



EV ON-BOARD CHARGER + DC-DC CONVERTER



Features

- Universal AC input range
- Input/output protections
- Intelligent charging modes
- CAN 2.0B interface
- 500kbs communication rate
- Bootloader via CAN bus
- Compliance with SAE J1772-2017
- IP67 enclosure, liquid cooled

Electrical Specifications

These specifications are valid over the converter’s full ranges of input voltage output voltage and current, and operating temperature unless noted otherwise.

Input Specifications

Parameter	Notes & Conditions	Min	Typical	Max	Unit
OBC					
Input Voltage	AC input	85	220	265	Vac
Wakeup Voltage at “Wakeup in” Pin		9	12	16	Vdc
Bias Voltage		9	12	16	Vdc
Input Frequency		45	50	65	Hz
Input Current		-	-	32	A
Inrush Current		-	-	50	A
Current Draw by “Wakeup in” Pin		-	-	0.3	mA
Leakage Current		-	-	3	mA
Power Factor	≥50% load	0.99	-	-	-
DC-DC					
Input Voltage		200	-	480	Vdc
Input Current		-	-	10	A
Quiescent Current		-	-	20	mA



Output Specifications

Parameter	Notes & Conditions	Min	Typical	Max	Unit
OBC					
Output Voltage		200	-	480	Vdc
Output Current		0	-	22.7	A
Output Power	With derating	-	-	6,600	W
Output Current Accuracy	Typical Vin, full load, Ta = 25°C	-	-	±0.4	A
Output Ripple & Noise	20MHz bandwidth, with 0.1uF and 47uF capacitor, typical Vin	-	-	±3%	mVp-p
Efficiency	Typical Vin, full load, Ta = 25°C	-	-	94.0	%
DC-DC					
Output Voltage		12	-	15	Vdc
Rated Output Voltage		13.23	13.5	13.77	Vdc
Output Current		0	185	220	A
Output Power	With derating	-	2,500	-	W
Maximum Output Power	Less than 6 min.	-	-	3,000	W
Output Voltage Accuracy	Typical Vin, full load, Ta = 25°C	-1.0	-	+1.0	%Vo
Output Ripple & Noise	20MHz bandwidth, with 0.1uF and 47uF capacitor, typical Vin	-	-	400	mVp-p
Efficiency	Typical Vin, full load, Ta = 25°C	-	-	94.0	%
Quiescent Current		-	-	0.3	mA
Dynamic Response	Typical Vin, full load, Ta = 25°C	-	-	200	ms

Protection Specifications

Parameter	Notes & Conditions	Min	Typical	Max	Unit
OBC					
Input Under-voltage Protection		75	80	85	Vac
Input Under-voltage Recovery	Auto-recovery	80	85	90	Vac
Input Over-voltage Protection		265	270	275	Vac
Input Over-voltage Recovery	Auto-recovery	260	265	270	Vac
Output Under-voltage Protection		190	195	200	Vdc
Output Under-voltage Recovery	Auto-recovery	195	200	205	Vdc
Output Over-voltage Protection		480	485	490	Vdc
Output Over-voltage Recovery	Auto-recovery	475	480	485	Vdc
Over Temperature Protection (coolant temperature)	Reduced output power	60	-	80	°C
	Shut down	80	-	-	°C
Output Short Circuit Protection	Shut down, auto-recovery				
DC-DC					
Input Under-voltage Protection		185	190	195	Vdc
Input Under-voltage Recovery	Auto-recovery	185	200	205	Vdc
Input Over-voltage Protection		480	485	490	Vdc
Input Over-voltage Recovery	Auto-recovery	475	480	485	Vdc

Protection Specifications (Continued)

Parameter	Notes & Conditions	Min	Typical	Max	Unit
Output Under-voltage Protection		7.75	8	8.25	Vdc
Output Under-voltage Recovery	Auto-recovery	8.75	9	9.25	Vdc
Output Over-voltage Protection		16.75	17	17.25	Vdc
Output Over-voltage Recovery	Auto-recovery	15.75	16	16.25	Vdc
Over Temperature Protection (coolant temperature)	Reduced output power	65	-	85	°C
	Shut down	85	-	-	°C
Output Short Circuit Protection	Shut down auto-recovery				

Other Specifications

General Specifications

Parameter	Notes & Conditions	Min	Typical	Max	Unit
Operating Temperature	Automatically reduces the output power when the coolant temperature goes over 65°C.	-40	-	+85	°C
Storage Temperature		-40	-	+105	°C
Relative Humidity	No condensation	5	-	95	%
Altitude		-	-	5,000	m
Ingress Protection	IP67				
Dimension (including terminal)	428.0 x 326.3 x 76.5 mm				
Weight		-	8.4	-	kg

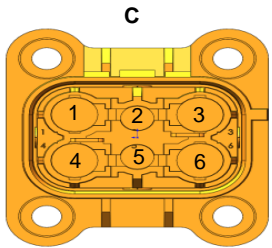
Cooling Specifications

Parameter	Notes
Cooling Style	Liquid cooled
Coolant Medium/Mixture	50/50 Ethylene Glycol/Water
Coolant Flow (min.)	5L/min.
Pressure Drop	See Figure 7

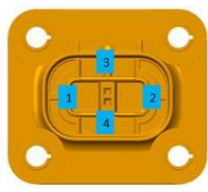
Safety Specifications

Parameter	Notes & Conditions	Min	Typical	Max	Unit
Isolation Voltage	Input-Output, 1 min.	2,000	-	-	Vac
		2,800	-	-	Vdc
Insulation Resistance		20	-	-	MΩ
Grounding Resistance	Case-Ground	-	-	0.1	Ω

Input Connector Descriptions


PIN NO.	Name	Module: 35048139	Mating Connector: 13879046
		Supplier: Delphi	
1	NC	 <p style="text-align: center;">C</p>	
2	Interlock in		
3	AC (L)		
4	AC (N)		
5	Interlock out		
6	NC		

High Voltage Output Connector Descriptions

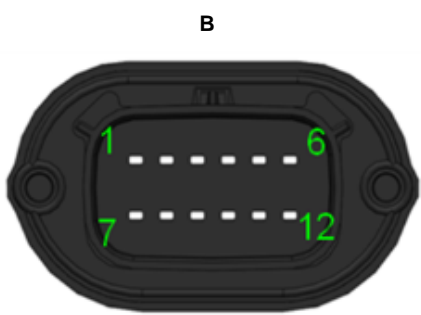
PIN NO.	Name	Module: 2310540-1	Mating Connector: 4-2103177-1
		Supplier: TE	
1	Vout -	 <p style="text-align: center;">A</p>	
2	Vout +		
3	Interlock 1		
4	Interlock 2		

Note: "Interlock 1" and "Interlock 2" are shorted together once the high voltage output cable is properly plugged in.

Low Voltage Output Connector Descriptions

PIN NO.	Name	
1	Vout +	

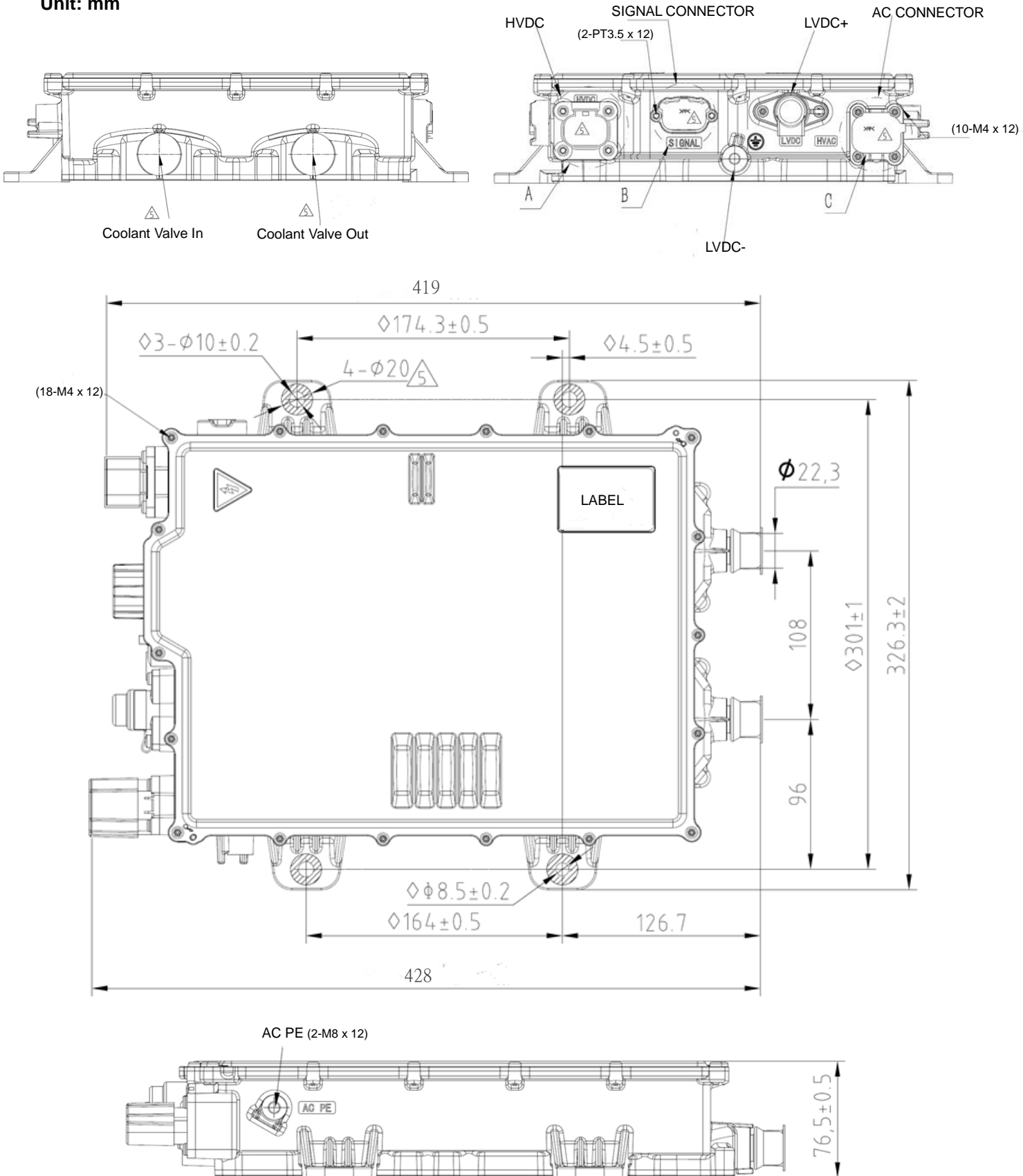
Signal Connector Descriptions

PIN NO.	Name	Module: 47725-6010	Mating Connector: 33472-1206
		Supplier: Molex	
1	CAN H	 <p style="text-align: center;">B</p>	
2	NC		
3	NC		
4	PP		
5	NC		
6	CP		
7	CAN L		
8	NC		
9	Wakeup in		
10	12Vin -		
11	12Vin +		
12	NC		



Mechanical Drawing

Unit: mm





Characteristic Curves

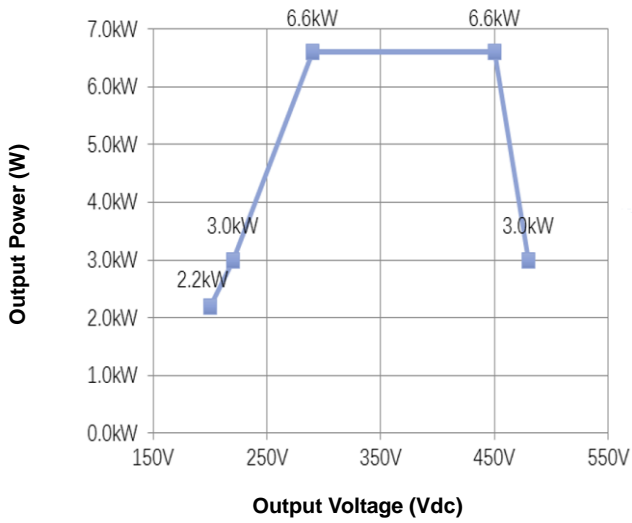


Figure 1. Output Power vs. Output Voltage (OBC)

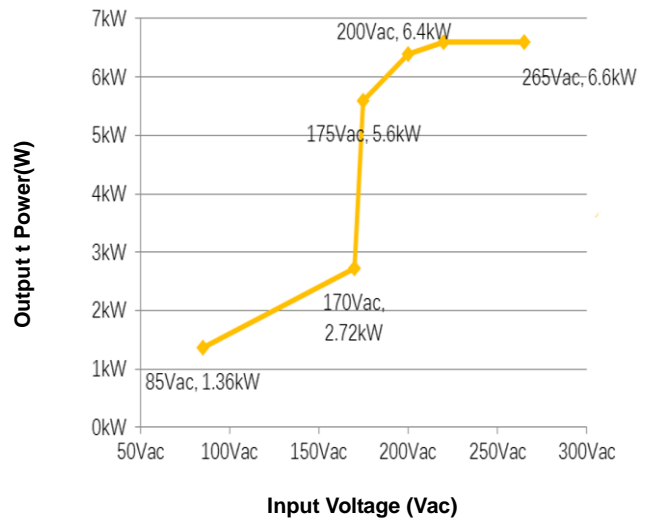


Figure 2. Output Power vs. Input Voltage (OBC)

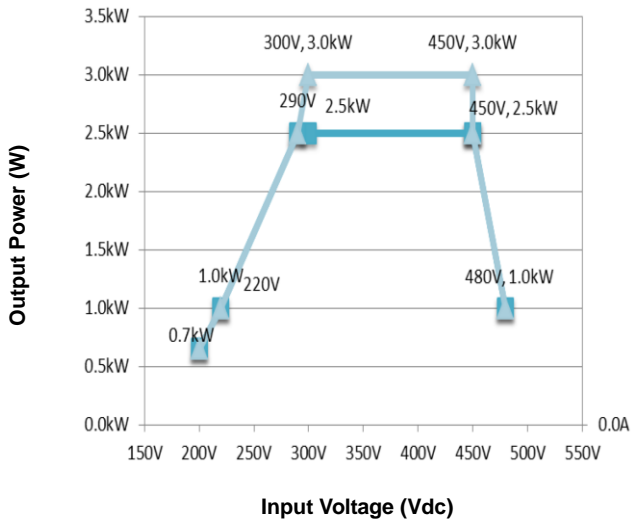


Figure 3. Output Power vs. Input Voltage (DC/DC)

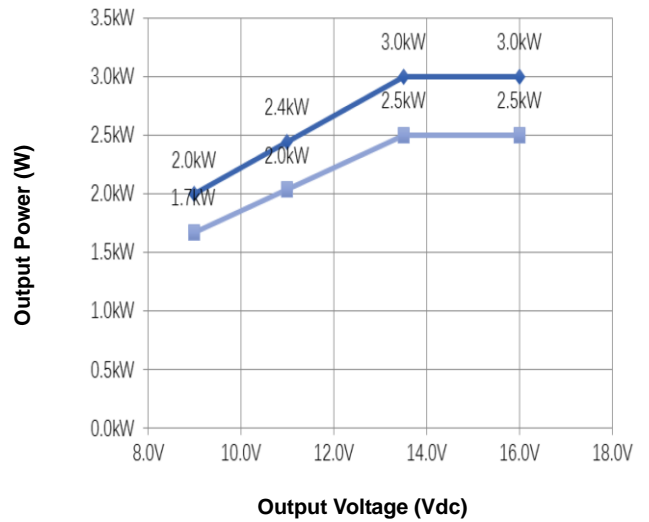


Figure 4. Output Power vs. Output Voltage (DC/DC)

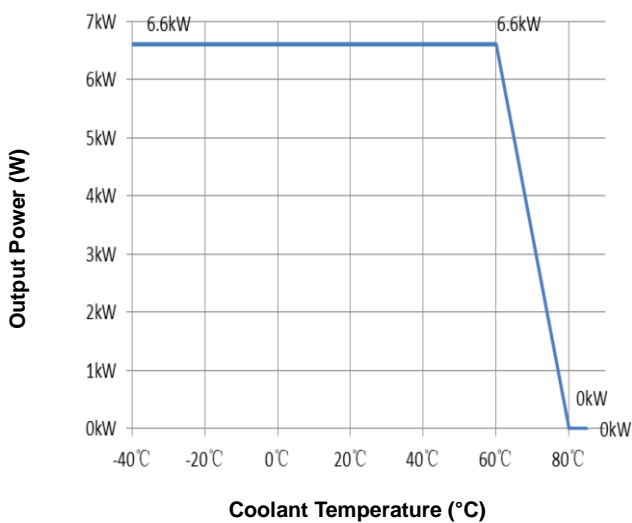


Figure 5. Output Power vs. Temperature (OBC)

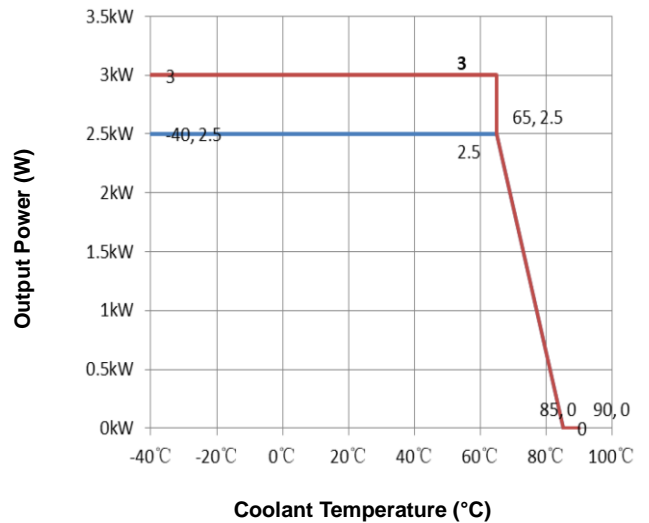


Figure 6. Output Power vs. Temperature (DC/DC)

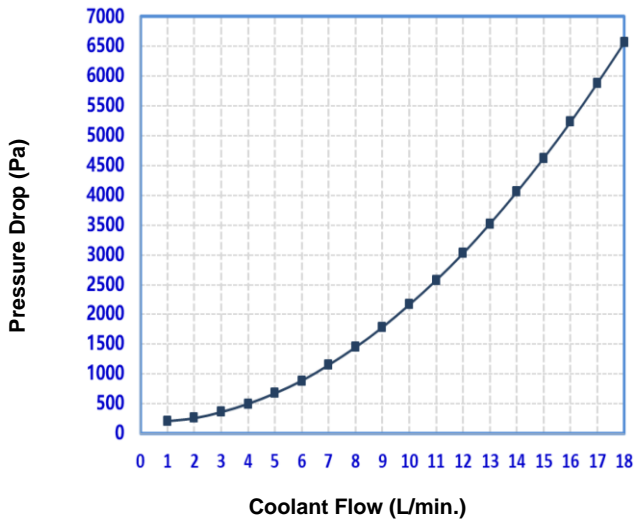


Figure 7: Pressure Drop vs. Coolant Flow (Ta=30°C)