



**Class 1**

ISO 9001 CERTIFIED

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SUITABLE FOR OEM DISTRIBUTION ONLY


## TECHNICAL PRODUCT DATASHEET

### High Current PDM


8 Output / 4 Input 4 MFI Input

P/N 610-00046



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	<b>PRODUCT</b>	<b>High Current PDM – 8 output / 4 INPUT / 4MFI input</b>			<b>REV</b>	1.00
					<b>BY</b>	<b>GMC</b>

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## 1. Revision Log

Rev	Date	Changes
1.00	9/13/2016	Initial revision



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

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## 2. Part Numbers

### 2.1. PDM part numbers

ES-Key High Current PDM 610-00046

Documentation (available from Class 1's website - [www.class1.com](http://www.class1.com))

Full Manual (this manual) FSG-MNL-00164

Quick Manual FSG-MNL-00165


### 2.2. Miscellaneous part numbers

#### PDM connector items

Deutsch 12- position mating plug - GREY	DT06-12SA
Deutsch 12- position mating plug wedge lock	W12S
Deutsch DT series socket (16 GA)	0462-201-16141
Deutsch DT series socket (16 GA) - GOLD	0462-201-1631
Deutsch 4-position mating plug – GREY	DTP06-4S
Deutsch 4- position mating plug – BLACK	DTP06-4S-E004
Deutsch 4- position mating plug wedge lock	WP-4S
Deutsch DTP series socket (12 GA)	0462-203-12141
Deutsch DTP series socket (12 GA) - GOLD	0462-210-12141
High current mating pigtail harness, 12 inches (2 AWG)	121700
Cannon 1-way circular high power plug	121583-0013
Cannon 2 AWG socket	031-8521-020
Cannon 4 AWG socket	031-8521-010
Cannon Hexagonal nut	217-8516-010
Cannon cable seal - 0.409in [10.4mm] to 0.472in [12.0mm]	351-8697-001

#### CAN connector items

Deutsch 3- position mating plug - GRAY	DT06-3S
Deutsch 3- position mating plug wedge lock - BLUE	W3S-1939
Deutsch 3- position mating plug wedge lock - ORANGE	W3S
Deutsch DT series socket (16 GA) - GOLD	0462-201-1631
Deutsch DT series 3-way "Y" receptacle	DT04-3P-P007
Deutsch 3- position mating plug with terminating resistor	DT06-3S-P006

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### 3. Overview

#### 3.1. Product description

The High Current PDM (p/n 610-00046) is a Class 1 ES-Key™ module with 8 high current positive outputs, 4 selectable polarity inputs designed for use within an ES-Key electrical system network, and 4 “MFI” (Multi-Function Inputs). This allows 4 inputs to be polarity selectable inputs and 4 inputs that have analog capability (0-5volt, 0-30volt, 4-20mA, Thermistor, and Frequency). Input 7 also has the ability to be reconfigured to a voltage reference output that is selectable between 5 volt and 9 volt.

#### 3.2. Features

- 8 positive polarity solid state outputs (30 Amps each) section 4.1
- 8 selectable polarity (positive or ground) digital inputs section 4.2
- Digital Circuit Breakers on all positive polarity outputs section 4.1.1
- Output PWM control section 4.1.3
- Output FLASH control section 4.1.2

#### 3.3. Indicators and buttons

The High Current PDM has a 7-segment display, three LED indicators, and two buttons for diagnostic, indication, and configuration purposes.

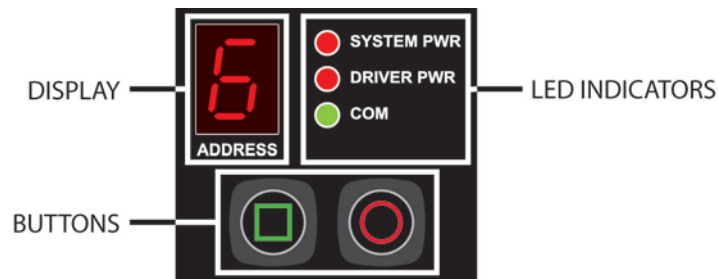



Figure 1. High Density PDM indicators and buttons.

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### 3.3.1. Display

The High Current PDM has a 7-segment LED display to show operational information.



Figure 2. High Density PDM display.

During normal operation the display shows the High Current PDM's ES-Key address (Table 1).


Display	Address	Display	Address	Display	Address
0	0	6	6	C	12
1	1	7	7	d	13
2	2	8	8	E	14
3	3	9	9	F	15
4	4	A	10		
5	5	b	11		

Table 1. Normal operation address display.

The display is also used to show password and configuration information.



**A flashing address display indicates a PRIMARY address conflict with another module of the same device type.**

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### 3.3.2. LED diagnostic indicators

The High Current PDM has three LED diagnostic indicators: SYSTEM PWR, DRIVER PWR, and COM.

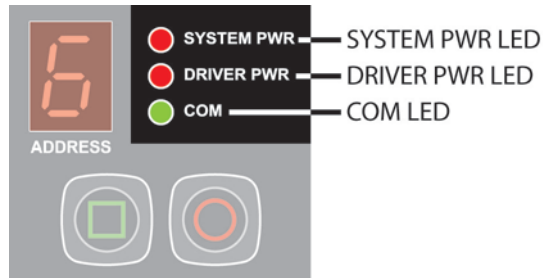


Figure 3. High Current PDM LED indicators.

#### SYSTEM PWR LED

The red system power (SYSTEM PWR) LED indicates the state of the system power input (pin 1) and system ground input (pin 12) of the gray connector.

LED state	Description
ON	Power is applied to pin 1 and ground applied to pin 12 of the gray connector.
OFF	Either power (pin 1) and/or ground (pin 12) is missing.

Table 2. SYSTEM PWR LED states.

#### DRIVER PWR LED

The red driver power (DRIVER PWR) LED indicates the state of the driver power input (large single pin Cannon connector).

LED state	Description
ON	Power is applied to the driver power pin.
OFF	Power is NOT applied to the driver power pin.


Table 3. DRIVER PWR LED states.

#### COM LED

The green communication (COM) LED indicates the state of the High Density PDM's CAN communication.

LED state	Description
ON	CAN communication active.
OFF	LED or module is inoperative
SLOW FLASH (1 Hz)	CAN bus okay, no communication with ECU. Verify CAN bus connection to ECU.
FAST FLASH (10 Hz)	CAN bus error (passive). Verify terminating resistors are correctly installed on CAN bus.
DOUBLE BLINK	CAN bus error (active). Evaluate CAN bus wiring for shorts, improper wiring, etc.

Table 4. COM LED states.

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### 3.3.3. Buttons

The High Current PDM has two buttons (green SQUARE, red CIRCLE) which are used to enter passwords (see section 5.2). The display will show a “1” momentarily when the green SQUARE button is pressed and a “0” momentarily when the red CIRCLE button is pressed.



Figure 4. High Current PDM buttons.




**Surface may be HOT when operating with high current. Use caution when operating buttons.**

### 3.4. Device type and address

The High Current PDM is recognized by the ES-Key Professional software as a **Power Distribution Module** (default), but may be configured via password as an Input Output Module (see section 5.7.1).

The High Density PDM's **address is 0** (default), but may be configured to any valid ES-Key address by entering a password (see section 5.6).



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## 4. Input / Output Detail

### 4.1. Solid state positive outputs

Outputs 0 through 7 utilize solid state, fully protected high-side drivers that feature overload protection, current limitation, and transient protection. These output drivers replace the requirement of a relay and circuit breaker.

#### High current rating

Each high current output is capable of supplying 30 Amps continuously. However, each Deutsch connector must be limited to a maximum of 100 Amps. The high current outputs are located on the black and green Deutsch connectors.



**The OEM is responsible for limiting each Deutsch connector to a maximum of 100 Amps of output current and to ensure that no more than 200 Amps is permitted through the power supply cable.**



**Combining multiple outputs in an effort to increase load carrying capability is NOT recommended due to current balancing issues which may cause over-current conditions.**

#### 4.1.1. Circuit protection (software circuit breaker)

An output will automatically turn OFF when its current exceeds 31.0 Amps (tolerance +/- .5 amps) for 3 seconds. The module will attempt to turn ON and verify the load two more times at 5 second intervals. If the output is still overloaded it will remain OFF.

An output's "circuit breaker" feature can be reset by de-activating the output and then re-activating the output through the ES-Key network.

When an output is in an over-current situation a fault is logged to the USM and data logger.

#### 4.1.2. Flash outputs

The High Current PDM has the integrated capability to flash outputs for use with flashing lights, wig-wag lights, etc. (refer to the I/O memory space table in section 5.1.1).

The outputs have the capability to flash at two flash rates: 150 pulses per minute (2.5 Hz) and 75 pulses per minute (1.25 Hz). Outputs 0 - 3 flash on the "A" pulse, and outputs 4 - 7 flash on the "B" pulse. This logic makes implementing alternating flashers quite simple.

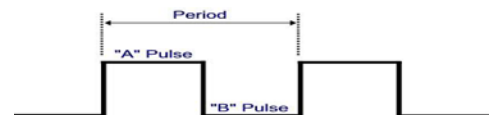



Figure 5. Output banks A and B flash rates.

Output memory spaces 12 through 19 control the output flash feature and output memory spaces 20 control the flash rate (see section 5.1.1).


Activate an output's flash output (output memory space 0-7) to begin flashing the output. The physical output (output memory space 0-7) should be OFF.

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An output's flash occurs on the opposite bank when its flash output is ON **and** its physical output is ON. For example, output 0 normally flashes on the "A" pulse (its primary BANK), but when its flash output memory space 12) and its physical output memory space 0 are activated together output 0 flashes on the "B" pulse (its alternate BANK).

Output memory space	Flash memory space	Result
OFF	OFF	Physical output is OFF
ON	OFF	Physical output is ON
<b>OFF</b>	<b>ON</b>	<b>Physical output is flashing on its primary BANK pulse</b>
<b>ON</b>	<b>ON</b>	<b>Physical output is flashing on its alternate BANK pulse</b>

Table 5. Flash logic.

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#### 4.1.3. Pulse Width Modulate (PWM) outputs

Outputs can be controlled ON at reduced power by activating the output's associated PWM control in the output memory space (refer to the output memory space table in section 5.1.1).

For example, activating output memory space 24 (PWM control of physical output 0) while NOT activating output memory space 0 (output control of physical output 0) will cause physical output 0 to be ON with PWM. This feature is useful for dimming lights, etc.

The table below shows the interaction of a physical output's control and PWM controls in the output memory space.

Output control memory space	PWM control memory space	Result
OFF	OFF	Physical output is OFF
ON	OFF	Physical output is ON
<b>OFF</b>	<b>ON</b>	<b>Physical output is ON with PWM 60%</b>
ON	ON	Physical output is ON (no PWM)

Table 6. PWM logic.

For example, as shown in the table above, if the output and PWM are activated the load for a physical output will be ON. To set the physical output to PWM (reduced power) mode it is necessary only to shed the primary output address for the desired output.


## 4.2. Selectable polarity inputs

The High Current PDM has 8 selectable polarity inputs (positive or ground). The state of the inputs is reported in the standard input memory space (see section 5.1.1).

The **default polarity** of the inputs is **positive**, but they may be changed by entering a special password (see section 5.3).

### 4.2.1. Viewing the configured input polarity

The input's configured polarity may be verified by entering a password and watching the display (see section 5.4.2).

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## 5. ES-Key Network Detail


### 5.1. Input/output memory space

The High Current PDM uses ES-Key defined input and output memory space. The High Current PDM uses the standard I/O memory space for the polarity selectable inputs, physical outputs, Flash, and PWM control.

#### 5.1.1. Standard I/O memory space

INPUT MEMORY SPACE		OUTPUT MEMORY SPACE		
INPUT	DESCRIPTION	OUTPUT	LOCATION	
0	Physical input 0	0	Physical output 0	30A, positive
1	Physical input 1	1	Physical output 1	30A, positive
2	Physical input 2	2	Physical output 2	30A, positive
3	Physical input 3	3	Physical output 3	30A, positive
4	Physical input 4	4	Physical output 4	30A, positive
5	Physical input 5	5	Physical output 5	30A, positive
6	Physical input 6	6	Physical output 6	30A, positive
7	Physical input 7	7	Physical output 7	30A, positive
8	<i>reserved</i>	8	<i>reserved</i>	
9	<i>reserved</i>	9	<i>reserved</i>	
10	<i>reserved</i>	10	<i>reserved</i>	
11	<i>reserved</i>	11	<i>reserved</i>	
12	<i>reserved</i>	12	Flash output 0	
13	<i>reserved</i>	13	Flash output 1	
14	<i>reserved</i>	14	Flash output 2	
15	<i>reserved</i>	15	Flash output 3	
16	<i>reserved</i>	16	Flash output 4	
17	<i>reserved</i>	17	Flash output 5	
18	<i>reserved</i>	18	Flash output 6	
19	<i>reserved</i>	19	Flash output 7	
20	<i>reserved</i>	20	Flash period (ON = 150Hz, OFF = 75Hz)	
21	<i>reserved</i>	21	<i>reserved</i>	
22	<i>reserved</i>	22	<i>reserved</i>	
23	<i>reserved</i>	23	<i>reserved</i>	
24	<i>reserved</i>	24	PWM output 0	
25	<i>reserved</i>	25	PWM output 1	
26	<i>reserved</i>	26	PWM output 2	
27	<i>reserved</i>	27	PWM output 3	
28	<i>reserved</i>	28	PWM output 4	
29	<i>reserved</i>	29	PWM output 5	
30	<i>reserved</i>	30	PWM output 6	
31	<i>reserved</i>	31	PWM output 7	

Table 7. Standard I/O memory space.

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## Configuration

### 5.2. Entering passwords


The High Current PDM utilizes passwords to modify its operational parameters. All operational parameters are stored in memory and will not be lost when power is disconnected.

Use the green **SQUARE** and red **CIRCLE** buttons to enter passwords. Each button press will show either a 1 or a 0 on the display to indicate the button pressed: **1** for the green SQUARE button and **0** for the red CIRCLE button. Each password button press must occur within 4 seconds of the last button press otherwise the attempted password is cleared.

#### 5.2.1. List of passwords

Function	Root password	Remaining password	Section
Set Input Mode	<input type="checkbox"/> <input type="radio"/> <input type="checkbox"/> <input type="checkbox"/>	Enter desired channel with 4 presses ( <input type="checkbox"/> = bit 1, <input type="radio"/> = bit 0). Enter desired function with 4 presses ( <input type="checkbox"/> = bit 1, <input type="radio"/> = bit 0).	5.3.1
View Input Mode	<input type="checkbox"/> <input type="checkbox"/> <input type="radio"/> <input type="checkbox"/>	Enter desired channel with 4 presses ( <input type="checkbox"/> = bit 1, <input type="radio"/> = bit 0).	5.3.2
Set polarity	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="checkbox"/>	Enter desired polarity with 8 presses ( <input type="checkbox"/> = positive, <input type="radio"/> = ground).	5.4.1
View polarity	<input type="radio"/> <input type="radio"/> <input type="checkbox"/> <input type="radio"/>	None. Flashes back the input number and polarity (using decimal).	5.4.2
Set Reference Mode	<input type="checkbox"/> <input type="checkbox"/> <input type="radio"/> <input type="radio"/>	Enter desired mode with 4 presses ( <input type="checkbox"/> = bit 1, <input type="radio"/> = bit 0).	5.5.1
View Reference Mode	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="radio"/>	None. Displays back the reference mode	5.5.2
Set address	<input type="radio"/> <input type="radio"/> <input type="checkbox"/> <input type="checkbox"/>	Enter desired address with 4 presses ( <input type="checkbox"/> = bit 1, <input type="radio"/> = bit 0).	5.6
Set device type	<input type="radio"/> <input type="checkbox"/> <input type="radio"/> <input type="radio"/>	Enter desired device type with 4 presses ( <input type="radio"/> <input type="radio"/> <input type="checkbox"/> = PDM, <input type="radio"/> <input type="checkbox"/> <input type="radio"/> = IOM).	5.7.1
View device type	<input type="radio"/> <input type="checkbox"/> <input type="radio"/> <input type="checkbox"/>	None. Flashes back the device type number (1 = PDM, 4 = SOM).	5.7.2
Load defaults	<input type="checkbox"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="radio"/> <input type="radio"/> <input type="checkbox"/> <input type="checkbox"/>	5.8

Table 8. Password list.

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	<b>PRODUCT</b>	<b>High Current PDM – 8 output / 4 INPUT / 4MFI input</b>			<b>REV</b>	1.00
					<b>BY</b>	<b>GMC</b>

### 5.3. Input Mode

The 4 MFI inputs (Input 0 through 3) can be configured for the desired mode of operation (**Digital** mode is the default).

#### 5.3.1. Set Input Mode

The password to set the mode consists of 12 button presses. The root password is the first 4 button presses (   ) the next 4 button presses indicate the channel and the remaining 4 button presses indicate the desired mode of the inputs. Use the table below to configure the remaining 8 bits of the password ( = bit 1,  = bit 0).

ROOT PASSWORD				Input				Mode			
<input type="checkbox"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> or <input type="radio"/>	<input type="checkbox"/> or <input type="radio"/>	<input type="checkbox"/> or <input type="radio"/>	<input type="checkbox"/> or <input type="radio"/>	<input type="checkbox"/> or <input type="radio"/>	<input type="checkbox"/> or <input type="radio"/>	<input type="checkbox"/> or <input type="radio"/>	<input type="checkbox"/> or <input type="radio"/>

Input	Password
0	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
1	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="checkbox"/>
2	<input type="radio"/> <input type="radio"/> <input type="checkbox"/> <input type="radio"/>
3	<input type="radio"/> <input type="radio"/> <input type="checkbox"/> <input type="checkbox"/>
ALL	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

Mode	Password	Display
Digital	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	0
4-20mA	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="checkbox"/>	1
0-5 Volt	<input type="radio"/> <input type="radio"/> <input type="checkbox"/> <input type="radio"/>	2
0-30 Volt	<input type="radio"/> <input type="radio"/> <input type="checkbox"/> <input type="checkbox"/>	3
Thermistor	<input type="radio"/> <input type="checkbox"/> <input type="radio"/> <input type="radio"/>	4
Frequency	<input type="radio"/> <input type="checkbox"/> <input type="radio"/> <input type="checkbox"/>	5

**Note: Frequency is only available for Input 0 and 1.**

For example, input 0 is desired to be a 0-5 volt input – the password would be:            .

If the password is valid the display will blank then display a number to indicate the mode the input is set for.

#### 5.3.2. View Input Mode

The password to view the mode consists of 8 button presses. The root password is the first 4 button presses (   ) the remaining 4 button presses indicate the desired input. Use the table below to configure the remaining 4 bits of the password ( = bit 1,  = bit 0).


ROOT PASSWORD				Input			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/> or <input type="radio"/>	<input type="checkbox"/> or <input type="radio"/>	<input type="checkbox"/> or <input type="radio"/>	<input type="checkbox"/> or <input type="radio"/>

Input	Password
0	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
1	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="checkbox"/>
2	<input type="radio"/> <input type="radio"/> <input type="checkbox"/> <input type="radio"/>
3	<input type="radio"/> <input type="radio"/> <input type="checkbox"/> <input type="checkbox"/>

Mode	Display
Digital	0
4-20mA	1
0-5 Volt	2
0-30 Volt	3
Thermistor	4
Frequency	5

**Note: Frequency is only available for Input 0 and 1.**

For example, to check input 0 – the password would be:        .

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					<b>BY</b>	<b>GMC</b>

If the password is valid the display will blank then display a number to indicate the mode the input is set for.

#### 5.4. Input polarity

Each of the 8 physical inputs can be configured for positive or ground polarity inputs (**positive** polarity is the **default**)  
 Note: input 0 through 3 must be selected to be Digital.

##### 5.4.1. Set polarity

The password to set the polarity consists of 12 button presses. The root password is the first 4 button presses (○ ○ ○ □) and the remaining 8 button presses indicate the desired polarity of the inputs. Use the table below to configure the remaining 10 bits of the password (□ = positive, ○ = ground).

ROOT PASSWORD				IN 7	IN 6	IN 5	IN 4	IN 3	IN 2	IN 1	IN 0
○	○	○	□	□ or ○	□ or ○	□ or ○	□ or ○	□ or ○	□ or ○	□ or ○	□ or ○

For example, inputs 0,1, 2, and 3 are desired to be ground polarity and inputs 4, 5, 6, and 7 are desired to be ground positive – the password would be: ○ ○ ○ □ □ □ □ □ ○ ○ ○.

##### 5.4.2. View polarity

The password to view the configured input polarities consists of 4 button presses.

ROOT PASSWORD			
○	○	□	○

After entering the “view polarity” password the High Current PDM’s display will scroll through the input numbers (0 through 7). If the display’s decimal is ON then the input is configured for positive polarity, if the display’s decimal is OFF the input is configured for ground polarity. Each input and its polarity will be shown for two seconds. After all ten inputs are shown the High Density PDM will return to normal operation.

#### 5.5. Reference Selection

Input 7 can be configured to be a voltage reference selectable between 5 volt and 9 volt.

##### 5.5.1. Set Reference Mode

The password to view the mode consists of 8 button presses. The root password is the first 4 button presses (□ □ ○ ○) the remaining 4 button presses indicate the desired mode. Use the table below to configure the remaining 4 bits of the password (□ = bit 1, ○ = bit 0).


ROOT PASSWORD				Mode			
□	□	○	○	□ or ○	□ or ○	□ or ○	□ or ○

Mode	Password	Display
Off	○ ○ ○ ○	0
5 Volt	○ ○ ○ □	5
9 Volt	○ ○ □ ○	9

**Note: If set to a voltage Output 20 becomes disabled.**

For example, to set to 5 volts – the password would be: □ □ ○ ○ ○ ○ □ .

If the password is valid the display will blank then display a number to indicate the mode the reference is set for.

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					<b>BY</b>	<b>GMC</b>

### 5.5.2. Get Reference Mode

The password to view the mode consists of 4 button presses.

ROOT PASSWORD			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>


Mode	Password	Display
Off	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	0
5 Volt	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="checkbox"/>	5
9 Volt	<input type="radio"/> <input type="radio"/> <input type="checkbox"/> <input type="radio"/>	9

**Note:** If set to a voltage Input 7 becomes disabled.

For example, to check the reference voltage – the password would be:    .

If the password is valid the display will blank then display a number to indicate the mode the reference is set for.




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**5.6. Address configuration**

The High Current PDM's address can be set to any of the valid ES-Key addresses (0 through 15). Address 14 **cannot** be used if the device type is the default PDM (device type 1) because this *device type/address* combination is reserved for the ES-Key USM's use.

The password to set the address consists of 8 button presses. The root password is the first 4 button presses (○ ○ □ □) and the remaining 4 button presses indicate the desired address in binary coded decimal.

ROOT PASSWORD				ADDRESS			
○	○	□	□	□ or ○	□ or ○	□ or ○	□ or ○



Address	Password
0	○ ○ ○ ○
1	○ ○ ○ □
2	○ ○ □ ○
3	○ ○ □ □
4	○ □ ○ ○
5	○ □ ○ □
6	○ □ □ ○
7	○ □ □ □

Address	Password
8	□ ○ ○ ○
9	□ ○ ○ □
10	□ ○ □ ○
11	□ ○ □ □
12	□ □ ○ ○
13	□ □ ○ □
14	□ □ □ ○
15	□ □ □ □

The address may be viewed at anytime during normal operation on the High Density PDM's display.

**5.7. Device Type configuration**

The High Current PDM's device type can be set as an Input Output Module (IOM, device type 4) or a Power Distribution Module (PDM, device type 1). The High Density PDM's **default device type** is a **Power Distribution Module**.

**5.7.1. Set device type**

Set the High Density PDM to Power Distribution Module device type.

ROOT PASSWORD				PDM DEVICE TYPE			
○	□	○	○	○	○	○	□

Set the High Density PDM to Input Output Module device type.


ROOT PASSWORD				IOM DEVICE TYPE			
○	□	○	○	○	□	○	○

**5.7.2. View device type**

The password to view the configured device type consists of 4 button presses.

ROOT PASSWORD			
○	□	○	□

After entering the "view device type" password the High Current PDM's display will flash a number corresponding to the device type for 2.5 seconds. A number 1 is a Power Distribution Module (PDM), and a number 4 is an Input Output Module (IOM). The High Current PDM returns to normal operation after flashing the configured device type.

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					<b>BY</b>	<b>GMC</b>


**5.8. Load defaults**

The High Density PDM's default configuration may be reloaded at anytime by entering a password.

ROOT PASSWORD				LOAD DEFAULTS							
<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="radio"/>	<input type="checkbox"/>

The High Density PDM's default configurations are:

- Input polarity for all inputs: Positive
- Device type: Power Distribution Module, device type 1
- Device address: 0
- Circuit protection over-current level for all outputs: 31 Amps

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## 6. Mounting and Installation

### 6.1. Overall dimensions

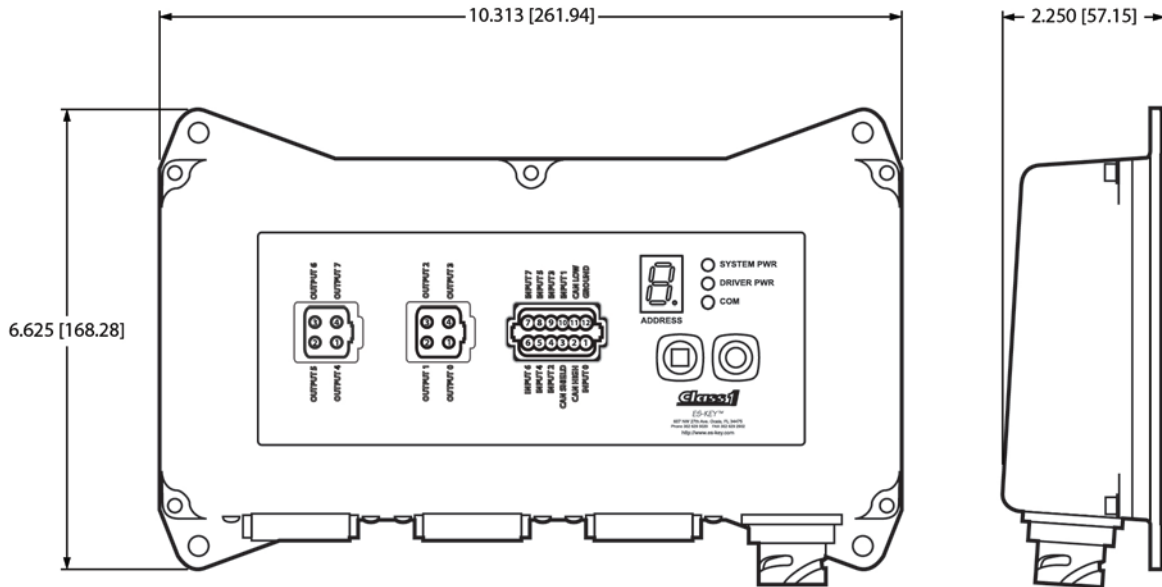


Figure 6. Overall dimensions in inches [millimeters].

### 6.2. Mounting dimensions

Mount the High Current PDM with four screws and nuts.

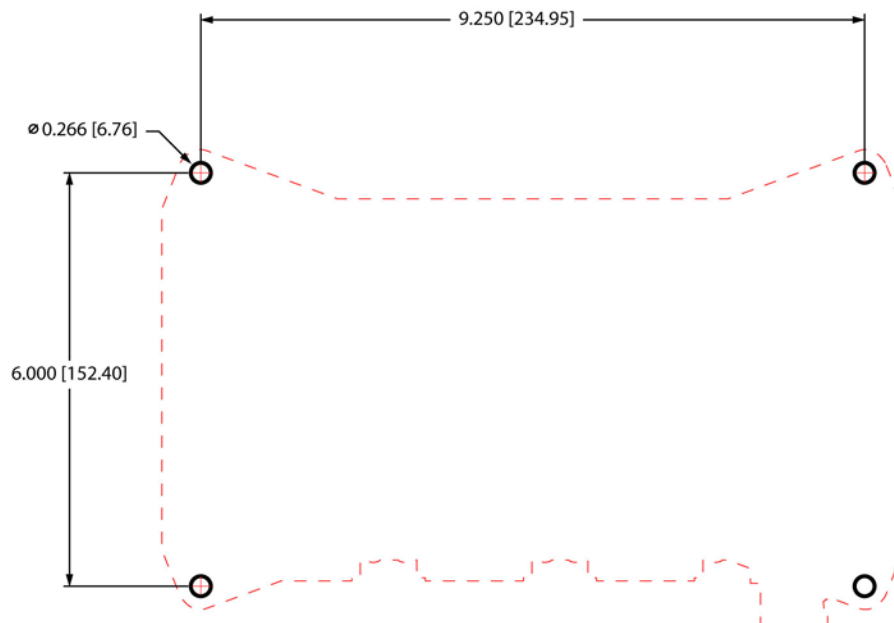



Figure 7. Installation dimensions in inches [millimeters].

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## 7. Connector Descriptions

### 7.1. Gray connector

<b>Mating connector:</b>		Deutsch DT06-12SA GRAY
<b>Mating sockets:</b>		Deutsch 0462-201-16141
<b>Gold mating sockets:</b>		Deutsch 0462-201-1631
<b>Recommended wire gage:</b>		16-20 AWG
<b>Wedge lock:</b>		W12S
PIN	CIRCUIT	DESCRIPTION
1	INPUT 0	(INPUT) – Positive/Ground polarity (configurable)(MFI)
2	CAN HIGH	(DATA) – SAE J1939 CAN 2.0B, 250Kbits/s *
3	CAN SHIELD	(DATA) – SAE J1939 CAN 2.0B, 250Kbits/s *
4	INPUT 2	(INPUT) – Positive/Ground polarity (configurable)(MFI)
5	INPUT 4	(INPUT) – Positive/Ground polarity (configurable)
6	INPUT 6	(INPUT) – Positive/Ground polarity (configurable)
7	INPUT 7	(INPUT) – Positive/Ground polarity (configurable)
8	INPUT 5	(INPUT) – Positive/Ground polarity (configurable)
9	INPUT 3	(INPUT) – Positive/Ground polarity (configurable)(MFI)
10	INPUT 1	(INPUT) – Positive/Ground polarity (configurable)(MFI)
11	CAN LOW	(DATA) – SAE J1939 CAN 2.0B, 250Kbits/s *
12	SYS GROUND	(INPUT) – battery ground


\* Gold sockets recommended for CAN connections.

### 7.2. Black connector (Middle)

<b>Mating connector:</b>		Deutsch DTP06-4S GREY DTP06-4S-E004 BLACK
<b>Mating sockets:</b>		Deutsch 0462-203-12141
<b>Recommended wire gage:</b>		10-12 AWG
<b>Wedge lock:</b>		WP4S
PIN	CIRCUIT	DESCRIPTION
1	OUTPUT 0	(OUTPUT) – Positive polarity (30 Amps)
2	OUTPUT 1	(OUTPUT) – Positive polarity (30 Amps)
3	OUTPUT 2	(OUTPUT) – Positive polarity (30 Amps)
4	OUTPUT 3	(OUTPUT) – Positive polarity (30 Amps)

### 7.3. Black connector

<b>Mating connector:</b>		Deutsch DTP06-4S GREY DTP06-4S-E004 BLACK
<b>Mating sockets:</b>		Deutsch 0462-203-12141
<b>Recommended wire gage:</b>		10-12 AWG
<b>Wedge lock:</b>		WP4S
PIN	CIRCUIT	DESCRIPTION
1	OUTPUT 4	(OUTPUT) – Positive polarity (30 Amps)
2	OUTPUT 5	(OUTPUT) – Positive polarity (30 Amps)
3	OUTPUT 6	(OUTPUT) – Positive polarity (30 Amps)
4	OUTPUT 7	(OUTPUT) – Positive polarity (30 Amps)


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					<b>BY</b>	GMC

#### 7.4. High power connector

<b>Mating connector:</b>	Cannon 121583-0013	
<b>Mating socket:</b>	Cannon 031-8521-020 (2 AWG) Cannon 031-8521-010 (4 AWG)	
<b>Hexagonal nut:</b>	Cannon 217-8516-010	
<b>Cable seal:</b>	Cannon 351-8697-001 0.409 in – 0.472 in [10.4mm – 12.0mm]	
<b>Recommended wire gage:</b>	2 AWG	
<b>For more information - Cannon website:</b>	<a href="http://www.ittcannon.com">http://www.ittcannon.com</a>	
PIN	CIRCUIT	DESCRIPTION
1	OUTPUT PWR	(INPUT) – battery voltage (+9VDC...+32VDC) *




***The output power feed line should be fused to limit current to 200 Amps maximum.***

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					BY	GMC

## 8. Technical Details and Compliances

Product category	ES-Key	
Voltage range	+9VDC...+32VDC	
Maximum current draw	Logic supply+ input (pin 1 of 12-pin gray connector)	
@13.8VDC	73 mA	
@27.6VDC	82 mA	
Temperature range	-40°F...+185°F (-40°C...+85°C)	
Environmental range	IP 67	
CAN specification	SAE J1939, 250 Kbits/second	
LED	3 LEDs (two green and one red) to indicate status	
Electrical protection	Internal thermal fuse (2500 mA on pin 1 of gray 12-pin connector)	
	CAN bus protected for heavy duty trucks (24V)	
	Transient voltage protected to SAE J1113 specification for heavy duty trucks (24V)	
Electrical performance	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 2 of 12-pin gray connector), Class C device	ISO 16750-2
	Overvoltage due to failing generator, Class A device	ISO 16750-2
	Immunity to conducted transients on power leads, L4 requirements (24V)	SAE J1113-11
	Immunity to Electrostatic Discharge – powered and unpowered modes	SAE J1113-13
	Immunity to radiated electromagnetic fields, Class C device	SAE J1113-21
	Conducted emission on power leads (Class 3 average and Class 5 peak limits)	CISPR 25
	Radiated emissions, absorber-lined shielded enclosure (Class 1 average and Class 3 peak limits)	CISPR 25
	Reset behavior on voltage drop 24V, Class C device	ISO 16750-2
	Environmental performance	Thermal shock
Exposure to humidity		MIL-STD-810F (method 507.4)
Thermal shock due to splash		Class 1 (STD-0001)
Pressure cleaning		Class 1
Exposure to salt spray atmosphere/fog		SAE J1455 (sec 4.3)
Exposure to outdoor UV		ISO 4892-2 (method A)
Exposure to chemicals		Class 1
Mechanical performance	Resonance dwell	SAE J1455 (sec 4.9.4.1)
	Random vibration	SAE J1455 (sec 4.9.4.2)
	Mechanical shock	SAE J1455 (sec 4.10.3.4)
Dimensions (W x H x D) in inches [millimeters]	10.313 [261.94] x 6.625 [168.28] x 2.250 [57.15]	
Weight in ounces [grams]	55.7 [1579.1]	

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