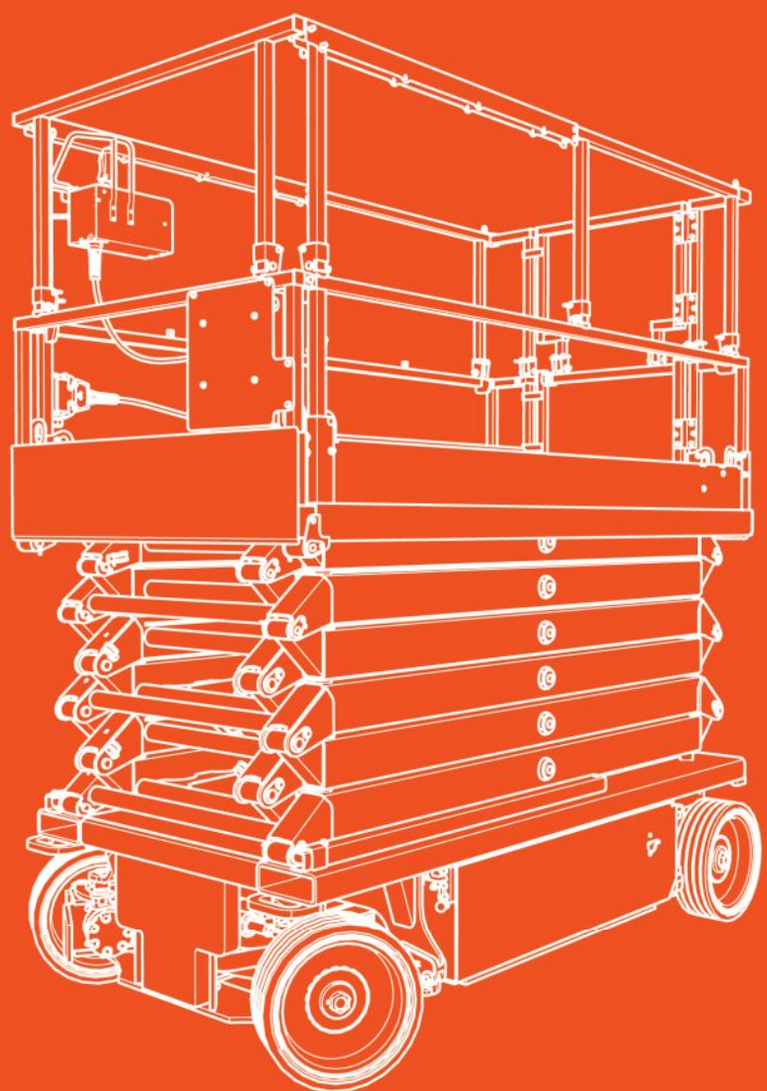
SKYJACK

SERVICE MANUAL

SJIII 4740

DC ELECTRIC SCISSORS



196430AG
January 17, 2022
ANSI/CSA, CE, AS & KC

This manual is for MEWPs with serial numbers:

SJIII 4740: 70 200 001 to 70 299 999

Please refer to the website (www.skyjack.com) for other serial numbers, most recent technical manuals and USB software.

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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.

Notes

Table of Contents

Section 1 – Scheduled Maintenance 11

1.1 Read and Heed 11

1.1-1 Aerial Platform and Mobile Elevating Work Platform Definition. 11

1.1-2 Purpose of Equipment 11

1.1-3 Use of Equipment 11

1.1-4 Manual 11

1.1-5 Service Policy and Warranty 11

1.1-6 Operator Safety Reminders, Warnings and Precautions. 11

1.2 Maintenance and Inspection Schedule 12

1.2-1 Owner's Annual Inspection Record 12

1.2-2 Replacement Parts 12

1.2-3 Maintenance and Service Safety Tips. 12

1.2-4 Railing Maintenance and Repair. 13

1.3 Hydraulic System & Component Maintenance and Repair 14

1.3-1 Maintenance Hints 15

1.4 About this Section 16

1.4-1 Service Bulletins 16

1.4-2 Maintenance and Inspection 16

1.4-3 Maintenance Instructions 16

1.5 Owner's Annual Inspection Record 17

1.6 Pre-Delivery/Maintenance Inspection Checklist 18

1.7 Visual & Daily Maintenance Inspections 19

1.7-1 Manuals. 19

1.7-2 Labels 19

1.7-3 Limit Switches. 19

1.7-4 Electrical 20

1.7-5 Hydraulic. 20

1.7-6 Entrance Side 20

1.7-7 Battery Tray Side 21

1.7-8 Extension Side. 22

1.7-10 Hydraulic/Electric Tray Side 24

1.7-11 Platform Assembly 25

1.7-12 Lifting Mechanism. 26

1.8 Function Tests 30

Section 2 – Maintenance Tables and Diagrams 31

2.1 Specifications & Features 32

2.2 Torque Specifications for Fasteners (US) 33
2.3 Torque Specifications for Fasteners (Metric) 34
2.4 Torque Specifications for Hydraulic Couplings & Hoses 35
2.5 Torque Specifications 36
2.6 Maximum Platform Capacities (Evenly Distributed) 37
2.7 Floor Loading Pressure 38
2.7-1 Locally Concentrated Pressure (LCP) 39
2.7-2 Overall Uniform Pressure (OUP) 39

Section 3 – System Component Identification and Schematics 41

3.1 Electrical Symbol Chart 42
3.2 Hydraulic Symbol Chart 43
3.3 Wire Number and Color Code 44
3.4 AC Cord Color Code 45
3.5 Hydraulic Parts List 46
3.6 Electrical Parts List 47
3.7 Drive, Brake Release and E-Lowering Manifold and Port Identification 50
3.8 Holding Valve and Port Identification 51
3.9 Platform Control Console 52
3.10 Base Control Console 53
3.11 Control Cable 54
3.12 High Speed Limit Switch Wiring 55
3.13 Anti-Overrising Limit Switch Wiring Diagrams 56
3.14 Hourmeter (CE) 57
3.15 Harness Wiring 58
3.16 Telematics Harness - ZTR 60
3.17 Main Manifold and Port Identidication 62
3.18 Hydraulic Schematics - ANSI/CSA, AS, KC 63
3.19 Hydraulic Schematics - CE & AS 64
3.20 Main Manifold Harness (ANSI/CSA) 65
3.21 Main Manifold Harness (CE, AS & KC) 66
3.22 Elevate Telematics Harness 67
3.23 Electrical Panel (ANSI/CSA) 68
3.24 Electrical Panel (ANSI/CSA) 69
3.25 Electrical Panel (CE) 70
3.26 Electrical Panel (CE) 71
3.27 Electrical Panel (AS) 72
3.28 Electrical Panel (AS) 73
3.29 Electrical Panel (KC) 74
3.30 Electrical Panel (KC) 75
3.31 Electrical Panel - Inverter Option 76
3.32 Telematics Wiring - Morey (ANSI/CSA) 77
3.33 Load Sensing and Beeper (CE & AS) 78

3.34 Horn/Tilt Switch/Flashing Light 79
3.35 Electrical Schematic - ANSI/CSA (All Options) 80
3.36 Electrical Schematics - ANSI/CSA (All Options) 81
3.37 Electrical Schematic - ANSI/CSA (No Options) 82
3.38 Electrical Schematic - ANSI/CSA (No Options) 83
3.39 Electrical Schematic (CE - All Options) 84
3.40 Electrical Schematic (CE - All Options) 85
3.41 Electrical Schematic (AS - All Options) 86
3.42 Electrical Schematic (AS - All Options) 87
3.43 Electrical Schematic (KC - All Options) 88
3.44 Electrical Schematic (KC - All Options) 89

Section 4 – Troubleshooting Information 91
4.1 Introduction 91
4.2 Electrical System - ANSI/CSA & KC 92
4.2-1 All Controls Inoperative 92
4.2-2 All Controls Except for Down Function Inoperative 93
4.2-3 All Controls Inoperative From Base Control Console 94
4.2-4 No Up Function from Base Control Console 94
4.2-5 Up Function Slow from Base Control Console 95
4.2-6 No Down Function from Base Control Console 95
4.2-7 All Controls Inoperative From Platform Control Console 96
4.2-8 No Up Function from Platform Controls 96
4.2-9 Up Function Slow from Platform Control Console 98
4.2-10 No Down Function from Platform Controls 98
4.2-11 No Emergency Down Function 98
4.2-12 Steer Only Inoperative. 99
4.2-13 Right Steer Inoperative 99
4.2-14 Left Steer Inoperative 99
4.2-15 Drive Only Inoperative. 100
4.2-16 No Drive or Steer when Platform Fully Lowered 100
4.2-17 No Drive or Steer when Platform Elevated 100
4.2-18 Platform Drives in Slow Speed Only 101
4.2-19 High/Low Torque Inoperative 101
4.2-20 Brake will not Release. 101
4.2-21 Forward Drive Function Inoperative 102
4.2-22 Reverse Drive Function Inoperative 102
4.3 Electrical System - CE & AS 103
4.3-1 All Controls Inoperative 103
4.3-2 All Controls Except for Down Function Inoperative 104
4.3-3 All Controls Inoperative From Base Control Console 105
4.3-4 No Up Function from Base Control Console 105
4.3-5 Up Function Slow from Base Control Console 106

4.3-6 No Down Function from Base Control Console . . . 106
4.3-7 All Controls Inoperative From Platform Control Console . . . 107
4.3-8 No Up Function from Platform Controls . . . 107
4.3-9 Up Function Slow from Platform Control Console . . . 108
4.3-10 No Down Function from Platform Controls . . . 108
4.3-11 No Emergency Down Function . . . 109
4.3-12 Steer Only Inoperative . . . 110
4.3-13 Right Steer Inoperative . . . 110
4.3-14 Left Steer Inoperative . . . 110
4.3-15 Drive Only Inoperative . . . 111
4.3-16 No Drive or Steer when Platform Fully Lowered . . . 111
4.3-17 No Drive or Steer when Platform Elevated . . . 111
4.3-18 Platform Drives in Slow Speed Only . . . 111
4.3-19 High/Low Torque Inoperative . . . 112
4.3-20 Brake will not Release . . . 112
4.3-21 Forward Drive Function Inoperative . . . 113
4.3-22 Reverse Drive Function Inoperative . . . 113
4.4 Hydraulic System - ANSI/CSA & KC . . . 114
4.4-1 All Controls Inoperative . . . 114
4.4-2 All System Sluggish . . . 114
4.4-3 Platform Drifts Down . . . 114
4.4-4 Platform Lifts Slowly . . . 114
4.4-5 Platform Does Not Lift . . . 114
4.4-6 Platform will not Lower . . . 114
4.4-7 Platform Drives Slow . . . 115
4.4-8 Platform will not Drive in Forward or Reverse . . . 115
4.4-9 Brake(s) will not Release . . . 115
4.4-10 MEWP will not Hold on a Grade . . . 115
4.4-11 Platform does not Steer . . . 115
4.4-12 High/Low Torque Inoperative . . . 116
4.4-13 No Emergency Down Function . . . 116
4.5 Hydraulic System - CE & AS . . . 117
4.5-1 All Function Inoperative . . . 117
4.5-2 All System Sluggish . . . 117
4.5-3 Platform Drifts Down . . . 117
4.5-4 Platform Lifts Slowly . . . 117
4.5-5 Platform Does Not Lift . . . 117
4.5-6 Platform will not Lower . . . 117
4.5-7 Platform Drives Slow . . . 118
4.5-8 Platform will not Drive in Forward or Reverse . . . 118
4.5-9 Brake(s) will not Release . . . 118
4.5-10 MEWP will not Hold on a Grade . . . 118
4.5-11 Platform does not Steer . . . 118

4.5-12 High/Low Torque Inoperative . . . 119
4.5-13 No Emergency Down Function . . . 119

Section 5 – Procedures . . . 121

5.1 General . . . 121
5.1-1 Safety and Workmanship . . . 121

5.2 Platform . . . 122
5.2-1 OEM Controller Electronics Information . . . 122
5.2-2 OEM Controller Troubleshooting . . . 123
5.2-3 OEM Controller Switch Wiring . . . 124
5.2-4 Gate Spring Hinge Adjustment . . . 125

5.3 Base . . . 126
5.3-1 System Relief Pressure Adjustment . . . 126
5.3-2 Lift Pressure Adjustment . . . 126
5.3-3 Electronic Tilt Switch Setup Procedure . . . 127
5.3-4 Pothole Limit Switches (LS4 & LS5) Replacement and Adjustment . . . 130
5.3-5 Wheel Replacement and Torquing Procedure . . . 131
5.3-6 Tightening and Torque Recommendations for Hydraulic Couplings and Hoses . . . 134
5.3-7 Resistor - Voltage Divider . . . 136
5.3-8 Counter Reset Procedure . . . 137
5.3-9 Battery Maintenance . . . 138
5.3-10 Charger Maintenance - Delta-Q . . . 138

5.4 Scissors . . . 146
5.4-1 High Speed Cutout Limit Switches (LS1A & LS1B) & Drive Override Limit Switch (LS6) Replacement and Adjustment . . . 146

5.5 Load Sensing System . . . 148
5.5-1 Systems Checks . . . 148
5.5-2 GP-102 Control Module Pin Reference Chart . . . 149
5.5-3 LED Error Codes - Quick Reference Chart . . . 151
5.5-4 LED Error Codes - Code Breakdown Chart . . . 152
5.5-5 Hand held Calibration/Diagnostic Tool Key Functions . . . 154
5.5-6 Control Module Load Calibration - Code Messages & Definitions . . . 155
5.5-7 Control Module Load Calibration Procedure . . . 159
5.5-8 All Motion Alarm . . . 162
5.5-9 Curve/Group Codes Chart . . . 162

Notes

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 Aerial Platform and Mobile Elevating Work Platform Definition

A mobile device that has a positionable platform supported from ground level by a structure.

1.1-2 Purpose of Equipment

The SKYJACK SJ DC Electric Series MEWPs are designed to transport and raise personnel, tools and materials to overhead work areas.

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 Manual

Operating Manual: The operating manual is considered a fundamental part of the aerial platform. It is a very important way to communicate necessary safety information to users and operators. A complete and legible copy of this manual must be kept in the provided weather-resistant storage compartment on the aerial platform at all times.

Service & Maintenance: The purpose of this is to provide the customer with the servicing and maintenance procedures essential for the promotion of proper machine operation for its intended purpose.

All information in this manual should be read and understood before any attempt is made to service the machine. The updated copy of the manuals are found on the company's website: *www.skyjack.com*.

1.1-5 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.

1.1-6 Operator Safety Reminders, Warnings and Precautions

Operator safety is SKYJACK's priority. The operator should comply with all applicable safety-related reminders, warnings and precautions found in the Operating Manual. They should be read and understood completely before operating the aerial platform.

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 *Pre-Delivery/Maintenance 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. *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 conenctors.

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 Railing Maintenance and Repair

Skyjack MEWPs have been designed to ensure 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 ensure 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/chain 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.

1.3 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 preotection 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.

1.3-1 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.

1.4 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.

1.4-1 Service Bulletins

Before performing any scheduled maintenance inspection procedure, refer to service bulletins found in our web site: *www.skyjackinc.com* for updates related to service and maintenance of this MEWP.

1.4-2 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 mantenance 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.

1.4-3 Maintenance Instructions

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

Issue or Symptom		
PDI/Frequent	**B**	Perform PDI prior to each delivery, or Frequent Inspection every 3 months or 150 hours.
Annual	**B + C**	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 each inspection procedure is completed.
- Use the maintenance and inspection checklist and step-by-step procedures in Section 1 to perform these inspections.
- If any inspection receives a fail, 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. Place a check in the repair column.

Legend	
Pass	**P**
Fail	**F**
Repaired	**R**
Not applicable	**N/A**

Table 1.5 Owner's Annual Inspection Record

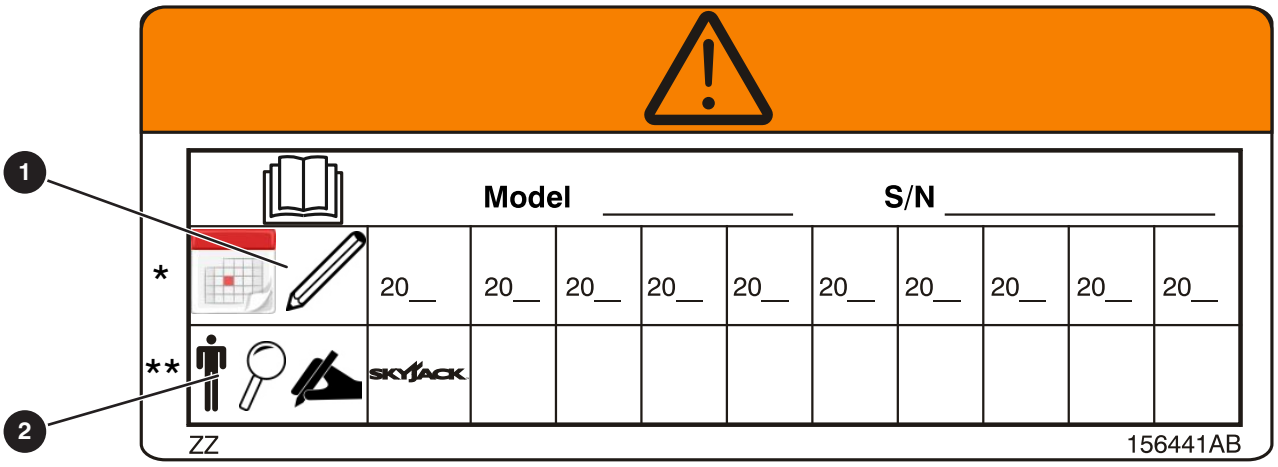

Figure 01 *This decal is located on the scissor assembly. It must be completed after an annual inspection has been completed. Do not use the aerial platform if an inspection has not been recorded in the last 13 months.*

Description	Label Pictorial	Description	Label Pictorial
1 **Inspection Date**		2 **Inspector Signature**	

1.6 Pre-Delivery/Maintenance Inspection Checklist

Pre-Delivery/Maintenance Inspection Checklist

Vertical Mast, SJIII, & Rough Terrain

Serial Number: _____ Product Owner: _____

Model: _____

Hourmeter Reading: _____ Product User: _____

Date/Time: _____

Use this form for Pre-Delivery Inspections (PDI) prior to each rental, lease or sale, or as a guide for all Frequent Inspections and Annual Inspections. Refer to the applicable Operating and Service Manuals for inspection details (eg. Visual Inspection and Function Tests, Torque Specs., Engine Oil, Chain Inspection Intervals, etc.).

Inspection Type Schedule	
❑ PDI	B
❑ Frequent	B
❑ Annual	B + C

B - Perform PDI prior to each delivery or Frequent Inspections every 3 months or 150 hrs. For further details refer to Service & Operating Manuals.

C - Perform Scheduled Maintenance Inspections every year. For further details refer to Service & Operating Manuals.

P - Pass
F - Fail
R - Repaired
N/A - Not Applicable

Check the appropriate box as each item is inspected. If an item is found to be not acceptable, please describe the issue in the comments box provided.

Items for Inspection		P	F	R	N/A
Refer to skyjack.com for the latest service bulletins.	B				
Ensure Annual Inspection has been completed within the last 13 months.	B				
Manuals & Required Documents. In storage box, in good condition & legible.	B				
Labels. In place, secure & legible.	B				
Limit Switches. Secured & no obstructions or damage.	B				
Main Power Disconnect Switch. Cables secure & in working order.	B				
Battery/ Hydraulic Tray. Latch is secure, & no missing parts.	B				
Battery Charger. Secure, & no damage.	B				
Battery. No damage, tight connections, fluid levels correct. Clean terminals and cable ends.	B				
Manifolds. Tight fittings and hoses & no damage or leaks. Tight wire connections & no missing parts.	B, C				
Motor Controller. Secure & no damage. No loose connections.	B				
Electrical Panel / Control Module. Secure & no damage. Tight wire connections and fasteners.	B				
Hydraulic Tank. Filler cap secure & no damage or leaks.	B				
Hydraulic Oil. Level at, or slightly above top mark.	B, C				
Hydraulic Components & Hoses. Secure & no damage or leaks.	B				
Base Weldment. No deformation or cracks.	B				
Base Control Switches. Switches to neutral position & no damage.	B				
Free-wheeling Valve Knob. Secure & no damage or missing parts.	B				
Ladder. Secure & no damage.	B				
AC Power to Platform (Plug Cord Receptacle). No obstructions, dirt or damage.	B				
Pothole Protection Device. Check both sides for obstructions, dirt, or damage.	B				
Brakes. Secure & no damage or leaks.	B, C				
Steer Cylinder Assembly. Secure & no damage, leaks or missing parts.	B				
Wheel/Tire Assembly. Check all tires for damage, wear & proper alignment. Lug nuts torqued as recommended.	B				
Axles. Secure & no missing parts. Tight fittings and hoses & no leaks.	B				
Tie Rod. End studs locked & no damage.	B				
Tilt (Load) Sensor. Secure & no damage.	B				
Emergency Lowering Access Rod. Secure & no damage.	B				
Engine Tray. No damage or missing parts.	B				

Items for Inspection		P	F	R	N/A
Engine Control Console. Secure & no damage.	B				
Engine Air Filter. No damage or missing parts.	B, C				
Engine Oil. Level between "L" and "H". Ensure oil change interval has not been exceeded.	B				
Radiator. Secure & no damage or missing parts. Check coolant level.	B, C				
Muffler and Exhaust. Secure & no damage.	B				
Fuel Shut-off Valve. No damage or missing parts.	B				
Fuel Tank. Filler cap is secure & no damage.	B				
Fuel Leaks. Tight fittings and hoses & no damage or leaks.	B				
Propane Tank. Straps fastened to brackets & coupler tight.	B				
Propane Tank Leaks. No leaks (refer to service manual for procedure).	B				
Scissor Assembly. No deformation/damage. Pins secure. Cables & wires routed with no damage.	B				
Mast Assembly. No damage or deformation. Lubricated	B, C				
Mast Chains. No damage or missing parts.	B, C				
Control Cables. No damage or missing parts.	B, C				
Rollers. Secure & no obstructions, dirt, or damage/wear.	B, C				
Wear Pads. No damage/wear or missing parts. Fasteners tightened.	B, C				
Scissor Bumpers. Secure & no damage.	B				
Sliders. Secure & no obstructions, dirt, or damage/wear.	B				
Maintenance Support. Secure & no damage.	B				
Lift Cylinder(s). No damage or missing parts. Tight fittings and hoses & no leaks.	B				
Scissor Pins. No damage/wear or missing parts.	B				
Platform Control Console. Switches to neutral position & secure. No missing parts.	B				
Raillings and Gate/Chain. Secure & no damage or missing parts.	B				
Lanyard Attachment Anchorage. Attachment rings secure & no damage.	B				
AC Outlet. No obstructions, dirt, or damage.	B				
Powered Extension Control Console. Switches to neutral position & secure. No missing parts.	B				
Extension Deck. Secure & no damage or missing parts. Check fluid level (if applicable).	B				
Outriggers. No damage or missing parts.	B				
Scissor Guards. Secure & no damage.	B				
Greasing Points. No obstructions, dirt, or damage.	B, C				
Function Tests (Refer to your corresponding Serial #'s Operating Manual for information on running these tests.)		❑ PASS ❑ FAIL			

Comments:

The undersigned confirms that all areas listed have been inspected, and any and all discrepancies have been brought to the attention of the owner. Furthermore, the undersigned confirms that all discrepancies have been corrected prior to using this machine.

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

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

Note: Visit skyjack.com for a printable copy of this form.

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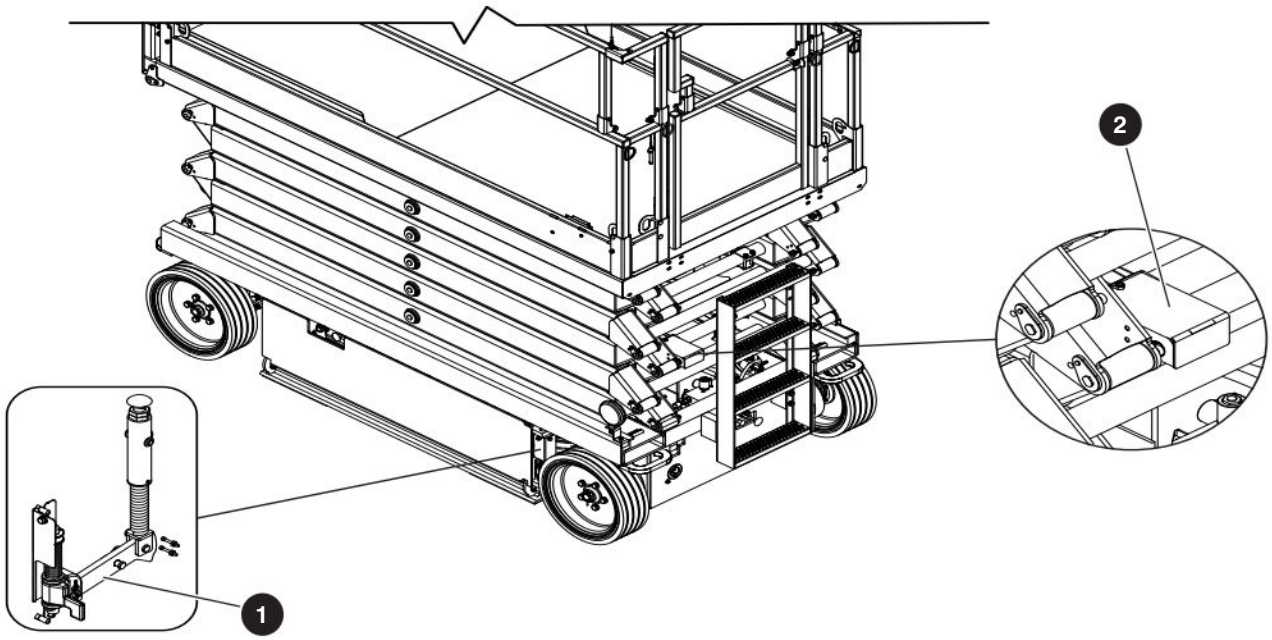


1.7 Visual & Daily Maintenance Inspections

Begin the visual and daily maintenance inspections by checking each item in sequence for the conditions listed in this section.

⚠ WARNING

To avoid injury, do not operate a MEWP until all malfunctions have been corrected.

⚠ WARNING

To avoid possible injury, ensure MEWP power is off during your visual and daily maintenance inspections.

⚠ CAUTION

Make sure the MEWP is on a firm, level surface.

NOTE

While performing visual and daily inspections in different areas, be aware to also inspect limit switches, electrical and hydraulic components.

1.7-1 Manuals (B)

Ensure a copy of operating manual and other important documents are enclosed in manual storage box.

- Check to be sure manual storage box is present and in good condition.
- Ensure manuals are legible and in good condition.
- Always return manuals to the manuel storage box.

1.7-2 Labels (B)

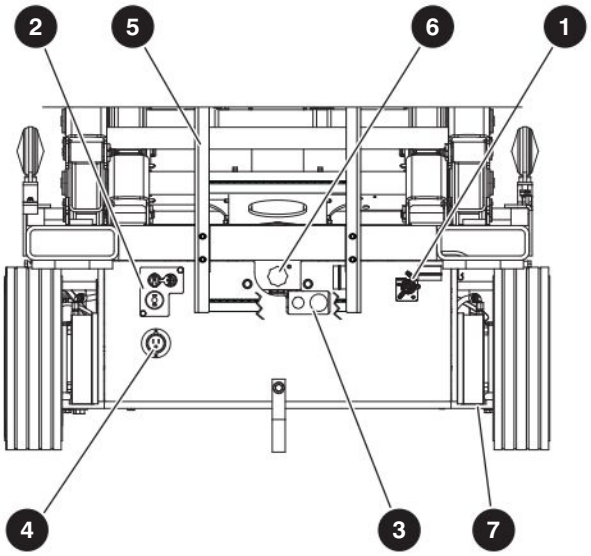
Refer to the labels section in the operating manual and determine that all labels are in place and are legible.

1.7-3 Limit Switches

Ensure **pothole protection limit switches** ❶ and **high speed limit switches** ❷ are properly secured with no signs of visible damage and movement is not obstructed.

Visually inspect all limit switch located inside the scissor arms and the outrigger assemblies for the following:

- Broken or missing actuator arm.
- Missing fasteners.
- Loose wire connections.



1.7-4 Electrical

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

Inspect the followisng areas for chafed, corroded and loose wires:

- Base to platform cables and wiring harness.
- Battery tray wiring harnesses.
- Hydraulic/electrical wiring harnesses.

1.7-5 Hydraulic

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

Perform a visual inspection around the following areas:

- hoses and fittings
- all hydraulic cylinders
- all hydraulic manifolds
- the underside of the base
- ground area under the MEWP

1.7-6 Entrance Side

1 Main Power Disconnect Switch (B)

- Turn main power disconnect switch to off ◯ position.
- Ensure all cables are secure and switch is in proper working condition.

2 Base Control Switches (B)

- Ensure there are no signs of visible damage and all switches are in their neutral positions.

3 Disc Brake Release Manifold (B, C)

- Ensure there are no loose or missing parts and there is no visible damage.
- Ensure brake override is not engaged.

4 AC Outlet Receptacle (B)

- Ensure receptacle is free from dirt and obstructions.

5 Ladder (B)

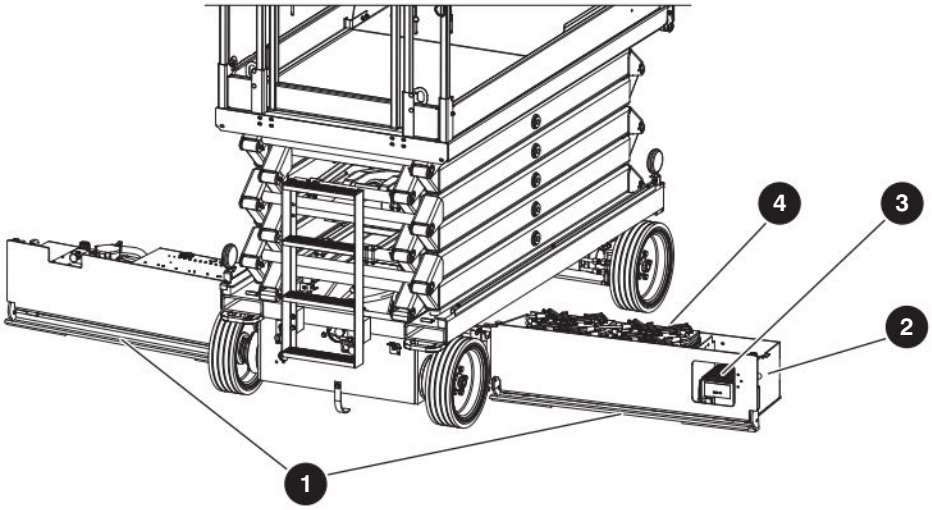
- Ensure there are no loose or missing parts and there is no visible damage.

6 Free-wheeling Valve Knob (B)

- Ensure there are no loose or missing parts and there is no visible damage.

3 Disc Brakes (B, C)

- Ensure there are no loose or missing parts and there is no visible damage.
- Ensure brake override is not engaged.



1.7-7 Battery Tray Side

1 Pothole Protection Device (B)

- Ensure mechanisms have no sign of visible damage and are free from dirt and obstructions.

2 Battery Tray (B)

- Ensure tray latch is secure and in proper working order.

3 Battery Charger (B)

- Ensure charger is secure and shows no visible damage.

4 Battery (B)

- Proper battery condition is essential to good performance and operational safety. Improper fluid levels or damaged cables and connections can result in component damage and hazardous conditions.

⚠ WARNING

Battery acid is extremely corrosive. Wear proper eye and facial protection as well as appropriate protective clothing. If contact occurs, immediately flush with cold water and seek medical attention.

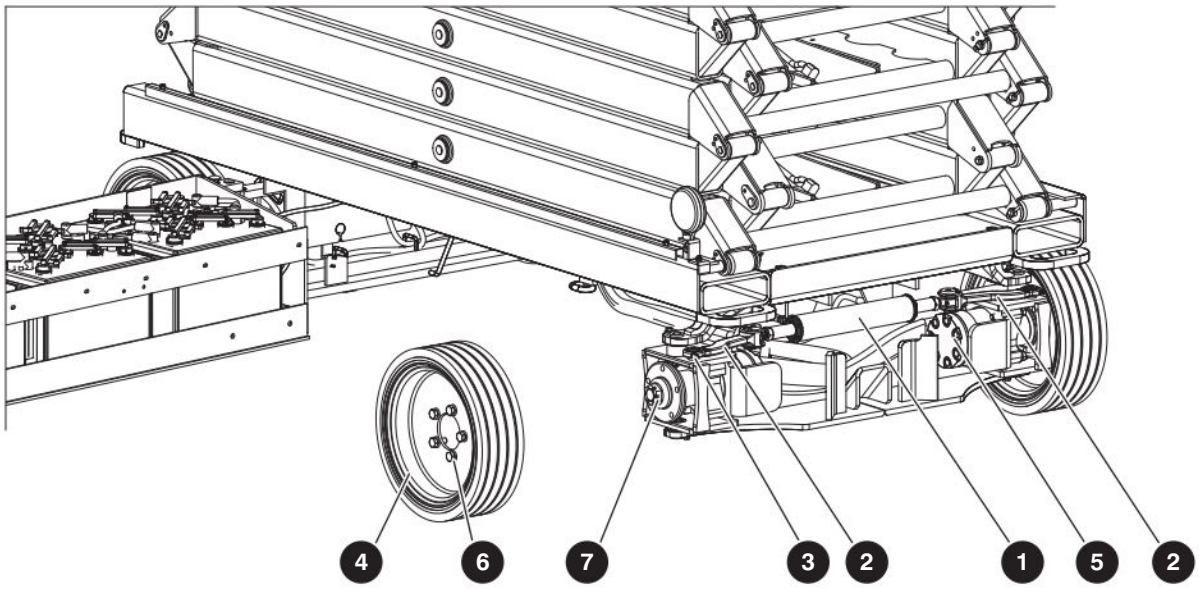
1. Check battery case for damage.
2. Clean battery terminals and cable ends thoroughly with a terminal cleaning tool or wire brush. **(B)**
3. Ensure all battery connections are tight.
4. If applicable, check battery fluid level. If plates are not covered by at least 13 mm of solution, add distilled or demineralized water. **(B)**
5. Replace battery if damaged or incapable of holding a lasting charge. **(B)**

⚠ WARNING

Use original or manufacturer-approved parts and components for the MEWP.

⚠ WARNING

Explosion hazard. Keep flames and sparks away. Do not smoke near batteries.



1.7-8 Extension Side

NOTE

It may be necessary to open the battery and hydraulic trays to inspect steering components on models SJIII 4740.

1 Steer Cylinder Assembly (B)

- Ensure steer cylinder assembly is properly secured and there are no loose or missing parts.

2 Steer Linkages (B, C)

- Ensure there are no loose or missing parts, steer linkages and bushings are secure and there is no visible damage.

3 Greasing Points (B, C)

- Ensure greasing points have no sign of visible damage and are free from dirt and obstructions.

4 Wheel/Tire Assembly (B)

A small amount of wear is permitted. But if any of the wear or damage meets the criteria mentioned below, the tire should be replaced.

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.

- **B - Frequent/periodic/pre-delivery inspection**

Do a check for damage or wear on each tire and rim.

- Look for damage or cracked welds on each rim. The rims should be round.
- Look for uneven or unusual wear on the tire.
- Look for flat spots on the tread face of the tire.

The tire treads have been removed from the illustration for clarity.

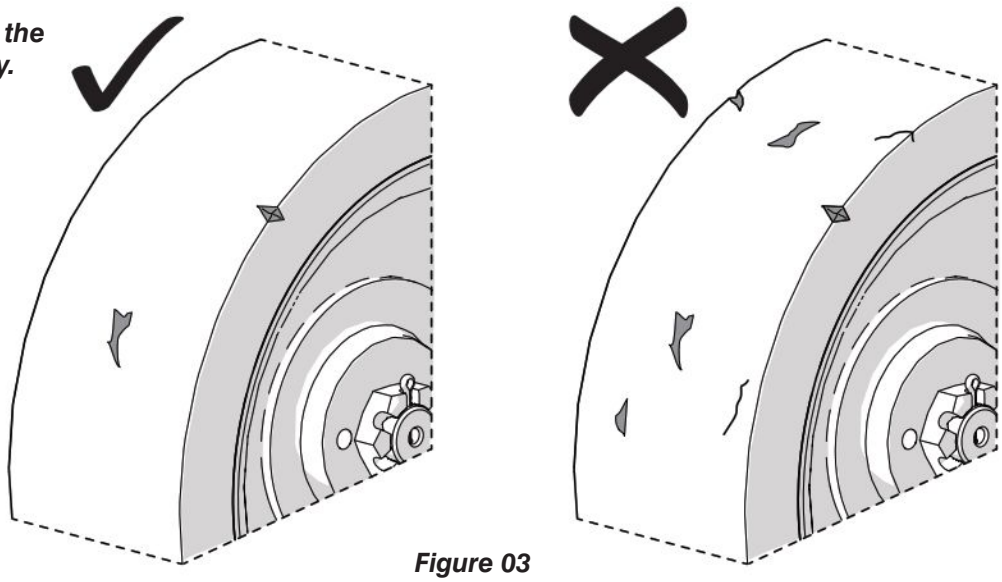


Figure 03

- The tire tread should be visible and not worn down completely. Refer to Figure 02.

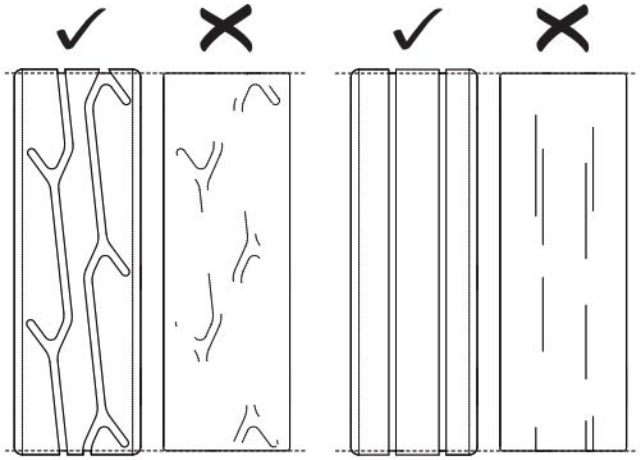


Figure 02

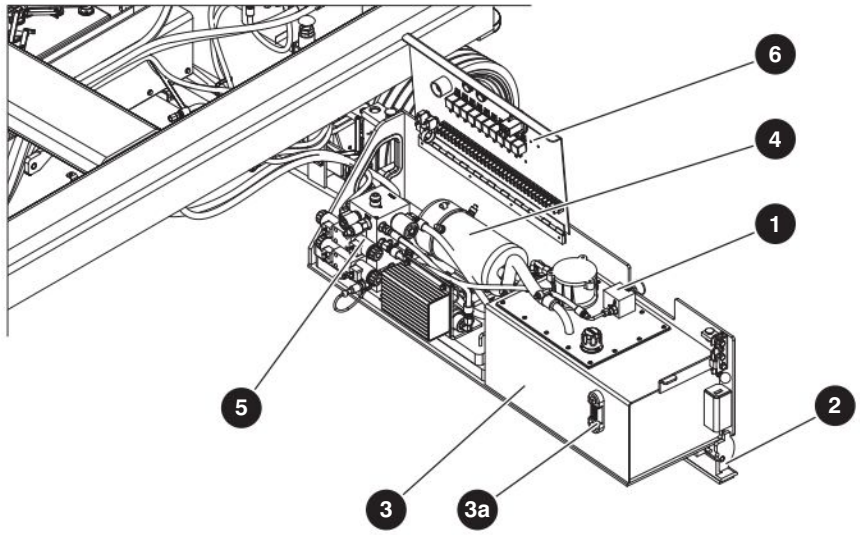
Do a check for cuts or missing chunks in the edges and tread face of the tire. Refer to Figure 03.

- The cut or missing chunk must not extend more than 10 mm (3/8”) towards the centre of the tire.
- Each cut or chunk should not be larger than 25 mm x 10 mm (1” x 3/8”), or deeper than 20 mm (3/4”).
- There should be no more than 2 cuts or chunks in each 1/4 section of the tire. There must be no more than 6 cuts or chunks in total in the tire.
- There should be no embedded debris.

Do a check of the wheel components and mounts.

- Make sure the wheels are correctly aligned vertically and horizontally.
- Make sure the **wheel motors** ❺ have no loose or missing parts and there is no visible damage.
- Check each **wheel bolt** ❻ for proper torque to make sure none are loose.
- If any wheel bolts are loose or not at the correct torque value (2.5 Torque Specifications), each component should be inspected to make sure there is no damage, prior to reassembly. Do not attempt to tighten damaged parts — they must be replaced.

- **C - Annual inspection**
  - Make sure the **castle nuts** ❼ are in position and are tight.
  - Make sure the **cotter pins** are correctly installed.
  - If the cotter pin is not installed, refer to 2.5 Torque Specifications for proper torque information.
  - See Section 5 – Procedures for procedures.



1.7-10 Hydraulic/Electric Tray Side

1 Hydraulic/Electric Tray (B)

- Ensure tray latch is secure and in proper working order.

2 Pothole Protection Device (B)

- Ensure mechanisms have no sign of visible damage and are free from dirt and obstructions.

3 Hydraulic Tank (B)

- Ensure hydraulic filler cap is secure.
- Ensure tank shows no visible damage and no evidence of hydraulic leakage.
- **Hydraulic Oil (B, C):** Ensure platform is fully lowered, and then visually inspect the **sight gauge** 3a located on the side of the hydraulic oil tank. The hydraulic oil level should be at or slightly above the top mark of the sight glass.

4 Hydraulic Pump and Motor (B)

- Ensure there are no loose or missing parts and there is no visible damage.

5 Main Manifold (B)

- Ensure all fittings and hoses are properly tightened and there is no evidence of hydraulic leakage.
- Ensure there are no loose wires or missing fasteners.

6 Electrical Panel (B)

- Ensure panel is properly secured and there is no visible damage.
- Ensure there are no loose wires or missing fasteners.

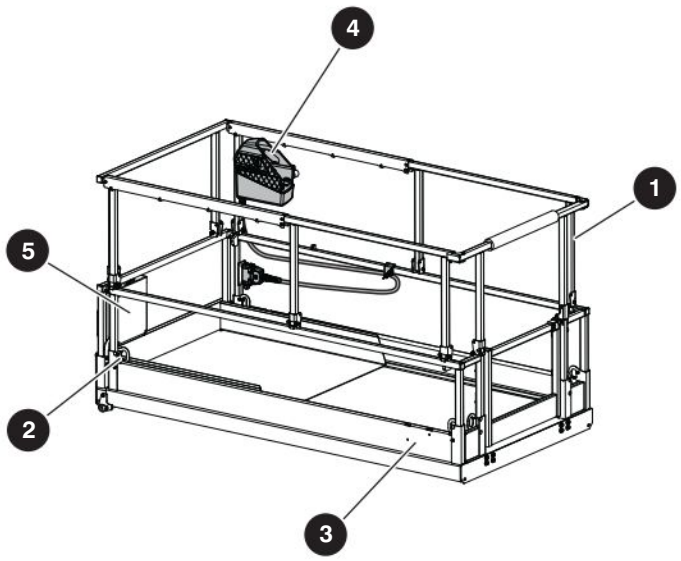
7 Tilt Sensor (B)

- Ensure panel is properly secured and there is no visible damage.

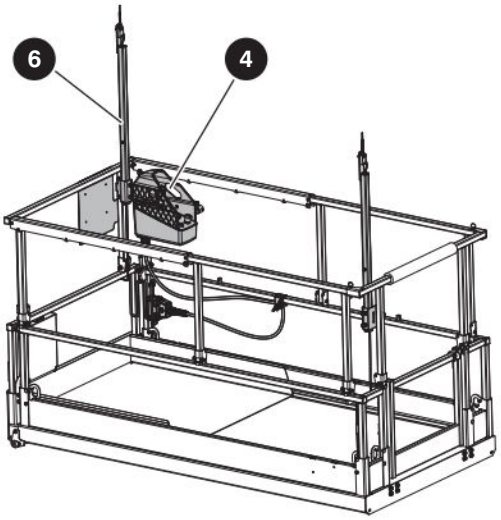
8 Load Sensor (If Equipped) (B)

- Ensure panel is properly secured and there is no visible damage.

ANSI/CSA, CE, AS



KC



1.7-11 Platform Assembly

⚠ WARNING

Make sure you maintain three points of contact when using the MEWP ladder to enter/exit the platform.

1. Use the ladder of MEWP to access platform.
2. Close the gate.
   - Ensure there are no loose or missing parts and there is no visible damage.
   - Ensure all fasteners are securely in place.
   - Ensure all **platform railings** ❶ are properly positioned and secured.
   - Ensure gate is in good working order.

❷ Fall Protection Anchorage(s) (B)

- Ensure anchorage(s) are secure and there is no visible damage.

❸ AC Outlet on Platform (B)

- Ensure outlet has no visible damage and free from dirt or obstructions.

❹ Platform Control Console (B)

- Ensure all switches and controller are returned to neutral and are properly secured.
- Ensure there are no loose or missing parts and there is no visible damage.

❺ Manual Storage Box (B)

- Check to be sure manual storage box is present and in good condition.
- Ensure a copy of operating manual is enclosed in manual storage box.
- Ensure manuals are legible and in good condition.
- Always return manuals to the manual storage box after use.

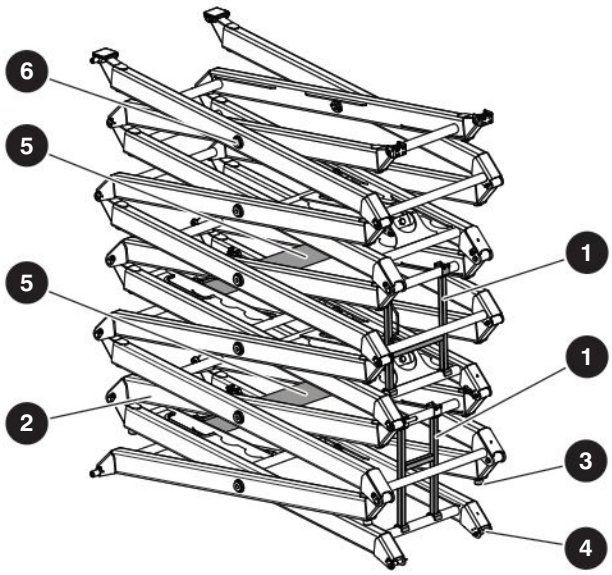
❻ Anti-Overrising System (KC Only) (B)

- Ensure the anti-overrising posts are fully extended.
- Ensure there are no loose or missing fasteners.

⚠ WARNING

Make sure you maintain three points of contact when using the MEWP ladder to enter/exit the platform.

3. Use the ladder to dismount from platform.



1.7-12 Lifting Mechanism

1. Raise the platform until there is adequate clearance to swing down the maintenance support.

1 Maintenance Support (B)

- Ensure maintenance support is properly secured and shows no visible damage.

NOTE

SJIII 4740 models have two maintenance supports.

2 Scissor Assembly (B)

- Ensure scissor assembly shows no visible damage and no signs of deformation in weldments.
- Ensure all pins are properly secured.
- Ensure cables and wires are properly routed and shows no signs of wear and/or physical damage.

3 Scissor Bumpers (B)

- Ensure bumpers are secure and shows no sign of visible damage.

4 Rollers (B)

- Ensure rollers are secure and there is no visible damage.
- Ensure rollers' path of travel are free from dirt and obstructions.

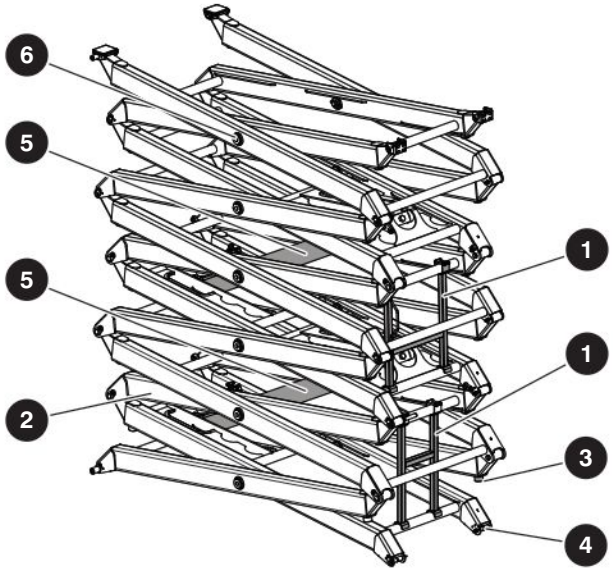
5 Lift Cylinder(s) (B)

- Ensure the lift cylinder is properly secured, there are no loose or missing parts and there is no evidence of damage.
- Ensure all fittings and hoses are properly tightened and there is no evidence of hydraulic leakage.

2. Raise the platform until there is adequate clearance to swing up the maintenance support.
3. Swing up maintenance support into storage bracket.
4. Fully lower the platform.

6 Scissor Pin Inspection (B)

- Complete a structural inspection of the scissor pin connections, looking for indicators of pin and/or scissor arm damage. These indicators include, but are not limited to:
- Noise coming from binding/seized pins
- Rust forming near pin joint
- Cracks in welds or in surrounding metal
- Evidence of metal dust or shavings from wearing components
- Broken/missing pin retainer bolts
- Broken/missing pin retainers
- Rotated pin
- Elongation/enlargement of pin hole



⚠ WARNING

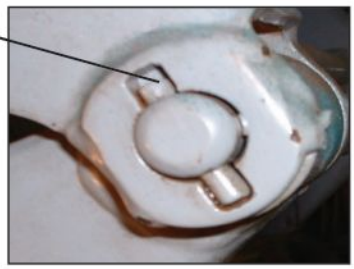
Any units showing the listed and/or depicted signs of damage should be immediately removed from service and repaired by a qualified technician.

Any units with structural damage to any pin connection or scissor arm must be immediately removed from service and repaired by a qualified technician. Contact Skyjack Service for direction on how to repair the unit.

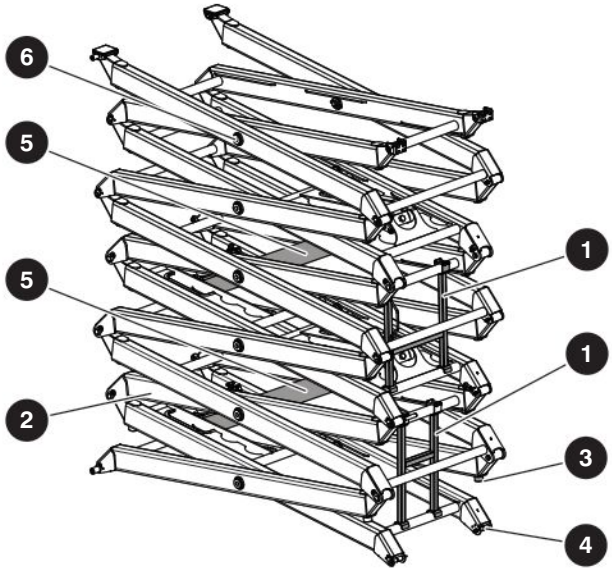
Examples of pivot pin connections with no damage:

- No rust
- Pin has not rotated
- Area is clear of dust/metal shaving
- Pin retainer/retainer bolts are in place

Pin retainer in place



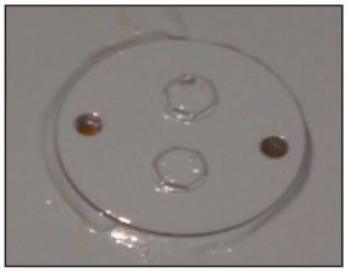
No rust. Pin has not rotated. Area is clean of dust/metal shavings



Pin retainer bolts in place

Center pin pivot - Outer

Center pin pivot - Middle



Center pin pivot - Inner

Examples of damaged pin connections:

Broken retainer bolt

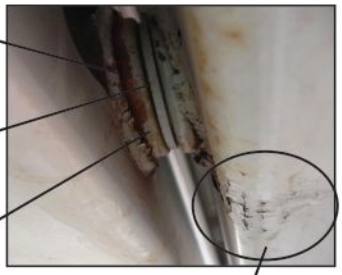
Rust is evident around pin

Retainer bolt hole out of line indicates pin has rotated

Rust around pin boss

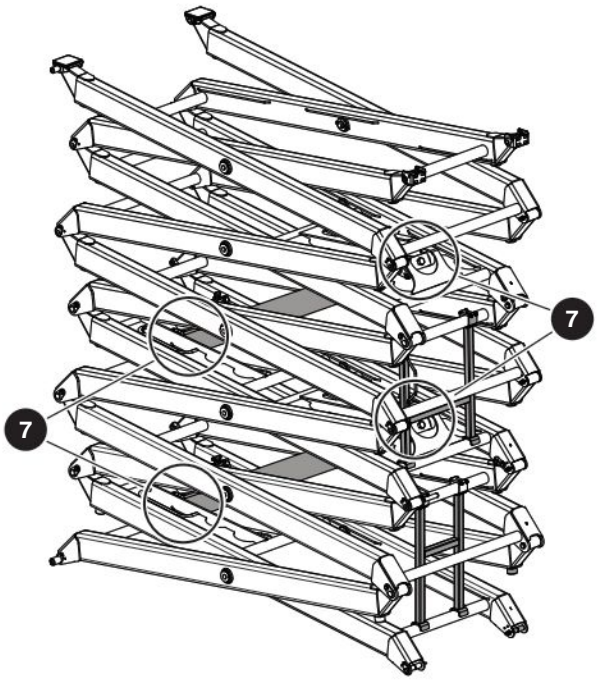
Thrust washer

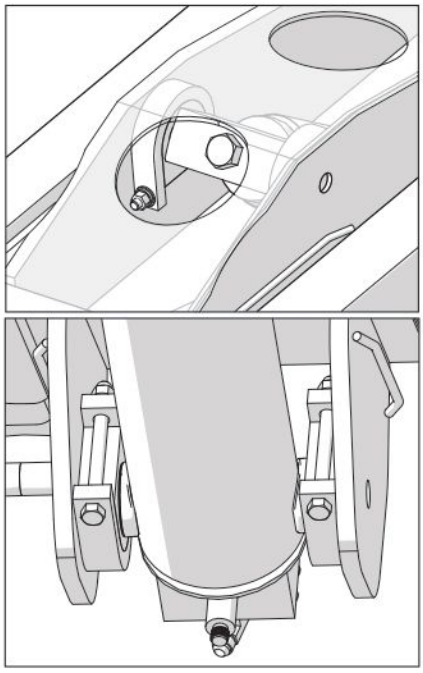
Pin boss is broken out of the scissor arm



Stress cracks

Scissor end pin connections showing symptoms of damage must be inspected after removing the applicable pins and bushings. The scissor bore should also be inspected at this time for any signs of damage, specifically elongation or ovality of the hole. Provided there is no structural damage to the scissor arms, the pins and bushings can be replaced with new components.

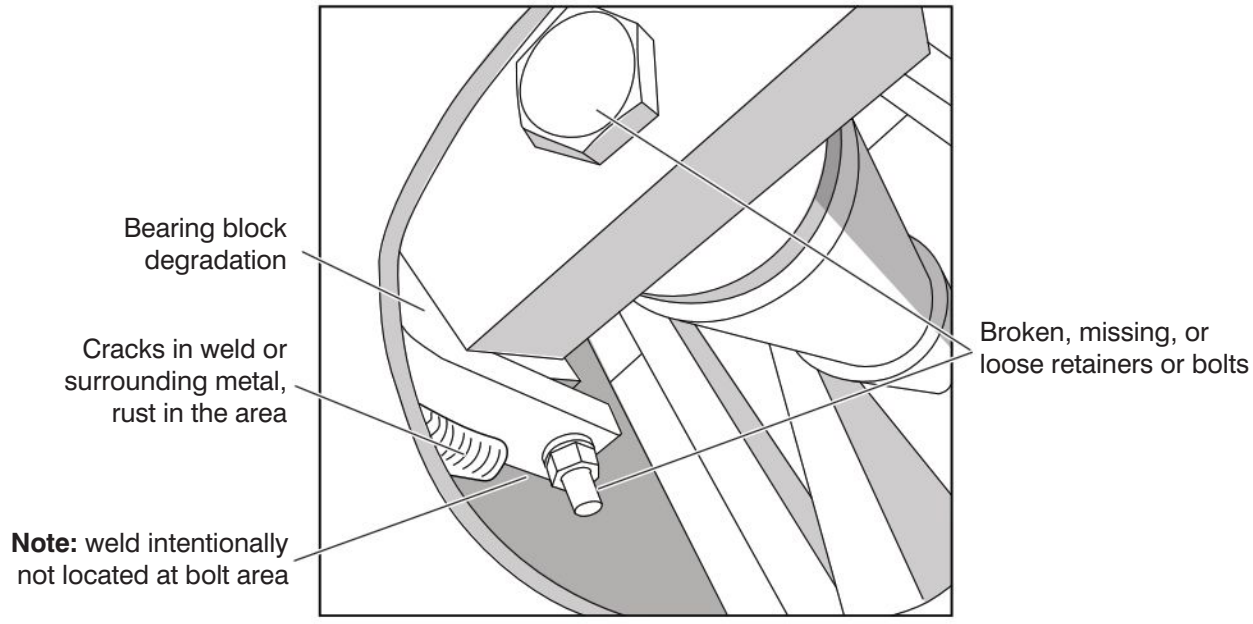




7 Cylinder mount inspection (B)

This inspection must be done as part of the scissor assembly inspection.

1. Do a structural inspection of the cylinder mount areas. Look for signs of damage to the mounts.
1. These signs can include:
   - Broken, loose or missing retainers or bolts
   - Bearing block degradation
   - Cracks in welds or the surrounding metal, or rust forming in the area.



1.8 Function Tests

Function tests are designed to discover any malfunctions before the MEWP is put into service. The operator must understand and follow step-by-step instructions to test all aerial platform functions.

⚠ WARNING

Never use a malfunctioning aerial platform. If malfunctions are discovered, aerial platform must be tagged and placed out of service. Repairs to aerial platform may only be made by a qualified service technician.

After repairs are completed, operator must perform a pre-operation inspection and a series of function tests again before putting aerial platform into service.

Prior to performing function tests, be sure to read and understand the "**Start Operation**" section of the operating manual.

For function test that are to be performed, please refer to the operating manual that corresponds to the correct serial number. Found there will be detailed instructions for which tests to perform, as well as how to properly and successfully perform them.

NOTE

All-function motion alarm should sound while operating any boom and drive function.

Section 2 – Maintenance Tables and Diagrams

Table 2.1 Specifications & Features

STANDARD	ANSI/CSA	CE/AS	KC
Weight*	7500 lb 3402 kg	2970 kg	
Overall Width	47.1 in 1.20 m	1.20 m	
Overall Length	94.7 in 2.40 m	2.40 m	
Platform Size (inside)	41.7 in x 86.1 in 1.06 m x 2.19 m	1.06 m x 2.19 m	
Height			
Working Height	45 ft. 6 in 13.86 m	13.82 m	
Platform Elevated Height	39 ft. 6 in 12.04 m	11.82 m	
Stowed Platform Height (Railings Down)	87.3 in 2.22 m	2.22 m	
Stowed Platform Height (Railings Up) Overhead Protection Post Up (KC Only)	97.9 in 2.49 m	2.49 m	3.30 m
Drive Height	39 ft. 6 in 12.04 m	11.82 m	
Standard Operating Time			
Lift Time (No Load)	67 s		
Lower Time (No Load)	54 s		
Lift Time (Rated Load0	76 s		
Lower Time (Rated Load)	46 s		
Chassis			
Normal Drive Speed	1.9 mph 3.06 km/h	3 km/h	
Elevated Drive Speed	≤ 0.50 mph ≤ 0.8 km/h	≤ 0.8 km/h	
Gradeability (Rample Angle)	25%		
Tires	16 x 5 x 12 Solid Rubber		
Hydraulic Oil			
Type	ATF Derox III		
	Bio-Oil		
Tank Capacity	7.4 gallon 28L		
Brake Hub Oil			
Type	SAE 20W		
Quantity	6.09 oz 180 mL		

**Weight with standard 3' (0.9m) or 4' (1.2m) extension platform.*
Refer to nameplate for aerial platforms with 5' (1.5m) or 6' (1.8m) extension platform.

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Table 2.2 Torque Specifications for Fasteners (US)

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
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	8.8		10.9	
		Dry	Lubed	Dry	Lubed
M5 x 0.80	(in-lb)	(54)	(41)	(78)	(59)
	Nm	6.1	4.6	8.8	6.7
M6 x 1.00	(in-lb)	(92)	(69)	(133)	(99)
	Nm	10.4	7.8	15	11.2
M7 x 1.00	(in-lb)	(156)	(116)	(222)	(167)
	Nm	17.6	13.1	25.1	18.9
M8 x 1.25	(in-lb)	(225)	(169)	(333)	(242)
	Nm	25.4	19.1	37.6	27.3
M10 x 1.50	ft-lb	37	28	53	40
	Nm	50	38	72	54
M12 x 1.75	ft-lb	65	49	93	69
	Nm	88	66	126	94
M14 x 2.00	ft-lb	104	78	148	111
	Nm	141	106	201	150
M16 x 2.00	ft-lb	161	121	230	172
	Nm	218	164	312	233
M18 x 2.50	ft-lb	222	167	318	238
	Nm	301	226	431	323
M20 x 2.50	ft-lb	314	235	449	337
	Nm	426	319	609	457
M22 x 2.50	ft-lb	428	321	613	460
	Nm	580	435	831	624
M24 x 3.00	ft-lb	543	407	776	582
	Nm	736	552	1052	789
M27 x 3.00	ft-lb	796	597	1139	854
	Nm	1079	809	1544	1158
M30 x 3.50	ft-lb	1079	809	1543	1158
	Nm	1463	1097	2092	1570
M33 x 3.50	ft-lb	1468	1101	2101	1576
	Nm	1990	1493	2849	2137
M36 x 4.00	ft-lb	1886	1415	2699	2024
	Nm	2557	1918	3659	2744

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

1375AB

Table 2.4 Torque Specifications for Hydraulic Couplings & Hoses

Hydraulic Coupling Torque Chart O-Ring Port Connectors				
SAE Size	Steel Ports		Non-ferrous Ports	
	ft-lb	Nm	ft-lb	Nm
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	-	-	-	-

Hose End Torque Chart for JIC									
Size		Steel				Brass			
Dash	Frac.	ft-lb		Nm		ft-lb		Nm	
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
-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

Hose End Torque Chart for Flat-Face O-Ring Seal (Steel)					
Size		Torque Specification			
Dash	Frac.	ft-lb		Nm	
		Min.	Max.	Min.	Max.
-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 Torque Specifications

Base	Torque	
Directional Value Mounting Bolts	2.3-2.7 lb-ft (28-32 lb-in)	3.2 -3 .6 Nm
Wheel Mounting Bolts	90 lb-ft	122 Nm
Wheel Motor Hub	350 lb-ft	475 Nm
Hydraulic Motor Mounting Bolts	85 lb-ft	115 Nm
Hydraulic Brake Hub	350 lb-ft	475 Nm
Wheel Castle Nut	150 lb-ft*	203 Nm*
*See section 5 for the full torque procedure.		

Cartridge							Coils
Valve Size	**8**	**38**	**58**	**10**	**12**	**16**	**All coil sizes**
Torque (lb-ft) max	20	20	20	25	35	50	4 to 5
Torque (lb-in) max	240	240	240	300	420	600	48 to 60
Torque (Nm) max	27.12	27.12	27.12	33.9	47.46	67.8	5.42 to 6.78

SAE Plugs								
Port Size	**2**	**4**	**5**	**6**	**8**	**10**	**12**	**16**
Torque (lb-ft) max	3	10	15	15	25	25	30	35
Torque (lb-in) max	36	120	180	180	300	300	360	420
Torque (Nm) max	4.07	13.56	20.34	20.34	33.9	33.9	40.68	47.46

Newton-meter = Nm Pound-foot = lb-ft Pound-inch = lb-in *1647AC*
Additional Torque Specifications may be found in Section 3.

Table 2.6 Maximum Platform Capacities (Evenly Distributed)

MODEL	Total		Extension Platform		Maximun Wind Speed	Tilt Cutout Setting
	Capacity	Number of Persons	Capacity	Number of Persons		
ANSI/CSA	500 lb 227 kg	2 Persons	250 lb 113 kg	1 Person	28 mph 45 km/h	1.5° x 3.5°
CE/AS/KC	350 kg	3 Persons	120 kg	1 Person	0 km/h	1.5° x 3.0°

Note: Overall Capacity - Occupants and materials not to exceed rated load. *1646AA*

Table 2.7 Floor Loading Pressure

MODEL		Total Aerial Platform Weight		Total Aerial Platform Load					
				Wheel		LCP**		OUP**	
		lb	kg	lb	kg	psi	kPa (kN/m^2)	psf	kg/m^2
ANSI/CSA	min*	7500	3400	2300	1050	184	1270	241	1178
	max*	8000	3630	3000	1360	210	1446	257	1257
CE/AS/KC	min*	6550	2970	2300	1050	184	1270	211	1030
	max*	7320	3320	3000	1360	210	1446	236	1150

** min - Total aerial platform weight with no options*
max - Aerial platform weight + all options + full capacity

1644AA

*** LCP - Locally Concentrated Pressure is a measure of how hard the aerial platform presses on the areas in direct contact with the floor. The floor covering (tile, carpet, etc.) must be able to withstand more that the indicated values above.*

OUP - Overall Uniform Pressure is a measure of the average load the aerial platform imparts on the whole surface directly underneath it. The structure of the operating surface (beams, etc.) must be able to withstand more than the indicated values above.

NOTE

The LCP or OUP that an individual surface can withstand varies from structure to structure and is generally determined by the engineer or architect for that particular structure.

2.7-1 Locally Concentrated Pressure (LCP)

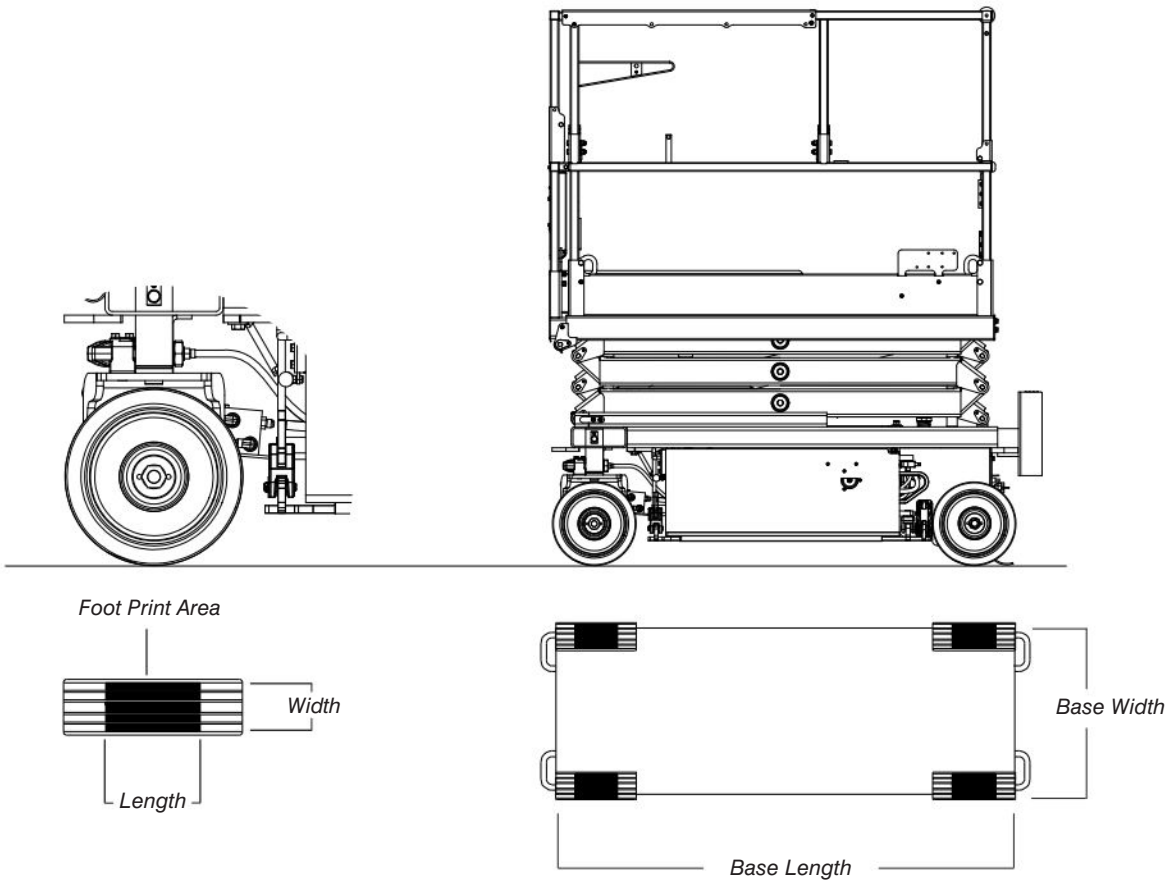
Foot Print Area = Length x Width

$$LCP = 0.4 \times \frac{\text{Weight of MEWP + Capacity}}{\text{Foot Print Area}}$$

2.7-2 Overall Uniform Pressure (OUP)

Base Area = Length x Width

$$OUP = \frac{\text{Weight of MEWP + Capacity}}{\text{Base Area}}$$



⚠ WARNING

Do not use tires other than those specified for this machine. Do not mix different types of tires. Tires other than those specified can adversely affect stability. Failure to operate with matched, approved tires in good condition can result in death or serious injury. Replace tires with the exact, Skyjack-approved types only.

Notes

Section 3 – System Component Identification and Schematics

Table 3.1 Electrical Symbol Chart

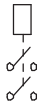
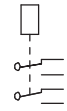
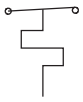
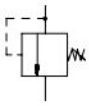
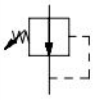
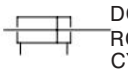
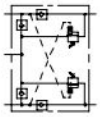
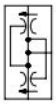
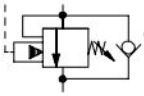
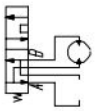
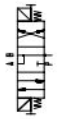
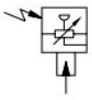
 CIRCUITS CROSSING NO CONNECTION	 HOURMETER	 KEY SWITCH	 LIMIT SWITCH N.O.
 CIRCUITS CONNECTED	 LIGHT	 FOOT SWITCH	 LIMIT SWITCH N.O. HELD CLOSED
 BATTERY	 HYDRAULIC VALVE COIL	 TOGGLE SWITCH	 LIMIT SWITCH N.C.
 GROUND	 PROPORTIONAL HYDRAULIC VALVE COIL	 PUSH BUTTON	 LIMIT SWITCH N.C. HELD OPEN
 FUSE	 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 THROWN 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

This table is to be used as a wire number/color reference for all electrical drawings and schematics. All wire numbers will retain their origional color coding, for example if wire 7 is red, wire 7A, 7B, and 7C will also be red.

3.4 AC Cord Color Code

Standard Definition	NEC Colours	IEC Colours
Protectice Ground/Protective Earth	Green	Green-Yellow
Neutral	White	Blue
Line, Single Phase	Black	Black/Brown/Grey

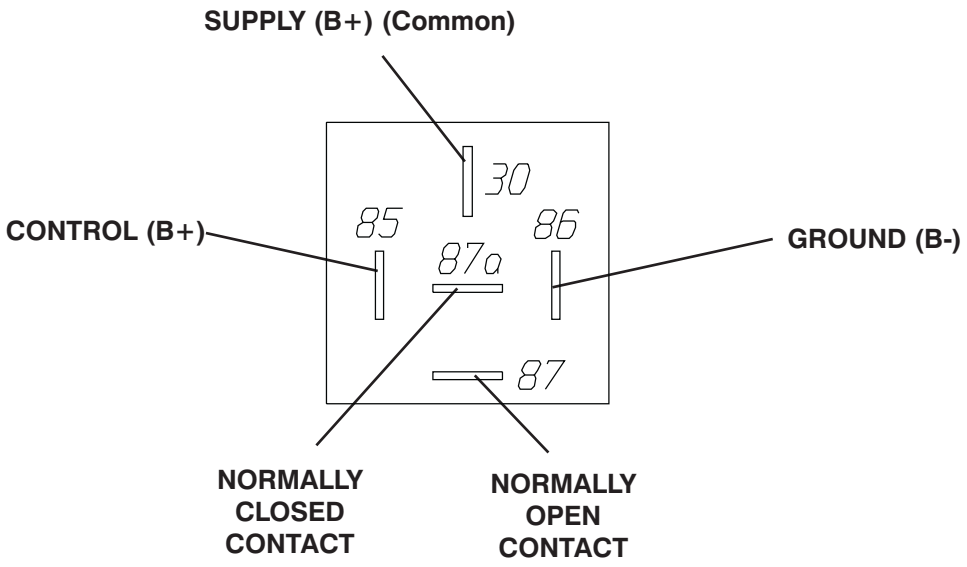
**Note: Standard colours referenced from IEC 60455:2010, Annex A:Table A.1*

1648AA

3.5 Hydraulic Parts List

Index No.	Skyjack Part No.	Description
2H-13C	103655	VALVE, Lowering Valve
2H-13C-1	103655	VALVE, Lower (Lower Cylinder)
2H-13C-2	103655	VALVE, Lower (Upper Cylinder)
2H-18A	166038	VALVE, Differential
2H-98-1	103655	VALVE, Auxilary Lower (Lower Cylinder)
2H-98-2	103655	VALVE, Auxilary Lower (Upper Cylinder)
3H-14	106273	VALVE, Lif
3H-17A	103623	VALVE, Brake
3H-18A-1	199121	VALVE, Speed A
3H-18A-2	199121	VALVE, Speed B
4H-15	153334	VALVE, Reverse Drive
4H-16	-	VALVE, Forward Drive
4H-23	153334	VALVE, Right Steer
4H-24	-	VALVE, Left Steer
BR1	171056	BRAKE, Rear (Left)
BR2	171056	BRAKE, Rear (Right)
C1	194807	CYLINDER, Steer
C2	197546	CYLINDER, Lower Scissor
C3	197548	CYLINDER, Upper Scissor
C4	124291	CYLINDER, Cushion
CB1	147889	VALVE, Counterbalance
F1	109568	FILTER, Return
FD1	199117	VALVE, Flow Divider/Combiner
M1	171849	MOTOR, Wheel (Left
M2	171849	MOTOR, Wheel (Right)
MB1	204102	MANIFOLD, Main ***(ANSI/CSA, KC)***
	204103	MANIFOLD, Main ***(CE, AS)***
MB2	162220	MANIFOLD, Lowering
MB3	195257	MANIFOLD, Upper Cylinder
MB4	195256	MANIFOLD, Lower Cylinder
MB5	171854	MANIFOLD, Drive
MB6	136540	MANIFOLD, Brake
O1	134243	ORIFICE, Lowering (0.113” diameter)
O2	151693	ORIFICE, Steer (0.035” diameter)
O3	151693	ORIFICE, Steer (0.035” diameter)
O4	105501	ORIFICE, One-Way Lower (0.094” diameter)
O5	105501	ORIFICE, One-Way Lower (0.094” diameter)
O6	199122	ORIFICE, Crossover (0.020” diameter)
O7	199123	ORIFICE, Differential (0.040” diameter)
P1	161938	PUMP, DC Motor
P2	146559	PUMP, Brake Release
R1	104534	RELIEF, System
R2	104534	RELIEF, Lift
R3	195259	RELIEF, Scissor
R4	195259	RELIEF, Scissor
V1	107271	VALVE, Emergency Lowering
V2	103136	VALVE, Free-Wheeling
V3	146561	VALVE, Brake Override

3.6 Electrical Parts List

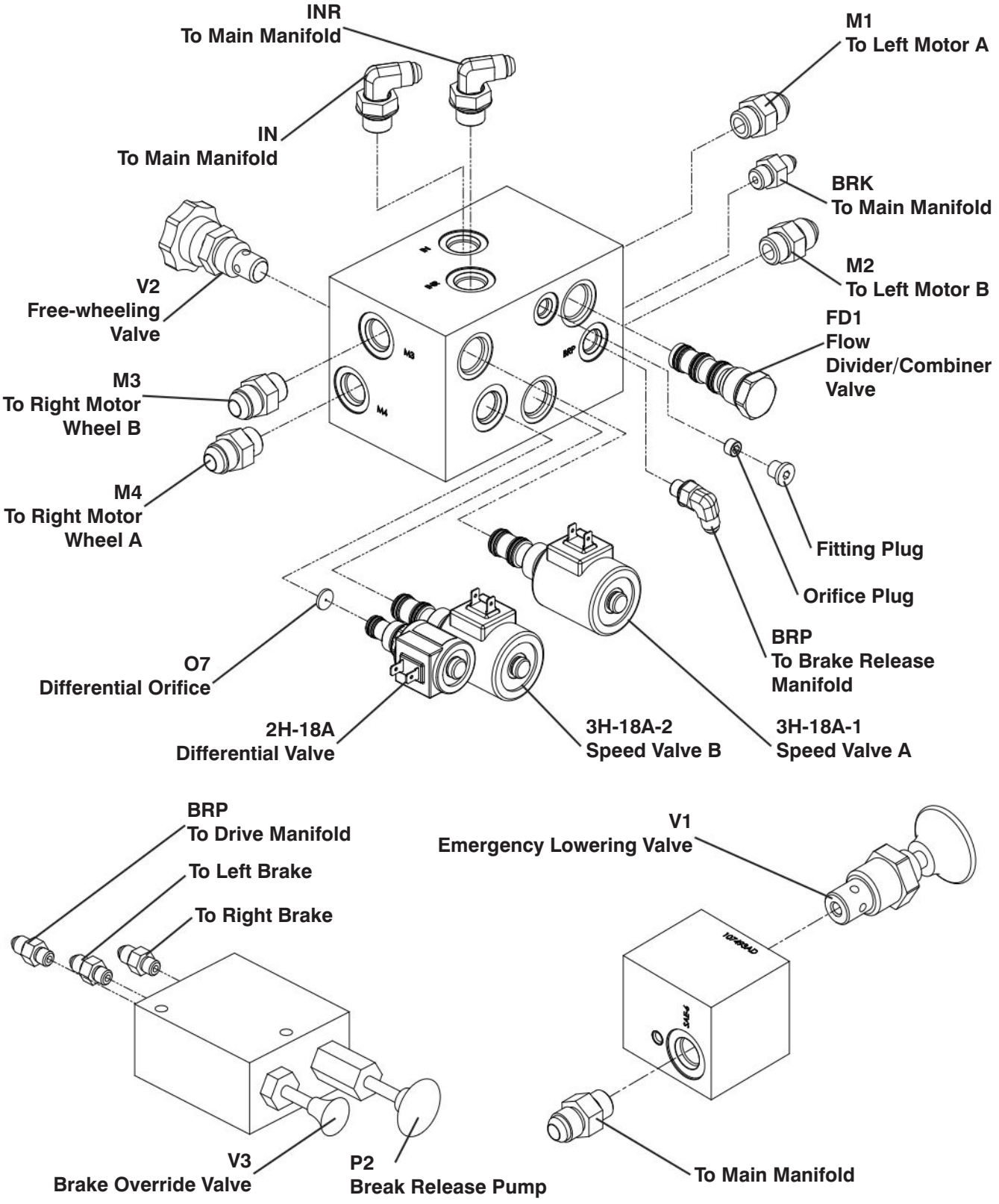


Index No.	Skyjack Part No.	Description
13ACR	108589	RELAY, 24 Volt (Tilt) ***(KC)***
14CR	108589	RELAY, 24 Volt (Lift Speed) ***(ANSI/CSA, KC)***
14CR1	108589	RELAY, 24 Volt (Lift Speed 2) ***(ANSI/CSA, KC)***
14ACR	108589	RELAY, 24 Volt (Lift Speed) ***(CE, AS)***
14ACR1	108589	RELAY, 24 Volt (Lift Speed 2) ***(CE, AS)***
17CR	108589	RELAY, 24 Volt ***(Steer)***
19BCR	108589	RELAY, 24 Volt (Brake Release) ***(CE, AS)***
21CR	108589	RELAY, 24 Volt (High Speed)
28CR	108589	RELAY, 24 Volt (Tilt) ***(ANSI/CSA, KC)***
28CR1	108589	RELAY, 24 Volt (Tilt) ***(CE, AS)***
28CR2	108589	RELAY, 24 Volt (Down) ***(CE, AS)***
28CR3	108589	RELAY, 24 Volt (Hourmeter) ***(CE)***
28ECR1	108589	RELAY, 24 Volt (Auxilary Tilt) ***(CE, AS)***
28ECR2	108589	RELAY, 24 Volt (Auxilary Down) ***(CE, AS)***
59JCR	108589	RELAY, 24 Volt (Base Control)
2H-13	103605	COIL, 24 Volt (Lowering Valve)
2H-13-1	195260	COIL, 20 Volt (Upper Holding Valve)
2H-98-2	195260	COIL, 20 Volt (Upper Auxilary Holding Valve)
2H-13-2	195260	COIL, 20 Volt (Lower Holding Valve)
2H-98-1	195260	COIL, 20 Volt (Lower Auxilary Holding Valve)
2H-18A	199118	COIL, 24 Volt (Differential Valve)
3H-14B	105610	COIL, 24 Volt (Lift valve)
3H-17	103650	COIL, 24 Volt (Brake Valve)
3H-18A-1	199119	COIL, 20 Volt (Speed A)
3H-18B-1	199119	COIL, 20 Volt (Speed B)
4H-15	153335	COIL, 24 Volt (Reverse Drive Spool Valve)

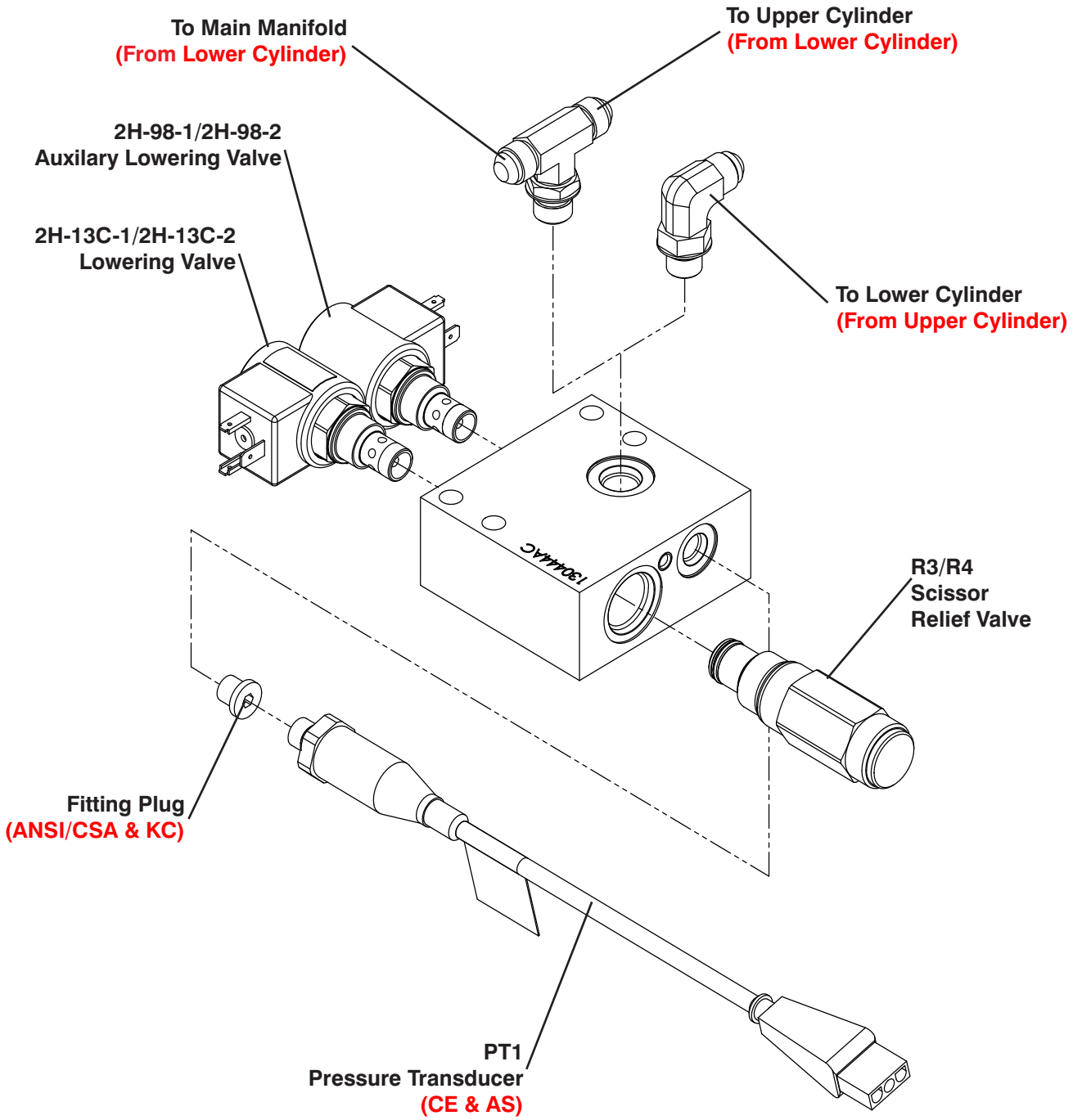
Index No.	Skyjack Part No.	Description
4H-16	-	COIL, 24 Volt (Forward Drive Spool Valve)
4H-23	153335	COIL, 24 Volt (Right Steer Spool Valve)
4H-24	-	COIL, 24 Volt (Left Steer Spool Valve)
AT1	130440	TRANSDUCER, Angle ***(CE & AS)***
B1-B4	197295	BATTERY, 12 Volt (US XC2)
	171855	BATTERY, 12 Volt (AGM Option) ***(ANSI/CSA)***
BC	171047	CHARGER, 750W Chord (Signet) ***(ANSI/CSA & AS)***
	171048	CHARGER, 750W Chord (Signet) ***(CE & KC)***
	194975	CHARGER, 750W Chord (AGM Option) ***(ANSI/CSA)***
BC1	122093	INDICATOR, Battery Charged
BP-29	103057	BEEPER, 4-28 VDC ***(ANSI/CSA)***
	170620	BEEPER, SP-1048 ***(CE & AS)***
	103057	BEEPER, 4-28 VDC ***(KC)***
C1	146475	CONTACTOR, Motor (24 Volt)
CAP1	110699	CAPACITOR (.47UF 100 Volts)
CB1	117325	BREAKER, Circuit (15 Amp)
CB2	117325	BREAKER, Circuit (15 Amp)
CB3	408526	BREAKER, Circuit (10 Amp)
CB4	408526	BREAKER, Circuit (10 Amp)
CM1	199159	MODULE, Overload Sensing Controller ***(CE)***
	158226	MODULE, Overload Sensing Controller ***(AS)***
M	169260	MOTOR (24 VDC)
DXX	102921	DIODE
D02-X	129258	DIODE
F1	310517	FUSE, In-Line (300 Amp)
F2	310517	FUSE, 100 Amp ***(ANSI/CSA)***
FL-22	126111	FLASHING LIGHT, 24VDC ***(ANSI/CSA & KC)***
	121477	FLASHING LIGHT, 24VDC ***(CE & AS)***
FL-29	103743	FLASHER ***(ANSI/CSA & KC)***
H1	146649	HORN, 24 Volts (Operator)
INV1	135990	INVERTER ***(ANSI/CSA)***
LED-1	147061	LED BLOCK, 24V - Power On (Platform Control Console)
LED-2	147061	LED BLOCK, 24V - Power On (Base Control Console)
LS1A	121975	LIMIT SWITCH, High speed
LS1B	121975	LIMIT SWITCH, High speed
LS4	166007	LIMIT SWITCH, Pothole Protection (Battery Tray) ***(ANSI/CSA & KC)***
	166003	LIMIT SWITCH, Pothole Protection (Battery Tray) ***(CE & AS)***
LS5	133600	LIMIT SWITCH, Pothole Protection (Hydraulic Tray) ***(ANSI/CSA & KC)***
	125885	LIMIT SWITCH, Pothole Protection (Hydraulic Tray) ***(CE & AS)***
LS6	121975	LIMIT SWITCH, Overhead Protection ***(KC)***
LS7A	119348	LIMIT SWITCH, Overhead Protection ***(KC)***
LS7B	119348	LIMIT SWITCH, Overhead Protection - Additional Switch Option ***(KC)***
LS7C	119348	LIMIT SWITCH, Overhead Protection - Additional Switch Option ***(KC)***
LS7D	119348	LIMIT SWITCH, Overhead Protection - Additional Switch Option ***(KC)***
PS1	198738	SWITCH, Pressure ***(KC)***
PT1	134431	TRANSDUCER, Pressure (2000 psi) ***(CE & AS)***
RST1	119629	RESISTOR, 2.7k ohm

Index No.	Skyjack Part No.	Description
RST2	199232	WIRE ASM, Motor Controller (8.00” / 68.1 Ohm) ***(ANSI/CSA & KC)***
	199237	WIRE ASM, Motor Controller (6.25” / 68.1 Ohm) ***(CE & AS)***
	151647	• RESISTOR, 68.1 Ohm
RST3	199231	WIRE ASM, Motor Controller (8.50” / 470 Ohm) ***(ANSI/CSA & KC)***
	199236	WIRE ASM, Motor Controller (6.25” / 470 Ohm) ***(CE & AS)***
	196028	• RESISTOR, 470 Ohm
RST3	199231	WIRE ASM, Motor Controller (8.50” / 470 Ohm) ***(ANSI/CSA & KC)***
	199236	WIRE ASM, Motor Controller (6.25” / 470 Ohm) ***(CE & AS)***
	196028	• RESISTOR, 470 Ohm
RST4	199233	WIRE ASM, Motor Controller (7.50” / 68.1 Ohm) ***(ANSI/CSA)***
	199238	WIRE ASM, Motor Controller (5.00” / 68.1 Ohm) ***(CE & AS)***
	199241	WIRE ASM, Motor Controller (7.00” / 68.1 Ohm) ***(KC)***
	151647	• RESISTOR, 68.1 Ohm
RST5	199234	WIRE ASM, Motor Controller (7.00” / 4.75 KOhm) ***(ANSI/CSA & KC)***
	199239	WIRE ASM, Motor Controller (4.50” / 4.75 KOhm) ***(CE & AS)***
	151645	• RESISTOR, 4.75 KOhm
RST6	199235	WIRE ASM, Motor Controller (7.00” / 1.2 KOhm) ***(ANSI/CSA & KC)***
	199240	WIRE ASM, Motor Controller (4.50” / 1.2 KOhm) ***(CE & AS)***
	163253	• RESISTOR, 1.2 KOhm
RST7	151643	RESISTOR, 250 Ohm
RST8	207716	RESISTOR ASM, 1.5 Ohm
	207707	RESISTOR ASM, 7.5 Ohm (AGM Option) ***(ANSI/CSA, CE)***
S1	119725	SWITCH, Main Power Disconnect
S2	147054	N.O. CONTACT, Raise/Lower
S3	116382	SWITCH, Toggle (Lift/Off/Drive)
S4	147053	N.C. CONTACT, Emergency Stop (Platform Control Console)
S7	159111	JOYSTICK, Motor Controller
S7-1	122869	SWITCH, Neutral
S7-2	159613	SWITCH, Right Steer
S7-3	159613	SWITCH, Left Steer
S7-6	159067	SWITCH, Enable
S8	147054	SWITCH, Horn
S10	171894	SWITCH, Key (Idle/Platform/Base) ***(ANSI/CSA, CE & KC)***
	171896	SWITCH, Key (Idle/Platform/Base) ***(AS)***
S27	115574	SWITCH, Torque
S28	147053	N.C. CONTACT, Emergency Stop (Base Control Console)
S51	199040	SWITCH, Emergency Lowering
TIMER	137417	TIMER, Relay - Delay-On-Release ***(ANSI/CSA)***
TS1	171561	TILT SWITCH ***(ANSI/CSA)***
-	171560	TILT SWITCH ***(KC)***
TT	195940	HOURMETER ***(ANSI/CSA, AS & KC)***
	170787	HOURMETER ***(CE)***

3.7 Drive, Brake Release and E-Lowering Manifold and Port Identification

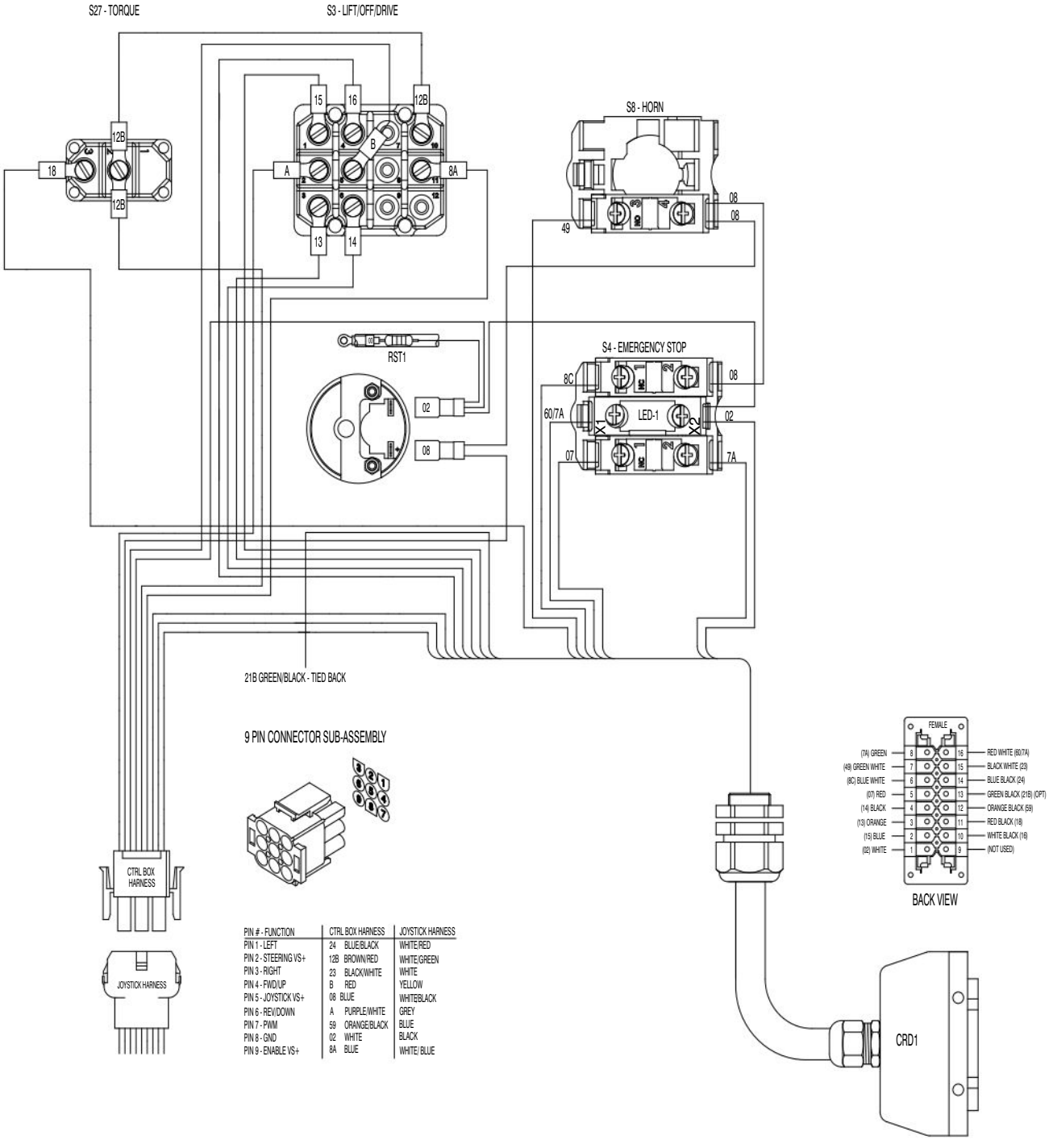


3.8 Holding Valve and Port Identification



M195256AC_S

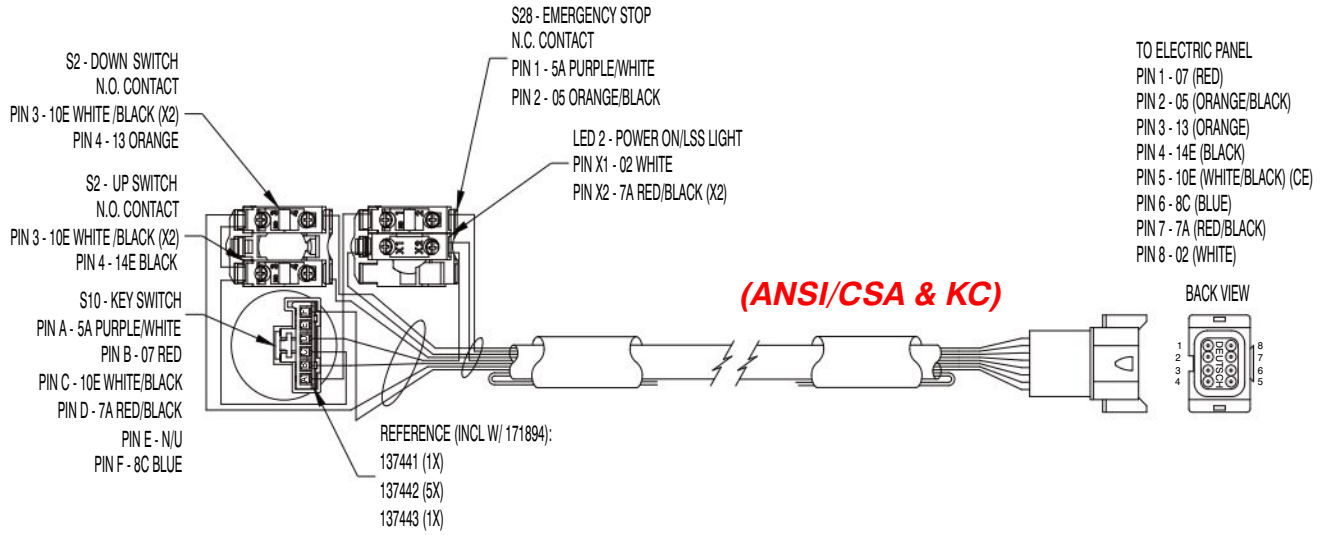
3.9 Platform Control Console

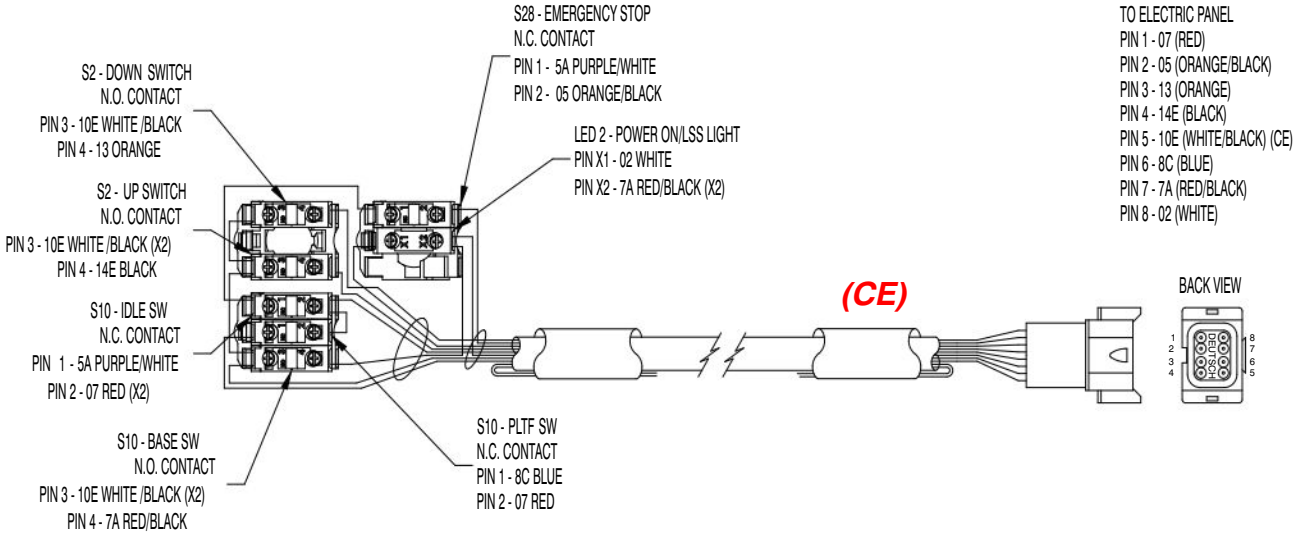


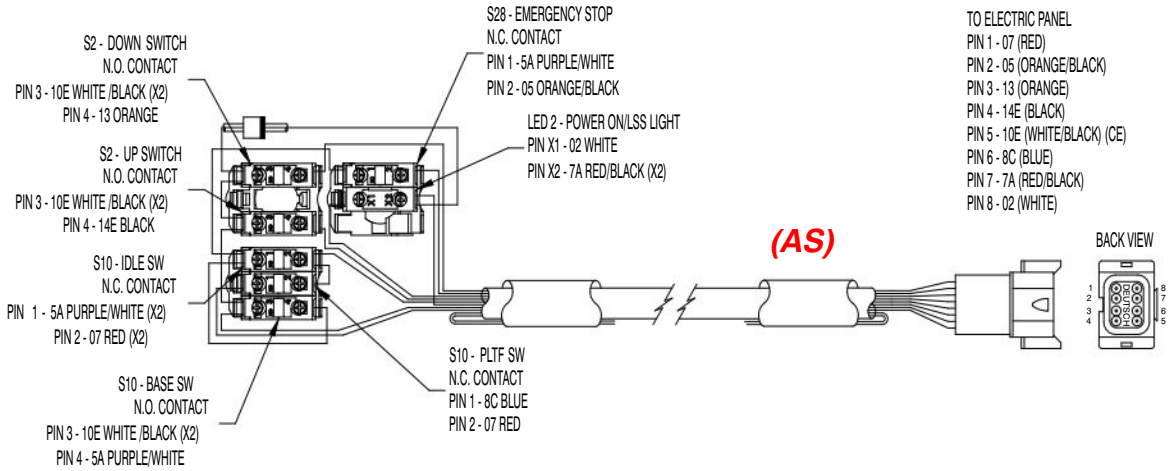
PIN # - FUNCTION	CTRL BOX HARNESS	JOYSTICK HARNESS
PIN 1 - LEFT	24 BLUE/BLACK	WHITE/RED
PIN 2 - STEERING VS+	12B BROWN/RED	WHITE/GREEN
PIN 3 - RIGHT	23 BLACK/WHITE	WHITE
PIN 4 - FWD/UP	B RED	YELLOW
PIN 5 - JOYSTICK VS+	08 BLUE	WHITE/BLACK
PIN 6 - REV/DOWN	A PURPLE/WHITE	GREY
PIN 7 - PWM	59 ORANGE/BLACK	BLUE
PIN 8 - GND	02 WHITE	BLACK
PIN 9 - ENABLE VS+	8A BLUE	WHITE/ BLUE

M163169AA

3.10 Base Control Console



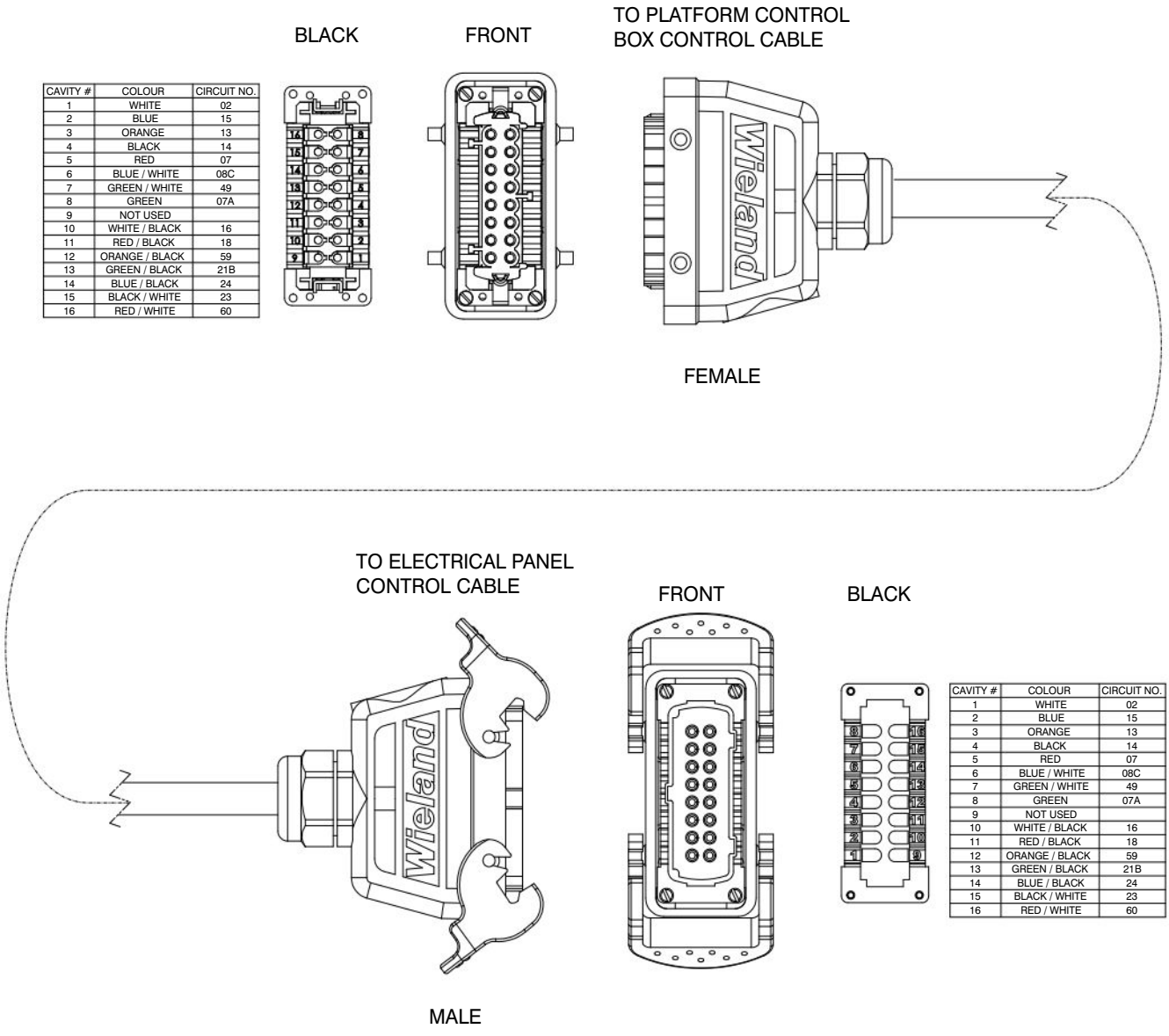




M149553AC, M195843AA, M158259AA

3.11 Control Cable

CONTROL CABLE OPTIONS		
WIRE COLOUR	EUROPE WIRE NUMBER	N.A WIRE NUMBER
GREEN/BLACK	21B	21B
RED/WHITE	60	7A

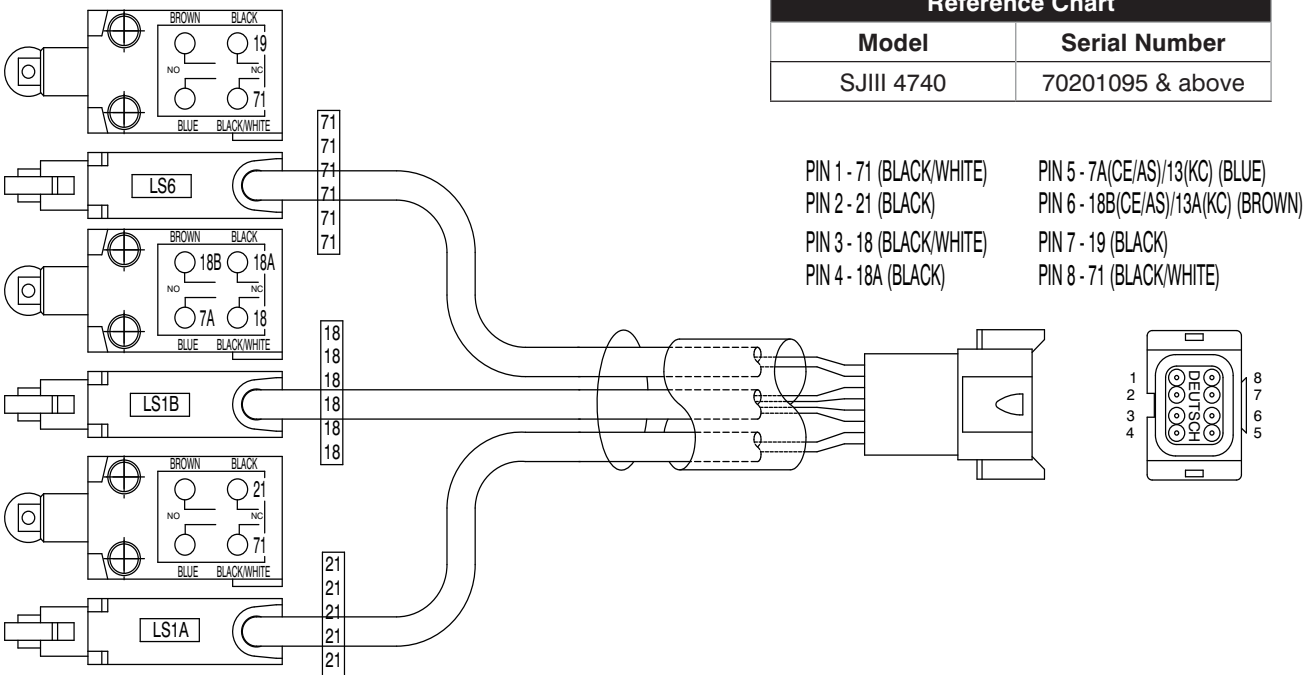


CAVITY #	COLOUR	CIRCUIT NO.
1	WHITE	02
2	BLUE	15
3	ORANGE	13
4	BLACK	14
5	RED	07
6	BLUE / WHITE	08C
7	GREEN / WHITE	49
8	GREEN	07A
9	NOT USED	
10	WHITE / BLACK	16
11	RED / BLACK	18
12	ORANGE / BLACK	59
13	GREEN / BLACK	21B
14	BLUE / BLACK	24
15	BLACK / WHITE	23
16	RED / WHITE	60

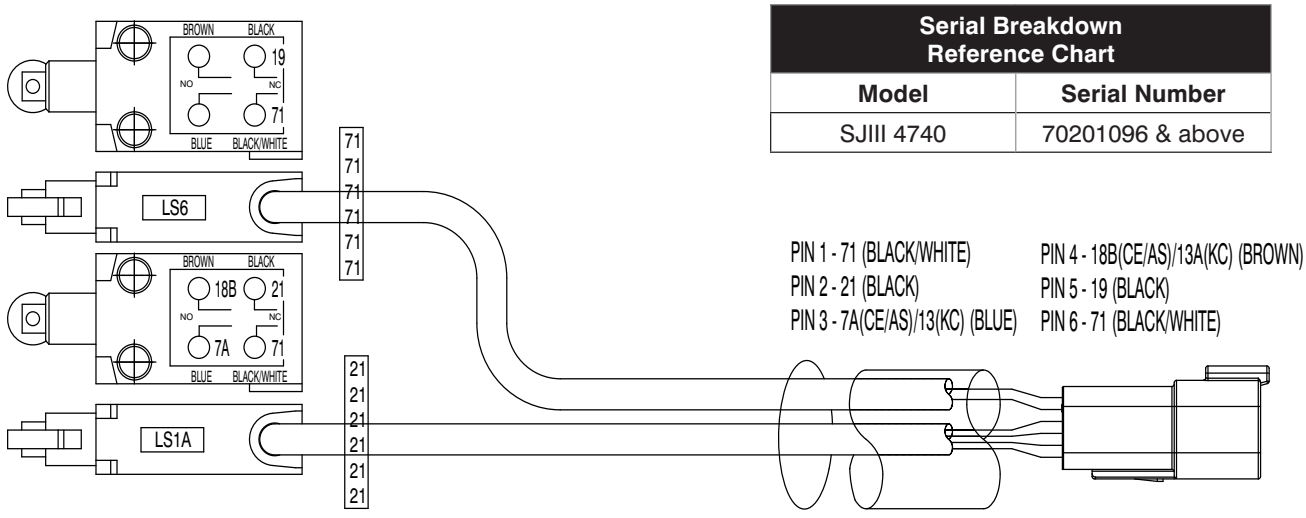
M171663AB_S

3.12 High Speed Limit Switch Wiring

Serial Breakdown Reference Chart	
Model	**Serial Number**
SJIII 4740	70201095 & above



Serial Breakdown Reference Chart	
Model	**Serial Number**
SJIII 4740	70201096 & above

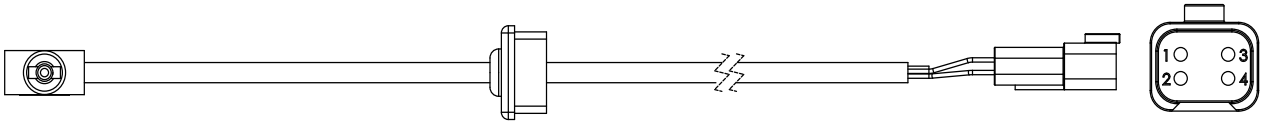


M130559AD, M204110AA_S

3.13 Anti-Overrising Limit Switch Wiring Diagrams

Anti-Overrising Limit Switch (KC Only)

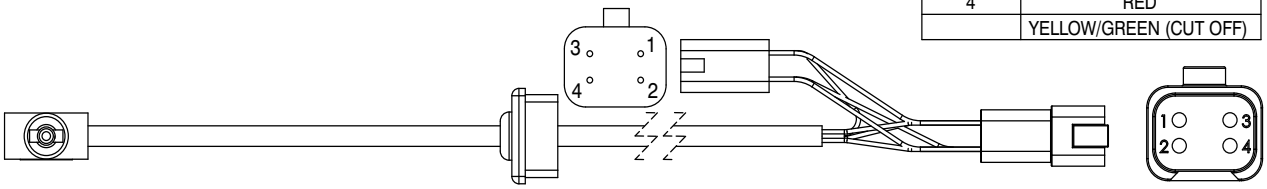
CAVITY	COLOUR
1	BROWN
2	BLACK
3	BLUE
4	BLACK/WHITE
	YELLOW/GREEN (CUT OFF)



Anti-Overrising Limit Switch - 2 Add Posts (KC Only)

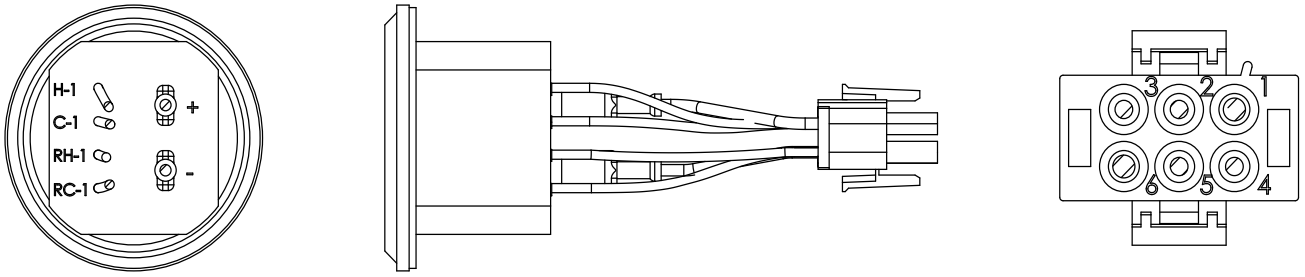
CAVITY	COLOUR
1	GREEN
2	BLACK
3	WHITE
4	RED

CAVITY	COLOUR
1	GREEN
2	BLACK/WHITE
3	WHITE
4	RED
	YELLOW/GREEN (CUT OFF)



M208038AA, M208934AA

3.14 Hourmeter (CE)

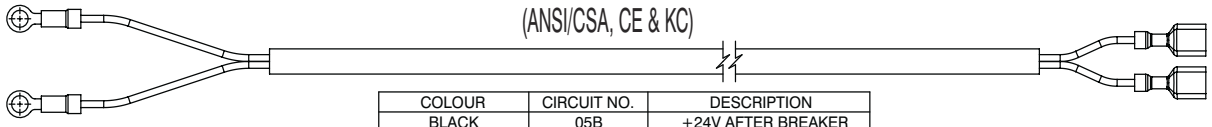


DESCRIPTION	IDENTIFICATION	COLOUR	CAVITY ID.
+12 VDC	+	PURPLE	1
HOURMETER	H-1	RED	2
COUTNER	C-1	BLUE	3
HOUR RESET	RH-1	GREEN	4
COUNTER RESET	RC-1	WHITE	5
GROUND	-	WHITE	6

M170787AB_1

3.15 Harness Wiring

EMERGENCY LOWERING SWITCH HARNESS
(ANSI/CSA, CE & KC)

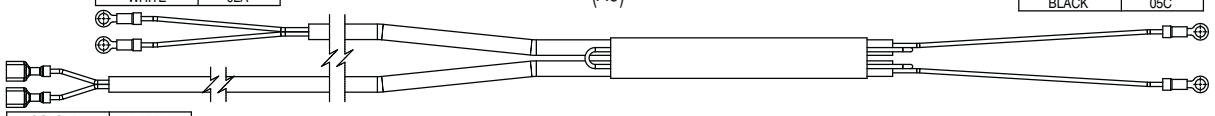


COLOUR	CIRCUIT NO.	DESCRIPTION
BLACK	05B	+24V AFTER BREAKER
WHITE	02A	GROUND AFTER BREAKER

EMERGENCY LOWERING SWITCH HARNESS
(AS)

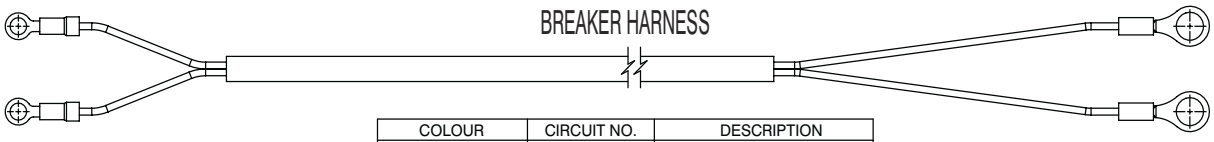
COLOUR	LABEL
BLACK	05B
WHITE	02A

COLOUR	LABEL
BLACK	05B
BLACK	05C



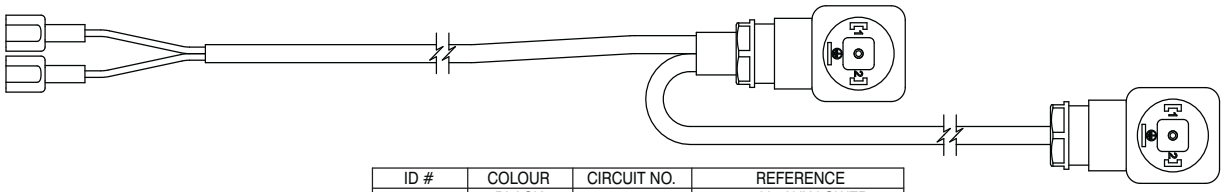
COLOUR	LABEL
BLACK	05C
WHITE	02A

BREAKER HARNESS



COLOUR	CIRCUIT NO.	DESCRIPTION
BLACK	03	+24V BEFORE BREAKER
WHITE	00	GROUND BEFORE BREAKER

AUXILARY HOLDING VALVE HARNESS



ID #	COLOUR	CIRCUIT NO.	REFERENCE
1	BLACK	98	+24 V - AUX LOWER
2	WHITE	02A	GROUND AFTER BREAKER

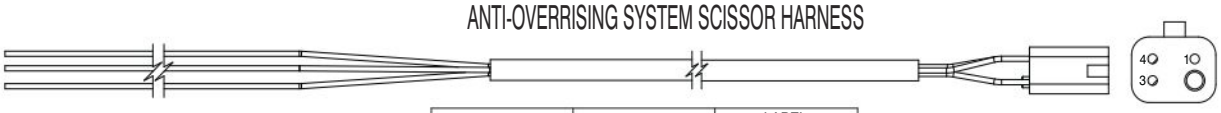
M171019AB1_Service Manuel Harnesses

3.15 Harness Wiring (Continued)

COUNTER RESET HARNESS

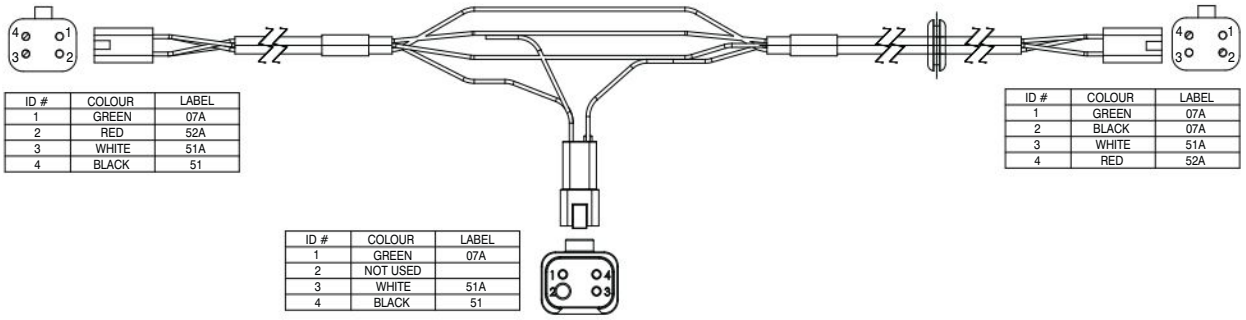
LABEL	DESCRIPTION	COLOUR
05B	+12V AFTERBREAKER	BLACK
05C	RESET	WHITE

ANTI-OVERRISING SYSTEM SCISSOR HARNESS



CAVITY	COLOUR	LABEL
1	GREEN	07A
2	NOT USED	
3	WHITE	51A
4	BLACK	51

ANTI-OVERRISING SYSTEM PLATFORM HARNESS



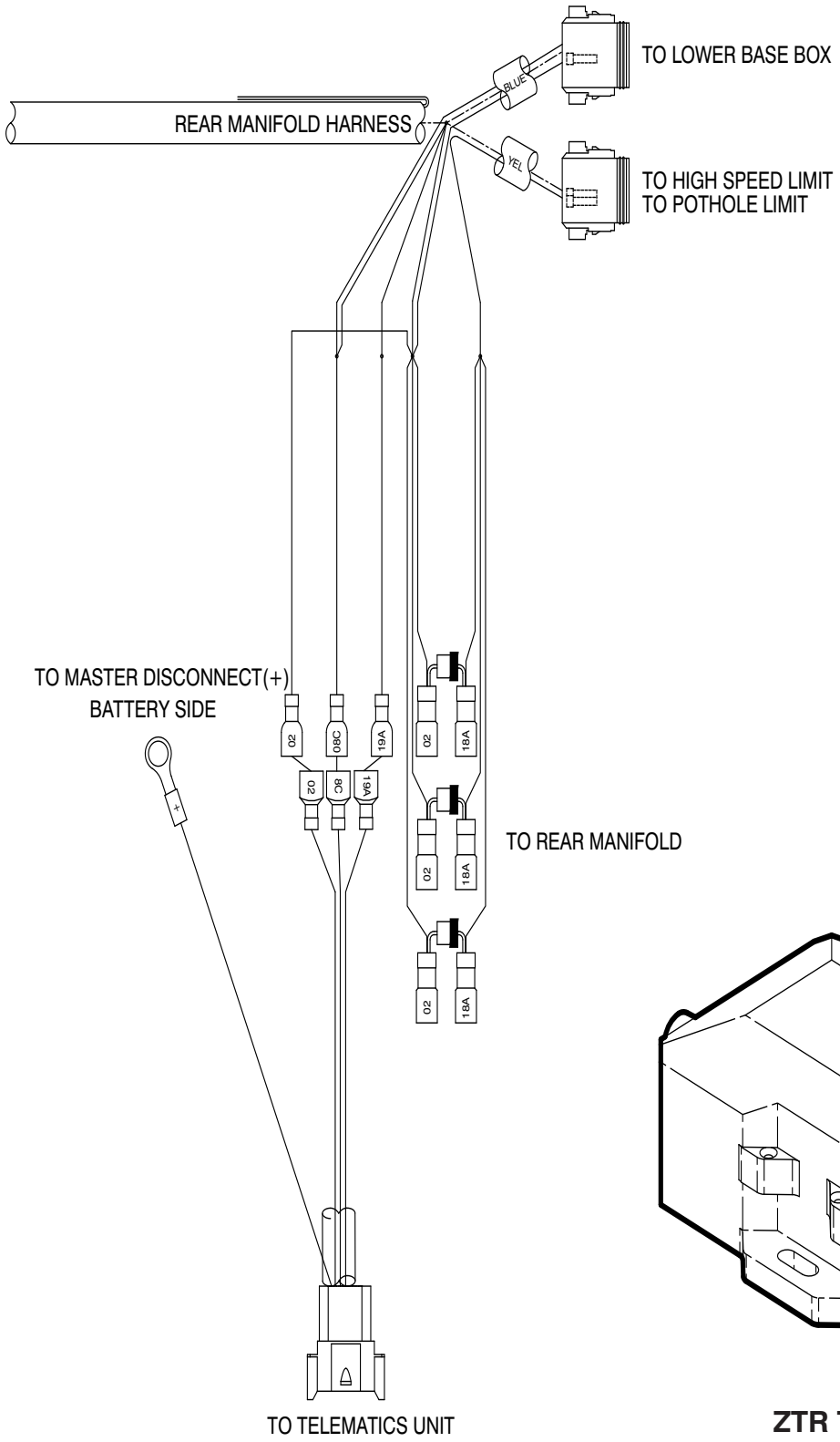
ID #	COLOUR	LABEL
1	GREEN	07A
2	RED	52A
3	WHITE	51A
4	BLACK	51

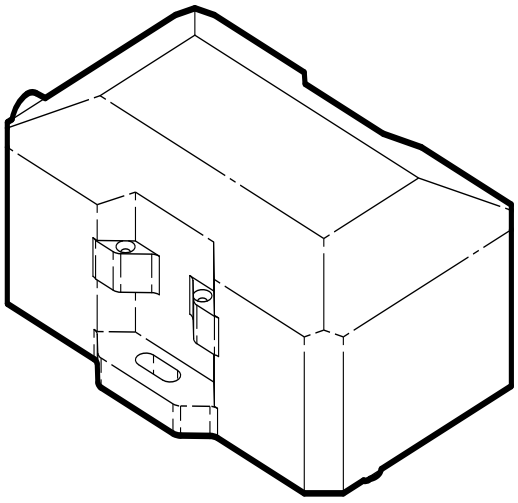
ID #	COLOUR	LABEL
1	GREEN	07A
2	BLACK	07A
3	WHITE	51A
4	RED	52A

ID #	COLOUR	LABEL
1	GREEN	07A
2	NOT USED	
3	WHITE	51A
4	BLACK	51

M171019AB1_Service Manuel Harnesses

3.16 Telematics Harness - ZTR



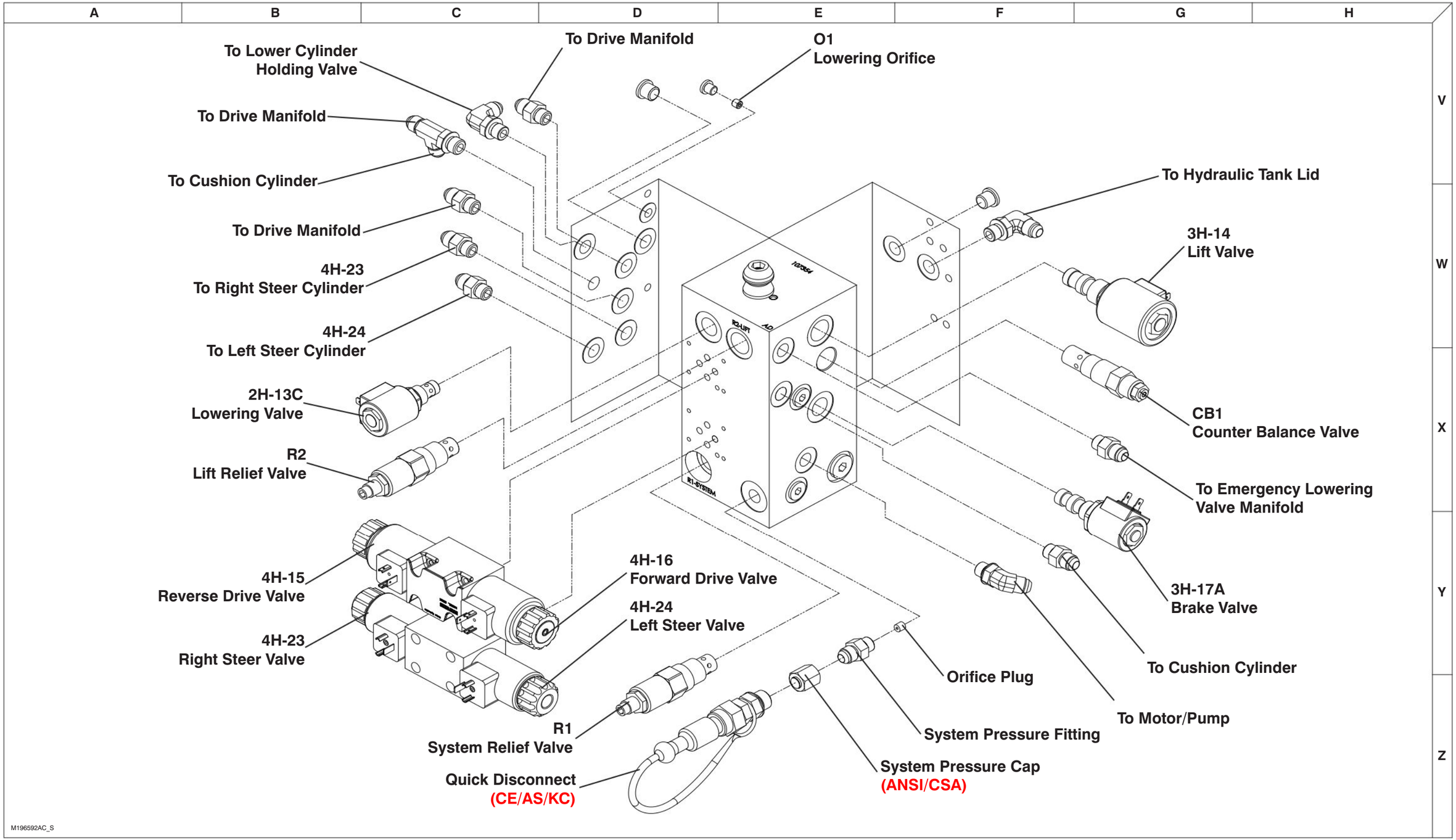


ZTR Telematics Unit

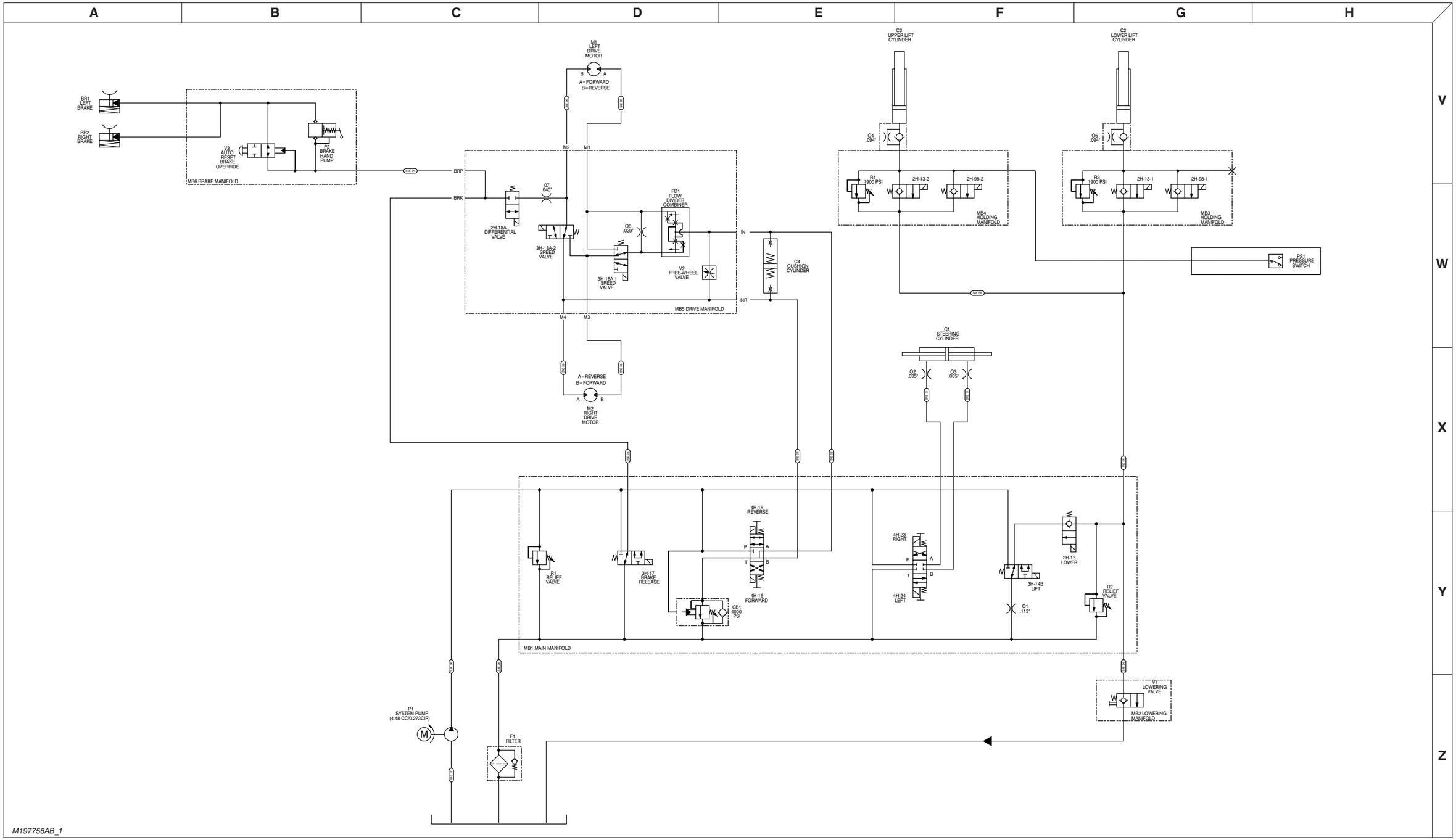
M170996AC_4740

Notes

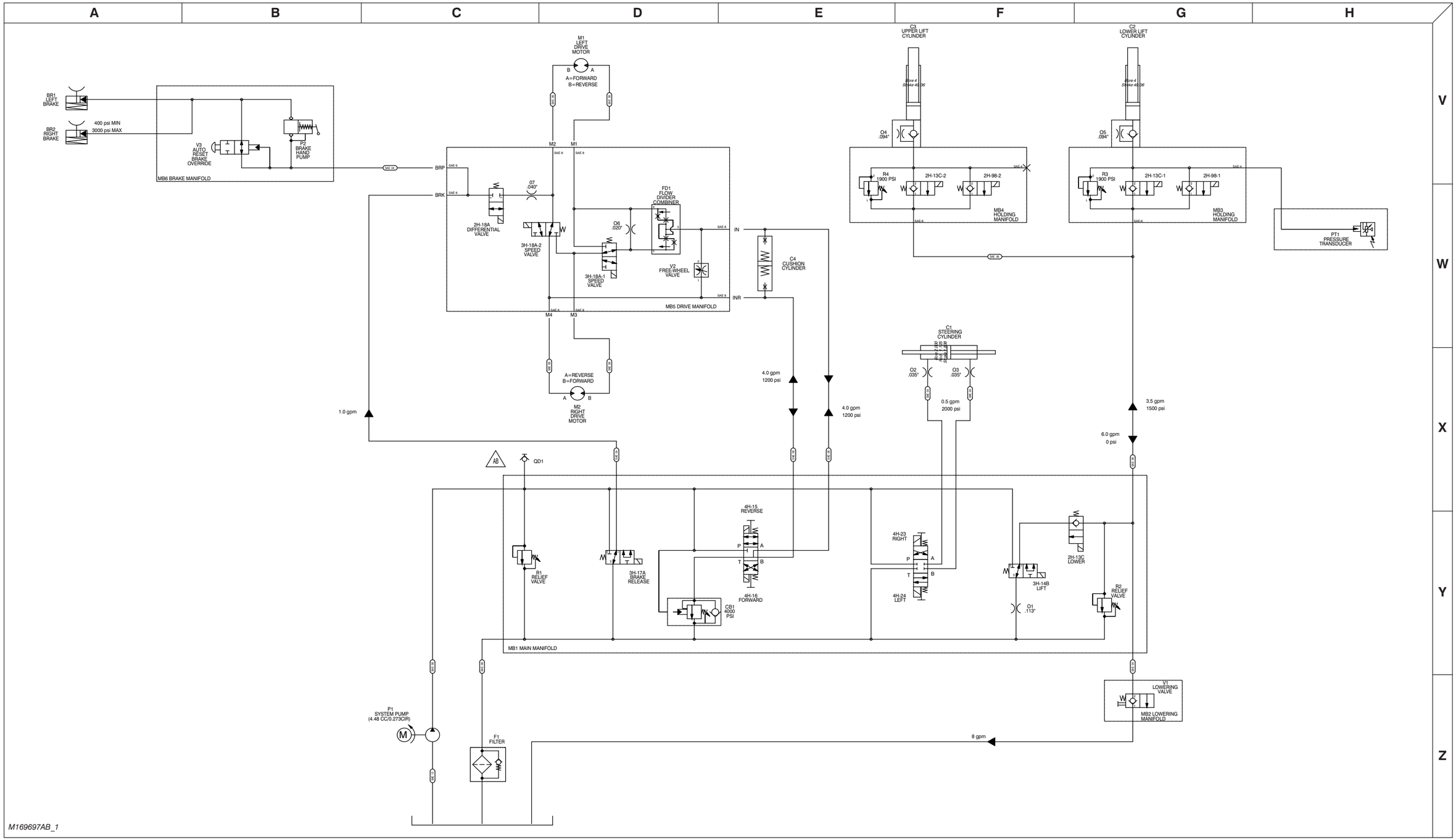
3.17 Main Manifold and Port Identidication



3.18 Hydraulic Schematics - ANSI/CSA, AS, KC

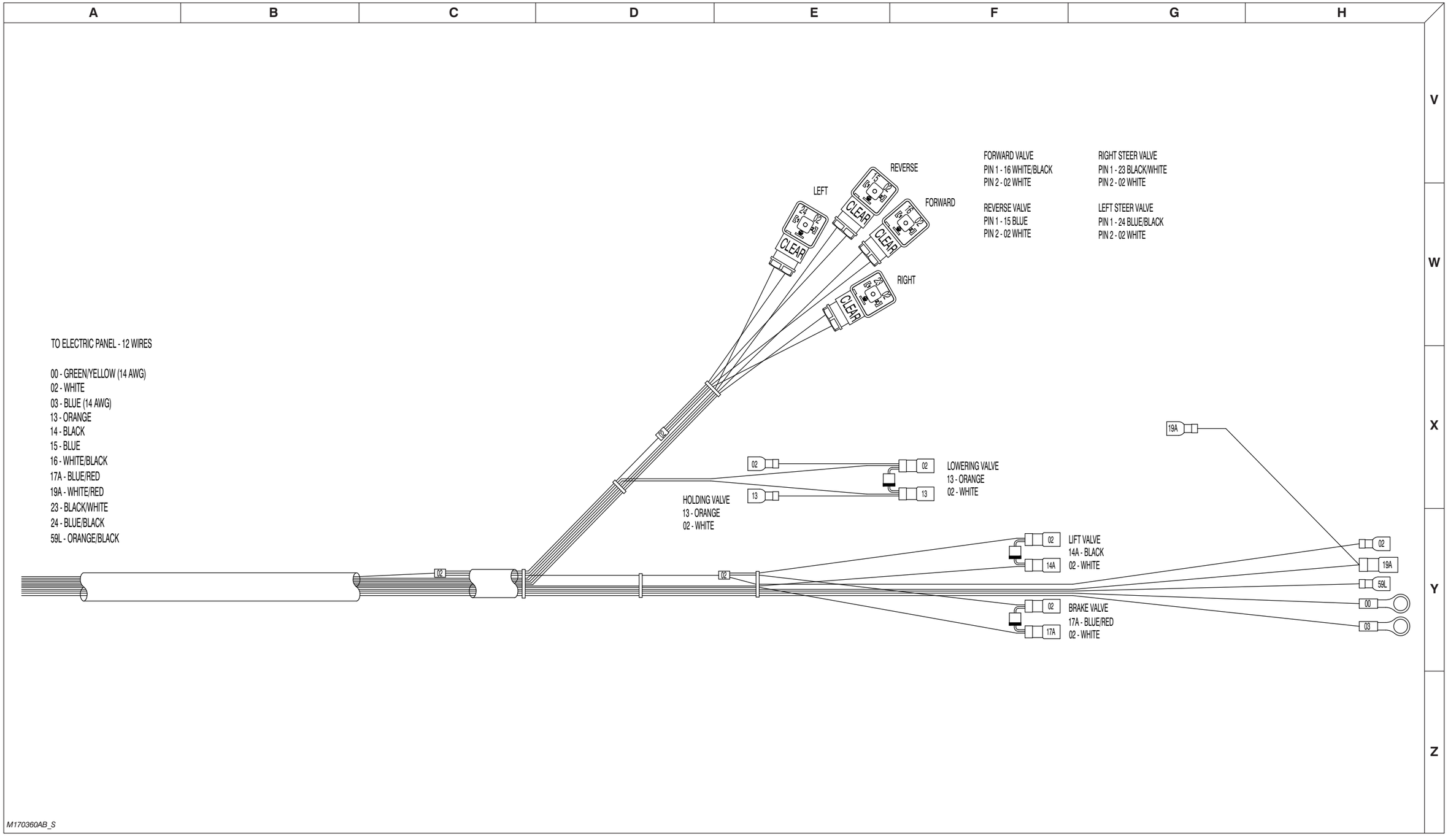


3.19 Hydraulic Schematics - CE & AS

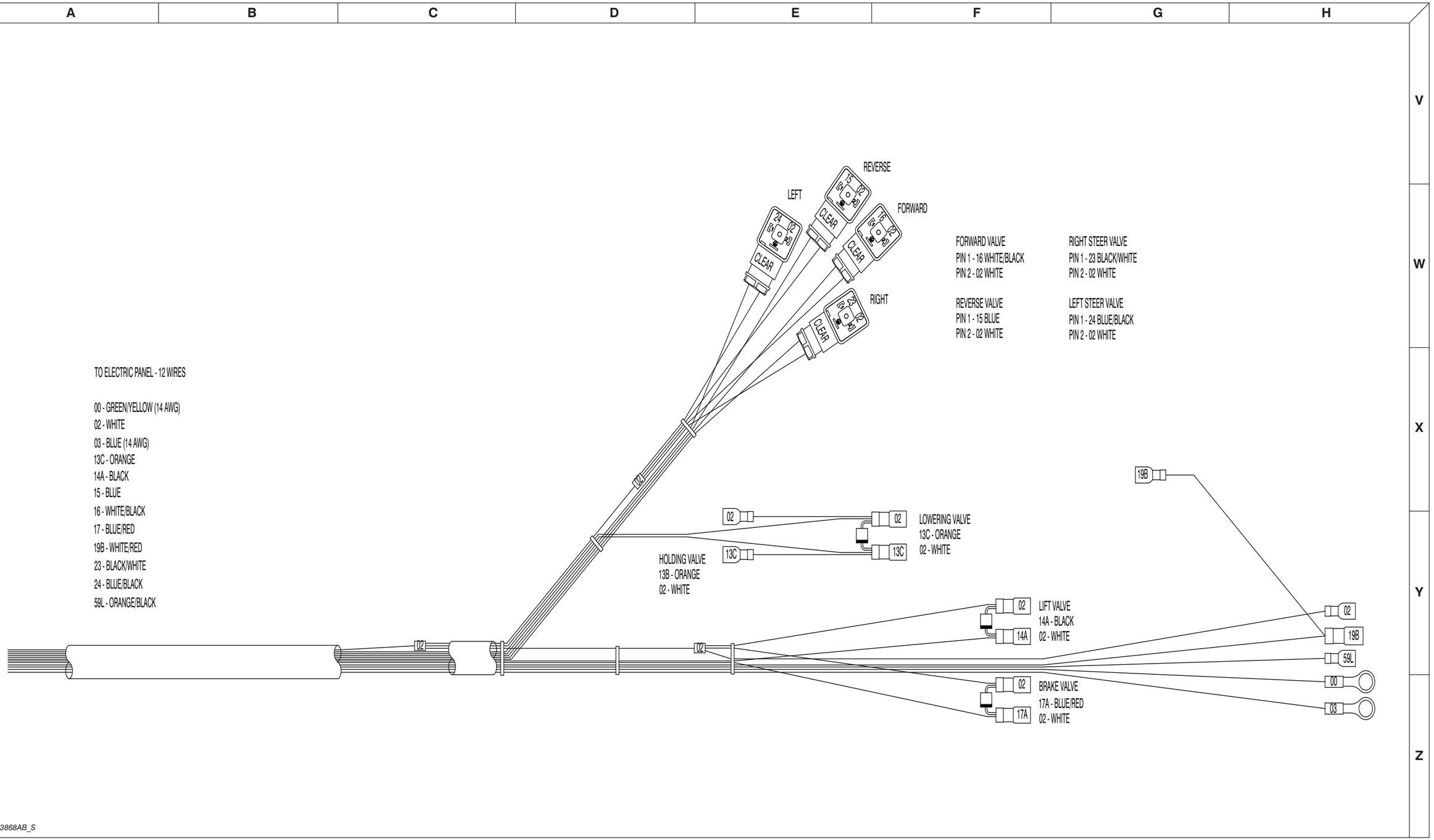


M169697AB_1

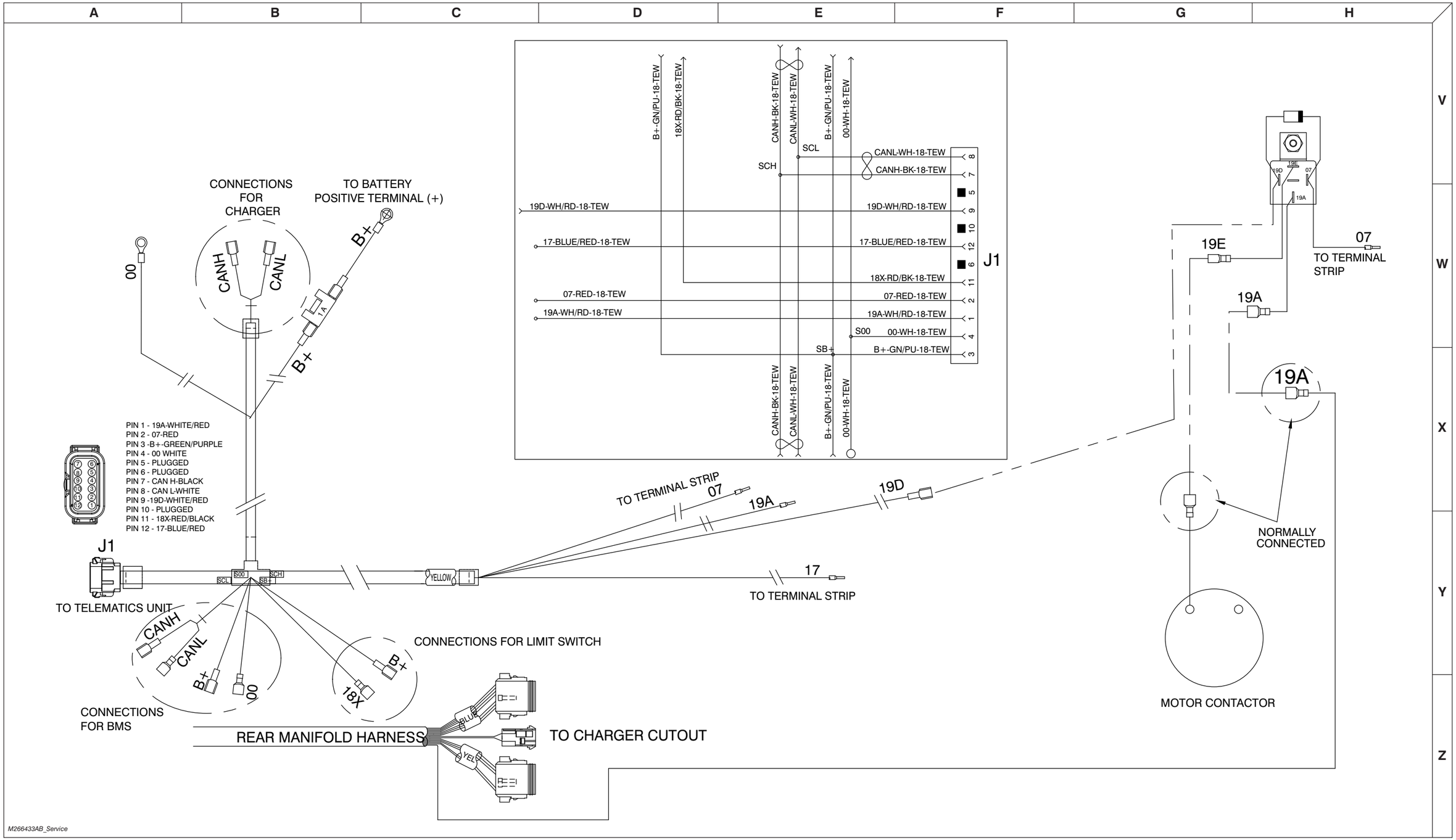
3.20 Main Manifold Harness (ANSI/CSA)



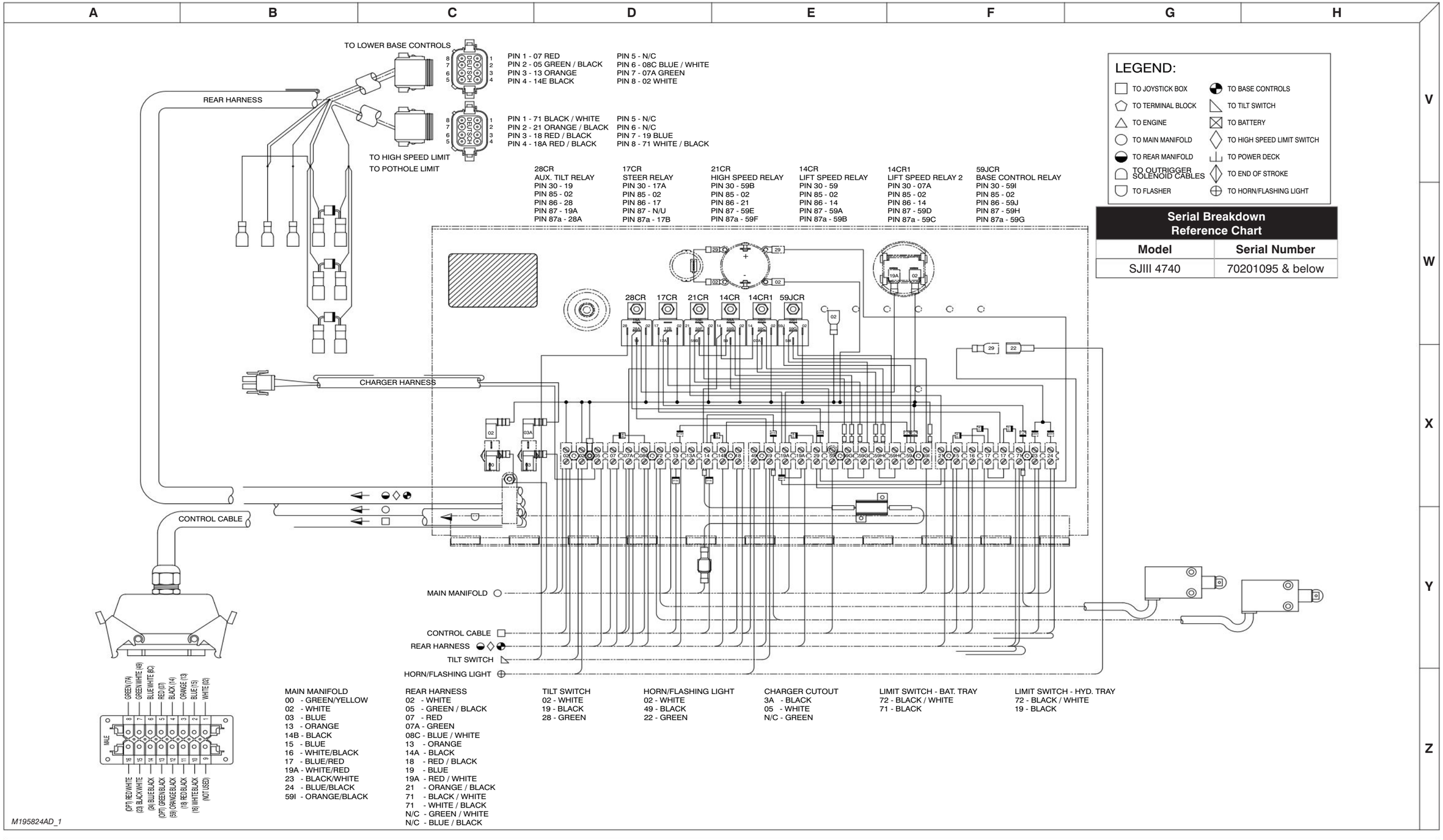
3.21 Main Manifold Harness (CE, AS & KC)



3.22 Elevate Telematics Harness



3.23 Electrical Panel (ANSI/CSA)

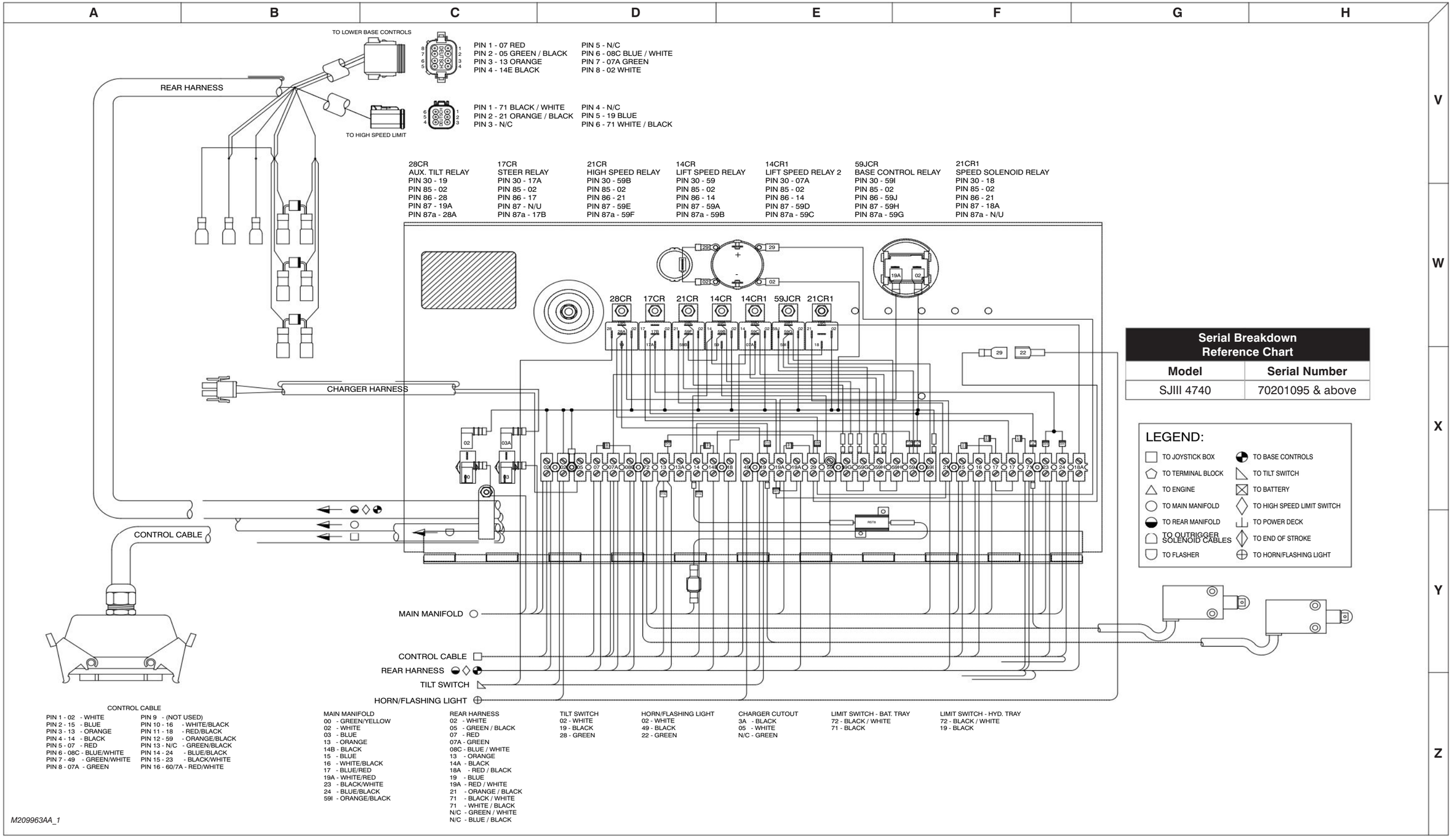


Serial Breakdown Reference Chart

Model	Serial Number
SJIII 4740	70201095 & below

M195824AD_1

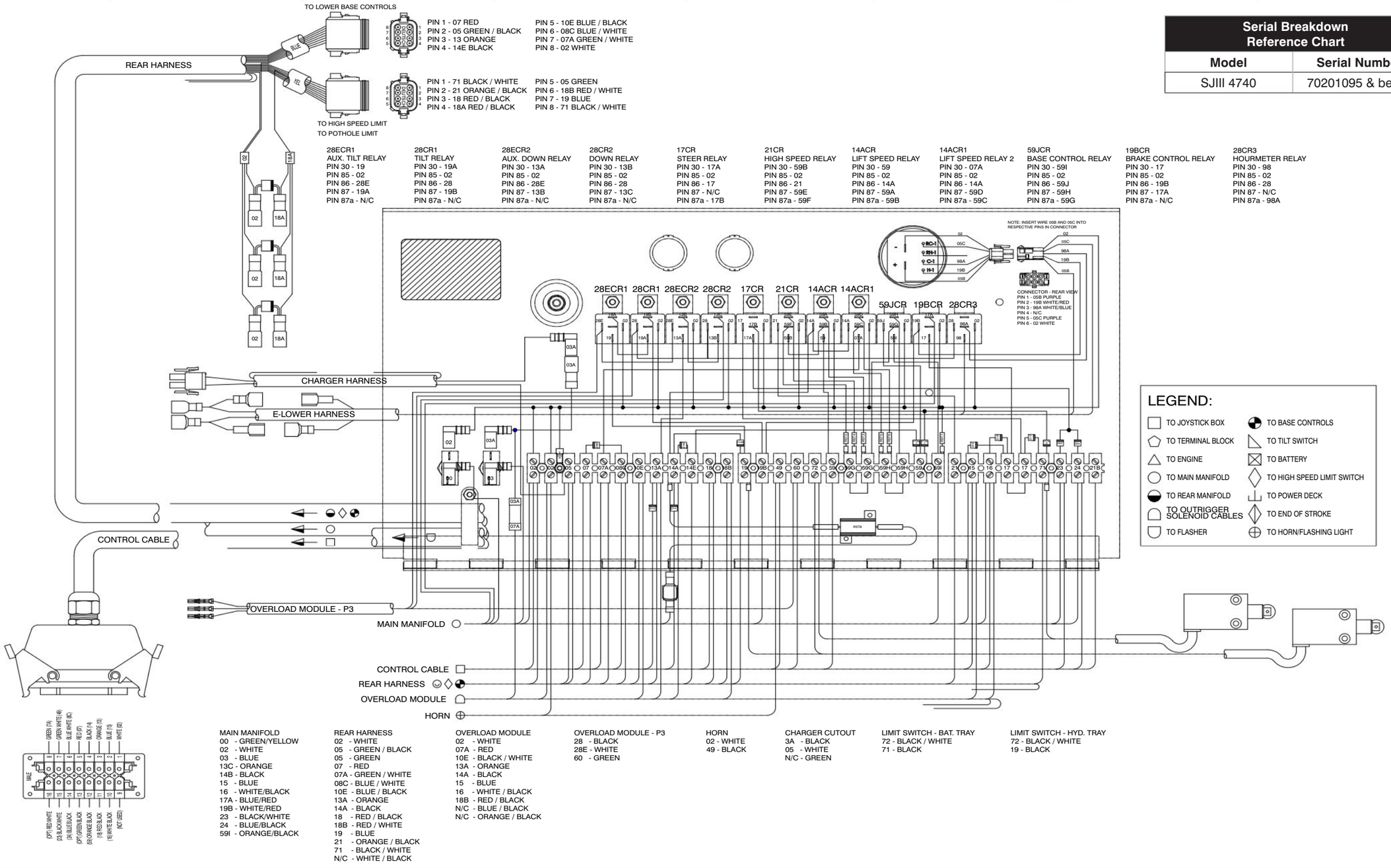
3.24 Electrical Panel (ANSI/CSA)



Serial Breakdown Reference Chart	
Model	**Serial Number**
SJIII 4740	70201095 & above

3.25 Electrical Panel (CE)

Serial Breakdown Reference Chart	
Model	**Serial Number**
SJIII 4740	70201095 & below



MAIN MANIFOLD
00 - GREEN/YELLOW
02 - WHITE
03 - BLUE
13C - ORANGE
14B - BLACK
15 - BLUE
16 - WHITE/BLACK
17A - BLUE/RED
19B - WHITE/RED
23 - BLACK/WHITE
24 - BLUE/BLACK
59I - ORANGE/BLACK

REAR HARNESS
02 - WHITE
05 - GREEN / BLACK
05 - GREEN
07 - RED
07A - GREEN / WHITE
08C - BLUE / WHITE
10E - BLUE / BLACK
13A - ORANGE
14A - BLACK
18 - RED / BLACK
18B - RED / WHITE
19 - BLUE
21 - ORANGE / BLACK
71 - BLACK / WHITE
N/C - WHITE / BLACK

OVERLOAD MODULE
02 - WHITE
07A - RED
10E - BLACK / WHITE
13A - ORANGE
14A - BLACK
15 - BLUE
16 - WHITE / BLACK
18B - RED / BLACK
N/C - BLUE / BLACK
N/C - ORANGE / BLACK

OVERLOAD MODULE - P3
28 - BLACK
28E - WHITE
60 - GREEN

HORN
02 - WHITE
49 - BLACK

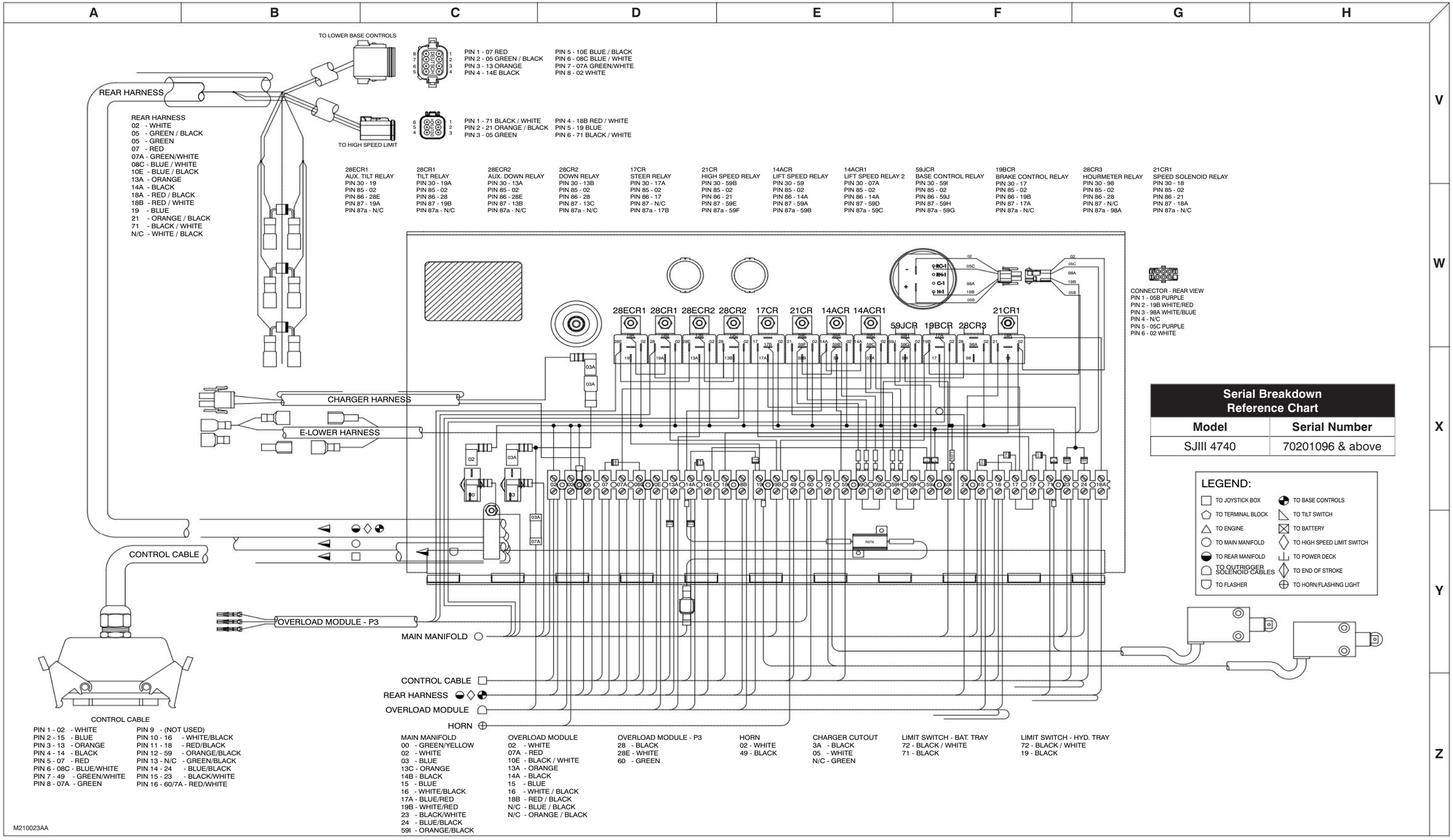
CHARGER CUTOUT
3A - BLACK
05 - WHITE
N/C - GREEN

LIMIT SWITCH - BAT. TRAY
72 - BLACK / WHITE
71 - BLACK

LIMIT SWITCH - HYD. TRAY
72 - BLACK / WHITE
19 - BLACK

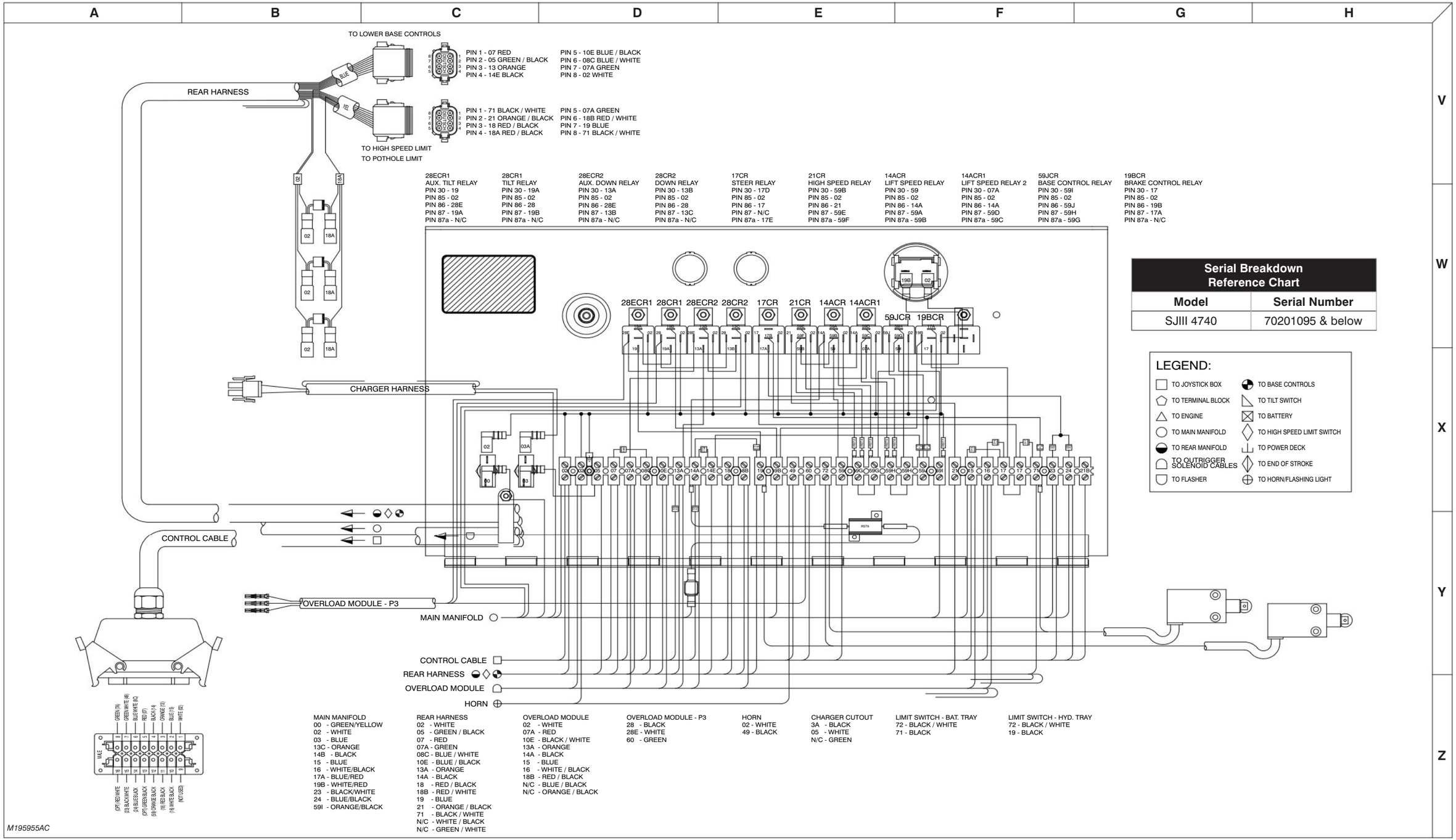
M198518AD_1

3.26 Electrical Panel (CE)

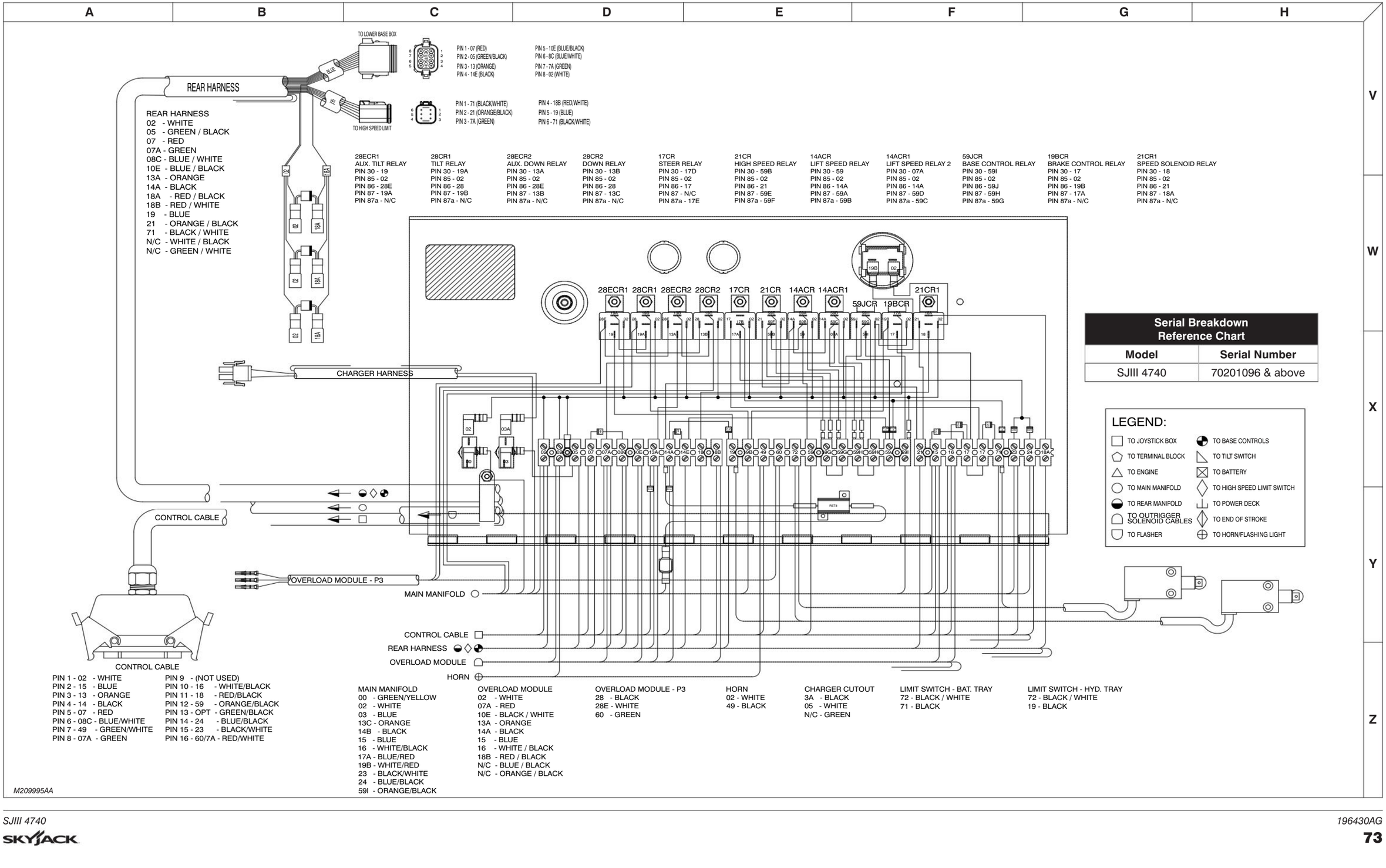


Serial Breakdown Reference Chart	
Model	**Serial Number**
SJIII 4740	70201096 & above

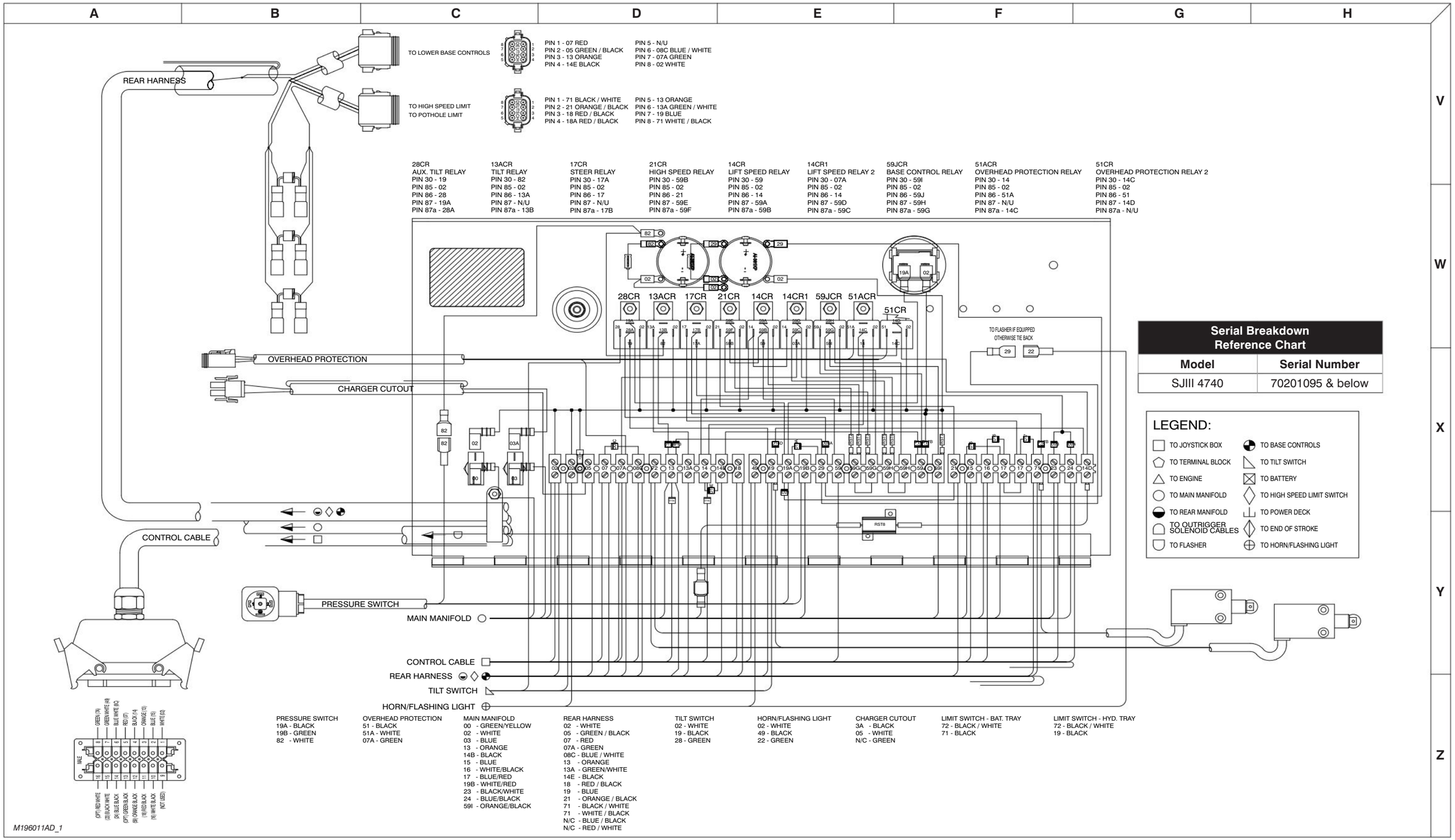
3.27 Electrical Panel (AS)



3.28 Electrical Panel (AS)



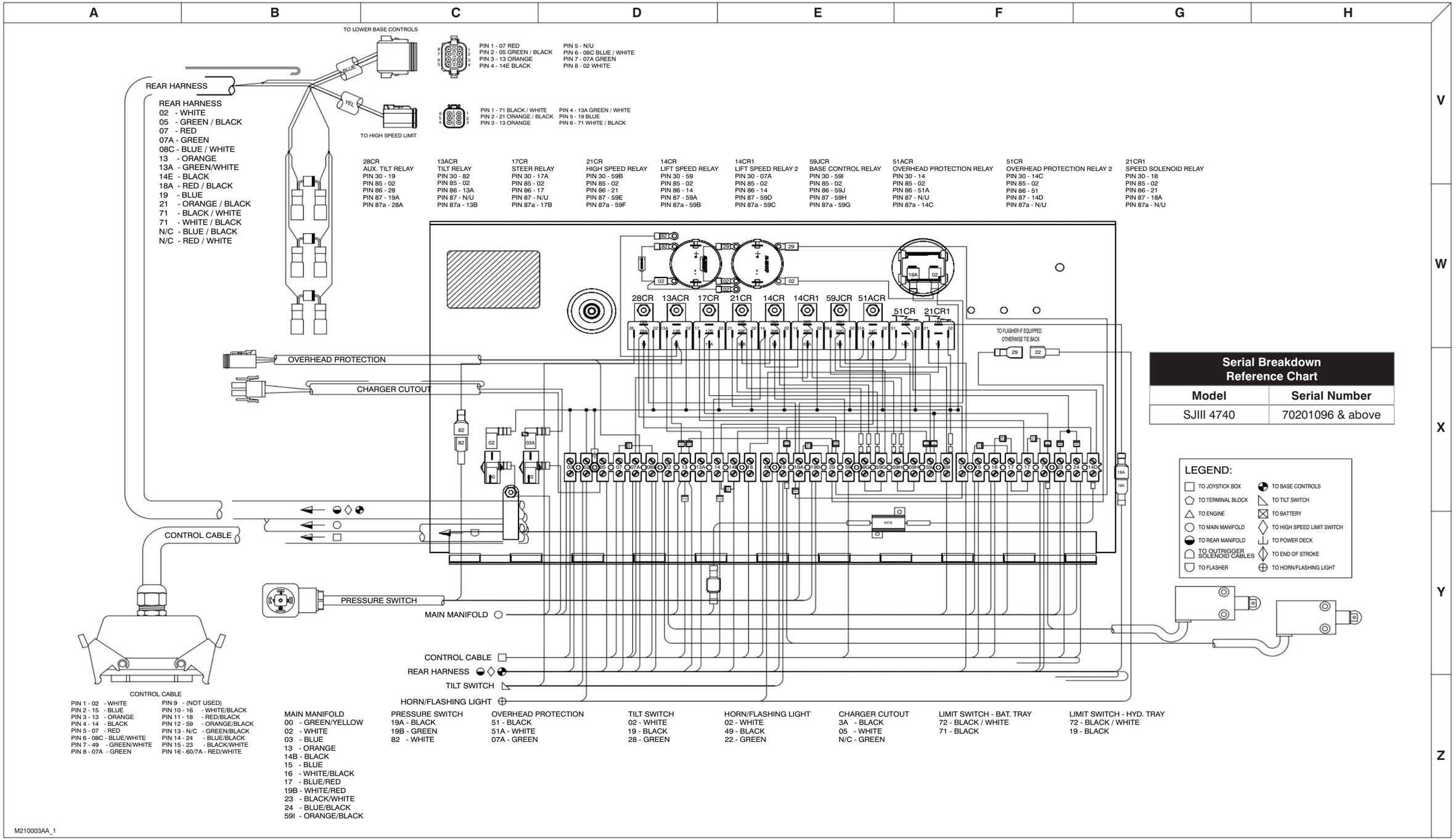
3.29 Electrical Panel (KC)



Serial Breakdown Reference Chart	
Model	**Serial Number**
SJIII 4740	70201095 & below

M196011AD_1

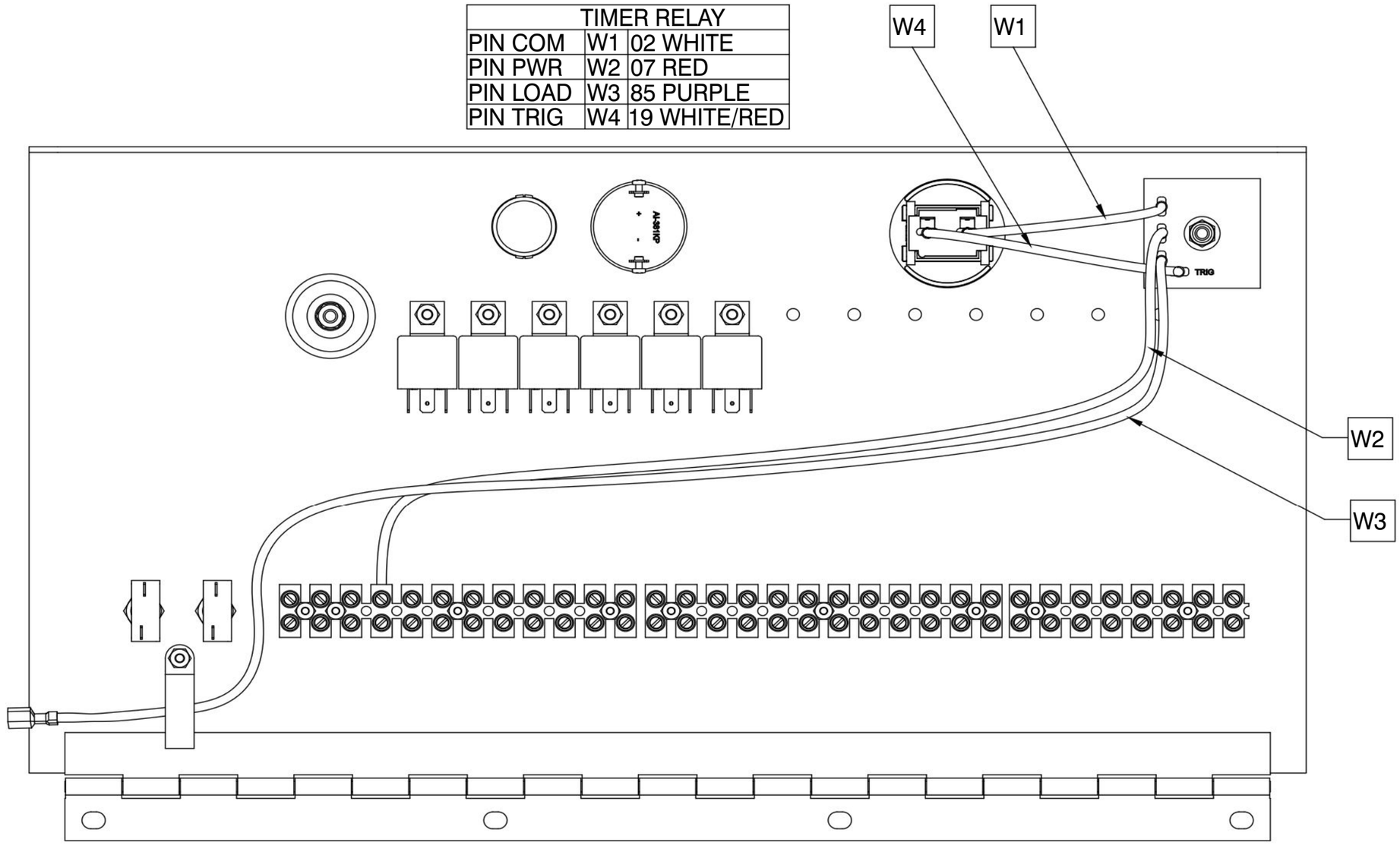
3.30 Electrical Panel (KC)



Serial Breakdown Reference Chart	
Model	**Serial Number**
SJIII 4740	70201096 & above

3.31 Electrical Panel - Inverter Option

TIMER RELAY		
PIN COM	W1	02 WHITE
PIN PWR	W2	07 RED
PIN LOAD	W3	85 PURPLE
PIN TRIG	W4	19 WHITE/RED



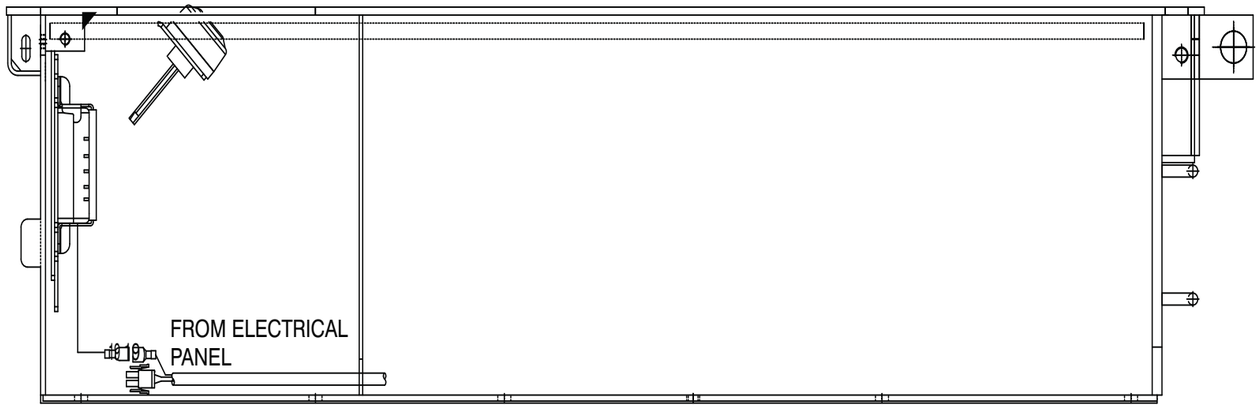
M204673AB_S

3.32 Telematics Wiring - Morey (ANSI/CSA)

A | B | C | D | E | F | G | H

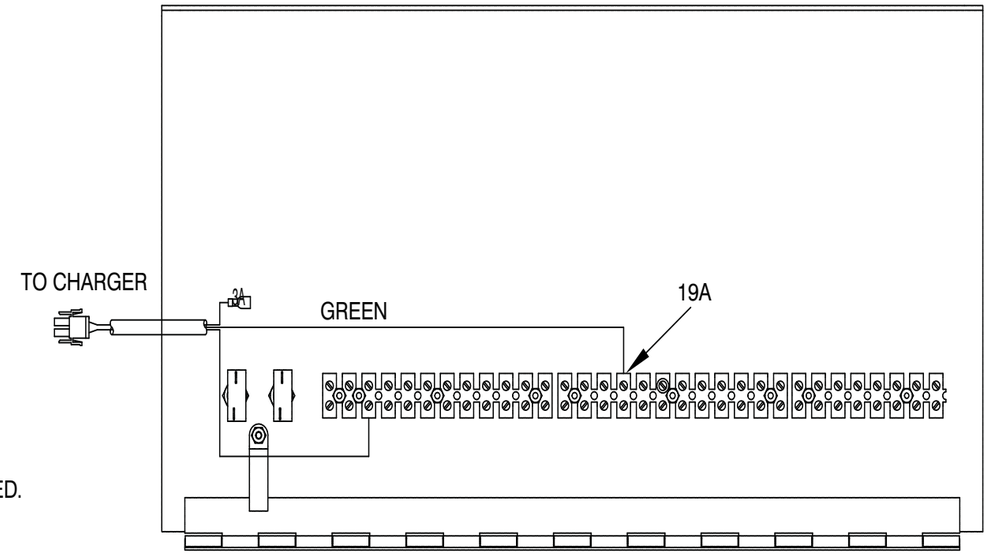
V | W | X | Y | Z

BATTERY TRAY

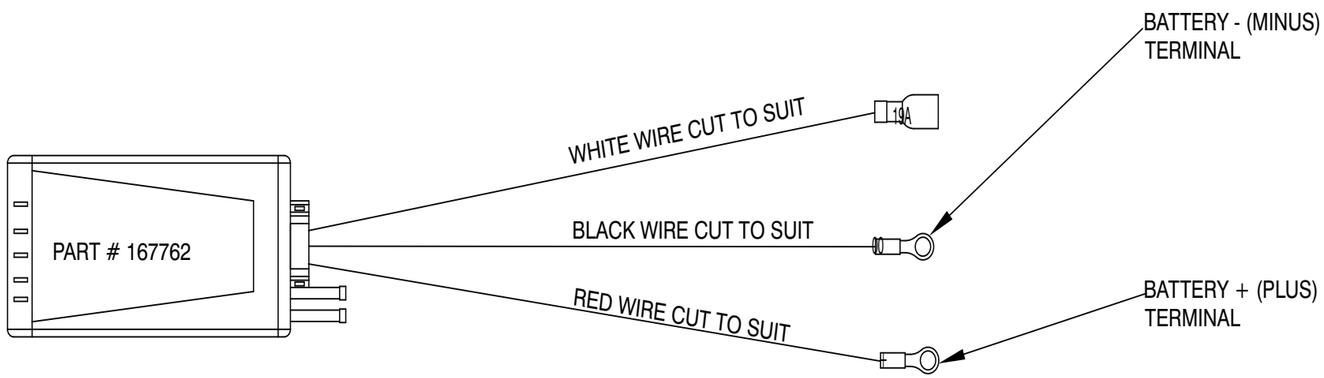


BATTERY TRAY NOTES:
1. ROUTE WIRES ALONG WITH CHARGER WIRE TO THE BATTERY AND CONNECT THEM WHERE THE CHARGER IS CONNECTED.
2. GREEN WIRE IS TIED BACK ON CHARGER HARNESS.
3. UNTIE AND ADD TERMINAL.

CONTROL PANEL

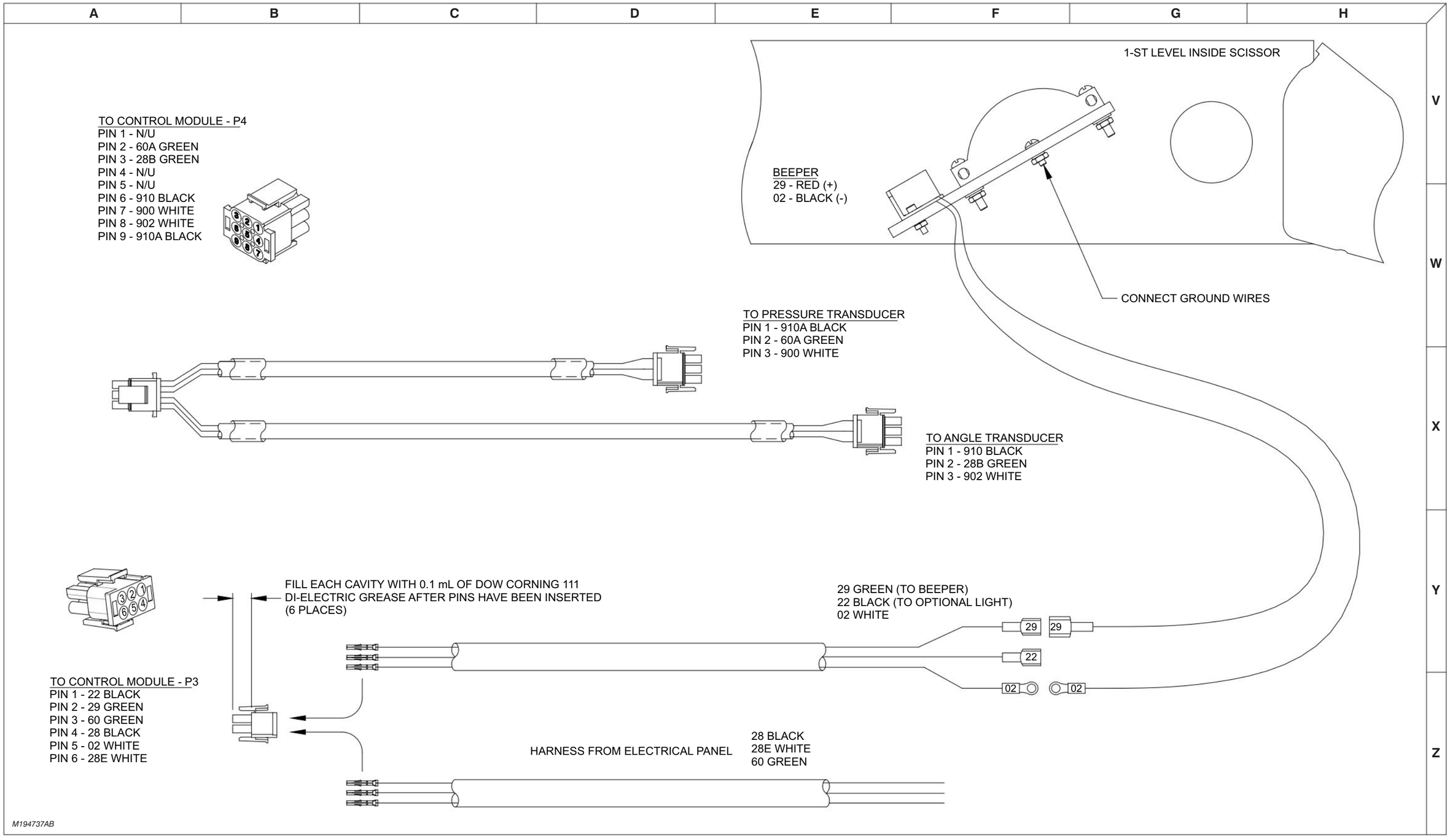


CONTROL PANEL NOTES:
A. GREEN WIRE IS TIED BACK ON CHARGER HARNESS.
B. UNTIE AND CONNECT TO 19A.

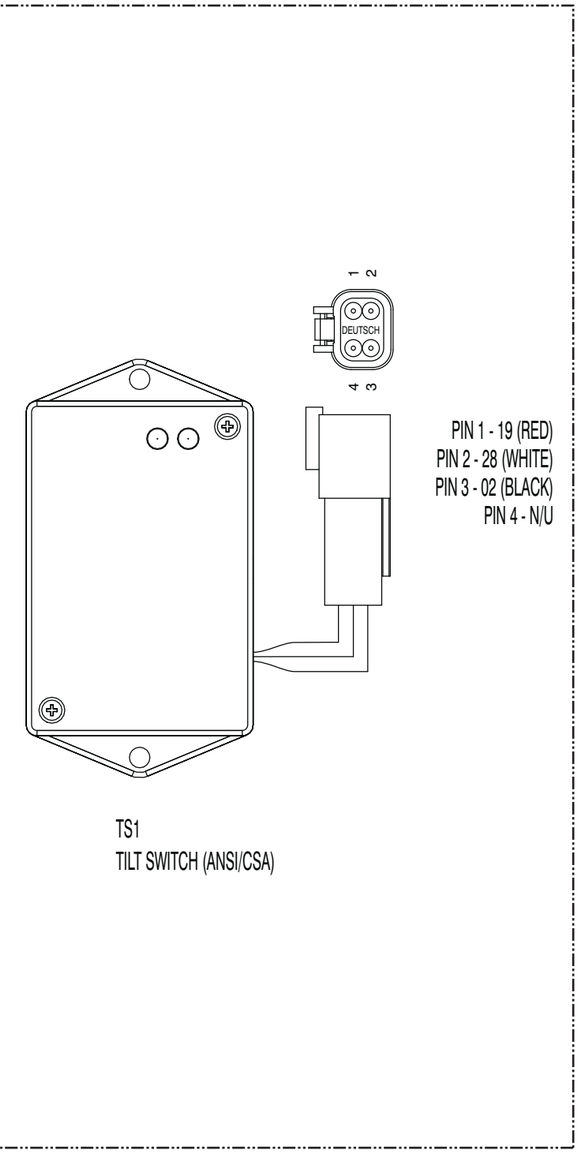


M208641AA

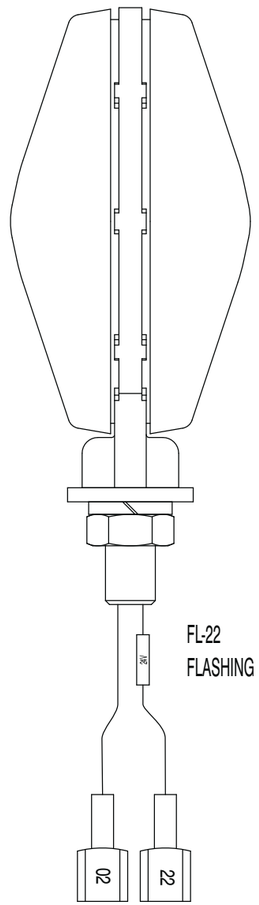
3.33 Load Sensing and Beeper (CE & AS)



3.34 Horn/Tilt Switch/Flashing Light

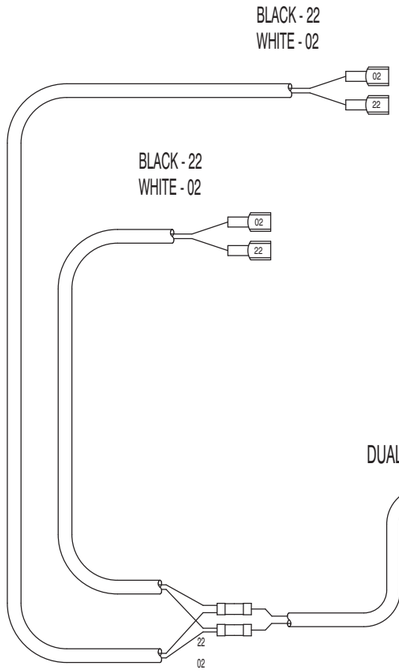


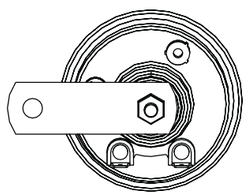
TS1
TILT SWITCH (ANSI/CSA)



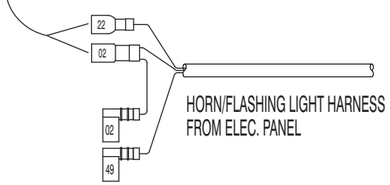
FL-22
FLASHING LIGHT

02 - WHITE
22 - GREEN





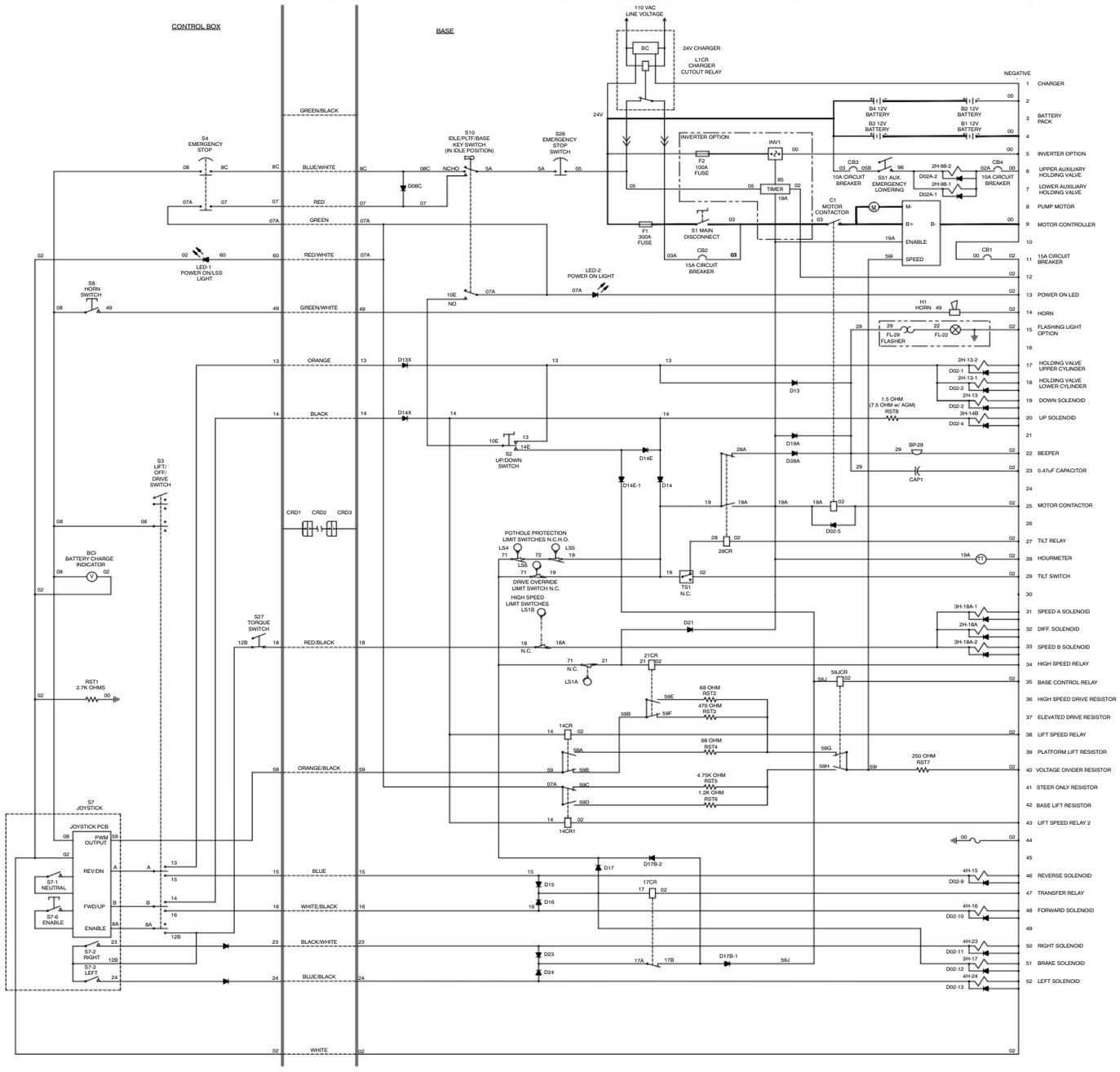
H1
HORN



M146648AA_S4-D1

3.35 Electrical Schematic - ANSI/CSA (All Options)

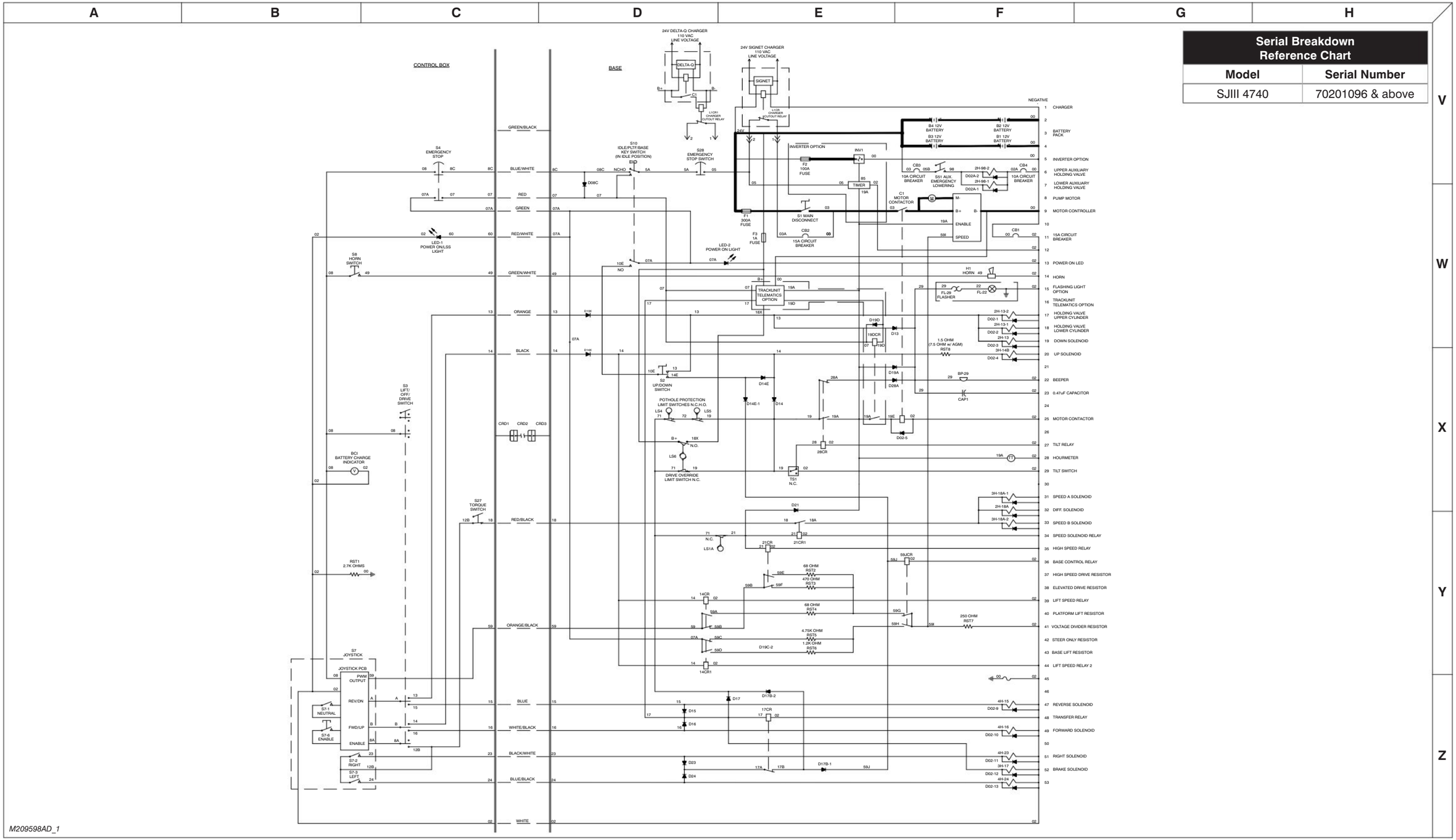
Serial Breakdown Reference Chart	
Model	**Serial Number**
SJIII 4740	70201095 & below



M195324AC_1

3.36 Electrical Schematics - ANSI/CSA (All Options)

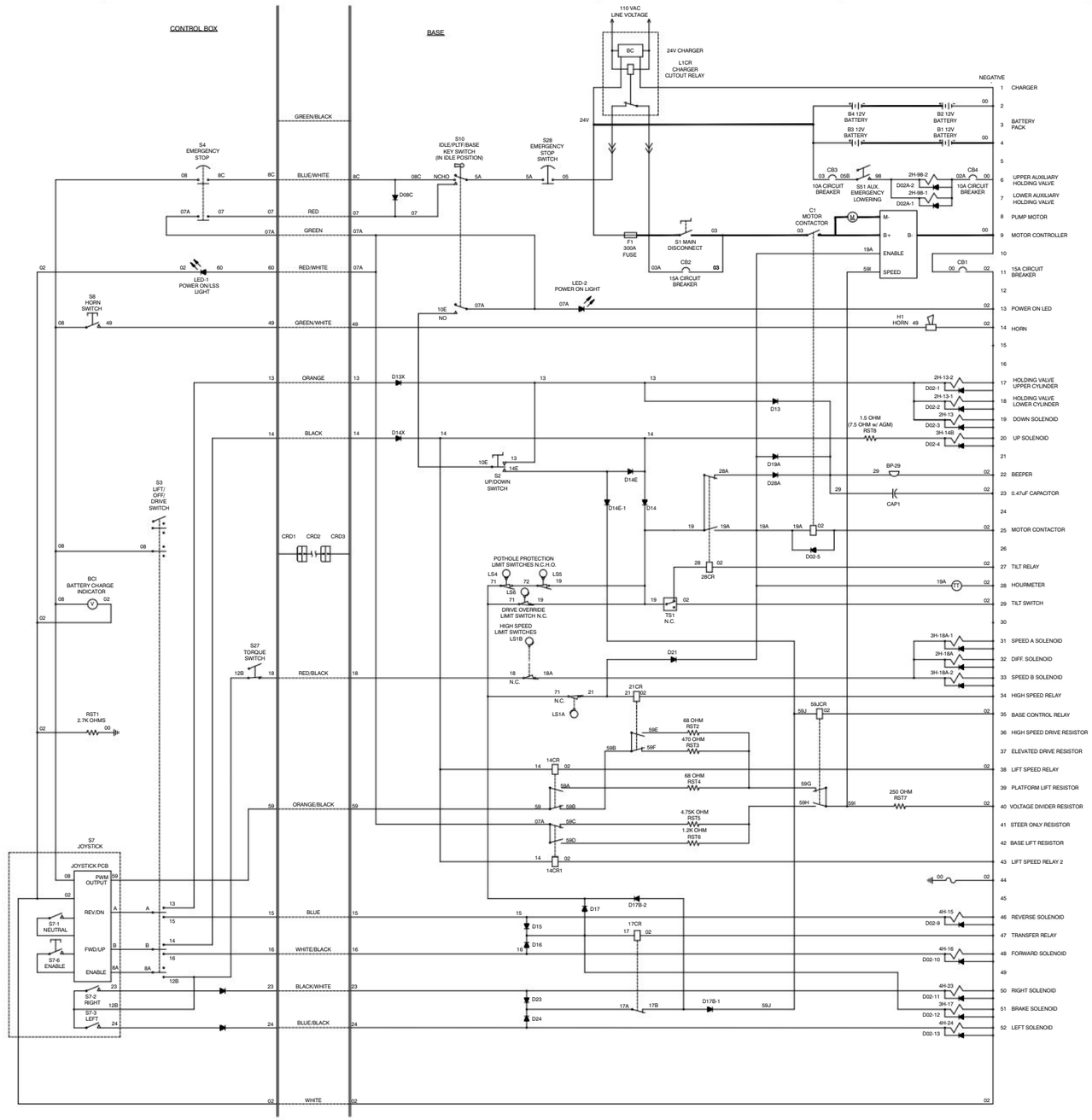
Serial Breakdown Reference Chart	
Model	**Serial Number**
SJIII 4740	70201096 & above



M209598AD_1

3.37 Electrical Schematic - ANSI/CSA (No Options)

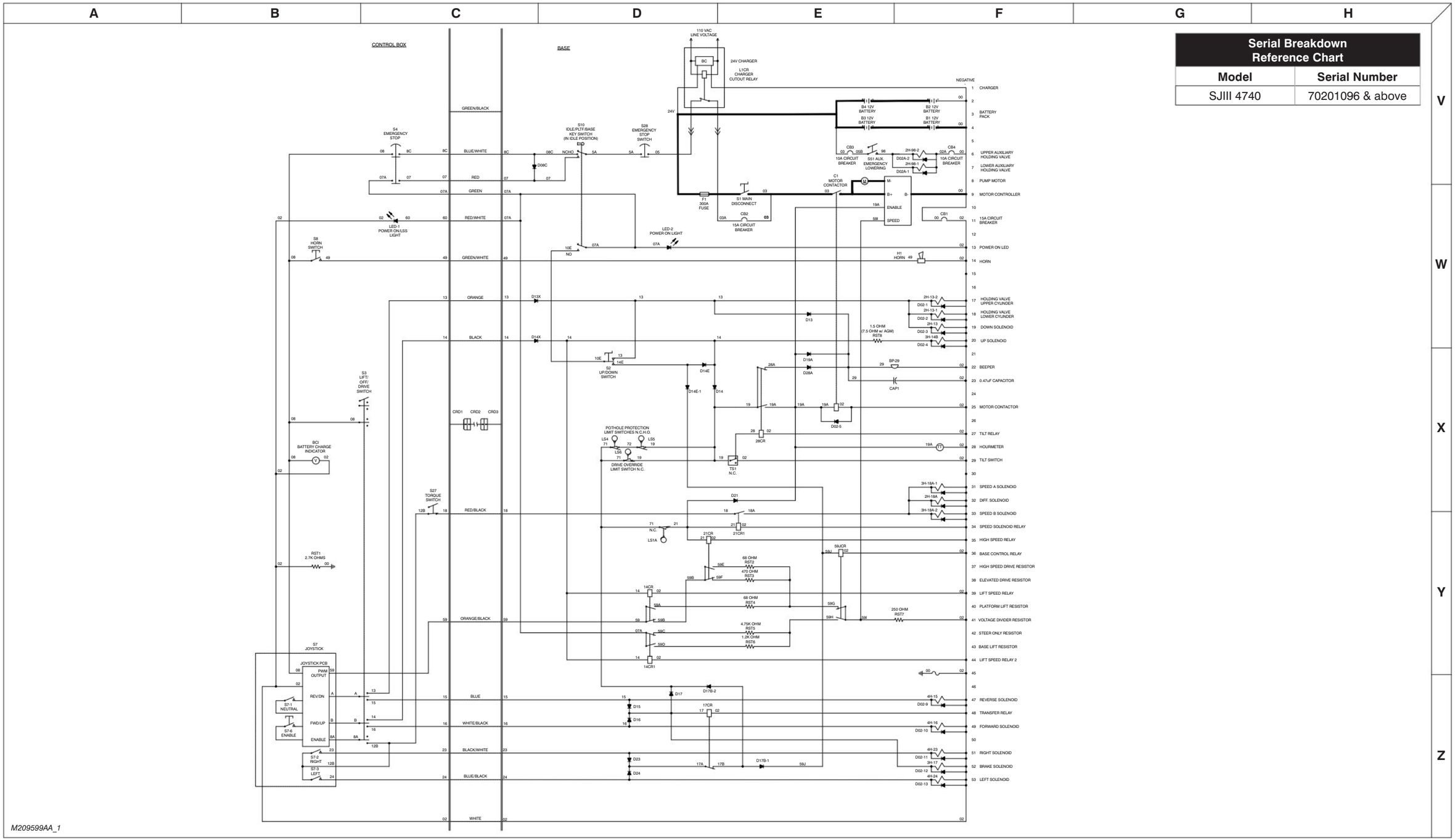
Serial Breakdown Reference Chart	
Model	**Serial Number**
SJIII 4740	70201095 & below



M195220AB_1

3.38 Electrical Schematic - ANSI/CSA (No Options)

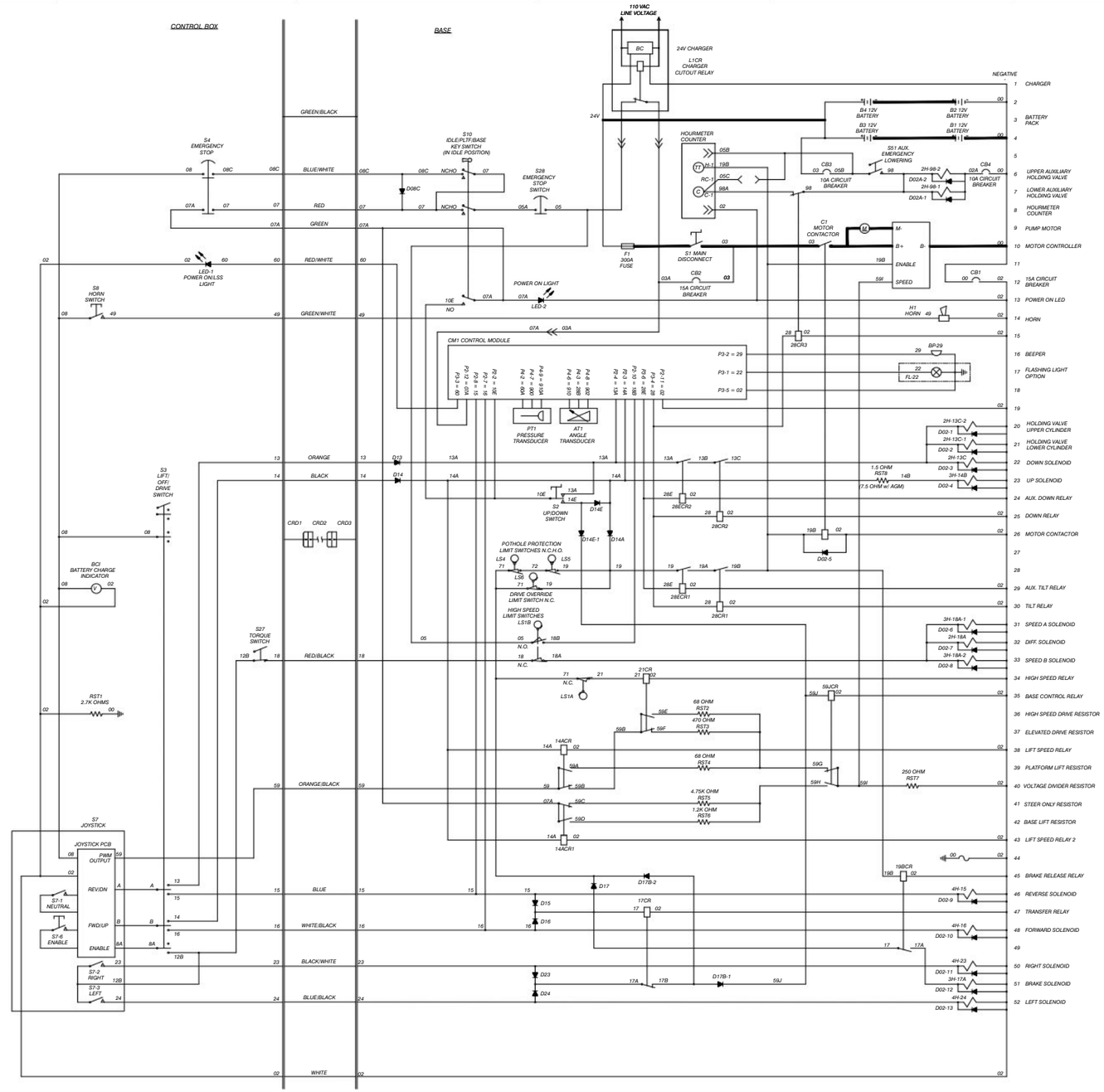
Serial Breakdown Reference Chart	
Model	**Serial Number**
SJIII 4740	70201096 & above



M209599AA_1

3.39 Electrical Schematic (CE - All Options)

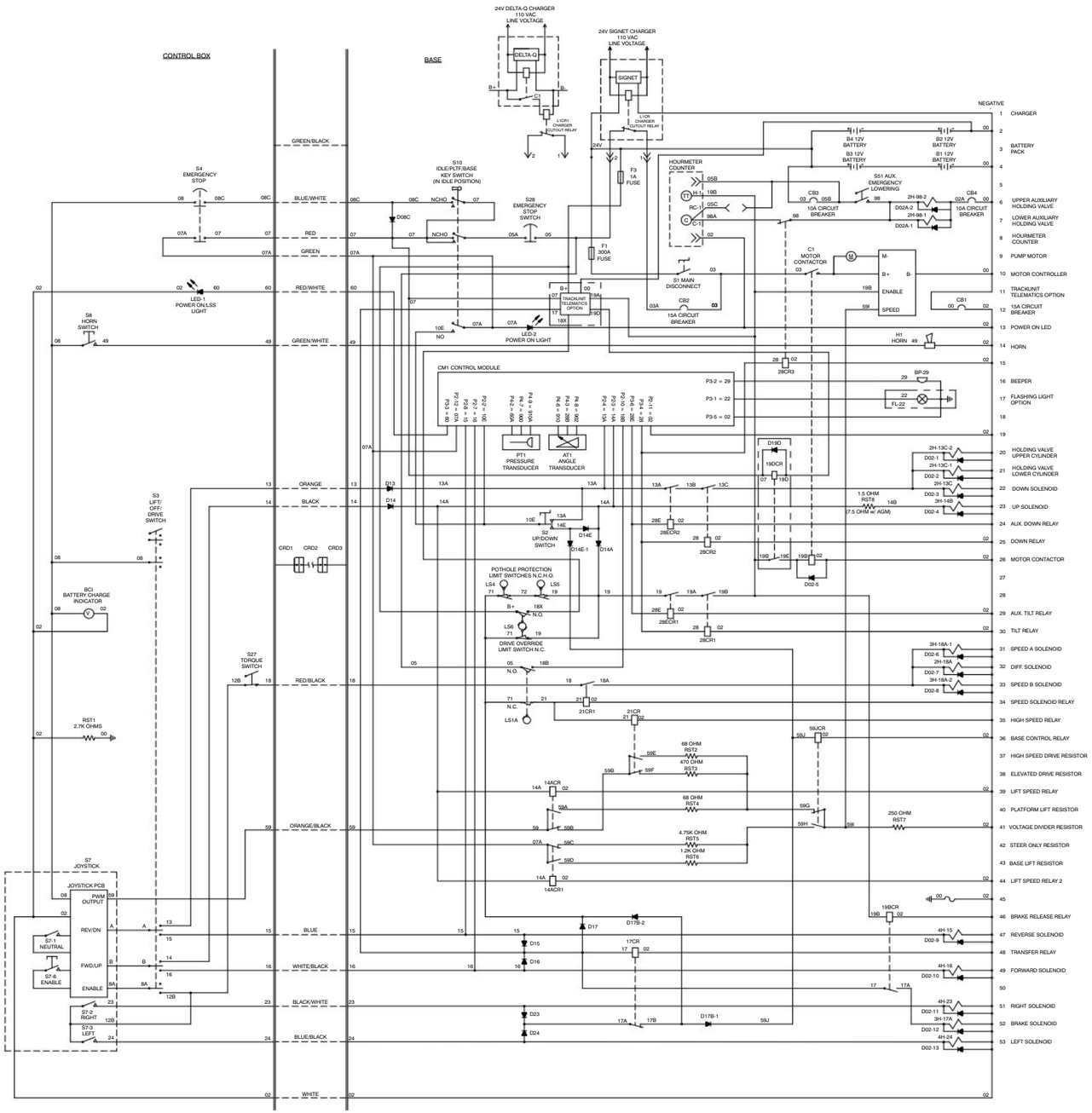
Serial Breakdown Reference Chart	
Model	**Serial Number**
SJIII 4740	70201095 & below



M169698AC

3.40 Electrical Schematic (CE - All Options)

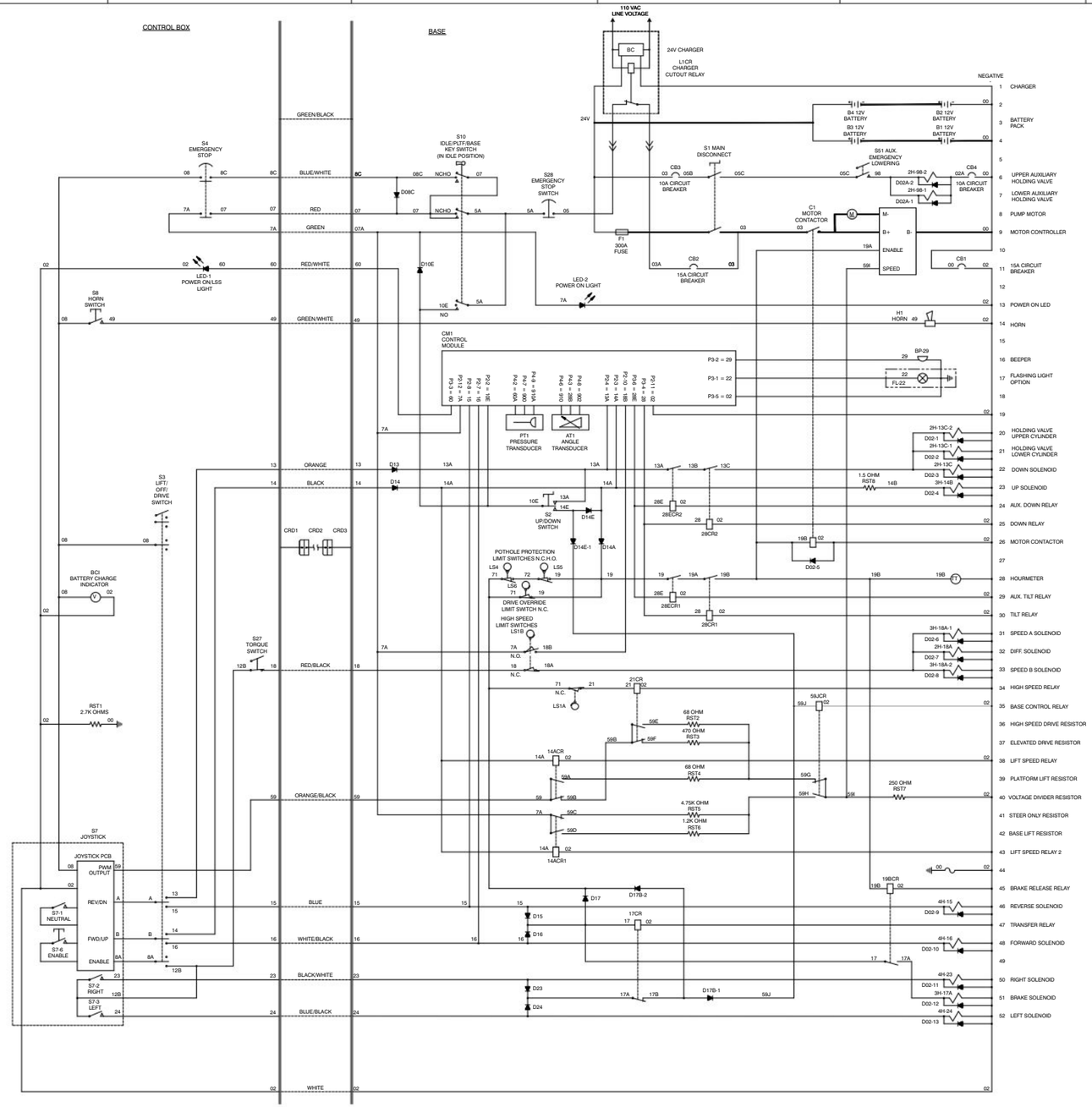
Serial Breakdown Reference Chart	
Model	**Serial Number**
SJIII 4740	70201096 & above



M209601AE

3.41 Electrical Schematic (AS - All Options)

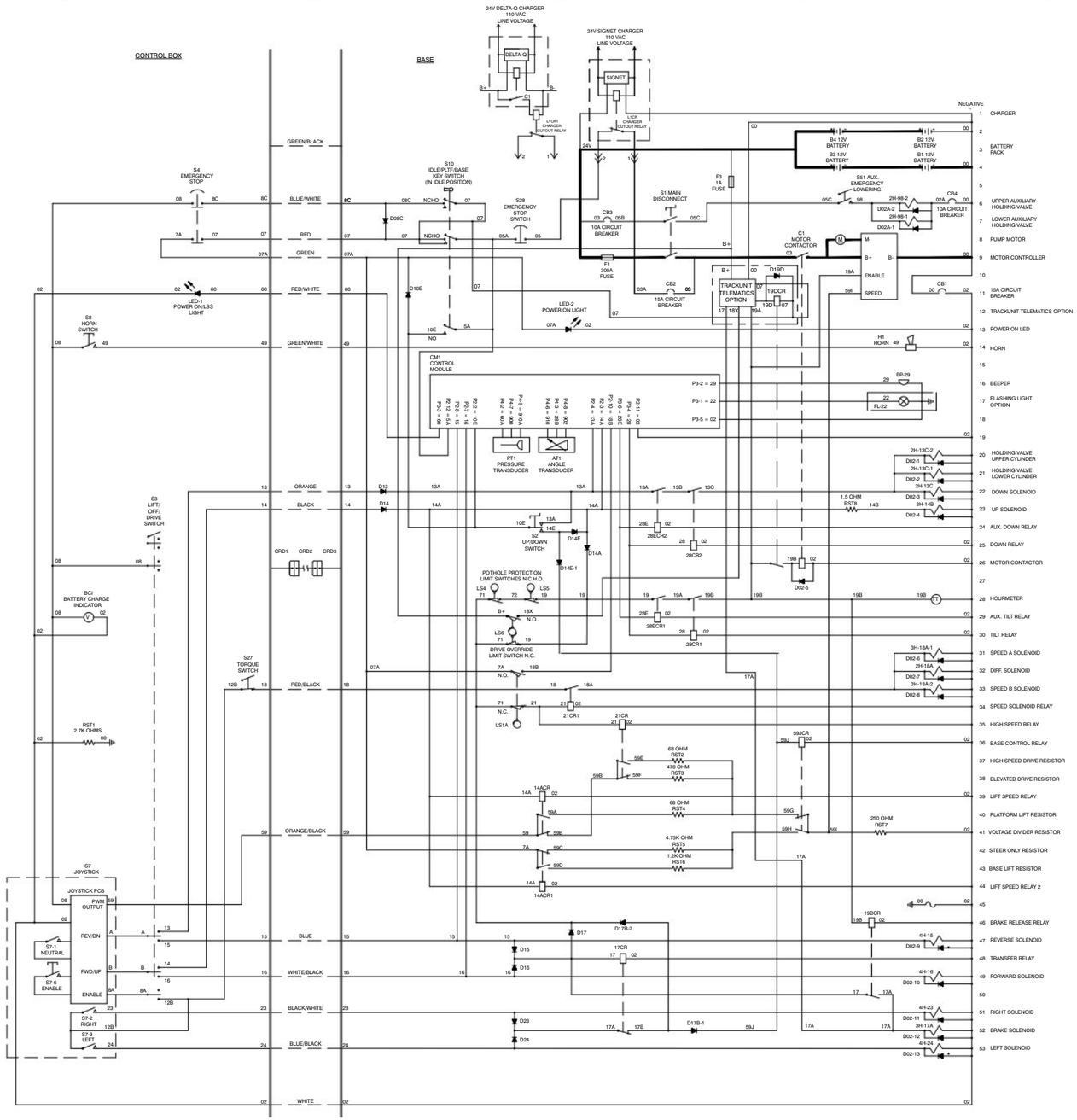
Serial Breakdown Reference Chart	
Model	**Serial Number**
SJIII 4740	70201095 & below



M195325AC

3.42 Electrical Schematic (AS - All Options)

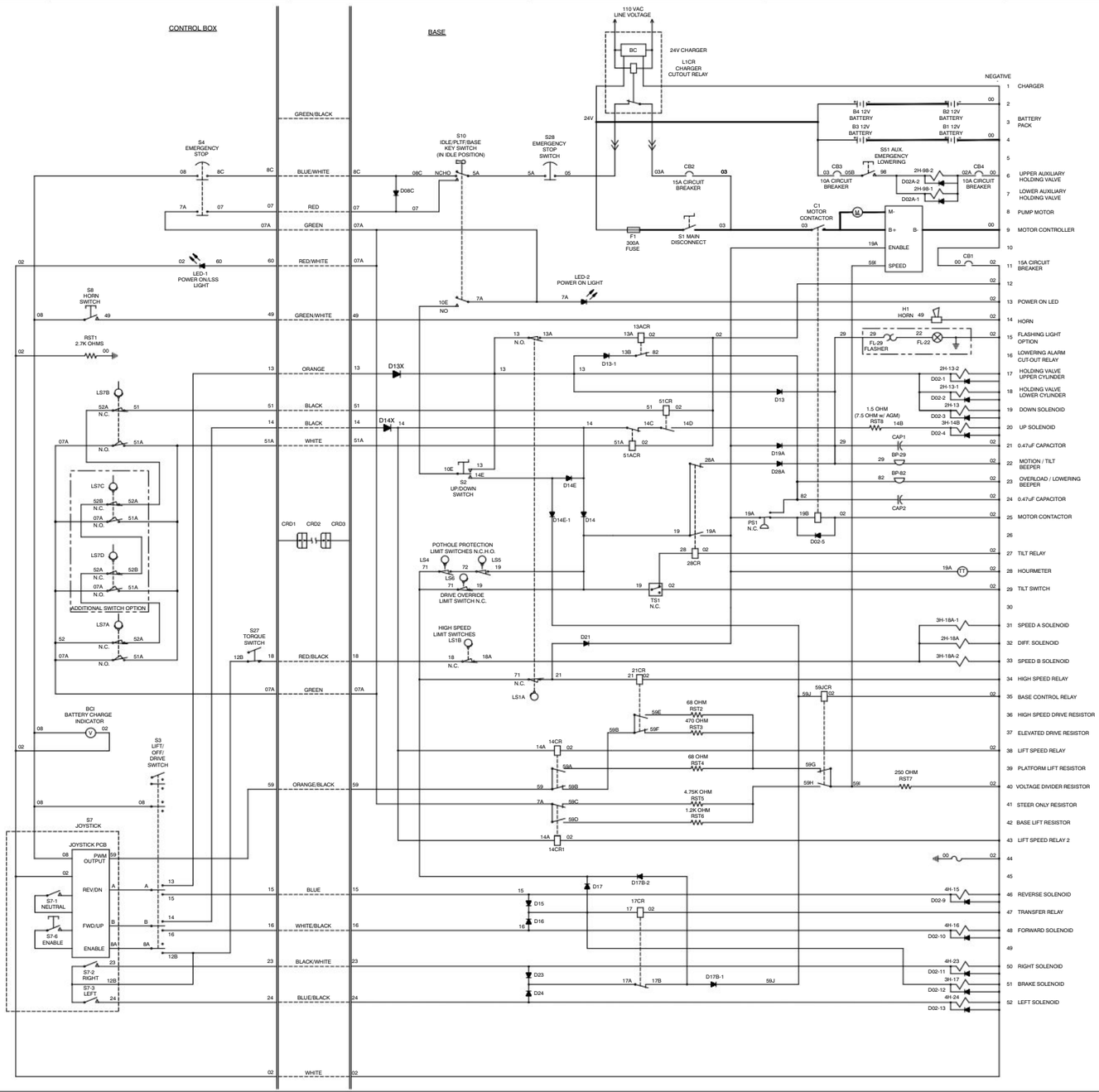
Serial Breakdown Reference Chart	
Model	**Serial Number**
SJIII 4740	70201096 & above



M209602AD

3.43 Electrical Schematic (KC - All Options)

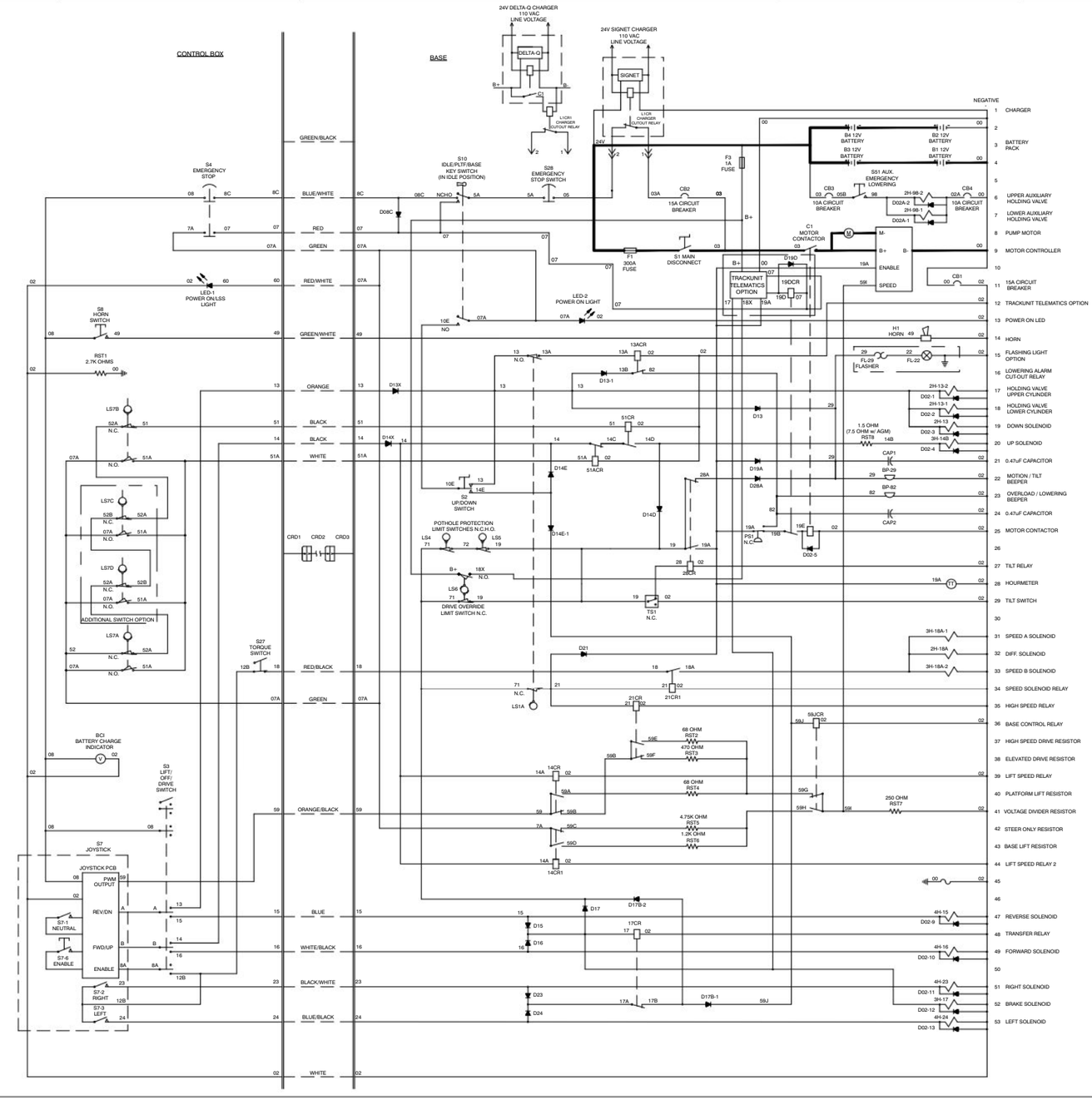
Serial Breakdown Reference Chart	
Model	**Serial Number**
SJIII 4740	70201095 & below



M195331AA_1

3.44 Electrical Schematic (KC - All Options)

Serial Breakdown Reference Chart	
Model	**Serial Number**
SJIII 4740	70201096 & above



M209600AD_1

Notes

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.

1. Probable cause	**Remedy**

4.2 Electrical System - ANSI/CSA & KC

4.2-1 All Controls Inoperative

1. Battery charger plugged into external power source.	**Disconnect charger cord.**
2. Batteries disconnected.	**Connect batteries.**
3. Dirty or loose battery terminals.	**Clean and tighten connections.**
4. Battery charge low.	**Check each cell with a hydrometer. Reading should be 1.275 (fully charged). Recharge if low reading. Replace if reading difference between cells is 0.050.**
5. Main battery cables open or defective.	**Check continuity. Replace if defective.**
6. Fuse F1 defective.	**Replace fuse.**
7. Main battery disconnect switch S1 open or defective.	**Close switch. Check continuity. Replace if defective.**
8. Loose or broken wire #3 from motor contactor C1 to circuit breaker CB2.	**Check continuity. Replace if defective.**
9. Defective or tripped circuit breaker CB2.	**Reset circuit breaker. Replace if defective.**
10. Loose or broken wire #3A from circuit breaker CB2 to charger relay L1CR.	**Check continuity. Replace if defective.**
11. Defective battery charger relay L1CR.	**Check relay. Replace if defective.**
12. Loose or broken wire #5 from charger relay L1CR to base emergency stop switch S28.	**Check continuity. Replace if defective.**
13. Open or defective base emergency stop switch S28.	**Close switch. Check switch. Replace if defective.**
14. Loose or broken wire #5A from base emergency stop switch S28 to base key switch S10.	**Check continuity. Replace if defective.**
15. Open or defective base key switch S10.	**Select function with switch. Check switch. Replace if defective.**
16. Loose or broken wire #07 from base key switch S10 to base terminal block.	**Check continuity. Replace if defective.**
17. Loose or broken wire #07 from base terminal block to platform emergency stop switch S4.	**Check continuity. Replace if defective.**
18. Open or defective platform emergency stop switch S4.	**Close switch. Replace if defective.**
19. Loose or broken wire #7A from platform emergency stop switch S4 to base terminal block.	**Check continuity. Replace if defective.**

20. Loose or broken wire #7A from base terminal block to base key switch S10.	**Check continuity. Replace if defective.**
21. Open or defective base key switch S10.	**Close switch. Replace if defective.**
22. Open diode D8C at base terminal block.	**Check diode. Replace if defective.**
23. Loose or broken wire #00 from motor controller to circuit breaker CB1.	**Check continuity. Replace if defective.**
24. Defective or tripped circuit breaker CB1.	**Reset circuit breaker. Replace if defective.**
25. Loose or broken wire #02 from circuit breaker CB1 to base terminal block.	**Check continuity. Replace if defective.**

4.2-2 All Controls Except for Down Function Inoperative

1. Loose or broken wire #59I from base terminal block to motor controller.	**Check continuity. Replace if defective.**
2. Loose or broken wire #19 or #02 from base terminal block to tilt switch TS1.	**Check continuity. Replace if defective.**
3. Loose or broken wire #28 from tilt switch to tilt relay 28CR.	**Check continuity. Replace if defective.**
4. Defective tilt relay 28CR.	**Check relay. Replace if defective.**
5. Loose or broken wire #19A from tilt relay 28CR to base terminal block.	**Check continuity. Replace if defective.**
6. Loose or broken wire #19A from base terminal block to motor controller.	**Check continuity. Replace if defective.**
7. Defective resistor RST7. (With joystick fully stroked)	**Check resistor and make sure it is secure. Replace if defective.**
8. Loose or broken B- cable from batteries to B- lug on motor controller.	**Check continuity. Replace if defective.**
9. Loose or broken #3 cable from main battery disconnect switch S1 to motor contactor C1.	**Check continuity. Replace if defective.**
10. Loose or broken B+ cable from motor contactor C1 to motor DCM1.	**Check continuity. Replace if defective.**
11. Loose or broken B+ cable from motor DCM1 to B+ lug on motor controller.	**Check continuity. Replace if defective.**
12. Loose or broken M- cable from motor DCM1 to M- lug on motor controller.	**Check continuity. Replace if defective.**
13. Defective motor controller.	**Check motor controller input and output voltage. Replace if defective.**
14. Defective motor DCM1.	**Check motor for operation with 24 volt supply. Replace if defective.**

4.2-3 All Controls Inoperative From Base Control Console

1. Loose or broken wire #10E from base key switch S10 to base up/down switch S2.	**Check continuity. Replace if defective.**

4.2-4 No Up Function from Base Control Console

1. Defective up/down switch S2.	**Check continuity. Replace if defective.**
2. Loose or broken wire #14E from up/down switch S2 to base terminal block.	**Check continuity. Replace if defective.**
3. Open or defective diode D14E.	**Check diode. Replace if defective.**
4. Open or defective diode D14E-1.	**Check diode. Replace if defective.**
5. Open diode D14.	**Check diode. Replace if defective.**
6. Loose or broken wire #14 from base terminal block to relay 14CR.	**Check continuity. Replace if defective.**
7. Loose or broken wire #14 from relay 14CR to relay 14CR1.	**Check continuity. Replace if defective.**
8. Loose or broken wire #14 from base terminal block to resistor RST8.	**Check continuity. Replace if defective.**
9. Defective low voltage protection resistor RST8.	**Check resistor and make sure it is secure. Replace if defective.**
10. Loose or broken wire #14B from resistor RST8 to up valve coil 3H-14B.	**Check continuity. Replace if defective**
11. Loose or broken wire #02 from base terminal block to up valve coil 3H-14B.	**Check continuity. Replace if defective.**
12. Defective up valve coil 3H-14B.	**Check continuity through coil. Replace if defective.**
13. Machine not level. (Above high speed limit switch)	**Use on level surface.**
14. Loose or broken wire #59J from base terminal block to base control relay 59JCR.	**Check continuity. Replace if defective.**
15. Loose or broken wire #02 from base terminal block to base control relay 59JCR.	**Check continuity. Replace if defective.**
16. Defective base control relay 59JCR.	**Check relay. Replace if defective.**
17. Loose or broken wire #7A from base terminal block to lift speed relay 14CR1.	**Check continuity. Replace if defective.**
18. Loose or broken wire #59D from lift speed relay 14CR1 to base terminal block.	**Check continuity. Replace if defective.**
19. Defective base lift resistor RST6.	**Check resistor and make sure it is secure. Replace if defective.**

20. Loose or broken jumper wire #59H at base terminal block.	**Check continuity. Replace if defective.**
21. Loose or broken wire #59H from base terminal block to base control relay 59JCR.	**Check continuity. Replace if defective.**
22. Loose or broken wire #07A from base terminal block to overhead protection limit switch LS7A. **(KC Only)**	**Check continuity. Replace if defective.**
23. Loose or broken wire #52A or #52B from overhead protection limit switch LS7A through overhead protection limit switches LS7D, LS7C or LS7B. (LS7D and LS7C are optional) **(KC Only)**	**Check continuity. Replace if defective.**
24. Loose or broken wire #51 from overhead protection limit switch LS7B to overhead protection relay 51CR. **(KC Only)**	**Check continuity. Replace if defective.**
25. Loose or broken wire #14C from relay 51ACR to relay 51CR. **(KC Only)**	**Check continuity. Replace if defective.**
26. Loose or broken wire #14D from relay 51CR to base terminal block. **(KC Only)**	**Check continuity. Replace if defective.**
27. Defective overhead protection relay 51CR or relay 51ACR. **(KC Only)**	**Check relay. Replace if defective.**
28. Open diode D14D. **(KC Only)**	**Check diode. Replace if defective.**
29. Open or defective overhead protection limit switch LS7A, LS7D, LS7C or LS7B. (LS7D and LS7C are optional) **(KC Only)**	**Check limit switch. Replace if defective.**

4.2-5 Up Function Slow from Base Control Console

1. Loose or broken wire #14 from base terminal block to lift speed relay 14CR1.	**Check continuity. Replace if defective.**
2. Loose or broken wire #02 from base terminal block to lift speed relay 14CR1	**Check continuity. Replace if defective.**
3. Defective lift speed relay 14CR1.	**Check relay. Replace if defective.**

4.2-6 No Down Function from Base Control Console

NOTE

Down function is not proportionally controlled.

1. Defective up/down switch S2.	**Check switch. Replace if defective.**
2. Loose or broken wire #13 from up/down switch S2 to base terminal block.	**Check continuity. Replace if defective.**

3. Loose or broken wire # 13 from base terminal block to down valve 2H-13 or holding valve 2H-13-1 and 2H-13-2.	**Check continuity. Replace if defective.**
4. Defective down valve coil 2H-13.	**Check continuity through coil. Replace if defective.**
5. Defective lift cylinder holding valve coil 2H-13-1 or 2H-13-2.	**Check continuity through coil. Replace if defective.**
6. Loose or broken wire #02 from holding valve coil 2H-13-1 or 2H-13-2 or down valve coil 2H-13 to base terminal block.	**Check continuity. Replace if defective.**

4.2-7 All Controls Inoperative From Platform Control Console

1. Loose or broken wire #8C from base key switch S10 to base terminal block.	**Check continuity. Replace if defective.**
2. Open diode D8C at base terminal block.	**Check diode. Replace if defective.**
3. Loose or broken wire #8C or wire #02 from base terminal block to platform emergency stop switch S4.	**Check continuity. Replace if defective.**
4. Open or defective platform emergency stop switch S4.	**Close switch. Replace if defective.**
5. Loose or broken wire #8 or wire #02 from emergency stop switch S4 to battery charge indicator BCI.	**Check continuity. Replace if defective.**
6. Loose or broken wire #8 or wire #02 from battery charge indicator BC1 to joystick S7.	**Check continuity. Replace if defective.**
7. Defective joystick enable switch S7-6.	**Check switch. Replace if defective.**
8. Defective joystick neutral switch S7-1.	**Check switch. Replace if defective.**
9. Defective joystick S7.	**Check joystick. Replace if defective.**

4.2-8 No Up Function from Platform Controls

1. Loose or broken wire “B” from proportional controller S7 to lift/drive switch S3.	**Check continuity. Replace if defective.**
2. Lift/Drive switch S3 defective.	**Check switch. Replace if defective.**
3. Defective PWM card on joystick S7.	**Check joystick card. Replace if defective.**
4. Loose or broken wire #14 from lift/drive switch S3 to base terminal block.	**Check continuity. Replace if defective.**
5. Open or defective diode D14.	**Check diode. Replace if defective.**
6. Loose or broken wire #14 or #02 from base terminal block to relay 14CR.	**Check continuity. Replace if defective.**

7. Loose or broken wire #59 from proportional controller S7 to base terminal block.	**Check continuity. Replace if defective.**
8. Loose or broken wire #59 from base terminal block to relay 14CR.	**Check continuity. Replace if defective.**
9. Defective lift speed relay 14CR.	**Check relay. Replace if defective.**
10. Defective low voltage protection resistor RST8.	**Check resistor and make sure it is secure. Replace if defective.**
11. Loose or broken wire #14B or #02 from base terminal block to up valve coil 3H-14B.	**Check continuity. Replace if defective.**
12. Defective up valve coil 3H-14B.	**Check continuity through coil. Replace if defective.**
13. Machine not level. (Above high speed limit switch)	**Use on level surface.**
14. Loose or broken wire #59A from lift speed relay 14CR to base terminal block.	**Check continuity. Replace if defective.**
15. Defective base lift resistor RST4.	**Check resistor and make sure it is secure. Replace if defective.**
16. Loose or broken wire #59G from base terminal block to base control relay 59JCR.	**Check continuity. Replace if defective.**
17. Defective base control relay 59JCR.	**Check relay. Replace if defective.**
18. Loose or broken wire #07A from base terminal block to overhead protection limit switch LS7A. **(KC Only)**	**Check continuity. Replace if defective.**
19. Loose or broken wire #52A or #52B from overhead protection limit switch LS7A through overhead protection limit switches LS7D, LS7C or LS7B. (LS7D and LS7C are optional) **(KC Only)**	**Check continuity. Replace if defective.**
20. Loose or broken wire #51 from overhead protection limit switch LS7B to overhead protection relay 51CR. **(KC Only)**	**Check continuity. Replace if defective.**
21. Loose or broken wire #14C from relay 51ACR to relay 51CR. **(KC Only)**	**Check continuity. Replace if defective.**
22. Loose or broken wire #14D from relay 51CR to base terminal block. **(KC Only)**	**Check continuity. Replace if defective.**
23. Defective overhead protection relay 51CR or relay 51ACR. **(KC Only)**	**Check relay. Replace if defective.**
24. Open diode D14D. **(KC Only)**	**Check diode. Replace if defective.**
25. Open or defective overhead protection limit switch LS7A, LS7D, LS7C or LS7B. (LS7D and LS7C are optional) **(KC Only)**	**Check limit switch. Replace if defective.**

4.2-9 Up Function Slow from Platform Control Console

1. Loose or broken wire #14 from base terminal block to lift speed relay 14CR.	**Check continuity. Replace if defective.**
2. Loose or broken wire #02 from base terminal block to lift speed relay 14CR.	**Check continuity. Replace if defective.**
3. Defective lift speed relay 14CR.	**Check relay. Replace if defective.**

4.2-10 No Down Function from Platform Controls

1. Loose or broken wire “A” from proportional controller S7 to lift/drive switch S3.	**Check continuity. Replace if defective.**
2. Lift/Drive switch S3 defective.	**Check switch. Replace if defective.**
3. Loose or broken wire #13 from lift/drive switch S3 to base terminal block.	**Check continuity. Replace if defective.**
4. Loose or broken wire # 13 from base terminal block to down valve 2H-13 or holding valve 2H-13-1 and 2H-13-2.	**Check continuity. Replace if defective.**
5. Defective down valve coil 2H-13.	**Check continuity through coil. Replace if defective.**
6. Defective lift cylinder holding valve coil 2H-13-1 or 2H-13-2.	**Check continuity through coil. Replace if defective.**
7. Loose or broken wire #02 from holding valve coil 2H-13-1 or 2H-13-2 or down valve coil 2H-13 to base terminal block.	**Check continuity. Replace if defective.**

4.2-11 No Emergency Down Function

1. Loose or broken wire #3 from batteries to circuit breaker CB3.	**Check continuity. Replace if defective.**
2. Defective circuit breaker CB3.	**Check continuity through circuit breaker. Replace if defective.**
3. Loose or broken wire #5B from circuit breaker CB3 to emergency down switch S51.	**Check continuity. Replace if defective.**
4. Defective emergency down switch S51.	**Check switch. Replace if defective.**
5. Loose or broken wire # 98 from emergency down switch S51 to aux. holding valve 2H-98-1 and 2H-98-2.	**Check continuity. Replace if defective.**
6. Defective lift cylinder aux. holding valve coil 2H-98-1 or 2H-98-2.	**Check continuity through coil. Replace if defective.**
7. Loose or broken wire #02A from aux. holding valve coil 2H-98-1 or 2H-98-2 to circuit breaker CB4.	**Check continuity. Replace if defective.**

8. Defective circuit breaker CB4.	**Check continuity through circuit breaker. Replace if defective.**
9. Loose or broken wire #00 from circuit breaker CB4 to batteries.	**Check continuity. Replace if defective.**

4.2-12 Steer Only Inoperative

1. Loose or broken wire #8A from proportional controller S7 to lift/off/drive switch S3.	**Check continuity. Replace if defective.**
2. Lift/Off/Drive switch S3 defective.	**Check switch. Replace if defective.**
3. Loose or broken wire #12B from steer switches S7-2 and S7-3 to lift/off/drive switch S3.	**Check continuity. Replace if defective.**
4. Loose or broken wire #17A from base terminal block to relay 17CR.	**Check continuity. Replace if defective.**
5. Defective relay 17CR.	**Check relay. Replace if defective.**
6. Loose or broken wire #17B from relay 17CR to base terminal block.	**Check continuity. Replace if defective.**
7. Open diode D17B-1.	**Check diode. Replace if defective.**
8. Open diode D17B-2.	**Check diode. Replace if defective.**
9. Defective lift speed relay 14CR1.	**Check relay. Replace if defective.**
10. Loose or broken wire #59C from 14CR1 lift speed relay to base terminal block.	**Check continuity. Replace if defective.**
11. Defective steer only resistor RST5.	**Check resistor and make sure it is secure. Replace if defective.**

4.2-13 Right Steer Inoperative

1. Defective right steer switch S7-2.	**Check switch. Replace if defective.**
2. Loose or broken wire #23 from right steer switch S7-2 to base terminal block.	**Check continuity. Replace if defective.**
3. Loose or broken wire #23 from base terminal block to steer right valve coil 4H-23.	**Check continuity. Replace if defective.**
4. Defective steer right valve coil 4H-23.	**Check continuity through coil. Replace if defective.**
5. Loose or broken wire #02 from steer right valve coil 4H-23 to base terminal block.	**Check continuity. Replace if defective.**
6. Open diode D23.	**Check diode. Replace if defective.**

4.2-14 Left Steer Inoperative

1. Defective left steer switch S7-3.	**Check switch. Replace if defective.**

2. Loose or broken wire #24 from left steer switch S7-3 to base terminal block.	**Check continuity. Replace if defective.**
3. Loose or broken wire #24 from base terminal block to steer left valve coil 4H-24.	**Check continuity. Replace if defective.**
4. Defective steer left valve coil 4H-24.	**Check continuity through coil. Replace if defective.**
5. Loose or broken wire #02 from steer left valve coil 4H-24 to base terminal block.	**Check continuity. Replace if defective.**
6. Open diode D24.	**Check diode. Replace if defective.**

4.2-15 Drive Only Inoperative

1. Open or defective diode D17.	**Check diode. Replace if defective.**
2. Loose or broken wire #59B from lift speed relay 14CR to base terminal block.	**Check continuity. Replace if defective.**
3. Defective relay 14CR.	**Check relay. Replace if defective.**
4. Loose or broken wire #59B from base terminal block to high speed relay 21CR.	**Check continuity. Replace if defective.**

4.2-16 No Drive or Steer when Platform Fully Lowered

1. Loose or broken wire #71 from base terminal block to drive override limit switch LS6.	**Check continuity. Replace if defective.**
2. Defective drive override switch LS6.	**Check switch. Replace if defective.**
3. Loose or broken wire #19 from drive override limit switch LS6 to base terminal block.	**Check continuity. Replace if defective.**

4.2-17 No Drive or Steer when Platform Elevated

1. Pothole protection bars not fully lowered.	**Clear obstructions. Repair as needed.**
2. Loose or broken wire #71 from base terminal block to pothole protection limit switch LS4.	**Check continuity. Replace if defective.**
3. Defective pothole protection limit switch LS4.	**Check switch. Replace if defective.**
4. Loose or broken wire #72 from pothole protection limit switch LS4 to base terminal block.	**Check continuity. Replace if defective.**
5. Loose or broken wire #72 from base terminal block to pothole protection limit switch LS5.	**Check continuity. Replace if defective.**
6. Defective pothole protection limit switch LS5.	**Check switch. Replace if defective.**
7. Loose or broken wire #19 from pothole protection limit switch LS5 to base terminal block.	**Check continuity. Replace if defective.**

4.2-18 Platform Drives in Slow Speed Only

1. Loose or broken wire #71 from base terminal block to high speed limit switch LS1A.	**Check continuity. Replace if defective.**
2. Open or defective high speed limit switch LS1A.	**Check switch. Replace if defective.**
3. Loose or broken wire #21 from high speed limit switch LS1A to base terminal block.	**Check continuity. Replace if defective.**
4. Loose or broken wire #59E from high speed relay 21CR to base terminal block.	**Check continuity. Replace if defective.**
5. High speed relay 21CR defective.	**Check relay, replace if defective.**
6. Defective high speed resistor RST2.	**Check resistor and make sure it is secure. Replace if defective.**

4.2-19 High/Low Torque Inoperative

1. Loose or broken wire #12B from joystick card to torque switch S27.	**Check continuity. Replace if defective.**
2. Defective torque switch S27.	**Check switch. Replace if defective.**
3. Loose or broken wire #18 from torque switch S27 to base terminal block.	**Check continuity. Replace if defective.**
4. Loose or broken wire #18 from base terminal block to high speed limit switch LS1B.	**Check continuity. Replace if defective.**
5. Defective high speed limit switch LS1B.	**Check switch. Replace if defective.**
6. Loose or broken wire #18A from high speed limit switch LS1B to rear drive manifold.	**Check continuity. Replace if defective.**
7. Defective speed valve coil 3H-18A-1 or 3H-18A-2.	**Check continuity through coil. Replace if defective.**
8. Loose or broken wire #02 from rear drive manifold to base terminal block.	**Check continuity. Replace if defective.**

4.2-20 Brake will not Release

1. Diode D16 forward or D15 reverse is shorted or open.	**Check diode. Replace if defective.**
2. Loose or broken wire #17 from base terminal block to brake valve coil 3H-17.	**Check continuity. Replace if defective.**
3. Brake valve coil 3H-17 defective.	**Check continuity through coil. Replace if defective.**
4. Loose or broken wire #02 from brake valve coil 3H-17 to base terminal block.	**Check continuity. Replace if defective.**

4.2-21 Forward Drive Function Inoperative

1. Loose or broken wire #16 from lift/drive switch S3 to base terminal block.	**Check continuity. Replace if defective.**
2. Loose or broken wire #16 from base terminal block to forward drive valve coil 4H-16.	**Check continuity. Replace if defective.**
3. Forward drive valve coil 4H-16 defective.	**Check continuity through coil. Replace if defective.**
4. Loose or broken wire #02 from forward drive valve coil 4H-16 to base terminal block.	**Check continuity. Replace if defective.**

4.2-22 Reverse Drive Function Inoperative

1. Loose or broken wire #15 from lift/drive switch S3 to base terminal block.	**Check continuity. Replace if defective.**
2. Loose or broken wire #15 from base terminal block to reverse drive valve coil 4H-15.	**Check continuity. Replace if defective.**
3. Reverse drive valve coil 4H-15 defective.	**Check continuity through coil. Replace if defective.**
4. Loose or broken wire #02 from reverse drive valve coil 4H-15 to base terminal block.	**Check continuity. Replace if defective.**

4.3 Electrical System - CE & AS

4.3-1 All Controls Inoperative

1. Battery charger plugged into external power source.	**Disconnect charger cord.**
2. Batteries disconnected.	**Connect batteries.**
3. Dirty or loose battery terminals.	**Clean and tighten connections.**
4. Battery charge low.	**Check each cell with a hydrometer. Reading should be 1.275 (fully charged). Recharge if low reading. Replace if reading difference between cells is 0.050.**
5. Main battery cables open or defective.	**Check continuity. Replace if defective.**
6. Fuse F1 defective.	**Replace fuse.**
7. Main battery disconnect switch S1 open or defective.	**Close switch. Check continuity. Replace if defective.**
8. Loose or broken wire #3 from motor contactor C1 to circuit breaker CB2.	**Check continuity. Replace if defective.**
9. Defective or tripped circuit breaker CB2.	**Reset circuit breaker. Replace if defective.**
10. Loose or broken wire #3A from circuit breaker CB2 to charger relay L1CR.	**Check continuity. Replace if defective.**
11. Defective battery charger relay L1CR.	**Check relay. Replace if defective.**
12. Loose or broken wire #5 from charger relay L1CR to base emergency stop switch S28.	**Check continuity. Replace if defective.**
13. Open or defective base emergency stop switch S28.	**Close switch. Check switch. Replace if defective.**
14. Loose or broken wire #5A from base emergency stop switch S28 to base key switch S10.	**Check continuity. Replace if defective.**
15. Open or defective base key switch S10.	**Select function with switch. Check switch. Replace if defective.**
16. Loose or broken wire #07 from base key switch S10 to base terminal block.	**Check continuity. Replace if defective.**
17. Loose or broken wire #07 from base terminal block to platform emergency stop switch S4.	**Check continuity. Replace if defective.**
18. Open or defective platform emergency stop switch S4.	**Close switch. Replace if defective.**
19. Loose or broken wire #7A from platform emergency stop switch S4 to base terminal block.	**Check continuity. Replace if defective.**
20. Loose or broken wire #7A from base terminal block to base key switch S10.	**Check continuity. Replace if defective.**

21. Open or defective base key switch S10.	**Close switch. Replace if defective.**
22. Loose or broken wire #00 from motor controller to circuit breaker CB1.	**Check continuity. Replace if defective.**
23. Defective or tripped circuit breaker CB1.	**Reset circuit breaker. Replace if defective.**
24. Loose or broken wire #02 from circuit breaker CB1 to base terminal block.	**Check continuity. Replace if defective.**
25. Loose or broken wire #7A from butt splice at wire #03A to CM1 control module pin P2-12.	**Check continuity. Replace if defective.**
26. Loose or broken wire #02 from base terminal block to CM1 control module pin P2-11.	**Check continuity. Replace if defective.**
27. Loose or broken wire #28 from CM1 control module pin P3-4 to tilt relay 28CR1 and down relay 28CR2.	**Check continuity. Replace if defective.**
28. Loose or broken wire #28E from CM1 control module pin P3-6 to Aux. tilt relay 28ECR1 and Aux. down relay 28ECR2.	**Check continuity. Replace if defective.**

4.3-2 All Controls Except for Down Function Inoperative

1. Loose or broken wire #59I from base terminal block to motor controller.	**Check continuity. Replace if defective.**
2. Loose or broken wire #19 from base terminal block to Aux. tilt relay 28ECR1.	**Check continuity. Replace if defective.**
3. Loose or broken wire #19A from Aux. tilt relay 28ECR1 to tilt relay 28CR1.	**Check continuity. Replace if defective.**
4. Loose or broken wire #19B from tilt relay 28CR1 to base terminal block.	**Check continuity. Replace if defective.**
5. Loose or broken wire #19B from base terminal block to motor controller.	**Check continuity. Replace if defective.**
6. Defective resistor RST7. (With joystick fully stroked)	**Check resistor and make sure it is secure. Replace if defective.**
7. Loose or broken B- cable from batteries to B- lug on motor controller.	**Check continuity. Replace if defective.**
8. Loose or broken B+ cable from main battery disconnect switch S1 to motor contactor C1.	**Check continuity. Replace if defective.**
9. Loose or broken B+ cable from motor contactor C1 to motor DCM1.	**Check continuity. Replace if defective.**
10. Loose or broken B+ cable from motor DCM1 to B+ lug on motor controller.	**Check continuity. Replace if defective.**
11. Loose or broken M- cable from motor DCM1 to M- lug on motor controller.	**Check continuity. Replace if defective.**

12. Defective motor controller.	**Check motor controller input and output voltage. Replace if defective.**
13. Defective motor DCM1.	**Check motor for operation with 24 volt supply. Replace if defective.**

4.3-3 All Controls Inoperative From Base Control Console

1. Loose or broken wire #10E from base key switch S10 to base up/down switch S2.	**Check continuity. Replace if defective.**
2. Loose or broken wire #10E from base terminal block to CM1 control module pin P2-2.	**Check continuity. Replace if defective.**

4.3-4 No Up Function from Base Control Console

1. Defective up/down switch S2.	**Check switch. Replace if defective.**
2. Loose or broken wire #14E from up/down switch S2 to base terminal block.	**Check continuity. Replace if defective.**
3. Open or defective diode D14E-1.	**Check diode. Replace if defective.**
4. Open or defective diode D14E-2.	**Check diode. Replace if defective.**
5. Open diode D14A.	**Check diode. Replace if defective.**
6. Loose or broken wire #14A from base terminal block to relay 14ACR.	**Check continuity. Replace if defective.**
7. Loose or broken wire #14A from relay 14ACR to relay 14ACR1.	**Check continuity. Replace if defective.**
8. Defective low voltage protection resistor RST8.	**Check resistor and make sure it is secure. Replace if defective.**
9. Loose or broken wire #14B from base terminal block to up valve coil 3H-14B.	**Check continuity. Replace if defective.**
10. Loose or broken wire #02 from base terminal block to up valve coil 3H-14B.	**Check continuity. Replace if defective.**
11. Defective up valve coil 3H-14B.	**Check continuity through coil. Replace if defective.**
12. Machine not level. (Above high speed limit switch)	**Use on level surface.**
13. Loose or broken wire #59J from base terminal block to base control relay 59JCR.	**Check continuity. Replace if defective.**
14. Loose or broken wire #02 from base terminal block to base control relay 59JCR.	**Check continuity. Replace if defective.**
15. Defective base control relay 59JCR.	**Check relay. Replace if defective.**
16. Loose or broken wire #7A from base terminal block to lift speed relay 14ACR1.	**Check continuity. Replace if defective.**
17. Loose or broken wire #59D from lift speed relay 14ACR1 to base terminal block.	**Check continuity. Replace if defective.**

18. Defective base lift resistor RST6.	**Check resistor and make sure it is secure. Replace if defective.**
19. Loose or broken jumper wire #59H at base terminal block.	**Check continuity. Replace if defective.**
20. Loose or broken wire #59H from base terminal block to base control relay 59JCR.	**Check continuity. Replace if defective.**

4.3-5 Up Function Slow from Base Control Console

1. Loose or broken wire #14A from base terminal block to lift speed relay 14ACR1.	**Check continuity. Replace if defective.**
2. Loose or broken wire #02 from base terminal block to lift speed relay 14ACR1.	**Check continuity. Replace if defective.**
3. Defective lift speed relay 14ACR1.	**Check relay. Replace if defective.**

4.3-6 No Down Function from Base Control Console

NOTE

Down function is not proportionally controlled.

1. Defective up/down switch S2.	**Check switch. Replace if defective.**
2. Loose or broken wire #13A from up/down switch S2 to base terminal block.	**Check continuity. Replace if defective.**
3. Loose or broken wire #13A from base terminal block to CM1 control module pin P2-4.	**Check continuity. Replace if defective.**
4. Defective down relay 28CR2 or Aux. down relay 28ECR2.	**Check relay. Replace if defective.**
5. Loose or broken wire #02 from base terminal block to down relay 28CR2 or Aux. down relay 28ECR2.	**Check continuity. Replace if defective.**
6. Loose or broken wire #13A from base terminal block to Aux. down relay 28ECR2.	**Check continuity. Replace if defective.**
7. Loose or broken wire #13B from Aux. down relay 28ECR2 to down relay 28CR2.	**Check continuity. Replace if defective.**
8. Loose or broken wire # 13C from down relay 28CR2 to down valve 2H-13C or holding valve 2H-13C-1 and 2H-13C-2.	**Check continuity. Replace if defective.**
9. Defective down valve coil 2H-13C.	**Check continuity through coil. Replace if defective.**
10. Defective lift cylinder holding valve coil 2H-13C-1 or 2H-13C-2.	**Check continuity through coil. Replace if defective.**
11. Loose or broken wire #02 from holding valve coil 2H-13C-1 or 2H-13C-2 or down valve coil 2H-13C to base terminal block.	**Check continuity. Replace if defective.**

4.3-7 All Controls Inoperative From Platform Control Console

1. Loose or broken wire #8C from base key switch S10 to base terminal block.	**Check continuity. Replace if defective.**
2. Loose or broken wire #8C or wire #02 from base terminal block to platform emergency stop switch S4.	**Check continuity. Replace if defective.**
3. Open diode D8C.	**Check diode. Replace if defective.**
4. Open or defective platform emergency stop switch S4.	**Close switch. Replace if defective.**
5. Loose or broken wire #8 or wire #02 from emergency stop switch S4 to battery charge indicator BCI.	**Check continuity. Replace if defective.**
6. Loose or broken wire #8 or wire #02 from battery charge indicator BC1 to joystick S7.	**Check continuity. Replace if defective.**
7. Defective joystick enable switch S7-6.	**Check switch. Replace if defective.**
8. Defective joystick neutral switch S7-1.	**Check switch. Replace if defective.**
9. Defective joystick S7.	**Check joystick. Replace if defective.**

4.3-8 No Up Function from Platform Controls

1. Loose or broken wire “B” from proportional controller S7 to lift/drive switch S3.	**Check continuity. Replace if defective.**
2. Lift/Drive switch S3 defective.	**Check switch. Replace if defective.**
3. Defective PWM card on joystick S7.	**Check joystick card. Replace if defective.**
4. Loose or broken wire #14 from lift/drive switch S3 to diode D14 at base terminal block.	**Check continuity. Replace if defective.**
5. Open or defective diode D14.	**Check diode. Replace if defective.**
6. Open or defective diode D14A.	**Check diode. Replace if defective.**
7. Defective tilt relay 28CR1 or Aux. tilt relay 28ECR1.	**Check relay. Replace if defective.**
8. Loose or broken wire #02 from base terminal block to tilt relay 28CR1 or Aux. tilt relay 28ECR1.	**Check continuity. Replace if defective.**
9. Loose or broken wire #28 from CM1 control module pin P3-4 to tilt relay 28CR1.	**Check continuity. Replace if defective.**
10. Loose or broken wire #28E from CM1 control module pin P3-6 to Aux. tilt relay 28ECR1.	**Check continuity. Replace if defective.**
11. Loose or broken wire #19 from base terminal block to Aux. tilt relay 28ECR1.	**Check continuity. Replace if defective.**
12. Loose or broken wire #19A from Aux. tilt relay 28ECR1 to tilt relay 28CR1.	**Check continuity. Replace if defective.**

13. Loose or broken wire #19B from tilt relay 28CR1 to motor contactor C1.	**Check continuity. Replace if defective.**
14. Loose or broken wire #19B from tilt relay 28CR1 to motor controller.	**Check continuity. Replace if defective.**
15. Loose or broken wire #14A from base terminal block to CM1 control module pin P2-3.	**Check continuity. Replace if defective.**
16. Defective low voltage protection resistor RST8.	**Check resistor and make sure it is secure. Replace if defective.**
17. Loose or broken wire #14B from base terminal block to up valve coil 3H-14B.	**Check continuity. Replace if defective.**
18. Loose or broken wire #02 from base terminal block to up valve coil 3H-14B.	**Check continuity. Replace if defective.**
19. Defective up valve coil 3H-14B.	**Check continuity through coil. Replace if defective.**
20. Machine not level. (Above high speed limit switch)	**Use on level surface.**
21. Loose or broken wire #14A from base terminal block to relay 14ACR.	**Check continuity. Replace if defective.**
22. Defective lift speed relay 14ACR.	**Check relay. Replace if defective.**
23. Loose or broken wire #59 from base terminal block to lift speed relay 14ACR.	**Check continuity. Replace if defective.**
24. Loose or broken wire #59A from lift speed relay 14ACR to base terminal block.	**Check continuity. Replace if defective.**
25. Defective platform lift resistor RST4.	**Check resistor and make sure it is secure. Replace if defective.**

4.3-9 Up Function Slow from Platform Control Console

1. Loose or broken wire #14A from base terminal block to lift speed relay 14ACR.	**Check continuity. Replace if defective.**
2. Loose or broken wire #02 from base terminal block to lift speed relay 14ACR.	**Check continuity. Replace if defective.**
3. Defective lift speed relay 14ACR.	**Check relay. Replace if defective.**

4.3-10 No Down Function from Platform Controls

1. Loose or broken wire “A” from proportional controller S7 to lift/drive switch S3.	**Check continuity. Replace if defective.**
2. Lift/Drive switch S3 defective.	**Check switch. Replace if defective.**
3. Defective PWM card on joystick S7.	**Check joystick card. Replace if defective.**
4. Loose or broken wire #13 from lift/drive switch S3 to diode D13 at base terminal block.	**Check continuity. Replace if defective.**

5. Open or defective diode D13.	**Check diode. Replace if defective.**
6. Loose or broken wire #13A from base terminal block to CM1 control module pin P2-4.	**Check continuity. Replace if defective.**
7. Defective down relay 28CR2 or Aux. down relay 28ECR2.	**Check relay. Replace if defective.**
8. Loose or broken wire #02 from base terminal block to down relay 28CR2 or Aux. down relay 28ECR2.	**Check continuity. Replace if defective.**
9. Loose or broken wire #13A from base terminal block to Aux. down relay 28ECR2.	**Check continuity. Replace if defective.**
10. Loose or broken wire #13B from Aux. down relay 28ECR2 to down relay 28CR2.	**Check continuity. Replace if defective.**
11. Loose or broken wire # 13C from down relay 28CR2 to down valve 2H-13C or holding valve 2H-13C-1 and 2H-13C-2.	**Check continuity. Replace if defective.**
12. Defective down valve coil 2H-13C.	**Check continuity through coil. Replace if defective.**
13. Defective lift cylinder holding valve coil 2H-13C-1 or 2H-13C-2.	**Check continuity through coil. Replace if defective.**
14. Check continuity through coil. Replace if defective.	**Check continuity. Replace if defective.**

4.3-11 No Emergency Down Function

1. Loose or broken wire #3 from batteries to circuit breaker CB3.	**Check continuity. Replace if defective.**
2. Defective circuit breaker CB3.	**Check continuity through circuit breaker. Replace if defective.**
3. Loose or broken wire #5B from circuit breaker CB3 to emergency down switch S51.	**Check continuity. Replace if defective.**
4. Defective emergency down switch S51.	**Check switch. Replace if defective.**
5. Loose or broken wire # 98 from emergency down switch S51 to aux. holding valve 2H-98-1 and 2H-98-2.	**Check continuity. Replace if defective.**
6. Defective lift cylinder aux. holding valve coil 2H-98-1 or 2H-98-2.	**Check continuity through coil. Replace if defective.**
7. Loose or broken wire #02A from aux. holding valve coil 2H-98-1 or 2H-98-2 to circuit breaker CB4.	**Check continuity. Replace if defective.**
8. Defective circuit breaker CB4.	**Check continuity through circuit breaker. Replace if defective.**
9. Loose or broken wire #00 from circuit breaker CB4 to batteries.	**Check continuity. Replace if defective.**

4.3-12 Steer Only Inoperative

1. Loose or broken wire #8A from proportional controller S7 to lift/off/drive switch S3.	**Check continuity. Replace if defective.**
2. Lift/Off/Drive switch S3 defective.	**Check switch. Replace if defective.**
3. Loose or broken wire #12B from steer switches S7-2 and S7-3 to lift/off/drive switch S3.	**Check continuity. Replace if defective.**
4. Loose or broken wire #17A from base terminal block to relay 17CR.	**Check continuity. Replace if defective.**
5. Defective relay 17CR.	**Check relay. Replace if defective.**
6. Loose or broken wire #17B from relay 17CR to base terminal block.	**Check continuity. Replace if defective.**
7. Open diode D17B-1.	**Check diode. Replace if defective.**
8. Open diode D17B-2.	**Check diode. Replace if defective.**
9. Defective lift speed relay 14ACR1.	**Check relay. Replace if defective.**
10. Loose or broken wire #59C from 14CR1 lift speed relay to base terminal block.	**Check continuity. Replace if defective.**
11. Defective steer only resistor RST5.	**Check resistor and make sure it is secure. Replace if defective.**

4.3-13 Right Steer Inoperative

1. Defective right steer switch S7-2.	**Check switch. Replace if defective.**
2. Loose or broken wire #23 from right steer switch S7-2 to base terminal block.	**Check continuity. Replace if defective.**
3. Loose or broken wire #23 from base terminal block to steer right valve coil 4H-23.	**Check continuity. Replace if defective.**
4. Defective steer right valve coil 4H-23.	**Check continuity through coil. Replace if defective.**
5. Check continuity through coil. Replace if defective.	**Check continuity. Replace if defective.**
6. Check continuity. Replace if defective.	**Check diode. Replace if defective.**

4.3-14 Left Steer Inoperative

1. Defective left steer switch S7-3.	**Defective left steer switch S7-3.**
2. Loose or broken wire #24 from left steer switch S7-3 to base terminal block.	**Check continuity. Replace if defective.**
3. Loose or broken wire #24 from base terminal block to steer left valve coil 4H-24.	**Check continuity. Replace if defective.**
4. Defective steer left valve coil 4H-24.	**Check continuity through coil. Replace if defective.**

5. Check continuity through coil. Replace if defective.	**Check continuity. Replace if defective.**
6. Open diode D24.	**Check diode. Replace if defective.**

4.3-15 Drive Only Inoperative

1. Open or defective diode D17.	**Check diode. Replace if defective.**
2. Loose or broken wire #59B from lift speed relay 14ACR to base terminal block.	**Check continuity. Replace if defective.**
3. Defective relay 14ACR.	**Check relay. Replace if defective.**
4. Loose or broken wire #59B from base terminal block to high speed relay 21CR.	**Check continuity. Replace if defective.**

4.3-16 No Drive or Steer when Platform Fully Lowered

1. Loose or broken wire #71 from base terminal block to drive override limit switch LS6.	**Check continuity. Replace if defective.**
2. Defective drive override switch LS6.	**Check switch. Replace if defective.**
3. Loose or broken wire #19 from drive override limit switch LS6 to base terminal block.	**Check continuity. Replace if defective.**

4.3-17 No Drive or Steer when Platform Elevated

1. Pothole protection bars not fully lowered.	**Clear obstructions. Repair as needed.**
2. Loose or broken wire #71 from base terminal block to pothole protection limit switch LS4.	**Check continuity. Replace if defective.**
3. Defective pothole protection limit switch LS4.	**Check switch. Replace if defective.**
4. Loose or broken wire #72 from pothole protection limit switch LS4 to base terminal block.	**Check continuity. Replace if defective.**
5. Loose or broken wire #72 from base terminal block to pothole protection limit switch LS5.	**Check continuity. Replace if defective.**
6. Defective pothole protection limit switch LS5.	**Check switch. Replace if defective.**
7. Loose or broken wire #19 from pothole protection limit switch LS5 to base terminal block.	**Check continuity. Replace if defective.**

4.3-18 Platform Drives in Slow Speed Only

1. Loose or broken wire #71 from base terminal block to high speed limit switch LS1A.	**Check continuity. Replace if defective.**
2. Open or defective high speed limit switch LS1A.	**Check switch. Replace if defective.**
3. Loose or broken wire #21 from high speed limit switch LS1A to base terminal block.	**Check continuity. Replace if defective.**

4. Loose or broken wire #59E from high speed relay 21CR to base terminal block.	**Check continuity. Replace if defective.**
5. High speed relay 21CR defective.	**Check relay, replace if defective.**
6. Defective high speed resistor RST2.	**Check resistor and make sure it is secure. Replace if defective.**

4.3-19 High/Low Torque Inoperative

1. Loose or broken wire #12B from joystick card to torque switch S27.	**Check continuity. Replace if defective.**
2. Defective torque switch S27.	**Check switch. Replace if defective.**
3. Loose or broken wire #18 from torque switch S27 to base terminal block.	**Check continuity. Replace if defective.**
4. Loose or broken wire #18 from base terminal block to high speed limit switch LS1B.	**Check continuity. Replace if defective.**
5. Defective high speed limit switch LS1B.	**Check switch. Replace if defective.**
6. Loose or broken wire #18A from high speed limit switch LS1B to rear drive manifold.	**Check continuity. Replace if defective.**
7. Defective speed valve coil 3H-18A-1 or 3H-18A-2.	**Check continuity through coil. Replace if defective.**
8. Loose or broken wire #02 from rear drive manifold to base terminal block.	**Check continuity. Replace if defective.**

4.3-20 Brake will not Release

1. Diode D16 forward or D15 reverse is shorted or open.	**Check diode. Replace if defective.**
2. Loose or broken wire #19B or #02 from base terminal block to brake release relay 19BCR.	**Check continuity. Replace if defective.**
3. Loose or broken wire #17 from base terminal block to brake release relay 19BCR.	**Check continuity. Replace if defective.**
4. Defective relay 19BCR.	**Check relay. Replace if defective.**
5. Loose or broken wire #17A from brake release relay to brake valve coil 3H-17A.	**Check continuity. Replace if defective.**
6. Brake valve coil 3H-17A defective.	**Check continuity through coil. Replace if defective.**
7. Loose or broken wire #02 from brake valve coil 3H-17A to base terminal block.	**Check continuity. Replace if defective.**

4.3-21 Forward Drive Function Inoperative

1. Loose or broken wire #16 from lift/drive switch S3 to base terminal block.	**Check continuity. Replace if defective.**
2. Loose or broken wire #16 from base terminal block to CM1 control module pin P2-7.	**Check continuity. Replace if defective.**
3. Loose or broken wire #16 from base terminal block to forward drive valve coil 4H-16.	**Check continuity. Replace if defective.**
4. Forward drive valve coil 4H-16 defective.	**Check continuity through coil. Replace if defective.**
5. Loose or broken wire #02 from forward drive valve coil 4H-16 to base terminal block.	**Check continuity. Replace if defective.**

4.3-22 Reverse Drive Function Inoperative

1. Loose or broken wire #15 from lift/drive switch S3 to base terminal block.	**Check continuity. Replace if defective.**
2. Loose or broken wire #15 from base terminal block to CM1 control module pin P2-8.	**Check continuity. Replace if defective.**
3. Loose or broken wire #15 from base terminal block to reverse drive valve coil 4H-15.	**Check continuity. Replace if defective.**
4. Reverse drive valve coil 4H-15 defective.	**Check continuity through coil. Replace if defective.**
5. Loose or broken wire #02 from reverse drive valve coil 4H-15 to base terminal block.	**Check continuity. Replace if defective.**

4.4 Hydraulic System - ANSI/CSA & KC

4.4-1 All Controls Inoperative

1. Pump P1 defective.	**Check pump. Replace if defective.**

4.4-2 All System Sluggish

1. System Relief Valve defective or not adjusted properly.	**Adjust valve. Replace if defective.**
2. Hydraulic pump P1 worn.	**Hydraulic pump P1 worn.**

4.4-3 Platform Drifts Down

1. Defective lift cylinder seals at the gland or holding valve manifold.	**Replace if damaged. Note: There are no piston seals, just wear rings.**
2. Combination of defective holding valves 2H-13-1 and 2H-13-2, and either defective lowering valve 2H-13 or relief valve R2 or manual lowering valve V1.	**Check valves. Replace if defective.**

4.4-4 Platform Lifts Slowly

1. Open or leaking manual lowering valve V1.	**Close valve. Replace if defective.**
2. Lift relief valve R2 defective.	**Check valve. Replace if defective.**
3. Open manual override on holding valve 2H-13-1 or 2H-13-2.	**Depress and turn manual override clockwise to close. Replace if defective.**

4.4-5 Platform Does Not Lift

1. Open manual lowering valve V1.	**Close valve. Replace if defective.**
2. Hydraulic oil level too low.	**Fully lower the platform. Fill hydraulic tank until fluid is at or slightly above the top mark on the sight glass.**
3. Platform weight excessive.	**Reduce platform load to maximum capacity.**
4. Up valve 3H-14B defective or is sticking.	**Check valve. Replace if defective.**

4.4-6 Platform will not Lower

NOTE
Down function is not proportionally controlled.

1. Lowering valve 2H-13 defective or is sticking.	**Clean valve. Replace if defective.**
2. Defective holding valve 2H-13-1 or 2H-13-2.	**Clean valve. Replace if defective.**

4.4-7 Platform Drives Slow

1. Free-wheeling valve V2 open or defective.	**Close valve. Replace if defective.**
2. Flow divider/combiner FD1 defective or is plugged.	**Close valve. Replace if defective.**
3. Drive motor M1 or M2 defective.	**Check motors. Replace if defective.**
4. Cushion cylinder C4 defective.	**Check cylinder. Replace if defective.**

4.4-8 Platform will not Drive in Forward or Reverse

1. Open free-wheeling valve V2.	**Close Valve. Replace if defective.**
2. Forward drive valve 4H-16 or reverse drive valve 4H-15 defective or is sticking.	**Check Valve. Replace if defective.**
3. Flow/Divider/Combiner valve FD1 defective or is plugged.	**Check Valve. Replace if defective.**
4. Counterbalance valve CB1 defective or is plugged.	**Counterbalance valve CB1 defective or is plugged.**

4.4-9 Brake(s) will not Release

1. Brake valve 3H-17 defective or is sticking.	**Clean valve. Replace if defective.**
2. Clean valve. Replace if defective.	**Remove orifice(s). Clean and reinstall.**
3. Defective internal brake piston seals.	**Check brake pack will maintain pressure. If pressure is not maintained replace seals.**
4. Damaged brake pack assembly.	**Inspect brake pack assembly. Repair or replace as necessary.**

4.4-10 MEWP will not Hold on a Grade

1. Worn or damaged brake discs.	**Inspect if machine can hold on a grade. Replace if worn or damaged.**
2. Broken or damaged brake compression springs.	**Inspect if machine can hold on a grade. Replace if worn or damaged.**

4.4-11 Platform does not Steer

1. Right steer valve 4H-23 or left steer valve 4H-24 defective or sticking.	**Clean valve. Replace if defective.**
2. Steer cylinder C1 seals leaking.	**Rebuild cylinder(s). Replace if damaged.**
3. Mechanical binding in kingpins.	**Check for binding. Repair as needed.**
4. Orifices O2 or O3 plugged.	**Clean orifices, and reinstall.**

4.4-12 High/Low Torque Inoperative

1. Stuck speed valve 3H-18A-1.	**Clean valve. Replace if defective.**
2. Stuck speed valve 3H-18A-2.	**Clean valve. Replace if defective.**

4.4-13 No Emergency Down Function

1. Defective aux. holding valve 2H-98-1 or 2H-98-2.	**Clean valve. Replace if defective.**

4.5 Hydraulic System - CE & AS

4.5-1 All Function Inoperative

1. Pump P1 defective.	**Check pump. Replace if defective.**

4.5-2 All System Sluggish

1. System Relief Valve defective or not adjusted properly.	**Adjust valve. Replace if defective.**
2. Hydraulic pump P1 worn.	**Hydraulic pump P1 worn.**

4.5-3 Platform Drifts Down

1. Defective lift cylinder seals at the gland or holding valve manifold.	**Replace if damaged. Note: There are no piston seals, just wear rings.**
2. Combination of defective holding valves 2H-13C-1 and 2H-13C-2, and either defective lowering valve 2H-13C or relief valve R2 or manual lowering valve V1.	**Check valves. Replace if defective.**

4.5-4 Platform Lifts Slowly

1. Open or leaking manual lowering valve V1.	**Close valve. Replace if defective.**
2. Lift relief valve R2 defective.	**Check valve. Replace if defective.**
3. Open manual override on holding valve 2H-13C-1 or 2H-13C-2.	**Depress and turn manual override clockwise to close. Replace if defective.**

4.5-5 Platform Does Not Lift

1. Open manual lowering valve V1.	**Close valve. Replace if defective.**
2. Hydraulic oil level too low.	**Fully lower the platform. Fill hydraulic tank until fluid is at or slightly above the top mark on the sight glass.**
3. Platform weight excessive.	**Reduce platform load to maximum capacity.**
4. Up valve 3H-14B defective or is sticking.	**Check valve. Replace if defective.**

4.5-6 Platform will not Lower

NOTE

Down function is not proportionally controlled.

1. Lowering valve 2H-13C defective or is sticking.	**Clean valve. Replace if defective.**
2. Defective holding valve 2H-13C-1 or 2H-13C-2.	**Clean valve. Replace if defective.**

4.5-7 Platform Drives Slow

1. Free-wheeling valve V2 open or defective.	**Close valve. Replace if defective.**
2. Flow divider/combiner FD1 defective or is plugged.	**Close valve. Replace if defective.**
3. Drive motor M3 or M4 defective.	**Check motors. Replace if defective.**
4. Cushion cylinder C1 defective.	**Check cylinder. Replace if defective.**

4.5-8 Platform will not Drive in Forward or Reverse

1. Open free-wheeling valve V2.	**Close Valve. Replace if defective.**
2. Forward drive valve 4H-16 or reverse drive valve 4H-15 defective or is sticking.	**Check Valve. Replace if defective.**
3. Flow/Divider/Combiner valve FD1 defective or is plugged.	**Check Valve. Replace if defective.**
4. Counterbalance valve CB1 defective or is plugged.	**Check Valve. Replace if defective.**

4.5-9 Brake(s) will not Release

1. Brake valve 3H-17A defective or is sticking.	**Clean valve. Replace if defective.**
2. Defective internal brake piston seals.	**Check brake pack will maintain pressure. If pressure is not maintained replace seals.**
3. Damaged brake pack assembly.	**Inspect brake pack assembly. Repair or replace as necessary.**

4.5-10 MEWP will not Hold on a Grade

1. Worn or damaged brake discs.	**Inspect if machine can hold on a grade. Replace if worn or damaged.**
2. Broken or damaged brake compression springs.	**Inspect if machine can hold on a grade. Replace if worn or damaged.**

4.5-11 Platform does not Steer

1. Right steer valve 4H-23 or left steer valve 4H-24 defective or sticking.	**Clean valve. Replace if defective.**
2. Steer cylinder C1 seals leaking.	**Rebuild cylinder(s). Replace if damaged.**
3. Mechanical binding in kingpins.	**Check for binding. Repair as needed.**
4. Orifices 02 or O3 plugged.	**Clean orifices, and reinstall.**

4.5-12 High/Low Torque Inoperative

1. Stuck speed valve 3H-18A-1.	**Clean valve. Replace if defective.**
2. Stuck speed valve 3H-18A-2.	**Clean valve. Replace if defective.**

4.5-13 No Emergency Down Function

1. Defective aux. holding valve 2H-98-1 or 2H-98-2.	**Clean valve. Replace if defective.**

Notes

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 Platform

5.2-1 OEM Controller Electronics Information

Flow Control

Single coil or solenoid for single direction. The coil has two connections; one is wired to the P.C. Board (A) terminal and the other is wired to (-), or the negative side of the supply voltage. Switches to control directional valves may be provided on the controller.

Adjustment Procedures

Adjustments are made by turning a trimpot adjustment screw. The trimpots are multi-turn, end to end-devices. It may be necessary to turn the adjustment screw several turns to observe a change in output.

Clockwise (CW) adjustment of the trimpot increases the output.

Counter-clockwise (CCW) adjustment of the trimpot decreases the output.

Adjustments affect output current, voltage or percentage of duty cycle to the coil. The minimum and maximum output is preset at the factory. However, for optimum performance, they must be adjusted while the equipment is operating.

Although the following adjustments affect the current/ voltage or percentage of duty cycle, the best way to adjust the function is to observe the response or speed of the function. The following adjustments affect function response, or speed. There may be some interaction between adjustments, making it necessary to repeat the adjustment in order to achieve the desired response.

“Threshold” Adjustments

Adjusts the initial current flow or duty cycle, affecting the function response or speed when the handle is first moved from the off position. Deflect the handle slowly to the position where the controller first turns on. Adjust the threshold trimpot screw to the point where the controlled function just starts to move, then turn the trimpot screw one, full turn in the counterclockwise direction. This adjustment should be done first.

“Maxout” Adjustments

Adjusts the full stroke current or duty cycle affecting the maximum function response, or speed when the handle is deflected to its full travel. Fully deflect the handle, and adjust the maxout trimpot for maximum desired function response or speed. To obtain proportional resolution, it is important that the function starts to slow down as soon as the handle is moved back from the fully deflected position.

The ideal adjustment occurs when the function just begins to move when the handle is deflected, and the output increases until it reaches its maximum desired response or speed at the end of handle travel.

5.2-2 OEM Controller Troubleshooting

Problem

1. The function will not operate when the handle is moved. The LEDs do not light
   - **a.** Check that voltage is present at the positive (+)input terminal.
   - **b.** Check that ground is connected to the negative (-) terminal.
   - **c.** If there is an in-line fuse, check to see if it is good.
   - **d.** Check the controller on/off switch and the connectors. Voltage should be present at the (X) terminal when the controller is turned on.
   - **e.** Check that valve wiring is not shorted to ground. The LEDs will not light.
   - **f.** Check that valve wiring is not open. The LEDs will light, but the intensity will not vary.
   - **g.** Check trimpot settings. Fully “CCW” turns output off, “CW” turns output fully on.
2. The function jumps or lurches when turned on.
   - **a.** Perform “Threshold” adjustment procedures.
3. The function reaches maximum speed before the handle is fully deflected,
   - **a.** Perform “Maxout” adjustment procedures.
4. The function speed remains constant regardless of the degree of handle deflection.
   - **a.** Perform “Maxout” adjustment procedures.

IRS Option

1. Function speed reacts too slowly or too quickly in relation to handle deflection.
   - **a.** Check “IRS” (Ramp) trimpot adjustment. “CW” increases ramp time, “CCW” decreases ramp time.

Integrated Ramp System (IRS)

Provides smooth function response ,when reacting to an abrupt change in handle deflection. “CW” rotation of the trimpot increases ramp time and slows the response time. “CCW” decreases ramp time and increases the response time. To increase the ramp time, turn the adjusting screw “CW” a few turns, then move the controller handle abruptly. Continue to adjust until a smooth response is observed. Most controllers have on/off contacts which remove power from the P.C. Board when the handle is returned to the off position. When the handle is abruptly returned to neutral, the output will not ramp down, and the function will stop.

Ramp Thru Off

The P.C. Board should be adjusted as outlined in the IRS adjustment procedure. If the handle is abruptly returned to neutral (OFF) the output will ramp down to off. Ramp time is factory set to 2 seconds, unless otherwise specified.

NOTE

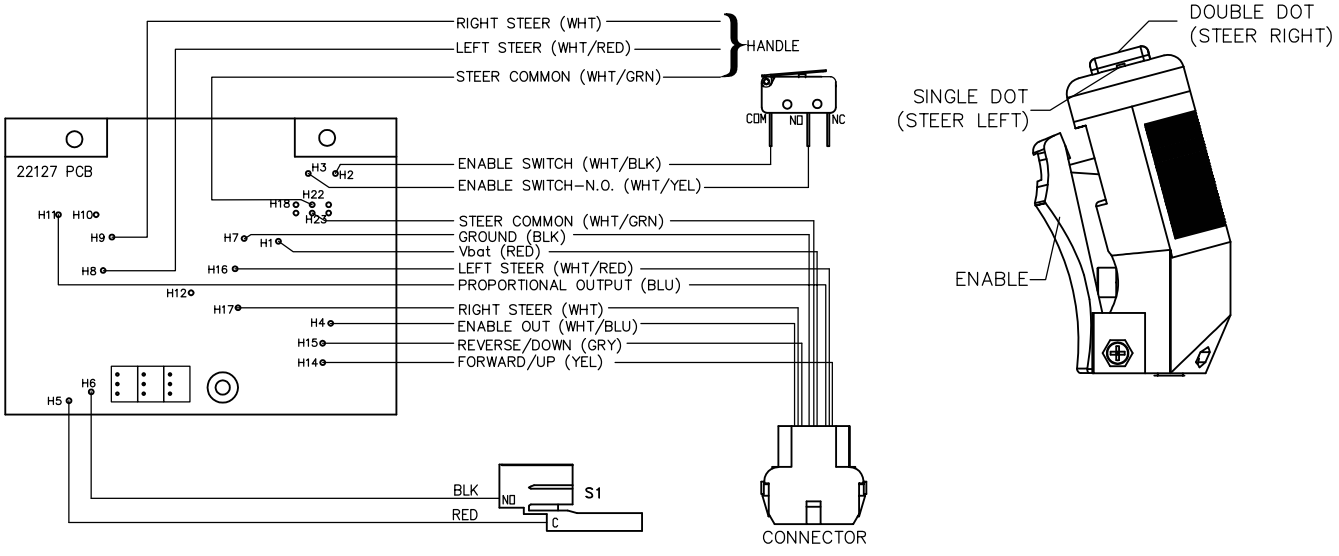
Trimpots should be sealed with nail polish or enamel based paint.

⚠ WARNING

Do not use RTV silicone.

5.2-3 OEM Controller Switch Wiring

WIRE CHART		
COLOR	**FROM**	**TO**
WHT/RED	STEER LEFT	PIN #1
WHT/RGN	STEER COMMON	PIN #2
WHT	STEER RIGHT	PIN #3
YELLOW	FORWARD/UP	PIN #4
RED	Vbat	PIN #5
GRY	REVERSE/DOWN	PIN #6
BLU	PROP. OUTPUT	PIN #7
BLK	GROUND (-)	PIN #8
WHT/BLU	ENABLE OUT	PIN #9



5.2-4 Gate Spring Hinge Adjustment

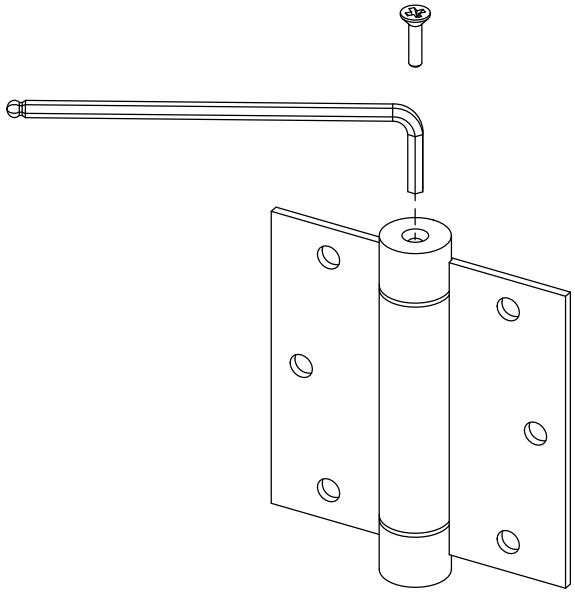
1. The tension of the spring hinges should be such that when the gate is opened halfway and released, it will close fully and latch.
2. To adjust the tension of the spring hinges, first remove the safety locking screw of each hinge. Retain the screws for reinstallation later.

NOTE

Adjusting the tension on the spring hinge is a two handed operation.

If Locking Screw Located at the Top or Bottom of the Spring Hinge,

3. To increase the tension, insert a 5/32” 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.



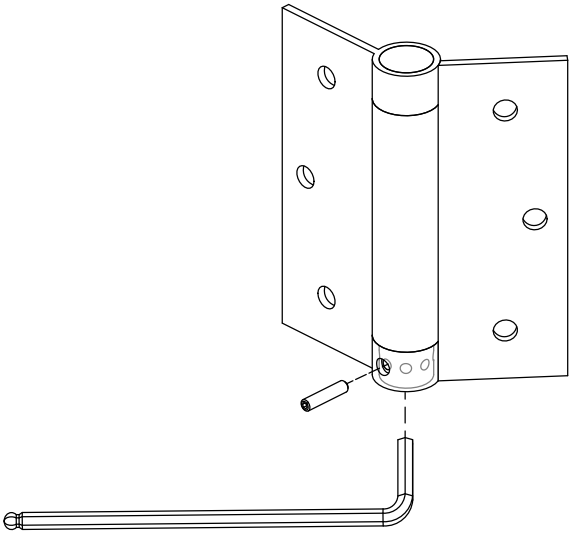
4. Adjust the tension on both hinges until the gate releases and latches from a half open position.
5. Reinstall the safety locking screws into the hinges when tension adjustment is complete.

If Locking Screw Located at the Side of the Spring Hinge,

6. To increase the tension, insert a 5/32” hex wrench in the screw socket. Turn the wrench clockwise to desired tension as well as aligning the locking screw hole. Hold the wrench in place, maintaining the selected tension, while reinstalling the locking screw.

NOTE

Ensure the holes inside the hinges are aligned before inserting the locking screw.



7. Adjust the tension on both hinges until the gate releases and latches from a half open position.

5.3 Base

5.3-1 System Relief Pressure Adjustment

1. Locate the system pressure fitting or quick disconnect port on the main manifold.
2. Install a calibrated 5000 psi gauge to the system pressure fitting or quick disconnect port.
3. At the main manifold, loosen the locknut on the system relief valve R1.
4. Remove black 14B wire from the lift coil.
5. Select lift with the lift/drive select switch on the platform control console.
6. Engaged lift and hold.
7. Observe reading on gauge. Adjust the R1 system relief value listed on the serial number plate. Turning the stem on the relief valve clockwise will increases pressure. Turning the stem counterclockwise will decreases pressure.
8. Release lift function and tighten the locknut.
9. Remove the gauge from system pressure test port.

5.3-2 Lift Pressure Adjustment

NOTE

Adequate area to raise the platform to full height is required for the following steps.

1. Locate the lift pressure test port on the main manifold.
2. Install a calibrated 5000 psi gauge to the lift pressure quick disconnect port.
3. At the main manifold, loosen the locknut on the lift relief valve R2.
4. Close the manual lowering valve. Use the lift switch at the base control console to raise the platform to full height and hold the lift up switch on.
5. Observe the reading on the gauge. Adjust the R2 relief valve to the value listed on the serial number plate. Turning the stem of the relief valve clockwise will increase pressure. Turning the stem counterclockwise will decrease pressure.
6. Remove the gauge from lift pressure test port.

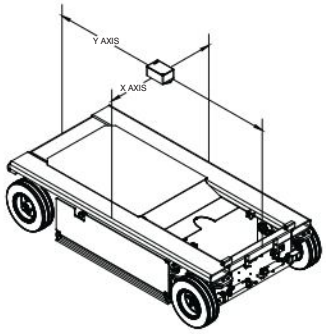
NOTE

Pressure setting may vary as MEWP components wear. The lift pressure should be set for rated load only.

5.3-3 Electronic Tilt Switch Setup Procedure

The following information is supplied for replacement or reprogramming of the electronic tilt switch. Also included are test and verification instructions. Follow the appropriate procedures below.

Tilt Switch Replacement



1. Ensure MEWP is parked on a firm level surface.
2. Chock or block wheels to keep the MEWP from rolling forward or backward.
3. Lower/Raise the platform and secure the scissors using the maintenance bars. (Refer to Operating manual for Maintenance Supports Procedure)
4. Push in emergency stop buttons and turn main disconnect switch to off position ◯ .
5. Remove any covers to locate and view the tilt switch.
6. Disconnect tilt switch from 4 pin connector.
7. Remove old tilt switch from mount.

NOTE

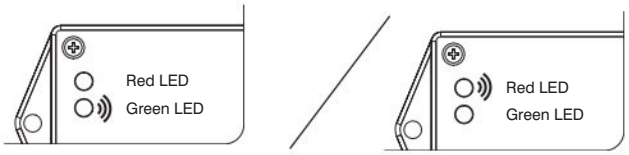
Ensure part number of old and new tilt switch are the same.

8. Install new switch to mount (in the same orientation as the old switch) and connect switch plug to 4-pin connector.

NOTE

The tilt circuit if only powered when activating a function.

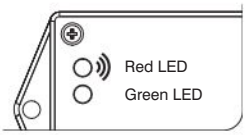
9. Disconnect all wires #02 from motor contactor.
10. Install jumper wire between #7 and #19 to terminal strip.
11. Pull out emergency stop button and turn main disconnect switch to | ON position.
12. Verify switch is powered. (Red or green LED will turn on solid)



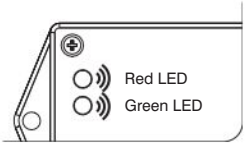
13. **Program the Tilt Switch**

a. Press and release the set up button 3 times.

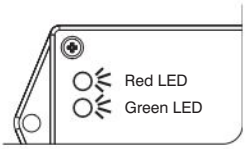
b. Observe program delay / stabilization time. (Only the red LED will blink for 4 seconds)



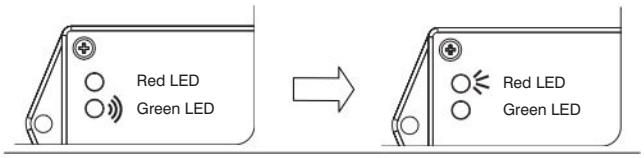
c. Both LEDs will flash for 1 second.
Results: The switch is learning the new zero position.



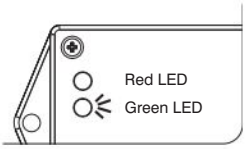
d. Both LEDs will turn on solid for 1 second.
Results: The new zero position has been learned.



e. The green LED will flash and then the red LED will turn on solid for 2 seconds.
Results: The switch is verifying the new zero position.

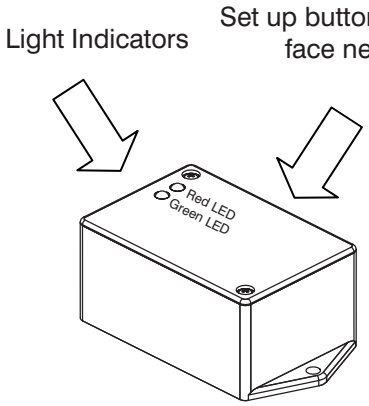


f. The green LED will turn on solid.
Results: The switch is ready for normal operation.



14. Turn main disconnect switch to ◯ off position.
15. Remove jumper wire between #7 and #19 from terminal block.
16. Reattach all wires #02 to motor contactor.
17. Reinstall any covers that was removed.
18. Remove chock or wheel blocks.
19. Proceed to Test and Verify Tilt Circuit.

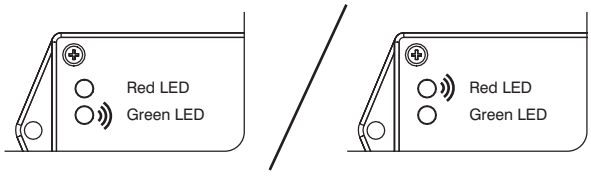
Reprogramming the Existing Tilt Switch



NOTE

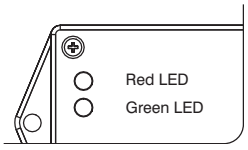
The tilt circuit is only powered when activating a function.

1. Ensure MEWP is parked on a firm level surface.
2. Chock or block wheels to keep the MEWP from rolling forward or backward.
3. Lower/Raise the platform and secure the scissors using the maintenance bars. (Refer to Operating manual for Maintenance Supports Procedure)
4. Remove any covers to locate and view the tilt switch.
5. Disconnect all wires #02 from motor contactor.
6. Install jumper wire between #7 and #19 to terminal strip.
7. Turn main disconnect switch to "|" ON position.
8. Verify switch is powered (Red or green LED will turn on solid).

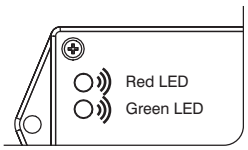


9. **Reprogram the Tilt Switch**

   a. Press and hold the set up button for 3 seconds.
   Results: Both LEDs will be OFF.



   b. Both LEDs will flash.

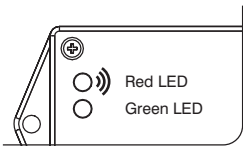


IMPORTANT

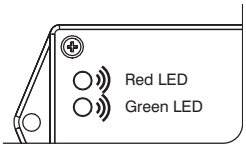
Step "c" must be completed within a 5 second period, or the switch will automatically exit program mode and return to normal operation using the previously stored data.

   c. Press and release the set up button 3 times.
   d. If the 5 second period has expired prior to completion, repeat steps "a", "b" and "c".

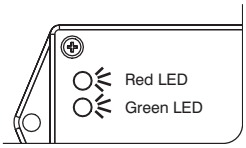
   e. Observe program delay / stabilization time (only the red LED will blink for 4 seconds).



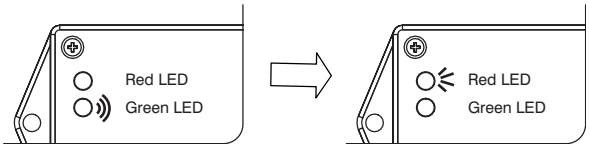
   f. Both LEDs will flash for 1 second.
   Results: The switch is learning the new zero position.



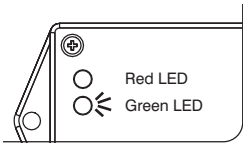
   g. Both LEDs will turn on solid for 1 second.
   Results: The new zero position has been learned.



   h. The green LED will flash and then the red LED will turn on solid for 2 seconds.
   Results: The switch is verifying the new zero position.

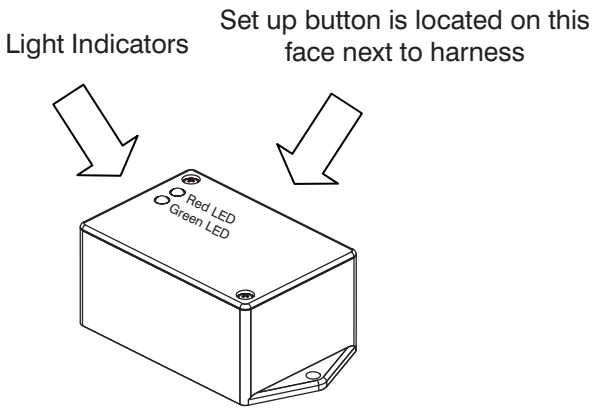


   i. The green LED will turn on solid.
   Results: The switch is ready for normal operation.



10. Turn the main power disconnect switch to the off position◯.
11. Remove jumper wire between #7 and #19 from terminal block.
12. Reattach all wires #02 to motor contactor.
13. Reinstall any covers that was removed.
14. Remove chock or wheel blocks.
15. Proceed to Test and Verify Tilt Circuit.

Verify Tilt Circuit



Operations of the Tilt Switch

The following describes the LED's and what they indicate.

Green LED	**Illuminated whenever both tilt axes are within the specified degrees of the zero/ home learned position. Flashes when transitioning in or out of tilt angle limits, but built in time delay has not fully occurred.**
Red LED	**Illuminated whenever tilt on one or more axes is more than the specified degrees out from the zero/ home position.**
Green & Red LED	**On together, no blinking when fault detected.**

Tilt Circuit Test

1. Refer to section 2 for test tilt sensor procedure.

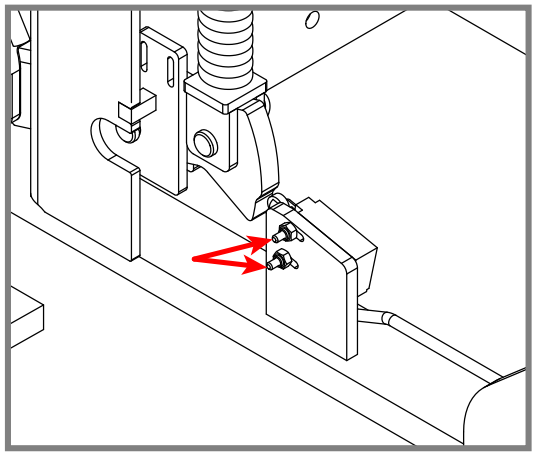
5.3-4 Pothole Limit Switches (LS4 & LS5) Replacement and Adjustment

Machine Preparation

1. Ensure the MEWP is parked on a firm level surface.
2. Chock or block the wheels to keep the MEWP from rolling forward or backward.

Limit Switch Removal

1. Raise the platform until pothole bars are deployed.
2. Swing out the hydraulic tray and the battery tray to gain access to the pothole limit switches underneath the base.
3. Remove the bolts and nuts (x2) securing each limit switch to the pothole lock plate. Set the hardware aside for later reinstallation.



4. Remove the limit switch and free the limit switch cable by cutting the tie wraps.
5. Follow the cable into the electrical panel, and disconnect the limit switch wires from the electrical panel. Discard the limit switches.

Limit Switch Replacement

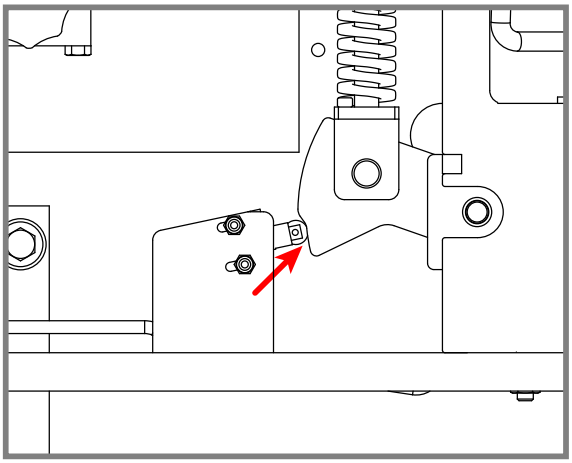
1. Mount loosely the new limit switch assemblies: 166003 (Battery Tray) & 125885 (Hydraulic Tray), using the hardware removed previously.

Limit Switch Electrical Connections

1. Route the new limit switch cable(s) along the same path as the old one(s) into the electrical panel cabinet. Use tie wraps as needed to secure them at regular intervals.
2. Strip the cable jacket back to separate the wires. Cut the wires to length if needed.
3. Strip the ends of wires 72-Black/White and 71-Black from the Battery Tray Limit Switch as well as wires 72-Black/White and 19-Black from the Hydraulic Tray Limit Switch and connect them to the electrical panel (refer to Section 3 Electrical Panel Schematics).

Limit Switch Setup

1. Loosen the hardware securing the limit switch to the pothole lock plate. Adjust and move the limit switch towards the lever bar until it makes contact inside the notch with the lever bar without depressing the plunger roller.



2. Fully tighten the bolts securing the limit switch. Ensure the limit switch does not move while tightening the bolts and the plunger roller retaining pin is fully visible.

Limit Switch Testing

1. Place a block, approximately 1.5” (3.75 cm), under the hydraulic/electric tray and then raise the platform to an approximate height of 7 feet (2 meters) or until the pothole protection is activated. Attempt to drive forward or reverse. MEWP should not move forward or backward.

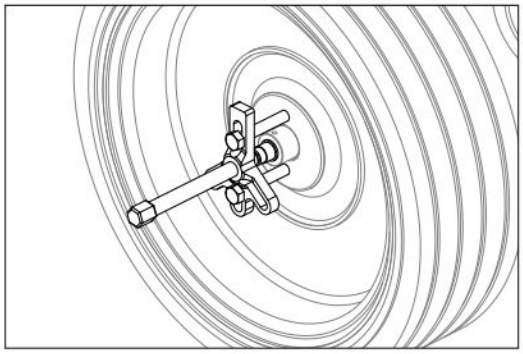
5.3-5 Wheel Replacement and Torquing Procedure

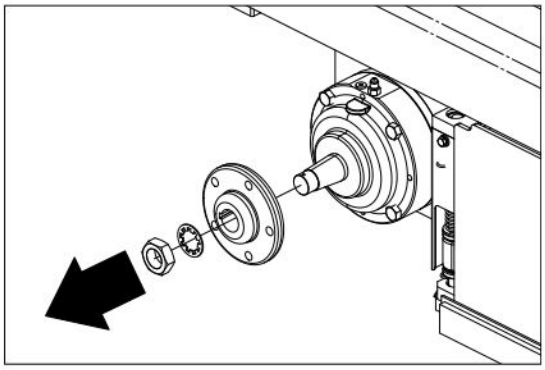
Tools Needed

- Adjustable Torque Wrench
  Capacity 475 Nm (350 ft-lb)
- Hub Puller

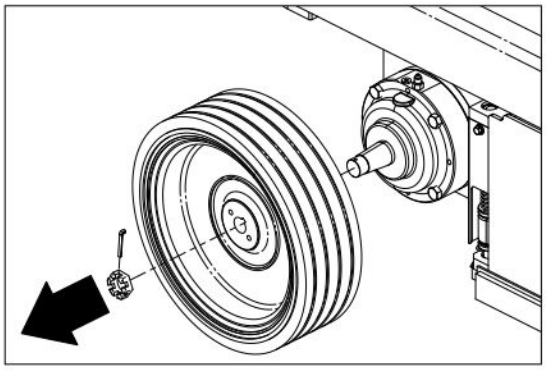
Hub/Integrated Hub Wheel Removal

1. Use an appropriately rated lifting device to raise up the MEWP until all the wheels are off the ground. Set the MEWP on stands adequately rated to support the weight of the machine.
2. Remove and set aside the wheel motor nut or castle nut.
3. Remove and discard the locktooth washer or cotter pin. A new one will be required for re-installating the hub/integrated hub wheel.
4. Use a hub puller to remove and discard the hub/integrated hub wheel from the wheel motor or brake.
5. For integrated hub wheels, use two 3/8”-24 bolts with a hub puller to remove the wheel.





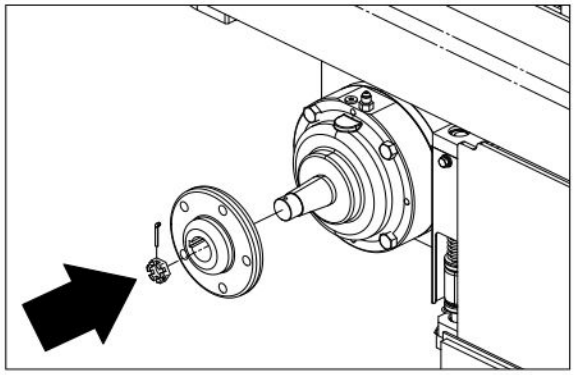
Remove Hub



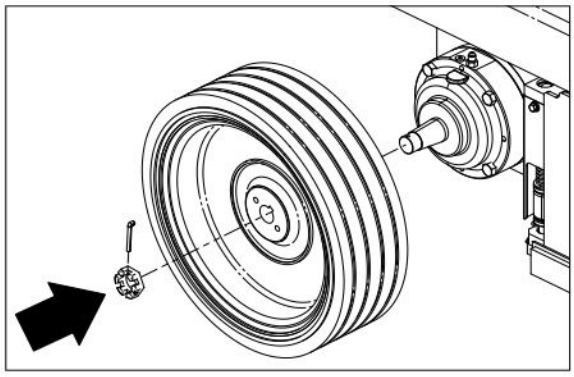
Remove Integrated Hub Wheel

Hub/Integrated Hub Wheel Installation

1. Install the hub/integrated hub wheel onto the wheel motor or spindle.
2. Secure the hub/integrated hub using a castle nut.
3. Tighten the castle nut to 203 Nm (150 ft-lb).
4. Insert a 1/8” x 1-3/4” cotter pin.
5. If the holes do not align to install the cotter pin, continue to torque the castle nut clockwise until the next hole is visible.
6. Ensure the cotter pin is pushed in completely.
7. Bend the ends of the cotter pin to secure the castle nut.



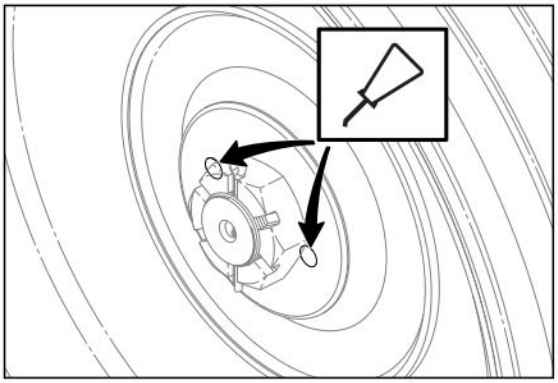
Hub Install



Integrated Hub Wheel Install

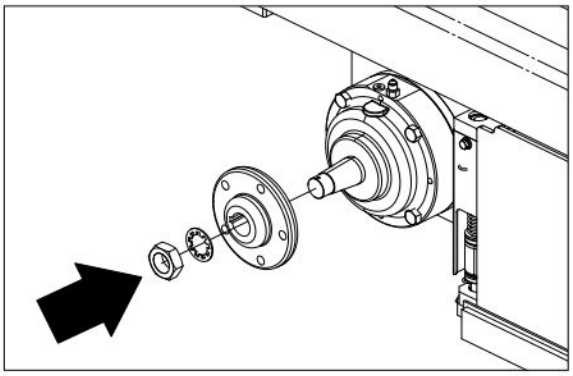
For integrated hub wheels only

8. To limit rust bleed, it is recommended that a few drops of grease be applied to the two small tapped holes on the front wheels.

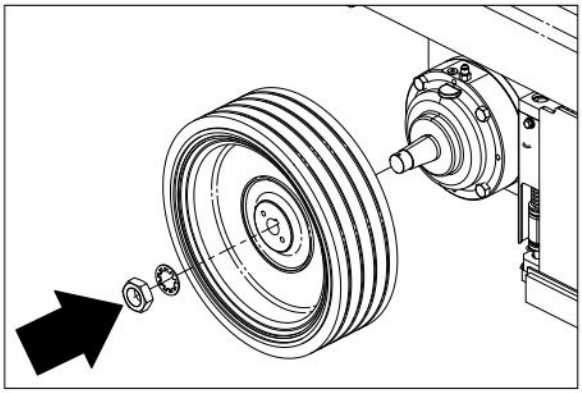


If using a wheel motor nut

9. Install a wheel motor nut and the new locktooth washer onto the hub/wheel.
10. Torque the wheel motor nut to 475 Nm (350 ft-lb).
11. Apply torque seal to the wheel motor nut.



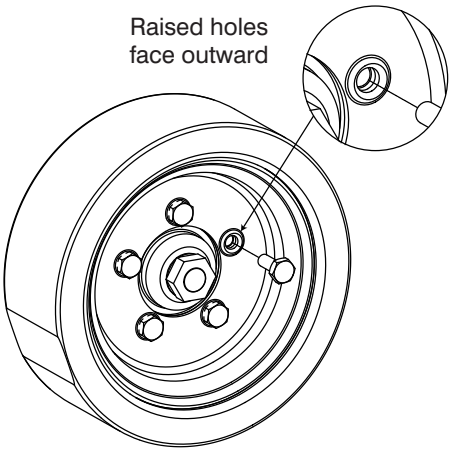
Hub Install



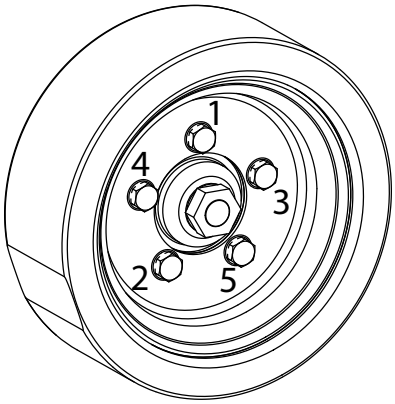
Integrated Hub Wheel Install

Wheel Installation (If applicable)

1. Install the wheel onto the hub.
2. Center the wheel mounting holes with the bolt holes from the hub.
3. Secure the wheel using wheel bolts and hand tighten to center the rim.



4. Torque the bolts to 68 Nm (50 ft-lb) in a criss-cross sequence.

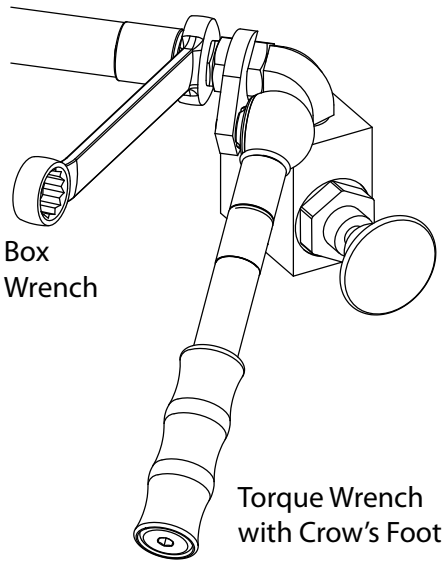


5. Torque the bolts again to 122 Nm (90 ft-lb) in a criss-cross sequence.
6. Repeat the tightening sequence to confirm that none have changed from 122 Nm (90 ft-lb). If any are found below 122 Nm (90 ft-lb), repeat complete sequence until there is no change in torque values. If possible, drive the machine prior to checking torques.
7. Apply dots of torque seal at the base of the wheel bolts.
8. Check torque values after 8 hours of operation.

5.3-6 Tightening and Torque Recommendations for Hydraulic Couplings and Hoses

General Work Practices

1. All components must be free of damage or contamination. O-rings cannot be reused anytime the component has been installed beyond finger tight. Clean or replace components, as required.
2. Over-tightening a coupling may result in overstressing and/or cracking, and may lead to leaking or failure.
3. When tightening hose couplings, ensure the hose does not twist on the adapter. Twisting will shorten hose life and scar the sealing surfaces of swivel type couplings (JIC, 45°, etc.), which can create leaks.
4. When tightening hose couplings, use a torque wrench (with crow's foot) on the hose end hex swivel nut, and a standard box wrench on the hose end stem hex to hold the hose from twisting.



5. Lubricate all o-ring surfaces with suitable hydraulic oil prior to installation in the flange head and o-ring seal grooves. This will minimize the possibility of damage to the O-ring when installed.
6. Install any 45° and 90° hydraulic hose ends first, then align direction and tighten. Adjust the swivel nut on the straight hose end before tightening to create the desired flow.

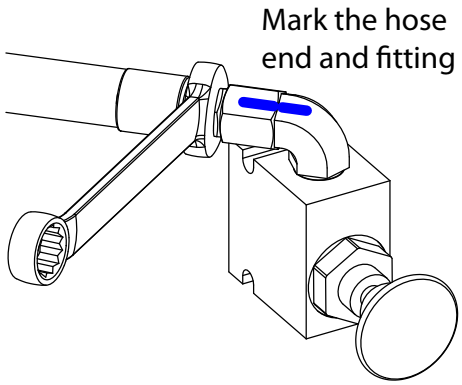
Torquing Using a Torque Wrench

1. This method is applicable for JIC (37°) and FFOR (Flat Face O-Ring) hose ends and fittings, wherever the components are accessible with torque wrench / crow's foot tools.
2. Align the hose end or fitting to the mating component.
3. Install the nut two or three turns by hand to assure proper alignment. Jiggle the hose while tightening to ensure the faces contact fully.
4. Using a properly calibrated torque wrench, tighten the coupling using a smooth, even motion until an indication (audible click) is heard and felt. Do NOT over tighten. For recommended torque values, refer to 2.4 Torque Specifications for Hydraulic Couplings & Hoses.
5. Apply a drop of torque seal to the connection.

Torquing Using the Flats From Wrench Resistance Method

1. This method is applicable for JIC (37°) and FFOR (Flat Face O-Ring) hose ends only, wherever the components are inaccessible with torque wrench/ crow's foot tools, or when a properly calibrated torque wrench is not available.
2. Align the hose end or fitting to the mating component.
3. Install the swivel hose end nut hand tight to the fitting to assure proper alignment. Jiggle the hose while tightening to ensure the faces contact fully.
4. Tighten the nut using a box wrench until minor resistance is felt.

5. Note the position of the nut relative to the fitting with a marking device (i.e., paint marker).



6. Referencing the chart below, use a second box wrench to tighten the nut the appropriate number of flats past the mark. Do NOT over tighten.

Flats From Wrench Resistance Chart for JIC Hose Ends			
Size		FFWR	
Dash	Frac. (in.)	37° Tube Nut	Swivel Nut
-4	1/4"	2	1.5
-5	5/16"	2	2
-6	3/8"	1.5	1.5
-8	1/2"	1.5	1.25
-10	5/8"	1.5	-
-12	3/4"	1.25	-
-16	1"	1	-
-20	1 1/4"	1	-
-24	1 1/2"	1	-
-32	2"	1	-

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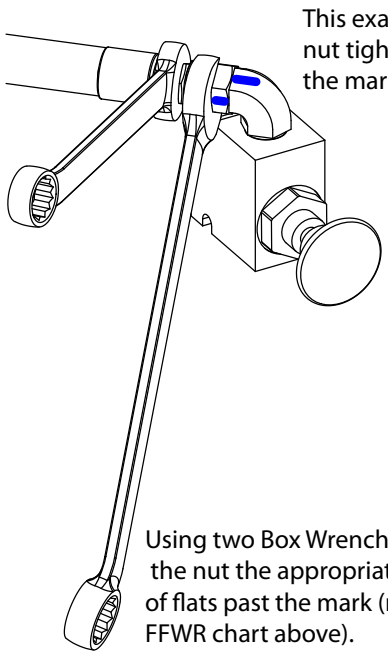
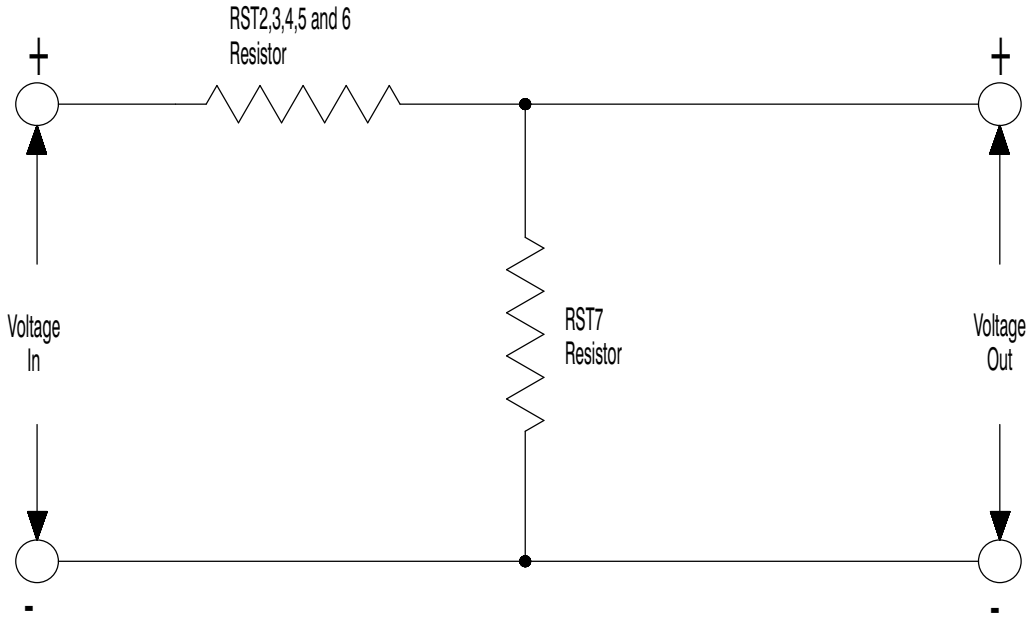


7. Apply a drop of torque seal to the connection.

5.3-7 Resistor - Voltage Divider



Common Resistor	Resistor	Ohm	Function	Input Voltage*	Output Voltage**
RST7 250 Ohm	RST4	68	Platform Lift Resistor	4.8	3.8
	RST2	68	Hi Speed Drive Resistor	4.8	3.8
	RST3	470	Elevated Drive Resistor	4.8	1.67
	RST5	4.75K	Steer Only Resistor	24	1.2
	RST6	1.2K	Base Lift Resistor	24	4.4

**4.8 volts refers to full stroke on the joystick. 24 volts represents a full charge on the battery pack.*
***Values given are with all connections tight and free from corrosion + or - 10%.*

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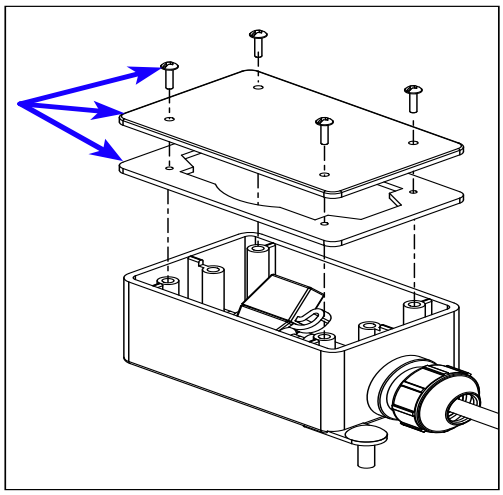
5.3-8 Counter Reset Procedure

Machine Preparation

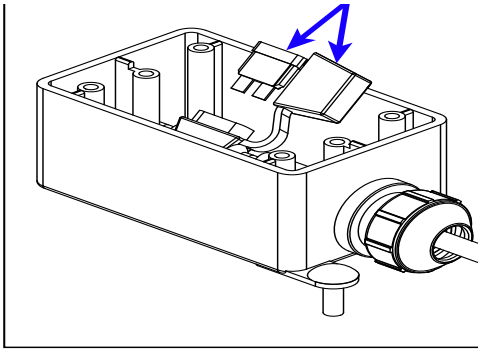
1. Ensure the MEWP is parked on a firm level surface.
2. Push in emergency stop buttons and turn main disconnect switch to | ON position.

How to Reset the Counter

1. Swing out the battery tray to gain access to the counter reset underneath the base.
2. Remove the screws (x4) securing the lid and gasket to the outlet box. Set the parts aside for later reinstallation.



3. Open the fuse holder inside the outlet box.



4. To reset the counter, fully insert the 20 amp fuse into the fuse holder. Ensure the counter on the electrical panel has been reset to zero.
5. Remove the 20 amp fuse from the fuse holder and close the fuse box.
6. Re-install the lid and the gasket to the outlet box.

5.3-9 Battery Maintenance

This section provides the operator with procedures on how to service and charge the battery. This also provides the charger operation instructions.

Servicing the battery

⚠ WARNING

Explosion hazard. Keep flames and sparks away. Do not smoke near batteries. Battery acid releases explosive gas while charging. Charge batteries in a well-ventilated area.

⚠ WARNING

Battery acid is extremely corrosive – wear proper eye and facial protection as well as appropriate protective clothing. If contact occurs, immediately flush with cold water and seek medical attention.

1. Turn the main power disconnect switch to the off position.
2. Check the battery case for damage.
3. Check the battery fluid level in each battery. If the plates are not covered by at least 13 mm (1/2 in) of solution, add distilled or demineralized water.
4. Make sure all the battery connections are tight.

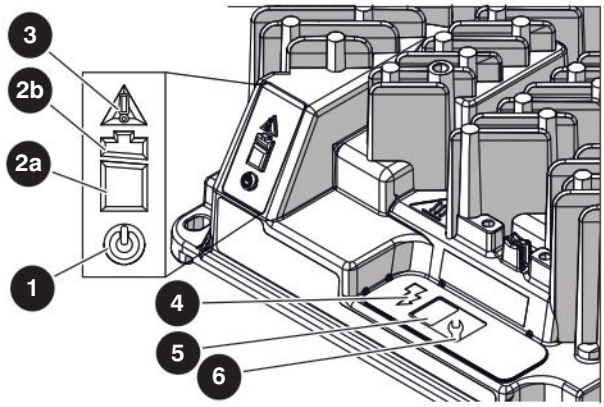
NOTE

Do not use any batteries other than the flooded lead-acid batteries of the proper Ah rating.

⚠ WARNING

Use the original or equivalent to the original parts and components for the MEWP.

5.3-10 Charger Maintenance - Delta-Q



No.	Indicator type	State	Description/action required
1	AC power	Blue	Battery charger is connected to the AC power.
2a	Battery charging <80%	Flashing green	Low charge— continue charging.
		Solid green	High charge— continue charging.
2b	Battery charging >80%	Flashing green	High charge— can discontinue charging.
		Solid green	Charge complete— discontinue charging.
3	Fault/ error	Solid red	Charger fault—refer to the service manual.
		Flashing amber	Error encountered—refer to the service manual.
4	Charging output	Solid yellow	Charger output is active.
5	Charge profile/ error display	Current algorithm or fault/ error code	N/A.
6	Select charge profile	Current charging algorithm	N/A.

Charger Profiles

IMPORTANT

Charge profiles differ depending on the battery type and manufacturer. Only use charge profiles with the batteries they were designed for. Using other incompatible batteries may cause poor charging performance and a decreased battery health.

1. Place the charger near a power outlet, but leave it unplugged.
2. Find your battery type in the following chart, and make a note of the profile number (starting with P).
3. Press and hold the Select Charger Profile button (wrench icon) on the Delta-Q charger. You will hear a small click when you press the button.
4. Continue to hold the Select Charger Profile button, and connect the charger to a power outlet.
5. Continue to hold the button for approximately 10 seconds or until the Error Indicator turns orange and the Battery Charging Indicator starts flashing green.
6. The current charger profile displays up to three times.

NOTE

The process times out and the profile remains unchanged if there are 15 seconds of inactivity, or if the charging profile is allowed to display three times.

7. Press and release the button to scroll through the charging profiles.
8. Select a profile, and press and hold the button for 10 seconds or until the Error Indicator and Battery Charging Indicator lights turn off.
9. Press the button again to confirm the selected profile.
10. Disconnect the charger from the power outlet.

Battery Brand	Compatible with	Profiles
U.S. Battery - US 2200 XC/XC2 Flooded, 6V, 232 Ah	200 - 255 Ah flooded	#11 (P-0-1-1)
Discover Energy - EVGC6A-A AGM, 6V, 220 Ah	220 - 400 Ah AGM	#43 (P-0-4-3)
Discover Energy - EV12A-A AGM, 12V, 140 Ah*		
U.S. Battery - US 12V XC2 Flooded, 12V, 155 Ah*	330 - 425 Ah flooded	#73 (P-0-7-3)
U.S. Battery - US 250 XC/XC2 Flooded-lead, 6V, 255 Ah		
Trojan - T105 ELPT Flooded, 6V, 225 Ah	150 - 250 Ah 6V, 8V, 12V flooded	#3 (P-0-0-3)

*The batteries used for these charger profiles are connected in a series-parallel circuit.

Charger Troubleshooting

The IC Series charger is continuously monitoring itself and its environment for unusual conditions. There are a few indications that may require the user's attention.

Symptom	Recommended Action
No Indicator Lights	Check AC voltage and connection to wall power.
Only Blue AC Light On	Charger is connected to AC and is waiting for a battery to be connected, or for CAN remote control commands. Battery voltage must rise over 0.1V/cell before charging will begin. Some charging algorithms require a higher battery voltage to begin.
Solid Red Fault/Error Indicator	Read fault code (e.g., F-0-0-1) number on the Charge Algorithm/Error Display and refer to the fault code table.
Flashing Amber Fault/Error Indicator	Read error code (e.g., E-0-0-1) number on the Charge Algorithm/Error Display and refer to the error code table.

Charger Fault Codes

Fault Code	Description	Troubleshooting/Customer Actions
F-0-0-1	DC-DC Failure: LLC excessive leakage fault.	Internal charger fault. Disconnect AC and battery from charger for a minimum of 30 seconds. If it fails again, contact Skyjack service.
F-0-0-2	Power Factor Correction (PFC) Failure: PFC excessive leakage fault.	
F-0-0-3	PFC has taken too long to boost.	
F-0-0-4	The charger has been unable to calibrate the current offset.	
F-0-0-5	The voltage drop across the DC relay is too high while the relay is closed.	
F-0-0-6	Large difference between internal DC-DC and battery sense currents.	

Charger Error Codes

Fault Code	Description	Troubleshooting/Customer Actions
E-0-0-1	Battery voltage over limit in software. Typically 2.5V/cell. At the start of a charger cycle only and only for lead acid batteries. It is acceptable for the voltage to go above this during charging and when charging Lithium batteries.	▪ Check the battery voltage and cable connections. ▪ Check charger voltage model is appropriate for batteries. ▪ This error automatically clears once the condition has been corrected.
E-0-0-2	Battery voltage too low to start a charge cycle. Algorithm dependent. Typically 0.1V/cell.	▪ Check the battery voltage and cable connections. ▪ Check the charger is the correct voltage for the batteries it is connected to. ▪ Check battery size and condition. Batteries may be overdischarged. Use another charger to bring the batteries above the minimum voltage. ▪ This error automatically clears once the condition has been corrected.
E-0-0-3	Charge time limit reached. Algorithm dependent.	▪ Charger output reduced due to high temperatures. Operate at lower ambient temperature. ▪ Charger output reduced due to low AC voltages. Check AC voltages. ▪ Check for shorted or damaged cells. ▪ Poor battery health. Replace the battery. ▪ Batteries too large for the charger. Replace batteries. ▪ Very deeply discharged battery. Retry charge. ▪ Battery connections are loose or corroded. Check connections. ▪ Extra loads. Turn off other devices running on the battery ▪ This error automatically clears once the charger is reset by cycling DC or by loss of AC for over 10 minutes.
E-0-0-4	Battery could not be trickle charged up to the minimumvoltage. May also be used for other battery-related errors depending on the algorithm.	▪ Check for shorted or damaged cells. ▪ Poor battery health. Replace the battery. ▪ Check DC connections. ▪ May be caused because of output reduced due to high temperature. ▪ Some new batteries may trigger these alarms as there voltage dips ▪ when charging starts before it goes onto rise.
E-0-0-7	Charge amp-hour Limit reached. Algorithm dependent.	▪ Charger output reduced due to high temperatures. Operate at lower ambient temperature ▪ Charger output reduced due to low AC voltages. Check AC voltage. ▪ Check for shorted or damaged cells. ▪ Poor battery health. Replace the battery. ▪ Very deeply discharged battery. Retry charge. ▪ Battery connections are loose or corroded. Check connections. ▪ Extra loads. Turn off other devices running on the battery ▪ This error automatically clears once the charger is reset by cycling ▪ DC or by loss of AC for over 10 minutes.

E-0-0-8	Battery temperature out of range. Algorithm dependent.	■ Cool or warm batteries as needed. ■ Check temperature sensor and connections. ■ This error automatically clears once the condition has been corrected.
E-0-1-1	Charge disabled by external command	■ Charger has been disabled by an external controller over the CANbus network. ■ This error automatically clears once the command has been removed.
E-0-1-2	Reverse polarity	■ Battery is connected the wrong way around. Check the battery connections. ■ This error automatically clears once the condition has been corrected.
E-0-1-3	Battery does not take current	■ Check for an electrical component or loose connection between the charger and the battery. ■ When charging lithium batteries, make sure the charger is properly connected to the battery and battery management system. ■ This error automatically clears once the charger is disconnecting DC or AC.
E-0-1-9	Hardware build does not support software version	■ The charger hardware does not support the new software version. ■ Existing SW is left running. Contact Delta-Q Technologies.
E-0-2-0	No active algorithm selected	■ Reprogram the charger with its original software, algorithms, and settings. ■ Use the wrench button to select the correct algorithm if still available on the charger. ■ The problem clears automatically when an available algorithm is set on the charger, as default.
E-0-2-1	High battery voltage while charging. Algorithm dependent. Typically 2.8V/cell.	■ When already charged, some new batteries may exhibit this error. ■ Disconnect the battery connection and wait for the battery voltage to fall. Reconnect the batteries to see if the condition reoccurs. ■ Check battery size and condition. Batteries in poor condition, with a high internal resistance, may cause this error. New batteries, if charged when already full, may also cause this error. Disconnect and reconnect the batteries a few times. ■ Check the battery voltage and cable connections. ■ This error automatically clears once the condition has been corrected.

E-0-2-2	Low battery voltage while charging. Algorithm dependent. Typically 0.1V/cell.	■ Another device may be drawing current from the battery. ■ Check the battery voltage and cable connections. ■ Check battery size and condition. Batteries may be overdischarged. ■ Use another charger to bring the batteries above the minimum voltage. ■ This error automatically clears once the condition has been corrected.
E-0-2-3	High AC voltage error (>270 VAC)	■ AC voltage is too high. Connect charger to an AC source that has a stable AC voltage between 85 and 270 VAC/45-65 Hz. ■ In newer software versions this does not prevent charging. ■ This error will automatically clear once the condition has been corrected.
E-0-2-4	Charger failed to turn on properly	■ Disconnect AC input and battery for 30 seconds. If the error persists, contact Delta-Q Technologies.
E-0-2-5	AC voltage has dipped below 80 VAC 3 times in 30 seconds	■ AC source is unstable. This could be caused by an undersized generator and/or input cables that are too long or too small. ■ Connect the charger to an AC source with a stable AC voltage between 85 and 270 VAC/45-65 Hz. ■ This error will automatically clear once the condition has been corrected.
E-0-2-8	Attempt to select algorithm incompatible with this software	■ Update charger software, continue to use existing algorithm* or select a different charging algorithm that is compatible. *** Notes** ■ If selecting a different algorithm, the existing algorithm will remain in the charger. ■ If upgrading an existing algorithm, the existing algorithm will be deleted. Contact Delta-Q Technologies for a software upgrade to run the new algorithm.
E-0-2-9	Cannot transmit on CAN bus	■ Check the physical CAN connector, electrical bus conditions, and other CAN modules for correct functioning. For example, check that termination resistance is approximately 60 ohms.
E-0-3-0	CAN heartbeat timeout on Battery module	■ May be caused by a missing heartbeat message. Check the CAN bus battery module for correct function. ■ This error automatically clears once the condition has been corrected.
E-0-3-1	The Vref for the ADC measurements has triggered an alarm	■ Internal charger error. Disconnect AC and the battery for a minimum of 30 seconds and retry. ■ If the problem persists, contact Delta-Q Technologies. ■ This error automatically clears once the condition has been corrected.

E-0-3-2	CAN Heartbeat Lost	▪ An error was detected with the CAN heartbeat communications with a registered node being guarded. ▪ Check the networked CANbus device(s) for correct functioning. ▪ This alarm does not display or get logged on the charger but does appear on the CAN bus via an emergency message.
E-0-3-6	Battery temperature sensor is missing or shorted	▪ Check sensor connections. ▪ The charger behavior when this fault occurs can be configured. OEMs may contact Delta-Q Technologies for more information. ▪ This error automatically clears once the condition has been corrected.
E-0-3-8	Fan will not turn	(Fan-equipped models only) ▪ Check fan connections. ▪ Check to make sure the fan turns freely and is not obstructed. ▪ This error automatically clears once the condition has been corrected.
E-0-4-0	Fan voltage pulled low	(Fan-equipped models only) ▪ Check to make sure the fan turns freely.
E-0-4-5	Battery disconnected	▪ Battery disconnected ▪ Reconnect the battery or check the wiring
E-0-4-6	Invalid PDO Length	▪ Check to make sure all PDOs are valid length. ▪ This error automatically clears once the condition has been corrected
E-0-4-7	Platform overvoltage alarm	▪ A battery or some other source has been connected to the charger that exceeds the hardware's design limits.

Notes

5.4 Scissors

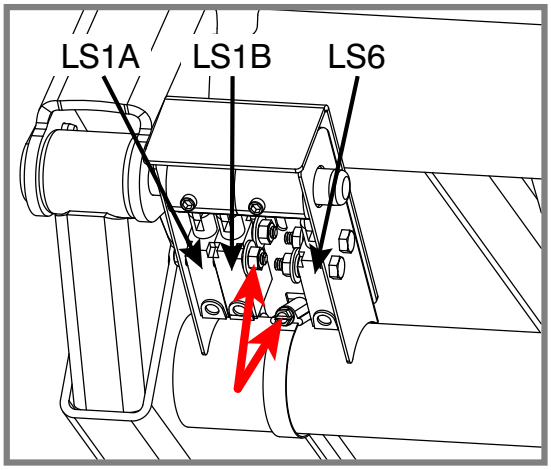
5.4-1 High Speed Cutout Limit Switches (LS1A & LS1B) & Drive Override Limit Switch (LS6) Replacement and Adjustment

Machine Preparation

1. Ensure the MEWP is parked on a firm level surface.
2. Chock or block the wheels to keep the MEWP from rolling forward or backward.

Limit Switch Removal

1. Raise the platform to give access to the limit switch cable, and deploy the maintenance stands.
2. Turn the emergency main power disconnect switch to the OFF position.
3. Remove the gear clamp securing the limit switch cover, and slide the limit switch cover off of the pin. Set aside the clamp for reinstallation later.
4. Remove the bolts, washers, and nuts securing the limit switches to the cover. Set the cover and hardware aside for reinstallation later.



5. Remove the limit switches and free the limit switch cable(s) by cutting the tie wraps.
6. Follow the cable into the plug and disconnect it from the rear harness. Discard the limit switches.

Limit Switch Replacement

1. Mount the new limit switch assembly, **130559**, using the hardware removed previously.

NOTE

High speed Cutout Limit Switch (LS1A) is the one closest to the scissor arm, then LS1B adjacent to it, and Drive Override Limit Switch (LS6) on the opposite side.

2. Slide the limit switch cover back onto the pin. Secure it with the gear clamp removed previously.

Limit Switch Electrical Connections

1. Route the limit switch cable(s) along the same path as the old one(s) into the 4-pin connector in the rear harness. Use tie wraps as needed to secure them at regular intervals.
2. Stow the maintenance stand and fully lower the platform.

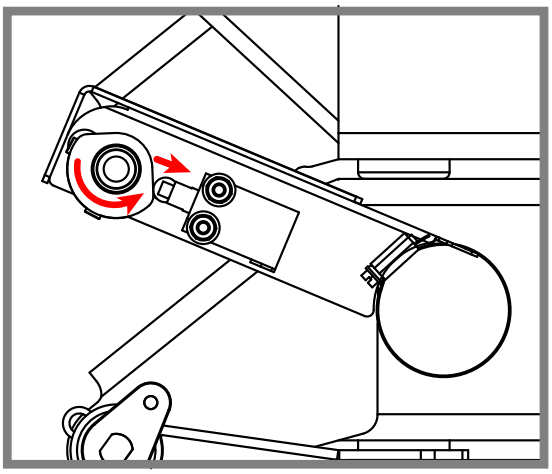
Limit Switch Cam Setup

1. Turn the emergency main power disconnect switch to the ON position.
2. Attach the end of a measuring tape to the side of the platform with a tie wrap, in such a way that the measuring tape will hang down freely to the ground.

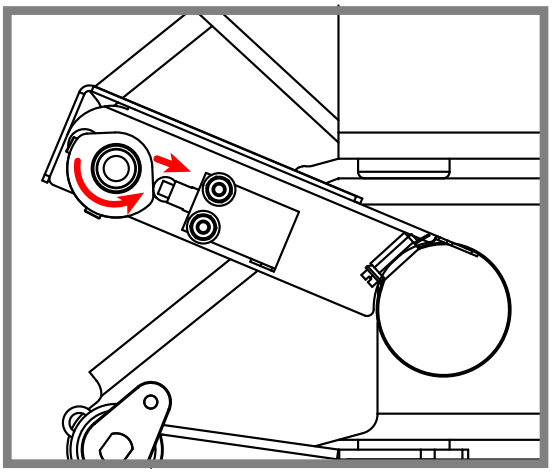
NOTE

The end of the measuring tape should be level with the standing surface of the platform.

3. **For High Speed Cutout Limit Switches**: Raise the platform until the distance from the standing surface of the platform to the ground measures 126”.
4. Loosen the set screws (x2) on the High Speed limit switch cam, and then rotate the cam until it depresses the limit switch plunger and a click is heard inside the limit switch. Repeat this step for the other high speed limit switch.



5. **For Drive Override Limit Switch:** Place a block, approximately 1.5” (3.75 cm), under the hydraulic/ electric tray and then raise the platform to an approximate height of 9.3 feet (2.8 meters) or until the pothole protection is activated.
6. Loosen the set screws (x2) on the Drive Override limit switch cam, and rotate the cam until it depresses the limit switch plunger and a click is heard inside the limit switch.



7. Fully lower the platform.

Limit Switch Testing

1. **For High Speed Cutout Limit Switch**: Raise the platform less than 126”, and drive the unit at full speed. The unit should move at high speed. Then raise the platform over 126”. The unit should automatically switch from high speed to low speed.

NOTE

High Speed Cutout should occur within the tolerance zone of 123” to 129”.

2. **For Drive Override Limit Switch:** Place a block, approximately 1.5” (3.75 cm), under the hydraulic/ electric tray and then raise the platform to an approximate height of 9.3 feet (2.8 meters) or until the pothole protection is activated. Attempt to drive forward or reverse. MEWP should not move forward or backward.

5.5 Load Sensing System

NOTE

Load sensing system should be tested on the first anniversary of the unit being in service. Afterwards, it should only be tested if major components have been replaced.

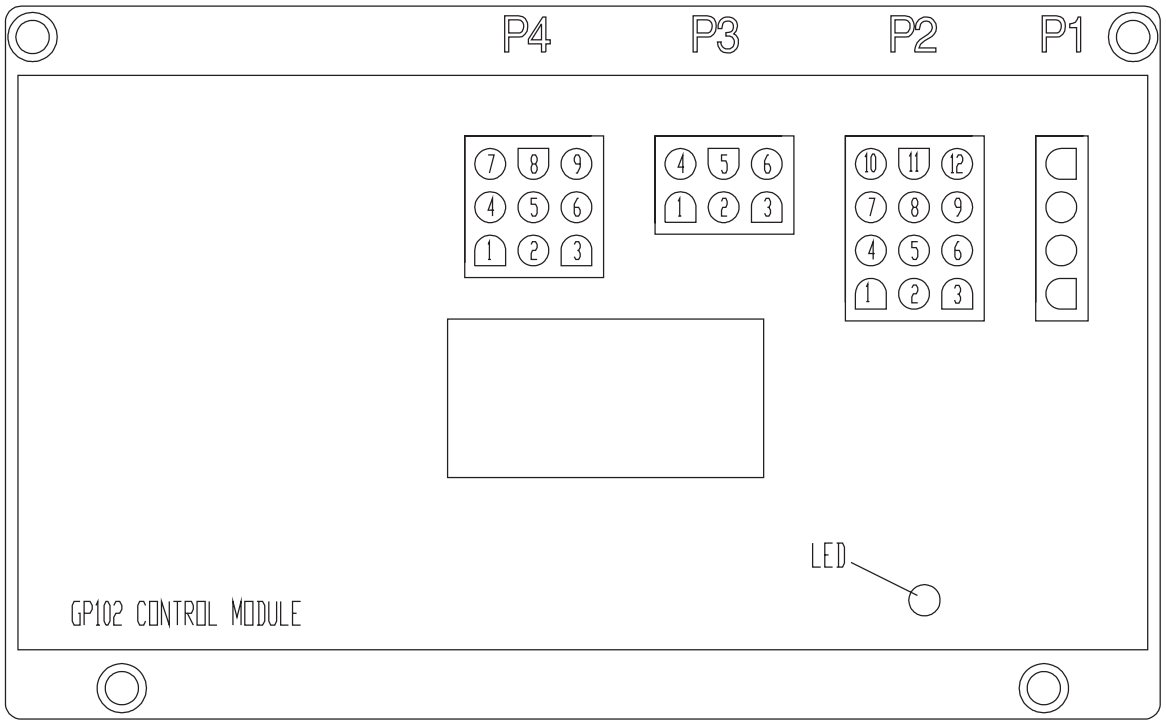
WARNING

Remove all equipment, tools, or accesssories, before starting system checks.

5.5-1 Systems Checks

1. Ensure batteries are fully charged.
2. Ensure you are familiar with the emergency lowering system and that it is fully functional.
3. Perform system functionality check as listed in the Operation manual.
4. Fully-lower platform.
5. Plug calibrator (EasyCal) into appropriate port on GP102 overload sensing controller.
6. Retract all extension decks.
7. Place rated load centered onto empty platform. Be sure to account for the weight, options or accessories on the platform or railings or remove all items.
8. The following steps may trigger an overload event, preventing upward motion on some machines. If this occurs, fully-lower the platform and repeat up to 2 more times. If overload is still triggered, stopping motion, recalibrate as per step 15. If the overload prevents lowering, use the emergency lowering procedure, as outlined in Operation manual, to lower machine.
9. Use base controls for all following movements. Holding enable (or key) switch in platform mode while calibrator is in use will prevent it from returning to its main menu.
10. 10.If at any time it is not possible to perform the required operation, go to step 15.
11. 11.Select the Diagnostics>System>Height menu.
12. Elevate until height is between 45% and 55%. Be sure to watch for overhead obstructions during this operation. If you accidentally pass 55%, lower to less than 40% and elevate into the required range. Ensure last motion was “Raise” and was at least 2s in duration.
13. Select the Diagnostics>System>Load menu.
14. Load reading should range from 95% to 110%. If not, recalibrate as per step 15.
15. If necessary, recalibrate as per procedure listed in Service manual with the following exceptions:
    a. Leave rated load on platform.
    a. When the calibrator displays “Calibrate Load: Empty? No”, press Enter.
    a. When the calibrator displays “Calibrate Load: Loaded? No”, using the UP button select “Calibrate Load: Loaded? Yes”, and press Enter.
16. Repeat steps 6 – 14 as necessary. If test cannot be passed after 2 calibration attempts, contact Skyjack Customer Service.
17. Fully lower platform.
18. Remove load.
19. Unplug calibrator.

5.5-2 GP-102 Control Module Pin Reference Chart



PLUG	PIN #	WIRE # AND COLOUR	WIRE FUNCTION
P1	The Calibration Connection		
P2	1	Not Used	Not Used
P2	2	10E Black/White	Input Power From Base Terminal Strip To Confirm Lower Control Is Selected
P2	3	14 Black	Raise Platform Input
P2	4	13 Orange	Lower Platform Input
P2	5	Not Used	Not Used
P2	6	Not Used	Not Used
P2	7	16 White/Black	Forward Direction Input
P2	8	15 Blue	Reverse Direction Input
P2	9	Not Used	Not Used
P2	10	18B Red/Black	Input From LS1 High Speed Limit Switch To Verify ON/OFF Limits
P2	11	02 White	Negative Input From Base Terminal Strip
P2	12	7A Red	Main Power Input From Base Terminal Strip
P3	1	22 Red	Output To FL-22 Flashing Light
P3	2	29 Black	Output To BP-29 Beeper
P3	3	60 Black/White	Output To Overload Warning Light On Control Box
P3	4	28 Green/Black	Output To 28CR1 Tilt Relay And 28CR2 Down Relay
P3	5	02 White	Negative for Flashing Light and Beeper
P3	6	28E Green/White	Output To 28ECR1 Aux. Tilt Relay And 28ECR2 Aux. Down Relay

P4	1	Not Used	Not Used
P4	2	60A Green	Varied Input From Transducer
P4	3	28B Green	Varied Input From Angle Transducer
P4	4	Not Used	Not Used
P4	5	Not Used	Not Used
P4	6	910 Black	Positive Signal To Angle Transducer
P4	7	900 White	Negative Signal To Pressure Transducer
P4	8	902 White	Negative Signal To Angle Transducer
P4	9	910A Black	Positive Signal To Pressure Transducer

5.5-3 LED Error Codes - Quick Reference Chart

HELP Message	LED indication
EVERYTHING OK	Steady on
IN GROUND MODE!	Steady on
OVERLOAD FUNCTIONS DISABLED!	6/6
VEHICLE TILTED	1/1
VEHICLE OVERLOADED	1/2
WAITING FOR B+ ON P2-12	5/2
ARMGUARD ACTIVE!	1/3
TOO HIGH - DRIVE PREVENTED	1/4
TOO HIGH - LIFT UP PREVENTED	1/5
TESTING HWFS	7/8
IDLE TIMEOUT ACTIVE!	Always off
WAITING FOR NEUTRAL	5/5
ARMGUARD ACTIVE!	2/3
ELEVATION SWITCH SHIFTED?	2/1
ELEVATION SWITCH STUCK?	2/2
NO LAST CALDATE!	6/3
LOAD NOT CALIBRATED	6/2
DRIVE/LIFT INPUTS FAULTY!	5/6
UP/DOWN SELECT INPUTS ACTIVE TOGETHER	5/4
INVALID LOAD - CHECK SENSORS	6/4
HEIGHT NOT CALIBRATED	6/1
INVALID HEIGHT - CHECK SENSOR	6/5
EMS INPUTS FAULTY!	5/2
B+ SUPPLY TOO LOW	5/1
P4-1 OR P5-1 SHORT TO 0V?	4/1
P3-4 SHORT TO SUPPLY!	4/2
P3-4 SHORT TO 0V?	4/3
P3-4 SHORT TO SUPPLY?	4/4
P3-6 SHORT TO 0V?	4/5
P3-6 SHORT TO SUPPLY?	4/6
FAULT: BAD TILT SENSOR	7/1
FAULT: BAD HWFS	7/2
FAULT: BAD SLAVE ANALOGS	7/3
FAULT: BAD STRAIN MONITORS	7/4
FAULT: BAD SLAVE MICRO	7/5
FAULT: HWFS STALLED!	7/6
STARTUP!	7/7
FACTORY OVERRIDE	6/7

1650AA

Reading the Codes:

In order to read the fault codes, a sequence of pauses and flashes can be seen on the LED mounted on the GP102 module. The codes are continuously displayed by the LED until the fault is cleared, the GP102 reset and no longer detects the fault, or idle timeout becomes active.

The sequence is as follows:

1. Quarter second flashes followed by quarter second pauses indicate the first digit.
2. A 1.5 second pause.
3. Quarter second flashes followed by quarter second pauses indicate the second digit
4. A 4 second pause. Repeat steps 1-4
5. Since the GP102 only reports one error, only one code can be read from the LED per instance. If the error is cleared and another error is present, it will then be presented.

5.5-4 LED Error Codes - Code Breakdown Chart

Diagnostic sequence dependant on LED flash code:

No Last Caldate	63
Load Not Calibrated	62
Height Not Calibration	61

An EZcal is required!

Waiting For Neutral	55
Drive/Lift Inputs Faulty!	56
Up/Down Select Inputs Active Together	54
EMS Inputs Faulty!	52

Check inputs on P2 pins 1,2,3,4,5,6,7,8.

P3-4 Short To Supply!	42
P3-4 Short To Supply?	44
P3-6 Short To Supply?	46

Disconnect plug P3. If fault clears there is a problem with the wiring from P3-4 or P3-6 to the rest of the vehicle.

Armguard Active!	23
Elevation Switch Shifted?	21
Elevation Switch Stuck?	22

If the 23 flash code is triggered by armguard, it will occur once then clean. This is not a true fault but just an indication of the reason for the vehicle stop. If the 21 or 22 flash code is triggered by a fault with the elevation switch, it will not clear. Check that the elevation switch correctly opens/closes when the platform is raised/lowered.

P3-4 Short To 0V?	43
P3-6 Short To 0V?	45

Disconnect plug P3. If fault clears there is a wiring fault from P3-4 or P3-6 to the rest of the vehicle.

Invalid Load - Check Sensors	45

Check the voltage out of the pressure transducer, into P4-2. It should be between 0.5V (zero pressure) and 4.5V (maximum pressure) and should vary as the platform load & position varies.

Waiting For B+ on P2-12	52
B+ Supply Too Low	51
P4-1 Or P5-1 Short To 0V?	41

Check that the battery voltage is not too low.
Verify battery voltage on P2-12.
Disconnect plug P4 – if the fault clears there is a wiring fault from P4-1 to the rest of the vehicle.

Vehicle Tilted	11
Vehicle Overloaded	12
Too High - Drive Prevented	14
Too High - Lift Up Prevented	15

These are not true faults but an indication that vehicle movement is prevented. Remove excessive load from the platform. Lower the platform if close to maximum height. Move the vehicle to level ground.

Invalid Height - Check Sensor	65

Check the voltage out of the height transducer, into P4-3. It should be between .4V and 4.6V and should vary as the platform position varies.

Testing HWFS	78
Start Up!	77

These are not true faults unless they do not clear.

Overload Functions Disabled!	66
Factory Override	67

These are not true faults – the GP102 has been configured to suppress overload functionality.

Idle Timeout Active!	Always Off
Fault: Bad Tilt Sensor	71
Fault: Bad HWFS	72
Fault: Bad Slave Analogs	73
Fault: Bad Strain Monitors	74
Fault: Bad Slave Micro	75
Fault HWFS Stalled!	76

Action a function to clear the idle timeout if it occurred. Ensure the GP102 is correctly mounted – incorrect mounting can cause the “bad tilt sensor” diagnostic to occur. Otherwise there may be an internal problem with the GP102.

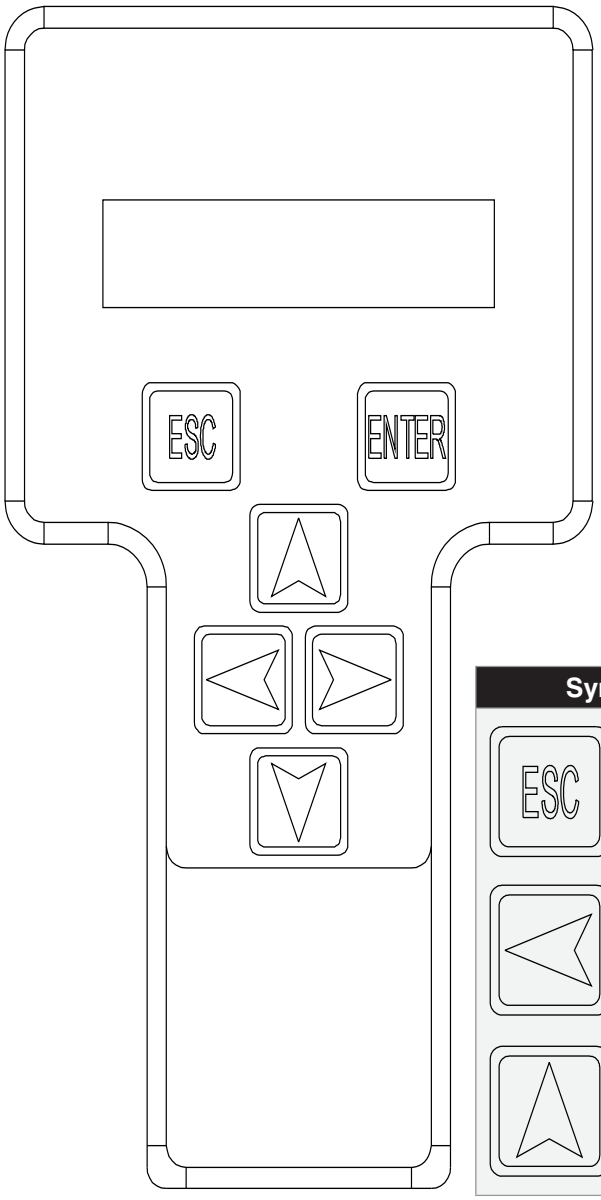
5.5-5 Hand held Calibration/Diagnostic Tool Key Functions

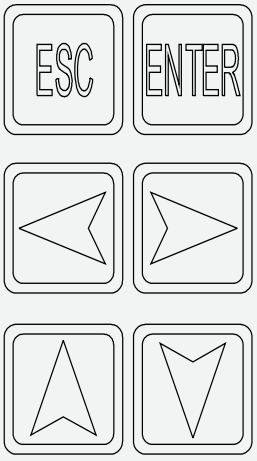
⚠ WARNING

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.



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

5.5-6 Control Module Load Calibration - Code Messages & Definitions

During calibration the following failure message may appear:

Code F01: Check HWFS This message is given if the GP102 startup tests have not completed.	**Check HELP message for more information.**
Code F02: Not Ground Mode This message is given if the machine is not in ground mode (P2-2 must be high).	**Calibration can only be carried out in ground mode.**
Code F03: Not Stopped This message is given if any function switch is closed.	**Check DIAGNOSTICS / SWITCHES to see which function switch is closed.**
Code F04: Tilted This message is given if the machine is tilted.	**Calibration must be carried out with the machine level. If the machine is level, use the SETUPS / TILT SETUPS to set the GP102 level.**
Code F05: Bad Height This message is given if the height sensor output (P4-3) is out of range at the start of calibration.	**The height sensor output must be 3.7V. Check DIAGNOSTICS / SENSORS to see the output. A reading of 0V or 5V is probably due to a wiring problem.**
Code F06: Check Elev This message is given if the elevation switch (P2-10) is closed at the start of calibration, when the operator has confirmed the “PLATFORM DOWN?” question.	**If the platform is down, check the elevation switch wiring.**
Code F08: Check Elev This message is given if the elevation switch (P2-10) is closed at the end of calibration, when the platform should be fully raised. This message would occur if the UP switch was accidentally opened near the start of the lift.	**If the platform is fully raised, check the elevation switch wiring.**
Code F09: Bad Height This message is given if the height sensor output (P4-3) is out of range at the start of calibration.	**The height sensor output must be 3.7V. Check DIAGNOSTICS / SENSORS to see the output.**
Code F10: Bad Height This message is given if the height sensor output (P4-3) is out of range at the end of calibration. The height sensor output must be between 0.9V and 4.1V.	**Check DIAGNOSTICS / SENSORS to see the output. A reading of 0V or 5V is probably due to a wiring problem.**
Code F11: Not Up This message occurs at the start of calibration if the operator selects a function other than UP.	**Select the UP function only.**

Code F13: Low Height Range This message occurs at the end of calibration if the height sensor output did not change sufficiently to give a reasonably accurate platform height estimate. This message could occur if the UP switch was accidentally opened too early (when the platform is not fully raised).	**DIAGNOSTICS / SENSORS can be used to check the height sensor output (P4-3). A difference of at least 1V is to be expected.**
Code F15: Check Elev This message is given if the elevation switch (P2-10) is closed when the platform has been fully lowered at the endof calibration. This message would occur if the DOWN switch was accidentally opened before the platform was fully lowered.	**If the platform is fully lowered, check the elevation switch.**
Code F16: Low Elev.open This message is given if the elevation switch (P2-10) opened during lift at a too low height (below 5%).	**Check CALIBRATIONS / HEIGHT CALS; the "ElevUp" value shows the recorded height where the switch opened. Set up elevation switch to manufacturers' specifications and calibrate load.**
Code F17: High Elev.open This message is given if the elevation switch (P2-10) opened during lift at a too high height (above 25%)	**Check CALIBRATIONS / HEIGHT CALS; the "ElevUp" value shows the recorded height where the switch opened. Set up elevation switch to manufacturers' specifications and calibrate load.**
Code F18: Low Elev.close This message is given if the elevation switch (P2-10) closed during lower at a too low height (below 5%).	**Check CALIBRATIONS / HEIGHT CALS; the "ElevDown" value shows the recorded height where the switch opened. Set up elevation switch to manufacturers' specifications and calibrate load.**
Code F19: High Elev.close This message is given if the elevation switch (P2-10) closed during lower at a too high height (above 25%).	**Check CALIBRATIONS / HEIGHT CALS; the "ElevUp" value shows the recorded height where the switch opened. Set up elevation switch to manufacturers' specifications and calibrate load.**
Code F20: Height<>0% This message occurs if the platform height is not 0% after the platform has been fully lowered during either STATIC lift. The platform must return to the same height each time it is fully lowered.	**Check DIAGNOSTICS / SYSTEM to check the height.**
Code F28: Bad Height This message indicates a problem with the height sensor output (P4-3) during calibration. The height sensor output must be between 1.0V and 4.0V at all times.	**Check DIAGNOSTICS / SENSORS to see the output. A reading of 0V or 5V is probably due to a wiring problem.**

Code F42: Low Pressure This message indicates that the pressure transducer output (P4-2) is too low (0.5V or less) at the beginning of calibration.	**Check DIAGNOSTICS / SENSORS to read output.**
Code F43: High Pressure This message indicates that the pressure transducer output (P4-2) is too high (4.5V or more) at the beginning of calibration.	**Check DIAGNOSTICS / SENSORS to read output.**
Code F44: Low Pressure This message indicates that the pressure transducer output (P4-2) is too low (0.5V or less) at a measurement point.	**Check DIAGNOSTICS / SENSORS to read output.**
Code F45: High Pressure This message indicates that the pressure transducer output (P4-2) is too high (4.5V or more) at a measurement point.	**Check DIAGNOSTICS / SENSORS to read output.**
Code F46: Check Elev This message indicates that the elevation switch opened more than once during calibration lifting.	
Code F47: Check Elev This message indicates that the elevation switch closed more than once during calibration lower	
Code F48: Bad Pressure This message indicates that the pressure transducer output (P4-2) is out of range at the beginning of calibration	**Check DIAGNOSTICS / SENSORS to read output.**
Code F52: Too Few This message indicates that not enough measurements were recorded during calibration lifting or lowering.	
Code F98: Out of Range This message indicates that the “fine tune” calibration is unacceptable. This is probably due to a faulty transducer or faulty/ open holding valve(s)/ emergency lowering valve.	

During calibration the following information messages may appear: Platform Down?
This message is prompting for confirmation that the platform is fully lowered. If necessary the DOWN switch canbe activated to lower the platform. Press ENTER to confirm when the platform is fully lowered.

Platform Empty?
This message is prompting for confirmation that the platform is completely empty. Press ENTER to confirm if the platform is empty.

Platform Loaded?
This message is prompting for confirmation that the platform is loaded to rated load Press ENTER to confirm if the platform is loaded.

Please Lift
This message is prompting for the platform to be raised. The UP switch should be closed.

Please Lower
This message is prompting for the platform to be lowered. The DOWN switch should be closed.

Lift Empty
This message is displayed while the platform is being raised to the next measurement height, when an EMPTY platform is being calibrated.

Lift Loaded
This message is displayed while the platform is being raised to the next measurement height, when a LOADED platform is being calibrated.

Lifting
This message is displayed while the platform is being raised, during HEIGHT-only calibration.

Measuring #
This message is displayed when the platform is stopped during calibration, when the GP102 takes a measurement.
There will be a short delay while the machine is allowed to stabilize after movement is stopped.

Must Go Down!
This message occurs if the wrong switch is closed when the GP102 is waiting for the platform to be lowered.

Must Go Up!
This message occurs if the wrong switch is closed when the GP102 is waiting for the platform to be raised.

Please Wait
This message indicates that the GP102 is busy; the delay will be short (no more than 5 s).

Lower Empty
This message is displayed while the platform is being lowered to the next measurement height, when an EMPTY platform is being calibrated.

Lower Loaded
This message is displayed while the platform is being lowered to the next measurement height, when an EMPTY platform is being calibrated.

Lowering
This message is displayed while the platform is being lowered, during HEIGHT-only calibration.

Total Data:
This message is displayed at the end of each phase, to confirm the number of measurements recorded by the GP102.

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

Finished
This message confirms that calibration is complete and successful.

5.5-7 Control Module Load Calibration Procedure

1. Move the MEWP to a test area where the platform can be elevated to its maximum working height and reach.
2. Ensure the MEWP is parked on a firm, level surface.

IMPORTANT

Each phase must be completed before the next phase can be carried out. All phases must be completed before the MEWP can be operated.

IMPORTANT

Always follow the instructions of the Calibration instrument.

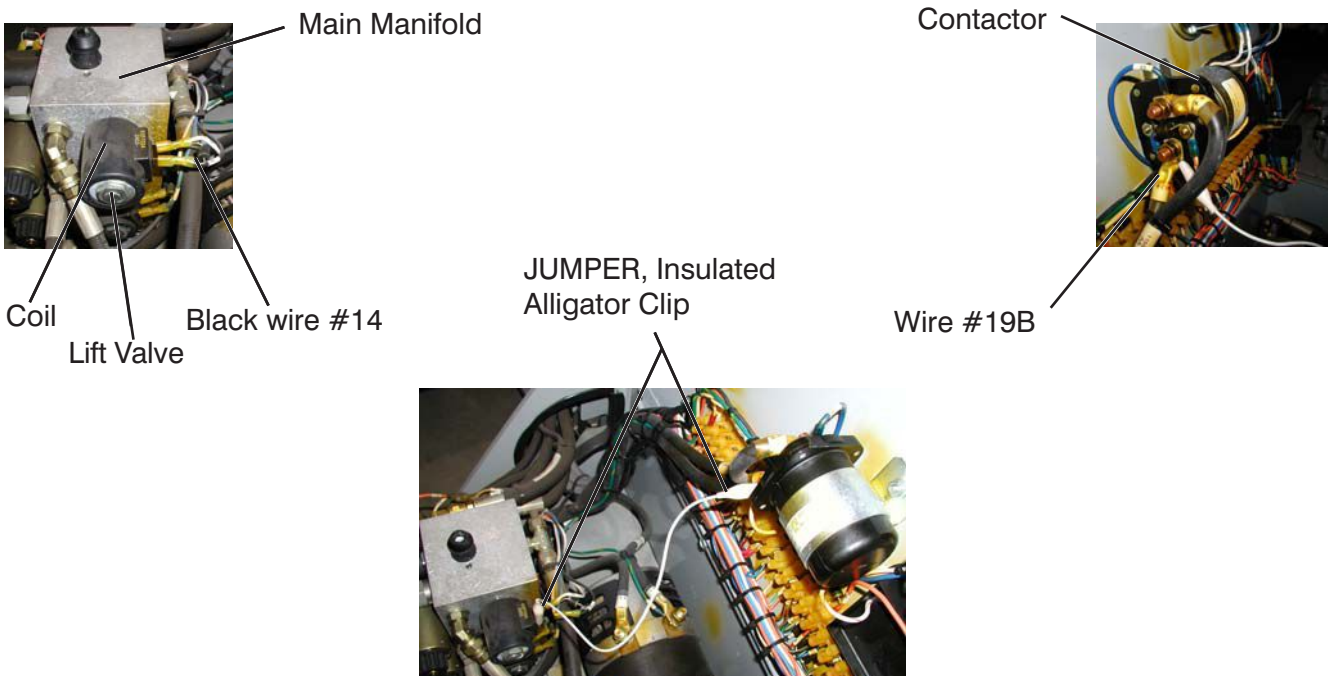
IMPORTANT

Make sure the MEWP is on BASE mode.

NOTE

To ensure a good and clear contact, clean the wire terminals before attaching the jumper clip.

3. Locate the main manifold inside the hydraulic/electric tray.
4. Disconnect the black wire #14 from the lift coil.
5. Locate the contactor on the electrical panel assembly.
6. The jumper connection must be connected between the contractor (wire #19B) and the lift coil (instead of the black wire #14)



7. Connect the Easy-Cal tool to the P1 connector on the CONTROL MODULE.

8. The display will show **“Help: Press Enter”.** By using Left/Right buttons, select the “Access Level (?)” from the menu and press the ENTER button.

Contact Skyjack Service Department at:
(44) 1691-676 236 for your Access Level Code Number.

9. The display will show **“Access Level Code (xxxx)”.**
   - By using the Up/Down buttons, enter the Access Level Code (xxxx) followed by pressing the **ENTER** button.
10. The display will show **“Access Level 2”.**
    - By using Left/Right buttons, select the “Setups” from the menu and press the **ENTER** button.
11. The display will show **“Machine Defaults”.**
    - Select the “Machine Defaults” from the menu and press the **ENTER** button.
12. The display will show **“Defaults, 0 = Custom”.**
    - By using Left/Right buttons, select the “X = Group Code” from the menu and press the **ENTER** button.
13. The display will show **“X=GROUP CODE”.** (Refer to 5.5-9 Curve/Group Codes Chart)
    - By using the Up/Down buttons, enter the “Group Code (?)” then by using Left/Right buttons, select the “**Curve**” from the menu.
14. The display will show **“X=CURVE”.** (Refer to 5.5-9 Curve/Group Codes Chart)
    - By using the Up/Down buttons, enter the “Curve Code (?)” followed by pressing the **ESCAPE** button.
15. The display will show **“Machine Defaults”.**
    - By using Left/Right buttons, select the “Tilt Setups” from the menu and press the **ENTER** button.
16. The display will show **“Tilt Setups: Calibrate Level”**.
    - Select the **“Tilt Setups: Calibrate Level”** from the menu and press the **ENTER** button.
17. The display will show **“Calibrate Level: Yes: Enter, No: ESC”**.
    - Select the **“Yes”** from the menu by press the **ENTER** button.
18. The display will show **“Calibrate Level: Tilt 0.0’ , 0.0’”.**
    - Select the “**ESCAPE**” from the menu once.
19. The display will show **“Tilt Setups Calibrate Level**”.
    - Select the “**ESCAPE**” from the menu once again.
20. The display will show “Setups Tilt Setups”.
    - By using Left/Right buttons, select the “Load Setups” from the menu and press the **ENTER** button.
21. The display will show **“Load Setups: Calibrate Load”.**
    - Select the **“Load Setups: Calibrate Load”** from the menu and press the **ENTER** button.
22. The display will show **“Calibrate Load: Platform Down?”**.
    - Asking for confirmation that the platform is fully lowered?
    - Check that the platform is fully lowered then press the **ENTER** button to confirm.
23. The display will show **“Calibrate: Loaded Empty? No”.**
    - Asking for confirmation that the platform is empty?
    - Check that the platform is empty.
24. By using the Up/Down buttons, enter the “Yes” followed by pressing the **ENTER** button.
25. The display will show “**Calibrate Load: Please Lift.....**”.
    - Waiting for the lift switch to be activated.

26. Hold the lift switch and keep holding it until the platform is fully elevated.

IMPORTANT

If the lift switch is released earlier than full-height position, the calibration will have to be aborted and repeated from the beginning!

27. When the system detects the lift switch closed, the display will show "**Calibrate Load: Lift Empty**".

28. After a delay, the system will stop the platform lifting and will take height & pressure measurements; the display will show "**MEASURING # xx**" When the measurements have been taken, the platform will resume lifting.

NOTE

The Lifting.....stopping.....measuring....lifting process will continue until the platform reaches full height.

29. When the platform reaches full height release the lift switch.

30. The display will briefly show "**TOTAL DATA: 04**" to indicate the number of measurements taken.

31. The display will show "**Calibrate Load: Please Lower.....**".

NOTE

The lowering.....stopping.....measuring....lowering process will continue until the platform is fully lowered.

32. Hold the lower switch and keep holding it until the platform is fully lowered.

33. When the system detects the lower switch closed, the display will show "**Calibrate Load: Lower Empty**"

34. After a delay, the system will stop the platform lowering and will take height & pressure measurements; the. display will show "**MEASURING #xx**". When the measurements have been taken, the platform will resume lowering.

IMPORTANT

If the lower switch is released earlier than full-lower position, the calibration will have to be aborted and repeated from the beginning!

35. When the platform is fully lowered, release the lower switch.

36. The display will show briefly "**TOTAL DATA: 04**" to indicate the number of measurements taken.

37. The display will show "**Calibrate Load: Caldate: mm/dd/yy**".

38. It is recommended that the current date be entered here to provide easy taking of the data of last calibration.

39. The current date must be entered using the **LEFT**/**RIGHT** and **UP**/**DOWN** buttons.

40. Press ENTER to complete date entry (the system will store it). Display will show "**FINISHED**".

41. Remove the jumper wire and re-connect the black wire #14 to the coil removed earlier.

42. Close the hydraulic/electric tray.

NOTE

Continuing partially complete load calibration.

If the phase does not need to be repeated, just press **ENTER** to move on.
If the phase does need to be repeated, press **UP** or **DOWN** to change "**NO**" to "**YES**" then press **ENTER**.

5.5-8 All Motion Alarm

1. If necessary, recalibrate the control module as per procedure listed in service manual.
2. Plug calibrator (EasyCal) into appropriate port on GP102 overload sensing controller.
3. Set the “Movement Alarm” settings to 4.
4. Test the alarm by moving the machine. If the alarm starts making a sound during any motion, the All Motion Alarm is enabled.

5.5-9 Curve/Group Codes Chart

Model	Standard	Model Part Number	Number and Type of Extension Platforms	Group Code	Curve Code
4740	CE	199159	1 Manual Extension Platform	3	60
4740	AS	158226	1 Manual Extension Platform	24	60

1651AA

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