Model 277EC
ENGINE IDLE LIMITER

Manufactured by
FLIGHT SYSTEMS
www.flightsystems.com

INSTALLATION INSTRUCTIONS

Please read these instructions *entirely* before starting the installation.

CONFIGURATION: Unless otherwise specified at the time your order is placed, the standard 277EC is shipped factory programmed for accessory shutdown and ambient temperature sensing. The ambient temperature sensor (57-A277-02) is not included with the model 277EC and is sold separately. The 277EC may be ordered factory programmed for accessory shutdown and shutdown notification using kit 57-A277-14 for 12 Volt systems or kit 57-A277-15 for 24 Volt systems. NOTE: Ambient temperature sensing and shutdown notification cannot be used together in the same installation.

MOUNTING: The unit should be securely mounted in the cab, driver's compartment or other protected location. The unit can be mounted in any position. Wiring must be protected from heat and abrasion and be properly tied. The optional ambient temperature sensor must be mounted on the outside of the cab away from heat sources.

MINIMUM 4-WIRE INSTALLATION: (No temperature sensing, no shutdown notification, no accessory control). Refer to **Wiring Diagram 1** and perform the following steps:

1. Disconnect the circuit(s) required to run the engine, (Ignition coil, fuel pump, fuel solenoid, ECM "IGN" circuit, etc., 10 AMPS MAX), from the ignition switch "run" position and connect to the **BROWN** wire (RUN) from the Model 277EC. The RUN wire will be "hot" (12 or 24V) until the idle limiter times out (shutdown). If the ECM requires a "stop" signal instead, see ECM STOP SIGNAL below.
2. NOTE: If the total load of the circuits connected to the **BROWN** wire exceeds 10 Amps, then connect an appropriately rated (40 or 70 Amp) relay as shown in **Wiring Diagram 3**.

3. Connect the **BLACK** fused wire (IGN) from the Model 277EC to the ignition switch or a terminal on the fuse block that is "hot" when the ignition or master switch is in the normal running position. *The BLACK wire supplies operating power to the idle limiter.*

4. Connect the **WHITE** wire (GND) from the Model 277EC to a good frame ground (battery negative). NOTE: Many vehicles provide extra ground terminals on or near the fuse block. Often, these are in the form of a male quick-connect tab.

5. Connect the **YELLOW** wire (SW) from the Model 277EC to the parking brake switch or other circuit that goes to ground when the idle limit time should begin. For a park brake that is held off with air pressure, this should be a normally-closed pressure switch that opens when the air pressure reaches 20-40 PSI. Alternatively, if the idle limit time should begin with a voltage instead of a switch closure to ground, connect the **VIOLET** wire (VOLT SIG.) from the Model 277EC to this source of voltage (5-28V).
6. NOTE: ***Both*** methods may be used in the same installation if this suits your application.

ACCESSORY CONTROL: If it is desired to shut off an accessory at the same time that the engine is shut down in order to reduce battery drain, refer to **Wiring Diagram 2** and perform the following *in addition* to the above steps:

1. Connect the **RED** fused wire (BAT+) to a battery circuit that is always "hot."

2. Disconnect the accessory or accessories to be controlled, from the ACC position of the ignition switch (or fuse block) and connect them to the **BLUE** wire (ACC). NOTE: If the total load of the circuits connected to the **BLUE** wire exceeds 10 Amps, then connect an appropriately rated (40 or 70 Amp) relay as shown in **Wiring Diagram 3**.

3. Connect the **GREEN** wire (ACC+) to the ACC position of the ignition switch (or fuse block) where the accessory wire(s) were removed in the step above.

ECM STOP SIGNAL: If the ECM requires a "stop" signal for engine shutdown, refer to **Wiring Diagram 2** and perform the following steps:

1. Connect the **RED** and **GREEN** wires as for ACCESSORY CONTROL, above.

2. Connect the **GRAY** wire (STOP SIG.) to the ECM "stop" input. The **GRAY** wire will be "hot" (12/24V) when the idle limiter times out.

3. If the **BLUE** wire is not being used for accessory control, it should be either removed or insulated with tape.

TEMPERATURE SENSING: If it is desired to make idle limiting dependent on ambient temperature (standard 277EC), plug the optional temperature sensor (57-A277-02) into the 2-pin connector P2 (refer to **Wiring Diagram 2**). Locate the temperature sensor where it will sense true ambient temperature and not be influenced by the direct sun, exhaust or engine heat. Secure the sensor with the clamp supplied. Idle limiting will then be disabled for driver comfort if the ambient temperature is below 32° F (0° C) or above 80° F (26° C).
NOTE: Temperature sensing cannot be used if shutdown notification is being used (see below).

SHUTDOWN NOTIFICATION: If shutdown notification is required, make sure the 277EC was ordered with shutdown notification and install kit 57-A277-14 for 12 Volt systems or kit 57-A277-15 for 24 Volt systems. (See photo at Right) Make sure you have the correct kit for your vehicle's electrical system. NOTE: Shutdown notification cannot be used if temperature sensing is being used.
Refer to **Wiring Diagram 4 or 5**, as applicable and perform the following steps:

1. Select a suitable location for the LED indicator so that it can be seen by the driver/operator under all expected working conditions. The red LED indicator supplied is rated to be visible in direct sunlight. CAUTION: It will be *very bright* at night. Position the indicator so that it does not create a temporary blinding hazard for the driver/operator during night operations.

2. Drill a 5/16" (0.312"; 8.0 mm) hole in the panel at the selected location. Mount the LED indicator in this hole with the rubber washer in front of the panel and the nut and lock washer behind the panel.

3. Connect the 24” (0.62 m) **ORANGE** wire from the notification kit to the brass (yellow-colored) terminal of the LED indicator by pushing the quick connector on to it. To fit properly, the marking on the quickconnect terminal should be facing *outward*. In like manner, connect the 24” (0.62 m) **WHITE** wire from the notification kit to the other (silver-colored) terminal of the LED indicator. NOTE: The LED indicator will not be damaged if connected incorrectly; it simply will not work.

4. Select a suitable location for the warning horn so that it can be heard by the driver/operator under all expected working conditions. It can be directly mounted in the panel, mounted to a suitable bracket (not supplied), or suspended behind the panel using wire ties. The horn requires a mounting-hole diameter of 1-3/32” (1.093”; 27.8 mm). It is secured using the plastic ring supplied. NOTE: The horn serves as a common connection (tie) point for the wires. It may be more convenient to attach the wires before mounting the horn in the panel. Connect both **ORANGE** wires to the horn (+) terminal and both **WHITE** wires to the horn (-) terminal. NOTE: The horn will *not* be damaged if connected incorrectly; it simply will not work.

5. Plug the white 2-pin connector (P2) into the mating connector on the Model 277EC wire harness.

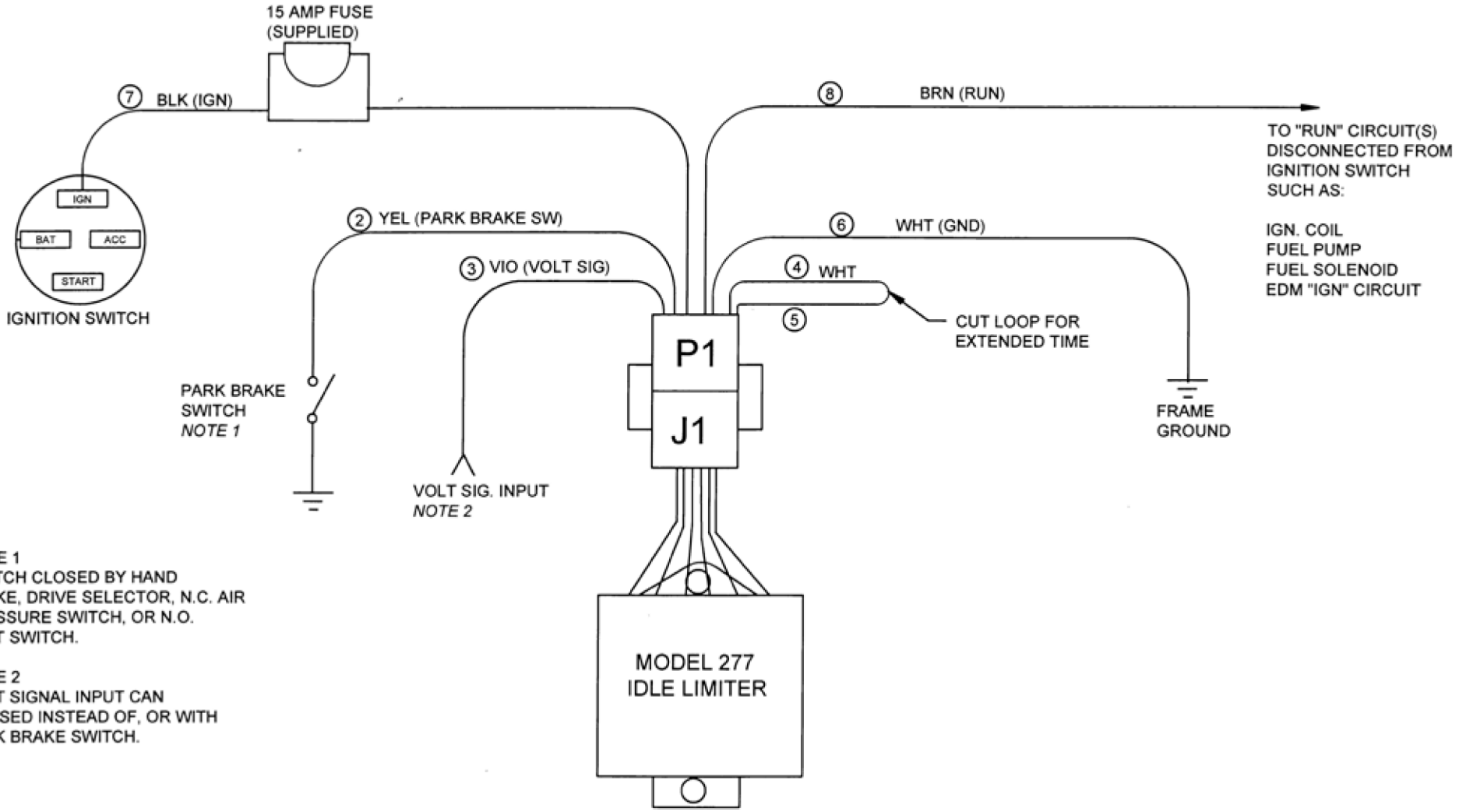
6. Avoid sharp edges when routing wires and secure the wiring using the wire ties supplied and black electrical tape if needed (not supplied).

7. Install the shutdown warning label/placard (supplied) near the LED indicator or other suitable location where it is visible to the driver/operator.

8. Test the installation for proper operation. The shutdown warning should always occur 30 seconds before shutdown.

SHUTDOWN OVERRIDE (If required): If using the SW input for activation, connect the normally-closed (momentary) reset switch (not supplied) in series with the **YELLOW** wire from the model 277EC. If using the VOLT input for activation, connect the normally-closed (momentary) reset switch (not supplied) in series with the **VIOLET** wire from the model 277EC. **See Wiring Diagrams 4 and 5**. Pressing the momentary SHUTDOWN OVERRIDE switch momentarily during timeout, either before or after notification or without notification, causes the timeout period to reset to zero and start over.

CHANGING IDLE LIMIT TIME TO 10 MIN: If it is desired to change the idle limit time from 5 minutes (standard) to 10 minutes, cut the **WHITE** wire loop on connector P1 (4-5) at its center and insulate the ends with tape or heat shrink tubing. It can be re-connected later, if desired.
NOTE: If the model 277EC you are installing has a time delay other than the standard 5/10 minutes (like 3/5 minutes), cutting the jumper will enable the longer delay. In this example, the delay would go from 3 minutes to 5 minutes.



NOTE 1
SWITCH CLOSED BY HAND BRAKE, DRIVE SELECTOR, N.C. AIR PRESSURE SWITCH, OR N.O. SEAT SWITCH.

NOTE 2
VOLT SIGNAL INPUT CAN BE USED INSTEAD OF, OR WITH PARK BRAKE SWITCH.

MODEL 277EC IDLE LIMITER
WIRING DIAGRAM 1
WITHOUT ACCESSORY CONTROL

Dwg Name: Model 277EC_V1.dwg
Modified Date:13 JUL 2016

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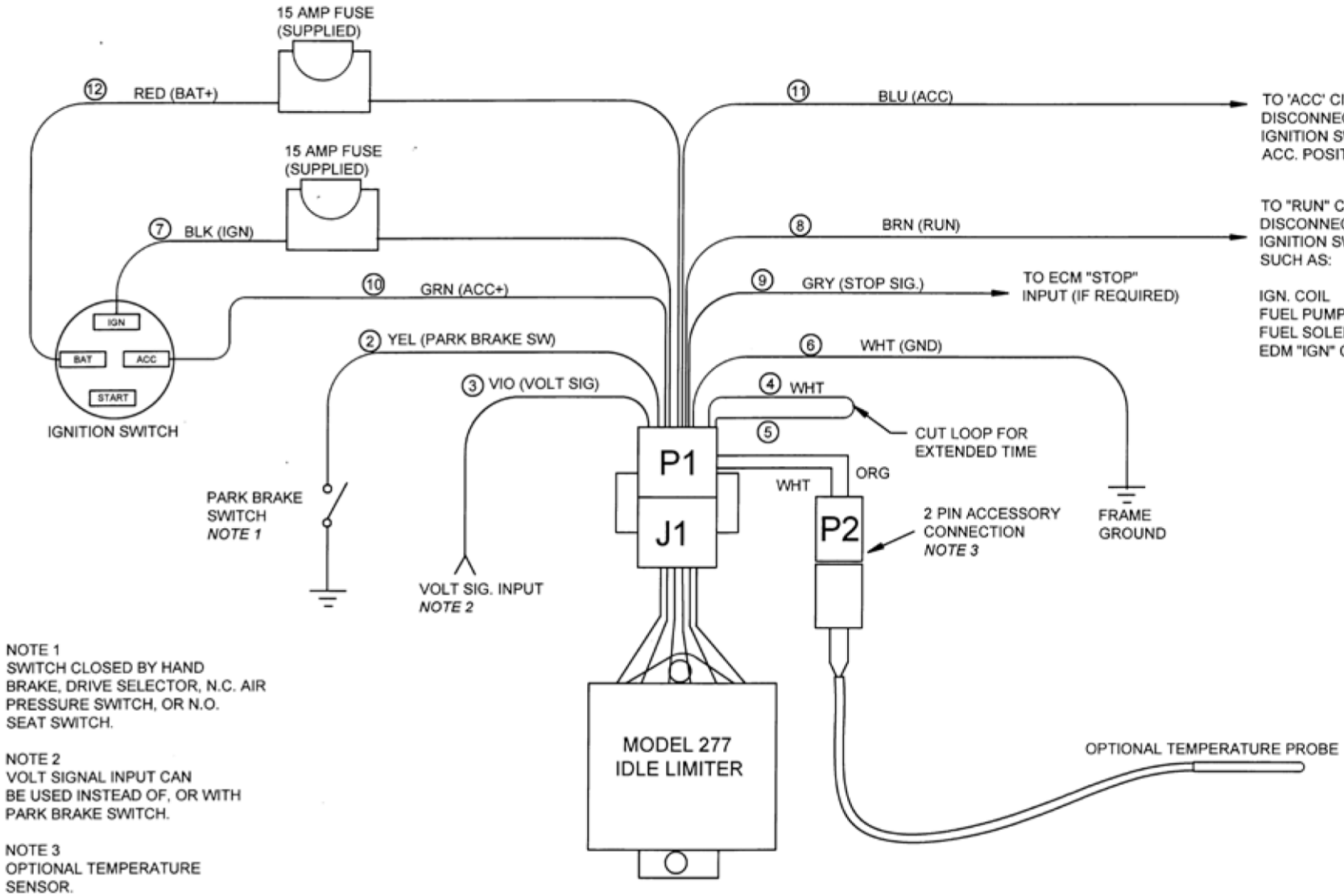
http://www.flightsystems.com



NOTE 1
SWITCH CLOSED BY HAND BRAKE, DRIVE SELECTOR, N.C. AIR PRESSURE SWITCH, OR N.O. SEAT SWITCH.

NOTE 2
VOLT SIGNAL INPUT CAN BE USED INSTEAD OF, OR WITH PARK BRAKE SWITCH.

NOTE 3
OPTIONAL TEMPERATURE SENSOR.

MODEL 277EC IDLE LIMITER
WIRING DIAGRAM 2
WITH ACCESSORY CONTROL

Dwg Name: Model 277EC_V4.dwg
Modified Date:13 JUL 2016

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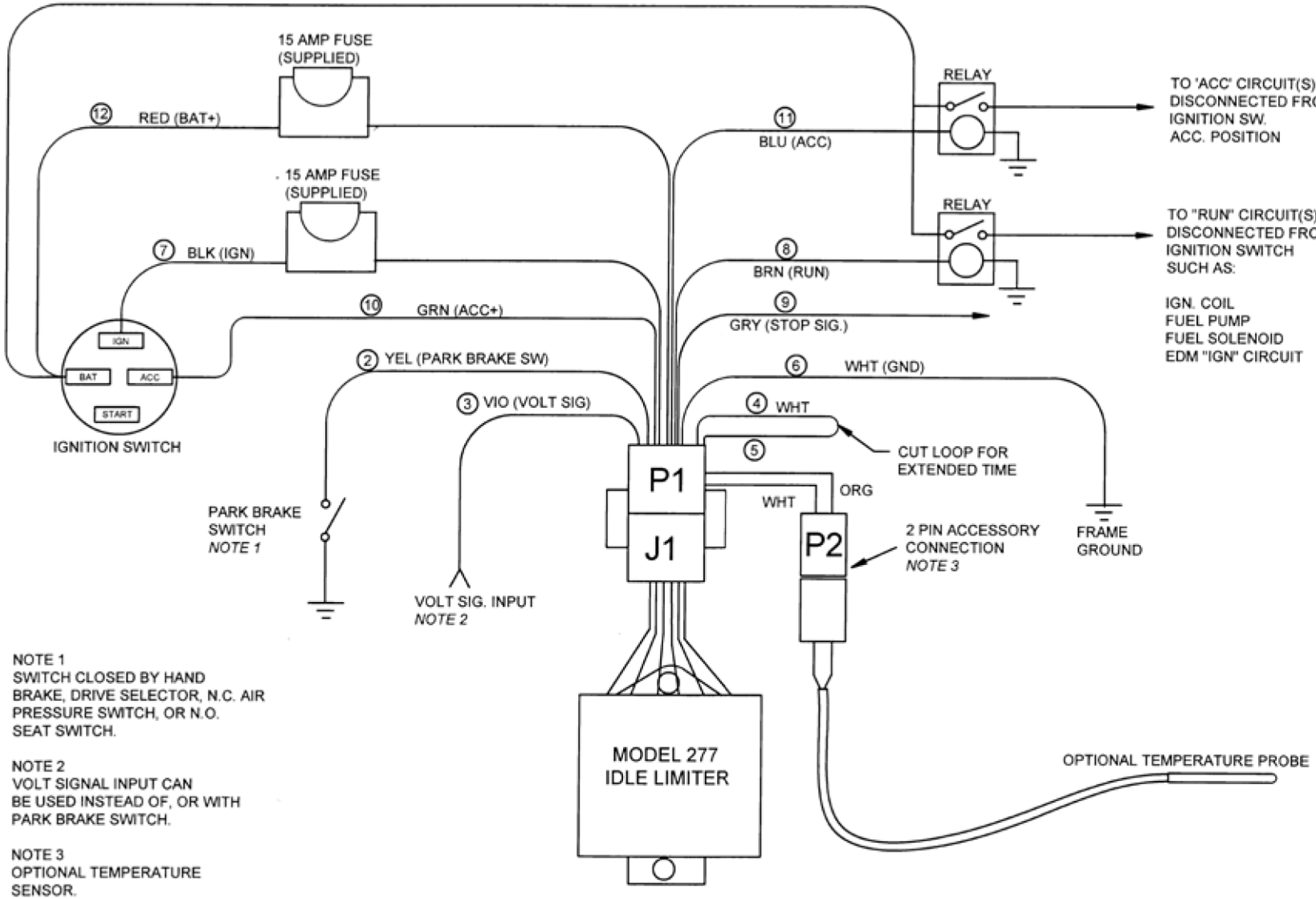

NOTE 1
SWITCH CLOSED BY HAND BRAKE, DRIVE SELECTOR, N.C. AIR PRESSURE SWITCH, OR N.O. SEAT SWITCH.

NOTE 2
VOLT SIGNAL INPUT CAN BE USED INSTEAD OF, OR WITH PARK BRAKE SWITCH.

NOTE 3
OPTIONAL TEMPERATURE SENSOR.

MODEL 277EC IDLE LIMITER
WIRING DIAGRAM 3
WITH ACCESSORY CONTROL

Dwg Name: Model 277EC_V5.dwg
Modified Date:13 JUL 2016

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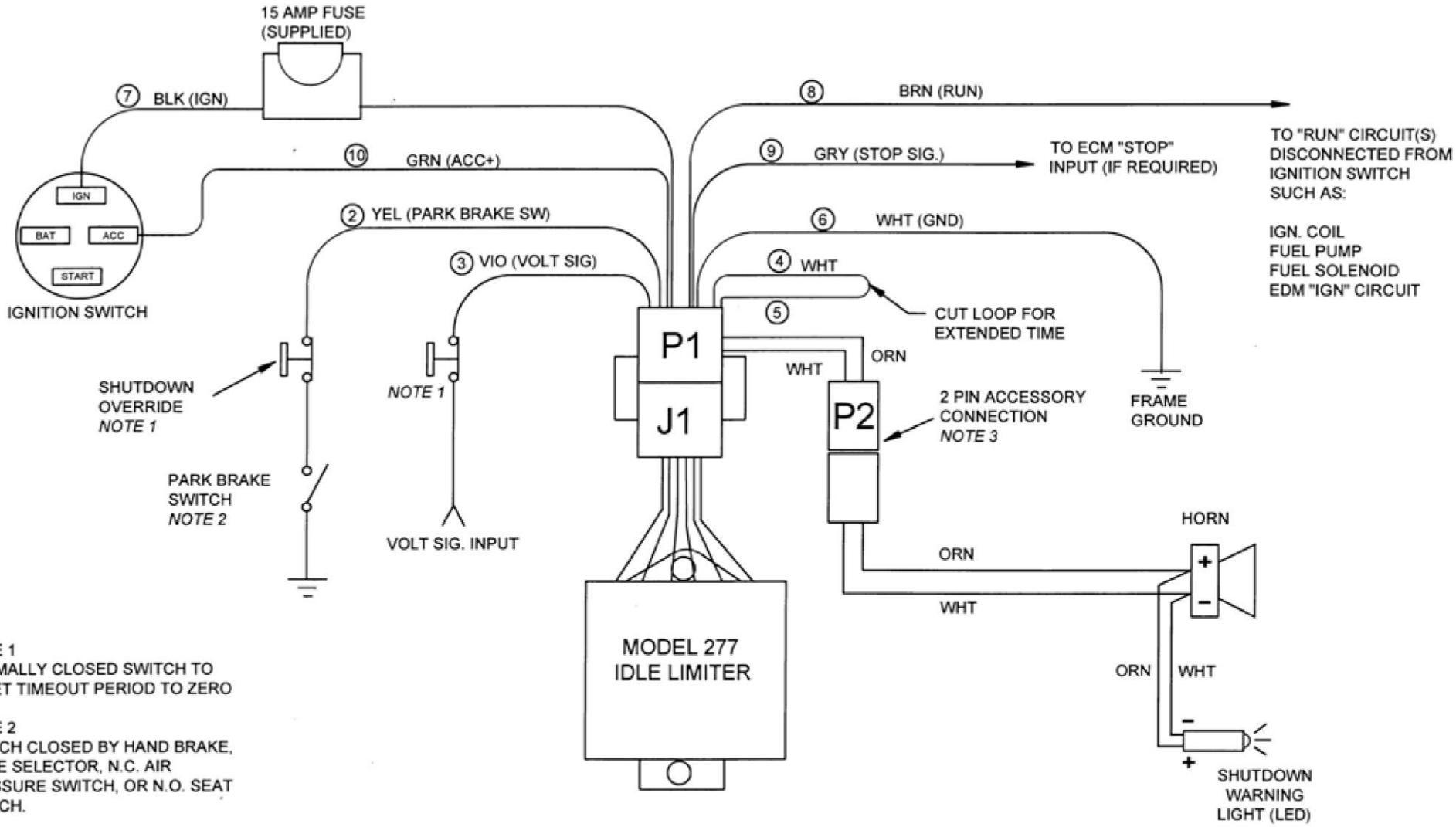

NOTE 1
NORMALLY CLOSED SWITCH TO RESET TIMEOUT PERIOD TO ZERO

NOTE 2
SWITCH CLOSED BY HAND BRAKE, DRIVE SELECTOR, N.C. AIR PRESSURE SWITCH, OR N.O. SEAT SWITCH.

NOTE 3
OPTIONAL EARLY WARNING SOUNDER AND LED INDICATOR

MODEL 277EC IDLE LIMITER
WIRING DIAGRAM 4
WITH SHUTDOWN NOTIFICATION

Dwg Name: Model 277EC_V2.dwg
Modified Date:13 JUL 2016

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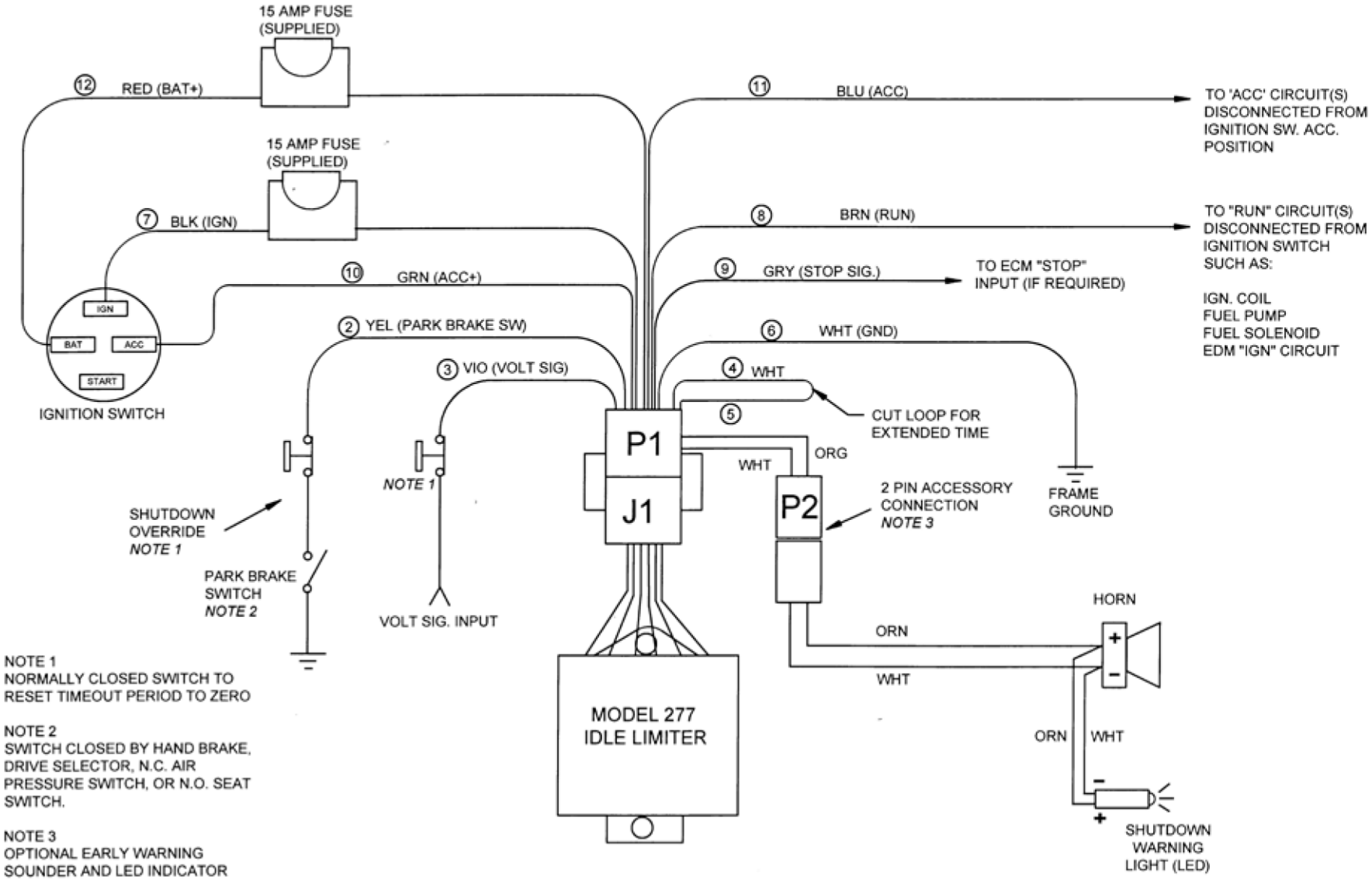

NOTE 1
NORMALLY CLOSED SWITCH TO RESET TIMEOUT PERIOD TO ZERO

NOTE 2
SWITCH CLOSED BY HAND BRAKE, DRIVE SELECTOR, N.C. AIR PRESSURE SWITCH, OR N.O. SEAT SWITCH.

NOTE 3
OPTIONAL EARLY WARNING SOUNDER AND LED INDICATOR

MODEL 277EC IDLE LIMITER
WIRING DIAGRAM 5
WITH ACCESSORY CONTROL

Dwg Name: Model 277EC_V3.dwg
Modified Date:13 JUL 2016

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FEATURES: The Model 277EC Engine Idle Limiter is designed to shut down the engine after a period of idling (5/10 minutes standard, other options available). Vehicle inactivity can be detected in several ways. The idle limiter latches after shutdown, making it necessary to cycle the ignition/master switch off and on again to re-start the engine. Accessory control is available as a standard feature to prevent battery drain during periods of engine shutdown. Shutdown can be inhibited by ambient temperature as an option. Shutdown notification is also available as an option.

BENEFITS: Idle limiting results in savings of fuel, emissions and maintenance costs. Also, a higher resale or trade-in value may be realized due to lower operating hours on the vehicle at the time of sale. An additional benefit is a demonstrated means of compliance with local, state, provincial or national ordinances that require idle limiting on certain classes of vehicles.

CERTIFICATIONS:

- **Type Approval**

The Model 277EC complies with ECE Regulations 2004/108EG, 2006/42EG, 2006/95EG, and 2009/19/E10 and is homologated (approved by an official authority, in this case Luxcontrol) with ECE Type Approval under the following marking:

10R - 03 12714

Under this ECE Type Approval marking, the Model 277EC can be installed and used in any vehicle in all of the 50+ ECE countries around the world with NO further tests and NO special permission required if used for the intended purpose, i.e. engine shutdown to avoid excessive idling.

Additional Information on Type Approval:

The United Nations' Economic Commission for Europe (ECE) in Geneva, Switzerland, was assigned the major task of the creation of a uniform set of regulations for vehicle design, vehicle safety and environmental protection to facilitate international trade. Moreover, 58 countries around the world participate and agree on a common set of ECE Regulations for Type Approval of vehicles and components. ***If an item is type approved, that approval is accepted by all other participating countries*** (indeed most countries that are not formally participating in the ECE agreement recognize the ECE Regulations and *do* accept such in their national requirements, or permit the import and use of ECE-approved vehicles, or both).

The ECE Agreement operates on the principles of Type Approval and Reciprocal Recognition. Approved items are marked with an "E" and a number within a circle, as above. Once an ECE Type Approval has been granted, every other acceding country is obliged to honor that Type Approval and regard that vehicle or item of motor vehicle equipment as legal for import, sale and use.

- **Safety and Reliability**

The Model 277EC has been designed in accordance with the applicable portions of ISO 13849-1, Safety of machinery – Safety-related parts of control systems – Part 1: General principles for design (ISO 138491:2006)

The Model 277EC has been tested and validated in accordance with the applicable portions of ISO 13849-2, Safety of machinery – Safety-related parts of control systems – Part 2:Validation (ISO 13849-2:2008).

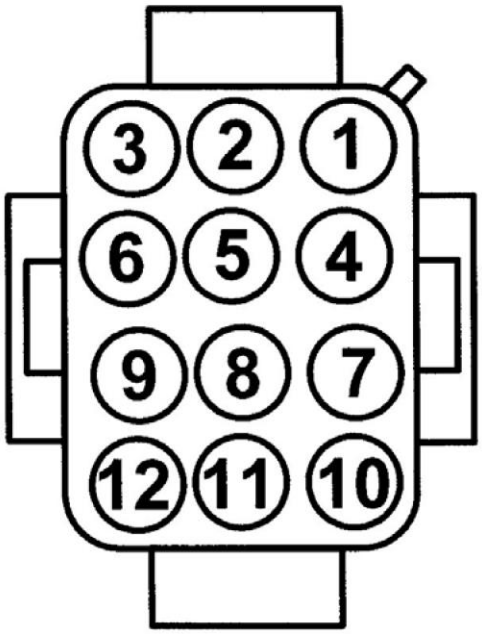
This international standard (ISO 13849) primarily covers design and safety considerations for control systems, determination of $MTTF_d$ (Mean Time to Dangerous Failure), DC (Diagnostic Coverage), Category, PL_r (Required Performance Level), and PL (Achieved Performance Level). The Model 277EC is a Category 1 device with an $MTTF_d$ = 58.83 years, and PL_r = PL = "c." Calculations for $MTTF_d$ were done using component failure rates from ISO 13849-1, Annex "C" and from MIL-HDBK-217F with appropriate "pi" factors applied.

It is to be understood that the Model 277EC EIL is not part of the control or safety system (SRP/CS) of the vehicle or equipment on which it is installed. The only action that the 277EC can take is to shut down the engine if it has been idling for more than the pre-determined time, typically 5 minutes. This time can be made longer or shorter, depending on the local requirements. The 277EC is incapable of causing or influencing any movement of the vehicle or the movement of any attachment on the vehicle, except for stopping of the engine. Likewise, the 277EC is incapable of influencing or interfering with the operation of any safety system or device on the vehicle. Because of this fact, many of the requirements of ISO 13849 are not applicable to the 277EC EIL. Failure of the 277EC is not expected to cause any significant harm to the vehicle or its driver/operator. However, failure modes of the 277EC have been identified and analyzed according to the requirements of ISO 13849-1. The only failure that carries any significant risk is one that results in an unexpected engine shutdown. The risk of failure of the 277EC EIL has been reduced by the use of "well-tried" and conservatively rated components.

- **Conformity with Standards**

Additionally, the Model 277EC has been designed to be in conformity with the applicable portions of the following international standards:

- DIN EN 474-1 12:2009 Earth Moving Machinery- Safety – Part 1: General Requirements
- DIN EN 474-1. Par. 5.16 Electromagnetic Compatibility
- DIN EN 13309 Construction Machinery – Electromagnetic compatibility of machines with internal power supply
- DIN EN 60529; VDE 0470-1:2000-09 – Degrees of protection provided by enclosures (IP code) (IEC 60529):1989+A1:1999). The Model 277EC has been tested in accordance with the requirements and procedures of IEC 60529 and has achieved a rating of IP67. This rating requires the unit to operate submerged under water at a depth of 1 meter, at 25°C for at least 30 minutes without a malfunction. NOTE: The connector normally supplied is not waterproof and was not included in this test.
- DIN EN 61310-1:VDE 0113-101:2008-09 Safety of machinery – indication, marking and actuation – Part 1: Requirements for visual, audible and tactile signals (IEC 61310-1:2007)
- ISO 3795 Road vehicles, tractors and machinery for agriculture and forestry – Determination of flammable nature of interior
- ISO 6405-1 Earth-moving machinery – Symbols for operator controls and other displays – Part 1: Common symbols
- ISO 6405-2 Earth-moving machinery – Symbols for operator controls and other displays – Part 2: Specific symbols for machines, equipment and accessories
- ISO 15998 Earth-moving machinery – machine control systems using electronic components – Performance criteria and tests for functional safety



MATING HARNESS, WIRING SIDE

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APPLICATION NOTES for Vehicle Specific Installations available at:
www.flightsystems.com/277
Manuals and Downloads

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Issued 8/16 - Printed in USA