

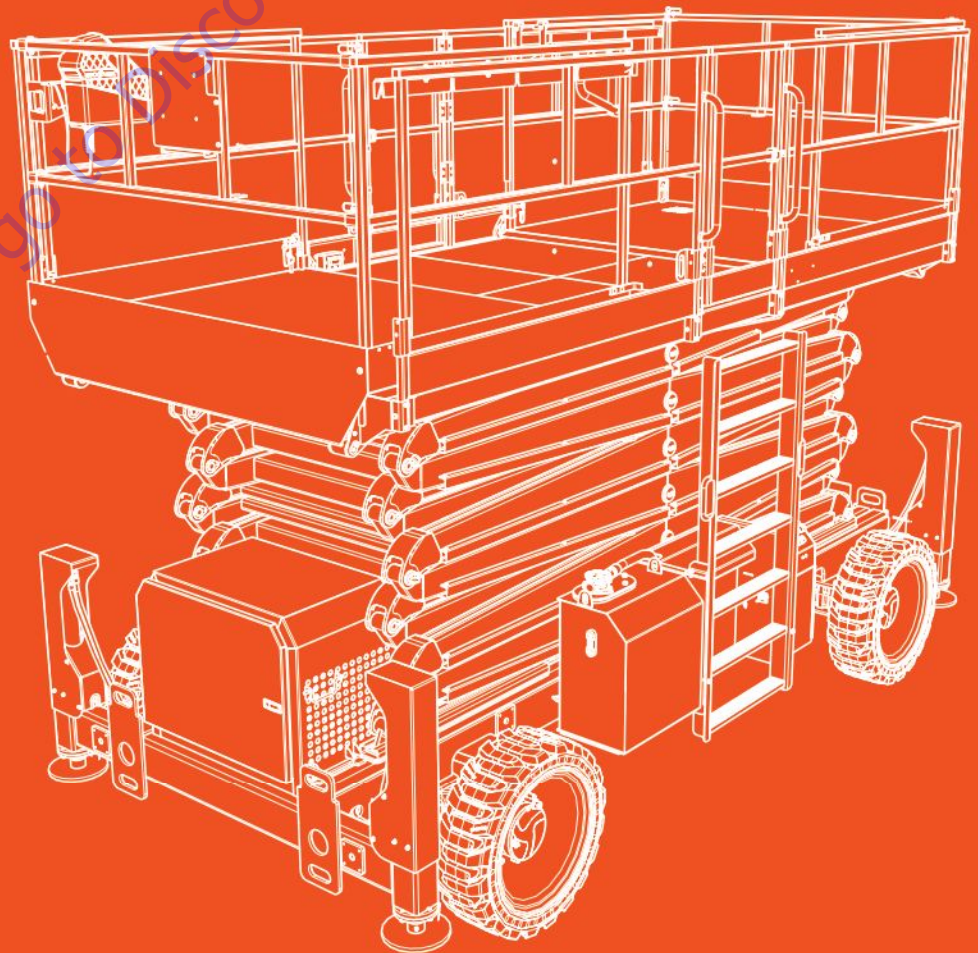


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**SKYJACK**

# SERVICE MANUAL

**SJ9233 RT, SJ9243 RT,  
SJ9253 RT, SJ9664 RT**  
ROUGH TERRAIN SCISSORS



**229046ACA**

January 2021

ANSI/CSA, CE, AS, KC

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**This manual is for MEWPs with serial numbers:**

**SJ9233 RT:** A202 000 001 - A202 999 999

**SJ9243 RT:** A202 000 001 - A202 999 999

**SJ9253 RT:** A202 000 001 - A202 999 999

**SJ9664 RT:** A203 000 001 - A203 999 999

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Original instructions in English.

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**THIS SAFETY ALERT SYMBOL MEANS ATTENTION!**



**BECOME ALERT! YOUR SAFETY IS INVOLVED.**

The Safety Alert Symbol identifies important safety messages on MEWPs, safety signs in manuals or elsewhere. When you see this symbol, be alert to the possibility of personal injury or death. Follow the instructions in the safety message.

**⚠ DANGER**

---

**DANGER** indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

---

**⚠ WARNING**

---

**WARNING** indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

---

**⚠ CAUTION**

---

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

---

**IMPORTANT**

**IMPORTANT** indicates a procedure essential for safe operation and which, if not followed, may result in a malfunction or damage to the MEWP.



# Table of Contents

<b>Section 1 – Scheduled Maintenance</b> .....	<b>11</b>
<b>1.1 Read and heed</b> .....	<b>11</b>
1.1-1 <i>Mobile Elevating Work Platform (MEWP) definition</i> .....	11
1.1-2 <i>Purpose of equipment</i> .....	11
1.1-3 <i>Use of equipment</i> .....	11
1.1-4 <i>Service policy and warranty</i> .....	11
1.1-5 <i>Ownership of MEWP</i> .....	11
1.1-6 <i>Optional equipment</i> .....	11
<b>1.2 Maintenance and Inspection Schedule</b> .....	<b>12</b>
1.2-1 <i>Owner's Annual Inspection Record</i> .....	12
1.2-2 <i>Replacement Parts</i> .....	12
1.2-3 <i>Maintenance and Service Safety Tips</i> .....	12
1.2-4 <i>Hydraulic System &amp; Component Maintenance and Repair</i> .....	13
1.2-5 <i>Maintenance Hints</i> .....	14
1.2-6 <i>About this Section</i> .....	15
<b>1.3 Owner's Annual Inspection Record</b> .....	<b>16</b>
<b>1.4 Frequent/Periodic/Annual/Pre-Delivery Inspection Checklist</b> .....	<b>17</b>
<b>1.5 General inspections</b> .....	<b>18</b>
1.5-1 <i>Service Bulletins</i> .....	18
1.5-2 <i>Annual Inspection</i> .....	18
1.5-3 <i>Labels</i> .....	18
1.5-4 <i>Limit switches</i> .....	18
<b>1.6 Base/Engine</b> .....	<b>19</b>
<b>1.7 Scissors inspection</b> .....	<b>24</b>
<b>1.8 Platform inspections</b> .....	<b>27</b>
<b>1.9 Function Tests</b> .....	<b>28</b>
<b>Section 2 – Maintenance Tables and Diagrams</b> .....	<b>29</b>
<b>2.1 Standard Hose Numbering System</b> .....	<b>29</b>
<b>2.2 Torque Specifications for Fasteners (US Imperial)</b> .....	<b>31</b>
<b>2.3 Torque Specifications for Fasteners (Metric)</b> .....	<b>32</b>
<b>2.4 Torque Specifications for Hydraulic Couplings &amp; Hoses</b> .....	<b>33</b>
<b>2.5 Axle Torque Specifications</b> .....	<b>34</b>
<b>2.6 Axle Maintenance Intervals</b> .....	<b>35</b>
<b>2.7 Specifications - SJ9253 RT, SJ9243 RT, SJ9253 RT</b> .....	<b>36</b>
<b>2.8 Specifications - SJ9664 RT</b> .....	<b>37</b>
<b>2.10 Fluids</b> .....	<b>38</b>
<b>2.9 Environment</b> .....	<b>38</b>

2.11	Floor Loading Pressure . . . . .	39
2.12	Maximum Platform Capacities (Evenly Distributed) . . . . .	40
<b>Section 3 – System Component Identification and Schematics . . . . .</b>		<b>41</b>
3.1	Electrical Symbol Chart . . . . .	42
3.2	Hydraulic Symbol Chart . . . . .	43
3.3	Wire Number and Color Code . . . . .	44
3.4	Hydraulic Parts List . . . . .	45
3.5	Electrical Parts List . . . . .	48
3.6	Drive Manifold - Hose Port Identification . . . . .	51
3.7	Drive Manifold - Hydraulic & Electrical Component Identification . . . . .	52
3.8	Auxiliary Manifold - Hose Port Identification . . . . .	53
3.9	Auxiliary Manifold - Hydraulic & Electrical Component Identification . . . . .	54
3.10	Outrigger Manifold . . . . .	55
3.11	Pressure Reducing & Motor Shift Manifolds . . . . .	56
3.12	Outrigger Manifold Harness . . . . .	57
3.13	Drive Manifold Harness . . . . .	58
3.14	Drive Manifold Harness Schematic . . . . .	59
3.15	Kubota D1305 Engine Harness . . . . .	60
3.16	Kubota D1305 Engine Harness Schematic . . . . .	61
3.17	Kubota WG972 Engine Harness . . . . .	62
3.18	Kubota WG972 Engine Harness Schematic . . . . .	63
3.19	Fuel Pump Harness . . . . .	64
3.20	ECU Power Harness . . . . .	65
3.21	Pressure Transducer Harness - SJ9233 RT, SJ9243 RT, SJ9253 RT . . . . .	66
3.22	Outrigger Control Harness . . . . .	67
3.23	Outrigger Terminal Strip . . . . .	68
3.24	Machine Controller Harness - SJ9233 RT, SJ9243 RT, SJ9253 RT . . . . .	69
3.25	Machine Controller Harness - Wiring Diagram - SJ9233 RT, SJ9243 RT, SJ9253 RT . . . . .	70
3.26	Machine Controller Harness - SJ9664 RT . . . . .	71
3.27	Machine Controller Harness - Wiring Diagram - SJ9664 RT . . . . .	72
3.28	Base Control Cable . . . . .	73
3.29	Control Harness A . . . . .	74
3.30	Control Harness B . . . . .	75
3.31	Dual Holding Valve Harness - SJ9233 RT, SJ9243 RT, SJ9253 RT . . . . .	76
3.32	Holding Valve Harnesses - SJ9664 RT . . . . .	77
3.33	Angle Transducer/Beeper/Flashing Light Harness - SJ9664 RT . . . . .	78
3.34	Load Cell Module Harness - SJ9664 RT . . . . .	79
3.35	Load Cell Module Power Harness - SJ9664 RT . . . . .	80
3.36	Load Cell Module CAN Harness - SJ9664 RT . . . . .	81
3.37	Hydraulic Schematic - SJ9233 RT, SJ9243 RT, SJ9253 RT . . . . .	83
3.38	Hydraulic Schematic - SJ9664 RT . . . . .	84
3.39	Base Control Box Wiring - with Outriggers . . . . .	85

<b>3.40</b>	<b>Base Control Box Wiring - No Outriggers</b> .....	<b>86</b>
<b>3.41</b>	<b>Platform Control Box Wiring</b> .....	<b>87</b>
<b>3.42</b>	<b>Electrical Schematic - No Options - SJ9233 RT, SJ9243 RT, SJ9253 RT</b> .....	<b>88</b>
<b>3.43</b>	<b>Electrical Schematic - All Options - SJ9233 RT, SJ9243 RT, SJ9253 RT</b> .....	<b>89</b>
<b>3.44</b>	<b>Electrical Schematic - No Options - SJ9664 RT</b> .....	<b>90</b>
<b>3.45</b>	<b>Electrical Schematic - All Options - SJ9664 RT</b> .....	<b>91</b>
<b>3.46</b>	<b>Engine Electrical Schematic - Kubota D1305</b> .....	<b>92</b>
<b>3.47</b>	<b>Engine Electrical Schematic - Kubota WG972</b> .....	<b>93</b>
<b>Section 4 – Troubleshooting Information</b> .....		<b>95</b>
<b>4.1</b>	<b>Introduction</b> .....	<b>95</b>
<b>4.2</b>	<b>Electrical System</b> .....	<b>96</b>
4.2-1	<i>All Controls Inoperative</i> .....	96
4.2-2	<i>All Functions Inoperative from Base</i> .....	99
4.2-3	<i>All Functions Inoperative from Platform</i> .....	101
4.2-4	<i>Engine Does Not Crank from Platform (Kubota Diesel D1305)</i> .....	102
4.2-5	<i>Engine Does Not Crank from Platform (Kubota Dual Fuel DG972)</i> .....	104
4.2-6	<i>Engine Does Not Crank from Base Controls</i> .....	106
4.2-7	<i>Glow Plugs Inoperative from Base (Kubota Diesel D1305)</i> .....	106
4.2-8	<i>Glow Plugs Inoperative from Platform (Kubota Diesel D1305)</i> .....	107
4.2-9	<i>Engine Cranks but Does Not Start (Kubota Diesel D1305)</i> .....	108
4.2-10	<i>Engine Cranks but Does Not Start (Kubota Dual Fuel WG972)</i> .....	108
4.2-11	<i>Drive and Steer Inoperative</i> .....	110
4.2-12	<i>Brakes Do Not Release</i> .....	112
4.2-13	<i>Steer Right Inoperative</i> .....	113
4.2-14	<i>Steer Left Inoperative</i> .....	114
4.2-15	<i>Reverse Drive Inoperative</i> .....	116
4.2-16	<i>Forward Drive Inoperative</i> .....	118
4.2-17	<i>High Speed/High Torque/Hill Climb Range Inoperative</i> .....	120
4.2-18	<i>Differential Lock will not Engage</i> .....	121
4.2-19	<i>Lift (Up) Circuit Inoperative from Platform (no Outriggers)</i> .....	122
4.2-20	<i>Lift (Up) Circuit Inoperative from Platform when using Outriggers</i> .....	124
4.2-21	<i>Lift (Up) Circuit Inoperative from Platform with Outriggers Retracted (Lift operates correctly with Outriggers extended)</i> .....	127
4.2-22	<i>Lift (Up) Circuit Inoperative from Base</i> .....	128
4.2-23	<i>Lower (Down) Circuit Inoperative from Platform</i> .....	130
4.2-24	<i>Down Circuit Inoperative from Base</i> .....	132
4.2-25	<i>Belt Driven 3.5kW Generator Inoperative (if equipped)</i> .....	133
4.2-26	<i>Hydraulic 7.5kW Generator Inoperative (if equipped)</i> .....	133
4.2-27	<i>Hydraulic 7.5kW Generator Does Not Shut Off from Generator Switch (if equipped)</i> .....	135
4.2-28	<i>Left Rear Outrigger Inoperative Manually</i> .....	136
4.2-29	<i>Right Rear Outrigger Inoperative Manually</i> .....	137
4.2-30	<i>Right Front Outriggers Inoperative Manually</i> .....	139

4.2-31	<i>Left Front Outriggers Inoperative Manually</i>	141
4.2-32	<i>Pressure Transducer PT1 Inoperative - SJ9233/43/53 RT</i>	143
4.2-33	<i>Load Cell Interface Inoperative - SJ9664 RT</i>	143
4.2-34	<i>Angle Transducer AT1 Inoperative</i>	144
<b>4.3</b>	<b>Hydraulic System</b>	<b>145</b>
4.3-1	<i>4.2-1 All Functions Inoperative</i>	145
4.3-2	<i>Steering Inoperative</i>	145
4.3-3	<i>Drive Inoperative</i>	145
4.3-4	<i>Reverse Drive Inoperative</i>	146
4.3-5	<i>Forward Drive Inoperative</i>	146
4.3-6	<i>Brakes Will Not Release</i>	146
4.3-7	<i>Brakes Will Not Engage</i>	147
4.3-8	<i>Differential Lock Will Not Engage</i>	147
4.3-9	<i>2-Speed Motor Will Not Engage - SJ9233/43/53 RT</i>	147
4.3-10	<i>2-Speed Motor Will Not Engage - SJ9664 RT</i>	147
4.3-11	<i>Lift (Up) Circuit Inoperative - SJ9233/43/53 RT</i>	148
4.3-12	<i>Lift (Up) Circuit Inoperative - SJ9664 RT</i>	148
4.3-13	<i>Lower (Down) Circuit Inoperative</i>	149
4.3-14	<i>Hydraulic 7.5kW Generator Inoperative (if equipped)</i>	149
4.3-15	<i>All Outriggers Inoperative</i>	149
4.3-16	<i>Left Front Outrigger Inoperative</i>	149
4.3-17	<i>Right Front Outrigger Inoperative</i>	150
4.3-18	<i>Right Rear Outrigger Inoperative</i>	150
4.3-19	<i>Left Rear Outrigger Inoperative</i>	150
4.3-20	<i>Outrigger(s) Drift Down - SJ9233/43/53 RT</i>	151
4.3-21	<i>Outrigger(s) Drift Down - SJ9664 RT</i>	151
<b>Section 5 – Procedures</b>		<b>153</b>
<b>5.1</b>	<b>General</b>	<b>153</b>
5.1-1	<i>Safety and Workmanship</i>	153
<b>5.2</b>	<b>Base</b>	<b>154</b>
5.2-1	<i>Changing the Hydraulic Oil</i>	154
5.2-2	<i>Outrigger Lower Limit Switch Replacement and Adjustment</i>	155
<b>5.3</b>	<b>Axles</b>	<b>157</b>
5.3-1	<i>Wheel Bolt/Nut Inspection and Torquing Procedure</i>	157
5.3-2	<i>Wheel Reinstallation and Torquing Procedure</i>	157
5.3-3	<i>Change the Oil in the Axles</i>	158
5.3-4	<i>Check the Oil Level in the Torque Hubs</i>	158
5.3-5	<i>Change the Oil in the Torque Hubs</i>	158
5.3-6	<i>Axle Grease Points</i>	159
5.3-7	<i>Brake Inspection</i>	160
5.3-8	<i>Release the brakes manually</i>	161

5.3-9	Winch and tow the MEWP . . . . .	161
<b>5.4</b>	<b>Engines . . . . .</b>	<b>163</b>
5.4-1	Replace the Engine Oil and Filter . . . . .	163
5.4-2	Replace the Fuel Filter Element - Diesel . . . . .	164
5.4-3	Bleed the Fuel System of Air - Diesel . . . . .	165
5.4-4	Replace the Air Cleaner Element . . . . .	166
5.4-5	Check and Replenish the Radiator Coolant Level . . . . .	167
5.4-6	Drain and Refill the Radiator . . . . .	167
5.4-7	Fan Belt Replacement and Adjustment . . . . .	168
5.4-8	Belt-driven Generator Belt Replacement . . . . .	169
<b>5.5</b>	<b>Manifolds and Hydraulic Pumps . . . . .</b>	<b>170</b>
5.5-1	System Pressure Test . . . . .	170
5.5-2	System Pressure Adjustment . . . . .	170
5.5-3	Load Sense Pressure test . . . . .	171
5.5-4	Load Sense Pressure Adjustment . . . . .	171
5.5-5	Lift Pressure test . . . . .	172
5.5-6	Lift Pressure Adjustment . . . . .	172
5.5-7	Brake Pressure test . . . . .	173
5.5-8	Brake Pressure Adjustment . . . . .	173
<b>5.6</b>	<b>Scissors . . . . .</b>	<b>174</b>
5.6-1	Lower Lift Cylinder Removal and Replacement . . . . .	174
5.6-2	Upper Cylinder Removal and Replacement . . . . .	176
<b>5.7</b>	<b>Platform . . . . .</b>	<b>178</b>
5.7-1	Single Axis Joystick . . . . .	178
5.7-2	Gate Spring Hinge Adjustment . . . . .	179
5.7-3	Railing Maintenance and Repair . . . . .	179
<b>5.8</b>	<b>Skycoded Module . . . . .</b>	<b>180</b>
5.8-1	Machine Controller Module Pin Reference Chart . . . . .	180
5.8-2	Valve Driver Current Control Module (VCCM) Pin Reference Chart . . . . .	186
5.8-3	Terminal Board Module (TMB) . . . . .	188
5.8-4	Current Sensing Controller . . . . .	190
5.8-5	Calibration and Diagnostic Tool Key Functions . . . . .	191
5.8-6	Machine Controller Menu . . . . .	198
5.8-7	Diagnostics . . . . .	212
5.8-8	Help Messages and Flash Codes . . . . .	214
5.8-9	Access Level Procedure . . . . .	218
5.8-10	Override Mode procedure . . . . .	218
5.8-11	Initial Set-Up And Change Defaults procedure . . . . .	219
5.8-12	Calibration . . . . .	219

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# Section 1 – Scheduled Maintenance

## 1.1 Read and heed

Skyjack is continuously improving and expanding product features on its equipment; therefore, specifications and dimensions are subject to change without notice.

### 1.1-1 Mobile Elevating Work Platform (MEWP) definition

A mobile machine intended for moving persons, tools, and material to working positions, consisting of a work platform with controls, an extending structure and a chassis.

### 1.1-2 Purpose of equipment

The Skyjack Rough Terrain scissor lifts are designed to move personnel, tools, and materials to working positions.

### 1.1-3 Use of equipment

The MEWP is a highly maneuverable, mobile work station. Work platform elevation and elevated driving must only be done on a firm, level surface.

### 1.1-4 Service policy and warranty

Skyjack warrants each new product to be free of defective parts and workmanship for the first 2 years or 3000 hours, whichever occurs first. Any defective part will be replaced or repaired by your local Skyjack dealer at no charge for parts or labor. In addition, all products have a 5 year structural warranty. Contact the Skyjack Service Department for warranty statement extensions or exclusions.

### 1.1-5 Ownership of MEWP

Notify Skyjack of MEWP ownership. If you sell or transfer the ownership of a MEWP, promptly notify Skyjack of the new owner's contact information.

Skyjack needs this information to inform the owner of any updates or additional activities that are necessary to keep the machine in proper working condition.

### 1.1-6 Optional equipment

This MEWP is designed to accept a variety of optional accessories. Refer to *operation manual* for a list of the optional accessories. Operating instructions for these options are located in Operation manual.

For components or systems that are not standard, speak to the Skyjack Service Department. Give the model and serial number for each applicable MEWP.



## 1.2 Maintenance and Inspection Schedule

The actual operating environment of the work platform governs the use of the maintenance schedule. The inspection points covered in section *1.4 Frequent/Periodic/Annual/Pre-Delivery Inspection Checklist*, indicates the areas of the MEWP to be maintained or inspected and at what intervals the maintenance and inspections are to be performed.

### 1.2-1 Owner's Annual Inspection Record

It is the responsibility of the owner to arrange quarterly and annual inspections of the MEWP. (*1.3 Owner's Annual Inspection Record*). Owner's Annual Inspection Record is to be used for recording the date of the inspection, owner's name, and the person responsible for the inspection of the work platform.

### 1.2-2 Replacement Parts

Use only original replacement parts. Parts such as batteries, wheels, railings, etc. with weight and dimensions different from original parts will affect stability of the MEWP and must not be used without manufacturer's consent.

All replacement tires must be of the same size and load rating as originally supplied tires; to maintain safety and stability of MEWP.

Consult Skyjack's Service Department for optional tires specifications and installation.

### WARNING

**Any unit that is damaged or not operating properly must be immediately tagged and removed from service until proper repairs are completed.**

### 1.2-3 Maintenance and Service Safety Tips

Maintenance and repair should only be performed by personnel who are trained and qualified to service this MEWP.

All maintenance and service procedures should be performed in a well lighted and well ventilated area.

Anyone operating or servicing this MEWP must read and completely understand all operating instructions and safety hazards in this manual and operating manual.

All tools, supports and lifting equipment to be used must be of proper rated load and in good working order before any service work begins. Work area should be kept clean and free of debris to avoid contaminating components while servicing.

Ensure personnel are clear from under unsupported components/systems that are at risk of movement during maintenance.

All service personnel must be familiar with employer and governmental regulations that apply to servicing this type of equipment.

Keep sparks and flames away from all flammable or combustible materials.

Properly dispose of all waste material such as lubricants, rags, and old parts according to the relative law provisions obtaining in the country.

Before attempting any repair work, disconnect the main power connectors.

Keep personnel clear of components, systems or unsupported loads that may move unexpectedly during maintenance procedures.

Preventive maintenance is the easiest and least expensive type of maintenance.

### 1.2-4 Hydraulic System & Component Maintenance and Repair

The following points should be kept in mind when working on the hydraulic system or any component:

#### **WARNING**

**Escaping fluid from a hydraulic pressure leak can damage your eyes, penetrate the skin and cause serious injury. Use proper personal protection at all times.**

1. Any structure has limits of strength and durability. To prevent failure of structural parts of hydraulic components, relief valves which limit pressure to safe operating values are included in the hydraulic circuits.
2. Tolerance of working parts in the hydraulic system is very close. Even small amounts of dirt or foreign materials in the system can cause wear or damage to components, as well as general faulty operation of the hydraulic system. Every precaution must be taken to assure absolute cleanliness of the hydraulic oil.
3. Whenever there is a hydraulic system failure which gives reason to believe that there are metal particles or foreign materials in the system, drain and flush the entire system and replace the filter cartridges. A complete change of oil must be performed under these circumstances.
4. Whenever the hydraulic system is drained, check the magnets in the hydraulic reservoir for metal particles. If metal particles are present, flush the entire system and add a new change of oil. The presence of metal particles also may indicate the possibility of imminent component failure. A very small amount of fine particles is normal.
5. All containers and funnels used in handling hydraulic oil must be absolutely clean. Use a funnel when necessary for filling the hydraulic oil reservoir, and fill the reservoir only through the filter opening. The use of cloth to strain the oil should be avoided to prevent lint from getting into the system.
6. When removing any hydraulic component, be sure to cap and tag all hydraulic lines involved. Also, plug the ports of the removed components.
7. All hydraulic components must be disassembled in spotlessly clean surroundings. During disassembly, pay particular attention to the identification of parts to assure proper reassembly. Clean all metal parts in a clean mineral oil solvent. Be sure to thoroughly clean all internal passages. After the parts have been dried thoroughly, lay them on a clean, lint-free surface for inspection.
8. Replace all O-rings and seals when overhauling any component. Lubricate all parts with clean hydraulic oil before reassembly. Use small amounts of petroleum jelly to hold O-rings in place during assembly.
9. Be sure to replace any lost hydraulic oil when completing the installation of the repaired component, and bleed any air from the system when required.
10. All hydraulic connections must be kept tight. A loose connection in a pressure line will permit the oil to leak out or air to be drawn into the system. Air in the system can cause damage to the components and noisy or erratic system operation.

### 1.2-5 Maintenance Hints

Three simple maintenance procedures have the greatest effect on the hydraulic system performance, efficiency and life. Yet, the very simplicity of them may be the reason they are so often overlooked. They are simply these:

1. Change filters annually. The filters will need to be changed more often depending on the operating conditions. Dirty, dusty, high moisture environments may cause the hydraulic system to be contaminated more quickly.
2. Maintain a sufficient quantity of clean hydraulic oil of the proper type and viscosity in the hydraulic reservoir.
3. Keep all connections tight.

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### 1.2-6 About this Section

This section contains the maintenance and inspection schedule that is to be performed.

References are made to the procedures in [Section 5](#) that outline detailed step-by-step instructions for checks and replacements.

#### Service Bulletins

Before performing any scheduled maintenance inspection procedure, refer to service bulletins found in our web site: [www.skyjack.com](http://www.skyjack.com) for updates related to service and maintenance of this MEWP.

#### Maintenance and Inspection

Death or injury can result if the MEWP is not kept in good working order. Inspection and maintenance should be performed by competent personnel who are trained and qualified on maintenance of this MEWP.

#### WARNING

**Failure to perform each procedure as presented and scheduled may cause death, serious injury or substantial damage.**

#### NOTE

*Preventive maintenance is the easiest and least expensive type of maintenance.*

- Unless otherwise specified, perform each maintenance procedure with the MEWP in the following configuration:
  - MEWP parked on a flat and level surface
  - Disconnect the batteries by disconnecting the main power connectors.
- Repair any damaged or malfunction components before operating MEWP.
- Keep records on all inspections.

### Maintenance Instructions

This manual consists of four schedules to be done for maintaining on an MEWP. Inspection schedule frequency is shown below:

#### Task Frequency

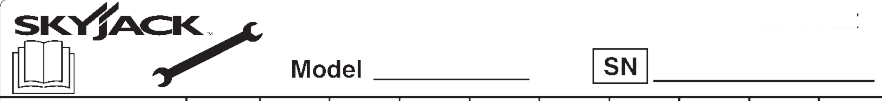
PDI/Frequent	<b>B</b>	Perform PDI prior to each delivery, or Frequent Inspection every 200 days or 200 hours.
Annual	<b>C</b>	Perform Scheduled Maintenance Inspections every year.
Additional	*	Perform at time sensitive maintenance intervals

- Make copies of the maintenance and inspection checklist to be used for each inspection.
- Check the schedule on the checklist for the type of inspection to be performed.
- Place a check in the appropriate box after the item meets the inspection requirements.
- Use the maintenance and inspection checklist and step-by-step procedures in [Section 1](#) to perform these inspections.
- If any inspection receives a fail, write the issue in the comments section. Tag and remove the MEWP from service.
- If any MEWP component(s) has been repaired, an inspection must be performed again before removing the tag.














#### Legend

Pass	<b>P</b>
Not applicable	<b>N/A</b>

**Table 1.3 Owner's Annual Inspection Record**



Model \_\_\_\_\_ SN \_\_\_\_\_

 Inspection Date											
 Inspector Signature	20	20	20	20	20	20	20	20	20	20	20
											

**⚠ WARNING**

Do not use the MEWP if there is no inspection recorded in the last 13 months. If you do not obey, there is a risk of death or serious injury.

**IMPORTANT**

The Owner's annual inspection record is located on the scissor assembly. It must be filled out after an annual inspection has been completed. Do not use the MEWP if an inspection has not been recorded in the last 13 months.



# 1.4 Frequent/Periodic/Annual/Pre-Delivery Inspection Checklist



## Frequent/Periodic/Annual/PDI Checklist Vertical Mast, Electric Scissor & Rough Terrain

Serial Number: Starting with serial number A000 000 000 or B000 000 000 and above

Product Owner: \_\_\_\_\_

Model: \_\_\_\_\_

Product User: \_\_\_\_\_

Hourmeter Reading: \_\_\_\_\_

Date/Time: \_\_\_\_\_

Inspection Type (Choose one):  Pre-delivery  Frequent  Periodic  Annual

Use this table for pre-delivery inspections (PDI) before each rental, lease or sale and as an instruction for all frequent inspections and annual inspections. Refer to the operation and service manuals for inspection instructions (for example, visual inspection and function tests, torque specs, engine oil, chain inspection intervals, and more).

Inspection Type Schedule	
PDI/Frequent/Periodic	B
Annual	B+C

B - Do the pre-delivery inspection before the machine is sent out or during the frequent inspections at 200 days or 200 hour intervals. For more instructions, refer to the operation and service manuals. P - Pass  
N/A - Not Applicable

C - Do the scheduled maintenance inspections each year. For more instructions, refer to the operation and service manuals.

Put a check mark on the "Pass" column as you meet the requirements of the inspection of each item. Add a comment if the item does not pass inspection.

Items for Inspection	P	N/A
<b>Service Bulletins.</b> Make sure there are no open service bulletins.	B	
<b>Annual Inspection.</b> Make sure you complete it within 13 months.	B	
<b>Labels.</b> In place, correctly attached & you can read them.	B	
<b>Limit Switches.</b> Correctly installed & no obstructions or damage.	B	
<b>BASE/ENGINE</b>		
<b>Engine and Components.</b> Do a check on engine and components for any loose, missing, damaged, or failed items. Make sure you do not exceed the recommended fluid, oil and coolant change intervals.	B	
<b>Engine and Components.</b> Replace the engine oil and filter.	C	
<b>Engine Intake Air Filter.</b> No damage or missing component. Remove dirt & dust.	B	
<b>Engine Intake Air Filter.</b> Replace the air filter if necessary.	C	
<b>Engine Oil.</b> Oil level between "L" and "H". Make sure you do not exceed the oil change interval.	B	
<b>Radiator.</b> Correctly attached & no damage or missing components. Do a check of coolant level.	B	
<b>Radiator.</b> Do a check of coolant level & condition & replace if necessary.	C	
<b>Fuel Tank &amp; Lines.</b> Filler cap, tank, fittings and hoses are tightly closed & no damage or leaks.	B	
<b>Propane Tank &amp; Lines.</b> Straps are correctly installed to brackets & couplers are tight. Make sure there are no damage or leaks.	B	
<b>Outriggers.</b> No damage or missing components.	B	
<b>Pothole Protection.</b> Both sides have no obstructions, dirt or damage.	B	
<b>Battery/Hydraulic Tray.</b> Trays are latched tightly & no missing components.	B	
<b>Batteries.</b> No damage, tight connections & sufficient fluid levels. Clean terminals and cable ends.	B	
<b>Battery Charger.</b> Correctly attached & no damage.	B	
<b>Steer Assembly.</b> Correctly attached & no damage leaks or missing components.	B	
<b>Wheel/Tire Assembly.</b> Do a check of all tires for damage, wear & correctly aligned.	B	
<b>Wheel/Tire Assembly.</b> Wheel nuts torqued as recommended.	C	
<b>Axles.</b> Correctly attached & no missing components. Tight fittings and hoses & no leaks.	B	
<b>Axles.</b> Do a check and replace oil if necessary.	C	
<b>Hydraulic Tank, Pump, Motor &amp; Lines.</b> Filler cap, hoses, and other hydraulic components are closed tightly & no damage or leaks.	B	
<b>Hydraulic Oil.</b> Level at, or slightly above top mark.	B	
<b>Hydraulic Oil.</b> Do a check and replace oil and filters if necessary.	C	
<b>Electrical Components.</b> Do a check on all electrical components such as the motor controller if necessary. Correctly attached & no damage. Tight wire connections and fasteners.	B	

Items for Inspection	P	N/A
<b>Manifolds.</b> Tight fittings and hoses & no damage or leaks. Tight wire connections, no missing components & correctly working valves.	B	
<b>Main Power Disconnect Switch.</b> Cables tight & in working order.	B	
<b>Base Controls.</b> Operate switches and make sure they all operate correctly. No damage or missing components.	B	
<b>Brakes.</b> Correctly attached & no damage or leaks.	B	
<b>Brakes.</b> Do a check on disc wear and replace if necessary.	C	
<b>Base Weldment.</b> No deformation or cracks.	B	
<b>Grease Points.</b> No obstructions, dirt, or damage. Add grease if necessary.	B	
<b>Ladder.</b> Correctly attached & no damage.	B	
<b>LIFTING MECHANISM - SCISSORS</b>		
<b>Maintenance Support(s).</b> Correctly attached & no damage.	B	
<b>Scissor Assembly &amp; Bumpers.</b> Correctly attached, no deformation/damage. Cables & wires installed with no damage.	B	
<b>Sliders &amp; Rollers.</b> Correctly attached & no obstructions, dirt, or damage/wear.	B	
<b>Lift Cylinder(s).</b> No damage or missing components. Tight fittings and hoses & no leaks. Correctly installed.	B	
<b>Angle Transducer.</b> Correctly attached & no damage.	B	
<b>Scissor Pins.</b> Correctly attached & no damage.	B	
<b>LIFTING MECHANISM - MAST</b>		
<b>Mast Assembly.</b> No damage, cracks or deformation.	B	
<b>Mast Assembly.</b> Lubricate the mast as recommended.	C	
<b>Chains, Rollers &amp; Control Cables.</b> No damage or missing components.	B	
<b>Wear Pads.</b> No damage/wear or missing components. Fasteners tight.	B	
<b>Tilt Sensor.</b> Correctly attached & no damage.	B	
<b>PLATFORM</b>		
<b>Railings and Gate.</b> Correctly attached & no damage or missing components.	B	
<b>Fall-Protection Anchorage.</b> Attachment rings correctly attached & no damage.	B	
<b>AC Power Socket.</b> No obstructions, dirt, or damage.	B	
<b>Platform Control Console.</b> Operate the switches and make sure they all operate correctly. No damage or missing components.	B	
<b>Manual Storage Box.</b> In storage box, in good condition and you can read them.	B	
<b>Powered Extension Control Console.</b> Operate switches and make sure they all operate correctly. No damage or missing components.	B	
<b>Extension Platform.</b> Correctly attached & no damage or missing components.	B	
<b>Function Tests.</b> Refer to the operation manual for your serial number for information on how to run these tests.	PASS	
	FAIL	

Comments: \_\_\_\_\_

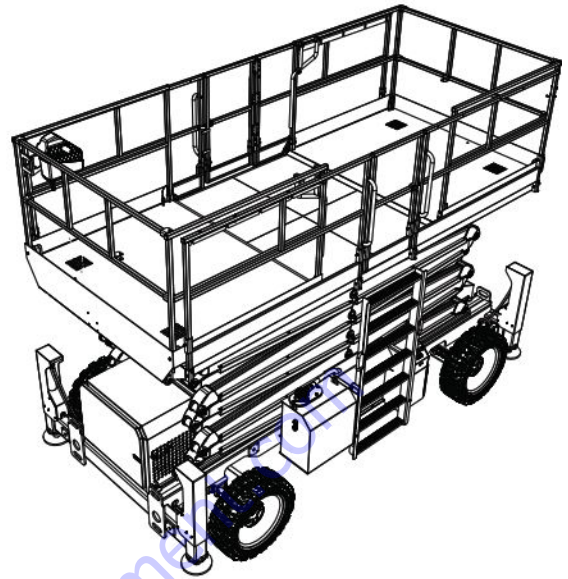
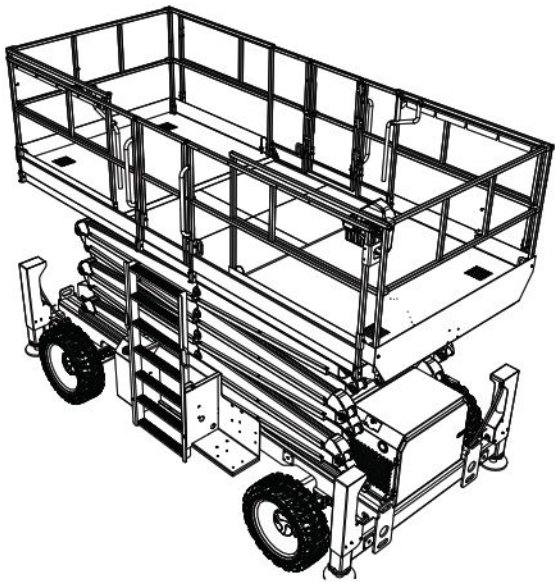
199341AA

The undersigned has made sure that all areas in the list have received an inspection. The undersigned has told the machine owner of all inconsistencies in the inspection and corrected them before machine operation.

Owner: \_\_\_\_\_ Print Name \_\_\_\_\_ Signature \_\_\_\_\_ Date (DD/MM/YY) \_\_\_\_\_

User: \_\_\_\_\_ Print Name \_\_\_\_\_ Signature \_\_\_\_\_ Date (DD/MM/YY) \_\_\_\_\_





## 1.5 General inspections

Do an inspection of the MEWP in this sequence.

### **⚠ WARNING**

Do not operate a MEWP that does not function correctly. Lock and tag the MEWP, and remove it for servicing. Only a qualified service technician must repair the MEWP. If you do not obey, there is a risk of death or serious injury.

### **⚠ WARNING**

Turn the main power disconnect switch to the off position before you do the visual and daily maintenance inspections. If you do not obey, there is a risk of death or serious injury.

### **⚠ CAUTION**

Make sure that the MEWP is on a firm, level surface before you do the visual and daily maintenance inspections. If you do not obey, there is a risk of machine damage.

### 1.5-1 Service Bulletins (B)

Go to [www.skyjack.com](http://www.skyjack.com) and use your machine's serial number to find related open service bulletins.

### 1.5-2 Annual Inspection (B)

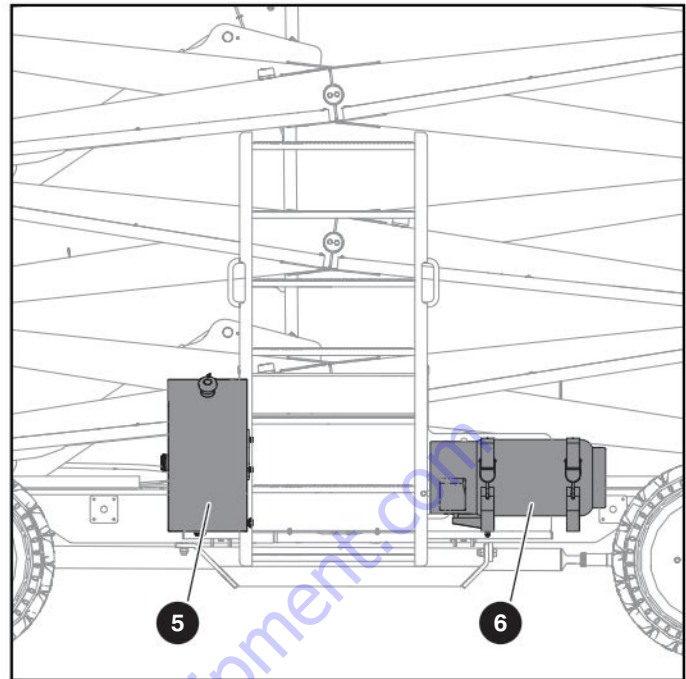
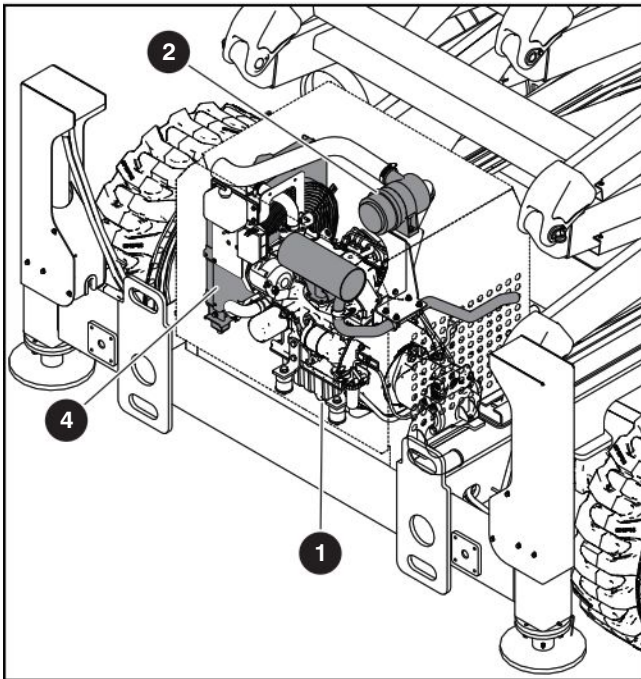
Do a check on the machine's service record to find information about previous service performed.

### 1.5-3 Labels (B)

Refer to the operation manual for the labels. Make sure all the labels are in the correct location, are in good condition, and you can read them.

### 1.5-4 Limit switches (B)

Make sure the limit switches are correctly attached, there is no visible damage, and the movement is not obstructed.



## 1.6 Base/Engine

### **⚠ WARNING**

**Burn hazard. Do not touch hot engine components without the correct PPE. Let the engine cool before you do an inspection or servicing. If you do not obey, there is a risk of death or serious injury.**

Open the door of the engine housing to gain access to the engine compartment.

#### 1 Engine components & Hydraulic pump (B, C)

- **B - Frequent/periodic/pre-delivery Inspection**
  - Make sure there are no loose or missing parts.
  - Make sure there is no visible damage.
- **C - Annual Inspection**
  - Make sure to replace the engine oil and filter in the recommended intervals.

#### 2 Engine Intake Air Filter (B, C)

- **B - Frequent/periodic/pre-delivery Inspection**
  - Make sure there are no loose or missing parts.
  - Make sure there is no visible damage.
  - Squeeze the lips of the vacuator valve to remove the dirt and dust.
- **C - Annual Inspection**
  - Do an inspection of the service indicator on the air cleaner. Replace the filter element if necessary.

#### 3 Engine Oil (B)

- Use the dipstick to check the oil level.
- The oil level must be between the marks L (low) and H (high). Add oil if it is necessary.

#### 4 Radiator (B,C)

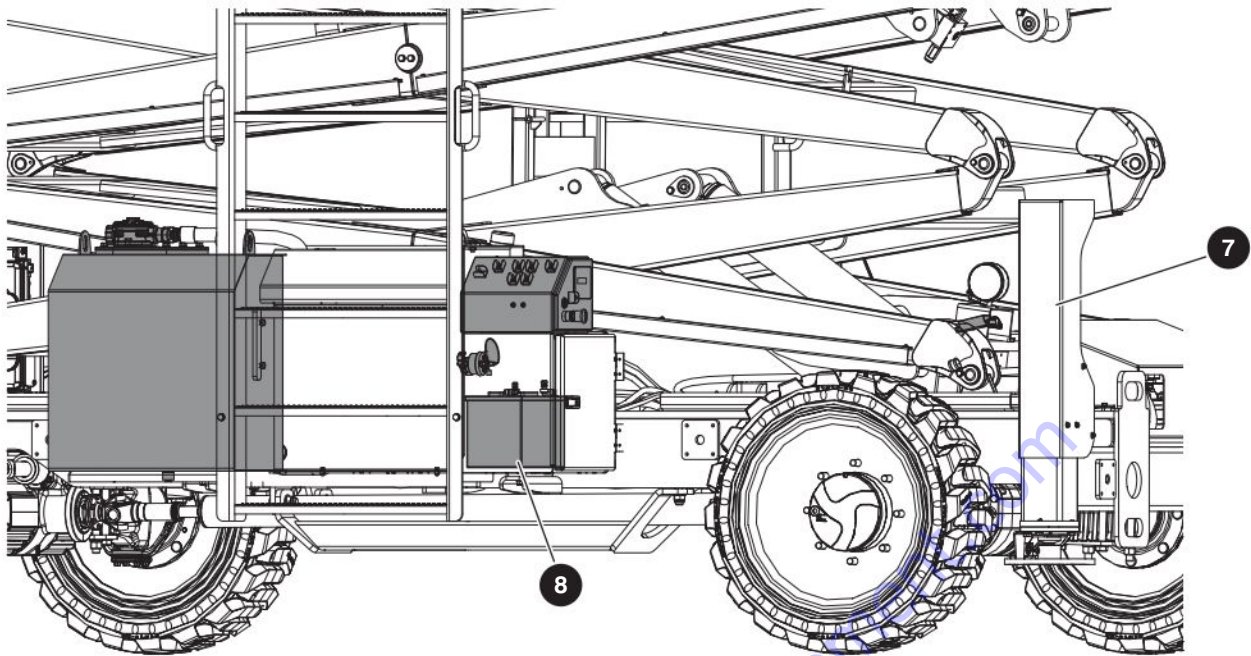
- **B - Frequent/periodic/pre-delivery Inspection**
  - Make sure that the radiator is correctly installed.
  - Make sure there are no loose or missing parts
  - Make sure there is no visible damage.
- **C - Annual Inspection**
  - Do a check of the coolant level and condition. Replace coolant if necessary

#### 5 Fuel Tank & Lines (B)

- Make sure that the fuel filler cap closes tightly.
- Make sure there is no visible damage to the tank, gauge, hoses, or fittings.
- Make sure there is no indication of fuel leakage from the tank, gauge, hoses, fittings, pump, and filter.

#### 6 Propane Tank & Lines (B)

- Make sure that the propane tank is correctly installed to the mounting tray.
- Make sure there is no visible damage to the propane tank, hoses and fittings.
- Make sure there is no indication of propane leakage.



### 7 Outriggers (B)

- Make sure outriggers are correctly installed and there are no loose or missing parts.
- Make sure there is no visible damage.

### 8 Battery (B)

#### **⚠ WARNING**

**Explosion hazard. Keep flames and sparks away. Do not smoke near the batteries. Batteries release explosive gas while you charge them. Charge the batteries in a well-ventilated area. If you do not obey, there is a risk of death or serious injury.**

#### **⚠ WARNING**

**Corrosion hazard. Do not touch battery acid. Wear the correct PPE. If the battery acid touches you, immediately flush the area with cold water and get medical aid.**

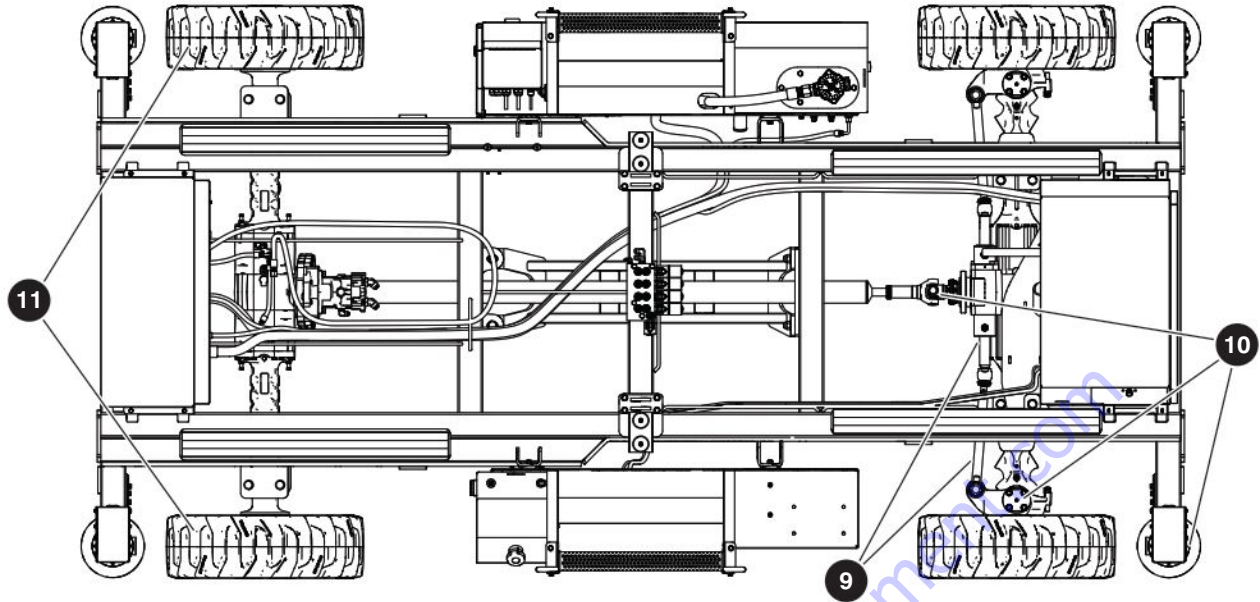
- Do an inspection of the battery case for damage.
- Make sure all the battery connections are tight.
- Clean the battery terminals and cable ends thoroughly with a terminal cleaning tool or wire brush.
- If applicable, do a check on the battery fluid levels. If the plates do not have a minimum 13 mm (1/2 inch) of solution above them, add distilled or demineralized water.

- Replace battery if damaged or incapable of holding a lasting charge.

#### **⚠ WARNING**

**Only use original or manufacturer-approved parts and components for the MEWP. If you do not obey, there is a risk of death, serious injury, or machine damage.**





### 9 Steer assembly (B)

- **Steer cylinder assembly (B)**
  - Make sure the steer cylinder assembly is correctly installed.
  - Make sure there are no loose or missing fasteners.
  - Make sure there is no visible damage.
  - Make sure the steer linkages and bushings are correctly attached.

### 10 Grease points (B)

- Make sure there are no loose or missing fasteners and lock-pins.
- Make sure there is no visible damage.
- Add grease if necessary. Refer to section 5.3-6 *Axle Grease Points*

### 12 Wheel/tire assembly (B,C)

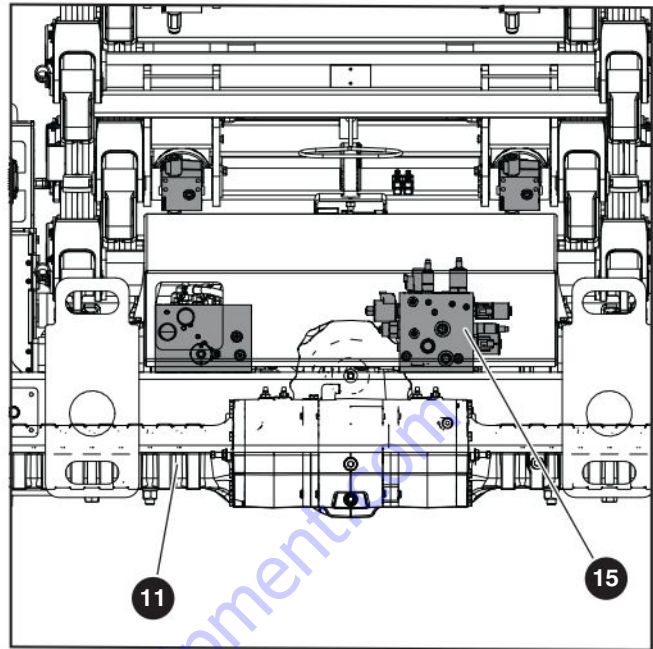
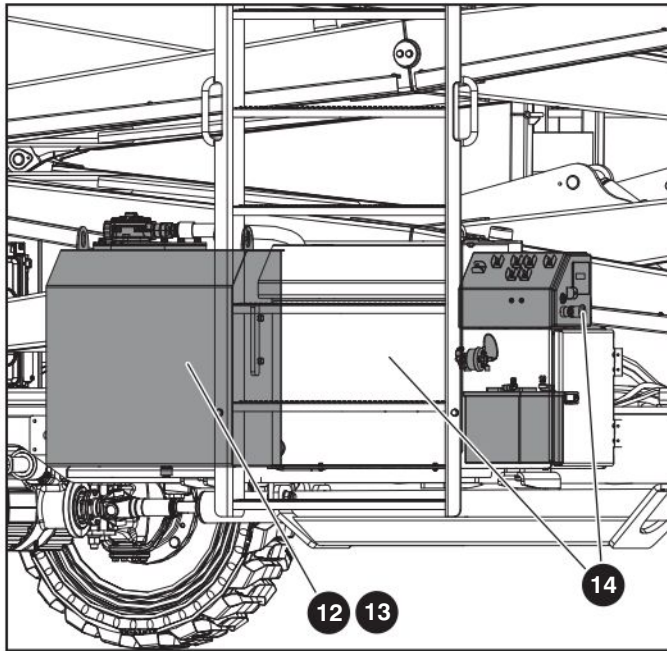
- **B - Frequent/periodic/pre-delivery Inspection**
  - Do a check on all the tire treads and sidewalls for cuts, cracks, and unusual wear.
  - Do a check on each wheel for damage, and cracked welds.
  - Make sure the wheels are correctly aligned vertically and horizontally.
  - Make sure there is no visible damage.
  - Do a check on wheel motor assembly for loose or missing parts and no visible damage.

### **⚠ WARNING**

**Do not use tires other than the tires that Skyjack specifies for this MEWP. Do not mix different types of tires or use tires that are not in good condition. Only replace the tires with the same types that are approved by Skyjack. The use of other tires can make the MEWP less stable. If you do not obey, there is a risk of death or serious injury.**

### ▪ **C - Annual Inspection**

- Make sure the lug nuts are in position and are tight. Refer to section 5.3-1 *Wheel Bolt/Nut Inspection and Torquing Procedure*.



### 11 Axles and Hydraulic Motor (B,C)

- Make sure there are no loose or missing parts.
- Make sure there is no visible damage or hydraulic leaks.
- Make sure all the fittings and hose connections are tight.

### 12 Hydraulic Tank (B)

#### **▲ WARNING**

**Environmental hazard. Immediately remove gasoline, diesel fuel, engine oil, and hydraulic fluid spills and leaks with rags. Discard these rags in accordance with national, state/provincial/territorial, and local regulations. Spilled fluids can damage the environment. When spilled fluids go into the water (for example, a sewage system, streams, rivers, or other surface water), they can kill aquatic life.**

- Make sure the hydraulic filler cap closes tightly.
- Make sure there is no visible damage or hydraulic leaks.

### 13 Hydraulic oil level (B,C)

- **B - Frequent/periodic/pre-delivery Inspection**
- Make sure the platform is fully lowered.
- Do a check on the gauge on the side of the hydraulic oil tank. The hydraulic oil level must be at or a small distance above the top mark of the gauge.

### ▪ C - Annual Inspection

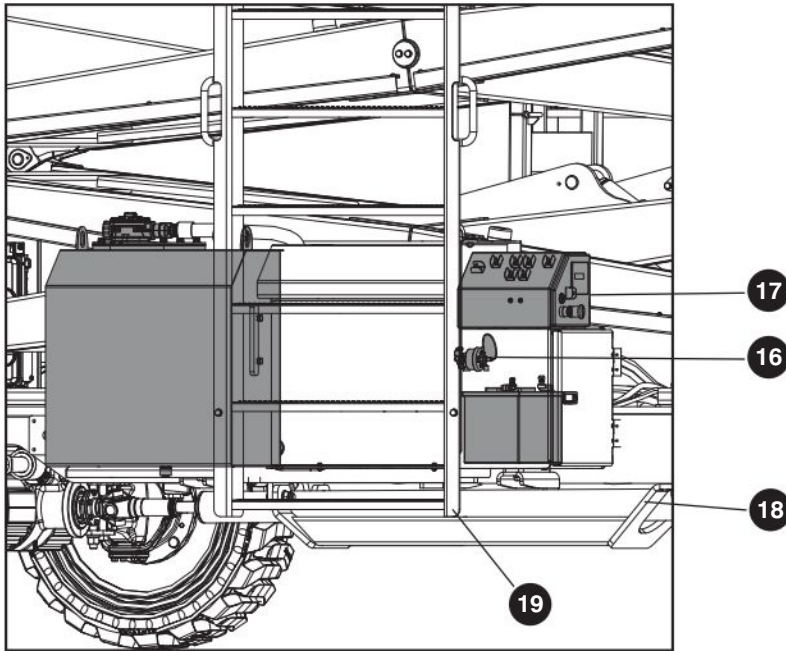
- Do a check on the hydraulic oil for contamination.
- Make sure the oil filter is in good condition.
- Replace the hydraulic oil and filters if necessary.

### 14 Electrical components (B)

- Do a check on these areas for chafed, corroded, and loose wires:
  - Base to platform cables and wiring harness
  - Hydraulic and electrical wiring harnesses.

### 15 Manifolds (B)

- Make sure all fittings and hoses are correctly tightened.
- Make sure there is no indication of hydraulic leakage.
- Make sure there are no loose wires or missing fasteners.
- Make sure the valves are secure and the electrical connection are fastened.



#### 16 Main Power Disconnect Switch (B)

- Turn main power disconnect switch to off position.
- Make sure the cables are secure and correctly installed.

#### 17 Base Controls (B)

- Make sure the base controls are correctly installed.
- Make sure there is no visible damage.

#### ▪ AC power socket (B)

- Make sure there is no visible damage.

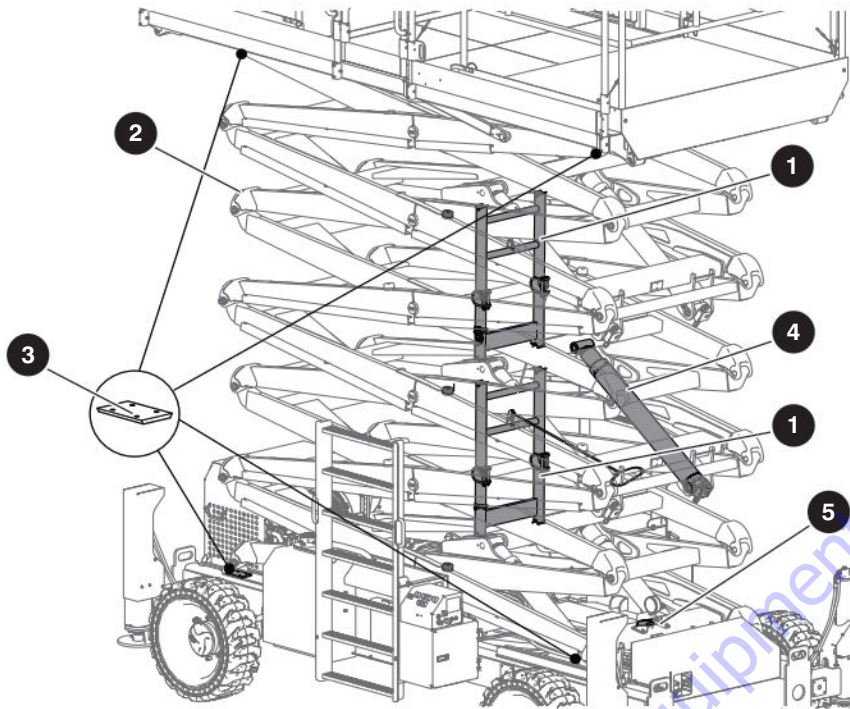
#### 18 Base Weldment (B)

- There are no cracks in the welds or structure.
- There are no signs of deformation.

#### 19 Ladder (B)

- Make sure there are no loose or missing parts.
- Make sure there is no visible damage.





## 1.7 Scissors inspection

1. Raise the platform and deploy the maintenance support.

### 1 Maintenance Support (B)

- Make sure that the maintenance support is correctly attached and show no visible damage.

### 2 Scissor Assembly (B)

- Make sure that the scissor assembly shows no signs of visible damage, deformation, or cracks in the weldments.
- Make sure all the pins and fasteners are correctly installed.
- Make sure that the cables and wires have the correct routing, and show no signs of wear and/or physical damage.
- Make sure that the scissor bumpers are correctly attached and have no visible damage.

### 3 Sliders & Rollers (B)

- Make sure that the sliders and rollers on the left and right side of the MEWP are correctly attached.
- Make sure there is no visible damage.
- Make sure there is no dirt or blockages in the slider or roller paths.

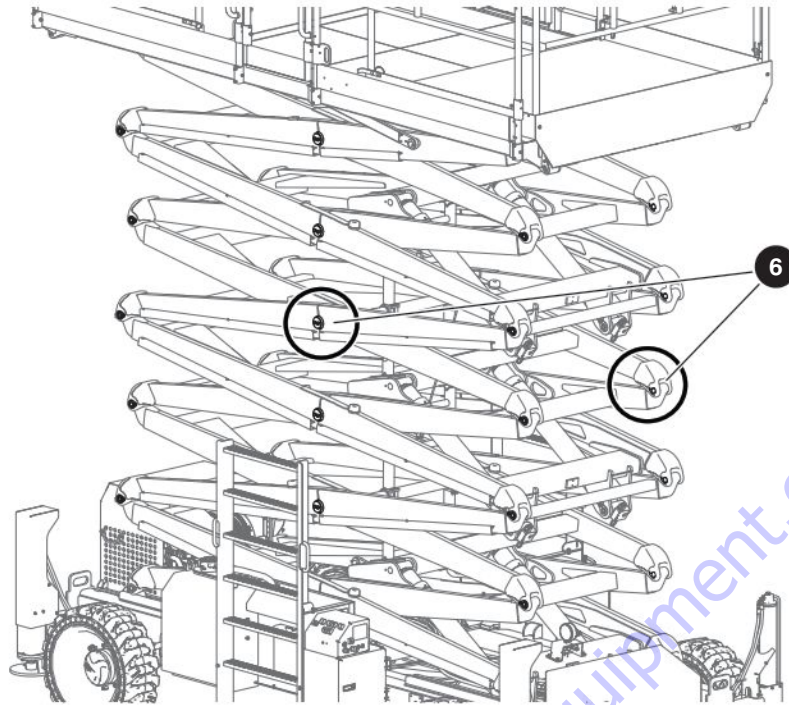
### 4 Lift Cylinder(s) (B)

- Make sure that the lift cylinders are correctly installed.
- Make sure there are no loose or missing fasteners.
- Make sure there is no indication of leaks or damage.

### 5 Angle Transducer (B)

- Make sure the angle transducer has no damage and is correctly attached.
- Make sure there is no visible damage.

2. Fully lower the platform.



### 6 Scissor pin inspection (B)

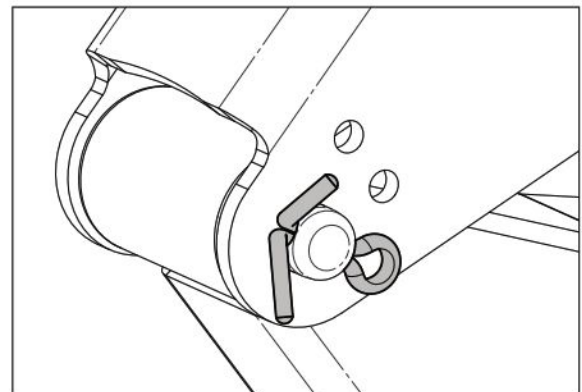
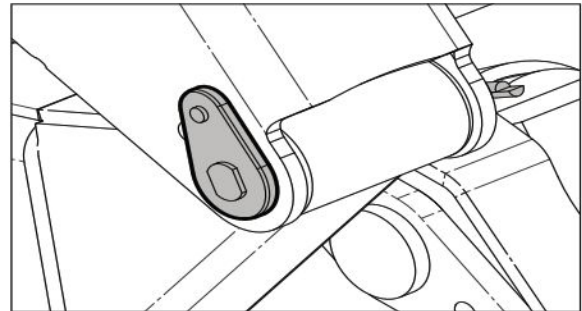
#### **WARNING**

Units that show signs of damage must be immediately removed from service and repaired by a qualified technician. Speak to the Skyjack service department for directions on how to repair the unit.

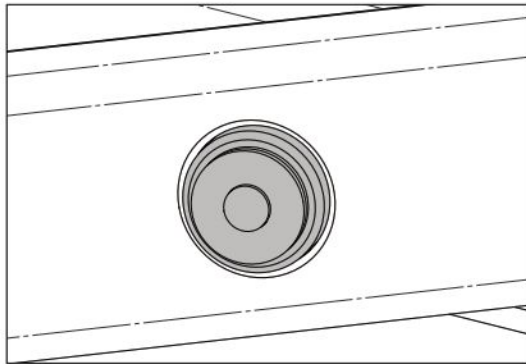
1. Do an inspection of the scissor pin connections. Look for signs of damage on the pins and scissor arms. These signs can include:
  - Noise can be heard from seized pins.
  - Rust near the pin joint
  - Cracks in welds of adjacent metals
  - Dust or metal shaving from worn components
  - Broken or missing pin retainer bolts
  - Broken or missing pin retainers
  - Rotated pin
  - Elongated or enlarged pin hole
2. Remove damaged pins and bushings. Do an inspection of the scissor bore after removing the applicable pins and bushings. Look for signs of damage, elongation and ovality of the hole.
3. If there is no structural damage to the scissor arms, replace the pins and bushings with new components.

#### Examples of pivot pin connections with no damage:

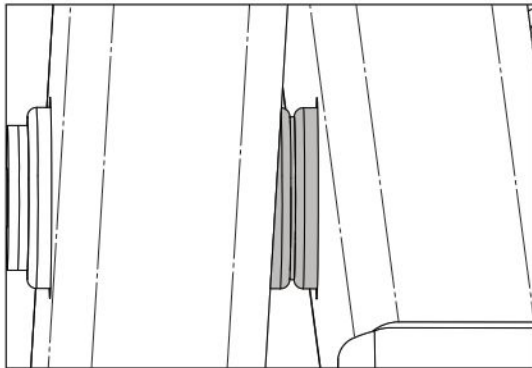
- No rust
- Pin has not rotated
- Area is clear of dust or metal shavings
- Pin retainers are installed



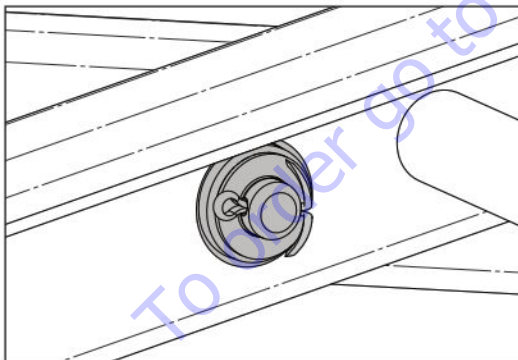
Examples of pivot pin connections with no damage:



Center Pin - Outer



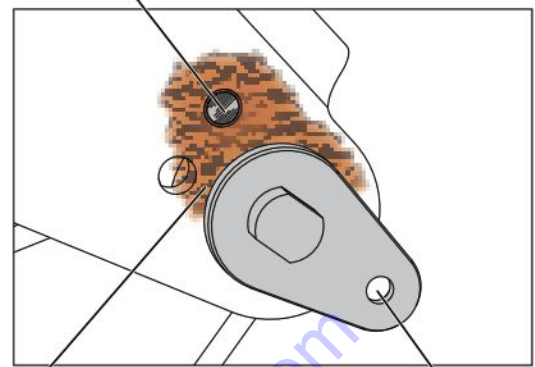
Center Pin - Middle



Center Pin - Inner

Examples of damaged pin connections:

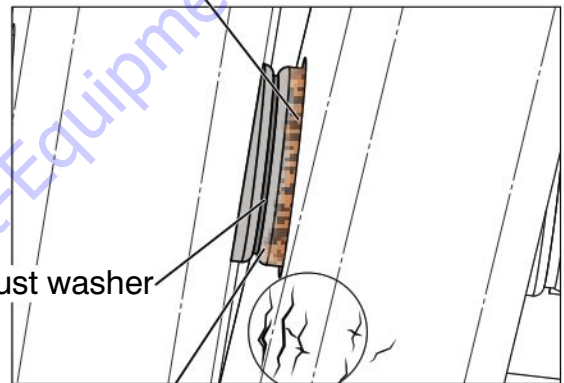
Broken retainer bolt



Rust around the pin

Rotated pin

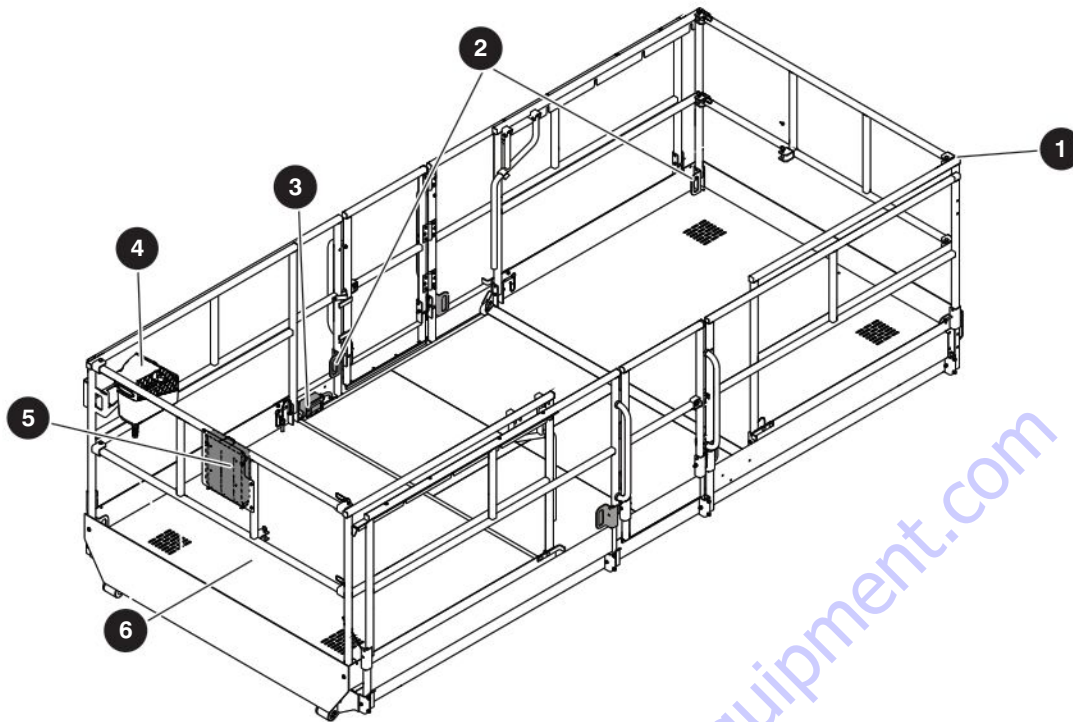
Rust around pin boss



Thrust washer

Broken pin boss

Stress cracks



## 1.8 Platform inspections

### **⚠ WARNING**

**Fall Hazard.** Use the three points of contact principle when you use the MEWP to enter or exit the platform. If you do not obey, there is a risk of death or serious injury.

1. Enter the platform and close the gate.

#### **1 Railings and gate (B)**

- Make sure there are no loose or missing parts, and there is no visible damage.
- Make sure that the lock-pins and fasteners are correctly locked.
- Make sure that the platform railings are in the correct position and locked with lock-pins.
- Make sure that the gate is in good condition and operates correctly.
- Refer to section [5.7-3 Railing Maintenance and Repair](#) for the railing maintenance information.

#### **2 Fall-protection anchorages (B)**

- Make sure that the fall-protection anchorages are correctly installed.
- Make sure there is no visible damage.

#### **3 AC power socket (B)**

- Make sure there is no visible damage.

#### **4 Platform control console (B)**

- Make sure the control console is locked with lock-pins.
- Make sure the platform control cable is correctly locked, and there is no visible damage.
- Make sure all switches operate correctly.

#### **5 Manual storage box (B)**

- Make sure that the operation manual and other important documents are in the manual storage box.
- Make sure that the documents are in good condition, and you can read them.
- Always put the manuals and other documents back in the storage box after use.

#### **6 Extension platform (B)**

- Make sure that the extension deck is correctly installed.
- Make sure there is no visible damage or missing components.
- Make sure that the extension handles, push bars, and extension lock bars are in good working order and that it has no loose or missing parts and there is no visible damage.

2. Use the MEWP ladder to exit the platform.

## 1.9 Function Tests

Do the function tests to find malfunctions in the MEWP before it is put into service. The operator must understand and follow the step-by-step instructions in the operation manual to do all the MEWP functions.

### **IMPORTANT**

**Do not operate a MEWP that does not function correctly. Lock and tag the MEWP, and remove it for servicing. Only a qualified service technician must repair the MEWP. If you do not obey, there is a risk of death or serious injury.**

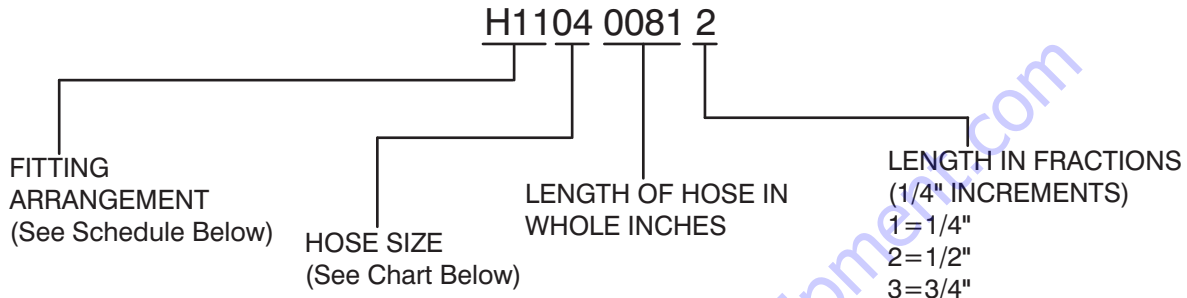
- After repairs are completed, operator must do a pre-operation inspection and a series of function tests again before putting MEWP into service.
- Before you do the function tests, read and understand the “Start Operation” section of the operating manual.
- Before you do the function tests, look for the operation manual with the same serial number as your MEWP. The operation manual has the instructions on which tests to do and how to do them correctly and successfully.

To order go to [Discount-Equipment.com](http://Discount-Equipment.com)



# Section 2 – Maintenance Tables and Diagrams

**Table 2.1 Standard Hose Numbering System**



Using the number above as an example, H1104 0081 2, this hose requires a 37° JIC female swivel fitting on one end, and a medium length 90° JIC female swivel fitting for the other end. The hose must meet or exceed the S.A.E. 100R13 hose specification, and be a total of 81-1/2" long.



**NOTE**

Hose ends and hose must be from same manufacturer per S.A.E. J1273 Nov. '91, Sections 3.10 and 4.2. Hose ends and hose must be of the same size i.e. #4 size fittings must be used with #4 size hose.

Hose Size Chart														
Size	03	04	06	08	10	12	16	20	24	32	40	48	56	64
ID	3/16"	1/4"	3/8"	1/2"	5/8"	3/4"	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"	3-1/2"	4"

Fitting Arrangement Schedule			
Hose Prefix	Hose End Fitting	Hose End Fitting	S.A.E. Hose Specification
H01	FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R17
H02	FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R13
H03	FEMALE, 37° JIC, SWIVEL	45°, FEMALE, 37° JIC, SWIVEL	100R17
H04	FEMALE, 37° JIC, SWIVEL	45°, FEMALE, 37° JIC, SWIVEL	100R13
H05	FEMALE, 37° JIC, SWIVEL	LONG 90°, FEMALE, 37° JIC, SWIVEL	100R17
H06	FEMALE, 37° JIC, SWIVEL	SHORT 90°, FEMALE, 37° JIC, SWIVEL	100R17
H07	LONG 90°, FEMALE, 37° JIC, SWIVEL	LONG 90°, FEMALE, 37° JIC, SWIVEL	100R17
H08	FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R4
H09	FEMALE, 37° JIC, SWIVEL	45°, FEMALE, 37° JIC, SWIVEL	100R4
H10	FEMALE, 37° JIC, SWIVEL	MALE PIPE THREAD FITTING	100R17
H11	FEMALE, 37° JIC, SWIVEL	MEDIUM 90°, FEMALE, 37° JIC, SWIVEL	100R13
H12	SHORT 90°, FEMALE, 37° JIC, SWIVEL	SHORT 90°, FEMALE, 37° JIC, SWIVEL	100R17
H13	FEMALE, 37° JIC, SWIVEL	REUSABLE MALE PIPE THREAD FITTING	300 PSI
H14	REUSABLE MALE PIPE THREAD FITTING	NO FITTING	300 PSI



Hose Prefix	Hose End Fitting	Hose End Fitting	S.A.E. Hose Specification
H15	REUSABLE FEMALE, 37° JIC, SWIVEL	REUSABLE FEMALE, 37° JIC, SWIVEL	300 PSI
H16	NO FITTING	NO FITTING	100R4
H17	NO FITTING	NO FITTING	300 PSI
H18	REUSABLE, FEMALE, 37° JIC, SWIVEL	NO FITTING	300 PSI
H19	LONG 90°, FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R13
H20	FEMALE, SHORT 37° JIC, SWIVEL	SHORT 90°, FEMALE, 37° JIC, SWIVEL	100R4
H21	FEMALE, SHORT 37° JIC, SWIVEL	SHORT 90°, FEMALE, 37° JIC, SWIVEL	100R2AT
H22	FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R2AT
H23	FEMALE, LONG 37° JIC, SWIVEL	LONG 90°, FEMALE, 37° JIC, SWIVEL	100R2AT
H24	FEMALE, SHORT 37° JIC, SWIVEL	SHORT 90°, FEMALE, 37° JIC, SWIVEL	100R13
H25	FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R4
H30	MEDIUM 90°, FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R17
H31	FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R17
H32	SHORT 45°, FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R17
H33	MEDIUM 45°, FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R17
H34	SHORT 90°, FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R17
H35	MEDIUM 90°, FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R17
H36	LONG 90°, FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R17
H37	SHORT 45°, FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R4
H38	SHORT 90°, FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R4
H39	LONG 90°, FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R4
H40	SHORT 90°, FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R16
H43	FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R16
H51	FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R17
H52	SHORT 45°, FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R17
H53	MEDIUM 45°, FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R17
H54	SHORT 90°, FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R17
H55	MEDIUM 90°, FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R17
H56	LONG 90°, FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R17
H57	SHORT 45°, FEMALE, SAE ORFS, SWIVEL	FEMALE, SAE ORFS, SWIVEL	100R13
H58	FEMALE, SAE ORFS, SWIVEL	FEMALE, SAE ORFS, SWIVEL	100R13
H59	MEDIUM 90°, FEMALE, SAE ORFS, SWIVEL	FEMALE, SAE ORFS, SWIVEL	100R13
H60	FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R17
H61	FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R16
H62	SHORT 90°, FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R16
H63	MEDIUM 90°, FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R16
H64	LONG 90°, FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R16
H65	MEDIUM 67°, FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R12
H66	FEMALE, 37° JIC, SWIVEL	NO FITTING	100R4
H67	FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R19
H68	SHORT 45°, FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R19
H69	MEDIUM 90°, FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R19
H70	LONG 90°, FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R19
H71	LONG 90°, FEMALE, SAE ORFS, SWIVEL	FEMALE, SAE ORFS, SWIVEL	100R15

**Table 2.2 Torque Specifications for Fasteners (US Imperial)**

Size	Torque Type	SAE2		SAE 5		SAE 8	
		Dry	Lubed	Dry	Lubed	Dry	Lubed
4-40	(in-lb)	(5)	(4)	(8)	(6)	(12)	(9)
	Nm	0.6	0.5	0.9	0.7	1.4	1.0
4-48	(in-lb)	(6)	(5)	(9)	(7)	(13)	(10)
	Nm	0.7	0.6	1.0	0.8	1.5	1.1
6-32	(in-lb)	(10)	(8)	(16)	(12)	(23)	(17)
	Nm	1.1	0.9	1.8	1.4	2.6	1.9
6-40	(in-lb)	(12)	(9)	(18)	(13)	(25)	(19)
	Nm	1.4	1.0	2.0	1.5	2.8	2.1
8-32	(in-lb)	(19)	(14)	(30)	(22)	(41)	(31)
	Nm	2.1	1.6	3.4	2.5	4.6	3.5
8-36	(in-lb)	(20)	(15)	(31)	(23)	(43)	(32)
	Nm	2.3	1.7	3.5	2.6	4.9	3.6
10-24	(in-lb)	(27)	(21)	(43)	(32)	(60)	(45)
	Nm	3.1	2.4	4.9	3.6	6.8	5.1
10-32	(in-lb)	(31)	(23)	(49)	(36)	(68)	(51)
	Nm	3.5	2.6	5.5	4.1	7.7	5.8
1/4-20	(in-lb) ft-lb	(66)	(50)	8	(75)	12	9
	Nm	7.5	5.6	11	8.5	16	12
1/4-28	(in-lb) ft-lb	(76)	(56)	10	(86)	14	10
	Nm	8.6	6.3	14	9.7	19	14
5/16-18	ft-lb	11	8	17	13	25	18
	Nm	15	11	23	18	34	24
5/16-24	ft-lb	12	9	19	14	25	20
	Nm	16	12	26	19	34	27
3/8-16	ft-lb	20	15	30	23	45	35
	Nm	27	20	41	31	61	47
3/8-24	ft-lb	23	17	35	25	50	35
	Nm	31	23	47	34	68	47
7/16-14	ft-lb	32	24	50	35	70	55
	Nm	43	33	68	47	95	75
7/16-20	ft-lb	36	27	55	40	80	60
	Nm	49	37	75	54	108	81
1/2-13	ft-lb	50	35	75	55	110	80
	Nm	68	47	102	75	149	108
1/2-20	ft-lb	55	40	90	65	120	90
	Nm	75	54	122	88	163	122

Size	Torque Type	SAE2		SAE 5		SAE 8	
		Dry	Lubed	Dry	Lubed	Dry	Lubed
9/16-12	ft-lb	70	55	110	80	150	110
	Nm	95	75	149	108	203	149
9/16-18	ft-lb	80	60	120	90	170	130
	Nm	108	81	163	122	230	176
5/8-11	ft-lb	100	75	150	110	220	170
	Nm	136	102	203	149	298	230
5/8-18	ft-lb	110	85	180	130	240	180
	Nm	149	115	244	176	325	244
3/4-10	ft-lb	175	130	260	200	380	280
	Nm	237	176	353	271	515	380
3/4-16	ft-lb	200	150	300	220	420	320
	Nm	271	203	407	298	569	434
7/8-9	ft-lb	170	125	430	320	600	460
	Nm	230	169	583	434	813	624
7/8-14	ft-lb	180	140	470	360	660	500
	Nm	244	190	637	488	895	678
1-8	ft-lb	250	190	640	480	900	680
	Nm	339	258	868	651	1220	922
1-12	ft-lb	270	210	710	530	1000	740
	Nm	366	285	963	719	1356	1003
1-14	ft-lb	280	210	730	540	1020	760
	Nm	380	285	990	732	1383	1030
1 1/8-7	ft-lb	350	270	800	600	1280	960
	Nm	475	366	1085	813	1735	1302
1 1/8-12	ft-lb	400	300	880	660	1440	1080
	Nm	542	407	1193	895	1952	1464
1 1/4-7	ft-lb	500	380	1120	840	1820	1360
	Nm	678	515	1519	1139	2468	1844
1 1/4-12	ft-lb	550	420	1240	920	2000	1500
	Nm	746	569	1681	1247	2712	2034
1 3/8-6	ft-lb	670	490	1460	1100	2380	1780
	Nm	908	664	1979	1491	3227	2413
1 3/8-12	ft-lb	750	560	1680	1260	2720	2040
	Nm	1017	759	2278	1708	3688	2766
1 1/2-6	ft-lb	870	650	1940	1460	3160	2360
	Nm	1180	881	2630	1979	4284	3200
1 1/2-12	ft-lb	980	730	2200	1640	3560	2660
	Nm	1329	990	2983	2224	4827	3606

**NOTE:** Lubed includes lubricants such as lubrizing, oil, grease, or uncured Loctite.

1374AA

**Table 2.3 Torque Specifications for Fasteners (Metric)**

Size	Torque Type	SAE2		SAE 5		SAE 8	
		Dry	Lubed	Dry	Lubed	Dry	Lubed
M5 x 0.80	(in-lb)	(54)	(41)	(78)	(59)	(12)	(9)
	Nm	6.1	4.6	8.8	6.7	1.4	1.0
M6 x 1.00	(in-lb)	(92)	(69)	(133)	(99)	(13)	(10)
	Nm	10.4	7.8	15	11.2	1.5	1.1
M7 x 1.00	(in-lb)	(156)	(116)	(222)	(167)	(23)	(17)
	Nm	17.6	13.1	25.1	18.9	2.6	1.9
M8 x 1.25	(in-lb)	(225)	(169)	(333)	(242)	(25)	(19)
	Nm	25.4	19.1	37.6	27.3	2.8	2.1
M10 x 1.50	ft-lb	37	28	53	40	(41)	(31)
	Nm	50	38	72	54	4.6	3.5
M12 x 1.75	ft-lb	65	49	93	69	(43)	(32)
	Nm	88	66	126	94	4.9	3.6
M14 x 2.00	ft-lb	104	78	148	111	(60)	(45)
	Nm	141	106	201	150	6.8	5.1
M16 x 2.00	ft-lb	161	121	230	172	(68)	(51)
	Nm	218	164	312	233	7.7	5.8
M18 x 2.50	ft-lb	222	167	318	238	12	9
	Nm	301	226	431	323	16	12
M20 x 2.50	ft-lb	314	235	449	337	14	10
	Nm	426	319	609	457	19	14
M22 x 2.50	ft-lb	428	321	613	460	25	18
	Nm	580	435	831	624	34	24
M24 x 3.00	ft-lb	543	407	776	582	25	20
	Nm	736	552	1052	789	34	27
M27 x 3.00	ft-lb	796	597	1139	854	45	35
	Nm	1079	809	1544	1158	61	47
M30 x 3.50	ft-lb	1079	809	1543	1158	50	35
	Nm	1463	1097	2092	1570	68	47
M33 x 3.50	ft-lb	1468	1101	2101	1576	70	55
	Nm	1990	1493	2849	2137	95	75
M36 x 4.00	ft-lb	1886	1415	2699	2024	80	60
	Nm	2557	1918	3659	2744	108	81

**NOTE:** Lubed includes lubricants such as lubrizing, oil, grease, or uncured Loctite.

1375AA

**Table 2.4 Torque Specifications for Hydraulic Couplings & Hoses**

<b>Hydraulic Coupling Torque Chart O-Ring Port Connectors</b>				
<b>SAE Size</b>	<b>Steel Ports</b>		<b>Non-ferrous Ports</b>	
	<b>ft-lb</b>	<b>Nm</b>	<b>ft-lb</b>	<b>Nm</b>
4	14-16	20-22	9-10	12-13
6	24-26	33-35	15-16	20-21
8	50-60	68-78	30-36	41-47
10	72-80	98-110	43-48	60-66
12	125-135	170-183	75-81	102-110
16	200-220	270-300	120-132	162-180
20	210-280	285-380	126-168	171-228
24	270-360	370-490	162-216	222-294
32	-	-	-	-

<b>Hose End Torque Chart for JIC</b>									
<b>Size</b>		<b>Steel</b>				<b>Brass</b>			
<b>Dash</b>	<b>Frac.</b>	<b>ft-lb</b>		<b>Nm</b>		<b>ft-lb</b>		<b>Nm</b>	
		<b>Min.</b>	<b>Max.</b>	<b>Min.</b>	<b>Max.</b>	<b>Min.</b>	<b>Max.</b>	<b>Min.</b>	<b>Max.</b>
-4	1/4"	10	11	13	15	5	6	6.75	9
-6	3/8"	17	19	23	26	12	15	17	20
-8	1/2"	34	38	47	52	20	24	27.66	33
-10	5/8"	50	56	69	76	34	40	46.33	55
-12	3/4"	70	78	96	106	53	60	72.33	82
-16	1"	94	104	127	141	74	82	100.5	111
-20	1 1/4"	124	138	169	188	75	83	101.5	113
-24	1 1/2"	156	173	212	235	79	87	107	118
-32	2"	219	243	296	329	158	175	214	237

<b>Hose End Torque Chart for Flat-Face O-Ring Seal (Steel)</b>					
<b>Size</b>		<b>Torque Specification</b>			
<b>Dash</b>	<b>Frac.</b>	<b>ft-lb</b>		<b>Nm</b>	
		<b>Min.</b>	<b>Max.</b>	<b>Min.</b>	<b>Max.</b>
-4	1/4"	10	12	14	16
-6	3/8"	18	20	24	27
-8	1/2"	32	40	43	54
-10	5/8"	46	56	60	75
-12	3/4"	65	80	90	110
-14	1"	65	80	90	110
-16	1 1/4"	92	105	125	240
-20	1 1/2"	125	140	170	190
-24	2"	150	180	200	245

1276AA

**Table 2.5 Axle Torque Specifications**

Size of Bolt		Type of Bolt					
		8.8		10.9		12.9	
		Normal Loctite 242 (Nm)	Loctite 270 (Nm)	Normal Loctite 242 (Nm)	Loctite 270 (Nm)	Normal Loctite 242 (Nm)	Loctite 270 (Nm)
Coarse Pitch	M6 x 1	9.5-10.5	10.5-11.5	14.3-15.7	15.2-16.8	16.2-17.8	18.1-20.0
	M8 x 1.25	23.8-26.2	25.6-28.4	34.2-37.8	36.7-40.5	39.0-43.0	43.7-48.3
	M10 x 1.5	48-53	52-58	68-75	73-81	80-88	88-97
	M12 x 1.75	82-91	90-100	116-128	126-139	139-153	152-168
	M14 x 2	129-143	143-158	182-202	200-221	221-244	238-263
	M16 x 2	200-221	219-242	283-312	309-341	337-373	371-410
	M18 x 2.5	276-305	299-331	390-431	428-473	466-515	509-562
	M20 x 2.5	390-431	428-473	553-611	603-667	660-730	722-798
	M22 x 2.5	523-578	575-635	746-824	817-903	893-987	974-1076
	M24 x 3	675-746	732-809	950-1050	1040-1150	1140-1260	1240-1370
	M27 x 3	998-1103	1088-1202	1411-1559	1539-1701	1710-1890	1838-2032
M30 x 3.5	1378-1523	1473-1628	1914-2115	2085-2305	2280-2520	2494-2757	
Fine Pitch	M8 x 1	25.7-28.3	27.5-30.5	36.2-39.8	40.0-44.0	42.8-47.2	47.5-52.5
	M10 x 1.25	49.4-54.6	55.2-61.0	71.5-78.5	78.0-86.0	86.0-94.0	93.0-103.0
	M12 x 1.25	90-100	98-109	128-142	139-154	152-168	166-184
	M12 x 1.5	86-95	94-104	120-132	133-147	143-158	159-175
	M14 x 1.5	143-158	157-173	200-222	219-242	238-263	261-289
	M16 x 1.5	214-236	233-257	302-334	333-368	361-399	394-436
	M18 x 1.5	312-345	342-378	442-489	485-536	527-583	580-641
	M20 x 1.5	437-483	475-525	613-677	674-745	736-814	808-893
	M22 x 1.5	581-642	637-704	822-908	903-998	998-1103	1078-1191
	M24 x 2	741-819	808-893	1045-1155	1140-1260	1235-1365	1363-1507
	M27 x 2	1083-1197	1178-1302	1520-1680	1672-1848	1834-2027	2000-2210
M30 x 2	1511-1670	1648-1822	2138-2363	2332-2577	2565-2835	2788-3082	

1373AA

Note: 1 Nm = 0.7376 ft-lb

Screw-locking, Sealing and Lubricating Materials

**Loctite 242**

- Anaerobic product apt to prevent the loosening of screws, nuts and plugs. Used for medium-strength locking. Before using it, completely remove any lubricant by using the specific activator.

**Loctite 270**

- Anaerobic product apt to prevent the loosening of screws, nuts and plugs. Used for medium-strength locking. Before using it, completely remove any lubricant by using the specific activator. To remove parts, it may be necessary to heat them at 80°C approx.



**Table 2.6 Axle Maintenance Intervals**

Operation	Component	Frequency	Lubricants
Check Levels	Differential	monthly	SAE 80W-90 API GL-5
	Planetary reduction	every 200 hours	
	Gear box	monthly	
Oil Change	Differential	every 800 hours *	SAE 80W-90 API GL-5
	Planetary reduction	every 1000 hours *	
	Self-locking differential gear	every 700 hours * &	
	Gear box	once at 50 hours after every 1000 hours	
Tighten	Gear box screws/bolts	every 200 hours	N/A
	Wheel Nuts	every 200 hours	

Operation	Member	Conditions	Frequency	Lubricants
Grease	Articulations	Normal work	monthly	MOLIKOTE
		Awkward work	weekly	

Torque Wrench Settings (Nm)			
Size of Screw	8G/8.8	10K/10.9	12K/12.9
M4	2.9	4.1	-
M6	10	14	-
M8	25	35	-
M12	49	69	-
M10 X 1.25	-	73	-
M12	86	120	-
M14	135	190	-
M14 X 1.5	-	-	250
M16	210	295	-
A18	325	-	-

\*Initially after 100 working hours  
& when it starts sounding noisy

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**NOTE**

1 Nm = 0.7376 ft-lb

**Table 2.7 Specifications - SJ9233 RT, SJ9243 RT, SJ9253 RT**

Model	SJ9233 RT		SJ9243 RT		SJ9253 RT		
Overall Weight*	<b>ANSI</b>	<b>CE &amp; AS</b>	<b>ANSI</b>	<b>CE &amp; AS</b>	<b>ANSI</b>	<b>CE &amp; AS</b>	<b>KC</b>
ANSI - single deck CE, AS, KC - dual decks	6 114 kg (13 479 lb)	6 446 kg	6 911 kg (15 236 lb)	7 081 kg	8 045 kg (17 736 lb)	8215 kg	8137 kg
Overall Width	2.30 m (7.55')		2.30 m (7.55')		2.30 m (7.55')		
Overall Length (Platform Retracted)	4.50 m (14.76')		4.50 m (14.76')		4.50 m (14.76')		
Overall Length (Platform Extended - Single)	5.81 m (19.06')		5.81 m (19.06')		5.81 m (19.06')		
Overall Length (Platform Extended - Dual)	7.21 m (23.65')		7.21 m (23.65')		7.21 m (23.65')		
Platform Size, Inside (Platform Retracted)	1.92 m x 4.28 m (6.30' x 14.04')		1.92 m x 4.25 m (6.30' x 13.94')		1.92 m x 4.25 m (6.30' x 13.94')		
Platform Size Inside (Platform Extended - Single)	1.92 m x 5.65 m (6.30' x 18.54')		1.92 m x 5.65 m (6.30' x 18.54')		1.92 m x 5.65 m (6.30' x 18.54')		
Platform Size Inside (Platform Extended - Dual)	1.92 m x 7.12 m (6.30' x 23.36')		1.92 m x 7.12 m (6.30' x 23.36')		1.92 m x 7.12 m (6.30' x 23.36')		
<b>Height</b>							
Working Height	12.06 m (39.57')		15.11 m (49.57')		18.15 m (59.55')		
Platform Elevated Height	10.06 m (33')		13.11 m (43')		16.15 m (53')		
Stowed Height (Railings Down)	1.96 m (6.43')		2.16 m (7.09')		2.39 m (7.84')		
Stowed Height (Railings Up)	2.77 m (9.09')		2.96 m (9.71')		3.20 m (10.5')		
Drive Height (Maximum)	10.06 m (33')		13.11 m (43')		10.06 m (33')		
<b>Standard Operating Times</b>							
	<b>ANSI &amp; AS</b>	<b>CE</b>	<b>ANSI &amp; AS</b>	<b>CE</b>	<b>ANSI &amp; AS</b>	<b>CE</b>	<b>KC</b>
Raise Time (No Load)	52 s		55 s		80 s		78 s
Raise Time (Rated Load)	52 s		56 s		82 s		80 s
Lower Time (No Load)	34 s	38 s	29 s	32 s	39 s	45 s	69 s
Lower Time (Rated Load)	30 s	36 s	29 s	32 s	39 s	45 s	70 s
<b>Chassis</b>							
Stowed Drive Speed	5.6 km/h (3.5 mph)		5.6 km/h (3.5 mph)		<b>ANSI, CE &amp; AS</b>		<b>KC</b>
					5.6 km/h (3.5 mph)		4.83 km/h
Elevated Drive Speed	≤ 0.80 km/h (≤ 0.5 mph)		≤ 0.80 km/h (≤ 0.5 mph)		≤ 0.80 km/h (≤ 0.5 mph)		≤ 0.81 km/h
Maximum Gradeability	40%		36%		32%		31%
Tires (Solid Rubber)	33 x 12 x 20						
Tank Capacity	87 L (23 gal)						

\* Weights are approximate; refer to the MEWP nameplate for the specific weight.

2092AB

**Table 2.8 Specifications - SJ9664 RT**

Model	SJ9664 RT	
Overall Weight - Single Deck*	9750 kg	21 495 lb
Overall Weight - Dual Decks*	9997 kg	22 040 lb
Overall Width	2.42 m	7.9'
Overall Length (Platform Retracted)	4.58 m	15'
Overall Length (Platform Extended - Single)	5.89 m	19.3'
Overall Length (Platform Extended - Dual)	7.21 m	23.7'
Platform Size, Inside (Platform Retracted - Single)	1.92 m x 4.38 m	6.3' x 14.3'
Platform Size, Inside (Platform Retracted - Dual)	1.92 m x 4.46 m	6.3' x 14.6'
Platform Size Inside (Platform Extended - Single)	1.92 m x 5.71 m	6.3' x 18.7'
Platform Size Inside (Platform Extended - Dual)	1.92 m x 7.11 m	6.3' x 23.3'
Height		
Working Height	21.51 m	70.6'
Raised Platform Height	19.51 m	64'
Stowed Height (Railings Down)	2.78 m	9.1'
Stowed Height (Railings Up)	3.60 m	11.8'
Drive Height (Maximum)	9.14 m	30'
Standard Operating Times		
Raise Time (No Load)	87 s	
Raise Time (Rated Load)	87 s	
Lower Time (No Load)	72 s	
Lower Time (Rated Load)	72 s	
Chassis		
Stowed Drive Speed	4.8 km/h	3 mph
Elevated Drive Speed	≤ 0.80 km/h	≤ 0.5 mph
Maximum Gradeability	30%	
Tires (Solid Rubber)	33 x 12 x 20	
Tank Capacity	117 L	31 gal

2124AA

\* Weights are approximate; refer to the MEWP nameplate for the specific weight.

**Table 2.10 Fluids**

Description	Temperature Range	Type
Hydraulic Oil - Standard	-26°C to 38°C (-15°F to 100°F)	Petro-Canada ATF D3M, Shell ATF Donax TG
Hydraulic Oil - Biodegradable	-29°C to 32°C (-20°F to 90°F)	Shell Naturelle HF-E 46
Gear Oil - Standard	-29°C to 45°C (-20°F to 115°F)	80W-90 API GL5
Gear Oil - Arctic	-40°C to 45°C (-40°F to 115°F)	Shell Spirax S4 TXM 10W-30
Engine Oil - Standard	-18°C to 45°C (0°F to 115°F)	Petro-Canada Duron-E 10W-30, Esso XD-3 Extra Premium Heavy Duty 10W-30
Engine Oil - Arctic	-40°C to 45°C (-40°F to 115°F)	Petro-Canada Duron-E synthetic 0W-40, Esso XD-3 Extra 0W-40
Coolant - Standard	-40°C to 45°C (-40°F to 115°F)	Recochem 50/50 Premix (green)
Coolant - Arctic	-40°C to 45°C (-40°F to 115°F)	*Recochem 50/50 Premix (green) mixed with Recochem Extended Life Predilute 60/40 concentrate

\*Add the concentrate antifreeze to the 50/50 mix to obtain a 60/40 concentration.

2093AA

**Table 2.9 Environment**

Model	SJ9233 RT	SJ9243 RT	SJ9253 RT	SJ9664 RT
Electromagnetic Compatibility (EMC)	Meets requirements of ISO 13766-1:2018 and CAN/CSA CISPR 12-10			
Hazardous Location Rating	MEWP not rated for hazardous locations with potentially flammable gases, explosive gases or particles			
Sound Pressure Level (ISO 3744)	72 dB			
Guaranteed Maximum Sound Power Level (ISO 4871)	100 dB			
Whole-body Vibration on Platform	≤ 0.5 m/s <sup>2</sup> (1.64 ft/s <sup>2</sup> )			
Operating Temperatures				
Standard	-20°C (-4°F) to +40°C (+104°F)			

1807AD

\*In cold conditions, 14°F / -10°C and below, machines should be equipped with the optional cold weather kit.

\*\* In extreme cold conditions, 0°F / -18°C and below, machines should be equipped with the optional arctic weather kit.

**Table 2.11 Floor Loading Pressure**

Model		Weights				Pressures			
		MEWP Weight		Max Weight per Wheel/Outrigger**		LCP***		OFL***	
		kg	lb	kg	lb	kPa	psi	kPa	psf
SJ9233 RT on Wheels	Min*	6114	13479	1860	4100	857	124	5.9	124
	Max*	7523	16586	2630	5800	930	135	7.1	149
SJ9233 RT on Outrigger Pads	Min*	6276	13836	1860	4100	498	72	5.9	124
	Max*	7523	16586	2630	5800	705	102	7.1	149
SJ9243 RT on Wheels	Min*	6749	14879	1950	4300	853	124	6.6	137
	Max*	7818	17236	2585	5700	920	133	7.4	155
SJ9243 RT on Outrigger Pads	Min*	6911	15236	1950	4300	522	76	6.6	137
	Max*	7818	17236	2585	5700	693	100	7.4	155
SJ9253 RT on Wheels	Min*	8045	17736	2268	5000	867	126	7.6	159
	Max*	8725	19236	2790	6150	971	141	8.3	173
SJ9253 RT on Outrigger Pads	Min*	8045	17736	2268	5000	609	88	7.6	159
	Max*	8725	19236	2790	6150	747	108	8.3	173
SJ9664 RT on Wheels	Min*	9980	22000	2525	5560	906	131	9.1	190
	Max*	10492	23130	3000	6600	1040	151	9.5	200
SJ9664 RT on Outrigger Pads	Min*	9980	22000	2525	5560	676	98	9.1	190
	Max*	10492	23130	3000	6600	800	116	9.5	200

1799AD

- \* **Min:** Minimum MEWP weight (Unloaded platform, no options/attachments)  
**Max:** Maximum MEWP weight (Platform loaded to capacity with options/attachments)
- \*\* **Wheel/Outrigger Load** is the weight that can be experienced on one wheel/outrigger.  
**Note:** This is more than 25% of the machine weight due to possible weight distribution over the machine and platform.
- \*\*\* **LCP:** Local Concentrated Pressure is a measure of how hard the MEWP presses on the area in direct contact with the floor/tire/outrigger.  
**OFL:** Overall Floor Load (Pressure) is a measure of the average load the MEWP imparts on the whole surface directly underneath the chassis. This has been calculated by dividing the MEWP weight by the overall floor area occupied by the MEWP (on wheels/outriggers).  
**Note:** The floor covering (e.g., tile, carpet, etc.) or the structure (e.g., beams) of the operating surface must be able to withstand more than the values indicated above.  
**Note:** The LCP or OFL that an individual surface can withstand varies from structure to structure and is generally determined by the engineer or architect for that particular structure.

**⚠ WARNING**

**Do not use tires other than the tires that Skyjack specifies for this MEWP. Do not mix different types of tires or use tires that are not in good condition. Only replace the tires with the same types that are approved by Skyjack. Other tires can make the MEWP less stable. If you do not obey, there is a risk of death or serious injury.**



**Table 2.12 Maximum Platform Capacities (Evenly Distributed)**

Model	Wind Rating	Total Platform Capacity		Extension Platform Capacity		Manual Side Force	Tilt Cutout Setting (side-to-side x front-to-back)	Outrigger Tilt Cutout Setting
SJ9233 RT	12.5 m/s (28 mph)	1247 kg (2 750 lb)	7 people	227 kg (500 lb)	2 people	400 N (90 lbf)	2.5° x 4.5°	1° x 1°
SJ9243 RT		907 kg (2 000 lb)	6 people					
SJ9253 RT		681 kg (1 500 lb)	5 people					
SJ9664 RT	0 m/s (0 mph)	512 kg (1 130 lb)	5 people				0.6° x 0.6°	
	12.5 m/s (28 mph)	512 kg (1 130 lb)	3 people					

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**NOTE**

Occupants and materials are not to exceed the rated load. Refer to the capacity label at the sides of the platform for additional information and models equipped with options.





































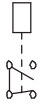
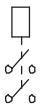
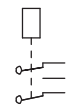
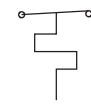
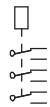


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














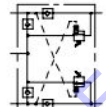







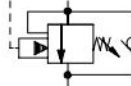





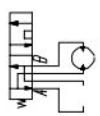


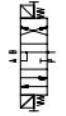
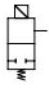





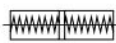
## Section 3 – System Component Identification and Schematics

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**Table 3.1 Electrical Symbol Chart**

 CIRCUITS CROSSING NO CONNECTION	 HOURMETER	 KEY SWITCH	 LIMIT SWITCH N.O.
 CIRCUITS CONNECTED	 LIGHT	 FOOT SWITCH	 LIMIT SWITCH N.O. HELD CLOSED
 BATTERY	 HYDRAULIC VALVE COIL	 TOGGLE SWITCH	 LIMIT SWITCH N.C.
 GROUND	 PROPORTIONAL HYDRAULIC VALVE COIL	 PUSH BUTTON	 LIMIT SWITCH N.C. HELD OPEN
 FUSE	 ELECTRIC MOTOR	 ROTARY SWITCH	 SILICON CONTROLLED RECTIFIER
 CIRCUIT BREAKER	 HORN	 LIMIT SWITCH	 PROXIMITY SWITCH
 VOLT METER	 EMERGENCY STOP BUTTON	 CAM OPERATED LIMIT SWITCH	 PNP TRANSISTOR
 CAPACITOR	 RESISTOR	 TILT SWITCH	 NPN TRANSISTOR
 POTENTIOMETER	 LEVEL SENSOR	 SINGLE POLE SINGLE THROW RELAY	 PRESSURE/ VACUUM SWITCH
 SINGLE POLE DOUBLE THROW RELAY	 DOUBLE POLE SINGLE THROW RELAY	 DOUBLE POLE DOUBLE THROW RELAY	 TEMPERATURE SWITCH
 TRIPLE POLE DOUBLE THROW RELAY	 DIODE	 RHEOSTAT	

**Table 3.2 Hydraulic Symbol Chart**

	LINE CROSSING		VARIABLE DISPLACEMENT PUMP		SHUTTLE VALVE		VELOCITY FUSE
	LINE JOINED		HAND PUMP		ACCUMULATOR, GAS CHARGED		SINGLE ACTING CYLINDER
	HYDRAULIC TANK		RELIEF VALVE		CUSHION CYLINDER		DOUBLE ACTING CYLINDER
	HYDRAULIC FILTER WITH BYPASS		PRESSURE REDUCING VALVE		PRESSURE SWITCH		DOUBLE ACTING DOUBLE RODDED CYLINDER
	ELECTRIC MOTOR		FIXED ORIFICE		MOTION CONTROL VALVE		SPRING APPLIED HYDRAULIC RELEASED BRAKE
	ENGINE		ADJUSTABLE FLOW CONTROL		FLOW DIVIDER COMBINER		BRAKE CYLINDER
	FIXED DISPLACEMENT PUMP		CHECK VALVE		COUNTER BALANCE VALVE		ROTARY ACTUATOR
	VARIABLE DISPLACEMENT HYDRAULIC MOTOR		OIL COOLER		VALVE COIL		BI DIRECTIONAL HYDRAULIC MOTOR
	SERIES PARALLEL HYDRAULIC MOTOR		TWO POSITION TWO WAY NORMALLY CLOSED VALVE		TWO POSITION THREE WAY VALVE		THREE POSITION FOUR WAY CLOSED CENTER OPEN PORT
	TWO POSITION TWO WAY NORMALLY OPEN VALVE		TWO POSITION THREE WAY VALVE		THREE POSITION FOUR WAY CLOSED CENTER CLOSED PORT		
	PRESSURE TRANSDUCER		MAIN LINES Solid		PILOT LINES Dashed		
	SERVO						

### 3.3 Wire Number and Color Code

WIRE NO.	WIRE COLOR	WIRE NO.	WIRE COLOR	WIRE NO.	WIRE COLOR	WIRE NO.	WIRE COLOR	WIRE NO.	WIRE COLOR
00	WHT	20	ORG/BLU	44	YEL/WHT	67	ORG/BRN	92	GRN SHLD
000	WHT	21	WHT/RED	45	YEL/ORG	68	GREY	93	BLK SHLD
B1	BLU/PINK	23	BLK/WHT	46	RED/BLK	69	WHT/GRN	95	YEL/GREY
01	PUR/BLK	24	BLU/BLK	47	PUR/ORG	70	ORG/PINK	96	WHT/GREY
02	WHT	25	BRN/BLK	48	YEL/GREY	71	RED/ORG	97	ORG/GREY
03	GRN/PUR	26	BLU/YEL	49	GRN/RED	72	RED/BRN	98	RED SHLD
04	RED/YEL	27	RED/BLK/WHT	50	BRN	73	RED/PINK	98A	BLK SHLD
05	PUR	28	GRN	51	BLK/GRN	74	GRN/GREY	99	BLK/GREY
06		29	GREY/ORG	52	GRN/BLU	75	GREY/PUR	103	BLK/PUR
07	RED	30	RED/GRN	53	BRN/RED	76	BRN/BLU	104	GRN/ORG
08	PUR/WHT	31	RED/WHT	54	PUR/RED	77	BRN/GREY	105	GRN/BRN
09	YEL	32	GRN/BLK	55	YEL/PUR	78	RED/BLU	106	GRN/PINK
10	BLU/WHT	33	GRN/WHT	56	YEL/BLK	79	BRN/PUR	107	BLK/BLU
11	WHT/ORG	34	ORG/BLK	57	BRN/GRN	80	GREY/WHT	108	YEL/BRN
12	RED/YEL/BLK	35	ORG/WHT	58	WHT/PUR	81	GREY/BLK	109	GRN/YEL
13	ORG	36	RED/PUR	59	YEL/BLU	82	BRN/WHT	110A	BLU
14	BLK	37	WHT/RED/BLK	60	WHT/BLU	83	BLU/GREY	110B	BRN
15	BLU	38	ORG/RED	61	GREY/BRN	84	WHT/BLK/PUR	111	GREY/GRN
16	WHT/BLK	39	BLK/RED	62	GREY/RED	85	GREY/BLU	112	BLU/ORG
17	BLU/GRN	40	BLU/RED	63	GREY/YEL	86/87	PUR/BLU	113	BLU/BRN
18	GRN/BLU	41	BLU/PUR	64	WHT/BRN	88	BLK/ORG	114	YEL/RED
19	ORG/GRN	42	PINK	65	YEL/PINK	90	RED/GREY	115	WHT/PUR
22	PUR/GRN	43	WHT/YEL	66	ORG/YEL	91	RED SHLD	118	PUR/PINK



### 3.4 Hydraulic Parts List

Index No.	Skyjack Part No.	Description
2H-13	229303	VALVE, Lower
2H-17	229304	VALVE, Outrigger enable
2H-21	229291	VALVE, Pressure dump
2H-85A	158058	VALVE, Generator
3H-14	229293	VALVE, Lift
3H-15	213997	VALVE, Drive reverse
3H-16	213997	VALVE, Drive forward
3H-20B	159827	VALVE, Motor shift
3H-30	159827	VALVE, Brake
3H-165A	159827	VALVE, Differential lock
5H-23	229294	VALVE, Steering
5H-24A	229294	VALVE, Steering
5H-71A	159804	VALVE, Outrigger front left retract
5H-72A	159804	VALVE, Outrigger front right retract
5H-73A	159804	VALVE, Outrigger rear right retract
5H-74A	159804	VALVE, Outrigger rear left retract
5H-75A	159804	VALVE, Outrigger front left extend
5H-76A	159804	VALVE, Outrigger front right extend
5H-77A	159804	VALVE, Outrigger rear right extend
5H-78A	159804	VALVE, Outrigger rear left extend
C1	215887	CYLINDER, Lift (4-1/2" bore) - <b>SJ9233/43/53 RT</b>
C1	237614	CYLINDER, Lift (4-1/2" bore) - <b>SJ9664 RT</b>
C2	222217	CYLINDER, Lift (4" bore) - <b>SJ9233/43/53 RT</b>
C2	237614	CYLINDER, Lift (4-1/2" bore) - <b>SJ9664 RT</b>
C3	215888	CYLINDER, Lift (3-1/2" bore)
C4	215887	CYLINDER, Lift (4-1/2" bore)
C5	222217	CYLINDER, Lift (4" bore)
C6	215888	CYLINDER, Lift (3-1/2" bore) - <b>SJ9233/43/53 RT</b>
C6	215821	CYLINDER, Outrigger - <b>SJ9664 RT</b>
C7	N/A	CYLINDER, Steer - <b>SJ9233/43/53 RT</b>
C7	215821	CYLINDER, Outrigger - <b>SJ9664 RT</b>
C8	N/A	CYLINDER, Brake - <b>SJ9233/43/53 RT</b>
C8	215821	CYLINDER, Outrigger - <b>SJ9664 RT</b>
C9	N/A	CYLINDER, Differential lock - <b>SJ9233/43/53 RT</b>
C9	215821	CYLINDER, Outrigger - <b>SJ9664 RT</b>
C10	215821	CYLINDER, Outrigger - <b>SJ9233/43/53 RT</b>
C11	215821	CYLINDER, Outrigger - <b>SJ9233/43/53 RT</b>
C12	215821	CYLINDER, Outrigger - <b>SJ9233/43/53 RT</b>
C13	215821	CYLINDER, Outrigger - <b>SJ9233/43/53 RT</b>
C14	222215	CYLINDER, Lift - level 1 cushion
C15	222215	CYLINDER, Lift - level 1 cushion
CB1	229302	COUNTERBALANCE, Drive forward
CB2	229302	COUNTERBALANCE, Drive reverse
CV1	171412	CHECK VALVE, Steer LS
CV2	171412	CHECK VALVE, Drive LS

### 3.4 Hydraulic Parts List

Index No.	Skyjack Part No.	Description
CV3	171412	CHECK VALVE, Drive LS
CV4	171412	ORIFICE, Auxiliary LS
CV5	171412	CHECK VALVE, Outtrigger LS
CV6	171412	CHECK VALVE, PD LS
CV7	229301	CHECK VALVE, Outtrigger LS
CV8	229301	CHECK VALVE, Outtrigger LS
CV9	229301	CHECK VALVE, Outtrigger LS
CV10	229301	CHECK VALVE, Outtrigger LS
CV11	236902	CHECK VALVE, Pilot operated
CV12	236902	CHECK VALVE, Pilot operated
CV13	236902	CHECK VALVE, Pilot operated
CV14	236902	CHECK VALVE, Pilot operated
CV15	231743	CHECK VALVE
CV16	171410	CHECK VALVE, Generator
CV17	197770	CHECK VALVE, Generator LS
F1	161934	FILTER, Return
FR1	166058	FLOW CONTROL, 0.1 GPM
FR2	171450	FLOW REGULATOR, Generator
M1	233001	MOTOR - Axle drive 2-speed
M2	171438	MOTOR - Generator
MB1	215851	MANIFOLD, Drive
MB2	215838	MANIFOLD, Auxiliary - <b>SJ9233/43/53 RT</b>
MB2	215800	MANIFOLD, Auxiliary - <b>SJ9664 RT</b>
MB3	215797	MANIFOLD, Outtrigger
MB4	230680	MANIFOLD, Cylinder
MB5	230680	MANIFOLD, Cylinder
MB6	230680	MANIFOLD, Cylinder
MB6	197766	MANIFOLD,Generator - <b>SJ9664 RT</b>
MB7	230678	MANIFOLD, Cylinder
MB8	230678	MANIFOLD, Cylinder
MB9	230678	MANIFOLD, Cylinder
MB10	125430	MANIFOLD, Scissor
MB11	125430	MANIFOLD, Scissor
MB12	125430	MANIFOLD, Scissor
MB13	233003	MANIFOLD, Motor shift
MB14	231735	MANIFOLD, Pressure reducing
MB15	197766	MANIFOLD,Generator - <b>SJ9233/43/53 RT</b>
NV1	137182	VALVE, Needle
OC1	160800	COOLER, Hydraulic oil - 12V DC
OR1	171416	ORIFICE, Steer 0.020"
OR2	231756	ORIFICE, Drive 0.035"
OR3	151691	FITTING, with orifice 0.035"
OR4	231755	ORIFICE, 0.090" pressure plug
P1	233000	PUMP, Piston 28CC 4200PSI
P2	159831	BRAKE HAND PUMP
PR1	229298	PRESSURE REDUCING VALVE, Auxiliary

### 3.4 Hydraulic Parts List

Index No.	Skyjack Part No.	Description
PR2	229299	PRESSURE REDUCING VALVE, Pilot
PR3	231742	PRESSURE REDUCING VALVE, Pilot - <b>SJ9233/43/53 RT</b>
PR3	229299	PRESSURE REDUCING VALVE, Pilot - <b>SJ9664 RT</b>
RV1	229296	RELIEF VALVE, System
RV2	206185	RELIEF VALVE, Steer - <b>SJ9233/43/53 RT</b>
RV2	238568	RELIEF VALVE, Steer - <b>SJ9664 RT</b>
RV3	229297	RELIEF VALVE, Lift
RV4	231759	RELIEF, VALVE Holding (3500 psi)
RV5	231759	RELIEF VALVE, Holding (3500 psi)
RV6	231759	RELIEF VALVE, Holding (3500 psi)
RV7	231759	RELIEF VALVE, Holding (3500 psi)
RV8	231759	RELIEF VALVE, Holding (3500 psi)
RV9	231759	RELIEF VALVE, Holding (3500 psi)
SN1	210292	SNUBBER, 5um
V1	229295	VALVE, Priority steer
V2	206190	VALVE, Directional valve
V3	141436	VALVE, Brake release

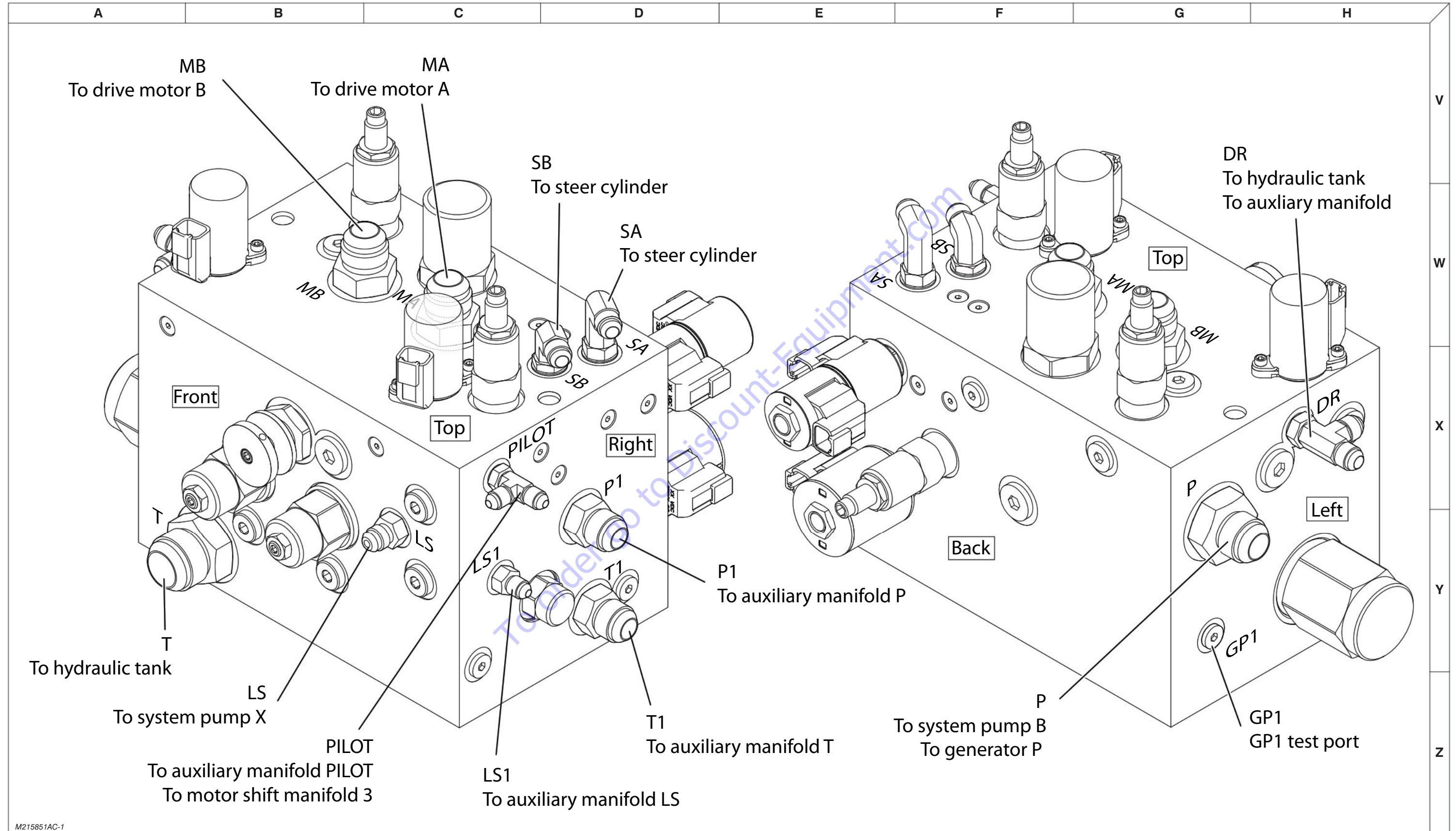
### 3.5 Electrical Parts List

Index No.	Skyjack Part No.	Description
08CR	127131	RELAY, Platform Sel
1044ACR	127131	RELAY, 12 V 40 A - <b>Kubota WG972</b>
1060CR	127131	RELAY, 12 V 40 A - <b>Kubota WG972</b>
1070CR	127131	RELAY, 12 V 40 A - <b>Kubota WG972</b>
31BCR	127131	RELAY, Fuse box- <b>Kubota D1305</b>
32CR	127131	RELAY, Fuse box - <b>Kubota D1305</b>
50ACR	127131	RELAY, 12 V 40 A - <b>Kubota WG972</b>
85CR	127035	RELAY, Generator oil cooler 12 V 40 A
CB1	137919	CIRCUIT BREAKER, 25 A, Base control box
CB2	137919	CIRCUIT BREAKER, 25 A, Base control box
CB3	117326	CIRCUIT BREAKER, 20 A
CB4	117326	CIRCUIT BREAKER, 20 A, Oil Cooler
CB5		CIRCUIT BREAKER, 50 A
CB6	231172	CIRCUIT BREAKER, 15 A - Generator 3.5 kW - <b>Kubota D1305</b>
CB6	230947	CIRCUIT BREAKER, 15 A - Generator 3.5 kW - <b>Kubota WG972</b>
CB7		CIRCUIT BREAKER, 15 A
DXX	102921	DIODE
F1	198727	FUSE, 30 A
F2	198727	FUSE, 30 A
F3	198725	FUSE, 5 A
F4	170626	FUSE, 10 A
F5	198725	FUSE, 5 A
F6	170626	FUSE, 10 A
F7		FUSE, 1 A
GPTS	115574	SWITCH, Toggle - gas/propane
LS1	215160	LIMIT SWITCH, Rear left outrigger N/O H/C
LS2	232970	LIMIT SWITCH, Rear right outrigger N/O H/C
LS3	232968	LIMIT SWITCH, Front right outrigger N/O H/C
LS4	215162	LIMIT SWITCH, Front left outrigger N/O H/C
LS5	215161	LIMIT SWITCH, Rear left outrigger N/C H/O
LS6	232971	LIMIT SWITCH, Rear right outrigger N/C H/O
LS7	215172	LIMIT SWITCH, Front left outrigge N/C H/O
LS7A	222208	LIMIT SWITCH, Anti-overriding - front right
LS7B	222209	LIMIT SWITCH, Anti-overriding - rear left
LS7C	222495	LIMIT SWITCH, Anti-overriding - front left
LS7D	222206	LIMIT SWITCH, Anti-overriding - rear right
LS8	232969	LIMIT SWITCH, Front right outrigger N/C H/O
PL3	226129	PILOT LIGHT, Lift
PL4	226129	PILOT LIGHT, Drive
PL5	226129	PILOT LIGHT, Outrigger mode
PL6	226129	PILOT LIGHT, Diff lock
PL7	226144	PILOT LIGHT, EcoStart
S1	210051	SWITCH, Main disconnect (base controls)
S2	144652	SWITCH, Emergency stop (base controls)

### 3.5 Electrical Parts List

Index No.	Skyjack Part No.	Description
S3	164949	SWITCH, Off/base/platform (base controls) - <b>ANSI/CSA</b>
S3	165828	SWITCH, Off/base/platform (base controls) - <b>CE</b>
S4	144652	SWITCH, Emergency stop (platform controls)
S5	144648	SWITCH, Horn(platform controls)
S6	102853	SWITCH, Engine start/off/glow plug (platform controls)
S7	102853	SWITCH, Outrigger/off/diff lock (platform controls)
S8	207741	SWITCH, High speed/high torque/hill climb (platform controls)
S9	102853	SWITCH, Lift/off/drive (platform controls)
S13	102853	SWITCH, Lift/lower (base controls)
S14	102853	SWITCH, Emergency lowering (base controls)
S15	102853	SWITCH, Enable (base controls)
S16	102853	SWITCH, Engine Start/glow plug - base
S17	115574	SWITCH, Generator
S18	102853	SWITCH, Left rear outrigger
S19	102853	SWITCH, Right rear outrigger
S20	102853	SWITCH, Right front outrigger
S21	102853	SWITCH, Left front outrigger
S22	226143	SWITCH, SGLE
STS	102853	SWITCH, Toggle - start - <b>Kubota D1305</b>
STS	115573	SWITCH, Toggle - start - <b>Kubota WG972</b>

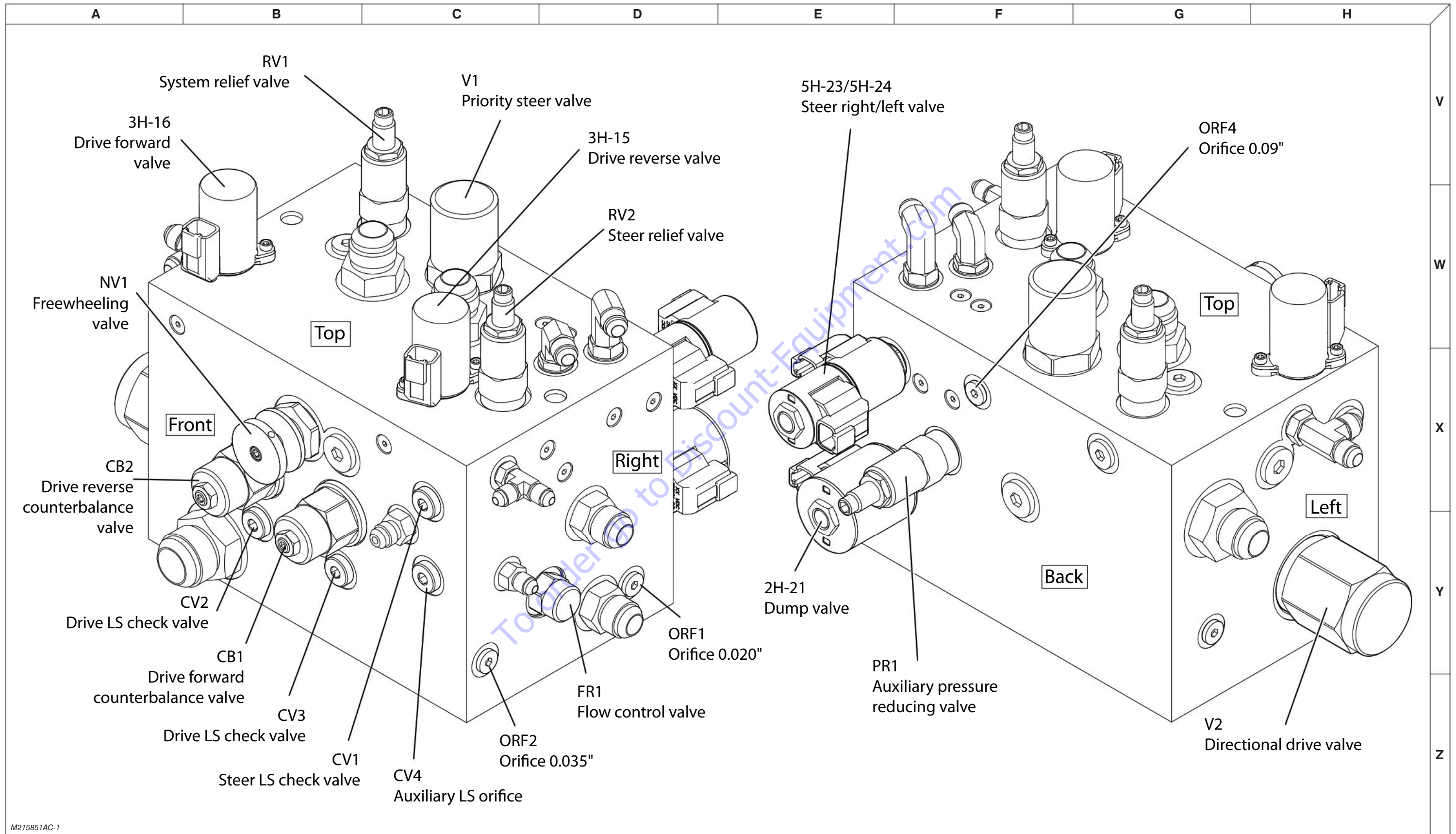
### 3.6 Drive Manifold - Hose Port Identification



M215851AC-1

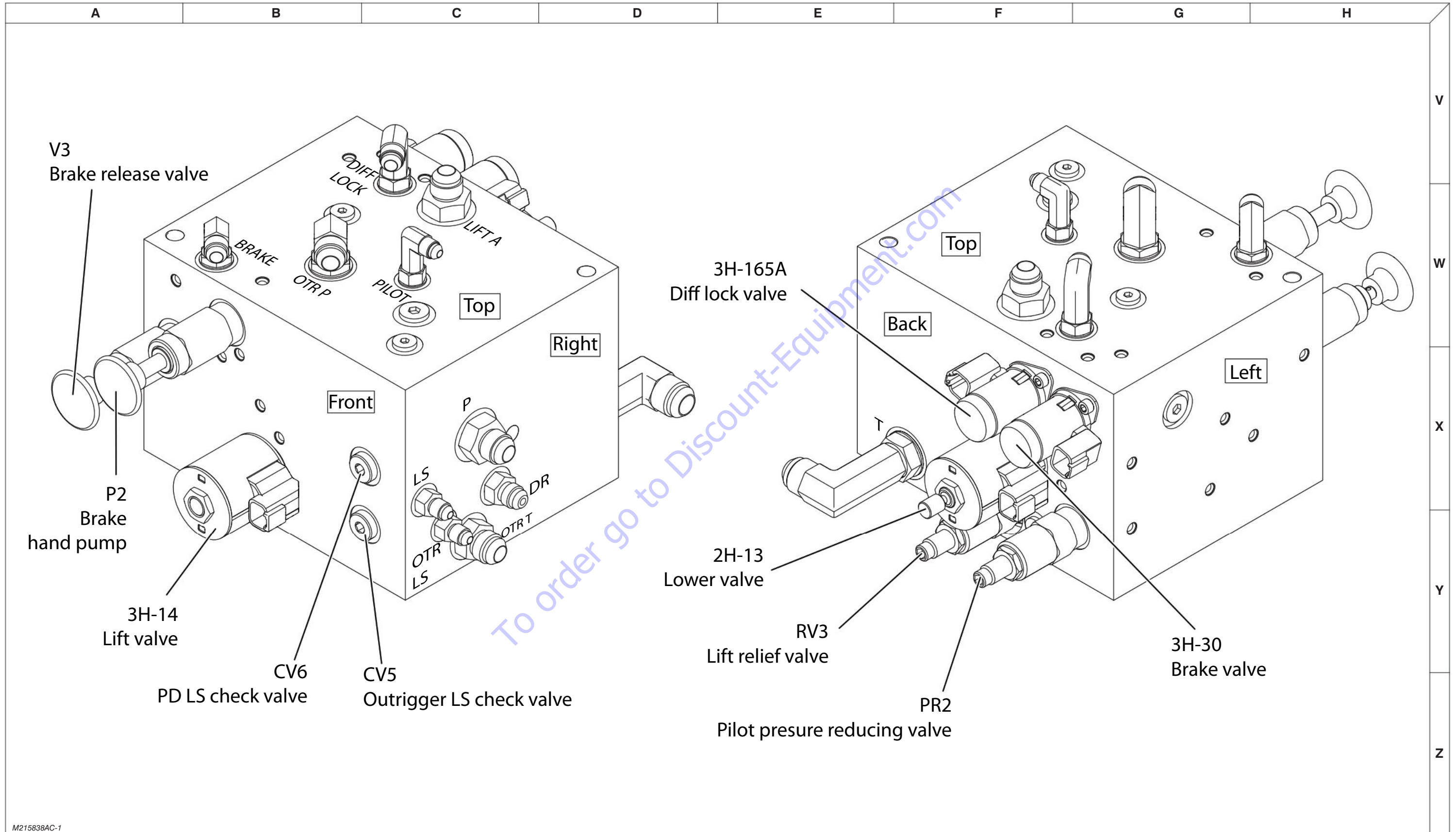


### 3.7 Drive Manifold - Hydraulic & Electrical Component Identification



M215851AC-1

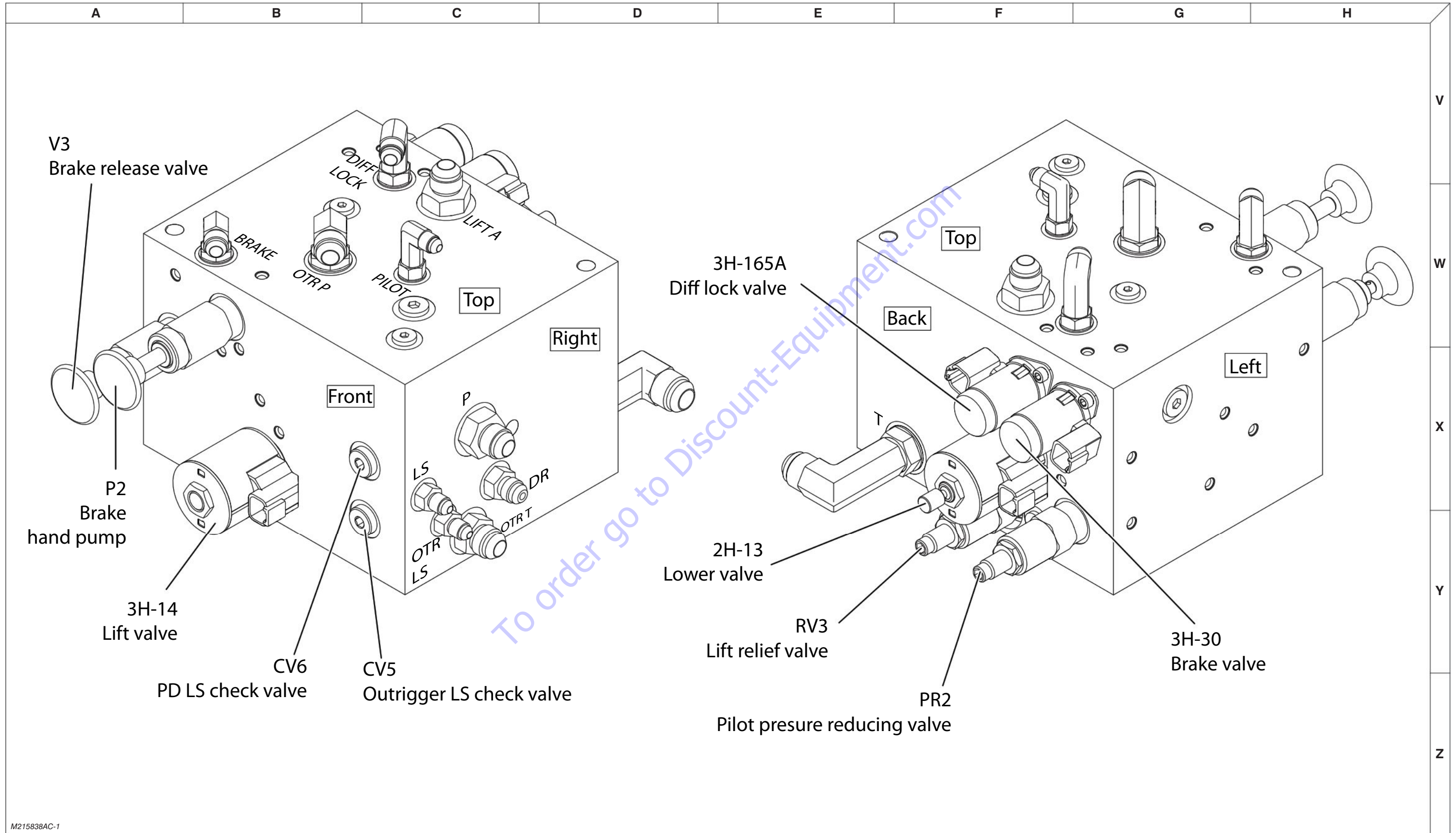
### 3.8 Auxiliary Manifold - Hose Port Identification



M215838AC-1

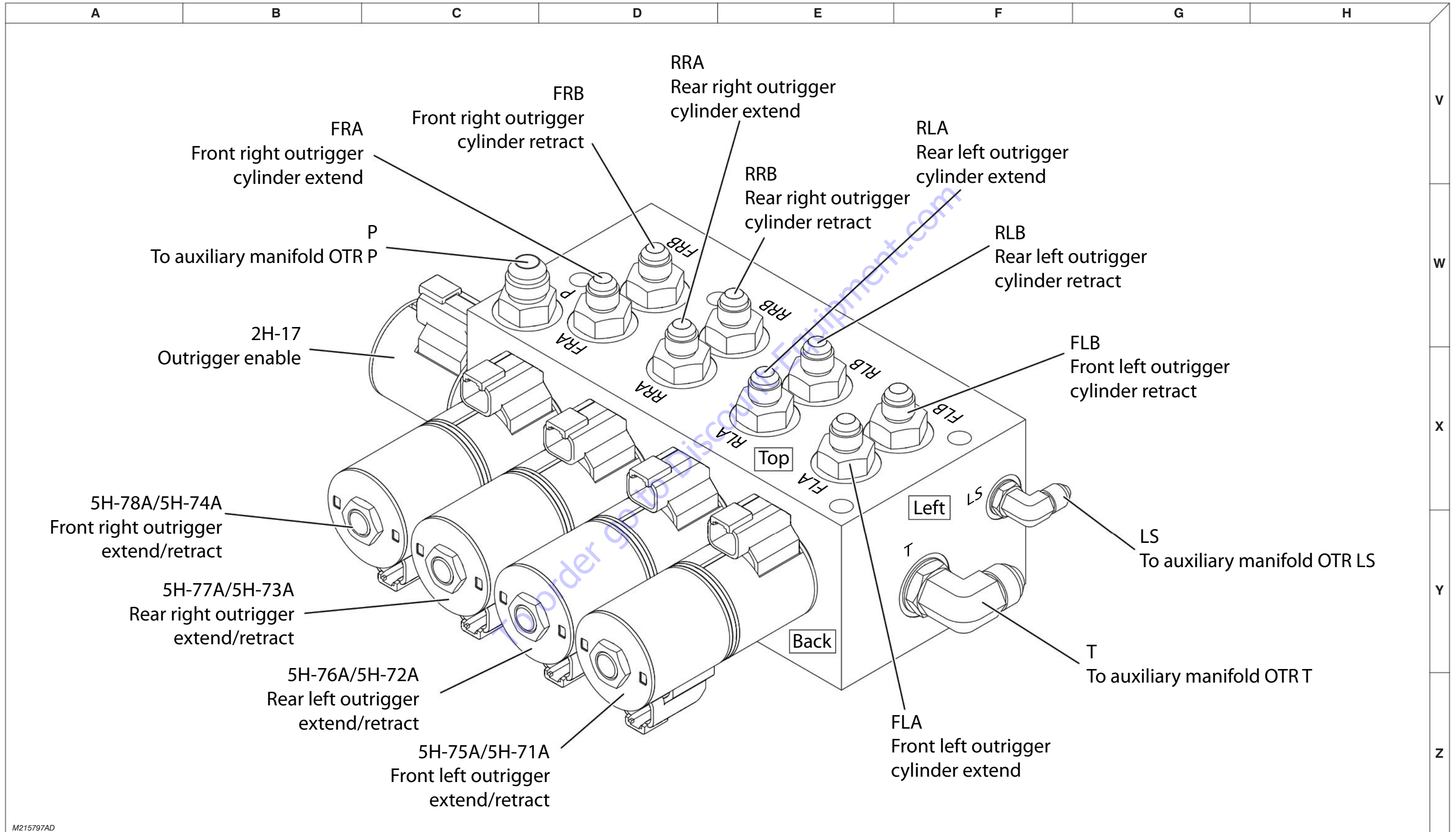


### 3.9 Auxiliary Manifold - Hydraulic & Electrical Component Identification



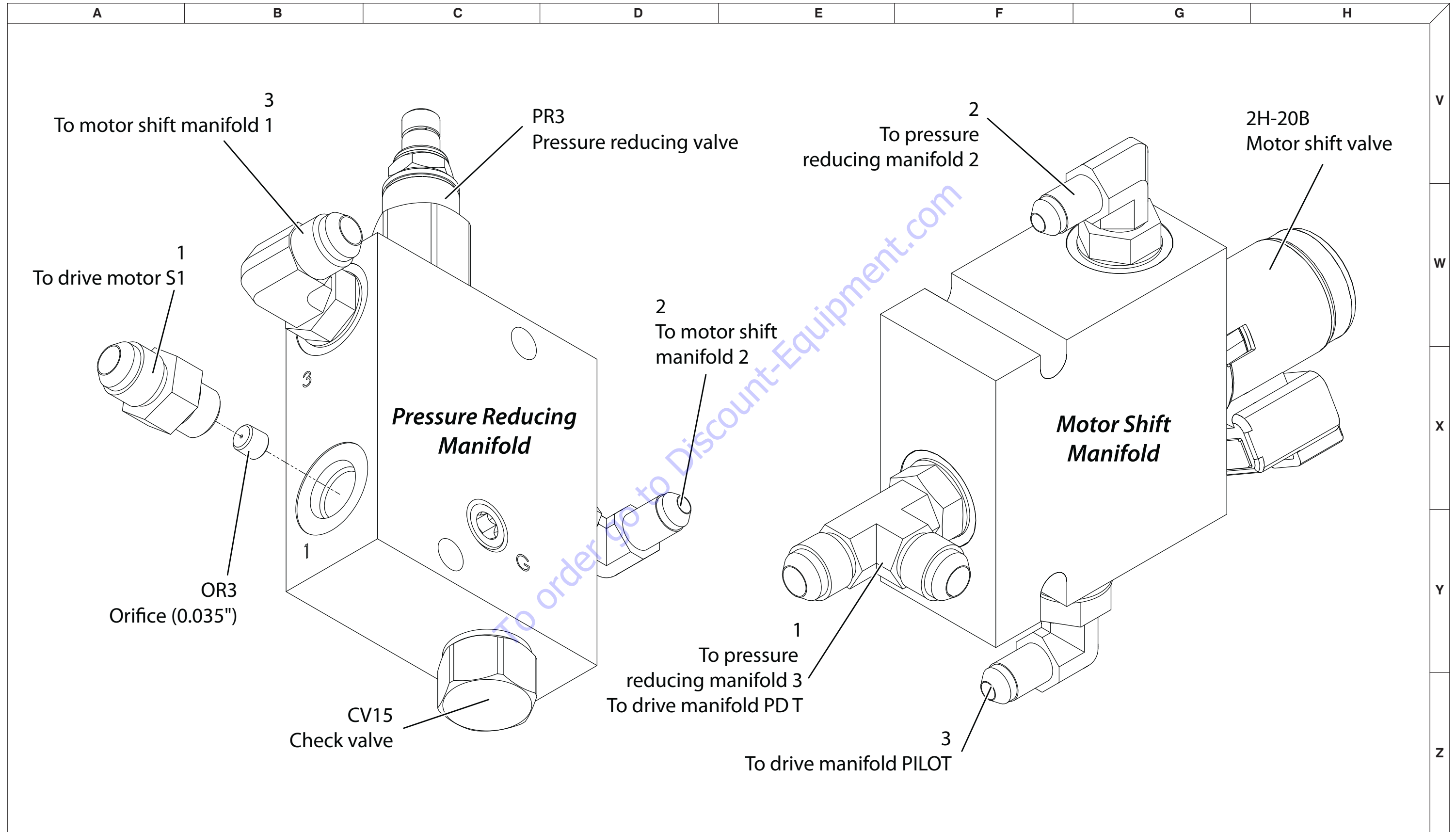
M215838AC-1

### 3.10 Outrigger Manifold

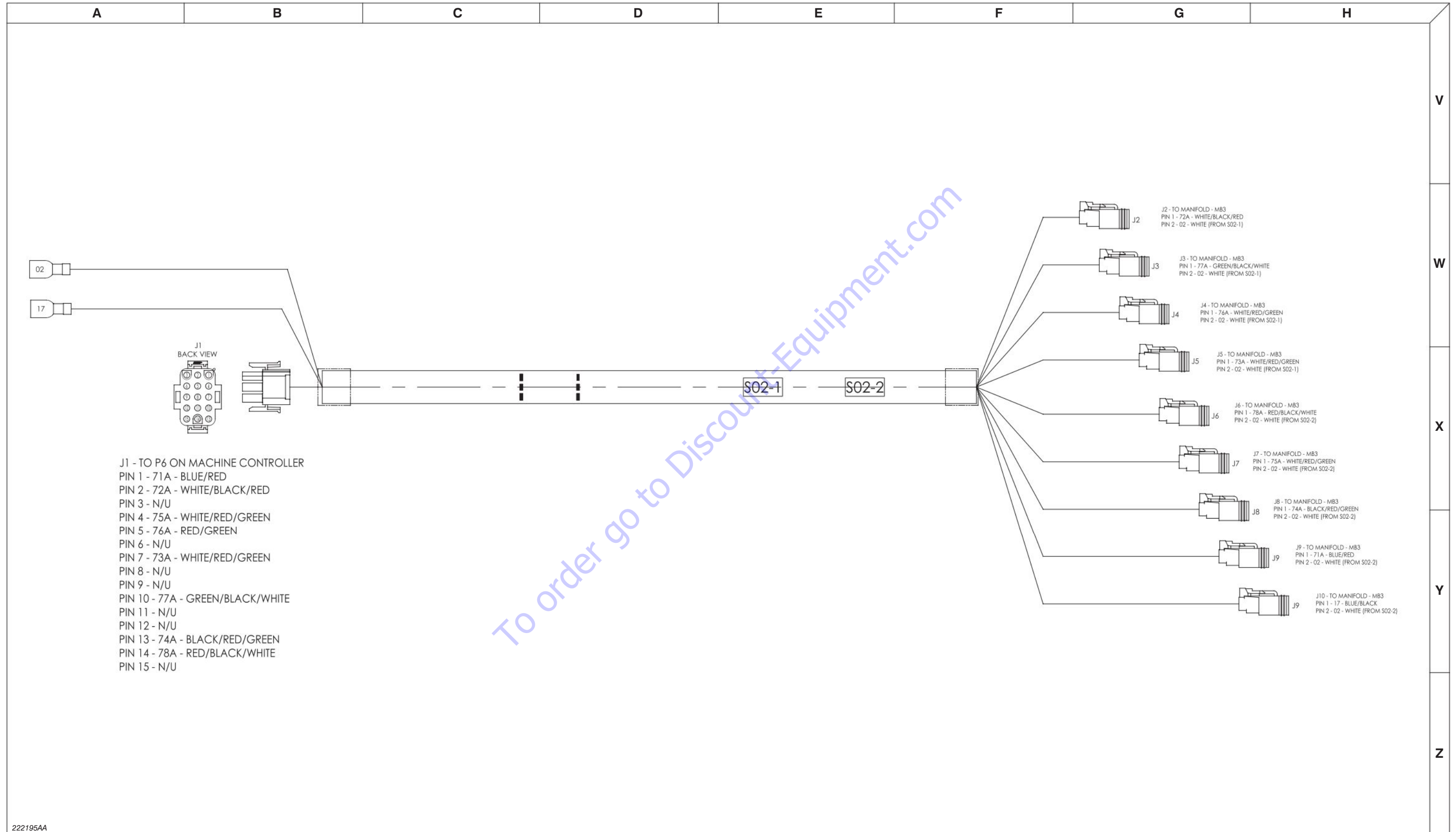


M215797AD

### 3.11 Pressure Reducing & Motor Shift Manifolds



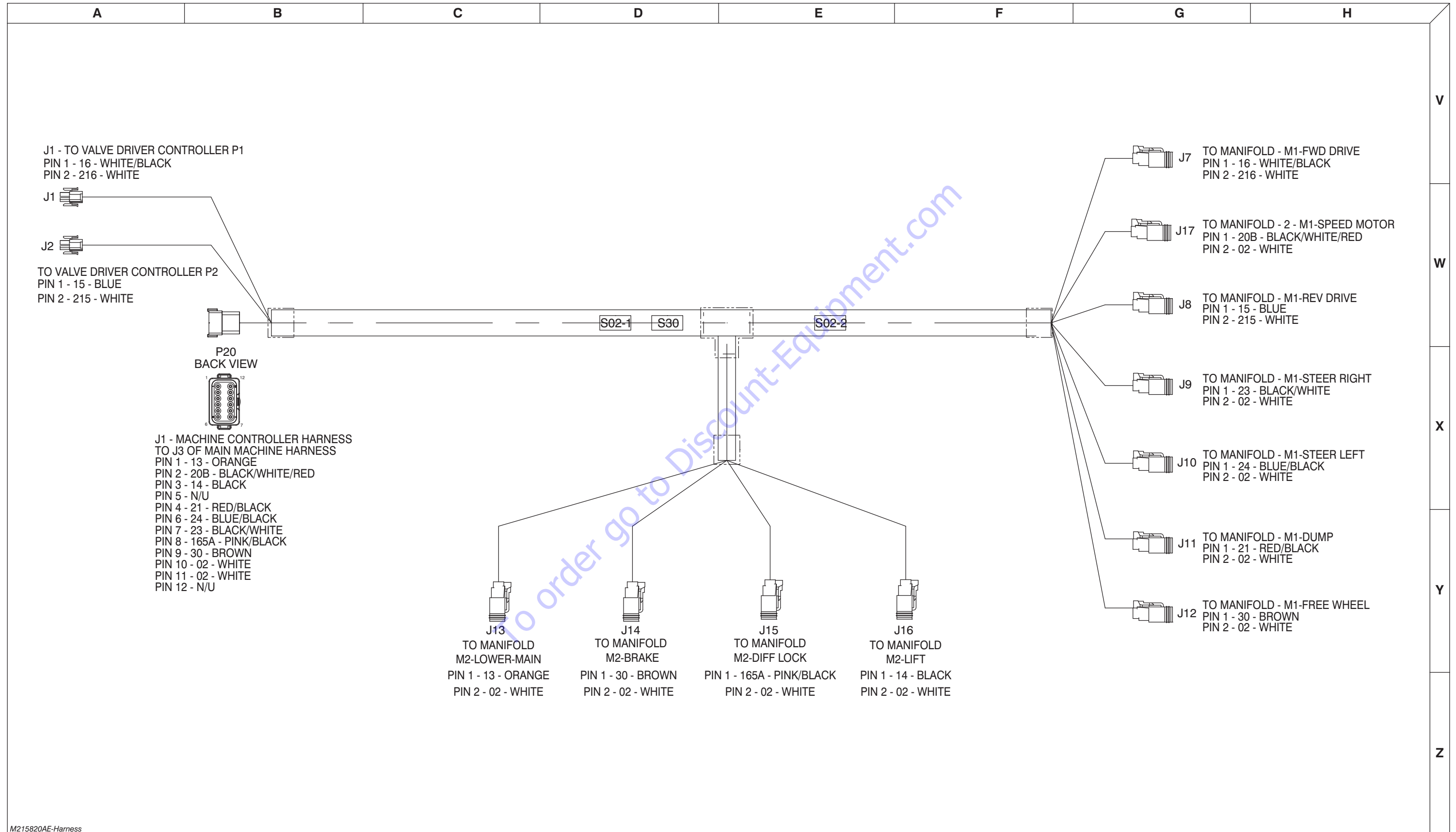
### 3.12 Outrigger Manifold Harness



222195AA

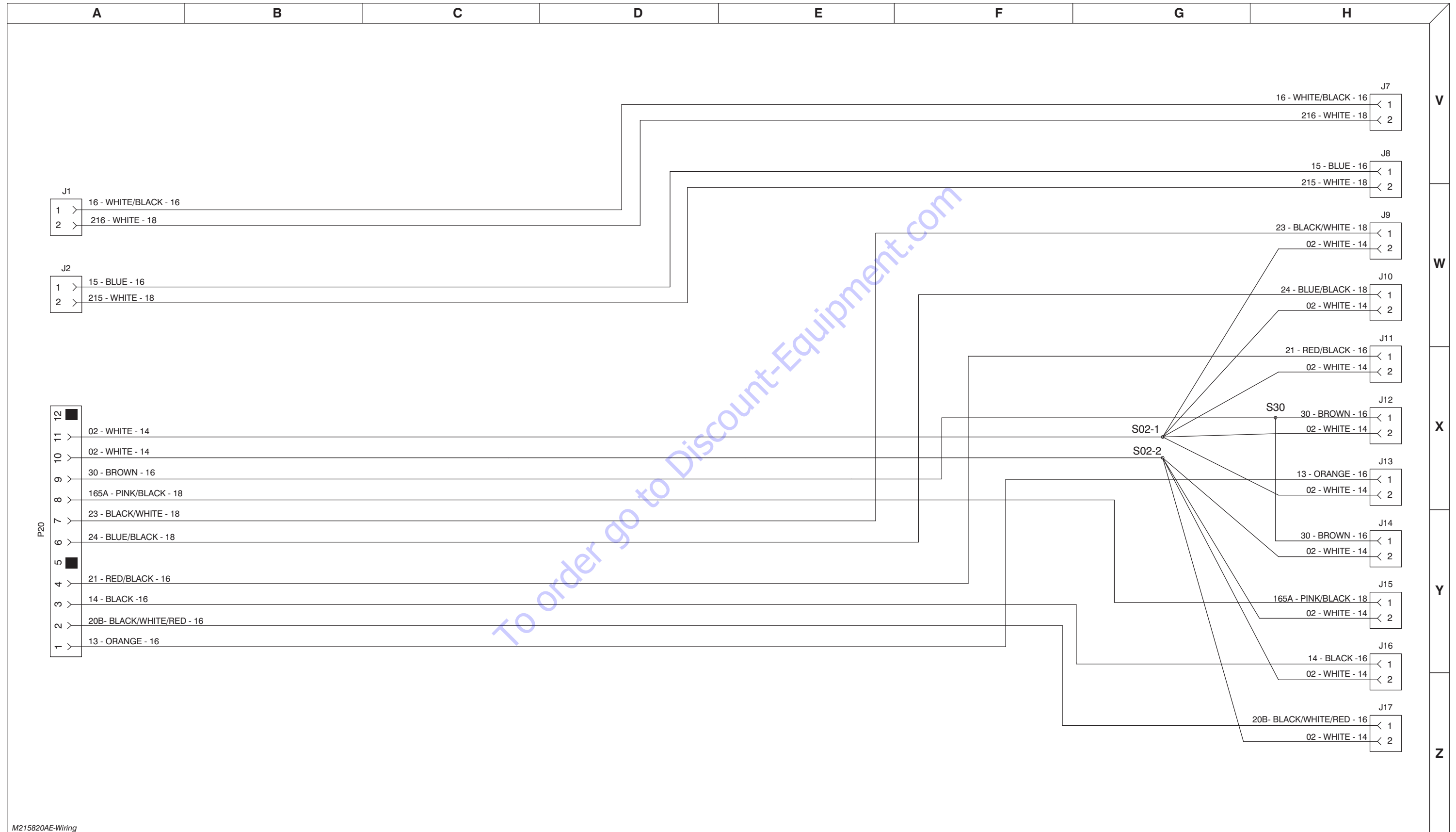


### 3.13 Drive Manifold Harness



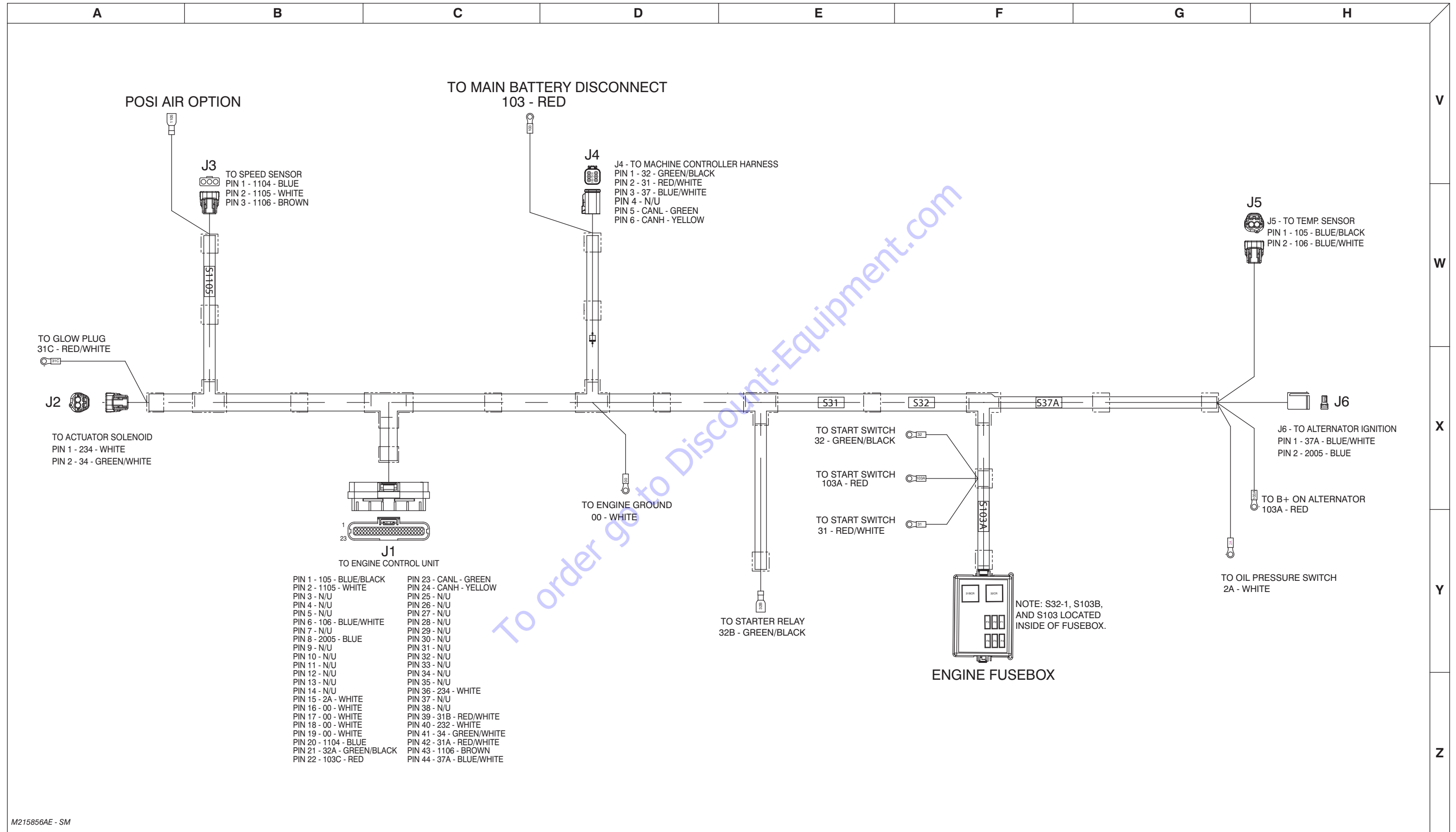
M215820AE-Harness

### 3.14 Drive Manifold Harness Schematic



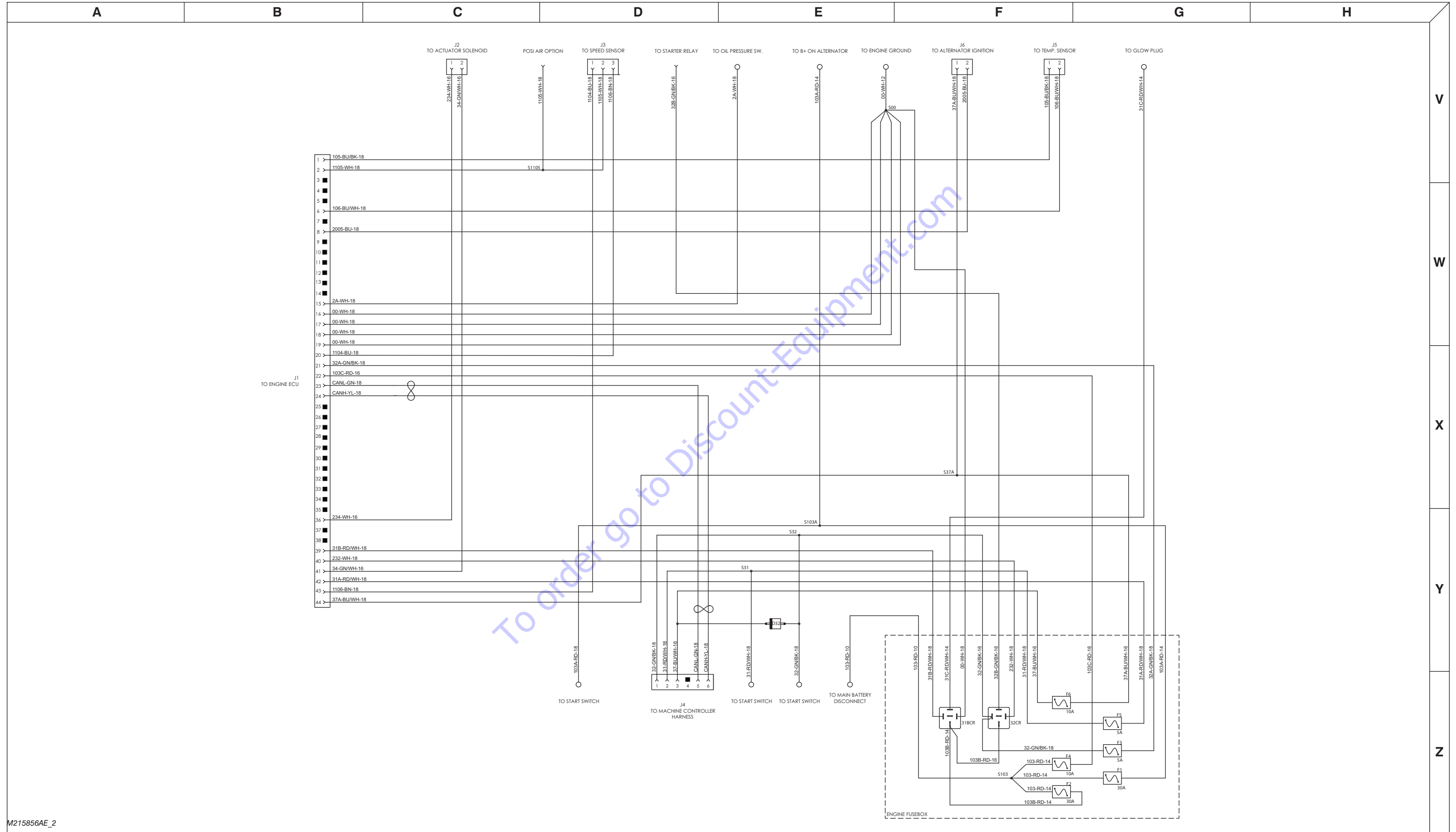
M215820AE-Wiring

### 3.15 Kubota D1305 Engine Harness



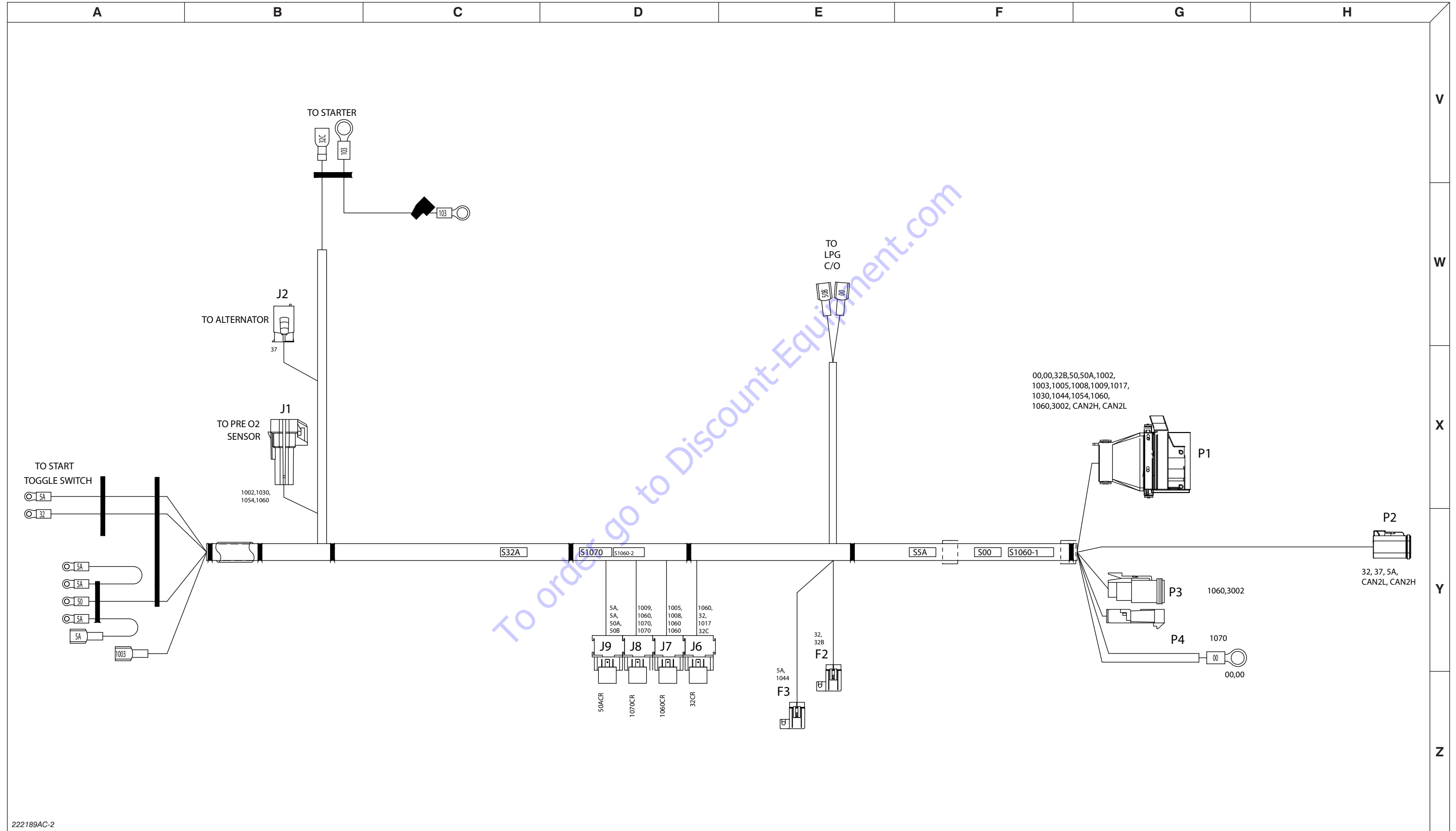
M215856AE - SM

### 3.16 Kubota D1305 Engine Harness Schematic



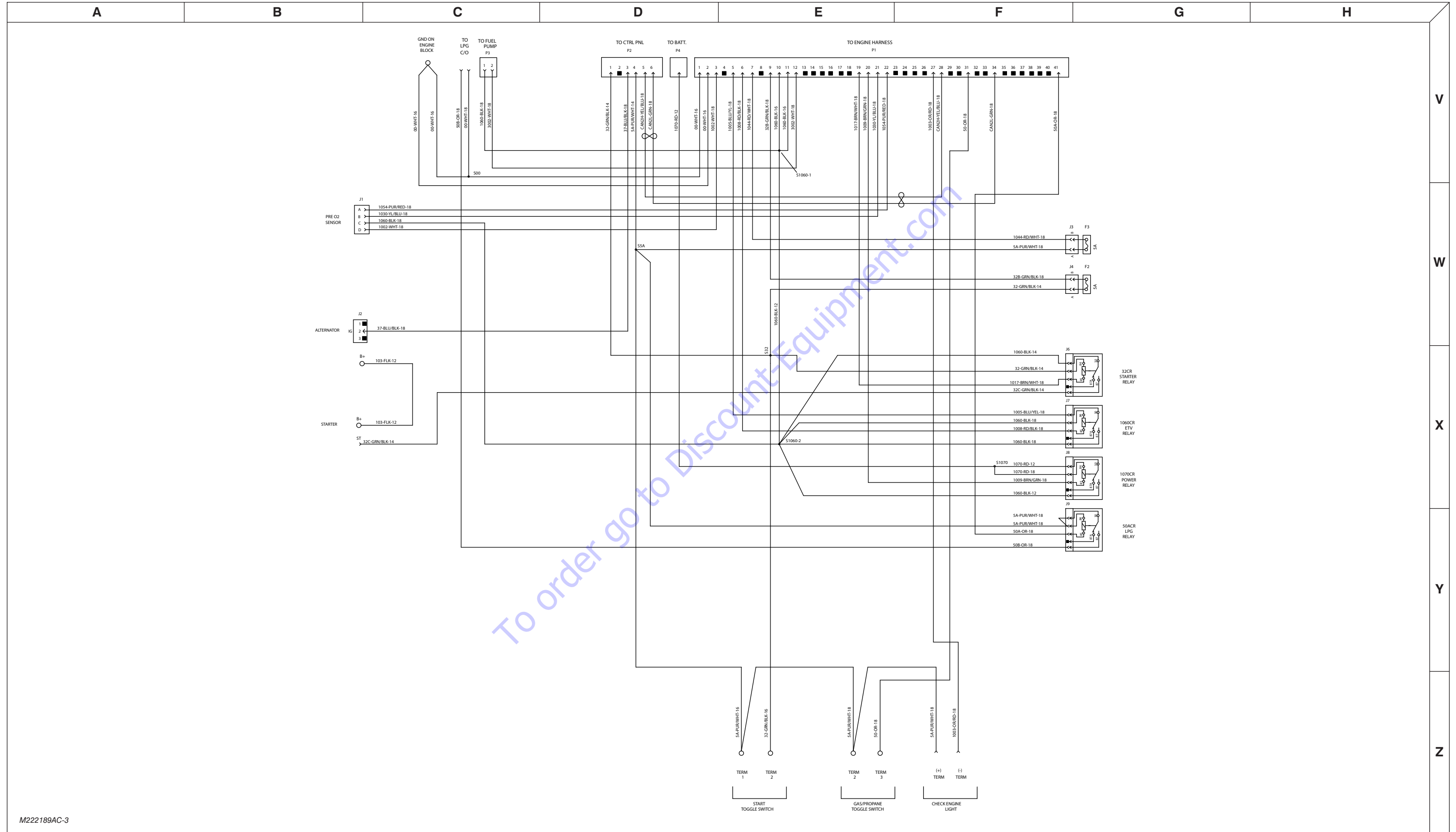
M215856AE\_2

### 3.17 Kubota WG972 Engine Harness



222189AC-2

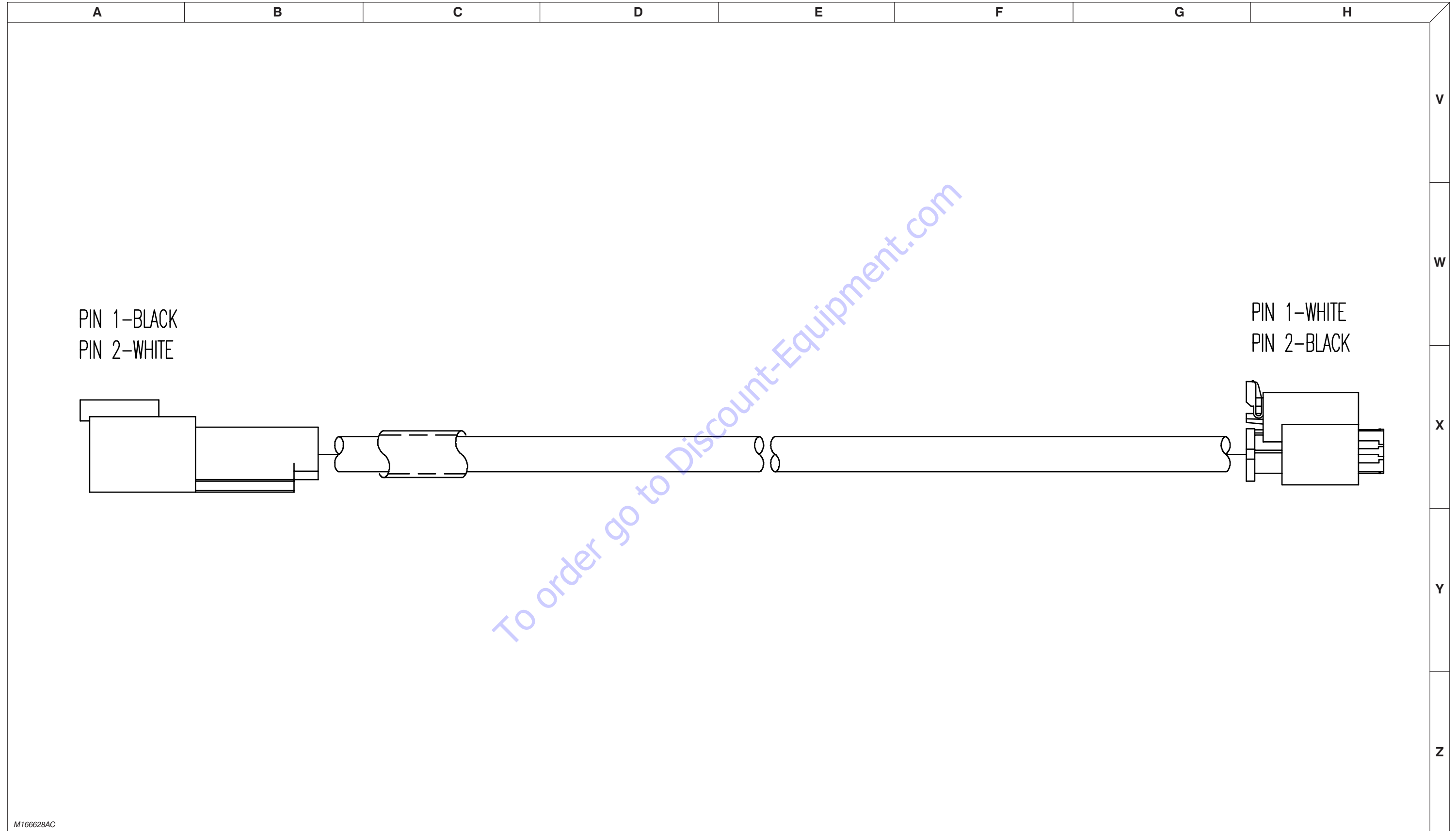
### 3.18 Kubota WG972 Engine Harness Schematic



M222189AC-3

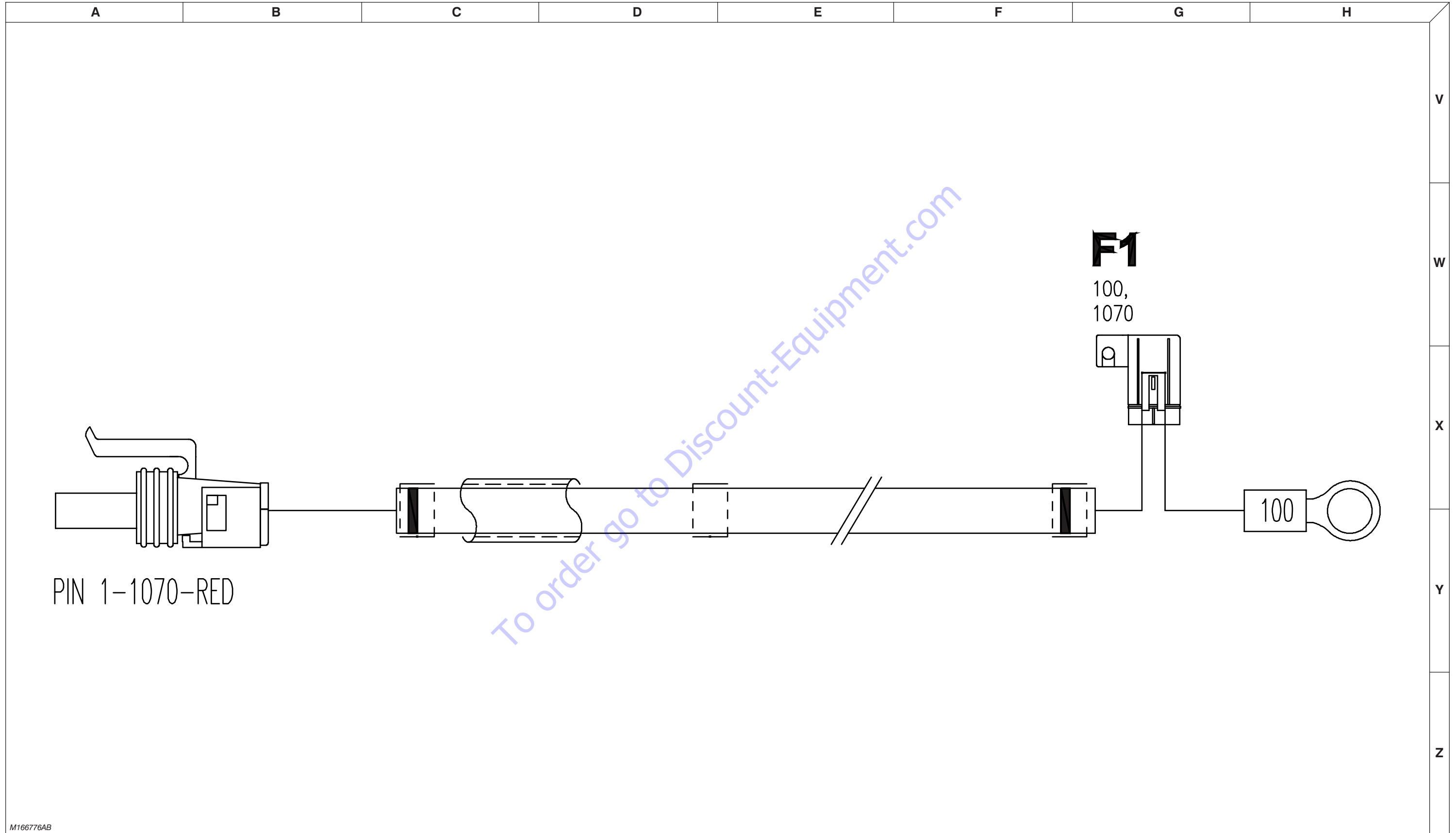


### 3.19 Fuel Pump Harness



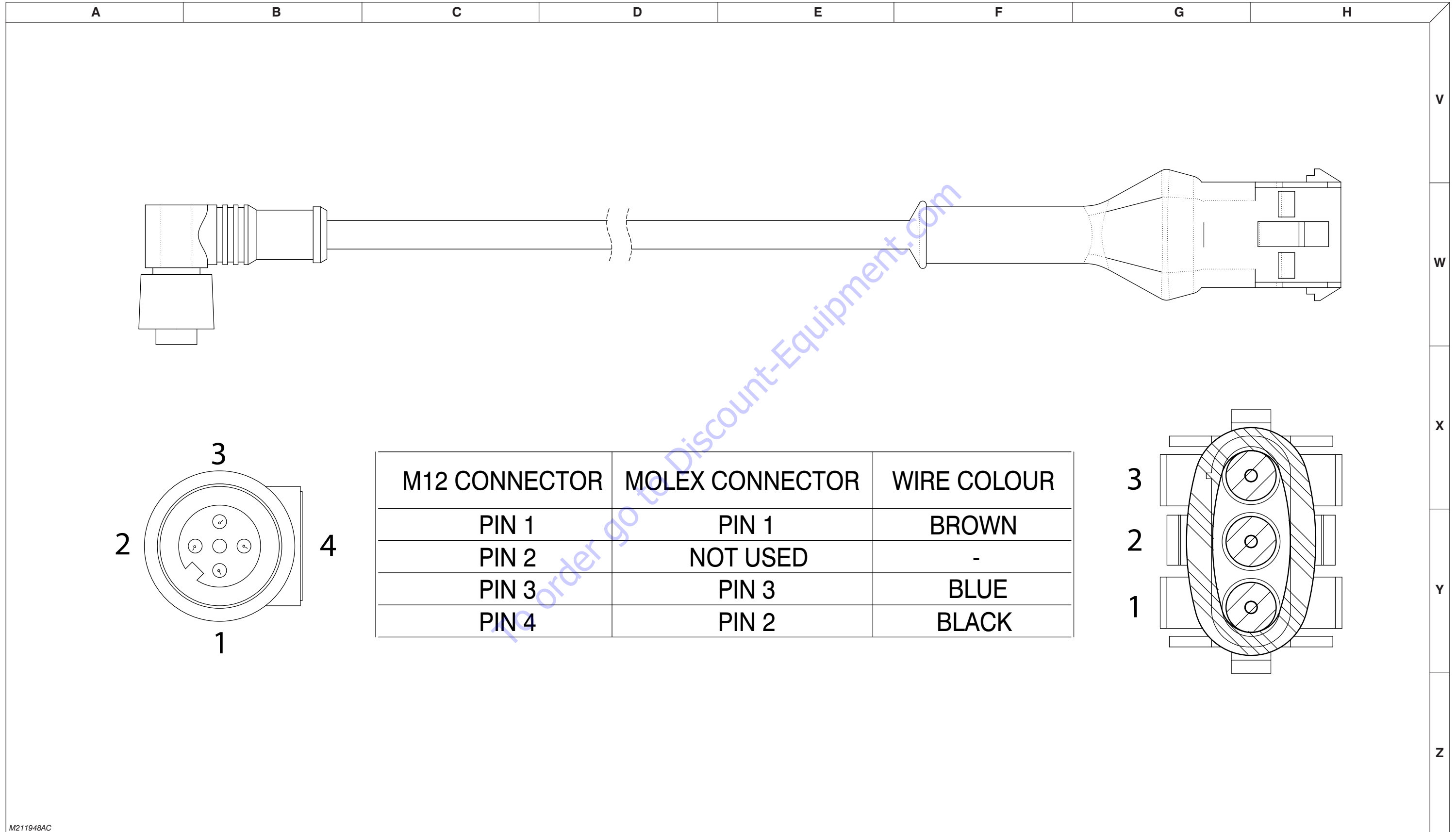
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### 3.20 ECU Power Harness



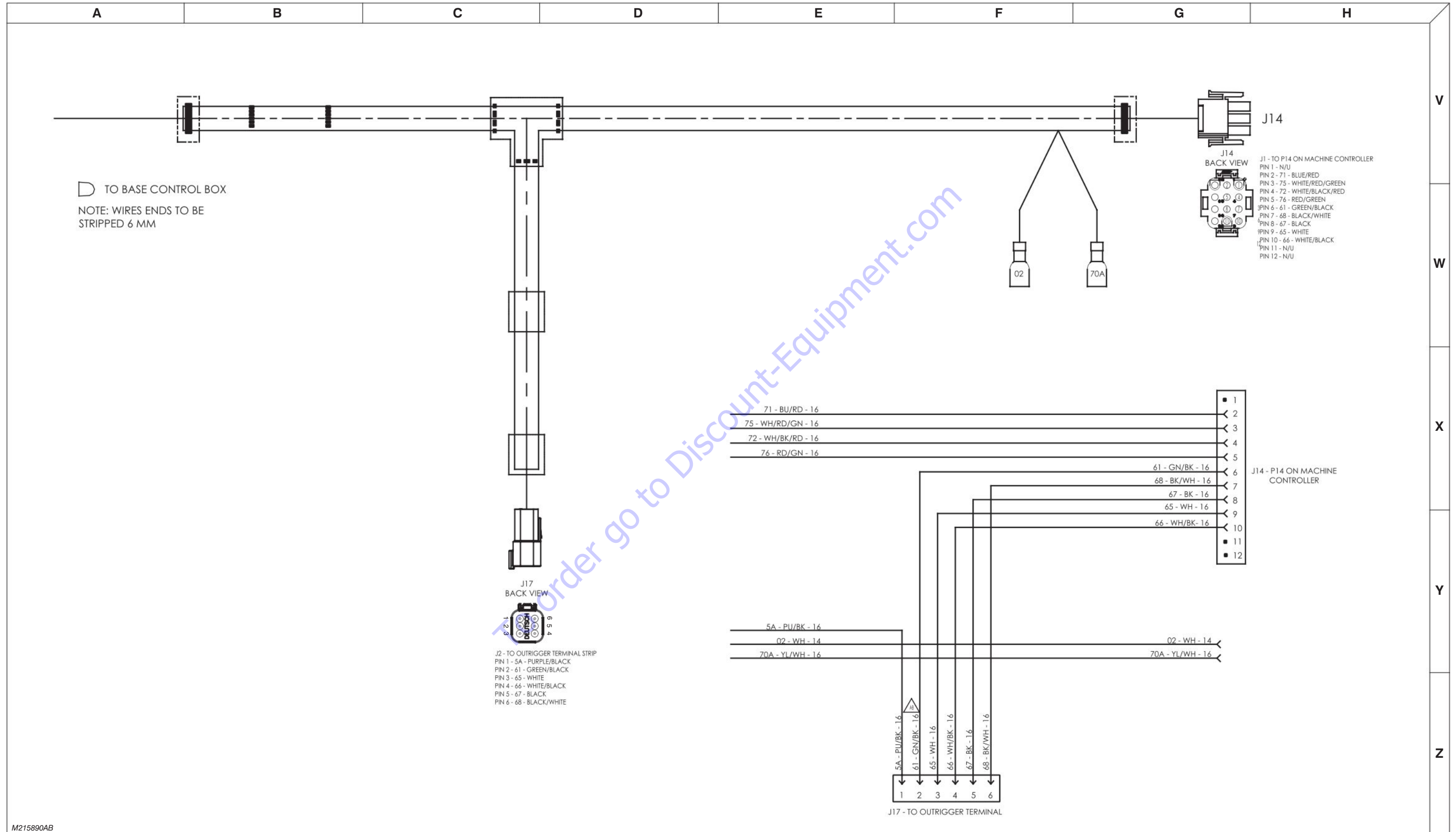
M166776AB

### 3.21 Pressure Transducer Harness - SJ9233 RT, SJ9243 RT, SJ9253 RT



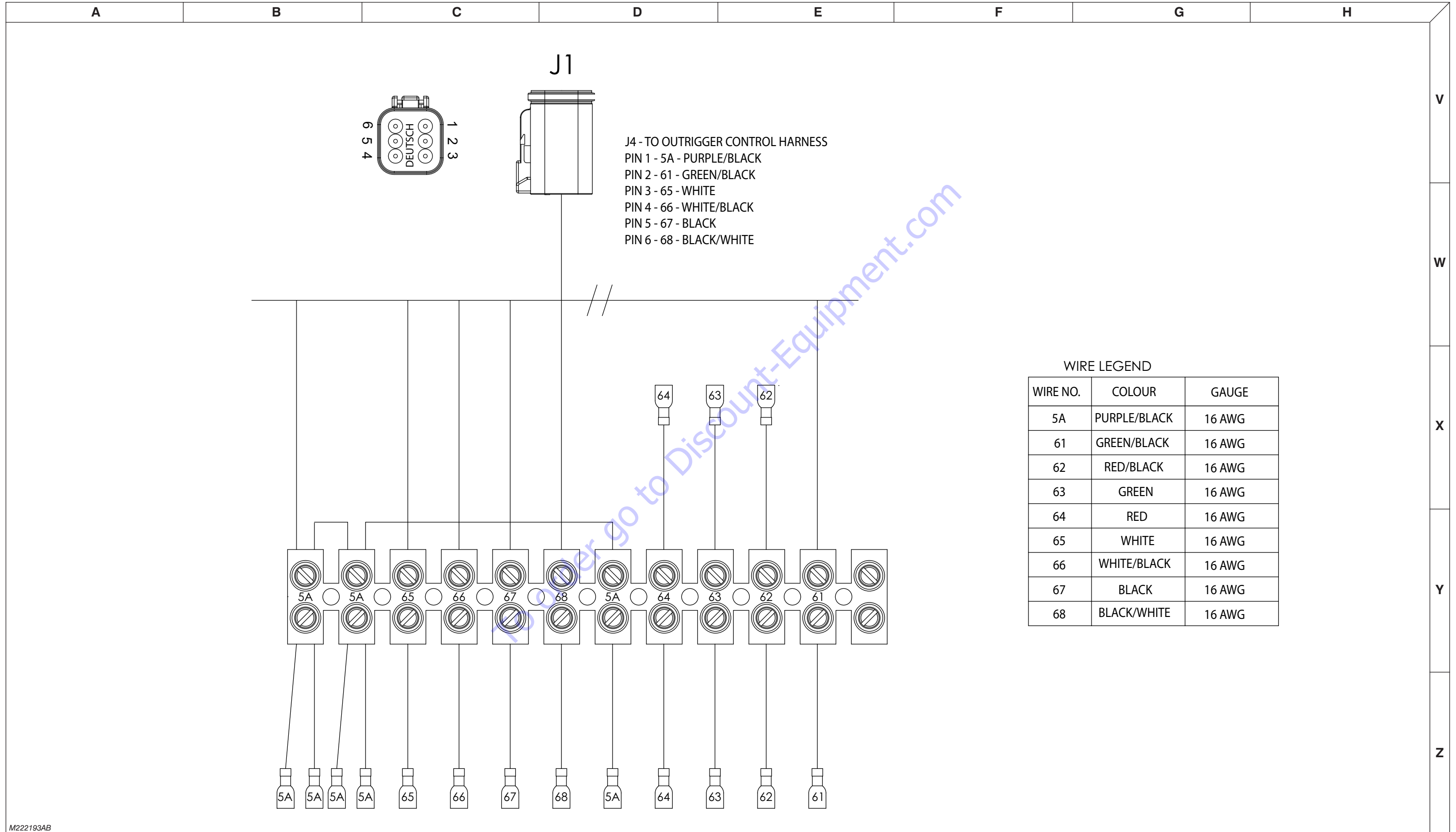
M211948AC

### 3.22 Outrigger Control Harness



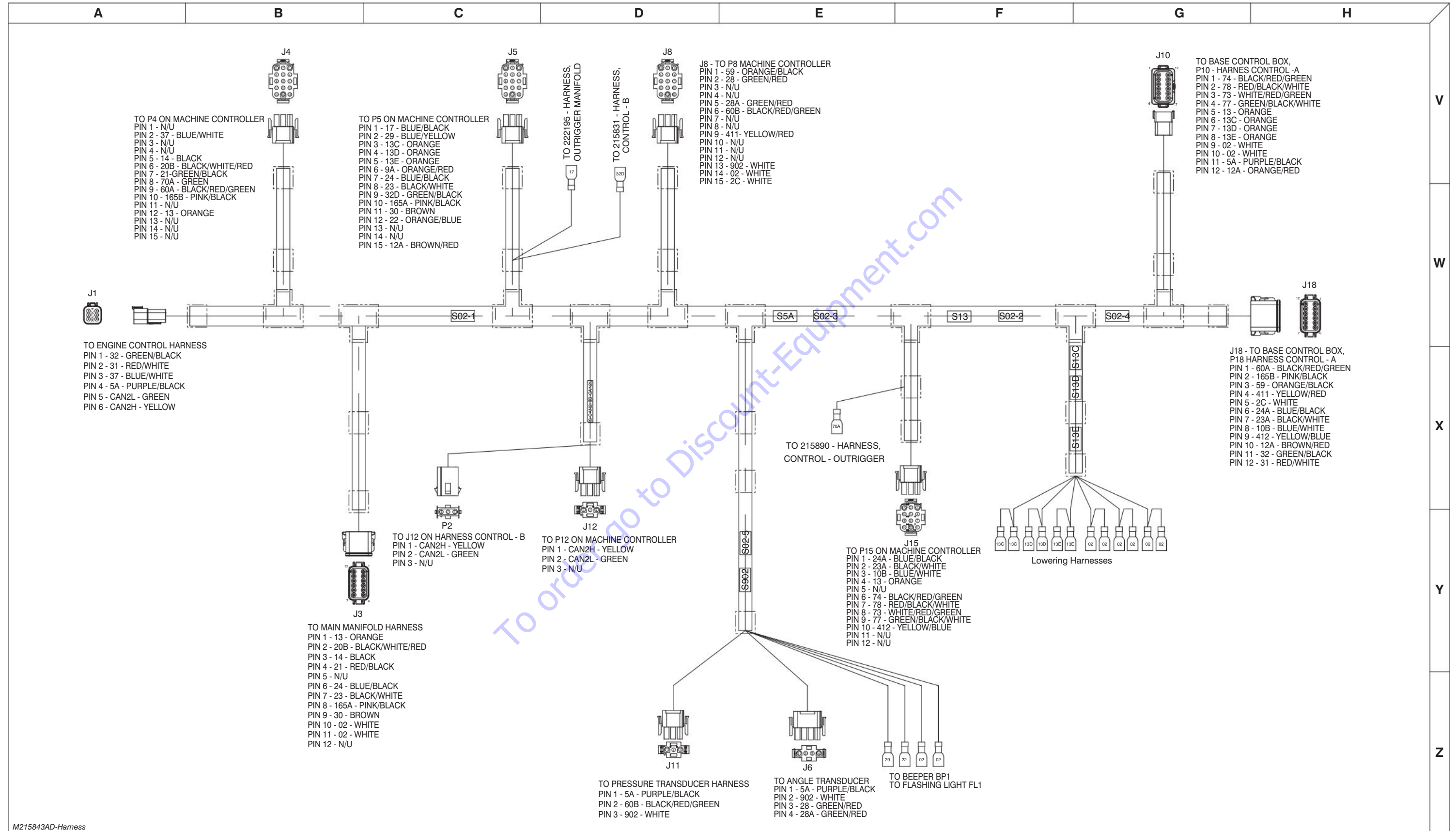
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### 3.23 Outrigger Terminal Strip



M222193AB

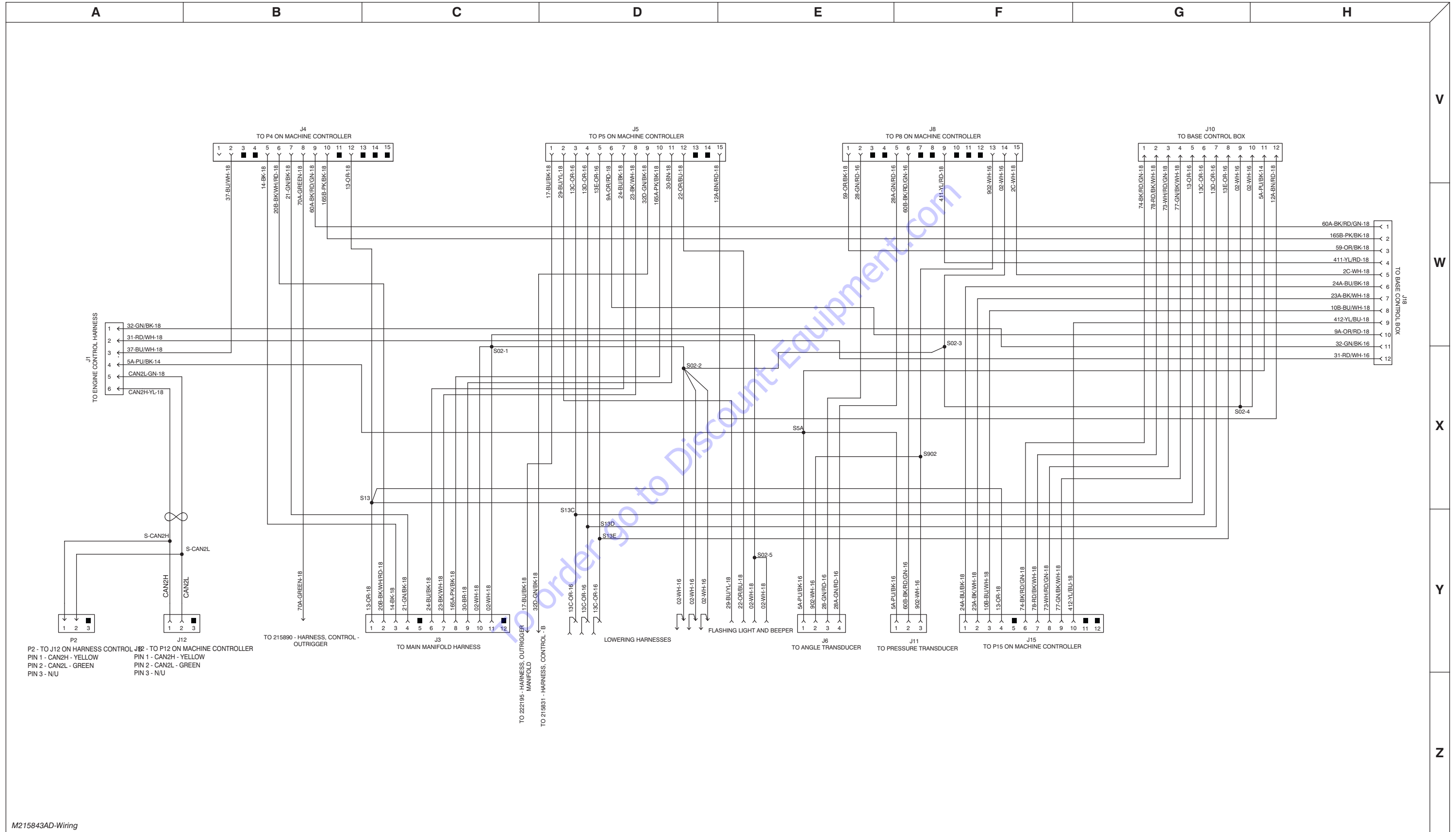
### 3.24 Machine Controller Harness - SJ9233 RT, SJ9243 RT, SJ9253 RT



M215843AD-Harness

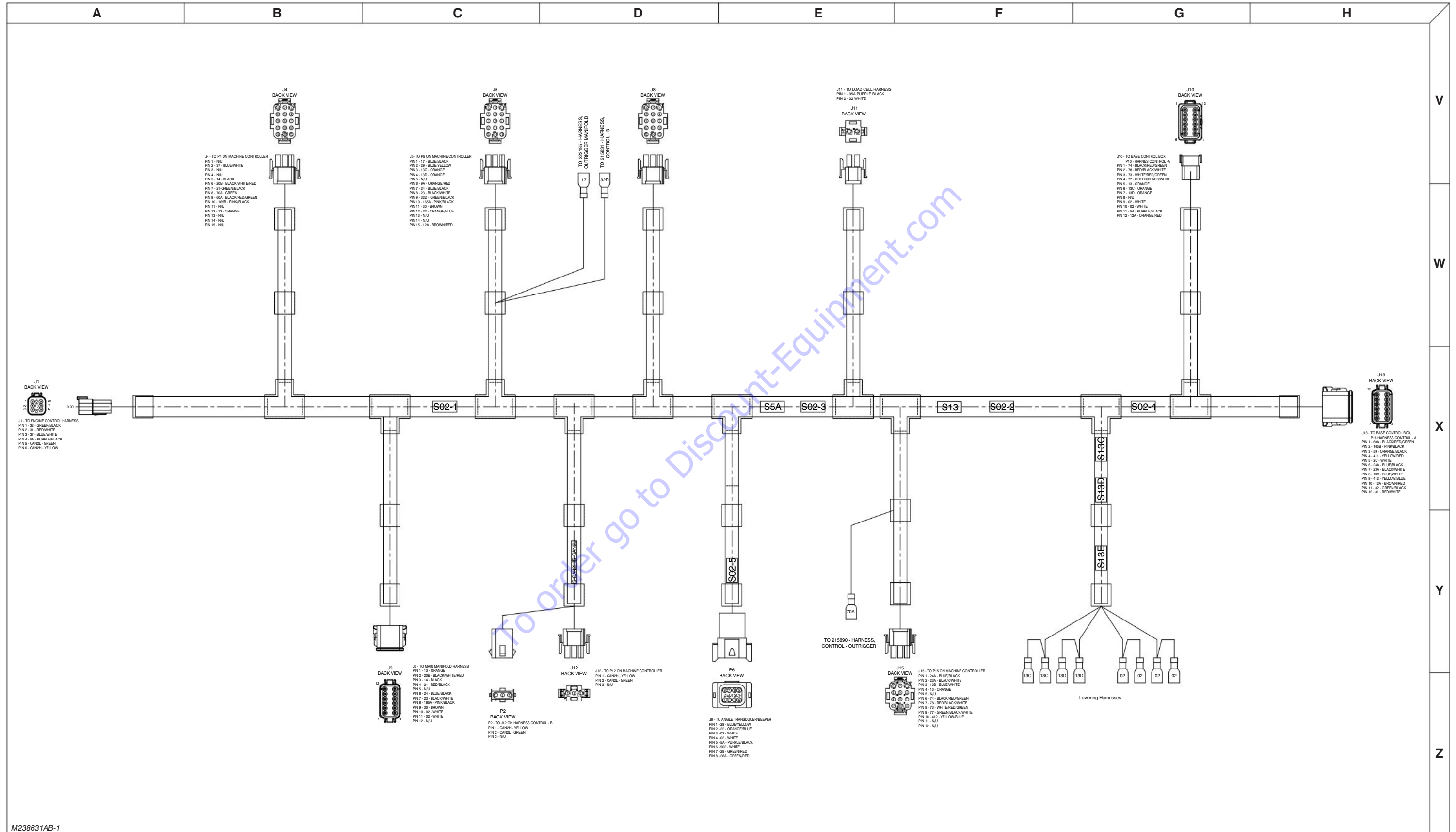


### 3.25 Machine Controller Harness - Wiring Diagram - SJ9233 RT, SJ9243 RT, SJ9253 RT



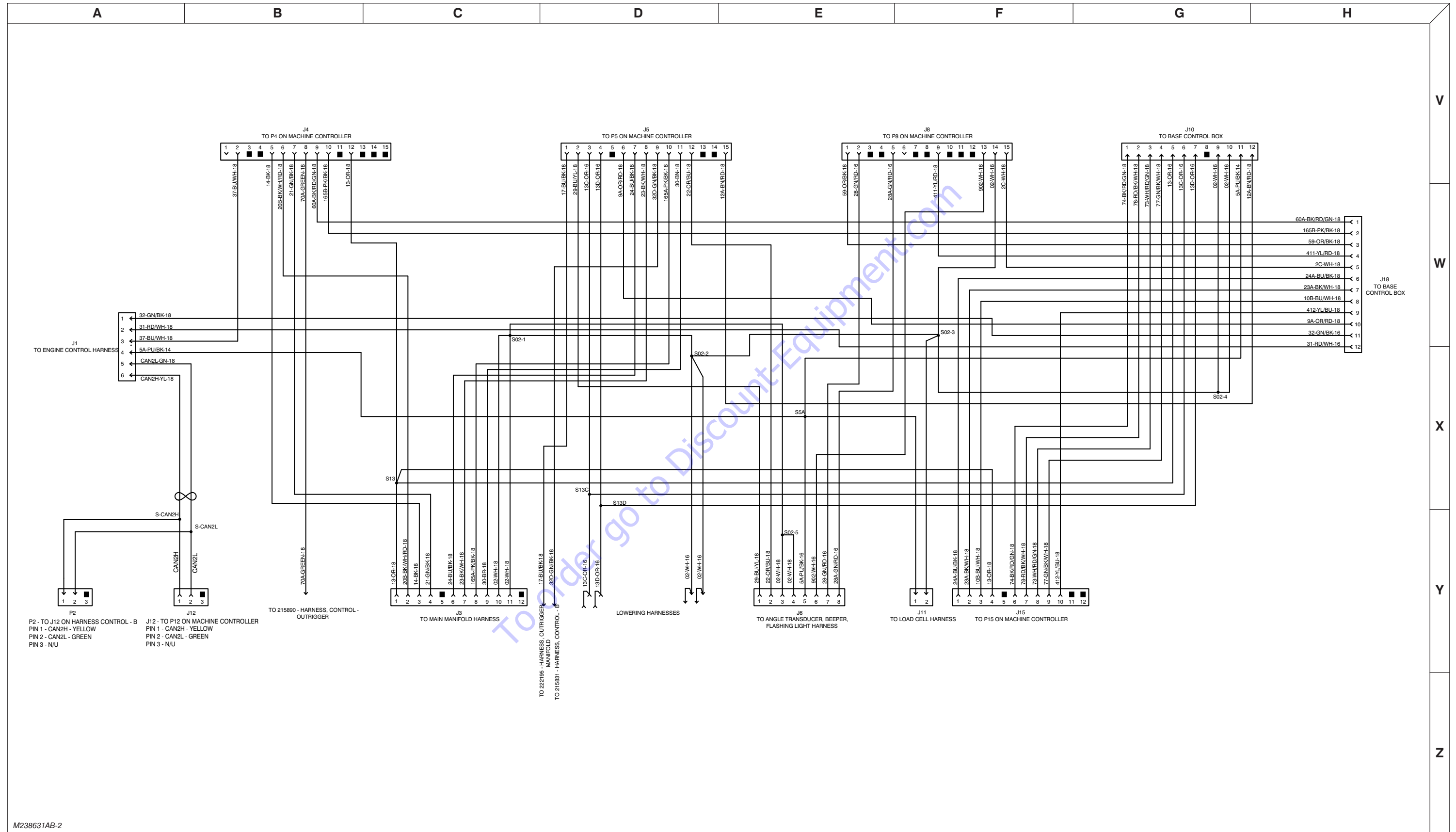
M215843AD-Wiring

### 3.26 Machine Controller Harness - SJ9664 RT



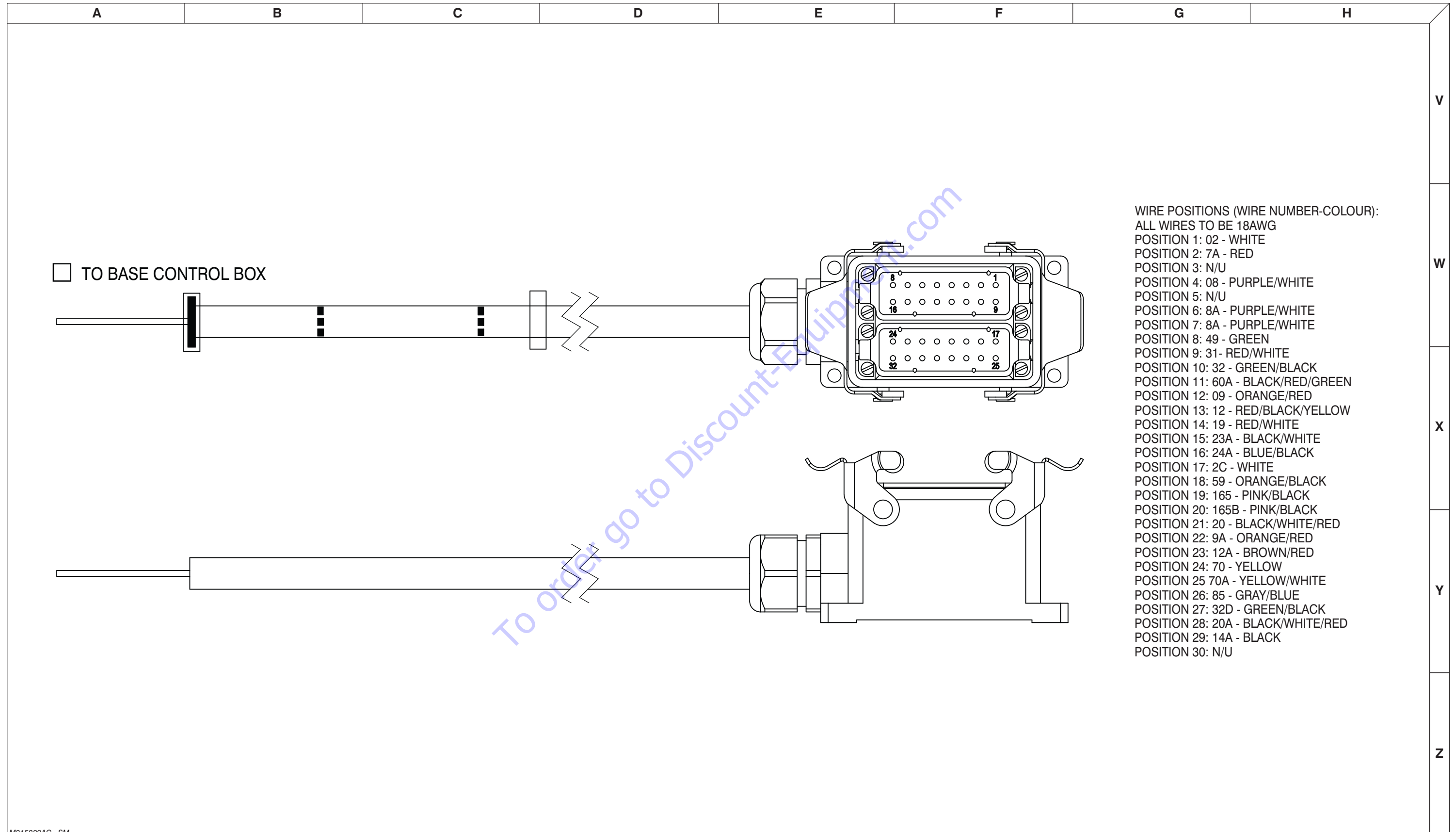
M238631AB-1

### 3.27 Machine Controller Harness - Wiring Diagram - SJ9664 RT



M238631AB-2

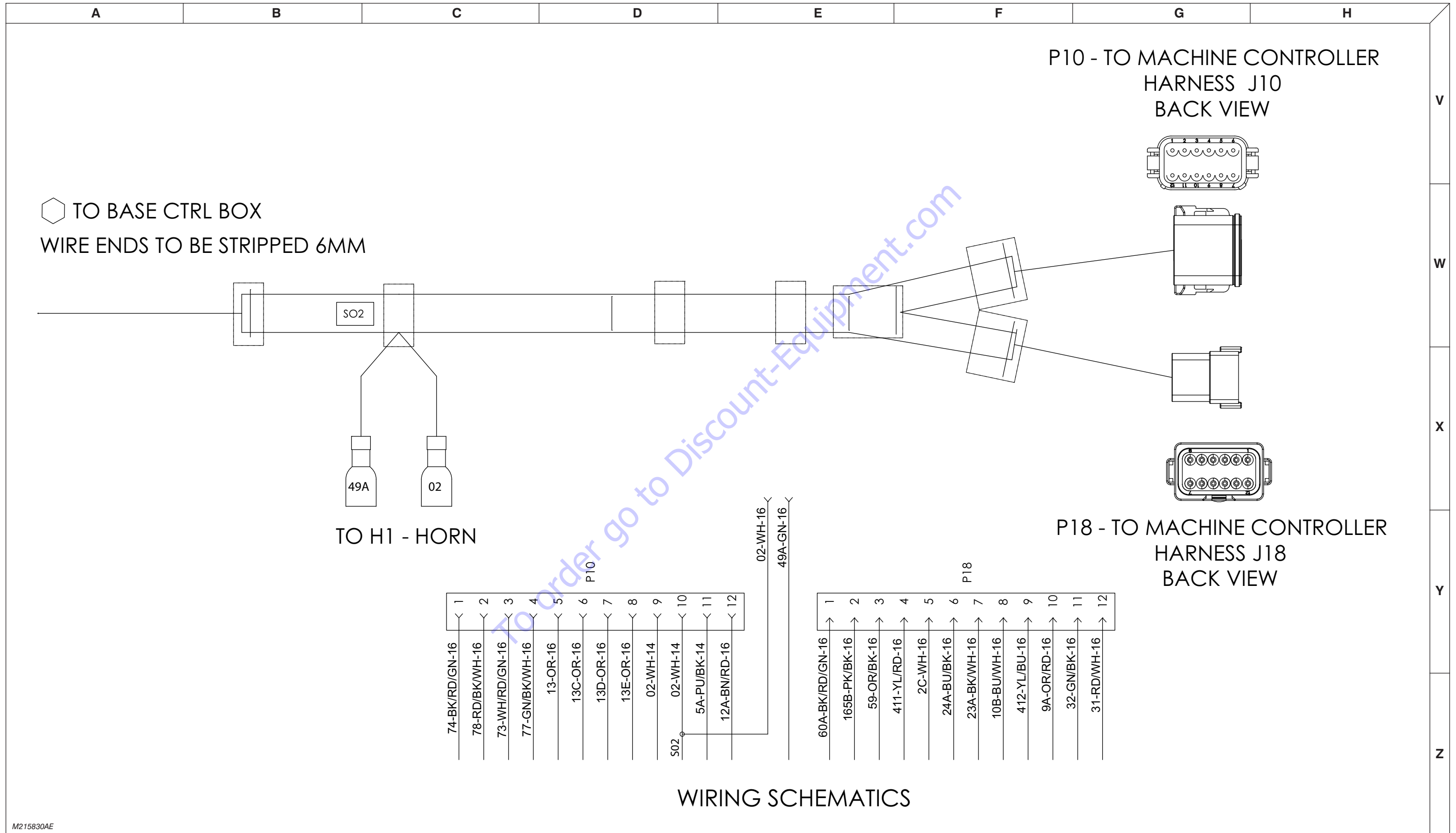
### 3.28 Base Control Cable



To order go to Discount-Equipment.com

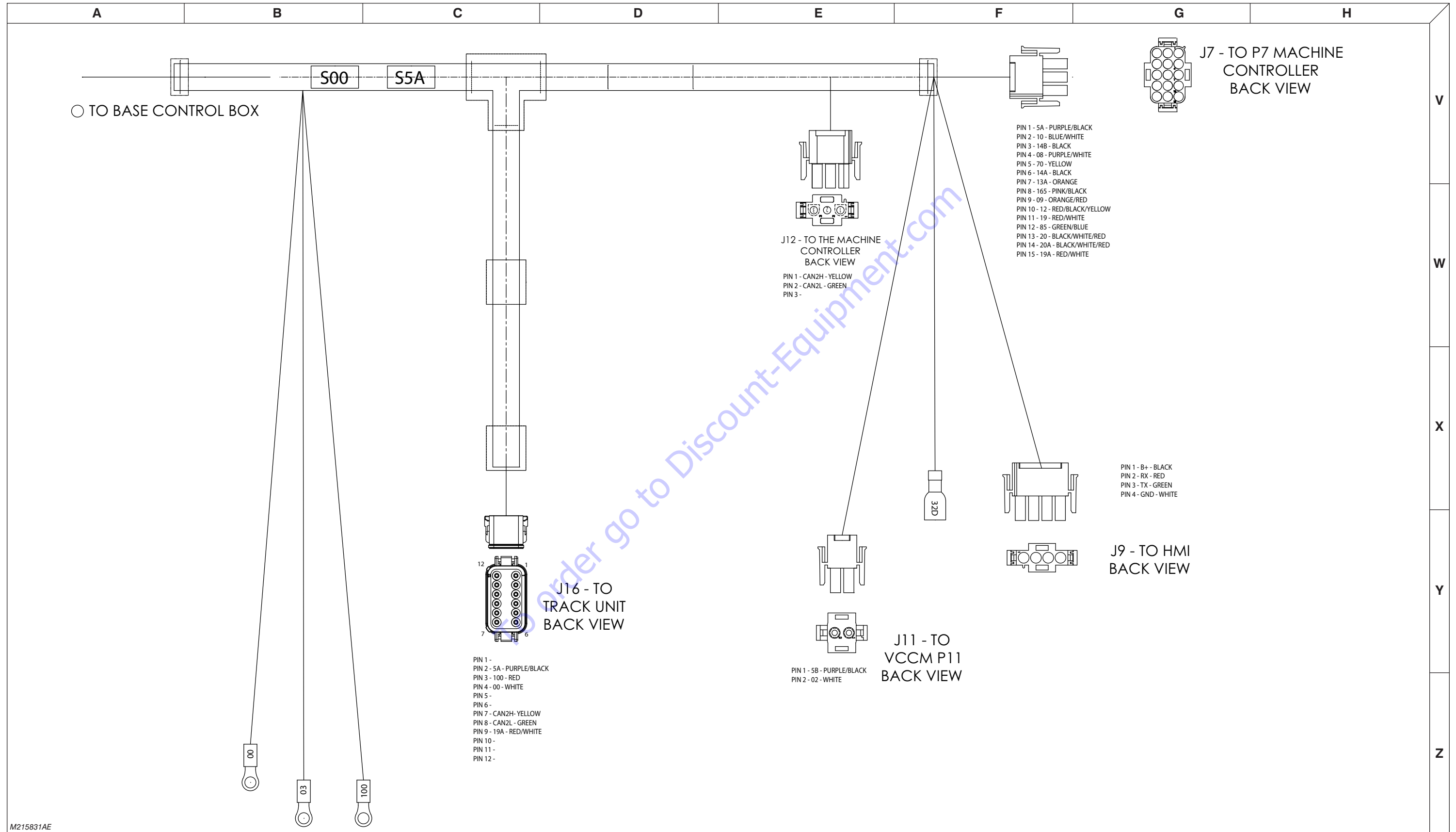
M215889AC - SM

### 3.29 Control Harness A



M215830AE

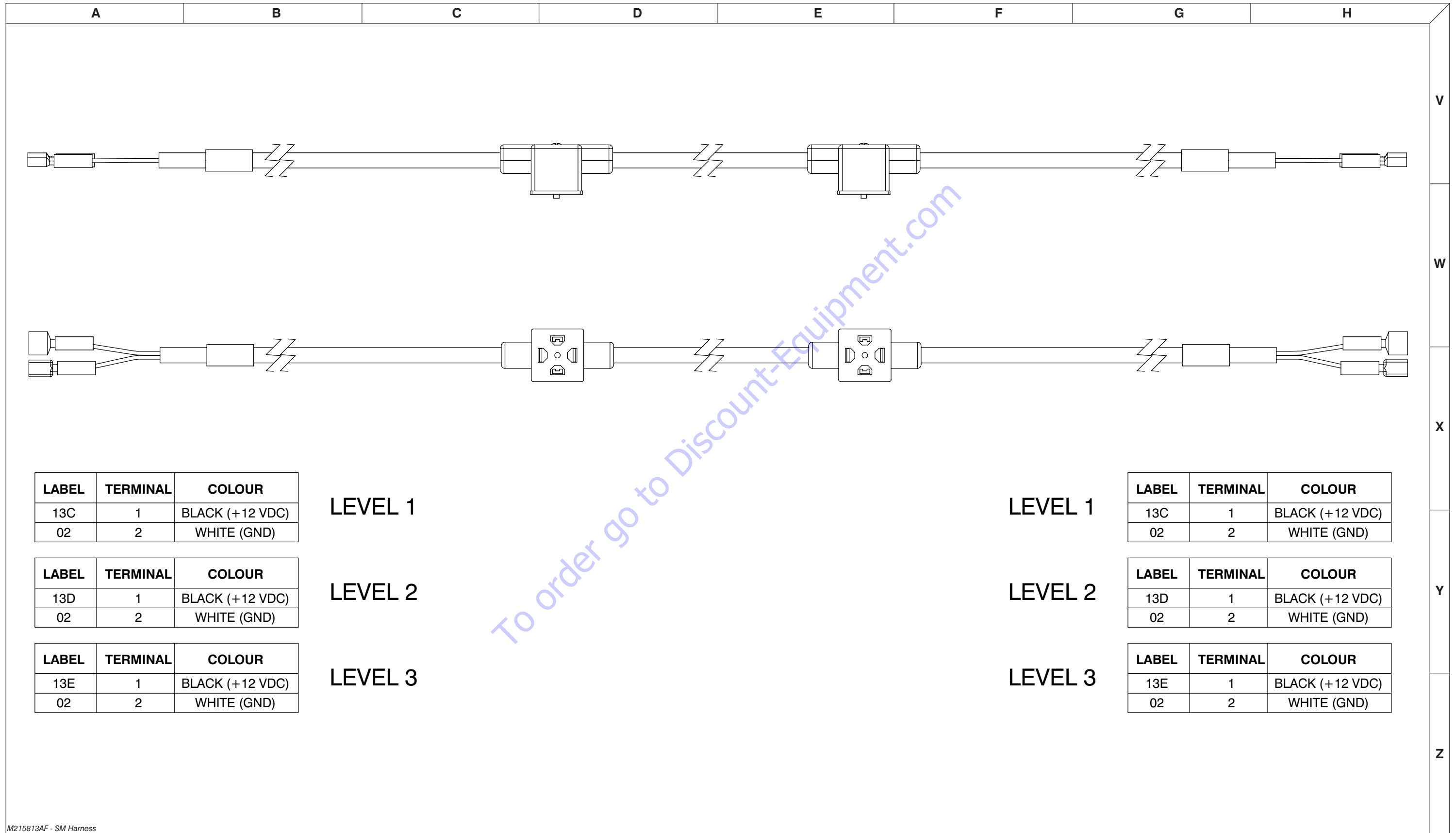
### 3.30 Control Harness B



M215831AE

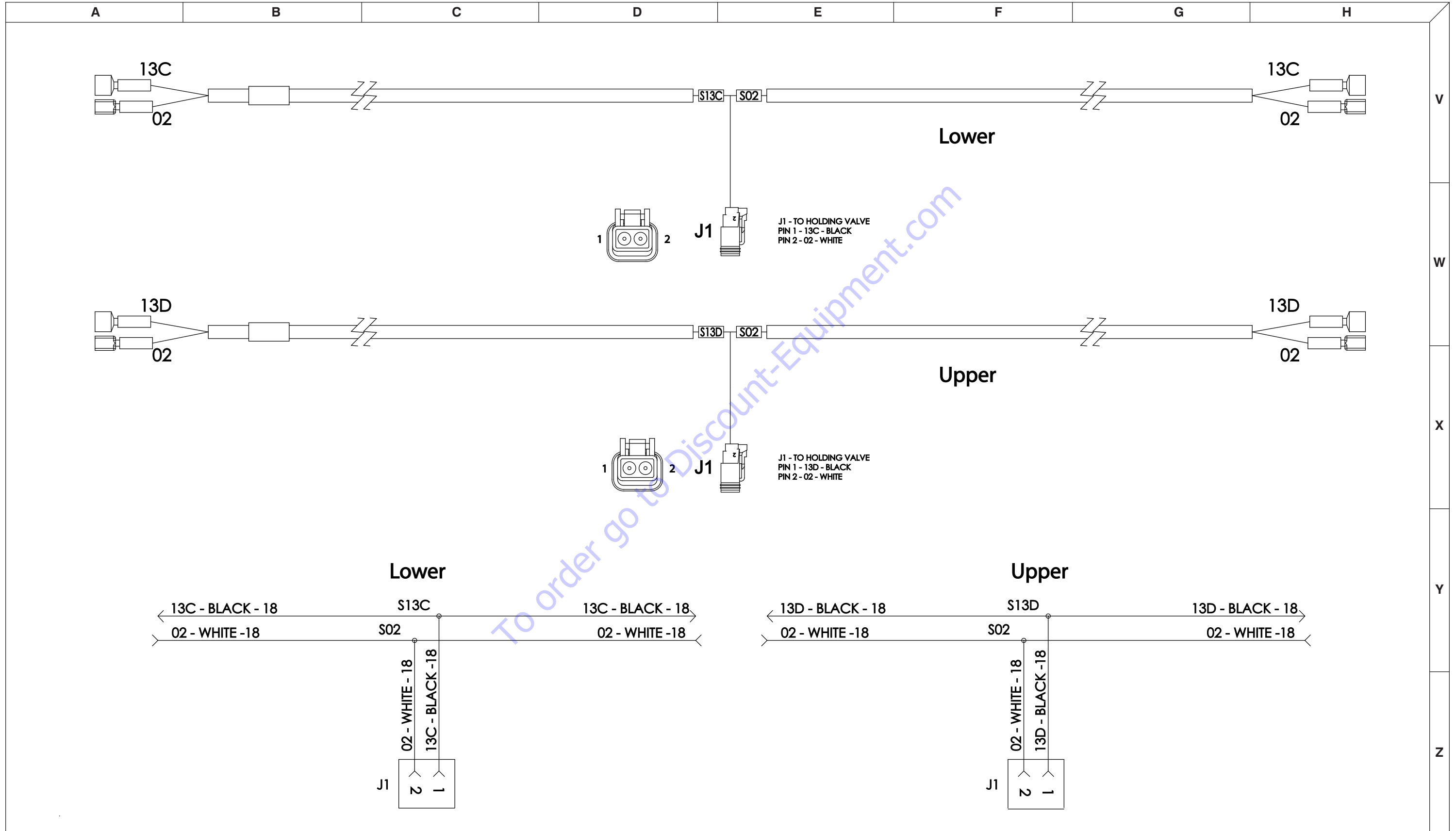


### 3.31 Dual Holding Valve Harness - SJ9233 RT, SJ9243 RT, SJ9253 RT



M215813AF - SM Harness

### 3.32 Holding Valve Harnesses - SJ9664 RT

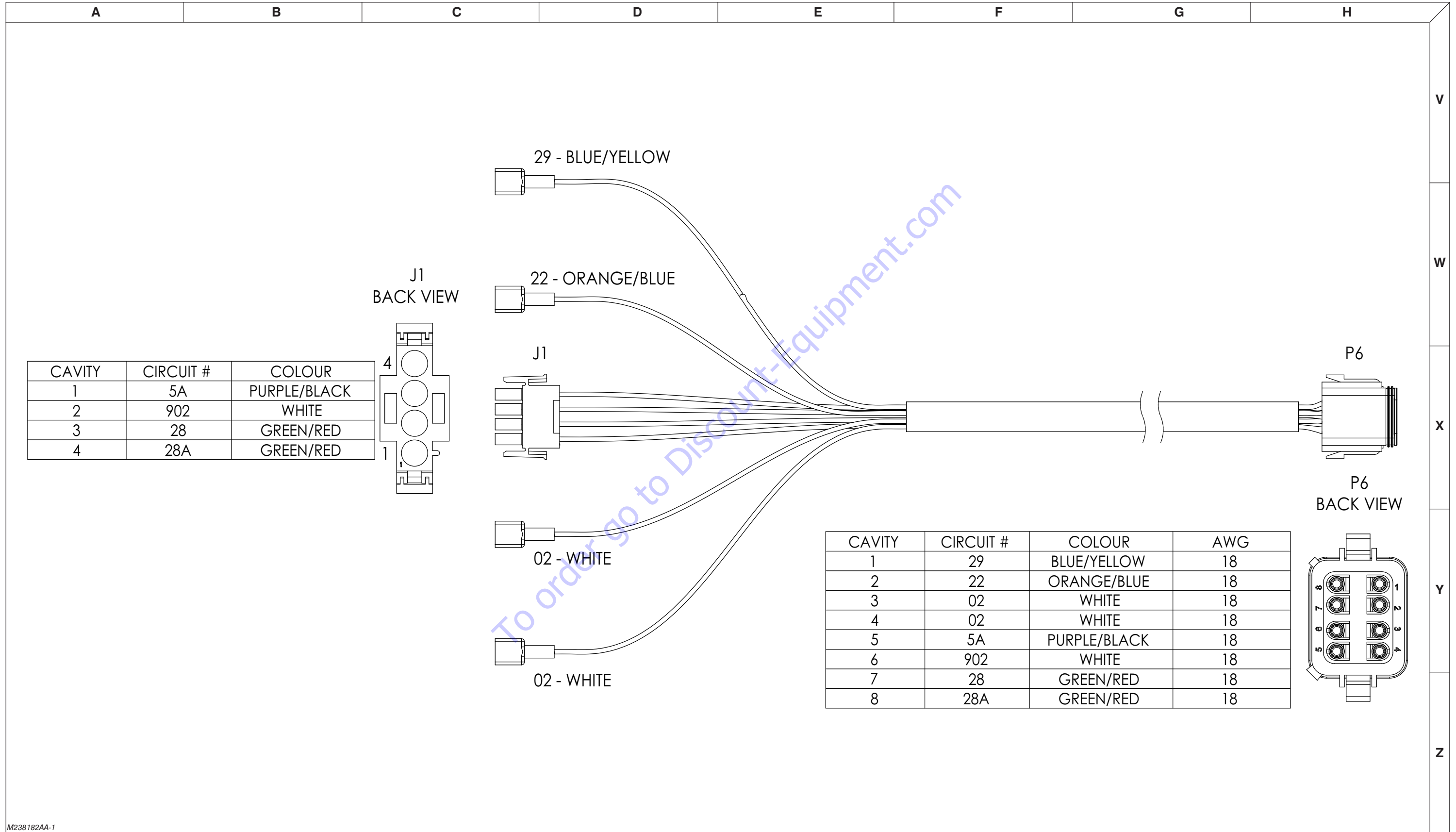


M2386333AA\_M238634AA

SJ9233 RT, SJ9243 RT, SJ9253 RT, SJ9664 RT

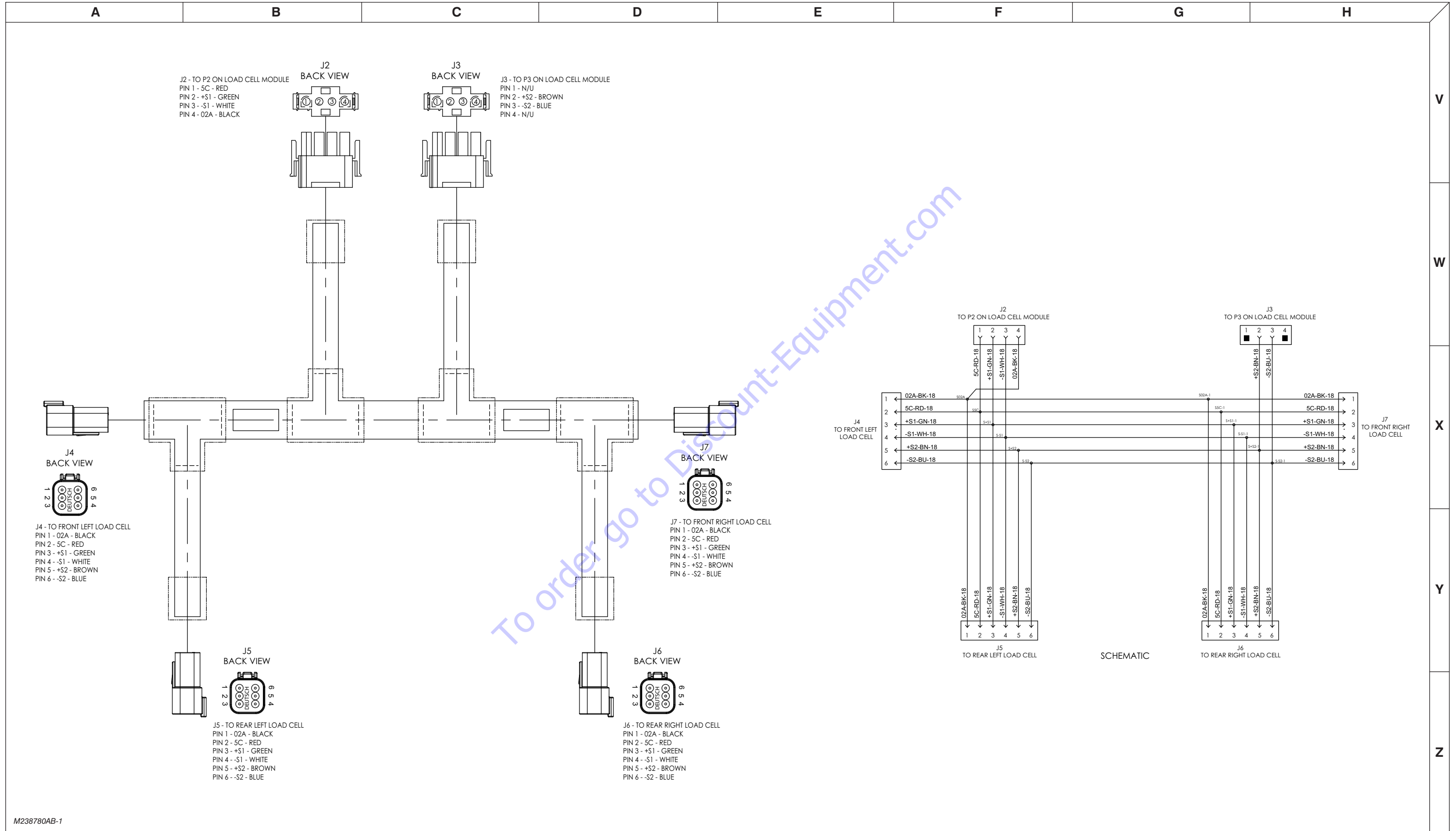
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### 3.33 Angle Transducer/Beeper/Flashing Light Harness - SJ9664 RT



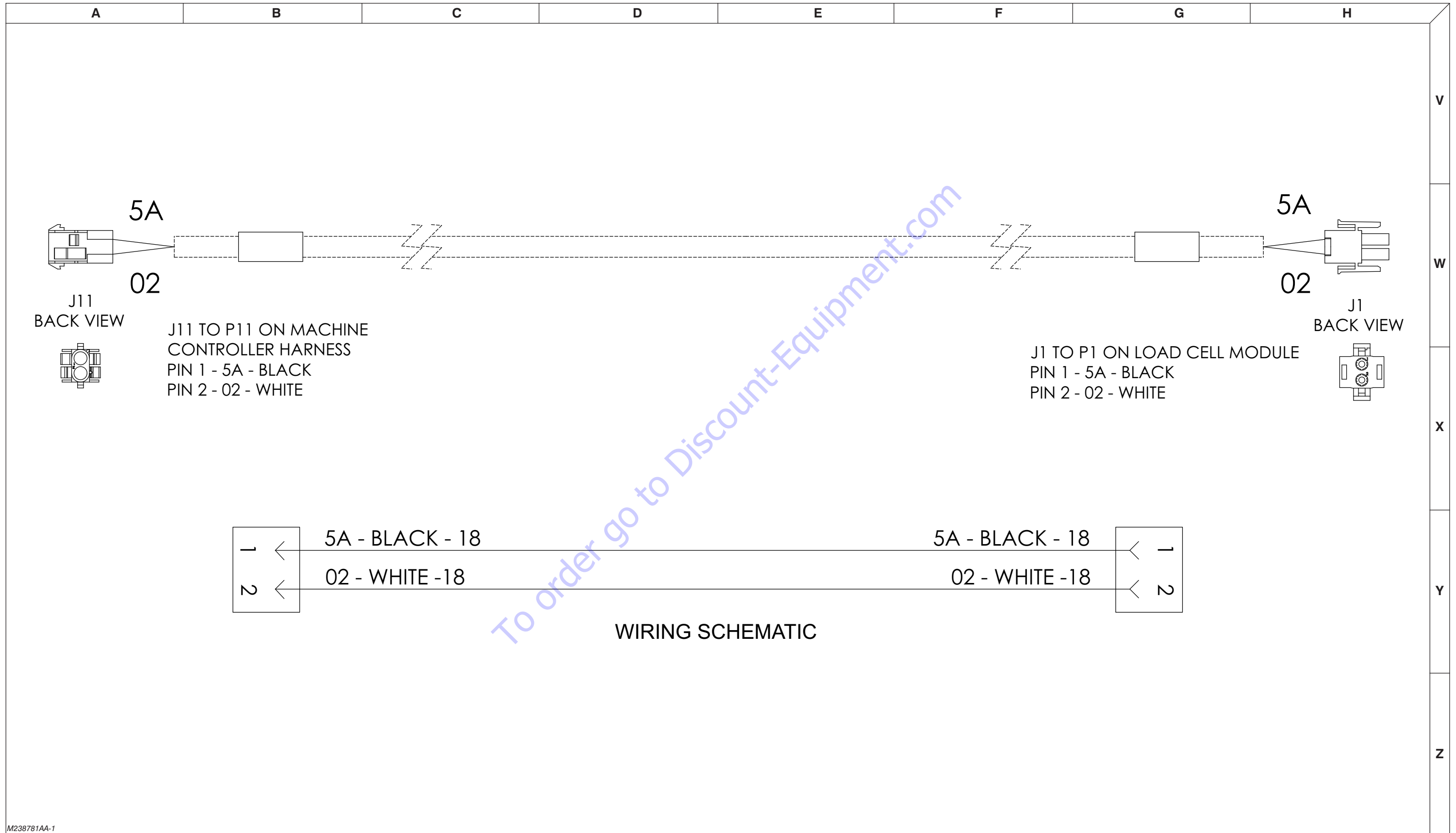
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### 3.34 Load Cell Module Harness - SJ9664 RT



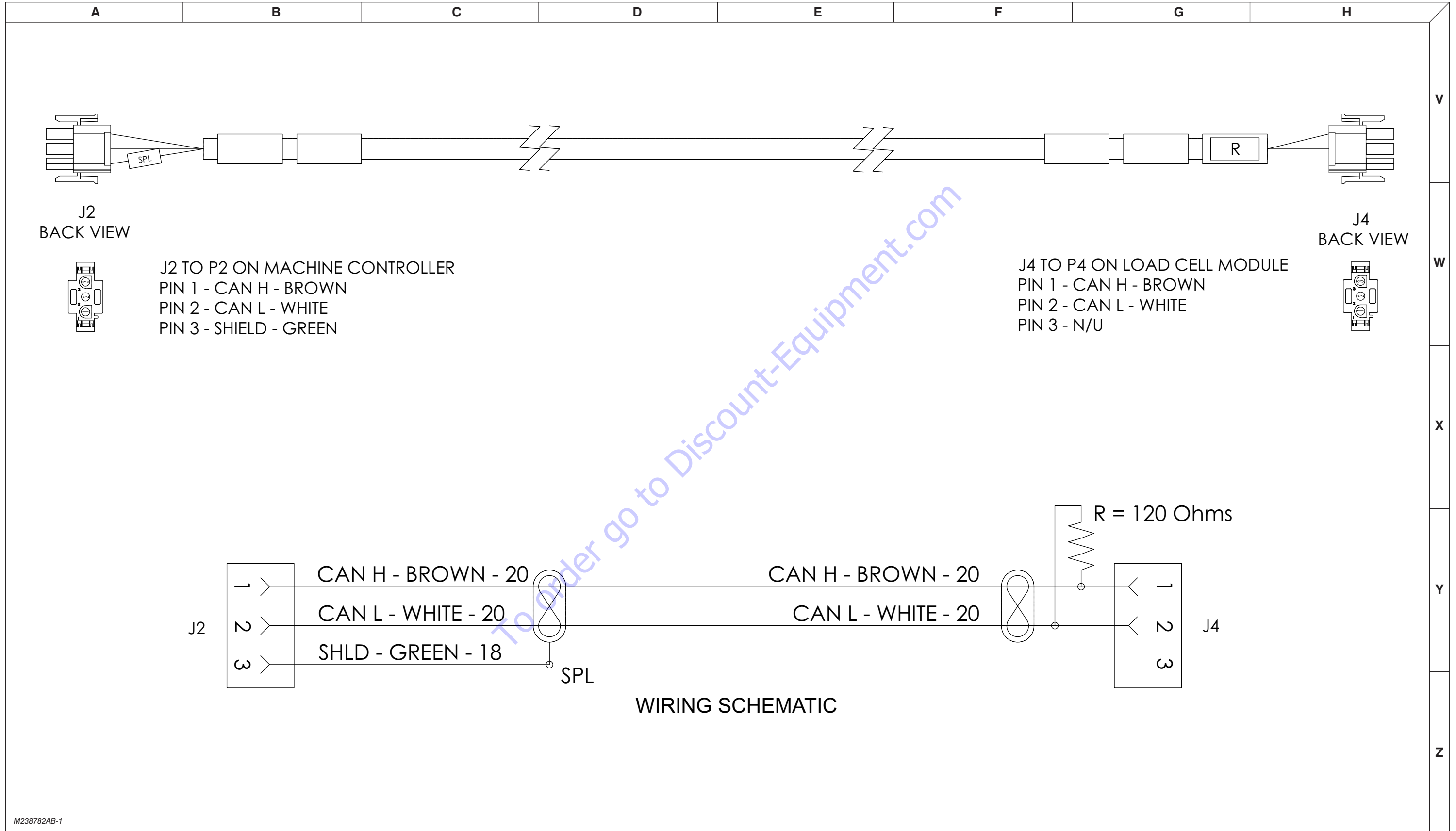
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### 3.35 Load Cell Module Power Harness - SJ9664 RT



M238781AA-1

### 3.36 Load Cell Module CAN Harness - SJ9664 RT

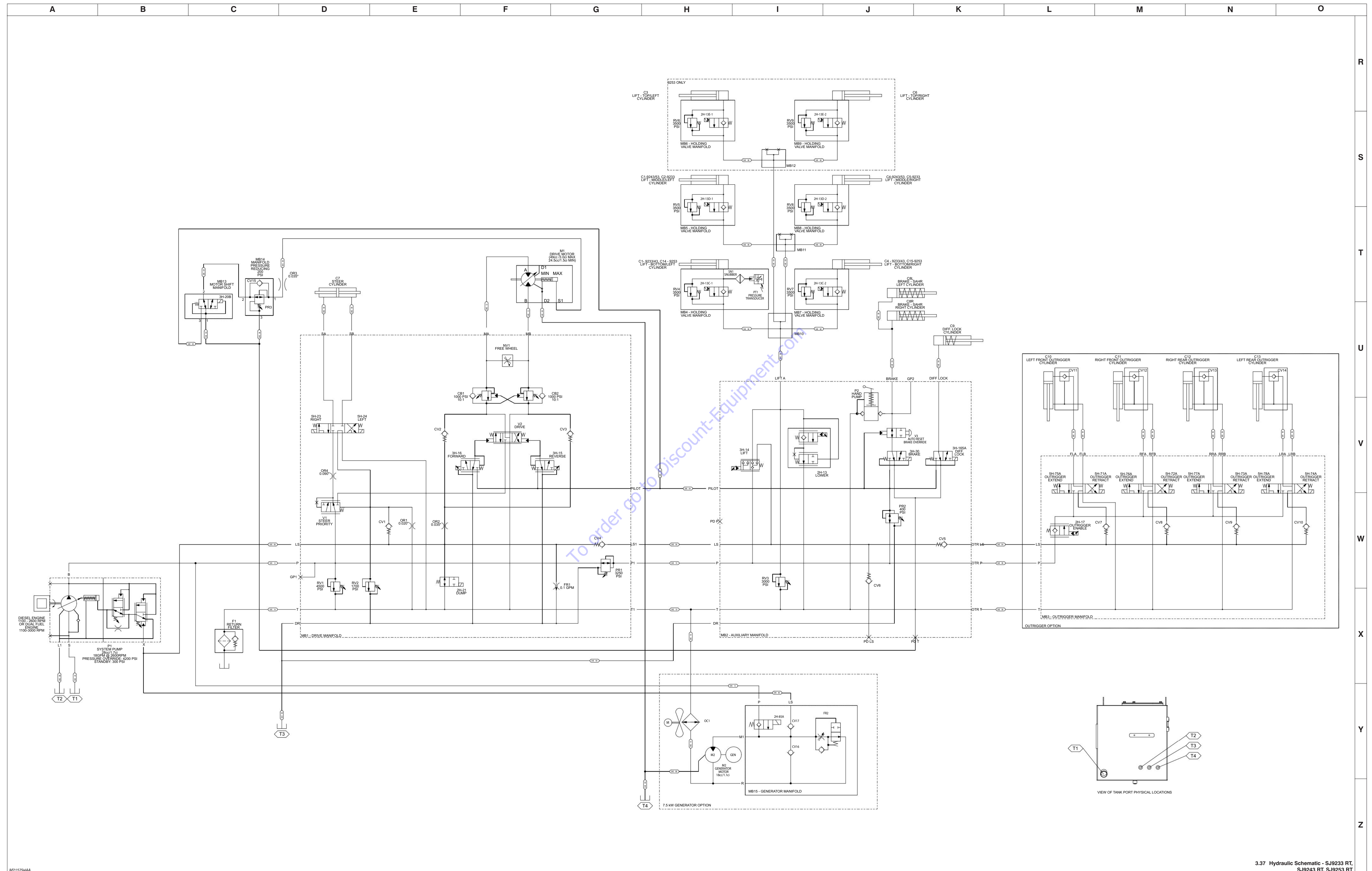


M238782AB-1



A	B	C	D	E	F	G	H	
<p>To order go to <a href="http://Discount-Equipment.com">Discount-Equipment.com</a></p>								V
								W
								X
								Y
								Z

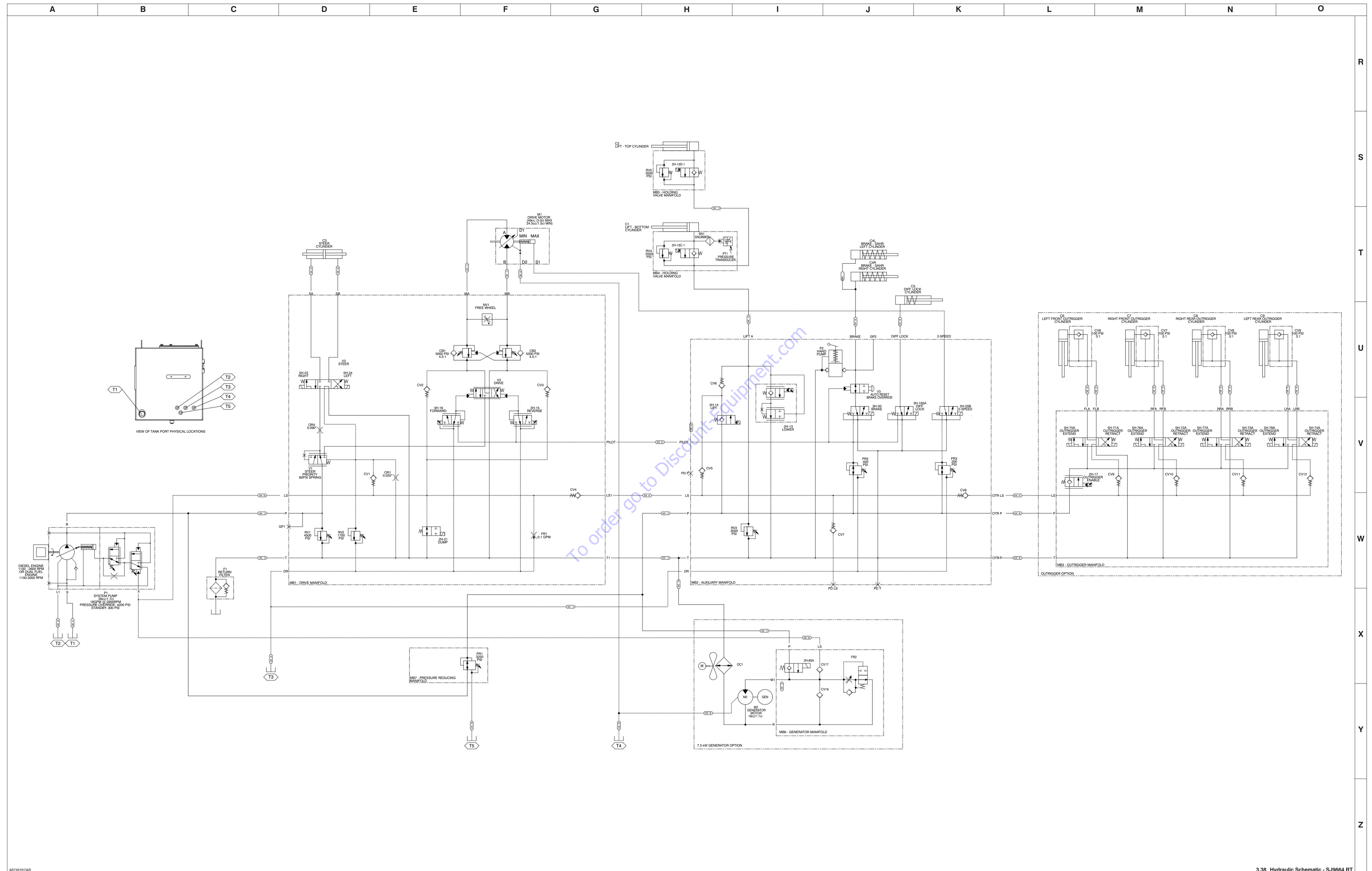
3.37 Hydraulic Schematic - SJ9233 RT, SJ9243 RT, SJ9253 RT



M215794AA

3.37 Hydraulic Schematic - SJ9233 RT, SJ9243 RT, SJ9253 RT

3.38 Hydraulic Schematic - SJ9664 RT

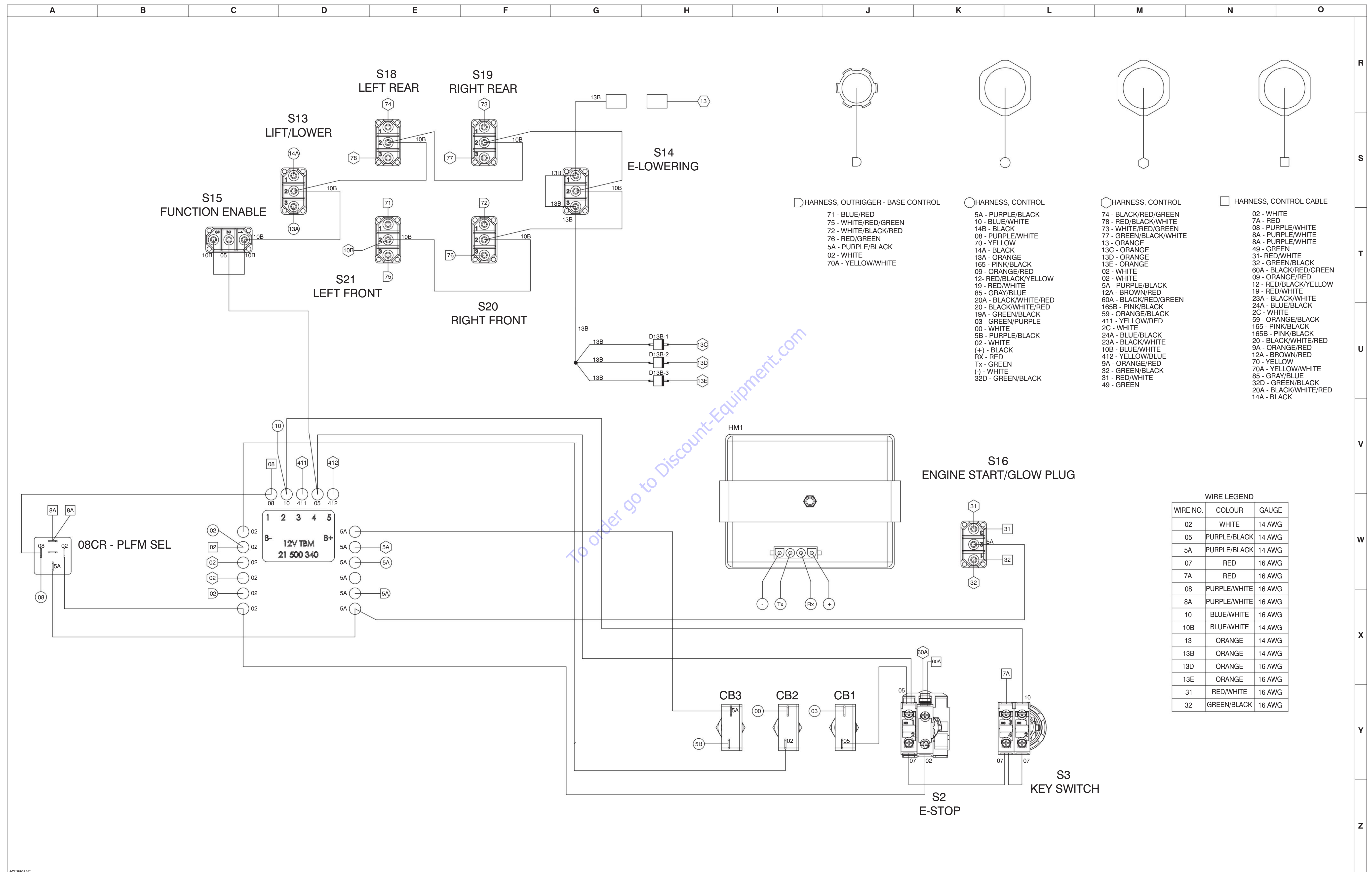


M238767AB

3.38 Hydraulic Schematic - SJ9664 RT

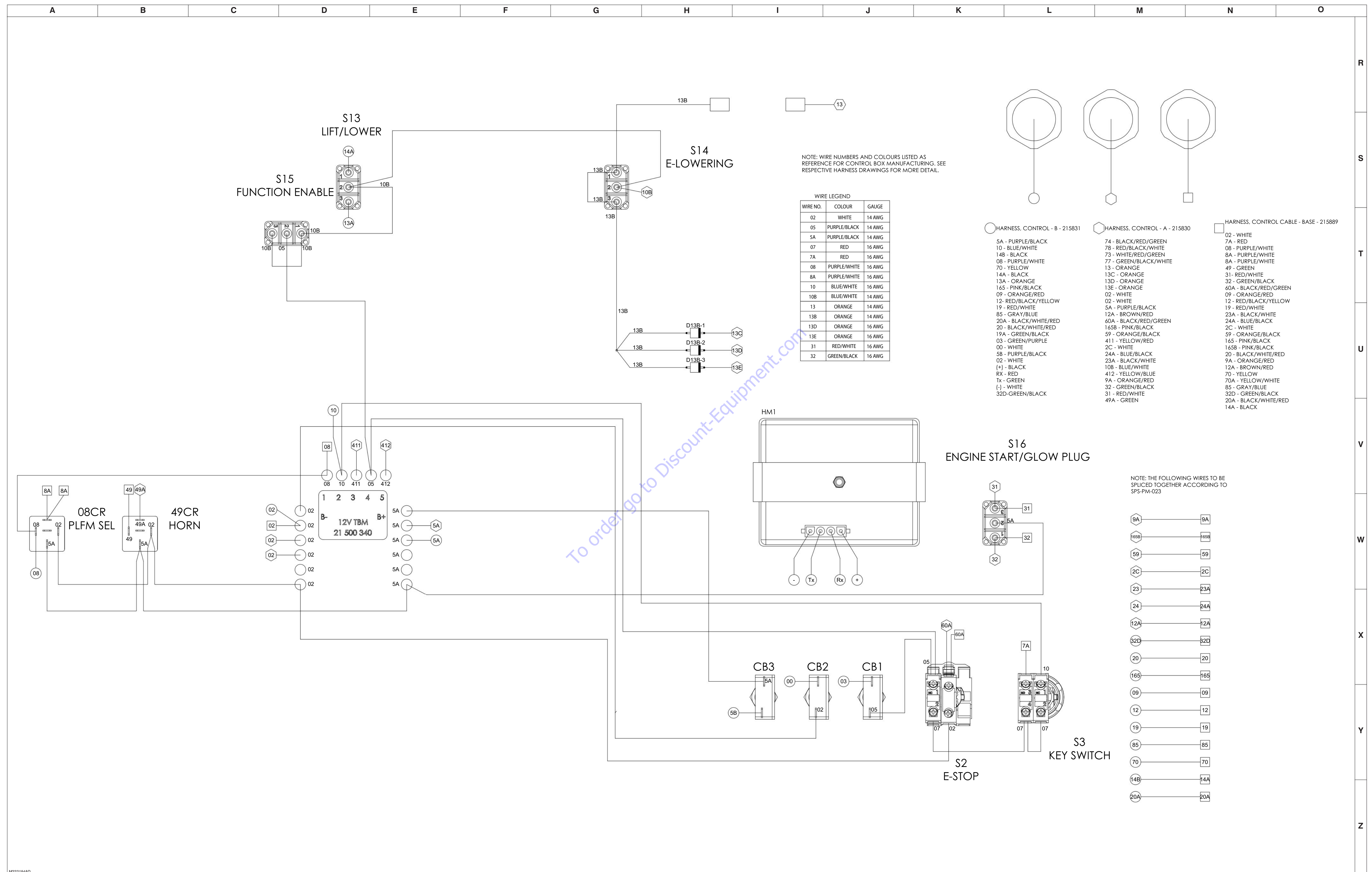


3.39 Base Control Box Wiring - with Outriggers



M215898AC

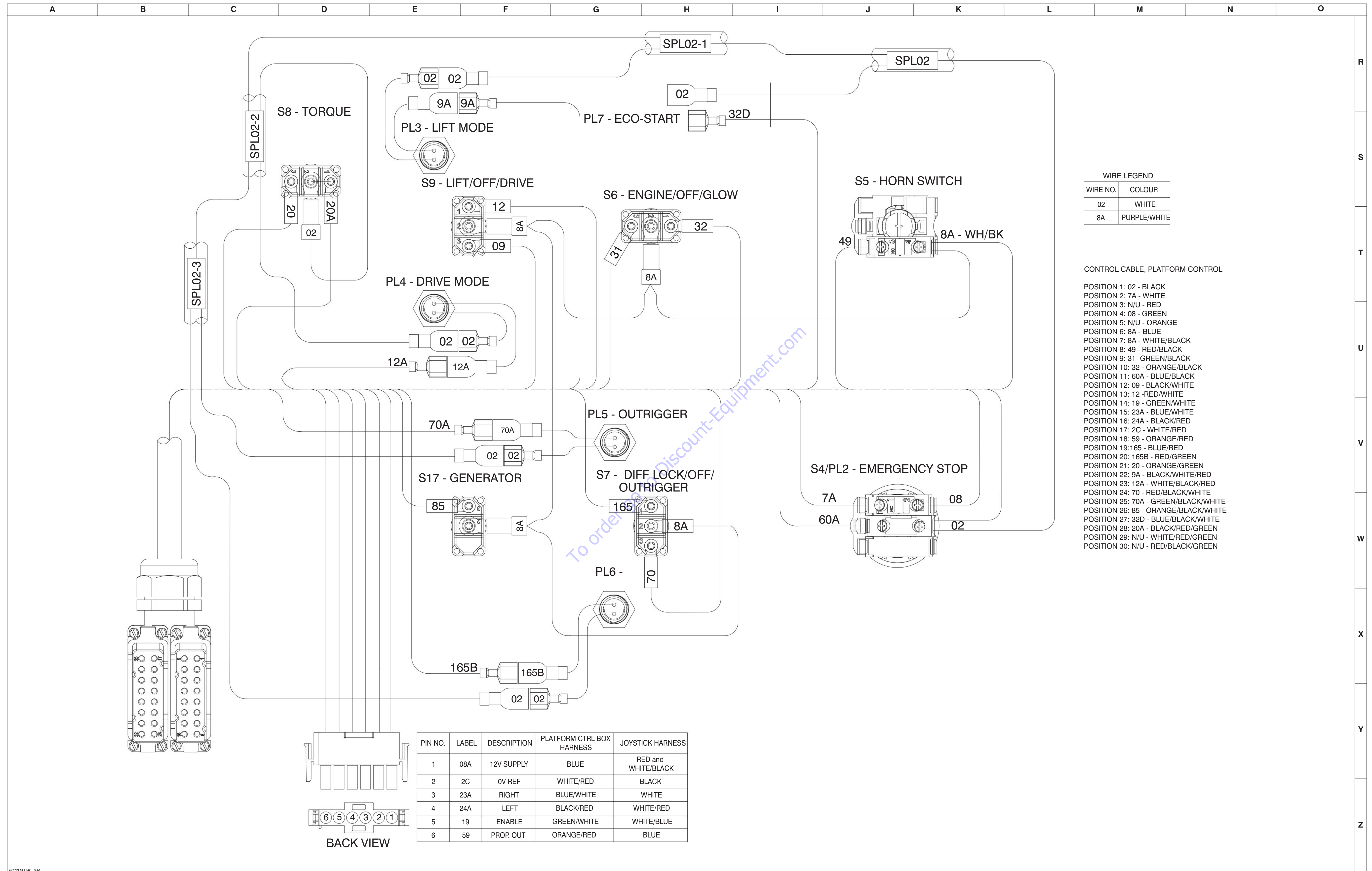
3.40 Base Control Box Wiring - No Outriggers



M2221944D

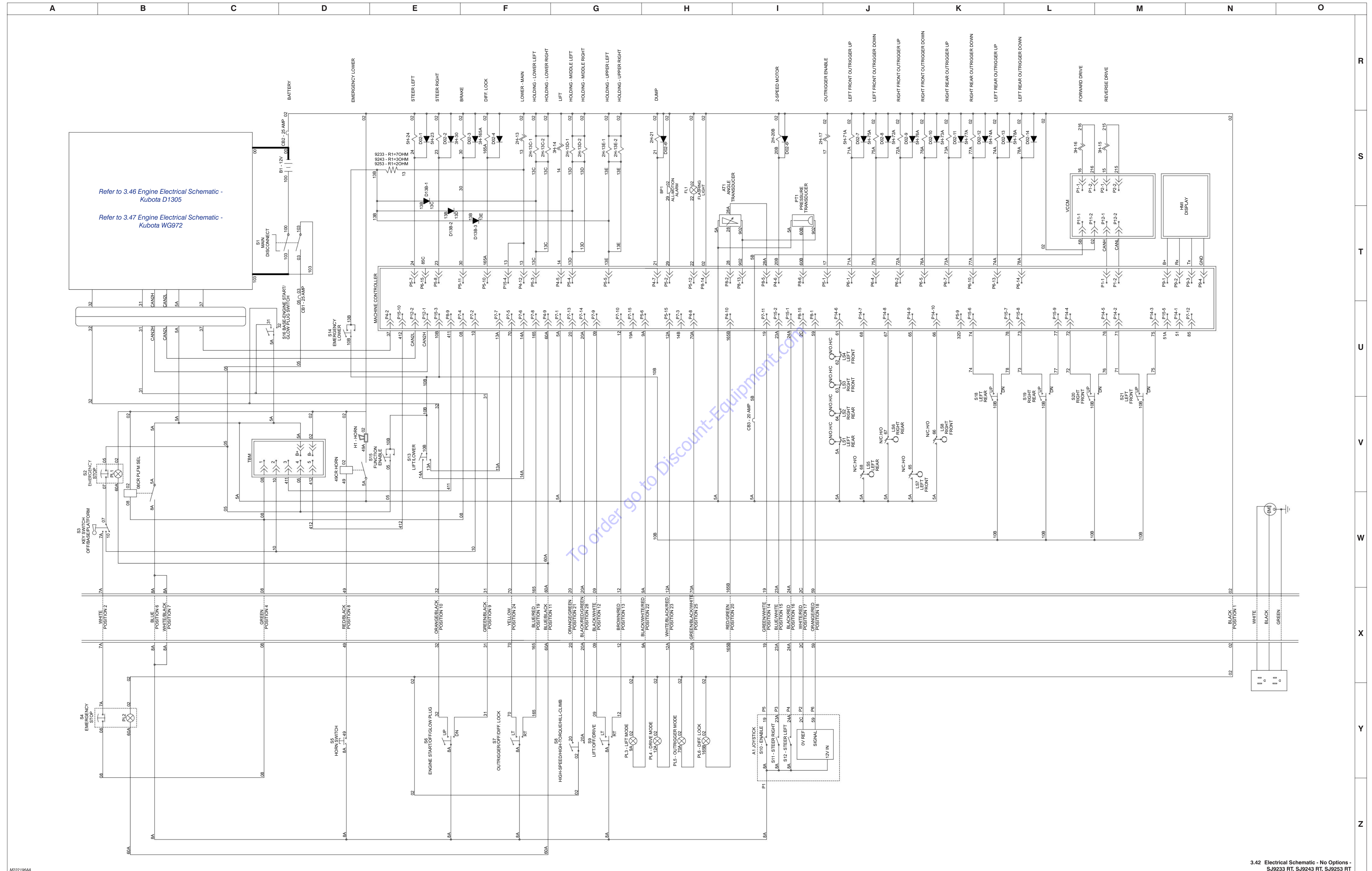


3.41 Platform Control Box Wiring



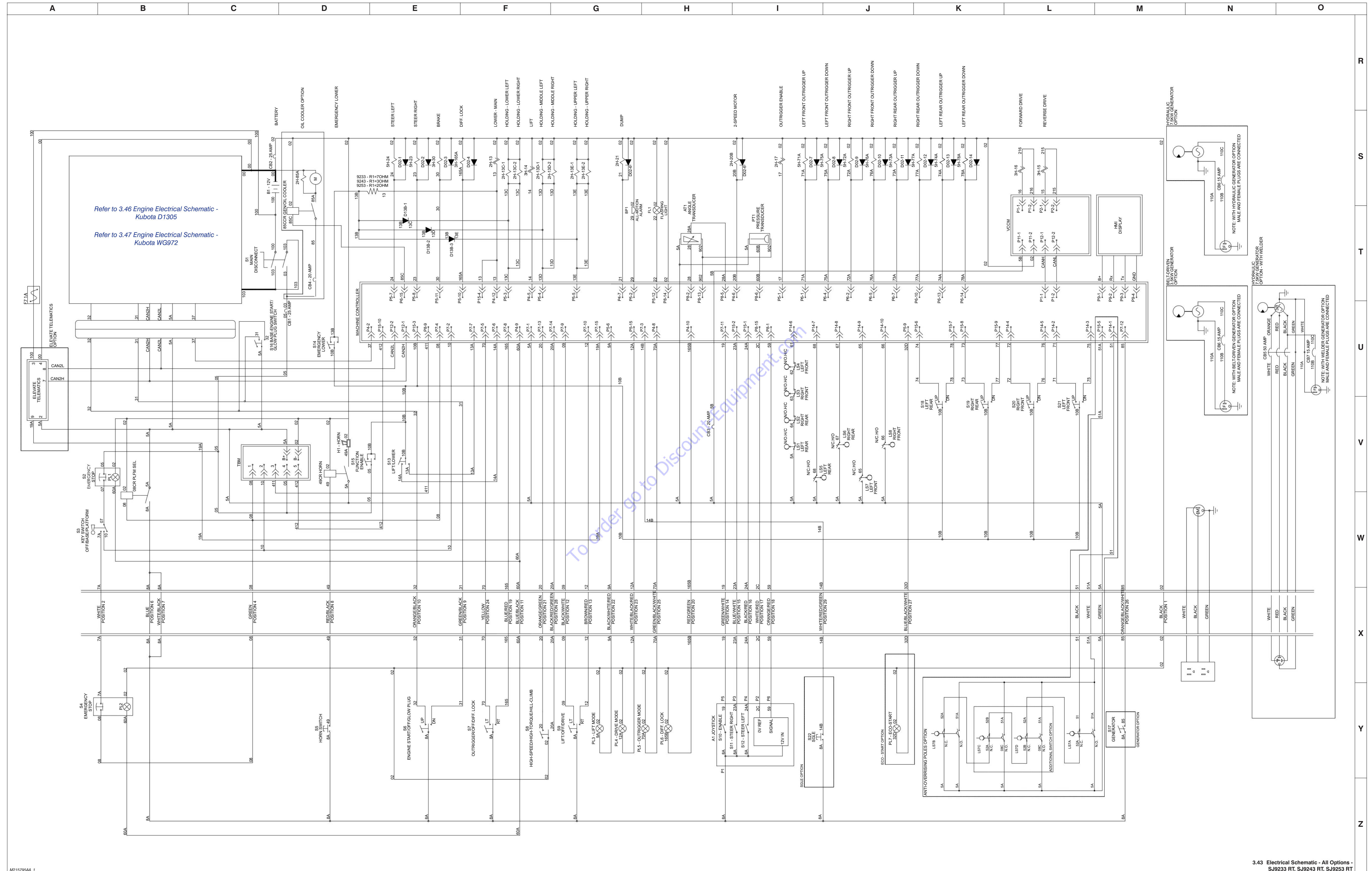


3.42 Electrical Schematic - No Options - SJ9233 RT, SJ9243 RT, SJ9253 RT



3.42 Electrical Schematic - No Options - SJ9233 RT, SJ9243 RT, SJ9253 RT

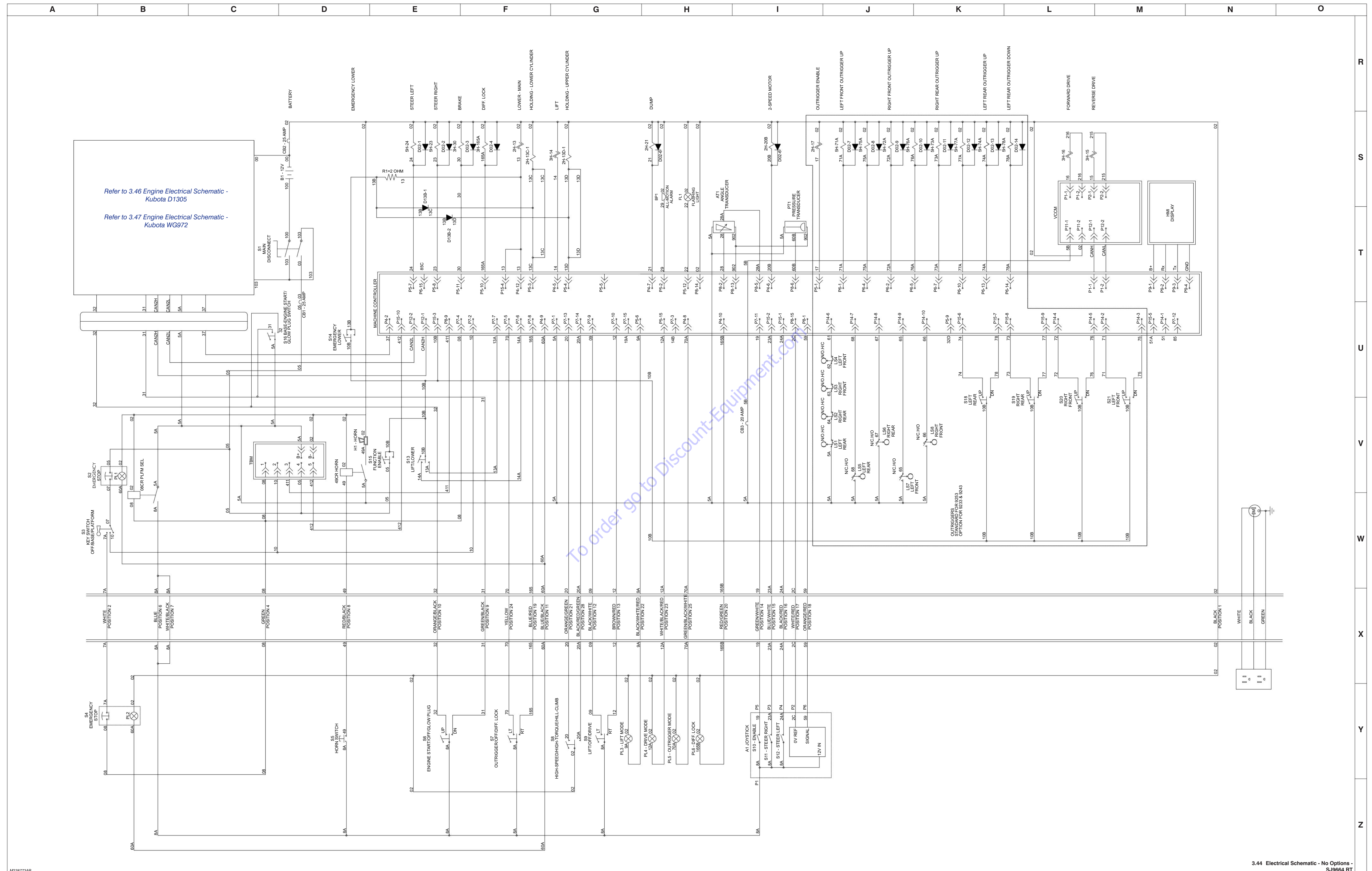
3.43 Electrical Schematic - All Options - SJ9233 RT, SJ9243 RT, SJ9253 RT



3.43 Electrical Schematic - All Options - SJ9233 RT, SJ9243 RT, SJ9253 RT

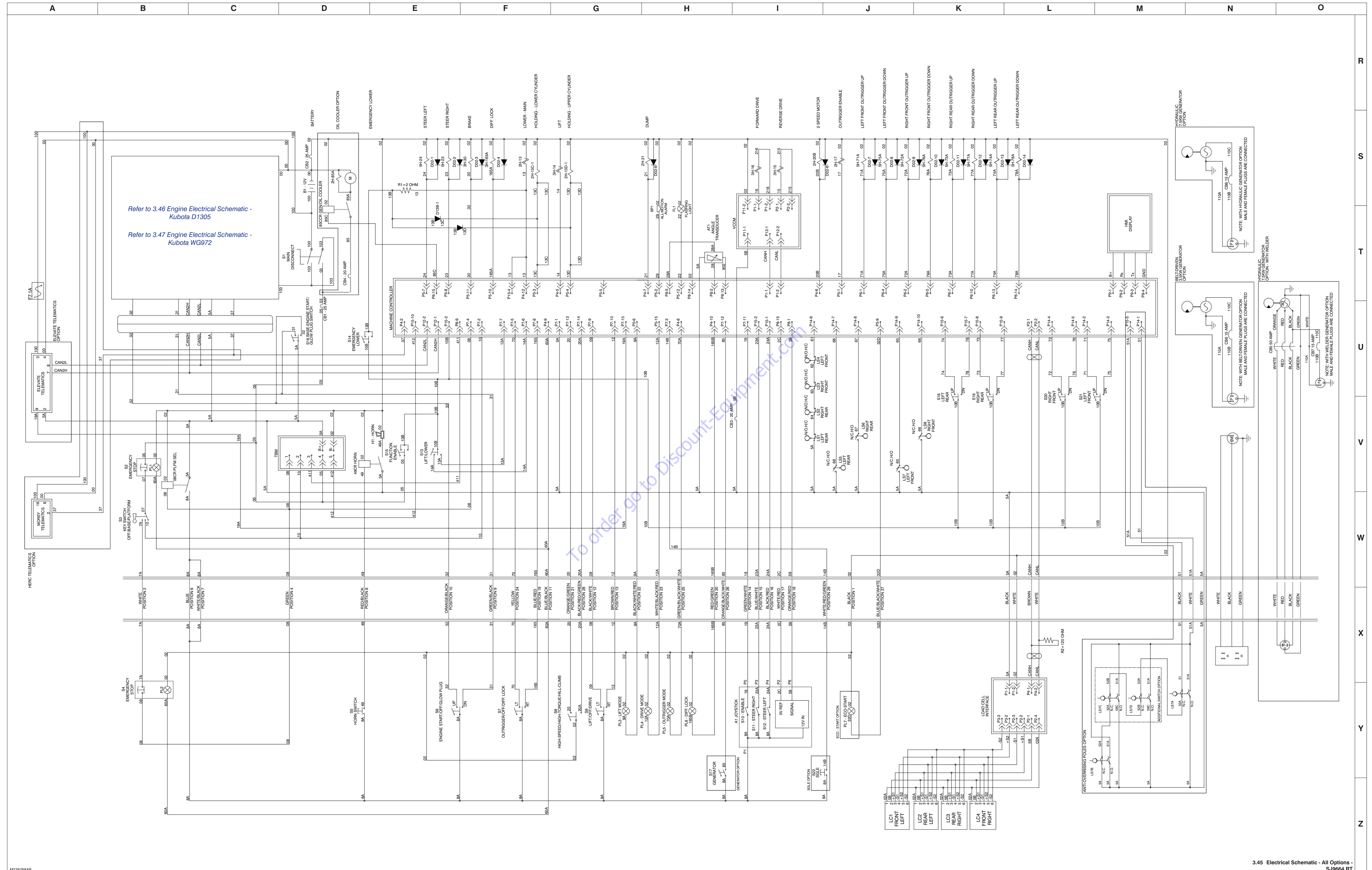


3.44 Electrical Schematic - No Options - SJ9664 RT

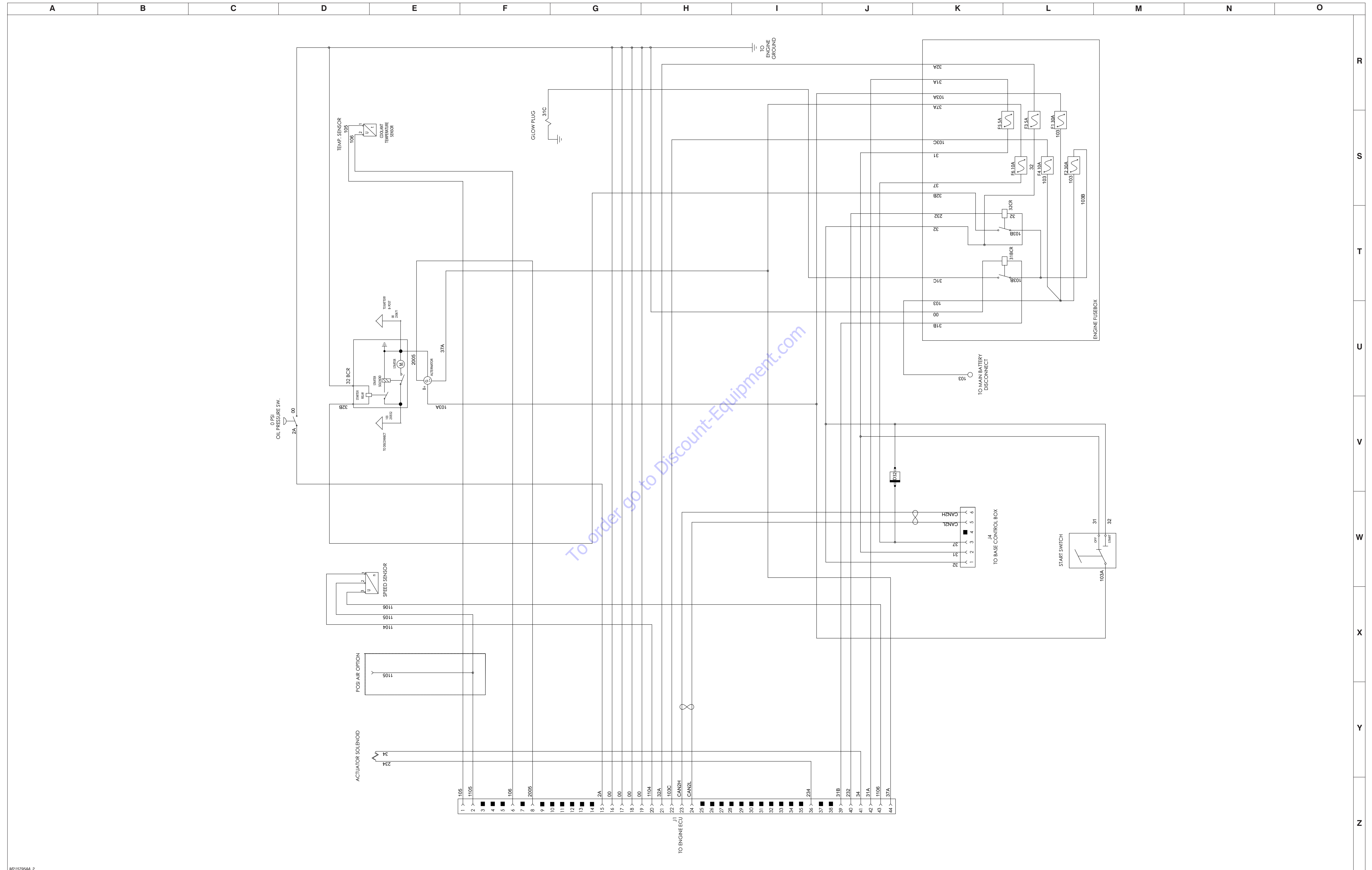




3.45 Electrical Schematic - All Options - SJ9664 RT



3.46 Engine Electrical Schematic - Kubota D1305



M215795AA\_2





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# Section 4 – Troubleshooting Information

## 4.1 Introduction

The following pages contain a table of Troubleshooting for locating and correcting most service trouble which can develop. Careful and accurate analysis of the systems listed in the table of Troubleshooting will localize the trouble more quickly than any other method. This manual cannot cover all possible troubles and deficiencies that may occur. If a specific trouble is not listed, isolate the major component in which the trouble occurs, isolate whether the problem is electrical or hydraulic, and then isolate and correct the specific problem.

The content of this section is separated into “probable cause” and “remedy.” The information in the left-hand column, preceded by a number, represents the “probable cause.” The information in the right-hand column, in bold text, represents the “remedy” to the “probable cause” directly beside it. See the example below for clarification.

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1. Probable cause

**Remedy**

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## 4.2 Electrical System

### 4.2-1 All Controls Inoperative

1. Display HMI is broadcasting an error message.	Check HMI display screen and follow instructions to clear error.
2. Battery B1 disconnected, discharged or faulty.	Connect battery and test for proper 12V supply voltage. Check each cell with a Hydrometer. Reading should be 1.275 (fully charged). Recharge if low reading. Replace battery if reading difference between cells is 0.050.
3. Loose or dirty battery cables/terminals.	Clean and tighten connections.
4. Main battery cables open or defective.	Check continuity of cable #100 (B+) to Main Disconnect switch S1. Check continuity of cable #00 (B-) to chassis ground and cable #00 to Negative Circuit Breaker CB2. Test for proper 12V supply voltage. Replace if defective. Close switch.
5. Open or defective Main Disconnect switch S1.	Check continuity between cable #100 and cable #103 on switch. Test for proper 12V supply voltage between wire #103 and wire #00. Check continuity between cable #103 and cable #03 on switch. Test for proper 12V supply voltage between wire #03 and wire #00. Replace switch if no continuity between either one of the switched poles.
6. Loose or broken wire #03 from Main Disconnect switch S1 to Circuit Breaker CB1.	Check continuity. Replace if defective.
7. Circuit Breaker CB1 defective or open.	Reset Breaker. Test for 12V supply voltage between wire #05 and wire #00. Replace if defective.
8. Loose or broken wire #05 from Circuit Breaker CB1 to Base Emergency Stop switch S2.	Check continuity. Test for 12V supply voltage between wire #05 and wire #00. Replace if defective.
9. Loose or broken wire #05 from Base Emergency Stop switch S2 from Terminal Board Module TBM screw #4.	Check continuity. Test for 12V supply voltage between wire #05 and wire #00. Replace if defective.
10. Loose or broken wire #00 from battery B- to Circuit Breaker CB2.	Check continuity. Replace if defective.

11. Circuit breaker CB2 defective or open.	<b>Reset breaker. Replace if defective.</b>
12. Loose or broken wire #02 from Circuit Breaker CB2 to Terminal Board Module TBM screw B- bus bar.	<b>Check continuity. Replace if defective.</b>
13. Loose or broken wire #02 to Platform Select Relay 08CR from Terminal Board Module TBM screw B- bus bar.	<b>Check continuity. Replace if defective.</b>
14. Loose or broken wire #02 from Terminal Board Module TBM screw B- bus Bar to Machine Controller pin #P8-14. (B- active signal)	<b>Check continuity. Replace if defective.</b>
15. Open or defective Base Emergency Stop switch S2.	<b>Close switch.</b>
	<b>Check continuity from wire #05 and wire #07 on switch.</b>
	<b>Test for 12V supply voltage between wire #07 and wire #02.</b>
16. Loose or broken wire #07 from Base Emergency Stop switch S2 to Off/Base/Platform Key switch S3.	<b>Replace if defective.</b>
	<b>Check continuity. Test for 12V supply voltage between wire #07 and wire #02.</b>
17. Open or defective Off/Base/Platform Key switch S3.	<b>Replace if defective.</b>
	<b>Select function with switch.</b>
	<b>Check continuity between wire #07 and wire #10 on switch (Base selected)</b>
18. Loose or broken wire #10 from Off/Base/Platform Key switch S3 to Terminal Board Module TBM screw #2.	<b>Check continuity between wire #07 and wire #7A on switch (Platform selected)</b>
	<b>Test for 12V supply voltage between wire #10 or #7A and wire #02.</b>
19. Loose or broken wire #10 from Terminal Board Module TBM screw #2 to Machine Controller pin #P7-2. (Base Selected signal)	<b>Replace switch if no continuity during correct switch function.</b>
	<b>Check continuity. Test for 12V supply voltage between wire #10 and wire #02.</b>
20. Loose or broken wire #7A from Off/Base/Platform Key switch S3 to Platform Emergency Stop switch S4.	<b>Replace if defective.</b>
	<b>Check continuity. Test for 12V supply voltage between wire #10 and wire #02.</b>
	<b>Use HMI Diagnostic menu to ensure Input P7-2 signal is present.</b>
	<b>Replace if defective.</b>
	<b>Check continuity. Test for 12V supply voltage between wire #7A and wire #02.</b>
	<b>Replace if defective.</b>

21. Open or defective Platform Emergency Stop switch S4.	<p><b>Close switch.</b></p> <p><b>Check continuity between wire #7A and wire #08 on switch.</b></p> <p><b>Test for 12V supply voltage between wire #08 and wire #02.</b></p>
22. Loose or broken wire #08 from Platform Emergency Stop switch S4 to Terminal Board Module TBM screw #1.	<p><b>Replace if defective.</b></p> <p><b>Check continuity. Test for 12V supply voltage between wire #08 and wire #02.</b></p> <p><b>Replace if defective.</b></p>
23. Loose or broken wire #08 from Terminal Board Module TBM screw #1 to Platform Select Relay 08CR.	<p><b>Check continuity. Test for 12V supply voltage between wire #08 and wire #02.</b></p> <p><b>Replace if defective.</b></p>
24. Loose or broken wire #08 from Platform Select Relay 08CR to Machine Controller pin #P7-4. (Platform Selected signal)	<p><b>Check continuity. Test for 12V supply voltage between wire #08 and wire #02.</b></p> <p><b>Use HMI Diagnostic menu to ensure Input P7-4 signal is present.</b></p> <p><b>Replace if defective.</b></p>
25. Loose or broken wire #411 from Terminal Board Module TBM screw #3 to Machine Controller pin #P8-9. (TBM Current monitoring signal)	<p><b>Check continuity. Use HMI Diagnostic menu to ensure Input P8-9 signal is present.</b></p> <p><b>Replace if defective.</b></p>
26. Loose or broken wire #412 from Terminal Board Module TBM screw #5 to Machine Controller pin #P15-10. (TBM open circuit monitoring signal)	<p><b>Check continuity.</b></p> <p><b>Replace if defective.</b></p>
27. Loose or broken wire #5A from Terminal Board Module TBM screw B+ bus bar to Machine Controller pin #P7-1. (Valve Supply Output)	<p><b>Check continuity. Test for 12V supply voltage between wire #5A and wire #02.</b></p> <p><b>Use HMI Diagnostic menu to ensure Output P7-1 signal is present.</b></p> <p><b>Replace if defective.</b></p>
28. Defective Terminal Board Module TBM.	<p><b>See Section 5 Procedures for Terminal Board Module TBM Troubleshooting section.</b></p>
29. External or internal fault detected by Machine Controller.	<p><b>Check HMI Display screen. Use Diagnostic Menu to see switch and sensor status.</b></p> <p><b>Correct trouble code as displayed. Replace module if defective.</b></p>

## 4.2-2 All Functions Inoperative from Base

1. Display HMI is broadcasting an error message.	<p>Check HMI display screen and follow instructions to clear error.</p> <p>Select function with switch.</p>
2. Open or defective Off/Base/Platform Key switch S3.	<p>Check continuity between wire #07 and wire #10 on switch (Base selected)</p> <p>Test for 12V supply voltage between wire #10 and wire #02.</p> <p>Replace switch if no continuity during correct switch function.</p>
3. Loose or broken wire #10 from Off/Base/Platform Key switch S3 to Terminal Board Module TBM screw #2.	<p>Check continuity. Test for 12V supply voltage between wire #10 and wire #02.</p> <p>Replace if defective.</p>
4. Loose or broken wire #10 from Terminal Board Module TBM screw #2 to Machine Controller pin #P7-2. (Base Selected signal)	<p>Check continuity. Test for 12V supply voltage between wire #10 and wire #02.</p> <p>Use HMI Diagnostic menu to ensure Input P7-2 signal is present.</p> <p>Replace if defective.</p>
5. No Valve Supply Voltage from Terminal Board Module TBM from wire #5A on B+ bus bar.	<p>Defective Terminal Board Module TBM.</p> <p>See Section 5 Procedures for Terminal Board Module TBM Troubleshooting section.</p>
6. Loose or broken wire #05 from Terminal Board Module TBM screw #4 to Function Enable toggle switch S15.	<p>Check continuity. Test for 12V supply voltage between wire #05 and wire #02.</p> <p>Replace if defective.</p>
7. Loose or broken wire #5A from Terminal Board Module TBM B+ bus bar to Circuit Breaker CB3.	<p>Check continuity. Test for 12V supply voltage between wire #5A and wire #02.</p> <p>Replace if defective.</p>
8. Circuit breaker CB3 defective or open.	<p>Reset breaker. Replace if defective.</p>
9. Loose or broken wire #5B from Circuit Breaker CB3 to Valve Current Driver Module VCCM pin P11-1.	<p>Check continuity. Test for 12V supply voltage between wire #5B and wire #02.</p> <p>Replace if defective.</p>
10. Open or defective Function Enable toggle switch S15.	<p>Operate switch.</p> <p>Check for continuity between wire #05 and wire #10B on switch when closed.</p> <p>Test for supply voltage between wire #10B and wire #02.</p> <p>Replace switch if no continuity during switch function.</p>

11. Loose or broken wire #10B from Function Enable toggle switch S15 to Lift/Lower toggle switch S13.	<p><b>Check continuity. Test for supply voltage between wire #10B and wire #02.</b></p> <hr/> <p><b>Replace if defective.</b></p>
12. Loose or broken wire #10B from Lift/Lower toggle switch S13 to Emergency Lowering switch S14.	<p><b>Check continuity. Test for supply voltage between wire #10B and wire #02.</b></p> <hr/> <p><b>Replace if defective.</b></p>
13. Loose or broken wire #10B from Emergency Lowering switch S14 to Machine Controller pin #P15-3. (Function Enable signal)	<p><b>Check continuity. Test for 12V supply voltage between wire #10B and wire #02.</b></p> <hr/> <p><b>Use HMI Diagnostic menu to ensure Input P15-3 signal is present.</b></p> <hr/> <p><b>Replace if defective.</b></p>
14. Open or defective Lift/Lower toggle switch S13.	<p><b>Operate switch.</b></p> <hr/> <p><b>Check continuity between wire #10B and wire #14A (Lift selected)</b></p> <hr/> <p><b>Check continuity between wire #10B and wire #13A (Lower selected)</b></p> <hr/> <p><b>Test for 12V supply voltage between wire #14A or #13A and wire #02.</b></p> <hr/> <p><b>Replace switch if no continuity during proper switch function.</b></p>
15. Loose or broken wire #14A from Lift/Lower toggle switch S13 to Machine Controller pin #P7-6. (Lift signal)	<p><b>Check continuity. Test for 12V supply voltage between wire #14A and wire #02.</b></p> <hr/> <p><b>Use HMI Diagnostic menu to ensure Input P7-6 signal is present.</b></p> <hr/> <p><b>Replace if defective.</b></p>
16. Loose or broken wire #13A from Lift/Lower toggle switch S13 to Machine Controller pin #P7-7. (Lower signal)	<p><b>Check continuity. Test for 12V supply voltage between wire #13A and wire #02.</b></p> <hr/> <p><b>Use HMI Diagnostic menu to ensure Input P7-7 signal is present.</b></p> <hr/> <p><b>Replace if defective.</b></p>
17. External or internal fault detected by Machine Controller.	<p><b>Check HMI Display screen. Use Diagnostic Menu to see switch and sensor status.</b></p> <hr/> <p><b>Correct trouble code as displayed. Replace module if defective.</b></p>



### 4.2-3 All Functions Inoperative from Platform

1. Display HMI is broadcasting an error message.	<b>Check HMI display screen and follow instructions to clear error.</b>
2. Loose or broken wire #7A from Off/Base/Platform Key switch S3 to Platform Emergency Stop switch S4.	<b>Check continuity. Test for 12V supply voltage between wire #7A and wire #02.</b> <b>Replace if defective.</b>
	<b>Close switch.</b>
3. Open or defective Platform Emergency Stop switch S4.	<b>Check continuity between wire #7A and wire #08 on switch.</b> <b>Test for 12V supply voltage between wire #08 and wire #02.</b> <b>Replace if defective.</b>
4. Loose or broken wire #08 from Platform Emergency Stop switch S4 to Terminal Board Module TBM screw #1.	<b>Check continuity. Test for 12V supply voltage between wire #08 and wire #02.</b> <b>Replace if defective.</b>
5. Loose or broken wire #08 from Terminal Board Module TBM screw #1 to Platform Select Relay 08CR.	<b>Check continuity. Test for 12V supply voltage between wire #08 and wire #02.</b> <b>Replace if defective.</b>
6. Loose or broken wire #08 from Platform Select Relay 08CR to Machine Controller pin #P7-4. (Platform Selected signal)	<b>Check continuity. Test for 12V supply voltage between wire #08 and wire #02.</b> <b>Use HMI Diagnostic menu to ensure Input P7-4 signal is present.</b> <b>Replace if defective.</b>
7. No Valve Supply Voltage from Terminal Board Module TBM from wire #5A on B+ bus bar.	<b>Defective Terminal Board Module TBM.</b> <b>See Section 5 Procedures for Terminal Board Module TBM Troubleshooting section.</b>
8. Loose or broken wire #5A from Terminal Board Module TBM screw B+ bus bar to Platform Select Relay 08CR.	<b>Check continuity. Test for 12V supply voltage between wire #5A and wire #02.</b> <b>Replace if defective.</b>
	<b>Check that Platform Select Relay 08CR is energized and functions when signal wire #08 from Terminal Board Module TBM screw #1 is powered.</b> <b>Test for 12V supply voltage between wire #08 and wire #02.</b>
9. Platform Select Relay 08CR is open or defective.	<b>Check continuity between wire #5A and wire #8A on the N.O. contact when the relay is energized.</b> <b>Test for 12V supply voltage between wire #8A and wire #02.</b> <b>Replace relay if defective.</b>

10. Loose or broken wire #8A from Platform Select Relay 08CR to Platform Horn switch S5 jumping to all switches including Lift/Off/Drive Selector switch S9.	<p><b>Check continuity. Test for 12V supply voltage between wire #8A and wire #02.</b></p> <hr/> <p><b>Replace if defective.</b></p>
11. Open or defective Lift/Off/Drive Selector switch S9.	<p><b>Select function with switch.</b></p> <hr/> <p><b>Check continuity between wire #8A and wire #09 on switch (Lift selected)</b></p> <hr/> <p><b>Check continuity between wire #8A and wire #12 on switch (Drive selected)</b></p> <hr/> <p><b>Test for 12V supply voltage between wire #09 or #12 and wire #02.</b></p> <hr/> <p><b>Replace switch if no continuity during correct switch function.</b></p>
12. Loose or broken wire #09 from Lift/Off/Drive Selector switch S9 to Machine Controller pin #P7-9. (Lift selected signal)	<p><b>Check continuity. Test for 12V supply voltage between wire #09 and wire #02.</b></p> <hr/> <p><b>Use HMI Diagnostic menu to ensure Input P7-9 signal is present.</b></p> <hr/> <p><b>Replace if defective.</b></p>
13. Loose or broken wire #12 from Lift/Off/Drive Selector switch S9 to Machine Controller pin #P7-10. (Drive selected signal)	<p><b>Check continuity. Test for 12V supply voltage between wire #12 and wire #02.</b></p> <hr/> <p><b>Use HMI Diagnostic menu to ensure Input P7-10 signal is present.</b></p> <hr/> <p><b>Replace if defective.</b></p>
14. External or internal fault detected by Machine Controller.	<p><b>Check HMI Display screen. Use Diagnostic Menu to see switch and sensor status.</b></p> <hr/> <p><b>Correct trouble code as displayed. Replace module if defective.</b></p>

#### 4.2-4 Engine Does Not Crank from Platform (Kubota Diesel D1305)

1. Display HMI is broadcasting an error message.	<p><b>Check HMI display screen and follow instructions to clear error.</b></p>
2. Loose or broken wire #8A from Platform Select Relay 08CR to Platform Horn switch S5 jumping to all switches including Engine Start/Glow Plug switch S6.	<p><b>Check continuity. Test for 12V supply voltage between wire #8A and wire #02.</b></p> <hr/> <p><b>Replace if defective.</b></p>

	<b>Operate switch.</b>
	<b>Check continuity between wire #8A and wire #32 (Start selected)</b>
3. Open or defective Engine Start/Glow Plug switch S6.	<b>Check continuity between wire #8A and wire #31 (Glow Plug selected)</b>
	<b>Test for 12V supply voltage between wire #32 or #31 and wire #02.</b>
	<b>Replace switch if no continuity during proper switch function.</b>
4. Loose or broken wire #32 from Engine Start/Glow Plug switch S6 to Engine Harness pin 1	<b>Check continuity. Test for 12V Supply voltage between wire #32 and wire #00 (B-) when operating switch.</b>
	<b>Replace if defective.</b>
5. Loose or broken wire #32 from Engine Harness pin 1 to Fusebox Starter Relay 32CR, Start Toggle switch, and Start Fuse F3.	<b>Check continuity. Replace if defective.</b>
6. Loose or broken wire #103 from Main Disconnect switch S1 to Engine Fusebox.	<b>Check for voltage supply between wire #103 and wire #00. Replace if defective.</b>
7. Defective Fuses F2, F3, F4, or F6.	<b>Check fuses. Replace if defective.</b>
8. Loose or broken wire #103B from Fuse F2 to Engine Fusebox Starter Relay 32CR.	<b>Check continuity. Replace if defective.</b>
9. Loose or broken wire #32A from Fuse F3 to Engine ECU Pin 21.	<b>Check continuity. Replace if defective.</b>
10. Loose or broken wire #103C from Fuse F4 to Engine ECU Pin 22.	<b>Check continuity. Replace if defective.</b>
11. Open or defective Diode D32.	<b>Test Diode. Replace if defective.</b>
12. Loose or broken wire #37 from Diode D32 to Fuse F6.	<b>Check continuity. Replace if defective.</b>
13. Loose or broken wire #37A from Fuse F6 to Alternator and Engine ECO Pin 44.	<b>Check continuity. Replace if defective.</b>
14. Loose or broken wire #232 from Engine Fusebox Starter Relay 32CR to Engine ECU pin 40.	<b>Check continuity. Replace if defective.</b>
	<b>Check that Engine Fusebox Starter Relay 32CR is energized and functions when signal wire #32 from Engine Harness is powered.</b>
15. Engine Fusebox Starter Relay 32CR is defective.	<b>Test for 12V supply voltage between wire #32 and wire #232.</b>
	<b>Check continuity between wire #103B and wire #32B on the N.O. contact when the relay is closed and energized.</b>
	<b>Replace relay if defective.</b>

16. Loose or broken wire #32B from Fusebox Stater Relay 32CR to Starter Motor Relay 32BCR.	<b>Check continuity. Replace if defective.</b>
17. Loose or broken wire #00 from Starter Motor Relay 32BCR to engine ground.	<b>Check continuity. Replace if defective.</b>
18. Loose or broken Large battery cable #103 from Main Disconnect switch S1 to Starter Contactor 32BCR.	<b>Check continuity. Replace if defective.</b>
19. Loose or broken Large battery cable #00 from Battery - (Neg) to Starter Contactor 32BCR.	<b>Check continuity. Replace if defective.</b>
20. Defective Starter Motor.	<b>Check Starter Motor. Repair or replace if defective.</b>

#### 4.2-5 Engine Does Not Crank from Platform (Kubota Dual Fuel DG972)

1. Display HMI is broadcasting an error message.	<b>Check HMI display screen and follow instructions to clear error.</b>
2. Loose or broken wire #8A from Platform Select Relay 08CR to Platform Horn switch S5 jumping to all switches including Engine Start switch S6.	<b>Check continuity. Test for 12V supply voltage between wire #8A and wire #02.</b> <b>Replace if defective.</b>
	<b>Operate switch.</b>
	<b>Check continuity between wire #8A and wire #32 (Start selected)</b>
3. Open or defective Engine Start switch S6.	<b>Test for 12V supply voltage between wire #32 and wire #02.</b> <b>Replace switch if no continuity during proper switch function.</b>
4. Loose or broken wire #32 from Engine Start switch S6 to Engine Harness pin 1.	<b>Check continuity. Test for 12V Supply voltage between wire #32 and wire #00 (B-) when operating switch.</b> <b>Replace if defective.</b>
5. Loose or broken wire #32 from Engine Harness pin 1 to Start Toggle switch, and Start Fuse F2.	<b>Check continuity. Replace if defective.</b>
6. Loose or broken wire #5A from Terminal Board Module TBM screw B+ bus bar to Engine Harness pin 4.	<b>Check continuity. Replace if defective.</b>
7. Loose or broken wire #5A from Engine Harness pin #4 to Engine Fuse F3, Start Toggle switch, Gas/Propane Selector Toggle switch, and Propane Relay 50ACR.	<b>Check continuity. Replace if defective.</b>
8. Defective Fuses F1, F2, or F3.	<b>Check fuses. Replace if defective.</b>
9. Loose or broken wire #1070 from Battery B+ thru Fuse F1 to Power Relay 1070CR.	<b>Check continuity. Replace if defective.</b>

10. Loose or broken supplied ground wire #1009 from Engine ECU pin 20 to Power Relay 1070CR.	<b>Check continuity. Replace if defective.</b>
	<b>Test for 12V supply voltage between wire #1070 and wire #1009.</b>
11. Power Relay 1070CR is open or defective.	<b>Check continuity between wire #1070 and wire #1060 on the N.O. contact when the relay is closed and energized.</b>
	<b>Replace relay if defective.</b>
12. Loose or broken wire #1060 from Power Relay 1070CR to ECU pin 10/11 and Starter Relay 1044ACR.	<b>Check continuity. Replace if defective.</b>
13. Loose or broken wire #32B from Fuse F2 to Engine ECU pin 9.	<b>Check continuity. Replace if defective.</b>
14. Loose or broken wire #1044 from Fuse F3 to Engine ECU pin 7 and to Diode D1044.	<b>Check continuity. Replace if defective.</b>
15. Open or defective Diode D1044.	<b>Test diode. Replace if defective.</b>
16. Loose or broken wire #1044A from Diode D1044 to Starter Relay 1044ACR.	<b>Check continuity. Replace if defective.</b>
17. Loose or broken supplied ground wire #1017 from Starter Relay 1044ACR to Engine ECU pin 19.	<b>Check continuity. Replace if defective.</b>
	<b>Test for 12V supply voltage between wire #1044A and wire #1017.</b>
18. Engine Starter Relay 1044ACR is open or defective.	<b>Check continuity between wire #1060 and wire #32A on the N.O. contact when the relay is closed and energized.</b>
	<b>Replace relay if defective.</b>
19. Loose or broken wire #32A from Starter Relay 1044ACR to Starter Motor Relay 32ACR.	<b>Check continuity. Replace if defective.</b>
20. Loose or broken wire #00 from Starter Motor Relay 32ACR to engine ground.	<b>Check continuity. Replace if defective.</b>
21. Loose or broken Large battery cable #103 from Main Disconnect switch S1 to Starter Contactor 32ACR.	<b>Check continuity. Replace if defective.</b>
22. Loose or broken Large battery cable #00 from Battery - (Neg) to Starter Contactor 32ACR.	<b>Check continuity. Replace if defective.</b>
23. Defective Starter Motor.	<b>Check Starter Motor. Repair or replace if defective.</b>

### 4.2-6 Engine Does Not Crank from Base Controls

1. Display HMI is broadcasting an error message.	Check HMI display screen and follow instructions to clear error.
2. Loose or broken wire #5A from Terminal Board Module TBM screw B+ bus bar to Base Engine Start switch S16.	Check continuity. Replace if defective.
	Operate switch.
	Check continuity between wire #5A and wire #32 on switch. (Start signal)
3. Defective Base Start switch S16.	Check continuity between wire #5A and wire #31 on switch. (Glow Plug signal-Diesel only)
	Test for 12V supply voltage between wire #32 or 31 and wire #02.
	Replace switch if defective.
4. Loose or broken wire #32 from Base Start switch to Engine Harness pin 1.	Check continuity. Test for 12V Supply voltage between wire #32 and wire #00 (B-) when operating switch.
	Replace if defective.
5. Check from step 5 on, in previous sections for Not Cranking from Platform for applicable Engine (Diesel or Dual Fuel).	

### 4.2-7 Glow Plugs Inoperative from Base (Kubota Diesel D1305)

1. Display HMI is broadcasting an error message.	Check HMI display screen and follow instructions to clear error.
2. Loose or broken wire #5A from Terminal Board Module TBM screw B+ bus bar to Base Engine Start switch S16.	Check continuity. Replace if defective.
	Operate switch.
	Check continuity between wire #5A and wire #32 on switch. (Start signal)
3. Defective Base Start switch S16.	Check continuity between wire #5A and wire #31 on switch. (Glow Plug signal)
	Test for 12V supply voltage between wire #32 or 31 and wire #02.
	Replace switch if defective.
4. Loose or broken wire #31 from Base Start switch S16 to Engine Harness pin 2.	Check continuity. Replace if defective.



5. Loose or broken wire #31 from Engine Harness pin 2 to Fuse F5.	<b>Check continuity. Replace if defective.</b>
6. Loose or broken wire #103 from Main Battery Disconnect switch S1 to Fuse F2.	<b>Check continuity. Replace if defective.</b>
7. Defective Fuse F2 and/or F5.	<b>Check fuses. Replace if defective.</b>
8. Loose or broken wire #31A from Fuse F5 to Engine ECU pin 42.	<b>Check continuity. Replace if defective.</b>
9. Loose or broken wire #103B from fuse F2 to Engine Fusebox Glow Plug Relay 31BCR.	<b>Check continuity. Replace if defective.</b>
10. Loose or broken wire #31B from Engine ECU pin 39 to Glow Plug Relay 31BCR.	<b>Check continuity. Replace if defective.</b>
11. Loose or broken wire #00 from Glow Plug Relay 31BCR to engine ground.	<b>Check continuity. Replace if defective.</b>
	<b>Check that Engine Fusebox Glow Plug Relay 31BCR is energized and functions when signal wire #31B from Engine ECU is powered.</b>
12. Engine Fusebox Glow Plug Relay 31BCR defective.	<b>Test for 12V supply voltage between wire #31B and wire #00.</b>
	<b>Check continuity between wire #103B and wire #31C on the N.O. contact when the relay is closed and energized.</b>
	<b>Replace relay if defective..</b>
13. . Loose or broken wire #31C from Glow Plug Relay 31BCR to Engine Glow Plugs EGP1.	<b>Check continuity. Replace if defective.</b>
14. Defective Glow Plugs EGP1.	<b>Check glow plugs. Replace if defective.</b>

#### 4.2-8 Glow Plugs Inoperative from Platform (Kubota Diesel D1305)

1. Display HMI is broadcasting an error message.	<b>Check HMI display screen and follow instructions to clear error.</b>
2. Loose or broken wire #8A from Platform Select Relay 08CR to Glow Plug switch S6.	<b>Check continuity. Replace if defective.</b>
	<b>Operate switch.</b>
	<b>Check continuity between wire #8A and wire #31 on switch. (Glow Plug select)</b>
3. Defective Glow Plug switch S6.	<b>Test for 12V supply voltage between wire #31 and wire #02.</b>
	<b>Replace if defective.</b>
4. Loose or broken wire #31 from Glow Plug switch S6 to Engine Harness pin 2	<b>Check continuity. Replace if defective.</b>

5. Check from step 5 on, in previous section for Glow Plugs Inoperative from Base.

#### 4.2-9 Engine Cranks but Does Not Start (Kubota Diesel D1305)

1. Display HMI is broadcasting an error message.	<b>Check HMI display screen and follow instructions to clear error.</b>
2. Loose or broken wire #37 from Machine Controller pin #P4-2 to Engine Harness pin 3. (Alternator Excite Output signal).	<b>Check continuity. Use HMI Diagnostic menu to ensure Input P4-2 signal is present.</b> <b>Replace if defective.</b>
3. Loose or broken wire #37 from Engine Harness to Fuse F6.	<b>Check continuity. Replace if defective.</b>
4. Defective Fuse F6.	<b>Test fuse. Replace if defective.</b>
5. Loose or broken wire #37A from Fuse F6 to Alternator Ignition and Engine ECU pin 44.	<b>Check continuity. Replace if defective.</b>
6. Loose or broken wire #2005 from Alternator Ignition to Engine ECU pin 8.	<b>Check continuity. Replace if defective.</b>
7. Defective Glow Plug circuit.	<b>See Glow Plugs Inoperative in above sections. Repair if necessary.</b>
8. Defective Fuel Delivery system.	<b>See Engine Repair guide.</b>

#### 4.2-10 Engine Cranks but Does Not Start (Kubota Dual Fuel WG972)



#### **NOTE**

For additional engine troubleshooting refer to diagnostic trouble codes for use with the engine diagnostic display.

#### Fuel Related Problems (Gasoline Only)

1. Display HMI is broadcasting an error message.	<b>Check HMI display screen and follow instructions to clear error.</b>
2. Loose or broken wire #37 from Machine Controller pin #P4-2 to Engine Harness pin 3. (Alternator Excite Output signal).	<b>Check continuity. Use HMI Diagnostic menu to ensure Input P4-2 signal is present.</b> <b>Replace if defective.</b>
3. Loose or broken wire #37 from Engine Harness pin 3 to Alternator Ignition.	<b>Check continuity. Replace if defective.</b>
4. Loose or broken wire #1070 from Battery + thru Fuse F1 to Power Relay 1070CR.	<b>Check Fuse F1 and wire continuity. Replace if defective.</b>
5. Loose or broken wire #3002 from ECU pin 12 to Fuel Pump.	<b>Check continuity. Replace if defective.</b>
6. Loose or broken wire #1060 from ECU pin 10/11 to Fuel Pump, Pre O2 Sensor, ETV Relay 1060CR, and Power Relay 1070CR.	<b>Check continuity. Replace if defective.</b>

7. Loose or broken wire #1009 from ECU pin 20 to Power Relay 1070CR.	<b>Check continuity. Replace if defective.</b>
	<b>Check that Engine Fusebox Power Relay 1070CR is energized and functions when signal wire #1070 from Fuse F1 is powered.</b>
8. Defective Power Relay 1070CR.	<b>Test for 12V supply voltage between wire #1070 and wire #1009.</b>
	<b>Check continuity between wire #1070 and wire #1060 on the N.O. contact when the relay is closed and energized.</b>
	<b>Replace relay if defective..</b>
9. Loose or broken wire #1008 from ECU pin 6 to ETV Relay 1060CR.	<b>Check continuity. Replace if defective.</b>
10. Defective Electronic Throttle Valve (ETV) Relay 1060CR.	<b>Check that Engine ETV Relay 1060CR is energized and functions when signal wire #1060 from 1070CR Power Relay is powered.</b>
	<b>Test for 12V supply voltage between wire #1060 and wire #1008.</b>
	<b>Check continuity between wire #1005 and wire #1060 on the N.O. contact when the relay is closed and energized.</b>
	<b>Replace relay if defective.</b>
11. Loose or broken wire #1005 from ETV Relay 1060CR to ECU pin 5.	<b>Check continuity. Replace if defective.</b>
12. Defective Ignition System.	<b>Check Spark plugs and refer to Engine Repair guide.</b>

### Fuel Related Problems (Propane LPG Only)



#### NOTE

*The default setting for the fuel select switch is Gasoline. If the system malfunctions with propane fuel selected, the system switches over to gasoline as long as that system is working properly. Disconnect fuel pump to test propane side.*

1. Loose or broken wire #5A from Terminal Board Module TBM screw B+ bus bar to Engine Harness pin 4.	<b>Check continuity. Replace if defective.</b>
2. Loose or broken wire #5A from Engine Harness pin 4 to Gas/Propane Toggle switch, and LPG Relay 50ACR.	<b>Check continuity. Replace if defective.</b>
3. Loose or broken wire #50 from Gas/Propane Toggle switch to ECU pin 31.	<b>Check continuity. Replace if defective.</b>

4. Loose or broken supplied ground wire #50A from ECU pin 41 to LPG Relay 50ACR.	<b>Check continuity. Replace if defective.</b>
	<b>Check that LPG Relay 50ACR is energized and functions when signal wire #5A is powered.</b>
	<b>Test for 12V supply voltage between wire #5A and wire #50A.</b>
5. Defective LPG Relay 50ACR.	<b>Check continuity between wire #5A and wire #50B on the N.O. contact when the relay is closed and energized.</b>
	<b>Replace relay if defective.</b>
6. Loose or broken wire #50B from LPG Relay 50ACR to LPG Cut-Off solenoid.	<b>Check continuity. Replace if defective.</b>
7. Loose or broken wire #00 from LPG Cut-Off solenoid to Engine ground.	<b>Check continuity. Replace if defective.</b>
8. Defective LPG C/D solenoid.	<b>Check solenoid. Replace if defective.</b>
9. Defective Ignition System.	<b>Check Spark plugs and refer to Engine Repair guide.</b>

#### 4.2-11 Drive and Steer Inoperative

1. Display HMI is broadcasting an error message.	<b>Check HMI display screen and follow instructions to clear error.</b>
	<b>Fully retract outrigger cylinders.</b>
	<b>Loose or broken wire #61 from all Outrigger retracted limit switches (in series) to Machine Controller pin #P14-6. (Outriggers retracted signal)</b>
	<b>Check continuity through all retracted limit switches (LS1, LS2, LS3, and LS4).</b>
2. Outriggers not fully retracted (if equipped).	<b>Test for 12V supply voltage between wire #61 on terminal strip and wire #02.</b>
	<b>Use HMI Diagnostic menu to ensure Input P14-6 signal is present.</b>
	<b>Replace if defective.</b>
3. Loose or broken wire #8A from Platform Select Relay 08CR to Platform Horn switch S5 jumping to all switches including Lift/Off/Drive Selector switch S9.	<b>Check continuity. Test for 12V supply voltage between wire #8A and wire #02.</b>
	<b>Replace if defective.</b>

	<b>Select Drive. Check switch.</b>
4. Lift/Off/Drive switch S9 is set to an incorrect mode or is defective.	<b>Check continuity between wire #8A and wire #12 on switch when Drive mode is selected. Test for 12V supply voltage between wire #12 and wire #02 when operating switch.</b>
	<b>Replace if defective.</b>
5. Loose or broken wire #12 from Lift/Off/Drive switch S9 to Machine Controller pin #P7-10. (Drive selected signal).	<b>Check continuity. Test for 12V supply voltage between wire #12 and wire #02.</b>
	<b>Use HMI Diagnostic menu to ensure Input P7-10 signal is present.</b>
	<b>Replace if defective.</b>
6. Loose or broken wire #8A from Platform Select Relay 08CR to Joystick A1 pin P1.	<b>Check continuity. Test for 12V supply voltage between wire #8A and wire #2C on Joystick pin 2.</b>
	<b>Replace if defective.</b>
7. Defective Joystick A1.	<b>Operate Joystick Enable switch S10. Check continuity between wire #8A and wire #19 on switch.</b>
	<b>Test for 12V supply voltage between wire #19 and wire #2C on Joystick when operating switch.</b>
	<b>Operate Steer Right switch S11. Check continuity between wire #8A and wire #23A on switch.</b>
	<b>Operate Steer Left switch S12. Check continuity between wire #8A and wire #24A on switch.</b>
	<b>Replace Joystick switches if defective.</b>
8. Loose or broken wire #2C from Machine Controller pin #P8-15 to Joystick A1 pin P2 (0V reference signal).	<b>Check continuity. Replace if defective.</b>
9. "Loose or broken wire #59 from Joystick A1 pin P6 to Machine Controller pin #P8-1 (Analog Proportional Output signal)."	<b>Check continuity.</b>
	<b>Use HMI Diagnostic menu to ensure Input P8-1 signal is present.</b>
	<b>Replace if defective.</b>
10. Loose or broken wire #19 from Joystick Enable switch S10 to Machine Controller pin #P7-11. (Enable signal)	<b>Check continuity. Test for 12V supply voltage between wire #19 and wire #02.</b>
	<b>Use HMI Diagnostic menu to ensure Input P7-11 signal is present.</b>
	<b>Replace if defective.</b>

11. Loose or broken wire #19 from Joystick Enable switch S10 to Machine Controller pin #P7-11. (Enable signal)	Check continuity. Test for 12V supply voltage between wire #19 and wire #02.
	Use HMI Diagnostic menu to ensure Input P7-11 signal is present.
	Replace if defective.
12. Loose or broken wire #23 from Joystick Steer Right switch S11 to Machine Controller pin #P15-2. (Steer Right request signal)	Check continuity. Test for 12V supply voltage between wire #23 and wire #02.
	Use HMI Diagnostic menu to ensure Input P15-2 signal is present.
	Replace if defective.
13. Loose or broken wire #24 from Joystick Steer Left switch S12 to Machine Controller pin #P15-1. (Steer Left request signal)	Check continuity. Test for 12V supply voltage between wire #24 and wire #02.
	Use HMI Diagnostic menu to ensure Input P15-1 signal is present.
	Replace if defective.
14. External or internal fault detected by Machine Controller.	Check HMI Display screen. Use Diagnostic Menu to see switch and sensor status.
	Correct trouble code as displayed. Replace module if defective.

#### 4.2-12 Brakes Do Not Release

1. Display HMI is broadcasting an error message.	Check HMI display screen and follow instructions to clear error.
2. Loose or broken wire #30 from Machine Controller pin #P5-11 to Brake Valve 3H-30.	Check continuity. Test for 12V supply voltage between wire #30 and wire #02 on valve.
	Use HMI Diagnostic menu to ensure Output P5-11 signal is present.
	Replace if defective.
3. Loose or broken wire #02 to Brake Valve coil 3H-30 from Terminal Board Module TBM screw B- bus bar.	Check continuity. Replace if defective.
4. Defective Brake Valve coil 3H-30.	Check continuity through coil. Replace if defective.
5. External or internal fault detected by Machine Controller.	Check HMI Display screen. Use Diagnostic Menu to see Output status.
	Correct trouble code as displayed. Replace module if defective.



### 4.2-13 Steer Right Inoperative

1. Display HMI is broadcasting an error message.	Check HMI display screen and follow instructions to clear error.
2. Loose or broken wire #8A from Platform Select Relay 08CR to Platform Horn switch S5 jumping to all switches including Lift/Off/Drive Selector switch S9.	Check continuity. Test for 12V supply voltage between wire #8A and wire #02. Replace if defective.
3. Lift/Off/Drive switch S9 is set to an incorrect mode.	Select Drive. Check switch. Check continuity between wire #8A and wire #12 on switch when Drive mode is selected. Test for 12V supply voltage between wire #12 and wire #02 when operating switch. Replace if defective.
4. Loose or broken wire #12 from Lift/Off/Drive switch S9 to Machine Controller pin #P7-10. (Drive selected signal).	Check continuity. Test for 12V supply voltage between wire #12 and wire #02. Use HMI Diagnostic menu to ensure Input P7-10 signal is present. Replace if defective.
5. Loose or broken wire #8A from Platform Select Relay 08CR to Joystick Enable switch S10.	Check continuity. Test for 12V supply voltage between wire #8A and wire #02. Replace if defective.
6. Defective Joystick Enable switch S10.	Operate Enable switch S10. Check continuity between wire #8A and wire #19 on switch. Test for 12V supply voltage between wire #19 and wire #2C on Joystick when operating switch. Replace if defective.
7. Loose or broken wire #19 from Joystick Enable switch S10 to Machine Controller pin #P7-11. (Enable signal)	Check continuity. Test for 12V supply voltage between wire #19 and wire #02. Use HMI Diagnostic menu to ensure Input P7-11 signal is present. Replace if defective.
8. Loose or broken wire #8A from Platform Select Relay 08CR to Steer Right switch S11.	Check continuity. Test for 12V supply voltage between wire #8A and wire #2C on Joystick. Replace if defective.
9. Defective Steer Right switch S11 in Joystick A1.	Operate switch. Check continuity. Test for 12V Supply voltage between wire #23A and wire #2C on Joystick when switch is closed. Replace if defective.

10. Loose or broken wire #23A from Steer Right switch S11 to Machine Controller pin #P15-2. (Steer Right signal)	Check continuity. Test for 12V supply voltage between wire #23A and wire #02.
	Use HMI Diagnostic menu to ensure Input P15-2 signal is present.
	Replace if defective.
11. Loose or broken wire #23 from Machine Controller P5-8 to Steer Right Valve coil 4H-23.	Check continuity. Test for 12V supply voltage between wire #23 and wire #02.
	Use HMI Diagnostic menu to ensure Output P5-8 signal is present.
	Replace if defective.
12. Loose or broken wire #02 to Steer Right Valve coil 4H-23 from Terminal Board Module TBM screw B- bus bar.	Check continuity. Replace if defective.
13. Defective Steer Right Valve coil 4H-23.	Check continuity through coil. Replace if defective.
14. External or internal fault detected by Machine Controller.	Check HMI Display screen. Use Diagnostic Menu to see Output status.
	Correct trouble code as displayed. Replace module if defective.

#### 4.2-14 Steer Left Inoperative

1. Display HMI is broadcasting an error message.	Check HMI display screen and follow instructions to clear error.
2. Loose or broken wire #8A from Platform Select Relay 08CR to Platform Horn switch S5 jumping to all switches including Lift/Off/Drive Selector switch S9.	Check continuity. Test for 12V supply voltage between wire #8A and wire #02.
	Replace if defective.
3. Lift/Off/Drive switch S9 is set to an incorrect mode.	Select Drive. Check switch.
	Check continuity between wire #8A and wire #12 on switch when Drive mode is selected.
	Test for 12V supply voltage between wire #12 and wire #02 when operating switch.
	Replace if defective.
4. Loose or broken wire #12 from Lift/Off/Drive switch S9 to Machine Controller pin #P7-10. (Drive selected signal).	Check continuity. Test for 12V supply voltage between wire #12 and wire #02.
	Use HMI Diagnostic menu to ensure Input P7-10 signal is present.
	Replace if defective.

5. Loose or broken wire #12 from Lift/Off/Drive switch S9 to Machine Controller pin #P7-10. (Drive selected signal).	<b>Check continuity. Test for 12V supply voltage between wire #12 and wire #02.</b>
	<b>Use HMI Diagnostic menu to ensure Input P7-10 signal is present.</b>
	<b>Replace if defective.</b>
6. Loose or broken wire #8A from Platform Select Relay 08CR to Joystick Enable switch S10.	<b>Check continuity. Test for 12V supply voltage between wire #8A and wire #02.</b>
	<b>Replace if defective.</b>
7. Defective Joystick Enable switch S10.	<b>Operate Enable switch S10. Check continuity between wire #8A and wire #19 on switch.</b>
	<b>Test for 12V supply voltage between wire #19 and wire #2C on Joystick when operating switch.</b>
	<b>Replace if defective.</b>
8. Loose or broken wire #19 from Joystick Enable switch S10 to Machine Controller pin #P7-11. (Enable signal)	<b>Check continuity. Test for 12V supply voltage between wire #19 and wire #02.</b>
	<b>Use HMI Diagnostic menu to ensure Input P7-11 signal is present.</b>
	<b>Replace if defective.</b>
9. Loose or broken wire #8A from Platform Select Relay 08CR to Steer Left switch S12.	<b>Check continuity. Test for 12V supply voltage between wire #8A and wire #02.</b>
	<b>Replace if defective.</b>
10. Defective Steer Left switch S12 in Joystick A1.	<b>Operate switch. Check continuity.</b>
	<b>Test for 12V Supply voltage between wire #24A and wire #2C on Joystick when switch is closed.</b>
	<b>Replace if defective.</b>
11. Loose or broken wire #24A from Steer Right switch S11 to Machine Controller pin #P15-1. (Steer Right request signal)	<b>Check continuity. Test for 12V supply voltage between wire #24A and wire #02.</b>
	<b>Use HMI Diagnostic menu to ensure Input P15-1 signal is present.</b>
	<b>Replace if defective.</b>
12. Loose or broken wire #24 from Machine Controller P5-7 to Steer Left Valve coil 4H-23.	<b>Check continuity. Test for 12V supply voltage between wire #24 and wire #02</b>
	<b>Use HMI Diagnostic menu to ensure Output P5-7 signal is present.</b>
	<b>Replace if defective.</b>
13. Loose or broken wire #02 to Steer Left Valve coil 4H-24 from Terminal Board Module TBM screw B- bus bar.	<b>Check continuity. Replace if defective.</b>

14. Loose or broken wire #02 to Steer Left Valve coil 4H-24 from Terminal Board Module TBM screw B- bus bar.	<b>Check continuity. Replace if defective.</b>
15. Defective Steer Left Valve coil 4H-24.	<b>Check continuity through coil. Replace if defective.</b>
16. External or internal fault detected by Machine Controller.	<b>Check HMI Display screen. Use Diagnostic Menu to see Output status.</b> <b>Correct trouble code as displayed. Replace module if defective.</b>

#### 4.2-15 Reverse Drive Inoperative

1. Display HMI is broadcasting an error message.	<b>Check HMI display screen and follow instructions to clear error.</b>
2. Outriggers not fully retracted (if equipped).	<b>Fully retract outrigger cylinders. Loose or broken wire #61 from all Outrigger retracted limit switches (in series) to Machine Controller pin #P14-6. (Outriggers retracted signal)</b> <b>Check continuity through all retracted limit switches (LS1, LS2, LS3, and LS4).</b> <b>Test for 12V supply voltage between wire #61 on terminal strip and wire #02.</b> <b>Use HMI Diagnostic menu to ensure Input P14-6 signal is present.</b> <b>Replace if defective.</b>
3. Loose or broken wire #8A from Platform Select Relay 08CR to Platform Horn switch S5 jumping to all switches including Lift/Off/Drive Selector switch S9.	<b>Check continuity. Test for 12V supply voltage between wire #8A and wire #02.</b> <b>Replace if defective.</b>
4. Lift/Off/Drive switch S9 is set to an incorrect mode.	<b>Select Drive. Check switch.</b> <b>Check continuity between wire #8A and wire #12 on switch when Drive mode is selected. Test for 12V supply voltage between wire #12 and wire #02 when operating switch.</b> <b>Replace if defective.</b>
5. Loose or broken wire #12 from Lift/Off/Drive switch S9 to Machine Controller pin #P7-10. (Drive selected signal).	<b>Check continuity. Test for 12V supply voltage between wire #12 and wire #02.</b> <b>Use HMI Diagnostic menu to ensure Input P7-10 signal is present.</b> <b>Replace if defective.</b>
6. Loose or broken wire #8A from Platform Select Relay 08CR to Joystick Enable switch S10.	<b>Check continuity. Test for 12V supply voltage between wire #8A and wire #02.</b> <b>Replace if defective.</b>

7. Defective Joystick Enable switch S10.	Operate Enable switch S10. Check continuity between wire #8A and wire #19 on switch.
	Test for 12V supply voltage between wire #19 and wire #2C on Joystick when operating switch.
	Replace if defective.
8. Loose or broken wire #19 from Joystick Enable switch S10 to Machine Controller pin #P7-11. (Enable signal)	Check continuity. Test for 12V supply voltage between wire #19 and wire #02.
	Use HMI Diagnostic menu to ensure Input P7-11 signal is present.
	Replace if defective.
9. Loose or broken wire #2C from Machine Controller pin #P8-15 to Joystick A1 pin 2 (0V reference signal).	Check continuity. Replace if defective.
10. Loose or broken wire #59 from Joystick A1 to Machine Controller pin #P8-1 (Analog Proportional Output signal).	Check continuity.
	Use HMI Diagnostic menu to ensure Input P8-1 signal is present.
	Replace if defective.
11. Loose or broken twisted pair CANbus communication cable from Machine Controller pin #P1-1 and P1-2 to Valve Current Control Module VCCM pin #P12-1 and P12-2 respectively.	Check continuity of CanH and CanL wires.
12. Valve Current Control Module VCCM not powered up or defective.	Check continuity of wire #5A from TBM B+ bus bar to Circuit Breaker CB3 and reset circuit breaker.
	Check continuity of wire #5B on VCCM P11-1 from Circuit Breaker CB3.
	Check continuity of wire #02 on VCCM P11-2 from Terminal Board Module TBM screw B- bus
	Test for 12V supply voltage to VCCM between wire #5B and wire #02 on VCCM.
	Replace if defective.
13. Loose or broken wires from Valve Current Control Module VCCM pin P2-1 and P2-2 to Reverse Drive Valve coil 3H-15.	Check continuity.
	Test for 0-12V analog proportional supply voltage between P2-1 and P2-2 on VCCM.
	Use HMI Diagnostic menu to ensure Output signal is present.
	Replace if defective.
14. Defective Proportional Reverse Valve coil 3H-15.	Check coil. Replace if defective.



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|--|---|
| 15. External or internal fault detected by Machine Controller. | <p><b>Check HMI Display screen. Use Diagnostic Menu to see Output status.</b></p> <p><b>Correct trouble code as displayed. Replace module if defective.</b></p> |
|--|---|

#### 4.2-16 Forward Drive Inoperative

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|---|---|
| 1. Display HMI is broadcasting an error message.  | <p><b>Check HMI display screen and follow instructions to clear error.</b></p>  |
| 2. Outriggers not fully retracted (if equipped).  | <p><b>Fully retract outrigger cylinders. Loose or broken wire #61 from all Outrigger retracted limit switches (in series) to Machine Controller pin #P14-6. (Outriggers retracted signal)</b></p> <p><b>Check continuity through all retracted limit switches (LS1, LS2, LS3, and LS4).</b></p> <p><b>Test for 12V supply voltage between wire #61 on terminal strip and wire #02.</b></p> <p><b>Use HMI Diagnostic menu to ensure Input P14-6 signal is present.</b></p> <p><b>Replace if defective.</b></p> |
| 3. Loose or broken wire #8A from Platform Select Relay 08CR to Platform Horn switch S5 jumping to all switches including Lift/Off/Drive Selector switch S9. | <p><b>Check continuity. Test for 12V supply voltage between wire #8A and wire #02.</b></p> <p><b>Replace if defective.</b></p>  |
| 4. Lift/Off/Drive switch S9 is set to an incorrect mode.  | <p><b>Select Drive. Check switch.</b></p> <p><b>Check continuity between wire #8A and wire #12 on switch when Drive mode is selected. Test for 12V supply voltage between wire #12 and wire #02 when operating switch.</b></p> <p><b>Replace if defective.</b></p>  |
| 5. Loose or broken wire #12 from Lift/Off/Drive switch S9 to Machine Controller pin #P7-10. (Drive selected signal).  | <p><b>Check continuity. Test for 12V supply voltage between wire #12 and wire #02.</b></p> <p><b>Use HMI Diagnostic menu to ensure Input P7-10 signal is present.</b></p> <p><b>Replace if defective.</b></p>   |
| 6. Loose or broken wire #8A from Platform Select Relay 08CR to Joystick Enable switch S10.  | <p><b>Check continuity. Test for 12V supply voltage between wire #8A and wire #02.</b></p> <p><b>Replace if defective.</b></p>  |

7. Defective Joystick Enable switch S10.	Operate Enable switch S10. Check continuity between wire #8A and wire #19 on switch.
	Test for 12V supply voltage between wire #19 and wire #2C on Joystick when operating switch.
	Replace if defective.
8. Loose or broken wire #19 from Joystick Enable switch S10 to Machine Controller pin #P7-11. (Enable signal)	Check continuity. Test for 12V supply voltage between wire #19 and wire #02.
	Use HMI Diagnostic menu to ensure Input P7-11 signal is present.
	Replace if defective.
9. Loose or broken wire #2C from Machine Controller pin #P8-15 to Joystick A1 pin 2 (0V reference signal).	Check continuity. Replace if defective.
10. Loose or broken wire #59 from Joystick A1 to Machine Controller pin #P8-1 (Analog Proportional Output signal).	Check continuity.
	Use HMI Diagnostic menu to ensure Input P8-1 signal is present.
	Replace if defective.
11. Loose or broken twisted pair CANbus communication cable from Machine Controller pin #P1-1 and P1-2 to Valve Current Control Module VCCM pin #P12-1 and P12-2 respectively.	Check continuity of CanH and CanL wires.
12. Valve Current Control Module VCCM not powered up or defective.	Check continuity of wire #5A from TBM B+ bus bar to Circuit Breaker CB3 and reset circuit breaker.
	Check continuity of wire #5B on VCCM P11-1 from Circuit Breaker CB3.
	Check continuity of wire #02 on VCCM P11-2 from Terminal Board Module TBM screw B-
	Test for 12V supply voltage to VCCM between wire #5B and wire #02 on VCCM.
	Replace if defective.
13. Loose or broken wires from Valve Current Control Module VCCM pin P1-1 and P1-2 to Forward Drive Valve coil 3H-16.	Check continuity.
	Test for 0-12V analog proportional supply voltage between P1-1 and P1-2 on VCCM.
	Use HMI Diagnostic menu to ensure Output signal is present.
	Replace if defective.
14. Defective Proportional Forward Valve coil 3H-16.	Check coil. Replace if defective.

15. External or internal fault detected by Machine Controller.

**Check HMI Display screen. Use Diagnostic Menu to see Output status.**

**Correct trouble code as displayed. Replace module if defective.**

#### 4.2-17 High Speed/High Torque/Hill Climb Range Inoperative

1. Display HMI is broadcasting an error message.

**Check HMI display screen and follow instructions to clear error.**

2. Loose or broken wire #8A from Platform Select Relay 08CR to Platform Horn switch S5 jumping to all switches including Lift/Off/Drive Selector switch S9.

**Check continuity. Test for 12V supply voltage between wire #8A and wire #02.**

**Replace if defective.**

3. Lift/Off/Drive switch S9 is set to an incorrect mode.

**Select Drive. Check switch.**

**Check continuity between wire #8A and wire #12 on switch when Drive mode is selected. Test for 12V supply voltage between wire #12 and wire #02 when operating switch.**

**Replace if defective.**

4. Loose or broken wire #12 from Lift/Off/Drive switch S9 to Machine Controller pin #P7-10. (Drive selected signal).

**Check continuity. Test for 12V supply voltage between wire #12 and wire #02.**

**Use HMI Diagnostic menu to ensure Input P7-10 signal is present.**

**Replace if defective.**

5. Loose or broken wire #8A from Platform Select Relay 08CR to Platform Horn switch S5 jumping to all switches including High Speed/High Torque/Hill Climb switch S8.

**Check continuity. Test for 12V supply voltage between wire #8A and wire #02.**

**Replace if defective.**

6. Defective High Speed/High Torque/Hill Climb switch S8.

**Operate Torque switch S8. Check continuity between wire #8A and wire #20 and 20A when operating switch.**

**Test for no continuity to either wire from 8A when in the Center off position (High Speed Mode).**

**Test for 12V supply voltage between wire #20 and wire #02 when operating switch. (High Torque Mode).**

**Test for 12V supply voltage between wire #20A and wire #02 when operating switch. (Hill Climb Mode).**

**Replace if defective.**

7. Loose or broken wire #20 from Torque switch S8 to Machine Controller pin #P7-13. (High Torque request signal)	<b>Check continuity. Test for 12V supply voltage between wire #20 and wire #02.</b>
	<b>Use HMI Diagnostic menu to ensure Input P7-13 signal is present.</b>
	<b>Replace if defective.</b>
8. Loose or broken wire #20A from Torque switch S8 to Machine Controller pin #P7-14. (Hill Climb request signal)	<b>Check continuity. Test for 12V supply voltage between wire #20A and wire #02.</b>
	<b>Use HMI Diagnostic menu to ensure Input P7-14 signal is present.</b>
	<b>Replace if defective.</b>
9. Loose or broken wire #20B from Machine Controller P4-6 to 2-Speed Motor Valve coil 3H-20B (SJ9233/43/53 RT) or 2H-20B (SJ9664 RT).	<b>Check continuity. Test for 12V supply voltage between wire #20B and wire #02</b>
	<b>Use HMI Diagnostic menu to ensure Output P4-6 signal is present.</b>
	<b>Replace if defective.</b>
10. Loose or broken wire #02 to 2-Speed Motor Valve coil 3H-20B (SJ9233/43/53 RT) or 2H-20B (SJ9664 RT) from Terminal Board Module TBM screw B- bus bar.	<b>Check continuity. Replace if defective.</b>
11. Defective 2-Speed Motor Valve coil 3H-20B (SJ9233/43/53 RT) or 2H-20B (SJ9664 RT).	<b>Check continuity through coil. Replace if defective.</b>
12. External or internal fault detected by Machine Controller.	<b>Check HMI Display screen. Use Diagnostic Menu to see Output status.</b>
	<b>Correct trouble code as displayed. Replace module if defective.</b>

#### 4.2-18 Differential Lock will not Engage

1. Display HMI is broadcasting an error message.	<b>Check HMI display screen and follow instructions to clear error.</b>
2. Loose or broken wire #8A from Platform Select Relay 08CR to Platform Horn switch S5 jumping to all switches including Outrigger/Off/Diff Lock switch S7.	<b>Check continuity. Test for 12V supply voltage between wire #8A and wire #02.</b>
	<b>Replace if defective.</b>
	<b>Replace if defective.</b>
	<b>Select Diff Lock. Check switch.</b>
3. Outrigger/Off/Diff Lock switch S7 is set to an incorrect mode.	<b>Check continuity between wire #8A and wire #165 on switch when Diff Lock mode is selected. Test for 12V supply voltage between wire #165 and wire #02 when operating switch.</b>
	<b>Replace if defective.</b>

4. Loose or broken wire #165 from Diff Lock switch S7 to Machine Controller pin #P7-8. (Diff Lock request signal)	Check continuity. Test for 12V supply voltage between wire #165 and wire #02.
	Use HMI Diagnostic menu to ensure Input P7-8 signal is present.
	Replace if defective.
5. Loose or broken wire #165A from Machine Controller P5-10 to Diff Lock Valve coil 3H-165A.	Check continuity. Test for 12V supply voltage between wire #165A and wire #02
	Use HMI Diagnostic menu to ensure Output P5-10 signal is present.
	Replace if defective.
6. Loose or broken wire #02 to Diff Lock Valve coil 3H-165A from Terminal Board Module TBM screw B- bus bar.	Check continuity. Replace if defective.
7. Defective Diff Lock Valve coil 3H-165A.	Check continuity through coil. Replace if defective.
8. External or internal fault detected by Machine Controller.	Check HMI Display screen. Use Diagnostic Menu to see Output status.
	Correct trouble code as displayed. Replace module if defective.

#### 4.2-19 Lift (Up) Circuit Inoperative from Platform (no Outriggers)

1. Display HMI is broadcasting an error message.	Check HMI display screen and follow instructions to clear error.
	Check machine limits and reduce weight as required.
	SJ9233/43/53 RT - Check Pressure Transducer PT1 and Angle Transducers AT1 functionality.
2. Machine overloaded and Overload Lights PL1 and PL2 on Emergency Stop buttons flashing.	SJ9664 RT - Check Load Cell Interface and Angle Transducers AT1 functionality.
	Check wire #60A from Machine Controller pin #P4-9. (Overloaded signal)
	Use HMI Diagnostic menu to ensure Output P4-9 signal is not present indicating an Overload condition.
3. Machine not level.	Move machine and ONLY use on level surface.
4. Loose or broken wire #8A from Platform Select Relay 08CR to Platform Horn switch S5 jumping to all switches including Lift/Off/Drive Selector switch S9.	Check continuity. Test for 12V supply voltage between wire #8A and wire #02.
	Replace if defective.



5. Lift/Off/Drive switch S9 is set to an incorrect mode.	<p><b>Select Lift. Check switch.</b></p> <p><b>Check continuity between wire #8A and wire #09 on switch when Lift mode is selected. Test for 12V supply voltage between wire #09 and wire #02 when operating switch.</b></p> <p><b>Replace if defective.</b></p>
6. Loose or broken wire #09 from Lift/Off/Drive switch S9 to Machine Controller pin #P7-9. (Lift selected signal)	<p><b>Check continuity. Test for 12V supply voltage between wire #09 and wire #02.</b></p> <p><b>Use HMI Diagnostic menu to ensure Input P7-9 signal is present.</b></p> <p><b>Replace if defective.</b></p>
7. Loose or broken wire #8A from Platform Select Relay 08CR to Joystick Enable switch S10.	<p><b>Check continuity. Test for 12V supply voltage between wire #8A and wire #02.</b></p> <p><b>Replace if defective.</b></p>
8. Defective Joystick Enable switch S10.	<p><b>Operate Enable switch S10. Check continuity between wire #8A and wire #19 on switch.</b></p> <p><b>Test for 12V supply voltage between wire #19 and wire #2C on Joystick when operating switch.</b></p> <p><b>Replace if defective.</b></p>
9. Loose or broken wire #19 from Joystick Enable switch S10 to Machine Controller pin #P7-11. (Enable signal)	<p><b>Check continuity. Test for 12V supply voltage between wire #19 and wire #02.</b></p> <p><b>Use HMI Diagnostic menu to ensure Input P7-11 signal is present.</b></p> <p><b>Replace if defective.</b></p>
10. Loose or broken wire #2C from Machine Controller pin #P8-15 to Joystick A1 pin 2 (0V reference signal).	<p><b>Check continuity. Replace if defective.</b></p>
11. Loose or broken wire #59 from Joystick A1 to Machine Controller pin #P8-1 (Analog Proportional Output signal).	<p><b>Check continuity.</b></p> <p><b>Use HMI Diagnostic menu to ensure Input P8-1 signal is present.</b></p> <p><b>Replace if defective.</b></p>
12. Loose or broken wires from Machine Controller pin #P4-5 to Lift Valve coil 3H-14.	<p><b>Check continuity. Test for 12V supply voltage between wire #14 and wire #02.</b></p> <p><b>Use HMI Diagnostic menu to ensure Output P4-5 signal is present.</b></p> <p><b>Replace if defective.</b></p>
13. Loose or broken wire #02 to Lift Valve coil 3H-14 from Terminal Board Module TBM screw B-	<p><b>Check continuity. Replace if defective</b></p>
14. Defective Proportional Lift Valve coil 3H-14.	<p><b>Check coil. Replace if defective.</b></p>

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| 15. External or internal fault detected by Machine Controller. | <p><b>Check HMI Display screen. Use Diagnostic Menu to see Output status.</b></p> <hr/> <p><b>Correct trouble code as displayed. Replace module if defective.</b></p> |
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#### 4.2-20 Lift (Up) Circuit Inoperative from Platform when using Outriggers

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| 1. Display HMI is broadcasting an error message.  | <b>Check HMI display screen and follow instructions to clear error.</b>  |
| 2. All items from 4.2-19 Lift (Up) Circuit Inoperative from Platform (no Outriggers) are checked.   |  |
| 3. Outrigger Indicator light is indicating that Outrigger Auto-Level is still leveling or not all legs have made firm contact with the ground.              | <b>Refer to Operation Manual for correct operation of Outriggers.</b>  |
| 4. Loose or broken wire #8A from Platform Select Relay 08CR to Platform Horn switch S5 jumping to all switches including Outrigger/Off/Diff lock switch S7. | <p><b>Check continuity. Test for 12V supply voltage between wire #8A and wire #02.</b></p> <hr/> <p><b>Replace if defective.</b></p>   |
| 5. Defective Outrigger/Off/Diff lock switch S7.   | <p><b>Operate Outrigger/Off/Diff lock switch S7. Check continuity between wire #8A and wire #70 on switch. (Outrigger request mode)</b></p> <hr/> <p><b>Test for 12V supply voltage between wire #70 and wire #02 when operating switch.</b></p> <hr/> <p><b>Replace if defective.</b></p> |
| 6. Loose or broken wire #70 from Outrigger/Off/Diff lock switch S7 to Machine Controller pin #P7-5. (Outrigger selected signal)                             | <p><b>Check continuity. Test for 12V supply voltage between wire #70 and wire #02.</b></p> <hr/> <p><b>Use HMI Diagnostic menu to ensure Input P7-5 signal is present.</b></p> <hr/> <p><b>Replace if defective.</b></p>   |
| 7. Outriggers are not extended or limit switches not functioning.   | <b>Extend Outriggers down.</b>   |

#### Left Rear Outrigger

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| 8. Loose or broken wire #5A from Terminal Board Module TBM screw B+ to Outrigger Left Rear Limit switch LS5. | <p><b>Check continuity. Test for 12V supply voltage between wire #5A and wire #02.</b></p> <hr/> <p><b>Replace if defective.</b></p>  |
| 9. Defective or misaligned Outrigger Left Rear Limit switch LS5.   | <p><b>Check switch. Test for 12V supply voltage between wire #68 and wire #02.</b></p> <hr/> <p><b>See Section 5 Procedures on aligning limit switches.</b></p> <hr/> <p><b>Replace if defective.</b></p> |

10. Loose or broken wire #68 from Outrigger Left Rear Limit switch LS5 to Outrigger terminal strip and then to Machine Controller pin P14-7. (Outrigger Left Rear Extended signal)	Check continuity. Test for 12V supply voltage between wire #68 and wire #02.
	Use HMI Diagnostic menu to ensure Input P14-7 signal is present.
	Replace if defective.
11. Loose or broken wire #78A from Machine Controller P6-14 to Left Rear Outrigger Down Valve coil 5H-78A.	Check continuity. Test for 12V supply voltage between wire #78A and wire #02.
	Use HMI Diagnostic menu to ensure Output P6-14 signal is present.
	Replace if defective.
12. Loose or broken wire #02 to Left Rear Outrigger Down Valve coil 5H-78A from Terminal Board Module TBM screw B-	Check continuity. Replace if defective.
13. Defective Left Rear Outrigger Down Valve coil 5H-78A.	Check continuity through coil. Replace if defective.
<b>Right Rear Outrigger</b>	
14. Loose or broken wire #5A from Terminal Board Module TBM screw B+ to Outrigger Right Rear Limit switch LS6.	Check continuity. Test for 12V supply voltage between wire #5A and wire #02.
	Replace if defective.
15. Defective or misaligned Outrigger Right Rear Limit switch LS6.	Check switch. Test for 12V supply voltage between wire #67 and wire #02.
	See Section 5 Procedures on aligning limit switches.
	Replace if defective.
16. Loose or broken wire #67 from Outrigger Right Rear Limit switch LS6 to Outrigger terminal strip and then to Machine Controller pin P14-8. (Outrigger Right Rear Extended signal)	Check continuity. Test for 12V supply voltage between wire #67 and wire #02.
	Use HMI Diagnostic menu to ensure Input P14-8 signal is present.
	Replace if defective.
17. Loose or broken wire #77A from Machine Controller P6-10 to Right Rear Outrigger Down Valve coil 5H-77A.	Check continuity. Test for 12V supply voltage between wire #77A and wire #02.
	Use HMI Diagnostic menu to ensure Output P6-10 signal is present.
	Replace if defective.
18. Loose or broken wire #02 to Right Rear Outrigger Down Valve coil 5H-77A from Terminal Board Module TBM screw B-	Check continuity. Replace if defective.
19. Defective Right Rear Outrigger Down Valve coil 5H-77A.	Check continuity through coil. Replace if defective.

### Left Front Outrigger

20. Loose or broken wire #5A from Terminal Board Module TBM screw B+ to Outrigger Left Front Limit switch LS7.	<b>Check continuity. Test for 12V supply voltage between wire #5A and wire #02.</b>
	<b>Replace if defective.</b>
21. Defective or misaligned Outrigger Left Front Limit switch LS7.	<b>Check switch. Test for 12V supply voltage between wire #65 and wire #02.</b>
	<b>See Section 5 Procedures on aligning limit switches.</b>
	<b>Replace if defective.</b>
22. Loose or broken wire #65 from Outrigger Left Front Limit switch LS7 to Outrigger terminal strip and then to Machine Controller pin P14-9. (Outrigger Left Front Extended signal)	<b>Check continuity. Test for 12V supply voltage between wire #65 and wire #02.</b>
	<b>Use HMI Diagnostic menu to ensure Input P14-9 signal is present.</b>
	<b>Replace if defective.</b>
23. Loose or broken wire #75A from Machine Controller P6-4 to Left Front Outrigger Down Valve coil 5H-75A.	<b>Check continuity. Test for 12V supply voltage between wire #75A and wire #02.</b>
	<b>Use HMI Diagnostic menu to ensure Output P6-4 signal is present.</b>
	<b>Replace if defective.</b>
24. Loose or broken wire #02 to Left Front Outrigger Down Valve coil 5H-75A from Terminal Board Module TBM screw B-	<b>Check continuity. Replace if defective.</b>
25. Defective Left Front Outrigger Down Valve coil 5H-75A.	<b>Check continuity through coil. Replace if defective.</b>
<b>Right Front Outrigger</b>	
26. Loose or broken wire #5A from Terminal Board Module TBM screw B+ to Outrigger Right Front Limit switch LS8.	<b>Check continuity. Test for 12V supply voltage between wire #5A and wire #02.</b>
	<b>Replace if defective.</b>
27. Defective or misaligned Outrigger Right Front Limit switch LS8.	<b>Check switch. Test for 12V supply voltage between wire #66 and wire #02.</b>
	<b>See Section 5 Procedures on aligning limit switches.</b>
	<b>Replace if defective.</b>
28. Loose or broken wire #66 from Outrigger Right Front Limit switch LS8 to Outrigger terminal strip and then to Machine Controller pin P14-10. (Outrigger Right Front Extended signal)	<b>Check continuity. Test for 12V supply voltage between wire #66 and wire #02.</b>
	<b>Use HMI Diagnostic menu to ensure Input P14-10 signal is present.</b>
	<b>Replace if defective.</b>

29. Loose or broken wire #76A from Machine Controller P6-5 to Right Front Outrigger Down Valve coil 5H-76A.	<b>Check continuity. Test for 12V supply voltage between wire #76A and wire #02.</b>
	<b>Use HMI Diagnostic menu to ensure Output P6-5 signal is present.</b>
	<b>Replace if defective.</b>
30. Loose or broken wire #02 to Right Front Outrigger Down Valve coil 5H-76A from Terminal Board Module TBM screw B-	<b>Check continuity. Replace if defective.</b>
31. Defective Right Front Outrigger Down Valve coil 5H-76A.	<b>Check continuity through coil. Replace if defective.</b>
32. External or internal fault detected by Machine Controller.	<b>Check HMI Display screen. Use Diagnostic Menu to see Output status.</b>
	<b>Correct trouble code as displayed. Replace module if defective.</b>
<b>4.2-21 Lift (Up) Circuit Inoperative from Platform with Outriggers Retracted (Lift operates correctly with Outriggers extended)</b>	
1. Display HMI is broadcasting an error message.	<b>Check HMI display screen and follow instructions to clear error.</b>
2. All items from 4.2-20 Lift (Up) Circuit Inoperative from Platform (no Outriggers) are checked.	
3. Outriggers are not fully retracted or limit switches not functioning.	<b>Fully retract outrigger cylinders.</b>
<b>Left Rear Outrigger</b>	
4. Loose or broken wire #5A from Terminal Board Module TBM screw B+ to Terminal strip to Outrigger Left Rear Limit switch LS1.	<b>Check continuity. Test for 12V supply voltage between wire #5A and wire #02.</b>
	<b>Replace if defective.</b>
5. Defective or misaligned Outrigger Left Rear Limit switch LS1.	<b>Check switch. Test for 12V supply voltage between wire #64 and wire #02.</b>
	<b>See Section 5 Procedures on aligning limit switches.</b>
	<b>Replace if defective.</b>
<b>Right Rear Outrigger</b>	
6. Loose or broken wire #64 from Outrigger Left Rear Limit switch LS1 to Terminal strip to Outrigger Right Rear Limit switch LS2.	<b>Check continuity. Test for 12V supply voltage between wire #64 and wire #02.</b>
	<b>Replace if defective.</b>

7. Defective or misaligned Outrigger Right Rear Limit switch LS2.	<b>Check switch. Test for 12V supply voltage between wire #63 and wire #02.</b>
	<b>See Section 5 Procedures on aligning limit switches.</b>
	<b>Replace if defective.</b>
<b>Left Front Outrigger</b>	
8. Loose or broken wire #63 from Outrigger Right Rear Limit switch LS2 to Terminal strip to Outrigger Left Front Limit switch LS3.	<b>Check continuity. Test for 12V supply voltage between wire #63 and wire #02.</b>
	<b>Replace if defective.</b>
9. Defective or misaligned Outrigger Left Front Limit switch LS3.	<b>Check switch. Test for 12V supply voltage between wire #62 and wire #02.</b>
	<b>See Section 5 Procedures on aligning limit switches.</b>
	<b>Replace if defective.</b>
<b>Right Front Outrigger</b>	
10. Loose or broken wire #62 from Outrigger Left Front Limit switch LS3 to Terminal strip to Outrigger Right Front Limit switch LS4.	<b>Check continuity. Test for 12V supply voltage between wire #62 and wire #02.</b>
	<b>Replace if defective.</b>
11. Defective or misaligned Outrigger Right Front Limit switch LS4.	<b>Check switch. Test for 12V supply voltage between wire #61 and wire #02.</b>
	<b>See Section 5 Procedures on aligning limit switches.</b>
	<b>Replace if defective.</b>
12. Loose or broken wire #61 from all Outrigger retracted limit switches (in series) to Machine Controller pin #P14-6. (Outriggers retracted signal)	<b>Check continuity through all retracted limit switches LS1, LS2, LS3, and LS4.</b>
	<b>Use HMI Diagnostic menu to ensure Input P14-6 signal is present.</b>
	<b>Replace if defective.</b>
13. External or internal fault detected by Machine Controller.	<b>Check HMI Display screen. Use Diagnostic Menu to see Output status.</b>
	<b>Correct trouble code as displayed. Replace module if defective.</b>

#### 4.2-22 Lift (Up) Circuit Inoperative from Base

1. Display HMI is broadcasting an error message.	<b>Check HMI display screen and follow instructions to clear error.</b>
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	<p>Check machine limits and reduce weight as required.</p> <p><b>SJ9233/43/53 RT - Check Pressure Transducer PT1 and Angle Transducers AT1 functionality.</b></p> <p><b>SJ9664 RT - Check Load Cell Interface and Angle Transducers AT1 functionality.</b></p> <p>Check wire #60A from Machine Controller pin #P4-9. (Overloaded signal)</p> <p>Use HMI Diagnostic menu to ensure Output P4-9 signal is not present indicating an Overload condition.</p>
2. Machine overloaded and Overload Lights PL1 and PL2 on Emergency Stop buttons flashing.	
3. Machine not level.	<p>Move machine and <b>ONLY use on level surface.</b></p>
4. Loose or broken wire #05 from Terminal Board Module TBM screw #4 to Function Enable switch S15.	<p>Check continuity. Test for 12V supply voltage between wire #05 and wire #02.</p> <p>Replace if defective.</p> <p>Operate switch.</p>
5. Defective or open Function Enable switch S15.	<p>Check continuity between wire #05 and wire #10B on switch when operating switch. Test for 12V supply voltage between wire #10B and wire #02 when operating switch.</p> <p>Replace if defective.</p>
6. Loose or broken wire #10B from Function Enable switch S15 to Lift/Lower switch S13.	<p>Check continuity. Test for 12V supply voltage between wire #10B and wire #02.</p> <p>Replace if defective.</p> <p>Operate switch.</p>
7. Defective or open Lift/Lower switch S13.	<p>Check continuity between wire #10B and wire #13A on switch when Lower is selected. Test for 12V supply voltage between wire #13A and wire #02 when operating switch.</p> <p>Check continuity between wire #10B and wire #14A on switch when Lift is selected.</p> <p>Test for 12V supply voltage between wire #14A and wire #02 when operating switch.</p> <p>Replace if either switch contact is defective.</p>
8. "Loose or broken wire #14A from Lift/Lower switch S13 to Machine Controller pin #P7-6 (Lift selected signal)."	<p>Check continuity. Test for 12V supply voltage between wire #14A and wire #02.</p> <p>Use HMI Diagnostic menu to ensure Input P7-6 signal is present.</p> <p>Replace if defective.</p>

9. Loose or broken wires from Machine Controller pin #P4-5 to Lift Valve coil 3H-14.	Check continuity. Test for 12V supply voltage between wire #14 and wire #02.
	Use HMI Diagnostic menu to ensure Output P4-5 signal is present.
	Replace if defective.
10. Loose or broken wire #02 to Lift Valve coil 3H-14 from Terminal Board Module TBM screw B-	Check continuity. Replace if defective
11. Defective Proportional Lift Valve coil 3H-14.	Check coil. Replace if defective.
12. External or internal fault detected by Machine Controller.	Check HMI Display screen. Use Diagnostic Menu to see Output status.
	Correct trouble code as displayed. Replace module if defective.

#### 4.2-23 Lower (Down) Circuit Inoperative from Platform

1. Display HMI is broadcasting an error message.	Check HMI display screen and follow instructions to clear error.
	Check machine limits and reduce weight as required.
	SJ9233/43/53 RT - Check Pressure Transducer PT1 and Angle Transducers AT1 functionality.
2. Machine overloaded and Overload Lights PL1 and PL2 on Emergency Stop buttons flashing.	SJ9664 RT - Check Load Cell Interface and Angle Transducers AT1 functionality.
	Check wire #60A from Machine Controller pin #P4-9. (Overloaded signal)
	Use HMI Diagnostic menu to ensure Output P4-9 signal is not present indicating an Overload condition.
3. Loose or broken wire #8A from Platform Select Relay 08CR to Platform Horn switch S5 jumping to all switches including Lift/Off/Drive Selector switch S9.	Check continuity. Test for 12V supply voltage between wire #8A and wire #02.
	Replace if defective.
	Select Lift. Check switch.
4. Lift/Off/Drive switch S9 is set to an incorrect mode.	Check continuity between wire #8A and wire #09 on switch when Lift mode is selected. Test for 12V supply voltage between wire #09 and wire #02 when operating switch.
	Replace if defective.

5. Loose or broken wire #09 from Lift/Off/Drive switch S9 to Machine Controller pin #P7-9. (Lift selected signal).	<b>Check continuity. Test for 12V supply voltage between wire #09 and wire #02.</b>
	<b>Use HMI Diagnostic menu to ensure Input P7-9 signal is present.</b>
	<b>Replace if defective.</b>
6. Loose or broken wire #8A from Platform Select Relay 08CR to Joystick Enable switch S10.	<b>Check continuity. Test for 12V supply voltage between wire #8A and wire #02.</b>
	<b>Replace if defective.</b>
7. Defective Joystick Enable switch S10.	<b>Operate Enable switch S10. Check continuity between wire #8A and wire #19 on switch.</b>
	<b>Test for 12V supply voltage between wire #19 and wire #2C on Joystick when operating switch.</b>
	<b>Replace if defective.</b>
8. Loose or broken wire #19 from Joystick Enable switch S10 to Machine Controller pin #P7-11. (Enable signal)	<b>Check continuity. Test for 12V supply voltage between wire #19 and wire #02.</b>
	<b>Use HMI Diagnostic menu to ensure Input P7-11 signal is present.</b>
	<b>Replace if defective.</b>
9. Loose or broken wire #2C from Machine Controller pin #P8-15 to Joystick A1 pin 2 (0V reference signal)	<b>Check continuity. Replace if defective.</b>
10. Loose or broken wire #59 from Joystick A1 to Machine Controller pin #P8-1 (Analog Proportional Output signal).	<b>Check continuity.</b>
	<b>Use HMI Diagnostic menu to ensure Input P8-1 signal is present.</b>
	<b>Replace if defective.</b>
11. Loose or broken wire #13 from Machine Controller P4-12 to Lower-Main Valve coil 2H-13.	<b>Check continuity. Test for 12V supply voltage between wire #13 and wire #02.</b>
	<b>Use HMI Diagnostic menu to ensure Output P4-12 signal is present.</b>
	<b>Replace if defective.</b>
12. Loose or broken wire #02 to Lower-Main Valve coil 2H-13 from Terminal Board Module TBM screw B-	<b>Check continuity. Replace if defective.</b>
13. Defective Lower-Main Valve coil 2H-13.	<b>Check continuity through coil. Replace if defective.</b>
14. External or internal fault detected by Machine Controller.	<b>Check HMI Display screen. Use Diagnostic Menu to see Output status.</b>
	<b>Correct trouble code as displayed. Replace module if defective.</b>

## 4.2-24 Down Circuit Inoperative from Base

1. Display HMI is broadcasting an error message.	Check HMI display screen and follow instructions to clear error.
2. Machine overloaded and Overload Lights PL1 and PL2 on Emergency Stop buttons flashing.	Check machine limits and reduce weight as required.  SJ9233/43/53 RT - Check Pressure Transducer PT1 and Angle Transducers AT1 functionality.  SJ9664 RT - Check Load Cell Interface and Angle Transducers AT1 functionality.
3. Machine not level.	Check wire #60A from Machine Controller pin #P4-9. (Overloaded signal)  Use HMI Diagnostic menu to ensure Output P4-9 signal is not present indicating an Overload condition.
4. Loose or broken wire #05 from Terminal Board Module TBM screw #4 to Function Enable switch S15.	Move machine and ONLY use on level surface.
5. Defective or open Function Enable switch S15.	Check continuity. Test for 12V supply voltage between wire #05 and wire #02.  Replace if defective.  Operate switch.
6. Loose or broken wire #10B from Function Enable switch S15 to Lift/Lower switch S13.	Check continuity between wire #05 and wire #10B on switch when operating switch. Test for 12V supply voltage between wire #10B and wire #02 when operating switch.  Replace if defective.
7. Defective or open Lift/Lower switch S13.	Check continuity. Test for 12V supply voltage between wire #10B and wire #02.  Replace if defective.  Operate switch.  Check continuity between wire #10B and wire #13A on switch when Lower is selected. Test for 12V supply voltage between wire #13A and wire #02 when operating switch.
	Check continuity between wire #10B and wire #14A on switch when Lift is selected.  Test for 12V supply voltage between wire #14A and wire #02 when operating switch.  Replace if either switch contact is defective.

8. Loose or broken wire #13A from Lift/Lower switch S13 to Machine Controller pin #P7-7. (Lower selected signal)	Check continuity. Test for 12V supply voltage between wire #13A and wire #02.
	Use HMI Diagnostic menu to ensure Input P7-7 signal is present.
	Replace if defective.
9. Loose or broken wire #13 from Machine Controller P4-12 to Lower-Main Valve coil 2H-13.	Check continuity. Test for 12V supply voltage between wire #13 and wire #02.
	Use HMI Diagnostic menu to ensure Output P4-12 signal is present.
	Replace if defective.
10. Loose or broken wire #02 to Lower-Main Valve coil 2H-13 from Terminal Board Module TBM screw B-	Check continuity. Replace if defective.
11. Defective Lower-Main Valve coil 2H-13.	Check continuity through coil. Replace if defective.
12. External or internal fault detected by Machine Controller.	Check HMI Display screen. Use Diagnostic Menu to see Output status.
	Correct trouble code as displayed. Replace module if defective.

#### 4.2-25 Belt Driven 3.5kW Generator Inoperative (if equipped)

1. Display HMI is broadcasting an error message.	Check HMI display screen and follow instructions to clear error.
2. Engine not running or drive pulley broken.	Check Generator shaft for rotation. Replace if defective.
3. Open or defective Circuit Breaker CB6	Reset Breaker. Test for proper AC voltage between wire #110A and wire #110B.
	Replace if defective.
4. Defective 3.5 kW Generator.	Check Generator. Repair or replace if defective.

#### 4.2-26 Hydraulic 7.5kW Generator Inoperative (if equipped)

1. Display HMI is broadcasting an error message.	Check HMI display screen and follow instructions to clear error.
2. Loose or broken wire #8A from Platform Select Relay 08CR to Platform Horn switch S5 jumping to all switches including Generator switch S17.	Check continuity. Test for 12V supply voltage between wire #8A and wire #02.
	Replace if defective.

3. Defective Generator switch S17.	Operate Generator switch S17. Check continuity between wire #8A and wire #85 on switch.
	Test for 12V supply voltage between wire #85 and wire #02 when operating switch.
	Replace if defective.
4. Loose or broken wire #85 from Generator switch S17 to Machine Controller pin #P7-12. (Generator ON request signal)	Check continuity. Test for 12V supply voltage between wire #85 and wire #02.
	Use HMI Diagnostic menu to ensure Input P7-12 signal is present.
	Replace if defective.
5. Loose or broken wire #03 from Main Disconnect switch S1 to Circuit Breaker CB4.	Check continuity. Replace if defective.
6. Circuit Breaker CB4 defective or open.	Reset Breaker. Test for 12V supply voltage between wire #85 and wire #02.
	Replace if defective.
7. Loose or broken wire #85 from Circuit Breaker CB4 to Generator relay 85CCR.	Check continuity. Test for 12V supply voltage between wire #85 and wire #02.
	Replace if defective.
8. Loose or broken wire #85C from Machine Controller P6-15 to Generator Relay 85CCR.	Check continuity. Test for 12V supply voltage between wire #85C and wire #02.
	Use HMI Diagnostic menu to ensure Output P6-15 signal is present.
	Replace if defective.
9. Loose or broken wire #02 from Terminal Board Module TBM screw B- bus bar to Generator Relay 85CCR.	Check continuity. Replace if defective
10. Generator Relay 85CCR is open or defective.	Check that Generator Relay 85CCR is energized and functions when signal wire #85C from Machine Controller pin #P6-15 is powered.
	Test for 12V supply voltage between wire #85C and wire #02.
	Check continuity between wire #85 and wire #85A on the N.O. contact when the relay is energized. Test for 12V supply voltage between wire #85A and wire #00.
	Replace relay if defective.
11. Loose or broken wire #85A from Generator Relay 85CCR to Generator valve 2H-85A and Cooler Fan motor.	Check continuity. Replace if defective.



12. Loose or broken wire #00 from Battery - to Generator valve and Cooler Fan motor.	<b>Check continuity. Replace if defective</b>
13. Defective Generator valve coil 2H-85A.	<b>Check continuity through coil. Replace if defective.</b>
14. Open or defective Circuit Breaker CB6	<b>Reset Breaker. Test for proper AC voltage between wire #110A and wire #110B.</b> <b>Replace if defective.</b>
15. Hydraulic Generator/Cooler Fan not functioning.	<b>Check Generator and Cooler fan operation.</b> <b>Replace Generator if defective.</b> <b>Replace Cooler fan motor if defective.</b>
16. External or internal fault detected by Machine Controller.	<b>Check HMI Display screen. Use Diagnostic Menu to see Output status.</b> <b>Correct trouble code as displayed. Replace module if defective.</b>

#### 4.2-27 Hydraulic 7.5kW Generator Does Not Shut Off from Generator Switch (if equipped)

1. Display HMI is broadcasting an error message.	<b>Check HMI display screen and follow instructions to clear error.</b>
2. Defective Generator switch S17.	<b>"Generator switch is in an incorrect position. Ensure Generator switch in in off position. Check that continuity is broken between wire #8A and wire #85 on switch."</b> <b>Test for 12V supply voltage shuts off between wire #85 and wire #02 when switch is in off position.</b> <b>Replace if defective.</b>
3. Shorted power on wire #85 to Machine Controller pin #P7-12. (Generator ON request signal)	<b>Test for 12V supply voltage between wire #85 and wire #02.</b> <b>Use HMI Diagnostic menu to ensure Input P7-12 signal is not present.</b> <b>Replace if defective.</b>
4. Shorted power on wire #85C to Generator Relay 85CCR.	<b>Test for 12V supply voltage between wire #85C and wire #02. Replace if defective.</b>
5. Defective or stuck Generator relay 85CCR.	<b>Check relay. Replace if defective.</b>
6. Defective 7.5kW Generator.	<b>Check Generator. Replace if defective.</b>
7. External or internal fault detected by Machine Controller.	<b>Check HMI Display screen. Use Diagnostic Menu to see Output status.</b> <b>Correct trouble code as displayed. Replace module if defective.</b>

## 4.2-28 Left Rear Outrigger Inoperative Manually

1. Display HMI is broadcasting an error message.	<p><b>Check HMI display screen and follow instructions to clear error.</b></p>
2. Loose or broken wire #05 from Terminal Board Module TBM screw #4 to Function Enable switch S15.	<p><b>Check continuity. Test for 12V supply voltage between wire #05 and wire #02.</b></p> <p><b>Replace if defective.</b></p>
3. Open or defective Function Enable toggle switch S15.	<p><b>Operate switch.</b></p> <p><b>Check for continuity between wire #05 and wire #10B on switch when closed.</b></p> <p><b>Test for supply voltage between wire #10B and wire #02.</b></p> <p><b>Replace switch if no continuity during switch function.</b></p>
4. Loose or broken wire #10B from Function Enable toggle switch S15 to Machine Controller pin #P15-3. (Function Enable signal)	<p><b>Check continuity. Test for 12V supply voltage between wire #10B and wire #02.</b></p> <p><b>Use HMI Diagnostic menu to ensure Input P15-3 signal is present.</b></p> <p><b>Replace if defective.</b></p>
5. Loose or broken wire #10B starting from Function Enable toggle switch S15, thru Lift/Lower switch S13 then to Outrigger Left Rear switch S18.	<p><b>Check continuity. Test for supply voltage between wire #10B and wire #02.</b></p> <p><b>Replace if defective.</b></p>
6. Defective or open Outrigger Left Rear switch S18.	<p><b>Operate switch.</b></p> <p><b>Check continuity between wire #10B and wire #74 on switch when UP is selected.</b></p> <p><b>Test for 12V supply voltage between wire #74 and wire #02 when operating switch.</b></p> <p><b>Check continuity between wire #10B and wire #78 on switch when DOWN is selected.</b></p> <p><b>Test for 12V supply voltage between wire #78 and wire #02 when operating switch.</b></p> <p><b>Replace if either switch contact is defective.</b></p>
7. Loose or broken wire #74 from Outrigger Left Rear switch S18 to Machine Controller pin #P15-6. (Outrigger UP request signal)	<p><b>Check continuity. Test for 12V supply voltage between wire #74 and wire #02.</b></p> <p><b>Use HMI Diagnostic menu to ensure Input P15-6 signal is present.</b></p> <p><b>Replace if defective.</b></p>

8. Loose or broken wire #78 from Outrigger Left Rear switch S18 to Machine Controller pin #P15-7. (Outrigger DOWN request signal)	<b>Check continuity. Test for 12V supply voltage between wire #78 and wire #02.</b>
	<b>Use HMI Diagnostic menu to ensure Input P15-7 signal is present.</b>
	<b>Replace if defective.</b>
9. Loose or broken wire #78A from Machine Controller P6-14 to Left Rear Outrigger Down Valve coil 5H-78A.	<b>Check continuity. Test for 12V supply voltage between wire #78A and wire #02.</b>
	<b>Use HMI Diagnostic menu to ensure Output P6-14 signal is present.</b>
	<b>Replace if defective.</b>
10. Loose or broken wire #74A from Machine Controller P6-13 to Left Rear Outrigger Up Valve coil 5H-74A.	<b>Check continuity. Test for 12V supply voltage between wire #74A and wire #02.</b>
	<b>Use HMI Diagnostic menu to ensure Output P6-14 signal is present.</b>
	<b>Replace if defective.</b>
11. Loose or broken wire #02 to Left Rear Outrigger Down Valve coil 5H-78A from Terminal Board Module TBM screw B- bus bar.	<b>Check continuity. Replace if defective.</b>
12. Loose or broken wire #02 to Left Rear Outrigger Up Valve coil 5H-74A from Terminal Board Module TBM screw B- bus bar.	<b>Check continuity. Replace if defective.</b>
13. Defective Left Rear Outrigger Down Valve coil 5H-78A.	<b>Check continuity through coil. Replace if defective.</b>
14. Defective Left Rear Outrigger Up Valve coil 5H-74A.	<b>Check continuity through coil. Replace if defective.</b>
15. External or internal fault detected by Machine Controller.	<b>Check HMI Display screen. Use Diagnostic Menu to see Output status.</b>
	<b>Correct trouble code as displayed. Replace module if defective.</b>

#### 4.2-29 Right Rear Outrigger Inoperative Manually

1. Display HMI is broadcasting an error message.	<b>Check HMI display screen and follow instructions to clear error.</b>
2. Loose or broken wire #05 from Terminal Board Module TBM screw #4 to Function Enable switch S15.	<b>Check continuity. Test for 12V supply voltage between wire #05 and wire #02.</b>
	<b>Replace if defective.</b>

3. Open or defective Function Enable toggle switch S15.	<p><b>Operate switch.</b></p> <p><b>Check for continuity between wire #05 and wire #10B on switch when closed.</b></p> <p><b>Test for supply voltage between wire #10B and wire #02.</b></p> <p><b>Replace switch if no continuity during switch function.</b></p>
4. Loose or broken wire #10B from Function Enable toggle switch S15 to Machine Controller pin #P15-3. (Function Enable signal)	<p><b>Check continuity. Test for 12V supply voltage between wire #10B and wire #02.</b></p> <p><b>Use HMI Diagnostic menu to ensure Input P15-3 signal is present.</b></p> <p><b>Replace if defective.</b></p>
5. Loose or broken wire #10B from Function Enable toggle switch S15 to Outrigger Right Rear switch S19.	<p><b>Check continuity. Test for supply voltage between wire #10B and wire #02.</b></p> <p><b>Replace if defective.</b></p>
6. Defective or open Outrigger Right Rear switch S19.	<p><b>Operate switch.</b></p> <p><b>"Check continuity between wire #10B and wire #73 on switch when UP is selected. Test for 12V supply voltage between wire #73 and wire #02 when operating switch."</b></p> <p><b>Check continuity between wire #10B and wire #77 on switch when DOWN is selected.</b></p> <p><b>Test for 12V supply voltage between wire #77 and wire #02 when operating switch.</b></p> <p><b>Replace if either switch contact is defective.</b></p>
7. Loose or broken wire #73 from Outrigger Right Rear switch S19 to Machine Controller pin #P15-8. (Outrigger UP request signal)	<p><b>Check continuity. Test for 12V supply voltage between wire #73 and wire #02.</b></p> <p><b>Use HMI Diagnostic menu to ensure Input P15-8 signal is present.</b></p> <p><b>Replace if defective.</b></p>
8. Loose or broken wire #77 from Outrigger Right Rear switch S19 to Machine Controller pin #P15-9. (Outrigger DOWN request signal)	<p><b>Check continuity. Test for 12V supply voltage between wire #77 and wire #02.</b></p> <p><b>Use HMI Diagnostic menu to ensure Input P15-9 signal is present.</b></p> <p><b>Replace if defective.</b></p>

9. Loose or broken wire #77A from Machine Controller P6-10 to Right Rear Outrigger Down Valve coil 5H-77A.	<b>Check continuity. Test for 12V supply voltage between wire #77A and wire #02.</b>
	<b>Use HMI Diagnostic menu to ensure Output P6-10 signal is present.</b>
	<b>Replace if defective.</b>
10. Loose or broken wire #73A from Machine Controller P6-7 to Right Rear Outrigger Up Valve coil 5H-73A.	<b>Check continuity. Test for 12V supply voltage between wire #73A and wire #02.</b>
	<b>Use HMI Diagnostic menu to ensure Output P6-7 signal is present.</b>
	<b>Replace if defective.</b>
11. Loose or broken wire #02 to Right Rear Outrigger Down Valve coil 5H-77A from Terminal Board Module TBM screw B- bus bar.	<b>Check continuity. Replace if defective.</b>
12. Loose or broken wire #02 to Right Rear Outrigger Up Valve coil 5H-73A from Terminal Board Module TBM screw B- bus bar.	<b>Check continuity. Replace if defective.</b>
13. Defective Right Rear Outrigger Down Valve coil 5H-77A.	<b>Check continuity through coil. Replace if defective.</b>
14. Defective Right Rear Outrigger Up Valve coil 5H-73A.	<b>Check continuity through coil. Replace if defective.</b>
15. External or internal fault detected by Machine Controller.	<b>Check HMI Display screen. Use Diagnostic Menu to see Output status.</b>
	<b>Correct trouble code as displayed. Replace module if defective.</b>

#### 4.2-30 Right Front Outriggers Inoperative Manually

1. Display HMI is broadcasting an error message.	<b>Check HMI display screen and follow instructions to clear error.</b>
2. Loose or broken wire #05 from Terminal Board Module TBM screw #4 to Function Enable switch S15.	<b>Check continuity. Test for 12V supply voltage between wire #05 and wire #02.</b>
	<b>Replace if defective.</b>
	<b>Operate switch.</b>
3. Open or defective Function Enable toggle switch S15.	<b>Check for continuity between wire #05 and wire #10B on switch when closed.</b>
	<b>Test for supply voltage between wire #10B and wire #02.</b>
	<b>Replace switch if no continuity during switch function.</b>

4. Loose or broken wire #10B from Function Enable toggle switch S15 to Machine Controller pin #P15-3. (Function Enable signal)	Check continuity. Test for 12V supply voltage between wire #10B and wire #02.
	Use HMI Diagnostic menu to ensure Input P15-3 signal is present.
	Replace if defective.
5. Loose or broken wire #10B from Function Enable toggle switch S15 to Outrigger Right Front switch S20.	Check continuity. Test for supply voltage between wire #10B and wire #02.
	Replace if defective.
6. Defective or open Outrigger Right Front switch S20.	Operate switch.
	"Check continuity between wire #10B and wire #72 on switch when UP is selected. Test for 12V supply voltage between wire #72 and wire #02 when operating switch."
	Check continuity between wire #10B and wire #76 on switch when DOWN is selected.
	Test for 12V supply voltage between wire #76 and wire #02 when operating switch.
	Replace if either switch contact is defective.
7. Loose or broken wire #72 from Outrigger Right Front switch S20 to Machine Controller pin #P14-4. (Outrigger UP request signal)	Check continuity. Test for 12V supply voltage between wire #72 and wire #02.
	Use HMI Diagnostic menu to ensure Input P14-4 signal is present.
	Replace if defective.
8. Loose or broken wire #76 from Outrigger Right Front switch S20 to Machine Controller pin #P14-5. (Outrigger DOWN request signal)	Check continuity. Test for 12V supply voltage between wire #76 and wire #02.
	Use HMI Diagnostic menu to ensure Input P14-5 signal is present.
	Replace if defective.
9. Loose or broken wire #72A from Machine Controller P6-2 to Right Front Outrigger Down Valve coil 5H-72A.	Check continuity. Test for 12V supply voltage between wire #72A and wire #02.
	Use HMI Diagnostic menu to ensure Output P6-2 signal is present.
	Replace if defective.
10. Loose or broken wire #76A from Machine Controller P6-5 to Right Front Outrigger Up Valve coil 5H-76A.	Check continuity. Test for 12V supply voltage between wire #76A and wire #02.
	Use HMI Diagnostic menu to ensure Output P6-5 signal is present.
	Replace if defective.



11. Loose or broken wire #02 to Right Front Outrigger Down Valve coil 5H-72A from Terminal Board Module TBM screw B- bus bar.	<b>Check continuity. Replace if defective.</b>
12. Loose or broken wire #02 to Right Front Outrigger Up Valve coil 5H-76A from Terminal Board Module TBM screw B- bus bar.	<b>Check continuity. Replace if defective.</b>
13. Defective Right Rear Outrigger Down Valve coil 5H-76A.	<b>Check continuity through coil. Replace if defective.</b>
14. Defective Right Rear Outrigger Up Valve coil 5H-72A.	<b>Check continuity through coil. Replace if defective.</b>
15. External or internal fault detected by Machine Controller.	<b>Check HMI Display screen. Use Diagnostic Menu to see Output status.</b> <b>Correct trouble code as displayed. Replace module if defective.</b>

#### 4.2-31 Left Front Outriggers Inoperative Manually

1. Display HMI is broadcasting an error message.	<b>Check HMI display screen and follow instructions to clear error.</b>
2. Loose or broken wire #05 from Terminal Board Module TBM screw #4 to Function Enable switch S15.	<b>Check continuity. Test for 12V supply voltage between wire #05 and wire #02.</b> <b>Replace if defective.</b> <b>Operate switch.</b>
3. Open or defective Function Enable toggle switch S15.	<b>Check for continuity between wire #05 and wire #10B on switch when closed.</b> <b>Test for supply voltage between wire #10B and wire #02.</b> <b>Replace switch if no continuity during switch function.</b>
4. Loose or broken wire #10B from Function Enable toggle switch S15 to Machine Controller pin #P15-3. (Function Enable signal).	<b>Check continuity. Test for 12V supply voltage between wire #10B and wire #02.</b> <b>Use HMI Diagnostic menu to ensure Input P15-3 signal is present.</b> <b>Replace if defective.</b>
5. Loose or broken wire #10B from Function Enable toggle switch S15 to Outrigger Left Front switch S21.	<b>Check continuity. Test for supply voltage between wire #10B and wire #02.</b> <b>Replace if defective.</b>

6. Defective or open Outrigger Left Front switch S21.	<p><b>Operate switch.</b></p> <p><b>Check continuity between wire #10B and wire #71 on switch when UP is selected.</b>  <b>Test for 12V supply voltage between wire #71 and wire #02 when operating switch.</b></p> <p><b>Check continuity between wire #10B and wire #75 on switch when DOWN is selected.</b>  <b>Test for 12V supply voltage between wire #75 and wire #02 when operating switch.</b></p> <p><b>Replace if either switch contact is defective.</b></p>
7. Loose or broken wire #71 from Outrigger Left Front switch S21 to Machine Controller pin #P14-2. (Outrigger UP request signal)	<p><b>Check continuity. Test for 12V supply voltage between wire #71 and wire #02.</b></p> <p><b>Use HMI Diagnostic menu to ensure Input P14-2 signal is present.</b></p> <p><b>Replace if defective.</b></p>
8. Loose or broken wire #75 from Outrigger Left Front switch S21 to Machine Controller pin #P14-3. (Outrigger DOWN request signal)	<p><b>Check continuity. Test for 12V supply voltage between wire #75 and wire #02.</b></p> <p><b>Use HMI Diagnostic menu to ensure Input P14-3 signal is present.</b></p> <p><b>Replace if defective.</b></p>
9. Loose or broken wire #71A from Machine Controller P6-1 to Left Front Outrigger Down Valve coil 5H-71A.	<p><b>Check continuity. Test for 12V supply voltage between wire #71A and wire #02.</b></p> <p><b>Use HMI Diagnostic menu to ensure Output P6-1 signal is present.</b></p> <p><b>Replace if defective.</b></p>
10. Loose or broken wire #75A from Machine Controller P6-4 to Left Front Outrigger Up Valve coil 5H-75A.	<p><b>Check continuity. Test for 12V supply voltage between wire #75A and wire #02.</b></p> <p><b>Use HMI Diagnostic menu to ensure Output P6-4 signal is present.</b></p> <p><b>Replace if defective.</b></p>
11. Loose or broken wire #02 to Left Front Outrigger Down Valve coil 5H-71A from Terminal Board Module TBM screw B- bus bar.	<p><b>Check continuity. Replace if defective.</b></p>
12. Loose or broken wire #02 to Left Front Outrigger Up Valve coil 5H-75A from Terminal Board Module TBM screw B- bus bar.	<p><b>Check continuity. Replace if defective.</b></p>
13. Defective Left Rear Outrigger Down Valve coil 5H-75A.	<p><b>Check continuity through coil. Replace if defective.</b></p>

14. Defective Left Rear Outrigger Up Valve coil 5H-71A.	<b>Check continuity through coil. Replace if defective.</b>
15. External or internal fault detected by Machine Controller.	<b>Check HMI Display screen. Use Diagnostic Menu to see Output status.</b> <b>Correct trouble code as displayed. Replace module if defective.</b>

#### 4.2-32 Pressure Transducer PT1 Inoperative - SJ9233/43/53 RT

1. Display HMI is broadcasting an error message.	<b>Check HMI display screen and follow instructions to clear error.</b>
2. Loose or broken wire #5A from Terminal Board Module (TBM) screw B+ bus bar to Pressure Transducer PT1. (B+)	<b>Check continuity. Test for 12V supply voltage between wire #5A and wire #02.</b> <b>Replace if defective.</b>
3. Loose or broken wire #902 from Machine Controller pin #P8-13 to Pressure Transducer PT1. (GND)	<b>Check continuity. Replace if defective.</b>
4. Loose or broken wire #60B from Machine Controller pin #P8-6 to Pressure Transducer PT1. (SIG)	<b>Check continuity.</b> <b>Use HMI Diagnostic menu to ensure Input P8-6 signal is present.</b> <b>Replace if defective.</b>
5. Defective Pressure Transducer PT1.	<b>Check operation. Replace if defective.</b>
6. External or internal fault detected by Machine Controller.	<b>Check HMI Display screen. Use Diagnostic Menu to see Output status.</b> <b>Correct trouble code as displayed. Replace module if defective.</b>

#### 4.2-33 Load Cell Interface Inoperative - SJ9664 RT

1. Display HMI is broadcasting an error message.	<b>Check HMI display screen and follow instructions to clear error.</b>
2. Loose or broken wire #5A from Terminal Board Module (TBM) screw B+ bus bar to Load Cell Interface P1-1. (B+)	<b>Check continuity. Test for 12V supply voltage between wire #5A and wire #02.</b> <b>Replace if defective.</b>
3. Loose or broken wire #02 from Terminal Board Module (TBM) screw B- bus bar to Load Cell Interface. (GND)	<b>Check continuity. Replace if defective.</b>
4. Loose or broken twisted pair CANbus communication cable from Machine Controller pin P2-1 (CanH) and/or P2-2 (CanL) to Load Cell Interface P4-1 and P4-2 respectively.	<b>Check continuity of CanH and CanL wires.</b>

5. Defective Load Cell(s) or Load Cell Interface.	<b>Check operation. Replace if defective. See Section 5 Procedures for Load Cell troubleshooting procedure.</b>
6. External or internal fault detected by Machine Controller.	<b>Check HMI Display screen. Use Diagnostic Menu to see Output status.</b>
	<b>Correct trouble code as displayed. Replace module if defective.</b>

#### 4.2-34 Angle Transducer AT1 Inoperative

1. Display HMI is broadcasting an error message.	<b>Check HMI display screen and follow instructions to clear error.</b>
2. Loose or broken wire #5A from Terminal Board Module (TBM) screw B+ bus bar to Angle Transducer AT1. (B+)	<b>Check continuity. Test for 12V supply voltage between wire #5A and wire #02.</b>
	<b>Replace if defective.</b>
3. Loose or broken wire #902 from Machine Controller pin #P8-13 to Angle Transducer AT1. (GND).	<b>Check continuity. Replace if defective.</b>
4. Loose or broken wire #28 from Machine Controller pin #P8-2 to Angle Transducer AT1. (SIG 1).	<b>Check continuity.</b>
	<b>Use HMI Diagnostic menu to ensure Input P8-2 signal is present.</b>
	<b>Replace if defective.</b>
5. Loose or broken wire #28A from Machine Controller pin #P8-5 to Angle Transducer AT1. (SIG 2)	<b>Check continuity.</b>
	<b>Use HMI Diagnostic menu to ensure Input P8-5 signal is present.</b>
	<b>Replace if defective.</b>
6. Defective Angle Transducer AT1.	<b>Check operation. Replace if defective.</b>
7. External or internal fault detected by Machine Controller.	<b>Check HMI Display screen. Use Diagnostic Menu to see Output status.</b>
	<b>Correct trouble code as displayed. Replace module if defective.</b>

## 4.3 Hydraulic System

### 4.3-1 4.2-1 All Functions Inoperative

1. Hydraulic oil level low or restricted flow.	Refill tank to proper level and ensure inlet screen and hose is clear to pump.
2. Broken Engine to Pump Hub Coupler.	Check Coupler. Replace if defective. See Section 5 Procedures for proper Coupler gap setting.
3. Incorrect pump P1 Compensator and/or Load Sense pressure or adjustment.	Check pressure settings. See Section 5 Procedures for pressure setting procedure.
4. Defective Pump P1.	Check Pump. Repair or replace if defective.
5. Open System Relief valve RV1.	Check Relief valve setting and operation. Replace if defective. See Section 5 Procedures for pressure setting.

### 4.3-2 Steering Inoperative

1. Stuck or defective Steer Priority valve V1.	Check valve. Repair or replace if defective.
2. Defective or plugged Orifice OR4.	Check that orifice is clean and operating. Replace if defective.
3. Incorrectly adjusted or defective Steer Relief valve RV2.	Adjust valve. Repair or replace if defective. See Section 5 Procedures for pressure setting.
4. Load Sense circuit preventing pump from achieving full stroke.	Check that Check Valve CV1 is clean and operating. Replace if defective.
5. Stuck or defective Steer Right valve 5H-23 or Steer Left valve 5H-24.	Check valve. Replace if defective.
6. Steer cylinder C7 (SJ9233/43/53 RT) or C3 (SJ9664 RT) damaged or bypassing internally.	Check cylinder. Repair or replace if defective.

### 4.3-3 Drive Inoperative

1. Open or defective Flee Wheel Valve NV1.	Close valve. Repair or replace if defective.
2. Stuck or defective Drive reverse valve 3H-15 or Drive Forward valve 3H-16.	Check valves. Repair or replace if defective.
3. Defective Steer Priority valve V1.	Check valve. Repair or replace if defective.
4. Incorrectly adjusted or defective System Relief valve RV1.	Adjust valve. Repair or replace if defective. See Section 5 Procedures for pressure setting.
5. Defective Drive valve V2 (SJ9233/43/53 RT) or V3 (SJ9664 RT).	Check valve. Repair or replace if defective.
6. Incorrectly adjusted or defective Pressure Reducing valves PR1 and/or PR2 preventing pilot pressure for Forward and Reverse valves.	Adjust valves. Repair or replace if defective. See Section 5 Procedures for pressure setting.

7. Defective Counterbalance valves CB1 and/or CB2.	Check valves. Repair or replace if defective.
8. Stuck or defective Dump Valve 2H-21.	Check valve. Repair or replace if defective.
9. Load Sense circuit preventing pump from achieving full stroke.	Check that Check Valves CV2 and CV3 are clean and operating. Replace if defective.
10. Defective Drive motor M1.	Check motor. Repair or replace if defective.
11. Brakes not released.	Check Brakes. Check Brake valve 3H-30. Repair or replace if defective. See Brakes Will Not Release section 4.3-6

#### 4.3-4 Reverse Drive Inoperative

1. Stuck or defective Drive Reverse valve 3H-15.	Check valve. Repair or replace if defective.
2. Load Sense circuit preventing pump from achieving full stroke.	Check that Check Valve CV3 is clean and operating. Replace if defective.
3. Defective Dump Valve 2H-21.	Check valve. Repair or replace if defective.
4. Stuck or defective Drive valve V2 (SJ9233/43/53 RT) or V3 (SJ9664 RT).	Check valve. Repair or replace if defective.
5. Stuck or defective Counterbalance valve CB1 and/or CB2.	Check valves. Clean or replace if defective.

#### 4.3-5 Forward Drive Inoperative

1. Stuck or defective Drive Forward valve 3H-16.	Check valve. Repair or replace if defective.
2. Load Sense circuit preventing pump from achieving full stroke.	Check that Check Valve CV2 is clean and operating. Replace if defective.
3. Stuck or defective Dump Valve 2H-21.	Check valve. Repair or replace if defective.
4. Stuck or defective Drive valve V2 (SJ9233/43/53 RT) or V3 (SJ9664 RT).	Check valve. Repair or replace if defective.
5. Stuck or defective Counterbalance valve CB1 and/or CB2.	Check valves. Clean or replace if defective.

#### 4.3-6 Brakes Will Not Release

1. Defective or incorrectly set Pressure Reducing valve PR2.	Check valve. Repair or replace if defective. See Section 5 for Procedure for pressure setting.
2. Stuck or defective Brake valve 3H-30.	Check valve. Repair or replace if defective.
3. Stuck or defective Auto Reset Brake Override valve V3.	Check valve. Repair or replace if defective.
4. Stuck or defective Brake Hand Pump P2.	Clean or replace if defective.
5. Bypassing or defective Brake SAHR cylinders C8L and C8R (SJ9233/43/53 RT) or C4L and C4R (SJ9664 RT) in Rear Drive Axle.	Check Rear Axle Brake operation. Repair or replace if defective.



### 4.3-7 Brakes Will Not Engage

- |   |   |
|---|---|
| 1. Defective or incorrectly set Pressure Reducing valves PR1 and/or PR2.  | <b>Check valves. Repair or replace if defective. See Section 5 Procedures for pressure setting.</b>                       |
| 2. Load Sense circuit from Drive forward or reverse circuit preventing pump from achieving full stroke.                                       | <b>Check Drive circuit operation. Repair or replace if defective.</b>   |
| 3. Stuck or defective Brake valve 3H-30.  | <b>Check valve. Repair or replace if defective.</b>   |
| 4. Stuck or defective Auto Reset Brake Override valve V3.   | <b>Check valve. Repair or replace if defective.</b>   |
| 5. Defective Brake SAHR cylinders C8L and C8R (SJ9233/43/53 RT) or C4L and C4R (SJ9664 RT) or brake discs in Rear Drive Axle incorrectly set. | <b>Check Rear Axle Brake settings. Repair or replace if defective. See Section 5 Procedures for adjustment procedure.</b> |

### 4.3-8 Differential Lock Will Not Engage

- |   |   |
|---|---|
| 1. Defective or incorrectly set Pressure Reducing valves PR1 and/or PR2.                                    | <b>Check valves. Repair or replace if defective. See Section 5 Procedures for pressure setting.</b>                                     |
| 2. Load Sense circuit from Drive forward or reverse circuit preventing pump from achieving full stroke.     | <b>Check Drive circuit operation. Repair or replace if defective.</b>   |
| 3. Stuck or defective Diff. Lock valve 3H-165A.   | <b>Check valve. Repair or replace if defective.</b>   |
| 4. Defective Diff. Lock Cylinder C9 (SJ9233/43/53 RT) or C5 (SJ9664 RT) in Rear Drive Axle incorrectly set. | <b>Check Rear Axle Diff Lock cylinder operation. Repair or replace if defective. See Section 5 Procedures for adjustment procedure.</b> |

### 4.3-9 2-Speed Motor Will Not Engage - SJ9233/43/53 RT

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|---|--|
| 1. Defective or incorrectly set Pressure Reducing valve PR2 . | <b>Check valve. Repair or replace if defective. See Section 5 Procedures for pressure setting.</b> |
| 2. Stuck or defective 2-Speed valve 3H-20B.                   | <b>Check valve. Repair or replace if defective.</b>  |
| 3. Defective or incorrectly set Pressure Reducing valve PR3.  | <b>Check valve. Repair or replace if defective. See Section 5 Procedures for pressure setting.</b> |
| 4. Defective or plugged Orifice OR3.                          | <b>Check that orifice is clean and operating. Replace if defective.</b>                            |
| 5. Defective Drive motor M1.                                  | <b>Check motor. Repair or replace if defective.</b>  |

### 4.3-10 2-Speed Motor Will Not Engage - SJ9664 RT

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|--|--|
| 1. Defective or incorrectly set Pressure Reducing valve PR3. | <b>Check valve. Repair or replace if defective. See Section 5 Procedures for pressure setting.</b> |
|--|--|

- |   |  |
|---|--|
| 2. Stuck or defective 2-Speed valve 3H-20B. | Check valve. Repair or replace if defective. |
| 3. Defective Drive motor M1.                | Check motor. Repair or replace if defective. |

#### 4.3-11 Lift (Up) Circuit Inoperative - SJ9233/43/53 RT

- |   |  |
|---|--|
| 1. Machine overloaded and Overload Lights PL1 & 2 on Emergency Stop buttons are flashing. | Check machine limits and reduce weight as required. Refer to Electrical troubleshooting.   |
| 2. Load Sense circuit preventing pump from achieving full stroke.                         | SJ9233/43/53 RT - Check that Check Valve CV4 is clean and operating. Replace if defective.<br>SJ9664 RT - Check that Check Valve CV5 is clean and operating. Replace if defective. |
| 3. Stuck or defective Lift valve 3H-14.   | Check valve. Repair or replace if defective.   |
| 4. Incorrectly adjusted or defective Lift Relief valve RV3.                               | Adjust valve. Repair or replace if defective. See Section 5 Procedures for pressure setting.   |
| 5. Stuck or defective lowering valve 2H-13.   | Check valve. Repair or replace if defective.   |
| 6. Stuck or defective Lift Holding Relief Valves RV4, RV5, RV6, RV7, RV8 and/or RV9.      | Check valves. Repair or replace if defective.  |
| 7. Hydraulic oil level too low.   | Fully lower the Platform and fill tank to top mark on sight gauge.   |
| 8. Stuck or defective Holding valve(s) 2H-13C-1 & 2, 2H-13D-1 & 2, or 2H-13E-1 & 2.       | Check valves. Repair or replace if defective.  |
| 9. Leaking or defective Lift Cylinder(s).   | Check cylinders. Repair or replace if defective.   |

#### 4.3-12 Lift (Up) Circuit Inoperative - SJ9664 RT

- |   |  |
|---|--|
| 1. Machine overloaded and Overload Lights PL1 & 2 on Emergency Stop buttons are flashing. | Check machine limits and reduce weight as required. Refer to Electrical troubleshooting.     |
| 2. Load Sense circuit preventing pump from achieving full stroke.                         | Check that Check Valve CV5 is clean and operating. Replace if defective.                     |
| 3. Stuck or defective Lift valve 3H-14.   | Check valve. Repair or replace if defective.   |
| 4. Stuck or defective Check Valve CV6.  | Check that Check Valve CV6 is clean and operating. Replace if defective.                     |
| 5. Incorrectly adjusted or defective Lift Relief valve RV3.                               | Adjust valve. Repair or replace if defective. See Section 5 Procedures for pressure setting. |
| 6. Stuck or defective lowering valve 2H-13.   | Check valve. Repair or replace if defective.   |
| 7. Stuck or defective Lift Holding Relief Valves RV4 and/or RV5.                          | Check valves. Repair or replace if defective.  |
| 8. Hydraulic oil level too low.   | Fully lower the Platform and fill tank to top mark on sight gauge.                           |
| 9. Stuck or defective Holding valve(s) 2H-13C-1, or 2H-13D-1.                             | Check valves. Repair or replace if defective.  |

- |  |  |
|--|--|
| 10. Leaking or defective Lift Cylinder(s). | Check cylinders. Repair or replace if defective. |
|--|--|

#### 4.3-13 Lower (Down) Circuit Inoperative

- |   |  |
|---|--|
| 1. Machine overloaded and Overload Lights PL1 & 2 on Emergency Stop buttons are flashing.   | Check machine limits and reduce weight as required. Refer to Electrical troubleshooting. |
| 2. Stuck or defective lowering valve 2H-13.   | Check valve. Repair or replace if defective.   |
| 3. SJ9233/43/53 RT - Stuck or defective Holding valve(s) 2H-13C-1 & 2, 2H-13D-1 & 2, or 2H-13E-1 & 2.<br>SJ9664 RT - Stuck or defective Holding valve(s) 2H-13C-1, or 2H-13D-1. | Check valves. Repair or replace if defective.  |

#### 4.3-14 Hydraulic 7.5kW Generator Inoperative (if equipped)

- |   |  |
|---|--|
| 1. SJ9233/43/53 RT - Incorrectly adjusted or defective Relief Valve RV1.      | Check valve. Repair or replace if defective.   |
| 2. SJ9664 RT - Incorrectly adjusted or defective Pressure Reducing Valve PR1. | Check valve. Repair or replace if defective.   |
| 3. Stuck or defective Hydraulic Generator valve 2H-85A.                       | Check valve. Repair or replace if defective.   |
| 4. Load Sense circuit preventing pump from achieving full stroke.             | Check that Load Sense Check Valve CV17 is clean and operating. Replace if defective. |
| 5. Incorrectly adjusted or defective Flow Control valve FR2.                  | Adjust valve. Replace if defective.  |
| 6. Stuck or defective Check Valve CV16 (SJ9233/43/53 RT) or CV18 (SJ9664 RT). | Check that Check Valve CV18 is clean and operating. Replace if defective.            |
| 7. Defective Hydraulic Generator Motor M2.                                    | Check motor. Repair or replace if defective.   |

#### 4.3-15 All Outriggers Inoperative

- |   |  |
|---|--|
| 1. Defective or incorrectly set Pressure Reducing valve PR2 (SJ9233/43/53 RT) or PR1 (SJ9664 RT). | Check valve. Repair or replace if defective. See Section 5 Procedures for pressure setting.  |
| 2. Stuck or defective Outrigger Enable valve 2H-17.   | Check valve. Repair or replace if defective.   |
| 3. Load Sense circuit preventing pump from achieving full stroke.                                 | SJ9233/43/53 RT - Check that Check Valves CV4 in Drive Manifold and CV5 in Aux. Manifold are clean and operating. Replace if defective.<br>SJ9664 RT - Check that Check Valves CV4 in Drive Manifold and CV8 in Aux. Manifold are clean and operating. Replace if defective. |

#### 4.3-16 Left Front Outrigger Inoperative

- |  |                                    |
|--|------------------------------------|
| 1. Stuck or defective Retract valve 5H-71A or Extend valve 5H-75A. | Clean valve. Replace if defective. |
|--|------------------------------------|

- |   |   |
|---|---|
| 2. Load Sense circuit preventing pump from achieving full stroke.                   | <b>SJ9233/43/53 RT - Check that Check Valve CV7 is clean and operating. Replace if defective.</b> |
|   | <b>SJ9664 RT - Check that Check Valve CV9 is clean and operating. Replace if defective.</b>       |
| 3. Stuck or defective pilot Check valve CV11 (SJ9233/43/53 RT) or CV13 (SJ9664 RT). | <b>Check valve. Replace if defective.</b>   |
| 4. Bypassing Outrigger Cylinder C10 (SJ9233/43/53 RT) or C6 (SJ9664 RT).            | <b>Repack cylinder. Replace if defective.</b>   |

#### 4.3-17 Right Front Outrigger Inoperative

- |   |   |
|---|---|
| 1. Stuck or defective Retract valve 5H-72A or Extend valve 5H-76A.                  | <b>Clean valve. Replace if defective.</b>   |
| 2. Load Sense circuit preventing pump from achieving full stroke.                   | <b>SJ9233/43/53 RT - Check that Check Valve CV8 is clean and operating. Replace if defective.</b> |
|   | <b>SJ9664 RT - Check that Check Valve CV10 is clean and operating. Replace if defective.</b>      |
| 3. Stuck or defective pilot Check valve CV12 (SJ9233/43/53 RT) or CV14 (SJ9664 RT). | <b>Check valve. Replace if defective.</b>   |
| 4. Bypassing Outrigger Cylinder C11 (SJ9233/43/53 RT) or C7 (SJ9664 RT).            | <b>Repack cylinder. Replace if defective</b>  |

#### 4.3-18 Right Rear Outrigger Inoperative

- |  |   |
|--|---|
| 1. Stuck or defective Retract valve 5H-73A or Extend valve 5H-77A.                 | <b>Clean valve. Replace if defective.</b>   |
| 2. Load Sense circuit preventing pump from achieving full stroke.                  | <b>SJ9233/43/53 RT - Check that Check Valve CV9 is clean and operating. Replace if defective.</b> |
|  | <b>SJ9664 RT - Check that Check Valve CV11 is clean and operating. Replace if defective.</b>      |
| 3. Stuck or defective pilot Check valve CV1 (SJ9233/43/53 RT) or CV15 (SJ9664 RT). | <b>Check valve. Replace if defective.</b>   |
| 4. Bypassing Outrigger Cylinder C12 (SJ9233/43/53 RT) or C8 (SJ9664 RT).           | <b>Repack cylinder. Replace if defective</b>  |

#### 4.3-19 Left Rear Outrigger Inoperative

- |  |  |
|--|--|
| 1. Stuck or defective Retract valve 5H-74A or Extend valve 5H-78A. | <b>Clean valve. Replace if defective.</b>  |
| 2. Load Sense circuit preventing pump from achieving full stroke.  | <b>SJ9233/43/53 RT - Check that Check Valve CV10 is clean and operating. Replace if defective.</b> |
|  | <b>SJ9664 RT - Check that Check Valve CV12 is clean and operating. Replace if defective.</b>       |

- |   |  |
|---|--|
| 3. Stuck or defective pilot Check valve CV14 (SJ9233/43/53 RT) or CV16 (SJ9664 RT). | <b>Check valve. Replace if defective.</b>    |
| 4. Bypassing Outrigger Cylinder C13 (SJ9233/43/53 RT) or C9 (SJ9664 RT).            | <b>Repack cylinder. Replace if defective</b> |

#### 4.3-20 Outrigger(s) Drift Down - SJ9233/43/53 RT

- |  |   |
|--|---|
| 1. Defective pilot Check valve(s) on Outrigger Cylinder(s); Left Front (CV11), Right Front (CV12), Right Rear (CV13) and/or Left Rear (CV14) | <b>Clean valve(s). Replace if defective.</b>    |
| 2. Outrigger Cylinder(s) bypassing; Left Front (C10), Right Front (C11), Right Rear (C12) and/or Left Rear (C14).                            | <b>Repack cylinder(s). Replace if defective</b> |

#### 4.3-21 Outrigger(s) Drift Down - SJ9664 RT

- |  |   |
|--|---|
| 1. Defective pilot Check valve(s) on Outrigger Cylinder(s); Left Front (CV13), Right Front (CV14), Right Rear (CV15) and/or Left Rear (CV16) | <b>Clean valve(s). Replace if defective.</b>    |
| 2. Outrigger Cylinder(s) bypassing; Left Front (C6), Right Front (C7), Right Rear (C8) and/or Left Rear (C9).                                | <b>Repack cylinder(s). Replace if defective</b> |

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# Section 5 – Procedures

## 5.1 General

The following information is provided to assist you in the use and application of servicing and maintenance procedures contained in this chapter.



### NOTE

*The illustrations in this manual are for instructional purposes only. The models and components shown may appear somewhat different from those on your actual MEWP.*

### 5.1-1 Safety and Workmanship

Your safety, and that of others, is the first consideration when engaging in the maintenance of equipment. Always be conscious of weight. Never attempt to move heavy parts without the aid of a mechanical device. Do not allow heavy objects to rest in an unstable position. When raising a portion of the equipment, ensure that adequate support is provided.

Unless specifically noted otherwise, before beginning any procedure:

1. Park the mobile elevating work platform (MEWP) on a firm, level surface.
2. Fully lower the machine.
3. Push in the emergency stop buttons on the platform control console and the base control console.
4. Turn the off/platform/base key switch to the off position. Remove the key.
5. Turn the main power disconnect switch to the off position.

After completing any procedure which involves modifying, adjusting, or replacing any hydraulic or electrical components, perform all of the function tests given in your unit's Operating Manual.

### WARNING

**Ensure you maintain three points of contact when mounting/dismounting the platform.**

### WARNING

**DO NOT operate any control on the platform control console without proper fall protection secured to the designated location in the platform. Failure to avoid this hazard could result in death or serious injury!**

### WARNING

**Make sure there are no people or obstructions in the test area, and there is sufficient space for the scissor and drive functions required for the given procedures.**

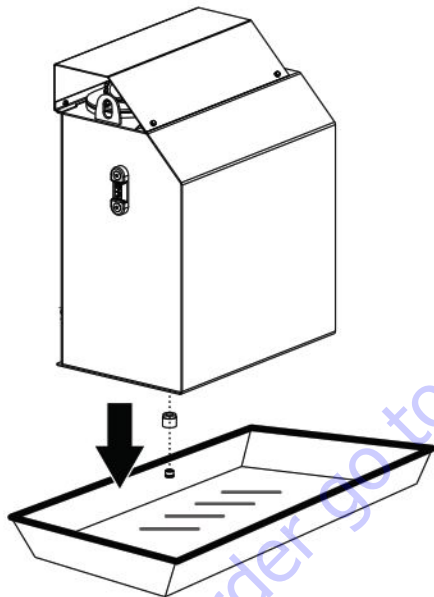


## 5.2 Base

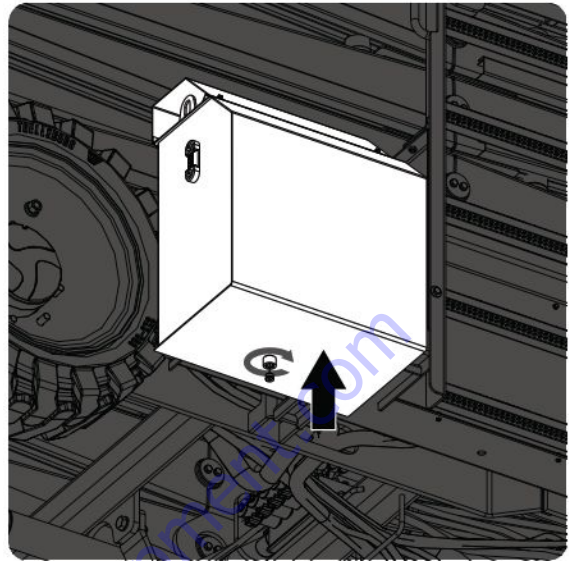
### 5.2-1 Changing the Hydraulic Oil

Refer to *Section 1 – Scheduled Maintenance*

1. Make sure the MEWP is on a firm level surface, fully lowered, and the outriggers (if equipped) are fully retracted.
2. Run the engine to allow the hydraulic oil to warm up.
3. Turn off the engine. Turn the main power disconnect switch to the off position.
4. Place a suitable container under the hydraulic tank.
5. Remove the drain plug from the hydraulic oil tank. Allow all of the hydraulic oil to drain into the container.



6. Install oil drain plug with a new sealing ring and tighten it firmly.



7. Refill the hydraulic tank with new oil as per the specifications. Refer to *2.7 Specifications - SJ9253 RT, SJ9243 RT, SJ9253 RT*.
8. Check for leakage.
9. Clean up any oil that may have spilled during this procedure.
10. Check the hydraulic oil level. The hydraulic oil level should be at or slightly above the top mark on the sight gauge.

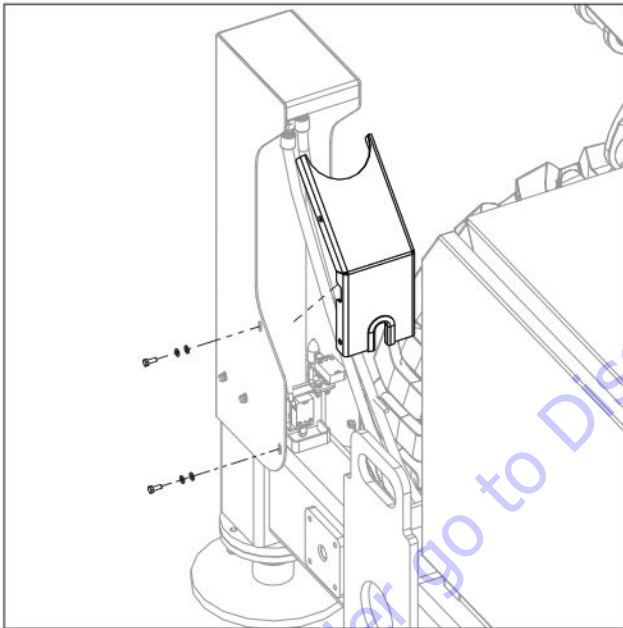
## 5.2-2 Outrigger Lower Limit Switch Replacement and Adjustment

### Machine Preparation

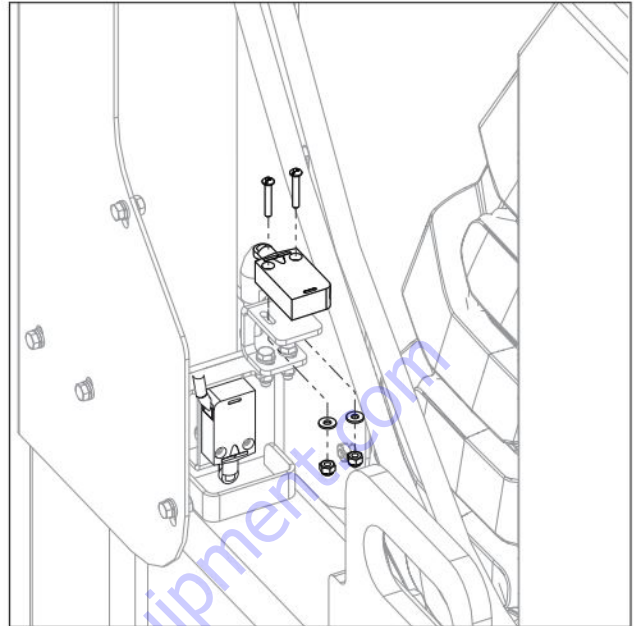
1. Park the MEWP on a firm level surface.
2. Fully retract the outriggers.
3. Turn the main power disconnect switch to the off position.
4. Chock or block the wheels to keep the MEWP from rolling forward or backward.

### Limit Switch Removal

1. Remove the cover for the limit switch.



2. Remove the limit switch.



3. Remove the limit switch cable from the split loom tubing, cutting tie wraps and tape as needed to free it.
4. Disconnect the connector, and remove the limit switch wires and ferrules. Keep the connector for reuse later. Throw out the old limit switch and cable.

### Limit Switch Replacement

1. Mount the new limit switch loosely on the bracket, using the hardware removed previously.
2. Starting from the top, place the new limit switch cable in the split loom.
3. Adjust the cable in the split loom as needed, and close the split loom by wrapping electrical tape around it at regular intervals. Tie wrap the split loom to the hoses.
4. Cut off any unneeded length from the cable, and strip the end to expose the wires beneath.
5. Strip the ends from each wire and crimp a ferrule onto each wire end.
6. Insert the wires into the connector end removed previously. Reconnect the connector.

### Limit Switch Adjustment

#### IMPORTANT

Fully retract the outriggers before doing these procedures.

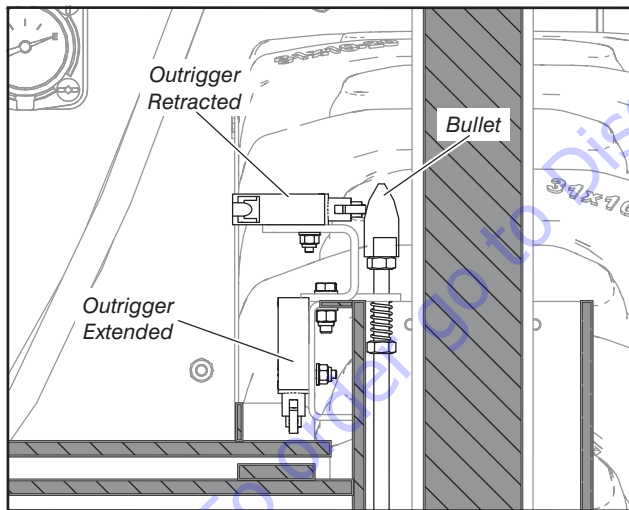
Make sure the base weldment tubes are free of debris.

#### Extend switch procedure

1. Loosen the bolts securing the limit switch to the mount.
2. Slide the limit switch until the plunger is pressed in halfway against the base weldment.
3. Apply a small amount of Loctite to the bolts, and tighten them.

#### Retract switch procedure

1. Loosen the bolts securing the limit switch to the mount.
2. Slide the limit switch until the plunger is pressed in halfway against the “bullet” on the rod.
3. Apply a small amount of Loctite to the bolts, and tighten them.

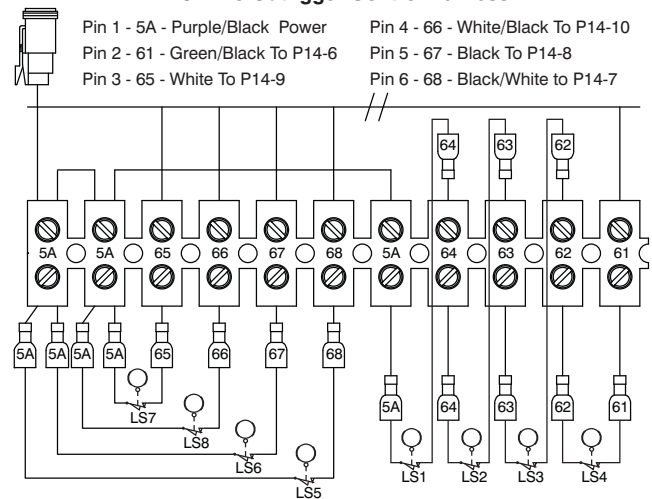


### Test the Limit Switch

1. Turn the main power disconnect switch to the on position. Start the engine.
2. With the outriggers fully retracted, the MEWP should be drivable. With the outriggers slightly extended, the MEWP should not be drivable.
3. Use the diagnostic menu in the display and make sure that an input signal is present.
  - P14-6 = All outriggers retracted
  - P14-7 = Rear Left Outrigger extended
  - P14-8 = Rear Right Outrigger extended
  - P14-9 = Front Left Outrigger extended
  - P14-10 = Front Right Outrigger extended
4. In the case that an input signal is not present, locate the outrigger terminal strip and test the continuity of the limit switches with a multimeter.
5. Replace or adjust the limit switches that do not function correctly.

Switch	LS1	LS2	LS3	LS4	LS5	LS6	LS7	LS8
Location	LR	RR	RF	LF	LR	RR	LF	RF
State	N/O	N/O	N/O	N/O	N/C	N/C	N/C	N/C

#### J4 - To Outrigger Control Harness

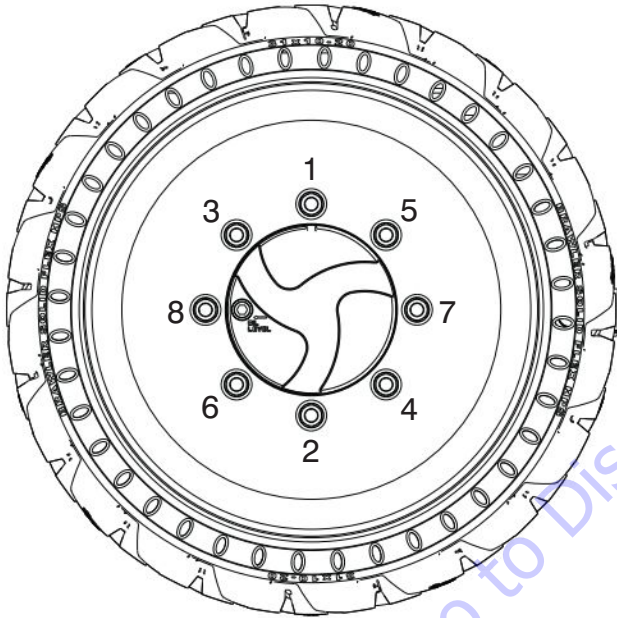


## 5.3 Axles

### 5.3-1 Wheel Bolt/Nut Inspection and Torquing Procedure

It is necessary to check the torque on all wheel nuts and wheel bolts at pre-delivery, after 8 hours of operation, and at weekly intervals using the following procedure:

1. Confirm that each wheel fastener is torqued to 440 N•m (325 lbf•ft). All fasteners must be torqued using the tightening sequence shown below.



**Figure 01** Diagram 5-4. Wheel Fastener Tightening Sequence

2. Again, confirm that each wheel fastener is torqued to the specified tolerance. Re-torque as necessary until all fasteners are properly torqued.

### 5.3-2 Wheel Reinstallation and Torquing Procedure

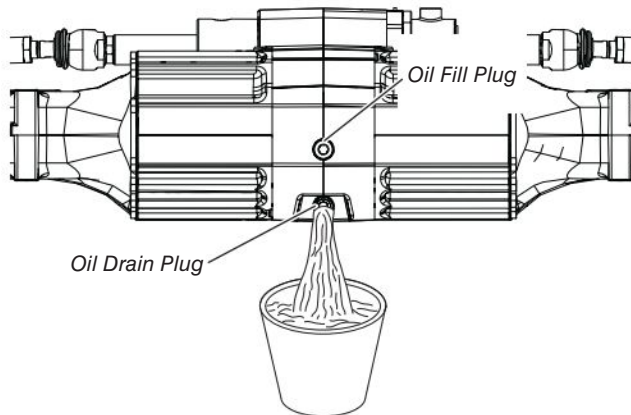
When a wheel/tire assembly has been removed or replaced, follow the procedure below to make sure it is installed correctly.

1. Inspect the wheel fastener threads for damage of defects. Replace if defective.
2. Clean the mounting surfaces of the hub and wheel rim of debris, rust, excess paint, etc.
3. Mount the wheel on the hub, centering the mounting holes on the wheel studs or bolt holes. Use an appropriate lifting device as required.
4. Install the wheel nuts. Hand tighten them to center the rim.
5. Torque the nuts or bolts in stages using the tightening sequence, increasing 68 N•m (50 lbf•ft) until a torque of 440 N•m (325 lbf•ft) is reached.
6. Confirm the torque values. If any are found below 440 N•m (325 lbf•ft), repeat the complete sequence until there is no change in the torque values. If possible, drive the machine prior to checking the torques.
7. Check the torque values after 8 hours of operation, and then at weekly intervals.

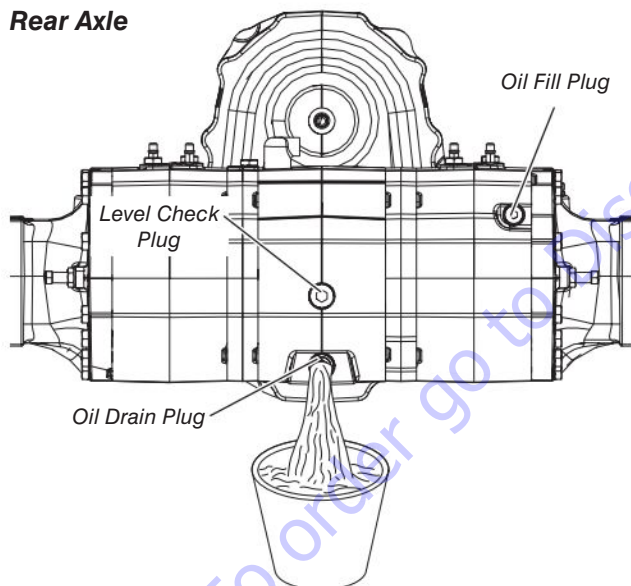
### 5.3-3 Change the Oil in the Axles

1. Place a suitable container under the axle.
2. Remove the fill plug to release the pressure.
3. Remove the drain plug and allow the oil to drain into the container.

#### Front Axle



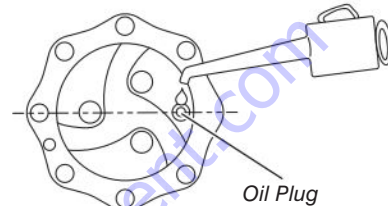
#### Rear Axle



4. Reinstall the drain plugs.
5. Remove the check level/oil fill plug.
6. Refill the axle with new oil until oil starts coming out from the check level/oil fill plug. Refer to [2.7 Specifications - SJ9253 RT, SJ9243 RT, SJ9253 RT](#)
7. Reinstall the check level plug.
8. Reinstall the oil fill plug.

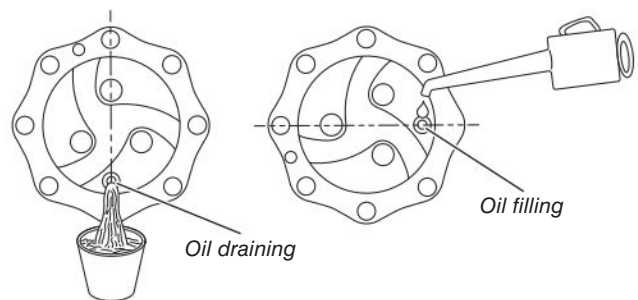
### 5.3-4 Check the Oil Level in the Torque Hubs

1. Drive the MEWP to rotate the hub until the plug is in the 3 or 9 o'clock position. Shut off the engine.
2. Remove the plug and check the oil level. The oil level should be even with the bottom of the plug hole. Add oil if needed. Refer to [2.7 Specifications - SJ9253 RT, SJ9243 RT, SJ9253 RT](#) for oil specifications.



### 5.3-5 Change the Oil in the Torque Hubs

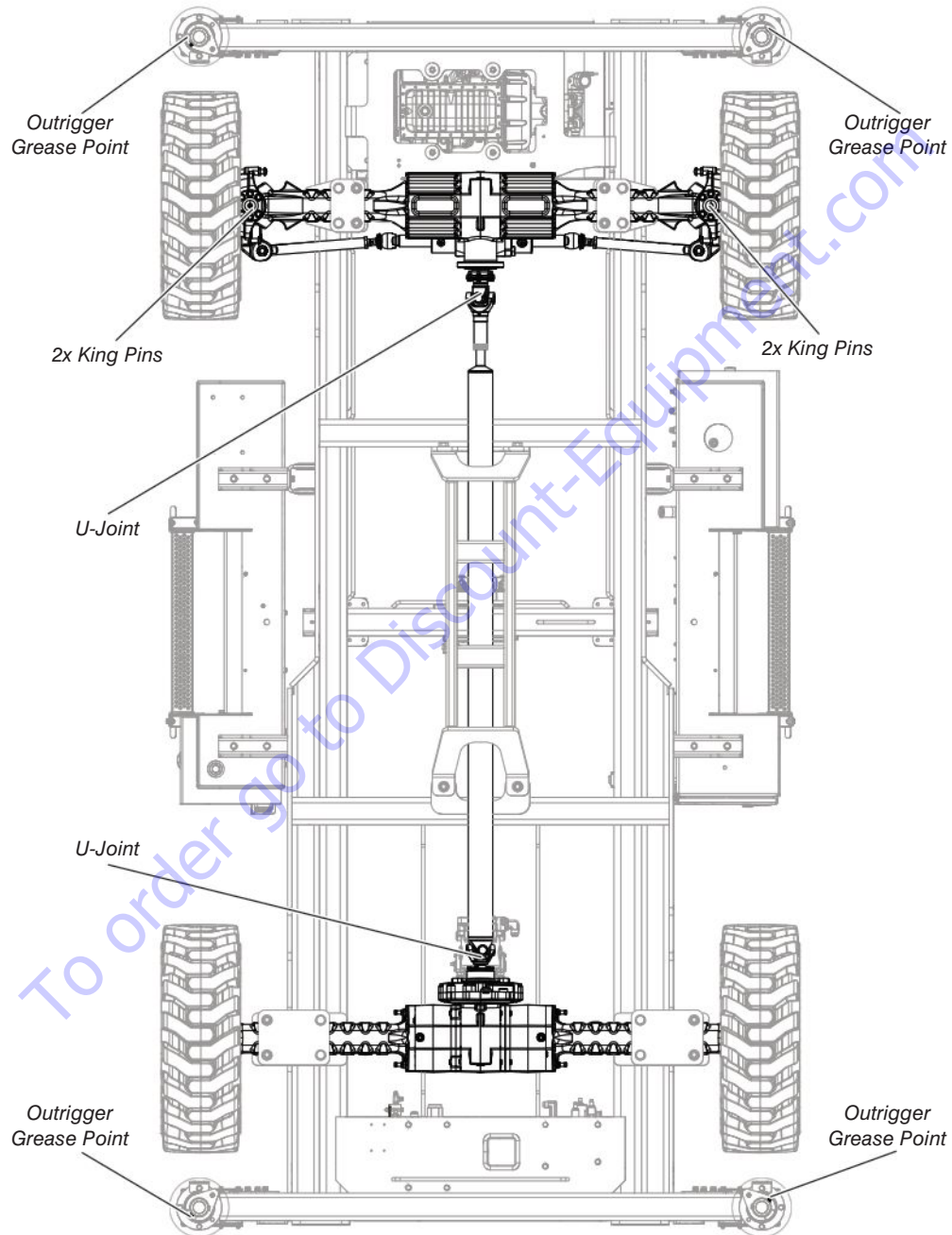
1. Drive the MEWP to rotate the hub until the plug is in the 12 o'clock position.
2. Loosen the plug to release the internal pressure.
3. Start the engine and drive the MEWP until the fill/drain port of one of the hubs is in the 6 o'clock position. Shut off the engine. Place a container under the fill/drain port.
4. Remove the plug and allow all of the oil to drain, watching carefully to avoid spills.
5. Restart the engine and drive the MEWP until the drain plug is in the 3 or 9 o'clock position. Shut off the engine.
6. Refill the hub with new oil as per the specifications. Refer to [2.7 Specifications - SJ9253 RT, SJ9243 RT, SJ9253 RT](#).
7. Repeat the above steps with the other three wheel hubs.





### 5.3-6 Axle Grease Points

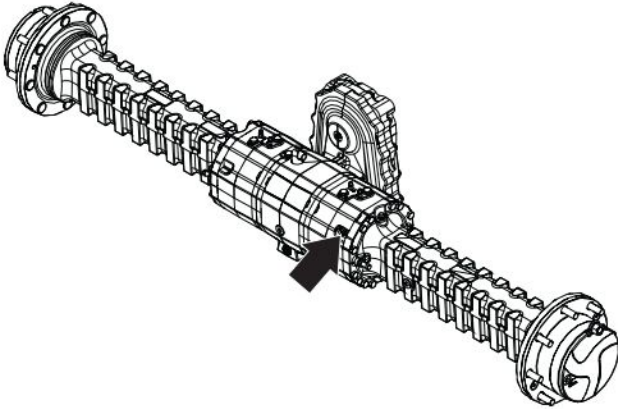
1. Wipe each fitting clean.
2. Apply grease to each fitting until a small amount of grease can be seen coming out around the joint or bearing. Refer to [2.6 Axle Maintenance Intervals](#) for the recommended grease types.



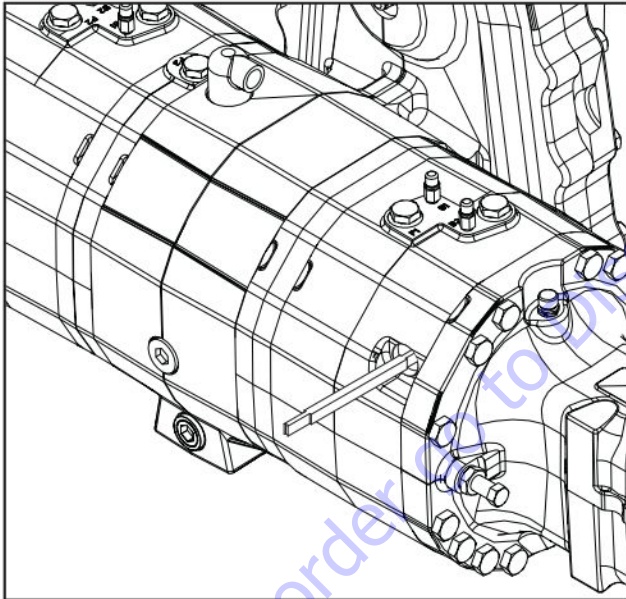


### 5.3-7 Brake Inspection

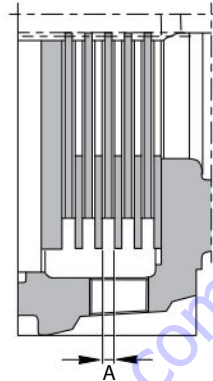
1. Remove the oil fill plug from one of the rear axle arms, as shown below.



2. Insert a 5.2 mm feeler gauge in the rear axle into the oil fill port.



3. Use the gauge to check the gap between the disks (A). The minimum distance allowed is 5.2 mm. Reinstall the oil level plug.



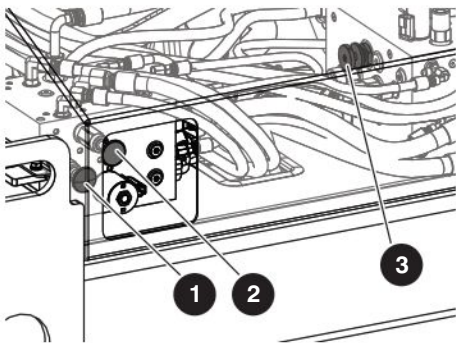
4. Repeat the inspection on the other axle arm. If the gap is smaller than 5.2 mm between the disks of either arm (i.e. the gauge doesn't fit), the brake disks must be replaced on both arms.

### 5.3-8 Release the brakes manually

#### **⚠ WARNING**

Do not manually disengage the brakes if the MEWP is on a slope. If you do not obey, there is a risk of death or serious injury.

1. Make sure that the MEWP is on firm, level ground. Use wheel chocks or blocks at the front and rear of the wheels to prevent MEWP movement.
2. Turn the **main power disconnect** switch to the off position.
3. Push the **plunger** ① of the brake auto-reset valve on the drive manifold at the rear side of the base.



4. Continuously push and release the **knob** ② of the hand pump until firm resistance is felt or until a pressure gauge shows 21 - 24 bar (300 - 350 psi). The brake is now released to permit wheel rolling.
5. Turn the freewheeling valve knob ③ counterclockwise to a fully open position.

### 5.3-9 Winch and tow the MEWP

#### **⚠ WARNING**

Tip-over hazard. Make sure the platform is fully lowered before you push, winch or tow. Sudden movement can cause the MEWP to become unstable. If you do not obey, there is a risk of death or serious injury.

#### **⚠ WARNING**

Tip-over hazard. In emergency situations, where the MEWP functions are unavailable, and an obstruction prevents the platform lower function, carefully move the MEWP. Move the MEWP sufficiently far away to clear the obstruction. Do not move at a speed faster than 50 mm/sec (2 in/sec). If you do not obey, there is a risk of death, serious injury, and/or MEWP damage.

#### **⚠ WARNING**

When you push, winch or tow, do not move the MEWP at a speed faster than 3.2 km/h (2.0 mph). If you do not obey, there is a risk of death or serious injury.

#### **⚠ WARNING**

Do not push, winch, or tow the MEWP onto a slope. Only brake the tow vehicle slowly. Do not pull the MEWP down a slope to a winch. Make sure that there are no personnel in the path you plan to travel. If you do not obey, there is a risk of death, serious injury, and/or MEWP damage.

#### **⚠ WARNING**

Do not manually disengage the brakes if the MEWP is on a slope. If you do not obey, there is a risk of death or serious injury.

#### **⚠ WARNING**

Tip-over hazard. Disengage the brakes manually before you push, winch, or tow the MEWP. If you do not obey, there is a risk of death or serious injury.

1. Release the brakes manually. Refer to section [5.3-8 Release the brakes manually](#).
2. Remove the wheel chocks or blocks.
3. Push, winch, or tow the MEWP to the necessary location.
4. Put the MEWP on a firm, level surface.
5. Use wheel chocks or blocks at the front and rear of the wheels to prevent MEWP movement.
6. Pull out the **plunger** of the brake auto-reset valve to re-engage the brakes.

### **WARNING**

**Engage the brakes immediately after the MEWP is at the necessary location. If you do not obey, there is a risk of death or serious injury.**

7. Turn the **freewheeling valve knob** clockwise to a fully closed position.

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## 5.4 Engines

Maintaining the engine components is essential to the good performance and service life of the MEWP.

### 5.4-1 Replace the Engine Oil and Filter

Periodic replacement of the engine oil and filter is essential to good engine performance.



#### NOTE

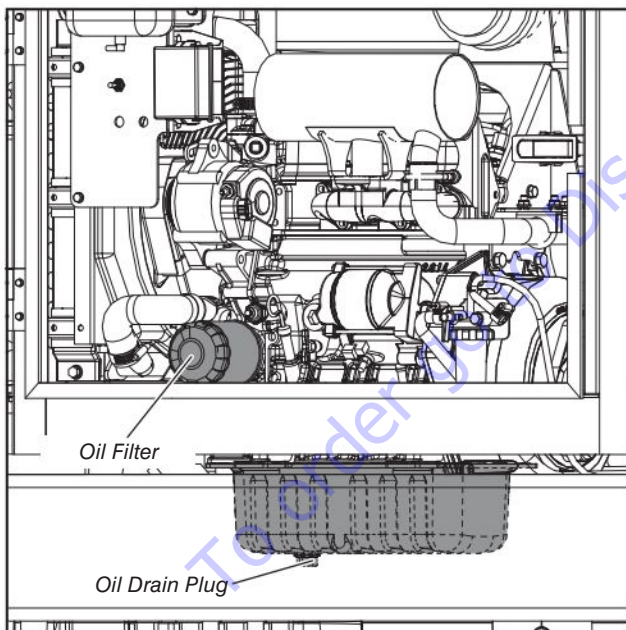
Warm the engine to a normal operating temperature before starting this procedure.



#### CAUTION

**Beware of hot engine components and hot oil. Contact with hot components can cause severe burns.**

1. Turn the engine off.
2. Place a suitable container under the engine oil drain.



3. Remove the oil drain plug and allow all of the engine oil to drain into the container.



#### WARNING

**Dispose of oil in accordance with local and federal regulations.**

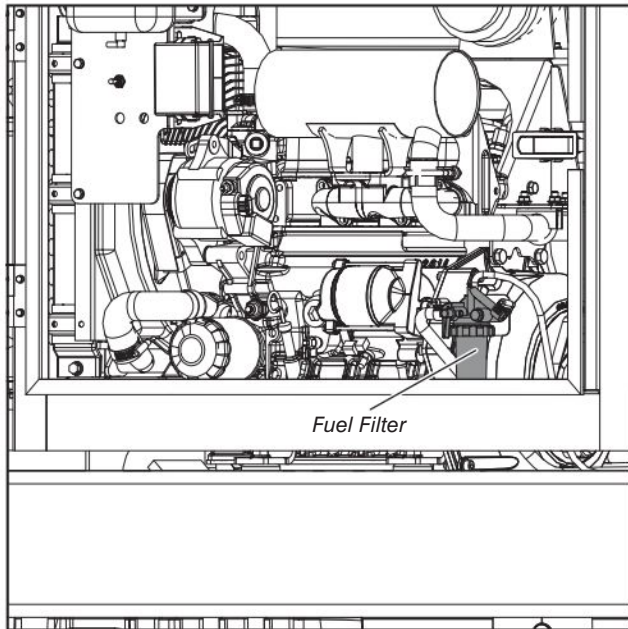
4. Install the oil drain plug with a new sealing ring. Tighten it firmly.

5. Open the engine door and locate the oil filter.
6. Remove the oil filter and catch any escaping oil.
7. Clean inside the filter head.
8. Add clean engine oil to the oil filter.
9. Apply a thin layer of engine oil to the new oil filter gasket.
10. Install the filter and tighten it by hand.
11. Clean up any oil that may have spilled during this procedure.
12. Refill the engine with new oil as per the specifications (refer to the engine manual).
13. Start the engine from the base control console and allow the engine to run for 30 seconds, then stop the engine.
14. Check for oil leaks.
15. Check the engine oil level on the dipstick and add oil if needed.
16. Close the engine door.

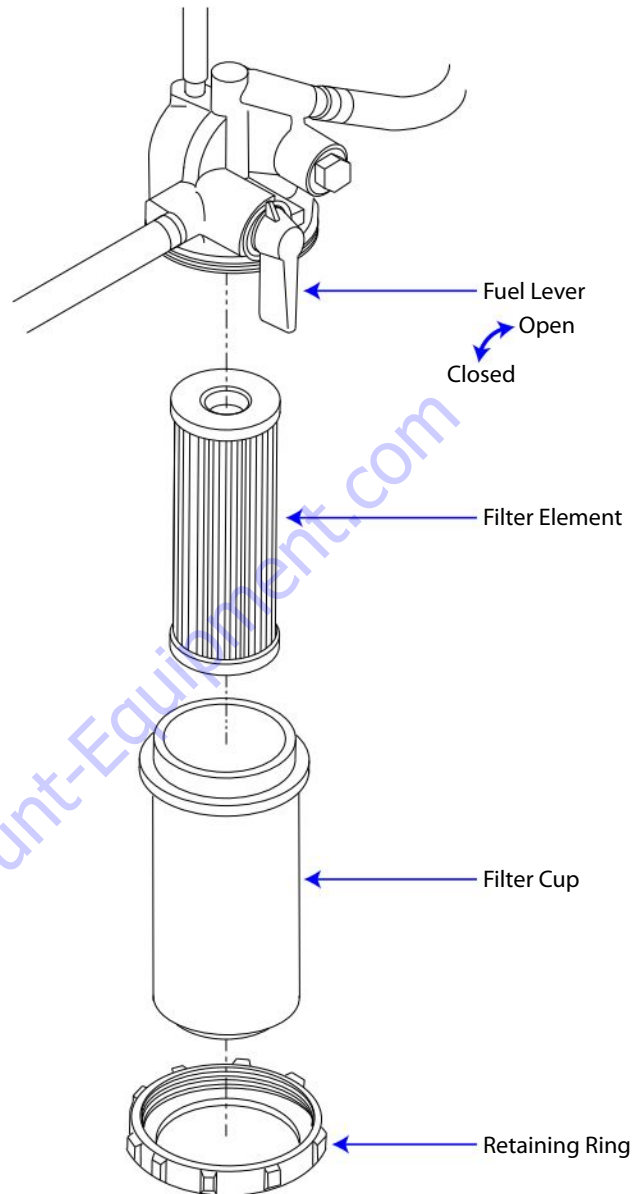
### 5.4-2 Replace the Fuel Filter Element - Diesel

Kubota recommends replacing the fuel filter every 400 hours.

1. Open the engine door and locate the fuel filter.



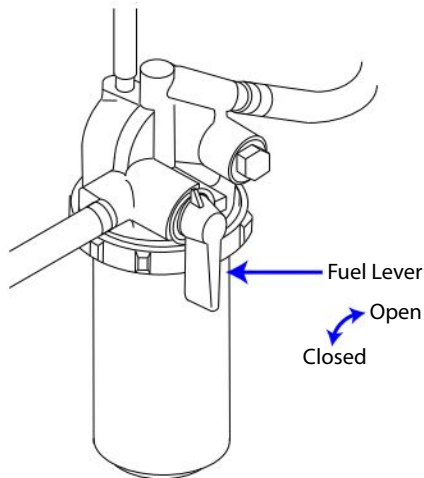
2. Close the fuel filter lever (turn it counterclockwise).
3. Unscrew the retaining ring and remove the filter cup.
4. Remove the old fuel filter element.
5. Rinse the inside of the cup with diesel fuel or kerosene.
6. Install a new fuel filter element, and reassemble the fuel filter cup and retaining ring. Make sure all components are free of dirt and dust.
7. Bleed the fuel system of air (refer to [5.4-3 Bleed the Fuel System of Air - Diesel](#)).
8. Close the engine door.



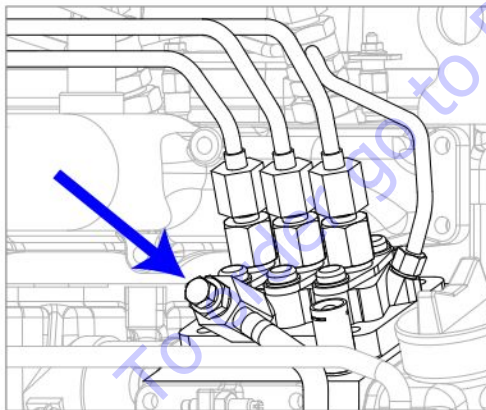
### 5.4-3 Bleed the Fuel System of Air - Diesel

Bleeding the fuel system of air is required after changing fuel hoses or filters, or after the fuel tank has become empty.

1. Allow the engine to cool, if it has been running.
2. Fill up the fuel tank with fuel.
3. Open the fuel filter lever (vertical position).



4. Open the air vent plug on the top of the fuel injection pump a few turns. Some air bubbles should come out.



5. When no more air bubbles are seen, close the air vent plug.



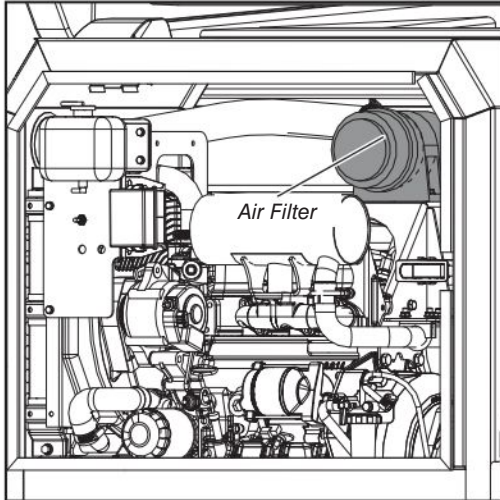
### 5.4-4 Replace the Air Cleaner Element

Engine specifications require that this procedure be performed more often if dusty conditions exist. Refer to the engine manual.

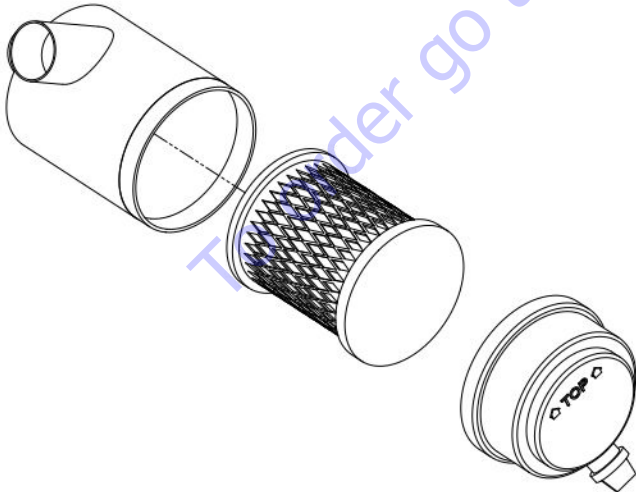
#### **CAUTION**

**Perform this procedure with the engine off.**

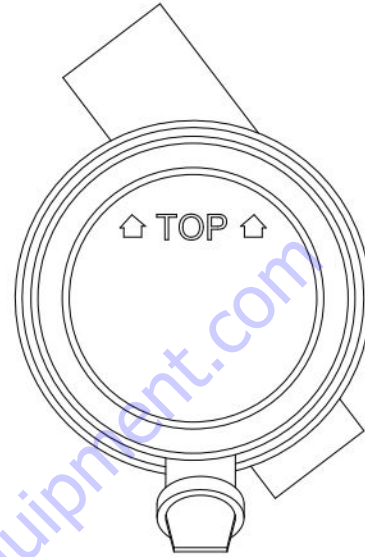
1. Open the engine door and locate the air filter.



2. Unlatch and remove the air cleaner cap. Use a cloth to clean any dirt or dust from out of the cap.
3. Remove the old air cleaner element by pulling it straight out.



4. Install a new air cleaner element, pushing firmly to seat it.
5. Reinstall and latch the air cleaner cap, ensuring the **TOP** mark is facing up.



6. Close the engine door.

### 5.4-5 Check and Replenish the Radiator Coolant Level

Kubota recommends checking the coolant level daily.

#### Check and Replenish the Coolant

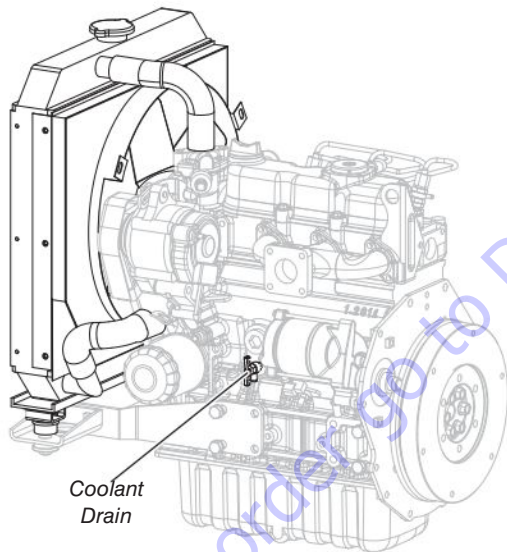
1. Check the coolant level at the recovery tank. The coolant should be between the **FULL** and **LOW** marks.
2. If the coolant is too low, determine the cause and remedy it by following Step A or B below:

#### A - Leaks

3. Inspect both drain plugs and the radiator hoses. Repair or replace faulty or leaking components.
4. Pre-mix 50% long-life coolant and 50% clean, soft water, stirring it well,. Replenish the recovery tank up to the **FULL** line.

#### B - Evaporation

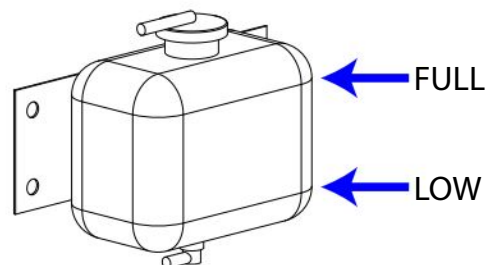
5. Replenish the recovery tank up to the **FULL** line with clean, soft water.



### 5.4-6 Drain and Refill the Radiator

Check the coolant condition annually and replace as required.

1. Place containers under the drain plugs to catch the coolant. One drain plug is located on the underside of the radiator, and the other on the body of the engine.
2. Open both drain plugs, and slowly open the radiator cap to relieve pressure. Open the radiator cap fully so the coolant can drain.
3. Place a container under the overflow container, and disconnect the overflow hose from the underside of the tank. Drain the tank.
4. When all coolant has drained from the radiator, engine, and recovery tank, reconnect the recovery tank hose, and close both drain plugs.
5. Pre-mix 50% long-life coolant and 50% clean, soft water, stirring it well.
6. Refill the radiator, venting air from the upper and lower radiator hoses by jiggling them while filling the radiator with coolant. The coolant should reach the **FULL** line on the overflow container, but not go past it.
7. Securely close the radiator cap.
8. Start the engine and run it for a few minutes, then shut it off.
9. Check the coolant level on the radiator again, and add more coolant to the tank if needed.

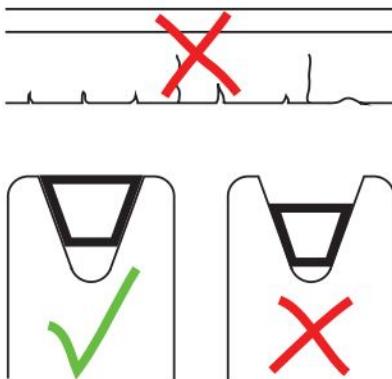


### 5.4-7 Fan Belt Replacement and Adjustment

Kubota recommends inspecting the fan belt every 100 hours, and replacing it every 500 hours.

#### Inspect the Fan Belt for Wear

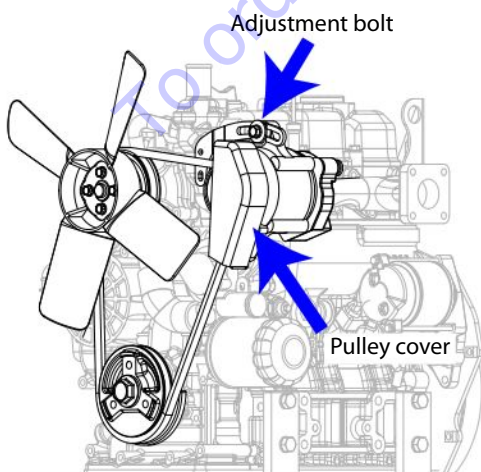
- Inspect the fan belt for any signs of damage, such as cracks or tears. Inspect the fan belt for signs of wear, which may include the belt sinking into the pulley groove.



If damage or wear is found, replace the fan belt as described in the next section.

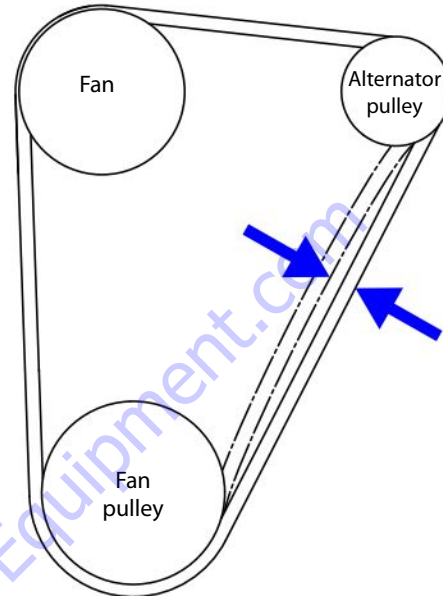
#### Replace the Fan Belt

- Remove the alternator pulley cover, and loosen the alternator adjustment bolt.
- Remove the old fan belt, and install a new one.
- Replace the alternator pulley cover, and tighten the adjustment bolt.
- Measure and adjust the fan belt deflection as described in the next section.

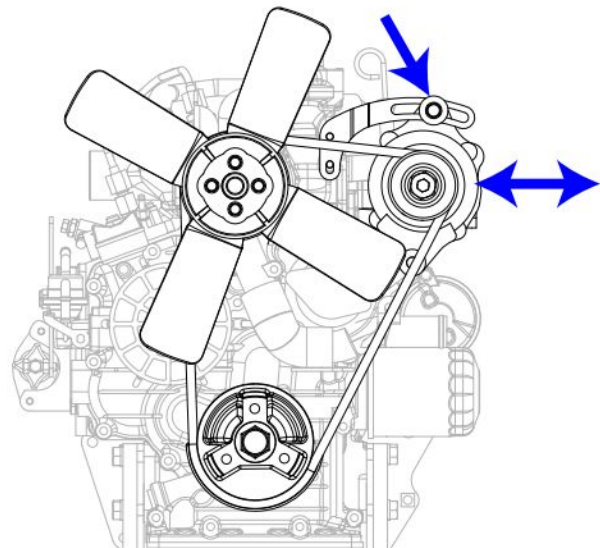


#### Test and Adjust the Deflection

- Measure the fan belt deflection by pressing the belt halfway between the fan drive pulley and the alternator pulley, at about 30 N•m (22 lbf•ft) of force.



- The belt deflection should be 7-9 mm (1/4"-3/8"). If it is more than that, loosen the alternator adjustment bolt and use a pry bar between the alternator and engine block to adjust it. Tighten the bolt.



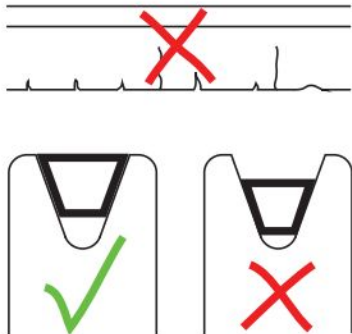
- Retest the deflection, and continue to adjust as needed until it falls within the range specified above.

### 5.4-8 Belt-driven Generator Belt Replacement

Kubota recommends inspecting the fan belt every 100 hours, and replacing it every 500 hours.

#### Inspect the Generator Belt for Wear

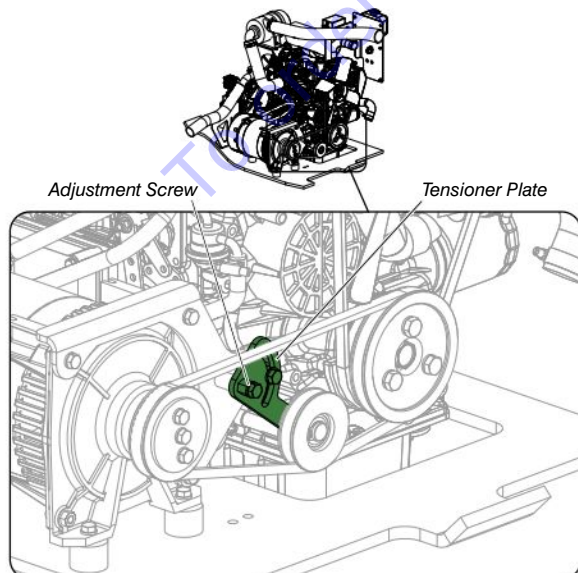
- Inspect the generator belt for any signs of damage, such as cracks or tears.
- Inspect the fan belt for signs of wear, which may include the belt sinking into the pulley groove.



If damage or wear is found, replace the fan belt as described in the next section.

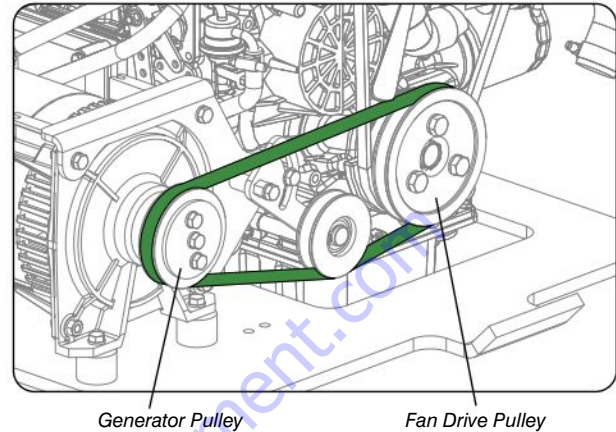
#### Replace the Generator Belt

- Loosen the adjustment bolts on the tensioner plate.
- Remove the generator belt, and install a new one.
- Measure and adjust the fan belt deflection as described in the next section.

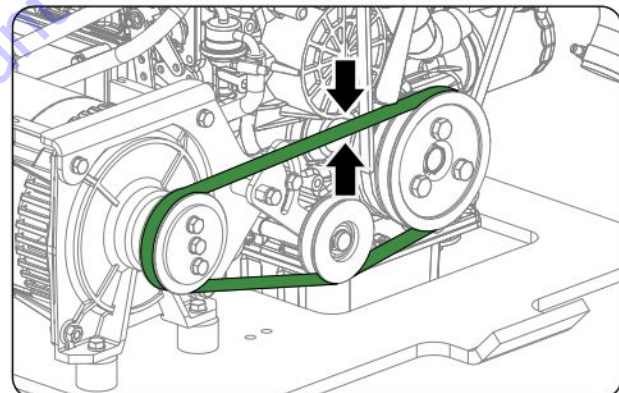


#### Test and Adjust the Deflection

- Measure the generator belt deflection by pressing the belt halfway between the fan drive pulley and the generator pulley, at about 30 N•m (22 lbf•ft) of force.



- The belt deflection should be 7-9 mm (1/4"-3/8"). If it is greater than that, loosen the adjustment bolts on the generator pulley and adjust it. Tighten the bolts.



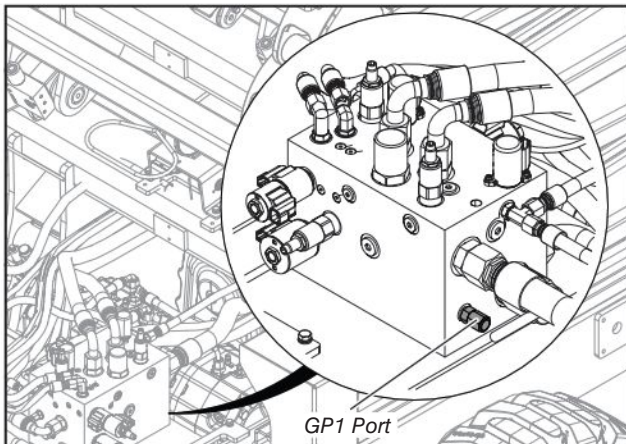
- Test the deflection again and adjust as needed until it falls within the range specified above.



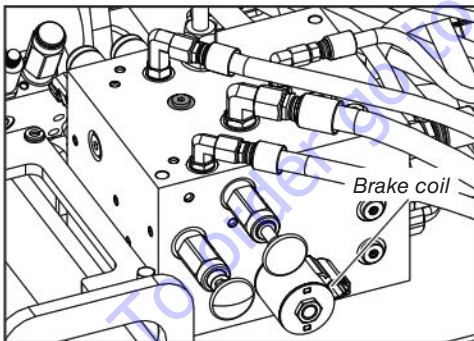
## 5.5 Manifolds and Hydraulic Pumps

### 5.5-1 System Pressure Test

1. Park the MEWP on a firm level surface.
2. Chock the wheels to keep the MEWP from moving.
3. Connect the platform control box to the base.
4. Locate the GP1 fitting on the back of the main drive manifold. Remove the cap.



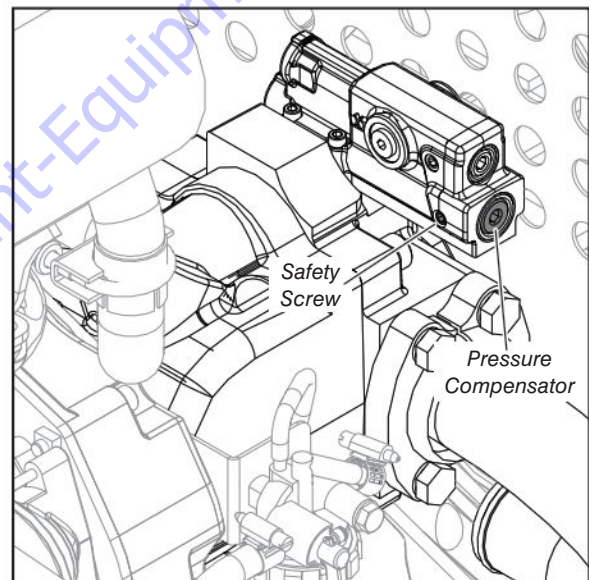
5. Connect a pressure gauge (345 bar/5000 psi) to the GP1 fitting.
6. Disconnect the plug from the brake coil.



7. Turn on the machine.
8. Set the driving mode to high torque.
9. Attempt to drive the machine.
10. If the reading is different than 280 bar/4060 psi, adjustment is necessary.
11. Turn off the machine.
12. Remove the pressure gauge from the GP1 fitting. Cap the fitting.
13. Reconnect the plug to the brake coil.

### 5.5-2 System Pressure Adjustment

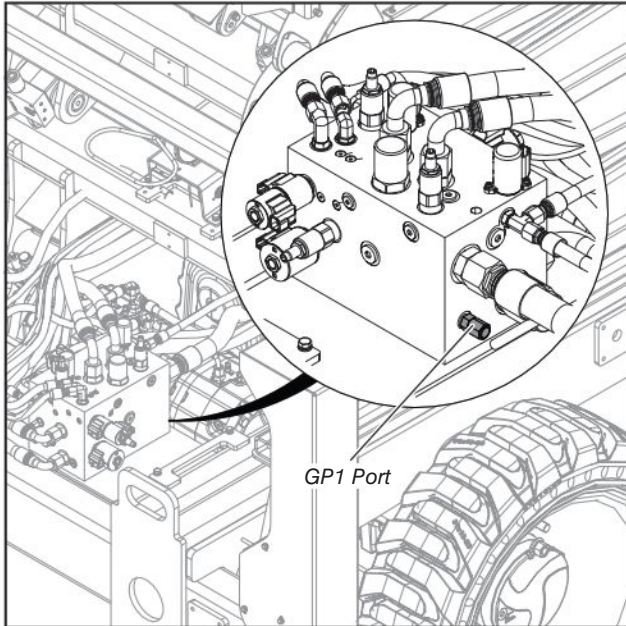
1. Park the MEWP on a firm level surface.
2. Chock the wheels to keep the MEWP from moving.
3. Connect the platform control box to the base.
4. Locate the GP1 fitting on the main drive manifold. Remove the cap.
5. Connect a pressure gauge (345 bar/5000 psi) to the GP1 fitting.
6. Disconnect the plug from the brake coil.
7. Start the engine from the base control console and let it run for 5 minutes.
8. Set the driving mode to high torque.
9. Attempt to drive the machine.
10. Inside the engine compartment locate the pressure compensator valve on the pump.



11. Loosen the safety screw on the side of the compensator valve.
12. Adjust the compensator pressure by turning the adjusting plug clockwise to increase pressure or counterclockwise to decrease pressure.
13. Tighten the safety screw after pressure is set to 280 bar/4060 psi.
14. Turn the engine off.
15. Remove the pressure gauge from the GP1 fitting. Cap the fitting.
16. Reconnect the plug to the brake coil.

### 5.5-3 Load Sense Pressure test

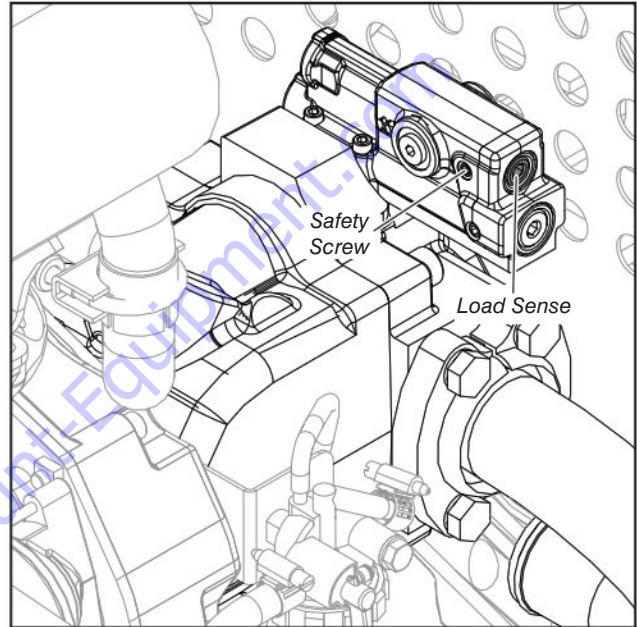
1. Park the MEWP on a firm level surface.
2. Locate the GP1 fitting on the back of the main drive manifold. Remove the cap.



3. Connect a pressure gauge (69 bar/1000 psi) to the GP1 fitting.
4. Start the engine from the base control console and let it run for 5 minutes.
5. If reading is different than 21 bar/305 psi, adjustment is necessary.

### 5.5-4 Load Sense Pressure Adjustment

1. Locate the GP1 port on the main drive manifold. Remove the cap.
2. Connect a pressure gauge (69 bar/1000 psi) to the GP1 port.
3. Start the engine from the base control console and let it run for 5 minutes.
4. Inside the engine compartment locate the load sense valve on the pump.

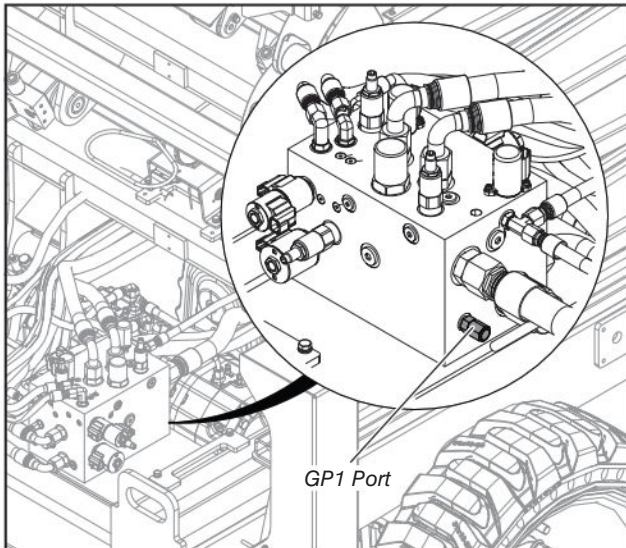


5. Loosen the safety screw on the side of the load sense valve.
6. Adjust the load sense pressure by turning the adjusting plug clockwise to increase pressure or counterclockwise to decrease pressure.
7. Tighten the safety screw after pressure is set to 21 bar/305 psi.
8. Turn the engine off.
9. Remove the pressure gauge from the GP1 fitting. Cap the fitting.

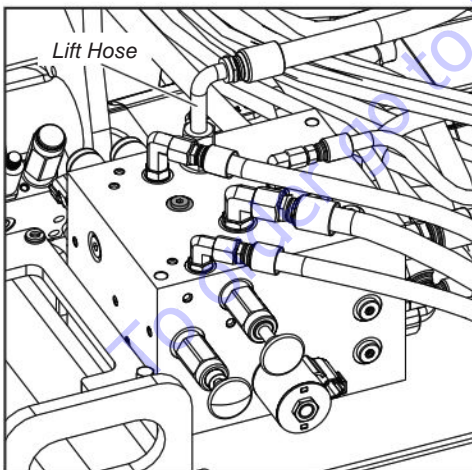


### 5.5-5 Lift Pressure test

1. Park the MEWP on a firm level surface.
2. Locate the GP1 fitting on the back of the main manifold. Remove the cap.



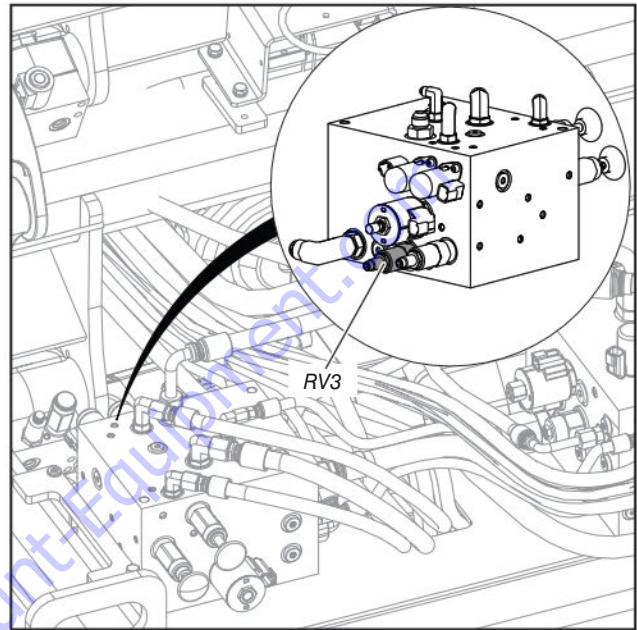
3. Connect a pressure gauge (345 bar/5000 psi) to the GP1 fitting.
4. Disconnect the lift hose from the top of the brake manifold and:
  - Cap the hose tightly.
  - Cap the manifold fitting tightly.



5. Start the engine from the base control console and try to raise the platform.
6. If the reading is different than 207 bar/3000 psi, adjustment is necessary.
7. Reconnect the lift hose.

### 5.5-6 Lift Pressure Adjustment

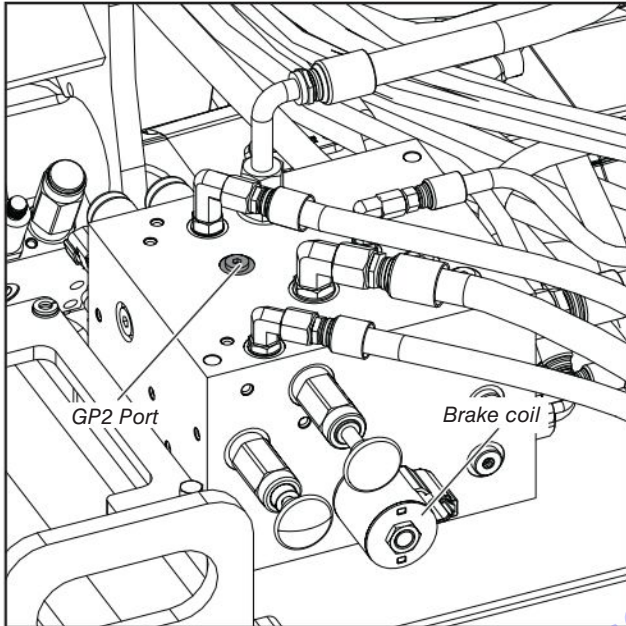
1. Locate the GP1 fitting on the main drive manifold. Remove the cap.
2. Connect a pressure gauge (345 bar/5000 psi) to the GP1 fitting.
3. On the back of the auxiliary manifold locate RV3.



4. Disconnect the lift hose from the top of the brake manifold and:
  - Cap the hose tightly.
  - Cap the manifold fitting tightly.
5. Start the engine from the base control console and let it run for 5 minutes. Try to raise the platform.
6. Loosen the safety nut on valve RV3. Adjust RV3 pressure by turning the adjusting plug clockwise to increase pressure or counterclockwise to decrease pressure.
7. Tighten the safety nut after the pressure is set to 207 bar/3000 psi.
8. Turn the engine off.
9. Remove the pressure gauge from the GP1 fitting. Cap the fitting.
10. Reconnect the lift hose.

### 5.5-7 Brake Pressure test

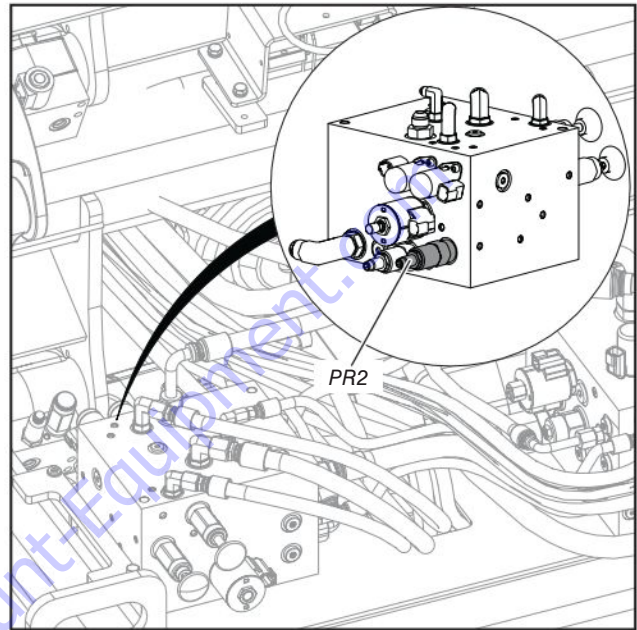
1. Park the MEWP on a firm level surface.
2. Chock the wheels to keep the MEWP from moving.
3. Connect the platform control box to the base.
4. Locate the GP2 port on top of the auxiliary manifold and remove the plug.



5. Connect a pressure gauge (69 bar/1000 psi) to the GP2 port.
6. Disconnect the plug from the brake coil.
7. Turn on the machine.
8. Attempt to drive the machine.
9. If reading is different than 400 psi, adjustment is necessary.
10. Reconnect the plug to the brake coil.

### 5.5-8 Brake Pressure Adjustment

1. Locate the GP2 port on the brake manifold and remove the plug.
2. Connect a pressure gauge (69 bar/1000 psi) to the GP2 port.
3. On the back of the auxiliary manifold locate PR2.



4. Disconnect the plug from the brake coil.
5. Start the engine from the base control console and let it run for 5 minutes.
6. Attempt to drive the machine.
7. Loosen the safety nut.
8. Adjust PR2 pressure by turning the adjusting plug clockwise to increase pressure or counterclockwise to decrease pressure.
9. Tighten the safety nut after pressure is set to 28 bar/400 psi.
10. Turn the engine off.
11. Remove the pressure gauge from the GP2 port and plug the port.
12. Reconnect the brake coil.



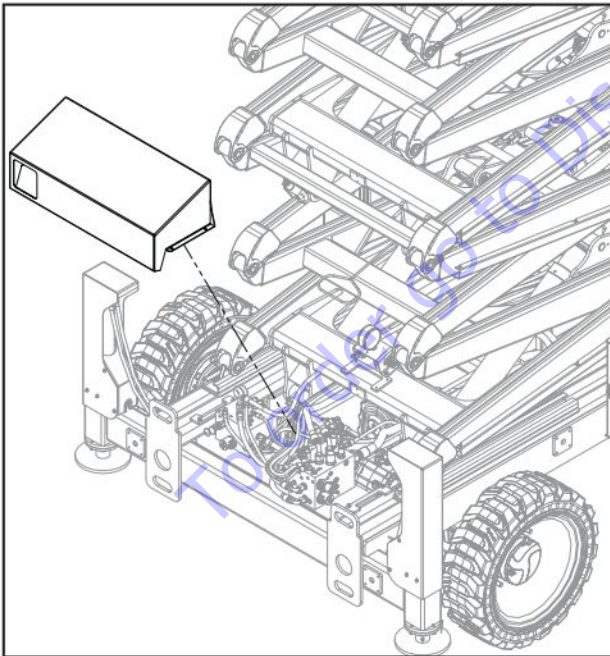
## 5.6 Scissors

### 5.6-1 Lower Lift Cylinder Removal and Replacement

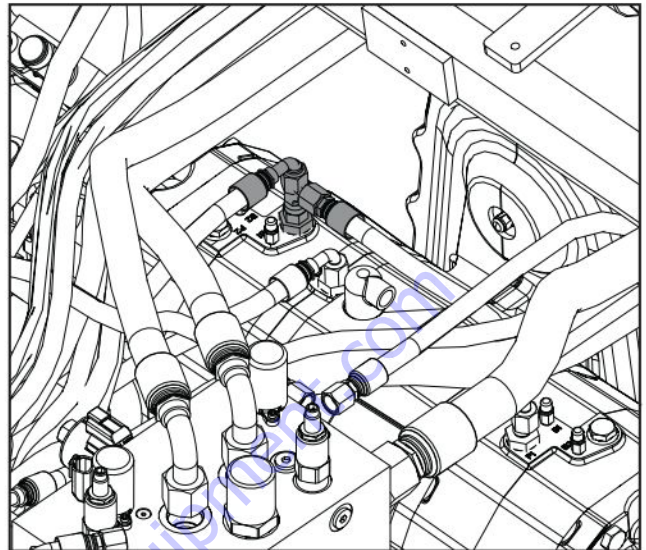
#### **⚠ WARNING**

The weight of the cylinders exceeds 50 lb. A suitable lifting device will be required to complete this procedure.

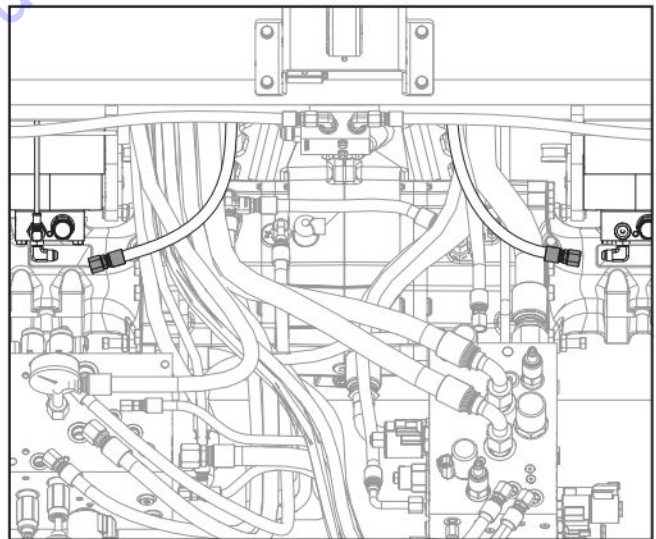
1. Park the MEWP on a firm, level surface.
2. Chock the wheels.
3. Raise the platform and deploy the maintenance support.
4. Push in the emergency stop button on the base control console.
5. Turn the base/off/platform key switch to the off position. Remove the key.
6. Turn the main power disconnect switch to the off position.
7. Remove the manifold cover.



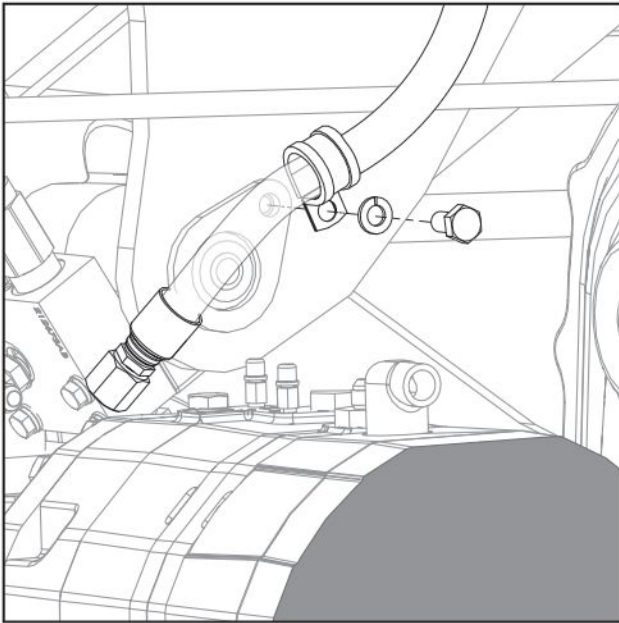
8. Locate the brake port tee fitting on top of the axle. Remove and plug the hoses.
9. Remove the tee fitting and plug the axle.



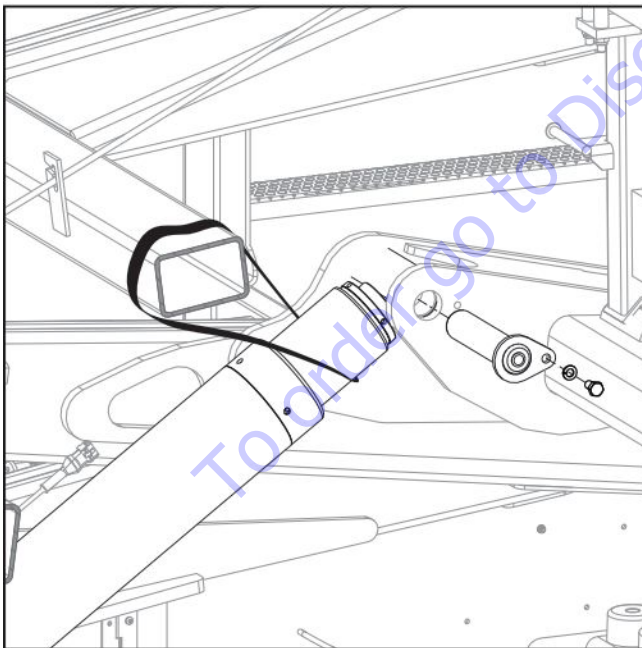
10. Locate the lower cylinder manifold. Unscrew the connectors and remove the electrical harness.
11. Remove the hose from the cylinder manifold. Plug the hose end.



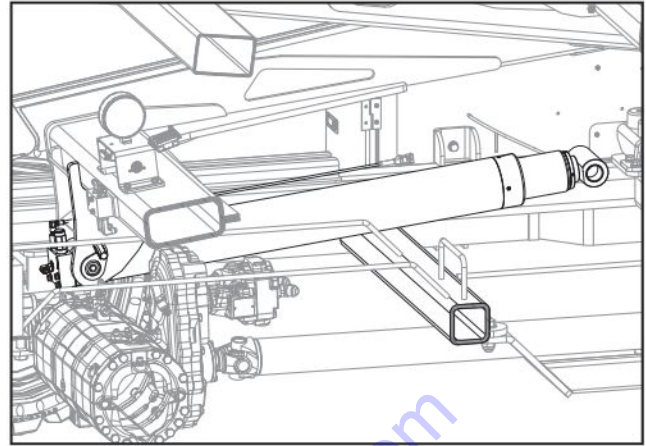
12. Remove the clamps from the cylinder pin. Set aside the hoses and the electrical harness.



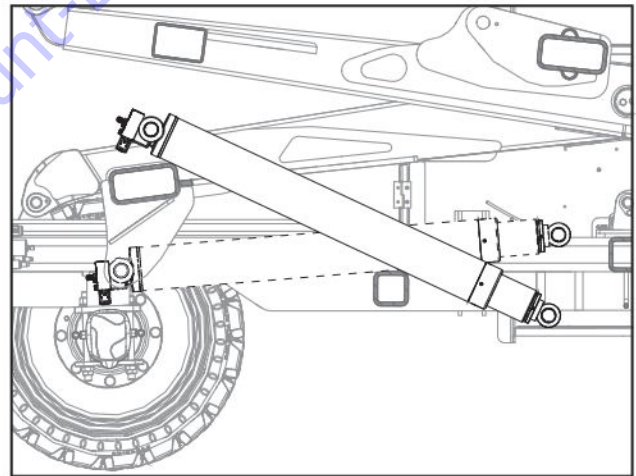
13. Lock the cylinder in place with a support strap.  
14. Remove the top keeper pin. Make sure to support the cylinder weight the whole time.



15. Slowly lower the top end of the cylinder until it rests on the chassis.



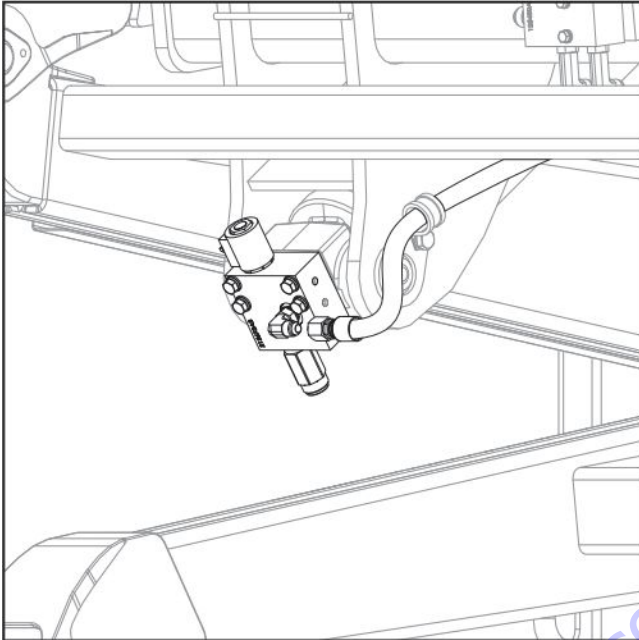
16. Remove the relief valve on the cylinder manifold and plug the manifold.  
17. Lock the cylinder in place with a support strap.  
18. Remove the lower keeper pin and slowly lower the cylinder.  
19. Maneuver the cylinder and place it on top of the crossbar as shown and take it out of the scissor stack.



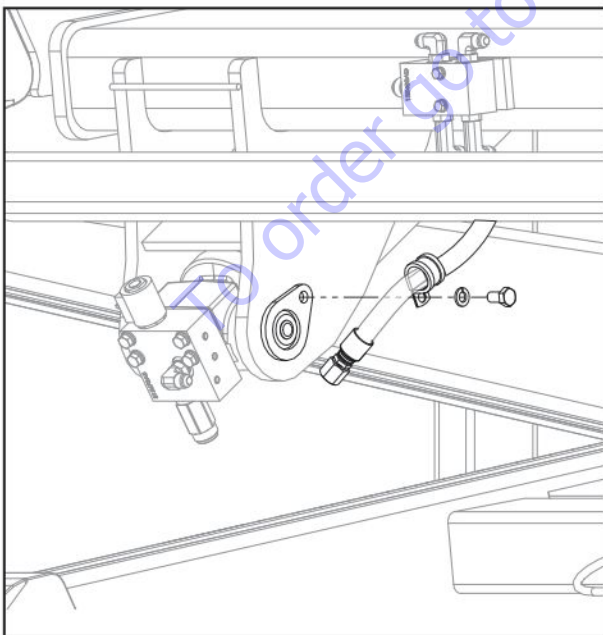
20. Maneuver the new cylinder into position.  
21. Insert the lower keeper pin in place.  
22. Lift the cylinder and insert the top keeper pin.  
23. Connect the hydraulic hose to the cylinder manifold.  
24. Insert the relief valve into the cylinder manifold.  
25. Connect the electrical harness to the cylinder manifold valve.  
26. Install the tee fitting into the brake port.  
27. Connect the hydraulic hoses to the tee fitting.

### 5.6-2 Upper Cylinder Removal and Replacement

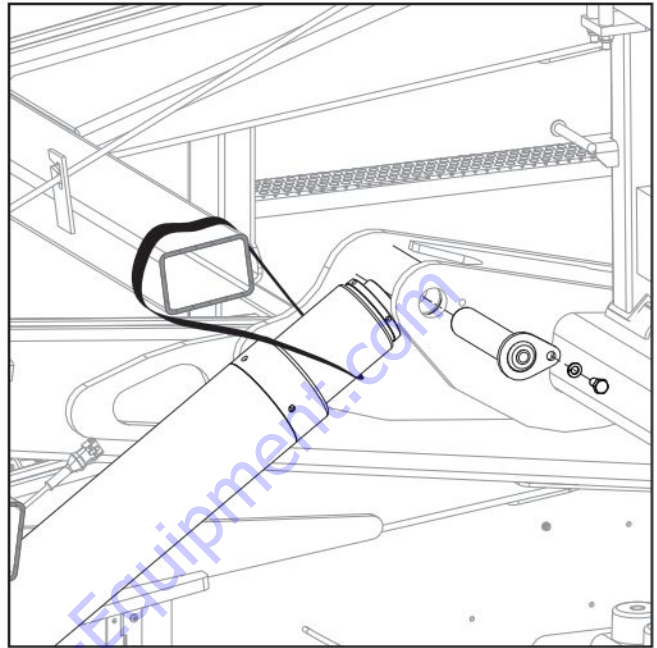
1. Locate the middle/upper cylinder manifold, unscrew the connector and remove the electrical harness.
2. Remove and cap the hydraulic hose from the cylinder manifold.



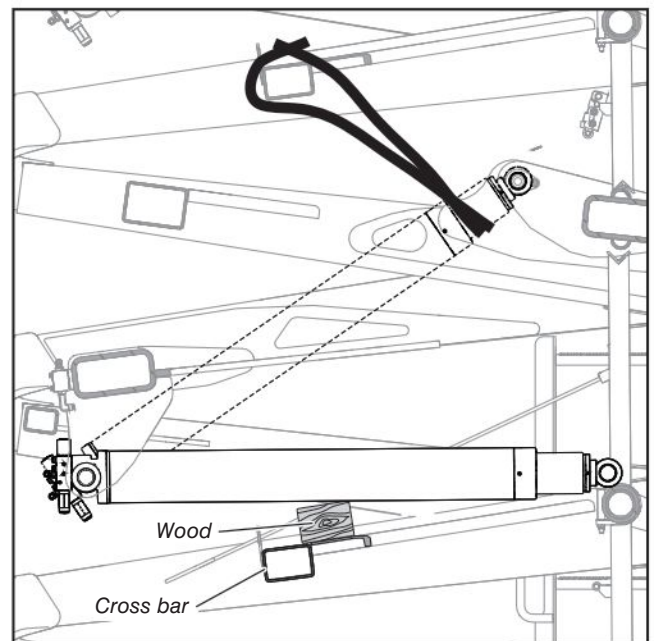
3. Remove the clamp from the cylinder pin and set aside the hose and the electrical harness.



4. Lock the cylinder in place with a support strap.
5. Remove the top keeper pin. Make sure to support the cylinder weight the whole time.

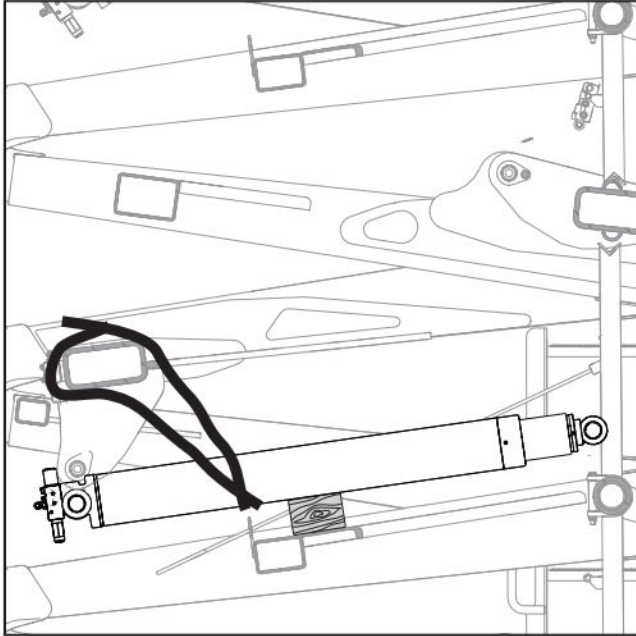


6. Put a piece of wood on top of the cross bar under the cylinder.
7. Slowly lower the top end of the cylinder until it rests on the piece of wood on the scissor stack.





8. Lock in place the lower end of the cylinder and make sure the cylinder is tightly locked in place.
9. Remove the lower keeper pin
10. Slowly lower the cylinder until it rests on the cross bar of the scissor stack.

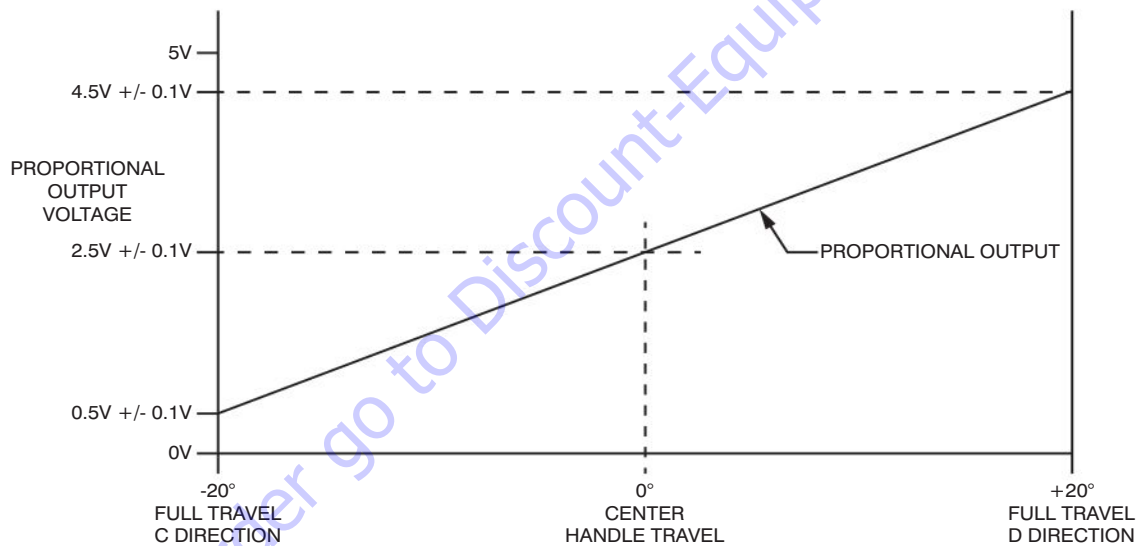
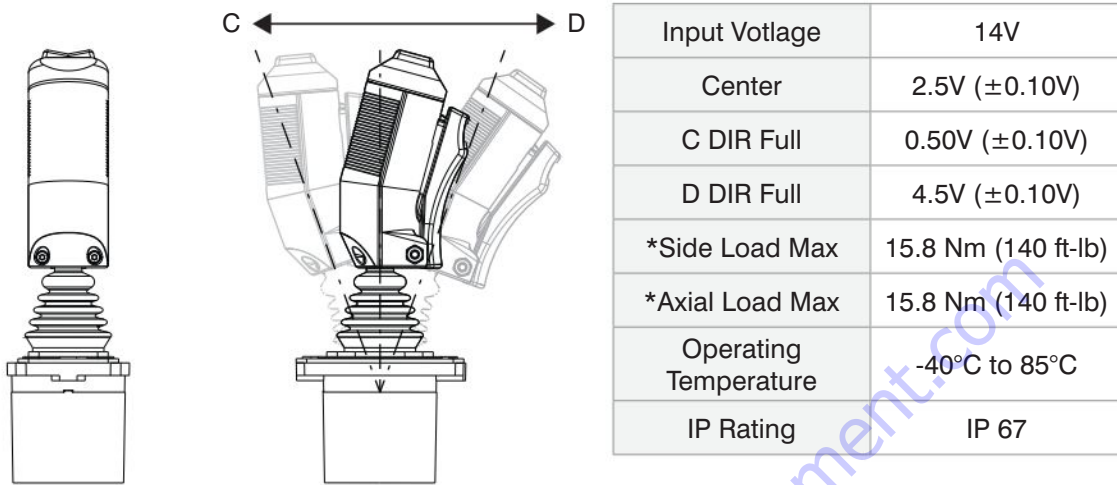


11. Slide the cylinder out of the scissor stack.
12. Maneuver the new cylinder back into position.
13. Insert the lower keeper pin in place.
14. Rise the cylinder and insert the top keeper pin.
15. Connect the hydraulic hose into the cylinder manifold.
16. Connect the electrical harness into the cylinder manifold valve.
17. Repeat steps 1 to 16 of this section to remove and replace the other cylinder.



## 5.7 Platform

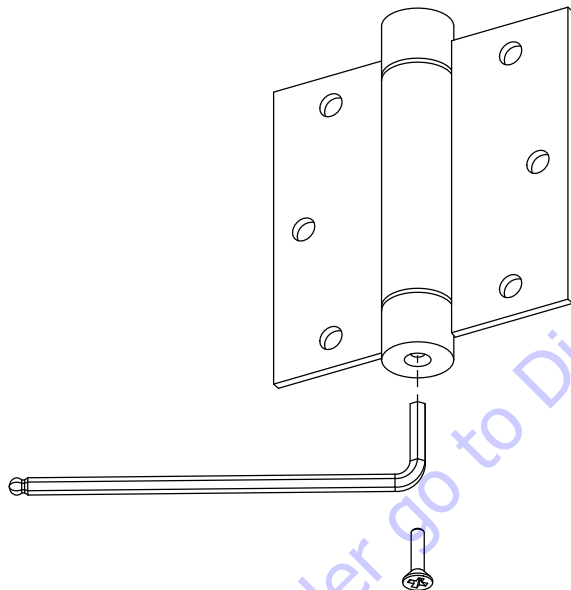
### 5.7-1 Single Axis Joystick



PCB and Handle Wires (6 pos, connector)		
Pin Out	Colour	Function
1	Red & White/Black	Power/handle com
2	Black	Ground
3	White	Handle rocker right steer
4	White/Red	Handle rocker left steer
5	White/Blue	Enable trigger
6	Blue	"Y" axis output

### 5.7-2 Gate Spring Hinge Adjustment

1. The tension of the spring hinges should be such that when the gate is opened halfway and released, it closes fully and latches.
2. To adjust the tension of the spring hinges, first remove the safety locking screw located at the top or bottom of each hinge. Retain the screws for reinstallation later.
3. To increase the tension, insert a 5/32 in hex wrench in the screw socket, and turn the wrench clockwise. To release the tension, depress the hex wrench in the socket, let it rotate counterclockwise, then release the hex wrench.



4. Adjust the tension on both hinges until the gate releases and latches from a half open position.
5. Reinstall the safety locking screws into the hinges when tension adjustment is complete.

### 5.7-3 Railing Maintenance and Repair

Skyjack MEWPs have been designed to make sure compliance with the relevant design standards applicable for that particular unit at the time of manufacture. As such, any repairs made to the guardrail or basket structure need to make sure this compliance is not compromised and must return the structure to its original condition.

Any damage must be repaired by returning the railing assembly to its undamaged state. Damage includes, but is not limited to, the items listed below:

- bent/deformed guardrail sections
- cracks or broken welds in railing sections
- damaged pin connections
- missing pins or broken pin lanyards
- missing railing hardware
- loose or missing parts
- additional holes in guardrail sections other than those approved by Skyjack

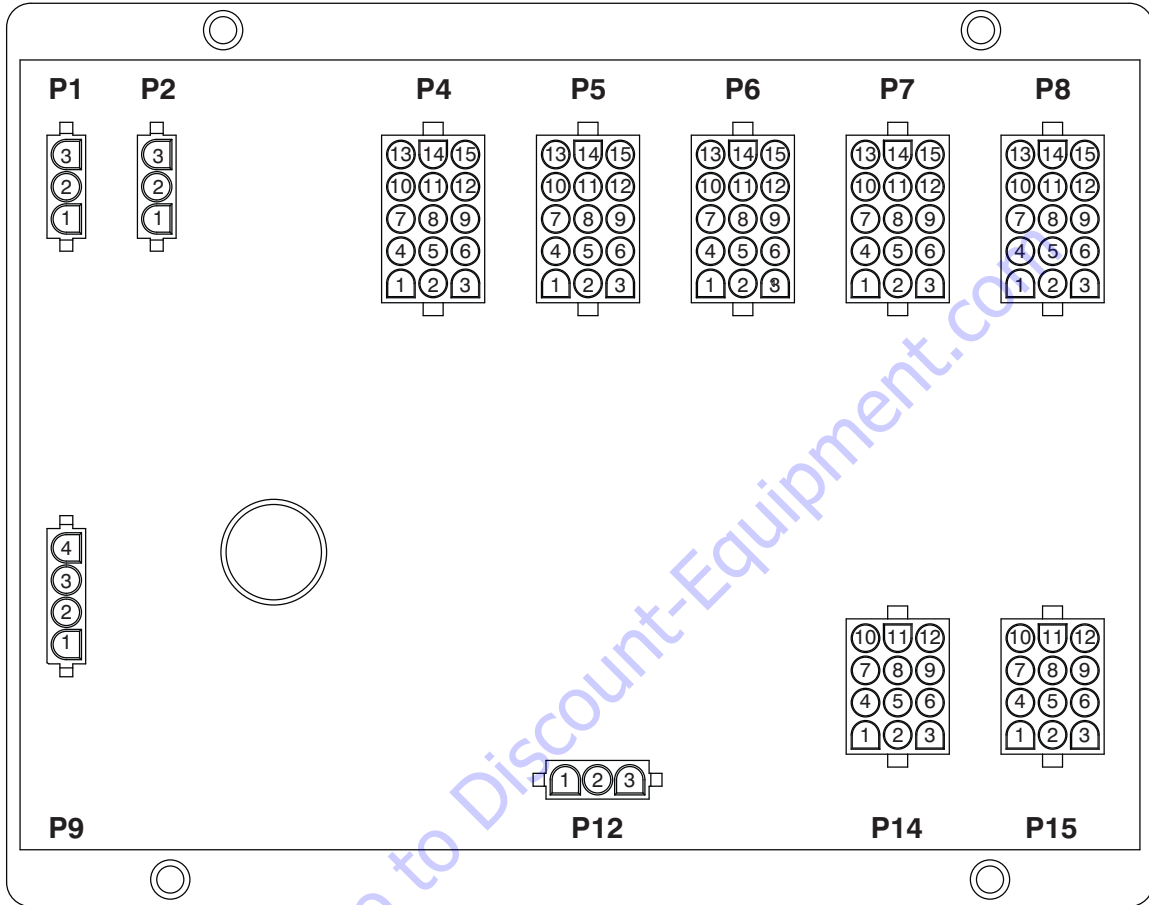
Additionally, the guardrails must be properly positioned and secured, and the entry gate must be in good working order.

The strength of the guardrail system, and therefore its ability to provide fall protection for platform occupants, depends upon the design being secure and undamaged.

Skyjack railings are designed for modular replacement, and Skyjack recommends replacement of any damaged railing section. Skyjack-approved replacement parts will meet this requirement.

## 5.8 Skycoded Module

### 5.8-1 Machine Controller Module Pin Reference Chart



PLUG	PIN #	WIRE # & COLOUR	WIRE FUNCTION
<b>CANbus Communication #1</b>			
P1	1	CANH Yellow	Communication CANbus High (to VCCM)
P1	2	CANL Green	Communication CANbus Low (to VCCM)
P1	3	Not used	Ground signal for CANbus
<b>CANbus Communication (duplicate of P1)</b>			
P2	1	Not used	Communication CANbus High
P2	2	Not used	Communication CANbus Low
P2	3	Not used	Ground signal for CANbus

PLUG	PIN #	WIRE # & COLOUR	WIRE FUNCTION
<b>Valve Outputs (2A highside outputs &amp; PWM outputs)</b>			
P4	1	Not used	Not used
P4	2	37 Blue/White	12V Output for Engine Harness Alternator (ON when engine running)
P4	3	Not used	Not used
P4	4	Not used	Not used
P4	5	14 Black	12V output for Lift Valve Solenoid 3H-14
P4	6	20B Black/White/Red	12V Output for 2-Speed Motor Valve 2H-20B
P4	7	21 Green/Black	12V Output for Dump Solenoid Valve 2H-21
P4	8	70A Green	12V Output for PL5 - Outrigger Mode Lamp
P4	9	60A Black/Red/Green	12V Output for PL1 & PL2 - Overload Light (on E-stop Buttons)
P4	10	165B Pink/Black	12V Output for PL6 - Differential Lock ON Mode Lamp
P4	11	Not used	Not used
P4	12	13 Orange	0-12V Output Proportional for Main Lower Solenoid Valve 2H-13A
P4	13	Not used	Not used
P4	14	Not used	Not used
P4	15	Not used	Not used
<b>Valve Outputs (2A highside outputs)</b>			
P5	1	17 Blue/Black	12V Output for Outrigger Enable Solenoid Valve 2H-17
P5	2	29 Blue/Yellow	12V Output for BP-1 All-Motion Alarm Beeper
P5	3	13C Orange	12V Output for Holding Solenoid Valves 2H-13C-1 & 2H-13C-2
P5	4	13D Orange	12V Output for Holding Solenoid Valves 2H-13D-1 & 2H-13D-2
P5	5	13E Orange	12V Output for Holding Solenoid Valves 2H-13E-1 & 2H-13E-2
P5	6	9A Orange/Red	12V Output for PL3 – Lift Mode Lamp
P5	7	24 Blue/Black	12V Output for Steer Left Solenoid Valve 5H-24
P5	8	23 Black/White	12V Output for Steer Right Solenoid Valve 5H-23
P5	9	32D Green/Black	12V Output for PL7 - Eco-Start Mode Lamp (if equipped)
P5	10	165A Pink/Black	12V Output for Differential Lock Solenoid Valve 3H-165A
P5	11	30 Brown	12V Output for Brake Solenoid Valve 3H-30
P5	12	22 Orange/Blue	12V Output for FL1 – Beacon Flashing Light
P5	13	Not used	Not used
P5	14	Not used	Not used
P5	15	12A Brown/Red	12V Output for PL4 – Drive Mode Lamp

Plug	Pin	Wire Number & Colour	Wire function
<b>Valve Outputs (2A highside outputs)</b>			
P6	1	71A Blue/Red	12V Output for Outrigger Left Front Up Solenoid Valve 5H-71A (if equipped)
P6	2	72A White/Black/Red	12V Output for Outrigger Right Front Up Solenoid Valve 5H-72A (if equipped)
P6	3	Not used	Not used
P6	4	75A White/Red/Green	12V Output for Outrigger Left Front Down Solenoid Valve 5H-75A (if equipped)
P6	5	76A Red/Green	12V Output for Outrigger Right Front Down Solenoid Valve 5H-76A (if equipped)
P6	6	Not used	Not used
P6	7	73A White/Red/Green	12V Output for Outrigger Right Rear Up Solenoid Valve 5H-73A (if equipped)
P6	8	Not used	Not used
P6	9	Not used	Not used
P6	10	77A Green/Black/White	12V Output for Outrigger Right Rear Down Solenoid Valve 5H-77A (if equipped)
P6	11	Not used	Not used
P6	12	Not used	Not used
P6	13	74A Black/Red/Green	12V Output for Outrigger Left Rear Up Solenoid Valve 5H-74A (if equipped)
P6	14	78A Red/Black/White	12V Output for Outrigger Left Rear Down Solenoid Valve 5H-78A (if equipped)
P6	15	Not used	Not used
<b>Switch Inputs (Highside Digital inputs)</b>			
P7	1	5A Purple/Black	12V Input Valve Supply for switched components (from TBM B+)
P7	2	10 Blue/White	Input 12V from S3 Off/Base/Platform Key Switch for Base signal *required input for any movement from Base - to TBM screw #2
P7	3	14B Black	Input 12V from S18 Secondary Guard Lift Enable SGLE switch signal (if equipped)
P7	4	08 Purple/White	Input 12V from S4 Platform Emergency Stop for Platform signal *required input for any movement from Platform - to TBM screw #1
P7	5	70 Yellow	Input 12V from S7 Outrigger/Off/Diff. Lock switch for Outrigger signal
P7	6	14A Black	Input 12V from S13 Lift/Lower switch for Lift signal
P7	7	13A Orange	Input 12V from S13 Lift/Lower switch for Lower signal
P7	8	165 Pink/Black	Input 12V from S7 Outrigger/Off/Diff. Lock switch for Diff. Lock signal
P7	9	09 Orange/Red	Input 12V from S9 Lift/Off/Drive switch for Lift signal
P7	10	12 Red/Black/Yellow	Input 12V from S9 Lift/Off/Drive switch for Drive signal

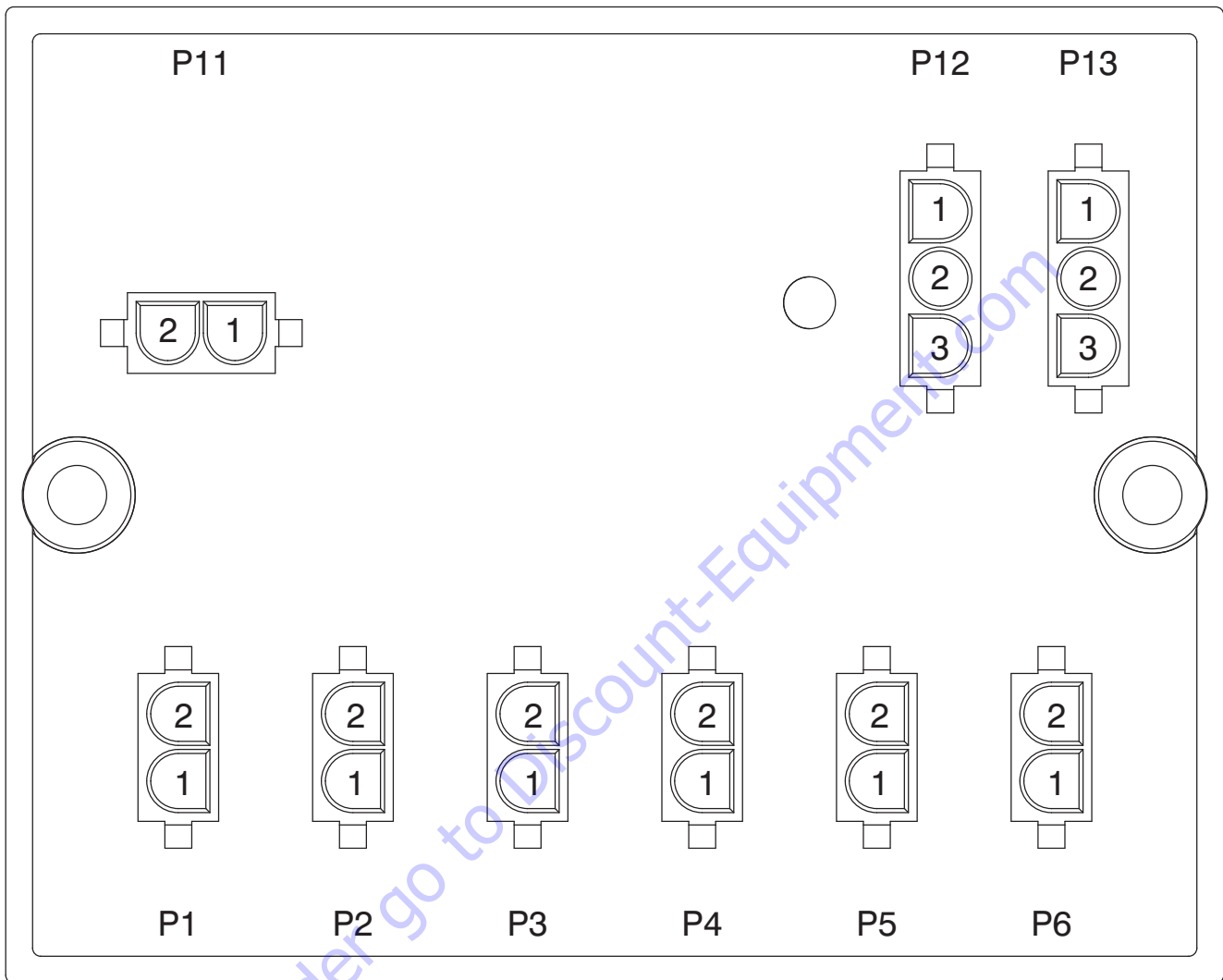


Plug	Pin	Wire Number & Colour	Wire function
<b>Switch Inputs (Highside Digital inputs)</b>			
P7	11	19 Red/White	Input 12V from S10 Joystick Enable switch for Function Enable signal
P7	12	85 Grey/Blue	Input 12V from S17 Generator switch for “On” signal (if equipped)
P7	13	20 Black/White/Red	Input 12V from S8 High Speed/High Torque/Hill Climb switch for High Torque signal
P7	14	20A Black/White/Red	Input 12V from S8 High Speed/High Torque/Hill Climb switch for Hill Climb signal
P7	15	19A Red/White	Input for Shutdown signal from Elevate Trackunit Telematics option (if equipped)
<b>Analog (voltage) Inputs</b>			
P8	1	59 Orange/Black	0-5V Proportional Input from A1 Joystick Analog Output signal
P8	2	28 Green/Red	0-5V Proportional Input from AT1 Angle Transducer Analog Output signal 1
P8	3	Not used	Not used
P8	4	Not used	Not used
P8	5	28A Green/Red	0-5V Proportional Input from AT1 Angle Transducer Analog Output signal 2
P8	6	60B Black/Red/Green	0-5V Proportional Input from PT1 Pressure Transducer Analog Output signal
P8	7	Not used	Not used
P8	8	Not used	Not used
P8	9	411 Yellow/Red	0-5V Proportional Input from TBM Power Module screw #3 for Monitored Current
P8	10	Not used	Not used
P8	11	Not used	Not used
P8	12	Not used	Not used
P8	13	902 White	Ground (GND) 0V reference for AT1 & PT1 transducers
P8	14	02 White	Ground (GND) 0V reference from Battery negative (negative bus bar on TBM)
P8	15	2C White	Ground (GND) 0V reference for Joystick

Plug	Pin	Wire Number & Colour	Wire function
<b>HMI Connection (RS232)</b>			
P9	1	(+) Black	B+ supply to Display Module
P9	2	(Rx) Red	Rx Receive signal to Display Module
P9	3	(TX) Green	Tx Transmit signal to Display Module
P9	4	(-) White	GND reference to Display Module
<b>CANbus Communication #2</b>			
P12	1	CANH Yellow	Communication CANbus High (to engine Harness)
P12	2	CANL Green	Communication CANbus Low (to Engine Harness)
P12	3	Not used	Ground signal for CANbus
<b>Switch Inputs (Highside inputs)</b>			
P14	1	Not Used	Not used
P14	2	71 Blue/Red	Input 12V from S21 Outrigger Left Front Toggle switch Up request signal
P14	3	75 White/Red/Green	Input 12V from S21 Outrigger Left Front Toggle switch Down request signal
P14	4	72 White/Black/Red	Input 12V from S20 Outrigger Right Front Toggle switch Up request signal
P14	5	76 Red/Green	Input 12V from S20 Outrigger Right Front Toggle switch Down request signal
P14	6	61 Green/Black	Input 12V from LS1, LS2, LS3 & LS4 Outriggers Limit Switches for Up signal *(all switch contacts must be closed to produce in series signal)
P14	7	68 Black/White	Input 12V from LS5 Outrigger Left Rear Limit switch Down signal
P14	8	67 Black	Input 12V from LS6 Outrigger Right Rear Limit switch Down signal
P14	9	65 White	Input 12V from LS7 Outrigger Left Front Limit switch Down signal
P14	10	66 White/Black	Input 12V from LS8 Outrigger Right Front Limit switch Down signal
P14	11	Not used	Not used
P14	12	Not used	Not used

Plug	Pin	Wire Number & Colour	Wire function
<b>Switch Inputs (Highside inputs)</b>			
P15	1	24A Blue/Black	Input 12V from S12 Joystick Steer Left signal
P15	2	23A Black/White	Input 12V from S11 Joystick Steer Right signal
P15	3	10B Blue/White	Input 12V from S15 Function Enable Toggle switch for Base Enable signal
P15	4	13 Orange	(ANSI/CSA/CE/AS) Input 12V from P4-12 Output for Emergency Operation
		51A	(KC built machines only) Input 12V from Anti-Overriding Limit switches N.O. contacts
P15	5		(ANSI/CSA/CE/AS only) Not used
		51	(KC built machines only) Input 12V from Anti-Overriding Limit switches N.C. contacts
P15	6	74 Black/Red/Green	Input 12V from S18 Outrigger Left Rear Toggle switch Up request signal
P15	7	78 Red/Black/White	Input 12V from S18 Outrigger Left Rear Toggle switch Down request signal
P15	8	73 White/Red/Green	Input 12V from S19 Outrigger Right Rear Toggle switch Up request signal
P15	9	77 Green/Black/White	Input 12V from S19 Outrigger Right Rear Toggle switch Down request signal
P15	10	412 Yellow/Blue	Input 12V from TBM screw # 5 for Monitored circuit
P15	11	Not used	Not used
P15	12	Not used	Not used

### 5.8-2 Valve Driver Current Control Module (VCCM) Pin Reference Chart

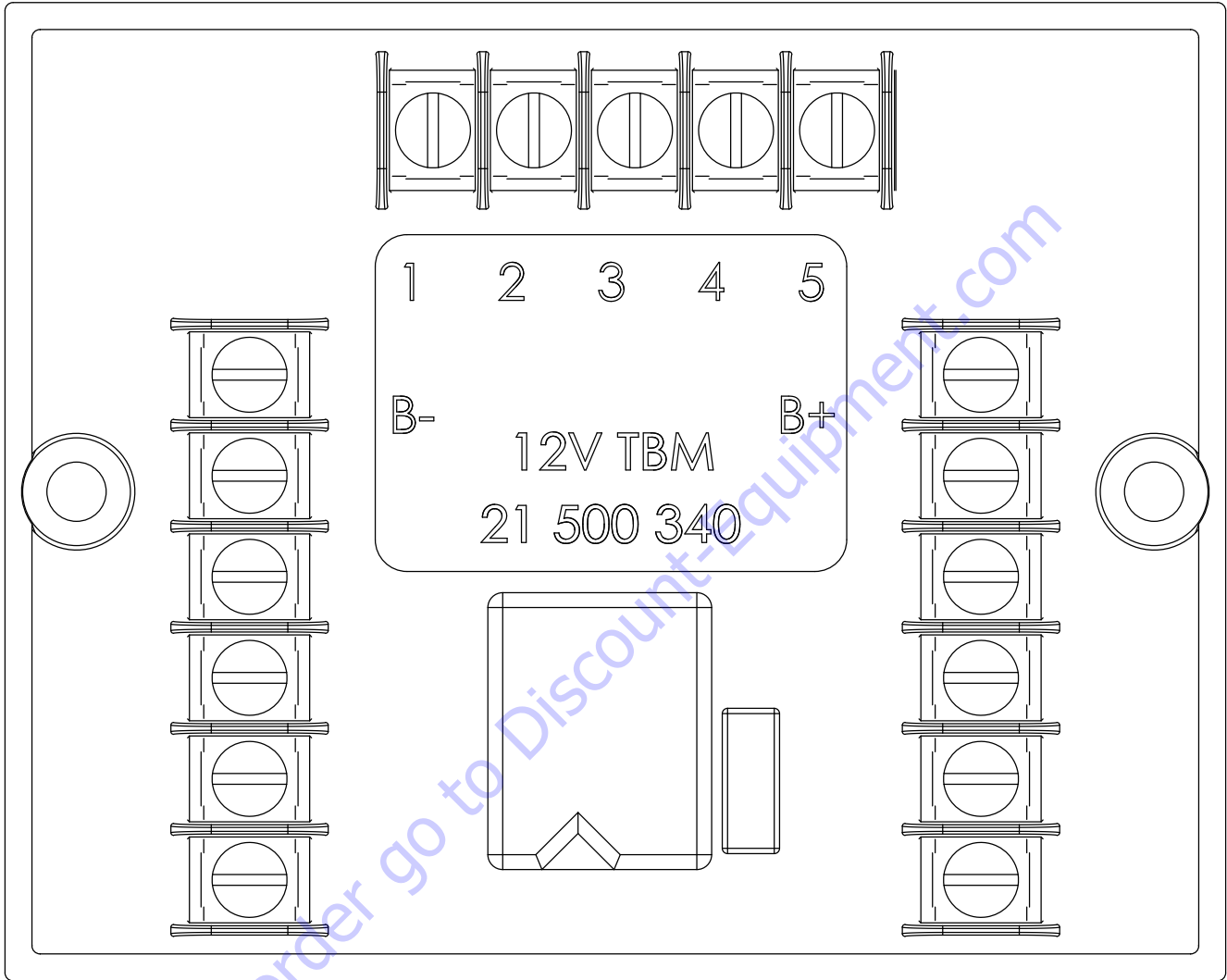


Plug	Pin	Wire Number & Colour	Wire function
<b>Supply Input</b>			
P11	1	5B Purple/Black	12V B+ Supply from Circuit breaker CB3 (via TBM B+)
P11	2	02 White	GND B – Supply (from TBM)

Plug	Pin	Wire Number & Colour	Wire function
<b>CANbus Communication</b>			
P12	1	White	Communication CANbus High (to Machine Controller)
P12	2	Green	Communication CANbus Low (to Machine Controller)
P12	3	Not used	Ground signal for CANbus
<b>CANbus Communication</b>			
P13	1	Not used	Communication CANbus High
P13	2	Not used	Communication CANbus Low
P13	3	Not used	Ground signal for CANbus
<b>Valve Outputs (P1 – P6)</b>			
P1	1	16 White/Black	12V Output Supply for Forward Drive Solenoid Valve 3H-16
P1	2	216 White	0V Ground (GND) Supply for Forward Drive Solenoid Valve 3H-16
P2	1	15 Blue	12V Output Supply for Reverse Drive Solenoid Valve 3H-15
P2	2	215 White	0V Ground (GND) Supply for Reverse Drive Solenoid Valve 3H-15
P3	1	Not used	+
P3	2	Not used	-
P4	1	Not used	+
P4	2	Not used	-
P5	1	Not used	+
P5	2	Not used	-
P6	1	Not used	+
P6	2	Not used	-

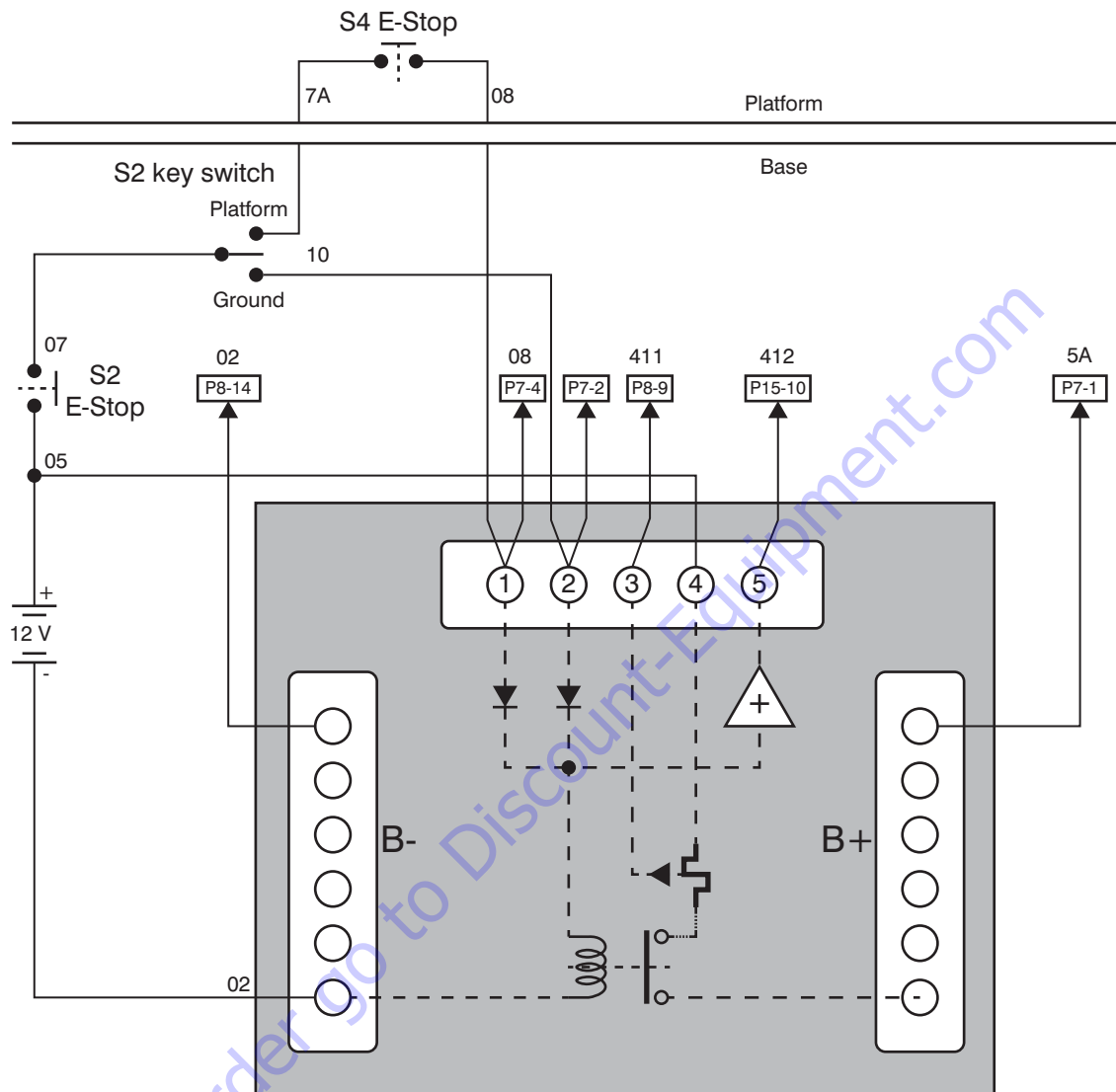


### 5.8-3 Terminal Board Module (TMB)



Screw Number	Wire Number & Colour	Wire Function
<b>Monitored Inputs, Enables B+, measures B+ current, diagnoses open circuits, and Engine cranking Boost circuitry</b>		
1	08 Purple/White	12V Input for Monitoring status of Platform select
		(S4 Emergency Stop Platform closed contact)
		To Machine Controller Pin P7-4
2	10 Blue/White	12V Input for Monitoring status of Base select (S3 Off/Base/Platform Key switch for Base signal and S2 Emergency Stop Base both contacts closed)
		To Machine Controller Pin P7-2
3	411 Yellow/Red	0.5-5.0V Proportional output to diagnose open circuit
		To Machine Controller Pin P8-9
4	05 Purple/Black	12V Input for Enabling B+
		From Circuit Breaker CB1 for Main Disconnect switch S1
5	412 Yellow/Blue	12V Output switch Supply
		To Machine Controller Pin P15-10
B+ bus	5A Purple/Black	12V Supply of Battery positive (B+) if monitoring sensing enabled
		12V Supply to Machine Controller Pin P7-1
		12V Supply to AT1 Angle Transducer and PT1 Pressure Transducer
		12V Supply to Outrigger Limit switches (if equipped)
		12V Supply to N.O. contact of Platform Select Relay 08CR
		12V Supply to Engine Harness for 12V supply for Engine
		12V Supply to Circuit Breaker CB3 for VCCM Supply B+
		12V Supply to S15 Function Enable switch
B- bus	02 White	0V Ground (GND) Supply from Circuit Breaker CB2 for Battery negative (B-)
		0V Ground (GND) Supply for Platform Select Relay 08CR
		0V Ground (GND) Supply for Base Emergency Stop switch light PL1
		0V Ground (GND) Supply for Outrigger Solenoid Valves (if equipped)
		0V Ground (GND) Supply for Valves
		0V Ground (GND) Supply for VCCM
		0V Ground (GND) Supply for Platform Harness
		0V Ground (GND) reference for Machine Controller Pin P8-14

### 5.8-4 Current Sensing Controller



### 5.8-5 Calibration and Diagnostic Tool Key Functions

#### **⚠ WARNING**

**Only trained and authorized personnel shall be permitted to service an MEWP.**

#### **⚠ WARNING**

**Read all instructions closely before attempting each phase of the calibration procedure.**

The SkyCoded Machine Controller is the Skyjack configured flexible control system, which provides high-side switched outputs for the valves and contactor, Proportional outputs, Pulse Width Modulated (PWM) outputs, and low-side outputs for indicator lamps, etc. It also provides active-high inputs from operator controls, and analog inputs from joysticks and sensors. The machine controller has specific Skyjack software and flashed memory for use with Load Sensing and Overload prevention.

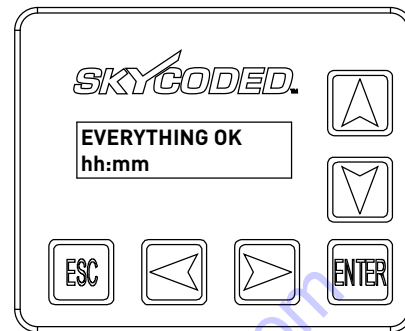
Due to its integral tilt sensor, the machine controller is mounted securely to the Lateral bracket behind a panel behind the ladder on the control side of the machine.

Factory calibrations for Height, Load, and Level are completed at Skyjack and only needs to be adjusted if a major component (i.e. the machine controller) has been replaced. See “Calibrate Level” procedure, “Calibrate Height” procedure, and/or “Calibrate Load” procedure for instructions on how to perform these steps if necessary. See “Initial Set-up and Change Defaults” procedure when replacing the machine controller.

The Display Module, found in the Base Control box, is connected via the rear plug with a four-pin RS232 connection to the machine controller P9 connector location. See the “Pin Reference Chart” for Skyjack specific wiring specifications on the machine controller.

The Display Module utilizes a two-line display, which shows various menus and settings. The top line of the display describes the currently selected menu and the bottom line shows the currently selected item in that menu.

#### Skycoded Display Controls



Symbol	Key Function
	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

Use the left and right arrows to scroll through the top level menu selections and press ENTER.

**EVERYTHING OK**

hh:mm

**Initial State**

Press and hold for 3-4 seconds to access the main menu.



**Main Menu**

Select this menu to see a description of the Control Module's (CM1) condition.

Select this menu to see the switch and sensor input conditions and logged data.

Select this menu and select the correct code to enable adjustments and calibrations.

Select this menu to enter the system override mode.

Select this menu to enter the system test mode.

Select this menu to see and adjust the Control Module (CM1) settings.

Select this menu to set up the Control Module (CM1).

This menu is to be used by Skyjack engineers only!

Select this menu to see the serial number of the Control Module (CM1).

Access level 2 set-ups and adjustments accessible menu.

**HELP**

**DIAGNOSTICS**

**ACCESS LEVEL**

**OVERRIDE**

**RUN SYSTEM TEST**

**ADJUSTMENTS**

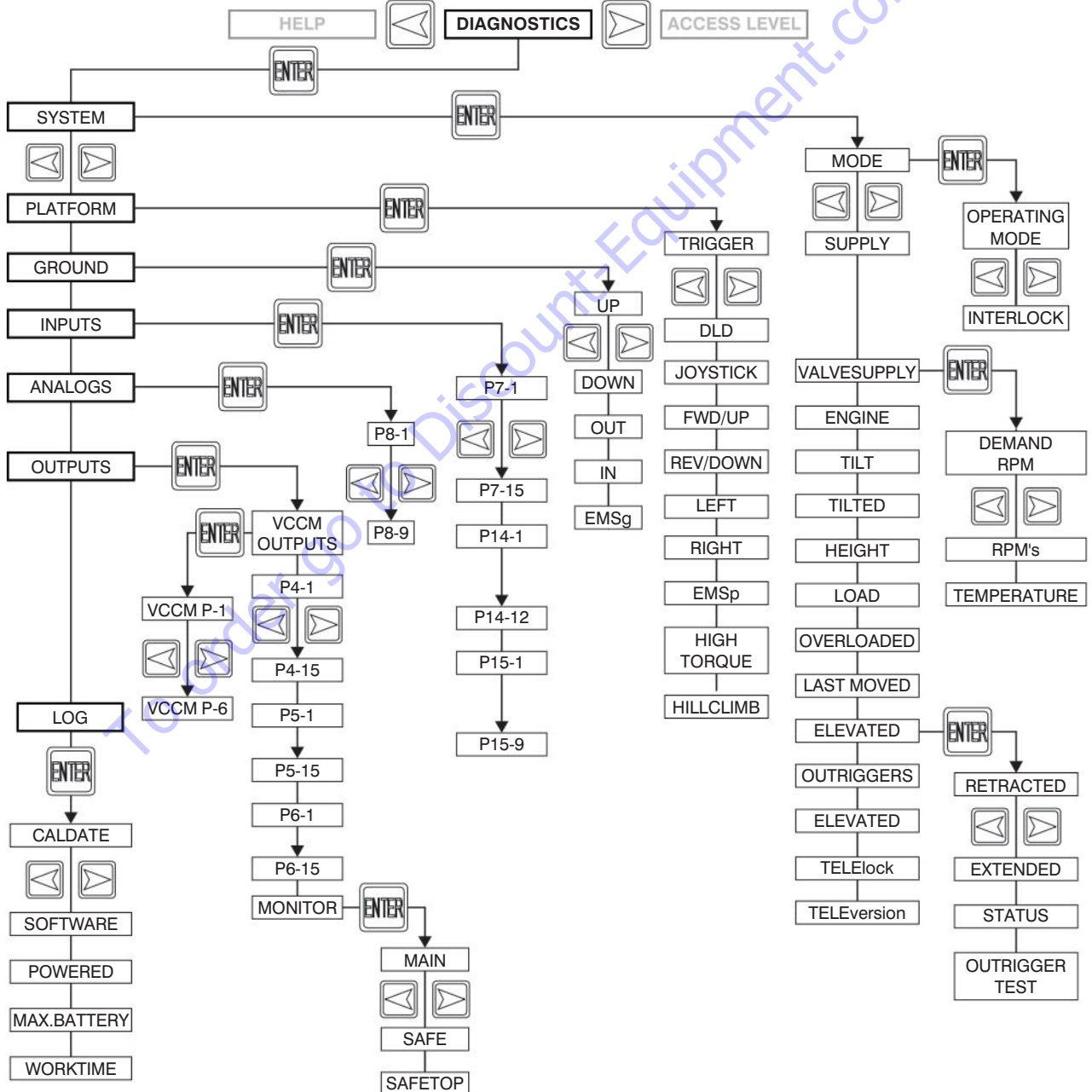
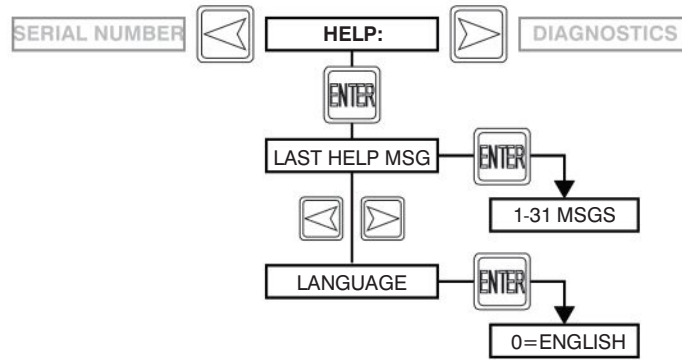
**SETUPS**

**CALIBRATIONS**

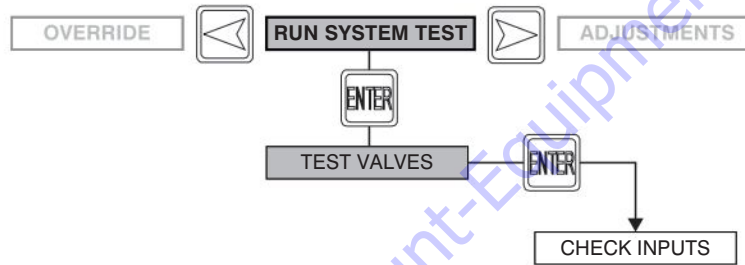
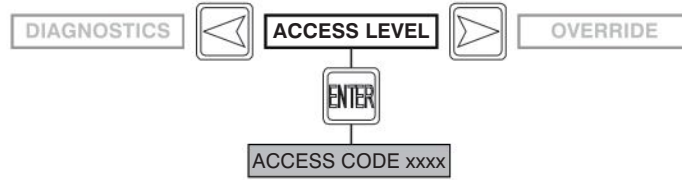
**SERIAL NUMBER**



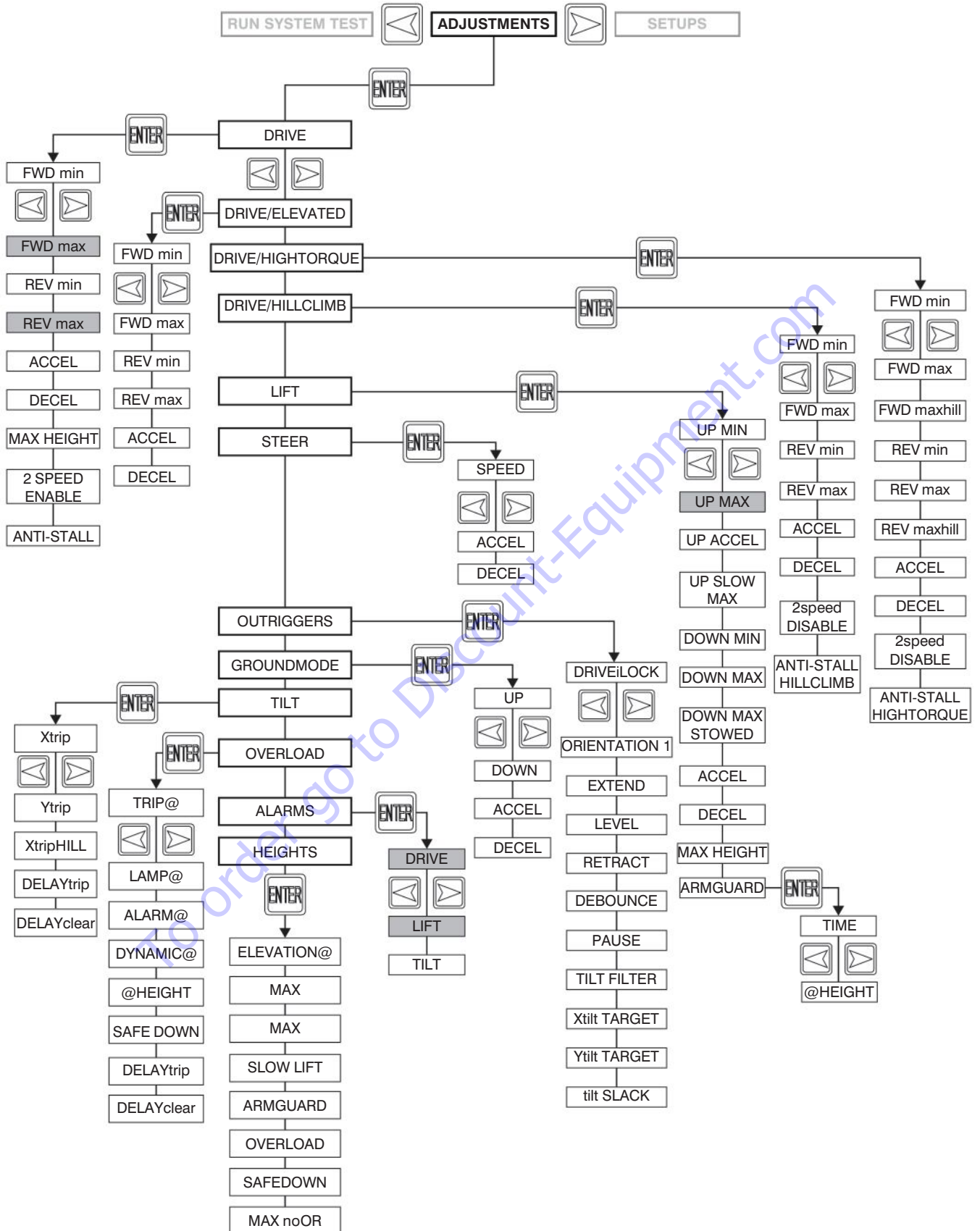
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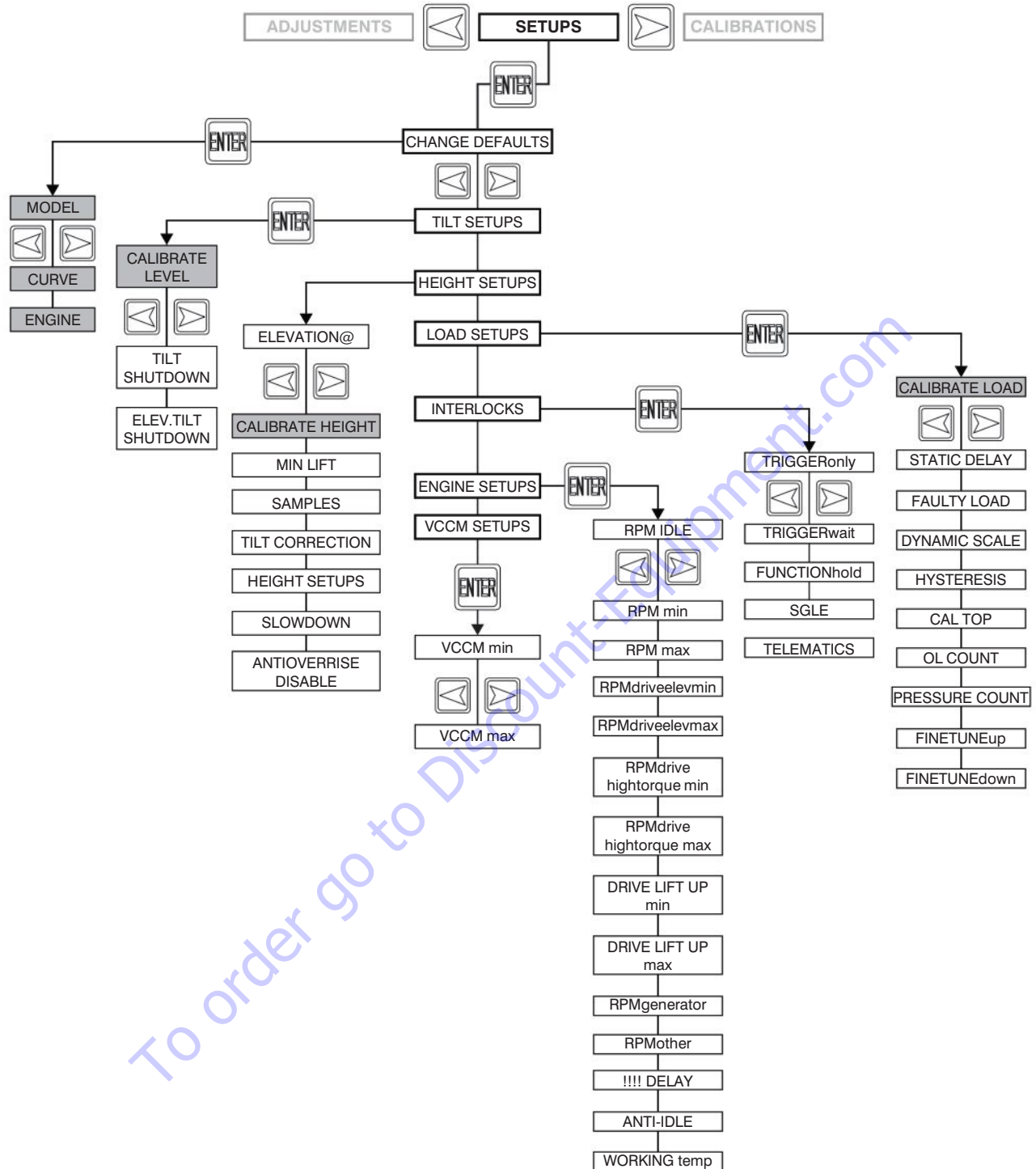


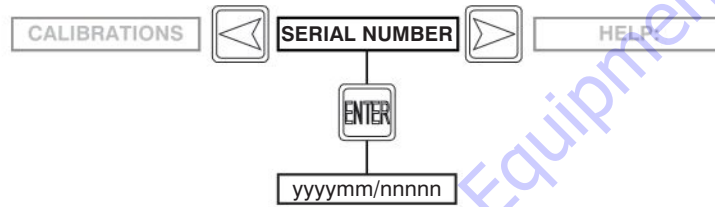
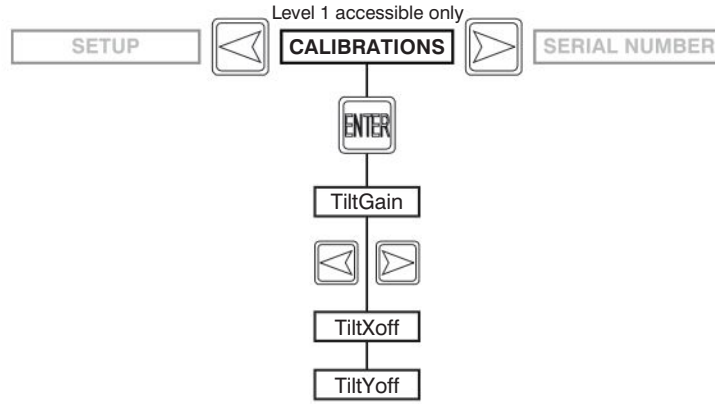




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## 5.8-6 Machine Controller Menu

Items highlighted in grey requires technician access level 2 to change. Otherwise, menus are locked as initial factory access level 1.

Menu	Selection	Sub-Menu	Description
<b>Help</b>			
<b>HELP</b>	LAST HELP MSG		Press ENTER when viewing the current HELP message to see a log (31) of recent HELP messages  Press  to see older messages, and  to see newer ones  Press ESC to return to the current HELP message
	LANGUAGE	0=ENGLISH	Press  or  select language preferred on the display.
<b>Diagnostics</b>			
<b>SYSTEM</b>	MODE	OPERATING MODE	Displays current operating mode or interlock
		INTERLOCK	When current operating mode shows INTERLOCKED, press ENTER to see the reason for the interlock.  Press ESC to return to the current operating mode
	SUPPLY		Displays battery supply voltage
	VALVESUPPLY		Displays valve supply state On or Off
	ENGINE		Press ENTER to display sub-menu to access settings related to Engine
		DEMAND RPM	Displays engine demand RPM
		RPM's	Displays engine RPM
		TEMPERATURE	Displays engine coolant temperature
	TILT		Displays tilt values (X°, Y°)
	TILTED		Displays whether system is in tilted mode Yes or No (measured tilt exceeds tilt trip points)
	HEIGHT		Displays platform height (avg of both outputs) (press arrows to see both outputs individually);
	LOAD		Displays Platform load in percentage (%)
	OVERLOADED		Displays whether system is in overload mode Yes or No (Platform load exceeds load trip point, at/above overload height)
	LAST MOVED		Displays whether the most recent Platform movement was UP or DOWN
	ELEVATED		Displays whether system is in elevated mode Yes or No
	OUTRIGGERS		Press ENTER to display sub-menu to access diagnosis related to Outriggers
		RETRACTED	Displays whether Outriggers are Retracted Up Yes or No
		EXTENDED	Displays whether Outriggers are Extended Down Yes or No
		STATUS	Displays Outriggers Auto-levelling status
		OUTRIGGER TEST	Displays submenus to test Outrigger limit switches
TELElock		Displays Telematics lockable setting On or Off	
TELEversion		Displays the type version of Telematics installed	

Menu	Selection	Sub-Menu	Description
<b>Diagnostics</b>			
<b>PLATFORM</b>	TRIGGER		Displays ON when Platform Joystick trigger is pressed
	DLD		Displays drive / lift mode (from S3 Lift/Off/Drive switch)
	JOYSTICK		Displays joystick position (%)
	FWD/UP		Displays ON when joystick is moved toward FWD or UP
	REV/DOWN		Displays ON when joystick is moved toward REV or DOWN
	LEFT		Displays ON when steer left button pressed
	RIGHT		Displays ON when steer right button pressed
	EMSp		Displays ON, indicating Platform Emergency Stop circuit is active
	HIGH TORQUE		Displays ON, indicating the S8 Torque switch High Torque is active
	HILLCLIMB		Displays ON, indicating the S8 Torque switch Hill Climb is active
<b>GROUND</b>	UP		Displays ON when UP switch pressed
	DOWN		Displays ON when DOWN switch pressed
	OUT		Displays ON when (optional) deck out switch pressed
	IN		Displays ON when (optional) deck in switch pressed
	EMSG		Displays ON, indicating ground Base Emergency Stop is active
<b>INPUT</b>	P7-1		Shows P7-1 input status (Valve Supply from TBM B+ active)
	P7-2		Shows P7-2 input status (S3 Off/Base/Platform Key switch for Base active)
	P7-3		Shows P7-3 input status (Not used)
	P7-4		Shows P7-4 input status (S4 Platform Emergency Stop for Platform active)
	P7-5		Shows P7-5 input status (S7 Outrigger/Diff Lock switch select Outrigger active)
	P7-6		Shows P7-6 input status (S13 Lift/Lower switch select Lift active)
	P7-7		Shows P7-7 input status (S13 Lift/Lower switch select Lower active)
	P7-8		Shows P7-8 input status (S7 Outrigger/Diff Lock switch select Diff Lock active)
	P7-9		Shows P7-9 input status (S9 Lift/Off/Drive switch select Lift active)
	P7-10		Shows P7-10 input status (S9 Lift/Off/Drive switch select Drive active)
	P7-11		Shows P7-11 input status (S10 Joystick Enable Trigger switch select Enable active)
	P7-12		Shows P7-12 input status (S17 Generator switch select Generator ON active)
	P7-13		Shows P7-13 input status (S8 High Torque signal active)
	P7-14		Shows P7-14 input status (S8 Hill Climb active)
	P7-15		Shows P7-15 input status (Elevate Trackunit Telematics shutdown signal active)



Menu	Selection	Sub-Menu	Description
<b>Diagnostics</b>			
<b>INPUT</b>	P14-1		Shows P14-1 input status (Not used)
	P14-2		Shows P14-2 input status (S21 Outrigger Left Front Toggle switch select Up request active)
	P14-3		Shows P14-3 input status (S21 Outrigger Left Front Toggle switch select Down request active)
	P14-4		Shows P14-4 input status (S20 Outrigger Right Front Toggle switch select Up request active)
	P14-5		Shows P14-5 input status (S20 Outrigger Right Front Toggle switch select Down request active)
	P14-6		Shows P14-6 input status (LS1, 2, 3 & 4 Outrigger switches in series for all retracted Up active)
	P14-7		Shows P14-7 input status (LS5 Outrigger Left Rear Limit switch Down active)
	P14-8		Shows P14-8 input status (LS6 Outrigger Right Rear Limit switch Down active)
	P14-9		Shows P14-9 input status (LS7 Outrigger Left Front Limit switch Down active)
	P14-10		Shows P14-10 input status (LS8 Outrigger Right Front Limit switch Down active)
	P14-11		Shows P14-11 input status (Not used)
	P14-12		Shows P14-12 input status (Not used)
	P15-1		Shows P15-1 input status (S12 Joystick Steer Left select active)
	P15-2		Shows P15-2 input status (S11 Joystick Steer Right select active)
	P15-3		Shows P15-3 input status (S15 Function Enable Toggle switch select Base Enable active)
	P15-4		Shows P15-4 input status (Anti-Overriding Limit switches N.O. contacts active) KC built machines only
	P15-5		Shows P15-5 input status (Anti-Overriding Limit switches N.C. contacts active) KC built machines only
	P15-6		Shows P15-6 input status (S18 Outrigger Left Rear Toggle switch select Up request active)
	P15-7		Shows P15-7 input status (S18 Outrigger Left Rear Toggle switch select Down request active)
	P15-8		Shows P15-8 input status (S19 Outrigger Right Rear Toggle switch select Up request active)
P15-9		Shows P15-9 input status (S19 Outrigger Right Rear Toggle switch select Down request active)	

Menu	Selection	Sub-Menu	Description
<b>Diagnostics</b>			
<b>ANALOGS</b>	P8-1		Displays voltage measurement of Joystick A1 analog signal
	P8-2		Displays voltage measurement of Angle Transducer AT1 signal 1
	P8-3		Shows P8-3 analog status (Not used)
	P8-4		Shows P8-4 analog status (Not used)
	P8-5		Displays voltage measurement of Angle Transducer AT1 signal 2
	P8-6		Displays voltage measurement of Pressure Transducer PT1 signal
	P8-7		Shows P8-7 analog status (Not used)
	P8-8		Shows P8-8 analog status (Not used)
	P8-9		Displays voltage measurement of TBM screw #3 Monitored circuit
<b>OUTPUTS</b>	<b>VCCM OUTPUTS</b>		Press ENTER to display sub-menu to access diagnosis related to VCCM Outputs
		VCCM P1	Displays output status of the Valve Driver P1 output (3H-16 Forward Drive Solenoid)
		VCCM P2	Displays output status of the Valve Driver P2 output (3H-15 Reverse Drive Solenoid)
		VCCM P3	Displays output status of the Valve Driver P3 output (not used)
		VCCM P4	Displays output status of the Valve Driver P4 output (not used)
		VCCM P5	Displays output status of the Valve Driver P5 output (not used)
		VCCM P6	Displays output status of the Valve Driver P6 output (not used)

Menu	Selection	Sub-Menu	Description
<b>Diagnostics</b>			
<b>OUTPUTS</b>	P4-1		Displays state of P4-1 output (not used)
	P4-2		Displays state of P4-2 output (Engine Harness Alternator (On when engine running))
	P4-3		Displays state of P4-3 output (not used)
	P4-4		Displays state of P4-4 output (not used)
	P4-5		Displays state of P4-5 output (3H-14 Lift Valve Solenoid)
	P4-6		Displays state of P4-6 output (2H-20B 2-Speed Shift Motor)
	P4-7		Displays state of P4-7 output (2H-21 Dump Valve Solenoid)
	P4-8		Displays state of P4-8 output (PL5 Outrigger Mode Lamp)
	P4-9		Displays state of P4-9 output (PL1 & PL2 Overload Lamps)
	P4-10		Displays state of P4-10 output (PL6 Differential Lock Mode Lamp)
	P4-11		Displays state of P4-11 output (Not used)
	P4-12		Displays state of P4-12 output (2H-13A Main Lower Valve Solenoid)
	P4-13		Displays state of P4-13 output (Not used)
	P4-14		Displays state of P4-14 output (Not used)
	P4-15		Displays state of P4-15 output (Not used)
	P5-1		Displays state of P5-1 output (2H-17 Outrigger Enable Valve Solenoid)
	P5-2		Displays state of P5-2 output (BP-1 All Motion Alarm Beeper)
	P5-3		Displays state of P5-3 output (2H-13C-1 & 2 Holding Valve Solenoids)
	P5-4		Displays state of P5-4 output (2H-13D-1 & 2 Holding Valve Solenoids)
	P5-5		Displays state of P5-5 output (2H-13E-1 & 2 Holding Valve Solenoids)
	P5-6		Displays state of P5-6 output (PL3 Lift Mode Lamp)
	P5-7		Displays state of P5-7 output (5H-24 Steer Left Valve Solenoid)
	P5-8		Displays state of P5-8 output (5H-23 Steer Right Valve Solenoid)

Menu	Selection	Sub-Menu	Description
<b>Diagnostics</b>			
<b>OUTPUTS</b>	P5-9		Displays state of P5-9 output (PL7 Eco-Start Mode Lamp)
	P5-10		Displays state of P5-10 output (3H-165A Differential Lock Valve Solenoid)
	P5-11		Displays state of P5-11 output (3H-30 Brake Valve Solenoid)
	P5-12		Displays state of P5-12 output (FL1 Beacon Flashing Light)
	P5-13		Displays state of P5-13 output (Not used)
	P5-14		Displays state of P5-14 output (Not used)
	P5-15		Displays state of P5-15 output (PL4 Drive Mode Lamp)
	P6-1		Displays state of P6-1 output (5H-71A Outrigger Left Front Up Valve Solenoid)
	P6-2		Displays state of P6-2 output (5H-72A Outrigger Right Front Up Valve Solenoid)
	P6-3		Displays state of P6-3 output (Not used)
	P6-4		Displays state of P6-4 output (5H-75A Outrigger Left Front Down Valve Solenoid)
	P6-5		Displays state of P6-5 output (5H-76A Outrigger Right Front Down Valve Solenoid)
	P6-6		Displays state of P6-6 output (Not used)
	P6-7		Displays state of P6-7 output (5H-73A Outrigger Right Rear Up Valve Solenoid)
	P6-8		Displays state of P6-8 output (Not used)
	P6-9		Displays state of P6-9 output (Not used)
	P6-10		Displays state of P6-10 output (5H-77A Outrigger Right Rear Down Valve Solenoid)
	P6-11		Displays state of P6-11 output (Not used)
	P6-12		Displays state of P9-12 output (Not used)
	P6-13		Displays state of P6-13 output (5H-74A Outrigger Left Rear Up Valve Solenoid)
P6-14		Displays state of P6-14 output (5H-78A Outrigger Left Rear Down Valve Solenoid)	
P6-15		Displays state of P6-15 output (Not used)	

Menu	Selection	Sub-Menu	Description
<b>Diagnostics</b>			
<b>OUTPUTS</b>	MONITOR		Press ENTER to display sub-menu to access adjustments related to Monitor
		MAIN	Displays monitor of outputs
		SAFE	Displays monitor of safe outputs
		SAFESTOP	Displays monitor of redundant safe pre-outputs
	TEST MODE		
<b>LOG</b>	CALDATE		Displays date entered by operator at end of last calibration
	SOFTWARE		Displays software version of Machine Controller
	POWERED		Displays total time that Machine Controller has been powered
	MAX.BATTERY		Displays maximum recorded battery supply voltage
	WORKTIME		Displays total time of use
<b>Access Level</b>			
Refer to section <a href="#">5.8-9 Access Level Procedure</a>			
<b>CODE xxxx</b>			"ACCESS LEVEL" 3 prevents adjustments and calibrations (default) "ACCESS LEVEL" 2 allows calibrations (requires correct code) "ACCESS LEVEL" 1 allows adjustments and calibrations (factory level)"
<b>Override</b>			
Refer to section <a href="#">5.8-10 Override Mode procedure</a>			
			Press ENTER to ENTER into OVERRIDE mode
<b>Run System Test</b>			
<b>TEST VALVES</b>			Press ENTER to run rolling test of all valves coils, Press ESC to skip to next test
<b>CHECK INPUTS</b>			Press ENTER to run rolling test of all inputs, Press ESC to skip to next test (manually operate switches to satisfy displayed request)
<b>Adjustments</b>			
<b>DRIVE</b>	FWD MIN		Determines the slowest drive speed in the forward direction (when the joystick is at 0% demand)
	FWD MAX		Determines the fastest drive speed in the forward direction (when the joystick is at 100% demand)
	REV MIN		Determines the slowest drive speed in the reverse direction (when the joystick is at 0% demand)
	REV MAX		Determines the fastest drive speed in the reverse direction (when the joystick is at 100% demand)
	ACCEL		Determines the rate of increase of drive speed when higher speeds are demanded
	DECEL		Determines the rate of decrease of drive speed when lower speeds (or stop) are demanded
	MAX HEIGHT		Determines the height above which drive is prevented.
	2-SPEED ENABLE		Determines the rate of drive speed before the 2-speed motor is automatically triggered to be demanded on
	ANTI-STALL		Determines the rate of speed that the 2-sped motor is automatically triggered off

Menu	Selection	Sub-Menu	Description
<b>Adjustments</b>			
<b>DRIVE/ ELEVATED</b>	FWD MIN		Determines the slowest drive speed in the forward direction (when the joystick is at 0% demand) when elevated
	FWD MAX		Determines the fastest drive speed in the forward direction (when the joystick is at 100% demand) when elevated
	REV MIN		Determines the slowest drive speed in the reverse direction (when the joystick is at 0% demand) when elevated
	REV MAX		Determines the fastest drive speed in the reverse direction (when the joystick is at 100% demand) when elevated
	ACCEL		Determines the rate of increase of drive speed when higher speeds are demanded when elevated
	DECEL		Determines the rate of decrease of drive speed when lower speeds (or stop) are demanded when elevated
<b>DRIVE/HIGH TORQUE</b>	FWD MIN		Determines the slowest drive speed in the forward direction in High Torque mode (when the joystick is at 0% demand)
	FWD MAX		Determines the fastest drive speed in the forward direction in High Torque mode (when the joystick is at 100% demand)
	FWD MAXHILL		Determines the fastest drive speed in the forward direction in High Torque mode (when the joystick is at 100% demand)
	REV MIN		Determines the slowest drive speed in the reverse direction in High Torque mode (when the joystick is at 0% demand)
	REV MAX		Determines the fastest drive speed in the reverse direction in High Torque mode (when the joystick is at 100% demand)
	ACCEL		Determines the rate of increase of drive speed when higher speeds are demanded in High Torque mode
	DECEL		Determines the rate of decrease of drive speed when lower speeds (or stop) are demanded in High Torque mode
	MAX HEIGHT		Determines the height above which drive is prevented in High Torque mode
	2-SPEED DISABLE		Determines the rate of drive speed before the 2-speed motor is automatically triggered to be demanded off in High Torque mode
	ANTI-STALL HIGHTORQUE		Determines the rate of speed that the 2-speed motor is automatically triggered off in High Torque mode
<b>DRIVE/HILL CLIMB</b>	FWD MIN		Determines the slowest drive speed in the forward direction in Hill Climb mode (when the joystick is at 0% demand)
	FWD MAX		Determines the fastest drive speed in the forward direction in Hill Climb mode (when the joystick is at 100% demand)
	REV MIN		Determines the slowest drive speed in the reverse direction in Hill Climb mode (when the joystick is at 0% demand)
	REV MAX		Determines the fastest drive speed in the reverse direction in Hill Climb mode (when the joystick is at 100% demand)
	ACCEL		Determines the rate of increase of drive speed when higher speeds are demanded in Hill Climb mode
	DECEL		Determines the rate of decrease of drive speed when lower speeds (or stop) are demanded in Hill Climb mode
	2-SPEED DISABLE		Determines the rate of drive speed before the 2-speed motor is automatically triggered to be demanded off in Hill Climb mode
	ANTI-STALL HILLCLIMB		Determines the rate of speed that the 2-speed motor is automatically triggered off in Hill Climb mode



Menu	Selection	Sub-Menu	Description
<b>Adjustments</b>			
<b>LIFT</b>	UP MIN		Determines the slowest lifting speed (when the joystick is at 0% demand)
	UP MAX		Determines the fastest lifting speed (when the joystick is at 100% demand)
	UP ACCEL		Determines the time for acceleration of lifting
	UP SLOW MAX		Determines the time for acceleration from stowed
	DOWN MIN		Determines the slowest lowering speed (when the joystick is at 0% demand)
	DOWN MAX		Determines the fastest lowering speed (when the joystick is at 100% demand) till 8% height
	DOWN MAX STOWED		Determines the fastest lowering speed (when the joystick is at 100% demand) the final 8% height
	ACCEL		Determines the rate of increase of lift speed when higher speeds are demanded
	DECEL		Determines the rate of decrease of lift speed when lower speeds are demanded
	MAX HEIGHT		Determines the height above which lifting is prevented.
	ARMGUARD		
TIME			Determines the time delay when armguard triggers during lowering, before lowering is allowed to continue
@HEIGHT			Determines the height at which “soft armguard” occurs when lowering
<b>STEER</b>	SPEED		Determines the pump speed when steering is used on its own (without drive).
	ACCEL		Determines the rate of increase of pump speed when steering is selected on its own (without drive)
	DECEL		Determines the rate of decrease of drive speed when steering is selected on its own (without drive)
<b>OUTRIGGERS</b>	DRIVEiLOCK		Determines the drive interlock functions
	ORIENTATION 1		Determines the initial set-up of what location the outriggers are located
	EXTEND		Determines the time delay of the extended outriggers after stopping
	LEVEL		Determines the tolerance for what the machine level must achieve
	RETRACT		Determines the time delay of the retracted outriggers before starting
	DEBOUNCE		Determines the time delay to stabilize machine level once perceived level is achieved
	PAUSE		Determines the time delay after outrigger functions are stabilized
	TILT FILTER		Determines the allowable tilt before outrigger perceived level is achieved
	Xtilt TARGET		Determines the target in degrees for the X plain that the outrigger perceived level is achieved
	Ytilt TARGET		Determines the target in degrees for the Y plain that the outrigger perceived level is achieved
	tilt SLACK		Determines the compensation slack of the outrigger level

Menu	Selection	Sub-Menu	Description
<b>Adjustments</b>			
<b>GROUNDMODE</b>	UP		Determines the (fixed) lifting speed in Base mode
	DOWN		Determines the (fixed) lowering speed in Base mode
	ACCEL		Determines the rate of increase of lift/lower/deck speeds in Base mode
	DECEL		Determines the rate of decrease of lift/lower/deck speeds in Base mode
<b>TILT</b>	Xtrip		Determines the amount of machine tilt needed to trigger the “tilted” condition; separate adjustments are provided for tilt in the two axis – the machine controller correctly combines tilt in each axis to determine an overall tilted / not-tilted condition.
	Ytrip		
	XtripHILL		Determines the amount of machine lift when going up an inclined plain
	DELAYtrip		Determines the time delay (“debounce”) to go from not-tilted to tilted, and from tilted to not-tilted – “DELAYtrip” determines the time delay to go in to a “tilted” condition and “DELAYclear” determines the time delay to exit the “tilted” condition.
	DELAYclear		
<b>OVERLOAD</b>	TRIP@		Determines the Platform load estimate above which functions will be prevented.
	LAMP@		Determines the Platform load estimate above which the overload warning lamp will be active.
	ALARM@		Determines the Platform load estimate above which the overload warning alarm will be active.
	DYNAMIC		Determines the Platform load estimate when moving and not static
	@HEIGHT		Determines the height above which an overloaded Platform will prevent functions
	SAFE-DOWN		Determines the height below which an overloaded Platform can still be lowered
	DELAYtrip		Determines the time delay (“debounce”) to go from not-overloaded to overloaded, and from overloaded to not-overloaded
	DELAYclear		Determines the time delay to exit the “overloaded” condition
<b>ALARMS</b>	DRIVE		Determines when to sound the alarm
	LIFT		Determines when to sound the alarm
	TILT		Determines when to sound the alarm
<b>HEIGHTS</b>	ELEVATION@		Determines the “elevation” point – the Platform height at which the machine is considered to be elevated
	MAX DRIVE		Determines the height above which drive is prevented
	MAX LIFT		Determines the height above which lift is prevented
	SLOW LIFT		Determines the height point that the lift slow speed in enabled
	ARMGUARD		Determines the height at which “soft armguard” occurs when lowering
	OVERLOAD		Determines the height above which an overloaded platform will prevent functions
	SAFE-DOWN		Determines the height below which an overloaded platform can still be lowered
	MAX noOR		Determines the maximum height for 9253 model with no outrigger

Menu	Selection	Sub-Menu	Description
<b>Setups</b>			
Refer to section <a href="#">5.8-11 Initial Set-Up And Change Defaults procedure</a>			
<b>CHANGE DEFAULTS</b>	MODEL		Factory set to configure the machine model type. Determines the initial default settings of all ADJUSTMENTS.
	CURVE		Selects the proper preprogrammed load/height curves
	ENGINE		Selects the proper engine installed in machine
<b>TILT SETUPS</b>	CALIBRATE LEVEL		Calibrates Machine Controller tilt to zero degrees X and Y. Refer to section <a href="#">Calibrate Level procedure</a>
	TILT SHUTDOWN		Determines if Machine Controller will prevent functions when machine is tilted
	ELEV. TILT SHUTDOWN		Determines if Machine Controller will prevent functions when machine is both tilted and elevated
<b>HEIGHT SETUPS</b>	ELEVATION@		Determines the “elevation” point – the platform height at which the machine is considered to be elevated.
	CALIBRATE HEIGHT		Calibrates platform height from 0% to 100% Refer to section <a href="#">Calibrate Height procedure</a>
	MIN LIFT		Determines the minimum time between each static measurement during load calibration
	SAMPLES		Determines the time between samples during dynamic lifting load calibration
	TILT CORRECTION		Configures how to correct machine tilt so that Machine Controller height measurement is correct
	HEIGHT SETUPS		Configures proper machine angle transducer settings
	SLOWDOWN		Determines whether to reduce lifting speed as platform height approaches MAX LIFT setting (to ensure no overshoot)
	ANTI OVERRISE DISABLE		Determines if the machine has optional KC Anti Overriding switches 1 =disable, 2=enable

Menu	Selection	Sub-Menu	Description
<b>Setups</b>			
<b>LOAD SETUPS</b>	CALIBRATE LOAD		Calibrates platform load estimation from 0% to 100% height, at rated load and empty, as measured by lift cylinder pressure sensor. Refer to section <a href="#">Calibrate Load procedure</a>
	STATIC DELAY		Determines the delay time to take measurements of a static stop point to ensure the machine is stable
	FAULTY LOAD		Determines whether to prevent movement if load estimate is implausibly low (i.e. damaged pressure sensor)
	DYNAMIC SCALE		Determines sensitivity to stop at OVERLOAD @HEIGHT, if platform load estimate is close to trip point.
	HYSTERESIS		Determines the difference between a changing state trip point
	CAL TOP		Determines the Calibrated load estimation at the top of the machine maximum lift
	OL COUNT		HIDE or SHOW the count for Overload triggers made.(CE model only)
	PRESSURE COUNT		
	FINETUNE <sup>up</sup>		Determines the percentage of fine tuning calculated during Calibration for DOWN movement
	FINETUNE <sup>down</sup>		Determines the percentage of fine tuning calculated during Calibration for UP movement
<b>INTERLOCKS</b>	TRIGGER <sup>only</sup>		Determines whether and after what delay to trigger an interlock when trigger is closed with no other function selected
	TRIGGER <sup>wait</sup>		Determines whether and after what delay to trigger an interlock when a function is selected without trigger being closed
	TRIGGER <sup>hold</sup>		Determines the time the triggered indicator lamps remain active
	SGLE		Only applicable if drive / lift mode is selected with momentary push switches; when using a drive / lift toggle switch.
	TELEMATICS		Determines if the Telematics option is "Normal" or has a "Lockout" keypad option installed

Menu	Selection	Sub-Menu	Description
<b>Setups</b>			
<b>ENGINE SETUPS</b>	RPM IDLE		Determines the Revolutions per Minute (RPM) of the engine at idle
	RPM min		Determines the minimum allowable Revolutions per Minute (RPM) of the engine
	RPM max		Determines the maximum allowable Revolutions per Minute (RPM) of the engine
	RPMdriveelevmin		Determines the minimum allowable Revolutions per Minute (RPM) of the engine while elevated
	RPMdriveelevmax		Determines the maximum allowable Revolutions per Minute (RPM) of the engine while elevated
	RPMdrivehightorque max		Determines the maximum allowable Revolutions per Minute (RPM) of the engine in high torque mode
	DRIVE LIFT UP min		
	DRIVE LIFT UP Max		
	RPMgenerator		Determines the Revolutions per Minute (RPM) of the engine with generator function selected
	RPMother		Determines the Revolutions per Minute (RPM) of the engine with other mode selected
	!!!!DELAY		
	ANTI IDLE		Determines the state of the eco start option on or off
WORKING temp		Determines the temperature setting from coolant sensor for allowing eco start option	
<b>VCCM SETUPS</b>	VCCM min		Determines the minimum curent level of VCCM output in amps
	VCCM max		Determines the maximum curent level of VCCM output in amps

Menu	Selection	Sub-Menu	Description
<b>Calibrations (Only visible for level 1 Access)</b>			
<b>TiltGain</b>			Factory set to calibrate machine controller tilt sensor
<b>TiltXoff</b>			Factory set to calibrate machine controller tilt sensor
<b>TiltYoff</b>			Factory set to calibrate machine controller tilt sensor
<b>Serial Number</b>			
<b>yyymm/nnnnn</b>			Displays the machine controller serial number

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## 5.8-7 Diagnostics

Message	Description
Diagnostics	The display module shows machine condition and operating information during operation.
INITIALIZING	Preparing to operate, immediately after power-on
SHUTDOWN!	All operation prevented – for example both the Platform & Ground (Base) Emergency Stop buttons inputs are active
CHECK CANbus	All operation prevented – CANbus communications is not successful
PLATFORM, GROUND	Ready to operate, from the platform or ground controls as indicated
GROUND UP, GROUND DOWN, GROUND OUT, GROUND IN	A Base function is operating normally
GROUND UP LOCKED, GROUND DOWN LOCKED, GROUND OUT LOCKED, GROUND IN LOCKED	A Base function is selected but not allowed (for example, the switch was closed at power-on)
GROUND FAULTY	Multiple Base function inputs are active at the same time
WAITING FOR TRIGGER	A platform function is selected, but the trigger switch is not closed (close trigger switch to proceed)
TRIGGER CLOSED	The platform trigger switch is closed, but no function is selected (select a function to proceed)
TRIGGER LOCKED	The platform trigger switch was closed at power-on, or closed for too long with no function selected
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
OUT, IN	A platform deck extend/retract 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)
OUT LOCKED, IN LOCKED	A platform deck 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

Message	Description
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:
ARMGUARD	During descent, the machine controller can be configured to stop movement and provide an armguard delay (allowing time to check that everything is clear before continuing descent)
	Release and re-select DOWN to continue lowering (after the delay time has passed)
BATTERY	Battery voltage is too low (or high!) to allow movement
EXTERNAL ALL, EXTERNAL DRIVE, EXTERNAL LIFT	An external cutout input is preventing functions – determine the cause of the external cutout
NO VALVE SUPPLY	Check power to P7-1
NONE	There is no interlock (the interlock has cleared while viewing the display)
OVERLOADED	The platform is overloaded, with the machine controller configured to measure overload and shut down functions when overloaded – reduce platform load
TEST MODE	The machine controller test mode is active – switch power off and on again to clear
TILTED	The machine is tilted beyond limits,– descend, then move machine to a more level location
TOO HIGH	The platform is too high to allow some functions – descend first
TOO HOT	The GP400 heatsink has reached 75°C, preventing all functions except lowering. Functions will be allowed again when the heatsink cools to below 70°C.
UNCALIBRATED	The height and/or pressure sensors have not been calibrated and are required to measure platform height and/or load
	If overload functions are active (ADJUSTMENTS/OVERLOAD TRIP@, LAMP@ or ALARM@ set to a non-zero value) then both the height and pressure sensors must be calibrated
	If overload functions are not active, but height-based decisions are active (ADJUSTMENTS/ HEIGHT values set to between 1% and 100%) then the height sensors must be calibrated
	Calibration procedures are accessible from the SETUPS/HEIGHT SETUPS and SETUPS/LOAD SETUPS menus

### 5.8-8 Help Messages and Flash Codes

The Display Module shows Help messages to show the machine conditions. Some messages cause the LED on the machine controller to flash so you can still do simple troubleshooting even if the display is not functioning.

#### IMPORTANT

Skyjack recommends reading the diagnostic messages from the Display Module and not the LED flash codes to troubleshoot the machine. The HELP message and diagnostic displays provides a much higher detail of information.

### LED Flash Codes

The diagnostic messages from the LED are shown as Dual Flash Codes. The LED flashes on/off a number of times stay off for a short time, then flash on/off a number of times again then followed by a much longer off time. The sequence repeats. For example, on/off/on/off-short delay/on/off/on/off-long delay/repeat

Message	Flash Code	Description
	LED remains on steady	There is no LED flash code
STARTUP!	No flash code	The machine controller 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	The machine controller 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	The machine controller is ready to operate in Base mode when a function is selected
DRIVING!	No flash code	
LIFTING!	No flash code	
LOWERING!	No flash code	
STEERING!	No flash code	
EXTENDING DECK!	No flash code	
RETRACTING DECK!	No flash code	All the above HELP messages indicate that a function is active – the machine should be moving as requested by the operator
CLOSE TRIGGER	No flash code	A platform function is selected but the trigger switch is not closed
VEHICLE TILTED	No flash code	The machine is tilted beyond the limits
CHECK DRIVE/LIFT SELECT SWITCH!	2/2	There is a problem with the platform drive/lift select switch – both modes are selected together
CHECK GROUND INPUT SWITCHES!	2/2	There is a problem with the base function select switches – more than one is active at the same time.
CHECK JOYSTICK SWITCHES!	2/2	There is a problem with the platform joystick switches – both directions are selected together

Message	Flash Code	Description
FACTORY OVERRIDE	(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 MEWP can be freely raised/lowered and driven irrespective of any calibration needs, tilt, etc.
		IMPORTANT: Never use a machine in factory override; this state is ONLY intended for use during manufacture! While factory override is active, the LED is rapidly flashed on/off.
FAULT: BAD 5V SENSOR SUPPLY - CHECK P2-1 WIRING!	4/5	The “5V sensor” supply feeds. Check wiring for short-circuits or misconnection to other wiring
FAULT: BAD INTERNAL 5V!	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 12V!	4/3	The internal “12V” supply is out of range; if the fault remains, the controller may have to be replaced
FAULT: BAD INTERNAL SLAVE!	4/2	The internal “slave” is not operating correctly; if the fault remains, the controller may have to be replaced
FAULT: BAD INTERNAL TEMPERATURE SENSOR!	4/1	The heatsink temperature is out of range; if the fault remains, the power controller may have to be replaced
FAULT: BATTERY VOLTAGE TOO LOW!	4/4	The battery supply is too low – the battery must be re-charged
FAULT: BATTERY VOLTAGE TOO HIGH!	4/4	The battery supply is too high – check that the correct battery and charger are installed
FAULT: CAN BUS!	6/6	CANbus 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.
FAULT: B+ STUD VOLTAGE TOO HIGH - CHECK LINE CONT!	3/3	The voltage on the B+ stud of the controller (connected to an internal voltage stabilization capacitor bank) is close to B+ when the line contactor is off
		Check the line contactor tips are not welded; check the power wiring for errors
FAULT: B+ STUD VOLTAGE TOO LOW!	7/7	The voltage on the B+ stud of the controller (connected to an internal voltage stabilization capacitor bank) is too far from B+ when the line contactor is off (a pre-charge circuit in the module normally applies a voltage to the capacitor bank)
		Check the power wiring for errors
FAULT: CHECK ELEVATION SWITCH	6/3	During calibration, the height at which the elevation switch opens (while lifting) and closes (while lowering), is recorded; during normal operation the elevation switch and platform height are continuously compared
		Check for open- or short-circuit wiring; check for loose elevation switch cam; re-calibrate height if necessary
FAULT: CHECK HEIGHT1 SENSOR	6/1	
FAULT: CHECK HEIGHT2 SENSOR	6/1	A height sensor is giving an out-of-range voltage (below 0.5V or above 4.5V)
		Check for open- or short-circuit wiring; replace height sensor if necessary

Message	Flash Code	Description
FAULT: CHECK HEIGHT SENSORS	6/1	When two height sensor outputs should read the same height at all times; this message indicates that the sensors are reading different heights. Check for loose/faulty sensors; re-calibrate height if necessary
FAULT: CHECK PRESSURE SENSOR	6/2	The pressure sensor is giving an out-of-range voltage (below 0.5V or above 4.5V) Check for open- or short- circuit wiring; replace pressure sensor and re-calibrate load if necessary
FAULT: CUSTOMER	1/1	The machine controller must be configured to the customer requirements – this should have been done before the controller was shipped from factory
FAULT: ENERGIZED LINE CONTACTOR - CHECK P5 WIRING!	3/4	There is a voltage on the line contactor coil output, when it should be off Check wiring to line contactor coil
FAULT: ENERGIZED VALVE - CHECK P5 WIRING!	3/2	
FAULT: VALVE FEEDBACK HIGH - CHECK VALVE WIRING!	3/2	There is a voltage on one or more valve outputs, when all outputs should be off Check wiring to each valve coil
FUNCTIONS LOCKED - ARMGUARD	2/2	During descent, the machine controller can stop movement for a configurable time (see ADJUSTMENTS/ LIFT/ ARMGUARD), to allow a safety check that no-one is close to the machine. The operator must release and then re-select DOWN to continue lowering (after the delay timeout)
FUNCTIONS LOCKED - BATTERY	4/4	Battery voltage is too low (or too high!) to allow movement.
FUNCTIONS LOCKED - EXTERNAL SHUTDOWN	2/2	An external shutdown is preventing functions – check DIAGNOSTICS/SYSTEM/ MODE/ INTERLOCK to see which external interlock is active.
FUNCTIONS LOCKED - NO VALVE SUPPLY	2/3	Check P3-2, which carries power to energize the valve outputs (separate to P3-1 EMS).
FUNCTIONS LOCKED - NOT CALIBRATED	1/1	If platform overload functions are active (ADJUSTMENTS/OVERLOAD TRIP@, LAMP@ or ALARM@ set to a non-zero value) then both height and load must be calibrated If overload functions are not active, but height-based decisions are active (ADJUSTMENTS/ HEIGHT values set to between 1% and 100%) then height must be calibrated Calibration procedures are accessible from the SETUPS menus
FUNCTIONS LOCKED - OVERLOADED	2/2	The platform is loaded too high to allow operation – the platform load must be reduced. If the overload features are not wanted, be sure to set ADJUSTMENTS/ OVERLOAD TRIP@, LAMP@ or ALARM@ to 0%
FUNCTIONS LOCKED - TEST MODE SELECTED	2/2	When Machine Controller test mode has been activated (see DIAGNOSTICS/ OUTPUTS), no functions are allowed. Switch power off/on to reset to normal operation
FUNCTIONS LOCKED - TILTED	2/2	The machine is tilted too much to allow some functions. (see SETUPS/TILT SETUPS/TILT SHUTDOWN and ELEV.TILT SHUTDOWN)

Message	Flash Code	Description
FUNCTIONS LOCKED - TOO HIGH	2/2	The platform is raised too high to allow some functions.
		(see ADJUSTMENTS/HEIGHTS/MAX DRIVE and MAX LIFT)
FUNCTIONS LOCKED - UNDERLOADED	2/2	Platform 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 machine mechanics/hydraulics
		(see SETUPS/LOAD SETUPS/ FAULTY LOAD)
HEIGHT NOT CALIBRATED	1/1	Height based functions are required (for example MAX DRIVE is configured), but height has not been calibrated
NOT CALIBRATED	1/1	Height and load based functions are required (for example platform overload is configured), but height and/or load has not been calibrated
RELEASE GROUND SWITCHES!	2/2	Ground function switches were closed at power-on (or a wiring error is causing an input to be active always)
RELEASE JOYSTICK!	2/2	Platform joystick was selected at power-on (or a wiring error is causing an input to be active always)
		Platform joystick selected for too long without trigger switch (see SETUPS/ INTERLOCKS/ TRIGGERwait)
RELEASE TRIGGER!	2/2	Trigger switch was closed at power-on (or a wiring error is causing the input to be active always)
		Trigger switch was closed for too long with no function selected (see SETUPS/ INTERLOCKS/ TRIGGERonly)
SELECT DRIVE/LIFT MODE!	2/2	There is a problem with the platform drive/lift select switch – neither mode is selected
		Check wiring from drive/lift select switch
SHUTDOWN - CHECK EMS SWITCHES!	2/1	The platform and ground EMS inputs indicate the mode in which the machine controller must operate. If neither input is active, or if both are active together, the machine controller does not know how to function
		Check EMS switch wiring.



### 5.8-9 Access Level Procedure

1. To set “ACCESS LEVEL” 2, (CODE 1122) for accessing set-ups and adjustments carry out the following procedure:
  - a. Ensure display reads “EVERYTHING OK”
  - b. Press and hold ESC key for 3-4 seconds
  - c. Press ◀ or ▶ to find the “ACCESS LEVEL” menu and select it by pressing ENTER
  - d. The display will show the initial code 0000 with the first 0 flashing
  - e. Set the first digit of the code (using ↑ and ↓)
  - f. Press ▶ to move to the next digit (the first digit will stop flashing, the second will start flashing)
  - g. Set the second digit of the code
  - h. Repeat steps 4 and 5 for all the code digits – ensure that the code is correctly entered (if a digit is wrong, press ◀ and ▶ to select it again, and ↑ and ↓ to correct it)
  - i. Press ENTER to confirm the code; the “ACCESS LEVEL” will change if the correct code is entered
2. To set “ACCESS LEVEL” 3 –for daily normal operation level defaulted after cycling power
3. Cycling power to the machine controller will restore you to ACCESS LEVEL 3.

### 5.8-10 Override Mode procedure

Normal function of the machine controller is to prevent movement if not properly calibrated. This can cause difficulties if you need to move the machine with faulty sensors to a service location, which might be different to that where it is.

With the machine controller in an “OVERRIDE” configuration, none of the normal shutdowns or interlocks will occur and the machine can be freely lifted/lowered and driven irrespective of any calibration needs, tilt, etc.

1. Enter the “ACCESS LEVEL” 2 code to enable adjustments and calibrations (see ACCESS LEVEL)
2. Press ◀ or ▶ to get to “SYSTEM OVERRIDE” and press ENTER to select
3. Press ENTER to enter the “OVERRIDE” option

#### **IMPORTANT**

**NEVER operate a machine for normal use that is still in “OVERRIDE” – all of the safety and shutdown interlocks are disabled! If the LED is flashing on/off rapidly, do not use the machine.**

Once the repairs and servicing have been completed and the machine has been calibrated again, the “OVERRIDE” is permanently disabled by cycling power to the machine controller, and it can be operated normally.

### 5.8-11 Initial Set-Up And Change Defaults procedure

The model of the machine and engine type utilized in the machine must be set in the machine controller to configure the machine size and capabilities due to replacement of the machine controller if necessary. This procedure only needs to be performed if the machine controller was replaced.

1. Ensure machine parked on level ground
2. Enter the "ACCESS LEVEL" 2 code to enable calibrations
3. Press ◀ or ▶ to get to "SETUPS" and press ENTER to select
4. The display will show "CHANGE DEFAULTS" and press ENTER to select
5. Press ENTER to run the "MODEL" option
6. The display will show "1=9233 NA" for example, which is the machine type in North America
7. Press ↑ until the proper machine type is listed plus the correct geographical region. (NA, KC, CE, AS etc.)
8. Press the ESC button to exit the "MODEL" option when the correct machine type is listed to load all the pre-programmed ADJUSTMENTS and LOAD curves for that machine type.
9. Press ◀ or ▶ to get to "CURVE" and press ENTER to select
10. The display will show "CURVE =1"
11. Press the ESC button to exit the CURVE option to load all the pre-programmed parameters for the correct CURVE.
12. Press ◀ or ▶ to get to "ENGINE" and press ENTER to select
13. The display will show "1=KUBOTA D1305 DIESEL" for example, which is the ENGINE utilized on the machine.
14. Press ↑ until the proper engine type is listed
15. Press ESC button to exit the "ENGINE" option
16. Cycle power to the machine controller to finish.

### 5.8-12 Calibration

#### Calibrate Level procedure

The integral tilt sensor of the machine controller must be calibrated to compensate for errors due to installation or replacement of the machine controller. This procedure only needs to be performed if necessary.

1. Ensure machine parked on level ground
2. Enter the "ACCESS LEVEL" 2 code to enable calibrations (see ACCESS LEVEL procedure)
3. Press ◀ or ▶ to get to "SET UPS" menu and press ENTER to select
4. The display will show "CHANGE DEFAULTS"
5. Press ◀ or ▶ to get to "TILT SETUPS" and press ENTER to select
6. Press ENTER to run the "CALIBRATE LEVEL" option
7. The display will show "YES: ENTER, NO:ESC", asking for confirmation that the machine is level
8. Press the ENTER button to confirm YES that calibration is required.
9. The display will now show the current tilt measurements; if the leveling procedure was successful then both the "X" and "Y" tilts should be about zero
10. Press the ESC button to exit the "CALIBRATE LEVEL" option
11. If the tilt measurements are not zero in step 9, try the procedure again – press the ESC button then the ENTER button and repeat from step 4
12. If the tilt measurements still cannot be zeroed, check that the machine is properly parked on level ground, and check that the machine controller is correctly and securely installed on a vertical surface of the machine base, with the connectors at the bottom.
13. Cycle power to the machine controller to finish.

### Calibrate Height procedure

The machine controller has a number of Platform height based functions – for example, driving can be prevented above a certain height, a “soft armguard” can stop lowering for a preset time at a certain height, etc. This procedure only needs to be performed if necessary.

The machine controller can detect wire-off or short-circuit failures of the Angle Transducers and continuously verify both sensors against each other, since both should read the same scissor angle at all times.

The Angle Transducer AT1 settings are calibrated to compensate for errors due to installation or replacement if necessary. The calibration is based on the tilt (measurement of the scissor angle relative to level ground). This is done using the internal X/Y tilt sensor in the machine controller and the Analog readings from the Angle Transducer two Outputs.

1. Ensure machine parked on level ground and there is sufficient room to raise the Platform all the way up to maximum height.
2. Enter the “ACCESS LEVEL” 2 code to enable calibrations (see ACCESS LEVEL procedure).
3. Press **←** or **→** to get to “SET UPS” menu and press **ENTER** to select
4. Press **←** or **→** to get to “HEIGHTS SETUPS” and press **ENTER** to select
5. The display will show “ELEVATION @ XX%”. Press **→** one time to get to next selection
6. Press **ENTER** to run the “CALIBRATE HEIGHT” option
7. The display will show “PLATFORM DOWN?”. Press **ENTER** if/when Platform is fully lowered.
8. The display will show “NOT GROUND MODE” if the S3 Base Key switch is not in correct Base selection. Ensure Base is selected.
9. The display will show “PLEASE WAIT, PLEASE LIFT”. Select Lift on S13 Lift/Lower switch to begin lifting the Platform and continue holding the switch.
10. The display will show “LIFTING XX” (increasing in value) and will continue to increase as Platform raises to 100% at which point, release the S13 Lift/Lower switch only.
11. The display will show “PLEASE WAIT, PLEASE LOWER”. Select Lower on S13 Lift/Lower switch to begin lowering the Platform and continue holding the switch.
12. The display will show “LOWERING XX” (decreasing in value) and will continue to decrease as Platform lowers to 0% at which point, release the switch.
13. The display will show “CALDATE: mm/dd/yy” with the “mm” value flashing
  - a. It is recommended that the current date be entered here to provide easy tracking of the date of last calibration (the date can be seen in the “LOG” menu available in the “DIAGNOSTICS” menu)
  - b. Use **↑** and **↓** to set the month, then press **→** to move to the date; set the date and then the year in the same way
  - c. Press **ENTER** to complete date entry (the system will store it)
14. The display will show “Finished”. Cycle the power to the machine controller to finish

## Calibrate Load procedure

The machine controller requires calibration before it can calculate Platform load. This procedure only needs to be performed if necessary.

Calibration records the lift cylinder pressure at various platform heights, both fully loaded and empty.

After the calibration procedure is enabled, the scissor lift machine's Platform is fully raised and lowered three times automatically:

1. "LOADED" calibration – fully loaded  
Platform raised & lowered with stops to take measurements
2. "EMPTY" calibration – unloaded Platform raised & lowered with stops to take measurements

## IMPORTANT

**Any changes to the machine mechanics, hydraulics, etc may require calibration to be repeated!**

The following procedure must be followed COMPLETELY to calibrate the machine controller; throughout the procedure various checks are made – if any problem is detected the procedure stops and displays a FLASHING failure message listed at the end of this procedure.

## NOTE

*If the calibration procedure is interrupted, completed phases need not 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 a significant mechanical or hydraulic change has been made).*

1. Ensure machine parked on level ground and Level Calibration performed, (see CALIBRATE LEVEL)
2. Enter the "ACCESS LEVEL" 2 code to enable adjustments and calibrations (see ACCESS LEVEL)
3. Press ◀ or ▶ to get to "LOAD SETUPS" and press ENTER to select
4. Press ENTER to run the "CALIBRATE LOAD" option
5. Ensure machine is in Base Mode on S3 Base Key switch

6. The display will show "PLATFORM DOWN?", asking for confirmation that the platform is fully lowered. Ensure that the Platform is fully lowered then press the ENTER button to confirm
7. The display will show "PLATFORM LOADED?", "YES: ENTER, NO:ESC", asking for confirmation that the Platform is loaded
  - a. Load the Platform with 100% calibrated load then press the ENTER button for YES to confirm there is a calibrated load on the Platform.
8. The display will show "PLEASE LIFT ...", waiting for the S13 Lift/Lower UP switch to be activated to begin raising the Platform
  - a. Close the UP switch and KEEP IT CLOSED until the Platform has reached full height

## IMPORTANT

**If the UP switch is released early, the calibration will have to be aborted and repeated from the beginning!**

9. When the system detects the UP switch closed, the display will show "LIFTING" with an increasing count
  - a. The system will monitor changing height as the Platform is lifted, until the UP switch is released
  - b. A counter shows the number of measurements taken during the lift; a maximum of 500 measurements can be recorded
  - c. When the UP switch is released, the machine controller records the maximum height of the Platform
10. The display now shows "PLEASE LOWER ..."
  - a. Close the DOWN switch and KEEP IT CLOSED until the Platform is fully lowered

## IMPORTANT

**If the DOWN switch is released early, the calibration will have to be aborted and repeated from the beginning!**

11. When the system detects the DOWN switch closed, the display will show "LOWERING"
  - a. The system will wait for the DOWN switch to be released once the Platform is fully lowered

12. The load calibration “LOADED” phase is now complete. The display will show “REDO EMPTY? YES” – for the first time calibration only “YES” can be selected
  - a. Press the ENTER button to confirm that empty calibration is needed
13. The display will show “PLATFORM EMPTY?”, asking for confirmation that the Platform is empty
  - a. Remove all load from the Platform then press the ENTER button to confirm
14. The display will show “PLEASE LIFT ...”, waiting for the UP switch to be activated to begin raising the Platform
  - a. Close the UP switch and keep it closed until the Platform has reached full height
  - b. When the system detects the UP switch closed, the display will show “LIFT EMPTY” with the current height (from 0% to 100%)
  - c. Similar to the “LIFT LOADED” phase the lifting ... stopping ... measuring ... lifting process will continue automatically until the Platform reaches full height, then the UP switch can be released
  - d. The display shows “TOTAL DATA: xx” to indicate the number of measurements taken
15. The display will show “PLEASE LOWER ...”
  - a. Close the DOWN switch and keep it closed until the Platform is fully lowered
  - b. Similar to the “LOWER LOADED” phase the lowering ... stopping ... measuring ... lowering process will continue automatically until the Platform is fully lowered, then the DOWN switch can be released
  - c. The display shows “TOTAL DATA: xx” to indicate the number of measurements taken
16. The load calibration “EMPTY” phase is now complete
17. The collected data is checked to ensure that there were no problems with the recorded pressure; checks include making sure that the loaded pressures are higher than the empty pressures, with sufficient difference to enable load estimates to be calculated
18. The display will show “CALDATE: mm/dd/yy” with the “mm” value flashing
  - a. It is recommended that the current date be entered here to provide easy tracking of the date of last calibration (the date can be seen in the “LOG” menu available in the “DIAGNOSTICS” menu)
  - b. Use ↑ and ↓ to set the month, then press → to move to the date; set the date and then the year in the same way
  - c. Press ENTER to complete date entry (the system will store it)
19. The display will show “FINISHED!”

### IMPORTANT

Press the ESC button to exit the “CALIBRATE LOAD” option (it’s not possible to use the machine if you don’t do this)

20. The machine controller is now fully calibrated for Load.

### Calibration Load Fault List

During calibration, the machine controller repeatedly checks for possible problems, which might prevent successful calibration, or subsequently give inaccurate Platform load estimates. If any problems are detected, a flashing error message is immediately displayed and calibration is terminated – the problem must be resolved, and then calibration must be re-started.

Most calibration error messages have an “Fxx” number as well as a description, to aid in trouble-shooting, as per the following fault list:

Fault Code	Fault Name	Fault Description
F01	CANNOT RUN	Something is wrong, preventing the machine controller from running – check the HELP message (causes include line contactor, valve, or motor wiring errors)
F02	NOT GROUND MODE	Calibration can only be carried out from Base control!
F03	NOT STOPPED	The machine must not already be moving when calibration started
F04	TILTED	The machine must be on level ground when calibration started
F05	BAD HEIGHT1	
	BAD HEIGHT2	At the start of calibration, the Angle Transducers are out of range (output must be between 0.9V and 4.1V with Platform fully lowered)
F06	CHECK ELEV	At the start of calibration, the Angle Transducers require calibration with Platform fully lowered
F07	BAD HEIGHTS	During calibration, the two Angle Transducers disagreed too much
F08	CHECK ELEV	The Angle Transducers require calibration with the Platform fully raised
F09	BAD HEIGHT1	
	BAD HEIGHT2	The Angle Transducers are out of range when fully lowered (0%) calibration is recorded (output must be between 0.9V and 4.1V with platform fully lowered)
F10	BAD HEIGHT1	
	BAD HEIGHT2	The Angle Transducers are out of range when fully raised (100%) calibration is recorded (output must be between 0.6V and 4.4V with platform fully raised)
F11	NOT UP	
	NOT DOWN	When instructed to go up (raise the Platform) the DOWN switch was activated.
F12	TOO MANY	More than 500 samples are recorded during dynamic lifting – the machine lifts too slowly
		Increase the value of SETUPS/HEIGHT SETUPS/SAMPLE@ to delay longer between each sample (do not increase too much, as this will cause inaccurate dynamic load estimates)
F13	LOW HEIGHT RANGE	There is not enough difference between the Angle Transducers output when fully lowered, and fully raised (minimum allowed difference is 1V)
		Ensure the UP switch is not released before the platform is fully raised



Fault Code	Fault Name	Fault Description
F14	BAD HEIGHT1	The Angle Transducers output is bad during dynamic lifting (must be between 0.6V and 4.4V always)
F15	CHECK ELEV	The Angle Transducers is open with platform fully lowered at the end of the dynamic raising / lowering cycle – or the switch changed state more than once
F16	LOW ELEV.OPEN	The point at which the Angle Transducers are open while the Platform was lifting, is too low (it should open between 5% and 20% height)
F17	HIGH ELEV.OPEN	The point at which the Angle Transducers are open while the Platform was lifting, is too high (it should open between 5% and 20% height)
F18	LOW ELEV.CLOSE	The point at which the Angle Transducers are closed while the Platform was lowering, is too low (it should open between 5% and 20% height)
F19	HIGH ELEV.CLOSE	The point at which the Angle Transducers are closed while the Platform was lowering, is too high (it should open between 5% and 20% height)
F20	HEIGHT1 <>0%	After fully raising and fully lowering the Platform, during dynamic or static calibration, we should always be back at 0% height!
	HEIGHT2 <>0%	
F22	HEIGHT1 <>100%	After fully raising the Platform, during static calibration, we should always lift to 100% height!
	HEIGHT1 <>100%	
F24	TOO MANY	During static (loaded or empty) calibration, no more than 20 measurement points can be recorded!
		A properly working machine with lift cylinder pressure reliably indicating Platform load, should not require more than 10 measurement points
F27	BAD HEIGHT	During static (loaded or empty) calibration, the Platform height is out of range (below 0% or above 100%, or below 0.4V or above 4.6V)
F30	BAD HEIGHTS	At the end of static (loaded or empty) calibration, the sequence of recorded height measurements is invalid!
F34	REJECT CURVE	At the end of dynamic calibration, the recorded height/pressure curve is checked – the expected curve has a high pressure peak near the bottom (due to maximum lift needed when the scissor arms are nearly horizontal), a low pressure trough near the middle, and a higher peak near the top
F40	REJECT DELTA DOWN @	
	REJECT DELTA UP @	At the end of all static calibrations, the loaded and empty height/pressure curves are compared – the loaded curve should be higher than the empty curve, due to the additional Platform load. <b>IMPORTANT:</b> Ensure that loaded calibration is done with rated load in the Platform, and empty calibration is done with no load in the Platform!
F42	LOW PRESSURE	
F43	HIGH PRESSURE	When the Platform is fully lowered, the lift cylinder pressure cannot be checked – therefore soon after lifting begins during static (loaded and empty) calibration, the lift cylinder pressure is checked; this ensures that a hydraulic problem is discovered early, instead of waiting till calibration has been completed but with bad data!
		The lift cylinder pressure transducer output must be between 0.4V and 4.6V at all times
F44	LOW PRESSURE	
F45	HIGH PRESSURE	During static (loaded or empty) calibration, the lift cylinder pressure is out of range (below 0.4V or above 4.6V)

Fault Code	Fault Name	Fault Description
F46	CHECK ELEV	
F47	CHECK ELEV	During dynamic calibration, the Angle Transducer changed state (closed to open, or open to closed) more than once!
F48	BAD PRESSURE	At the start of calibration, the pressure sensor is out of range (output must be between 0.3V and 4.8V at all times)
F49	TOO FEW	At the end of static (loaded or empty) lifting or lowering calibration, too few measurements were taken (a minimum of 4 measurements is required)
		Check that SETUPS/HEIGHT SETUPS/MIN LIFT is not set too high; recommended values are between 1s for fast lifting machines, and 3s for slow lifting machines
F52	NOT CALIBRATED!	Something happened to cause calibration to fail – it is recommended to check all sensor wiring for loose connections, then repeat calibration
	FINISHED!	This display occurs when all calibrations (dynamic, loaded up, loaded down, empty up, empty down) have been completed, and the CALDATE has been entered, be sure to press <ESC> on the display module to exit calibration, before attempting to use the machine
	GO UP MORE!	
	GO DOWN MORE!	During calibration, the operator needs to close the UP or DOWN switch as required to lift or lower the Platform – if the switch is closed in the wrong direction, no fault occurs but the machine does not move! This display clarifies the error
	IGNORING	During static (loaded or empty) calibration, it may happen that a second measurement is taken very close to the previous measurement (for example if the operator lets go the UP/DOWN switch – no fault occurs, and this display indicates that the new measurement is being ignored
	PLEASE WAIT	During calibration, the machine controller sometimes delays while waiting for sensor values to stabilize – this display indicates why nothing appears to be happening

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