



Class 1

ISO 9001 CERTIFIED

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SUITABLE FOR EXTERNAL DISTRIBUTION



TECHNICAL PRODUCT DATASHEET

UV-TPG Pressure Governor



599-00010-011
599-00010-012
599-00010-013
599-00010-014

Kit, UV-TPG with Twister, Vertical
Kit, UV-TPG with Twister, Horizontal
Kit, UV-TPG, Vertical
Kit, UV-TPG, Horizontal





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	PRODUCT	UV-TPG PRESSURE GOVERNOR			BY	AMS


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1. Revision Log

Rev	Date	Changes
1.00	11/18/2021	Initial revision
1.01	12/08/2021	Updated P/N for UV-TPG
1.02	12/15/2021	Added TPG-UV-TPG cutout overlay, added 513-00015 adapter harness p/n
1.03	01/03/2022	Updated P/N for UV-TPG on Page 5



Product specifications in this manual are subject to change without notice.

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2. System Overview

2.1. System part numbers

UV-TPG Pressure Governor system kit with Twister, vertical	599-00010-011
UV-TPG Pressure Governor system kit with Twister, horizontal	599-00010-012
UV-TPG Pressure Governor system kit (no Twister), vertical	599-00010-013
UV-TPG Pressure Governor system kit (no Twister), horizontal	599-00010-014
UV-TPG Pressure Governor, display only	3045-100-00-CL1
TPG to UV-TPG adapter harness	513-00015

Kit includes

UV-TPG Pressure Governor	QTY-1	3045-100-00-CL1
UV-TPG system harness	QTY-1	513-00019
UV-TPG Label, vertical	QTY-1	122482-001
OR UV-TPG Label, horizontal	QTY-1	122481-001
Transducer 0-300 PSI	QTY-2	200-00092
OR Transducer 0-600 PSI	QTY-2	200-00108
In Twister kits - Twister Control Knob	QTY-1	119970

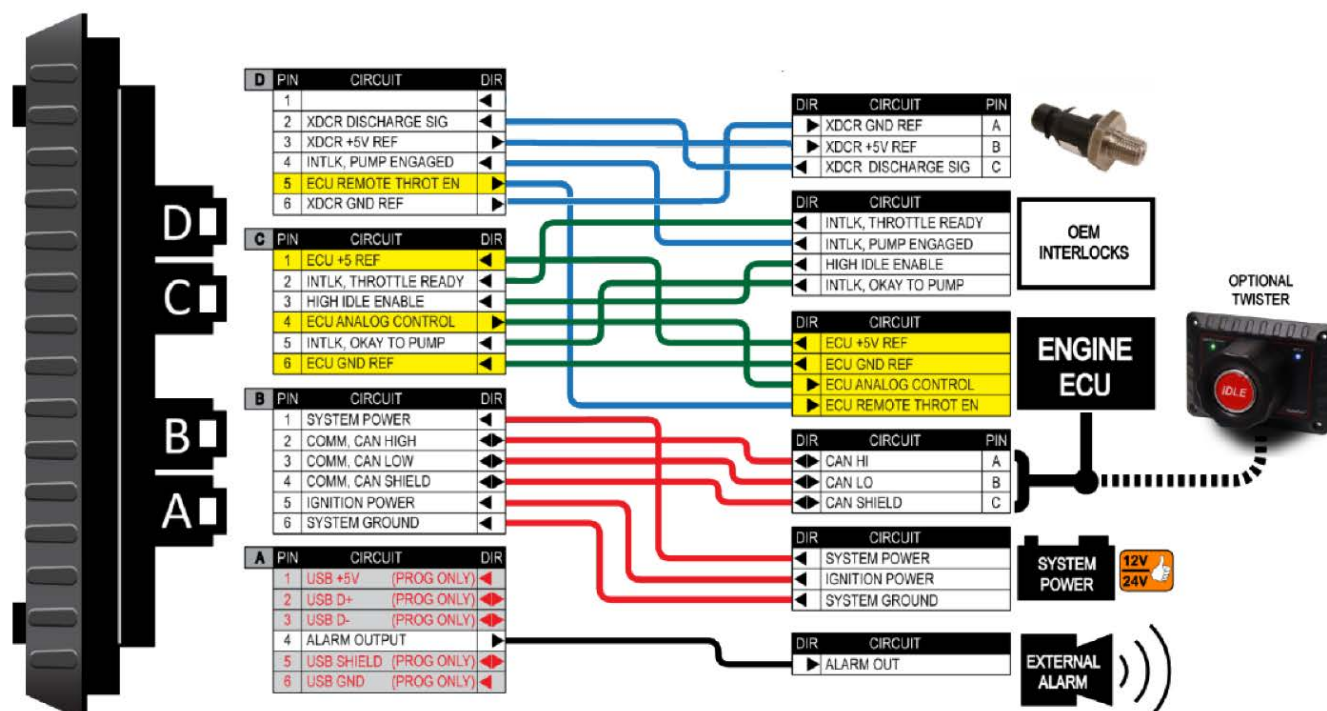
Documentation (available from the website - www.haleproducts.com)

Engine compatibility guide	117686
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2.2. Wiring detail

Below is the point-to-point wiring of the UV-TPG. The circuits with the yellow background are for analog control of the engine ECU and are optional.

NOTE: Wire designations below correspond to those on the standard part number 513-00019 installation harness. If a custom harness is being used please refer to its accompanying documentation. There is a specific connection on the harness for the optional Twister.



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3. Overview of the UV-TPG Governor

The UV-TPG Governor (p/n 599-00010-01X) is an SAE J1939 Controller Area Network (CAN) device that controls engine speed using data communications directly to the engine ECU or through with an analog control signal. By operating on the J1939 network, the governor is able to monitor engine RPM and other pertinent data directly from the engine ECU. Engine information is available directly so that NFPA required instrumentation is delivered through a single unit saving panel space and delivering engine specific warnings as determined by each engine manufacturer.

Control algorithms are optimized to take advantage of the J1939 CAN data to yield crisp and accurate control of engine and subsequently pump speed and pressure output.

For engines that may not support the data link control, an analog output signal is available to provide precise control of the engine speed and pressure.



Figure 2. UV-TPG controls and indicators.



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Figure 3. *Optional Twister controls and indicators.*

3.1. Mode and Interlock indicators (UV-TPG)

Green icons indicate the status of the three (3) interlocks: *throttle ready*, *pump engaged*, and *okay to pump*.

The mode indicators consist of two (2) icons to show the governor's current operating mode. The PRESSURE MODE ICON (yellow) indicates the governor is operating in **pressure mode** and the RPM MODE ICON (blue) indicates the governor is operating in **throttle mode**. When both icons are OFF the governor is in **idle mode** (standby).

3.2. Primary display (UV-TPG)

The Primary display shows the pertinent governor information: engine RPM, set pressure, and mode information.

3.3. Mode, Preset, Increase, Decrease, Silence, and Idle buttons (UV-TPG)

The six (6) control buttons are color coded and labeled for easy identification.

3.3.1. IDLE

The IDLE switch (red) forces the governor to **idle mode** (standby). Pressing and holding this button for **one second** while in rpm mode or pressure mode will cause the engine to ramp down to its idle position.

3.3.2. PRESET 1



The PRESET 1 button sets the governor to the configured preset 1 engine RPM while in **throttle mode**, or preset pressure while in **pressure mode**.

3.3.3. PRESET 2

The PRESET 2 button sets the governor to the configured preset 2 engine RPM while in **throttle mode**, or preset pressure while in **pressure mode**.

3.3.4. MODE

The MODE button (green) sets the governor to either **throttle mode** (RPM) or **pressure mode** (PSI). The correct interlocks must be present for the system to begin governor operation: throttle ready for RPM mode, throttle ready,

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pump engaged, and okay to pump for PSI mode.

3.3.5. **INCREASE**

The INCREASE button (yellow) increases the RPM or PSI target per button press while in either **throttle mode** (RPM) or **pressure mode** (PSI) respectively.

3.3.6. **DECREASE**

The DECREASE button (yellow) decreases the RPM or PSI target per button press while in either **throttle mode** (RPM) or **pressure mode** (PSI) respectively.

3.3.7. **SILENCE**

The SILENCE button (blue) acknowledges and clears currently active warnings.

3.4. **“Soft” button (UV-TPG)**

The one (1) soft button has a function based on the current operating mode and/or warning messages displayed. It will display an icon when the button function is active and is typically used to show more detailed information about the current warning.

3.5. **Information displays (UV-TPG)**

The UV-TPG has six (6) information displays.

3.5.1. **Battery voltage display**

The battery voltage monitor is comprised of three (3) LEDs (green, yellow, and red). The active LED color indicates the current system voltage's range as measured by the power and ground inputs pins. The alarm will activate when the voltage monitor is in condition RED.



- GREEN 12.5VDC and higher
- YELLOW 12.4VDC to 11.9VDC
- RED 11.8VDC and lower

3.5.2. **Coolant temperature display**

The coolant temperature monitor is comprised of three (3) LEDs (green, yellow, and red). The active LED color indicates the status of the coolant temperature as reported by the J1939 network data messages (DM1). The coolant temperature status can also be set to react to user desired points. The alarm will activate when the coolant temperature monitor is in condition RED.





- GREEN No active error reported by engine for coolant temperature
- YELLOW Coolant temperature high WARNING – SPN 110, FMI 16
- RED Coolant temperature high CRITICAL – SPN 110, FMI 0

3.5.3. **Oil pressure display**

The oil pressure monitor is comprised of three (3) LEDs (green, yellow, and red). The active LED color indicates the status of the oil pressure as reported by the J1939 network data messages (DM1). The oil pressure status can also be set to react to user desired points (see section 5.2.22). The alarm will activate when the oil monitor is in condition RED.



- GREEN No active error reported by engine for oil pressure
- YELLOW Oil pressure low WARNING – SPN 100, FMI 18
- RED Oil pressure low CRITICAL – SPN 100, FMI 1

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3.6. Ready indicator (optional Twister)

The green **READY** indicator shows the status of the UV-TPG throttle ready interlock.

3.7. Active indicator (optional Twister)


The blue **READY** indicator indicates that the Twister is ready to control the UV-TPG. This is mainly used with dual-governor applications to indicate which governor is active for user operation.

3.8. Control knob (optional Twister)

The control knob is the operator's interface for controlling the UV-TPG's engine speed (throttle mode) and target pressure (pressure mode). The control knob can be configured to increase engine speed/target pressure with clockwise or counter-clockwise rotation (see section 6.6.1).

3.9. Idle button (optional Twister)

The Twister's idle button performs the same task as the idle button on the UV-TPG. Press and hold this button for **one second** while in rpm mode or pressure mode to force the engine to ramp down to its idle position.

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4. Operation

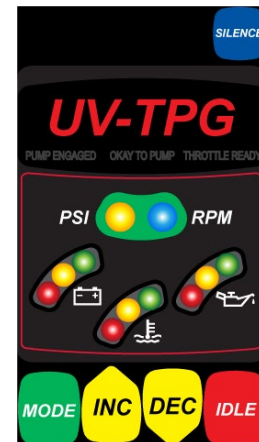
4.1. Initialization

The UV-TPG has a six (12) second power initialization cycle and during this time the display will show:

The UV-TPG displays a black screen with the word “Booting....” For 4 seconds after a power cycle.



The UV-TPG shows the UV-TPG image with all “LED” indicators active for the next 4 seconds.





The UV-TPG shows the version and configuration for the last 4 seconds. The last letter of this display indicates the configured control method of the UV-TPG.

- TPG-C – CFPG control method
- TPG-P – PGN0 control method
- TPG-A – Analog control method
- TPG-S1 – Scania BWS control method
- TPG-S2 – Scania BCI control method
- TPG-D – Mercedes control method
- TPG-M – MAN control method
- TPG-V1 – Volvo FM/FH control method
- TPG-V2 – Volvo FE/FL control method
- FAW – FAW control method
- SLAVE – Second UV-TPG device

(See section 6.11.2 for engine configuration).

After the initialization the UV-TPG begins normal operation.



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4.2. Operating mode selection

The UV-TPG has three operating modes: **throttle mode** (RPM), **pressure mode** (PSI) and **hi-idle mode** (HIDLE)



Press the **MODE** button to select an operating mode. An operating mode will only be activated if the required interlock(s) are in place (see section 4.3).

There is no variation in engine RPM or pump pressure when changing between **throttle mode** and **pressure mode**.



Pressure mode is the desired operating mode because it offers protection from pressure changes that could injure personnel.

4.2.1. Throttle mode

Throttle mode (RPM) maintains a set engine RPM and will not deviate until the operator changes the RPM with the control switches on the UV-TPG. (Proper interlocking is required for normal operation – refer to Required Interlocking section 4.3)

Throttle mode is typically used when...

- priming the pump
- the water supply pressure stability is questionable
- connected to a stand pipe
- acting as a relay pumper



Press the **MODE** button to select **throttle mode**. The RPM mode indicator LED will illuminate blue.



Press a **PRESET** button to set the engine speed to the configured preset RPM - as long as the pump pressure is less than 10 PSI (see section 4.4). Configure the **throttle mode** presets through the USER Menu (see section 6.5.2 and 6.5.4)




Press the **INCREASE** or **DECREASE** buttons to adjust the pressure in either direction. (see section 3.4.5 and 3.4.6)



Rotate the Twister knob in the **INCREASE** direction to increase or the **DECREASE** direction to decrease the engine RPM set point. The direction of increase can be set to clockwise or counter-clockwise (see section 6.6.1).



Press the **IDLE** button on the UV-TPG (or optional Twister) at any time to set the UV-TPG back to standby. Both mode indicator LEDs will turn off when the engine speed reaches idle (see section 4.5).

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4.2.2. Pressure mode

Pressure mode maintains a set pump pressure by monitoring the discharge pressure transducer and modifying the pump speed by adjusting the engine RPM. The operator can modify the set pump pressure with the control switches on the UV-TPG. *(Proper interlocking is required for normal operation – refer to Required Interlocking section 4.3)*



Pressure mode affords the most safety to the operator by not allowing potentially hazardous pressure spikes. The UV-TPG will maintain the set pump pressure even when discharge lines are actively opened and closed as long as the water supply is sufficient. The UV-TPG will automatically increase engine speed when pump pressure has decreased due to discharge lines being opened. The increase in engine speed will return the pump pressure to the desired set pressure (and vice-versa when discharge lines are closed).



Press the **MODE** button to select **pressure mode**. The PSI mode indicator LED will illuminate yellow.

It may be necessary to press the **MODE** switch twice depending on the configured first mode (see section 6.9.1).

Press a **PRESET** button to set the pump pressure to the configured preset. The UV-TPG will adjust the engine RPM to maintain the preset pressure value (see section 4.4). Configure the **pressure mode** preset through the Setup Menu (see section 6.5.3 and 6.5.5).



Press the INCREASE or DECREASE buttons to adjust the pressure in either direction. (see section 3.4.5 and 3.4.6). The target pressure will be displayed in the target pressure display.



Optional Twister

Rotate the Twister knob in the **INCREASE** direction to increase or the **DECREASE** direction to decrease the pressure set point. The direction of increase can be set to clockwise or counter-clockwise (see section 6.6.1). The target pressure will be displayed in the target pressure display.



Press the **IDLE** switch at any time to set the UV-TPG back to standby. Both mode indicator LEDs will turn off when the engine speed reaches idle (see section 4.5).

Attention Ford F-Series Customers

While pumping or operating in split shaft/PTO mode, do not press the accelerator pedal or brake pedal. If the accelerator pedal or brake pedal is pressed while in split shaft/PTO mode, the engine will return to curb idle and control of the remote throttle or governor will be lost. This will cause the pump to be reduced to idle and water pressure will be reduced.

For complete details please reference service bulletin SB-143 at www.haleproducts.com.

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4.2.3. High Idle mode



High Idle mode maintains a set engine RPM and will not deviate until the operator loses the High Idle Interlock, Presses Idle on the UV-TPG. *(Proper interlocking is required for normal operation – High Idle mode requires that only the Throttle Ready and High Idle interlocks are active.)*



Press the **MODE** button to select **throttle mode** and leave High Idle mode. The RPM mode indicator LED will illuminate blue.





Press a **PRESET** button to set the pump pressure to the configured preset. The UV-TPG will adjust the engine RPM to maintain the preset pressure value (see section 4.4). Configure the **pressure mode** preset through the Setup Menu (see section 6.5.3 and 6.5.5).



Press the INCREASE or DECREASE buttons to adjust the pressure in either direction. (see section 3.4.5 and 3.4.6)



Press the **IDLE** button at any time to set the UV-TPG back to standby. Both mode indicator LEDs will turn off when the engine speed reaches idle (see section 4.5).

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4.2.4. Pressure mode control parameters

There are three control parameters which can be modified to improve **pressure mode** performance: pressure sensitivity, pressure time-out, and pressure gain.

CONTROL PARAMETER	DESCRIPTION	DEFAULT	SECTION
Pressure sensitivity	Controls how much difference between the target pressure and actual pressure that is allowed before the UV-TPG actively adjusts the engine speed to bring the discharge pressure back to the target pressure.	6 PSI	6.8.1
Pressure time-out	The engine speed will be commanded to the idle RPM when the discharge pressure drops below 30 PSI (and only after the discharge pressure had been above 50 PSI) for the number of seconds configured. The alarm will sound and the OPERATOR CMD warning will be shown in the display window (see section 5).	3 Seconds	6.8.7
Pressure gain	The pressure change requested with each Twister control click in the INCREASE or DECREASE direction.	3 PSI	6.8.8

4.3. Required interlocking

The UV-TPG requires interlocks before engine control operations are permitted. The UV-TPG provides two interlock inputs that allow easy separation of pumping operations and throttle/high idle operations through two inputs dedicated as system interlocks: **THROTTLE READY** (pin 2 of connector C) and **PUMP ENGAGED** (pin 4 of connector D). These interlock inputs are activated when system power is applied (positive polarity).



The OEM is responsible for creating safe and effective interlocking routines.

The UV-TPG uses green icons to indicate the status of the interlocks.

THROTTLE READY interlock **THROTTLE READY**

Apply system power to pin 2 of connector C (through OEM interlocking).
THROTTLE READY icon illuminates green.

The UV-TPG will operate in **throttle mode** (RPM) only.

PUMP ENGAGED interlock **PUMP ENGAGED**

Apply system power to pin 4 of connector D (through OEM interlocking).
PUMP ENGAGED icon illuminates green.

The UV-TPG will not operate in any mode until the THROTTLE READY interlock is also applied.

OKAY TO PUMP **OKAY TO PUMP**

When THROTTLE READY and PUMP ENGAGED interlocks are applied the OKAY TO PUMP icon illuminates green.


The UV-TPG will operate in **throttle mode** (RPM) or **pressure mode** (PSI).

4.4. PRESET button operation



The **PRESET** buttons bring the discharge pressure (or engine RPM, in throttle mode) to the configured preset point (see section 6.5.2 to 6.5.5).

Using a **PRESET** button is a method of smoothly and expeditiously attaining water pressure and flow, but it is not intended to be the initial attack pressure. Attack pressures and flows should be determined by the actual fire status.

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and manually achieved for best operation.

PRESET is an operational convenience and needs to be considered as a fixed point (higher or lower than the current point) that can be achieved with a single button press.



Note: Initiating pumping operations is simplified by bringing the pump to a preset pressure with a single button press. Consequently, securing or regaining control operations can be aided by returning to this fixed pressure point with a single button press.

4.5. IDLE button operation

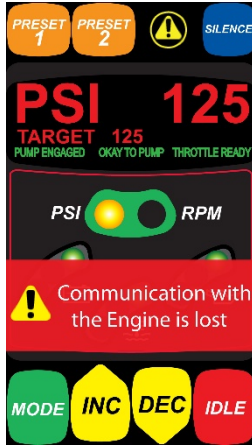


Press and hold the **IDLE** button on the UV-TPG (or optional Twister) for **one second** to release engine RPM control back to the engine ECU. The engine RPM will promptly go to its configured curb idle (see section 6.9.3).

Note: In view of the fact that driveline stress can be induced by quick changes in engine speed, depending on rpm and torque load, the engine speed is ramped to idle over a short duration to minimize the effect of driveline kick.

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5. Warning and Error messages



The UV-TPG displays warning and error messages on a red bar in front of the secondary information displays and the “more information” and “Silence” icons appear below the soft buttons.



More information

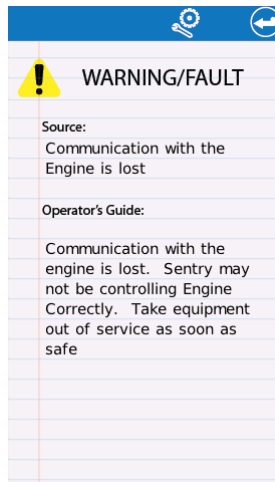
Press the soft button above this icon to learn more about the current warning or error message (first level information).



Silence (Clear message)

Press the soft button above this icon to clear the warning message from the screen.

5.1. First level message information (operator)




The first level message information screen is designed for the operator and will give basic information about the current warning/error as well as simple instructions on what should be accomplished next.



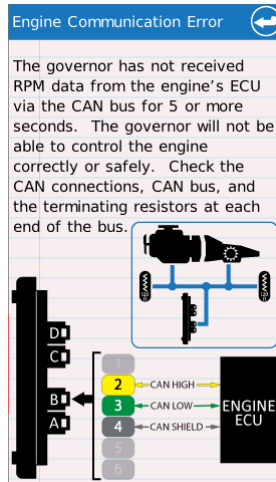
Press the “technician information” soft button to display the second level message information which gives a technician detailed information about the warning/error message that is currently displayed.



Press the “return” soft button to exit the first level message information and return to the standard operating screen.

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5.2. Second level message information (technician)





The second level message information screen is designed for the technician and will give more information about the current warning/error as well as simple instructions on what should be evaluated in order to correct the warning/error.





Press the "return" soft button to exit the second level message information and return to the standard operating screen.

5.3. List of warning/error messages



MESSAGE	DESCRIPTION	UV-TPG RESPONSE	OPERATOR ACTION
Communication with the engine is lost	The UV-TPG is not receiving CAN communication for engine RPM.	<i>No change in operation.</i>	<i>Operator should cancel UV-TPG operation and have engine to UV-TPG communication verified.</i>
Throttle Interlock Is Not Enabled	The UV-TPG's throttle interlock is not active when the MODE button was pressed.	<i>No change in operation.</i>	<i>Operator should activate OEM interlocking that enables the UV-TPG's throttle interlock.</i>
Pump Engaged Interlock Not Enabled	The UV-TPG's pump engaged interlock is not active when the MODE button was pressed.	<i>No change in operation.</i>	<i>Operator should activate OEM interlocking that enables the UV-TPG's pump engaged interlock.</i>
Low Battery Voltage Fault	The UV-TPG's supply voltage is less than or equal to 11.9VDC (12 volt system) or 23.8VDC (24 volt system). The voltage set point is adjustable in the factory menu.	<i>No change in operation.</i>	<i>Operator should determine the cause of the low voltage condition.</i>
Low Battery Voltage Warning	The UV-TPG's supply voltage is less than or equal to 12.4VDC (12 volt system) or 24.8VDC (24 volt system). The voltage set point is adjustable in the factory menu.	<i>No change in operation.</i>	<i>Operator should determine the cause of the low voltage condition.</i>
Low Oil Pressure Fault	The UV-TPG has received low oil pressure diagnostic message (bus warnings) or the oil pressure is less than the configured limit (user warnings).	<i>No change in operation.</i>	<i>Operator should cancel UV-TPG operation and determine the cause of the low oil pressure fault.</i>
Low Oil Pressure Warning	The UV-TPG has received low oil pressure diagnostic message (bus warnings) or the oil pressure is less than the configured limit (user warnings).	<i>No change in operation.</i>	<i>Operator should cancel UV-TPG operation and determine the cause of the low oil pressure warning.</i>

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MESSAGE	DESCRIPTION	UV-TPG RESPONSE	OPERATOR ACTION
Coolant High Temperature Fault	The UV-TPG has received high coolant temperature diagnostic message (bus warnings) or the coolant temperature is greater than the configured limit (user warnings).	<i>No change in operation.</i>	<i>Operator should cancel UV-TPG operation and determine the cause of the high coolant temperature fault.</i>
Coolant High Temperature Warning	The UV-TPG has received high coolant temperature diagnostic message (bus warnings) or the coolant temperature is greater than the configured limit (user warnings).	<i>No change in operation.</i>	<i>Operator should cancel UV-TPG operation and determine the cause of the high coolant temperature warning.</i>
Discharge Sensor Fault	Signal voltage from the discharge pressure sensor is less than +0.30VDC or greater than +4.90VDC.	<i>UV-TPG switches to THROTTLE mode operation.</i>	<i>Operator may continue to use UV-TPG in THROTTLE mode. Operator should have the discharge pressure sensor and associated wiring verified.</i>
Check Engine Warning	The engine control unit is reporting a check engine light.	<i>No change in operation.</i>	<i>Operator may view the specific warning and determine if UV-TPG operation should be discontinued and the engine turned OFF.</i>
Stop Engine Fault	The engine control unit is reporting a stop engine light.	<i>No change in operation.</i>	<i>Operator may view the specific fault and then discontinue UV-TPG operation and turn off the engine.</i>
Discharge Pressure not in Range to be Zeroed	Signal voltage from the discharge pressure sensor is less than +0.45VDC or greater than +0.80VDC.	<i>UV-TPG will not allow the discharge pressure to be calibrated to zero.</i>	<i>Operator should verify that the discharge pressure is actually zero.</i>
Water Supply Insufficient	Pump discharge pressure decreased 5 or more PSI as engine speed was increased 120 or more RPM (while in pressure mode).	<i>UV-TPG reduces engine speed to 1100 RPM and attempts to increase discharge pressure by ramping engine RPM.</i>	<i>Operator should verify water supply or change to THROTTLE mode.</i>
Discharge Pressure Less than 30 PSI	Pump intake pressure loss. Discharge pressure dropped below 30 PSI.	<i>UV-TPG maintains engine speed at 1100 RPM for the configured pressure time-out (6.8.7).</i>	<i>Operator should verify water supply or change to THROTTLE mode.</i>

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MESSAGE	DESCRIPTION	UV-TPG RESPONSE	OPERATOR ACTION
CRITICAL: UV-TPG In Standby. Check Water Source	Pump discharge pressure has been less than 30 PSI for longer than the configured pressure time-out .	<i>UV-TPG reduces engine speed to the idle RPM and returns to IDLE mode operation.</i>	<i>Operator should verify water supply and then re-enable PRESSURE mode operation.</i>
Unable to maintain discharge pressure	The UV-TPG has increased the engine speed more than 300 RPM above the stasis RPM.	<i>UV-TPG maintains the engine speed at the stasis RPM + 300.</i>	<i>Operator should verify water supply to determine why the desired discharge pressure cannot be maintained.</i>
Discharge Pressure Has Increased More Than 50 PSI Since Setting RPMs	The UV-TPG is in THROTTLE mode and the discharge pressure has increased more than 50 PSI over the previous stasis pressure.	<i>UV-TPG maintains THROTTLE mode operation but limits the engine RPM to maintain no more than a 50 PSI differential over the pressure detected when the operator set the desired engine RPM.</i>	<i>No operator action required. Operator may continue to use UV-TPG in THROTTLE mode.</i>
5 volt reference error	The UV-TPG is not detecting the 5 volt supply voltage required for analog control (pin 1, connector C).	<i>The UV-TPG will not be able to create the variable voltage required for analog control mode.</i>	<i>Operator should have the UV-TPG wiring confirmed.</i>
Water Pressure > 10 PSI and Preset Inhibit Enabled	The UV-TPG has been configured for RPM Preset inhibit. The operator has pressed the RPM preset button when 10 or more PSI of discharge pressure is detected.	<i>The UV-TPG will not increase engine speed to the preset RPM.</i>	<i>Operator should determine why discharge pressure is detected on the discharge side of the pump.</i>
Preset Is Not Permitted With Discharge PSI Less Than 30	The UV-TPG detects less than 30 PSI of discharge pressure.	<i>The UV-TPG will not allow preset operation</i>	<i>The operator should manually adjust discharge pressure to above 30 PSI and then use the desired preset.</i>

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5.3.1. Discharge Sensor Fault

The **Discharge Sensor Fault** warning messages indicate that the associated pressure sensor signal voltage is out of range (<0.30 VDC or >4.90 VDC). When this occurs the UV-TPG does not have valid pressure data and responds by switching operation to THROTTLE mode (where pressure data is not required). There are typically four reasons the pressure sensor voltage is out of range:

- The pressure sensor is damaged.
- The pressure sensor signal wire is broken.
- The pressure sensor ground wire is broken (signal voltage will be at 5.00 VDC).
- The pressure sensor supply voltage wire is broken (signal voltage will be at 0.00 VDC).

5.3.2. Water Supply Insufficient, Discharge Pressure Less Than 30 Psi, and Critical: UV-TPG In Stand By. Check Water Source

Water Supply Insufficient, Discharge Pressure Less Than 30 Psi, and Critical: UV-TPG In Stand By. Check Water Source work together and in sequence when the discharge water pressure cannot be maintained due to cavitation or inadequate water supply.

- The **Water Supply Insufficient** message appears first after the UV-TPG has attempted to maintain discharge pressure by increasing the engine RPM. Failing to maintain the discharge pressure, the UV-TPG drops the engine speed to 1100 RPM and begins increasing the RPM as part of the Supply Intake Protection (SIP) routine.
- The **Discharge Pressure Less Than 30 Psi** message appears after the Supply Intake Protection (SIP) routine has failed and the discharge pressure has dropped below 30 PSI. The UV-TPG maintains the engine speed at 1100 RPM for the time period defined by the pressure time-out variable (3 seconds default, see section 6.8.7).
- The **Critical: UV-TPG In Stand By. Check Water Source** message appears after the UV-TPG has switched to STANDBY mode (IDLE). This message informs the operator that the UV-TPG could not maintain a discharge pressure of 30 PSI or more. The water supply must be verified.

5.3.3. Unable To Maintain Discharge Pressure

The UV-TPG in PRESSURE mode maintains the operator set discharge pressure by adjusting the engine RPM. The UV-TPG increases the engine RPM to return to the operator's set discharge pressure when a pressure drop is detected. The UV-TPG maintains the *Limit RPM* and displays the warning message when the UV-TPG cannot fully regain the operator's set discharge pressure. The Range can be adjusted through the Pressure Lag menu item.

$$\text{Limit RPM} = \text{RPM}_{\text{STASIS}} + \text{RPM}_{\text{RANGE}}$$



$\text{RPM}_{\text{STASIS}}$ = Engine RPM where operator's pressure was last stable.

$\text{RPM}_{\text{RANGE}}$ = Engine RPM increase range (300 RPM if $\text{RPM}_{\text{STASIS}} < 1500$, 200 RPM if $\text{RPM}_{\text{STASIS}} > 1500$)

For example: The UV-TPG is maintaining the operator's set discharge pressure of 100 PSI at 1100 RPM. The pressure drops to 90 PSI and the UV-TPG compensates by increasing the engine RPM. The UV-TPG continues increasing engine speed until 1400 RPM is reached but the discharge pressure has only increased to 92 PSI so the UV-TPG maintains 1400 RPM and displays the warning message.

5.3.4. Discharge Pressure Has Increased More Than 50 Psi Since Setting Rpm's

The UV-TPG in THROTTLE mode maintains the operator set engine RPM. But the UV-TPG will limit the discharge pressure if the pressure recorded when the RPM was last set has increased more than 50 PSI. The UV-TPG will reduce the engine RPM to maintain the pressure increase to no more than a 50 PSI differential and display the warning message. The UV-TPG does not attempt to regulate pressure while in THROTTLE mode, but it will attempt to limit a pressure increase to a maximum of 50 PSI over the pressure detected when the operator set the desired engine RPM.



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For example: The UV-TPG is maintaining the operator's desired engine speed of 1100 RPM (at a discharge pressure of 100 PSI). The discharge pressure increases to 160 PSI (e.g. a discharge line was closed) and the UV-TPG decreases the engine RPM until the discharge pressure is reduced to 150 PSI (50 PSI differential).

5.3.5. Communication with engine is lost

The UV-TPG receives engine RPM data via CAN communication (PGN 61444, SPN 190). The UV-TPG displays this warning message after not receiving the RPM data for 4 or more seconds.

Note: If the UV-TPG is configured for a CAN control and this warning message is active due to a CAN bus problem, then the control of the engine RPM cannot be certain since the engine ECU may not receive engine speed request data from the UV-TPG.

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6. UV-TPG Setup Menus

6.1. Engine compatibility

The factory default settings of the UV-TPG make it “out of the box” ready to operate a Cummins engine programmed with the Emergency Vehicle Calibration. Typically, for the default configuration no values will require modification, other than changing the desired engine rpm, high-idle rpm and pump pressure preset values.

The governor is capable of controlling any engine that allows J1939 PGN0 (Torque Speed Control) messages from a unique source address. These engines include various Detroit Diesel DDEC engines, Mercedes Benz (MBE) engines, Volvo, and others. Programming of the source address or other parameters on the engine ECM may be required. The Scania and MAN engines allow control by proprietary J1939 messages and are supported by the UV-TPG. In cases where an engine does not support data link control, the UV-TPG can be configured to control the engine with an analog signal coupled to the engine remote PTO throttle input. Contact Class 1 for a complete engine compatibility list.

6.2. Enter the setup menu



The MENU button is only available when the UV-TPG is not in an active operating mode (pressure, RPM). Access the menu by pressing the “soft button” associated with the menu icon shown on the UV-TPG’s display.

The INFO and USER menus are standard and do not require a password. A password must be entered to access the COMMAND, OEM1, OEM2, OEM3, FACTORY 1 and FACTORY 2 menu levels.

6.2.1. Menu soft buttons

The icons near each of the soft buttons indicate their operation.



The UP ARROW button moves the menu highlight bar (yellow) to the previous menu item.



The DOWN ARROW button moves the menu highlight bar (yellow) to the next menu item.



The INCREASE button changes the currently selected menu item's to the next option.



The DECREASE button changes the currently selected menu item's to the next option.



The EXIT/CANCEL button exits the menu and returns to the main screen.





The UNLOCK button opens the password entry screen. Passwords are required to access menu items beyond the INFO and USER menus.



The NEXT MENU button cycles to the next available menu screen. Some menu screens require entering a password.



The SAVE button saves any changes to the menu(s).

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6.3. Password Entry Screen



The Password Entry Screen allows for access to the various menus along with special functions.

- COMMAND MENU - 0311
- OEM 1 MENU - 1560
- OEM 2 MENU - 9769
- OEM 3 MENU - 3317
- OEM 4 MENU - 1505
- FACTORY 1 MENU - 6679
- FACTORY 2 MENU - 7081
- USB BOOTLOADER - 4235
- RESET PUMP HOURS - 0414
- USB SAVE MENU ITEMS - 5224
- USB LOAD MENU ITEMS - 0592

6.3.1. Reset the Pump Hours

Enter the Password Entry screen and enter 0414 then press the SAVE button. The display will prompt you to verify that you want to reset the pump hours. Press the green accept button to reset or the red cancel button to not reset. Once back to the INFO menu you must press the SAVE button to save the reset operation and exit the menu.

6.3.2. USB Bootloader

Enter the Password Entry screen and enter 4235 then press the SAVE button. The display will prompt you to verify that you want to reboot and load new firmware. Make sure you have a USB thumb drive with your new UV-TPG firmware plugged into Port A. Press the green accept button to reset or the red cancel button to not reboot. Follow the on screen instructions and select the desired UV-TPG firmware. The firmware will need to be on the root directory of the USB thumb drive, it cannot be in a folder on the drive.


6.3.3. Save Menu Items to a USB thumb drive

Enter the Password Entry screen and enter 5224 then press the SAVE button. The display will prompt you to verify that you want to save the menu parameters to a USB thumb drive. Make sure you have a USB thumb drive plugged into Port A. Press the green accept button to save the parameters or the red cancel button to not save the parameters. Once saved you can rename your file using your PC but do not edit the contents as a corrupt file will be unreadable on a UV-TPG.

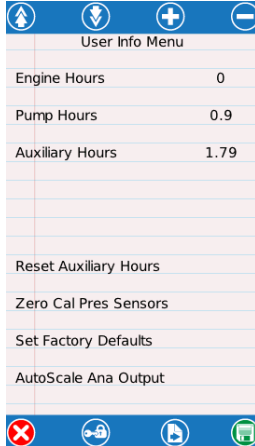
6.3.4. Load Menu Items from a USB thumb drive

Enter the Password Entry screen and enter 0592 then press the SAVE button. The display will prompt you to verify that you want to load new menu parameters from a USB thumb drive. Make sure you have a USB thumb drive plugged into Port A. Press the green accept button to load a list of files on the drive to the UV-TPG or press the red cancel button to not load the list of files. On this screen use the UP and DOWN arrows to navigate the list which may be several pages. You can press the red cancel button to leave the list and return to the menu without loading new menu parameters. You can press the SAVE button on any item in the list and you will be prompted to verify that you want to try to load the file and present the file's name to you. Press the green RETURN button to try to read the file or press the red cancel button to return to the list of files.

****NOTE:** If the firmware versions of the UV-TPG on the USB does not match the version on the current display it will fail to load. If the file has been corrupted, it will fail to load. Please only rename the file and do not edit to the contents. Opening the file in a text editor appends data on the end of the file that will make it unreadable to a UV-TPG**

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6.4. INFO menu



The User Info Menu allows viewing of the Engine Hours, Pump Hours, and Auxiliary Hours.

DISPLAY ITEM	FORMAT	SOURCE
Engine hours	XX.XX h	SAE J1939 CAN message – PGN 65253
Pump hours	XX.XX h	Internal timer, running with pump engaged interlock
Auxiliary hours	XX.XX h	Internal timer, always running

This menu also allows resetting of the auxiliary hours and zero calibrating the pressure sensors, setting the factory defaults, and auto scaling the analog output (for analog control method).

Use the soft buttons to navigate and execute options.

6.4.1. Reset the Auxiliary Hours

Enter the INFO menu and select “Reset Auxiliary Hours” then press the SAVE button. The display will prompt you to verify that you want to reset the auxiliary hours. Press the green accept button to reset or the red cancel button to not reset. Once back to the INFO menu you must press the SAVE button to save the reset operation and exit the menu.

6.4.2. Zero Calibrate the pressure sensors

Enter the INFO menu and select “Zero Cal Pres Sensors” then press the SAVE button. The display will prompt you to verify that you want to zero the pressure sensors. Press the green ACCEPT button to reset or the red CANCEL button to not reset. Once back to the INFO menu you must press the SAVE button to save the zero calibration operation and exit the menu.


6.4.3. Set Factory Defaults

Enter the INFO menu and select “Set Factory Defaults” then press the SAVE button. The display will prompt you to verify that you want to set the factory defaults. Press the green accept button to reset or the red cancel button to not reset. Once back to the INFO menu you must press the SAVE button to save the factory default operation and exit the menu.

6.4.4. Autoscale Analog Output

A UV-TPG set to Analog control mode (see section 6.11.2) may use the Auto Scale configure method to automatically set the IDLE voltage (see sections 6.4.4 and 6.12.4) and GAIN setting (6.9.5).

The engine must be running and the interlocks (as defined in section 4.3) must be enabled when running the Auto Scale mode. Enter the INFO menu and select “AutoScale Analog Output” then press the SAVE button. The display will prompt you to verify that you want to set the Auto Scale the analog output. Press the green accept button to reset or the red cancel button to not reset. If the engine control method is not set for “analog” a warning will be shown and Auto Scale will not be attempted. Once back to the INFO menu you must press the SAVE button to save the Auto Scale operation and exit the menu.

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Defaults:					
Unit of measure	= PSI, °F	Oil pressure critical	= 20 PSI	Inhibit Presets by Pres.	= YES
Preset RPM 1	= 1000	Warn. Voltage 12V	= 12.4	Voltage Adjust	= 0 v
Preset pressure 1	= 100	Crit. Voltage 12V	= 11.9	Max Rate of Change	= 200
Preset RPM 2	= 1000	Warn. Voltage 24V	= 24.8	Gain Integrator	= 0.5
Preset pressure 2	= 100	Crit. Voltage 24V	= 23.8	System voltage	= 12 volts
Brightness day	= 70	Pressure sensitivity	= 5 PSI	Engine control method	= unknown
Brightness night	= 50			Source ID	= 7
Round pressure	= YES	Discharge pressure offset	= 0	Display Orientation	= Horz
Day/night mode	= DAY			Slave Orientation	= Horz
Twister rotation increase	= CW	Discharge sensor range	= 300 PSI	Language	= English
Display Fuel Economy	= YES			Baud Rate	= 250K
Display Trans. Temp	= YES	Pressure time out	= 8 seconds	Ok to Pump Mode	= Normal
Display Oil Pressure	= YES	Pressure mode gain	= 1 PSI	Twister Enable	= DISABLED
Display Disch. Pressure	= YES	Pressure lag	= 0 PSI	Alert tone	= ENABLE
Display Intk. Pressure	= YES	First mode	= Pressure	Volts Yellow Warn.	= DISABLE
Iconography	= DEFAULT	Inhibit RPM presets	= NO	Control auto mode	= Disabled
High Idle Preset	= 1000	Idle speed	= 700 RPM	Idle voltage	= 0.5 volts
Warning source	= CAN Bus	Maximum speed	= 2400 RPM	BCM1 version	= 1
Coolant temp warning	= 180 °F	RPM mode gain	= 750 RPM/v	Scania mode	= NORMAL
Coolant temp critical	= 230 °F	Dither enable	= NO	SPN 696	= 3
Oil pressure warning	= 40 PSI	Max Pressure	= 500 PSI	Alarms Behind OEM Intlk	= DISABLED

☐ USER
 ☐ COMMAND
 ☐ OEM 1
 ☐ OEM 2
 ☐ OEM 3
 ☐ OEM 4
 ☐ FACTORY 1
 ☐ FACTORY 2



6.5. USER menu

User Menu	
Units of meas.	PSI/Deg F
Preset 1, RPM	1000
Preset 1, PSI	100
Preset 2, RPM	1000
Preset 2, PSI	100
Brightness (day)	70
Brightness (night)	50
Round to 5 PSI	Yes
Display Mode	Day

The User Menu allows configuration of standard user modifiable items.

- Unit of measure
- Preset RPM 1
- Preset pressure 1
- Preset RPM 2
- Preset pressure 2
- Brightness, day
- Brightness, night
- Round pressure
- Display mode

Use the soft buttons to navigate and modify options.

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6.5.1. Change the unit of measure

Enter the USER menu and select “Units of meas” then press the INCREASE or DECREASE buttons to change to the desired unit of measure (PSI/Deg F, kPa/Deg C, or Bar/Deg C). Press the SAVE button to save the USER menu items and exit the menu.

6.5.2. Change the Preset RPM 1

Enter the USER menu and select “Preset 1 (RPM)” then press the INCREASE or DECREASE buttons to change the preset RPM 1 to the desired value (900 to 1800 in 25 RPM steps). Press the SAVE button to save the USER menu items and exit the menu.

6.5.3. Change the Preset Pressure 1

Enter the USER menu and select “Preset 1 (PSI/kPa/BAR)” then press the INCREASE or DECREASE buttons to change the preset pressure 1 to the desired value (90 to 175 PSI, 621 to 1207 kPa, 6.21 to 12.07 Bar). Press the SAVE button to save the USER menu items and exit the menu.

6.5.4. Change the Preset RPM 2

Enter the USER menu and select “Preset 2 (RPM)” then press the INCREASE or DECREASE buttons to change the preset RPM 2 to the desired value (900 to 1800 in 25 RPM steps). Press the SAVE button to save the USER menu items and exit the menu.

6.5.5. Change the Preset Pressure 2

Enter the USER menu and select “Preset 2 (PSI/kPa/BAR)” then press the INCREASE or DECREASE buttons to change the preset pressure 2 to the desired value (90 to 175 PSI, 621 to 1207 kPa, 6.21 to 12.07 Bar). Press the SAVE button to save the USER menu items and exit the menu.

6.5.6. Change the Display Brightness (day mode)

Enter the USER menu and select “Brightness (day)” then press the INCREASE or DECREASE buttons to change the brightness to the desired value (1 to 100). Press the SAVE button to save the USER menu items and exit the menu.

6.5.7. Change the Display Brightness (night mode)


Enter the USER menu and select “Brightness (night)” then press the INCREASE or DECREASE buttons to change the brightness to the desired value (1 to 100). Press the SAVE button to save the USER menu items and exit the menu.

6.5.8. Round pressure

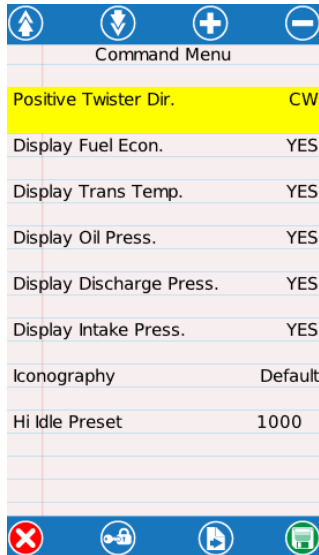
Enter the USER menu and select “Round to [5 PSI/34.5 kPa/0.345 Bar]” then press the INCREASE or DECREASE buttons to select YES or NO. Press the SAVE button to save the USER menu items and exit the menu.

6.5.9. Change the Display Mode (Day or Night)

Enter the USER menu and select “Display Mode” then press the INCREASE or DECREASE buttons to change the display mode to DAY or NIGHT. Press the SAVE button to save the USER menu items and exit the menu.

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6.6. Command menu



The Command Menu allows configuration of standard user modifiable items. The Command menu requires a password (0311).

- Positive Twister Direction
- Display Fuel Economy
- Display Transmission Temperature
- Display Oil Pressure
- Display Discharge Pressure
- Display Intake Pressure
- Iconography

Use the soft buttons to navigate and modify options.

6.6.1. Positive Twister Direction

This menu item allows configuration of the direction the Twister control knob must be turned for increasing RPM/Pressure. CW equals clockwise and CCW equals counter-clockwise.

6.6.2. Display Fuel Economy

This menu item allows the display window for the fuel economy to be seen or hidden. YES indicates the display will be shown, NO indicates it will not.

6.6.3. Display Transmission Temperature

This menu item allows the display window for the transmission temperature to be seen or hidden. YES indicates the display will be shown, NO indicates it will not.

6.6.4. Display Oil Pressure



This menu item allows the display window for the engine oil pressure to be seen or hidden. YES indicates the display will be shown, NO indicates it will not.

6.6.5. Display Discharge Pressure

This menu item allows the display window for the discharge pressure to be seen or hidden. YES indicates the display will be shown, NO indicates it will not.

6.6.7. Iconography

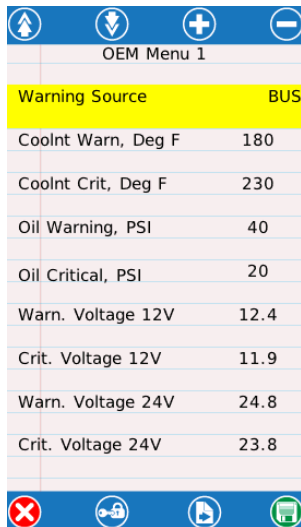
This menu item allows the user to swap on screen icon between the UV-TPG's traditional icons and international FAMA icons. DEFAULT indicates traditional icons, INTERNATIONAL indicates FAMA icons.

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6.6.8. High Idle Preset

This menu item allows the user to configure the RPM that entering High Idle mode would target. It is adjustable from 900 to 1800 in steps of 25.

6.7. OEM 1 menu



OEM Menu 1	
Warning Source	BUS
Coolant Warn, Deg F	180
Coolant Crit, Deg F	230
Oil Warning, PSI	40
Oil Critical, PSI	20
Warn. Voltage 12V	12.4
Crit. Voltage 12V	11.9
Warn. Voltage 24V	24.8
Crit. Voltage 24V	23.8

The OEM 1 Menu allows configuration of OEM modifiable items. The OEM 1 menu requires a password (1560).

- Warning source
- Coolant temperature warning (degrees)
- Coolant temperature critical (degrees)
- Oil pressure warning (pressure)
- Oil pressure critical (pressure)
- Warning Voltage 12v
- Critical Voltage 12v
- Warning Voltage 24v
- Critical Voltage 24v

Use the soft buttons to navigate and modify options.

6.7.1. Warning Source

This menu item configures the coolant temperature and oil pressure warnings to be determined by the CAN Bus or by user selected points. Enter the OEM 1 menu and select "Warning Source" then press the INCREASE or DECREASE buttons to change to the value (BUS or USER). Press the SAVE button to save the OEM 1 menu items and exit the menu.

6.7.2. Coolant Temperature Warning (USER)

This menu item configures the coolant temperature warning trip point. This value is only used if the Warning Source is set to "USER". Enter the OEM 1 menu and select "Cool Tmp Warn (Deg F/DegC)" then press the INCREASE or DECREASE buttons to change to the warning temperature trip point. Press the SAVE button to save the OEM 1 menu items and exit the menu.

6.7.3. Coolant Temperature Critical (USER)



This menu item configures the coolant temperature critical trip point. This value is only used if the Warning Source is set to "USER". Enter the OEM 1 menu and select "Cool Tmp Crit (Deg F/DegC)" then press the INCREASE or DECREASE buttons to change to the critical temperature trip point. Press the SAVE button to save the OEM 1 menu items and exit the menu.

6.7.4. Oil Pressure Warning (USER)

This menu item configures the oil pressure warning trip point. This value is only used if the Warning Source is set to "USER". Enter the OEM 1 menu and select "Oil Press Warn (PSI/kPa/Bar)" then press the INCREASE or DECREASE buttons to change to the warning pressure trip point. Press the SAVE button to save the OEM 1 menu items and exit the menu.

6.7.5. Oil Pressure Critical (USER)

This menu item configures the oil pressure critical trip point. This value is only used if the Warning Source is set to "USER". Enter the OEM 1 menu and select "Oil Press Crit (PSI/kPa/Bar)" then press the INCREASE or

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DECREASE buttons to change to the critical pressure trip point. Press the SAVE button to save the OEM 1 menu items and exit the menu.

6.7.6. Warning Voltage 12V

This menu item allows the warning voltage point to be adjusted to a user desired value within the range of 12.0V-13.0V for 12V systems (based on the selected battery voltage range, section 6.6.1).

6.7.7. Critical Voltage 12V

This menu item allows the critical voltage point to be adjusted to a user desired value within the range of 11.0V-12.5V for 12V systems (based on the selected battery voltage range, section 6.6.1).

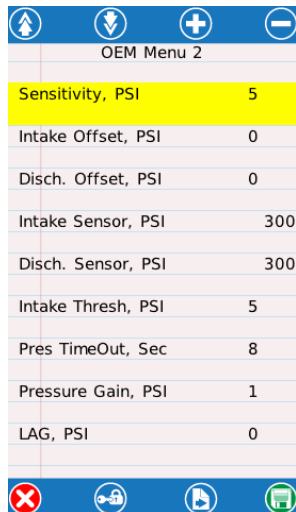
6.7.8. Warning Voltage 24V

This menu item allows the warning voltage point to be adjusted to a user desired value within the range of 24.0V-25.0V for 24V systems (based on the selected battery voltage range, section 6.6.1).

6.7.9. Critical Voltage 24V

This menu item allows the critical voltage point to be adjusted to a user desired value within the range of 23.0V-23.9V for 24V systems (based on the selected battery voltage range, section 6.6.1).

6.8. OEM 2 menu



OEM Menu 2	
Sensitivity, PSI	5
Intake Offset, PSI	0
Disch. Offset, PSI	0
Intake Sensor, PSI	300
Disch. Sensor, PSI	300
Intake Thresh, PSI	5
Pres TimeOut, Sec	8
Pressure Gain, PSI	1
LAG, PSI	0

The OEM 2 Menu allows configuration of OEM modifiable items. The OEM 2 menu requires a password (9769).

- Sensitivity Pressure
- Intake Offset Pressure
- Discharge Offset Pressure
- Intake Sensor Pressure
- Discharge Sensor Pressure
- Intake Threshold Pressure
- Pressure time-out
- Pressure gain
- Pressure lag



Use the soft buttons to navigate and modify options.

6.8.1. Sensitivity (pressure)

The pressure sensitivity is the amount of pressure change required between the discharge pressure and the target pressure before the pressure control algorithm modifies the engine speed to try and re-establish the discharge pressure to the target pressure. Enter the OEM 2 menu and select "Sensitivity (PSI/kPa/Bar)" then press the INCREASE or DECREASE buttons to change to the desired value (1 to 12 PSI, 6.89476 to 82.7371 kPa, .0689476 to .827371 Bar). Press the SAVE button to save the OEM 2 menu items and exit the menu.

6.8.2. Intake Offset Pressure

This menu item allows for adjustment of the intake pressure (-15 to +15 in 1 PSI increments). Enter the OEM 2 menu and select "Intake Offset , (PSI, kPa, Bar)" then press the INCREASE or DECREASE buttons to change to the desired value. Press the SAVE button to save the OEM 2 menu items and exit the menu.

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6.8.3. Discharge Offset Pressure

This menu item allows for adjustment of the discharge pressure (-15 to +15 in 1 PSI increments). Enter the OEM 2 menu and select "Discharge Offset , (PSI, kPa, Bar)" then press the INCREASE or DECREASE buttons to change to the desired value. Press the SAVE button to save the OEM 2 menu items and exit the menu.

6.8.5. Discharge Sensor Range

This menu item allows sets the proper pressure range for the discharge sensor to either 300 PSI or 600 PSI (2068 kPa or 4137 kPa, 20.68 Bar or 41.37 Bar). Enter the OEM 2 menu and select "Dis. Sens. Rng (PSI/kPa/Bar)" then press the INCREASE or DECREASE buttons to change to the desired sensor range value. Press the SAVE button to save the OEM 2 menu items and exit the menu.

6.8.7. Pressure Time-Out (Seconds)



This menu item allows configuration of the low pressure time out. When the UV-TPG is governing in pressure mode and the pressure falls below 30 PSI the UV-TPG will wait the configured number of seconds to attempt to regain pressure before dropping to IDLE. Enter the OEM 2 menu and select "Press Time-Out (Sec)" then press the INCREASE or DECREASE buttons to change to the desired value (3 to 10 seconds in 1 second increments). Press the SAVE button to save the OEM 2 menu items and exit the menu.

6.8.8. Pressure Gain (pressure change per step)

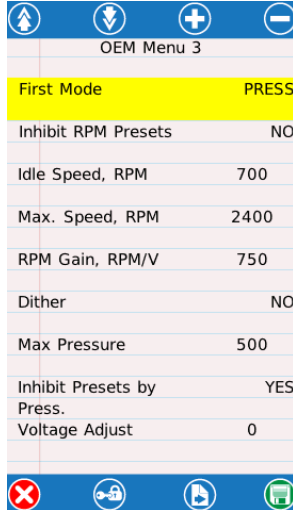
This menu item allows configuration of the psi change per step. A larger number changes the PSI more with each **INCREASE** or **DECREASE** click of the Twister control knob. Enter the OEM 2 menu and select "Pressure Gain (PSI/kPa/Bar)" then press the INCREASE or DECREASE buttons to change to the desired value (1 to 5 PSI in 1 PSI increments). Press the SAVE button to save the OEM 2 menu items and exit the menu.

6.8.9. LAG (PSI/kPa/Bar)

This menu item allows configuration of the pressure lag which defines the maximum allowable difference that the actual pressure is behind the commanded set-point before a "wait" (catch-up) state is introduced while operating in pressure mode. Enter the OEM 2 menu and select "Lag (PSI/kPa/Bar)" then press the INCREASE or DECREASE buttons to change to the desired value (1 to 20 PSI in 1 PSI increments). Press the SAVE button to save the OEM 2 menu items and exit the menu.

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6.9. OEM 3 menu



The OEM 3 Menu allows configuration of OEM modifiable items. The OEM 3 menu requires a password (3317).

- First Mode
- Inhibit RPM Presets
- Idle Speed RPM
- Max Speed RPM
- RPM Gain
- Dither
- Max Pressure
- Inhibit Presets by Pressure
- Voltage Adjust

Use the soft buttons to navigate and modify options.

6.9.1. First Operating Mode

This menu item allows configuration of the governor mode active when the MODE button is first pressed. Proper interlocks must be established for the configured first mode to become active during operation. Enter the OEM 3 menu and select "First Mode" then press the INCREASE or DECREASE buttons to change to the desired value (PRESS or RPM). Press the SAVE button to save the OEM 3 menu items and exit the menu.

6.9.2. Inhibit RPM Presets

This menu item allows enabling/disabling of the RPM mode preset usage when pump discharge pressure over 10 PSI is detected. Enter the OEM 3 menu and select "Dis. Sens. Rng (PSI/kPa/Bar)" then press the INCREASE or DECREASE buttons to change to the value (NO or YES). Press the SAVE button to save the OEM 3 menu items and exit the menu.

6.9.3. Idle Engine Speed (RPM)

This menu item allows configuration of the idle speed of the engine. Enter the OEM 3 menu and select "Idle Speed (RPM)" then press the INCREASE or DECREASE buttons to change the desired value (650 to 900 RPM in 1 RPM increments). Press the SAVE button to save the OEM 3 menu items and exit the menu.



6.9.4. Maximum Engine Speed (RPM)

This menu item allows configuration of the maximum speed of the engine. Enter the OEM 3 menu and select "Max. Speed (RPM)" then press the INCREASE or DECREASE buttons to change to the desired value (1900 to 2500 RPM in 25 RPM increments). Press the SAVE button to save the OEM 3 menu items and exit the menu.

6.9.5. Governor Gain (RPM per volt)

This menu item allows configuration of the RPM change per step. A larger number changes the RPM more with each **INCREASE** or **DECREASE** click of the Twister control knob.

Note: Option only available with the Analog control type. This parameter is automatically set by the UV-TPG when the Auto Scale routine is run (see section 6.4.4 for more information). Enter the OEM 3 menu and select

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"Governor Gain (RPM/V)" then press the INCREASE or DECREASE buttons to change to the desired value (250 to 1750 RPM/V in 25 RPM/V increments). Press the SAVE button to save the OEM 3 menu items and exit the menu.

6.9.6. DITHER (Engine handshake)

This menu item allows enabling/disabling of engine handshake. Some engines require constant RPM modification in order to maintain remote RPM control. When enabled, the UV-TPG will vary the engine speed +/- 5 RPM around the desired engine speed (CAN communication methods only). Enter the OEM 3 menu and select "Dither" then press the INCREASE or DECREASE buttons to change to the desired value (YES or NO). Press the SAVE button to save the OEM 3 menu items and exit the menu.

6.9.7. Max Pressure



This menu item allows configuration of the maximum pressure of the discharge. Enter the OEM 3 menu and select "Max Pressure" then press the INCREASE or DECREASE buttons to change to the desired value (50 to 600 PSI in 5 PSI increments). Press the SAVE button to save the OEM 3 menu items and exit the menu.

6.9.8. Inhibit Presets by Pressure

This menu item allows the enabling/disabling of the safety feature that requires a minimum amount of discharge before allowing the use of a Preset button. "YES" indicates you require a minimum discharge pressure to use presets, "NO" means you do not.

6.9.9. Voltage Adjust

This menu item allows calibration of the voltage. Enter the OEM 3 menu and select "Voltage Adjust" then press the INCREASE or DECREASE buttons to change to the desired value (-0.5 to +0.5 RPM in .1 V increments). Press the SAVE button to save the OEM 3 menu items and exit the menu.

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6.10. OEM 4 menu



The OEM 4 Menu allows configuration of OEM modifiable items. The OEM 4 menu requires a password (1505).

- Max Rate of Change
- Gain Integrator


Use the soft buttons to navigate and modify options.

6.10.1. Max Rate of Change

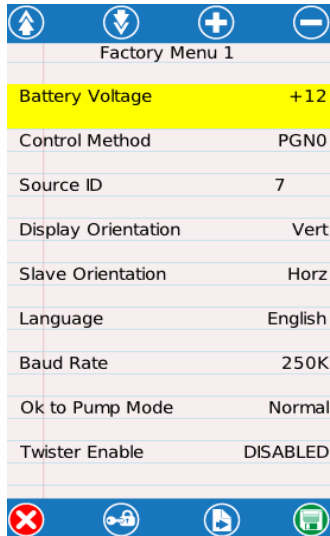
This menu item allows modification of the response rate of engine adjustment requests (50-800). Adjust this item in conjunction with "Gain Integrator" to fine tune the desired response rate. It is recommended for Cummins to leave this value at the default or keep it near it.

6.10.2. Gain Integrator

This menu item allows modification of the response rate of engine adjustment requests (0.1 – 0.9). Adjust this item in conjunction with "Max Rate of Change" to fine tune the desired response rate.

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6.11. FACT menu 1



The Factory Menu 1 allows configuration of the Control method, Slave settings, Languages and baud rate. The Factory Menu requires a password (6679).

- Battery Voltage
- Control Method
- Source ID
- Display Orientation
- Slave Orientation
- Language
- Baud Rate
- Ok to Pump Mode
- Twister Enable

Use the soft buttons to navigate and execute options.

6.11.1. Battery Voltage Range

Enter the FACT 1 menu and select "Batt. Voltage (volts)" then press the INCREASE or DECREASE buttons to change to the desired value (+12 or +24). Press the SAVE button to save the FACT 1 menu items and exit the menu.

6.11.2. Engine Control Method

This menu item allows configuration of the engine control type.

CFPG – **C**ummins **F**ire **P**ressure **G**overnor, uses Cummins proprietary control message via CAN to control engine speed.

PGN0 – Uses J1939, PGN0 – Torque Speed Control message to control engine speed.

SN-BWS – **SCAN**ia, uses the Scania Bodywork Control Message 1.

SN-BCI – SCANia, uses the Scania Body Control Interface Control Message.

ANLG – Uses analog voltage signal to control remote throttle input on engine.

MERC – Specific J1939 messaging structure for certain Mercedes applications.

MAN – Specific MAN engines J1939 control message.

V-FMFH – Volvo FM/FH messaging.

V-FEFL – Volvo FE/FL messaging.



FAW – FAW control messaging

SLAV – Is the second UV-TPG on the vehicle (slave).

Enter the FACT 1 menu and select "Control Method" then press the INCREASE or DECREASE buttons to change to the desired value (CFPG, PGN0, SN-BWS, SN-BCI, ANLG, MERC, MAN, V-FMFM, V-FEFL, FAW, SLAV). Press the SAVE button to save the FACT 1 menu items and exit the menu.

6.11.3. CAN Source ID

This menu item allows configuration of the source address for the PGN0 engine communication method. Enter the FACT 1 menu and select "Source ID" then press the INCREASE or DECREASE buttons to change to the desired address number (0-79). Press the SAVE button to save the FACT 1 menu items and exit the menu.

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6.11.4. Display Orientation

This menu item allows configuration of the Orientation of the Display from Horizontal to Vertical. Horz equals horizontal and Vert equals vertical.

6.11.5. Slave Orientation

This menu item allows configuration of the Orientation of the Slave Display from Horizontal to Vertical. Horz equals horizontal and Vert equals vertical.

6.11.6. Language

This menu item allows configuration of the language that is being used. Available languages include English, German, French, Spanish, Portuguese, Russian, Polish, Thai, Greek, and Chinese.

6.11.7. Baud Rate

This menu item allows configuration of the Baud Rate that is used on the CAN bus. 125K indicates the UV-TPG will communicate at 125K Baud Rate, 250K indicates the UV-TPG will communicate at 250K Baud Rate, and 500K indicates the UV-TPG will communicate at 500K Baud Rate. Slave Displays auto acquire the Master's Baud Rate.

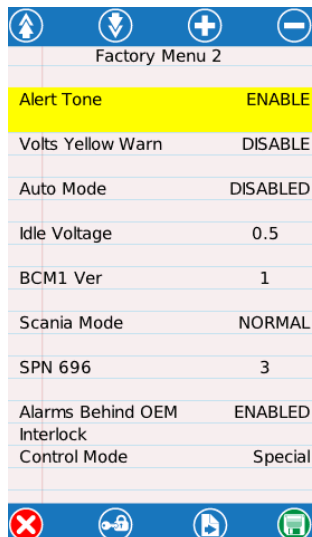
6.11.8. Ok to Pump Mode

This menu item allows configuration of the Ok to Pump Mode either Normal or Special. When in Normal mode OEM and Pump Engaged Interlocks with activate the Ok to Pump Interlock. In Special mode Okay to Pump interlock is activated from the UV-TPG's IO.

6.11.9. Twister Enable

This menu item allows configuration of a Twister throttle module to be used in conjunction with the UV-TPG. When disabled the UV-TPG will not look for or listen to Twister commands.

6.12. FACT menu 2





Factory Menu 2	
Alert Tone	ENABLE
Volts Yellow Warn	DISABLE
Auto Mode	DISABLED
Idle Voltage	0.5
BCM1 Ver	1
Scania Mode	NORMAL
SPN 696	3
Alarms Behind OEM Interlock	ENABLED
Control Mode	Special

The Factory Menu 2 allows configuration various menu options. The Factory Menu 2 requires a password (7081).

- Alert Tone
- Voltage Yellow Warning
- Auto Mode
- Idle Voltage
- BCM1 Version
- Scania Mode
- SPN 696
- Alarms behind OEM Interlock
- Control Mode

Use the soft buttons to navigate and execute options.

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6.12.1. Set the Warning Alert Tone

Enter the FACT 2 menu and select “Warn. Alert Tone” then press the INCREASE or DECREASE buttons to change to the desired value (ENABLE, DISABLE). Press the SAVE button to save the FACT 2 menu items and exit the menu.

6.12.2. Volts Yellow Warn

This menu item enables or disables the low battery warning message. When the warning is disabled there will only be one low battery voltage level which is the critical point.

6.12.3. Auto Mode

This menu item allows configuration of automatically entering pressure mode when pump engagement occurs (Auto Mode = ENABLED). Note that this option will only be available if the 1st mode parameter (section 6.9.1) is set to pressure mode. When this parameter is enabled, the governor will be put in pressure mode when the pump is changed from a disengaged to an engaged position (interlocks permitting). Thereafter, when a user selects the IDLE (standby) mode, the governor will remain in standby mode until a new mode is selected or the Twister knob is turned in the “increase” direction (interlocks permitting).

Enter the FACT 2 menu and select “Auto Mode” then press the INCREASE or DECREASE buttons to change to the desired value (ENABLED, DISABLED). Press the SAVE button to save the FACT 2 menu items and exit the menu.

6.12.4. Idle Voltage

This menu item allows configuration of the analog idle offset voltage, displayed in “volts”. This option is only available with the Analog Engine Control Method (section 6.11.2).

Note: This parameter is automatically set by the UV-TPG when the Auto Scale routine is run (see section 6.4.4 for more information).

Enter the FACT 2 menu and select “Idle Voltag (Volts)” then press the INCREASE or DECREASE buttons to change to the desired value (0 to 5 volts in 0.1 volt increments). Press the SAVE button to save the FACT 2 menu items and exit the menu.

6.12.5. BCM1 VER (Body Control Message 1 version)

This menu item allows configuration of the message configuration version transmitted in the Scania Body Control Message 1. Enter the FACT 2 menu and select “BCM1 Ver” then press the INCREASE or DECREASE buttons to change to the desired value (1 to 255). Press the SAVE button to save the FACT 2 menu items and exit the menu.



6.12.6. Scania Mode (Scania governor type)

This menu item allows configuration of the Scania requested governor type in the Body Control Message 1. Enter the FACT 2 menu and select “Scania Mode” then press the INCREASE or DECREASE buttons to change to the desired value (NORMAL or STIFF). Press the SAVE button to save the FACT 2 menu items and exit the menu.

6.12.7. SPN 696

This menu item allows the configuration of the CAN Engine Requested Speed Control Condition. The possible values are:

0. Transient optimized for driveline disengaged and non-lockup conditions.
1. Stability optimized for driveline disengaged and non-lockup conditions.
2. Stability optimized for driveline engaged and/or and in lockup condition 1 (e.g. vehicle driveline).
3. Stability optimized for driveline engaged and/or and in lockup condition 2 (e.g. PTO driveline).

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6.12.8. Alarms behind OEM Interlock

This menu item allows configuration of the when warning and error messages can appear on the main screen. Enabling this menu option will prevent any alarms that were activated, prior to the OEM interlock being engaged, from appearing.

6.12.9. Control Mode

This menu item allows configuration of the Engine Control messages (Special, Normal). "Special" is the legacy send while Normal requires at least an interlock be made before control messages are transmitted by the UV-TPG.

7. Configuration**7.1. Configure the IDLE voltage and GAIN setting using Auto Scale (Analog engines)**



A UV-TPG set to Analog control mode (see section 6.11.2) may use the Auto Scale configure method to automatically set the IDLE voltage (6.12.4) and GAIN setting (6.9.5).

The engine must be running and the interlocks (as defined in section 4.3) must be enabled when running the Auto Scale mode.



The UV-TPG will actively control the engine RPM during Auto Scale. Make certain that all operational precautions are observed and a trained operator is present.

Enter the INFO menu (section 6.3) and select "AutoScale Analog Output" then press the SAVE button. The display will prompt you to verify that you want to set the Auto Scale the analog output. Press the green ACCEPT button to start or the red cancel button to not start. If the engine control method is not set for "analog" a warning will be shown and Auto Scale will not be attempted. Once back to the INFO menu you must press the SAVE button to save the Auto Scale operation and exit the menu.

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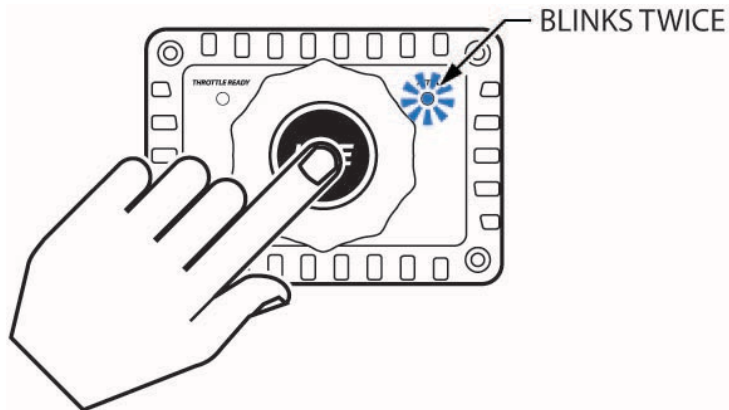
8. Using a Twister with the UV-TPG

8.1. List of warning/error messages

If a Twister is configured for use with a UV-TPG two potential warnings/errors become possible.


MESSAGE	DESCRIPTION	UV-TPG RESPONSE	OPERATOR ACTION
Primary Twister Communication Timeout Fault	The UV-TPG is not receiving CAN communication from the Twister device.	<i>No change in operation.</i>	<i>Operator may continue to use UV-TPG but only presets and idle will function.</i>
Secondary Twister Communication Timeout Fault	The UV-TPG is not receiving CAN communication from the secondary Twister device.	<i>No change in operation.</i>	<i>Operator may continue to use UV-TPG but only presets and idle will function.</i>

8.2. Configure the Twister for operation with the UV-TPG (master)

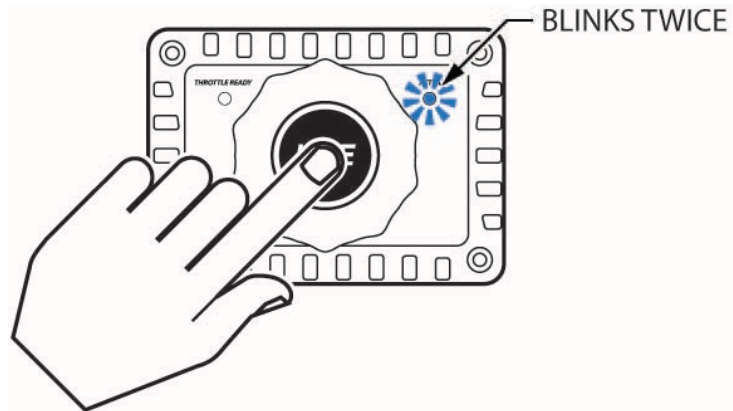


1. Press and hold the IDLE button until the ACTIVE LED blinks twice (two seconds). Continue holding the IDLE button while entering the password.

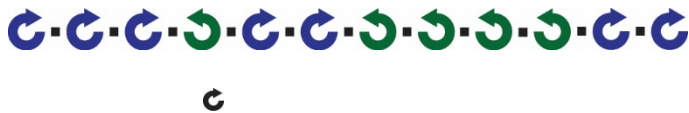


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8.3. Configure the Twister for operation with the UV-TPG (slave)



- Press and hold the IDLE button until the ACTIVE LED blinks twice (two seconds). Continue holding the IDLE button while entering the password.



- Press and hold the IDLE button until the ACTIVE LED blinks twice (two seconds). Continue holding the IDLE button while entering the password.



- Release the idle button.



- Once all 8 rotations of the desired address have been completed the Twister will flash the THROTTLE READY LED seven times followed by a single flash of the ACTIVE.

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PRODUCT

UV-TPG PRESSURE GOVERNOR

9. Mounting & installation

9.1. Panel cutout dimensions (UV-TPG)

Mount the UV-TPG on the operator's panel with four #6 screws and nuts.

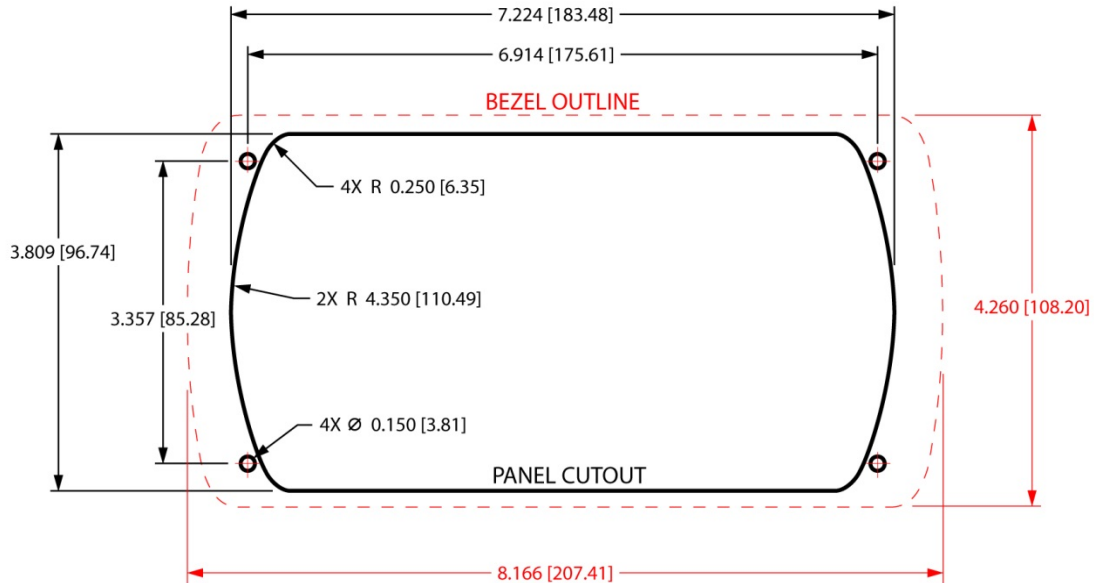


Figure 4. Installation dimensions in inches [millimeters].

9.2. Panel cutout dimensions (Twister)

Mount the Twister on the operator's panel with four #6 screws and nuts.

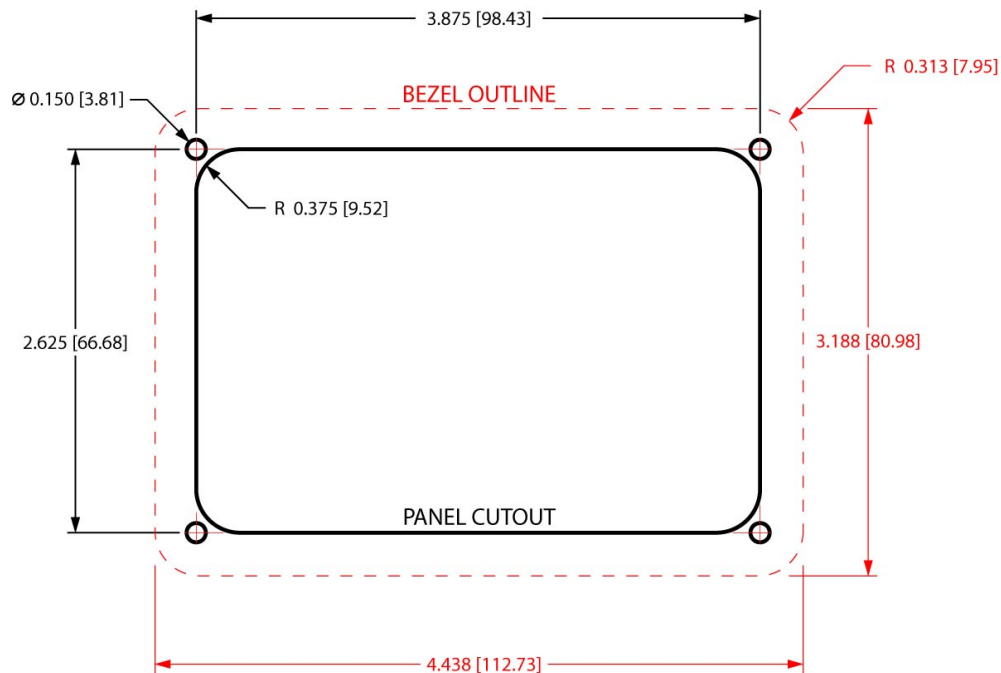



Figure 5. Installation dimensions in inches [millimeters].

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9.3. Panel cutout dimensions (replacing TPG with UV-TPG)

Use the drawing below when replacing a TPG with the UV-TPG. This may require using the TPG to UV-TPG adapter harness (p/n 513-00015)

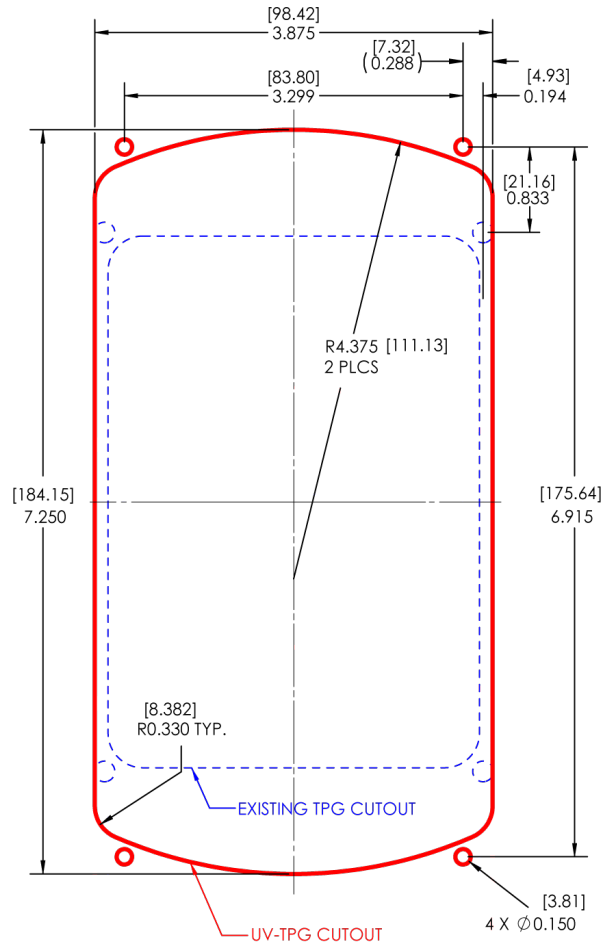




Figure 6. Installation dimensions in inches [millimeters].

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10. Connector Description

10.1. UV-TPG connectors

The module has four connectors and the following definitions apply:

Mating connector:	Deutsch DT06-6SA GRAY
Mating sockets:	Deutsch 0462-201-16141
Gold mating sockets:	Deutsch 0462-201-1631
Wedge lock: W6S2-P012	Recommended wire gage: 16-20 AWG

PIN	CIRCUIT	DESCRIPTION
1		
2	Sensor SIGNAL	(INPUT) – Discharge pressure signal (+0.5VDC to +4.5VDC)
3	Sensor +5 REF	(OUTPUT) – Intake pressure supply (+5VDC)
4	PUMP INTLK	(INPUT) – pump engaged interlock (positive polarity)
5	Throttle EN	(OUTPUT) – remote throttle activate (ground polarity)
6	Sensor gnd REF	(OUTPUT) – Intake pressure ground

Mating connector:	Deutsch DT06-6SA GRAY
Mating sockets:	Deutsch 0462-201-16141
Gold mating sockets:	Deutsch 0462-201-1631
Wedge lock: W6S	Recommended wire gage: 16-20 AWG

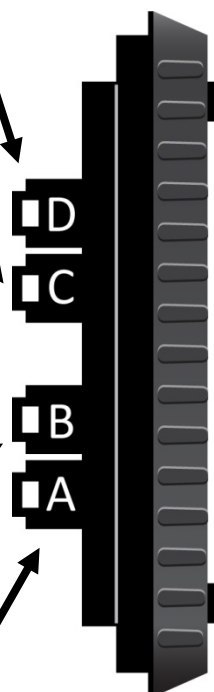
PIN	CIRCUIT	DESCRIPTION
1	ENG REF (+)	(INPUT) – analog signal reference (+5VDC)
2	THROT INTLK	(INPUT) – throttle ready interlock (positive polarity)
3	HI IDLE	(INPUT) – high idle enable (positive polarity)
4	ENG SIGNAL	(OUTPUT) – analog signal control (+0.5VDC to +4.5VDC)
5	OK2P INTLK	(INPUT) – okay to pump interlock (positive polarity)
6	ENG REF (-)	(INPUT) – analog signal reference (ground)


Mating connector:	Deutsch DT06-6SA GRAY
Mating sockets:	Deutsch 0462-201-16141
Gold mating sockets:	Deutsch 0462-201-1631
Wedge lock: W6S	Recommended wire gage: 16-20 AWG

PIN	CIRCUIT	DESCRIPTION
1	SUPPLY (+)	(INPUT) – battery voltage (+9VDC...+32VDC)
2	CAN HIGH	(DATA) – SAE J1939 CAN 2.0B, 250Kbits/s
3	CAN LOW	(DATA) – SAE J1939 CAN 2.0B, 250Kbits/s
4	CAN SHIELD	(DATA) – SAE J1939 CAN 2.0B, 250Kbits/s
5	SUPPLY (+)	(INPUT) – battery voltage (+9VDC...+32VDC)
6	SUPPLY (-)	(INPUT) – battery ground

Mating connector:	Deutsch DT06-6SA GRAY
Mating sockets:	Deutsch 0462-201-16141
Gold mating sockets:	Deutsch 0462-201-1631
Wedge lock: W6S2-P012	Recommended wire gage: 16-20 AWG

PIN	CIRCUIT	DESCRIPTION
1	USB +5V	Programming only
2	USB D+	Programming only
3	USB D-	Programming only
4	ALARM (-)	(OUTPUT) – alarm active (ground polarity, 250mA)
5	USB Shield	Programming only
6	USB GND	Programming only

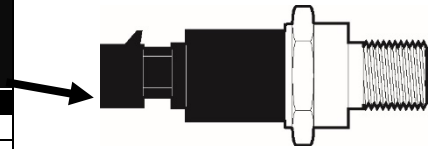


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10.2. Pressure sensor connector

The pressure sensors (intake and discharge) have one connector and the following definitions apply:

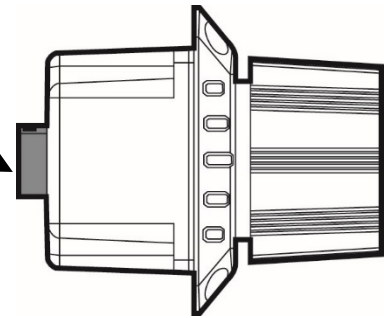
Mating connector: Packard 12078090 Mating sockets: Packard 12089290 Recommended wire gage: 16-20 AWG		
PIN	CIRCUIT	DESCRIPTION
A	SUPPLY (-)	(INPUT) – pressure sensor ground
B	SUPPLY (+)	(INPUT) – pressure sensor supply (+5VDC)
C	Signal	(OUTPUT) – pressure sensor signal (+0.5VDC to +4.5VDC)




10.3. Twister connector

The module has one connector and the following definitions apply:

Mating connector: Deutsch DT06-6S GRAY Mating sockets: Deutsch 0462-201-16141 Gold mating sockets: Deutsch 0462-201-1631 Recommended wire gage: 16-20 AWG Wedge lock: W6S		
PIN	CIRCUIT	DESCRIPTION
1	SYS POWER	(INPUT) – battery voltage (+9VDC...+32VDC)
2	SYS GROUND	(INPUT) – battery ground
3	----	Not used
4	CAN HIGH	(DATA) – SAE J1939 CAN 2.0B, 250Kbits/s
5	CAN LOW	(DATA) – SAE J1939 CAN 2.0B, 250Kbits/s
6	CAN SHIELD	(DATA) – SAE J1939 CAN 2.0B, 250Kbits/s



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11. Technical Details

Product category	ES-Key network (SAE J1939 CAN)	
Voltage range	+9VDC...+32VDC	
Maximum current draw	Logic supply+ input (pin 1 of connector B)	
@13.8VDC	240 mA	
@27.6VDC	120 mA	
Maximum output current		
Sensor (+5VDC) References	250mA	
Alarm active	250mA (ground polarity output)	
Temperature range	-40°C...+85°C	
Environmental range	IP 67	
CAN specification	SAE J1939, 250 Kbits/second	
Electrical protection	Internal thermal fuse (2500mA on pin 1 of black 12-pin connector)	
	CAN bus protected for heavy duty trucks (24V)	
Electrical performance	Transient voltage protected to SAE J1113 specification for heavy duty trucks (24V)	
	Load dump voltage protected to SAE J1113 specification for heavy duty trucks (24V)	
	Immunity to Radiated Electromagnetic Fields– Bulk Current Injection (BCI) method, Class C device	SAE J1113-4
	Reverse voltage protection on power leads (pins 1 and 12 of black 12-pin connector), Class C device	ISO 16750-2
	Jump start on power leads, Class C device	ISO 16750-2
	Immunity to conducted transients on power leads, Class C device (24V)	SAE J1113-11
	Immunity to Electrostatic Discharge – powered and unpowered modes	SAE J1113-13
	Immunity to radiated electromagnetic fields	SAE J1113-21
	Conducted emission on power leads (level 3 limits)	SAE J1113-41
	Radiated emissions, absorber-lined shielded enclosure (level 2 limits)	SAE J1113-41
	Reset behavior on voltage drop 24V, Class C device	ISO 16750-2
	Exposure to fungus	MIL-STD-810F (method 508.5) SAE J1455 (sec 4.6)
	Thermal shock	SAE J1455 (sec 4.1.3.2)
	Exposure to humidity	MIL-STD-810F (method 507.4)
Environmental performance	Thermal shock due to splash	Class 1 (STD-0001)
	Steam cleaning	SAE J1455 (sec 4.4)
	Exposure to salt spray atmosphere/fog	SAE J1455 (sec 4.3)
	Exposure to splash due to chemicals and oils	SAE J1455 (sec 4.4)
	Exposure to outdoor UV	ISO 4892-2 (method A)
	Resonance dwell	SAE J1455 (sec 4.9.4.1)
	Random vibration	SAE J1455 (sec 4.9.4.2)
Mechanical performance	Mechanical shock	SAE J1455 (sec 4.10.3.4)