VIM Versatile Input Module

Part Number #18110

The **VIM (Versatile Input Module)** is a compact expander that works in conjunction with an ACL or ADL3 Data Logger to facilitate the logging of high speed, high resolution inputs.

Its versatile nature and CAN-based communication allows multiple VIMs to be connected, providing for up to 200 sensor inputs. Because they can be located close to sensors, the weight and complexity of wiring can be reduced. The VIM supports many different types of sensors including unamplified thermocouples and strain gauges.

The VIM is configured and controlled using Data Logger Manager software, that has special programming functions for the VIM.

Basic Specifications

Inputs

- 6 x Fast analogue voltage inputs
- 8 x High resolution analogue voltage inputs
- 2 x Special analogue voltage inputs (fast, high resolution)
- 8 x Differential analogue voltage inputs
- 2 x Speed inputs

Internal sensors

- Battery voltage
- Internal temperature
- Internal voltages

Communications

- 1 x CAN

Power Supply

- Operating voltage 7 - 30 V
- Operating current 0.15 A (excluding sensor currents)
- Reverse battery protection
- Battery transient protection

Physical

- Case size 38 x 90 x 26.2 mm
- Weight 120 grams
- Connectors
  - 1 x 55 pin Autosport connector
  - 1 x 5 pin Autosport connector
- Internal temperature range -40 to 85 °C
- Ambient temperature range -40 to 70 °C

Other Information

Compatibility

- MoTeC Data Loggers: ACL and ADL3

Connectors and Pinout

Connector 1

55 pin Autosport connector
Mating connector: #68090

Pin	Name	Function
1	0V 1	Sensor 0 V 1
2	AV H1	Analogue Voltage High Res 1
3	AV H2	Analogue Voltage High Res 2
4	0V 4	Sensor 0 V 4
5	0V 1	Sensor 0 V 1
6	AV H3	Analogue Voltage High Res 3
7	AV H4	Analogue Voltage High Res 4
8	AV H5	Analogue Voltage High Res 5
9	AV H6	Analogue Voltage High Res 6
10	0V 4	Sensor 0 V 4
11	R1	Pull-up Resistor 1
12	R2	Pull-up Resistor 2
13	AV H7	Analogue Voltage High Res 7
14	AV H8	Analogue Voltage High Res 8
15	AV D1+	Analogue Voltage Diff 1 +
16	AV D1–	Analogue Voltage Diff 1 –
17	0V 3	Sensor 0 V 3
18	5V	Sensor 5 V
19	AV S1	Analogue Voltage Special 1
20	AV S2	Analogue Voltage Special 2
21	AV D8+	Analogue Voltage Diff 8 +
22	AV D8–	Analogue Voltage Diff 8 –
23	AV D2+	Analogue Voltage Diff 2 +
24	AV D2–	Analogue Voltage Diff 2 –
25	0V 3	Sensor 0 V 3
26	5V	Sensor 5 V
27	5V	Sensor 5 V
28	AV D7+	Analogue Voltage Diff 7 +
29	AV D7–	Analogue Voltage Diff 7 –
30	AV D5+	Analogue Voltage Differ 5 +
31	AV D5–	Analogue Voltage Diff 5 –
32	0V 2	Sensor 0 V 2
33	R3	Pull-up Resistor 3
34	R4	Pull-up Resistor 4
35	5V	Sensor 5 V
36	AV D4+	Analogue Voltage Differ 4 +
37	AV D4–	Analogue Voltage Diff 4 –
38	AV D6+	Analogue Voltage Diff 6 +
39	AV D6–	Analogue Voltage Diff 6 –
40	0V 2	Sensor 0 V 2
41	SPD1	Speed 1
42	SPD2	Speed 2
43	5V	Sensor 5 V
44	5V	Sensor 5 V
45	AV D3+	Analogue Voltage Diff 3 +
46	AV D3–	Analogue Voltage Diff 3 –
47	AV F1	Analogue Voltage Fast 1
48	AV F2	Analogue Voltage Fast 2
49	AV F3	Analogue Voltage Fast 3
50	AV F4	Analogue Voltage Fast 4
51	AV F5	Analogue Voltage Fast 5
52	AV F6	Analogue Voltage Fast 6
53		Not Used
54		Not Used
55		Not Used

Connector 2

5 pin Autosport connector
Mating connector: #65033

Pin	Name	Function
1	BAT –	Battery –
2		Not Used
3	BAT +	Battery +
4	CAN LO	CAN Low
5	CAN HI	CAN High

For Analogue Temperature inputs refer to the Input Types section.

Input Specification

Type	Qty	Update Rate	Analogue Filter*	Digital Filter**	Bits	Gain Range
AV F	6	5000 Hz***	4400 Hz	8 x Avg****	12	1
AV H	8	500 Hz	330 Hz	6.4 kHz	15	1-64
AV S	2	2000 Hz***	720 Hz	6.4 kHz	15	1-64
AV D	8	1000 Hz	360 Hz	6.4 kHz	15+Sign	1-64
AV SPD	2	100 Hz	7000 Hz	None	12	1

Type	At Gain = 1		
	Range	Resolution	Input Resistance
AV F	0 to 5 V	1.22 mV/step	66 kΩ
AV H	0 to 5 V	0.153 mV/step	150 kΩ
AV S	0 to 5 V	0.153 mV/step	150 kΩ
AV D	-5 to 5 V differential 0 to 5 V absolute*****	0.153 mV/step	150 kΩ
AV SPD	0 to 10.3 V	2.5 mV/step	90 kΩ (Magnetic mode)

Type	At Gain = 64		
	Range	Resolution	Input Resistance
AV H	0 to 78 mV	0.00238 mV/step	4.7 kΩ
AV S	0 to 78 mV	0.00238 mV/step	4.7 kΩ
AV D	-78 to +78 mV differential 0 to 3 V absolute	0.00238 mV/step	>1000 kΩ (gain > 1)

* Analogue filter: First order RC type. The frequency is the 3 dB point.

** Digital filter: 5th order digital sync filter. The frequency specifies the 3 dB point.

*** 1000 Hz when used with ADL3

*** Avg: Inputs are sampled at 40 kHz, 8 samples are averaged to give a 5 kHz update rate.

**** Only if all inputs in the group are set to gain = 1. See input types AV D

Input specifications continued

Sample Rates

Type	Sample time
AV F1	100
AV F2	100
AV F3	100
AV F4	100
AV F5	100
AV F6	100

Type	Sample time
AV H1	1550
AV H2	1800
AV H3	50
AV H4	300
AV H5	550
AV H6	800
AV H7	1050
AV H8	1300

Type	Sample time
AV S1	150
AV S2	400

Type	Sample time
AV D1	550
AV D2	800
AV D3	50
AV D4	300
AV D5	650
AV D6	900
AV D7	150
AV D8	400

Type	Sample time
AV SPD 1	1200
AV SPD2	1450

CAN Bus Limits

The total available CAN bandwidth on a single CAN bus is 1 Mbit/sec. The bandwidth used by the total of all devices on the CAN bus must not exceed approximately 90% of this value (900000 bits/second)

If using multiple VIMs and fast logging rates, it may be necessary to put some VIMs on one CAN bus and some on the other to avoid exceeding the CAN bus bandwidth limit.

Approximate bandwidth = Total measurement rate (samples/second) x 30 (bits per sample)

Note The measurement rate for an input equals the logging rate or 50 Hz, whichever is higher.

Example

- 4 channels at 2000 Hz
- 20 channels at 500 Hz
- 40 channels at 20 Hz (occupies 50 Hz)

Total measurement rate =
4 x 2000 + 20 x 500 + 40 x 50 =
20000 (samples/sec)

Approximate bandwidth =
20000 x 30 = 600000 (bits/sec)

The Data Logger Manager will warn if the bandwidth is likely to be exceeded.

Configuration

The VIM has no stand-alone software package. It is configured using the special VIM control options in the Manager software of the controlling device; ACL or ADL3.

Data Logger Control

- In ACL Manager software, on the **Inputs** menu, click ***ACL Connections***
  OR
  In ADL3 Manager software, on the **Connections** menu, click **Devices**.
- In the *Connections* screen select ***Edit > Add*** to add a VIM to the devices list.
- In the *Connection Properties* screen enter the VIM serial number and CAN bus number.
- The various inputs can then be assigned to a channel and calibrated.

There is no need to configure the communications section in ACL/ADL3 Manager; this is done automatically.

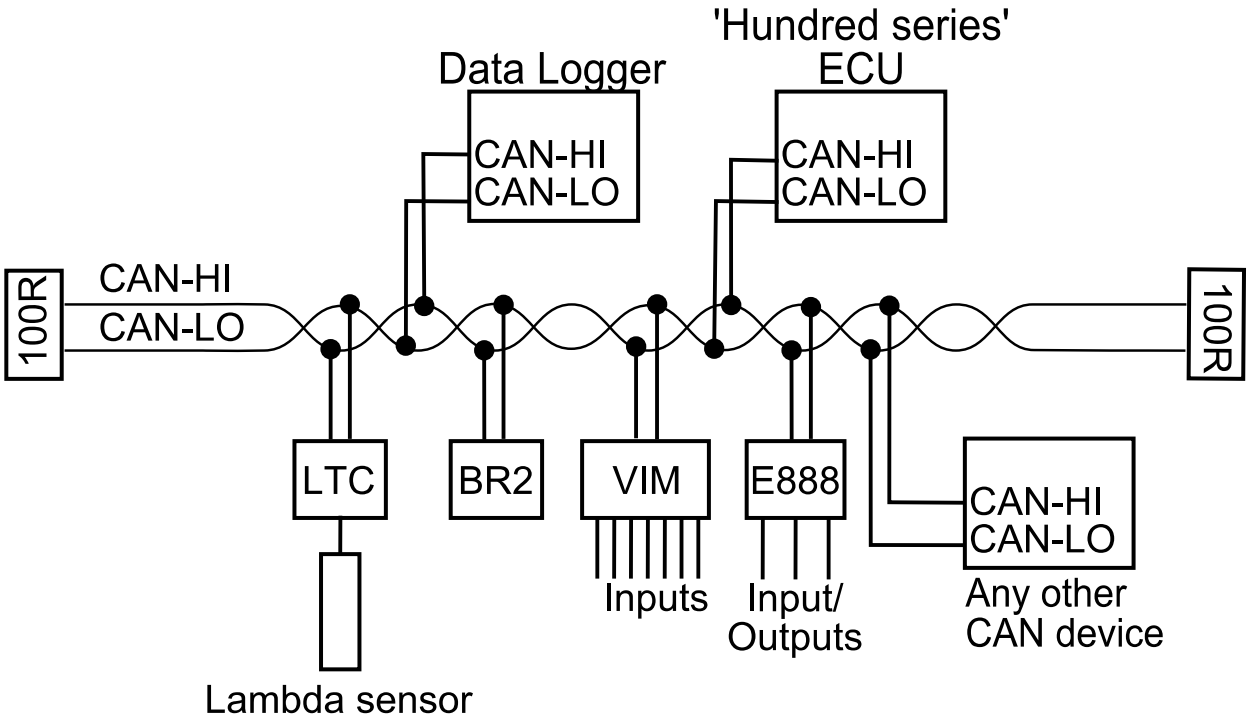
Firmware

When sending the configuration file to the ACL/ADL3, the Manager software will also automatically update the firmware version in the VIM if necessary.

To check the current firmware version

- On the **Help** menu, click **About MoTeC ACL/ADL3 Manager**.
  This will list the firmware versions of all supported devices

Wiring



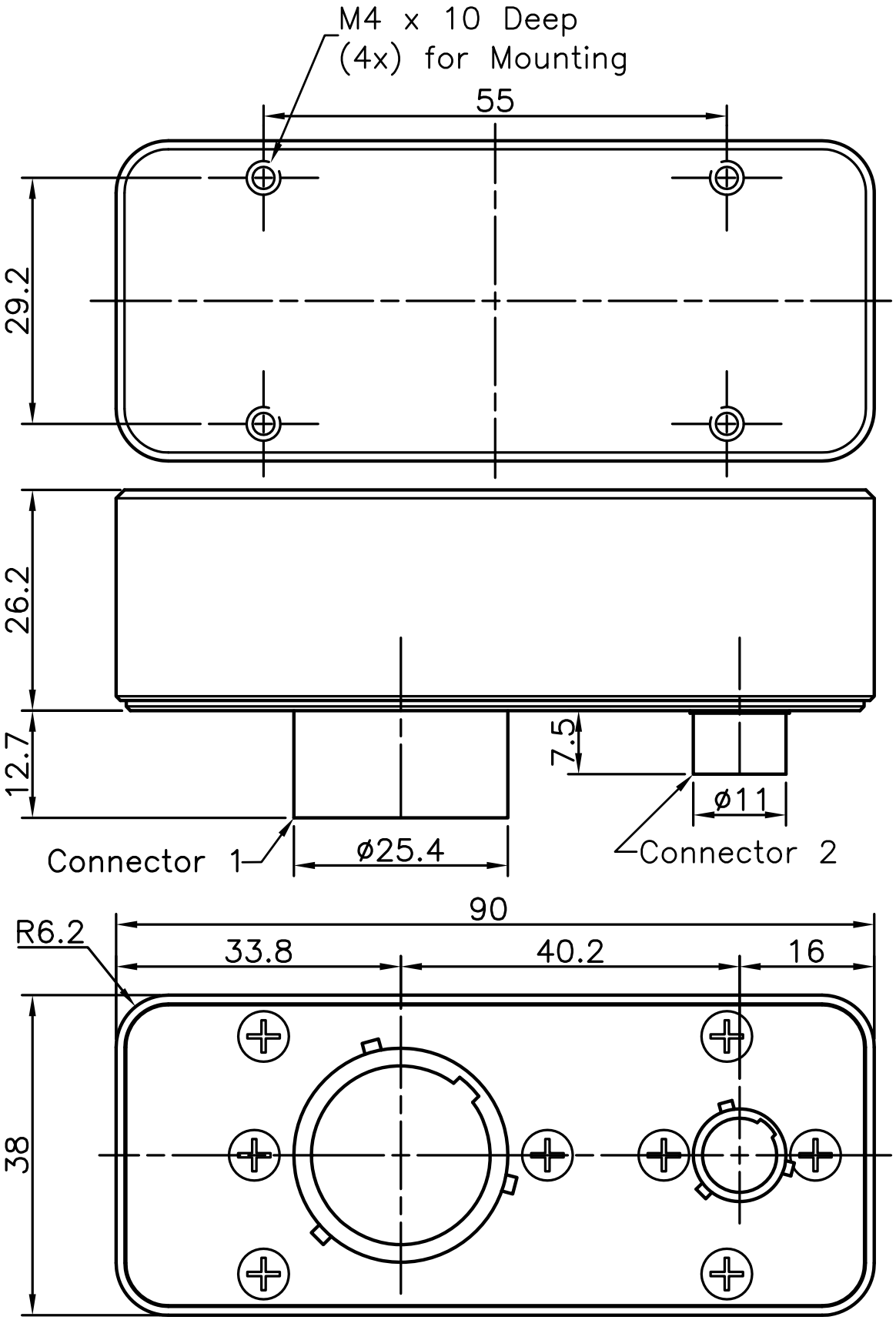
The VIM is powered from the vehicle battery and connected to the Data Logger via the CAN bus.

Information on CAN bus wiring can be found in the Data Logger user manual, available for download from www.motec.com/downloads

Important

Please ensure wiring is according to CAN requirements and the CAN bus has at least one 100R terminating resistor.

Dimensions


M4 x 10 Deep
(4x) for Mounting
55
29.2
26.2
12.7
7.5
ø11
Connector 1
ø25.4
Connector 2
90
R6.2
33.8
40.2
16
38