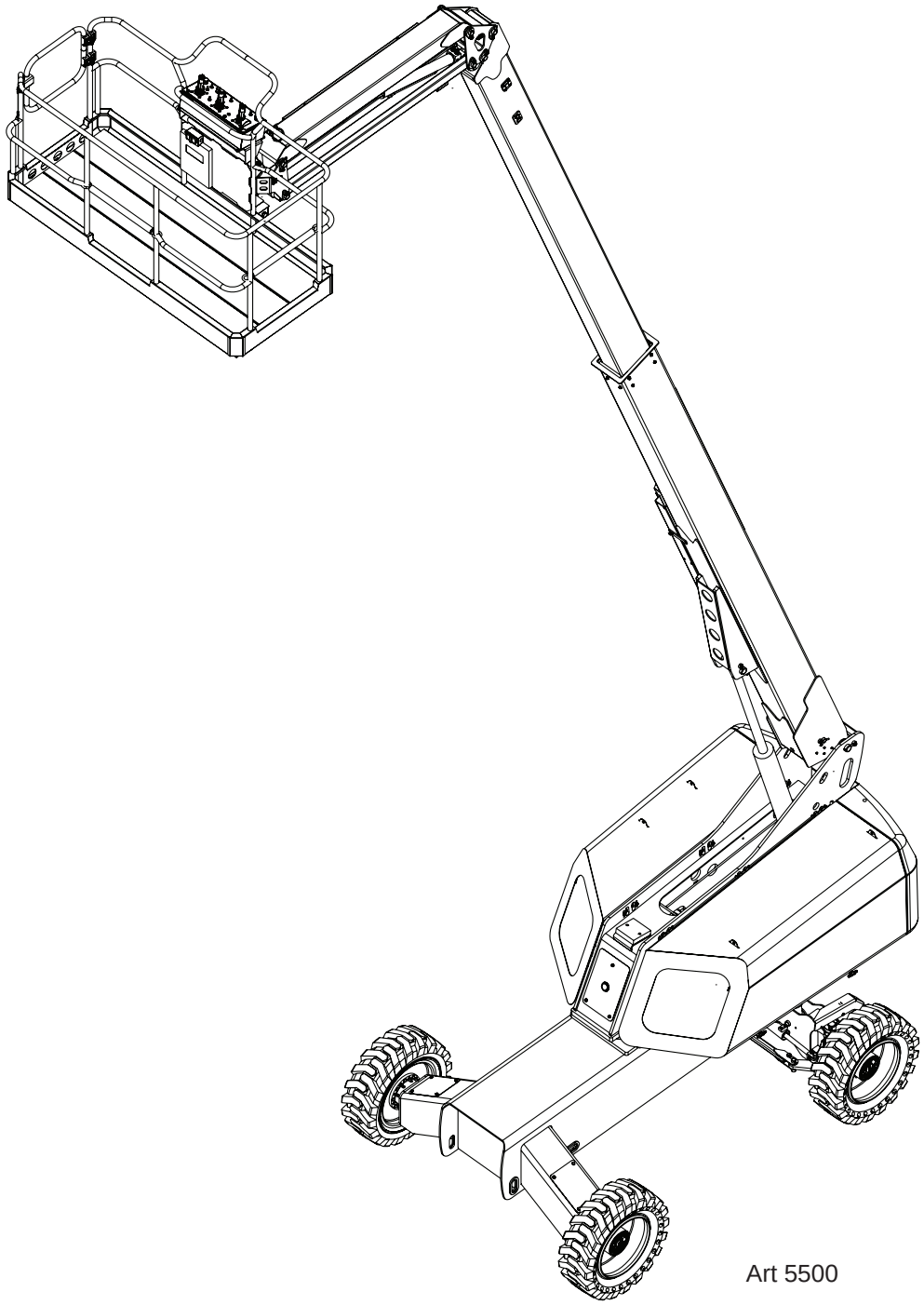
Service & Parts Manual

45-J Diesel



Art 5500

Serial Number Range
14700001 - Up

Part # 95090
April 2026

Revision History

Date	Reason for Update
May 2020	New Release
August 2020	Added Boom Harness
January 2025	Updated description of 91116 and 91123 on page 208. Added 96387 and 96388 on page 208.
March 2025	Updated New Chassis Electrical Schematic on page 124.
December 2025	Added 7553 to page 130.
January 2026	Updated artwork and added item #18-24 for page 146.
April 2026	Added 93173 as sub-item to item #48 for page 198.

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Service Introduction

This Service section 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 in this manual and the Operator's 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 Platforms, 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, and the Service and Parts Manuals in order to gain a thorough understanding of the unit prior to making any repairs.

MEC Operator Policy

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

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

DANGER

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

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

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

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

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

If there is a question on application and/or operation, contact MEC Aerial Work Platforms:

MEC Aerial Work Platforms

1401 S. Madera Avenue, Kerman, CA 93630 USA
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Safety Symbols & General Safety Tips

MEC manuals and decals use symbols, colors and signal words to help you recognize important safety, operation and maintenance information.



RED and the word DANGER – Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



ORANGE and the word WARNING – Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



YELLOW with alert symbol and the word CAUTION – Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.



YELLOW without alert symbol and the word CAUTION – Indicates a potentially hazardous situation which, if not avoided, may result in property damage.



GREEN and the word NOTICE – Indicates operation or maintenance information.

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

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

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

Specifications

Work Height*		50 ft 3 in	15.5 m
Platform Height		44 ft 3 in	13.5 m
Maximum Drive Height		Full Height	
Maximum Outreach		38 ft	11.6 m
Turntable Swing		Continuous	
Jib Range Of Motion		135°	
Platform Rotation		180° (90° Each Side)	
Machine Weight** (Unloaded)		14,100 lb	6,400 kg
Lift Capacity	Up To Serial #14700199	500 lb	227 kg
	From Serial #14700200	600 lb	272 kg
Maximum Occupants		2	
Stowed Height		95 in	2.4 m
Overall Length		28 ft	8.5 m
Overall Width		96 in	2.44 m
Tailswing		35 in	0.9 m
Platform Details	Width	90 in	2.3 m
	Depth	40 in	1 m
	Entry	1 End Swing Gate 2 Slide Bar Entries	
Turning Radius, Inside		6 ft 6 in	2 m
Ground Clearance		13.5 in	34 cm
Lift Speed		40 sec	
Extend Speed		20 sec	
Jib Lift Speed		15 sec	
Drive Speed (Proportional)	Stowed	0-3.5 mph	0-5.5 km/h
	Raised or Extended	0-0.5 mph	0-0.8 km/h
Gradeability	Stowed, Downhill	40%/22°	
	Stowed, Uphill	40%/22°	
Breakover Angle		40%/22°	
Axle Oscillation		10° (5° Each Side)	
Maximum Allowable Operating Wind Speed		28 mph	12.5 m/sec (45 km/h)
Engine		Kubota V1505 - Tier 4 Final	
Fuel Type		Diesel	
Fuel Capacity		16 gal	60 liter
Hydraulic Fluid Capacity		40 gal	150 liter
Maximum Vibration		Does not exceed 8.2 ft/sec^2 (2.5 m/sec^2) at operator's position	
Ambient Operating Range		-20° F min 120° F max	-29° C min 49° C max
Wheel Lug Nut Torque		150 lb-ft	203 Nm

Sound Pressure At Workstation	80 dB(A)	
Sound Power Level	86 dB @ 1m	
Ground Pressure/Wheel (Maximum)	69 psi	4.86 kg/cm^2
Maximum Wheel Load	5869 lb	2662 kg

Meets requirements of ANSI 92.20-2020 and CSA B354.6-2019.

Allowable ambient temperature range: -20° F to 120° F (-29° C to 49°C).
Consult with MEC for operation outside of this range.

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

Bolt Torque Specification - American Standard

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

American Standard Cap Screws								
SAE Grade	**5**				**8**			
Cap Screw Size (inches)								
	Torque				**Torque**			
	Ft-lbs		**Nm**		**Ft-lbs**		**Nm**	
	Min	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**
1/4 - 20	6.25	7.25	8.5	10	8.25	9.5	11	13
1/4 - 28	8	9	11	12	10.5	12	14	16
5/16 - 18	14	15	19	20	18.5	20	25	27
5/16 - 24	17.5	19	12	26	23	25	31	34
3/8 - 16	26	28	35	38	35	37	47.5	50
3/8 - 24	31	34	42	46	41	45	55.5	61
7/16- 14	41	45	55.5	61	55	60	74.5	81
7/16 - 20	51	55	69	74.5	68	75	92	102
1/2 - 13	65	72	88	97.5	86	96	116	130
1/2 - 20	76	84	103	114	102	112	138	152
9/16 - 12	95	105	129	142	127	140	172	190
9/16 - 18	111	123	150	167	148	164	200	222
5/8 - 11	126	139	171	188	168	185	228	251
5/8 - 18	152	168	206	228	203	224	275	304
3/4 - 10	238	262	322	255	318	350	431	474
3/4 - 16	274	302	371	409	365	402	495	544
7/8 - 9	350	386	474	523	466	515	631	698
7/8 - 14	407	448	551	607	543	597	736	809
1- 8	537	592	728	802	716	790	970	1070
1 - 14	670	740	908	1003	894	987	1211	1137

Torque values apply to fasteners as received from the supplier, dry or when lubricated with normal engine oil.

If special graphite grease, molydisulphide grease, or other extreme pressure lubricants are used, these torque values do not apply.

Specific Torque Values for Selected Fasteners					
Location	**Torque**		**Location**	**Torque**	
Lug Nuts	150 Lb-ft	203 N-m	Engine Tray / Battery Tray	140 Lb-ft	190 N-m
Torque Hubs to Yokes, Front	180 Lb-ft	244 N-m	Boom Wear Pads	30 Lb-ft	41 N-m
Torque Hubs to Rear Axle, Rear	180 Lb-ft	244 N-m	Level Cylinder Pin Retainer	20 Lb-ft	27 N-m
Drive Motor to Torque Hub Bolts	60 Lb-ft	81 N-m	Platform Rotator to Spacer/Load Cell	55 Lb-ft	75 N-m
Swing Bearing Bolts on Chassis	180 Lb-ft	244 N-m	Spacer/Load Cell to Platform Mount Weldment	95 Lb-ft	129 N-m
Swing Bearing Bolts on Turret	180 Lb-ft	244 N-m	Platform Rotator Through Bolt & Nut	420-450 Lb-ft	569-610 N-m
--	--	--	Platform Mount Weldment Bolts & Nuts	250-270 Lb-ft	339-366 N-m

Bolt Torque Specification - Metric Standard

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

Metric Cap Screws								
Metric Grade	**8.8**				**10.9**			
Cap Screw Size (Millimeters)								
	Torque				**Torque**			
	Ft-lbs		**Nm**		**Ft-lbs**		**Nm**	
	Min	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**
M6 × 1.00	6	8	8	11	9	11	12	15
M8 × 1.25	16	20	21.5	27	23	27	31	36.5
M10 × 1.50	29	35	39	47	42	52	57	70
M12 × 1.75	52	62	70	84	75	91	102	123
M14 × 2.00	85	103	115	139	120	146	163	198
M16 × 2.50	130	158	176	214	176	216	238	293
M18 × 2.50	172	210	233	284	240	294	325	398
M20 × 2.50	247	301	335	408	343	426	465	577
M22 × 2.50	332	404	450	547	472	576	639	780
M24 × 3.00	423	517	573	700	599	732	812	992
M27 × 3.00	637	779	863	1055	898	1098	1217	1488
M30 × 3.00	872	1066	1181	1444	1224	1496	1658	2027

Torque values apply to fasteners as received from the supplier, dry or when lubricated with normal engine oil.

If special graphite grease, molydisulphide grease, or other extreme pressure lubricants are used, these torque values do not apply.

Specific Torque Values for Selected Fasteners		
Location	**Torque**	
Lug Nuts	150 Lb-ft	203 N-m
Torque Hubs to Yokes, Front	180 Lb-ft	244 N-m
Torque Hubs to Rear Axle, Rear	180 Lb-ft	244 N-m
Drive Motor to Torque Hub Bolts	60 Lb-ft	81 N-m
Swing Bearing Bolts on Chassis	180 Lb-ft	244 N-m
Swing Bearing Bolts on Turret	180 Lb-ft	244 N-m
Swing Drive Bolts	320 Lb-ft	434 N-m
Engine Tray / Battery Tray	140 Lb-ft	190 N-m
Boom Wear Pads	30 Lb-ft	41 N-m
Level Cylinder Pin Retainer	20 Lb-ft	27 N-m
Platform Rotator to Spacer/Load Cell	55 Lb-ft	75 N-m
Spacer/Load Cell to Platform Mount Weldment	95 Lb-ft	129 N-m
Platform Rotator Through Bolt & Nut	420-450 Lb-ft	569-610 N-m
Platform Mount Weldment Bolts & Nuts	250-270 Lb-ft	339-366 N-m

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		SAE ORB Fittings		ORFF Hoses	
	Ft-lbs	Nm	Ft-lbs	Nm	Ft-lbs	Nm
#4	N/A	N/A	26	35	18	24
#6	N/A	N/A	35	46	30	40
#8	25 - 30	31 - 41	60	80	40	54
#10	35 - 40	47 - 54	100	135	60	81
#12	85 - 90	115 - 122	135	185	85	115
#16	130 - 140	176 - 190	175	235	110	149

Boom Support

Supporting The Boom Assembly

WARNING

NEVER PERFORM WORK UNDER THE BOOM ASSEMBLY WITH THE PLATFORM ELEVATED WITHOUT FIRST SUPPORTING THE BOOM ASSEMBLY.

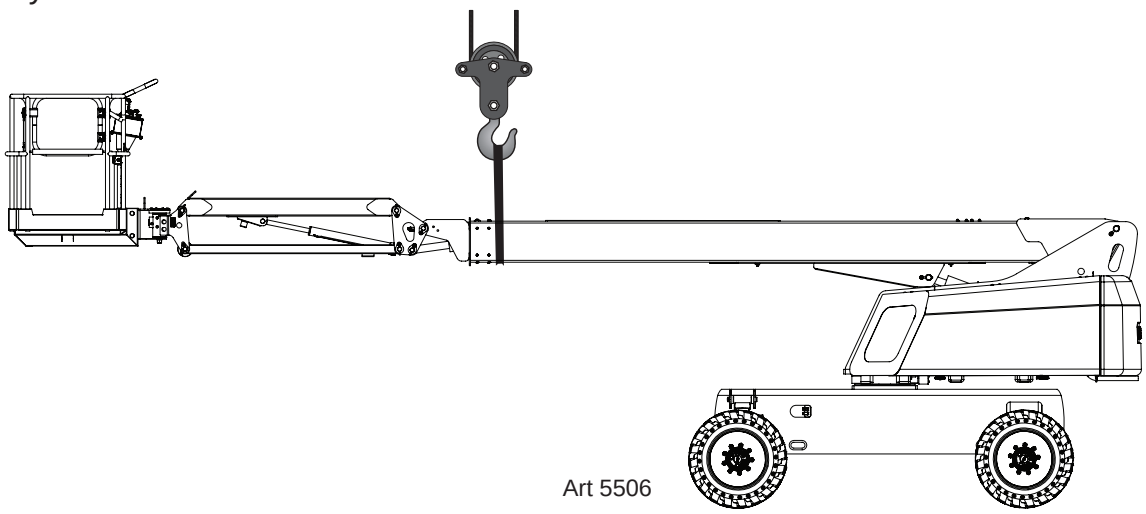
DO NOT work beneath the boom assembly with the platform elevated unless the boom assembly is properly supported.

Use a sling and overhead hoist rated for 3 tons (2,700 kg) or more.

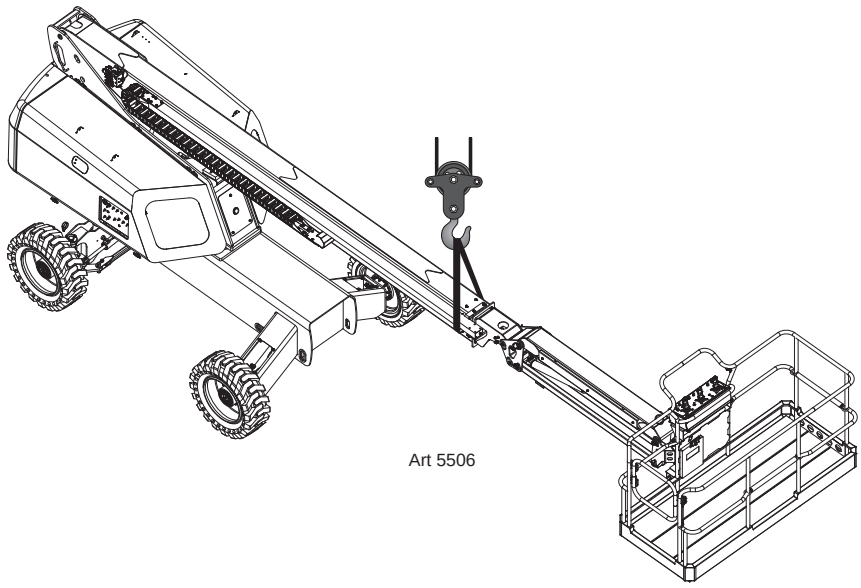
Thread the sling around the boom as shown. Proper sling placement should have the sling up against the cable slide-bracket.

Important: Sling should NOT wrap around the cable track tube, but between it and the boom.

Connect it to the overhead hoist, then lift enough that the weight of the boom assembly is being supported by the hoist.



Art 5506



Art 5506

Hydraulic, Electrical and Total System

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.

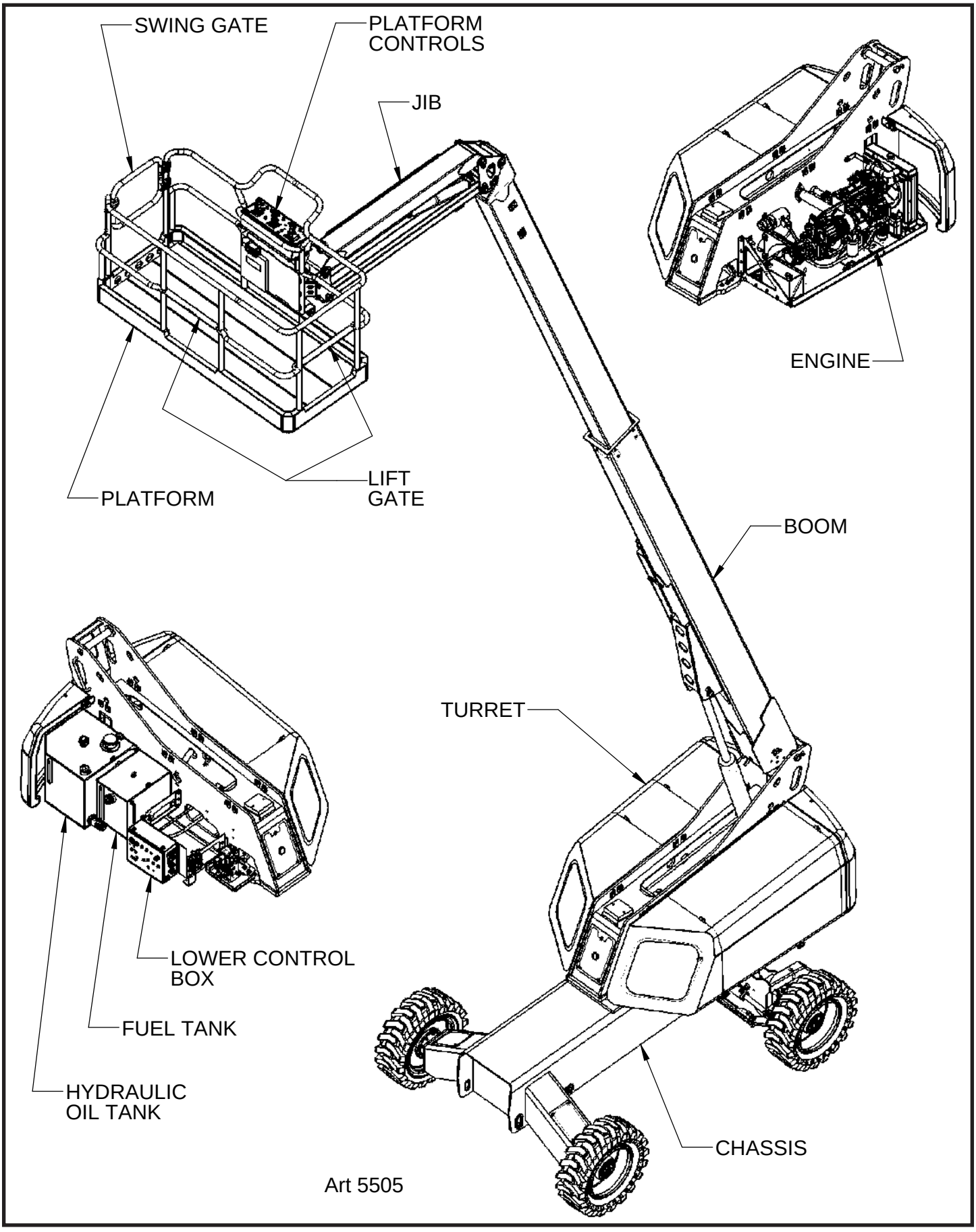
Failure to perform preventive maintenance at recommended intervals may result in the unit being operated with a defect that could result in injury or death of the operator.

CAUTION

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



Emergency Systems and Procedures

DANGER

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



ART_3353

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

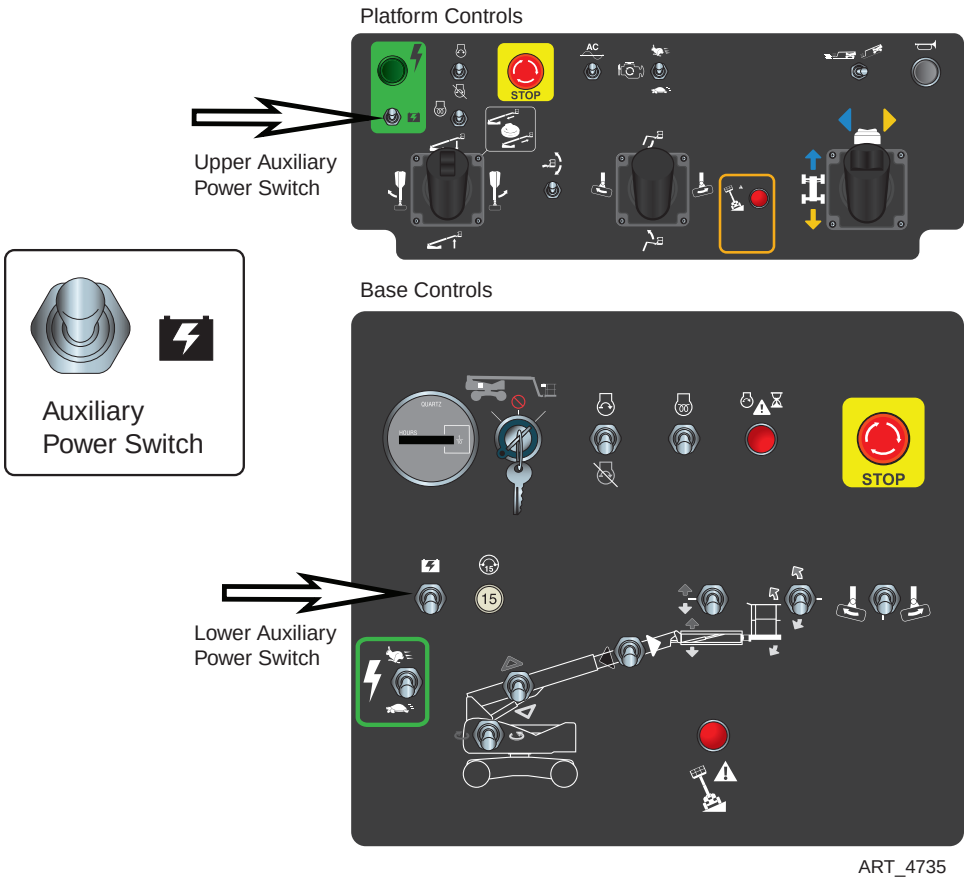
- The upper controls are locked out.
- The lower controls switch must be reset or the machine will not operate.
- The machine will operate from the lower controls if the upper controls switch is tripped.

Auxiliary Power System & Test

WARNING

IF PRIMARY POWER FAILS WHILE THE PLATFORM IS ELEVATED, USE THE AUXILIARY POWER SYSTEM TO SAFELY LOWER THE PLATFORM. DO NOT CLIMB DOWN THE BOOM ASSEMBLY OR EXIT THE PLATFORM WHILE ELEVATED.

ALWAYS CHECK OVER, UNDER AND AROUND THE MACHINE FOR PERSONNEL, STRUCTURES AND OBSTRUCTIONS BEFORE ACTIVATING ANY CONTROL FUNCTION AND CONTINUE TO WATCH FOR HAZARDS WHILE OPERATING THE MACHINE



The Auxiliary Power System is used to lower the platform in case of primary power failure. To lower the platform, activate the Auxiliary Power Switch to run the 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 Auxiliary Power System is disabled when the engine is running.

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

Lift and Support The Machine

DANGER

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

BE SURE THAT THE SURFACE BENEATH THE MACHINE IS CAPABLE OF SUPPORTING THE JACK AND JACK STANDS.

REMOVE ALL MATERIAL, TOOLS AND PERSONNEL FROM THE PLATFORM BEFORE LIFTING.

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

- A jack with a lifting capacity of five (5) tons or more.
- Jack stands with a rating of five (5) 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 Specifications).
5. Remove chocks.

Transportation Instructions

Safety Information

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

WARNING

TRUCK 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).

ONLY PROPERLY TRAINED AND QUALIFIED OPERATORS SHALL LOAD AND UNLOAD THIS MACHINE.

Loading

Free-Wheel Configuration For Winching Or Towing.

RUNAWAY HAZARD!

DANGER

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

ALWAYS CHOCK THE WHEELS BEFORE MANUALLY RELEASING THE BRAKES.

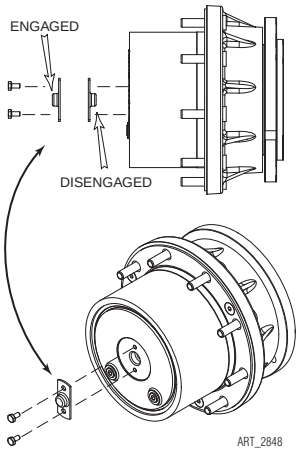
The machine can be winched or towed short distances at speeds not to exceed 5 MPH (8 km/h). Before towing or winching the machine, it is necessary to release the brakes. Reset the brakes after towing or winching.

Disengage Brakes Before Towing Or Winching

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

Engage Brakes Before Driving

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



Driving or Winching onto or off of a Transport Vehicle

Before loading the machine, orient the turntable so that the platform is over the nonsteering wheels so that the Rotation Lock may be engaged later in the loading process.

WARNING

ONLY PROPERLY TRAINED AND QUALIFIED OPERATORS SHALL LOAD AND UNLOAD THIS MACHINE.

READ AND UNDERSTAND ALL SAFETY, CONTROL, AND OPERATING INFORMATION FOUND ON THE MACHINE AND IN THIS MANUAL BEFORE OPERATING THE MACHINE.

WHETHER WINCHING OR DRIVING THE MACHINE ON TO A TRUCK OR TRAILER, ALWAYS CHECK THE AREA FOR DANGEROUS SITUATIONS BEFORE MOVING THE MACHINE.

IF DRIVING THE MACHINE, ALWAYS USE A SECOND PERSON ACTING AS A SPOTTER TO MAKE SURE THE PERSON LOADING THE MACHINE AVOIDS DANGEROUS SITUATIONS.

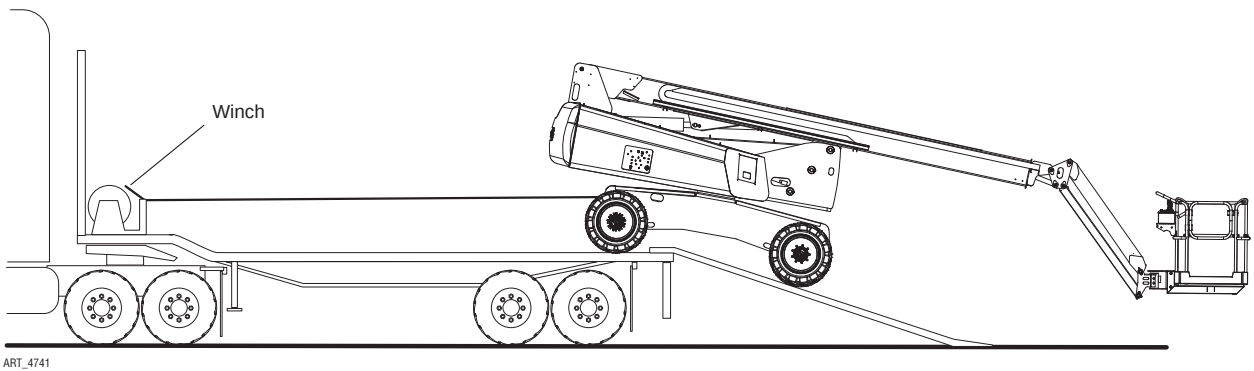
Driving

- Turn the Base Key Switch to PLATFORM. Check that the Emergency Stop Switch is reset by turning it clockwise.
- Enter the platform and reset the Platform Emergency Stop Switch.
- Test platform control functions.
- Raise the jib slightly for platform ground clearance.
- Carefully drive the machine off or on to the transport vehicle.
- Make sure you can see the second person giving guidance.

Note: The brakes are automatically released for driving and will automatically apply when the control lever is returned to neutral which causes the machine to stop.

Winching

- Chock the wheels, then disengage brakes (see Disengage Brakes before Towing or Winching on page 14).
- Carefully operate the winch to lower the machine down the ramp or pull the machine up the ramp.
- Chock the wheels and engage the brakes before disengaging the winch.



Securing To Truck Or Trailer For Transport

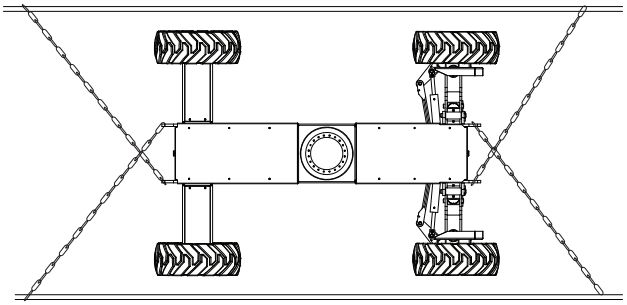
- Turn the key Selector Key Switch to OFF and remove the key before transport.
- Turn the Battery Disconnect Switch to OFF before transport.
- Inspect the entire machine for loose or unsecured items.
- Secure the chassis.
- Engage the Rotation Lock.
- Secure the platform.

Securing The Chassis

Make sure each of your chains is rated to hold the machine's weight (see serial number plate or Specifications). Use at least 4 chains.

Do not attach chain hooks directly to the machine. Loop the chain through the tie-down point and connect the chain hook to the chain.

Be sure chains are arranged so that they do not damage the machine.



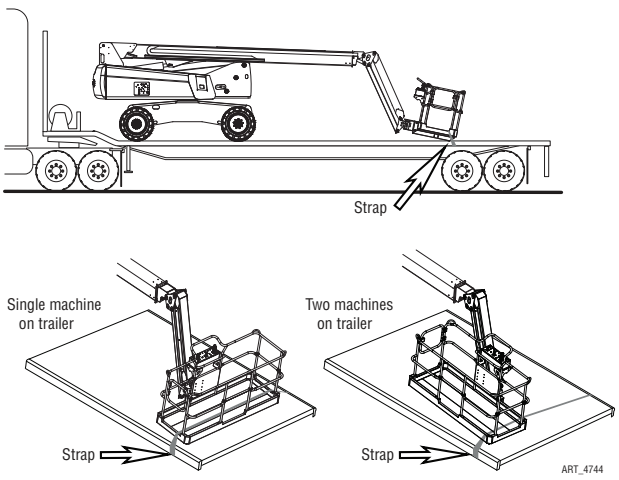
ART_4742

Securing The Platform

With the boom completely stowed, raise the jib slightly, then use the Platform Level function to lower the platform until the front of the platform touches the trailer surface.

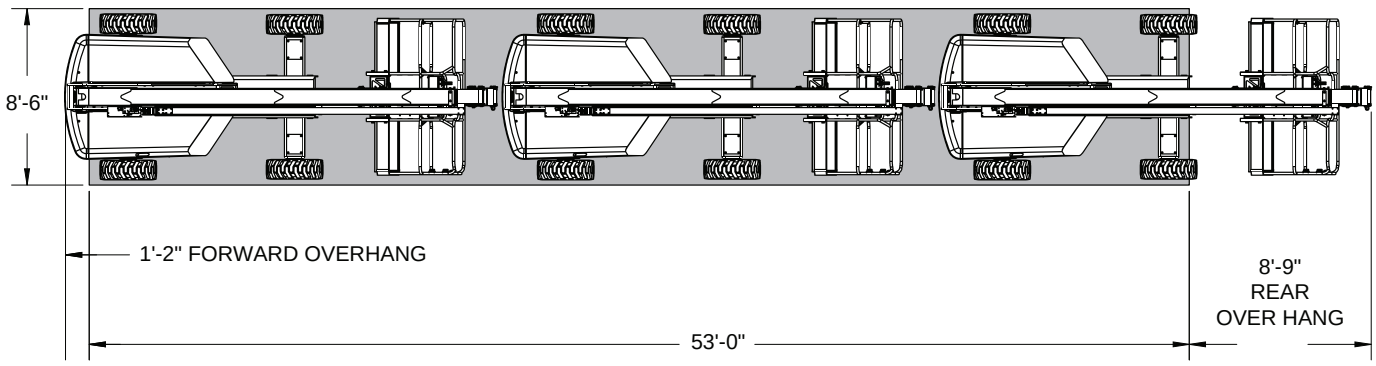
Route the tie-down strap as shown through the width of the platform, over the toe boards of both side entry points. Tighten securely but do not overtighten.

It may be necessary to turn the platform 90 degrees when loading two machines on the same trailer. In this case, route the strap over the toeboard and through the end of the platform as shown.



Loading Three Machines

Three machines may be loaded onto a single 53 ft trailer by rotating the turntable of each machine and rotating the platforms as shown below.



The boom of each machine should be full retracted.

Arrange the machines as shown.

Secure the chassis of each machine as previously instructed on page 16.

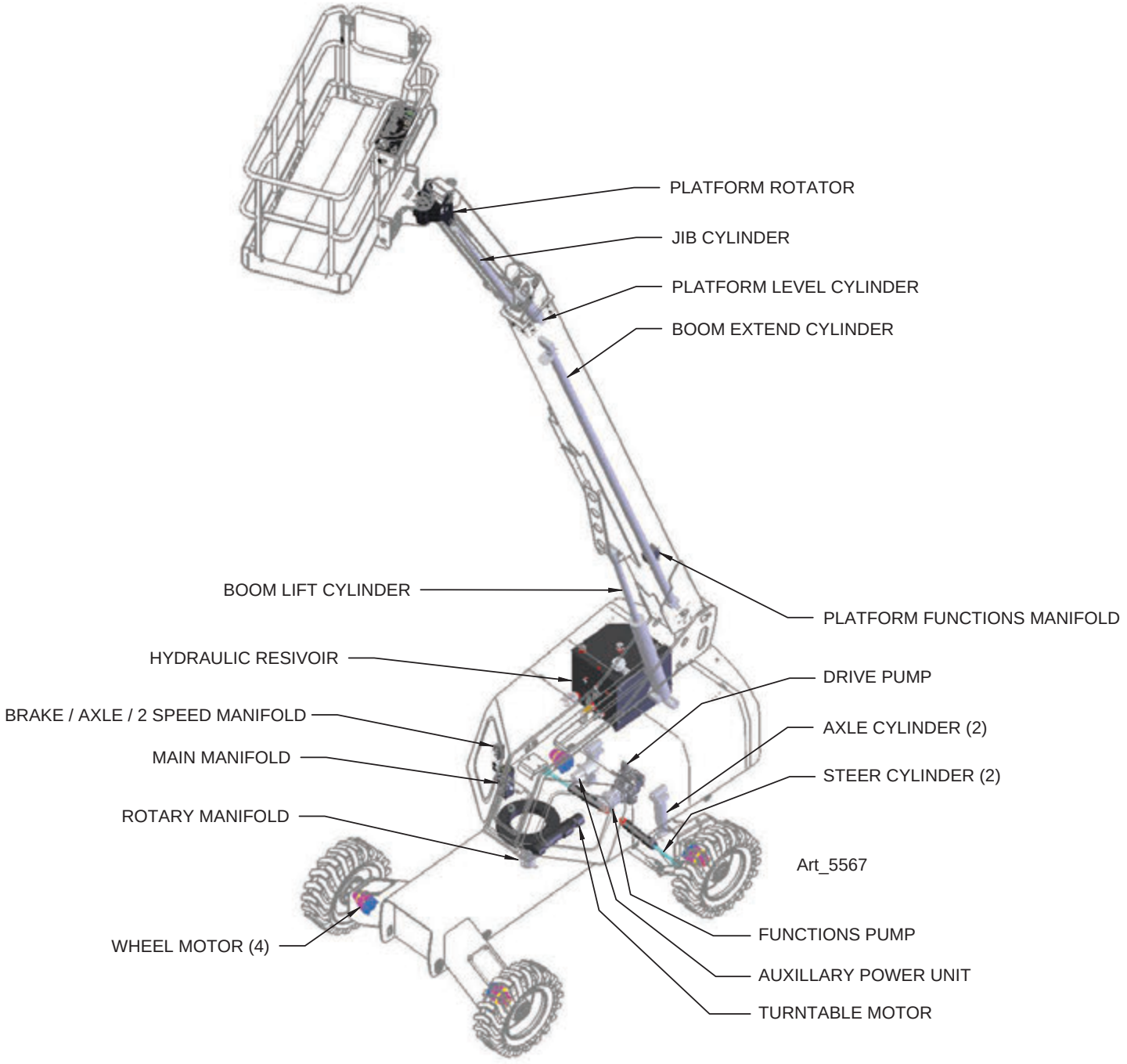
Secure the platform of each machine as previously instructed on page 16.

Hydraulic System – General

The hydraulic 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 coupled to the engine and 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 wheel motors and valve manifolds.

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



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.

Drive Pump

- The closed-loop hydrostatic piston-type Drive Pump with infinitely variable proportional control delivers hydraulic fluid under pressure to the Wheel Motors.

Functions Pump

- The gear-type Functions Pump delivers hydraulic fluid under pressure to the Functions Manifold and provides pressure to the platform and turntable functions, in addition to controlling the axle cylinders and the brakes.

Main Manifold

- The Main Manifold directs the hydraulic fluid to the Boom Lift, Boom Extend and Steering Cylinders, as well as fluid flow to the Platform Functions Manifold, through the use of electronically-operated solenoid valves.

Brake/Axle/2-Speed Manifold

- The Brake/Axle/2-Speed Manifold directs the hydraulic fluid to the Axle Cylinders, the Brake Release function and the 2-Speed Pilot function through the use of electronically-operated solenoid valves.

Platform Functions Manifold

- The Auxiliary Manifold provides hydraulic control to the Platform Level, Platform Rotate and Jib functions.

Turntable Motor

- One hydraulic motor turns the turntable, boom and platform in relation to the chassis.

Rotary Manifold

- The Rotary Manifold provides hydraulic connection between the turntable and chassis and allows continuous rotation of the turntable.

Wheel Motors/Brake Hubs

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

Axle Cylinders

- Two hydraulic cylinders control angle of steering axle relative to the frame. The axle cylinders move freely and allow the axle to float when driving over rough terrain when the platform is stowed. When platform is elevated or extended, the axle cylinders lock in place to increase machine stability. Each cylinder has an integral counterbalance valves for load-holding.

Steer Cylinders

- This machine has two Steer Cylinders that control the angle of the steerable wheels.
- Steering is not self-centering.

Boom Lift Cylinders

- Two hydraulic lift cylinders raise and lower the boom assembly in sequence.

Boom Extend Cylinder

- One hydraulic cylinder extends and retracts the upper boom.

Platform Level Cylinder

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

Platform Rotator

- One rotary hydraulic actuator rotates the platform 90° either side of the centered position.

Jib Cylinder

- One hydraulic cylinder raises and lowers the jib.

Auxiliary Power Unit

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

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.

WARNING

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 Chevron 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.

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” above.
9. Loosen the output hose fittings at the hydraulic pumps to flood with hydraulic fluid. Tighten fittings.
10. Disconnect the wiring harness lead to the Fuel Solenoid on the engine.
11. Crank the engine for 5 seconds, then stop for 30 seconds. Do this three times.
12. Reconnect the wiring harness lead to the Fuel Solenoid on the engine.
13. Start the engine and allow it to run for one minute, then briefly operate all functions. Two or three

complete cycles may be necessary to purge all air from Boom Lift and Boom Extend cylinder(s).

14. When the above procedures have been completed, lower the platform to the stowed position, then fill hydraulic reservoir to the full mark on sight gauge.
15. 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.

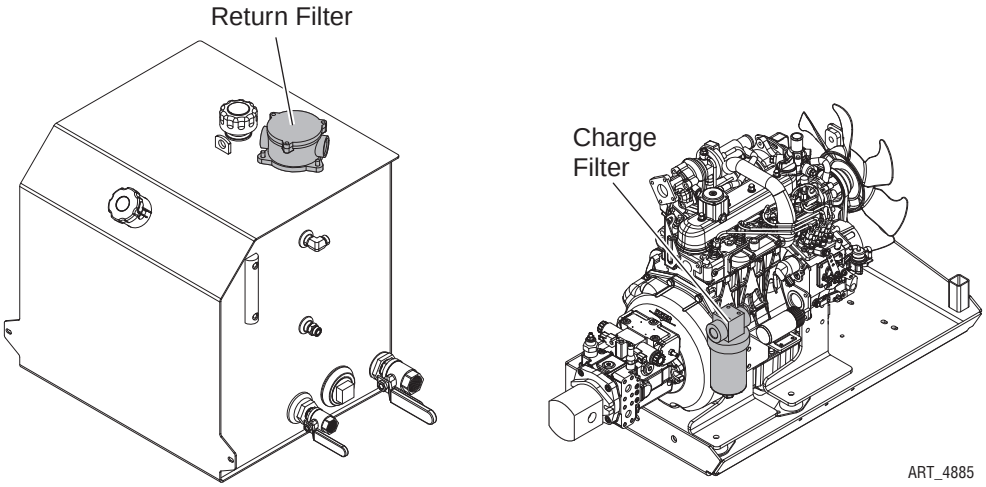
Hydraulic Filters

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

The Hydraulic Fluid Reservoir contains a return filter and a charge filter.

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.



Hydraulic Pumps

Note: Refer to Section 25 - Hydraulics.

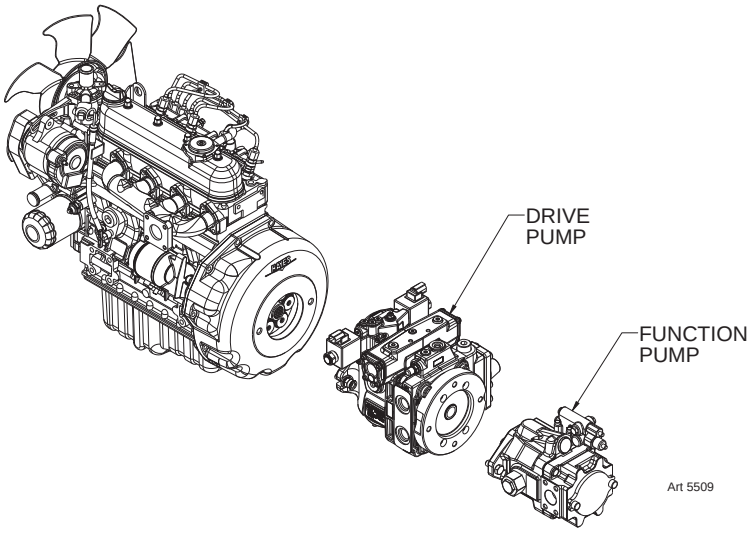
An internal combustion engine drives the Drive and Functions Pumps.

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 variable displacement pump that provides hydraulic power to the Functions Manifold.

Remove

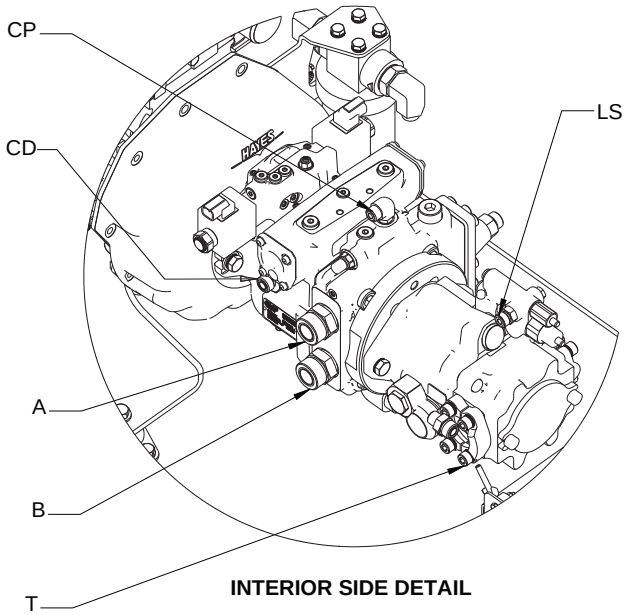
1. Disconnect the battery.
2. Place a large container under the engine and pumps to catch fluid that will be lost during pump replacement. Dispose of used fluid properly.
3. Close the ball valve(s) on the Hydraulic Tank to prevent fluid loss when the hoses are removed.
4. Tag and disconnect hydraulic hoses, and IMMEDIATELY cap or cover the openings to prevent contamination.
5. Remove the bolts that secure the Functions Pump. Remove the pump.
6. Remove the bolts that hold the Drive Pump to the engine. Remove the pump.
7. Installation is reverse of removal. Apply one (1) drop of Loctite® 242 or equivalent to each mounting bolt.
8. Open the ball valves on the Hydraulic Tank.
9. Loosen the output hose fittings at the hydraulic pumps to flood with hydraulic fluid. Tighten fittings.



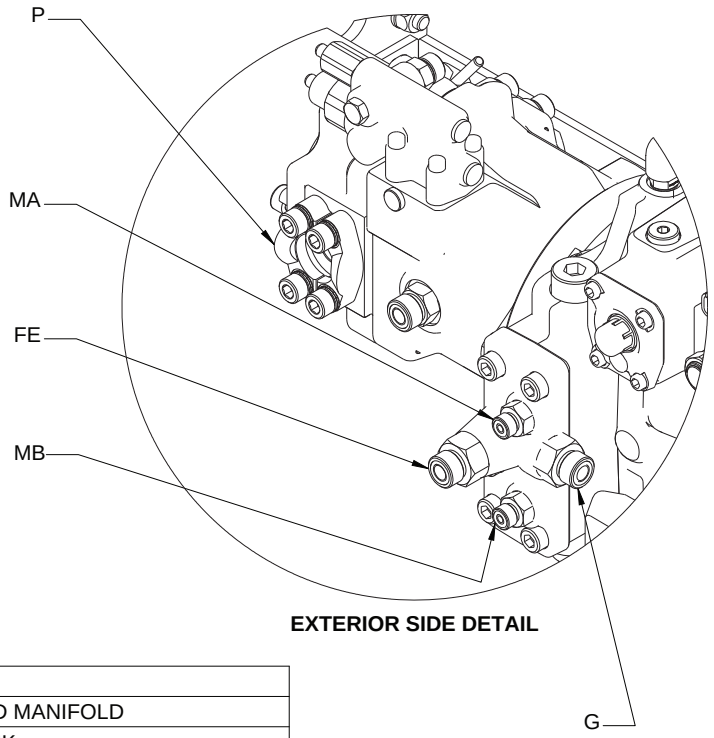
CAUTION

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

DO NOT operate the hydraulic pump until you have filled them with fluid and bled all air out of them. Severe damage will occur.



INTERIOR SIDE DETAIL



EXTERIOR SIDE DETAIL

PORT	CONNECTION
CP	OUTPUT TO 2-SPEED MANIFOLD
CD	CASE DRAIN TO TANK
A	OUT TO ROTARY MANIFOLD
B	OUT TO ROTARY MANIFOLD
T	FUNCTION PUMP SUCTION IN FROM TANK
LS	TO MAIN MANIFOLD
P	FUNCTION PUMP OUTPUT TO MAIN MANIFOLD
MA	OUT TO ROTARY MANIFOLD PORT
MB	OUT TO ROTARY MANIFOLD PORT
FE	OUT TO CHARGE FILTER
G	IN FROM CHARGE FILTER

Art_5510

Drive Pump

The Drive Pump provides fluid to power the machine's Drive Function.

The Drive Pump must be filled with fluid and all air bled out any time the pump is removed and re-installed, or drained of fluid for any reason. To prime the pump, loosen the output hose fittings at the hydraulic pumps to flood with hydraulic fluid. Tighten fittings.

Drive Pump Service

MEC does not recommend end-user maintenance or repair of the Drive Pump on the 45-J machines. Contact MEC for the nearest service provider.

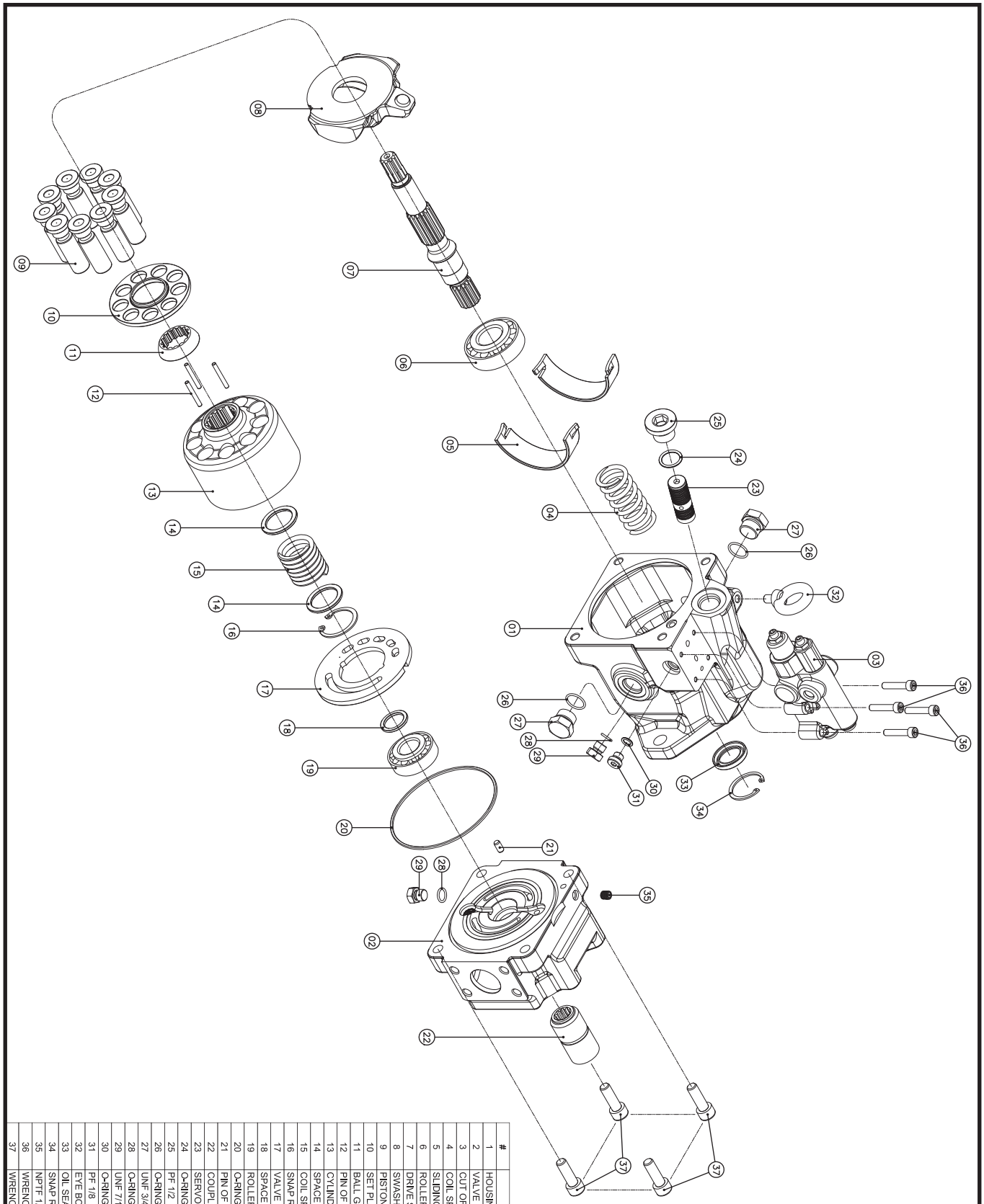


ILLUSTRATION No.
Art_5706

#	PART NAME	QTY.
1	HOUSING	1
2	VALVE BLOCK	1
3	CUT OFF VALVE ASEMBLY	1
4	COIL SPRING OF SWASH PLATE	1
5	SLIDING BEARING	2
6	ROLLER BEARING	1
7	DRIVE SHAFT	1
8	SWASH PLATE	1
9	PISTON ASSEMBLY	9
10	SET PLATE	1
11	BALL GUIDE	1
12	PIN OF CYLINDER BLOCK	3
13	CYLINDER BLOCK	1
14	SPACE OF CYLINDER BLOCK	2
15	COIL SPRING OF CYLINDER BLOCK	1
16	SNAP RING	1
17	VALVE PLATE 4.5t	1
18	SPACE OF DRIVE SHAFT	1
19	ROLLER BEARING	1
20	O-RING OF VALVE BLOCK	1
21	PIN OF VALVE BLOCK	1
22	COUPLING	1
23	SERVO PISTON	1
24	O-RING	1
25	PF 1/2	2
26	O-RING	2
27	UNF 3/4	2
28	O-RING	2
29	UNF 7/16	2
30	O-RING	1
31	PF 1/8	1
32	EYE BOLT	1
33	OIL SEAL	1
34	SNAP RING	1
35	NPTF 1/16	1
36	WRENCH BOLT	1
37	WRENCH BOLT	1

Functions Pump

The Functions Pump is a variable-displacement open loop load sense pump. The pump creates only the oil flow necessary with the load sense signal determining pump demand.

The Functions Pump must be filled with fluid and all air bled out any time the pump is removed and re-installed, or drained of fluid for any reason. To prime the pump, loosen the output hose fittings at the hydraulic pumps to flood with hydraulic fluid. Tighten fittings.

Hydraulic Manifolds

Note: Refer to Section 25 - Hydraulics.

This machine has three hydraulic valve manifolds: the Main Functions Manifold, the Brake/Axle/2-Speed Manifold and the Boom Functions Manifold.

Additional hydraulic manifolds include the Brake and Steering junction blocks at the steering end of the chassis and the Rotary Manifold provides hydraulic connection between the turntable and chassis and allows continuous rotation of the turntable.

CAUTION

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 valves 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. Tag and remove coils from solenoid valves.
2. Tag and mark and remove valves.
3. Tag and 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 Orings, 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 valves on the Hydraulic Tank.

CAUTION **Failure to open the ball valves 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.

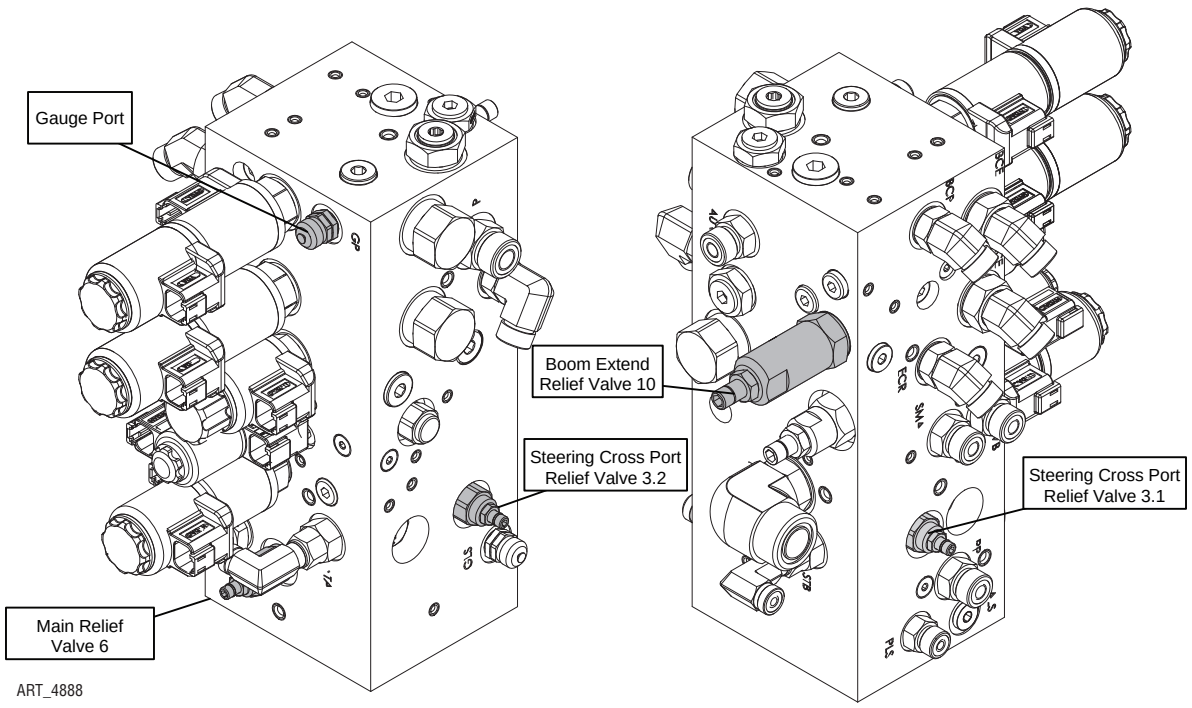
Hydraulic Pressure Adjustment

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 to normal operating temperature.

Insert a 0-5000 psi gauge onto the appropriate pressure test port GP using gauge adapter fitting MEC part no. 50974.

45-J Diesel Pressure Settings				
System	**Setting**		**Adjustment**	**Gauge Port**
Main Functions Manifold Relief	3000 psi	207 bar	@ Primary Functions Pump	GP
Crossport Steering Relief	1500 psi	103 bar	@ Primary Functions Pump	
Extend Relief	1500 psi	103 bar	RV1	

Adjusting Relief Valves



System pressures should be checked and adjusted during routine maintenance to ensure proper machine performance

Counterbalance Valves

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

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

Main Relief Valve Pressure 6

Park the machine on a firm level surface free from overhead obstructions.

Primary Manifold Pressure should be set to 3000 psi (207 bar).

- Insert a 0-5000 psi gauge into the port GP of the Main Functions Manifold.
- Loosen the lock nut on the Main Relief Valve on the Main Functions Manifold.
- **With no load on platform**, use the Boom Retract function to retract the boom completely.
- Press and hold the Boom Retract 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.
- Tighten the lock nut on the valve.

Steering Cross Port Relief Valves 3.1, 3.2

Park the machine on a firm level surface free from obstructions.

The Steering Cross Port Relief Valves (3.1 and 3.2) should be set to 1500 psi (103 bar).

- Insert a 0-5000 psi gauge into the port GP of the Main Functions Manifold.
- Loosen the lock nuts on Steering Cross Port Relief Valves 3.1 and 3.2 on the Main Functions Manifold.
- Steer the wheels fully left. Hold the switch for 10 seconds. This is the reading for valve 3.1.
- If pressure is LOW, adjust Valve 3.1 ¼ turn clockwise and recheck.
- If pressure is HIGH, adjust Valve 3.1 ¼ turn counterclockwise and recheck.
- Steer the wheels fully right. Hold the switch for 10 seconds. This is the reading for valve 3.2.
- If pressure is LOW, adjust Valve 3.2 ¼ turn clockwise and recheck.
- If pressure is HIGH, adjust Valve 3.2 ¼ turn counterclockwise and recheck.
- Tighten the lock nuts on the valves.

Boom Extend Relief 10

Park the machine on a firm level surface free from overhead obstructions.

The Boom Extend Relief Valve (10) should be set to 1500 psi (107 bar).

- Insert a 0-5000 psi gauge into the port GP1 of the Functions Manifold.
- Loosen the lock nut on the Boom Extend Relief Valve on the Main 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 Boom Extend Relief Valve ¼ turn clockwise and recheck.
- If pressure is HIGH, adjust Boom Extend Relief Valve ¼ turn counterclockwise and recheck.
- Repeat until correct.
- Tighten the lock nut on the valve.

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.

WARNING

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

CAUTION

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.

Inspect each Drive Motor for damage prior to installation. Use only the appropriate hydraulic fluid as recommended in “Fluid Recommendations” on page 21.

1. Fill the reservoir with the appropriate hydraulic fluid as recommended in “Fluid Recommendations” on page 21. 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. Reconnect all hoses.
4. Disconnect the wiring harness lead to the Fuel Solenoid on the engine.
5. Crank the engine for 5 seconds, then stop for 30 seconds. Do this three times.
6. Reconnect the wiring harness lead to the Fuel Solenoid on the engine.
7. Start the engine and allow it to run for one minute, then test the Drive Function for proper operation.

Repair

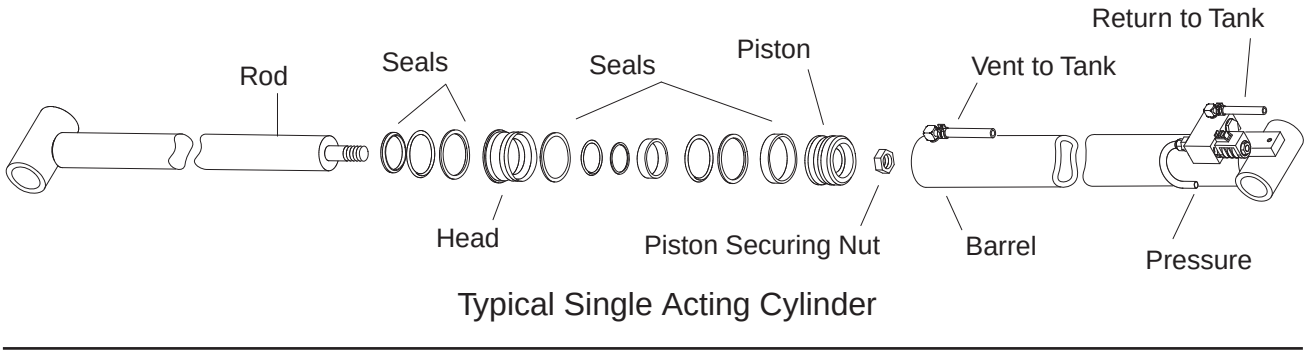
MEC does not recommend end-user maintenance or repair of the drive motors or drive pump. Contact MEC for the nearest service provider or replacement.

General Cylinder Repair

WARNING

WHEN REMOVING ANY HYDRAULIC CYLINDER, ENSURE THAT THE COMPONENTS IT SUPPORTS ARE THEMSELVES SECURELY SUPPORTED PRIOR TO BEGINNING ANY REMOVAL.

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



Typical Single Acting Cylinder

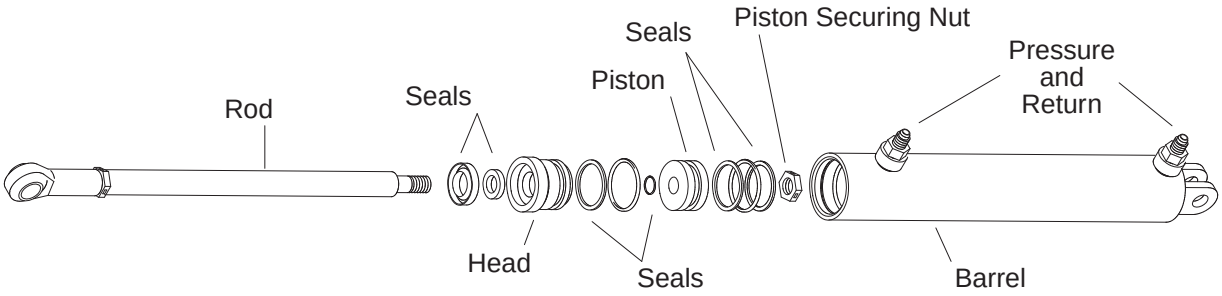


ILLUSTRATION No.
ART_2040

Typical Dual Acting Cylinder

Removal

Note: Refer to Section 18 - Mechanical Components 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 18 - Mechanical Components.

Preparation

CAUTION

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

1. Drain all fluid from cylinder.
2. Clean all dirt and grit from outside of cylinder.

3. Insert cylinder into vise. Do not over clamp the cylinder or damage will result.

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

Cylinder Disassembly

1. Mark and remove solenoid valves or counterbalance valves, if the cylinder is equipped with them.
2. Remove the head from the cylinder body using special spanner tool.
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.

Some pistons may be threaded onto the end of the rod and secured with a set screw. Remove the set screw before attempting to remove the piston to avoid damage to the rod and piston.

6. Remove all seals from the head and piston using a non-sharp seal tool. These tools are available from various seal suppliers or tool stores.
7. Clean all fluid and debris off of the head, piston, shaft, collar and barrel using solvent, rags, and an air hose.
8. Inspect parts for scratches, pits or polishing. Check seal groves and sealing surfaces.
   a. Scratches or pits deep enough to catch the fingernail are unacceptable; replace the cylinder.
   b. Polishing is a sign of uneven loading. Check for roundness. If a polished surface is not round within .007 in. (0.18 mm) replace the cylinder.

Cylinder Assembly

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.

CAUTION **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 N-m).

On pistons with set screws, tighten the set screw.

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.

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 located at each control station.

Lower Controls

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

Upper Controls

The upper controls 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, turntable rotate, platform rotate, jib and drive functions are proportional and are controlled by position and direction of the upper controls joysticks.

Emergency Stop



ART_3353

There are two red Emergency Stop switches, one located on the upper controls and one on the lower controls. 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.

When operating from the lower controls station, only the lower Emergency Stop switch affects machine operation. Activation of the lower Emergency Stop switch in this situation will immediately cut electrical power to all controls and stopping all machine functions.

When operating from the upper controls, activation of either Emergency Stop switches will immediately cut electrical power to all controls and stopping all machine functions.

Note: Both switches must be set or the machine will not operate from the upper controls.

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

Auxiliary Power System

The Auxiliary Power System is used to lower the platform in case of power failure. To lower the platform, activate the Auxiliary Power Switch to run the 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.

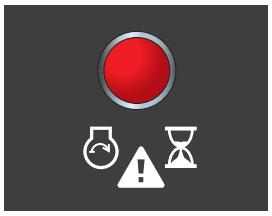
Note: The Auxiliary Power System is disabled when the engine is running.

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

Diagnostic LED & EZ-Cal Diagnostic Tool

If the machine fails to operate, inspect the GP400/GP500 Module located inside the lower control box. The LED located on the processor should be ON. If the LED is OFF or FLASHING, refer to Section 19 - Troubleshooting. This section also contains instructions on the use of the EZ-Cal diagnostic tool.

Starter Circuit Cutout



ART_3342

This light has 2 functions.

1. To protect the starter motor, power cuts 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 reengages after 30 seconds.
2. Functions as Engine ECU Fault Code indicator. The light will Flash Engine Fault Code.

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.

DANGER

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.

WARNING

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.

One 12 Volts DC battery supplies the electrical power required to start the engine and\ to operate the electrical circuits. An optional second may be present in machines to provide additional 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)

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.

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.**

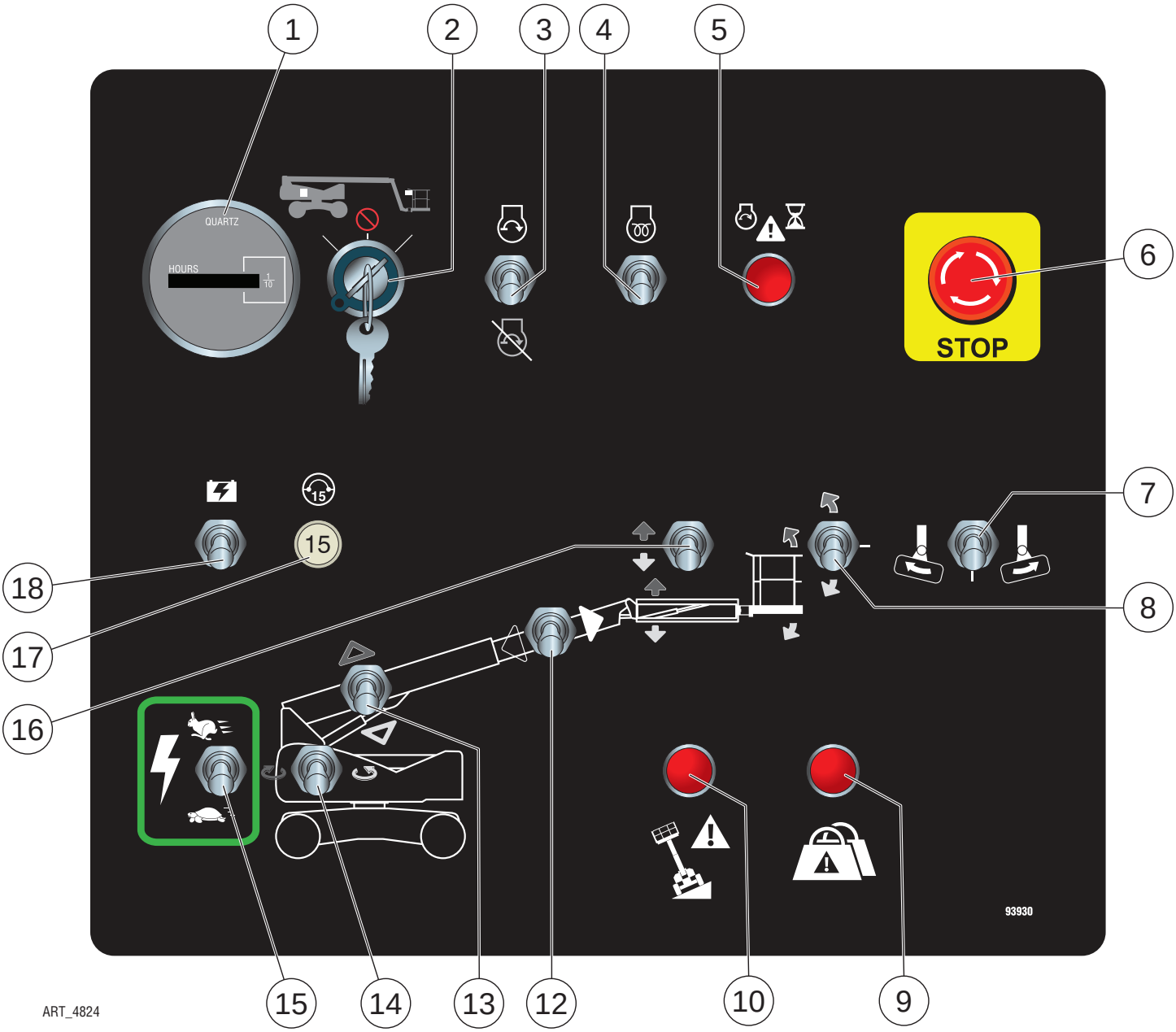
To Remove A Battery:

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.

Lower Controls

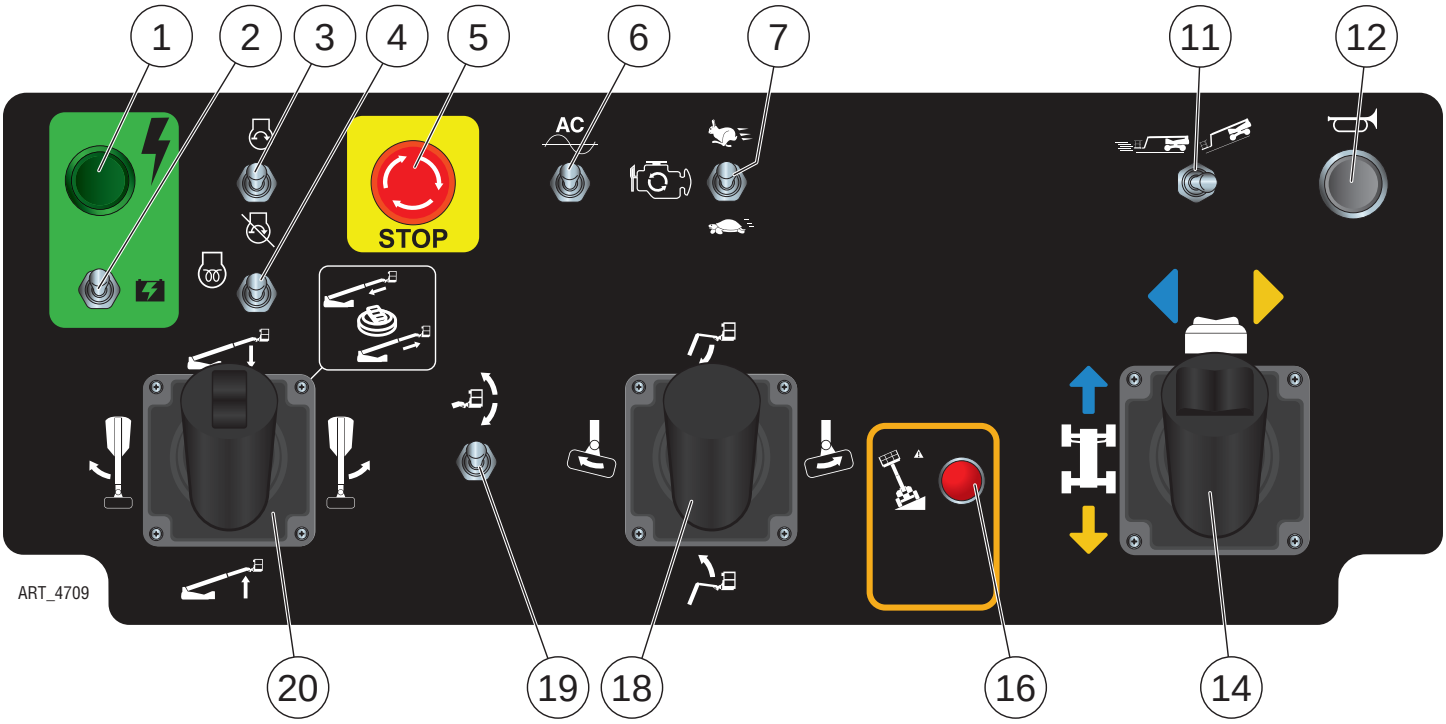


WARNING

ALWAYS CHECK OVER, UNDER AND AROUND THE MACHINE FOR PERSONNEL, STRUCTURES AND OBSTRUCTIONS BEFORE ACTIVATING ANY CONTROL FUNCTION AND CONTINUE TO WATCH FOR HAZARDS WHILE OPERATING THE MACHINE

#	CONTROL	DESCRIPTION	
1	Hour Meter	Indicates total elapsed time of machine operation.	
2	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.
3	Start/Stop Switch	Push switch up to start engine. Push switch down to stop engine.	
4	Glow Switch	Press this switch up to activate glow plugs prior to starting.	
5	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 15 seconds without the engine starting. The starter functions resets after approximately 30 seconds. When blinking, functions as an Engine ECU Fault Code indicator.	
6	Emergency Stop Switch	Press the EMERGENCY STOP switch at any time to stop all machine functions. Turn switch clockwise to reset.	
7	Platform Rotate Switch	Press and hold the Function Enable Switch (#15), then move this switch left to rotate the platform clockwise. Press and hold the Function Enable Switch (#15), then move this switch right to rotate the platform counterclockwise.	
8	Platform Level Switch	Press and hold the Function Enable Switch (#15), then move this switch up to manually level the rear of the platform upward. Press and hold the Function Enable Switch (#15), then move this switch down to manually level the rear of the platform downward.	
9	Overload Indicator Light -- Optional Overload Sensing System Only	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.	
10	Tilt Indicator Light	This light illuminates and an alarm sounds when the machine is not level. Follow the instructions in the operator's manual to safely lower the platform.	
11	--	--	
12	Boom Extend/ Retract	Press and hold the Function Enable Switch (#15), then move this switch right to extend the boom. Press and hold the Function Enable Switch (#15), then move this switch left to retract the boom.	
13	Boom Lift/Lower	Press and hold the Function Enable Switch (#15), then move this switch up to lift the boom. Press and hold the Function Enable Switch (#15), then move this switch down to lower the boom.	
14	Turntable Rotate	Press and hold the Function Enable Switch (#15), then move this switch left to rotate the turntable clockwise. Press and hold the Function Enable Switch (#15), then move this switch right to rotate the turntable counterclockwise.	
15	Function Enable Switch	Press and hold this switch to enable boom, turntable and platform operations. Press down to operate the controls at slow speed. Press up to operate the controls at higher speed.	
16	Jib Lift/Lower	Press and hold the Function Enable Switch (#15), then move this switch up to lift the jib. Press and hold the Function Enable Switch (#15), then move this switch down to lower the jib.	
17	Circuit Breaker	Trips when there is excessive electrical load. Push to reset.	
18	Auxiliary Power Switch	If normal power fails, press and hold while using boom retract and boom lower functions.	

Platform Controls



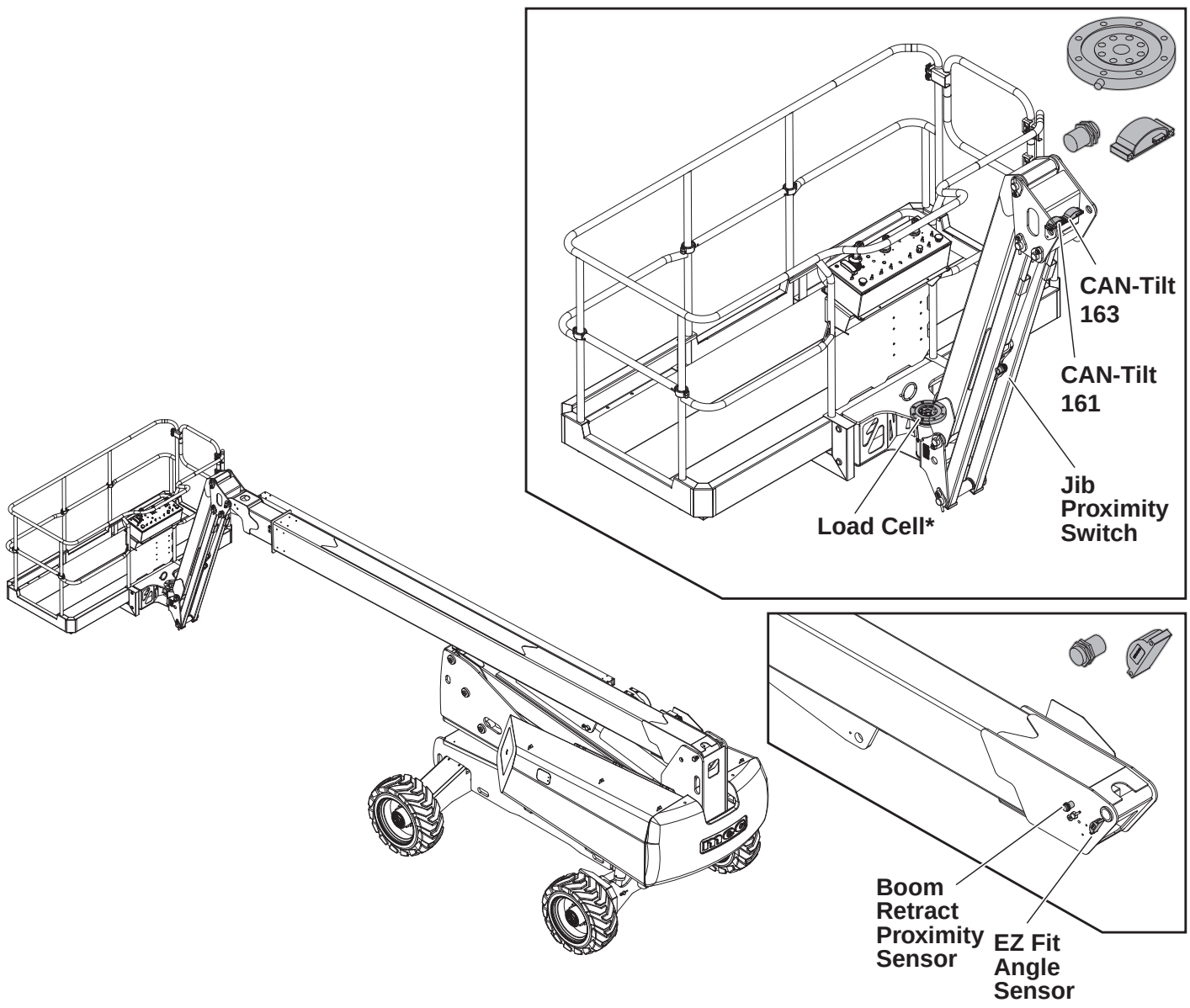
WARNING

ALWAYS CHECK OVER, UNDER AND AROUND THE MACHINE FOR PERSONNEL, STRUCTURES AND OBSTRUCTIONS BEFORE ACTIVATING ANY CONTROL FUNCTION AND CONTINUE TO WATCH FOR HAZARDS WHILE OPERATING THE MACHINE

#	Control	Description
1	Function Enable Button	Press and hold this button to enable boom and platform operations.
2	Auxiliary Power	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 clockwise to reset.
6	Generator Switch (Optional)	Turn switch ON to engage optional AC generator. Generator switches off when any other function is enabled.
7	Engine Speed Select Switch	Use this switch to set the engine speed when functions are enabled. Setting this switch to low idle speed allows the operator to move the machine slowly and precisely. Move this switch up for high idle speed and fast function speed. Move this switch down for low idle speed and slow function speed.
8	--	--
9	--	--
10	--	--
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.

13	--	--	
14	Drive/Steer Control Lever	Depending on the position of the turntable, 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 chassis. Be sure to check the arrows on the chassis before using the Drive or Steer functions.	
		Drive Function	Depress the enable bar on front of the control lever, then push the control lever forward or backward to drive the machine.
		Steer Function	Depress the enable bar on front of the control lever, then press the thumb switch on top of the control lever to steer left or right.
15	--	--	
16	Tilt Indicator Light	This light illuminates and an alarm sounds when the machine is not level. Follow the instructions in the operator's manual to safely lower the platform.	
17	--	--	
18	Jib/Platform Control Lever	Jib Lift/Lower Function	Depress the enable bar on front of the control lever, then pull the control lever backward to lift the jib. Depress the enable bar on front of the control lever, then push the control lever forward to lower the jib.
		Platform Rotate Function	Depress the enable bar on front of the control lever, then push the control lever right to rotate the platform counterclockwise. Depress the enable bar on front of the control lever, then push the control lever left to rotate the platform clockwise.
19	Platform Level Switch	Press the Function Enable Button (#1) to enable this function, then press this switch up to manually level the platform upward or down to manually level the platform downward.	
20	Boom/Turntable Control Lever	Turntable Rotate Function	Depress the enable bar on front of the control lever, then push the control lever to the left to rotate the turntable clockwise or right to rotate the turntable counterclockwise.
		Boom Lift/Lower Function	Depress the enable bar on front of the control lever, then pull the control lever back to elevate the boom. Depress the enable bar on front of the control lever, then push the control lever forward to lower the boom.
		Boom Extend/ Retract Function	Depress the enable bar on front of the control lever, then push the thumb switch on top of control lever back to extend the boom. Depress the enable bar on front of the control lever, then push the thumb switch forward to retract the boom.

Sensors



***Optional Overload Sensing System component**

ART_4889

Platform Load Cell

On machines equipped with the optional Overload Sensing System, there is one Load Cell sensor located between the platform mounting bracket and the platform rotator. The Load Cell senses the weight of the platform contents and stops operation of the machine if the platform is overloaded.

Platform Level CAN-Tilt Sensors

There are two CAN-Tilt Sensors located on the Platform Level bell crank. These sensors detect the level state of the platform and communicate with the control system to keep the platform level during boom operation.

CAN-Tilt Angle Transducers **are not** interchangeable. Each is identified by number for communication with the GP400/GP500 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.

Jib Proximity Switch

The Jib Proximity Switch senses when the jib is close to its fully lowered and raised position and slows down jib motion.

EZfit Angle Sensors

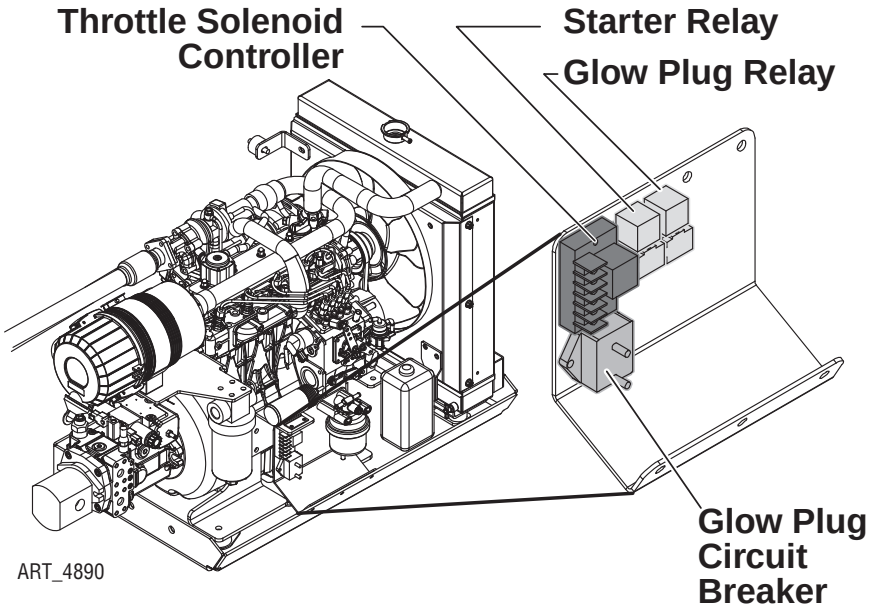
There are two EZfit Angle Sensors. One is located at the base of the main boom while the other is mounted on the lower boom.

The EZfit Angle Sensors measure the absolute angle of the boom sections relative to level.

Boom Retract Proximity Sensor

The Boom Retract Proximity Sensor detects when the boom is fully retracted.

Relays



Engine Relays

The Engine Relays are located beside the engine on the exterior edge of the Engine Tray. These relays convert GP400/GP500 signals into engine operational functions (e.g., start and stop). Refer to the Section 20 - Schematics for relay functions and interconnect.

Start Relay

Provides power to the starter solenoid.

Glow Plug Relay

Provides power to the diesel engine glow plugs.

Throttle Solenoid Controller

Provides power to the electric throttle solenoid.

Glow Plug Circuit Breaker

Provides over-amperage protection for the Glow Plug wiring.

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 GP400 inside the Lower Control Box).

To Correct: Manually lower the platform using the Level toggle switch and enable or retract and lower the boom until the platform is in the stowed position. Move the machine to a firm level surface before repositioning the platform.

Overload Alarm

On machines equipped with the optional Overload Sensing System, 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.

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.

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

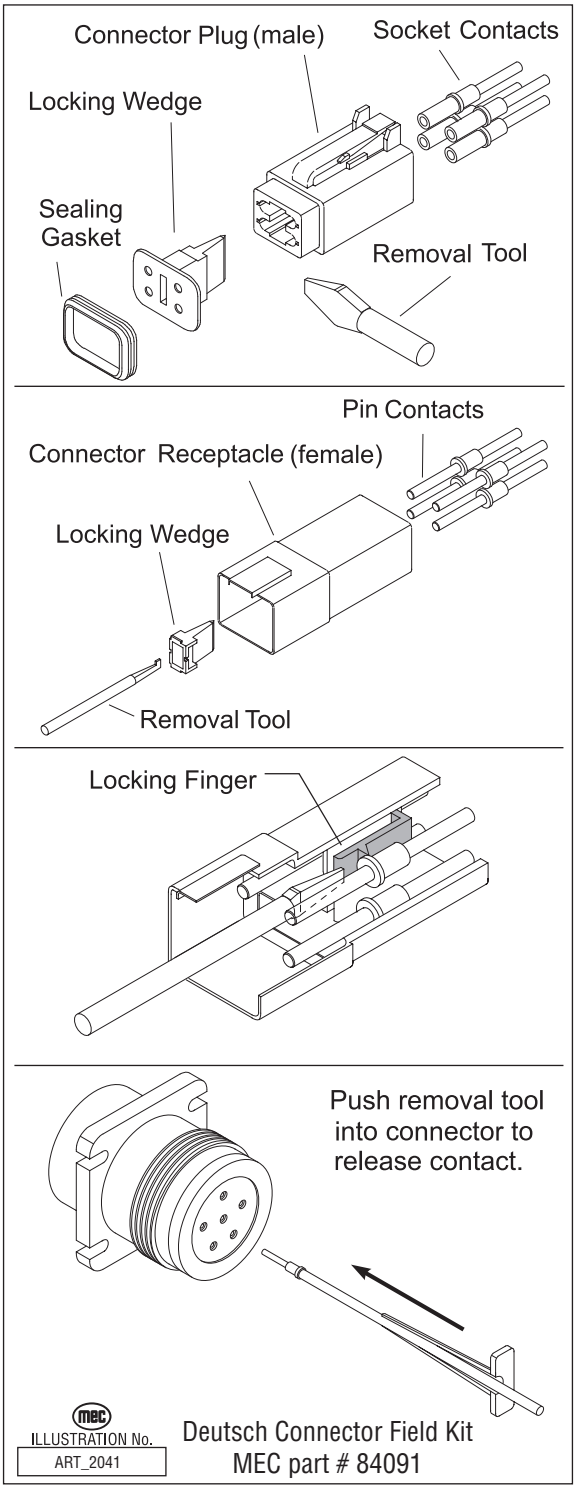
- Remove the Locking Wedge as outlined above.
- Using the Removal Tool or a flat blade screwdriver, push the Locking Fingers aside to release the contact.
- Pull the wire and contact out of the connector.

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

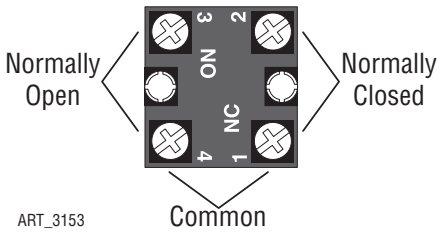
- Strip 1/4 in. (6 mm) insulation from the wire.
- Insert the contact into the crimping tool and insert the stripped wire into the contact making sure no wires are outside the contact barrel.
- Close the handles of the crimping tool, then release the handles to remove the crimped contact.



Continuity Checks

Selector Switch – On-Off

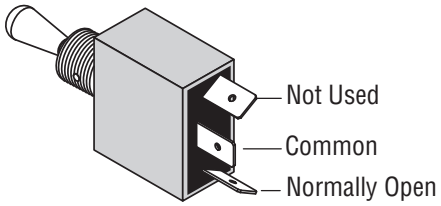
- Disconnect wires.
- Connect the first probe of the ohm meter to Common terminal.
- Connect the second probe to any Normally Open terminal.
- With switch OFF (open) there should be an open circuit.
- With the switch ON (closed) there should be continuity.
- Repeat for each Normally Open terminal.

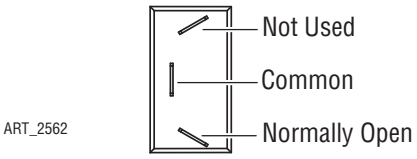


ART_3153

Toggle Switch – On-Off

- Disconnect wires.
- Connect the first probe of the ohm meter to Common terminal.
- Connect the second probe to Normally Open terminal.
- With the switch turned OFF there should be an open circuit.
- With the switch turned ON there should be continuity.

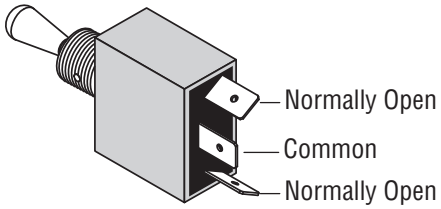


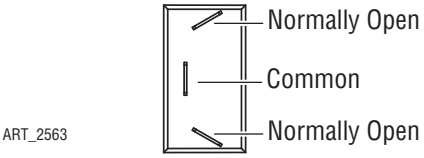


ART_2562

Toggle Switch – 1-Pole 2-Position

- Disconnect wires.
- Connect the first probe of the ohm meter to Common terminal.
- Connect the 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 the second probe to bottom Normally Open terminal.
- With toggle UP there should be an open circuit.
- With the toggle DOWN there should be continuity.

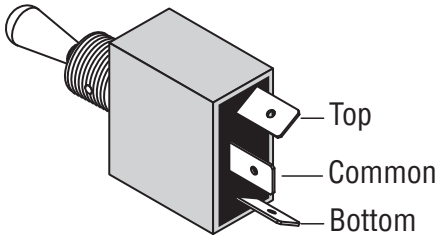


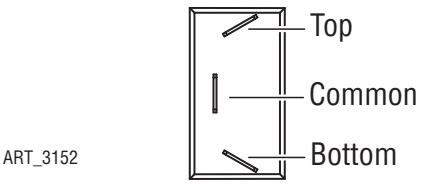


ART_2563

Toggle Switch – 1-Pole 3-Position

- Disconnect wires.
- Connect the first probe of the ohm meter to Common terminal.
- Connect the second probe of ohm meter to Top terminal.
- With the toggle UP or MIDDLE there should be continuity.
- Move second probe to Bottom terminal.
- With the toggle DOWN or MIDDLE there should be continuity.
- 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 an open circuit reading.

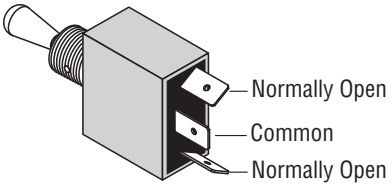




ART_3152

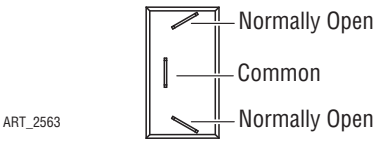
Toggle Momentary Switch

- Disconnect wires.
- Connect the first probe of the ohm meter to Common Terminal.



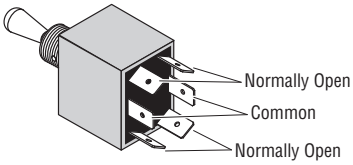
Test top position

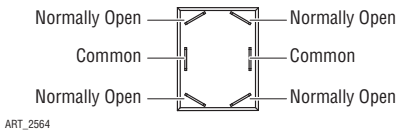
- Connect second probe to top Normally Open terminal.
- With the toggle in the neutral (open) position there should be an open circuit reading.
- With the toggle UP (closed) there should be continuity.
- With the toggle DOWN (closed) there should be an open circuit reading.



Test bottom position

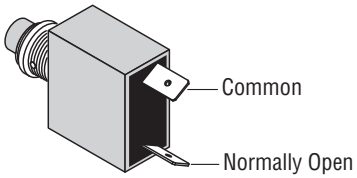
- Move second probe to bottom Normally Open terminal.
- With the toggle in the neutral (open) position there should be no reading.
- With the toggle DOWN (closed) there should be continuity.
- With the toggle UP (closed) there should be an open circuit reading.
- Repeat for both rows of two-row switch.

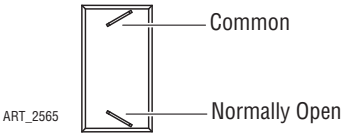




Momentary Button Switch

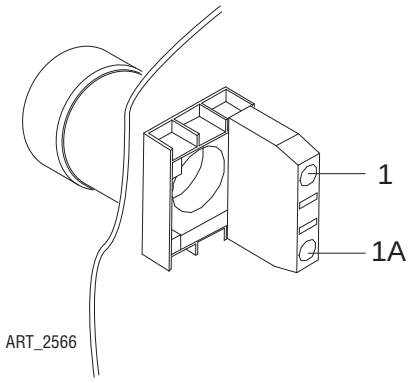
- Disconnect wires.
- Connect one probe of ohm meter to each terminal.
- With the button in the neutral (open) position there should be an open circuit reading.
- With the button pushed (closed) there should be continuity.





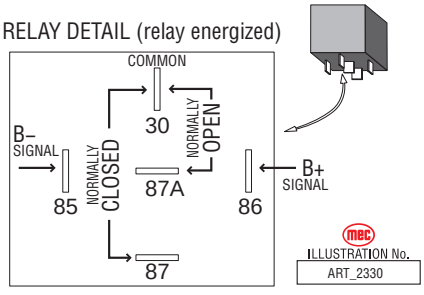
Emergency Stop Button

- Disconnect wires.
- Connect one probe of ohm meter to each terminal.
- With the button PRESSED there should be an open circuit reading.
- With the button RESET there should be a continuity.



Relay

- Measure the resistance across terminals 85 and 86. Resistance should be 90Ω±9Ω.
- Apply 12Vdc±4Vdc power source across terminals 85 and 86.
- Confirm continuity across terminals 87 and 30.
- Confirm an open circuit across terminals 87A and 30.
- Remove 12Vdc power source across terminals 85 and 86.
- Confirm and open circuit across terminals 87 and 30.
- Confirm continuity across terminals 87A and 30

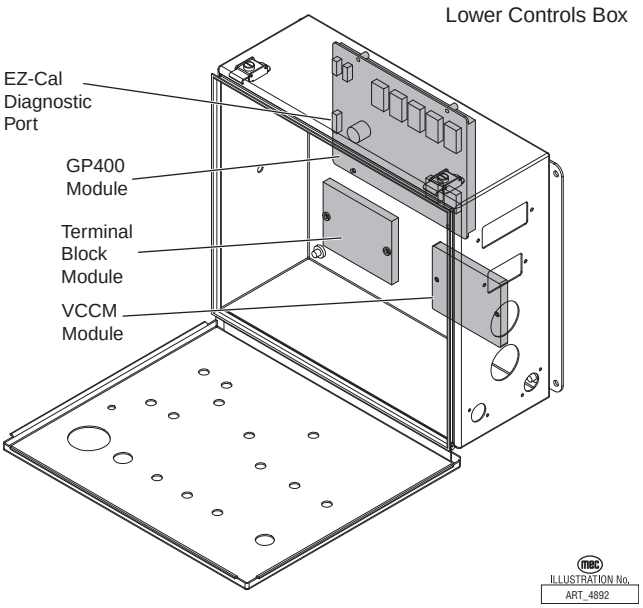


Control System

The GP400/GP500 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.

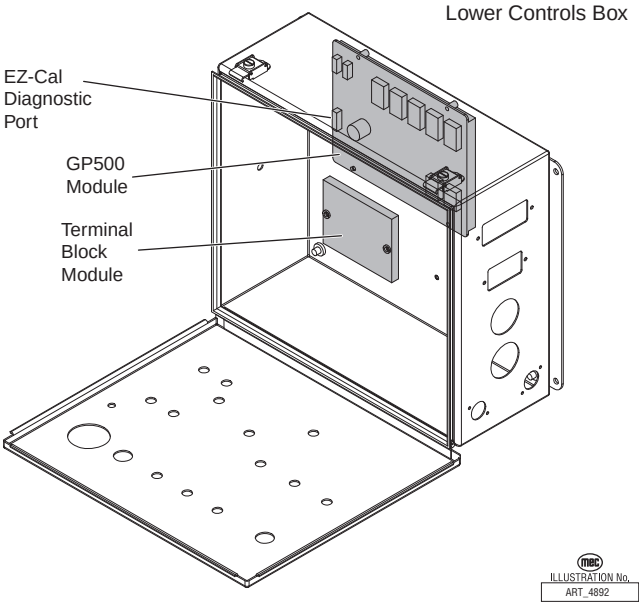
Components & Locations (Up To Serial # 14700199)

- GP400 Control Module processor -- Inside Lower Controls Box
- Valve Current Control Module (VCCM) -- Inside Lower Controls Box
- GP440 Module -- Inside Upper Control Box



Components & Locations (From Serial # 14700200)

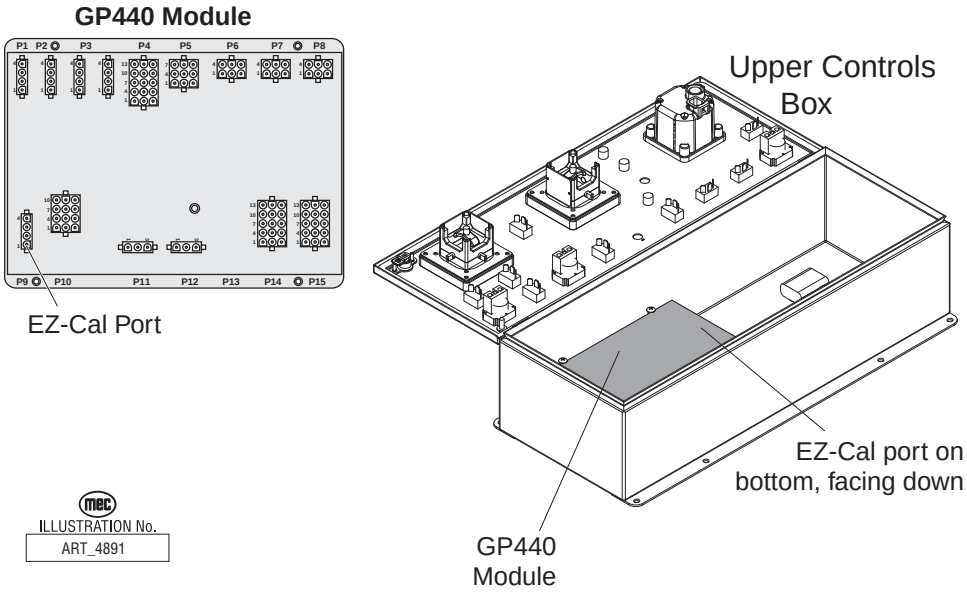
- GP500 Control Module processor -- Inside Lower Controls Box
- GP442 Module -- Inside Upper Control Box



Diagnostic information can be found in Section 19 - Troubleshooting.

Wiring information can be found in Section 20 - Schematics.

GP400 Calibration



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

Example: *An Angle Transducer, used to monitor platform elevation, has a variable output between 1.00 and 4.00 Vdc as the Jib Boom / Platform rotates through 140 degrees. During calibration, the GP400 calculates that 1.80 Vdc is the fully lowered condition, and 3.60 Vdc is the fully lifted condition. Therefore, any voltage between these two extremes relates to a position between 0 - 140 degrees.*

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 a 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

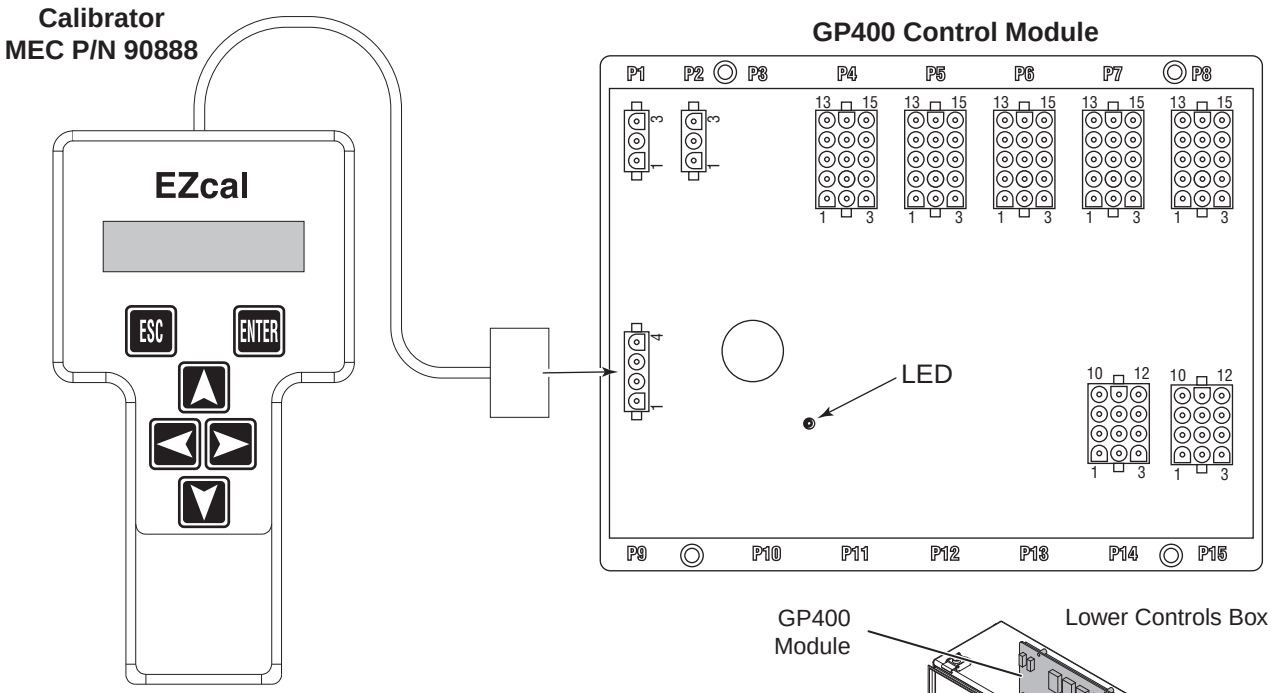
DANGER

IMPROPER CALIBRATION OF THE 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.

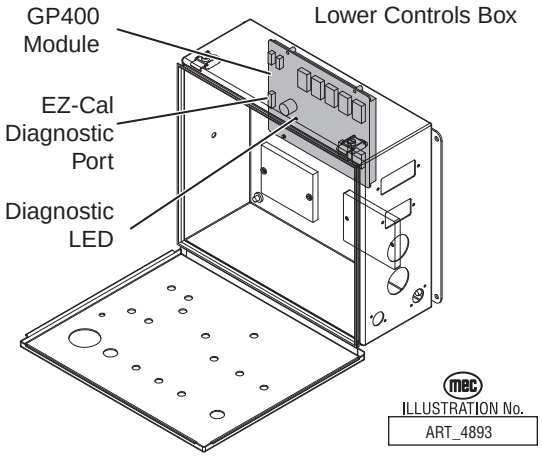
ONLY TRAINED AND AUTHORIZED PERSONNEL SHALL BE PERMITTED TO CALIBRATE THE PLATFORM OVERLOAD SENSING SYSTEM. READ ALL INSTRUCTIONS CLOSELY BEFORE ATTEMPTING EACH STEP OF THE CALIBRATION PROCEDURE.

In the event of a GP400 replacement, the GP400 must be calibrated before it will operate properly.

The following procedures and additional tasks detailed in Section 19 - Troubleshooting can only be performed using an EZ-Cal scan tool or optional on-board diagnostic display. If you do not have an EZ-Cal, please contact MEC to obtain one.



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



Two calibrations must be performed for all versions of this machine:

1. Level Sensor(s) Calibration
2. Height Sensor Calibration
   a. Machines equipped with the optional Overload Sensing System package must perform the following calibration:
3. Load Calibration

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 Sensor(s) calibration must be performed first. When calibrating the level sensor(s), 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 Level Sensors that measure platform angle; both mounted at the front of the Platform Level Bell Crank.

Therefore, before calibration can begin:

- Use a framers/spirit level to check that both the chassis and the steering axle are level both fore-and-aft and side-to-side.
- The PLATFORM must be leveled both fore-and-aft and side-to-side through the use of a framers/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.

After the platform has been confirmed to be absolutely level, proceed to the Level Sensor(s) Calibration instructions.

The sensors used on the this machine are very sensitive and can detect even the slightest movement of the parts that they monitor. Therefore it is 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, the steering axle and the 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 GP400. Connect the EZ-Cal.
3. Power up the 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 it 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.

Height calibration is complete.

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

Perform the previous calibration procedures before performing the following:

Load Calibration

Weight required for Load Calibration:

- (1) 227 kg (500 lbs) -- Machines equipped with optional Overload Sensing System.

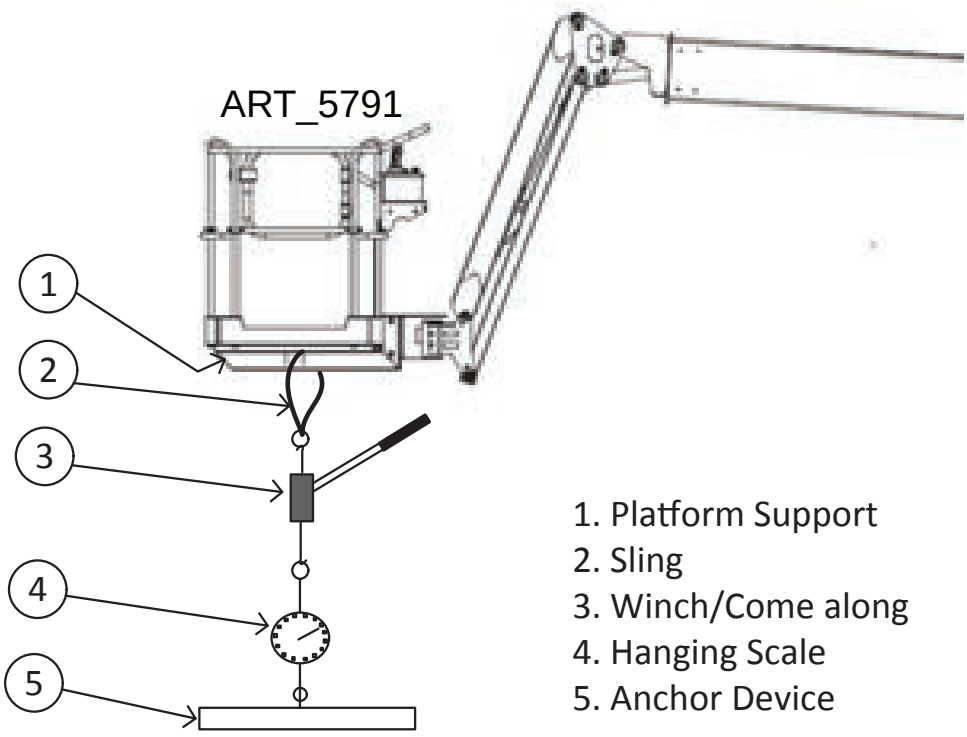
1. If not already done, perform Pre-Calibration Set-up as described in the beginning of these instructions and the Level Sensors and Height Sensor Calibrations before proceeding with Load Calibration.
2. Place the machine on firm level ground.
3. Raise the boom so that the platform is approximately 12 inches (25 cm) off the ground.
4. Access the EZ-Cal by opening the Control Module door, then opening the Lower Control Box door. Attach the EZ-Cal as shown in page 53.
5. Power the system up. The EZ-Cal display will read "HELP PRESS ENTER".
6. Press the right arrow twice until the display reads, "ACCESS LEVEL 3". Press ENTER.
7. Using the up arrow and right arrow, enter the numbers 1775 then press ENTER. The display should now read "ACCESS LEVEL 2"
8. Press the right arrow twice until the display reads "SETUPS". Press ENTER.
9. Press the right arrow until the display reads "LOAD SETUPS". Press ENTER.
10. Press the right arrow until the display reads "CALIBRATE LOAD". Press ENTER.
11. Press the right arrow until the display reads "PLATFORM LOADED". Load the platform with the appropriate weight, then press ENTER.

- (1) 227 kg (500 lbs) -- Machines equipped with optional Overload Sensing System.

12. Press the right arrow until the display reads “PLATFORM EMPTY”. Remove all weight from the platform, then press ENTER.
13. 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.

Alternative Load Calibration

An alternate method of achieving rated load in the platform is to attach a Hanging Scale to the bottom of the platform and apply load using a winch or similar device until the readout displays the appropriate weight. Proceed with Load Calibration.



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 Sensor 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.

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 1.00V and 4.00V. 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. 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. 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. 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. 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. 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 1.00V and 4.00V 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 (0.50V 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 (4.50V 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 (0.50V 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 (4.50V 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 0.50V and 4.50V.
- Check DIAGNOSTICS / SENSORS to see the output. A reading of 0.00V or 5.00V 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 standard version of this machine, this is 500 lbs (227 kg). See machine's serial plate for platform capacity.
- 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 control system 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.

Mechanical Components

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

Base

CAUTION **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.

DANGER

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

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

ON MACHINES WHERE FOAM FILLED TIRES ARE FITTED AS ORIGINAL EQUIPMENT, 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 Section 9 for instructions and safety precautions.

CAUTION **Always chock the tires before lifting the machine.**

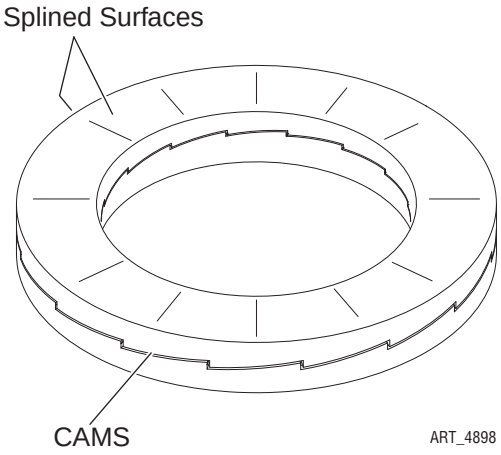
1. Chock tires on the end of machine opposite the tire to be changed.
2. Break loose but **do not remove** lug nuts before raising the machine.
3. Lift the end of machine requiring a tire change and support with jackstands of adequate capacity.
4. Remove lug nuts and pull the wheel off.
5. Install the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

Nordlock Washers

Nord-Lock® style lock washers are used on many places in this machine. Nord-Lock® washers consist of a pair of washers with cams facing each other and spline gripping the mating surface. The use cam-geometry to effectively prevent the bolt from unbolting loose.

Nord-Lock® style washers must be used anywhere they were originally installed on this machine. Take care during disassembly to collect both parts of each washer for later reuse.

During installation, be sure to assemble the pairs as shown, with the cam surface in the middle and the radial splines facing out.



Platform Removal & Installation

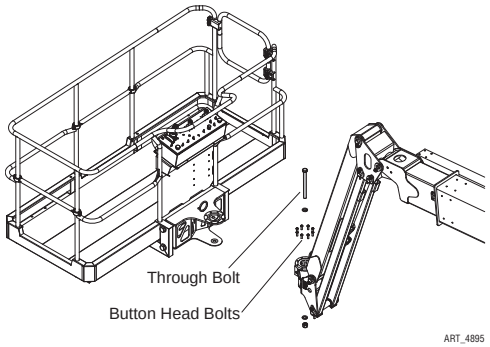
WARNING

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.

The Platform is normally removed only for replacement or as a step in a larger disassembly.

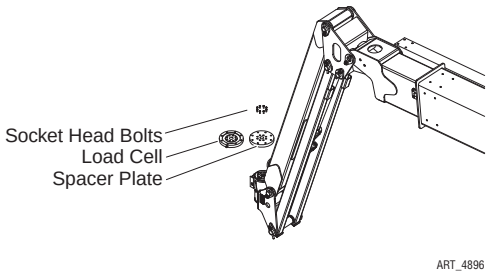
This procedure is also used to replace the Load Cell on machines equipped with the optional Overload Sensing System.

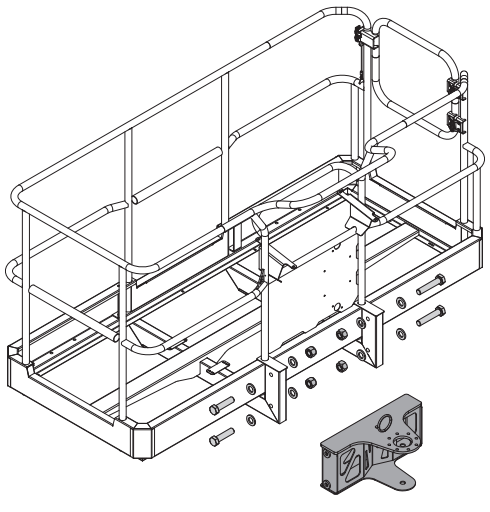
A fork lift and pallet are needed for this procedure.



Disassembly

1. Park the machine on a firm level surface.
2. Position the platform on a pallet so that the bottom of the through bolt is off the ground. Strap the platform to the pallet.
3. Disconnect the wiring harness from the Upper Controls box. Carefully pull the wiring harness back towards the jib.
4. Remove the center through bolt.
5. Remove the eight button head bolts that secure the platform mount weldment to the load cell/spacer plate.
6. Use the forklift to move the platform and pallet away from the rest of the machine.
7. If necessary, remove the eight socket head bolts that secure the Load Cell/Spacer Plate to the platform rotator.
8. If necessary, remove the platform mount weldment from the platform.





Note: Load Cells are used on any machine equipped with the optional Overload Sensing System. The Spacer Plate is used only if the optional Overload Sensing System is not present.

Assembly

Assembly is the reverse of disassembly. Tighten all fasteners to proper torque as shown below.

Location	Torque	
Platform Rotator to Spacer/Load Cell	55 Lb-ft	75 N-m
Spacer/Load Cell to Platform Mount Weldment	95 Lb-ft	129 N-m
Platform Rotator Through Bolt & Nut	420-450 Lb-ft	569-610 N-m
Platform Mount Weldment Bolts & Nuts	250-270 Lb-ft	339-366 N-m

Platform Rotator

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.

The Platform Rotator is located between the Platform and the Jib.

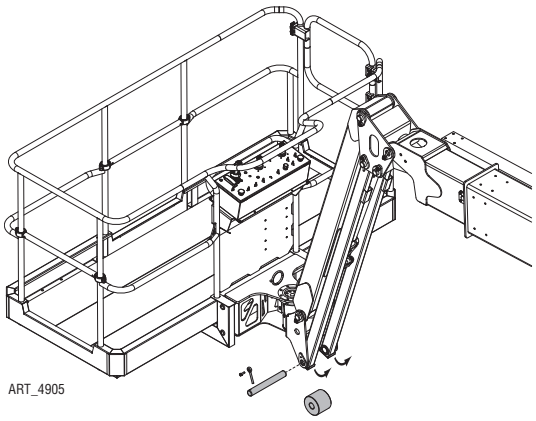
The Platform Rotator is normally removed only for repair or replacement.

This procedure differs from the Platform Removal procedure in that the platform is removed while still attached to the Platform Rotator. This reduces the possibility of injury when the jib pivot points are released.

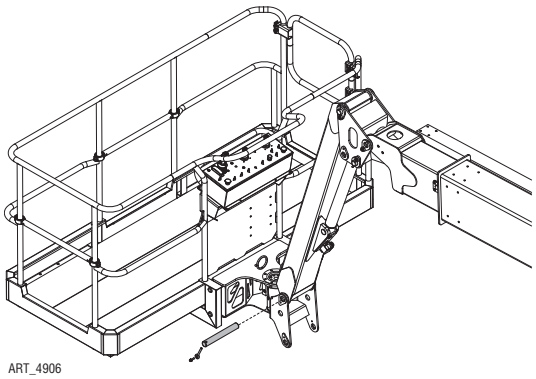
A fork lift and pallet are needed for this procedure.

Disassembly

1. Park the machine on a firm level surface.
2. Thoroughly clean all hydraulic connections and tag all hoses for proper reassembly before disconnecting them. Immediately plug and cap all openings to prevent contamination. Tag electrical connections before disconnecting them.
3. Position the platform on a pallet so that the bottom of the through bolt is off the ground. Strap the platform to the pallet.
4. Disconnect the wiring harness from the Upper Controls box. Carefully pull the wiring harness back to the jib.
5. Disconnect all hydraulic hoses. Immediately plug and cap all openings to prevent contamination.
6. Remove retainer bolt, pin retainer, lower pin and roller from the Platform Rotator lower pivot point. Swing the lower jib links out of the way.
7. Remove retainer bolt, pin retainer and upper pin from the Platform Rotator upper pivot point.
8. Use a forklift to move the platform away from the machine.
9. Support the Platform Rotator. Remove the center through bolt.
10. Remove the eight button head bolts that secure the platform mount weldment to the load cell/spacer plate. The Platform Rotator is now detached from the platform.
11. If necessary, remove the eight socket head bolts that secure the Load Cell/Spacer Plate to the platform rotator.



ART_4905



ART_4906

Note: Load Cells are used on any machine equipped with the optional Overload Sensing System. The Spacer Plate is used only if the optional Overload Sensing System is not present.

Assembly

Assembly is the reverse of disassembly.

Examine all pins for signs of wear, surface imperfections, cracks or gray dust in the pivot area. Replace if any of the above conditions exist.

Tighten all fasteners to proper torque as shown below. Refer to Section 4 - Torque Specifications of this manual for torque specifications of fasteners not listed below.

Location	Torque	
Platform Rotator to Spacer/Load Cell	55 Lb-ft	75 N-m
Spacer/Load Cell to Platform Mount Weldment	95 Lb-ft	129 N-m
Platform Rotator Through Bolt & Nut	420/450 Lb-ft	569/610 N-m

Jib Cylinder

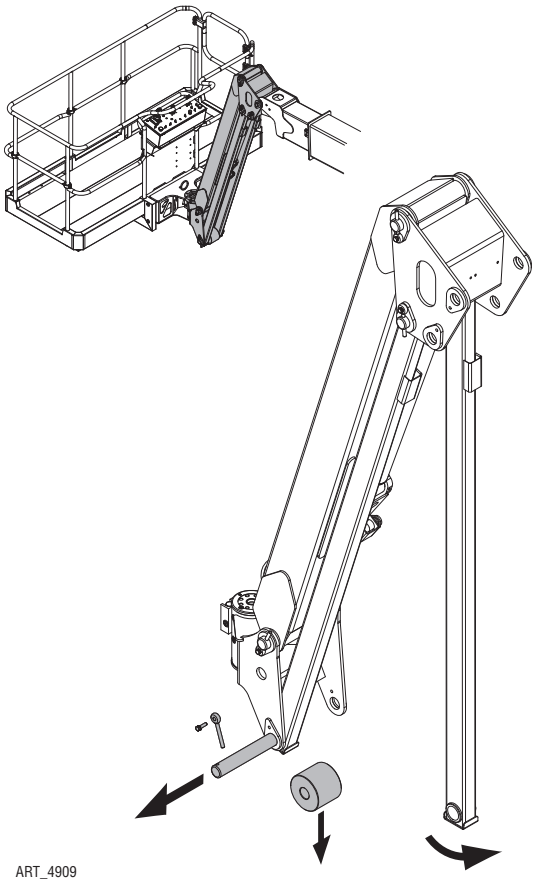
WARNING

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.

The Jib Cylinder is located within the Jib linkage assembly. Its purpose is to move the Jib up and down relative to the position of the Boom tip.

Disassembly

1. Park the machine on a firm level surface.
2. Thoroughly clean all hydraulic connections and tag all hoses for proper reassembly before disconnecting them. Immediately plug and cap all openings to prevent contamination. Tag electrical connections before disconnecting them.
3. Lower the boom to the stowed position, so that the boom rests on the turntable.
4. Using the Jib Lift function, raise the jib high enough to position a pallet on the ground beneath the platform. Lower the platform onto the pallet, then strap the platform to the pallet.
5. Disconnect all hydraulic hoses. Immediately plug and cap all openings to prevent contamination.
6. Remove bolt and pin retainer for the lower pin at the Platform Rotator lower pivot point.



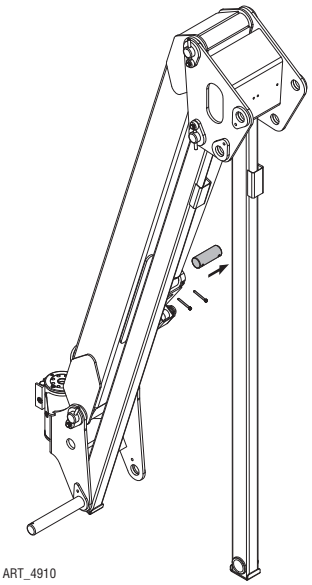
ART_4909

On the pin retainer side, pull the pin out just far enough to release the bottom of the further lower jib link and the jib roller.

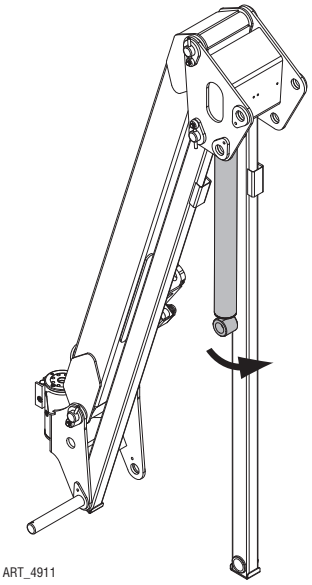
Swing the lower jib link out of the way as shown.

IMPORTANT! Leave the pin holding the nearer lower jib link in place. DO NOT pull the pin all the way out.

7. Remove the bolts that secure the Jib Cylinder pin to the jib. Support the end of the Jib Cylinder, then remove the pin.


ART_4910

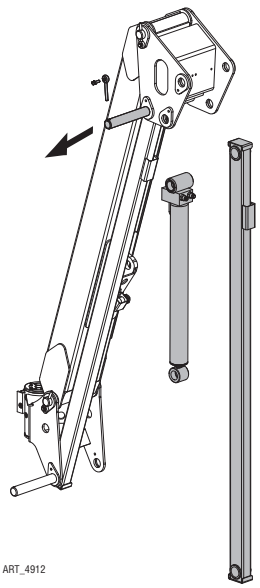
8. Swing the Jib Cylinder out as shown.


ART_4911

9. Remove bolt and pin retainer for the lower pin at the front lower pivot point of the bell crank weldment.

Support the Jib Cylinder and the lower jib link that are hanging straight down. On the pin retainer side, pull the pin out just far enough to release the link and the cylinder.

Remove the link and cylinder


ART_4912

IMPORTANT! Leave the pin holding the nearer lower jib link in place. DO NOT pull the pin all the way out.

Assembly

Assembly is the reverse of disassembly.

Examine all pins for signs of wear, surface imperfections, cracks or gray dust in the pivot area. Replace if any of the above conditions exist.

Re-connect the hydraulic lines after the barrel end of the Jib Cylinder is secured. Use the Jib Lift/ Lower function to extend or retract the cylinder to proper length for assembly. Refer to Section 4 - Torque Specifications of this manual for torque specifications of fasteners.

Platform Level Cylinder

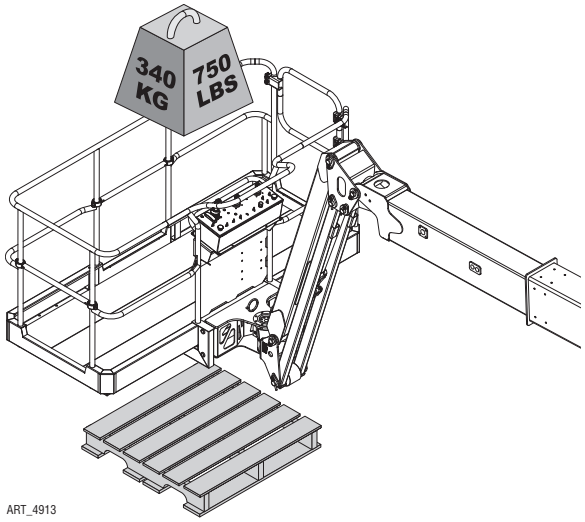
WARNING

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.

The Platform Level Cylinder is located at the end of the inner boom section. Its purpose is to keep the Platform level as the position of the Boom changes.

Disassembly

1. Park the machine on a firm level surface.
2. Thoroughly clean all hydraulic connections and tag all hoses for proper reassembly before disconnecting them. Immediately plug and cap all openings to prevent contamination. Tag electrical connections before disconnecting them.
3. Use the Boom Lift/Lower function to raise the boom slightly.
4. Use the Jib Lift/Lower function to lower the jib completely.
5. Use the Boom Extend/Retract function to extend the boom approximately 5 feet (1.5 m).
6. Use the Boom Lift/Lower function to lower the platform onto the pallet, then strap the platform to the pallet.
7. Place 750 lbs (340 kg) of weight on the platform floor.

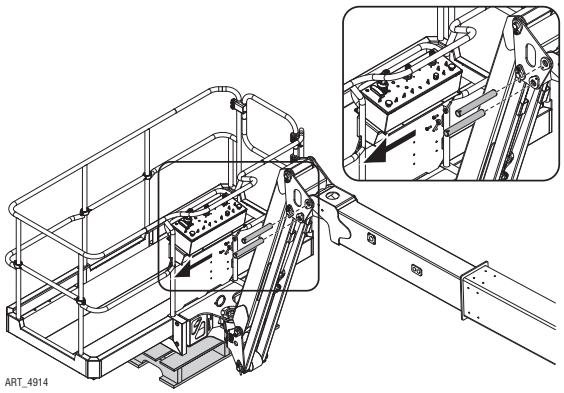


ART_4913

WARNING

This 750lb weight is required to prevent the Platform/Jib assembly from tipping when disconnected from the boom.

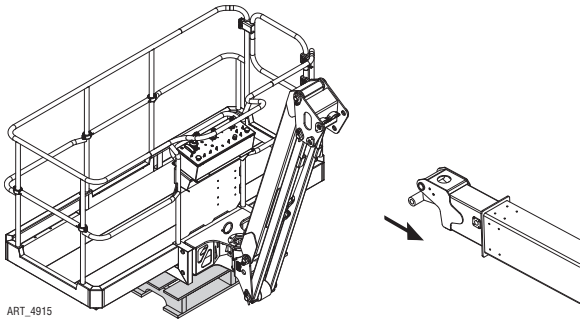
8. Remove the hose/cable cover from the side of the Jib Arm.
9. Clean all hydraulic fittings, then tag all hoses for proper reassembly.
10. Disconnect the hydraulic hoses that supply the Jib Lift/Lower Cylinder and the Platform Rotator. Immediately plug and cap all openings to prevent contamination.
11. Tag all electrical harness connections connecting the boom and the jib, then disconnect.
12. Remove the bolts securing the platform level bell crank pins that connect the bell crank to the boom. Secure the Lower Jib Links with a strap, then remove the pins.


ART_4914

13. Use the Jib Extend/ Retract function to retract the boom away from the Platform/Jib Assembly.

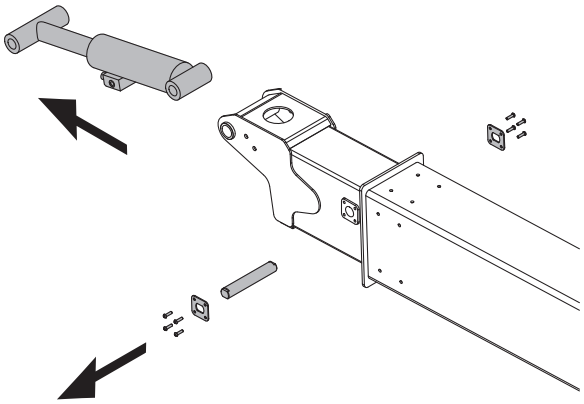
IMPORTANT! Be sure the plates that secure the Platform Level Cylinder pin are exposed.

14. Disconnect the hydraulic hoses that supply the Platform Level Cylinder. Immediately plug and cap all openings to prevent contamination.



ART_4915

15. Support the Platform Level Cylinder, then remove bolts and pin retainer plates that secure the upper Platform Level Cylinder pin.
16. Remove the pin, then remove the Platform Level Cylinder.



ART_4916

Assembly

Assembly is the reverse of disassembly.

Examine all pins for signs of wear, surface imperfections, cracks or gray dust in the pivot area. Replace if any of the above conditions exist.

Re-connect the hydraulic lines to the Platform Level Cylinder after the barrel end of the cylinder is secured. Use the Platform Level function to extend or retract the cylinder to proper length for assembly.

Refer to Section 4 - Torque Specifications of this manual for torque specifications of fasteners.

Boom Extend Cylinder

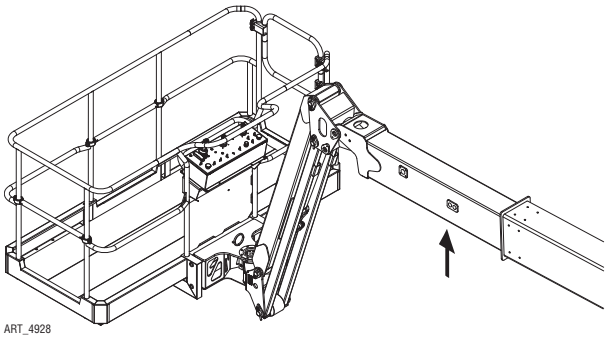
WARNING

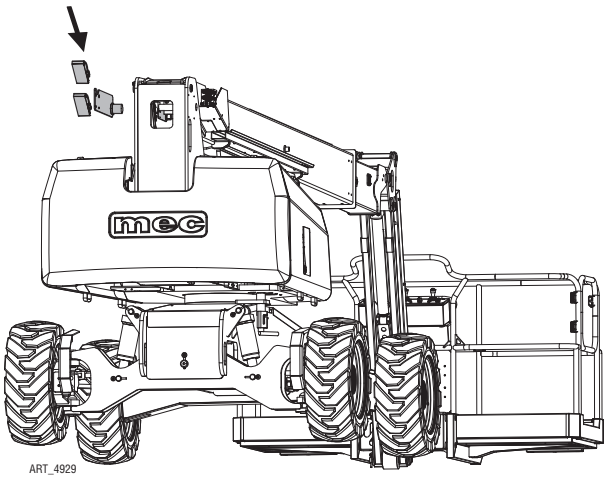
THIS PROCESS REQUIRES SPECIFIC REPAIR SKILLS AND EXPERIENCE, APPROPRIATE LIFTING EQUIPMENT AND A PROPER WORKPLACE. DEATH, SERIOUS INJURY OR SIGNIFICANT MACHINE DAMAGE COULD OCCUR IF YOU ATTEMPT THIS PROCESS WITHOUT THE APPROPRIATE SKILLS AND EQUIPMENT.

The Boom Extend Cylinder is located within the Main Boom assembly. Its purpose is to extend the inner boom section.

Disassembly

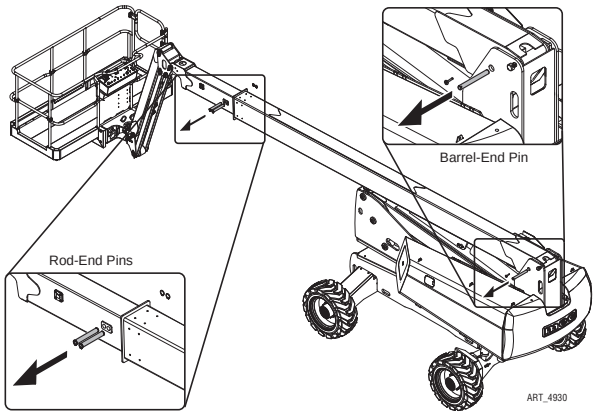
1. Park the machine on a firm level surface.
2. Thoroughly clean all hydraulic connections and tag all hoses for proper reassembly before disconnecting them. Immediately plug and cap all openings to prevent contamination. Tag electrical connections before disconnecting them.
3. Lower the boom to the stowed position, so that the boom rests on the turntable.
4. Use the Boom Extend/Retract function to extend the boom approximately 5 feet (1.5 m) to expose the rod pins.
5. Disconnect all hydraulic hoses. Immediately plug and cap all openings to prevent contamination.
6. At the base end of the main boom assembly, tag and disconnect the wiring harness from the angle transducers and the Boom Extend proximity sensor. Remove the angle transducers and the proximity sensor and mounting plate.
7. Ensure that all hydraulic hoses and electrical wiring near the access hole are out of the path of removal.


ART_4928



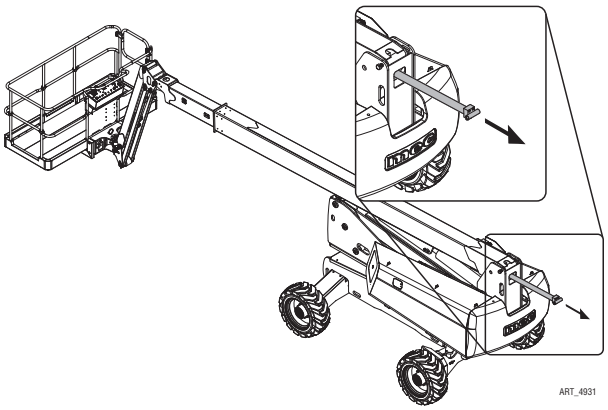
ART_4929

8. Remove the retainer rings from one side of the rod-end pins. Remove the pins using a soft metal drift. Remove bolt and pin retainer that secure the barrel-end pin at the rear end of the cylinder. Remove the pin using a soft metal drift.

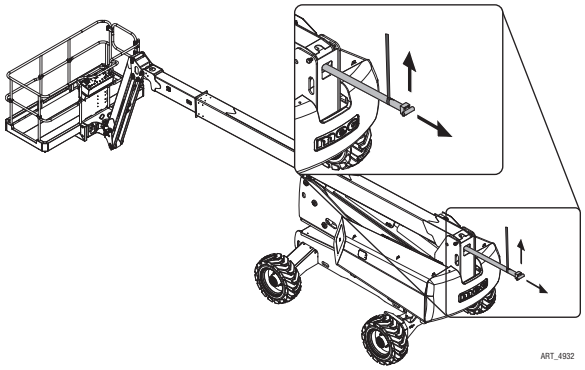


ART_4930

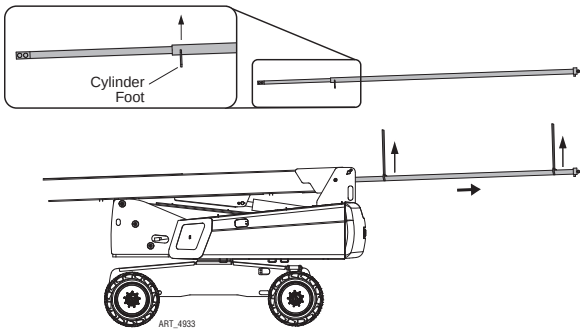
9. Wrap a sling around the cylinder base, then pull the end of the cylinder approximately 5 feet (1.5 m) out of the boom. Be careful as the end of the cylinder comes out through the access hole.



10. Attach a sling to the cylinder barrel and apply slight lifting pressure with a forklift or overhead crane. Use this sling to continue pulling the cylinder out of the boom.



11. Pull the cylinder out approximately 14.5 feet (4.5 m). Attach a second sling close to where the cylinder exits the machine. At this point, it is necessary to lift the rod end of the cylinder so that the cylinder foot and slide pad will clear the wearpad bolts inside the boom. Prior to this point, the weight at the front of the cylinder had been supported by this foot.
12. Carefully extract the cylinder completely from the boom.



IMPORTANT! Measure and record the length of the slightly-extended cylinder for easier reassembly.

Assembly

Assembly is the reverse of disassembly.

Examine all pins for signs of wear, surface imperfections, cracks or gray dust in the pivot area. Replace if any of the above conditions exist.

Extend the cylinder to the length recorded previously to ease reassembly. Ensure that the pin holes at the rod end are in line with the pin hole at the barrel end.

If necessary, re-connect the hydraulic lines to the Boom Extend Cylinder after the cylinder is secured at the rear of the boom. Use the Boom Extend/Retract function to extend or retract the cylinder to proper length for assembly.

Install the pin at the barrel end of the cylinder. Use a pin alignment tool to position one rod end pin hole, then install the pin in the other hole. Install the second pin at the rod end.

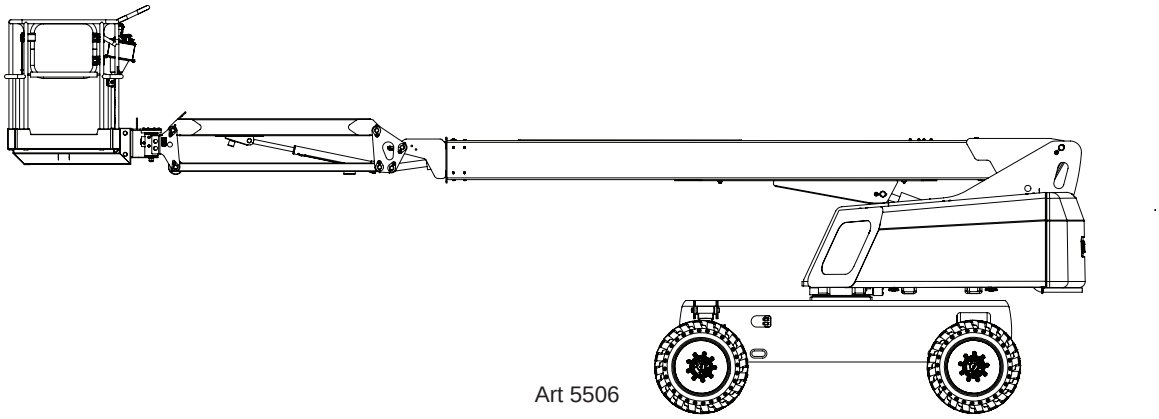
Refer to Section 4 - Torque Specifications of this manual for torque specifications of fasteners.

Boom Lift Cylinder/Boom Linkage

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.

The Boom Lift Cylinder is located within the boom linkage near the turntable. The purpose is to raise and lower the boom assembly.

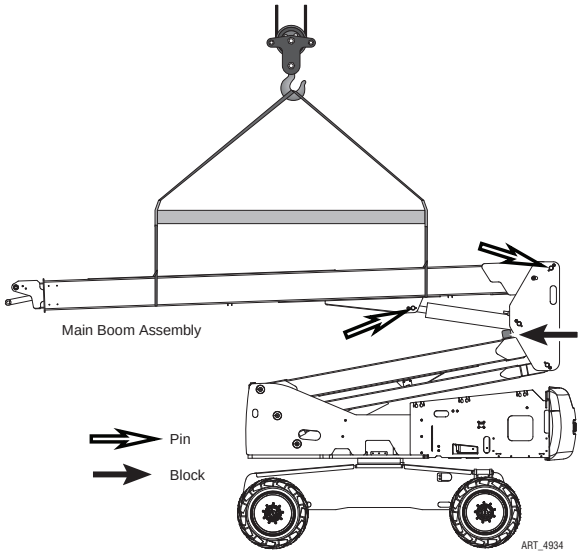


Art 5506

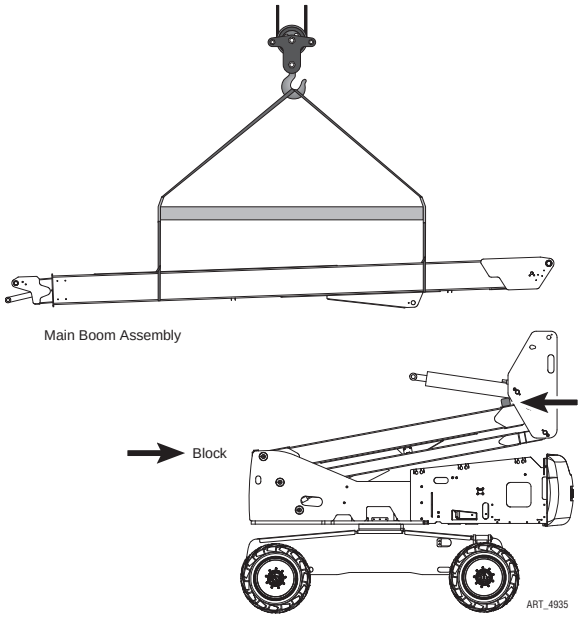
Note: The module doors and module contents are omitted from the following illustrations to better show the disassembly process. It is not necessary to remove the doors or contents to perform this procedure.

Disassembly

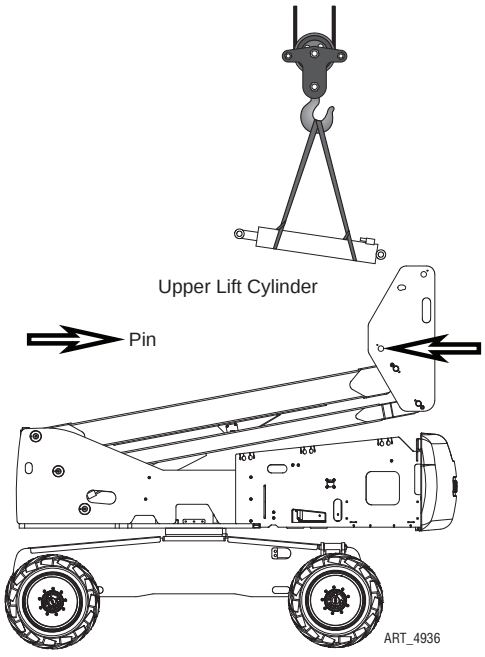
1. Park the machine on a firm level surface.
2. Thoroughly clean all hydraulic connections and tag all hoses for proper reassembly before disconnecting them. Immediately plug and cap all openings to prevent contamination. Tag electrical connections before disconnecting them.
3. Remove the Platform/Jib assembly as described in steps 1 through 12 of the Platform Level Cylinder removal procedure on page 74.
4. Use the Boom Lift/Lower function to position the boom as shown at right.
5. Remove the hose and cable guards and coverings. It is not necessary to remove the cable track or its contents from the Main Boom Assembly.
6. Make note of all cable and hose routing from the turntable to the main boom assembly.
7. Disconnect the hoses and control cable connected to the Platform Functions Manifold, located at the base of the Main Boom Assembly. Pull these down through the linkage back to the turntable.
8. Disconnect the power-to-platform cable and the platform control cable from their connections in the turntable and the Control Module. Pull these up through the linkage to the Main Boom Assembly.



9. Rig slings and a spreader bar from the Main Boom Assembly to an overhead hoist as shown. Apply slight lifting pressure.
10. Place a 4x4 inch (10x10 cm) block between the Lift Cylinder and turntable side sheets as shown. Remove the pin and the rod end of the Lift Cylinder.
11. Remove the pivot pin at the base of the Main Boom Assembly.
12. Remove the Main Boom Assembly.



13. Rig slings from the Lift Cylinder to an overhead hoist as shown.
14. Disconnect the hydraulic hoses and control wiring connected to the Lift Cylinder.
15. Remove the pin at the barrel end of the Lift Cylinder.
16. Remove the Lift Cylinder.



Assembly

Assembly is the reverse of disassembly.

Examine all pins for signs of wear, surface imperfections, cracks or gray dust in the pivot area. Replace if any of the above conditions exist.

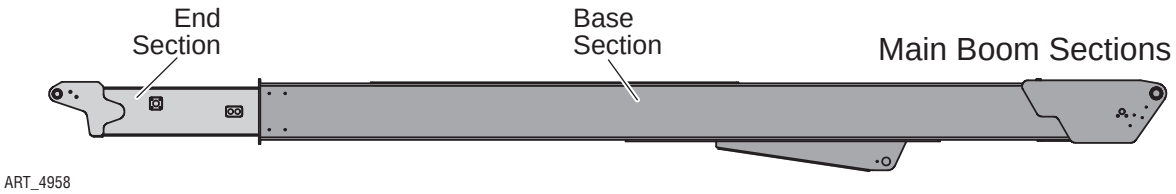
Refer to Section 4 - Torque Specifications of this manual for torque specifications of fasteners.

Main Boom Assembly

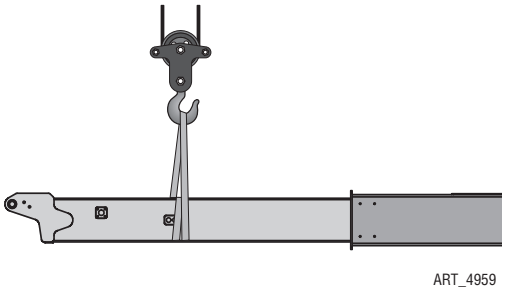
WARNING

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.

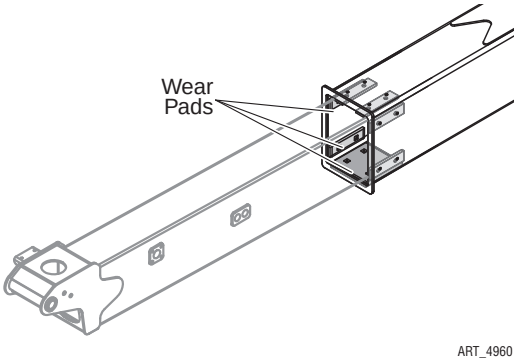
Disassembly



1. Park the machine on a firm level surface.
2. Thoroughly clean all hydraulic connections and tag all hoses for proper reassembly before disconnecting them. Immediately plug and cap all openings to prevent contamination. Tag electrical connections before disconnecting them.
3. Remove the Platform/Jib Assembly and Platform Level Cylinder as described on page 74.
4. Remove the Boom Extend Cylinder as described on page 76.
5. Remove the Main Boom Assembly as described in steps 1 through 12 of the Boom Lift Cylinder/Boom Linkage disassembly procedure on page 78. Set the Main Boom Assembly on stands for further disassembly.
6. Remove the cable track and associated machine parts from the boom. Lay all cable and hoses out of the way to avoid damage.
7. 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.



8. Remove the side and the top inner wear pads and shims from the front of the boom's Base Section.
9. Apply slight lifting pressure.
10. Remove the bottom inner wear pad from the front of the boom's Base Section.
11. 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.
12. Carefully extract the boom End Section completely.
13. Remove the wear pads from the End Section



Assembly

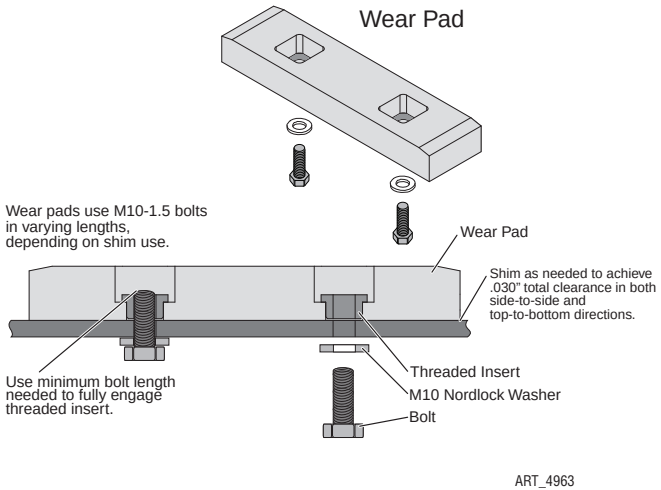
The boom must be properly shimmed to function correctly. Each boom section must be shimmed to a clearance no greater than 0.030" (0.76mm) at its tightest point of travel. It may be necessary to run each boom section in and out several times to properly identify the tightest point of travel, and to adjust 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 Section 4 of this manual for proper torque specifications.

Shims are not used on the larger square wearpads located on the top of the End section and bottom of the Base Section.

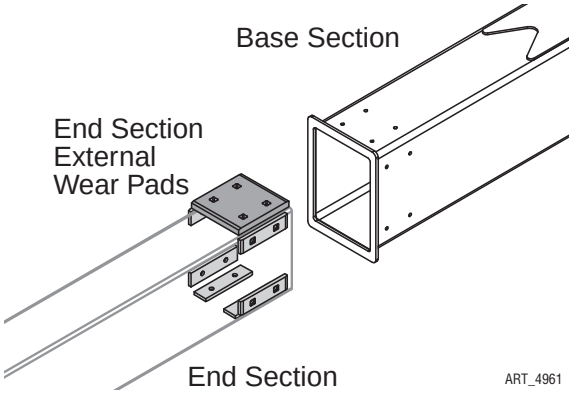
Standard Shims	
22224	Shim, .020" (0.5 mm)
11861977	Shim, .040" (1 mm)
11861981	Shim, .120" (3 mm)
11861982	Shim, .200" (5 mm)
11861983	Shim, .400" (10 mm)

Wear pads use M10 bolts in varying lengths, depending on shim use. Use minimum bolt length needed to fully engage threaded insert. Wear pad bolts must be installed with M10 Nordlock washers.

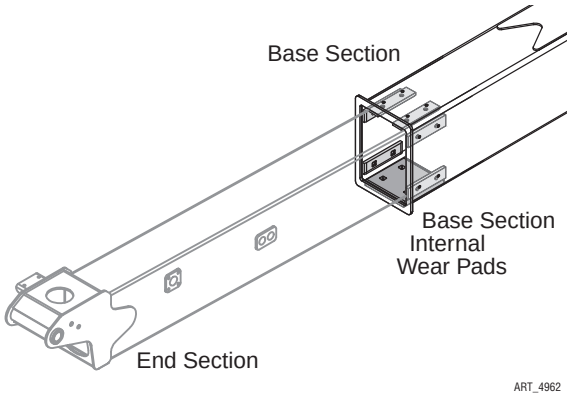


Bolts & Washers	
50033	Bolt, M10-25 Lg
50034	Bolt, M10-30 Lg
50332	Bolt, M10-35 Lg
50035	Bolt, M10-40 Lg
50036	Bolt, M10-50 Lg
50021	Bolt, M10-55 Lg
50006	Washer, M10 Nordlock

1. Use an overhead hoist or forklift to position the End Section of the boom in front of the Base Section.
2. With wearpads and shims in place, insert the End Section into the Base Section of the boom.
3. Keeping the sections as parallel as possible, slide the End Section into and out of the Base Section. Shim the End 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 Section 4 of this manual for proper torque specifications. Insert the End Section into the Base Section of the boom.



5. With the hoist still attached to the boom End Section, install the Base Section Internal Wear pads and shims. Use the hoist to position the End 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 End 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 Section 4 of this manual for proper torque specifications. Push the End Section into the Base Section of the boom.
8. Install the Main Boom Assembly in reverse of steps 1 through 12 of the Boom Lift Cylinder/Boom Linkage disassembly procedure on page 78.
9. Install the Boom Extend Cylinder on page 76.
10. Install the Platform/Jib Assembly and Platform Level Cylinder on page 74.

Swing Bearing/Turntable Components

WARNING

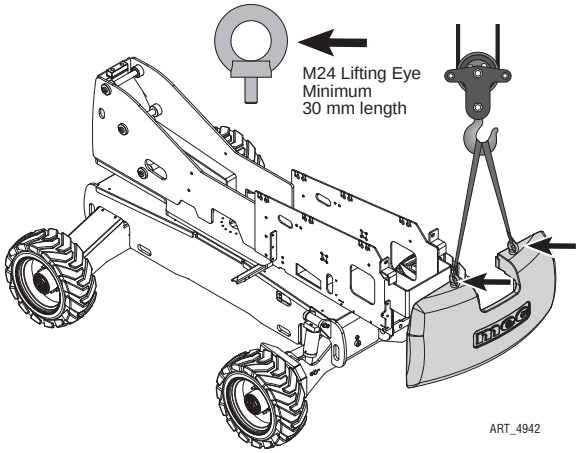
THIS PROCESS REQUIRES SPECIFIC REPAIR SKILLS AND EXPERIENCE, APPROPRIATE LIFTING EQUIPMENT AND A PROPER WORKPLACE. DEATH, SERIOUS INJURY OR SIGNIFICANT MACHINE DAMAGE COULD OCCUR IF YOU ATTEMPT THIS PROCESS WITHOUT THE APPROPRIATE SKILLS AND EQUIPMENT.

The Swing Bearing is located between the turntable and the machine chassis. It's purpose is to provide continuous turntable rotation.

Note: The module doors and module contents are omitted from some of the following illustrations to better show the disassembly process. It is not necessary to remove the doors or contents to perform this procedure unless stated.

Disassembly

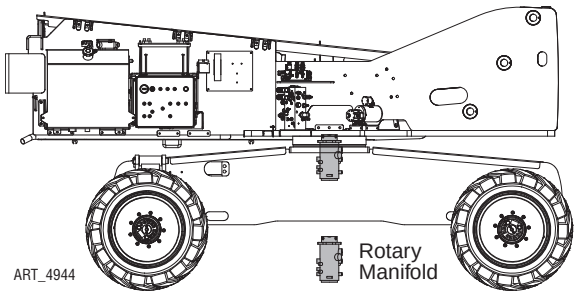
1. Park the machine on a firm level surface.
2. Thoroughly clean all hydraulic connections and tag all hoses for proper reassembly before disconnecting them. Immediately plug and cap all openings to prevent contamination. Tag electrical connections before disconnecting them.
3. Remove the Platform/Jib assembly as described in steps 1 through 12 of the Platform Level Cylinder removal procedure on page 74.
4. Disassemble the boom linkage as described in the Boom Lift Cylinder/Boom Linkage procedure on page 78.
5. Thread two M24 lifting eyebolts into the machine counterweight and rig slings as shown. Apply slight lifting pressure.



6. Remove the four bolts that secure the counterweight to the machine turntable.
7. Remove the counterweight.

Note: Counterweight Mass: 1980 LBS / 898 KG

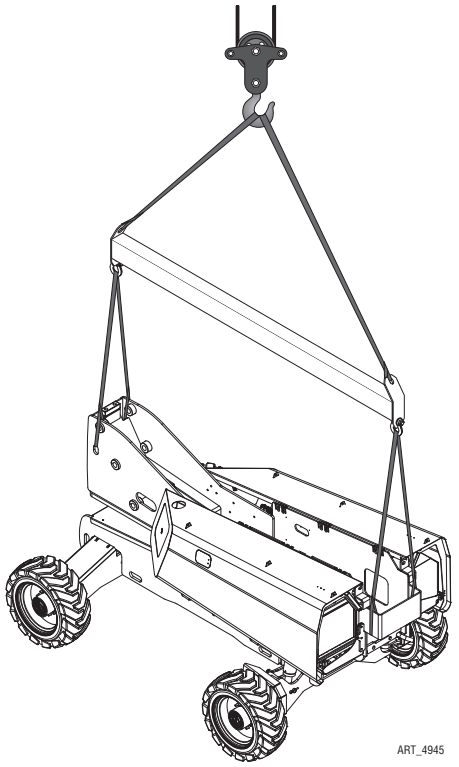
8. Tag and disconnect the hydraulic lines from the top of the Rotary Manifold.
9. Tag and disconnect the hydraulic lines from the bottom of the Rotary Manifold.
10. Support the Rotary Manifold from below, then remove the bolts securing the Rotary Manifold in place.
11. Remove the Rotary Manifold.



Note: Rotary Manifold Mass:
75 LBS
34 KG

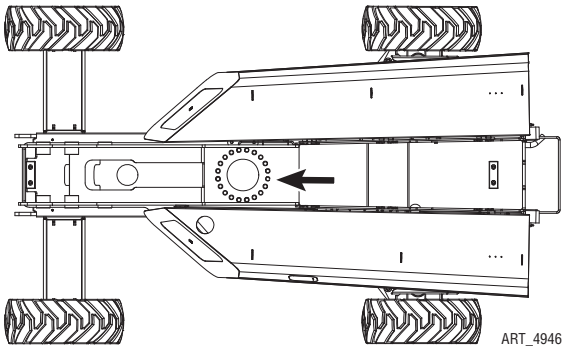
12. Rig slings and a spreader bar from the Turntable Assembly to an overhead hoist as shown. Use a separate sling for each lift point.

Apply slight lifting pressure.



13. Remove the bolts and washers holding the Turntable Assembly to the Swing Bearing.

Note: Swing Drive and Swing Bearing Mass:
210 LBS
95 KG

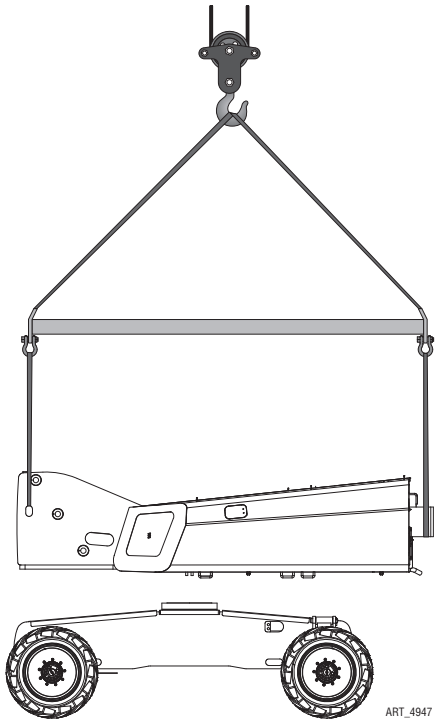


WARNING

THE WASHERS USED ON THESE BOLTS ARE HARDENED STRUCTURAL WASHERS.

REPLACE LOST OR DAMAGED WASHERS WITH MEC PART #50582 ONLY.

14. Carefully apply lifting pressure. Check the balance of the load before lifting and adjust the rigging as necessary.
15. Lift the Turntable Assembly off the Chassis.

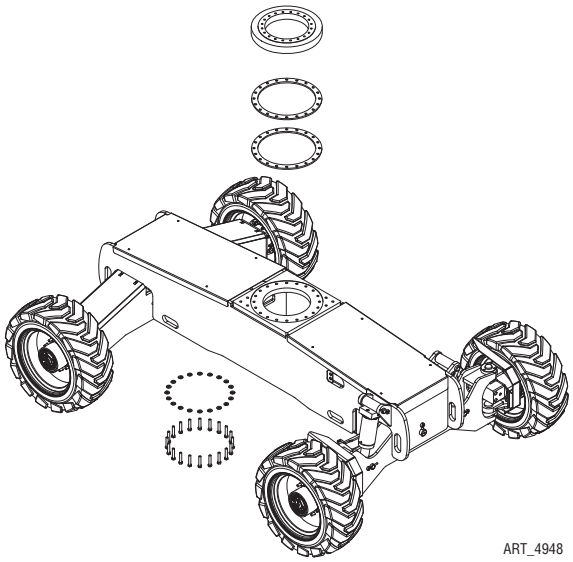


Note: Turntable Mass with Counterweight, Swing Drive and Rotary Manifold removed:
4,000 LBS
1,814 KG

16. Remove the bolts and washers holding the Swing Bearing to the Chassis.

WARNING

THE WASHERS USED ON THESE BOLTS ARE HARDENED STRUCTURAL WASHERS. REPLACE LOST OR DAMAGED WASHERS WITH MEC PART #50582 ONLY.



17. Remove the Swing Bearing and ring spacers from the Chassis.

Note: Ring Bearing Mass:
200 LBS
91 KG

Assembly

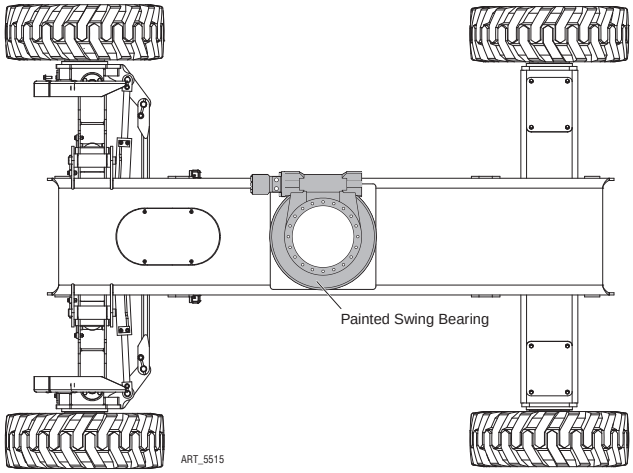
Assembly is the reverse of disassembly, with special instructions regarding Swing Bearing and Swing Drive installation below.

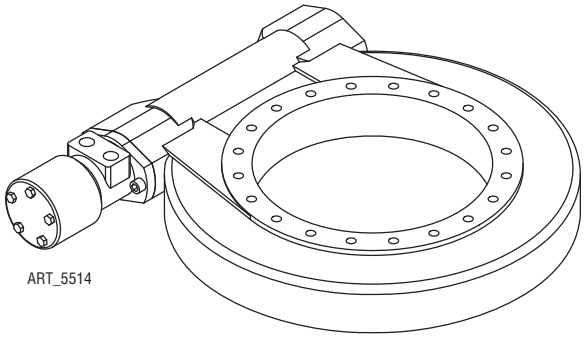
Tighten all fasteners to proper torque as shown below. Refer to Section 4 of this manual for torque specifications of fasteners not listed below.

Location	Torque	
Swing Bearing Bolts on Chassis	180 Lb-ft	244 N-m
Swing Bearing Bolts on Turret	180 Lb-ft	244 N-m
Swing Drive Bolts	320 Lb-ft	434 N-m

Swing Bearing/ Swing Drive Installation

Install the Swing Bearing with the motor axis parallel to the chassis side sheet. The swing bearing drive motor should be towards/facing the front axle.





Use an alternating criss-cross pattern to tighten the bolts securing the Swing

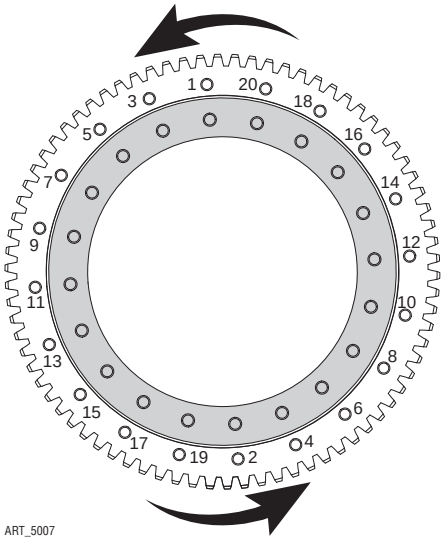
Bearing to the chassis. Tighten the bolts in three stages in numerical order as shown to the right.

Tighten to 50 Lb-ft (68 N-m) on the first pass.

Tighten to 100 Lb-ft (136 N-m) on the second pass.

Tighten to 180 Lb-ft (244 N-m) on the first pass.

Use the same pattern and stages later when securing the turntable to the Swing Bearing.



Drive Motors & Gear Hubs

Note: See Section 24 - Axles & Section 25 - Hydraulics of the Parts portion of this manual for parts lists.

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

CAUTION

Clean all fittings before disconnecting hoses.

Tag hoses for proper reassembly.

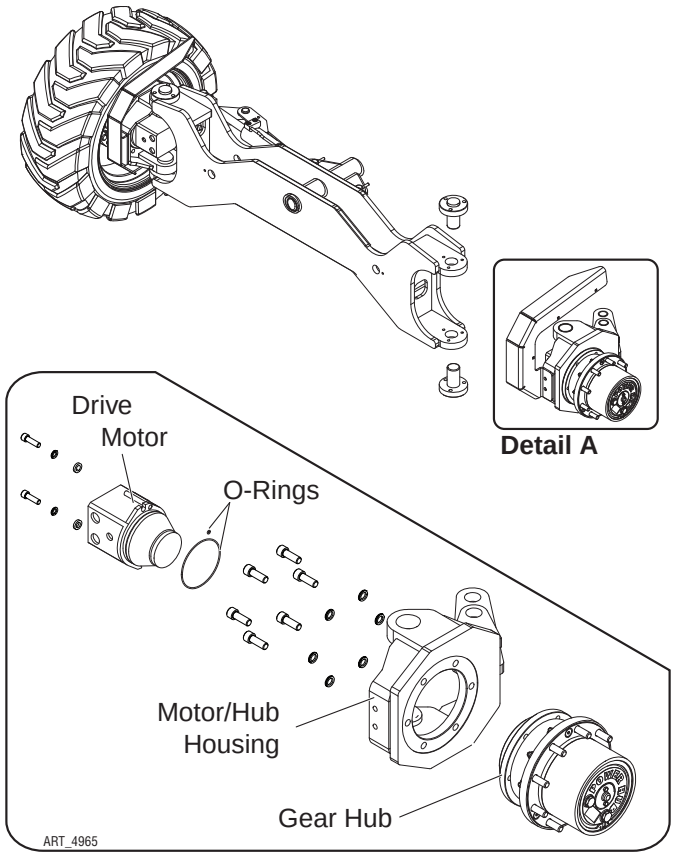
Immediately plug and cap all openings to prevent contamination.

Replace any O-rings and inspect all hoses for crack and damage before reassembly.

Refer to “Lift and Support The Machine” in Section 9 for instructions and safety precautions.

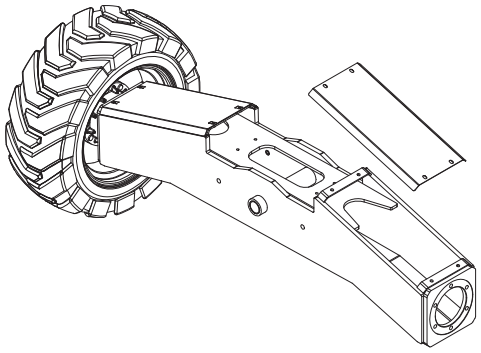
Removal - Steering Axle

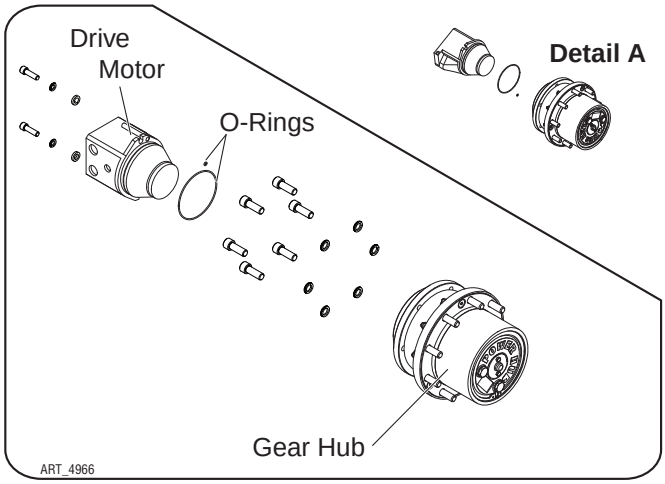
1. Raise and support the steering end of machine.
2. Remove the wheel and tire assembly.
3. Remove the retaining pins that secure the steer cylinder and the tie rod to the motor/hub housing. Rotate the housing to access the drive motor.
4. Clean all hydraulic fittings, then tag all hoses for proper reassembly.
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.



Removal - Non-steering Axle

1. Raise and support the non-steering end of machine.
2. Remove the wheel and tire assembly.
3. Remove the axle weldment cover.
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 drive motors. Contact MEC or 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

To change the oil in the gear hub:

1. Position the gear hub as shown at left.
2. Loosen and remove 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.



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.

CAUTION

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.

Engine oil should be checked daily prior to machine use. Oil should be changed after the first 50 hours of service, and every 500 hours thereafter.

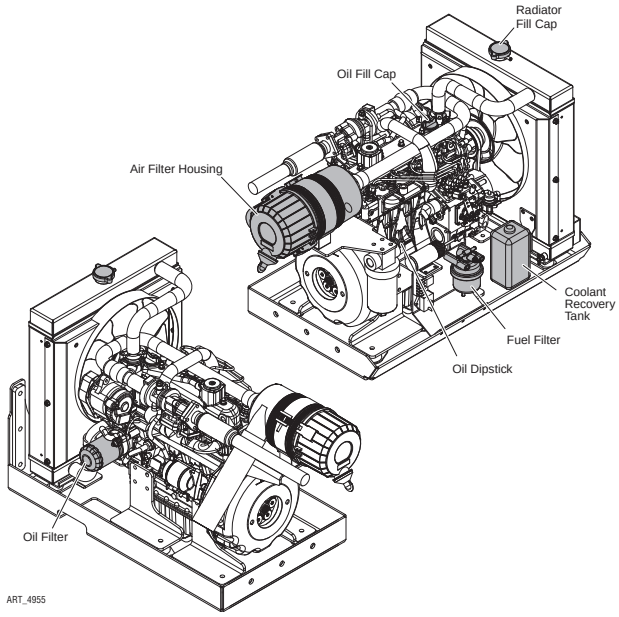
Note: The use of synthetic oil is not recommended.

Engine oil should be MIL-L-2104C or have properties of API classification CF or higher.

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 SAE10W-30 or SAE15W-40
14° ~ 77° F (-10 ~ 25° C)	SAE10W-30 or SAE15W-40
Below 14° F (-10° C)	SAE10W-30

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 appropriate motor oil until the dipstick indicates FULL. Capacity is 1.6 US gallons (6.0 L).
5. Wait 5 minutes, recheck dipstick after running engine. Fill as necessary.

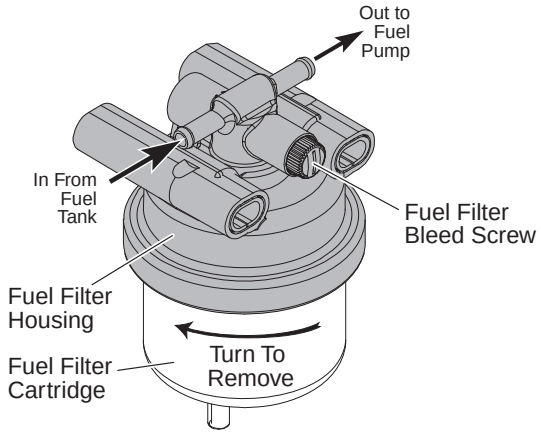


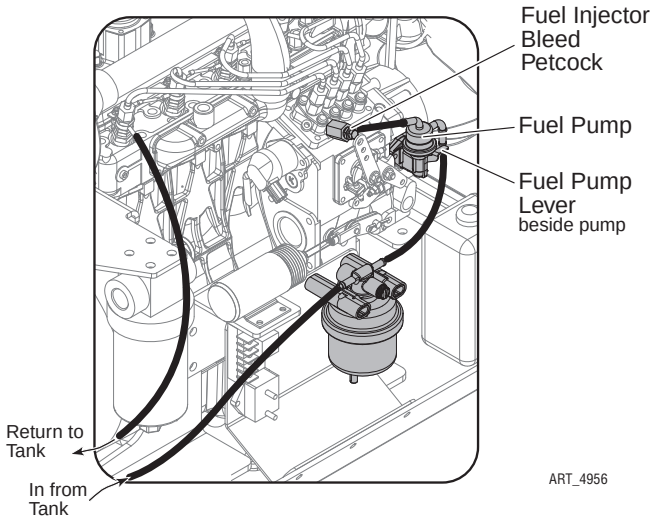
Air Filter Element

1. Clean the air filter housing 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.

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 counterclockwise 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.



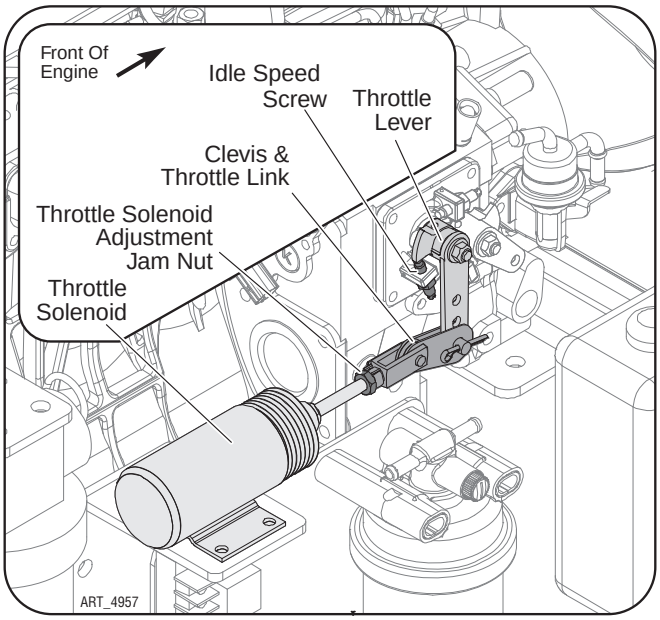


Note: The engine will crank for up to 10 seconds before the starter is cut out for a mandatory 30-second starter cooldown cycle. A red light will illuminate on the Base Control Station during the cool-down cycle.

Throttle Adjustment

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 1800. 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 Throttle Solenoid Replacement. 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, disconnect the Clevis from the Throttle Lever.
2. Manually retract the Throttle 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.

3. Have a second person rotate the Throttle Lever as far as it will go.
4. With the Throttle Solenoid piston fully retracted, adjust the Clevis until its hole lines up with the Throttle Link that is attached to the fully-rotated Throttle Lever. Reconnect the Clevis to the Throttle Link.
5. Tighten the Throttle Solenoid Jam Nut.

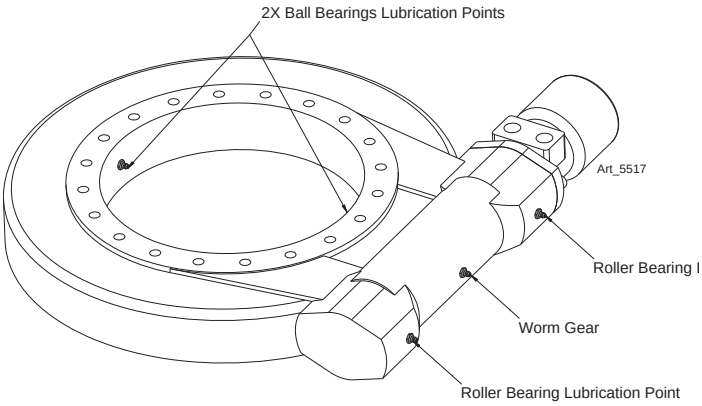
Lubrication Points

Boom Wear Pads

With the boom in the stowed position, raise the jib 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 internal sections of the boom.

Swing Bearing & Gear

1. Ball Bearing - apply approximately 15g (approximately 10 pumps on a standard grease gun) then rotate swing bearing 45°. Repeat this thru 180° of swing or 4 times.
2. Apply 325g (approximately 80 pumps on a standard grease gun) to the worm gear. Do this thru 180° of motion while swim bearing is turning.
3. While swing leveling is turning, apply 18g (approximately 4 pumps from a standard grease gun.)



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 page 92.

General Troubleshooting Tips

Hydraulic Fluid Pump

The hydraulic Drive Pump and Primary Functions Pump used in this model are variable displacement, axial piston type pumps. Proper adjustment is critical for normal operation of the machine. Refer to Section 10 - Hydraulic System of this manual.

The Secondary Functions pump is a fixed-displacement gear-type pump attached to the rear of the Primary Functions Pump.

Common Causes of Electrical System Malfunctions:

- Battery connections are loose or corroded
- Battery is not fully charged.
- Emergency Stop buttons are pushed (OFF position).
- Circuit breaker is 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 10 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 Module, 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.

WARNING

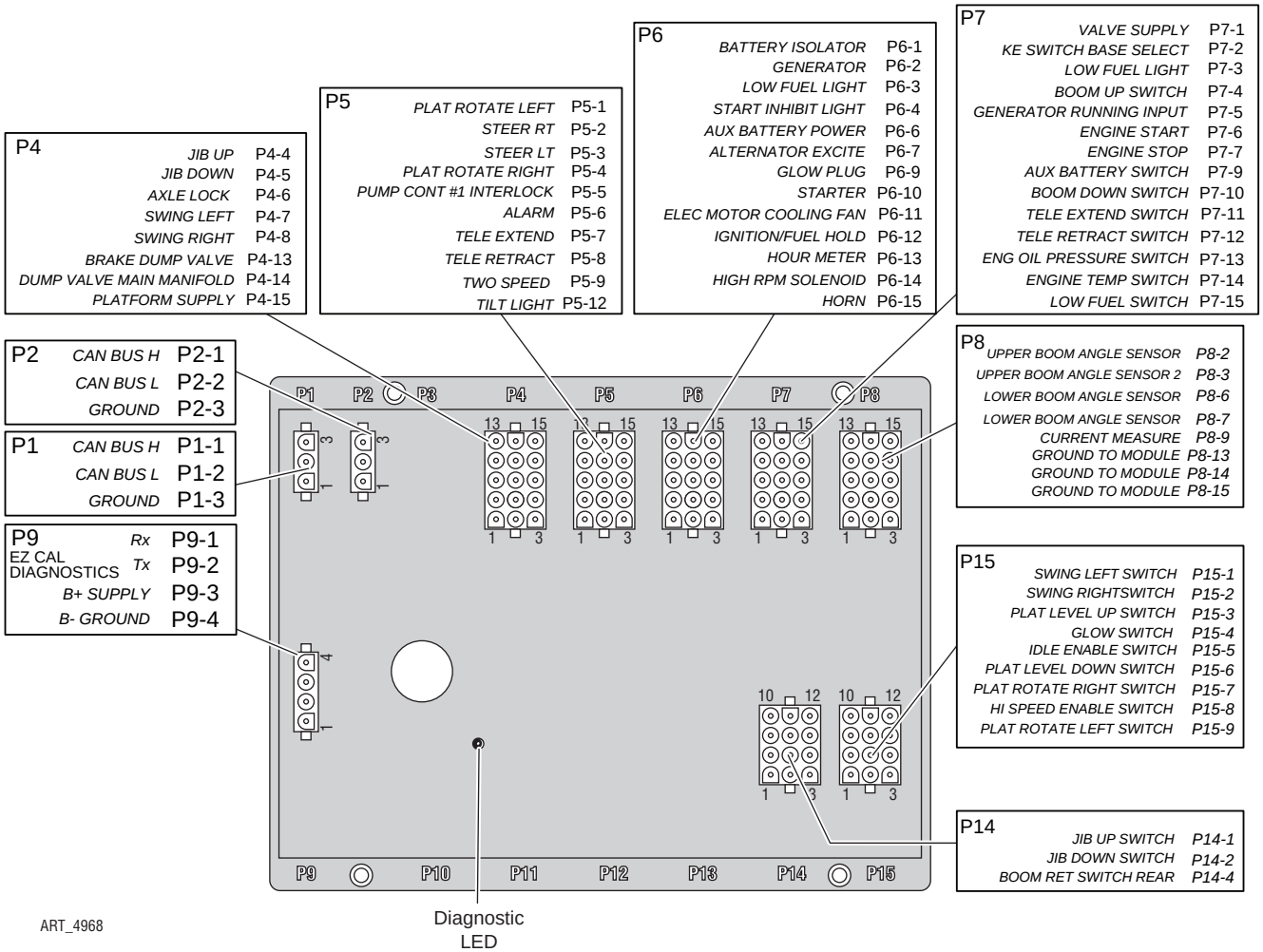
USE OF HIGH PRESSURE WASHING EQUIPMENT DIRECTLY ON THE MODULES CAN FORCE WATER INTO SEALED CONNECTIONS AND CAN CAUSE A TEMPORARY SYSTEM SHUT-DOWN. HIGH PRESSURE WASHING WITHIN THE VICINITY OF THE MODULES IS HIGHLY DISCOURAGED.

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 the 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.

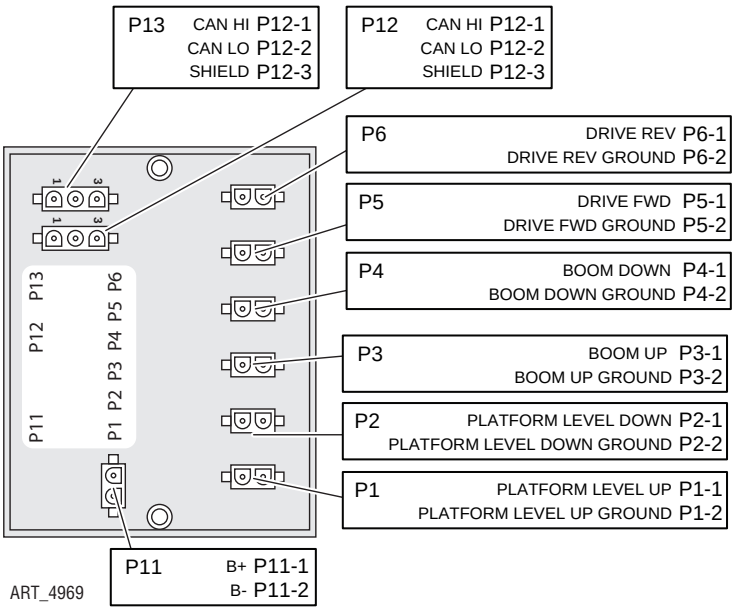
The GP400 operates on 12 volts DC and should never be probed or operated with voltage higher than 14 volts DC.



Valve Constant Current Module and Terminal Block Module

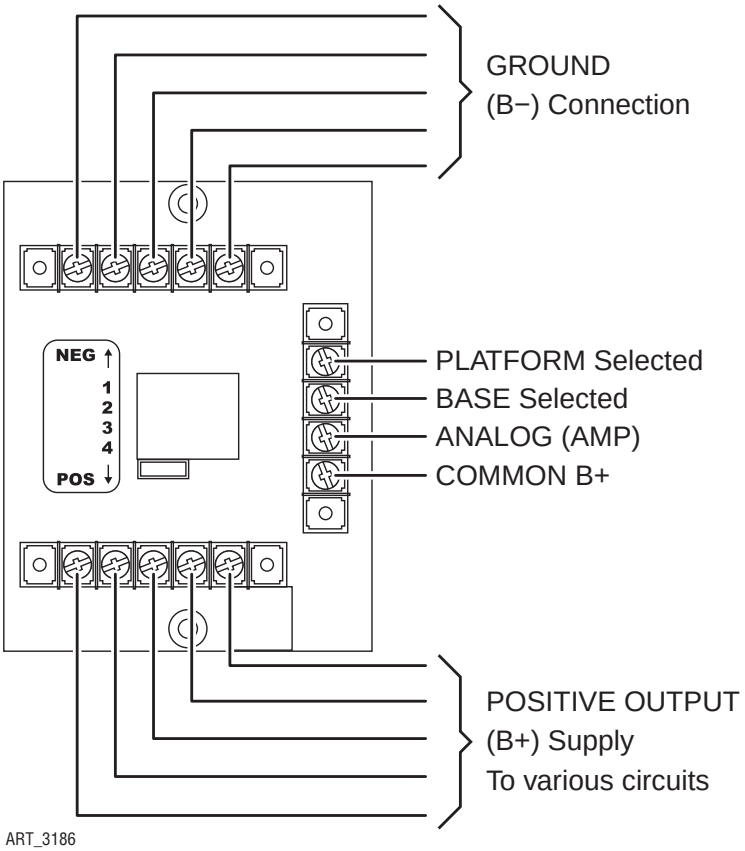
Valve Constant Current Modules (VCCM)

The Valve Constant Current Module is an auxiliary module located inside the lower control box. It controls certain proportional functions of the machine.



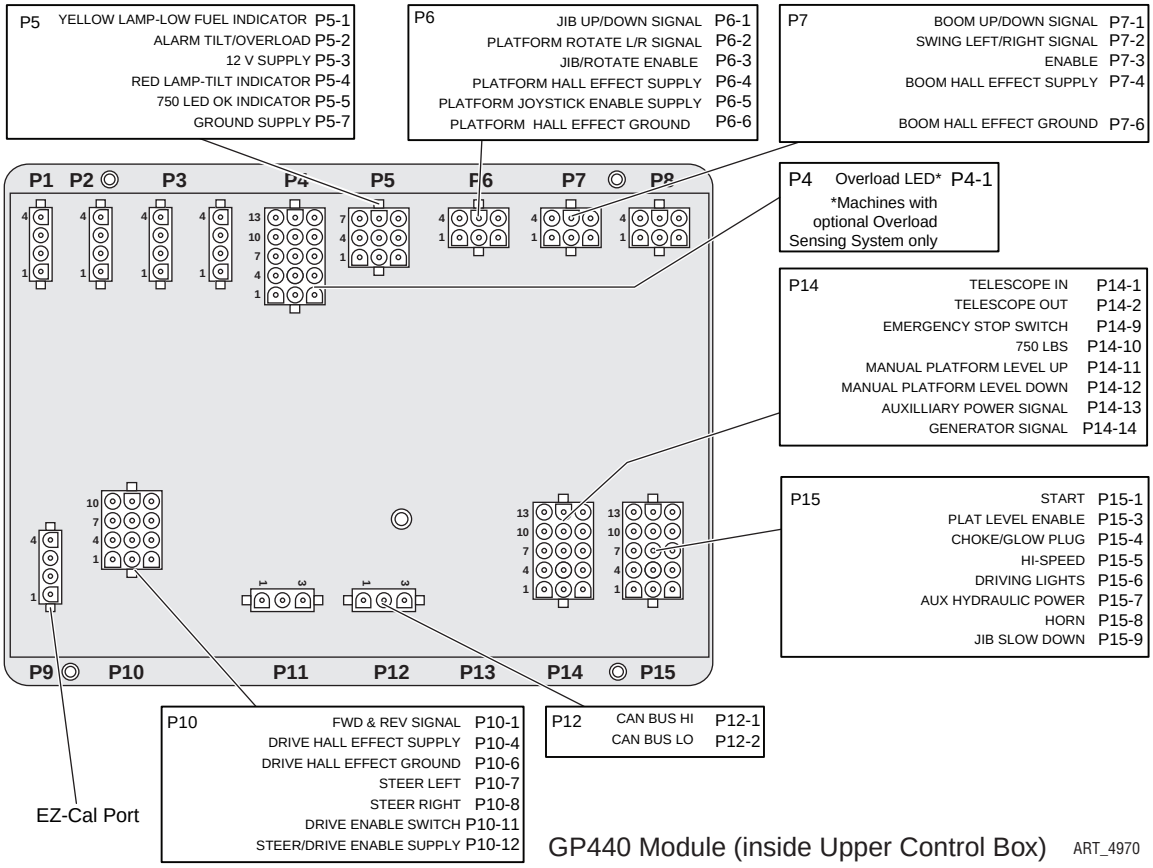
Terminal Block Module (TBM)

The Terminal Block Module (TBM) is a module inside the lower control box 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.



GP440 Module

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



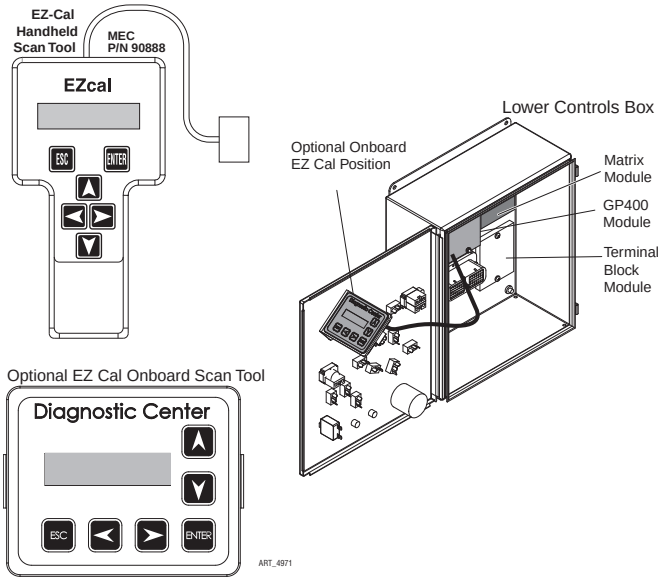
GP440 Module (inside Upper Control Box) ART_4970

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 Option -- 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.

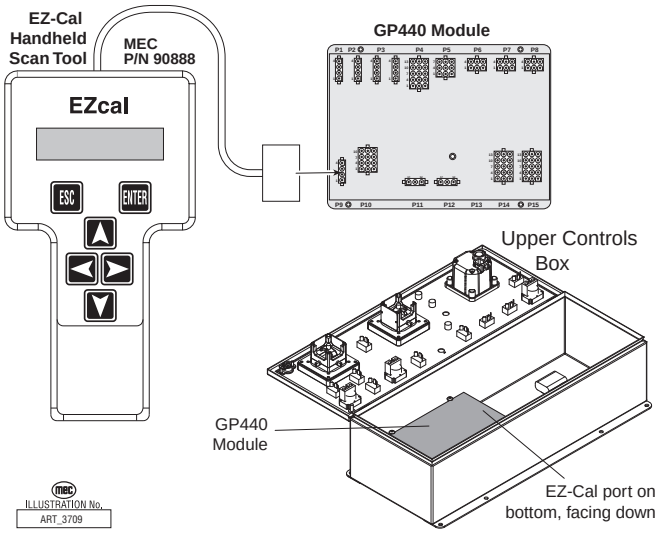


Handheld EZ-Cal -- Upper Controls Box

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.



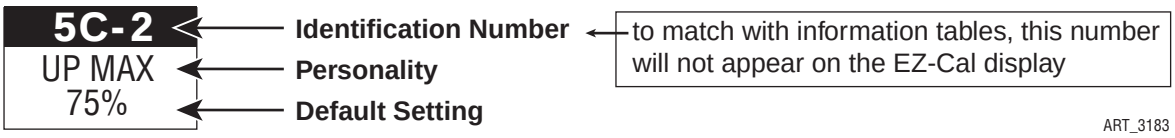
Using The EZ-Cal Scan Tool

- 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.

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

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.



The IDENTIFIER (5C2): Used to locate this specific personality in the informational charts. Here you can obtain specific information on the individual personalities.

The PERSONALITY (UP MAX): Identifies the individual personalities.

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

WARNING

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

Error Messages

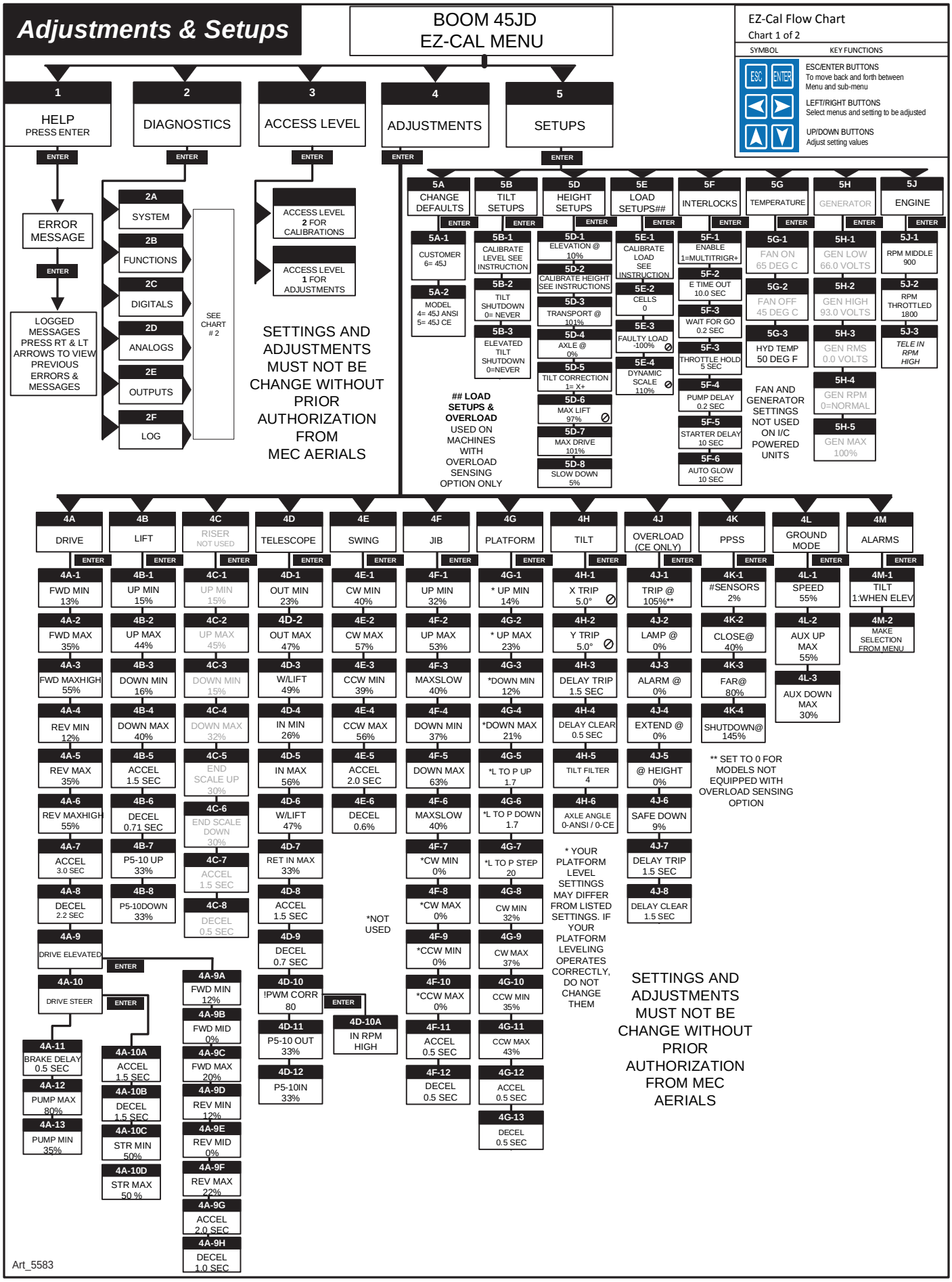
To obtain error messages from the EZ-Cal, access the EZ-Cal as mentioned above. The display will read, “HELP:PRESS ENTER”. Press ENTER to display the current error message. If an error message is present, use the following list of error messages to better understand the fault. If an error message is 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 105 for flash coded error messages.

To Serial #14700199



To Serial #14700199

DIAGNOSTIC

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

45JD BOOM EZ-CAL MENU

2 DIAGNOSTICS

ENTER

EZ-Cal Flow Chart
Chart 2 of 2

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

2A SYSTEM

ENTER

- **2A-1** ENABLED NO/YES
- **2A-2** B+ SUPPLY ACTUAL INPUT VOLTAGE
- **2A-3** TRACTION NOT USED ON DIESEL UNITS
- **2A-4** PUMP NOT USED ON DIESEL UNITS
- **2A-5** TILT STATE OF LEVEL IN DEGREES
- **2A-6** AXLE ANGLE NOT USED
- **2A-7** TILTED YES or NO
- **2A-8** HEIGHT ACTUAL IN %
- **2A-9** LOAD ACTUAL IN %
- **2A-10** OVERLOADED YES or NO
- **2A-11** ELEVATED YES or NO
- **2A-12** EXTENDED YES or NO
- **2A-13** EXTENDED #2 YES or NO
- **2A-14** TRANSPORT YES or NO
- **2A-15** PPSS YES/NO
- **2A-16** CURTIS NOT USED
- **2A-17** GEN STATE NOT USED

2A-1A PLATFORM MODE ON or OFF
2A-1B GROUND MODE ON or OFF
2A-1C VALVE SUPPLY ON or OFF
2A-1D OK to GO YES or NO
2A-2A LOW BATTERY YES or NO
2A-2B 12 VOLT SUPPLY ACTUAL
2A-2C CAPBANK NOT USED

2A-5A PLATFORM ACTUAL IN DEGREES LEVEL
2A-5B GP400 ACTUAL IN DEGREES LEVEL
2A-5C CAN TILT 151 ACTUAL IN DEGREES LEVEL
2A-5D CAN TILT 153 ACTUAL IN DEGREES LEVEL
2A-5E P ADJUST

2A-6A AXLE ANGLE LOCKED YES or NO

2A-8A HEIGHT 1 up ACTUAL IN %
2A-8B HEIGHT 2 low ACTUAL IN %

2A-10A OVERLOADED 0/L EXTEND YES OR NO

2A-15A PPSS SENSOR .5 – 4.5 VOLTS

2B FUNCTIONS

ENTER

- **2B-1** DRIVE ACTUAL
- **2B-2** STEER ACTUAL
- **2B-3** LIFT ACTUAL
- **2B-4** RISER ACTUAL
- **2B-5** JIB U-D ACTUAL
- **2B-6** JIB L-R ACTUAL
- **2B-7** BASKET U-D ACTUAL
- **2B-8** BASKET L-R ACTUAL
- **2B-9** TELE ACTUAL
- **2B-10** SWING ACTUAL
- **2B-11** INTERLOCK INFORMATION

2C DIGITALS

ENTER

2C-1 GP400 DIGITALS Lower control box INPUTS

ENTER

P7-1	(VALVE SUPPLY) POWER INPUT
P7-2	KEY SWITCH BASE SELECTED
P7-3	BOOM UP SWITCH
P7-4	KEY SWITCH PLATFORM SEL
P7-6	ENG START SWITCH
P7-7	ENGINE STOP SWITCH
P7-9	AUX BATTERY POWER
P7-10	BOOM DOWN SWITCH
P7-11	TELE EXTEND SWITCH
P7-12	TELE RETRACT SWITCH
P7-13	ENGINE OIL PRESSURE SWITCH
P7-14	ENGINE TEMP SWITCH
P7-15	LOW FUEL SWITCH
P14-1	JIB UP SWITCH
P14-2	JIB DOWN SWITCH
P14-10	BOOM RETRACT PROX SWITCH
P15-1	SWING LEFT SWITCH
P15-2	SWING RIGHT SWITCH
P15-3	PLATFORM LEVEL UP SWITCH
P15-4	GLOW PLUG SWITCH
P15-5	IDLE ENABLE SWITCH
P15-6	PLATFORM LEVEL DOWN SWITCH
P15-7	PLATFORM ROT RIGHT SWITCH
P15-8	HIGH SPEED ENABLE SWITCH
P15-9	PLATFORM ROT LEFT SWITCH

2C-2 GP440 Upper control box INPUTS

ENTER

P10-7	STEER LEFT
P10-8	STEER RIGHT
P10-11	DRIVE ENABLE SWITCH
P14-1	TELE OUT SWITCH
P14-2	TELE IN SWITCH
P14-9	EMERGENCY STOP SWITCH
P14-11	PLATFORM LEVEL UP
P14-12	PLATFORM LEVEL DOWN
P14-13	AUXILLIARY POWER SIGNAL
P15-1	START
P15-3	ENABLE, PLATFORM LEVEL
P15-4	GLOW PLUG/CHOKE
P15-5	HIGH SPEED
P15-6	DRIVING LIGHTS
P15-7	AUX HYDRAULIC POWER
P15-8	HORN
P15-9	JIB SLOW DOWN SWITCH

2C-3 MATRIX MODULE LOWER CONTROLS

ENTER

NO MATRIX DIGITALS

2D ANALOGS

ENTER

2D-1 GP400 ANALOGS Lower control box INPUTS

ENTER

P8-2	BOOM ANGLE TRNS
P8-9	TBM AMPERAGE
P8-13	GROUND TO MODULE
P8-14	GROUND TO MODULE
P8-15	GROUND TO MODULE

2D-2 GP440 Upper control box ANALOG INPUTS

ENTER

P6-1	JIB UP/DWN JSTK
P6-2	PLATFORM ROTATE L/R
P6-3	ENABLE JIB/ROTATE
P7-1	BOOM UP/DOWN
P7-2	TURRET SWING
P7-3	ENABLE BOOM/SWING
P10-1	DRIVE FWD/REV JSTK
P14-1	TELESCOPE OUT
P14-2	TELESCOPE IN
CELL P1	PLAT LOAD CELL IN MV
CELL P2	PLAT LOAD CELL IN MV

2D-3 MATRIX MODULE LOWER CONTROLS

ENTER

NO MATRIX ANALOGS

NOTE: When viewing PROPORTIONAL outputs press ENTER for actual output %

2E OUTPUTS

ENTER

2E-1 GP400 OUTPUTS Lower control box OUTPUTS

ENTER

P4-4	JIB UP VALVE
P4-5	JIB DOWN VALVE
P4-6	AXLE LOCK VALVE
P4-7	SWING LEFT VALVE
P4-8	SWING RIGHT VALVE
P4-13	BRAKE DUMP VALVE
P4-14	DUMP VALVE MAIN
P4-15	PLATFORM SUPPLY
P5-1	PLATFORM ROTATE LEFT
P5-2	STEER RIGHT VALVE
P5-3	STEER LEFT VALVE
P5-4	PLATFORM ROTATE RIGHT
P5-6	ALARM
P5-7	TELE OUT VALVE
P5-8	TELE IN VALVE
P5-9	2-SPEED VALVE
P5-12	TILT LIGHT
P6-2	GENERATOR
P6-3	LOW FUEL LIGHT
P6-4	START INHIBIT LIGHT
P6-6	AUX BATTERY POWER
P6-7	ALTERNATOR EXCITE
P6-9	GLOW PLUG (CHOKE)
P6-10	STARTER
P6-12	DIESEL STOP VALVE (IGN)
P6-13	HOUR METER
P6-14	HIGH RPM SOLENOID
P6-15	HORN

2E-2 GP440 OUTPUTS Upper control box OUTPUTS

ENTER

P4-1	OVERLOAD LIGHT (CE)
P5-1	LOW FUEL INDICATOR LT
P5-2	TILT ALARM/OVERLOAD
P5-3	12 VOLT SUPPLY
P5-4	TILT INDICATOR LT
P5-7	GROUND SUPPLY B-

2E-3 MATRIX MODULE LOWER CONTROLS

ENTER

NO MATRIX OUTPUTS

2E-4 VCCM OUTPUTS

ENTER

VCCM1	PLATFORM LEVEL UP
VCCM2	PLATFORM LEVEL DOWN
VCCM3	BOOM UP
VCCM4	BOOM DOWN
VCCM5	DRIVE FORWARD
VCCM6	DRIVE REVERSE

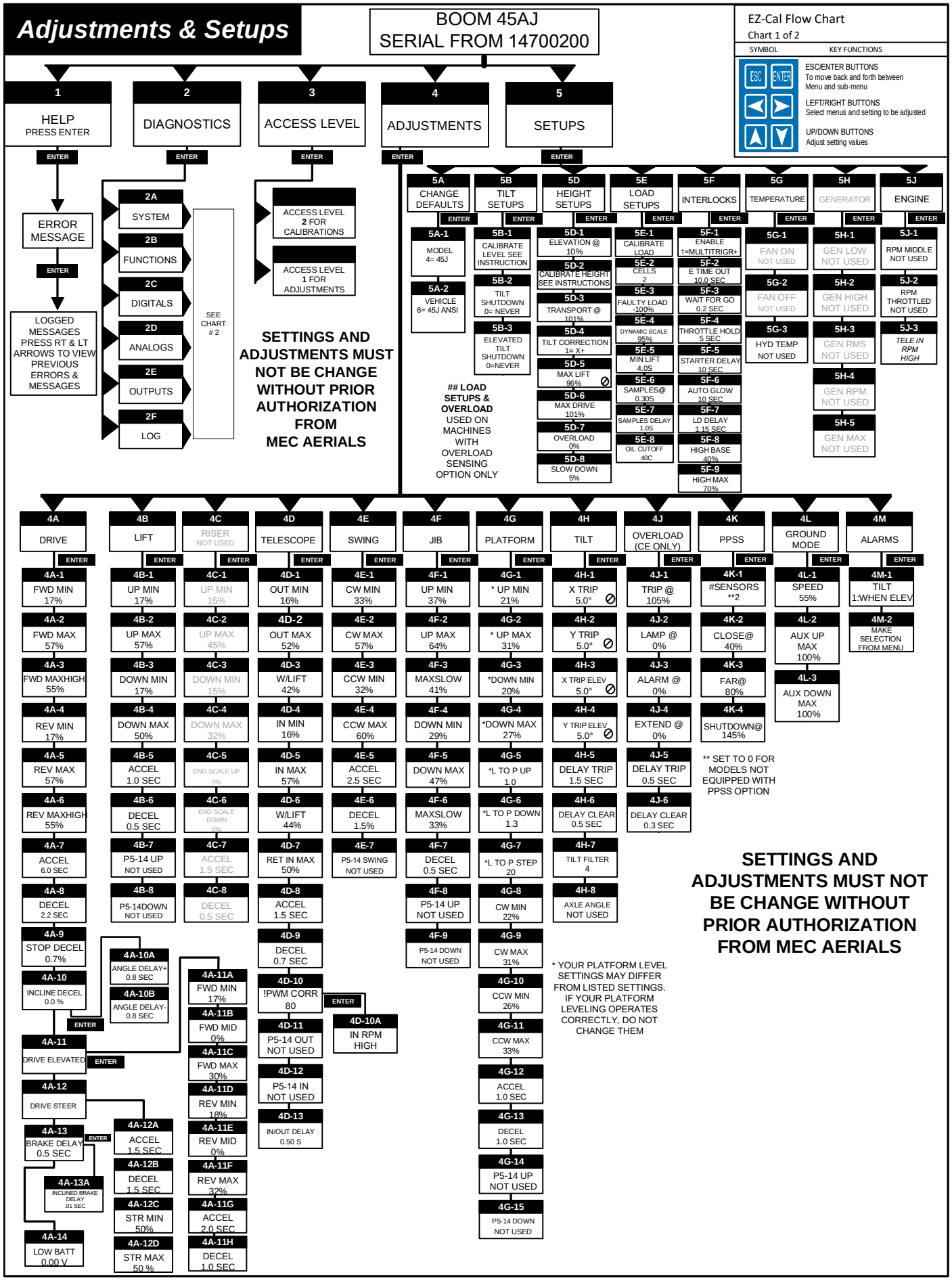
2F LOG

ENTER

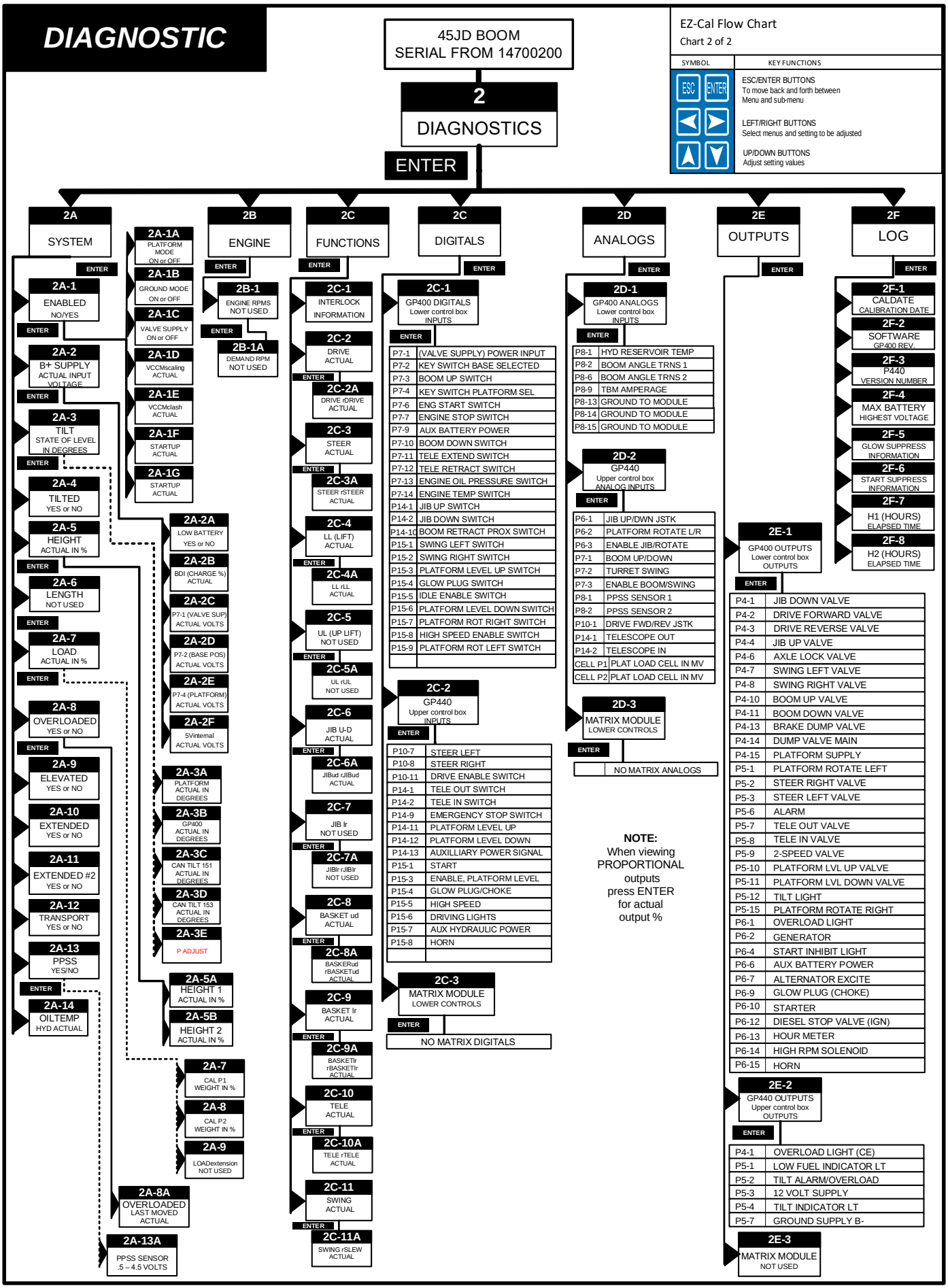
- **2F-1** CALDATE CALIBRATION DATE
- **2F-2** SOFTWARE VERSION NUMBER
- **2F-3** MAX BATTERY HIGHEST VOLTAGE

Art_5583

From Serial #14700200



From Serial #14700200



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. 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.

WARNING

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 “GP400 Calibration Procedure” 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 “GP400 Calibration Procedure” 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 “GP400 Calibration Procedure” for calibration information and 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 then 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 EZCal 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.

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 then 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

- Check for incorrect GP 400 part.

FAULT: LOW OIL PRESSURE!_____ Flash Code 7/7

- Engine Start was pushed but engine did not start or oil pressure switch did not close.
- Engine Oil Pressure is low. Check oil level.

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 inoperable functions of this machine. 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 onboard EZ-Cal scan tool, located inside the lower control box door. Please refer to “EZ-Cal Scan Tools” on page 99 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.

Problem	Possible Cause	Remedy/Solution
General Power Issue		
No operation from upper or lower control station. No LEDs on modules.	Emergency stop switch pushed in, or ignition switch turned off, or faulty switches	Lower e-stop switch and ignition switch will cut all power. Upper e-stop will cut only upper power as will the ignition switch in 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.
	Faulty Terminal Block Module (TBM)	Located inside the lower control box. Initiates all power when signaled by the key switch. Check for loose terminals. Terminal 4 is Common power from Circuit breaker. Terminals 1 and 2 are signals to close the relay.
No operation from upper or lower control station Module LEDs on or flashing	Flash codes are the GP400’s indication of a fault in the system.	Refer to flash code designation in this section of the manual or plug in an EZ-Cal scan for more relevant information relating to the failure. See EZ-Cal Instructions for more information.
	Starter Relay or Starter failure	Test for signal and Common power to Starter Relay. Check fuse for Common power to relay. Test Starter.
Operates from lower controls but not from upper controls. No LEDs when in Upper control position.	Base/Platform select switch not in Platform position or switch malfunction	Ensure that the switch is in the Platform position. Check switch function.
	Damaged or loose harness connections to upper control box	Check for power inside the upper control box on e-stop switch and at Buss Module. Check for presence of ground on the Ground Buss Module. Repair connections.
	Malfunctioning GP440 Module (Module inside the upper control box)	Check help messages using the EZ-Cal tool. Also check for joystick inputs (see 2C2 and 2D2 Diagnostic Chart for inputs from GP440).
	System interlock	Check EZ-Cal HELP messages for interlock

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 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
	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.

Problem	Possible Cause	Remedy/Solution
Engine Related Issues		
7-7 Flash code on GP400	Indicates an attempt to start was sent by the GP400 but the oil pressure switch did not close.	Check all the above
Starter cranks but engine will not start	Low fuel reservoir	Check/fill fuel reservoir. Fuel system requires air purge after loss of fuel.
	Air trapped in the fuel system	Purge air from the fuel system (See Section 18 - Mechanical Components for instructions). Check fuel reservoir level or for leaks in the fuel hoses.
	Restriction in the fuel system	Replace fuel filter. Check fuel supply hoses
	Malfunctioning fuel solenoid	Check/replace fuel solenoid located on the top of the injection pump.
	Malfunctioning glow plugs (cold climates)	Test/ replace grid heater relay, fuse and grid heater
	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 controller, solenoid or blown fuse	Test/replace throttle controller 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

Problem	Possible Cause	Remedy/Solution
Boom Lift/Lower		
Platform will not raise	Excessive weight on platform	Reduce weight to within platform capacity
	Machine out of level (platform elevated above 10')	Indicator light will be illuminated and alarm will sound off. Reposition machine to level ground.
	Main relief valve (6) out of adjustment	Adjust main relief valve (6) to rated platform capacity located on function manifold - See Section 10 - Hydraulic System.
	Lift valve (8.1) not energized	Check wiring to lift valve. Check for EZ-Cal message or flash code
	Lift valve (8.1) not shifting	Clean debris. Check for damage/replace.
	Solenoid valve (18) dump valve not energized	Check wiring to valve. Check EZ-Cal ref. P4-14 for output.
	Solenoid Valve (18) load sense dump not shifting	Clean debris. Check for damage/replace.
	Main system pressure inadequate	Check pump output flow and pressure
	Lift/Lower joystick inoperative	Check Joystick output using EZ-Cal ref. 2D-2
		P7-1 for analog joystick 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	Lowering valve SV3 not energized	Check wiring to lowering valve located inside control module - See Section 10 - Hydraulic System for location.
	Lowering valve (8.2) not shifting	Clean debris. Check for damage/replace.
	System interlock	Check EZ-Cal HELP messages for interlock
	Main system pressure inadequate	Check pump output flow and pressure
Emergency lowering not working	Battery discharged, not charging	Check/charge battery. Check charge Isolator relay and fuse. Check alternator output (14.5 volts)
	Auxiliary power unit malfunction	Check APU located beside lower control box
	Emergency Down switch failure	Check/replace switch.
	Lowering valve (8.2) not shifting	See "Platform will not lower or lowers slowly"
	Counterbalance valve (on lift cylinder) not adjusted correctly	Contact Factory Technical Support for instructions for counterbalance valve adjustment
	System interlock	Check EZ-Cal HELP messages for interlock

Problem	Possible Cause	Remedy/Solution
Boom Extend/Retract		
No boom extension	Excessive weight on platform	Reduce weight to within platform capacity
	Level sensor out of level (platform elevated above 10')	Indicator light will be illuminated and alarm will sound off. Reposition machine to level ground
	Main relief valve (6) out of adjustment	Adjust main relief valve (6) to rated platform capacity located on function manifold - See Section 10 - Hydraulic System.
	Solenoid valve (18) (dump valve) not energized	Check wiring to valve. Check EZ-Cal ref. P4-14 for output
	Ext/Retract valve (8.2) not energized	Check wiring to lift valve. Check for EZ-Cal message or flash code.
	Extend/Retract valve (8.2) not shifting	Clean debris. Check for damage/replace.
	Ext/Retract joystick inoperative	Check joystick output using EZ-Cal ref. 2D-2, P14-1 & P14-2 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 slow	Excessive weight on Platform	Reduce weight to rated platform capacity
	Main relief valve (6) out of adjustment	Adjust extend relief valve (See Section 10 - Hydraulic System) located on function manifold.
	Extend/Retract valve (8.2) not shifting completely	Clean debris. Check for damage/replace.
	Extend Speed adjustment reduced in GP400 Module	Use the EZ-Cal and check/adjust setting. See ADJUSTMENTS/TELESCOPE OUT MAX
No boom retract	Main relief valve (6) out of adjustment	Adjust main relief valve (6) to rated platform capacity located on function manifold - See Section 10 - Hydraulic System.
	Foreign debris stuck in boom slide pads	Inspect/ clean slide pads.
	Solenoid valve (18) (dump valve) not energized	Check wiring to valve. Check EZ-Cal ref. P4-14 for output.
	Ext/Retract valve (8.2) not energized	Check wiring to lift valve. Check for EZ-Cal message or flash code.
	Extend/Retract valve (8.2) not shifting	Clean debris. Check for damage/replace.
	Ext/Retract joystick inoperative	Check joystick output using EZ-Cal ref. 2D-2, P14-1 & P14-2 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

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 (19) valve not energized	Check wiring to valve. Check output from VCCM P-1.
	Platform Level solenoid valve (19) sticking	Remove valve and inspect for debris or damage. Replace valve located up on the side of the boom.
	Counterbalance valve faulty	Valve must not be tampered with. Replace valve.
	Flow Compensator valve (20) not shifting	Clean debris. Check for damage/replace.
Platform will not remain level while elevating or lowering platform (level cylinder moving too slow or fast)	Excessive weight on platform	Reduce weight to within platform capacity
	Main relief valve (16) out of adjustment	Adjust main relief valve (See Section 10 - Hydraulic System) located on function manifold.
	Platform level solenoid valve (19) not shifting completely	Clean debris. Check for damage/replace.

Problem	Possible Cause	Remedy/Solution
Platform Auto-Level		
Platform will not remain level while elevating or lowering platform (level cylinder moving too slow or fast)	Flow compensator valve (22) not shifting completely	Clean debris. Check for damage/replace.
	Adjustments in GP400 incorrect	Refer to Adjustments Flow Chart column 4F for settings that will allow leveling to be close then make slight changes until operating correctly. Contact MEC Technical Support for assistance if needed.
	Pump faulty	Test/replace pump

Problem	Possible Cause	Remedy/Solution
Platform Manual Level		
Platform level operates automatically but not manually	Platform level toggle switch inoperative	Check output from toggle using EZ-Cal. See I.D.# 2C-1, P15-3 (up) P15-6 (down) for lower control operation or 2c-2, P14-11 (up) or P14-12 (down) from upper controls.
	System Interlock	Check EZ-Cal HELP message for interlock

Problem	Possible Cause	Remedy/Solution
Turntable Rotate		
Turntable will not rotate either direction	Turntable rotate joystick inoperative	Check joystick output using EZ-Cal. See 2D2 P7-2 for signal.
	Rotate valve (11) not energizing.	Check wiring to valve Check GP400 output using EZ-Cal. See 2E1 P4-7 (left) and P4-8 (right).
	Rotate valve (11) not shifting.	Clean debris. Check for damage/replace.
	Internal damage or failure of rotator	Inspect/clean/repair
	System interlock	Check EZ-Cal HELP messages for interlock
Turntable will rotate in one direction only	Rotate valve (11) not energizing	Check wiring to valve
	Rotate valve (11) 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

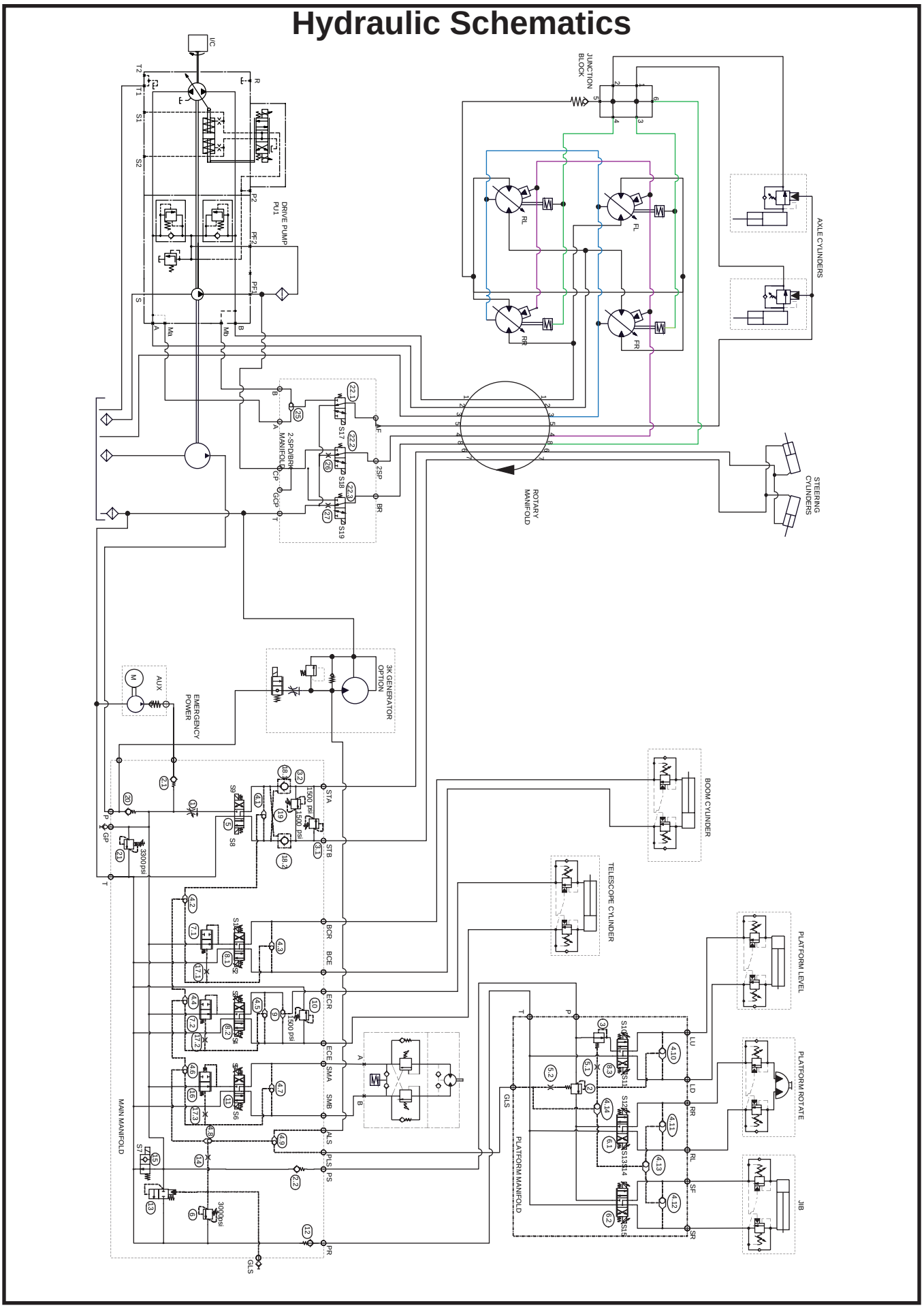
Problem	Possible Cause	Remedy/Solution
Platform Rotate		
Platform will not rotate either direction	Platform rotate joystick inoperative	Check joystick output using EZ-Cal. See 2D2 P6-2 for signal.
	Rotate valve (20-1) not energizing	Check wiring to valve Check GP400 output using EZ-Cal. See 2E1 P5-1 (left) and P5-4 (right)
	Rotate valve (20-1) not shifting	Clean debris. Check for damage/replace.
	Internal damage or failure of rotator	Inspect, clean or repair
	Flow Compensator valve (22) not shifting	Clean debris. Check for damage/replace.
	System interlock	Check EZ-Cal HELP messages for interlock
Platform will rotate in one direction only	Rotate valve (20-1) not energizing	Check wiring to valve
	Rotate valve (20-1) 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

Problem	Possible Cause	Remedy/Solution
Drive		
No drive operation	Planetary hub bypass engaged	Check bypass plates located in the center of each planetary hub. Should be convex. Turn over if not.
	System interlock	Check EZ-Cal HELP messages for interlock
	Hydraulic oil incorrect for severe low temperatures	Use hydraulic tank warmer if equipped. Operate drive continuously until drive begins to operate.

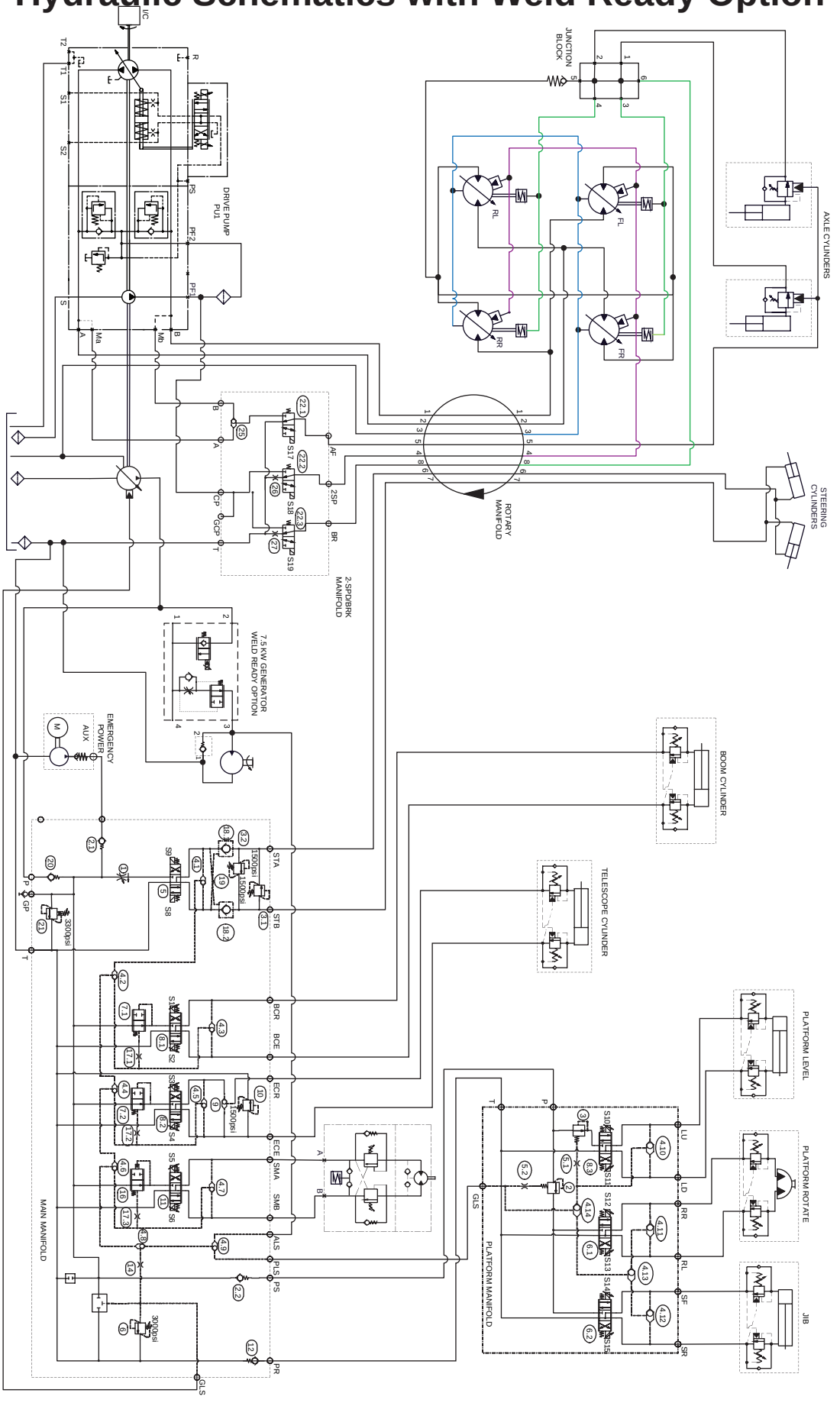
Problem	Possible Cause	Remedy/Solution
Drive		
No drive operation	Drive Valve (on drive pump) not energized	Check Drive output from VCCM Module VP5 and VP6. Check for power at valve coils located on top of the drive pump.
	Drive Valve (on drive pump) not shifting	Check drive valve for contamination
	Brakes not releasing (system under pressure when drive attempted)	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.
	Low pump stand-by pressure	Check at main manifold port GCP (see hydraulic Diagram). Adjust stand-by pressure to 300 PSI (21 bar).
	Incorrectly adjusted or worn hydraulic drive pump	See Section 10 - Hydraulic System for pump adjustment. Inspect or replace pump.
No drive with platform elevated **CE rated models	Unit out of level	Lower boom and operate on more level surfaces.
	FWD MIN, REV MIN setting incorrect	Reset drive speeds using EZ-Cal
	Hydraulic oil incorrect for severe low temperatures	Use hydraulic tank warmer if equipped. Operate drive continuously until drive begins to operate.
	Low pump stand-by pressure	Check at main manifold port GCP (see hydraulic Diagram). Adjust stand-by pressure to 300 PSI (21 bar).
	System interlock	Check EZ-Cal HELP messages for interlock
	Axles not parallel	Reposition machine on flat ground
Slow drive with platform in stowed position and boom retracted	Slow speed enabled	Check speed switch in platform box. Check 2-speed valve located on the main manifold (see hydraulic diagram).
	Hydraulic oil incorrect for severe low temperatures	Use hydraulic tank warmer if equipped. Operate drive continuously until drive begins to operate.
	Boom Retract proximity switch failure	Check for power ground & signal output to Proximity Switch located inside the rear of boom. Also check EZ-Cal 2C1, P14-10 for input.
	Low pump stand-by pressure	Check at main manifold port GCP (see hydraulic Diagram). Adjust stand-by pressure to 300 PSI (21 bar).
	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 grade-ability or drive performance	High Speed enabled	Check Speed Switch
	Wheel motor not functioning correctly	Inspect wheel motors for excessive bypass or shift not working properly
	Hydraulic oil incorrect for severe low temperatures	Use hydraulic tank warmer if equipped. Operate drive continuously until drive begins to operate.
	Planetary hub bypass engaged	Check bypass plates located in the center of each planetary hub. Should be convex. Turn over if not.
	Low pump stand-by pressure	Check at Brake/Axle manifold, should be 300psi (21 bar). Adjust stand-by pressure to 300 PSI (21 bar).
	Incorrectly adjusted or worn hydraulic drive pump	See Section 10 - Hydraulic System 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 VCCM Module	Check output from VCCM VP5 and VP6
	Drive joystick output failure	Check drive joystick output from GP400 (see 2d2, P10-1)
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).
	Boom Retract proximity switch failure	Check for power ground & signal output to Proximity Switch located inside the rear of boom. Also check EZ-Cal 2C1, P14-10 for input

Problem	Possible Cause	Remedy/Solution
Steer		
No steer in either direction	Joystick rocker switch inoperative	Check continuity through micro-switch inside joystick handle using wires outside the handle. Check output (see EZ-Cal 2C2, P10-7 and P7-8).
	Steering valve 5 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). Inspect/ replace steering valve.
	Hoses connected incorrectly	See Section 10 - Hydraulic System for correct connection.
	Steer cross-port relief valve(s) 3-1 and 3-2 set too low	Set steer relief valves to 1500 PSI (103 bar). See hydraulic diagram for relief valves location.
	System interlock	Check EZ-Cal HELP messages for interlock
Steer in one direction only	Joystick rocker switch inoperative	Check continuity through micro-switch inside joystick handle using wires outside the handle. Check output (see EZ-Cal 2C2, P10-7 and P7-8).
	Steering valve 5 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). Inspect/ 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).
	System interlock	Check EZ-Cal HELP messages for interlock
Will steer but not fully or slow steering	One or both steering cylinder internal seal failure	Check/replace steering cylinder seals.
	Steer cross-port relief valve(s) 3-1 and 3-2 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.

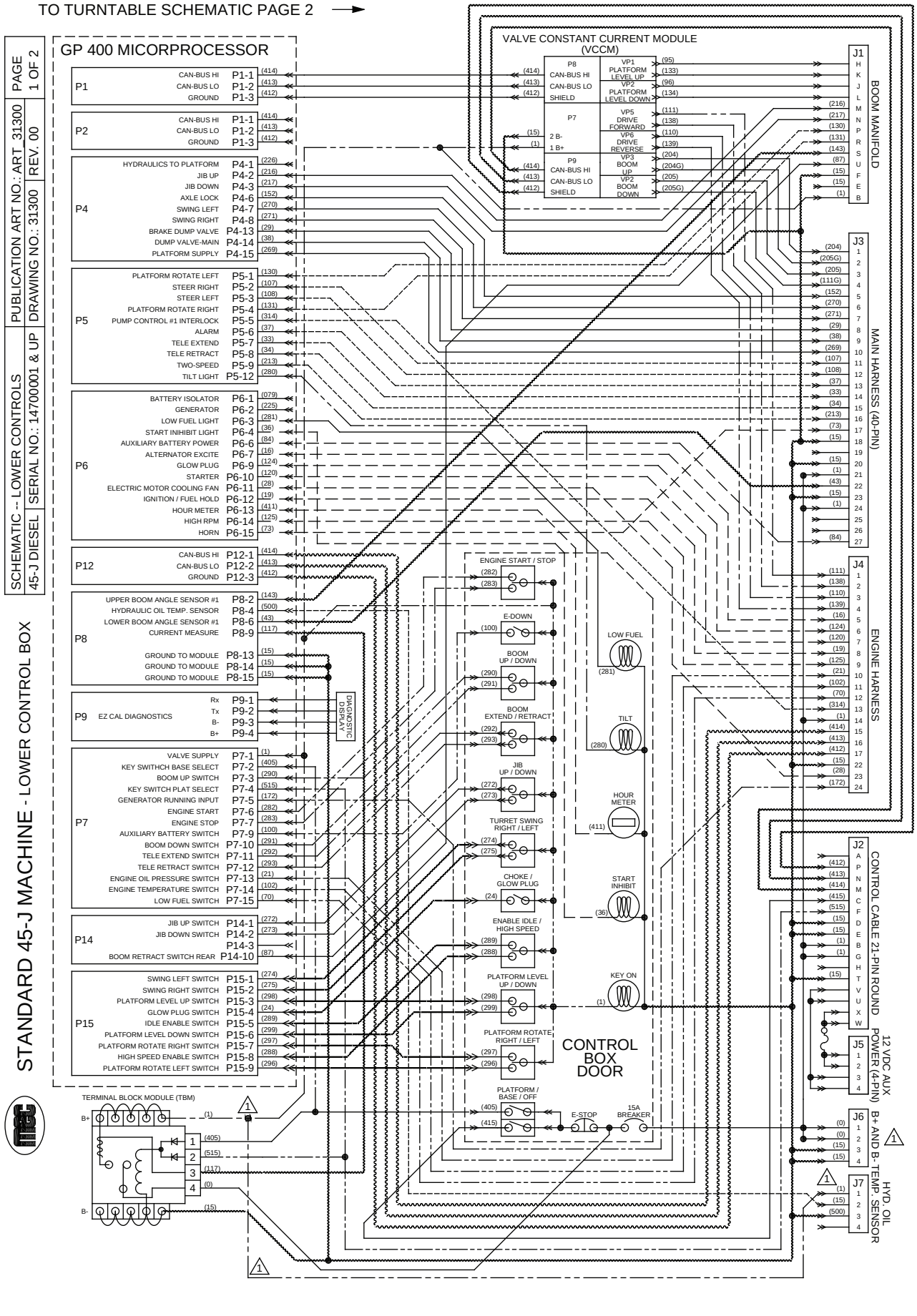
Hydraulic Schematics



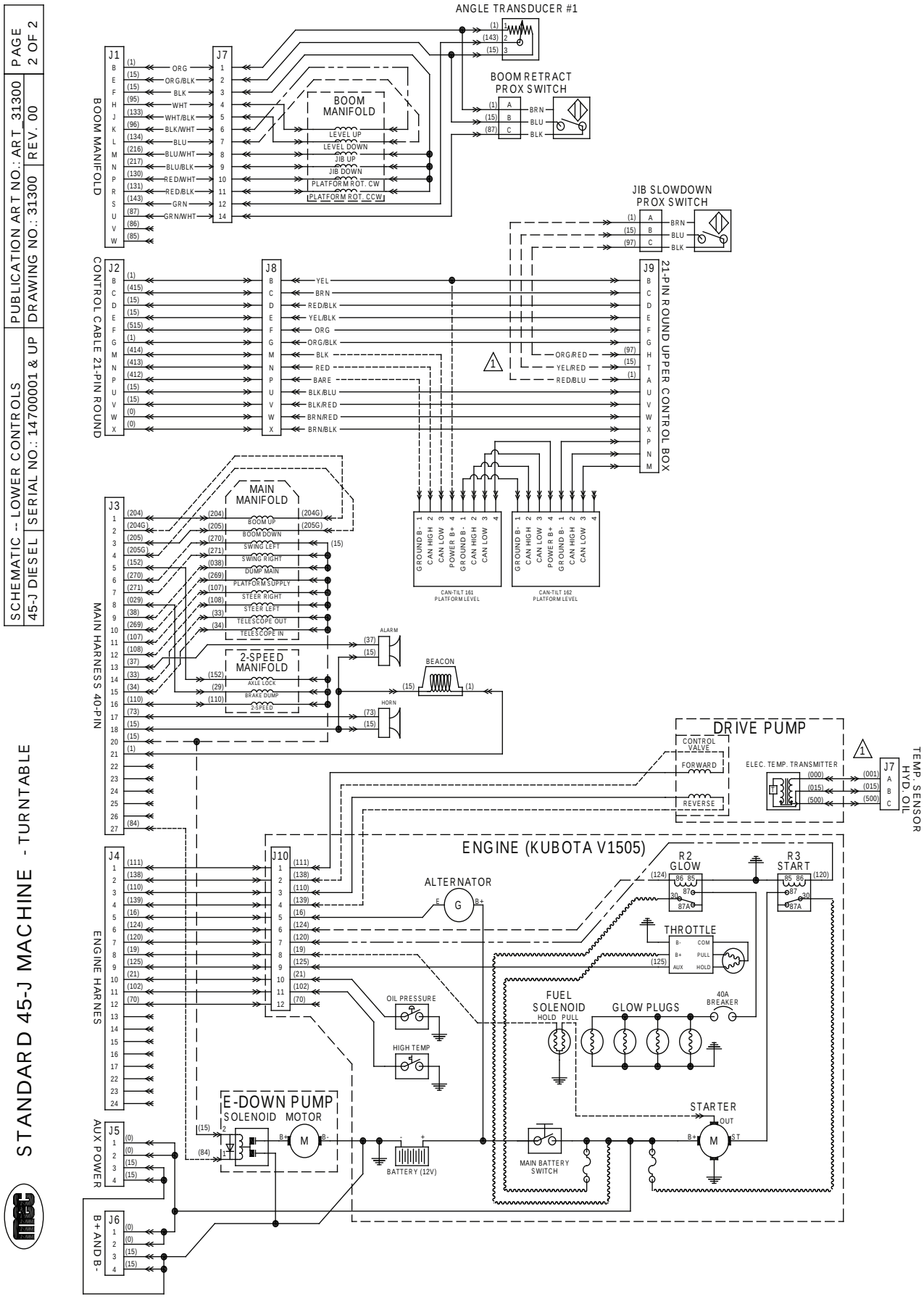
Hydraulic Schematics with Weld Ready Option



Electric Schematic, Lower Control Box, To Serial #14700199



Electric Schematic, Chassis, To Serial #14700199

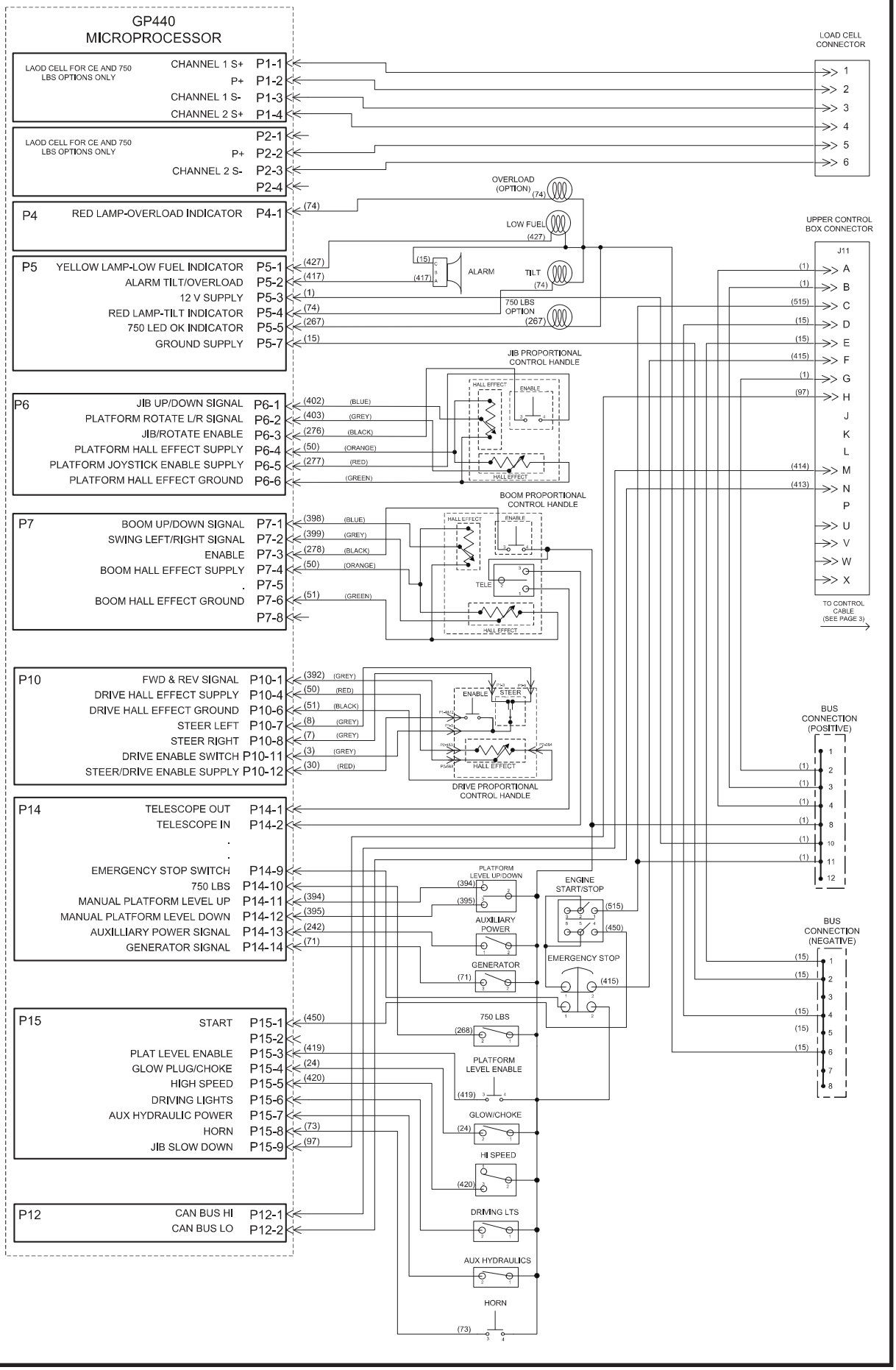


Electric Schematic, Upper Controls Box, To Serial #14700199

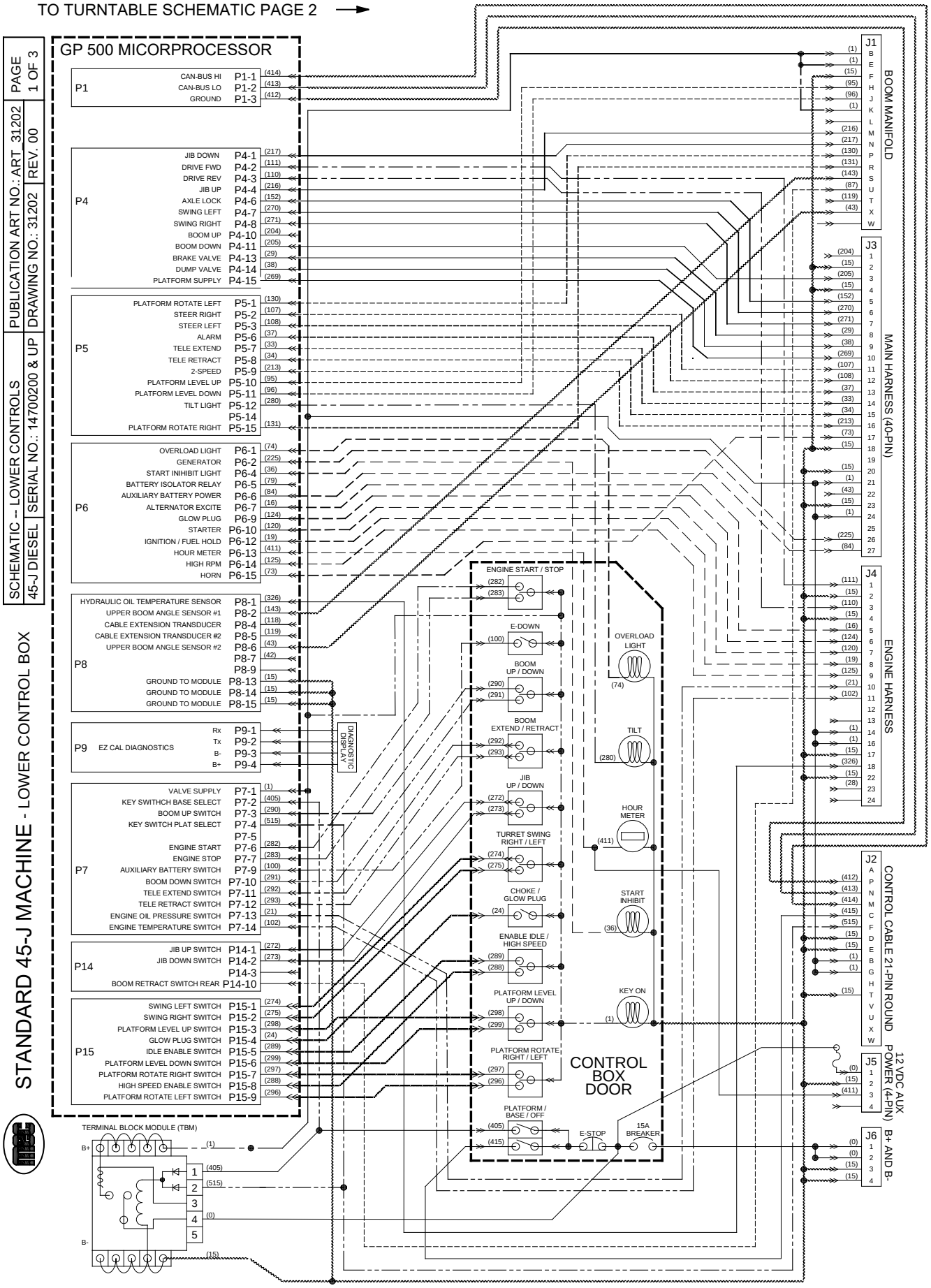
SCHEMATIC -- Lower Controls | 60-J Diesel | Serial #14400001- UP

Publication Art #: ART_4921 Reference Art #: 28872

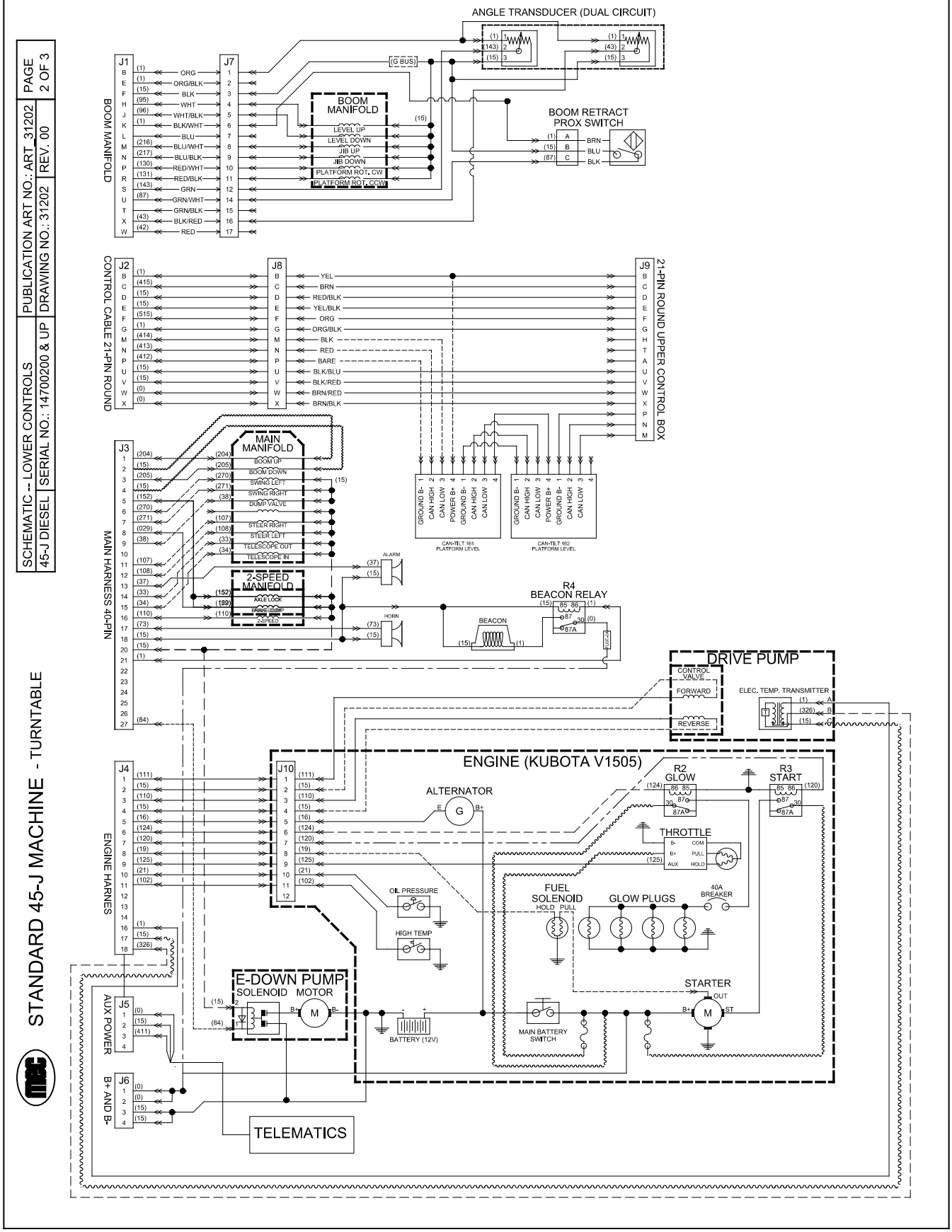
ALL MACHINES -- Upper Controls Box



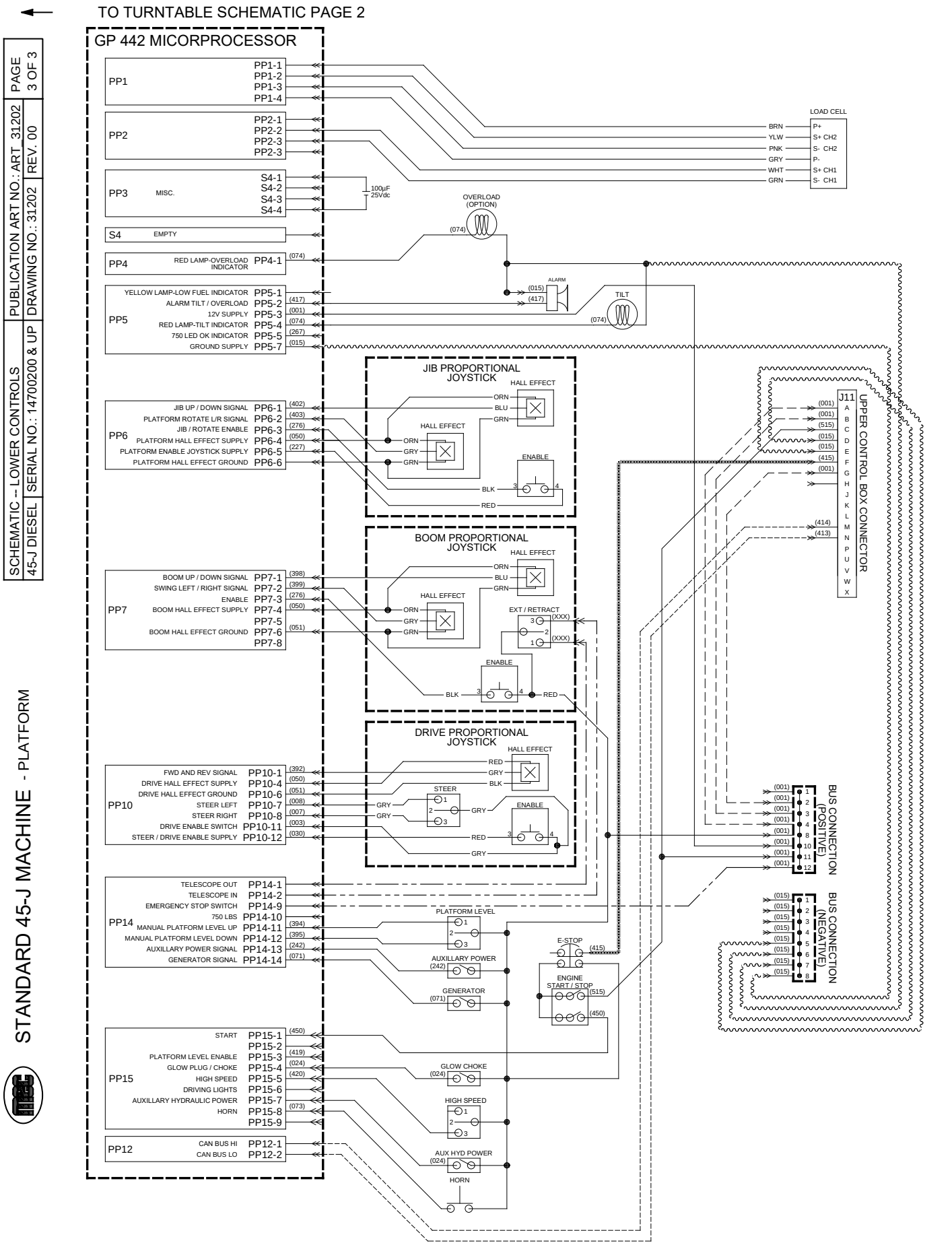
Electric Schematic, Lower Control Box, From Serial #14700200



Electric Schematic, Chassis, From Serial #14700200



Electric Schematic, Upper Controls Box, From Serial #14700200



Notes

Parts Introduction

This Parts sections consists of illustrated parts sections and is designed to provide you, the customer, with illustrations and the list of associated parts needed to properly maintain the MEC self-propelled aerial work platform. When used in conjunction with the Service section in this manual and the Operator's 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 Platforms, 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, and the Service and Parts Manuals in order to gain a thorough understanding of the unit prior to making any repairs.

The following list is a quick reference of the parts ordered most often.
Please consult parts diagrams for additional information

Part Number	Description
8665	Filter, Engine Oil
91123	Filter Element, Fuel
93907	Filter Element, Air Cleaner
92169	Filter Element, Hydraulic Charge Pump
92397	Filter Element, Hydraulic Oil Return
8082	Block-Contact, N/O
6234	Switch, Toggle, 2 Pos. SPDT
6905	Switch, Toggle, 3 Pos. Maint.
91954	Switch, toggle 3 Pos. Momentary
9549	Switch, Keyed Selector
92032	Sensor, Proximity
92201	Sensor, CAN-Tilt #1
92203	Sensor, CAN-Tilt #3
90844	Angle Transducer
91375	Relay, 12 Volt
94685	Joystick Boom Control
93773	Joystick Jib Control
94687	Joystick Drive Control
93817	Latch, Rubber Door
84091	Deutsch Connector Assortment
*94574	O-Ring Assortment, Boss type
*50972	Fitting, Quick Disconnect, Manifold
*93027	Fitting, Quick Disconnect, Gauge
*90888	Scan Tool (EZ-Cal)

* Tools and Supplies

Upper Controls Box, Part 1

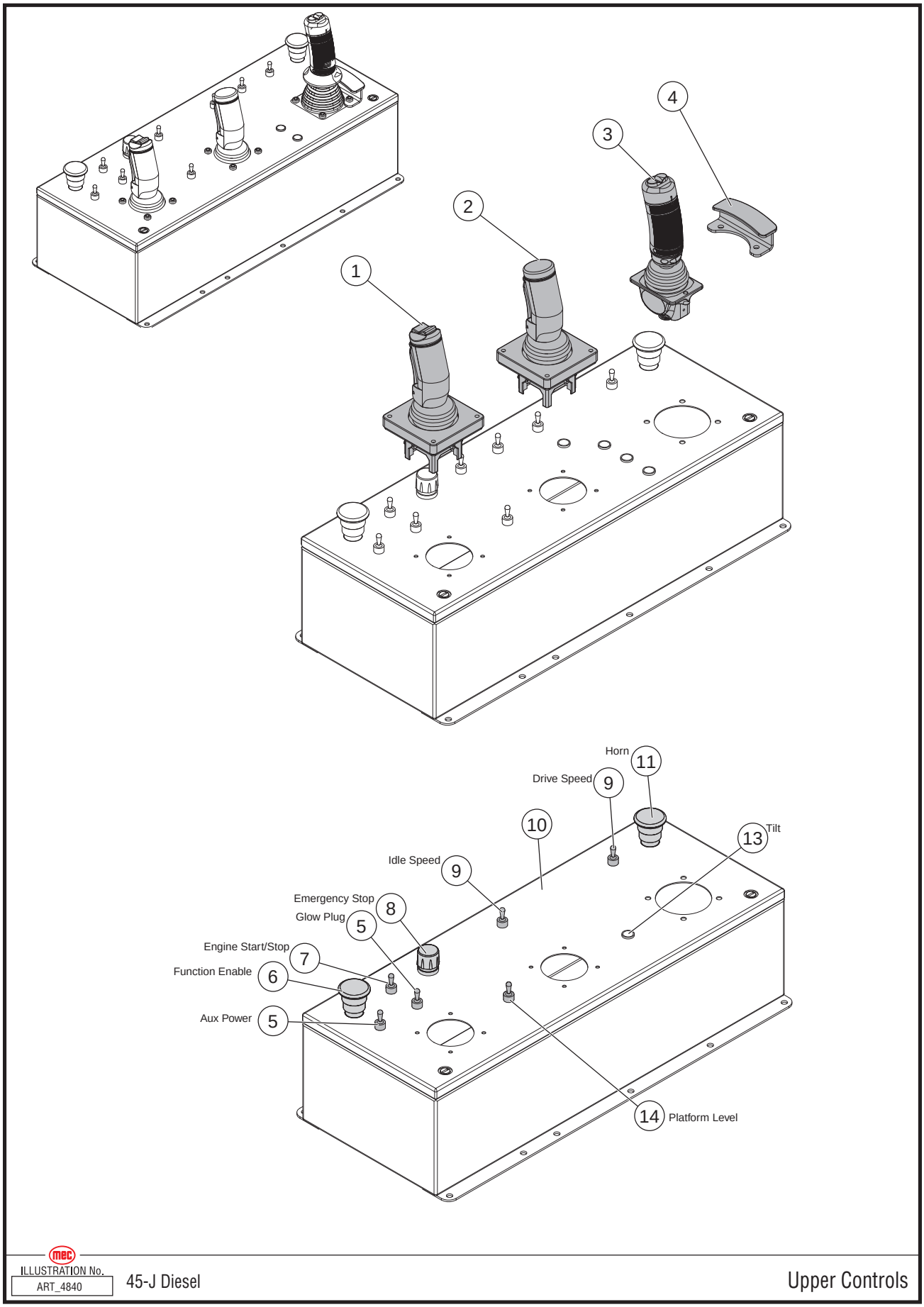


ILLUSTRATION No. ART_4840

45-J Diesel

Upper Controls

Item	Part Number	Description	Qty.
1	94685	PQ Controls - Boom Control Handle	1
2	94686	PQ Controls - Platform Control Handle	1
3	94687	PQ Controls - Drive Control Handle	1
4	28581	Palm Rest	1
5	7423	Switch, 2 Position Momentary	2
6	92422	Enable Button	1
7	92427	Switch, 3 Position, Single Momentary	1
8	92408	Emergency Stop Button	1
9	6234	Switch, 2 Position	2
10	93688	Decal, Upper Controls, 60J-D	1
11	92421	Horn Button	1
13	92253	Light, Amber	2
14	91954	Switch, 3 Position Momentary	1

Upper Controls Box, Part 2

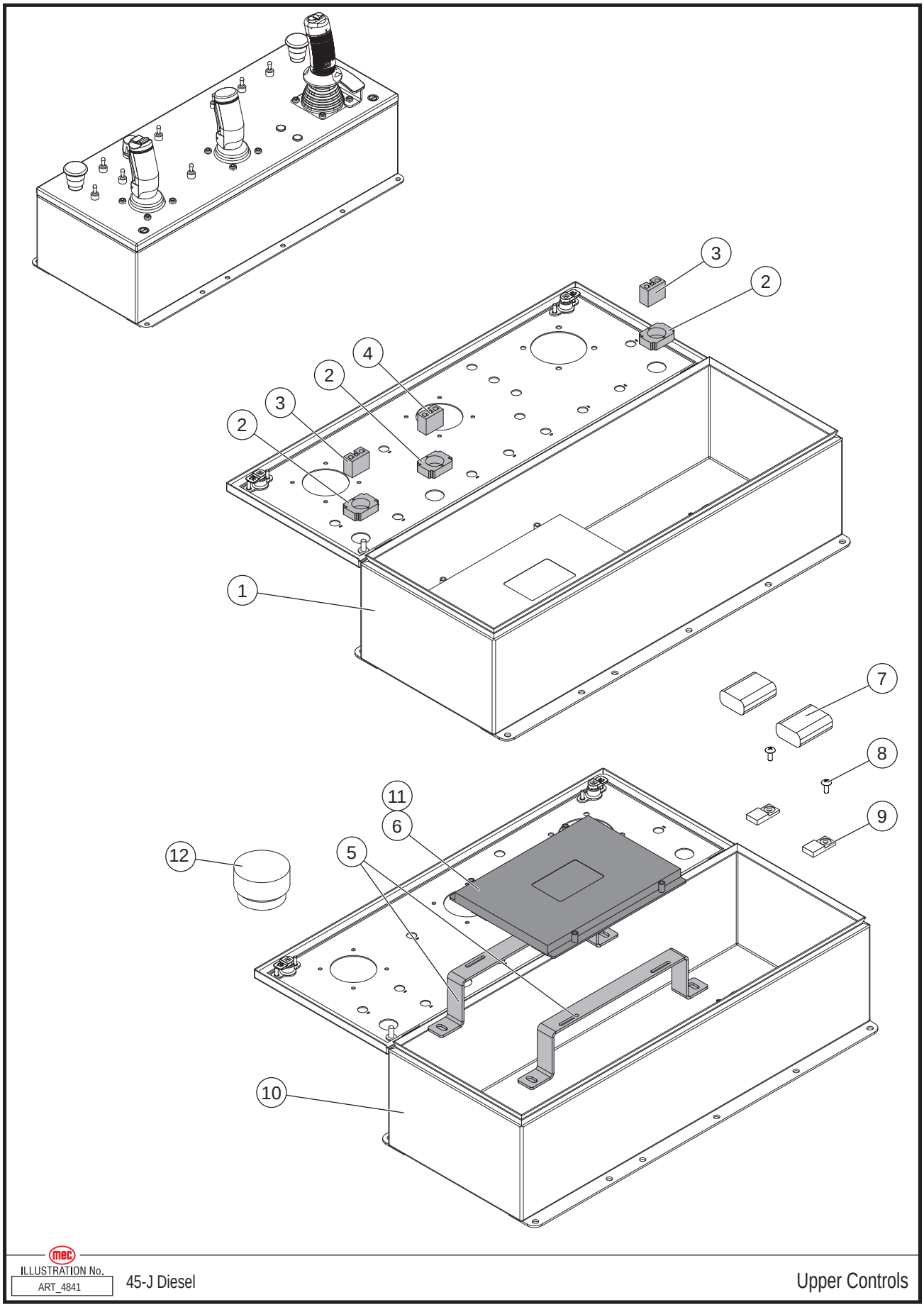


ILLUSTRATION No. ART_4841

45-J Diesel

Upper Controls

Item	Part Number	Description	Qty.
1	28781	Upper Controls Enclosure	1
2	90714	Switch Base	3
3	8082	Contact Block, Normally Open	2
4	8083	Contact Block, Normally Closed	1
5	28779	Bracket	1
--	50191	THMS #10-32X00.50 ZP	4
6	92027	GP440 Module (Up To Serial #14700199)	1
	95236	GP442 Module (From Serial #14700200)	1
--	50330	THMS #10-32X01.00 ZN Phillips (Not Shown)	4
--	50238	NNYL #10-32 05 Z (Not Shown)	4
7	92033	Buss Module	2
8	50191	Screw, THMS #10-32 × 0.5	2
--	50238	NNYL #10-32 05 Z (Not Shown)	2
9	91881	Bus Mount	2
10	28785	Cable Assembly, Upper Control Box Lid Leash	1
11	92236	Decal, EZ-CAL Port	1
12	7553	Alarm, Tip Over	1

Lower Controls Box

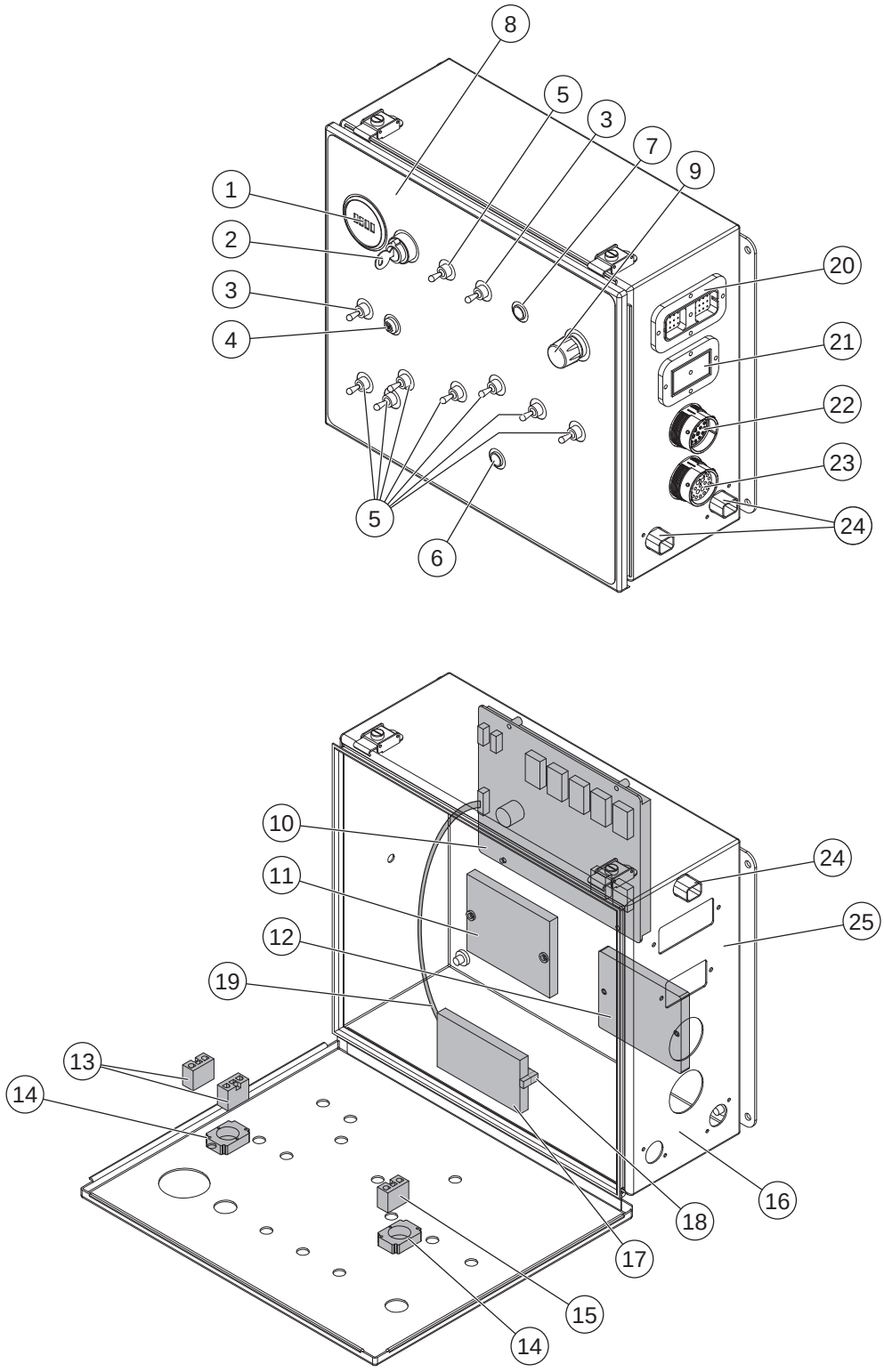


ILLUSTRATION No. ART_4842 45-J Diesel Lower Controls

Item	Part Number	Description	Qty.
1	91704	Hour Meter	1
2	9549	Key Switch	1
3	7423	Switch, 2 Position Momentary	2
4	7235	Circuit Breaker	1
5	91954	Switch, 3 Position Momentary	8
6	92253	Light, Amber	1
7	92254	Light, Red	1
8	93687	Decal, Lower Controls, 60J-D	1
9	7800	Emergency Stop Button	1
10	93900	GP400 Module (Up To Serial # 14700199)	1
	95222	GP500 Module (From Serial # 14700200)	1
--	50524	NNYL M05-0.80 Nylon Lock Nut, ZP	4
--	53325	THMS M05-0.80X025, ZP	4
11	91838	Terminal Block Module	1
--	50524	NNYL M05-0.80 Nylon Lock Nut, ZP	2
--	53325	THMS M05-0.80X025, ZP	2
12	91950	VCCM Module	1
--	50524	NNYL M05-0.80 Nylon Lock Nut, ZP	2
--	53325	THMS M05-0.80X025, ZP	2
13	8082	Contact Block, Normally Open	2
14	90714	Switch Base	2
15	8083	Contact Block, Normally Closed	1
16	28696	Lower Controls Enclosure	1
17	92003	Diagnostic Display	1
18	26571	Bracket	1
19	22626	Cable	1
--	26571	Bracket	1
--	50524	NNYL M05-0.80 Nylon Lock Nut, ZP	2
--	53325	THMS M05-0.80X025, ZP	2
20	92374	Connector, Deutsch	1
21	92307	Connector, Deutsch	1
22	92289	Receptacle	1
23	93768	Receptacle	1
24	91290	Connector Flanged, Deutsch	3
25	95297	Lanyard	1

Platform Sub-Assembly, Part 1

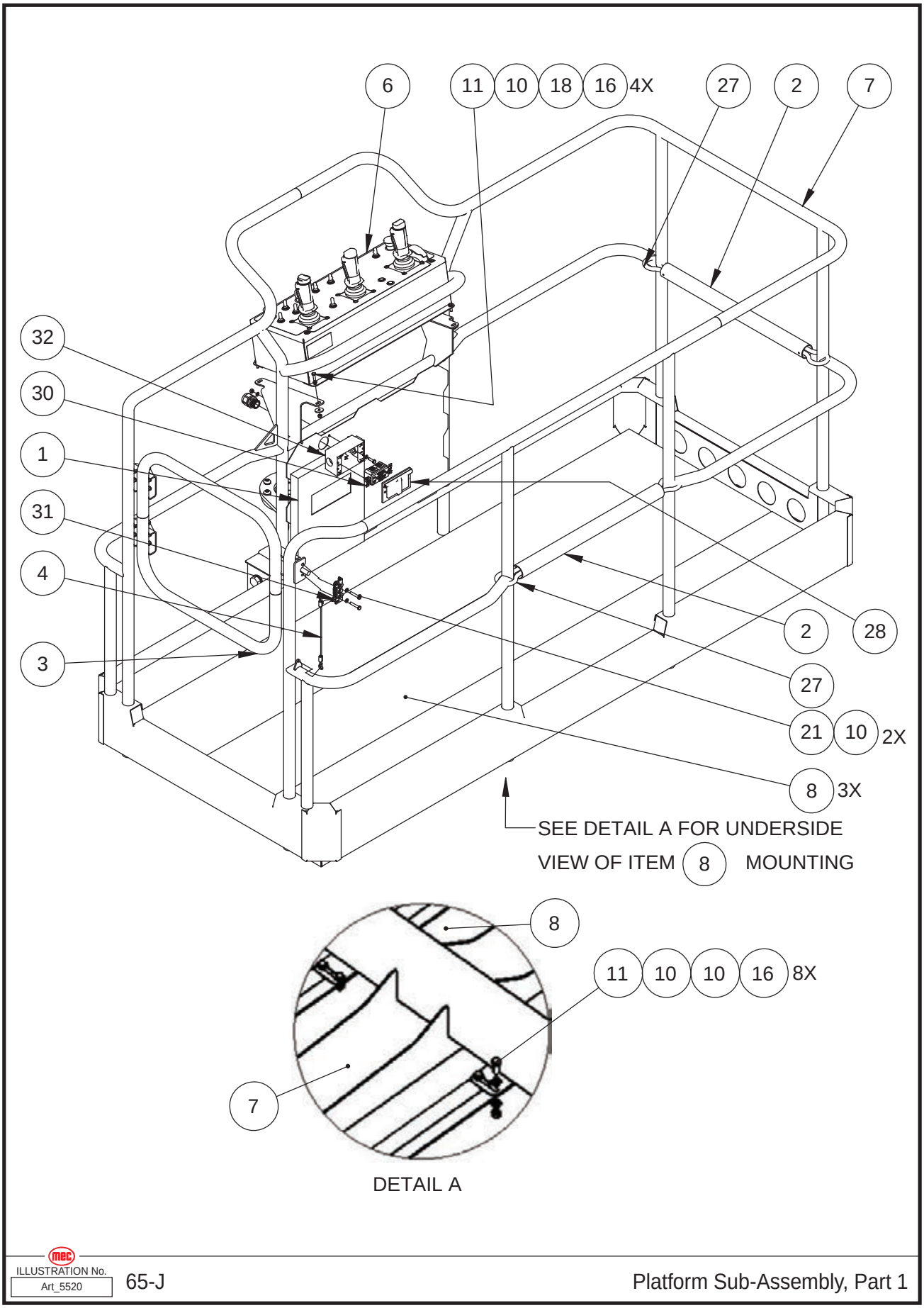


ILLUSTRATION No. Art_5520 65-J Platform Sub-Assembly, Part 1

Item	Part Number	Description	Qty.
--	31890	Platform Sub-Assembly	1
1	8909	Enclosure Service Manual	1
2	28521	Platform, Entry Slide Tube	2
3	28520	Platform, Swing Gate Weldment	1
4	28528	Platform, Swing Gate Latch Cable Assembly	1
6	28916	Upper Control Box (Refer to page 128 and page 130)	1
7	31160	Weldment, Platform, 90”	1
8	31197	Decking, Aluminum, 90”	3
9	31207	Weldment, Platform-To-Jib Mount, 45J	1
10	50000	WSHR M06 Standard Flat	52
11	50028	HHCS M06-1.00 × 20	24
16	50047	NNYL M06 × 1.00 Nylock	24
18	50068	WSHR M06 Fender	4
21	50327	HHCS M06-1.00 × 35	2
27	52674	Slide Tube Hose	2
28	91598	Cover, (Outlet Box) Weatherproof	1
30	92271	Outlet, 120V 20A GFCI	1
31	92302	Sliding Gate Latch	1
32	93871	Electrical Box, 1-Gang, Weatherproof, GFCI, 3X 3/4 NPT Outlets	1

Platform Sub-Assembly, Part 2

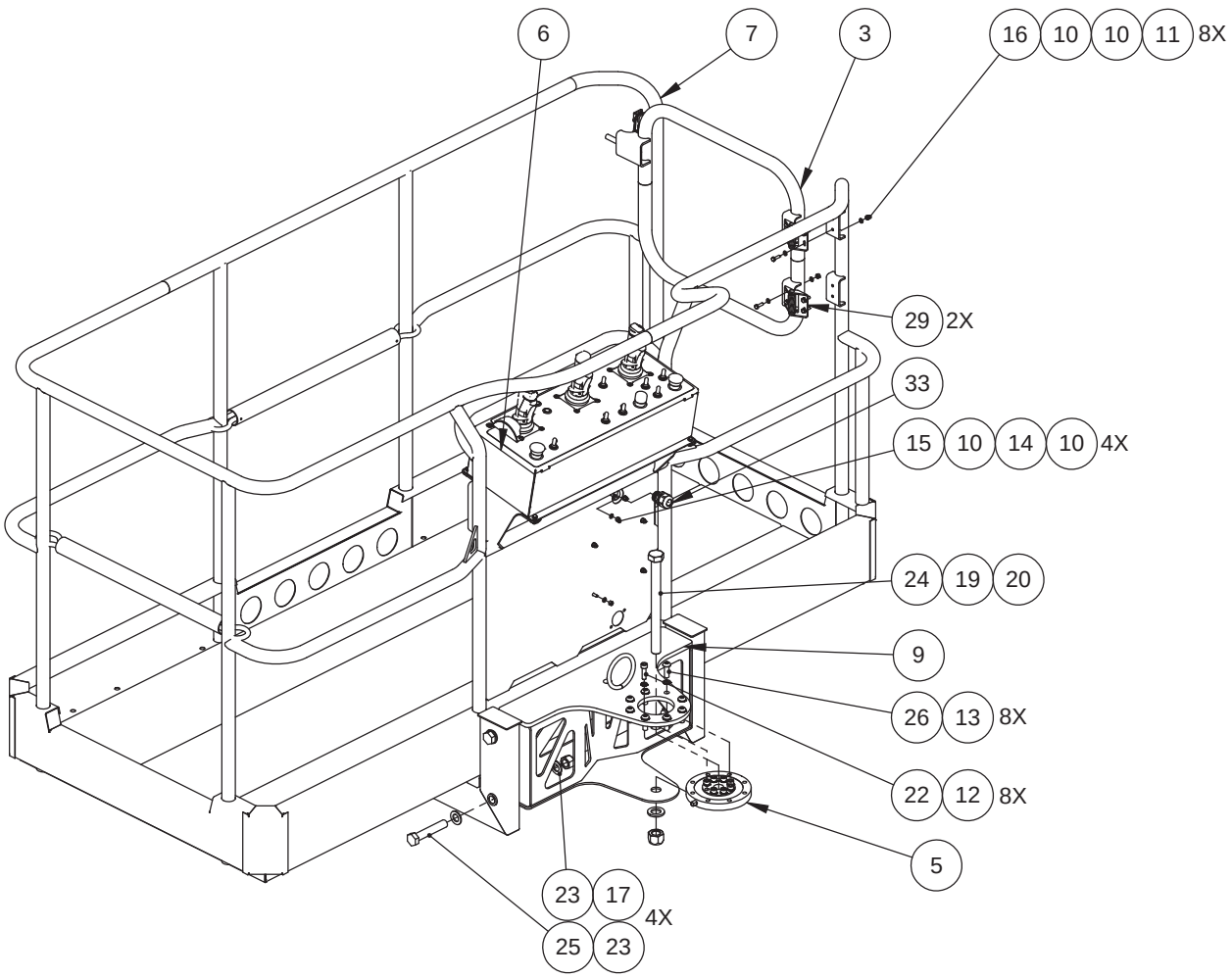


ILLUSTRATION No. Art_5520 65-J Platform Sub-Assembly, Part 2

Item	Part Number	Description	Qty.
--	31890	Platform Sub-Assembly	1
3	28520	Platform, Swing Gate Weldment	1
5	28698	Spacer, Load Ring Plate w/o Overload	1
	93868	Spacer, Load Ring Plate w/ Overload	1
6	28916	Upper Control Box (Refer to page 128 and page 130)	1
7	31160	Weldment, Platform, 90”	1
9	31207	Weldment, Platform-To-Jib Mount, 45J	1
10	50000	WSHR M06 Standard Flat	52
11	50028	HHCS M06-1.00 × 20	24
12	50006	WSHR M10 ZP Nordlock	8
13	50007	WSHR M12 ZP Nordlock	8
14	50028	HHCS M06-1.00 × 20	2
15	50047	NNYL M06 × 1.00 Nylock	4
16	50047	NNYL M06 × 1.00 Nylock	24
17	50052	NNYL M20 × 2.50	4
19	50255	WSHR M06 Standard Flat	1
20	50256	NNYL M24 × 3.00	1
22	50378	SHCS M10-1.50 × 35	8
23	50489	WSHR M20 Thru-Hardened	8
24	50593	HHCS M24-3.00 × 280	1
25	53002	HHCS M20-2.50 × 110	4
26	53018	HHCS M12-1.75 × 35	8
29	91888	Hinge, Entry Gate	2
33	93872	Strain Relief, Cord Grip, 0.44” - 0.71” Cord, 3/4 NPT, Straight, Black, Water Tight	1

Base Boom Sub-Assembly, Part 1

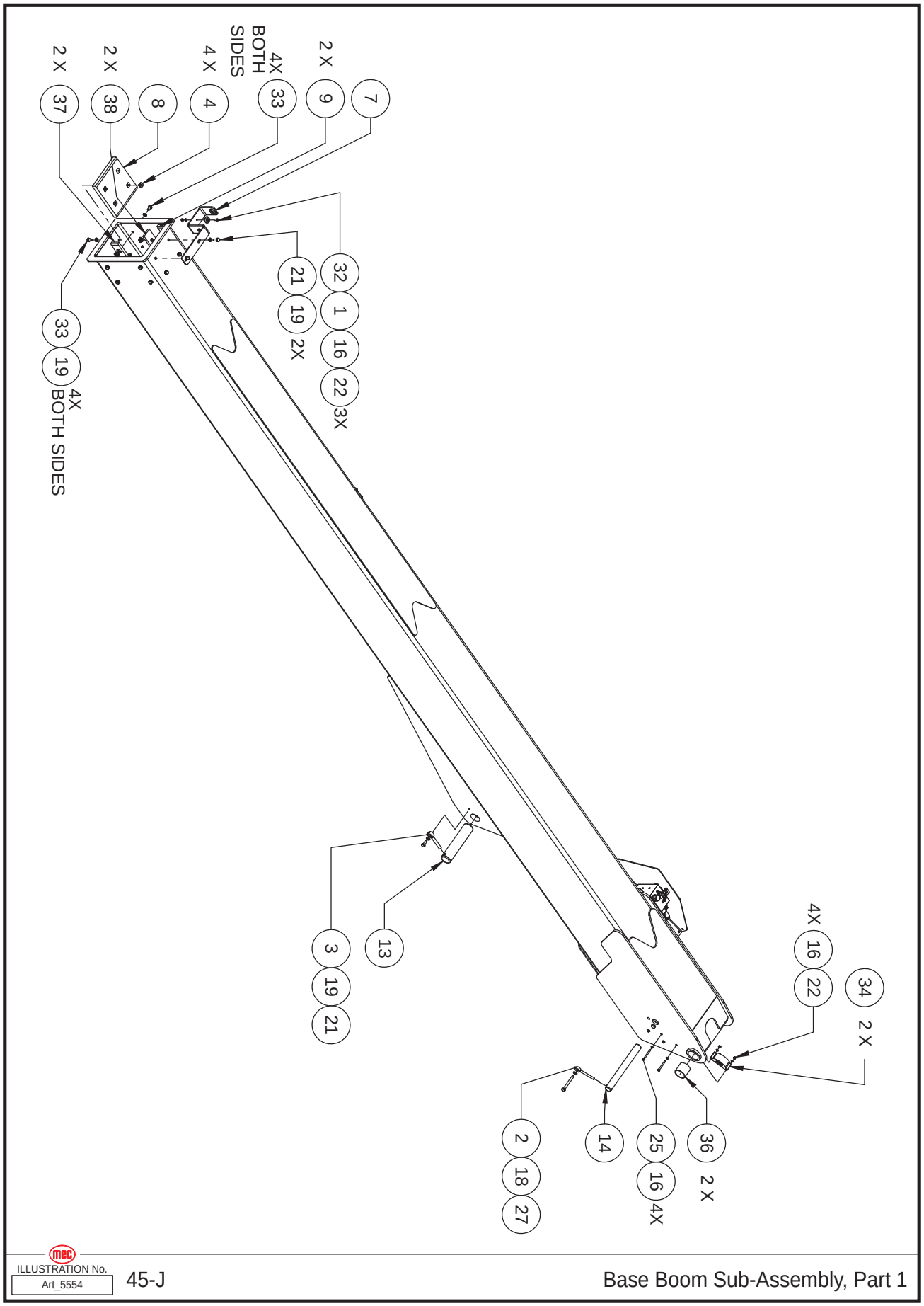


ILLUSTRATION No. Art_5554

45-J

Base Boom Sub-Assembly, Part 1

Item	Part Number	Description	Qty.
1	16788	Slide Bumper	3
2	18151	Keeper Pin	1
3	18152	1/2" Pin Retainer	1
4	22541	M10 × 1.50 Insert	16
7	28748	Bracket, Boom Cable Tube Slide Guide	1
8	28765	Inner Tube Slide Block, High Load	1
9	28772	Offset, Thin Side Wear Pad	2
13	31222	Pin, 50.80mm × 230mm LG	1
14	31226	Pin, 31.75mm × 300mm LG	1
16	50000	WSHR M06 ZP Standard Flat	11
18	50002	WSHR M10 ZP Standard Flat	24
19	50006	WSHR M10 ZP Nordlock	17
21	50033	HHCS M10-1.50 × 25 08 ZP F	3
22	50047	NNYL M06 × 1.00 08 ZP Nylock	7
25	50134	HHCS M06-1.00 × 60 08 ZP F	4
27	50213	HHCS M10-1.50 × 90 08 ZP P	1
32	50561	CSCS M06-1.00 × 20	3
33	50215	HHCS M10-1.50 × 16 08 ZP F	14
34	90844	EZ-Fit	2
36	92110	2.00 × 2.25 × 2.00 Polygon Bearing	2
37	11861979	Wear Pad, 1/2” Thick	2
38	11861979	Side Wearpad	2

Base Boom Sub-Assembly, Part 2

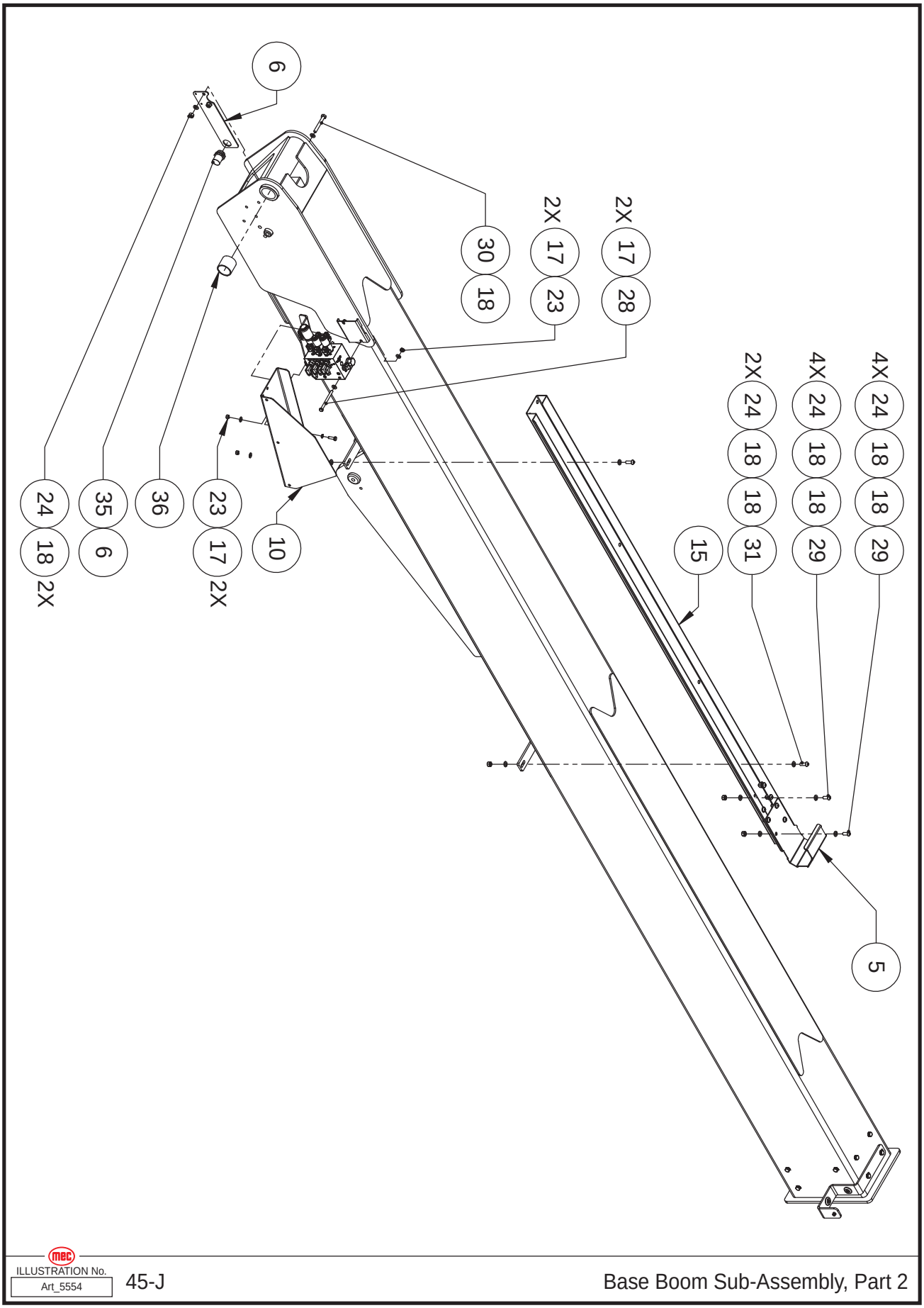


ILLUSTRATION No. Art_5554 45-J Base Boom Sub-Assembly, Part 2

Item	Part Number	Description	Qty.
5	24379	Hose Wrap Forming	1
6	28634	Bracket, Boom Prox Switch	1
10	28694	Bracket, Platform Manifold Cover	1
17	50001	WSHR M08 ZP Standard Flat	6
18	50002	WSHR M10 ZP Standard Flat	24
23	50048	NNYL M08 × 1.25 08 ZP Nylon	4
24	50049	NNYL M10 × 1.50 08 ZP Nylon Inse	11
28	50237	HHCS M08-1.25 × 100 08 ZP P	2
29	50297	BHCS M10-1.50 × 25 08 ZF	8
30	50352	HHCS M10-1.50 × 80 08 ZP P	1
35	92032	30mm Proximity Switch	1
36	92110	2.00 × 2.25 × 2.00 Polygon Bearing	2

Boom Sub-Assembly

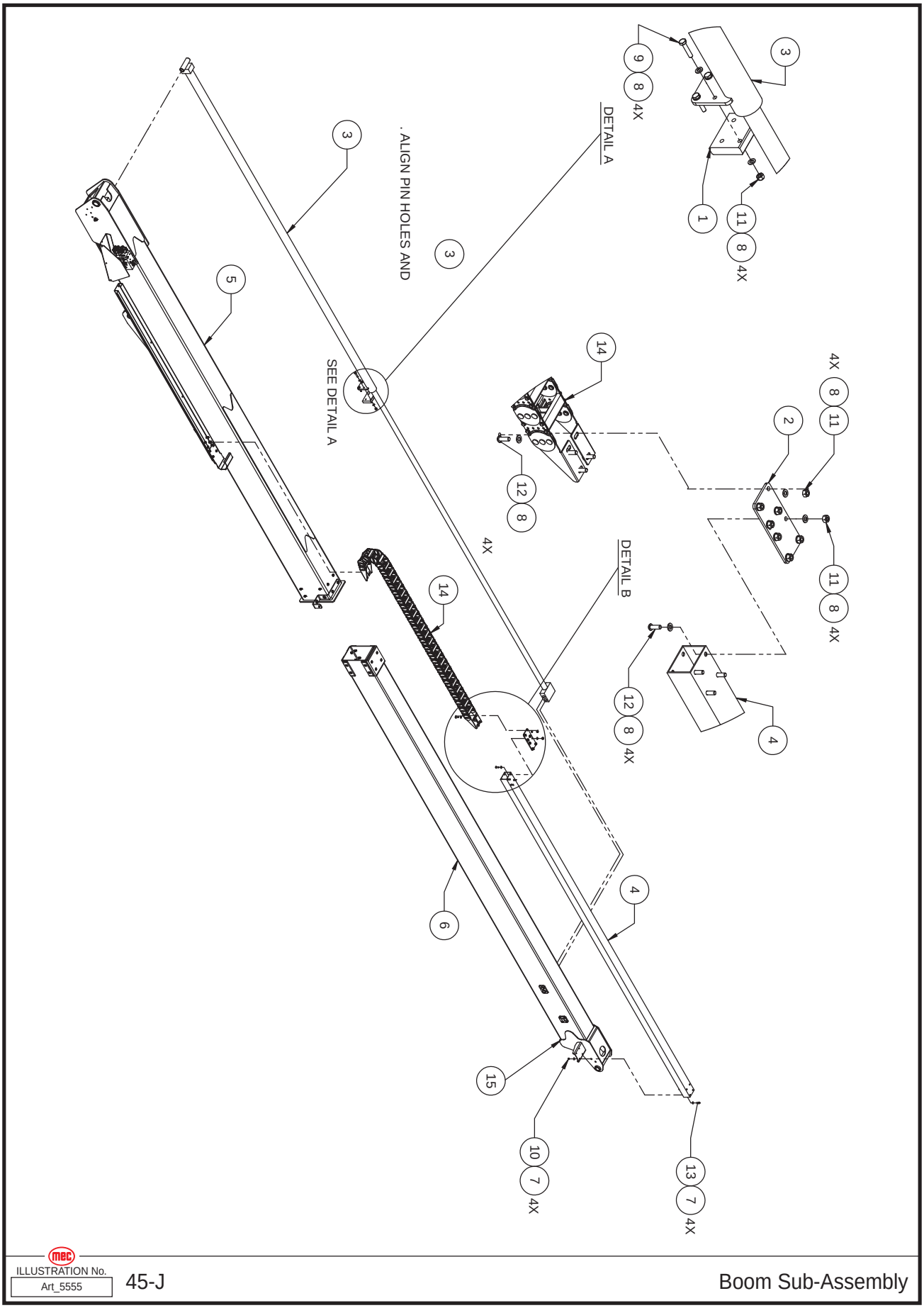


ILLUSTRATION No. Art_5555

45-J

Boom Sub-Assembly

Item	Part Number	Description	Qty.
1	28643	Wear Pad, Extend Cylinder Rest	1
2	28749	Bracket, Boom Cable Tube To Cable Track Connector	1
3	31032	Extend Cylinder	1
4	31227	Tube, Cable Track, 45J	1
5	31868	Base Boom Sub-Assembly (Refer to page 138 and page 140)	1
6	31869	Tip Boom Sub-Assembly (Refer to page 144)	1
7	50001	WSHR M08 ZP Standard Flat	8
8	50002	WSHR M10 ZP Standard Flat	24
9	50020	HHCS M10-1.50 × 50 08 ZP P	4
10	50048	NNYL M08 × 1.25 08 ZP Nylon	4
11	50049	NNYL M10 × 1.50 08 ZP Nylon Inse	12
12	50277	BHCS M10-1.50 × 30, 08, ZP, F	8
13	50372	BHCS M08-1.25 × 25 08 ZP P	4
14	94835	Cable Track, 4” Wide × 26 Links, 95mm Pitch	1
15	31033	Level Cylinder	1

Tip Boom Sub-Assembly

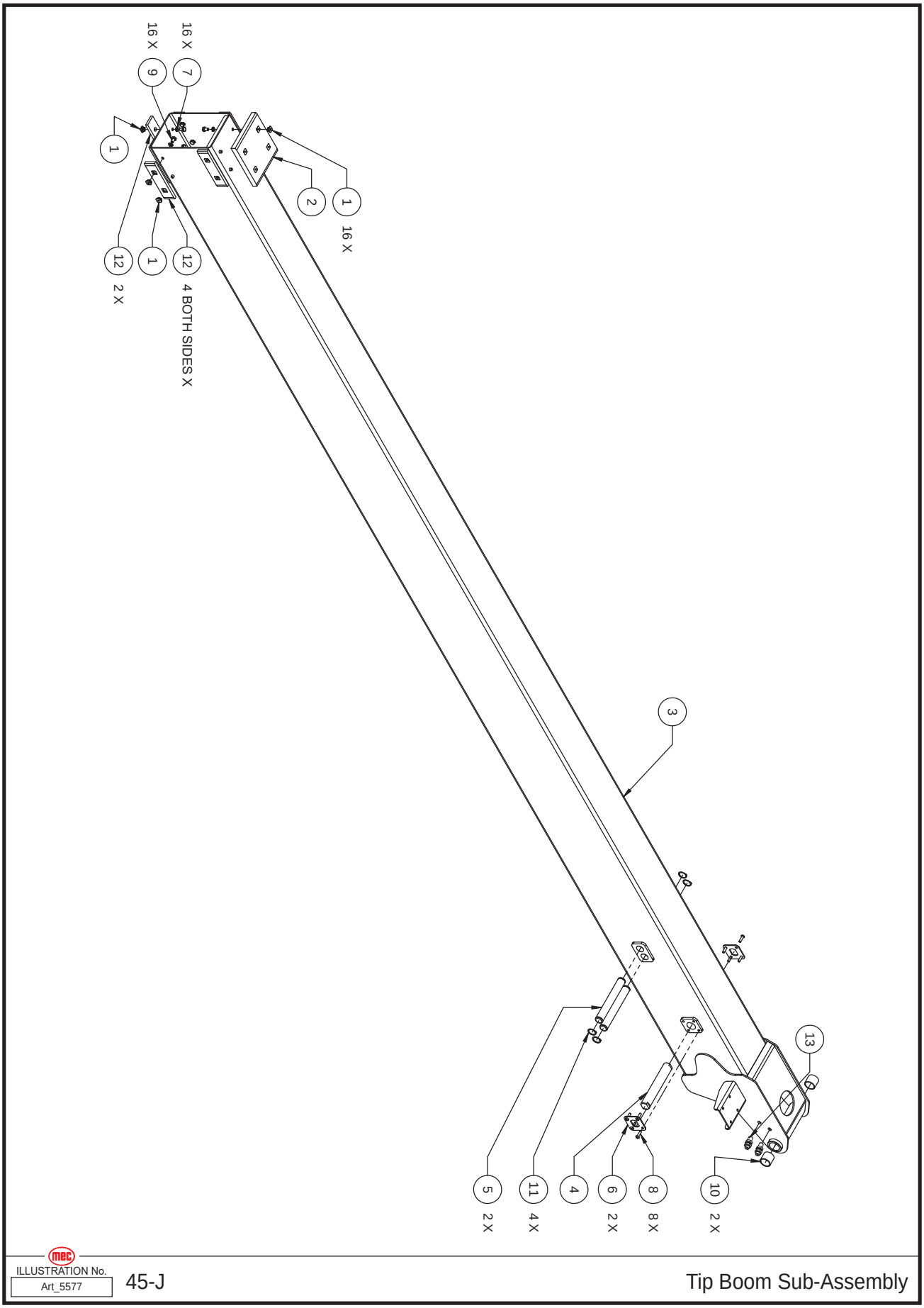


ILLUSTRATION No. Art_5577 45-J Tip Boom Sub-Assembly

Item	Part Number	Description	Qty.
1	22541	M10 × 1.50 Insert	16
2	28765	Inner Tube Slide Block, High Load	1
3	31086	Weldment, Tip Boom	1
4	31219	Pin, Platform	1
5	31221	Pin, Extend Cylinder, Tip Boom	2
6	28644	Retainer, Tip Boom Level Cyl Pin	2
7	50006	WSHR M10 ZP Nordlock	16
8	50414	BHCS M08-1.25 × 30 10.9 ZP P	8
9	50215	HHCS M10-1.50 × 16 08 ZP F	16
10	92360	1.50 × 1.75 × 1.50+/-.01” Polygon Bearing	2
11	93695	Retaining Ring, External 1.25 (1-1/4) Shaft	4
12	11861979	Wear Pad, 1/2” Thick	6
13	51073	HYFT MFFOR-MFFOR BH -4-4	2

Jib Components

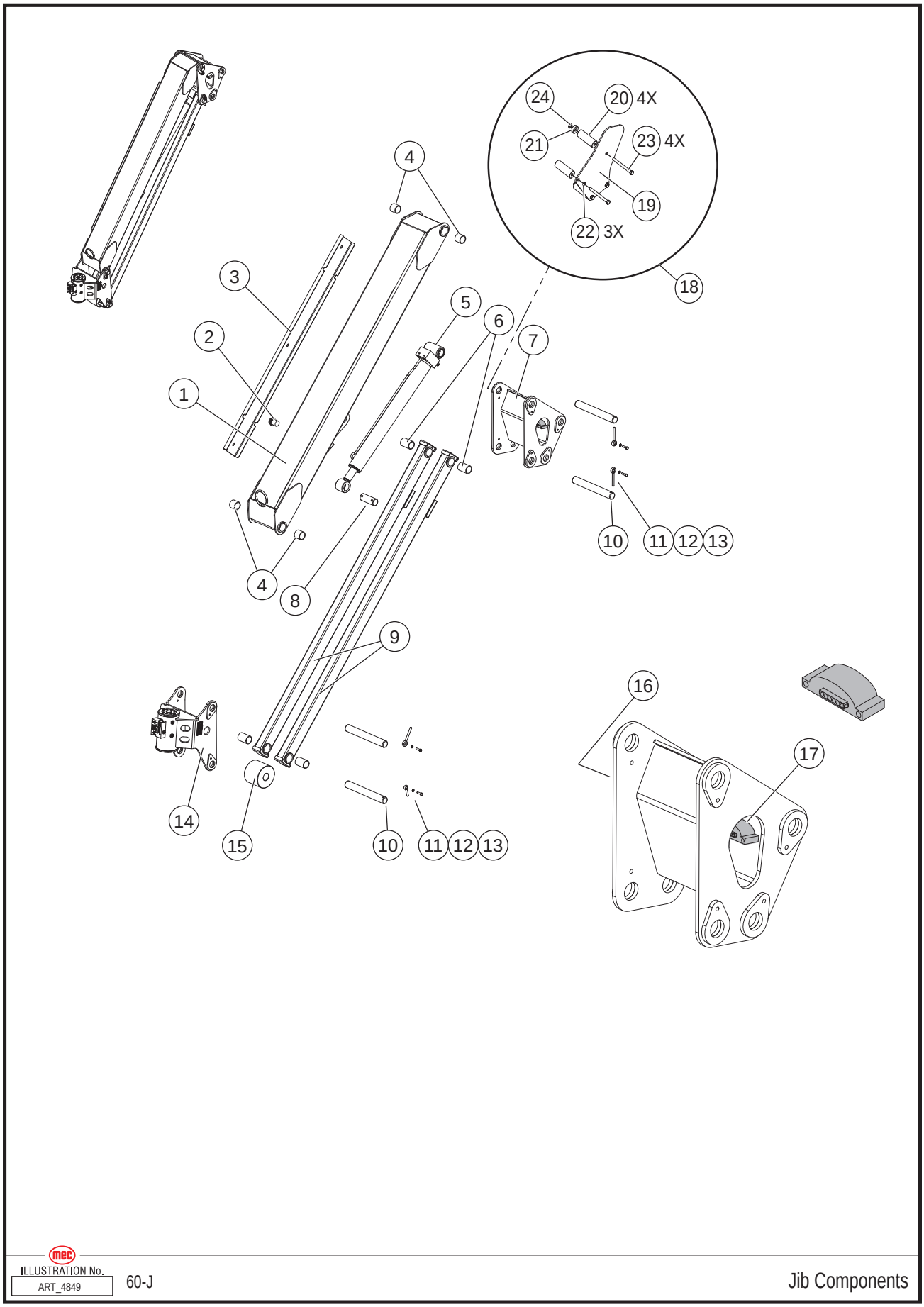


ILLUSTRATION No. ART_4849 60-J Jib Components

Item	Part Number	Description	Qty.
1	28400	Jib Tube Weldment	1
2	92032	Proximity Sensor	1
3	28646	Hose/Cable Cover	1
4	92360	Bearing	4
5	REF	Jib Cylinder (Refer to page 178)	1
6	93740	Bearing	4
7	28420	Jib Linkage Weldment	1
8	28608	Pin, Jib Cylinder	1
9	28410	Compression Link	2
10	28607	Pin, Bell Crank/Platform Rotator	4
11	18151	Pin Retainer	4
12	50200	Washer, M8 Nordlock	4
13	50032	Bolt, M8 x 30	4
14	REF	Platform Rotator (Refer to page 148)	1
15	28716	Roller /Spacer	1
16	92201	CAN-TILT 161	1
17	92203	CAN-TILT 163	1
18	31322	Bell Crank Hose Guard Sub-Assembly	1
19	31320	Cover Plate,	1
20	31321	Standoff, Bell Crank	4
21	31323	Cushion, Standoff	1
22	50007	WSHR M12 ZP Nordlock	3
23	53320	HHCS M12-1.75X130 08 ZP F	4
24	53321	NJAM M12-1.75 ZP	1

REF – Reference

Platform Rotator

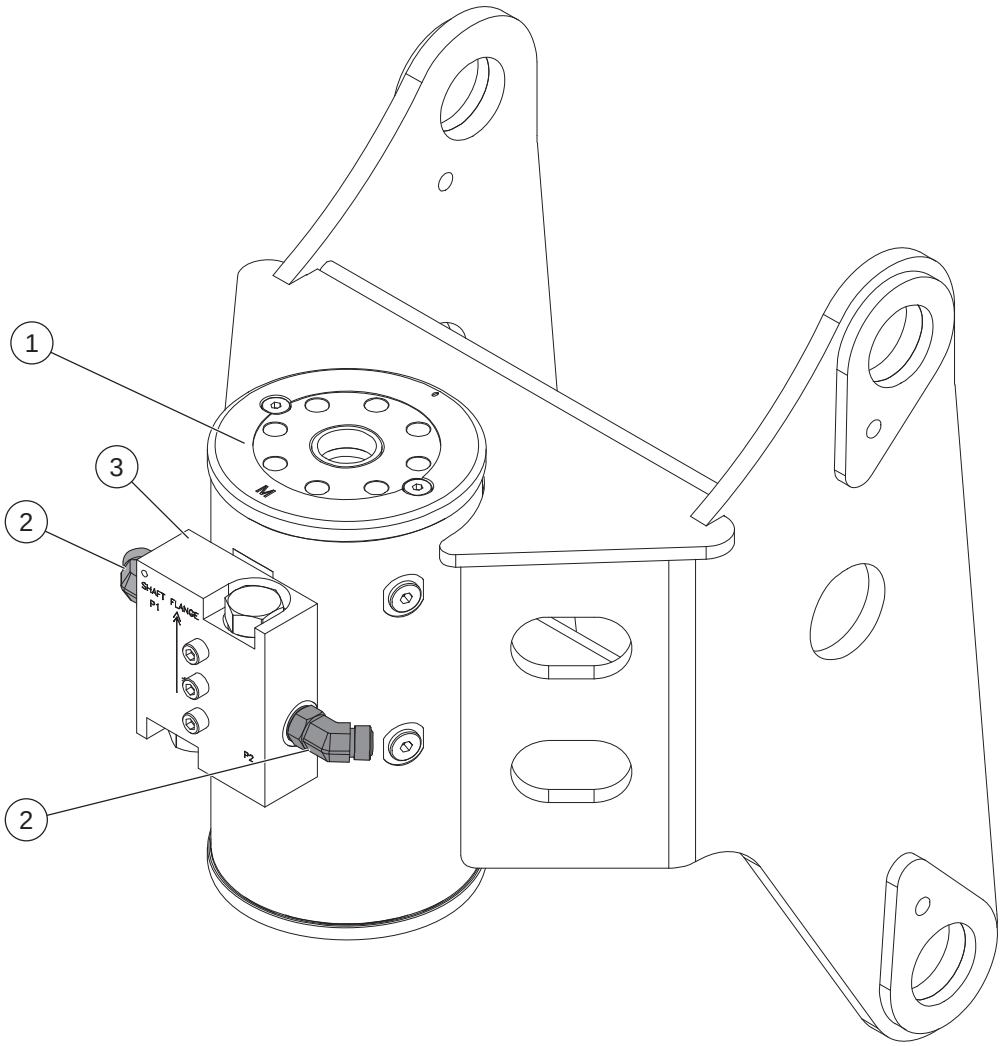


ILLUSTRATION No. ART_4874 60-J Platform Rotator

Item	Part Number	Description	Qty.
1	93830	Platform Rotator	1
2	50675	Fitting, MFFOR-MB45-4-4	2
3	94403	Manifold Assy	1

Wheel and Tire Assembly

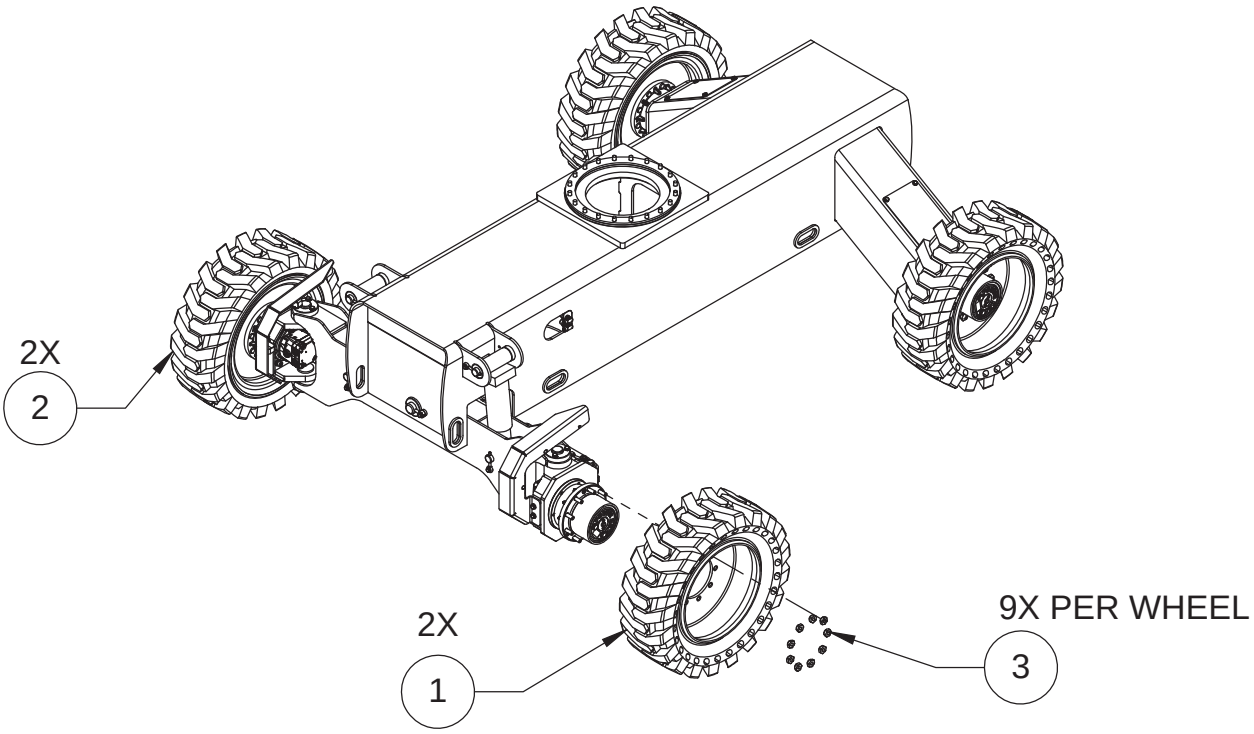


ILLUSTRATION No. Art_5578 45-J Wheel and Tire Assembly

Item	Part Number	Description	Qty.
1	31098	Wheel & Tire, 33×12-20 RH, Solid	2
2	31099	Wheel & Tire, 33×12-20 LH, Solid	2
3	50266	Nut, Lug, 5/8-18 UNF	36

Front Axle Sub-Assembly, Part 1

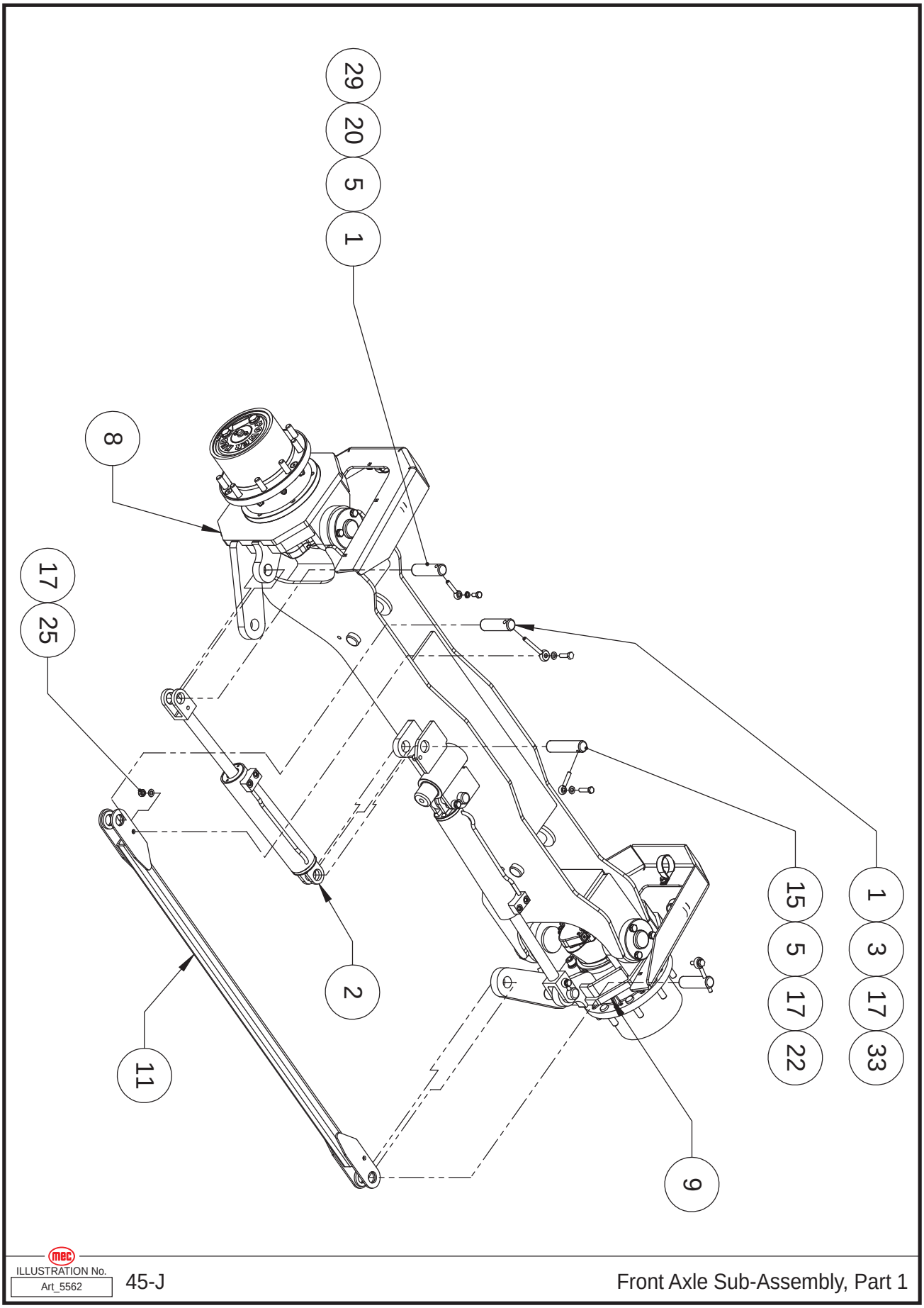


ILLUSTRATION No. Art_5562 45-J Front Axle Sub-Assembly, Part 1

Item	Part Number	Description	Qty.
1	18051	Pin, 1.250 × 4.25	4
2	18070	Cylinder, Steering	2
3	18151	Keeper Pin	4
5	18165	Keeper Pin .375 × 2.20	4
8	31021	Weldment, Yoke, Right Side	1
9	31029	Weldment, Yoke, Left Side	1
11	31045	Weldment, Tie Rod	1
15	31236	Pin, 31.75mm × 130	2
17	50002	WSHR M10 ZP Standard Flat	12
20	50006	WSHR M10 ZP Nordlock	2
22	50035	HHCS M10-1.50 × 40 08 ZP F	4
25	50049	NNYL M10 × 1.50 08 ZP Nylon Inse	6
29	50215	HHCS M10-1.50 × 20 08 ZP F	2
33	50332	HHCS M10-1.50 × 35 08 ZP P	2

Front Axle Sub-Assembly, Part 2

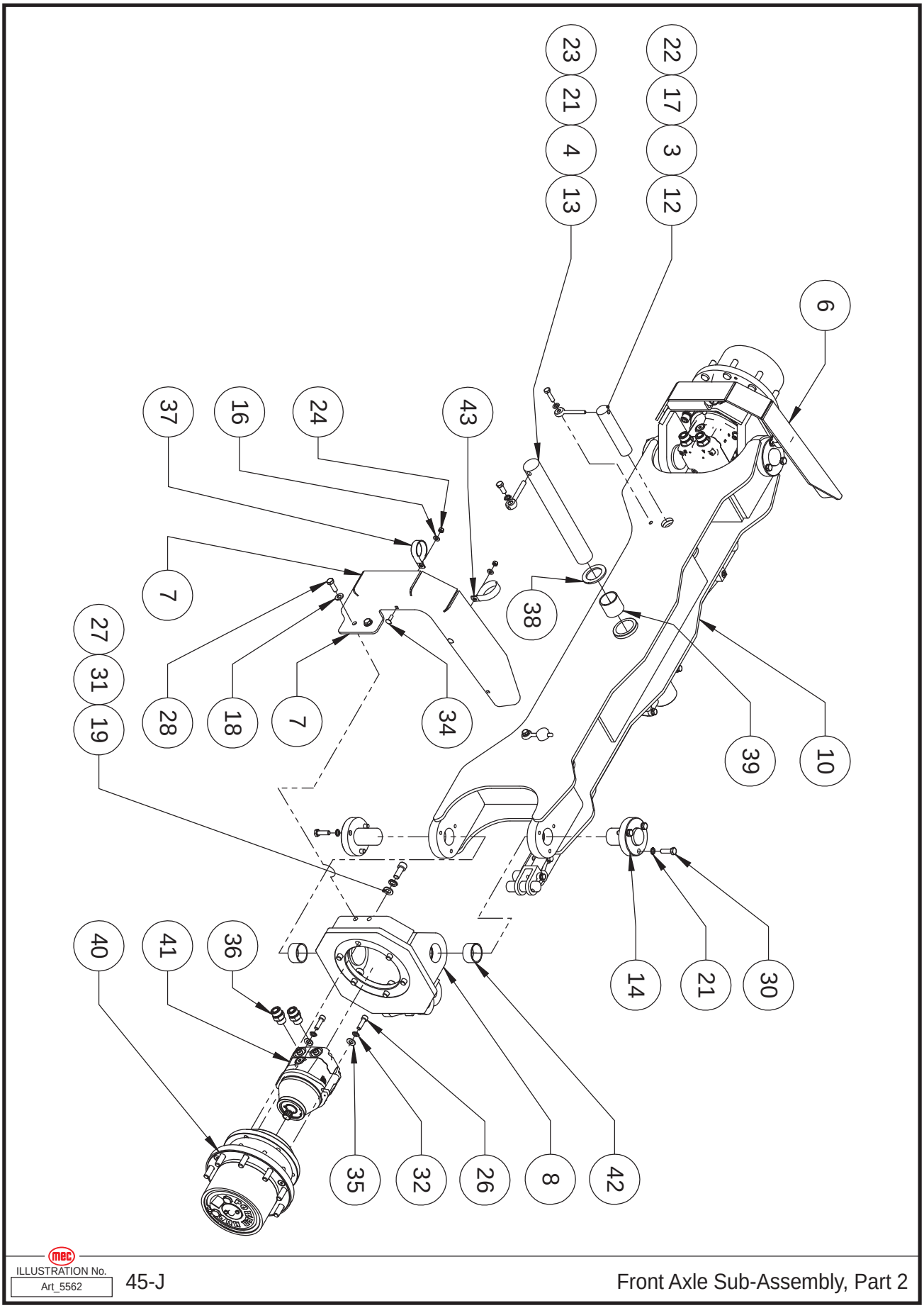


ILLUSTRATION No. Art_5562 45-J Front Axle Sub-Assembly, Part 2

Item	Part Number	Description	Qty.
3	18151	Keeper Pin	4
4	18152	1/2" Pin Retainer	1
6	22209	Hose Guard	1
7	22210	Hose Guard	1
8	31021	Weldment, Yoke, Right Side	1
10	31034	Weldment, Front Axle	1
12	31216	Pin, 38.10mm × 180mm LG	2
13	31218	Pin, 50.80mm × 400mm LG	1
14	31233	Pin, Trunnion	4
16	50001	WSHR M08 ZP Standard Flat	4
17	50002	WSHR M10 ZP Standard Flat	12
18	50003	WSHR M12 ZP Standard Flat	8
19	50004	WSHR M16 ZP Standard Flat	12
21	50007	WSHR M12 ZP Nordlock	13
22	50035	HHCS M10-1.50 × 40 08 ZP F	4
23	50039	HHCS M12-1.75 × 30 08 ZP F	1
24	50048	NNYL M08 × 1.25 08 ZP Nylon	4
26	50055	SHCS 7/16-14 × 1.5 GR 8	4
27	50056	SHCS 5/8"-11 × 1.50 GR8	12
28	50133	HHCS M12-1.25 × 35 08 ZP F	4
30	50236	HHCS M12-1.75 × 40 ZP	12
31	50249	WSHR M16 ZP Nordlock 5/8	12
32	50273	WSHR M11 ZP Nordlock 7/16	4
34	50418	CARB M08-1.25 × 25 08 ZP Carriage	4
35	50563	WSHR 1/2 ID Flat SAE Hardened	4
36	50826	HYFT MFFOR-MB-12-12 ; FS6400-12-12-O	4
37	91953	P-Clamp, 2" DIA. × 3/4" Wide, .406 Hole, Vinyl Coated	2
38	92039	Thrust Washer 2.010 × 3.00 × 0.188	3
39	92110	2.00 × 2.25 × 2.00 Polygon Bearing	2
40	94014	Planetary Wheel Drive	2
41	94742	Hydraulic Motor	2
42	94815	2.00 × 2.25 × 1.19	4
43	94934	P-Clamp W/VNL 2 1/4 × 3/4 Wide	2

Main Manifold Assembly

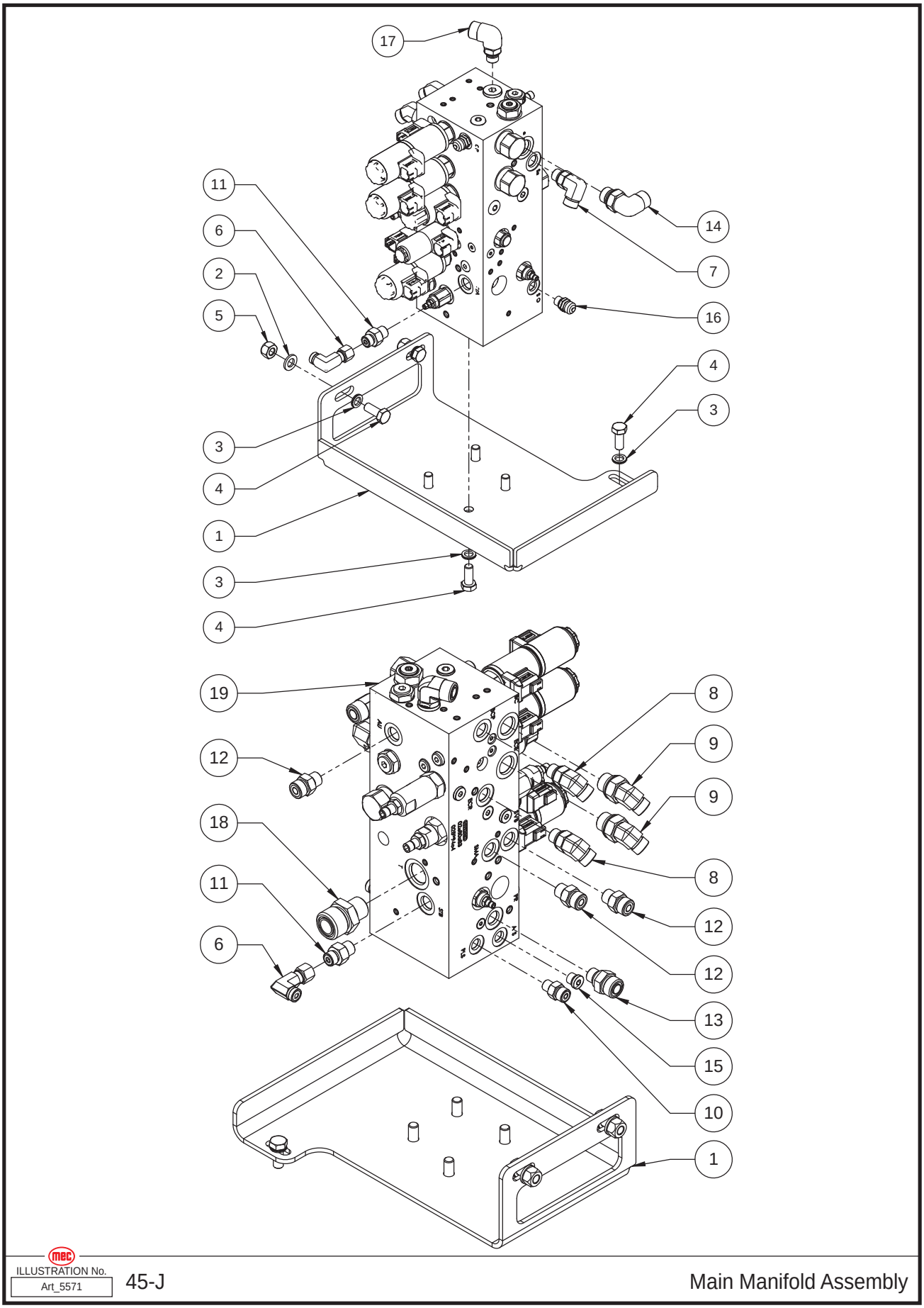
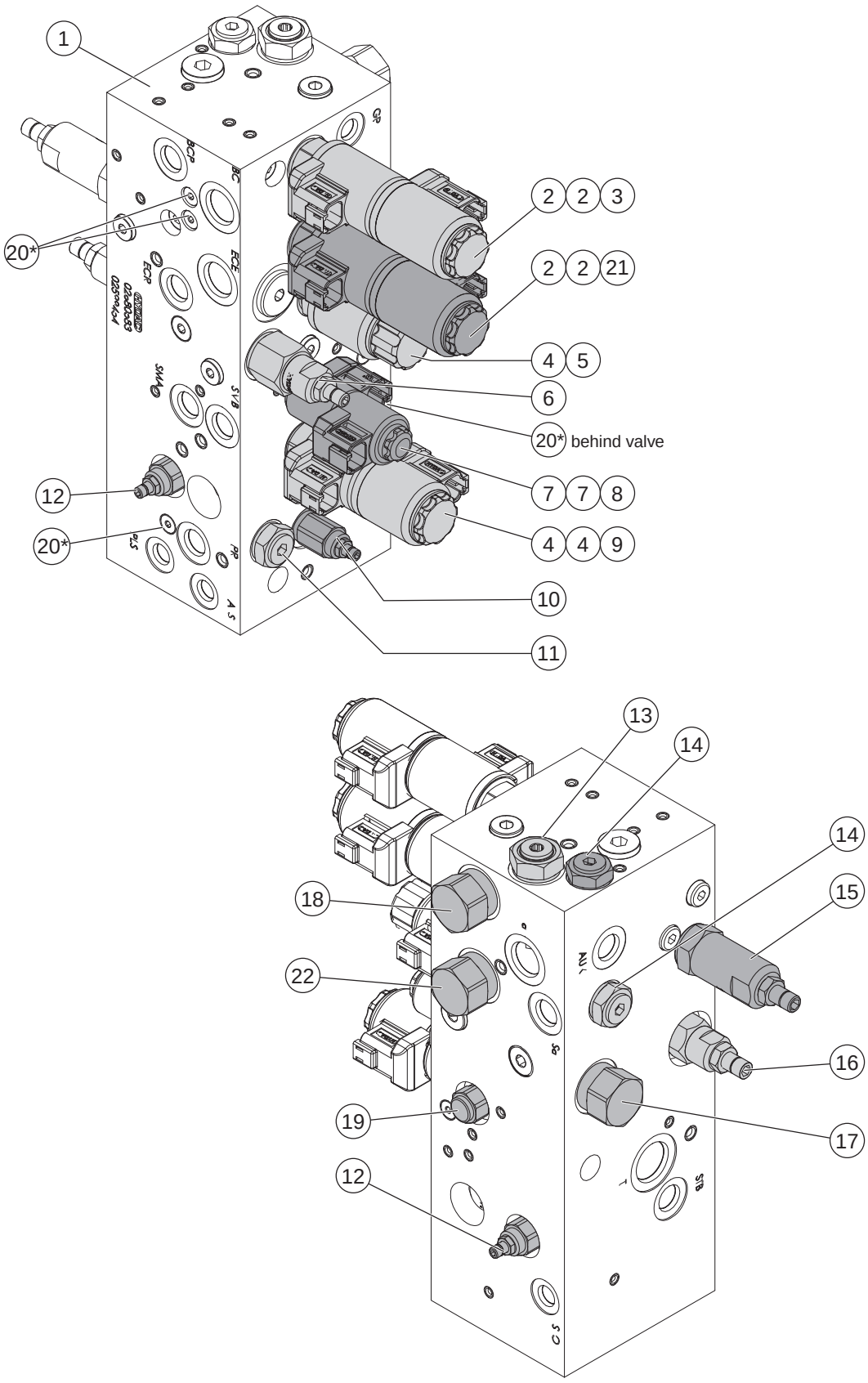


ILLUSTRATION No. Art_5571 45-J Main Manifold Assembly

Item	Part Number	Description	Qty.
1	31128	Bracket, Main	1
2	50002	WSHR M10 ZP Standard Flat	2
3	50006	WSHR M10 ZP Nordlock	7
4	50033	HHCS M10-1.50 × 25 08 ZP F	7
5	50049	NNYL M10 × 1.50 08 ZP Nylon Inse	2
6	50671	HYFT MFFOR-FFORX90-04-04	2
7	50674	HYFT MFFOR-MB90-06-06	1
8	50676	HYFT MFFOR-MB45-06-06	2
9	50816	HYFT MFFOR-MB45-6-8 ; FS6802-06-08	2
10	50831	HYFT MFFOR-MB-4-4 ; FS6400-04-04	1
11	50832	HYFT MFFOR-MB-4-6 ; FS6400-04-06	2
12	50835	HYFT MFFOR-MB-6-6 ; FS6400-06-06-O	3
13	50840	HYFT MFFOR-MB-8-6 ; FS6400-08-06-O	1
14	50850	HYFT MFFOR-MB90-8-8 ; FS6801-08-08-FG	1
15	50961	HYFT MB-04-PLUG	1
16	50974	HYFT TPO-4	2
17	51084	HYFT MFFOR-MB90-08-06; 6801-08-06	1
18	51223	HYFT MFFOR-MB-12-10; FS6400-12-10-O	1
19	93902	60J Main Manifold MkII	1

Main Functions Manifold Block Components



*Orifices located beneath plugs

ILLUSTRATION No. ART_5002 60-J Main Functions Manifold

Item	Part Number	Description	Qty.
1	93902	Main Functions Manifold, w/o fittings, including parts listed below	1
2	94081	Coil	4
3	94031	Solenoid Valve	1
4	94083	Coil	3
5	94080	Solenoid Valve, Directional Control	1
6	94223	Relief Valve	1
7	94082	Coil	2
8	94036	Solenoid Valve	1
9	94070	Solenoid Valve	1
10	94071	Relief Valve	1
11	94217	Check Valve	1
12	94068	Relief Valve	2
13	94222	Check Valve	1
14	94067	Check Valve	2
15	94074	Pilot Valve	1
16	94221	Priority Flow Valve	1
17	94076	Pilot Valve (Not needed for 7.5kW Option)	1
18	94072	Pilot Valve	1
19	94079	Pilot Valve	1
20	94218	Orifice, 1/4-20, .6mm	4
21	94540	Solenoid Valve	1
22	94290	Flow Compensator	1

Platform Functions Manifold

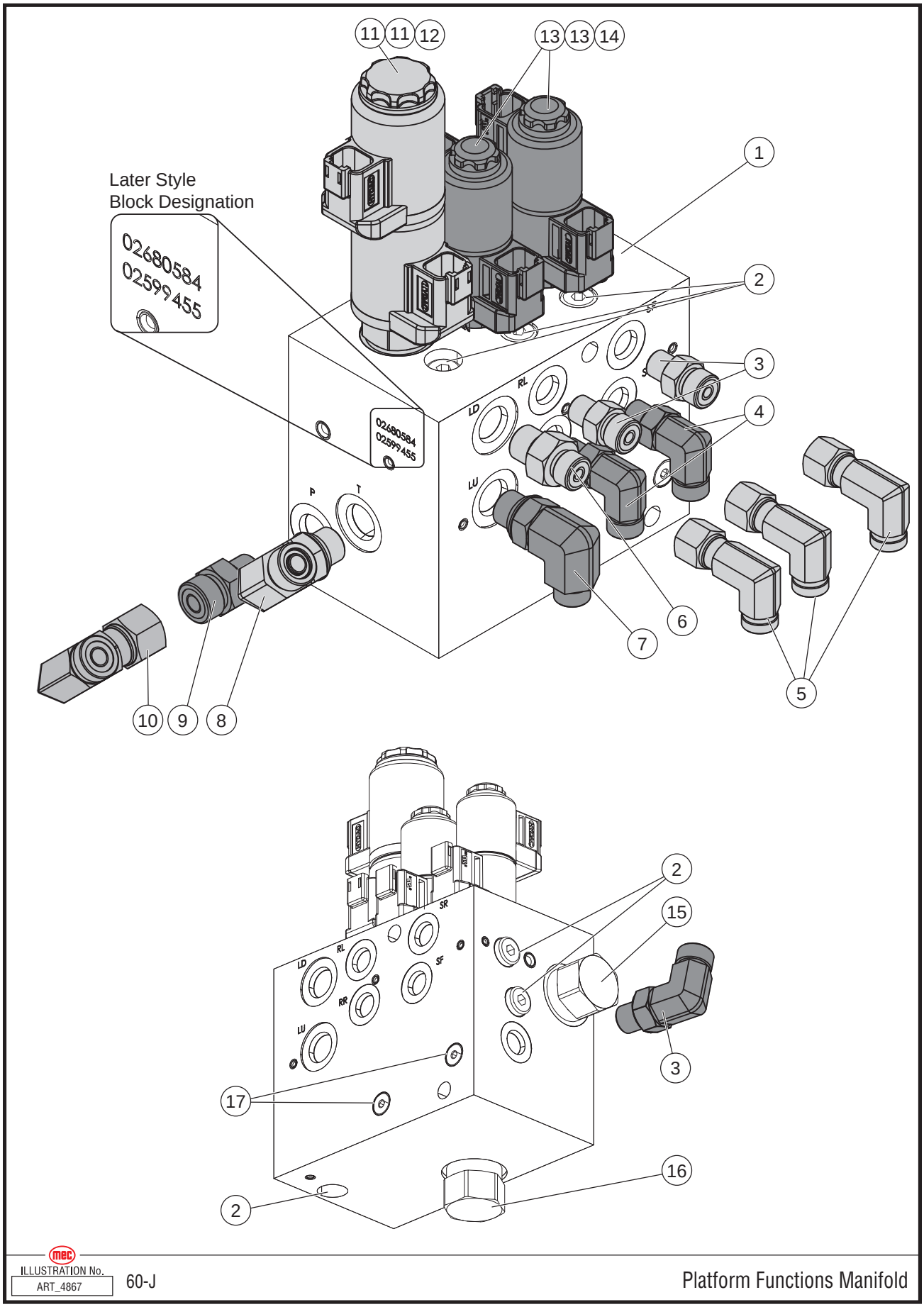


ILLUSTRATION No. ART_4867 60-J

Platform Functions Manifold

Item	Part Number	Description	Qty.
1	93903	Platform Function Manifold -- Late Style, complete, without fittings	1
2	94069	Shuttle Valve	5
3	50831	Fitting, MFFOR-MB-4-4	3
4	50673	Fitting, MFFOR-MB90 4-4	2
5	50671	Fitting, MFFOR-FFORX90- 4-4	3
6	50832	Fitting, MFFOR-MB-4-6	1
7	50656	Fitting, MFFOR-MB90-4-6	1
8	50674	Fitting, MFFOR-MB90-06-06	1
9	50835	Fitting, MFFOR-MB-6-6	1
10	50672	Fitting, MFFOR-FFORX90-06-06	1
11	94081	Coil	2
12	94031	Solenoid Valve	1
13	94082	Coil	4
14	94036	Solenoid Valve	2
15	94084	Pilot Valve	1
16	94072	Pilot Valve	1
17	94077	Orifice, .6mm	2

Brake/Axle/2-Speed Manifold

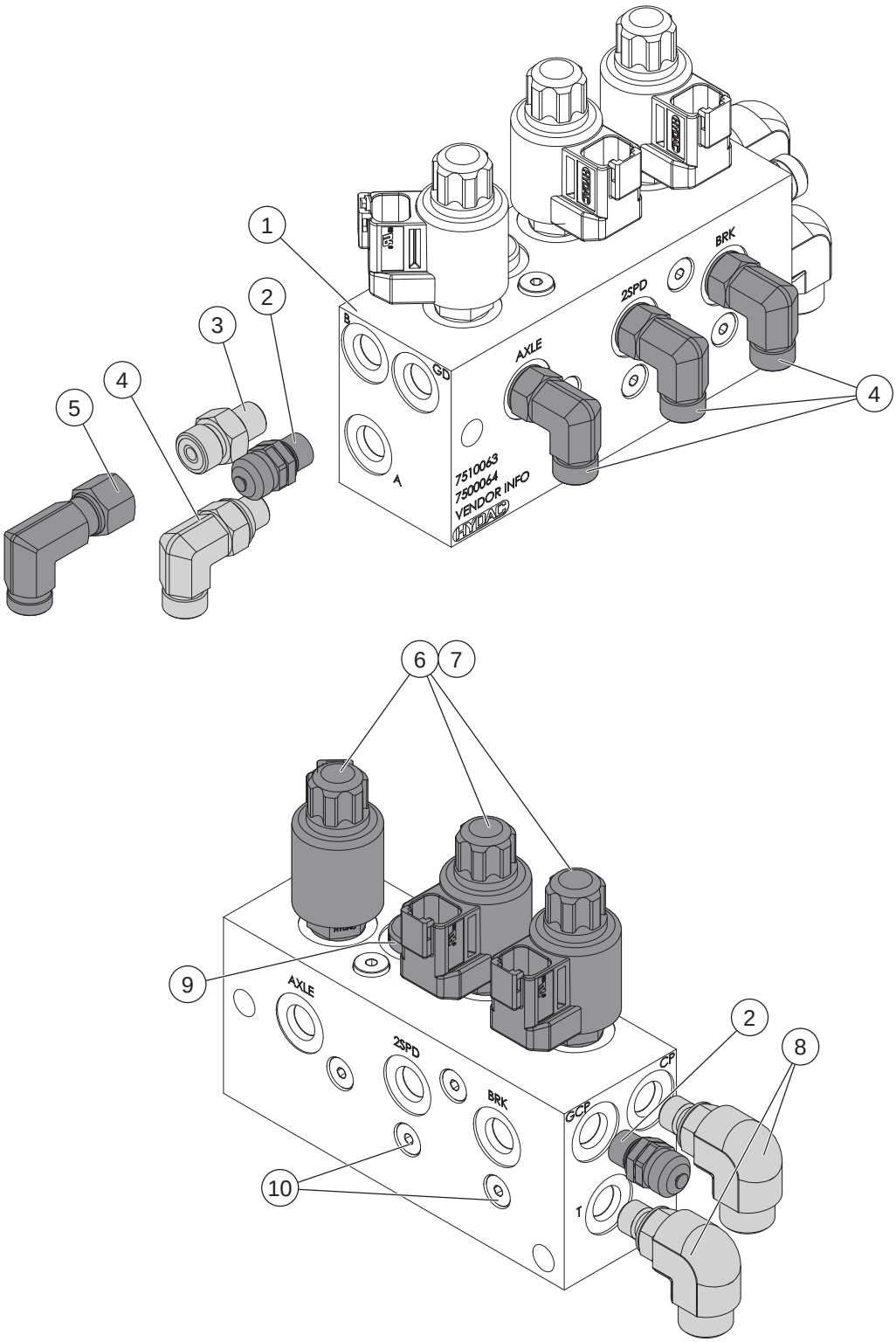


ILLUSTRATION No. ART_4865

60-J Diesel

Brake/Axle/2-Speed Manifold

Item	Part Number	Description	Qty.
1	93779	Brake/Axle/2-Speed Manifold, complete, without fittings	1
2	50974	Fitting, TPO-4	2
3	50831	Fitting, MFFOR-MB-4-4	1
4	50673	Fitting, MFFOR-MB90- 4-4	4
5	50671	Fitting, MFFOR-FFORX90- 4-4	1
6	94087	Solenoid Valve	3
7	94082	Coil	3
8	51083	Fitting, MFFOR-MB90-6-4	2
9	94086	Valve	1
10	94088	Orifice, .75mm	2

Rotary Manifold Sub-Assembly

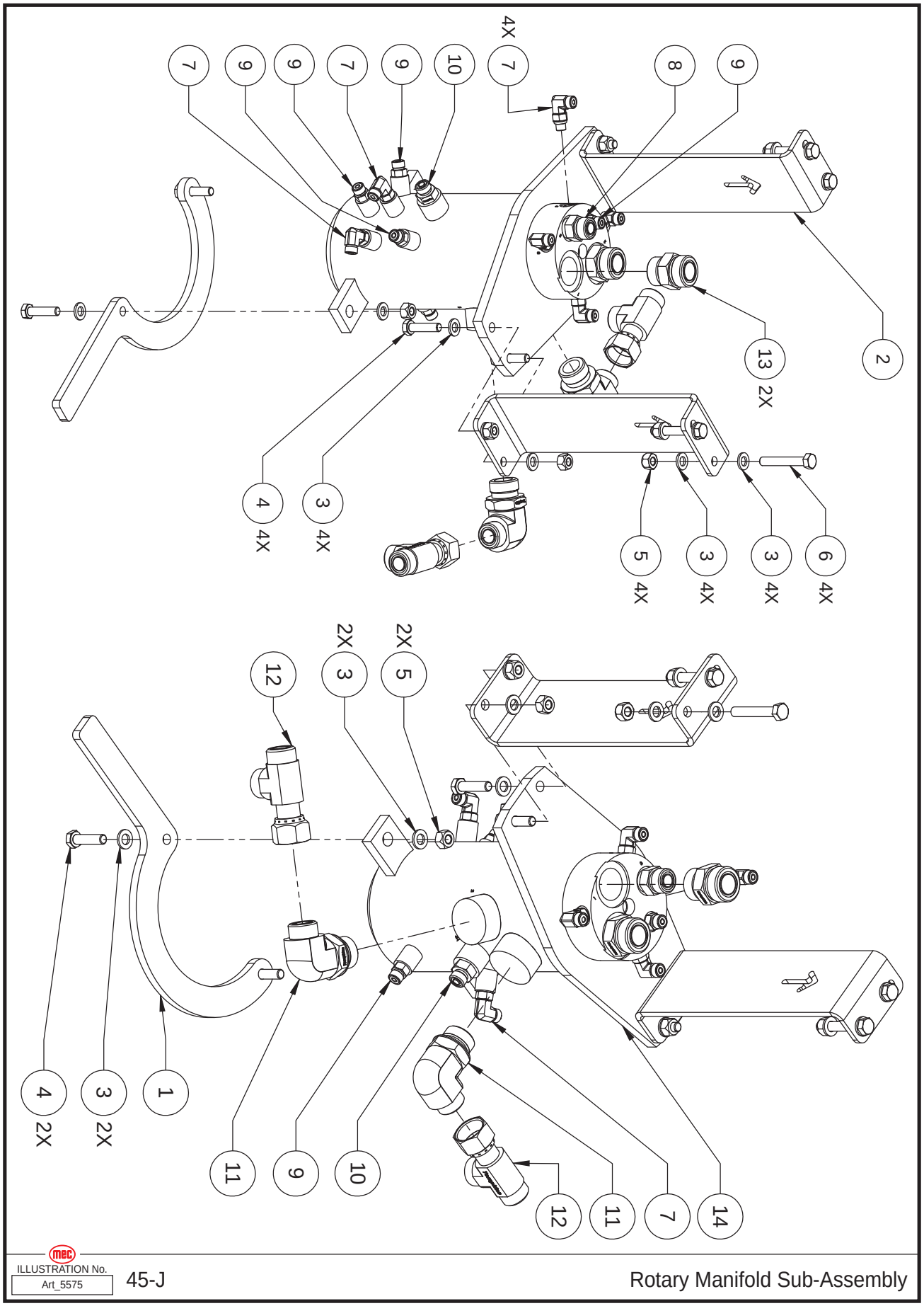


ILLUSTRATION No. Art_5575

45-J

Rotary Manifold Sub-Assembly

Item	Part Number	Description	Qty.
1	28621	Stop, Hydraulic Rotary Manifold	1
2	31263	Support, Rotary Manifold	2
3	50002	WSHR M10 ZP Standard Flat	20
4	50035	HHCS M10-1.50 × 40 08 ZP F	6
5	50049	NNYL M10 × 1.50 08 ZP Nylon Inse	10
6	50421	HHCS M10-1.50 × 65 08 ZP P	4
7	50673	HYFT MFFOR-MB90 4-4	7
8	50814	HYFT MFFOR-MB-10-8 ; FD6400-10-08	1
9	50831	HYFT MFFOR-MB-4-4 ; FS6400-04-04	5
10	50836	HYFT MFFOR-MB-6-8 ; FS6400-06-08-O	2
11	50844	HYFT MFFOR-MB90-12-16 ; FS6801-12-16-F+	2
12	50979	HYFT MFFOR-FFORX-MFFOR-12 FS6602-12-12-12	2
13	50810	HYFT MFFOR-MB-16-16 ; FS6400-16-16-O	2
14	93651	Hydraulic Rotary / Swivel Manifold, 8 Port	1

Front Case Drain Manifold Assembly

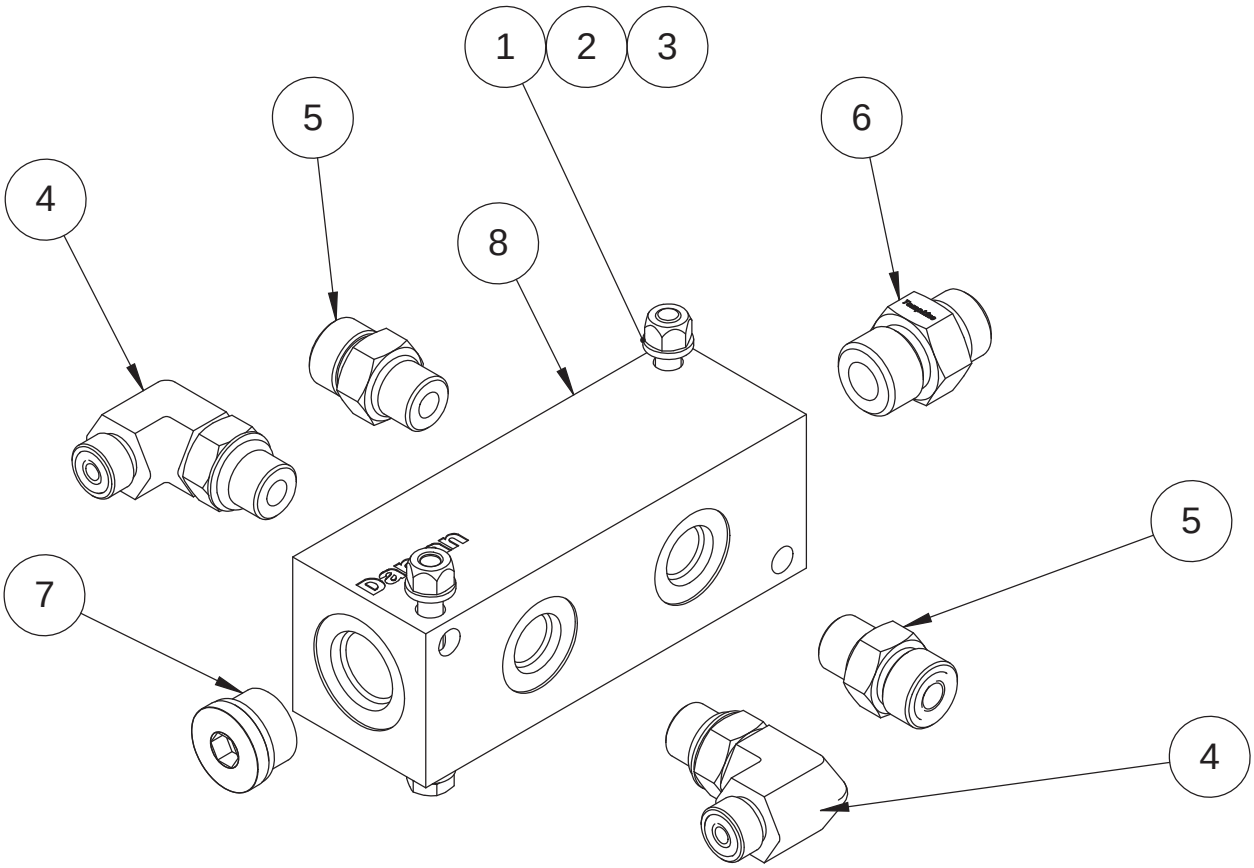


ILLUSTRATION No. Art_5563 45-J Front Case Drain Manifold Assembly

Item	Part Number	Description	Qty.
1	50000	WSHR M06 ZP Standard Flat	4
2	50047	NNYL M06 × 1.00 08 ZP Nylock	2
3	50134	HHCS M06-1.00 × 60 08 ZP F	2
4	50656	HYFT MFFOR-MB90-04-06	2
5	50835	HYFT MFFOR-MB-6-6 ; FS6400-06-06-O	2
6	50836	HYFT MFFOR-MB-6-8 ; FS6400-06-08-O	1
7	51098	HYFT MB-08-PLUG	1
8	93863	Header Manifold	1

Hydraulic Tank Sub-Assembly

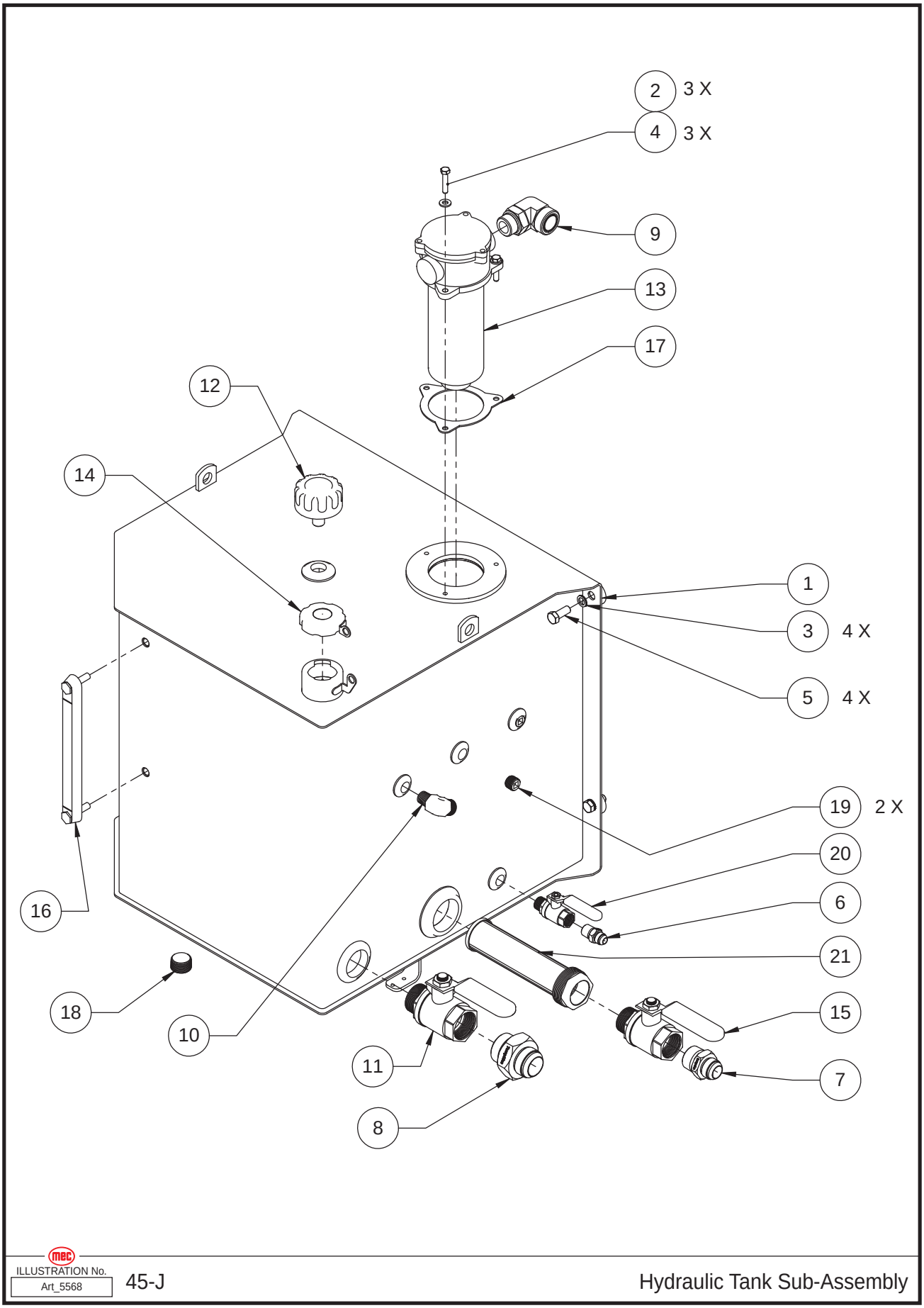


ILLUSTRATION No. Art_5568 45-J Hydraulic Tank Sub-Assembly

Item	Part Number	Description	Qty.
1	31100	Weldment, Hydraulic Tank	1
2	50001	WSHR M08 ZP Standard Flat	3
3	50007	WSHR M12 ZP Nordlock	4
4	50014	HHCS M08-1.25 × 40 08 ZP P	3
5	50039	HHCS M12-1.75 × 30 08 ZP F	4
6	50981	HYFT MJ-MP-08-08 ; 2404-08-08	1
7	50909	HYFT MJ-MP-16-20 ; 2404-16-20	1
8	50911	HYFT MJ-MP-24-24 ; 2404-24-24	1
9	51257	HYFT MFFOR-MB90 20-16	1
10	51261	HYFT MFFOR-MP90-10-08	1
11	92111	Valve Ball Full Port 1.50" MPT × FPT	1
12	92357	Hydraulic Tank Breather, 3/4" NPT	1
13	92366	In Tank 40GPM Filter Assembly	1
14	92478	HYD. Locking Non Vent Cap	1
--	92397	Filter Element Return	1
15	93120	Ball Valve, 1 1/4" NPT, Female × Male, Brass	1
16	93816	Sight Level Gauge	1
17	93992	Gasket, ZT Filter	1
18	94826	Square-Socket Plug 1" NPT	1
19	94827	Square-Socket Plug 1/2" NPT	2
20	92112	Valve Ball Full Port 0.50" MPT × FPT	1
21	93433	Suction Strainer 2"MP-1-1/4"FP	1

Charge Filter Sub-Assembly

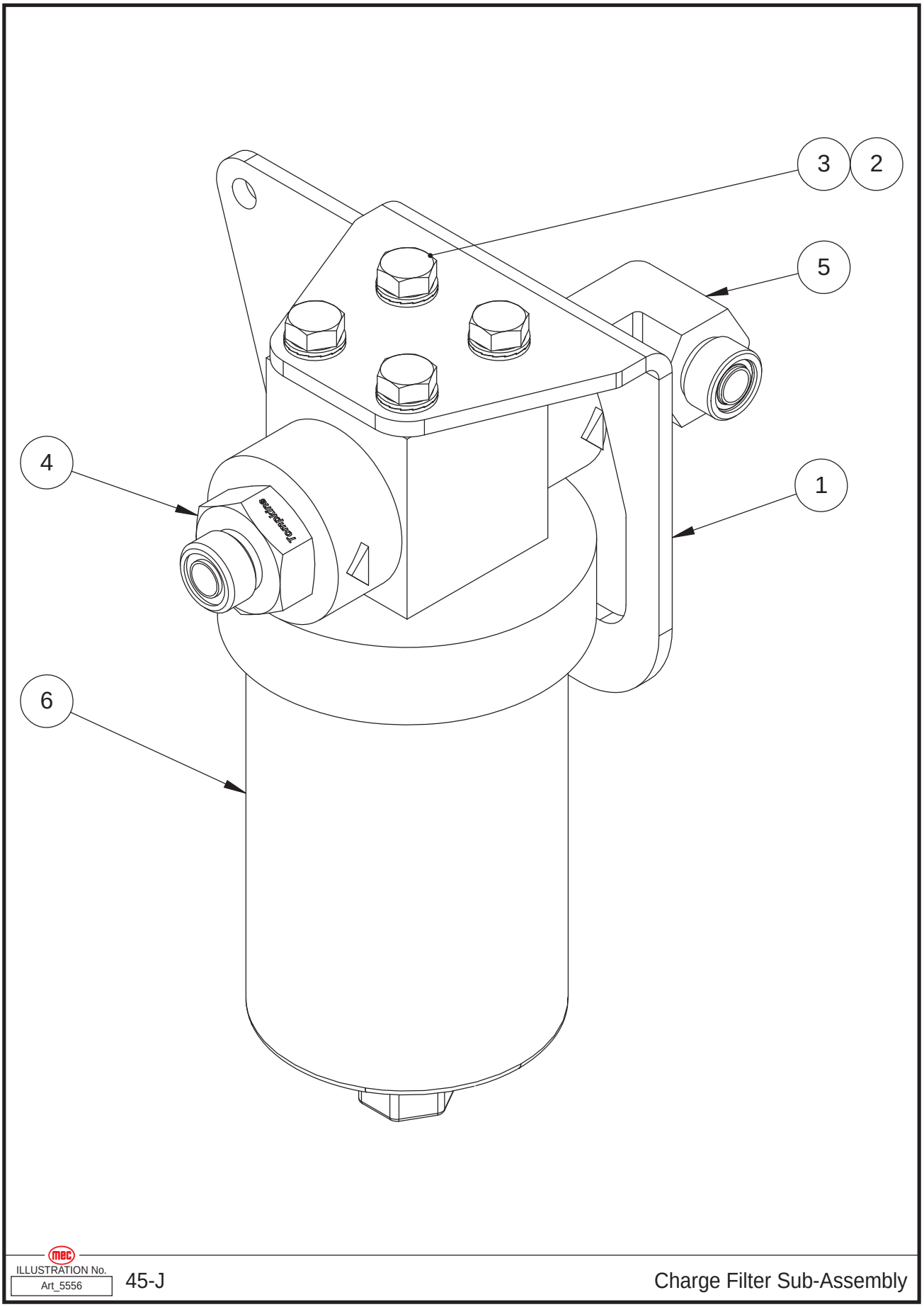


ILLUSTRATION No. Art_5556 45-J Charge Filter Sub-Assembly

Item	Part Number	Description	Qty.
1	31242	Bracket, Charge Filter	1
2	50006	WSHR M10 ZP Nordlock	4
3	50219	HHCS 03/08-16 × 0.75 05 ZP	4
4	50838	HYFT MFFOR-MB-8-12 ; FS6400-08-12-O	1
5	50849	HYFT MFFOR-MB90-8-12 ; FS6801-08-12-FG	1
6	92072	Filter Charge 725psi	1
--	92169	Filter Element Charge	1

Boom Lift Cylinder

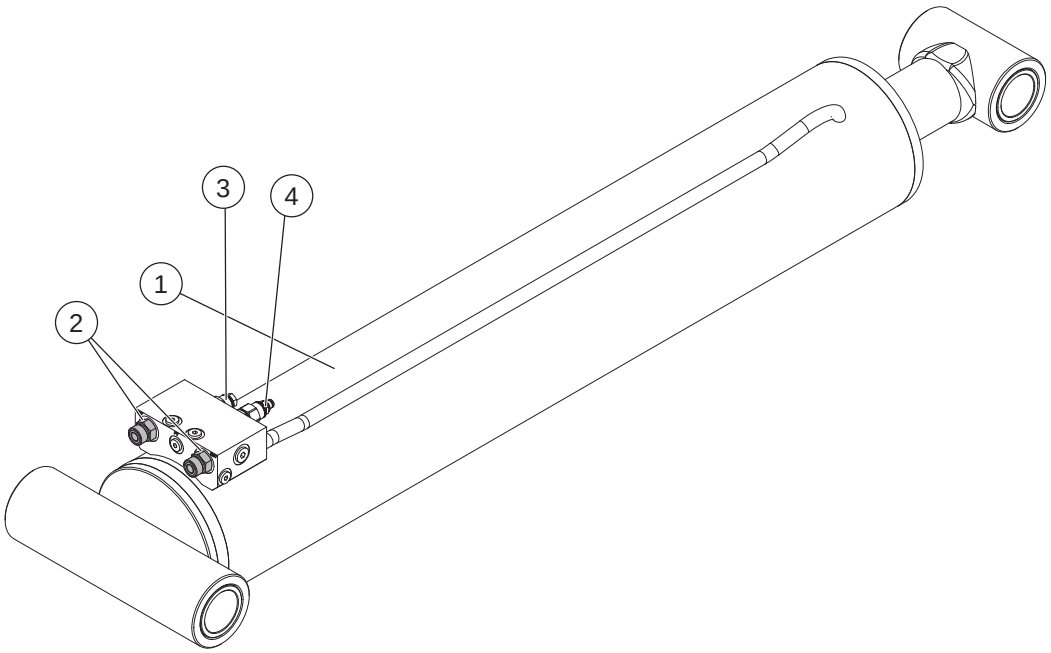


ILLUSTRATION No. ART_5601 45-J Boom Lift Cylinder

Item	Part Number	Description	Qty.
1	31030	Boom Lift Cylinder	1
2	50840	Fitting, MFFOR-MB-8-6	2
3	92622	Counterbalance valve	1
4	94033	Counterbalance valve	1
--	95382	Seal Kit	1

Boom Extend Cylinder

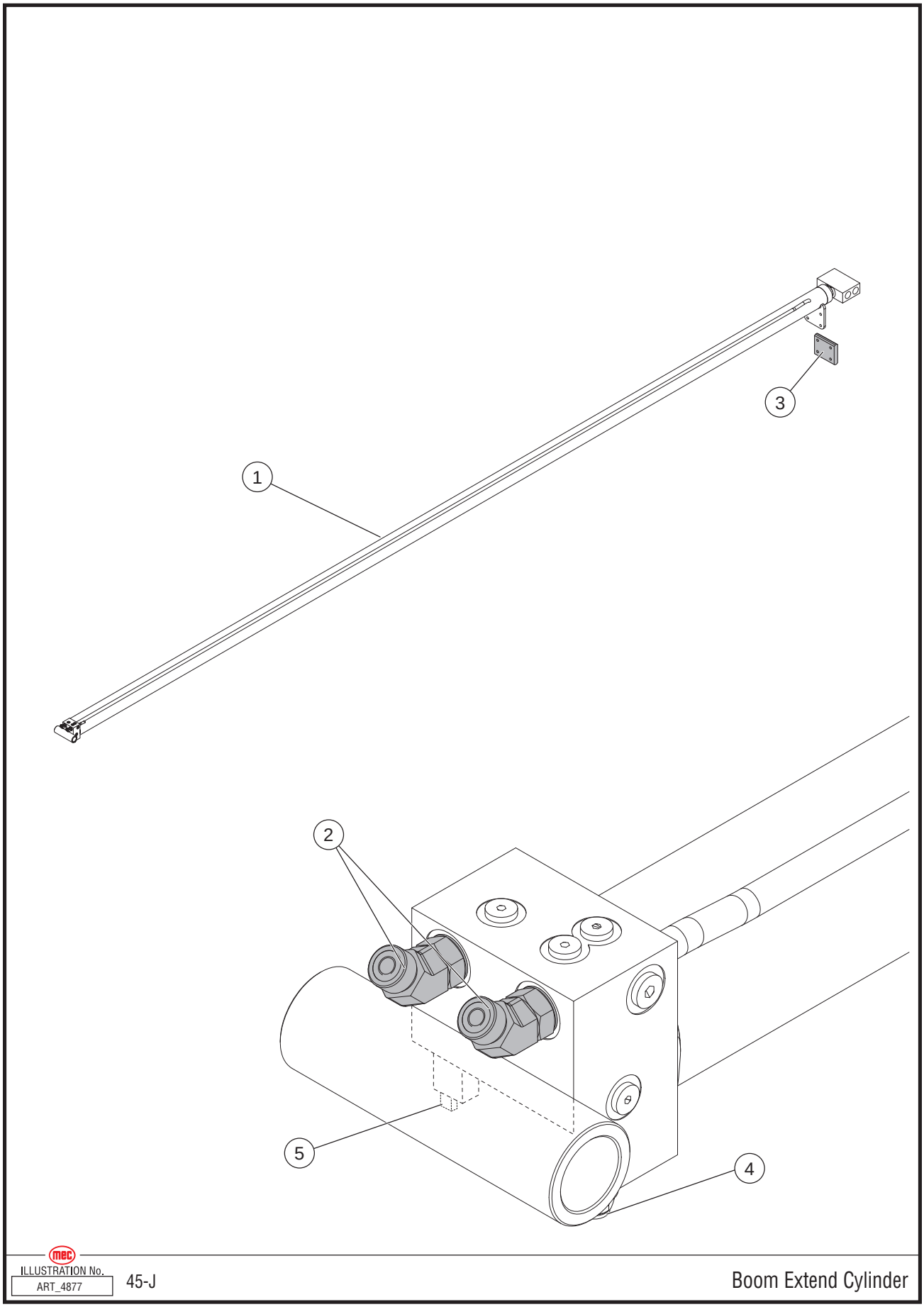


ILLUSTRATION No. ART_4877 45-J Boom Extend Cylinder

Item	Part Number	Description	Qty.
1	31032	Extend Cylinder	1
2	50676	Fitting, MFFOR-MB45-6-6	2
3	28643	Wear Pad, Extend Cylinder Rest	1
--	50020	Bolt, M10 x 50	4
--	50053	Nut, M10 Nylock	4
--	50002	Washer, M10 Flat	4
4	92020	Counterbalance Valve	1
5	94536	Counterbalance Valve	1
--	95383	Seal Kit	1

Platform Level Cylinder

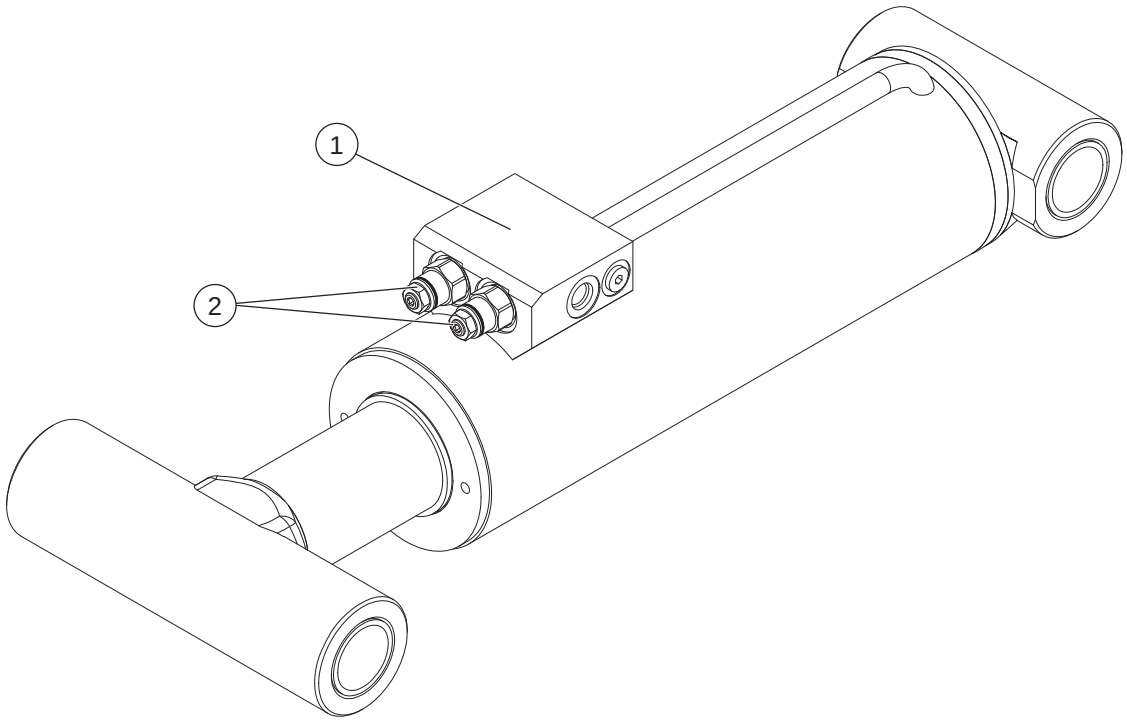


ILLUSTRATION No. ART_4878 45-J Platform Level Cylinder

Item	Part Number	Description	Qty.
1	31033	Platform Level Cylinder	1
2	94527	Counterbalance Valve	2
--	95384	Seal Kit	1

Jib Cylinder

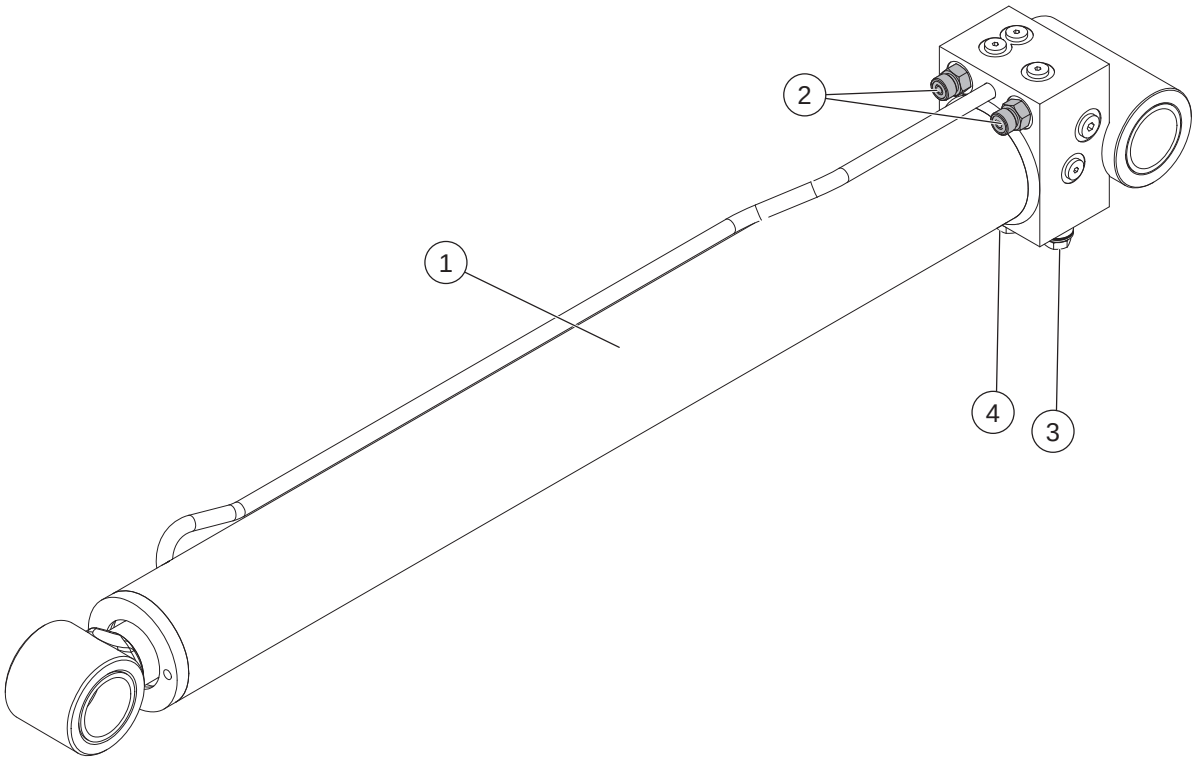
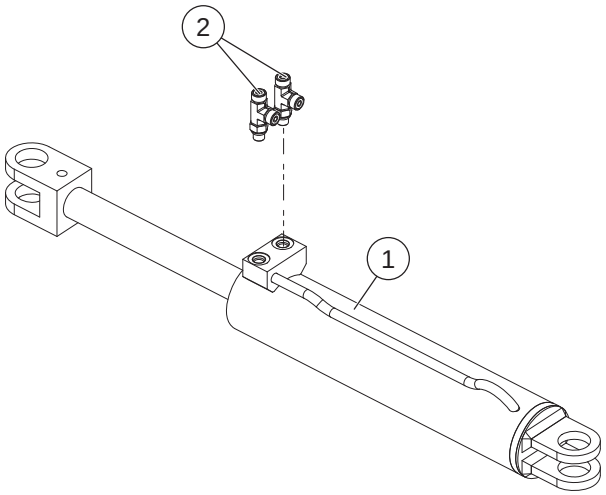


ILLUSTRATION No. ART_5602 45-J Jib Cylinder

Item	Part Number	Description	Qty.
1	28399	Jib Cylinder (To Serial # 14700199)	1
	28394	Jib Cylinder (From Serial # 14700200)	1
2	50831	Fitting, MFFOR-MB-4-4	2
3	94630	Counterbalance Valve	1
4	94408	Counterbalance Valve	1
--	94327	Seal Kit for 28399	1
	96257	Seal Kit for 28394	1

Steer Cylinders



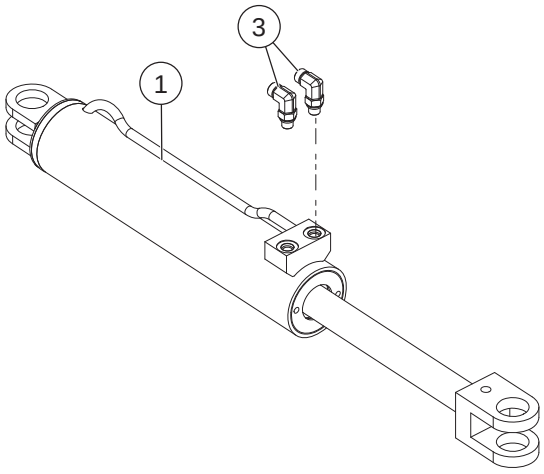


ILLUSTRATION No. ART_4873 60-J Steer Cylinders

Item	Part Number	Description	Qty.
1	18070	Steer Cylinder, Without Fittings	2
--	92616	Seal Kit	2
2	50858	Fitting, MFFOR-MB-MFFORT-4	2
3	50673	Fitting, MFFOR-MB90-04-04	2

Axle Cylinders

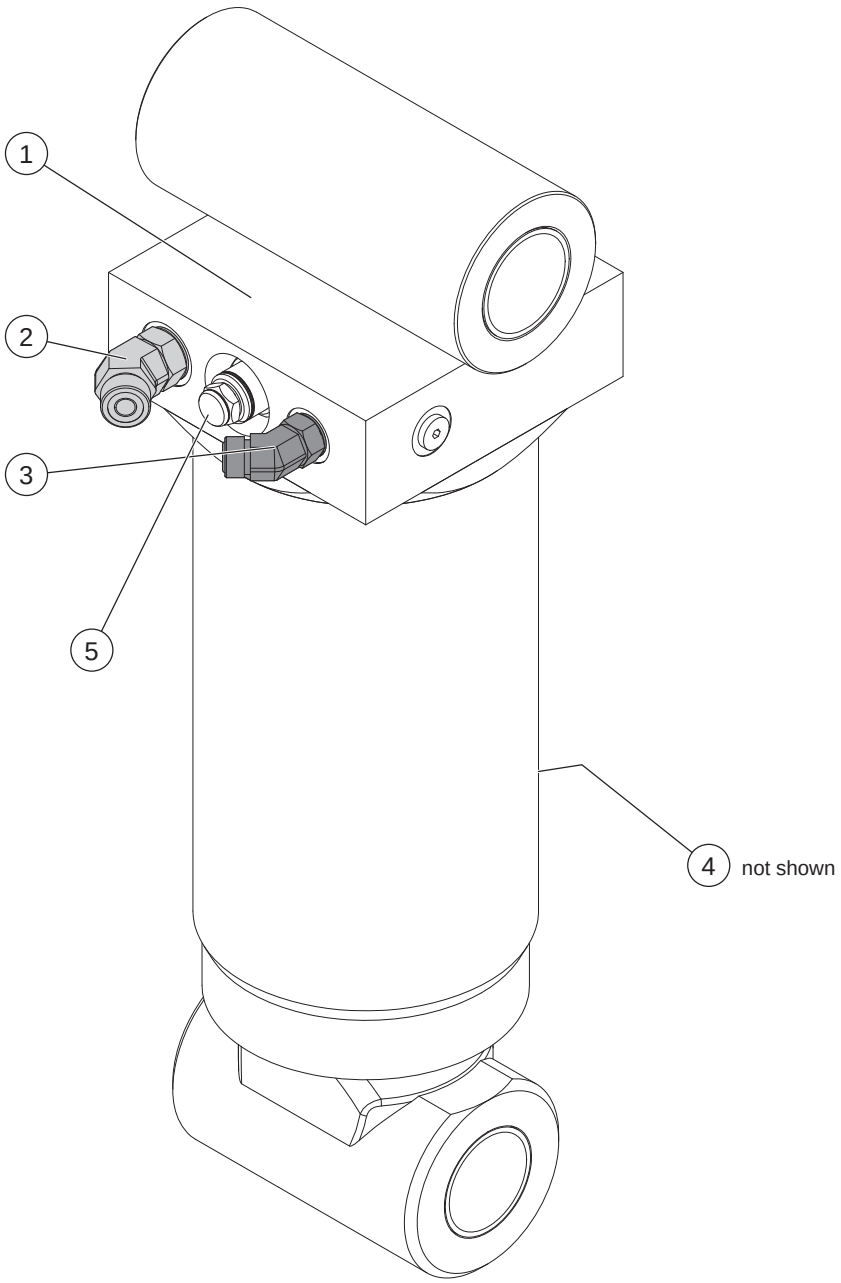
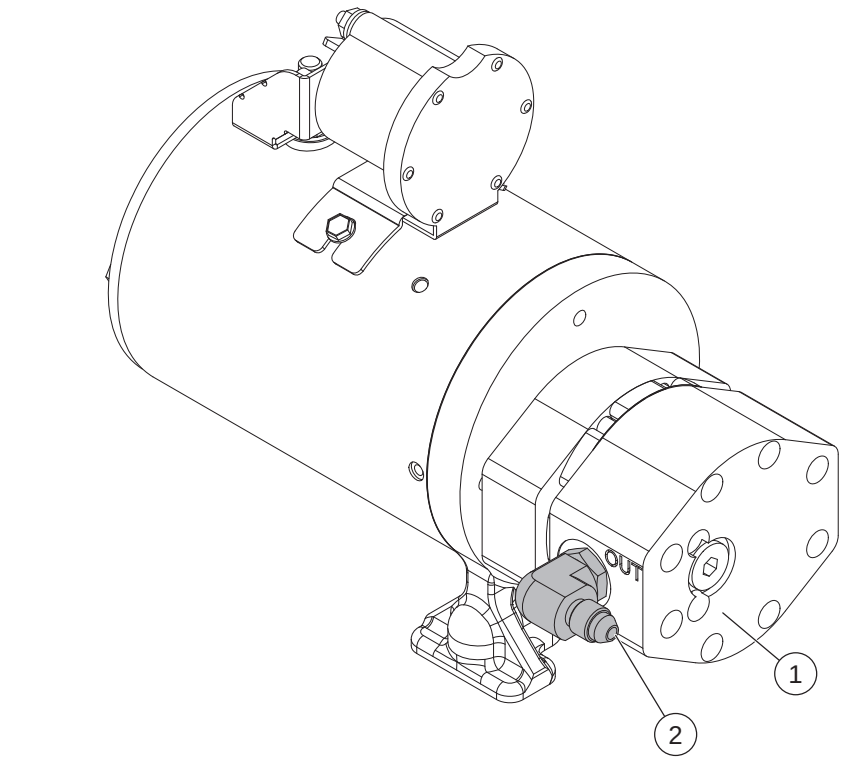


ILLUSTRATION No. ART_4880 45-J Axle Cylinders

Item	Part Number	Description	Qty.
1	31031	Axle Cylinder	1
2	50676	Fitting, MFFOR-MB45-6-6	1
3	50675	Fitting, MFFOR-MB45-4-4	1
4	51167	Fitting, MP-MFFOR-4-4	1
5	95378	Counterbalance Valve	1
6	95385	Seal Kit	1

Auxiliary Power Unit



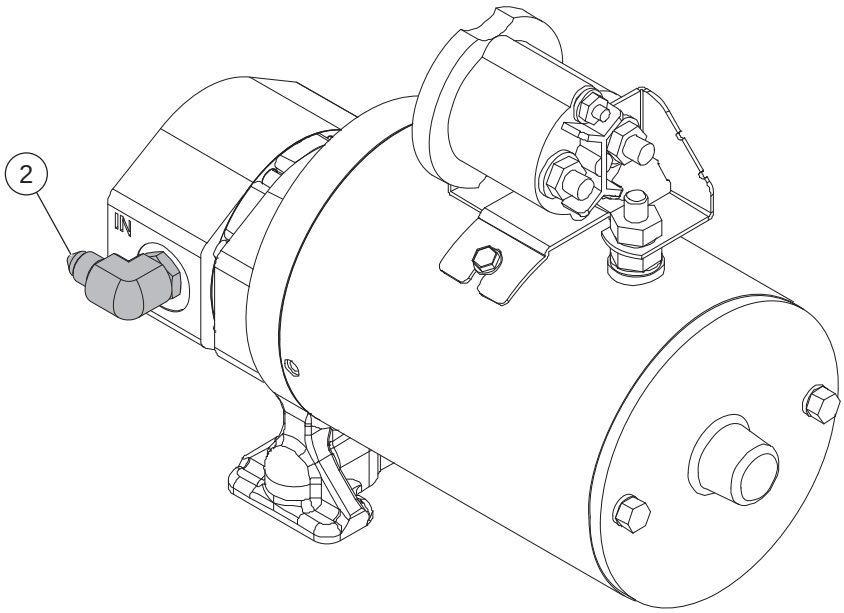


ILLUSTRATION No. ART_3491

92RT Series

AUXILLARY POWER UNIT, 5592RT, 3392RT-T

Item	Part Number	Description	Qty.
1	17973	Auxiliary Power Unit, Without Fittings	1
--	92534	Solenoid	--
2	50790	Fitting, MB-MJ90-6-6	2

Hydraulic Hoses

P/N	ID	End A Fitting P/N	End A Fitting Description	End B Fitting P/N	End B Fitting Description	Hose Spec P/N	Hose Spec Description	Hose Length (mm)
52953	RFBRK - T	50667	4G-4FFORX	50679	4G-4FFORX 90	50627	4M-3K	1981
52954	LFBRK-T	50667	4G-4FFORX	50679	4G-4FFORX 90	50627	4M-3K	1981
52955	LF2SPED - T	50667	4G-4FFORX	50679	4G-4FFORX 90	50627	4M-3K	1803
52956	RF2SPED - T	50667	4G-4FFORX	50679	4G-4FFORX 90	50627	4M-3K	1803
52957	LR2SPD - RRT2SPD	50667	4G-4FFORX	50679	4G-4FFORX 90	50627	4M-3K	1753
52958	F2SPEDT -RM4A	50667	4G-4FFORX	50679	4G-4FFORX 90	50627	4M-3K	762
52959	LRBRK - RRBRKT	50667	4G-4FFORX	50677	4G-4FFORX 45	50627	4M-3K	1626
52960	AXLRET - T	50667	4G-4FFORX	50679	4G-4FFORX 90	50627	4M-4K	762
52961	AXLRET - T	50667	4G-4FFORX	50679	4G-4FFORX 90	50627	4M-4K	762
52962	AXLT - RM5	50667	4G-4FFORX	50679	4G-4FFORX 90	50627	4M-4K	991
52963	RRBRKT -RM8B	50667	4G-4FFORX	50679	4G-4FFORX 90	50627	4M-3K	2032
52964	RR2SPDT - RM4B	50667	4G-4FFORX	50679	4G-4FFORX 90	50627	4M-3K	1880
52965	RM6 - STRRET	50667	4G-4FFORX	50677	4G-4FFORX 45	50627	4M-3K	1803
52966	RM7 - STREXT	50667	4G-4FFORX	50677	4G-4FFORX 45	50627	4M-3K	1803
52967	M8PORT-RM8A	50667	4G-4FFORX	50862	4G-6FFORX	50627	4M-3K	432
52968	STRRET-STREXT	50667	4G-4FFORX	50679	4G-4FFORX 90	50627	4M-3K	965
52969	STREXT-STRRET	50667	4G-4FFORX	50679	4G-4FFORX 90	50627	4M-3K	965
52970	AXLEXT-M8PORT	50862	4G-6FFORX	50862	4G-6FFORX	50627	4M-3K	762
52971	AXLEXT-M8PORT	50862	4G-6FFORX	50862	4G-6FFORX	50627	4M-3K	762
52972	LRCD/ RRCD-T	50620	8G-8FFORX	50622	8G-8FFORX 90	50630	8M-3K	1168
52973	LRCD/ RRCD-T	50620	8G-8FFORX	50622	8G-8FFORX 90	50630	8M-3K	1168
52974	LFRFCD-T	50620	8G-8FFORX	50622	8G-8FFORX 90	50630	8M-3K	1651
52975	LFRFCD-T	50620	8G-8FFORX	50622	8G-8FFORX 90	50630	8M-3K	1651
52976	LFRFCDT -RM3A	50620	8G-8FFORX	50620	8G-8FFORX	50630	8M-3K	508
52977	LFRRCDT -RM3B	50620	8G-8FFORX	50620	8G-8FFORX	50630	8M-3K	1270
52978	LBHUPERT-CV	50618	08G-12FJX	50620	8G-6FFORX	50728	8M-4K MTF	178
52979	LRRAT-LBHUPERT	51002	8G-12FFORX	50694	8G-12FFORX 90	50728	8M-4K -MTF	2591
52980	RBHLOWER - RMT1	50654	12G-12FFORX	50602	12G-12FJX	50730	12M-4K -MTF	940
52981	LFA - LBHLOWER	50654	12G-12FFORX	50704	12G-12FFORX 45	50730	12M-4K -MTF	1448

52982	LFB - LBHUPER	50654	12G-12FFORX	50704	12G-12FFORX 45	50730	12M-4K -MTF	1448
52983	RFA - RBHLOWER	50654	12G-12FFORX	50704	12G-12FFORX 45	50730	12M-4K -MTF	1448
52984	RFB - RBHUPER	50654	12G-12FFORX	50704	12G-12FFORX 45	50730	12M-4K -MTF	1448
52985	LBHLOWER - RMT2	50654	12G-12FFORX	50603	12G-12FJX 90	50730	12M-4K -MTF	813
52986	LRB - RMT1	50654	12G-12FFORX	50603	12G-12FJX 90	50730	12M-4K -MTF	2032
52987	LRAT-RRB	50654	12G-12FFORX	50654	12G-12FFORX	50730	12M-4K -MTF	1422
52988	RRB - RMT2	50654	12G-12FFORX	50603	12G-12FJX 90	50730	12M-4K -MTF	2032
52989	RBHUPPER-LBHUPPERT	50704	12G-12FFORX 45	50704	12G-12FFORX 45	50730	12M-4K -MTF	457
52990	PLLU - BHUPPER	50667	4G-4FFORX	50667	4G-4FFORX	50627	4M-3K	11700
52991	PLLD - BHLOWER	50667	4G-4FFORX	50667	4G-4FFORX	50627	4M-3K	11700
52992	SF - BH	50667	4G-4FFORX	50667	4G-4FFORX	50627	4M-3K	11900
52993	SR - BH	50667	4G-4FFORX	50667	4G-4FFORX	50627	4M-3K	11900
52994	RL - BH	50667	4G-4FFORX	50667	4G-4FFORX	50627	4M-3K	13500
52995	RR - BH	50667	4G-4FFORX	50667	4G-4FFORX	50627	4M-3K	13500
52996	SFBH - JIBEXT	50667	4G-4FFORX	50677	4G-4FFORX 45	50627	4M-3K	940
52997	SRBH - JIBRET	50667	4G-4FFORX	50677	4G-4FFORX 45	50627	4M-3K	940
52998	RLBH - HP1	50667	4G-4FFORX	50677	4G-4FFORX 45	50627	4M-3K	940
52999	RRBH - HP2	50667	4G-4FFORX	50677	4G-4FFORX 45	50627	4M-3K	940
56000	BHUPPER -PLCEXT	50667	4G-4FFORX	51001	4G-6MBX90BL	50627	4M-3K	330
56001	BHLOWER - PLCRET	50667	4G-4FFORX	51001	4G-6MBX90BL	50627	4M-3K	330
56001	BRK -RM8	50667	4G-4FFORX	50667	4G-4FFORX	50627	4M-3K	1346
56002	2SPD - RM4	50667	4G-4FFORX	50667	4G-4FFORX	50627	4M-3K	1346
56002	AXLE - RM5	50667	4G-4FFORX	50667	4G-4FFORX	50627	4M-3K	1295
56003	A - MA	50667	4G-4FFORX	50679	4G-4FFORX 90	50627	4M-4K	1524
56003	B - MB	50667	4G-4FFORX	50679	4G-4FFORX 90	50627	4M-4K	1524
56004	STB - RM7	50667	4G-4FFORX	50667	4G-4FFORX	50627	4M-3K	1118
56004	STA -RM6	50667	4G-4FFORX	50667	4G-4FFORX	50627	4M-3K	1219
56005	PLS-GLS	50667	4G-4FFORX	50667	4G-4FFORX	50627	4M-3K	3937
56005	SMB -SD1	50666	6G-6FFORX	50690	6G-8FFORX	50629	6M-3K	1016
56006	SMA -SD2	50666	6G-6FFORX	50690	6G-8FFORX	50629	6M-3K	1016
56006	PS - PMP	50666	6G-6FFORX	50687	6G-6FFORX 90	50629	6M-3K	3835
56007	BCR - LCRET	50666	6G-6FFORX	50666	6G-6FFORX	50629	6M-3K	3048
56007	BCE - LCEXT	50666	6G-6FFORX	50666	6G-6FFORX	50629	6M-3K	3048
56008	ECE - ECEXT	50666	6G-6FFORX	50666	6G-6FFORX	50629	6M-3K	2743
56008	ECR - ECRET	50666	6G-6FFORX	50666	6G-6FFORX	50629	6M-3K	2743

56009	B2SPEEDT-MMTOP	50666	6G-6FFORX	50685	6G-6FFORX 45	50629	6M-3K	406
56009	EDOWNP-AUX	50666	6G-6FFORX	50687	6G-6FFORX 90	50629	6M-3K	1219
56010	PR - PMT	50698	8G-8FFORX	50698	8G-8FFORX	50630	8M-3K	3835
56010	CP-FET	50666	6G-6FFORX	50685	6G-6FFORX 45	50630	8M-3K	1245
56011	G - CFO	50698	8G-8FFORX	50697	8G-8FFORX 90L	50630	8M-3K	432
56011	FET - CFI	50698	8G-8FFORX	50622	8G-8FFORX 90	50630	8M-3K	432
56012	BV2T-EDOWNT	50625	8G-8FJX	50698	8G-8FFORX	50630	8M-3K	1448
56012	DPCD - TANK	50698	8G-8FFORX	50698	8G-8FFORX	50630	8M-3K	1321
56013	RM3 - TANK	50700	10G-10FFORX	50700	10G-10FFORX	51080	10M-3K	1854
56013	FP-P	50700	10G-10FFORX	50701	10G-10FF0RX 90L	51080	10M-3K	1473
56014	MMT - RF	50654	12G-12FFORX	50655	12G-12FFORX90	51080	12M-3K	1854
56014	DPB -RM1	50715	16G-16FFORX	50715	16G-16FFORX	51271	16M-4K	1397
56015	DPA - RM2	50715	16G-16FFORX	50715	16G-16FFORX	51271	16M-4K	1397
56015	SFP - BV2	50726	24G-24FJX	50726	24G-24FJX	50731	24 GMV	1321

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Chassis Sub-Assembly

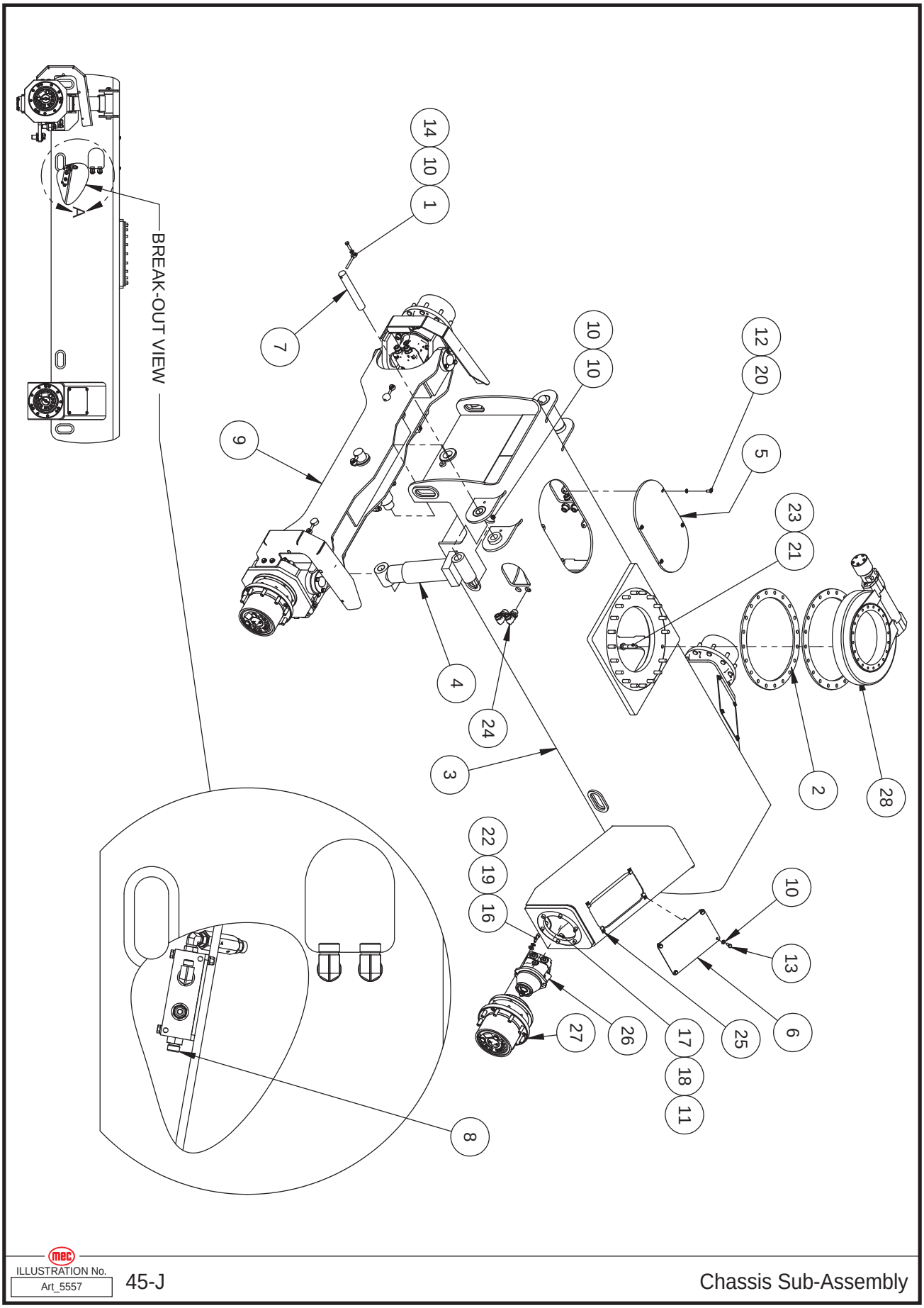


ILLUSTRATION No. Art_5557

45-J

Chassis Sub-Assembly

Item	Part Number	Description	Qty.
1	18151	Keeper Pin	2
2	28617	Spacer, Swing Bearing	2
3	31000	Frame Weldment	1
4	31031	Axle Lock Cylinder	2
5	31055	Cover Plate, Chassis	1
6	31096	Plate, Cover, Rear Axle, 45J	2
7	31215	Pin, 38.1mm × 250mm LG	2
8	31238	Front Case Drain Manifold Assembly (Refer to page 166)	1
9	31820	Front Axle Sub-Assembly (Refer to page 152 and page 154)	1
10	50002	WSHR M10 ZP Standard Flat	12
11	50004	WSHR M16 ZP Standard Flat	12
12	50006	WSHR M10 ZP Nordlock	4
13	50033	HHCS M10-1.50 × 25 08 ZP F	8
14	50035	HHCS M10-1.50 × 40 08 ZP F	2
15	50049	NNYL M10 × 1.50 08 ZP Nylon Inse	2
16	50055	SHCS 7/16-14 × 1.5 GR 8	6
17	50056	SHCS 5/8"-11 × 1.50 GR8	12
18	50249	WSHR M16 ZP Nordlock 5/8	12
19	50273	WSHR M11 ZP Nordlock 7/16	6
20	50297	BHCS M10-1.50 × 25 08 ZF	4
21	50580	HHCS 5/8-11 × 3.25, 8, ZP, P	20
22	50563	WSHR 1/2 ID Flat SAE Hardened	6
23	50582	WSHR 05/08 × 1-5/16 × 1/8, SAE, 08, ZP	20
24	51266	HYFT MFFOR-MFFORH90-12 BLKHD ADPTR	4
25	92098	Nut Clip M10 × 0.375	8
26	94742	Hydraulic Motor	2
27	94014	Planetary Wheel Drive	2
28	94817	Slew Gear	1

Engine Hood Assembly

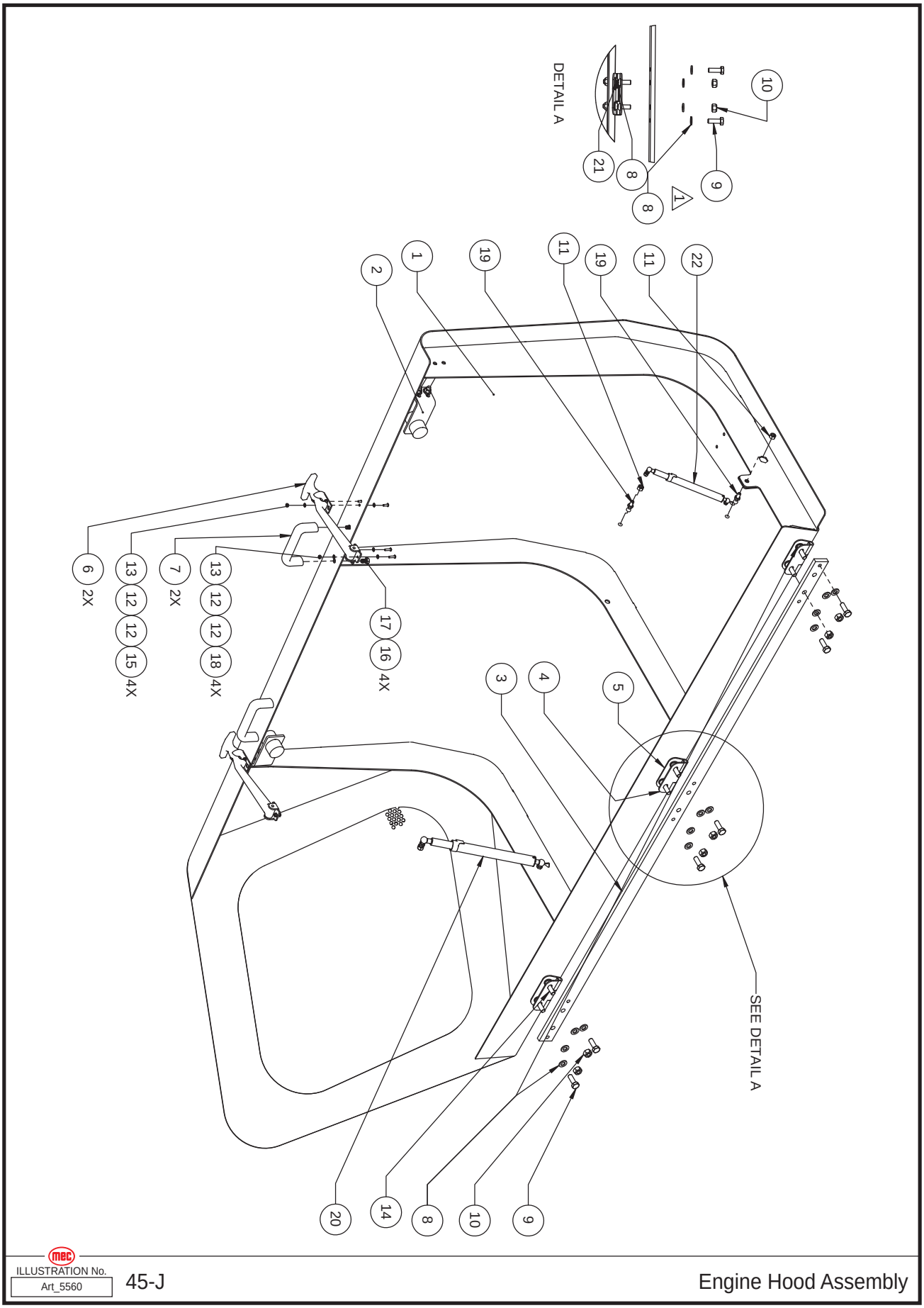


ILLUSTRATION No. Art_5560

45-J

Engine Hood Assembly

Item	Part Number	Description	Qty.
1	31137	Weldment, Hood, Engine, 45J	1
2	31138	Hood Stop Assembly, 45J	2
3	31139	Mounting Bracket, Hood Hinge, 45J	1
4	93733-A	Hinge Half	3
5	93733-B	Hinge Half	3
6	93817	Flexible Molded Latch, Rubber, Stainless Steel	2
7	93821	Load Rated Pull Handle, 4-7/16" Center To Center, Aluminum	2
8	50002	WSHR M10 ZP Standard Flat	24
9	50034	HHCS M10-1.50 × 30 08 ZP F	6
10	50049	NNYL M10 × 1.50 08 ZP Nylon Inse	12
11	50203	NNYL 5/16-18, 05, ZP	4
12	50284	WSHR M04 ZP Standard Flat	16
13	50285	NNYL M04 × 0.70 08 ZP Nylon Inse	8
14	50297	BHCS M10-1.5 × 25 08 ZF	6
15	53034	BHCS M04-0.70 × 12 10 ZP	4
16	53055	Spring Washer, M8	4
17	53154	HHCS M8-1.25 × 16	4
18	53241	BHCS M04-0.70 × 16 10 ZP	4
19	94065	Ball Stud, 13mm Ball, 5/16 × 1/2 Thread	4
20	94989	Gas Spring, EXT 508mm, RET 305mm, 150 LB, Locking	1
21	50370	BHCS M10-1.5 × 30 08 ZP P	6
22	93952	Gas Spring, EXT 19.63”, RET 11.73”, 150 LBF Force	1

Control Hood Assembly

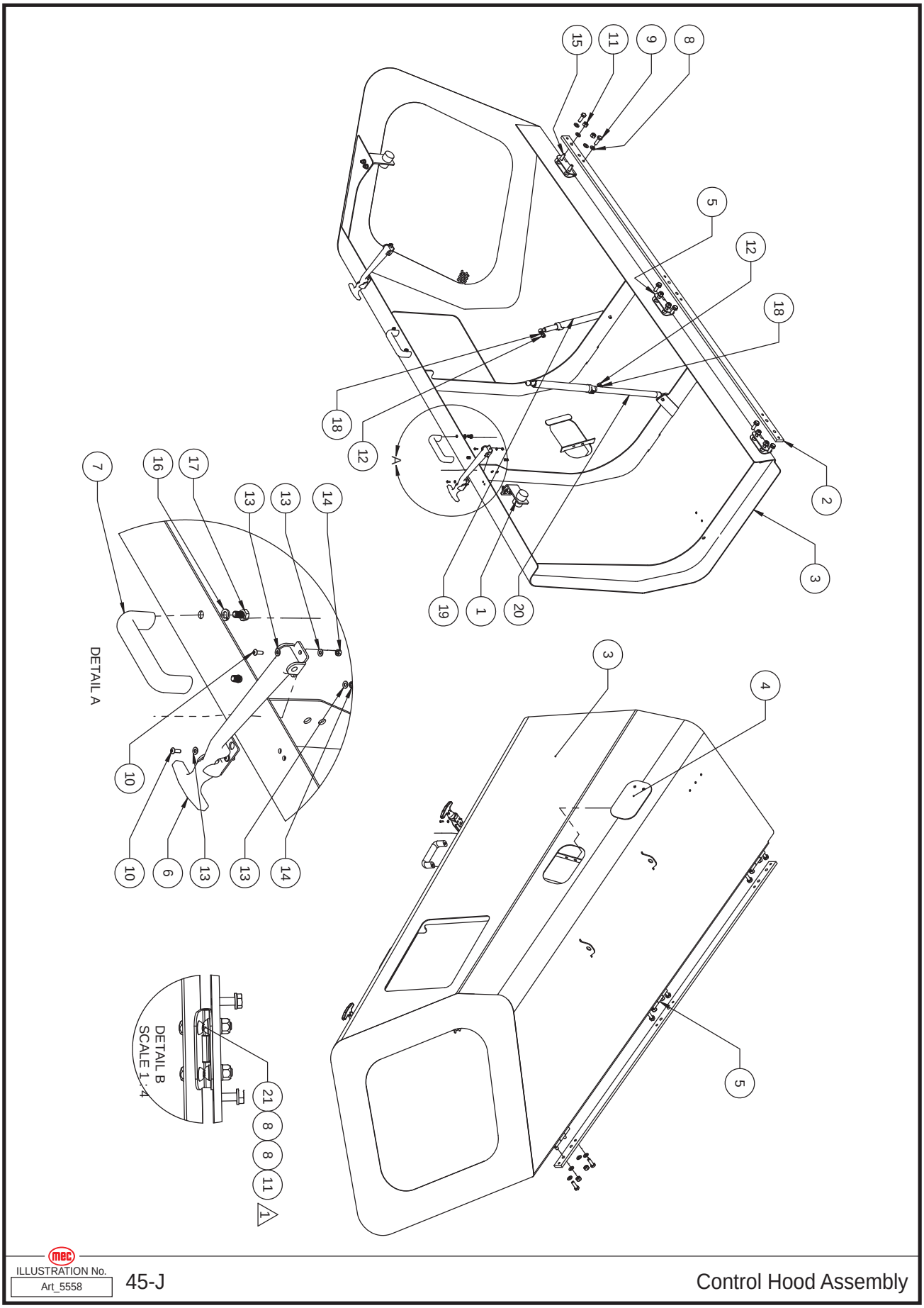


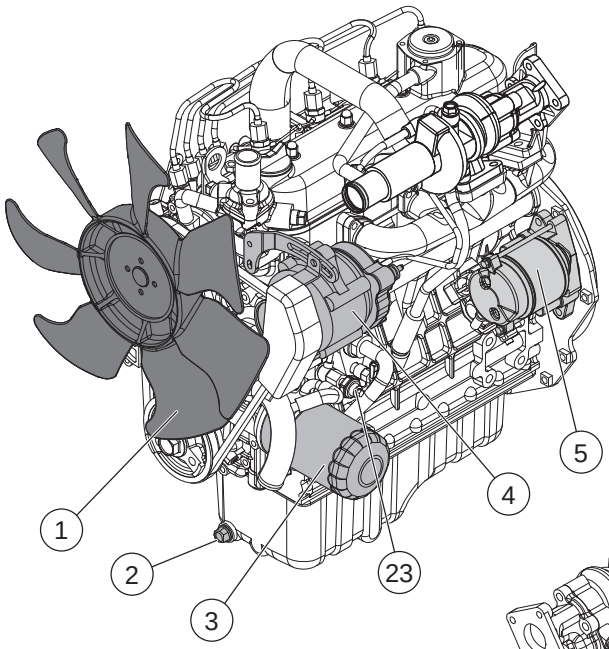
ILLUSTRATION No. Art_5558

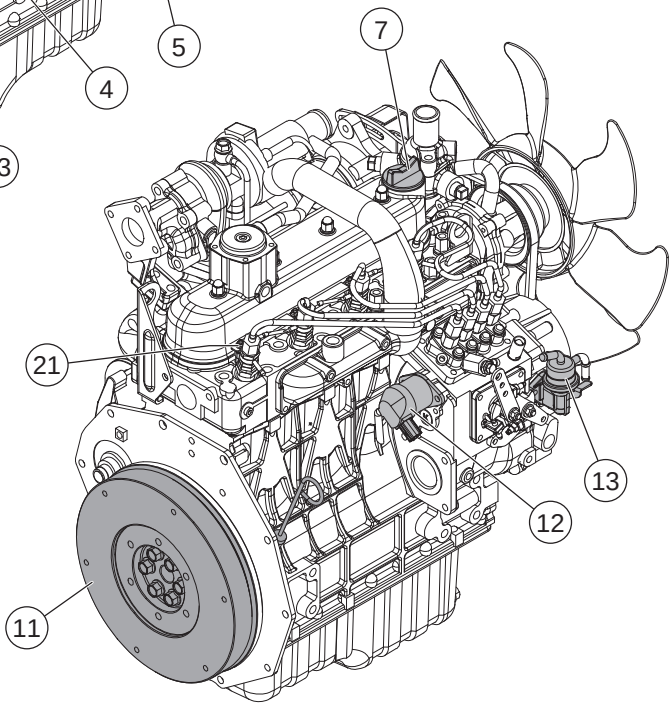
45-J

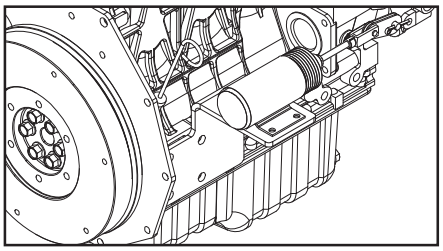
Control Hood Assembly

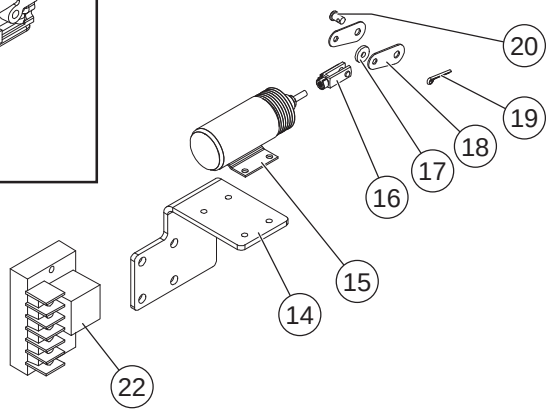
Item	Part Number	Description	Qty.
1	31138	Hood Stop Assembly (Refer to page 218)	2
2	31139	Mounting Bracket, Hood Hinge, 45J	1
3	31151	Weldment, Hood, Control, 45J	1
4	31152	Assembly, Fuel Door	1
--	31231	Forming, Mount Fuel Door	1
--	50142	RHMS #06-32X00.375 ZP	2
--	50329	NNYL #06-32 ZP Nylon Inse	2
5	93733	Hinge, Butt, Heavy Duty	3
6	93817	Flexible Molded Latch, Rubber, Stainless Steel, “Latch & Catch"	2
7	93821	Load Rated Pull Handle, 4-7/16” Center To Center, Aluminum	2
8	50002	WSHR M10 ZP Standard Flat	24
9	50034	HHCS M10-1.50 × 30 08 ZP F	6
10	53034	BHCS M04-0.70 × 12 10 ZP	8
11	50049	NNYL M10 × 1.50 08 ZP Nylon Inse	12
12	50203	NNYL 5/16-18, 05, ZP	2
13	50284	WSHR M04 ZP Standard Flat	16
14	50285	NNYL M04 × 0.70 08 ZP Nylon Inse	8
15	50297	BHCS M10-1.50 × 25 08 ZF	6
16	53055	Spring Washer, M8	4
17	53154	HHCS M08-1.25 × 16	4
18	94065	Ball Stud, 13mm Ball, 5/16 × 1/2 Thread	4
19	94989	Gas Spring, EXT 508mm, RET 305mm, 150 LB, Locking	1
20	93952	Gas Spring, EXT 19.63”, RET 11.73”, 150 LBF Force	1
21	50370	BHCS M10-1.50 × 30 08 ZP P	6

Engine Components









See previous pages for Solenoid Mounting Bracket hardware.

ILLUSTRATION No. ART_4858 45-J Diesel Engine Components

Item	Part Number	Description	Qty.
1	94038	Fan	1
--	94040	V-Belt	1
2	94038	Oil Plug	1
3	8665	Oil Filter	1
4	90227	Alternator	1
5	8413	Starter	1
7	94056	Oil Filler Cap	1
11	94058	Flywheel	1
--	91360	Ring Gear	1
12	94057	Fuel Solenoid	1
13	93619	Fuel Pump	1
14	31240	Mounting Bracket	1
15	92939	Throttle Pull Solenoid	1
16	91117	Throttle Link Clevis	1
--	50296	Bolt, M6 x 15	4
--	50000	Washer, M6 Std	4
--	50047	Nut, M6 Nylock	4
17	91588	Washer	1
18	16347	Throttle Link	2
19	50178	Cotter Pin	1
20	50171	Clevis Pin	1
21	94059	Glow Plug	4
22	92940	Throttle Solenoid Controller	1
23	91175	Oil Pressure Switch	1

Engine Tray Assembly, Part 1

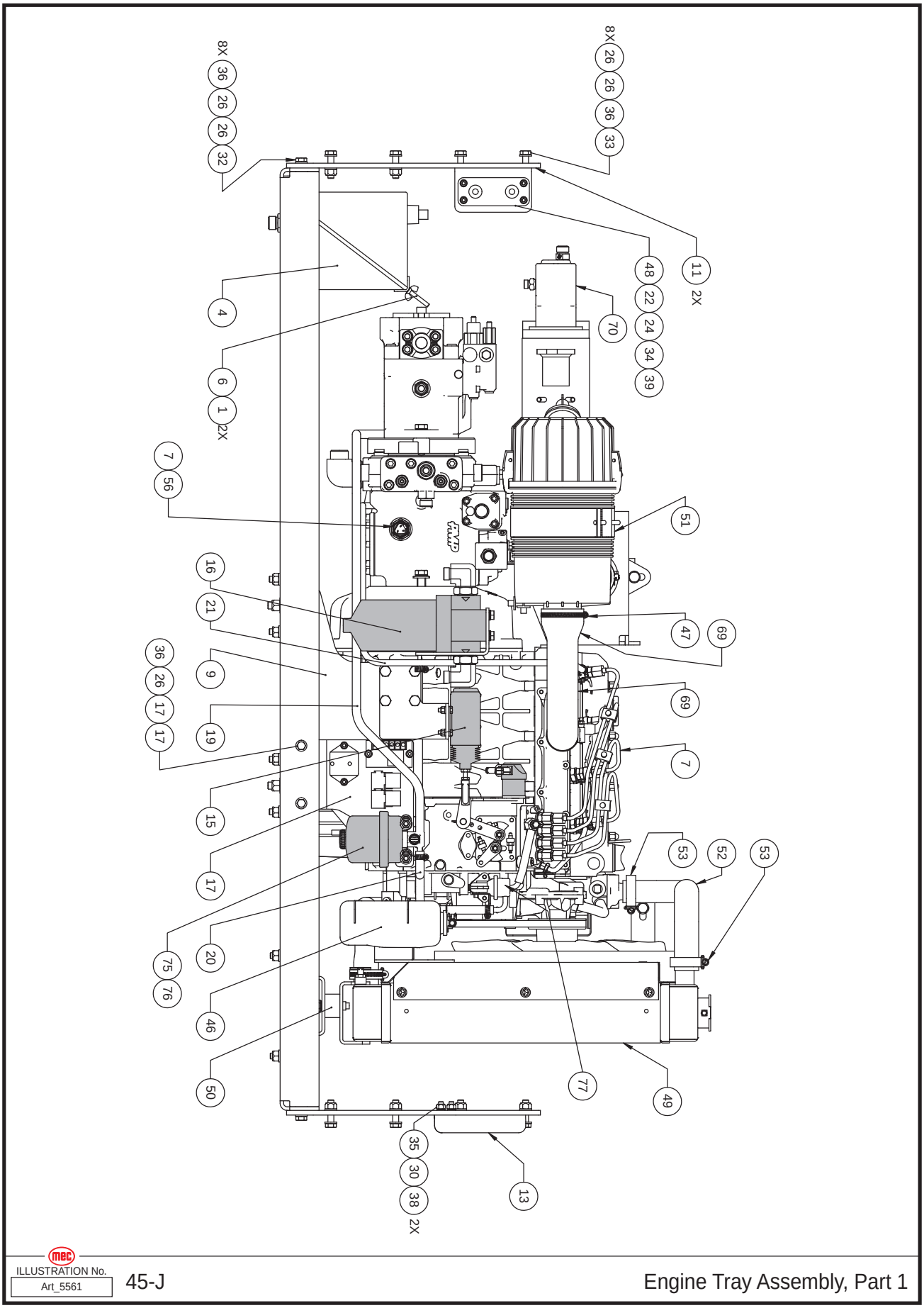


ILLUSTRATION No. Art_5561 45-J Engine Tray Assembly, Part 1

Item	Part Number	Description	Qty.
1	6110	1/4"-20 Wing Nut	2
4	17966	Battery 950cca Group 31-STUD	1
6	22563	Battery Holdown	2
7	31109	Power Plant Assembly, Engine Module (Refer to page 206)	1
9	31111	Engine Mount, LH, Engine Module	1
10	31112	Radiator Mount, Engine Module	2
11	31113	Mounting Bracket, Engine Module	2
13	31115	Rear Mount, Gas Spring, Engine Module	1
15	31239	Solenoid Control Sub-Assembly (Refer to page 210)	1
16	31241	Charge Filter Sub-Assembly (Refer to page 170)	1
--	92169	Filter Charge Pump Element	1
17	31243	Relay & Fuel Filter Sub-Assembly (Refer to page 208)	1
19	31266	Fuel Line 8mm OR 5/16” ID, Tank-Filter	1
20	31267	Fuel Line, Filter-Engine, 45J	1
21	31268	Fuel Line, Return	1
22	31269	Mounting Bracket, Fuse Holder	1
24	50000	WSHR M06 ZP Standard Flat	4
26	50002	WSHR M10 ZP Standard Flat	70
28	50006	WSHR M10 ZP Nordlock	24
30	50032	HHCS M08-1.25 × 30 ZP	2
32	50034	HHCS M10-1.50 × 30 08 ZP F	22
33	50035	HHCS M10-1.50 × 40 08 ZP F	10
34	50047	NNYL M06 × 1.00 08 ZP Nylock	4
35	50048	NNYL M08 × 1.25 08 ZP Nylon	2
36	50049	NNYL M10 × 1.50 08 ZP Nylon Inse	36
38	50200	M08 Nordlock Washer	4
39	50214	HHCS M06-1.00 × 30 08 ZP P	4
46	91127	Coolant Reserve Tank	1
47	92536	Hose Clamp, Intake #44	3
48	93172	Fuse Holder	1
--	93173	400 Amp Fuse	1
49	93644	Radiator, Aluminum	1
50	93728	Vibration Damper	2
51	93737	Air Cleaner, Magna Seal, 2.5 in Inlet & Outlet	1
--	93907	Filter Element, Air	1
52	93794	Radiator Hose, Upper	1
53	93873	Hose Clamp, 1-1/4 - 2-1/8	4
56	95111	Sensor, Electronic Temperature	1
69	93757	Silicone Reducer, 2-1/2” To 1-1/2”, Black	1
70	95110	E-Down Pump	1
71	50874	HYFT MFFOR-MP-6-6 ; FS2404-06-06	1
75	REF	Fuel Filter Assembly (Refer to page 208)	1
76	REF	Fuel Filter Element (Refer to page 208)	1
77	93619	Fuel Pump	1

REF - Reference

Engine Tray Assembly, Part 2

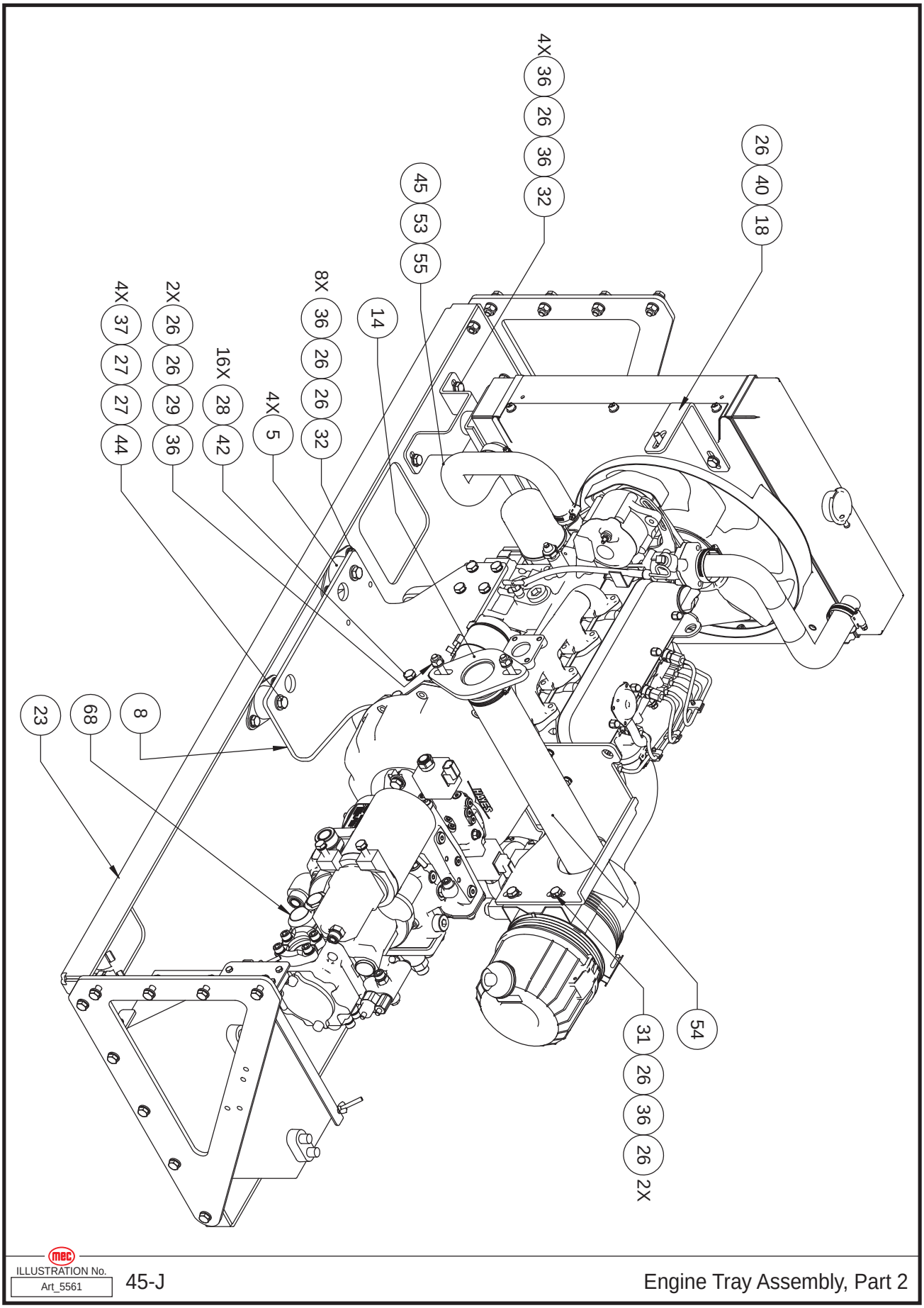


ILLUSTRATION No. Art_5561

45-J

Engine Tray Assembly, Part 2

Item	Part Number	Description	Qty.
5	17969	Motor Mount, Engine, 70 DR.	4
8	31110	Engine Mount, RH, Engine Module	1
14	31117	Weldment, Air Inlet, Engine Module	1
18	31265	Bracket, Radiator Mount, Top	1
23	31274	Weldment, Engine Pan	1
26	50002	WSHR M10 ZP Standard Flat	70
27	50003	WSHR M12 ZP Standard Flat	8
28	50006	WSHR M10 ZP Nordlock	24
29	50020	HHCS M10-1.50 × 50 08 ZP P	2
31	50033	HHCS M10-1.50 × 25 08 ZP F	3
32	50034	HHCS M10-1.50 × 30 08 ZP F	22
36	50049	NNYL M10 × 1.50 08 ZP Nylon Inse	36
37	50050	NNYL M12 × 1.75 08 ZP Nylon Inse	4
40	50215	HHCS M10-1.50 × 20 08 ZP F	2
42	50392	HHCS M10-1.25 × 30 08 ZP	11
44	53108	HHCS M12-1.75 × 80 10 ZP F	4
45	90740	Hose Clamp 13/16" 1-3/4" (SAE #16)	1
53	93873	Hose Clamp, 1-1/4 - 2-1/8	4
54	94830	2.75ID × 15.75LG Silicone Tube	1
55	94888	Radiator Hose	1
68	51262	HYFT MB-MJ-16-24	1
--	8413	Starter	1
--	90227	Alternator	1
--	8665	Oil Filter	1
--	94059	Glow Plug	4

Engine Tray Assembly, Part 3

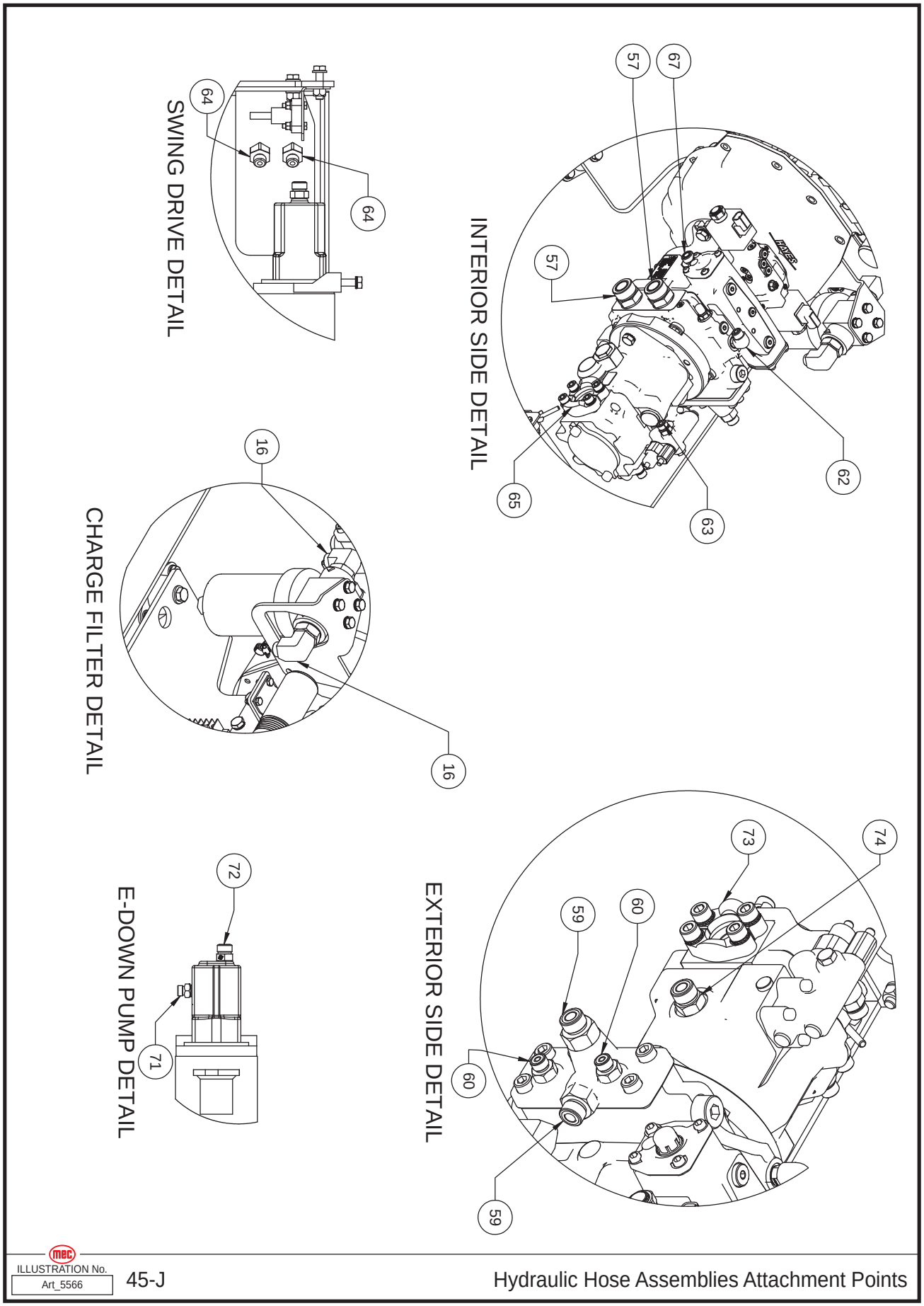


ILLUSTRATION No. Art_5566

45-J

Hydraulic Hose Assemblies Attachment Points

Item	Part Number	Description	Qty.
16	31241	Charge Filter Sub-Assembly (Refer to page 170)	1
--	92169	Filter Charge Pump Element	1
--	92397	Filter Element In-tank Return Filter	1
57	50806	HYFT MFFOR-MB-16-12	2
59	50837	HYFT MFFOR-MB-8-10	2
60	51330	HYFT 04MFFOR-05MB	2
62	51083	HYFT MFFOR-MB90-06-04	1
63	50820	HYFT MFFOR-MB-6-4 ; FS6400-06-04-O	1
64	51280	HYFT MFFOR-MB45-6-10	2
65	51282	Flange Clamp, Split, Code 61, #20	1
67	50838	HYFT MFFOR-MB-8-12 ; FS6400-08-12-O	1
72	51286	HYFT MFFOR-MP-08-06	1
73	51276	Flange Clamp, Code 61, #12	1
74	50841	HYFT MFFOR-MB-8-8 ; FS6400-08-08-O	1

Engine Tray Assembly, Part 4

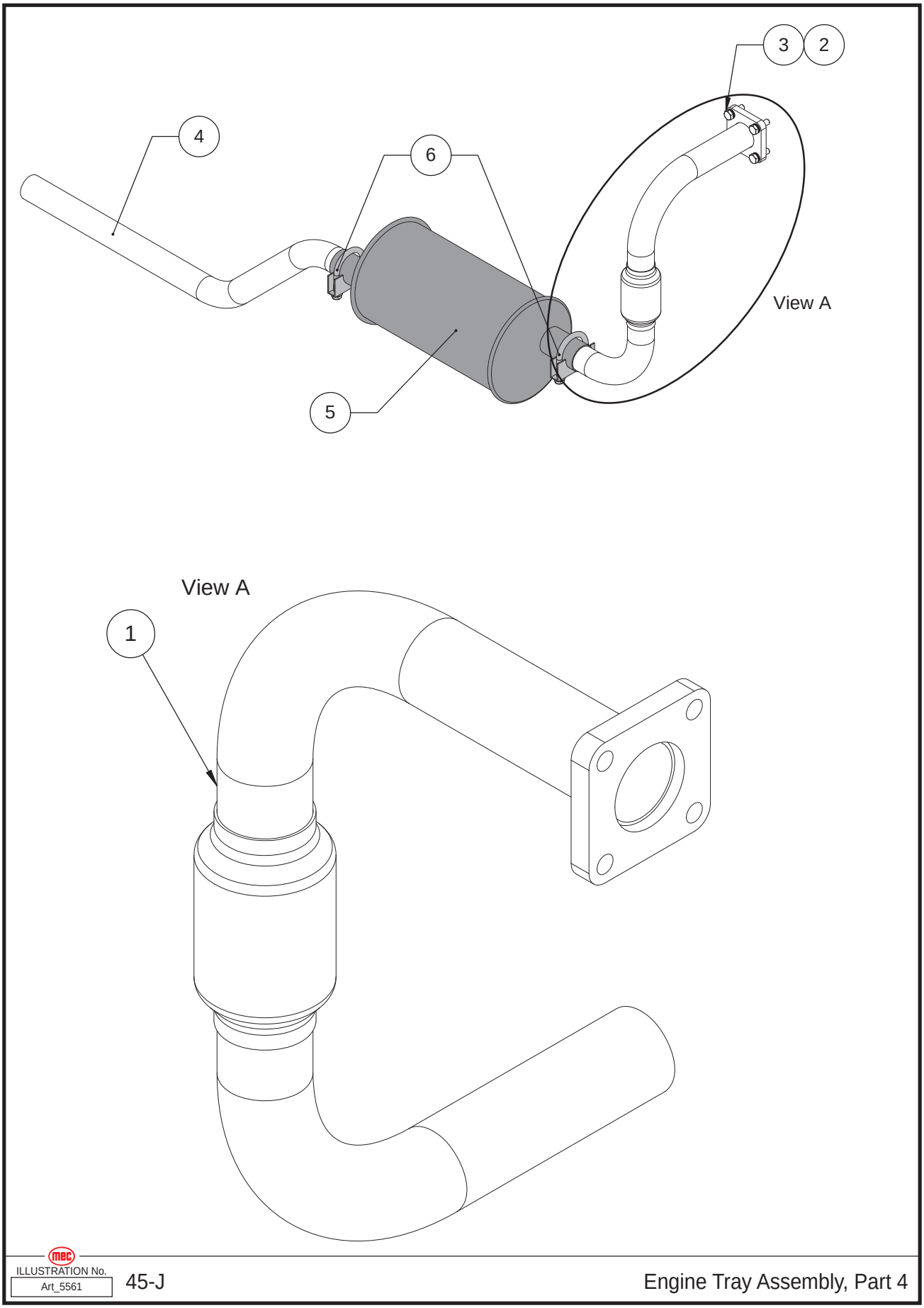


ILLUSTRATION No. Art_5561 45-J Engine Tray Assembly, Part 4

Item	Part Number	Description	Qty.
1	31332	Weldment, Exhaust Tube	1
2	50200	M08 Nordlock Washer	4
3	50348	HHCS M08-1.25X25 08 ZP P	4
4	31257	Tube, Exhaust, End	1
5	92965	Exhaust Muffler, 6” Round, 1.5" ID Inlet, 1.5" ID Outlet	1
6	93267	1-5/8" Muffler Clamp, 5/16” Thread, Zinc Plate	2

Power Plant Assembly, Engine Module

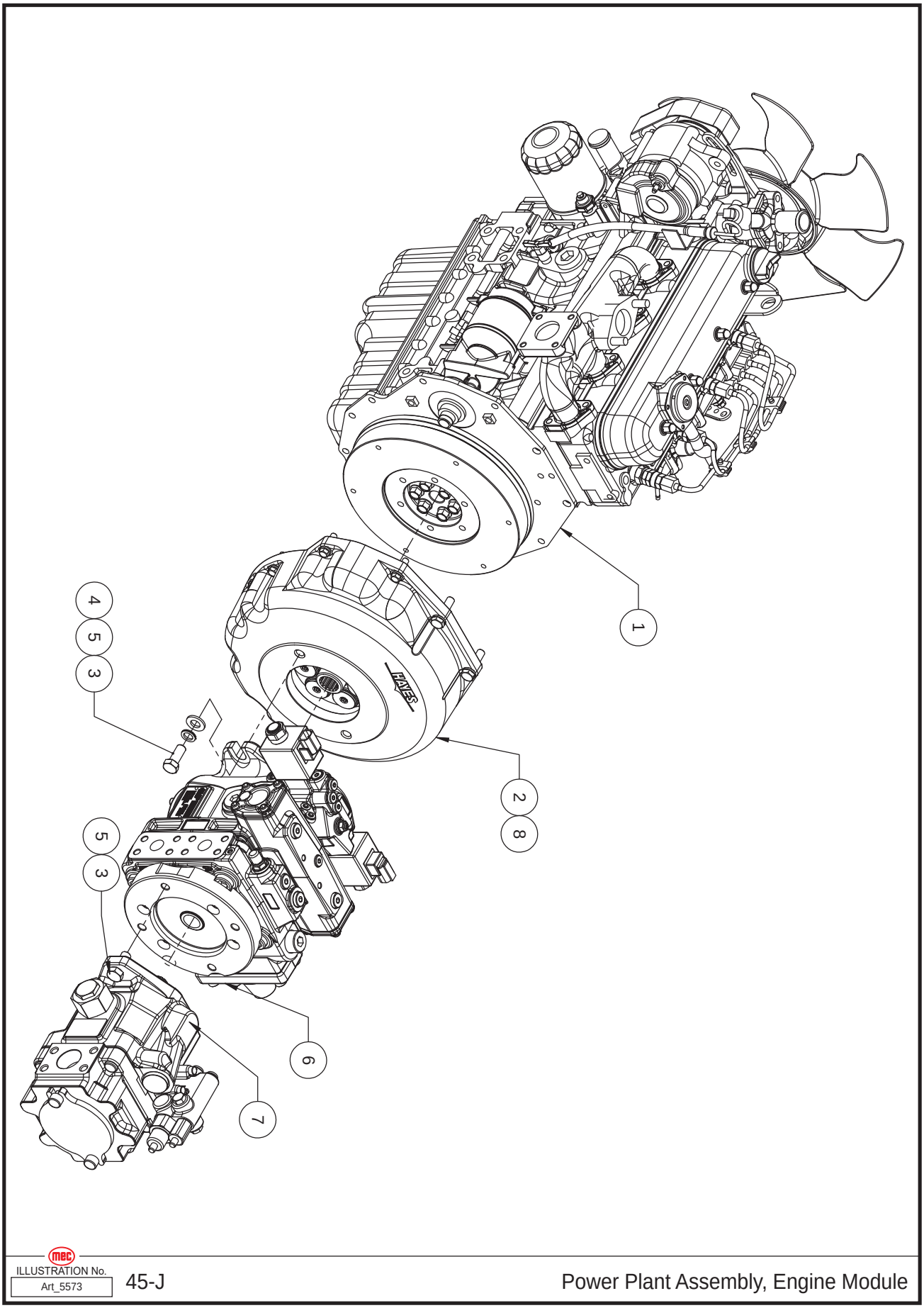


ILLUSTRATION No. Art_5573 45-J Power Plant Assembly, Engine Module

Item	Part Number	Description	Qty.
1	94746	Kubota Diesel Engine V1505 Tier 4, 1.5L, 4-Cyl	1
2	93470	D1105 SAE B-B Coupler (15T Spline)	1
3	50039	HHCS M12-1.75 × 30 08 ZP F	4
4	50003	WSHR M12 ZP Standard Flat	2
5	50007	WSHR M12 ZP Nordlock	4
6	94469	33cc Closed Loop Pump	1
7	95027	28CC SAE B 13T Hyd. Piston Pump	1
8	95388	Coupling Assembly	1

Relay & Fuel Filter Sub-Assembly

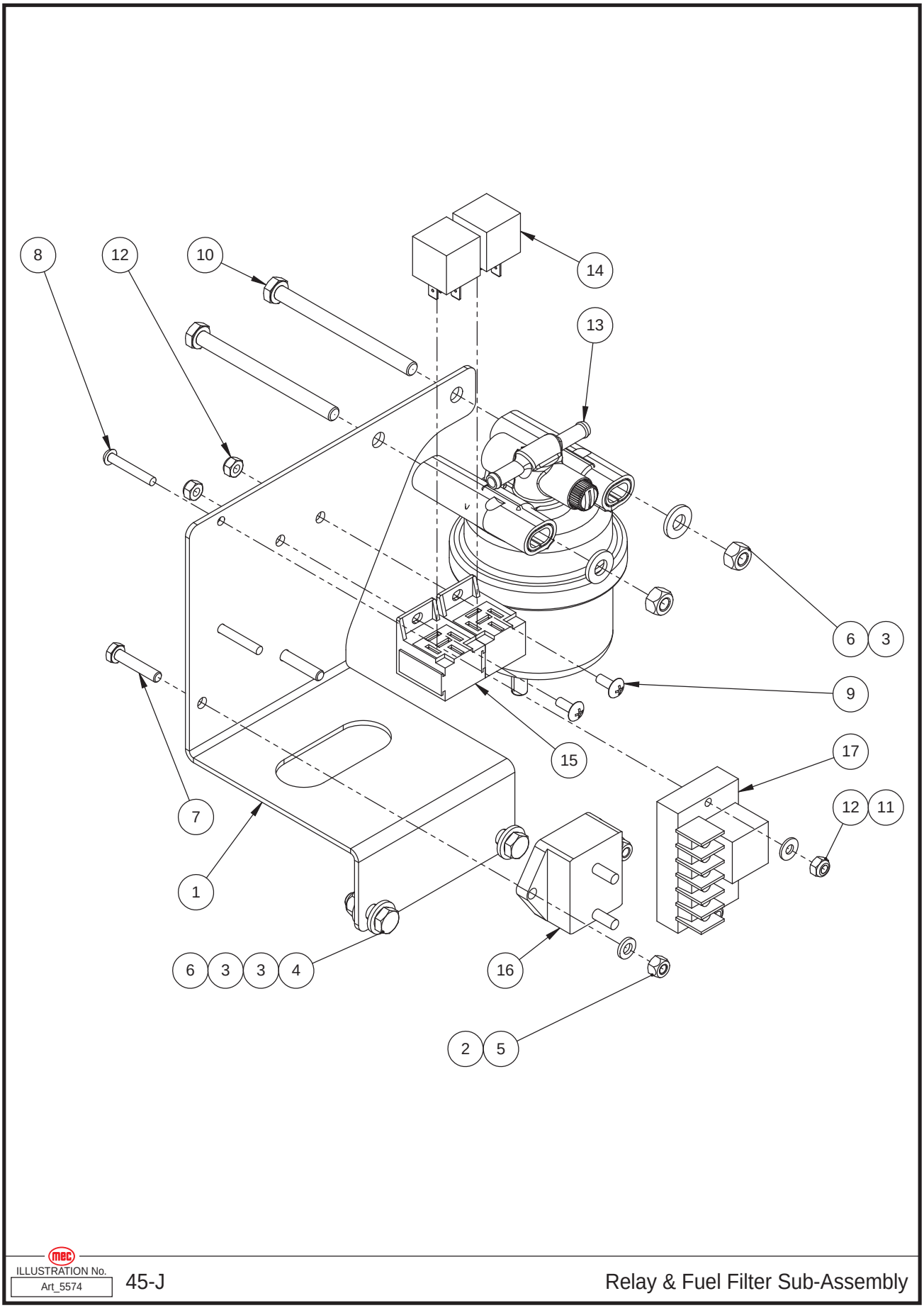


ILLUSTRATION No. Art_5574 45-J Relay & Fuel Filter Sub-Assembly

Item	Part Number	Description	Qty.
1	31244	Bracket, Fuel Filter, Solenoid Controller, Relay	1
2	50000	WSHR M06 ZP Standard Flat	2
3	50001	WSHR M08 ZP Standard Flat	6
4	50031	HHCS M08-1.25 × 25 08 ZP F	2
5	50047	NNYL M06X1.00 08 ZP Nylock	2
6	50048	NNYL M08X1.25 08 ZP Nylon	4
7	50214	HHCS M06-1.00 × 30 08 ZP P	2
8	50189	RHST #10-32 × 1.25 ZP	2
9	50191	THMS #10-32 × 0.50 ZP	2
10	50237	HHCS M08-1.25 × 100 08 ZP P	2
11	50337	WSHR #10-32	2
12	50238	NNYL #10-32 05 Z	4
13	91116	Fuel Filter Assembly, Stanadyne	1
	91123	Fuel Filter Element, Stanadyne	1
	96387	Fuel Filter Assembly, Black	1
	96388	Fuel Filter Element, Black	1
14	91375	12 VDC SPDT Relay	2
15	92103	Relay Holder	2
16	92403	HI Amp Auto Reset 50 Amp Panel Mount	1
17	92940	Throttle Pull Solenoid Controller	1

Solenoid Control Sub-Assembly

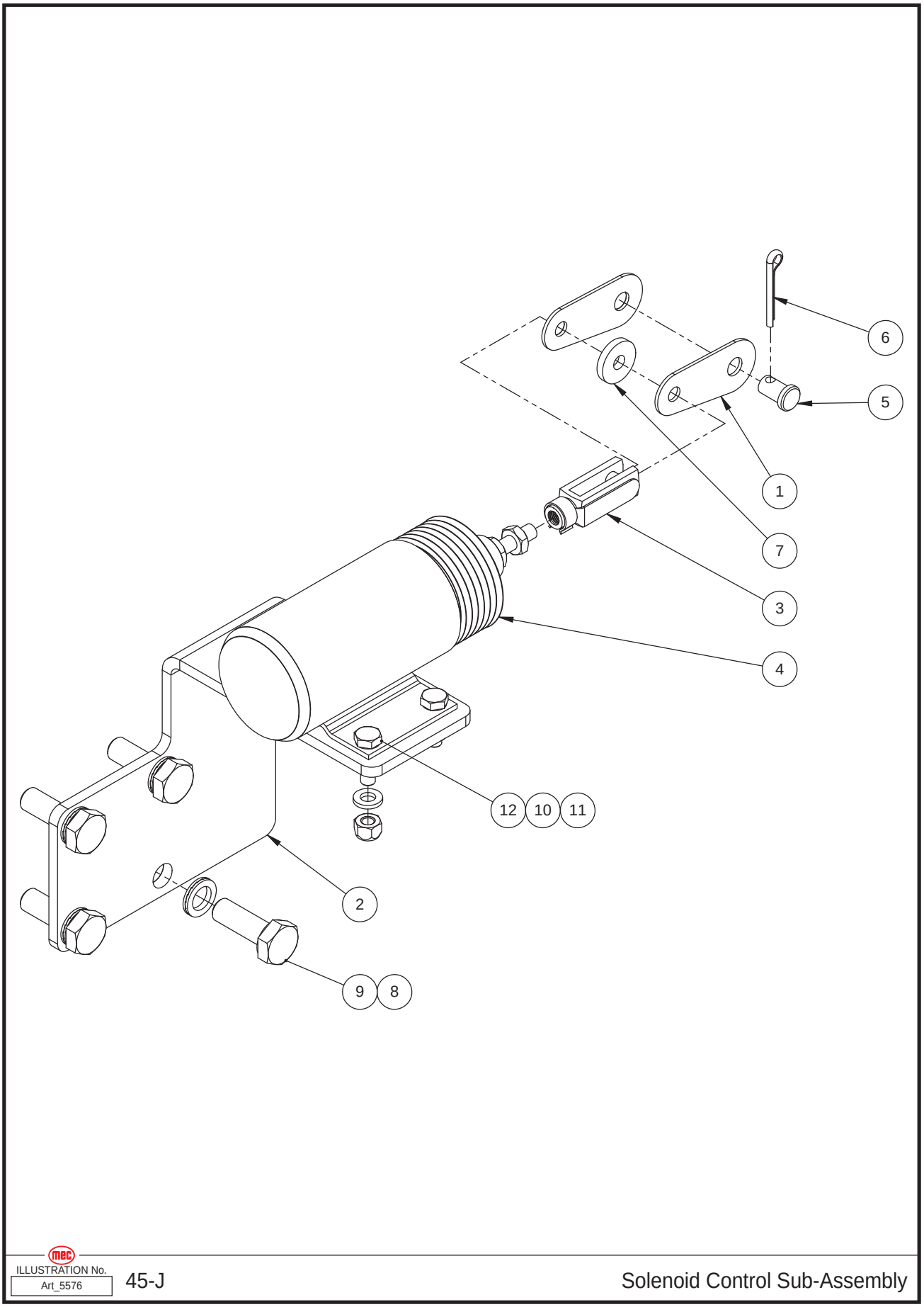


ILLUSTRATION No. Art_5576 45-J Solenoid Control Sub-Assembly

Item	Part Number	Description	Qty.
1	16347	Throttle Link	2
2	31240	Bracket, Throttle Solenoid	1
3	91117	Clevis, Throttle Linkage	1
4	92939	Throttle Pull Solenoid	1
5	50171	PCLV 0.310 × 0.50 ZP STL	1
6	50178	Cotter Pin, 1/8” × 1.00"	1
7	91588	WRFLAT 0.2500.7500	1
8	50006	WSHR M10 ZP Nordlock	4
9	50392	HHCS M10-1.25 × 30 08 ZP	4
10	50000	WSHR M06 ZP Standard Flat	4
11	50047	NNYL M06 × 1.00 08 ZP Nylock	4
12	50028	HHCS M06-1.00 × 20 08 ZP F	4
13	50164	NJAM 01/04-28 05 ZP Hex Jam Nut	1

Diesel Turret Sub-Assembly, Part 1

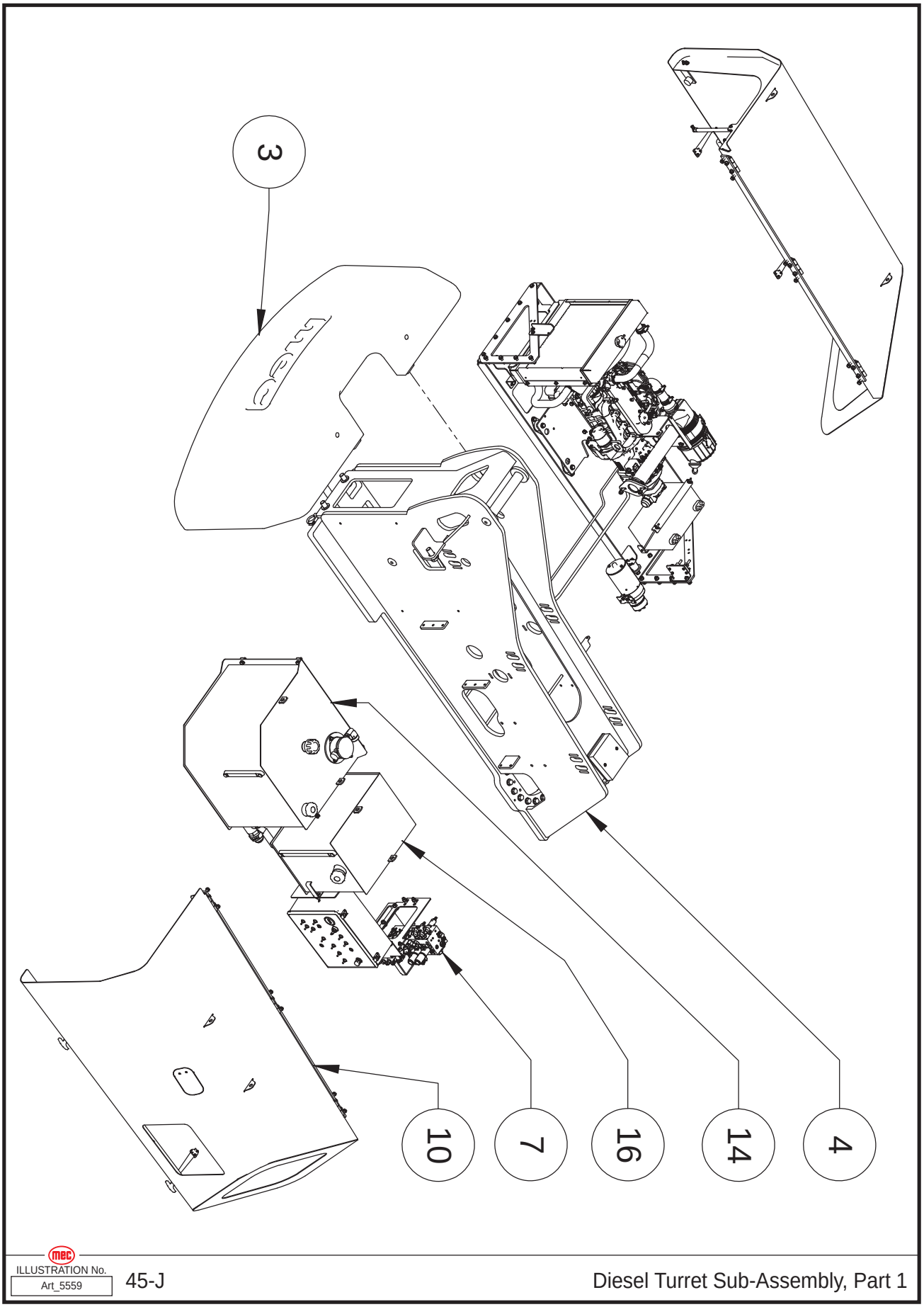


ILLUSTRATION No. Art_5559 45-J Diesel Turret Sub-Assembly, Part 1

Item	Part Number	Description	Qty.
3	31020	Counterweight	1
4	31051	Weldment, Turret	1
7	31127	Main Manifold Assembly (Refer to page 156)	1
10	31150	Control Hood Assembly (Refer to page 194)	1
14	31250	Hydraulic Tank Sub-Assembly (Refer to page 168)	1
16	31280	Fuel Tank, 16 Gal (Refer to page 220)	1

Diesel Turret Sub-Assembly, Part 2

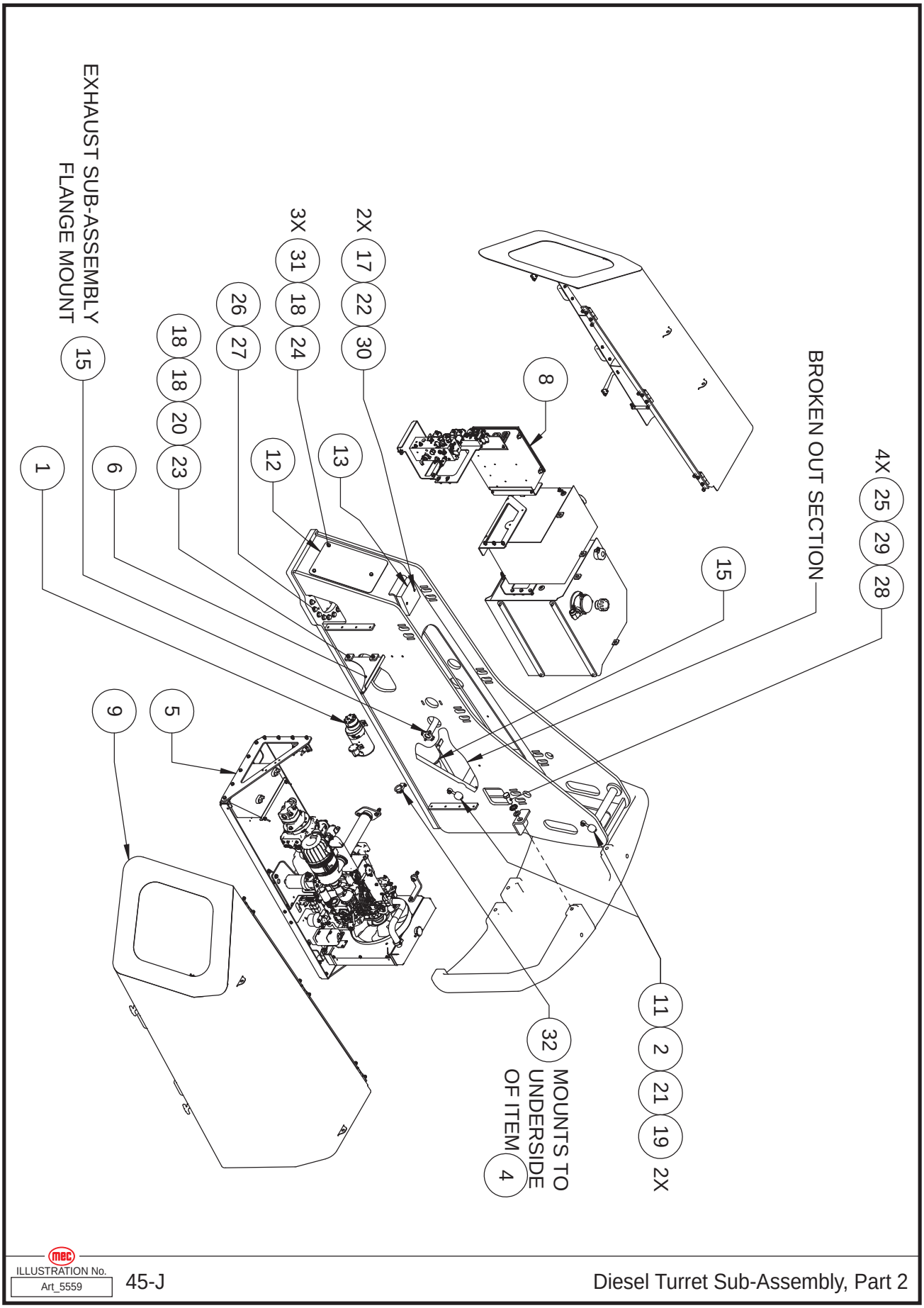


ILLUSTRATION No. Art_5559 45-J Diesel Turret Sub-Assembly, Part 2

Item	Part Number	Description	Qty.
1	17973	Auxiliary Pump, 12 VDC (Refer to page 184)	1
2	18152	1/2" Pin Retainer	2
5	31107	Engine Tray Assembly (Refer to page 198, page 200, page 202, page 204)	1
6	31116	Front Mount, Gas Spring, Engine Module	1
8	31129	Lower Control Box & Brackets Assembly (Refer to page 216)	1
9	31136	Engine Hood Assembly (Refer to page 192)	1
11	31218	Pin, 50.80mm × 400mm LG	2
12	31198	Plate, Cover, Front Turret, 45J	1
13	31249	Support Block, Boom	1
15	31251	Exhaust, Sub-Assembly	1
--	31332	Weldment, Exhaust Tube	1
17	50001	WSHR M08 ZP Standard Flat	2
18	50002	WSHR M10 ZP Standard Flat	7
19	50007	WSHR M12 ZP Nordlock	2
20	50034	HHCS M10-1.50 × 30 08 ZP F	2
21	50040	HHCS M12-1.75 × 35 08 ZP F	2
22	50048	NNYL M08 × 1.25 08 ZP Nylon	2
23	50049	NNYL M10 × 1.50 08 ZP Nylon Inse	2
24	50215	HHCS M10-1.50 × 20 08 ZP F	3
25	50255	WSHR M24 Hardened ZP	6
26	50580	HHCS 05/08-11 × 3-1/4, 08, ZP, P	20
27	50582	WSHR 05/08 × 1-5/16 × 1/8, SAE, 08, ZP	20
28	50585	HHCS M24-3.00 × 060, 10.9, ZP	4
29	50586	WSHR M24 ZP Nordlock	4
30	53211	M08-1.25 × 55	2
31	92098	Nut Clip M10 × 0.375	3
32	93267	1-5/8" Muffler Clamp, 5/16” Thread, Zinc Plate	1

Lower Control Box & Brackets Assembly

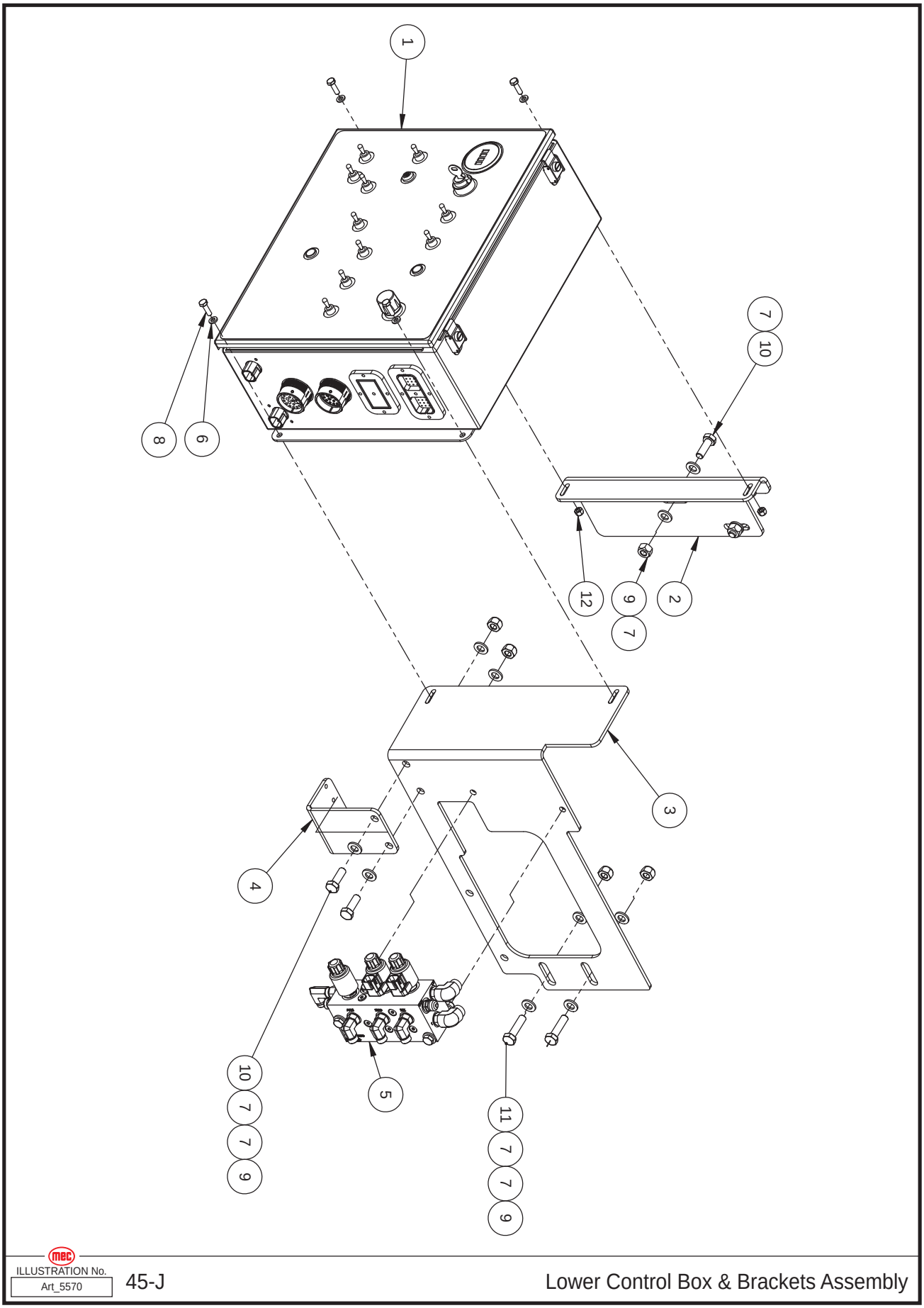


ILLUSTRATION No. Art_5570 45-J Lower Control Box & Brackets Assembly

Item	Part Number	Description	Qty.
1	28910	Lower Control Box (Refer to page 132)	1
2	31130	Bracket, Control Box-To-Tank, 45J	1
3	31131	Bracket, Control Box-To-Frame, 45J	1
4	31132	Bracket, Accessories, Hood Latch, 45J	1
5	31278	Axle/2Spd/Brake Manifold Assembly (Refer to page 162)	1
6	50000	WSHR M06 ZP Standard Flat	8
7	50002	WSHR M10 ZP Standard Flat	12
8	50028	HHCS M06-1.00 × 20 08 ZP F	4
9	50049	NNYL M10 × 1.50 08 ZP Nylon Inse	6
10	50034	HHCS M10-1.50 × 30 08 ZP F	4
11	50035	HHCS M10-1.50 × 40 08 ZP F	2
12	50047	NNYL M06 × 1.00 08 ZP Nylock	4

Hood Stop Assembly

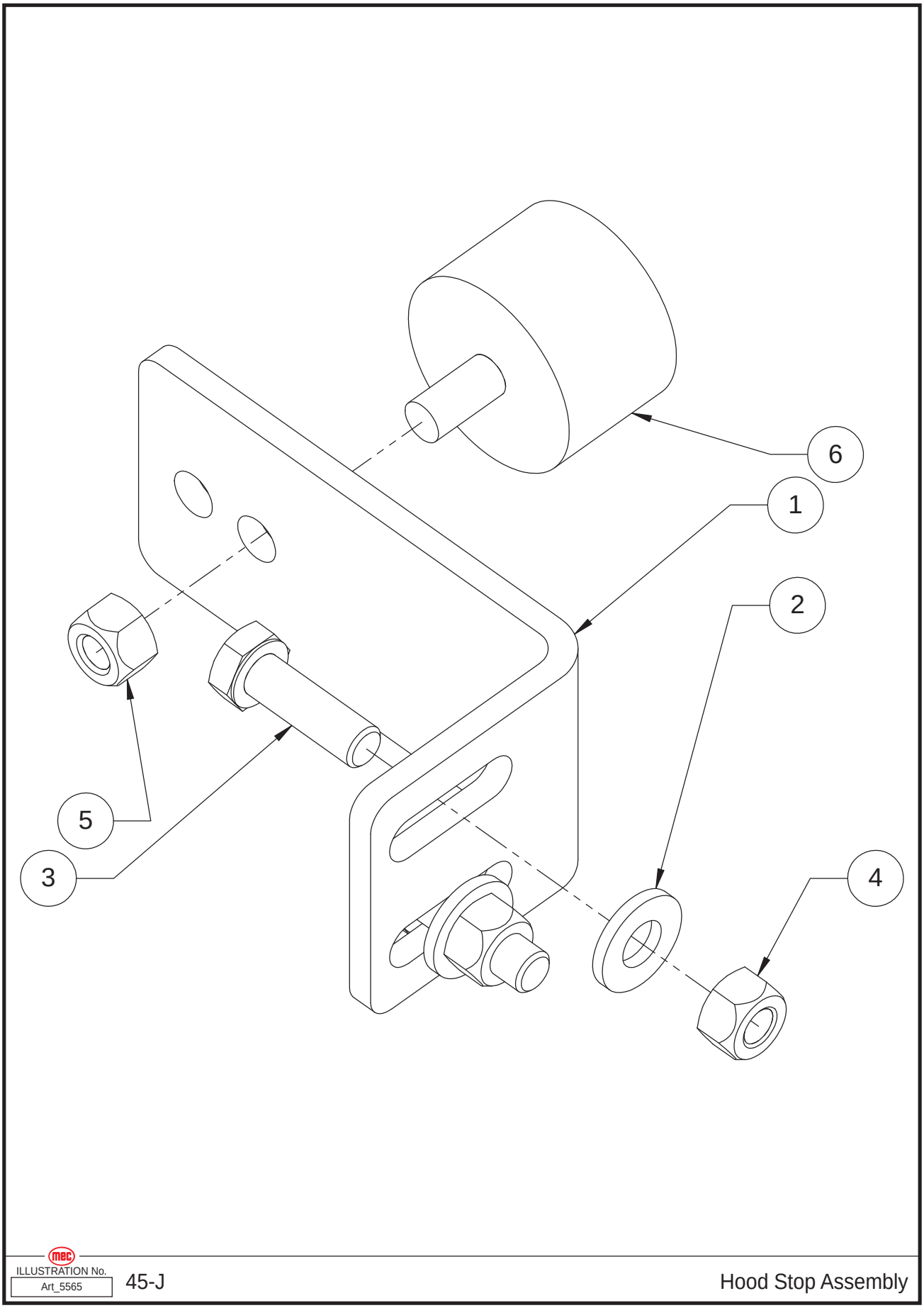


ILLUSTRATION No. Art_5565 45-J Hood Stop Assembly

Item	Part Number	Description	Qty.
1	31149	Bracket, Hood	1
2	50001	WSHR M08 ZP Standard Flat	2
3	50031	HHCS M08-1.25 × 25 08 ZP F	2
4	50048	NNYL M08 × 1.25 08 ZP Nylon	2
5	50203	NNYL 5/16-18, 05, ZP	2
6	93845	Load Rated Bumper	1

Fuel Tank, 16 Gal

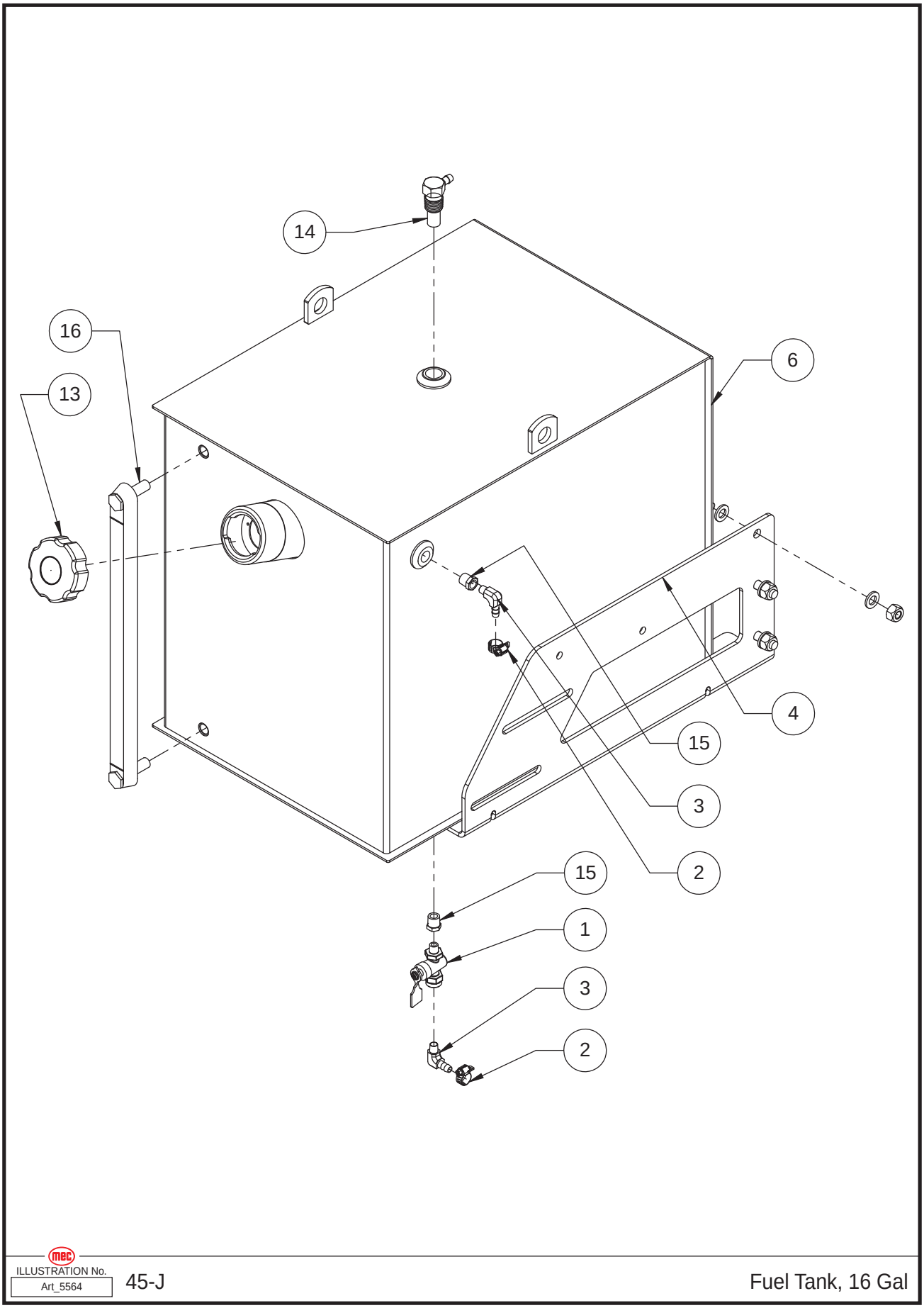


ILLUSTRATION No. Art_5564 45-J Fuel Tank, 16 Gal

Item	Part Number	Description	Qty.
1	6919	Shut Off Valve	1
2	7789	SAE 4 Hose Clamp	2
3	8879	5/16" × 1/8" BARB 90	2
4	31285	Forming, Fuel Tank Mount, RH	1
5	31286	Forming, Fuel Tank Mount, LH	1
6	31281	Weldment, Fuel Tank	1
7	50000	WSHR M06 ZP Standard Flat	8
8	50002	WSHR M10 ZP Standard Flat	12
9	50028	HHCS M06-1.00 × 20 08 ZP F	4
10	50047	NNYL M06 × 1.00 08 ZP Nylock	4
11	50049	NNYL M10 × 1.50 08 ZP Nylon Inse	6
12	50332	HHCS M10-1.50 × 35 08 ZP P	6
13	92480	Fuel, Non Vent Cap	1
14	92699	1/2 - 14 NPT Roll-Over Vent	1
15	94983	Pipe FTG, Bushing, 1/4" NPTM × 1/8 NPTF	2
16	94987	Sight Level Gauge	1

Boom Harness

Part Number	Description
28853	Harness, Platform Valves
28854	Harness, Engine
28856	Harness, Power To Lower Box
28858	Harness, Main Function Block
28859	Harness, Engine Extension
28869	Harness, CAN Tilt Jumper
28883	Harness, COM To CAN Tilt
28884	Cable, Battery To Fuse (+)
28885	Cable, Fuse To E-Down (+)
28886	Cable, Battery To E-Down (-)
28889	Harness, Flashing Beacon Light
28891	Harness, Standard E-Down Contactor 60-J Diesel
31159	Harness, Sensor, Temperature, Hydro Stat.
31205	Harness, Platform Level To Lower Control (32262)
31206	Harness, Platform Manifold
31228	Harness, Lower Control Box To Engine, Hyd Temp Sensor
31248	Harness, Relay, 7.5 KW Generator
31258	Harness, Temperature Sensor, Drive Pump
31273	Harness, Main Power Relay, 7.5KW Gen
31294	Harness, Beacon Light, Power
31295	Harness, Beacon Light, Relay
31306	Harness, ZTR Battery Assy
31310	Harness, Light Flashing Beacon

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Option - 7.5kW Generator Motor Sub-Assembly

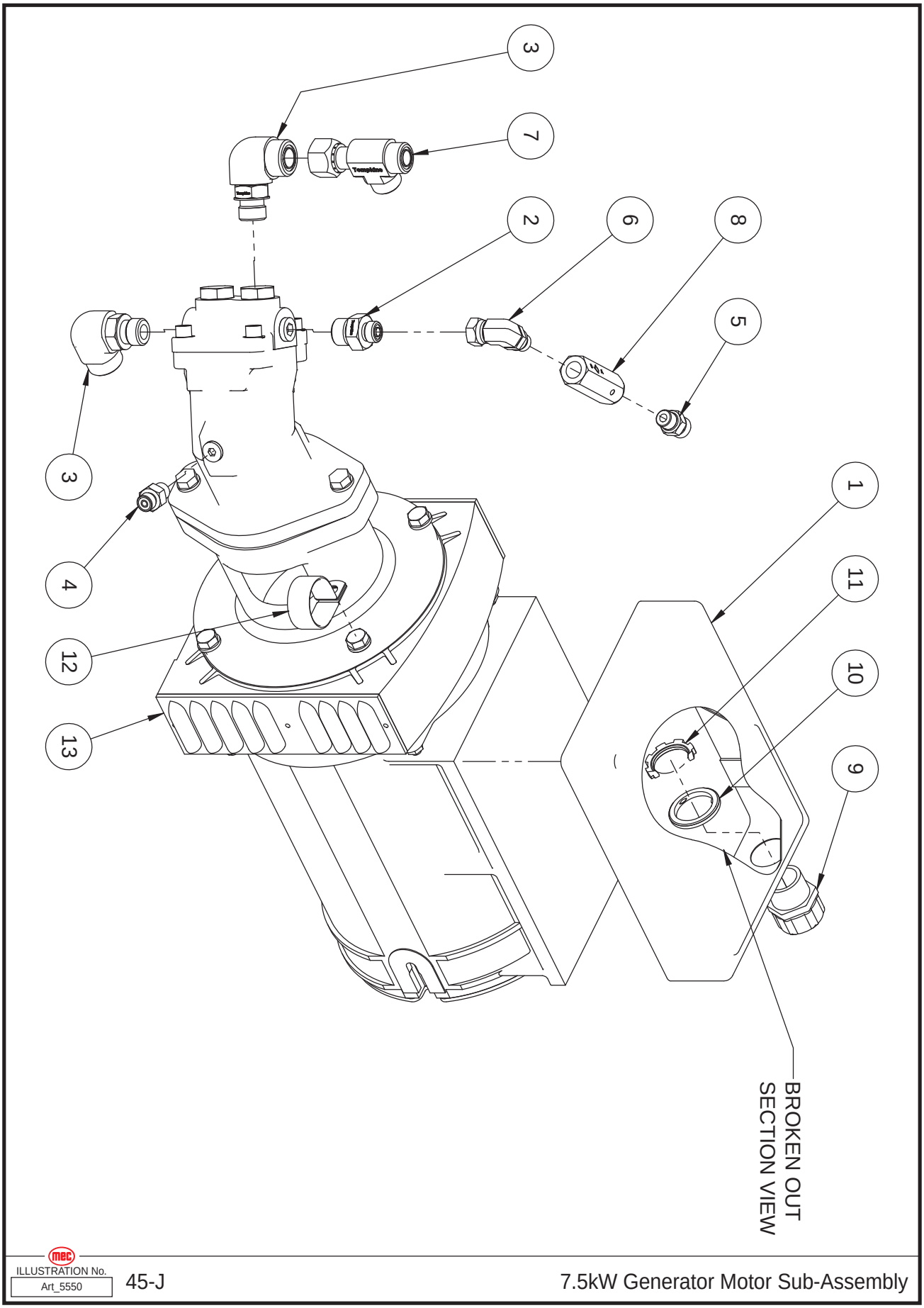
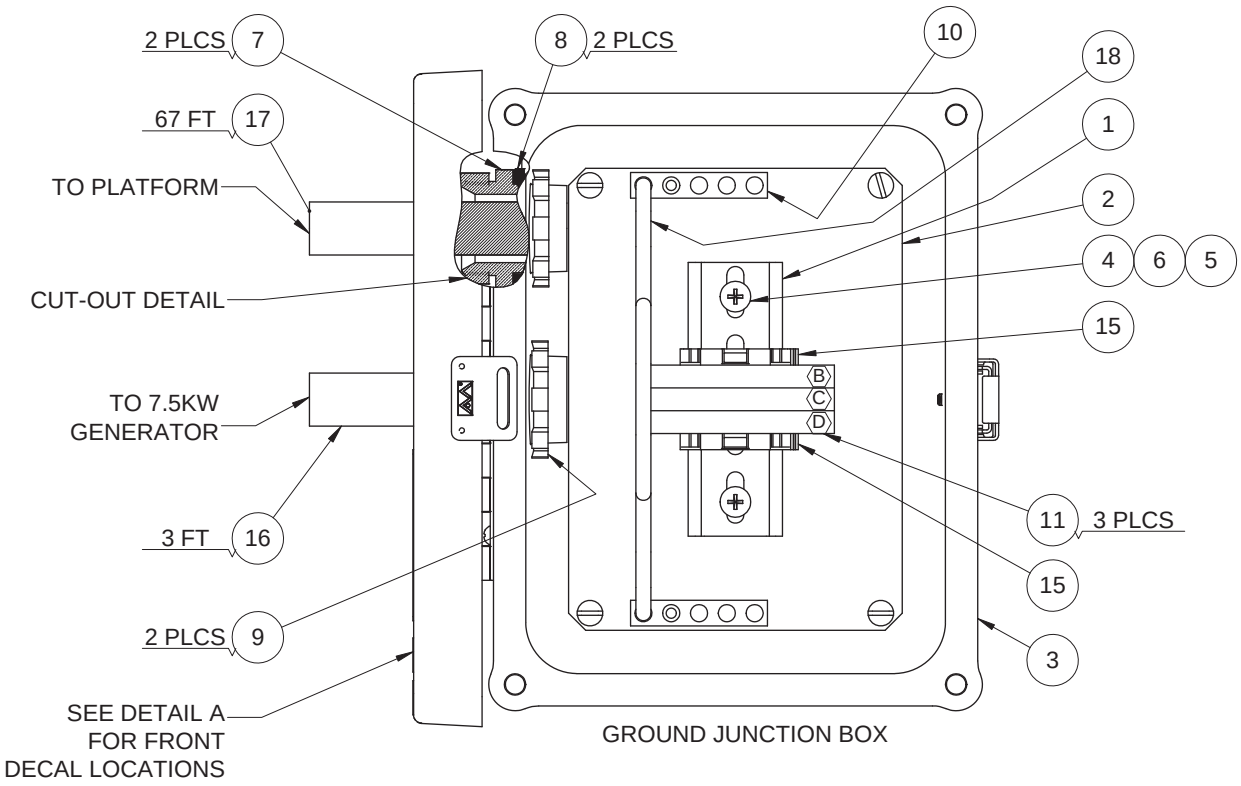


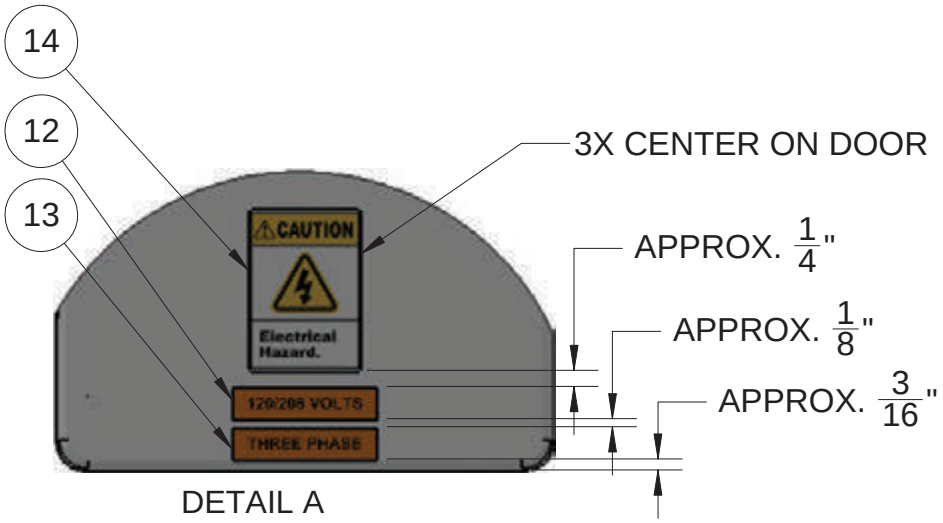
ILLUSTRATION No. Art_5550 45-J 7.5kW Generator Motor Sub-Assembly

Item	Part Number	Description	Qty.
1	31232	HYD Generator 7.5kW 208/120 60HZ 12cc (Cover)	REF
--	94774	HYD Motor	1
2	50834	HYFT MFFOR-MB-6-10 ; FS6400-06-10-O	1
3	50842	HYFT MFFOR-MB90-12-10 ; FS6801-12-10-F	2
4	50832	HYFT MFFOR-MB-4-6 ; FS6400-04-06	1
5	50835	HYFT MFFOR-MB-6-6	1
6	51075	FFORX-MB90-06-06 FF6507-06-06	1
7	51199	HYFT MFFOR-FFORX-MFFOR-10 FF6602-10-10-10	1
8	93864	SAE #6 Check Valve	1
9	93095	Cable Gland, 1"	1
10	93096	Gasket, Cable Gland, 1"	1
11	93097	Locknut, Cable Gland, 1"	1
12	93108	P-Clamp W/VNL 1-1/2 ID × 3/4 Wide	1
13	93829	HYD Generator 7.5kW 208/120 60HZ 12cc	1

REF - Reference

Option - 7.5kW Breaker Box





DETAIL A
FRONT OF DOOR BOX
STICKER LOCATIONS

ILLUSTRATION No. Art_5572 45-J 7.5kW Breaker Box

Item	Part Number	Description	Qty.
1	28849	Option, 7.5kW Generator DIN Rail	1
2	28894	Option, 7.5kW Back Panel Hole Cutout	1
3	31144	Option, 7.5kW Breaker Box Cutout	1
4	50191	THMS #10-32 × 0.50 ZP	2
5	50238	NNYL #10-32 05 Z	2
6	50337	WSHR #10-32	2
7	93095	Cable Gland, 1”, Zinc Plated	2
8	93096	Gasket, Cable Gland, 1"	2
9	93097	Locknut, Cable Gland, 1"	2
10	94272	Ground Bar Kit	2
11	94397	ABB Miniature Circuit Breakers	1
12	94404	Electrical Equipment Marker, "120/208 VOLTS", 1/2" × 2-1/4"	1
13	94405	Electrical Equipment Marker, "THREE PHASE", 1/2" × 2-1/4"	1
14	94406	Illustrated Accident Prevention Label, "ELECTRICAL HAZARD", 1-3/4" × 2-1/2"	1
15	94407	End Stop, DIN-Rail	2
16	99289	10 AWG 5 Conductor	3 FT
17	99289	10 AWG 5 Conductor	67 FT
18	99289	10 AWG, Ground Wire, Terminal Block	SCRAP

Wiring Table		
Item 16 Wire Color	**Connection**	**Item 17 Wire Color**
GRN	A	GRN
BLK	B	BLK
RED	C	RED
YLW	D	YLW
WHT	E	WHT

Option - 7.5kW Generator Sub-Assembly

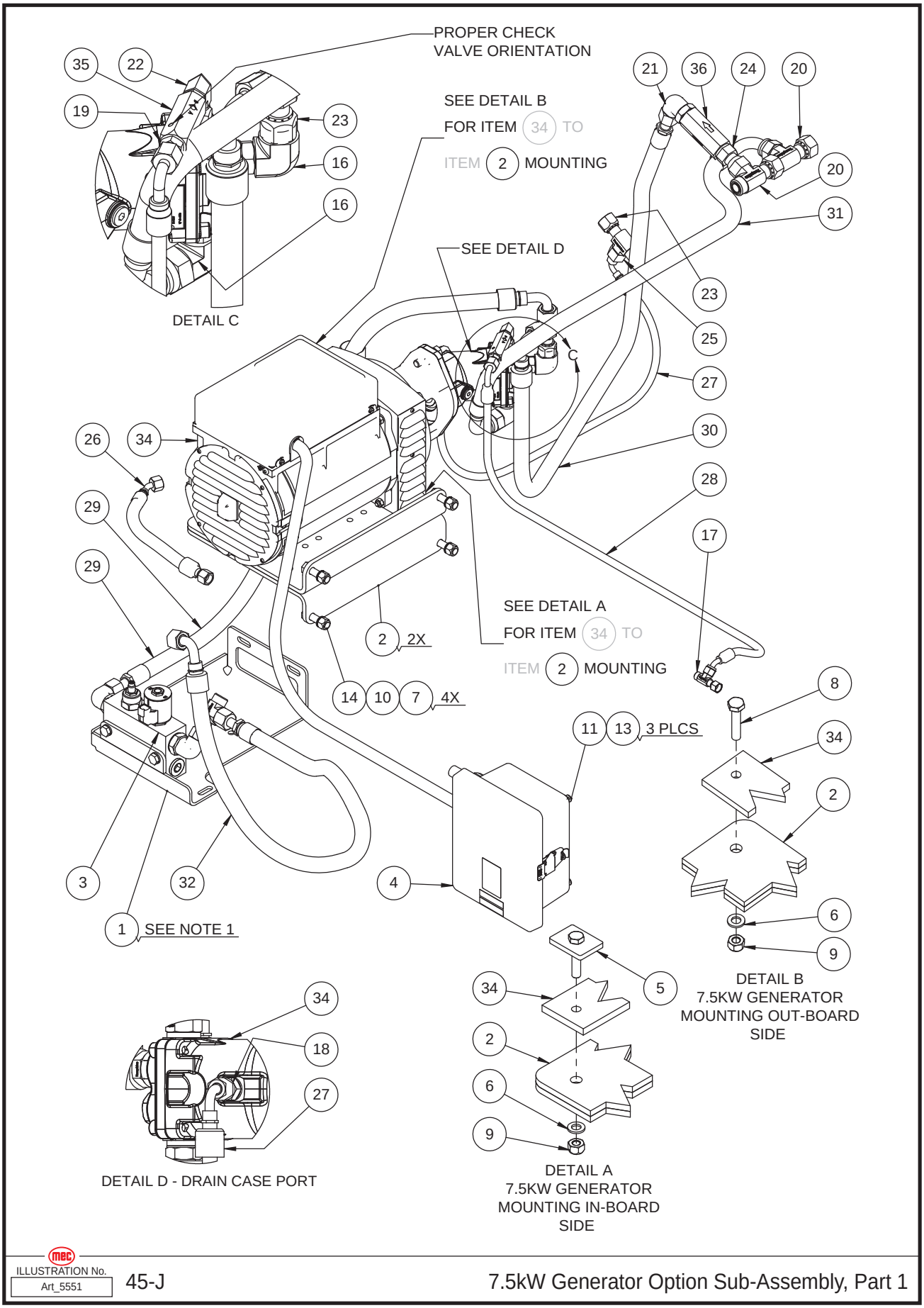


ILLUSTRATION No. Art_5551

45-J

7.5kW Generator Option Sub-Assembly, Part 1

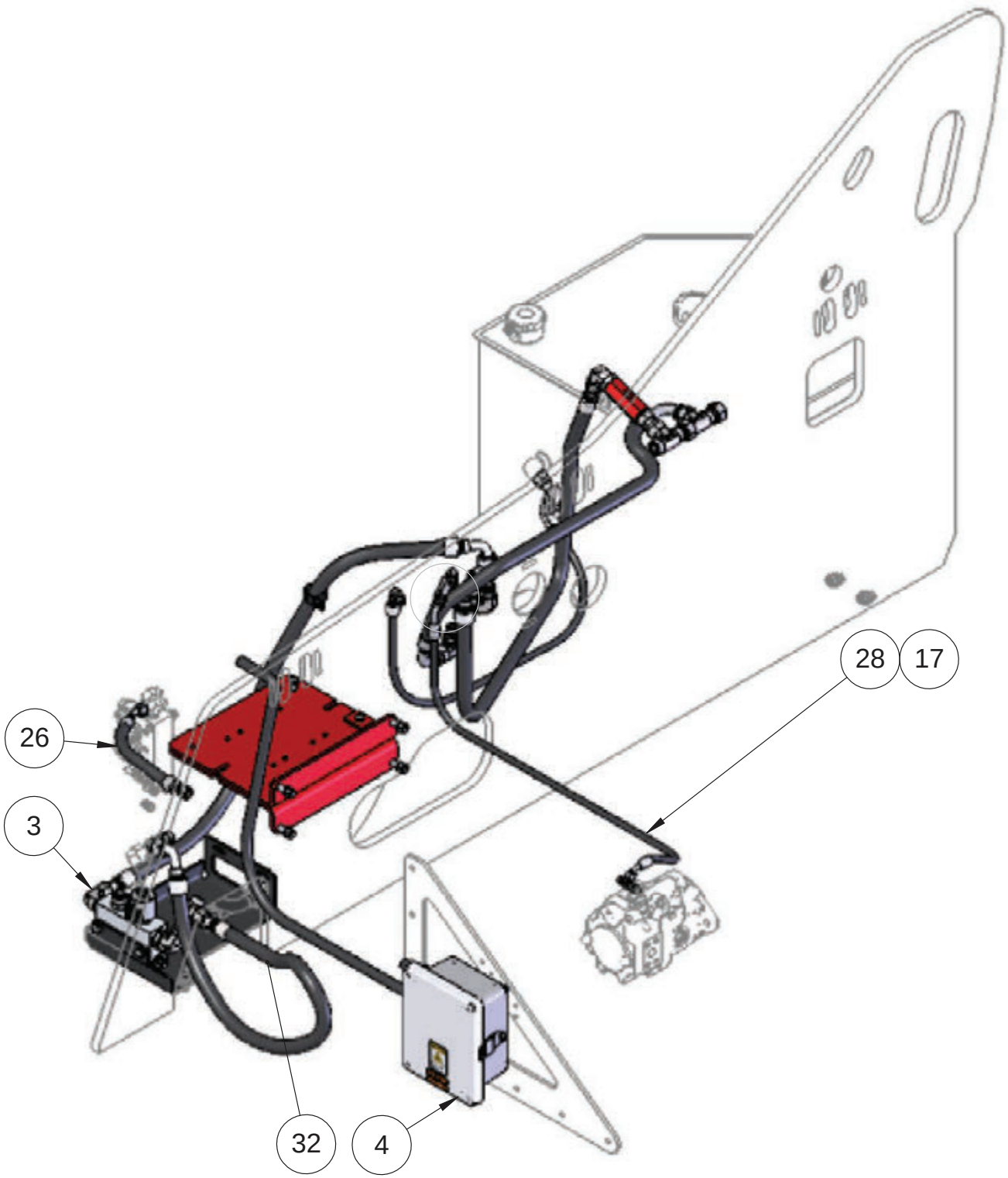


ILLUSTRATION No.
Art_5551

45-J

7.5kW Generator Option Sub-Assembly, Part 2

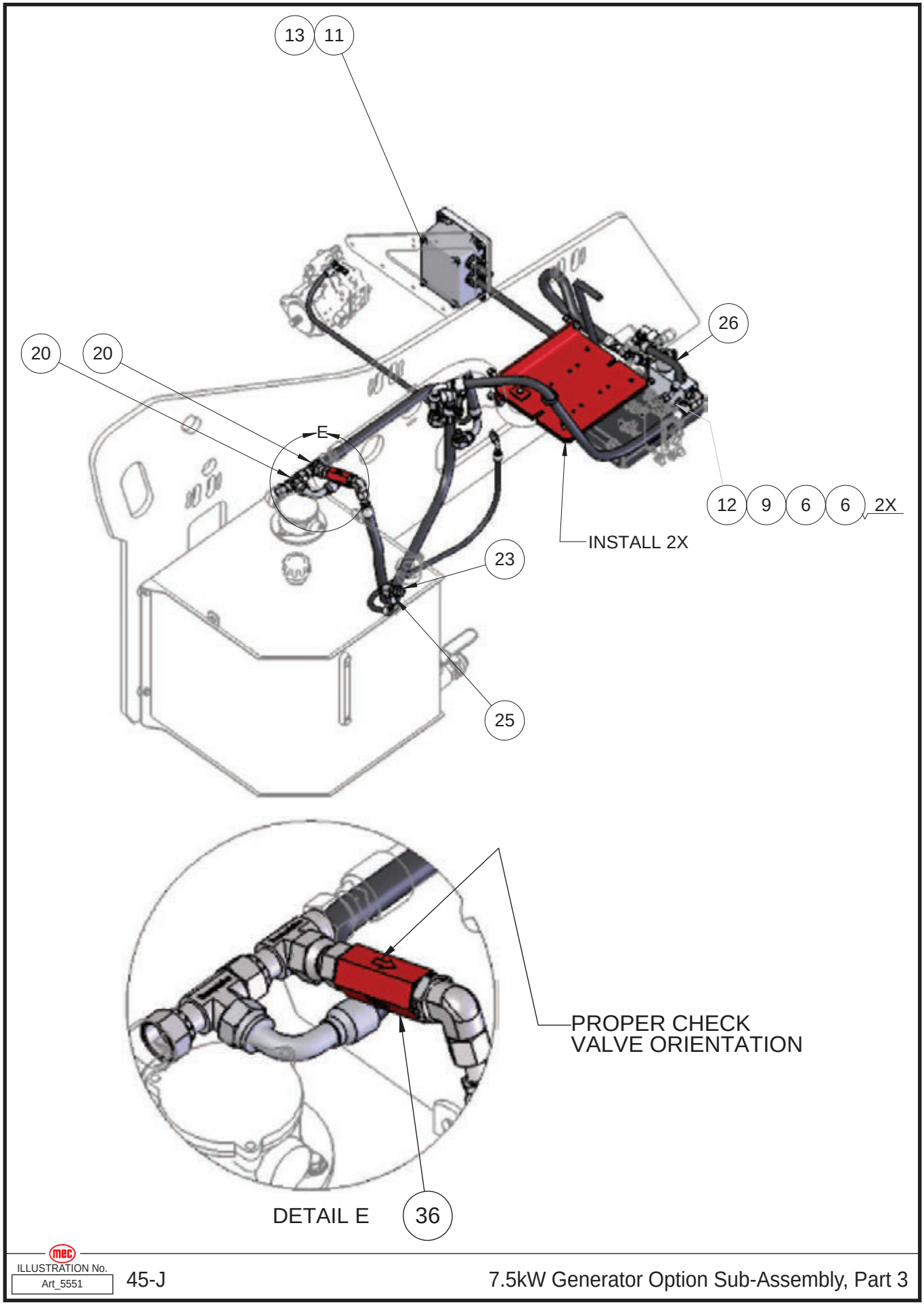


ILLUSTRATION No. Art_5551

45-J

7.5kW Generator Option Sub-Assembly, Part 3

Item	Part Number	Description	Qty.
1	31085	Weldment, 7.5kW Gen	1
2	31134	Mounting Plate, 7.5kW Gen, 45J	2
3	31199	7.5kW Generator, Partial Manifold Sub-Assembly (Refer to page 232)	1
4	28984	Option, 7.5kW Breaker Box Sub-Assembly (Refer to page 226)	1
5	42871	Foot Plate Weldment	1
6	50002	WSHR M10 ZP Standard Flat	6
7	50007	WSHR M12 ZP Nordlock	4
8	50020	HHCS M10-1.50 × 50 08 ZP P	1
9	50049	NNYL M10 × 1.50 08 ZP Nylon Inse	4
10	50050	NNYL M12 × 1.75 08 ZP Nylon Inse	4
11	50337	WSHR #10-32	3
12	50352	HHCS M10-1.50 × 080 08 ZP P	2
13	50530	RHMS #10-32 × 3/4" ZP F	3
14	53103	HHCS M12-1.75 × 45 08 ZP F	4
15	50834	HYFT MFFOR-MB-6-10 ; FS6400-06-10-O	1
16	50842	HYFT MFFOR-MB90-12-10 ; FS6801-12-10-F	2
17	50809	HYFT MFFOR-FFORX-MFFOR-4 ; FS6602-04-04-04	1
18	50832	HYFT MFFOR-MB-4-6 ; FS6400-04-06	1
19	50835	HYFT MFFOR-MB-6-6	1
20	50979	HYFT MFFOR-FFORX-MFFOR-12 FS6602-12-12-12	2
21	51066	HYFT MFFOR-MB90-10-12	1
22	51075	FFORX-MB90-06-06 FF6507-06-06	1
23	51199	HYFT MFFOR-FFORX-MFFOR-10 FF6602-10-10-10	2
24	51216	HYFT FFORX-MB-12-12	1
25	51291	HYFT FFFOR-MFFOR-10-04 (D-FF2406-10-04)	1
26	56172	Hyd. Hose Asy 6M-3K	1
27	56173	Hyd. Hose Asy 4M-3K	1
28	56174	Hyd. Hose Asy 4M-3K	1
29	56175	Hyd. Hose Asy 10M-3K	1
30	56175	Hyd. Hose Asy 10M-3K	1
31	56175	Hyd. Hose Asy 10M-3K	1
32	56177	Hyd. Hose Asy 10M-3K	1
33	93108	P-Clamp W/VNL 1-1/2 ID × 3/4 Wide	1
34	93829	Hyd Gen 7.5kW 208/120 60Hz 12CC	1
35	93864	SAE #6 Check Valve	1
36	94277	Check Valve	1

7.5kW Generator Option Hose List

Item	P/N	I/D	End A Fitting	End A Fitting Description	End B Fitting	End B Fitting Description	Hose Spec P/N	Hose Spec	Hose Length	Qty
26	56172	B2SPEEDT - MMTOP	50666	6G-6FFORX	50685	6G-6FFORX 45	50629	6M-3K	11	1
27	56173	Case Drain - Tank *	50679	4G4FFORX 90	50679	4G-4FFORX 90	50627	4M-3K	44	1
28	56174	Load Sense - Func Pump	50677	4G-4FFORX 45	51029	4G-6FFORX 90S	50627	4M-3K	48	1
29 & 30	56175	Port B - Gen / Anticav - Tank	50700	10G-10FFORX	50702	10G-10FFORX 90S	51080	10M-3K	48	2
31	56176	Gen Return - Tank *	51241	10G-12MFFOR 90S	51241	10G-12MFFOR 90S	51080	10M-3K	32	1
32	56177	Port A - Main Manifold	50702	10G-10FFORX 90S	50700	10G-10FFORX	51080	10M-3K	42	1

* Orientation: 6:00 - 12:00

Option - 7.5kW Generator, Partial Manifold Sub-Assembly

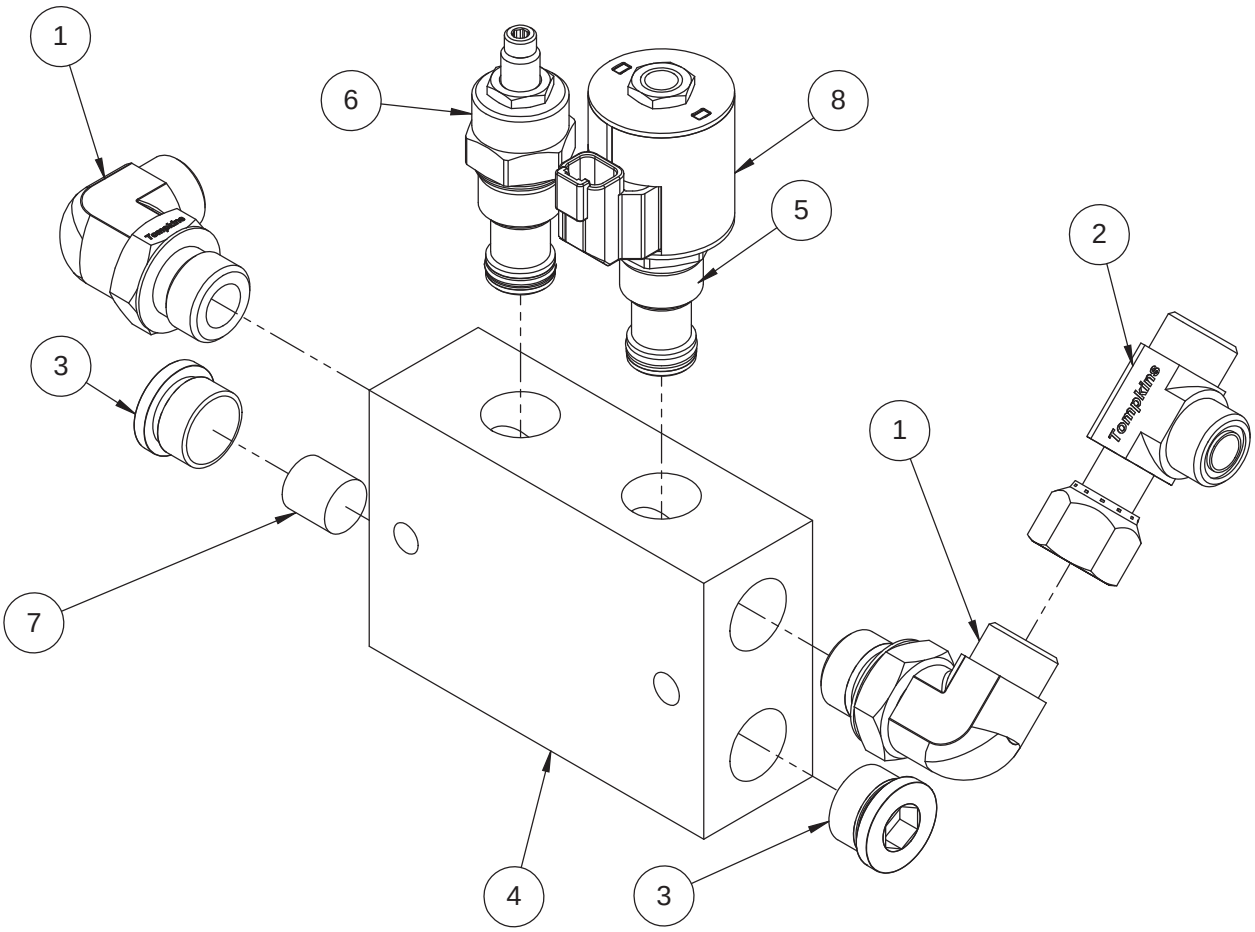


ILLUSTRATION No. Art_5552 45-J 7.5kW Generator, Partial Manifold Sub-Assembly

Item	Part Number	Description	Qty.
1	51066	HYFT MFFOR-MB90-10-12	2
2	51199	HYFT MFFOR-FFORX-MFFOR-10 FF6602-10-10-10	1
3	51217	HYFT MB-12 PLUG	2
4	94108	2 By 2 Parallel Body #12	1
5	93034	2 Way Proportional Valve NC	1
6	94410	Needle Valve	1
7	94109	Plug For 94108	1
8	91143	Coil 12V	1

Option - 3.5kW Generator Sub-Assembly

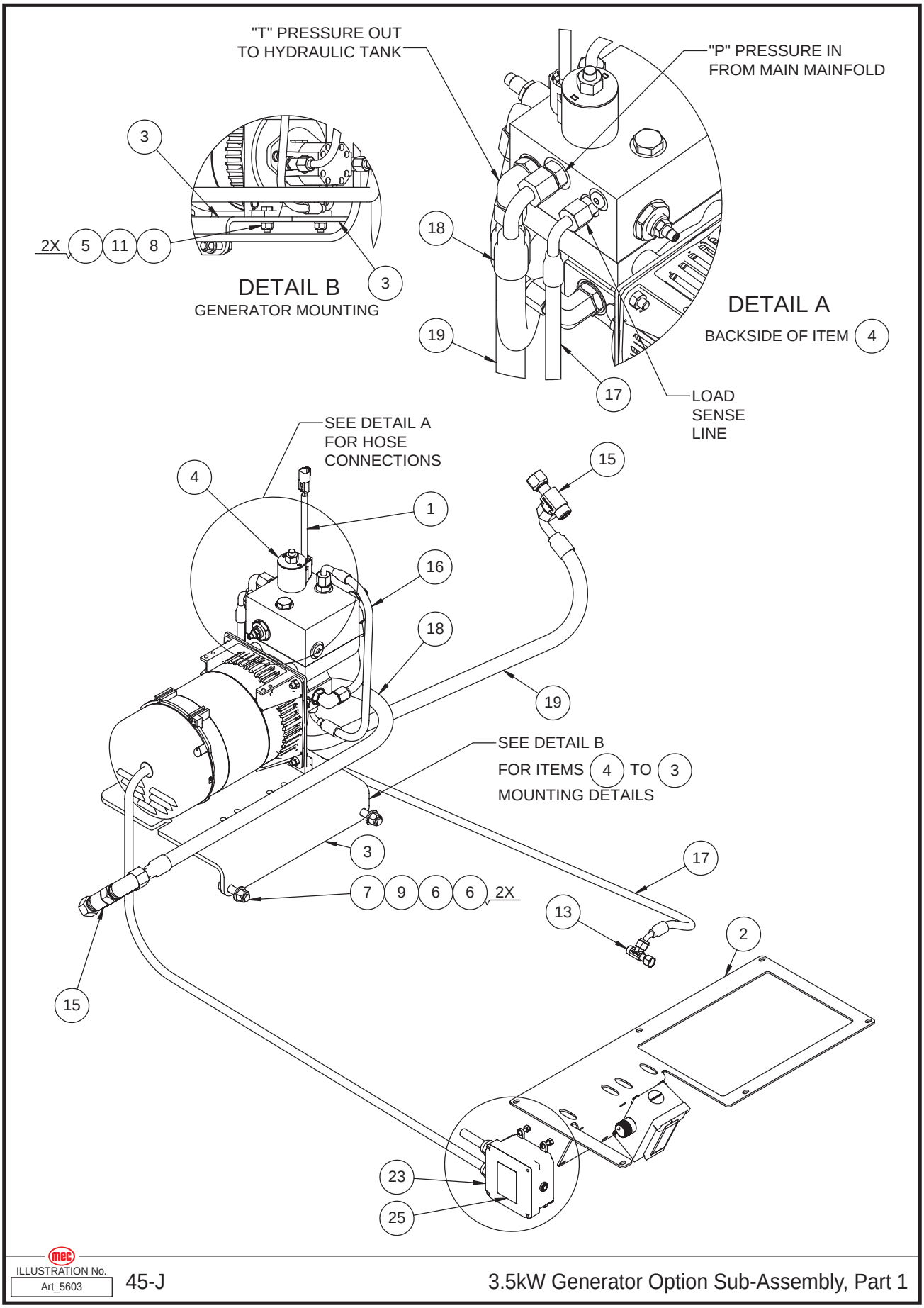
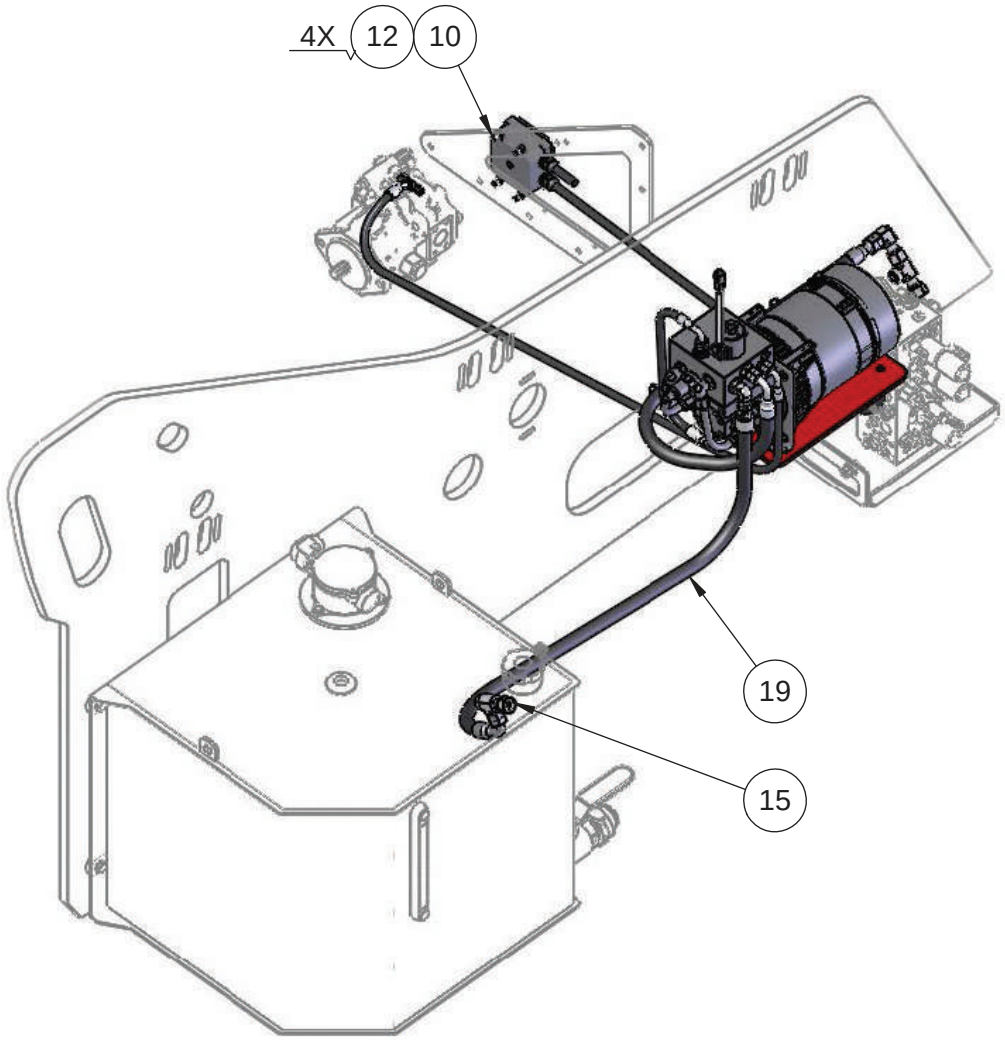
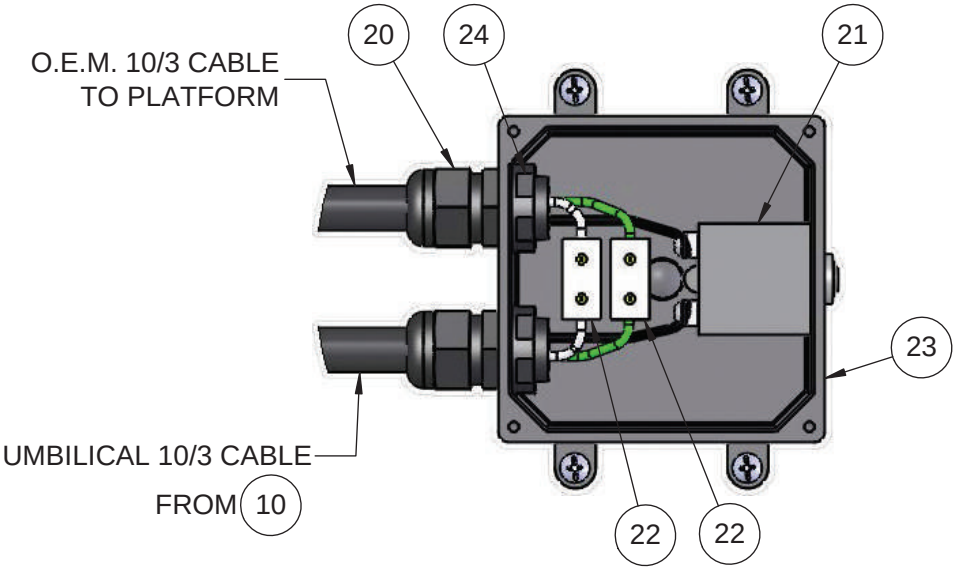


ILLUSTRATION No. Art_5603 45-J 3.5kW Generator Option Sub-Assembly, Part 1





DETAIL C

ILLUSTRATION No. Art_5603 45-J 3.5kW Generator Option Sub-Assembly, Part 2

Item	Part Number	Description	Qty.
1	18667	Option, Generator Excite Harness	1
2	REF	Subassembly, Option, 7.5kW Outlet Boxes MKII	REF
--	92271	Outlet, 120V 20A GFCI	1
--	92661	Terminal, Ring #10 Stud, 12-10 AWG	3
--	94414	3/4" Closure Plug	3
--	94741	Electrical Box, 1-Gang, Weatherproof, 5X 3/4 NPT Outlets, Alum	1
--	94748	Cover Weatherproof 1 Gang Vertical GFCI	1
--	94752	Conduit Rigid/Imc 3/4" X 1-1/2"	1
--	99331	Wire, 12 AWG THHN Green Stranded, 12 Inches	1
--	99332	Wire, 12 AWG THHN White Stranded, 12 Inches	1
--	99333	Wire, 12 AWG THHN Black Stranded, 12 Inches	1
3	31134	Mounting Plate	1
4	31305	3.5kW Gen Fitting Assy (Refer to page 238)	1
5	50002	WSHR M10 ZP Standard Flat	2
6	50003	WSHR M12 ZP Standard Flat	4
7	50023	HHCS M12-1.75 × 50 08 ZP P	2
8	50049	NNYL M10 × 1.50 08 ZP Nylon Inse	2
9	50050	NNYL M12 × 1.75 08 ZP Nylon Inse	2
10	50238	NNYL #10-32 05 Z	4
11	50332	HHCS M10-1.50 × 35 08 ZP P	2
12	50530	RHMS #10-32 × 3/4" ZP F	4
13	50809	HYFT MFFOR-FFORX-MFFOR-4	1
14	51198	HYFT MFFOR-FFORX90-10-10	1
15	51199	HYFT MFFOR-FFORX-MFFOR-10	2
16	56200	Hyd. Hose Assy: CD-T	1
17	56201	Hyd. Hose Assy: Load Sense-Func Pump	1
18	56202	Hyd. Hose Assy: Main Manifold-P	1
19	56203	Hyd. Hose Assy: T-Tank	1
20	92008	Strain Relief, Plastic Black 1/2	2
21	92493	Circuit Breaker, Generator Option, 30 Amp	1
22	92494	Ceramic Wire Connector	2
23	92495	Junction Box	1
24	92949	Locknut, Nylon, 1/2 NPT, Cable Gland	2
25	94406	Accident Prevention Label	1

REF - REFERENCE

45-J - 3.5kW Generator Option Hose List

Item	P/N	I/D	End A Fitting	End A Fitting Description	End B Fitting	End B Fitting Description	Hose Spec P/N	Hose Spec	Hose Length	Qty
16	56200	CD-T *	50679	4G-4FFORX 90	51029	4G-6FFORX 90S	50629	4M-3K	17	1
17	56201	Load Sense-Func Pump **	50677	4G-4FFORX 45	50679	4G-4FFORX 90S	50627	4M-3K	52	1
18	56202	Main Manifold-P	50693	8G-10FFORX	50622	8G-8FFORX 90S	50630	8M-3K	38	1
19	56203	T-Tank	50620	8G-8FFORXS	51202	8G-10FFORX 90S	51080	8M-3K	44	1

* Orientation: 12:00 - 12:00

** Orientation: 6:00 - 12:00

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Option - 3.5kW Generator Fitting Assembly

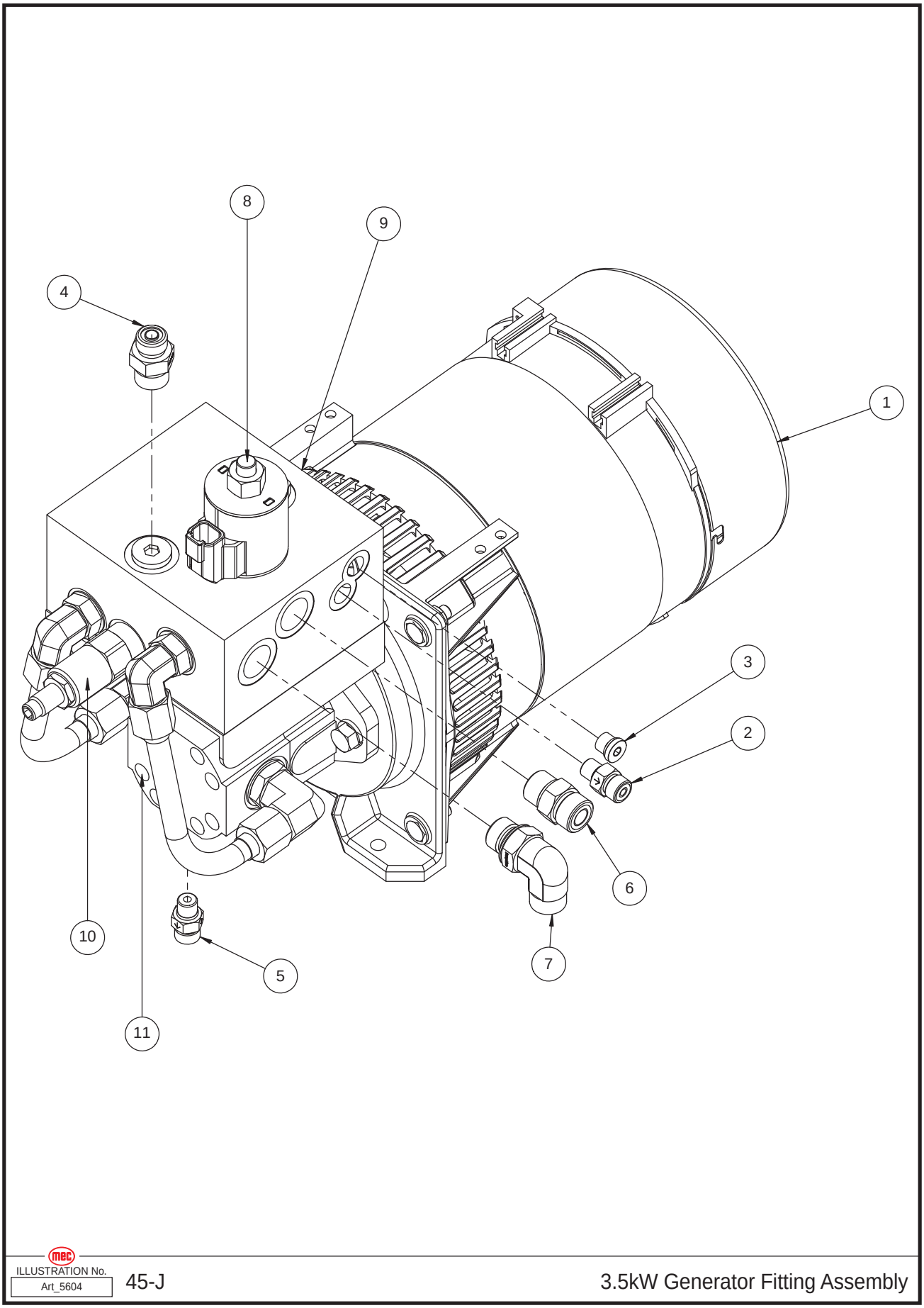


ILLUSTRATION No. Art_5604 45-J 3.5kW Generator Fitting Assembly

Item	Part Number	Description	Qty.
1	93828	Generator, 3.5kW, 120V, 60 Hz	1
--	94764	Capacitor 14UF	1
2	93948	Check Valve Fitting	1
3	50961	HYFT MB-04-PLUG	1
4	50836	HYFT MFFOR-MB-6-8 ; FS6400-06-08-O	1
5	94506	Orifice Check Valve Fitting	1
6	50841	HYFT MFFOR-MB-8-8 ; FS6400-08-08-O	1
7	50850	HYFT MFFOR-MB90-8-8 ; FS6801-08-08-FG	1
8	93654	Valve, 2 Way, Normally Closed	1
9	94110	Pressure Compensated Flow Control (Not Shown)	1
10	95387	Valve, Relief	1
11	94772	Gear Motor, 5cc	1
--	94455	Seal Kit	1

Option - Glazier Rack

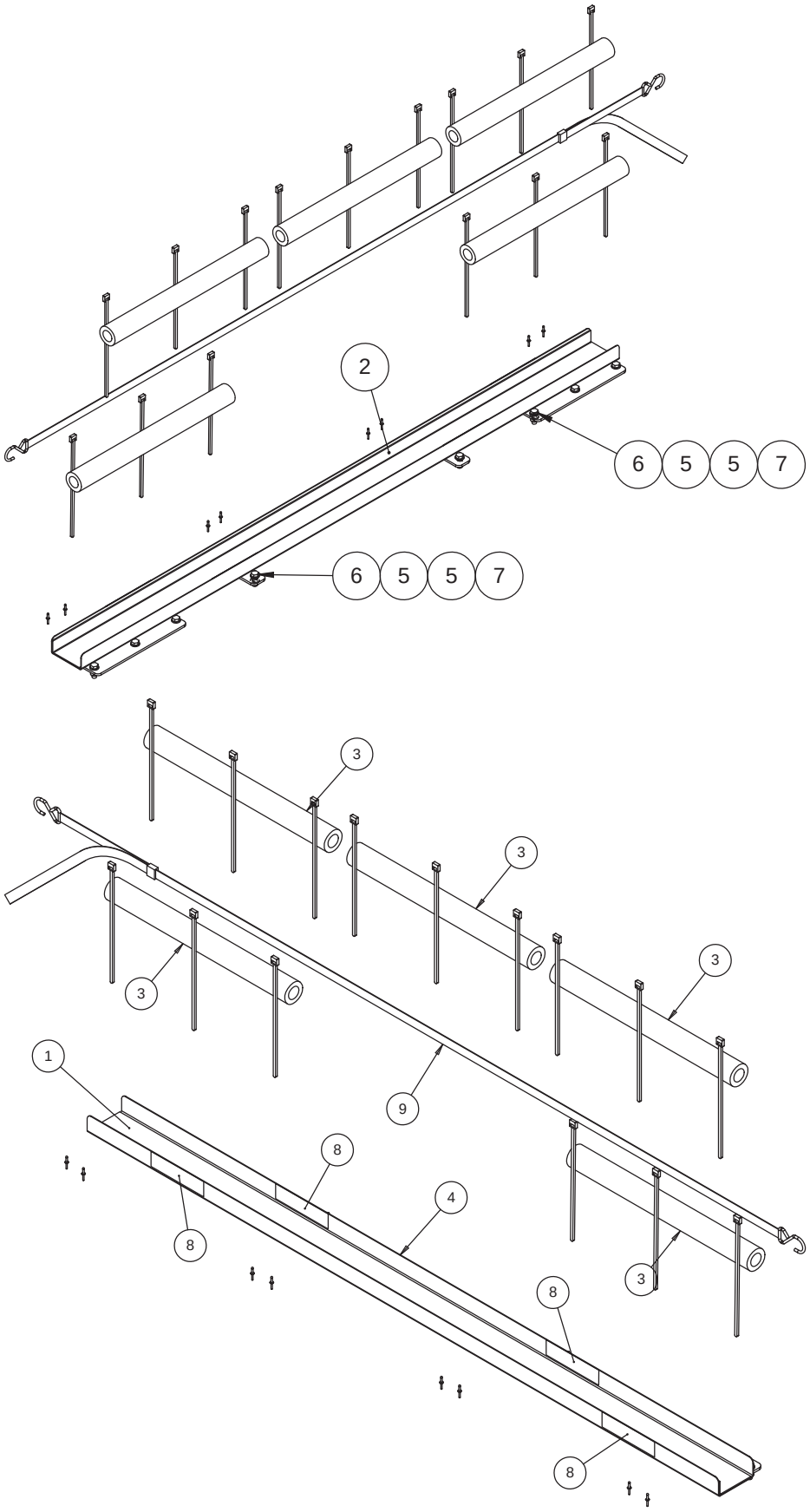


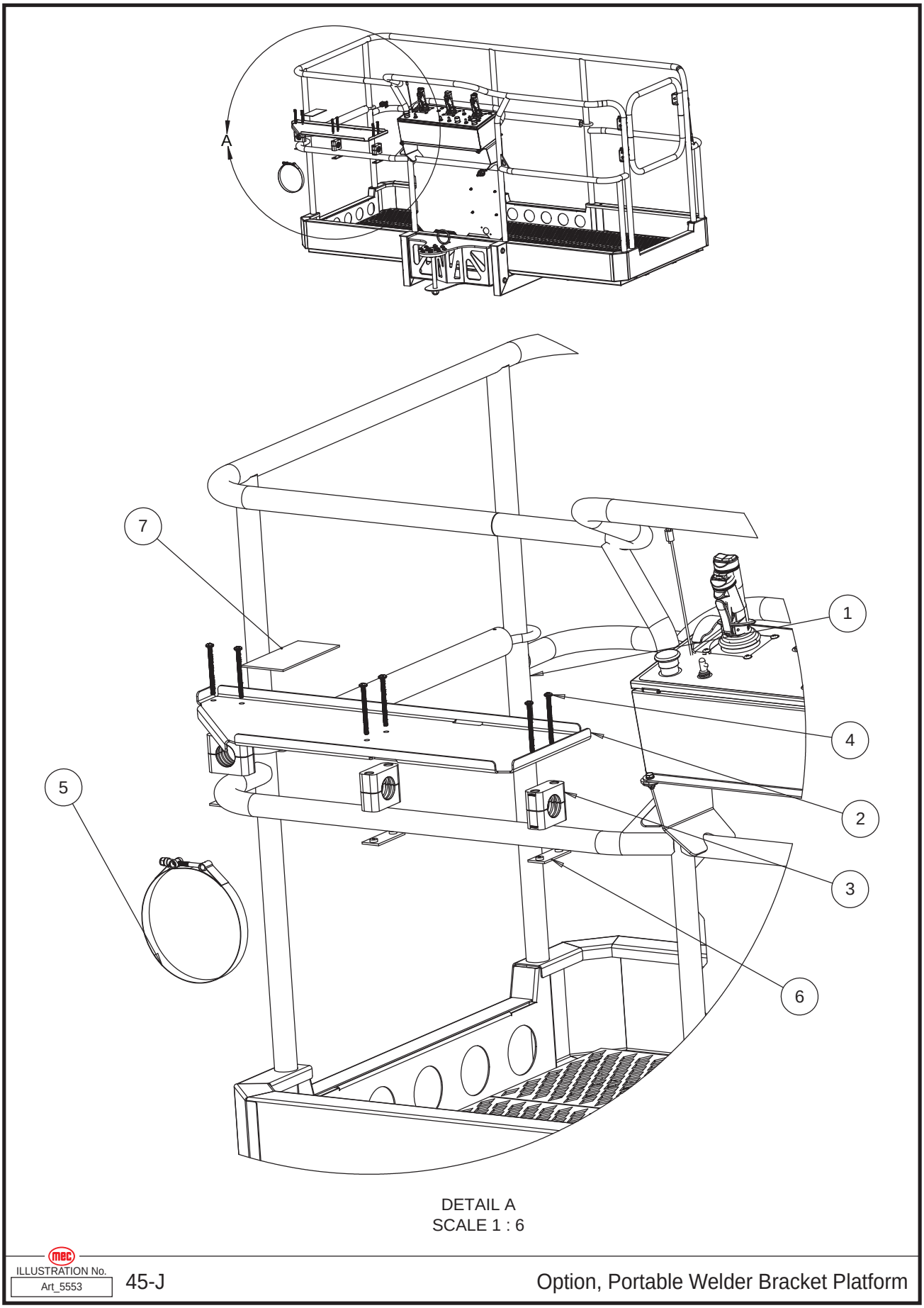
ILLUSTRATION No. Art_5569

45-J

Option, Glazier Rack

Item	Part Number	Description	Qty.
--	28950	Glazier Rack Assembly Option	1
1	28533	UHMW Wear Strip, Large	1
2	28534	UHMW Wear Strip, Small	1
3	28535	Bumper, Foam Rubber	5
4	28540	Platform, Material Rack Weldment	1
5	50003	WSHR M12 ZP Standard Flat	16
6	50042	HHCS M12-1.75 X 35, 10.9, ZP	8
7	50054	NNYL M12X1.75 10 ZP Nylon	8
8	93920	Decal - Warning, Sheet Rack Self Weight	4
9	93963	Strap, Cam Buckle, 1”, 300# WL, Yellow, 10FT, W/ MEC Name	1
10	94393	Blind Rivot, Plastic, .157” Diameter,	8
11	Yellow Zip Tie	Yellow Zip Tie 15” Long X .30” Wide	15

Option - Portable Welder Bracket Platform



DETAIL A
SCALE 1 : 6

ILLUSTRATION No.
Art_5553

45-J

Option, Portable Welder Bracket Platform

Item	Part Number	Description	Qty.
--	28572	Portable Welder Bracket Assembly Option	1
1	31890	Assembly, Platform (Refer to page 134 and page 136)	REF
2	28571	Option, Welder Bracket Platform	1
3	94268	Clamp, Round Tube, 35 mm, Polyamide, Black	3
4	53205	PHMS M6-1.00 X 60MM Long ZP	6
5	94753	T-Bolt Clamp	1
6	94486	Stauff Single Weld Plate	3
7	94749	Decal, Portable Welder Capacity	1

Option - Proactive Platform Safety System

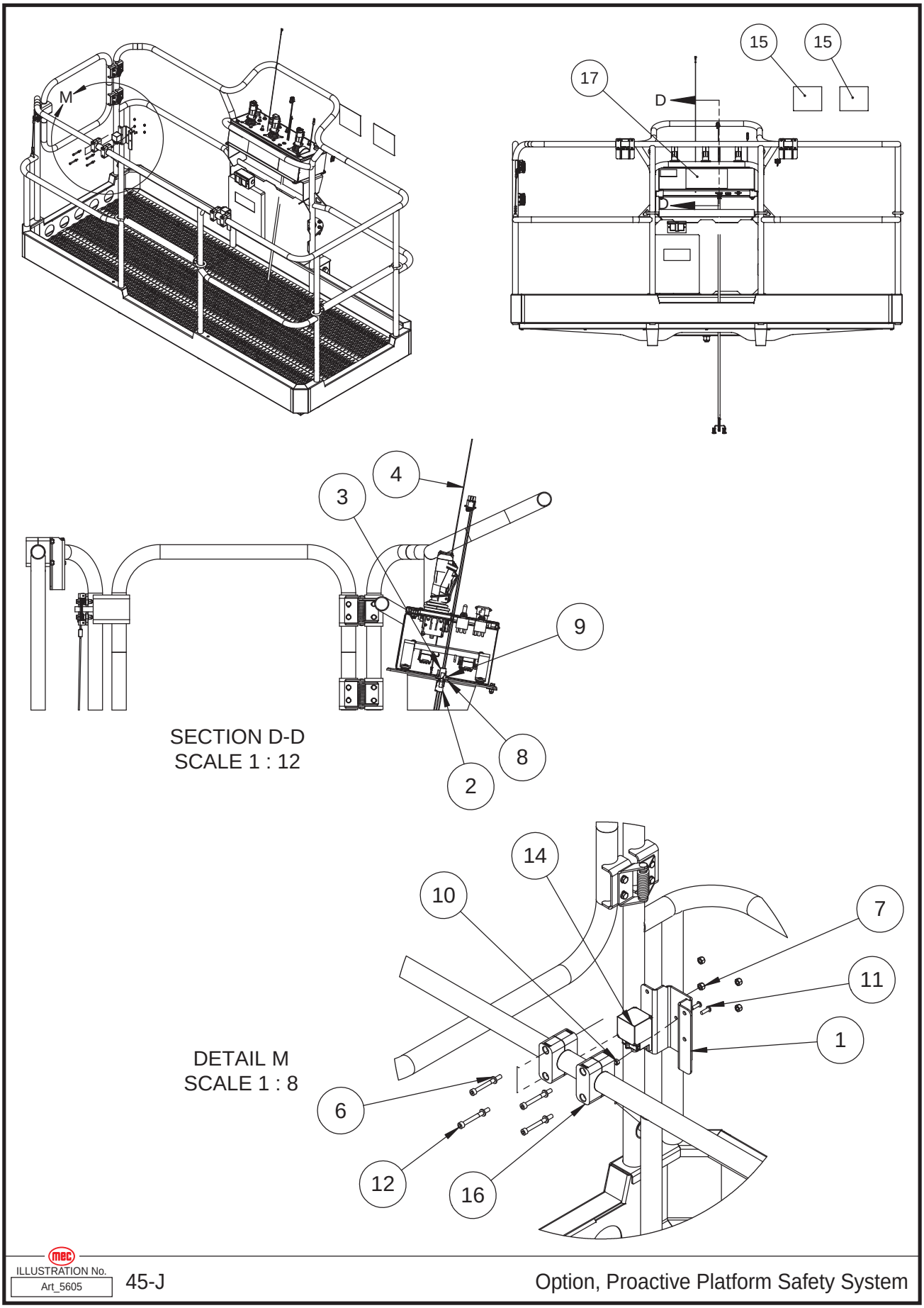


ILLUSTRATION No. Art_5605 45-J Option, Proactive Platform Safety System

Item	Part Number	Description	Qty.
1	28537	Bracket, Prox Switch Mount	2
2	28865	Harness, PPSS Extension	1
3	28866	Harness, PPSS Control	1
4	28890	Harness, PPSS Override	1
5	42386	Harness, PPSS Sensor Cable 90 Deg	2
6	50000	WSHR M06 ZP Standard Flat	8
7	50047	NNYL M06X1.00 08 ZP Nylock	8
8	50141	THMS #06-32 X 3/4 ZP	2
9	50329	NNYL #06-32 ZP Nylon Inse	2
10	50524	NNYL M05-0.80 Nylon Lock Nut	4
11	53035	BHCS M05-0.80 X 16, G08, ZP	4
12	53083	SHCS M06-1.00X060, 12.9, ZP, P	8
13	92950	Plug, Liquid Tight - Gen Switch Hole	2
14	94143	Sensor, Ultrasonic, UC4000	2
15	94254	Decal PPSS Equipped	2
16	94268	Clamp, Round Tube, 35 mm, Polyamide, Black	4
17	95287	Decal, PPSS Switch Instructions	1

Option - Upper Control Box Cover

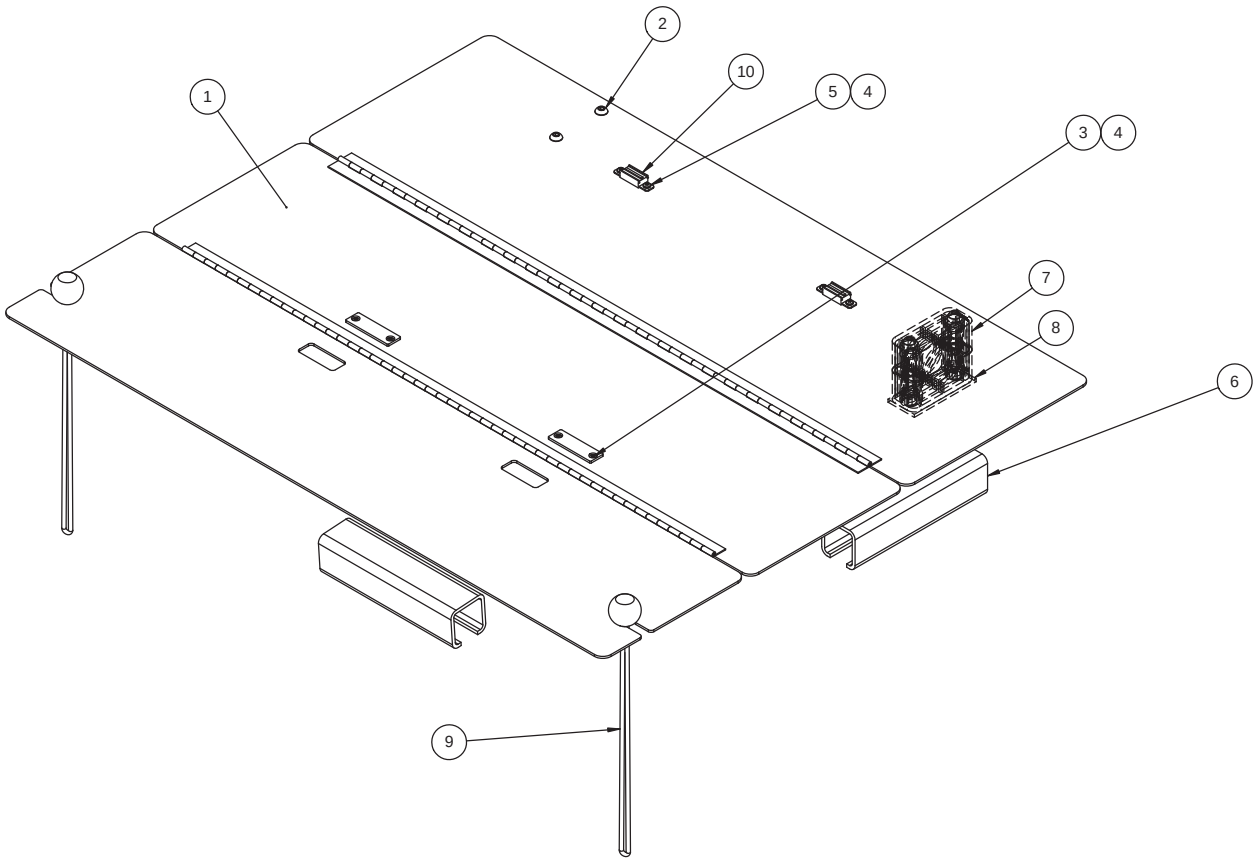


ILLUSTRATION No.
Art_5606

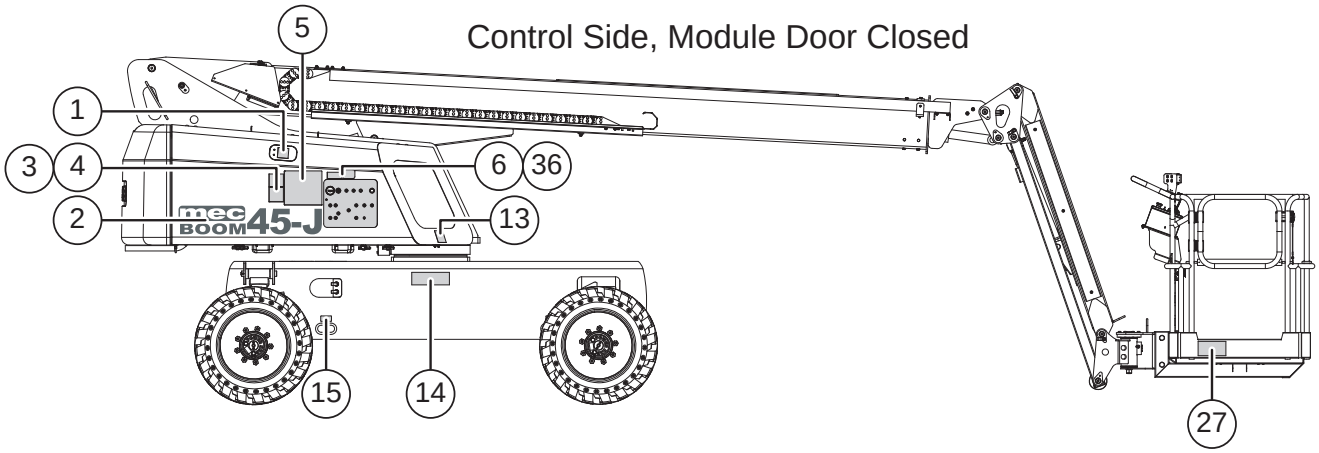
45-J

Option, Upper Control Box Cover

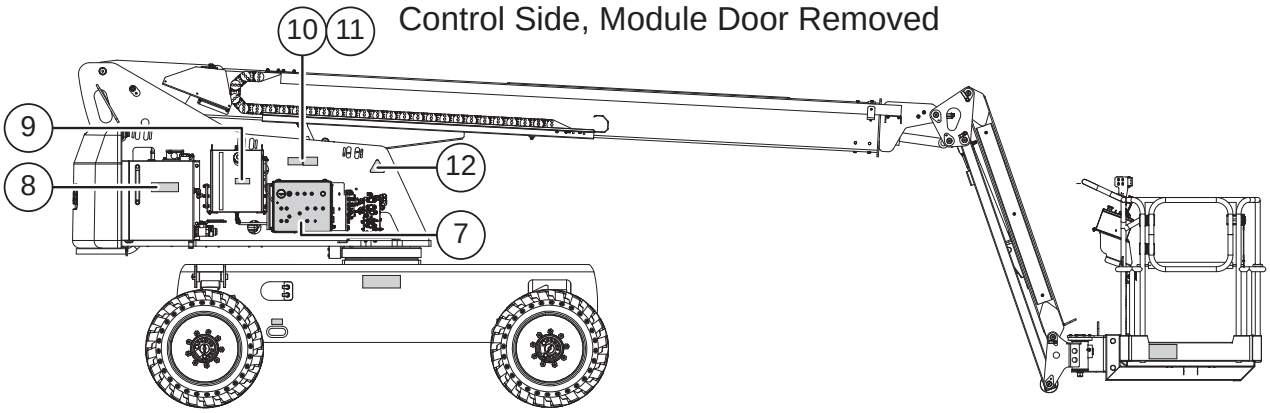
Item	Part Number	Description	Qty.
1	28780	Weldment, Upper Control Box Cover	1
2	53090	BHCS M06-1.00X070, 12.9, SS, F	4
3	53091	FHMS M03-0.50X008 SS	4
4	53092	NNYL M03-0.50 SS	8
5	53093	PHMS M03-0.50X008	4
6	92852	UHMW 1.25" X 5.5" C-Channel Wear Strip	3
7	94268	Clamp, Round Tube, 35 mm, Polyamide, Black	2
8	94486	Stauff Single Weld Plate	2
9	94487	10IN Tarp Canopy Bungee Cord (Plastic Toggle Ball Ends)	2
10	94488	Magnetic Catch	2

Decal Locations

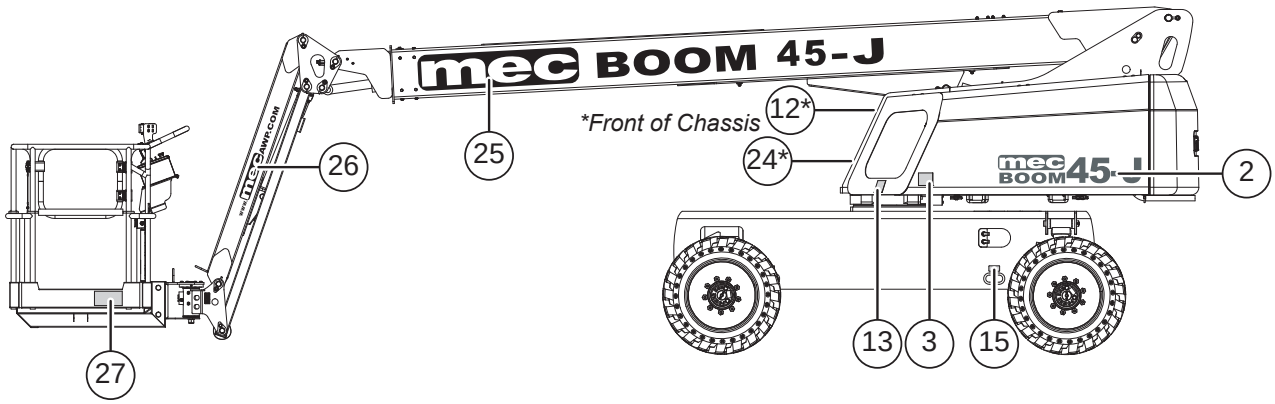
Control Side, Module Door Closed



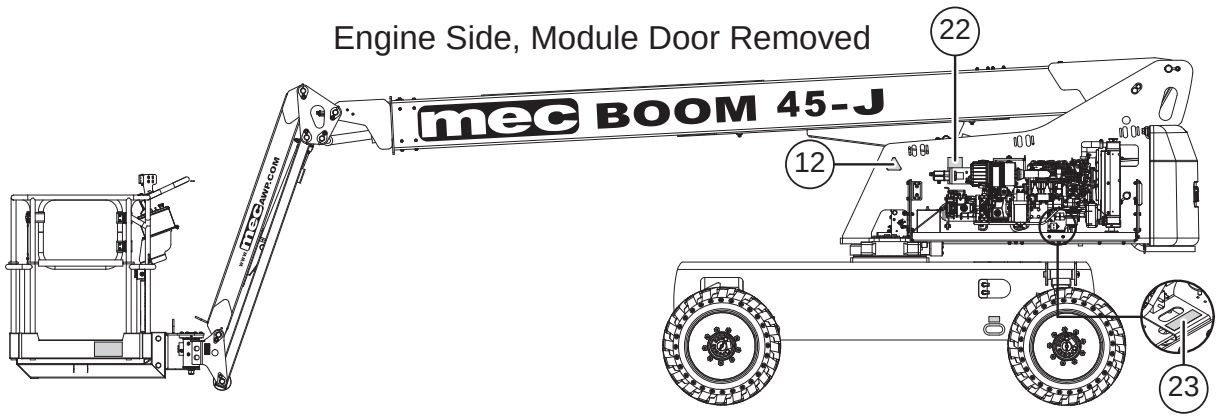
Control Side, Module Door Removed



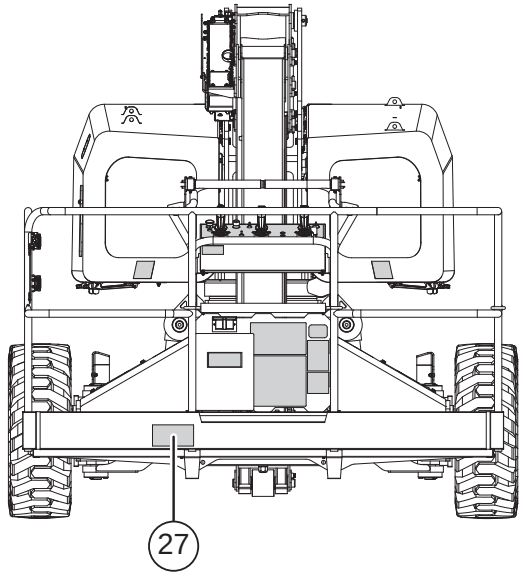
Engine Side, Module Door Closed



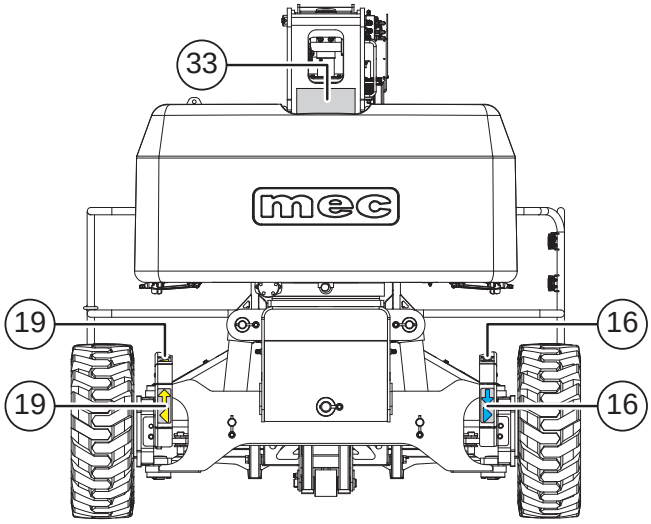
Engine Side, Module Door Removed

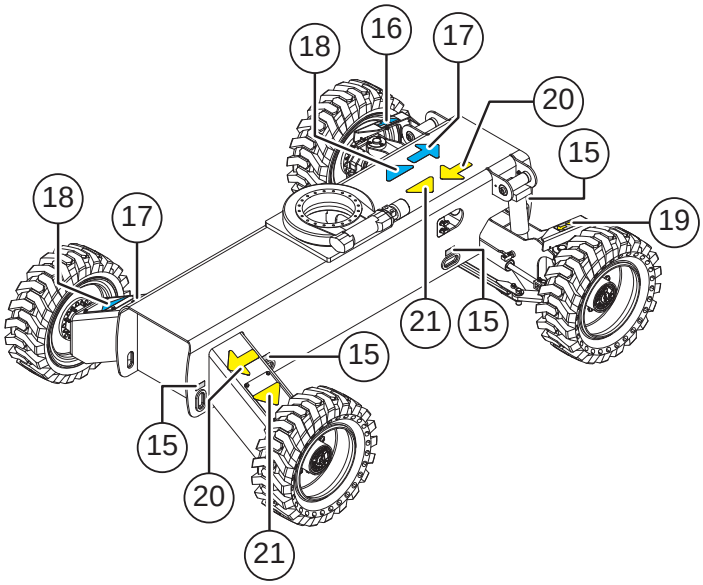


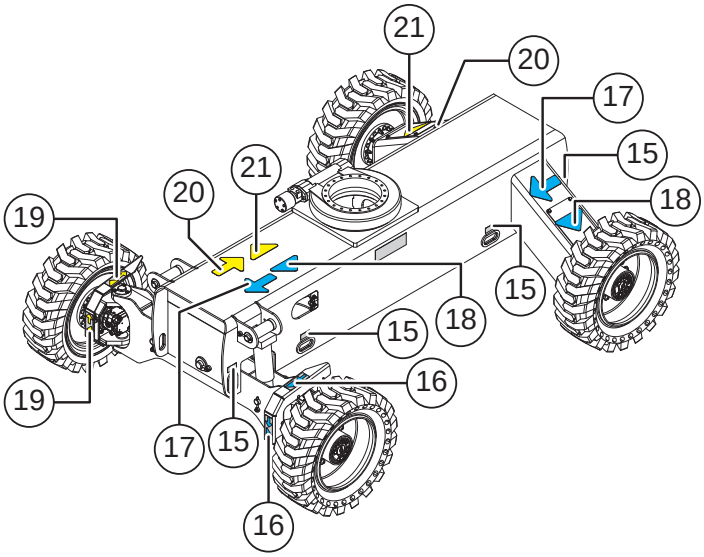
Front Side

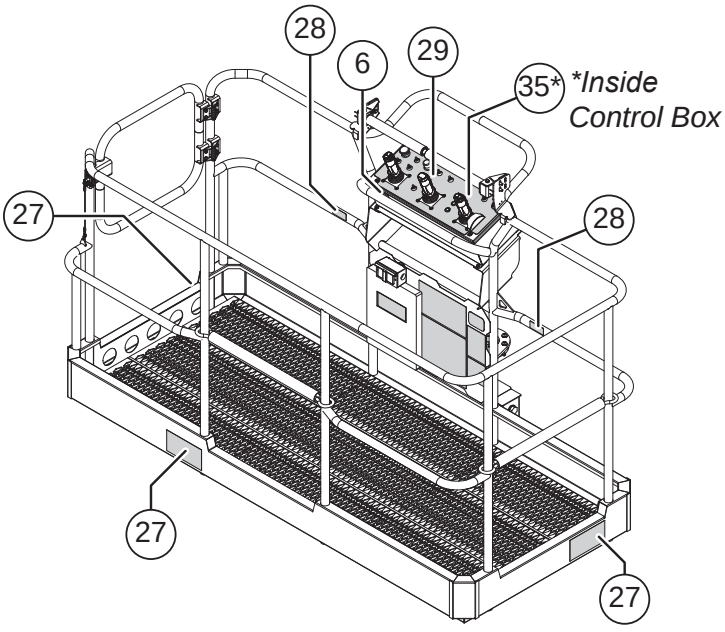


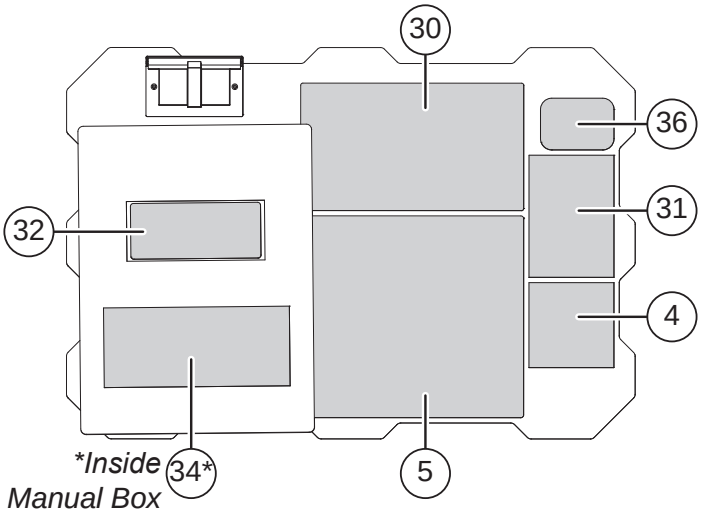
Rear Side

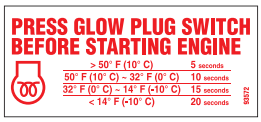
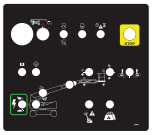
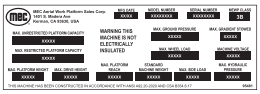
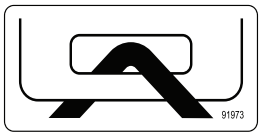
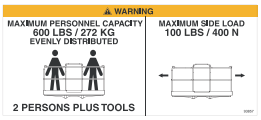
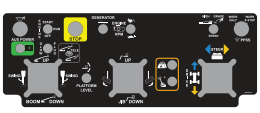
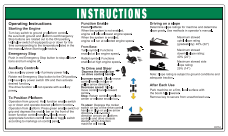
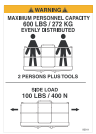
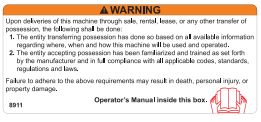










1  93182 Qty. - 1	2  94851 Qty. - 1	3  93801 Qty. - 2	4  93807 Qty. - 2	5  93755 Qty. - 2
6  93572 Qty. - 2	7  93930 Qty. - 1	8  92117 Qty. - 1	9  9378 Qty. - 1	10  90732 Qty. - 1
11  93805 Qty. - 1	12  91850 Qty. - 3	13  93804 Qty. - 2	14  95481 Qty. - 1	15  91973 Qty. - 8
16  93814 Qty. - 2	17  91971 Qty. - 2	18  91981 Qty. - 2	19  93815 Qty. - 2	20  91972 Qty. - 2
21  91982 Qty. - 2	22  93806 Qty. - 1	23  92119 Qty. - 1	24  90751 Qty. - 1	25  94850 Qty. - 1
26  92416 Qty. - 1	27  93857 Qty. - 3	28  91970 Qty. - 2	29  96516 Qty. - 1	30  93754 Qty. - 1
31  93911 Qty. - 1	32  8911 Qty. - 1	33  90719 Qty. - 1	34  90718 Qty. - 1	35  92236 Qty. - 1
36  95266 Qty. - 2				

Notes

MEC Parts Order Form

Phone: 559-842-1523
Fax: 559-400-6723
Email: Parts@mecawp.com

Please fill out completely

Date: _____

Account: _____

Bill to: _____

_____

_____

_____

Ordered By: _____

Your Fax No.: _____

Ship to: _____

_____

_____

_____

Purchase Order Number _____
** All orders MUST have a Purchase Order Number

Ship VIA _____
**Fed Ex shipments require Fed Ex account number

Part Number	Description	Quantity	Price

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

___ Ship complete order only - No Backorders
___ Ship all available parts and contact customer on disposition of back-ordered parts
___ Other (Please specify)

_____

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.



MEC Aerial Work Platforms

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