Doosan Infracore
Portable Power

ELECTRONIC SERVICE MANUAL

HP375WCU T3 (E60)
XP375WCU-T3 (E59)

COMPRESSOR MODELS

Doosan Infracore Portable Power
1293 Glenway Drive
Statesville, N.C. 28625
DoosanPortablePower.com

Book: 46598506 (12-2012) Rev B

Table of Contents

SECTION 1 – General Information

Operational Theory

The HP375WCU and XP375WCU Tier 3 compressors have an electronic system that provides discharge air pressure control and package monitoring functions. The system uses the WEDGE controller to perform these functions. The electrical system connects all the necessary switches, sensors and transducers to the WEDGE controller in order for it to perform the monitoring and control functions.

WEDGE Controller

The WEDGE controller is the heart of the compressor monitoring and control system. It provides data collection, package monitoring, and control functions for compressor operations. It is a microprocessor-based controller with analog and digital inputs and outputs.

The WEDGE controller is attached to a bracket mounted to the lifting bail inside the machine over the fuel tank. A laminate is attached to the bracket to identify the diagnostic lamps and the display.

The first function of the WEDGE controller is to scan all inputs at a fixed interval. The analog values are compared to minimum and maximum values and an ALERT or SHUTDOWN is issued if a value is out of range. The various ALERTS and SHUTDOWNS are listed in the Compressor Diagnostic Code Troubleshooting section.

The second function of the WEDGE controller is compressor discharge pressure control. The WEDGE monitors the regulation system air pressure and varies the engine throttle to maintain the setpoint discharge air pressure. The setpoint pressure is set by adjusting the pressure regulator.

The third function of the WEDGE controller is to communicate with the engine ECM and other control modules over the J1939 CAN network. Diagnostic and control information is passed between the WEDGE, engine ECM, and other optional controllers over the J1939 CAN Network. The engine throttle setting is sent from the WEDGE to the engine ECM. Figure 1-1 shows the connection layout between the WEDGE controller and engine ECM.

Sensors and Transducers

The electronics system uses temperature sensors and pressure transducers to monitor the compressor operation. The temperature sensors used to measure compressor temperatures are thermistor type devices. The resistance output of the temperature sensor changes with a temperature change of the parameter being monitored. The WEDGE controller receives the resistance value of the sensor and converts it to a temperature value. The WEDGE uses the temperature value to ensure the parameter being monitored is within its operating limits.

The pressure sensors used to measure compressor pressures are transducer type devices. These devices have an output signal of 0.5 VDC to 4.5 VDC where 0.5 VDC corresponds to 0 PSI and 4.5 VDC corresponds to the maximum PSI rating for a particular transducer. Pressure sensors are provided with 5 VDC from the WEDGE controller for excitation voltage. Also the sensor return or ground connects to the WEDGE controller. The output voltage of the pressure sensor changes with a pressure change of the parameter being monitored. The WEDGE controller receives the voltage of the sensor and converts it to a pressure value. The WEDGE uses the pressure value to ensure the parameter being monitored is within its operating limits.

Digital Inputs and Outputs

The WEDGE controller scans digital inputs such as switch contacts. These are either 24 VDC or (0 VDC). These digital inputs are connected to switches within the package.

The WEDGE controller provides 24 VDC digital outputs to control solenoids, relays, and other devices. These are 24 VDC "ON" and 0 VDC "OFF". They are current limited and short circuit protected.

Controller Outputs

The WEDGE controller has three types of outputs: frequency, pulse width modulated (PWM) and 24 VDC digital (ON/OFF).

Pressure Control

The discharge pressure is controlled by manipulating the engine speed and compressor inlet valve position. The inlet valve position is controlled pneumatically and the engine speed is controlled by the WEDGE controller. The WEDGE measures the pneumatic system regulation pressure and computes the engine throttle setting. This throttle setting is sent to the engine ECM via the J1939 CAN network. This throttle technique is referred to as J1939 throttle. The engine ECM will control engine speed to this throttle setting.

Engine Electronics

The HP375WCU and XP375WCU model compressors contain a Tier 3 emissions certified diesel engine. The engine has an electronic control system. The engine ECM handles all monitor, alarm, and control functions for the engine. The WEDGE controller communicates with the engine ECM over the J1939 CAN network.

J1939 CAN Link

The J1939 CAN network is a twisted pair of wires located in the compressor and engine harness. These wires are the network link between all electronic control modules. The wires are color coded yellow and dark green. The yellow wire is referred to as CAN High (+) and the dark green wire is referred to as CAN Low (-). Figure 1-2 shows the connection layout of the CAN network.

Located on each end of the J1939 CAN network are termination resistors (terminator). The terminators prevent reflections on the transmission line and must be in place for the network to function properly.

Electrical System

The electrical system consists of the wiring harnesses and associated electrical devices such as relays, switches, sensors and solenoids. There are three wiring harnesses on this compressor.

- Control Panel Harness
- Compressor and Engine Harness
- Engine Intake Air Heater Harness

Figure 1-3 shows the connection layout of the harness system.

The electrical circuits are protected by the ATC style fuses. A fuse should only be replaced with one of the same rating. Installing a larger rated fuse could lead to wiring harness damage.

WEDGE TO ENGINE ECM
CONNECTION LAYOUT
CUMMINS CM850 ENGINE ECM

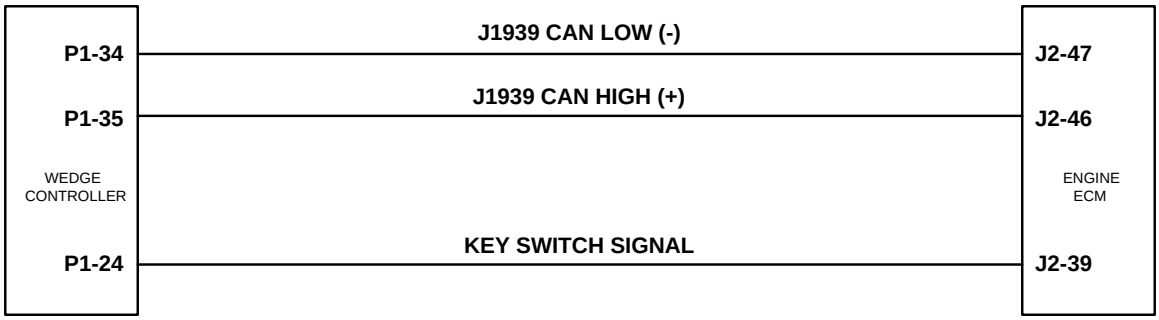


FIGURE 1-1

J1939 CAN BUSS
CONNECTION LAYOUT

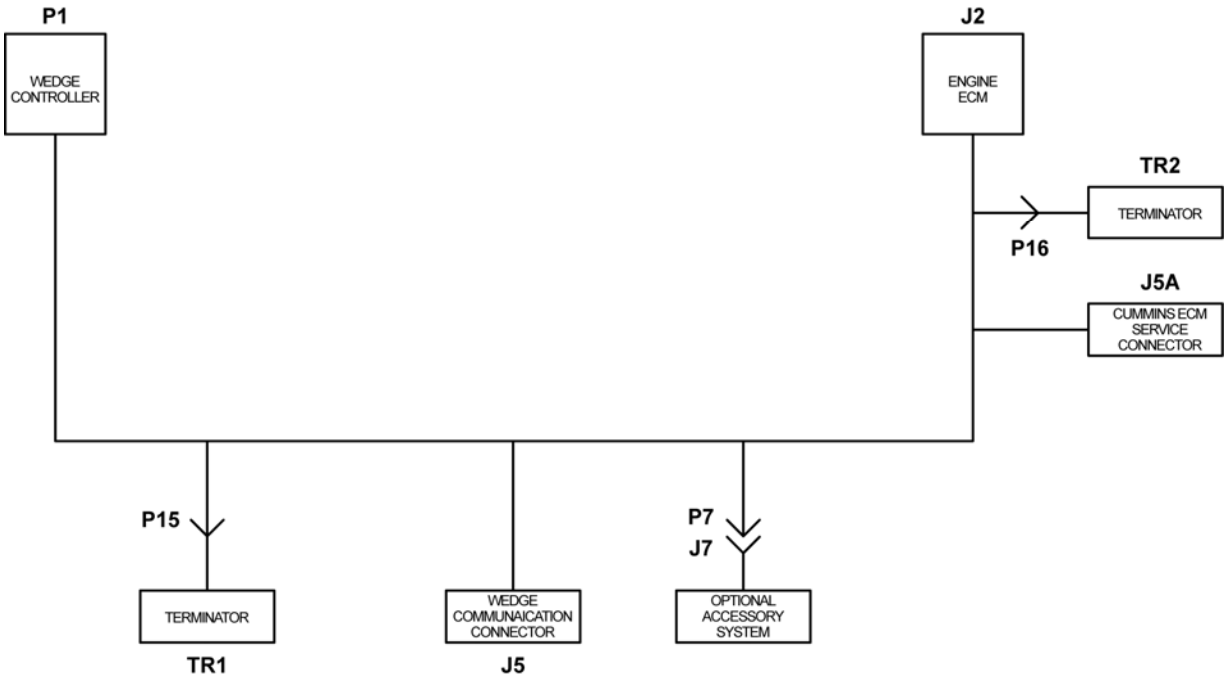


FIGURE 1-2

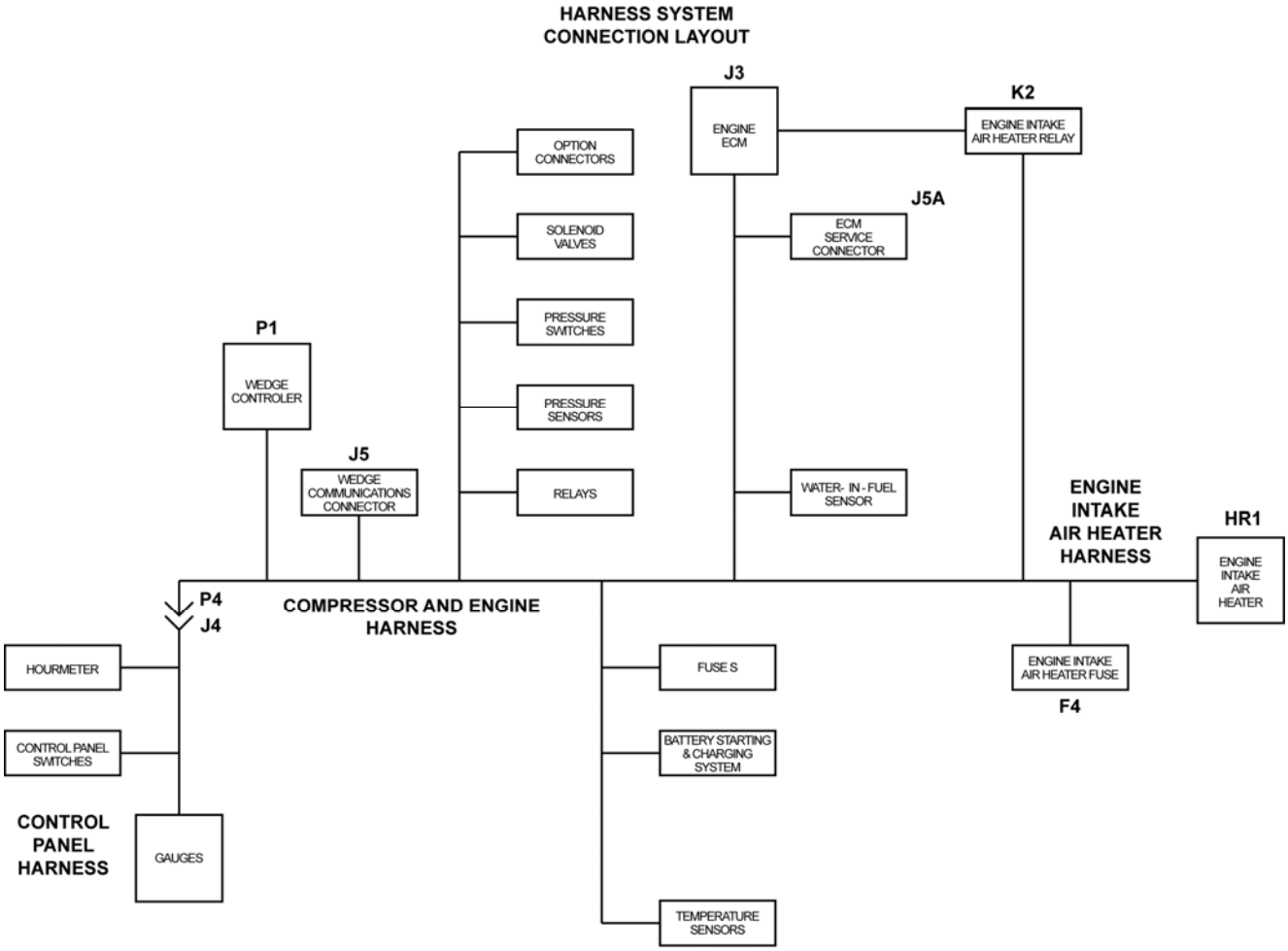
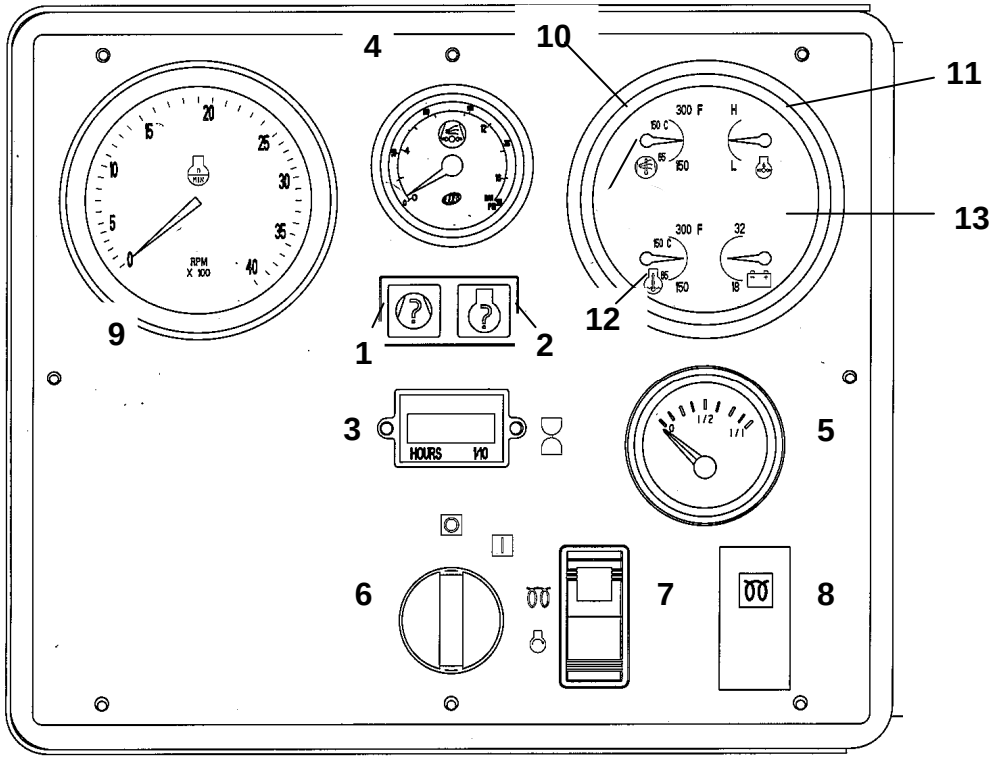

HARNESS SYSTEM
CONNECTION LAYOUT
J3
ENGINE
ECM
K2
ENGINE INTAKE
AIR HEATER RELAY
OPTION
CONNECTORS
J5A
SOLENOID
VALVES
ECM
SERVICE
CONNECTOR
PRESSURE
SWITCHES
P1
WEDGE
CONTROLER
PRESSURE
SENSORS
J5
WEDGE
COMMUNICATIONS
CONNECTOR
RELAYS
WATER- IN - FUEL
SENSOR
ENGINE
INTAKE
AIR HEATER
HARNESS
HR1
ENGINE
INTAKE
AIR
HEATER
P4
J4
COMPRESSOR AND ENGINE
HARNESS
HOURMETER
FUSE S
ENGINE INTAKE
AIR HEATER FUSE
F4
CONTROL PANEL
SWITCHES
BATTERY STARTING
& CHARGING
SYSTEM
CONTROL
PANEL
HARNESS
GAUGES
TEMPERATURE
SENSORS

FIGURE 1-3

Key Electrical Component Functions

PT1:	PT1 is a 0-225 psi gauge pressure transducer that measures discharge air pressure.
PT2:	PT2 is a 0-100 psi gauge pressure transducer that measures regulation system pressure.
RT1:	RT1 is a 10K ohm Thermistor type temperature sensor that measures separator tank temperature.
RT2:	RT2 is a 10K ohm Thermistor type temperature sensor that measures airend discharge temperature.
K1:	K1 is a SPST, 24 VDC relay used to engage the engine starter solenoid.
K2:	K2 is a SPST, 24 VDC relay used to energize the engine inlet heater.
U1:	U1 is a resistive level detector and low level switch sensor used to monitor fuel level. The resistive function drives the fuel gauge and the switch function opens to shut the machine down on low fuel level.

Operating Controls and Instruments



The operating controls and instruments are arranged on the control panel as shown above. A description of each panel device is as follows:

1. **Compressor Malfunction Diagnostic Light:** Indicates ALERT or SHUTDOWN displayed number is a Compressor Diagnostic Code. (see WEDGE on inside of machine)

2. **Engine Malfunction Diagnostic Light:** Indicates ALERT or SHUTDOWN displayed number is an Engine Diagnostic Code. (see WEDGE on inside of machine)

3. **Hourmeter:** Indicates machine operating hours.

4. **Discharge Air Pressure Gage:** Indicates pressure in receiver tank, normally from 0 psi (kPa) to the rated pressure of the machine.

5. **Fuel Level Gauge:** Indicates level of fuel in fuel tank.

6. **Main Ignition Switch:** ON/OFF Start Switch

7. **Service Air Switch:** Momentary ON/OFF switch. Allows user to load compressor after engine warm-up.

8. **Wait To Start Lamp:** Indicates engine inlet heater is operating wait till lamp turns off before starting machine.

9. **Engine Tachometer:** Indicates engine speed in RPM from 0 when stopped to full speed. (If equipped)

4 –IN-1 Gauge Assembly (if equipped)

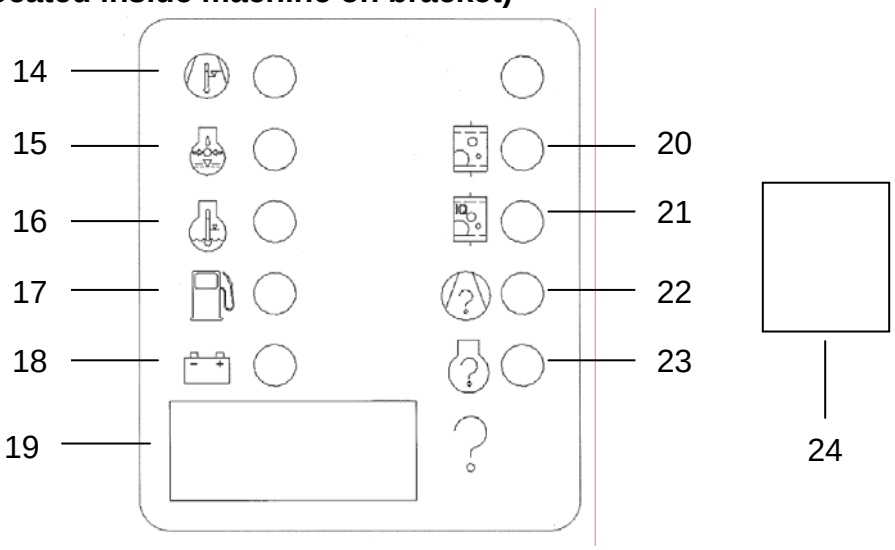
10. **Compressor Oil Temperature Gauge**

11. **Engine Oil Pressure Gauge**

12. **Engine Coolant Temperature Gauge**

13. **Battery Voltage Gauge**

WEDGE Lights (located inside machine on bracket)



14. **High Compressor Temperature Diagnostic Light:** Indicates SHUTDOWN due to high compressor temperature.

15. **Low Engine Oil Pressure Diagnostic Light:** Indicates ALERT or SHUTDOWN due to low engine oil pressure.

16. **High Engine Coolant Temperature Diagnostic Light:** Indicates ALERT or SHUTDOWN due to high engine coolant temperature.

17. **Low Fuel Level Diagnostic Light:** Indicates ALERT or SHUTDOWN due to low fuel level.

18. **Low Battery Voltage Diagnostic Light:** ALERT indication battery or charging system requires service.

19. **Numeric Display:** Used to display diagnostic codes and machine operational parameters.

20. **Restricted Air Filter Diagnostic Light:** ALERT indication engine/compressor air inlet filters need service. (if equipped)

21. **Restricted IQ Air Filters Diagnostic Light:** Indicates SHUTDOWN due to dirty IQ air filters (if equipped).

22. **Compressor Malfunction Diagnostic Light:** Indicates ALERT or SHUTDOWN displayed number is a Compressor Diagnostic Code.

23. **Engine Malfunction Diagnostic Light:** Indicates ALERT or SHUTDOWN displayed number is an Engine Diagnostic Code.

24. **Data Input Switch:** Momentary ON/OFF switch. Allows user to toggle through WEDGE service diagnostic display, set display units, and set machine ID.

Operational Information

Models: XP375WCU, HP375WCU

Power On
When the Ignition switch is turned to the “ON” position:

- Keyswitch signal (24 VDC) supplied to engine ECM from WEDGE.

Startup
When the Ignition switch is turned to the “START” position:

- Engine starter is energized.
- Start/Run solenoid valve (L1) is opened (energized).

When the engine speed reaches 600 RPM (engine start declared):

- Engine starter is de-energized.
- Engine speed is set to 1600 RPM.

When the engine speed reaches 1450 RPM:

- Start/Run solenoid valve (L1) is closed (de-energized).

When the separator tank reaches 50 psi:

- Start/Run solenoid valve (L1) is opened (energized).

After 5 seconds:

- Engine speed is set to idle. (1600 RPM until engine coolant temperature reaches 100^{o}F, and then idle is set to 1500 RPM).

Load
When the Service Air switch is pressed:

- Engine speed is set to 2200 RPM.

When the engine speed reaches 2000 RPM:

- Start/Run solenoid valve (L1) is closed (de-energized).

After 2 seconds, if the regulation system pressure is 4 psi or greater:

- Engine speed control is engaged.

SECTION 2 - Settings

Reading and Setting Display Units

The WEDGE has four choices for display units:

°F, PSI
°C, Bars
°C, kPa
°C, Kg/cm2

To determine which units the WEDGE has been configured for:

1. With the ignition switch turned “OFF”

2. Press and hold the "Service Air" Switch

3. Turn the ignition switch directly to the crank position.

4. Hold these switch positions until the numeric display on the WEDGE goes blank.

5. Release "Service Air" switch, release ignition switch to the "ON" position.

The current units will be displayed for 2 seconds. The units will be displayed as:

°F, PSI will be displayed as "PSI"
°C, Bars will be displayed as "bar"
°C, kPa will be displayed as "HPA"
°C, Kg/cm2 will be displayed as "H9C"

To change the units setting:

1. With the WEDGE showing the current units setting, press and release the "Service Air" switch until the desired units appear on the display.

2. Once it appears, do not release the "Service Air" switch. Keep the switch pressed until the WEDGE restarts. This will change the units to the desired selection.

3. Release the "Service Air" switch.

4. Cycle the power using the ignition switch. The machine is now ready to start and displaying the units selected.

Wedge Service Diagnostic Display

The WEDGE controller provides a diagnostic capability that allows various machine parameters to be viewed on the numeric display. The diagnostic display can be accessed with the machine stopped or while it is operating. The “Data Input” switch located beside the WEDGE controller inside the unit is used to toggle through the list of parameters.

If the “Data Input” switch is broken then the following method can be used: If the machine is stopped, the “Service Air” switch on the control panel is used to toggle through the list of parameters. If the machine is operating, the “START” position of the ignition switch is used to toggle through the list of parameters.

To view the parameters, use the “Data Input” switch to scroll to the desired display number. After 1 second, the display number will disappear and the desired parameter will be displayed. After 3 minutes, the display will return to normal mode. The toggle only works in the ascending order direction, but it will wrap around and start over.

Display	Parameter	Remarks
2	Not Available	
3	Engine RPM	Filtered Value From WEDGE
4	Regulation System Pressure	From PT2
5	Separator Tank Pressure	From PT1
6	Airend Discharge Temperature	From RT2
7	Separator Tank Temperature	From RT1
8	Target Engine RPM	Throttle Command to Engine
9	Machine ID	Selected Machine Type
10	Engine Coolant Temperature	From Engine ECM
11	Not Available	
12	Engine Oil Pressure	From Engine ECM
13	Engine Intake Manifold Temperature	From Engine ECM
14	Engine RPM	From Engine ECM
15	Engine Fault Codes	From Engine ECM
16	Engine Throttle Position	From Engine ECM (Percent %)
17	Not Available	
18	Engine Hours	From Engine ECM
19	Engine Load at Speed	From Engine ECM (Percent %)
20	Set Machine ID	To Set Selected Machine Type

Entering Machine ID for WEDGE Control Systems

For machines with the WEDGE controller mounted inside the control panel/instrument panel box, the "Service Air" switch is used to enter the machine ID. Disconnect the fuel level sensor (if equipped, will be located in the fuel tank), before starting the process and reconnect once the process is completed.

For machines with the WEDGE controller mounted in the engine compartment, the rocker switch beside the WEDGE is used to enter the machine ID. If a machine ID other than 16 has been entered into the WEDGE, then the “Service Air” switch on the front control panel will have to be used to enter the correct machine ID. This may require the help of an additional person to see the WEDGE display.

For the instructions below, the "Service Air" or rocker switch will be referred to as the "data input switch".

1. Examine the machine data plate to confirm the machine model.
   Using the machine model from the data plate, locate the proper machine ID from the “Machine Models List” in this manual.

2. Turn ignition switch to the "ON" position. Machine must not be operating.

3. Toggle the data input switch twice and the number "2" will appear on the WEDGE 4-digit numeric display. Continue to toggle the switch until the number "9" is reached. Read the machine ID on the display. If it matches the proper machine ID in Step 1, stop. If not, proceed to step 4.

4. Continue to toggle the switch until number "19" is reached. Push and hold the data input switch and the number "20" will appear. Continue to hold the switch. After 1 second, the current machine ID will appear in the display. Continue to hold for 9 more seconds and a blinking "-" will appear. Release the switch.

5. Toggle the data input switch, the display will show "0". Toggle the data input switch until the proper machine ID appears on the display, then stop the toggle sequence.

6. Wait until the controller performs a reset function (approximately 10 seconds). At reset, the controller display first goes blank, then all 10 diagnostic lights come on, the numeric display shows all 8's, the display then shows the installed software version and finally the display goes blank and the engine oil pressure and alternator diagnostic lights begin flashing. At this point the controller has stored the machine ID selected in step 5.

7. Using the data input switch, toggle to service diagnostic number "9".
   The number "9" will appear for 1 second and then the machine ID will appear. The ID should be the same as the one entered in steps 4-6. If not, go back to step 4 and enter the ID again.

Machine Models List

Machine Models	Machine ID
North America Models	
HP375WCU	16
XP375WCU	16

SECTION 3 - Diagnostic Code Descriptions

Compressor and Engine Diagnostic Code Descriptions

The following are descriptions of Compressor and Engine diagnostic codes. When a Compressor diagnostic code is displayed the “Compressor Malfunction” diagnostic light will be illuminated. When an Engine diagnostic code is displayed the “Engine Malfunction” diagnostic light will be illuminated. Refer to the “Operating Controls and Instruments” page to determine the location of the malfunction lights. Be sure to determine which malfunction light is illuminated before beginning the troubleshooting process.

Compressor Diagnostic Display Codes

Wedge Software Version 2.20 or greater

Compressor Malfunction Diagnostic Light

	ALERT		SHUTDOWN		
Condition	**Code**	**Light (Blinks)**	**Code**	**Light (Steady)**	**Delay**
Low Engine Speed			1	Compressor Malfunction	30 sec.
High Engine Speed			2	Compressor Malfunction	30 sec.
Engine Crank time Exceeded			3	Compressor Malfunction	0 sec.
Low Fuel Level			4	Compressor Malfunction	3 sec.
Engine Not Responding To Throttle Command	10	Compressor Malfunction			
Too Many Start Attempts During Auto Start			11	Compressor Malfunction	0 sec.
Engine SHUTDOWN: Reason Unknown			29	Compressor Malfunction	0 sec.
High Airend Discharge Temperature (RT2) (248^{o}F)			30	Compressor Malfunction	3 sec.
Airend Discharge Temperature Sensor Fault (RT2)			32	Compressor Malfunction	10 sec.
Separator Tank Pressure Sensor Fault (PT1)	33	Compressor Malfunction			
Separator Tank Pressure > 20 psi at Crank (engine will not start)			34	Compressor Malfunction	0 sec.
High Separator Tank Temperature (RT1) (248^{o}F)			50	Compressor Malfunction	3 sec.
Machine ID Not Installed			51	Compressor Malfunction	0 sec.
IQ Filter Restriction			52	Compressor Malfunction	3 sec.
Separator Tank Temperature Sensor Fault (RT1)			53	Compressor Malfunction	10 sec.
Regulation System Pressure Sensor Fault (PT2)	54	Compressor Malfunction			
Minimum Start Pressure Not Met (50 psi)	56	Compressor Malfunction			
Serial Communications Failure	70	Compressor Malfunction			
Engine ECM Communication Failure			71	Compressor Malfunction	13 sec.
Auto/Stop Controller Communication Failure	73	Compressor Malfunction			

Compressor Diagnostic Lights

Wedge Software Version 2.20 or greater

Compressor ALERT/SHUTDOWN Diagnostic Lights			
	ALERT	**SHUTDOWN**	
Diagnostic Light	**Light (Blinks)**	**Light (Steady)**	**Delay**
Compressor Malfunction	•	•	
Engine Malfunction	•	•	
Low Fuel Level		•	3 sec.
Restricted Air Filters	•		
Low Battery Voltage	•		
Low Engine Oil Pressure (SHUTDOWN by Engine ECM)	•	•	15 sec.
High Engine Coolant Temperature (225^{o}F ALERT) (SHUTDOWN by Engine ECM)	•	•	30 sec.
High Compressor Temperature (RT2) (248^{o}F)		•	3 sec.
Restricted IQ Air Filter		•	3 sec.

Cummins Engine Model QSB4.5 Diagnostic Display Codes

Engine Diagnostic Codes 

Displayed Code	Definition
111	Engine Control Module - Critical internal failure
115	Engine Speed/Position Sensor Circuit - Lost both of two signals
122	Intake Manifold Pressure Sensor Circuit - Voltage Above Normal, or Shorted High
123	Intake Manifold Pressure Sensor Circuit - Voltage Below Normal, or Shorted Low
135	Engine Oil Pressure Sensor Circuit - Voltage Above Normal, or Shorted High
141	Engine Oil Pressure Sensor Circuit - Voltage Below Normal, or Shorted Low
143	Engine Oil Pressure Low - Warning
144	Engine Coolant Temperature Sensor Circuit - Voltage Above Normal, or Shorted High
145	Engine Coolant Temperature Sensor Circuit - Voltage Below Normal, or Shorted Low
146	Engine Coolant Temperature High - Warning
147	Frequency Throttle Signal - Abnormal Frequency, Pulse Width, or Period
148	Frequency Throttle Signal - Abnormal Frequency, Pulse Width, or Period
151	Engine Coolant Temperature Low - Critical
153	Intake Manifold Air Temperature Sensor Circuit - Voltage Above Normal, or Shorted High
154	Intake Manifold Air Temperature Sensor Circuit - Voltage Below Normal, or Shorted Low
155	Intake Manifold Air Temperature High - Critical
187	Sensor Supply Voltage #2 Circuit - Voltage Below Normal, or Shorted Low
195	Engine Coolant Level Sensor Circuit - Voltage Above Normal, or Shorted High
196	Engine Coolant Level Sensor Circuit - Voltage Below Normal, or Shorted Low
197	Engine Coolant Level Low - Warning
212	Engine Oil Temperature Sensor 1 Circuit - Voltage Above Normal, or Shorted High
213	Engine Oil Temperature Sensor 1 Circuit - Voltage Below Normal, or Shorted Low
214	Engine Oil Temperature High - Critical
221	Barometric Pressure Sensor Circuit - Voltage Above Normal, or Shorted High
222	Barometric Pressure Sensor Circuit - Voltage Below Normal, or Shorted Low
227	Sensor Supply Voltage #2 Circuit - Voltage Above Normal, or Shorted High
231	Engine Coolant Pressure Sensor Circuit - Voltage Above Normal, or Shorted High
232	Engine Coolant Pressure Sensor Circuit - Voltage Below Normal, or Shorted Low
233	Engine Coolant Pressure Low - Warning
234	Engine Speed High - Critical

Displayed Code	Definition
235	Engine Coolant Level Low - Critical
238	Sensor Supply Voltage #3 Circuit - Voltage Below Normal, or Shorted Low
249	Ambient Air Temperature Sensor Circuit - Voltage Above Normal, or Shorted High
256	Ambient Air Temperature Sensor Circuit - Voltage Below Normal, or Shorted Low
261	Engine Fuel Temperature High - Warning
263	Engine Fuel Temperature Sensor 1 Circuit - Voltage Above Normal, or Shorted High
265	Engine Fuel Temperature Sensor 1 Circuit - Voltage Below Normal, or Shorted Low
268	Fuel Pressure Sensor Circuit - Data Incorrect
271	High Fuel Pressure Solenoid Valve Circuit – Voltage Below Normal, or Shorted Low
272	High Fuel Pressure Solenoid Valve Circuit - Voltage Above Normal, or Shorted High
275	Fuel Pumping Element (Front) - Mechanical System Malfunction
281	High Fuel Pressure Solenoid Valve - Mechanical System Malfunction
284	Engine Speed/Position Sensor (Crankshaft) Circuit - Voltage Below Normal, or Shorted Low
285	SAE J1939 Multiplexing PGN Time-out Error
286	SAE J1939 Multiplexing Configuration Error
287	SAE J1939 Multiplexing Throttle Error
295	Barometric Pressure Sensor Circuit - Data Incorrect
319	Real Time Clock Power Interrupt - Data Incorrect
322	Injector Solenoid Cylinder #1 Circuit - Current Below Normal, or Open Circuit
323	Injector Solenoid Cylinder #5 Circuit - Current Below Normal, or Open Circuit
324	Injector Solenoid Cylinder #3 Circuit - Current Below Normal, or Open Circuit
325	Injector Solenoid Cylinder #6 Circuit - Current Below Normal, or Open Circuit
331	Injector Solenoid Cylinder #2 Circuit - Current Below Normal, or Open Circuit
332	Injector Solenoid Cylinder #4 Circuit - Current Below Normal, or Open Circuit
334	Engine Coolant Temperature Sensor Circuit - Data Incorrect
342	Electronic Calibration Code Incompatibility - Out of Calibration
351	Injector Power Supply - Bad Intelligent Device or Component
352	Sensor Supply Voltage #1 Circuit - Voltage Below Normal, or Shorted Low
386	Sensor Supply Voltage #1 Circuit - Voltage Above Normal, or Shorted High
415	Engine Oil Pressure Low - Critical
418	Water in Fuel Indicator High - Maintenance

Displayed Code	Definition
422	Engine Coolant Level - Data Incorrect
425	Engine Oil Temperature - Data Incorrect
428	Water in Fuel Sensor Circuit - Voltage Above Normal, or Shorted High
429	Water in Fuel Sensor Circuit - Voltage Below Normal, or Shorted Low
433	Intake Manifold Pressure Sensor Circuit - Data Incorrect
435	Engine Oil Pressure Sensor Circuit - Data Incorrect
441	Battery Voltage Low - Warning
442	Battery Voltage High - Warning
449	Fuel Pressure High - Warning
451	Injector Metering Rail Pressure Sensor Circuit - Voltage Above Normal, or Shorted High
452	Injector Metering Rail Pressure Sensor Circuit - Voltage Below Normal, or Shorted Low
488	Intake Manifold Air Temperature High - Warning
553	Injector Metering Rail Pressure High - Warning
554	Fuel Pressure Sensor Error - Data Incorrect
559	Injector Metering Rail Pressure Low - Warning
595	Turbocharger Speed High - Warning
596	Electrical Charging System Voltage High - Warning
597	Electrical Charging System Voltage Low - Warning
598	Electrical Charging System Voltage Low - Critical
687	Turbocharger Speed Low - Warning
689	Primary Engine Speed Sensor Error - Data Incorrect
691	Turbocharger Compressor Inlet Temp Sensor Circuit - Voltage Above Normal, or Shorted High
692	Turbocharger Compressor Inlet Temp Sensor Circuit - Voltage Below Normal, or Shorted Low
697	ECM Internal Temperature Sensor Circuit - Voltage Above Normal, or Shorted High
698	ECM Internal Temperature Sensor Circuit - Voltage Below Normal, or Shorted Low
719	Extended Crankcase Blow-by Pressure Circuit - Voltage Above Normal, or Shorted High
729	Extended Crankcase Blow-by Pressure Circuit - Voltage Below Normal, or Shorted Low
731	Engine Speed/Position #2 Mechanical Misalignment - Mechanical System Malfunction
753	Engine Speed/Position #2 Camshaft Sync Error - Data Incorrect
778	Engine Speed Sensor (Camshaft) Error - Data Incorrect
951	Cylinder Power Imbalance Between Cylinders - Data Incorrect

Displayed Code	Definition
1139	Injector Cylinder #1 - Mechanical System Malfunction
1141	Injector Cylinder #2 - Mechanical System Malfunction
1142	Injector Cylinder #3 - Mechanical System Malfunction
1143	Injector Cylinder #4 - Mechanical System Malfunction
1144	Injector Cylinder #5 - Mechanical System Malfunction
1145	Injector Cylinder #6 - Mechanical System Malfunction
1911	Injector Metering Rail Pressure High - Critical
2111	Engine Coolant Temperature 2 Sensor Circuit - Voltage Above Normal, or Shorted High
2112	Engine Coolant Temperature 2 Sensor Circuit - Voltage Below Normal, or Shorted Low
2113	Engine Coolant Temperature 2 High - Warning
2114	Engine Coolant Temperature 2 High - Critical
2115	Engine Coolant Pressure 2 Circuit - Voltage Above Normal, or Shorted High
2116	Engine Coolant Pressure 2 Circuit -Voltage Below Normal, or Shorted Low
2117	Engine Coolant Pressure 2 Low - Warning
2185	Sensor Supply Voltage #4 Circuit – Voltage Above Normal, or Shorted High
2186	Sensor Supply Voltage #4 Circuit – Voltage Below Normal, or Shorted Low
2215	Fuel Pump Delivery Pressure Low - Warning
2216	Fuel Pump Delivery Pressure High - Warning
2249	Injector Metering Rail Pressure Low - Critical
2265	Fuel Priming Pump Control Signal Circuit - Voltage Above Normal, or Shorted High
2266	Fuel Priming Pump Control Signal Circuit - Voltage Below Normal, or Shorted Low
2292	Fuel Inlet Meter Device - High - Warning
2293	Fuel Inlet Meter Device - Low - Warning
2311	Fueling Actuator #1 Circuit Error - Condition Exists
2321	Engine Speed/Position Sensor #1 - Data Incorrect
2322	Engine Speed/Position Sensor #2 - Data Incorrect
2345	Turbocharger Speed - Abnormal Rate of Change
2555	Intake Air Heater #1 Circuit - Voltage Above Normal, or Shorted High
2556	Intake Air Heater #1 Circuit - Voltage Below Normal, or Shorted Low
2963	Engine Coolant Temperature High - Alert
2964	Intake Manifold Air Temperature High - Alert
2973	Intake Manifold Pressure Sensor Circuit - Data Incorrect

Cummins QSB4.5 Engine ECM ALERT/SHUTDOWN Parameters

Description	Trip Point
Low Engine Oil Pressure	
Warning	Less than threshold for 5 seconds
Shutdown	Less than threshold for 15 seconds
High Engine Coolant Temperature	
Warning	225^{o}F
Shutdown	235^{o}F
High Engine Manifold Air Temperature	
Warning	180^{o}F
Shutdown	210^{o}F

SECTION 4 - Troubleshooting

Compressor Diagnostic Codes

Procedures and Techniques

General

A thorough analysis of the problem is the key to successful troubleshooting. The more information known about a problem, the faster and easier the problem can be solved.

Troubleshooting charts are included to act as a guide to the troubleshooting process. They are organized so the easiest and most logical things are performed first. It is not possible to include all the solutions to problems that can occur or list all possible problems. The charts are designed to stimulate a thinking process that will lead to solution of the problem.

Basic Troubleshooting Steps

- Collect all facts concerning the problem
- Analyze the problem thoroughly
- Relate the symptoms to the basic electrical / electronic systems and components
- Consider any recent repairs that could relate to the problem
- Double check before replacing components
- Review the controller fault log for clues as to the problem
- Determine the cause of the problem and make a thorough repair

General Measuring Guidelines:

Since the electrical system uses sealed connectors and splices, access of test points can be difficult. It is recommended that a test probe kit be used to access the signals to prevent damage to wires and connectors. Back probing connectors and insulation piercing test probes can cause damage that can cause future failures.

Measuring Voltage:

A digital voltmeter is recommended to make measurements. Voltage measurements are made by connecting the RED + lead to the desired signal and the BLACK lead to the common. The test lead connections must be secure or incorrect readings will result. Use circuit common for the Black lead, not chassis ground or other metal connection. Circuit common will be any of the BROWN wires or battery negative can be used.

IMPORTANT INFORMATION

DO NOT USE MACHINE FRAME, SHEET METAL, PIPING OR OTHER METAL COMPONENTS AS COMMON OR GROUND WHEN MAKING VOLTAGE OR FREQUENCY MEASUREMENTS.

Measuring Resistance:

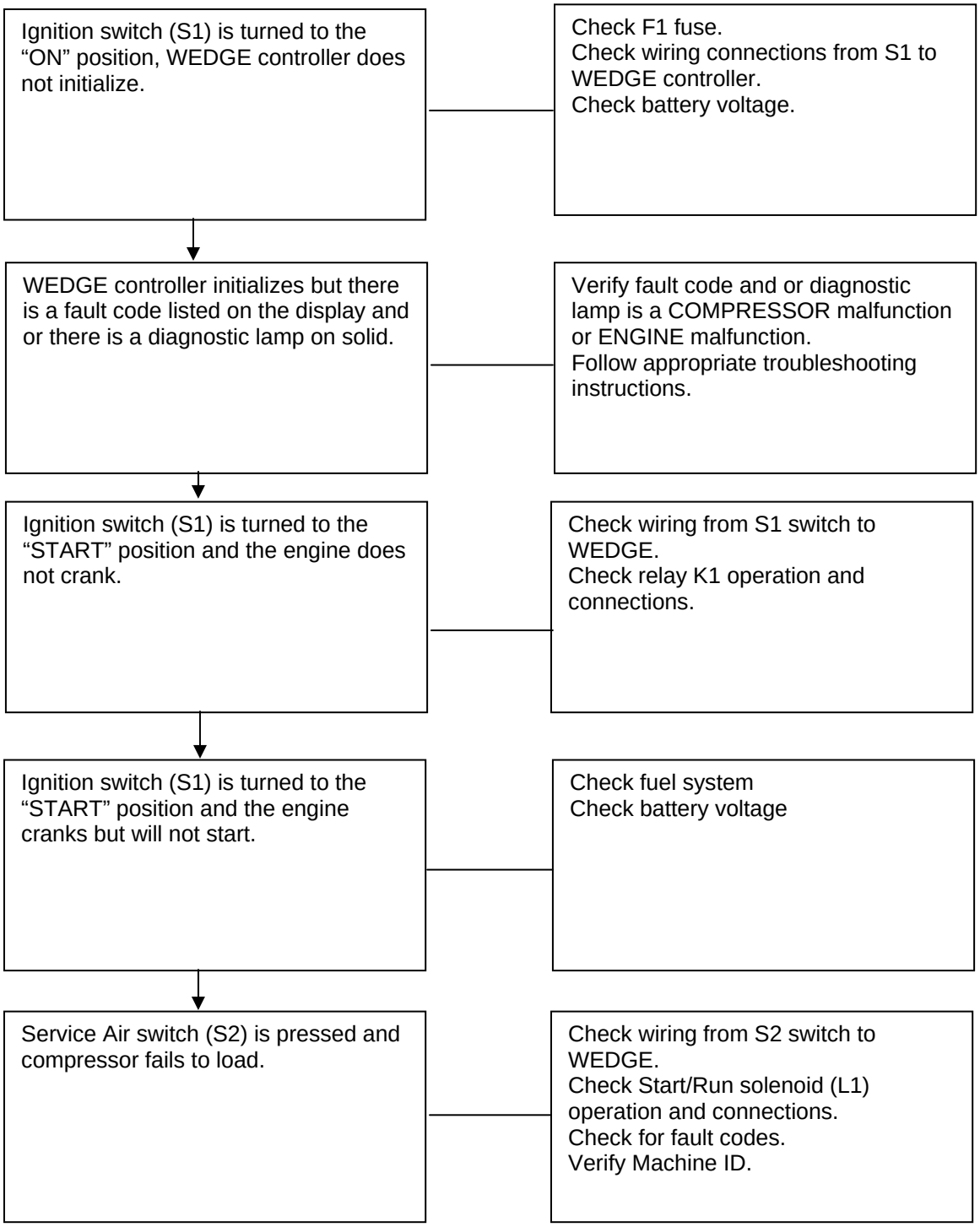
Extra care must be taken when making resistance measurements. Test probe connections are crucial to correct readings. Ensure the test probe makes a solid connection with the wire(s) or connector pin(s) under test. The test probe kit may help with these types of measurements. Make sure system power is turned OFF while making resistance measurements.

Measuring Frequency:

Frequency is measured in the same manner as voltage, but the meter is set for "HZ" or frequency. Good connections are important or false readings will occur.

Measuring Duty Cycle:
To measure duty cycle, setup the meter as if measuring frequency or voltage. Select the "%" or duty cycle function and take the measurements. As of the date of this writing, Fluke is the only known digital voltmeter that has the duty cycle feature. The Fluke Model 87 Digital Meter has the duty cycle function.

Troubleshooting Flow Chart



COMPRESSOR CODE 1

Low Engine Speed

Explanation:
The WEDGE has received an engine speed value less than 1100 RPM for 30 seconds from the engine ECM.

Effect:
Code 1 is a SHUTDOWN condition and will stop the machine. The Compressor Malfunction light will be on solid, and Code 1 will be displayed.

Troubleshooting Steps

Action	Result
Step 1: Check WEDGE diagnostic display 15 for engine fault codes.	
Step 2: Check engine fuel system for restrictions.	Dirty fuel filters Clogged fuel hoses Air in fuel system
Step 3: Retrieve active and inactive engine ECM fault codes via engine manufacturer's service tool.	
Step 4: Check engine ECM setup via engine manufacturer's service tool.	

COMPRESSOR CODE 2

High Engine Speed

Explanation:
The WEDGE has received an engine speed value greater than 2300 RPM for 30 seconds from the engine ECM.

Effect:
Code 2 is a SHUTDOWN condition and will stop the machine. The Compressor Malfunction light will be on solid, and Code 2 will be displayed.

Troubleshooting Steps

Action	Result
Step 1: Check WEDGE diagnostic display 15 for engine fault codes.	
Step 2: Retrieve active and inactive engine ECM fault codes via engine manufacturer's service tool.	
Step 3: Check engine ECM setup via engine manufacturer's service tool.	

COMPRESSOR CODE 3

Engine Crank Time Exceeded

Explanation:
The user has attempted to crank the engine longer than 30 seconds.

Effect:
Code 3 is a SHUTDOWN condition and will prevent further cranking. The Compressor Malfunction light will be on solid, and Code 3 will be displayed.

Troubleshooting Steps

Action	Result
Step 1: Cycle power and wait 1 minute before attempting to crank machine again.	
Step 2: Check engine fuel system for restrictions.	Dirty fuel filters Clogged fuel hoses Air in fuel system
Step 3: Verify machine cold weather kit is working properly (if equipped).	

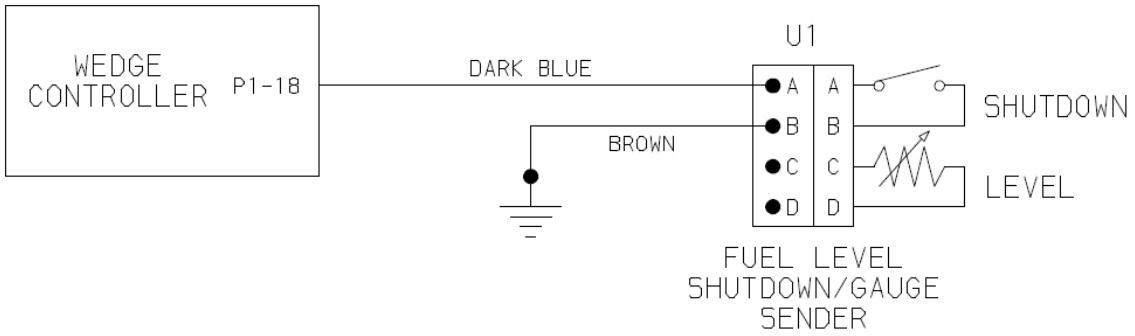
COMPRESSOR CODE 4

Low Fuel Level

Explanation:
The WEDGE has detected an open switch contact from the U1 fuel level sensor.

Effect:
Code 4 is a SHUTDOWN condition and will stop the machine. The Low Fuel diagnostic lamp will be on solid, the Compressor Malfunction light will be on solid, and Code 4 will be displayed.

U1 Fuel Level Sensor Circuit:



Circuit Description:
The fuel level sensor connects to the WEDGE controller as shown in the circuit above. U1 has a switch contact that opens when the fuel level is low. The dark blue wire is the sense line to the WEDGE. The brown wire is the switch common to ground.

Component Location:
U1 fuel level sensor is located in top of the fuel tank.

COMPRESSOR CODE 4

Troubleshooting Steps

Action	Result
Step 1: Check fuel level in tank.	Add fuel if needed.
Step 2: Check all harness connections between WEDGE and U1 fuel level sensor.	Repair harness as needed.
Step 3: Disconnect U1 from harness. Using a multimeter, measure resistance between U1-A and U1-B on fuel level sensor. Remove fuel level sensor from tank. Using a multimeter, measure resistance between U1-A and U1-B on fuel level sensor with it upside down.	Resistance value measured should be shorted with tank full of fuel. Resistance value measured should be shorted, if not replace U1 fuel level sensor.
Step 4: Turn ignition switch to the “ON” position. Jumper across U1-A and U1-B on the harness connector.	The low fuel light, compressor malfunction light, and Code 4 should appear on the WEDGE controller, if not check wiring.
Step 5: If Steps 1 through 4 checkout OK, replace WEDGE.	

COMPRESSOR CODE 10

Engine Not Responding To Throttle Command

Explanation:
The engine has failed to reach target RPM within 10 seconds after starting.

Effect:
Code 10 is an ALERT condition and will not stop the machine, however minimum pressure will not be met and pressure control will not be engaged. The Compressor Malfunction light will be blinking, and Code 10 will be displayed.

Troubleshooting Steps

Action	Result
Step 1: Check WEDGE diagnostic display 9 to verify correct machine ID.	Machine ID incorrect select correct ID and reload into WEDGE.
Step 2: Scroll to WEDGE diagnostic display 8. Crank machine. Verify Target RPM listed below. Target RPM = 1600 if engine coolant < 100^{o}F 1500 if engine coolant > 100^{o}F	
Step 3: Scroll to WEDGE diagnostic display 16. Crank machine. Verify Throttle Position listed below. Throttle Position = 57 if engine coolant < 100^{o}F 50 if engine coolant > 100^{o}F	
Step 4: Check engine fuel system for restrictions.	Dirty filters Clogged Hoses Air in fuel system
Step 5: Refer to the engine manufacturer's service manual for instructions.	

COMPRESSOR CODE 11

Too Many Start Attempts During Auto Start

Explanation:
The WEDGE has made three attempts to start the machine as commanded by the Auto Start/Stop controller and the machine failed to start.

Effect:
Code 11 is a SHUTDOWN condition and will prevent further cranking. The Compressor Malfunction light will be on solid, and Code 11 will be displayed.

Troubleshooting Steps

Action	Result
Step 1: Crank machine manually to verify proper operation.	
Step 2: Check engine fuel system for restrictions.	Dirty fuel filters Clogged Hoses Air in fuel system
Step 3: Check the condition of the machine batteries and verify battery charger is working properly.	
Step 4: Verify machine cold weather kit is working properly (if equipped).	

COMPRESSOR CODE 29

Engine SHUTDOWN: Reason Unknown

Explanation:
The engine has shut down and the WEDGE did not detect a fault code from the engine ECM.

Effect:
Code 29 is a SHUTDOWN condition and will stop the machine. The Compressor Malfunction light will be on solid, and Code 29 will be displayed.

Troubleshooting Steps

Action	Result
Step 1: Check fuse F2.	Replace fuses as needed.
Step 2: Check engine fuel system for restrictions.	Dirty fuel filters Clogged Hoses Air in fuel system
Step 3: Verify battery + and – connections to the engine ECM.	Repair harness as needed.
Step 4: Verify KEYSWITCH signal (24 VDC) connection from WEDGE to engine ECM.	
Step 5: Retrieve active and inactive engine ECM fault codes via engine manufacturer's service tool.	

COMPRESSOR CODE 30

High Airend Discharge Temperature

Explanation:
The WEDGE has detected a temperature from RT2 temperature sensor that is greater than or equal to 248^{o}F.

Effect:
Code 30 is a SHUTDOWN condition and will stop the machine. The High Airend Discharge Temperature diagnostic light will be on solid, the Compressor Malfunction light will be on solid, and code 30 will be displayed.

Troubleshooting Steps

Action	Result
Step 1: Check coolers and clean if necessary.	Clogged coolers
Step 2: Check all harness connections between Wedge and RT2 temperature sensor.	Repair harness as needed.
Step 3: Disconnect RT2 from harness and plug thermistor simulator (Part No. 22073878) into the harness connector. Check WEDGE diagnostic display 6 to verify temperature value is between -3^{o}F and -13^{o}F.	If temperature value on display 6 is not between -3^{o}F and -13^{o}F, check for wiring problems. If temperature value on display 6 is between -3^{o}F and -13^{o}F, replace RT2 temperature sensor.
Step 4: If Steps 1 through 3 checkout OK, replace WEDGE.	

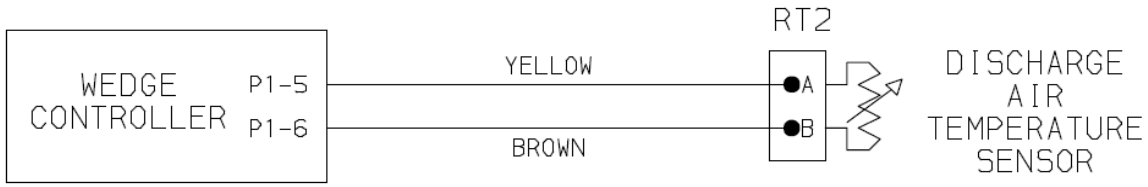
COMPRESSOR CODE 32

RT2, Airend Discharge Temperature Sensor Fault

Explanation:
The WEDGE has detected an out of range reading from the RT2 temperature sensor.

Effect:
Code 32 is a SHUTDOWN condition and will stop the machine. The Compressor Malfunction light will be on solid, and Code 32 will be displayed.

RT2 Temperature Sensor Circuit:



Circuit Description:
The temperature sensor connects to the WEDGE controller as shown in the circuit above. RT2 is a 10K ohm Thermistor type temperature sensor. The yellow wire is the sense line to the WEDGE. The brown wire is the sensor ground.

Component Location:
RT2 temperature sensor is located in the discharge port of the airend.

COMPRESSOR CODE 32

Troubleshooting Steps

Action	Result
Step 1: Check all harness connections between WEDGE and RT2 temperature sensor.	Repair harness as needed.
Step 2: Disconnect RT2 from harness and plug thermistor simulator (Part No. 22073878) into the harness connector. Check WEDGE diagnostic display 6 to verify temperature value is between -3^{o}F and -13^{o}F.	If temperature value on display 6 is not between -3^{o}F and -13^{o}F, check for wiring problems. If temperature value on display 6 is between -3^{o}F and -13^{o}F, replace RT2 temperature sensor.
Step 3: If Steps 1 and 2 checkout OK, replace WEDGE.	

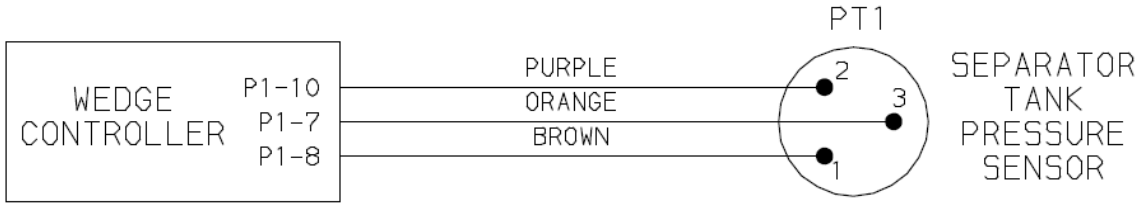
COMPRESSOR CODE 33

PT1, Separator Tank Pressure Sensor Fault

Explanation:
The WEDGE has detected an out of range reading from the PT1 pressure sensor.

Effect:
Code 33 is an ALERT condition and will not stop the machine. The Compressor Malfunction light will be blinking, and Code 33 will be displayed.

PT1 Pressure Sensor Circuit:



Circuit Description:
The pressure sensor connects to the WEDGE controller as shown in the circuit above. The purple wire is the 5 VDC excitation supply from the WEDGE. The orange wire is the signal output to the WEDGE with a range of 0.5 to 4.5 VDC. The brown wire is the sensor ground. The pressure range of PT1 is 0 psig (0.5 VDC) to 225 psig (4.5 VDC).

Component Location:
PT1 pressure sensor is located on top of the separator tank.

COMPRESSOR CODE 33

Troubleshooting Steps

Action	Result
Step 1: Check all harness connections between WEDGE and PT1 pressure sensor.	Repair harness as needed.
Step 2: Disconnect PT1 from harness and plug pressure transducer simulator (Part No. 22168868) into the harness connector. Check WEDGE diagnostic display 5 to verify pressure value is between 186 psi and 196 psi.	If pressure value on display 5 is not between 186 psi and 196 psi, check for wiring problems. If pressure value on display 5 is between 186 psi and 196 psi, replace PT1 pressure sensor.
Step 3: If Steps 1 and 2 checkout OK, replace WEDGE.	

COMPRESSOR CODE 34

Separator Tank Pressure Greater Than 20 psi at Crank

Explanation:
The WEDGE has detected a pressure from PT1 pressure sensor that is greater than 20 psi at the time of engine crank.

Effect:
Code 34 is a SHUTDOWN condition and will prevent cranking until the separator tank pressure is below 20 psi. The Compressor Malfunction light will be on solid, and Code 34 will be displayed.

Troubleshooting Steps

Action	Result
Step 1: Wait until separator tank pressure is below 20 psi and try to crank the machine.	
Step 2: With air system completely blown down, check WEDGE diagnostic display 5 to verify pressure value is 0 psi.	
Step 3: Check all harness connections between WEDGE and PT1 pressure sensor.	Repair harness as needed.
Step 4: Disconnect PT1 from harness and plug pressure transducer simulator (Part No. 22168868) into the harness connector. Check WEDGE diagnostic display 5 to verify pressure value is between 186 psi and 196 psi.	If pressure value on display 5 is not between 186 psi and 196 psi, check for wiring problems. If pressure value on display 5 is between 186 psi and 196 psi, replace PT1 pressure sensor.
Step 5: If Steps 3 and 4 checkout OK, replace WEDGE.	

COMPRESSOR CODE 50

High Separator Tank Temperature

Explanation:
The WEDGE has detected a temperature from RT1 temperature sensor that is greater than or equal to 248^{o}F.

Effect:
Code 50 is a SHUTDOWN condition and will stop the machine. The Compressor Malfunction light will be on solid, and Code 50 will be displayed.

Troubleshooting Steps

Action	Result
Step 1: Check coolers and clean if necessary.	Clogged coolers
Step 2: Check all harness connections between WEDGE and RT1 temperature sensor.	Repair harness as needed.
Step 3: Disconnect RT1 from harness and plug thermistor simulator (Part No. 22073878) into the harness connector. Check WEDGE diagnostic display 7 to verify temperature value is between -3^{o}F and -13^{o}F.	If temperature value on display 7 is not between -3^{o}F and -13^{o}F, check for wiring problems. If temperature value on display 7 is between -3^{o}F and -13^{o}F, replace RT1 temperature sensor.
Step 4: If Steps 1 through 3 checkout OK, replace WEDGE.	

COMPRESSOR CODE 51

Machine ID Not Installed

Explanation:
The WEDGE does not have a machine ID loaded. Code 51 will occur only when a new WEDGE is installed and the machine ID has never been loaded. The machine ID defines the proper operational profile of a machine type. Absence of code 51 does not ensure the machine ID is correct.

Effect:
Code 51 is a SHUTDOWN condition and will prevent any operation of the machine. The Compressor Malfunction light will be on solid, and Code 51 will be displayed.

Troubleshooting Steps

Action	Result
Step 1: Select correct machine ID from the “Machine Models List” in this manual and load into the WEDGE. Refer to the section “Entering Machine ID For Wedge Control Systems” in this manual.	

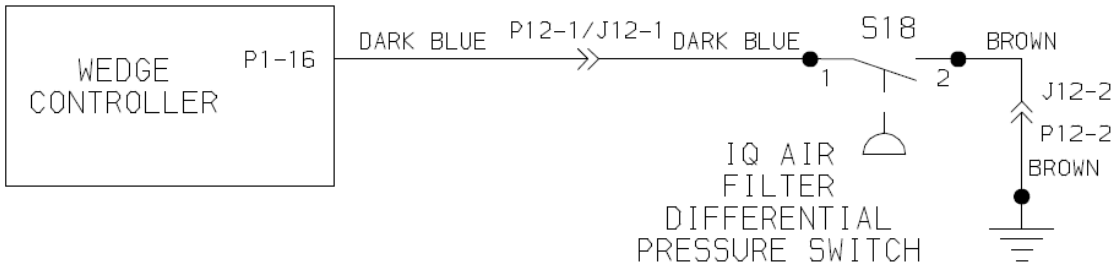
COMPRESSOR CODE 52

IQ Filter Restriction

Explanation:
The WEDGE has detected a closed switch contact from the IQ air filter S18 differential pressure switch.

Effect:
Code 52 is a SHUTDOWN condition and will stop the machine. The Restricted IQ Air Filter diagnostic light will be on solid, the Compressor Malfunction light will be on solid, and Code 52 will be displayed.

S18 Differential Switch Circuit:



Circuit Description:
The differential pressure switch connects to the WEDGE controller as shown in the circuit above. S18 has a switch contact that closes when the pressure across the IQ air filter is restricted. The dark blue wire is the sense line to the WEDGE. The brown wire is the switch common to ground.

Component Location:
S18 IQ air filter differential pressure switch is located on a bracket inside the machine beside the IQ air filter.

COMPRESSOR CODE 52

Troubleshooting Steps

Action	Result
Step 1: Check IQ air filter.	Clogged filter
Step 2: Check all harness connections between WEDGE and S18 differential pressure switch.	Repair harness as needed
Step 3: Disconnect S18 from harness. Using a multimeter, measure resistance between across switch terminals 1 and 2 on differential pressure switch.	Resistance value measured should be open, if not replace S18 differential pressure switch
Step 4: If Steps 1 and 2 checkout OK, replace WEDGE.	

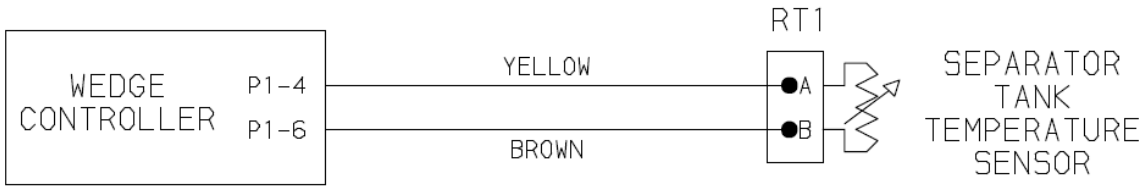
COMPRESSOR CODE 53

RT1, Separator Tank Temperature Sensor Fault

Explanation:
The WEDGE has detected an out of range reading from the RT1 temperature sensor.

Effect:
Code 53 is a SHUTDOWN condition and will stop the machine. The Compressor Malfunction light will be on solid, and Code 53 will be displayed.

RT1 Temperature Sensor Circuit:



Circuit Description:
The temperature sensor connects to the WEDGE controller as shown in the circuit above. RT1 is a 10K ohm Thermistor type temperature sensor. The yellow wire is the sense line to the WEDGE. The brown wire is the sensor ground.

Component Location:
RT1 temperature sensor is located on the side of the separator tank near the safety valve.

COMPRESSOR CODE 53

Troubleshooting Steps

Action	Result
Step 1: Check all harness connections between WEDGE and RT2 temperature sensor.	Repair harness as needed.
Step 2: Disconnect RT1 from harness and plug thermistor simulator (Part No. 22073878) into the harness connector. Check WEDGE diagnostic display 7 to verify temperature value is between -3^{o}F and -13^{o}F.	If temperature value on display 7 is not between -3^{o}F and -13^{o}F, check for wiring problems. If temperature value on display 7 is between -3^{o}F and -13^{o}F, replace RT1 temperature sensor.
Step 3: If Steps 1 and 2 checkout OK, replace WEDGE.	

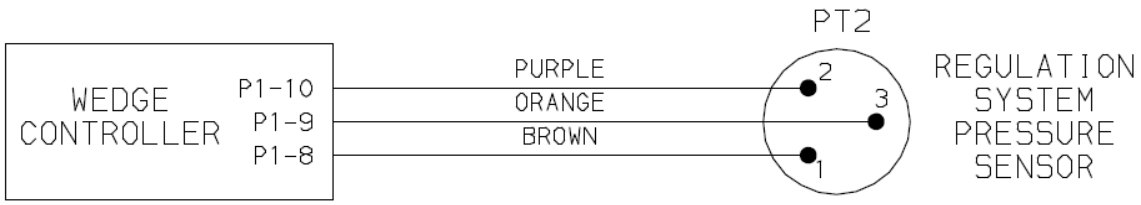
COMPRESSOR CODE 54

PT2, Regulation System Pressure Sensor Fault

Explanation:
The WEDGE has detected an out of range reading from the PT2 pressure sensor.

Effect:
Code 54 is an ALERT condition and will not stop the machine. The Compressor Malfunction light will be blinking, and Code 54 will be displayed.

PT2 Pressure Sensor Circuit:



Circuit Description:
The pressure sensor connects to the WEDGE controller as shown in the circuit above. The purple wire is the 5 VDC excitation supply from the WEDGE. The orange wire is the signal output to the WEDGE with a range of 0.5 to 4.5 VDC. The brown wire is the sensor ground. The pressure range of PT2 is 0 psig (0.5 VDC) to 100 psig (4.5 VDC).

Component Location:
PT2 pressure sensor is located in regulation system on top of the separator tank.

COMPRESSOR CODE 54

Troubleshooting Steps

Action	Result
Step 1: Check all harness connections between WEDGE and PT2 pressure sensor.	Repair harness as needed.
Step 2: Disconnect PT2 from harness and plug pressure transducer simulator (Part No. 22168868) into the harness connector. Check WEDGE diagnostic display 4 to verify pressure value is between 33 psi and 43 psi.	If pressure value on display 4 is not between 33 psi and 43 psi, check for wiring problems. If pressure value on display 4 is between 33 psi and 43 psi, replace PT2 pressure sensor.
Step 3: If Steps 1 and 2 checkout OK, replace WEDGE.	

COMPRESSOR CODE 56

Minimum Start Pressure Not Met

Explanation:
The minimum start pressure (50 psi) has not been met within 20 seconds of machine start.

Effect:
Code 56 is an ALERT condition and will not stop the machine; however the machine will not load. The Compressor Malfunction light will be blinking, and Code 56 will be displayed.

Troubleshooting Steps

Action	Result
Step 1: Check air piping system for leaks and or restrictions.	Loose fittings Clogged hoses or pipes
Step 2: Check unloader operation.	Stuck unloader
Step 3: Check all harness connections between WEDGE and PT1 pressure sensor.	Repair harness as needed.
Step 4: Disconnect PT1 from harness and plug pressure transducer simulator (Part No. 22168868) into the harness connector. Check WEDGE diagnostic display 5 to verify pressure value is between 186 psi and 196 psi.	If pressure value on display 5 is not between 186 psi and 196 psi, check for wiring problems. If pressure value on display 5 is between 186 psi and 196 psi, replace PT1 pressure sensor.
Step 5: If Steps 1 through 2 checkout OK, replace WEDGE.	

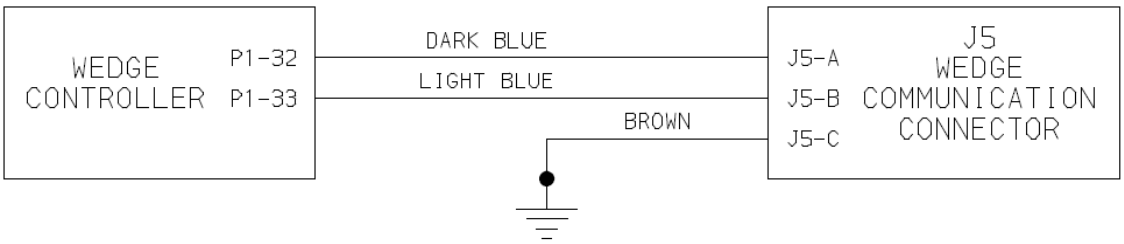
COMPRESSOR CODE 70

Serial Communications Failure

Explanation:
The WEDGE has detected an RS232 serial link problem. The serial link is used to install software and to communicate with a test tool.

Effect:
Code 70 is an ALERT condition and will not stop the machine. The Compressor Malfunction light will be blinking, and Code 70 will be displayed.

Serial Communications Circuit:



Circuit Description:
The communication connector connects to the WEDGE controller as shown in the circuit above. The dark blue wire is the RXD (received) signal at the WEDGE. The light blue wire is the TXD (transmit) signal from the WEDGE. The brown wire is the serial link ground.

Component Location:
J5 connector is located inside the machine near the WEDGE controller.

COMPRESSOR CODE 70

Troubleshooting Steps

Action	Result
Step 1: Check all harness connections between WEDGE and J5 connector.	Repair harness as needed.
Step 2: Substitute the current device (laptop or test tool) being used to communicate with the WEDGE with another one.	
Step 3: If Steps 1 and 2 do not resolve the problem, replace WEDGE.	

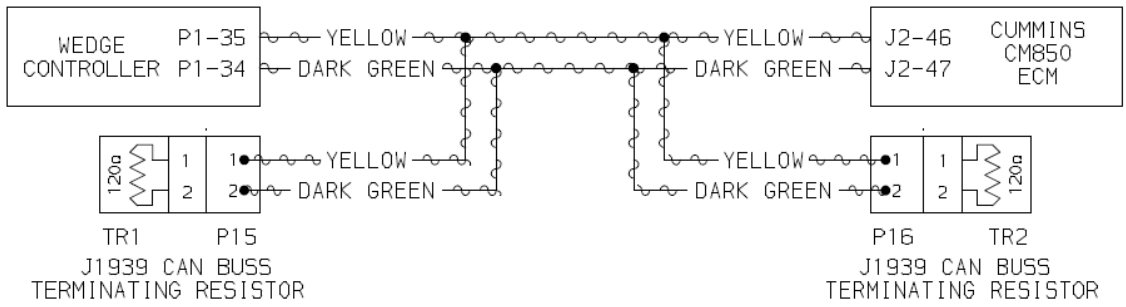
COMPRESSOR CODE 71

Engine ECM Communication

Explanation:
The WEDGE controller cannot communicate with the engine ECM via J1939 CAN BUSS network.

Effect:
Code 71 is a SHUTDOWN condition and will stop the machine. The Compressor Malfunction light will be on solid, and Code 71 will be displayed.

WEDGE to Engine ECM J1939 CAN BUSS circuit:



Circuit Description:
The twisted pair yellow and dark green wires are the communications link (J1939 CAN BUSS) that connects the WEDGE controller and the engine ECM together as shown in the circuit diagram. The yellow wire is referred to as J1939 CAN High (+). The dark green wire is referred to as J1939 CAN Low (-).

The CAN network has two terminating resistors TR1 and TR2. The resistance value of each terminator is 120 ohms. The terminators are connected together in parallel across the High (+) and Low (-) wires. When connected the resistance value between the High (+) and Low (-) wires is 60 ohms.

Component Location:
P1 connector is connected to the WEDGE controller and the J2 connector is connected to the engine ECM. Terminating resistor TR1 is located on the main harness near the WEDGE controller. Terminating resistor TR2 is located on the main harness near the engine ECM.

Compressor Code 71

Troubleshooting Steps

Action	Result
Step 1: Check engine ECM fuse F2.	If fuse is blown, replace F2 fuse.
Step 2: Check battery positive and negative connections to the engine ECM.	If harness connections are loose or damaged, repair harness as needed.
Step 3: Turn the ignition switch to the ON position. Using a multimeter, measure the engine keyswitch signal voltage at J2-39.	Voltage measured should be 24 VDC at J2-39. If voltage measured is not 24 VDC, check for defective harness connections.
Step 4: Disconnect P1 connector from the WEDGE, J2 connector from the engine ECM, and any other devices connected to the J1939 CAN BUSS. Using a multimeter, measure the resistance between P1-34 and P1-35. Using a multimeter, measure the resistance between J2-46 and J2-47.	Resistance value measured should be 60 ohms between P1-34 and P1-35. Resistance value measured should be 60 ohms between J2-46 and J2-47. If resistance value measured is not 60 ohms, measure resistance value of each terminator (120 ohms) and or check for defective harness connections.
Step 5: Disconnect P1 connector from the WEDGE, J2 connector from the engine ECM, and any other devices connected to the J1939 CAN BUSS. Disconnect TR1 and TR2 from the harness. Using a multimeter, measure resistance between P1-35 and J2-46. Using a multimeter, measure resistance between P1-34 and J2-47. Using a multimeter, measure resistance between P1-34 and P1-35.	Continuity should be shorted between P1-35 and J2-46. Continuity should be shorted between P1-34 and J2-47. Continuity should be open between P1-34 and P1-35. If not, check for defective harness connections.

COMPRESSOR CODE 71

Troubleshooting Steps

Action	*Result*
Step 6: If steps 1 thru 5 checkout OK, replace WEDGE controller.	
Step 7: If steps 1 thru 6 checkout OK, replace engine ECM.	

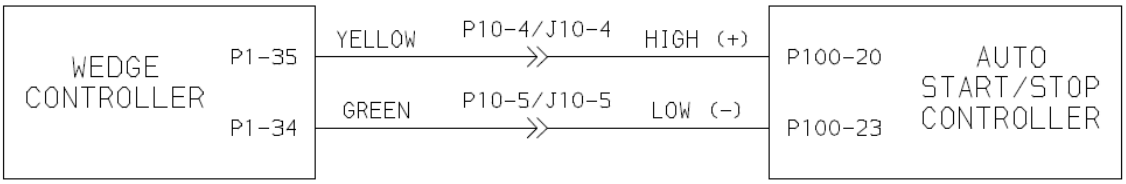
COMPRESSOR CODE 73

Auto Start/Stop Controller Communication Failure

Explanation:
The WEDGE cannot communicate with the Auto Start/Stop Controller via J1939 CAN BUSS network.

Effect:
Code 73 is an ALERT condition and will not stop the machine. The Compressor Malfunction light will be blinking, and Code 73 will be displayed.

WEDGE to Auto Start/Stop Controller J1939 CAN BUSS circuit:



Circuit Description:
The J1939 CAN BUSS cable connects the WEDGE controller and the Auto Start/Stop Controller together as shown in the circuit above. The yellow wire is referred to as J1939 CAN High (+). The green wire is referred to as J1939 CAN Low (-). This cable is the communications link between the WEDGE and all devices connected to it. The P10/J10 connector is the connection point where the Auto Start/Stop harness connects to the chassis harness.

Component Location:
P1 connector is connected to the WEDGE controller and the P100 connector is connected to the Auto Start/Stop Controller. P10/J10 connectors are located close to the lift bail on the curb side of the machine.

COMPRESSOR CODE 73

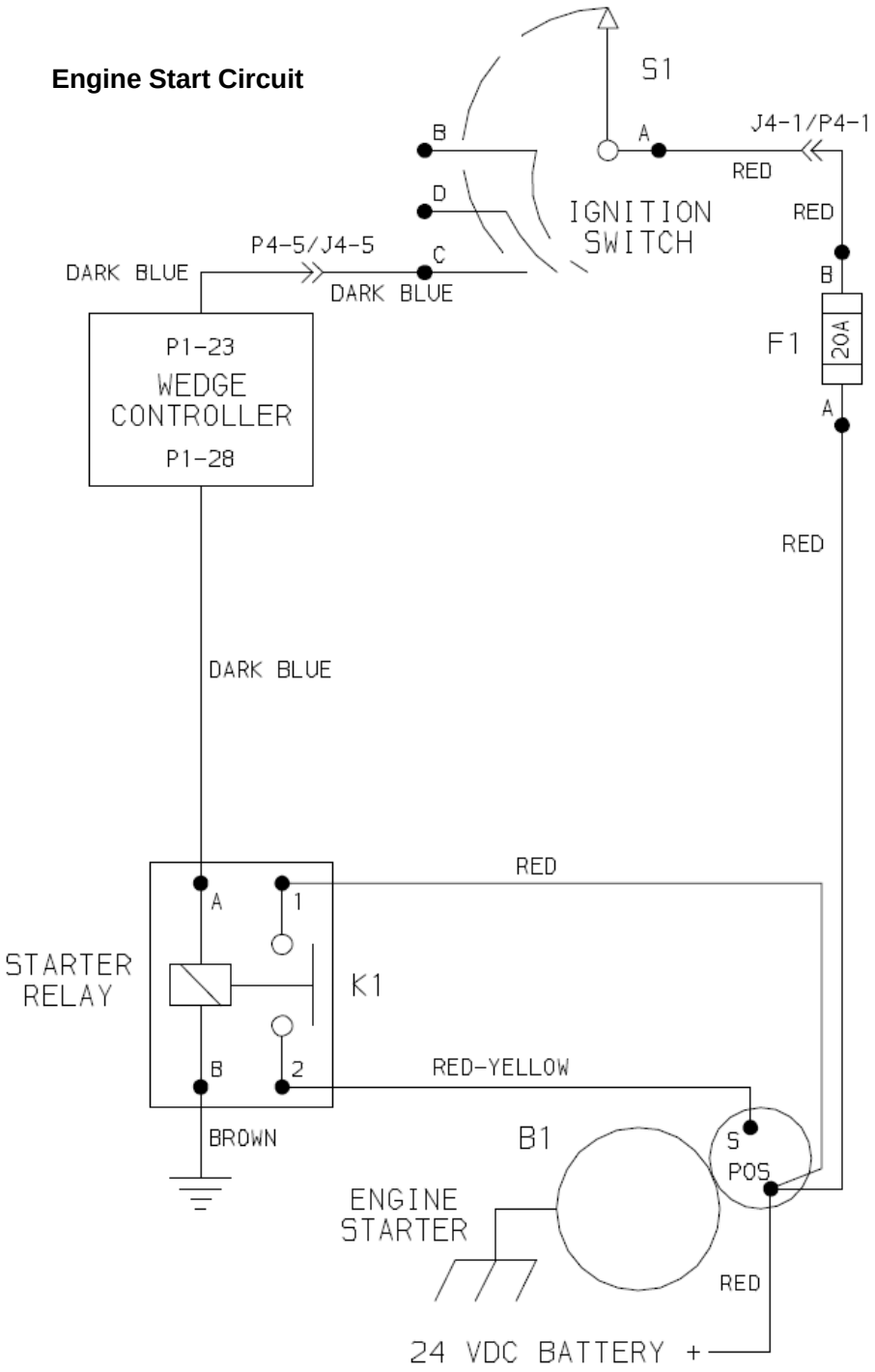
Troubleshooting Steps

Action	Result
Step 1: Check fuse F9 to verify that it has not blown.	Replace fuse if needed.
Step 2: Check all harness connections at WEDGE and Auto Start/Stop Controller.	Repair harness as needed.
Step 3: Disconnect P1 connector from the WEDGE, J02 connector from the engine ECM, P100 from the Auto Start/Stop controller, and any other device connected to the J1939 CAN BUSS network. Using a multimeter, measure the resistance between P100-20 and P100-23	Resistance value measured should be 60 ohms across P100-20 and P100-23. If not, measure resistance value of each terminator (120 ohms) and or check for defective splice, broken wire, and loose connection at connector pins.
Step 4: If steps 1 through 3 checkout OK, replace Auto Start/Stop Controller.	

SECTION 5 - Troubleshooting

Electrical Circuits

Engine Start Circuit



Engine Start Circuit

Circuit Description:

The WEDGE controls engine starter engagement using a 24 VDC input from the ignition switch (S1) and a 24 VDC output to the starter relay coil (K1). The WEDGE provides starter protection by turning off the output to K1 relay coil when engine speed reaches 600 RPM even if the operator is still holding the ignition switch in the start position. The WEDGE prevents cranking if a SHUTDOWN code is active.

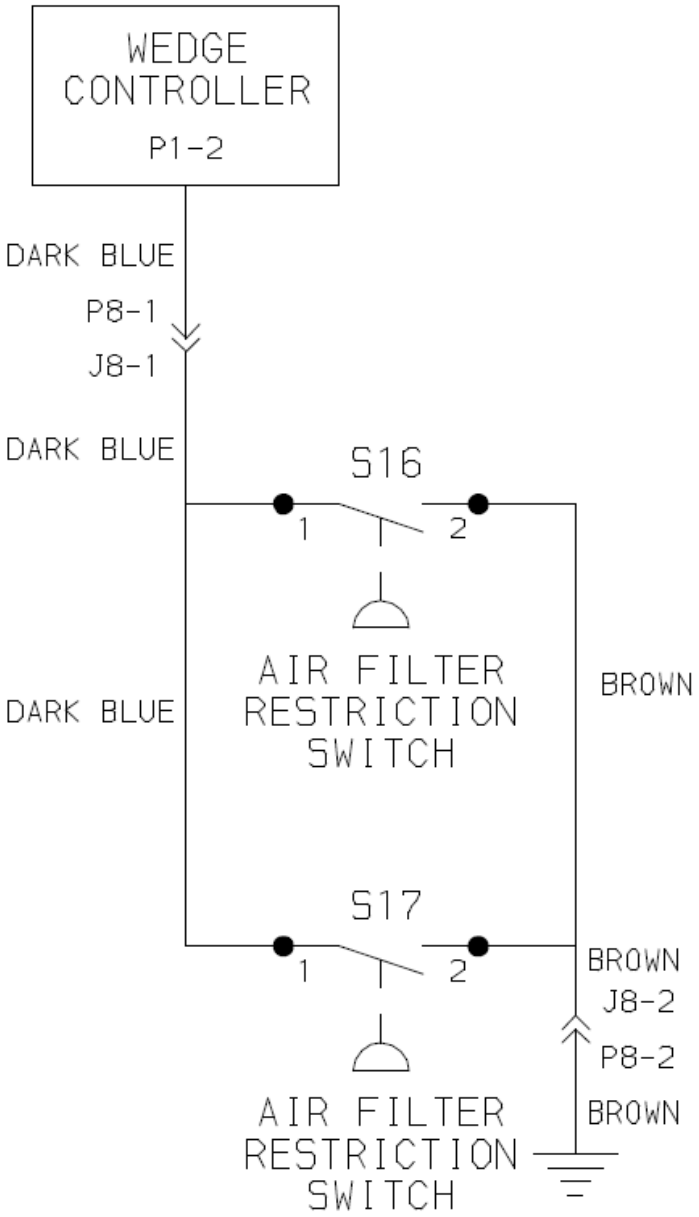
Component Location:

K1 relay is located on a bracket inside the lift bail. S1 ignition switch is located on the control panel.

Troubleshooting Steps If Starter Does Not Engage During Crank

Action	Result
Step 1: Check display for fault codes.	Clear fault codes by following instructions in this manual.
Step 2: Check F1 fuse.	Replace fuse if needed.
Step 3: Check all harness connections throughout engine start circuit.	Repair harness as needed.
Step 4: Check battery voltage.	Replace batteries if needed.
Step 5: Hold the ignition switch (S1) in the “Start” position. Using a multimeter, measure the voltage at: 1. Ignition switch (S1-C). 2. WEDGE controller connector (P1-23). 3. WEDGE controller connector (P1-28). 4. Starter relay (K1-A). 5. Starter relay (K1-1). 6. Starter relay (K1-2). 7. Engine starter (B1-S).	Voltage measured should be 24 VDC. If not, replace S1 ignition switch If not, replace WEDGE. If not, replace K1 relay If 24 VDC is measured at B1-S, replace starter.

Air Filter Restriction Switch Circuit



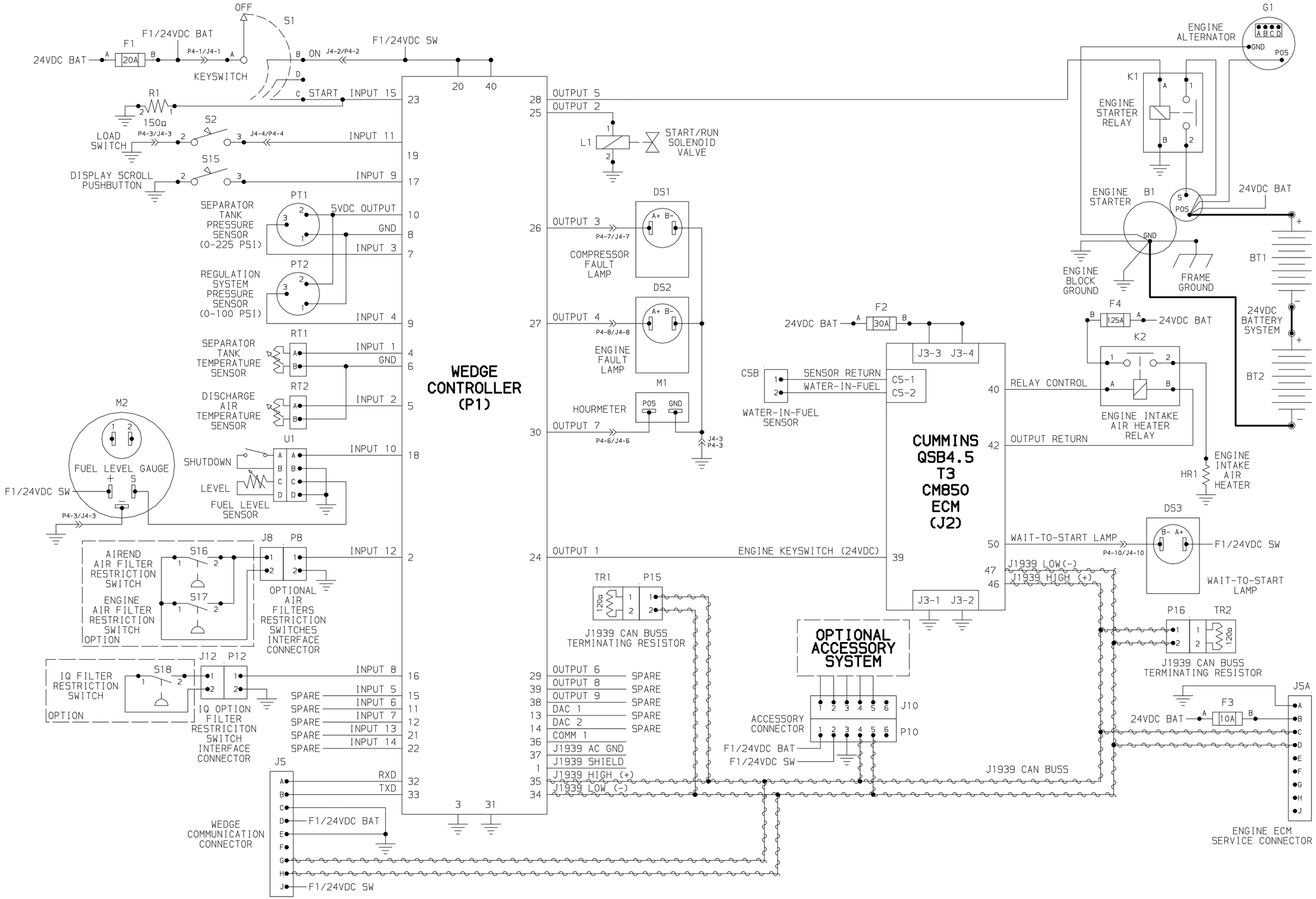
Circuit Description:
The WEDGE receives a battery ground input from the air filter restriction switch (S16 and or S17) when the switch closes signaling that the filters are clogged. The air filter restriction switch contacts are normally open. The contacts close when the air filter restriction reaches 20 inches of water.

Component Location:
S16 and S17 air filter restriction switches are located behind the engine and airend air filter housing.

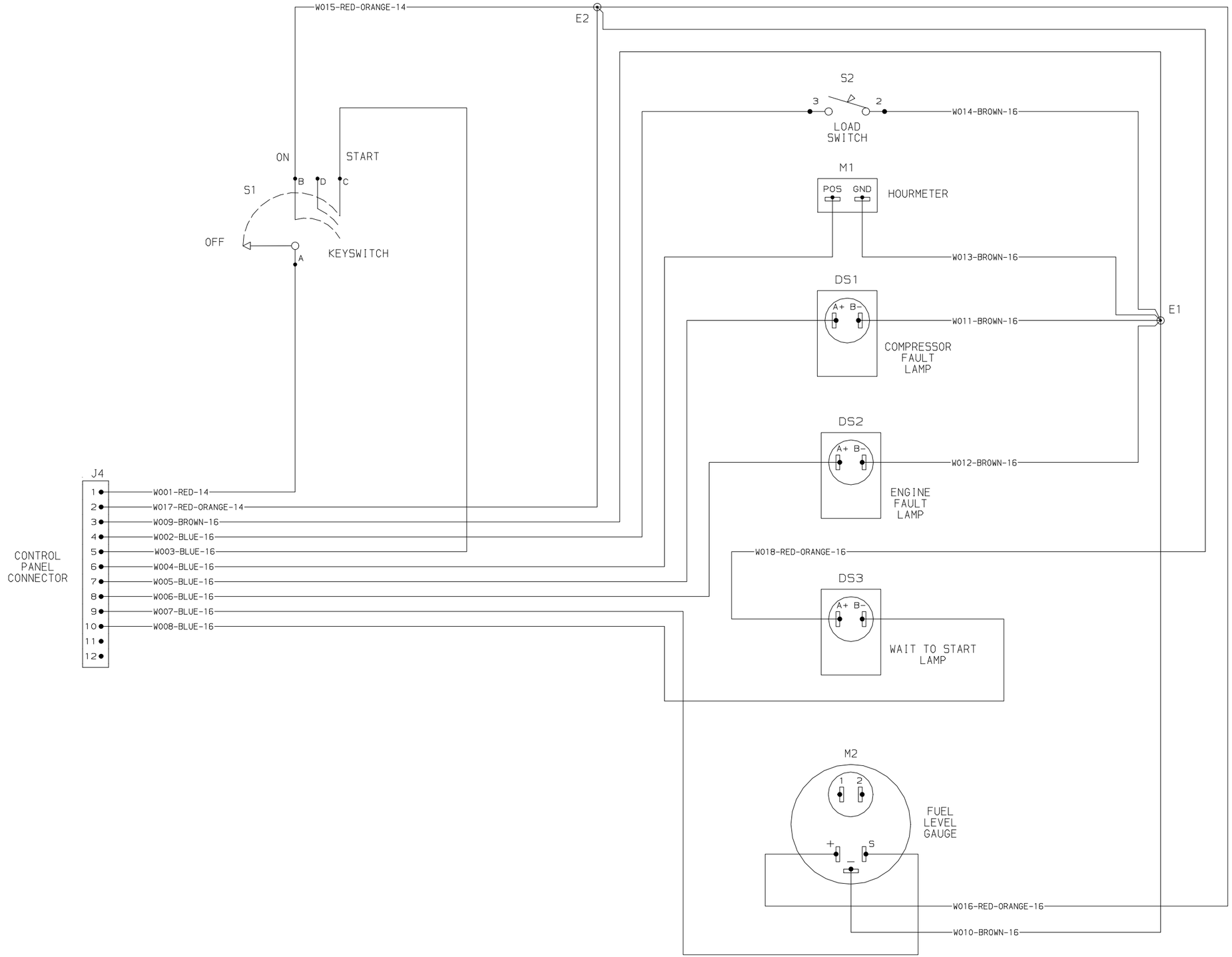
Troubleshooting Steps If Air Filter Switches Do Not Close

Action	Result
Step 1: Check all harness connections throughout air filter restriction switch circuit.	Repair harness as needed.
Step 2: Disconnect the harness from S16 and S17 air filter restriction switches. Using a multimeter, measure the continuity from the brown wire on the harness at each switch to battery negative.	Continuity should be shorted between each brown wire and battery negative. If not, repair harness.
Step 3: Turn the ignition switch to the “ON” position. Disconnect the harness from S16 and S17 air filter restriction switches. Place a jumper across the harness terminals at S16. Remove jumper at S16 and place across harness terminals at S17.	Air filter restriction diagnostic light on panel should come on. If not, replace WEDGE.

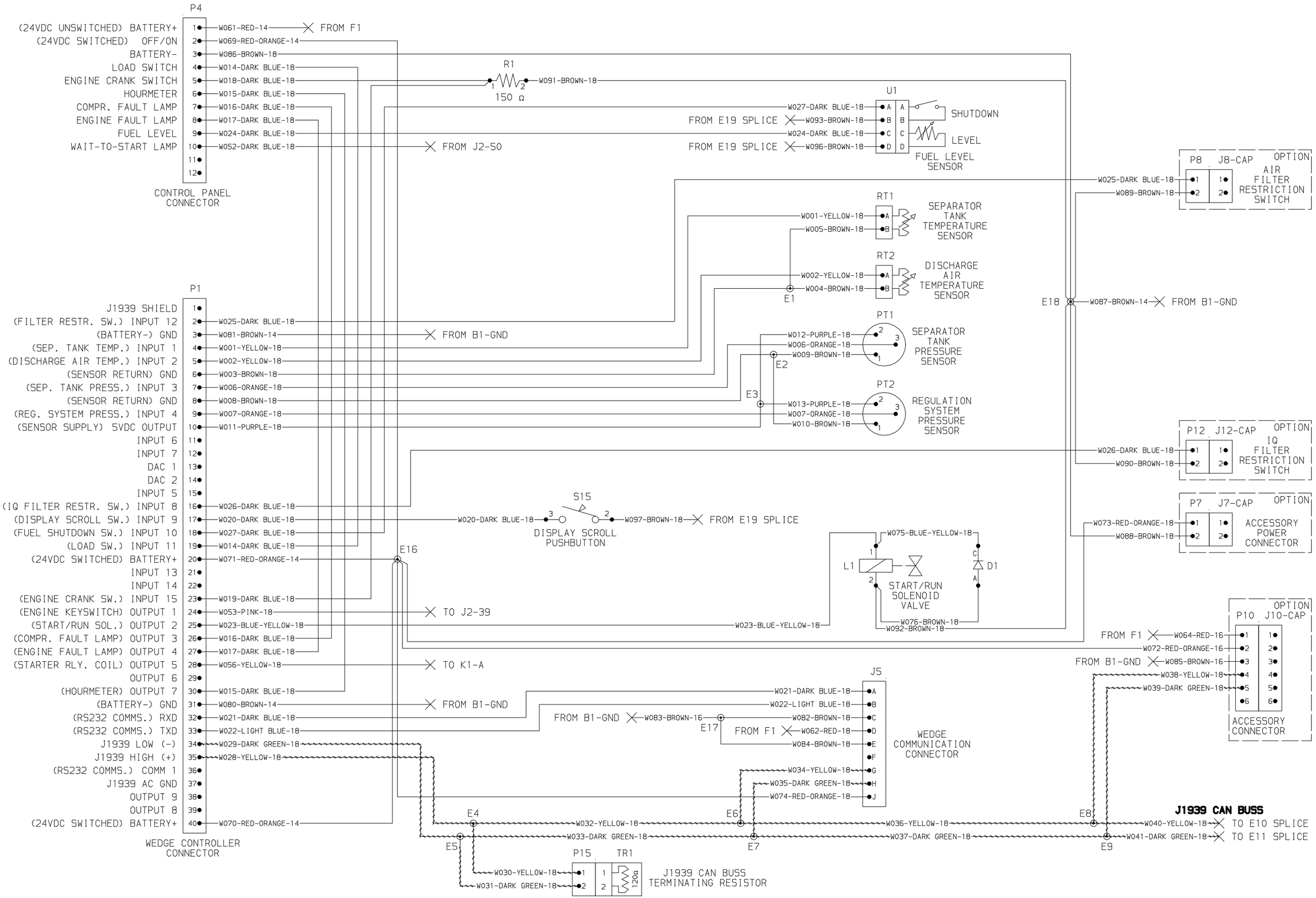
SECTION 6 - System Schematics & Wiring Diagrams



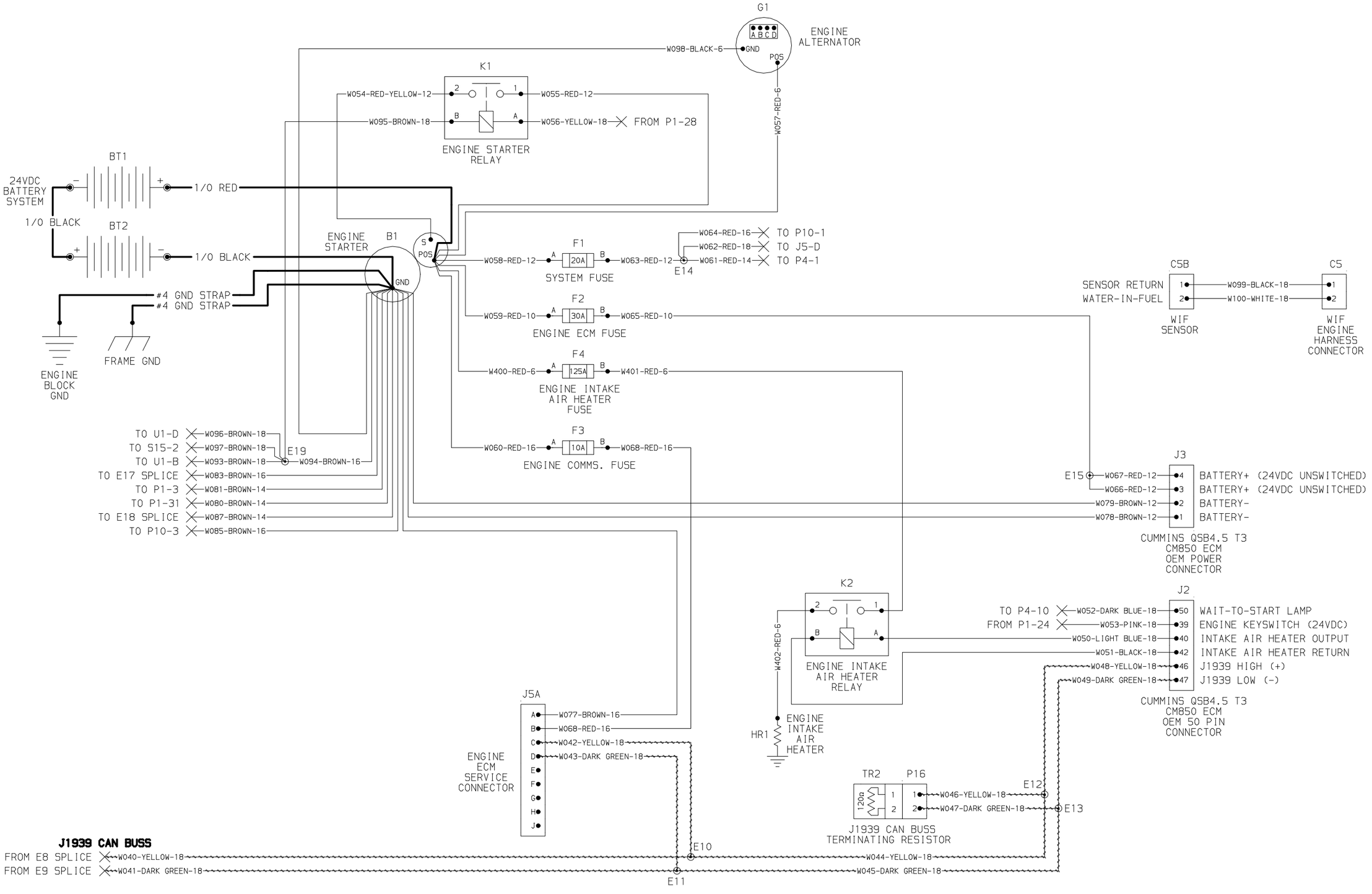
Compressor and Engine Control System Schematic 46589099 Rev.A



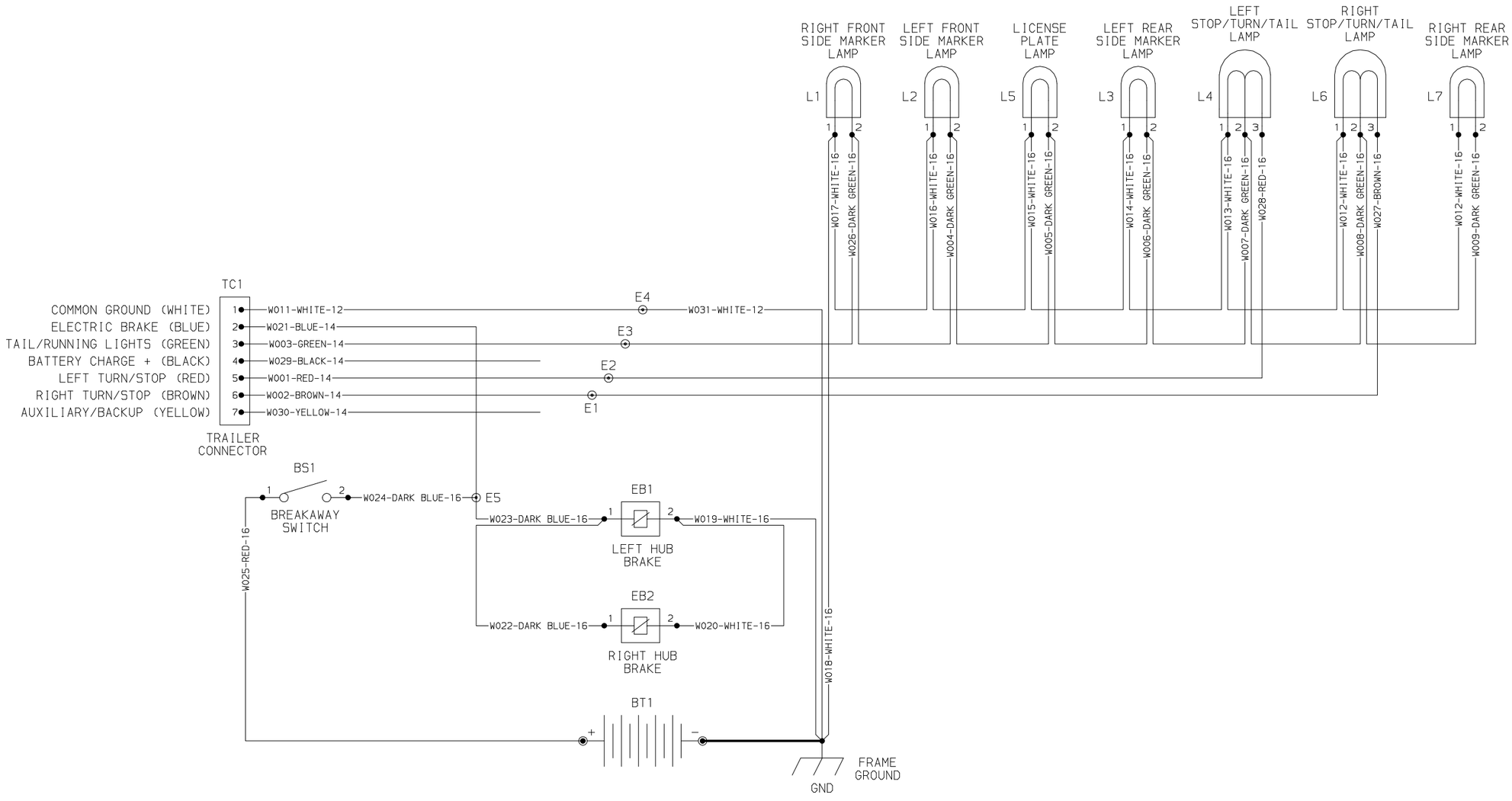
Control Panel Harness Schematic 22835698 Rev.A



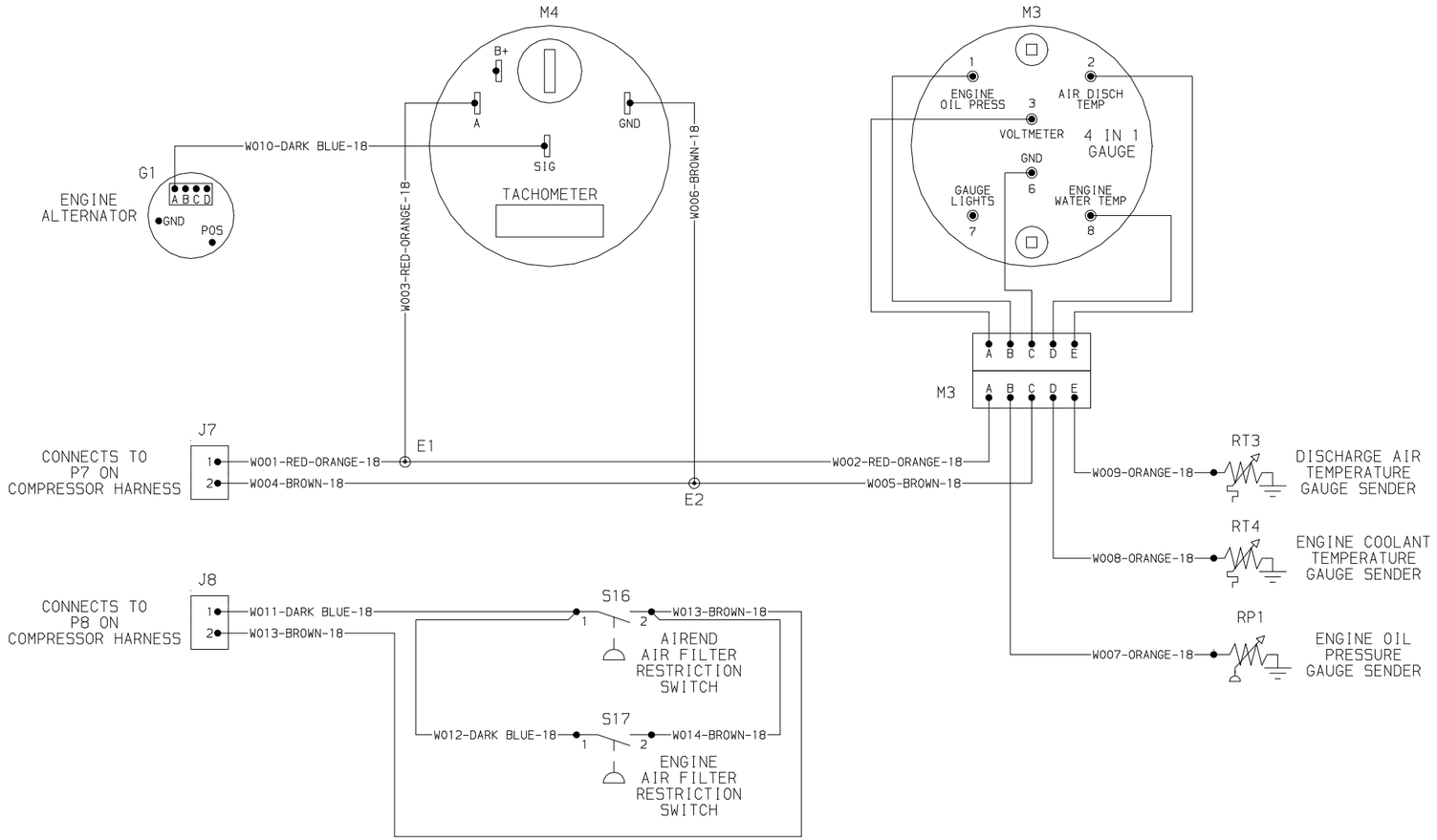
Compressor and Engine Harness Schematic 46589100 Rev.B (sheet 1)



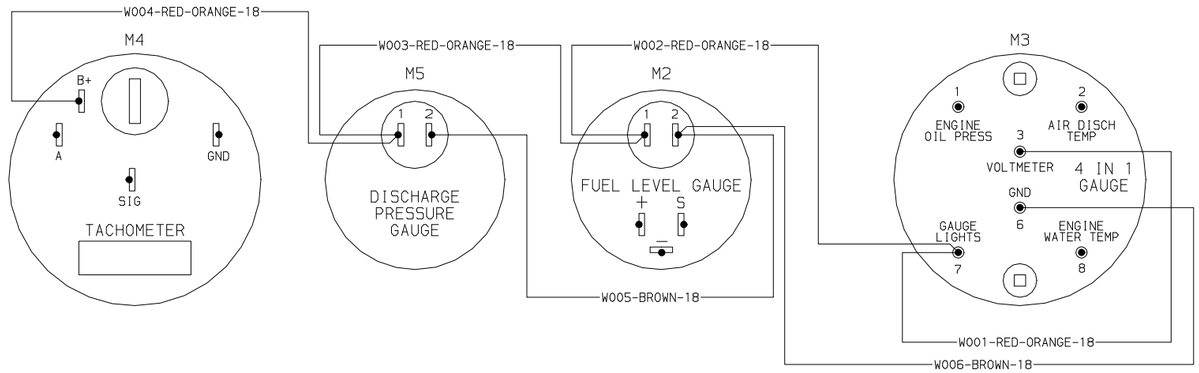
Compressor and Engine Harness Schematic 46589100 Rev.B (sheet 2)



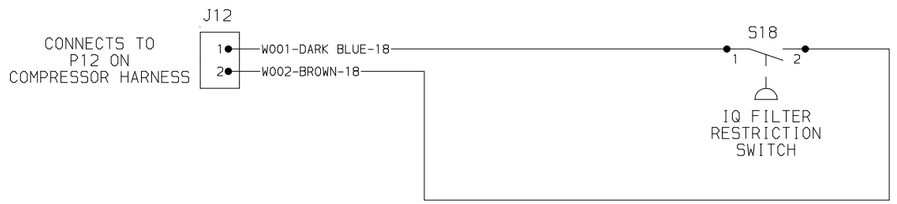
Trailer Harness Schematic 46546321 Rev.D



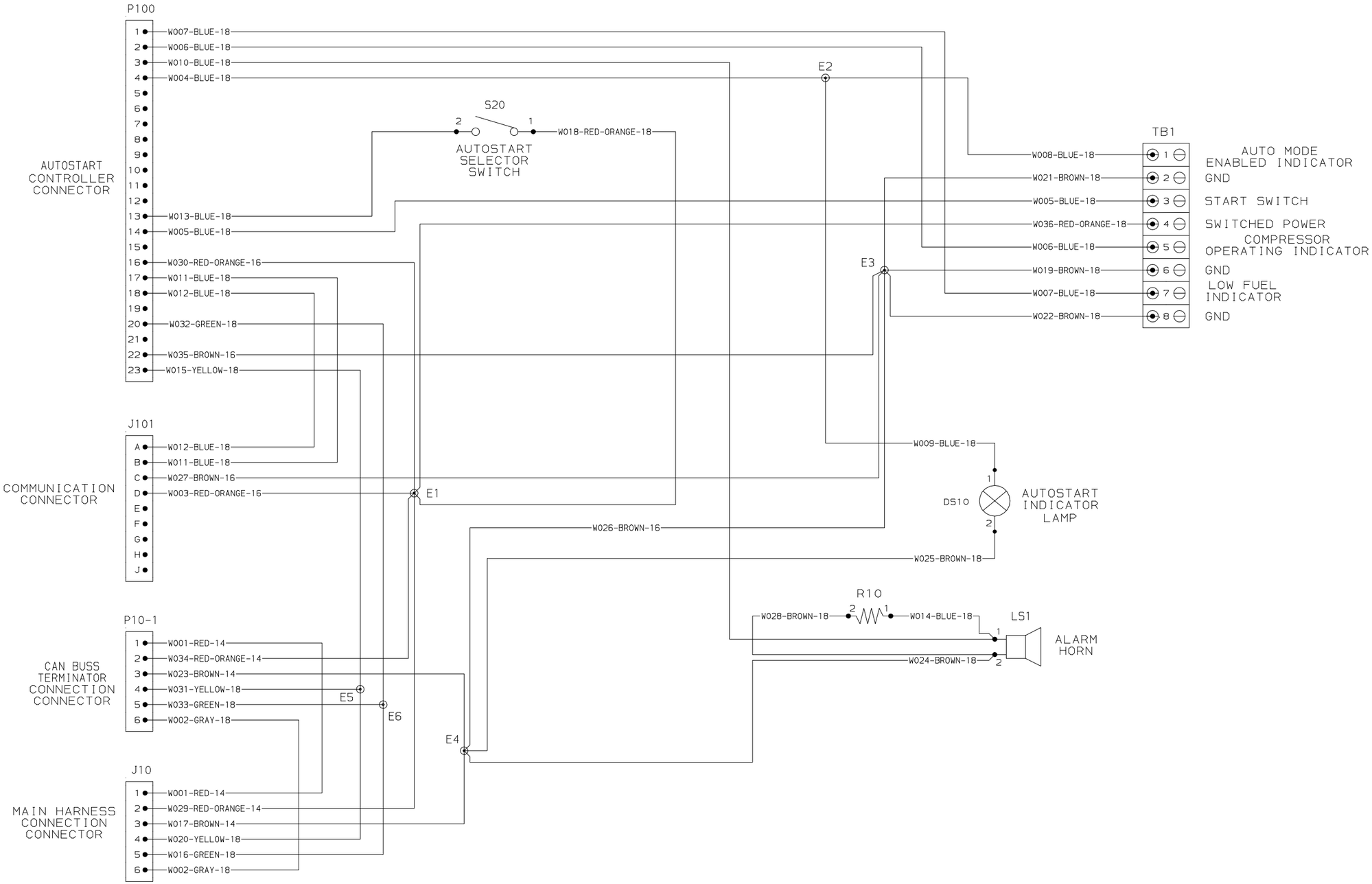
Full Gauge Option Harness Schematic 46606619 Rev.A



Gauge Illumination Option Harness Schematic 46606679 Rev.A

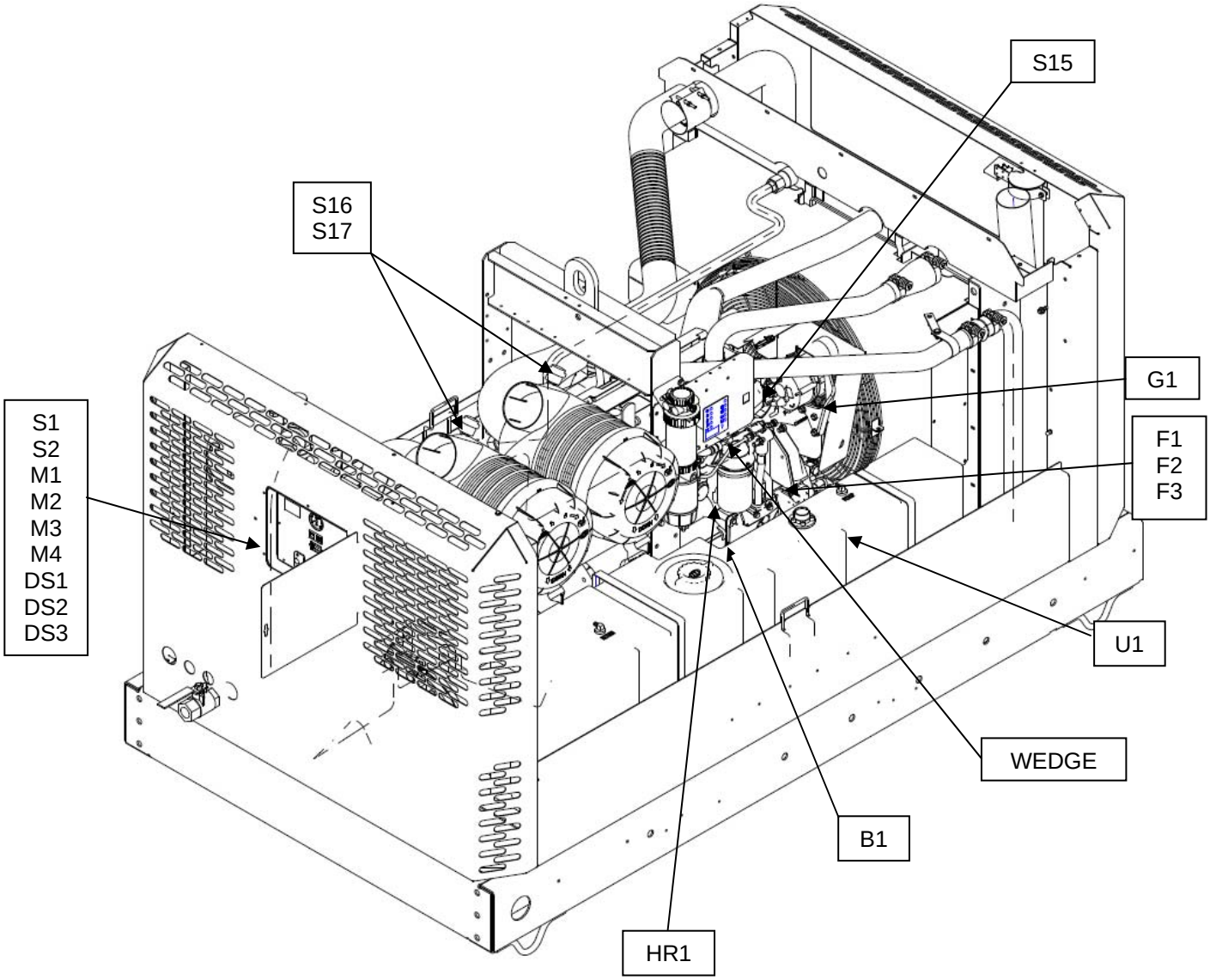


IQ Filter Restriction Switch Option Harness Schematic 46606719 Rev.A

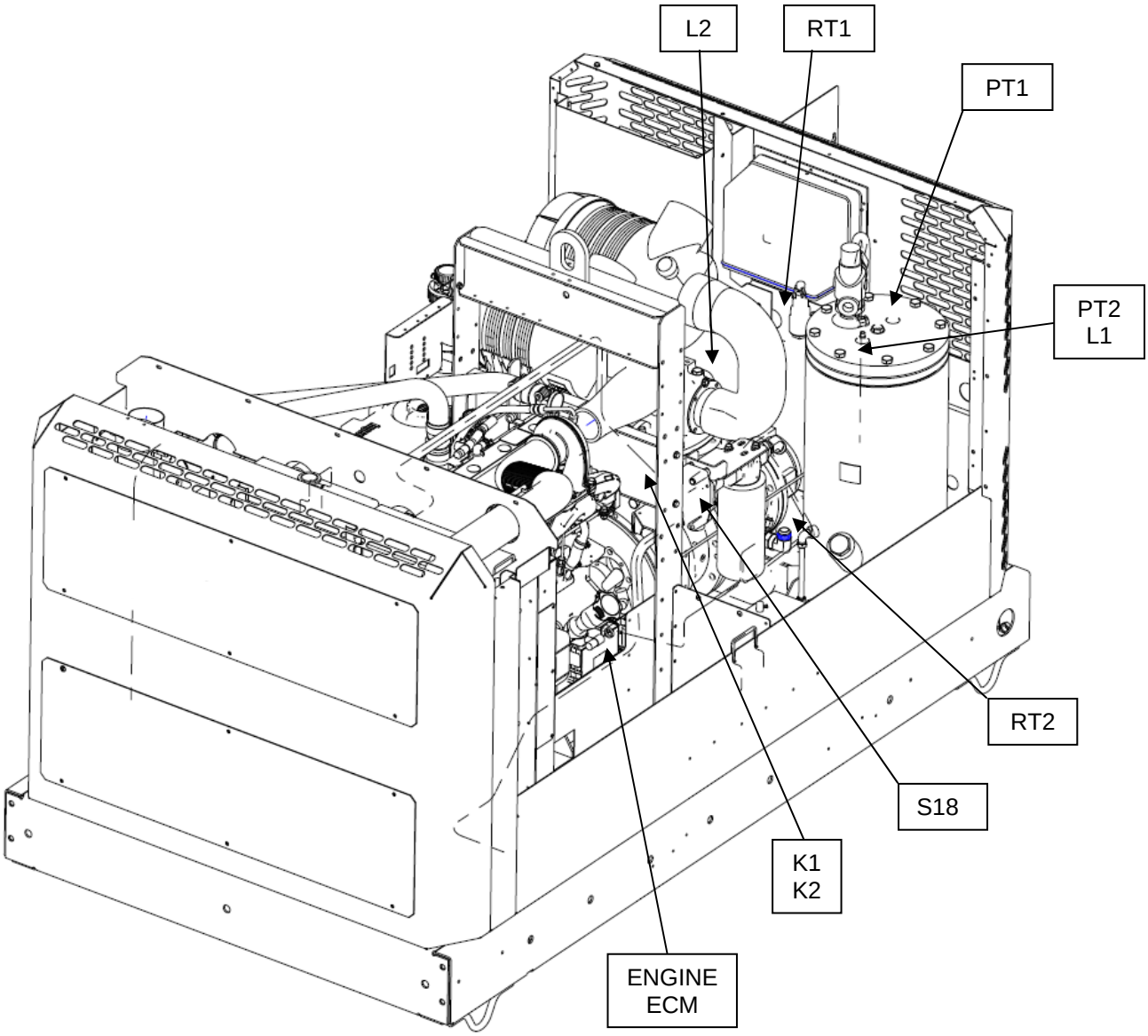


AutoStart Option Harness Schematic 22864581 Rev.A

SECTION 7- Electrical Component Locations


S15
S16
S17
G1
S1
S2
M1
M2
M3
M4
DS1
DS2
DS3
F1
F2
F3
U1
WEDGE
B1
HR1

ELECTRICAL COMPONENT LOCATION



Harness Connector Locations

P1: 40 pin connector located on WEDGE controller

J2: 50 pin connector located on engine ECM

J3: 4 pin connector located on engine ECM

J5: 9 pin connector for WEDGE RS232 communication, located near WEDGE controller

J5A: 9 pin connector for engine ECM service tool, located near engine ECM.

P4/J4: 12 pin connector located at back of control panel

P15: 2 pin connector for termination resistor on J1939 CAN BUSS near WEDGE controller

P16: 2 pin connector for termination resistor on J1939 CAN BUSS near engine ECM

P10/J10: 6 pin connector for various options, located near airend

P7/J7: 2 pin connector for Full Gauge option power, located behind control panel

P8/J8: 2 pin connector for Air Filter Restriction option, located near lift bail

P12/J12: 2 pin connector for IQ Filter Restriction option, located near lift bail

SECTION 8 - Electrical Parts List

Electrical Parts List

Compressor and Engine		
Reference Designator	**Description**	**Part Number**
	WEDGE Controller	22173579
	Compressor and Engine Harness	46589101
	Engine Intake Heater Harness	46589479
	Battery Positive Cable	35583582
	Battery Negative Cable	35610856
	Battery Cable Jumper	22192801
	Frame Ground Strap 750mm	23232762
	Engine Ground Strap 750mm	23232762
B1	Engine Starter	Cummins Part
BT1	Battery, 12 VDC	36844975
BT2	Battery, 12 VDC	36844975
D1	Diode	35376169
F1	System Fuse 20 Amp	36792083
F1	Replacement Fuse Cap	46551840
F2	Engine ECM Fuse 30 Amp	36786259
F2	Replacement Fuse Cap	46551840
F3	Engine Comms. Fuse 10 Amp	36782456
F3	Replacement Fuse Cap	46551840
F4	Engine Intake Air Heater Fuse 125 Amp	46606279
F4	Replacement Fuse Holder	45671534
G1	Engine Alternator	Cummins Part
HR1	Engine Intake Air Heater	Cummins Part
J2	Replacement Backshell	22870026
J5	Replacement Cap with Lanyard	23366768
J5A	Replacement Cap with Lanyard	23366768
K1	Engine Starter Relay	36853521
K2	Engine Intake Air Heater Relay	36853521
L1	Start/Run Solenoid Valve	36840841
PT1	Separator Tank Pressure Sensor	54496773
PT2	Regulation System Pressure Sensor	36920825
RT1	Separator Tank Temperature Sensor	23294838
RT2	Discharge Air Temperature Sensor	23294838
S15	Display Scroll Switch	54475777
TR1	J1939 CAN BUSS Terminating Resistor	23091804
TR2	J1939 CAN BUSS Terminating Resistor	23091804
U1	Fuel Level Sensor	54731427

Electrical Parts List

Control Panel		
Reference Designator	**Description**	**Part Number**
	Control Panel Harness	22835680
DS1 / DS2	Compressor Fault Lamp / Engine Fault Lamp	22172423
DS3	Wait To Start Lamp	22050553
M1	Hourmeter	22054175
M2	Fuel Level Gauge	22692602
M2	Replacement Bulb 28VDC	22137426
M5	Discharge Pressure Gauge	36891216
M5	Replacement Bulb 28VDC	22137426
S1	Keyswitch	22127385
S1	Replacement Knob Assembly	22134118
S2	Load Switch	22054076

Trailer		
Reference Designator	**Description**	**Part Number**
	Trailer Harness	46546339
	Trailer Harness Extension (Extended Drawbar Option)	46547782
BS1	Breakaway Switch	46554147
L1	Right Front Side Marker Lamp	35367051
L2	Left Front Side Marker Lamp	35367051
L3	Left Rear Side Marker Lamp	35367044
L4	Left Stop/Turn/Tail Lamp	36788081
L5	License Plate Lamp	36895860
L6	Right Stop/Turn/Tail Lamp	36788081
L7	Right Rear Side Marker Lamp	35367044

Electrical Parts List

Full Gauge Option		
Reference Designator	**Description**	**Part Number**
	Full Gauge Panel Option Harness	46606620
M3	4 IN 1 Gauge	22255046
M3	Replacement Bulb 28VDC	22137426
M4	Engine Tachometer	22055883
M4	Replacement Resistor Board 24VDC	22271779
M4	Replacement Bulb 28VDC	22137426
RP1	Engine Oil Pressure Gauge Sender	36870608
RT3	Discharge Air Temperature Gauge Sender	35367218
RT4	Engine Coolant Temperature Gauge Sender	35604180
S16	Airend Air Filter Restriction Switch	36847838
S17	Engine Air Filter Restriction Switch	36847838

Gauge Illumination Option		
Reference Designator	**Description**	**Part Number**
	Gauge Illumination Option Harness	22681845

IQ Filter Restriction Switch Option		
Reference Designator	**Description**	**Part Number**
	IQ Filter Restriction Switch Option Harness	22293484
S18	IQ Filter Restriction Switch	36899615

AutoStart Option		
Reference Designator	**Description**	**Part Number**
	AutoStart Controller	22743322
	AutoStart Option Harness	22864631
	Battery Charger	54715941
	Battery Charger Harness	22327175
DS10	AutoStart Indicator Lamp	22307698
DS10	Replacement Bulb	35290089
J101	Replacement Cap with Lanyard	23366768
LS1	Alarm Horn	36785145
S20	AutoStart Selection Switch	54615091
TB1	Terminal Block	22307706

SECTION 9 - Harness Connector Information

Harness Connector Information

The following is a complete list of the connectors and connector parts that are used on the compressor harnesses. The most common replacement connectors and connector parts will be found in the Deutsch terminal repair kit, Packard terminal repair kit, and Wire terminal repair kit. A repair kit is available for the WEDGE connector and Engine ECM connector. Check the Electrical Parts List section for individual replacement harness parts for certain items. If the connectors and connector parts are not in the kits above, the manufacturer part numbers and contact information will be provided.

Compressor and Engine Harness:

Connector and Parts	Manufacturer	Manufacturer's Part No.	Included in Doosan Service Kit Part No.
P1 WEDGE Connector			
Plug, 40 way	Deutsch	DRC16-40S	22252993
Socket size 16 Tin	Deutsch	0462-201-16141	22252993 / 46490983
Socket size 14 Tin	Deutsch	0462-209-16141	22252993 / 46490983
Socket size 16 Gold	Deutsch	0462-201-1631	22252993 / 46490983
Sealing plug size 16-12	Deutsch	114017	22252993 / 46490983
Rubber Boot	Deutsch	DRC40-BT	
P4 Control Panel Connector			
Plug, 12 way	Deutsch	DT06-12SA-EP08	
Rubber Boot	Deutsch	DT12S-BT-BK	
Socket size 16 Tin	Deutsch	0462-201-16141	46490983
Socket size 14 Tin	Deutsch	0462-209-16141	46490983
Sealing plug size 16-12	Deutsch	114017	46490983
P10 Accessory Connector			
Plug, 6 way	Deutsch	DT06-6S-EP06	46490983
Wedgelock	Deutsch	W6S-P012	46490983
Socket size 16 Gold	Deutsch	0462-201-1631	46490983
J10-Cap Accessory Connector			
Dust Cap, 6 way Plug	Deutsch	1011-347-0605	
RT1 Temperature Sensor Connector			
Plug, 2 way	Packard	15300027	46491296
TPA	Packard	15300014	46491296
Terminal, 18-16 Awg	Packard	12077411	46491296
Cable Seal	Packard	12089679	46491296
RT2 Temperature Sensor Connector			
Plug, 2 way	Packard	15300027	46491296
TPA	Packard	15300014	46491296
Terminal, 18-16 Awg	Packard	12077411	46491296
PT1 Pressure Sensor Connector			
Plug, 3 way	Packard	13532244	46491296
TPA	Packard	15452678	46491296
Terminal	Packard	15326267	46491296
Cable Seal	Packard	15305351	46491296
Cable Seal	Packard	12089679	46491296

Harness Connector Information

Compressor and Engine Harness:

Connector and Parts	Manufacturer	Manufacturer's Part No.	Included in Doosan Service Kit Part No.
PT2 Pressure Sensor Connector			
Plug, 3 way	Packard	13532244	46491296
TPA	Packard	15452678	46491296
Terminal	Packard	15326267	46491296
Cable Seal	Packard	15305351	46491296
J5 WEDGE Controller Communication Connector			
Receptacle, 9 way	Deutsch	HD10-9-96P	46490983
Connector Cap	Deutsch	HDC9-JDL082397	46490983
Pin size 16 Gold	Deutsch	0460-202-1631	46490983
Sealing plug size 16-12	Deutsch	114017	46490983
P7 Option Connector			
Plug, 2 way	Deutsch	DT06-2S-EP06	46490983
Wedgelock	Deutsch	W2S-P012	46490983
Socket size 16 Tin	Deutsch	0462-201-16141	46490983
J7-Cap Option Connector			
Dust Cap, 2 way Plug	Deutsch	1011-344-0205	
P8 Option Connector			
Plug, 2 way	Deutsch	DT06-2S-EP06	46490983
Wedgelock	Deutsch	W2S-P012	46490983
Socket size 16 Tin	Deutsch	0462-201-16141	46490983
J8-Cap Option Connector			
Dust Cap, 2 way Plug	Deutsch	1011-344-0205	
P12 Option Connector			
Plug, 2 way	Deutsch	DT06-2S-EP06	46490983
Wedgelock	Deutsch	W2S-P012	46490983
Socket size 16 Tin	Deutsch	0462-201-16141	46490983
J12-Cap Option Connector			
Dust Cap, 2 way Plug	Deutsch	1011-344-0205	
P15 J1939 CAN Terminator Connector			
Plug, 2 way	Deutsch	DTM06-2S-E005	46490983
Wedgelock	Deutsch	WM-2SB	46490983
Socket size 20 Gold	Deutsch	0462-201-2031	46490983
P16 J1939 CAN Terminator Connector			
Plug, 2 way	Deutsch	DTM06-2S-E005	46490983
Wedgelock	Deutsch	WM-2SB	46490983
Socket size 20 Gold	Deutsch	0462-201-2031	46490983
TR1 J1939 CAN Terminator			
Receptacle, 2 way terminator	Deutsch	DTM04-2P-EP10	46490983
TR2 J1939 CAN Terminator			
Receptacle, 2 way terminator	Deutsch	DTM04-2P-EP10	46490983

Harness Connector Information

Compressor and Engine Harness:

Connector and Parts	Manufacturer	Manufacturer's Part No.	Included in Doosan Service Kit Part No.
U1 Low Fuel Shutdown/Gauge Sender Connector			
Plug, 4 way	Packard	12015797	46491296
Terminal, 20-18 Awg	Packard	12089188	46491296
Cable Seal	Packard	12089679	46491296
F1 Fuse Connector			
Plug, 2 way Fuse	Packard	12085030	46491296
Fuse Connector Cap	Packard	12033731	46491296
Terminal, 16-14 Awg	Packard	12033997	46491296
F2 Fuse Connector			
Plug, 2 way Fuse	Packard	12085030	46491296
Fuse Connector Cap	Packard	12033731	46491296
Terminal, 16-14 Awg	Packard	12033997	46491296
F3 Fuse Connector			
Plug, 2 way Fuse	Packard	12085030	46491296
Fuse Connector Cap	Packard	12033731	46491296
Terminal, 16-14 Awg	Packard	12033997	46491296
D1 Diode Terminal			
Plug, Bullet	AMP	60660-1	22252969
Receptacle, Bullet	AMP	60798-1	22252969
J2 Cummins CM850 OEM 50 Pin Connector			
Plug, 50 way	Deutsch	DRC26-50S-04	46491569
Backshell	Deutsch	0528-001-5005	46491569
Socket size 20 Gold	Deutsch	0462-201-2031	46491569 / 46490983
Cavity Plug	Deutsch	0413-204-2005	46491569 / 46490983
J3 Cummins CM850 Power Connector			
Plug, 4 way	Deutsch	DTP06-4S-E003	46491569
Wedgelock	Deutsch	WP-4S	46491569
Socket size 12	Deutsch	0462-203-12141	46491569 / 46490983
J5A Cummins Engine ECM Service Connector			
Receptacle, 9 way	Deutsch	HD10-9-1939P	46490983
Connector Cap	Deutsch	HDC9-JDL082397	46490983
Pin size 16 Gold	Deutsch	0460-202-1631	46490983
Sealing plug size 16-12	Deutsch	114017	46490983
CB5 WIF Connector			
Plug, 2 way	Deutsch	DT06-2S-EP06	46490983
Wedgelock	Deutsch	W2S-P012	46490983
Socket size 16 Gold	Deutsch	0462-201-1631	46490983
C5 WIF Engine Harness Connector			
Receptacle, 2 way	Deutsch	DT04-2P-E005	46490983
Wedgelock	Deutsch	W2P	46490983
Pin size 16 Gold	Deutsch	0460-202-1631	46490983

Harness Connector Information

Control Panel Harness:

Connector and Parts	Manufacturer	Manufacturer's Part No.	Included in Doosan Service Kit Part No.
J4 Control Panel Connector			
Receptacle, 12 way	Deutsch	DT04-12PA-E005	
Rubber Boot	Deutsch	DT12P-BT-BK	
Pin size 16 Tin	Deutsch	0460-202-16141	46490983
Pin size 14 Tin	Deutsch	0460-215-16141	46490983
Sealing plug size 16-12	Deutsch	114017	46490983
S1 Keyswitch Connector			
Plug, 4 way	Packard	12052856	46491296
TPA	Packard	15324456	46491296
Terminal 18-16 Awg	Packard	12034046	46491296
Terminal, 16-14 Awg	Packard	12066214	46491296

Quick Disconnects, Ring Terminals, and Butt Splices	
Most Common used Quick Disconnects, Ring Terminals, and Butt Splices can be found in the Doosan Wire Terminal Service Kit.	22252969

Contact For Packard and Molex Connector and Connector Parts:
Power and Signal Group
6675 Parkland Blvd.
Solon, OH 44139
1-800-722-5273

Contact For Deutsch Connector and Connector Parts:
Ladd Industries. Inc.
4849 Hempstead Station Dr.
Kettering, OH 45429
1-800-223-1236

Contact For AMP Connector and Connector Parts:
AMP Incorporated
Harrisburg, PA 17105
1-800-522-6752

Electrical Torque Specifications

Electronic Controller Connector Screw Torque Specifications			
Description	**Connector Manufacturer**	**Manufacturer Part Number**	**Torque**
WEDGE Controller	Deutsch	DRC16-40S	25 in.lbs
Caterpillar C9,C15, & C18 Tier 3 Engine ECM	Amp	776241-1	53 in.lbs
Cummins QSB4.5, QSL9, and QSC8.3 Tier 3 Engine ECM	Deutsch	DRC26-50S-04	25 in.lbs
Cummins QSX15 Tier 3 Engine ECM	Deutsch	DRC26-50S-01	25 in.lbs

SECTION 10 - Tools and Repair Kits

Service Tools

The following list of special service tools are recommended to perform service and troubleshooting procedures in this manual. These tools can be purchased through Doosan Infracore Portable Power.

Part Number	Description
22216691	Digital Multimeter (Fluke 87) Used to measure electrical circuits: Volts, Amps, Ohms
22216733	Fluke Meter Case Storage Case for Fluke meter and test leads
22216709	Fluke Test Lead Set Contains needle probes, alligator clips, and test leads
22216725	Fluke Wire Insulation Piercing Probe Used to pierce wire insulation when making electrical measurements
22147540	Kit, Test Adapters Used to interconnect between devices and harness for electrical measurements
22281588	T-Handle Hex Wrench 5/32” Used to remove Titan, Caterpillar ECM, and Cummins ECM connectors
22282107	Screw Driver Hex 5/32” Used to remove Titan, Caterpillar ECM, and Cummins ECM connectors
22282172	Flex Driver ¼” Used to remove John Deere ECM connector
54740675	RS232 Heavy Duty Serial Cable Used for communication connection to Doosan controllers
54699640	Deutsch Terminal Removal Tool Size 20 Used to remove Deutsch size 20 terminals from connectors
54699632	Deutsch Terminal Removal Tool Size 16 Used to remove Deutsch size 16 terminals from connectors
46490942	Deutsch Terminal Removal Tool Size 14 Used to remove Deutsch size 14 terminals from connectors
54699624	Deutsch Terminal Removal Tool Size 12 Used to remove Deutsch size 12 terminals from connectors
54699616	Deutsch Terminal Removal Tool Size 8 Used to remove Deutsch size 8 terminals from connectors
54699657	Deutsch Wedgelock and Terminal Removal Tool Used to remove Deutsch DT style connector Wedgelock and terminals
22146393	Kit, Deutsch Terminal Removal Tool Size 20 Through 8 Used to remove Deutsch size 20 through 8 terminals from connectors
22216667	Deutsch Terminal Crimp Tool Used to crimp Deutsch connector terminals

Service Tools

Part Number	Description
54729660	Packard Weather-Pack Terminal Removal Tool Used to remove Packard Weather-Pack connector terminals
54749643	Packard Metri-Pack Terminal Removal Tool Used to remove Packard Metri-Pack connector terminals
46490959	Packard Metri-Pack Terminal Removal Tool Used to remove Packard Metri-Pack connector terminals
22254734	Packard Weather-Pack Terminal Crimp Tool Used to crimp Packard Weather-Pack connector terminals
22216683	Packard Metri-Pack Terminal Crimp Tool Used to crimp Packard 150 and 280 series connector terminals
22255947	Packard Metri-Pack Terminal Crimp Tool Used to crimp Packard 150 series pull-to-seat connector terminals
46490967	Packard Metri-Pack Terminal Crimp Tool Used to crimp Packard 150-GT series connector terminals
46490975	Packard Metri-Pack Terminal Crimp Tool Used to crimp Packard 630 series connector terminals
54749544	RTD Simulator Used to troubleshoot RTD type temperature sensor problems
54749551	Thermistor Simulator Used to troubleshoot Thermistor type temperature sensor problems
22073878	Thermistor Simulator Used to troubleshoot Thermistor type temperature sensor problems
22168868	Pressure Transducer Simulator Used to troubleshoot pressure sensor problems
54729710	Electrical Contact Cleaner Used to clean electrical terminals and connectors
22409114	Electrical Grease Used to prevent corrosion in connector terminals
46491338	Molex 1.5 Terminal Crimp Tool Used to crimp Molex CMC 1.5 series connector terminals
46491346	Molex 0.6 Terminal Crimp Tool Used to crimp Molex CMC 0.6 series connector terminals
46491653	Molex 1.5 Terminal Removal Tool Used to remove Molex CMC connector terminals
46491361	Molex 0.6 Terminal Removal Tool Used to remove Molex CMC connector terminals
46491320	AMP Ampseal Terminal Crimp Tool Used to crimp Ampseal series connector terminals

Harness Connector Repair Kits

The following is a list of harness connector repair kits that can be purchased through Doosan Portable Power to service or repair the most common used connectors.

Part Number	Description
46490983	Kit, Deutsch Connector Repair Assortment of Deutsch connectors and terminals.
22252969	Kit, Wire Terminal Repair Assortment of ring and quick disconnect terminals.
22254775	Kit, Fuses Assortment of ATC and ATM style fuses.
22253017	Kit, Adhesive Lined Heat Shrink Assortment of adhesive lined heat shrink sizes.
22252993	Kit, Wedge Connector Repair Used to repair 40 way Wedge connector and terminals.
46491296	Kit, Packard Connector Repair Assortment of Packard connectors and terminals.
46491304	Kit, Caterpillar C9, C15, and C18 Engine ECM Connector Repair Used to repair 70 way engine ECM connector and terminals.
46491312	Kit, IQ, TC4, OTC, and Auto Start Controller Connector Repair Used to repair 23 way controller connector and terminals.
46491411	Kit, John Deere and Yanmar Tier 3 Engine ECM Connector Repair Used to repair 48 way engine ECM connector and terminals.
46491429	Kit, Cummins QSX15 Engine ECM Connector Repair Used to repair 50 way engine ECM connector and terminals.
46491502	Kit, SECU, Mote and Titan Controller Connector Repair Used to repair 35 way controller connector and terminals.
46491569	Kit, Cummins OSL9 and QSC 8.3 Engine ECM Connector Used to repair 50 way engine ECM connector and terminals.
46599302	Kit, Cummins T4i CM2250 Engine ECM Connector Repair Used to repair 60 way engine ECM connector and terminals.
46599303	Kit, ViewPort Connector Repair Used to repair 8 way ViewPort connector and terminals.
46599319	Kit, Engine Tachometer Connector Repair Used to repair 12 way and 6 way Engine Tachometer connector and terminals.
46603079	Kit, Cummins T4i OEM 24 Pin Breakout Connector Repair Used to repair 24 way OEM Breakout Connector connected to Engine Harness.

Terminal Crimp Tool Usage

The following chart shows which manufacturer's crimp tool to use with each terminal when making repairs. Most of the common crimp tools are available through Doosan Portable Power. If the tools needed are not available through Doosan Portable Power, the manufacturer part numbers and contact information will be provided.

Terminal	Manufacturer	Manufacturer's Part No.	Manufacturer's Crimp Tool Part No.	Doosan Crimp Tool Part No.
Socket size 20 Tin	Deutsch	0462-201-20141	HDT-48-00	2221667
Socket size 20 Gold	Deutsch	0462-201-2031	HDT-48-00	2221667
Pin size 20 Tin	Deutsch	0460-202-20141	HDT-48-00	2221667
Pin size 20 Gold	Deutsch	0460-202-2031	HDT-48-00	2221667
Socket size 16 Tin	Deutsch	0462-201-16141	HDT-48-00	2221667
Socket size 16 Gold	Deutsch	0462-201-1631	HDT-48-00	2221667
Pin size 16 Tin	Deutsch	0460-202-16141	HDT-48-00	2221667
Pin size 16 Gold	Deutsch	0460-202-1631	HDT-48-00	2221667
Socket size 14 Tin	Deutsch	0462-209-16141	HDT-48-00	2221667
Socket size 14 Gold	Deutsch	0462-209-1631	HDT-48-00	2221667
Pin size 14 Tin	Deutsch	0460-215-16141	HDT-48-00	2221667
Pin size 14 Gold	Deutsch	0460-215-1631	HDT-48-00	2221667
Socket size 12 Tin	Deutsch	0462-203-12141	HDT-48-00	2221667
Socket size 12 Gold	Deutsch	0462-210-1231	HDT-48-00	2221667
Pin size 12 Tin	Deutsch	0460-204-12141	HDT-48-00	2221667
Pin size 12 Gold	Deutsch	0460-220-1231	HDT-48-00	2221667
Terminal	Packard	15326267	15359996	46490967
Terminal	Packard	12077411	12155975	22216683
Terminal	Packard	12048074	12155975	22216683
Terminal 16-18 Awg	Packard	12110847	12155975	22216683
Terminal 16-	Packard	12129409	12155975	22216683

14 Awg				
Pin Grip Terminal	Packard	08911072	12155975	22216683
Terminal 18-16 Awg	Packard	12034046	12155975	22216683
Terminal 20-16 Awg Gold	AMP	770854-3	58440-1	46491320

Crimp Tool Manufacturer Information

Contact for Packard ConnectorTools:
Power and Signal Group
6675 Parkland Blvd.
Solon, OH 44139
1-800-722-5273

Contact for Deutsch Connector Tools:
Ladd Industries. Inc.
4849 Hempstead Station Dr.
Kettering, OH 45429
1-800-223-1236

Contact For AMP Tools:
Amp Inc.
Harrisburg, PA 17105
1-800-522-6752

Contact for FCI Connector Tools:
Mouser Electronics
1000 North Main Street
Mansfield, TX 76063
1-800-346-6873

Contact for Sumitomo Connector Tools:
Ballenger Motorsports, Inc.
8972 Quioccasin Rd
Suite 188
Richmond, VA 23229
1-804-915-7201

Contact for Yazaki Connector Tools:
Yazaki
6801 Haggerty Road
Canton, MI 48187
1-888-942-9152

Deutsch Crimp Tool HDT-48-00 Instructions

Crimping Procedure
(HDT-48-00)

1) Strip (see recommended strip lengths) insulation from wire.

2) Raise selector knob and rotate until arrow is aligned with wire size to be crimped.

3) Loosen lock nut, turn adjusting screw in until it stops.

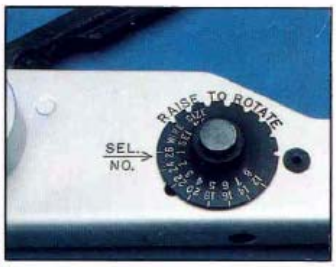
4) Insert contact, turn adjusting screw counter clockwise out until contact is flush with indentor cover. Tighten lock nut.

5) Insert wire in contact, contact must be centered between indicators, close handles until handle contacts the stop.

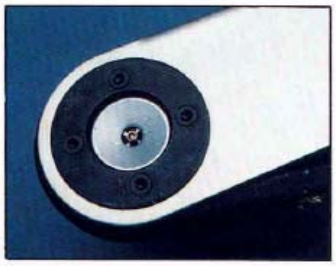
6) Release handles and remove crimped contact.

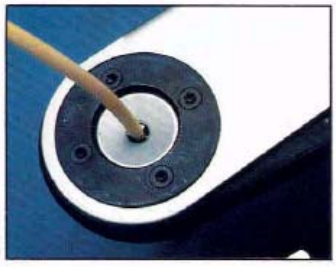
7) Inspect terminal to insure that all strands are in crimp barrel.

NOTE: Tool must be readjusted for each type/size of contact.



1)
2)
3)


4)


5)
6)


7)

Wire Termination

Do's and Don'ts

Do's

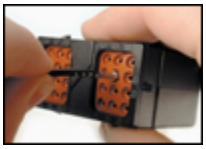
- Check strip lengths.
- Protect wire strands.
- Gauge the crimp indenters.
- Check crimp selector for correct wire size settings.
- Check air pressure on semi- and automatic crimp equipment.
- Tensile pull test.
- Specify Deutsch manufactured terminals.
- Check crimp locations.

Don'ts

- Add solder.
- Apply heat.
- Leave exposed conductor wire strands.
- Overcrimp.
- Rely on T-Dim measurments only.
- Use "Field-Maintenance" crimp tools for volume production.
- Buy bogus terminals.

Contact Insertion

1. Grasp contact approximately 1.00" (25.4 mm) behind the contact crimp barrel.

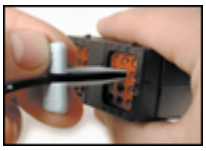


2. Hold connector with rear grommet facing you.

3. Push contact straight into connector grommet until a positive stop is felt. A slight tug will confirm that it is properly locked in place.

Contact Removal

1. With rear insert toward you, snap appropriate size extractor tool over the wire of contact to be removed.



2. Slide tool along wire into the insert cavity until it engages contact and resistance is felt. **NOTE:** Do not twist or insert tool at an angle.

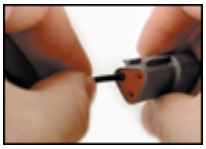
3. Pull contact-wire assembly out of connector.

Deutsch DT Series Connector Service Procedures

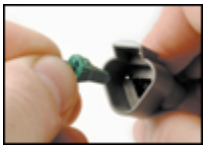
Contact Insertion

1. Grasp crimped contact approximately (25.2 mm) one inch behind the contact barrel.

2. Hold connector with rear grommet facing you.

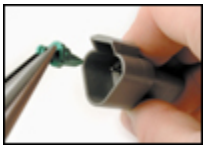


3. Push contact straight into connector grommet until a click is felt. A slight tug will confirm that it is properly locked in place.



Once all contacts are in place, insert orange wedge will arrow pointing toward exterior locking mechanism. The orange wedge will snap into place. Rectangular wedges are not oriented. They may go in either way.
NOTE: The receptacle is shown - use the same procedure for plug.

Contact Removal



1. Remove orange wedge using needle nose pliers or a hook shaped wire to pull wedge straight out.

2. To remove the contacts, gently pull wire backwards, while at the same time releasing the locking finger by moving it away from the contact with a screwdriver.

3. Hold the rear seal in place, as removing the contact will displace the seal.

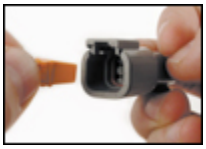
Deutsch DTM Series Connector Service Procedures

Contact Insertion

1. Grasp crimped contact approximately 1.0" (25.4 mm) behind the contact barrel.

2. Hold connector with rear grommet facing you.

3. Push contact straight into connector grommet until a click is felt. A slight tug will confirm that it is properly locked in place.



Once all contacts are in place, insert orange wedge: receptacles - with half holes aligning with contacts. Plugs - with contacts aligning behind full holes. The orange wedge will snap into place. **NOTE:** The receptacle is shown - use the same procedure for plug.

Contact Removal

1. Remove orange wedge using needle nose pliers to pull wedge straight out.

2. To remove the contacts, gently pull wire backwards, while at the same time releasing the locking finger by moving it away from the contact with a screwdriver.

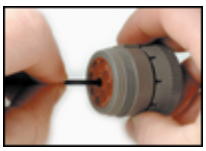
3. Hold the rear seal in place, as removing the contact will displace the seal.

Deutsch HD10 Series Connector Service Procedures

Contact Insertion

1. Grasp the contact-wire assembly between the thumb and forefinger on the wire approximately one inch behind the contact crimp barrel.

2. Hold the connector with the rear grommet facing you.



3. Push the contact straight into the connector grommet until a positive stop is felt. The retaining fingers in the connector will snap behind the shoulder of the contact and lock it in place. A slight tug will confirm that it is properly sealed.

Contact Removal

1. With rear insert toward you, snap the appropriate size plastic tool over the wire of the contact to be removed.

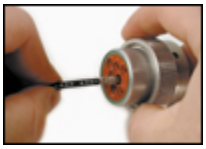
2. Slide the tool along the wire into the insert cavity until it engages the contact and resistance is felt. The contact retaining clip will be in the unlocked position.

3. Pull the contact-wire assembly out of the connector.

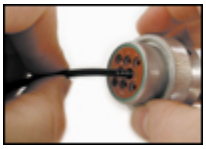
Deutsch HD30 and HDP20 Series Connector Service Procedures

Contact Insertion

1. Grasp contact approximately (25.4 mm) one inch behind the contact crimp barrel.

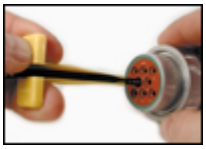


2. Hold connector with rear grommet facing you.

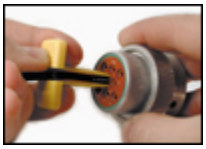


3. Push contact straight into connector grommet until a positive stop is felt. A slight tug will confirm that it is properly locked in place.
NOTE: For unused wire cavities, insert sealing plugs for full environmental sealing

Contact Removal



1. With rear insert toward you, snap appropriate size extractor tool over the wire of contact to be removed.



2. Slide tool along into the insert cavity until it engages contact and resistance is felt.

3. Pull contact-wire assembly out of connector.
NOTE: Do not twist or insert tool at an angle

PROPER USE GUIDELINES

Cumulative Trauma Disorders can result from the prolonged use of manually powered hand tools. AMP hand tools are intended for occasional use and low volume applications. AMP offers a wide selection of powered application equipment for extended–use, production operations.

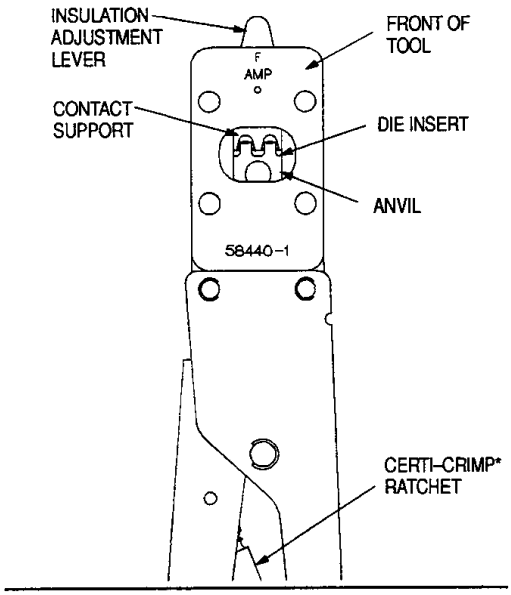


Figure 1 cad

1. INTRODUCTION

AMP Hand Crimping Tool 58440–1, shown in Figure 1, is designed for crimping AMPSEAL* Loose Piece contacts listed in Figure 2. Read these instructions thoroughly before crimping any contact.

NOTE *All dimensions on this document are in metric units [with U.S. customary units in brackets].*

2. DESCRIPTION

The FRONT of the tool, into which the contact is inserted, has the tool number marked on it. The BACK of the tool (wire side), into which the wire is inserted, has the wire size marked above the crimp section.

The tool features two fixed upper die inserts, two bottom movable dies (anvils), an insulation crimp adjustment lever, a contact support, a locator, ann ejector, and a CERTI–CRIMP ratchet. The insulation adjustment lever is used to regulate the crimp height of the contact insulation barrel. Refer to Paragraph 4, INSULATION CRIMP ADJUSTMENT. The contact support prevents the contact from bending during the crimping operation.

The locator has two functions: first, it positions the contact between the upper insert and the anvil before crimping; and, second, it limits the insertion distance of the stripped wire into the contact. In use, it rest in the locator slot of the contact (see Figures 2 and 3).

The ejector pulls the locator down, and ejects the crimped contact when the tool handles are fully opened.

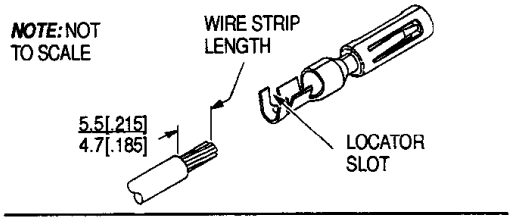
The CERTI–CRIMP ratchet assures full crimping of the contact. Once engaged, the ratchet will not release until the handles have been fully closed.

CAUTION *The crimping jaws bottom before the CERTI–CRIMP ratchet releases. This is a design feature that ensures maximum electrical and tensile performance of the crimp. Do NOT re–adjust the ratchet.*

3. CRIMPING PROCEDURE

Refer to the chart in Figure 2 and ensure that the wire is of the specified size and insulation diameter, and is compatible with the contact and the wire size marking on the BACK of the tool. Strip the wire to the length indicated — do NOT cut or nick the wire strands.

WIRE		TOOL CRIMP SECTION (Wire Size Marking)	CONTACT PART NUMBER	
SIZE (AWG)	INSULATION DIAMETER RANGE		LOOSE PIECE	STRIP FORM•
16	1.7 – 2.7 [.067 – .106]	16	770854–1	770520–1
20 – 18		20 – 18		



• SEE CAUTION BELOW *Figure 2* cad

CAUTION *Do NOT cut strip form• (reeled) contacts into loose piece form. This will produce burrs on the cut–off tab which will damage the wire seal in the plug assembly.*

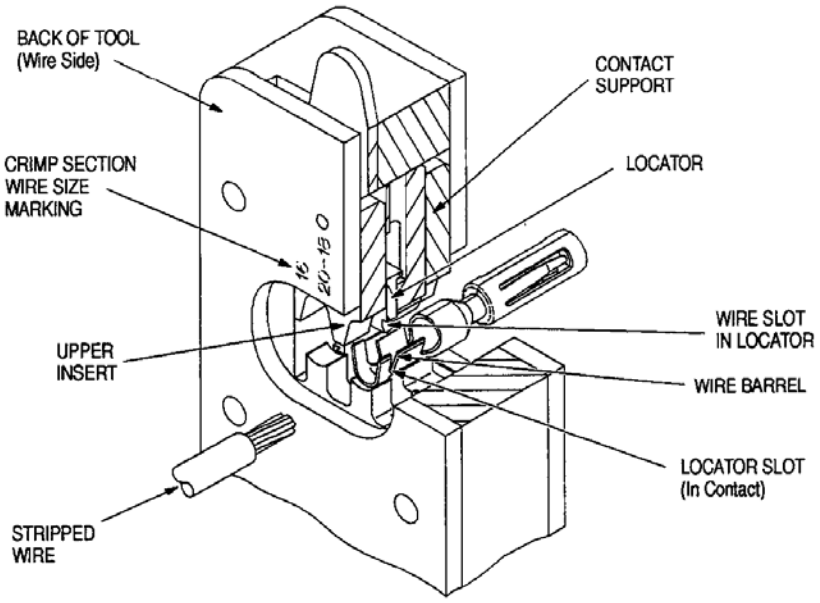


Figure 3 cad

For dimensional information on the product, refer to AMP Application Specification 114–16016. Then proceed as follows:

1. Hold tool so BACK side (wire side) faces you. See Figure 3.

2. Ensure that tool ratchet is released by squeezing tool handles and allowing them to open.

3. Holding contact by its mating portion and looking straight into crimp section, insert contact from the FRONT of tool into BACK of crimp section. Position contact between the crimping dies so the locator–insulation stop enters the locator slot in contact. The wire barrel should butt against the locator/insulation stop.

4. Holding contact in this position, squeeze tool handles together until insulation barrel anvil starts entry into the upper insert (insulation). Do NOT deform insulation barrel or wire barrel.

5. Insert properly stripped wire through the wire slot in locator and into wire barrel of contact until insulation butts against the locator/insulation stop.

6. Holding wire in place, crimp contact to wire by squeezing tool handles together until ratchet releases.

7. Allow tool handles to open FULLY and remove crimped contact from tool.

4. INSULATION CRIMP ADJUSTMENT

The insulation barrel crimp height is regulated by the insulation adjustment lever. To determine the proper setting, test crimp a contact using the setting which approximates the insulation size: (1) small, (2) medium, or (3) large. If the crimped insulation barrel is too tight or too loose, change the setting accordingly. The crimp should hold the insulation firmly without cutting into it.

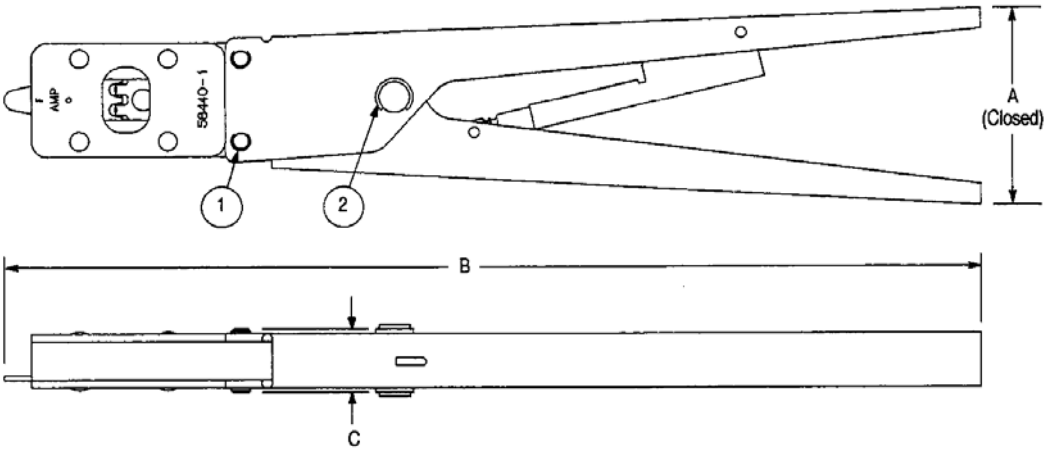
5. MAINTENANCE/INSPECTION

These instructions have been approved by AMP Design, Production, and Quality Control Engineers to provide documented maintenance and inspection procedures. Through AMP test laboratories and the inspection of production assembly, the procedures described herein have been established to ensure quality and reliability of AMP hand crimping tools.

Customer–replaceable parts are listed in Figure 4. A complete inventory should be stocked and controlled to prevent lost time when replacement of parts is necessary. When parts are needed, order by part number and description.

5.1. Daily Maintenance

Remove all foreign particles with a clean, soft brush, or a clean, soft lint–free cloth. Make sure the proper retaining pins are in place, and secured with the proper retaining rings. If foreign matter/substances



TOOL SPECIFICATIONS			CUSTOMER-REPLACEABLE PARTS			
DIMENSION		WEIGHT	ITEM	PART NUMBER	DESCRIPTION	QTY
A	63.5 [2.5]	567 g [1 lb. 4 oz.]	1	21045-3	RING, Retaining	4
B	289 [11.375]					
C	20.1 [0.79]		2	21045-9	RING, Retaining	2

CAUTION *DO NOT REMOVE THE RETAINING PINS AS PERMANENT DAMAGE TO THE TOOL MAY RESULT.* cad

Figure 4

cannot be removed easily, or if the proper replacement parts are not available, return the tool to your supervisor.

Make certain all pivot points and bearing surfaces are protected with a THIN coat of any good SAE No. 20 motor oil. Do NOT oil excessively. When tool is not on use, keep the handles closed to prevent objects from becoming lodged between the crimping dies, and store the tool in a clean, dry area.

5.2. Periodic Inspection

Regular inspections should be performed by quality control personnel. A record of scheduled inspection should remain with the tool and/or be supplied to supervisory personnel responsible for the tool. Though recommendations call for at least one inspection a month, the inspection frequency should be based on the amount of use, ambient working conditions, operator training and skill, and established company standards. These inspections should be performed in the following sequence:

A. Visual Inspection

1. Remove all lubrication and accumulated film by immersing the tool (handles partially closed) in a suitable commercial degreaser that will not affect paint or plastic material.

2. Make certain all retaining pins are in place and secured with retaining rings. If replacements are necessary, refer to parts listed in Figure 4.

3, Close the tool handles until the ratchet releases, then allow the tool handles to open freely. If they do not open quickly and fully, the spring is defective and must be replaced (see Paragraph 6, REPAIR).

4. Inspect the head assembly, with special emphasis on checking for worn, cracked, or broken dies. If damage to any part of the head assembly is evident, return the tool to AMP for evaluation and repair (see Paragraph 6, REPLACEMENT AND REPAIR).

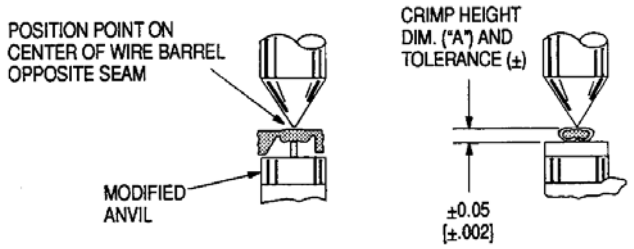
B. Crimp Height Inspection

This inspection requires the use of a micrometer with a modified anvil as shown in Figure 5. AMP recommends the modified micrometer (Crimp Height Comparator RS-1019-5LP) which can be purchased from:

York Machinery & Supply Co.
20 North Penn Street
York, PA 17401-1014

or

VALCO
1410 Stonewood Drive
Bethlehem, PA 18017-3527



CONTACT NUMBER STRIP FORM	CONTACT NUMBER LOOSE PIECE	WIRE SIZE AWG (Max)	CRIMP SECTION (Wire Size Marking)	CRIMP HEIGHT DIMENSION "A"	HAND TOOL NUMBER
770520-1	770854-1	20	20 - 18	1.22 [.048]	58440-1
		18	20 - 18	1.22 [.048]	
		16	16	1.40 [.055]	

Figure 5 200-002E

Proceed as follows:

1. Refer to chart in Figure 5 and select a contact and a wire (maximum size) for each crimp section listed in the chart.

2. Refer to Paragraph 3, CRIMPING PROCEDURE, and crimp the contacts(s) accordingly.

3. Using a crimp height comparator, measure wire barrel crimp height as shown in Figure 5. If the crimp height conforms to that shown in the chart, the tool is considered dimensionally correct. If not, return the tool to AMP for evaluation and repair (see Paragraph 6, REPLACEMENT AND REPAIR).

For additional information concerning the use of the crimp height comparator, refer to AMP instruction sheet 408-7424.

C. CERTI-CRIMP Ratchet Inspection

Obtain a .025mm [.001-in] shim that is suitable for checking the clearance between the bottoming surfaces of the crimping dies.

Proceed as follows:

1. Select a contact,wire (maximum size) and the designated crimp section for the wire you are using (see Figure 5).

2. Position the contact and wire between the crimping dies, according to Paragraph 3, CRIMPING PROCEDURE (STEPS 1 THROUGH 5). Holding the wire in place, squeeze the handles together until the CERTI-CRIMP ratchet releases. Hold the tool handles in this position, maintaining just enough pressure to keep the dies closed.

3. Check the clearance between the bottoming surfaces of the crimping dies. If the clearance is .025mm [.001 in], or less, the ratchet is satisfactory. If clearance is greater, the ratchet is out of adjustment and must be repaired (see Paragraph 6, REPLACEMENT AND REPAIR).

If the tool conforms to these inspection procedures, lubricate it with a THIN coat of any good SAE No. 20 motor oil and return it to service.

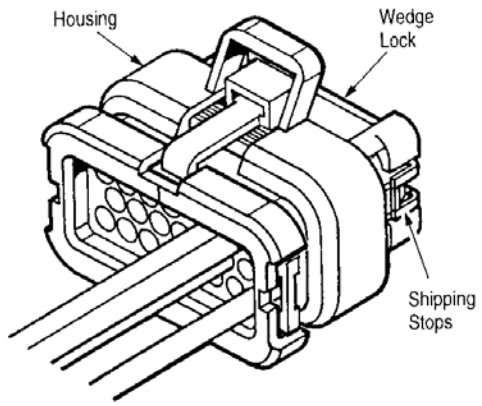
6. REPLACEMENT AND REPAIR

The parts listed in Figure 4 are customer-replaceable. A complete inventory can be stocked and controlled to prevent lost time when replacement of parts is necessary. Order replacement parts through your AMP representative, or call 1-800-526-5142, or send a facsimile of your purchase order to 1-717-986-7605, or write to:

CUSTOMER SERVICE (38-35)
AMP INCORPORATED
P.O. BOX 3608
HARRISBURG PA 17105-3608

Tools may also be returned to AMP for evaluation and repair. For repairs, send tool, with a written description of the problem, to:

CUSTOMER REPAIR (01-12)
AMP INCORPORATED
1523 NORTH 4TH STREET
HARRISBURG, PA 17102-1604



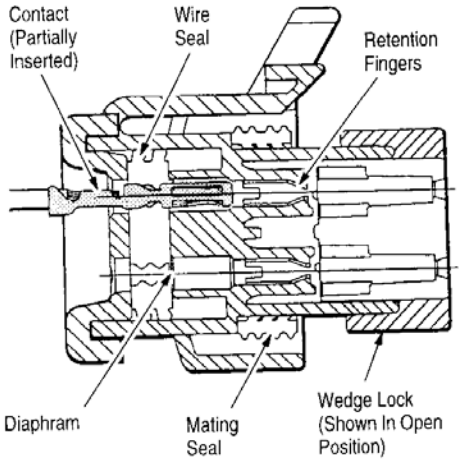


Figure 1 92-146

1. INTRODUCTION

This instruction sheet provides assembly and disassembly procedures for the AMP* AMPSEAL Automotive Plug Connector Assembly shown in Figure 1.

NOTE *All dimensions are in millimeters.*

Reasons for reissue of this sheet are provided in Section 9, REVISION SUMMARY.

2. DESCRIPTION

The plug assembly is shipped in one piece, with the wedge lock in the open position. The assembly consists of a housing, a cover, a wedge lock, a wire seal, and a mating seal.

Contacts are available in strip–form or in loose piece. Strip–form contacts are designed to be crimped with AMP Mini–Applicator 567333–2. Loose piece contacts are designed to be crimped with AMP Hand Tool 58440 or AMP PRO–CRIMPER* Tool 58529–1.

3. ASSEMBLY PROCEDURES

Check to be sure the wedge lock is in the **open**, or as–shipped, position (see Figure 1). If the wedge lock is closed, see Section 7. Then, proceed as follows:

1. To insert a contact, push it straight into the appropriate circuit cavity as far as it will go (see Figure 2).

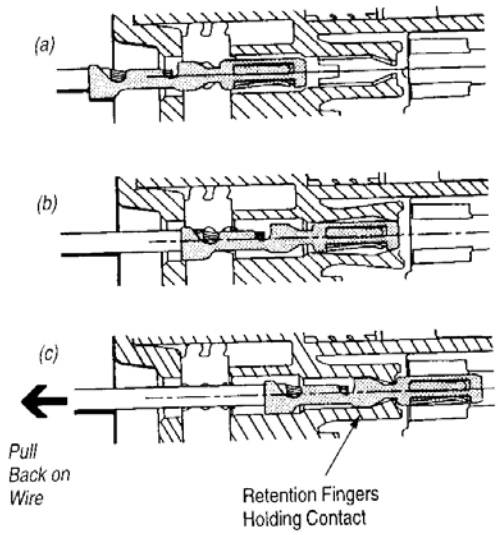


Figure 2 91-591A

2. Pull back on the contact wire with a force of about 4 to 9 Newtons [1 or 2 pounds] to be sure the retention fingers are holding the contact (see Figure 2).

3. After all required contacts have been inserted, the wedge lock must be closed to its **locked** position. Release the locking latches by squeezing them inward (see Figure 3).

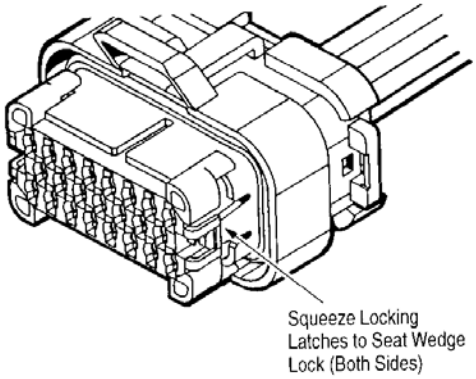


Figure 3 91-591b

4. Slide the wedge lock into the housing until it is flush with the housing (see Figure 4).

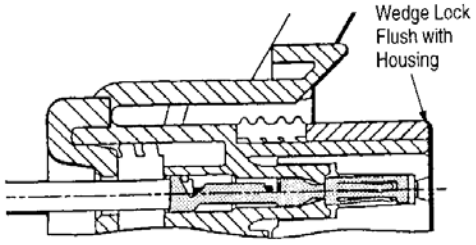


Figure 4 92-147

4. SEAL PLUG (Figure 5)

All circuits are sealed by a diaphragm in the rubber wire seal. When assembling the connector, the diaphragm is pierced as the contact passes through it. Unused circuit cavities will remain sealed, unless perforated by accidently inserting and removing a contact in the wrong cavity. AMP Seal Plug 770678–1 is designed to keep out contaminants if the diaphragm is pierced. Insert seal plug, **large end first**, into the circuit cavity as far as it will go. An insertion tool is generally **not** required for this procedure.

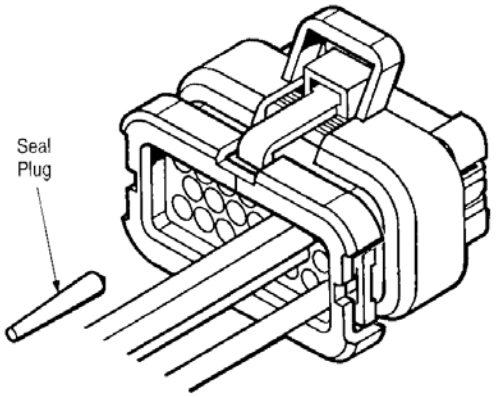


Figure 5 92-148

5. DISASSEMBLY PROCEDURES (Contact Removal)

Refer to Figure 6 and proceed as follows:

1. Insert a screwdriver blade between the mating seal and one of the red wedge lock tabs.

2. Pry open the wedge lock to the open (as shipped) position.

3. While rotating the wire back and forth over a half turn (1/4 turn in each direction), gently pull the wire until the contact is removed.

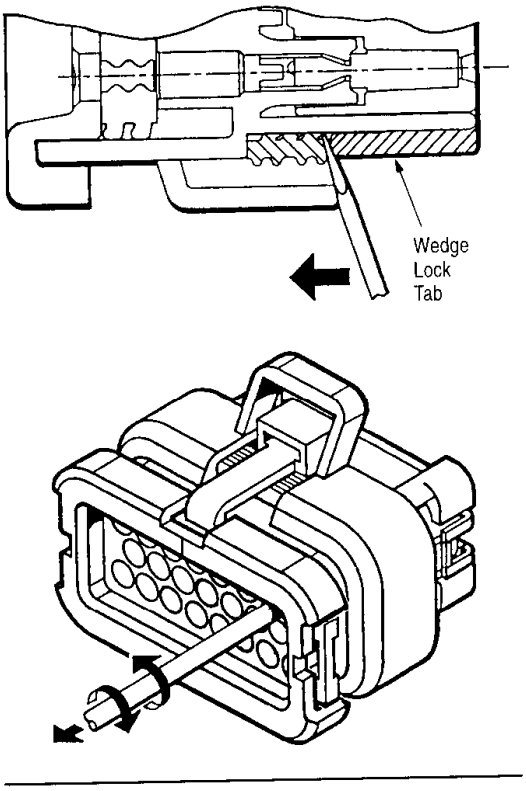
NOTE *The wedge lock should never be removed from the housing for insertion or removal of the contacts.*

6. ADDITIONAL INFORMATION

For information on contact crimping, refer to the instructions packaged with the tooling. For inspection information on crimped contacts, refer to instruction sheet 408–3284. For panel cutout dimensions, printed circuit board layout, etc. for the header assembly, refer to 408–3285. For application information on the AMPSEAL product line, refer to Application Specification 114–16016.

7. OPENING WEDGE LOCK

It is possible during adverse shipping conditions that some wedge locks may get bumped into the closed position (see Figure 4). If so, refer to Section 5, DISASSEMBLY PROCEDURES, Steps 1 and 2.



92-149

Figure 6

8. CURRENT RATING

Refer to Figure 7 for current ratings of special–use connectors, AMPSEAL Series 770669 (headers) and 770680 (plugs).

SINGLE–CIRCUIT PLATING	WIRE SIZE (AWG)	CURRENT RATING (MAX.)
Tin	16, 18, and 20	8A
Gold	16	14.5A
	18	13A
	20	11.5A

Figure 7

9. REVISION SUMMARY

Revisions to this document include:

Per EC 0740–0073–95:

- Added PRO–CRIMPER Tool and part number to Section 2
- Deleted two NOTES from Section 2

SECTION 11 - Recommended Spare Parts

Recommended Spare Parts

Quantity	Description	Part Number
1	WEDGE Controller	22173579
2	Thermistor Temperature Sensor	23294820
2	0-100 psig Pressure Transducer	36920825
2	0-225 psig Pressure Transducer	54496773
2	Solenoid Valve 24VDC NC	36840841

SECTION 12 - Software Information

Software Updates

Software updates are available on a website for downloading. The website will always contain the latest software revisions for all applications of Doosan Portable Power products.

The website address is: WWW.irembedded.com

Revision History

Rev.	EC Number	Comments
A	CN018821	Original Release
B	CN026881	Doosan Reference Updates

Doosan Infracore Portable Power
1293 Glenway Drive
Statesville, N.C. 28625
www.doosanportablepower.com

Doosan Infracore
Portable Power