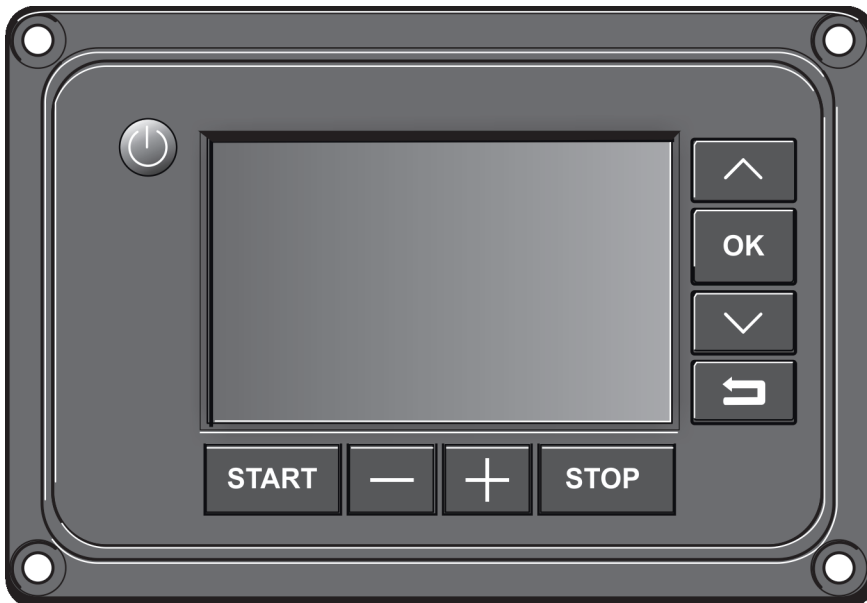


INSTALLATION INSTRUCTIONS

CIM (EMS 2.3/2.4)



P0020684

Table of Content

Installation Instruction	2
Introduction	2
Contents in kit	3
Installation	5
Connection	21
Connection to engine	21
Connecting instruments	22
I/O connections	23
Installation Examples	27
Settings	28
Navigation	28
Display Settings	28
Information	30
Save/Restore	30
Template	32
Index	35

Installation Instruction

Introduction



P0018811



Turn the ignition on/off.

START

Start the engine



Reduce engine speed



Increase engine speed

STOP

Stop the engine



Scroll up in menus

OK

Select and confirm in menus



Scroll down in menus



Return to previous menu selection

This installation instruction contains instructions for installation, connection and configuration of Volvo Penta instrument panel CIM (Volvo Penta Control Interface Module).

The installation instruction with appurtenant kit content is only intended for professional use in Volvo Penta service workshops, machine manufacturers and other authorized workshops having staff with qualified professional training.

Volvo Penta disclaims all responsibility for injury to persons or damage to property that may occur as a result of the failure to follow the instructions, or for work carried out by unqualified staff.

NOTICE! The illustrations are used in different instructions, consequently details may vary between different engine models. The essential information is correct.

CIM communicates with the engine control unit and has a number of functions such as the display of engine data, monitoring and diagnostics.

CIM can be configured for the current installation with respect to the inputs and outputs that are to be displayed.

The CIM has a default factory software setting. If any changes need be done only the Vodia tool can activate and calibrate new functions.

Typical display settings like contrast and back light can be adjusted from the CIM's menu. The choice of language and units to be used can be chosen from the menu as well.

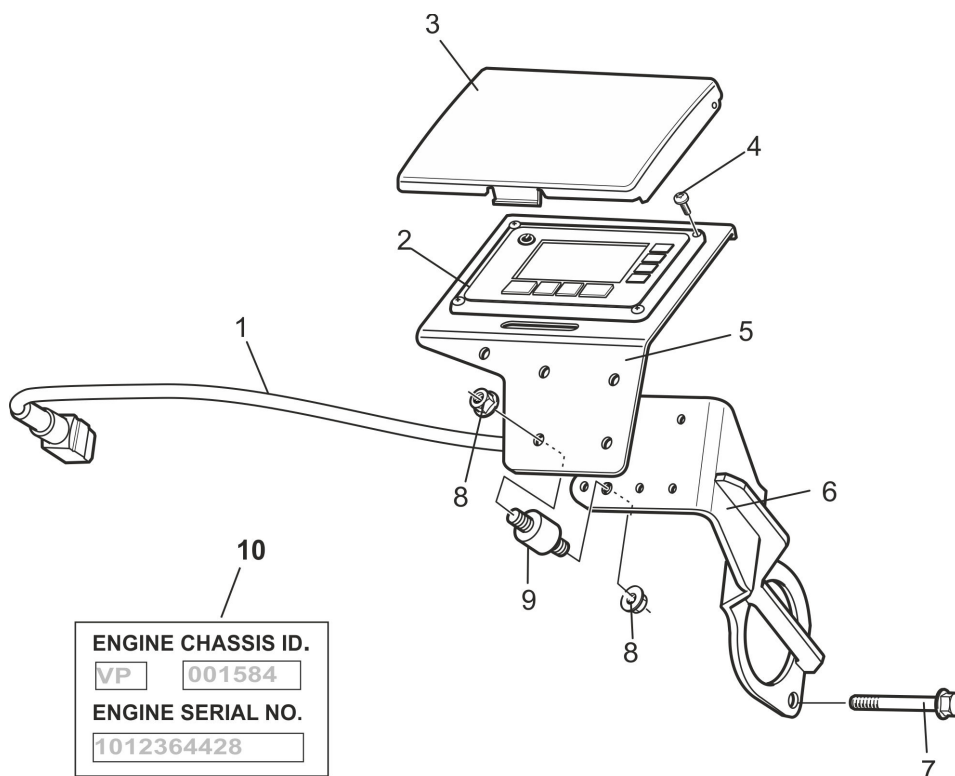
Most of the functions in the CIM are designed for the versatile engines. The CIM can however be used to control genset engines as well, but some of the functions may be of no use for these applications. It may also not be possible to combine certain functions, please see each unique functions for more details.

See the Operator's Manual for respective engine model on how to operate CIM.

NOTICE! Do not subject the CIM to high vibrations, eg do not mount the CIM on a motor mounted on a frame without motor cushions.

Contents in kit

Kit including Volvo Penta bracket



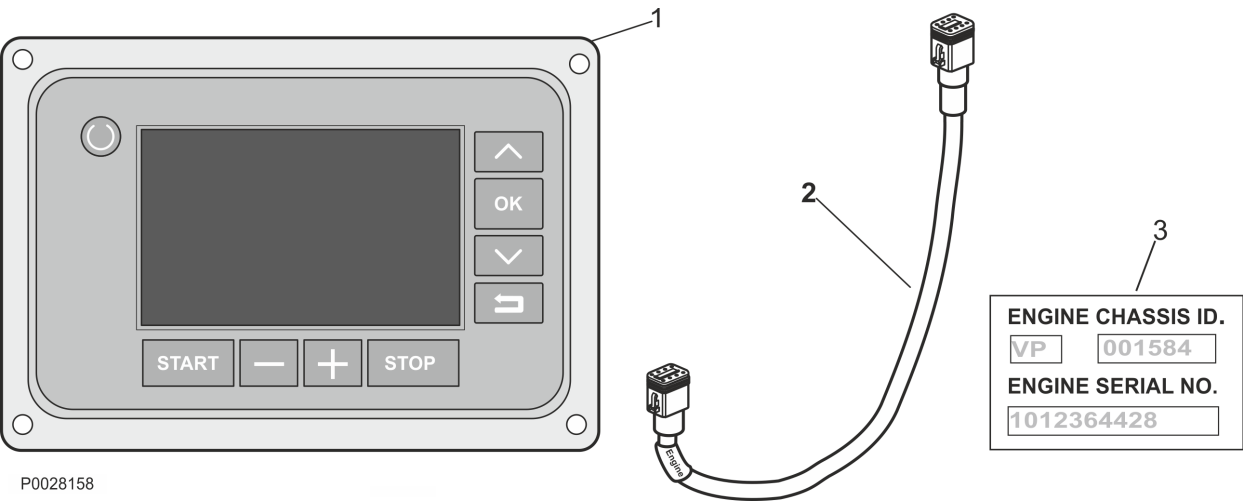
P0028157

Position in illustration/ Designation	Quantity
1 Harness, engine – CIM	1
2 CIM (Control Interface Module)	1
3 Protective cover	1
4 Screw, M5*	1
5 Bracket	1
6 Bracket	2
7 Flange bolt	8
8 Nut, rubber mount	4
9 Screw, M6, rubber mount	1
10 Decal	—
11 Installation instruction	—

* Not included in kit.

NOTICE! Bolt with rubber mount 3574797P04

Kit excluding Volvo Penta bracket



P0028158

Position in illustration/ Designation	Quantity
1 CIM (Control Interface Module)	1
2 Harness, engine CIM	1
3 Decal	1
4 Installation instruction	—

NOTICE! Any extension cables should be ordered separately.

Installation

IMPORTANT!

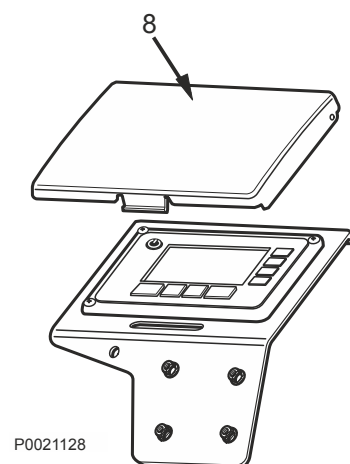
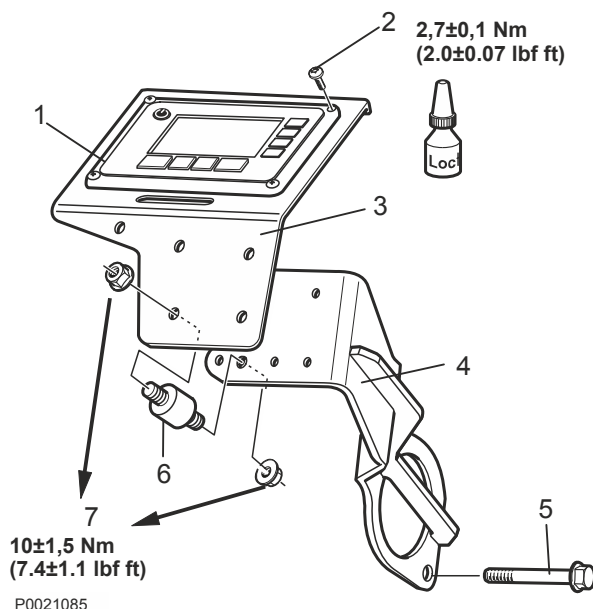
Read through the entire instruction carefully before starting work.

Installation without a bracket provided by Volvo Penta

- 1 Use accompanying hole template; refer to , page 32. Position the hole template at the desired screen location.
- 2 Drill and cut out the installation area with the aid of a jigsaw along the inside of the line shown on the template.
- 3 Drill the four holes for the mounting screws (2), M5.
- 4 Mount the CIM unit according to the description below.

Installing in the bracket

- 1 Mount the CIM unit (1) in the bracket (3) and secure using the mounting screws (2), M5. Lock the bolts with thread sealing fluid to prevent them from loosening due to vibrations. Tightening torque 2.7 ± 0.1 Nm (2.0 ± 0.07 lbf ft).
- 2 Assemble brackets (2 and 3). Use 4 screws with a rubber mount (6) and 8 nuts (7) as shown in the figure. Tightening torque 10 ± 1.5 Nm (7.4 ± 1.1 lbf ft)
- 3 Use a flange screw (5) in the event the bracket has to be attached to the engine.



- 4 If the CIM is exposed for direct sunshine, it's recommended to use the protective cover (8) when not used.

NOTICE! The protective cover is not included in all kits but can be ordered separately.

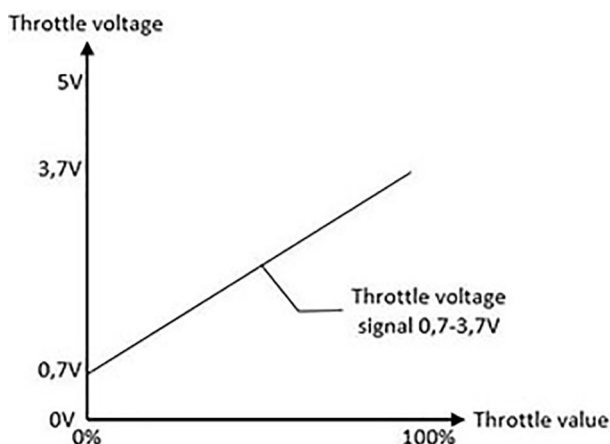
External speed throttle input calibration

The CIM has an input for using an external speed throttle signal. There are several types of speed throttles such as foot pedals, hand throttles and simple rotoray panel mount potentiometers. It's recommended to use a traditional resistive potentiometer that is supplied by the CIM's internal voltage supply 5 or 10V.

Other types of throttle controls with active electronics generating an analog signal to the CIM may be used as long as they behave just like a passive potentiometer. These must have a valid signal to the CIM when the ignition is turned on, some analogue signals are generated by means of a PWM (pulse width modulated) that may be wrongly interpreted by the CIM and the active device must be able to handle faults and set its output signal to either 0 volts or to supply volts (5 or 10V) whenever an internal fault occur.

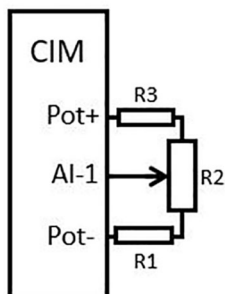
Further it's important that the active potentiometer device share the same signal ground (pot-) to avoid any potential differences that may cause either a fault or in worst case a voltage signal higher than expected making the engine speed to increase.

The active throttle device must be tested together with the CIM by simulates various errors, please refer to the external throttle diagnostic limits chapter. Volvo Penta is not responsible for any third party device that will not meet the CIMs input and fault handling characteristics, nor the consequences of using one.



P0031013

General connection with external components



Recommended values:
R1 and R3: 180 ohm
R2: potentiometer 1kohm linear

P0031742

Calibration of the throttle input

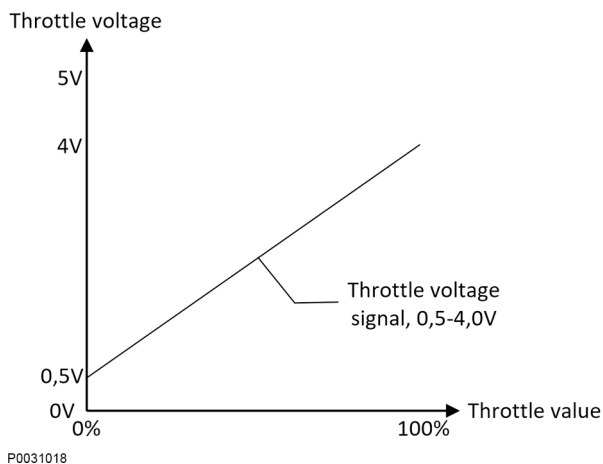
- 1 Connect the external throttle according to the wiring diagram.
- 2 Activate the throttle control.
- 3 Select 5 or 10V supply. 5V is default and recommended.
- 4 Measure the voltage signal either by the built in voltage value seen in the CIMs display or by an external volt meter.
- 5 When the external pedal/hand/panel-potentiometer is in idle position, read the value and calibrate the idle voltage in the Vodia tool. Round off the value to the nearest higher 1/10th of a volt i.e. 0,65V measured then calibrate 0,7V as idle. This to ensure idle can always be reached.
- 6 Press/move/turn the potentiometer to its max speed position and read the value. Round off the value to the nearest lower 1/10th of a volt i.e. 3,75V measured then calibrate in Vodia 3,7V as max speed. This to ensure max speed can always be reached.
- 7 Program the CIM when the voltages have been set in the Vodia tool.
- 8 Scroll the parameters list until the throttle value in % can be seen.
- 9 Make sure 0% throttle is shown when the potentiometer is in idle position.

- 10 Slowly press/move/turn the potentiometer and the value should increase but with a small dead band at the very beginning. If this dead band is too large or the value is already over 0% throttle at idle, the wrong calibration value has been programmed. Recalibrate to correct the error.
- 11 Press/move/turn the potentiometer all the way to its max speed position. When near the max position make sure the 100% value is reached just before the physical end of the pedal/hand/panel-potentiometer. If the dead band is too large at max speed position or the 100% value can't be reached, the wrong calibration value has been programmed. Recalibrate to correct the error.

NOTICE! There may be a slight difference between the internal voltage displayed in the CIM compared with an external volt meter. It's however the internal volt meter in the CIM that is the value that should be used when calibrating the external speed throttle.

P1U20	CIM, Connector "I/O A", Pin 1, Configuration		Speed Control		
P1TND	CIM, External Potentiometer Supply		5 V		
P1TV0	Engine Speed Control, Minimum Throttle Position, Voltage Threshold	0,4	3,7	4,6	V
P1TV1	Engine Speed Control, Maximum Throttle Position, Voltage Threshold	0,4	0,7	4,6	V

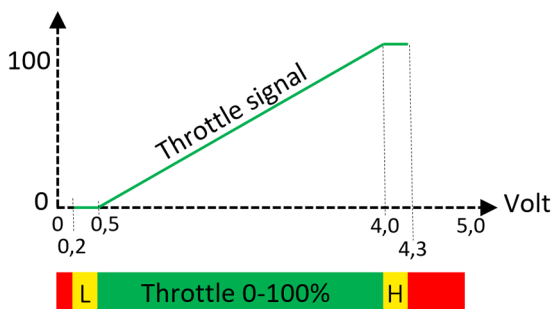
P0031743



External throttle input diagnostic limits

Example of a throttle potentiometer with an active range corresponding to 0,5V as idle speed voltage to 4,0V as maximum engine speed voltage, see graph. Fault code limits indicated as red area in the graph: Low: 0,2V which is a fixed value set in the CIM's software.

High: Calibrated max throttle voltage + 0,3V : $4,0 + 0,3 = 4,3V$



Red: fault code area 0,0-0,2V and 4,3-5,0V

Yellow: deadband area: Low=0%, High=100%

Green: normal working range: 0,5-4,0V = 0-100%

P0031019

To avoid unnecessary faults there is a dead band between the calibrated min/max voltages and the fault limit voltages, indicated in yellow area in the graph.

Throttle value between voltage 0,2-0,5V → 0%

Throttle value between voltage 4,0-4,3V → 100%

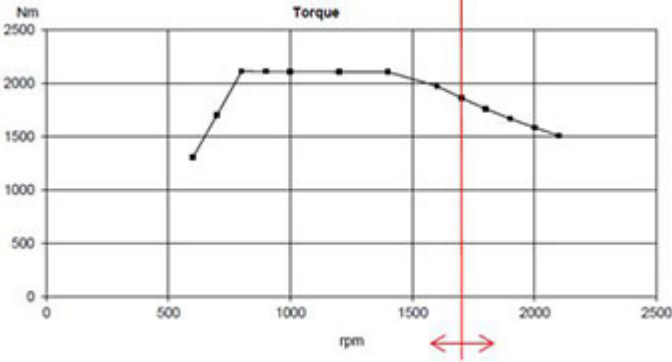
Any voltages outside 0,2-4,3V in this example will set a fault code.

After calibration check diagnostics by disconnecting connections one by one to the throttle potentiometer:

- the voltage supply
- the signal
- the voltage ground

All 3 type of faults or any combinations of them must result in a fault code in the CIM's display.

NOTICE! If any active potentiometers with built in electronics that generate a voltage signal (including PLCs) is used as a source for the CIM throttle input, it's the OEM's responsibility to make sure all kind of errors on the active device will set a diagnostic fault by bringing the signal to either 0V (or below 0,2V) or 5V (or above the calibrated max voltage +0,3V).



P0031115

Max engine speed limitation

It's possible to limit the maximum engine speed by means of the parameter (P1WJT) max throttle value. The function works with both the internal and external speed control.

The throttle value is sent from the CIM to the engine in percent where idle corresponds to 0% and full speed to 100%.

Example: An engine has 600rpm as idle (0%) and rated speed at 2100 rpm (100%). The customer wants to limit the max engine speed to 1700 rpm.

Calculated max throttle value: target-idle/engine speed range = $(1700-600)/(2100-600) = 1100/1500 = 73,33\%$ calibrate 73.3% in the Vodia tool.

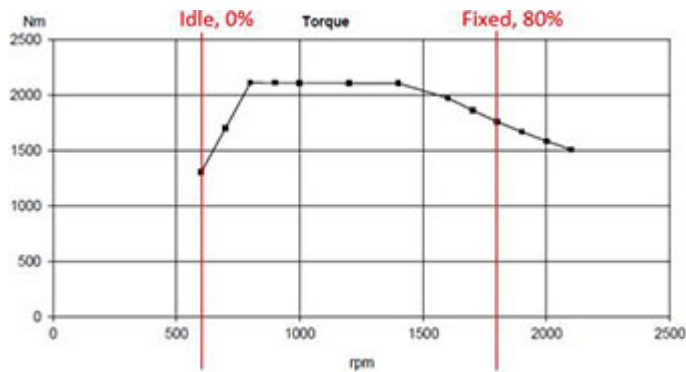
NOTICE! This is a calculated value and must be tested. There can be some speed deviation from the calculated value due to governor gradient settings, the engine's torque roll off curve etc. Readjust if necessary. If the engine's idle speed is changed a new calculation of the throttle value is needed.

Prerequisites:

- Set the parameter max throttle value in percent.

P1WJT	Maximum Throttle, Engine Speed Limitation, Reduction Percentage	0	73,3	100	%
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P0031935



P0031117

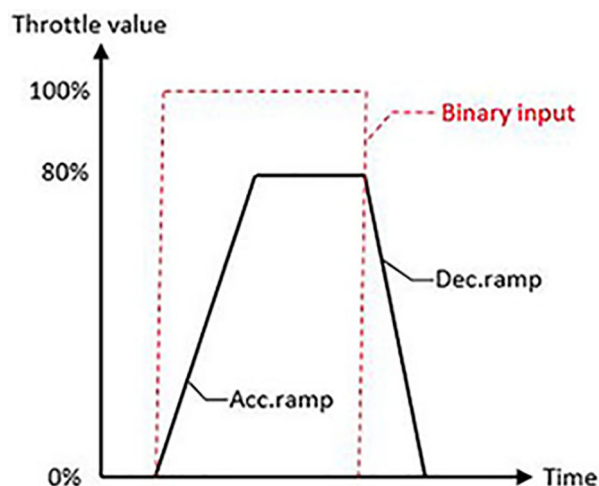
Fixed speed function

Many installations operate at a fixed speed only, for example water/hydraulic pumps and air compressors. In those cases a normal variable speed control may not be needed but just a simple switch that will bring the engine speed from idle directly to the operating speed. The CIM supports such a function by configuring a binary input and connect it to +24V via a switch or a relay contact. The operating speed is selected/limited with the parameter max throttle value.

Example: An engine has 600rpm as idle (0%) and rated speed at 2100rpm (100%). The customer wants to run the engine at a fixed target speed 1800rpm.

Calculated throttle value: $(\text{target-idle})/(\text{engine speed range}) = (1800-600)/(2100-600) = 1200/1500 = 80\%$

NOTICE! This is a calculated value and must be tested. There can be some speed deviation from the calculated value due to governor gradient settings, the engine's torque roll off curve etc. Readjust if necessary. If the engine's idle speed is changed a new calculation of the throttle value is needed.



P0031116

Ramping throttle value

When the fixed speed function is activated by the binary input going high, the commanded throttle value will ramp up to the predefined setting, max throttle value. As the function is disabled by open the binary input switch, the throttle value will ramp down to 0%. The slope of the ramps are predefined in the CIM's software.

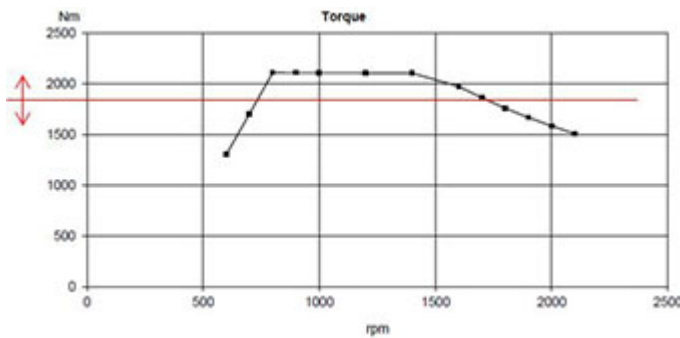
Acceleration ramp: +20%/s

Deceleration ramp: -30%/s

The benefit from these ramps will reduce a potential over-shoot of the speed, reduction of smoke during acceleration and prevent the engine from stalling if large loads are applied when the speed is being ramped down to idle.

Prerequisites:

- Select a binary input as fixed speed
- Set the parameter max throttle value



P0031118

Engine torque limitation

The engine maximum torque can be limited with a parameter called max torque set in %, e.g. 90%. The function will constantly limit the maximum available torque in the engine via the TSC1 message on the can bus as long as the function is active. As illustrated the peak torque in the engine will be limited to 90%.

The most common use of this function is that the driven application e.g. a pump or a transmission may not be able to handle the maximum torque available from the engine and the pump/transmission may have premature wear.

NOTICE! This function is not to be used to limit the available torque/power with the purpose to use an engine certified for another lower emission legislation. Volvo Penta is not responsible for any such misuse.

Prerequisites:

- Activate torque reduction
- Set the parameter max available torque in %

Engine torque limitation via binary input

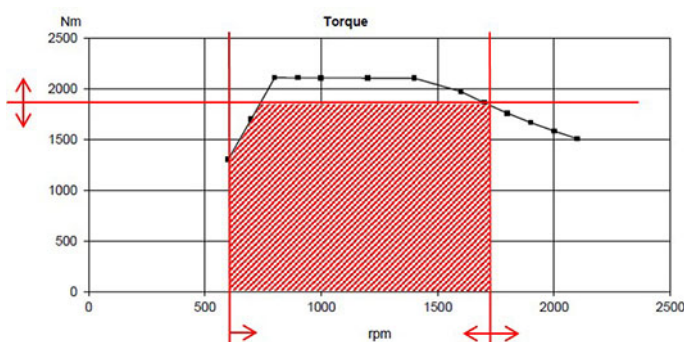
The engine torque can be limited momentarily by using a binary input as torque reduction. When the binary input is active by connecting it to +24V via switch or a relay contact, the engine torque is reduced as long as the input remains active. When the function is disabled, the engine will resume full available torque.

Prerequisites:

- Activate torque reduction
- Set the parameter max available torque in %
- Select a binary input as torque reduction

P1U5Z	▲ CIM, Engine Torque Reduction, Configuration				
P1U5Z	CIMEngineTorqueReduction_Value	50	90	100	%
P1U5Z	CIMEngineTorqueReductionActive		True		

P0031745



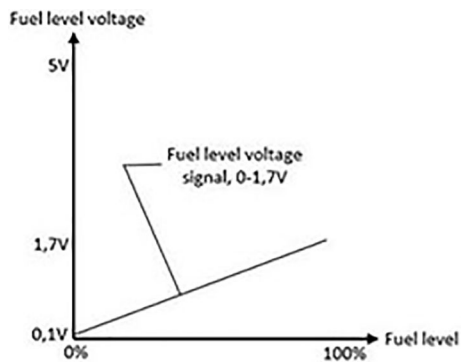
P0031746

Limitation of the engine's work range

By combining both the max torque limit with the max speed limit and the idle speed as well, one can adapt the engine's torque/speed working range. This is usually done to make sure the driven application, for example a pump is not overloaded nor overspeeding.



P0031122



P0031124

Fuel level

Analogue input 2 is possible to use as a fuel level indicator. The input has a 0 to 10V input range and can be activated/calibrated with the Vodia tool.

Volvo Penta has a fuel level sensor that is working as a reostat (3-180 ohms, empty to full) and needs an additional resistor* to work as a voltage divider, see illustration. The min (empty tank) and max (full tank) voltages are calibrated with the Vodia tool to reach 0 to 100% viewed in the display.

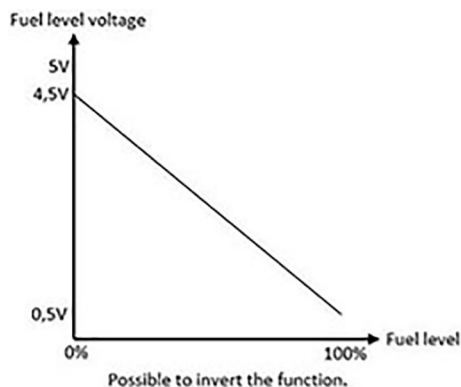
Recommended resistor value together with the Penta level sensor is 330ohms. This will give calibration voltages 0,1V at empty tank and 1,7V at full tank.

3rd party fuel level sensors

There are several types of fuel level sensors available. From simple passive resistor based versions to more sophisticated active sensors. Some may have no moving parts and have its own built in electronics that generate different types of electrical signals. The active versions need external supply like 24V to operate.

The CIM has a voltage input so any signal from the fuel level sensor must support the CIMs voltage range, 0-10V. The input can also handle an inverted voltage signal like empty tank means a high voltage while full tank is a low voltage. If the level sensor does not produce a proportional voltage for the CIM one can optimize/convert the signal with external components.

There is no diagnostics for electrical faults nor any alarms for low fuel level. If the fuel level sensor is not used, one can hide the parameter in engine data, see chapter display settings.

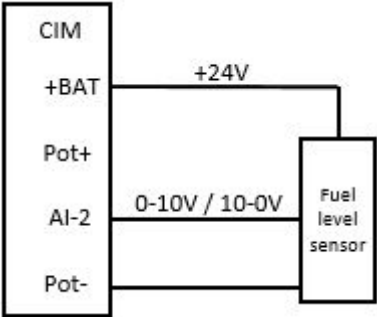


P0031126

NOTICE! If there is any electrical issues with the fuel sensor or its connections, it may influence the external speed throttle function (if installed/activated) since they both share the same supply (5 or 10V). If possible we recommend to use an external power source for the fuel level sensor from the 24V system whenever an external speed throttle is used.

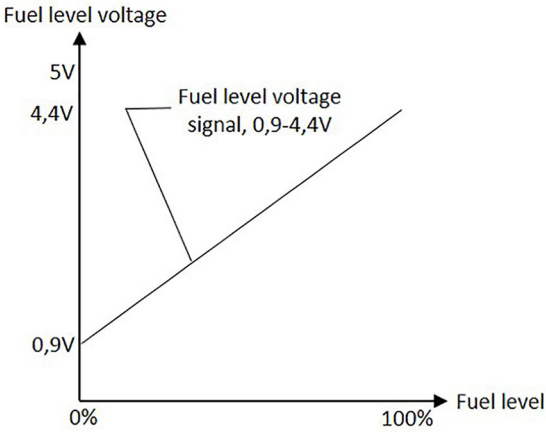
P1VY	Fuel Level Sensor, Input Configuration				
P1VY	Fuellevel_InputConfiguration		ENABLE		
P1VY	Fuellevel_MaxVoltage	0,0	4,2	10,0	V
P1VY	Fuellevel_MinVoltage	0,0	0,7	10,0	V

P0031747

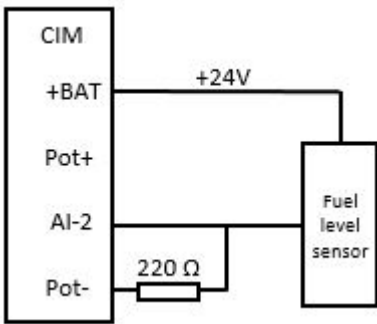


Type A is a 3 wire active sensor operating from 24V and that generates an output voltage directly supporting the CIM. The low and high fuel level voltages are simply calibrated with the vodia tool and no other external components are needed.

Type A: 3 wire active sensor with an output voltage directly compatible with the CIM's input.



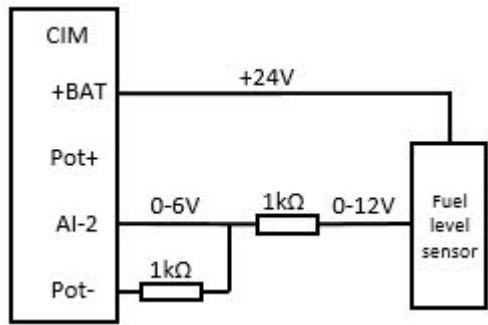
P0031198



Type B is a 2 wire current sensor (4-20mA). The CIM can't handle a current only voltage so an external 220 ohm shunt resistor is needed to convert current to voltage.

The voltage generated across this resistor will be 0,88V at 4mA and 4,4V at 20mA. Calibrate 0,9V (low) and 4,4V (high).

Type B: 2 wire active sensor with a current (4-20mA) output. 4mA will give 0,88V and 20mA 4,4V. Calibrate 0,9V and 4,4V.



Type C: Fuel level sensor with a too high output voltage can easily be converted with two external resistors. In the example the output from the sensor will be half at the CIM's input.

Other types generating voltages outside the maximum 10 volts the CIM can handle, must be scaled down by means of an external voltage divider (2 resistors) see **type C**.

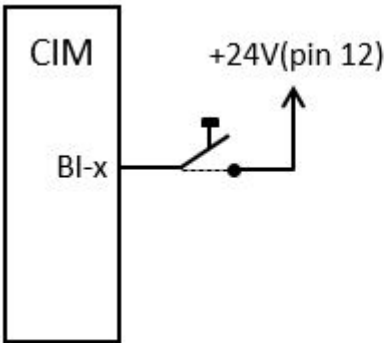
Start and stop, internal and external

It's possible to configure external start and stop inputs via the CIM's binary inputs. For each I/O there is a drop down menu with two options for the start and stop respectively. Chose if the start or stop should be only active via the external binary input or working in parallel with the internal start and stop buttons on the CIM.

- Input, Engine start request (the internal start disabled)
- Input, Engine start request, internal enabled (will enable the internal start switch)
- Input, Engine stop request (the internal stop disabled)
- Input, Engine stop request, internal enabled (will enable the internal stop switch)

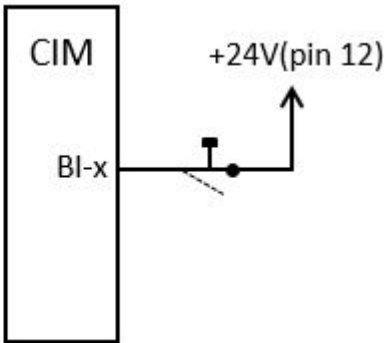
External stop switch.

The CIM can be set to accept an external stop voltage signal that is either energize to stop (ETS), which is the factory default setting, or energize to run (ETR). The switch should be a spring loaded momentary version that is normally open (NO) when used as ETS and normally closed (NC) when used as ETR. The stop signal should only be active for a brief period like 1 second in order to stop the engine. It is not allowed to keep an active stop for a longer period of time when the engine is not running while the ignition is still switched on.



Stop input set as ETS, normally open

P0031779



Stop input set as ETR, normally closed

P1TNE	CIM, Stop Request Logic	Energized to Stop ▾		
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P0031780

Restart throttle option

The function is valid when only internal speed control is used, the +/- buttons.
There are 3 choices in a drop down menu in the vodia tool:

- Normal throttle mode
- Restore previous throttle
- Throttle always reset

Normal throttle mode: Engine throttle command will reset to 0% at each power/ignition on.

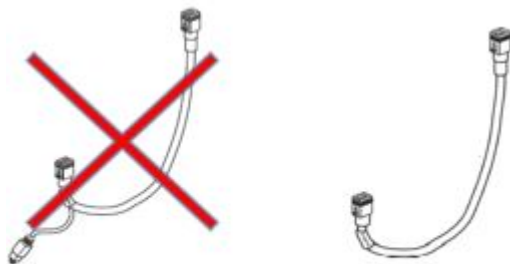
Restore previous throttle: The last engine throttle request will be stored and reused upon next power/ignition on.

Throttle always reset: The CIM will reset the throttle request to 0% before each start, i.e. engine will always start with idle request.

NOTICE! This function may be of no use for a genset engine.

P1WF1	Engine Speed Control, Restart Throttle, Configuration		Normal Throttle Mode		
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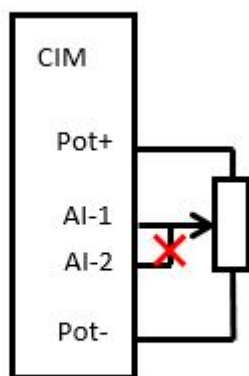
P0031781



Remove old DCU2 cable

P0031207

If the old DCU2 used external speed throttle.



Remove the wire going to input 2, which is not used for throttle anymore.
Use only input 1 for throttle.

P0031208

Replace a DCU2 with a CIM

- 1 Run a conversion kit on the vodia web "Remove DCU2" for the concerned chassis ID.
- 2 Then run conversion kit "Add CIM" and download the CIM SW to the computer.

On site in the machine:

- 1 Remove the old DCU2 cable and replace with the new CIM cable.
- 2 If the DCU2 is using an external throttle, remove or cut the wire the wire going to input 2 in the I/O A connector.
- 3 Connect the CIM to the new cable and switch on the battery power.
- 4 Connect the vodia tool at the diagnostic connector on the engine.
- 5 Start vodia and program the new CIM.

NOTICE! An empty CIM does not show anything in its screen until it's been programmed. Any local configurable settings in the old DCU2 like external speed throttle, inputs and outputs, must be set with the vodia tool "parameter programming" once the SW programming of the CIM has been completed.

CIM used as display only

The CIM can be set to work as a display only by choosing "Can communication mode, active/passive" with the vodia tool. All communication from the CIM is then turned off except being able to force or inhibit particulate filter regeneration for stage 5 engines, which is sent in the "CM1" message, refer to EMS electrical interface specification manual.

NOTICE! In case there is already a CM1 message on the can bus from another control unit, the force/inhibit regeneration function from the CIM may not work.

Using two or more CIMs in the same network

It's possible to use more than one CIM in the can bus network. However only one CIM can be set as active having the full can bus communication. All other CIMs on the bus must be set as passive can communication.

Using Vodia together with more than one CIM in the network

The Vodia tool can only communicate with one CIM at a time. Hence must the other CIMs in the network temporarily be disconnected when diagnostics or programming with Vodia is carried out. The newly updated CIM must then be disconnected and the other CIM reconnected and the programming starts over again for the other CIM.

P1T3J	CIM, CAN Communication, Mode	Active		
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P0031783

Set installation variant

With the vodia tool one can select whether the CIM is working as a versatile engine (VE) controller or as a genset controller. As a genset controller, the CIM will default set 50% speed throttle instead of 0% as for VE when the internal speed control is used.

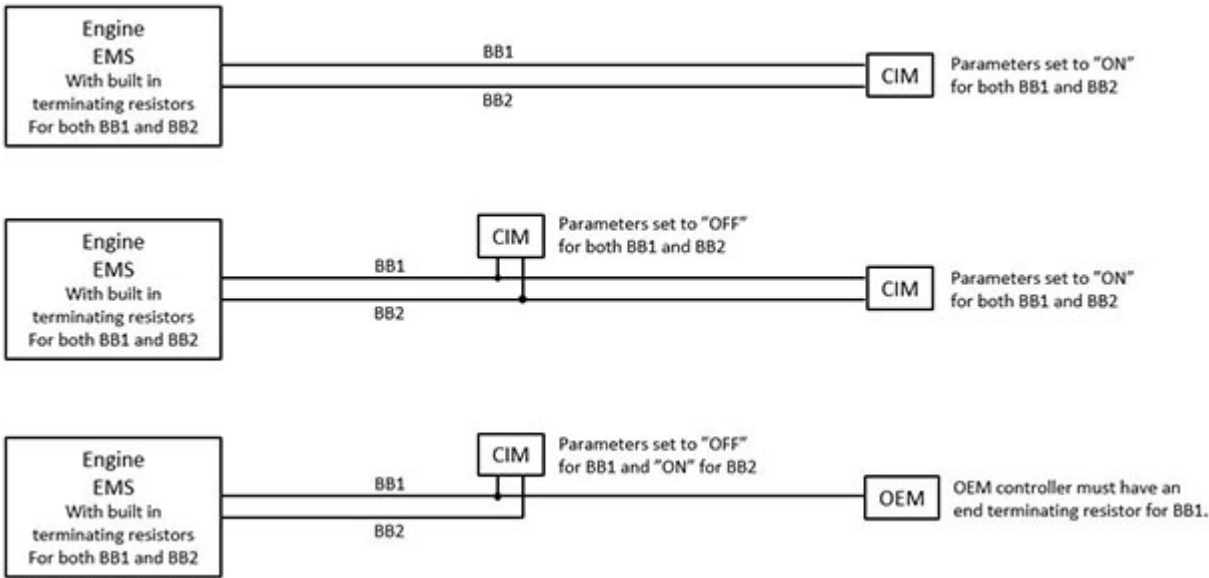
NOTICE! Some functions in the CIM will not work or are of no use when the CIM is set as genset.

P1TNB	CIM, Installation Variant	Industrial VE		
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P0031784

Termination of the can bus

It's possible to turn on/off internal can bus end terminating resistors for both BB1 and BB2, for more information refer to EMS electrical interface specification manual. Depending on the physical location of the CIM in the can bus network it's possible to activate the internal resistors individually. The Volvo Penta EMS must always be located at one physical end of the can bus network having built in terminating resistors. The control unit that is farthest on the can bus from the engine EMS should have the corresponding end terminating resistors activated or externally connected as close to the control unit as possible. See examples below.



P0031209

P1U7P	CIM, CAN Terminating Resistor BB1		ENABLE		
P1U7Q	CIM, CAN Terminating Resistor BB2		ENABLE		

P0031748

External ignition on/off

If the external ignition switch is used, the internal ignition on/off button on the CIM will automatically be disabled once the CIM has detected a high signal (=ignition on) on pin number 11 in the I/O connector A, see wiring diagram. After each drive cycle the function is reset and the internal ignition button can be used as normal again until the CIM detects a new active signal on the external ignition input.

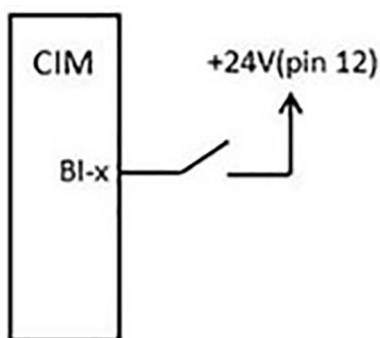
Binary in and outputs:	Description:
I/O 3 - 16	Refer to EMS installation manual for detailed information
In: 1500/1800	Input for frequency select switch for GE only. Inactive = primary speed; Active = secondary speed
In: Engine Prot override	Overrides engine protection for a limited time. Restored operation. Will also activate inducement override if installed.
In: Governor mode	VE: activates governor gradient. GE: activates governor droop. VE: the slope of the gradient can be adjusted with vodia. GE: the amount of droop can be adjusted with Vodia.
In: Idle speed request	VE: used with external throttle as a limp home function. GE: the engine will go to idle.
In: Preheat request	Activates the preheat on the engine.
In: Start request	Internal start switch will work in parallel with external start switch.
In: Start request, internal disabled	Only external start switch is active.
In: Stop request	Internal stop switch will work in parallel with external stop switch.
In Stop request, internal disabled	Only external stop switch is active.
In: Acknowledge	Acknowledge/clear active buzzer and/or pop up messages in the CIM's display.
In: Fixed engine speed	Activates the fixed speed function.
In: Torque reduction	Activates the torque reduction.
In: Block DPF regeneration	Override particulate filter regeneration.
Out: Low batt alarm	Alarm indication of low battery voltage.
Out: Oil level alarm	Alarm indication of low oil level in the engine.
Out: Oil press alarm	Alarm indication of low oil pressure in the engine.
Out: Oil temp alarm	Alarm indication of high oil temperature in the engine.
Out: Preheat indication	Indication from the engine that preheat is active.
Out: Red lamp	General alarm indication of any red alarms (severe).
Out: Running indication	Indication that engine is running.
Out: Water in fuel alarm	Alarm indication of water detected in the fuel.
Out: Coolant level alarm	Alarm indication of low coolant level in the engine.

Out: Coolant temp alarm	Alarm indication of high oil temperature in the engine.
Out: Yellow lamp	General alarm indication of any yellow alarms (warning).
Out: External buzzer	Output for external buzzer.
Out: Over speed alarm	Alarm indication of engine over speed.
Out: DPF soot load alarm	Alarm indication that particulate filter is clogged and that operator may need to start regeneration.
Inactive	—

I/O connections

Binary input

Use standard mechanical on/off switch. For start and stop use a momentary switch. Feed the switch from the CIM pin 12 (+BAT) to avoid any voltage potential differences, see **picture A**.

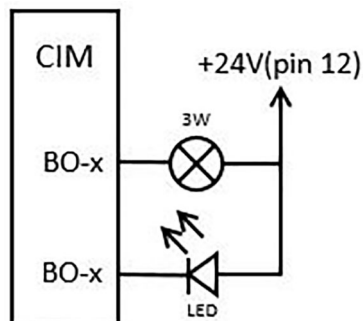


Picture A

P0031202

Binary output

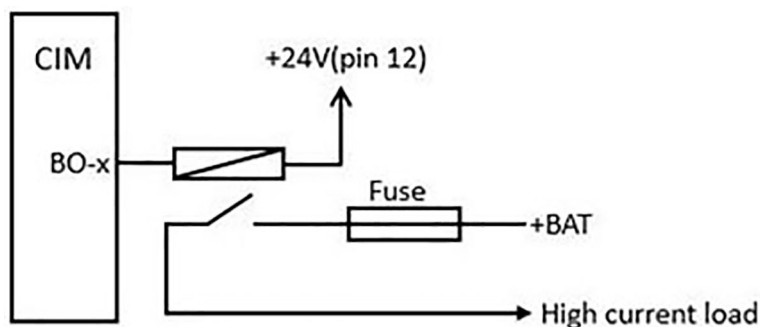
The outputs of the CIM are a so called low side switch (LSS) from a semiconductor such as MOSFET transistor. There is no standard mechanical switch i.e. a relay contact. The output is intended to drive low current indication lamps or LEDs. Feed the lamps/LEDs from the CIM's internal supply pin 12, see **picture B**.



Picture B

P0031203

The maximum current for each output should not exceed 100mA (approx. 3W). If any device needing a higher current, one must drive an external relay and feed the high current wires separately taken from the battery to the load, see **picture C**.



Picture C

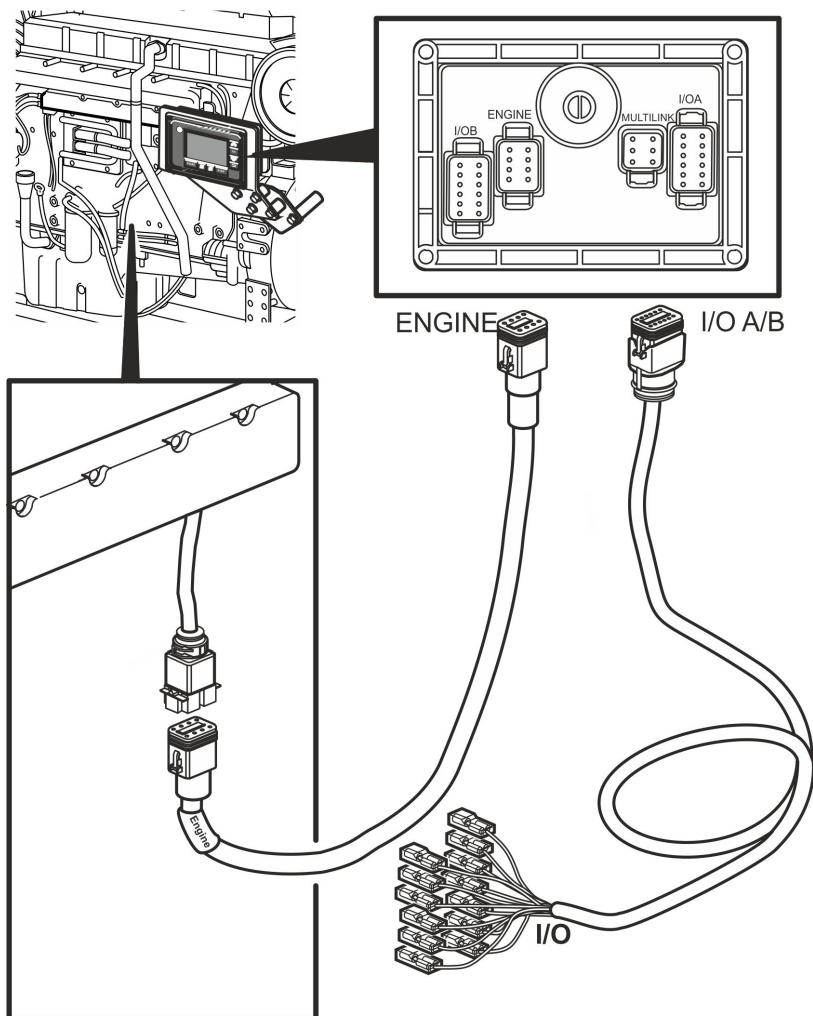
P0031204

Connection

Connection to engine

NOTICE! If this is used as a vehicular node, the plus (+) and minus connections (-) in the line must be used for the node, otherwise the CAN-bus must be galvanically insulated. The term, vehicular node, refers to systems other than those belonging to Volvo Penta.

- 1 Connect the harness between the engine and the CIM to the contact labeled ENGINE on the rear of the CIM.
The harness to the engine may not be longer than 30 meters (98.4 ft), between CIM and the engine.
- 2 The harness to connector I/O A and I/O B may not be longer than 3 meters (10 ft). For configuration of input and outputs, see *I/O Status*.
For examples of installation of I/O A/B, see , *page 27*.



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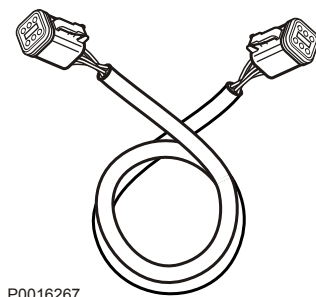
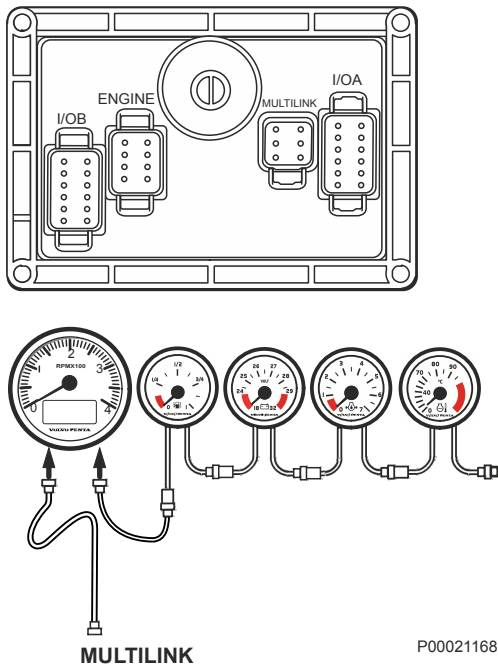
Connecting instruments

When using “easy-link” instruments, connect the connector labeled MULTILINK to the tachometer using a multilink cable. Connect the other instruments from the tachometer.

NOTICE! Order the multilink cable separately.

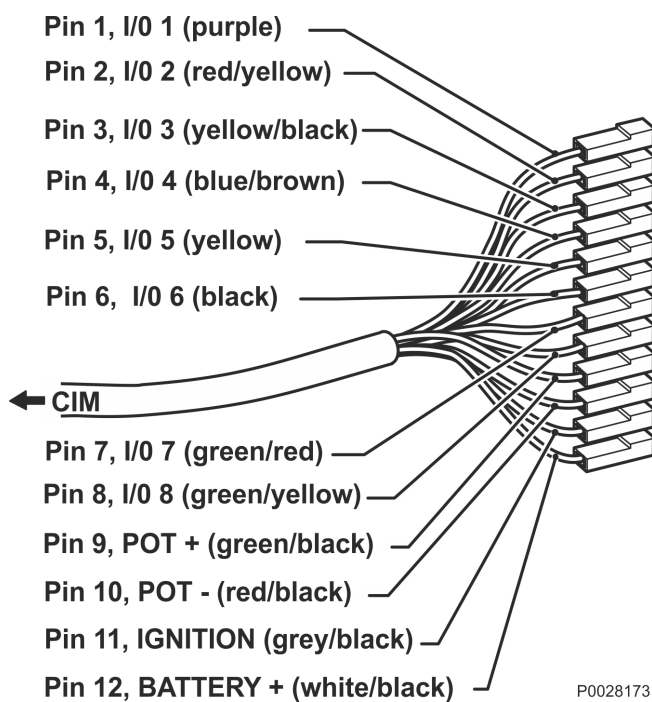
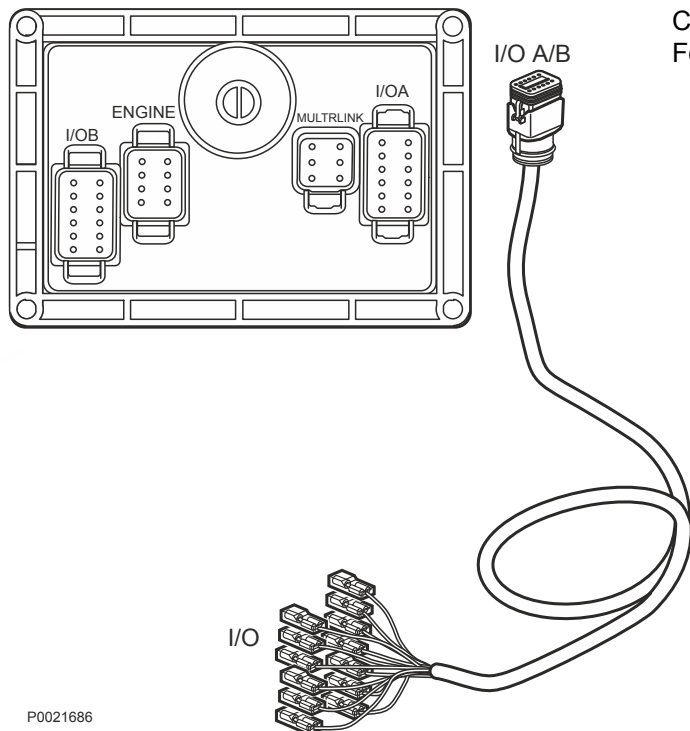
The following instruments can be connected to a CIM

- Tachometer (mandatory)
- Engine coolant temperature
- Oil temperature
- Oil pressure
- Battery voltage
- Boost pressure
- Alarm instrument
- fuel level
- exhaust temp



I/O connections

Connect the I/O harness to connector I/O A or I/O B.
For configuration of input and outputs, see *I/O Status*



The other end of the harness is labeled as per figure.
Examples of connections can be found in , *page 27*.

- Pin 1, I/O 1 (purple)
- Pin 2, I/O 2 (red/yellow)
- Pin 3, I/O 3 (yellow/black)
- Pin 4, I/O 4 (blue/brown)
- Pin 5, I/O 5 (yellow)
- Pin 6, I/O 6 (black)
- Pin 7, I/O 7 (green/red)
- Pin 8, I/O 8 (green/yellow)
- Pin 9, POT+ (green/black)
- Pin 10, POT- (red/black)
- Pin 11, IGNITION (gray/black)
- Pin 12 Battery + (white/black)

Connector I/O A:

- Pin 1, AI1 (throttle potentiometer)
- Pin 2, AI2 (fuel level potentiometer)
- Pin 3, Digital I/O3 (LSS)
- Pin 4, Digital I/O4 (LSS)
- Pin 5, Digital I/O5 (LSS)
- Pin 6, Digital I/O6 (LSS)
- Pin 7, Digital I/O7 (LSS)
- Pin 8, Digital I/O8 (LSS)
- Pin 9, Potentiometer supply + (5 V/10 V)
- Pin 10, Potentiometer supply - (ground)
- Pin 11, Input signal ignition
- Pin 12, Battery connection +

LSS = Low Side Switch

Connector I/O B:

- Pin 1, Digital I/O9 (LSS)
- Pin 2, Digital I/O10 (LSS)
- Pin 3, Digital I/O11 (LSS)
- Pin 4, Digital I/O12 (LSS)
- Pin 5, Digital I/O13 (LSS)
- Pin 6, Digital I/O14 (LSS)
- Pin 7, Digital I/O15 (LSS)
- Pin 8, Digital I/O16 (LSS)
- Pin 9, Not used
- Pin 10, Not used
- Pin 11, Not used
- Pin 12, Battery connection +

Connector Multilink:

- 1: not used
- 2: CAN low
- 3: not used
- 4: Battery -
- 5: CAN high
- 6: Battery +

Connector Engine:

- 1: CAN high, SAE J1939
- 2: CAN low, SAE J1939
- 3: Battery –
- 4: Battery +
- 5: Battery + switched (ignition)
- 6: not used
- 7: CAN high, ISO 15765
- 8: CAN low, ISO 15765

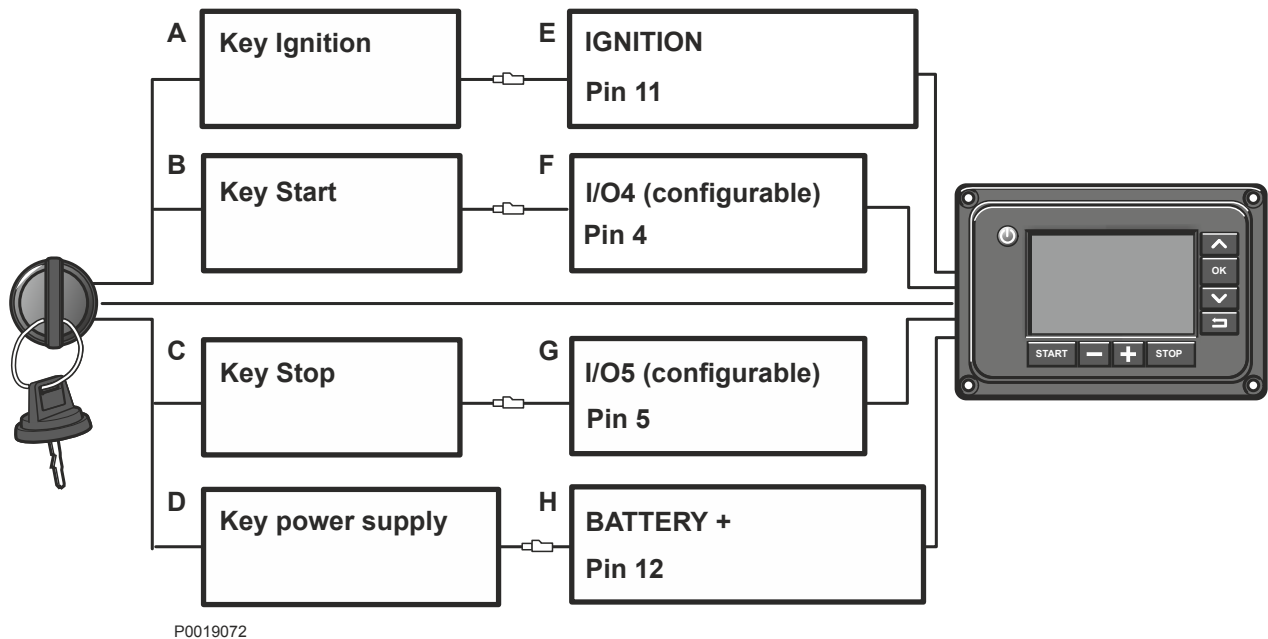
CIM–VODIA, parameters list

DOID	Caption	Description
P1TM0	CIM, Connector "I/O B", Pin 1, Configuration	Configures the function for connector "I/O B" pin 1 ("I/O 9"). Default is 0
P1TM1	CIM, Connector "I/O B", Pin 2, Configuration	Configures the function for connector "I/O B" pin 2 ("I/O 9"). Default is 0
P1TM2	CIM, Connector "I/O B", Pin 3, Configuration	Configures the function for connector "I/O B" pin 3 ("I/O 9"). Default is 0
P1TM3	CIM, Connector "I/O B", Pin 4, Configuration	Configures the function for connector "I/O B" pin 4 ("I/O 9"). Default is 0
P1TM4	CIM, Connector "I/O B", Pin 5, Configuration	Configures the function for connector "I/O B" pin 6 ("I/O 9"). Default is 0
P1TM5	CIM, Connector "I/O B", Pin 6, Configuration	Configures the function for connector "I/O B" pin 6 ("I/O 9"). Default is 0
P1TM6	CIM, Connector "I/O B", Pin 7, Configuration	Configures the function for connector "I/O B" pin 7 ("I/O 9"). Default is 0
P1TM7	CIM, Connector "I/O B", Pin 8, Configuration	Configures the function for connector "I/O B" pin 8 ("I/O 9"). Default is 0
P1TMU	CIM, Connector "I/O A", Pin 3, Configuration	Configures the function for connector "I/O A" pin 3 ("I/O 9"). Default is 0
P1TMV	CIM, Connector "I/O A", Pin 4, Configuration	Configures the function for connector "I/O A" pin 4 ("I/O 9"). Default is 0
P1TMW	CIM, Connector "I/O A", Pin 5, Configuration	Configures the function for connector "I/O A" pin 5 ("I/O 9"). Default is 0
P1TMX	CIM, Connector "I/O A", Pin 6, Configuration	Configures the function for connector "I/O A" pin 6 ("I/O 9"). Default is 0
P1TMY	CIM, Connector "I/O A", Pin 7, Configuration	Configures the function for connector "I/O A" pin 7 ("I/O 9"). Default is 0
P1TMZ	CIM, Connector "I/O A", Pin 8, Configuration	Configures the function for connector "I/O A" pin 8 ("I/O 9"). Default is 0
P1TNB	CIM, Installation Variant	Sets the engine installation type (GE/VE)
P1TND	CIM, External Potentiometer Supply	Sets what supply voltage which is used for the external potentiometer on connector 'I/O A', pin 9
P1TNE	CIM, Stop Request Logic	Sets the logic used for the Control Interface Module (CIM) stop signal.
P1TVO	Engine Speed Control, Minimum Throttle Position, Voltage Threshold	Sets the signal voltage which is used to indicate minimum throttle position.
P1TV1	Engine Speed Control, Maximum Throttle Position, Voltage Threshold	Sets the signal voltage which is used to indicate maximum throttle position.
P1WJT	Maximum Throttle, Engine Speed Limitation, Reduction Percentage	Set by how much the engine speed will be reduced (in percentage) when the throttle is in the maximum position.
P1TVY	Fuel Level Sensor, Input Configuration	Configures if the fuel level input is used and what signal voltage thresholds that is used to determine when the fuel level is 0 or 100 %
P1T3J	CIM, CAN Communication, Mode	Sets the CAN communication mode of the Control Interface Module (CIM). When set to Active mode, CIM will actively broadcast on CAN. When set to Passive mode, CIM will only listen to (receive) relevant data communicated on CAN.

P1U5Z	CIM, Engine Torque Reduction, Configuration	Configures if the engine torque reduction is active and selects a numeric engine torque reduction value in the Control Interface Module (CIM). -The initial value of the engine torque reduction setting is FALSE (deactivated). -The initial value of the engine torque reduction value setting is 100%. Min value: 0%, Max value: 100%
P1U20	CIM, Connector "I/O A", Pin 1, Configuration	Configures the function for connector "I/O A" pin 1 ("I/O 9"). Default is 0.
P1WF1	Throttle restart option	Sets different throttle restart mode
P1U7P	CAN bus termination, BB1	Enable/disable internal can bus terminating resistor, BB1
P1U7Q	CAN bus termination, BB2	Enable/disable internal can bus terminating resistor, BB2

Installation Examples

Connecting key

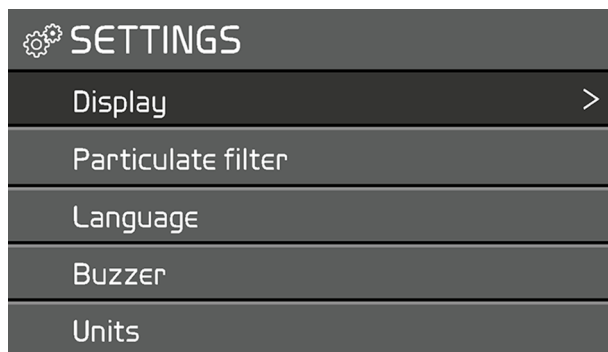


Connect the contacts of the key as per figure and the following description.

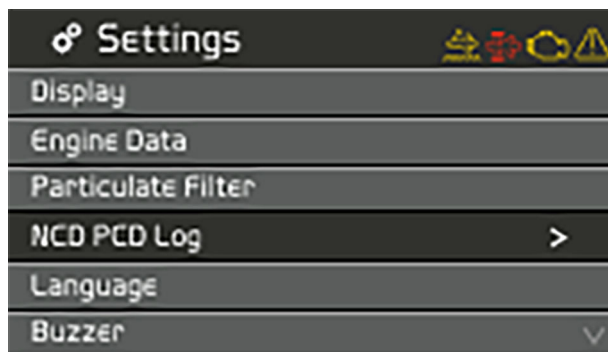
- | | |
|-----------------------------|--|
| A. Key, ignition | E. Pin 11, ignition (gray/black) |
| B. Key, start | F. Pin 4, I/O4 (configurable*) (blue/brown) |
| C. Key, stop | G. Pin 5, I/O5 (configurable*) (yellow) |
| D. Key, power supply | H. Pin 12, battery connection + (white/black) |

* For configuration refer to *I/O Status*.

Settings



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Navigation

Press **OK** to proceed to the submenus.

Press **↵** after setting to save and return to the previous menu.

Display Settings


Display

- **Set backlight time**
Setting for backlighting to run in standby mode. *On* is the default setting.
Press OK to toggle between **ON** and **OFF**.
- **Set backlight brightness**
Adjust the brightness using the panel arrow buttons. Set the value with the arrow buttons.
- **Set instrument brightness**
Setting backlighting in gauges. Set the value with the arrow buttons.
- **Change background color**
Select background color, gray or white. Browse with arrow buttons and confirm with OK.

Engine Data

- The user can set which parameters should be displayed at the engine data main menu.
- An installation that has the Adblue/DEF tank and the particulate filter installed, must by law show AdBlue/DEF level and the soot load.
- Log for NCD= Nox Control Diagnostic and PCD= Particle Control Diagnostic.

NOTICE! For engines equipped with an exhaust after treatment system, a fully functional system is mandatory to meet the emission requirements. When a system fault is detected, required information must be shown to the user.

 Engine Data	
Engine hours	ON
Coolant temperature	ON
Oil pressure	ON
Fuel rate	OFF
Boost temperature	OFF
Boost pressure	ON ✓

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- Scroll and chose **ON** or **OFF** for the parameters to be shown or not.

 Engine Data	
No. of NCD warnings	0
No. of severe NCD	0
Ack. time severe NCD	0 h
No. of PCD warnings	0
No. of severe PCD	0
Ack. time severe PCD	0 h ✓

P0038438

Settings menu for NCD and PCD counters


The user can read out numbers of NCD/PCD warnings, number of severe warnings and accumulated time due to severe failures (engine not running)

NCD:

- No. Of NCD warnings
- No. Of severe NCD warnings
- Ack. Time severe NCD warnings

PCD:

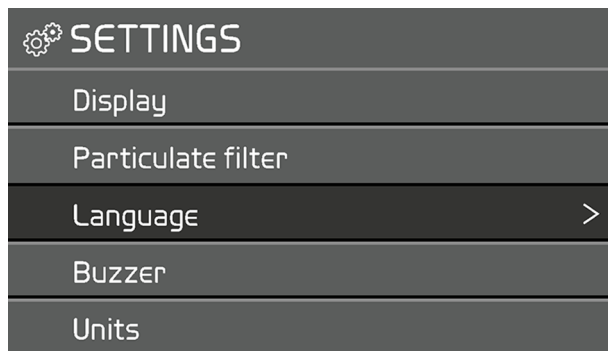
- No. Of PCD warnings
- No. Of severe PCD warnings
- Ack. Time severe PCD warnings

 SETTINGS	
Display	
Particulate filter	>
Language	
Buzzer	
Units	

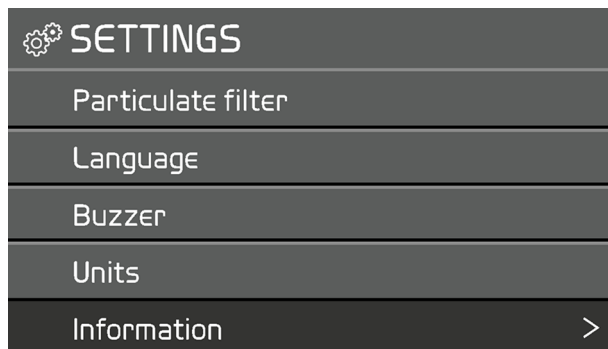
P0028069

Particulate filter

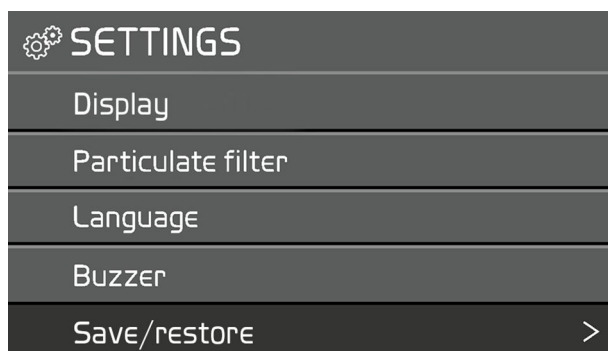
- Start regeneration, here you can manually start the regeneration when all requirements for regeneration are met.
- Automatic regeneration, here you can turn the automatic regeneration **ON** and **OFF**.



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Language (Language)

Setting the display language; choose between: English, French, German, Spanish, Italian, Russian, Brazilian Portuguese and Chinese. Browse with arrow buttons and confirm with OK.

Information

Reading CIM information

- **Engine Hardware ID** (Engine Hardware ID)
- **CIM hardware ID** (CIM hardware ID)
- **Engine Software ID** (Engine Software ID)
- **CIM Software ID** (CIM Software ID)
- **Chassis ID** (Chassis ID)

Engine Data

- Restart (option)
- Save / Restore
- I/O Calibration
- I/O Status
- Torque reduction
- Active / Passive mode
- CAN termination
- Stop Logic CIM
- Pot. supply
- Genset/VE

Save/Restore

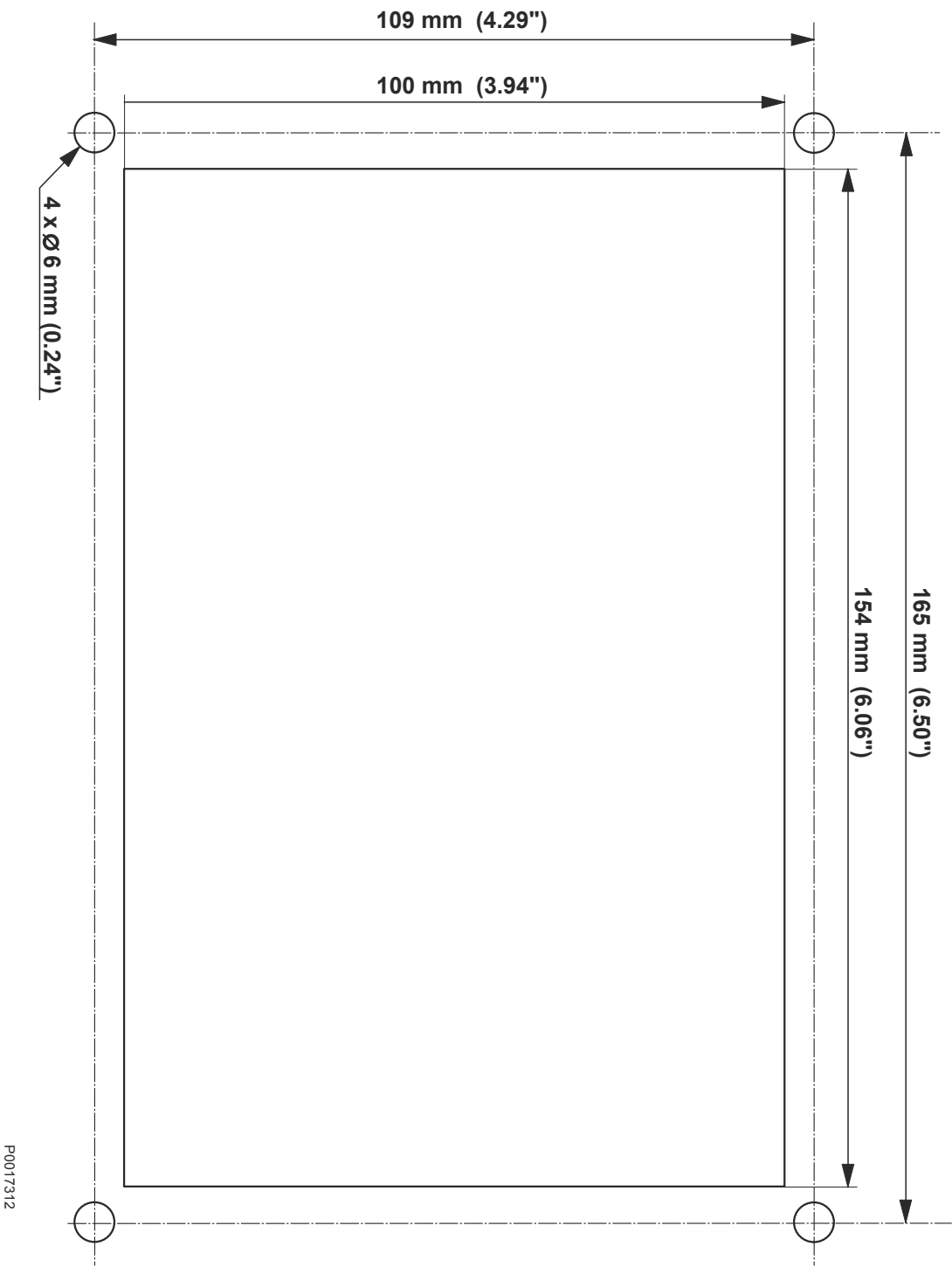
Parameters changeable with VODIA:

- I/O Calibration
- I/O Status
- Torque Reduction
- Active/Passive (set the unit as Display or Control)
- CAN Termination
- Stop Logic
- Potentiometer Supply

- GENSET/VE (set if the engine is used as Genset or Versatile)

Template

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Index

C

Connecting instruments.....	22
Connection.....	21
Connection to engine.....	21
Contents in kit.....	3

D

Display Settings.....	28
-----------------------	----

I

I/O connections.....	23
Information.....	30
Installation.....	5
Installation Examples.....	27
Installation Instruction.....	2
Introduction.....	2

N

Navigation.....	28
-----------------	----

S

Save/Restore.....	30
Settings.....	28

T

Template.....	32
---------------	----



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V O L V O P E N T A

