

## **ATTENTION INSTALLING TECHNICIAN !**

**INSTALLATION MANUAL FOR ALL TEMP-A-START  
MODELS T211 with DEUTSCH CONNECTIONS  
(PLASTIC / METAL CASES)**

***NO TAS EXTERNAL MODULES NEEDED.***

***PLEASE CALL 1(309) 472-0676 FOR TECHNICAL SUPPORT  
IF YOU HAVE ANY QUESTIONS BEFORE PROCEEDING***

***OFFICE 1-309-691-0919***



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## SECTION 1

# INSTALLATION PROCEDURES

*The following procedures are suggested for installing the Temp-A-Start system in all diesel powered MACHINES . These procedures will offer suggested mounting locations and installation processes. However, with the large number of different configurations available, it may require alternate locations and modified installation processes.*

## TOOLS AND EQUIPMENT REQUIRED

To properly install the Temp-A-Start system, you will need the following tools and equipment:

- ✓ ELECTRIC DRILL
- ✓ 1 INCH HOLE SAW
- ✓ HOT AIR GUN (TO INSTALL SHRINK TUBING)
- ✓ TORX DRIVER SET FOR PANEL FASTENERS
- ✓ QUALITY WIRE STRIPPERS
- ✓ DEUTSCH TERMINAL CRIMPER
- ✓ DIGITAL ACDA VOLT METER
- ✓ TEST LIGHT TO LOAD CIRCUIT
- ✓ ELECTRICAL TAPE
- ✓ STANDARD HAND TOOLS

### **CAUTION:**

**Battery powered continuity testers SHOULD NOT BE USED on electronic components.**

**They may cause damage if used to check circuits connected to the MAIN CONTROL MODULE, ELECTRONIC INTERFACE MODULE, and DISPLAY PANEL.**

## PRE- INSTALLATION CHECK:

Before beginning installation, the following preliminary checks should be performed:

### **ALL ENGINES WITH ELECTRONIC CONTROLS**

1. Is truck 100% operational, is high idle working?  
Machine must be fully operational before you start the installation.
2. Have you checked transmission for neutral switch port & ordered it?

**NOTE: MACHINES WITH AUTOMATIC TRANSMISSION THE NEUTRAL SWITCH IS NOT USED**

## PREPARE TRUCK FOR INSTALLATION

- ✓ DISCONNECT BATTERIES DURING INSTALLATION
- ✓ OPEN HOOD; LOCATE AN OIL PSI PORT FOR THE OIL TEMP SENSOR.
- ✓ LOCATE THE TILT SW ON THE SAME SIDE AS THE OIL TEMP SENSOR.
- ✓ OPEN UP DASH AND EXPOSE IGN. SWITCH, FUSES, PTO SWITCHES & PARK BRAKE LINES.
- ✓ LOCATE TEMP-A-START MAIN CONTROL MODULE
  - 1<sup>ST</sup> CHOICE CENTER IN DASH, OR UNDER DASH
  - 2<sup>ND</sup> CHOICE IS IN A STORAGE COMPARTMENT

**\*\*\*CAUTION\*\*\*CAUTION\*\*\*CAUTION\*\*\*CAUTION\*\*\*CAUTION:**

***Remember: Temp-A-Start controls the start/stop functions of the machine's engine. To prevent possible down time caused by a dead engine, the following requirements must be strictly observed.***

1. All connections made in the engine compartment and other locations outside the cab must be crimped, and covered with heat shrink tubing.
2. All heat shrink tubing must be completely and tightly shrunk to prevent possible corrosion. A heat gun is designed for this purpose and should be used.

***NOTE:*** Do not attempt to use a "hair dryer" as a heat gun to install heat shrink tubing. "Hair dryers" do not supply adequate heat for this purpose. Heat guns used for the installation of heat shrink tubing get very hot and may damage the wire insulation. ***Exercise extreme caution to prevent burns or damage to the wire insulation.***

3. All crimped connections made within the cab area must be "pull tested" to verify the integrity of the connection. Be absolutely certain the wire was properly stripped, and that bare wire is not exposed outside the crimp. Also, be sure the connector is crimped on bare wire rather than on the wire insulation. Then heat shrink any connection needed. After the main wiring harness has been positioned, it should be taped and cable tied securely in place. Be certain the harness is protected from heat, abrasion, pinching, and sharp edges. Allow adequate spacing for engine torque and vibration.
4. Do not coil up excess wire. Cut to length as required, and discard extra wire. Coiled excess wire can cause false signals in the Temp-A-Start system. If needed, run wire loosely in dash left to right, or right to left, leaving space between loops.
5. Inspect all pre-wired Temp-A-Start assemblies before installing to make sure all wires and terminals are properly crimped tight.

## SECTION 2

# INSTALLATION OUTLINE

### **SUGGESTED** ORDER OF INSTALLATION

The following outline is designed to give the installer a general idea of the steps and processes involved.

#### 1. LAY OUT AND IDENTIFY ALL TEMP-A-START COMPONENTS.

- ✓ Verify against shipping checklist that all parts are present.

#### 2. DETERMINE THE LOCATIONS OF THE TEMP-A-START (TAS) MAIN CONTROL MODULE & DASH DISPLAY.

- ✓ **MAIN CONTROL CENTER:** Usual location is behind the instrument panel, in machine fuse panel, or under the dash.
- ✓ **DASH DISPLAY:** May be mounted in any location within reach of the operator.

#### 3. THE HARNESES: MAIN ENGINE, MAIN POWER, FAST IDLE/RELAY, DASH, AUXILIARY (optional), & J1939 (if used)

- ✓ Route the MAIN ENGINE HARNESS as required to reach all MODULES, SENSORS, & SWITCHES.  
**Note:** Please reference number 4 and 5 below for sensor and switch locations.
- ✓ Route the MAIN POWER HARNESS as required to reach to the **TAS module**.
- ✓ Route the MAIN FAST IDLE/RELAY HARNESS as required to reach to the **TAS module**.
- ✓ Route the DASH HARNESS to the instrument panel.
- ✓ Route the AUXILIARY HARNESS (if used) as required to reach to the **TAS module**
- ✓ Route the J1939 DATA LINE (if used) Locate a location for tapping the J1939 data line in engine compartment or under dash. The J1939 data line will give RPM, VSS, & REGEN information.

#### 4. PARK BRAKE SWITCH. Can be located under dash or in the engine compartment.

#### 5. MASTER RELAY (if used). Mount in the dash near ignition switch.

*(Relay is used with Idle Shutdown and/or in conjunction with Temp-A-Start Thermostat).*

#### 6. THE ENGINE COMPARTMENT COMPONENTS.

- ✓ **ALARM SWITCH:** Usual location high on the firewall in engine compartment
- ✓ **TILT SWITCH:** Usual location is side of hood next to head light assembly.
- ✓ **OIL TEMP SENSOR:** Will mount in an oil psi port, usually located low on the side of the engine block.
- ✓ **NSS (NEUTRAL SAFETY SWITCH)** Usually located on the transmission.

**NOTE: MACHINES WITH AUTOMATIC TRANSMISSION THE NEUTRAL SWITCH IS NOT USED**

#### 7. ENGINE RUN: J1939, FLYWHEEL SENSOR or TACHOMETER

Choices:

- 1: All engines J1939 DATA LINE IF AVAILABLE (any older engine without J1939 must use analog sensors)
- 2: Flywheel Sensor
- 3: Tachometer

#### 8. ENGINE VEHICLE SPEED SENSOR OR FAN CLUTCH (if needed).

#### 9. APPLY CAUTION DECALS as required.

- ✓ One decal must be applied to the driver's door.
- ✓ One decal must be applied at each hood latch or a decal must be applied at each cab tilt lock

## SECTION 3

### IDENTIFICATION OF COMPONENTS

Carefully unpack and inspect all components to be sure there was no shipping damage. Cross check the shipping checklist to be sure all components necessary for the installation are present.

**Suggestion:** *Lay out the entire Temp-A-Start system on the bench to assist in parts identification and to familiarize yourself with the system configuration.*

#### DETERMINE THE LOCATION OF ALL THE TEMP-A-START SYSTEM PARTS

Using the modules, sensors, switches and the MAIN WIRING HARNESS, determine the final location of each part. Be sure the MAIN WIRING HARNESS connectors will reach the module without straining the harness and that ample space is available to mate the connectors. Suggested locations for components are mentioned throughout this manual. These locations have proven effective for the majority of installations. Locations and harness routing may have to be modified in some applications due to unforeseen circumstances, and/or customer modifications. Be certain to follow good engineering and workmanship practices. **Technical support is available 24/7 at 309/472-0676 if you have any questions or need additional information.**

**MAIN TEMP-A-START CONTROL SYSTEM** Mount in your predesignated area using the **Mounting Hardware Kit**.

#### **LED DASHBOARD DISPLAY**

The **LED** on the dashboard **DISPLAY** is a two color **LED** that indicates the status of the **TAS System**.

A **GREEN** LED indicates the TAS System is on



A **RED** LED indicates the TAS System in off & in Neutral



#### **Mounting Dash Operator Display:**

- ✓ Find an open area on your vehicle's instrument panel and apply Yellow Dash Sticker (included in Dash Kit)
- ✓ Use a **1/2"** drill bit to drill a hole for the DASHBOARD SWITCH
- ✓ Use a **9/32"** drill bit for the LED hole.
- ✓ Remove lock nut from **dash switch**, run **dash switch** through the back side of the panel.
- ✓ Using the lock nut secure the dash switch on the outside of the yellow label..
- ✓ Remove the lock nut and washer from the **LED**, push the **LED** through the front of the panel
- ✓ Using the lock nut and washer secure the **LED** from the back side of the panel.
- ✓ Pin out the LED to the switch connector as follows: Green to 4; Red to 5; Black to 6
- ✓ Place wedge lock in switch / LED connector.
- ✓ Once **Dash Harness** is run, connect to the **Dash Harness** connector.

**NOTE:** *Please verify wire colors match up once connected.*



# THE HARNESSES

## MAIN ENGINE HARNESS

A hole may be drilled where the harness passes through the firewall. Be certain to use the enclosed grommet out of the **Terminal Hardware Kit** to protect the harness from chafing and cutting where it passes from the machine interior to the engine compartment, and plug any air leaks that may exist in the feed-through area.

**NOTE:** In some cases a pre-existing hole may be used to access the engine compartment. If the supplied grommet does not fit this hole, similar protection must be utilized to protect the harness and seal the opening.



### Installing the Main Engine Harness

- ✓ Lay the harness in place in the predetermined location
- ✓ Connect harness to the back of the **TAS Control System** (verify wire colors match)
- ✓ Route the pre-labeled sections to the predetermined location for the following:
  - Alarm Switch (white/green & blue /white)
  - Park Brake Switch (tan & tan/white)
  - Tilt Switch/ Temp Sensor (TILT - gray & gray/white)  
(Oil Temp Sensor - orange)
  - Neutral Safety Switch, NSS, (red/orange & brown/yellow)

**Note : Automatic Transmissions the NSS Switch IS NOT USED!**

**The following two sections are ONLY INCLUDED IF THERE IS NO J1939 DATA LINE!**

- White Tape route to RPM (control center side orange/white)
- Yellow Tape route to VSS (control center side white/red)

**Note:** Do not cut the wires to length at this moment. This will be done during the actual installing of the components listed above (alarm, park brake, tilt, oil temp, and NSS if used.)

## MAIN POWER HARNESS



### Installing the Main Power Harness

- ✓ Lay the harness in place in the predetermined location
- ✓ Connect harness to the back of the **TAS Control System** (verify wire colors match)
- ✓ Route the Black 12 AWG Ground wire to the engine block, cut to length
  - Mount to the block housing with one of the enclosed ring terminals out of the **Terminal Hardware Kit**
- ✓ Route the Red wire to the power bus or terminal board **that is always hot**, cut to length. (This wire is the main power wire for the **TAS Control System**, this wire **MUST BE FUSED (30A)**.
  - Take the red fuse holder enclosed in the **Terminal Hardware Kit**
  - Cut fuse holder red wire in half
  - Using a butt connector enclosed in the **Terminal Hardware Kit** attach one end to the Red wire coming from **Main Power Harness**
  - Attach other end of Fuse holder using a butt connector enclosed in the **Terminal Hardware Kit** to the power bus or terminal board.
- ✓ Route the Yellow and the Green wires to ignition switch; cut to length
  - Green goes to the ignition post on the back of the ignition switch. Remove any existing wire/wires from ignition post and let hang for a moment.
  - Yellow goes to the start post on the back of the ignition switch

**Note:** Attaching the green and yellow wires depend on what type of ignition switch is on the equipment. Please use any of the following methods: Ring terminals, butt connectors, and/or stripping the wires and wrapping it around switch posts. The butt connectors and ring terminals can be found in the enclosed **Terminal Hardware Kit**. Don't forget to cover butt connectors with enclosed heat shrink.

## MAIN FAST IDLE/RELAY HARNESS

### Installing the Main Fast Idle Relay Harness

- ✓ Lay the harness in place in the predetermined location
- ✓ Connect harness to the back of the **TAS Control System** (verify wire colors match)
- ✓ Route one of the solid Blue wires to the ignition switch cut to length and attach to the previously removed wire/wires from the ignition post. **OR Route to Master Relay if being used.** (please see Master Relay install on page 11)
- ✓ The 2<sup>nd</sup> Blue wire is used as an ignition 2 output for automatic transmissions, that have their own *ECM (engine control module)*
- ✓ Route Red/Orange, Brown/White, Pink. Purple/White wires to Master Relay **if being used;** if not being used coil up and wire tie up out to the way
- ✓ Route Orange/Black AUX 12V Fast Idle driver **if being used;** if not being used coil up and wire tie up out of the way
- ✓ Route the following wires to the Cruise Control **if machine has this option;** if not being used coil up and wire tie the following wires up out to the way.
  - Red/Black, to ON side of cruise switch, cut to length
  - Yellow to SET side of cruise switch, cut to length
  - Green/Black to CENTER post of cruise switch, cut to length
  - Blue/Black to OFF side of cruise switch, cut to length



**Note:** Attaching the wires listed above again depends on what type of ignition and cruise control switches are on the equipment. Please use any of the following methods: Ring terminals, butt connectors, and/or stripping the wires and wrapping it around switch posts. The butt connectors and ring terminals can be found in the enclosed **Terminal Hardware Kit**. Don't forget to cover butt connectors with enclosed heat shrink.

**Note:** The **Master Relay kit** will include the necessary terminals for connecting the wires to it if being used.

**Note:** The **Fast Idle Kit** will include the necessary terminals for connecting the wires to it if being used.

## DASH HARNESS

### Installing the Dash Harness

- ✓ Lay the harness in place in the predetermined location
- ✓ Connect harness to the back of the **TAS Control System** (verify wire colors match)
- ✓ Strip wires at end
- ✓ Attach terminals enclosed in the **6 PIN INFIELD CONNECTION PLUG KIT** that was inside of the **DASH KIT**
- ✓ Pin out as follows:
  - White to 2
  - Brown to 3
  - Green to 4
  - Red to 5
  - Black to 6
- ✓ Pull test connections and place wedge lock in plug connector.
- ✓ Connect to previously installed DASH SWITCH/LED connector (verify colors match)





## MAIN AUXILIARY HARNESS (OPTIONAL)



### Installing the Auxiliary Harness

- ✓ Lay the harness in place in the predetermined location
- ✓ Connect harness to the back of the **TAS Control System** (*verify wire colors match*)
- ✓ Route Purple to radio signal IN
- ✓ Route Black/yellow and White/Yellow to 12 V Relay for REM Light (*used for optional strobe light*)

**The following colors are ONLY USED IF YOU WILL BE USING A THERMOSTAT SYSTEM in conjunction with the TAS CONTROL SYSTEM!! Please coil them up and wire tie them out of the way if you are not installing a THERMOSTAT UNIT as well.**

- ✓ Red/Yellow Plus side of STAT
- ✓ Green/Yellow STAT Return
- ✓ Black/Yellow Ground

**Note:** Attaching the Purple wire listed above again depends on what type of radio signal INPUT is on the equipment. Please use any of the following methods: Ring terminals, butt connectors, and/or stripping the wires and wrapping it around switch posts. The butt connectors and ring terminals can be found in the enclosed **Terminal Hardware Kit**. Don't forget to cover butt connectors with enclosed heat shrink.

## J1939 HARNESS



### Installing the J1939 HARNESS

- ✓ Lay the harness in place in the predetermined location
- ✓ Connect harness to the back of the **TAS Control System** (*verify wire colors match*)
- ✓ Strip tan casing off
- ✓ Route as follows:
  - Red wire to the Positive side of the machines J1939 Data line
  - Black wire to the Negative side of the machines J1939 Data line
- ✓ Attach wires using butt connectors or ring terminals out of the **Terminal Hardware Kit**  
*Don't forget to cover butt connectors with enclosed heat shrink.*

## THE PARK BRAKE SWITCH

The parking brake switch is used to determine that the tractor brakes have been engaged.



A second switch can be installed on the trailer brakes if desired.

The PARKING BRAKE SWITCH is installed as follows:

- ✓ The PARKING BRAKE SWITCH must be installed in an air line or in an available port of the park brake valve body that has: POSITIVE AIR PRESSURE WITH THE PARKING BRAKES NOT APPLIED, and NO AIR WHEN BRAKES ARE SET.
- ✓ When the parking brake is applied, Confirm the correct connection point by loosening the selected air line or plug, then applying or releasing the PARKING BRAKE observing the presence or absence of air pressure..

Use the most convenient location for installation.

### **Suggested locations for the PARK BRAKE SWITCH are**

- ✓ PARK BRAKE VALVE BODY or MANIFOLD: Remove the original air line connector, install the BRASS TEE and SWITCH, reinstall the air line.
- ✓ AIR LINE SPACE: Splice into the proper air line using compression fittings and inserts, install the BRASS TEE and SWITCH.

**NOTE:** Always use the metal inserts with the compression fittings or plastic air lines. Use sealant on pipe thread fittings. DO NOT OVER TIGHTEN ferrules and nuts on plastic tubing

**NOTE:** A second PARK BRAKE SWITCH may be installed on the trailer brake in the same manner. If installed, this switch must be wired in parallel with the first.

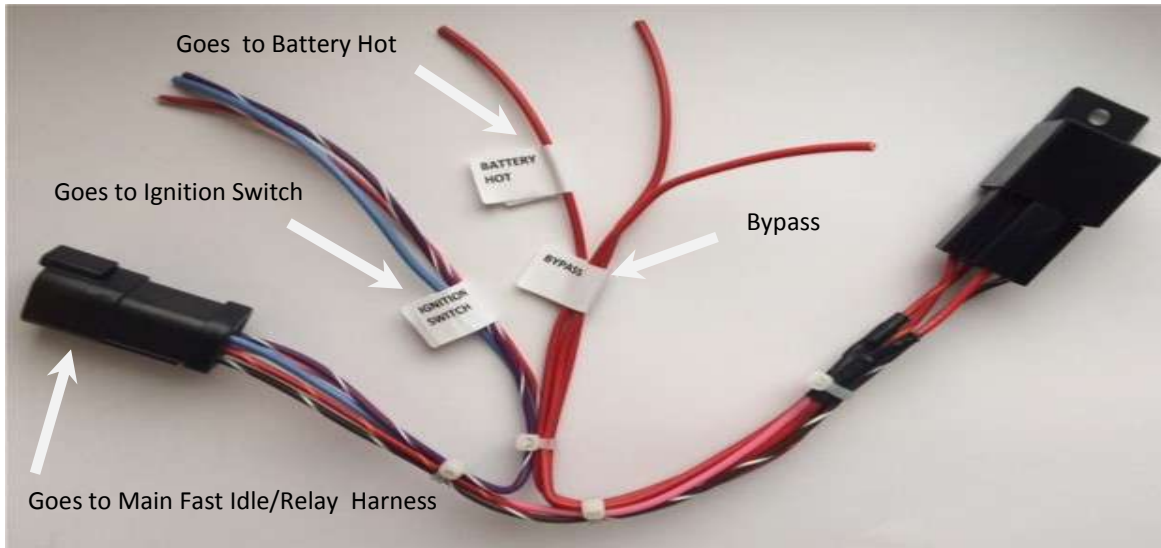
### **Attach PARK BRAKE to MAIN HARNESS AS FOLLOWS:**

- ✓ Cut wires from MAIN HARNESS to length
- ✓ Strip Tan and Tan/white wires
- ✓ Attach terminals enclosed in the **2 PIN INFIELD CONNECTION PLUG KIT** that was inside of the **PARK BRAKE KIT**
- ✓ Pin out as follows:
  - Tan/White goes to 1
  - Tan goes to 2
- ✓ Pull test connections and place wedge lock into plug connector.
- ✓ Connect to the MAIN HARNESS (verify wire colors match)

## **MASTER RELAY**

*(Used with IDLE SHUTDOWN & must be used in conjunction with the **TAS Thermostat**)*

The Master Relay enables Temp-A-Start to control the battery feed to the ignition switch.  
The Master Relay assembly comes wired for any standard ignition switch.



The MASTER RELAY may be mounted in any position, even upside down.

Installing the MASTER RELAY:

- ✓ Secure the MASTER RELAY in the dash using the tek screw enclosed in the **SHUTDOWN RELAY KIT**.

### **Attach RELAY to MAIN FAST IDLE/RELAY HARNESS AS FOLLOWS:**

- ✓ Cut Wires from HARNESS to length
- ✓ Strip Blue, Red/Orange, Brown/White, and Purple/White, and Pink wires
- ✓ Attach terminals enclosed in the **SHUTDOWN RELAY KIT**
- ✓ Pin out as follows:
  - Blue goes to 1
  - Red/Orange goes to 2
  - Brown/White goes to 3
  - Purple/White goes to 4
  - Pink goes to 5
- ✓ Pull test connections and place wedge lock into plug connector.
- ✓ Connect to the FAST IDLE/RELAY HARNESS (verify wire colors match)

### **Attach RELAY to IGNITION SWITCH AS FOLLOWS:**

- ✓ Blue goes to ignition post, (tie into wires previously wired to post during Main Fast Idle/Relay Harness)
- ✓ Purple goes to accessories post
- ✓ Red/White goes to battery post key switch

### **Attach RELAY to BATTERY SWITCH AS FOLLOWS:**

- ✓ Red goes to HOT Battery feed switch

### **THE LAST TWO RED BYPASS WIRES SHOULD BE HOOKED TOGETHER TO BYPASS MASTER RELAY**

- ✓ These can be hooked together with one of the butt connectors enclosed in **SHUTDOWN RELAY KIT**.
- ✓ Cover connection with enclosed heat shrink enclosed in the **SHUTDOWN RELAY KIT**

# ENGINE COMPARTMENT COMPONENTS

## **ALARM SWITCH**

The engine compartment ALARM provides an audible alarm 15 seconds before the engine starts.



Anywhere in the engine compartment firewall is an acceptable location for installation.

Installing the ALARM SWITCH:

- ✓ Secure the alarm to the firewall of the machine using velcro or double sided tape.

### **Attach ALARM to MAIN HARNESS AS FOLLOWS:**

- ✓ Cut Wires to from MAIN HARNESS to length
- ✓ Strip White/Green & Blue /White wires
- ✓ Attach terminals enclosed in the **2 PIN INFIELD CONNECTION PLUG KIT** that was inside of the **ALARM KIT**
- ✓ Pin out as follows:
  - Blue/White goes to 1
  - White/Green goes to 2
- ✓ Pull test connections and place wedge lock into plug connector.
- ✓ Connect to the MAIN HARNESS (verify wire colors match)

## TILT SWITCH

The TILT SWITCH is used so if the hood is up the Temp-A-Start system will not start for safety reasons!



The TILT SWITCH should mount on the side of hood next to the head light assembly.

**Suggestion:** Easier if it is on the same side as alarm switch.

### Installing the TILT SWITCH

- ✓ Locate side you want the TILT SWITCH mounted to.  
**NOTE:** Check to make sure you pick a side that your tilt switch wires from the main harness will be long enough to reach.
- ✓ Using the screws included in the kit mount switch to hood.

### Attach TILT to MAIN HARNESS AS FOLLOWS:

- ✓ Cut Wires from MAIN HARNESS to length
- ✓ Strip White/Green & Blue /White wires
- ✓ Attach terminals enclosed in the 2 PIN INFIELD CONNECTION PLUG KIT that was inside of the TILT KIT
- ✓ Pin out as follows:
  - Gray/White goes to 1
  - Gray goes to 2
- ✓ Pull test connections and place wedge lock into plug connector.
- ✓ Connect to the MAIN HARNESS

**(NOTE:** The tilt switch is not polarity sensitive!)



## OIL TEMPERATURE SENSOR

Temp-a-Start's engine temp sensor should be placed in an oil passage, either a feed or return passage, as low on the engine block as possible. Temp-a-Start's cycle time and set points for start & stop are based on the fact that it takes longer to heat the oil than the water when in engine mode. This added run time will bring oil temp up to 170°F. That is our shut down **temp** setting. This will result in an extended off time, increasing fuel savings. Bringing the oil temp up to 170°F also helps keep the oil clean. Our start point is based on engine block temperature as no oil is flowing during an off cycle. The BTU's stored in the oil give up their heat more slowly than water, resulting in extended off time. The heat rising from the oil pan keeps the engine warm. At approx. 60° F (lower block temp) we start the engine. Our cranking time in most cases will be under 5 sec. & our starter load will be light. Sensor placement other than as describe above may result in a failed start. Example: placing a temp sensor in the oil pan has been tried. Cycle times & starter crank loads become higher at colder temps resulting in a failed start. Some engines have oil ports in their oil filter housings. We have used these ports without problems. Temp-a-Start has the capability to fit our sensor into any size housing, metric or standard.



### Installing the OIL TEMP SENSOR:

- ✓ On the engine block locate an existing hole that has been tapped and plugged.  
**NOTE:** Usually located low on the side of the engine block in the main oil gallery.
- ✓ Remove an existing plug along the side of the engine in the oil gallery.
- ✓ Use adaptor enclosed in the **Oil Temp Sensor Kit**; screw into place

### Attach OIL TEMP SENSOR to MAIN HARNESS AS FOLLOWS:

- ✓ Cut Wires from MAIN HARNESS to length
- ✓ Strip Orange wire
- ✓ Attach terminal enclosed in the 2 PIN INFIELD CONNECTION PLUG KIT that was inside of the OIL TEMP KIT
- ✓ Pin out as follows:
  - Orange to 1
- ✓ Pull test connections and place wedge lock into plug connector.
- ✓ Connect to the MAIN HARNESS (verifying orange wire lines up)



### TESTING AN ENGINE OIL TEMP SENSOR, installed on any machine

- ✓ TAS must be on & dash led green.
- ✓ Alternator voltage must be above minimum specs measured at control center main power wire (RED 12 AWG wire)
- ✓ Using a digital volt meter (10 v dc scale) measure voltage on ORANGE wire going to oil temp sensor. Should read between .75 dc volts to 4.95 volts see chart below for Temperature reading.

**(NOTE)** *THE TAS TEMP SENSOR changes resistance with changing engine temp, as temp goes up resistance goes down pulling reference voltage low. As engine temp cools resistance goes up & reference voltage goes up.*

To bench test a temp sensor place an ohm meter across sensor & heat or cool sensor & note changes in meter.

#### VOLTAGE TO TEMP CHART + - 2.5°F

Volts      Temp

1.300 V = 170.0° F current stop temp

1.841 V = 133.0° F

2.081 V = 117.0° F

2.291 V = 101.0° F

2.563 V = 83.40° F

2.840 V = 62.40° F current start point

3.020 V = 40.42° F

## Neutral Safety Switch (NSS) (only if being used)

**NOTE: MACHINES WITH AN AUTOMATIC TRANSMISSION THE NEUTRAL SWITCH IS NOT USED**

**NEUTRAL SAFETY SWITCH IF USED (INSTALLING DEALER RESPONSIBLE): MUST ORDER SWITCH PRIOR TO INSTALLATION.**

The **NEUTRAL SAFETY SWITCH** is used by Temp-A-Start to verify that the tractor transmission is in neutral.



- ✓ Connect a multimeter (set to a low ohms setting) to the **NSS** leads.
- ✓ Verify that the **NSS** has a closed circuit (continuity) with transmission in neutral and has an open circuit (no continuity) with the transmission in any gear

**Note:** In rare cases the switch may not operate due to the switch actuator not contracting the internal slide in the transmission. Remove the shim from the **NSS** and recheck for reliable operation if this is the case.

**Note:** To installing person of the NSS: The Red/orange wire should go to the supply and Brown/yellow to the return.

### Attach NSS IF USED to MAIN HARNESS AS FOLLOWS:

- ✓ Cut Wires from MAIN HARNESS to length
- ✓ Strip Red/orange & Brown/ yellow wires
- ✓ Attach terminals enclosed in the **2 PIN NSS COMPLETE KIT**
- ✓ Pin out as follows to the plug:
  - Red/orange goes to 1
  - Brown/yellow goes to 2
- ✓ Pull test connections and place wedge lock into plug connector.
- ✓ Connect to the MAIN HARNESS

### When the NSS IS NOT USED:

- ✓ Strip Red/orange & Brown/ yellow wires
- ✓ Butt connector these two wires using a butt connector out of the Terminal Hardware kit
- ✓ Cover with a small piece of heat shrink from the Terminal Hardware kit

## SECTION 4

### WIRE IDENTIFICATION

The following wire numbers conform to the ATA (American Trucking Association) codes. Temp-A-Start has been assigned the 402 series of numbers by the ATA

- **402 (RED)** MAIN POWER SUPPLY CIRCUIT: CONNECTS TO TRACTORS 12 V POSITIVE {+} BATTERY SUPPLY. BEST PLACE TO CONNECT IS AT CAB MAIN POWER POST.
- **402A (GREEN)** IGN. REQUIRED SENSING CIRCUIT: CONNECTS TO THE IGN POST AT KEY SW. REMOVE ALL WIRES FROM IGN. POST. REMOVED WIRES HOOK TO TAS BLUE IGN. ONE
- **402B (BLUE)** TEMP-A-START IGN. ONE CIRCUIT: CONNECTS TO THE WIRES REMOVED FROM THE IGN. POST AT THE KEY SWITCH.
- **402C (YELLOW)** STARTER CIRCUIT: CONNECTS TO OUTPUT SIDE OF STARTER BUTTON OR, START TERMINAL OF IGNITION SWITCH.
- **402D (ORANGE)** OIL TEMPERATURE CIRCUIT: CONNECTS TO TEMP-A-START ENGINE MOUNTED OIL TEMPERATURE SENSOR.
- **402G (BLACK)** GROUND CIRCUIT: GROUND DIRECTLY TO THE ENGINE BLOCK AS CLOSE AS POSSIBLE TO THE SENSORS. **DO NOT GROUND TO THE EXHAUST MANIFOLD.**
- **402H1 ( PURPLE / WHITE )** SENSES IGNITION SWITCH POSITION: CONNECTS TO THE IGNITION SWITCH ACCESSORY POST ( NOT USED FOR ENGINE ONLY)
- **402J ORANGE / BLACK )** *\*\*AUX OUTPUT DELAY ON 12VOLT OUT RELAY MAX CURRENT 1.8 AMP.\*\**
- **402K (PINK)** KEY SENSE BATTERY POST KEY SW.(NOT USED ENGINE ONLY)
- **402L1 (GREY / WHITE)** TILT SWITCH CIRCUIT+.
- **402L2 (GREY)** TILT SWITCH RETURN.
- **402N1 (RED/ORANGE)** NEUTRAL SAFETY SWITCH FEED.
- **402N1 (BROWN/YELLOW)** NEUTRAL SAFETY SWITCH.
- **402R (BROWN/WHITE)** MASTER RELAY COIL RETURN CIRCUIT.(NOT USED ENGINE ONLY )
- **402P1 (TAN / WHITE)** PARK BRAKE SWITCH CIRCUIT.
- **402P2 (TAN)** PARK BRAKE SWITCH. *THIS CIRCUIT MAY BE PARALLEL WIRED TO A SECOND SWITCH IF NEEDED*
- **RED / BLACK** FAST IDLE ON / OFF SW + SIDE OR PTO PORT ON
- **BLUE / BLACK** FAST IDLE ON / OFF SW OR FOR PTO PORT TO COMMON POST AT Cruise SW
- **YELLOW** FAST IDLE RAMP UP 1 SET / RESUME SW
- **GREEN / BLACK** FAST IDLE RAMP UP SET / RESUME COMMON OR CENTER POST
- **WHITE / BLACK** FAST IDLE RAMP UP 2
- **GRAY/BLACK** FAST IDLE RAMP UP

**NOTE:** REFER TO MAIN WIRING DIAGRAM FOR MASTER RELAY IF USING IDLE SHUT DOWN

## Section 5

### ENGINE RUN

The **Temp-A-Start System** must be able to monitor RPM in order to disengage the starter. Most tractors use an electronic tachometer and Temp-A-Start uses this to determine engine RPM. If the tractor doesn't have an electronic tachometer, a flywheel sensor must be installed and adjusted, or first choice J 1939 DATA Line.

**1<sup>st</sup> Choice: J1939 DATA LINE** Please see **J1939 Harness** section (page 9) to install **TAS** to the J1939 Data Line.  
(**Note:** *The J1939 circuit is enclosed within the TAS Control Center Module.*)

**2<sup>nd</sup> Choice: FLYWHEEL SENSOR (if used)**

Install as follows:

- ✓ Install the jam nut loosely on the **Flywheel Sensor**.
- ✓ Screw the **Flywheel Sensor** into the existing tapped hole on the engine housing.
- ✓ When the **Flywheel Sensor** bottoms out on the flywheel, BACK OFF 1 FULL TURN
- ✓ Secure by tightening the jam nut
- ✓ Test with an AC voltmeter connected to the leads, it should indicate approximately 2 to 3 volts when the engine is idling. If voltage is over 3.5 V AC back sensor out more
- ✓ Route the Flywheel Sensor cable (*if the sensor has one*) to the RPM section of the **Main Engine Harness**.
- ✓ Connect RPM section of the **Main Engine Harness** directly to the Flywheel Sensor if there is no cable

**Note:** *Please use any of the following methods when connecting to the **Main Engine Engine Harness** : Ring terminals, butt connectors which can be found in the **Terminal Hardware Kit**. Don't forget to place the enclosed heat shrink over the connections.*

**3<sup>RD</sup> Choice: TACHOMETER (if used for RPM) ONLY FOR ANALOG TACHOMETERS!**  
**DO NOT HOOK UP IF DIGITAL DASH!**

Install as follows:

- ✓ Take the rerouted White taped RPM section from the **Main Engine Harness**
- ✓ Cut wires to length
- ✓ Crimp on ring terminals found in the **Terminal Hardware Kit**
- ✓ Attach to back of **Tachometer**

**Note:** *The **Tachometer** is polarity sensitive. If you hook the tachometer harness wires to the tachometer backwards, the **Tachometer** won't operate. Reverse the wires and it should operate correctly. The **Tachometer** will not operate when the **TAS System** is operating in engine mode with the key off because the **Tachometer** is not receiving power. Key on and it should operate. If it still doesn't recheck the polarity.*

## **VEHICLE SPEED SENSOR (VSS) Analog Installation Only (Supplied by customer)**

Requires a dual output **VSS (four wire)** 2 +/- for VSS 2 +/- for **TAS System**

Install as follows:

- ✓ Take the rerouted Yellow taped VSS section from the **Main Engine Harness**
- ✓ Cut wires to length
- ✓ Strip gray housing off
- ✓ Strip white wire and connect to the (+) sides of the **VSS** wires using butt connectors found in the **Terminal Hardware Kit**
- ✓ Strip black wire and connect to the (-) sides of the **VSS** wires using butt connectors found in the **Terminal Hardware Kit**

## **FAN CLUTCH**

Determine what type of **Fan Clutch** is being used; Power to TURN OFF or Power to TURN ON

**Note:** *Important in Engine Mode Only, the engine clutch fan MUST be disengaged. Most engine clutch fans are currently controlled by the vehicle ECM (engine control module), therefore require no additional wiring.*

## SECTION 6

### WARNING LABEL DECALS

A **WARNING DECAL** is required to be applied to each side of the hood just above the release latch as well as just above the operator side door latch. This will alert a service technician that the vehicle is equipped with an automatic engine starting device. They should disable the unit before starting any under the hood service maintenance work.

***Please clean the area prior to adhering the WARNING DECALS. Any alcohol-based cleaner is suggested.***





## SECTION 7

### SYSTEM CHECK OUT

- Verify all the connectors are secure
- Double check wire colors match on each side of ALL the connectors.
- Reconnect battery power
- Check **TAS** fuses

### STANDARD TEST PROCEDURE & ENGINE MODE TEST START

- Engine OFF
- Key OFF
- TEMP-A-START (**TAS**) switch OFF
- Cruise on/off switch OFF
- In NEUTRAL
- Tractor BRAKE SET
- HOOD CLOSED
- **TAS** DASH led LIGHT **ON and RED.**
- Start engine. Let engine RUN AT NORMAL IDLE.
- Turn **TAS** switch ON, **TAS** light ON DASH will change from **RED to GREEN.** Engine will ramp up to HIGH IDLE within 30 seconds.
- Turn truck **key OFF**, all accessories, blower motors, etc. should turn OFF, engine will **CONTINUE to RUN.**
- Let engine RUN until **TAS** shuts it **OFF.** Engine will SHUT DOWN and return to BASE IDLE for approximately 15 seconds or until the conditions listed below are met.
  - ✓ Batteries are at 13.75 volts or above
  - ✓ Temperature of engine oil is 170F or above
  - ✓ Engine has run at least 7 minutes

**Note:** Ignition key should still be in the OFF position to proceed with Check out for Engine Mode Start. Let the engine run until shut down occurs.

### ENGINE MODE TEST START

To initiate a test start for **ENGINE MODE ONLY** applications:

- At 6 pin connector, jumper the red yellow wire to the green yellow wire for 1 sec. Do this after engine has been off for at least 1 min. There will be a delay before engine starts (alarm should **SOUND** first for about 14 sec.)
- When engine starts, engine mode check out is complete.

**\*\*\*\*\*TEST START SEQUENCE COMPLETE\*\*\*\*\***

# **TROUBLE SHOOTING**

## Common Symptoms TAS Will Not Activate

### **TAS Display L.E.D. will not light red:**

- Check 3 amp fuse in harness found within one foot of the TAS main module .
- Check main power circuit 25 amp fuse found at point where TAS red wire is connected to truck power source.
- Check for power on red wire at dash connector to L.E.D. at dash display. If power present replace LED.

### **Possible Safety circuit open:**

- With a test light check for power at each side of each switch in the safety loop. If you have power on one wire and not on the other wire, check for open wire at switch. No power found on one side of switch, replace switch.

### **Possible RPM signal loss:**

- Start engine. At back of control center, check orange / white wire, for RPM input signal. With a digital volt meter on 10 volt ac scale you should read at least 3 to 5 volts AC. Yes: Replace TAS control center only, If all safety wires have power & the dash on / off switch has power on brown & white wires with tas switch on & engine idling. No rpm sig found, find & repair lost RPM sig. Check J1939 data line. For other installations remove & clean rpm sensor, reinstall & adjust for right volts out. No output volts replace the rpm sensor. Note: Any time engine is running an AC voltage will be present on the orange /white wire indicating RPM sig. is ok

### **Engine Short Cycling Starting and Stopping:**

- This problem is caused by TAS attempting to charge the batteries and prevented from doing so because of:
  - ✓ Dirty or corroded battery cables
  - ✓ Alternator not charging to specifications
  - ✓ Weak or shorted cell in one or more batteries
- Engine will not stop running. If the alternator output is below 13.75 or the engine temperature sensor fails in the open position, the engine will not shut off because TAS will not see the engine temperature target satisfied. If the sensor fails by shorting to ground, TAS will see high engine temp & will shut down, but not restart for low engine temp. Low battery volts will still call start.

### **High Idle will not work:**

- Check all fast idle wiring to insure there are no mix-up on colors. Be sure fast idle is working when machine is running on the key.
- Check connections at Cruise control on/off and resume switches. Check red/black and yellow wires for continuity. Check to make sure high idle is working when ign is on & engine is running, by turning on cruise switch & pushing on the set resume switch. If no increase in rpm, problem is on truck side & must be fixed first.

***PLEASE CALL TECHNICAL SUPPORT 24/7 309/472-0676 FOR ANY QUESTIONS OR CONCERNS.***

## **TEMP-A-START FEATURES AND SPECIFICATIONS**

- Keyless mode allowing for security while truck is running.
- Engine ramp up or down in RPM smoothly.
- Improved battery charging.

### **CURRENT DRAW ON SYSTEMS**

- System OFF, Truck OFF .13 amp @ 13.0 volts
- Unit ON, on STAND BY 0.18 amp @ 13.0 volts
- Truck ON, Unit on/off switch ON 0.36 amp @ 13.0 volts (Truck Running)
- Unit on STAND BY, 0.21 amp @ 13.0 volt
- **All voltage and current draw readings subject to (+) plus or (-) minus 5%**

## **SAFETY CONCERNS**

Temp-A-Start will turn itself off and immediately shut down the engine if any of the following switches are momentarily opened:

- Neutral
- Hoot Tilt Switch,
- Park brake

Temp-A-Start will shut down the engine if it sees VSS = 16 pulses or greater

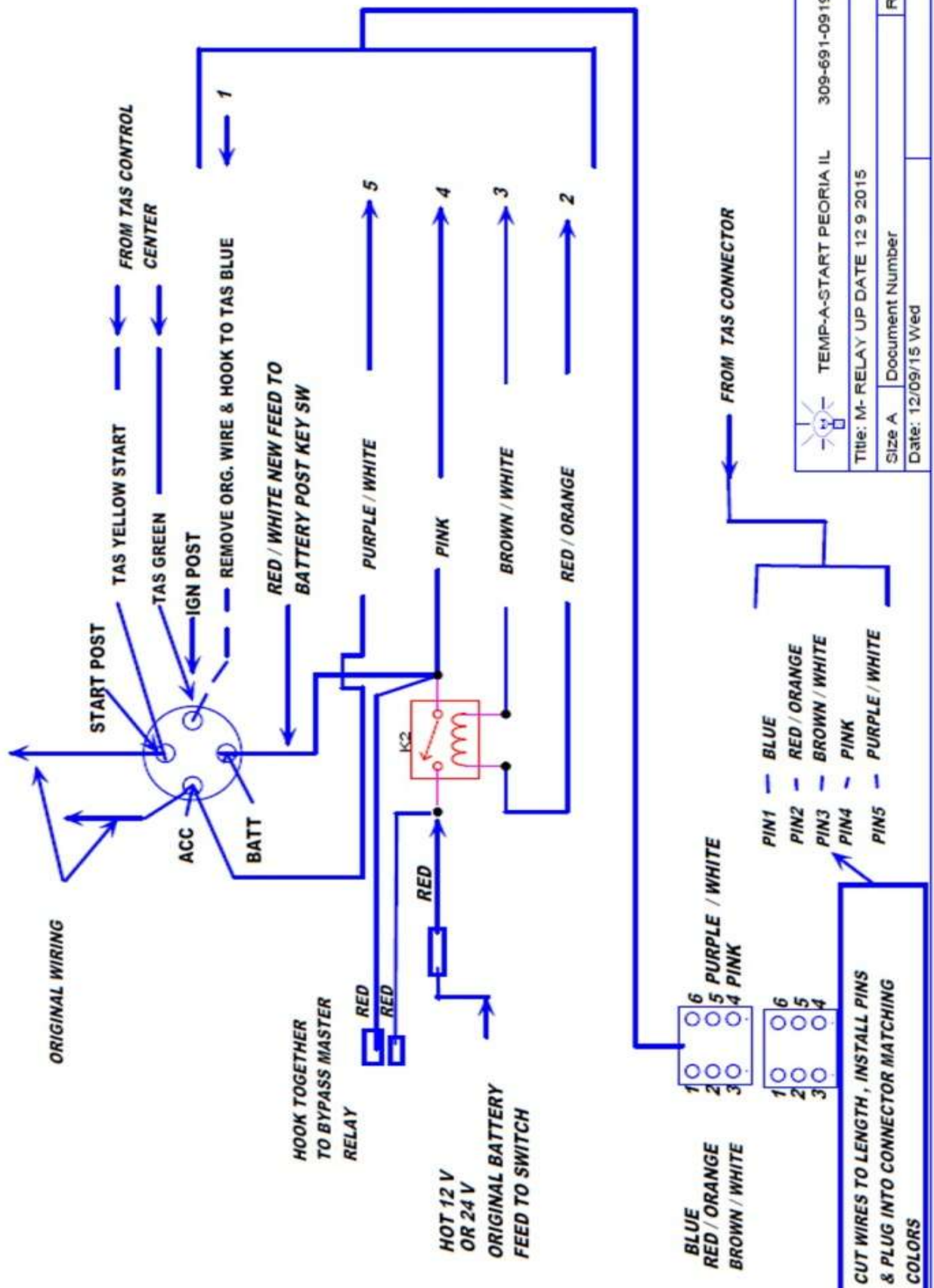
DIAGRAMS

- MASTER WIRING ID    *ENGINE ONLY - NO SHUTDOWN* .....page 25
  
- MASTER WIRING ID    *RETRO IDLE SHUTDOWN* .....page 26
  
- MASTER RELAY .....page 27
  
- RPM .....page 28
  
- SWITCH AS START KEY ?? .....page 30
  
- OPTIONAL    HORN, STROBE LIGHT .....page 31
  
- INTERFACE & THROTTLE SENSOR .....page 32
  
- TAS DIAGNOSTIC CHART .....page 33









TEMP-A-START PEORIA IL		309-691-0919
Title: M-RELAY UP DATE 12 9 2015		
Size A	Document Number	Rev
Date: 12/09/15	Wed	

PIGGY BACK AN RPM OR CAMSHAFT SIGNAL FROM AN EXSISTING ENGINE SENSOR

TAS SIGNAL WIRE TO USE WILL BE WHITE OR RED IN A TWISTED PAIR. TIE OFF BLACK, NOT USED WHEN PIGGYBACKING



LOCATE ENGINE SENSOR AND HOOK ONLY ONE WIRE TO SENSOR SIG + OR- WIRE  
USE A VOLT METER TO IDENTIFY + & - AC SIGNALS

NOTE : TAS ONLY NEEDS A + OR - SIG FROM ONE WIRE ( IF YOU GET A  
ERROR CODE ON YOUR DASH MOVE PICK UP WIRE TO OTHER SIDE OF SENSOR)  
DO NOT USE OTHER WIRE FROM TAS IN THIS CASE TIE OFF & TAPE

? CALL 1-309-472-0676



Mental Automation, Inc.

Title: RETO RPM PICKUP

Size A Document Number

Date: Mon, September 08, 2014

Rev A

Sheet 1 of 1

# RPM INPUT SETTINGS



**\*\*DIP SW 1\*\*** CONTROLS THE RPM INPUT FREQUENCY

ALL TAS SYSTEMS ARE SHIPPED WITH DIP SWITCH SET ON 1

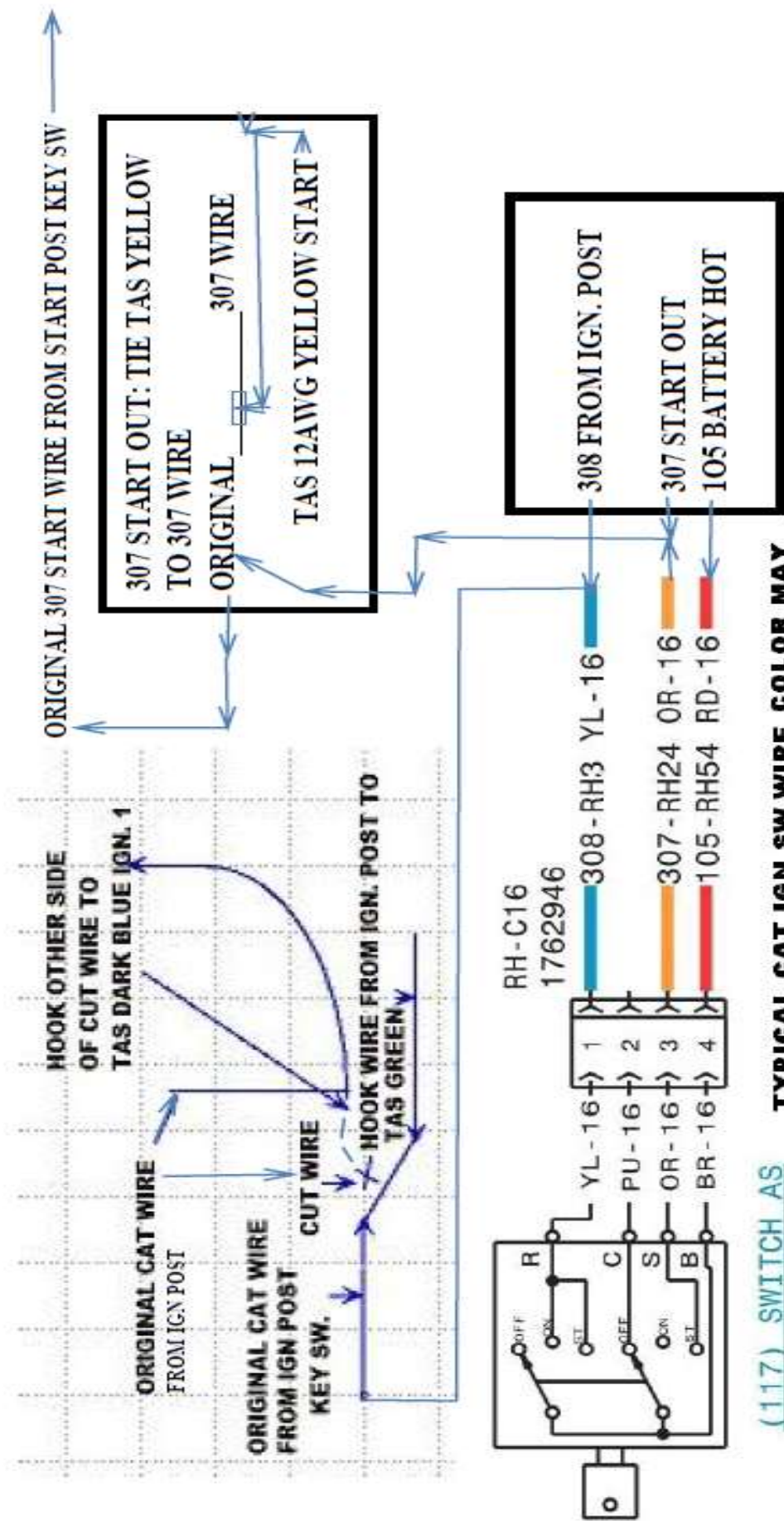
1 = FLYWHEEL INPUT

2 = CAM SHAFT INPUT

3 = VOLVO FLYWHEEL INPUT

4 & 5 = CALL TAS TECHNICAL SUPPORT IF NEEDED 309/472-0676





**TYPICAL CAT IGN SW WIRE COLOR MAY Vary ON SOME Machines BUT WIRE NUMBERS & PIN ID SHOULD BE THE SAME**

**PIN 1 IGN. SW ON PIN HOT**

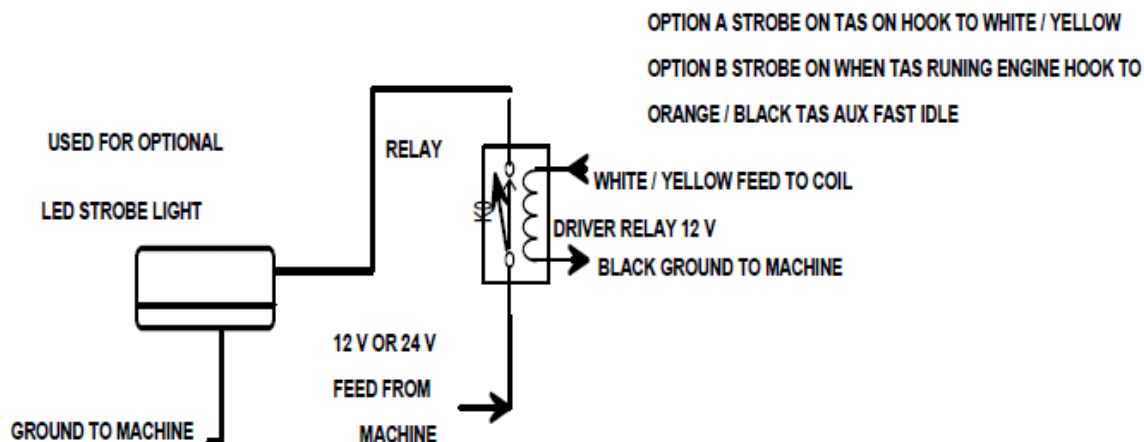
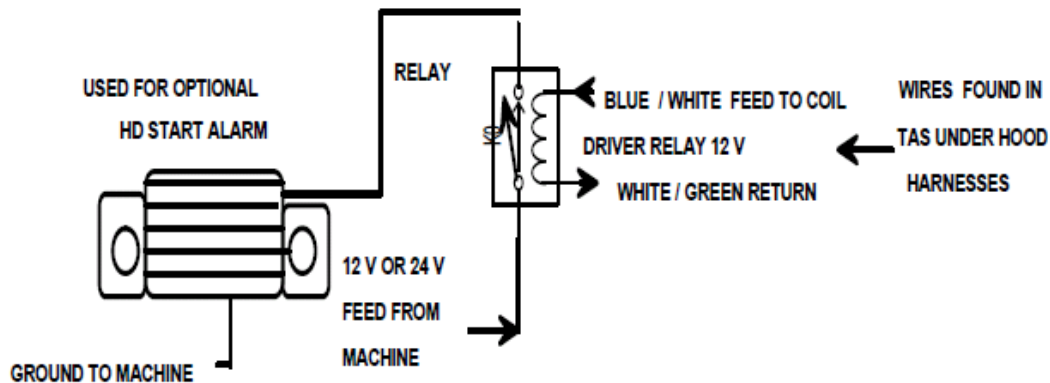
**PIN 2 OPEN NOT USED**

**PIN 3 STARTER SIGNAL OUT PIN 3 & 1 HOT WHILE ENGINE IS CRANKING**

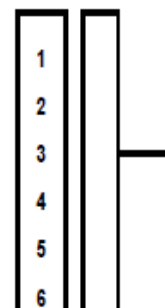
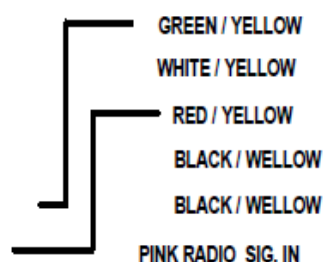
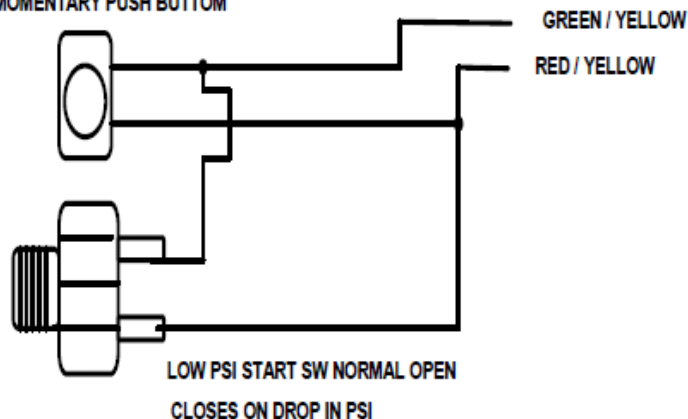
**PIN 4 BATTERY HOT POST 12 OR 24 VOLTS**

(117) SWITCH AS START (KEY)

110-7887



NORMAL OPEN  
MOMENTARY PUSH BUTTON



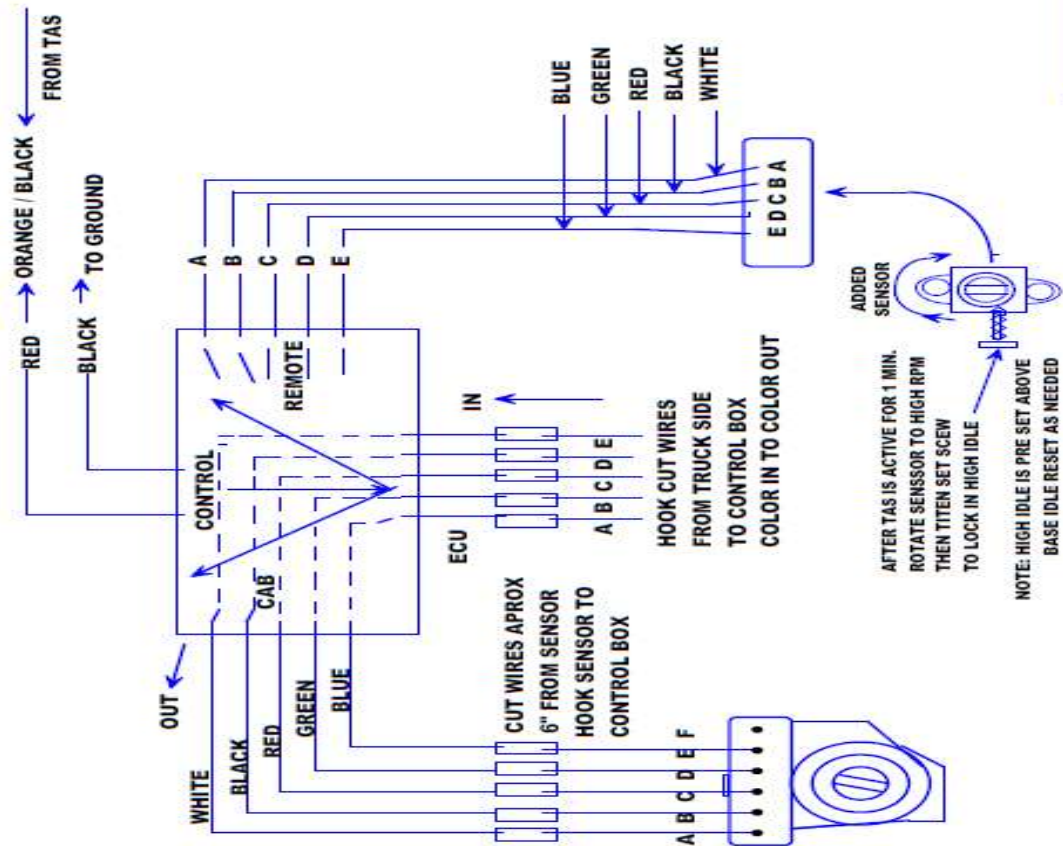
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Title: HD HORN,, STROBE LIGH&RM ST2014v1

Size A Document Number 11/10/12 Rev A

Date: Sat, June 28, 2014

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