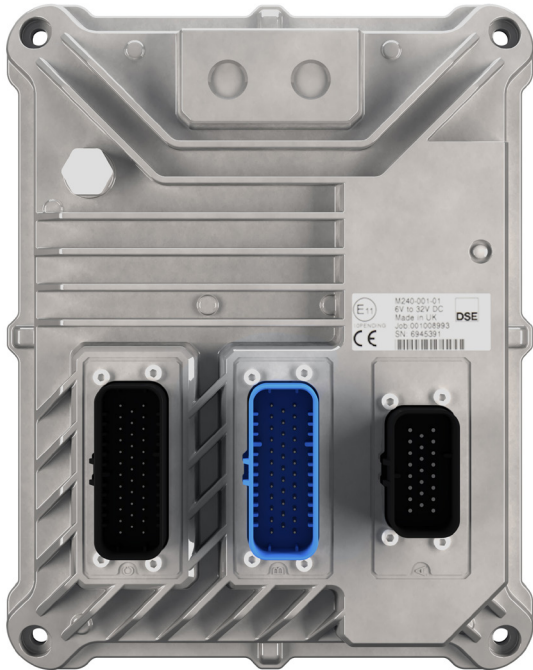




DSEM240

CAN SLAVE UNIT FOR USE IN VEHICLES
AND OFF-HIGHWAY MACHINERY



KEY FEATURES / SUMMARY

- Device specifically designed for mobile applications
- 20 configurable inputs, digital and analogue capability
- 24 configurable outputs with digital, PWM and PWMi
- CAN interfaces with J1939 or CANopen
- Robust die cast aluminium housing for IP67 protection

ADDITIONAL HARDWARE

M24x Connector Set
M24x Connector Harness Set

007-1021
016-175

OVERVIEW

DC SUPPLY
8 V DC to 32 V DC

CURRENT CONSUMPTION
OPERATING CURRENT
<300 mA at 24 V without external loads

TOTAL INPUTS/OUTPUTS
44 (20 inputs / 24 outputs)

INPUTS
Configurable
Digital inputs (active high/active low)
Analogue inputs voltage 0 V to 5 V, 0 V to 10 V, 0 V to 32 V, current 4 mA to 20 mA,
Ratiometric, Resistive, Frequency, Pulse Count

OUTPUTS
Configurable
2 A / 4 A
Digital Output High-Sided, Low-Sided
PWM, PWMi

INTERFACES
CAN 1
J1939 or CANopen

DIMENSIONS
37 mm x 240 mm x 190 mm (H x W x D)
1.46 " x 9.45 " x 7.48 " (H x W x D)

WEIGHT
<1.5 kg

STORAGE TEMPERATURE RANGE
-40 °C to +85 °C
-40 °F to +185 °F

OPERATING TEMPERATURE RANGE
-40 °C to +85 °C
-40 °F to +185 °F
(at full load)

PROTECTION RATING
IP67 (with mating connectors)

MOUNTING
4 x M6 bolts

RELATED MATERIALS

TITLE
M240 Installation Instructions
M240 Operators Manual

VARIANTS

PART NO.	DESCRIPTION	PART NO.
053-228	J1939 Variant	M240-01
057-270	CANOpen Variant	M240-02



Technical Data

DSEM240

Supply		Connector A
Operating voltage	8 V DC to 32 V DC	Pin 4
Unit power supply maximum current consumption (no external loads)	<300 mA at 24 V	
Fusing		Connector A
Unit power supply external protection fuse rating	3 A Max	Pin 4
Outputs supply input external fuse protection rating (i.e. sum of output currents from all outputs provided for by an individual supply to < external fuse rating in total)	16 A Max	Pin 1
	16 A Max	Pin 8
	16 A Max	Pin 16
	16 A Max	Pin 23
Max supply current	36 A Max	
Program Enable Pin		Connector A
Program enable high (program enabled)	> 6 V	Pin 5
Program enable low (program disabled)	< 2 V	
Program enable pin pull-down resistance	>30 kΩ	
Housing		
Diecast aluminium		
Dimensions		
49 mm x 240 mm x 190 mm (H x W x D) / 1.46 " x 9.45 " x 7.48 " (H x W x D)		
Weight		
1.5 kg		
Temperature		
Operating temperature	-40 °C to +85 °C / -40 °F to +185 °F	
Storage temperature	-40 °C to +85 °C / -40 °F to +185 °F	
Protection Rating		
IP Rating	IP67 (with mating connectors)	
Connectors		
Connector A - 23 pin TE connectivity 1-776228-1		
Connector B - 35 pin TE connectivity 1-776231-5		
Connector C - 35 pin TE connectivity 1-776231-1		
Digital Inputs		Connector B/C
Digital inputs active high/active low		Pin 6, 7, 8, 14, 17, 18, 22, 28, 29, 31
High level voltage threshold for active high	> 66% of the supply voltage	
Low level voltage threshold for active high	< 0.33 of the supply voltage	
Analogue Voltage Inputs		Connector B/C
0 V to 5 V programmable voltage range	0 V to 5 V	Pin 17, 18, 29
0 V to 10 V programmable voltage range	0 V to 10 V	Pin 7, 8
0 V to 32 V programmable voltage range	0 V to 32 V	Pin 7, 8, 17, 18, 29
Voltage measurement resolution	12 bits	
Voltage measurement accuracy	±1% FSD	
Voltage measurement input resistance	≥ 10 kΩ	
Voltage measurement sampling rate	1 kHz	
<i>FSD = Full Scale Deflection</i>		



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Analogue Current Inputs	Current Sink Only	Connector B/C
Current measurement ranges	0 mA to 20 mA	Pin 17, 18, 29
Current measurement resolution	12 bits	
Resistance measurement accuracy	±1% FSD	
Input resistance max	150 Ω ±1%	
Current measurement sampling rate	1 kHz	
<i>FSD = Full Scale Deflection</i>		
Analogue Resistive Inputs		Connector B/C
Resistance measurement range	0 Ω to 3400 Ω	Pin 7, 8
Input resistance max	<10 Ω ±1%	
Resistance measurement resolution	12 bits	
Resistance measurement accuracy	±1% FSD	
<i>FSD = Full Scale Deflection</i>		
Frequency Inputs		Connector B/C
Frequency range	5 Hz to 1 kHz / 160 Hz to 30 kHz	Pin 6, 28
Resolution	100 Hz at maximum frequency	
Accuracy	400 Hz at Maximum frequency	
High-level voltage threshold	> 2.1 V	
Low-level voltage threshold	> 1.1 V	
Outputs		Connector B/C
Output configuration (Type 1)		Pins 2, 3, 34, 35
Output mode	High side, PWM, PWMi	
Max current	4 A	
Leakage current when unit is shutdown	< 2 mA	
Leakage current when unit is active but output is off	< 10 mA @ 24 V	
PWM and PWMi frequency range (2)	20 Hz to 2 KHz (1 Hz steps)	
PWMi current range (4 A outputs)	0 A to 4 A	
Current measurement and resolution 4 A range	0 mA to 5000 mA (12bits)	
Current measurement accuracy	±1%	
Outputs		Connector B/C
Output configuration (Type 2)		Pins 5, 11, 26, 32
Output mode	High side, low side	
Max current	2 A	
Leakage current when unit is shutdown	<2 mA	
Leakage current when unit is active but output is off	<10 mA @ 24 V	
Current measurement and resolution 4 A range	0 mA to 6000 mA (12 bits)	



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Outputs		Connector B/C
Output configuration (Type 3)		Pins 1, 23
Output mode	High side, low side	
Max current	2 A / 4 A	
Leakage current when unit is shutdown	<2 mA	
Leakage current when unit is active but output is off	<10 mA @ 24 V	
Current measurement and resolution 4 A range	0 mA to 6000 mA (12 bits) High side only	
Current measurement accuracy	±10%	
Outputs		Connector B/C
Output configuration (Type 4)		Pins 12, 13
Output mode	High side, low side	
Max current	4 A	
Leakage current when unit is shutdown	<2 mA	
Leakage current when unit is active but output is off	<10 mA @ 24 V	
Current measurement and resolution 4 A range	0 mA to 6000 mA (12 bits) *High side only	
Current measurement accuracy	±10%	
Reference Voltage		Connector B/C
Reference voltage output	Programmable 5 V or 10 V	Pin 4
	500 mA accuracy ±8% under load	VREF GND Pin 21
CAN Interfaces		Connector A
Number of CAN interfaces	1	Pins 10, 11, 12, 13
Supported protocols	J1939 & CANopen	



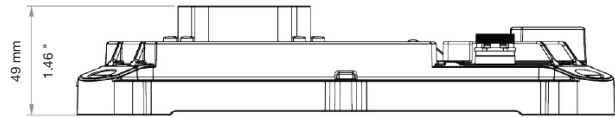
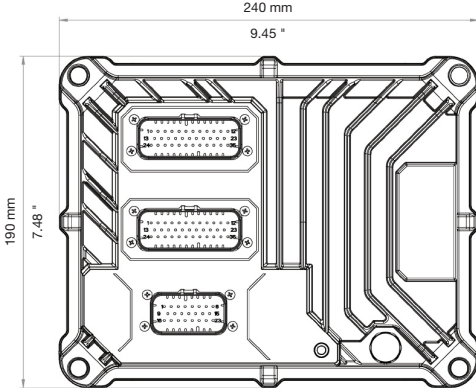
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Environmental and Testing		
CE marking	Electromagnetic compatibility (EMC) noise immunity Electromagnetic compatibility (EMC) emission standard Safety requirements for electrical equipment for measurement, control and laboratory use	EN 61000-6-2 EN 61000-6-4 EN 61010
E11 marking (Pending)	Emission standard noise immunity with 100 V / m	UN/ECE-R10
Electrical tests	Pulse 1, severity level: III; function state C Pulse 1, severity level: IV; function state C Pulse 2a, severity level: III; function state A Pulse 2a, severity level: IV; function state A Pulse 2b, severity level: III; function state C Pulse 2b, severity level: IV; function state C Pulse 3a, severity level: III; function state A Pulse 3b, severity level: III; function state A Pulse 3b, severity level: IV; function state A Pulse 4, severity level: III; function state A Pulse 4, severity level: IV; function state A Pulse 5a, severity level: III; function state A Pulse 5a, severity level: IV; function state A	ISO 7637-2 (2004 E) ISO 16750-2 (2012 E)
Climatic tests	Cold test, 96 hours unpowered minimum storage temperature. Increase to minimum operating temp 5 hours power cycle (50 % duty cycle) Dry heat, 96 hours operational at maximum operating temp Temp & humidity cyclic test, 18 hours unpowered maximum storage temperature. Decrease to maximum operating temp 5 hours power cycle (90 % duty cycle) Damp heat, cyclic 25 °C / 55 °C 95 % RH - 6 cycles Damp heat, steady state test temperature 40 °C / 93 % RH test duration: 21 days Temperature cyclic test	EN 60068-2-1 EN 60068-2-2 EN 60068-2-30 EN 60068-2-38 EN 60068-2-78
Mechanical tests	Shock Test. Shock pulse shape: Half sine Amplitude: 50 g Nominal duration: 6 ms Number of shocks: 3 in each direction of each axis (9 in total of each duration) Shock pulse shape: Half sine Amplitude: 50g Nominal duration: 11 ms Number of Shocks: 3 in each direction of each axis (9 in total of each duration)	BS EN 60068-2-27
	Resonance Search Vibration type: Sinusoidal Frequency range: 10 Hz to 2000 Hz Amplitude: 5 g Sweep rate: 1 octave per minute Number of sweeps: 1 up, 1 down	BS EN 60068-2-6
	Resonance Dwell Test Vibration type: Sinusoidal dwell Frequencies: At any resonant frequencies identified in the resonance search Amplitude: 5 g Duration: 5 minutes per identified resonance	BS EN 60068-2-6
	Random Vibration Test Vibration type: Broadband random Frequency range: 10 Hz to 350 Hz PSD level: Total 1.88 g RMS Duration: 5 hours per axis	BS EN 60068-2-64

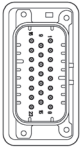


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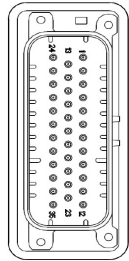
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Connector A

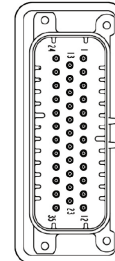


PIN	DESCRIPTION
1	Output Supply +VE
2	N/C
3	N/C
4	Product Supply +VE
5	Product Supply -VE
6	Program Enable
7	Output Supply -VE
8	Output Supply +VE
9	Output Supply -VE
10	CAN1 H
11	CAN1 H
12	CAN1 L
13	CAN1L
14	Output Supply -VE
15	Output Supply -VE
16	Output Supply +VE
17	Output GND
18	Output GND
19	AGND
20	Output GND
21	N/C
22	N/C
23	Output Supply +VE



Connector B

PIN	DESCRIPTION	REF
1	OUT H, L, 2 A, 4 A	QB010
2	OUT H, PWM/PWMI, 4 A	QB001
3	OUT H, PWM/PWMI, 4 A	QB002
4	VREF +	
5	OUT H, 2 A	QB005
6	DIN, Frequency	IB006
7	AIN, Resistive, 10 V, 32 V Range	IB001
8	AIN, Resistive, 10 V, 32 V Range	IB002
9	Output GND	
10	Output GND	
11	OUT H, 2 A	QB006
12	OUT H, L, 4 A	QB011
13	OUT H, L, 4 A	QB009
14	DIN	IB008
15	Output GND	
16	Output GND	
17	AIN, Current, 5 V, 32 V, Range	IB003
18	AIN, Current, 5 V, 32 V, Range	IB004
19	Output GND	
20	Output GND	
21	AGND	
22	DIN	IB009
23	Out H, L, 2 A, 4 A	QB012
24	Output GND	
25	Output GND	
26	OUT H, 2 A	QB007
27	Output GND	
28	DIN, Frequency	IB007
29	AIN, Current, 5 V, 32 V Range	IB005
30	Output GND	
31	DIN	IB010
32	OUT H, 2 A	QB008
33	Output GND	
34	OUT H, PWM/PWMI, 4 A	QB003
35	OUT H, PWM/PWMI, 4 A	QB004



Connector C

PIN	DESCRIPTION	REF
1	OUT H, L, 2 A, 4 A	QC010
2	OUT H, PWM/PWMI, 4 A	QC001
3	OUT H, PWM/PWMI, 4 A	QC002
4	VREF +	
5	OUT H, 2 A	QC005
6	DIN, Frequency	IC006
7	AIN, Resistive, 10 V, 32 V Range	IC001
8	AIN, Resistive, 10 V, 32 V Range	IC002
9	Output GND	
10	Output GND	
11	OUT H, 2 A	QC006
12	OUT H, L, 4 A	QC011
13	OUT H, L, 4 A	QC009
14	DIN	IC008
15	Output GND	
16	Output GND	
17	AIN, Current, 5 V, 32 V, Range	IC003
18	AIN, Current, 5 V, 32 V, Range	IC004
19	Output GND	
20	Output GND	
21	AGND	
22	DIN	IC009
23	OUT H, L, 2 A, 4 A	QC012
24	Output GND	
25	Output GND	
26	OUT H, 2 A	QC007
27	Output GND	
28	DIN, Frequency	IC007
29	AIN, Current, 5 V, 32 V Range	IC005
30	Output GND	
31	DIN	IC010
32	OUT H, 2 A	QC008
33	Output GND	
34	OUT H, PWM/PWMI, 4 A	QC003
35	OUT H, PWM/PWMI, 4 A	QC004

Abbreviations
 OUT PWM, H, L
 OUT H
 OUT H, L
 AIN
 DIN, H, L, FREQ

Output can be configured as a PWM, PWMI, digital high-side or digital low-side.
 Output is digital high.
 Output can be configured as a digital high-side or digital low-side.
 Input can be configured to positive digital, negative digital or analogue signal.
 Input can be configured to accept signals from positive digital, negative digital or frequency.

