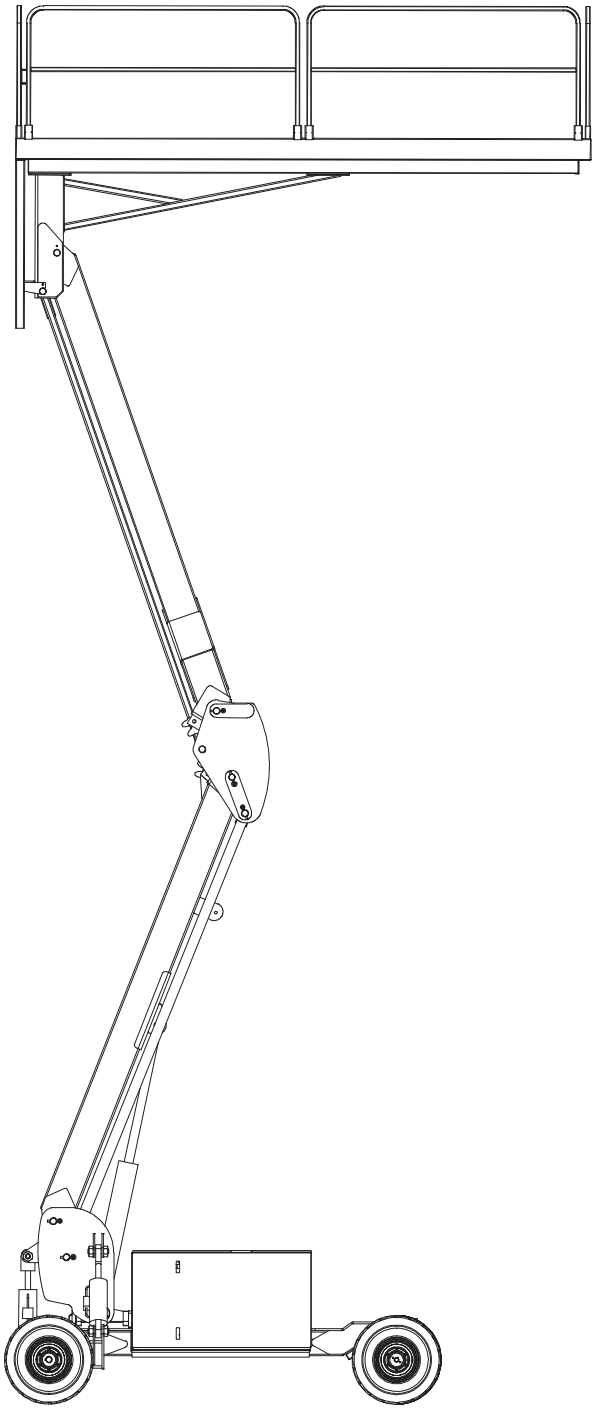
Service & Parts Manual

Speed Level Series



RT - Internal Combustion
ES - Electric

2684ES Serial Number Range 12700000 - Up
2684RT Serial Number Range 12800000 - Up
3084ES Serial Number Range 11700000 - Up
3084RT Serial Number Range 11800000 - Up

Part # 91885
November 2023

Revision History

Date	Reason for Update
January 2019	Speed Level Mk. 2 Update

MEC Aerial Work Platforms

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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
Toll Free: 1 - 877 - 632 - 5438
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Fax: 1 - 559 - 842 - 1520
info@MECawp.com
www.MECawp.com

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.

RT Models Specifications

		2684RT		3084RT	
Working Height*		32 ft*	10.0 m*	36 ft*	11.0 m*
Platform Height		26 ft	7.9 m	30 ft	9.0 m
Stowed Height	Rails Up	107 in	2.72 m	105 in	2.67 m
	Rails Folded Down	72 in	1.83 m	70 in	1.78 m
Maximum Occupants	0 m/s wind	5		5	
	45 km/h (12.5 m/s) wind	5		5	
	On Slide-Out Extension	2		N/A	
Lift Capacity		1700 lbs	770 kg	1500 lbs	680 kg
Slide-Out Deck Capacity		700 lbs	320 kg	N/A	
Platform Dimensions	Length (Inside Rails)	12 ft 2 in	3.71 m	14 ft	4.27 m
	Length (Platform Extended)	16 ft 2 in	4.93 m	N/A	
	Platform Width (Inside Rails)	72 in	1.83 m	72 in	1.83 m
	Guardrail Height	43.5 in	1.1 m	43.5 in	1.1 m
	Toeboard Height	6 in	15 cm	6 in	15 cm
Overall Length		13 ft 2 in	4.0 m	14 ft 6 in	4.4 m
Overall Width		84 in		2.13 m	
Wheel Base		100 in		2.54 m	
Wheel Track		72 in		1.83 m	
Turning Radius	Inside	8 ft		2.44 m	
	Outside	16 ft 8 in		5.08 m	
Ground Clearance		10 in		25 cm	
Machine Weight** (Unloaded) (Approximate)		7800 lb**	3535 kg**	8100 lb**	3674 kg**
Drive System (Proportional)					
	Drive Speed - Platform Elevated	0-.4 mph		0-.6 km/h	
	Drive Speed - Platform Lowered	0-3.2 mph		0-5 km/h	
Lift/Lower Speeds (Approximate)		35 sec/40 sec			
Gradeability		40%		22°	
Ground Pressure/Wheel (Maximum)		90 psi	6.3 kg/cm^2	94 psi	6.6 kg/cm^2
Wheel Load		2855 lb	1295 kg	2965 lb	1345 kg
Wind Speed (Maximum)		28 mph		45 km/h (12.5 m/s)	
Tire Size - Standard		26 x 12D / 380NHS			
Tire Pressure		45 psi		3.1 bar	
		Foam-filled tires are standard in Europe and Australia, optional in North America			
Wheel Lug Nut Torque		75-85 ft/lb		102-115 Nm	
Hydraulic Pressure	Main System	2800 psi		193 bar	
	Lift System	2800 psi		193 bar	
	Steering System	2000 psi		138 bar	
Hydraulic Fluid Capacity		23 gallon		87 liters	
Engine		Diesel -- Kubota D1105E, 25HP (18.6 kW), Liquid Cooled Dual Fuel (North America only) -- Kubota DF752, 20HP (14.9 kW), Liquid Cooled			
Noise Level		86 dB maximum			
Maximum Vibration		Does not exceed 2.5 m/sec at operator's position			
Ambient Operating Range		-30° C minimum; 50° C maximum			
Operating Inclination		Manual and self-leveling, side/side to 14°, fore/aft to 10°			
Brakes		Dual Rear Wheel Multi-disc			

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

ES Models Specifications

		2684ES		3084ES	
Working Height*		32 ft*	10.0 m*	36 ft*	11.0 m*
Platform Height		26 ft	7.9 m	30 ft	9.0 m
Stowed Height	Rails Up	107 in	2.72 m	105 in	2.67 m
	Rails Folded Down	72 in	1.83 m	70 in	1.78 m
Maximum Occupants	0 m/s wind	5		5	
	45 km/h (12.5 m/s) wind	5		5	
	On Slide-Out Extension	2		N/A	
Lift Capacity		1700 lbs	770 kg	1500 lbs	680 kg
Slide-Out Deck Capacity		700 lbs	320 kg	N/A	
Platform Dimensions	Length (Inside Rails)	12 ft 2 in	3.71 m	14 ft	4.27 m
	Length (Platform Extended)	16 ft 2 in	4.93 m	N/A	
	Platform Width (Inside Rails)	72 in	1.83 m	72 in	1.83 m
	Guardrail Height	43.5 in	1.1 m	43.5 in	1.1 m
	Toeboard Height	6 in	15 cm	6 in	15 cm
Overall Length		13 ft 2 in	4.0 m	14 ft 6 in	4.4 m
Overall Width		84 in		2.13 m	
Wheel Base		100 in		2.54 m	
Wheel Track		72 in		1.83 m	
Turning Radius	Inside	8 ft		2.44 m	
	Outside	16 ft 8 in		5.08 m	
Ground Clearance		10 in		25 cm	
Machine Weight** (Unloaded) (Approximate)		8400 lb**	3810 kg**	8700 lb**	3946 kg**
Drive System (Proportional)					
	Drive Speed - Platform Elevated	0-.4 mph		0-.6 km/h	
	Drive Speed - Platform Lowered	0-3.2 mph		0-5 km/h	
Lift/Lower Speeds (Approximate)		35 sec/40 sec			
Gradeability		40%		22°	
Ground Pressure/Wheel (Maximum)		98 psi	6.9 kg/cm^2	101 psi	7.1 kg/cm^2
Wheel Load		3065 lb	1390 kg	3175 lb	1440 kg
Wind Speed (Maximum)		28 mph		45 km/h (12.5 m/s)	
Tire Size - Standard		26 x 12D / 380NHS			
Tire Pressure		45 psi		3.1 bar	
		Foam-filled tires are standard in Europe and Australia, optional in North America			
Wheel Lug Nut Torque		75-85 ft/lb		102-115 Nm	
Hydraulic Pressure	Main System	2800 psi		193 bar	
	Lift System	2800 psi		193 bar	
	Steering System	2000 psi		138 bar	
Hydraulic Fluid Capacity		23 gallon		87 liters	
Electric Motor		8 hp (6kW): 3600 rpm			
Power Source -- Voltage		48 volts DC			
Batteries		Eight 6-volt DC 370 amp-hour industrial deep cycle batteries			
Battery Charger	Input	120 Volt AC, 50.60 Hz, 18 Amp - 240 Volt AC, 50.60 Hz, 9 Amp			
	Output	48 Volt DC, 32 Amp, 1500 W, Timed Shutoff			
Maximum Vibration		Does not exceed 2.5 m/sec at operator's position			
Ambient Operating Range		-30° C minimum; 50° C maximum			
Operating Inclination		Manual and self-leveling, side/side to 14°, fore/aft to 10°			
Brakes		Dual Rear Wheel Multi-disc			

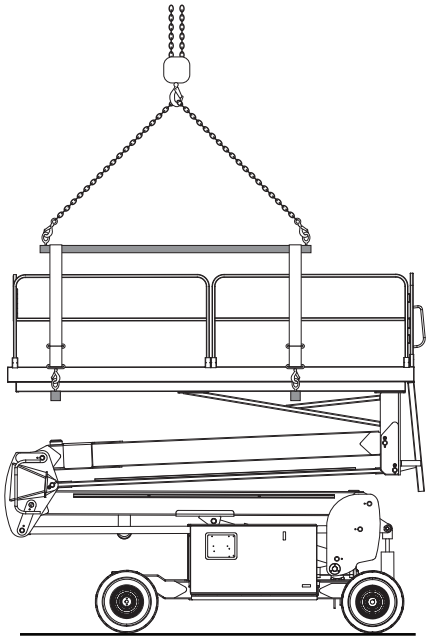
*Working Height adds 6 feet (2 m) to platform height.
**Weight may increase with certain options or country standards.

Key Safety Tips

DANGER

NEVER PERFORM SERVICE ON THE MACHINE WITH THE PLATFORM ELEVATED WITHOUT FIRST SUPPORTING THE PLATFORM/BOOM ASSEMBLY.

- Use a crane with chains and straps of adequate lifting capacity to support the platform.
- 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.



Art_3098

Hydraulic System

WARNING

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

CORRECT LEAKS IMMEDIATELY.

CAUTION

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

Electrical System

CAUTION

Prevent damage to battery and/or electrical system;

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

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

Total System

Engine coolant level must be checked only after engine has cooled. If radiator cap is removed while the coolant is at normal operating temperature, pressure within the coolant system will force hot liquid out through the filler opening and may cause severe scalding.

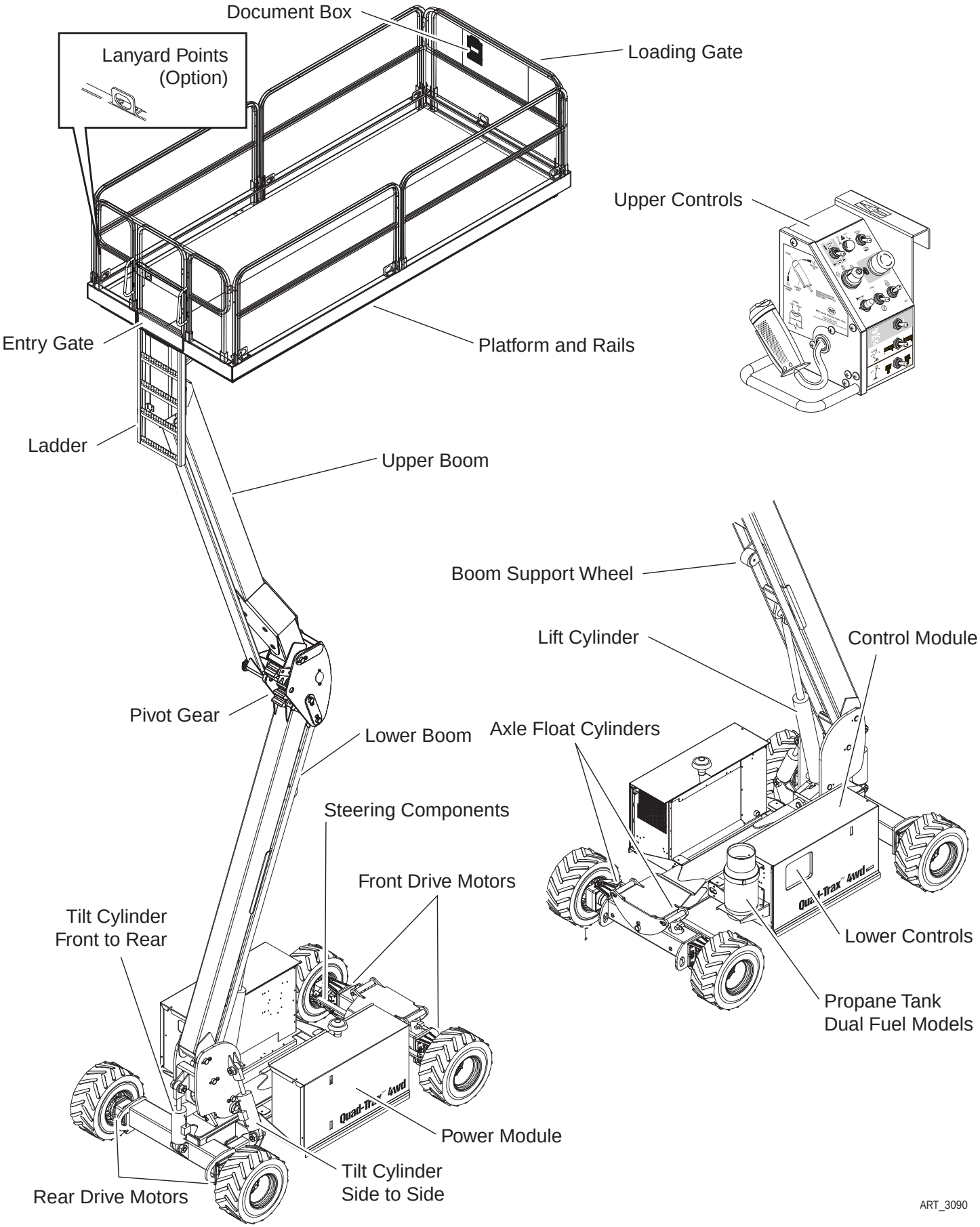
CAUTION

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

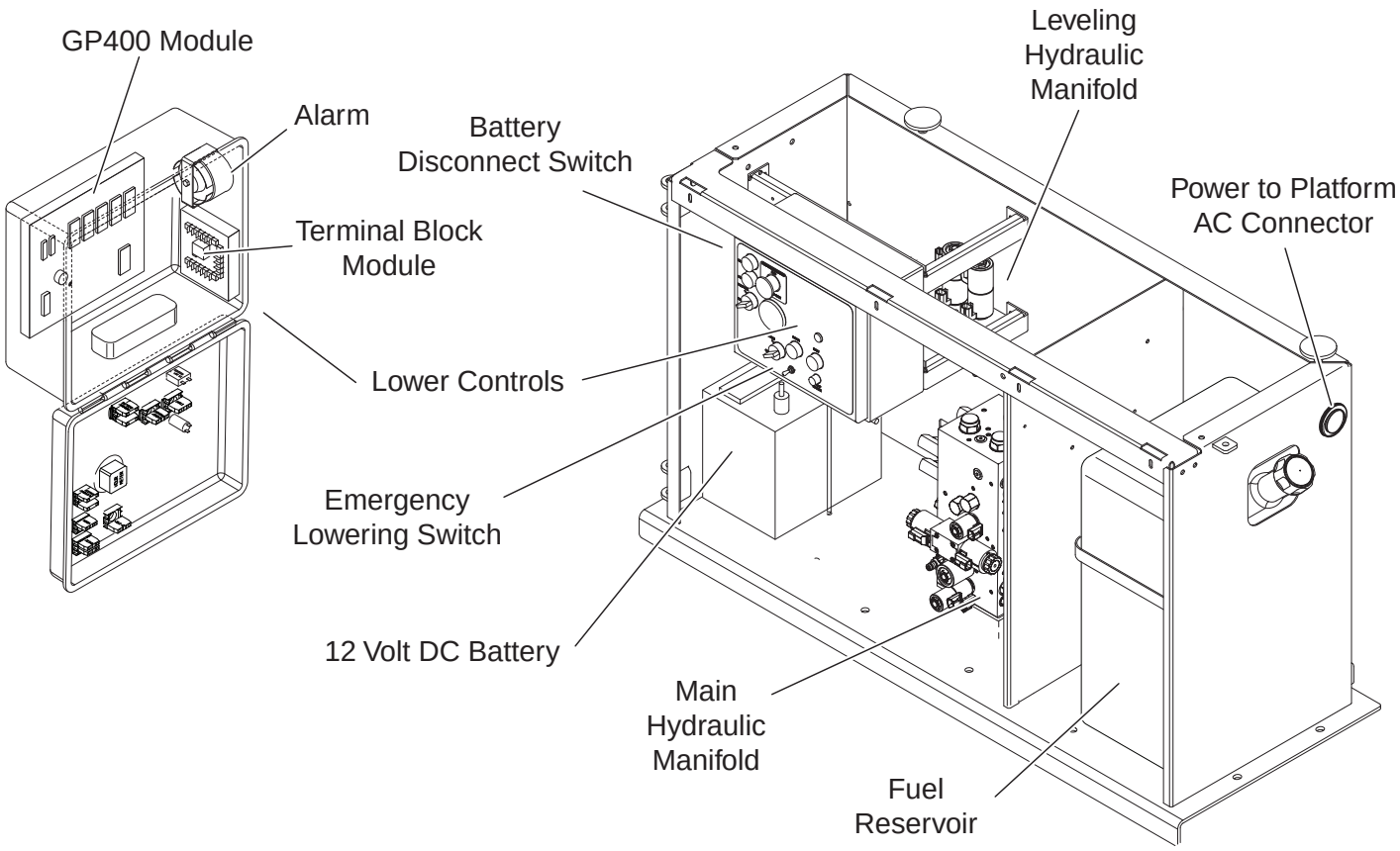
Immediately report to your supervisor any defect or malfunction. Any defect shall be repaired prior to continued use of the aerial work platform.

Inspection and maintenance should be performed by qualified personnel familiar with the equipment.

Primary Machine Components



Control Module



Power Module

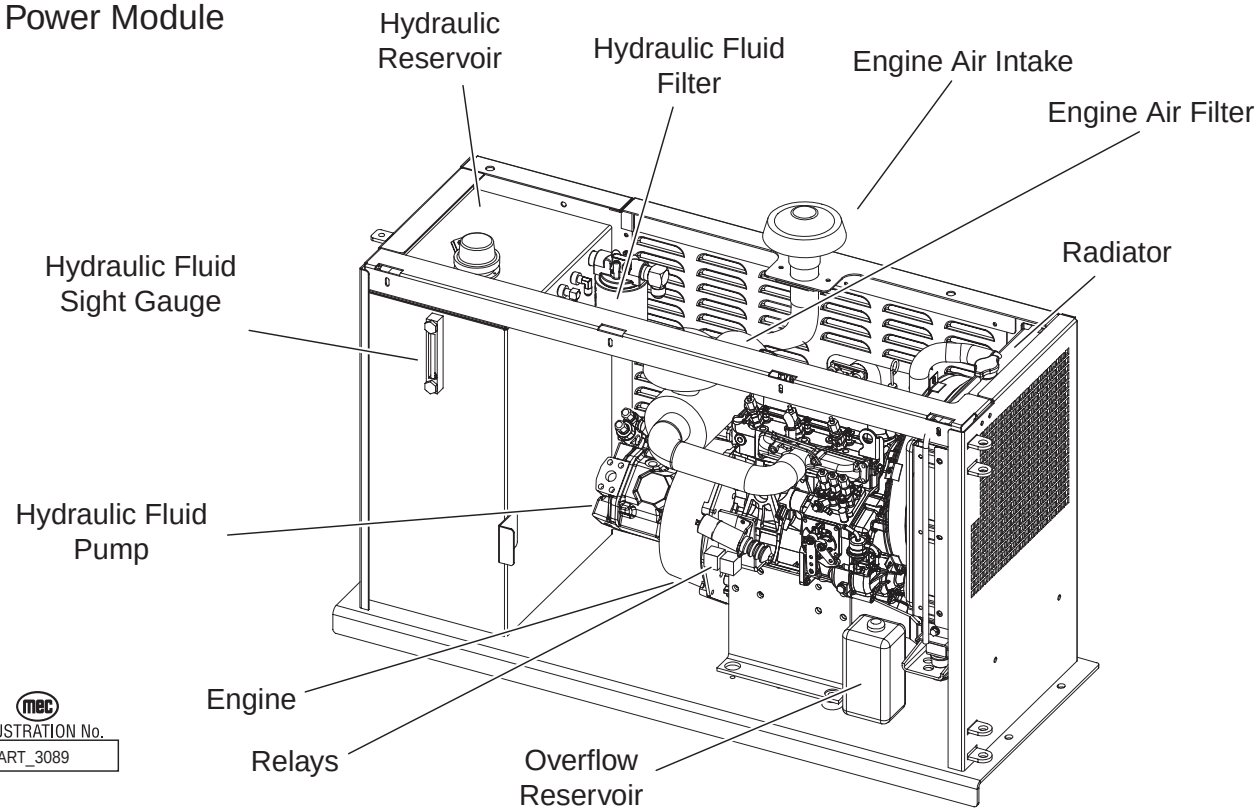


ILLUSTRATION No.
ART_3089

Bolt Torque Specification - American Standard

Fasteners

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

American Standard Cap Screws								
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.

Bolt Torque Specification - Metric Standard

Fasteners

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.

Hydraulic Components Torque Table

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

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

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

Type: SAE Port Series	Cartridge Poppet		Fittings		Hoses	
	Ft. lbs	Nm	Ft. lbs	Nm	Ft. lbs	Nm
#4	N/A	N/A	N/A	N/A	135 - 145	15 - 16
#6	N/A	N/A	10 - 20	14 - 27	215 - 245	24 - 28
#8	25 - 30	31 - 41	25 - 30	34 - 41	430 - 470	49 - 53
#10	35 - 40	47 - 54	35 - 40	47 - 54	680 - 750	77 - 85
#12	85 - 90	115 - 122	85 - 90	115 - 122	950 - 1050	107 - 119
#16	130 - 140	176 - 190	130 - 140	176 - 190	1300 - 1368	147 - 155

Emergency Systems And Procedures

WARNING

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

DO NOT ATTEMPT TO CLIMB DOWN ELEVATING ASSEMBLY.

Emergency Stop

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

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

Selector Switch Is Set To Base

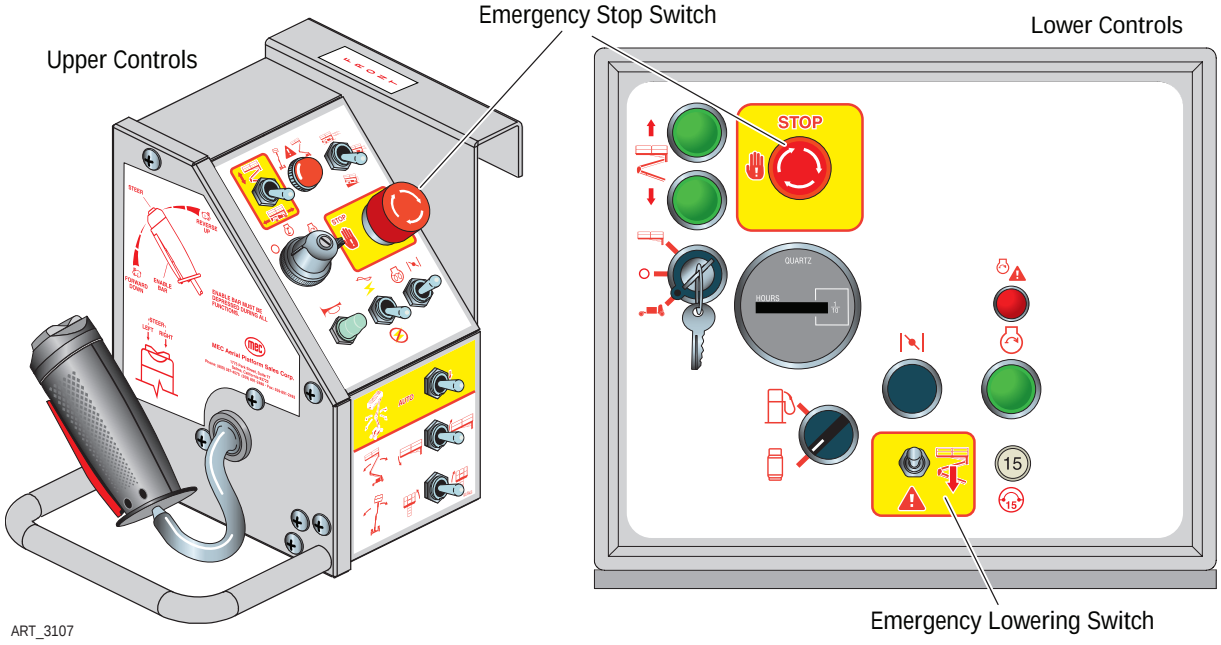
- The upper controls are locked out.
- The lower controls switch must be reset or the machine will not operate.
- The machine will operate from the lower controls if the upper controls switch is tripped.

Emergency Lowering

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

The Emergency Lowering switch *will* continue to function if the EMERGENCY STOP switch is tripped.

- To lower the platform, perform the following steps:
- Push and hold the toggle switch down to lower the platform.
- Once the platform is fully lowered, release the toggle switch.



Parking Brake And Towing Circuit

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

DANGER

AFTER DISENGAGING BRAKES THERE IS NOTHING TO STOP THE MACHINE'S TRAVEL. MACHINE WILL ROLL FREELY ON SLOPES. BE ON GUARD AGAINST RUNAWAY.

CAUTION

Prior to manually releasing brakes, insure wheels are chocked to prevent unintentional movement.

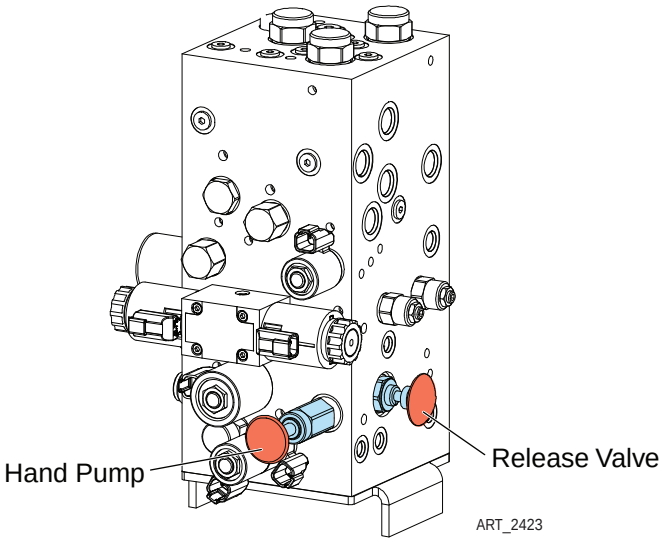
Disengage Brakes Before Towing:

- Chock the wheels.
- Push and hold release valve.
- Using the hand pump on the manifold, pump valve until pressure is built and valve cannot be pumped.
- Machine is now ready for towing.

Engage Brakes Before Driving:

- Pull out the manual brake release valve to reset brakes.

Note: Brakes will reset automatically when drive function is activated.



Lift And Support The Machine

DANGER

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

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

- A jack with a lifting capacity of two (2) tons or more.
- Jack stands with a rating of two (2) tons or more.

To Raise The Machine

1. Move machine to a firm level surface capable of supporting the weight of the machine.
2. Chock tires on one end of machine and raise the other end of machine.
3. If wheel is to be removed, break loose but **do not remove** 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 lugs to proper torque (refer to machine specifications).
2. Raise machine slightly and remove jack stands.
3. Lower the machine and remove the jack.
4. Remove chocks.

Transporting The Machine

Safety Information

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

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

WARNING

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

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

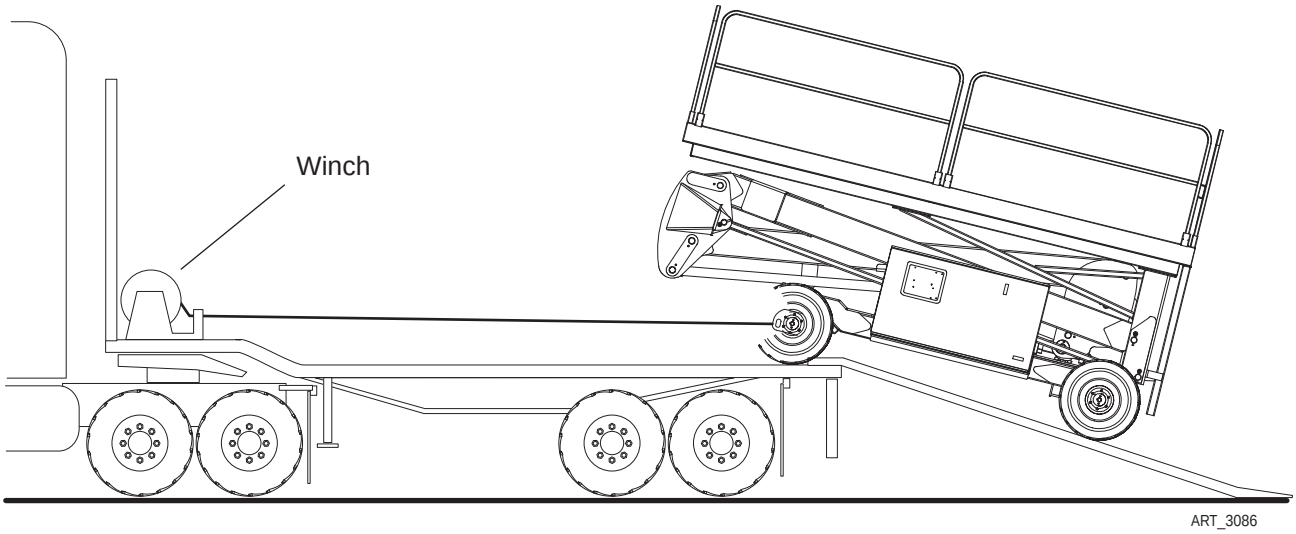
Driving Or Winching Onto Or Off Of A Transport Vehicle

MEC DOES NOT RECOMMEND UNASSISTED LOADING OR UNLOADING.

WARNING

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

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



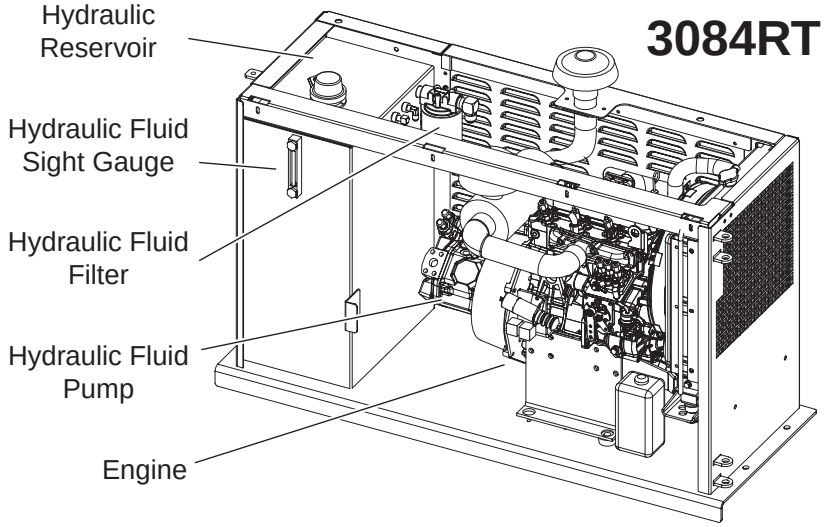
Hydraulic System – General

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

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

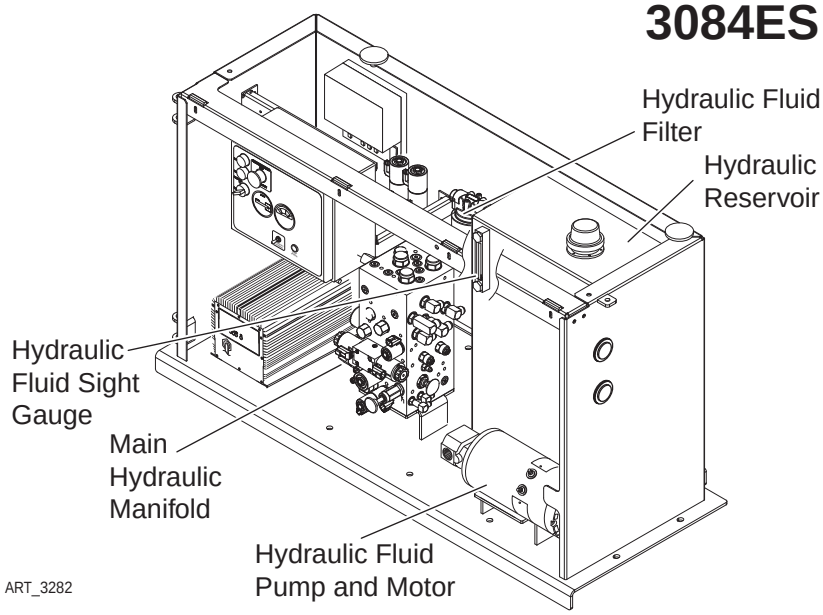
If no function is selected to perform, the pump remains on standby and no fluid is pumped through the manifold. Each function has a maximum pressure control limit set by pressure relief valve.

Power Module 3084RT



ART_3132

Controls Module 3084ES



ART_3282

Hydraulic Roadmap

Hydraulic Reservoir

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

Pump

The pump delivers hydraulic fluid under pressure to the main hydraulic manifold.

Hydraulic Manifold

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

Drive And Brake System

There are four (4) hydraulic, fixed-displacement gear wheel motors to provide power to all four wheels [two (2) front and two (2) rear].

The two rear wheel motors have integral spring-held brakes. The brakes are released by hydraulic pressure developed in the drive circuit during drive mode. A fixed orifice in the brake circuit controls the deceleration rate and initiates a smooth stop.

Floating Axle Lock Cylinders

Two (2) hydraulic cylinders control the floating axle on the front of the machine. When platform is elevated, the cylinders lock into place to increase machine stability.

Steering System

Two (2) hydraulic cylinders control steering.

Lift System

The machine is equipped with one (1) hydraulic lift cylinder.

Tilt System

The boom and platform tilts as a unit to provide a level work platform, regardless of chassis level. One (1) hydraulic cylinder provides tilt from front to rear, and one (1) hydraulic cylinder provides tilt from side to side.

Optional Generator System

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

Hydraulic Fluid

Handling Precautions

WARNING

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

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

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

FLUID LEAKS UNDER PRESSURE MAY NOT ALWAYS BE VISIBLE.

Fluid Recommendations

MEC recommends the use of **Mobile Fluid DTE 10**, **DTE 13 M** or **AW32** hydraulic fluid.

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

System Flushing Procedure

1. With platform fully down, 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 bypass filter and hose.
4. Flush the hoses with clean hydraulic fluid.
5. Discard old bypass filter element 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 (refer to Lubrication Chart).
9. Loosen output hose fittings at pump to flood with hydraulic fluid. Tighten fittings.
10. Start up the machine. Briefly operate all functions. Two or three lift cycles may be necessary to purge all air from lift cylinder(s).
11. When the above procedures have been completed, fill hydraulic reservoir to full mark on sight gauge.
12. Check all leaks and correct as necessary. Machine is now ready to be placed back in operation.

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

Hydraulic Fluid Reservoir

Consists of the reservoir, a 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.

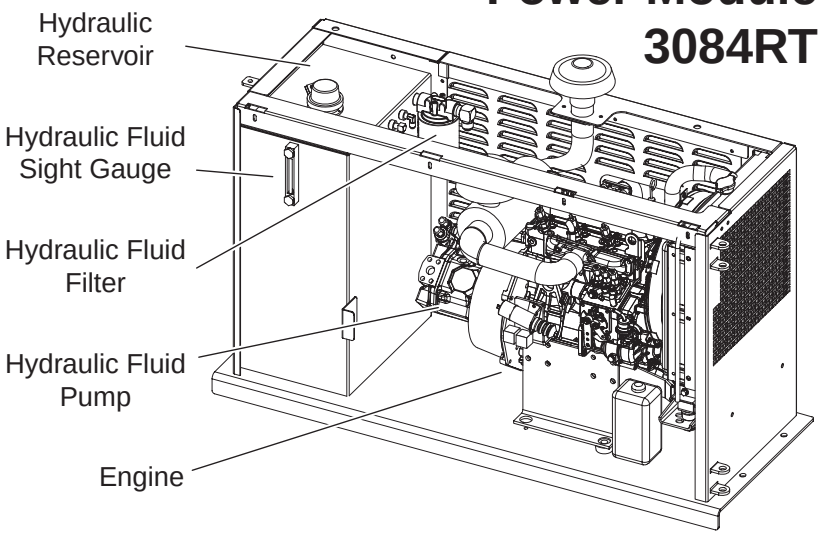
Hydraulic Reservoir Assembly

CAUTION

All machines are produced with a spin-on, bypassing filter. When the filter is clogged, hydraulic flow bypasses the filter element. The filter element must be changed every six (6) months or 500 hours. Extremely dirty conditions may require that the filter be replaced more often.

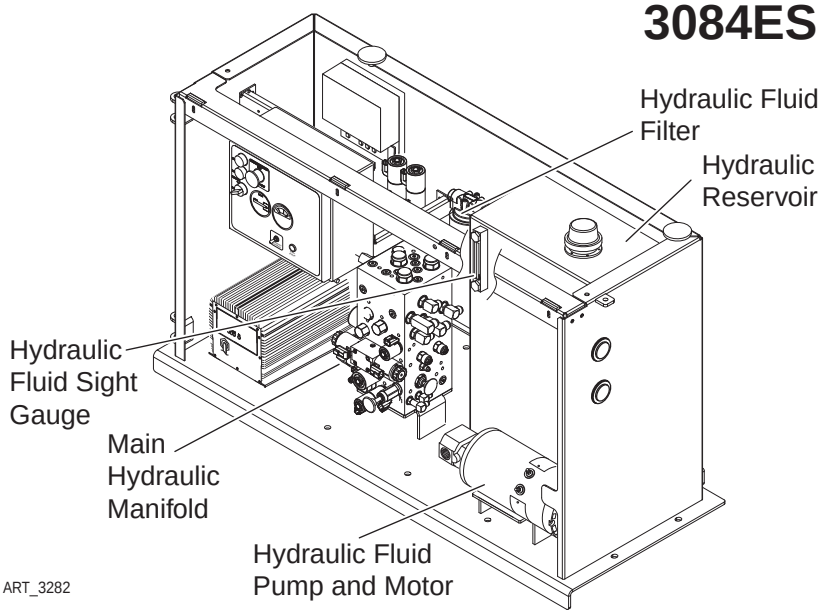
Beware of hot fluid. Contact with hot fluid may cause severe burns.

Power Module 3084RT



ART_3132

Controls Module 3084ES



ART_3282

Hydraulic Pump - 3084RT

Note: For Hydraulic Pressure Adjustment Procedures refer to Section 8.
Refer to Parts Section 16.

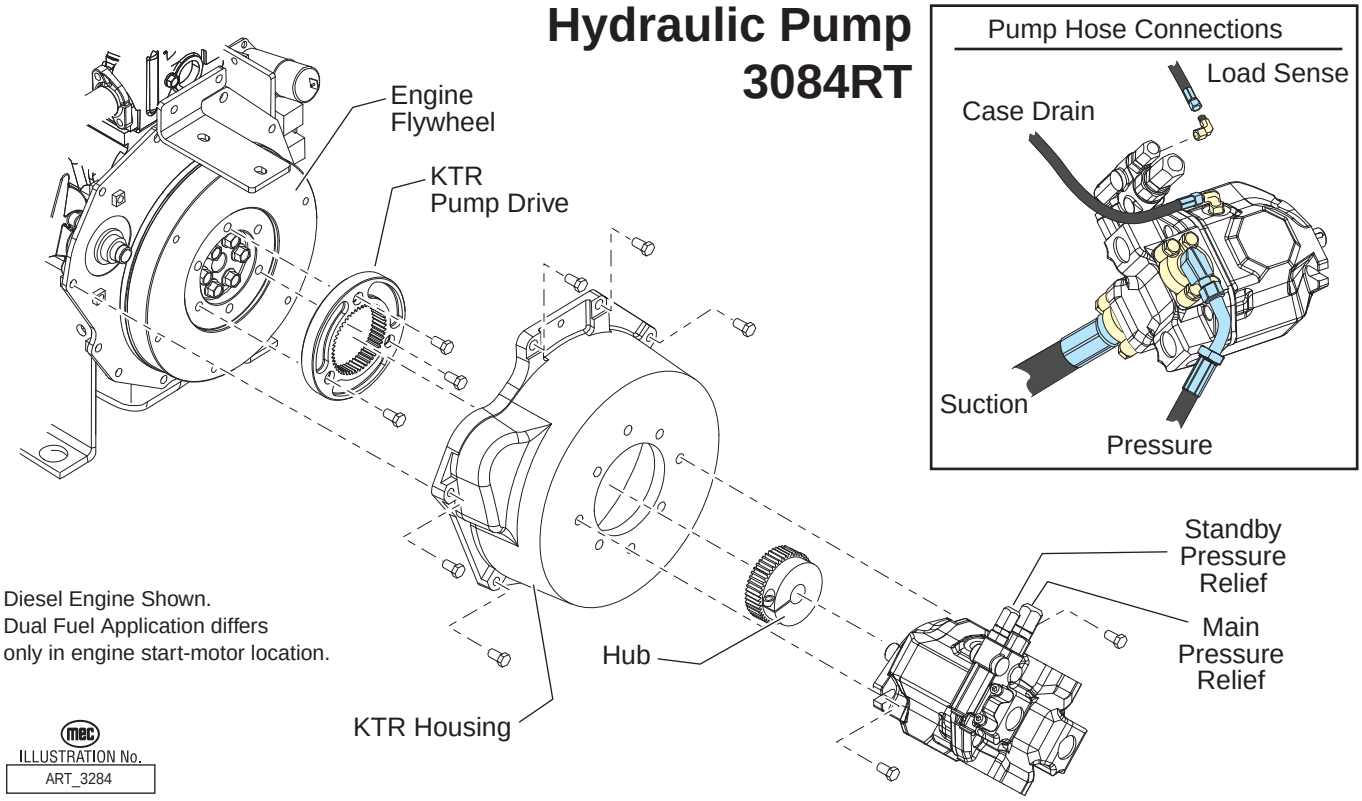
An internal combustion engine drives a variable displacement axial piston pump.

Remove

1. Turn the Battery Disconnect Switch (inside Control Module) to the OFF position.
2. Place a large container under the engine and pump to catch fluid that will be lost during pump replacement. Dispose of used fluid properly.
3. Tag and disconnect hydraulic hoses, and IMMEDIATELY cap or cover the openings to prevent contamination.
4. Remove the two (2) bolts that hold the pump to the housing.
5. Remove the pump.

Install

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



Hydraulic Pump Seals - 3084RT

Drive Shaft Seal Replacement

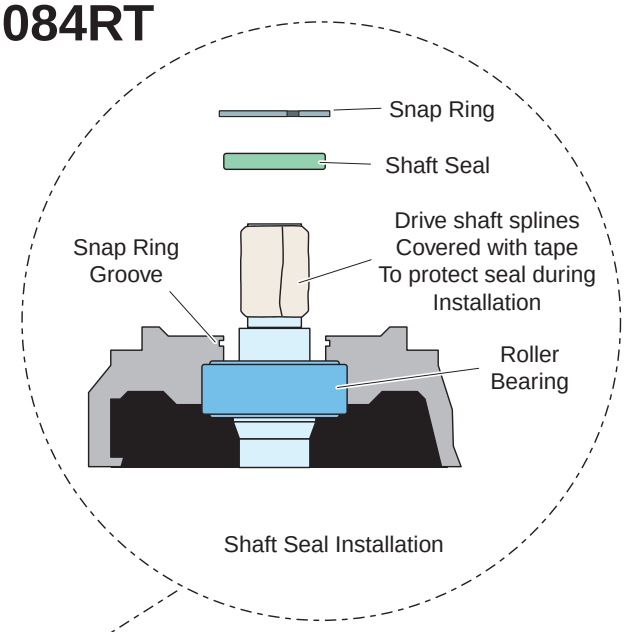
CAUTION **Be careful not to damage the drive shaft when removing the old seal.**

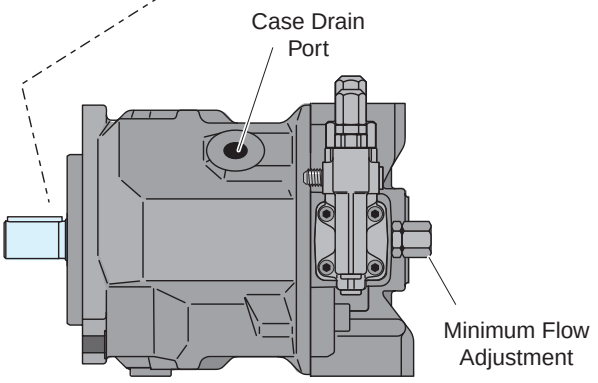
1. Remove the shaft key.
2. Remove the snap ring.
3. Remove the shaft seal.
   - Check the surface of the shaft and the housing for imperfections.
4. Install new shaft seal.
   - Cover the keyway portion of the drive shaft with tape to prevent damage to the seal during installation.
   - Coat the shaft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

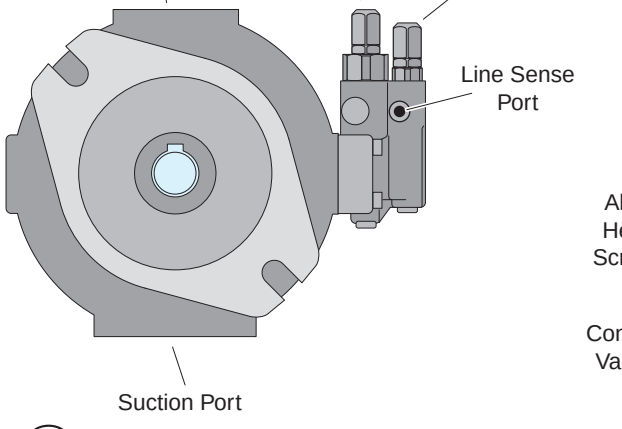
Hydraulic Pump Rebuild

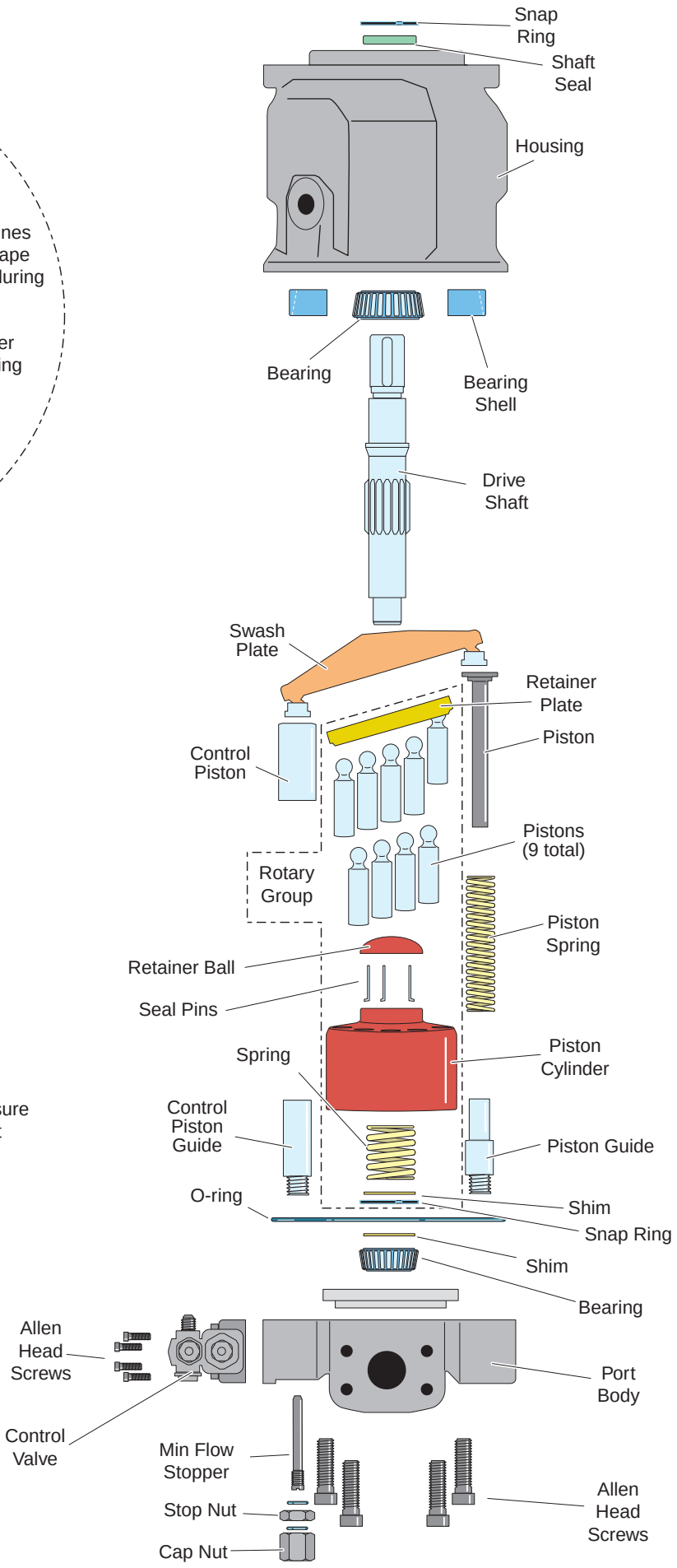
Pump rebuild should be performed only by a qualified mechanic. Contact MEC Technical Support before attempting to rebuild the pump.

Hydraulic Pump
3084RT







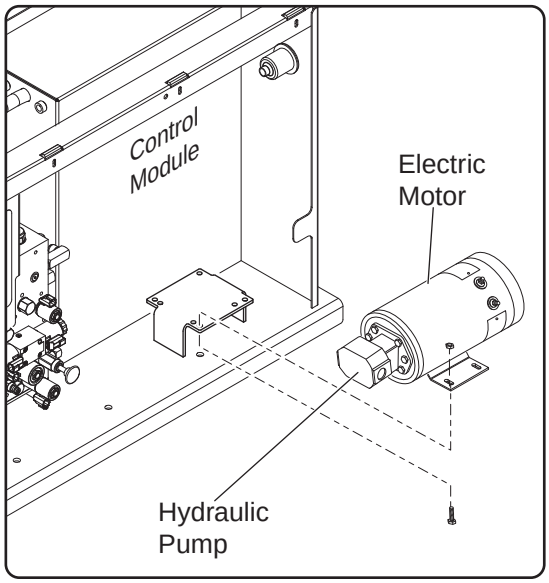


mec
ILLUSTRATION No.
ART_3285

Hydraulic Pump - 3084ES

The hydraulic pump and electric motor used on the 3084ES model contain no serviceable parts, and must be replaced rather than repaired. See the Parts Manual for more information.

Hydraulic Pump & Electric Motor 3084ES



ART_3283

Hydraulic Manifold

Note: Refer to Parts Section 15.

- Tag all components as they are removed to aid in reassembly.

Hydraulic Manifold Removal

1. Disconnect the negative battery terminal.
2. Tag and disconnect the solenoid valve leads.
3. Tag and disconnect hydraulic hoses, and IMMEDIATELY cap the openings to prevent contamination.
4. Remove the bolts that hold the manifold to the mounting bracket.
5. Remove the manifold block.

Disassembly

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

Cleaning And Inspection

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

Assembly

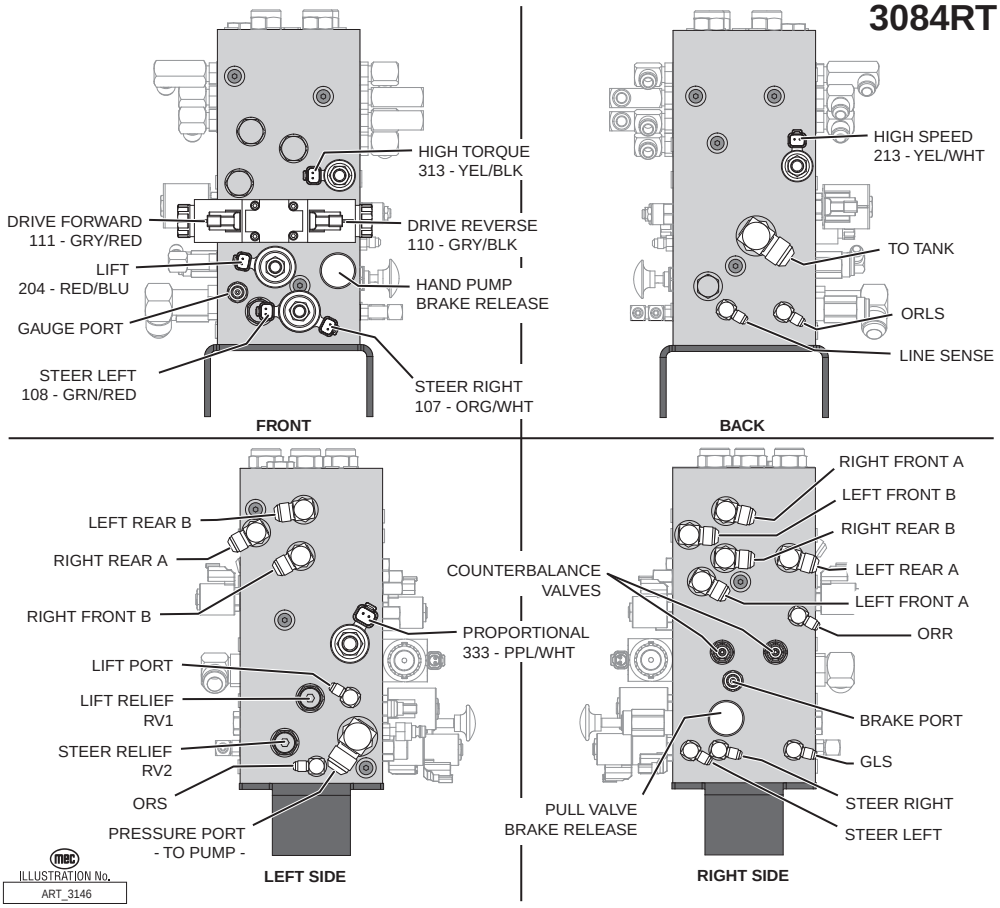
Note: Lubricate all O-rings before installation to prevent damage to the O-ring. Seat balls in manifold block by lightly tapping on the ball with a brass drift punch.

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

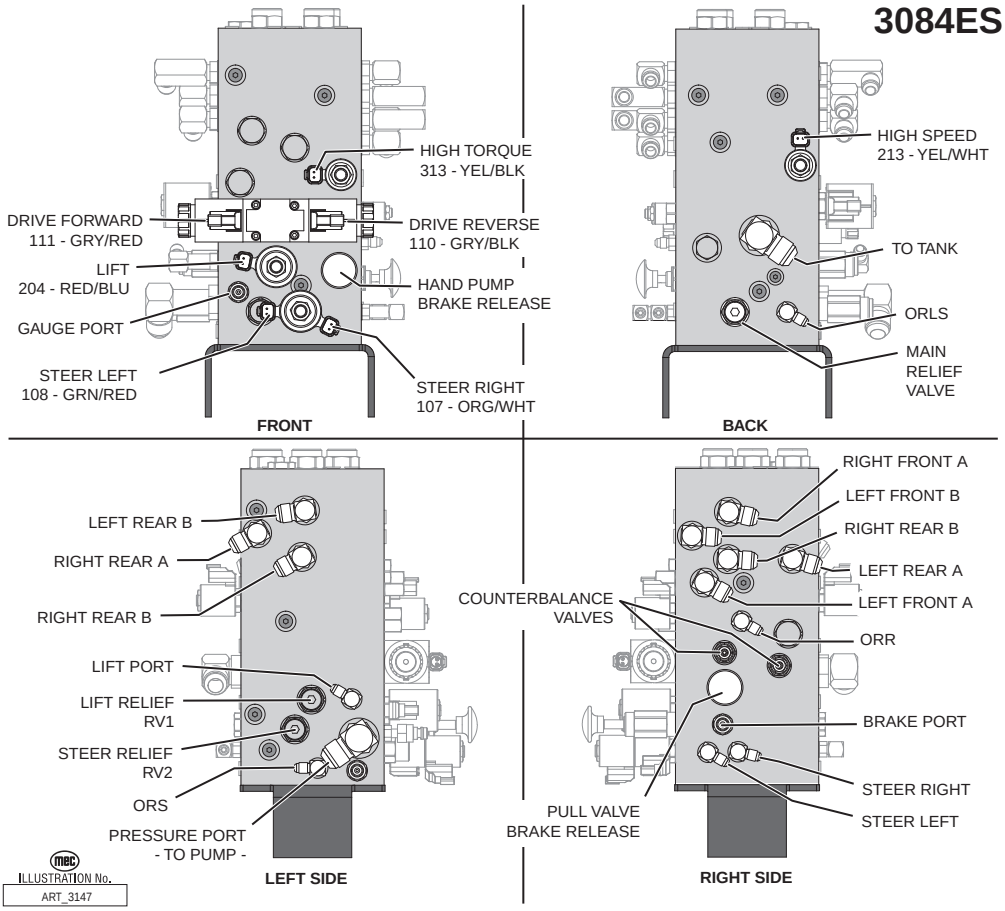
Installation

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

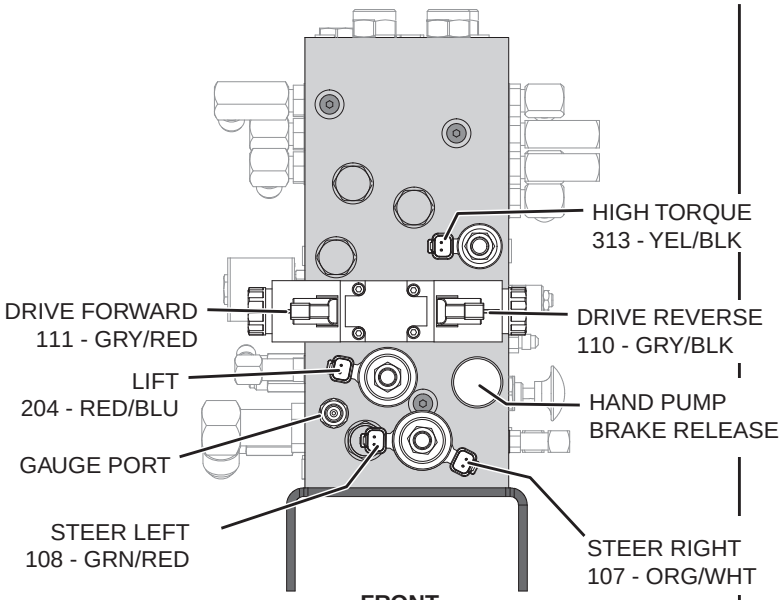
Hydraulic Manifold 3084RT



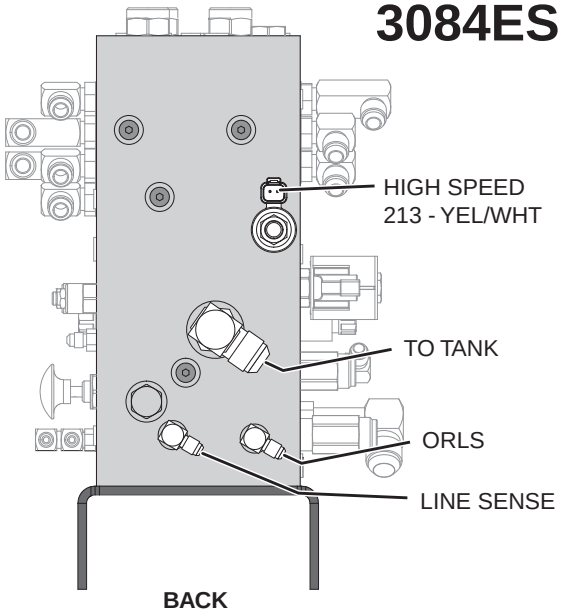
Hydraulic Manifold 3084ES



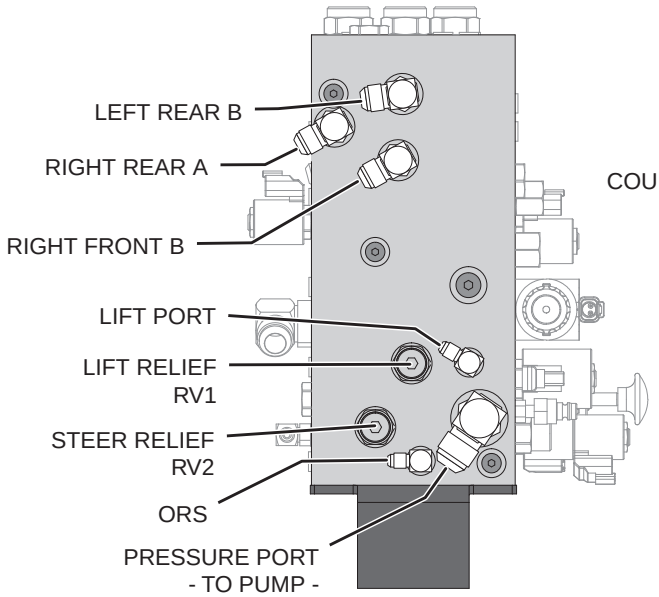
Hydraulic Manifold - Alternate Configuration 3084ES



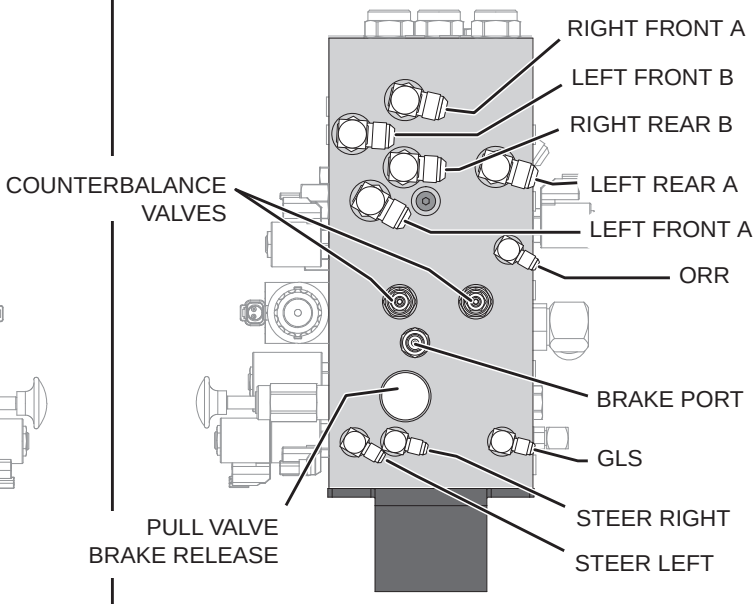
FRONT



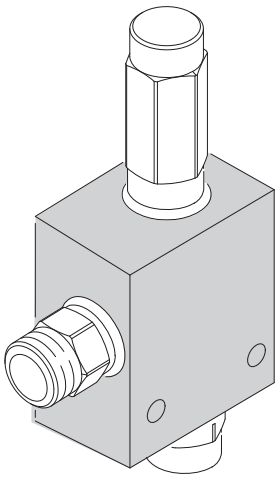
BACK



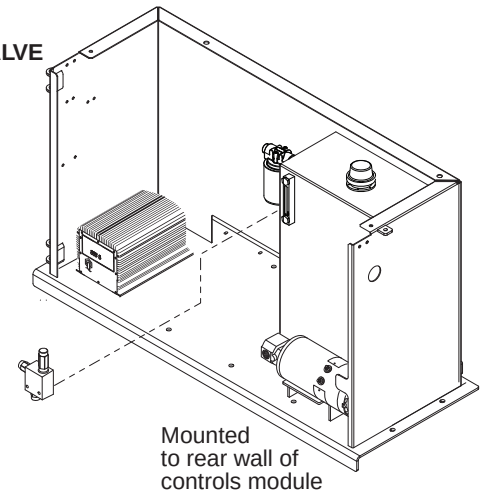
LEFT SIDE



RIGHT SIDE

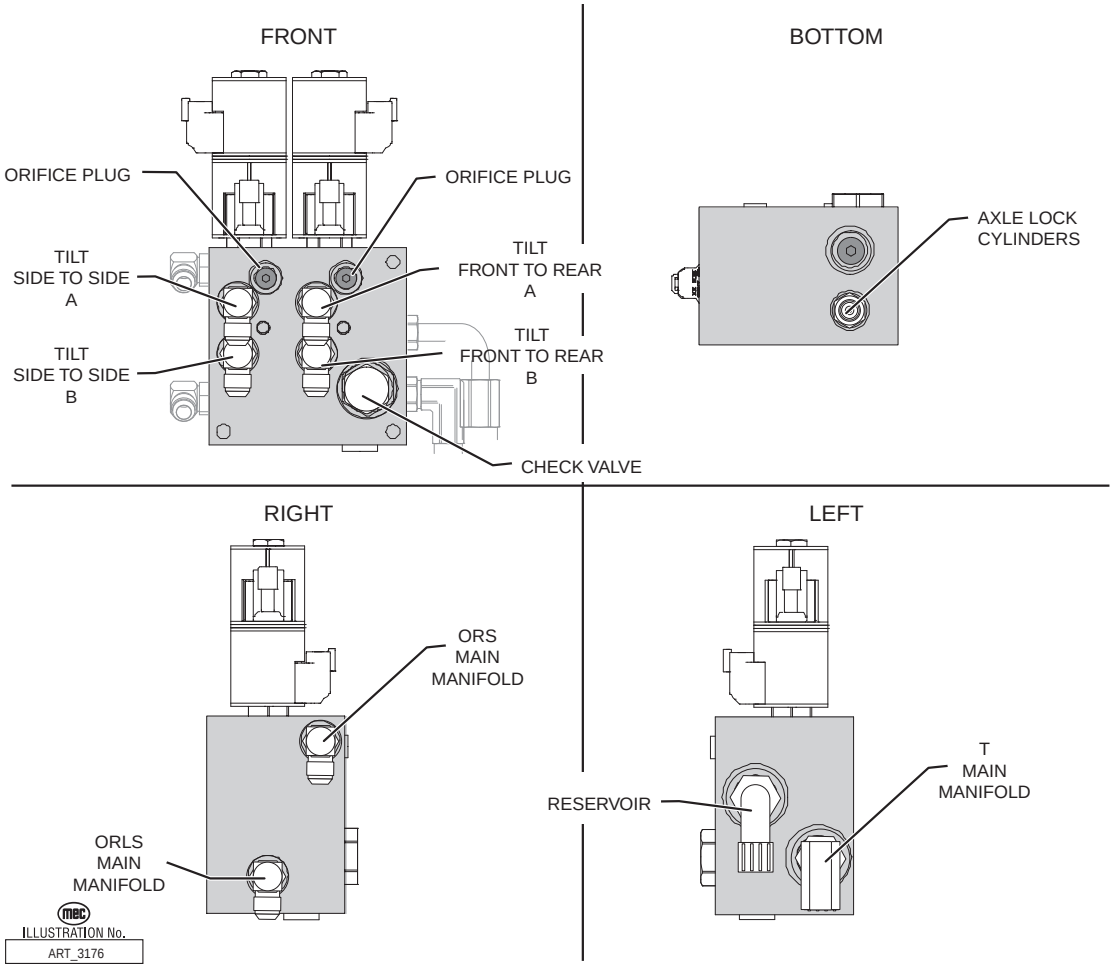


REMOTE MAIN RELIEF VALVE



Mounted to rear wall of controls module

ILLUSTRATION No.
ART_3286


FRONT
BOTTOM
ORIFICE PLUG
ORIFICE PLUG
TILT
SIDE TO SIDE
A
TILT
FRONT TO REAR
A
TILT
SIDE TO SIDE
B
TILT
FRONT TO REAR
B
AXLE LOCK
CYLINDERS
CHECK VALVE
RIGHT
LEFT
ORS
MAIN
MANIFOLD
ORLS
MAIN
MANIFOLD
RESERVOIR
T
MAIN
MANIFOLD
ILLUSTRATION No.
ART_3176

Drive And Brake System Wheel Drive

Note: Refer to Section 7 for Remove and Install instructions. Refer to Parts Section 14.

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

Dynamic Braking Circuit

The two (2) rear wheel motors have integral spring-held brakes. Hydraulic pressure developed in the drive circuit during drive mode releases the brakes. A fixed orifice in the brake circuit controls the brake application to provide a smooth stop.

Front Wheel Motors (DT-701)

Refer to page 31.

Housing And Shaft Disassembly

1. Remove all shaft-related components from the shaft. Secure the motor housing in a vise.
   - Remove the retaining ring from the grove in the pilot of the housing.
   - Remove the spacer from the housing.
   - Remove the shaft from the housing.
   - Remove the bearing, thrust bearing, and two (2) thrust washers from the shaft.
2. Being careful not to drop bearing rollers,
   - Pry out the shaft seal, backup seal, and dust seal from the bearing assembly.

Note: It is not necessary to remove the metal backup ring from the bearing to service the motor.

   - Remove the high pressure seal from the groove in the pilot of the housing.
   - Discard shaft seal, backup seal and high pressure seal.
3. Clean all parts in an oil-based solvent and dry using compressed air.

Housing And Shaft Assembly

1. Apply a light coating of fluid to all new seals prior to installation.
   - Install the high pressure seal into the groove in the pilot of the housing.
2. Place the shaft on a clean, flat surface with the output end facing up.
   - Place the first thrust washer, thrust bearing and second thrust washer over the shaft.
   - Using plastic installation sleeve, place the shaft seal over the shaft with the lip facing down.
   - Repeat for the backup seal, making sure the lip faces down.
   - If the metal backup ring came out in Step 2 above, place it over the shaft with the large O.D. facing down.
   - Lightly grease the bearing and place it over the shaft with the large O.D. facing down.
   - Use an arbor press to carefully press the bearing down to press the seal assembly into the bearing.
3. Place the shaft assembly into the housing.
   - Place the dust seal over the shaft with the lip facing up.
   - Place the bearing spacer and retaining snap ring over the shaft.

Note: It may be necessary to lightly tap the snap ring and bearing spacer to allow the retaining ring to seat properly.

- Replace all shaft-related components (i.e. keys, wire rings, nuts).

Motor Section Disassembly

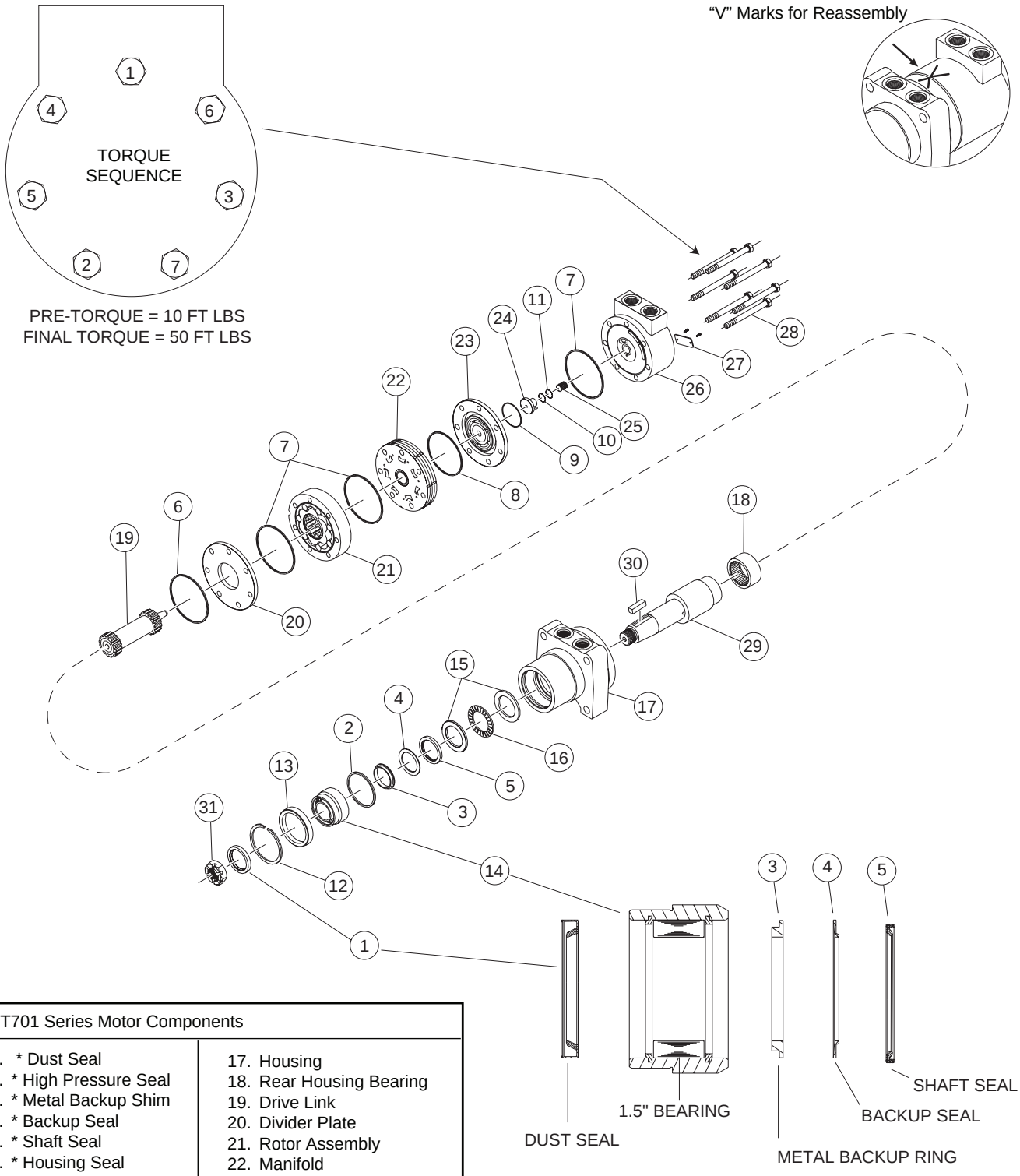
1. Make a “V” shaped set of alignment marks on the end-cover and housing to aid in the reassembly process.
   - Clamp the motor housing in a vise with the shaft facing down.
2. Remove the seven (7) bolts that hold the motor assembly together.
   - Carefully remove the end-cover - be aware that the piston and spring may fall out.
   - Carefully remove the piston from the end-cover and set it aside.
   - Remove and discard the O-ring seal and backup seal.
   - Remove the spring and set it aside.
3. Lift commutator container and commutator from the motor and set aside.
   - Place commutator on a flat, clean surface with the seal facing up.
   - Gently tap on the seal with a small screwdriver until the opposite side of the seal lifts from the groove. Remove the seal and discard.
4. Remove the manifold, rotor set, and divider plate. Remove all seals and discard.

CAUTION Do not allow rollers to drop from the rotor assembly when removing the rotor from the motor.

   - Remove the drive link from the motor and set aside.
5. Clean all parts in an oil-based solvent and dry using compressed air.

Motor Section Assembly

1. Apply a light coating of fluid to all new seals prior to installation.
2. Install the drive link into the end of the shaft with the tapered end facing up.
   - Place the rear housing seal in the groove in the housing.
   - Place the divider plate onto the housing.
   - Place body seals in grooves in both sides of the rotor.
   - Place the rotor onto the housing with the side of the rotor with chamfer in splines facing the housing.
   - Place the manifold over the rotor with the seal-groove side up.
   - Install the manifold seal
3. Install the commutator seal into the commutator with the metal side facing up.
   - Use finger pressure to press the seal down flush with the surface of the commutator.
   - Place the commutator onto the manifold and then place the commutator onto the protruding end of the drive link. Make sure that the seal side is facing up.
4. Install the remaining body seal in the groove on the end-cover.
   - Install the piston spring into the end-cover, then the white backup seal followed by the O-Ring seal.
   - Line up the alignment pin with the hole in the end-cover and press the piston into the endcover.
   - While holding the piston in place, lower the end-cover assembly onto the motor. Align the “V” shaped marks that were made on the housing and end-cover before disassembly.
5. Install the seven (7) assembly bolts.
   - Tighten bolts in sequence (see illustration)
   - Pre-torque to 10 ft. lbs. (13.6 Nm). Final torque to 50 ft. lbs. (67.8 Nm).



DT701 Series Motor Components

1. * Dust Seal
2. * High Pressure Seal
3. * Metal Backup Shim
4. * Backup Seal
5. * Shaft Seal
6. * Housing Seal
7. * Body Seals (3)
8. * Manifold Seal
9. * Commutator Seal
10. * O-Ring Seal
11. * Backup Seal
12. Retaining Snap Ring
13. Bearing Spacer
14. 1.5" Bearing
15. Thrust Washers (2)
16. Thrust Bearing
17. Housing
18. Rear Housing Bearing
19. Drive Link
20. Divider Plate
21. Rotor Assembly
22. Manifold
23. Commutator Assembly
24. Endcover Piston
25. Piston Spring
26. Endcover
27. I.D. Tag Assembly
28. Assembly Bolts (7)
29. Shaft
30. Shaft Key
31. Shaft Nut

*Seal kit components

ILLUSTRATION No.
ART_2548

Rear Wheel Motors With Brakes (DT-710)

Refer to page 34.

Disassembly

1. Make a “V” shaped set of alignment marks on the end-cover and housing to aid in the reassembly process.
   - Clamp the motor housing in a vise with the shaft facing down.
2. Remove the seven (7) bolts that hold the motor assembly together.
   - Carefully remove the end-cover - **be aware that the piston and spring may fall out.**
   - Carefully remove the piston from the end-cover and set it aside.
   - Remove and discard the O-ring seal and backup seal.
   - Remove the spring and set it aside.
3. Lift commutator container and commutator from the motor and set aside.
   - Place commutator on a flat, clean surface with the seal facing up.
   - Gently tap on the seal with a small screwdriver until the opposite side of the seal lifts from the groove. Remove the seal and discard.
4. Remove the manifold, rotor set, and divider plate. Remove all seals and discard.

CAUTION Do not allow rollers to drop from the rotor assembly when removing the rotor from the motor.

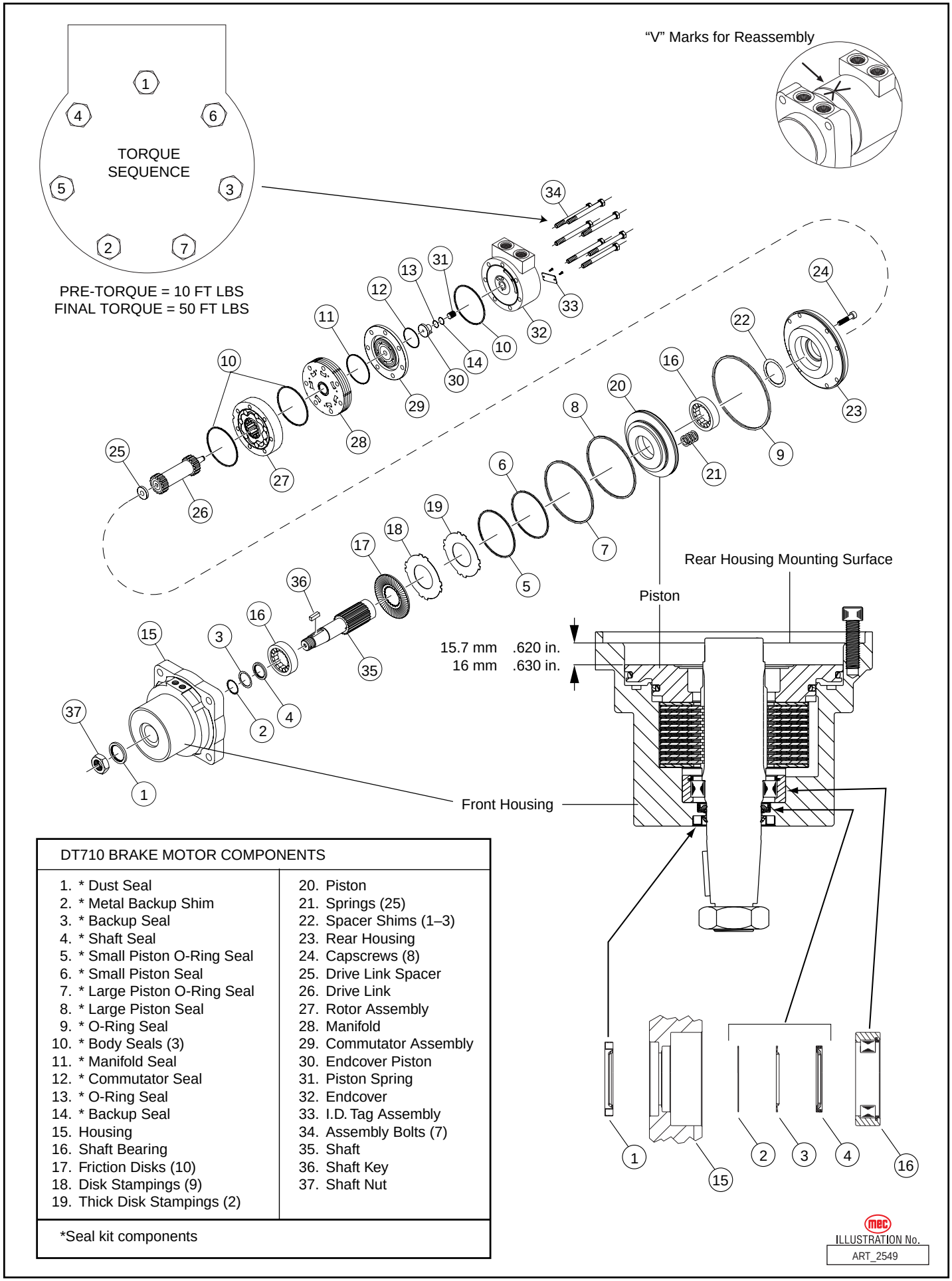
   - Remove the drive link from the motor and set aside.
5. Clean all parts in an oil-based solvent and dry using compressed air.

Assembly

1. Apply a light coating of fluid to all new seals prior to installation.
2. Place the housing on a clean, flat surface with the output end facing up.
   - Install the dust seal with the lip on the seal facing up.
   - Clamp the housing in a vise with the pilot on the housing facing down.
   - Install the metal backup shim into the bore.
   - Install the backup seal into the housing bore with the lip on the seal facing up.
   - Install the shaft seal into the housing bore with the lip on the seal facing up.
   - Refer to illustration for seal orientation.
3. Install the bearing shims (not shown in illustration) in housing.
   - Install housing bearing.
   - Install the shaft being careful not to cut seal lip with the shaft keyway.
4. Locate the 2 thick disk stampings and set them aside.
   - Install one (1) thick disk stamping into the housing. Make sure that lugs or splines engage those in the housing.
   - Install one (1) friction disk engaging splines on the disk with those on the shaft.
   - Alternate disk stampings and friction disks until all disks except the thick disk stamping are installed.
   - Install the second thick disk stamping on top of the disk assembly.
5. Install the small O-Ring seal and large O-Ring seal into corresponding groves in the piston.
   - Install small seal and large seal in corresponding groves over the O-Ring seals.
   - Thoroughly coat the seals and sealing surfaces of the housing with clean fluid.
   - Install the piston into the housing with the large O.D. side facing up.
   - Evenly press the piston down. Be careful not to pinch the seals.

IMPORTANT: If replacing the disks and disk stampings, the new stack must be between .620 and .630 in. thick (15.7 mm and 16 mm) (see illustration).

6. Install spring on top of the piston.
   - Install O-Ring seal in groove in the rear surface of the housing.
   - Install the rear shaft bearing. Make sure that the snap ring that retains the bearing rolls faces out.
   - Place the rear housing onto the front housing and line up bolt holes.
   - Hold the motor assembly together, remove from the vise and place in an arbor press.
   - Press down on the rear housing until it contacts the front housing and lock the press
   - Install eight (8) cap-screws and torque to 45 ft. lbs. (61 Nm).
7. Install the drive link into the end of the shaft with the tapered end facing up.
   - Place the body seals in the grooves in both sides of the rotor.
   - Place the rotor onto the housing with the side of the rotor with the chamfer in the splines facing the housing.
   - Place the manifold over the rotor with the seal groove side up.
   - Install the manifold seal.
8. Install the commutator seal into the commutator with the metal side facing out.
   - Use finger pressure to press the seal down flush with the surface of the commutator.
   - Place the commutator onto the manifold and then place the commutator onto the protruding end of the drive link. Make sure that the seal side is facing up.
9. Install the remaining body seal in the groove on the end-cover.
   - Install the piston spring into the end-cover, then the white backup seal followed by the O-Ring seal.
   - Line up the alignment pin with the hole in the end-cover and press the piston into the endcover.
   - While holding the piston in place, lower the end-cover assembly onto the motor. Align the “V” shaped marks that were made on the housing and end-cover before disassembly.
10. Install the seven (7) assembly bolts.
    - Tighten bolts in sequence (see illustration)
    - Pre-torque to 10 ft. lbs (13.6 Nm).
    - Final torque to 50 ft. lbs (67.8 Nm).



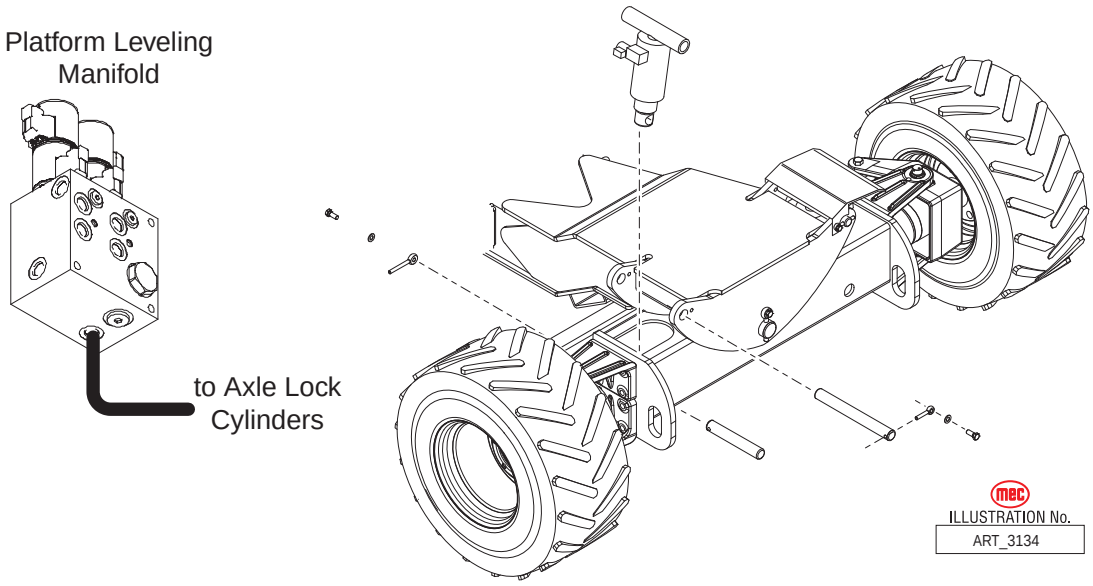
DT710 BRAKE MOTOR COMPONENTS	
1. * Dust Seal	20. Piston
2. * Metal Backup Shim	21. Springs (25)
3. * Backup Seal	22. Spacer Shims (1–3)
4. * Shaft Seal	23. Rear Housing
5. * Small Piston O-Ring Seal	24. Capscrews (8)
6. * Small Piston Seal	25. Drive Link Spacer
7. * Large Piston O-Ring Seal	26. Drive Link
8. * Large Piston Seal	27. Rotor Assembly
9. * O-Ring Seal	28. Manifold
10. * Body Seals (3)	29. Commutator Assembly
11. * Manifold Seal	30. Endcover Piston
12. * Commutator Seal	31. Piston Spring
13. * O-Ring Seal	32. Endcover
14. * Backup Seal	33. I.D. Tag Assembly
15. Housing	34. Assembly Bolts (7)
16. Shaft Bearing	35. Shaft
17. Friction Disks (10)	36. Shaft Key
18. Disk Stampings (9)	37. Shaft Nut
19. Thick Disk Stampings (2)	
*Seal kit components	

ILLUSTRATION No.
ART_2549

Floating Axle Lock Cylinders

Note: Refer to Cylinder Repair.
Refer to Section 7 for Remove and Install instructions.
Refer to the Parts Manual Section 15 for parts list.

There are two (2) cylinders in the floating axle system. These cylinders allow fluid to transfer from one side to the other while the platform is in the stowed position. When the platform is elevated, the electrically operated valve closes, preventing fluid flow and thereby locking the cylinders.

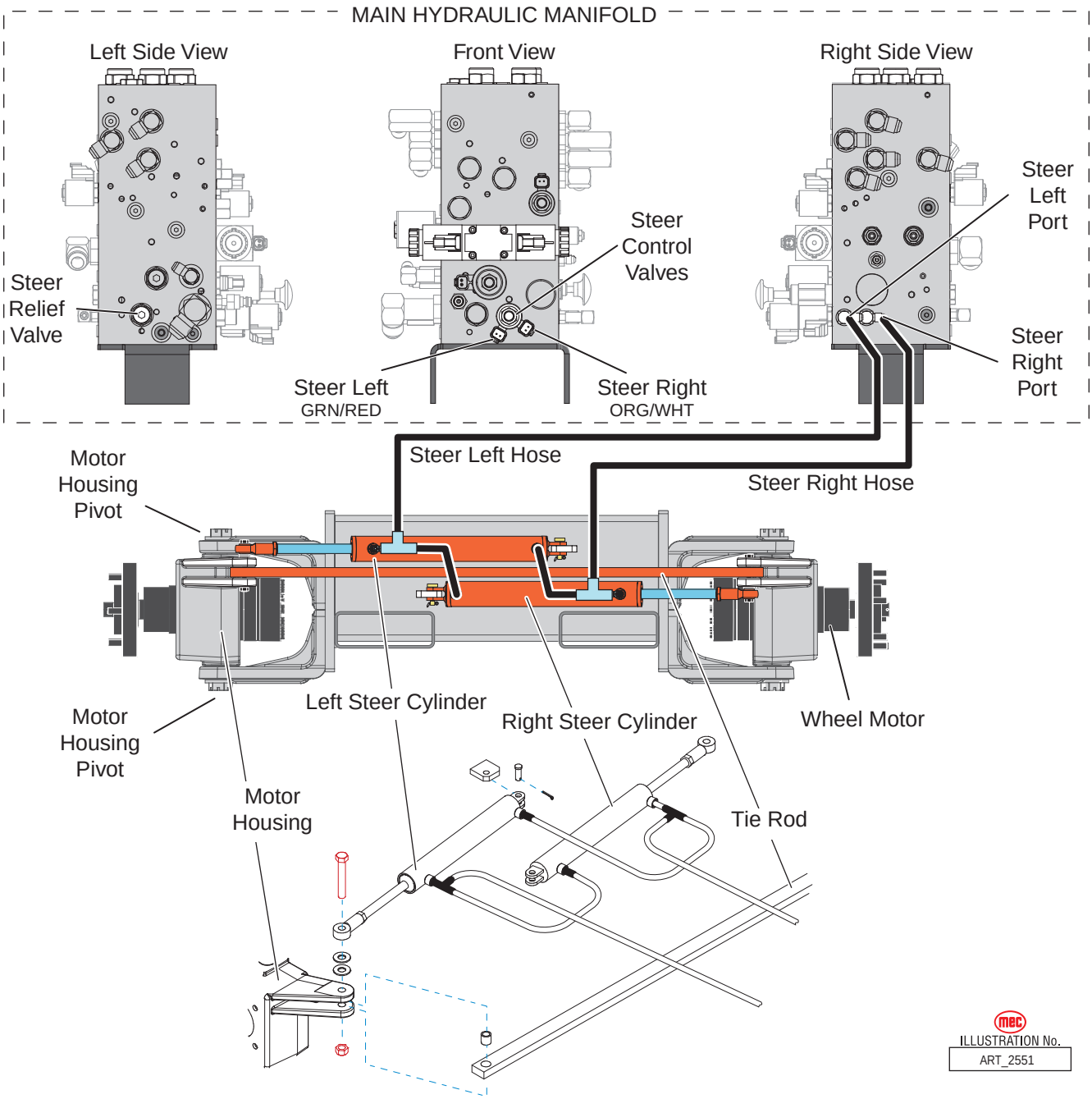


Steering Circuit

Note: Refer to Hydraulic Manifold and Relief Pressure Adjustment Procedure.
Refer to Section 7 for Remove and Install instructions.
Refer to the Parts Manual Section 15 for hose routing.

The steering system consists of the following components:

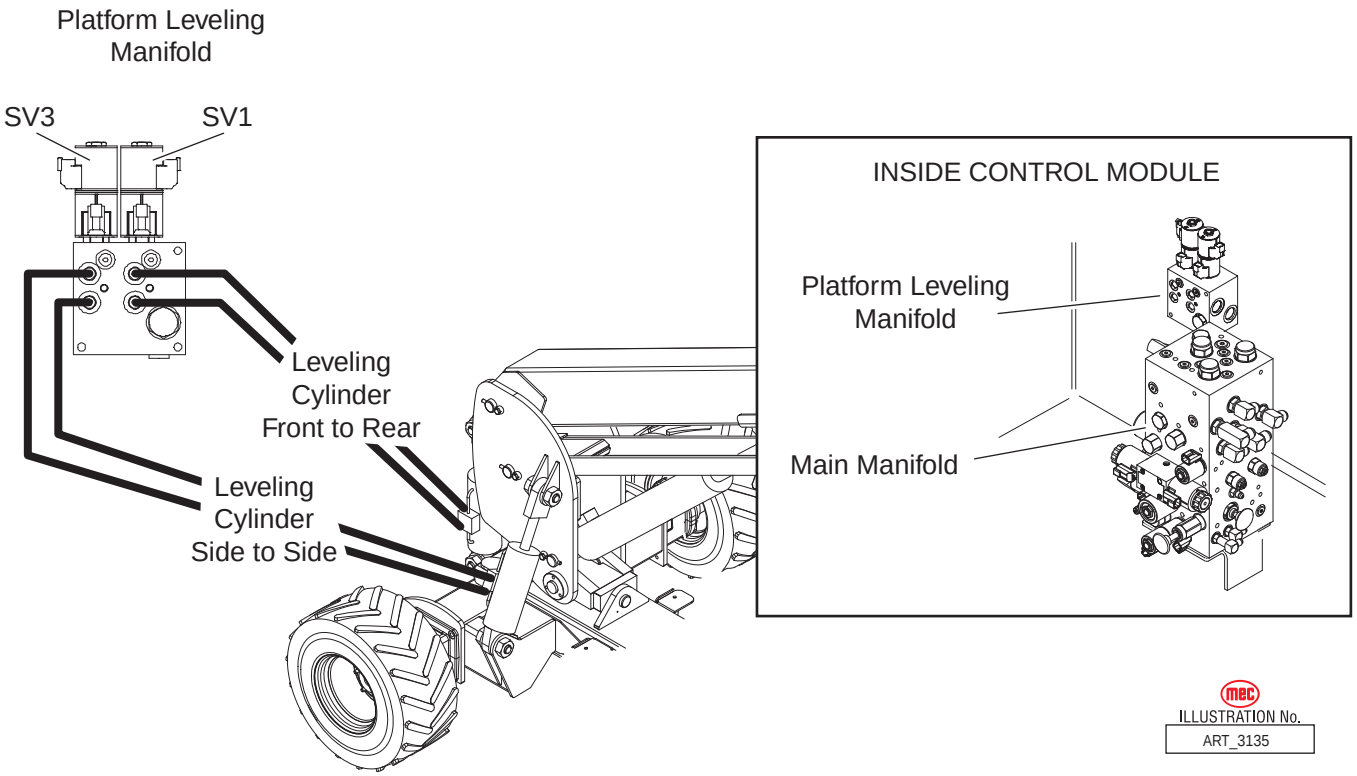
- The wheel motor housings have pivots on the top and bottom, and are mechanically linked together via a tie-rod.
- Steering is accomplished hydraulically by using two (2) double-acting cylinders, and a 4-way 3-position solenoid-operated, hydraulic directional control cartridge valve.
- Maximum steering pressure is limited by the steering relief valve (refer to Relief Pressure Adjustment Procedure).



Platform Leveling System

There are two (2) hydraulic cylinders in the platform leveling system. These cylinders work in conjunction with a pivot mount to allow the platform and boom to tilt front-to-rear and side-to-side in order to provide a level work platform.

Automatic leveling is controlled by the GP400 processor.



Platform Lift Circuit

Note: Refer to Hydraulic Manifold and Relief Pressure Adjustment Procedure.
Refer to Section 7 for Remove and Install instructions.

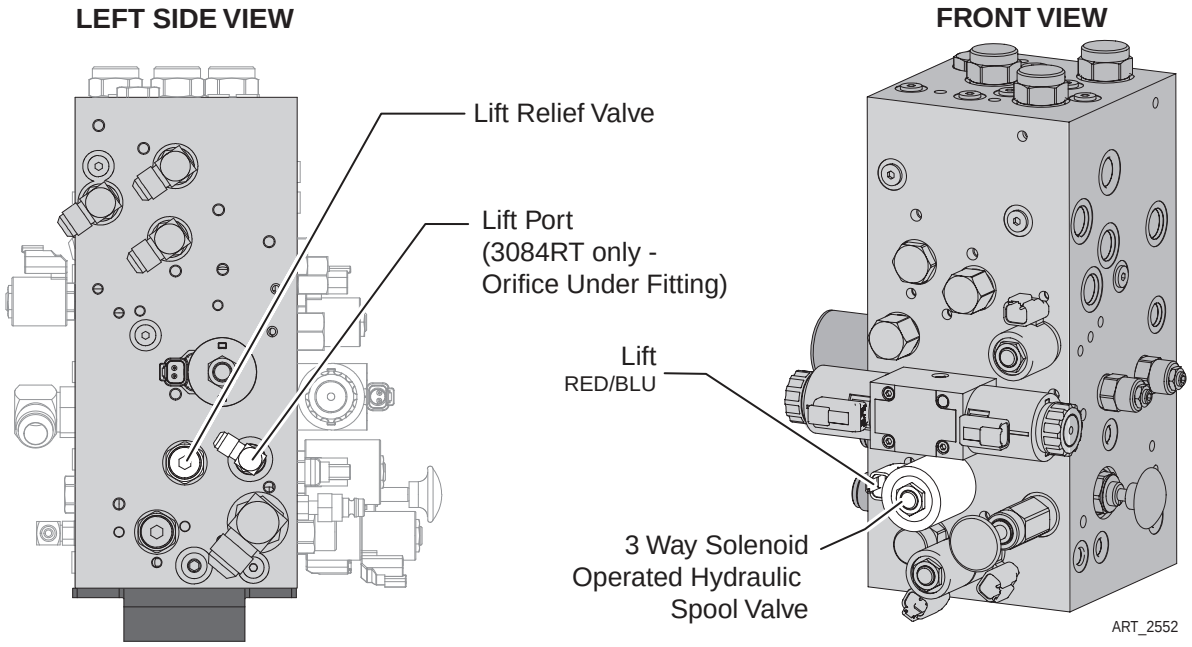
On model 3084RT, the lift system uses the hydraulic pump to obtain proportional lifting function controlled by the lift valve and proportional valve.

On model 3084ES, the lift system uses the electric motor to obtain proportional lifting function controlled by the lift valve.

Lowering is single speed. When lowering, the holding valve on the lift cylinder opens allowing gravity to lower the platform. Lowering speed is regulated by a fixed orifice located on the lift cylinder.

ANSI: Platform capacity is limited by a hydraulic relief valve in the lift circuit. (Refer to Machine Specifications or the Hydraulic Schematic for proper setting).

CE: Lift capacity is controlled by the Overload System.



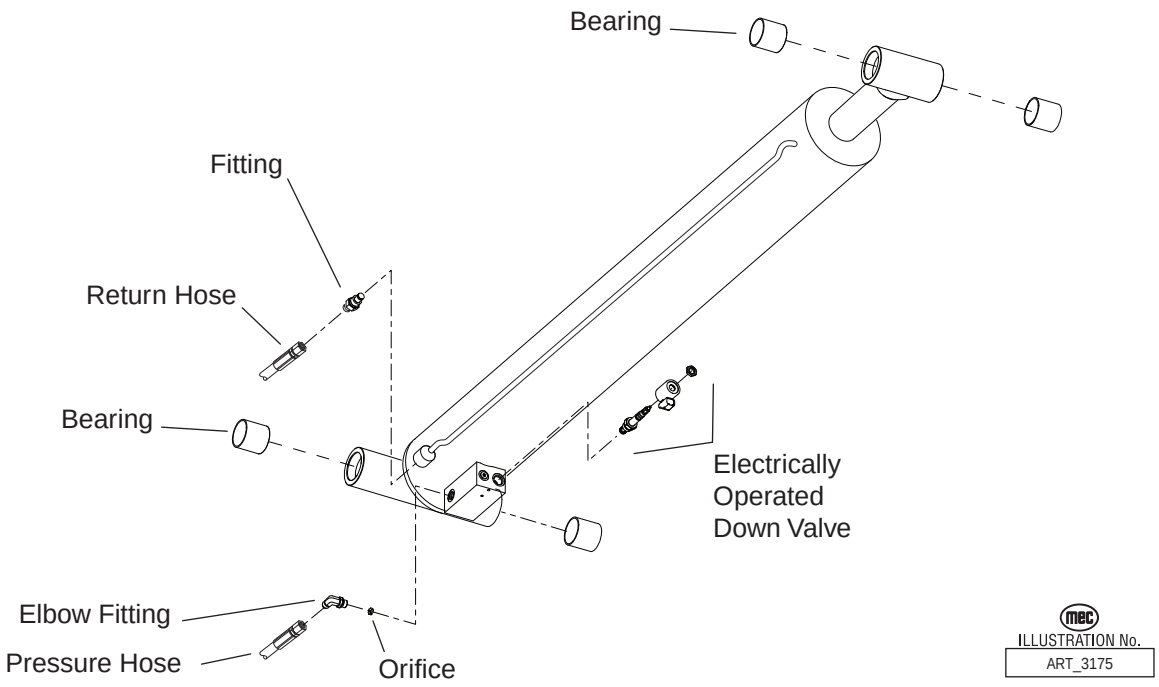
Lift Cylinder

Note: Refer to Cylinder Repair.

One (1) single acting type hydraulic cylinder.

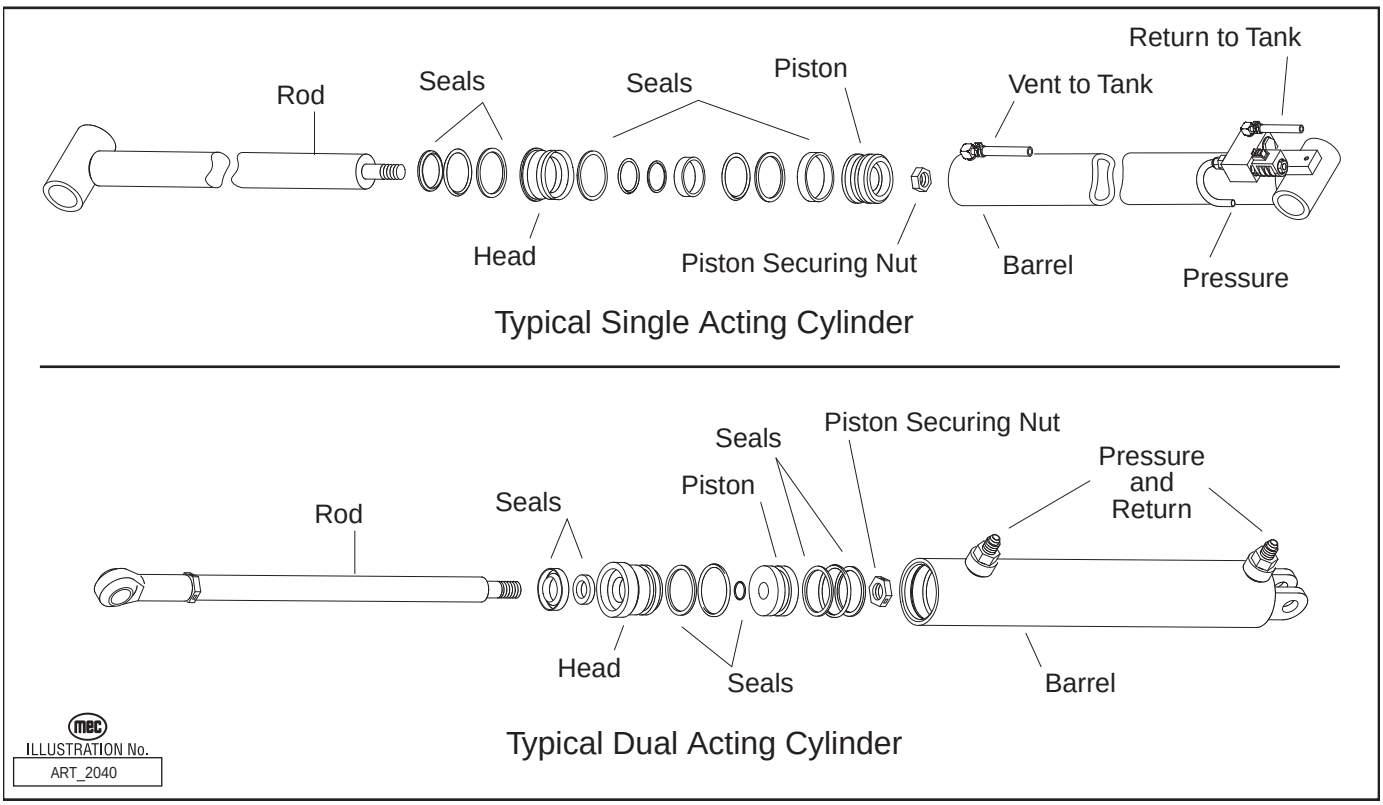
The cylinder has an integrated 2-position, 2-way solenoid operated platform lower valve for holding the platform in position. The valve is also electrically actuated via a toggle switch for manually lowering the platform.

The normally-closed holding valve prevents retraction of the cylinder rod should a hydraulic line rupture or a leak develop between the cylinder and its related control valve.



General Cylinder Repair

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



Removal

Note: Refer to Section 7 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 8.

Preparation

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

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

Cylinder Disassembly

1. Remove the head from the cylinder body.
2. Remove the shaft assembly from the barrel, pulling in a straight line, so as not to scar the internal parts.

3. Insert shaft into a **soft jawed** vise so that the head and piston can be removed. Be sure the shaft and vise are both clean before using.
4. Remove nut at the end of the shaft and pull head and piston off of the rod.
5. Remove all seals from the head and piston using a non-sharp seal tool. These tools are available from various seal suppliers.
6. Clean all fluid and debris off of the head, piston, shaft, collar and barrel using solvent, rags, and an air hose.
7. Inspect parts for scratches, pits or polishing. Check seal groves and sealing surfaces.
   - Scratches or pits deep enough to catch the fingernail are unacceptable; replace the cylinder.
   - 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 insure 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.

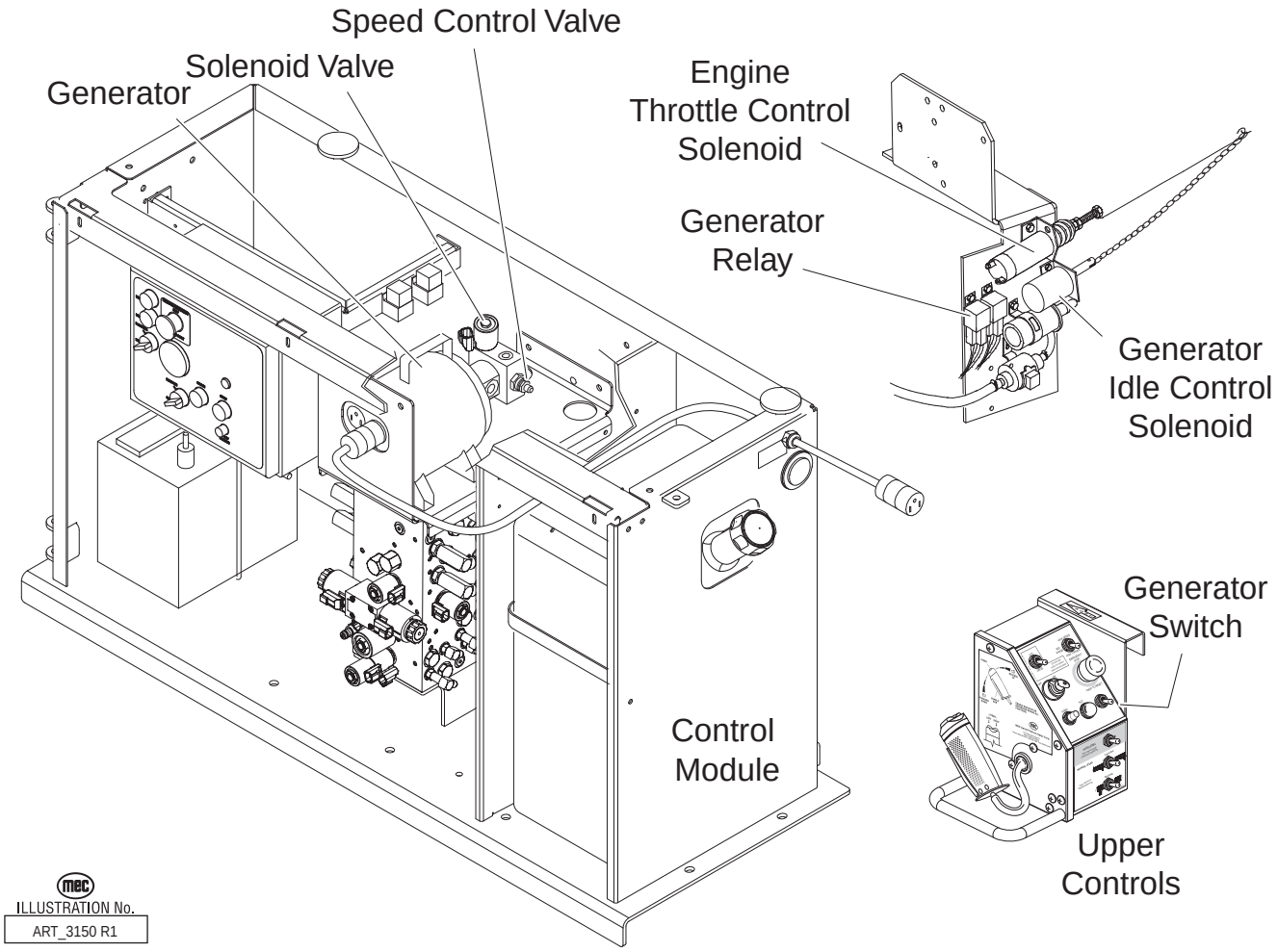
1. Lubricate all components with clean hydraulic fluid.
2. Install new seal kit components. Install all seals on the head and piston using the non-sharp seal tool.
3. Place a small amount of fluid on the inside head seals. Reinstall the head on the shaft by slipping head over the piston end of the shaft. 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 Nm).
6. Grease the outside seals of the head and piston.
7. Reinstall the shaft into the barrel of the cylinder and push in until groove of the head lines up with the slot in the barrel.
8. Reinstall the cylinder retainer. Installation is reverse of removal.
9. 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.

Generator Option - 3084RT

Note: Refer to Parts Sections 15 and 16.

This option is available only on model 3084RT.

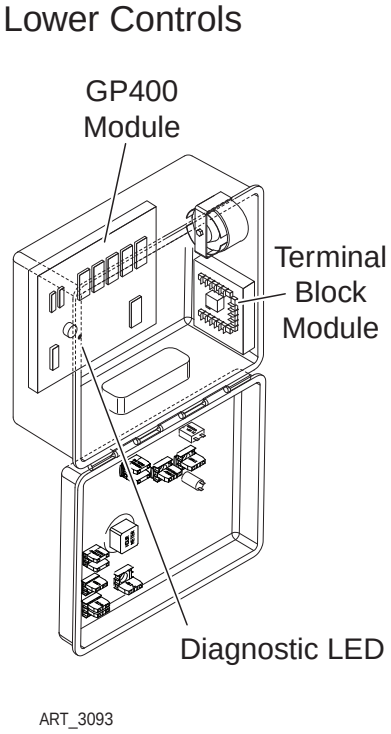


Electrical System – General

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

Lower Controls

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



Upper Controls

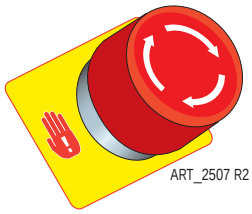
The upper controls will operate all functions including drive, steer, lift, and lower. A momentary bi-directional rocker switch on the joystick provides the steering function. The control system for operation of drive, steer, lift, and lower are electric-over-hydraulic type. The drive system is a proportional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

Emergency Stop

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

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





Note: Both switches must be set or the machine will not operate. The electric Emergency Lowering switch will continue to function when the Emergency Stop switches are depressed.

Emergency Lowering

The machine utilizes a toggle switch to open the down valve on the lift cylinder, allowing hydraulic fluid to return to the hydraulic reservoir at a controlled rate.

Diagnostic LED

If the machine fails to operate, inspect the GP400 Module located inside the control box. The LED located on the processor should be ON. If the LED is OFF or FLASHING, refer to Section 8 or 9 for Troubleshooting.

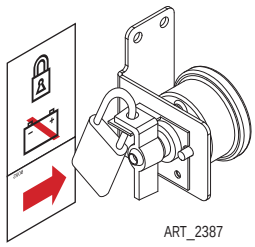
Start Delay Light - 3084RT

The START DELAY light is located on the Lower Control box (see page 48).

- The machine is equipped with a start system protective device, controlled by the GP400. This protects the starter and related parts from damage caused by overcranking in hard starting situations.
- Maximum starter operation time is 10 seconds.
- If no start, the START DELAY light will illuminate and the starter will be disabled for 35 seconds.
- When the START DELAY light goes OFF the starter will operate.

Battery Disconnect Switch

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



Batteries

CAUTION

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

WARNING

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

ALWAYS WEAR SAFETY GLASSES WHEN WORKING WITH BATTERIES.

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

REPLACE ONLY WITH MANUFACTURER-APPROVED BATTERIES.

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

3084RT One (1) battery (12 Volts DC) supplies the electrical power required to start the engine and operate the electrical circuits.

3084ES Eight (8) batteries (6 Volts DC) supply power required to operate the machine.

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 (100%) charged 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:

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

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

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

Battery Specific Gravity and Voltage

Specific Gravity		Volts DC		
	Each Cell	Per Cell	6V Battery	12V Battery
Fully Charged	1.280	2.10	6.30	12.60
Fully Discharged	1.130	1.75	5.19	10.50

Battery Replacement

WARNING

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

CAUTION

Prevent damage to the battery and/or electrical system;

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

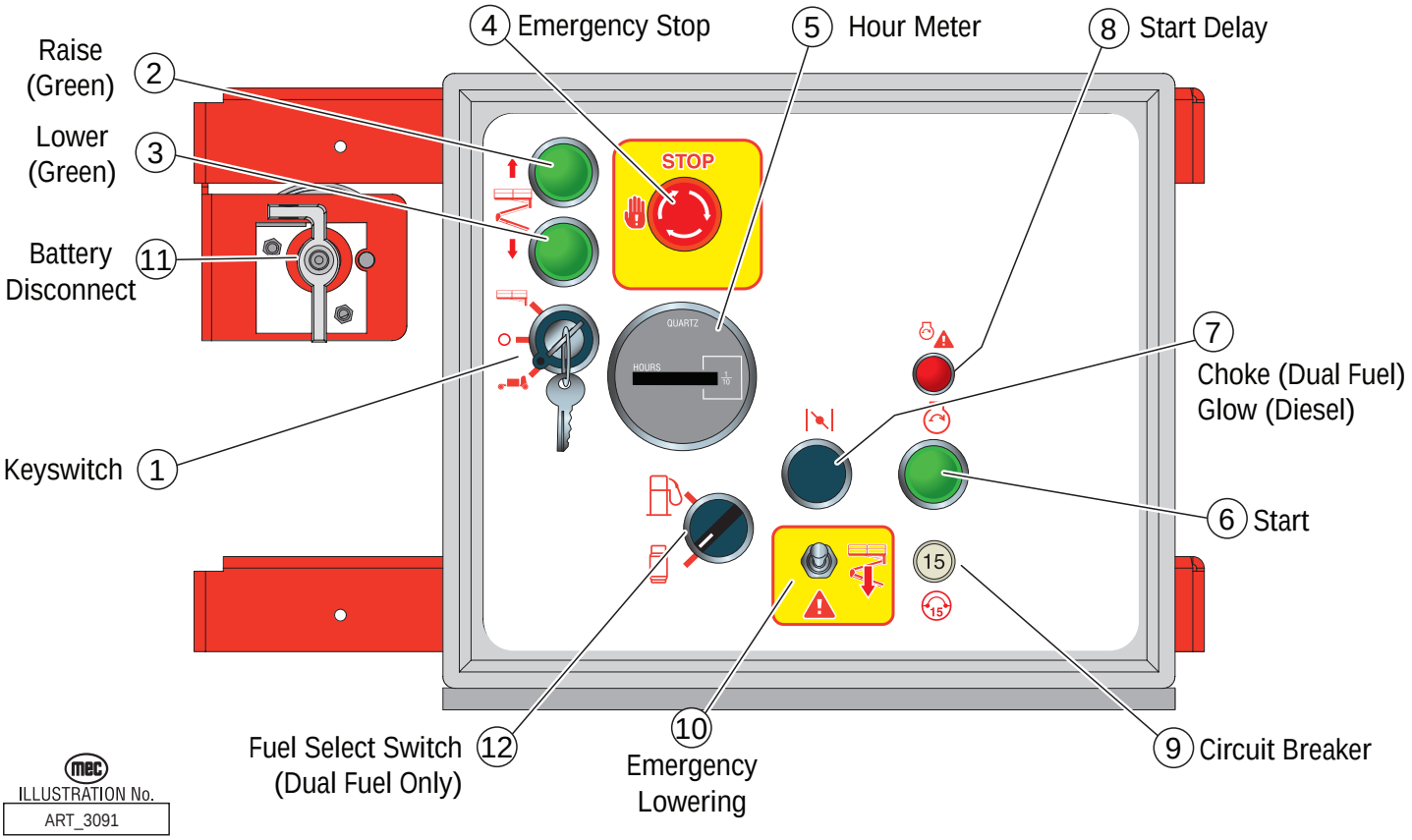
To Remove A Battery;

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

To Install A Battery;

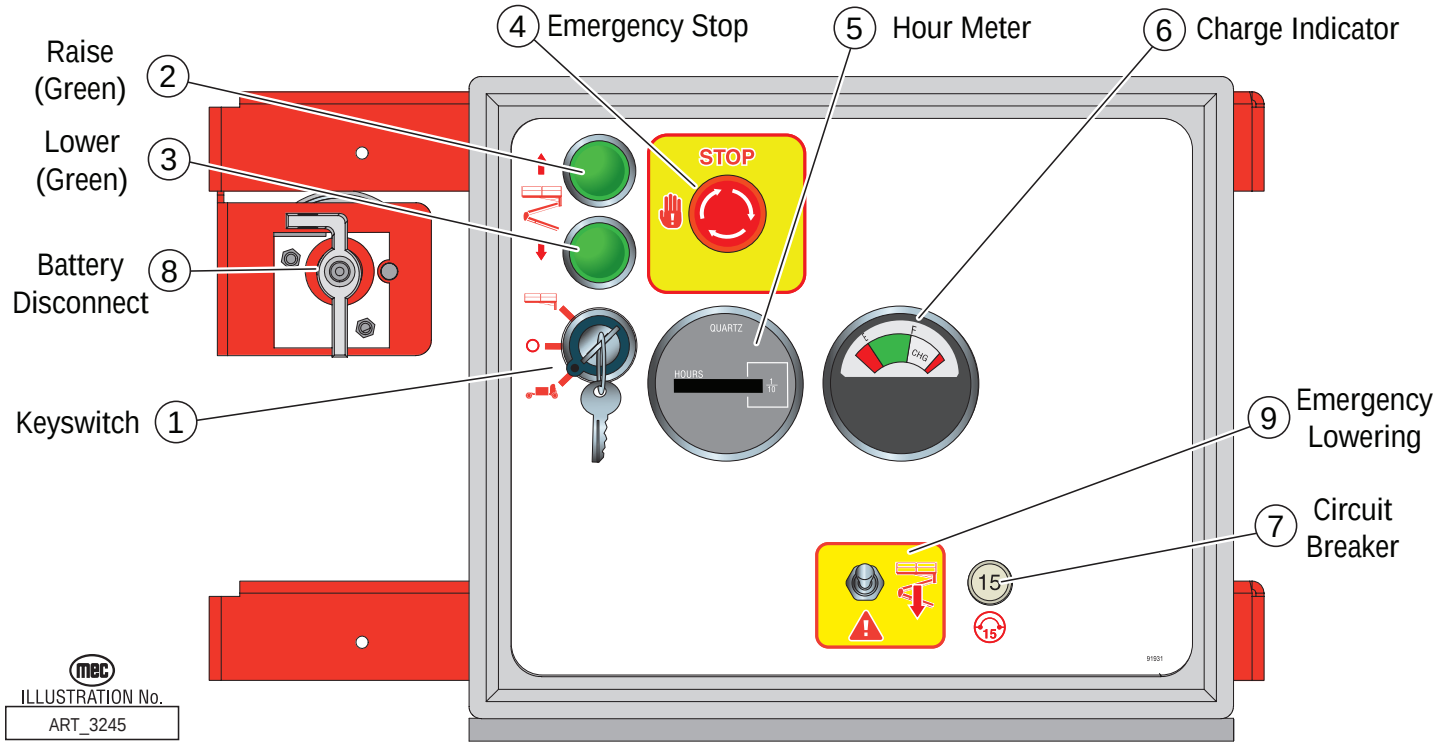
1. Position the battery in the compartment and secure with hold-down hardware.
2. Connect battery cables.

Lower Controls - 3084RT Dual Fuel/Diesel



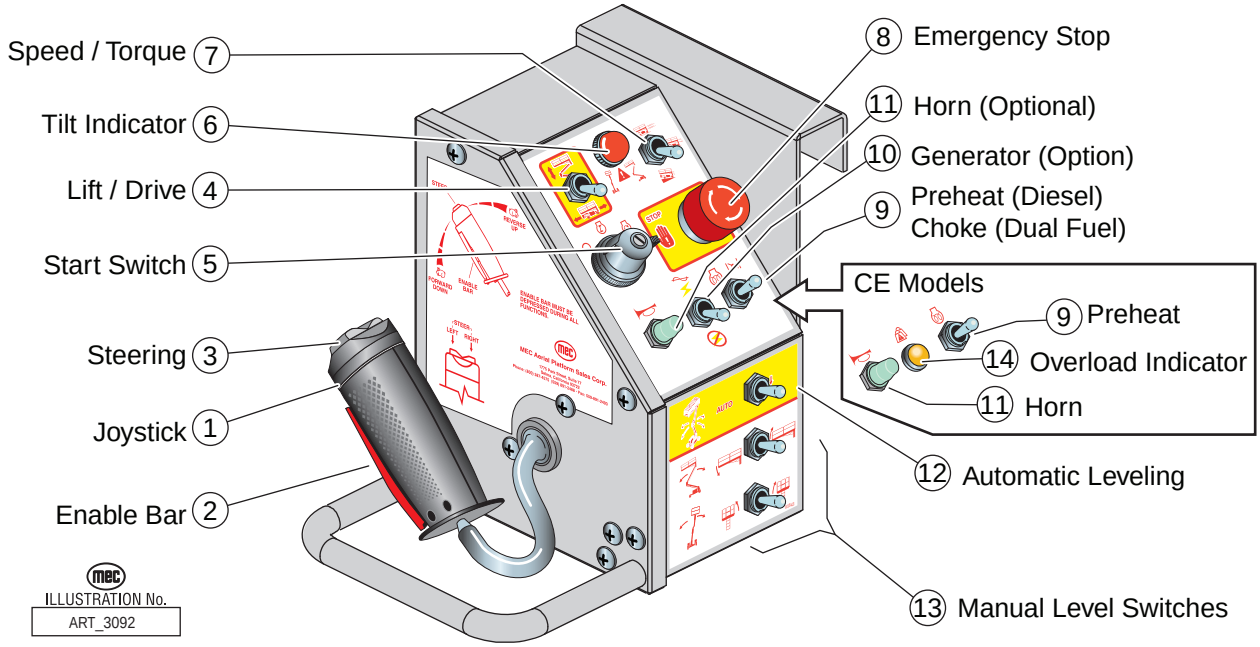
Control		Description	
1	Selector Switch (Key Can Be Removed In Any Position)	Platform	Select to operate from the platform control panel.
		Base	Select to operate from the base control panel.
		Off	Select to stop operation from either control panel.
2	Raise Button	Press and hold to elevate the platform. Release to stop elevation. Throttle activation is automatic.	
3	Lower Button	Press and hold to lower the platform. Release to stop lowering.	
4	Emergency Stop Switch	Press to stop all machine functions. Turn clockwise to reset.	
5	Hour Meter	Indicates total elapsed time of machine operation.	
6	Start Button	Press to start engine. Release when engine starts.	
7	Choke/glow	Operate when starting in cold start conditions.	
8	Start Delay Light	Prevents over-cranking of engine. When lit, starter is disabled. After approximately 35 seconds the light will go out and starter will operate.	
9	Circuit Breaker	Trips when there is excessive electrical load. Push to reset.	
10	Emergency Lowering Switch	Push and hold the toggle switch Down to fully lower the platform.	
11	Battery Disconnect	Battery power supply. Turn OFF and padlock to secure machine from unauthorized use.	
12	Fuel Selector (Dual Fuel Only)	Turn switch to select Gasoline or Propane.	

Lower Controls - 3084ES Electric



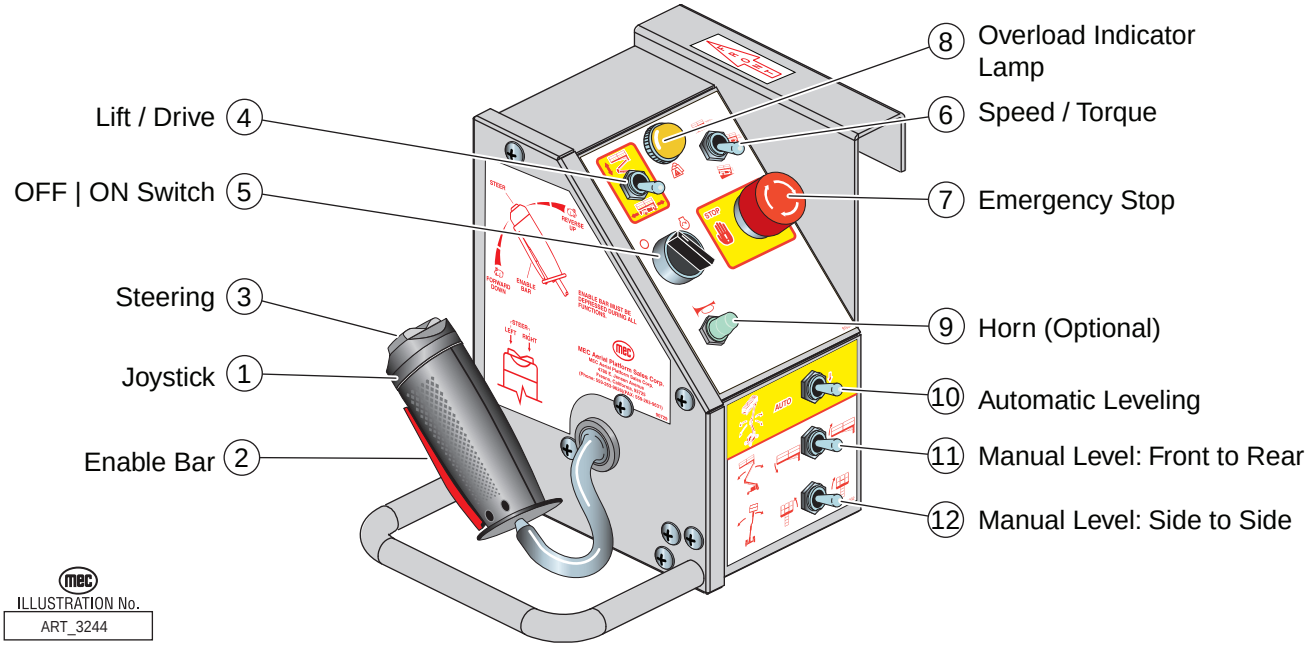
Control		Description	
1	Selector Switch (Key Can Be Removed In Any Position)	Platform	Select to operate from the platform control panel.
		Base	Select to operate from the base control panel.
		Off	Select to stop operation from either control panel.
2	Raise Button	Press and hold to elevate the platform. Release to stop elevation. Throttle activation is automatic.	
3	Lower Button	Press and hold to lower the platform. Release to stop lowering.	
4	Emergency Stop Switch	Press to stop all machine functions. Turn clockwise to reset.	
5	Hour Meter	Indicates total elapsed time of machine operation.	
6	Charge Indicator	Indicates state of battery charge.	
7	Circuit Breaker	Trips when there is excessive electrical load. Push to reset.	
8	Battery Disconnect	Battery power supply. Turn OFF and padlock to secure machine from unauthorized use.	
9	Emergency Lowering Switch	Push and hold the toggle switch Down to fully lower the platform.	

Upper Controls - 3084RT Dual Fuel/Diesel



Control		Description	
1	Joystick	Drive	Controls Forward and Reverse travel at variable speeds.
		Lift	Move toward operator to elevate platform. Lift speed increases proportional to the joystick movement. Will not function if TILT light is ON. Move away from operator to lower platform. Speed is fixed.
2	Enable Bar	Squeeze to enable DRIVE, STEER, and LIFT from joystick.	
3	Steering Switch	Using thumb, press and hold the rocker switch to steer Left or Right.	
4	Lift/drive Selector	Select LIFT or DRIVE function for joystick.	
5	Start Switch	Turn to start engine. Switch will return to RUN position for normal operation. Turn to OFF to shut engine down. Anti-restart switch must be turned OFF before attempting to start.	
6	Tilt Indicator Light	Light ON indicates platform out of level. Platform will not elevate when TILT light is ON.	
7	Speed / Torque Switch	High Torque	Slow speed. Provides maximum torque for rough terrain and climbing.
		Mid Range	Mid speed. Provides medium torque for smooth to moderate terrain.
		High Speed	Provides high speed when platform height is below 10 feet (3 m).
8	Emergency Stop Switch	PUSH to stop all machine functions. TURN CLOCKWISE to reset.	
9	Choke/preheat	Operate when starting in cold start conditions.	
10	Generator (Option)	Turn switch ON to engage optional AC generator. Drive and Lift are disabled while the generator is on.	
11	Horn (Option)	Press to sound warning horn.	
11	Automatic Level Switch	Move switch DOWN and hold until automatic leveling is complete. Tilt Light will turn OFF when platform is level.	
12	Manual Level Switch Front To Rear	Move switch to the left to LOWER the front of the platform. Move the switch to the right to RAISE the front of the platform.	
13	Manual Level Switch Side To Side	Move the switch to the left to move the platform to the LEFT. Move the switch to the right to move the platform to the RIGHT.	
14	Overload Indicator	Platform overloaded when light is ON. Alarms will sound in Upper and Lower Control boxes.	

Upper Controls - 3084ES Electric



Control		Description	
1	Joystick	Drive	Controls Forward and Reverse travel at variable speeds.
		Lift	Move toward operator to elevate platform. Lift speed increases proportional to the joystick movement. Will not function if TILT light is ON. Move away from operator to lower platform. Speed is fixed.
2	Enable Bar	Squeeze to enable DRIVE, STEER, and LIFT from joystick.	
3	Steering Switch	Using thumb, press and hold the rocker switch to steer Left or Right.	
4	Lift/Drive Selector	Select LIFT or DRIVE function for joystick.	
5	Off/On Switch	Turn power ON or OFF at the platform. Does not affect lower controls.	
6	Tilt Indicator Light	Light ON indicates platform out of level. Platform will not elevate when TILT light is ON.	
6	Speed / Torque Switch	High Torque	Slow speed. Provides maximum torque for rough terrain and climbing.
		Mid Range	Mid speed. Provides medium torque for smooth to moderate terrain.
		High Speed	Provides high speed when platform height is below 10 feet (3 m).
8	Emergency Stop Switch	PUSH to stop all machine functions. TURN CLOCKWISE to reset.	
9	Choke/Preheat	Operate when starting in cold start conditions.	
10	Generator (Option)	Turn switch ON to engage optional AC generator. Drive and Lift are disabled while the generator is on.	
11	Horn (Option)	Press to sound warning horn.	
11	Automatic Level Switch	Move switch DOWN and hold until automatic leveling is complete. Tilt Light will turn OFF when platform is level.	
12	Manual Level Switch Front to Rear	Move switch to the left to LOWER the front of the platform. Move the switch to the right to RAISE the front of the platform.	
13	Manual Level Switch Side to Side	Move the switch to the left to move the platform to the LEFT. Move the switch to the right to move the platform to the RIGHT.	
14	Overload Indicator	Platform overloaded when light is ON. Alarms will sound in Upper and Lower Control boxes.	

Alarms And Switches

Movement Alarm

The Movement Alarm is activated as soon as the DOWN operation is activated from either control station. This is the default setting. If desired, the movement alarm setting can be modified to activate the alarm during other functions (refer to Section 8 or 9 for Troubleshooting).

WARNING

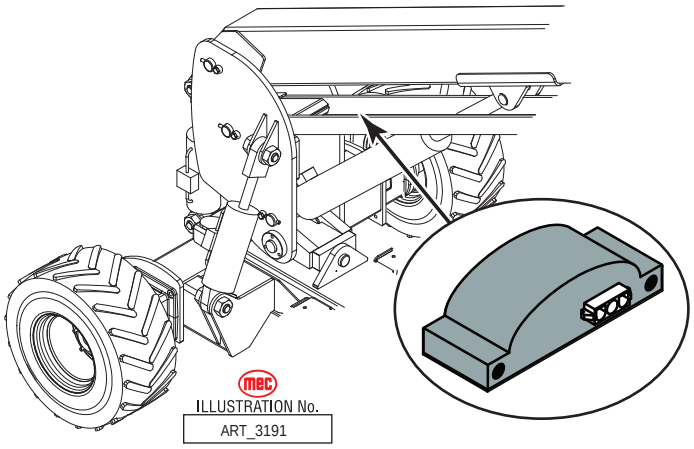
THE MOVEMENT ALARM IS PROVIDED FOR YOUR PROTECTION, AND PROTECTION OF PERSONS WORKING IN THE IMMEDIATE AREA. DISABLING THIS IMPORTANT SAFETY DEVICE MAY RESULT IN SERIOUS INJURY OR DEATH.

EZFit Angle Sensor

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

- Disable tilt operation.
- Enable tilt sensor cutout operation.
- Reduce drive speed.

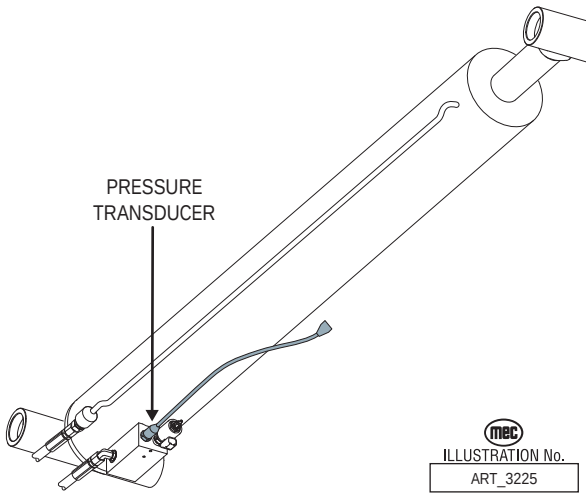
On CE models, the Angle Sensor works in conjunction with the Pressure Transducer and a second redundant Angle Sensor located beside the first.



Pressure Transducer (CE Only)

The Pressure Transducer provides lift cylinder pressure information to the GP400. It works in conjunction with the Angle Sensor. Excessive pressure indicates platform overload. When the GP400 reads a certain output from the angle sensor it will:

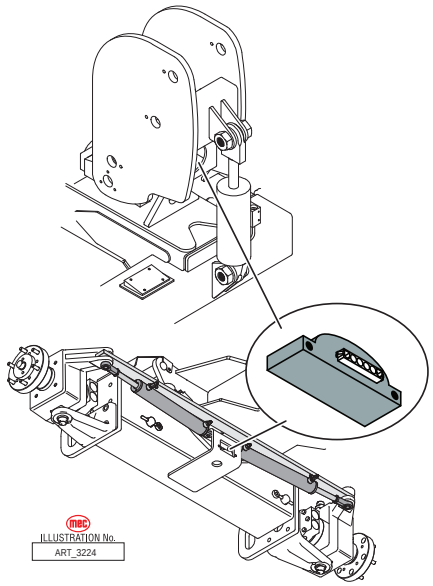
- Disable lift, lower and drive operation.
- Sound audible alarms.
- Turn ON the OVERLOAD light on the upper control panel.



CAN Tilt Angle Transducer

Provides level information to GP400.

- **Platform Level** located on the mast assembly, accessible through the rear of the mast. Provides platform level information to the GP400 through the CAN-bus system.
- **Axle Level** located on the front axle near the steer cylinder mount. Provides axle position information to the GP400 through the CAN-bus system.



Relays - 3084RT Only

Relays are located on the engine inside the power module. These relays reduce the current flow through the GP400 Control Module. Refer to the Section 10 for relay functions and interconnect.

Start Relay

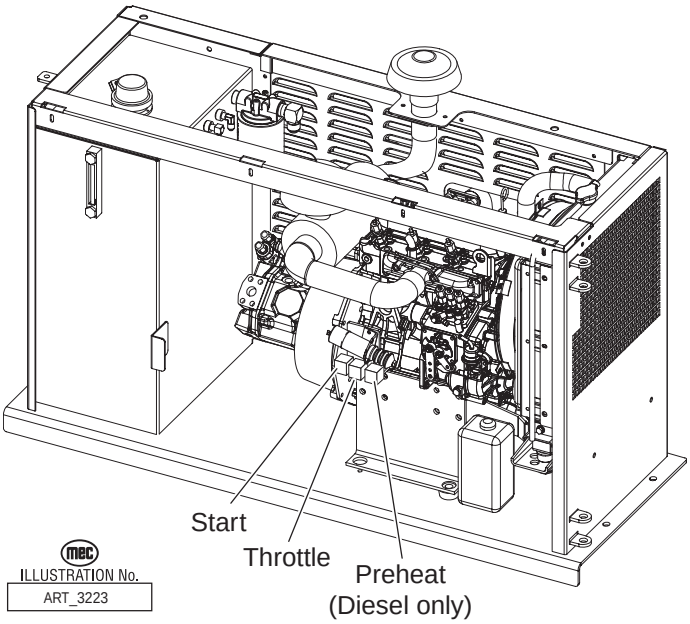
- Provides power to the starter solenoid.

Throttle Relay

- Provides power to the electric throttle solenoid.

Preheat Relay (Diesel Only)

- Provides power to the diesel engine glow plugs.



Deutsch Connectors

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

Male Plug Connector

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

Female Receptacle Connector

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

Locking Fingers

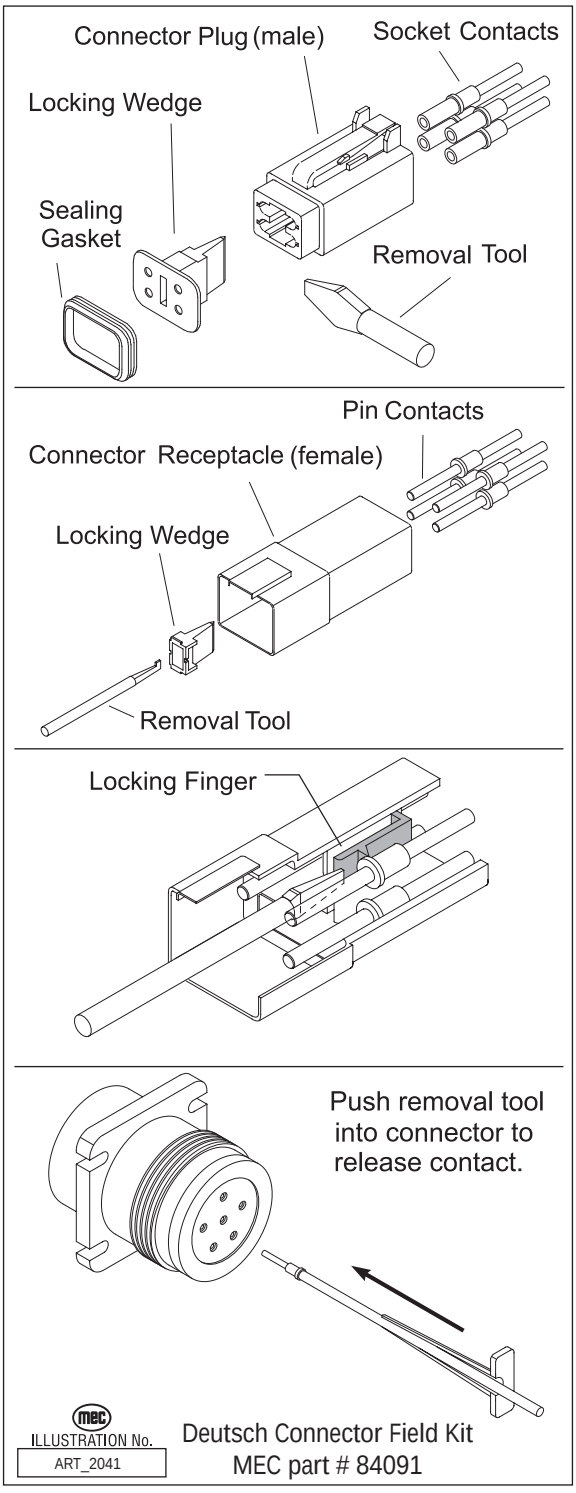
- Remove the locking wedge as outlined above.
- Using the removal tool or a flat blade screwdriver, push the Locking Fingers aside to release the contact.
- Pull the wire and contact out of the connector.

Heavy Duty Plug

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

Crimping

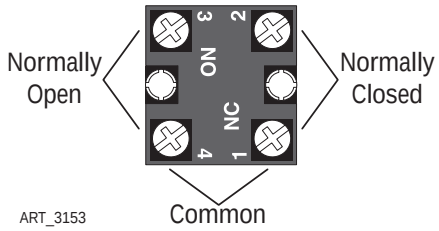
- Strip 1/4 in. (6 mm) insulation from the wire.
- Insert the contact into the crimping tool and insert the stripped wire into the contact making sure no wires are outside the contact barrel.
- Close the handles of the crimping tool, then release the handles to remove the crimped contact.



Continuity Checks

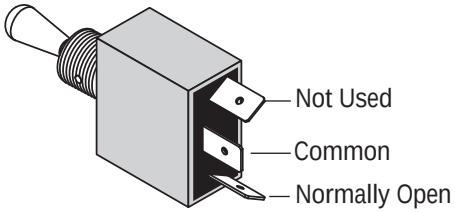
Selector Switch – On-Off

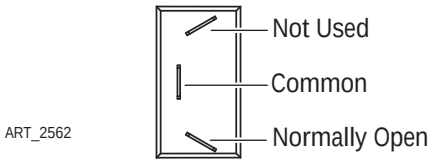
- Disconnect wires.
- Connect first probe of ohm meter to *common* terminal.
- Connect second probe to any normally open terminal.
- With switch OFF (open) there should be no reading.
- With the switch ON (closed) there should be a low reading.
- Repeat for each normally open terminal.



Toggle Switch – On-Off

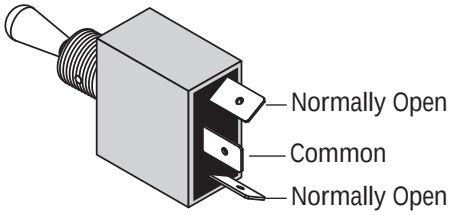
- Disconnect wires.
- Connect first probe of ohm meter to *common* terminal.
- Connect second probe to normally open terminal.
- With the switch turned OFF there should be no reading.
- With the switch turned ON there should be a low resistance.

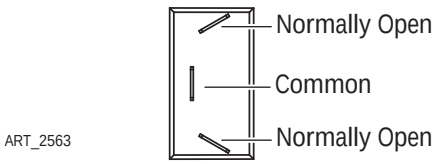




Toggle Switch – 1-Pole 2-Position

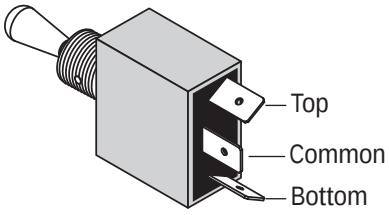
- Disconnect wires.
- Connect first probe of ohm meter to *common* terminal.
- Connect second probe to *top* normally open terminal.
- With toggle DOWN there should be no reading.
- With the toggle UP there should be a low resistance.
- Move second probe to *bottom* normally open terminal.
- With toggle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

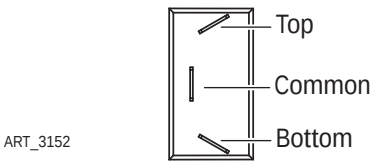




Toggle Switch – 1-Pole 3-Position

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



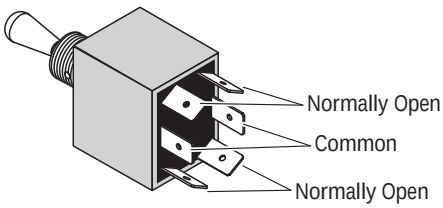


Toggle Momentary Switch

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

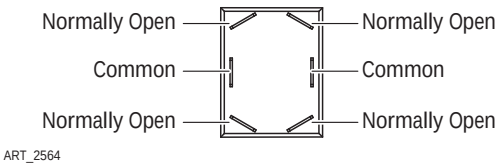
Test top position

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



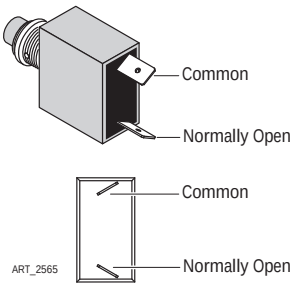
Test bottom position

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



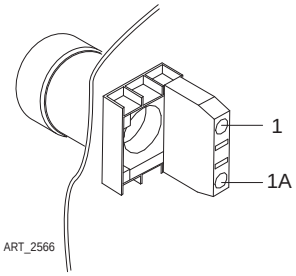
Momentary Button Switch

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



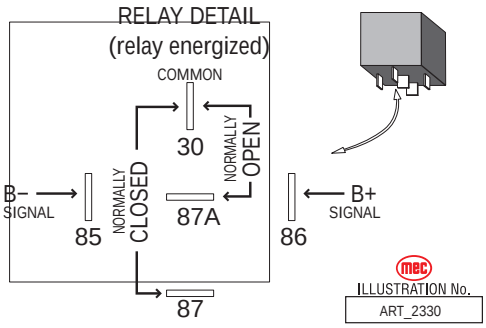
Emergency Stop Button

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



Relay

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



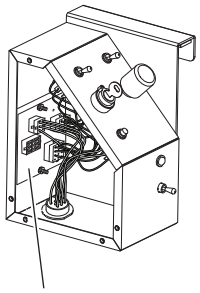
GP400 Control Module Setup

Location

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

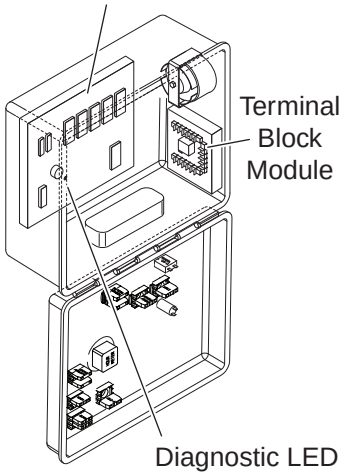
Diagnostic information can be found in Section 9 or 10 for Troubleshooting. Wiring information can be found in Section 11: Schematics.

Upper Controls



ART_3156

Lower Controls



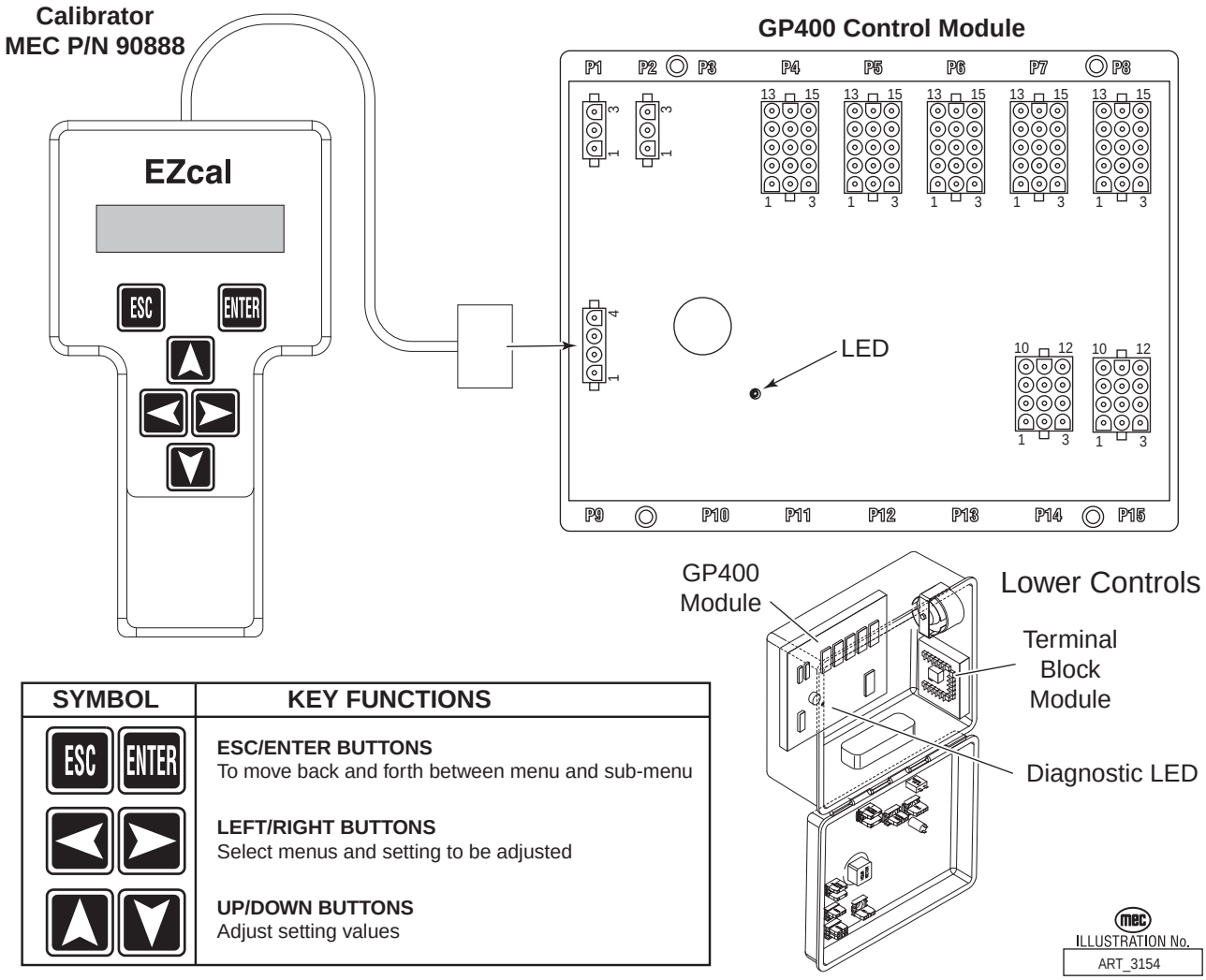
General Description

The GP400 control module uses a variety of 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. For example, the CE equipped machine, designed for European (and many other) countries, is equipped with a Load Sensing system that uses a Pressure Transducer to monitor oil pressure in the lift circuit and an Angle Transducer to monitor platform elevation. ANSI models use an Angle Transducer, and only monitor platform elevation.

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

WARNING

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.



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

GP400 Calibration

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

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

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

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

Tilt Sensor calibration is required on all machines regardless of destination or certification (ANSI or CE) and must be performed first.

ANSI calibration follows Tilt calibration for machines not equipped with an overload protection system and consists of only height calibration.

CE calibration is required of all machines outfitted with an Overload Protection System as required for CE certification. All steps in the CE calibration must be performed in the proper sequence before the GP400 will recognize complete and proper calibration. Begin with the ANSI/CE Tilt Sensor Calibration, then proceed to the CE Calibrations section.

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

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

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

ANSI/CE Tilt Sensor Calibration

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

- The automated leveling system relies on the information provided by three sensors:
- The platform tilt sensor (Platform CAN Tilt Angle Transducer) is used to level the platform to within 0.2 degrees of absolute level when auto-leveling. It is also use by the control system to monitor platform level status for enhanced unit stability. The platform tilt sensor is located inside the Lower Boom Mount.
- The axle sensor (Axle CAN Tilt angle transducer) which is mounted to the front oscillating axle

provides information as to the position of the axle relative to the chassis. This information is used to allow or disallow drive when the platform is in the elevated position. If the front axle is more then 3 degrees out of parallel with the chassis, drive will be turned off to prevent the loss of stability.

- The third level sensor is located inside the GP400 and monitors the chassis angle. All three sensors will calibrate at one time during the calibration procedure.

1. Park machine on a flat level surface.
2. Be sure that all tires are properly inflated to the same pressure and that the tires are all the same size.
3. Ensure that the platform is perfectly level side-to-side and front-to-rear by using the two Manual Level Switches located in the upper control box and a spirit level. Use a framers level if necessary.
4. Open the lower control box and plug the EZ-Cal into plug J-9 (4-pin connector) on the GP400. The display should light up and read “HELP - PRESS ENTER.
   a. Press the right arrow to access “ACCESS LEVEL 3”, press ENTER.
      - The display reads CODE 0000 with the cursor flashing.
   b. Press the Up and Right arrows to enter code 2222, Press Enter
      - Display reads “ACCESS LEVEL 2”
      - On later models, the display may continue to read “ACCESS LEVEL 3”. Repeat step b. and enter code 1775.
   c. Right arrow to SETUPS, Press Enter
      - Display reads ‘CHANGE DEFAULTS”
   d. Right arrow to TILT SETUPS, Press Enter
      - Display reads “CALIBRATE LEVEL”.
   e. Press Enter
      - Display reads “CALIBRATE LEVEL YES: ENTER NO: ESC”
   f. Press Enter
      - Display reads “CALIBRATE LEVEL YES: ENTER NO: ESC” plus has actual tilt percentages.
   g. Press Enter again.
      - The percentage numbers should be 0.0 - 0.0 (or very close).
   h. Level calibration is complete. Unplug the EZ-Cal or press ESC, ESC, ESC.

ANSI Height Calibration

Height calibration must be performed if the GP400 is replaced. For this procedure it is not necessary to place any load in the platform.

1. Drive machine to level ground, in area where it can reach full elevation.
2. Turn selector switch to Base controls.
3. Plug EZ-Cal into connector P9 on GP400 Control Module. EZ-Cal display reads HELP: PRESS ENTER
4. Press right arrow to ACCESS LEVEL 3, Press Enter.
   - Display reads CODE 0000
5. Press Up and Right Arrow to enter code 2222. Press Enter.
   - Display reads ACCESS LEVEL 2.
   - On later models, the display may continue to read “ACCESS LEVEL 3”. Repeat step b. and enter code 1775.
6. Press Right Arrow to SETUPS, Press Enter.

- Display reads CHANGE DEFAULTS

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

CE Calibrations

CE Platform Load Calibration

Perform the tilt sensor calibration outlined at the beginning of this section (“ ANSI/CE Tilt Sensor Calibration” on page 59).

Platform Load calibration must be performed any time:
- Significant repairs are made to the elevating assembly
- The lift cylinder is removed and serviced or replaced
- Any Platform Overload System component is replaced

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

1. “DYNAMIC” calibration – fully loaded platform raised & lowered in one continuous movement. DYNAMIC measurements are taken.
2. “LOADED” calibration – fully loaded platform raised & lowered with stops to take measurements. STATIC measurements are taken.
3. “EMPTY” calibration – unloaded platform raised & lowered with stops to take measurements. STATIC measurements are taken.

The following procedure must be followed COMPLETELY to calibrate the **GP400 Overload System**. If any problem is detected, the procedure stops and an Error Message will display on the EZ-Cal. Explanations of each message and suggested corrections can be found in the section of this manual following the calibration procedure.

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

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

- Display reads CODE 0000

6. Press up and right arrow to enter code 2222, Press Enter.
   - Display reads ACCESS LEVEL 2.
   - On later models, the display may continue to read “ACCESS LEVEL 3”. Repeat step b. and enter code 1775.
7. Press Right Arrow to SETUPS, Press Enter.
   - Display reads CHANGE DEFAULTS
8. Press Right Arrow to LOAD SETUPS. Press Enter.
   - Display reads CALIBRATE LOAD
9. Press Enter.
   - Display reads PLATFORM DOWN? Verify that platform is fully lowered.
10. Press Enter.
    - Display reads PLATFORM LOADED? Verify that rated load is in platform.
11. Press Enter.
    - Display reads PLEASE LIFT.
12. Hold lower controls switch in the up position until machine is fully elevated, then release switch.
    - Display reads PLEASE LOWER.
13. Hold switch in down position until platform is in the fully lowered position. Release switch.
    - Display reads PLATFORM LOADED?
14. Ensure that the rated load is distributed evenly in the platform, then press Enter.
    - Display reads PLEASE LIFT.
15. Hold lower controls switch in the up position until machine is fully elevated, then release switch.
    - Display reads TOTAL DATA #XX, then PLEASE LOWER.

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

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

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

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

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

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

The Platform Overload Sensing System is now calibrated.

CE Height Calibration

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

1. Drive machine to a flat, level surface where it can reach full elevation.
2. Turn selector switch to Base controls.
3. Plug EZ-Cal into connector P9 on GP400 Control Module.
   - Display reads HELP: PRESS ENTER
4. Press right arrow to ACCESS LEVEL 3. Press Enter.
   - Display reads CODE 0000
5. Press Up and Right Arrow to enter code 2222. Press Enter.
   - Display reads ACCESS LEVEL 2.
   - On later models, the display may continue to read “ACCESS LEVEL 3”. Repeat step b. and enter code 1775.
6. Press Right Arrow to SETUPS. Press Enter.
   - Display reads CHANGE DEFAULTS
7. Press Right Arrow to HEIGHT SETUPS. Press Enter.
   - Display reads CALIBRATE HEIGHT
8. Press Enter.
   - Display reads PLATFORM DOWN?
9. Verify that platform is fully lowered. Press Enter.
   - Display reads PLEASE LIFT.
10. Hold lower controls switch in the up position until machine is fully elevated, then release switch.
    - Display reads PLEASE LOWER.
11. Hold switch in down position until platform is in the fully lowered position. Release switch.
    - Display reads FINISHED.

Calibration Problems

Failure Messages

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

F01:CHECK HWFS
- This message is given if the startup tests have not completed.
- Check HELP message for more information.

F02:NOT GROUND MODE
- This message is given if the machine is not in ground mode (P7-2 must be high). Calibration can only be carried out in ground mode.

F03:NOT STOPPED
- This message is given if any function switch is closed. Check DIAGNOSTICS / SWITCHES to see which function switch is closed.

F04:TILTED
- This message is given if the machine is tilted. Calibration must be carried out with the machine level. If the machine is level, perform the Tilt Calibration procedure above.

F05:BAD HEIGHT
- This message is given if the height sensor output (P8-2 and P8-6) is out of range at the start of calibration. The height sensor output must be between 1.0V and 4.0V. Check DIAGNOSTICS / SENSORS to see the output. A reading of 0V or 5V is probably due to a wiring problem.

F06:CHECK ELEV
- This message is given if the elevation switch (P7-5) is open at the start of calibration, when the operator has confirmed the “PLATFORM DOWN?” question.
- If the platform is down, check the elevation switch wiring.

F08:CHECK ELEV
- This message is given if the elevation switch (P7-5) is closed at the end of the DYNAMIC lift, when the platform should be fully raised.
- This message would occur if the UP switch was accidentally opened near the start of the DYNAMIC lift.
- If the platform is fully raised, check the elevation switch wiring.

F09:BAD HEIGHT
- This message is given if the height sensor output (P8-2 and P8-6) is out of range at the start of the DYNAMIC lift. The height sensor output must be between 1.0V and 4.0V.
- Check DIAGNOSTICS / SENSORS to see the output. This is usually due to a wiring problem.

F10:BAD HEIGHT
- This message is given if the height sensor output (P8-2 and P8-6) is out of range at the end of the DYNAMIC lift. The height sensor output must be between 1.0V and 4.0V. Check DIAGNOSTICS / SENSORS to see the output. A reading of 0V or 5V is probably due to a wiring

problem.

F11:NOT UP

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

F12:TOO MANY

- This message occurs if the DYNAMIC lift takes too long.
- This message could occur if the UP switch was not released at the end of the dynamic lift.

F13:LOW HEIGHT RANGE

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

F14:BAD HEIGHT

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

F15:CHECK ELEV

- This message is given if the elevation switch (P7-5) is open when the platform has been fully lowered after the DYNAMIC lift.
- This message would occur if the DOWN switch was accidentally opened before the platform was fully lowered.
- If the platform is fully lowered, check the elevation switch.

F16:LOW ELEV.OPEN

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

F17:HIGH ELEV.OPEN

- This message is given if the elevation switch (P7-5) opened during lift at a too high height (above 25%).
- Check CALIBRATIONS / HEIGHT CALS; the “ElevUp” value shows the recorded height where the switch opened.

F18:LOW ELEV.CLOSE

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

F19:HIGH ELEV.CLOSE

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

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

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

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

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

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

F24:TOO MANY

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

F25:CHECK ELEV
F26:CHECK ELEV

- This message indicates a problem with the elevation switch (P7-5) during the STATIC phases.
- The switch is either staying closed to a higher height, or staying open to a lower height, than that recorded during the DYNAMIC phase.

F27:BAD HEIGHT

- This message indicates a problem with the height sensor output (P8-2 and P8-6) during the STATIC calibration phases.
- The height sensor output must be between 1.0V and 4.0V at all times.
- Check DIAGNOSTICS / SENSORS to see the output. A reading of 0V or 5V is probably due to a wiring problem.

F30:BAD HEIGHTS

- This message indicates that the recorded heights are not increasing during STATIC lift, or are not decreasing during STATIC lower.
- This problem may be caused by repeatedly opening and closing the UP or DOWN switch during the STATIC phases.

F31:REJECT CURVE

- The DYNAMIC pressure curve is unacceptable.
- An initial pressure peak when the platform lifted cannot be found between 0% and 15% height.
- Check for proper weight in the platform and check pressure sensor and lift cylinder hydraulics.

F32:REJECT CURVE

- The DYNAMIC pressure curve is unacceptable.
- There should be a lowest pressure about halfway through the lift (i.e.: near 50% height); the lowest pressure measured is at too low a height.
- Check for proper weight in the platform and check pressure sensor and lift cylinder hydraulics.

F33:REJECT CURVE

- The DYNAMIC pressure curve is unacceptable.
- There should be a lowest pressure about halfway through the lift (i.e.: near 50% height); the lowest pressure measured is at too high a height.
- Check for proper weight in the platform and check pressure sensor and lift cylinder hydraulics.

F34:REJECT CURVE

- The DYNAMIC pressure curve is unacceptable.
- There is not enough difference between the initial pressure peak and the minimum pressure.
- Check for proper weight in the platform and check pressure sensor and lift cylinder hydraulics.

F40:REJECT DELTA

- This message indicates that there is not enough difference between the loaded & empty pressure.
- This message could occur if the platform were not properly loaded during the STATIC LOADED phase, or if the platform were not properly empty during the STATIC EMPTY phase.
- This message could also occur if the wrong pressure sensor was fitted (e.g.: a 5000psi sensor when a 3000psi one is needed).
- Check CALIBRATIONS / HEIGHT CALS; the “Height” indicates the first height at which there was insufficient difference and the “Up” and “Down” values show the loaded pressure (first) and the difference between loaded and empty pressure (second).

F42:LOW PRESSURE

- This message indicates that the pressure is too low (0.5V or less) when the elevation switch opens during the DYNAMIC lift.
- This message would occur if the pressure sensor was disconnected, or if there were some other wiring error.
- Check DIAGNOSTICS / SENSORS to check the pressure.

F43:HIGH PRESSURE

- This message indicates that the pressure is too high (4.5V or more) when the elevation switch opens during the DYNAMIC lift.
- This message would occur if the wrong pressure sensor was fitted, or if there were some other wiring error.
- Check DIAGNOSTICS / SENSORS to check the pressure.

F44:LOW PRESSURE

- This message indicates that the pressure is too low (0.5V or less) at a STATIC measurement point.
- This message would occur if the pressure sensor was disconnected, or if there were some other wiring error.
- Check DIAGNOSTICS / SENSORS to check the pressure.

F45:HIGH PRESSURE

- This message indicates that the pressure is too high (4.5V or more) at a STATIC measurement point.
- This message would occur if the wrong pressure sensor was fitted, or if there were some other wiring error.
- Check DIAGNOSTICS / SENSORS to check the pressure.

F46:CHECK ELEV

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

F47:CHECK ELEV

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

F48:BAD PRESSURE

- This message is given if the pressure sensor output (P8-2 and P8-6) is out of range at the start of calibration.
- The height sensor output must be between 0.5V and 4.5V.
- Check DIAGNOSTICS / SENSORS to see the output. A reading of 0V or 5V is probably due to a wiring problem.

F52:NOT CALIBRATED

- This message is a catch-all code which indicates an improper calibration sequence or that one of the phases of calibration was not completed. The skipped phase must be completed or the calibration sequence must be passed through in proper sequence before this message will clear. Re-start the calibration sequence and proceed through each sequence in the specified order.
- A “Redo” prompt will appear before each sequence. Answer “NO” if there is no reason to repeat or “YES” if the phase must be completed.

Information Messages

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

BUILDING TABLES

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

CALDATE:

- This message is prompting for the date to be entered; it is stored to identify when the machine was calibrated.
- The last calibrate date can be viewed in DIAGNOSTICS / LOG.
- Press LEFT & RIGHT to select the flashing digits.
- Press UP & DOWN to change the flashing digits.
- Press ENTER when the entry is complete.
- **IMPORTANT:** The date 00/00/00 is not allowed!

FINISHED

- This message confirms that calibration is complete and successful.

GO DOWN MORE!

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

GO UP MORE!

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

LIFT EMPTY

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

LIFT LOADED

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

LIFTING

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

LOWER EMPTY

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

LOWER LOADED

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

LOWERING

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

MEASURING #
- This message is displayed when the platform is stopped during either STATIC phase, when the GP400 takes a measurement.
- There will be a short delay while the machine is allowed to stabilize after movement is stopped.

MUST GO DOWN!
- This message occurs if the wrong switch is operated when the GP400 is waiting for the platform to be lowered.

MUST GO UP!
- This message occurs if the wrong switch is operated when the GP400 is waiting for the platform to be raised.

PLATFORM DOWN?
- This message is prompting for confirmation that the platform is fully lowered. If necessary the DOWN switch can be activated to lower the platform.
- Press ENTER to confirm when the platform is fully lowered.

PLATFORM EMPTY?
- This message is prompting for confirmation that the platform is completely empty.
- Press ENTER to confirm when the platform is empty.

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

PLEASE LIFT …
- This message is prompting for the platform to be raised.
- The UP switch should be operated.

PLEASE LOWER …
- This message is prompting for the platform to be lowered.
- The DOWN switch should be operated.

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

REDO DYNAMIC:
- This message is displayed if the DYNAMIC phase of load calibration has previously been completed.
- Press ENTER when “NO” is displayed if there is no need to redo the DYNAMIC phase.
- Press UP or DOWN to display “YES” then press ENTER if it is necessary to redo the DYNAMIC phase.
- If the previous DYNAMIC calibration was in error, or if the height or pressure sensor is replaced, it will be necessary to redo the DYNAMIC phase.

REDO EMPTY:
- This message is displayed if the EMPTY phase of load calibration has previously been

completed.
- Press ENTER when “NO” is displayed if there is no need to redo the EMPTY phase.
- Press UP or DOWN to display “YES” then press ENTER if it is necessary to redo the EMPTY phase.
- If the previous EMPTY calibration was in error, or if the pressure sensor is replaced, it will be necessary to redo the EMPTY phase.

REDO LOADED:
- This message is displayed if the LOADED phase of load calibration has previously been completed.
- Press ENTER when “NO” is displayed if there is no need to redo the LOADED phase.
- Press UP or DOWN to display “YES” then press ENTER if it is necessary to redo the LOADED phase.
- If the previous LOADED calibration was in error, or if the pressure sensor is replaced, it will be necessary to redo the LOADED phase.

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

Mechanical Components

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

Base

CAUTION

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

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

Tires And Wheels

Inspect for cuts, chunking, side-wall damage, or abnormal wear. Any tire faults MUST BE CORRECTED before further machine operation. Refer to Parts sections for replacement tires.

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

DANGER

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

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

Changing Tires

Refer to “Lift and Support The Machine” on page 15 for instructions and safety precautions.

CAUTION

Always block the wheels before lifting the machine.

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

Drive Motors

Refer to Section 5 for repair information.

There are two (2) hydraulic drive motors on the front axle and two (2) hydraulic drive motors on the

rear drive axle. Repair or replace as necessary when damage or leaks occur.

Clean all fittings before disconnecting hoses.

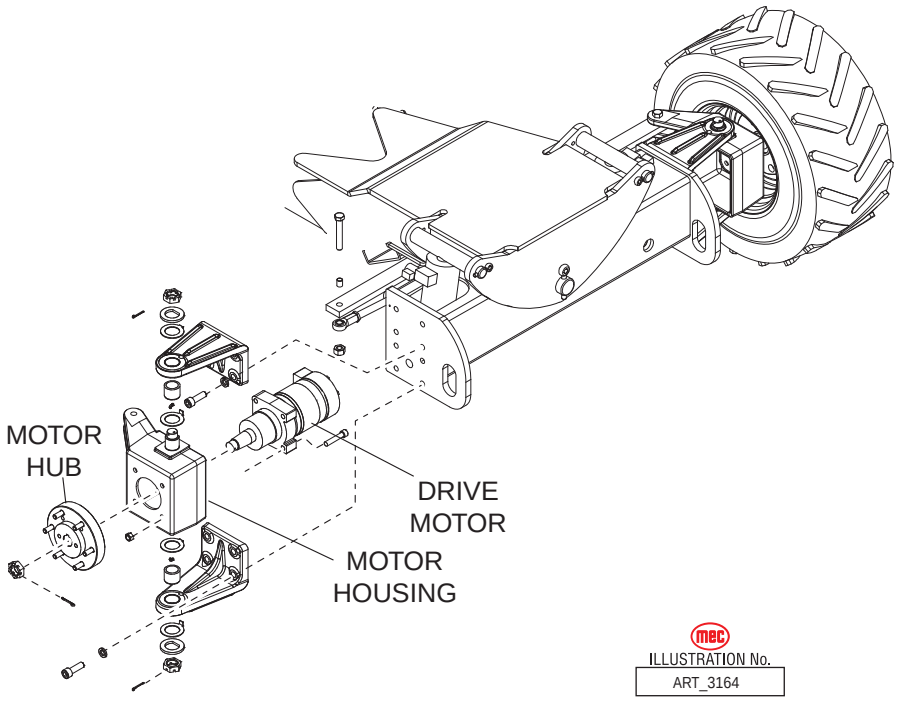
CAUTION

Tag hoses for proper reassembly.

Plug all openings immediately to prevent contamination.

Front Drive Motors

Refer to “Lift and Support The Machine” on page 15 for instructions and safety precautions.



Remove

1. Raise and support the front end of machine.
2. Remove the wheel and tire assembly to access drive motor.
3. Remove the hub from the drive motor shaft using a suitable hub pulling tool. DO NOT use a hammer on the shaft or hub as this will damage the motor.
4. Disconnect the cylinder end and tie-rod from the motor housing.
5. Turn the motor housing to gain access to the motor and hose assemblies.
6. Disconnect hose assemblies from drive motor. Immediately cap and plug all openings to prevent contamination.
7. Remove the cap screws and remove the drive motor.

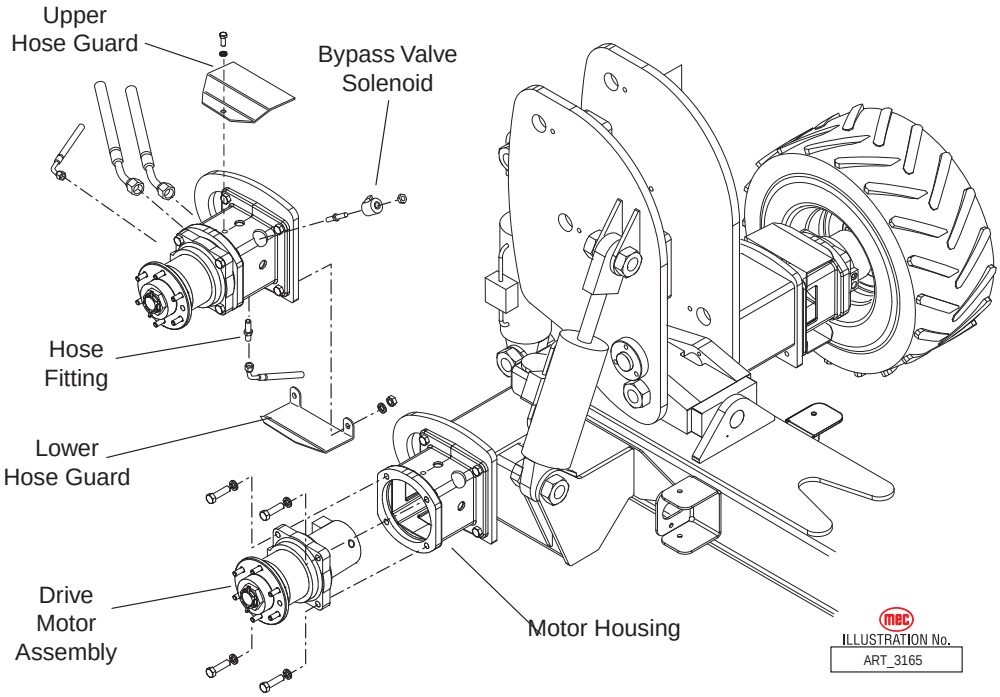
Replace

Installation is reverse of removal.

1. Use Loctite® on mounting bolts.

Rear Drive Motor

Refer to “Lift and Support The Machine” on page 15 for instructions and safety precautions.



Remove

1. Raise and support the rear end of machine (see Raising the Machine).
2. Remove the wheel and tire assembly to access drive motor.
3. Remove the upper and lower hose guards.
4. Disconnect hose assemblies from drive motor. Immediately cap and plug all openings to prevent contamination.
5. Remove the hose fitting and the bypass valve solenoid from the motor.

Note: The bypass valve solenoid is mounted UP on the left side motor, and mounted DOWN on the right side motor.

6. Remove the cap screws and remove the drive motor from the housing.

Replace

Installation is reverse of removal.

1. Use Loctite® on mounting bolts.

Steer Cylinder

There are two (2) double acting type steer cylinders on this machine. During operation, cylinder(s) should not leak, but a slight damping at the rod seal is acceptable. The pins should be checked for wear.

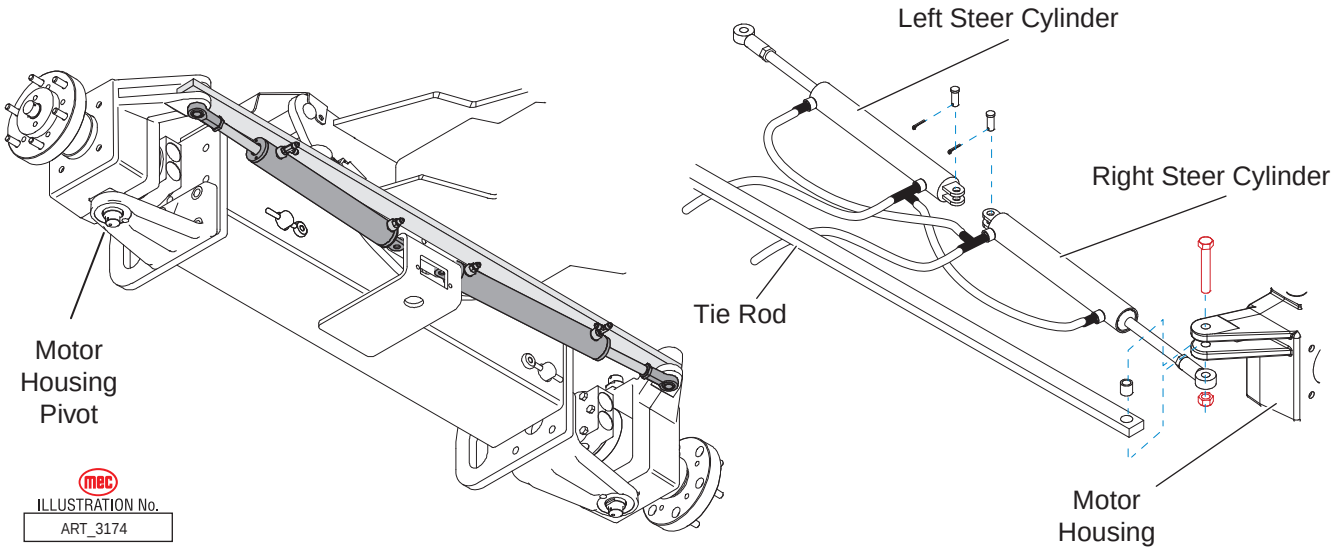
To Replace Steer Cylinder:

Clean all fittings before disconnecting hoses.

CAUTION

Tag hoses for proper reassembly.

Plug all openings immediately to prevent contamination.



1. Raise and support the front end of machine (see Raising the Machine).
2. Disconnect hydraulic hoses. Immediately cap and plug all openings to prevent contamination.
3. Remove the nut and bolt holding the steer cylinder to the motor mounting bracket.
4. Remove the pin and cotter pin holding the steer cylinder to the front axle.
5. Carefully lift off the steer cylinder.
6. Position the new steer cylinder and install pin and cotter pin to hold cylinder to the front axle.
7. Install nut and bolt to hold cylinder to motor mounting bracket.
8. Connect hydraulic hoses.
9. To purge air from cylinder, cycle the steering system fully left and right 4-5 times.

Note: Refer to Section 5 for seal replacement instructions.

Floating Axle Lock Cylinders

There are two Floating Axle Lock Cylinders located at the front of the machine.

Remove

1. Raise and support the front end of machine.
2. Disconnect hydraulic hoses. Immediately cap and plug all openings to prevent contamination.
3. Remove the bolt and banjo pin that secures the pivot pin to the frame and remove the pivot pin.
4. Remove the bolt and banjo pin that secures the pivot pin to the floating axle and remove the pivot pin.

Replace

Installation is reverse of removal. Apply one (1) drop of Loctite® to the bolts that secure clevis pins.

Bleed Procedure - 3084RT

Use this procedure for machine model 3084RT.

1. Start engine.
2. Loosen the bleed valve located on the top of the cylinder.
3. Watch as air escapes from valve.
4. Once a steady stream of fluid runs from the valve, tighten the valve.
5. Repeat on opposite side.

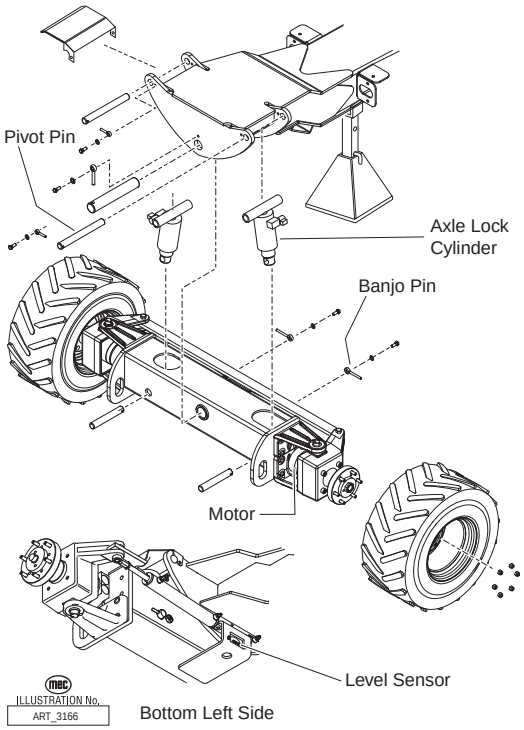
Bleed Procedure - 3084ES

Use this procedure for machine model 3084ES.

1. Loosen the bleed valve located on top of the cylinder
2. Drive the machine very slowly while watching as air escapes from the valve.
3. Once a steady stream of fluid runs from the valve, tighten the valve.
4. Repeat on opposite side.

Test Locking And Center Position

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

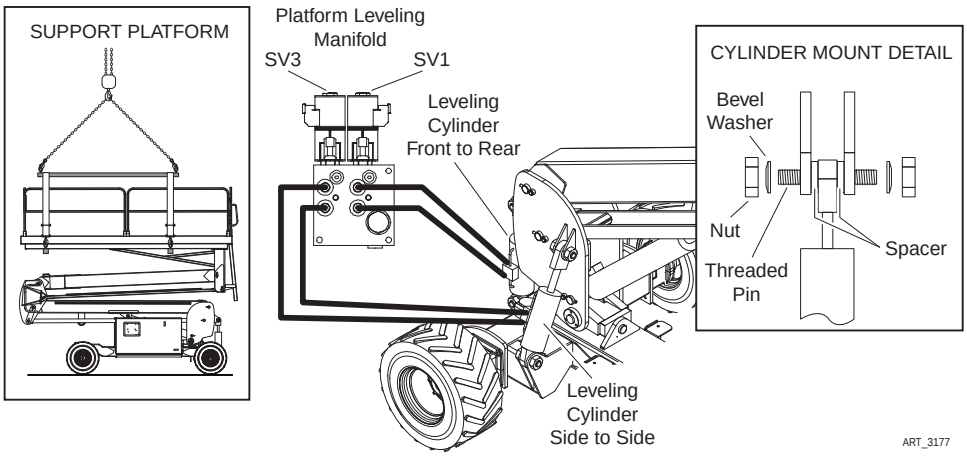


Platform Leveling Cylinders

There are two Tilt Cylinders located at the rear of the machine.

DANGER **NEVER PERFORM SERVICE ON THE MACHINE WITH THE PLATFORM ELEVATED WITHOUT FIRST SUPPORTING THE PLATFORM/BOOM ASSEMBLY.**

Use a crane with chains and straps of adequate lifting capacity to support the platform.



Remove

1. Support the platform.
2. Disconnect hydraulic hoses. Immediately cap and plug all openings to prevent contamination.
3. Remove the nuts and beveled washers from the mounting pins.
4. Carefully remove the mounting pins.
5. Carefully lift the cylinder.
6. Installation is reverse of removal.

Hoses And Cables

Note: Refer to Parts Section 15 for detailed hydraulic hose diagrams.

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

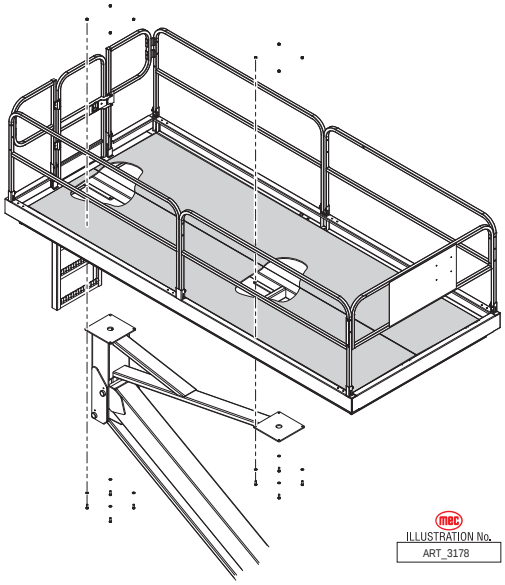
Check all ties and clamps that keep hoses secure.

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

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

Platform Removal

1. Connect overhead crane or appropriate lifting device to the platform.
2. Disconnect cables that go to the platform.
3. Remove the bolts that secure the platform to the boom assembly.
4. Lift the platform away from the boom assembly.
5. Installation is reverse of removal.



Lift Cylinder Removal And Installation

Note: Refer to Section 5 for seal replacement instructions.
Refer to Parts Section 13 for detailed parts list and illustration.

CLEAN ALL FITTINGS BEFORE DISCONNECTING HOSES.

WARNING

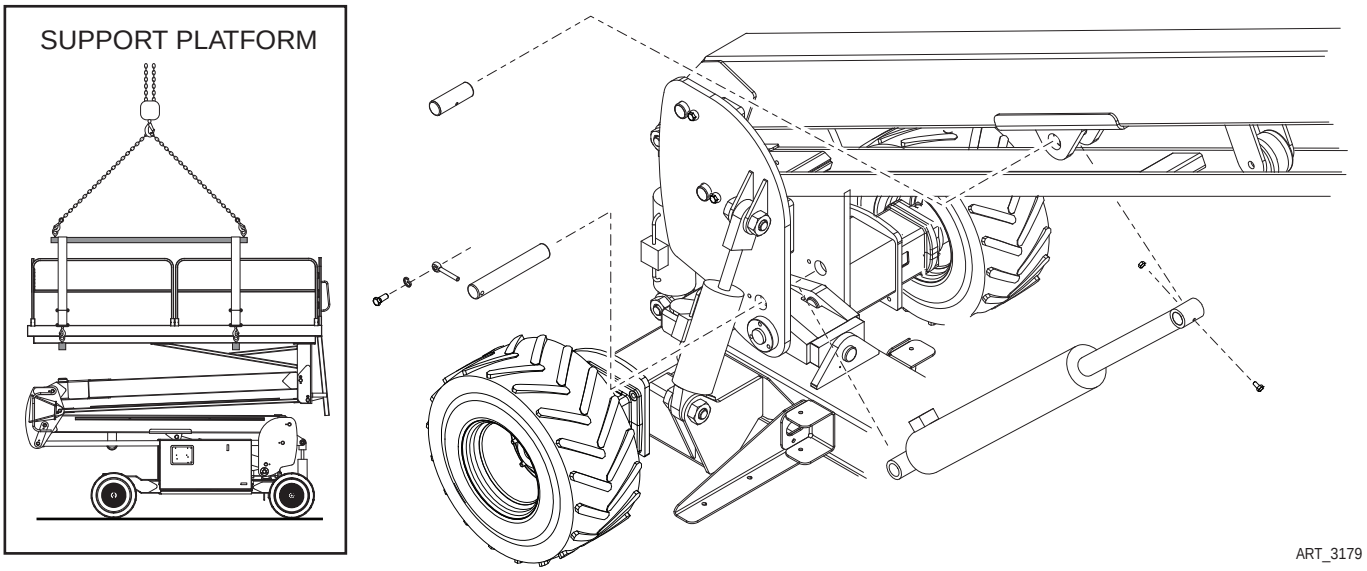
CYLINDERS ARE HEAVY. PROVIDE PROPER SUPPORT BEFORE REMOVING PINS.

ATTACH THE LIFTING DEVICE TO THE CYLINDER BODY. LIFTING BY EITHER END WILL CAUSE THE CYLINDER TO EXTEND.

1. Raise the platform.
2. Connect overhead crane by appropriate lifting device to the platform.
3. Tag wiring and hoses for proper reassembly.
4. Disconnect wires from the cylinder.
5. Disconnect hydraulic hoses. Immediately cap and plug all openings to prevent contamination.

6. Remove the bolt and nut that secure the cylinder head to the mounting pin on the boom assembly.
7. While supporting the cylinder, carefully remove the mounting pin and lower the cylinder to the chassis.
8. Remove the bolt, lock washer and banjo pin from the lower mounting pin, then remove the mounting pin.
9. Remove the cylinder.
10. Installation is reverse of removal.

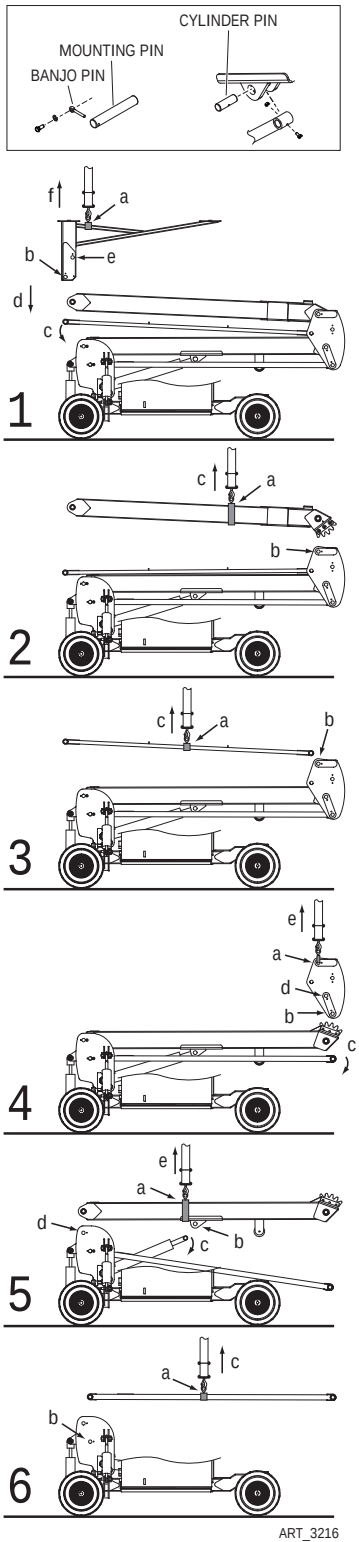
Note: Apply one (1) drop of Loctite® to all bolts.



Boom - Elevating Assembly

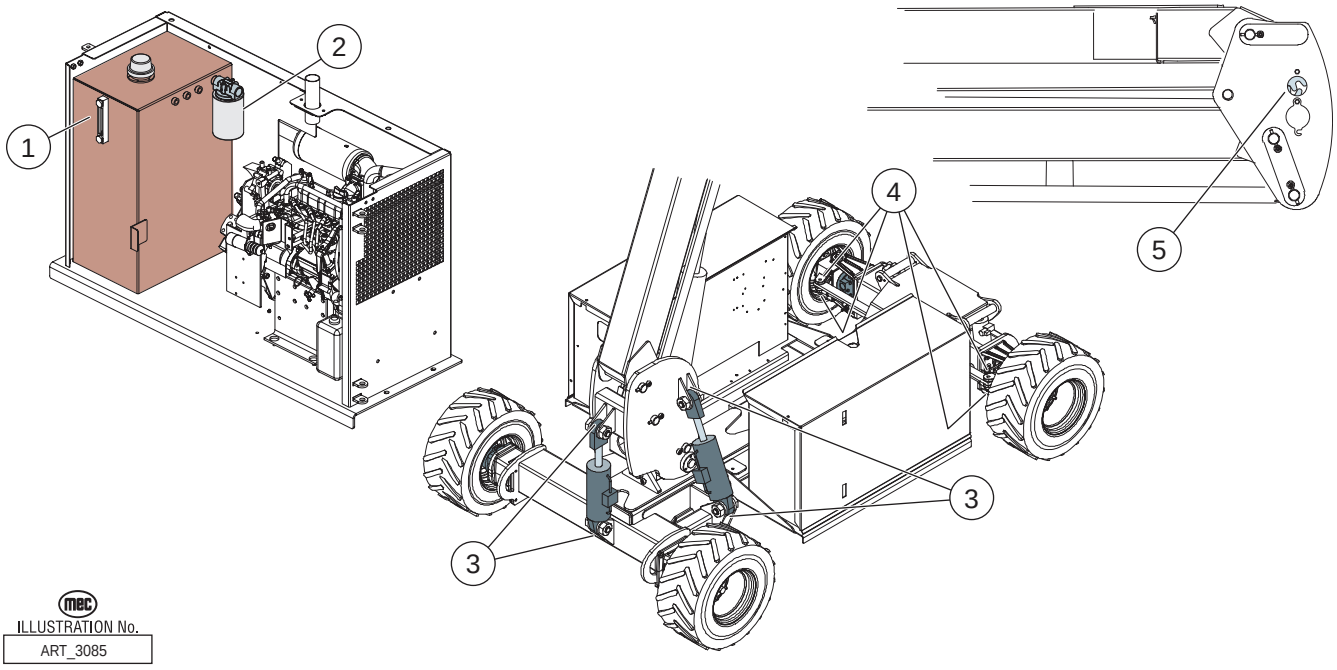
Remove the platform (see “Platform Removal” on page 78).

1. Remove the platform pivot.
   1. Attach a crane to the platform pivot and apply enough lift to provide support.
   2. While supporting the tension beam, remove the lower bolt, washer and banjo pin.
   3. Lower the tension beam to rest on the lower boom.
   4. Using the crane, lower the platform pivot and upper boom to rest on the lower boom.
   5. Remove the upper bolt, washer and banjo pin.
   6. Lift the platform pivot up and away.
2. Remove upper boom
   1. Attach a crane to the upper boom and apply enough lift to provide support.
   2. Remove the bolt, washer and banjo pin.
   3. Lift the upper boom up and away.
3. Remove upper tension beam.
   1. Attach a crane to the upper tension beam.
   2. Remove the bolt, washer and banjo pin.
   3. Lift the upper tension beam up and away.
4. Remove boom pivot.
   1. Attach a crane to the boom pivot through the top holes and apply enough lift to provide support.
   2. While supporting the tension beam, remove the lower bolt, washer and banjo pin.
   3. Lower the tension beam to rest on the chassis.
   4. Remove the upper bolt, washer and banjo pin.
   5. Lift the boom pivot up and away.
5. Remove the lower boom.
   1. Attach a crane to the upper boom and apply enough lift to provide support.
   2. While supporting the lift cylinder remove the cylinder pin.
   3. Lower the lift cylinder to rest on the chassis.
   4. Remove the bolt, washer and banjo pin.
   5. Lift the lower boom up and away.
6. Remove lower tension beam.
   1. Attach a crane to the lower tension beam.
   2. Remove the bolt, washer and banjo pin.
   3. Lift the lower tension beam up and away.
7. Installation is reverse of removal.



Apply one (1) drop of Loctite® to all bolts.

Lubrication



No.	Item	Specification	Frequency
1	Hydraulic Reservoir	**Mobile Fluid DTE 10, DTE 13 M, or AW32 M** *Do not substitute with lower grade fluids as pump damage may result.* Fill to the middle of the sight gauge with platform in the stowed position.	**Routine Maintenance** Check Daily **Scheduled Maintenance** Change yearly or every 1000 hours, whichever occurs first
2	Hydraulic Filter	Filter Element	**Scheduled Maintenance** **Normal Conditions** Change every six months or 500 hours, whichever occurs first **Severe Conditions** Change every three months or 300 hours, whichever occurs first
3	Tilt Cylinders Pivot Points	**Lithium N.L.G. #2 EP** Purge old grease	**Scheduled Maintenance** **Normal Conditions** Apply every 6 months or 500 hours, whichever occurs first **Severe Conditions** Apply every 3 months or 250 hours, whichever occurs first
4	Steering Pivot Points	**Lithium N.L.G. #2 EP** Purge old grease	**Scheduled Maintenance** **Normal Conditions** Apply every 6 months or 500 hours, whichever occurs first **Severe Conditions** Apply every 3 months or 250 hours, whichever occurs first
5	Boom Gear	**High copper content Anti-Seize compound** Apply through access port or from front when platform is fully elevated	**Scheduled Maintenance** **All Conditions** Apply every 1 months or 100 hours, whichever occurs first

Engine Maintenance

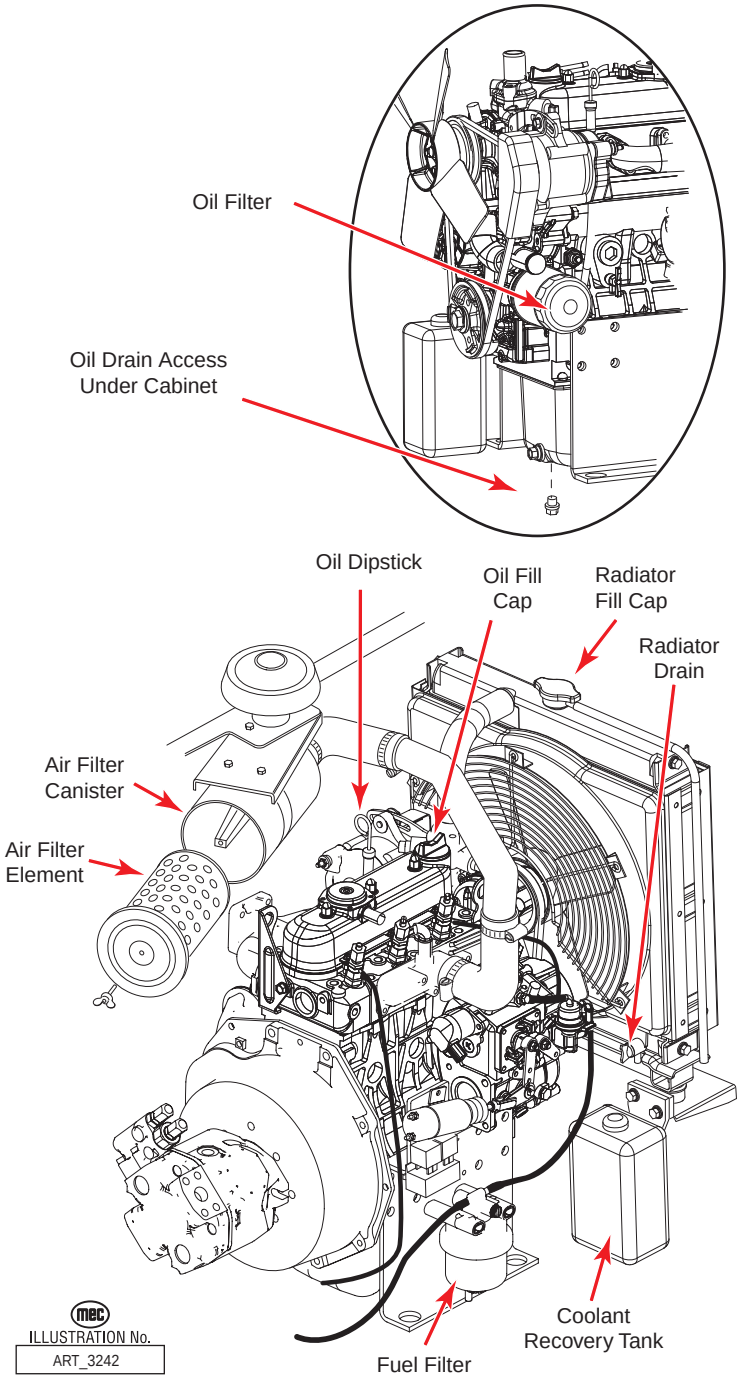
Diesel Engine Models

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

CAUTION

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

Engine should be OFF when replacing filter elements.



Oil And Oil Filter, Diesel

Dispose of used oil and filters properly.

1. Use a suitable container to catch drained oil. Remove the drain plug. After oil has drained, replace the drain plug.
2. Remove the old filter and wipe the filter seal contact surface with a clean towel. Coat the seal on the new filter with clean oil, then install and tighten by hand.
3. Fill engine with 10w-30 motor oil until the dipstick indicates FULL. Capacity is 5.4 US quarts (5,1 l).
4. Recheck dipstick after running engine. Fill as necessary.

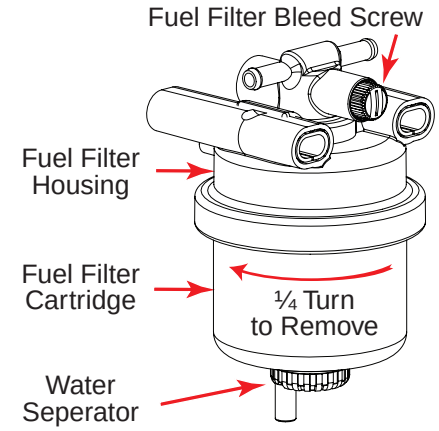
Air Filter Element, Diesel

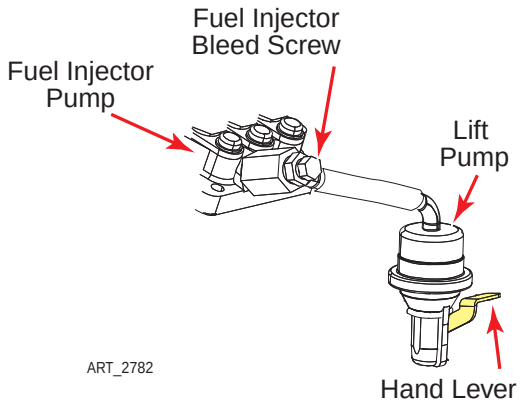
1. Remove the wing-bolt
2. Remove old filter and replace with a new filter.
3. Replace and tighten the wingbolt.

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

Fuel Filter, Diesel

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





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

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

Idle Speed Adjustment, Diesel

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

High Speed Adjustment, Diesel

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

1. Bring engine to operating temperature.
2. Disconnect the Throttle Solenoid linkage at the clevis.
3. Manually pull the Throttle Lever until it contacts the High Speed Stop Screw.
4. Adjust the High Speed Stop Screw until the RPM is 3000 with the Throttle Lever against the High Speed Stop Screw.
5. Turn off the engine and reconnect the Throttle Solenoid linkage at the clevis.
6. Hold the High Speed Stop Screw while tightening the jam nut to prevent change in adjustment.

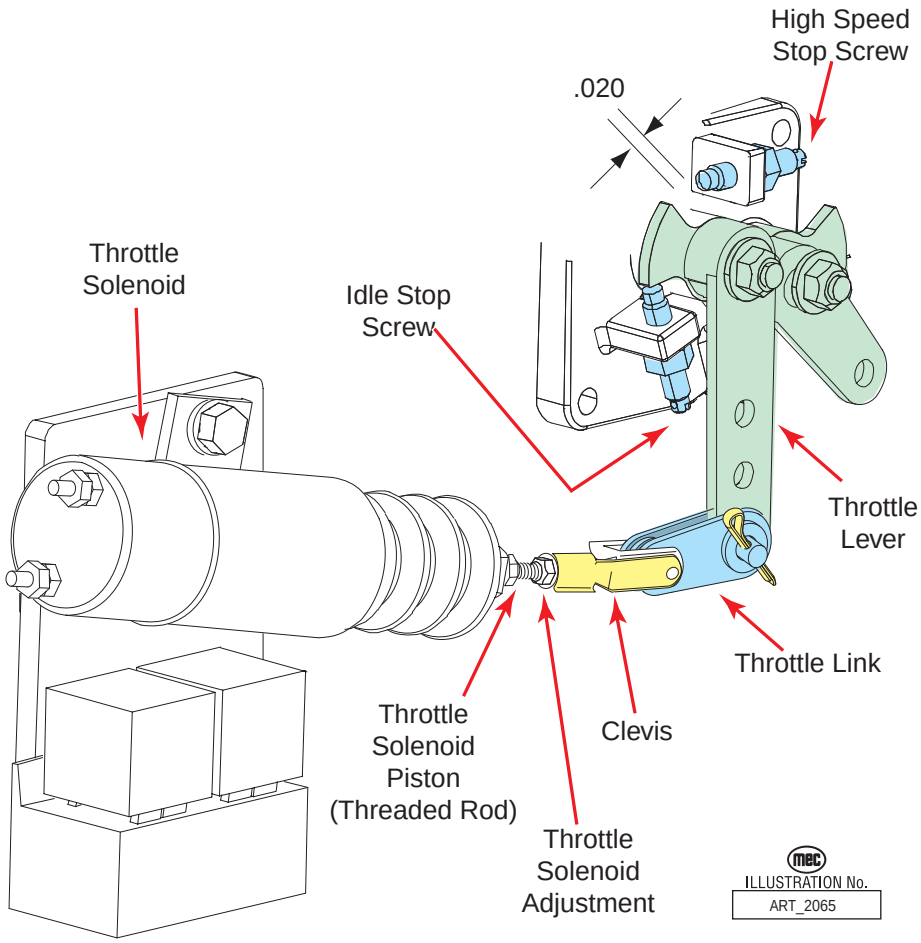
Throttle Solenoid Adjustment, Diesel

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

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

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

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



Gasoline & Dual Fuel Engine Models

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

CAUTION

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

Engine should be OFF when replacing filter elements.

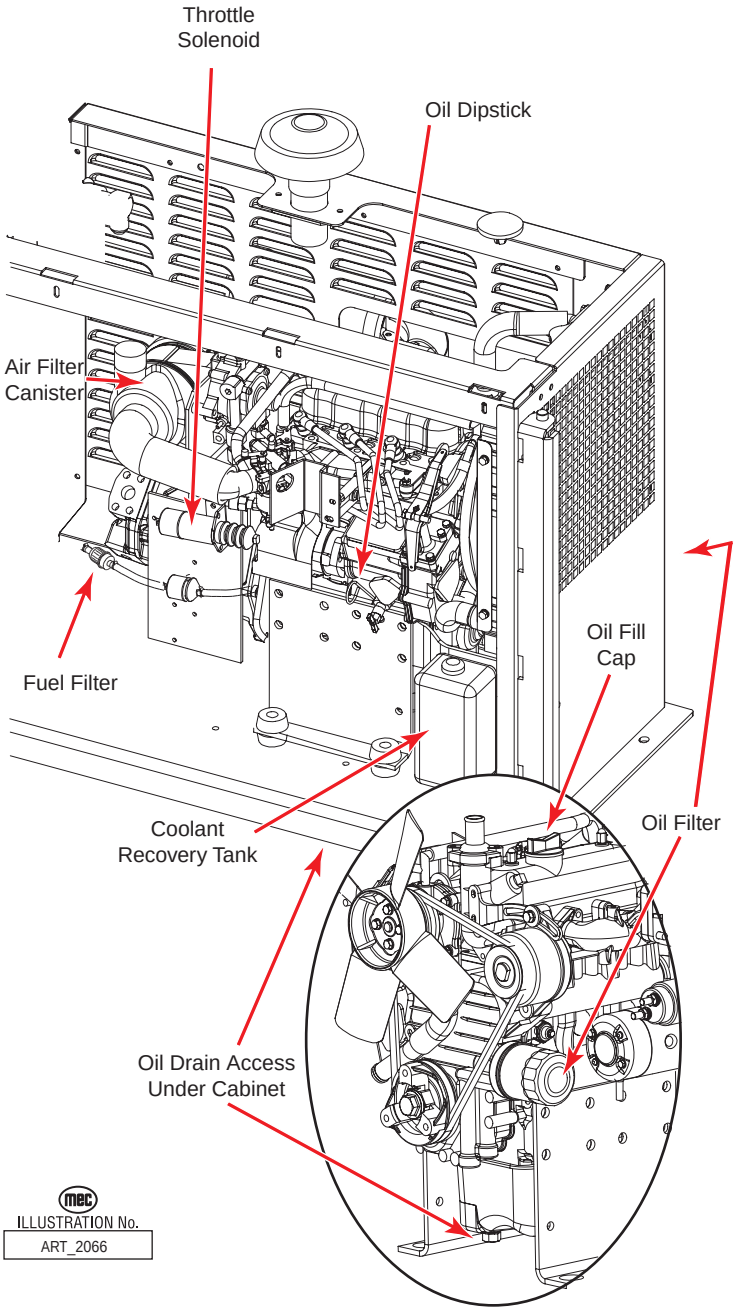
Oil And Oil Filter - Gasoline & Dual Fuel

Dispose of used oil and filters properly.

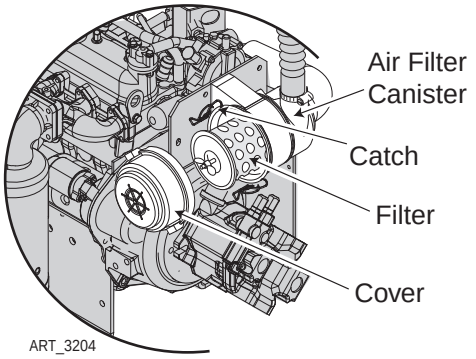
1. Use a suitable container to catch drained oil. Remove the drain plug. After oil has drained, replace the drain plug.
2. Remove the old filter. Coat the seal on the new filter with clean oil, then install and tighten by hand.
3. Fill engine with 10w-30 motor oil until the dipstick indicates FULL. Capacity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

Fuel Filter - Gasoline

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



Air Filter Element - Gasoline & Dual Fuel

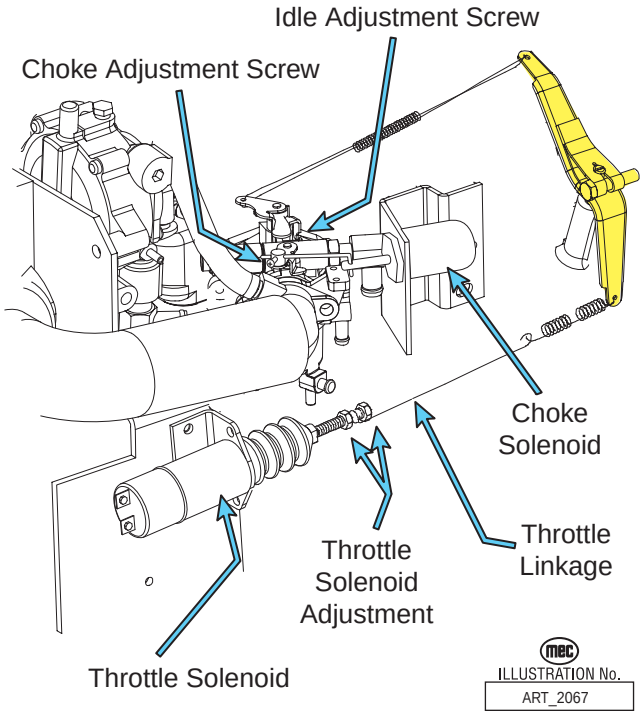


1. Unlock the catches holding the filter canister cover.
2. Remove the wing-nut from the filter assembly and remove the filter element.
3. Inspect the canister for debris and clean as necessary.
4. Install a new filter element and tighten the wingnut.
5. Replace the canister cover and lock the catches.

Engine Adjustment - Gasoline & Dual Fuel

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

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



Choke Adjustment - Gasoline & Dual Fuel

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

Idle Speed Adjustment - Gasoline & Dual Fuel

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

High Speed Adjustment - Gasoline & Dual Fuel

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

General Troubleshooting Tips

Hydraulic Fluid Pump - 3084RT Models

The Hydraulic Pump used in this model is a Variable Displacement, Pressure Compensated, Piston type pump. Proper adjustment is critical for normal operation of the machine. Refer to “Hydraulic Pressure Adjustment - 3084RT” on page 118.

Common Causes of Electrical System Malfunctions:

- Battery switch is turned OFF (located to the left of lower controls).
- Battery connections are loose or corroded
- Battery is not fully charged.
- Emergency Stop buttons are pushed (OFF position).
- Circuit breaker is in the tripped (OFF position).

Common Causes of Hydraulic System Malfunctions:

- Hydraulic fluid level is too low.
- 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 with a lower grade fluid will result in pump failure. Refer to “Lubrication” on page 81.

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. Please make sure all ports and cavities of the manifold and cylinders are properly covered/ plugged during maintenance activities.

Electrical System Troubleshooting - 3084RT

The electronic control system used on the 3084RT was designed for low maintenance and long trouble free operation. The system consists of two microprocessor based modules; The Matrix Module and the GP400 Processor. They communicate through a low voltage digital signal called Can-Bus communication.

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

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

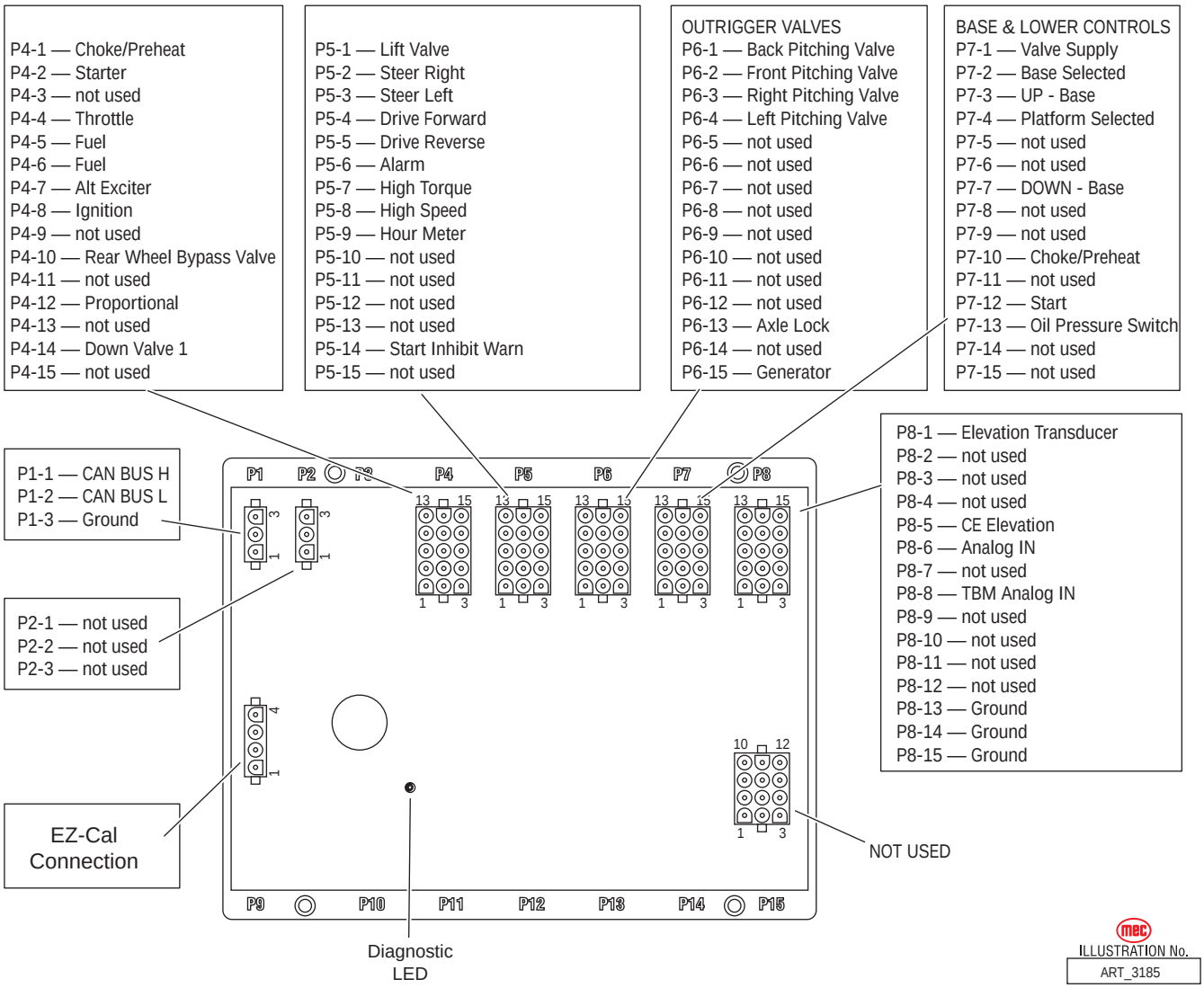
USE OF HIGH PRESSURE WASHING EQUIPMENT DIRECTLY ON THE MODULES CAN FORCE WATER INTO SEALED CONNECTION AND CAN CAUSE A TEMPORARY SYSTEM SHUT-DOWN. HIGH PRESSURE WASHING WITHIN THE VICINITY OF THE MODULES IS HIGHLY DISCOURAGED.

GP400 Module

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

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

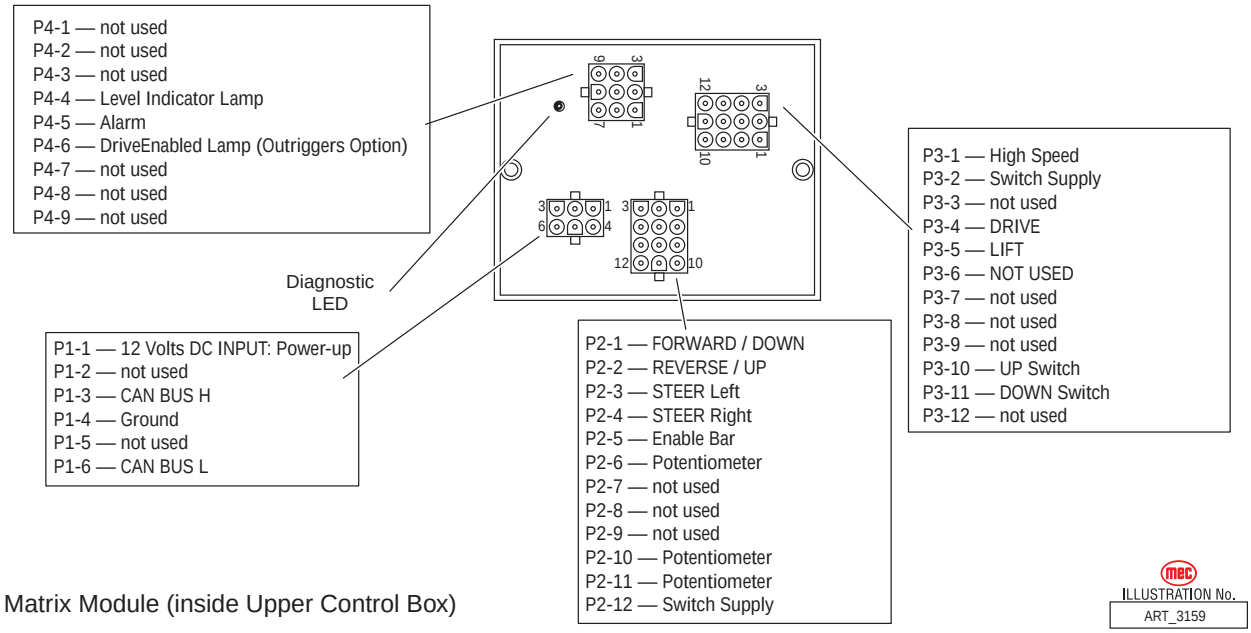
The GP400 operates on 12 volts DC and should never be probed or operated with voltage higher than 14 volts DC.



Matrix Module & Terminal Block Module (TBM)

Matrix Module

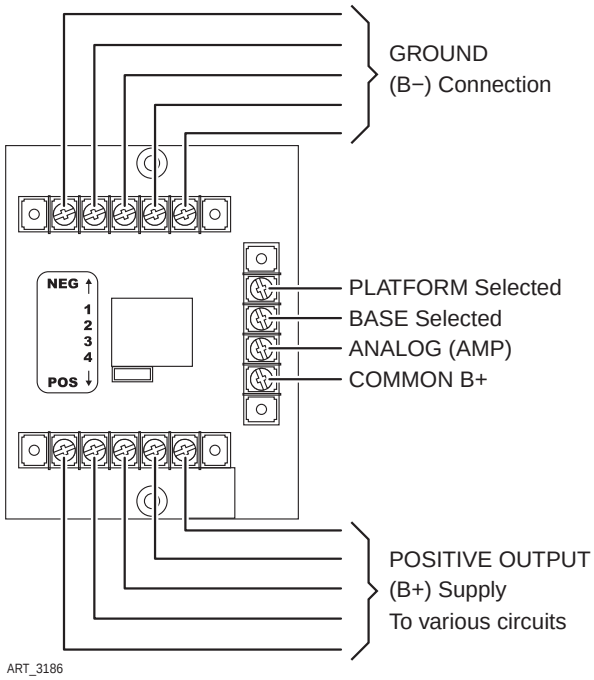
The Matrix Module is the remote module located inside the upper control box. It received inputs from the operator and relays them to the GP400.



Matrix Module (inside Upper Control Box)

Terminal Block Module

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



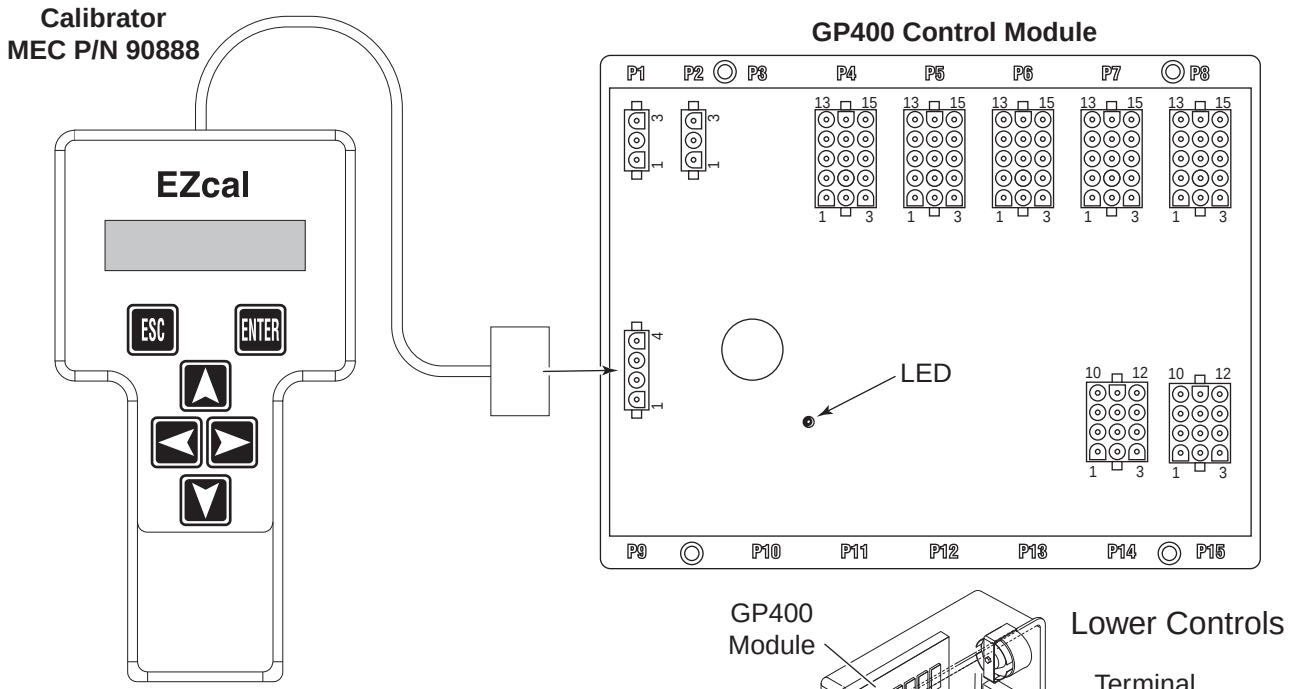
EZ-Cal Scan Tool

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

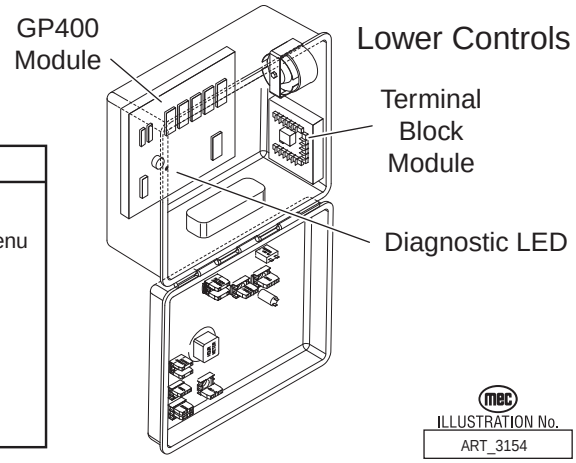
Using The EZ-Cal Scan Tool

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

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

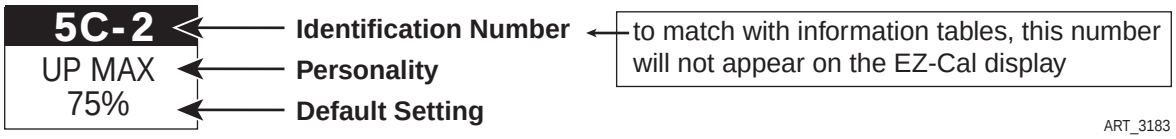


SYMBOL	KEY FUNCTIONS
ESC ENTER	**ESC/ENTER BUTTONS** To move back and forth between menu and sub-menu
◀ ▶	**LEFT/RIGHT BUTTONS** Select menus and setting to be adjusted
▲ ▼	**UP/DOWN BUTTONS** Adjust setting values



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 Connect the EZ-Cal as mentioned above. The display will read, “HELP:PRESS ENTER”. Press Enter to display the current error message. Use the following list of error messages to better understand the fault.

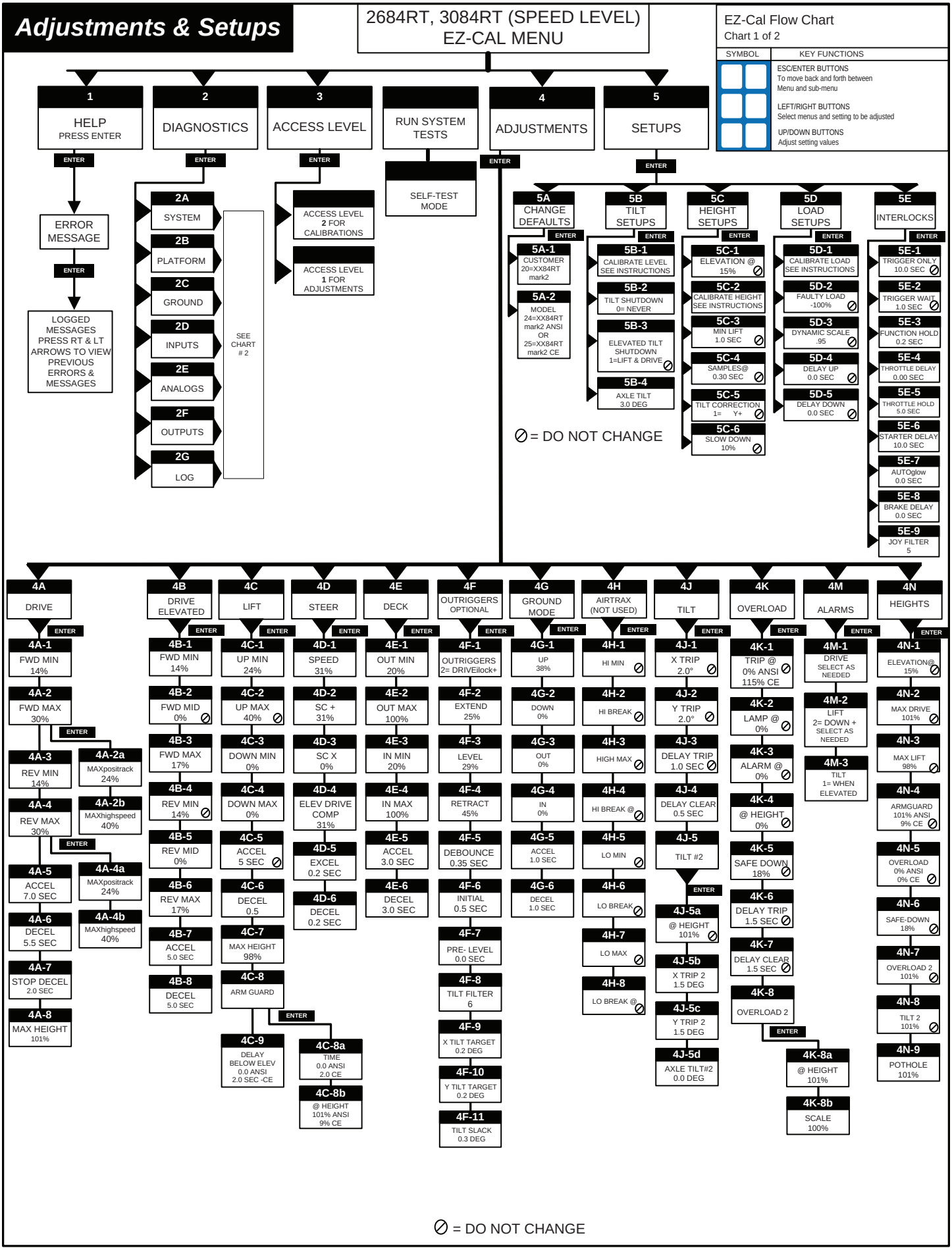
Pressing Enter twice will provide a scrolling message of the current error followed by a log of previous errors that may have occurred within recent operation.

Scrolling Messages

The EZ-Cal will provide a scrolling message of the current error followed by a log of previous errors that may have occurred within recent operation. Refer to “Scrolling Message” on page 103.

Flash Codes

Flash Codes, provided from the GP400 red LED, will also assist in the event an EZ-Cal is not available. However, the EZ-Cal yields considerably more relevant information. Refer to “EZ-Cal HELP Messages” on page 107 for flash coded error messages.


Adjustments & Setups
2684RT, 3084RT (SPEED LEVEL)
EZ-CAL MENU
EZ-Cal Flow Chart
Chart 1 of 2
SYMBOL
KEY FUNCTIONS
ESC/ENTER BUTTONS
To move back and forth between Menu and sub-menu
LEFT/RIGHT BUTTONS
Select menus and setting to be adjusted
UP/DOWN BUTTONS
Adjust setting values
1 HELP PRESS ENTER
ERROR MESSAGE
LOGGED MESSAGES PRESS RT & LT ARROWS TO VIEW PREVIOUS ERRORS & MESSAGES
2 DIAGNOSTICS
2A SYSTEM
2B PLATFORM
2C GROUND
2D INPUTS
2E ANALOGS
2F OUTPUTS
2G LOG
SEE CHART # 2
3 ACCESS LEVEL
ACCESS LEVEL 2 FOR CALIBRATIONS
ACCESS LEVEL 1 FOR ADJUSTMENTS
RUN SYSTEM TESTS
SELF-TEST MODE
4 ADJUSTMENTS
5 SETUPS
5A CHANGE DEFAULTS
5A-1 CUSTOMER 20=XX84RT mark2
5A-2 MODEL 24=XX84RT mark2 ANSI OR 25=XX84RT mark2 CE
5B TILT SETUPS
5B-1 CALIBRATE LEVEL SEE INSTRUCTIONS
5B-2 TILT SHUTDOWN 0= NEVER
5B-3 ELEVATED TILT SHUTDOWN 1=LIFT & DRIVE
5B-4 AXLE TILT 3.0 DEG
5C HEIGHT SETUPS
5C-1 ELEVATION @ 15%
5C-2 CALIBRATE HEIGHT SEE INSTRUCTIONS
5C-3 MIN LIFT 1.0 SEC
5C-4 SAMPLES@ 0.30 SEC
5C-5 TILT CORRECTION 1= Y+
5C-6 SLOW DOWN 10%
5D LOAD SETUPS
5D-1 CALIBRATE LOAD SEE INSTRUCTIONS
5D-2 FAULTY LOAD -100%
5D-3 DYNAMIC SCALE .95
5D-4 DELAY UP 0.0 SEC
5D-5 DELAY DOWN 0.0 SEC
5E INTERLOCKS
5E-1 TRIGGER ONLY 10.0 SEC
5E-2 TRIGGER WAIT 1.0 SEC
5E-3 FUNCTION HOLD 0.2 SEC
5E-4 THROTTLE DELAY 0.00 SEC
5E-5 THROTTLE HOLD 5.0 SEC
5E-6 STARTER DELAY 10.0 SEC
5E-7 AUTOglow 0.0 SEC
5E-8 BRAKE DELAY 0.0 SEC
5E-9 JOY FILTER 5
⊘ = DO NOT CHANGE
4A DRIVE
4A-1 FWD MIN 14%
4A-2 FWD MAX 30%
4A-2a MAXpositrack 24%
4A-2b MAXhighspeed 40%
4A-3 REV MIN 14%
4A-4 REV MAX 30%
4A-4a MAXpositrack 24%
4A-4b MAXhighspeed 40%
4A-5 ACCEL 7.0 SEC
4A-6 DECEL 5.5 SEC
4A-7 STOP DECEL 2.0 SEC
4A-8 MAX HEIGHT 101%
4B DRIVE ELEVATED
4B-1 FWD MIN 14%
4B-2 FWD MID 0%
4B-3 FWD MAX 17%
4B-4 REV MIN 14%
4B-5 REV MID 0%
4B-6 REV MAX 17%
4B-7 ACCEL 5.0 SEC
4B-8 DECEL 5.0 SEC
4C LIFT
4C-1 UP MIN 24%
4C-2 UP MAX 40%
4C-3 DOWN MIN 0%
4C-4 DOWN MAX 0%
4C-5 ACCEL 5 SEC
4C-6 DECEL 0.5
4C-7 MAX HEIGHT 98%
4C-8 ARM GUARD
4C-9 DELAY BELOW ELEV 0.0 ANSI 2.0 SEC -CE
4C-8a TIME 0.0 ANSI 2.0 CE
4C-8b @ HEIGHT 101% ANSI 9% CE
4D STEER
4D-1 SPEED 31%
4D-2 SC + 31%
4D-3 SC X 0%
4D-4 ELEV DRIVE COMP 31%
4D-5 EXCEL 0.2 SEC
4D-6 DECEL 0.2 SEC
4E DECK
4E-1 OUT MIN 20%
4E-2 OUT MAX 100%
4E-3 IN MIN 20%
4E-4 IN MAX 100%
4E-5 ACCEL 3.0 SEC
4E-6 DECEL 3.0 SEC
4F OUTRIGGERS OPTIONAL
4F-1 OUTRIGGERS 2= DRIVEilock+
4F-2 EXTEND 25%
4F-3 LEVEL 29%
4F-4 RETRACT 45%
4F-5 DEBOUNCE 0.35 SEC
4F-6 INITIAL 0.5 SEC
4F-7 PRE- LEVEL 0.0 SEC
4F-8 TILT FILTER 6
4F-9 X TILT TARGET 0.2 DEG
4F-10 Y TILT TARGET 0.2 DEG
4F-11 TILT SLACK 0.3 DEG
4G GROUND MODE
4G-1 UP 38%
4G-2 DOWN 0%
4G-3 OUT 0%
4G-4 IN 0%
4G-5 ACCEL 1.0 SEC
4G-6 DECEL 1.0 SEC
4H AIRTRAX (NOT USED)
4H-1 HI MIN
4H-2 HI BREAK
4H-3 HIGH MAX
4H-4 HI BREAK @
4H-5 LO MIN
4H-6 LO BREAK
4H-7 LO MAX
4H-8 LO BREAK @
4J TILT
4J-1 X TRIP 2.0°
4J-2 Y TRIP 2.0°
4J-3 DELAY TRIP 1.0 SEC
4J-4 DELAY CLEAR 0.5 SEC
4J-5 TILT #2
4J-5a @ HEIGHT 101%
4J-5b X TRIP 2 1.5 DEG
4J-5c Y TRIP 2 1.5 DEG
4J-5d AXLE TILT#2 0.0 DEG
4K OVERLOAD
4K-1 TRIP @ 0% ANSI 115% CE
4K-2 LAMP @ 0%
4K-3 ALARM @ 0%
4K-4 @ HEIGHT 0%
4K-5 SAFE DOWN 18%
4K-6 DELAY TRIP 1.5 SEC
4K-7 DELAY CLEAR 1.5 SEC
4K-8 OVERLOAD 2
4K-8a @ HEIGHT 101%
4K-8b SCALE 100%
4M ALARMS
4M-1 DRIVE SELECT AS NEEDED
4M-2 LIFT 2= DOWN + SELECT AS NEEDED
4M-3 TILT 1= WHEN ELEVATED
4N HEIGHTS
4N-1 ELEVATION@ 15%
4N-2 MAX DRIVE 101%
4N-3 MAX LIFT 98%
4N-4 ARMGUARD 101% ANSI 9% CE
4N-5 OVERLOAD 0% ANSI 0% CE
4N-6 SAFE-DOWN 18%
4N-7 OVERLOAD 2 101%
4N-8 TILT 2 101%
4N-9 POTHOLE 101%
ENTER
⊘ = DO NOT CHANGE

DIAGNOSTIC

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

XX84RT SERIES ANSI & CE EZ-CAL MENU

2 DIAGNOSTICS

ENTER

EZ-Cal Flow Chart

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

2A SYSTEM (ENTER)
- 2A-1 MODE — PRESS ENTER FOR MESSAGES
- 2A-2 SUPPLY (ENTER)
  - 2A-2A SUPPLY — BATTERY VOLTS
  - 2A-2B SUPPLY — 12 VOLT SUPPLY
  - 2A-2C SUPPLY — CAP BANK
  - 2A-2D SUPPLY — BATT SCALE
- 2A-3 VALVE SUPPLY — ON/OFF
- 2A-4 MOTOR VOLTS — ACTUAL
- 2A-5 MOTOR AMPS — ACTUAL
- 2A-6 TEMPERATURE — OF P600 CONTROLLER
- 2A-7 TILT (ENTER)
  - 2A-7A TILT FILTERED — NOT USED
  - 2A-7B TILT LOCAL — GP400 LEVEL
- 2A-8 TILTED — YES OR NO
- 2A-9 HEIGHT — ACTUAL IN % (ENTER)
  - 2A-9A HEIGHT 1 — ANSI & CE
  - 2A-9B HEIGHT 2 — CE ONLY
- 2A-10 LOAD — OVERLOAD PROTECTION ONLY
- 2A-11 OVERLOADED — YES or NO
- 2A-12 LAST MOVED — NOT USED
- 2A-13 ELEVATED — YES or NO
- 2A-14 OUTRIGGERS — AUTO-LEVEL INFO
- 2A-15 AXLE — ENTER FOR INFO (ENTER)
  - 2A-15A AXLE — ANSI & CE
  - 2A-15B AXLE LOCKED — YES OR NO
  - 2A-15C AXLE ANGLE — IN DEGREES
- 2A-16 GEN STATE — HYBRED OPTION (ENTER)
  - 2A-16A GEN DEB
  - 2A-16B GEN RPM
  - 2A-16C GEN RMS — PRESS ENTER (ENTER)
    - 2A-16C1 TRMS

2B PLATFORM (ENTER)
- 2B-1 TRIGGER — ON/OFF
- 2B-2 DLD — ACTUAL
- 2B-3 JOYSTICK — ACTUAL DEG OF MOVEMENT
- 2B-4 FWD / UP — FWD JOYSTCK MOVEMENT
- 2B-5 REV / UP — REV JOYSTICK MOVEMENT
- 2B-6 LEFT(STEER) — ON/OFF
- 2B-7 RIGHT (STEER) — ON/OFF
- 2B-8 POSITRACK — ON/OFF (ENTER)
  - 2B-9 AUTO-POSITRACK — ON/OFF
- 2B-10 AIRTRAX — NOT USED

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

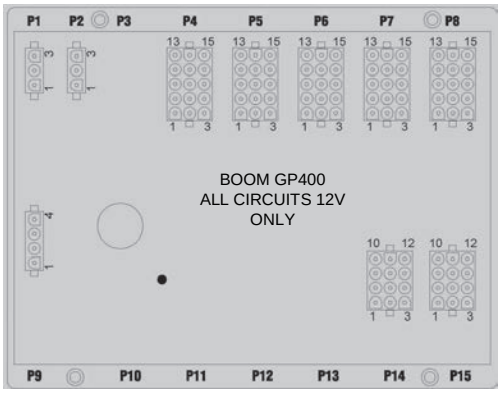
2D INPUTS (ENTER)
- 2D-1 P7-1 — 12 V SUPPLY
- 2D-2 P7-2 — BASE SELECTED
- 2D-3 P7-3 — UP SELECTED
- 2D-4 P7-4 — PLATFORM SELECTED
- 2D-5 P7-7 — DOWN SELECTED
- 2D-6 P7-10 — ENG PRE-HEAT
- 2D-7 P7-12 — ENG START
- 2D-8 P7-13 — ENG OIL PRESSURE

2E ANALOGS (ENTER)
- 2E-1 GP400 ANALOGS — MAIN CPU (ENTER)
  - 2E-1A P8-2 — ANGLE TRANSDUCER 1
  - 2E-1B P8-5 — ANGLE TRANSDUCER 2
  - 2E-1C P8-6 — PRESSURE TRANSDUCER
  - 2E-1D P8-9 — TBM IN
- 2E-2 MATRIX ANALOGS — UPPER CONTROL (ENTER)
  - 2E-2A M2-6 — POTENTIOMETER

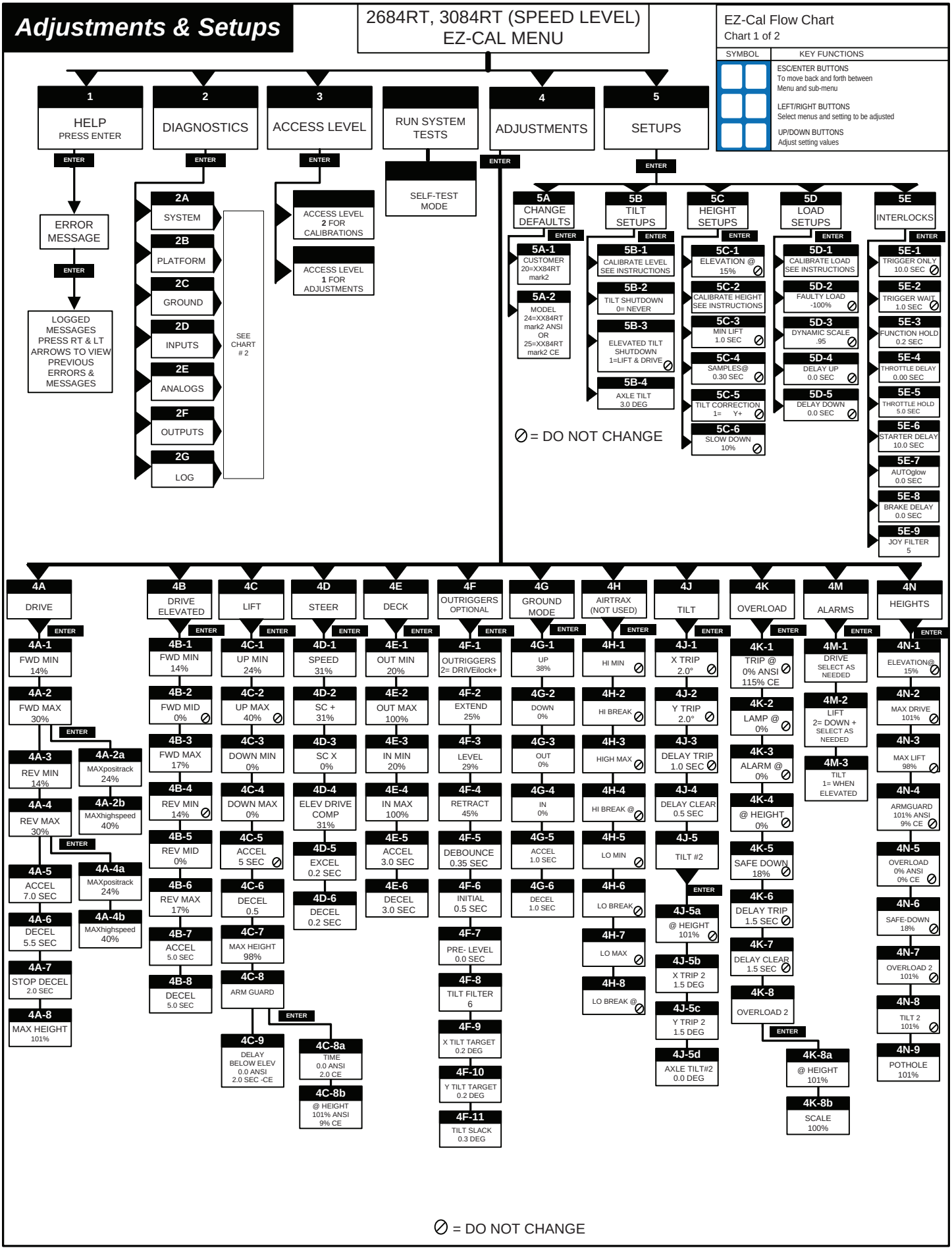
2F OUTPUTS (ENTER)
- 2F-1 P4-1 — CHOKE, PREHEAT
- 2F-2 P4-2 — STARTER
- 2F-3 P4-4 — THROTTLE
- 2F-4 P4-7 — ALTERNATOR EXCITE
- 2F-5 P4-8 — IGNITION, FUEL
- 2F-6 P4-14 — DOWN VALVE
- 2F-7 P5-1 — LIFT VALVE
- 2F-8 P5-2 — STEER RIGHT
- 2F-9 P5-3 — STEER LEFT
- 2F-10 P5-6 — ALARM
- 2F-11 P5-9 — HOUR METER
- 2F-12 P5-14 — STRT INHIBIT LIGHT
- 2F-13 P6-1 — LEVEL BACK
- 2F-14 P6-2 — LEVEL FORWARD
- 2F-15 P6-3 — LEVEL RIGHT
- 2F-16 P6-4 — LEVEL LEFT
- 2F-17 P6-13 — AXLE LOCK
- 2F-18 P6-15 — A/C GENERATOR

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

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



Adjustments & Setups



DIAGNOSTIC

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

XX84RT SERIES ANSI & CE EZ-CAL MENU

2 DIAGNOSTICS

ENTER

EZ-Cal Flow Chart

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

2A SYSTEM (ENTER)
- 2A-1 MODE — PRESS ENTER FOR MESSAGES
- 2A-2 SUPPLY (ENTER)
  - 2A-2A SUPPLY — BATTERY VOLTS
  - 2A-2B SUPPLY — 12 VOLT SUPPLY
  - 2A-2C SUPPLY — CAP BANK
  - 2A-2D SUPPLY — BATT SCALE
- 2A-3 VALVE SUPPLY — ON/OFF
- 2A-4 MOTOR VOLTS — ACTUAL
- 2A-5 MOTOR AMPS — ACTUAL
- 2A-6 TEMPERATURE — OF P600 CONTROLLER
- 2A-7 TILT (ENTER)
  - 2A-7A TILT FILTERED — NOT USED
  - 2A-7B TILT LOCAL — GP400 LEVEL
- 2A-8 TILTED — YES OR NO
- 2A-9 HEIGHT — ACTUAL IN % (ENTER)
  - 2A-9A HEIGHT 1 — ANSI & CE
  - 2A-9B HEIGHT 2 — CE ONLY
- 2A-10 LOAD — OVERLOAD PROTECTION ONLY
- 2A-11 OVERLOADED — YES or NO
  - 2A-15A AXLE — ANSI & CE
  - 2A-15B AXLE LOCKED — YES OR NO
  - 2A-15C AXLE ANGLE — IN DEGREES
- 2A-12 LAST MOVED — NOT USED
- 2A-13 ELEVATED — YES or NO
- 2A-14 OUTRIGGERS — AUTO-LEVEL INFO
- 2A-15 AXLE — ENTER FOR INFO (ENTER)
- 2A-16 GEN STATE — HYBRED OPTION (ENTER)
  - 2A-16A GEN DEB
  - 2A-16B GEN RPM
  - 2A-16C GEN RMS — PRESS ENTER (ENTER)
    - 2A-16C1 TRMS

2B PLATFORM (ENTER)
- 2B-1 TRIGGER — ON/OFF
- 2B-2 DLD — ACTUAL
- 2B-3 JOYSTICK — ACTUAL DEG OF MOVEMENT
- 2B-4 FWD / UP — FWD JOYSTCK MOVEMENT
- 2B-5 REV / UP — REV JOYSTICK MOVEMENT
- 2B-6 LEFT(STEER) — ON/OFF
- 2B-7 RIGHT (STEER) — ON/OFF
- 2B-8 POSITRACK — ON/OFF (ENTER)
  - 2B-9 AUTO-POSITRACK — ON/OFF
- 2B-10 AIRTRAX — NOT USED

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

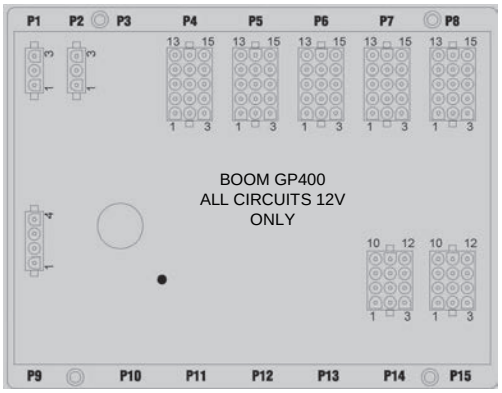
2D INPUTS (ENTER)
- 2D-1 P7-1 — 12 V SUPPLY
- 2D-2 P7-2 — BASE SELECTED
- 2D-3 P7-3 — UP SELECTED
- 2D-4 P7-4 — PLATFORM SELECTED
- 2D-5 P7-7 — DOWN SELECTED
- 2D-6 P7-10 — ENG PRE-HEAT
- 2D-7 P7-12 — ENG START
- 2D-8 P7-13 — ENG OIL PRESSURE

2E ANALOGS (ENTER)
- 2E-1 GP400 ANALOGS — MAIN CPU (ENTER)
  - 2E-1A P8-2 — ANGLE TRANSDUCER 1
  - 2E-1B P8-5 — ANGLE TRANSDUCER 2
  - 2E-1C P8-6 — PRESSURE TRANSDUCER
  - 2E-1D P8-9 — TBM IN
- 2E-2 MATRIX ANALOGS — UPPER CONTROL (ENTER)
  - 2E-2A M2-6 — POTENTIOMETER

2F OUTPUTS (ENTER)
- 2F-1 P4-1 — CHOKE, PREHEAT
- 2F-2 P4-2 — STARTER
- 2F-3 P4-4 — THROTTLE
- 2F-4 P4-7 — ALTERNATOR EXCITE
- 2F-5 P4-8 — IGNITION, FUEL
- 2F-6 P4-14 — DOWN VALVE
- 2F-7 P5-1 — LIFT VALVE
- 2F-8 P5-2 — STEER RIGHT
- 2F-9 P5-3 — STEER LEFT
- 2F-10 P5-6 — ALARM
- 2F-11 P5-9 — HOUR METER
- 2F-12 P5-14 — STRT INHIBIT LIGHT
- 2F-13 P6-1 — LEVEL BACK
- 2F-14 P6-2 — LEVEL FORWARD
- 2F-15 P6-3 — LEVEL RIGHT
- 2F-16 P6-4 — LEVEL LEFT
- 2F-17 P6-13 — AXLE LOCK
- 2F-18 P6-15 — A/C GENERATOR

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

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



EZ-Cal Adjustment

Refer to “Using the EZ-Cal Scan Tool” on page 91.

Adjustments possible in Access Level 1 Only.

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

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

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

Operation	ID	Personality	Factory Setting	Explanation
5A DRIVE (PLATFORM STOWED)	5A-1	FWD Min	33%	Slowest speed possible
	5A-2	FWD Max	100%	Maximum speed potential
	5A-3	REV Min	31%	Slowest speed possible
	5A-4	REV Max	100%	Maximum speed potential
	5A-5	ACCEL	1.8 sec	Ramp-up time to maximum
	5A-6	DECEL	1.6 sec	Ramp-down time to stop
	5A-7	MAX Height	101%	Maximum drivable height
POSITRACK	5A-8	Positrack	-	Sub category, press ENTER to access
Sub Menu	5A-8a	AUTO below	0%	Not Used
	5A-8b	AUTO	Not Used	Not Used
5B DRIVE ELEVATED	5B-1	FWD Min	33%	Slowest speed possible
	5B-2	FWD Max	46%	Maximum speed potential
	5B-3	REV Min	31%	Slowest speed possible
	5B-4	REV Max	49%	Maximum speed potential
	5B-5	ACCEL	5.0 sec	Ramp-up time to maximum
	5B-6	DECEL	5.0 sec	Ramp-down time to stop
5C LIFT	5C-1	UP Min	5%	Slowest speed possible
	5C-2	UP Max	52%	Maximum speed potential
	5C-3	DOWN Min	0% (not used)	Gravity down (not used)
	5C-4	DOWN Max	0% (not used)	Gravity down (not used)
	5C-5	ACCEL	1.2 sec	Ramp-up time to maximum
	5C-6	DECEL	0.5 sec	Ramp-down time to stop
	5C-7	MAX Height	**ANSI:** 101% **CE:** 98%	Maximum height potential
ARMGUARD (CE)	5C-8	Armguard	-	Sub category, press ENTER to access
Sub Menu	5C-8a	Armguard Time	0.0 sec	CE Option Only
	5C-8b	Armguard @ Height	101%	CE Option Only
5D STEER	5D-1	Speed	0%	Maximum speed potential
	5D-2	Drive Compensation	0%	Adds additional to drive speed
	5D-3	Drive Comp Elevated	0%	Adds additional to drive speed elevated
	5D-4	ACCEL	0.2 sec	Ramp-up time to maximum
	5D-5	DECEL	0.2 sec	Ramp-down time to stop
5E - DECK	5E-	Not Used	Not Used	Power-out deck (not used)

Operation	ID	Personality	Factory Setting	Explanation
5F OUTRIGGERS Called “Outriggers” on the EZ-Cal, these personalities effect **Auto-level** function	5F-1	Outriggers	2	Not Used
	5F-2	Extend	50%	O/R speed before all legs down
	5F-3	Level	35%	O/R speed after all legs touch down
	5F-4	Retract	55%	Maximum speed potential
	5F-5	Debounce	0.35	Compensates for switch bounce
	5F-6	Initial	0.5	Not Used
	5F-7	Tilt filter	6	Compensates for tilt sensor free movement
	5F-8	X Tilt target	0.2 deg	Target level stops movement
	5F-9	Y Tilt target	0.2 deg	Target level stops movement
	5F-10	Tilt Slack	0.3 deg	Additional compensation
	5F-11	Outrigger Test	Yes/No	Not Used
5G GROUND MODE Lower Control Operations	5G-1	UP	53%	Maximum speed potential
	5G-2	DOWN	0%	Gravity down
	5G-3	OUT	0%	Power deck operation (not used)
	5G-4	IN	0%	Power deck operation (not used)
	5G-5	ACCEL	1.0 sec	Ramp-up time to maximum
	5G-6	DECEL	1.0 sec	Ramp-down drive output
5H TILT	5H-1	X Trip	2.0 degrees	Angle tilt sensor signals Out Of Level
	5H-2	Y Trip	2.0 degrees	Angle tilt sensor signals Out Of Level
	5H-3	Delay Trip	2.0 sec	Time delay between Tip and Signal
	5H-4	Delay Clear	0.5 sec	Time delay between Tip and Signal OFF
TILT 2	5H-4	Tilt 2	-	Sub category, press ENTER to access
Sub Menu	5H-5A	At Height	101%	Point where lesser tilt angle used
	5H-5B	X Trip 2	1.5 sec	Not Used
	5H-5C	Y Trip 2	1.5 sec	Not Used
5I OVERLOAD **ANSI:** values = 0 **CE: values apply**	5I-1	Trip @	**ANSI:** 0% **CE:** 110%	% of weight over maximum to trigger overload
	5I-2	Lamp @	**ANSI:** 0% **CE:** 0%	% of weight over maximum to trigger lamp
	5I-3	Alarm @	**ANSI:** 0% **CE:** 0%	% of weight over maximum to trigger alarm
	5I-4	@ Height	**ANSI:** 0% **CE:** 8%	% of elevation load sense starts monitoring weight
	5I-5	Safe Down	**ANSI:** 0% **CE:** 12%	% of elevation lift-down still operates in overload
	5I-6	Delay Trip	1.5 sec	Delay before overload trip
	5I-7	Delay Clear	1.5 sec	Delay before overload clear
OVERLOAD 2 **Sub Menu**	5I-8	Overload # 2	-	Sub category, press ENTER to access
	5I-8a	@ Height	0%	% of height for secondary overload valve
	5I-8b	Scale	100%	% of reduced overload valve
5J ALARMS	5J-1	Drive: Yes/No	No	1 = FWD 2 = REV 3 = Both 4 = All Motion
	5J-2	Lift	2 = Down	1 = UP 2 = DOWN 3 = Both 4 = All Motion
	5J-3	Tilt	1 = When Elevated	1 = When Elevated 2 = Always
5K HEIGHTS	5K-1	Elevation	15%	Point at which machine enters elevated mode
	5K-2	Maximum Drive	101%	Maximum drivable height
	5K-3	Maximum Lift	**ANSI:** 101% **CE:** 98%	Maximum elevated height potential
	5K-4	Armguard	101%	Stops descent for 5 sec
	5K-5	Overload	**ANSI:** 0% **CE:** 8%	% of elevation load sense starts monitoring weight
	5K-6	Safe Down	**ANSI:** 0% **CE:** 12%	% of elevation lift-down still operates in overload
	5K-7	Overload # 2	0%	Not Used
	5K-8	Tilt # 2	**ANSI:** 0% **CE:** 0%	Reduced degree of tilt at % elevation

Operation	ID	Personality	Factory Setting	Explanation
6A CHANGE DEFAULTS	6A-1	Customer	5: XX84RT	Identifies Base Model Must be set when GP400 is Replaced
	6A-2	Model	5 = ANSI 6 = CE	Select from these choices only
6D TILT SETUPS	6B-1	Calibrate Level?	Y = ENTER N = ESC	Follow instructions in Section 7- Level Sensor Calibration
	WARNING! Refer to Tilt Sensor Calibration instructions before attempting calibration			
	6B-2	Tilt Shutdown	0 = Never	Function shutdown tilted when platform stowed
	6B-3	Elevated Shutdown	1 = Lift & Drive	Function shutdown tilted when platform elevated
	6B-4	Axle Tilt	3.0 deg	Maximum deflection of axle before elevated drive interlock
6C HEIGHT SETUP (CE OPTION ONLY)	6C-1	Elevation @	13%	
	6C-2	Calibrate Height	Start Calibration	See Section 7 for calibration of Height Sensor
	6C-3	Minimum Lift	1.0 sec	Calibration setting - do not change
	6C-4	Samples	0.10 sec	Calibration setting - do not change
	6C-5	Tilt Correction	Disabled	Calibration setting - do not change
	6C-6	Slow Down	10%	Calibration setting - do not change
6D LOAD SETUPS (CE OPTION ONLY)	6D-1	Calibrate Load	Start Calibration	See Section 7 for calibration of CE Overload System
	6D-2	Faulty Load	100%	Calibration setting - do not change
	6D-3	Dynamic Scale	95%	Calibration setting - do not change
	6D-4	Delay Up	0.0 sec	Not Used
	6D-5	Delay Down	0.0 sec	Not Used
6E INTERLOCKS	6E-1	Trigger Only	10.0 sec	Enable bar held without operation before interlock
	6E-2	Trigger Wait	0.0 sec	Delay after enable bar pulled before function enabled
	6E-3	Function hold	0.2 sec	Function enabled after operator release
Delays	6E-4	Delays	-	Sub category, press ENTER to access
Sub Menu	6E-4a	Throttle Delay	0.0 sec	Delay before throttle enabled
	6E-4b	Start Delay	10.0 sec	Interlocks start to protect start system from overheat

EZ-Cal Diagnostics

The EZ-Cal Diagnostics menu provides the ability to view and test individual circuits for irregularities. Whether diagnosing a failure or testing functions during preventative maintenance, the Diagnostics Menu provides a quick view at the inputs and outputs as registered by the GP400 Control Module in real time. Using the EZ-Cal Flow Chart, compare ID number to this menu for circuit identification and result.

To reach DIAGNOSTICS menu from HELP;

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

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

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

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

Selection	ID	EZ-Cal Readout	Explanation
2A SYSTEM	2A-1	MODE	Current operation - Press ENTER to read interlock when 2-2 flash is present
	2A-2	Supply	Voltage through EMS circuit to either Base or Platform input. 12 - 13.5 volts
Sub Menu	2A-2a	Supply	Voltage through EMS circuit to either Base or Platform input. 12 - 13.5 volts
	2A-2b	Cap Bank Voltage	Capacitor bank charge voltage, should be around 35 volts - Electric models only
	2A-3	Valve Supply	Supply all 12 volt circuits through TBM Module
	2A-4	Motor Volts	Not used on I/C engine models
	2A-5	Motor 1	Not used on I/C engine models
	2A-6	Temperature	Not used on I/C engine models
	2A-7	Tilt	Current state of tilt as measured by 4-way e-z fit sensor located in elevating linkage
Sub Menu	2A-7a	Tilt Filtered	Slowed tilt value used for O/R or Auto-level
	2A-7b	Tilt Local	Current state of level as measured by level sensor located inside the GP400
	2A-8	Tilted Y/N	Indicates tilted state. All motorized functions stop above limit, lift disabled in stowed
	2A-9	Height	Current state of platform elevation in %. (CE overload option only)
Sub Menu	2A-9a	Height 1 %	Reading in % from Angle Transducer #1 - relates directly to degree of elevation
	2A-9b	Height 2 %	Reading in % from Angle Transducer #2 - CE Equipped units only
	2A-10	Load	Current load on platform in %. (CE overload option only)
	2A-11	Overloaded Y/N	Platform overloaded. (CE overload option only)
	2A-12	Last Moved	Not used
	2A-13	Elevated Y/N	Shows platform elevation above/below limit switch, test limit switch operation
	2A-14	Outriggers Y/N	Turns the auto-level feature on/off
Sub Menu	2A-14a	Retracted Y/N	All Retract switches closed - For outrigger equipped units only.
	2A-14b	Extended Y/N	All pressure switches closed - For outrigger equipped units only.
	2A-14c	Status	For outrigger equipped units only
	2A-14d	Outrigger Test	Follow instructions on EZ-Cal to test O/R circuits - For outrigger equipped units only.
	2A-14e	Auto-retract 15s	Retract in drive mode - auto-retract feature used on 5492 models only
	2A-15	Axle	Press ENTER for Axle sub menus

Selection	ID	EZ-Cal Readout	Explanation
Sub Menu	2A-15a	Level / Off Level	Status of axle position as read by GP400 - Not used on all models
	2A-15b	Locked Y/N	Status of oscillating axle lock valves, locked = no oscillation - Not used on all models
	2A-15c	Angle	Position of oscillating Axle relative to the chassis - Not used on all models
2B PLATFORM	2B-1	Trigger ON/OFF	Current status of enable trigger - upper controls
	2B-2	DLD	Status of Lift/Drive selector switch
	2B-3	Joystick	Indicates % of stroke from center in real time. Direction not indicated here
	2B-4	FWD/DWN OFF/ ON	Status of Forward micro-switch Forward stroke of the joystick
	2B-5	REV/UP OFF/ON	Status of Reverse micro-switch Reverse stroke of the joystick
	2B-6	LEFT OFF/ON	Status of Left Steer switch
	2B-7	RIGHT OFF/ON	Status of Right Steer switch
	2B-8	Positrac Y/N	Status of rear wheel solenoids activation. Activated in high speed or elevated drive
	2B-9	EMSG OFF/ON	Not used
2C GROUND	2C-1	UP OFF/ON	Status of Up switch from lower control station
	2C-2	DOWN OFF/ON	Status of Down switch from lower control station
	2C-3	OUT OFF/ON	Not used
	2C-4	IN OFF/ON	Not used
	2C-5	EMSg OFF/ON	Not used
2D INPUTS	2D-1	P7-1	12 Volt Supply. Battery voltage from TBM Module
	2D-2	P7-2	Base Selected. ON= Base/Platform select switch in Base position
	2D-3	P7-3	Up. On= platform UP switch activated to elevate platform
	2D-4	P7-4	Platform Selected. ON= Base/Platform selector switch in Platform position.
	2D-5	P7-5	Limit Switch. ON= limit switch closed - platform low enough to be in stowed position
	2D-6	P7-7	Down. ON= Down switch activated for platform lower operation
	2D-7	P79	Throttle Solenoid. ON= Throttle requested by function operation
	2D-8	P7-10	Choke (gas engine) or pre-heat (diesel). ON= Choke or Pre-heat switch activated
	2D-9	P7-11	Axle Center Switch. ON= Front axle parallel with chassis - Elevated drive enabled
	2D-10	P7-12	Start. ON= input from engine-start switch
	2D-11	P7-13	Oil Pressure Switch
2E ANALOGS		Not used	Not used

Selection	ID	EZ-Cal Readout	Explanation
2F OUTPUTS	2F-1	P4-1	Choke (gas engine) or pre-heat (diesel). ON= Choke or Pre-heat activated
	2F-2	P4-2	Engine Start. ON= Starter activated
	2F-3	P4-4	Throttle Solenoid. ON= Throttle solenoid pulled in
	2F-4	P4-5	Fuel to fuel select switch. ON= fuel system activated
	2F-5	P4-6	Fuel to fuel select switch. ON= fuel system activated
	2F-6	P4-7	Alternator Excite. ON= power to activate alternator charge
	2F-7	P4-8	Ignition. ON= power to ignition coil (gas) or fuel hold solenoid (diesel)
	2F-8	P4-10	Rear Wheel Bi-pass Valves. ON= Valves powered, rear wheels in bi-pass
	2F-9	P4-12	Proportional Valve. ON= Proportional valve activated for lift and drive operation
	2F-10	P4-14	Down Valves. ON= Down valves activated for platform lower operation
	2F-11	P5-1	Lift Valve. ON= Lift valve activated for platform Lift
	2F-12	P5-2	Steer Right. ON= steer right valve activated
	2F-13	P5-3	Steer Left. ON= steer left valve activated
	2F-14	P5-4	Drive Forward. ON= drive forward valve activated
	2F-15	P5-5	Drive Reversed. ON= drive reverse valve activated
	2F-16	P5-6	Alarm. ON= alarm activated (default alarm in Down, may be selected for other modes)
	2F-17	P5-7	High Torque. ON= high torque valve activated (drive range toggle in down position)
	2F-18	P5-8	High Speed. ON= high speed valve activated (drive range toggle in up position)
	2F-19	P5-9	Hour Meter. ON= Meter powered up
	2F-20	P5-12	Power Supply to limit switch and TBM module - should be ON when system powered
	2F-21	P6-1	Rear Pitching Valve. ON= rear pitching valve activated for Platform Rear Leveling
	2F-22	P6-2	Front Pitching Valve. ON= Front Pitching valve activated for Platform forward Level
	2F-23	P6-3	Outrigger – Not used
	2F-24	P6-4	Left Rolling Valve. ON= Left valve activated for platform Level Left
	2F-25	P6-11	Axle Lock Valves. ON= Axle valves powered, front axle will oscillate
2G LOG	2G-1	Cal Date	Date of Load Sense calibration (CE option only)
	2G-2	Software	MEC specific software version
	2G-3	Powered	Accumulated time GP400 powered up (red LED on)

EZ-Cal Retrieve Mode And Help Messages

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

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

MODE Menu

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

HELP Menu

Provides various HELP messages to identify failure modes.

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

MODE Message

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

Scrolling Message

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

Other helpful menus available include DIAGNOSTICS which allows the technician to monitor specific plug input/output information. Refer to EZ-Cal Flow Chart 2 – Diagnostics (ANSI Page 94 – CE Page 96).

MODE Messages

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

INITIALIZING

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

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

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

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

GROUND UP, GROUND DOWN,
- A ground function is operating normally

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

GROUND FAULTY
- Multiple ground function inputs are active at the same time

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

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

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

FORWARD, REVERSE
- A platform drive function is operating normally

FORWARD (LEFT), FORWARD (RIGHT), REVERSE (LEFT), REVERSE (RIGHT)
- A platform drive function is operating normally, with steer also active

STEER LEFT, STEER RIGHT
- A platform steer function is operating normally (without drive)

UP, DOWN
- A platform lift/lower function is operating normally

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

LEFT LOCKED, RIGHT LOCKED

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

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

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

CHECK JOYSTICK
- Both platform joystick directions are active at the same time

STEER FAULTY
- Both platform steer directions are active at the same time

EXTENDING LEGS
- Outrigger legs are extending normally

RETRACTING LEGS
- Outrigger legs are extending normally

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

INTERLOCKED**
- An interlock shutdown is active, preventing one or more functions. The interlock can be due to many different causes …
- **Press <ENTER> from the MODE display to see the precise cause of the interlock (listed below) – press <ESC> from that display to return to the MODE display:

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

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

OVERLOADED
- The vehicle platform is overloaded, reduce platform load. **(CE option only)**

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

ARMGUARD
- During descent, the system is configured to stop movement to provide an armguard delay – release and re-select DOWN to continue lowering **(CE option only)**

TOO HOT
- The EZLIFT heatsink has reached 75ºc, preventing all functions except lowering. Functions will

be allowed again when the heatsink cools to below 70ºc.

- The heatsink temperature can be viewed in the DIAGNOSTICS/SYSTEM/ TEMPERATURE display, ID # 2a5.
- The heatsink must be bolted to a significant metal panel of the vehicle, capable of dissipating heat to the environment.

UNCALIBRATED

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

EXTERNAL ALL, EXTERNAL DRIVE, EXTERNAL LIFT

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

EZ-Cal Help Messages

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

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

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

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

Information Only Messages

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

STARTUP! _____ (no flash code)

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

EVERYTHING OK _____ (no flash code)

- There is no problem with the system – it is ready to operate in platform mode when a function is selected.
- **Note:** If this is the HELP message when a function is selected, check for open-circuit switches or wiring.

GROUND MODE ACTIVE! _____ (no flash code)

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

CLOSE TRIGGER _____ (no flash code)

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

VEHICLE TILTED _____ (no flash code)

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

Function Active Messages

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

DRIVING! _____ (no flash code)
LIFTING! _____ (no flash code)
LOWERING! _____ (no flash code)
STEERING! _____ (no flash code)
EXTENDING OUTRIGGERS! _____ (no flash code)
RETRACTING OUTRIGGERS! _____ (no flash code)

Calibration Messages

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

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

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

FAULT: CUSTOMER _____ Flash Code: 1/1

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

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

Shutdown Help Messages

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

SHUTDOWN - CHECK EMS SWITCHES! _____ Flash Code: 2/1
- The Base/Platform selector switch position indicates the mode in which the system must operate if both are active together; the system does not know how to function

FUNCTIONS LOCKED - TEST MODE SELECTED _____ Flash Code: 2/2
- Test mode is not accessible with this system. Switch power off/on to reset to normal operation

FUNCTIONS LOCKED - ARMGUARD (CE option only)_____ Flash Code: 2/2
- During descent, the System can stop movement for a configurable time, to allow a safety check that no-one is close to the machine. The operator must release and re-select DOWN to continue lowering (after the delay time-out).

FUNCTIONS LOCKED – OVERLOADED (CE option only) _____ Flash Code: 2/2
- System overload features are active, and the platform is excessively loaded to allow operation – the platform load must be reduced.

FUNCTIONS LOCKED – UNDERLOADED (CE option only) _____ Flash Code: 2/2
- System overload features are active, and the platform load is too low to be valid – this could be caused by erroneous calibration, a sensor fault, or a change in the vehicle mechanics/ hydraulics.

FUNCTIONS LOCKED - TOO HIGH _____ Flash Code: 2/2
- The platform is raised too high to allow some functions. Certain functions may not be allowed above certain elevations.
- Check operator’s manual or ADJUSTMENTS/HEIGHTS/MAX DRIVE and MAX LIFT to see if drive and/or lift is allowed at all heights.

FUNCTIONS LOCKED - TILTED _____ Flash Code: 2/2
- The vehicle is tilted too much to allow some functions.
- Check operator’s manual or ADJUSTMENTS/TILT/Xtrip and Ytrip, which determine the maximum allowed vehicle tilt.
- Refer to EZ-Cal Flow Chart 1 – Adjustments and Setup.

FUNCTIONS LOCKED - EXTERNAL SHUTDOWN _____ Flash Code: 2/2
- An external shutdown is preventing functions – check DIAGNOSTICS/SYSTEM/ MODE/ INTERLOCK to see which external interlock is active.

CHECK GROUND INPUT SWITCHES! _____ Flash Code: 2/2
- There is a problem with the ground function select switches – more than one is active at the same time.

SELECT DRIVE/LIFT MODE! _____ Flash Code: 2/2
- There is a problem with the platform drive/lift select switch – neither mode is selected.

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

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

CHECK JOYSTICK SWITCHES! _____ Flash Code: 2/2
- There is a problem with the platform joystick switches – both directions are selected together.

RELEASE TRIGGER! _____ Flash Code: 2/2
- The trigger was closed at power-on, or closed for too long with no function selected.

RELEASE GROUND SWITCHES!_____ Flash Code: 2/2
- Ground function switches were closed at power-on.

RELEASE JOYSTICK SWITCHES!_____ Flash Code: 2/2
- Platform joystick switches were closed at power-on, or closed for too long without trigger switch (see SETUPS/INTERLOCKS/TRIGGER wait).

RELEASE OUTRIGGER SWITCHES!_____ Flash Code: 2/2
- Outrigger switches were closed at power-on.

Wiring Messages

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

FAULT: ENERGIZED VALVE - CHECK P5 WIRING! _____ Flash Code: 3/2
FAULT: VALVE FEEDBACK HIGH - CHECK VALVE WIRING!_____ Flash Code: 3/2
- There is a voltage on one or more valve outputs, when all outputs are off.
- Check each valve output to trace where the invalid supply is coming from.

FAULT: CAPBANK VOLTAGE TOO HIGH - CHECK LINE CONT! __ Flash Code: 3/3
- The voltage on the B+ stud of the controller (connected to an internal voltage stabilization capacitor bank) is too high when the line contactor is off. B+ stud voltage should be approximately 32 volts at idle.
- Check the line contactor tips are not welded, and check the power wiring for errors.

FAULT: ENERGIZED LINE CONTACTOR - CHECK P5 WIRING! __ Flash Code: 3/4
- There is a voltage on the line contactor coil output, when it is off.
- Check wiring to the line contactor coil to trace where the invalid supply is coming from.

FAULT: MOTOR OVERLOAD! _____ Flash Code: 3/5
- The power protection circuits in the controller have activated to protect from extreme overload.
- Check for short-circuit power wiring; check for a seized or shorted motor.

Supply Messages

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Sensor Messages CE Models

The following are “sensor” HELP messages – problems have been detected which are likely due to sensor issues (CE models).

FAULT: CHECK HEIGHT1 SENSOR _____ Flash Code: 6/1
FAULT: CHECK HEIGHT2 SENSOR _____ Flash Code: 6/1

- A height sensor is giving an out-of-range voltage (below 0.5V or above 4.5V).

FAULT: CHECK HEIGHT SENSORS_____ Flash Code: 6/1

- When two height sensors are fitted, both should read the same height at all times; this message indicates that the sensors are reading different heights. Check for loose sensors and/or re-calibrate.

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

- A pressure sensor is giving an out-of-range voltage (below 0.5V or above 4.5V).

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

- The elevation switch is in disagreement with the height sensor(s).
- During calibration, the height at which the elevation switch opens (while lifting) and closes (while lowering), is recorded. Subsequently, height and these calibration points are continuously checked – any significant difference generates this error.

CANBUS Messages

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

FAULT: CANBUS! _____ Flash Code: 6/6

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

Power Wiring Messages

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

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

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

Other Messages

The following are other HELP messages:

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

- This message should not occur!

FACTORY OVERRIDE_____ Flash Code: (fast flashing)

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

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

Troubleshooting Chart

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

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

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

Problem	Possible Cause	Remedy/Solution
General Power Issue		
No operation from Upper or Lower control station	Main Battery Switch turned OFF	Located left of Lower Control Box
	Emergency Stop Switch pushed or Ignition Switch turned OFF	Upper or lower E-Stop will cut all power, as will the Ignition Switch in the Upper Control Box
	Battery discharged or faulty cables	Will receive 4-4 or 7-7 flash on GP400. Clean, service and charge battery - repair cables
	Circuit Breaker Tripped	Located in Lower Control Box Panel Look for short circuit and/or damage in wiring or high amperage draw at valve coils or engine actuators.
	Damaged Upper Control Box harness	Inspect the harnesses and harness plugs for damage or broken wires - May receive 6-6 flash code on GP-400 (CAN bus) or no power at all
	Blown supply fuse	Locate source of short circuit. Inspect/replace fuse located just below Main Battery Switch
	Other fault in system monitored by GP400	Check HELP message on EZ-Cal or check Flash Code for error
Functions from Lower Controls but not from Upper Controls	Interlock Switch (Joystick)	Check power to red wire (power to switch) and power to purple wire (power out of switch) at the joystick plug
Lift/Lower		
Platform will not raise	Excessive weight on platform	Reduce weight to within platform capacity
	Lift Relief Valve out of adjustment	Adjust Relief Valve to rated platform capacity
	Lift Valve SV-1 not energized	Check wiring to lift valve Check for EZ-Cal message or flash code
	Lowering valve SV-5 stuck open (located at base of lift cylinder	Check and remove contamination from valve
	Level sensor out of level (platform elevated above 10')	Reposition machine to firm level surface Check level sensor function using EZ-Cal
	Main system pressure inadequate	Check pump output pressure
	Battery discharged - no charge output	Check battery voltage, alternator output (14.5 volts) Clean, service and charge battery
	System interruption	Check HELP messages using EZ-Cal

Problem	Possible Cause	Remedy/Solution
Platform will not lower or lowers slowly	Maintenance lock in maintenance position	Return maintenance lock to the stowed position
	Lowering valve not energized	Check wiring to lowering valve located on Lift Cylinder
	Lowering valve not shifting	Clean debris, check for damage, replace
	Lowering orifice/s plugged	Clean orifice/s located inside hose fitting on lift cylinder
	System interruption	Check HELP messages using EZ-Cal
Lowers but not completely	Down valve on lift cylinder inoperative	Check lift valve coil
Emergency lowering not working	Lowering valve not shifting	Clean debris, check for damage, replace
	Lowering orifice plugged	Clean orifice/s located inside hose fitting on the lift cylinder
	E-down battery discharged	Charge, check charge diode & connections
	Valve coil failed on cylinder	Test (6-8 ohms), replace
Drive		
No drive function	Lift/Drive select switch not in Drive position or not operational	Select Drive position (upper control box), Check switch Check switch position from GP400 with EZ-Cal (see EZ-Cal ID# 2b-2) DLD
	Drive valve not shifting (SVD1)	Check connections at valve Check Drive Valve for contamination Check Drive output from GP400 (See EZ-Cal chart ID# 2b-4 & 2b-5 also 2f1-4 & 2f-15)
	Proportional Valve not shifting (SP1)	Check connections at valve Check Proportional valve for contamination Check proportional output from GP400 (see EZ-Cal ID# 2f-9 & 2b-3)
	Drive system shut down (interlock)	Check HELP and MODE message on EZ-Cal
No drive elevated	Unit out of level	Lower and operate Auto-level
	System Interruption (interlock)	Check HELP messages using EZ-Cal
Slow drive with platform stowed	High torque enabled	Check Speed/Torque switch on upper controls
	Malfunctioning rear wheel bypass valve	Located on rear wheel motors only Check electrical by disconnecting valves Check function by replacing valves
	Wheel motors not functioning correctly	Inspect wheel motors for excessive bypass
Poor gradeability or drive performance	High or mid speed enabled	Check Speed/Torque switch on upper controls
	Batteries discharged	Check battery voltage with multi-meter or EZ-Cal Clean, service, charge batteries
	Wheel motors not functioning correctly	Inspect wheel motors for excessive bypass
	Malfunctioning rear wheel bypass valve	Located on rear wheels only Check electrical by disconnecting valves Check function by replacing valves
	Malfunctioning series parallel valves	Located on top of main hydraulic manifold PD1, PD2 & PD3 Remove and inspect
	Incorrectly adjusted or worn hydraulic pump	See Hydraulics section for pump adjustment Inspect or replace pump
Drive in one direction only	Drive valve SVD1 not energized in one direction	Check 12 volts to appropriate coil Check coil Check valve function
	Counterbalance valve CBV1 or CBV2 not functioning correctly	Swap counterbalance valves to see if functioning direction changes
	No output from GP400	Check switch position output from GP400 (see EZ-Cal ID# 4f-7 – FWD or 2f-9 – Reverse)

Problem	Possible Cause	Remedy/Solution
No low speed (high torque mode)	Speed/Torque switch inoperative	Check continuity through Speed Select switch with wires disconnected terminals 2 & 1
	Valve SV3 not functioning	Check for 12 volts and ground to valve Check for faulty valve spool Check switch position output from GP400 (See EZ-Cal ID# 2f-17)
	EP1 poppet valve not functioning	Check or replace valve (see hyd schematic for location)
No Mid Speed	SV3 or SV4 powered and/or shifted	These valves should not have 12 volts In mid-speed, check valve function
	Speed/Torque selector switch malfunction	Terminals 1 or 3 are common with terminal 2 when switch is in mid position
No High Speed	Speed/Torque selector switch inoperative	Check continuity through Speed Select switch with wires disconnected terminals 2 & 3
	Valve SV4 not functioning	Check voltage and ground to valve Check for faulty valve spool Check switch position output from GP400 (See EZ-Cal ID# 2f-18)
	EP2 poppet valve not functioning	Check or replace valve
No Speed Selection	Limit switch not functioning	Check limit switch located on left rear of base Check limit switch input with EZ-Cal (EZ-Cal ID# 2d5)
Steer		
No steer in either direction	Lift/Drive selector switch in the Lift position	Switch must be in Drive position for steer operation
	Joystick rocker switch inoperative	Check continuity through rocker switch on green and yellow wires (right & left) with blue wire (input).
	Steering valve inoperative	Check steering valve for power or damage Check switch position output from GP400 (see EZ-Cal ID # 2f-12 & 2f-13)
	System Interruption	Check HELP messages using EZ-Cal
	Hoses connected incorrectly	See hydraulic section for proper connection
	Pressure relief valve set too low	Set steer relief valve to 2000 p.s.i.
Steers in one direction only	Steering valve inoperative or stuck	Inspect – replace steering valve
	No power to steering coil	Check for power and ground in both directions. Repair wiring Check switch position output from GP400 (see EZ-Cal ID#s 2f-12 right & 2f-13 left)
	System Interruption	Check HELP and MODE message on EZ-Cal
Steers, but not fully, or steers slowly	One or both steering cylinder seals failed	Check steering cylinder seals – replace
	Pressure relief valve set too low	Set steer relief valve to 2000 p.s.i.
	King pin/s seizing in the bore	Disassemble and inspect Repair Replace bushings

Problem	Possible Cause	Remedy/Solution
Level (Auto and Manual)		
No Auto - level operation	System senses platform elevation above 10 feet (3.2m)	Check elevation status using the EZ-Cal (see ID# 2a-13) Recalibration of Height may be necessary (see Calibration section for instruction.
	System interruption	Check HELP messages using EZ-Cal
	Level switch inoperative	Check level switch located in the upper control box, Check switch position input to GP400 (see EZ-CalID# 2a-14)
	Level Valves not functioning	Located behind lower control box Inspect valve for power or damage Check switch position output from GP400 (see EZ-Cal ID# 2f-21 through 2f-24)
Auto-level operates but platform is not level when cycle is complete	Level sensor not properly calibrated	See Calibration section for proper level sensor calibration
	Unit on too extreme angle	Relocate unit to more level ground
	A level valve is sticking	Located behind lower control box Inspect valve for power or damage Check switch position output from GP400 (see EZ-Cal ID# 2f-21 through 2f-24)
	Level cylinder hoses not connected in correct location	See hydraulic section for correct location
	Level valves wired incorrectly	See Electrical section for proper plug connection.
	Relief valve out of adjustment	Re-set Steer relief valve to 2000 PSI
No Manual level operation	See “No Auto-level Operation” for information	

Hydraulic Pressure Adjustment - 3084RT

Before attempting to check and/or adjust pressure relief valves, operate the machine for 15 minutes or long enough to sufficiently warm the hydraulic fluid.

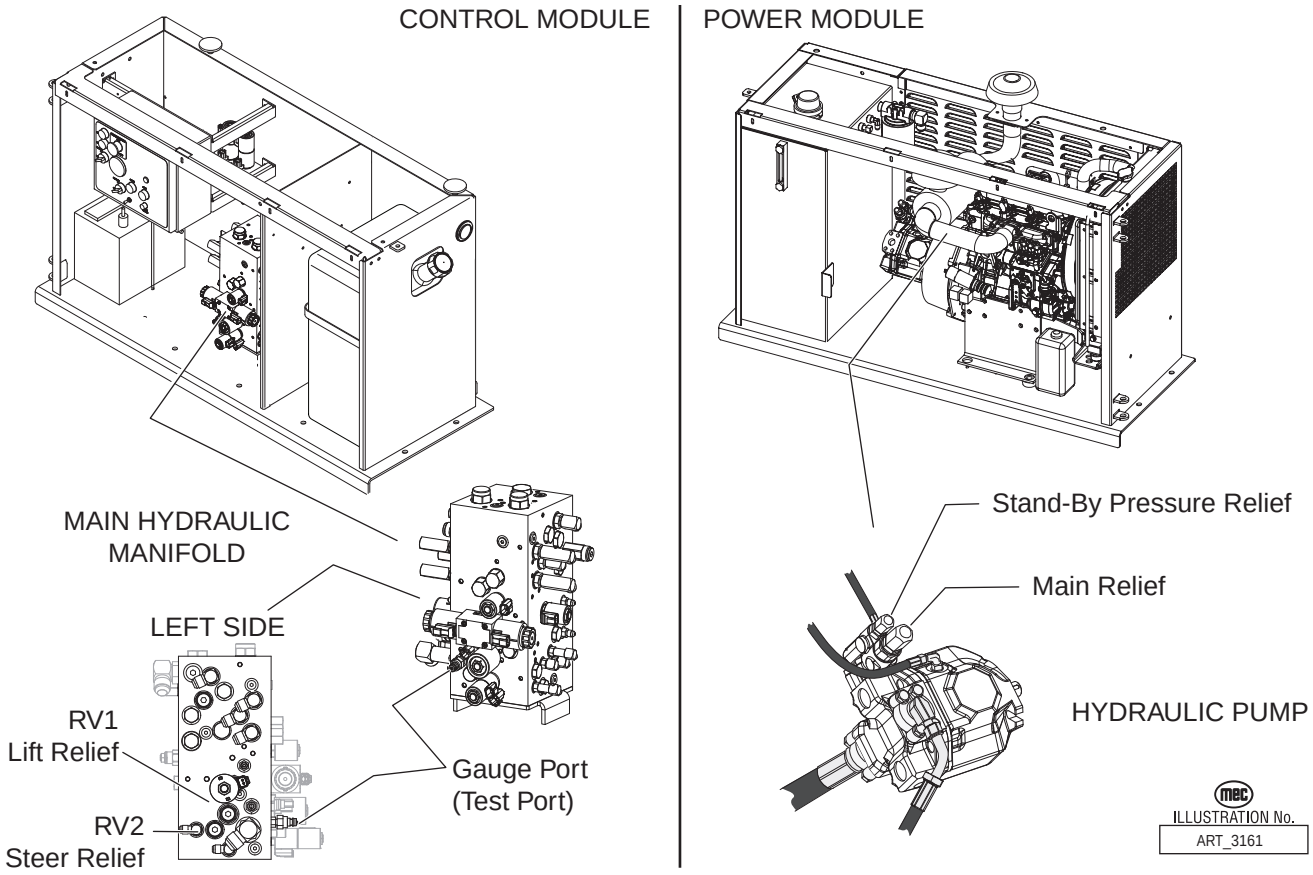
Insert a 0-5000 psi gauge onto the pressure test port on the valve manifold using gauge adapter fitting MEC part no. 8434

Model	Main		Lift		Steer		Stand-by	
3084RT	2800 PSI	193 bar	2500 PSI	172.4 bar	2000 PSI	137.9 bar	500-550PSI	35-38 bar

Adjusting Relief Valves

- Remove the tamper proof cap.
- Turn adjustment screw “IN” to increase pressure.
- Turn adjustment screw “OUT” to decrease pressure.
- When correct pressure is obtained replace tamper proof cap with a new one.

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



Adjustments - 3084RT

This machine uses a variable displacement, pressure compensated, piston type hydraulic pump. Proper adjustment is critical for normal operation of the machine.

All of the following steps must be performed in sequence to achieve proper adjustment and machine performance.

Refer to “Adjustable Valves Location - 3084RT” on page 118.

See Section 11 - Schematics for correct pressure settings.

Main Relief and Standby Pressure Adjustments

- Start engine and operate the unit for 15 minutes or until the hydraulic fluid is warm.
- Insert a 0 – 5000 PSI (0-345 bar) gauge onto the manifold pressure gauge port.
- Remove the acorn nut from the Main Relief adjustment screw. Loosen the jam nut and turn the screw counterclockwise 3 turns. Tighten the jam nut and install the acorn nut.
- Remove the acorn nut from the Standby adjustment screw and loosen the jam nut. Turn the screw clockwise 3 turns or until the needle on the gauge stops climbing. At this point the gauge is reading full main relief pressure.
- Access the Main Relief screw again and adjust it until the gauge settles at 2800 PSI (193.5 bar). Tighten the jam nut and install the acorn nut.
- Check the gauge reading again to ensure the setting did not change.
- Turn the Standby adjustment screw counterclockwise until the gauge reads 550 PSI (38 bar). Tighten the jamb nut and install the acorn nut.
- Check the gauge reading again to ensure the setting did not change.

Pump Displacement Adjustment

This adjustment is set at the factory and should not be altered. The displacement adjustment controls the maximum amount of fluid flow that the pump will produce per revolution. Excessive flow will result in severe engine loading and stalling. Reduced flow will result in slower functions with no engine loading. If you suspect that the setting is incorrect, please call MEC Product Support at (800) 387-4575 for assistance.

Lift Relief (RV1)

The Lift Relief valve is located on the left-side, center of the valve manifold. It will be necessary to remove the cap from the relief valve if adjustment is necessary. REMOVING THE CAP WHILE THE ENGINE IS RUNNING WILL RESULT IN FLUID LEAKAGE.

To check Lift Relief valve setting, park the machine on a firm level surface free from overhead obstructions.

- Extend the platform to full height with **no load on platform**.
- Hold the 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.

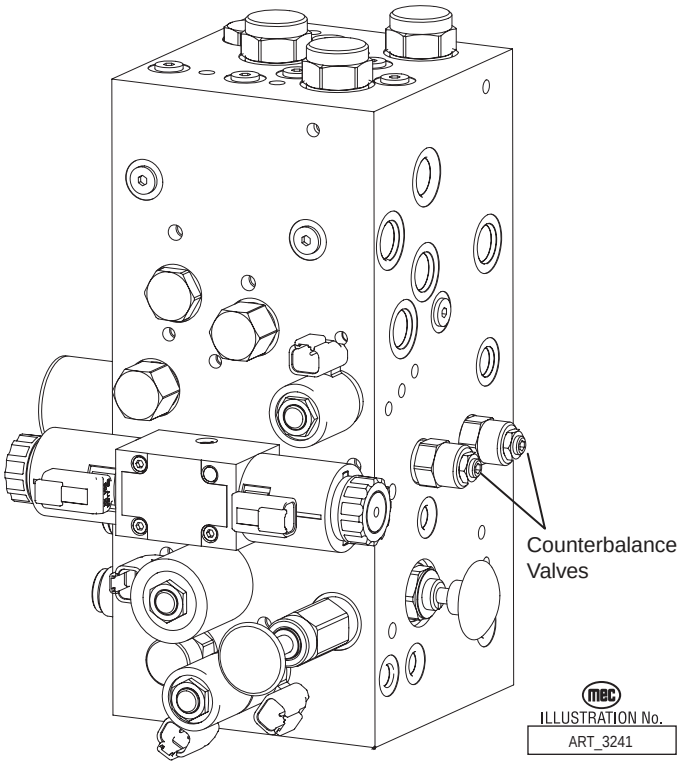
Steering Relief (RV2)

The steering Relief valve is located on the lower left side of the valve manifold. It is necessary to remove the cap from the relief valve if adjustment is necessary. REMOVING THE CAP WHILE THE ENGINE IS RUNNING WILL RESULT IN FLUID LEAKAGE.

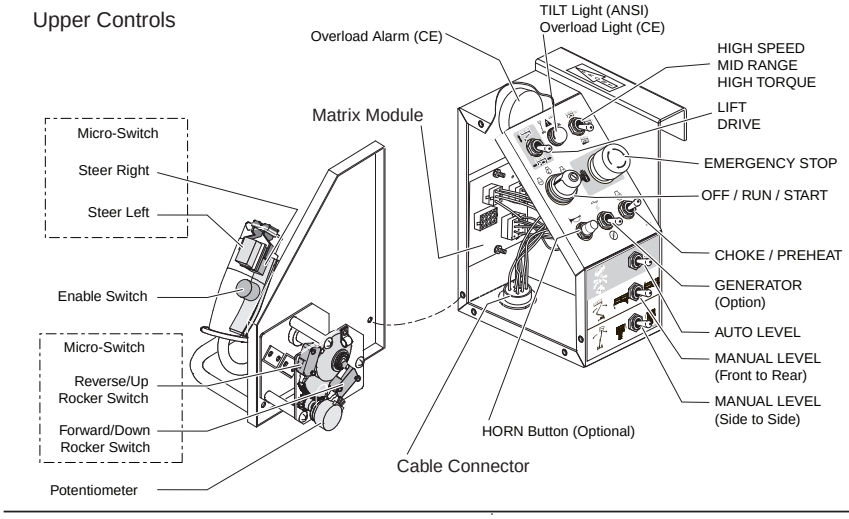
- Energize the steering to full left.
- Hold the switch for 10 seconds to get an accurate reading on the pressure gauge.
- If pressure is LOW, adjust steering relief valve ¼ turn clockwise and recheck.
- If pressure is HIGH, adjust steering relief valve ¼ turn counterclockwise and recheck.
- Repeat until correct.

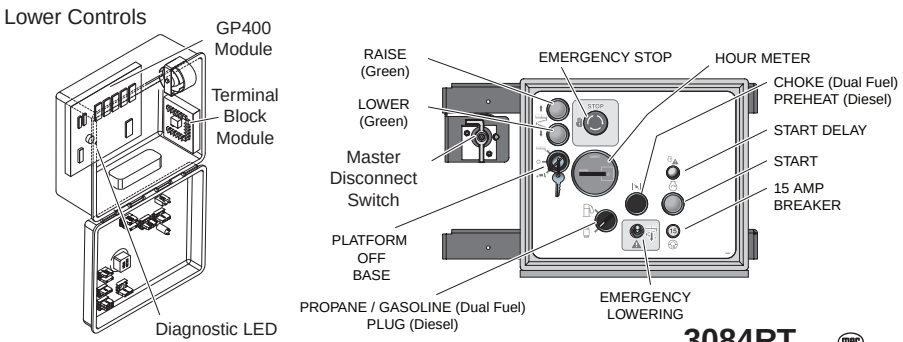
Counterbalance Valves

1. Loosen the locknut on one of the valves.
2. Turn the adjustment screw counterclockwise (to the left) until it reaches the internal stop and the screw will turn no further.
3. Turn the adjustment screw clockwise (to the right) 3¼ turns.
4. Tighten the locknut while holding the adjustment screw in position to prevent it from rotating.
5. Repeat steps 1 through 4 on the other Counterbalance valve.
6. Adjustment is complete.



Component Illustrations





3084RT Controls ILLUSTRATION No. ART_3163

Hydraulic Manifold 3084RT

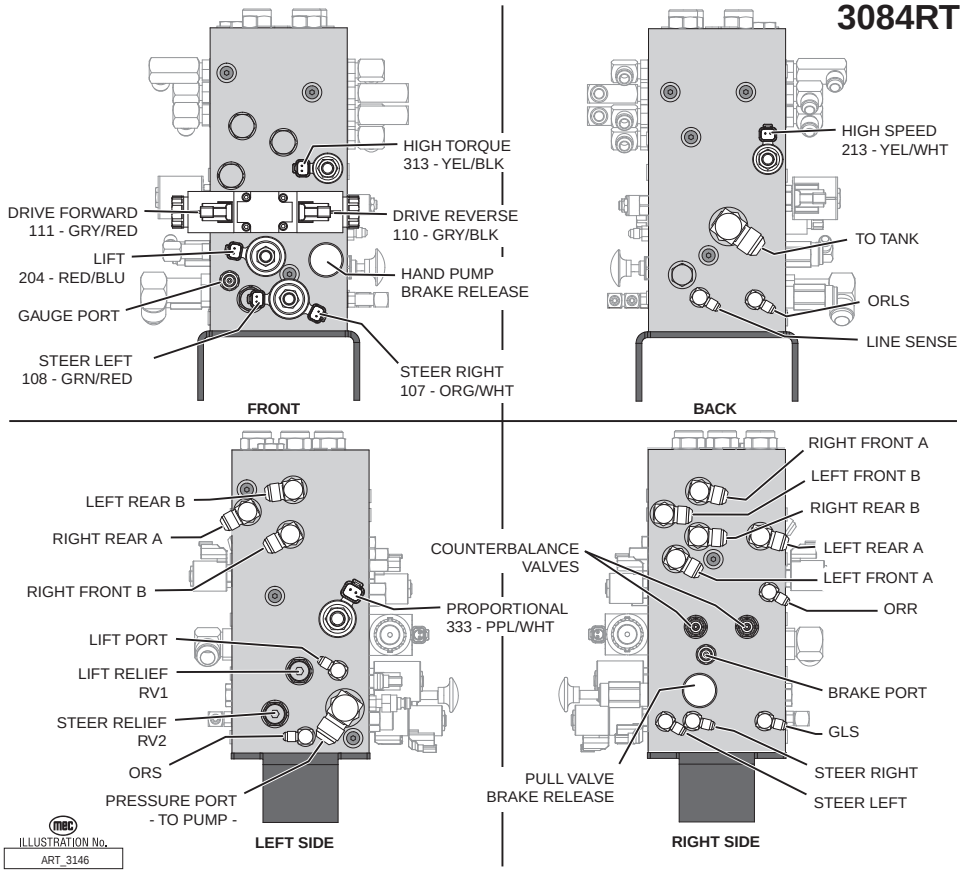


ILLUSTRATION No. ART_3146

General Troubleshooting Tips

Hydraulic Fluid Pump: 3084ES Models

The 3084ES Aerial Work Platforms operate on a “Motor Control” theory in which fluid flow volume is controlled by varying the speed of the DC electric motor driving a fixed displacement pump. 100% of the fluid produced by the pump goes to the selected function.

Battery Charge State: 3084ES Models

Before you begin troubleshooting this model, check the battery state of charge and inspect the battery connections for looseness or corrosion. A fully charged battery pack on a 48 Volts DC system will have a nominal voltage of 52.5–54 Volts DC.

Common Causes of Electrical System Malfunctions:

- Battery switch is turned OFF (located to the left of lower controls).
- Battery connections are loose or corroded
- Battery is not fully charged.
- Emergency Stop buttons are pushed (OFF position).
- Circuit breaker is in the tripped (OFF position).

Common Causes of Hydraulic System Malfunctions:

- Hydraulic fluid level is too low.
- 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 with a lower grade fluid will result in pump failure. Refer to “Lubrication” on page 81.

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. Please make sure all ports and cavities of the manifold and cylinders are properly covered/ plugged during maintenance activities.

Electrical System Troubleshooting - 3084ES

The electronic control system used on the 3084ES is designed for very low maintenance and long trouble free operation. The system consists of three electronic microprocessor controlled modules; the Matrix Module, P600 Motor Control Module and the GP400 Processor. They communicate through low voltage digital signal technology called CANBUS communication.

The modules are protected against short circuit and reverse polarity to protect against part failure or incorrect plug connections.

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

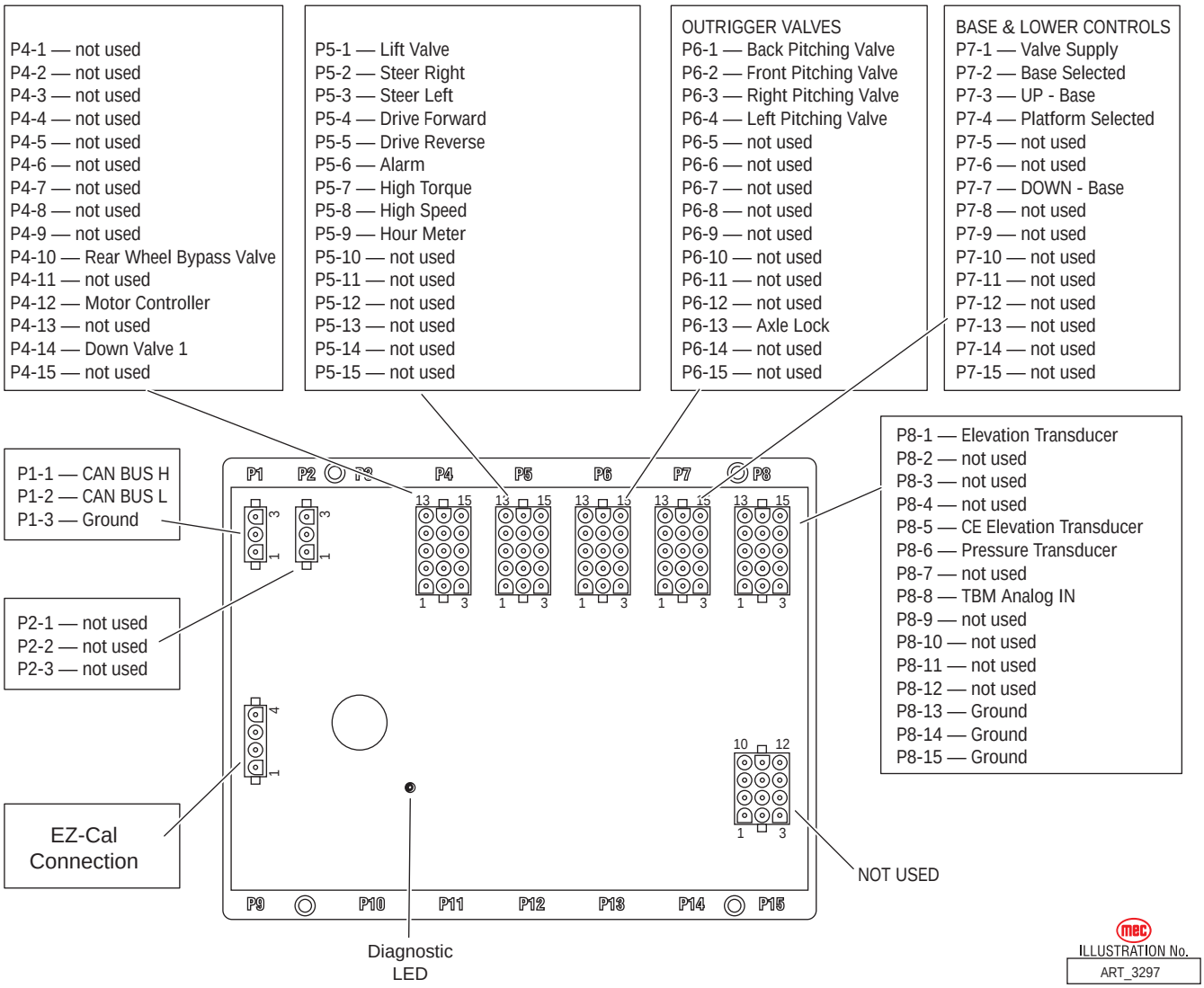
USE OF HIGH PRESSURE WASHING EQUIPMENT DIRECTLY ON THE MODULES CAN FORCE WATER INTO SEALED CONNECTION AND CAN CAUSE A TEMPORARY SYSTEM SHUT-DOWN. HIGH PRESSURE WASHING WITHIN THE VICINITY OF THE MODULES IS HIGHLY DISCOURAGED.

GP400 Module

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

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

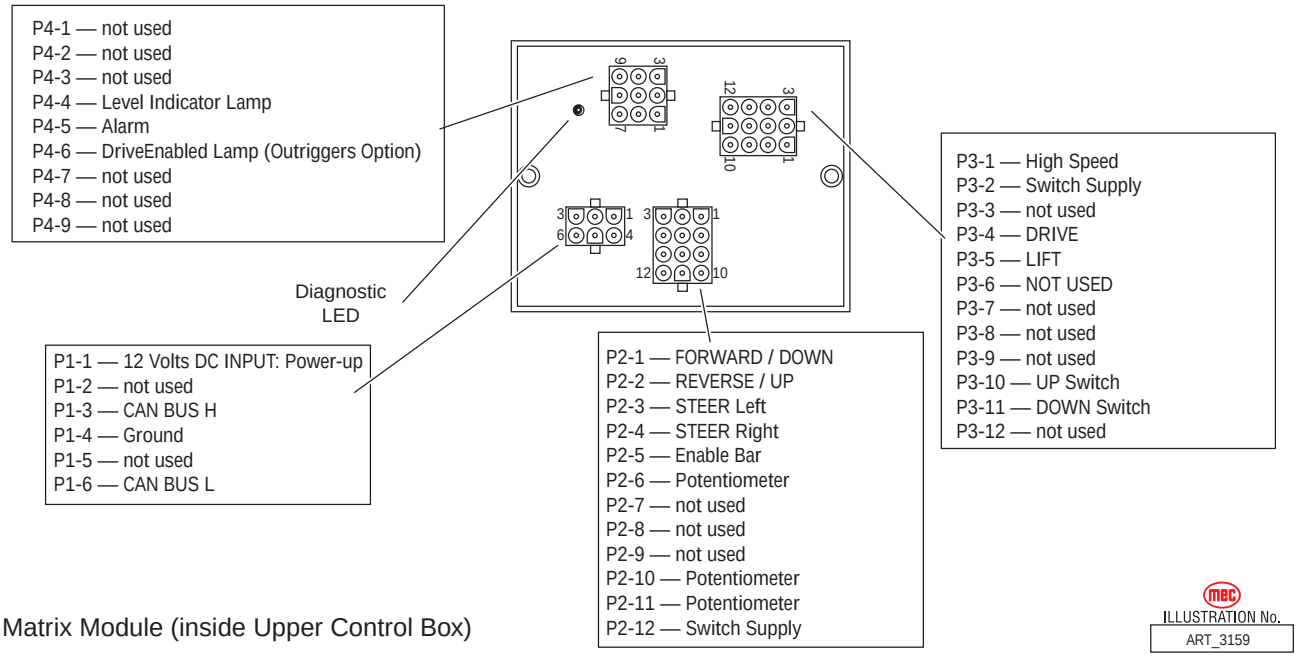
The GP400 operates on 12 volts DC and should never be probed or operated with voltage higher than 14 volts DC.



Matrix Module & Terminal Block Module

Matrix Module

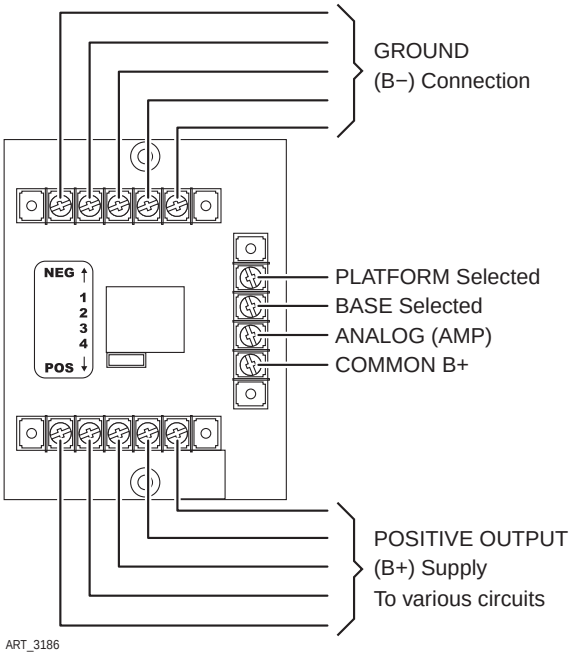
The Matrix Module is the remote module located inside the upper control box. It received inputs from the operator and relays them to the GP400.



Matrix Module (inside Upper Control Box)

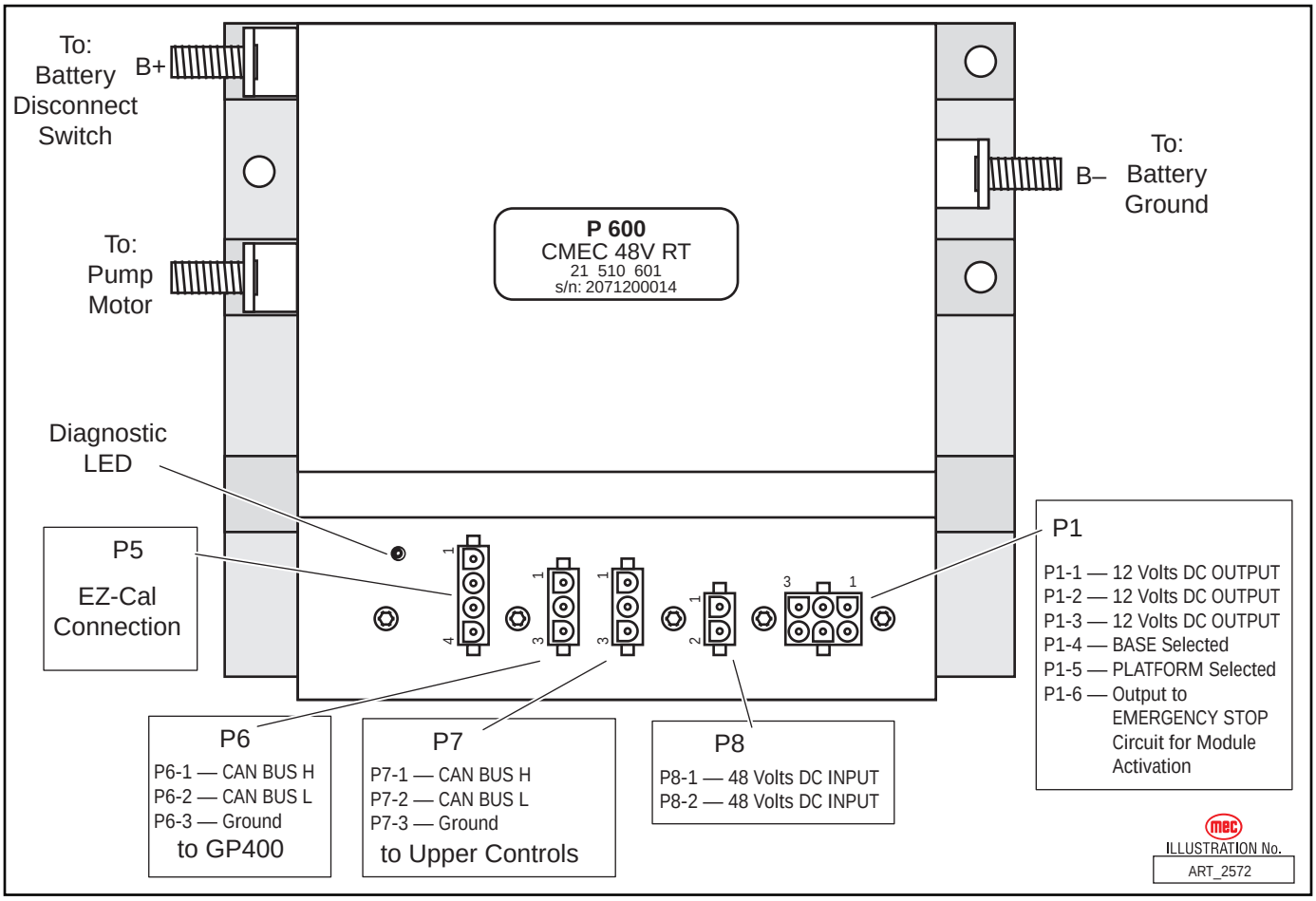
Terminal Block Module (TBM)

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



P600 Motor Control Module

The Motor Control Module operates the electric pump motor with varied speeds depending on operator commands. Pulse-width Modulation provides smooth and controlled operation with maximum battery efficiency. The Motor Controller also converts battery voltage (48 volts DC) to the user-friendly 12 volts DC used throughout the rest of the system.



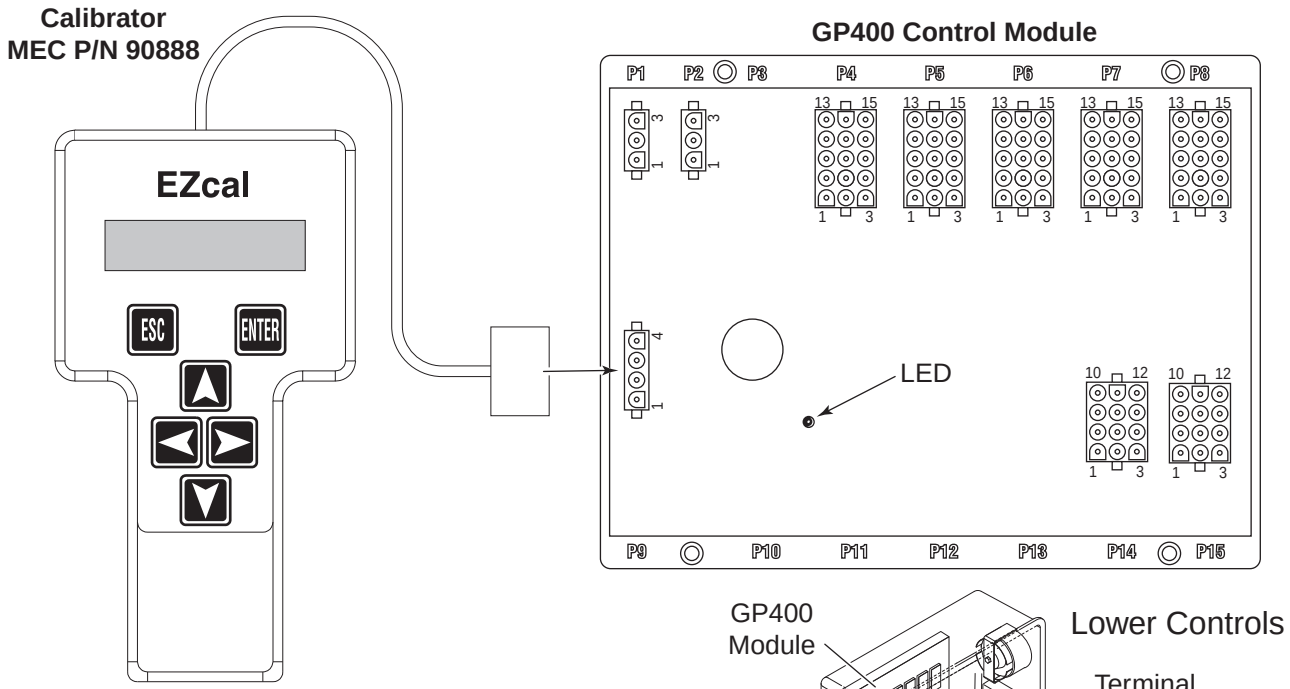
EZ-Cal Scan Tool

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

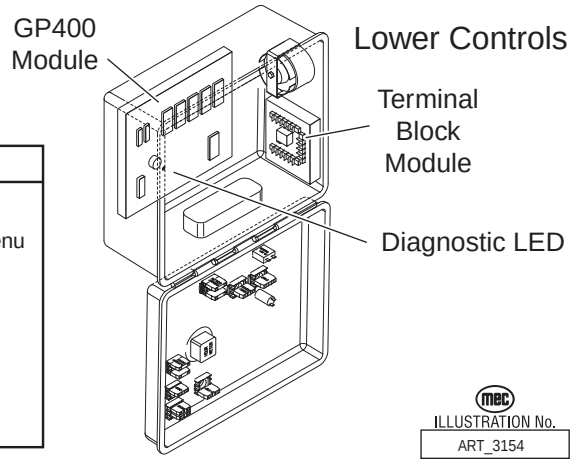
Using The EZ-Cal Scan Tool

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

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

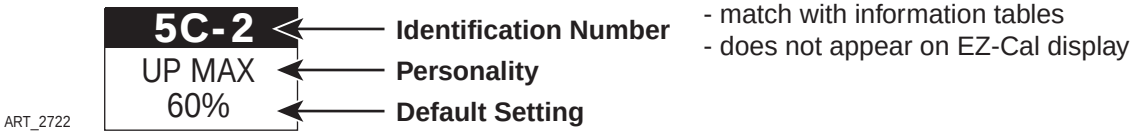


SYMBOL	KEY FUNCTIONS
ESC ENTER	**ESC/ENTER BUTTONS** To move back and forth between menu and sub-menu
◀ ▶	**LEFT/RIGHT BUTTONS** Select menus and setting to be adjusted
▲ ▼	**UP/DOWN BUTTONS** Adjust setting values



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 Connect the EZ-Cal as mentioned above. The display will read, “HELP:PRESS ENTER”. Press Enter to display the current error message. Use the following list of error messages to better understand the fault. Pressing Enter twice will provide a scrolling message of the current error followed by a log of previous errors that may have occurred within recent operation.

Scrolling Messages

The EZ-Cal will provide a scrolling message of the current error followed by a log of previous errors that may have occurred within recent operation. Refer to “Scrolling Message” on page 138.

Flash Codes

Flash Codes, provided from the GP400 red LED, will also assist in the event an EZ-Cal is not available. However, the EZ-Cal yields considerably more relevant information. Refer to “EZ-Cal HELP Messages” on page 142 for flash coded error messages.

Adjustments & Setups

2684ERT, 3084ERT (SPEED LEVEL) EZ-CAL MENU

EZ-Cal Flow Chart
Chart 1 of 2

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

- 1 HELP (PRESS ENTER) → ENTER → ERROR MESSAGE → ENTER → LOGGED MESSAGES PRESS RT & LT ARROWS TO VIEW PREVIOUS ERRORS & MESSAGES
- 2 DIAGNOSTICS → ENTER
  - 2A SYSTEM
  - 2B PLATFORM
  - 2C GROUND
  - 2D INPUTS
  - 2E ANALOGS
  - 2F OUTPUTS
  - 2G LOG
  - SEE CHART # 2
- 3 ACCESS LEVEL → ENTER
  - ACCESS LEVEL **2** FOR CALIBRATIONS
  - ACCESS LEVEL **1** FOR ADJUSTMENTS
- RUN SYSTEM TESTS → ENTER → SELF-TEST MODE
- 4 ADJUSTMENTS → ENTER
- 5 SETUPS → ENTER
  - 5A CHANGE DEFAULTS → ENTER
    - 5A-1 CUSTOMER 21=XX84ERT mark2
    - 5A-2 MODEL 2?=XX84ERT mark2 ANSI OR 4=XX84RT mark2 CE
    - 5A-3 JOYSTICK SWITCHED OR HALL-EFFECT3
  - 5B TILT SETUPS → ENTER
    - 5B-1 CALIBRATE LEVEL SEE INST
    - 5B-2 TILT SHUTDOWN 0= NEVER
    - 5B-3 ELEVATED TILT SHUTDOWN ⊘ 1= LIFT & DRIVE
    - 5B-4 AXLE TILT 3.0 DEG
  - 5C HEIGHT SETUPS → ENTER
    - 5C-1 ELEVATION @ 15% ⊘
    - 5C-2 CALIBRATE HEIGHT SEE INSTRUCTIONS
    - 5C-3 MIN LIFT 1.0 SEC ⊘
    - 5C-4 SAMPLES@ 0.30 SEC ⊘
    - 5C-5 TILT CORRECTION 1= Y+ ⊘
    - 5C-6 SLOW DOWN 10% ⊘
  - 5D LOAD SETUPS → ENTER
    - 5D-1 CALIBRATE LOAD SEE INST
    - 5D-2 FAULTY LOAD -100% ⊘
    - 5D-3 DYNAMIC SCALE 95 ⊘
    - 5D-4 DELAY UP 0.0 SEC ⊘
    - 5D-5 DELAY DOWN 0.0 SEC ⊘
  - 5E INTERLOCKS → ENTER
    - 5E-1 TRIGGER ONLY 10.0 SEC ⊘
    - 5E-2 TRIGGER WAIT 1.0 SEC ⊘
    - 5E-3 FUNCTION HOLD 0.2 SEC
    - 5E-4 THROTTLE DELAY 0.00 SEC
    - 5E-5 THROTTLE HOLD 5.0 SEC
    - 5E-6 STARTER DELAY 10.0 SEC
    - 5E-7 AUTOglow 0.0 SEC
    - 5E-8 BRAKE DELAY 0.0 SEC
    - 5E-9 JOY FILTER 5
  - 5F GENERATOR → ENTER
    - 5F-1 GEN LOW 48 VOLTS
    - 5F-2 GEN HIGH 59.5 VOLTS
    - 5F-3 GEN RMS 0.0A
    - 5F-4 5K GEN NO
    - 5F-5 BATTERY 0% 0.0V
    - 5F-6 BATTERY 100% 0.0V
  - 5G FAN → ENTER
    - 5G-1 FAN ON 2.5V
    - 5G-2 FAN OFF 2.5V

⊘ = DO NOT CHANGE

- 4A DRIVE → ENTER
  - 4A-1 FWD MIN 5%
  - 4A-2 FWD MAX 60% → ENTER
    - 4A-2a MAXpositrack 30%
    - 4A-2b MAXhighspeed 95%
  - 4A-3 REV MIN 5%
  - 4A-4 REV MAX 60% → ENTER
    - 4A-4a MAXpositrack 30%
    - 4A-4b MAXhighspeed 95%
  - 4A-5 ACCEL 1.5 SEC
  - 4A-6 DECEL 1.2 SEC
  - 4A-7 DECELhs 2.0 SEC
  - 4A-8 STOP DECEL 1.0 SEC
  - 4A-9 MAX HEIGHT 101%
- 4B DRIVE ELEVATED → ENTER
  - 4B-1 FWD MIN 5%
  - 4B-2 FWD MID 0% ⊘
  - 4B-3 FWD MAX 30%
  - 4B-4 REV MIN 5% ⊘
  - 4B-5 REV MID 0%
  - 4B-6 REV MAX 30%
  - 4B-7 ACCEL 1.5 SEC
  - 4B-8 DECEL 1.2 SEC
- 4C LIFT → ENTER
  - 4C-1 UP MIN 5%
  - 4C-2 UP MAX 54% ⊘
  - 4C-3 DOWN MIN 0%
  - 4C-4 DOWN MAX 0%
  - 4C-5 ACCEL 1.2 SEC ⊘
  - 4C-6 DECEL 0.5
  - 4C-7 MAX HEIGHT 98%
  - 4C-8 ARM GUARD → ENTER
    - 4C-8a TIME 0.0 ANSI 2.0 CE
    - 4C-8b @ HEIGHT 101% ANSI 9% CE
  - 4C-9 DELAY BELOW ELEV 0.0 ANSI 2.0 SEC -CE
- 4D STEER → ENTER
  - 4D-1 SPEED 30%
  - 4D-2 SC + 40%
  - 4D-3 SC X 0%
  - 4D-4 ELEV DRIVE COMP 30%
  - 4D-5 EXCEL 0.7 SEC
  - 4D-6 DECEL 0.2 SEC
- 4E DECK → ENTER
  - 4E-1 OUT MIN 20%
  - 4E-2 OUT MAX 100%
  - 4E-3 IN MIN 20%
  - 4E-4 IN MAX 100%
  - 4E-5 ACCEL 3.0 SEC
  - 4E-6 DECEL 3.0 SEC
- 4F OUTRIGGERS OPTIONAL → ENTER
  - 4F-1 OUTRIGGERS 2= DRIVEilock+
  - 4F-2 EXTEND 50%
  - 4F-3 LEVEL 35%
  - 4F-4 RETRACT 0%
  - 4F-5 DEBOUNCE 0.35 SEC
  - 4F-6 INITIAL 0.5 SEC
  - 4F-7 PRE- LEVEL 0.0 SEC
  - 4F-8 TILT FILTER 6
  - 4F-9 X TILT TARGET 0.2 DEG
  - 4F-10 Y TILT TARGET 0.2 DEG
  - 4F-11 TILT SLACK 0.3 DEG
- 4G GROUND MODE → ENTER
  - 4G-1 UP 53%
  - 4G-2 DOWN 0%
  - 4G-3 OUT 0%
  - 4G-4 IN 0%
  - 4G-5 ACCEL 1.0 SEC
  - 4G-6 DECEL 1.0 SEC
- 4H AIRTRAX (NOT USED) → ENTER
  - 4H-1 HI MIN ⊘
  - 4H-2 HI BREAK ⊘
  - 4H-3 HIGH MAX ⊘
  - 4H-4 HI BREAK @ ⊘
  - 4H-5 LO MIN ⊘
  - 4H-6 LO BREAK ⊘
  - 4H-7 LO MAX ⊘
  - 4H-8 LO BREAK @ ⊘
- 4J TILT → ENTER
  - 4J-1 X TRIP 2.0° ⊘
  - 4J-2 Y TRIP 2.0° ⊘
  - 4J-3 DELAY TRIP 1.0 SEC ⊘
  - 4J-4 DELAY CLEAR 0.5 SEC
  - 4J-5 TILT #2 → ENTER
    - 4J-5a @ HEIGHT 101% ⊘
    - 4J-5b X TRIP 2 1.5 DEG
    - 4J-5c Y TRIP 2 1.5 DEG
    - 4J-5d AXLE TILT#2 0.0 DEG
- 4K OVERLOAD → ENTER
  - 4K-1 TRIP @ 0% ANSI ⊘ 110% CE
  - 4K-2 LAMP @ 0% ⊘
  - 4K-3 ALARM @ 0% ⊘
  - 4K-4 @ HEIGHT 0% ⊘
  - 4K-5 SAFE DOWN 18% ⊘
  - 4K-6 DELAY TRIP 1.5 SEC ⊘
  - 4K-7 DELAY CLEAR 1.5 SEC ⊘
  - 4K-8 OVERLOAD 2 → ENTER
    - 4K-8a @ HEIGHT 101%
    - 4K-8b SCALE 100%
- 4M ALARMS → ENTER
  - 4M-1 DRIVE SELECT AS NEEDED
  - 4M-2 LIFT 2= DOWN + SELECT AS NEEDED
  - 4M-3 TILT 1= WHEN ELEVATED
- 4N HEIGHTS → ENTER
  - 4N-1 ELEVATION@ 15% ⊘
  - 4N-2 MAX DRIVE 101% ⊘
  - 4N-3 MAX LIFT 98% ⊘
  - 4N-4 ARMGUARD 101% ANSI 9% CE ⊘
  - 4N-5 OVERLOAD 0% ANSI 0% CE ⊘
  - 4N-6 SAFE-DOWN 18% ⊘
  - 4N-7 OVERLOAD 2 101% ⊘
  - 4N-8 TILT 2 101% ⊘
  - 4N-9 POTHOLE 101%

⊘ = DO NOT CHANGE

DIAGNOSTIC

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

XX84RT SERIES ANSI & CE EZ-CAL MENU

2 DIAGNOSTICS

ENTER

EZ-Cal Flow Chart

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

2A SYSTEM (ENTER)
- 2A-1 MODE — PRESS ENTER FOR MESSAGES
- 2A-2 SUPPLY (ENTER)
- 2A-3 VALVE SUPPLY — ON/OFF
- 2A-4 MOTOR VOLTS — ACTUAL
- 2A-5 MOTOR AMPS — ACTUAL
- 2A-6 TEMPERATURE — OF P600 CONTROLLER
- 2A-7 TILT (ENTER)
- 2A-8 TILTED — YES OR NO
- 2A-9 HEIGHT — ACTUAL IN % (ENTER)
- 2A-10 LOAD — OVERLOAD PROTECTION ONLY
- 2A-11 OVERLOADED — YES or NO
- 2A-12 LAST MOVED — NOT USED
- 2A-13 ELEVATED — YES or NO
- 2A-14 OUTRIGGERS — AUTO-LEVEL INFO
- 2A-15 AXLE — ENTER FOR INFO (ENTER)
- 2A-16 GEN STATE — HYBRED OPTION (ENTER)

2A-1 MODE:
- 2A-2A SUPPLY — BATTERY VOLTS
- 2A-2B SUPPLY — 12 VOLT SUPPLY
- 2A-2C SUPPLY — CAP BANK
- 2A-2D SUPPLY — BATT SCALE

2A-7 TILT:
- 2A-7A TILT FILTERED — NOT USED
- 2A-7B TILT LOCAL — GP400 LEVEL

2A-9 HEIGHT:
- 2A-9A HEIGHT 1 — ANSI & CE
- 2A-9B HEIGHT 2 — CE ONLY

2A-15 AXLE:
- 2A-15A AXLE — ANSI & CE
- 2A-15B AXLE LOCKED — YES OR NO
- 2A-15C AXLE ANGLE — IN DEGREES

2A-16 GEN STATE:
- 2A-16A GEN DEB
- 2A-16B GEN RPM
- 2A-16C GEN RMS — PRESS ENTER (ENTER) → 2A-16C1 TRMS

2B PLATFORM (ENTER)
- 2B-1 TRIGGER — ON/OFF
- 2B-2 DLD — ACTUAL
- 2B-3 JOYSTICK — ACTUAL DEG OF MOVEMENT
- 2B-4 FWD / UP — FWD JOYSTCK MOVEMENT
- 2B-5 REV / UP — REV JOYSTICK MOVEMENT
- 2B-6 LEFT(STEER) — ON/OFF
- 2B-7 RIGHT (STEER) — ON/OFF
- 2B-8 POSITRACK — ON/OFF (ENTER) → 2B-9 AUTO-POSITRACK — ON/OFF
- 2B-10 AIRTRAX — NOT USED

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

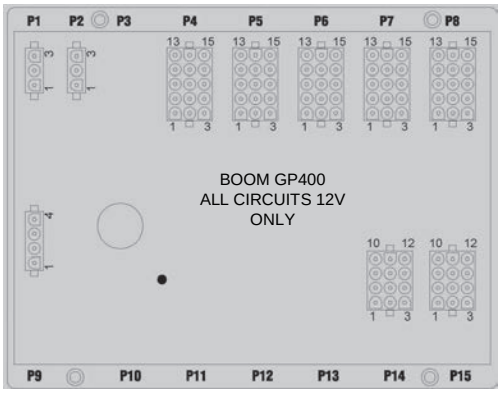
2D INPUTS (ENTER)
- 2D-1 P7-1 — 12 V SUPPLY
- 2D-2 P7-2 — BASE SELECTED
- 2D-3 P7-3 — UP SELECTED
- 2D-4 P7-4 — PLATFORM SELECTED
- 2D-5 P7-7 — DOWN SELECTED
- 2D-6 P7-10 — ENG PRE-HEAT
- 2D-7 P7-12 — ENG START
- 2D-8 P7-13 — ENG OIL PRESSURE

2E ANALOGS (ENTER)
- 2E-1 GP400 ANALOGS — MAIN CPU (ENTER)
  - 2E-1A P8-2 — ANGLE TRANSDUCER 1
  - 2E-1B P8-5 — ANGLE TRANSDUCER 2
  - 2E-1C P8-6 — PRESSURE TRANSDUCER
  - 2E-1D P8-9 — TBM IN
- 2E-2 MATRIX ANALOGS — UPPER CONTROL (ENTER)
  - 2E-2A M2-6 — POTENTIOMETER

2F OUTPUTS (ENTER)
- 2F-1 P4-1 — CHOKE, PREHEAT
- 2F-2 P4-2 — STARTER
- 2F-3 P4-4 — THROTTLE
- 2F-4 P4-7 — ALTERNATOR EXCITE
- 2F-5 P4-8 — IGNITION, FUEL
- 2F-6 P4-14 — DOWN VALVE
- 2F-7 P5-1 — LIFT VALVE
- 2F-8 P5-2 — STEER RIGHT
- 2F-9 P5-3 — STEER LEFT
- 2F-10 P5-6 — ALARM
- 2F-11 P5-9 — HOUR METER
- 2F-12 P5-14 — STRT INHIBIT LIGHT
- 2F-13 P6-1 — LEVEL BACK
- 2F-14 P6-2 — LEVEL FORWARD
- 2F-15 P6-3 — LEVEL RIGHT
- 2F-16 P6-4 — LEVEL LEFT
- 2F-17 P6-13 — AXLE LOCK
- 2F-18 P6-15 — A/C GENERATOR

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

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



Adjustments & Setups

2684ERT, 3084ERT (SPEED LEVEL) EZ-CAL MENU

EZ-Cal Flow Chart
Chart 1 of 2

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

- 1 HELP — PRESS ENTER → ENTER → ERROR MESSAGE → ENTER → LOGGED MESSAGES PRESS RT & LT ARROWS TO VIEW PREVIOUS ERRORS & MESSAGES
- 2 DIAGNOSTICS → ENTER
  - 2A SYSTEM
  - 2B PLATFORM
  - 2C GROUND
  - 2D INPUTS
  - 2E ANALOGS
  - 2F OUTPUTS
  - 2G LOG
  - SEE CHART # 2
- 3 ACCESS LEVEL → ENTER
  - ACCESS LEVEL **2** FOR CALIBRATIONS
  - ACCESS LEVEL **1** FOR ADJUSTMENTS
- RUN SYSTEM TESTS → ENTER → SELF-TEST MODE
- 4 ADJUSTMENTS → ENTER
- 5 SETUPS → ENTER
  - 5A CHANGE DEFAULTS → ENTER
    - 5A-1 CUSTOMER 21=XX84ERT mark2
    - 5A-2 MODEL 2?=XX84ERT mark2 ANSI OR 4=XX84RT mark2 CE
    - 5A-3 JOYSTICK SWITCHED OR HALL-EFFECT3
  - 5B TILT SETUPS → ENTER
    - 5B-1 CALIBRATE LEVEL SEE INST
    - 5B-2 TILT SHUTDOWN 0= NEVER
    - 5B-3 ELEVATED TILT SHUTDOWN ⊘ 1= LIFT & DRIVE
    - 5B-4 AXLE TILT 3.0 DEG
  - 5C HEIGHT SETUPS → ENTER
    - 5C-1 ELEVATION @ 15% ⊘
    - 5C-2 CALIBRATE HEIGHT SEE INSTRUCTIONS
    - 5C-3 MIN LIFT 1.0 SEC ⊘
    - 5C-4 SAMPLES@ 0.30 SEC ⊘
    - 5C-5 TILT CORRECTION 1= Y+ ⊘
    - 5C-6 SLOW DOWN 10% ⊘
  - 5D LOAD SETUPS → ENTER
    - 5D-1 CALIBRATE LOAD SEE INST
    - 5D-2 FAULTY LOAD -100% ⊘
    - 5D-3 DYNAMIC SCALE 95 ⊘
    - 5D-4 DELAY UP 0.0 SEC ⊘
    - 5D-5 DELAY DOWN 0.0 SEC ⊘
  - 5E INTERLOCKS → ENTER
    - 5E-1 TRIGGER ONLY 10.0 SEC ⊘
    - 5E-2 TRIGGER WAIT 1.0 SEC ⊘
    - 5E-3 FUNCTION HOLD 0.2 SEC
    - 5E-4 THROTTLE DELAY 0.00 SEC
    - 5E-5 THROTTLE HOLD 5.0 SEC
    - 5E-6 STARTER DELAY 10.0 SEC
    - 5E-7 AUTOglow 0.0 SEC
    - 5E-8 BRAKE DELAY 0.0 SEC
    - 5E-9 JOY FILTER 5
  - 5F GENERATOR → ENTER
    - 5F-1 GEN LOW 48 VOLTS
    - 5F-2 GEN HIGH 59.5 VOLTS
    - 5F-3 GEN RMS 0.0A
    - 5F-4 5K GEN NO
    - 5F-5 BATTERY 0% 0.0V
    - 5F-6 BATTERY 100% 0.0V
  - 5G FAN → ENTER
    - 5G-1 FAN ON 2.5V
    - 5G-2 FAN OFF 2.5V

⊘ = DO NOT CHANGE

- 4A DRIVE → ENTER
  - 4A-1 FWD MIN 5%
  - 4A-2 FWD MAX 60% → ENTER
    - 4A-2a MAXpositrack 30%
    - 4A-2b MAXhighspeed 95%
  - 4A-3 REV MIN 5%
  - 4A-4 REV MAX 60% → ENTER
    - 4A-4a MAXpositrack 30%
    - 4A-4b MAXhighspeed 95%
  - 4A-5 ACCEL 1.5 SEC
  - 4A-6 DECEL 1.2 SEC
  - 4A-7 DECELhs 2.0 SEC
  - 4A-8 STOP DECEL 1.0 SEC
  - 4A-9 MAX HEIGHT 101%
- 4B DRIVE ELEVATED → ENTER
  - 4B-1 FWD MIN 5%
  - 4B-2 FWD MID 0% ⊘
  - 4B-3 FWD MAX 30%
  - 4B-4 REV MIN 5% ⊘
  - 4B-5 REV MID 0%
  - 4B-6 REV MAX 30%
  - 4B-7 ACCEL 1.5 SEC
  - 4B-8 DECEL 1.2 SEC
- 4C LIFT → ENTER
  - 4C-1 UP MIN 5%
  - 4C-2 UP MAX 54% ⊘
  - 4C-3 DOWN MIN 0%
  - 4C-4 DOWN MAX 0%
  - 4C-5 ACCEL 1.2 SEC ⊘
  - 4C-6 DECEL 0.5
  - 4C-7 MAX HEIGHT 98%
  - 4C-8 ARM GUARD → ENTER
    - 4C-8a TIME 0.0 ANSI 2.0 CE
    - 4C-8b @ HEIGHT 101% ANSI 9% CE
  - 4C-9 DELAY BELOW ELEV 0.0 ANSI 2.0 SEC -CE
- 4D STEER → ENTER
  - 4D-1 SPEED 30%
  - 4D-2 SC + 40%
  - 4D-3 SC X 0%
  - 4D-4 ELEV DRIVE COMP 30%
  - 4D-5 EXCEL 0.7 SEC
  - 4D-6 DECEL 0.2 SEC
- 4E DECK → ENTER
  - 4E-1 OUT MIN 20%
  - 4E-2 OUT MAX 100%
  - 4E-3 IN MIN 20%
  - 4E-4 IN MAX 100%
  - 4E-5 ACCEL 3.0 SEC
  - 4E-6 DECEL 3.0 SEC
- 4F OUTRIGGERS OPTIONAL → ENTER
  - 4F-1 OUTRIGGERS 2= DRIVEilock+
  - 4F-2 EXTEND 50%
  - 4F-3 LEVEL 35%
  - 4F-4 RETRACT 0%
  - 4F-5 DEBOUNCE 0.35 SEC
  - 4F-6 INITIAL 0.5 SEC
  - 4F-7 PRE- LEVEL 0.0 SEC
  - 4F-8 TILT FILTER 6
  - 4F-9 X TILT TARGET 0.2 DEG
  - 4F-10 Y TILT TARGET 0.2 DEG
  - 4F-11 TILT SLACK 0.3 DEG
- 4G GROUND MODE → ENTER
  - 4G-1 UP 53%
  - 4G-2 DOWN 0%
  - 4G-3 OUT 0%
  - 4G-4 IN 0%
  - 4G-5 ACCEL 1.0 SEC
  - 4G-6 DECEL 1.0 SEC
- 4H AIRTRAX (NOT USED) → ENTER
  - 4H-1 HI MIN ⊘
  - 4H-2 HI BREAK ⊘
  - 4H-3 HIGH MAX ⊘
  - 4H-4 HI BREAK @ ⊘
  - 4H-5 LO MIN ⊘
  - 4H-6 LO BREAK ⊘
  - 4H-7 LO MAX ⊘
  - 4H-8 LO BREAK @ ⊘
- 4J TILT → ENTER
  - 4J-1 X TRIP 2.0° ⊘
  - 4J-2 Y TRIP 2.0° ⊘
  - 4J-3 DELAY TRIP 1.0 SEC ⊘
  - 4J-4 DELAY CLEAR 0.5 SEC
  - 4J-5 TILT #2 → ENTER
    - 4J-5a @ HEIGHT 101% ⊘
    - 4J-5b X TRIP 2 1.5 DEG
    - 4J-5c Y TRIP 2 1.5 DEG
    - 4J-5d AXLE TILT#2 0.0 DEG
- 4K OVERLOAD → ENTER
  - 4K-1 TRIP @ 0% ANSI ⊘ 110% CE
  - 4K-2 LAMP @ 0% ⊘
  - 4K-3 ALARM @ 0% ⊘
  - 4K-4 @ HEIGHT 0% ⊘
  - 4K-5 SAFE DOWN 18% ⊘
  - 4K-6 DELAY TRIP 1.5 SEC ⊘
  - 4K-7 DELAY CLEAR 1.5 SEC ⊘
  - 4K-8 OVERLOAD 2 → ENTER
    - 4K-8a @ HEIGHT 101%
    - 4K-8b SCALE 100%
- 4M ALARMS → ENTER
  - 4M-1 DRIVE SELECT AS NEEDED
  - 4M-2 LIFT 2= DOWN + SELECT AS NEEDED
  - 4M-3 TILT 1= WHEN ELEVATED
- 4N HEIGHTS → ENTER
  - 4N-1 ELEVATION@ 15% ⊘
  - 4N-2 MAX DRIVE 101% ⊘
  - 4N-3 MAX LIFT 98% ⊘
  - 4N-4 ARMGUARD 101% ANSI 9% CE ⊘
  - 4N-5 OVERLOAD 0% ANSI 0% CE ⊘
  - 4N-6 SAFE-DOWN 18% ⊘
  - 4N-7 OVERLOAD 2 101% ⊘
  - 4N-8 TILT 2 101% ⊘
  - 4N-9 POTHOLE 101%

⊘ = DO NOT CHANGE

DIAGNOSTIC

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

XX84RT SERIES ANSI & CE
EZ-CAL MENU

2
DIAGNOSTICS
ENTER

EZ-Cal Flow Chart

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

2A SYSTEM (ENTER)
- 2A-1 MODE — PRESS ENTER FOR MESSAGES
- 2A-2 SUPPLY (ENTER)
  - 2A-2A SUPPLY — BATTERY VOLTS
  - 2A-2B SUPPLY — 12 VOLT SUPPLY
  - 2A-2C SUPPLY — CAP BANK
  - 2A-2D SUPPLY — BATT SCALE
- 2A-3 VALVE SUPPLY — ON/OFF
- 2A-4 MOTOR VOLTS — ACTUAL
- 2A-5 MOTOR AMPS — ACTUAL
- 2A-6 TEMPERATURE — OF P600 CONTROLLER
- 2A-7 TILT (ENTER)
  - 2A-7A TILT FILTERED — NOT USED
  - 2A-7B TILT LOCAL — GP400 LEVEL
- 2A-8 TILTED — YES OR NO
- 2A-9 HEIGHT — ACTUAL IN % (ENTER)
  - 2A-9A HEIGHT 1 — ANSI & CE
  - 2A-9B HEIGHT 2 — CE ONLY
- 2A-10 LOAD — OVERLOAD PROTECTION ONLY
- 2A-11 OVERLOADED — YES or NO
- 2A-12 LAST MOVED — NOT USED
- 2A-13 ELEVATED — YES or NO
- 2A-14 OUTRIGGERS — AUTO-LEVEL INFO
- 2A-15 AXLE — ENTER FOR INFO (ENTER)
  - 2A-15A AXLE — ANSI & CE
  - 2A-15B AXLE LOCKED — YES OR NO
  - 2A-15C AXLE ANGLE — IN DEGREES
- 2A-16 GEN STATE — HYBRED OPTION (ENTER)
  - 2A-16A GEN DEB
  - 2A-16B GEN RPM
  - 2A-16C GEN RMS — PRESS ENTER (ENTER)
    - 2A-16C1 TRMS

2B PLATFORM (ENTER)
- 2B-1 TRIGGER — ON/OFF
- 2B-2 DLD — ACTUAL
- 2B-3 JOYSTICK — ACTUAL DEG OF MOVEMENT
- 2B-4 FWD / UP — FWD JOYSTCK MOVEMENT
- 2B-5 REV / UP — REV JOYSTICK MOVEMENT
- 2B-6 LEFT(STEER) — ON/OFF
- 2B-7 RIGHT (STEER) — ON/OFF
- 2B-8 POSITRACK — ON/OFF (ENTER)
  - 2B-9 AUTO-POSITRACK — ON/OFF
- 2B-10 AIRTRAX — NOT USED

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

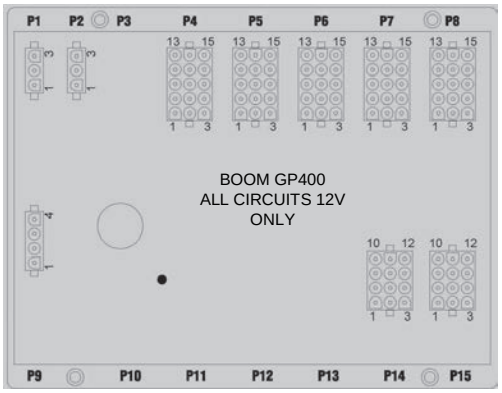
2D INPUTS (ENTER)
- 2D-1 P7-1 — 12 V SUPPLY
- 2D-2 P7-2 — BASE SELECTED
- 2D-3 P7-3 — UP SELECTED
- 2D-4 P7-4 — PLATFORM SELECTED
- 2D-5 P7-7 — DOWN SELECTED
- 2D-6 P7-10 — ENG PRE-HEAT
- 2D-7 P7-12 — ENG START
- 2D-8 P7-13 — ENG OIL PRESSURE

2E ANALOGS (ENTER)
- 2E-1 GP400 ANALOGS — MAIN CPU (ENTER)
  - 2E-1A P8-2 — ANGLE TRANSDUCER 1
  - 2E-1B P8-5 — ANGLE TRANSDUCER 2
  - 2E-1C P8-6 — PRESSURE TRANSDUCER
  - 2E-1D P8-9 — TBM IN
- 2E-2 MATRIX ANALOGS — UPPER CONTROL (ENTER)
  - 2E-2A M2-6 — POTENTIOMETER

2F OUTPUTS (ENTER)
- 2F-1 P4-1 — CHOKE, PREHEAT
- 2F-2 P4-2 — STARTER
- 2F-3 P4-4 — THROTTLE
- 2F-4 P4-7 — ALTERNATOR EXCITE
- 2F-5 P4-8 — IGNITION, FUEL
- 2F-6 P4-14 — DOWN VALVE
- 2F-7 P5-1 — LIFT VALVE
- 2F-8 P5-2 — STEER RIGHT
- 2F-9 P5-3 — STEER LEFT
- 2F-10 P5-6 — ALARM
- 2F-11 P5-9 — HOUR METER
- 2F-12 P5-14 — STRT INHIBIT LIGHT
- 2F-13 P6-1 — LEVEL BACK
- 2F-14 P6-2 — LEVEL FORWARD
- 2F-15 P6-3 — LEVEL RIGHT
- 2F-16 P6-4 — LEVEL LEFT
- 2F-17 P6-13 — AXLE LOCK
- 2F-18 P6-15 — A/C GENERATOR

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

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



EZ-Cal Adjustment

Refer to “EZ-Cal Scan Tool” on page 127.

Adjustments possible in Access Level 1 Only.

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

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

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

Operation	ID	Personality	Factory Setting	Explanation
5A DRIVE - PLATFORM STOWED	5A-1	FWD Min	5%	Slowest speed possible
	5A-2	FWD Max	95%	Maximum speed potential
	5A-3	REV Min	5%	Slowest speed possible
	5A-4	REV Max	95%	Maximum speed potential
	5A-5	ACCEL	1.5 sec	Ramp-up time to maximum
	5A-6	DECEL	1.0 sec	Ramp-down time to stop
	5A-7	MAX Height	101%	Maximum drivable height
	5A-8	Positrack	Not Used	Not Used
	5A-9	Positrack	Not Used	Not Used
5B DRIVE PLATFORM ELEVATED	5B-1	FWD Min	5%	Slowest speed possible
	5B-2	FWD Max	23%	Maximum speed potential
	5B-3	REV Min	5%	Slowest speed possible
	5B-4	REV Max	23%	Maximum speed potential
	5B-5	ACCEL	1.5 sec	Ramp-up time to maximum
	5B-6	DECEL	5.0 sec	Ramp-down time to stop
5C LIFT	5C-1	UP Min	5%	Slowest speed possible
	5C-2	UP Max	60%	Maximum speed potential
	5C-3	DOWN Min	0% (not used)	Gravity down (not used)
	5C-4	DOWN Max	0% (not used)	Gravity down (not used)
	5C-5	ACCEL	1.2 sec	Ramp-up time to maximum
	5C-6	DECEL	0.5 sec	Ramp-down time to stop
	5C-7	MAX Height	**ANSI:** 101% **CE:** 100%	Maximum elevated height potential
	5C-8	Armguard --> Time	0.0 sec	CE Spec. Machines Only
	5C-9	Armguard --> @ Height	101%	CE Spec. Machines Only
5D STEER	5D-1	Speed	30%	Maximum speed potential
	5D-2	Drive Compensation	30%	Adds additional to drive speed
	5D-3	Drive Comp Elevated	20%	Adds additional to drive speed elevated
	5D-4	ACCEL	0.2 sec	Ramp-up time to maximum
	5D-5	DECEL	0.2 sec	Ramp-down time to stop
5E - DECK	5E-	Not Used	Not Used	Power-out deck (not used)

Operation	ID	Personality	Factory Setting	Explanation
5F OUTRIGGERS Called "Outriggers" on the EZ-Cal, these personalities control Speed-Level functions	5F-1	Outriggers	2 = drive i lock	Outrigger program controls level operation
	5F-2	Extend	50%	Maximum speed potential
	5F-3	Level	35%	Extend speed after all legs touch down
	5F-4	Retract	55%	Maximum speed potential
	5F-5	Debounce	0.35	Compensates for switch bounce
	5F-6	Initial	0.5	Minimum level operating time
	5F-7	Tilt filter	6	Compensates for tilt sensor free movement
	5F-8	X Tilt target	0.2 deg	Target level stops movement - side/side
	5F-9	Y Tilt target	0.2 deg	Target level stops movement - fore/aft
	5F-10	Tilt Slack	0.3 deg	Variance to tilt target
	5F-11	Not Used	Not Used	Not Used
5G GROUND MODE Lower Control Operations	5G-1	UP	65%	Maximum speed potential
	5G-2	DOWN	0%	Gravity down (not used)
	5G-3	OUT	0%	Power deck operation (not used)
	5G-4	IN	0%	Power deck operation (not used)
	5G-5	ACCEL	1.0 sec	Ramp-up time to maximum
	5G-6	DECEL	1.0 sec	Ramp-down drive output
5H TILT	5H-1	X Trip	3.0 degrees	Angle tilt sensor signals Out Of Level
	5H-2	Y Trip	3.0 degrees	Angle tilt sensor signals Out Of Level
	5H-3	Delay Trip	2.0 sec	Time delay between Tip and Signal
	5H-4	Delay Clear	0.5 sec	Time delay between Tip and Signal OFF
	5H-5	Tilt 2	-	Second tilt setting used for increased stability. Press ENTER to access
5H-5 Sub Menu	5H-5A	@ Height	101%	Point where lesser tilt angle used
	5H-5B	X Trip 2	1.5 sec	Secondary tilt angle - see 5H-5
	5H-5C	Y Trip 2	1.5 sec	Secondary tilt angle - see 5H-5
5I OVERLOAD **ANSI: values = 0** **CE: values apply**	5I-1	Trip @	**ANSI:** 0% **CE:** 110%	% of weight over maximum to trigger overload
	5I-2	Lamp @	**ANSI:** 0% **CE:** 0%	% of weight over maximum to trigger lamp
	5I-3	Alarm @	**ANSI:** 0% **CE:** 0%	% of weight over maximum to trigger alarm
	5I-4	@ Height	**ANSI:** 0% **CE:** 8%	% of elevation load sense starts monitoring weight
	5I-5	Safe Down	**ANSI:** 0% **CE:** 12%	% of elevation lift-down still operates in overload
	5I-6	Delay Trip	1.5 sec	Delay before overload trip
	5I-7	Delay Clear	1.5 sec	Delay before overload clear
	5I-8	Overload 2	-	Sub category - press ENTER to access
5I-8 Sub Menu	5I-8a	Height 0%	0%	% of height for secondary overload valve
	5I-1b	Scale	100%	% of reduced overload valve
5J ALARMS	5J-1	Drive: Yes/No	No	1 = FWD 2 = REV 3 = Both 4 = All Motion
	5J-2	Lift	2 = Down	1 = UP 2 = DOWN 3 = Both 4 = All Motion
	5J-3	Tilt	1 = When Elevated	1 = When Elevated 2 = Always
5K HEIGHTS	5K-1	Elevation @	15%	Point at which machine enters elevated mode
	5K-2	Maximum Drive	101%	Maximum drivable height
	5K-3	Maximum Lift	**ANSI:** 101% **CE:** 98%	Maximum elevated height potential
	5K-4	Armguard	101%	Stops descent for 5 sec
	5K-5	Overload	**ANSI:** 0% **CE:** 12%	% of elevation load sense starts monitoring weight
	5K-6	Safe Down	**ANSI:** 0% **CE:** 18%	% of elevation lift-down still operates in overload
	5K-7	Overload # 2	0%	Not Used
	5K-8	Tilt # 2	**ANSI:** 0% **CE:** 0%	Reduced degree of tilt at % elevation

EZ-Cal Setup

Refer to “EZ-Cal Scan Tool” on page 127.

Operation	ID	Personality	Factory Setting	Explanation
6A CHANGE DEFAULTS	6A-1	Customer	5=xx84ES	Choose basic model and power source
	6A-2	Model Select	3 = 3084ES ANSI 4 = 3084ES CE	Choose model and certification
6D TILT SETUPS	6B-1	Calibrate Level?	Y = ENTER N = ESC	Follow instructions in Section 7 - Level Sensor Calibration
	WARNING! Refer to Tilt Sensor Calibration instructions before attempting calibration			
	6B-2	Tilt Shutdown	0 = Never	Function shutdown tilted when platform stowed
	6B-3	Elev Tilt Shutdown	1 = Lift & Drive	Function shutdown tilted when platform elevated
	6B-4	Axle Tilt	3.0 deg	Oscillating axle maximum interlock angle
6C HEIGHT SETUP	6C-1	Elevation @	15%	% of maximum height when system goes into elevated mode
	6C-2	Calibrate Height	Start Calibration	See Section 7 for calibration of Height Sensor
	6C-3	Min Lift	1.0 sec	Calibration setting - do not change
	6C-4	Samples	0.30 sec	Calibration setting - do not change
	6C-5	Tilt Correction	3=Y+	Calibration setting - do not change
	6C-6	Slow Down	10%	Calibration setting - do not change
6D LOAD SETUPS (EUROPEAN OPTION ONLY)	6D-1	Calibrate Load	Start Calibration	See Section 7 for calibration of CE Overload System
	6D-2	Faulty Load	-100%	Calibration setting - do not change
	6D-3	Dynamic Scale	110%	Calibration setting - do not change
6E INTERLOCKS	6E-1	Trigger Only	10.0 sec	Time that the enable bar can be held without operation before timeout
	6E-2	Trigger Wait	0.0 sec	Delay before function after enable bar is actuated
	6E-3	Function hold	0.2 sec	Function enabled after operator release
	6E-4	Throttle Delay	0.0 sec	Delay before throttle enabled (not used)
	6E-5	Starter Delay	10.0 sec	Starter over-crank feature; time starter is off (not used)

EZ-Cal Diagnostics

The EZ-Cal Diagnostics menu provides the ability to view and test individual circuits for irregularities. Whether diagnosing a failure or testing functions during preventative maintenance, the Diagnostics Menu provides a quick view at the inputs and outputs as registered by the GP400 Control Module and the P600 Motor Control Module in real time. Using the EZ-Cal Flow Chart, compare ID number to this menu for circuit identification and result. To reach DIAGNOSTICS menu from HELP;

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

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

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

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

Selection	ID	EZ-Cal Readout	Explanation
2A SYSTEM	2A-1	MODE	Current function message/s, press ENTER for additional information
	2A-2	Supply	Indicates valve supply output on or off; should be ON
	2A-3	Valve Supply	Regulated 12 volt signal output from Motor Controller to supply all 12 volt circuits
	2A-4	Motor Volts	Real time motor voltage
	2A-5	Motor 1	Real time motor amperage draw. Varies depending on load and motor speed.
	2A-6	Temperature	Motor controller chassis temp. Error message “too Hot” at 75 C.
	2A-7	Tilt	Current state of tilt as measured by Can-tilt angle transducer in degrees
	2A-8	Tilted Y/N	Indicates tilted state. All motorized functions interlocked above @ height (15% elevation)
	2A-9	Height	Current state of platform elevation in %.
	2A-10	Load	Current load on platform in %. (Over load option only)
	2A-11	Overloaded Y/N	Platform overload status. (Over load option only)
	2A-12	Last Moved	Not used
	2A-13	Elevated Y/N	Shows platform elevation is above 15% (@ height setting). Elevated settings apply.
	2A-14	Outrigger (leveling function)	Press ENTER for outrigger sub categories.
SUB CATEGORIES	2A-14a	O/R Retracted Y/N	Not used
	2A-14b	O/R Extended Y/N	Not used
	2A-14c	O/R Status	Current state of level will be displayed,
	2A-14d	O/R Test Y/N	Not used
2B PLATFORM	2B-1	Trigger ON/OFF	Current status of enable trigger; pulled =ON @ platform controls
	2B-2	DLD	Position of Lift/Drive selector switch
	2B-3	Joystick	Indicates % of stroke from center in real time. Direction not indicated here
	2B-4	FWD/DWN OFF/ON	Status of Forward micro-switch Forward stroke of the joystick
	2B-5	REV/UP OFF/ON	Status of Reverse micro-switch Reverse stroke of the joystick
	2B-6	LEFT OFF/ON	Status of Left Steer switch
	2B-7	RIGHT OFF/ON	Status of Right Steer switch
	2B-8	Positrac Y/N	Status of rear wheel solenoids activation. Activated in high speed or elevated drive
	2B-9	EMSp OFF/ON	Not used

Selection	ID	EZ-Cal Readout	Explanation
2C GROUND	2C-1	UP OFF/ON	Status of Up switch from lower control station
	2C-2	DOWN OFF/ON	Status of Down switch from lower control station
	2C-3	OUT OFF/ON	Not used
	2C-4	IN OFF/ON	Not used
	2C-5	EMSg OFF/ON	Not used
2D INPUTS	2D-1	P7-1	12V supply from Motor Controller. ON= Voltage, OFF= no voltage
	2D-2	P7-2	Base selected, ON= selector on Base position - unit operating from base controls
READOUT = plug and Pin	2D-3	P7-3	Up selected from base controls, ON= Up activated
	2D-4	P7-4	Platform Selected. ON= selector in platform position. Operate from upper controls
Example: P7-1 = Plug 7 Pin 1	2D-5	P7-5	Platform Down limit switch. Not used.
	2D-6	P7-7	Down selected from lower controls, ON= Down activated
		P7-6 & P7-8–P7-15	Not used
Refer to schematic		P15-1 - P15-15	Not used
2E ANALOGS	2E-1	P8-2	State of angle #2 in %, relates directly to the degree of platform elevation.
	2E-2	P8-5	State of angle #1 in %, relates directly to the degree of platform elevation.
	2E-3	P8-6	Measures pressure in lift cylinder for load sense system. CE only.
2F OUTPUTS		Numbers not listed in this table but that are displayed by EZ-Cal are not used.	
	2F-1	P4-10	Rear wheel bypass valves. ON= valves powered - rear wheels in bypass
READOUT = plug and Pin	2F-2	P4-12	Line Contactor signal B+. ON= Contactor activated
	2F-3	P4-14	Down Valve/s signal B+. ON= down valve activated
Example: P7-1 = Plug 7 Pin 1	2F-4	P5-1	Lift Valve Signal B+. ON= lift valve activated
	2F-5	P5-2	Steer Right signal B+. ON= valve activated
	2F-6	P5-3	Steer Left signal B+. ON= valve activated
Refer to schematic	2F-7	P5-4	Drive FWD signal B+. ON= valve activated
	2F-8	P5-5	Drive Rev signal B+. ON= valve activated
	2F-9	P5-6	Alarm signal B+. ON= alarm activated
	2F-10	P5-7	High Torque signal B+. ON= valve activated
	2F-11	P5-8	High Speed signal B+. ON= valve activated
	2F-12	P5-9	Hour Meter signal B+. ON= Meter activated
	2F-15	P5-12	Power supply to valves. Should be ON when system is powered up
	2F-16	P6-1	Back Pitching Valve. ON= valve activated
	2F-17	P6-2	Front Pitching Valve. ON= valve activated
	2F-18	P6-3	Left Rolling Valve. ON= valve activated
	2F-19	P6-4	Right Rolling Valve. ON= valve activated
	2F-20	P6-13	Axle Lock Valves. ON= Valves activated (axles can oscillate)
2H LOG	2H-1	Cal Date	Date of last calibration (height or load)
	2H-2	Software	MEC specific software
	2H-3	Powered	Accumulated time GP400 powered up (red LED on)

EZ-Cal Retrieve Mode And Help Messages

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

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

MODE Menu

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

HELP Menu

Provides various HELP messages to identify failure modes.

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

MODE Message

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

SCROLLING Message

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

Other helpful menus available include DIAGNOSTICS which allows the technician to monitor specific plug input/output information. Refer to EZ-Cal Flow Chart 2 – Diagnostics (ANSI Page 130 – CE Page 132).

MODE Messages

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

INITIALIZING

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

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

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

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

GROUND UP, GROUND DOWN,
- A ground function is operating normally

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

GROUND FAULTY
- Multiple ground function inputs are active at the same time

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

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

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

FORWARD, REVERSE
- A platform drive function is operating normally

FORWARD (LEFT), FORWARD (RIGHT), REVERSE (LEFT), REVERSE (RIGHT)
- A platform drive function is operating normally, with steer also active

STEER LEFT, STEER RIGHT
- A platform steer function is operating normally (without drive)

UP, DOWN
- A platform lift/lower function is operating normally

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

LEFT LOCKED, RIGHT LOCKED

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

UP LOCKED, DOWN LOCKED

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

CHECK DRIVE/LIFT

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

CHECK JOYSTICK

- Both platform joystick directions are active at the same time

STEER FAULTY

- Both platform steer directions are active at the same time

EXTENDING LEGS

- Outrigger legs are extending normally

RETRACTING LEGS

- Outrigger legs are extending normally

OUTRIGGERS LOCKED

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

INTERLOCKED**

- An interlock shutdown is active, preventing one or more functions. The interlock can be due to many different causes …
- **Press <ENTER> from the MODE display to see the precise cause of the interlock (listed below) – press <ESC> from that display to return to the MODE display:

TEST MODE

- The system test mode is active – switch power off and on again to clear TILTED
- The vehicle is tilted beyond limits, descend, then move vehicle to a more level location

OVERLOADED

- The vehicle platform is overloaded, reduce platform load. (CE option only)

TOO HIGH

- The vehicle platform is too high to allow some functions – descend first ARMGUARD
- During descent, the system is configured to stop movement to provide an armguard delay – release and re-select DOWN to continue lowering (CE option only)

TOO HOT

- The EZLIFT heatsink has reached 75ºc, preventing all functions except lowering. Functions will be allowed again when the heatsink cools to below 70ºc.
- The heatsink temperature can be viewed in the DIAGNOSTICS/SYSTEM/ TEMPERATURE display, ID # 2a5.

- The heatsink must be bolted to a significant metal panel of the vehicle, capable of dissipating heat to the environment.

UNCALIBRATED

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

EXTERNAL ALL, EXTERNAL DRIVE, EXTERNAL LIFT

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

EZ-Cal Help Messages

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

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

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

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

Information Only Messages

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

STARTUP! _____ (no flash code)

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

EVERYTHING OK _____ (no flash code)

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

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

GROUND MODE ACTIVE! _____ (no flash code)

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

CLOSE TRIGGER _____ (no flash code)

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

VEHICLE TILTED _____ (no flash code)

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

Function Active Messages

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

DRIVING! _____ (no flash code)
LIFTING! _____ (no flash code)
LOWERING! _____ (no flash code)
STEERING! _____ (no flash code)
EXTENDING OUTRIGGERS! _____ (no flash code)
RETRACTING OUTRIGGERS! _____ (no flash code)

Calibration Messages

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

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

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

FAULT: CUSTOMER _____ Flash Code: 1/1

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

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

Shutdown Help Messages

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

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

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

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

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

FUNCTIONS LOCKED - ARMGUARD (CE option only)_____ Flash Code: 2/2

- During descent, the System can stop movement for a configurable time, to allow a safety check that no-one is close to the machine. The operator must release and re-select DOWN to continue lowering (after the delay time-out).

FUNCTIONS LOCKED – OVERLOADED (CE option only) _____ Flash Code: 2/2

- System overload features are active, and the platform is excessively loaded to allow operation – the platform load must be reduced.

FUNCTIONS LOCKED – UNDERLOADED (CE option only) _____ Flash Code: 2/2

- System overload features are active, and the platform load is too low to be valid – this could be caused by erroneous calibration, a sensor fault, or a change in the vehicle mechanics/ hydraulics.

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

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

FUNCTIONS LOCKED - TILTED _____ Flash Code: 2/2

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

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

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

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

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

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

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

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

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

CHECK JOYSTICK SWITCHES! _____ Flash Code: 2/2

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

RELEASE TRIGGER! _____ Flash Code: 2/2

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

RELEASE GROUND SWITCHES!_____ Flash Code: 2/2

- Ground function switches were closed at power-on.

RELEASE JOYSTICK SWITCHES!_____ Flash Code: 2/2

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

RELEASE OUTRIGGER SWITCHES!_____ Flash Code: 2/2

- Outrigger switches were closed at power-on.

Wiring Messages

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

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

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

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

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

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

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

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

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

P600 Temperature Messages

This section lists “temperature” HELP messages – problems have been detected which are likely due to excessive duty cycling or poor heatsinking:

FAULT: BAD INTERNAL TEMPERATURE SENSOR! _____ Flash Code: 4/1

- The heatsink temperature is out of range; if the fault remains, the power controller may have to be replaced.

FUNCTIONS LOCKED - TOO HOT! _____ Flash Code: 4/2

- The heatsink temperature exceeds 75ºc, preventing all functions except lowering. Check for excessive motor current draw; check for good heatsinking to vehicle chassis.

Supply Messages

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

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

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

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

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

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

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

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

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

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

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

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

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

Sensor Messages CE Models

The following are “sensor” HELP messages – problems have been detected which are likely due to sensor issues (CE models).

FAULT: CHECK HEIGHT1 SENSOR _____ Flash Code: 6/1
FAULT: CHECK HEIGHT2 SENSOR _____ Flash Code: 6/1

- A height sensor is giving an out-of-range voltage (below 0.5V or above 4.5V).

FAULT: CHECK HEIGHT SENSORS_____ Flash Code: 6/1

- When two height sensors are fitted, both should read the same height at all times; this message indicates that the sensors are reading different heights. Check for loose sensors and/or re-calibrate.

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

- A pressure sensor is giving an out-of-range voltage (below 0.5V or above 4.5V).

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

- The elevation switch is in disagreement with the height sensor(s).
- During calibration, the height at which the elevation switch opens (while lifting) and closes (while lowering), is recorded. Subsequently, height and these calibration points are continuously checked – any significant difference generates this error.
- This section lists “CANBUS” HELP messages – problems have been detected with CANBUS communications between different modules (of course, only applicable if more than one module is connected together via CANBUS):

FAULT: CANBUS! _____ Flash Code: 6/6

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

Power Wiring Messages

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

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

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

Other Messages

The following are other HELP messages:

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

- This message should not occur!

FACTORY OVERRIDE_____ Flash Code: (fast flashing)

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

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

Troubleshooting Chart

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

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

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

Problem	Possible Cause	Remedy/Solution
General Power Issue		
No operation from upper or lower control station; no red LED at GP400.	Main battery switch turned off	Located left of lower control box.
	Emergency switch pushed in or ignition switch turned off or defective	Upper or lower e-stop switch will cut all power, as will the ignition switch in the platform control box.
	Batteries discharged	Will receive 4-4 or 7-7 flash on GP400. Clean, service and charge batteries. Battery charger may not operate if battery voltage drops below 20 volts.
	Blown 30 amp fuse	Located just below the battery cutoff switch
	Circuit breaker tripped	Located in lower control box panel
No functions; LED illuminated or flashing on GP400	Blown 300 amp fuse	Located just to the left of lower control station. Check for excessive motor amperage draw. Will receive a 7-7 flash code on GP400.
	Batteries discharged	Will receive 4-4 or 7-7 flash on GP400. Clean, service and charge batteries. Battery charger may not operate if battery voltage drops below 20 volts
	Damaged upper control box harness	Inspect from harness plug to terminal strip under platform. May receive 6-6 flash code on GP-400 (CAN bus)
	Other fault in system monitored by GP400	Check Help message on EZ-Cal or check flash code for error
Functions from lower controls but not from upper controls	Interlock switch (joystick)	Check power to red wire (power to switch) and power to purple wire (power out of switch) at joystick plug
	Loose plug connections on Matrix module	Check plug connections
	Damaged upper control box harness	Inspect from harness plug to terminal strip under platform. May receive 6-6 flash code on GP-400 (CAN bus)
	System interlock	Check HELP messages using EZ-Cal

Problem	Possible Cause	Remedy/Solution
LIFT/LOWER		
Platform will not raise; electric motor operating.	Excessive weight on platform	Reduce weight to rated platform capacity
	Lift Relief Valve RV-1 out of adjustment	Adjust relief valve to rated platform capacity
	Lift Valve SV-1 not energized	Check wiring to lift valve. Check for EZ-Cal message or flash code
	Lowering Valve SV-5 stuck open (located at base of lift cylinder)	Check and remove contamination from valve
	Main system pressure inadequate	Check pump output pressure
Platform will not raise; electric motor NOT operating.	Level sensor out of level (platform elevated above 10')	Reposition machine to firm level surface. Check level sensor function using EZ-Cal See Diagnostic chart 2e1
	Batteries discharged	Will receive 4-4 or 7-7 flash on GP400. Clean, service and charge batteries Battery charger may not operate if battery voltage drops below 20 volts
	System interlock	Check HELP messages using EZ-Cal
Platform raises uncommanded when operating other functions	Lift Valve SV-1 sticking	Clean or replace SV-1 valve
	Shuttle Valve LS-2 damaged or contaminated	Clean or replace LS-2 valve. See hydraulic diagram for location
Platform will not lower or lowers slowly	Maintenance lock in maintenance position	Return maintenance lock to the stowed position
	Lowering valve not energized	Check wiring to lowering valve located on Lift Cylinder. Check for EZ-Cal message or Flash code
	Lowering valve not shifting	Clean debris. Check for damage, replace
	Lowering orifice plugged	Clean orifice located inside hose fitting on lift cylinder
	System interruption	Check HELP messages using EZ-Cal
Platform lowers uncommanded (drift down)	Lowering Valve SV-5 sticking or contaminated	**Deploy Maintenance Lock!** Remove and clean or replace lowering valve SV5
	Cylinder internal seal failure	Check, repair seals
Emergency lowering not working	Lowering valve not shifting	Clean debris, check for damage, replace
	Lowering Orifice ORF-3 plugged	Clean orifice, located in Lift cylinder hose port.
	Emergency Down battery discharged	Charge, check charge diode & connections
	Emergency Down supply fuse blown	Replace fuse, check for shorts in wire and coil
	Valve coil failed on cylinder	Test, replace

Problem	Possible Cause	Remedy/Solution
DRIVE:		
No drive function	Drive Valve not shifting	Check electrical connections at drive valve, check drive valve for contamination.
	Lift/Drive select switch malfunction	Check continuity through switch
	Drive system interlock	Check HELP and MODE messages on EZ-Cal
Drive operates uncommanded when operating other functions	Drive Valve SVD-1 sticking or damaged	Clean, replace SVD-1 valve. See hydraulic diagram.
	Shuttle Valve LS-3 damaged or contaminated	Clean or replace LS-3 valve. See hydraulic diagram for location

No drive elevated	Unit out of level	Lower and re-position the machine.
	Batteries discharged	Will receive 4-4 or 7-7 flash on GP400. Clean, service and charge batteries. Battery charger may not operate if battery voltage drops below 20 volts
Slow drive with platform in stowed position	System interlock	Check HELP messages using EZ-Cal
	High torque enabled	Check Speed/Torque Switch at platform controls
	Elevation sensor out of calibration	Use EZ-Cal to monitor platform state of elevation. See Diagnostic chart I.D. 2a13 for elevated status and 2e1 for platform % of elevation input. Failure of the angle transducer will trigger a fault code.
	Malfunctioning rear wheel bypass valve	Located on rear wheel motors only. Check by replacing valves.
	Wheel motor/s not functioning correctly	Inspect wheel motors for excessive bypass
Poor gradability performance	High or Mid Speed enabled	Check Speed/Torque Switch
	Batteries discharged	Will receive 4-4 or 7-7 flash on GP400, Clean, service and charge batteries. Battery charger may not operate if battery voltage drops below 20 volts
	Wheel motor/s not functioning correctly	Inspect wheel motors for excessive bypass
	Malfunctioning Rear wheel bypass valve	Located on rear wheel motors only. Check electrical by disconnecting valves or function by replacing valves
	Malfunctioning Series/Parallel Valves	Located on top of main hydraulic Manifold
	Worn hydraulic pump	Check with flow meter or replace pump
Drive in one direction only	Drive Valve SVD1 not energizing in one direction	Check 12 volts to appropriate coil, check coil, check valve function
	Counterbalance Valve CBV1 or CBV2 malfunction	Swap counterbalance valves to see if functioning direction changes.
	No output from GP400	Scan using EZ-Cal and troubleshooting charts. EZ-Cal chart I.D 4f-7 - Fwd or 2f-9 - Reverse
No Low Speed (high torque mode)	Speed/torque selector switch inoperative	Check continuity of Speed/Torque switch in platform control box
	Valve SV3 not functioning	Check for 12 volts and ground to valve check for faulty valve spool
	EP1 poppet valve not functioning	Check or replace valve
No Mid Speed	SV3 or SV4 powered and/or shifted	These valves should not have 12 volts, in mid-speed, check valve function
	Speed/torque selector switch malfunction	Check continuity through switch
No High Speed	Speed/torque selector switch inoperative	Check continuity of Speed/Torque switch in platform control box
	Valve SV4 not functioning	Check voltage and ground to valve check for faulty valve spool
	EP2 poppet valve not functioning	Check or replace valve
No brake effectiveness	Brake Orifice OD-1 obstructed	Remove, clean orifice. See hydraulic diagram for location in manifold.
	Brake discs worn past service limit	Replace brake discs located inside rear wheel motors.

Problem	Possible Cause	Remedy/Solution
LIFT AND DRIVE		
No drive or lift operation motor operates	Main Relief Valve RV-3 out of adjustment	For test purposes, swap RV-3 with RV-2.
	Pump or pump coupler failure	Inspect, replace as necessary
	Diverter Valve EC-1 malfunction	Inspect, replace as necessary
	Hydraulic tank empty	Check, fill with approved oil
No drive or lift operation motor does not operate	Motor malfunction	Inspect, replace as necessary
	System interlock	Check HELP messages using EZ-Cal
	Battery discharged	Will receive 4-4 or 7-7 flash on GP400. Clean, service and charge batteries. Battery charger may not operate if battery voltage drops below 20 volts.

Problem	Possible Cause	Remedy/Solution
STEER		
No steer in either direction	Joystick rocker switch inoperative	Check rocker switch output on green and yellow wires, input on blue wire.
	Steering Valve SV-2 inoperative	Check steering valve for power or damage.
	System interlock	Check HELP messages using EZ-Cal
	Hoses connected incorrectly	See hydraulic section for correct connection.
	Pressure Relief Valve RV-2 set too low	Set steer relief valve to 2000 PSI
Steers in one direction only	Steering Valve inoperative or stuck	Inspect; replace steering valve
	No power to steering coil	Check for power and ground in both directions, repair wiring
	System interlock	Check HELP messages using EZ-Cal
Steers but not fully or steers slowly	One or both steering cylinder internal seal failure	Check steering cylinder seals, replace
	Pressure relief valve set too low	Set steer relief valve to 2000 PSI
	King pin/s seizing in the bore	Disassemble and inspect, repair, replace bushings
Wheels do not stay in position while driving	One or both steering cylinder internal seal failure	Check steering cylinder seals, replace
Steers uncommanded	Steering Valve SV-2 sticking or damaged	Remove and inspect for visible debris and stem straightness, clean with solvent and air
	Check Valve CV-1 or CV-2 damaged or contaminated with debris	Remove and clean or replace check valves see hydraulic diagram for manifold location

Problem	Possible Cause	Remedy/Solution
LEVEL, AUTO & MANUAL		
No level operation	Platform is in elevated position or is perceived to be in the elevated position. Elevation is monitored by a sensor located on left-rear portion of the scissor stack.	Use EZ-Cal to monitor platform state of elevation. See Diagnostic chart I.D. 2a13 for elevated status and 2e1 for platform % of elevation input. Failure of the angle transducer will trigger a fault code.
	System interlock	Check HELP messages using EZ-Cal
	Level switch/s inoperative	Check level switch located in the upper control box
	Directional pressure valve not functioning	Located behind lower control box. Inspect valve for loss of power, ground or damage.
No auto-level operation; manual level operates	Switch or switch wiring problem. Located inside upper control box	Check switch and wiring
	Level Sensor not calibrated	See Tilt Sensor Calibration instructions found earlier in this section.
	System Interlock	Check HELP messages using EZ-Cal
Unit will not accurately level platform	Unit on too extreme an angle	Relocate unit to more level ground
	Level valve sticking	Inspect/replace valves located behind lower control box
	Excessive weight on platform	Reduce weight to 1500 lbs max (680Kg)
	Pressure relief valve out of adjustment	Set steering relief valve SV-2 to 2000 PSI (138 bar)
	Tilt sensor not calibrated or not calibrated properly	See Tilt Sensor Calibration instructions found earlier in this section.
	Level cylinder valves wired incorrectly	Refer to schematic diagram for correct wiring.
	Level cylinder hoses connected incorrectly	See Hydraulic section for hose routing detail
Will not stay level; drifts down	Counterbalance valve adjustment or failure	Located on the outrigger cylinder, not adjustable. If valve is suspect it must be replaced
	Failure of cylinder internal seals	Inspect and repair as necessary

Troubleshooting Battery Charger: Electric Models

Insufficient AC power systems, poor connections, bad batteries or low electrolyte in batteries may result in poor charger performance. Refer to Section 6: Electrical System for electrical requirements, and charger and battery maintenance instructions.

Refer to the Operator's Manual for detailed charging instructions.

To be able to use the trouble shooting guide safely and effectively, it is important to read through this guide before beginning any tests.

Do not operate the charger if it is malfunctioning. Personal injury or property damage may result.

Do not disassemble charger. Return to MEC when service or repair is required.

CAUTION

To reduce the risk of fire, only use AC circuits and extension cords in accordance with all National and Local Electrical Codes for the location of use.

Only use MEC approved lead acid type flooded batteries. Use of GEL type batteries may damage the charger and cause machine instability due to decreased weight.

TO REDUCE THE RISK OF ELECTRIC SHOCK, ALWAYS DISCONNECT BOTH THE POWER SUPPLY CORD AND THE OUTPUT WIRES BEFORE ATTEMPTING MAINTENANCE.

WARNING

THE CHARGER SURFACE CAN GET HOT WHILE OPERATING. CONTACT WITH THE SKIN OR SURROUNDING MATERIALS SHOULD BE AVOIDED.

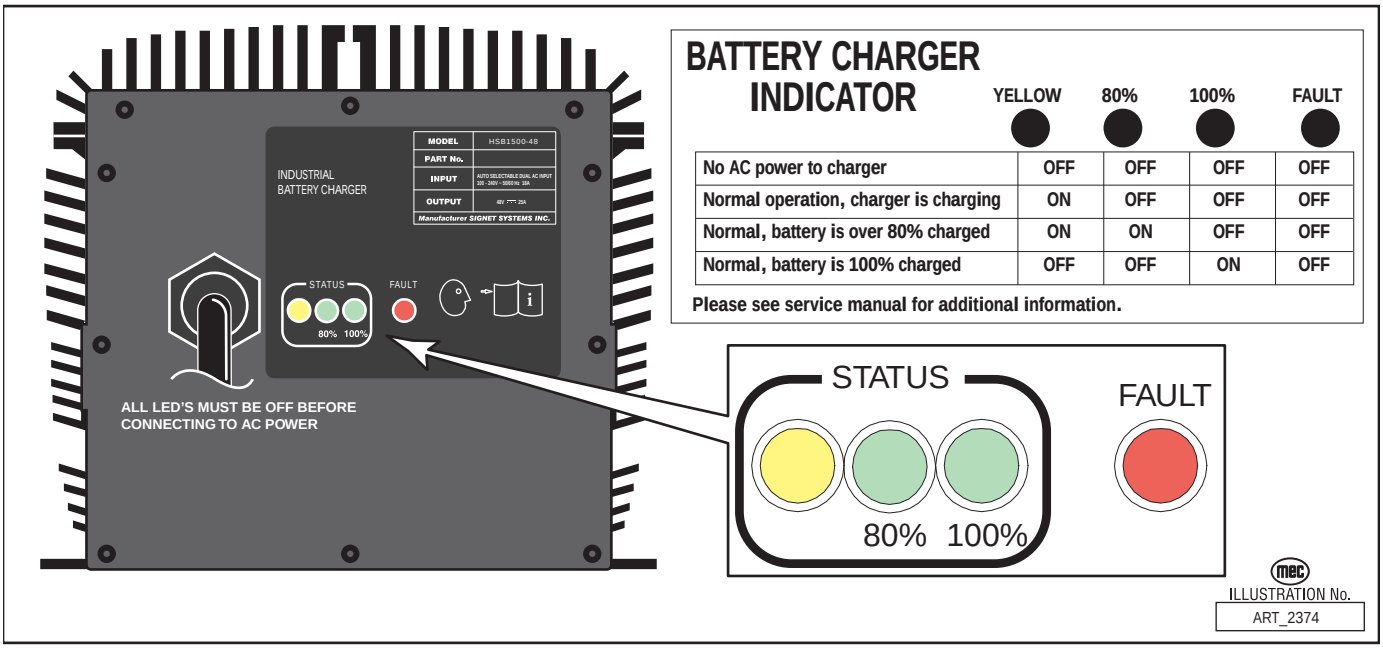
TO REDUCE THE RISK OF AN ELECTRIC SHOCK, CONNECT ONLY TO A PROPERLY GROUNDED SINGLE-PHASE (3 WIRE) OUTLET.

Incorrect assembly may result in a risk of electric shock or fire. The following procedures are intended only to determine if a malfunction may exist in the charger. As most returned chargers test good, it is very important that this procedure is followed and that other problems are corrected before assuming the charger has failed.

The MEC battery charger is a fully automatic type with a maintenance feature that will maintain battery voltage indefinitely when connected to an AC power source. The battery charger should be plugged into an un-switched AC power source if the machine is stored for long periods of time.

Important: All MEC electric aerial lifts are equipped with lead acid type flooded batteries. The yellow wire loop on the back of the charger must be intact. If it is cut, broken or damaged the charger may go into GEL charging mode, causing damage to the machine and/or batteries.

Battery Charger, HB1500-48



Battery Charger Fault Codes

CHG YELLOW LED	80% GREEN LED	100% GREEN LED	Fault RED LED	Condition
X	X	X	ON	Battery pack probably bad Weak or bad cell Batteries excessively discharged
OFF	OFF	OFF	ONE FLASH	Output open circuit or short circuit or reverse polarity connection of battery to charger Battery voltage is too high (may be connected to wrong voltage battery)
OFF	OFF	OFF	TWO FLASH	Charger has timed-out at 22 hours (battery pack probably bad or bad cell)
X = "don't care" LED may be ON or OFF				

To determine if a charger is malfunctioning, identify the problem from the following list and refer to the Trouble Table for instructions.

1. Charger does not turn ON -or- no yellow LED
2. Red FAULT LED is ON or BLINKING
3. Batteries do not fully charge
4. The AC supply circuit breaker is tripped or fuse is blown

If the problem is not listed above, refer the problem to a qualified service agent for additional trouble shooting procedures.

Note: Over 1/2 of all battery chargers returned as "failed" are good. Please follow the troubleshooting procedures carefully and check all other items before returning the charger.

Problem	Diagnosis
Charger does not turn ON - no LEDs	The AC plug must be disconnected and reconnected to start the charger once it has turned-off from a charge cycle. • Connect the AC supply cord securely to a live AC outlet (minimum 20-amp circuit) • Check the AC outlet to ensure it is working and has 20-amp supply. • Check that DC output wires and connections are in good working condition. • Replace charger if everything else is correct.

Red FAULT LED is ON or BLINKING	The faults identified below cause the FAULT LED to turn ON or BLINK. If the cause of the fault is removed the charger restarts automatically.
	• LED is ON
	  • Weak or bad battery pack, bad cell, low electrolyte level or batteries excessively discharged.
	• LED blinks once: OUTPUT CONNECTION ERROR
	  • Check Battery and Charger Connection
	  • Connection may be corroded or loose
	  • Check for pinched or broken wires (may cause a short)
	  • Output may be connected in reverse polarity to batteries (the charger is not damaged by any of these problems.)

Red FAULT LED BLINKS twice: charger has Timed-Out	The charger has a 22 hour timer - if charge cycle is not complete within 22 hours the charger will stop charging.
	• Possible Causes:
	  • Batteries are extremely discharged - unplug for 30 seconds then plug charger back in to restart and complete charging.
	  • Electrolyte is low in one or more cells.
	  • Batteries are weak, old, or have one or more bad cells. Batteries will still charge but in a weakened capacity - they should be replaced.

Batteries do not fully charge	• Overnight Charging
	  • Make sure AC power supply is not being switched OFF at night
	• NEW batteries
	  • New batteries sometimes require 20 to 30 charge/discharge cycles before they charge normally. 80% LED after overnight charging is normal. Within a few weeks the 100% LED should light after overnight charge.
	• OLD batteries
	  • Check for dead cells or reduced capacity.

AC Line circuit breaker tripped or fuse blown	• Overloaded Circuit • Minimum 20-amp service required. Plug charger into a different AC outlet on a different circuit. If charger operates properly the AC line may require repair. If charger fails and AC line checks “good” the charger should be replaced.

Hydraulic Pressure Adjustment - 3084ES

Before attempting to check and/or adjust pressure relief valves, operate the machine for 15 minutes or long enough to sufficiently warm the hydraulic fluid.

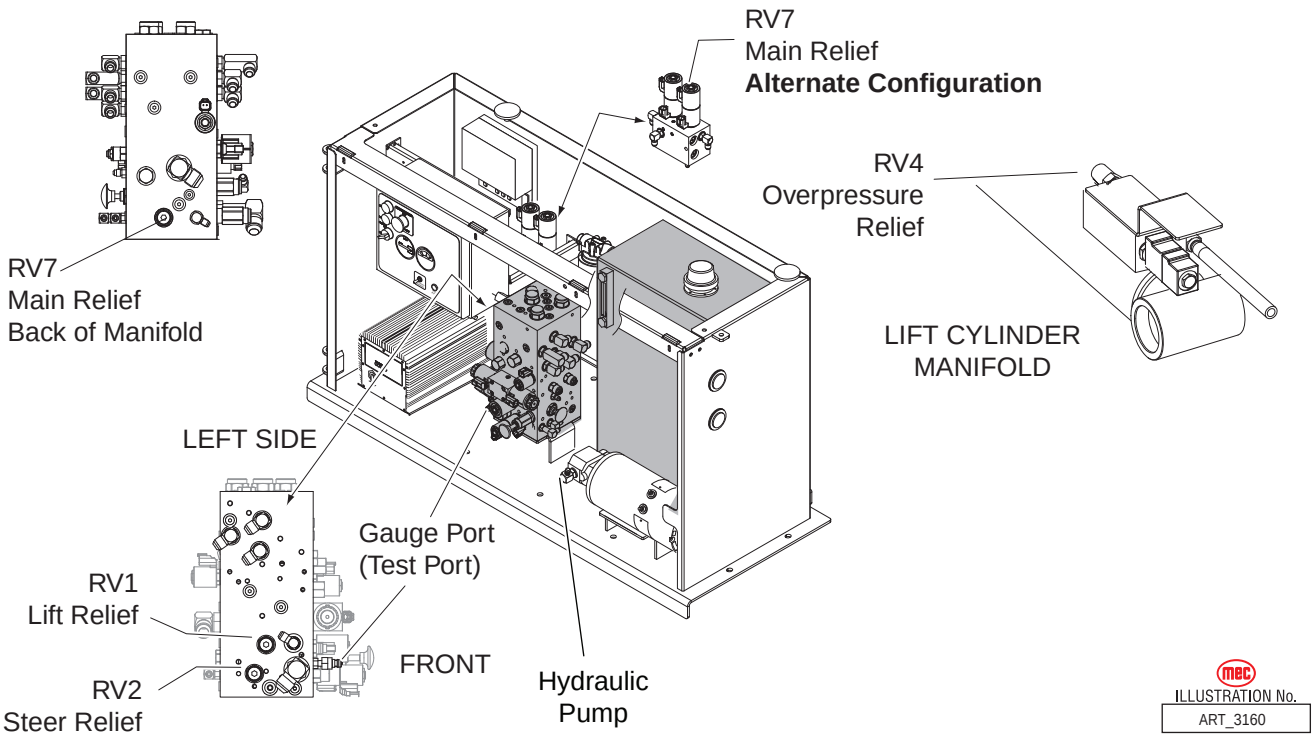
Insert a 0-5000 psi gauge onto the pressure test port on the valve manifold using gauge adapter fitting MEC part no. 8434

Model	Main		Lift		Steer		Stand-By	
3084ES	2800 PSI	193 bar	2500 PSI	172.4 bar	2000 PSI	137.9 bar	Not Used	Not Used

Adjusting Relief Valves

- Remove the tamper proof cap.
- Turn adjustment screw “IN” to increase pressure.
- Turn adjustment screw “OUT” to decrease pressure.
- When correct pressure is obtained replace tamper proof cap with a new one.

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



Adjustments - 3084ES

The Hydraulic Pump used in this model is not adjustable.

See Section 11 - Schematics for correct pressure settings.

Main Relief (RV7)

- Disconnect forward or reverse coil of drive valve.
- Energize drive function by moving joystick in the direction of the already disconnected coil.

- Hold the switch for 10 seconds to get an accurate reading on the pressure gauge.
- If pressure is LOW, adjust main relief valve ¼ turn clockwise and recheck.
- If pressure is HIGH, adjust main relief valve ¼ turn counterclockwise and recheck.
- Repeat until correct.

Lift Relief (RV1)

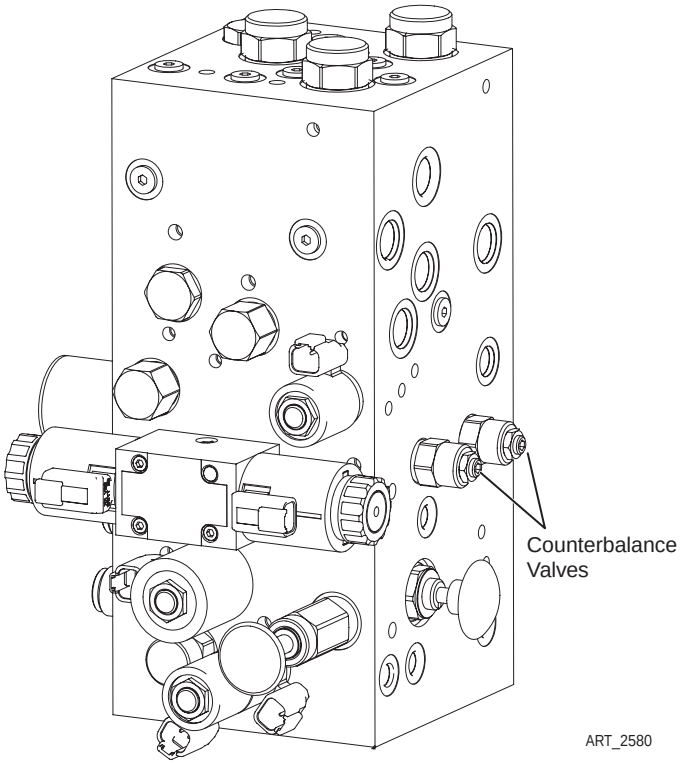
- Move the platform to full height with no load on platform.
- Hold the switch for 10 seconds to get an accurate reading on the pressure gauge.
- If pressure is LOW, adjust lift relief valve ¼ turn clockwise and recheck.
- If pressure is HIGH, adjust lift relief valve ¼ turn counterclockwise and recheck.
- Repeat until correct.

Steering Relief (RV2)

- Energize the steering to full left.
- Hold the switch for 10 seconds to get an accurate reading on the pressure gauge.
- If pressure is LOW, adjust steering relief valve ¼ turn clockwise and recheck.
- If pressure is HIGH, adjust steering relief valve ¼ turn counterclockwise and recheck.
- Repeat until correct.

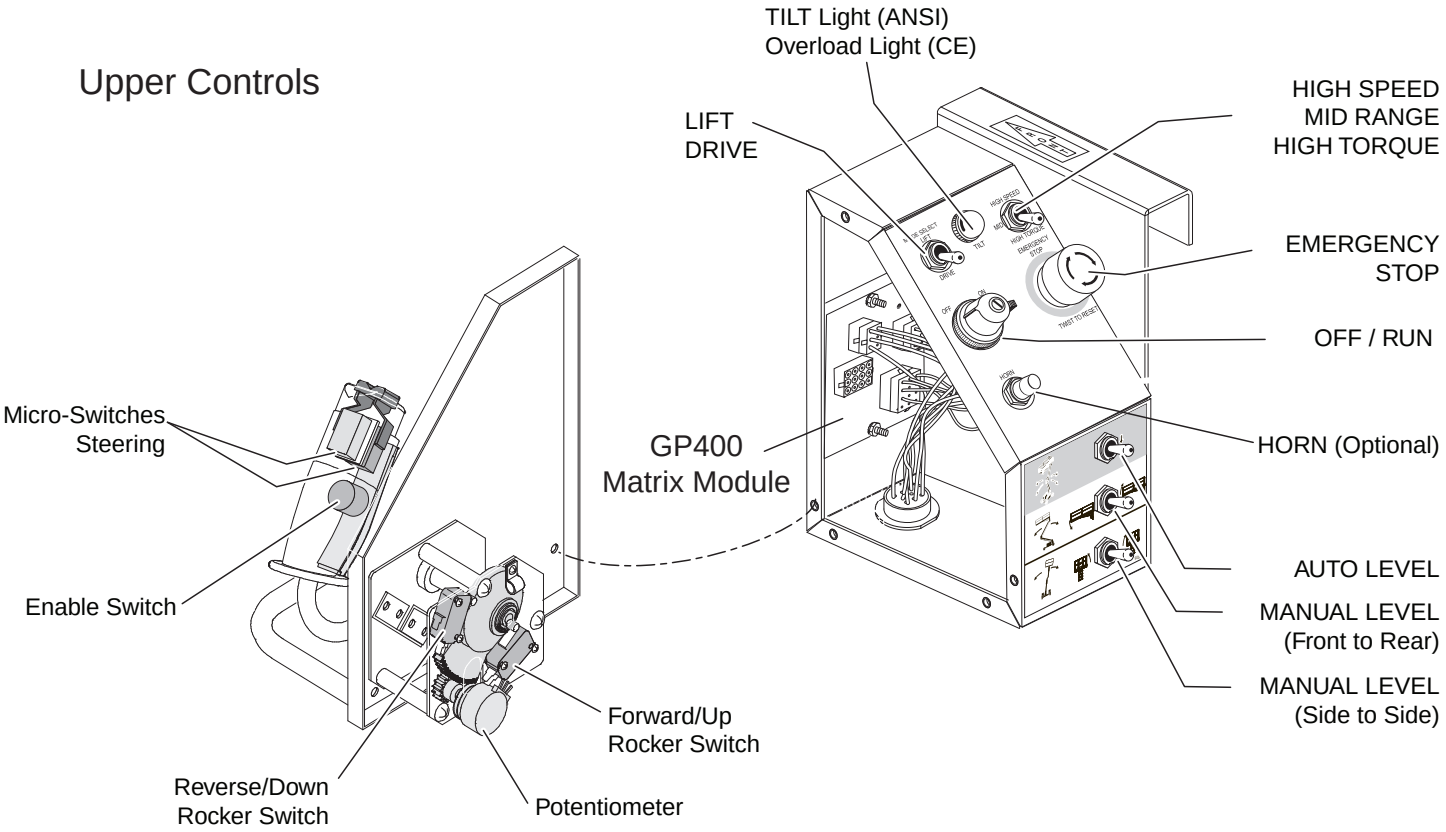
Counterbalance Valves

- Loosen the locknut on one of the valves.
- Turn the adjustment screw clockwise (to the right) until it reaches the internal stop and the screw will turn no further.
- Turn the adjustment screw clockwise (to the right) 3¼ turns.
- Tighten the locknut while holding the adjustment screw in position to prevent it from rotating.
- Repeat steps 1 through 4 on the other Counterbalance valve.
- Adjustment is complete.

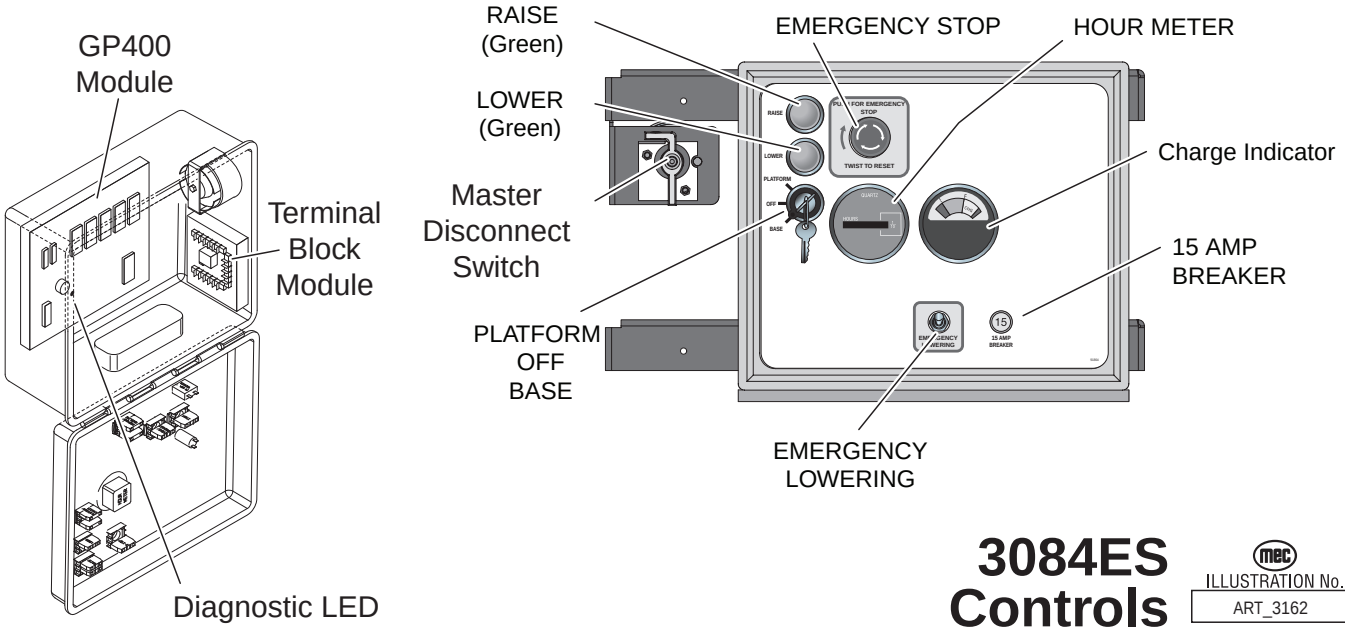


Component Illustrations

Upper Controls



Lower Controls



3084ES Controls

ILLUSTRATION No.
ART_3162

Hydraulic Manifold 3084ES

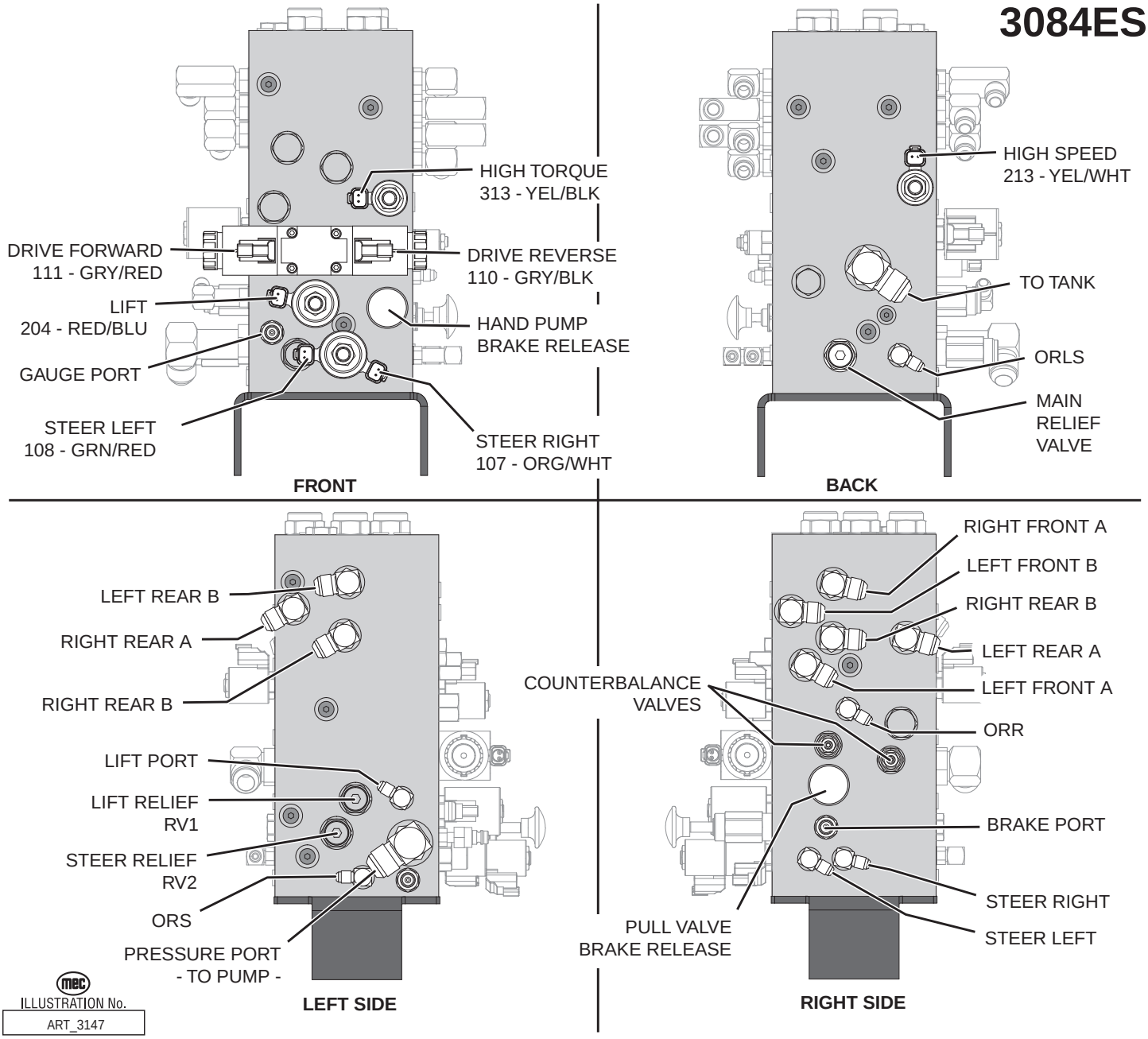
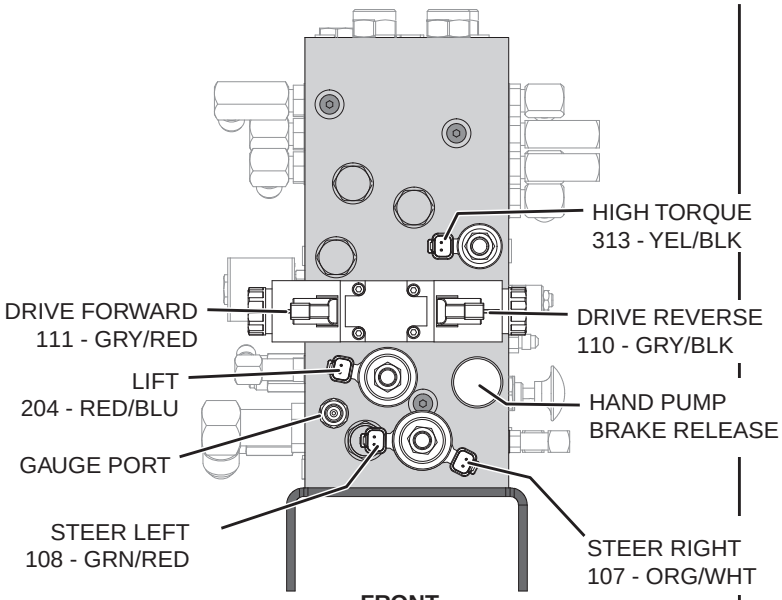
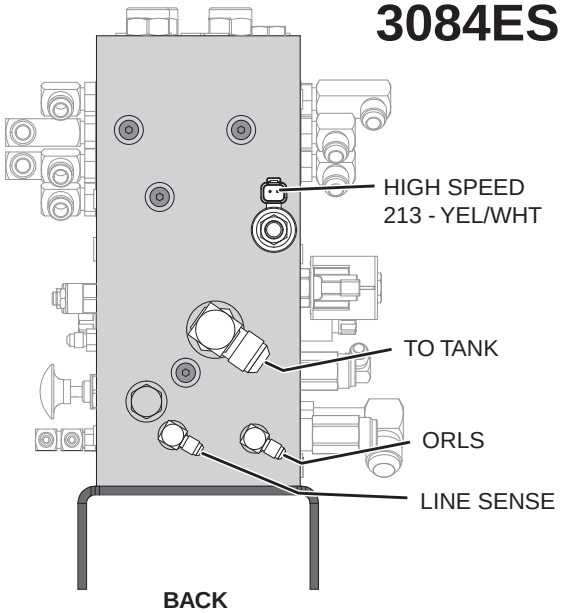
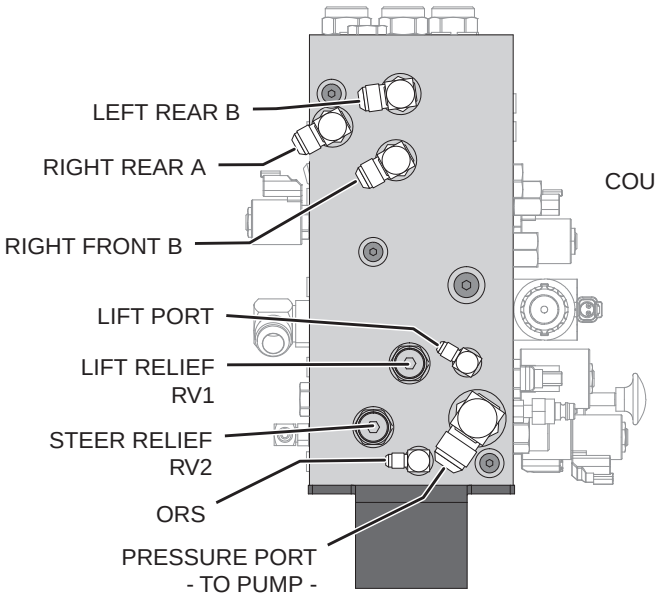


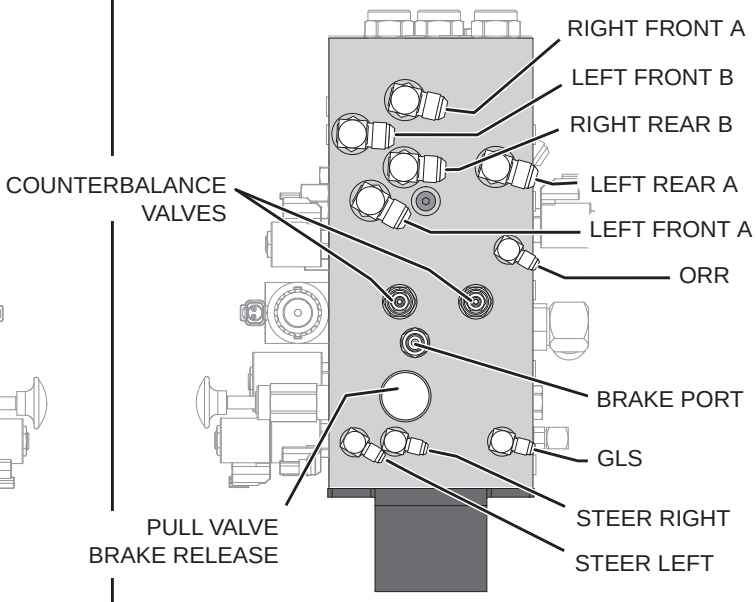
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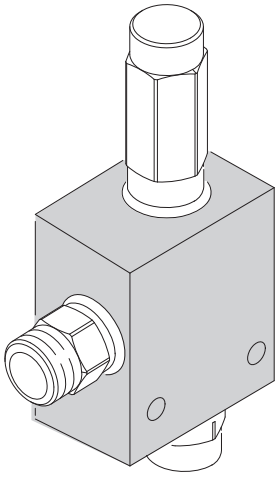
Hydraulic Manifold - Alternate Configuration 3084ES











REMOTE MAIN RELIEF VALVE

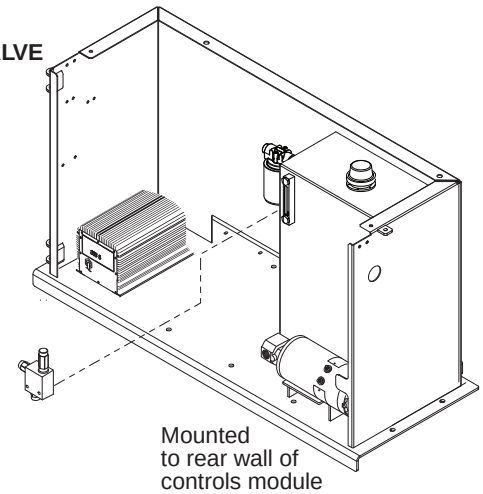


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3084RT - Diesel/Dual Fuel Models

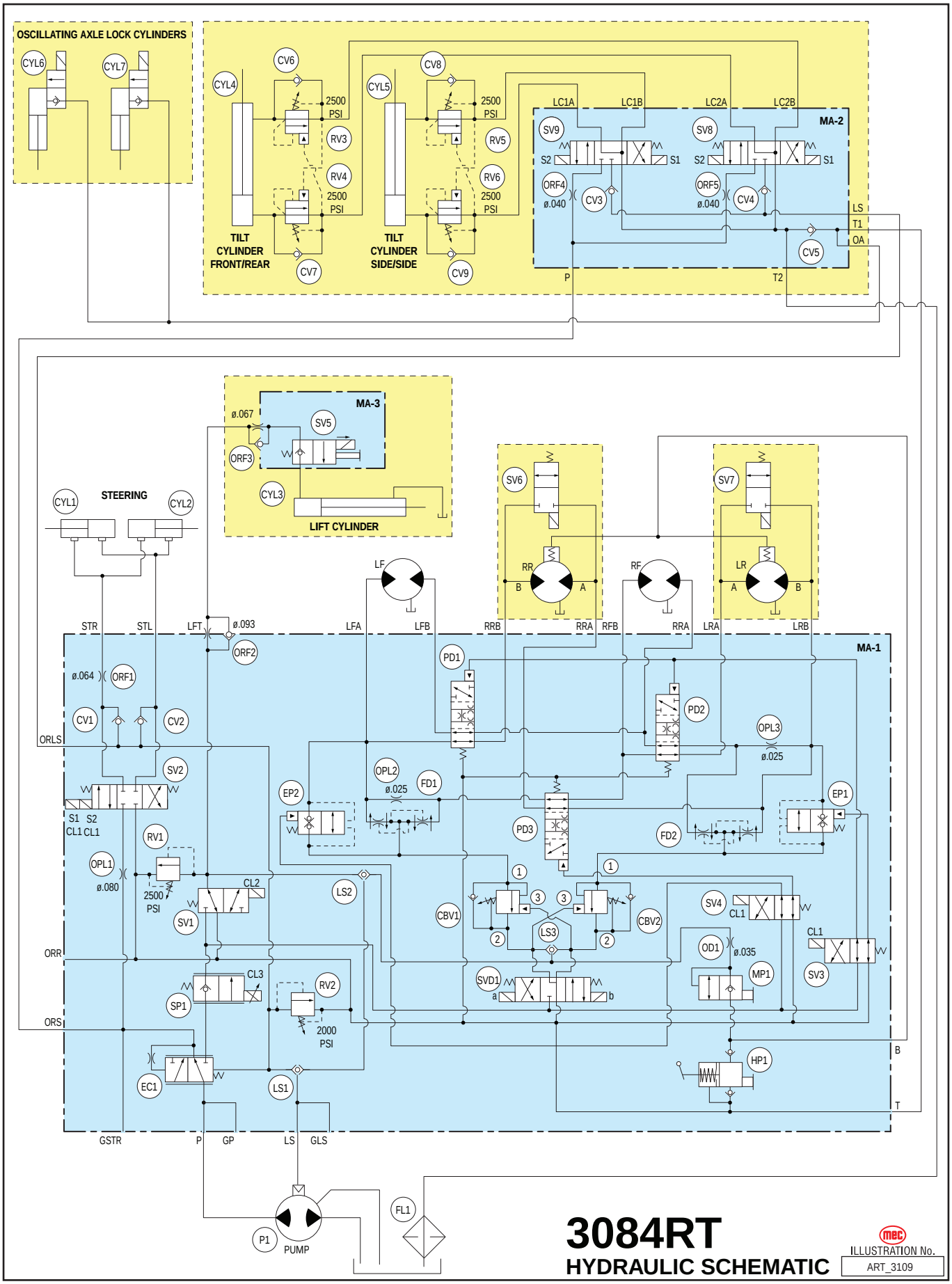
Hydraulic - 3084RT

The following table applies to page 163 - 165.

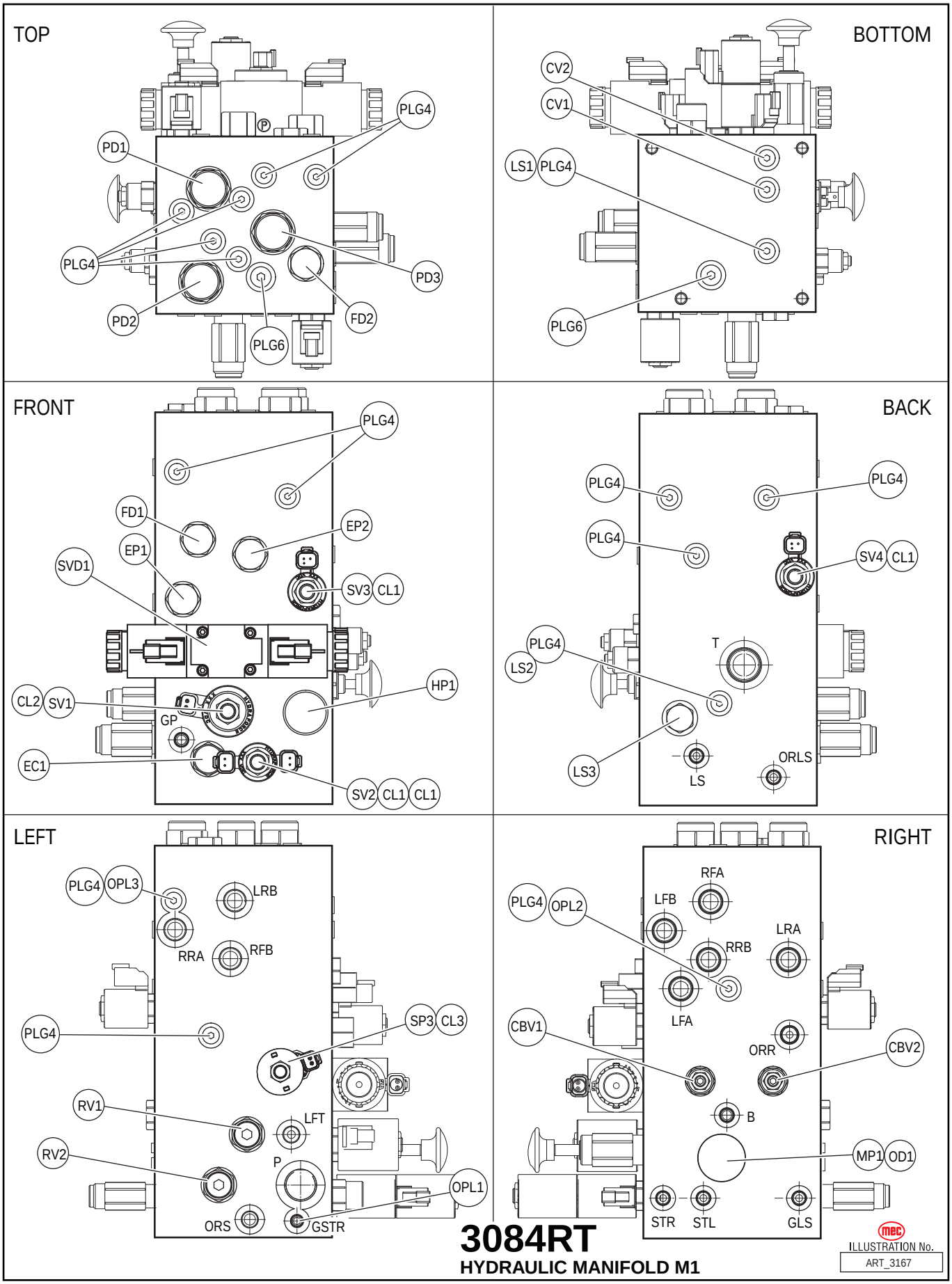
Callout	Description
MA-1	**MAIN MANIFOLD**
CBV1	Counter Balance Valve, Drive
CBV2	Counter Balance Valve, Drive
CL1	Coil - Speed/Torque/Steer Valves #8
CL2	Coil - Lift Valve #10
CV1	Check Valve, Load Sense Steer Left
CV2	Check Valve, Load Sense Steer Right
EC1	Priority Flow Control
EP1	Piloted Poppet Valve - Torque/Speed
EP2	Piloted Poppet Valve - Torque/Speed
FD1	Flow Divider/Combiner
FD2	Flow Divider/Combiner
HP1	Hand Pump, Brake Release
LS1	Load Sense Shuttle Valve
LS2	Load Sense Shuttle Valve
LS3	Load Sense Shuttle Valve
MP1	Manual Push Brake Release Valve
OD1	Orifice Disc, Brakes, 0.035
OPL1	Orifice Plug, Steering, 0.087
OPL2	Orifice Plug, Flow Divider Bleed, 0.025
OPL3	Orifice Plug, Flow Divider Bleed, 0.025
ORF1	Orifice, Steering, 0.064
ORF2	Orifice, Lift, 0.093
PD1	Pilot Valve, Series Parallel, 4-Way / 3-Position
PD2	Pilot Valve, Series Parallel, 4-Way / 3-Position
PD3	Pilot Valve, Series Parallel, 4-Way / 3-Position
PLG4	Port Plug
PLG6	Port Plug
RV1	Relief Valve, Lift, 2500 PSI
RV2	Relief Valve, Steering, 2000 PSI
SP1	Proportional Valve
SV1	Spool Valve, Lift, 3-Way
SV2	Spool Valve, Steer, 4-Way / 3-Position
SV3	Spool Valve, Series Parallel, 4-Way / 3-Position
SV4	Spool Valve, Series Parallel, 4-Way / 3-Position
SVD1	Spool Valve, Drive, 4-Way / 3-Position

Callout	Description
	STEERING COMPONENTS
CYL1	Steer Cylinder, Right
CYL2	Steer Cylinder, Left
	TILT COMPONENTS
MA-2	Combination Valve Manifold - Tilt
CV3	Check Valve, Tilt, Side/Side Load Sense
CV4	Check Valve, Tilt, Front/Rear Load Sense
CV5	Check Valve, 10 PSI Oscillating axle
CV6	Check Valve, Tilt Cyl, Front/Rear
CV7	Check Valve, Tilt Cyl, Front/Rear
CV8	Check Valve, Tilt Cyl, Side/Side
CV9	Check Valve, Tilt Cyl, Side/Side
CYL4	Tilt Cylinder, Front/Rear
CYL5	Tilt Cylinder, Side/Side
CYL6	Axle Lock Cylinder
CYL7	Axle Lock Cylinder
ORF4	Orifice, 0.040, Tilt, Side/Side
ORF5	Orifice, 0.040, Tilt, Front/Rear
RV3	Relief Valve, Tilt Cyl Front/Rear, 2500 PSI
RV4	Relief Valve, Tilt Cyl Front/Rear, 2500 PSI
RV5	Relief Valve, Tilt Cyl Side/Side, 2500 PSI
RV6	Relief Valve, Tilt Cyl Side/Side, 2500 PSI
SV8	Spool Valve, Tilt Front/Rear
SV9	Spool Valve, Tilt Side/Side
	LIFT COMPONENTS
MA-3	Lift Cylinder Manifold
CYL3	Lift Cylinder
ORF3	Orifice, 0.067 Descend
SV5	Solenoid Valve, 12V, Dual Coil
	Wheel Motors
LF	Wheel Motor - Left Front
LR	Wheel Motor w/ Brake - Left Rear
RF	Wheel Motor - Right Front
RR	Wheel Motor w/ Brake - Right Rear
SV6	Spool Valve - Right Wheel Motor Bypass
SV7	Spool Valve - Left Wheel Motor Bypass
	RESERVOIR
FL1	Filter, 10 Micron, Fluid Return
P1	Pump, Hydraulic Fluid

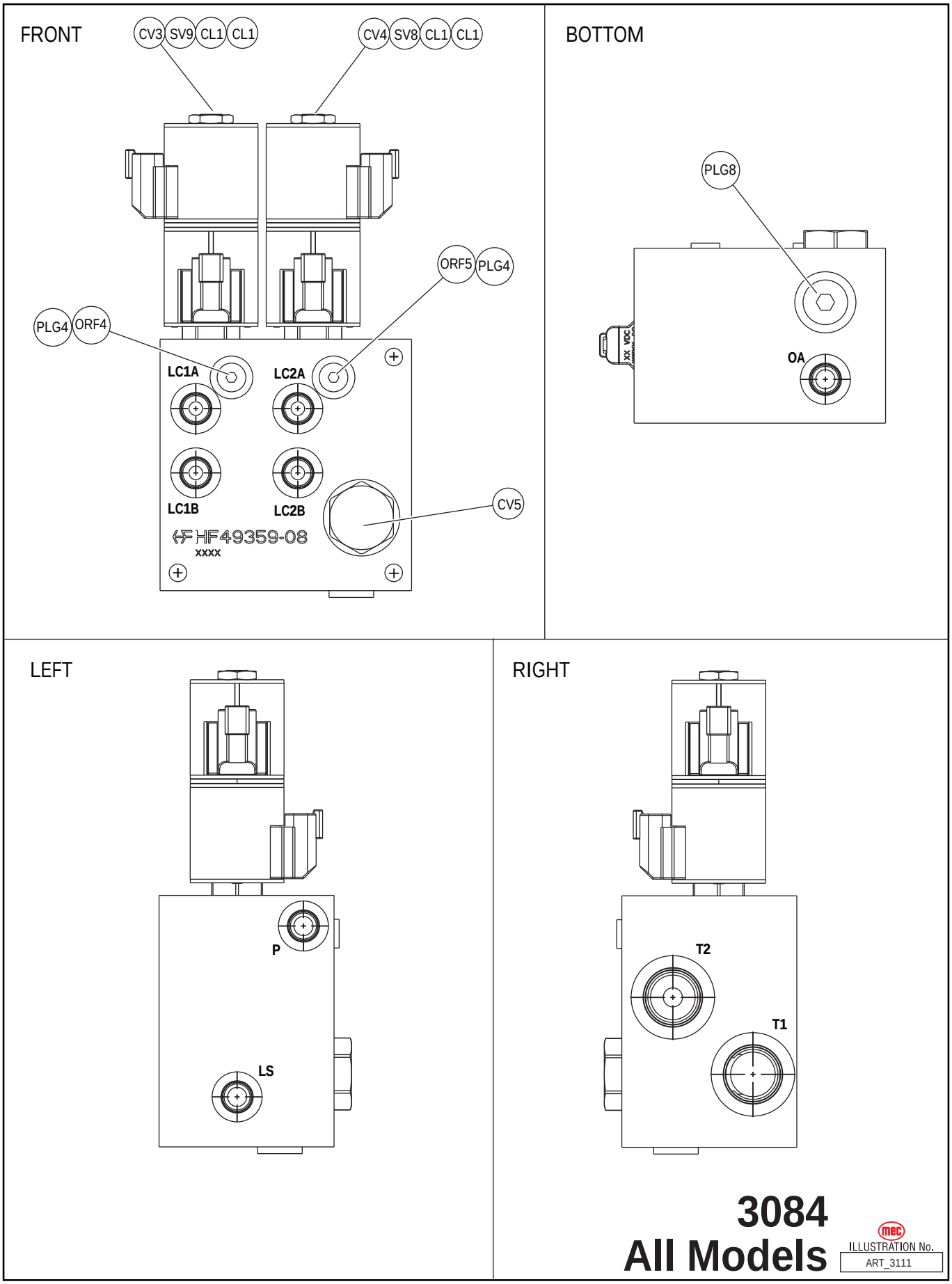
3084RT - Hydraulic Schematic



3084RT - Hydraulic Manifold Main M1



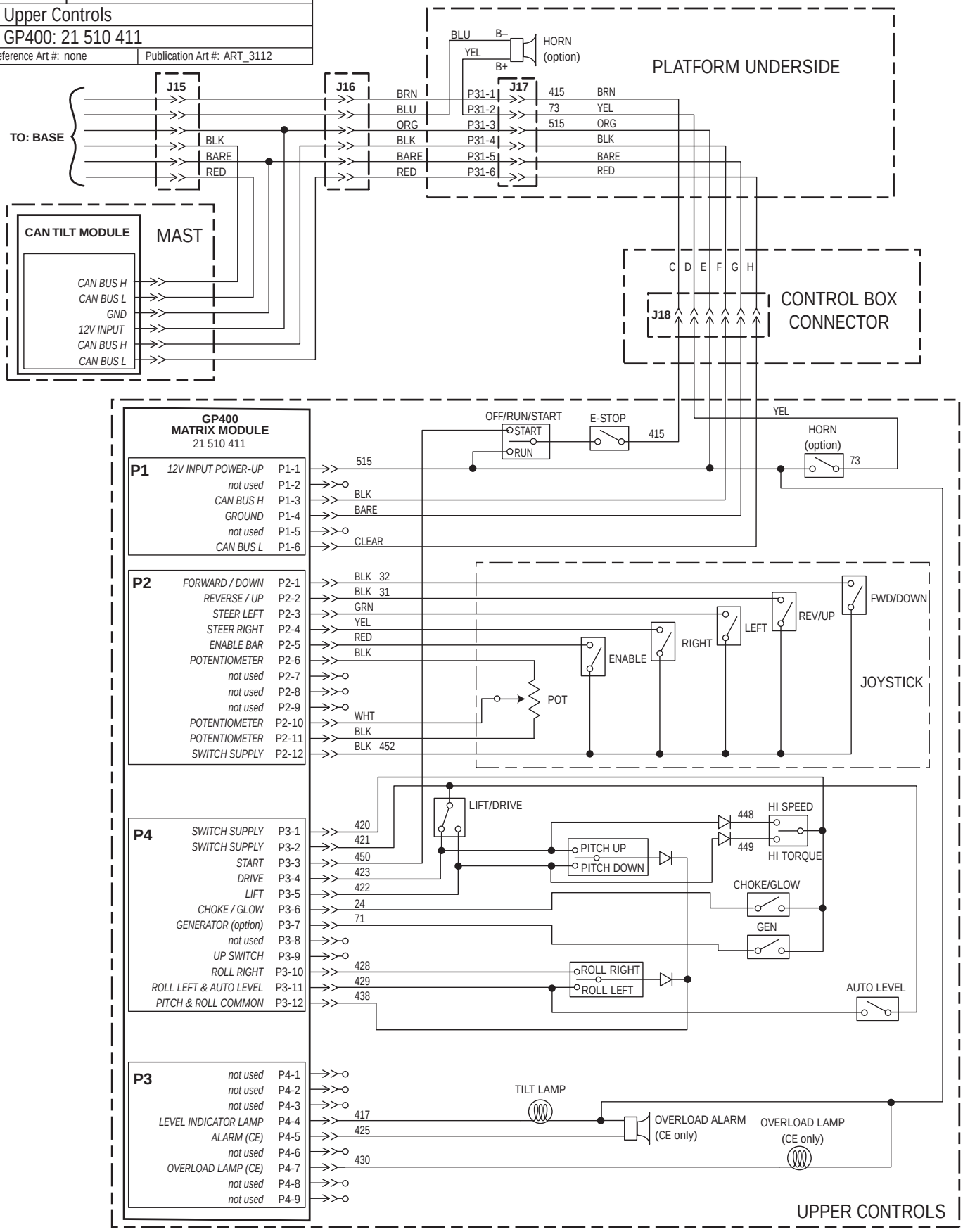
3084 All Models - Hydraulic Manifold Tilt M2



3084RT - Upper Controls Electric Schematic

SCHEMATIC
Model: / Serial #
3084RT | 11800025- UP
Upper Controls
GP400: 21 510 411
Reference Art #: none | Publication Art #: ART_3112

3084RT



3084RT - Upper Controls Components

3084RT ANSI

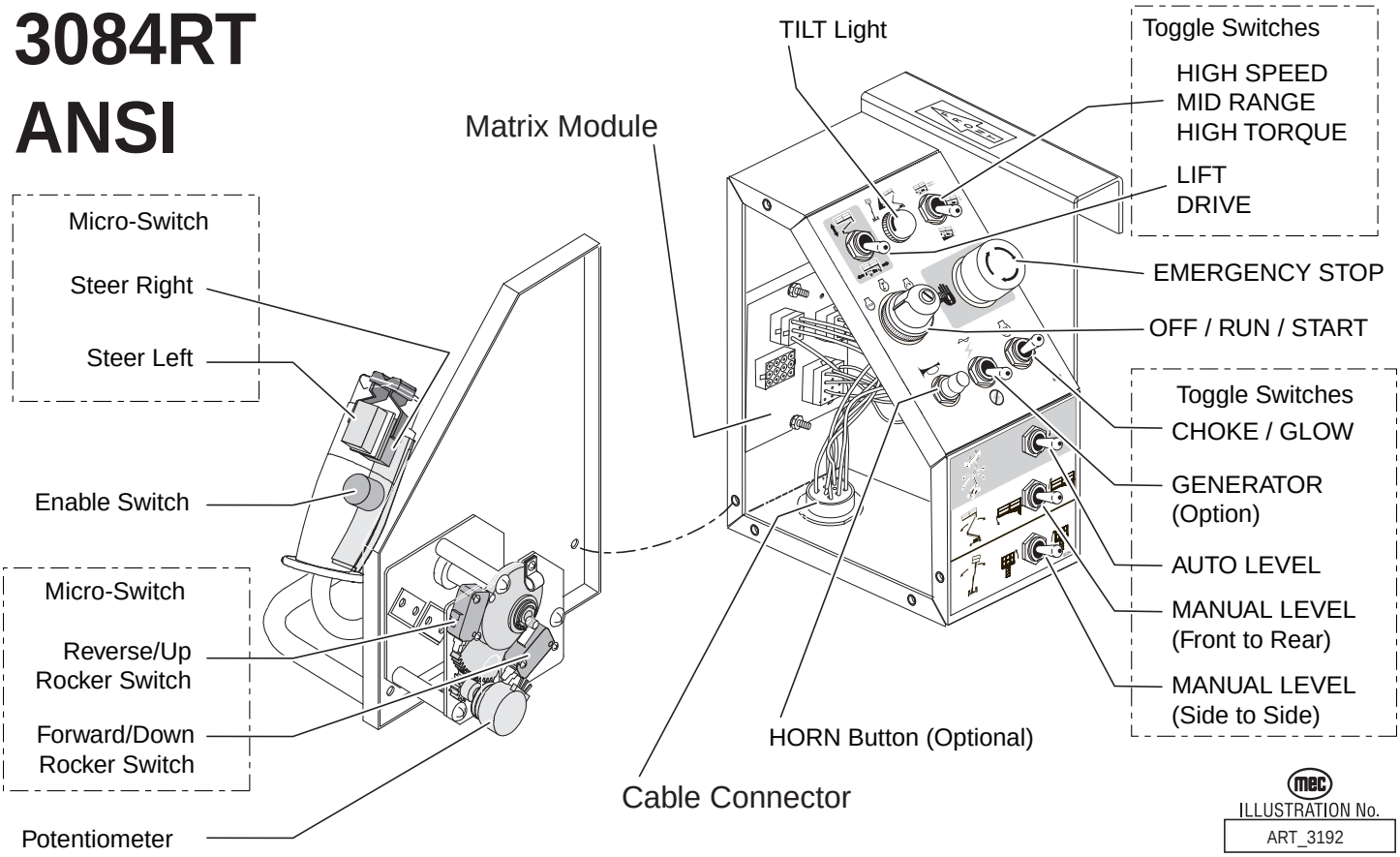


ILLUSTRATION No.
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3084RT CE

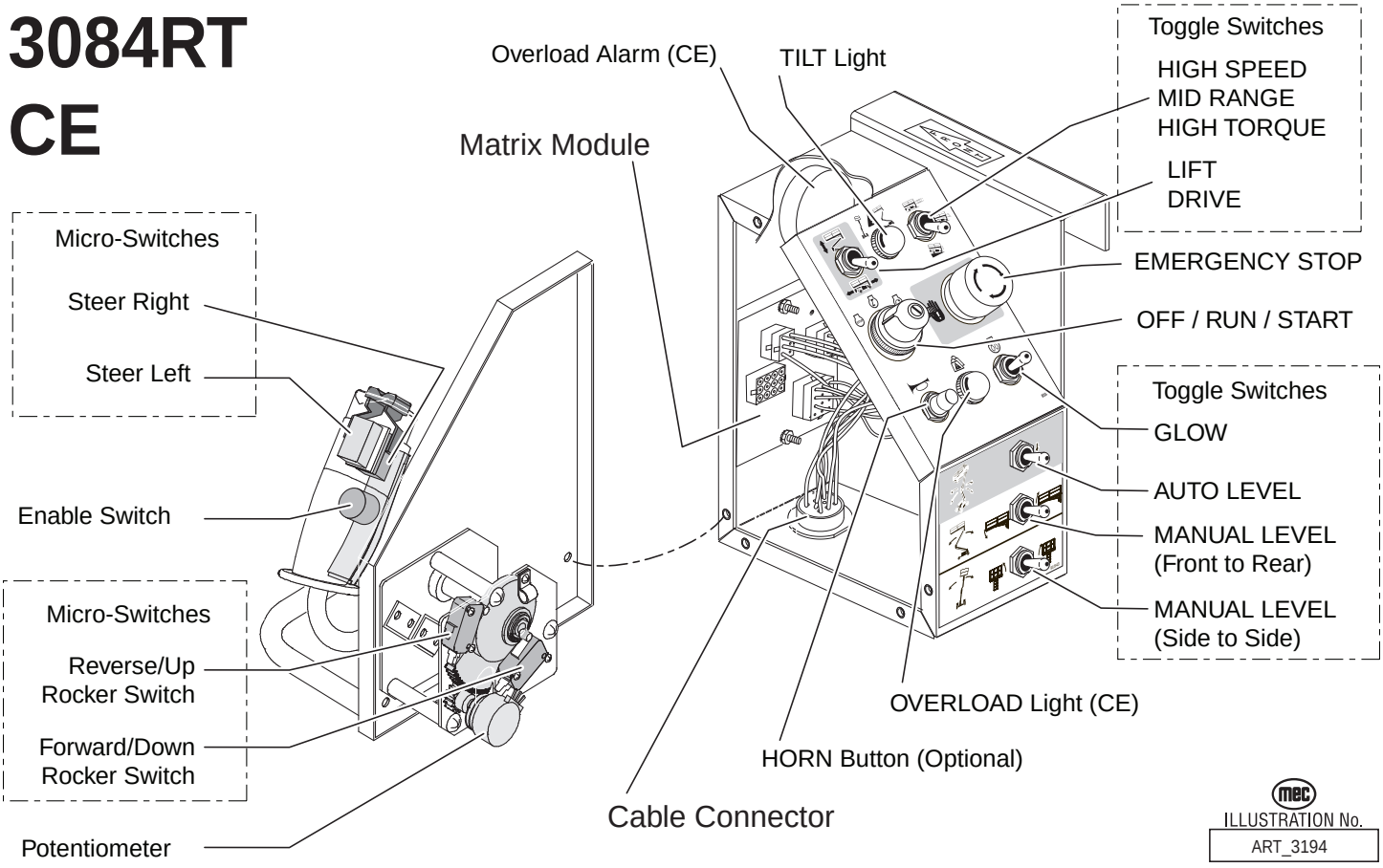


ILLUSTRATION No.
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3084RT Dual Fuel - Lower Control Box Electric Schematic

SCHEMATIC

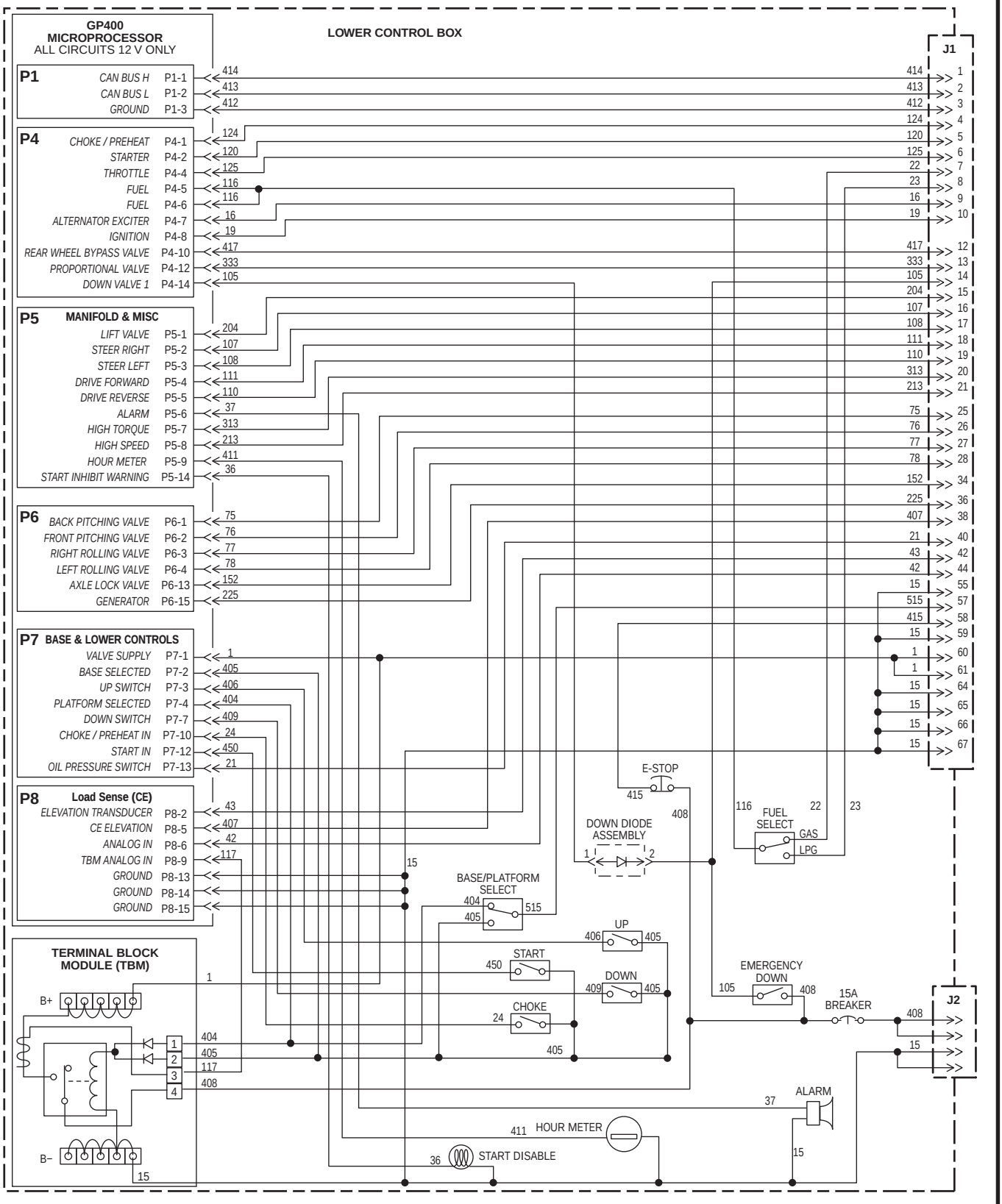
Model: / Serial #

3084 | Serial #11800025 - UP

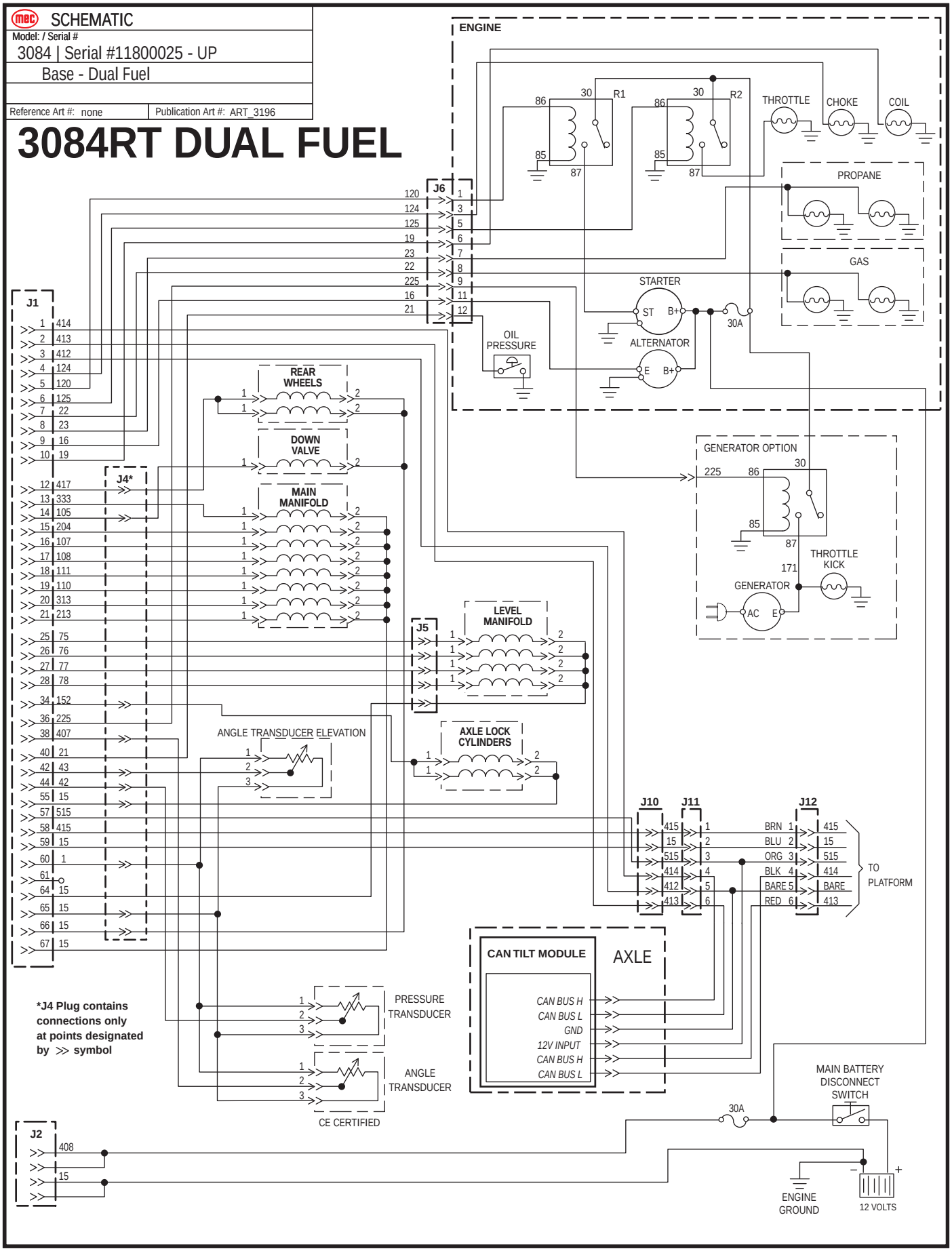
Lower Control Box - Dual Fuel

Reference Art #: none | Publication Art #: ART_3195

3084RT DUAL FUEL



3084RT Dual Fuel - Base Electric Schematic



3084RT Diesel - Lower Control Box Electric Schematic

SCHEMATIC

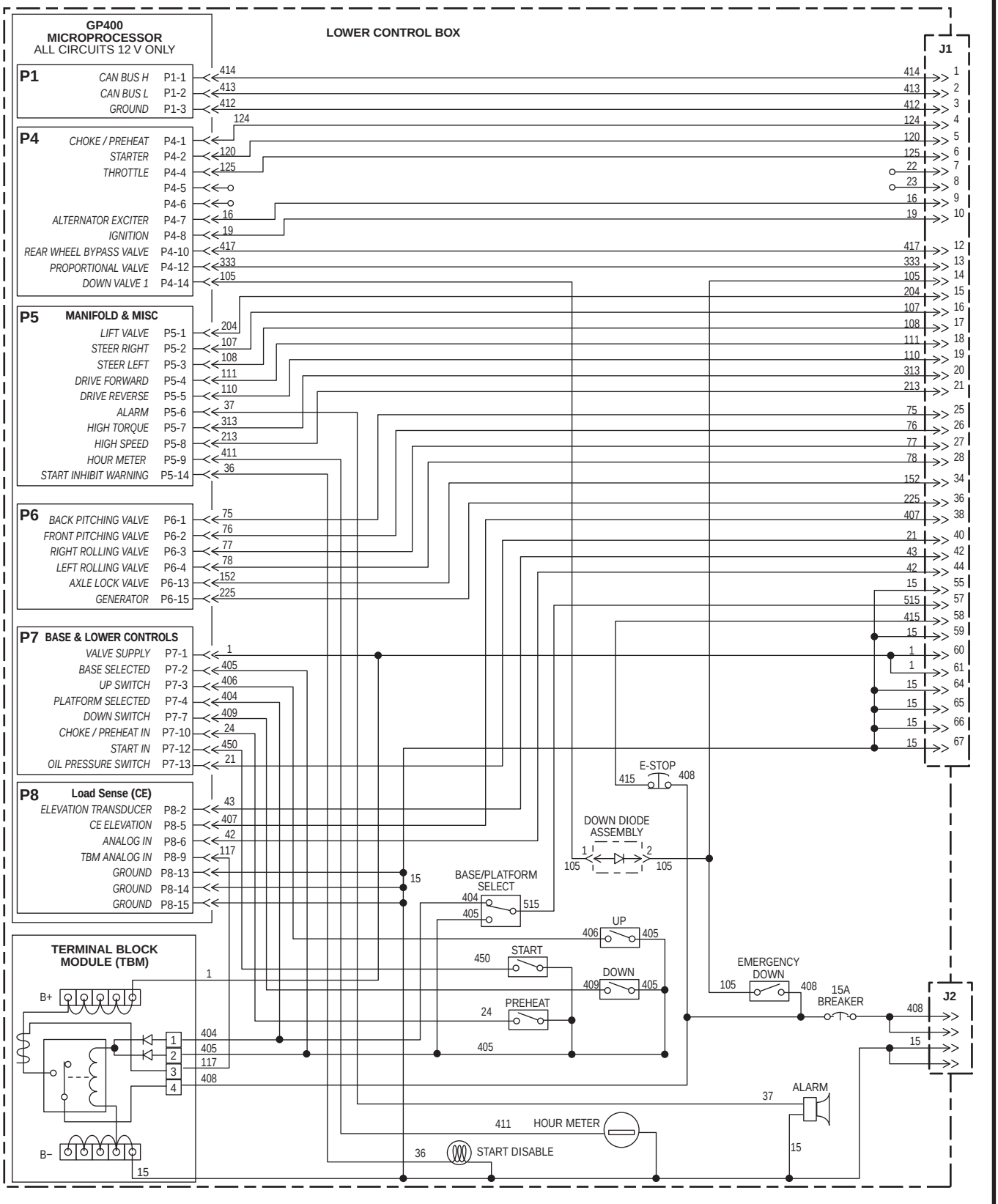
Model: / Serial #

3084 | Serial #11800025 - UP

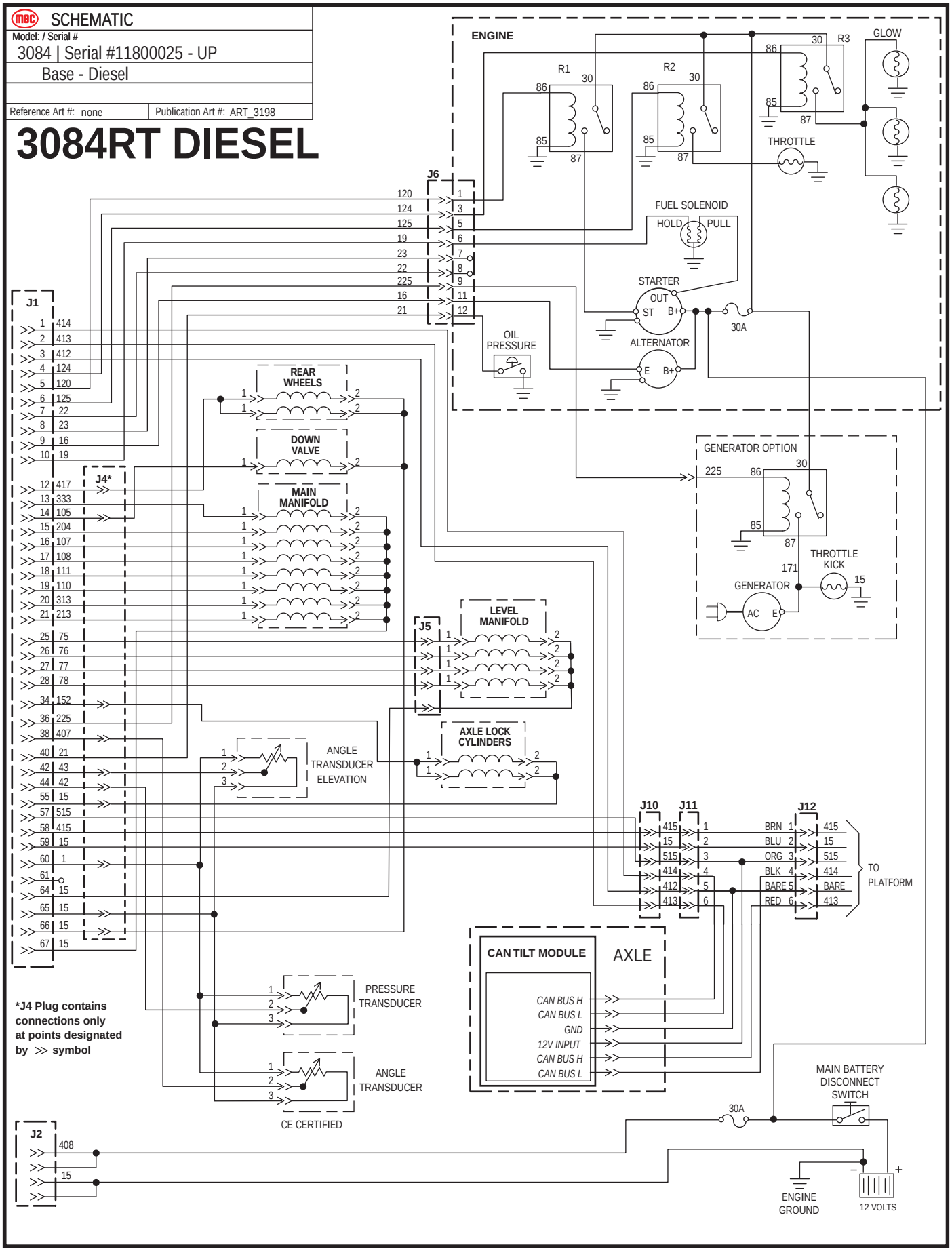
Lower Control Box - Diesel

Reference Art #: none | Publication Art #: ART_3197

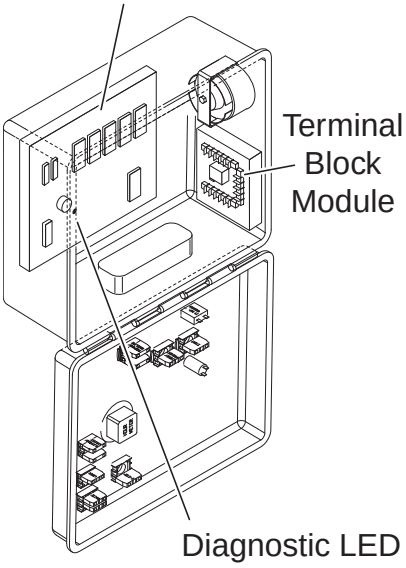
3084RT DIESEL

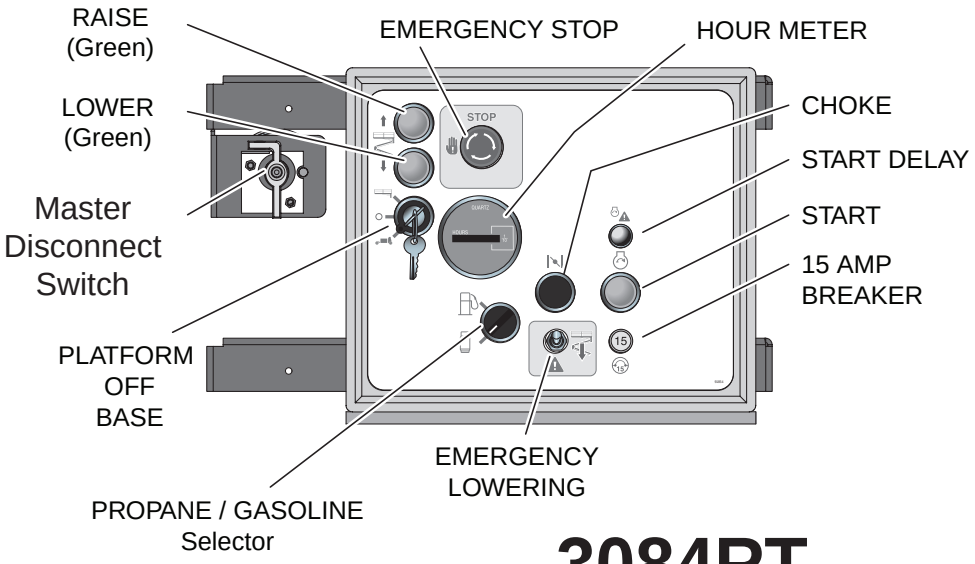


3084RT Diesel - Base Electric Schematic



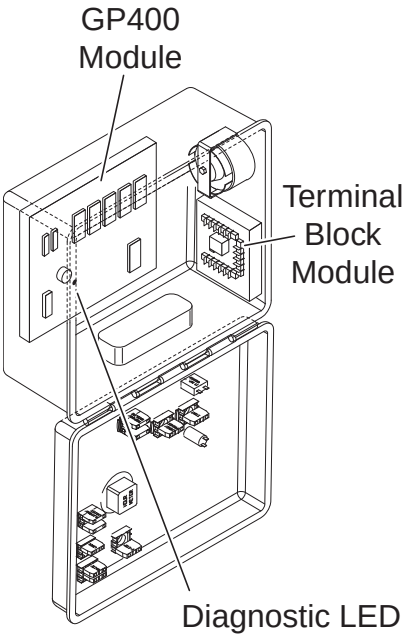
3084RT - Lower Controls Components

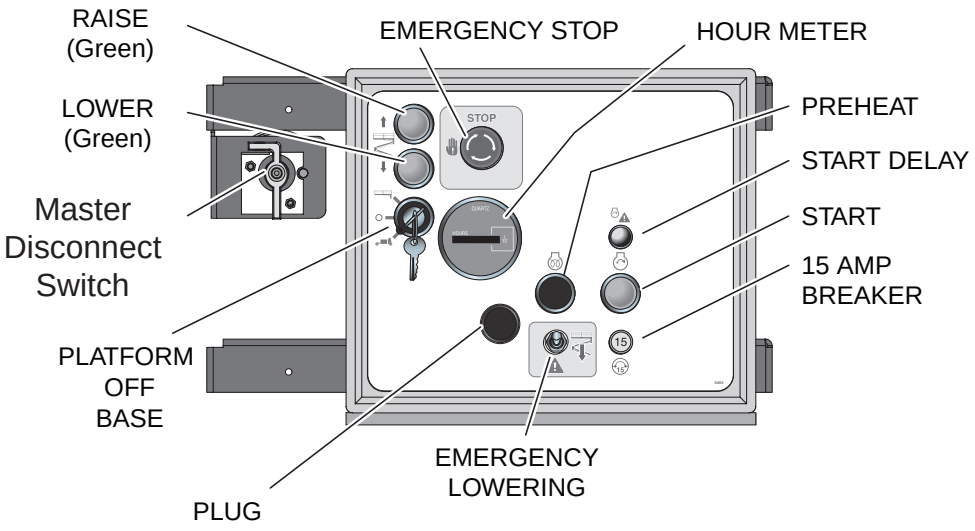




3084RT Dual Fuel - ANSI

ILLUSTRATION No. ART_3193





3084RT Diesel - ANSI/CE

ILLUSTRATION No. ART_3203

3084ES - Electric Model

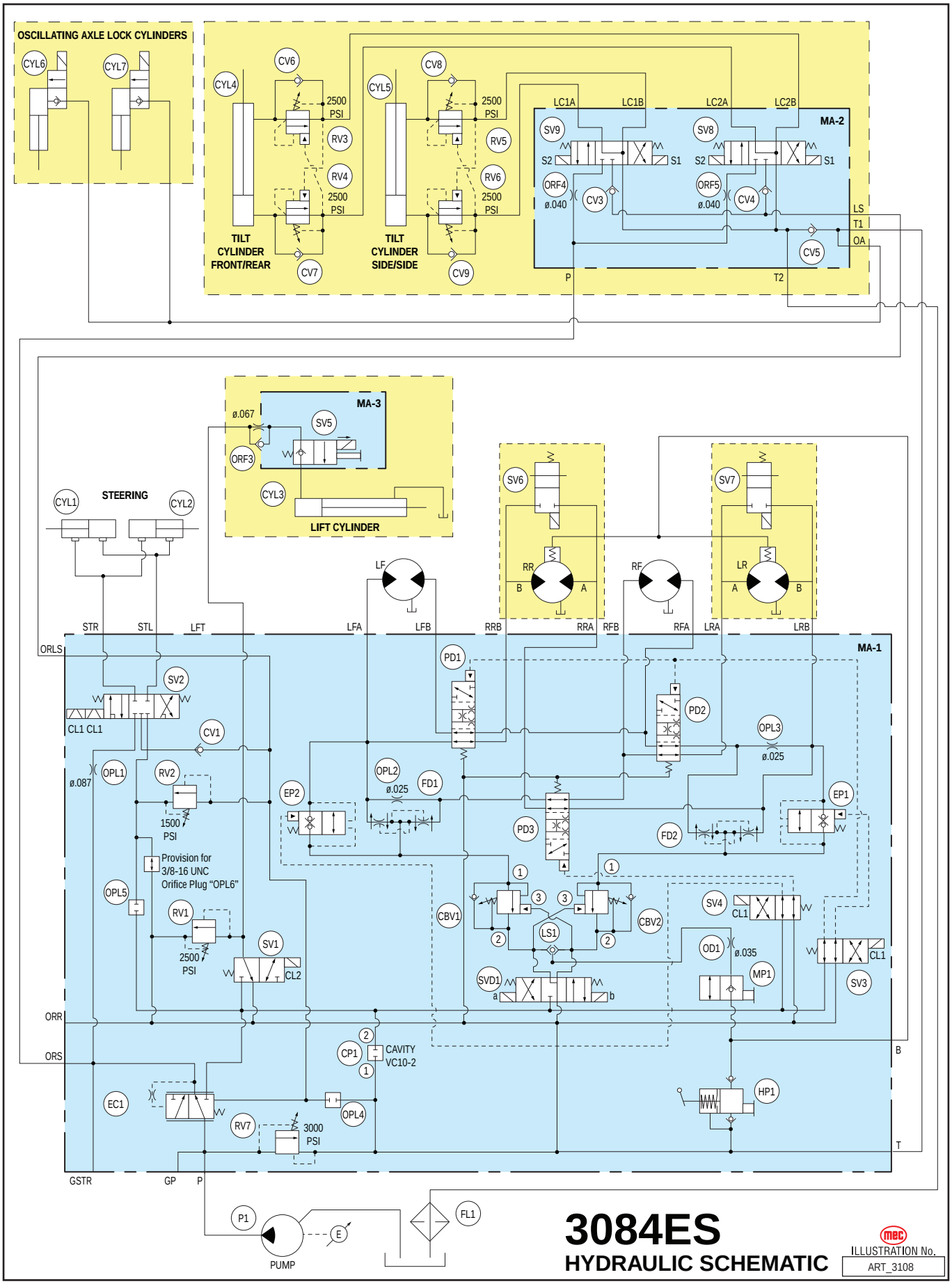
Hydraulic - 3084ES

The following table applies to page 174 - 176.

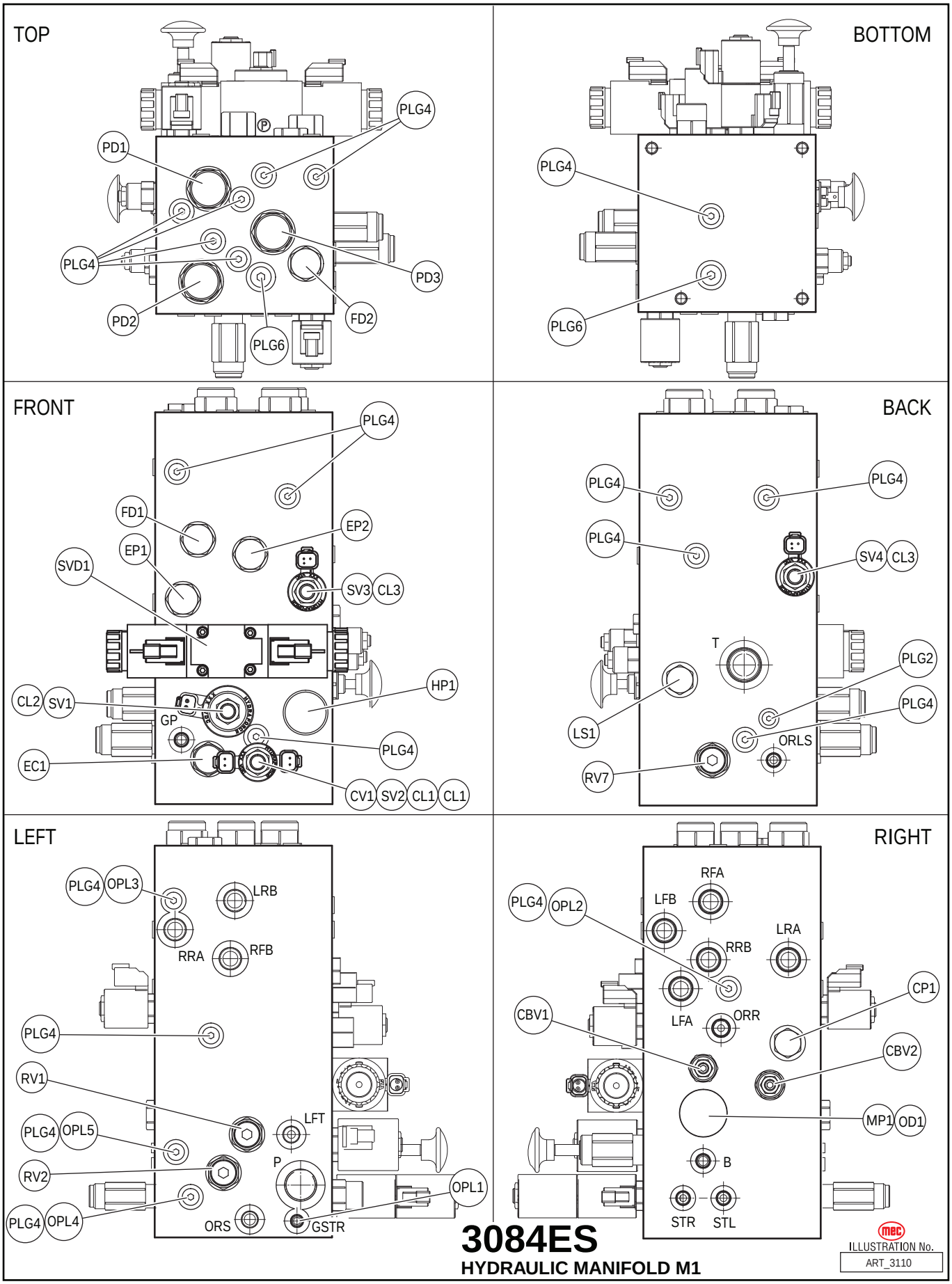
Callout	Description
MA-1	**MAIN MANIFOLD**
CBV1	Counter Balance Valve, Drive
CBV2	Counter Balance Valve, Drive
CL1	Coil - Speed/Torque/Steer #8
CL2	Coil - Lift Valve #10
CL3	Coil - Proportional
CP1	Cavity Plug, Stopped
CV1	Check Valve, Load Sense Steer
EC1	Priority Flow Control
EP1	Piloted Poppet Valve - Torque/Speed
EP2	Piloted Poppet Valve - Torque/Speed
FD1	Flow Divider/Combiner
FD2	Flow Divider/Combiner
HP1	Hand Pump, Brake Release
LS1	Load Sense Shuttle
MP1	Manual Push Brake Release Valve
OD1	Orifice Disc, Brakes, 0.035
OPL1	Orifice Plug, Steering, 0.087
OPL2	Orifice Plug, Flow Divider Bleed, 0.025
OPL3	Orifice Plug, Flow Divider Bleed, 0.025
OPL4	Orifice Plug, Stopped
OPL5	Orifice Plug, Stopped
PD1	Pilot Valve, Series Parallel, 4-Way / 3-Position
PD2	Pilot Valve, Series Parallel, 4-Way / 3-Position
PD3	Pilot Valve, Series Parallel, 4-Way / 3-Position
PLG4	Port Plug
PLG6	Port Plug
RV1	Relief Valve, Lift, 2500 PSI
RV2	Relief Valve, Steering, 2000 PSI
RV7	Relief Valve, 3000 PSI Main
SV1	Spool Valve, Lift, 3-Way
SV2	Spool Valve, Steer, 4-Way / 3-Position
SV3	Spool Valve, Series Parallel, 4-Way / 3-Position
SV4	Spool Valve, Series Parallel, 4-Way / 3-Position
SVD1	Spool Valve, Drive, 4-Way / 3-Position

Callout	Description
	STEERING COMPONENTS
CYL1	Steer Cylinder, Right
CYL2	Steer Cylinder, Left
	TILT COMPONENTS
MA-2	Combination Valve Manifold - Tilt
CV3	Check Valve, Tilt, Side/Side Load Sense
CV4	Check Valve, Tilt, Front/Rear Load Sense
CV5	Check Valve, 10PSI Oscillating Axle
CV6	Check Valve, Tilt Cyl, Front/Rear
CV7	Check Valve, Tilt Cyl, Front/Rear
CV8	Check Valve, Tilt Cyl, Side/Side
CV9	Check Valve, Tilt Cyl, Side/Side
CYL4	Tilt Cylinder, Front/Rear
CYL5	Tilt Cylinder, Side/Side
CYL6	Axle Lock Cylinder
CYL7	Axle Lock Cylinder
ORF4	Orifice, 0.040, Tilt, Side/Side
ORF5	Orifice, 0.040, Tilt, Front/Rear
RV3	Relief Valve, Tilt Cyl Front/Rear, 2500 PSI
RV4	Relief Valve, Tilt Cyl Front/Rear, 2500 PSI
RV5	Relief Valve, Tilt Cyl Side/Side, 2500 PSI
RV6	Relief Valve, Tilt Cyl Side/Side, 2500 PSI
SV8	Spool Valve, Tilt Front/Rear
SV9	Spool Valve, Tilt Side/Side
	LIFT COMPONENTS
MA-3	Lift Cylinder Manifold
CYL3	Lift Cylinder
ORF3	Orifice, 0.067 Descend
SV5	Solenoid Valve, 12V, Dual Coil
	WHEEL MOTORS
LF	Wheel Motor - Left Front
LR	Wheel Motor w/ Brake - Left Rear
RF	Wheel Motor - Right Front
RR	Wheel Motor w/ Brake - Right Rear
SV6	Spool Valve - Right Wheel Motor Bypass
SV7	Spool Valve - Left Wheel Motor Bypass
	RESERVOIR
FL1	Filter, 10 Micron, Fluid Return
P1	Pump, Hydraulic Fluid

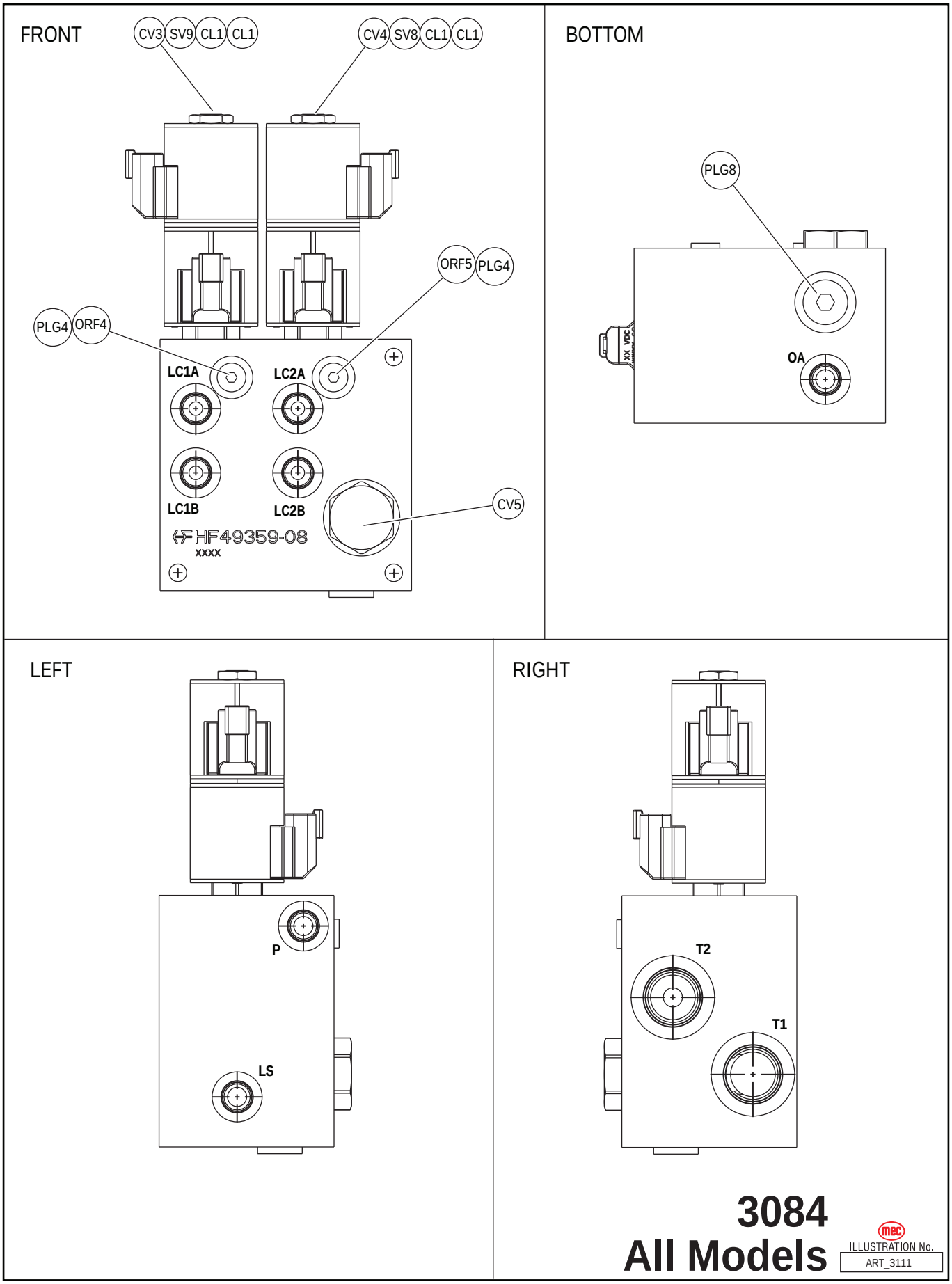
3084ES - Hydraulic Schematic



3084ES - Hydraulic Manifold Main M1



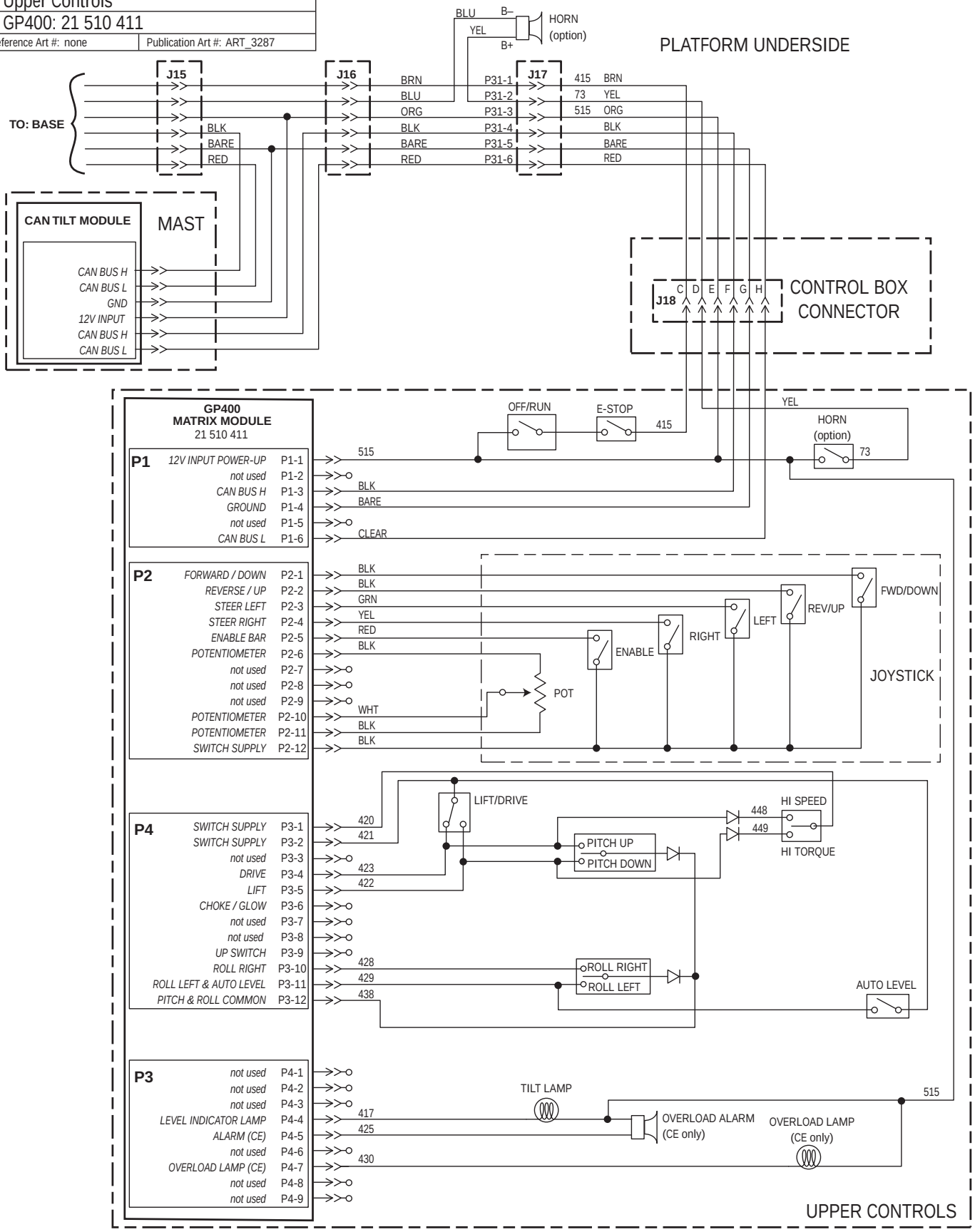
3084 All Models - Hydraulic Manifold Tilt M2



3084ES - Upper Controls Electric Schematic

SCHEMATIC
Model: / Serial #
3084ES | 11800025- UP
Upper Controls
GP400: 21 510 411
Reference Art #: none | Publication Art #: ART_3287

3084ES



3084ES - Upper Controls Components

3084ES ANSI

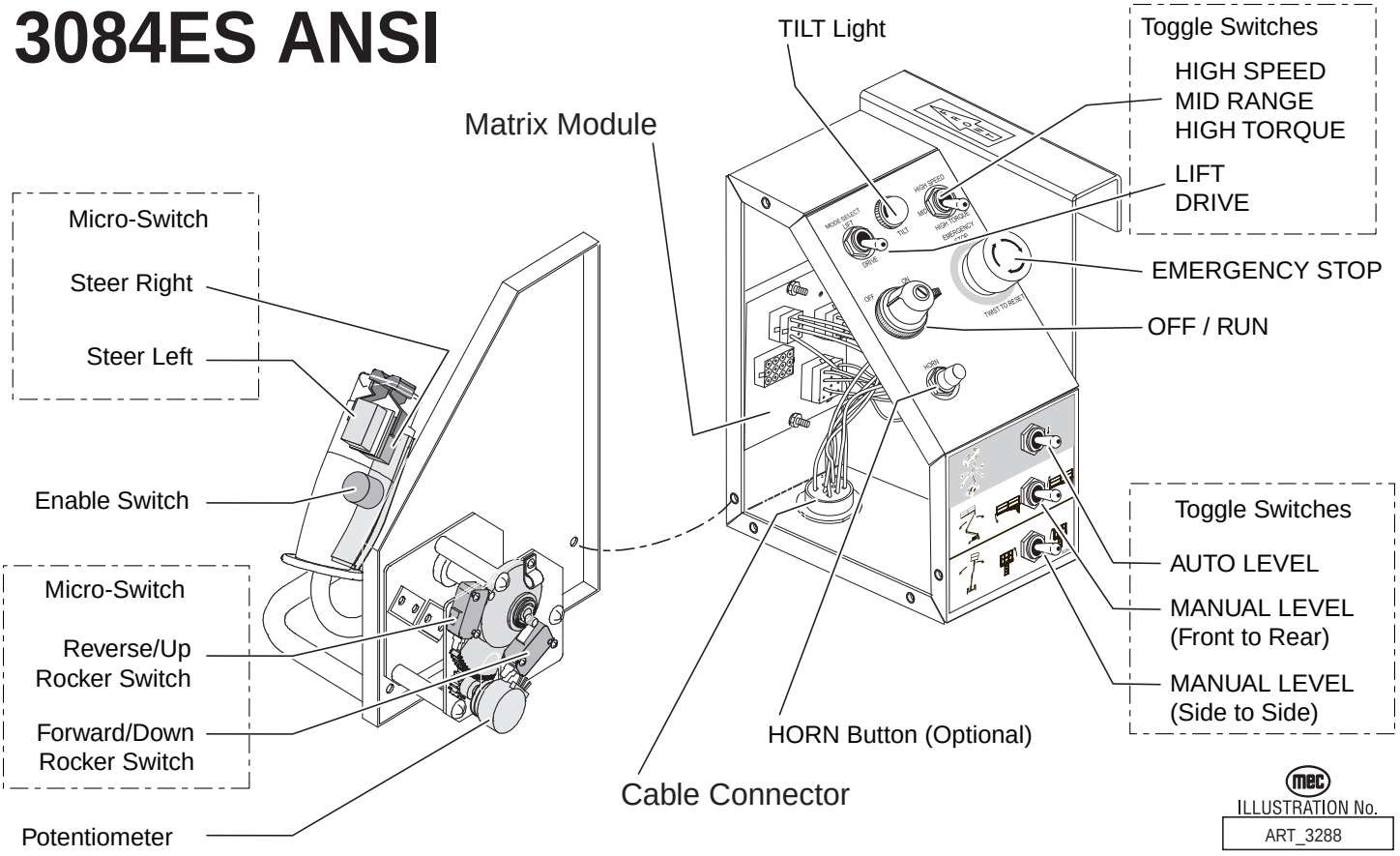


ILLUSTRATION No.
ART_3288

3084ES CE

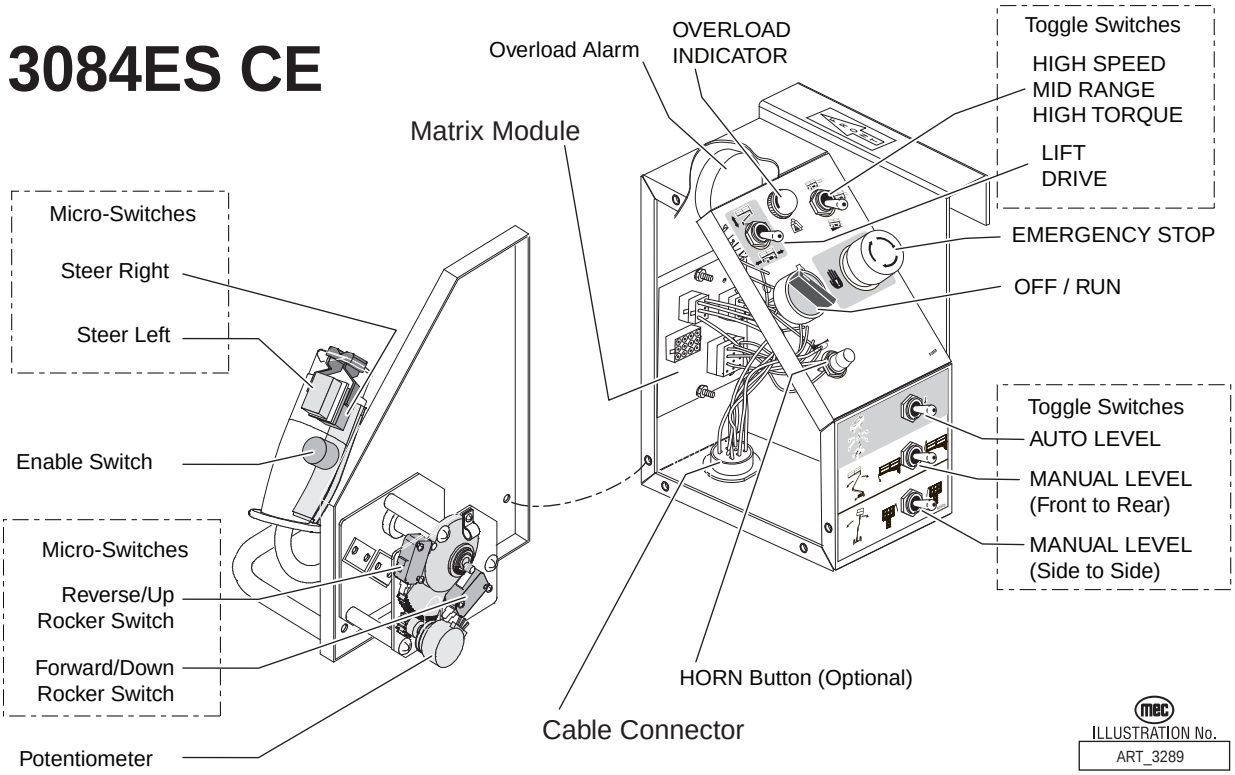


ILLUSTRATION No.
ART_3289

3084ES - Lower Control Box Electric Schematic

SCHEMATIC

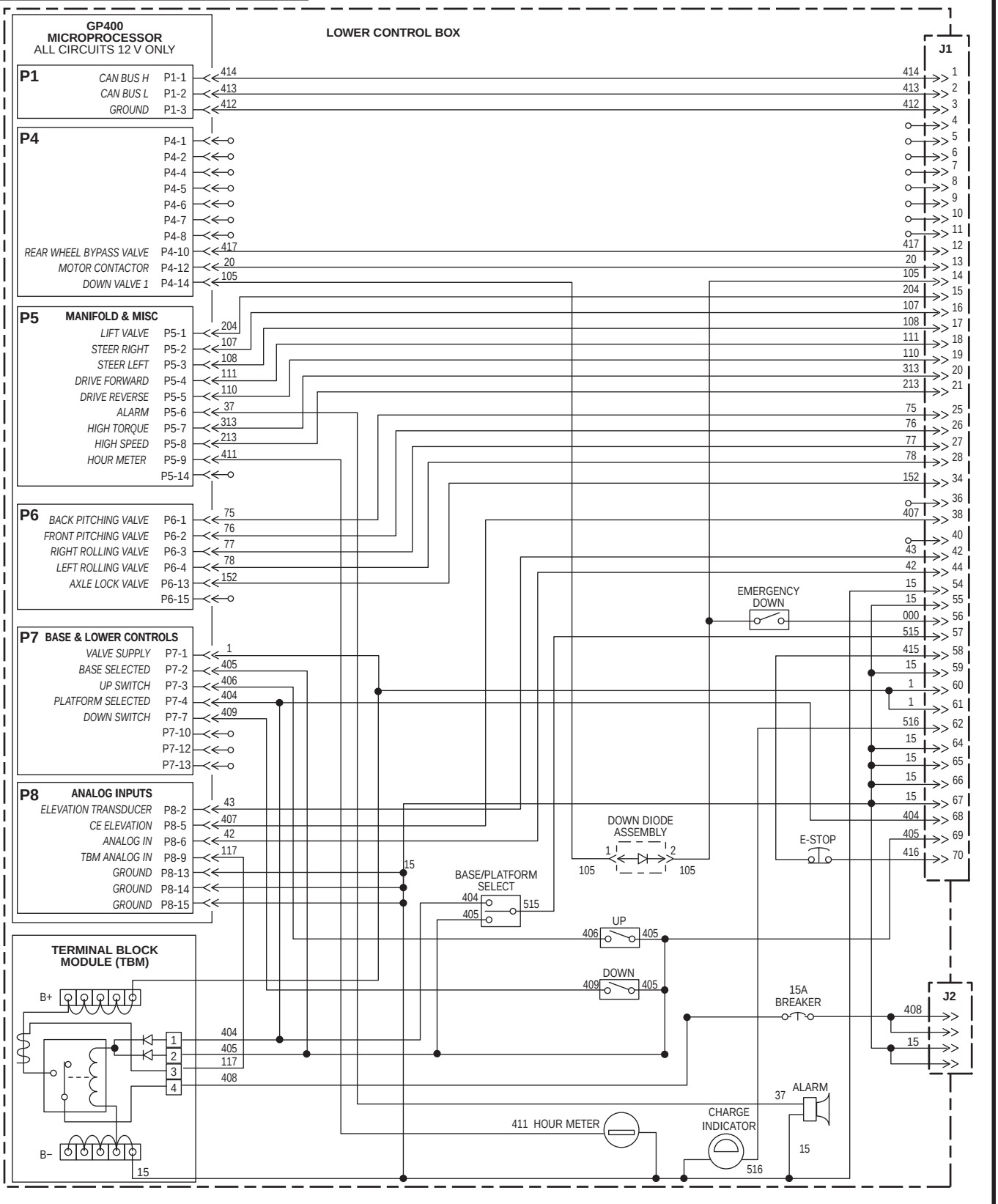
Model: / Serial #

3084ES | Serial #11800025- UP

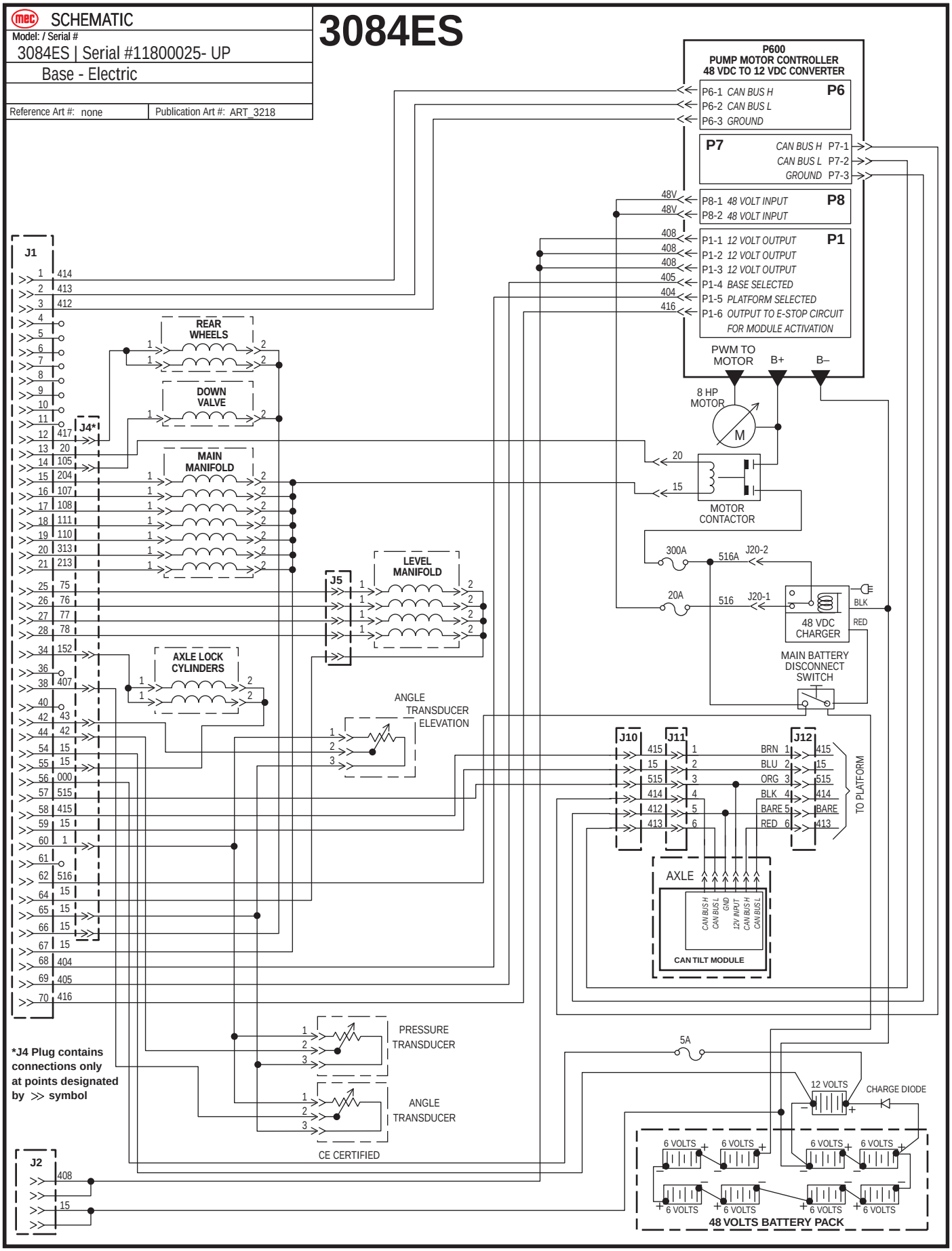
Lower Control Box - Electric

Reference Art #: none Publication Art #: ART_3217

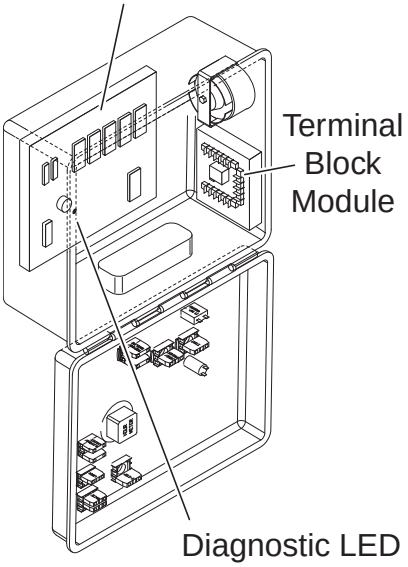
3084ES

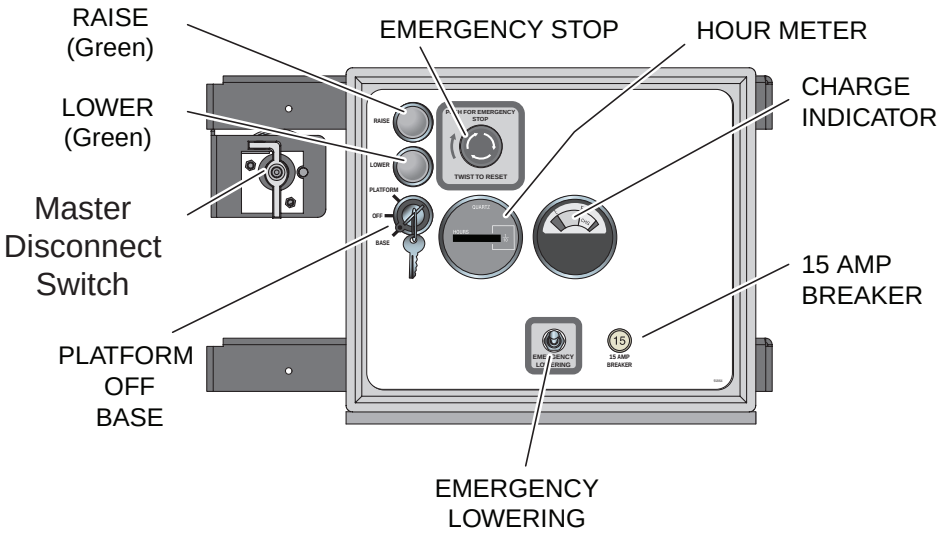


3084ES - Base Electric Schematic



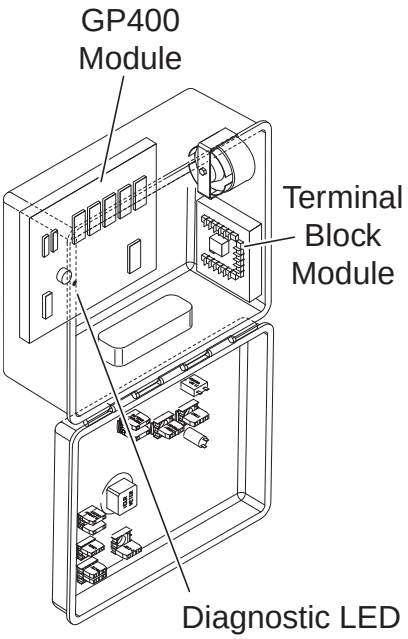
3084ES - Lower Controls Components

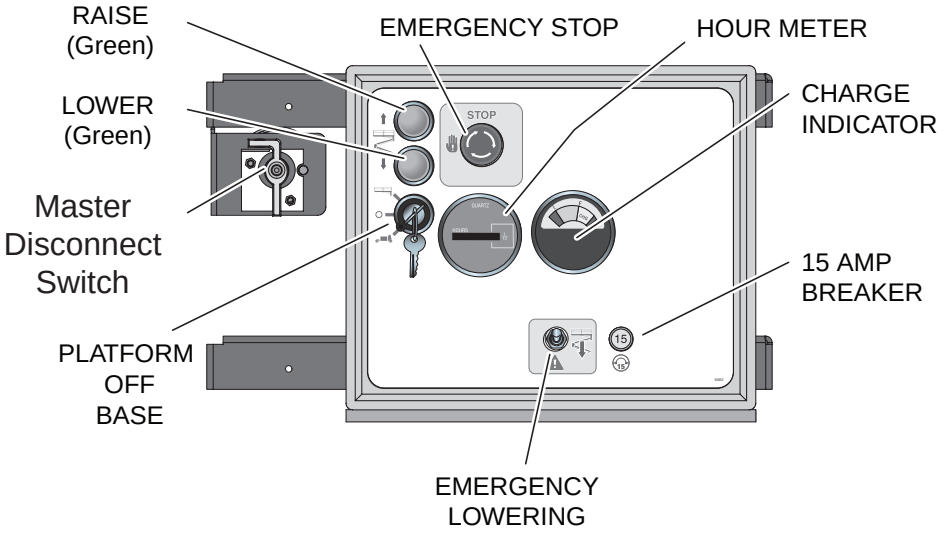




3084ES ANSI

ILLUSTRATION No.
ART_3290



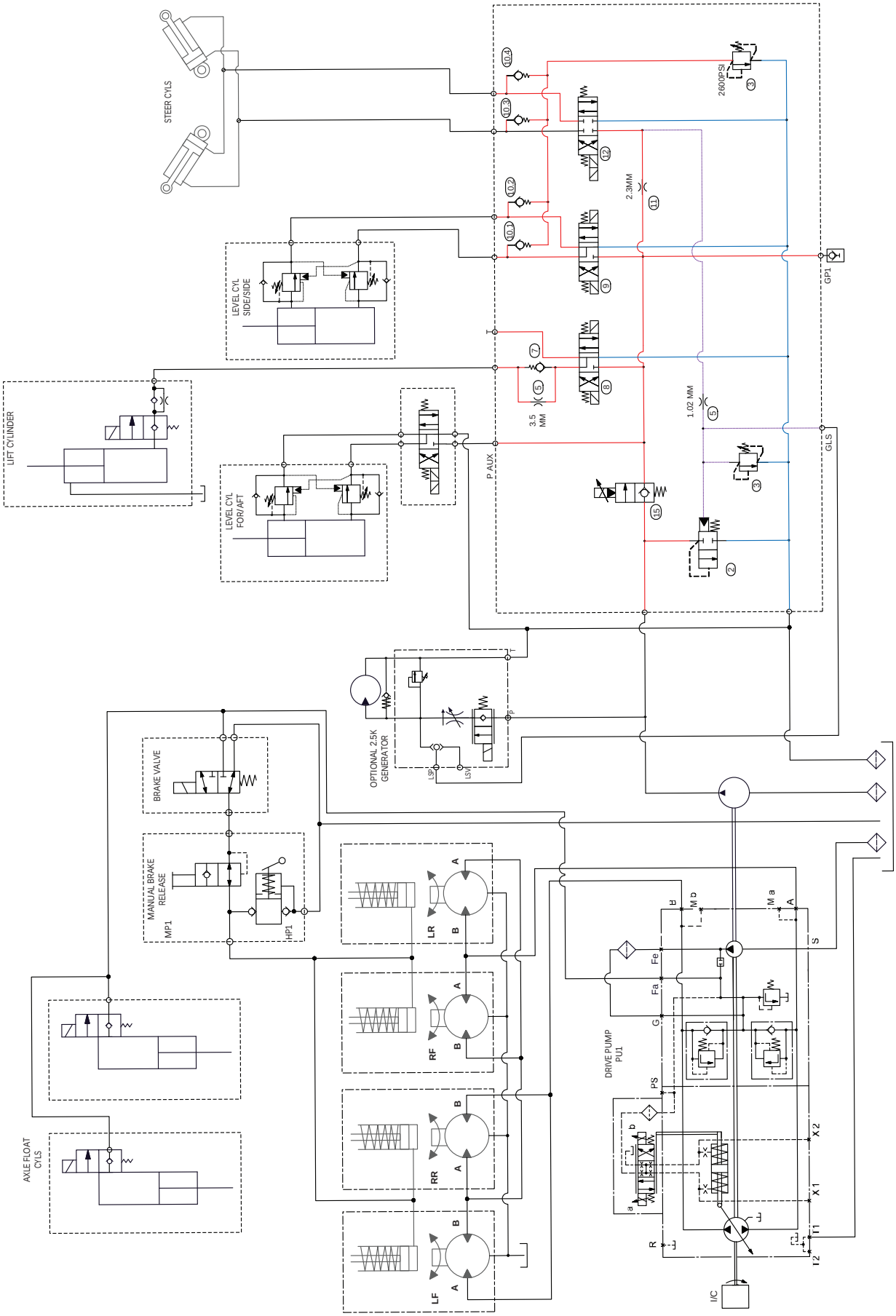


3084ES CE

ILLUSTRATION No.
ART_3291

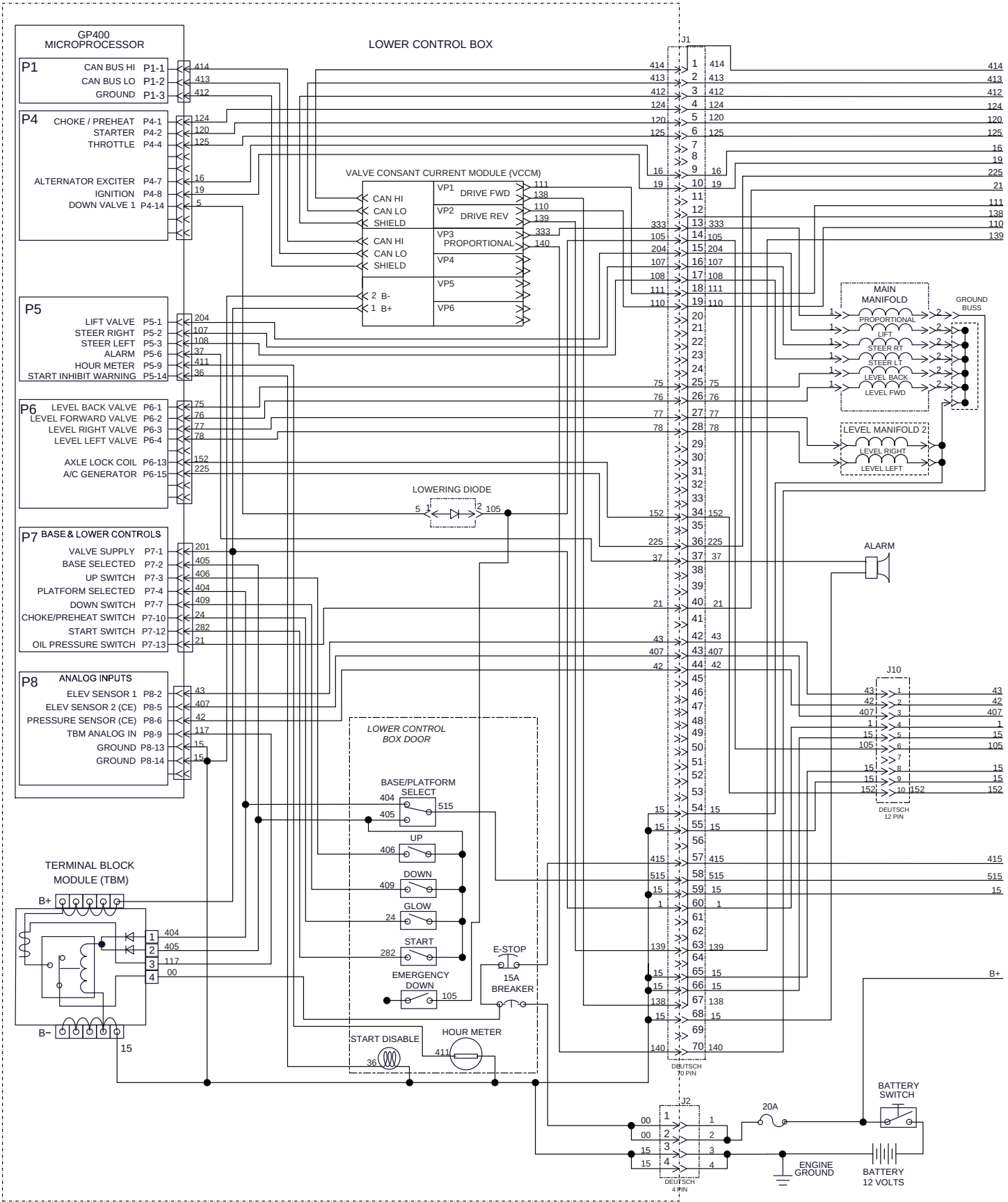
XX84RT Model, Hydraulic Schematic with Hydrastatic Drive

2684RT - From Serial # 12800200 3084RT - From Serial # 11800400



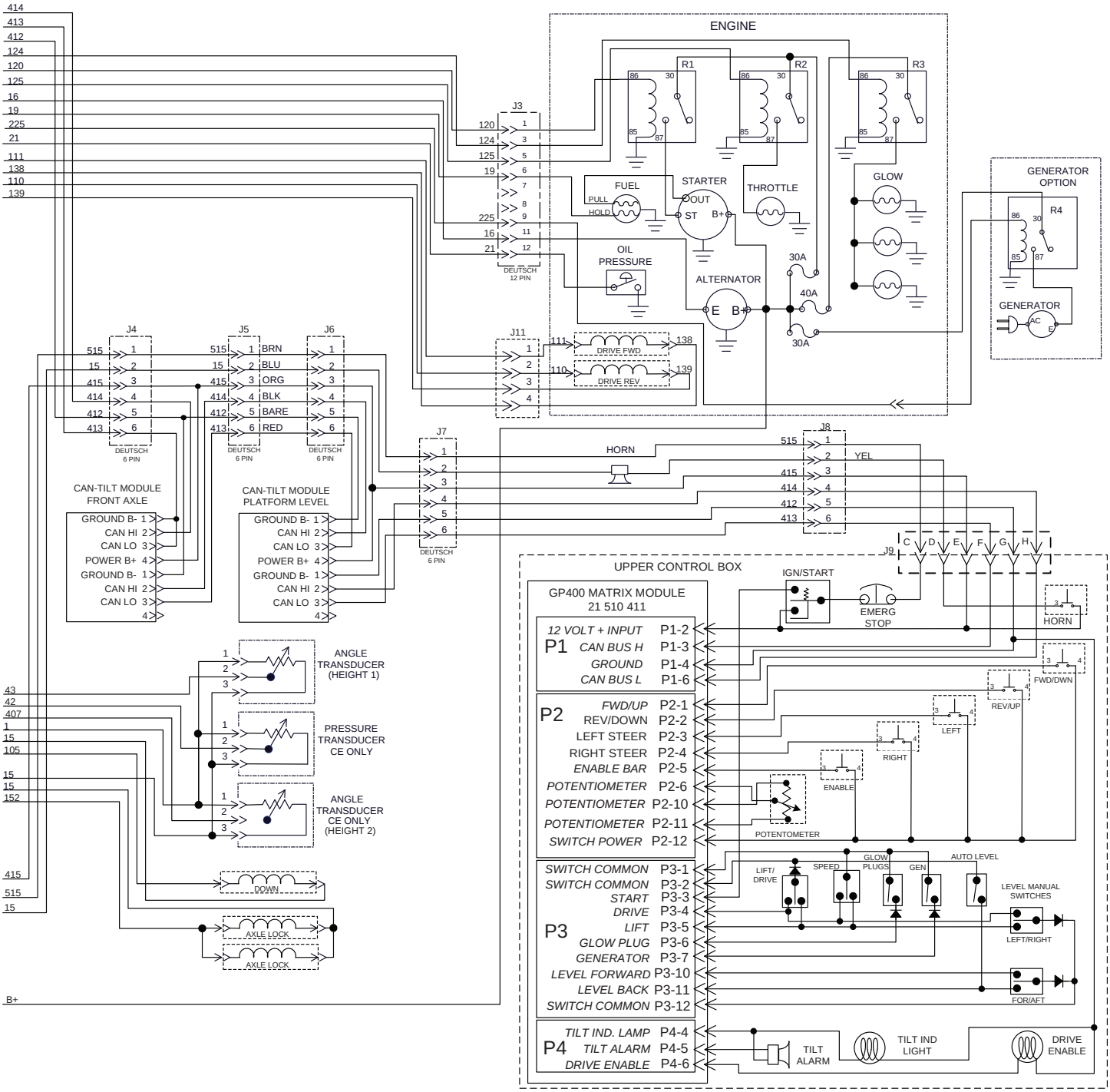
XX84 RT Diesel Models - Electrical Schematic, Part 1

2684 RT - From Serial # 12800200 3084 RT - From Serial # 11800400



XX84 RT Diesel Models - Electrical Schematic, Part 2

2684 RT - From Serial # 12800200 3084 RT - From Serial # 11800400



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.

Upper Controls, ANSI Models, Early Style

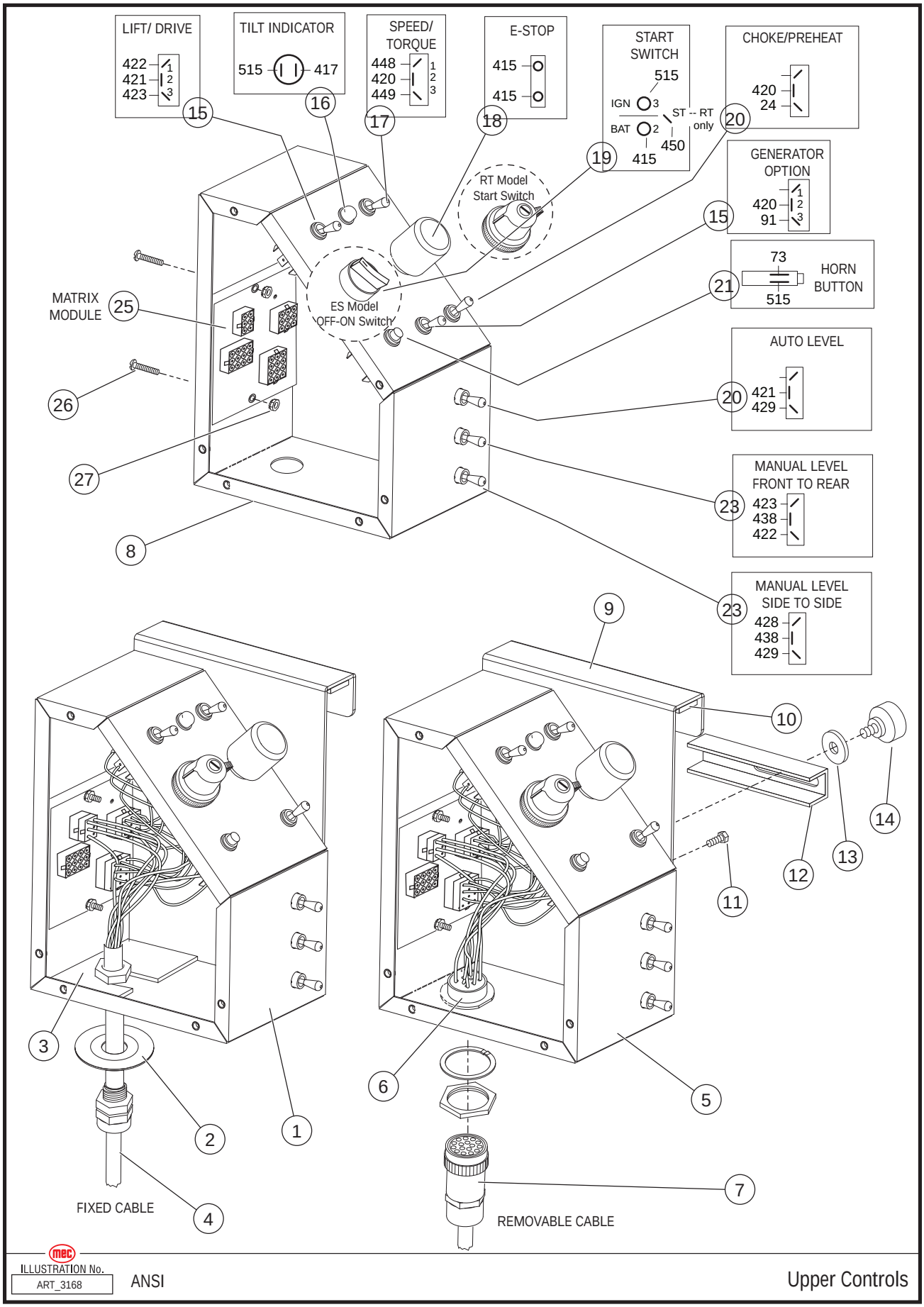
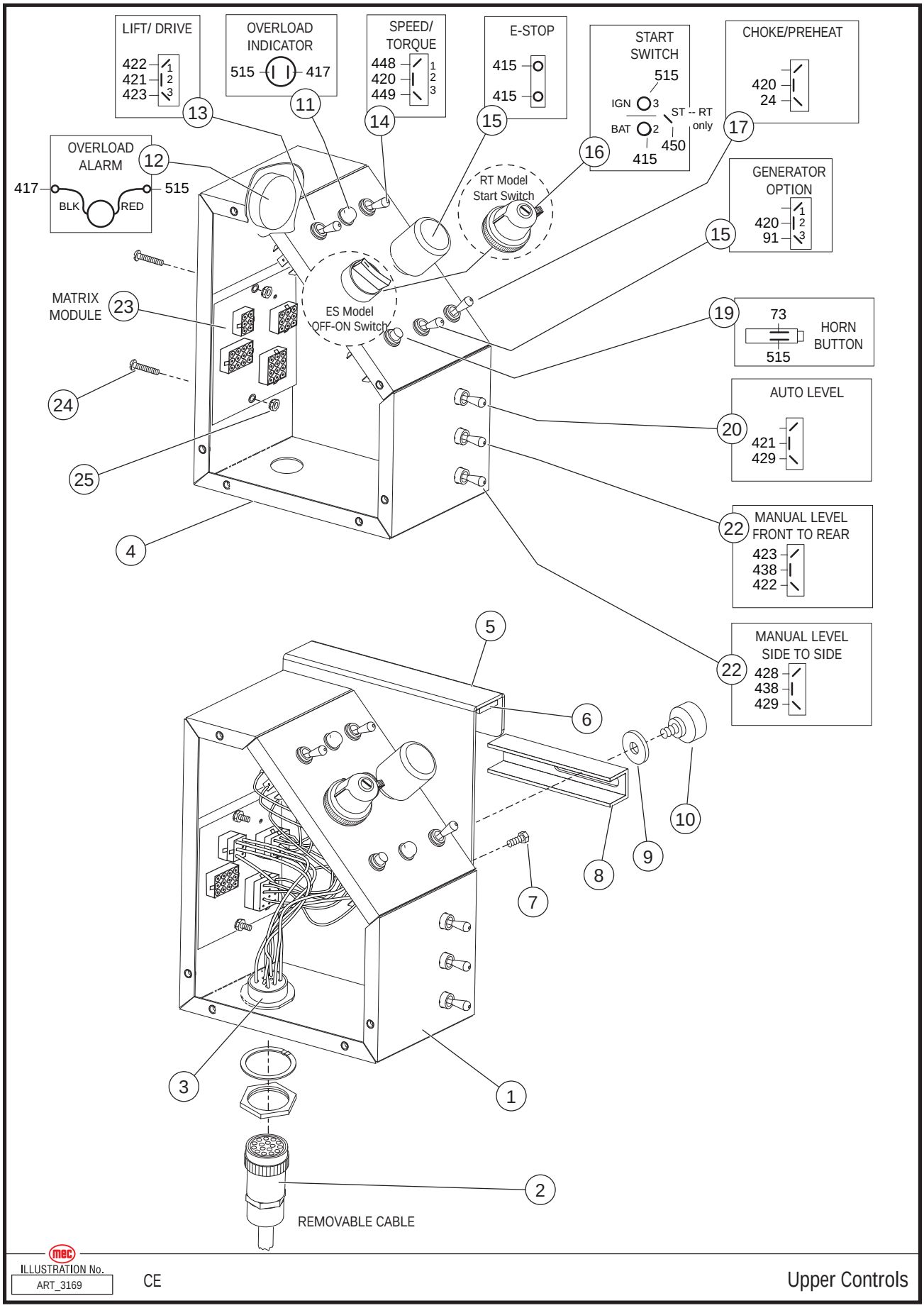


ILLUSTRATION No. ART_3168 ANSI Upper Controls

Item	Part Number	Description	Qty.
Fixed Control Box Assembly			
1	83169	Assy, Upper Control Box, Without Options - 3084 ANSI ES	1
	83170	Assy, Upper Control Box, With Horn Option - 3084 ANSI ES	1
	83171	Assy, Upper Control Box, Without Options - 3084 ANSI DSL	1
	83172	Assy, Upper Control Box, With Horn Option - 3084 ANSI DSL	1
	83189	Assy, Upper Control Box, Without Options - 3084 CE ES	1
	83190	Assy, Upper Control Box, With Horn Option - 3084 CE ES	1
	83191	Assy, Upper Control Box, Without Options - 3084 CE DSL	1
	83192	Assy, Upper Control Box, With Horn Option - 3084 CE DSL	1
2	REF	Strain Relief Washer (See Wire Harness, Section 6)	1
3	REF	Mounting Plate (See Wire Harness, Section 6)	1
4	REF	Cable, Fixed (See Wire Harness, Section 6)	1
Removable Control Box Assembly			
5	83064	Assembly With Removable Cable, ES Models	1
	83065	Assembly With Removable Cable, RT Models	1
6	REF	Harness, Removable (See Wire Harness, Section 6)	1
7	REF	Cable, Removable (See Wire Harness, Section 6)	1
All Models			
8	16242	Weldment, Control Box	1
9	13865	Bracket, Control Box Holder	1
10	6350	Tape, Foam	.5 ft
11	50109	Screw, 5/16–18	1
12	13864	Bracket, Control Box Holder	1
13	50063	Washer, Flat	1
14	8826	Thumb Screw, 5/16–18, Flower	1
15	6234	Switch, Toggle, Lift/Drive	1
	6234	Switch, Toggle, Generator Option	1
16	9184	Lens, Amber, Tilt Indicator	1
	9188	Light, Bayonet, 14 Volt	1
	9179	Socket, Indicator Light	1
17	6905	Switch, Toggle, Speed/Torque	1
18	7800	Switch, Emergency Stop	1
19 RT	91619	RT Models - Switch, Start	1
19 ES	91926	ES Models - Switch, Start	1
	90714	ES Models - Switch Base	1
	8082	ES Models - Contact Block, N.O.	1
20	7423	Switch Toggle 1 Pole 2 Position 3	1
21	8044	Switch, Button (Horn Option)	1
	8819	Boot	1
22	--	--	--
23	91954	Switch, 3-Position Momentary	2
24	--	--	--
25	91663	Matrix Module	1
26	50189	Screw, 10-32 x 1.25	2
27	50238	Nut, 10-32 Nylock	2

REF - Reference

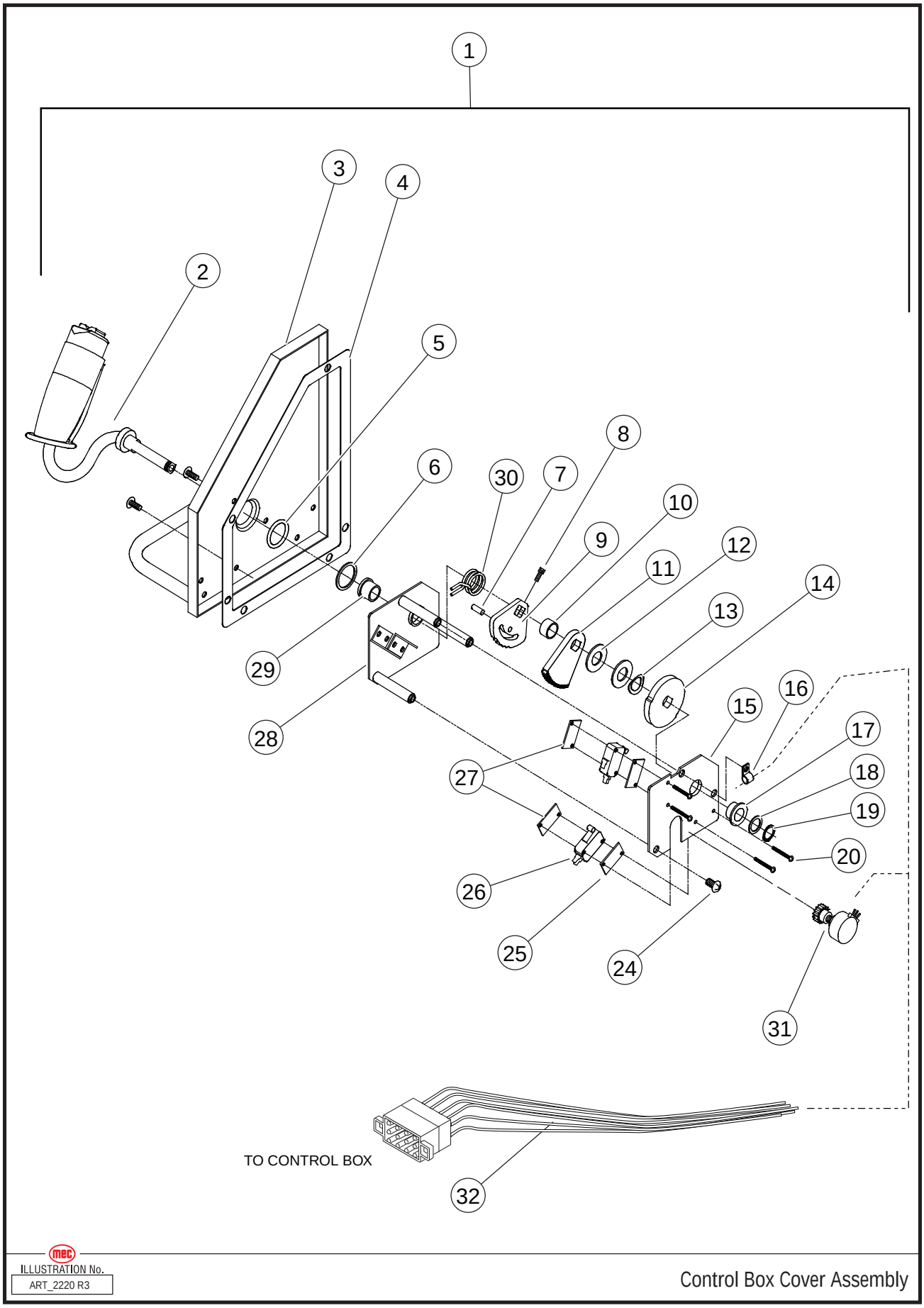
Upper Controls, CE Models



Item	Part Number	Description	Qty.
Removable Control Box Assembly			
1	83169	Assy, Upper Control Box, Without Options - 3084 ANSI ES	1
	83170	Assy, Upper Control Box, With Horn Option - 3084 ANSI ES	1
	83171	Assy, Upper Control Box, Without Options - 3084 ANSI DSL	1
	83172	Assy, Upper Control Box, With Horn Option - 3084 ANSI DSL	1
	83189	Assy, Upper Control Box, Without Options - 3084 CE ES	1
	83190	Assy, Upper Control Box, With Horn Option - 3084 CE ES	1
	83191	Assy, Upper Control Box, Without Options - 3084 CE DSL	1
	83192	Assy, Upper Control Box, With Horn Option - 3084 CE DSL	1
2	REF	Harness, Removable (See Wire Harness, Section 6)	1
3	REF	Cable, Removable (See Wire Harness, Section 6)	1
4	16242	Weldment, Control Box	1
5	13865	Bracket, Control Box Holder	1
6	6350	Tape, Foam	.5 ft
7	50109	Screw, 5/16–18	1
8	13864	Bracket, Control Box Holder	1
9	50063	Washer, Flat	1
10	8826	Thumb Screw, 5/16–18, Flower	1
11	9183	Lens, Red, Overload	1
	9188	Light, Bayonet, 14 Volt	1
	9179	Socket, Indicator Light	1
12	7553	Alarm	1
13	6234	Switch, Toggle, Lift/Drive	1
	6234	Switch, Toggle, Generator Option	1
14	6905	Switch, Toggle, Speed/Torque	1
15	7800	Switch, Emergency Stop	1
16 RT	91619	RT Models - Switch, Start	1
16 ES	91926	ES Models - Switch, Start	1
	90714	ES Models - Switch Base	1
	8082	ES Models - Contact Block, N.O.	1
17	7423	Switch Toggle 1 Pole 2 Position 3	1
18	--	--	--
19	8044	Switch, Button (Horn Option)	1
20	7423	Switch Toggle 1 Pole 2 Position 3	1
21	5694	Switch, Toggle, Manual Level, Front-Rear	1
22	91954	Switch, 3-Position Momentary	2
23	91663	Matrix Module	1
24	50189	Screw, 10-32 x 1.25	2
25	50238	Nut, 10-32 Nylock	2

REF - Reference

Upper Control Box Cover Assembly, Early Style



Item	Part Number	Description	Qty.
1	83076	Control Box Cover Assembly	1
2	92199	Joystick Assembly	1
3	3772	Cover	1
4	7875	Gasket	1
5	7882	O-Ring	1
6	HDW3768	Washer, Flat	1
7	1008348	Pin, Hold Down	1
8	50155	Screw, 6–32 x 1/2 Inch	1
9	13502	Bracket, Centering	1
10	3763	Spacer, Step	1
11	13402	Gear, Large	1
12	HDW8531	Washer, Flat	2
13	HDW7881	Washer, Bevel	1
14	3782	Cam, Directional	1
15	13403	Plate, Bottom	1
16	6917	Clamp, Cable, 1/4 Inch	1
17	7818	Bearing, Bronze, Flanged	1
18	HDW3771	Washer, Flat	1
19	5736	Ring, Retaining, 1/2 Inch	1
20	50139	Screw, 4-40 x 5/8 Inch	4
21	--	--	--
22	--	--	--
23	--	--	--
24	50191	Screw, 10–32 x 1/2 Inch	12
25	3764	Plate, Spacer	2
26	8696	Switch, Limit, Micro V7	2
27	3765	Plate, Strap	2
28	3766	Plate, Top	1
29	7819	Bearing, Bronze, Flanged	1
30	8435	Spring, Joystick Centering	1
31	91824	Potentiometer Assembly	1
32	REF	Wire Harness, (See Wire Harness, Section 6)	1

REF - Reference

Upper Control Joystick, Early Style

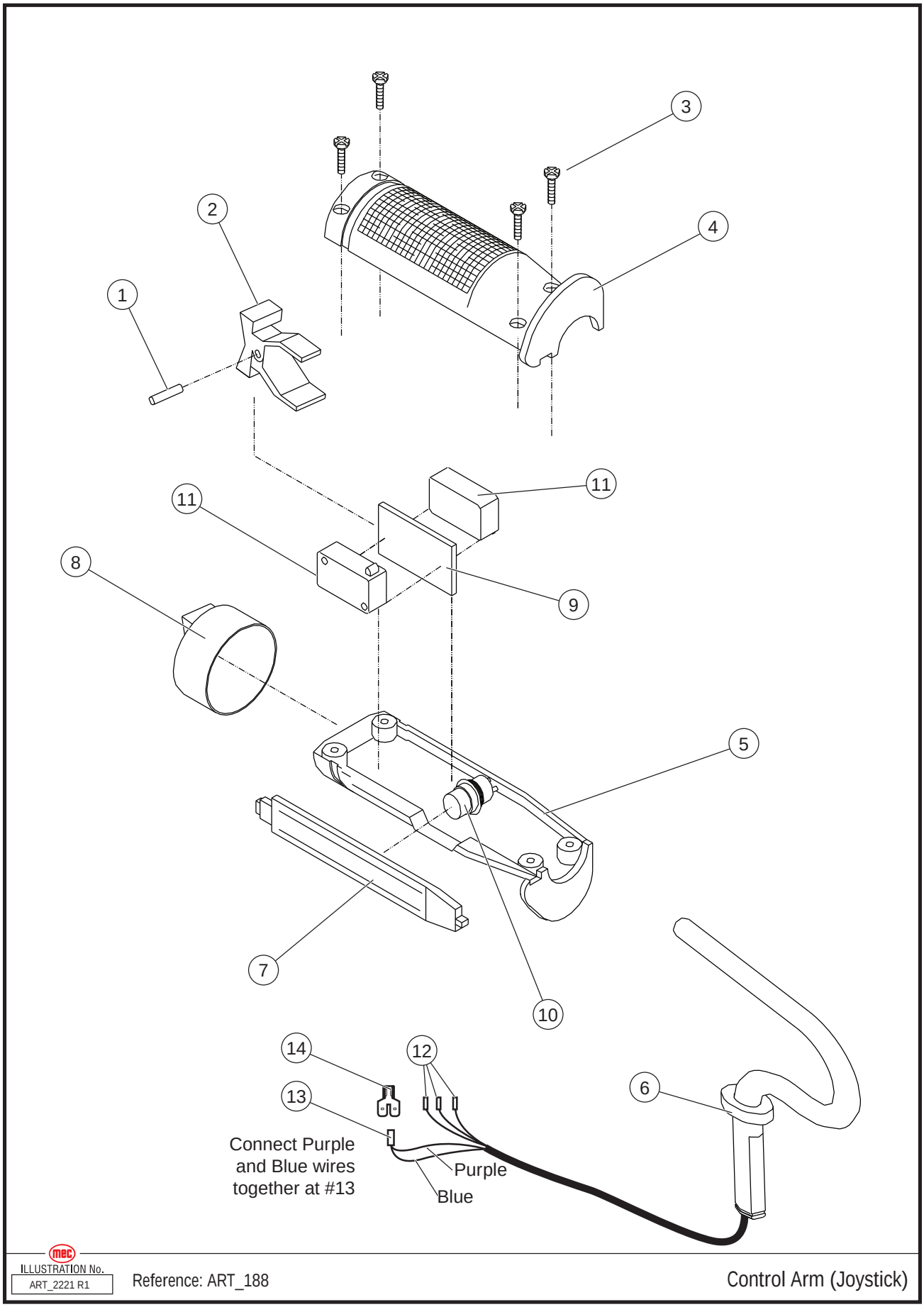


ILLUSTRATION No. ART_2221 R1

Reference: ART_188

Control Arm (Joystick)

Item	Part Number	Description	Qty.
--	92199	Joystick Assembly	--
--	8630	Joystick Assembly Without Control Arm (#6)	--
1	8750	Pin (Service Only)	1
2	8453	Switch Actuator (Service Only)	1
3	HDW8455	Screw (Service Only)	4
4	8752	Grip, Top Half (Service Only)	1
5	8751	Grip, Bottom Half (Service Only)	1
6	13638	Control Arm Without Wire	1
7	8748	Trigger (Service Only)	1
8	8456	Rocker Boot (Service Only)	1
9	8447	Switch Separator (Service Only)	1
10	8753	Motion Switch, OFF-ON (Service Only)	1
11	8448	Switch (Service Only)	2
12	91839	Amp Socket (Not Shown)	3
13	92194	Push Connector, 3/16”	1
--	8761	Switch Assembly (Not Shown) -- Includes Item #9, Item #11 (x2), Wire And Connectors	--

Upper Control Box Assembly, Early Style

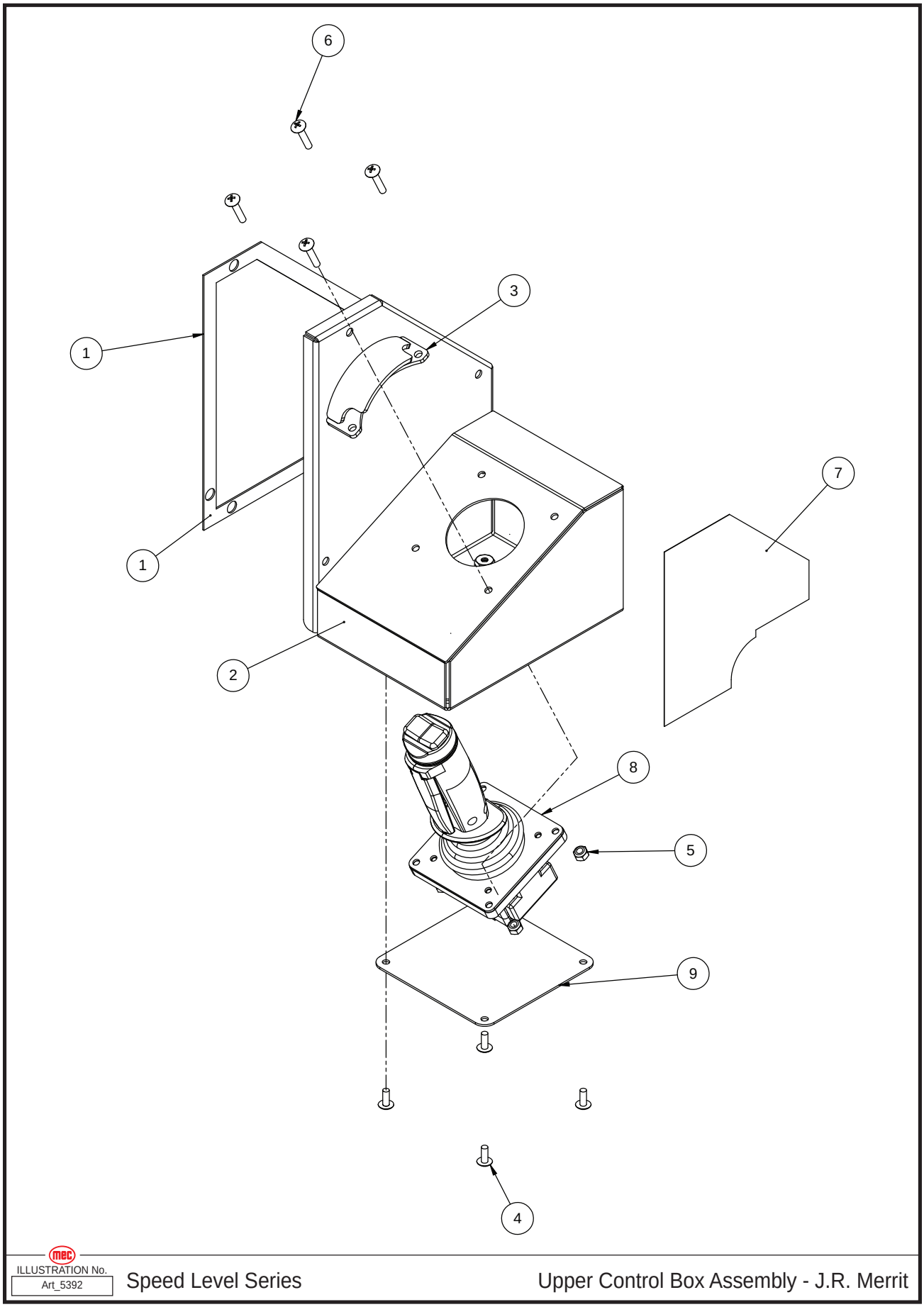


ILLUSTRATION No. Art_5392

Speed Level Series

Upper Control Box Assembly - J.R. Merrit

Item	Part Number	Description	Qty.
1	7875	Gasket	1
2	18660	Joystick Box Weldment	1
3	28542	Palm Rest Weldment	1
4	50191	THMS #10-32X00.50 ZP	4
5	50238	NNYL #10-32 05 Z	4
6	50330	THMS #10-32X01.00 ZP	4
7	90729	Decal, Upper Control Joystick Operations	1
8	94688	Single Axis Joystick W/Trig & R/L Rocker PQ Controls 112N38-249	1
9	27343	Joystick Box Cover	1

Lower Controls, 3084ES Electric Models

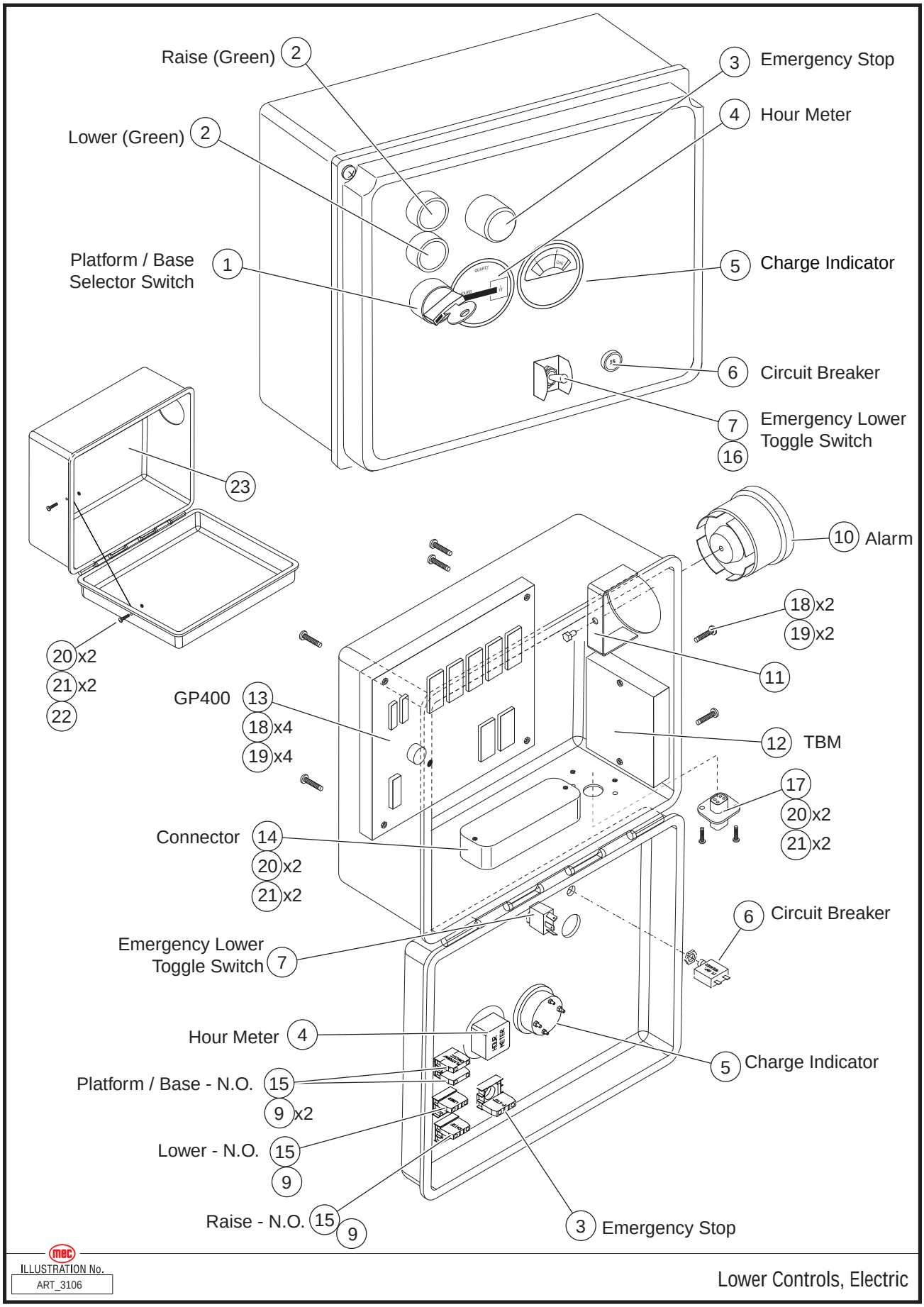


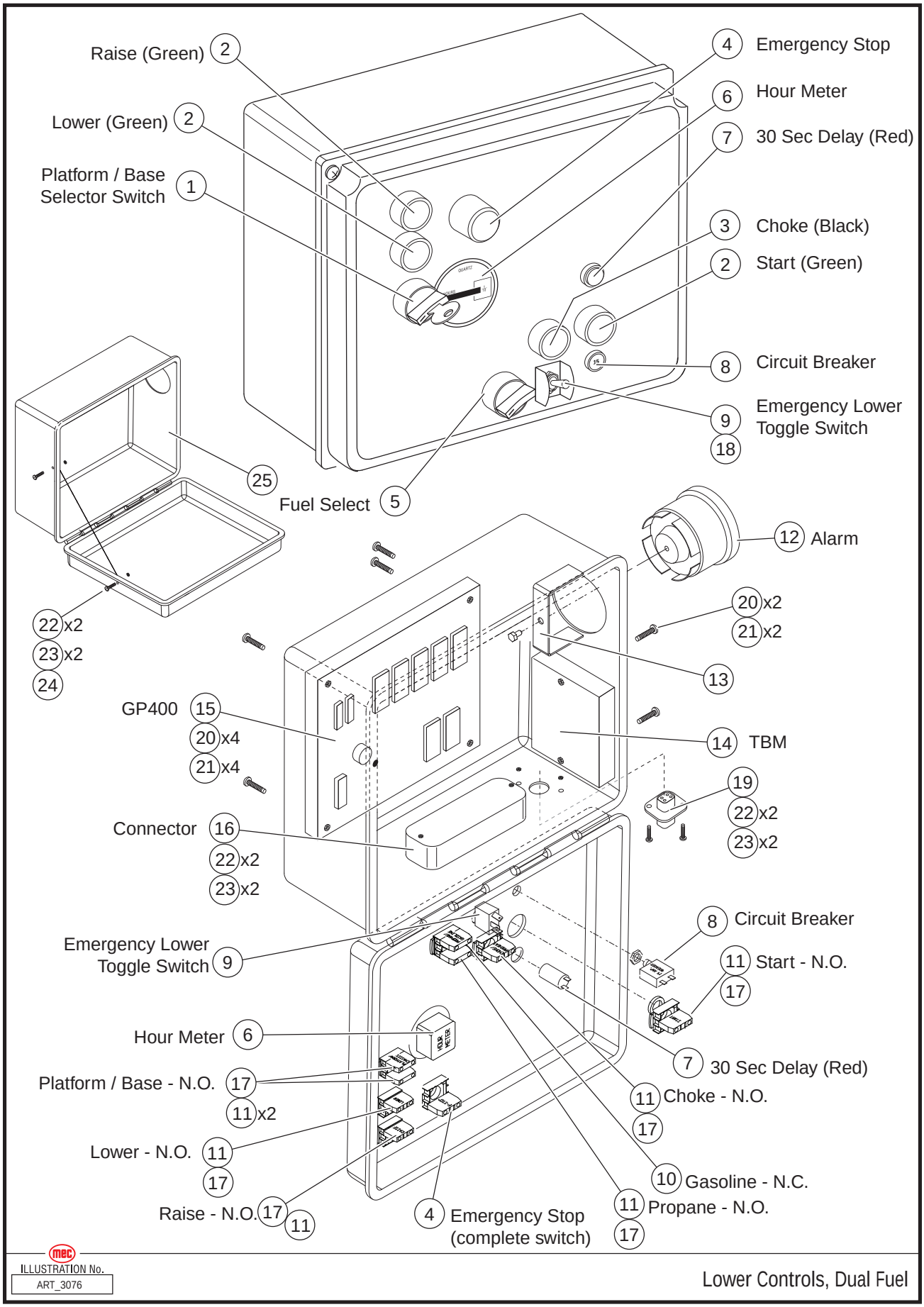
ILLUSTRATION No.
ART_3106

Lower Controls, Electric

Item	Part Number	Description	Qty.
--	83077	Lower Control Box Assembly, ES Models	1
1	9549	Switch, 3-Position, Keyed	1
2	91667	Switch, Button, Green	2
3	7800	Switch, Emergency Stop, Red	1
4	91704	Hour Meter	1
5	91744	Charge Indicator	1
6	7235	Circuit Breaker	1
7	7423	Switch Toggle 1 Pole 2 Position 3	1
8	--	--	--
9	8082	Contact Block, N. O.	4
10	91711	Alarm, 107dB	1
11	17082	Bracket, Alarm Mount	1
12	91838	Terminal Block Module (TBM)	1
13	91659	System Controller, GP400	1
14	91887	Deutsch Connector, DRC 12 70P	1
15	90714	Contact Base	3
16	1313	Switch Guard	1
17	91290	Deutsch Connection, DT14-4P-L012	1
18	50229	Screw, 10-24 x 1.00	6
19	50230	Nut, 10-24 Nylock	6
20	50233	Screw, 8-32 x 1.00	6
21	50231	Nut, 8-32 Nylock	6
22	91921	Lanyard	1
23	92015C	Control Box	1
--	REF	Harness -- See Section 6	--

REF - Reference

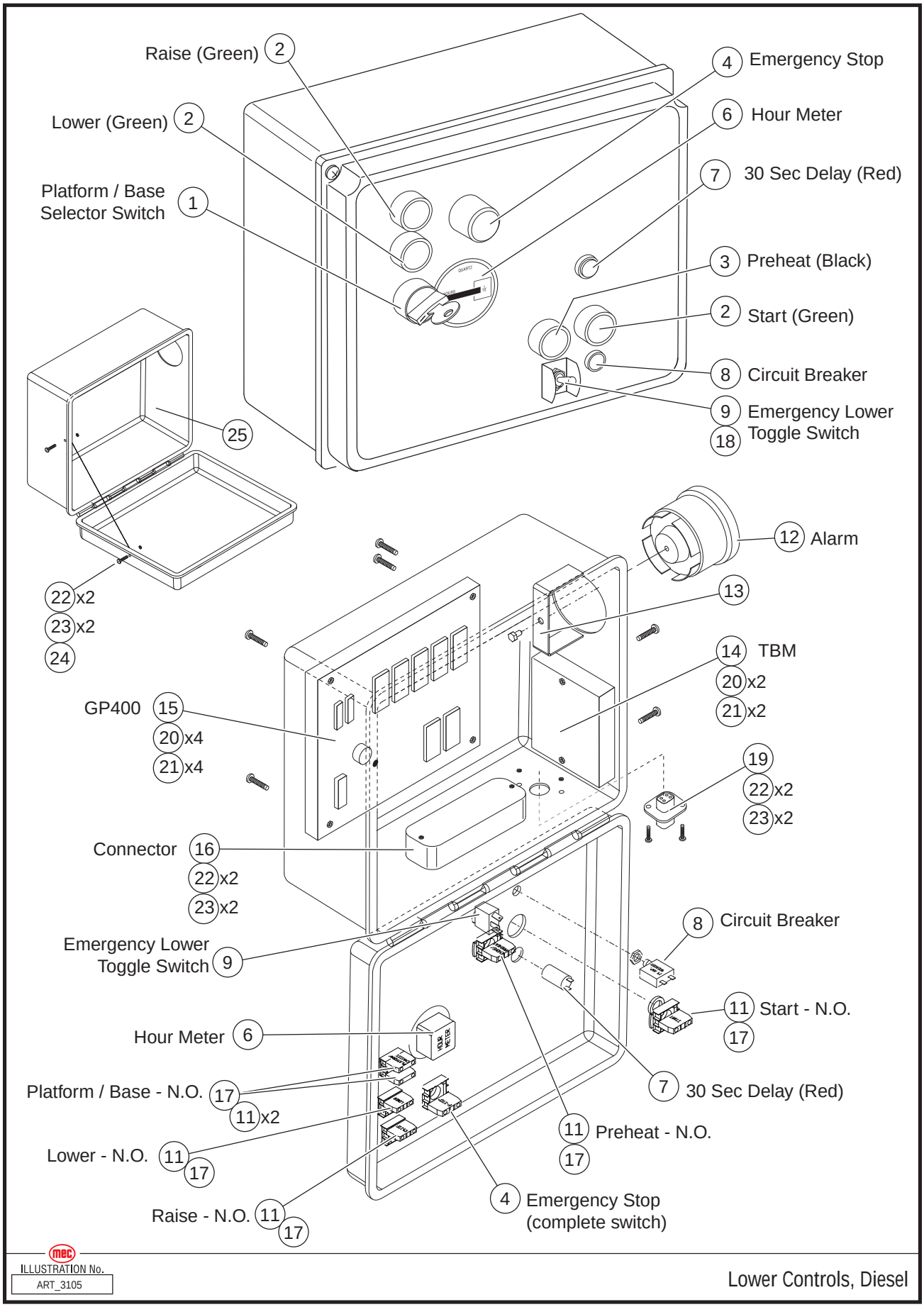
Lower Controls, 3084RT Dual Fuel Models



Item	Part Number	Description	Qty.
--	83078	Lower Control Box Assembly, DF Models	1
1	9549	Switch, 3-Position, Keyed	1
2	91667	Switch, Button, Green	3
3	91957	Switch, Button, Black	1
4	7800	Switch, Emergency Stop	1
5	91926	Switch, 2-Position	1
6	91704	Hour Meter	1
7	92254	Light, Red	1
8	7235	Circuit Breaker	1
9	7423	Switch Toggle 1 Pole 2 Position 3	1
10	8083	Contact Block, N. C.	1
11	8082	Contact Block, N. O.	7
12	91711	Alarm, 107dB	1
13	17082	Bracket, Alarm Mount	1
14	91838	Terminal Block Module (TBM)	1
15	91659	System Controller, GP400	1
16	91887	Deutsch Connector, DRC 12 70P	1
17	90714	Contact Base	6
18	1313	Switch Guard	1
19	91290	Deutsch Connection, DT14-4P-L012	1
20	50229	Screw, 10-24 x 1.00	6
21	50230	Nut, 10-24 Nylock	6
22	50233	Screw, 8-32 x 1.00	6
23	50231	Nut, 8-32 Nylock	6
24	91921	Lanyard	1
25	92016C	Control Box	1
--	REF	Harness -- See Section 6	--

REF - Reference

Lower Controls, 3084RT Diesel Models



Item	Part Number	Description	Qty.
--	83079	Lower Control Box Assembly, Diesel Models	1
1	9549	Switch, 3-Position, Keyed	1
2	91667	Switch, Button, Green	3
3	91957	Switch, Button, Black	1
4	7800	Switch, Emergency Stop	1
--	--	--	--
6	91704	Hour Meter	1
7	92254	Light, Red	1
8	7235	Circuit Breaker	1
9	7423	Switch Toggle 1 Pole 2 Position 3	1
--	--	--	--
11	8082	Contact Block, N. O.	6
12	91711	Alarm, 107dB	1
13	17082	Bracket, Alarm Mount	1
14	91838	Terminal Block Module (TBM)	1
15	91659	System Controller, GP400	1
16	91887	Deutsch Connector, DRC 12 70P	1
17	90714	Contact Base	6
18	1313	Switch Guard	1
19	91290	Deutsch Connection, DT14-4P-L012	1
20	50229	Screw, 10-24 x 1.00	6
21	50230	Nut, 10-24 Nylock	6
22	50233	Screw, 8-32 x 1.00	6
23	50231	Nut, 8-32 Nylock	6
24	91921	Lanyard	1
25	92016C	Control Box	1
--	REF	Harness -- See Section 6	--

REF - Reference

Platform Installation - To Serial #11800046

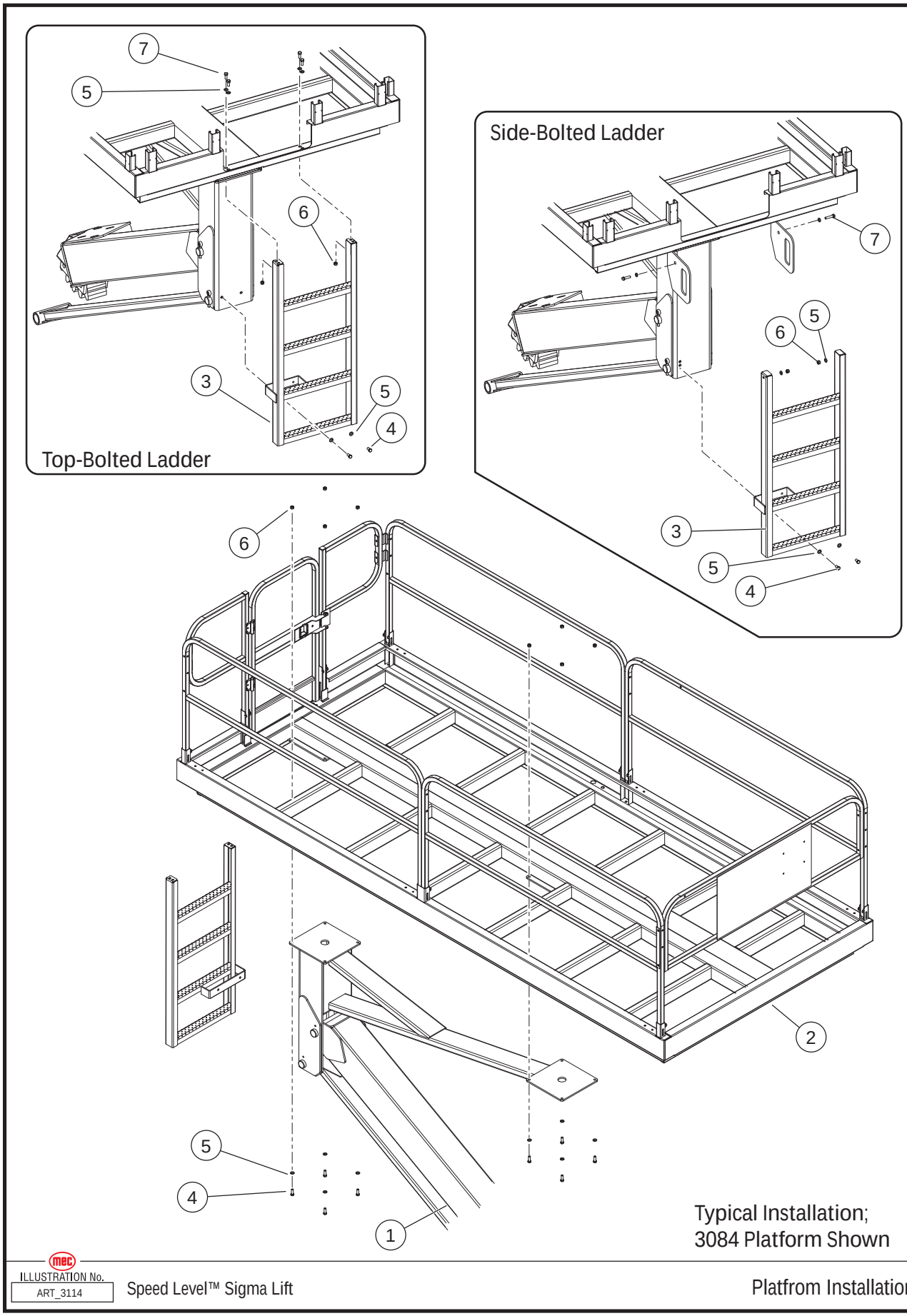


ILLUSTRATION No. ART_3114

Speed Level™ Sigma Lift

Platfrom Installation

Item	Part Number	Description	Qty.
1	83083	Boom Assembly	REF
2	83080 / 83160	Platform Assembly, 3084	REF
	83097	Platform Assembly, 2684	REF
3	19258	Ladder, Side-Bolted	1
	19148	Ladder, Top-Bolted	1
4	50040	Bolt, M12 x 35, GR8.8	10
5	50003	Washer, 13.5 mm ID x 24mm OD	14
6	50054	Nut, M12, GR8.8	14
7	50039	Bolt, M12 x 30	4

REF - Reference

Platform & Rails, 3084 - To Serial # 11800046

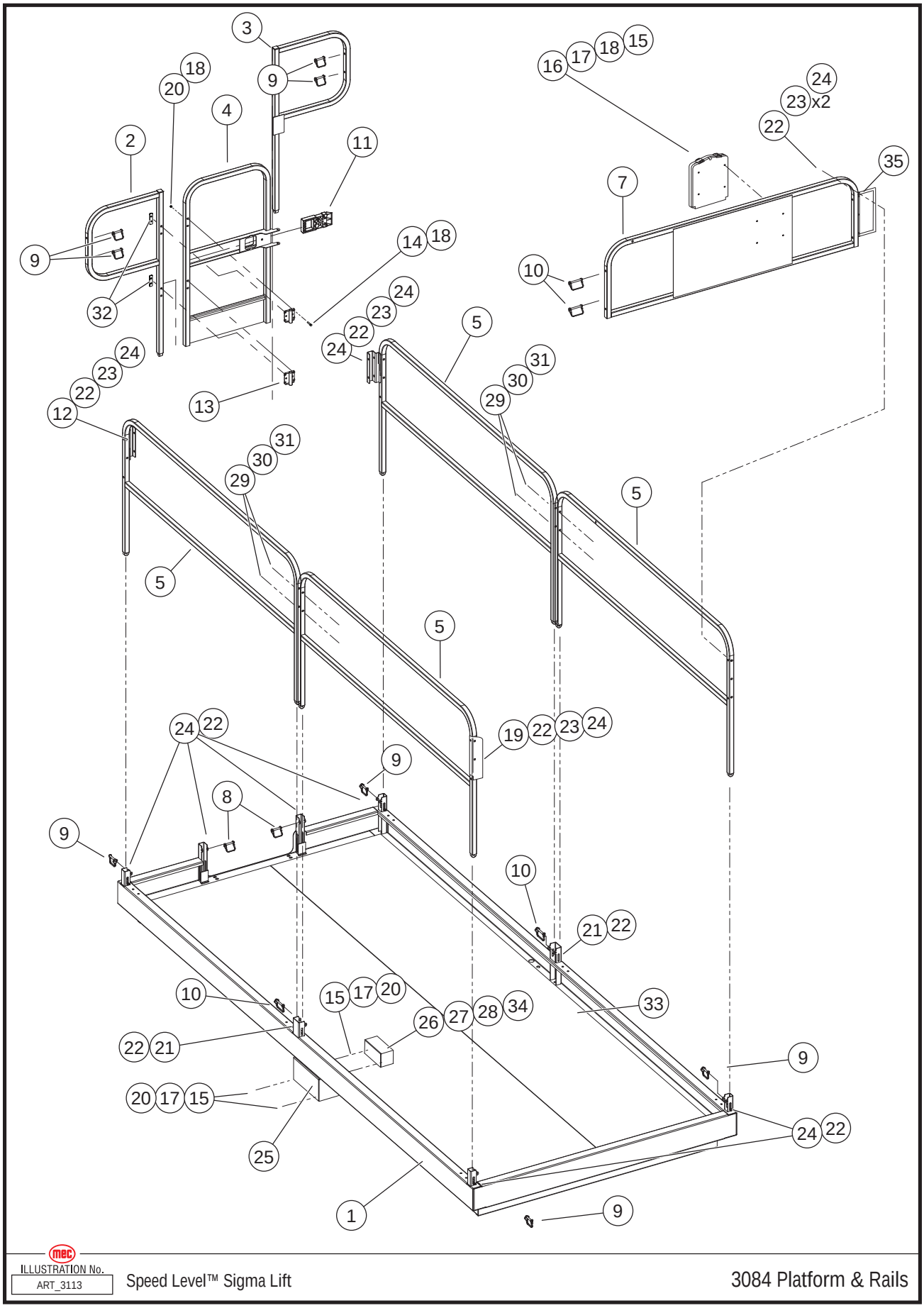


ILLUSTRATION No. ART_3113

Speed Level™ Sigma Lift

3084 Platform & Rails

Item	Part Number	Description	Qty.
--	83080	Platform Assembly, 3084	1
1	19252	Platform Deck	1
2	19207	Entry Rail, RH	1
3	19221	Entry Rail, LH	1
4	19192	Gate	1
5	19216	Side Rail	4
6	--	--	--
7	19218	Front Rail	1
8	50182	Clip Fastener, 3/8 X 2	2
9	50183	Clip Fastener, 3/8 X 2.25	8
10	50186	Clip Fastener, 3/8 X 3.25	4
11	16799	Gate Latch	1
--	7408	Gate Spring (Not Shown)	1
--	50015	Bolt, 8 x 50 (Not Shown)	1
--	50001	Washer, #8 (Not Shown)	2
--	50048	Nut, #8 Nylock (Not Shown)	1
12	19215	Bracket, Rear Rail	2
13	17960	Hinge - Up To Serial # 11800033	2
	91888	Hinge - Serial # 11800034 - Up	2
14	50125	Bolt, 6mm x 55	8
15	50047	Nut, 6mm	10
16	8909	Manual Enclosure	1
17	50028	Bolt, 6mm x 20	8
18	50000	6mm Washer	10
19	19228	Front Gate Lock	1
20	50068	Fender Washer, M6	4
21	50024	Bolt, M10 x 85	2
22	50049	Nut, M10 Nylock	17
23	50002	Washer, M10	34
24	50021	Bolt, M10 x 55	15
25	19262	Cover, Control Cable	1
26	91597	GFI Power Box	1
27	91598	GFI Cover Plate	1
28	92007	GFI Power Plug, Female	1
29	50018	Bolt, M8 x 80	4
30	50048	Nut, M8	4
31	50001	Washer, M8	8
32	19239	Backing Plate, Hinge	4
33*	19263	Deck Plate, Single Piece	1
33**	19132	Deck Plate, 2-Piece Deck, 30” x 163.75”	1
	19144	Deck Plate, 2-Piece Deck, 38” x 163.75”	1
34	92008	Strain Relief Connector	1
35	91024	Hinge 12” x 2”	1

*Single-Piece Deck **2-Piece Deck

Platform & Rails, 3084 - From Serial # 11800047

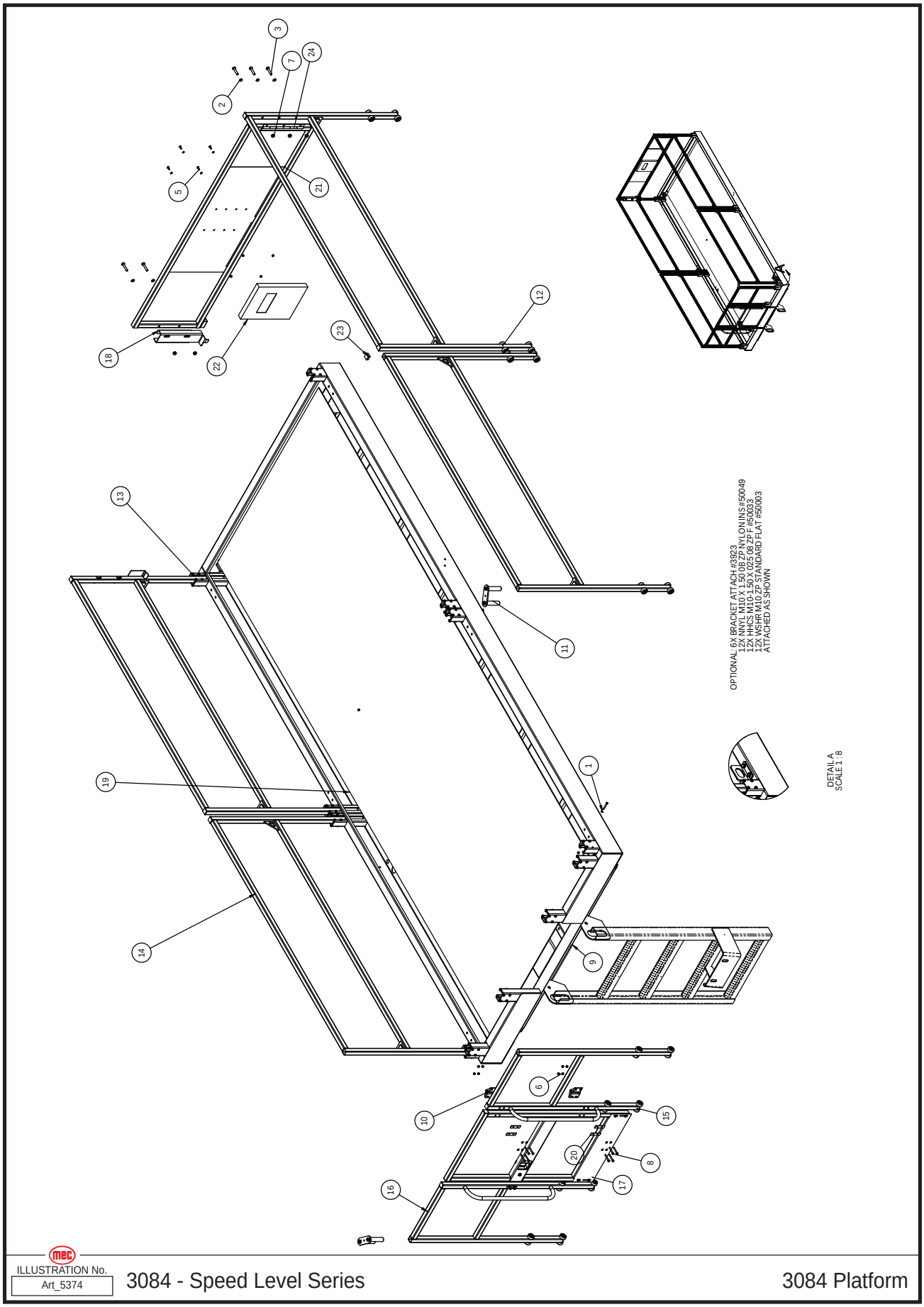


ILLUSTRATION No. Art_5374

3084 - Speed Level Series

3084 Platform

Item	Part Number	Description	Qty.
1	50000	WSHR M06 ZP Standard Flat	60
2	50002	WSHR M10 ZP Standard Flat	7
3	50020	HHCS M10-1.50x050 08 ZP P	3
4	50021	HHCS M10-1.50x055 08 ZP P	2
5	50296	HHCS M06-1.00x16 08 ZP P	4
6	50047	NNYL M06x1.00 08 ZP Nylock	60
7	50049	NNYL M10x1.50 08 ZP Nylon Inse	5
8	50262	HHCS M06-1.00x050 08 ZP F	56
9	19109	Deck Weldment	1
10	91888	Gate Hinge	2
11	84148	Reinforcement Rail Corner Assy	2
12	83165	Front Right Rail Assy	1
	19141	Front Right Rail Only	1
13	83164	Front Left Rail Assy	1
	19136	Front Left Rail Only	1
14	83161	Platform Side Rail Assy	2
	19116	Platform Side Rail Only	1
15	83153	Main Deck Right Rail Assy	1
	19384	Main Deck Right Rail Only	1
16	83152	Main Deck Left Rear Rail Assy	1
	19381	Main Deck Left Rear Rail Only	1
17	83149	Entry Gate Weldment	1
	22366	Entry Gate Only	1
18	19376	Deck Gate Lock	1
19	19263	Diamond Plate Decking	1
20	19239	Hinge Spacer	4
21	19133	Weldment, Loading Gate	1
22	8909	Enclosure Service Manual	1
23	6823	Cap Plug 1-1/4” Sq. Tube	10
24	91024	Hinge	1

Platform & Rails, 2684 - Part 1

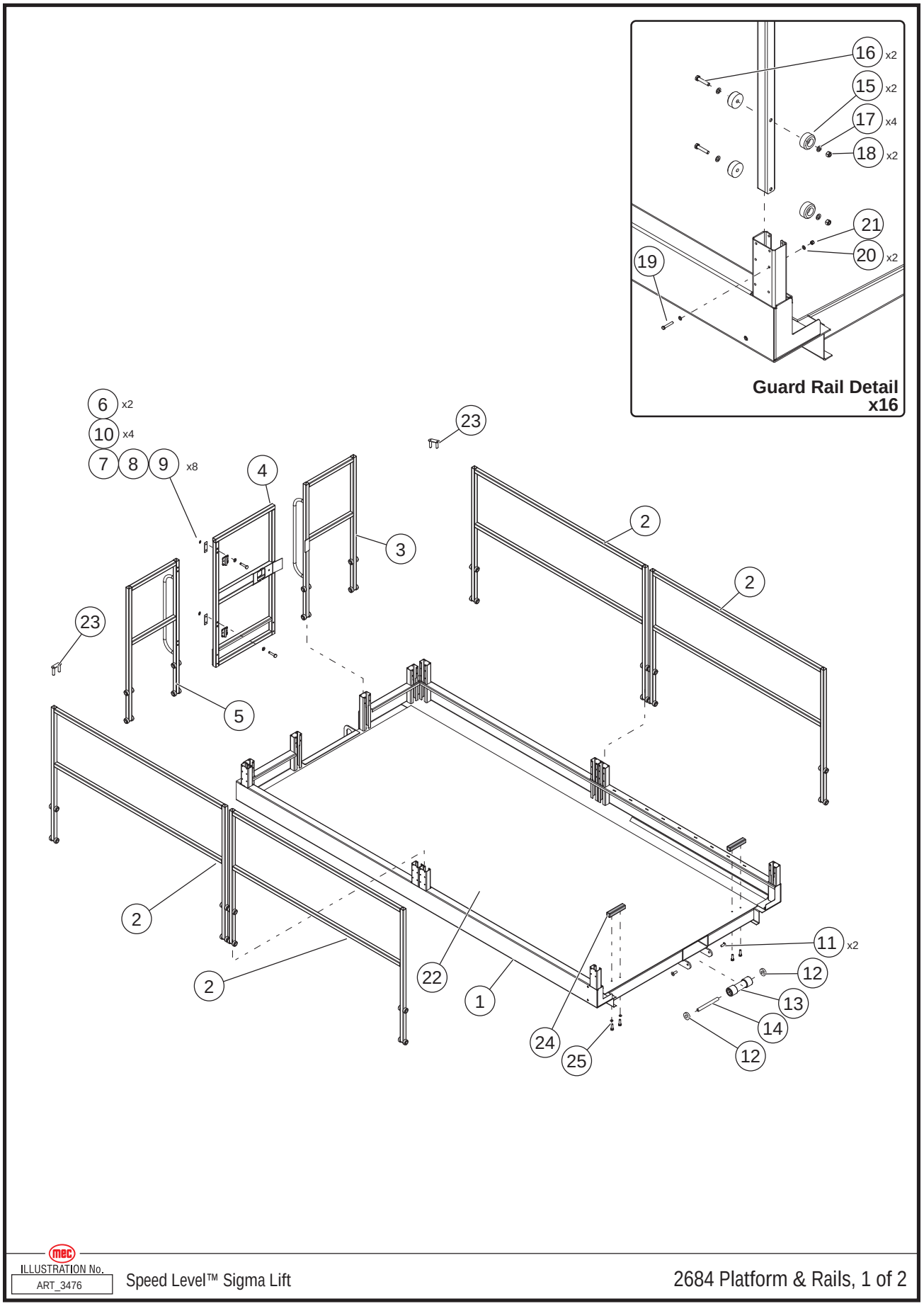


ILLUSTRATION No. ART_3476

Speed Level™ Sigma Lift

2684 Platform & Rails, 1 of 2

Item	Part Number	Description	Qty.
--	83097	Platform Assembly, 2684	1
1	19356	Platform Weldment	1
2	19377	Side Rail	4
3	19381	End Rail, Left	1
4	22366	Gate Weldment	1
--	22372	Gate Toeboard	1
--	16799	Gate Latch (Not Shown)	1
--	7408	Gate Latch (Not Shown)	1
--	50015	Bolt, 8 x 50 (Not Shown)	1
--	50001	Washer, #8 (Not Shown)	2
--	50048	Nut, #8 Nylock (Not Shown)	1
5	19384	End Rail, Right	1
6	91888	Hinge	2
7	50125	Bolt, 6mm x 55	8
8	50000	Washer, M6 Flat	8
9	50047	Nut, M6 Nylock	8
10	19239	Backing Plate, Hinge	4
11	50039	Screw, M12x1.75 x 30	10
12	91593	Bearing	10
13	19399	Roller	2
14	19398	Axle, Threaded	2
15	19131	Rail Wheel	64
16	50016	Bolt, M8 x 55	32
17	50001	Washer, M8	64
18	50048	Nut, M8 Nylock	32
19	50283	Bolt, M4 x 55	16
20	50284	Washer, M4	32
21	50285	Nut, M4 Nylock	16
22	19390	Platform Deck Plate	1
23	84148	Reinforcement Rail Corner Assy	1
	22459	Plate, Corner Cap	2
	22458	Pin, Corner Cap	4
	50286	Bolt, Button Head, M12 x 50	4
Items #24 and #25 used on serial numbers 12800001 - 12800009 only			
24	22248	Block, Deck Extension Stop	2
25	50036	Bolt, M10-1.5 x 50	4
	50006	Washer, M10 Nordlock	4

Platform & Rails, 2684 - Part 2

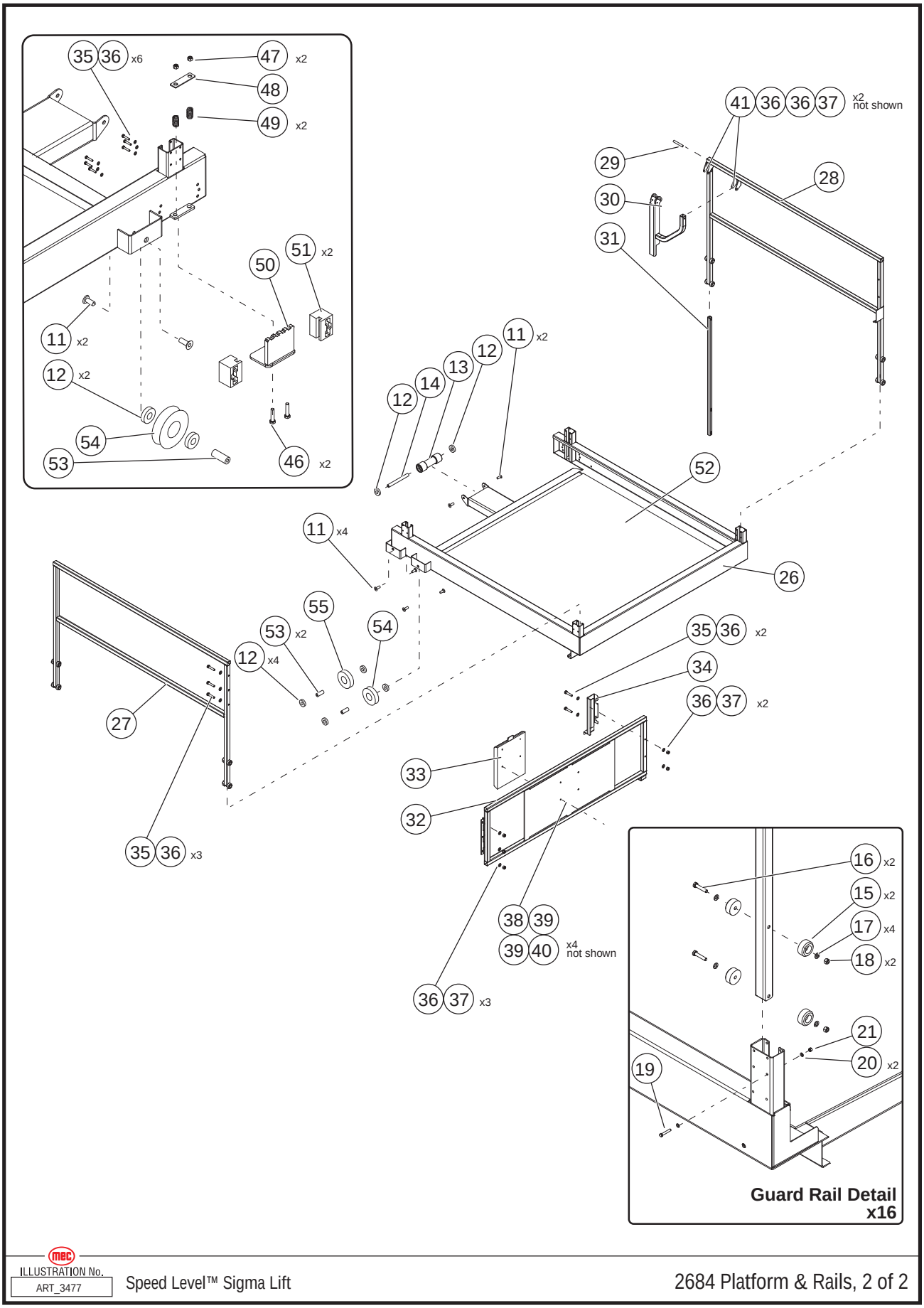


ILLUSTRATION No. ART_3477

Speed Level™ Sigma Lift

2684 Platform & Rails, 2 of 2

Item	Part Number	Description	Qty.
--	83097	Platform Assembly, 2684	1
11		Screw, Countersink	10
12	91593	Bearing	10
13	19399	Roller	2
14	19398	Axle, Threaded	2
15	19131	Rail Wheel	64
16	50016	Bolt, M8 x 55	32
17	50001	Washer, M8	64
18	50048	Nut, M8 Nylock	32
19	50283	Bolt, M4 x 55	16
20	50284	Washer, M4	32
21	50285	Nut, M4 Nylock	16
26	19337	Platform Extension Weldment	1
27	19424	Side Rail, Deck Extension, Right Side	1
28	19432	Side Rail, Deck Extension, Left Side	1
29	92219	Spring Pin, M8 x 55	1
30	19367	Deck Extension Handle Weldment	1
31	19370	Deck Extension Bar	1
32	19374	Gate, Material Loading	1
33	8909	Manuals Case	1
34	19376	Latch, Material Loading Gate	1
35	50015	Bolt, M8 x 50	11
36	50001	Washer, M8	20
37	50048	Nut, M8 Nylock	7
38	50028	Bolt, M6 x 20	4
39	50000	Washer, M6	8
40	50047	Nut, M6	4
41	50287	Bolt, Button Head Cap Screw, M8 x 70	2
42	--	--	--
43	--	--	--
44	--	--	--
45	--	--	--
46	50288	Cap Screw, Shouldered, M10 x 60	2
47	50053	Nut, M10	2
48	19389	Plate	1
49	92218	Spring	2
50	19385	Weldment, Locking Rack	1
51	19388	Locking Track	2
52	19391	Platform Extension Deck Plate	1
53	16791	Threaded Axle	3
54	16793	V-Wheel	2
55	16792	Flat Wheel	1

Boom Mount and Pivot

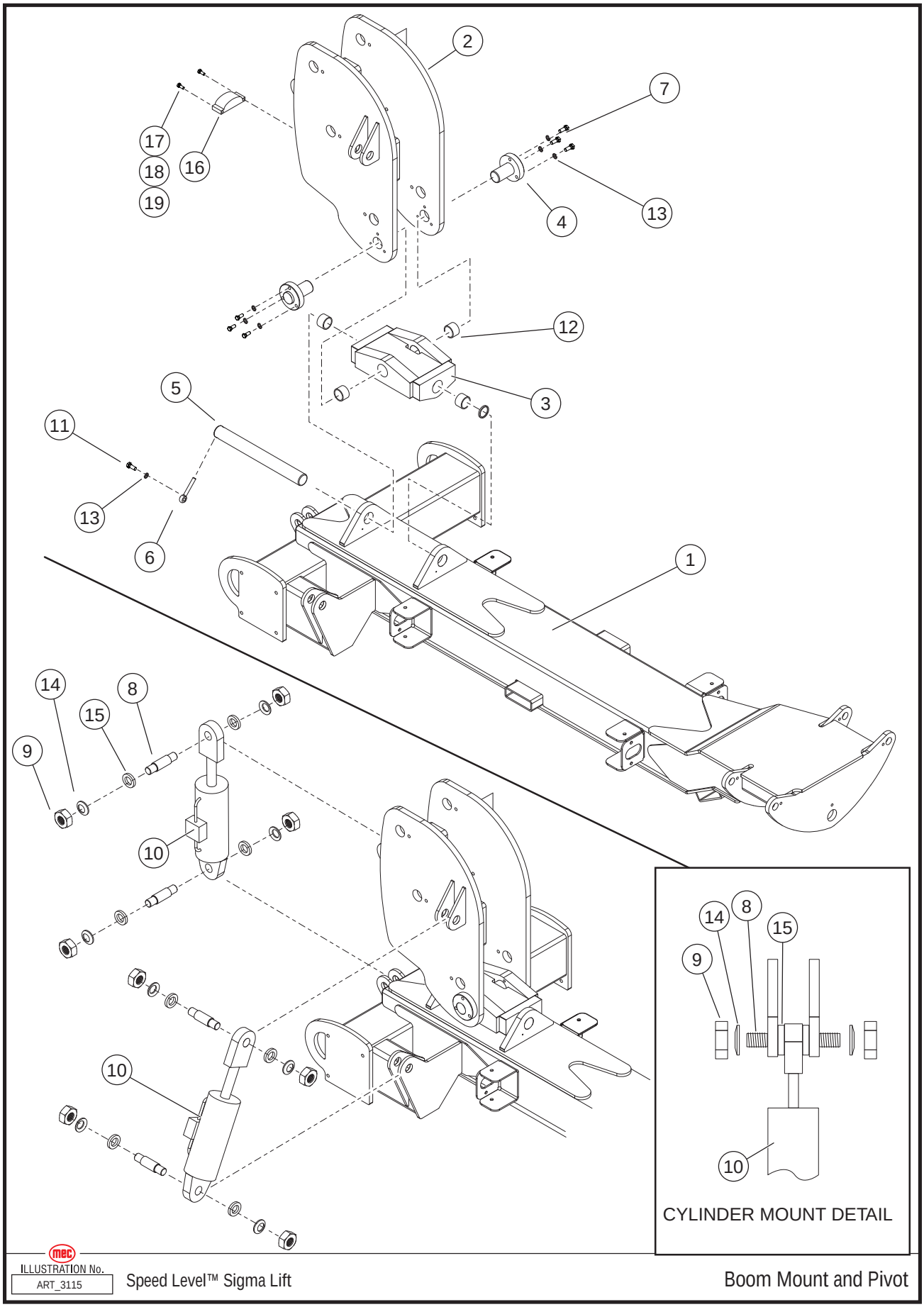


ILLUSTRATION No. ART_3115

Speed Level™ Sigma Lift

Boom Mount and Pivot

Item	Part Number	Description	Qty.
--	83081	Chassis Assembly	1
1	19020	Chassis Weldment	1
2	19031	Boom Mount Weldment	1
3	19013	Level Pivot Weldment	1
4	19124	Pin	2
5	19123	Pin	1
6	18152	Pin Retainer	1
7	50023	Bolt, M12 x 50	6
8	19122	Pin	4
9	50119	Nut, Nylock 1-1/4”	8
10	19081	Cylinder, Level	2
11	50039	Bolt, M12 x 30	1
12	92011	Bearing, Flange	4
13	50007	Washer, M12 Nord-Lock	6
14	50065	Flat Washer, 1¼	8
15	19164	Spacer	8
16	92201*	CAN Tilt Angle Transducer, Model 151	1
17	50125	Screw, M6 x 55	2
18	50047	Nut, M6 Nylock	2
19	50068	Washer, M6 Fender	2
20	92040	Spacer	As Needed

* For adapter from early style (1-Plug) CAN Tilt to new style (2-Plug) CAN Tilt use 22538

Chassis Planetary Drive Assembly

2684RT - From Serial # 12800107 / 2684ES - From Serial # 12700041
3084RT - From Serial # 11800400 / 3084ES - From Serial # 11700089

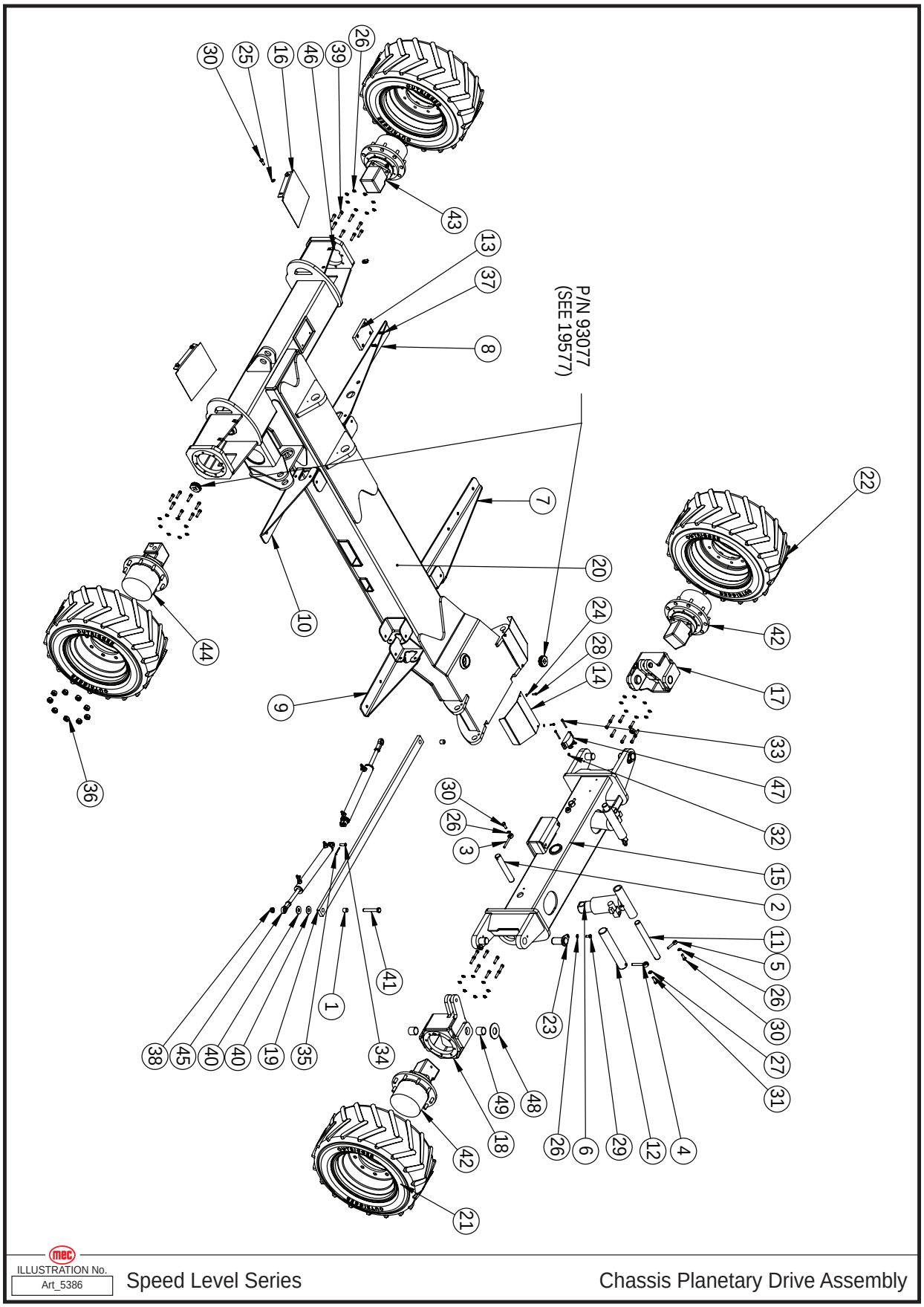


ILLUSTRATION No. Art_5386 Speed Level Series Chassis Planetary Drive Assembly

Item	Part Number	Description	Qty.
1	7292	Bearing, Sleeve, Bronze, .625 X .500 LG	2
2	18074	Pin, 1.250 X 8.00	2
3	18151	Keeper Pin	2
4	18152	1/2” Pin Retainer	1
5	18165	Keeper Pin .375 x 2.20	2
6	19087	Axle Lock Cylinder	2
7	19103	Module Mount	1
8	19104	Module Mount	1
9	19105	Module Mount	1
10	19106	Module Mount	1
11	19119	Pin, 1.250 X 11.50	2
12	19120	Pin, 2.000 X 11.50	1
13	19157	Boom Wear Pad	1
14	19162	Cylinder Guard	2
15	19550	Front Axle	1
16	19557	Rear Axle Cover	2
17	19568	LH Yoke	1
18	19569	RH Yoke	1
19	19571	Tie Rod	1
20	19577	Chassis	1
21	19579	RH Air Filled Tire	2
22	19580	LH Air Filled Tire	2
23	26057	King Pin Weldment	4
24	50000	WSHR M06 ZP Standard Flat	4
25	50002	WSHR M10 ZP Standard Flat	4
26	50006	WSHR M10 ZP Nordlock	40
27	50007	WSHR M12 ZP Nordlock	1
28	50028	HHCS M06-1.00X020 08 ZP F	4
29	50033	HHCS M10-1.50X025 08 ZP F	4
30	50034	HHCS M10-1.50X030 08 ZP F	8
31	50040	HHCS M12-1.75X035 08 ZP F	1
32	50047	NNYL M06X1.00 08 ZP Nylock	2
33	50125	HHCS M06-1.00X055 08 ZP F	2
34	50172	PCLV 0.500X1.38 ZP STL	2
35	50177	Cotter Pin 0.156X1.75 ZP STL Extprng	2
36	50365	NLUG 09/16-18 08 ZP Hex Lug Nut	36
37	50372	BHCS M08-1.25X025 08 ZP P	2
38	50398	NLOC 05/08-11 05 ZP Top LOC	2
39	50440	SHCS M10-1.50X040 12 ZP F	32
40	50443	WSHR 05/08 ZP Standard Flat	4
41	50477	HHCS 05/08-11X04.00 08 ZP	2
42	83231*	Motor & Drive Side Port Assy	2
43	83231*	Motor & Drive Side Port Assy	1
44	83231*	Motor & Drive Side Port Assy	1
45	91019	Steer Cylinder	2
46	92098	Nut Clip M10 X .375	4
47	92202	PG Trionic Can Tilt 162	1
48	92341	1.51”X3.5”X3/16” Thrust Washer	2
49	92360	1.50 X 1.75 X 1.50+/-.01” Polygon Bearing	4

* See page 217 for individual drive parts

Side Port Assembly

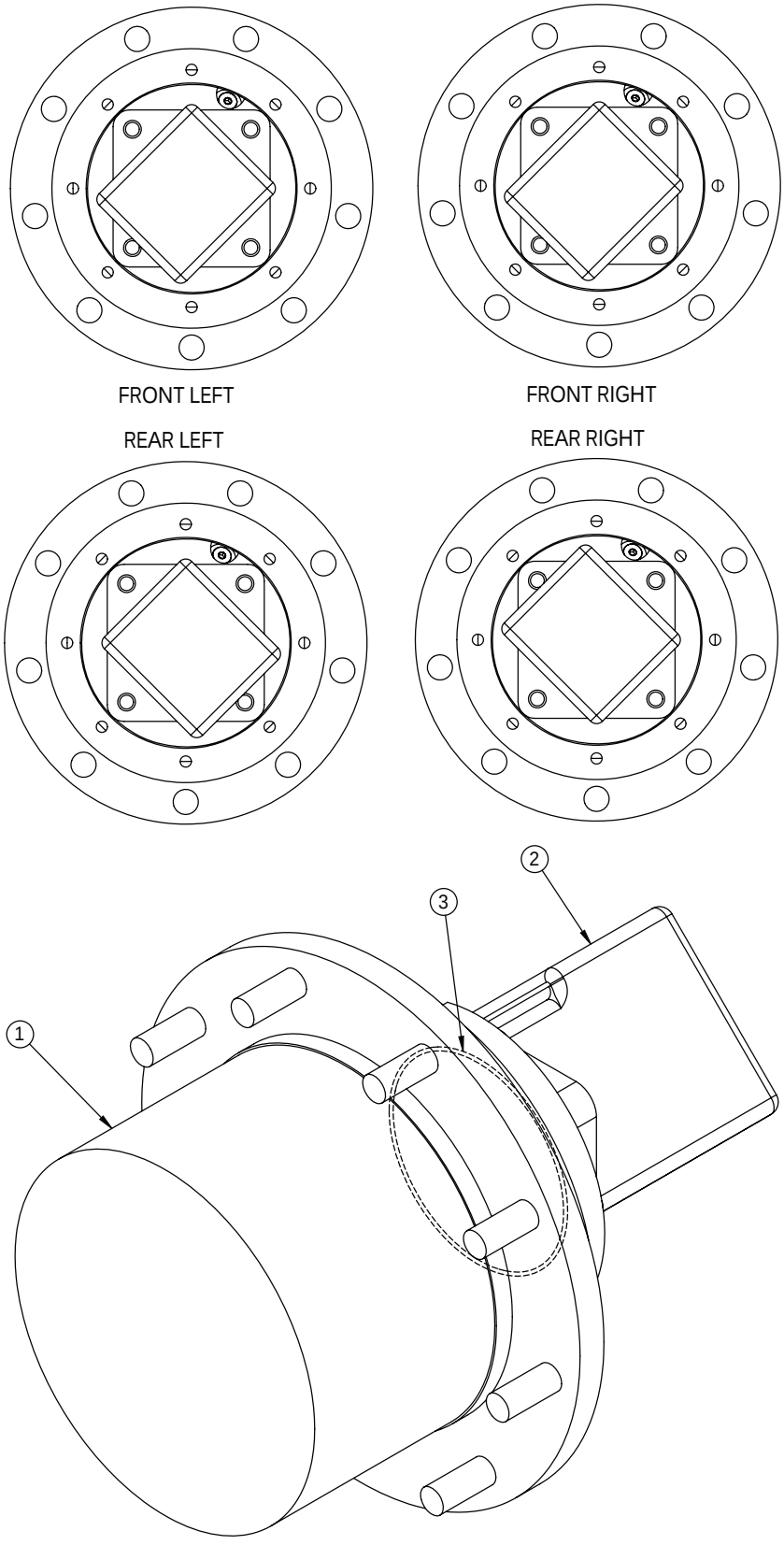


ILLUSTRATION No. Art_5385

Speed Level Series

Side Port Assembly

Item	Part Number	Description	Qty.
1	93710	Omni Gear VB04 WHL DRV Planetary	1
2	93965	129CC HYD Motor Side Ports	1
3	94756	O-Ring AS 568A-046	1

Lower Boom Assembly

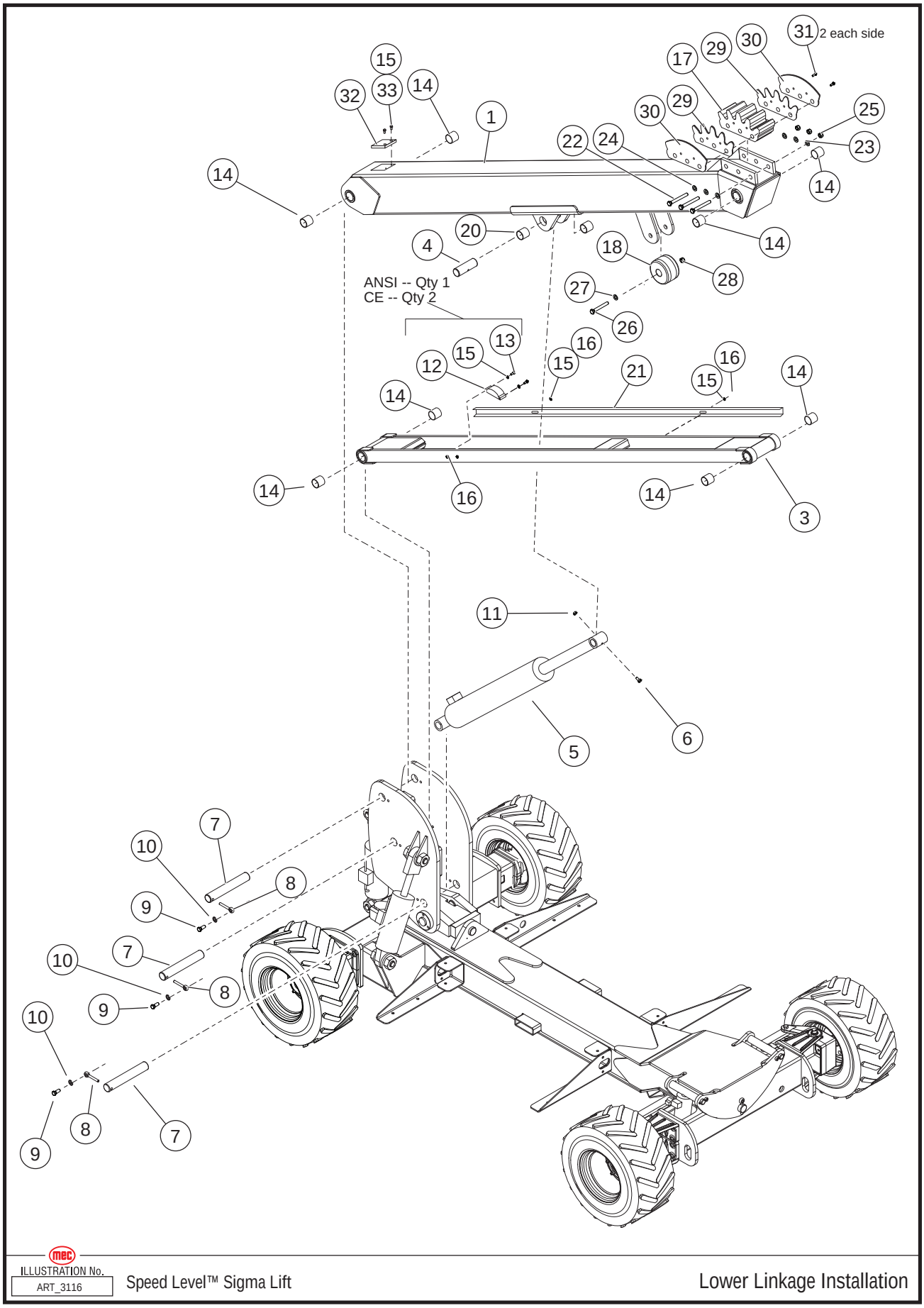


ILLUSTRATION No. ART_3116

Speed Level™ Sigma Lift

Lower Linkage Installation

Item	Part Number	Description	Qty.
--	83082	3084 -- Lower Boom Assembly	1
--	83095	2684 -- Lower Boom Assembly	1
1	19034	3084 -- Lower Boom Weldment	1
	19327	2684 -- Lower Boom Weldment	1
2	--	--	--
3	19049	3084 -- Lower Tension Weldment	1
	19329	2684 -- Lower Tension Weldment	1
4	19118	Cylinder Mount Pin	1
5	19084	Lift Cylinder	1
6	50024	Bolt, M10.9 x 65	1
7	19121	Pin, Boom Mount	3
8	18152	Pin Retainer	3
9	50039	Bolt, M12 x 30	3
10	50007	Washer, M12 Nordlock	3
11	50049	Lock Nut, M10	1
12	90844	ANSI Specifications - EZfit Angle Transducer, Model 120	1
		CE Specifications - EZfit Angle Transducer, Model 120	2
13	50016	ANSI Specifications - Screw, M8 x 55	2
		CE Specifications - Screw, M8 x 55	4
14	92011	Flange Bearing	8
15	50001	M8 Washer	10
16	50048	ANSI Specifications - M8 Lock Nut	4
		CE Specifications - M8 Lock Nut	6
17	19199	Gear, Pivot	1
18	91963	Wheel	1
19	--	--	--
20	92012	Flange Bearing, 2.0 x 1.0	2
21	19158	3084 -- Cable Cover	1
	19436	2684 -- Cable Cover	1
22	50058	Bolt, HHCS 1”-8 x 8”, GR8, ZP	3
23	50063	Washer, 1” ZP Std Flat	3
24	50064	Washer, 1” ZP Flat XT	3
25	50120	Nut, NNYL 1”-8	3
26	50059	Bolt, 3/4-10 x 5.5	1
27	50062	Washer, 3/4 Std	1
28	50118	Nut, 3/4-10 Jam Nylock	1
29	19240	Spacer, Lower Boom Gear Shield	2
30	19241	Guard	2
31	50031	Bolt, M8 x 25	4
32	19157	Wear Pad	1
33	50124	Cap Screw, M8 x 1.25 x 20, Button Head Allen	2

Upper Boom Assembly

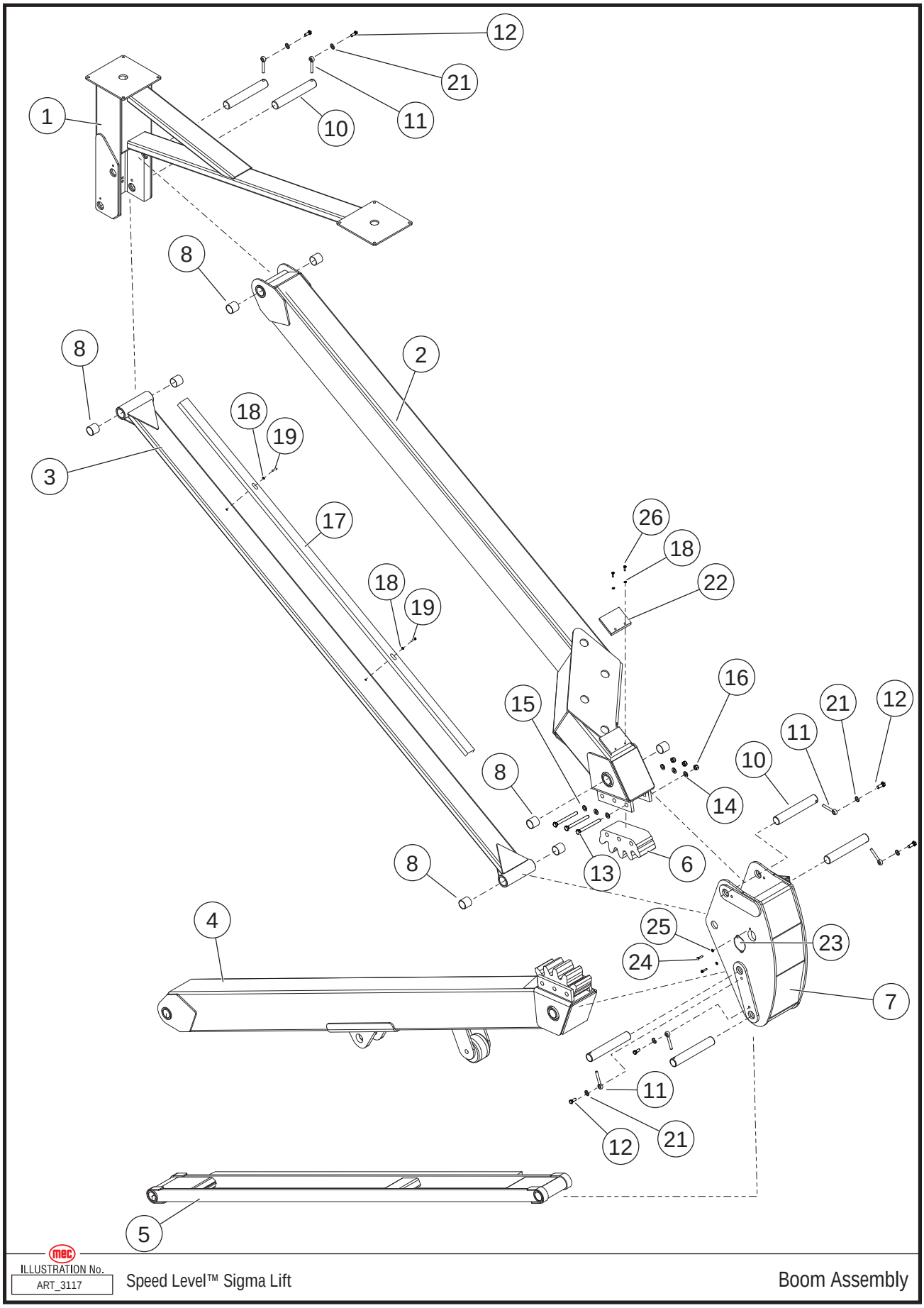


ILLUSTRATION No. ART_3117

Speed Level™ Sigma Lift

Boom Assembly

Item	Part Number	Description	Qty.
--	83083	3084 -- Upper Boom Assembly	1
--	83096	2684 -- Upper Boom Assembly	1
1	19068	Platform Pivot Weldment	1
2	19073	3084 -- Upper Boom Weldment	1
	19332	2684 -- Upper Boom Weldment	1
3	19058	3084 -- Upper Tension Weldment	1
	19334	2684 -- Upper Tension Weldment	1
4	REF	Lower Boom Weldment (See “Lower Boom Assembly” On Page 220)	1
5	REF	Lower Tension Weldment (See “Lower Boom Assembly” On Page 220)	1
6	19199	Gear, Pivot	1
7	19055	Boom Pivot Weldment	1
8	92011	Flange Bearing	8
9	--	--	--
10	19121	Boom Mount Pin	6
11	18152	Pin Retainer	6
12	50046	Bolt, M12 x 35	6
13	50058	Bolt, HHCS 1”-8 x 8”, GR8, ZP	3
14	50063	Washer, 1” ZP Std Flat	3
15	50064	Washer, 1” ZP Flat XT	3
16	50120	Nut, NNYL 1”-8	3
17	19158	3084 -- Cable Cover	1
	19436	2684 -- Cable Cover	1
18	50001	M8 Washer Standard	4
19	50048	M8 Lock Nut	2
--	--	--	--
21	50007	Split Lock Washer, M12	6
22	19157	Wear Pad	1
23	19183	Grease Port Cover	1
24	50037	Bolt, M12 x 20	2
25	50003	Washer, M12	2
26	50124	Bolt	2

REF - Reference

Front Axle Assembly

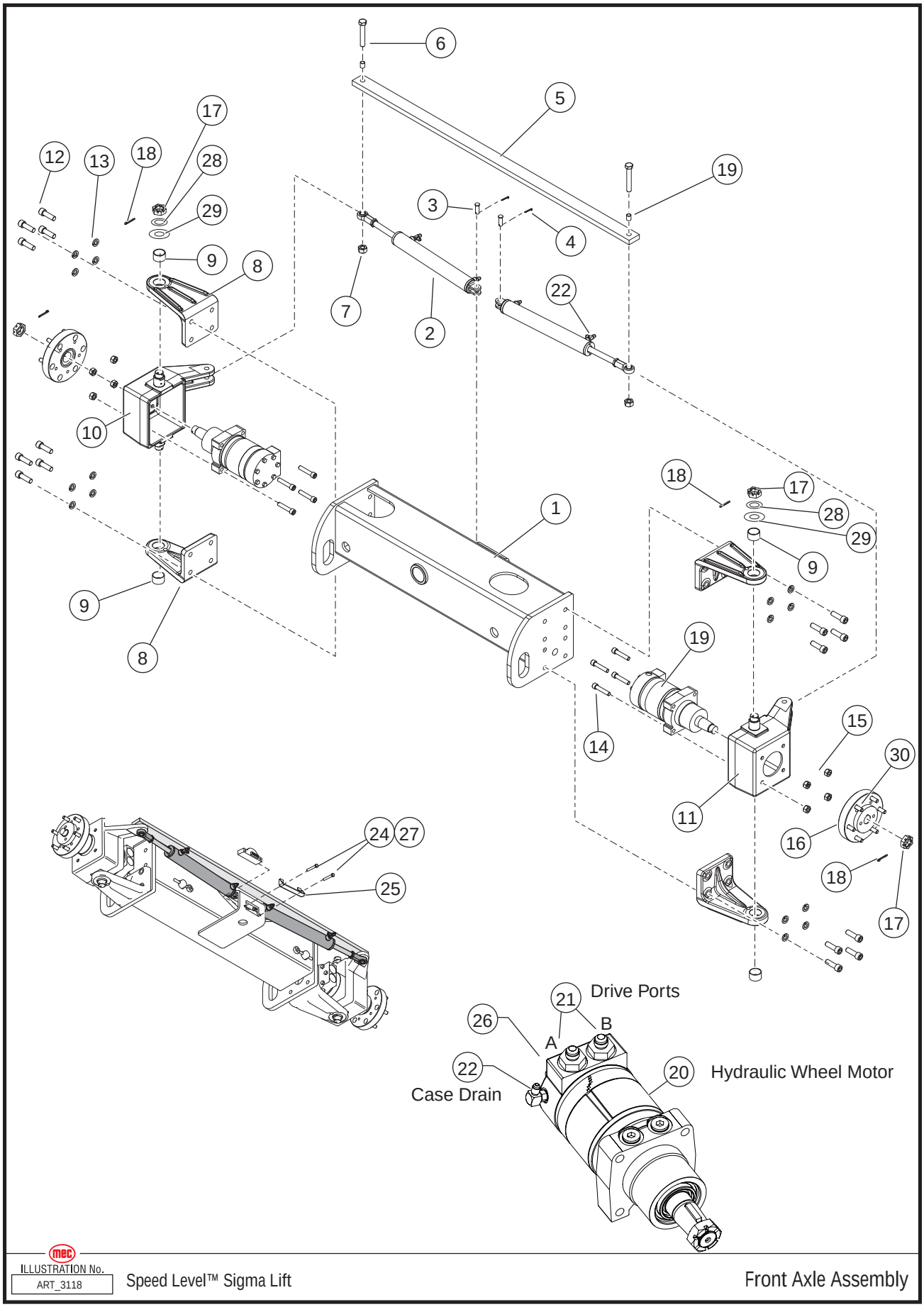


ILLUSTRATION No. ART_3118

Speed Level™ Sigma Lift

Front Axle Assembly

Item	Part Number	Description	Qty.
--	83084	Front Axle Assembly	1
1	19008	Front Axle Weldment	1
2	91019	Cylinder, Steering	2
	90990	Seal Kit, Steer Cylinder (Not Shown)	--
3	50172	Pin, Clevis, ½ DIA. X 1 3/8” LG	2
4	50178	Pin, Cotter, .12 DIA. X 1” LG	2
5	19079	Rod, Tie Steering	1
6	50154	Screw, 5/8” - 11. 4” LG, GR 5	2
7	HDW6633	Nut, Lock, 5/8” - 11, GR 5	2
8	40334	Mount, Motor W/Bearings	4
9	9307	Bearing, 1.50 x 1.0 DIA	4
10	40308	Mount, Wheel Motor, RH, Front	1
11	40464	Mount, Wheel Motor, LH, Front	1
12	50012	Screw, M16 X 50, GR 12, Socket Head	16
13	50008	Lock Washer, M16	16
14	50072	Screw, ½”-13, 2.50” LG, GR 8, Socket Head	8
15	HDW8457	Nut, ½”-13, GR8	8
16	10709	Hub	2
17	HDW8568	Nut, 1 1/8” - 18	6
18	50177	Pin, Cotter, .156 DIA. X 1.75” LG	6
19	7292	Bearing	2
20	7300P	Motor, Wheel, Hyd.	2
	94863	Hyd Drive Motors 160CC 3084RT - From Serial #11800423	2
21	50659	Fitting, MB-MJ-12-8	4
22	50665	Fitting, MB-MJ90-4-4	4
23	92202*	CAN Tilt Angle Transducer, (152)	1
24	50017	Screw, M8 x 60	2
25	19197	Guard	1
26	50645	Fitting, MJ-FJX-8-8	2
27	50048	Locknut, M8	2
28	20312	Washer Bearing	8
29	20311	Washer, 2.550 x 1.560	4
30	HDW6676	Wheel Stud 1/2-20 x 1 3/4 LG	1

* For adapter from early style (1-Plug) CAN Tilt to new style (2-Plug) CAN Tilt use 22538

Axle Installation, Front

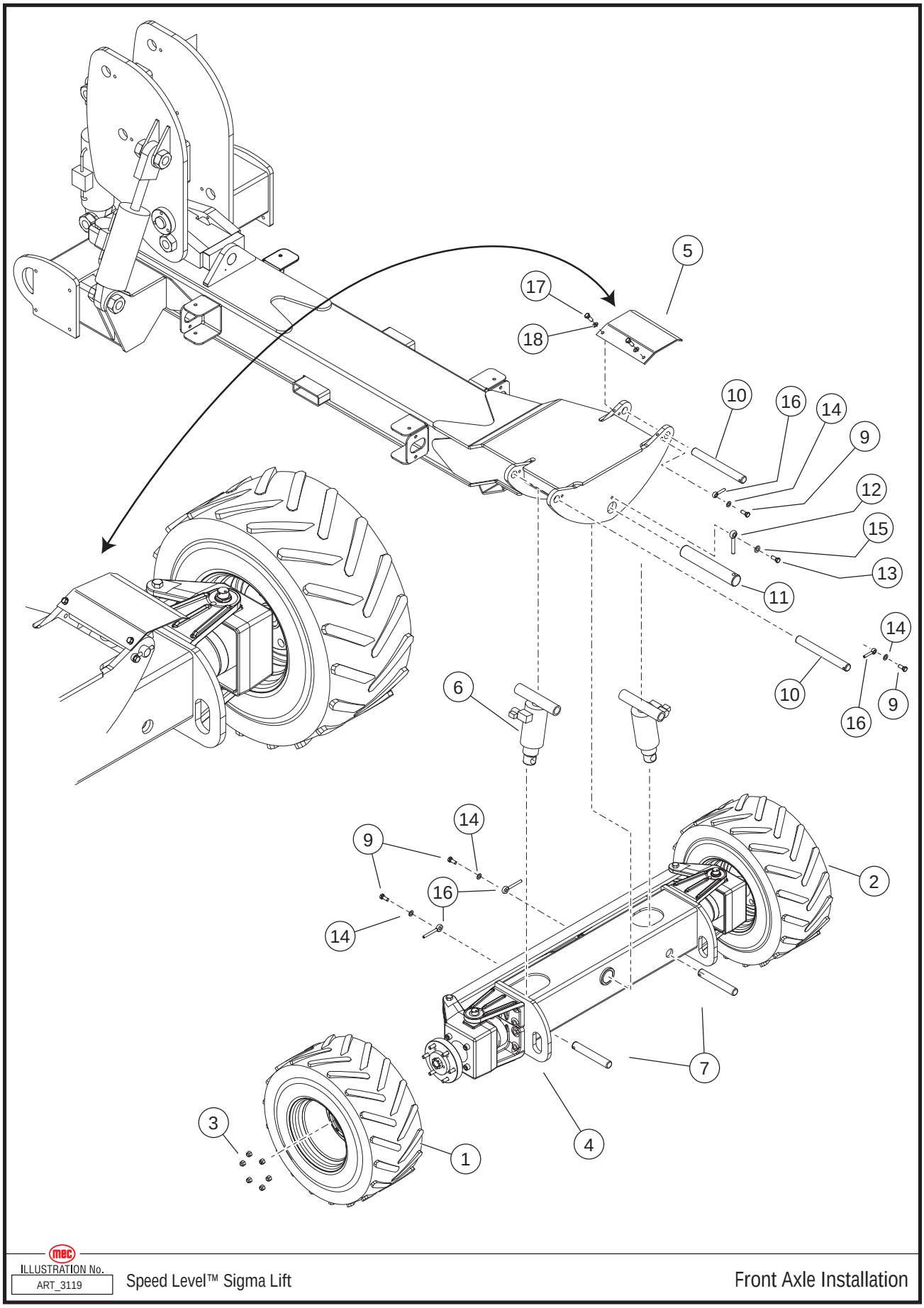


ILLUSTRATION No. ART_3119

Speed Level™ Sigma Lift

Front Axle Installation

Item	Part Number	Description	Qty.
1	91166	Wheel/Tire Assy, LH - 10 PLY - Pneumatic (ANSI Standard)	1
	91168	Wheel/Tire Assy, LH - 10 PLY - Foam (ANSI Option) (CE Standard)	1
	91578	Wheel/Tire Assy, LH - Non-Marking Pneumatic (ANSI Option)	1
	91580	Wheel/Tire Assy, LH - Non-Marking Foam (ANSI, CE Option)	1
	91581	Wheel/Tire Assy, LH - Turf Pneumatic (ANSI Option)	1
2	91165	Wheel/Tire Assy, RH - 10 PLY - Pneumatic (ANSI Standard)	1
	91167	Wheel/Tire Assy, RH - 10 PLY - Foam (ANSI Option) (CE Standard)	1
	91577	Wheel/Tire Assy, RH - Non-Marking Pneumatic (ANSI Option)	1
	91579	Wheel/Tire Assy, RH - Non-Marking Foam (ANSI, CE Option)	1
	91581	Wheel/Tire Assy, RH - Turf Pneumatic (ANSI Option)	1
Incl	91180	Wheel (Service, No Tire)	--
3	50165	Nut, Lug, ½" - 20, GR 5	12
4	REF	Front Axle Assembly	1
5	19162	Cover	2
6	19087	Cylinder, Axle Lock	2
7	18074	Pin, Ø1.25"	2
8	--	--	--
9	50033	Bolt, M10 x 25	4
10	19119	Pin, Ø1.25	2
11	19120	Pin, Ø7.0	1
12	18152	Pin Retainer, 0.5 x 3.80	1
13	50039	Bolt, M12 x 30	1
14	50006	Lock Washer, M12	4
15	50007	Lock Washer, M10	1
16	18151	Pin Retainer, .375 x 3.75	4
17	50027	Bolt, M6 x 10	4
18	50068	Washer, M6 Flat	4

REF - Reference
Incl - Included with Assembly

Axle Installation, Rear

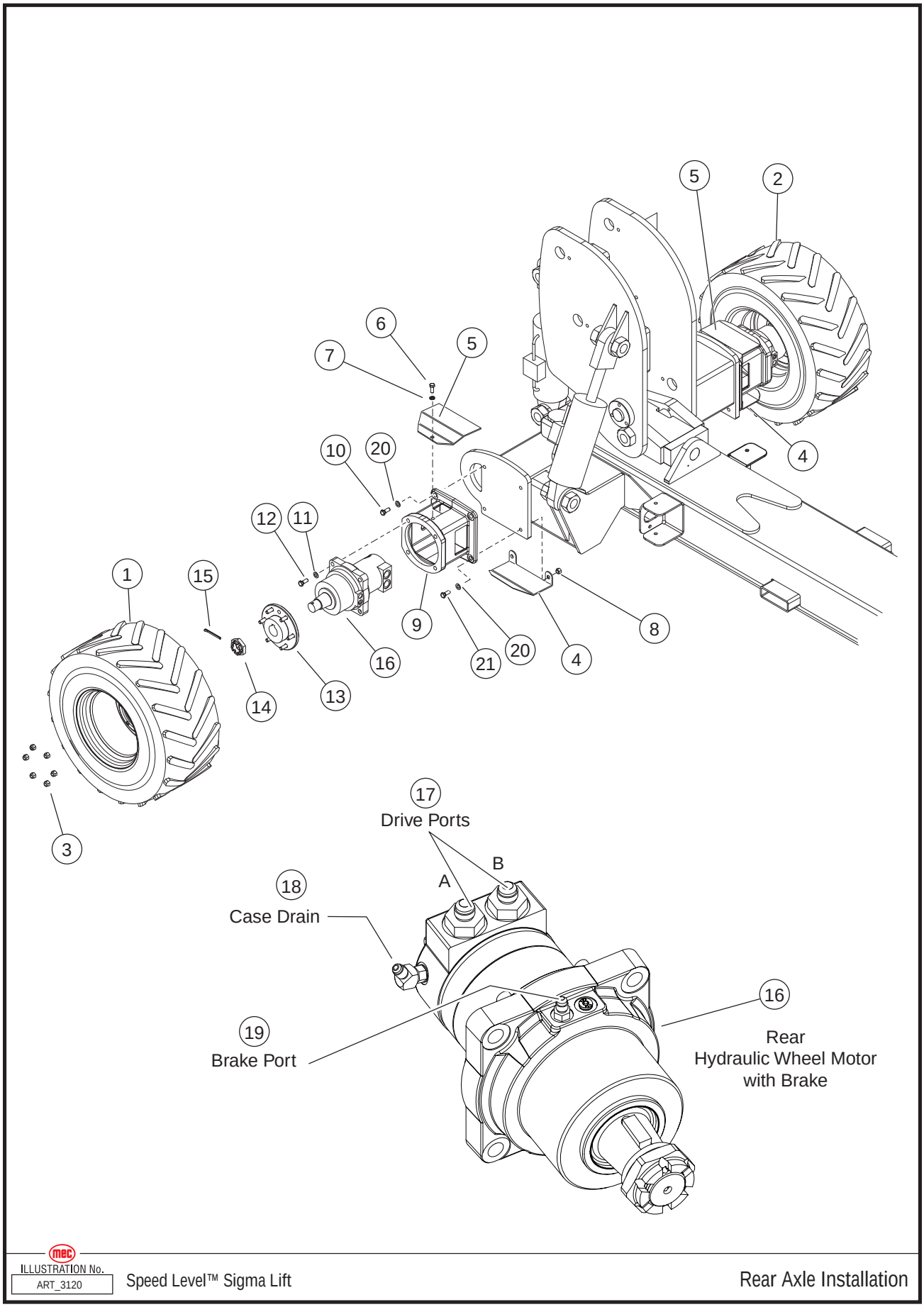


ILLUSTRATION No. ART_3120 Speed Level™ Sigma Lift Rear Axle Installation

Item	Part Number	Description	Qty.
1	91166	Wheel/Tire Assy, LH - 10 PLY - Pneumatic (ANSI Standard)	1
	91168	Wheel/Tire Assy, LH - 10 PLY - Foam (ANSI Option) (CE Standard)	1
	91578	Wheel/Tire Assy, LH - Non-Marking Pneumatic (ANSI Option)	1
	91580	Wheel/Tire Assy, LH - Non-Marking Foam (ANSI, CE Option)	1
	91581	Wheel/Tire Assy, LH - Turf Pneumatic (ANSI Option)	1
2	91165	Wheel/Tire Assy, RH - 10 PLY - Pneumatic (ANSI Standard)	1
	91167	Wheel/Tire Assy, RH - 10 PLY - Foam (ANSI Option) (CE Standard)	1
	91577	Wheel/Tire Assy, RH - Non-Marking Pneumatic (ANSI Option)	1
	91579	Wheel/Tire Assy, RH - Non-Marking Foam (ANSI, CE Option)	1
	91581	Wheel/Tire Assy, RH - Turf Pneumatic (ANSI Option)	1
Incl	91180	Wheel (Service)	--
3	50165	Nut, Lug, ½" - 20, GR 5	12
4	16349	Bottom Hose Cover	2
5	19168	Top Hose Cover	2
6	50010	Screw, M8 x 25	2
7	50001	Washer, Lock, M8	2
8	50051	Nut, M16	4
9	40258	Mount, Motor, Rear Axle, Machined	2
10	50043	Bolt, M16 x 40	8
11	50253	Washer, Lock, 5/8	8
12	50151	Screw, 5/8"-11, 2.25" LG, GR 5	8
13	14773	Hub	2
14	HDW9037	Nut, Castle, M42 X 3 (Service)	--
15	50170	Pin, Cotter, .250 DIA. X 3" LG	2
16	91319	Wheel Motor, Hyd W/Brake	2
	94863	Hyd Drive Motors 160CC 3084RT - From Serial #11800423	2
	9781	Seal Kit	1
	91138	Brake Kit	1
17	50659	Fitting, MB-MJ-12-8	4
18	50646	Fitting, MB-MJL-4-4	2
19	50647	Fitting, MB-MJ90L-4-4	2
20	50008	Washer, Lock, M16	8
21	50044	Bolt, M16 x 60 G10.9	8
22	91585	Valve Assembly With Coil (XX84ES Models Only) 3084ES - From Serial #11700100	2
23	HDW6676	Wheel Stud 1/2-20 x 1 3/4 LG	1

Incl - Included with Assembly

Wheel Motor, Rear

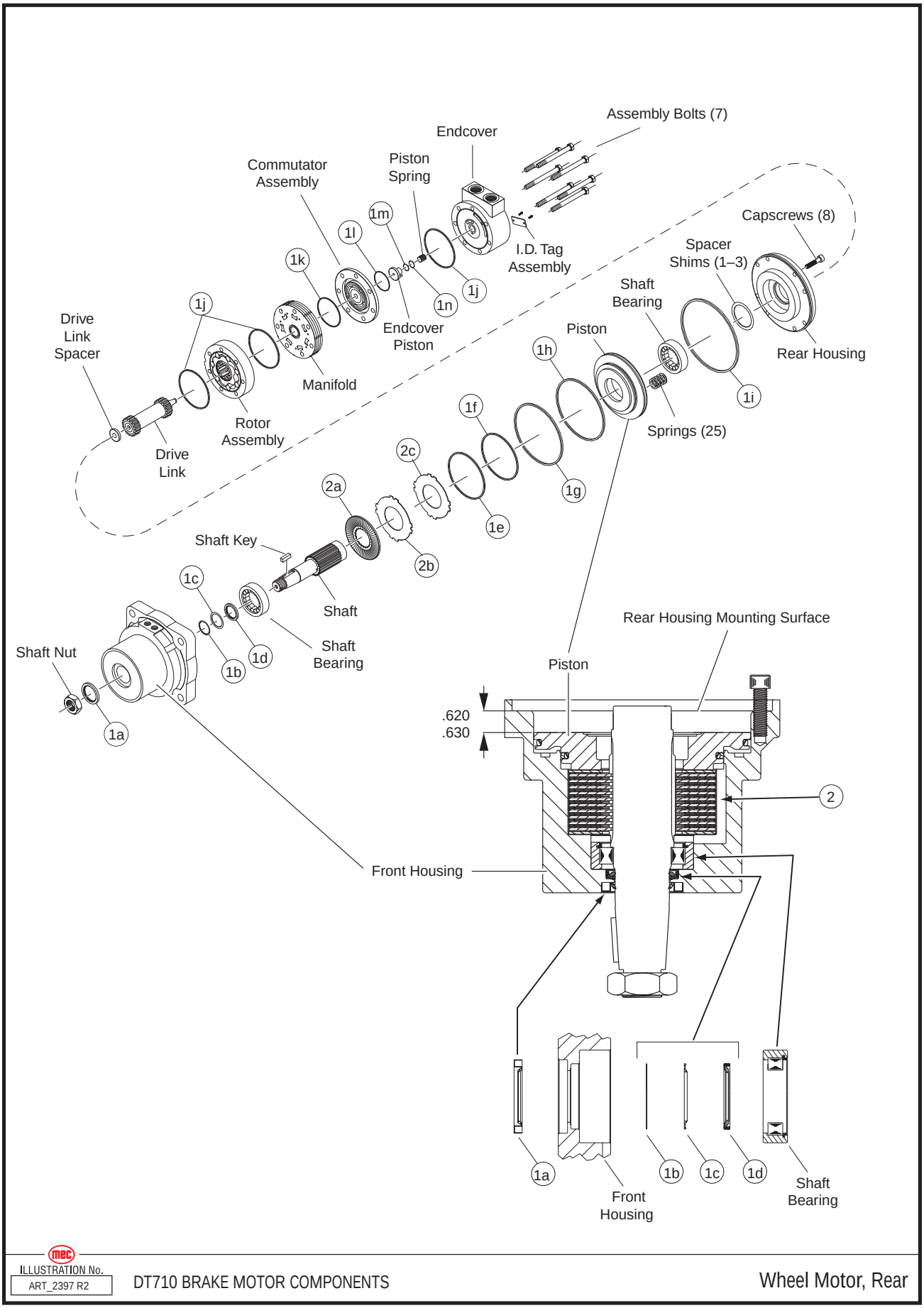


ILLUSTRATION No. ART_2397 R2

DT710 BRAKE MOTOR COMPONENTS

Wheel Motor, Rear

Item	Part Number	Description	Qty.
--	91319	Wheel Motor W/Brake	--
1	9781	Seal Kit	--
1a	Incl	Dust Seal	1
1b	Incl	Metal Backup Shim	1
1c	Incl	Backup Seal	1
1d	Incl	Shaft Seal	1
1e	Incl	Small Piston O-Ring Seal	1
1f	Incl	Small Piston Seal	1
1g	Incl	Large Piston O-Ring Seal	1
1h	Incl	Large Piston Seal	1
1i	Incl	O-Ring Seal	1
1j	Incl	Body Seal	3
1k	Incl	Manifold Seal	1
1l	Incl	Commutator Seal	1
1m	Incl	O-Ring Seal	1
1n	Incl	Backup Seal	1
--	--	--	--
2	91138	Disk Kit	--
2a	Incl	Friction Disk	10
	91138	Brake Kit	1
2b	Incl	Disk Stamping	9
	91138	Brake Kit	1
2c	Incl	Thick Disk Stamping	2
	91138	Brake Kit	1

Incl - Included with Assembly

Wheel Motor, Front

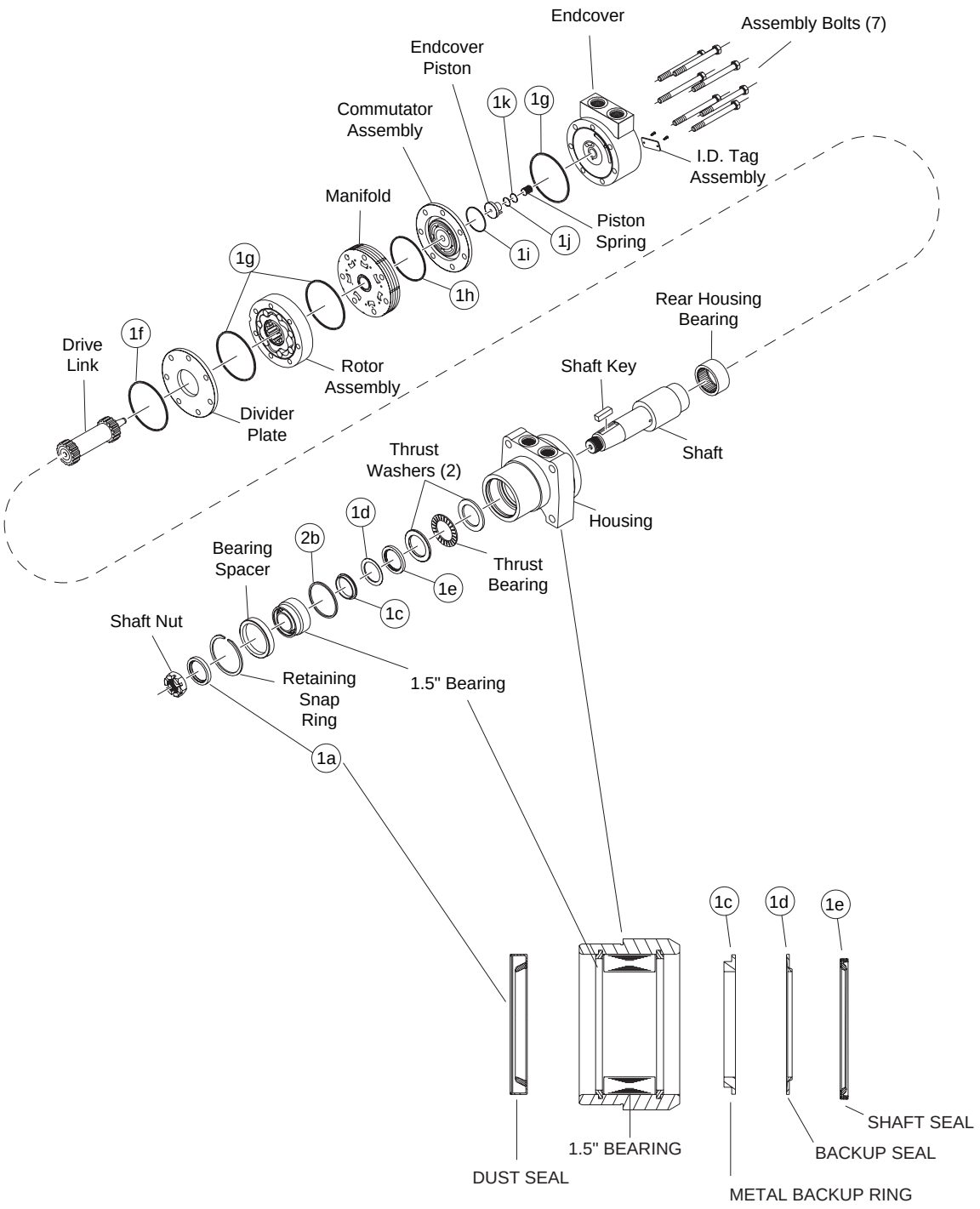


ILLUSTRATION No. ART_2701 R2

DT701 Series Motor Components

Wheel Motor, Front

Item	Part Number	Description	Qty.
--	7300P	Motor Wheel Hyd Painted	--
1	90592	Seal Kit	--
1a	Incl	Dust Seal	1
1b	Incl	High Pressure Seal	1
1c	Incl	Metal Backup Shim	1
1d	Incl	Teflon Back Up Seal	1
1e	Incl	Shaft Seal	1
1f	Incl	Housing Seal	1
1g	Incl	Body Seals	3
1h	Incl	Manifold Seal	1
1i	Incl	Commutator Seal	1
1j	Incl	O-Ring Seal	1
1k	Incl	Teflon Backup Seal	1

Incl - Included with Assembly

Main Manifold Assembly, Electric Models - Part 1

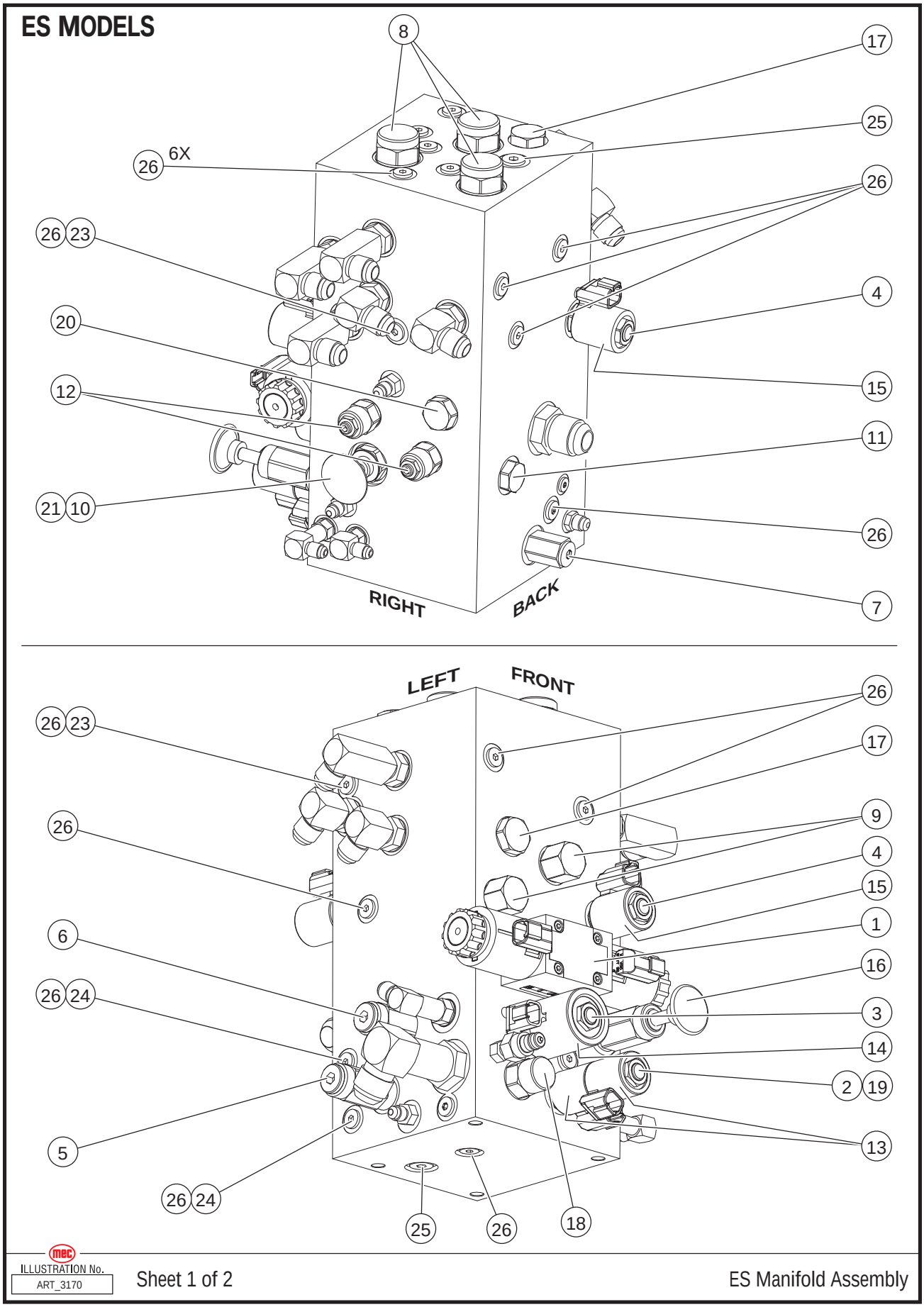


ILLUSTRATION No. ART_3170

Sheet 1 of 2

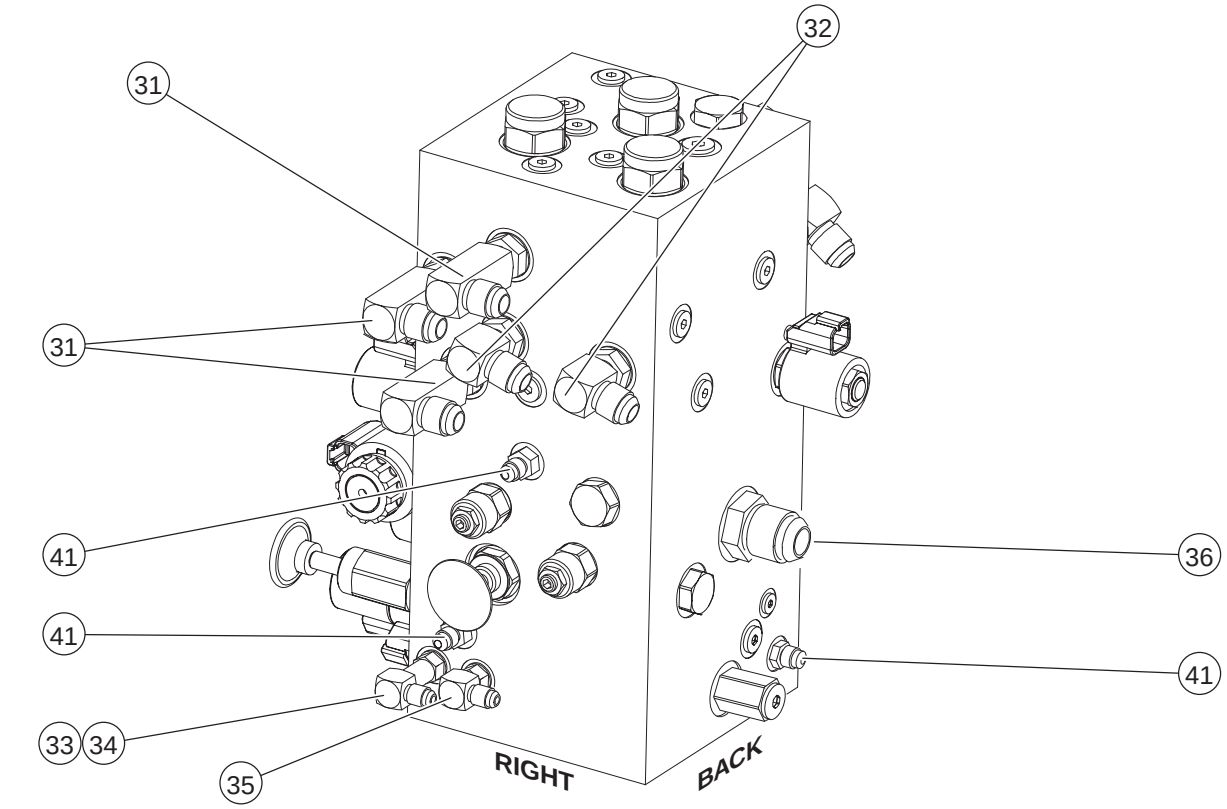
ES Manifold Assembly

Item	Part Number	Description	Qty.
--	83072	Manifold Assembly, ES Models	--
--	91743	Manifold W/ Valves, No Fittings, ES Models	--
1	91144	Valve, Drive, 4 way 3 Position	1
2	91146	Valve, Steer, 4 Way 3 Position	1
3	91145	Valve, Lift Spool, 3 Way	1
4	91147	Valve, Series Parallel Spool, 4 Way 3 Position	2
5	91150	Valve, Relief, Steer	1
6	91149	Valve, Relief, Lift	1
7	91476	Valve, Relief	1
8	91151	Valve, Piloted Spool 4 Way 3 Position	3
9	91152	Valve, Piloted Poppet	2
10	91012	Valve, Manual — Pull	1
11	91153	Valve, Load Shuttle Check	1
12	91350	Valve, Counterbalance	2
13	91141	Coil, Series 8, 12V	2
14	91142	Coil, Series 10, 12V	1
15	91141	Coil, Series	2
16	91015	Hand Pump, Brake Release	1
17	91351	Flow Divider / Combiner	2
18	91352	Pressure Compensator	1
19	91141	Coil	1
20	REF	Cavity Plug	1
21	91354	Orifice Disc	1
22	91355	Orifice Plug, Steer	1
23	91356	Orifice Plug, Flow Divider Bleed	2
24	REF	Orifice Plug	2
25	7484	Port Plug M 0.38” O-Ring, RBG-6	2
26	HDW7314	Port Plug M ¼”, O-Ring, RBG-4	19

REF - Reference

Main Manifold Assembly, Electric Models - Part 2

ES MODELS



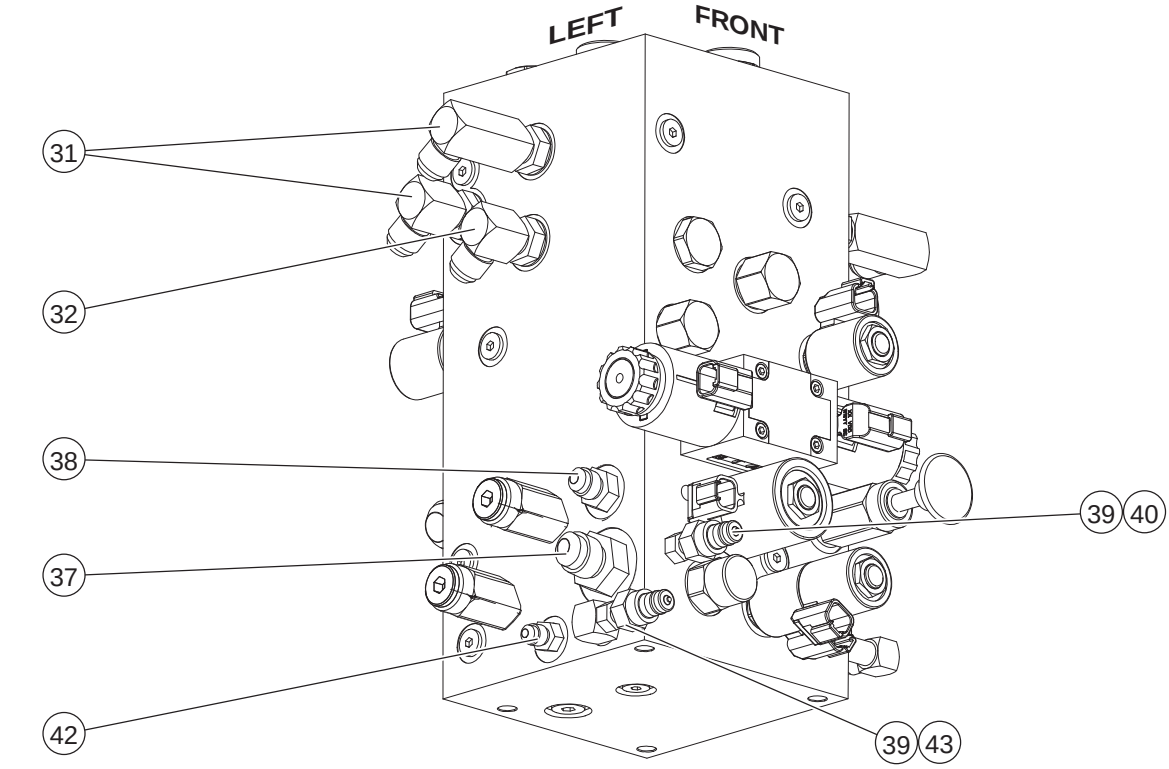


ILLUSTRATION No. ART_3171

Sheet 2 of 2

ES Manifold Assembly

Item	Part Number	Description	Qty.
31	50796	Elbow, 90°, Male, ½", O-Ring, Male, ½", MB-MJ90LL-8-8	4
32	50792	Elbow, 90°, Male, ½", O-Ring, Male, ½", MB-MJ90-8-8	4
33	50770	Fitting, Orifice 1/16" (Electric Only)	1
34	50794	Elbow, 90°, Male ¼" O-Ring, Male ¼", MB-MJ90LL-4-4	1
35	50647	Elbow, 90°, Male ¼" O-Ring, Male ¼", MB-MJ90L-4-4	1
36	50763	Fitting, Male ¾" O-Ring, Male ¾", MB-MJ-12-12	1
37	50659	Fitting, Male ¾" O-Ring, Male ¾",MB-MJ-12-8	1
38	50799	Fitting, Male .37 JIC, Male .37 O-Ring, MB-MJL-8-6	1
39	HDW7971	Fitting, Male Disconnect, ¼" NPT	2
40	50950	Adapter Male ¼" O-Ring Male ¼" NTP, MP-MB-4-4	1
41	50769	Adapter, Male ¼", O-Ring, Male ¼" 37° MB-MJ-4-4	3
42	50775	Adapter, Male ¼", O-Ring, Male ¼" MB-MJ-6-4	1
43	50952	Elbow, 90°, MP-MB90-4-4	1
44	50960	Port Plug, MB-06-Plug	2

Main Manifold Assembly, RT Models - Part 1

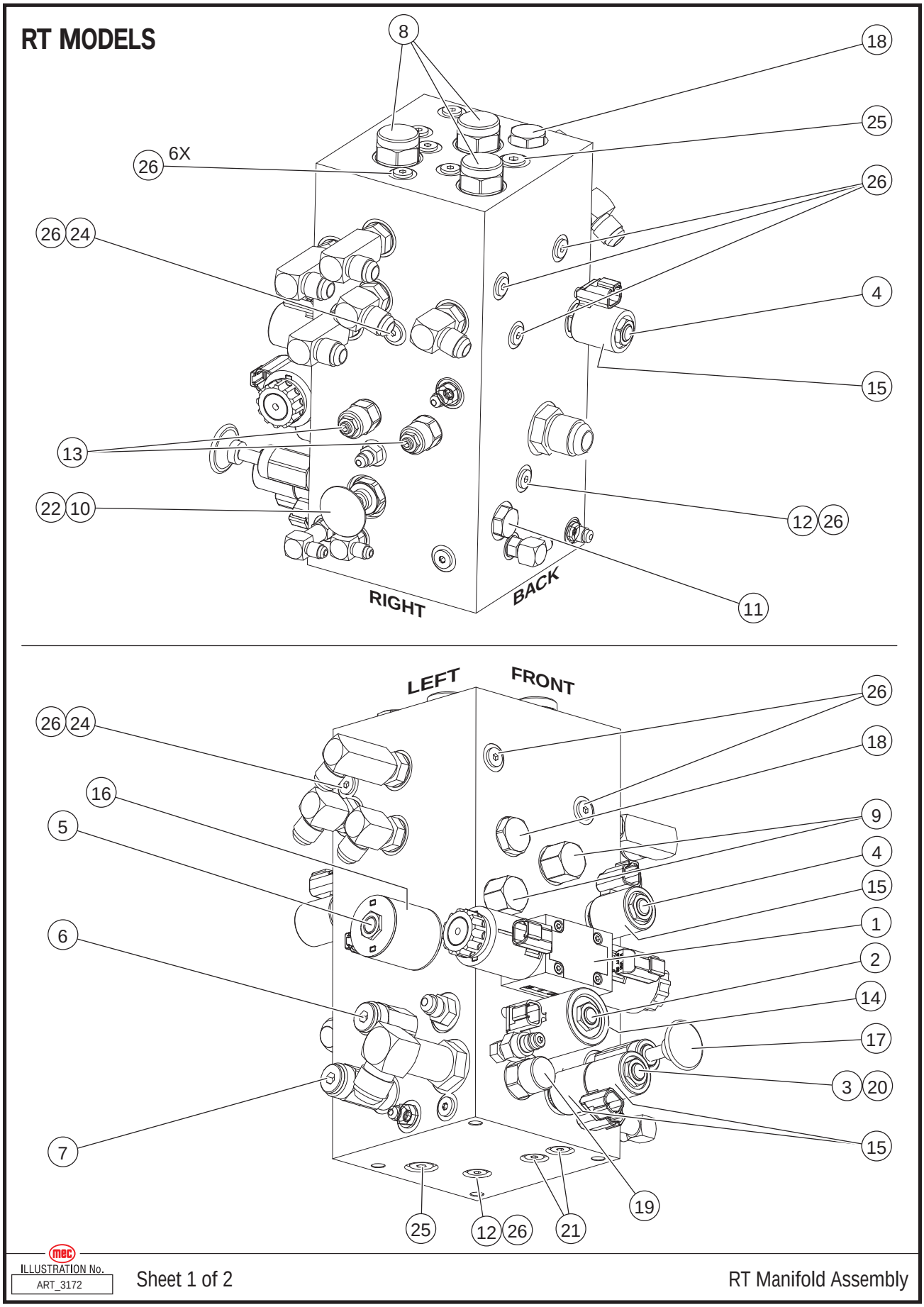


ILLUSTRATION No. ART_3172

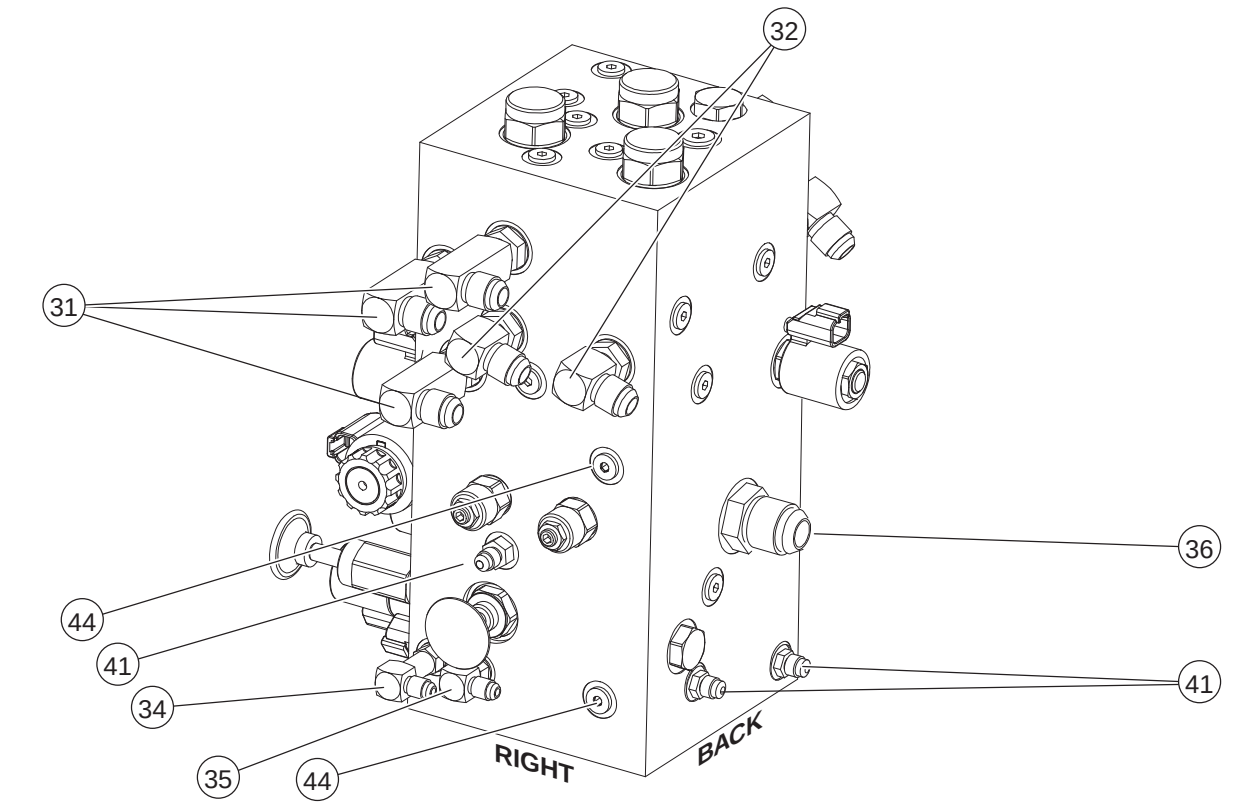
Sheet 1 of 2

RT Manifold Assembly

Item	Part Number	Description	Qty.
--	83071	Manifold Assembly, RT Models	--
--	91140	Manifold W/ Valves, No Fittings, RT Models	--
1	91144	Valve, Drive, 4 Way 3 Position	1
2	91145	Valve, Lift Spool, 3 Way	1
3	91146	Valve, Steer, 4 Way 3 Position	1
4	91147	Valve, Series Parallel Spool, 4 Way 3 Position	2
5	91148	Valve, Proportional	1
6	91149	Valve, Relief, Lift	1
7	91150	Valve, Relief, Steer	1
8	91151	Valve, Piloted Spool 4 Way 3 Position	3
9	91152	Valve, Piloted Poppet	2
10	91012	Valve, Manual — Pull	1
11	91153	Valve, Load Shuttle Check	1
12	91154	Valve, Load Shuttle Check	2
13	91350	Valve, Counterbalance	2
14	91142	Coil, Series 10, 12V	1
15	91142	Coil, Series 10, 12V	1
16	91142	Coil, Series 10, 12V	1
17	91015	Hand Pump, Brake Release	1
18	91351	Flow Divider / Combiner	2
19	91352	Pressure Compensator	1
20	91141	Coil, Series 8, 12V	2
21	91353	Valve, Check	2
22	91354	Orifice Disc	1
23	--	--	--
24	91356	Orifice Plug, Flow Divider Bleed	2
25	7484	Port Plug M 0.38” O-Ring, RBG-6	2
26	HDW7314	Port Plug M ¼”, O-Ring, RBG-4	20

Main Manifold Assembly, RT Models - Part 2

RT MODELS



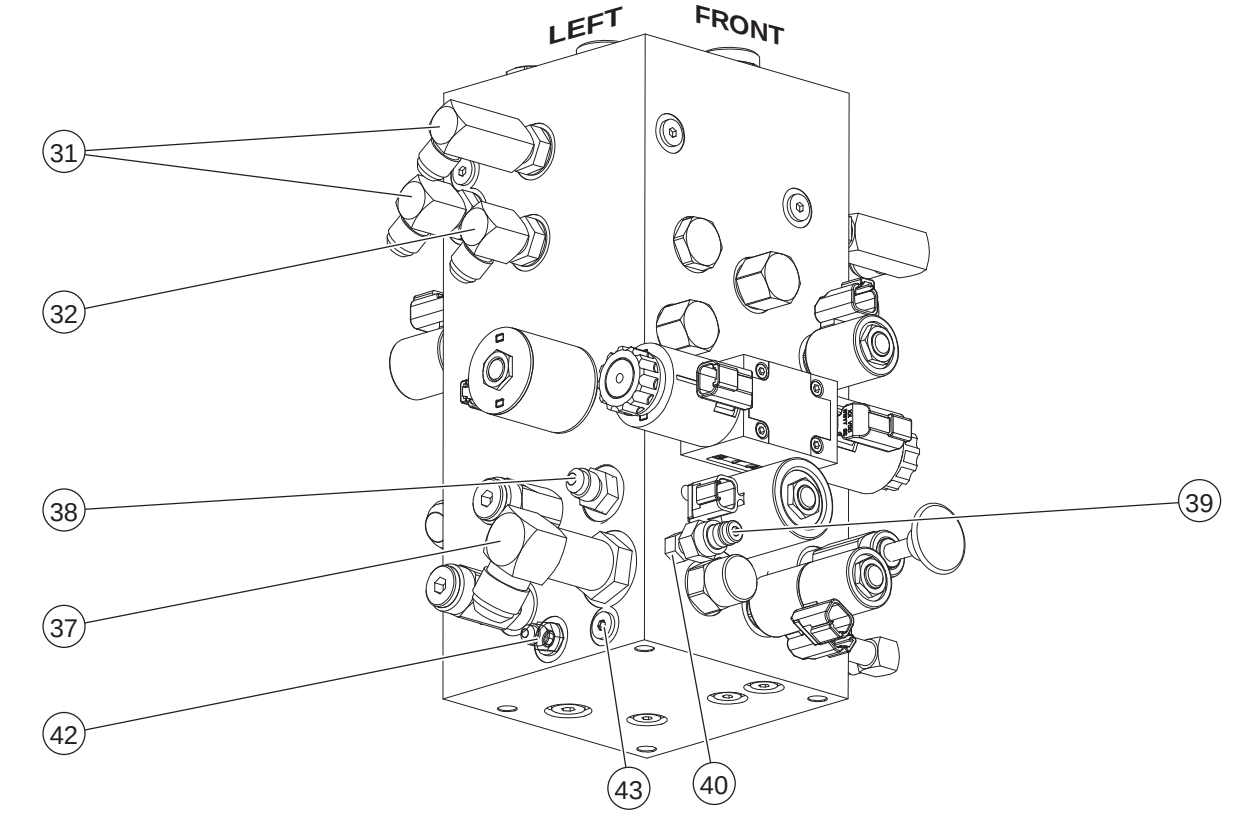


ILLUSTRATION No. ART_3173

Sheet 2 of 2

RT Manifold Assembly

Item	Part Number	Description	Qty.
31	50796	Elbow, 90°, Male, ½", O-Ring, Male, ½", MB-MJ90LL-8-8	4
32	50792	Elbow, 90°, Male, ½", O-Ring, Male, ½", MB-MJ90-8-8	4
33	--	--	--
34	50794	Elbow, 90°, Male ¼" O-Ring, Male ¼", MB-MJ90LL-4-4	1
35	50647	Elbow, 90°, Male ¼" O-Ring, Male ¼", MB-MJ90L-4-4	1
36	50763	Elbow, 90°, Male ¾" O-Ring, Male ¾", MB-MJ-12-12	1
37	50821	Elbow, 90°, Male ¾" O-Ring, Male ¾",MB-MJ90LL-12-12	1
38	50658	Fitting, Male .37 JIC, Male .37 O-Ring, MB-MJL-6-6	1
39	HDW7971	Fitting, Male Disconnect, ¼" NPT	1
40	50950	Adapter Male ¼" O-Ring Male ¼" NTP, MP-MB-4-4	1
41	50769	Adapter, Male ¼", O-Ring, Male ¼" 37° MB-MJ-4-4	3
42	50775	Adapter, Male ¼", O-Ring, Male ¼" MB-MJ-6-4	1
43	50961	Port Plug, MB-04-Plug	1
44	50960	Port Plug, MB-06-Plug	2

Leveling Manifold Assembly

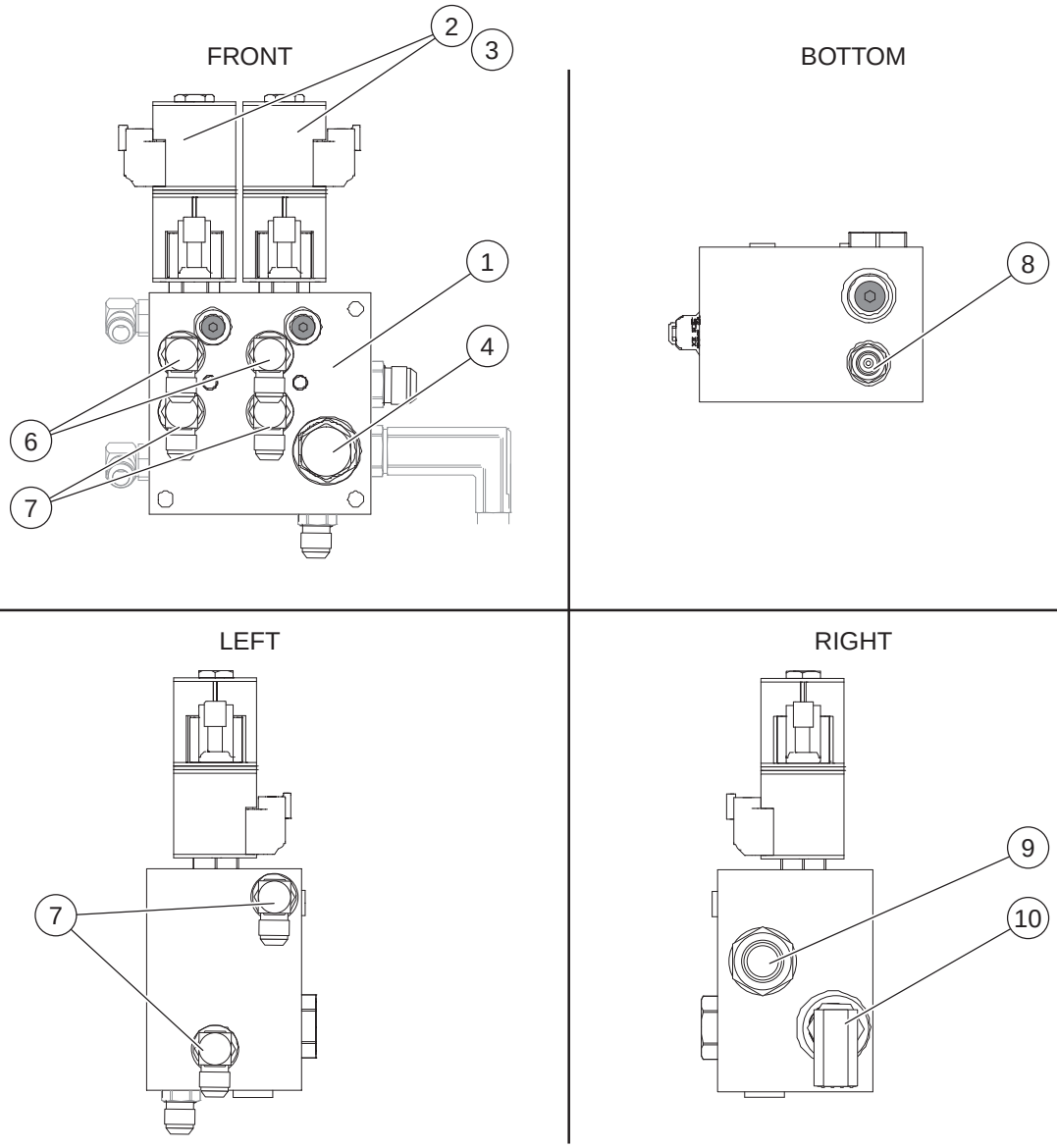


ILLUSTRATION No.
ART_3205

Speed Level™ Sigma Lift

Leveling Manifold

Item	Part Number	Description	Qty.
--	83093	Leveling Manifold Assembly W/ Fittings	1
1	19300	Leveling Manifold Assembly W/o Fittings	1
2	92123	Valve	2
3	91143	Coil	2
4	91473	Check Valve	1
5	--	--	--
6	50661	Fitting, MB-MJ-90LL-6-4 (MB-MJ-90-4-4)	2
7	50660	Fitting, MB-MJ-90-6-4	4
8	50775	MB-MJ-6-4	1
9	50763	MB-MJ-12-12	1
10	50821	MB-MJ-90LL-12-12	1

RT Manifold Assembly

2684RT - From Serial # 12800107 / 2684ES - From Serial # 12700041
3084RT - From Serial # 11800400 / 3084ES - From Serial # 11700089

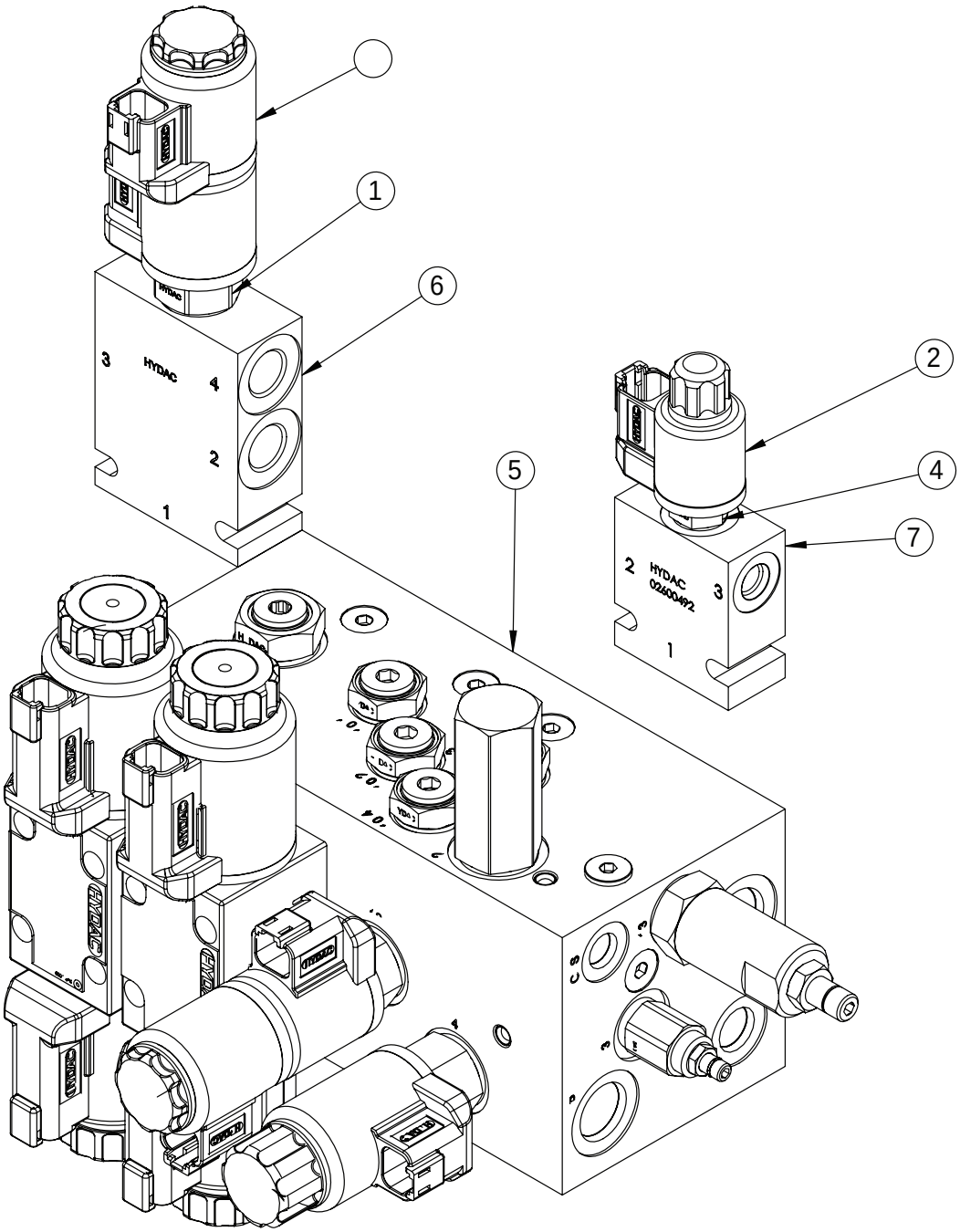
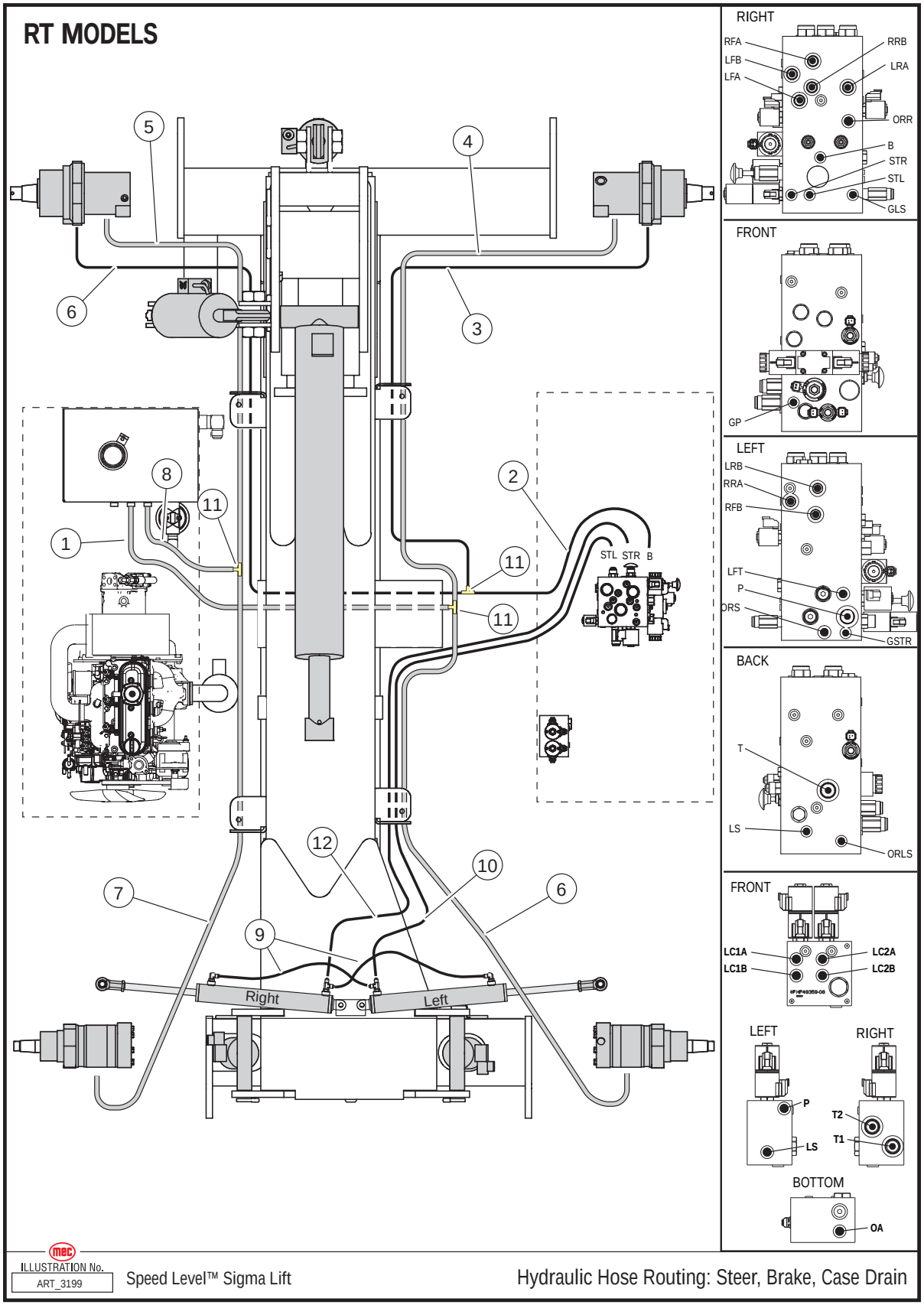


ILLUSTRATION No. Art_5384 Speed Level Series RT Manifold Assembly

Item	Part Number	Description	Qty.
1	94070	Valve, 4 Way/3 Pos Solenoid Operated, WK08J-01-C-N-0 HYDAC 2610215	1
2	94082	Coil 12DN-32-1329 HYDAC 2610149	1
3	94083	Coil 12DN-40-1836 HYDAC 3012600	2
4	94087	Valve 3W2P SO WK06C-01-C-N-0 HYDAC 2610183	1
5	94452	XX92 Main Manifold (Alt For 17950) HYDAC 7510113	1
6	94754	Line Body -08SIZE 4 Way SAE#6 Ports FH084-AS6 HYDAC 3011404	1
7	94760	Line Body -06SIZE 3 Way SAE#4 Ports FH063-AS4 HYDAC 2600492	1

Hydraulic Hose Routing, RT Models: Steer, Brake, Case Drain Early Style

2684RT - From Serial # 12800107 / 2684ES - From Serial # 12700041
3084RT - From Serial # 11800400 / 3084ES - From Serial # 11700089



Item	Part Number	Description	Qty.
1	19340	Hose Assy, 1/4” x 65”, 4G4FJX-4G4FJX	1
2	19358	Hose Assy, 1/4” x 15”, 4G4FJX-4G4FJX90S	1
3	19359	Hose Assy, 1/4” x 86”, 4G4FJX-4G4FJX90S	1
4	19361	Hose Assy, 1/4” x 73”, 4G4FJX-4G4FJX90S	1
5	19362	Hose Assy, 1/4” x 52”, 4G4FJX-4G4FJX90S	1
6	19363	Hose Assy, 1/4” x 89”, 4G4FJX-4G4FJX	2
7	19364	Hose Assy, 1/4” x 77”, 4G4FJX-4G4FJX	1
8	19365	Hose Assy, 1/4” x 38”, 4G4FJX-4G4FJX	1
9	90316	Hose Assy, 1/4” x 21”, 4G4FJX-4G4FJX	2
10	19364	Hose, LT Steer Cyl, 1/4” x 77”, 4G4FJX-4G4FJX	1
11	50927	Tee, MJT-04	3
12	19359	Hose, Rt Steer Cyl, 1/4” x 86”, 4G4FJX-4G4FJX90S	1

Hydraulic Hose Routing, RT Models: Lift, Pump

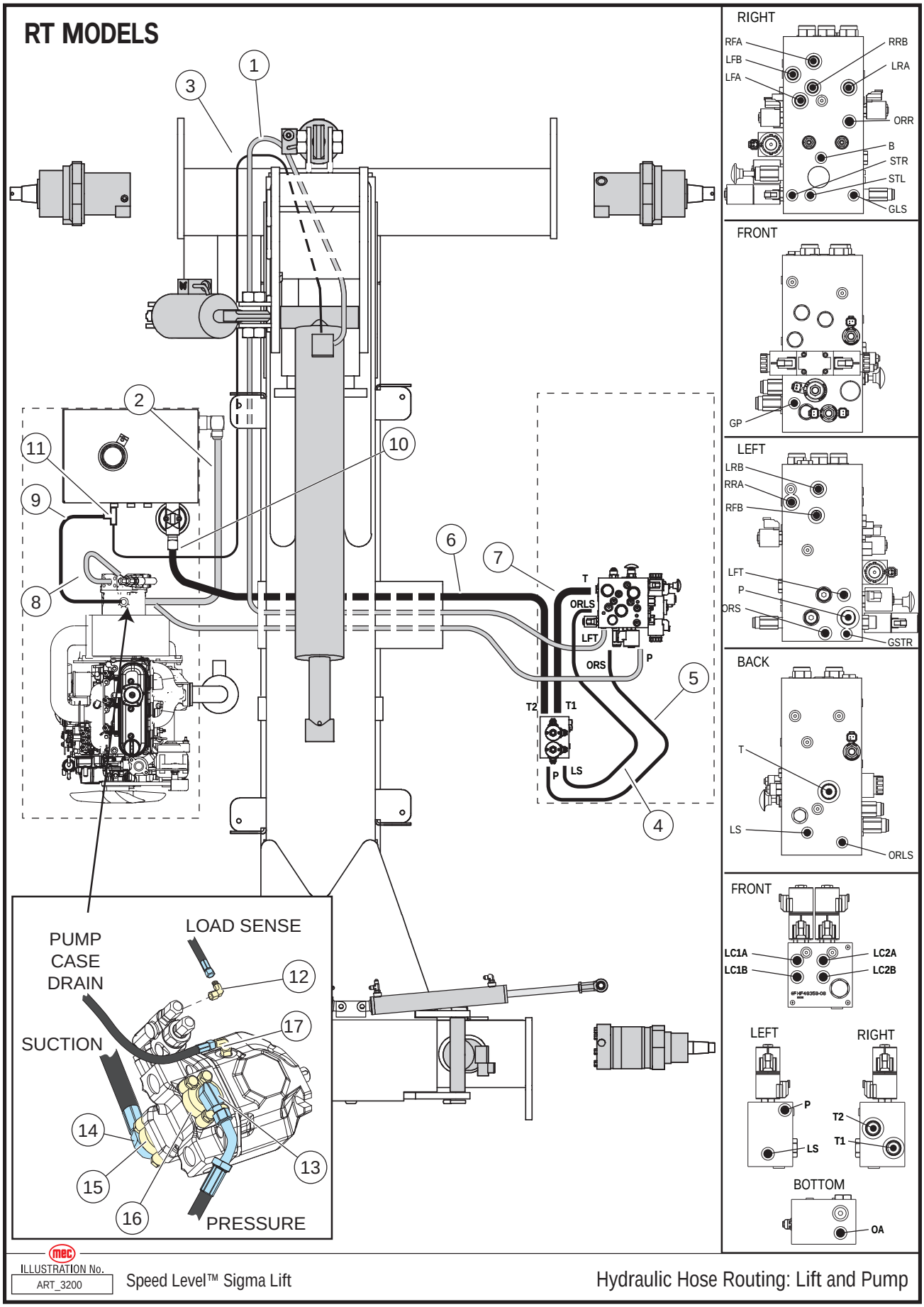


ILLUSTRATION No. ART_3200

Speed Level™ Sigma Lift

Hydraulic Hose Routing: Lift and Pump

Item	Part Number	Description	Qty.
1	19341	Hose Assy, 3/8” x 132”, 6G6FJX90S-6G6FJX	1
2	91265	Hose Assy, 1” x 22”, 16G16FJX-16G16FJX	1
3	19342	Hose Assy, 3/8” x 118”, 6G6FJX-6G6FJX	1
4	19369	Hose Assy, 1/4” x 28”, 4G4FJX-4G4FJX45	1
5	19370	Hose Assy, 1/4” x 33”, 4G4FJX-4G4FJX90S	1
6	19343	Hose Assy, 3/4” x 90”, 12G12FJX-12G12FJX90S	1
7	19347	Hose Assy, 3/4” x 21”, 12G12FJX-12G12FJX90S	1
8	91423	Hose Assy, 3/4” X 82”, 12M3K-12FJX-12FJX45	1
9	90276	Hose Assy, 1/4” X 24”, 4G1-4FJX-6FJX-24	1
10	50916	Fitting, MP-MJ 90	2
11	50892	Tee, MJ-FJX-MJT-4	1
12	50665	Fitting, MB-MJ-90-4-4	1
13	91163	Adapter ¾” Flange, Male 1” JIC 90	1
14	HDW91176	Adapter 1” Flange, Male 1” JIC	1
15	91161	Flange Kit #16	1
16	91162	Flange Kit #12	1
17	50660	Fitting, MB-MJ-90-6-4	1

Hydraulic Hose Routing, RT Models: Platform Level, Axle Float

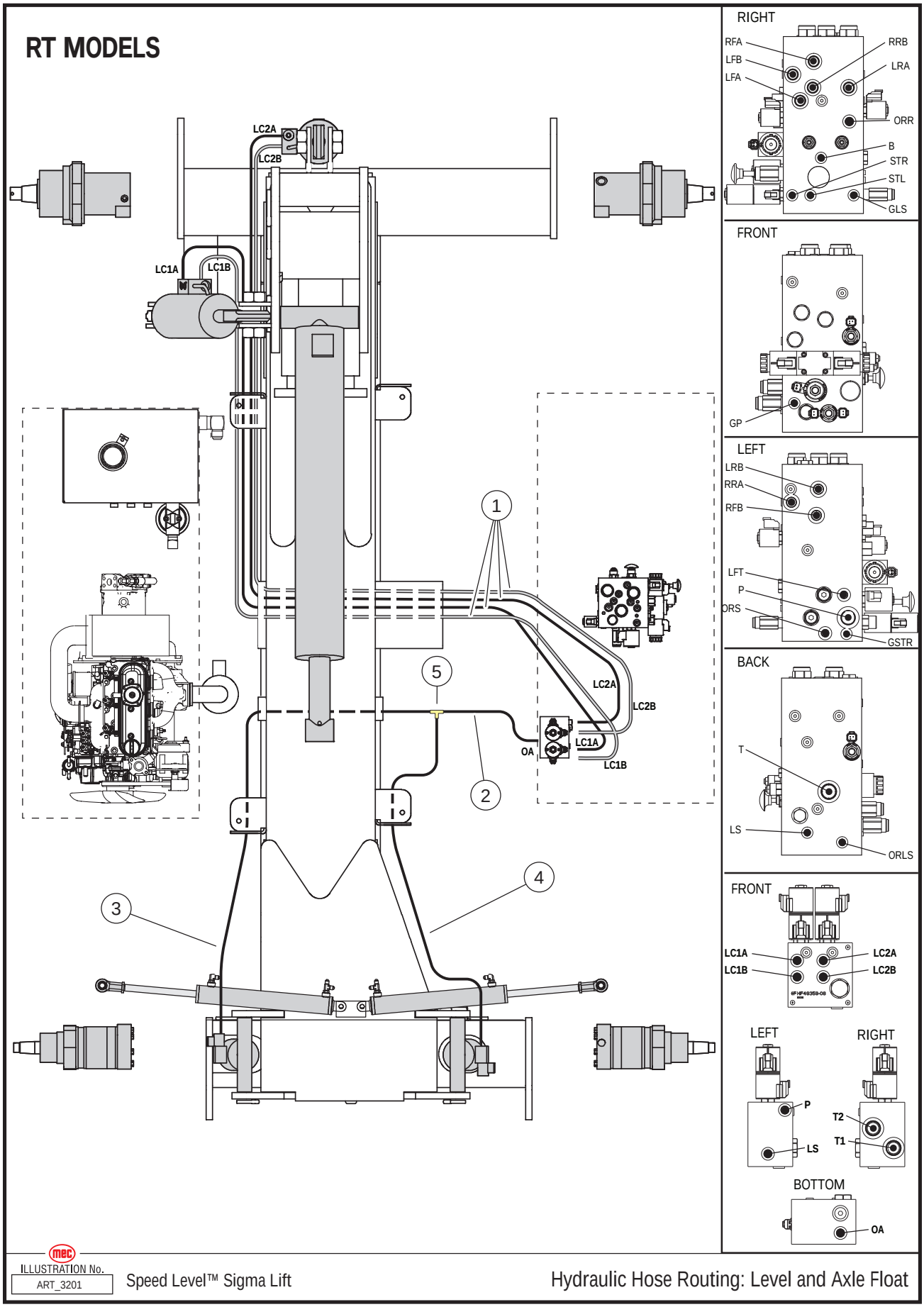


ILLUSTRATION No. ART_3201

Speed Level™ Sigma Lift

Hydraulic Hose Routing: Level and Axle Float

Item	Part Number	Description	Qty.
1	19349	Hose Assy, 1/4” x 120”, 4G4FJX-4G4FJX	4
2	90316	Hose Assy, 1/4” x 21”, 4G4FJX-4G4FJX	1
3	19361	Hose Assy, 1/4” x 73”, 4G4FJX-4G4FJX90S	1
4	19340	Hose Assy, 1/4” x 65”, 4G4FJX-4G4FJX	1
5	50927	Tee, MJT-4	1

Hydraulic Hose Routing, RT Models: Drive Motors

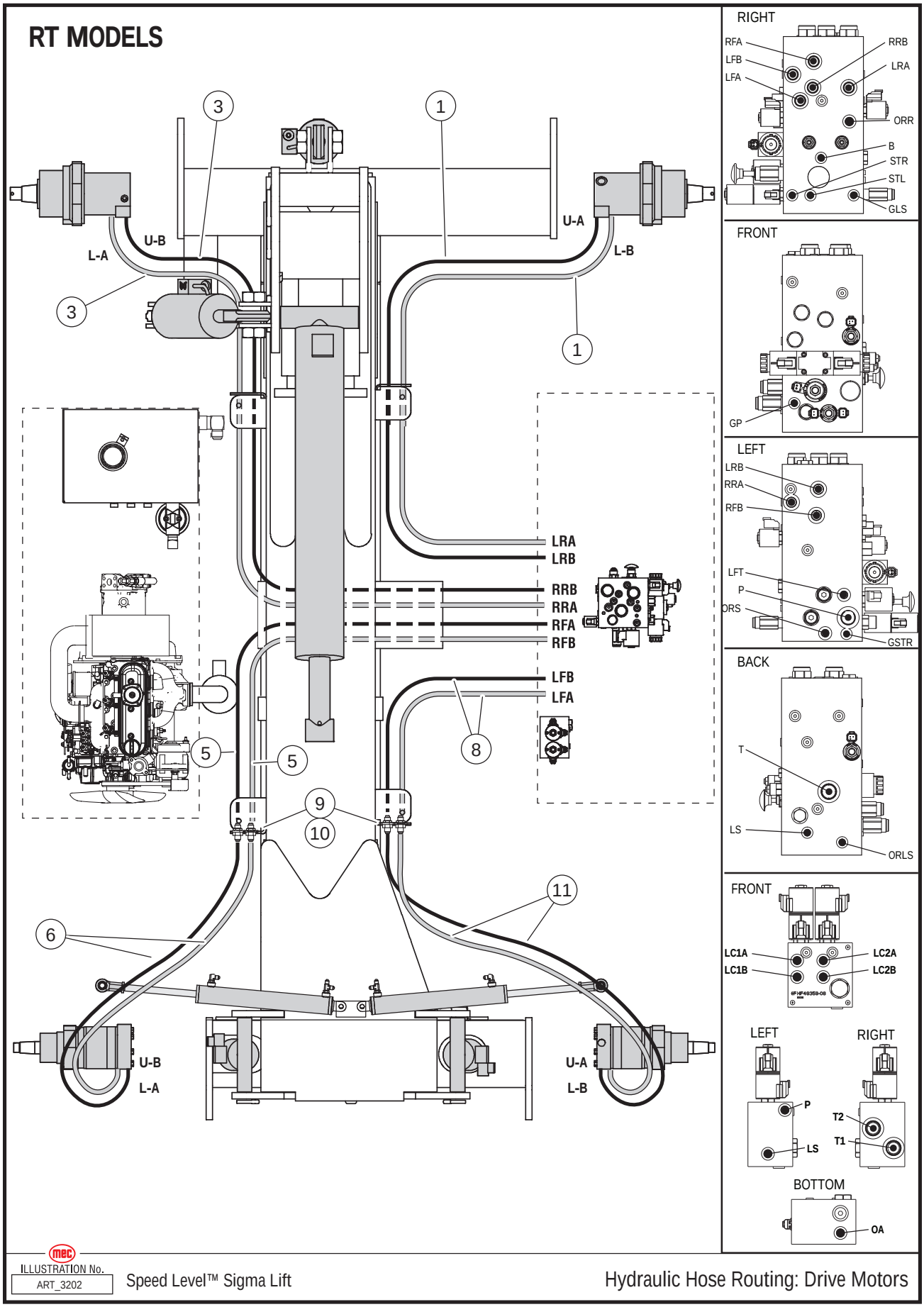


ILLUSTRATION No. ART_3202

Speed Level™ Sigma Lift

Hydraulic Hose Routing: Drive Motors

Item	Part Number	Description	Qty.
1	19355	Hose Assy, 1/2” x 49”, 8M3K-8FJX-8FJX45	2
2	--	--	--
3	19357	Hose Assy, 1/2” x 102”, 8M3K-8FJX-8FJX45	2
4	--	--	--
5	19353	Hose Assy, 1/2” x 61”, 8M3K-8FJX-8FJX	2
6	19352	Hose Assy, 1/2” x 37”, 8M3K-8FJX-8FJX90S	2
7	--	--	--
8	19354	Hose Assy, 1/2” x 44”, 8M3K-8FJX-8FJX	2
9	50904	Adapter, Male 1/2” JIC-1/2” JIC Bulkhead MJ-MJH-8-8	4
10	91193	Jamnut, 3/4-16	4
11	19350	Hose Assy, 58”	2

Hydraulic Hose Routing, ES Models: Steer, Brake, Case Drain

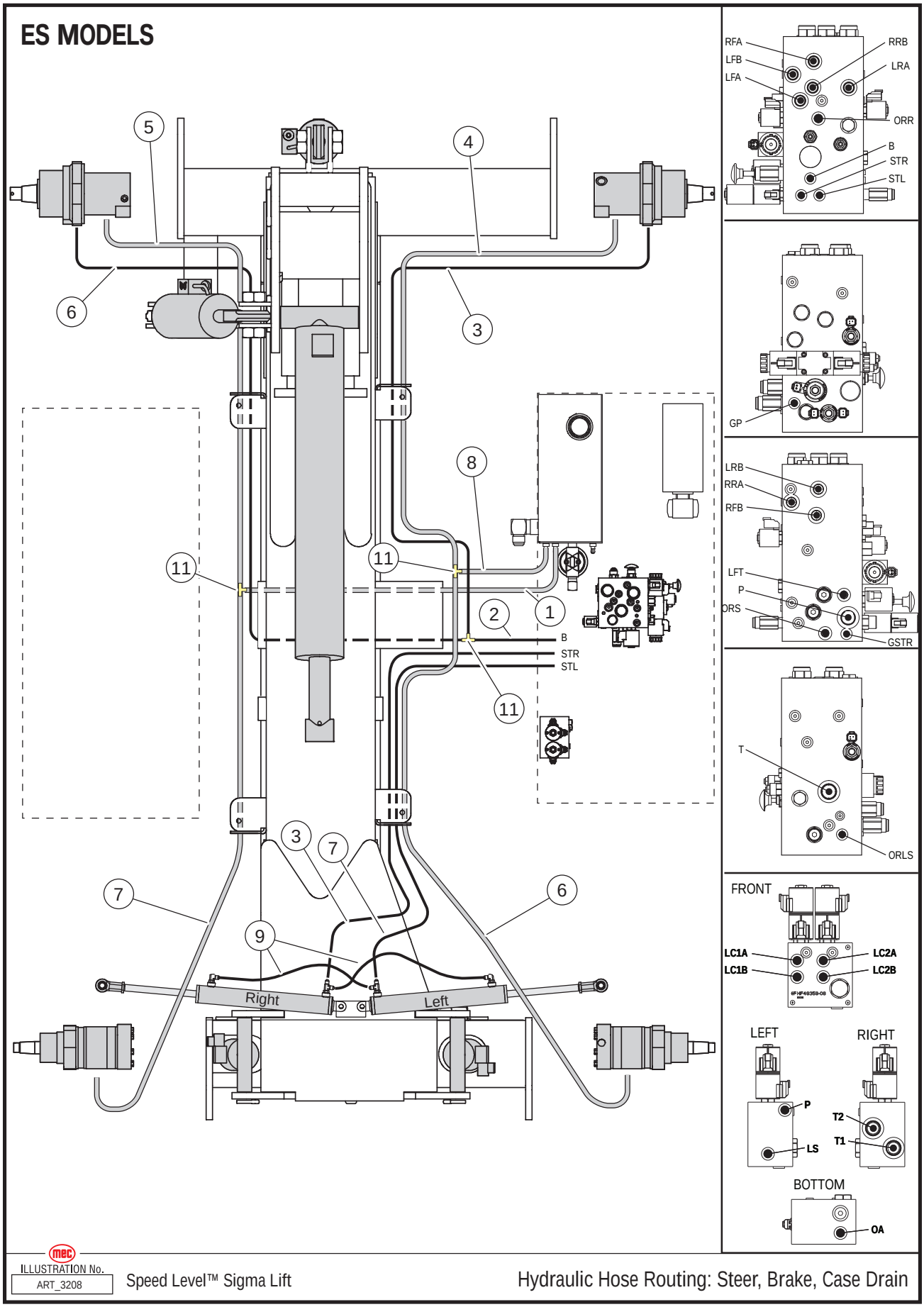


ILLUSTRATION No. ART_3208

Speed Level™ Sigma Lift

Hydraulic Hose Routing: Steer, Brake, Case Drain

Item	Part Number	Description	Qty.
1	19340	Hose Assy, 1/4” x 65”, 4G4FJX-4G4FJX	1
2	19358	Hose Assy, 1/4” x 15”, 4G4FJX-4G4FJX90S	1
3	19359	Hose Assy, 1/4” x 86”, 4G4FJX-4G4FJX90S	2
4	19361	Hose Assy, 1/4” x 73”, 4G4FJX-4G4FJX90S	1
5	19362	Hose Assy, 1/4” x 52”, 4G4FJX-4G4FJX90S	1
6	19363	Hose Assy, 1/4” x 89”, 4G4FJX-4G4FJX	2
7	19364	Hose Assy, 1/4” x 77”, 4G4FJX-4G4FJX	1
8	19365	Hose Assy, 1/4” x 38”, 4G4FJX-4G4FJX	1
9	90316	Hose Assy, 1/4” x 21”, 4G4FJX-4G4FJX	2
10	--	--	--
11	50927	Tee, MJT-04	3

Hydraulic Hose Routing, ES Models: Lift, Pump

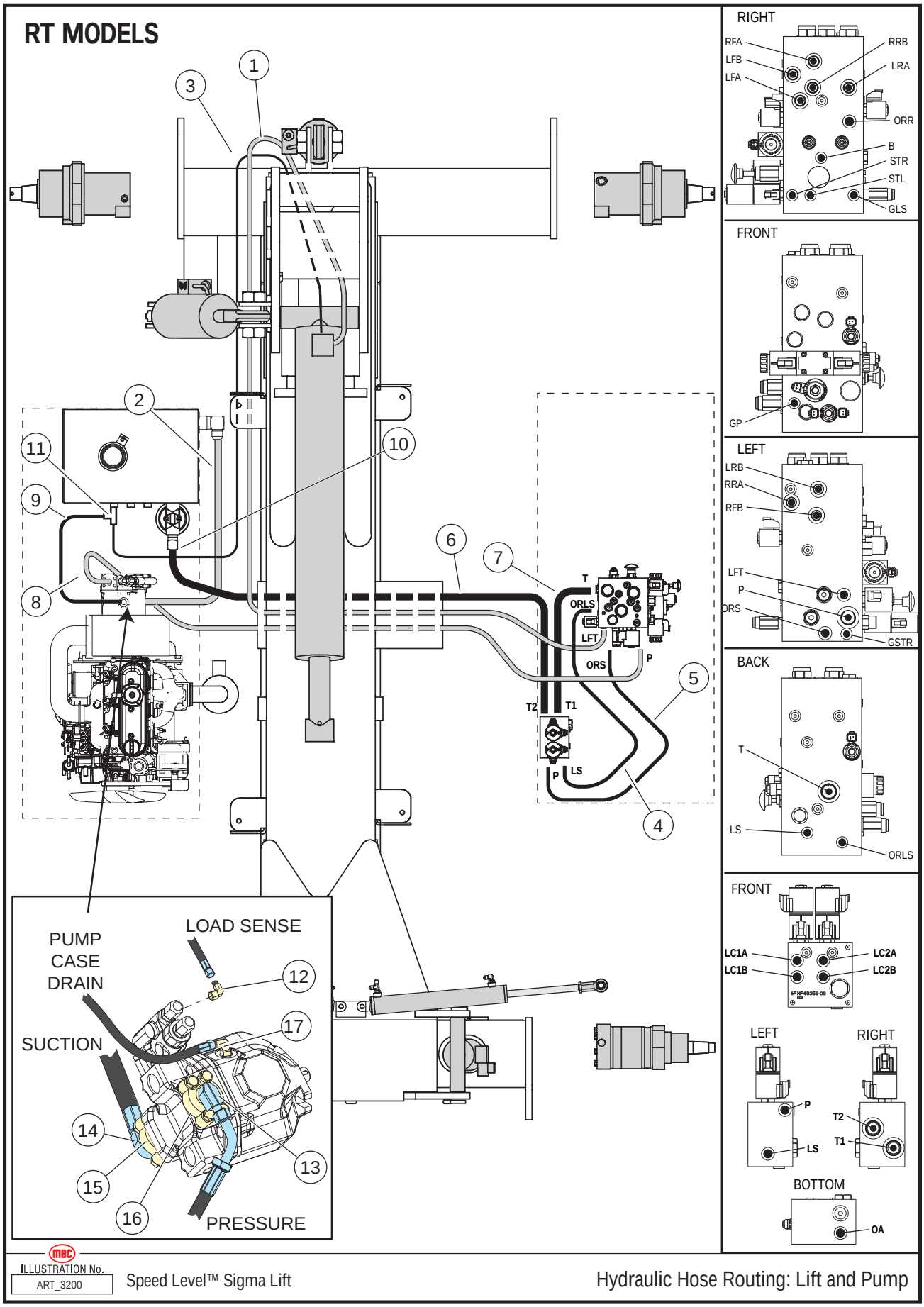


ILLUSTRATION No. ART_3200

Speed Level™ Sigma Lift

Hydraulic Hose Routing: Lift and Pump

Item	Part Number	Description	Qty.
1	19341	Hose Assy, 3/8” x 132”, 6G6FJ90X - 6G6FJX	1
2	91698	Hose Assy, 3/4” x 35”, 12G12FJX - 12G12FJX	1
3	91909	Hose Assy, 3/8” x 150”, 6G6FJX - 6G6FJX	1
4	91879	Hose Assy, 3/4” x 16”, 12G12FJX - 12G12FJX	1
5	19347	Hose Assy, 3/4” x 21”, 12G12FJX - 12G12FJX90S	1
6	90315	Hose Assy, 1/2” x 21”, 8G8FJX - 8G8FJX90S	1
7	19369	Hose Assy, 1/4” x 28”, 4G4FJX - 4G4FJX45	1
8	19370	Hose Assy, 1/4” x 33”, 4G4FJX - 4G4FJX90S	1
9	50665	Fitting, 90°, MB - MJ90 - 04 - 04	2
10	50906	Fitting, MJ - MP - 12 - 12	1
11	50892	Tee, MJFJX - MJT - 4	1
12	50907	Fitting, MJ - MP - 12 - 20	1

Hydraulic Hose Routing, ES Models: Platform Level, Axle Float

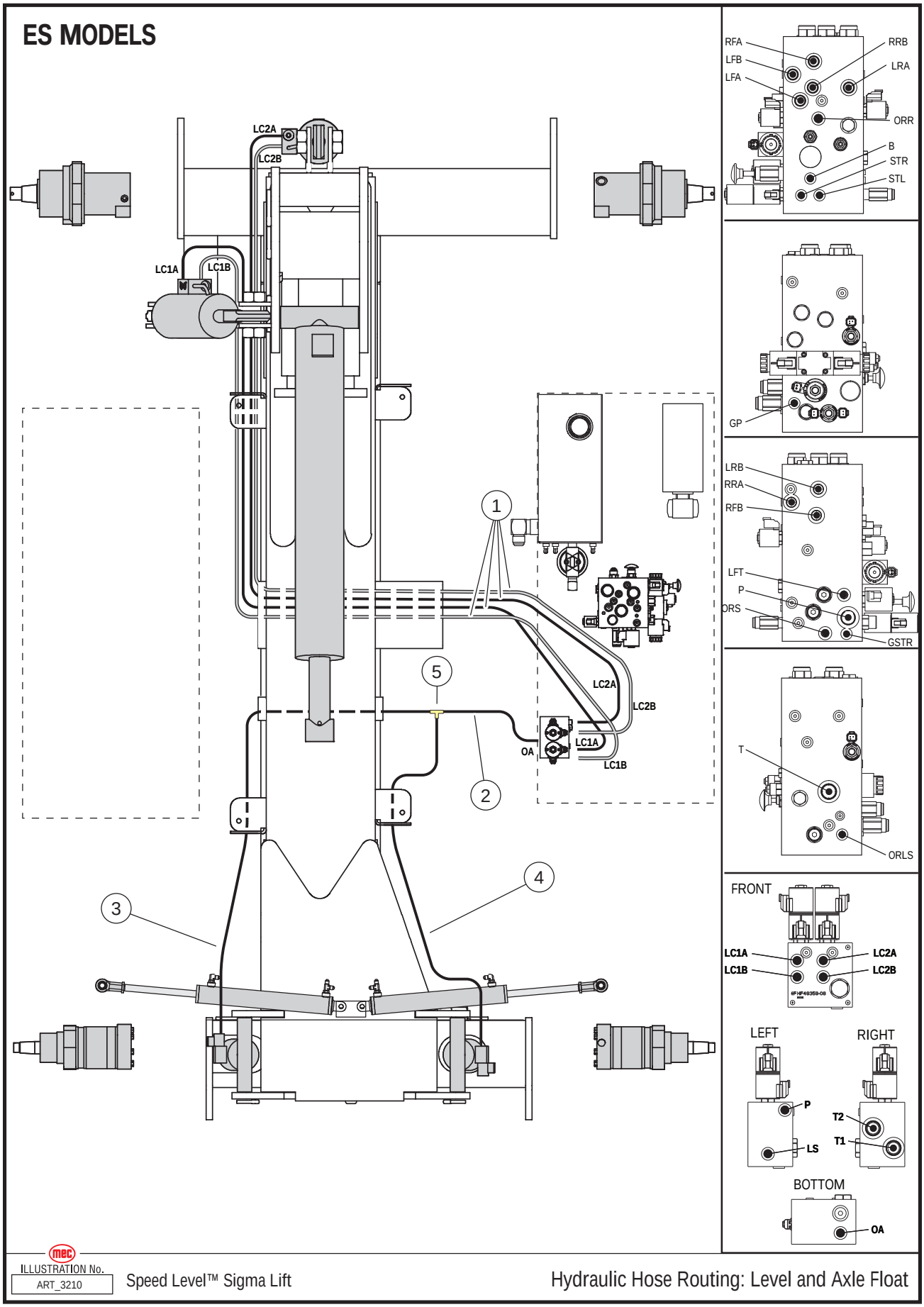


ILLUSTRATION No. ART_3210

Speed Level™ Sigma Lift

Hydraulic Hose Routing: Level and Axle Float

Item	Part Number	Description	Qty.
1	19349	Hose Assy, 1/4” x 120”, 4G4FJX-4G4FJX	4
2	90316	Hose Assy, 1/4” x 21”, 4G4FJX-4G4FJX	1
3	19361	Hose Assy, 1/4” x 73”, 4G4FJX-4G4FJX90S	1
4	19340	Hose Assy, 1/4” x 65”, 4G4FJX-4G4FJX	1
5	50927	Tee, MJT-4	1

Hydraulic Hose Routing, ES Models: Drive Motors

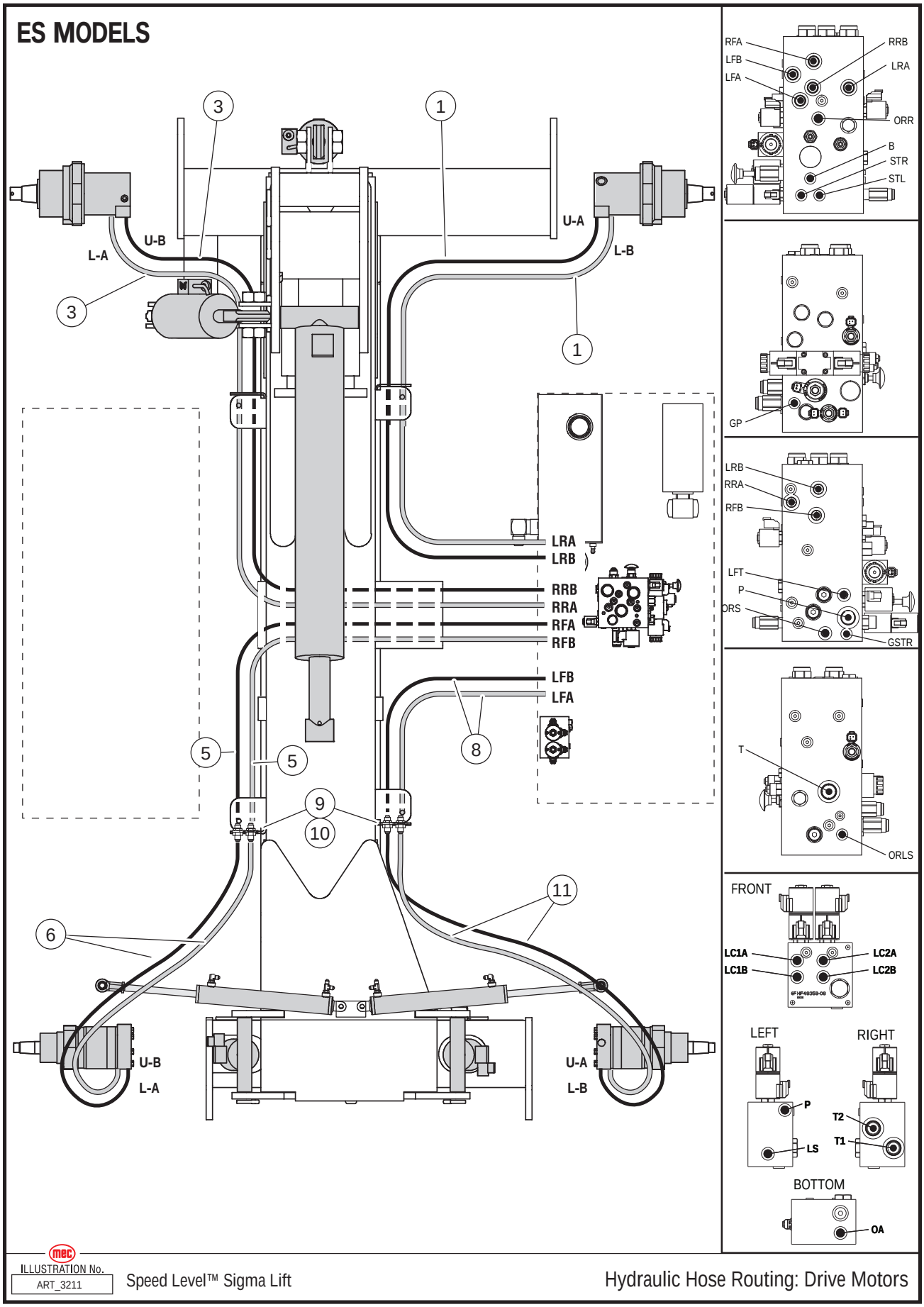


ILLUSTRATION No. ART_3211

Speed Level™ Sigma Lift

Hydraulic Hose Routing: Drive Motors

Item	Part Number	Description	Qty.
1	19355	Hose Assy, 1/2” x 49”, 8M3K-8FJX-8FJX45	2
2	--	--	--
3	19357	Hose Assy, 1/2” x 102”, 8M3K-8FJX-8FJX45	2
4	--	--	--
5	19353	Hose Assy, 1/2” x 61”, 8M3K-8FJX-8FJX	2
6	19352	Hose Assy, 1/2” x 37”, 8M3K-8FJX-8FJX90S	2
7	--	--	--
8	19354	Hose Assy, 1/2” x 44”, 8M3K-8FJX-8FJX	2
9	50904	Adapter, Male 1/2” JIC-1/2” JIC Bulkhead MJ-MJH-8-8	4
10	91193	Jamnut, 3/4-16	4
11	19350	Hose Assy, 58”	2

Lift Cylinder

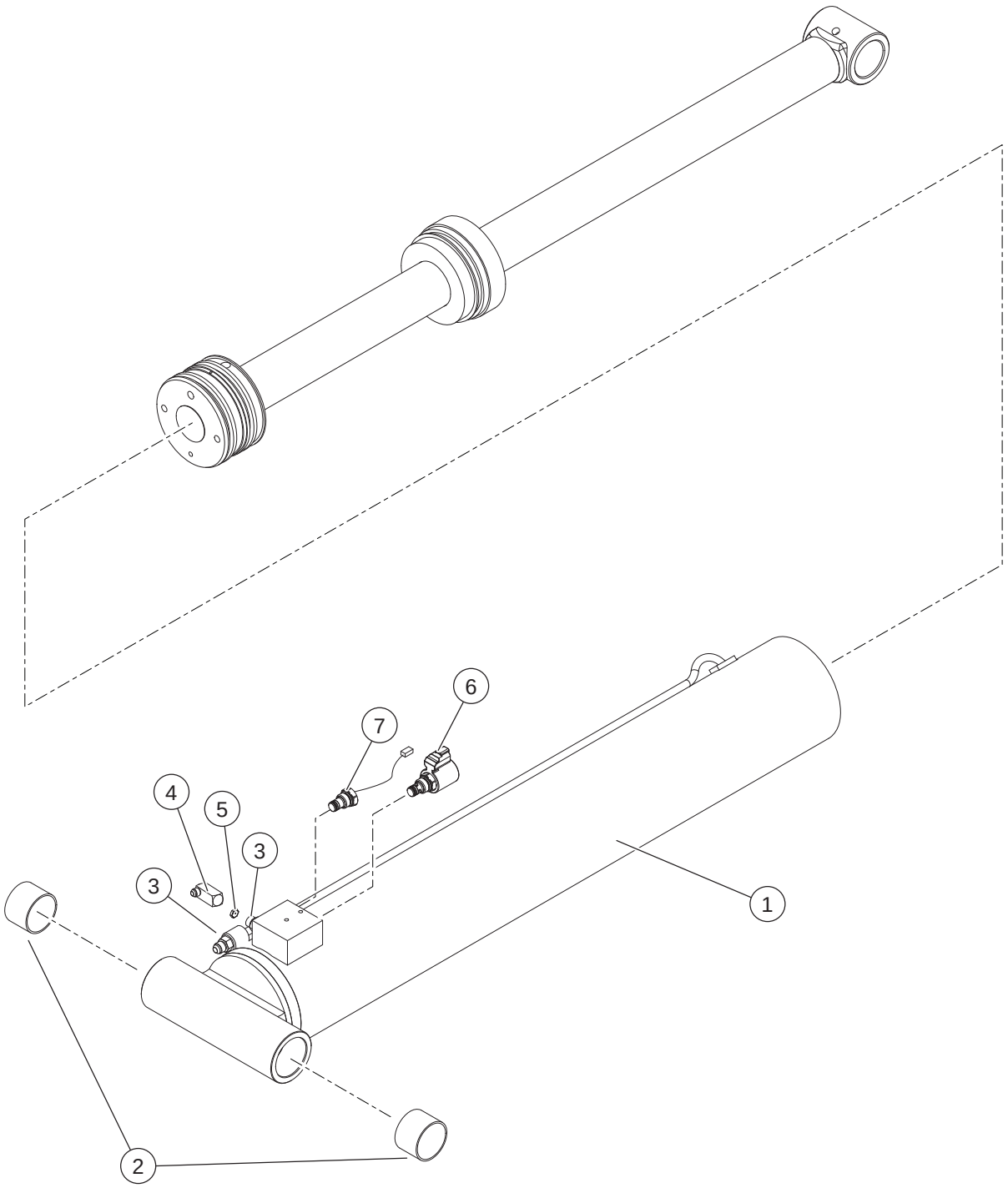


ILLUSTRATION No.
ART_3206

Sigma Level

Lift Cylinder

Item	Part Number	Description	Qty.
1	19084	Lift Cylinder	1
--	92077	Seal Kit	--
2	6669	Bearing	4
3	50776	Fitting, MB-MJ-6-6	2
4	50890	Fitting, MJ-FJX-90-6-6	1
5	91732	Orifice	1
6	91464	Valve, 2-Way, NC	1
	91141	Coil, 12V	1
7	90845	Pressure Sensor (CE Only)	1
8		Spring, Orifice	1

Steering Cylinder

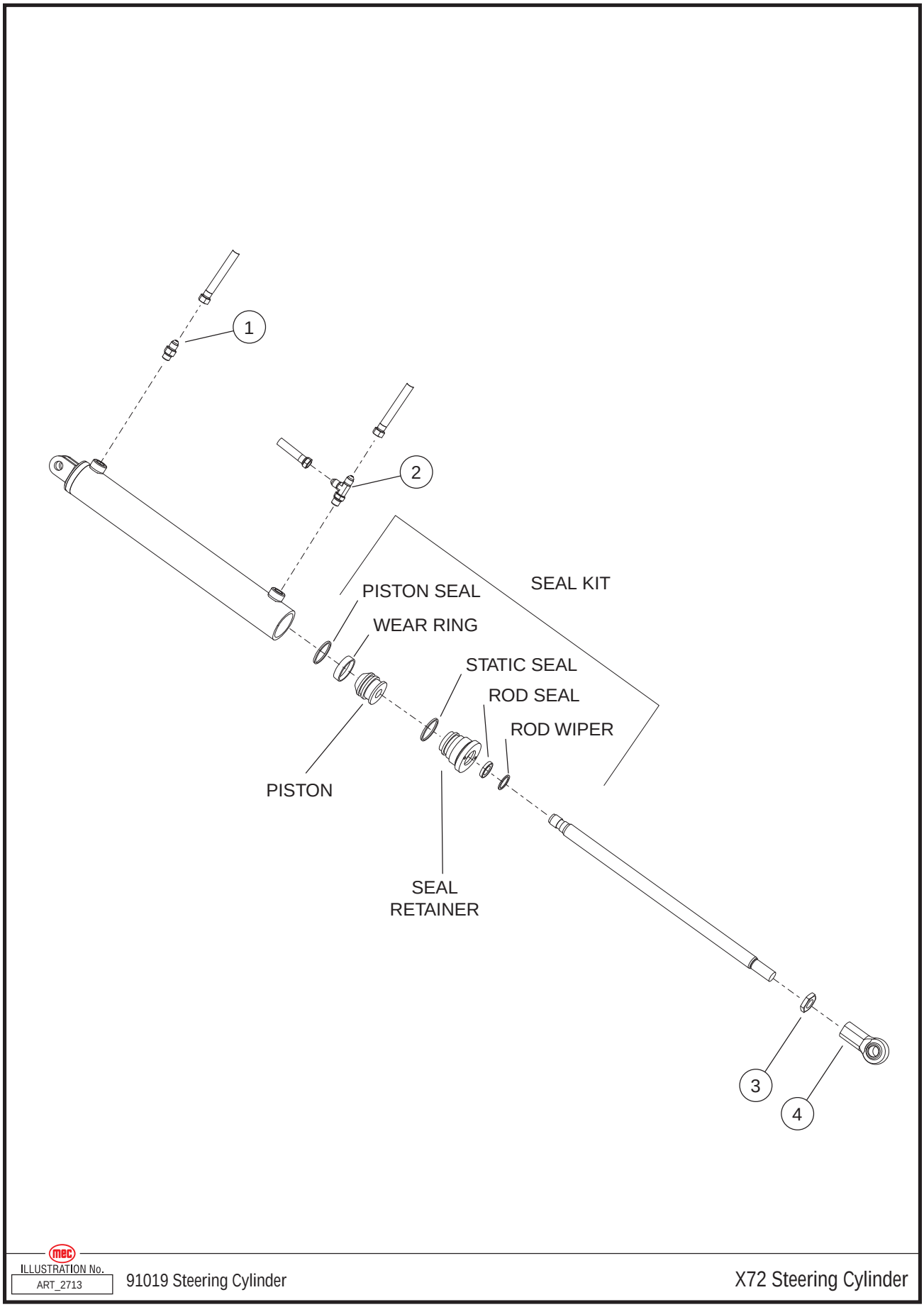


ILLUSTRATION No. ART_2713

91019 Steering Cylinder

X72 Steering Cylinder

Item	Part Number	Description	Qty.
--	91019	Steering Cylinder	2
--	90990	Seal Kit (Service)	--
1	50769	Adapter Male ¼” O-Ring-Male ¼” JIC	1
2	50962	Tee, MJ-MB-MJT-4	1
3	HDW5925	Jamnut 5/8-18	1
4	7293	Rod End	1
5	50665	Fitting, 90, MJ-FJX90-4-4	2

Level Cylinder

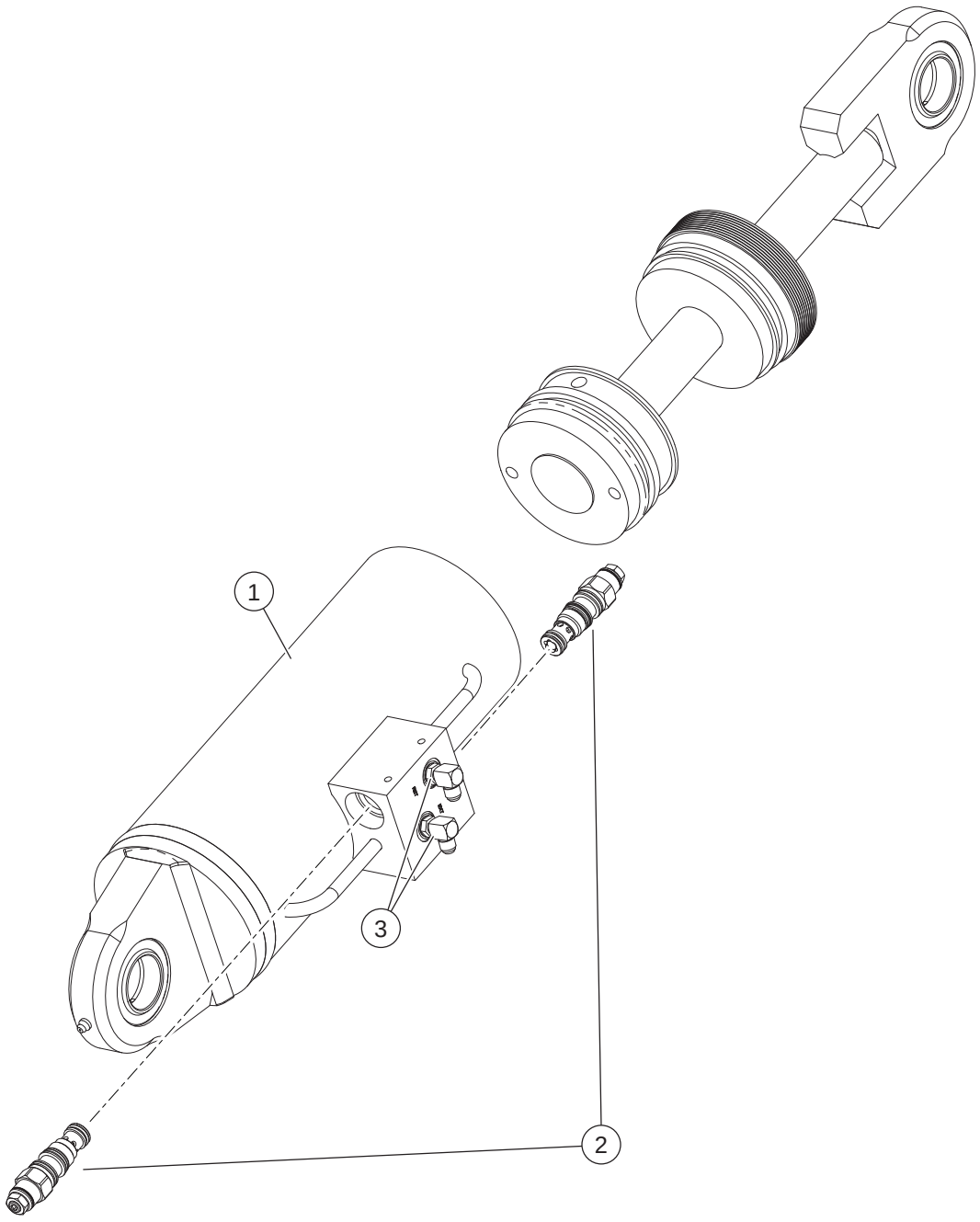


ILLUSTRATION No. ART_3219 Sigma Level Level Cylinder

Item	Part Number	Description	Qty.
1	19081	Level Cylinder	2
--	92078	Seal Kit (Service)	--
2	92125	Counterbalance Valve	4
3	50665	Fitting, MB-MJ90-4-4	4

Axle Lock Cylinder

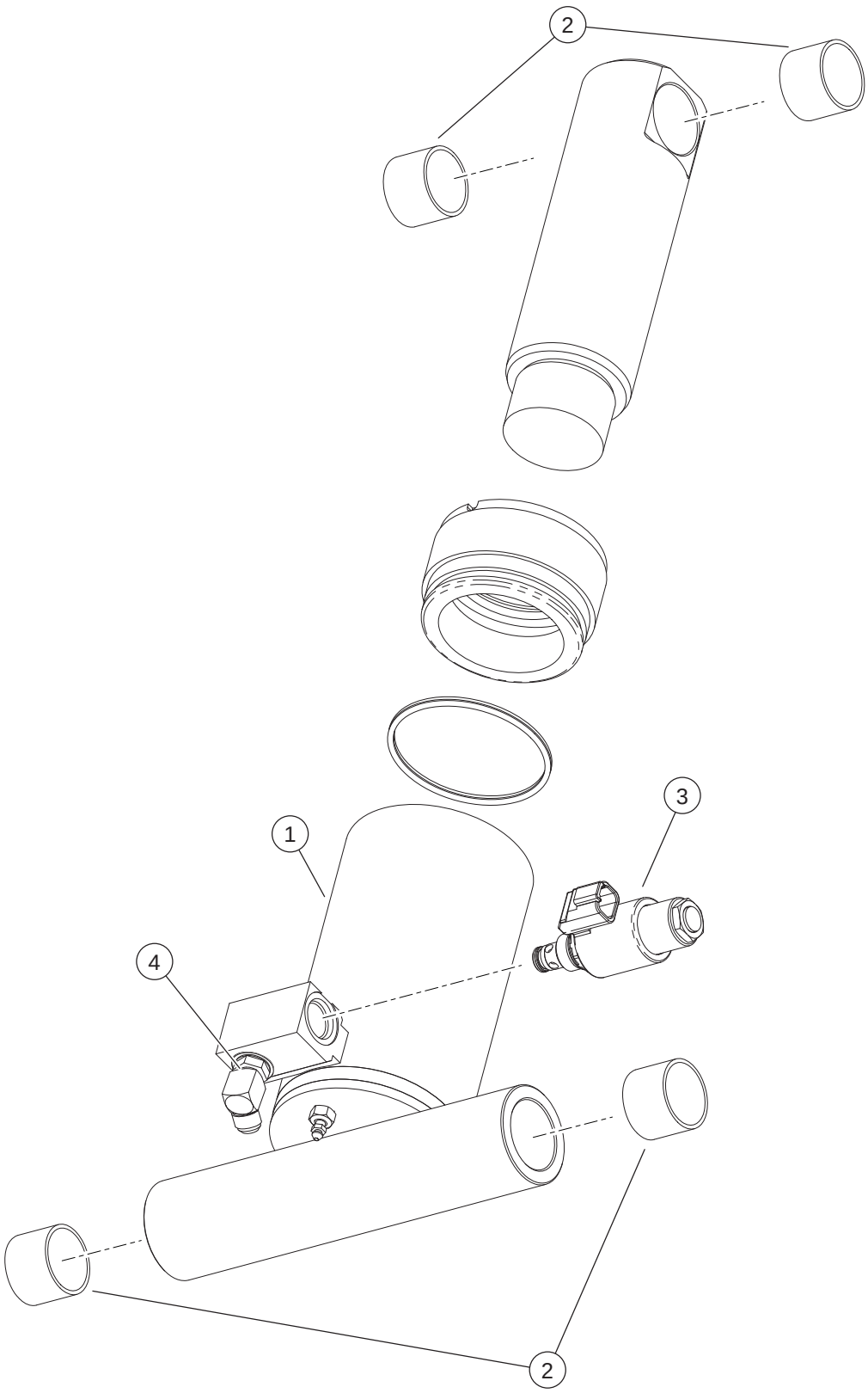


ILLUSTRATION No. ART_3220 Sigma Level Axle Lock Cylinder

Item	Part Number	Description	Qty.
1	19087	Axle Lock Cylinder	2
--	92079	Seal Kit (Service)	--
2	7896	Bearing	4
3	92192	Valve	1
4	50665	Fitting, MB-MJ90-4-4	2

Module Installation

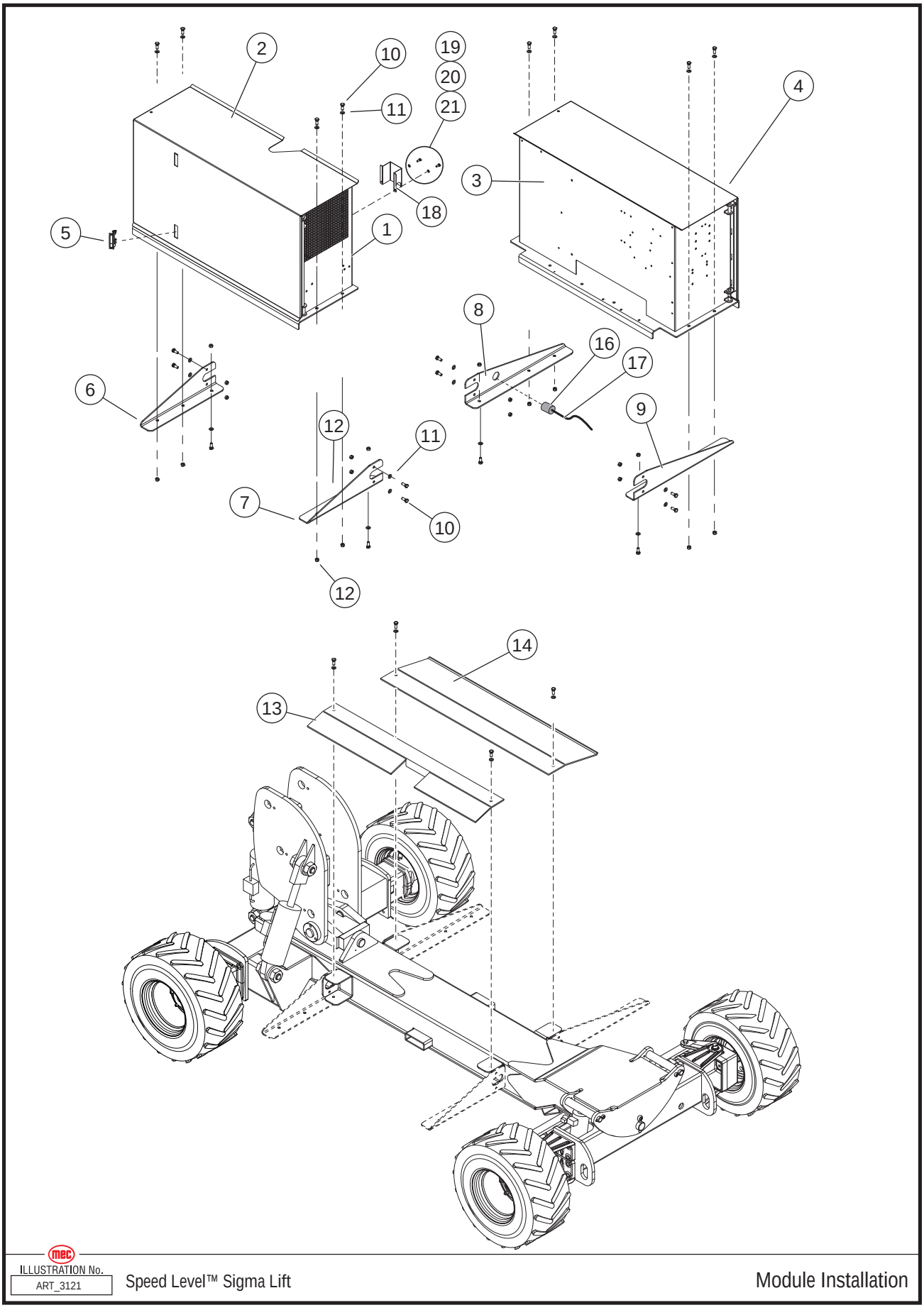


ILLUSTRATION No. ART_3121

Speed Level™ Sigma Lift

Module Installation

Item	Part Number	Description	Qty.
1	16978	Power Module Weldment, ES	1
	16213	Power Module Weldment, RT	1
2	16984	Power Module Door, ES	1
	16220	Power Module Door, RT	1
3	16989	Control Module, ES	1
	16153	Control Module, RT	1
4	16985	Control Module Door, ES	1
	16156	Control Module Door, RT	1
5	8386	Door Latch Trigger	1
6	19106	Module Bracket, Right Front	1
7	19105	Module Bracket, Right Rear	1
8	19104	Module Bracket, Left Rear	1
9	19103	Module Bracket, Left Front	1
10	50039	Bolt, M12 x 30	24
11	50003	Washer, M12	24
12	50050	Nut, M12 Nylock	24
13	19155	Hose Cover, Right Side	1
14	19154	Hose Cover, Left Side	1
15	19159	RT Models -- Exhaust Cover	1
16	90749	Plug, Marinco 15 Amp	1
17	REF	Cable, Power To Platform, 14G -- See “Wire Harness” Page At The End Of Section 16	--
18	19159	Exhaust Shroud	
19	50289	HHCS M06-1.00 X 40MM ZP	1
20	50000	Washer M06 ZP Standard Flat	1
21	50047	NNYL M06 X 1.00 08 ZP Nylock	1

REF - Reference

Control Module – ES, Drawing 1 of 2

2684ES To Serial #12700029 - 3084ES To Serial #11700042

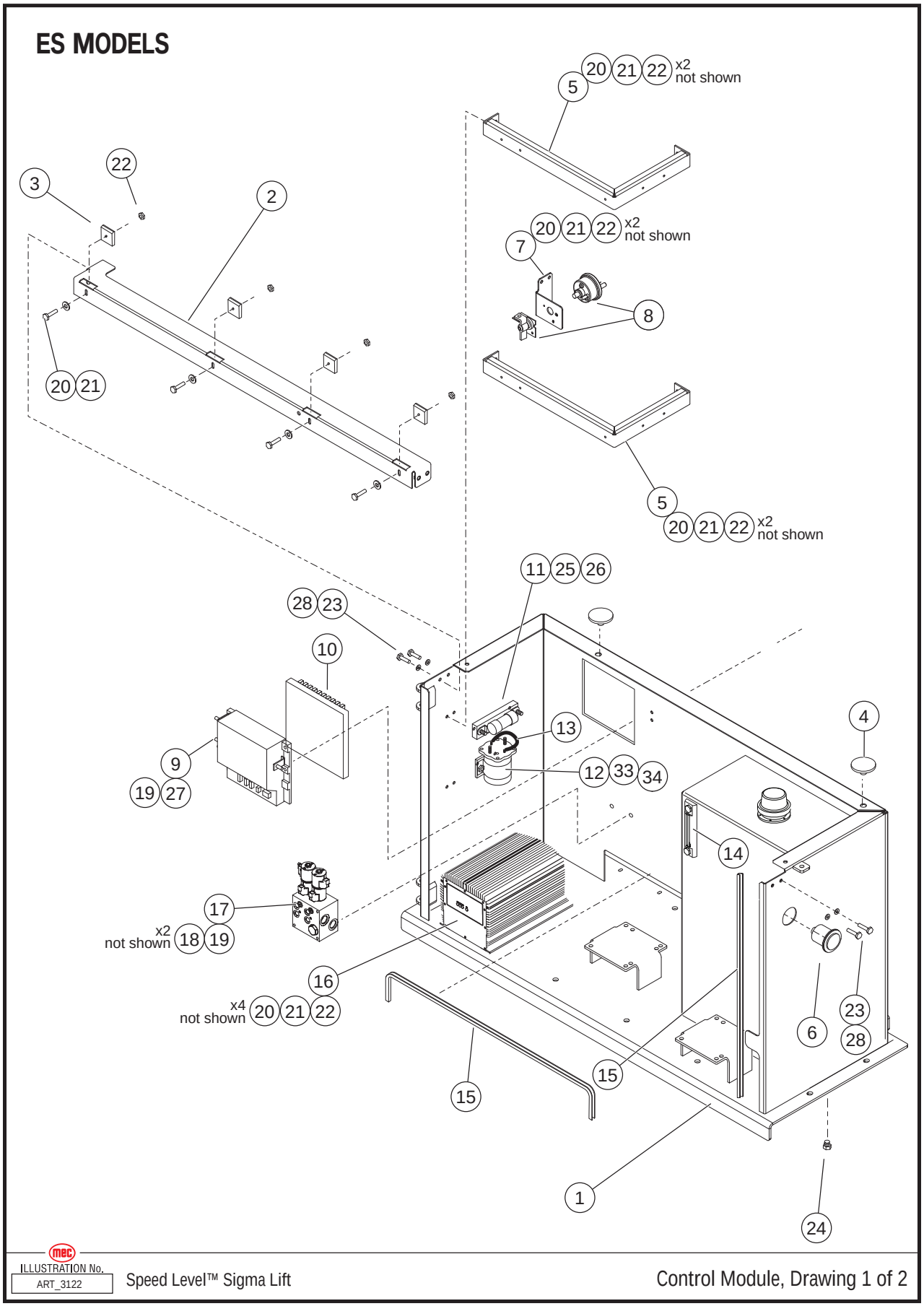


ILLUSTRATION No. ART_3122

Speed Level™ Sigma Lift

Control Module, Drawing 1 of 2

Item	Part Number	Description	Qty.
1	REF	Control Module Weldment -- See “Module Installation” On Page 270	--
2	16154	Bracket, Cross Support	1
3	14896	Block, Slide, Door	4
4	25429	Pad	2
5	16226	Bracket, Control Box	2
6	90749	Plug, Battery Charger Connection	1
7	16229	Bracket, Battery Disconnect	1
8	8841	Switch, Battery Disconnect	1
9	91658	Motor Controller	1
10	19276	Heat Sink	1
11	93173	Fuse	1
	93174	Base	1
12	91745	Contactor, Solenoid 48V, 12V Coil	1
13	8368	Diode	1
14	9370	Fluid Level Gauge	1
15	6121	Trim Lock	5 ft.
16	91633	Battery Charger	1
17	93093	Manifold, Leveling -- See Section 5 - Hydraulics	1
18	50237	Screw, Hex M8 x 100	3
19	50048	Nut, M8 Nylock	6
20	50028	Screw, Hex, M6 x 20	14
21	50068	Washer, M6 Fender	15
22	50047	Nut, M6 Nylock	14
23	50150	Screw, 5/16–18 × ¾, GR5	4
24	HDW9200	Plug, ¼ NPT	1
25	HDW7778	Screw, FPH MS 1/4-20 x 12	2
26	HDW8267	Nut,Top Lk 1/4-20 GR C	2
27	50282	Screw, Hex, M8 x 35	2
28	50061	Washer, 5/16 Flat	4

REF - Reference

Control Module – ES, Drawing 2 of 2

2684ES To Serial #12700029 - 3084ES To Serial #11700042

ES MODELS

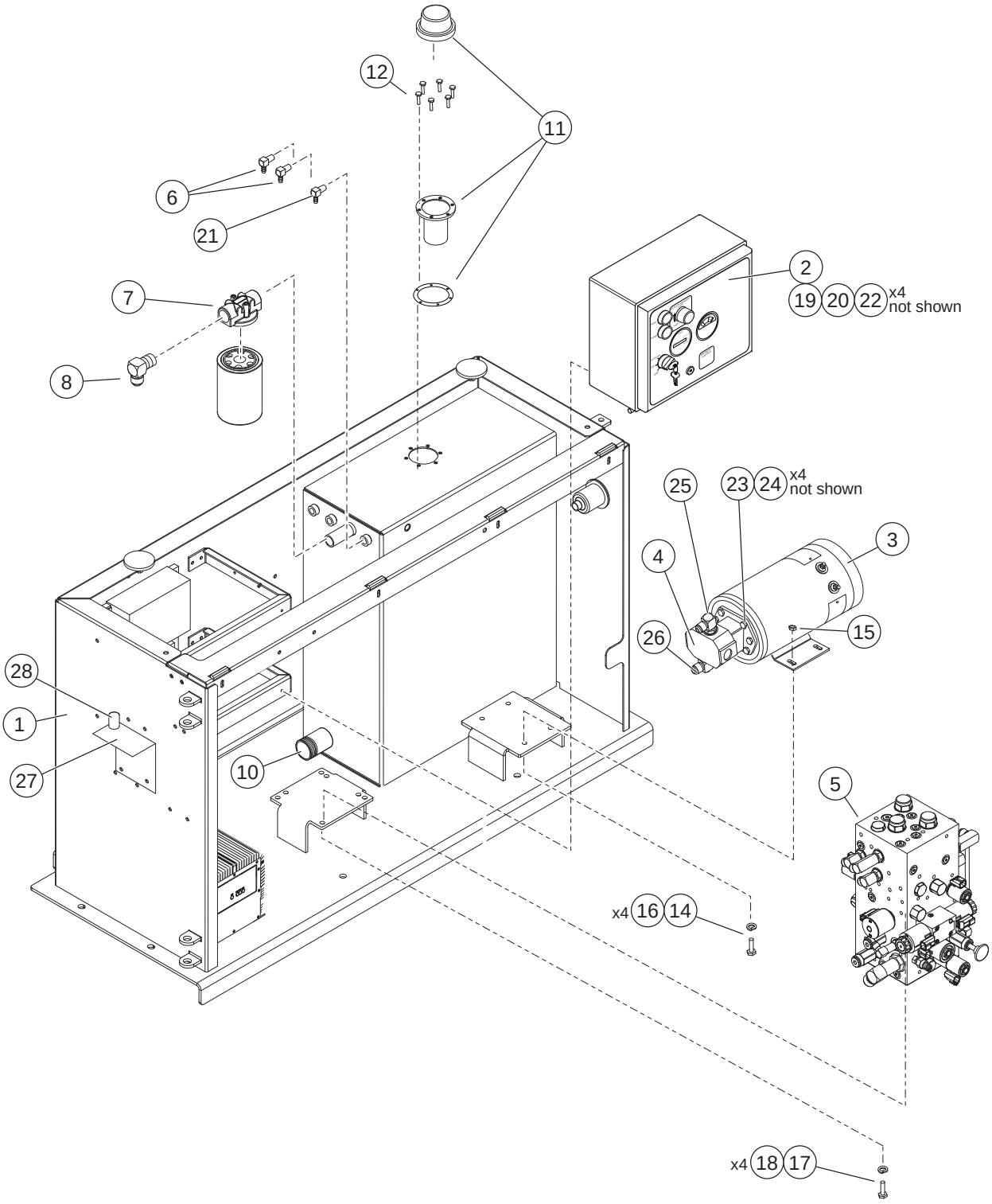


ILLUSTRATION No. ART_3123

Speed Level™ Sigma Lift

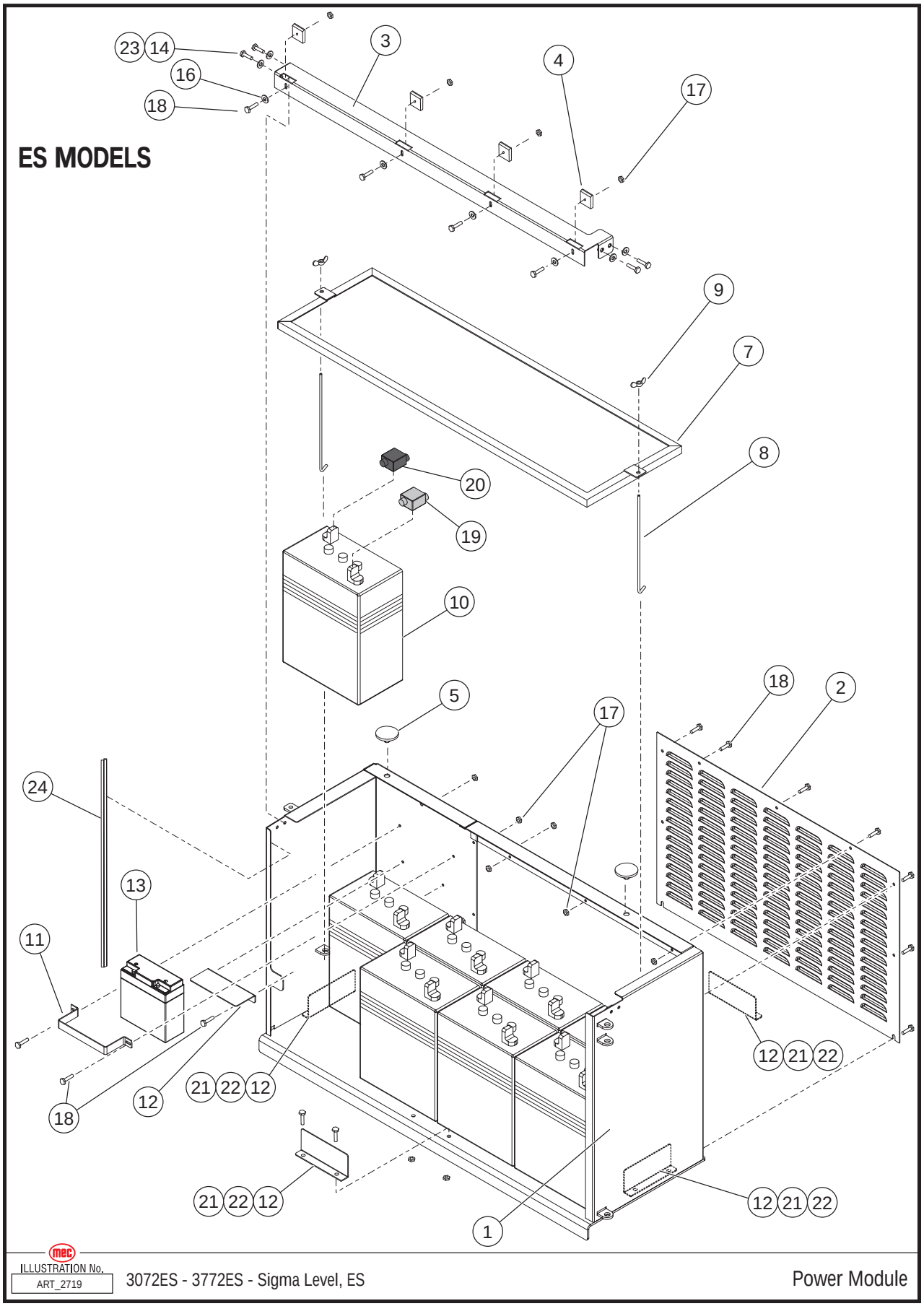
Control Module, Drawing 2 of 2

Item	Part Number	Description	Qty.
1	REF	Control Module Weldment	--
2	83077	Control Box -- See Section 1 - Controls	1
3	91640	Electric Motor	1
4	91673	Pump, 10CC	1
5	83072	Hydraulic Manifold -- See Section 5 - Hydraulics	1
6	HDW6727	Fitting, MP-MJ-4-4 90	2
7	6714	Filter Head	1
8	50916	Elbow, 90° ¾ NPT – ¾ JIC	1
9	6156	Filter Cartridge	1
10	50650	Nipple, MJ-MP-12-20	1
11	9367	Filler/Strainer	1
12	50143	Bolt, 32 × 1.57	6
13	--	--	--
14	50031	Screw, Hex, M8 x 25	4
15	50048	Nut, M8 Nylock	4
16	5000	Washer, M8	4
17	50147	Screw, 3/8 × 1	4
18	HDW7783	Lock Washer, 3/8	4
19	50214	Screw, M6 x 30	4
20	50047	Nut, M6 Nylock	4
21	50919	Fitting, MP-MJ-4-6 90	1
22	50068	Washer, M6 Fender	4
23	50188	Screw, Hex Fine Thread 3/8-24 x 1.5	4
24	50062	Washer, 3/8	4
25	50762	Fitting, MB-MJ-10-8 90	1
26	50763	Fitting, MB-MJ-12-12 90	1
27	40439	Beacon Bracket (Old Cabinets Only)	1
28	90164	Beacon	1

REF - Reference

Power Module – ES

2684ES To Serial #12700029 - 3084ES To Serial #11700042

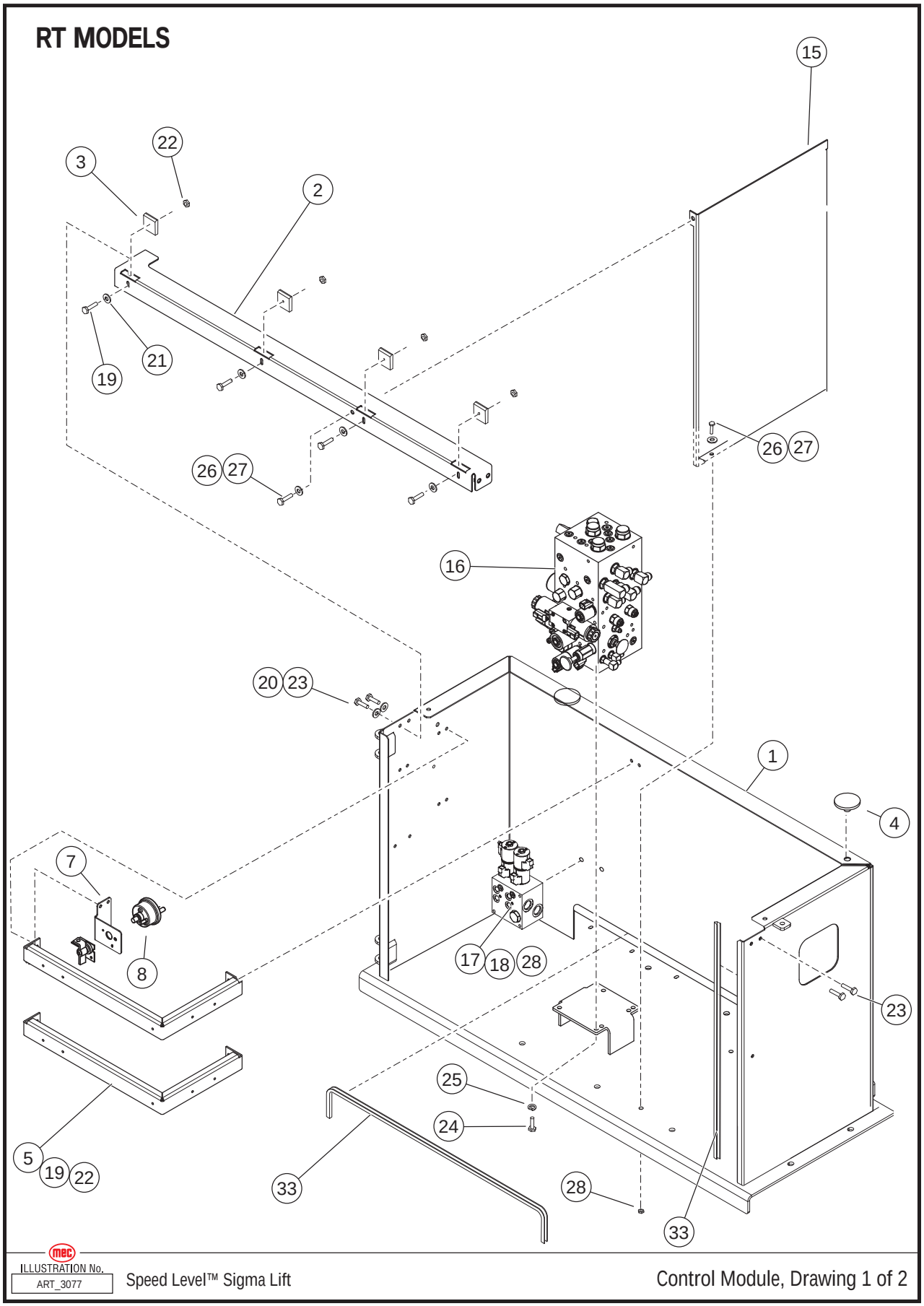


Item	Part Number	Description	Qty.
1	REF	Weldment, Battery Module -- See “Module Installation” On Page 270	--
2	16974	Panel, Battery Module	1
3	16977	Crossbar, Battery Module	1
4	14896	Block, Slide, Door	4
5	25429	Pad	2
6	--	--	--
7	16983	Battery Holddown	1
8	2987	Holddown Rod	2
9	6110	Wingnut	2
10	91641	Battery, 375 AH, UL16	8
11	16619	Bracket, Battery	1
12	16620	Shelf, Battery	5
13	90898	Battery, 12VDC / 17-18 AH	1
14	HDW5724	Screw, 5/16–18, ¾” LG, GR 5	4
15	--	--	--
16	50068	Washer, M6 Fender	17
17	50047	Nut, M6 Nylock	17
18	50028	Screw, Hex, M6 x 20	18
19	91790	Battery Boot, Red, Positive	8
20	91790	Battery Boot, Black, Negative	8
21	91789	Screw, Hex, M8 x 20	4
22	50030	Nut, M8 Nylock	4
23	50061	Washer, 5/16 Flat	4
24	6121	Trim Lock, 1/4”	26

REF - Reference

Control Module RT, Drawing 1 of 2

2684RT To Serial #12800038 - 3084RT To Serial #11800078

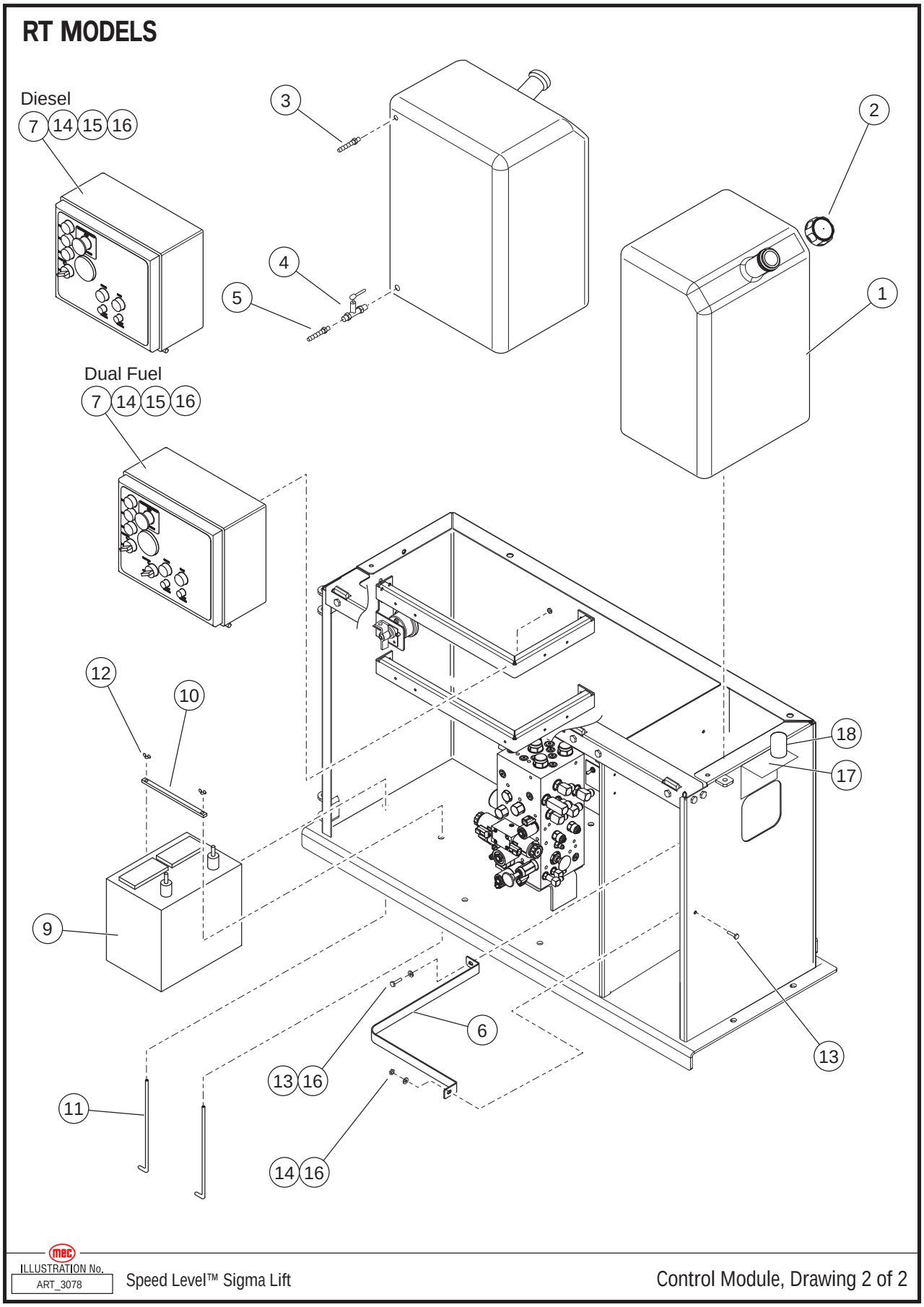


Item	Part Number	Description	Qty.
1	REF	Control Module Weldment -- See “Module Installation” On Page 270	--
2	16154	Bracket, Cross Support	1
3	14896	Block, Slide, Door	4
4	25429	Pad	2
5	16226	Bracket, Control Box	2
6	--	--	--
7	16229	Bracket, Battery Disconnect	1
8	8841	Switch, Battery Disconnect	1
9	--	--	--
10	--	--	--
11	--	--	--
12	--	--	--
13	--	--	--
14	--	--	--
15	16152	Bulkhead	1
16	83071	Hydraulic Manifold -- See Section 5 - Hydraulics	1
17	83093	Manifold, Leveling -- See Section 5 - Hydraulics	1
18	50237	Screw, Hex M8 x 100	3
19	50028	Screw, M6 x 20	8
20	50000	Washer, M6 Flat	4
21	50068	Washer, M6	8
22	50047	Nut, M6 x 1.0 Nylock	8
23	50150	Screw, 5/16–18 × ¾, GR5	4
24	50147	Screw, 3/8 × 1	4
25	HDW7783	Lock Washer, 3/8	4
26	50001	Washer, M8 Flat	5
27	50030	Screw, Hex M8 x 20	5
28	50048	Nut, M8 Nylock	5
29	50047	Nut, M6 Nylock	3
30	--	--	--
31	--	--	--
32	--	--	--
33	6121	Trim Lock	5 ft.

REF - Reference

Control Module, RT Drawing 2 of 2

2684RT To Serial #12800038 - 3084RT To Serial #11800078



Item	Part Number	Description	Qty.
1	91023	Fuel Tank, Plastic	1
2	91091	Fuel Tank Cap	1
3	HDW91233	Plug (Dual Fuel) 1/8 NPT, 3/19 Hose Barb	1
	HDW91320	Adapter (Diesel)	1
4	6919	Fuel Shutoff	1
5	HDW91279	Adapter, Male 1/8 NPT, 5/16 Hose Barb	1
	7788	Clamp (Not Shown)	1
	6458	Hose, Fuel Line (Not Shown)	90 in
6	16225	Bracket, Fuel Tank	1
7	83078	Dual Duel Models -- Control Box Assy	1
	83079	Diesel Models -- Control Box Assy	1
8	--	--	--
9	6854	Battery, 12VDC, Grp 24 Deep Cycle	1
10	3436	Hold Down Bar	1
11	2987	Hold Down Rod	2
12	HDW6110	Wing Nut	2
13	50028	Screw, M6 x 20	2
14	50047	Nut, M6 Nylock	6
15	50239	Screw, Hex M6 x 30	4
16	50130	Washer, M6 Fender	6
17	40439	Beacon Bracket (Old Cabinets Only)	1
18	90164	Beacon	1

ES Control Module Assembly

2684ES From Serial #12700030 - 3084ES From Serial #11700043

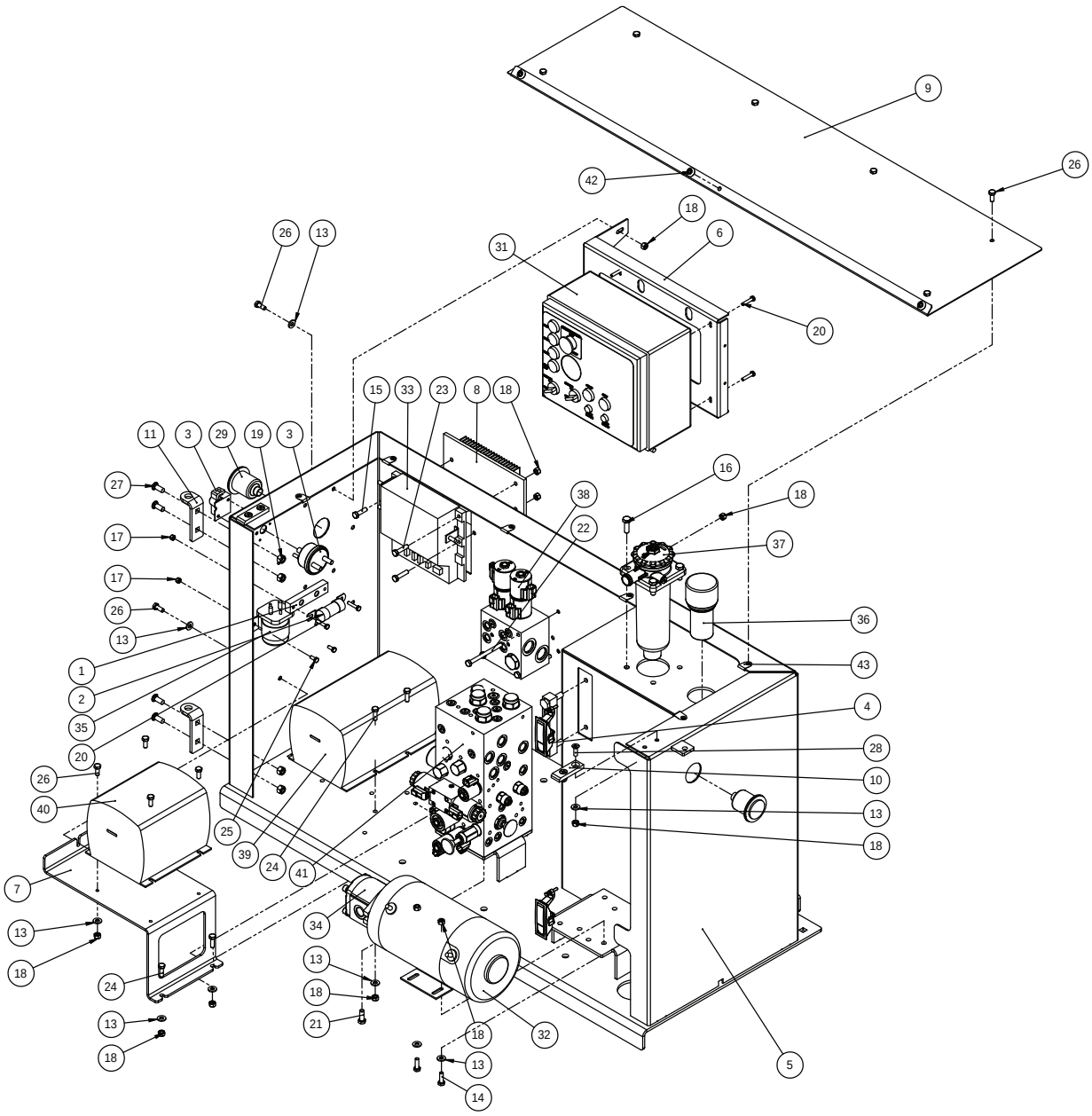


ILLUSTRATION No. Art_5387

Speed Level Series

ES Control Module Assembly

Item	Part Number	Description	Qty.
1	19471	Fuse Block	1
2	91709	Fuse, 300 Amp	1
3	8841	Switch, Battery	1
4	9370	Gauge Level Hyd Tank	1
5	19264	Control Module	1
6	19271	Bracket, Control Box	1
7	19274	Inverter Bracket Option	1
8	19276	Heat Sink	1
9	19441	Top Cover	1
10	19443	Wear Pad, Door	2
11	24146	Door Mount	2
12	50000	WSHR M06 ZP Standard Flat	2
13	50001	WSHR M08 ZP Standard Flat	23
14	50031	HHCS M08-1.25X025 08 ZP F	4
15	50032	HHCS M08-1.25X030 08 ZP F	1
16	50034	HHCS M10-1.50X030 08 ZP F	4
17	50047	NNYL M06X1.00 08 ZP Nylock	4
18	50048	NNYL M08X1.25 08 ZP Nylon Inse	29
19	50049	NNYL M10X1.50 08 ZP Nylon Inse	4
20	50214	HHCS M06-1.00X030 08 ZP P	6
21	50219	HHCS 03/08-16X00.75 05 ZP	4
22	50237	HHCS M08-1.25X100 08 ZP P	3
23	50295	HHCS M08-1.25X15 08 ZP P	2
24	50348	HHCS M08-1.25X25 08 ZP P	6
25	50296	HHCS M06-1.00X15 08 ZP P	2
26	50030	HHCS M8-1.25 X 20 GR 8.8 ZP	15
27	50342	Carb M10-1.50X25 08 ZP Carriage	4
28	50346	FHMS M8 - 1.25 x 30 ZP	4
29	90749	Marinco Plug	2
31	83077	Control Box	1
32	91640	Electric Motor	1
33	91658	Motor Controller	1
34	91673	Pump, 10CC	1
35	91745	Contactor, 48V Contacts, 12V Coil	1
36	92563	Tank Filler W/ Strainer	1
37	92565	Internal Filter	1
38	93093	Tilt Manifold	1
39	91633	Battery Charger	1
40	91859	Inverter Option	1
41	83072	Hydraulic Manifold	1
42	92633	Rubber Door Bumper	3
43	92634	Spring Nut M8 - 1.25X20-25	6

RT Control Module Assembly

2684RT From Serial #12800039 - 3084RT From Serial #11800079

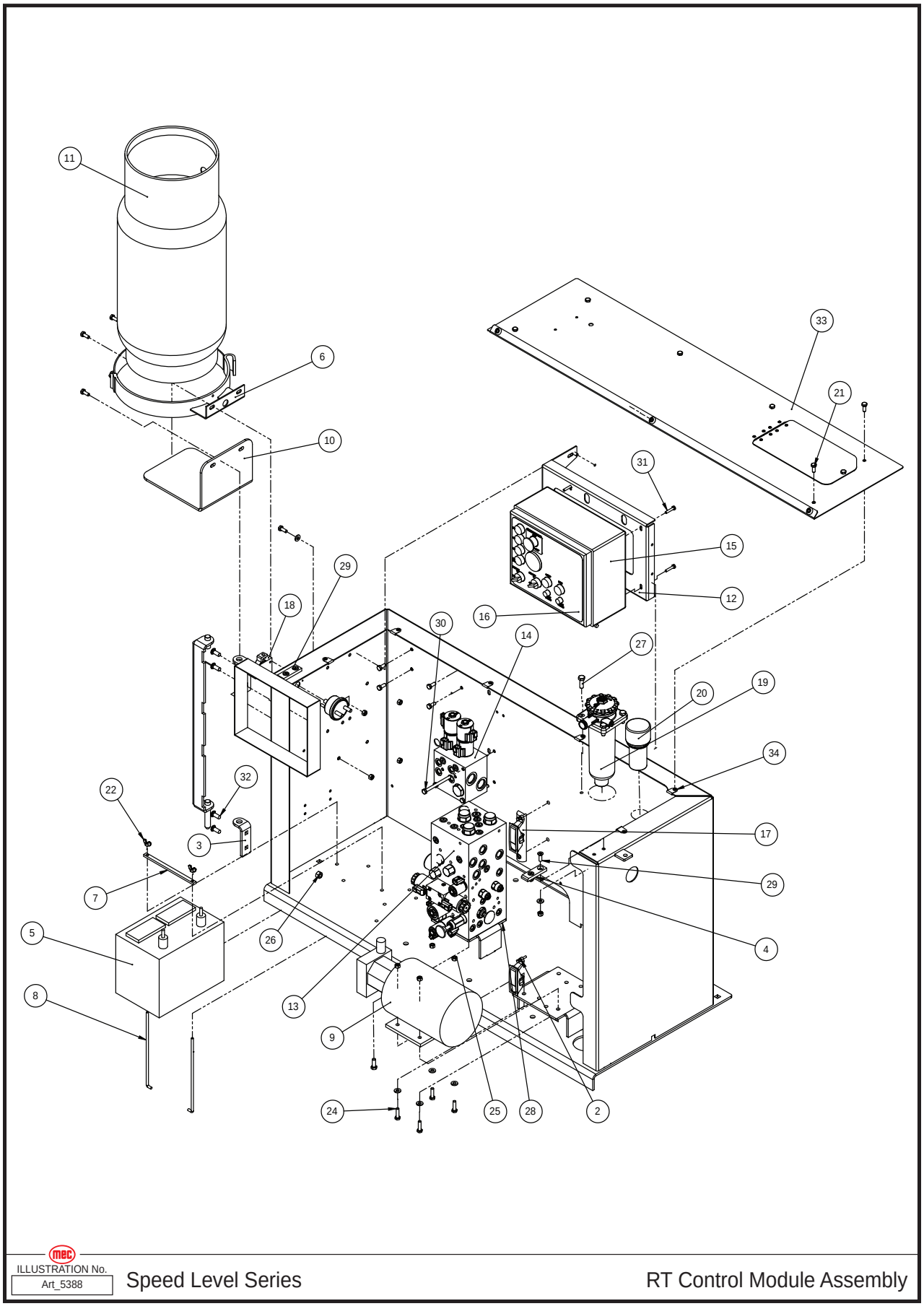


ILLUSTRATION No. Art_5388

Speed Level Series RT Control Module Assembly

Item	Part Number	Description	Qty.
1	19264	Control Module	1
2	83107	Control Module Door Assem.	1
3	24146	Door Mount	2
4	19443	Wear Pad, Door	2
5	6854	Battery, 12 VDC	1
6	6860	Bracket, Tank Mount	1
7	3436	Hold Down Bar, Battery	1
8	2987	Rod, Hold Down	2
9	91550	Generator, 2000 Watt Optional	1
10	19463	Propane Tank	1
11	6859	Propane Tank	1
12	19271	Bracket, Control Box	1
13	83072	Hydraulic Manifold	1
14	83093	Tilt Manifold	1
15	91179	Control Box	1
16	91157	Control Box Cover	1
17	9370	Gauge Level Hyd Tank	1
18	8841	Switch, Battery	1
19	92565	Internal Filter	1
20	92563	Tank Filler W/ Strainer	1
21	50030	HHCS M8-1.25 X 20 GR 8.8 ZP	18
22	90866A029	1/4”-20 Wing Nut	2
23	50001	WSHR M08 ZP Standard Flat	12
24	50032	HHCS M8-1.25 x 30 ZP	4
25	50048	NNYL M08X1.25 08 ZP Nylon Inse	19
26	50049	NNYL M10X1.50 08 ZP Nylon Inse	4
27	50034	HHCS M10-1.50X030 08 ZP F	4
28	50219	HHCS 03/08-16X00.75 05 ZP	4
29	50346	FHMS M8-1.25X30 ZP	4
30	50237	HHCS M08-1.25X100 08 ZP P	3
31	50214	HHCS M06-1.00X030 08 ZP P	4
32	50342	Carb M10-1.50X25 08 ZP Carriage	4
33	83168	Module Top W/ Door Latch Assy.	1
34	95210A200	Spring Steel Clip-on Nut, M8	6

Power Module – RT

2684RT To Serial #12800038 - 3084RT To Serial #11800078

RT MODELS

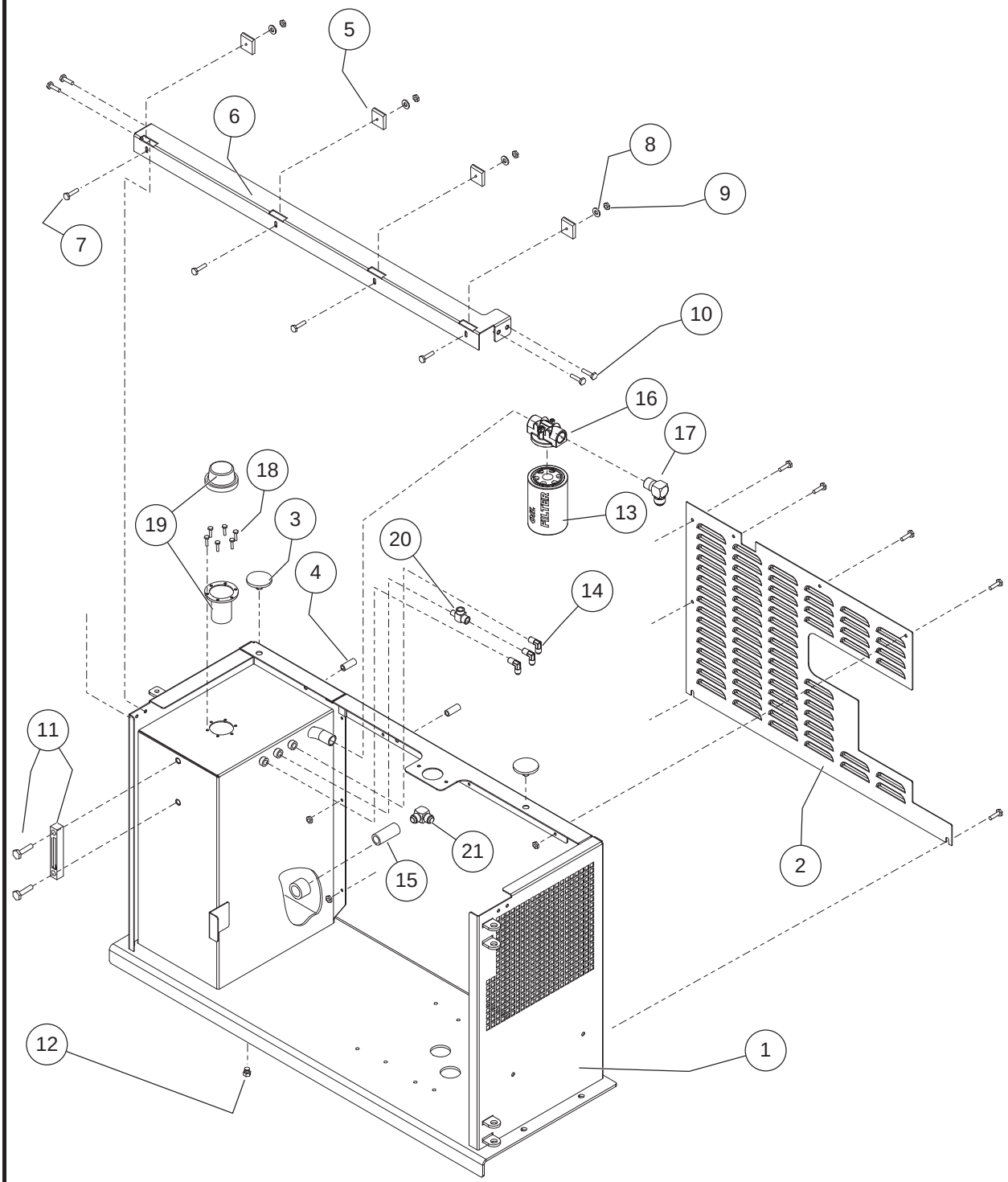


ILLUSTRATION No. ART_3478

91RT - Speed Level™ RT

Power Module

Item	Part Number	Description	Qty.
1	16213	Power Module Weldment	REF
2	16247	Guard, Engine Module	1
3	25429	Pad	2
4	40620	Spacer, Insulator	2
5	14896	Slide Block, Door	4
6	14826	Bracket, Cross Support	1
7	50028	Screw, M6 x 20	11
8	50068	Washer, M6 Fender	13
9	50047	Nut, M6 Nylock	12
10	HDW5724	Screw, 5/16 - 18 x 3/4 Inch, GR5	4
11	9370	Level Gauge	1
12	HDW9200	Plug, 1/4 NPT	1
13	6156	Filter Cartridge	1
14	50664	Elbow, MP-MJ90-4-4	2
15	50648	Fitting, MJ-MP-16-20	1
16	6714	Filter Head	1
17	HDW9268	Elbow, 90º 1/4 NPT - 3/4 JIC	1
18	HDW8482	Bolt, 32 × 1.57	6
19	9367	Filler/Strainer	1
20	50893	Tee, MJ-FJX-MJT-6	1
21	50649	Elbow 90, MJ-FJX90-16-16	1
22	50061	Washer, 5/16 Flat	4
23	50920	Fitting, MJ-MP90-6-4	1

REF - Reference

ES Power Module Assembly

2684ES From Serial #12700030 - 3084ES From Serial #11700043

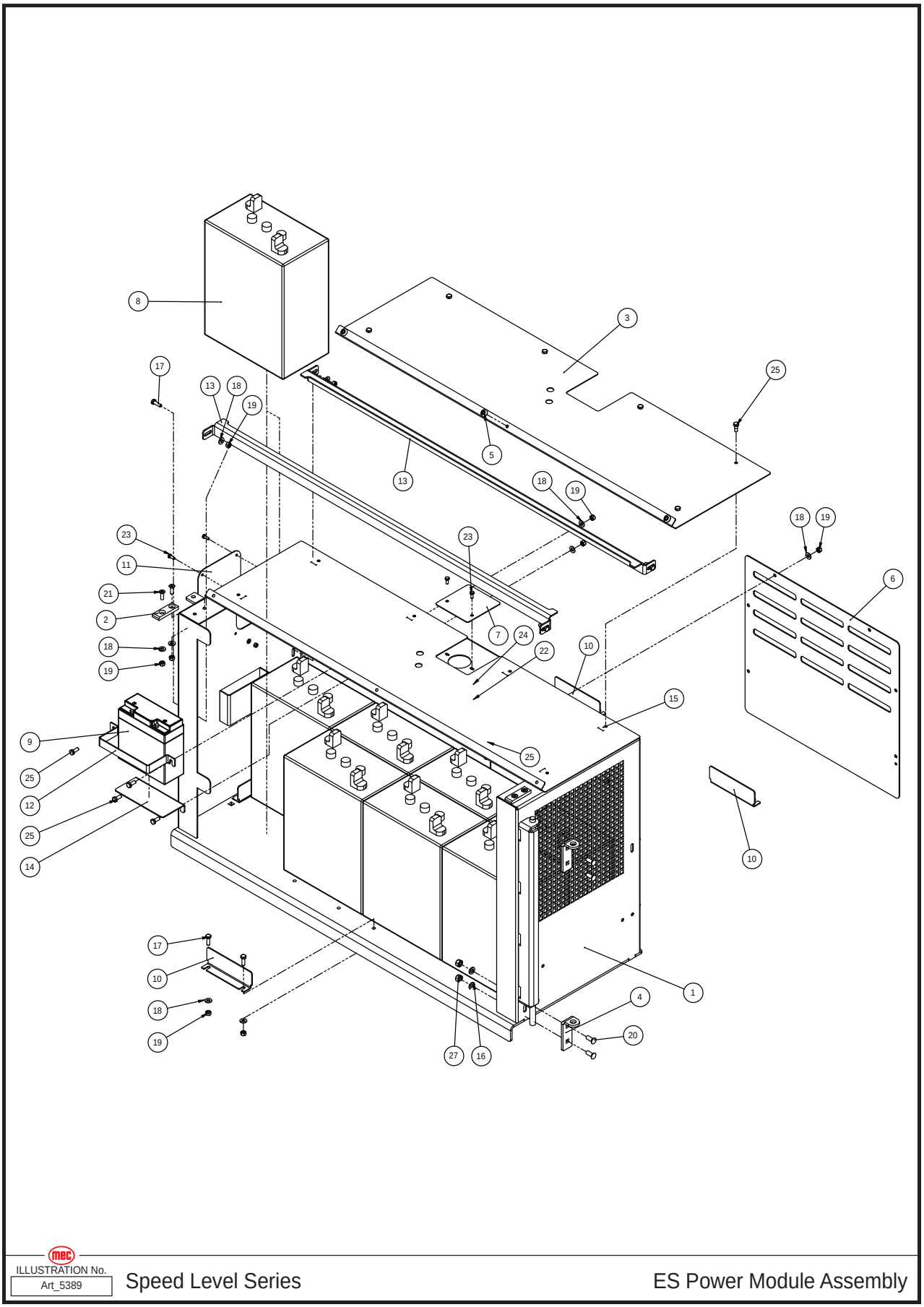


ILLUSTRATION No. Art_5389

Speed Level Series

ES Power Module Assembly

Item	Part Number	Description	Qty.
1	19281	Power Module	1
2	19443	Wear Pad, Door	2
3	19444	Top Cover	1
4	24146	Door Mount	2
5	92633	Rubber Door Bumper	3
6	19462	Battery Vent	1
7	19461	Intake Cover Plate	1
8	91641	X72ES Battery	8
9	90898	Emergency Down Battery	1
10	19438	Battery Bracket	3
11	19437	Fuel Fill Cover	1
12	19446	Battery, Cross Brace	1
13	19288	Battery Stop	2
14	19445	Battery Bracket	1
15	92634	Spring Nut M8 - 1.25X20-25	6
16	50002	WSHR M10 ZP Standard Flat	4
17	50295	HHCS M08-1.25X25 08 ZP P	10
18	50001	WSHR M08 ZP Standard Flat	24
19	50048	NNYL M08X1.25 08 ZP Nylon Inse	24
20	50342	Carb M10-1.50X25 08 ZP Carriage	4
21	50346	FHMS M8 - 1.25 x 30 ZP	4
22	50047	NNYL M06X1.00 08 ZP Nylock	6
23	50296	HHCS M06-1.00X15 08 ZP P	6
24	50000	WSHR M06 ZP Standard Flat	6
25	50030	HHCS M8-1.25 X 20 GR 8.8 ZP	16
27	50049	NNYL M10X1.50 08 ZP Nylon Inse	4

Diesel Power Module Assembly

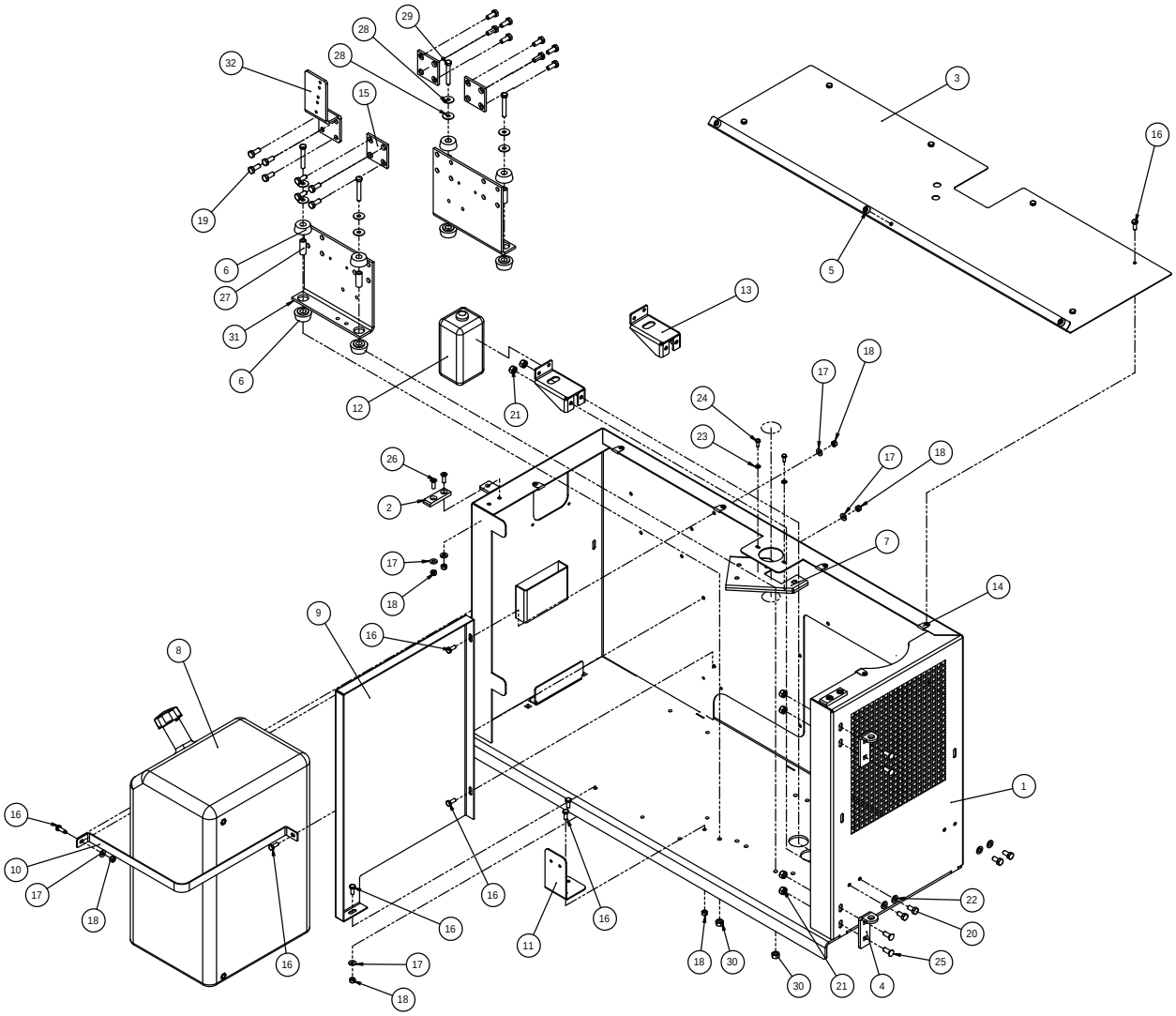


ILLUSTRATION No. Art_5390

Speed Level Series

Diesel Power Module Assembly

Item	Part Number	Description	Qty.
1	19281	Power Module	1
2	19443	Wear Pad, Door	2
3	19444	Top Cover, Power Module	1
4	24146	Door Mount	2
5	92633	Rubber Door Stop	3
6	7736	Insulator, Rubber	8
7	16721	Bracket, Instake, Air Intake, Diesel	1
8	91023	Fuel Tank, Plastic	1
9	19293	Bulkhead, Power Module	1
10	19316	Bracket, Fuel Tank	1
11	19472	Relay Bracket	1
12	91127	Coolant Overflow Tank	1
13	16345	Mount Bracket, Radiator	2
14	92978	Spring Num M8-1.25X20-25	6
15	16210	Spacer, Engine	3
16	50030	HHCS M8-1.25 X 20 GR 8.8 ZP	13
17	50001	WSHR M08 ZP Standard Flat	9
18	50048	NNYL M08X1.25 08 ZP Nylon Inse	11
19	50116	HHCS M10-1.5X025 08 ZP	16
20	50215	HHCS M10-1.50X020 08 ZP F	4
21	50049	NNYL M10X1.50 08 ZP Nylon Inse	9
22	50002	WSHR M10 ZP Standard Flat	4
23	50000	WSHR M06 ZP Standard Flat	2
24	50296	HHCS M06-1.00X15 08 ZP P	2
25	50342	Carb M10-1.50X25 08 ZP Carriage	4
26	50346	FHMS M8-1.25X30 ZP	4
27	40620	Spacer-Isolator	4
28	90480	WSHR 03/08X1-1/2 Fender	8
29	50097	HHCS 03/08-16X2.50 08 ZP	4
30	50210	NNYL 03/08-16 05 ZP	4
31	16209	Engine Mount, Diesel	2
32	17854	Dual Solenoid Bracket	1

Dual Fuel Power Module Assembly

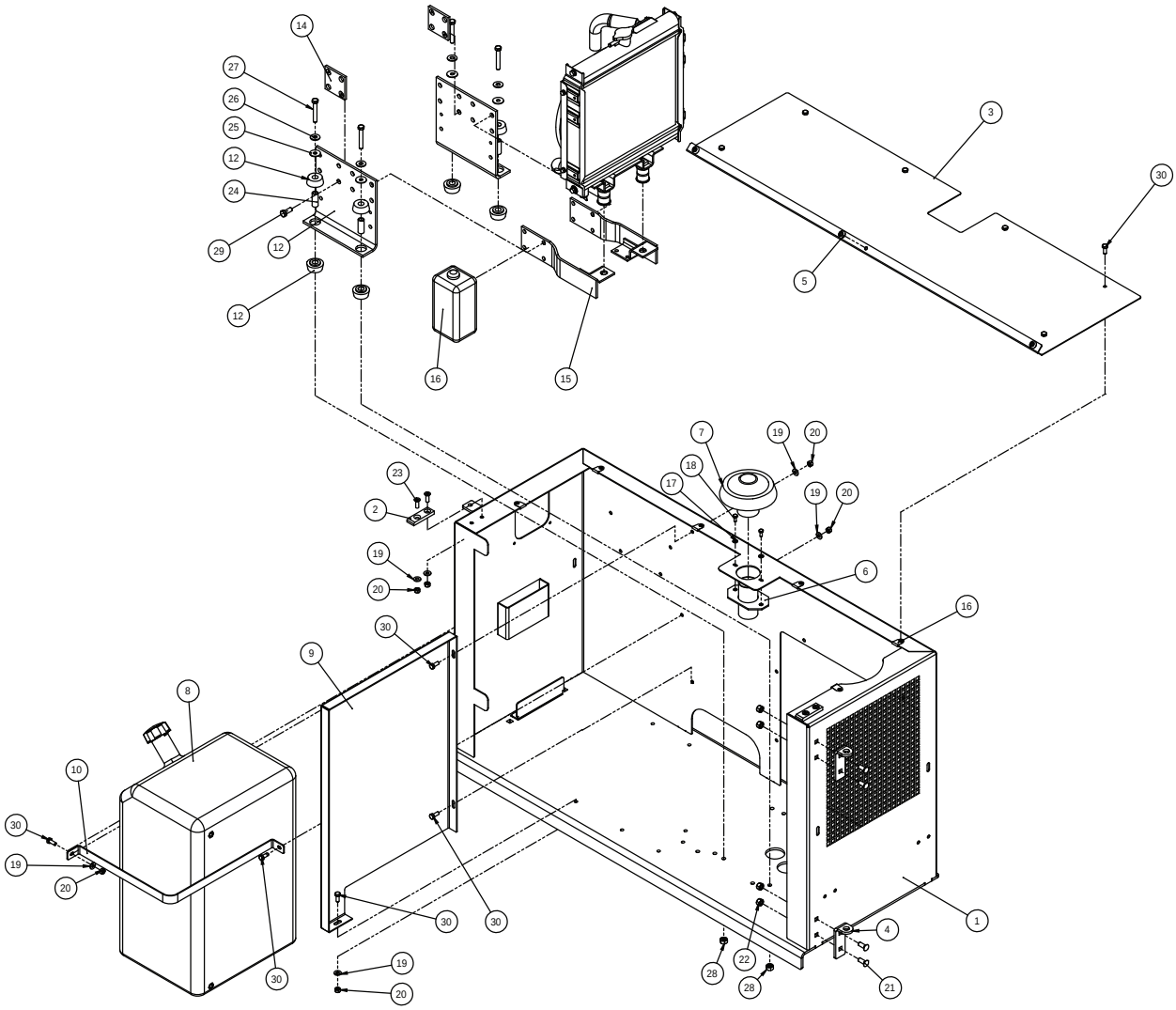


ILLUSTRATION No. Art_5391 Speed Level Series Dual Fuel Power Module Assembly

Item	Part Number	Description	Qty.
1	19281	Power Module	1
2	19443	Wear Pad, Door	2
3	19444	Top Cover	1
4	24146	Door Mount	2
5	92633	Rubber Door Stop	3
6	16295	Weldment, Intake	1
8	91023	Fuel Tank, Plastic	1
9	19293	Bulkhead	1
10	19316	Bracket, Fuel Tank	1
11	16211	Engine Mount, Dual Fuel	2
12	7736	Insulator, Rubber	8
13	16210	Spacer	2
14	91131	Radiator Bracket Kit	1
15	91127	Coolant Overflow Tank	1
16	92634	Spring Nut M8 - 1.25X20-25	6
17	50000	WSHR M06 ZP Standard Flat	2
18	50296	HHCS M06-1.00X15 08 ZP P	2
19	50001	WSHR M08 ZP Standard Flat	9
20	50048	NNYL M08X1.25 08 ZP Nylon Inse	9
21	50342	Carb M10-1.50X25 08 ZP Carriage	4
22	50049	NNYL M10X1.50 08 ZP Nylon Inse	4
23	50346	FHMS M8 - 1.25 x 30 ZP	4
24	40620	Spacer - Isolator	4
25	90480	WSHR 03/08 X 1-1/2 Fender	4
26	50129	WSHR 03/08 ZP SAE Flat	4
27	50219	HHCS 03/08-16X2.50 08 ZP	4
28	50210	NNYL 03/08-16 05 ZP	4
29	50116	HHCS M10-1.5X025 08 ZP	1
30	50030	HHCS M8-1.25 X 20 GR 8.8 ZP	11

Engine Mount – Dual Fuel

DUAL FUEL MODELS

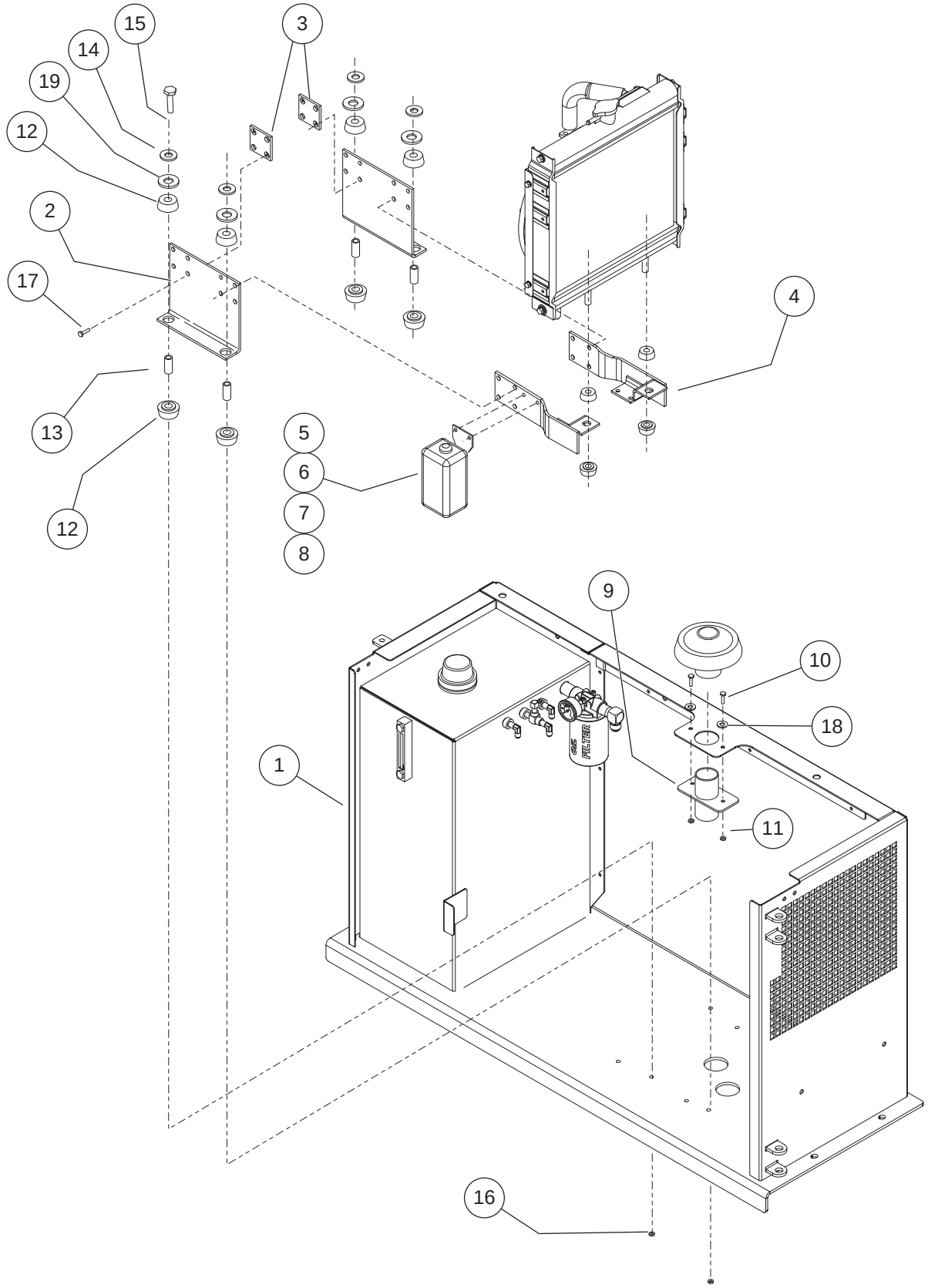


ILLUSTRATION No.
ART_2126 R1

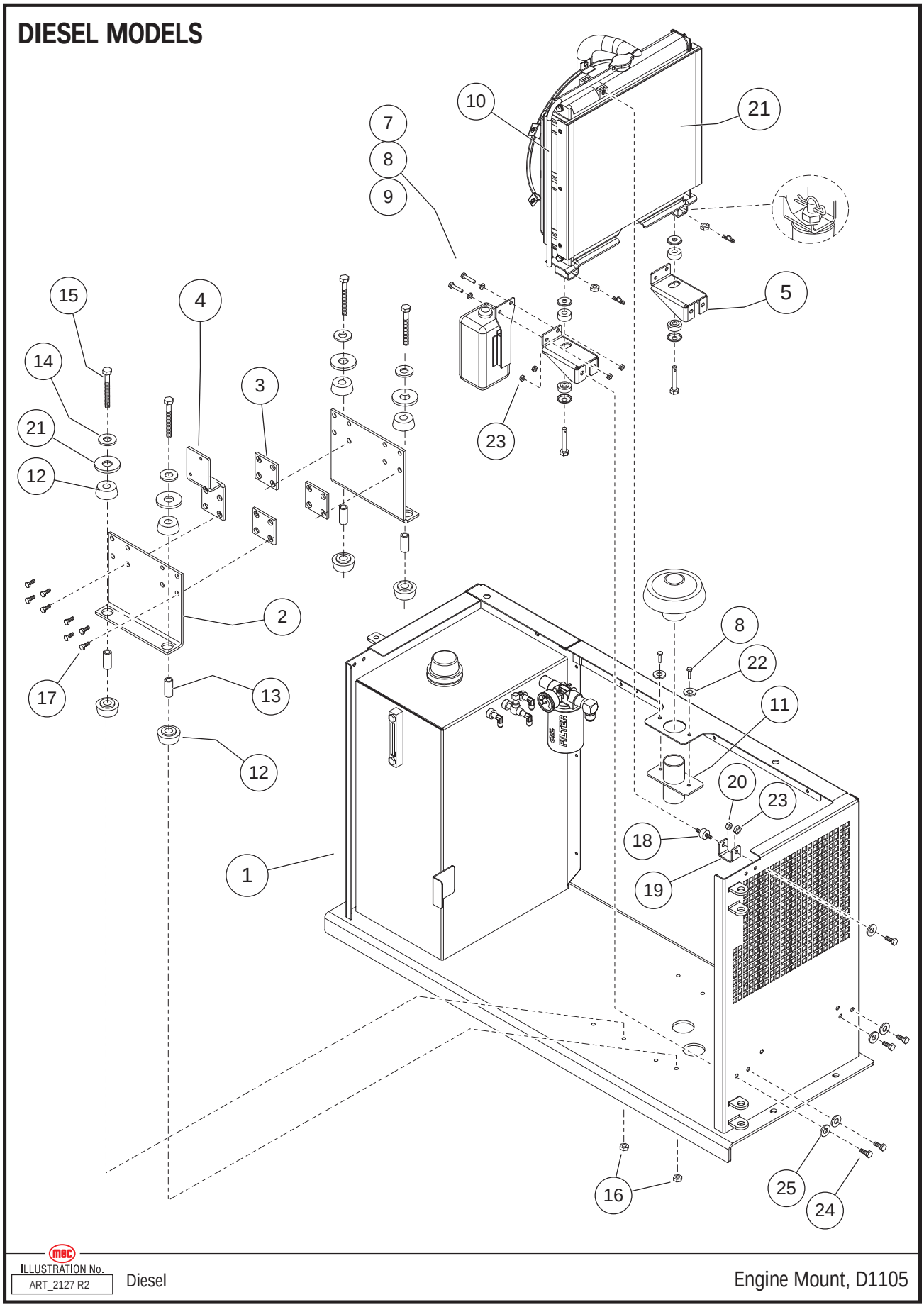
Dual Fuel

Engine Mount, DF752

Item	Part Number	Description	Qty.
1	16213	Power Module Weldment	REF
2	16211	Engine Mount, Dual Fuel	2
3	16210	Spacer	2
4	91131	Radiator Bracket Kit	1
5	91127	Coolant Overflow Tank	1
6	50028	Screw, M6 x 20	2
7	50047	Nut, M6 Nylock	2
8	6458	Hose	3 ft.
9	16295	Air Intake Weldment	1
10	HDW5723	Air Intake Weldment	2
11	HDW8267	Nut, 1/4 - 20	4
12	7736	Insulator, Rubber	8
13	40620	Spacer - Isolator	4
14	HDW8567	Washer, Flat, 3/8	4
15	HDW8279	Bolt, 3/8 - 16 x 2 1/2 GR8	4
16	HDW8268	Nut, 3/8 - 16	4
17	HDW91234	Screw, M10-1.25 x 25 8.8	12
18	50130	Washer, 1/4 Flat	2
19	90480	Washer, 3/8 x 1-1/2 Fender	4

REF - Reference

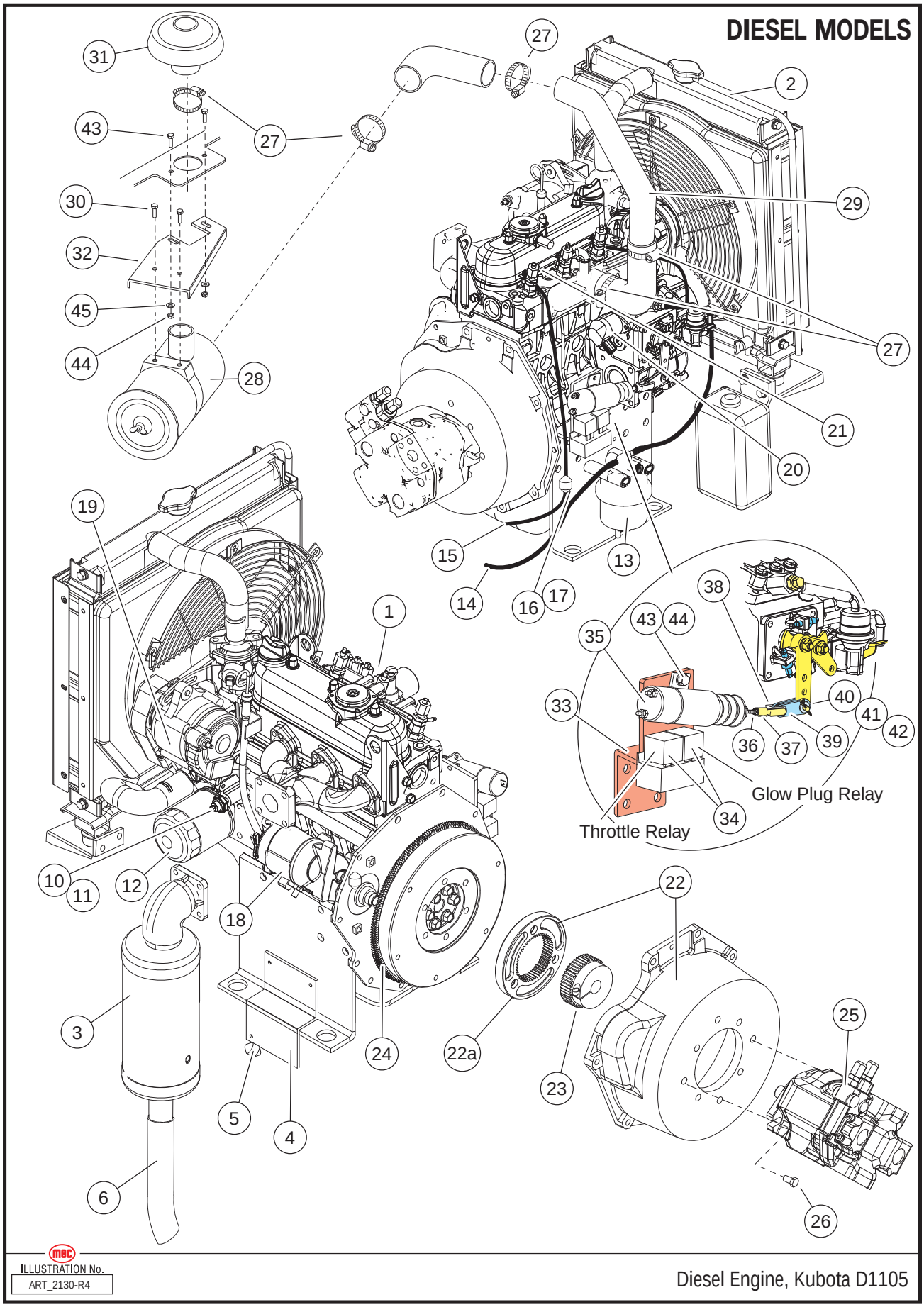
Engine Mount – Diesel



Item	Part Number	Description	Qty.
1	16213	Power Module Weldment	REF
2	16209	Engine Mount, Diesel	2
3	16210	Spacer	3
4	16207	Bracket, Solenoid Mount	1
5	16345	Bracket, Radiator Mount	2
6	--	--	--
7	91127	Coolant Overflow Tank	1
8	50028	Screw, M6 x 20	2
9	50047	Nut, M6 Nylock	2
10	6458	Hose	3 ft.
11	16295	Air Intake Weldment	1
12	7736	Insulator, Rubber	8
13	40620	Spacer - Isolator	4
14	HDW8567	Washer, Flat, 3/8	4
15	HDW8279	Screw, 3/8 - 16 x 2 1/2 GR8	4
16	HDW8268	Nut, 3/8 - 16	4
17	HDW91234	Screw, M10 - 1.25 x 25 8.8	12
18	91591	Vibration Isolator	1
19	16346	Radiator Brace	1
20	50047	Nut, M6	1
21	90480	Washer, 3/8 x 1-1/2 Fender	4
22	50130	Washer, 1/4 Flat	2
23	50049	Nut, M10 Nylock	5
24	50215	Bolt, M10 x 20 HHCS	5
25	50002	Washer, M10 Flat	5

REF - Reference

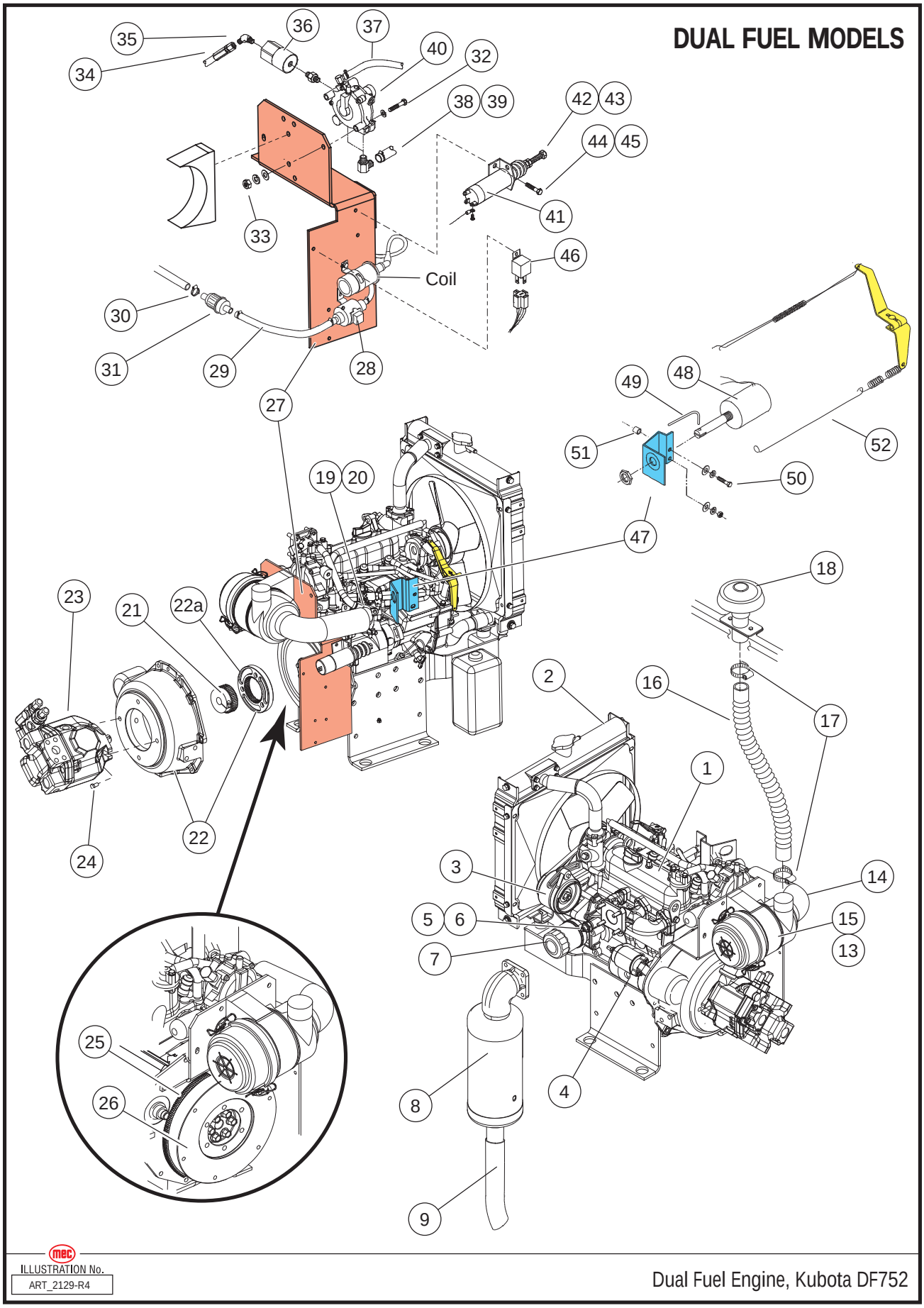
Engine – Diesel



Item	Part Number	Description	Qty.
Additional attaching engine parts found earlier in this section			
--	84036	Engine Subassembly, Diesel	--
1	91429	Engine Kit, D1105	1
2	91113	Radiator Kit	1
--	9831	Radiator	--
3	19405	Muffler Kit	1
--	92164	Gasket, Exhaust (Not Shown)	--
4	19458	Bracket Exhaust Mount	1
5	92533	Clamp 1-1/2”	1
6	91776	Tail Pipe	1
10	91175	Oil Pressure Switch	1
11	HDW91187	Fitting, 1/8 NPT, M–F	1
12	8665	Oil Filter	1
13	91116	Fuel Filter Assembly	1
--	91123	Fuel Filter Element	--
14	6458	Hose, Fuel, 5/16	8 ft.
15	91199	Hose, Fuel, 3/16	6 ft.
16	91114	Valve, Check	1
17	7788	Hose Clamp	5
18	8413	Starter	Incl
19	90227	Alternator	Incl
20	91124	Fuel Solenoid	Incl
21	9832	Glow Plugs	Incl
22	91112	KTR Housing Kit, D905	1
22a	91572	Coupler, Outer	--
23	91130	Hub	1
24	91630	Ring Gear	1
25	91160	Hydraulic Pump	1
26	HDW6433	Screw, 3/8-16 × 1	2
27	7545	Hose Clamp	5
28	91111	Air Cleaner kit	1
--	8667	Air Filter Element	--
29	16720	Tube, Intake Extension	1
30	946640	Screw	2
31	91799	Breather Cap	1
32	16721	Bracket	1
33	16207	Bracket, Solenoid	1
34	91375	Relay	2
35	91589	Solenoid, Throttle	1
36	HDW91231	Jamnut, ¼–28	1
37	91117	Yoke	1
38	91588	Washer, ¼” Rubber	1
39	16347	Throttle Link	2
40	HDW5217	Washer, Flat, 5/16	1
41	HDW91590	Clevis Pin, 5/16 × 1	1
42	HDW5290	Cotter Pin, 1/8” × 1	1
43	50028	Screw, M6 x 20	4
44	50047	Nut, M6 Nylock	4
45	HDW5217	Flat Washer	2

Incl - Included with Assembly

Engine – Dual Fuel



Item	Part Number	Description	Qty.
Additional attaching engine parts found earlier in this section			
--	91035	Engine Subassembly, Dual Fuel	--
1	91125	Engine, Kubota DF752	1
2	8472	Radiator	1
3	90227	Alternator, 40 AMP	1
4	8365	Starter	1
5	91175	Oil Pressure Switch	1
6	HDW91187	Fitting, 1/8 NPT, M-F	1
7	8516	Oil Filter	1
8	91115	Muffler	1
--	92164	Gasket, Exhaust (Not Shown)	--
9	91776	Tail Pipe	1
10	92533	Clamp 1-1/2|	1
11	--	--	--
12	--	--	--
13	93632	Air Cleaner Assembly	1
14	91136	Air Filter Element	1
15	91188	Intake Hose	1
16	91340	Hose, 2.00” I.D. Flex	1
17	7545	Hose Clamp	2
18	91799	Breather Cap	1
19	91133	Carburetor Flange	1
20	91617	Carburetor Assembly	1
21	91130	Hub	1
22	91129	KTR Housing Kit, DF752	1
22a	91573	Coupler, Outer	--
23	91160	Hydraulic Pump	1
24	HDW6433	Screw, 3/8-16 × 1”	2
25	91765	Ring Gear	1
26	91766	Flywheel	1
27	21020	Bracket, Components	1
28	91177	Fuel Pump	1
29	6458	Hose, Fuel, 5/16	As Req
30	7788	Hose Clamp, 5/16	5
31	8514	Fuel Filter	1
32	50015	Screw, M8 x 50	2
33	50048	Nut, M8 Nylock	2
34	7406	Hose Assembly, LP	1
35	HDW6894	Elbow, 90° Brass	1
36	91132	Valve, Lockoff	1
37	91197	LP Hose, ½”	10 in
38	91198	Radiator Hose, 3/8”	60 in
39	91232	Hose Clamp, #8	6
40	9833	LPG Regulator	1
41	91119	Solenoid, Throttle	1
42	HDW9247	Screw, Cap Socket Head, ¼–28 × 1.0”	1

Item	Part Number	Description	Qty
Additional attaching engine parts found earlier in this section			
43	HDW91231	Jamnut, ¼–28	2
44	50028	Screw, M6 x 20	6
45	50047	Nut, M6 Nylock	6
46	91375	Relay, Throttle	1
47	91375	Choke Bracket	1
48	9502	Choke Solenoid	1
49	9498	Choke Linkage	1
50	HDW91283	Screw, M6–1.0 × 25	1
51	20204	Spacer	1
52	9252	Throttle Linkage	1
53	92944	Solenoid Gas Shutoff	1
54	92945	Solenoid Propane Shutoff	1
55	92944	Wire Assembly, Gas Shutoff Solenoid	1
56	91046	Manifold Exhaust	1
57	91559	Gasket Muffler Flange	1

As Req - As Required

Engine – Dual Fuel, Kubota Part 1

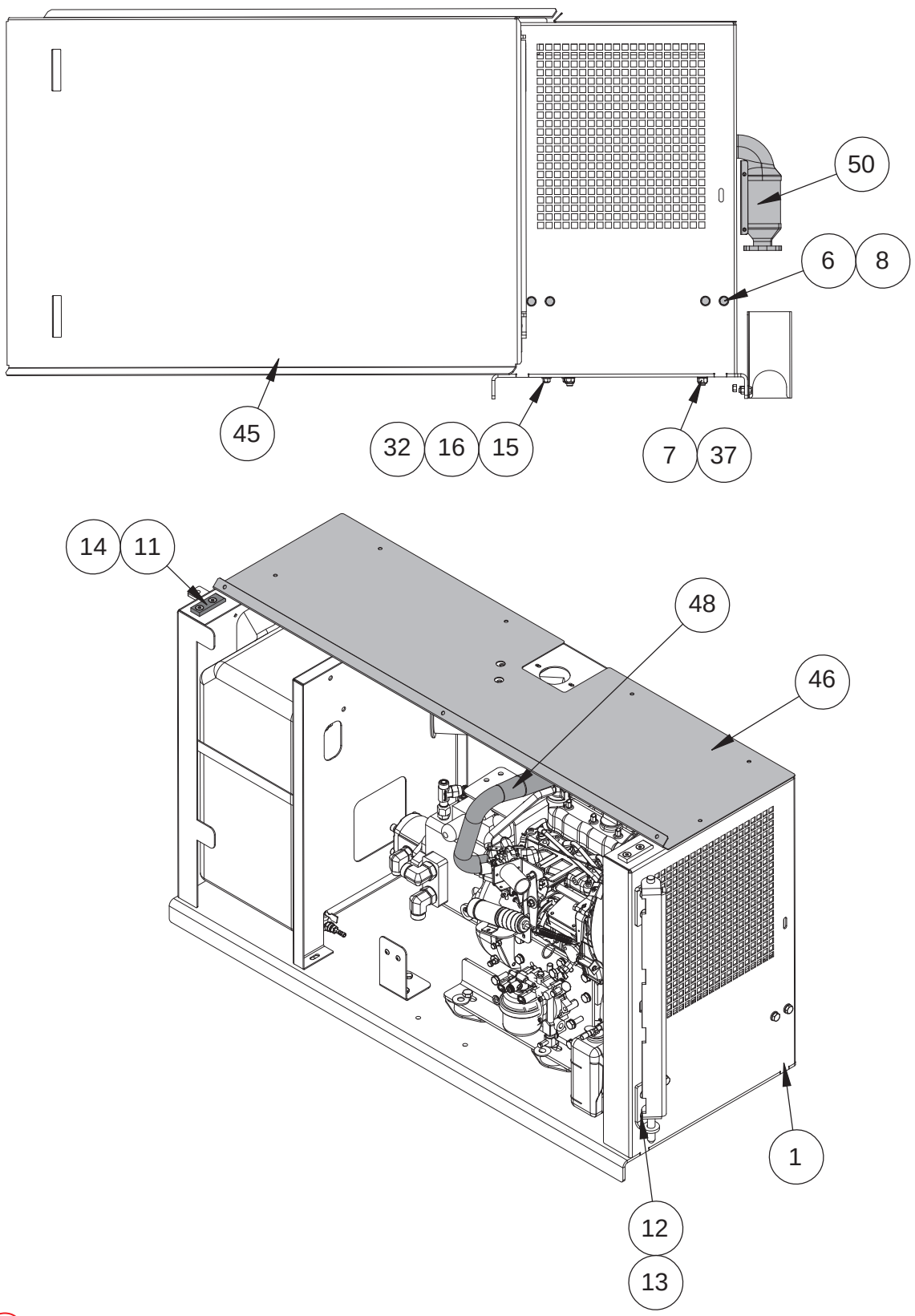


ILLUSTRATION No.
ART_5861

XX84RT

Dual Fuel Engine Assembly

Item	Part Number	Description	Qty.
1	19683	Engine Module	1
6	50215	HHCS M10-1.50X020 08 ZP F	4
7	50049	NNYL M10X1.50 08 ZP Nylon Inse	16
8	50002	WSHR M10 ZP Standard Flat	14
11	19443	Wear Pad Door UHMW XX84	2
12	50342	CARB M10-1.50X25 08 ZP Carriage	4
13	50006	WSHR M10 ZP Nordlock	6
14	53252	M08-1.25 X 30 SS	4
15	50001	WSHR M08 ZP Standard Flat	12
16	50048	NNYL M08X1.25 08 ZP Nylon	12
32	50007	WSHR M12 ZP Nordlock	23
37	50050	NNYL M12X1.75 08 ZP Nylon Inse	3
45	19690	Engine Module Door Weldment	1
46	19688	Top Cover, Engine	1
48	19696	Air Intake Dual Fuel	1
50	CAT REC	\X2\000D\X0\\X2\000A\X0\	REF

REF - Reference

Engine – Dual Fuel, Kubota Part 2

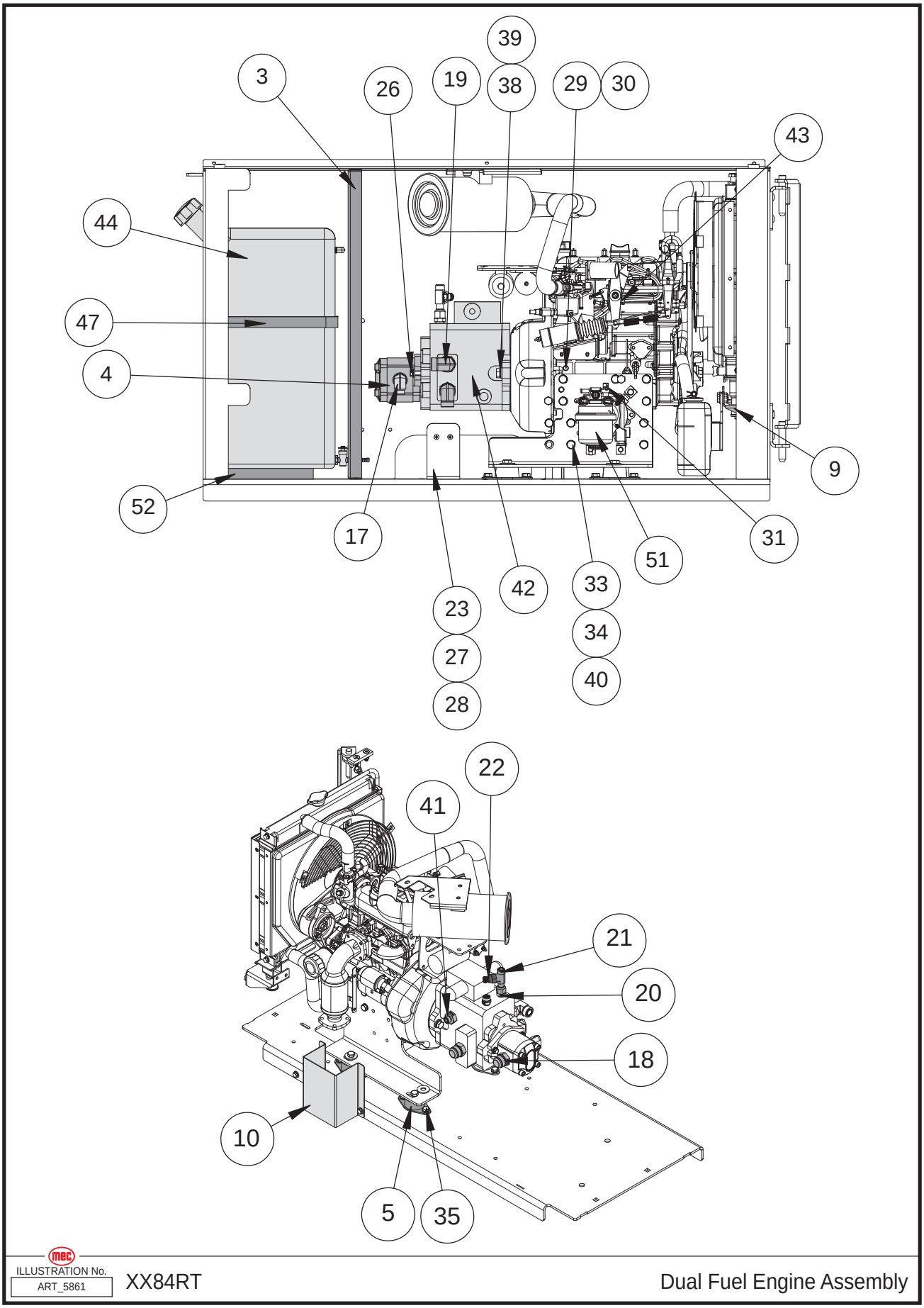


ILLUSTRATION No. ART_5861 XX84RT Dual Fuel Engine Assembly

Item	Part Number	Description	Qty.
2	19405	Weldment, Exhaust	1
3	19682	Bulkhead, Engine	1
4	91673	Pump, 10CC	1
5	17969	Motor Mount, Engine	4
9	19685	Radiator	2
10	19159	Hose Cover	1
17	50848	HYFT MFFOR-MB90-8-10	1
18	51211	HYFT MB-MJ-12-16; 6400-16-12	2
19	50843	HYFT MFFOR-MB90-12-12	2
20	50840	HYFT MFFOR-MB-8-6 FS6400-08-06-O	2
21	50811	HYFT MFFOR-FFORX-MFFOR-8	1
22	50804	HYFT MFFOR-FFORX-6-8	1
23	19472	Relay Bracket	1
26	50019	HHCS M08-1.25X085 08 ZP P	2
27	50191	THMS #10-32X00.50 ZP	2
28	50238	NNYL #10-32 05 Z	2
29	50445	HHCS M06-1.00X16 08 ZP P	2
30	50047	NNYL M06X1.00 08 ZP Nylock	2
31	50164	NJAM 01/04-28 05 ZP Hex Jam Nut	1
33	50392	HHCS M10-1.25X30 08 ZP	8
34	50237	HHCS M08-1.25X100 08 ZP P	2
35	50033	HHCS M10-1.50X025 08 ZP F	8
38	50003	WSHR M12 ZP Standard Flat	2
39	50069	HHCS 01/02-13X01.50 08 ZP	2
40	50000	WSHR M06 ZP Standard Flat	2
41	50838	HYFT MFFOR-MB-8-12	1
42	94795	28CC Closed Loop Drive Pump	1
43	19691	Dual Fuel Engine Assy	1
44	19697	Fuel Tank Assy	1
47	19684	Fuel Tank	1
51	91116	Fuel Filter Assembly	1
--	91123	Fuel Filter Element	1
52	22270	Boom Rest Pad	1

LP Tank – Dual Fuel

DUAL FUEL MODELS

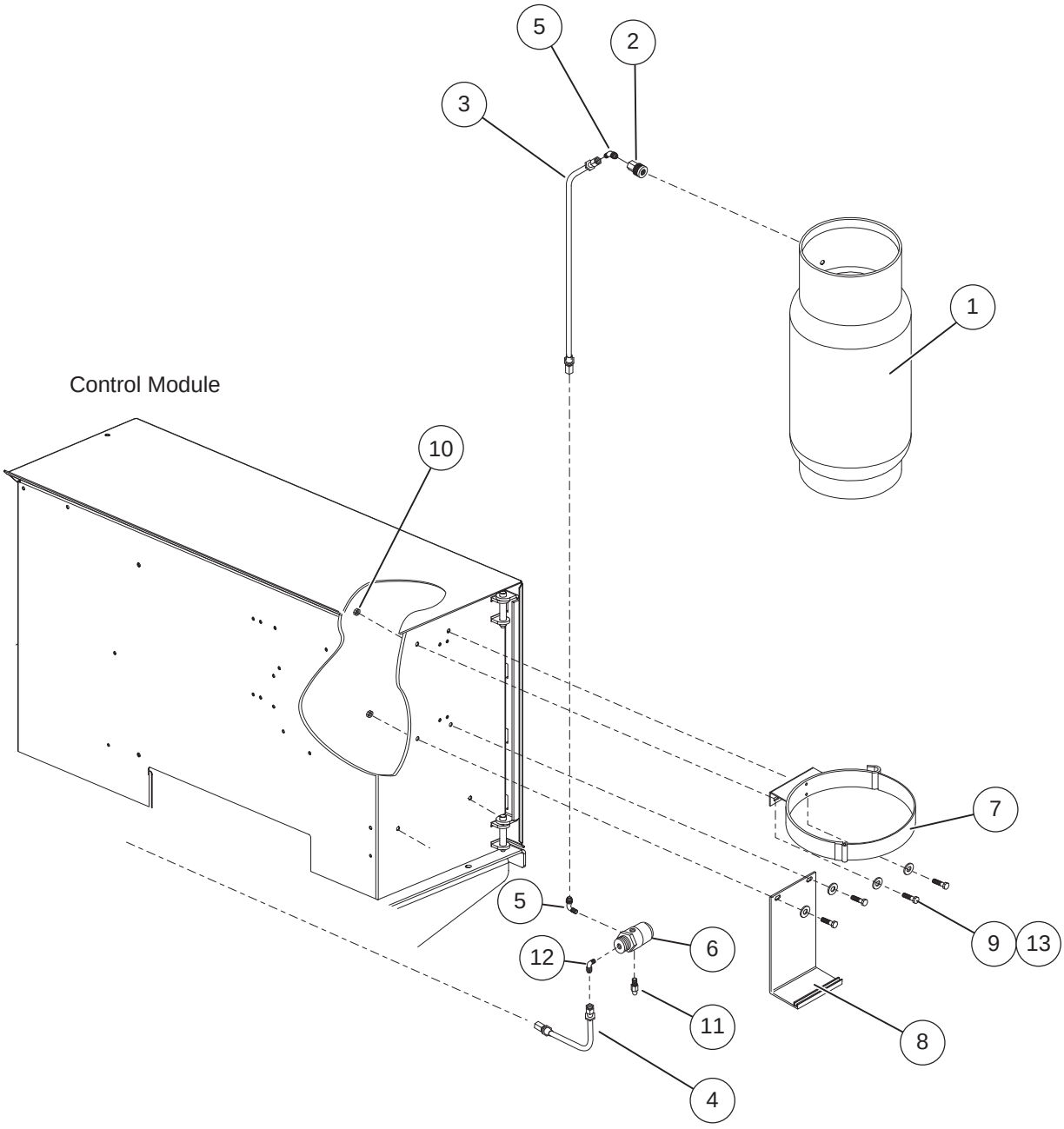


ILLUSTRATION No. ART_2128 R2

Dual Fuel

LP Tank

Item	Part Number	Description	Qty.
1	6859	LP Tank	1
2	6868	Quick Disconnect	1
3	6890	Hose Assembly, 30”	1
4	7406	Hose Assembly, 90”	1
5	HDW6894	Elbow, Brass, NPT to SAE 45°	2
6	6861	Bulkhead Filter	1
7	6860	Bracket, Tank Mount	1
8	19102	Tank Support Weldment	1
9	50031	Screw, M8 x 25	4
10	50048	Locknut, M8 Nylock	4
11	6938	Relief Valve	1
12	HDW6727	Elbow, Brass NPT to SAE 90	1
13	50001	Washer, M8 Flat	4

Generator Option, RT - Old Style

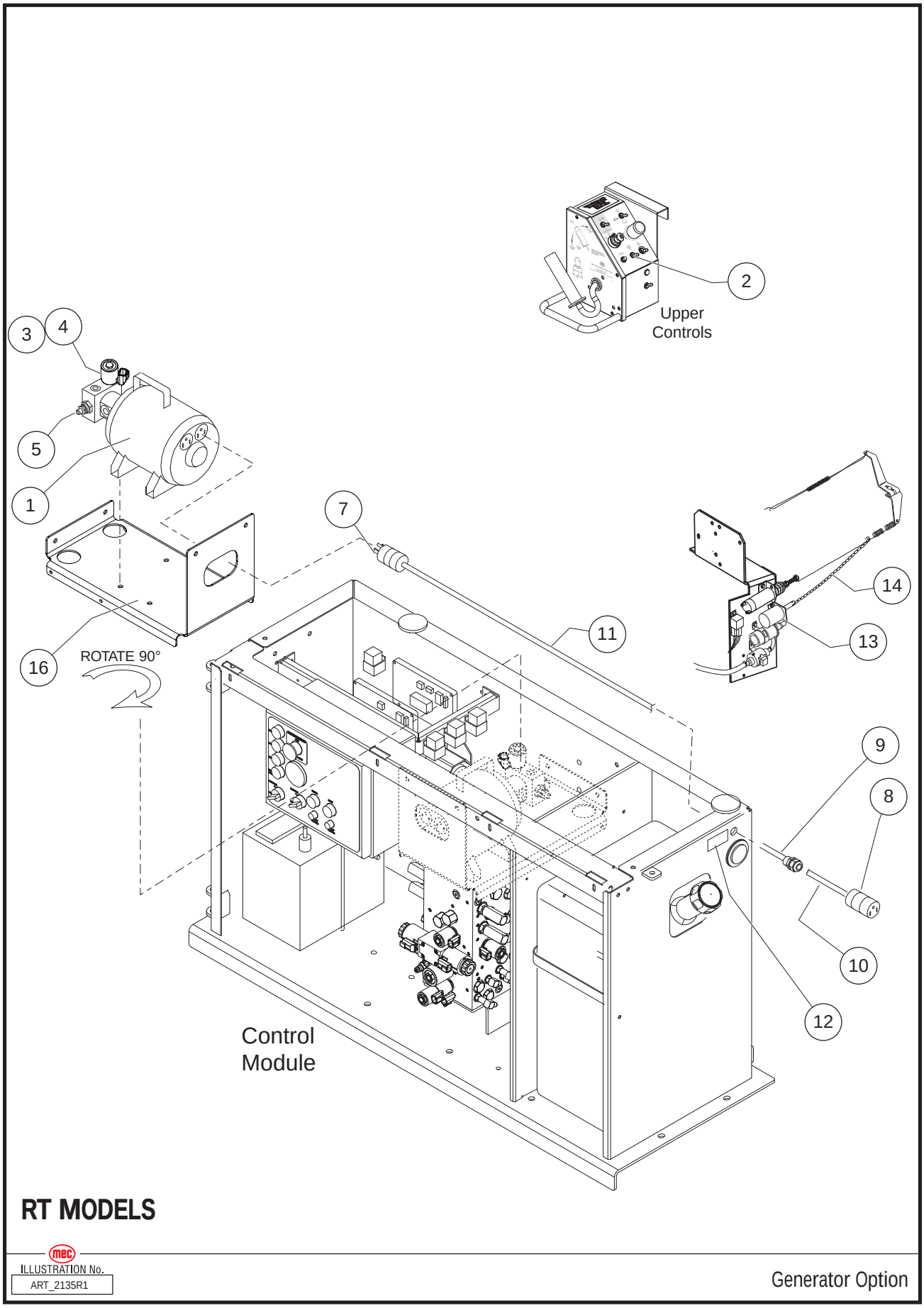


ILLUSTRATION No.
ART_2135R1

Generator Option

Item	Part Number	Description	Qty.
Refer to Section 5 for Hose Kit			
1	91550	Generator, 2000 Watt	1
2	7423	Switch Toggle 1 Pole 2 Position 3	1
3	91551	Valve, Solenoid, 2-Way, N.C. -- Included With Item #1	--
4	91002	Coil, 12V 10 Series -- Included With Item #1	--
5	91546	Needle Valve -- Included With Item #1	--
6	--	--	--
7	91544	Plug, Male, 3 Prong	1
8	91545	Receptacle, Female	2
9	7594	Strain Relief	1
10	--	--	--
11	7617	Wire, 14GA, 3 conductor	6 ft.
12	91556	Label, AC Generator	1
13	9502	Solenoid, Generator-Throttle, Gas Engine	1
	91119	Solenoid, Generator-Throttle, Diesel Engine	1
14	91469	Chain, Sash #8	2 ft.
15	92196	Harness, Engine Intermediate, Generator Option	1
16	16369	Bracket, Generator Mount	1

Wire Harness – Electric Models

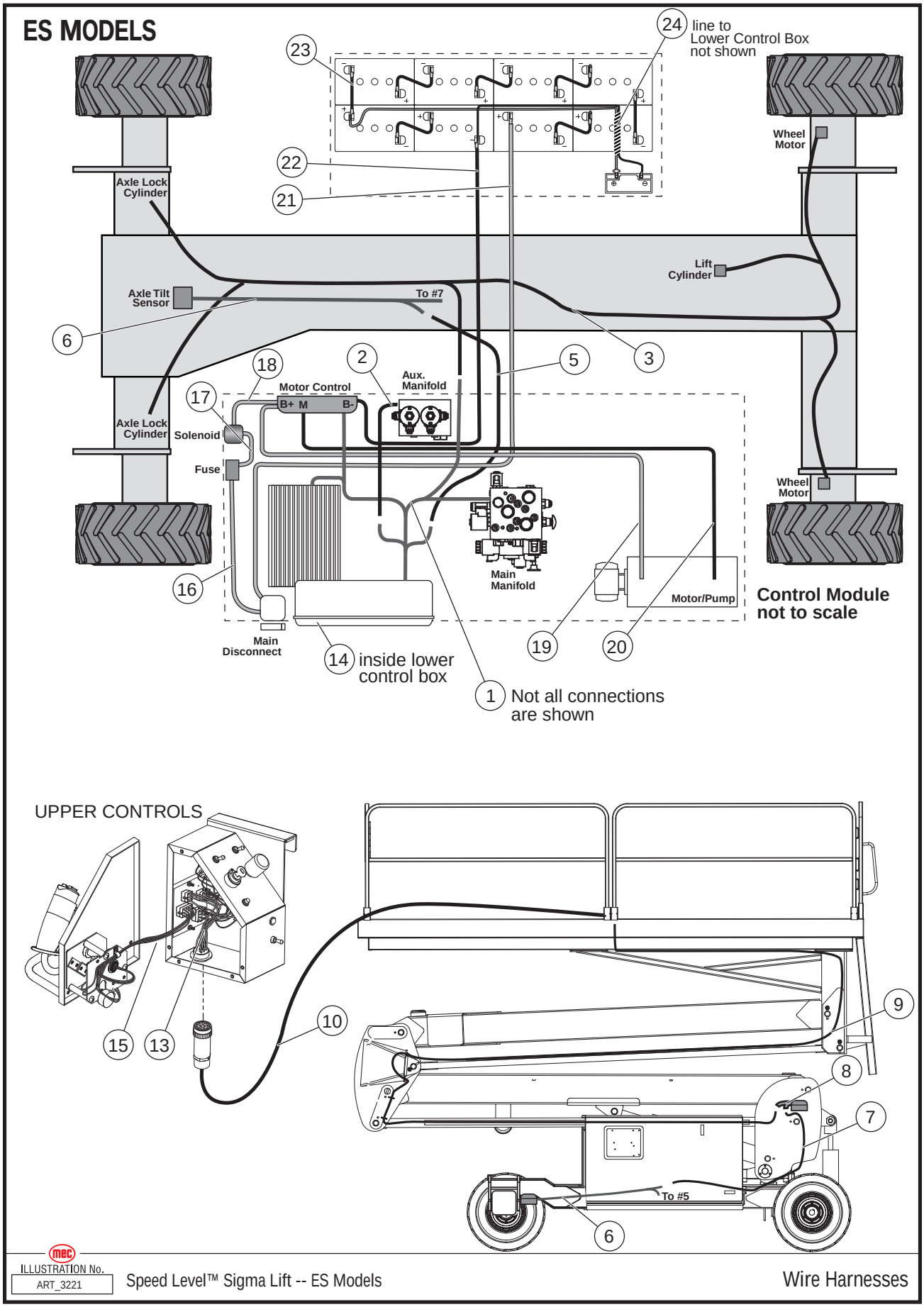


ILLUSTRATION No. ART_3221

Speed Level™ Sigma Lift -- ES Models

Wire Harnesses

Item	Part Number	Description	Qty.
1	92145	Harness, Main, Lower Control Box To Valve Manifold And Modules	1
2	92134	Harness, Main Harness To Level Manifold	1
3	92135	Harness, Main Harness To Down Valve, Axle Cylinders, Wheel Bypass	1
4	--	--	--
5	92137	Harness, Communication, Main Harness To Axle CAN-Tilt	1
6	92138	Harness, Communication, Axle CAN-Tilt Connection Adapter	1
7	92139	Harness, Communication, Axle CAN-Tilt To Boom Pivot CAN-Tilt	1
8	92140	Harness, Communication, Boom Pivot Angle CAN-Tilt Adapter	1
9	92141	Harness, Communication, Boom Pivot Angle CAN-Tilt To Platform Bottom	1
10	91780	Harness, Communication, Platform Bottom To Upper Control Box, Removable Control Box	1
	92195	Harness, Communication, Platform Bottom To Upper Control Box, Fixed Control Box	1
11	9441	Cable, Power to Platform, 3084 (Not Shown -- Connects Plug On Module Base To Plug At Platform)	55 ft.
		Cable, Power to Platform, 2684 (Not Shown -- Connects Plug On Module Base To Plug At Platform)	50 ft.
12	--	--	--
13	92143	Harness, Inside Upper Control Box Base -- Removable Control Box Only	1
14	92146	Harness, Lower Control Box Interior	1
15	92193	Harness, Matrix Module To Joystick	1
16	92150	Cable, Master Disconnect To Fuse	1
17	92151	Cable, Fuse To Solenoid	1
18	92151	Cable, Solenoid To Motor Controller B+	1
19	92152	Cable, Red, Motor Controller B+ To Motor B+	1
20	92153	Cable, Black, Motor Controller M To Motor B-	1
21	92148	Cable, Battery+ To Master Disconnect	1
22	92149	Cable, Battery- To Motor Controller B-	1
23	6208	Cable, Battery Connection	7
24	92147	Harness, Emergency Down	1

Wire Harness – RT Models

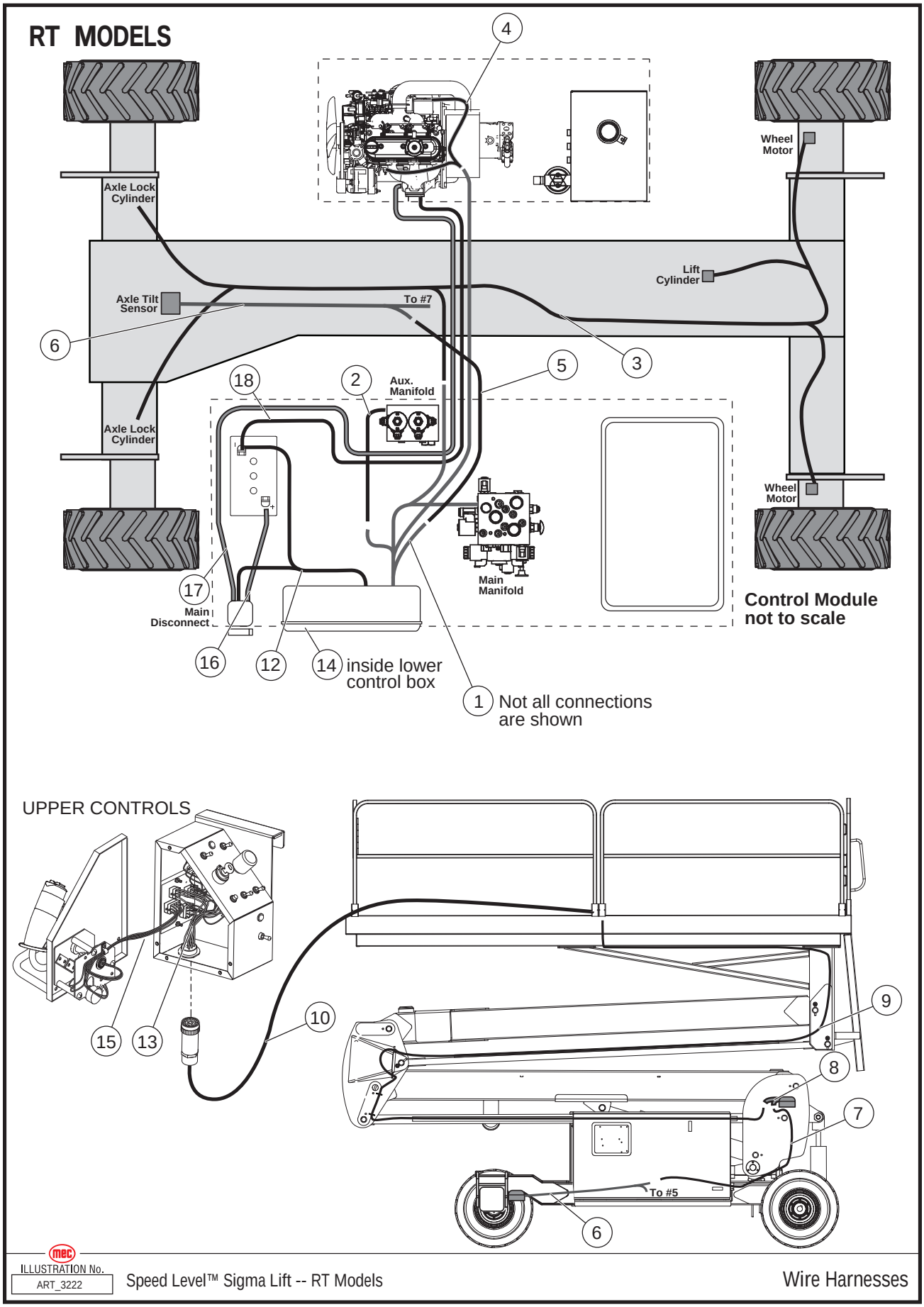


ILLUSTRATION No. ART_3222

Speed Level™ Sigma Lift -- RT Models

Wire Harnesses

Item	Part Number	Description	Qty.
1	92133	Harness, Main, Lower Control Box To Valve Manifold And Modules	1
2	92134	Harness, Main Harness To Level Manifold	1
3	92135	Harness, Main Harness To Down Valve, Axle Cylinders, Wheel Bypass	1
4	92136	Dual Fuel - Harness, Engine, Main Harness To Engine	1
	92222	Diesel - Harness, Engine, Main Harness To Engine	1
5	92137	Harness, Communication, Main Harness To Axle CAN-Tilt	1
6	92138	Harness, Communication, Axle CAN-Tilt Connection Adapter	1
7	92139	Harness, Communication, Axle CAN-Tilt To Boom Pivot CAN-Tilt	1
8	92140	Harness, Communication, Boom Pivot Angle CAN-Tilt Adapter	1
9	92141	Harness, Communication, Boom Pivot Angle CAN-Tilt To Platform Bottom	1
10	91780	Harness, Communication, Platform Bottom To Upper Control Box, Removable Control Box	1
	92196	Harness, Communication, Platform Bottom To Upper Control Box, Fixed Control Box	1
11	9441	Cable, Power To Platform, 3084 (Not Shown -- Connects Plug On Module Base To Plug At Platform)	55
		Cable, Power To Platform, 2684 (Not Shown -- Connects Plug On Module Base To Plug At Platform)	50
12	92142	Harness, 12V Power Supply To Lower Control Box	1
13	92143	Harness, Inside Upper Control Box Base -- Removable Control Box Only	1
14	92144	Harness, Lower Control Box Interior	1
15	92193	Harness, Matrix Module To Joystick	1
16	92154	Cable, Battery+ To Master Disconnect	1
17	92155	Cable, Master Disconnect To Engine Starter	1
18	92156	Cable, Battery- To Engine	1

Decals, ES Models, ANSI Specification - Part 1

ES MODELS - ANSI

1

2 3084ES

mec 3084ES SPEED LEVEL™

2684ES

mec 2684ES SPEED LEVEL™

5



6

⚠ WARNING

- **SHEET LOADING GATE** MUST BE IN LOWERED LOCKED POSITION BEFORE OPERATING FROM PLATFORM.
- **PLATFORM ENTRANCE** MUST BE PROPERLY CLOSED AND ALL GUARDRAILS PROPERLY IN PLACE AND SECURED BEFORE OPERATING FROM PLATFORM.

FAILURE TO FOLLOW INSTRUCTIONS COULD CAUSE DEATH OR PERSONAL INJURY.

91888

7

⚠ WARNING

INSPECT MACHINE AND MAKE SURE THAT IT IS OPERATING PROPERLY, THAT ALL NAME PLATE AND SAFETY AND CONTROL DECALS ARE IN PLACE AND LEGIBLE, AND THAT THE MACHINE IS IN ACCORDANCE WITH THE MANUFACTURER'S MAINTENANCE REQUIREMENTS CONTAINED IN THE OPERATION AND MAINTENANCE MANUAL AND THE DAILY SAFETY CHECKLIST.

OPERATE MACHINE WITH EXTREME CAUTION. WATCH FOR OBSTRUCTIONS WHICH MAY STRIKE PLATFORM, PERSONNEL, CONTROLS, OR MACHINE. OPERATE CONTROLS SLOWLY FOR SMOOTH PLATFORM MOTION.

FOR DRIVING WITH PLATFORM LOWERED:

- DO NOT EXCEED MAXIMUM PLATFORM OR EXTENSION LOAD LIMIT CAPACITY. LOAD TO BE UNIFORMLY DISTRIBUTED. PLACE LOAD NEAR CENTER OF PLATFORM WHEN POSSIBLE.
- DO NOT DRIVE ON SIDE SLOPE IF PLATFORM IS OVER 5% OFF LEVEL.
- DO NOT DRIVE UP OR DOWN A GRADE OF OVER 40%.

FOR DRIVING WITH PLATFORM ELEVATED:

- DRIVE ONLY ON A SMOOTH, FIRM, AND PLANAR SURFACE FREE OF OBSTRUCTIONS.
- DO NOT EXCEED MAXIMUM PLATFORM OR EXTENSION LOAD CAPACITY.
- LOAD MUST BE UNIFORMLY DISTRIBUTED.
- IF TILT WARNING LIGHT ILLUMINATES OR TILT ALARM SOUNDS LOWER PLATFORM AND RE-LEVEL
- USE EXTREME CAUTION.

OTHER HAZARDS

1. DO NOT EXCEED PLATFORM LOAD CAPACITY.
2. DO NOT EXCEED MAXIMUM SIDE FORCE AND MAXIMUM NUMBER OF OCCUPANTS.
3. DO NOT USE WITHOUT GUARD RAILS IN PLACE, AND ENTRY GATE PROPERLY SECURED.
4. DO NOT USE IF WORK PLATFORM IS NOT WORKING PROPERLY OR IF ANY PART IS DAMAGED OR WORN.
5. DO NOT USE NEAR MOVING VEHICLES OR CRANES.
6. DO NOT STAND OR SIT ON GUARDRAILS, ALL PERSONNEL SHALL ALWAYS MAINTAIN FIRM FOOTING ON PLATFORM FLOOR.
7. DO NOT USE WHILE UNDER THE INFLUENCE OF ALCOHOL OR DRUGS.
8. DO NOT OVERRIDE SAFETY DEVICES.
9. DO NOT LEAVE MACHINE UNATTENDED WITH KEY IN THE SWITCH.
10. DO NOT RAISE PLATFORM WHILE MACHINE IS ON A TRUCK, FORKLIFT, OR OTHER DEVICE OR VEHICLE.
11. DO NOT USE LADDER, SCAFFOLDING, OR OTHER DEVICES TO INCREASE SIZE OR WORKING HEIGHT OF PLATFORM.
12. DO NOT ENTER OR EXIT PLATFORM WHILE IN MOTION.
13. DO NOT RECHARGE BATTERIES NEAR SPARKS OR OPEN FLAME. BATTERIES EMIT HIGHLY EXPLOSIVE HYDROGEN GAS.
14. DO NOT PERFORM SERVICE ON THE MACHINE WITHOUT PROPERLY SUPPORTING ELEVATING ASSEMBLY.
15. DO NOT ATTACH OVERHANGING LOADS OR INCREASE PLATFORM SIZE.

IMPROPER OPERATION OF THIS MACHINE COULD CAUSE DEATH OR SERIOUS INJURY.

91846

8

⚠ DANGER

YOU MUST NOT OPERATE THIS MACHINE:

UNLESS YOU HAVE BEEN AUTHORIZED TO USE AND TRAINED IN THE SAFE OPERATION OF THIS MACHINE.

TRAINING INCLUDES COMPLETE KNOWLEDGE OF THE SAFETY AND OPERATION INSTRUCTIONS CONTAINED IN THE MANUFACTURERS MANUAL, ANSI MANUAL OF RESPONSIBILITIES, YOUR EMPLOYERS WORK RULES AND APPLICABLE GOVERNMENTAL REGULATIONS.

AN UNAUTHORIZED AND UNTRAINED OPERATOR SUBJECTS THEMSELF AND OTHERS TO DEATH OR SERIOUS INJURY.

ELECTROCUTION HAZARD
THIS MACHINE IS NOT INSULATED

MAINTAIN SAFE CLEARANCE FROM ELECTRICAL LINES AND APPARATUS. YOU MUST ALLOW FOR MACHINE SWAY, ROCK OR SAG AND ELECTRICAL LINES SWAYING.

THIS MACHINE DOES NOT PROVIDE PROTECTION FROM CONTACT WITH OR PROXIMITY TO AN ELECTRICALLY CHARGED CONDUCTOR.

YOU MUST MAINTAIN A CLEARANCE OF AT LEAST TEN (10) FEET BETWEEN ANY PART OF THIS MACHINE OR ITS LOAD AND ANY ELECTRICAL LINE OR APPARATUS CARRYING UP TO 50,000 VOLTS. ONE FOOT OF ADDITIONAL CLEARANCE IS REQUIRED FOR EVERY ADDITIONAL 30,000 VOLTS OR LESS.

DEATH OR SERIOUS INJURY WILL RESULT FROM CONTACT OR INADEQUATE CLEARANCE

TIP-OVER HAZARDS



DO NOT DRIVE NEAR DROP-OFFS, HOLES, OPEN ELEVATOR SHAFTS, AND LOADING DOCKS



DO NOT ELEVATE PLATFORM ON UNEVEN OR SOFT SURFACES

DO NOT DRIVE ONTO UNEVEN OR SOFT SURFACES WHEN ELEVATED



DO NOT RAISE PLATFORM IN WINDY OR GUSTY CONDITIONS

DEATH OR SERIOUS INJURY WILL RESULT FROM IMPROPER USE OF THIS EQUIPMENT

91845

9

⚠ WARNING

USE OR OPERATION OF AN UNINSPECTED WORK PLATFORM COULD CAUSE DEATH, PERSONAL INJURY

NEW	• DO NOT OPERATE THIS WORK PLATFORM IF AN INSPECTION HAS NOT BEEN PERFORMED WITHIN 13 MONTHS OF THE LAST RECORDED INSPECTION DATE.	6TH YEAR
1ST YEAR		7TH YEAR
2ND YEAR	• STAMP MONTH/DAY/YEAR NEXT TO APPROPRIATE YEAR AFTER EACH INSPECTION.	8TH YEAR
3RD YEAR	– NOTICE –	9TH YEAR
4TH YEAR	CHANGE OF OWNERSHIP OF THIS WORK PLATFORM MUST BE REPORTED TO MANUFACTURER: MEC Aerial Platform Sales Corp. 4700 E. Jensen Avenue Fresno, California 93725 Phone: (559) 263-9626	10TH YEAR
5TH YEAR		

90718

10

⚠ WARNING

- LANYARD ANCHORAGE POINTS ARE RECOMMENDED FOR WORK POSITIONING RESTRAINTS ONLY.

USE OF FALL ARREST SYSTEMS ATTACHED TO ANCHORAGE POINTS ON MOBILE EQUIPMENT MAY CAUSE MACHINE TO TIP, RESULTING IN SERIOUS INJURY OR DEATH.

8606

11

CERTIFIED LANYARD ANCHORAGE POINT

8605

14

MADE IN USA

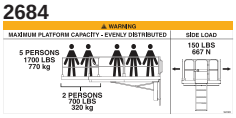


MEC AERIAL PLATFORM SALES CORP.

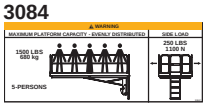
90720

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2684



3084



13

⚠ WARNING

DISTANCE FROM GROUND TO LADDER WILL VARY WITH GROUND VARIATIONS. CHECK DISTANCE BEFORE LEAVING PLATFORM.

91849

15



16



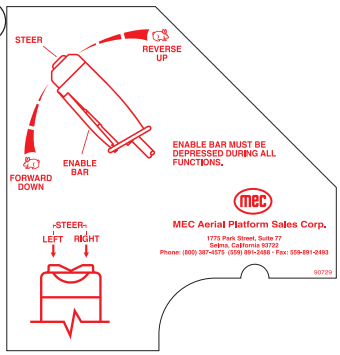
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LOCATE CONTROL BOX HERE

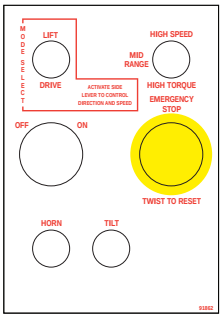
FOR NORMAL OPERATION OF THIS UNIT

7155

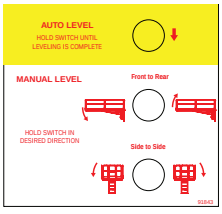
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20



21

THIS MACHINE HAS BEEN CONSTRUCTED IN ACCORDANCE WITH CAN B354.2-01.

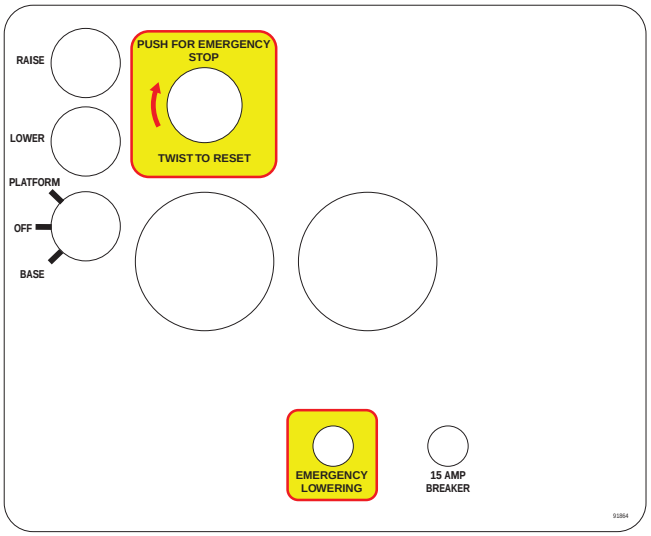
ILLUSTRATION No. ART_3124 | Sigma Level | ANSI Speed Level™ ES Models: Sheet 1 of 4 | Decals

Item	Part Number	Description	Qty.
1	90719	Decal, MEC Oval	1
2	91987	3084ES -- Decal, MEC 3084ES	2
	92232	2684ES -- Decal, MEC 3084ES	2
3	--	--	--
4	--	--	--
5	8911	Decal, Manuals Inside	1
6	91869	Decal, Warning, Sheet Loading	1
7	91846	Decal, Warning Panel	1
8	91845	Decal, Danger, Electric - Tipover - Wind Rating	1
9	90718	Warning, Inspection Report	1
10	8606	Warning, Lanyard (Option)	1
11	8605	Decal, Anchorage Point (Option)	5
12	91847	3084 -- Decal, Capacity, 1500 LB	2
	92228	2684 -- Decal, Capacity, 1700 LB	2
13	91849	Decal, Ladder Clearance	1
14	90739	Decal, Made in USA	1
15	91850	Decal, Crush Hazard	4
16	7156	Decal, Front	1
17	7155	Decal, Locate Control Box Here	1
18	90729	Decal, Upper Control Box, Side	1
19	91862	Decal, Upper Controls	1
20	91843	Decal, Level Controls	1
21	90794	CAN B354 (Canadian Only)	1

Decals, ES Models, ANSI Specification - Part 2

ES MODELS - ANSI

22



23

Quad-Trax™ 4wd

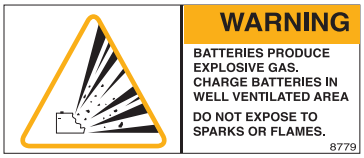
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2684	3084
PLATFORM CAPACITY 1700 LBs (770kg) 92122	PLATFORM CAPACITY 1500 LBs (680kg) 91848

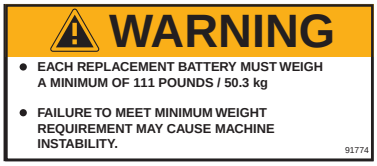
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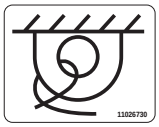
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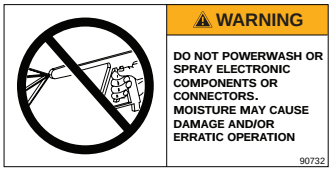
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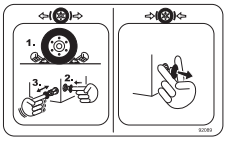
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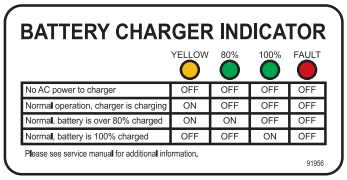
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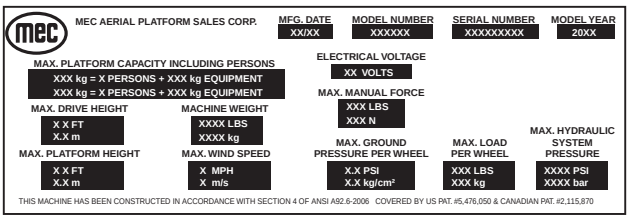
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39



ILLUSTRATION No. ART_3125 | Sigma Level | ANSI Speed Level™ ES Models: Sheet 2 of 4 | Decals

Item	Part Number	Description	Qty.
22	91864	Decal, Lower Controls	1
23	91266	Decal, Quad Trax 4wd	2
24	91848	3084 -- Decal, Platform Capacity, Small	1
	92122	2684 -- Decal, Platform Capacity, Small	1
25	9052	Decal, Battery Disconnect And Lock	1
26	8779	Warning, Battery, Explosive Gas	1
27	91774	Warning, Battery Replacement	1
28	11026730	Tie Down Point	2
29	90732	Decal, Warning, Pressure Wash	1
30	6873	Decal, Hydraulic Oil	1
31	90750	Decal, Battery Charger	1
32	92089	Decal, Brake Release	1
33	8502	Decal, Tire Inflation	4
34	91956	Decal, Battery Charge Indicator	1
35	--	--	--
36	90725	Decal, Warning, Tire Replacement	4
37	90751	Decal, Power To Platform	1
38	91592	Serial Plate	1
39	91870	Decal, Greaseport	1

Decals, ES Models, ANSI Specification - Part 3

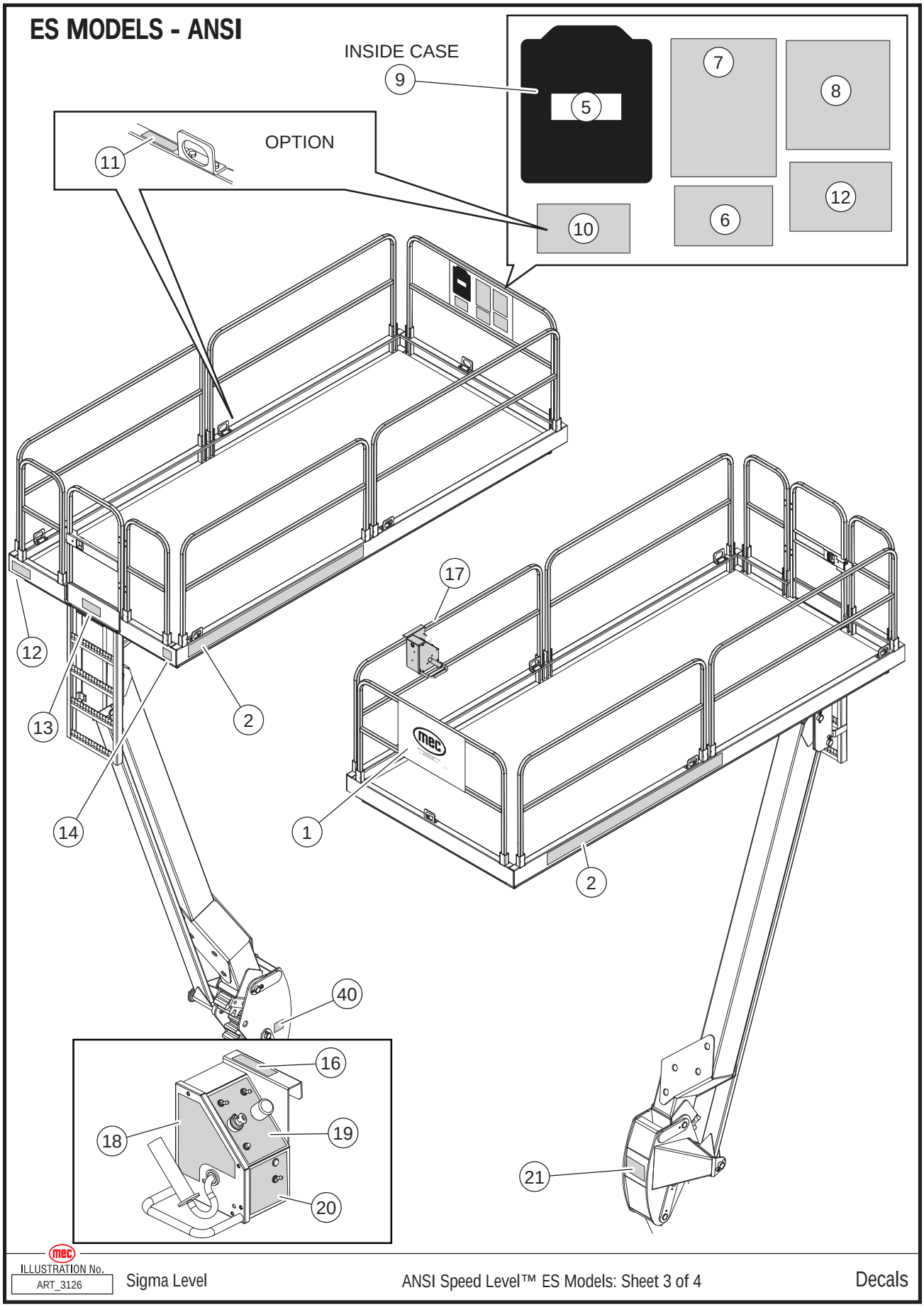


ILLUSTRATION No. ART_3126 Sigma Level ANSI Speed Level™ ES Models: Sheet 3 of 4 Decals

Decals, ES Models, ANSI Specification - Part 4

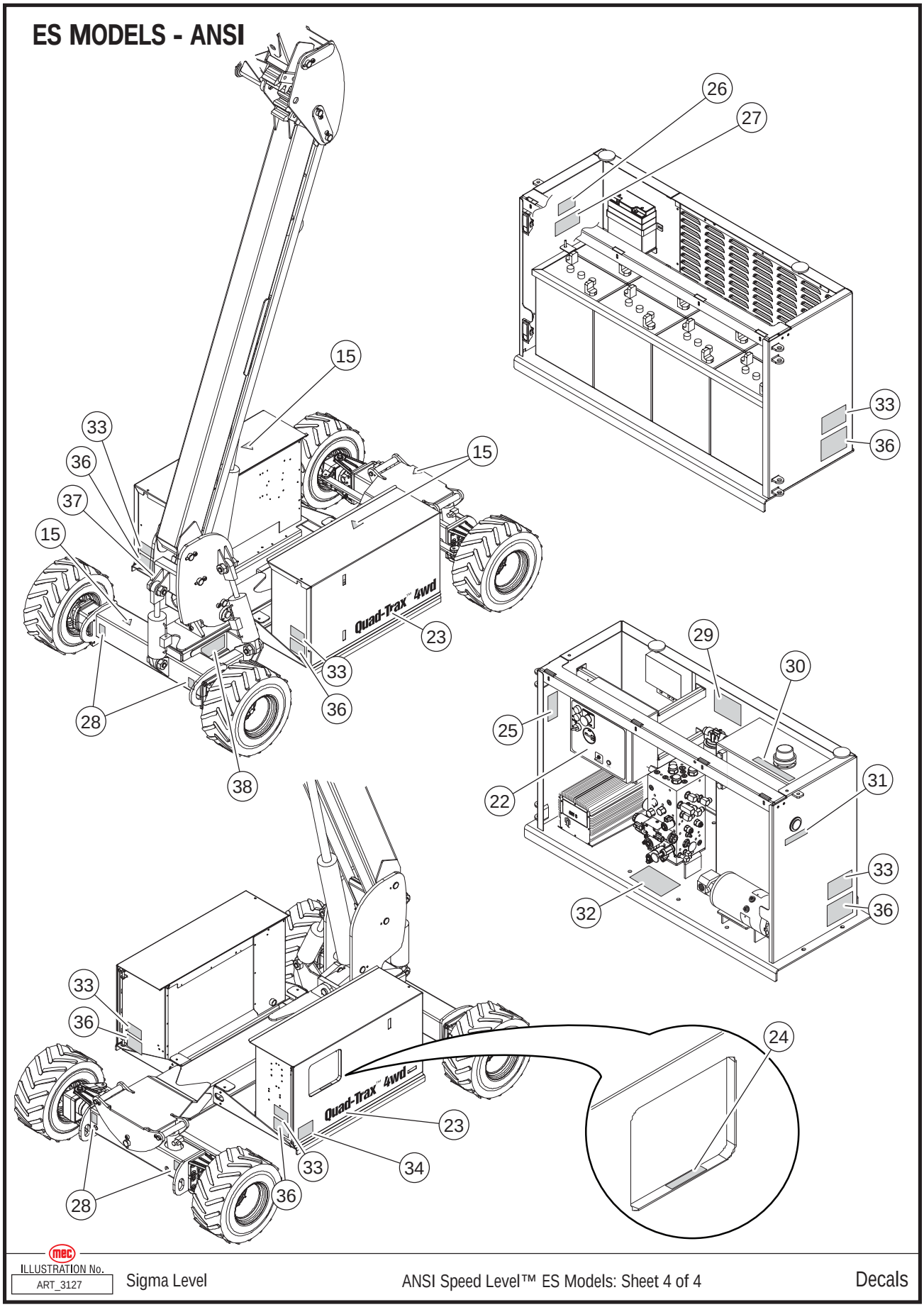


ILLUSTRATION No. ART_3127 | Sigma Level | ANSI Speed Level™ ES Models: Sheet 4 of 4 | Decals

Decals, RT Models, ANSI Specification - Part 1

RT MODELS - ANSI

1

2 3084RT

mec 3084RT SPEED LEVEL™

2684RT

mec 2684RT SPEED LEVEL™

5



6

⚠ WARNING

- **SHEET LOADING GATE** MUST BE IN LOWERED LOCKED POSITION BEFORE OPERATING FROM PLATFORM.
- **PLATFORM ENTRANCE** MUST BE PROPERLY CLOSED AND ALL GUARDRAILS PROPERLY IN PLACE AND SECURED BEFORE OPERATING FROM PLATFORM.

FAILURE TO FOLLOW INSTRUCTIONS COULD CAUSE DEATH OR PERSONAL INJURY.

91869

7

⚠ WARNING

INSPECT MACHINE AND MAKE SURE THAT IT IS OPERATING PROPERLY, THAT ALL NAME PLATE AND SAFETY AND CONTROL DECALS ARE IN PLACE AND LEGIBLE, AND THAT THE MACHINE IS IN ACCORDANCE WITH THE MANUFACTURER'S MAINTENANCE REQUIREMENTS CONTAINED IN THE OPERATION AND MAINTENANCE MANUAL AND THE DAILY SAFETY CHECKLIST.

OPERATE MACHINE WITH EXTREME CAUTION. WATCH FOR OBSTRUCTIONS WHICH MAY STRIKE PLATFORM, PERSONNEL, CONTROLS, OR MACHINE. OPERATE CONTROLS SLOWLY FOR SMOOTH PLATFORM MOTION.

FOR DRIVING WITH PLATFORM LOWERED:

- DO NOT EXCEED MAXIMUM PLATFORM OR EXTENSION LOAD LIMIT CAPACITY. LOAD TO BE UNIFORMLY DISTRIBUTED. PLACE LOAD NEAR CENTER OF PLATFORM WHEN POSSIBLE.
- DO NOT DRIVE ON SIDE SLOPE IF PLATFORM IS OVER 5% OFF LEVEL.
- DO NOT DRIVE UP OR DOWN A GRADE OF OVER 40%.

FOR DRIVING WITH PLATFORM ELEVATED:

- DRIVE ONLY ON A SMOOTH, FIRM, AND PLANAR SURFACE FREE OF OBSTRUCTIONS.
- DO NOT EXCEED MAXIMUM PLATFORM OR EXTENSION LOAD CAPACITY.
- LOAD MUST BE UNIFORMLY DISTRIBUTED.
- IF TILT WARNING LIGHT ILLUMINATES OR TILT ALARM SOUNDS LOWER PLATFORM AND RE-LEVEL
- USE EXTREME CAUTION.

OTHER HAZARDS

1. DO NOT EXCEED PLATFORM LOAD CAPACITY.
2. DO NOT EXCEED MAXIMUM SIDE FORCE AND MAXIMUM NUMBER OF OCCUPANTS.
3. DO NOT USE WITHOUT GUARD RAILS IN PLACE, AND ENTRY GATE PROPERLY SECURED.
4. DO NOT USE IF WORK PLATFORM IS NOT WORKING PROPERLY OR IF ANY PART IS DAMAGED OR WORN.
5. DO NOT USE NEAR MOVING VEHICLES OR CRANES.
6. DO NOT STAND OR SIT ON GUARDRAILS. ALL PERSONNEL SHALL ALWAYS MAINTAIN FIRM FOOTING ON PLATFORM FLOOR.
7. DO NOT USE WHILE UNDER THE INFLUENCE OF ALCOHOL OR DRUGS.
8. DO NOT OVERRIDE SAFETY DEVICES.
9. DO NOT LEAVE MACHINE UNATTENDED WITH KEY IN THE SWITCH.
10. DO NOT RAISE PLATFORM WHILE MACHINE IS ON A TRUCK, FORKLIFT, OR OTHER DEVICE OR VEHICLE.
11. DO NOT USE LADDER, SCAFFOLDING, OR OTHER DEVICES TO INCREASE SIZE OR WORKING HEIGHT OF PLATFORM.
12. DO NOT ENTER OR EXIT PLATFORM WHILE IN MOTION.
13. DO NOT RECHARGE BATTERIES NEAR SPARKS OR OPEN FLAME. BATTERIES EMIT HIGHLY EXPLOSIVE HYDROGEN GAS.
14. DO NOT PERFORM SERVICE ON THE MACHINE WITHOUT PROPERLY SUPPORTING ELEVATING ASSEMBLY.
15. DO NOT ATTACH OVERHANGING LOADS OR INCREASE PLATFORM SIZE.

IMPROPER OPERATION OF THIS MACHINE COULD CAUSE DEATH OR SERIOUS INJURY.

91846

8

⚠ DANGER

YOU MUST NOT OPERATE THIS MACHINE:

UNLESS YOU HAVE BEEN AUTHORIZED TO USE AND TRAINED IN THE SAFE OPERATION OF THIS MACHINE.

TRAINING INCLUDES COMPLETE KNOWLEDGE OF THE SAFETY AND OPERATION INSTRUCTIONS CONTAINED IN THE MANUFACTURERS MANUAL, ANSI MANUAL OF RESPONSIBILITIES, YOUR EMPLOYERS WORK RULES AND APPLICABLE GOVERNMENTAL REGULATIONS.

AN UNAUTHORIZED AND UNTRAINED OPERATOR SUBJECTS THEMSELF AND OTHERS TO DEATH OR SERIOUS INJURY.

ELECTROCUTION HAZARD
THIS MACHINE IS NOT INSULATED

MAINTAIN SAFE CLEARANCE FROM ELECTRICAL LINES AND APPARATUS. YOU MUST ALLOW FOR MACHINE SWAY, ROCK OR SAG AND ELECTRICAL LINES SWAYING.

THIS MACHINE DOES NOT PROVIDE PROTECTION FROM CONTACT WITH OR PROXIMITY TO AN ELECTRICALLY CHARGED CONDUCTOR.

YOU MUST MAINTAIN A CLEARANCE OF AT LEAST TEN (10) FEET BETWEEN ANY PART OF THIS MACHINE OR ITS LOAD AND ANY ELECTRICAL LINE OR APPARATUS CARRYING UP TO 50,000 VOLTS. ONE FOOT OF ADDITIONAL CLEARANCE IS REQUIRED FOR EVERY ADDITIONAL 30,000 VOLTS OR LESS.

DEATH OR SERIOUS INJURY WILL RESULT FROM CONTACT OR INADEQUATE CLEARANCE

TIP-OVER HAZARDS

DO NOT DRIVE NEAR DROP-OFFS, HOLES, OPEN ELEVATOR SHAFTS, AND LOADING DOCKS

DO NOT ELEVATE PLATFORM ON UNEVEN OR SOFT SURFACES

DO NOT DRIVE ONTO UNEVEN OR SOFT SURFACES WHEN ELEVATED

DO NOT RAISE PLATFORM IN WINDY OR GUSTY CONDITIONS

DEATH OR SERIOUS INJURY WILL RESULT FROM IMPROPER USE OF THIS EQUIPMENT

91845

9

⚠ WARNING

USE OR OPERATION OF AN UNINSPECTED WORK PLATFORM COULD CAUSE DEATH, PERSONAL INJURY

NEW	• DO NOT OPERATE THIS WORK PLATFORM IF AN INSPECTION HAS NOT BEEN PERFORMED WITHIN 13 MONTHS OF THE LAST RECORDED INSPECTION DATE.	6TH YEAR
1ST YEAR		7TH YEAR
2ND YEAR	• STAMP MONTH/DAY/YEAR NEXT TO APPROPRIATE YEAR AFTER EACH INSPECTION.	8TH YEAR
3RD YEAR	– NOTICE –	9TH YEAR
4TH YEAR	CHANGE OF OWNERSHIP OF THIS WORK PLATFORM MUST BE REPORTED TO MANUFACTURER: MEC Aerial Platform Sales Corp. 4700 E. Jensen Avenue Fresno, California 93725 Phone: (559) 263-9626	10TH YEAR
5TH YEAR		

90718

10

⚠ WARNING

- LANYARD ANCHORAGE POINTS ARE RECOMMENDED FOR WORK POSITIONING RESTRAINTS ONLY.

USE OF FALL ARREST SYSTEMS ATTACHED TO ANCHORAGE POINTS ON MOBILE EQUIPMENT MAY CAUSE MACHINE TO TIP, RESULTING IN SERIOUS INJURY OR DEATH.

8606

11

CERTIFIED LANYARD ANCHORAGE POINT

8605

14

MADE IN USA

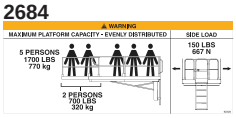


MEC AERIAL PLATFORM SALES CORP.

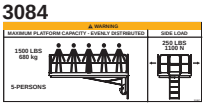
90739

12

2684



3084



13

⚠ WARNING

DISTANCE FROM GROUND TO LADDER WILL VARY WITH GROUND VARIATIONS. CHECK DISTANCE BEFORE LEAVING PLATFORM.

91849

15



91855

16



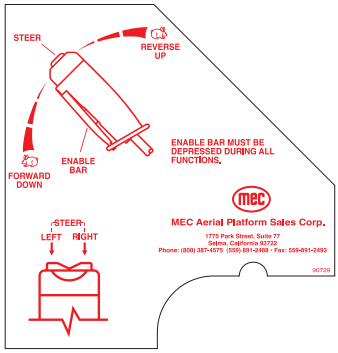
17

LOCATE CONTROL BOX HERE

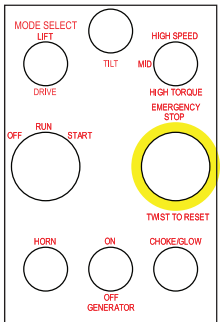
FOR NORMAL OPERATION OF THIS UNIT

7155

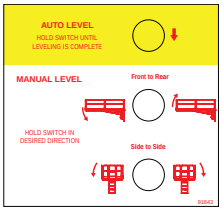
18



19



20



21

THIS MACHINE HAS BEEN CONSTRUCTED IN ACCORDANCE WITH CAN B354.2-01.

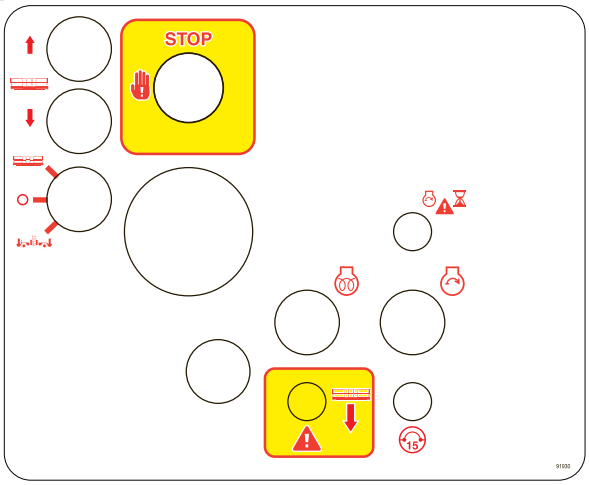
ILLUSTRATION No. ART_3128 | Sigma Level | ANSI Speed Level™ RT Models: Sheet 1 of 4 | Decals

Item	Part Number	Description	Qty.
1	90719	Decal, MEC Oval	1
2	91990	3084RT -- Decal, Speed Level	2
	92231	2684RT -- Decal, Speed Level	2
3	--	--	--
4	--	--	--
5	8911	Decal, Manuals Inside	1
6	91869	Decal, Warning, Sheet Loading	1
7	91846	Decal, Warning Panel	1
8	91845	Decal, Danger, Electric - Tipover - Wind Rating	1
9	90718	Warning, Inspection Report	1
10	8606	Warning, Lanyard (Option)	1
11	8605	Decal, Anchorage Point (Option)	5
12	91847	3084 -- Decal, Capacity, 1500 LB	2
	92228	2684 -- Decal, Capacity, 1700 LB	2
13	91849	Decal, Ladder Clearance	1
14	90739	Decal, Made in USA	1
15	91850	Decal, Crush Hazard	4
16	7156	Decal, Front	1
17	7155	Decal, Locate Control Box Here	1
18	90729	Decal, Upper Control Box, Side	1
19	91158	Decal, Upper Controls	1
20	91843	Decal, Level Controls	1
21	90794	CAN B354 (Canadian Only)	1

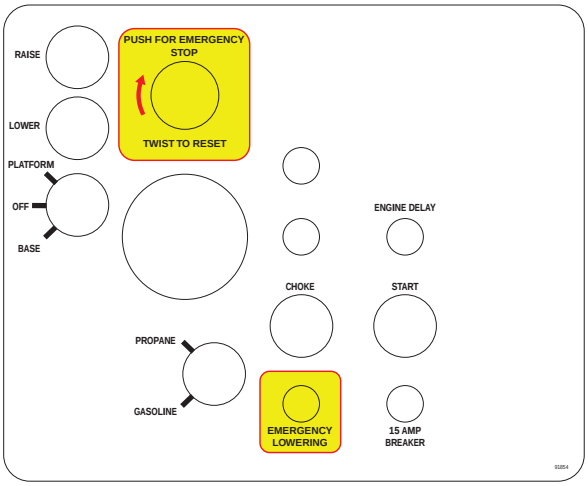
Decals, RT Models, ANSI Specification - Part 2

RT MODELS - ANSI

22 DIESEL



23 DUAL FUEL



24

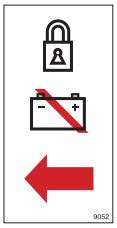
Quad-Trax™ 4wd

25

2684
PLATFORM CAPACITY
1700 LBs (770kg)
92122

3084
PLATFORM CAPACITY
1500 LBs (680kg)
91848

26



27

HYDRAULIC OIL

28

POWER TO PLATFORM
90751

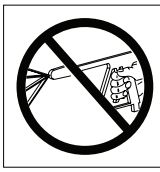
29



WARNING

BATTERIES PRODUCE EXPLOSIVE GAS.
CHARGE BATTERIES IN WELL VENTILATED AREA
DO NOT EXPOSE TO SPARKS OR FLAMES.
8779

30



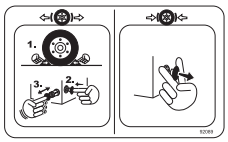
WARNING

DO NOT POWERWASH OR SPRAY ELECTRONIC COMPONENTS OR CONNECTORS.
MOISTURE MAY CAUSE DAMAGE AND/OR ERRATIC OPERATION
90732

31

INFLATE TO TIRE MANUFACTURER'S MAX. SPECIFICATIONS OR SEE SERVICE MANUAL
8502

32



34

WARNING

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

8519

35 DUAL FUEL

WARNING

L.P.G.

1. NO SMOKING - WHILE CHANGING TANKS.
2. "MOUNT TANKS PROPERLY" USING HOLES IN COLLAR FOR HORIZONTAL MOUNTING AND SLOT FOOTINGS FOR VERTICAL MOUNTING TO INSURE FULL USAGE.
3. OPEN VALVE SLOWLY SO THAT HOSE AND TANK PRESSURE CAN EQUALIZE OR VALVE MAY SLUG.
4. CLOSE VALVE BEFORE DISCONNECTING AND USE UP FUEL STILL IN LINE.
5. FOR PROPER USE OF THE L.P. SYSTEM, THE USE OF FUEL MANUFACTURED TO NATURAL GAS PROCESSORS ASSN. SPECIFICATIONS - "HD-5" - IS RECOMMENDED.

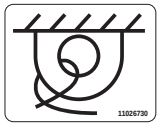
36 DUAL FUEL

GASOLINE ONLY

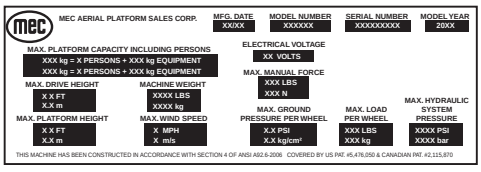
37 DIESEL

DIESEL ONLY

38



39



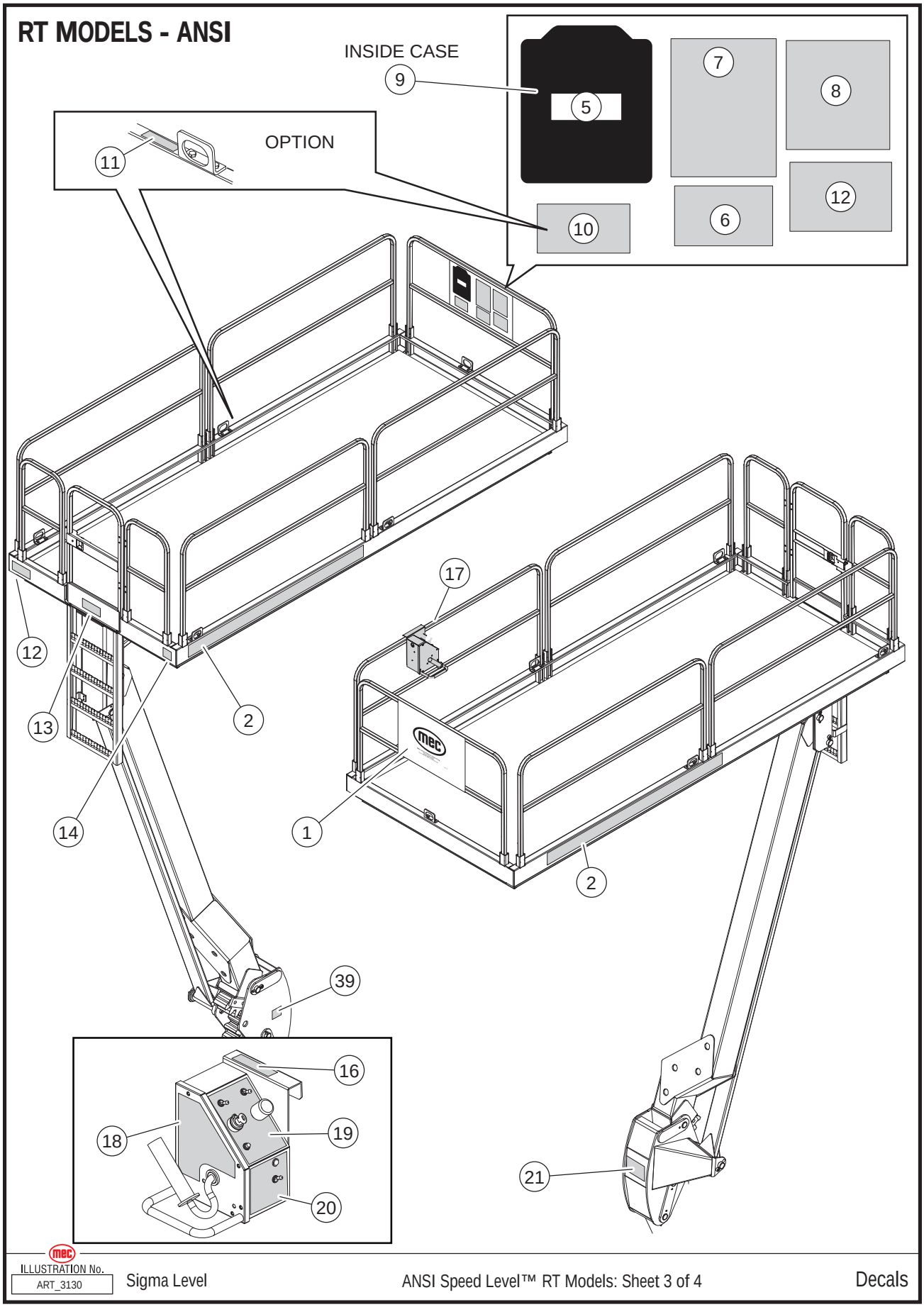
40

GREASE PORT
(Slide to open)
91870

ILLUSTRATION No. ART_3129 Sigma Level ANSI Speed Level™ RT Models: Sheet 2 of 4 Decals

Item	Part Number	Description	Qty.
22	91930	Decal, Lower Controls Diesel	1
23	91854	Decal, Lower Controls Dual Fuel	1
24	91266	Decal, Quad Trax 4wd	2
25	91848	3084 -- Decal, Platform Capacity, Small	1
	92122	2684 -- Decal, Platform Capacity, Small	1
26	9052	Decal, Battery Disconnect And Lock	1
27	6873	Decal, Hydraulic Oil	1
28	90751	Decal, Power To Platform	1
29	8779	Warning, Battery, Explosive Gas	1
30	90732	Decal, Warning, Pressure Wash	1
31	8502	Decal, Tire Inflation	4
32	92089	Decal, Brake Release	1
33	--	--	--
34	8519	Decal, Warning, Tire Replacement	4
35	6948	Decal, Warning, LPG Dual Fuel	1
36	6872	Decal, Gasoline Only Dual Fuel	1
37	9378	Decal, Diesel Only Diesel	1
38	11026730	Tie Down Point	2
39	90751	Serial Plate	1
40	91870	Decal, Grease Port	1

Decals, RT Models, ANSI Specification - Part 3



Decals, RT Models, ANSI Specification - Part 4

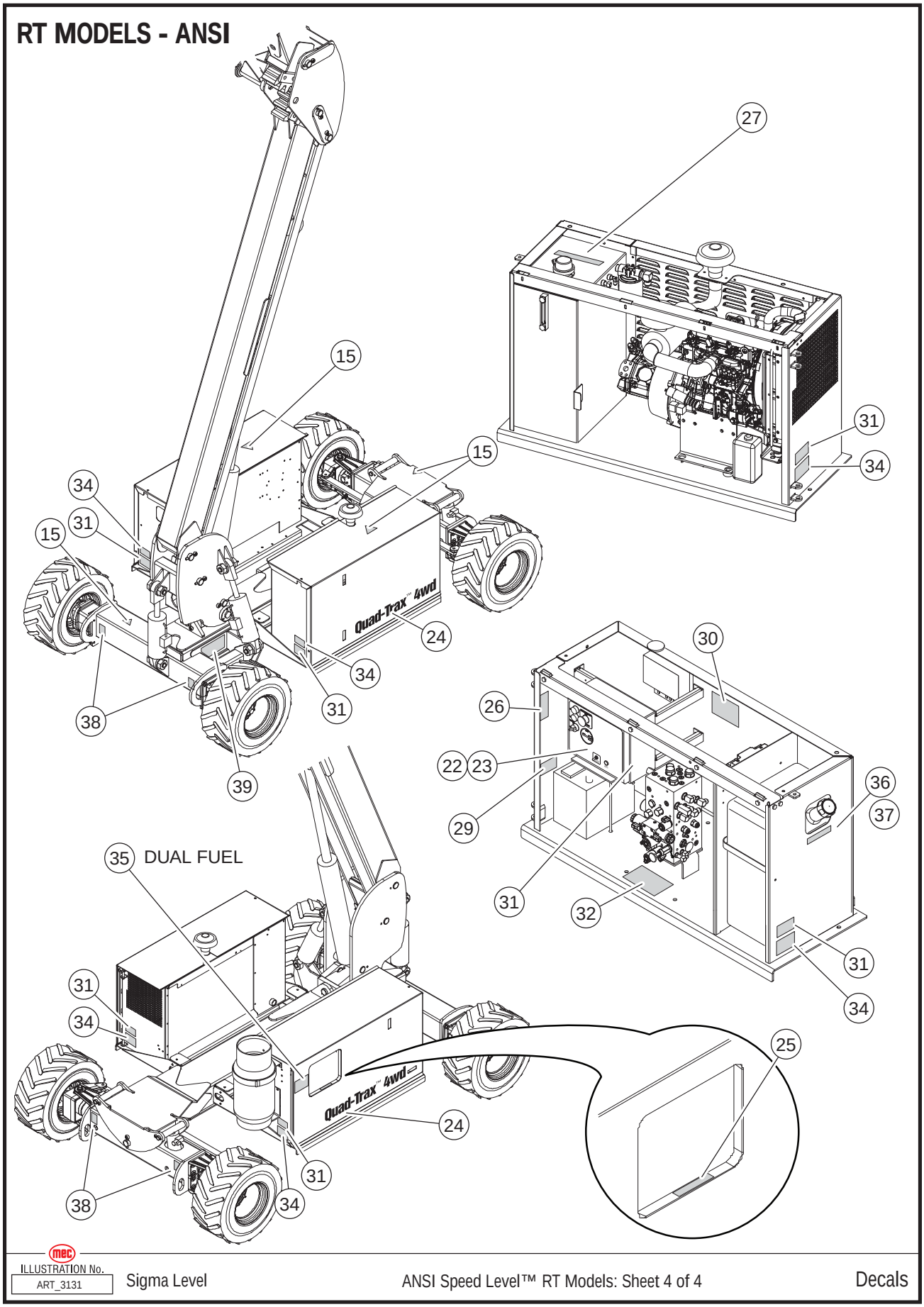


ILLUSTRATION No. ART_3131 | Sigma Level | ANSI Speed Level™ RT Models: Sheet 4 of 4 | Decals

Decals, ES Models, CE Specification - Part 1

ES MODELS - CE

1

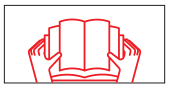
2 3084ES

mec 3084ES SPEED LEVEL™

2684ES

mec 2684ES SPEED LEVEL™

5



6

⚠ WARNING

- **SHEET LOADING GATE** MUST BE IN LOWERED LOCKED POSITION BEFORE OPERATING FROM PLATFORM.
- **PLATFORM ENTRANCE** MUST BE PROPERLY CLOSED AND ALL GUARDRAILS PROPERLY IN PLACE AND SECURED BEFORE OPERATING FROM PLATFORM.

FAILURE TO FOLLOW INSTRUCTIONS COULD CAUSE DEATH OR PERSONAL INJURY. 91869

7

⚠ WARNING

INSPECT MACHINE AND MAKE SURE THAT IT IS OPERATING PROPERLY, THAT ALL NAME PLATE AND SAFETY AND CONTROL DECALS ARE IN PLACE AND LEGIBLE, AND THAT THE MACHINE IS IN ACCORDANCE WITH THE MANUFACTURER'S MAINTENANCE REQUIREMENTS CONTAINED IN THE OPERATION AND MAINTENANCE MANUAL AND THE DAILY SAFETY CHECKLIST.

OPERATE MACHINE WITH EXTREME CAUTION. WATCH FOR OBSTRUCTIONS WHICH MAY STRIKE PLATFORM, PERSONNEL, CONTROLS, OR MACHINE. OPERATE CONTROLS SLOWLY FOR SMOOTH PLATFORM MOTION.

FOR DRIVING WITH PLATFORM LOWERED:

- DO NOT EXCEED MAXIMUM PLATFORM OR EXTENSION LOAD LIMIT CAPACITY. LOAD TO BE UNIFORMLY DISTRIBUTED. PLACE LOAD NEAR CENTER OF PLATFORM WHEN POSSIBLE.
- DO NOT DRIVE ON SIDE SLOPE IF PLATFORM IS OVER 5% OFF LEVEL.
- DO NOT DRIVE UP OR DOWN A GRADE OF OVER 40%.

FOR DRIVING WITH PLATFORM ELEVATED:

- DRIVE ONLY ON A SMOOTH, FIRM, AND PLANAR SURFACE FREE OF OBSTRUCTIONS.
- DO NOT EXCEED MAXIMUM PLATFORM OR EXTENSION LOAD CAPACITY.
- LOAD MUST BE UNIFORMLY DISTRIBUTED.
- IF TILT WARNING LIGHT ILLUMINATES OR TILT ALARM SOUNDS LOWER PLATFORM AND RE-LEVEL
- USE EXTREME CAUTION.

OTHER HAZARDS

1. DO NOT EXCEED PLATFORM LOAD CAPACITY.
2. DO NOT EXCEED MAXIMUM SIDE FORCE AND MAXIMUM NUMBER OF OCCUPANTS.
3. DO NOT USE WITHOUT GUARD RAILS IN PLACE, AND ENTRY GATE PROPERLY SECURED.
4. DO NOT USE IF WORK PLATFORM IS NOT WORKING PROPERLY OR IF ANY PART IS DAMAGED OR WORN.
5. DO NOT USE NEAR MOVING VEHICLES OR CRANES.
6. DO NOT STAND OR SIT ON GUARDRAILS. ALL PERSONNEL SHALL ALWAYS MAINTAIN FIRM FOOTING ON PLATFORM FLOOR.
7. DO NOT USE WHILE UNDER THE INFLUENCE OF ALCOHOL OR DRUGS.
8. DO NOT OVERRIDE SAFETY DEVICES.
9. DO NOT LEAVE MACHINE UNATTENDED WITH KEY IN THE SWITCH.
10. DO NOT RAISE PLATFORM WHILE MACHINE IS ON A TRUCK, FORKLIFT, OR OTHER DEVICE OR VEHICLE.
11. DO NOT USE LADDER, SCAFFOLDING, OR OTHER DEVICES TO INCREASE SIZE OR WORKING HEIGHT OF PLATFORM.
12. DO NOT ENTER OR EXIT PLATFORM WHILE IN MOTION.
13. DO NOT RECHARGE BATTERIES NEAR SPARKS OR OPEN FLAME. BATTERIES EMIT HIGHLY EXPLOSIVE HYDROGEN GAS.
14. DO NOT PERFORM SERVICE ON THE MACHINE WITHOUT PROPERLY SUPPORTING ELEVATING ASSEMBLY.
15. DO NOT ATTACH OVERHANGING LOADS OR INCREASE PLATFORM SIZE.

IMPROPER OPERATION OF THIS MACHINE COULD CAUSE DEATH OR SERIOUS INJURY. 91846

8

⚠ DANGER

YOU MUST NOT OPERATE THIS MACHINE:

UNLESS YOU HAVE BEEN AUTHORIZED TO USE AND TRAINED IN THE SAFE OPERATION OF THIS MACHINE.

TRAINING INCLUDES COMPLETE KNOWLEDGE OF THE SAFETY AND OPERATION INSTRUCTIONS CONTAINED IN THE MANUFACTURERS MANUAL, ANSI MANUAL OF RESPONSIBILITIES, YOUR EMPLOYERS WORK RULES AND APPLICABLE GOVERNMENTAL REGULATIONS.

AN UNAUTHORIZED AND UNTRAINED OPERATOR SUBJECTS THEMSELF AND OTHERS TO DEATH OR SERIOUS INJURY.

ELECTROCUTION HAZARD
THIS MACHINE IS NOT INSULATED

MAINTAIN SAFE CLEARANCE FROM ELECTRICAL LINES AND APPARATUS. YOU MUST ALLOW FOR MACHINE SWAY, ROCK OR SAG AND ELECTRICAL LINES SWAYING.

THIS MACHINE DOES NOT PROVIDE PROTECTION FROM CONTACT WITH OR PROXIMITY TO AN ELECTRICALLY CHARGED CONDUCTOR.

YOU MUST MAINTAIN A CLEARANCE OF AT LEAST TEN (10) FEET BETWEEN ANY PART OF THIS MACHINE OR ITS LOAD AND ANY ELECTRICAL LINE OR APPARATUS CARRYING UP TO 50,000 VOLTS. ONE FOOT OF ADDITIONAL CLEARANCE IS REQUIRED FOR EVERY ADDITIONAL 30,000 VOLTS OR LESS.

DEATH OR SERIOUS INJURY WILL RESULT FROM CONTACT OR INADEQUATE CLEARANCE

TIP-OVER HAZARDS

DO NOT DRIVE NEAR DROP-OFFS, HOLES, OPEN ELEVATOR SHAFTS, AND LOADING DOCKS

DO NOT ELEVATE PLATFORM ON UNEVEN OR SOFT SURFACES

DO NOT DRIVE ONTO UNEVEN OR SOFT SURFACES WHEN ELEVATED

DO NOT RAISE PLATFORM IN WINDY OR GUSTY CONDITIONS

DEATH OR SERIOUS INJURY WILL RESULT FROM IMPROPER USE OF THIS EQUIPMENT

91845

9

⚠ WARNING

USE OR OPERATION OF AN UNINSPECTED WORK PLATFORM COULD CAUSE DEATH, PERSONAL INJURY

NEW	• DO NOT OPERATE THIS WORK PLATFORM IF AN INSPECTION HAS NOT BEEN PERFORMED WITHIN 13 MONTHS OF THE LAST RECORDED INSPECTION DATE.	6TH YEAR
1ST YEAR		7TH YEAR
2ND YEAR	• STAMP MONTH/DAY/YEAR NEXT TO APPROPRIATE YEAR AFTER EACH INSPECTION.	8TH YEAR
3RD YEAR	– NOTICE –	9TH YEAR
4TH YEAR	CHANGE OF OWNERSHIP OF THIS WORK PLATFORM MUST BE REPORTED TO MANUFACTURER:	10TH YEAR
5TH YEAR	MEC Aerial Platform Sales Corp. 4780 E. Jensen Avenue Fresno, California 93725 Phone: (559) 263-9626	

90718

10

⚠ WARNING

- LANYARD ANCHORAGE POINTS ARE RECOMMENDED FOR WORK POSITIONING RESTRAINTS ONLY.

USE OF FALL ARREST SYSTEMS ATTACHED TO ANCHORAGE POINTS ON MOBILE EQUIPMENT MAY CAUSE MACHINE TO TIP, RESULTING IN SERIOUS INJURY OR DEATH.

8606

11

CERTIFIED LANYARD ANCHORAGE POINT 8605

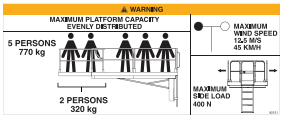
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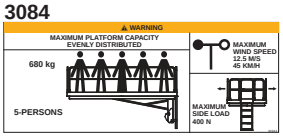
90735

12

2684



3084



13

⚠ WARNING

DISTANCE FROM GROUND TO LADDER WILL VARY WITH GROUND VARIATIONS. CHECK DISTANCE BEFORE LEAVING PLATFORM. 91849

15



91850

16



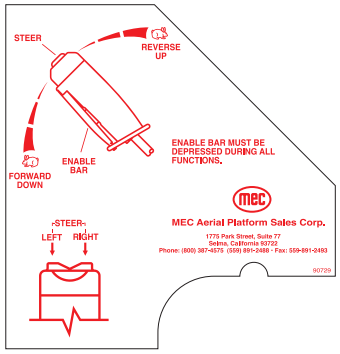
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LOCATE CONTROL BOX HERE

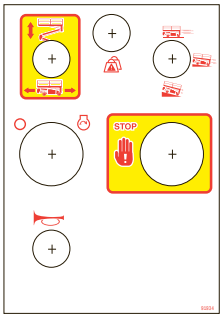
FOR NORMAL OPERATION OF THIS UNIT

7155

18

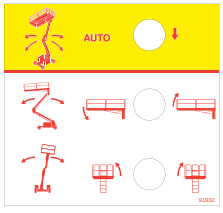


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91934

20



91932

ILLUSTRATION No. ART_3398 Sigma Level

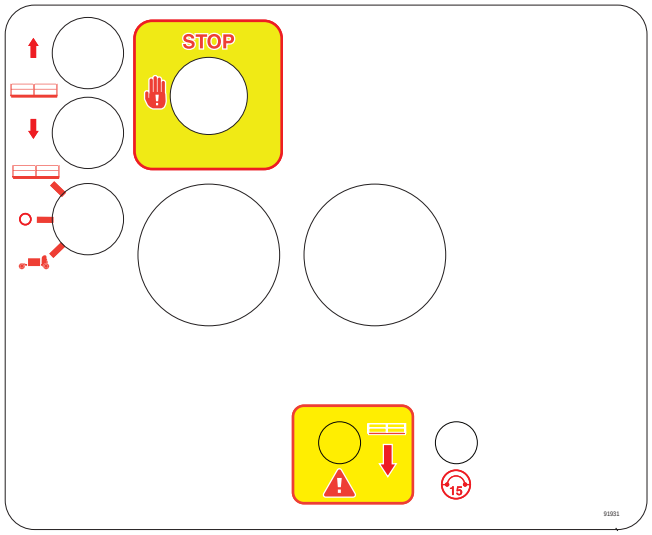
CE Speed Level™ ES Models: Sheet 1 of 4 Decals

Item	Part Number	Description	Qty.
1	90719	Decal, MEC Oval	1
2	91987	3084ES -- Decal, MEC 3084ES	2
	92232	2684ES -- Decal, MEC 3084ES	2
3	--	--	--
4	--	--	--
5	8911	Decal, Manuals Inside	1
6	91869	Decal, Warning, Sheet Loading	1
7	91846	Decal, Warning Panel	1
8	91845	Decal, Danger, Electric - Tipover - Wind Rating	1
9	90718	Warning, Inspection Report	1
10	8606	Warning, Lanyard	1
11	8605	Decal, Anchorage Point	5
12	91944	3084 - Decal, Capacity, 1500 LB	2
	92121	2684 - Decal, Capacity, 1700 LB	2
13	91849	Decal, Ladder Clearance	1
14	90739	Decal, Made in USA	1
15	91850	Decal, Crush Hazard	1
16	7156	Decal, Front	1
17	7155	Decal, Locate Control Box Here	1
18	90729	Decal, Upper Control Box, Side	1
19	91934	Decal, Upper Controls	1
20	91932	Decal, Level Controls	1
21	--	--	--

Decals, ES Models, CE Specification - Part 2

ES MODELS - CE

22



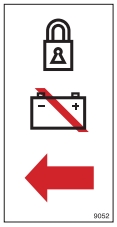
23 Quad-Trax™ 4wd

24

2684
PLATFORM CAPACITY
1700 LBs (770kg)
92122

3084
PLATFORM CAPACITY
1500 LBs (680kg)
91848

25



26



WARNING

BATTERIES PRODUCE EXPLOSIVE GAS.
CHARGE BATTERIES IN WELL VENTILATED AREA

DO NOT EXPOSE TO SPARKS OR FLAMES.

8779

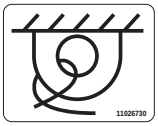
27

WARNING

- EACH REPLACEMENT BATTERY MUST WEIGH A MINIMUM OF 111 POUNDS / 50.3 kg
- FAILURE TO MEET MINIMUM WEIGHT REQUIREMENT MAY CAUSE MACHINE INSTABILITY.

91774

28



29



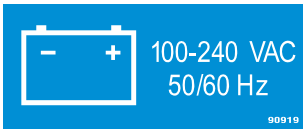
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DO NOT POWERWASH OR SPRAY ELECTRONIC COMPONENTS OR CONNECTORS. MOISTURE MAY CAUSE DAMAGE AND/OR ERRATIC OPERATION

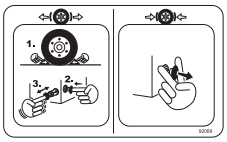
90732

30 HYDRAULIC OIL

31



32



33

INFLATE TO TIRE MANUFACTURER'S MAX. SPECIFICATIONS OR SEE SERVICE MANUAL

8502

34

BATTERY CHARGER INDICATOR

	YELLOW	80%	100%	FAULT
No AC power to charger	OFF	OFF	OFF	OFF
Normal operation, charger is charging	ON	OFF	OFF	OFF
Normal, battery is over 80% charged	ON	ON	OFF	OFF
Normal, battery is 100% charged	OFF	OFF	ON	OFF

Please see service manual for additional information.

91956

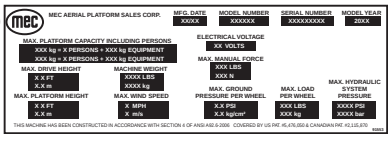
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WARNING

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

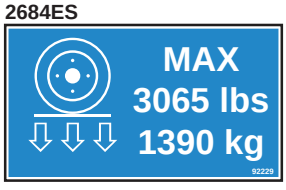
8519

38

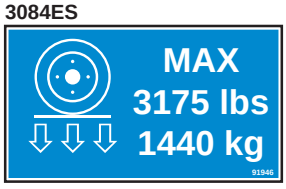


39

2684ES



3084ES



40

GREASE PORT
(Slide to open)
91870

41 Australia only

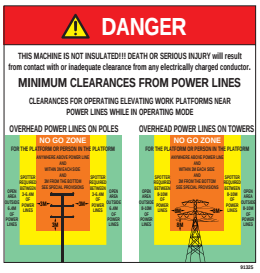


ILLUSTRATION No. ART_3399 | Sigma Level | CE Speed Level™ ES Models: Sheet 2 of 4 | Decals

Item	Part Number	Description	Qty.
22	91931	Decal, Lower Controls	1
23	91266	Decal, Quad Trax 4wd	2
24	91848	3084 - Decal, Platform Capacity, Small	1
	92122	2684 - Decal, Platform Capacity, Small	1
25	9052	Decal, Battery Disconnect And Lock	1
26	8779	Warning, Battery, Explosive Gas	1
27	91774	Warning, Battery Replacement	1
28	11026730	Tie Down Point	1
29	90732	Decal, Warning, Pressure Wash	1
30	6873	Decal, Hydraulic Oil	1
31	90919	Decal, Battery Charger	1
32	92089	Decal, Brake Release	1
33	8502	Decal, Tire Inflation	4
34	91956	Decal, Battery Charge Indicator	1
35	8867	Tag, Warning	1
36	8519	Decal, Warning, Tire Replacement	4
37	90751	Decal, Power To Platform	1
38	91775	Serial Plate	1
39	91946	3084ES - Decal, Wheel Load	4
	92229	2684ES - Decal, Wheel Load	4
40	91870	Decal, Grease Port	1
41	91325	Decal, Danger, Electrocution Hazard (AUS Only)	1

Decals, ES Models, CE Specification - Part 3

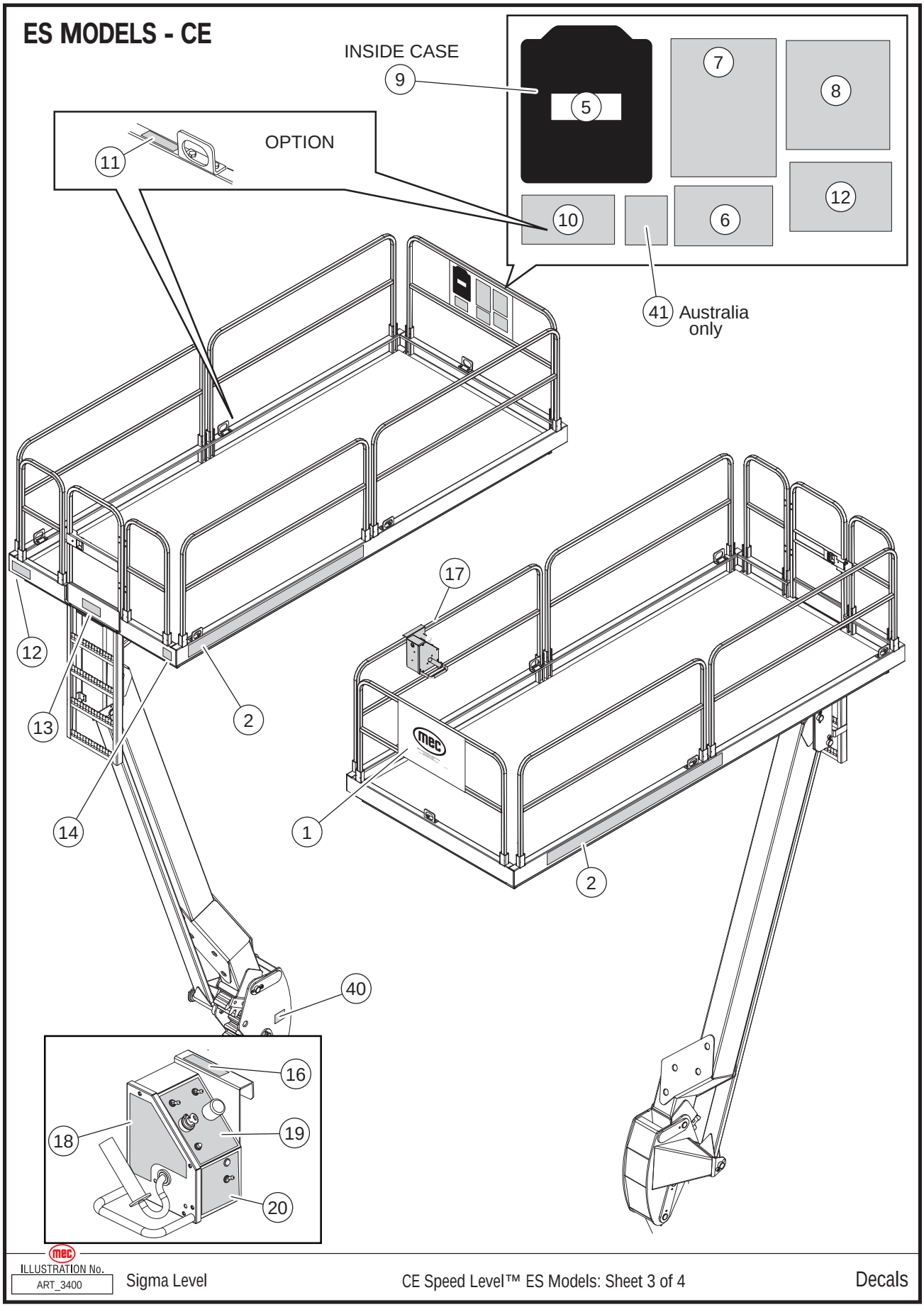


ILLUSTRATION No. ART_3400 Sigma Level CE Speed Level™ ES Models: Sheet 3 of 4 Decals

Decals, ES Models, CE Specification - Part 4

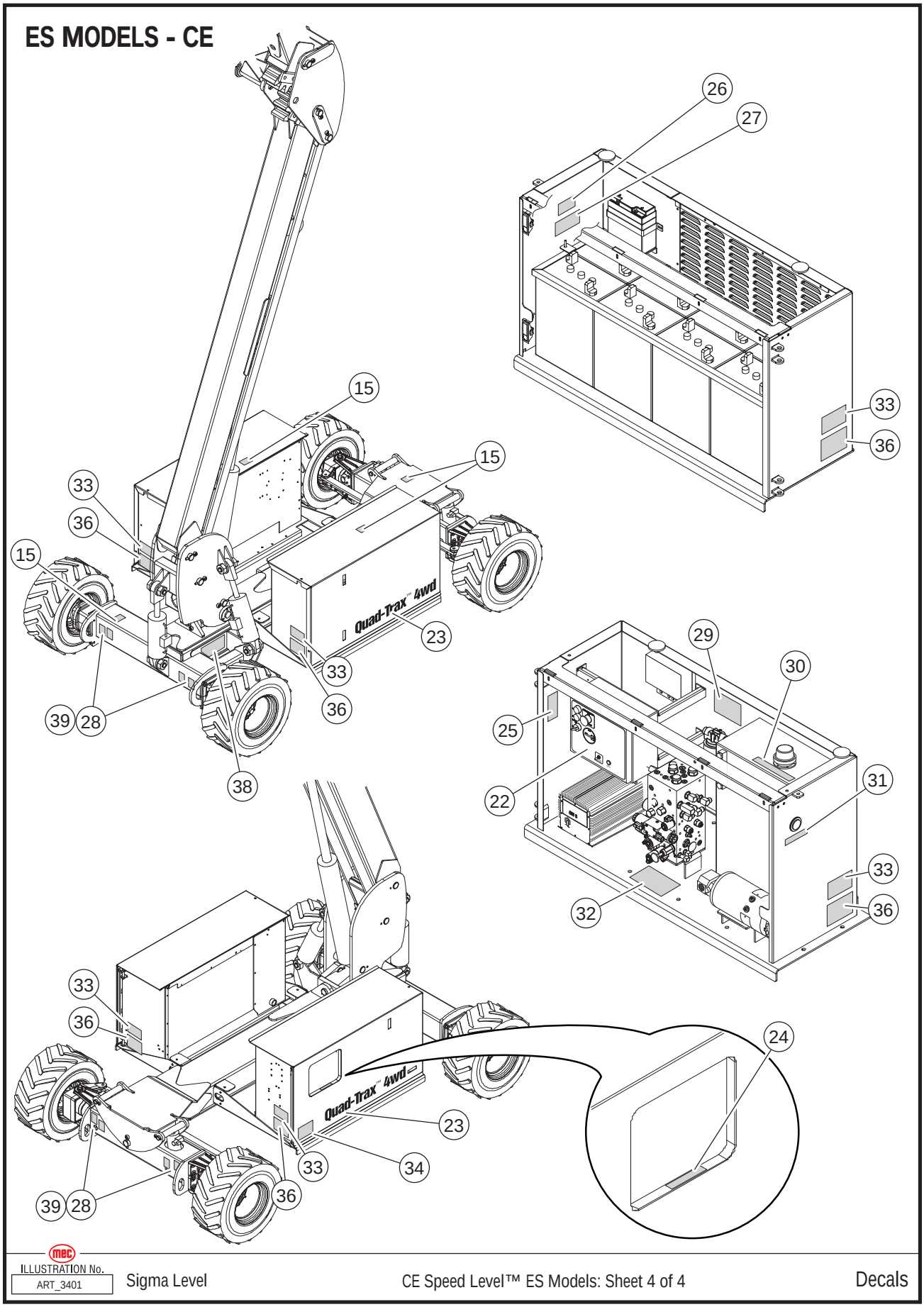


ILLUSTRATION No. ART_3401 Sigma Level CE Speed Level™ ES Models: Sheet 4 of 4 Decals

Decals, RT Models, CE Specification - Part 1

RT MODELS - CE

1

2 3084RT

mec 3084RT SPEED LEVEL™

2684RT

mec 2684RT SPEED LEVEL™

5

6

⚠ WARNING

- **SHEET LOADING GATE** MUST BE IN LOWERED LOCKED POSITION BEFORE OPERATING FROM PLATFORM.
- **PLATFORM ENTRANCE** MUST BE PROPERLY CLOSED AND ALL GUARDRAILS PROPERLY IN PLACE AND SECURED BEFORE OPERATING FROM PLATFORM.

FAILURE TO FOLLOW INSTRUCTIONS COULD CAUSE DEATH OR PERSONAL INJURY.

91869

7

⚠ WARNING

INSPECT MACHINE AND MAKE SURE THAT IT IS OPERATING PROPERLY, THAT ALL NAME PLATE AND SAFETY AND CONTROL DECALS ARE IN PLACE AND LEGIBLE, AND THAT THE MACHINE IS IN ACCORDANCE WITH THE MANUFACTURER'S MAINTENANCE REQUIREMENTS CONTAINED IN THE OPERATION AND MAINTENANCE MANUAL AND THE DAILY SAFETY CHECKLIST.

OPERATE MACHINE WITH EXTREME CAUTION. WATCH FOR OBSTRUCTIONS WHICH MAY STRIKE PLATFORM, PERSONNEL, CONTROLS, OR MACHINE. OPERATE CONTROLS SLOWLY FOR SMOOTH PLATFORM MOTION.

FOR DRIVING WITH PLATFORM LOWERED:

- DO NOT EXCEED MAXIMUM PLATFORM OR EXTENSION LOAD LIMIT CAPACITY. LOAD TO BE UNIFORMLY DISTRIBUTED. PLACE LOAD NEAR CENTER OF PLATFORM WHEN POSSIBLE.
- DO NOT DRIVE ON SIDE SLOPE IF PLATFORM IS OVER 5% OFF LEVEL.
- DO NOT DRIVE UP OR DOWN A GRADE OF OVER 40%.

FOR DRIVING WITH PLATFORM ELEVATED:

- DRIVE ONLY ON A SMOOTH, FIRM, AND PLANAR SURFACE FREE OF OBSTRUCTIONS.
- DO NOT EXCEED MAXIMUM PLATFORM OR EXTENSION LOAD CAPACITY.
- LOAD MUST BE UNIFORMLY DISTRIBUTED.
- IF TILT WARNING LIGHT ILLUMINATES OR TILT ALARM SOUNDS LOWER PLATFORM AND RE-LEVEL
- USE EXTREME CAUTION.

OTHER HAZARDS

1. DO NOT EXCEED PLATFORM LOAD CAPACITY.
2. DO NOT EXCEED MAXIMUM SIDE FORCE AND MAXIMUM NUMBER OF OCCUPANTS.
3. DO NOT USE WITHOUT GUARD RAILS IN PLACE, AND ENTRY GATE PROPERLY SECURED.
4. DO NOT USE IF WORK PLATFORM IS NOT WORKING PROPERLY OR IF ANY PART IS DAMAGED OR WORN.
5. DO NOT USE NEAR MOVING VEHICLES OR CRANES.
6. DO NOT STAND OR SIT ON GUARDRAILS. ALL PERSONNEL SHALL ALWAYS MAINTAIN FIRM FOOTING ON PLATFORM FLOOR.
7. DO NOT USE WHILE UNDER THE INFLUENCE OF ALCOHOL OR DRUGS.
8. DO NOT OVERRIDE SAFETY DEVICES.
9. DO NOT LEAVE MACHINE UNATTENDED WITH KEY IN THE SWITCH.
10. DO NOT RAISE PLATFORM WHILE MACHINE IS ON A TRUCK, FORKLIFT, OR OTHER DEVICE OR VEHICLE.
11. DO NOT USE LADDER, SCAFFOLDING, OR OTHER DEVICES TO INCREASE SIZE OR WORKING HEIGHT OF PLATFORM.
12. DO NOT ENTER OR EXIT PLATFORM WHILE IN MOTION.
13. DO NOT RECHARGE BATTERIES NEAR SPARKS OR OPEN FLAME. BATTERIES EMIT HIGHLY EXPLOSIVE HYDROGEN GAS.
14. DO NOT PERFORM SERVICE ON THE MACHINE WITHOUT PROPERLY SUPPORTING ELEVATING ASSEMBLY.
15. DO NOT ATTACH OVERHANGING LOADS OR INCREASE PLATFORM SIZE.

IMPROPER OPERATION OF THIS MACHINE COULD CAUSE DEATH OR SERIOUS INJURY.

91846

8

⚠ DANGER

YOU MUST NOT OPERATE THIS MACHINE:

UNLESS YOU HAVE BEEN AUTHORIZED TO USE AND TRAINED IN THE SAFE OPERATION OF THIS MACHINE.

TRAINING INCLUDES COMPLETE KNOWLEDGE OF THE SAFETY AND OPERATION INSTRUCTIONS CONTAINED IN THE MANUFACTURERS MANUAL, ANSI MANUAL OF RESPONSIBILITIES, YOUR EMPLOYERS WORK RULES AND APPLICABLE GOVERNMENTAL REGULATIONS.

AN UNAUTHORIZED AND UNTRAINED OPERATOR SUBJECTS THEMSELF AND OTHERS TO DEATH OR SERIOUS INJURY.

ELECTROCUTION HAZARD
THIS MACHINE IS NOT INSULATED

MAINTAIN SAFE CLEARANCE FROM ELECTRICAL LINES AND APPARATUS. YOU MUST ALLOW FOR MACHINE SWAY, ROCK OR SAG AND ELECTRICAL LINES SWAYING.

THIS MACHINE DOES NOT PROVIDE PROTECTION FROM CONTACT WITH OR PROXIMITY TO AN ELECTRICALLY CHARGED CONDUCTOR.

YOU MUST MAINTAIN A CLEARANCE OF AT LEAST TEN (10) FEET BETWEEN ANY PART OF THIS MACHINE OR ITS LOAD AND ANY ELECTRICAL LINE OR APPARATUS CARRYING UP TO 50,000 VOLTS. ONE FOOT OF ADDITIONAL CLEARANCE IS REQUIRED FOR EVERY ADDITIONAL 30,000 VOLTS OR LESS.

DEATH OR SERIOUS INJURY WILL RESULT FROM CONTACT OR INADEQUATE CLEARANCE

TIP-OVER HAZARDS

DO NOT DRIVE NEAR DROP-OFFS, HOLES, OPEN ELEVATOR SHAFTS, AND LOADING DOCKS

DO NOT ELEVATE PLATFORM ON UNEVEN OR SOFT SURFACES

DO NOT DRIVE ONTO UNEVEN OR SOFT SURFACES WHEN ELEVATED

DO NOT RAISE PLATFORM IN WINDY OR GUSTY CONDITIONS

DEATH OR SERIOUS INJURY WILL RESULT FROM IMPROPER USE OF THIS EQUIPMENT

91845

9

⚠ WARNING

USE OR OPERATION OF AN UNINSPECTED WORK PLATFORM COULD CAUSE DEATH, PERSONAL INJURY

NEW	• DO NOT OPERATE THIS WORK PLATFORM IF AN INSPECTION HAS NOT BEEN PERFORMED WITHIN 13 MONTHS OF THE LAST RECORDED INSPECTION DATE.	6TH YEAR
1ST YEAR		7TH YEAR
2ND YEAR	• STAMP MONTH/DAY/YEAR NEXT TO APPROPRIATE YEAR AFTER EACH INSPECTION.	8TH YEAR
3RD YEAR	– NOTICE –	9TH YEAR
4TH YEAR	CHANGE OF OWNERSHIP OF THIS WORK PLATFORM MUST BE REPORTED TO MANUFACTURER:	10TH YEAR
5TH YEAR	MEC Aerial Platform Sales Corp. 4780 E. Jensen Avenue Fresno, California 93725 Phone: (559) 263-9626	

90718

10

⚠ WARNING

- LANYARD ANCHORAGE POINTS ARE RECOMMENDED FOR WORK POSITIONING RESTRAINTS ONLY.

USE OF FALL ARREST SYSTEMS ATTACHED TO ANCHORAGE POINTS ON MOBILE EQUIPMENT MAY CAUSE MACHINE TO TIP, RESULTING IN SERIOUS INJURY OR DEATH.

8606

11 CERTIFIED LANYARD ANCHORAGE POINT

8505

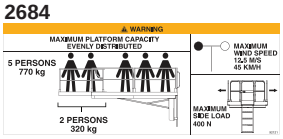
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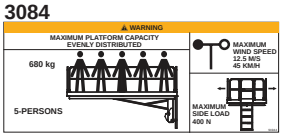
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2684



3084



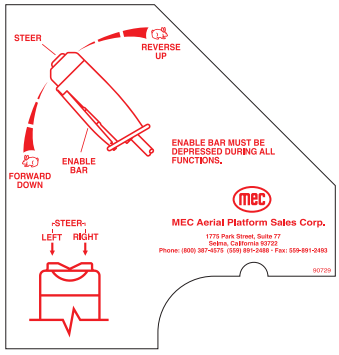
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⚠ WARNING

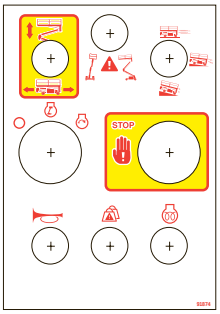
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91849

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91874

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91850

16



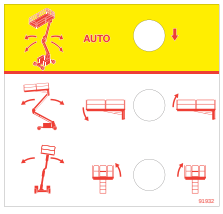
17

LOCATE CONTROL BOX HERE

FOR NORMAL OPERATION OF THIS UNIT

7155

20



91932

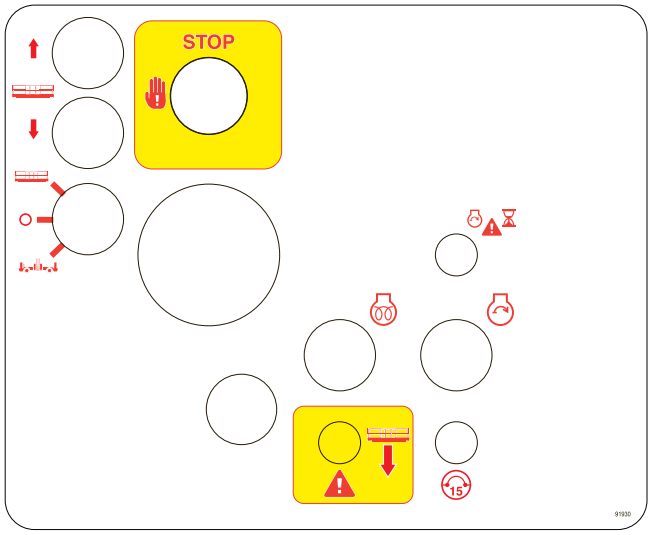
ILLUSTRATION No. ART_3402 | Sigma Level | CE Speed Level™ RT Models: Sheet 1 of 4 | Decals

Item	Part Number	Description	Qty.
1	90719	Decal, MEC Oval	1
2	91990	3084RT -- Decal, Speed Level	2
	92231	2684RT -- Decal, Speed Level	2
3	--	--	--
4	--	--	--
5	8911	Decal, Manuals Inside	1
6	91869	Decal, Warning, Sheet Loading	1
7	91846	Decal, Warning Panel	1
8	91845	Decal, Danger, Electric - Tipover - Wind Rating	1
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21	--	--	--

Decals, RT Models, CE Specification - Part 2

RT MODELS - CE

22



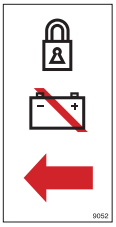
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PLATFORM CAPACITY
1700 LBs (770kg)
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PLATFORM CAPACITY
1500 LBs (680kg)
91848

25



26



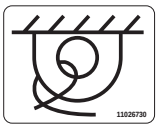
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CHARGE BATTERIES IN WELL VENTILATED AREA

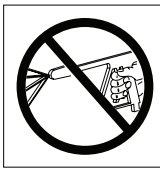
DO NOT EXPOSE TO SPARKS OR FLAMES.

8779

28



29



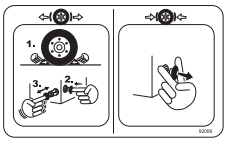
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DO NOT POWERWASH OR SPRAY ELECTRONIC COMPONENTS OR CONNECTORS. MOISTURE MAY CAUSE DAMAGE AND/OR ERRATIC OPERATION

90732

30 HYDRAULIC OIL

32



33 INFLATE TO TIRE MANUFACTURER'S MAX. SPECIFICATIONS OR SEE SERVICE MANUAL

8502

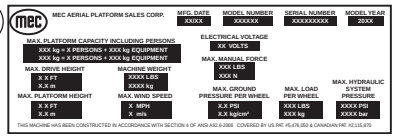
36

WARNING

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

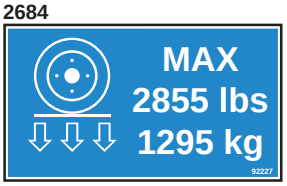
8519

38

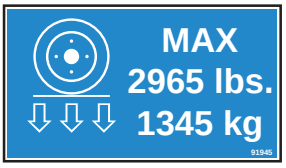


39

2684



3084



40

GREASE PORT
(Slide to open)
91870

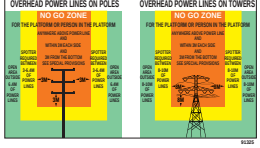
41 Australia only

DANGER

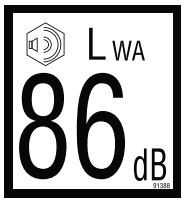
THIS MACHINE IS NOT INSULATED!!! DEATH OR SERIOUS INJURY will result from contact with or inadequate clearance from any electrically charged conductor.

MINIMUM CLEARANCES FROM POWER LINES

CLEARANCES FOR OPERATING ELEVATING WORK PLATFORMS NEAR POWER LINES WHILE IN OPERATING MODE



42



43 DIESEL ONLY

9078

ILLUSTRATION No. ART_3403 Sigma Level CE Speed Level™ RT Models: Sheet 2 of 4 Decals

Item	Part Number	Description	Qty.
22	91930	Decal, Lower Controls	1
23	91266	Decal, Quad Trax 4wd	2
24	91848	3084 - Decal, Platform Capacity, Small	1
	92122	2684 - Decal, Platform Capacity, Small	1
25	9052	Decal, Battery Disconnect And Lock	1
26	8779	Warning, Battery, Explosive Gas	1
27	--	--	--
28	11026730	Tie Down Point	1
29	90732	Decal, Warning, Pressure Wash	1
30	6873	Decal, Hydraulic Oil	1
31	--	--	--
32	92089	Decal, Brake Release	1
33	8502	Decal, Tire Inflation	4
34	--	--	--
35	--	--	--
36	8519	Decal, Warning, Tire Replacement	4
37	--	--	--
38	91775	Serial Plate	1
39	91945	3084RT - Decal, Wheel Load	4
	92227	2684RT - Decal, Wheel Load	4
40	91870	Decal, Grease Port	1
41	91325	Decal, Danger, Electrocution Hazard (AUS Only)	1
42	91388	Decal, Noise Level	1
43	9378	Decal, Diesel Only	1

Decals, RT Models, CE Specification - Part 3

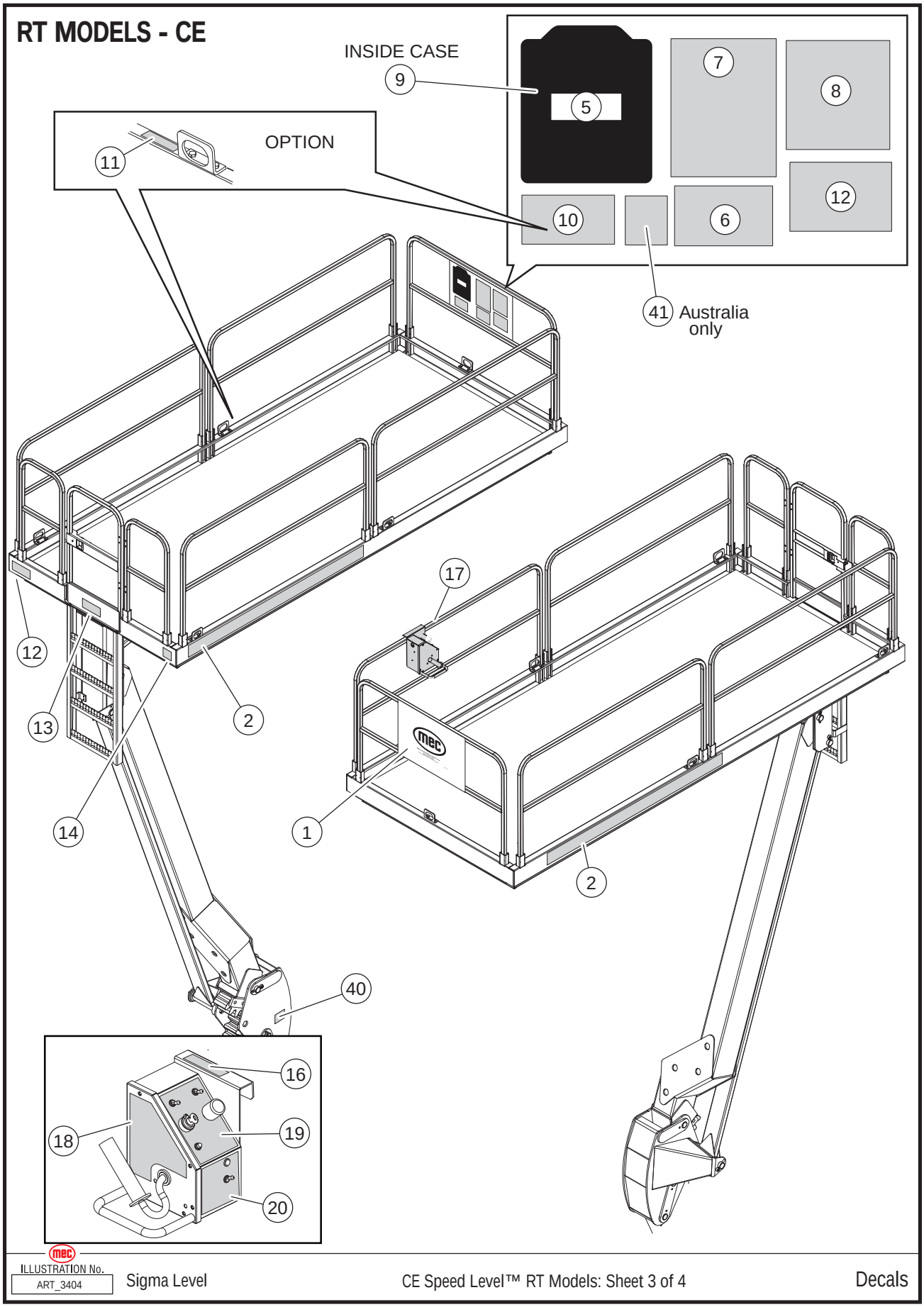


ILLUSTRATION No. ART_3404 Sigma Level CE Speed Level™ RT Models: Sheet 3 of 4 Decals

Decals, RT Models, CE Specification - Part 4

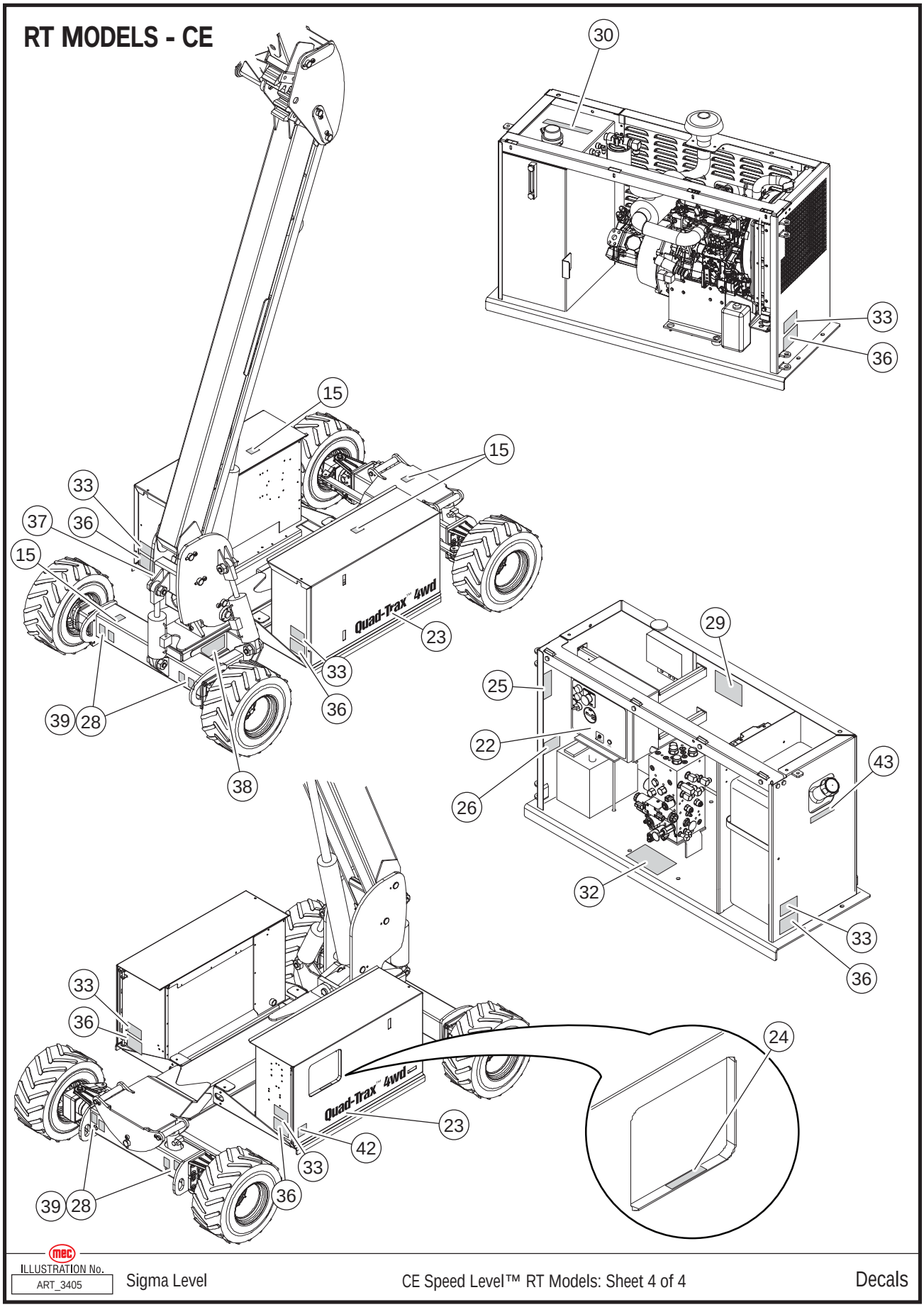


ILLUSTRATION No. ART_3405 | Sigma Level | CE Speed Level™ RT Models: Sheet 4 of 4 | Decals

Notes

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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