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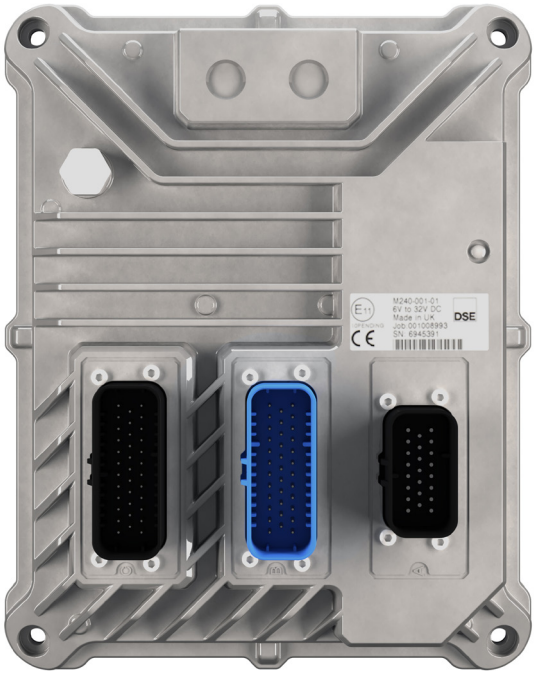
DSEM240

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	007-1021
M24x Connector Harness Set	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	PART NO.
M240 Installation Instructions	053-228
M240 Operators Manual	057-270

VARIANTS

DESCRIPTION	PART NO.
J1939 Variant	M240-01
CANOpen Variant	M240-02

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Technical Data

DSE**M240**

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	
FSD = Full Scale Deflection		

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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	
FSD = Full Scale Deflection		
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	
FSD = Full Scale Deflection		
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 in 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 ouput 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 ouput 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 ouput 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: IIII; 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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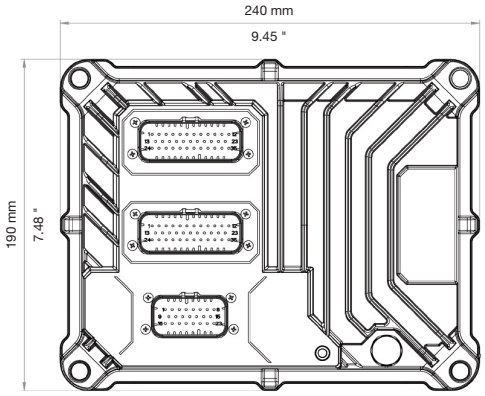
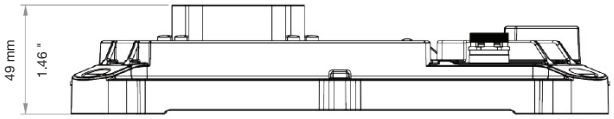
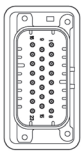


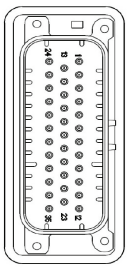


Connector A



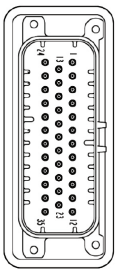
PIN	DESCRIPTION
1	Output Supply +VE
2	N/C
3	N/C
4	Product Supply +VE
5	Product Supply -VE
6	Program Enable
7	Output Supply -VE
8	Output Supply +VE
9	Output Supply -VE
10	CAN1 H
11	CAN1 H
12	CAN1 L
13	CAN1L
14	Output Supply -VE
15	Output Supply -VE
16	Output Supply +VE
17	Output GND
18	Output GND
19	AGND
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	Output can be configured as a PWM, PWMi, digital high-side or digital low-side.
OUT H	Output is digital high.
OUT H, L	Output can be configured as a digital high-side or digital low side.
AIN	Input can be configured to positive digital, negative digital or analogue signal.
DIN, H, L, FREQ	Input can be configured to accept signals from positive digital, negative digital or frequency.

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