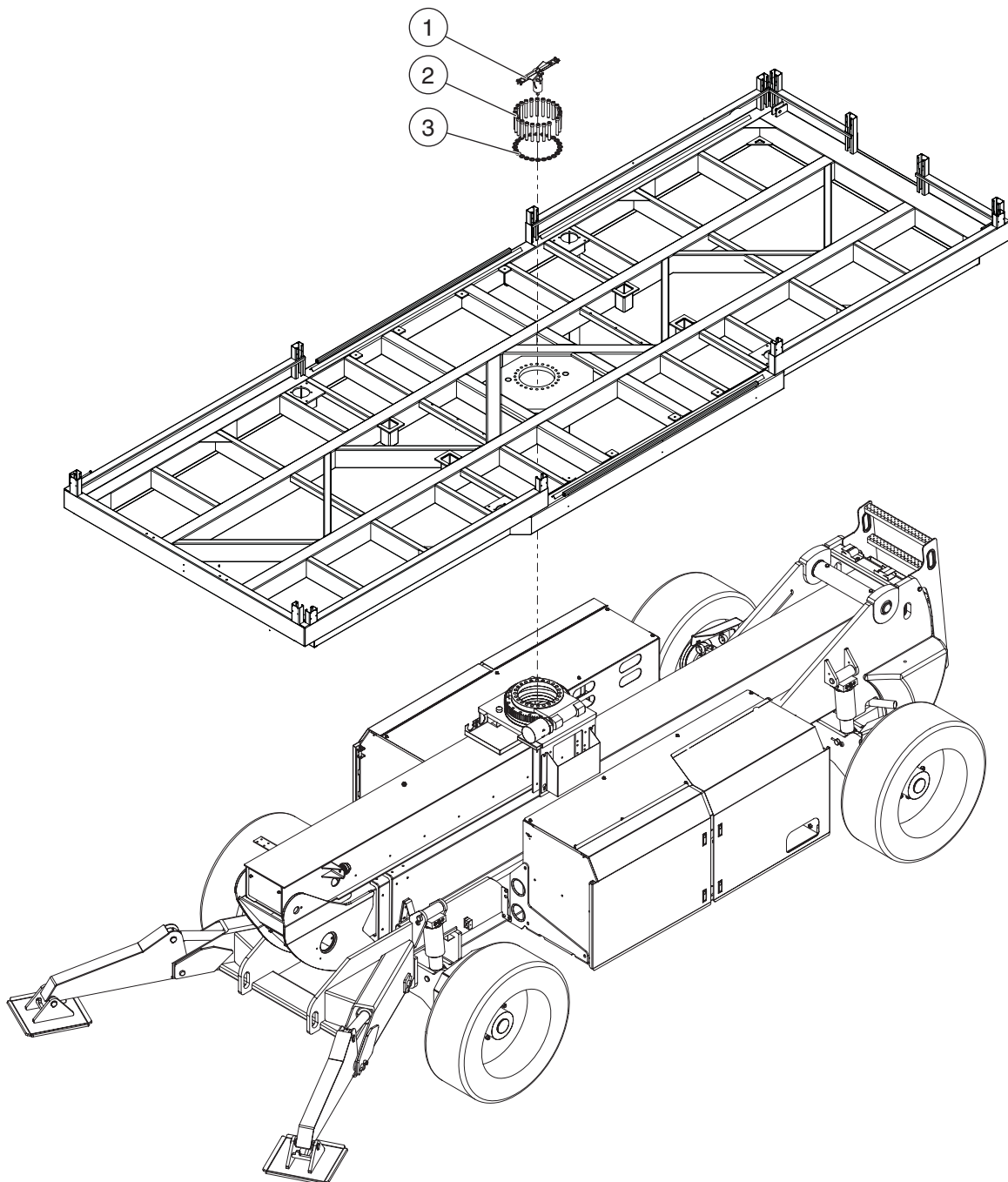


• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only



Deck components removed for clarity.
It is only necessary to remove the central
Load Zone plate to access these parts.


ILLUSTRATION No.
ART_3627

TITAN BOOM 40-S

Platform/Cantilever Assembly

Platform/Cantilever Assembly, All Machines

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|---|
| 1 | REF | 1 | Rotation Sensor Assembly -- See page 37 |
| 2 | 50263 | 23 | Bolt, SHCS M16-2.00 x 110 |
| 3 | 50261 | 23 | Washer, M16 Hardened |



• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

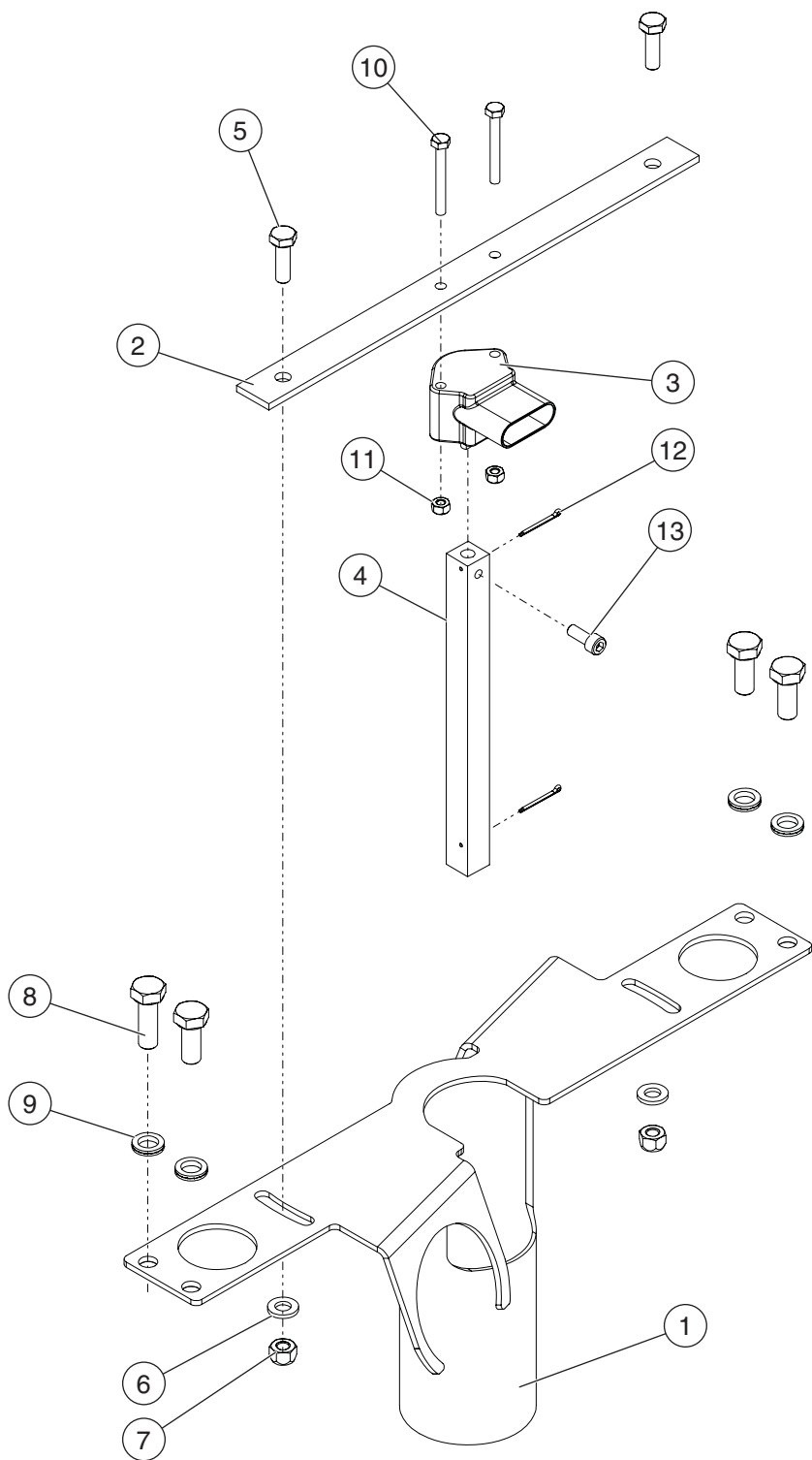


ILLUSTRATION No.
ART_3613

TITAN BOOM 40-S

Rotational Sensor Assembly

Rotation Sensor Assembly, All Machines

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|------------------------------|
| 1 | 22533 | 1 | Rotation Wire Guide Weldment |
| 2 | 22536 | 1 | Rotation Sensor Mount |
| 3 | 92220 | 1 | Rotation Position Sensor |
| 4 | 22537 | 1 | Rotation Shaft |
| 5 | 50028 | 8 | Bolt, HHCS M06-1.00x020 |
| 6 | 50000 | 26 | Washer, M06 Zp Standard Flat |
| 7 | 50047 | 16 | Nut, M06x1.00 Nylock |
| 8 | 50030 | 5 | Bolt, HHCS M8-1.25 X 20 |
| 9 | 50200 | 9 | Washer, M08 Zp Nordlock |
| 10 | 50307 | 2 | Bolt, HHCS M04-0.70x035 |
| 11 | 50285 | 2 | Nut, M04x0.70 08 Zp Nylock |
| 12 | 92276 | 2 | Cotter Pin, 1/16" x 0.75" |
| 13 | 50326 | 1 | Bolt, SHCS #10-32 X 0.5" |



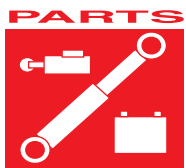
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• REF: Reference only

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SECTION D

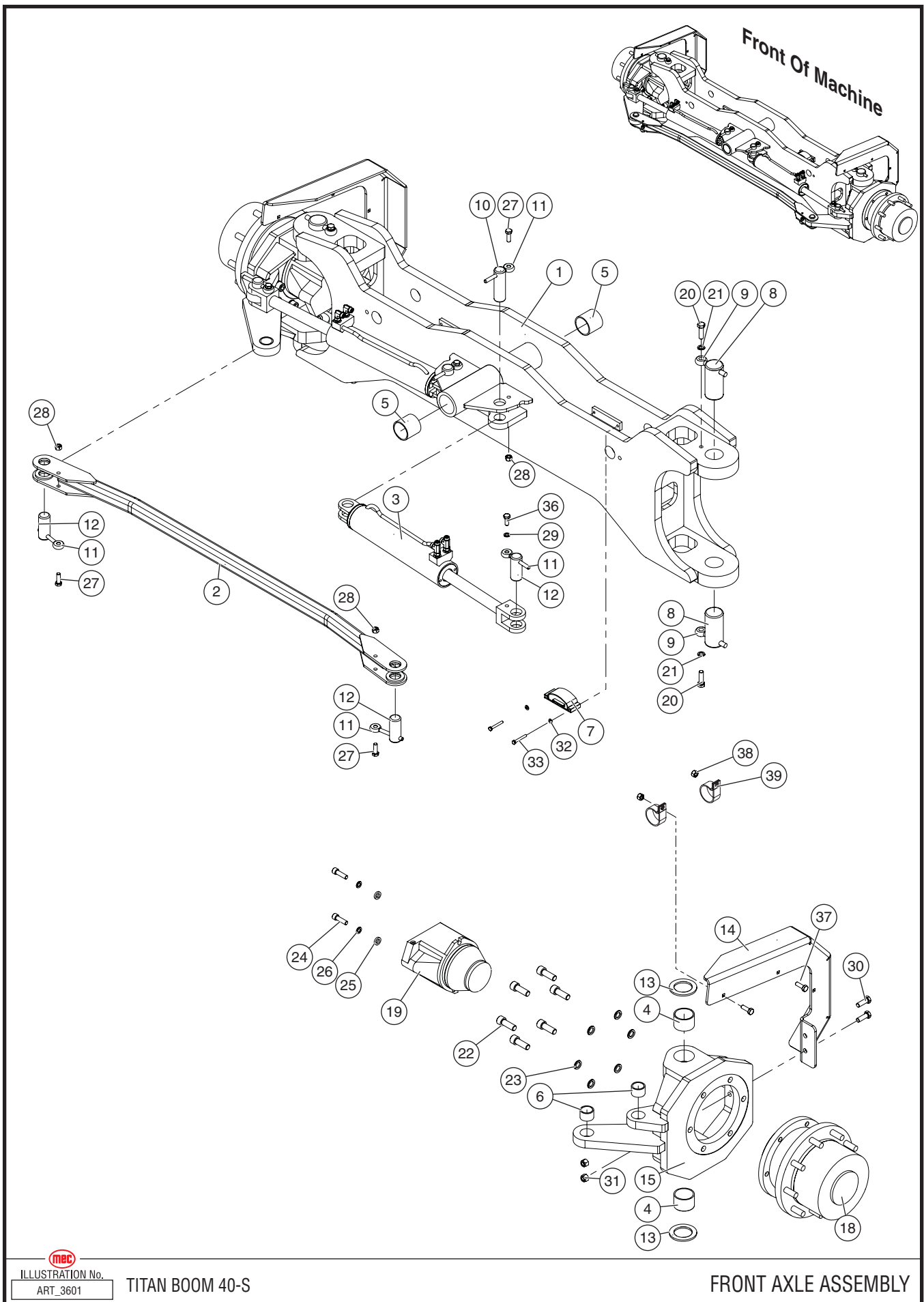
AXLES

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Front Axle Assembly

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|--|
| -- | 84152 | 1 | Front Axle Assembly |
| 1 | 18022 | 1 | Front Axle |
| 2 | 18028 | 1 | Tie Rod |
| 3 | REF | 2 | Steering Cylinder -- See SECTION E |
| 4 | 92108 | 4 | Sleeve Bearing |
| 5 | 92110 | 2 | Sleeve Bearing |
| 6 | 92109 | 4 | Sleeve Bearing |
| 7 | 91961 | 1 | SERIAL # ~12400101 -- Can Tilt 154 |
| | 92204 | 1 | SERIAL # 12400102~ -- Can Tilt 164 w/ Deutsch Connector |
| 8 | 18055 | 4 | Pin |
| 9 | 18152 | 4 | Keeper Pin |
| 10 | 18051 | 2 | Pin |
| 11 | 18151 | 6 | Keeper Pin |
| 12 | 22215 | 4 | Pin |
| 13 | 92039 | 4 | Thrust Washer |
| 14 | 22209 | 1 | Hose Guard |
| 15 | 18038 | 1 | Yoke, Right |
| 16 | 18031 | 1 | Yoke, Left |
| 17 | 22210 | 1 | Hose Guard |
| 18 | 17958 | 2 | Planetary Hub |
| -- | 92528 | -- | Seal Kit |
| -- | 92529 | -- | Brake Release Parts Kit |
| 19 | REF | 2 | Drive Motor -- See SECTION E |
| 20 | 50236 | 4 | HHCS M12-1.75X040 10 ZP F |
| 21 | 50007 | 4 | WSHR M12 ZP NORDLOCK |
| 22 | 50057 | 12 | SHCS 05/08-11X01.75 08 ZP F |
| 23 | 50249 | 12 | WSHR M16 ZP NORDLOCK 5/8 |
| 24 | 50055 | 4 | SHCS 07/16-14X01.50 08 ZP F |
| 25 | 11176 | 4 | DRIVE MOTOR WASHERS |
| 26 | 50273 | 4 | WSHR M11 ZP NORDLOCK 7/16 |
| 27 | 50034 | 4 | HHCS M10-1.50X030 08 ZP F |
| 28 | 50049 | 4 | NNYL M10X1.50 08 ZP NYLON INSE |
| 29 | 50006 | 2 | WSHR M10 ZP NORDLOCK |
| 30 | 50040 | 4 | HHCS M12-1.75X035 08 ZP F |
| 31 | 50050 | 4 | NNYL M12X1.75 08 ZP NYLON INSE |
| 32 | 50000 | 2 | HHCS M12-1.75X035 08 ZP F |
| 33 | 50294 | 2 | HHCS M06-1.00X45 08 ZP P |
| 34 | -- | -- | -- |
| 35 | -- | -- | -- |
| 36 | 50033 | 2 | HHCS M10-1.50X025 08 ZP F |
| 37 | 50225 | 2 | Bolt, CARB M8 x 20 |
| 38 | 50048 | 2 | Nut, M8 Nylock |
| 39 | 91953 | 2 | P-Clip |

• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only



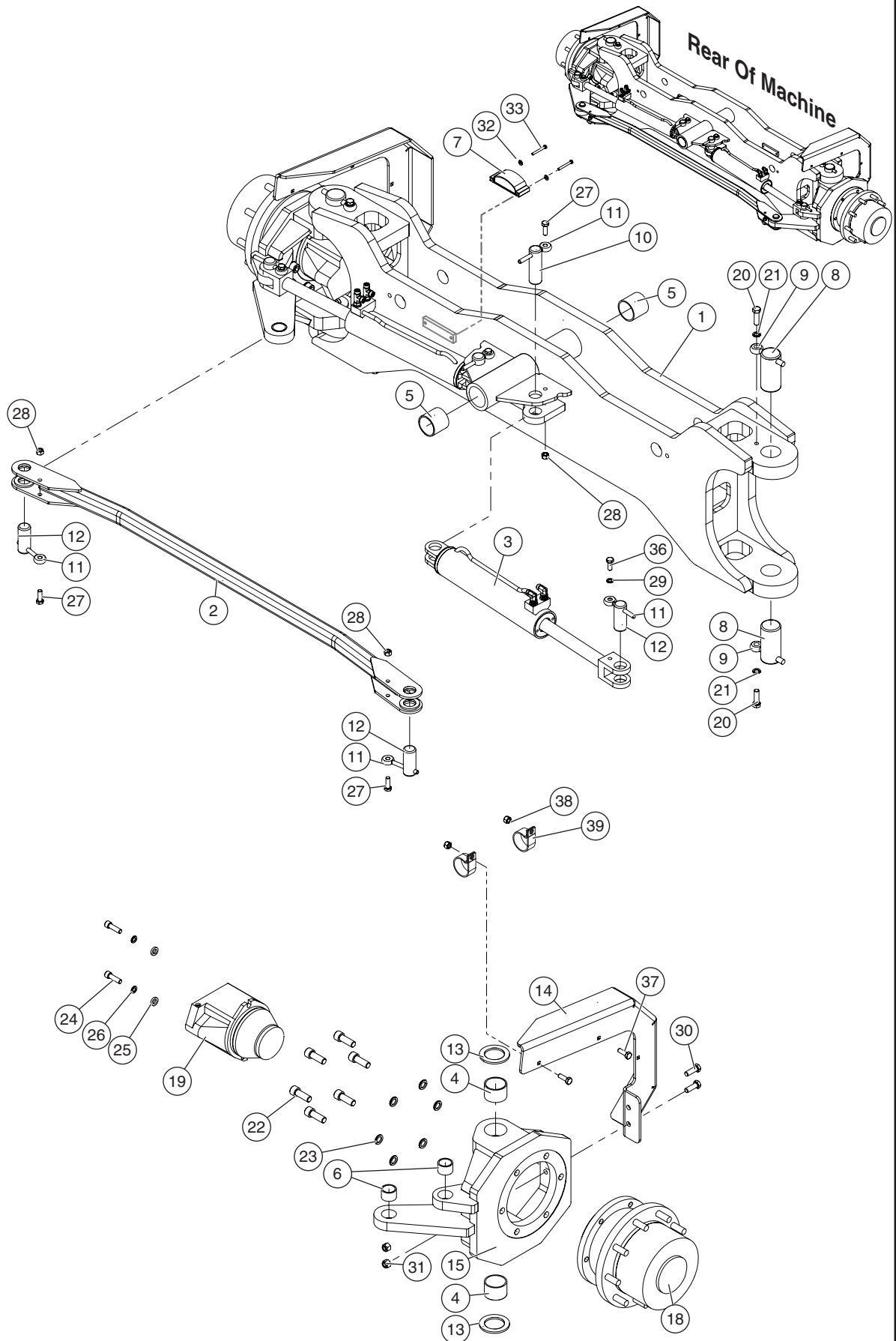


ILLUSTRATION No.
ART_3602

TITAN BOOM 40-S

REAR AXLE ASSEMBLY

Rear Axle Assembly

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|--|
| -- | 84172 | 1 | Rear Axle Assembly |
| 1 | 18022 | 1 | Front Axle |
| 2 | 18028 | 1 | Tie Rod |
| 3 | REF | 2 | Steering Cylinder -- See Section E |
| 4 | 92108 | 4 | Sleeve Bearing |
| 5 | 92110 | 2 | Sleeve Bearing |
| 6 | 92109 | 4 | Sleeve Bearing |
| 7 | 92010 | 1 | CAN TILT 152 |
| 7 | 92010 | 1 | SERIAL # ~12400101 -- Can Tilt 152 |
| | 92202 | 1 | SERIAL # 12400102~ -- Can Tilt 162 w/ Deutsch Connector |
| 8 | 18055 | 4 | Pin |
| 9 | 18152 | 4 | Keeper Pin |
| 10 | 18051 | 2 | Pin |
| 11 | 18151 | 6 | Keeper Pin |
| 12 | 22215 | 4 | Pin |
| 13 | 92039 | 4 | Thrust Washer |
| 14 | 22209 | 1 | Hose Guard |
| 15 | 18038 | 1 | Yoke, Right |
| 16 | 18031 | 1 | Yoke, Left |
| 17 | 22210 | 1 | Hose Guard |
| 18 | 17958 | 2 | Planetary Hub |
| -- | 92528 | -- | Seal Kit |
| -- | 92529 | -- | Brake Release Parts Kit |
| 19 | REF | 2 | Drive Motor -- See SECTION E |
| 20 | 50236 | 4 | HHCS M12-1.75X040 10 ZP F |
| 21 | 50007 | 4 | WSHR M12 ZP NORDLOCK |
| 22 | 50057 | 12 | SHCS 05/08-11X01.75 08 ZP F |
| 23 | 50249 | 12 | WSHR M16 ZP NORDLOCK 5/8 |
| 24 | 50055 | 4 | SHCS 07/16-14X01.50 08 ZP F |
| 25 | 11176 | 4 | DRIVE MOTOR WASHERS |
| 26 | 50273 | 4 | WSHR M11 ZP NORDLOCK 7/16 |
| 27 | 50034 | 4 | HHCS M10-1.50X030 08 ZP F |
| 28 | 50049 | 4 | NNYL M10X1.50 08 ZP NYLON INSE |
| 29 | 50006 | 2 | WSHR M10 ZP NORDLOCK |
| 30 | 50040 | 4 | HHCS M12-1.75X035 08 ZP F |
| 31 | 50050 | 4 | NNYL M12X1.75 08 ZP NYLON INSE |
| 32 | 50000 | 2 | HHCS M12-1.75X035 08 ZP F |
| 33 | 50294 | 2 | HHCS M06-1.00X45 08 ZP P |
| 34 | -- | -- | -- |
| 35 | -- | -- | -- |
| 36 | 50033 | 2 | HHCS M10-1.50X025 08 ZP F |
| 37 | 50225 | 2 | Bolt, CARB M8 x 20 |
| 38 | 50048 | 2 | Nut, M8 Nylock |
| 39 | 91953 | 2 | P-Clip |

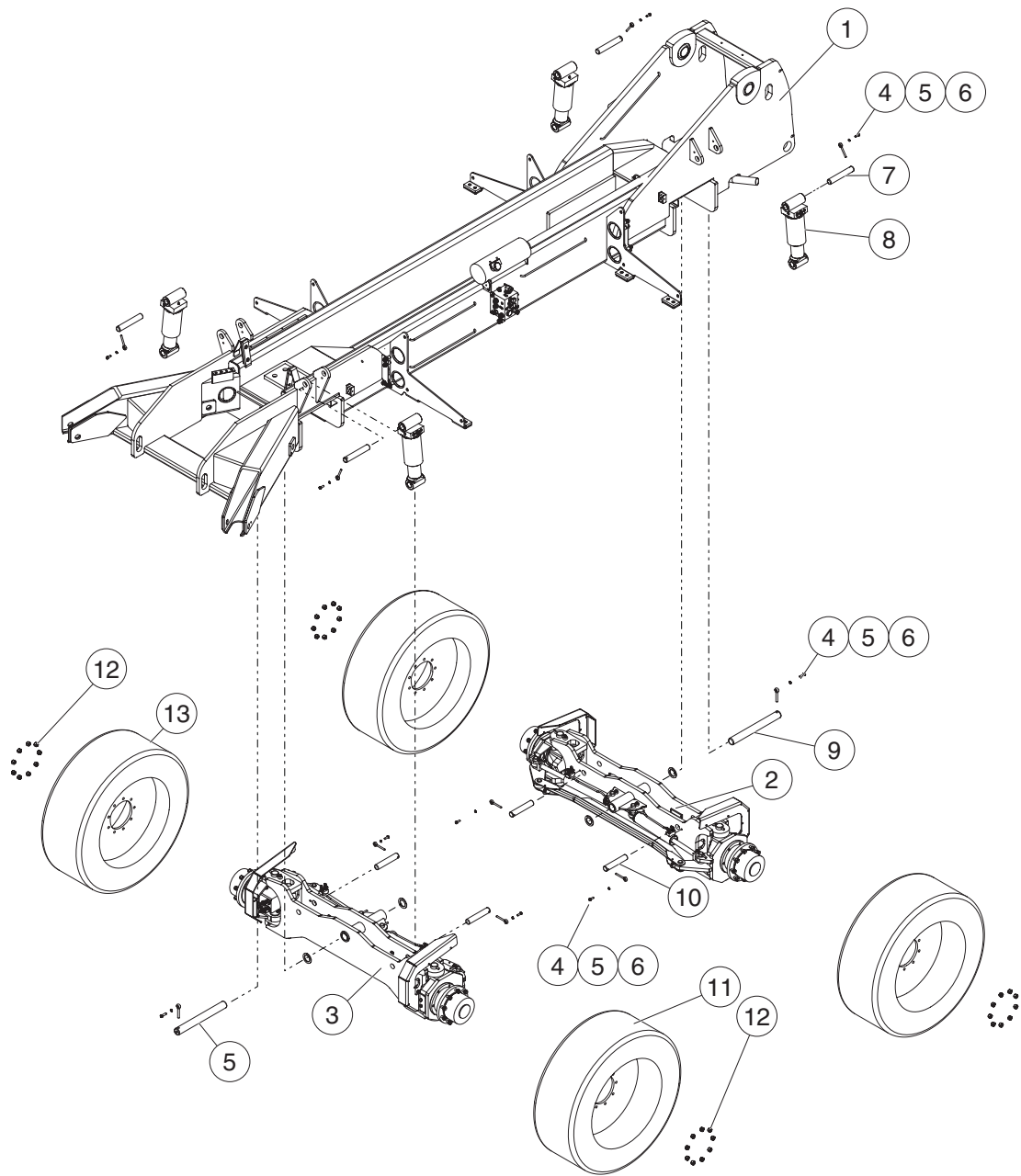
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• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only





Axle/Chassis Assembly

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|--|
| 1 | REF | -- | Chassis |
| 2 | REF | -- | Rear Axle Assembly |
| 3 | REF | -- | Front Axle Assembly |
| 4 | 50034 | 10 | Bolt, HHCS M10 x 30 |
| 5 | 50006 | 10 | Washer, M10 Nordlock |
| 6 | 18151 | 10 | Pin Retainer |
| 7 | 22198 | 4 | Pin |
| 8 | REF | 4 | Axle Lock Cylinder -- See Section E |
| 9 | 18045 | 2 | Pin |
| 10 | 18075 | 4 | Pin |
| 11 | 91899 | 2 | Tire/Wheel Assembly, Foam Filled, Left Hand |
| 12 | 50266 | 36 | Lug nut, 5/8-18 |
| 13 | 91898 | 2 | Tire/Wheel Assembly, Foam Filled, Right Hand |



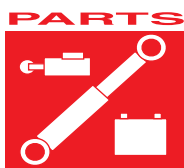
• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

NOTES:



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NOTES:



• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

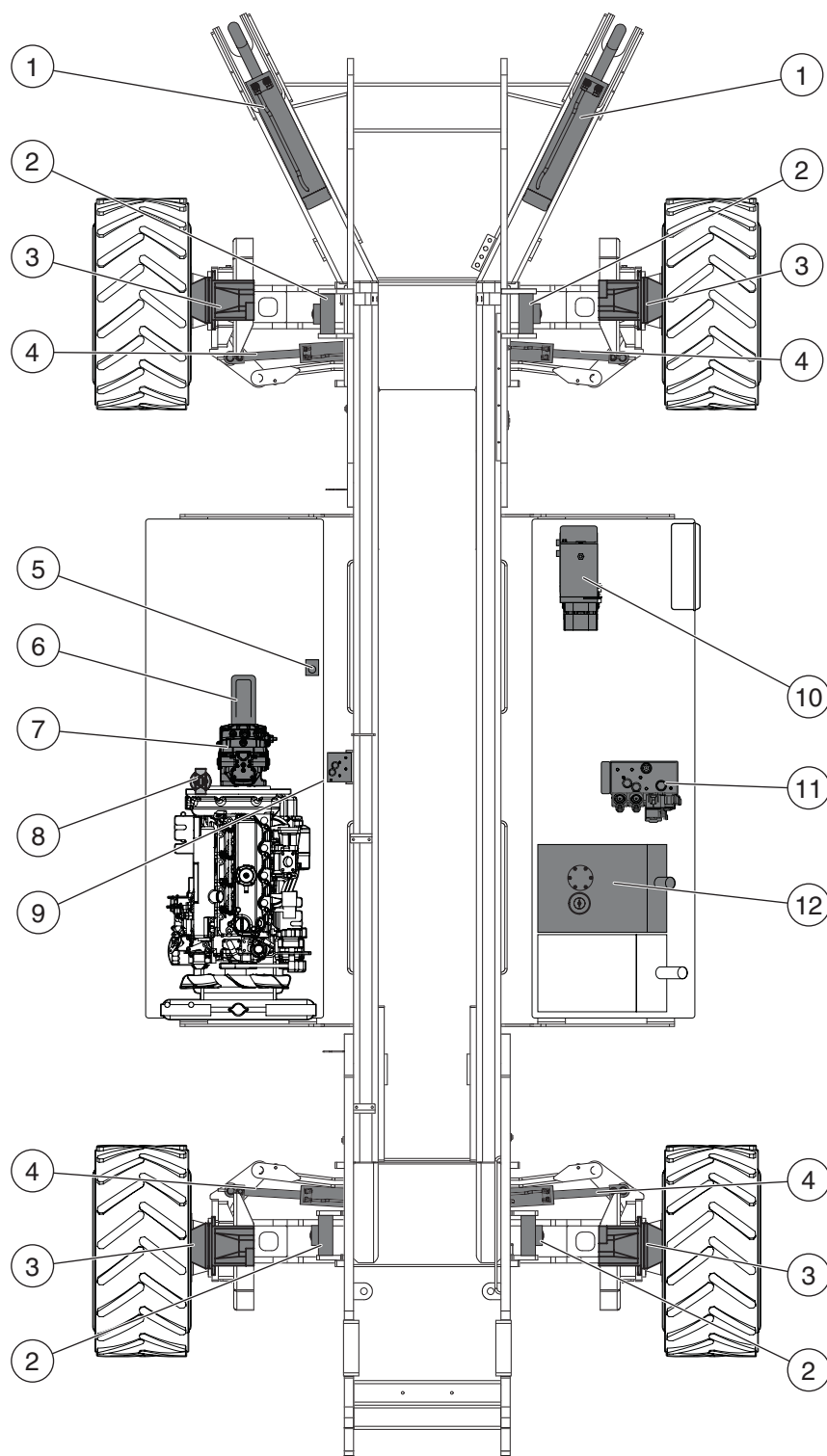


ILLUSTRATION No.
ART_3650

TITAN BOOM 40-S

Hydraulic Components -- Chassis

Hydraulic Components -- Chassis

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|----------------------|
| 1 | 22241 | 2 | Stabilizer Cylinder |
| 2 | 22315 | 4 | Axle Lock Cylinder |
| 3 | 17961 | 4 | Wheel Motor |
| 4 | 18070 | 4 | Steering Cylinder |
| 5 | 92037 | 1 | Suction Manifold |
| 6 | 84175 | 1 | Tandem Gear Pump |
| 7 | 84174 | 1 | Piston Pump |
| 8 | 92072 | 1 | Charge Filter |
| 9 | 84177 | 1 | Traction Manifold |
| 10 | 90970 | 1 | Emergency Down Unit |
| 11 | 84178 | 1 | Functions Manifold |
| 12 | 22440 | 1 | Hydraulic Fluid Tank |

Component Fittings not show or listed on this page.



• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

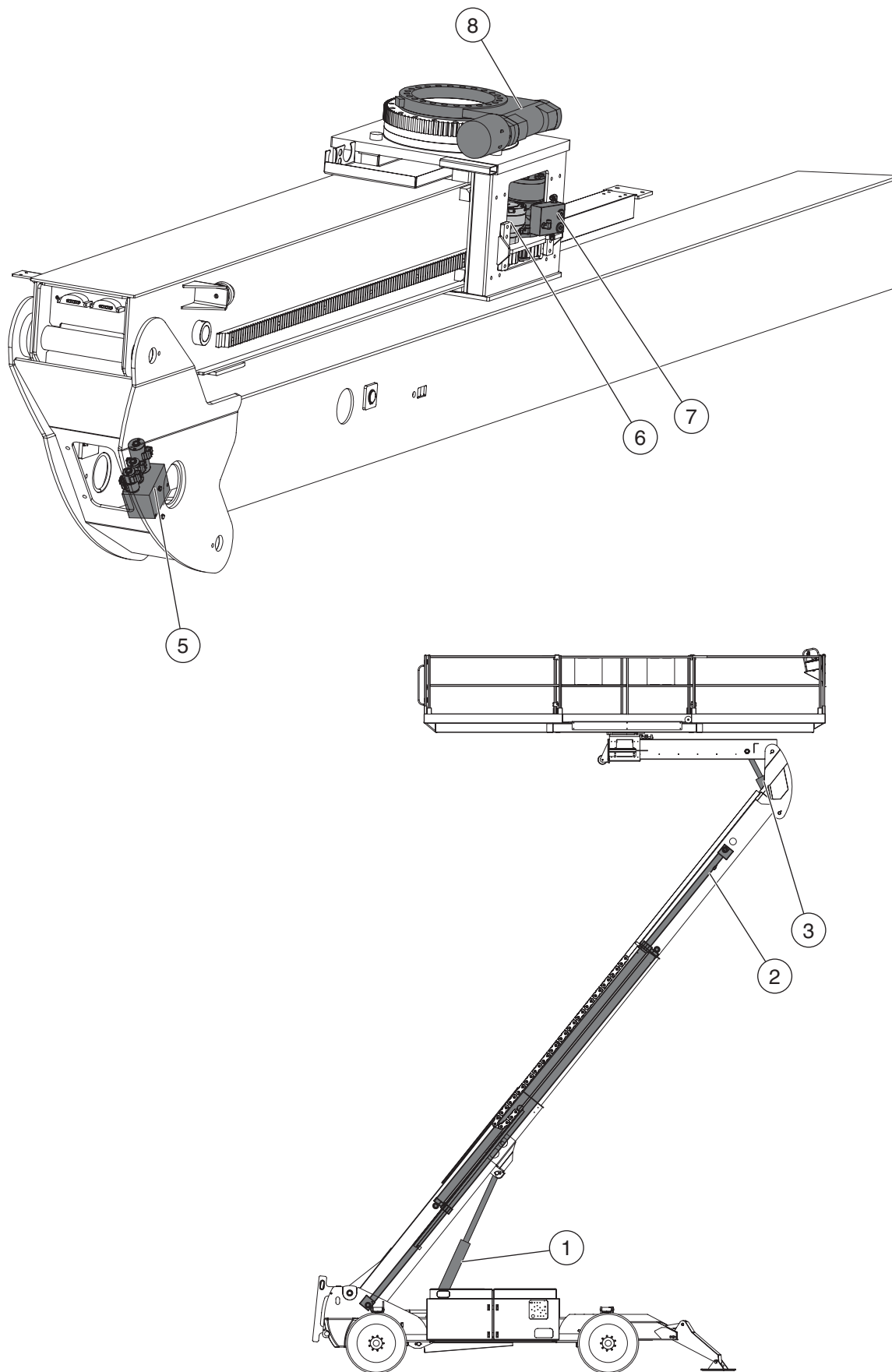


ILLUSTRATION No.
ART_3651

TITAN BOOM 40-S

Hydraulic Components -- Boom & Platform

Hydraulic Components -- Boom & Platform

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|--|
| 1 | 22151 | 1 | Lift Cylinder |
| 2 | 22152 | 1 | Extend Cylinder |
| 3 | 22153 | 1 | Platform Level Cylinder |
| 4 | -- | -- | -- |
| 5 | 84189 | 1 | Auxiliary Manifold |
| 6 | 91894 | 1 | Carriage Brake |
| 7 | REF | 1 | Carriage Slide Motor (see "Carriage Motor & Brake" on Page E-43) |
| 8 | 92018 | 1 | Platform Rotate Drive Unit |

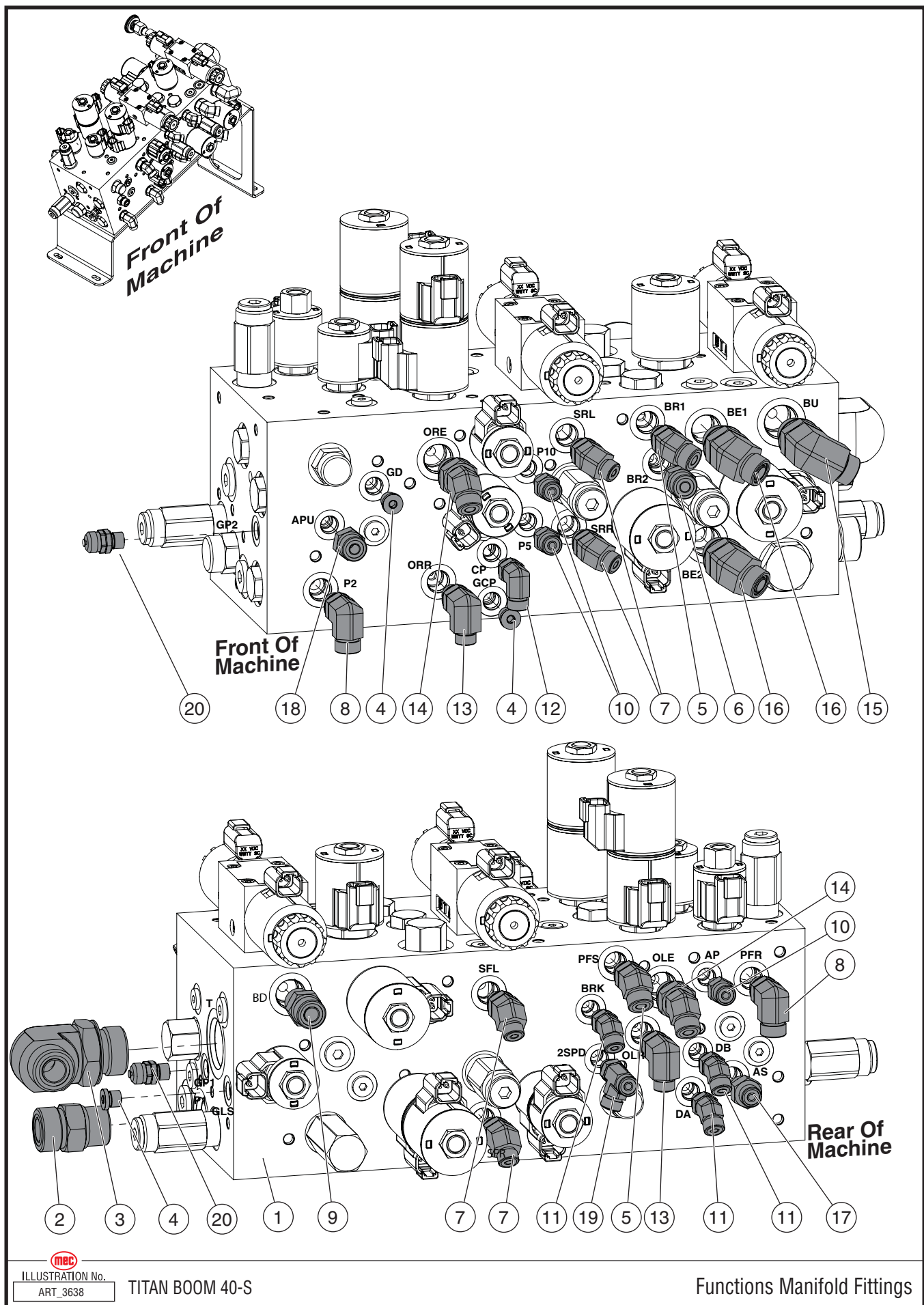


• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only



Functions Manifold Assembly -- Fittings

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|---------------------------------------|
| -- | 84178 | -- | Functions Manifold Assembly, Complete |
| 1 | 92083 | 1 | Functions Manifold, no fittings |
| 2 | 50826 | 1 | Fitting, MFFOR-MB-12-12 |
| 3 | 50844 | 1 | Fitting, MFFOR-MB90-12-16 |
| 4 | 50748 | 3 | Fitting, 4MFFOR-plug |
| 5 | 50676 | 2 | Fitting, MFFOR-MB45-06-06 |
| 6 | 50835 | 1 | Fitting, MFFOR-MB-6-6 |
| 7 | 50815 | 4 | Fitting, MFFOR-MB45-4-6 |
| 8 | 50674 | 2 | Fitting, MFFOR-MB90-06-06 |
| 9 | 50836 | 1 | Fitting, MFFOR-MB-6-8 |
| 10 | 50831 | 3 | Fitting, MFFOR-MB-4-4 |
| 11 | 50675 | 3 | Fitting, MFFOR-MB45-04-04 |
| 12 | 50673 | 1 | Fitting, MMFOR-mb90 4-4 |
| 13 | 50656 | 2 | Fitting, MFFOR-MB90-04-06 |
| 14 | 50816 | 2 | Fitting, MFFOR-MB45-6-8 |
| 15 | 50848 | 1 | Fitting, MFFOR-MB90-8-10 |
| 16 | 50819 | 2 | Fitting, MFFOR-MB45-8-8 |
| 17 | 50832 | 1 | Fitting, MFFOR-MB-4-6 |
| 18 | 50820 | 1 | Fitting, MFFOR-MB-6-4 |
| 19 | 50858 | 1 | Fitting, MFFOR-MB-MFFORT-4 |
| 20 | 50974 | 2 | Fitting, Test Port, TPO-4 |



• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

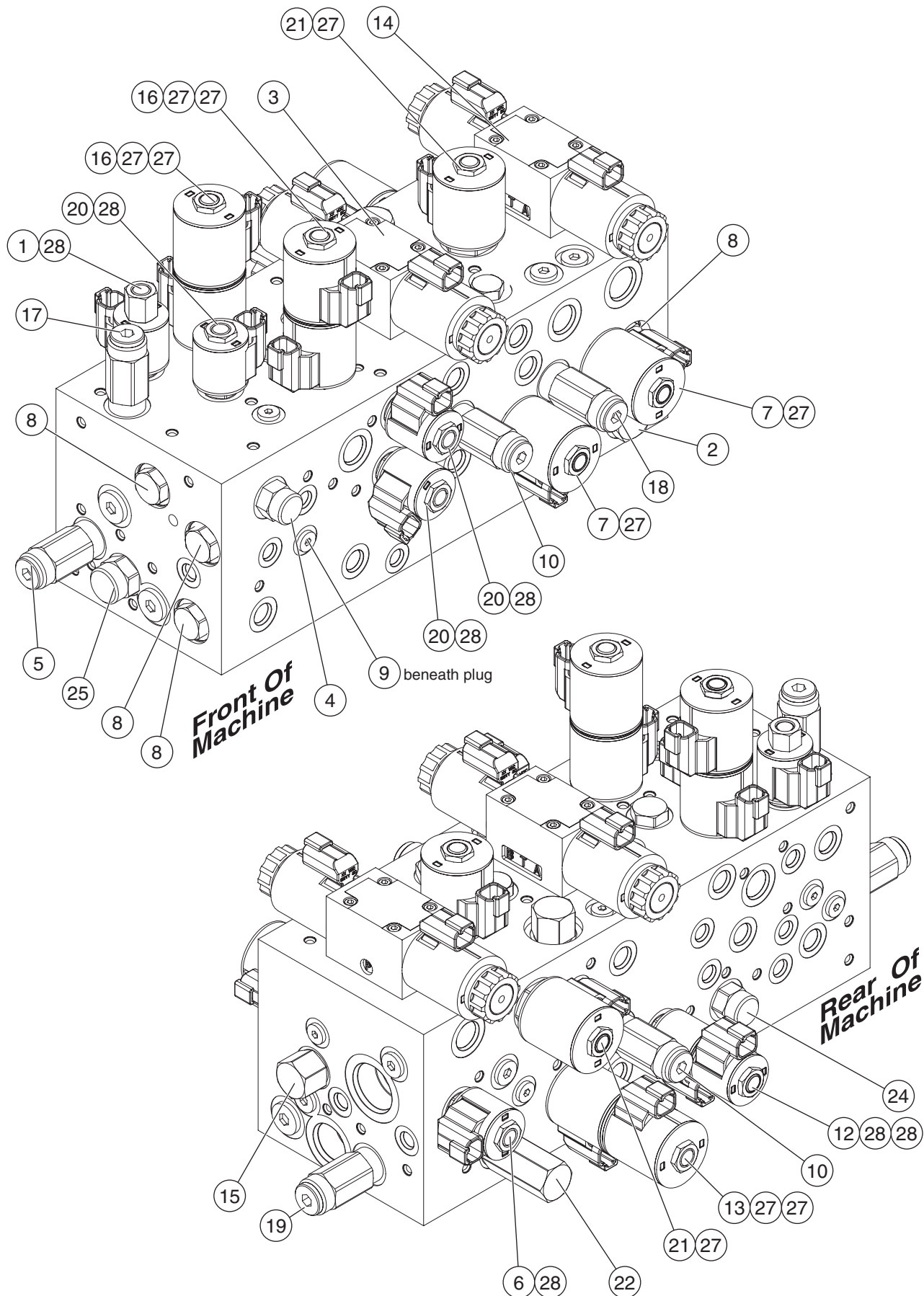


ILLUSTRATION No.
ART_3639

TITAN BOOM 40-S

Functions Manifold Valves & Coils

Functions Manifold Assembly -- Valves

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|--------------------------------------|
| -- | 92083 | -- | Functions Manifold, without fittings |
| 1 | 92572 | 1 | Valve, Solenoid |
| 2 | 91473 | 1 | Valve, Check |
| 3 | 92573 | 1 | Valve, Spool |
| 4 | 92574 | 1 | Valve, Pilot |
| 5 | 92575 | 1 | Valve, Pressure-Reducing |
| 6 | 90120 | 1 | Valve, Solenoid |
| 7 | 91148 | 2 | Valve, Solenoid Proportional |
| 8 | 91477 | 5 | Valve, Check |
| 9 | 91154 | 2 | Valve, Load Shuttle Check |
| 10 | 92576 | 2 | Valve, Cross-Port Relief |
| 11 | 92577 | 1 | Flow Divider |
| 12 | 92578 | 1 | Valve, Solenoid |
| 13 | 92579 | 1 | Valve, Solenoid |
| 14 | 91144 | 1 | Valve, Spool |
| 15 | 92580 | 2 | Valve, Pilot |
| 16 | 92581 | 2 | Valve, Proportional |
| 17 | 92582 | 1 | Valve, Relief |
| 18 | 92583 | 1 | Valve, Relief |
| 19 | 92584 | 1 | Valve, Relief |
| 20 | 90119 | 3 | Valve, Solenoid |
| 21 | 92585 | 2 | Valve, Solenoid |
| 22 | 92586 | 1 | Valve, Flow-Reducing |
| 23 | -- | -- | -- |
| 24 | 92587 | 1 | Valve, Flow-Reducing |
| 25 | 92588 | 1 | Valve, Flow-Reducing |
| 26 | 92475 | 1 | Orifice |
| 27 | 91143 | 10 | Coil |
| 28 | 92589 | 7 | Coil |



• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

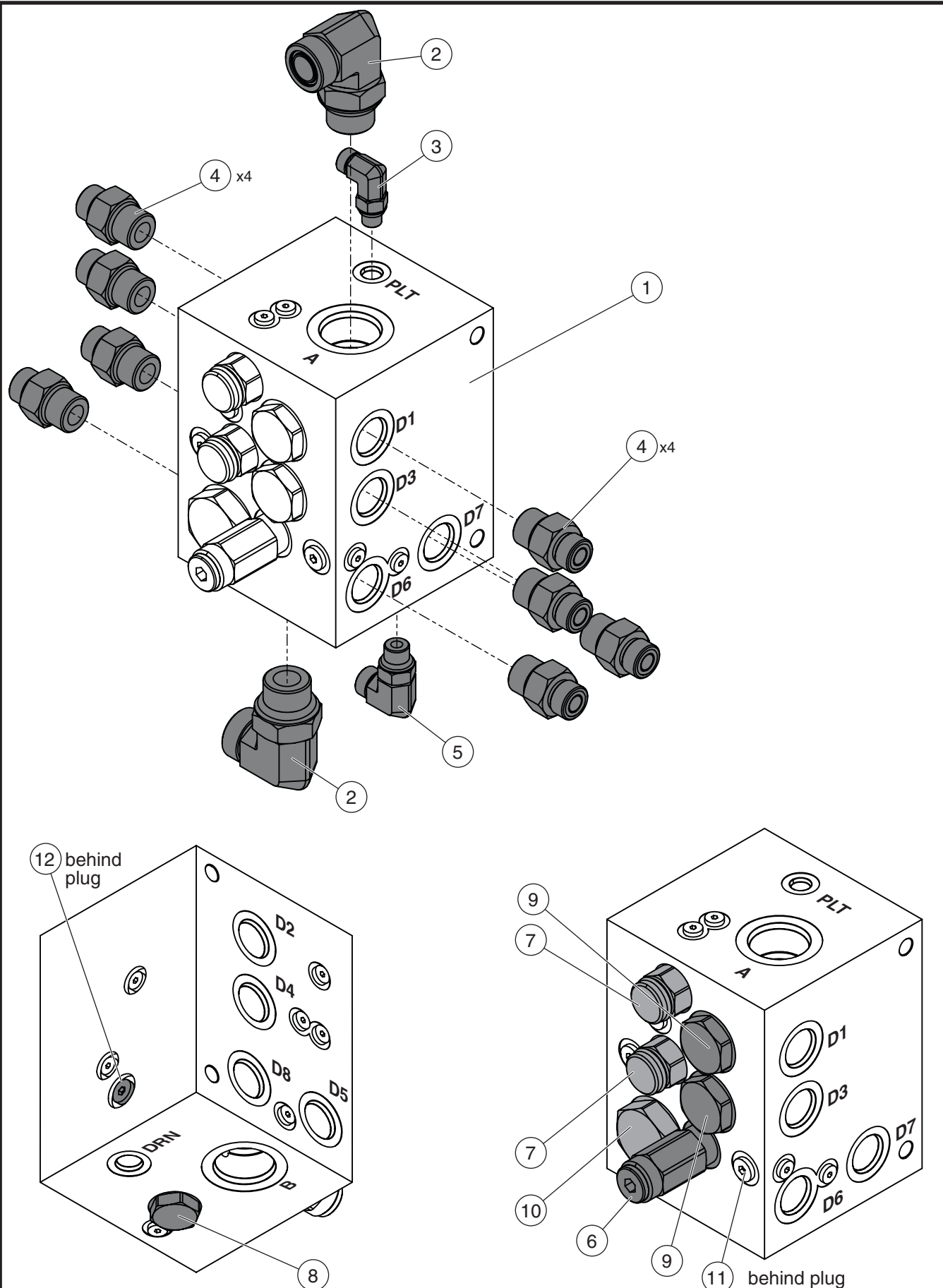


ILLUSTRATION No.
ART_3652

TITAN BOOM 40-S

Traction Manifold

Traction Manifold Assembly

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|---|
| -- | 84177 | -- | Traction Manifold Assembly |
| 1 | 92167 | 1 | Traction Manifold Block, without fittings |
| 2 | 50843 | 2 | Fitting, MFFOR-MB90-12-12 |
| 3 | 50673 | 1 | Fitting, MFFOR-MB90 4-4 |
| 4 | 50837 | 8 | Fitting, MFFOR-MB-8-10 |
| 5 | 50674 | 1 | Fitting, MFFOR-MB90-06-06 |
| 6 | 92602 | 1 | Valve, Relief |
| 7 | 92603 | 2 | Valve, Piloted |
| 8 | 92604 | 1 | Valve, Oil Shuttle |
| 9 | 92605 | 2 | Flow Divider |
| 10 | 92606 | 1 | Flow Divider |
| 11 | 92607 | 1 | Orifice Plug, .090" |
| 12 | 91017 | 1 | Orifice Plug, .040" |
| 13 | 92608 | 2 | Orifice Plug, .052" |



• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

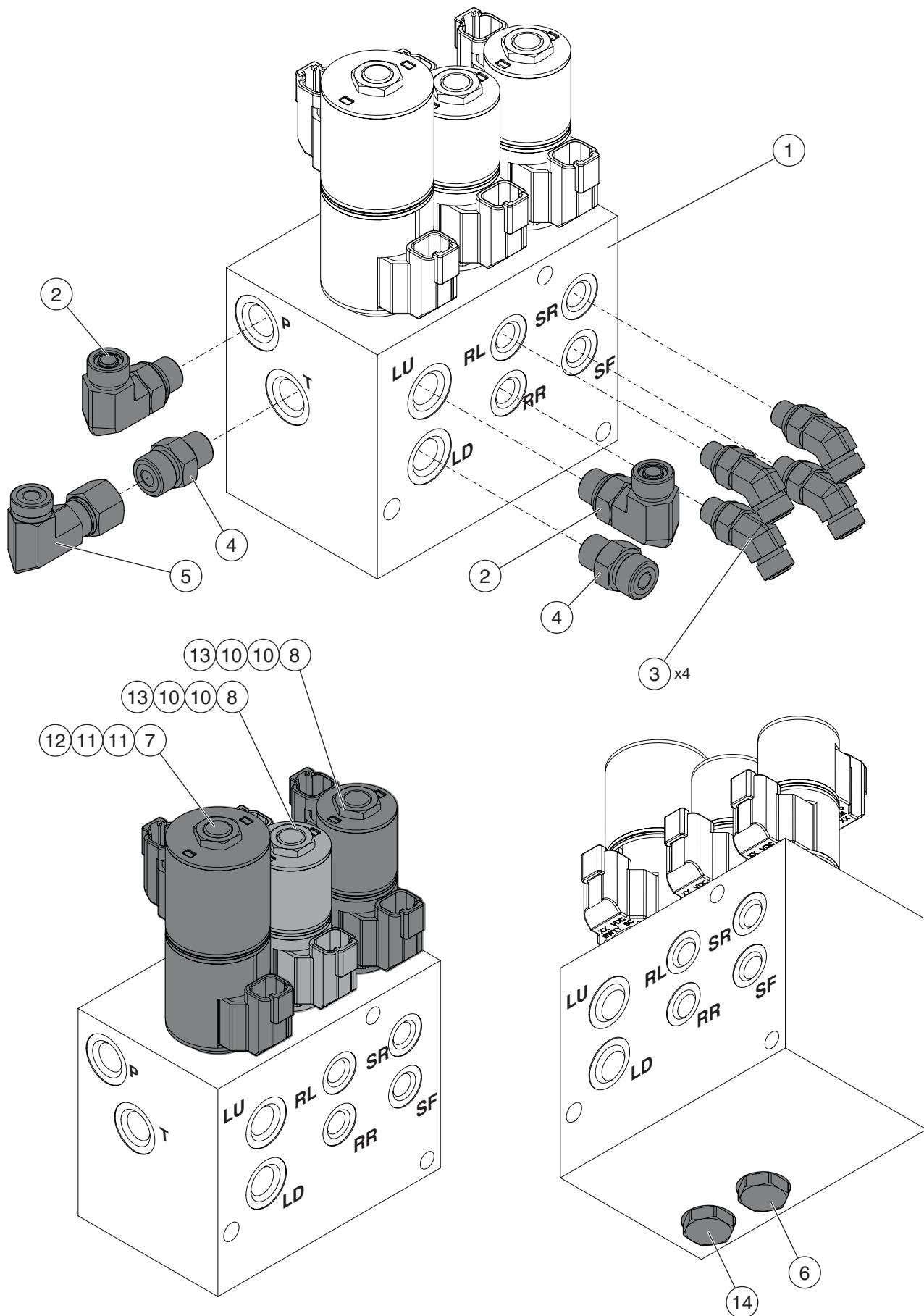


ILLUSTRATION No.
ART_3653

TITAN BOOM 40-S

Auxilliary Manifold

Auxiliary Manifold Assembly

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|------------------------------|
| -- | 84189 | 1 | Auxiliary Manifold Assembly |
| 1 | 92082 | 1 | Platform Function Manifold |
| 2 | 50674 | 2 | Fitting, MFFOR-MB90-06-06 |
| 3 | 50675 | 4 | Fitting, MFFOR-MB45-04-04 |
| 4 | 50835 | 2 | Fitting, MFFOR-MB-6-6 |
| 5 | 50672 | 1 | Fitting, MFFOR-FFORX90-06-06 |
| 6 | 92864 | 1 | Valve, Piloted |
| 7 | 92581 | 1 | Valve, Solenoid |
| 8 | 92600 | 2 | Valve, Solenoid |
| 9 | -- | -- | -- |
| 10 | 92173 | 4 | Coil |
| 11 | 91143 | 2 | Coil |
| 12 | 92398 | 1 | Check Valve Disk |
| 13 | 92399 | 2 | Check Valve Disk |
| 14 | 92669 | 1 | Valve Flow Regulator |



• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

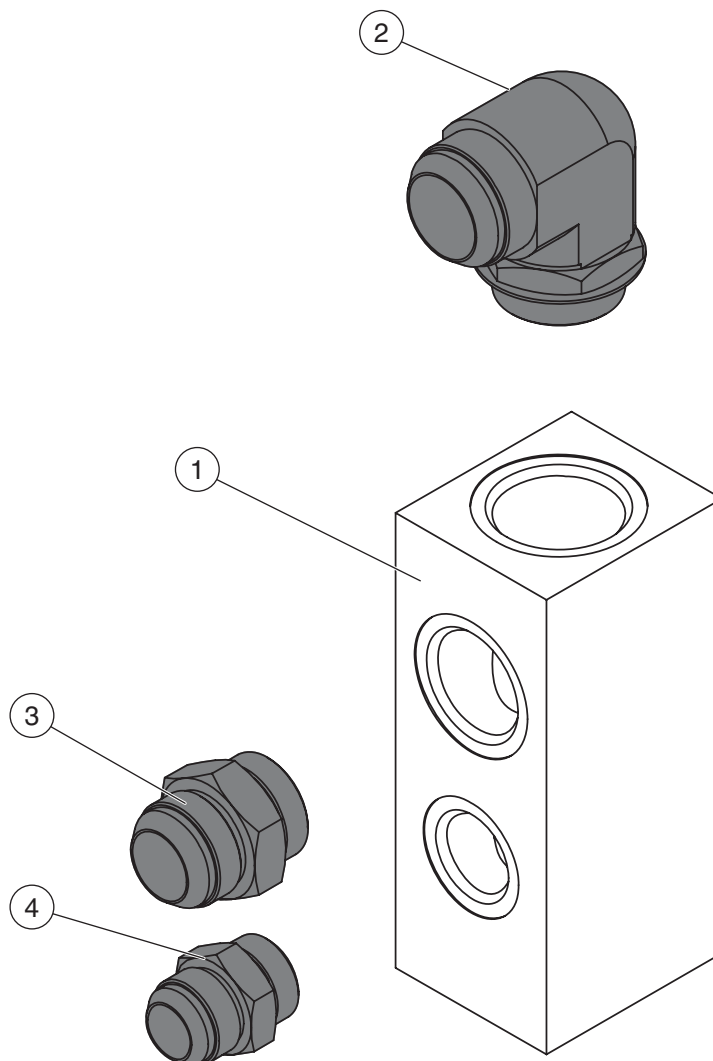


ILLUSTRATION No.
ART_3655

TITAN BOOM 40-S

Suction Manifold

Suction Manifold

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|------------------------|
| 1 | 92037 | 1 | Suction Manifold |
| 2 | 50966 | 1 | Fitting, MB-MJ90-24-24 |
| 3 | 50967 | 1 | Fitting, MB-MJ-20-20 |
| 4 | 50765 | 1 | Fitting, MB-MJ-16-16 |



• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

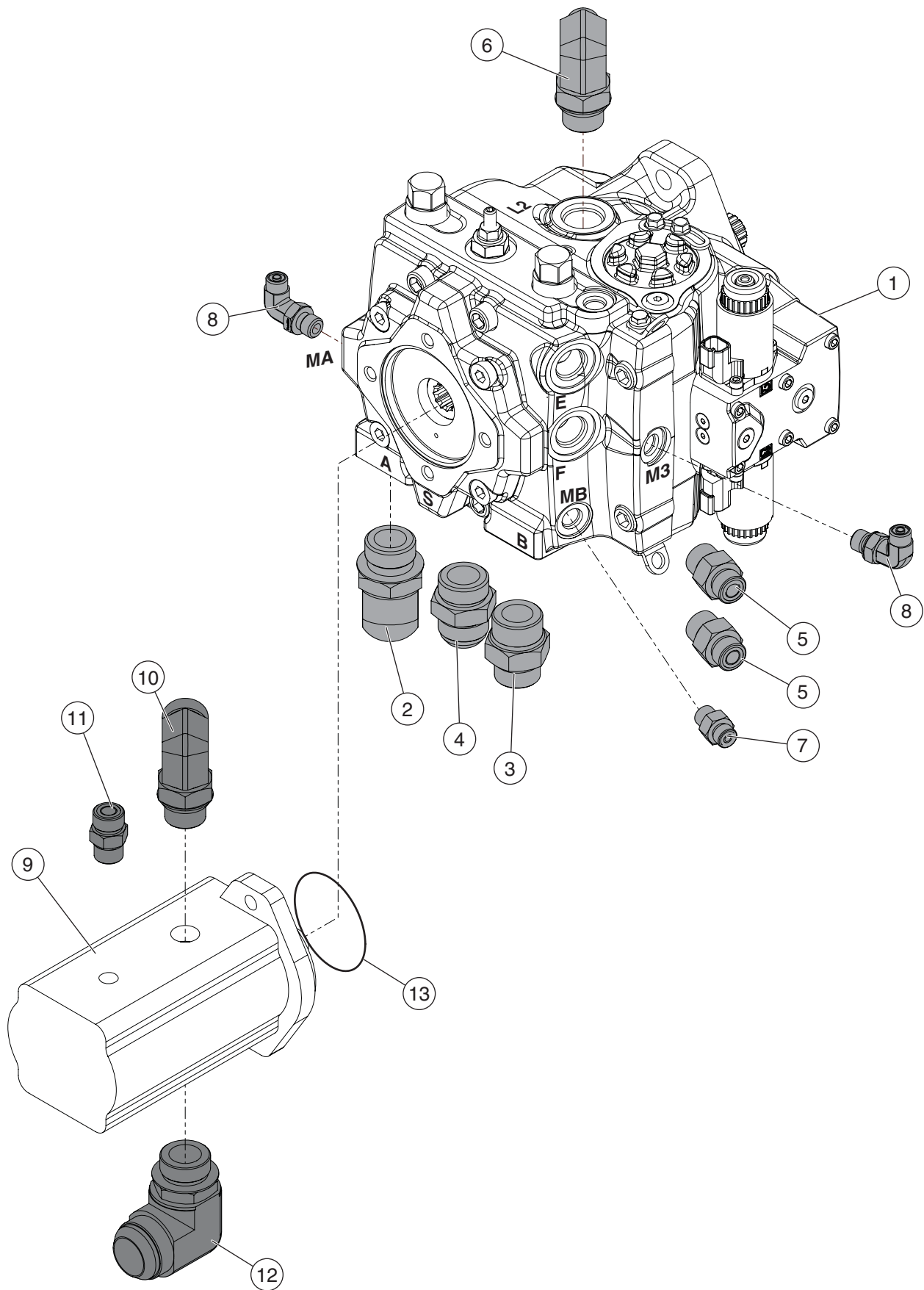


ILLUSTRATION No.
ART_3644

TITAN BOOM 40-S

Hydraulic Pumps

Hydraulic Pumps

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|------------------------------------|
| -- | 84174 | -- | Piston Pump Assembly |
| -- | 84175 | -- | Tandem Gear Pump Assembly |
| 1 | 91893 | 1 | Piston Pump, without fittings |
| 2 | 50844 | 1 | Fitting, MFFOR-MB90-12-16 |
| 3 | 50827 | 1 | Fitting, MFFOR-MB-12-16 |
| 4 | 50765 | 1 | Fitting, MB-MJ-16-16 |
| 5 | 50837 | 2 | Fitting, MFFOR-MB-8-10 |
| 6 | 50849 | 1 | Fitting, MFFOR-MB90-8-12 |
| 7 | 50832 | 1 | Fitting, MFFOR-MB-4-6 |
| 8 | 50846 | 2 | Fitting, MFFOR-MB90-4-6 |
| 9 | 92698 | 1 | Tandem Gear Pump, without fittings |
| 10 | 50843 | 1 | Fitting, MFFOR-MB90-12-12 |
| 11 | 50841 | 1 | Fitting, MFFOR-MB-8-8 |
| 12 | 50787 | 1 | Fitting, MB-MJ90-16-20 |
| 13 | 17971 | 1 | O-Ring |



• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

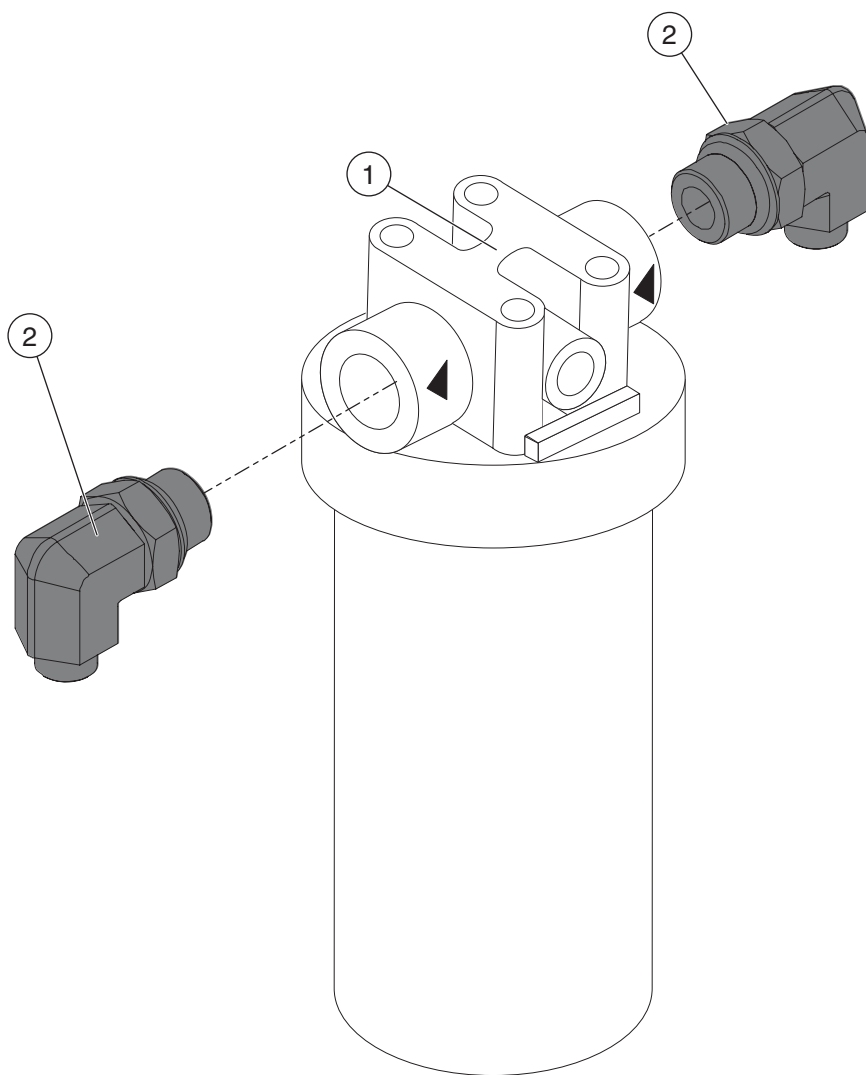


ILLUSTRATION No.
ART_3656

TITAN BOOM 40-S

Charge Filter Assembly

Charge Filter Assembly

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|--|
| 1 | 92072 | 1 | Charge Filter Assembly, , without fittings |
| -- | 92169 | -- | Filter Element |
| 2 | 50849 | 1 | Fitting, MFFOR-MB90-8-12 |



• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

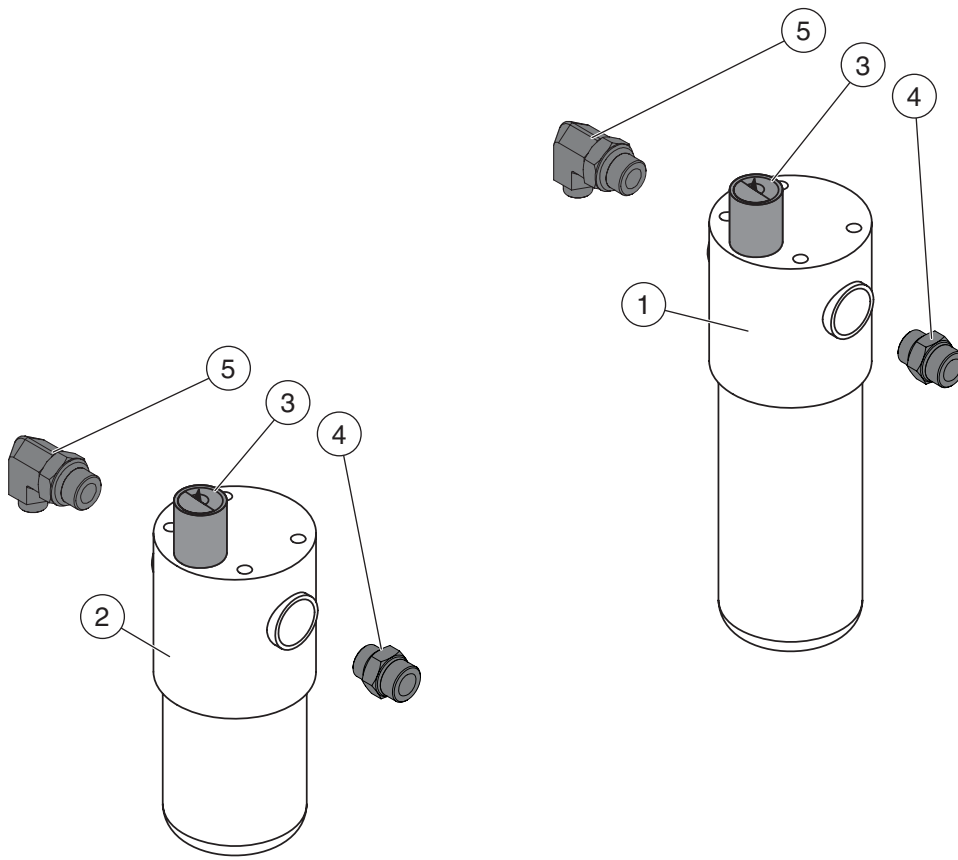


ILLUSTRATION No.
ART_4192

TITAN BOOM 40-S

OPTION -- High Pressure Filters

OPTION -- High Pressure Filter Assembly

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|-------------------------------|
| 1 | 92674 | 1 | Filter Assembly, Long, 20GPM |
| -- | 92831 | -- | Filter Element, Long, 20GPM |
| 2 | 92785 | 1 | Filter Assembly, Short, 10GPM |
| -- | 92830 | -- | Filter Element, Short, 10GPM |
| 3 | 92832 | 1 | Guage, Filter Minder |
| 4 | 50838 | 2 | Fitting, MB-MFFOR-12-8 |
| 5 | 50849 | 2 | Fitting, MB-MFFOR90-12-8 |



• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

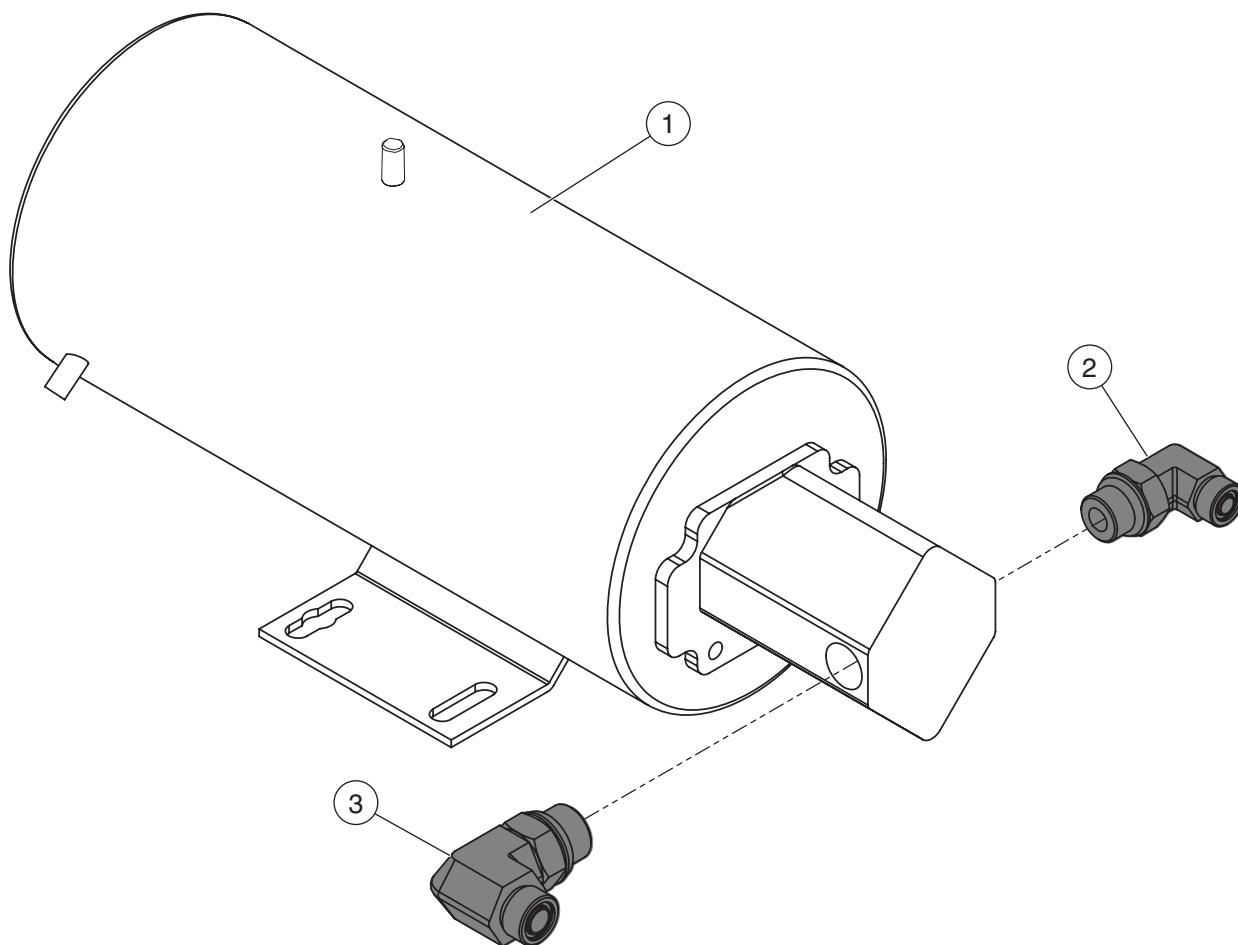


ILLUSTRATION No.
ART_3657

TITAN BOOM 40-S

Emergency Power Unit Assembly

Emergency Power Unit Assembly

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|--------------------------|
| 1 | 90970 | 1 | Emergency Power Unit |
| -- | 90997 | -- | Motor |
| -- | 90998 | -- | Pump |
| 2 | 50847 | 1 | Fitting, MFFOR-MB90-6-8 |
| 3 | 50848 | 1 | Fitting, MFFOR-MB90-8-10 |

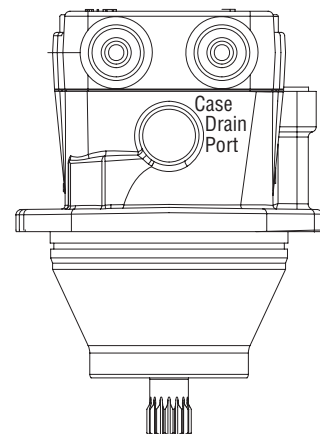
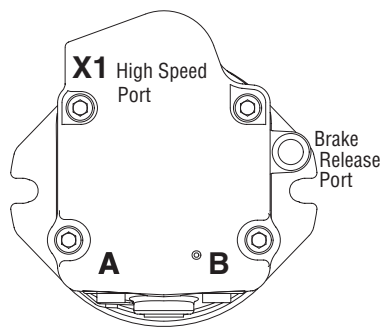
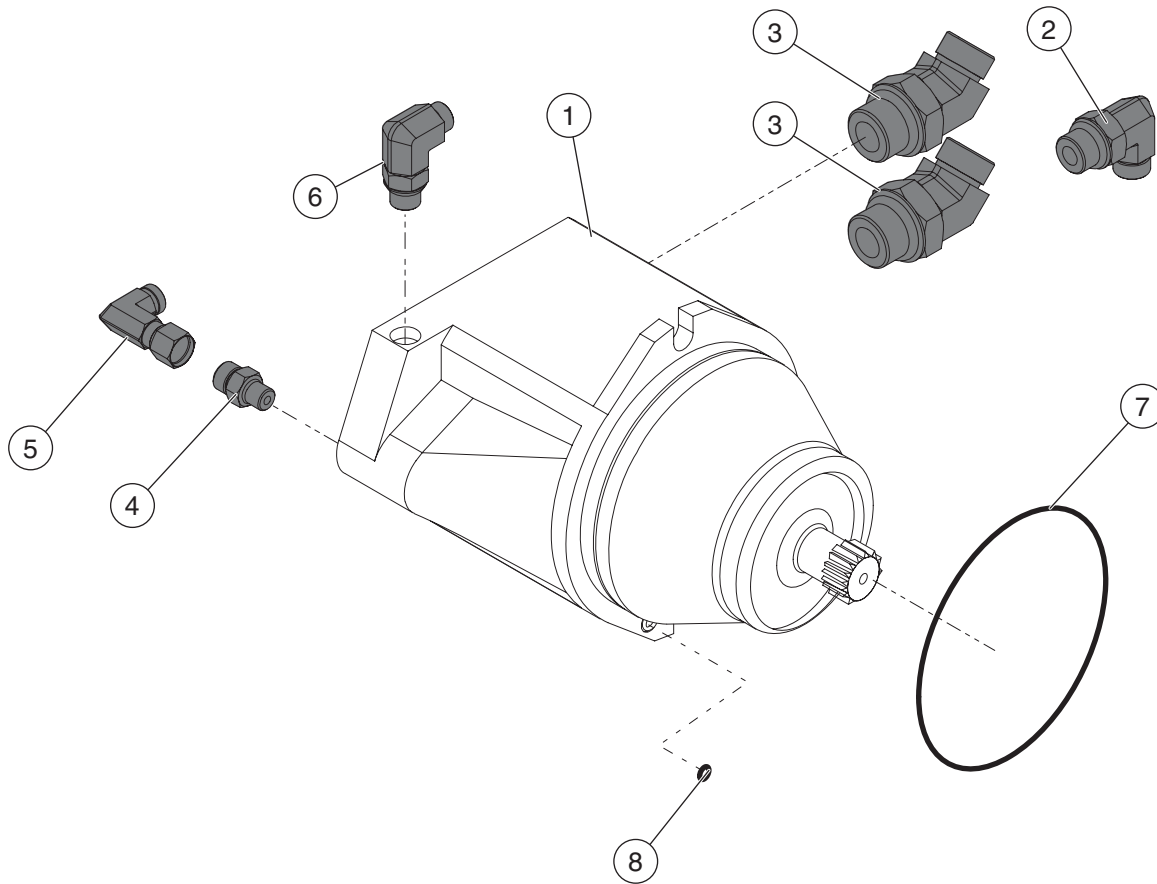


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• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only



Wheel Motor Assembly

Wheel Motor Assembly

| ITEM | PART NO. | QTY PER WHEEL | QTY PER MACHINE | DESCRIPTION |
|------|----------|---------------|-----------------|-------------------------------|
| 1 | 91882 | 1 | 4 | Wheel Motor, without fittings |
| 2 | 50847 | 1 | 4 | Fitting, MFFOR-MB90-6-8 |
| 3 | 50957 | 2 | 8 | Fitting, MFFOR-MB45-10-12 |
| 4 | 50831 | 1 | 4 | Fitting, MFFOR-MB-4-4 |
| 5 | 50671 | 1 | 4 | Fitting, MFFOR-FFORX90-04-04 |
| 6 | 50656 | 1 | 4 | Fitting, MFFOR-MB90-04-06 |
| 7 | 92166 | 1 | 4 | O-Ring |
| 8 | 92042 | 1 | 4 | O-Ring |

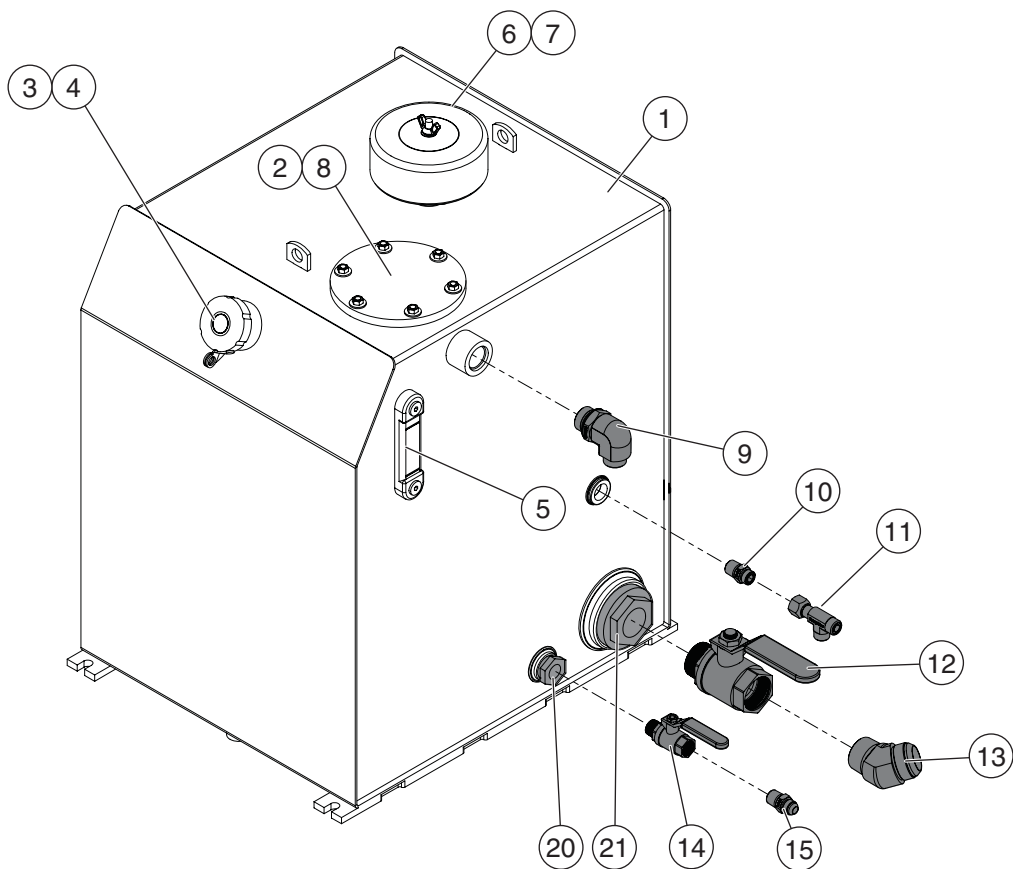


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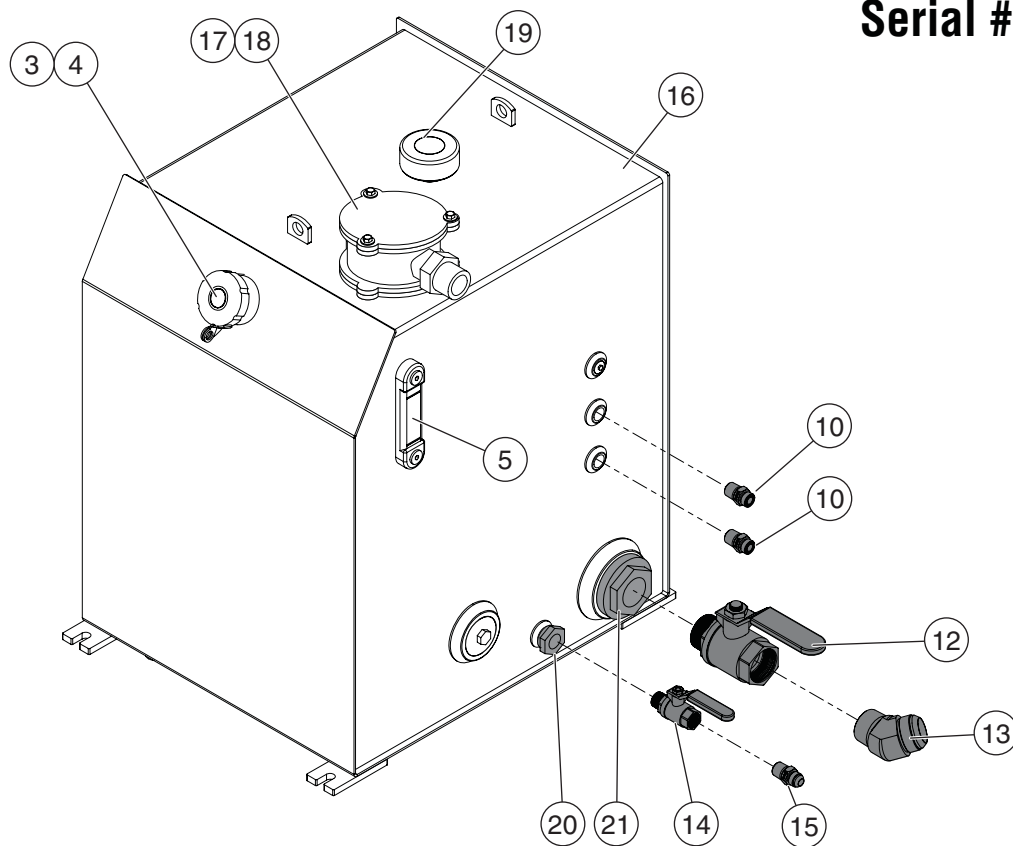
• NS: Not a Stock item

• REF: Reference only



Serial ~ #12400061

Serial #12400062 ~



Hydraulic Tank Assembly

| ITEM | PART NO. | QTY Serial ~ #12400061 | QTY Serial #12400062~ | DESCRIPTION |
|------|----------|------------------------------|-----------------------------|------------------------------|
| -- | 84180 | -- | -- | Hydraulic Tank Assembly |
| 1 | 18407 | 1 | -- | Hydraulic Tank |
| 2 | 92482 | 1 | -- | Filter Element |
| 3 | 92478 | 1 | 1 | Filler Cap |
| 4 | 92484 | 1 | 1 | Filler Strainer |
| 5 | 92479 | 1 | 1 | Sight Gauge |
| 6 | 92481 | 1 | -- | Breather Assembly |
| 7 | 92485 | 1 | -- | Breather Element |
| 8 | 92483 | 1 | -- | Gasket, Filter Cover |
| 9 | 50844 | 1 | -- | Fitting, MFFOR-MB90-12-16 |
| 10 | 50876 | 1 | 3 | Fitting, MFFOR-MP-8-8 |
| 11 | 50811 | 1 | -- | Fitting, MFFOR-FFORX-MMFOR-8 |
| 12 | 92111 | 1 | 1 | Valve, Ball, 1.5" |
| 13 | 50969 | 1 | 1 | Fitting, MJ-MP-45-24-24 |
| 14 | 92122 | 1 | 1 | Valve, Ball, .5" |
| 15 | 50981 | 1 | 1 | Fitting, MJ-MP-8-8 |
| 16 | 22633 | -- | 1 | Hydraulic Tank |
| 17 | 92366 | -- | 1 | Filter Assembly |
| 18 | 92397 | -- | 1 | Filter Element |
| 19 | 92357 | -- | 1 | Breather Assembly |
| 20 | 92355 | 1 | 1 | Suction Strainer, .5" NPT |
| 21 | 92356 | 1 | 1 | Suction Strainer, 1.5" NPT |

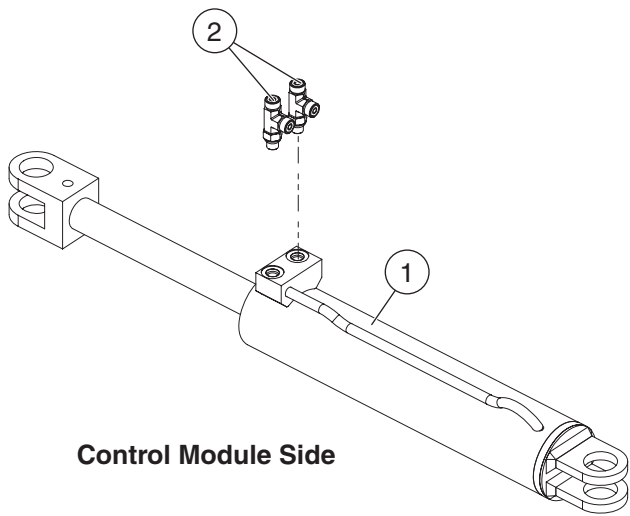


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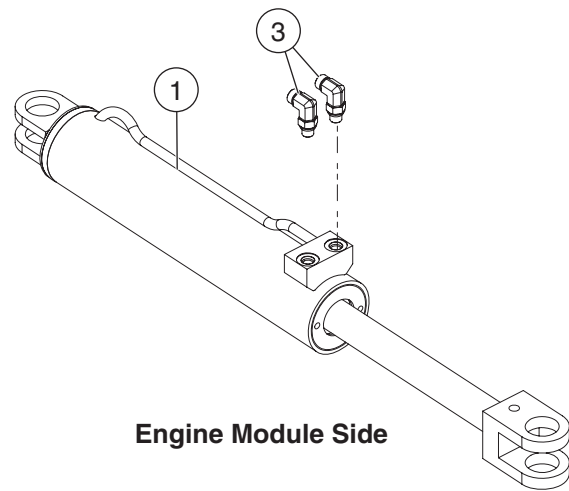
• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only



Control Module Side



Engine Module Side

Same each axle

Steer Cylinders



ILLUSTRATION No.
ART_3659

TITAN BOOM 40-S

Steer Cylinder

| ITEM | PART NO. | QTY PER AXLE | QTY PER MACHINE | DESCRIPTION |
|------|----------|--------------|-----------------|----------------------------------|
| 1 | 18070 | 2 | 4 | Steer Cylinder, without fittings |
| -- | 92616 | 2 | 4 | Seal Kit |
| 2 | 50858 | 2 | 4 | Fitting, MFFOR-MB-MFFORT-4 |
| 3 | 50673 | 2 | 4 | Fitting, MFFOR-MB90-04-04 |



• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

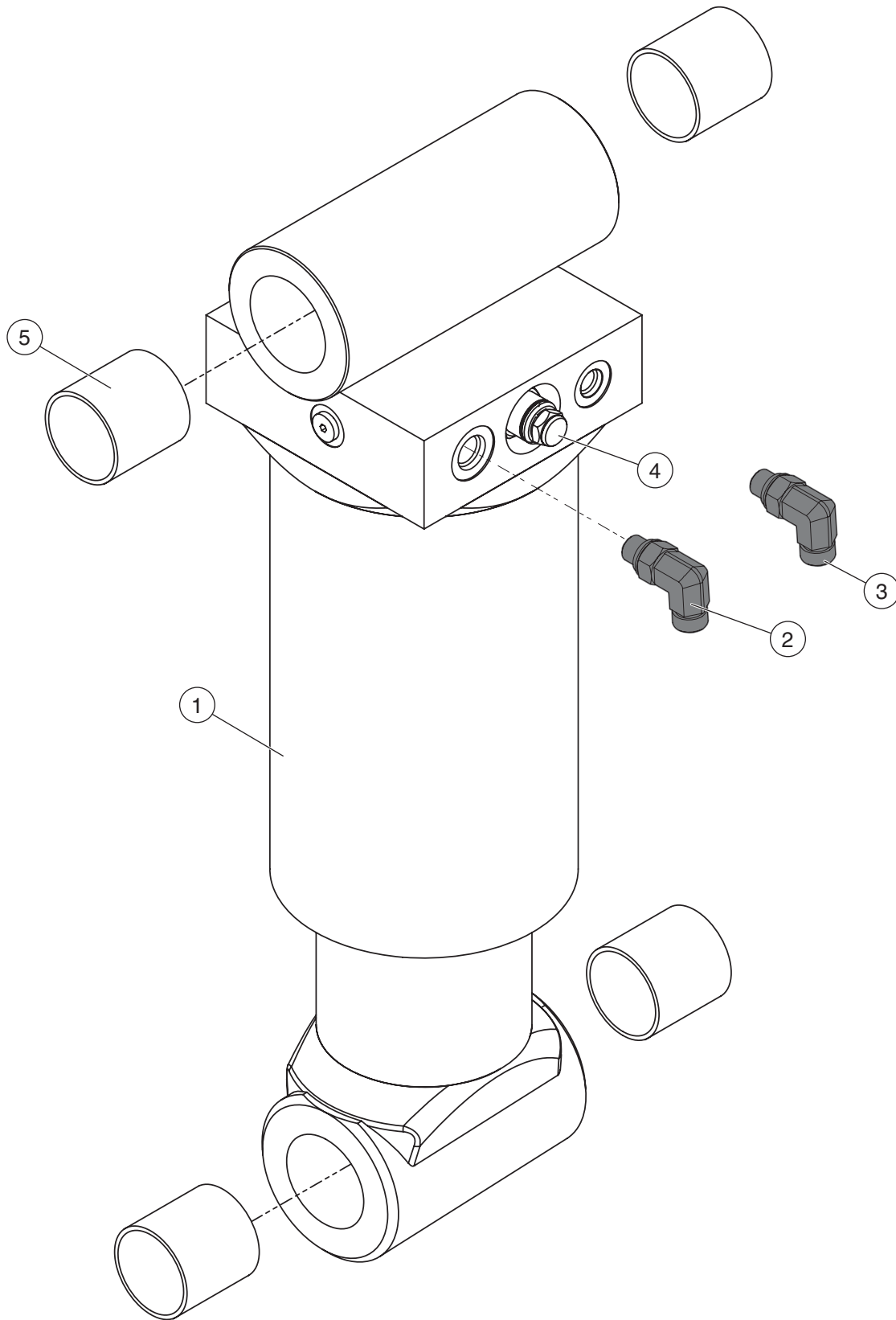


ILLUSTRATION No.
ART_3660

TITAN BOOM 40-S

Axle Lock Cylinders

Axle Lock Cylinder

| ITEM | PART NO. | QTY PER ASSEMBLY | QTY PER MACHINE | DESCRIPTION |
|------|----------|------------------|-----------------|--|
| 1 | 22315 | 1 | 4 | Assembly, Axle Lock Cylinder, without fittings |
| -- | 92617 | -- | -- | Seal Kit |
| 2 | 50846 | 1 | 4 | Fitting, MFFOR-MB90-4-6 |
| 3 | 50673 | 1 | 4 | Fitting, MFFOR-MB90-4-4 |
| 4 | 92622 | 1 | 4 | Valve, Counterbalance |
| 5 | 7217 | 4 | 16 | Bearing |



• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

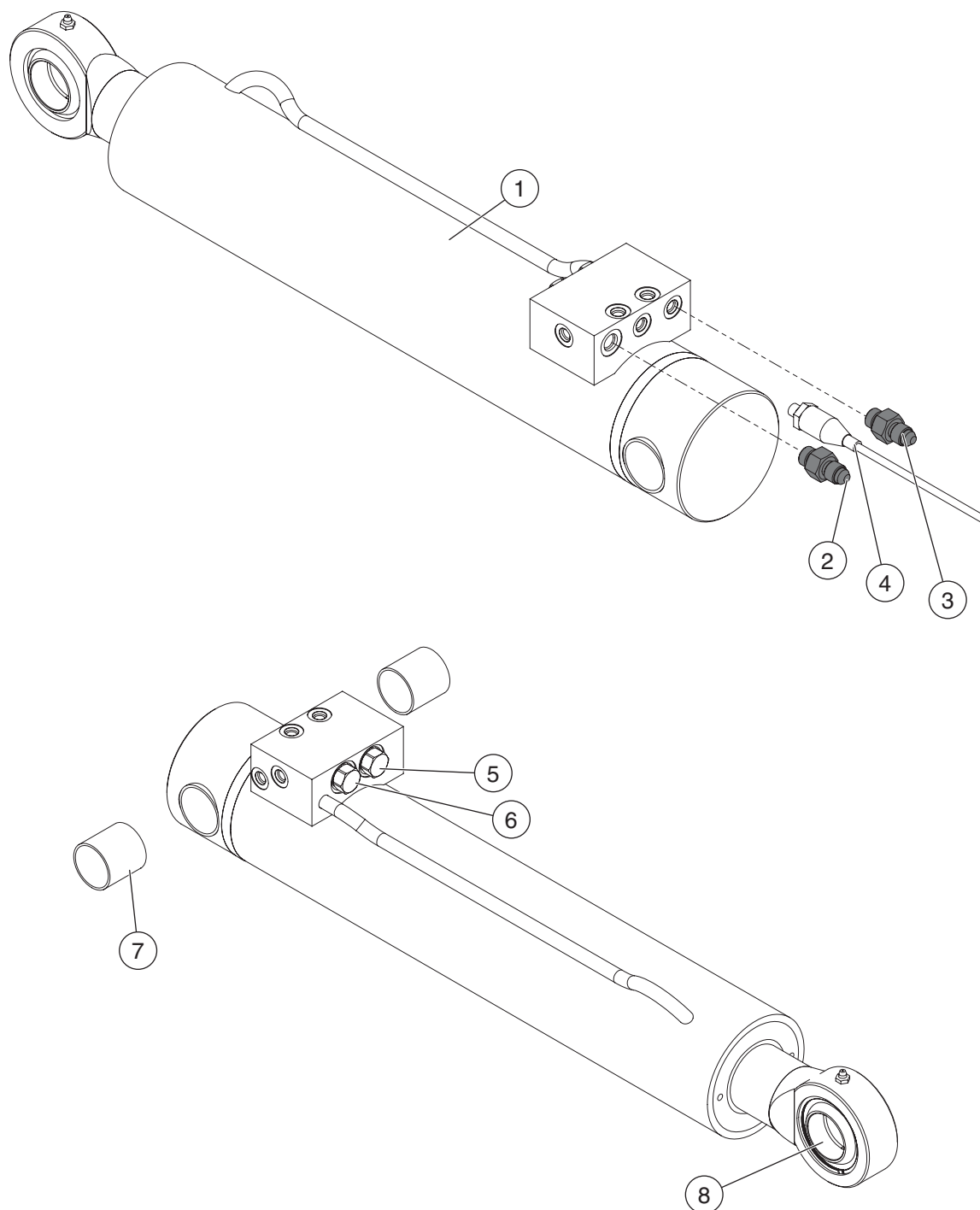


ILLUSTRATION No.
ART_3661

TITAN BOOM 40-S

Stabilizer Cylinders

Stabilizer Cylinder

| ITEM | PART NO. | QTY PER ASSEMBLY | QTY PER MACHINE | DESCRIPTION |
|------|----------|---------------------|--------------------|---------------------------------------|
| 1 | 22241 | 1 | 2 | Stabilizer Cylinder, without fittings |
| -- | 92618 | -- | -- | Seal Kit |
| 2 | 50832 | 1 | 2 | Fitting, MFFOR-MB-4-6 |
| 3 | 50831 | 1 | 2 | Fitting, MFFOR-MB-4-4 |
| 4 | 90845 | 1 | 2 | Pressure Sensor |
| 5 | 92623 | 1 | 2 | Valve, Counterbalance, 3600 psi |
| 6 | 92019 | 1 | 2 | Valve, Counterbalance, 1000 psi |
| 7 | 7217 | 2 | 4 | Bearing |
| 8 | 92629 | 1 | 2 | Bearing, Spherical |



• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

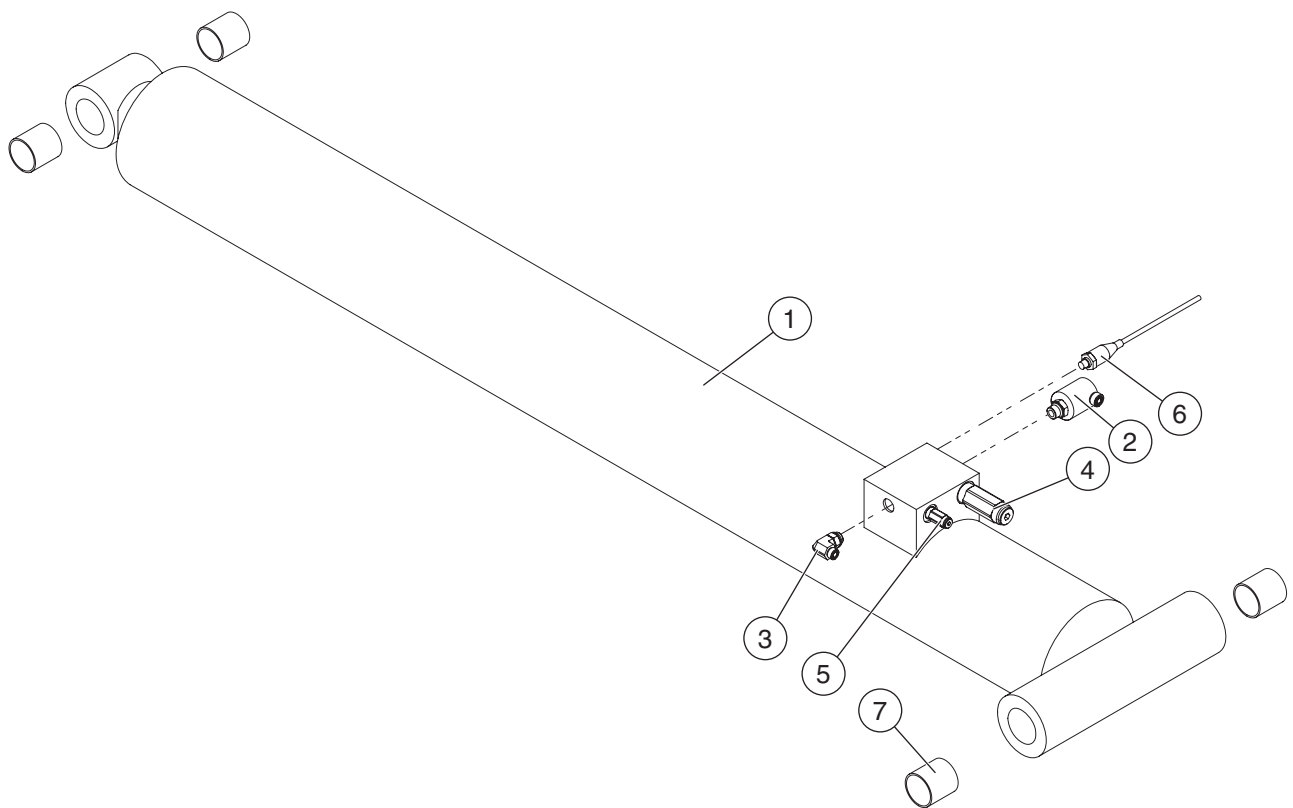


ILLUSTRATION No.
ART_3662

TITAN BOOM 40-S

Lift Cylinder

Lift Cylinder

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|--|
| 1 | 22151 | -- | Lift Cylinder Assembly, without fittings |
| -- | 92619 | -- | Seal Kit |
| 2 | 50982 | 1 | Fitting, MFFOR-MB-08-10 Swivel |
| 3 | 50847 | 1 | Fitting, MFFOR-MB90-6-8 |
| 4 | 92624 | 1 | Valve, Load Reactive |
| 5 | 92623 | 1 | Valve, Counterbalance |
| 6 | 92646 | 1 | Pressure Transducer -- Optional Overload Sensing System Only |
| 7 | 92630 | 4 | Bearing |

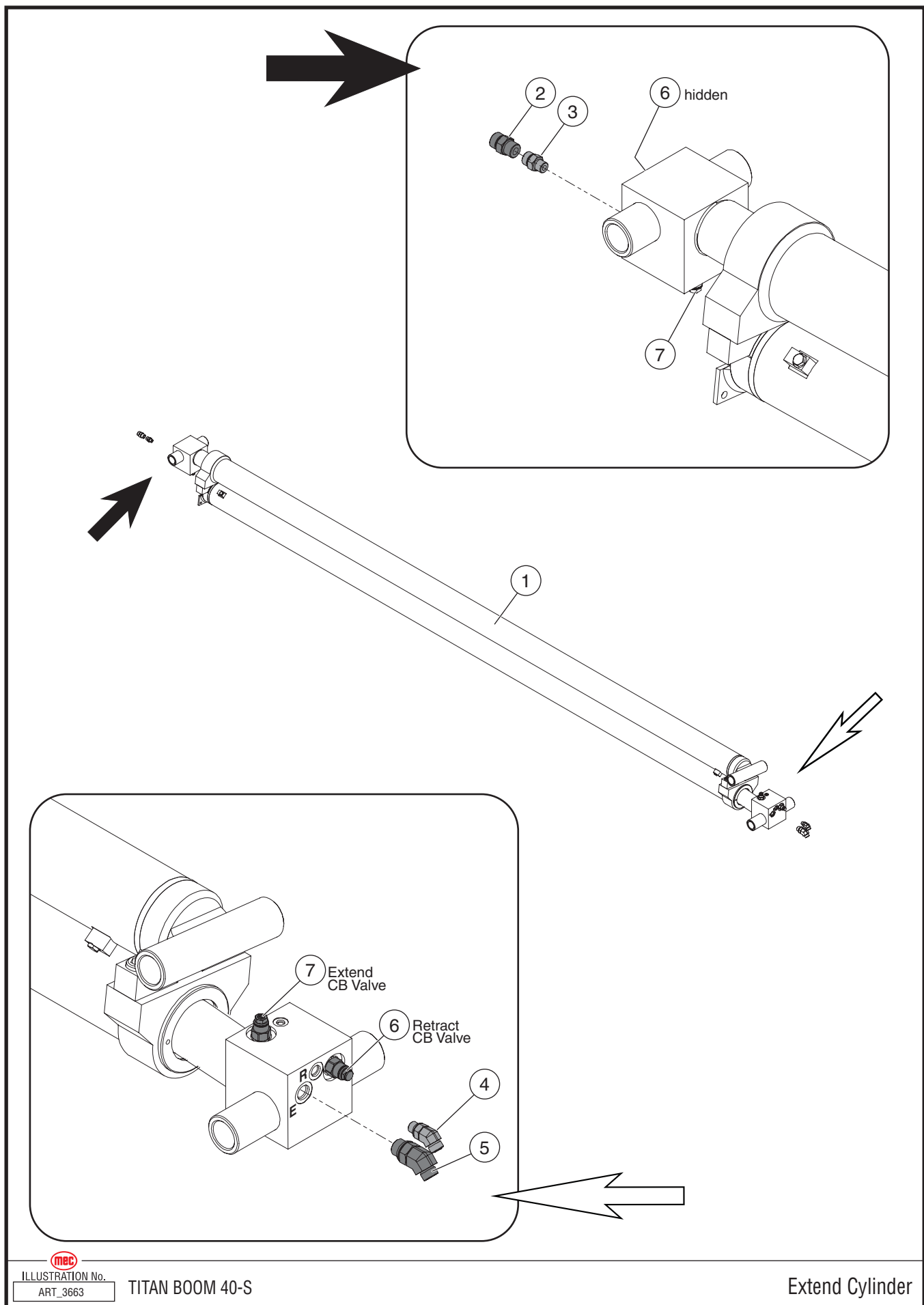


• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only



Extend Cylinder

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|---|
| 1 | 22152 | 1 | Boom Extend Cylinder Assembly, without fittings |
| -- | 92620 | -- | Seal Kit |
| 2 | 50841 | 1 | Fitting, MFFOR-MB-8-8 |
| 3 | 50835 | 1 | Fitting, MFFOR-MB-6-6 |
| 4 | 50676 | 1 | Fitting, MFFOR-MB45-06-06 |
| 5 | 50819 | 1 | Fitting, MFFOR-MB45-8-8 |
| 6 | 92625 | 2 | Valve, Counterbalance |
| 7 | 92626 | 2 | Valve, Counterbalance |



• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

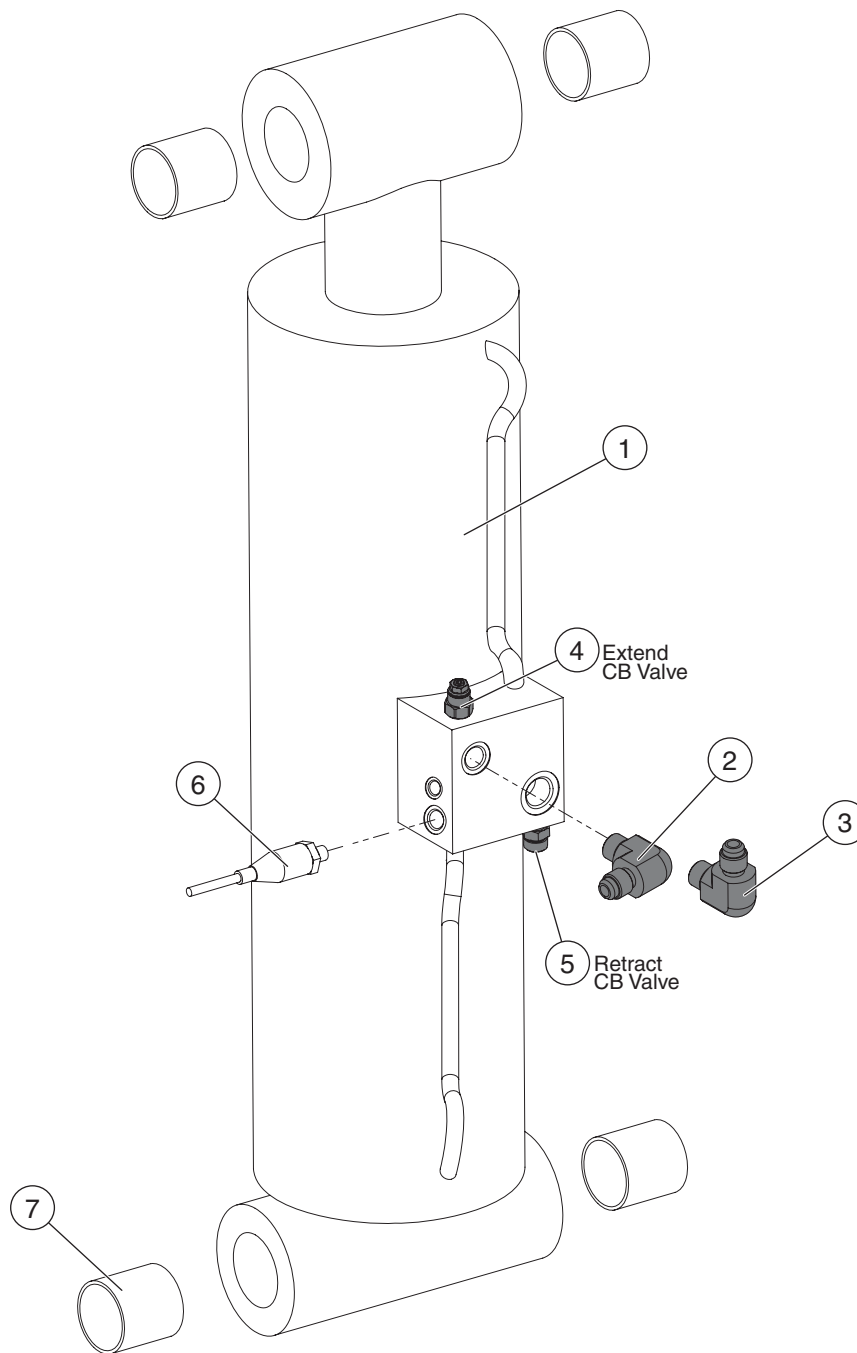


ILLUSTRATION No.
ART_3664

TITAN BOOM 40-S

Platform Level Cylinder

Platform Level Cylinder

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|--|
| 1 | 22153 | 1 | Platform Level Cylinder, without fittings |
| -- | 92621 | -- | Seal Kit |
| 2 | 50674 | 1 | Fitting, MFFOR-MB90-6-6 |
| 3 | 50847 | 1 | Fitting, MFFOR-MB90-6-8 |
| 4 | 92627 | 1 | Valve, Counterbalance |
| 5 | 92628 | 1 | Valve, Counterbalance |
| 6 | 92646 | 1 | Pressure Transducer -- Optional Overload Sensing System Only |
| 7 | 92631 | 4 | Bearing |

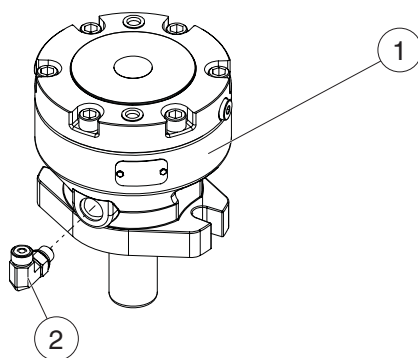


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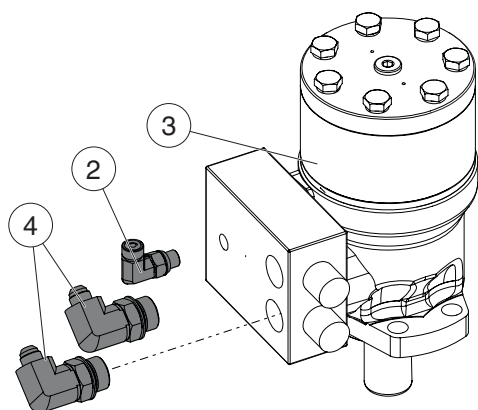
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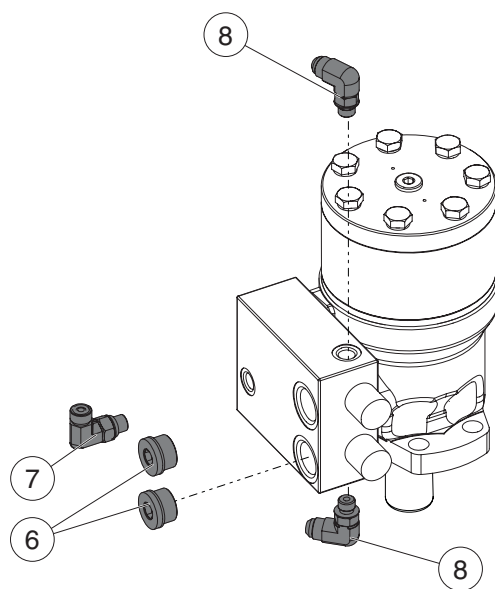


Carriage Brake

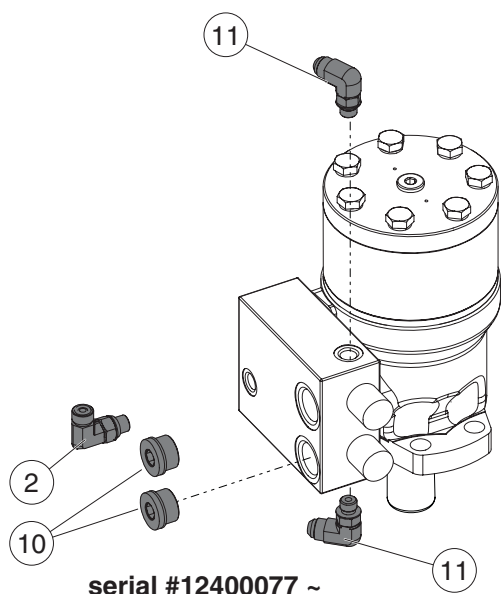
Carriage Motor



~ serial #12400044



serial #12400045 ~ #12400076



serial #12400077 ~

Carriage Motor & Brake

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|--|
| 1 | 91894 | 1 | Brake |
| 2 | 50673 | 2 | Serial ~ #12400044, #12400077~ Fitting, MFFOR-MB90 4-4 |
| | | 1 | Serial #124000045-#12400076 Fitting, MFFOR-MB90 4-4 |
| 3 | 92005 | 1 | Hydraulic Motor |
| -- | 92657 | -- | Motor only; no block |
| -- | 92658 | -- | Shaft Key |
| 4 | 50780 | 2 | Fitting, MB-MJ90-10-6 |
| 5 | -- | -- | -- |
| 6 | 50987 | 2 | Fitting, 1/2" BSPP Plug |
| 7 | 50800 | 1 | Fitting, MBSPPOR-MJ-4-4 |
| 8 | 50986 | 2 | Fitting, MB-MJ90-04-06 |
| 9 | -- | -- | -- |
| 10 | HDW90952 | 2 | Fitting, MB-10 Plug |
| 11 | 50986 | 2 | Fitting, MB-MJ90-04-06 |



• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

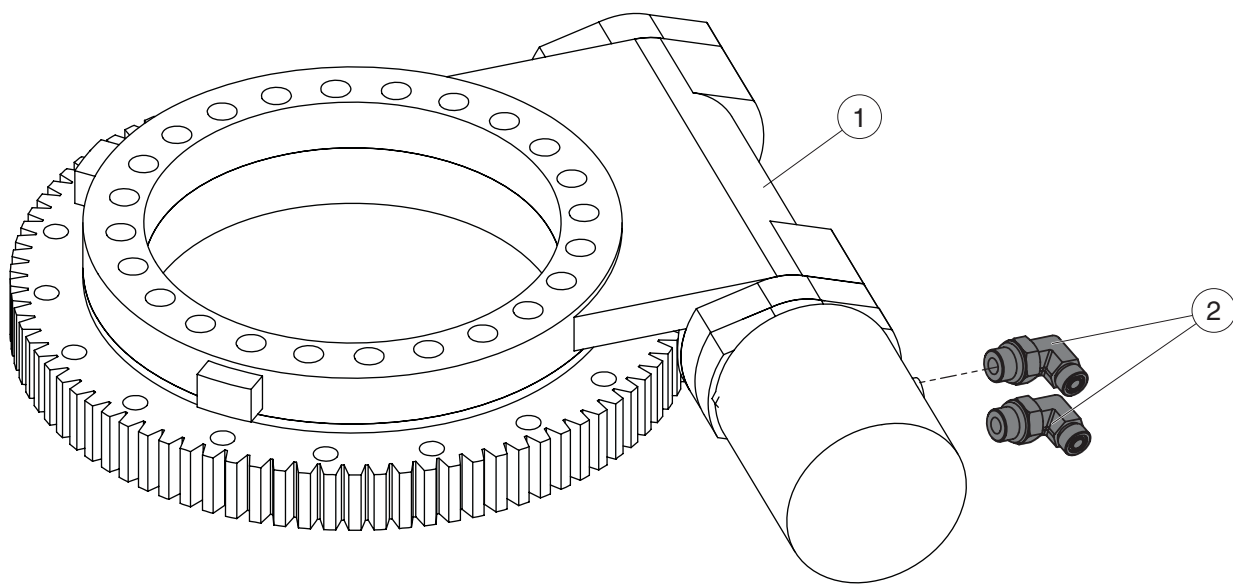


ILLUSTRATION No.
ART_3666

TITAN BOOM 40-S

Platform Rotate Drive Unit

Platform Rotate Drive Unit

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|---|
| 1 | 92018 | 1 | Platform Rotate motor, without fittings |
| 2 | 50665 | 2 | Fitting, MB-MJ90-04-04 |

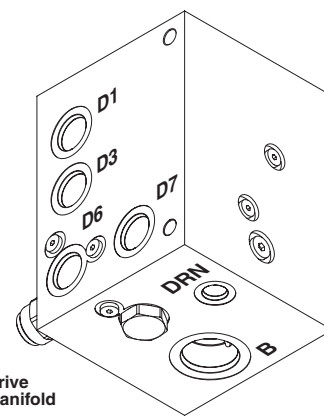
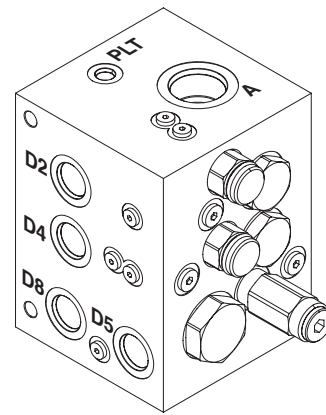
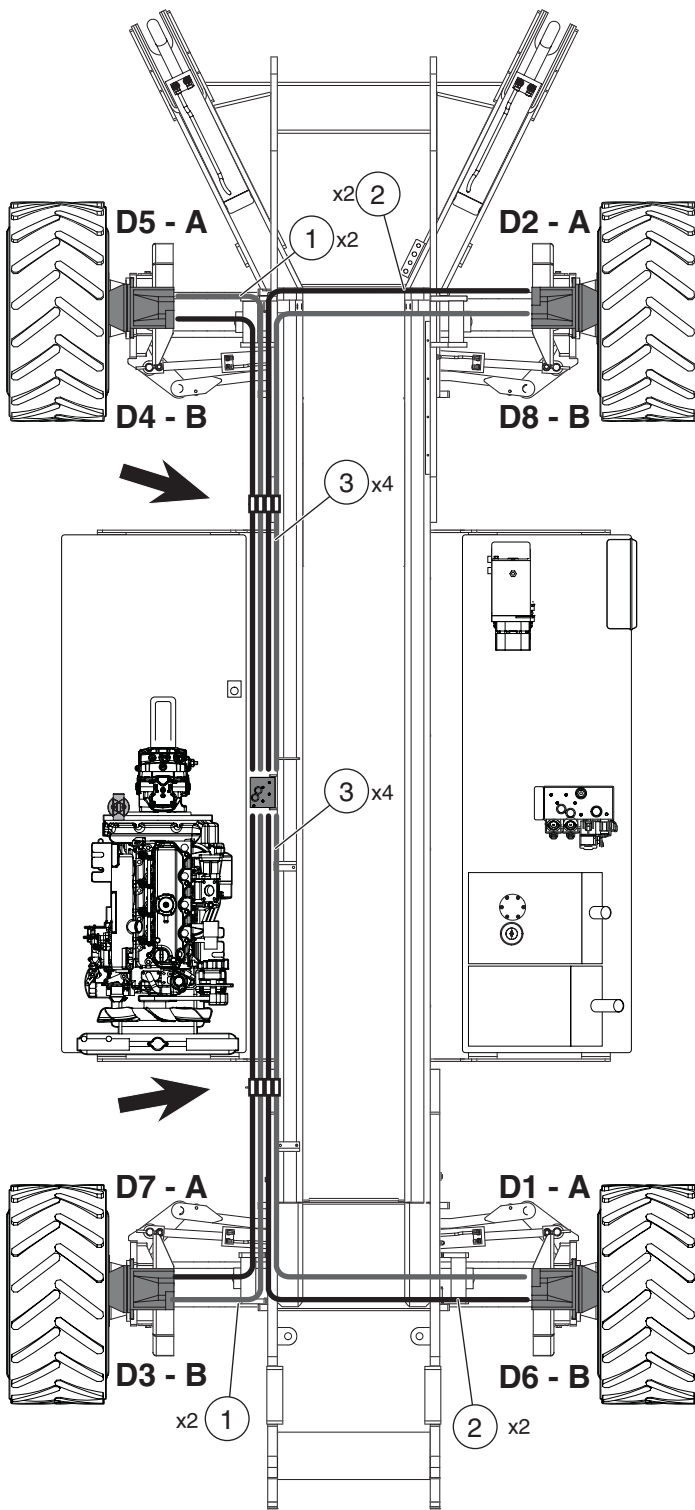


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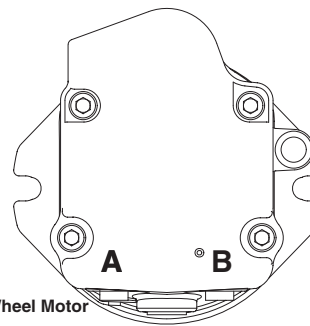
• INCL: Included with assembly

• NS: Not a Stock item

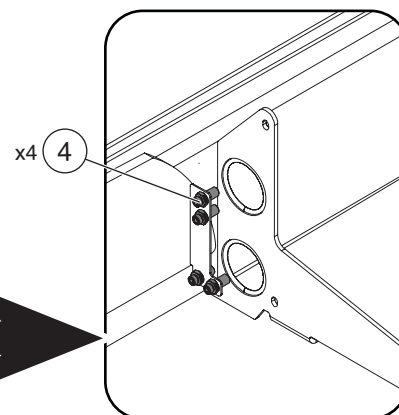
• REF: Reference only



Drive Manifold



Wheel Motor



2 Places

Drive Circuit



ILLUSTRATION No.
ART_3667

TITAN BOOM 40-S

Drive Circuit

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|--|
| 1 | 52021 | 4 | Hose Assy, 1/2" x 65", 8G-10FFORX-8G8FFORX |
| 2 | 52020 | 4 | Hose Assy, 1/2" x 101", 8G-10FFORX-8G8FFORX |
| 3 | 52022 | 8 | Hose Assy, 1/2" x 43.5", 8G-10FFORX-8G8FFORX |
| 4 | 50867 | 8 | Fitting, MMFOR-MMFORH-8 Bulkhead Adapter |



• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

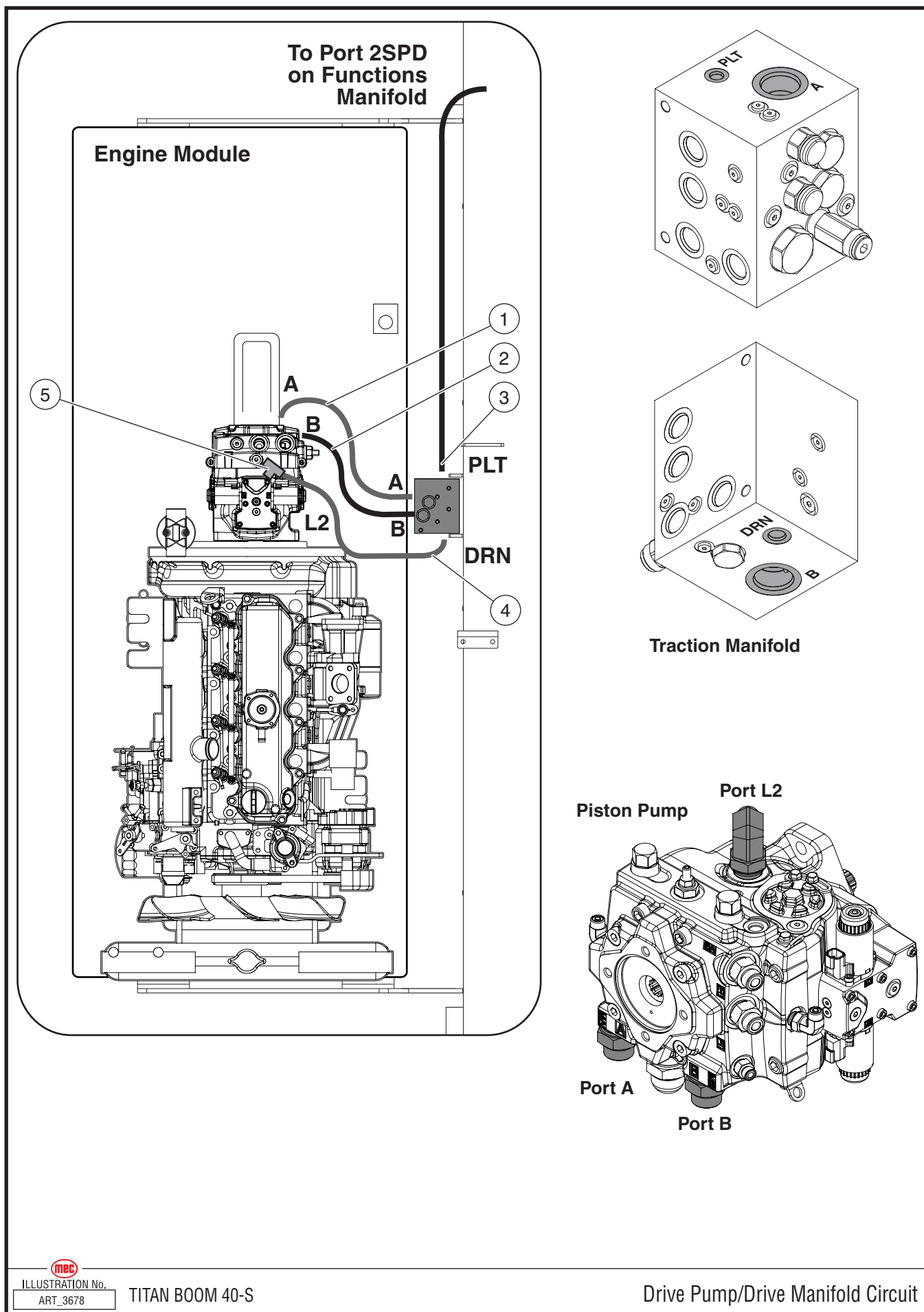


ILLUSTRATION No.
ART_3678

TITAN BOOM 40-S

Drive Pump/Traction Manifold Circuit

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|--|
| 1 | 52027 | 1 | Hose Assy, Port B to Port B, 3/4" x 26 12G12FFORX x 12G12FFORX90 |
| 2 | 52028 | 1 | Hose Assy, Port A to Port A, 3/4" x 18 12G12FFORX45 x 12G12FFORX45 |
| 3 | 52119 | 1 | Hose Assy, Port PLT to Port 2SPD |
| 4 | 52120 | 1 | Hose Assy, Port DRN to Port L2 on Drive Pump |
| 5 | 50975 | 1 | Fitting, MFFOR-MFFOR-FFORX-08 |

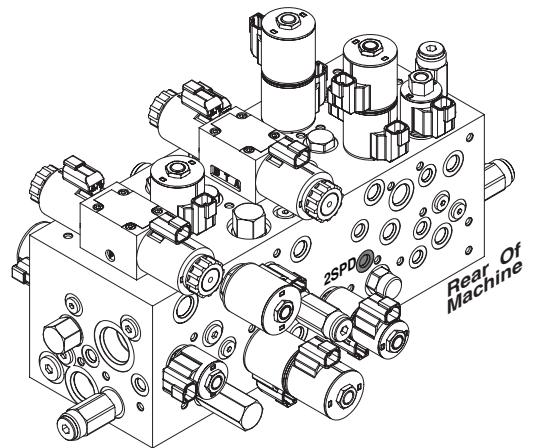
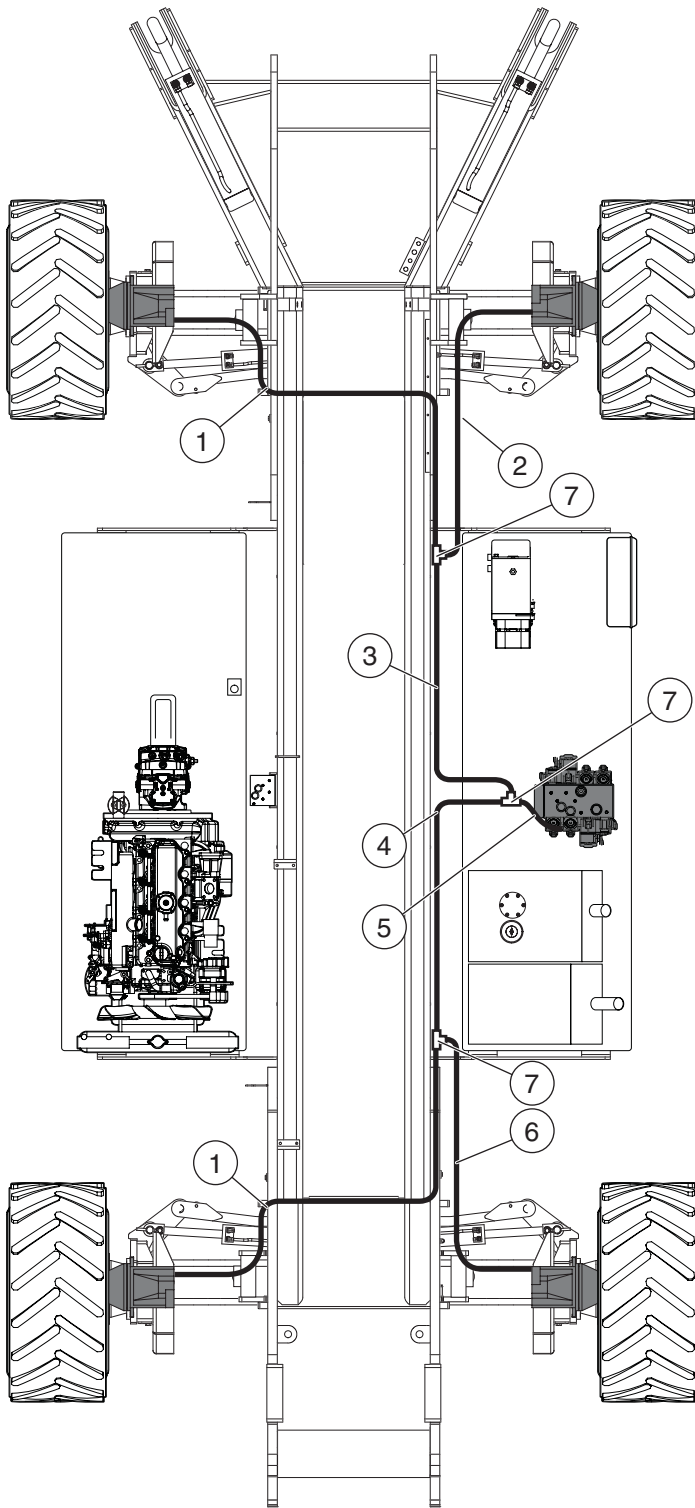


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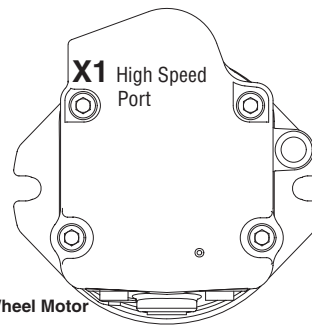
• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only



Functions Manifold



Wheel Motor

High Speed Circuit

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|---|
| 1 | 52047 | 2 | Hose Assy, 1/4" x 112", 4G4FFORX-4G4FFORX |
| 2 | 52002 | 1 | Hose Assy, 1/4" x 87", 4G4FFORX-4G4FFORX |
| 3 | 52026 | 1 | Hose Assy, 1/4" x 38", 4G4FFORX-4G4FFORX |
| 4 | 52050 | 1 | Hose Assy, 1/4" x 64", 4G4FFORX-4G4FFORX |
| 5 | 52052 | 1 | Hose Assy, 1/4" x 18", 4G4FFORX-4G4FFORX90L |
| 6 | 52048 | 1 | Hose Assy, 1/4" x 90", 4G4FFORX-4G4FFORX |
| 7 | 50878 | 3 | Fitting, MFFORT-4 |

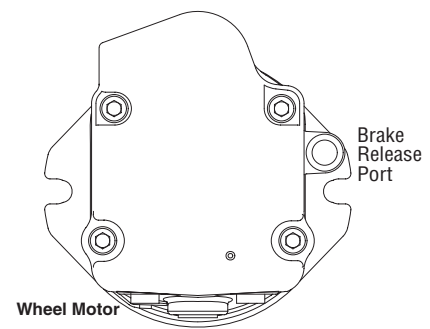
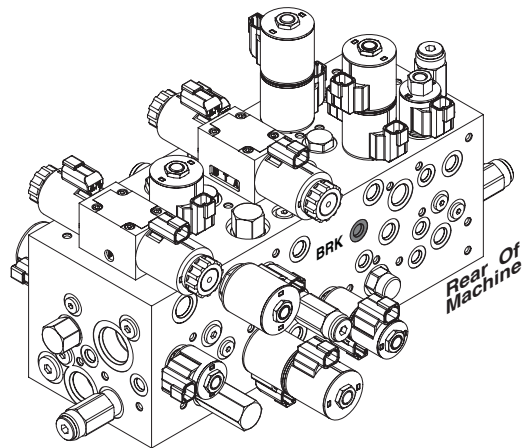
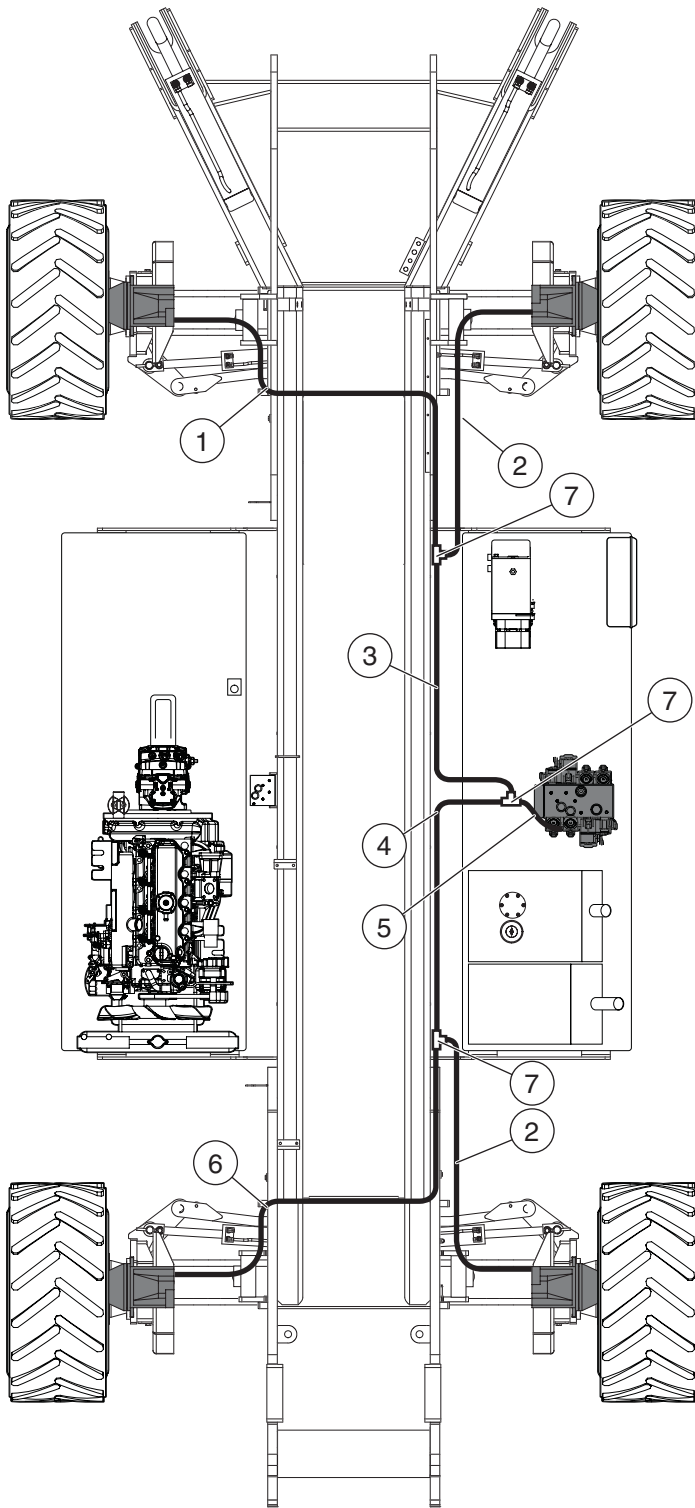


• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only



Brake Circuit

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|---|
| 1 | 52046 | 1 | Hose Assy, 1/4" x 103", 4G4FFORX-4G4FFORX |
| 2 | 52002 | 2 | Hose Assy, 1/4" x 87", 4G4FFORX-4G4FFORX |
| 3 | 52026 | 1 | Hose Assy, 1/4" x 38", 4G4FFORX-4G4FFORX |
| 4 | 52050 | 1 | Hose Assy, 1/4" x 64", 4G4FFORX-4G4FFORX |
| 5 | 52010 | 1 | Hose Assy, 1/4" x 17", 4G4FFORX-4G4FFORX |
| 6 | 52047 | 2 | Hose Assy, 1/4" x 112", 4G4FFORX-4G4FFORX |
| 7 | 50878 | 3 | Fitting, MFFORT-4 |

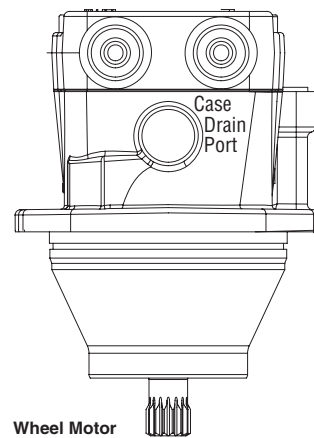
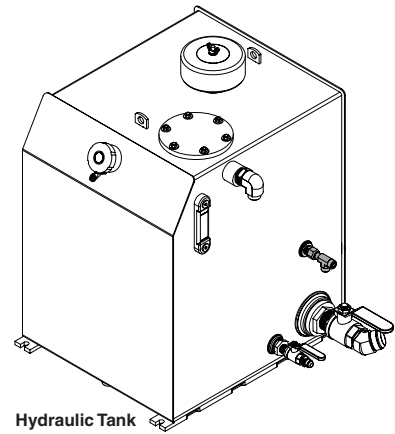
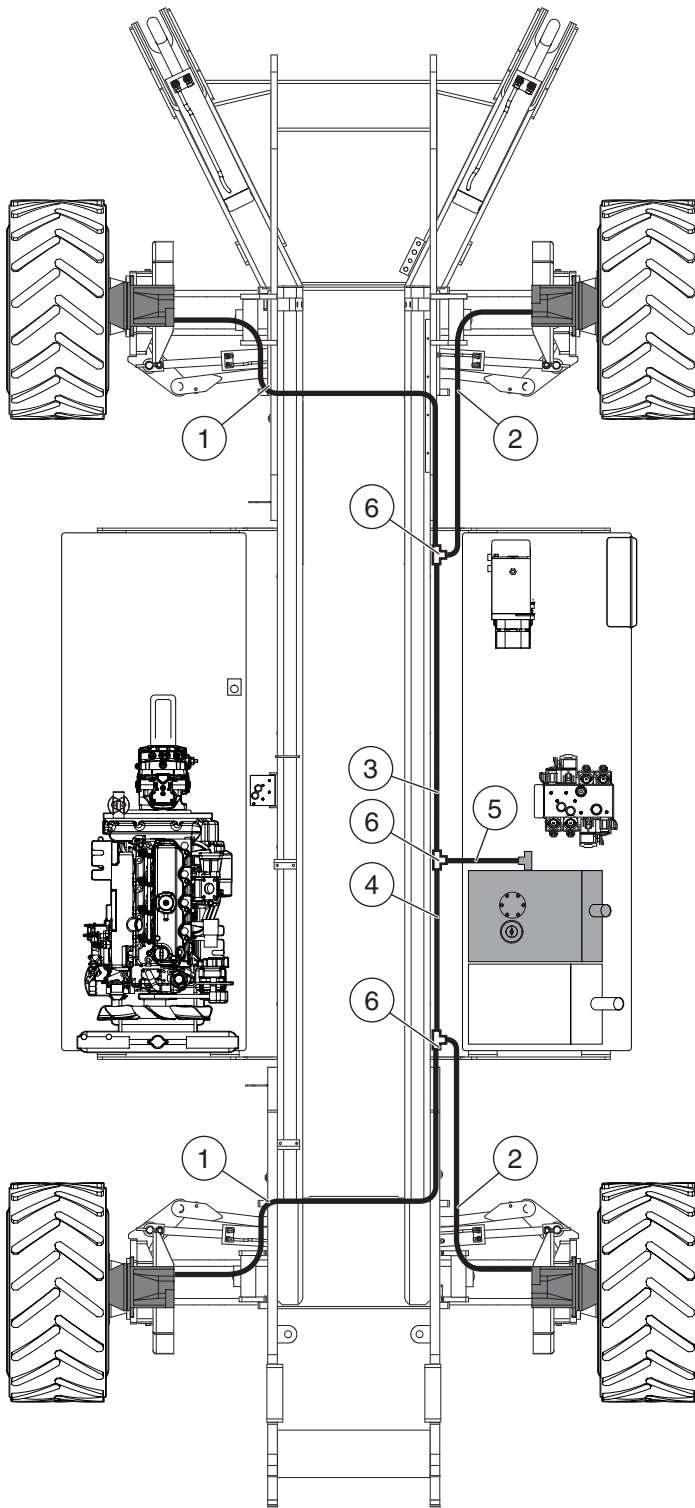


• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only



Drive Case Drain Circuit

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|--|
| 1 | 52045 | 2 | Hose Assy, 3/8" x 109", 6G6FJX-6G6FJX90S |
| 2 | 52044 | 2 | Hose Assy, 3/8" x 84", 6G6FJX-6G6FJX90S |
| 3 | 52051 | 1 | Hose Assy, 3/8" x 64", 6G6FJX-6G6FJX |
| 4 | 52049 | 1 | Hose Assy, 3/8" x 38", 6G6FJX-6G6FJX |
| 5 | 52053 | 1 | Hose Assy, 3/8" x 42", 6G6FJX-6G6FJX90 |
| 6 | 50879 | 3 | Fitting, MFFORT-6 |

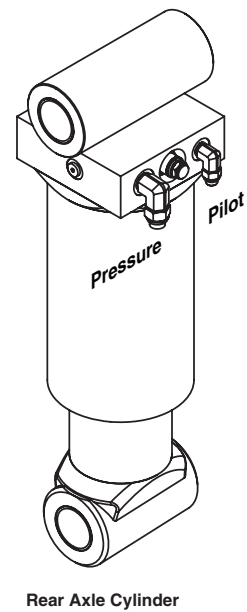
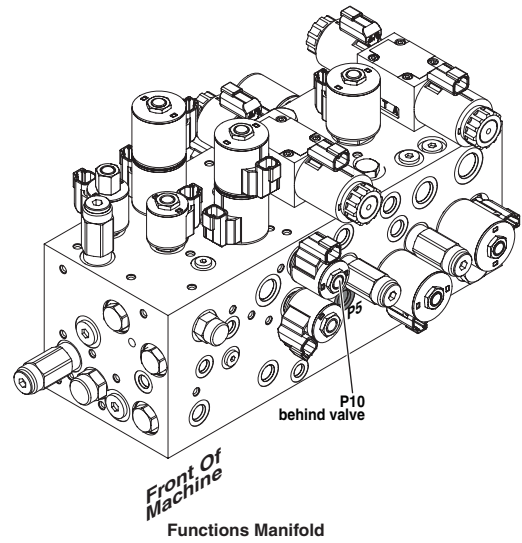
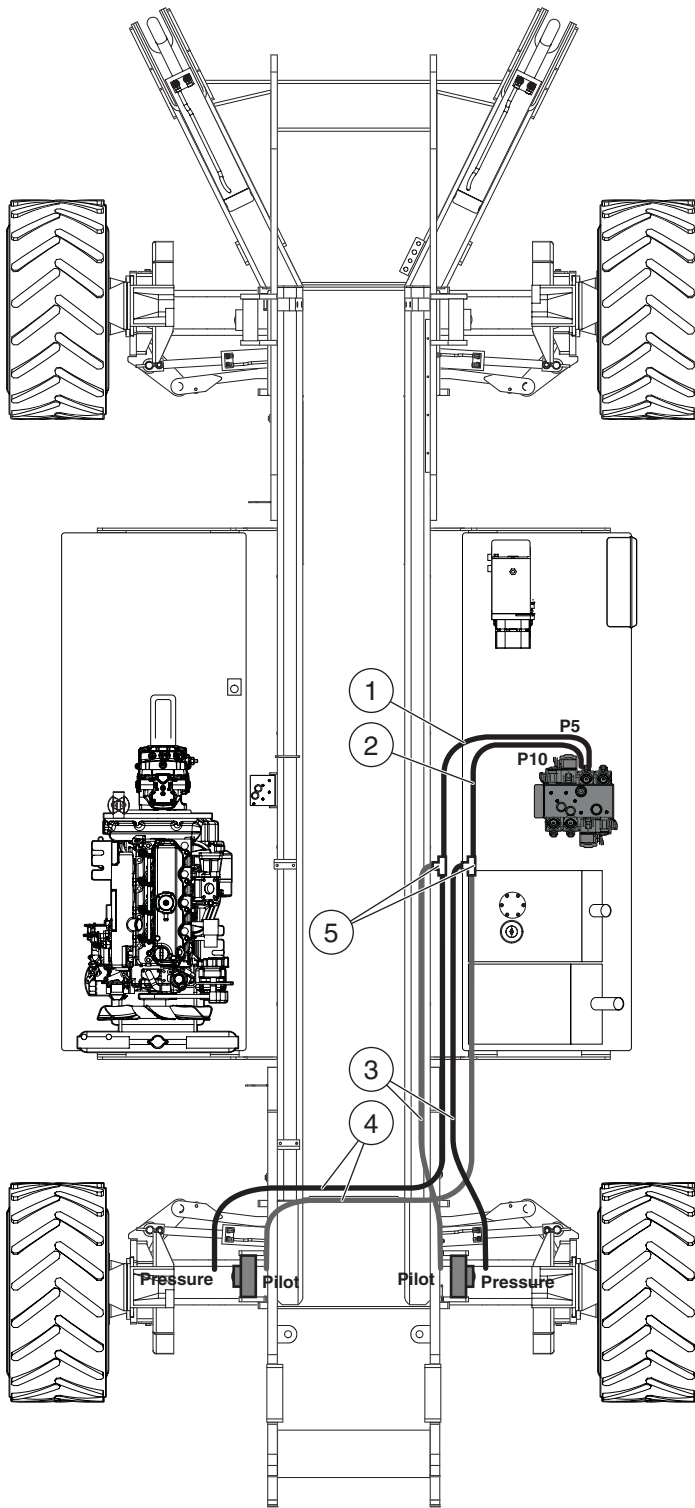


• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only



Rear Axle Cylinder Circuit



ILLUSTRATION No.
ART_3672

TITAN BOOM 40-S

Rear Axle Cylinder Circuit

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|---|
| 1 | 52006 | 1 | Hose Assy, 1/4" x 25", 4G4FFORX-4G4FFORX90S |
| 2 | 52004 | 1 | Hose Assy, 1/4" x 29", 4G4FFORX-4G4FFORX90L |
| 3 | 52003 | 2 | Hose Assy, 1/4" x 119", 4G4FFORX-4G4FFORX |
| 4 | 52002 | 2 | Hose Assy, 1/4" x 87", 4G4FFORX-4G4FFORX |
| 5 | 50878 | 2 | Fitting, MFFORT-4 |

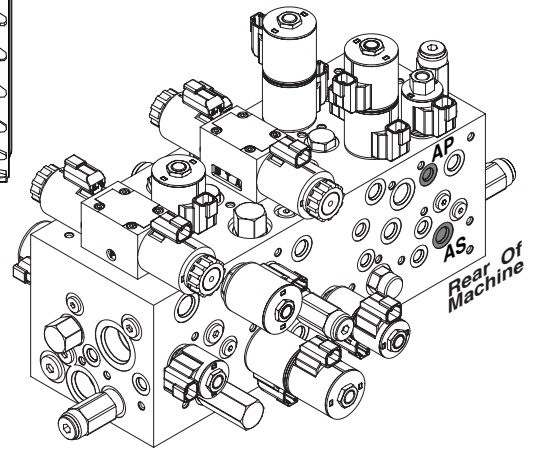
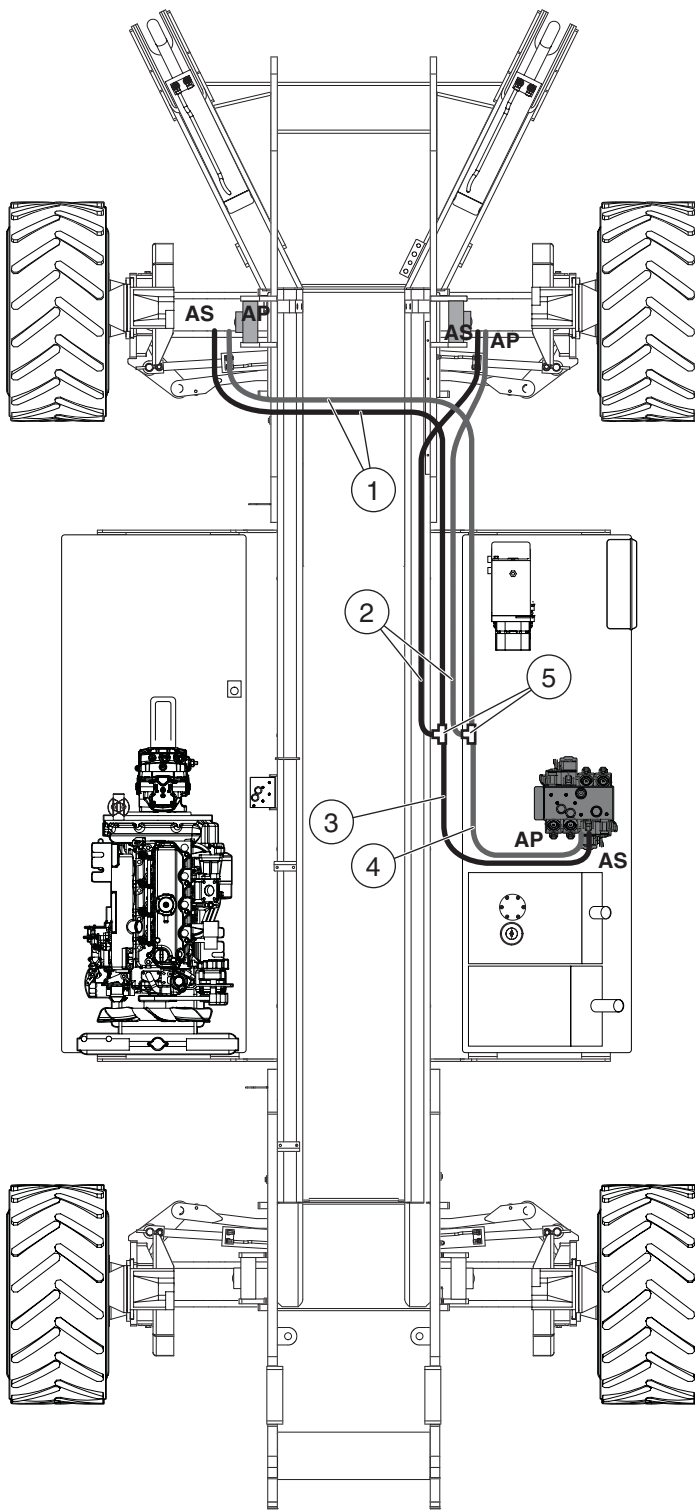


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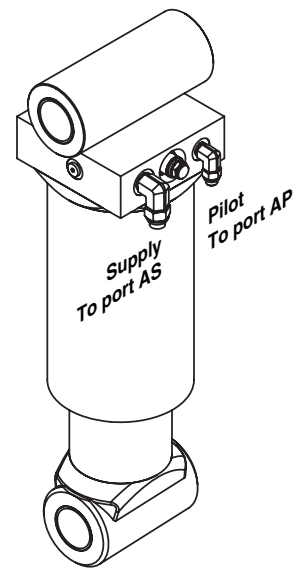
• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only



Functions Manifold



Front Axle Cylinder

Front Axle Cylinder Circuit



ILLUSTRATION No.
ART_3673

TITAN BOOM 40-S

Front Axle Cylinder Circuit

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|---|
| 1 | 52001 | 2 | Hose Assy, 1/4" x 96", 4G4FFORX-4G4FFORX |
| 2 | 52000 | 2 | Hose Assy, 1/4" x 62", 4G4FFORX-4G4FFORX90S |
| 3 | 52005 | 1 | Hose Assy, 1/4" x 31", 4G4FFORX-4G4FFORX90S |
| 4 | 52004 | 1 | Hose Assy, 1/4" x 29", 4G4FFORX-4G4FFORX90L |
| 5 | 50878 | 2 | Fitting, MFFORT-4 |

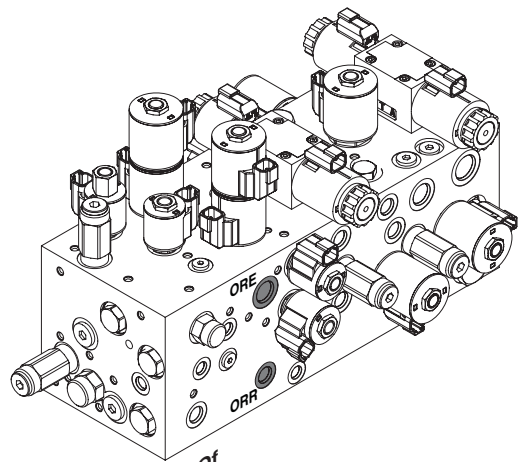
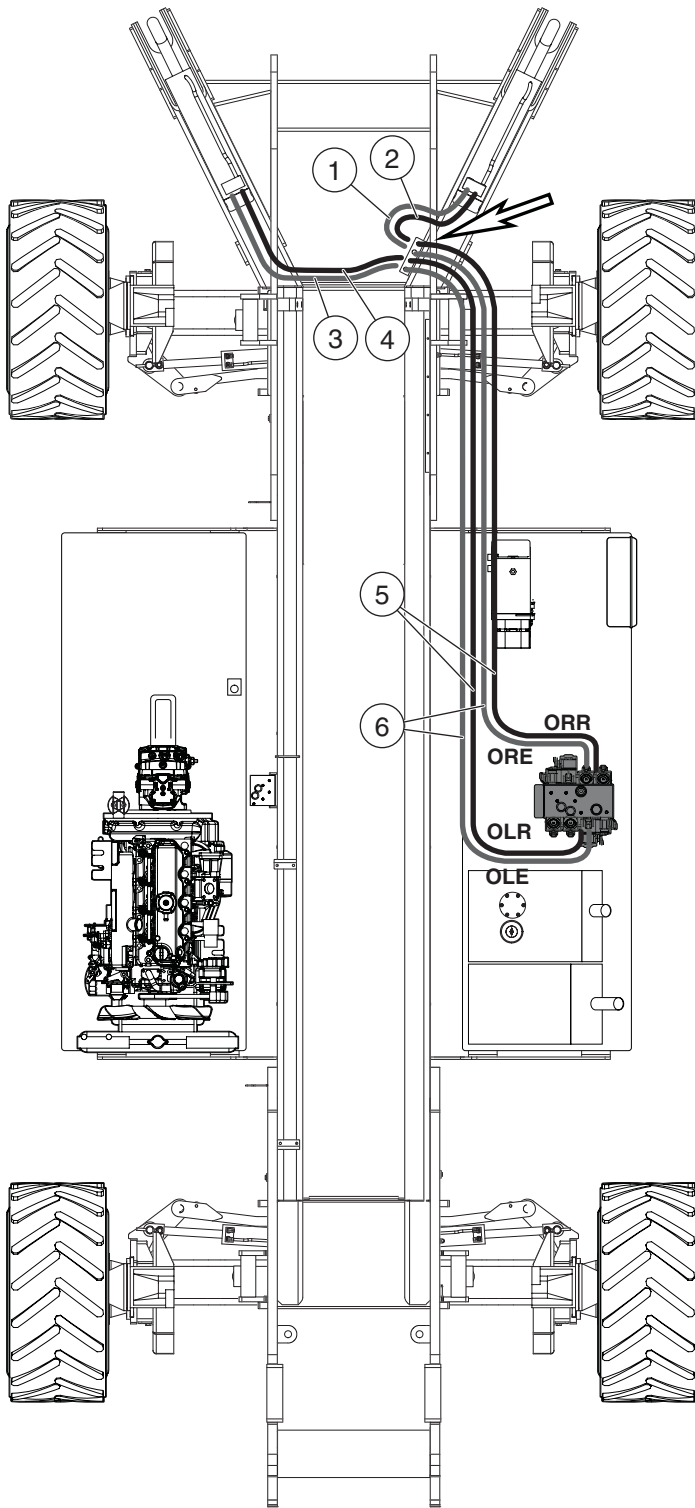


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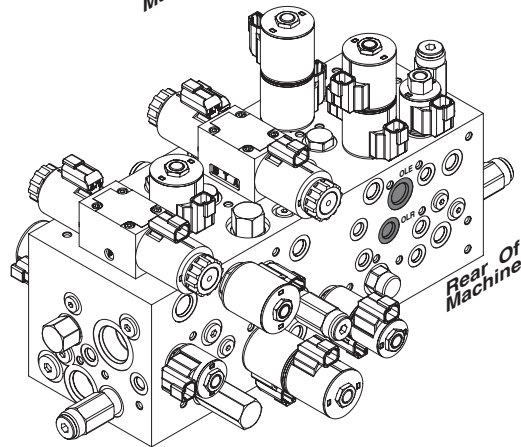
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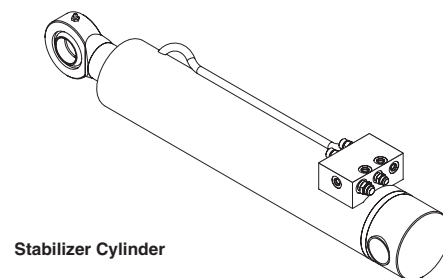


Front Of Machine

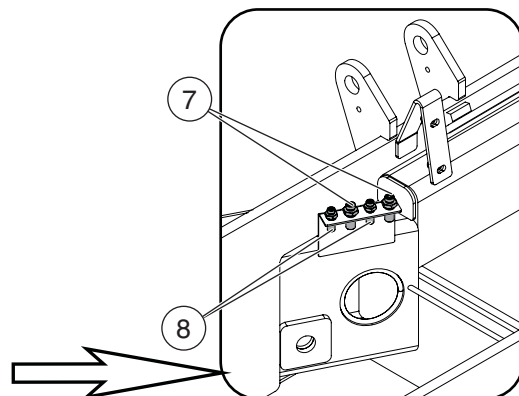


Rear Of Machine

Functions Manifold



Stabilizer Cylinder



Stabilizer Circuit

Stabilizer Circuit

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|--|
| 1 | 52009 | 1 | Hose Assy, 3/8" x 14", 6G6FFORX-6G6FFORX |
| 2 | 52010 | 1 | Hose Assy, 1/4" x 17", 4G4FFORX-4G4FFORX |
| 3 | 52011 | 1 | Hose Assy, 3/8" x 34", 6G6FFORX-6G6FFORX |
| 4 | 52012 | 1 | Hose Assy, 1/4" x 35", 4G4FFORX-4G4FFORX |
| 5 | 52007 | 2 | Hose Assy, 1/4" x 99", 4G4FFORX-4G4FFORX90 |
| 6 | 52008 | 2 | Hose Assy, 3/8" x 94", 6G6FFORX-6G6FFORX90 |
| 7 | 50964 | 2 | Fitting, MMFOR-MMFORH90-6 Bulkhead Adapter |
| 8 | 50963 | 2 | Fitting, MMFOR-MMFORH90-4 Bulkhead Adapter |

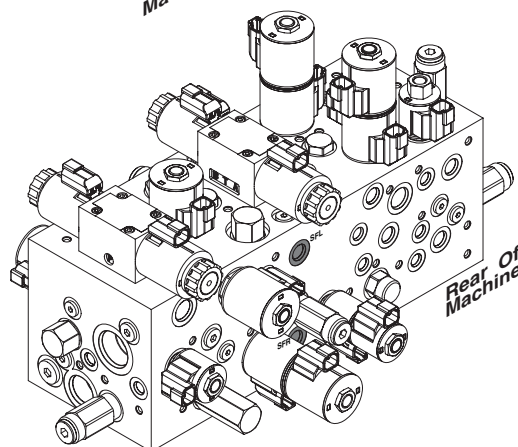
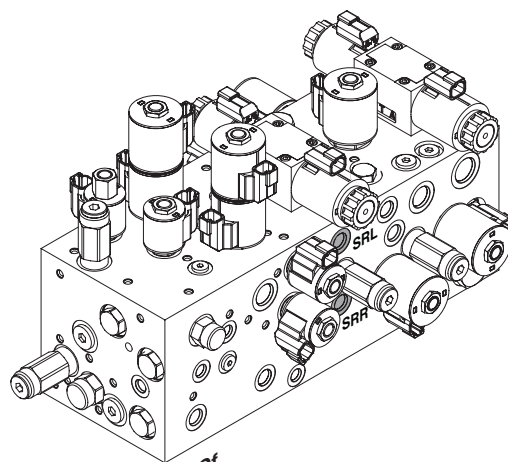
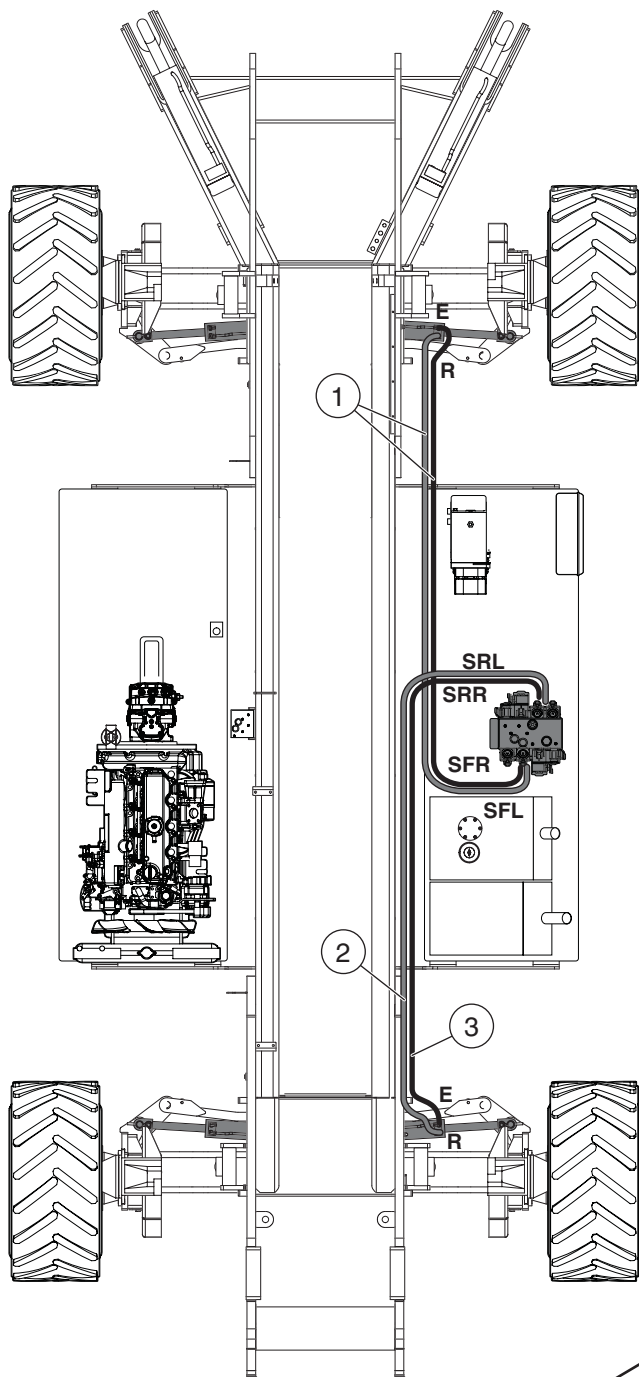


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• NS: Not a Stock item

• REF: Reference only



Functions Manifold

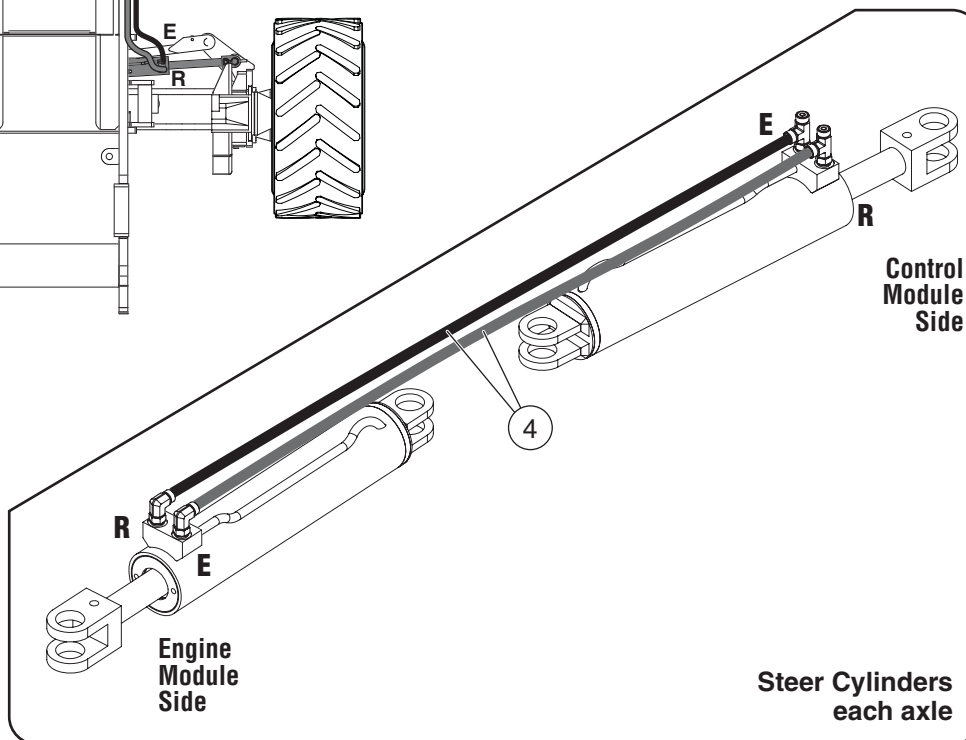


ILLUSTRATION No.
ART_3675

TITAN BOOM 40-S

Steer Circuit

Steer Cylinder Circuit

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|---|
| 1 | 52023 | 2 | Hose Assy, 1/4" x 118", 4G4FFORX-4G4FFORX45 |
| 2 | 52024 | 1 | Hose Assy, 1/4" x 85", 4G4FFORX-4G4FFORX45 |
| 3 | 52025 | 1 | Hose Assy, 1/4" x 90", 4G4FFORX-4G4FFORX45 |
| 4 | 52026 | 4 | Hose Assy, 1/4" x 38", 4G4FFORX-4G4FFORX |

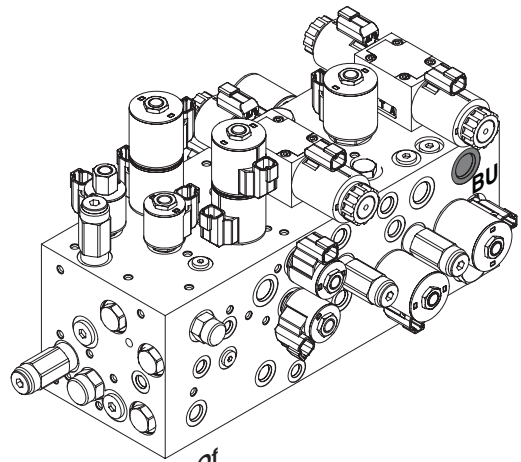
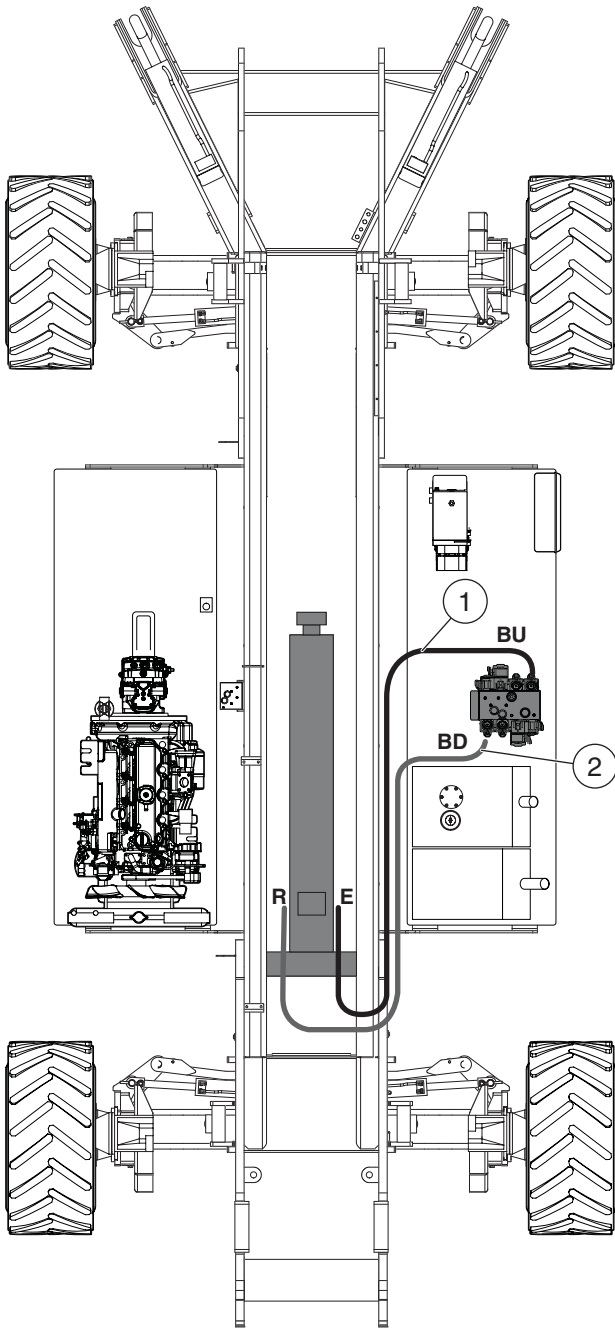


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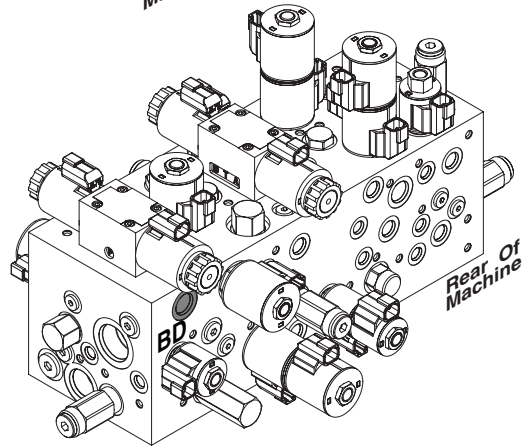
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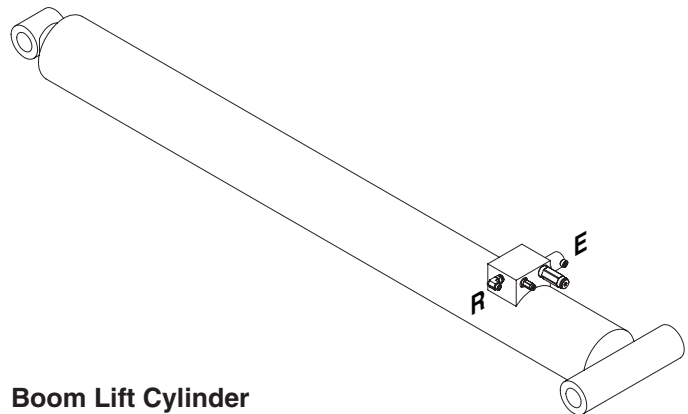


Front Of Machine



Rear Of Machine

Functions Manifold



Boom Lift Cylinder

Lift Cylinder Circuit

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|--|
| 1 | 52018 | 1 | Hose Assy, 3/8" x 120" 6G6FFORX-6G6FFORX90 |
| 2 | 52017 | 1 | Hose Assy, 1/2" x 120" 8G8FFORX-8G8FFORX45 |



• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

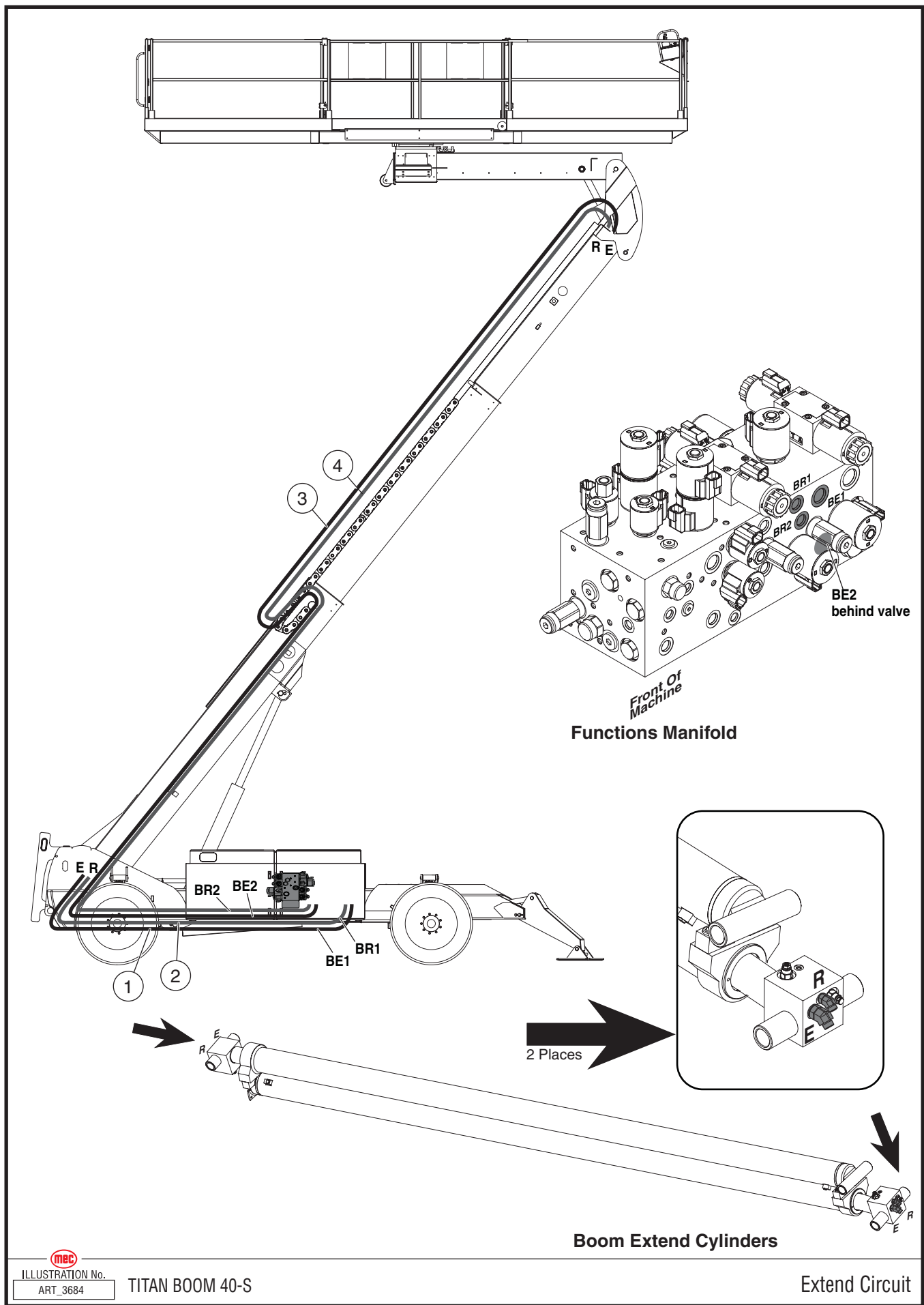


ILLUSTRATION No.
ART_3684

TITAN BOOM 40-S

Extend Cylinder Circuit

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|--|
| 1 | 52013 | 1 | Hose Assy, 1/2" x 152" 8G8FFORX45-8G8FFORX45 |
| 2 | 52014 | 1 | Hose Assy, 3/8" x 152" 6G6FFORX45-6G6FFORX45 |
| 3 | 52015 | 1 | Hose Assy, 1/2" x 684" 8G8FFORX-8G8FFORX45 |
| 4 | 52016 | 1 | Hose Assy, 3/8" x 684" 6G6FFORX-6G6FFORX90 |

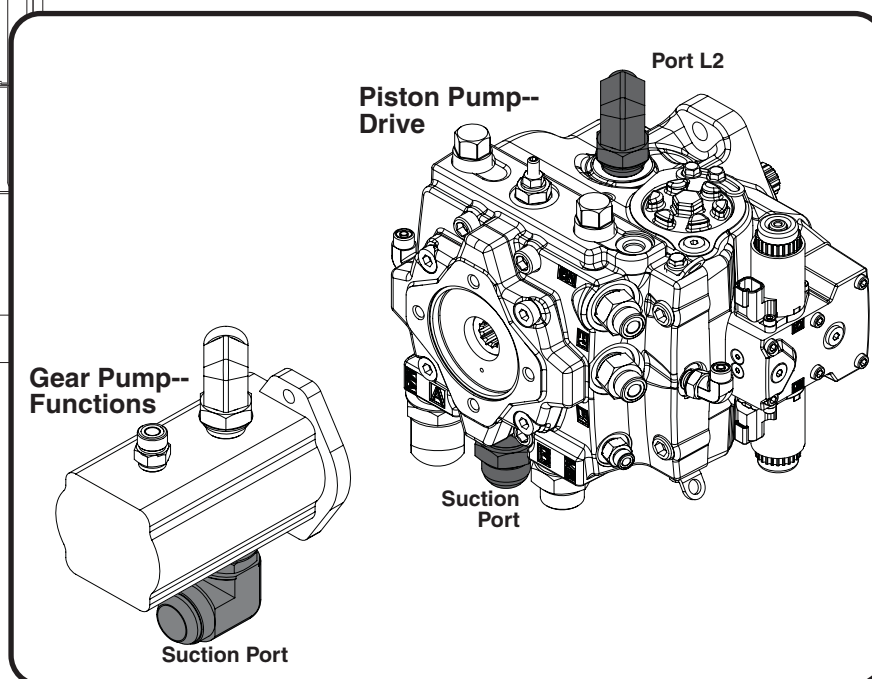
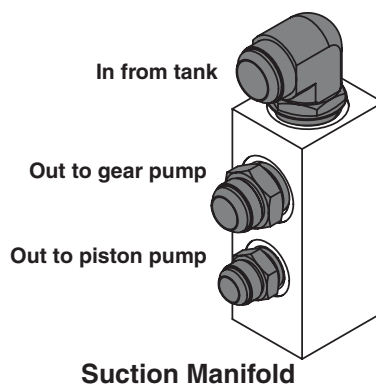
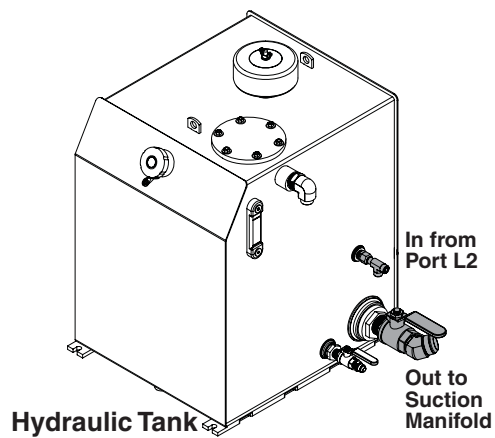
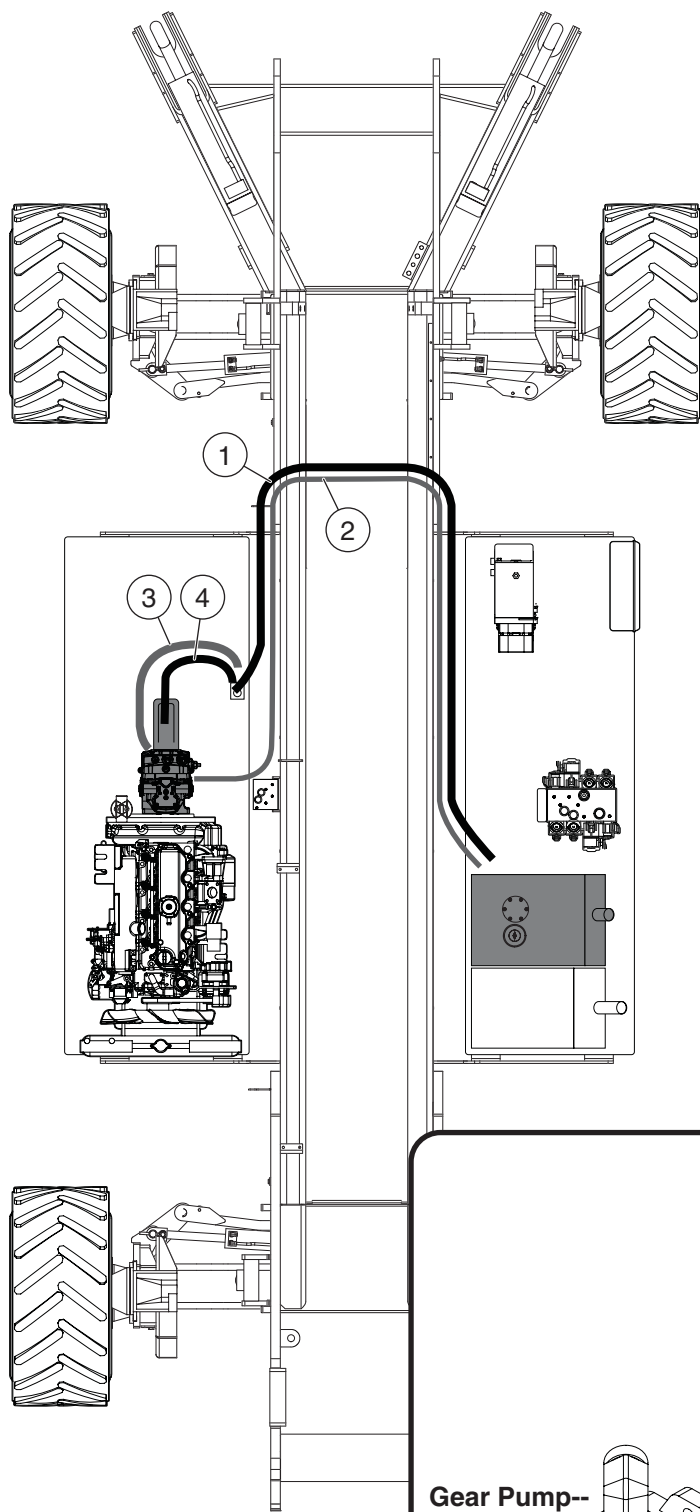


• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only



Suction/ Piston Pump Case Drain Circuit

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|---|
| 1 | 52043 | 1 | Hose Assy, 1.5" x 124" 24G24FJX-24G24FJX |
| 2 | 52031 | 1 | Hose, Assy, 1/2" x 158" 8G8FFORX-8G8FFORX90 |
| 3 | 52033 | 1 | Hose Assy, 1" x 35" 16GS16FJX-16GS16FJX |
| 4 | 52036 | 1 | Hose Assy, 1.25" x 31" 20G20FJX-20G20FJX |

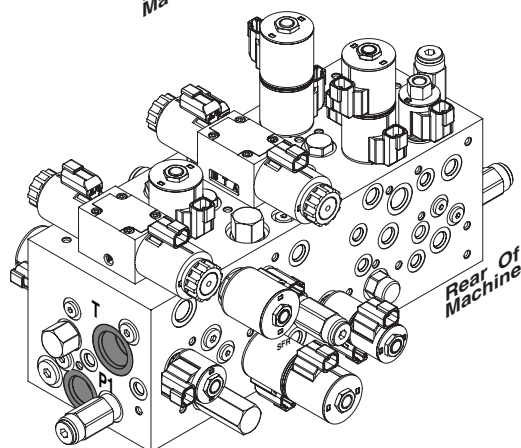
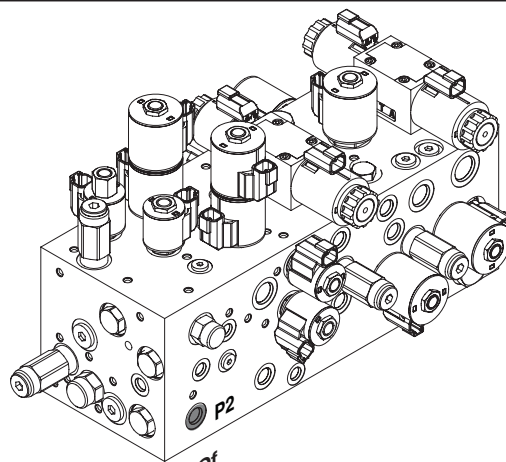
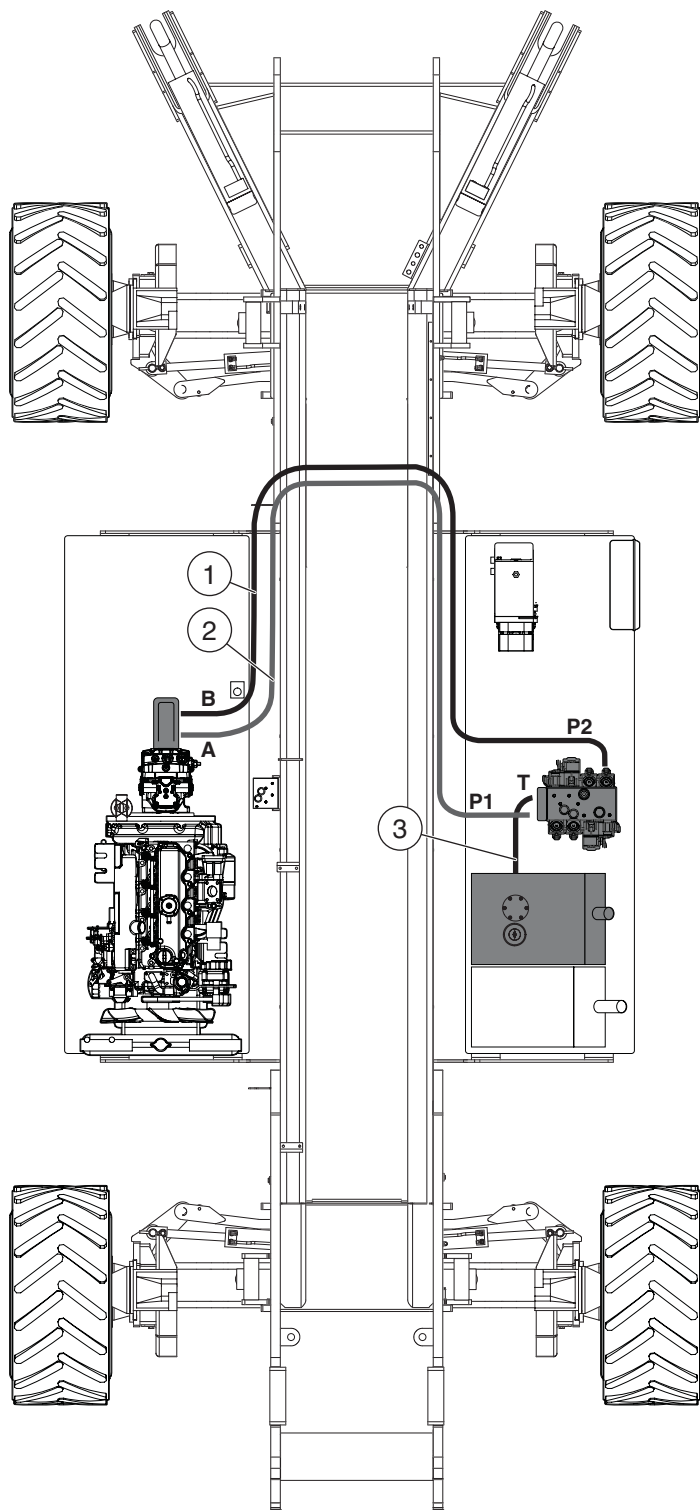


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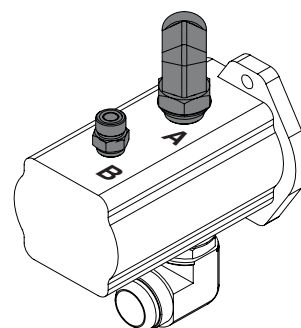
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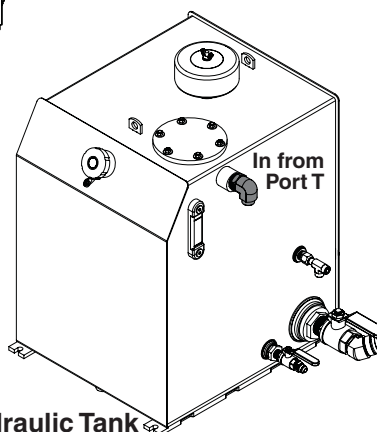
• REF: Reference only



Functions Manifold



Gear Pump



Hydraulic Tank



ILLUSTRATION No.
ART_3681

TITAN BOOM 40-S

Gear Pump/Functions Manifold & Functions Manifold Return Hoses

Gear Pump to Functions Manifold Pressure & Functions Manifold Return Hoses

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|--|
| 1 | 52034 | 1 | Hose Assy, 3/4" x 171" 12G12FFORX-12G12FFORX45 |
| 2 | 52034 | 1 | Hose Assy, 3/8" x 185" 6G6FFORX-6G8FFORX |
| 3 | 52054 | 1 | Hose Assy, 3/4" x 24", 12G12FFORX-12G12FFORX |

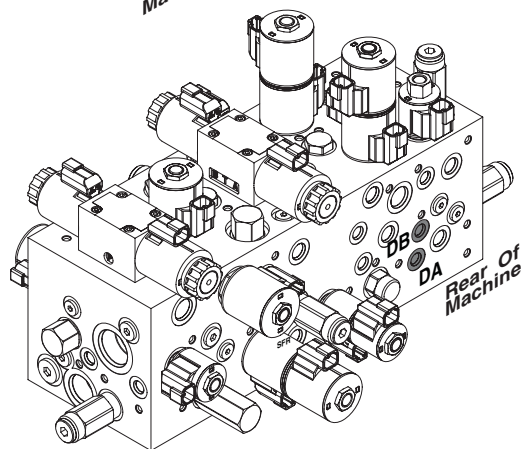
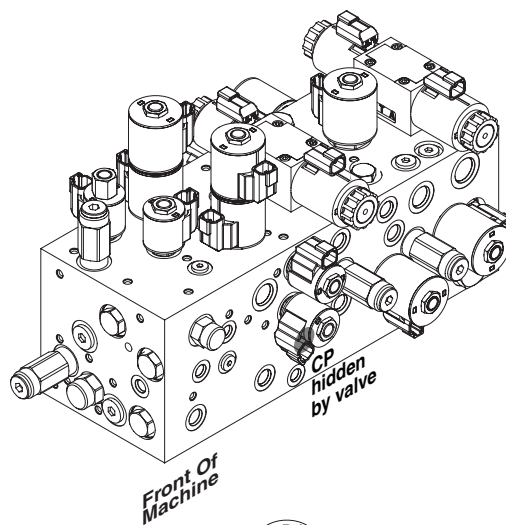
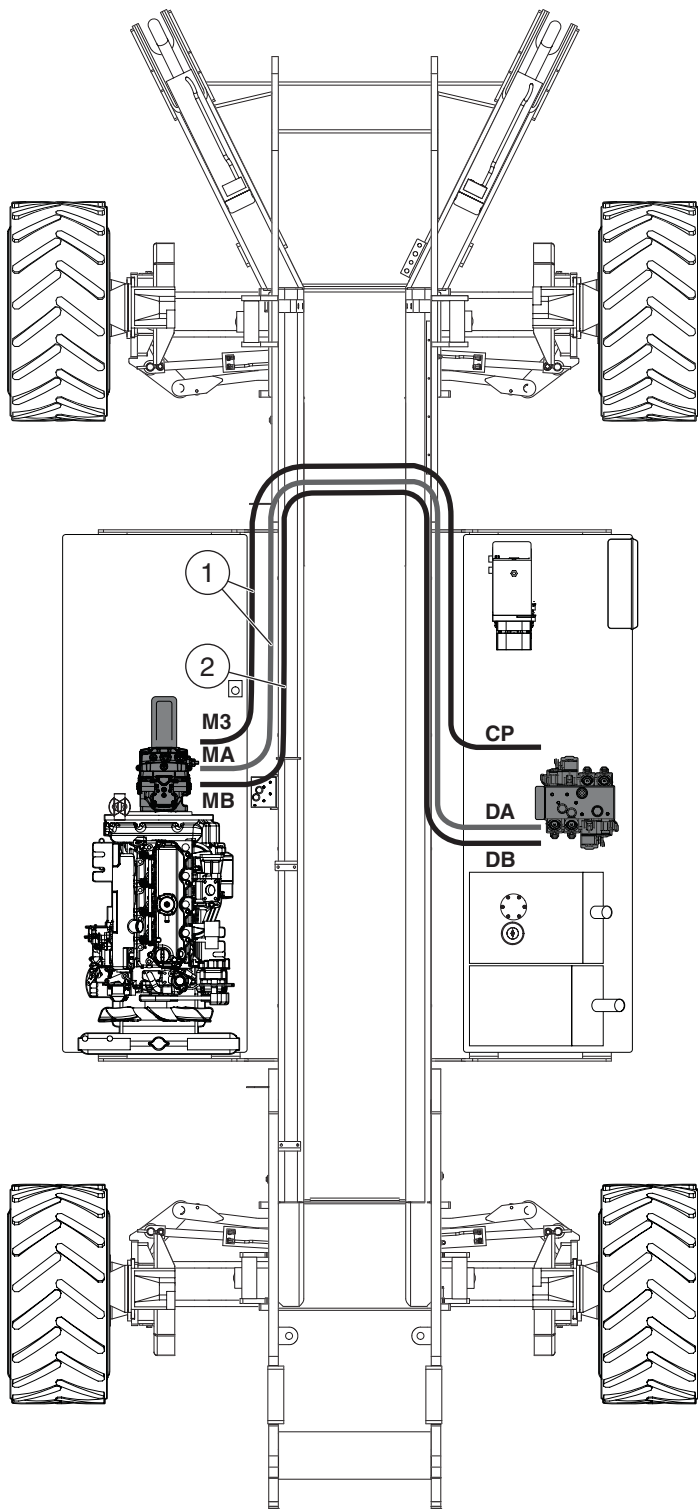


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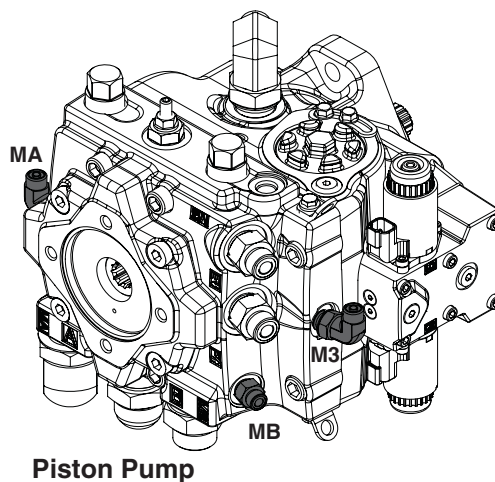
• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only



Functions Manifold



Piston Pump

Charge Pressure Circuit

Charge Pressure & Drive Signal Hoses

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|---|
| 1 | 52029 | 2 | Hose Assy, 1/4" x 185" 4G4FFORX-4G4FFORX |
| 2 | 52030 | 1 | Hose Assy, 1/4" x 195" 4G4FFORX-4G4FFORX90L |

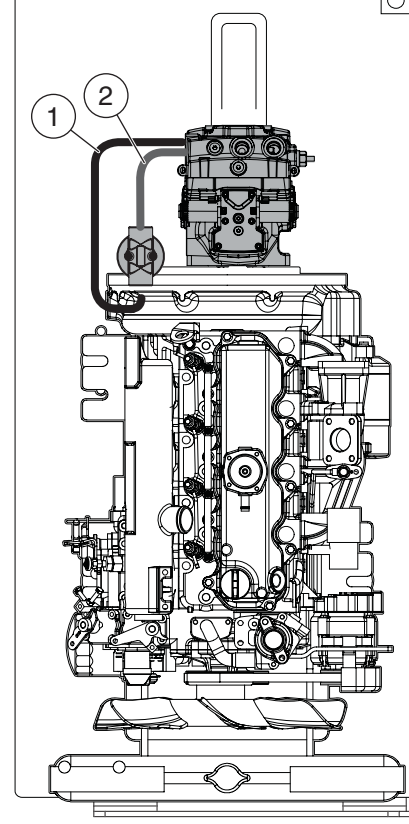


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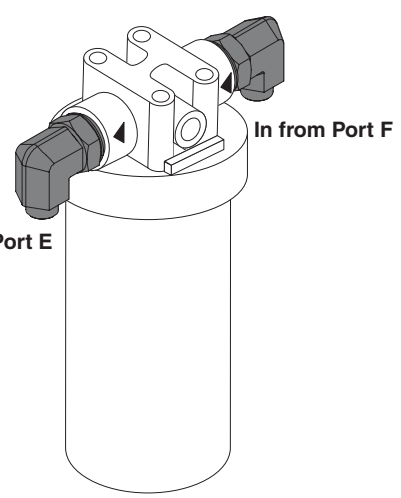
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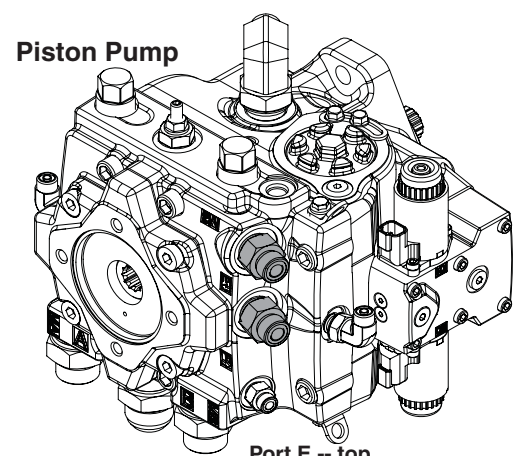
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Engine Module



Charge Filter



Piston Pump

Port E -- top
In from Charge Filter

Port F -- bottom
Out to Charge Filter



ILLUSTRATION No.
ART_3679

TITAN BOOM 40-S

Charge Filter Circuit

Charge Filter Circuit

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|--|
| 1 | 52032 | 2 | Hose Assy, 1/2" x 35", 8G8FJX-8G8FJX90 |

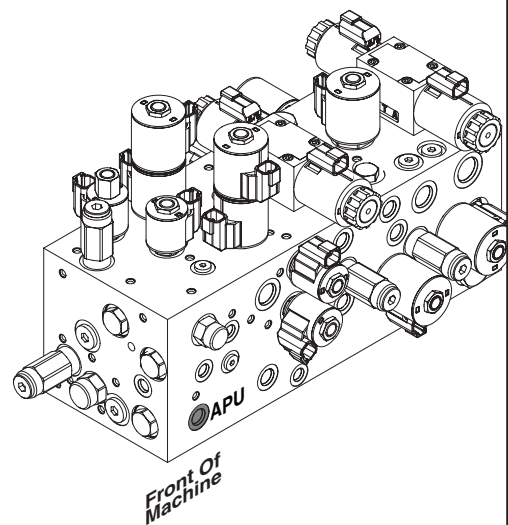
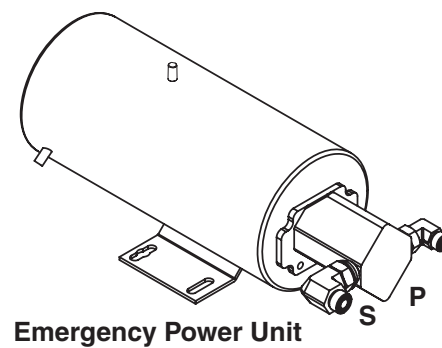
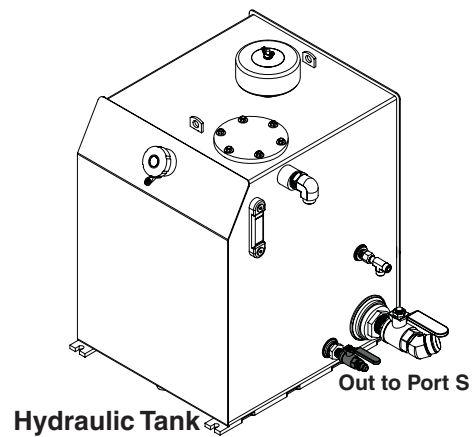
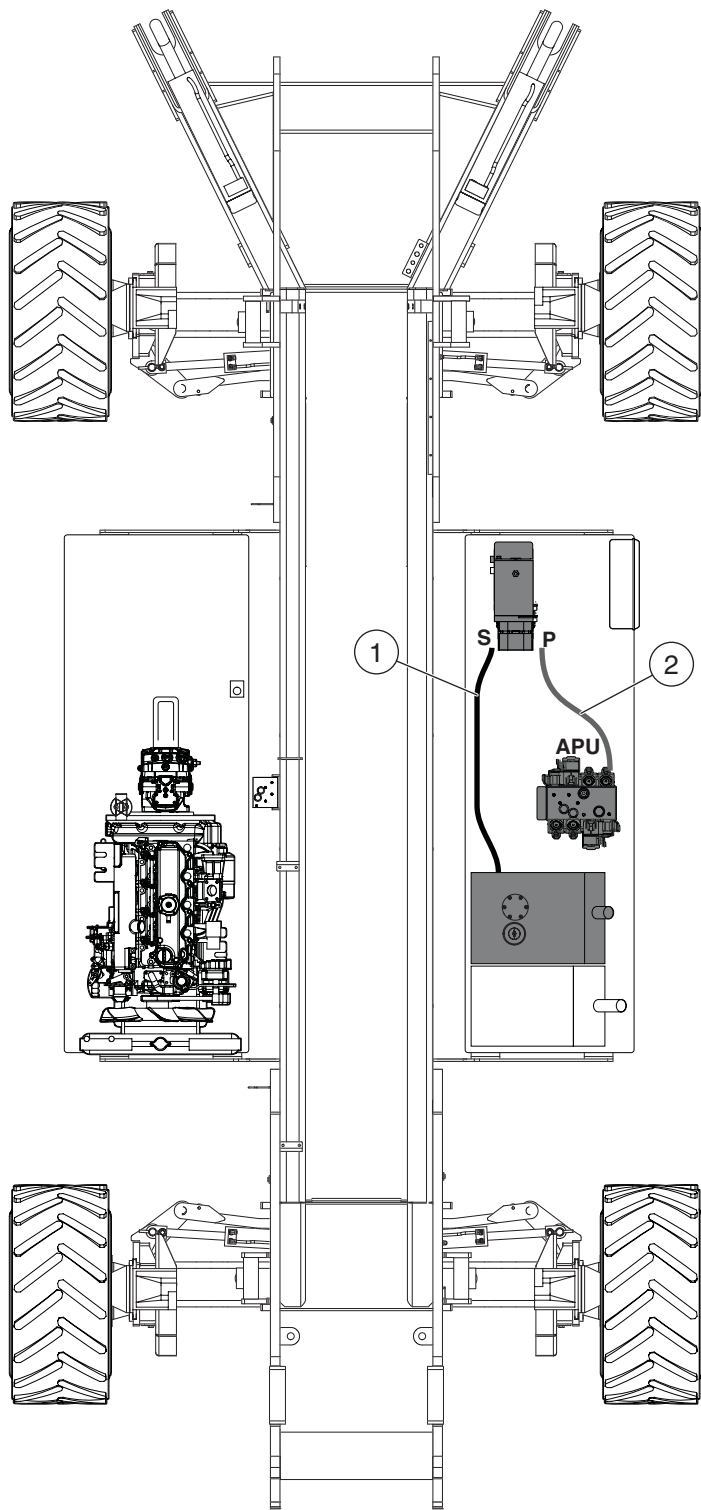


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• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only



Emergency Power Unit Hoses

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|--|
| 1 | 52037 | 1 | Hose Assy, 1/2" x 28", 8G8FJX-8G8FFORX |
| 2 | 52038 | 1 | Hose Assy, 3/8" x 26", 6G6FFORX-6G6FFORX |

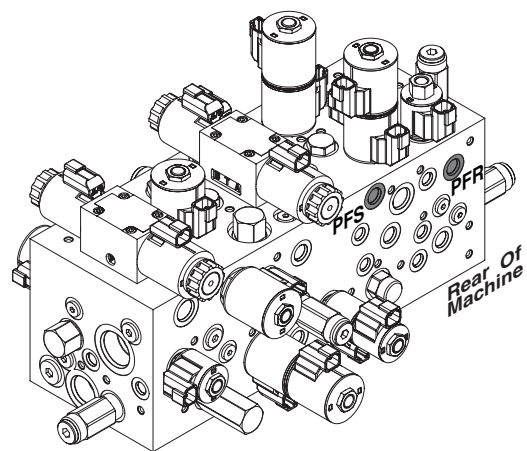
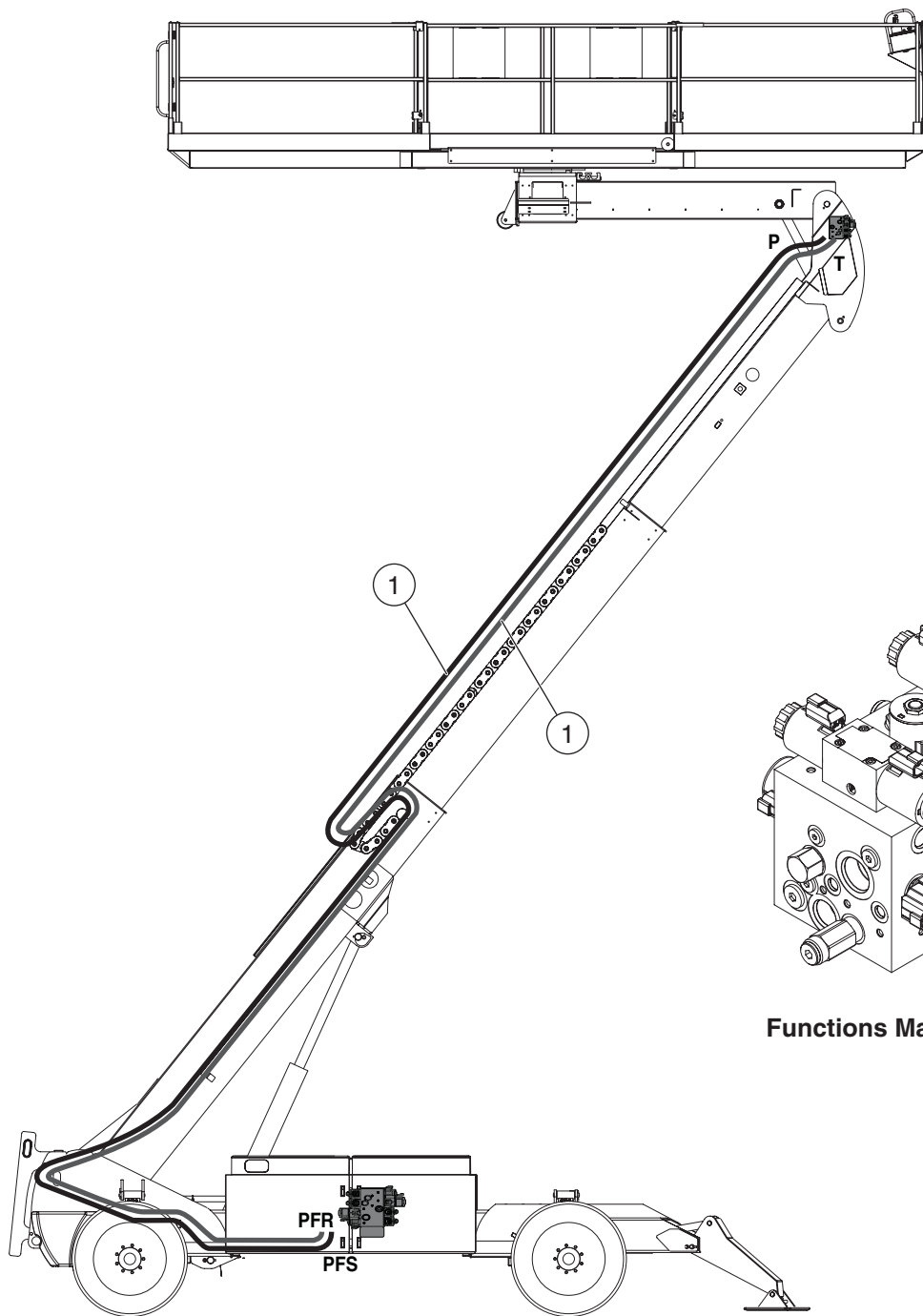


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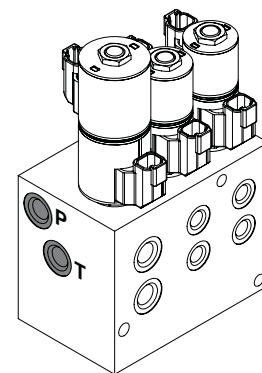
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• NS: Not a Stock item

• REF: Reference only



Functions Manifold



Auxiliary Manifold



ILLUSTRATION No.
ART_3685

TITAN BOOM 40-S

Functions Manifold/Auxiliary Manifold Hoses

Functions Manifold/Auxiliary Manifold Hoses

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|---|
| 1 | 52019 | 2 | Hose Assy, 3/8" x 666", 6G6FFORX-6G6FFORX |

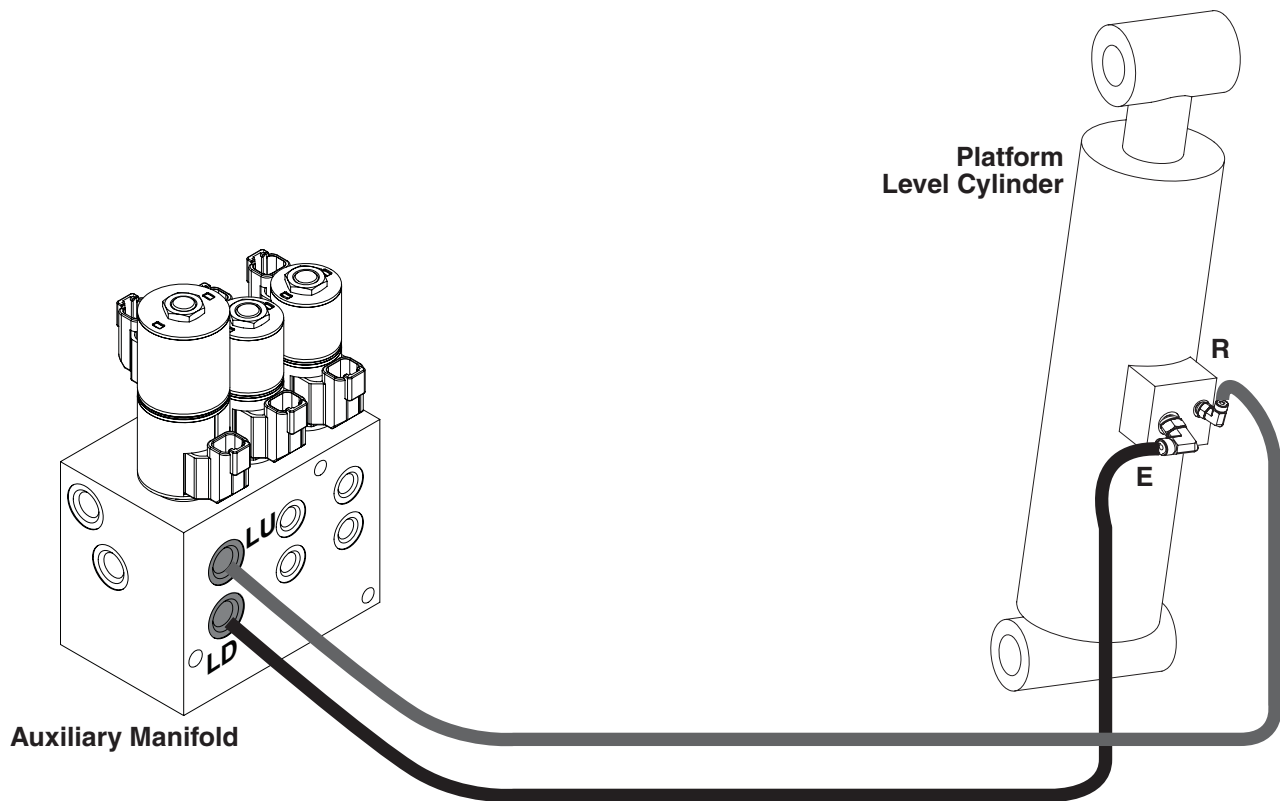
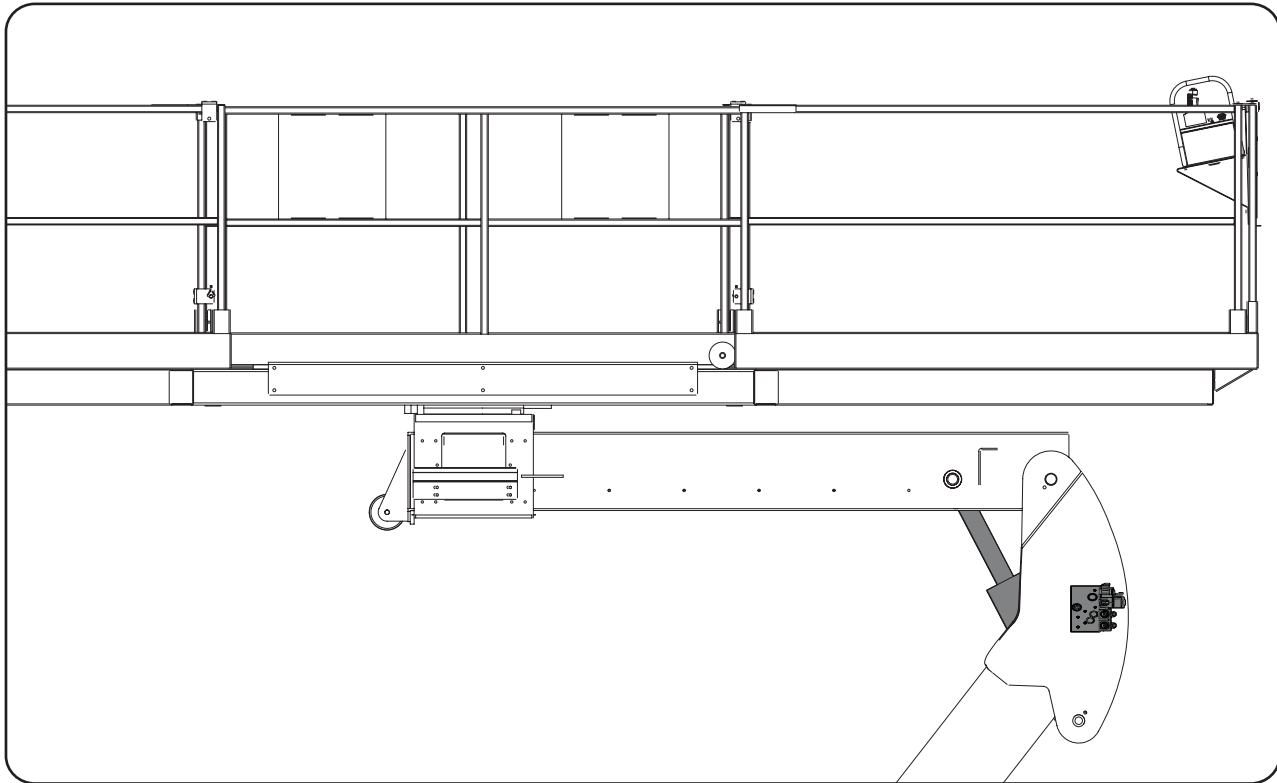


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• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only



Platform Level Circuit

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|---|
| 1 | 52041 | 1 | Hose Assy, 3/8" x 12", 6G6FFORX-6G6FFORX |
| 2 | 52042 | 1 | Hose Assy, 3/8" x 26", 6G6FFORX-6G6FFORX90S |



• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

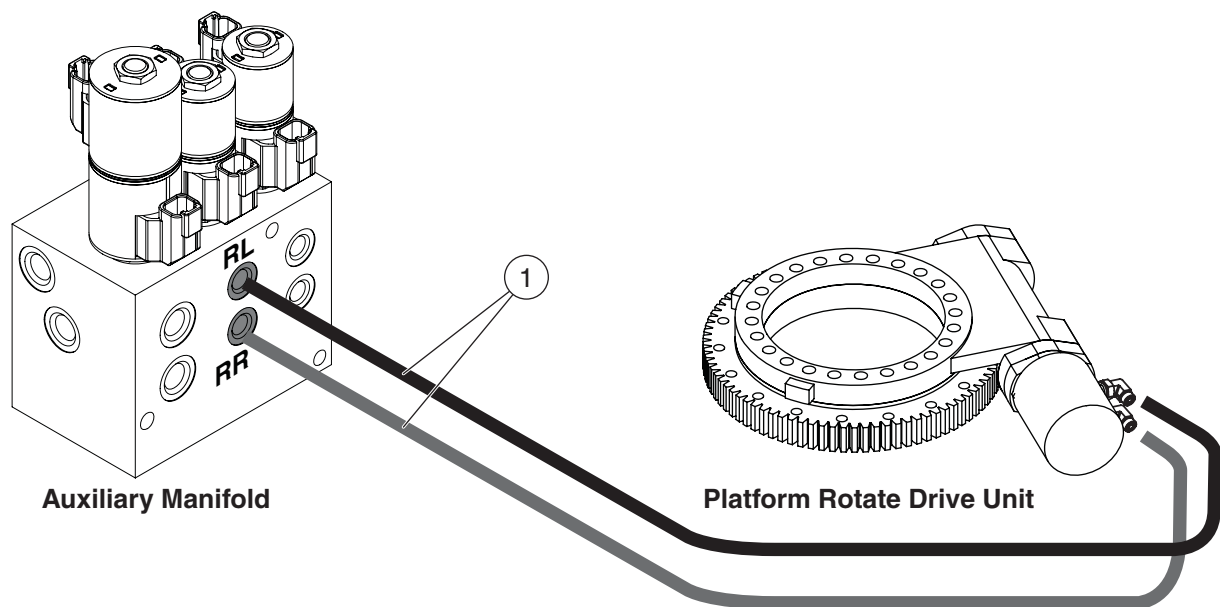
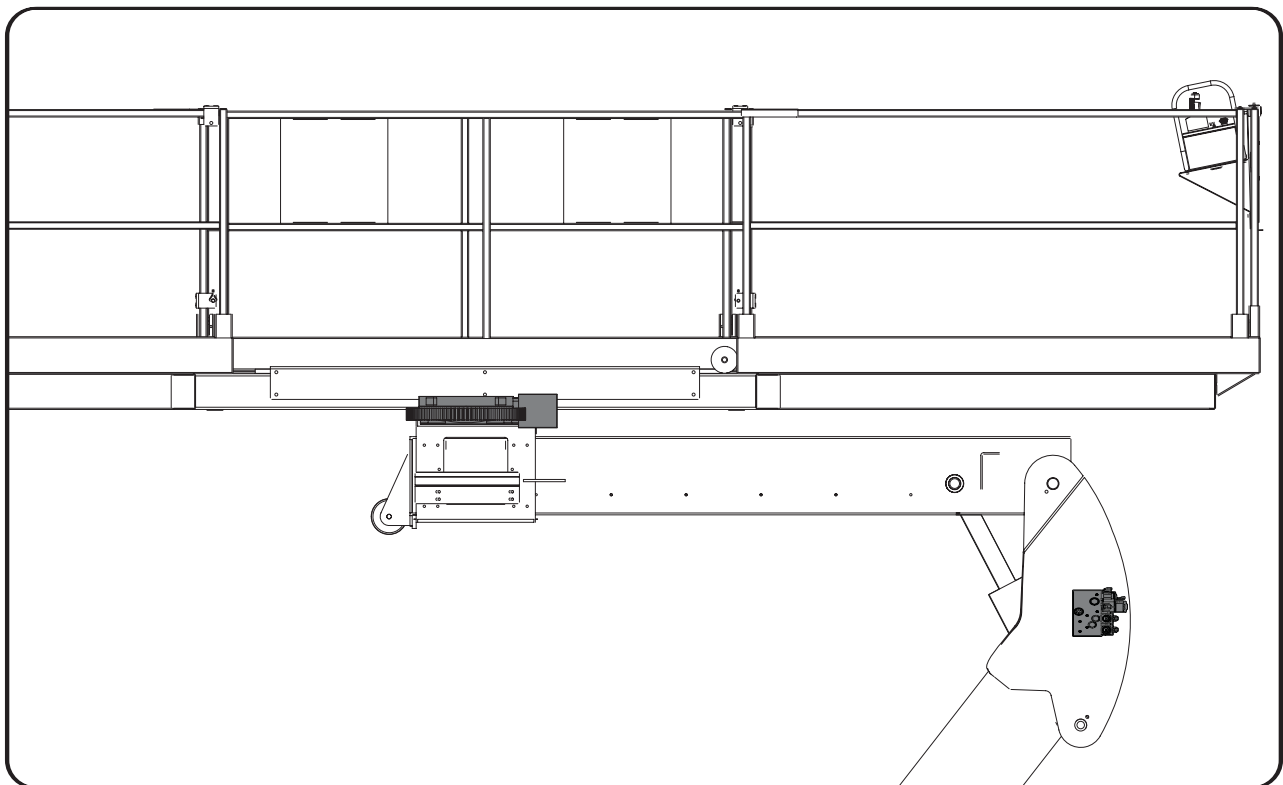


ILLUSTRATION No.
ART_3687

TITAN BOOM 40-S

Platform Rotate Circuit

Platform Rotate Circuit

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|---|
| 1 | 52039 | 2 | Hose Assy, 1/4" x 257", 4G4FFORX-4G6FJX |



• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

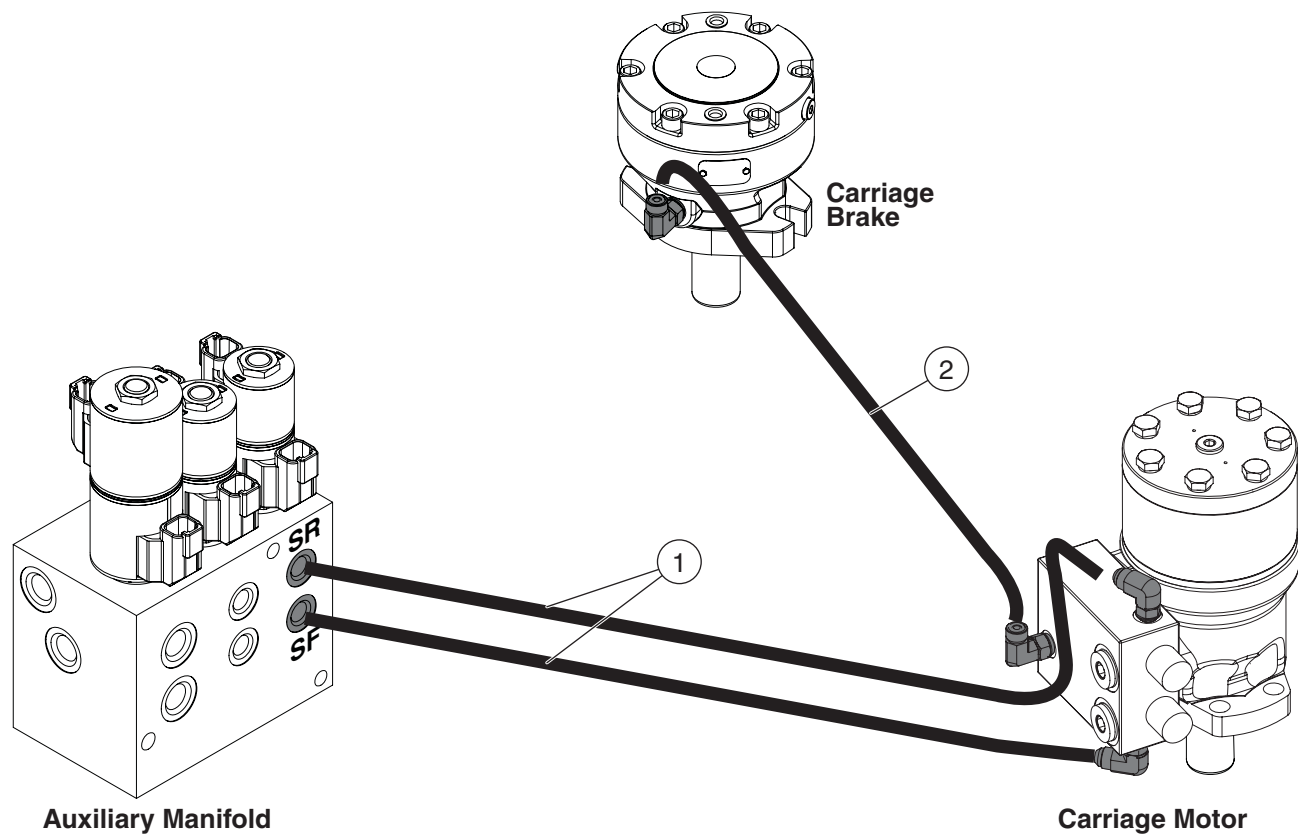
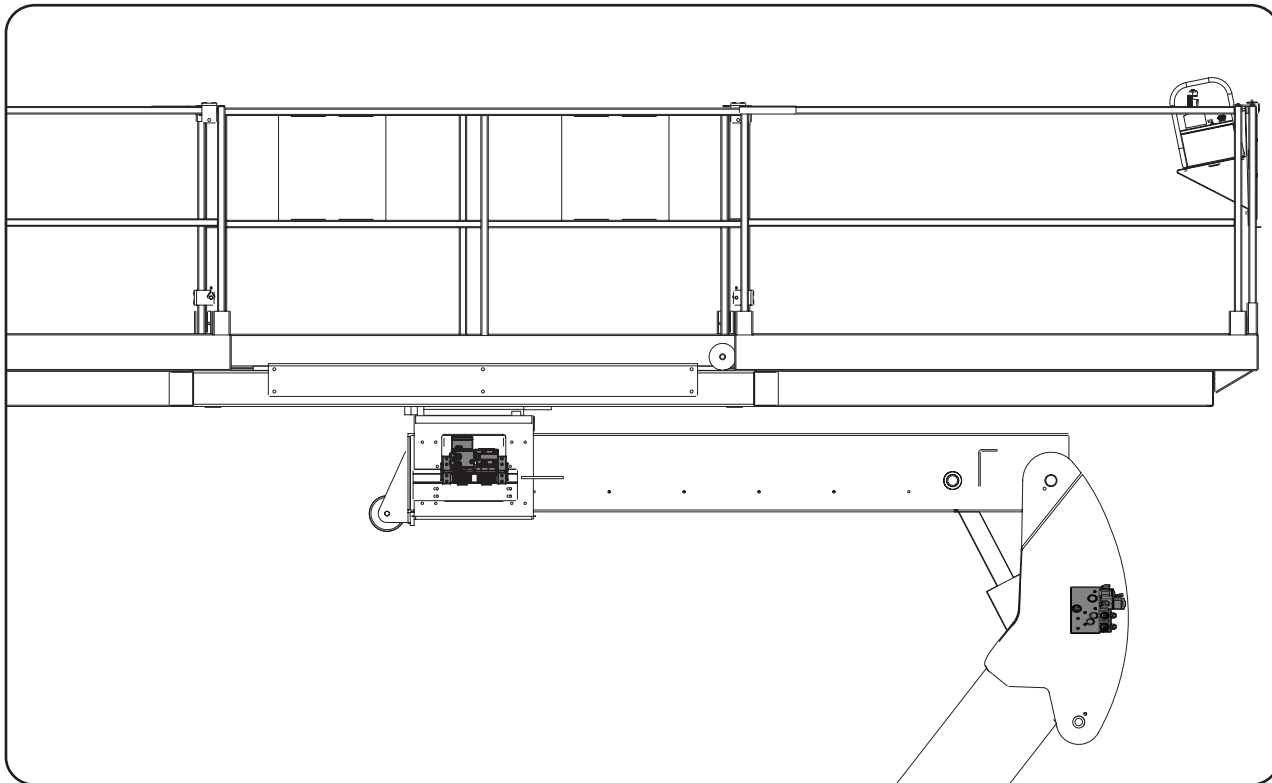


ILLUSTRATION No.
ART_3688

TITAN BOOM 40-S

Carriage Slide Circuit

Platform Circuit

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|---|
| 1 | 52040 | 2 | Hose Assy, 1/4" x 216", 4G4FFORX-4G6FJX |
| 2 | 50667 | 1 | Serial ~ #12400044, #12400060~ Hose Assy, 1/4" x 13", 4G4FFORX-4G4FFORX |
| | 50607 | 1 | Serial #124000045-#12400059 Hose Assy, 1/4" x 13", 4G4FJX-4G4FJX |



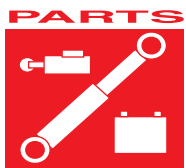
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• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

NOTES:



SECTION F

BASE

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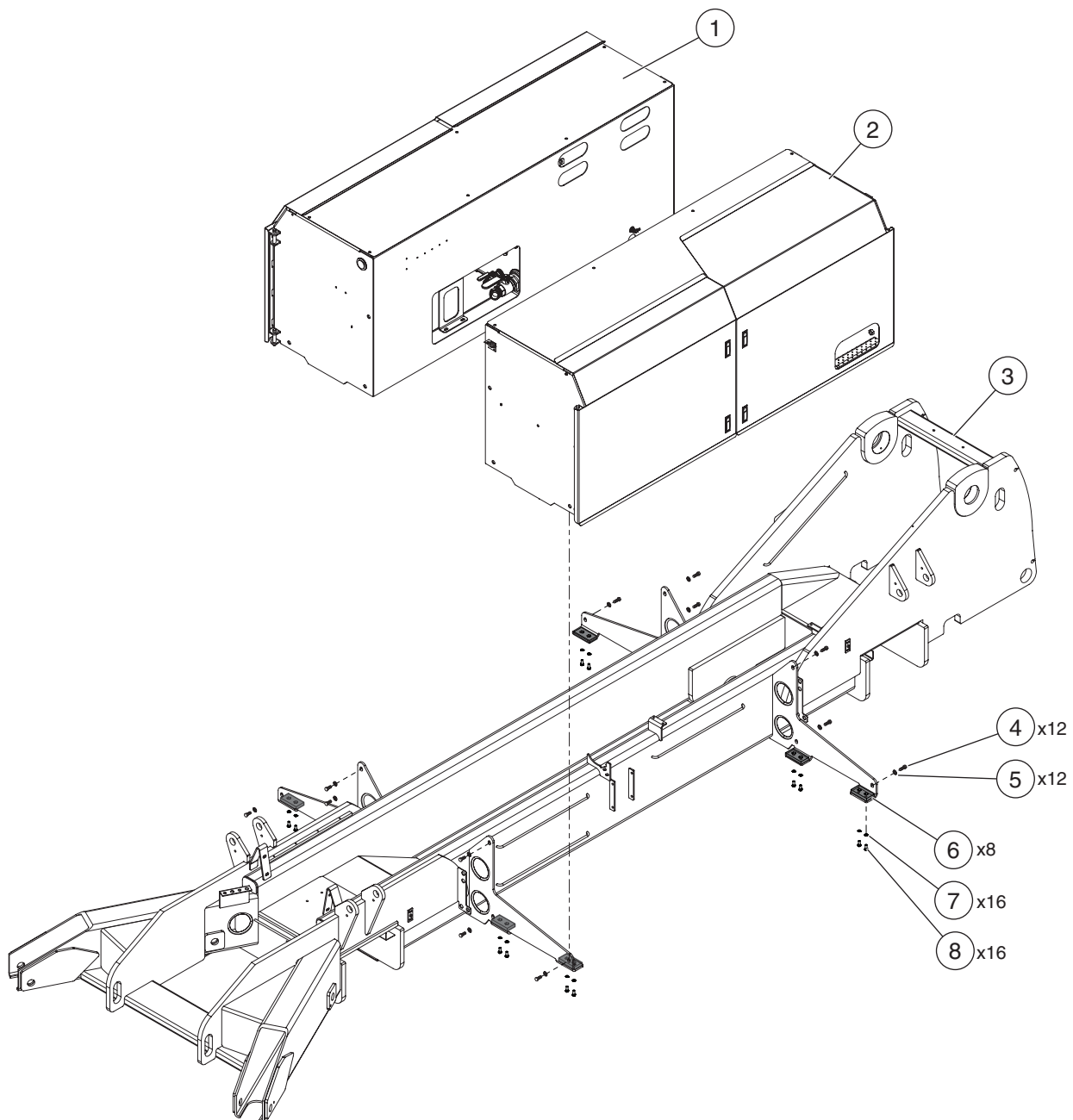


ILLUSTRATION No.
ART_3633

TITAN BOOM 40-S

Module Installation

Module Installation

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|----------------------|
| 1 | REF | 1 | Control Module |
| 2 | REF | 1 | Engine Module |
| 3 | 22001 | 1 | Chassis Weldment |
| 4 | 50043 | 12 | Bolt, HHCS M16 x 40 |
| 5 | 50249 | 12 | Washer, M16 Nordlock |
| 6 | 22425 | 8 | Block |
| 7 | 50006 | 16 | Washer, M10 Nordlock |
| 8 | 50033 | 16 | Bolt, HHCS M10 x 25 |



• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

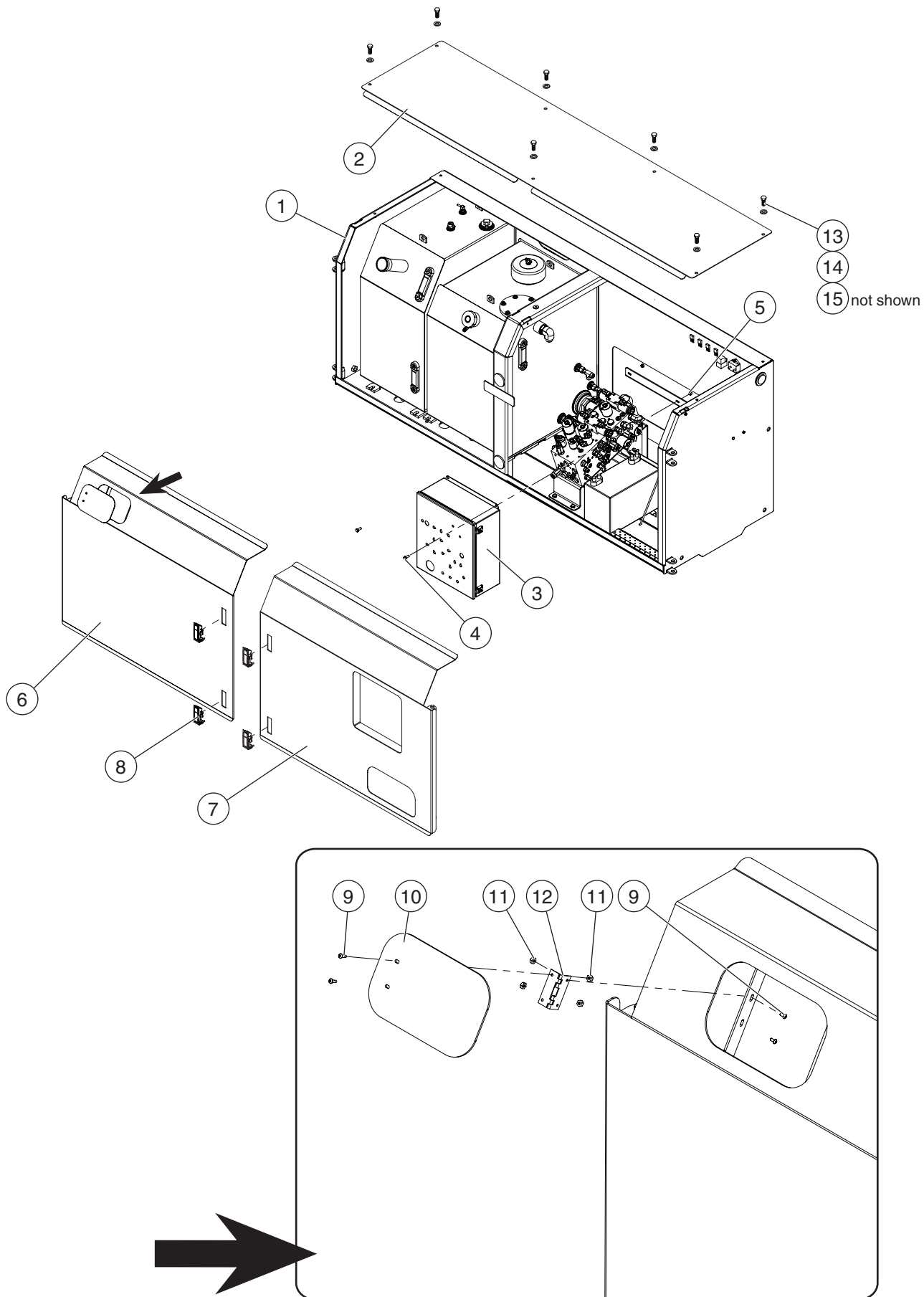


ILLUSTRATION No.
ART_3624

TITAN BOOM 40-S

Control Module, 1 of 3

Control Module, Drawing 1 of 3

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|-------------------------------------|
| 1 | REF | -- | Control Module |
| 2 | 22253 | 1 | Top Cover, Control Module |
| 3 | REF | -- | Lower Controls Box -- See Section A |
| 4 | 50030 | 2 | Bolt, HHCS M8 x 20 |
| 5 | 50048 | 2 | Nut, M8 Nylock |
| 6 | 22452 | 1 | Left-Hand Door, Control Module |
| 7 | 22182 | 1 | Right-Hand Door, Control Module |
| 8 | 8386 | 4 | Door Latch |
| | 92690 | -- | Door Latch, Locking (option) |
| | 92691 | -- | Key, Locking Door Latch (option) |
| 9 | 50328 | 4 | Bolt, BHCS 6-32 x 3/8 |
| 10 | 22400 | 1 | Fuel Door |
| 11 | 50329 | 4 | Nut, 6-32 Nylock |
| 12 | 92213 | 1 | Hinge |
| 13 | 50215 | 7 | Bolt, HHCS M10 x 20 |
| 14 | 50006 | 7 | Washer, M10 Nordlock |
| 15 | 50049 | 7 | Nut, M10 Nylock |



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• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

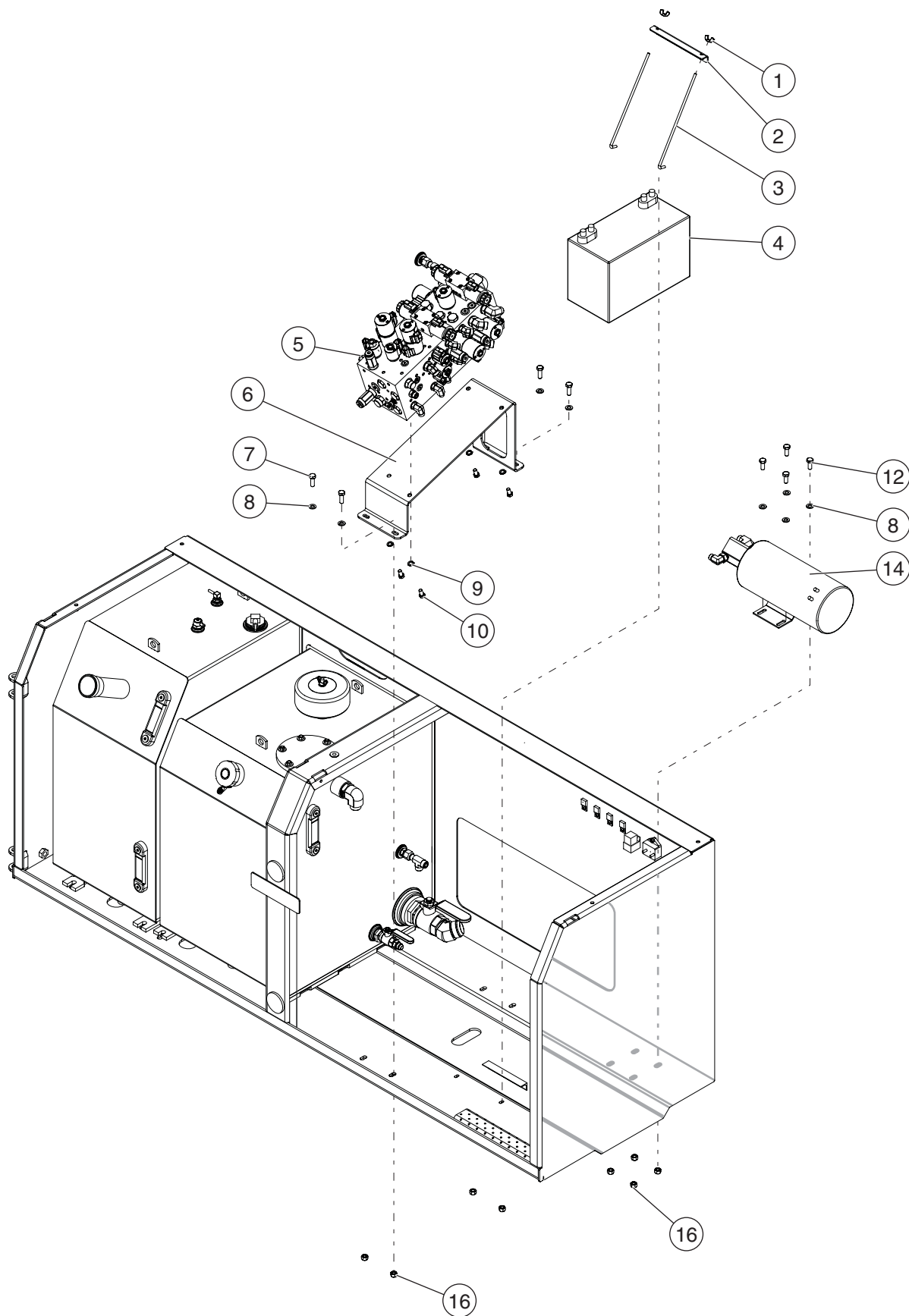


ILLUSTRATION No.
ART_3625

TITAN BOOM 40-S

Control Module, 2 of 3

Control Module, Drawing 2 of 3

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|---------------------------------------|
| 1 | HDW6110 | 2 | Wing Nut 1/4-20 |
| 2 | 22421 | 1 | Battery Bracket |
| 3 | 22563 | 2 | J-Bolts, Battery Hold-Down |
| 4 | 17966 | 1 | Battery, Group 31-stud, 950 CCA |
| 5 | 84178 | 1 | Functions Manifold |
| 6 | 22269 | 1 | Mount, Functions Manifold |
| 7 | 50034 | 4 | Bolt, HHCS M10 x 30 |
| 8 | 50002 | 8 | Washer, M10 Std. |
| 9 | 50006 | 4 | Washer, M10 Nordlock |
| 10 | 50219 | 4 | Bolt, HHCS 3/8 x .75 |
| 11 | -- | -- | -- |
| 12 | 50033 | 4 | Bolt, HHCS M10 x 25 |
| 13 | -- | -- | -- |
| 14 | REF | 1 | Emergency Power Unit -- See Section E |
| 15 | -- | -- | -- |
| 16 | 50049 | 8 | Nut, M10 Nylock |



• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

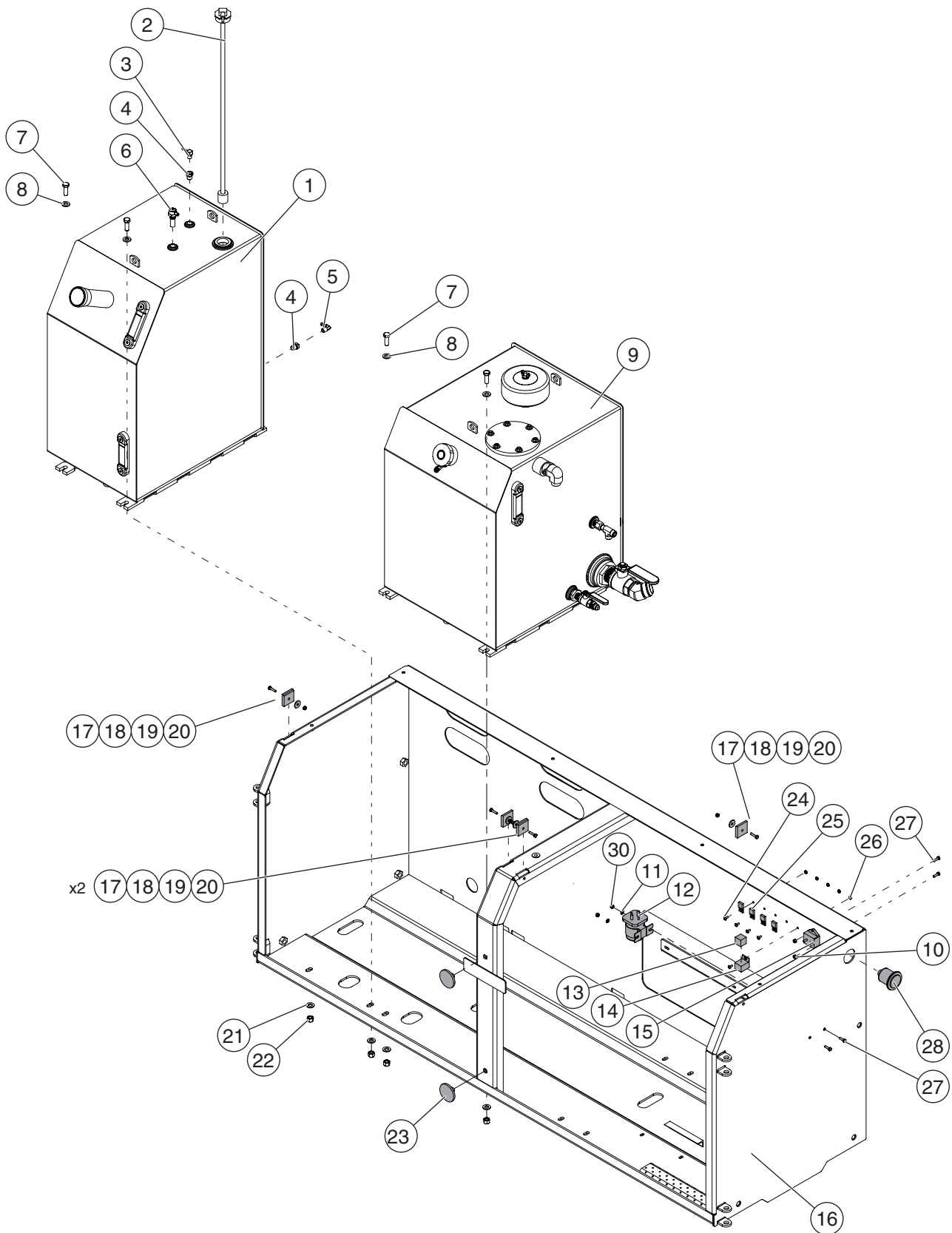


ILLUSTRATION No.
ART_3626

TITAN BOOM 40-S

Control Module, 3 of 3

Control Module, Drawing 3 of 3

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|--|
| 1 | 22647 | 1 | Fuel Tank Weldment |
| -- | 92480 | -- | Filler Cap |
| -- | 92479 | -- | Sight Gauge |
| 2 | 92069 | 1 | Fuel Sending Unit |
| 3 | 92488 | 1 | Fitting, 1/4 NPT-3/16 hose-90 |
| 4 | 50941 | 2 | Fitting, MP-FP-6-4 *Not used on later tanks |
| 5 | HDW6727 | 1 | Fitting, 1/4 NPT-5/16 hose-90 |
| 6 | 92699 | 1 | 1/4 NPT Roll-Over Vent |
| 7 | 50040 | 4 | Bolt, HHCS M12 x 35 |
| 8 | 50003 | 4 | Washer, M10 Std. |
| 9 | REF | -- | Hydraulic Tank Assembly -- See Section E |
| 10 | 50047 | 4 | Nut, M6 Nylock |
| 11 | 50000 | 2 | Washer, M6 Std. |
| 12 | 91745 | 1 | Contactor, 48V Contacts, 12V Coil |
| 13 | 92400 | 1 | Relay |
| 14 | 92103 | 1 | Relay Base |
| -- | 92104 | 2 | Terminal, Relay Base, 14-16 gauge |
| -- | 92105 | 2 | Terminal, Relay Base, 10-12 gauge |
| 15 | 92403 | 1 | Auto Reset, 50 Amp |
| 16 | 22175 | 1 | Control Module Weldment |
| 17 | 50117 | 4 | Bolt, HHCS M6 x 25 |
| 18 | 14896 | 4 | Slide Block, Door |
| 19 | 50068 | 4 | Washer, M6 Fender |
| 20 | 50047 | 4 | Nut, M6 Nylock |
| 21 | 50003 | 4 | Washer, M12 Std. |
| 22 | 50050 | 4 | Nut, M12 Nylock |
| 23 | 25429 | 2 | Spacer, Rubber |
| 24 | 50191 | 5 | Bolt, THCS 10-32 x .5" |
| 25 | 91881 | 4 | Buss Holder |
| 26 | 50238 | 5 | Nut, 10-32 Nylock |
| 27 | 50028 | 4 | Bolt, HHCS M6 x 20 |
| 28 | 90749 | 1 | Plug |
| 29 | 92033 | 4 | Buss, 12-Terminal |



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• NS: Not a Stock item

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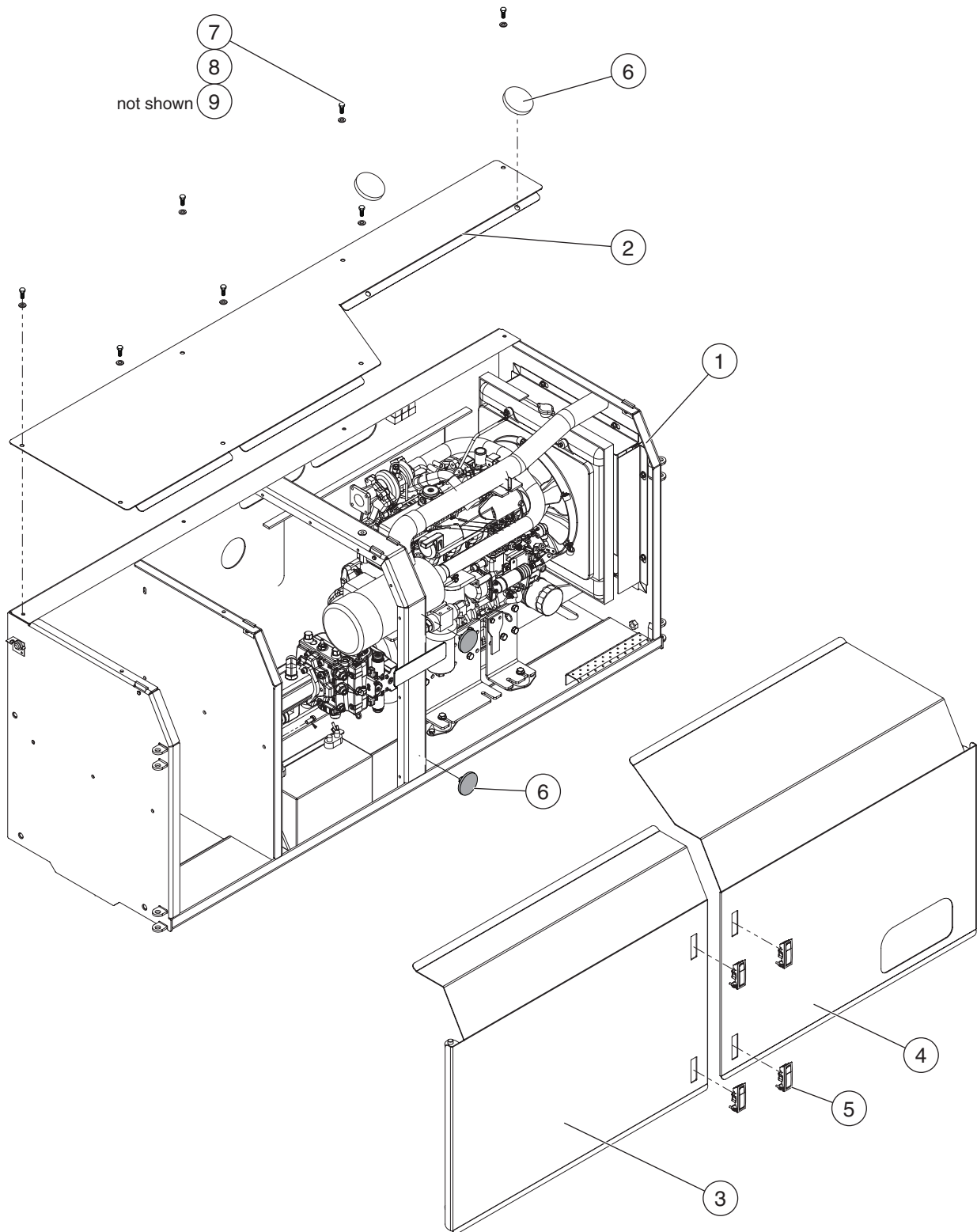


ILLUSTRATION No.
ART_3628

TITAN BOOM 40-S

Engine Module, 1 of 4

Engine Module, Drawing 1 of 4

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|----------------------------------|
| 1 | 22155 | 1 | Engine Module Weldment |
| 2 | 22249 | 1 | Top Cover, Engine Module |
| 3 | 22180 | 1 | Left-Hand Door, Engine Module |
| 4 | 22161 | 1 | Right-Hand Door, Engine Module |
| 5 | 8386 | 4 | Door Latch |
| | 92690 | -- | Door Latch, Locking (option) |
| | 92691 | -- | Key, Locking Door Latch (option) |
| 6 | 25429 | 2 | Spacer, Rubber |
| 7 | 50215 | 7 | Bolt, HHCS M10 x 20 |
| 8 | 50006 | 7 | Washer, M10 Nordlock |
| 9 | 50049 | 7 | Nut, M10 Nylock |



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• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

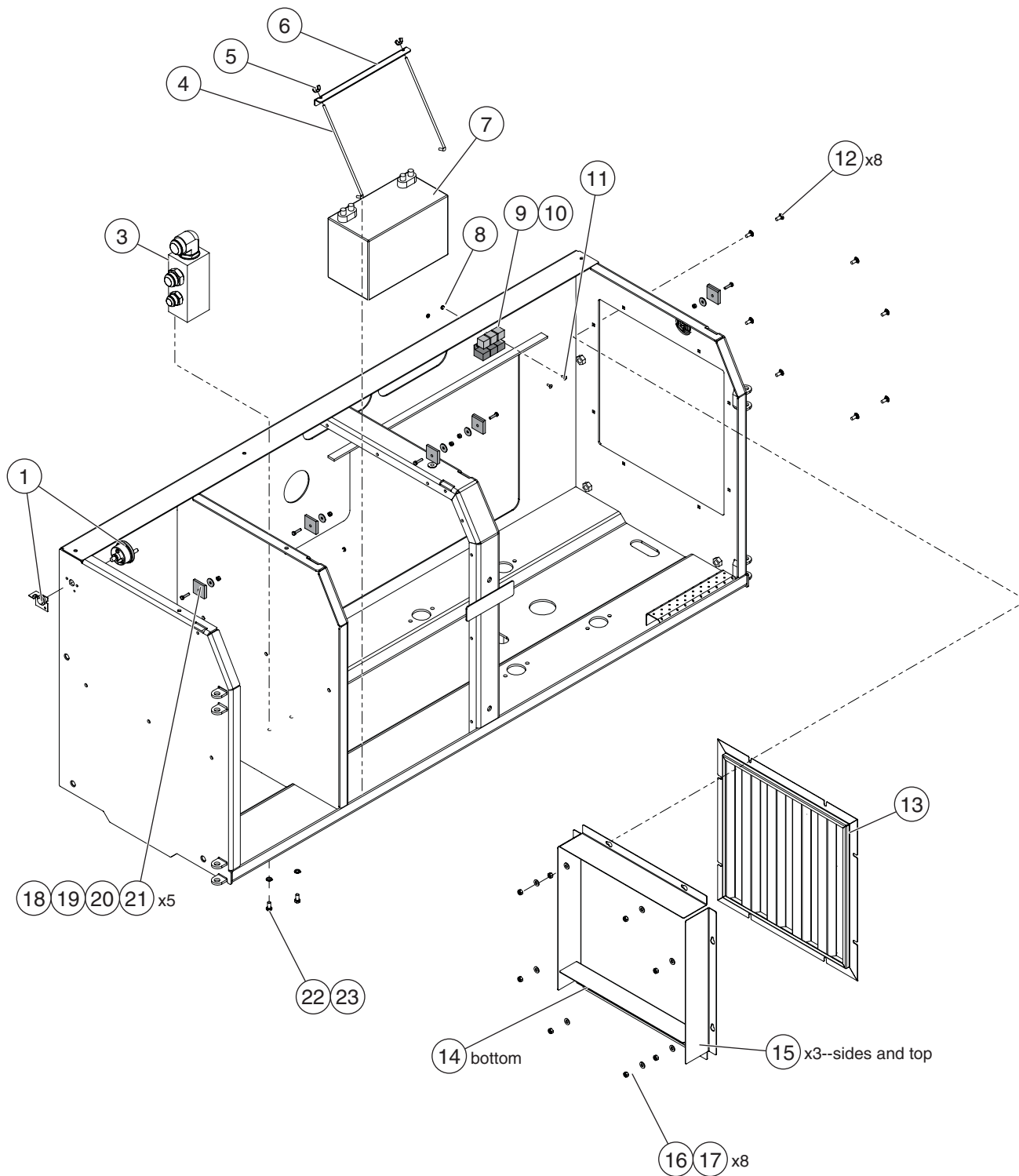


ILLUSTRATION No.
ART_3629

TITAN BOOM 40-S

Engine Module, 2 of 4

Engine Module, Drawing 2 of 4

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|-----------------------------------|
| 1 | 8841 | 1 | Switch, Master Disconnect |
| 2 | -- | -- | -- |
| 3 | REF | 1 | Suction Manifold -- See Section E |
| 4 | 22563 | 2 | Battery J-Bolt |
| 5 | HDW6110 | 2 | Wing Nut, 1/4-20 |
| 6 | 17475 | 1 | Bracket, Battery |
| 7 | 17966 | 1 | Battery, Group 31-stud, 950 CCA |
| 8 | 50238 | 2 | Nut, 10-32 Nylock |
| 9 | 91375 | 3 | Relay |
| 10 | 92103 | 3 | Relay Base |
| -- | 92104 | 2 | Terminal, Relay Base, 14-16 gauge |
| -- | 92105 | 2 | Terminal, Relay Base, 10-12 gauge |
| 11 | 50191 | 2 | Screw, THMS 10-32 x 1.5 |
| 12 | 50225 | 8 | Bolt, Carriage, M8 x 20 |
| 13 | 17680 | 1 | Radiator Grill |
| 14 | 22464 | 1 | Bracket, Radiator, Bottom |
| 15 | 22462 | 3 | Bracket, Radiator, Top/Sides |
| 16 | 50048 | 8 | Nut, M8 Nylock |
| 17 | 50001 | 8 | Washer, M8 Std. |
| 18 | 50117 | 4 | Bolt, HHCS M6 x 25 |
| 19 | 14896 | 4 | Slide Block, Door |
| 20 | 50068 | 4 | Washer, M6 Fender |
| 21 | 50047 | 4 | Nut, M6 Nylock |
| 22 | 50219 | 2 | Bolt, HHCS 3/8-16 x .75 |
| 23 | 50006 | 2 | Washer, M10 Nordlock |



• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

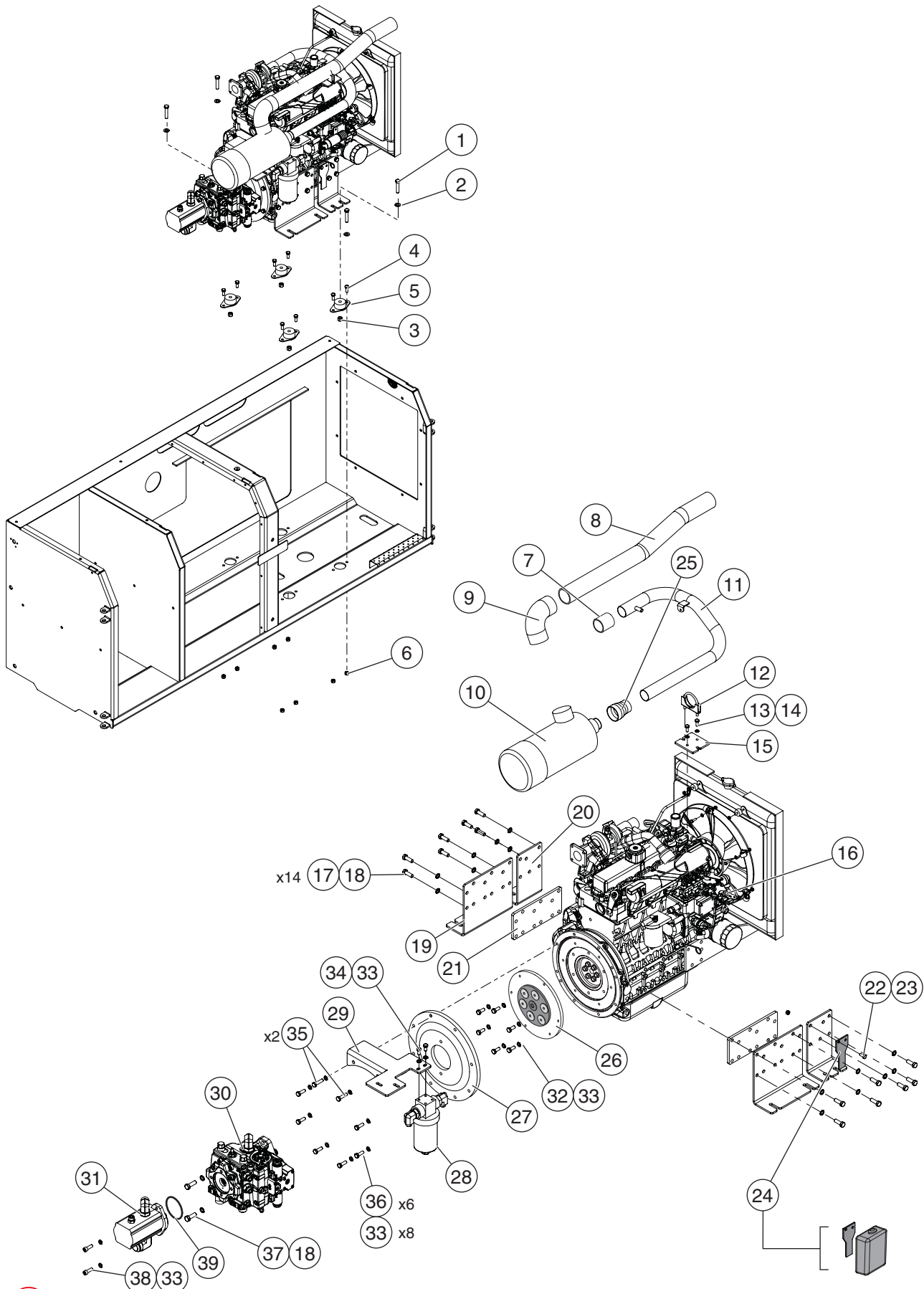


ILLUSTRATION No.
ART_3630

TITAN BOOM 40-S

Engine Module, 3 of 4

Engine Module, Drawing 3 of 4

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|---|
| 1 | 50265 | 4 | Bolt, HHCS M12 x 60 |
| 2 | 50003 | 4 | Washer, M12 St.d |
| 3 | 50050 | 4 | Nut, M12 Nylock |
| 4 | 50116 | 8 | Bolt, HHCS M10 x 25 |
| 5 | 17969 | 4 | Motor Mount |
| 6 | 50049 | 8 | Nut, M10 Nylock |
| 7 | 92396 | 1 | Connector, Turbo to Intake Tube |
| 8 | 22287 | 1 | Intake Tube |
| 9 | 92021 | 1 | Connector, 90° |
| 10 | 92475 | 1 | Air Filter Assembly |
| -- | 92181 | -- | Filter Element, Air |
| 11 | 22548 | 1 | Turbo Intake Tube |
| 12 | 91883 | 1 | Clamp, U-Bolt 2.5" |
| 13 | 50030 | 2 | Bolt, HHCS |
| 14 | 50200 | 2 | Washer, M8 Nordlock |
| 15 | 22329 | 1 | Intake Mount |
| 16 | 17964 | 1 | Engine, Kubota V2403-MT |
| 17 | 50133 | 14 | Bolt, HHCS M12 x 35 |
| 18 | 50007 | 16 | Washer, M12 Nordlock |
| 19 | 18228 | 2 | Mounting Bracket, Rear Engine |
| 20 | 18227 | 2 | Mounting Bracket, Front Engine |
| 21 | 18271 | 2 | Spacer |
| 22 | 50030 | 1 | Bolt, HHCS M8 x 20 |
| 23 | 50048 | 1 | Nut, M8 Nylock |
| 24 | 91127 | 1 | Coolant Overflow Tank Assembly |
| 25 | 17676 | 1 | Intake Adapter |
| 26 | 92473 | 1 | Motor Coupler |
| 27 | 92498 | 1 | Adapter Plate |
| 28 | REF | 1 | Charge Filter Assembly-- See Section E |
| 29 | 17467 | 1 | Filter Mounting Bracket |
| 30 | REF | 1 | Drive Pump Assembly -- See Section E |
| 31 | REF | 1 | Functions Pump Assembly-- See Section E |
| 32 | 50033 | 6 | Bolt, HHCS M10 x 25 |
| 33 | 50006 | 19 | Washer, M10 Nordlock |
| 34 | 50219 | 2 | Bolt, HHCS 3/8 x .75" |
| 35 | 50035 | 2 | Bolt, HHCS M10 x 40 |
| 36 | 50034 | 6 | Bolt, HHCS M10 x 35 |
| 37 | 50069 | 2 | Bolt, HHCS 1/2 x 1.5" |
| 38 | 50127 | 2 | Bolt, SHCS M10 x 30 |
| 39 | 17971 | 1 | O-Ring |

• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only



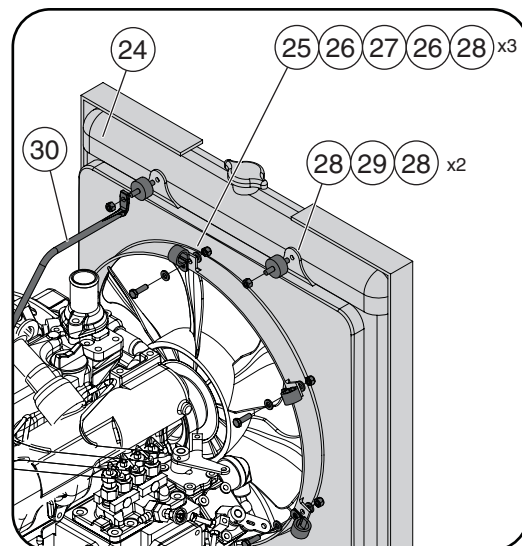
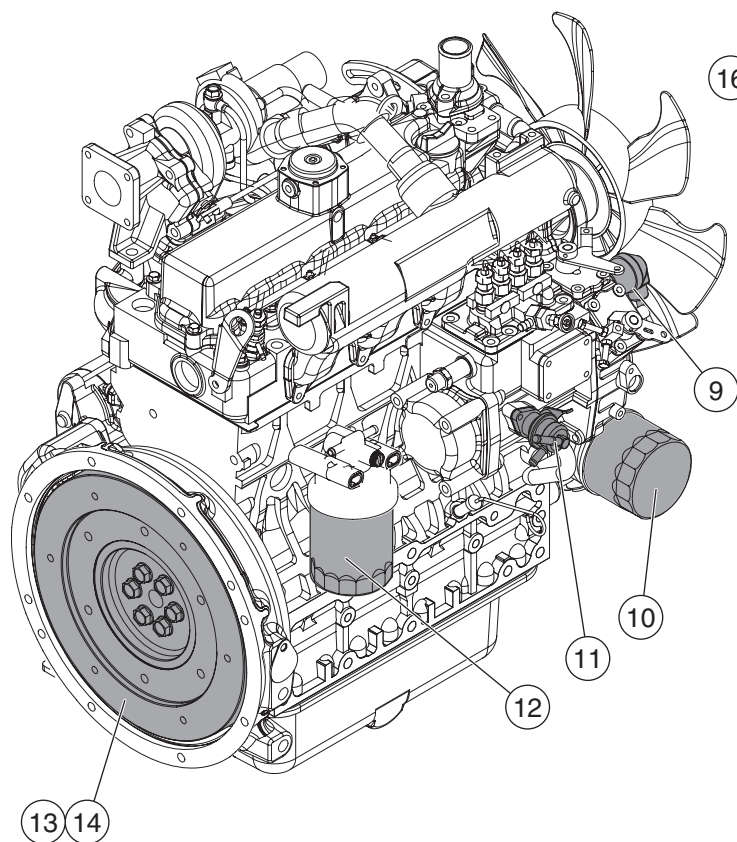
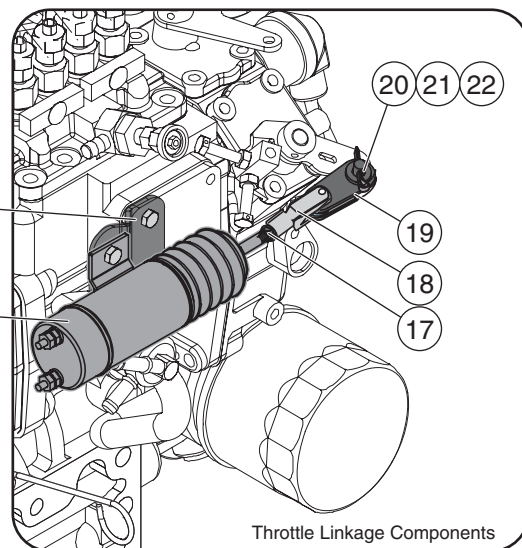
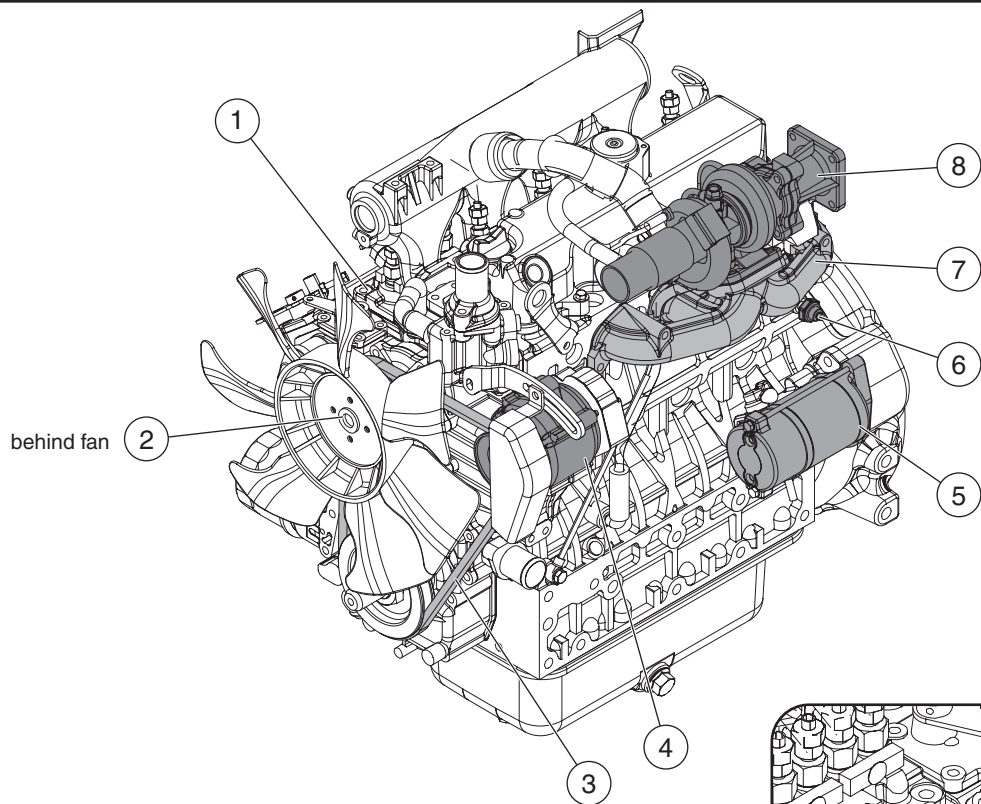


ILLUSTRATION No.
ART_3631

TITAN BOOM 40-S

Engine Module, 4 of 4

Engine Module, Drawing 4 of 4

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|------------------------------------|
| 1 | 17964 | -- | Engine, Kubota V2403-T |
| 2 | 92471 | 1 | Water Pump |
| 3 | 92472 | 1 | Fan Belt |
| 4 | 92178 | 1 | Alternator |
| 5 | 92177 | 1 | Starter |
| 6 | 91175 | 1 | Oil Pressure Switch |
| 7 | 92184 | 1 | Exhaust Manifold |
| -- | 92185 | -- | Gasket, Exhaust Manifold |
| 8 | 92470 | 1 | Turbo Charger Assy |
| 9 | 92179 | 1 | Solenoid, Fuel Shutoff |
| 10 | 92180 | 1 | Oil Filter |
| 11 | 92176 | 1 | Fuel Pump |
| 12 | 92182 | 1 | Fuel Filter |
| 13 | 92183 | 1 | Flywheel Assy -- Includes Item #58 |
| 14 | 92175 | 1 | Ring Gear, Flywheel |
| 15 | 17638 | 1 | Bracket, Throttle Solenoid |
| 16 | 91589 | 1 | Throttle Solenoid |
| -- | 50028 | 2 | Bolt, M6 x 20 |
| -- | 50000 | 4 | Washer, M6 Std |
| -- | 50047 | 2 | Nut, M6 Nylock |
| 17 | 50164 | 1 | Jam Nut, 1/4-28 |
| 18 | 91117 | 1 | Yoke |
| 19 | 16347 | 2 | Throttle Link |
| 20 | HDW5217 | 1 | Washer, 5/16 Flat |
| 21 | HDW91590 | 1 | Pin, Clevis, 5/16 x 1 |
| 22 | 50177 | 1 | Pin, Cotter, 1/8 x 1 |
| 23 | -- | -- | -- |
| 24 | 92186 | 1 | Radiator Assembly |
| -- | 92468 | 1 | Upper Radiator Hose |
| -- | 92469 | 1 | Lower Radiator Hose |
| 25 | 50028 | 3 | Bolt, HHCS M6 X 20 |
| 26 | 50000 | 3 | Washer, M6 Std |
| 27 | 5882 | 3 | P Clamp |
| 28 | 50047 | 3 | Nut, M6 Nylock |
| 29 | 91591 | 2 | Hose Mount |
| 30 | 18257 | 1 | Bar, Radiator Mount |

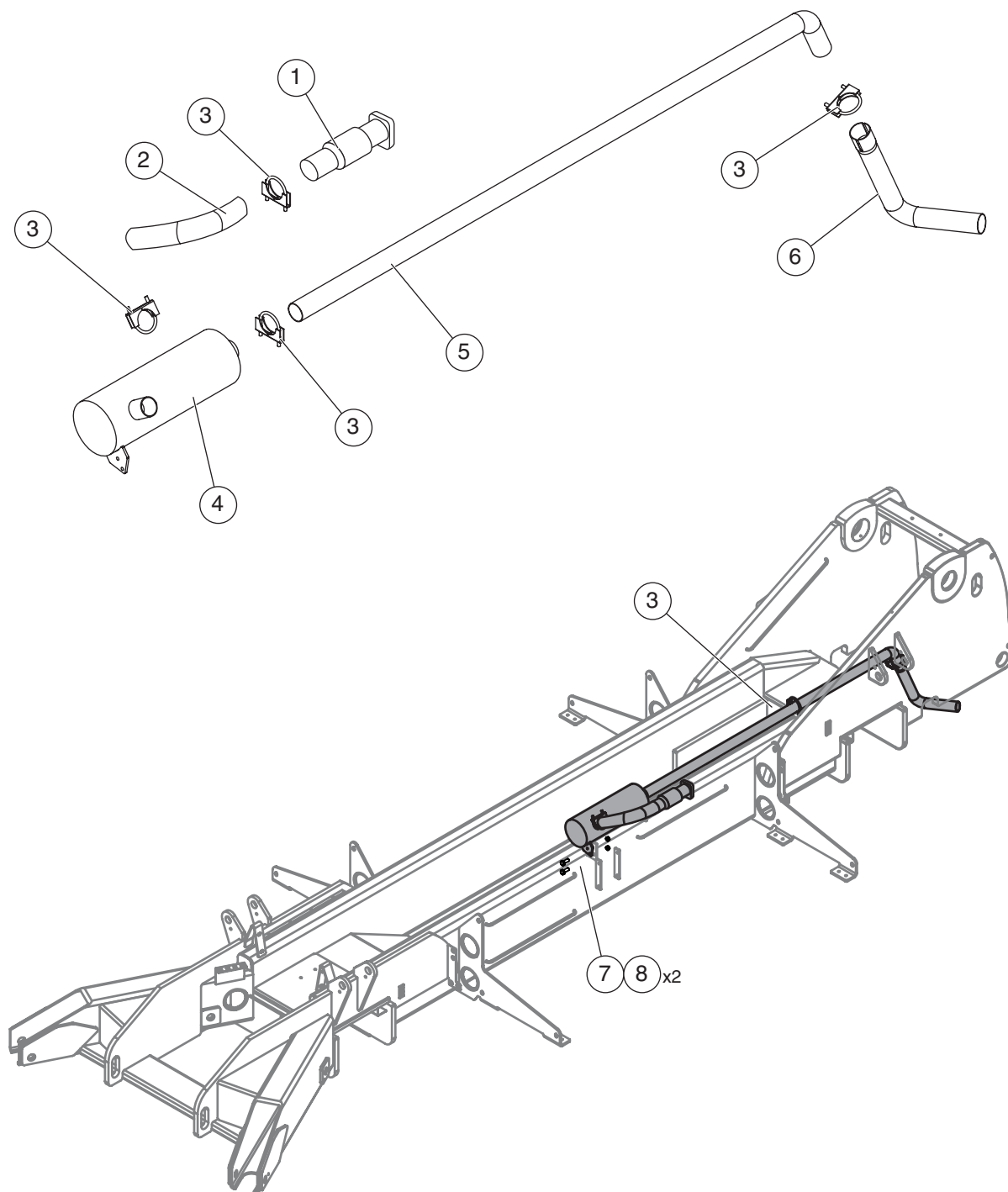


ILLUSTRATION No.
ART_3632

TITAN BOOM 40-S

Exhaust Components

Exhaust Components

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|------------------------------------|
| 1 | 22586 | 1 | Flexible Coupling |
| 2 | 22543 | 1 | Exhaust Pipe |
| 3 | 17637 | 4 | Clamp, U-Bolt, 2-1/8" |
| 4 | 22435 | 1 | Muffler |
| | 92517 | 1 | OPTION -- Exhaust Purifier/Muffler |
| 5 | 22328 | 1 | Exhaust Pipe |
| 6 | 22396 | 1 | Exhaust Pipe |
| 7 | 50031 | 2 | Bolt, HHCS M8 x 25 |
| 8 | 50048 | 2 | Nut, M8 Nylock |



• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

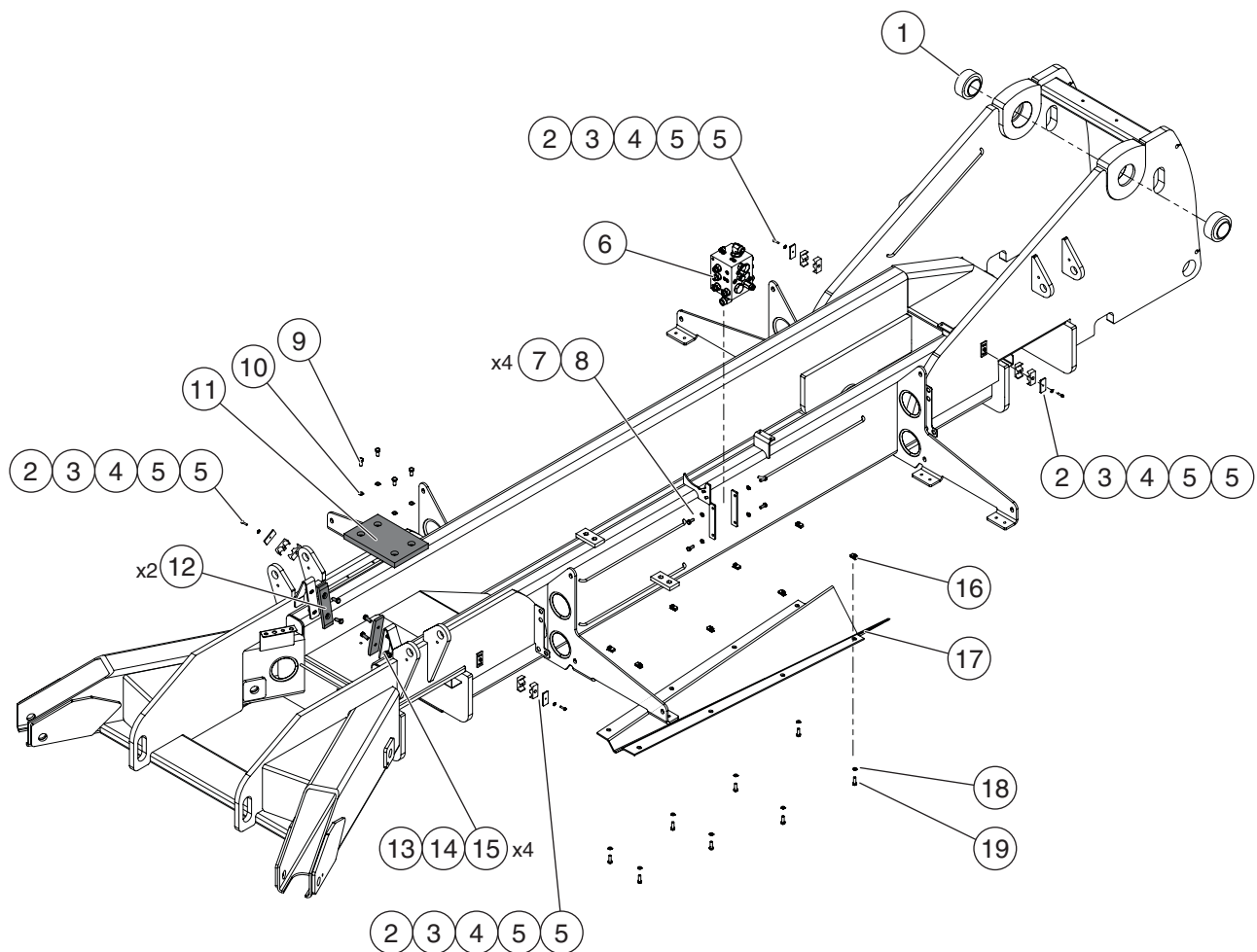


ILLUSTRATION No.
ART_3634

TITAN BOOM 40-S

Chassis Components, 1 of 3

Chassis Components, Drawing 1 of 3

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|------------------------------------|
| 1 | 92099 | 2 | Bearing |
| 2 | 50015 | 4 | Bolt, HHCS M6 x 25 |
| 3 | 50200 | 4 | Washer, M6 Std |
| 4 | 92487 | 4 | Cover Plate |
| 5 | 92499 | 8 | Clamp Plate |
| 6 | REF | -- | Traction Manifold -- See Section E |
| 7 | 50033 | 4 | Bolt, HHCS M10 x 25 |
| 8 | 50006 | 4 | Washer, M10 Nordlock |
| 9 | 50038 | 4 | Bolt, HHCS M12 x 25 |
| 10 | 50007 | 4 | Washer, M12 Nordlock |
| 11 | 22270 | 1 | Boom Pad |
| 12 | 11861980 | 2 | Bearing Pad |
| 13 | 50137 | 4 | Bolt, HHCS M12 x 30 |
| 14 | 50003 | 4 | Washer, M12 Std. |
| 15 | 50050 | 4 | Nut, M12 Nylock |
| 16 | 92098 | 8 | Nut Clip M10 |
| 17 | 22041 | 1 | Bottom Pan |
| 18 | 50006 | 8 | Washer, M10 Nordlock |
| 19 | 50034 | 8 | Bolt, HHCS M10 x 30 |



• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

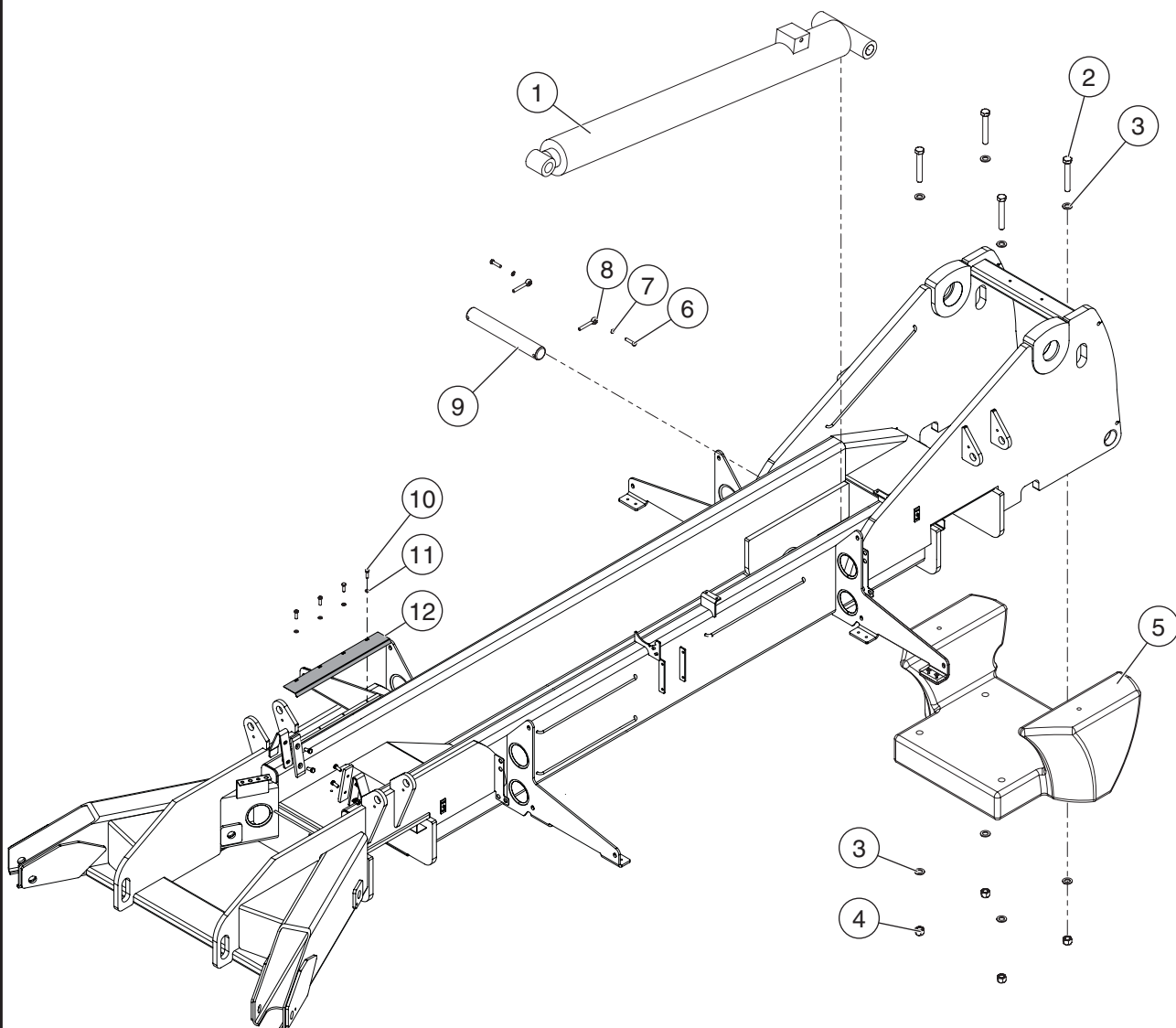


ILLUSTRATION No.
ART_3635

TITAN BOOM 40-S

Chassis Components, 2 of 3

Chassis Components, Drawing 2 of 3

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|--------------------------------|
| 1 | REF | -- | Lift Cylinder -- See Section E |
| 2 | 50254 | 4 | Bolt, HHCS M24 x 160 |
| 3 | 50255 | 8 | Washer, M24 |
| 4 | 50256 | 4 | Nut, M24 Nylock |
| 5 | 11870311 | 1 | Counterweight |
| 6 | 50250 | 2 | Bolt, HHCS M12 x 50 |
| 7 | 50007 | 2 | Washer, M12 Nordlick |
| 8 | 18152 | 2 | Pin Retainer |
| 9 | 22197 | 1 | Pin, Chassis/Lift Cylinder |
| 10 | 50295 | 4 | Bolt, HHCS M8 x 15 |
| 11 | 50001 | 4 | Washer, M8 Std. |
| 12 | 22512 | 1 | Hose Guard |



• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

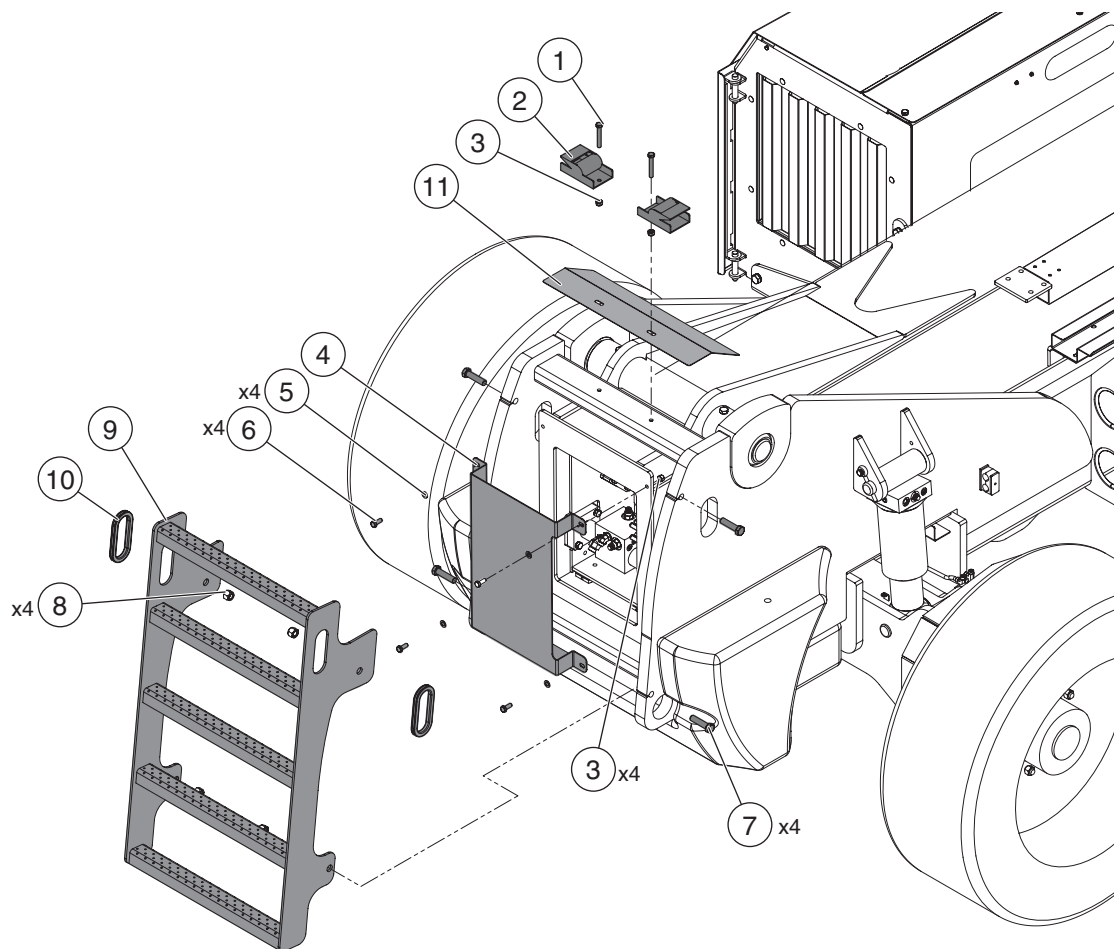


ILLUSTRATION No.
ART_3636

TITAN BOOM 40-S

Chassis Components, 3 of 3

Chassis Components, Drawing 3 of 3

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|---------------------------------------|
| 1 | 50022 | 2 | Bolt, HHCS M10 x 70 |
| 2 | 92076 | 2 | Platform Retention Strap |
| 3 | 50049 | 2 | Nut, M10 Nylock |
| 4 | 22268 | 1 | Rear Cover |
| 5 | 50002 | 4 | Washer, M10 Std. |
| 6 | 50033 | 4 | Bolt, HHCS M10 x 25 |
| 7 | 50044 | 4 | Bolt, HHCS M16 x 65 |
| 8 | 50051 | 4 | Nut, M16 Nylock |
| 9 | 22244 | 1 | Ladder Weldment |
| 10 | 92535 | 2 | Trim Lock |
| 11 | 22615 | 1 | Pivot Guard -- CE option package only |



• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

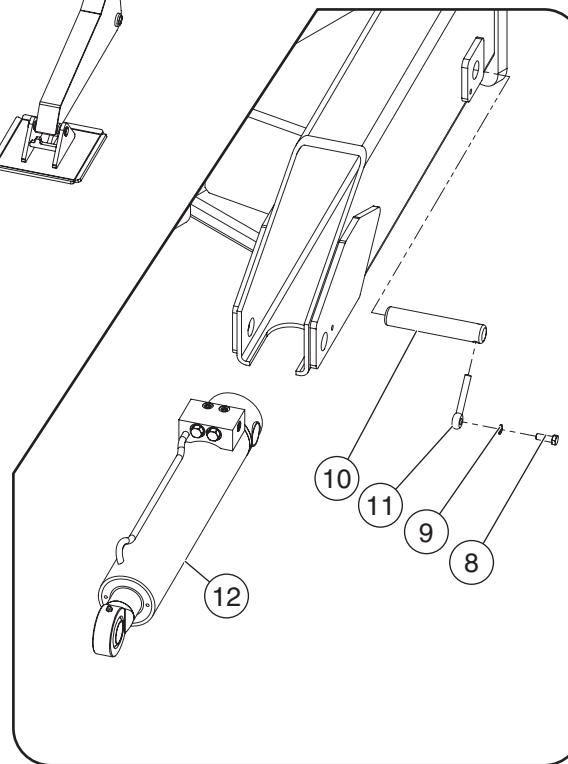
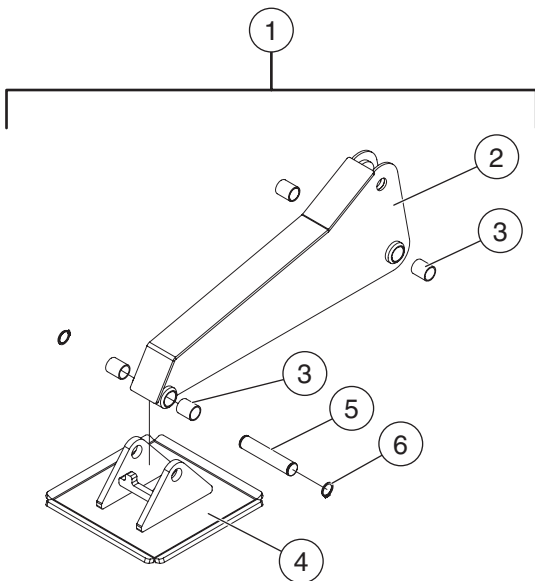
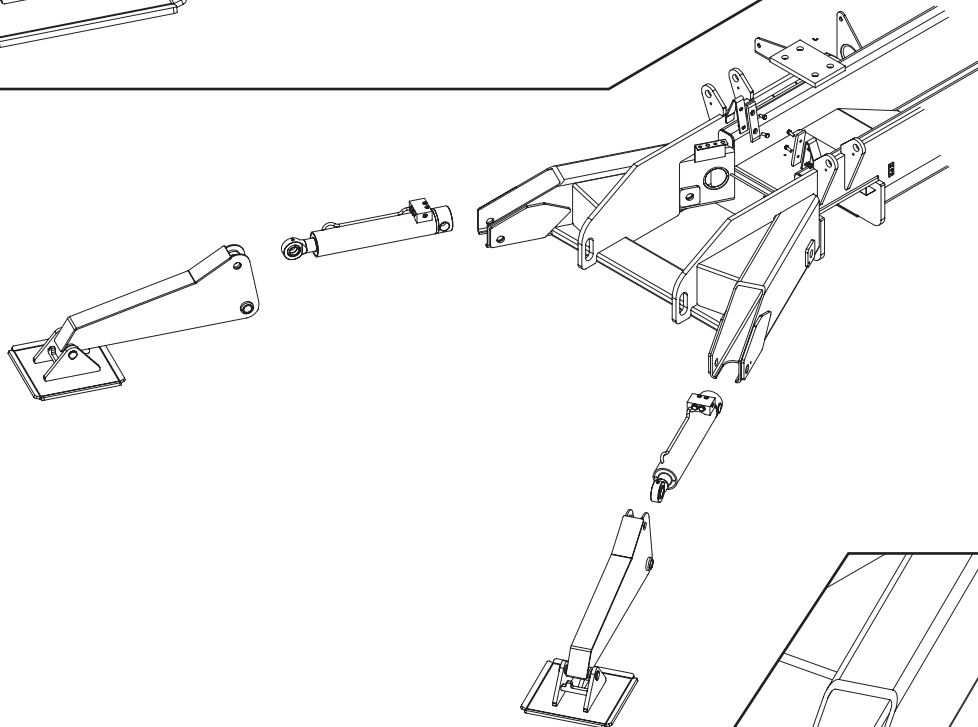
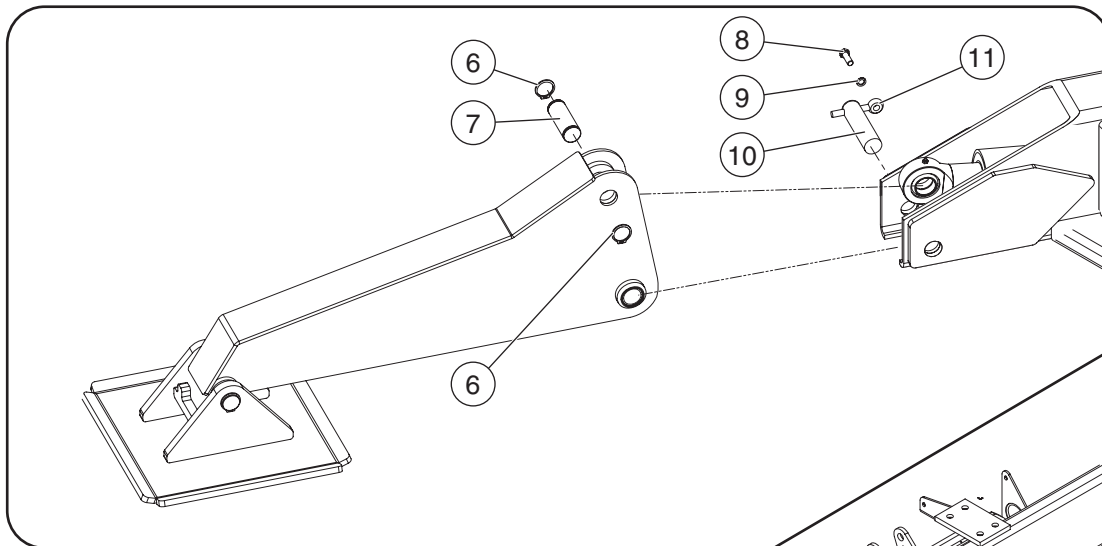


ILLUSTRATION No.
ART_3640

TITAN BOOM 40-S

Stabilizer Installation

Stabilizer Components

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|--------------------------------------|
| 1 | 84169 | 2 | Stabilizer Assembly |
| 2 | 22300 | 2 | Stabilizer Arm |
| 3 | 92214 | 8 | Bearing |
| 4 | 22233 | 2 | Stabilizer Pad |
| 5 | 22342 | 2 | Pin |
| 6 | 92243 | 8 | Snap Ring |
| 7 | 22335 | 2 | Pin |
| 8 | 50040 | 4 | Botl, HHCS M12 x 35 |
| 9 | 50007 | 4 | Washer, M12 Nordlock |
| 10 | 22207 | 4 | Pin |
| 11 | 18152 | 4 | Pin Retainer |
| 12 | REF | 2 | Stabilizer Cylinder -- See Section E |



• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

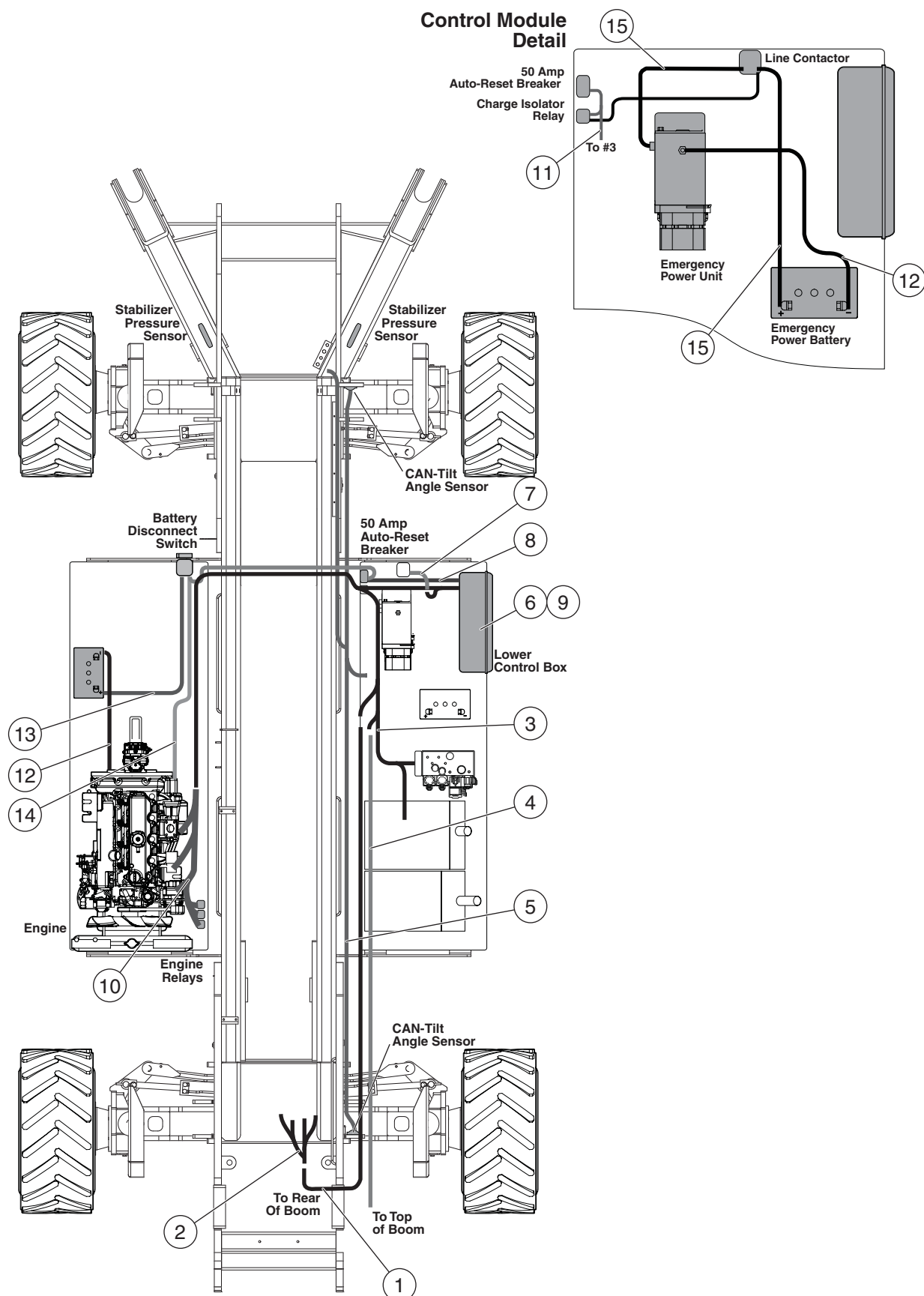


ILLUSTRATION No.
ART_3641

TITAN BOOM 40-S

Wiring Harness -- Chassis

Wiring Harness -- Chassis

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|---|
| 1 | 22604 | 1 | Harness, Transducer Extension (J6, J7) |
| 2 | 22605 | 1 | Harness, Transducer (J7, Sensors at rear of boom) |
| 3 | 22606 | 1 | Harness, Chassis Complete (J1, J2, J3, J4, J5, J6) |
| 4 | 22609 | 1 | Harness, Control Cable, Lower (J3, J8) |
| 5 | 22612 | 1 | Harness, Axle Can-tilt (J5, Axle CAN-Tilt Modules, Stabilizer Pressure Sensors) |
| 6 | 22613 | 1 | Harness, Lower Control Box Complete (J1, Interior of Lower Control Box) |
| 7 | 22624 | 1 | Harness, Line Contactor to Main Harness Adaptor |
| 8 | 22625 | 1 | Harness, Lower Control Box Power Harness |
| 9 | 22626 | 1 | Harness, Internal Ez Cal |
| 10 | 92433 | 1 | Harness, Engine (J4, Engine) |
| 11 | 22553 | 1 | Harness, Charge Isolator Relay |
| 12 | 55001 | 2 | Cable, Black 2-Gauge, 30" |
| 13 | 55002 | 1 | Cable, Red 2-Gauge, 103" |
| 14 | 55003 | 1 | Cable, Red 2-Gauge, 130" |
| 15 | 55004 | 2 | Cable, Red 2-Gauge, 30" |



• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

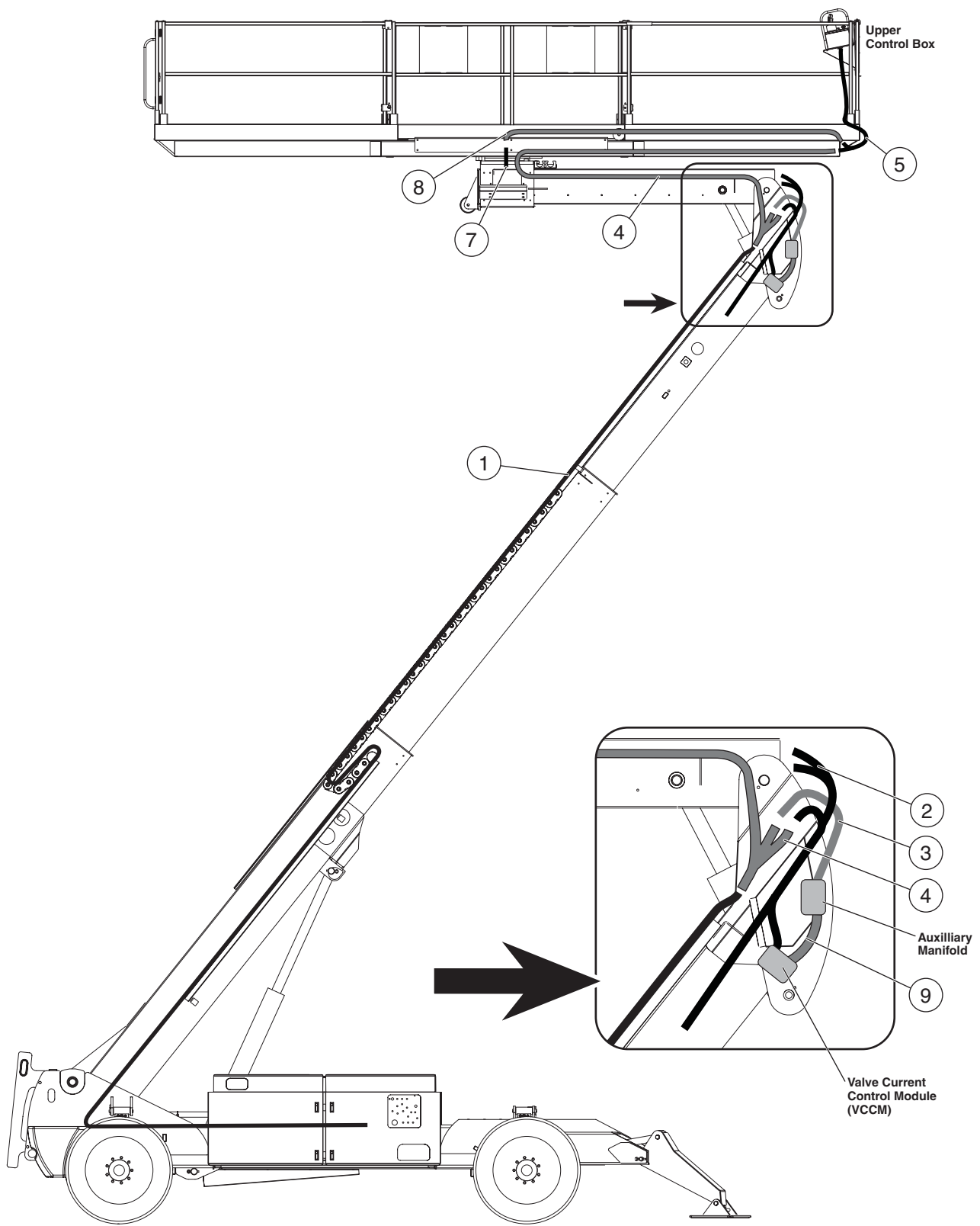


ILLUSTRATION No.
ART_3642

TITAN BOOM 40-S

Wiring Harness -- Boom & Platform

Wiring Harness -- Boom & Platform

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|--------|---|
| 1 | 22609 | 1 | Harness, Control Cable, Lower (J3, J8) |
| 2 | 22607 | 1 | Harness, End Boom (J11, CAN-Tilt, VCCM, Prox. Switch) |
| 3 | 22608 | 1 | Harness, Platform Level Valve (J12, Aux. Manifold) |
| 4 | 22610 | 1 | Harness Control Cable, Intermediate (J8, J9, J11, J12) |
| 5 | 22611 | 1 | Harness, Control Cable, Upper (J8, J10, J13) |
| 6 | 22614 | 1 | Harness, Upper Control Box, Complete (J10, interior of control box) |
| 7 | 22622 | 1 | Harness, Rotational Sensor (J14, Rotation Sensor) |
| 8 | 22627 | 1 | Harness, Rotational Sensor Extension Harness (J13, J14) |
| 9 | 22554 | 1 | Harness, VCCM/Aux Manifold (VCCM, Aux. Manifold) |
| 10 | 9441 | 85 ft. | Cable, Power To Platform (not shown; follows path similar to Item #1) |

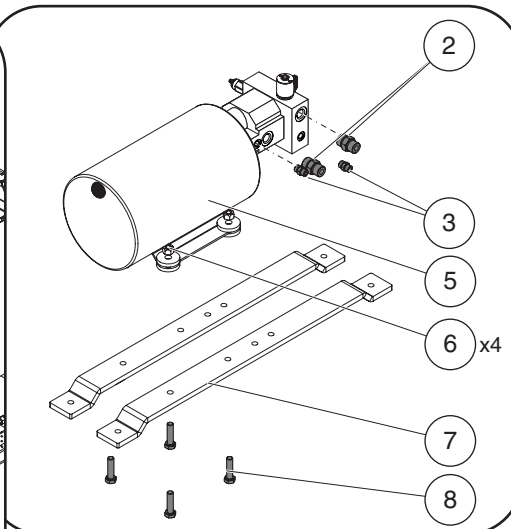
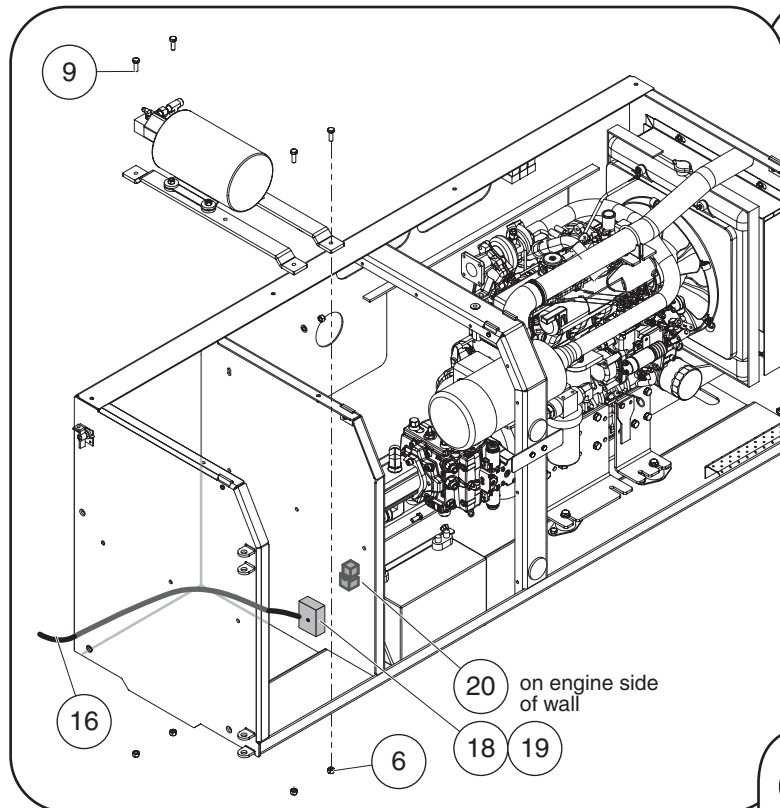


• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only



To wiring harness connection

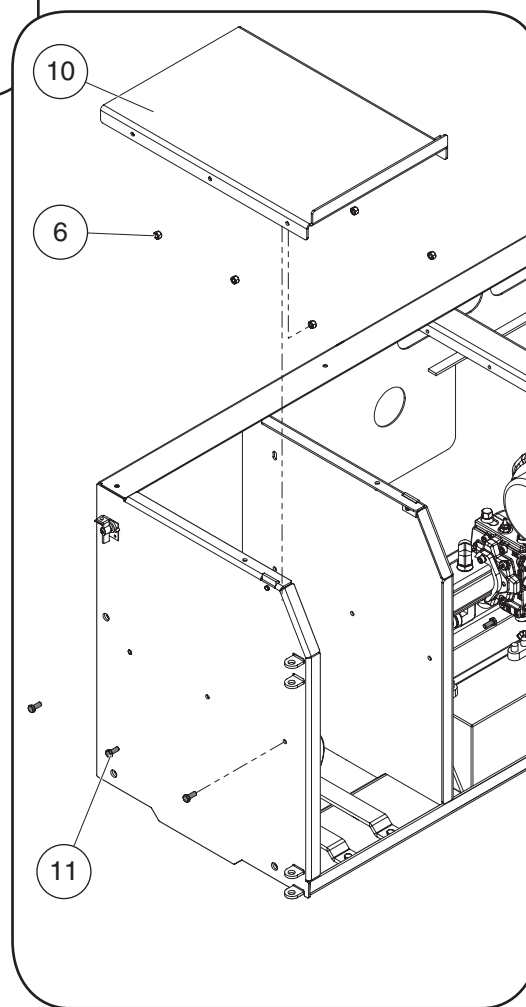
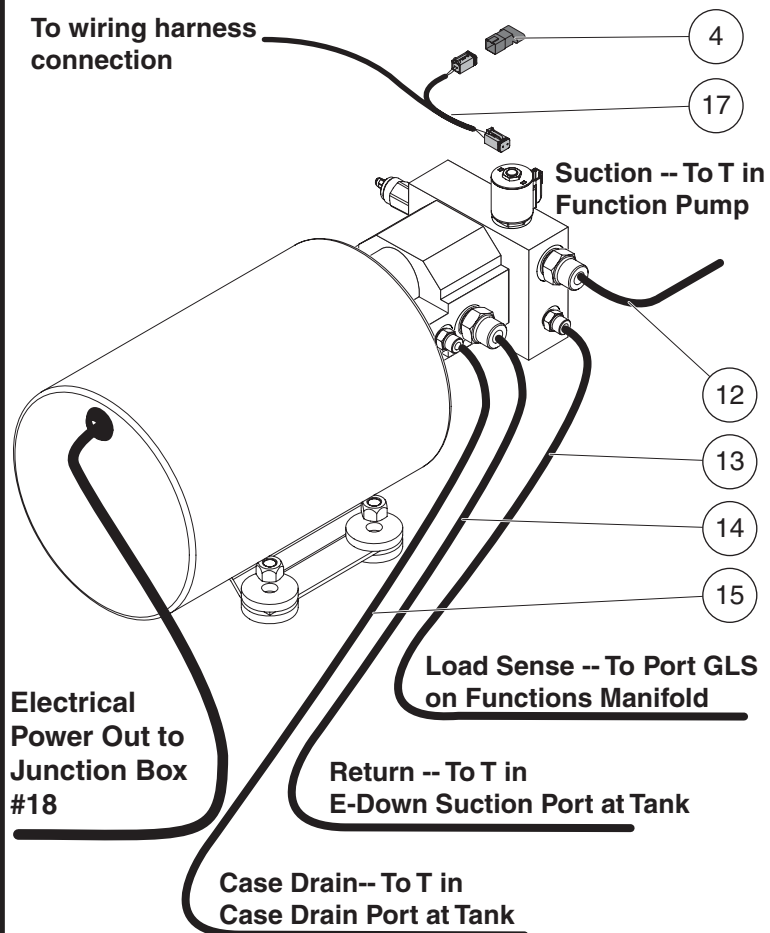


ILLUSTRATION No.
ART_3694

TITAN BOOM 40-S

3kW Generator Option

OPTION -- 3kVA Generator

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|------|--|
| 1 | -- | -- | -- |
| 2 | 50841 | 2 | Fitting, MFFOR-MB-8-8 |
| 3 | 50831 | 2 | Fitting, MFFOR-MJ-4-4 |
| 4 | 91027 | 1 | Diode, 2-pin |
| 5 | 92515 | 1 | Generator, 3kVA |
| 6 | 50049 | 14 | Nut, M10 Nylock |
| 7 | 22532 | 2 | Mounting Bracket |
| 8 | 50035 | 4 | Bolt, HHCS M10 x 40 |
| 9 | 50034 | 4 | Bolt, HHCS, M10 x 30 |
| 10 | 22531 | 1 | Utility Shelf, Generator Option |
| 11 | 50033 | 6 | Bolt, HHCS M10 x 25 |
| 12 | 52056 | 1 | Hose Assy, Pressure, 1/2" x 39", 8G8FFORX-8G8FFORX |
| 13 | 19349 | 1 | Hose Assy, Load Sense, 1/4" x 120", 4G4FJX-4G4FJX |
| 14 | 52057 | 1 | Hose Assy, Return, 1/2" x 125", 8G8FFORX90L-8G8FFORX |
| 15 | 52177 | 1 | Hose, Assy, Case Drain, 1/4" x 125", 4G4FFORX-4G4FJX |
| 16 | 91375 | 7 ft | Cable, Generator to Power To Platform connection |
| 17 | 22554 | 1 | Harness, Engine Intermediate, Generator Option |
| 18 | 92495 | 1 | Junction Box |
| 19 | 92493 | 1 | Circuit Breaker, 30 Amp |
| 20 | 91375 | 1 | Relay, Generator Power |
| -- | 92496 | 1 | Plug, 30A 110V Female (not shown; attached to #16 and plugs into Power To Platform connection) |



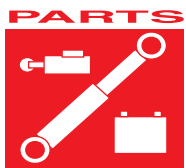
• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only

NOTES:



SECTION G

DECALS, ANSI

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Decals, Titan Boom 40-S ANSI

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|---------------------------------|
| 1 | 92050 | 2 | Decal, MEC TITAN BOOM, Boom |
| 2 | 92049 | 2 | Decal, MEC TITAN BOOM, Toeboard |
| 3 | 92051 | 2 | Decal, MEC TITAN BOOM, Module |
| 4 | 92054 | 1 | Decal, Patents Pending |
| 5 | 92044 | 1 | Decal, Platform Controls |
| 6 | 92056 | 1 | Decal, Instructions |
| 6a | 92233 | 1 | Decal, Instructions |
| 7 | 92055 | 1 | Decal, Danger |
| 8 | 92115 | 4 | Decal, Load Zone |
| 9 | 92057 | 2 | Decal, Personnel |
| 10 | 90718 | 1 | Decal, Inspection |
| 11 | 92116 | 4 | Decal, Lanyard Cable |
| 12 | 8911 | 1 | Decal, Manuals Case |
| 13 | 90739 | 1 | Decal, Made In USA |
| 14 | 92059 | 2 | Decal, Load Zone Capacity |
| 15 | 92058 | 2 | Decal, Material Gates |
| 16 | 92060 | 1 | Decal, Base Controls |
| 17 | 92230 | 1 | Decal, Serial Number ANSI |
| | 92230 | 1 | Decal, Serial Number CSA |
| 18 | 92117 | 1 | Decal, Hydraulic Fluid Range |
| 19 | 9052 | 1 | Decal, Master Disconnect |
| 20 | 91850 | 2 | Decal, Crush Hazard |
| 21 | 91975 | 2 | Decal, Diesel Fuel |
| 22 | 92118 | 2 | Decal, Maintenance Chock |
| 23 | 92120 | 2 | Decal, Tie-Down Straps |
| 24 | 92119 | 1 | Decal, Relays |
| 25 | 92114 | 2 | Decal, Material Loading Gates |
| 26 | 91971 | 1 | Decal, Arrow, Forward |
| 27 | 91972 | 1 | Decal, Arrow, Reverse |
| 28 | 91981 | 1 | Decal, Arrow, Left |
| 29 | 91982 | 1 | Decal, Arrow, Right |
| 30 | 22474 | 4 | Stencil, Load Zone |
| 31 | 22484 | 2 | Plate, Load Zone |
| 32 | 92236 | 1 | Decal, EZ Cal Port |
| 33 | 11026730 | 4 | Decal, Tie-Down Point |
| 34 | 90751 | 1 | Decal, Power To Platform |
| 35 | 92542 | 1 | Decal, Lanyard Point |

• as req: as required

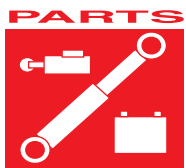
• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only



- 1 92050 2 Places
mec TITAN BOOM™ 40-S
- 2 92049 2 Places
mec TITAN BOOM™ 40-S
- 3 92051 2 Places
mec TITAN BOOM™ 40-S
- 4 92054
Multiple Patents Pending
- 5 92044
- 6 92056
- 6a 92233
- 7 92055
- 8 92115 4 Places
- 9 92057 2 Places
- 10 90718
- 11 92116 4 Places
- 12 8911
- 13 90739
- 14 92059 2 Places
- 15 92058 2 Places
- 16 92060
- 17 92334 -- ANSI
92230 -- CSA
- 18 92117
- 19 9052
- 20 91850 2 Places
- 21 91975 2 Places
- 22 92118 2 Places
- 23 92120 2 Places
- 24 92119
- 25 92114 2 Places
- 26 91971 2 places
- 27 91972 2 places
- 28 91981
- 29 91982
- 30 22474 -- Paint Stencil for Load Zone
4 places - not a decal
- 31 22484 -- Metal Plates on Pallet Stops
2 places
- 32 92236
- 33 11026730 4 Places
- 34 90751
- 35 92542



SECTION H

DECALS, CE

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| Decals, Titan Boom 40-S CE | H-3 |
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Decals, Titan Boom 40-S CE

| ITEM | PART NO. | QTY | DESCRIPTION |
|------|----------|-----|--|
| 1 | 92050 | 2 | Decal, MEC TITAN BOOM, Boom |
| 2 | 92049 | 2 | Decal, MEC TITAN BOOM, Toeboard |
| 3 | 92051 | 2 | Decal, MEC TITAN BOOM, Module |
| 4 | 92054 | 1 | Decal, Patents Pending |
| 5 | 92044 | 1 | Decal, Platform Controls |
| 6 | 92056 | 1 | Decal, Instructions |
| 6a | 92233 | 1 | Decal, Instructions |
| 7 | 92411 | 1 | Decal, Danger |
| 8 | 92297 | 4 | Decal, Load Zone |
| 9 | 92298 | 2 | Decal, Personnel |
| 10 | 92542 | 1 | Decal, Lanyard Point |
| 11 | 92116 | 4 | Decal, Lanyard Cable |
| 12 | 8911 | 1 | Decal, Manuals Case |
| 13 | 90739 | 1 | Decal, Made In USA |
| 14 | 92410 | 2 | Decal, Load Zone Capacity |
| 15 | 92058 | 2 | Decal, Material Gates |
| 16 | 92294 | 1 | Decal, Base Controls |
| 17 | 92235 | 1 | Decal, Serial Number |
| 18 | 92117 | 1 | Decal, Hydraulic Fluid Range |
| 19 | 9052 | 1 | Decal, Master Disconnect |
| 20 | 91850 | 2 | Decal, Crush Hazard |
| 21 | 91975 | 2 | Decal, Diesel Fuel |
| 22 | 92118 | 2 | Decal, Maintenance Chock |
| 23 | 92120 | 2 | Decal, Tie-Down Straps |
| 24 | 92119 | 1 | Decal, Relays |
| 25 | 92114 | 2 | Decal, Material Loading Gates |
| 26 | 91971 | 1 | Decal, Arrow, Forward |
| 27 | 91972 | 1 | Decal, Arrow, Reverse |
| 28 | 91981 | 1 | Decal, Arrow, Left |
| 29 | 91982 | 1 | Decal, Arrow, Right |
| 30 | 22474 | 4 | Stencil, Load Zone |
| 31 | 22484 | 2 | Plate, Load Zone |
| 32 | 92236 | 1 | Decal, EZ Cal Port |
| 33 | 11026730 | 4 | Decal, Tie-Down Point |
| 34 | 90751 | 1 | Decal, Power To Platform |
| 35 | 91388 | 1 | Decal, 86 dB |
| 36 | 7982 | 4 | Decal, Safety Tape |
| 37 | 92299 | 4 | Decal, Wheel Load |
| 38 | 91325 | 1 | Decal, Electrical Clearance (Australia only) |
| 39 | 92548 | 2 | Decal, Stabilizer Load |
| 40 | 92549 | 1 | Decal, Personnel Entry Gate |
| 41 | 9910 | 4 | Decal, Pinch Point |
| 42 | 90717EUR | 2 | Decal, Maintenance Block |

• as req: as required

• INCL: Included with assembly

• NS: Not a Stock item

• REF: Reference only



- ILLUSTRATION No.
ART_3520



Service Parts Order Form

Fax to 559-263-9631

Please fill out completely

Date: _____

Ordered By: _____

Account: _____

Your Fax No.: _____

Bill to: _____

Ship to: _____

Purchase Order Number _____

Ship VIA _____

**All orders MUST have a Purchase Order Number

**Fed Ex shipments require Fed Ex account number

| Part Number | Description | Quantity | Price |
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All backordered parts will be shipped when available via the same ship method as original order unless noted below:

- Ship complete order only - no backorders
- Ship all available parts and contact customer on disposition of backordered 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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