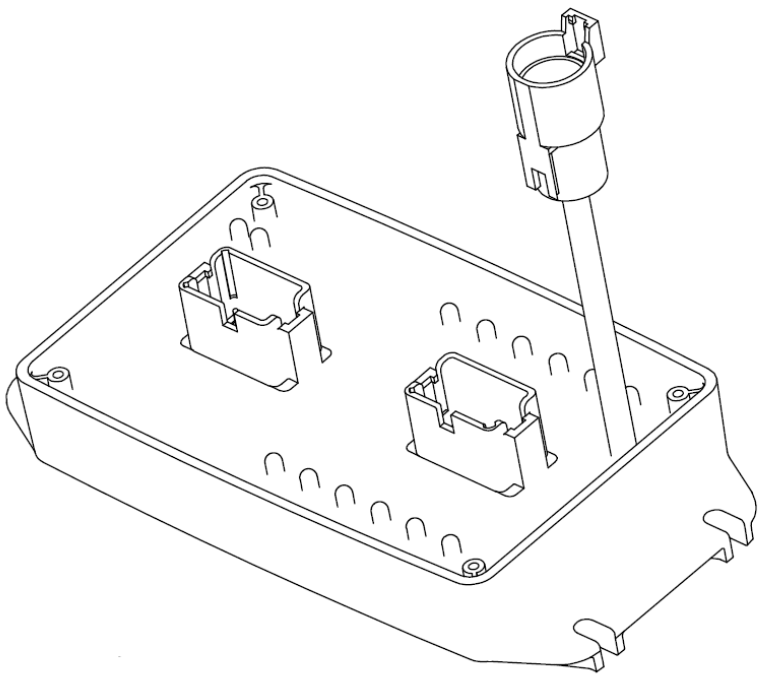
Device: J1939 High Current 12 Output Module (12V)

Trombetta P/N: 99-0530



Specification Revision History:

Rev	Rev Date	Modified by	Description
A	6/18/2019	ALG	First time release
B	7/12/2019	AM	Added ambient temp vs. max current graph to environmental requirements section.
C	2/25/2020	AM	Added outputs are sourcing to the features section. Fixed an oversight on the ambient temp vs. max current graph.
D	11/11/2020	AM	Added an updated Continuous Operation Derating Curve. Updated the electrical/mechanical/environmental specifications with testing specifications/notes and findings from DVP&R testing. Fixed small oversights such as inputs being listed instead of addressing pins in the ground pin matrix table.

Contents

Features:

- For 12VDC Systems (operating voltage supply range 8-16VDC)
- Twelve SOURCING outputs
- Outputs [1] – [8]
  - Rating (per output): 13A (maximum) continuous current
- Outputs [9] – [12]
  - Rating (per output): 3A (maximum) continuous current
- System Total Maximum Current Draw:
  - 100A *Reference the Continuous Operation Derating Curve*
- Each output has short circuit and overcurrent detection and protection
- Four addressing pins that adjust CAN-ID when grounded via external harnessing
- CAN Baud Rate:
  - 250k
- CAN SAE J1939 communications protocol
- IP67 Rated with properly mated connectors

Module Reference Guide:

LED Indicator Location Reference:

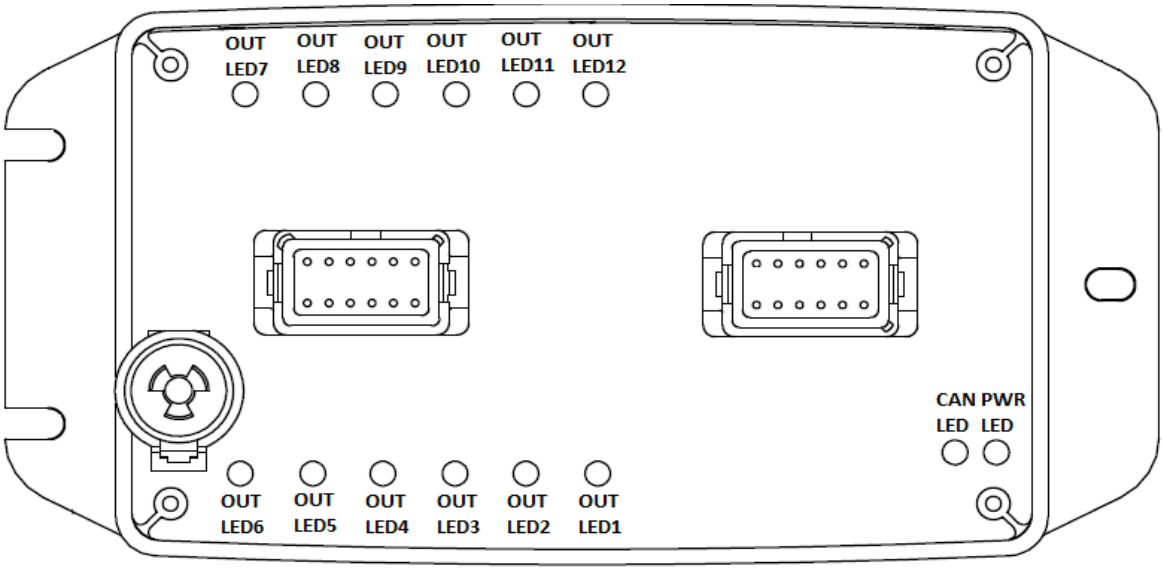


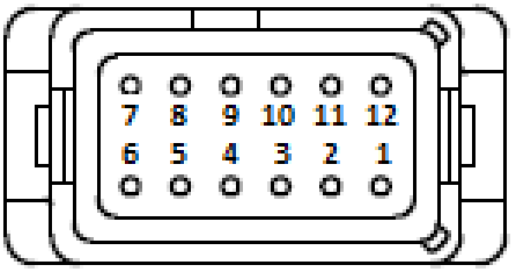
Image 1: A top-down view of the 99-0530 with LEDs labeled for reference

FET Battery Input:

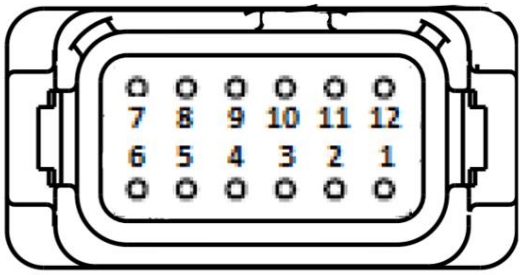
Connector: Deutsch DTHD04-1-4P, Contact 0460-204-0490

Mating Connector: Deutsch DTHD06-1-4S, Socket 0462-203-08141

Connector Pinout Reference:



Connector 1: Black Deutsch DTF15-12PB



Connector 2: Gray Deutsch DTF15-12PA

Outputs Connector (Gray):

Connector: Deutsch DTF15-12PA

Mating Connector: DT06-12SA-P012, Socket 1062-16-0122, Wedgelock W12S-P012

Pinout Outputs Connector (Gray):

Pin:	**Function:**
1	Output[1]
2	Output[2]
3	Output[3]
4	Output[4]
5	Output[5]
6	Output[6]
7	Output[7]
8	Output[8]
9	Output[9]
10	Output[10]
11	Output[11]
12	Output[12]

Power/Ground/Com/Input Connector (Black):

Connector: Deutsch DTF15-12PB

Mating Connector: DT06-12SB-P012, Socket 1062-16-0122, Wedgelock W12S-P012

Power/Ground/Com/Input Connector (Black):

Pin:	**Function:**
1	Ground – Common with pin 12, only one of these must be connected
2	CANH communication
3	CANL communication
4	Address[0]
5	Address[1]
6	Address[2]
7	Address[3]
8	Unused
9	Unused
10	Unused
11	Battery, logic power
12	Ground – Common with pin 1, only one of these must be connected

Ground Pin Matrix (LSB CAN ID):

The Ground pin Matrix provides the end user with the ability to change the modules 4 Least Significant Bits of its CAN ID. This is achieved by sinking the addressing pins to ground via external harnessing. Please note that these addressing pins are only read in during powerup. Each addressing pin can be thought of as a specific bit in a 4-place binary number. If the addressing pin is not grounded, the value of the bit is 0. When ground is applied to the addressing pin, the value of the bit is 1.

Reference the truth table below for possible CAN-ID combinations:

Address 3:	Address 2:	Address 1:	Address 0:	CAN ID:
0	0	0	0	0
0	0	0	1	1
0	0	1	0	2
0	0	1	1	3
0	1	0	0	4
0	1	0	1	5
0	1	1	0	6
0	1	1	1	7
1	0	0	0	8
1	0	0	1	9
1	0	1	0	A
1	0	1	1	B
1	1	0	0	C
1	1	0	1	D
1	1	1	0	E
1	1	1	1	F

Key:
0 = Pin not connected
1 = Pin connected to ground

Table 1: Ground Pin Matrix truth table

Electrical Specifications:

Parameter	Min	Typ.	Max	Units	Notes
Functional Battery Voltage	8	14	16	VDC	Nominal 12VDC battery systems.
Reverse Battery Voltage	-	-	-16	VDC	One-hour verification test Test: ISO16750-2, Section 4.7.2.3
Jump Start Voltage	-	-	32	VDC	One-hour verification test Test: ISO16750-2, Section 4.3.2
Output Current	-	-	100	A	Reference Continuous Operation Derating Curve
CAN Bus Baud Rate	-	250	-	Kbps	The unit will default to 250Kbps only.
Electrostatic Discharge (ESD)	-15	-	15	KV	Per SAE J1113-12, Section 5, Test Sequence 1-5
Node ID	-	0x60	-	-	0x60 is default CAN ID, reference the Ground Pin Matrix section for how the CAN-ID is changed.

Environmental/Mechanical Specifications:

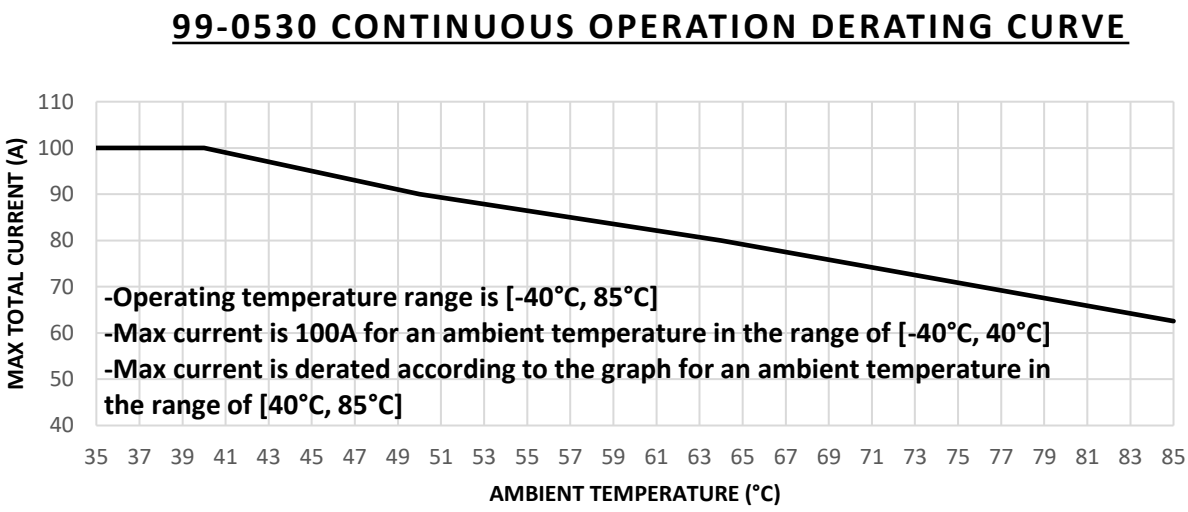
Parameter	Min	Typ.	Max	Units	Notes
Storage Temperature	-40	-	125	°C	
Operating Temperature	-40	-	85	°C	Including Condensing.
Ingress Protection	-	-	IP67	-	With all connectors properly mated and strain relieved.
Mounting Torque	-	-	50	in-lbs	Mounted with a M6 bolt, split lock washer, and a flat washer.

Parameter	Test	Notes
Thermal Cycle Test	SAE J1455 Section 4.1.3, 8-Hour Cycle	Unpowered, -40°C to 85°C, 20 cycles
Thermal Shock Test	ISO16750-4 Section 5.3. 2	Unpowered, -40°C to 85°C, 100 cycles, 60 min dwells
Drop Test / Handling Shock	IEC 60068-2-31 Section 5.1, 5.2.	Topple, Free Fall 1m onto concrete
Humidity & Temperature Cycling (Thermal Cyclic Aging)	SAE J1455 Section 4.2.3, Figure 4A, 8 Hour	Powered but not necessarily monitored for function. -40°C to 85°C, 50 cycles
Fluid Compatibility	SAE J1455 Section 4. 4	Degreaser, DEF, Diesel, 10W-30 Motor Oil, Anti-Freeze
Thermal Shock Immersion	ISO16750-4 Section 5.4.3	Unit brought to 85°C to then submerged in Ice Water, Salt, Detergent, Dye, Unpowered for dunk.
Ingress Protection (IP)	IEC 60519, IP67	1m of Water, 30 minutes. Water and equipment temperature within 5°C of each other.
Mechanical Shock Test	Half -sine – 50g	3 axis, 11ms pulse duration in positive and negative directions with 1 second between pulses
Vibration - Random	Standard Trombetta random vibration profile. Overall GRMS- 8.17GRMS, 5-2000Hz	3 axis 8 hours per axes. Connectors populated.
Load Dump	ISO16750-2, Section 4.6.4.2.2, SAE J1113-11, Pulse 5B, ISO7637 Pulse 5B	32VDC, 2 Ohm, 350ms, 5 pulses, 1 min intervals

Continuous Operation Derating Curve:

Ambient temperature will limit the safe maximum allowable continuous current for this output module. This module DOES NOT read temperature and has been hard coded with a maximum current of 100A [+/-5%]. Please reference the graph below for the overall maximum continuous current allowed over the module's operating temperature range [-40°C, 85°C].

For ambient temperatures ranging from [-40°C, 40°C] the module can safely continuously operate with a maximum current draw of 100A. For ambient operating temperatures ranging [40°C, 85°C] the maximum current allowed for safe continuous operation is derated according to ambient temperature in *Graph 1* below.



Graph 1: 99-0530 Continuous Operation Derating Curve over the operating temperature range

END OF DOCUMENT