INSTRUCTION MANUAL

P/N 30-8300
8 CH POWER DISTRIBUTION UNIT

STOP! - READ THIS BEFORE INSTALL OR USE!

WARNING:
IT IS THE RESPONSIBILITY OF THE INSTALLER TO ULTIMATELY CONFIRM THE CONFIGURATION USED FOR ANY PARTICULAR INSTALLATION IS SAFE FOR ITS INTENDED USE. AEM HOLDS NO RESPONSIBILITY FOR ANY DAMAGE THAT RESULTS FROM THE MISUSEOF THIS PRODUCT.

Working on Electric Vehicle tractive systems with high voltage battery packs requires special experience and training. Doing this safely is entirely the responsibility of the installer. AEM has done everything it can to ensure the VCU has appropriate fault detection and failsafe logic but that does not mean that your installation will be safe or that your VCU installation will not interfere with other systems on your vehicle and create a hazardous situation. It is the responsibility of the installer to understand the implications of each stage of tractive system installation and testing, and to know what might be unique about your application that presents an unintended hazard or potential safety issue – and to solve it.

Following is a brief list of recommended practices. This is not a comprehensive list; as noted below, if you are not well-versed in the appropriate installation and testing procedures, you should refer the installation and calibration to a reputable installation facility or contact AEM EV for a referral in your area.

- When access is required near the battery pack, the cell segments must be separated by using an appropriate maintenance disconnect plug.
- When working on the battery pack or tractive system, safety glasses with side shields and appropriate insulated tools must be used.
- Always wear Class 0 gloves rated at 1000V with leather protectors.
- Only use a CAT III rated digital multi-meter (DMM) and test leads.
- When working on the battery pack or tractive system, use the one hand rule: work with one hand keeping the other behind your back whenever possible.
- During initial system power up and testing, the vehicle must be raised off the ground and supported appropriately. Wheels/tires should be removed.
- During the VCU firmware upgrade process, battery cell segments must be separated by using an appropriate maintenance disconnect plug.
- Do not make calibration changes while the inverter PWM is enabled.

USE THIS PDU WITH EXTREME CAUTION. MISUSE AND/OR IMPROPER INSTALLATION CAN CAUSE SIGNIFICANT DAMAGE TO YOUR VEHICLE AND PROPERTY BELONGING TO YOU OR OTHERS, AS WELL AS PERSONAL INJURY OR DEATH. IF YOU ARE NOT WELL VERSED IN THE INSTALLATION OF TRACTIVE SYSTEMS OR CONFIGURING THE CALIBRATIONS IN THE AEM EV VCU THAT ARE NECESSARY TO CONTROL THE VEHICLE, YOU SHOULD REFER THE INSTALLATION AND VCU CALIBRATION TO A REPUTABLE INSTALLATION FACILITY, OR CONTACT AEM EV FOR A REFERRAL IN YOUR AREA. IT IS THE RESPONSIBILITY OF THE INSTALLER TO ULTIMATELY CONFIRM THAT THE INSTALLATION AND CALIBRATIONS ARE SAFE FOR ITS INTENDED USE.

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The PDU-8 is a very high current, small, and lightweight module designed to be mounted near the devices requiring power. Its design philosophy is for multiple units to be part of a vehicle installation and to distribute the power throughout the vehicle rather than having it concentrated in a central area.

The PDU-8 is not a stand-alone device. It is designed to be operated as a satellite unit and controlled via CAN by either an AEM Vehicle Control Unit or a programmable 3rd party device that can generate the required CAN control messages. As such, the PDU-8 module itself is not programmable in any way and only carries out commands issued by other devices.

Specific PDU's are identified by grounding different combinations of configuration pins on the PDU connector and 8 unique combinations are available. Since the pin configurations are part of the harness no software ID configuration is needed to be stored within the PDU, meaning units are field interchangeable.

Specifications

Parameter	Value
8 Outputs	Switched 12V 4 Channels continuous 20A max per channel 4 Channels continuous 10A max per channel Multiple channels can be combined for higher currents
Duty Cycle	Any channel, 100hz fixed, 0-100% duty
Total Unit Maximum Current	90A
CAN Bus	CAN 2.0, 500 kbps, up to 8 units per bus
Status LED	Solid when powered up and OK, Flashing when CAN is lost
Casing	Sealed Billet Aluminium
Size	105 x 67 x 33 mm
Weight	216 grams (7.6 oz)

NOTE: Use 2 pins for each output for full current capacity.

Connectors

ID	Connector	Loom/Mating Connector
1	TE SUPERSEAL 6437288-6	TE 3-1437290-7
2	M6 threaded power pin	M6 ring terminal (recommended)

A mating connector kit is available separately from AEM (P/N 30-3711, PDU Plug & Pin Kit). It contains 1x mating connector, 26x terminals, 10x blanking seals, 1x M6 Ring terminal, and 1x Ping Terminal cover.

Pin Out

Connector	1, TE Superseal	
Pin	**Name**	**Function/Notes**
1	High Side Driver 1	20 Amp Max
2		
3	CAN Low	Unterminated
4	CAN High	Unterminated
5	Ground	
6	High Side Driver 5	20 Amp Max
7		
8	High Side Driver 2	10 Amp Max
9		
10	Config 3	Ground for Unit ID's 5,6,7,8
11	Ground	
12	High Side Driver 6	10 Amp Max
13		
14	High Side Driver 3	10 Amp Max
15		
16	Config 2	Ground for Unit ID's 3,4,7,8
17	*Not Used*	
18	High Side Driver 7	10 Amp Max
19		
20	High Side Driver 4	20 Amp Max
21		
22	*Not Used*	
23	*Not Used*	
24	Config 1	Ground for Unit ID's 2,4,6, 8
25	High Side Driver 8	20 Amp Max
26		

Connector	2, M6 Threaded Power Pin	
Pin	**Name**	**Function/Notes**
1	12V Power	

CAN Control

If you are using the PDU-8 module with an AEM VCU then no specific CAN setup is required. Refer to the VCU instructions to activate the PDU within the control strategy used by the VCU.

If you are controlling the PDU-8 with a 3rd party device the following CAN control information will be needed. A CAN DBC file is available from AEM to aid in entering the CAN setup.

The PDU-8 will continuously transmit 2 messages at 20hz containing the current status of the 8 channels. Tx Message 1 is for Channels 1 to 4, Tx Message 2 is for Channels 5 to 8.

PDMMeasuredCurrent0# is an unsigned 10 bit number with a scale of 0.1A and an offset of 0 (0-102.3A). Note that the individual channels are assumed to be used to drive high current loads, in some cases up to 20A per channel. The current measurement is designed for use above 2 amps and currents below this are unreliable.

PDMErrorStatus0# is a 3 bit unsigned number with a scale of 1 and an offset of 0 (0 to 7). The possible values for the PDMErrorStatus0# are:

4 = Short Circuit

2 = Current Limit Exceeded

1 = Open Circuit

0 = OK

The Open Circuit detection only works when the channel is commanded off. Once the channel is turned on the measured current should be used to identify errors.

PDU-8 Tx Message 1, 0x000A0610 (for unit 1) continuous transmit at 20 hz

	BIT 7 (MSB)	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0 (LSB)
BYTE 1	PDMErrorStatus01 msb 7	6	lsb 5	4	3	2	PDMMeasuredCurrent01 msb 1	0
BYTE 2	PDMMeasuredCurrent01 15	14	13	12	11	10	9	lsb 8
BYTE 3	PDMErrorStatus02 msb 23	22	lsb 21	20	19	18	PDMMeasuredCurrent02 msb 17	16
BYTE 4	PDMMeasuredCurrent02 31	30	29	28	27	26	25	lsb 24
BYTE 5	PDMErrorStatus03 msb 39	38	lsb 37	36	35	34	PDMMeasuredCurrent03 msb 33	32
BYTE 6	PDMMeasuredCurrent03 47	46	45	44	43	42	41	lsb 40
BYTE 7	PDMErrorStatus04 msb 55	54	lsb 53	52	51	50	PDMMeasuredCurrent04 msb 49	48
BYTE 8	PDMMeasuredCurrent04 63	62	61	60	59	58	57	lsb 56

PDU-8 Tx Message 2, 0x000A0610 (for unit 1) continuous transmit at 20 hz

	BIT 7 (MSB)	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0 (LSB)
BYTE 1	PDMErrorStatus05 msb 7	6	lsb 5	4	3	2	PDMMeasuredCurrent05 msb 1	0
BYTE 2	PDMMeasuredCurrent05 15	14	13	12	11	10	9	lsb 8
BYTE 3	PDMErrorStatus06 msb 23	22	lsb 21	20	19	18	PDMMeasuredCurrent06 msb 17	16
BYTE 4	PDMMeasuredCurrent06 31	30	29	28	27	26	25	lsb 24
BYTE 5	PDMErrorStatus07 msb 39	38	lsb 37	36	35	34	PDMMeasuredCurrent07 msb 33	32
BYTE 6	PDMMeasuredCurrent07 47	46	45	44	43	42	41	lsb 40
BYTE 7	PDMErrorStatus08 msb 55	54	lsb 53	52	51	50	PDMMeasuredCurrent08 msb 49	48
BYTE 8	PDMMeasuredCurrent08 63	62	61	60	59	58	57	lsb 56

The PDU-8 is controlled by 2 CAN received messages;

Rx Message 1 receives the control information to the PDU-8 unit. Each message consists of 8 bytes. Each byte controls 1 of the 8 output drives. Byte 1 controls drive 1... Byte 8 controls drive 8. If the value is set to 0 then the output is off. A non 0 value sets the current limit for the output. If a value higher than the allowed maximum is selected then the current limit is set to the max allowed for that channel. If the PDU-8 unit does not receive the command message within 500mS it will switch off all the outputs and flash the Status LED.

PDMMaxCurrent0# is an unsigned 8 bit number with a scale of 0.4A and an offset of 0 (0-102A).

PDU-8 Rx Message 1, 0x000A0620 (for unit 1) timeout if not updated within 500mS

	BIT 7 (MSB)	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0 (LSB)
BYTE 1	PDMMaxCurrent01 msb 7	6	5	4	3	2	1	lsb 0
BYTE 2	PDMMaxCurrent02 msb 15	14	13	12	11	10	9	lsb 8
BYTE 3	PDMMaxCurrent03 msb 23	22	21	20	19	18	17	lsb 16
BYTE 4	PDMMaxCurrent04 msb 31	30	29	28	27	26	25	lsb 24
BYTE 5	PDMMaxCurrent05 msb 39	38	37	36	35	34	33	lsb 32
BYTE 6	PDMMaxCurrent06 msb 47	46	45	44	43	42	41	lsb 40
BYTE 7	PDMMaxCurrent07 msb 55	54	53	52	51	50	49	lsb 48
BYTE 8	PDMMaxCurrent08 msb 63	62	61	60	59	58	57	lsb 56

Rx Message 2 receives the PWM duty value for the output. The PWM control of the outputs is designed to regulate the speed of devices like pumps and fans. If message 2 is present then all of the outputs will become PWM duty cycle outputs with a base frequency of 100hz.The requested duty cycle can vary between 0 – 100%. Any outputs that you do not want to have a PWM should have a value of 255. If this message does not update within 500mS then the PDU-8 will treat all channels with simple ON/OFF control.

PDMDutyOut0# is an unsigned 8 bit number with a scale of 0.392157 and an offset of 0 (0-100%).

PDU-8 Rx Message 2, 0x000A0630 (for unit 1) timeout if not updated within 500mS

	BIT 7 (MSB)	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0 (LSB)
BYTE 1	PDMDutyOut01 msb 7	6	5	4	3	2	1	lsb 0
BYTE 2	PDMDutyOut02 msb 15	14	13	12	11	10	9	lsb 8
BYTE 3	PDMDutyOut03 msb 23	22	21	20	19	18	17	lsb 16
BYTE 4	PDMDutyOut04 msb 31	30	29	28	27	26	25	lsb 24
BYTE 5	PDMDutyOut05 msb 39	38	37	36	35	34	33	lsb 32
BYTE 6	PDMDutyOut06 msb 47	46	45	44	43	42	41	lsb 40
BYTE 7	PDMDutyOut07 msb 55	54	53	52	51	50	49	lsb 48
BYTE 8	PDMDutyOut08 msb 63	62	61	60	59	58	57	lsb 56

Multi Unit Configuration

There can be up to 8 PDU modules units on the same CAN bus. If more than one PDU is used on a CAN bus then the unit ID for each module needs to be set. If only 1 unit is to be used simply leave all the Config pins disconnected and ignore the rest of this section.

For multiple units to function in a single CAN bus, the PDU's need to be assigned one of 8 Unit ID's, each using unique receive and transmit CAN message addresses. To assign the Unit ID, the 3 config pins on the main connector (pins 10, 16 and 24) are either left open circuit (O/C) or connected to GND (Pin11).

The following table lists the configuration pin settings and the resulting 8 possible unit IDs.

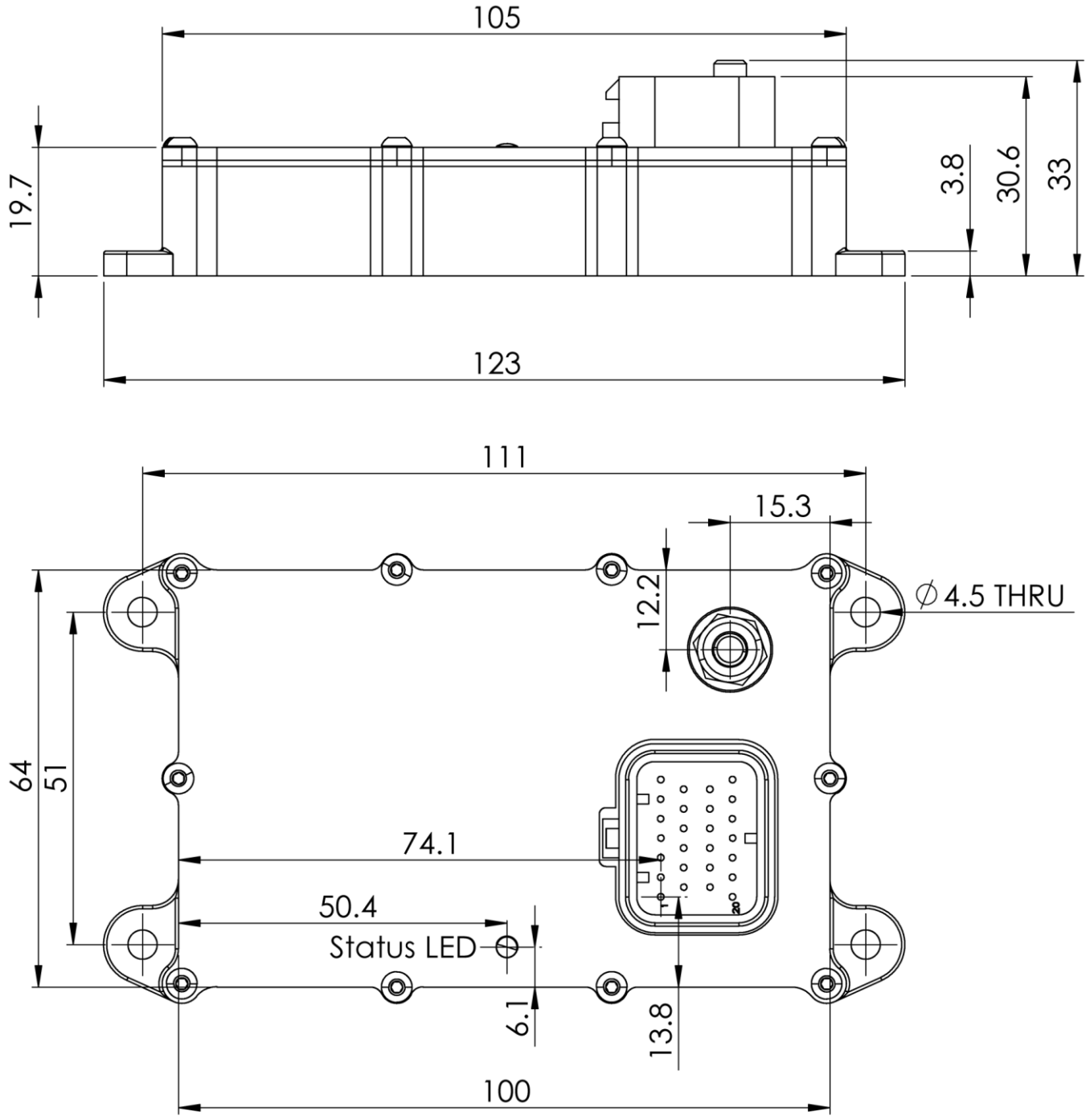
Unit ID	Config 1 Pin 24	Config 2 Pin 16	Config 3 Pin 10	TX Msg 1 Address	TX Msg 2 Address	RX Msg 1 Address	RX Msg 2 Address
1	O/C	O/C	O/C	0x000A0610	0x000A0611	0x000A0620	0X000A0630
2	Gnd	O/C	O/C	0x000A0612	0x000A0613	0x000A0621	0X000A0631
3	O/C	Gnd	O/C	0x000A0614	0x000A0615	0x000A0622	0X000A0632
4	Gnd	Gnd	O/C	0x000A0616	0x000A0617	0x000A0623	0X000A0633
5	O/C	O/C	Gnd	0x000A0618	0x000A0619	0x000A0624	0X000A0634
6	Gnd	O/C	Gnd	0x000A061A	0x000A061B	0x000A0625	0X000A0635
7	O/C	Gnd	Gnd	0x000A061C	0x000A061D	0x000A0626	0X000A0636
8	Gnd	Gnd	Gnd	0x000A061E	0x000A061F	0x000A0627	0X000A0637

Mounting

The PDU-8 has four 4.5mm mounting holes in a 51mm x 111mm (2.0” x 4.4”) rectangular pattern and is suitable for use with either an M4 or a #8 mounting fastener.

If the total power provided by any one PDU-8 is expected to exceed 50A continuous then the unit should be mounted with the bottom flush against a surface which can act as a heat dissipation path.

Dimensions



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AEM Performance Electronics warrants to the consumer that all AEM Electronics products will be free from defects in material and workmanship for a period of twelve months from the date of the original purchase. Products that fail within this 12-month warranty period will be repaired or replaced when determined by us that the product failed due to defects in material or workmanship. This warranty is limited to the repair or replacement of the AEM Electronics part. This warranty applies only to the original purchaser of the product and is non-transferable. All implied warranties shall be limited in duration to the said 12-month warranty period. Improper use or installation, accident, abuse, unauthorized repairs or alterations performed by the user on any AEM Electronics products voids this warranty.

In no event shall this warranty exceed the original purchase price of the AEM Electronics part nor shall AEM Electronics be responsible for special, incidental or consequential damages or cost incurred due to the failure of this product.

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Warranty returns will only be accepted by AEM Electronics when accompanied by a valid Return Merchandise Authorization (RMA) number and a dated proof of purchase. The product must be received by AEM Electronics within 30 days of the date the RMA is issued. Warranty claims to AEM Electronics must be shipped to us prepaid (we recommend a shipping service with package tracking capability). Once your package is received by our warranty and repairs department you will be notified and provided with updates.

PROCEDURES FOR ISSUANCE OF A RETURN MERCHANDISE AUTHORIZATION (RMA) NUMBER–

Please note that before AEM Electronics can issue an RMA for any product, it is first necessary for the installer or end-user to contact our technical support team to discuss the problem. Most issues can be resolved over the phone. Under no circumstances should a system be returned, or an RMA requested before our support team is contacted. This will ensure that if an RMA is needed that our team is able to track your product through the warranty process.

You can reach our Tech Support Team for support on all AEM Electronics performance products by phone at 1-800-423-0046. To contact us by email for engine management systems, email us at emstech@aemelectronics.com. For all other products, email us at gen.tech@aemelectronics.com.

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