

HCM2010S Hybrid Controller



- 60 configurable I/O
- Programmable
- Designed for 12 VDC and 24 VDC
- RS232
- 3 x CAN
- 3 Hardware quadrature encoders
- 3-axis accelerometer
- Built-in gyro (z)

HCM2010S is compact and versatile high power I/O controller with 60 configurable I/O's. 36 of them can be used as current controlled PWM outputs. All of the outputs have at least diagnostics level current measurement.

The unit has a built-in Real Time Clock, which can be used for logging events with a time stamp. In addition to flash there is also battery backed memory for storing fast changing information.

There is also 3-axis accelerometer and gyro as standard.

Technical Information

- 9-32 VDC operating voltage range
(Protected against reverse polarity)
- Maximum simultaneous load 40 A
- -40...+85 °C operating temperature range
- ARM Cortex M4 168 MHz CPU
- 256 kB SRAM, 2 MB flash memory
- 4 kB battery secured RAM
- IP67 aluminium housing
- Weight 0.7 kg
- Main dimensions 172 mm x 122 mm x 35 mm
- Three 26 pin AMP Super Seal connector
- 3x CAN Interface 2.0B, ISO 11898
- Real time clock (RTC)
- 3-axis accelerometer
0.1° accuracy
- Gyro for Z axis
±125°/sec angular rate sensing

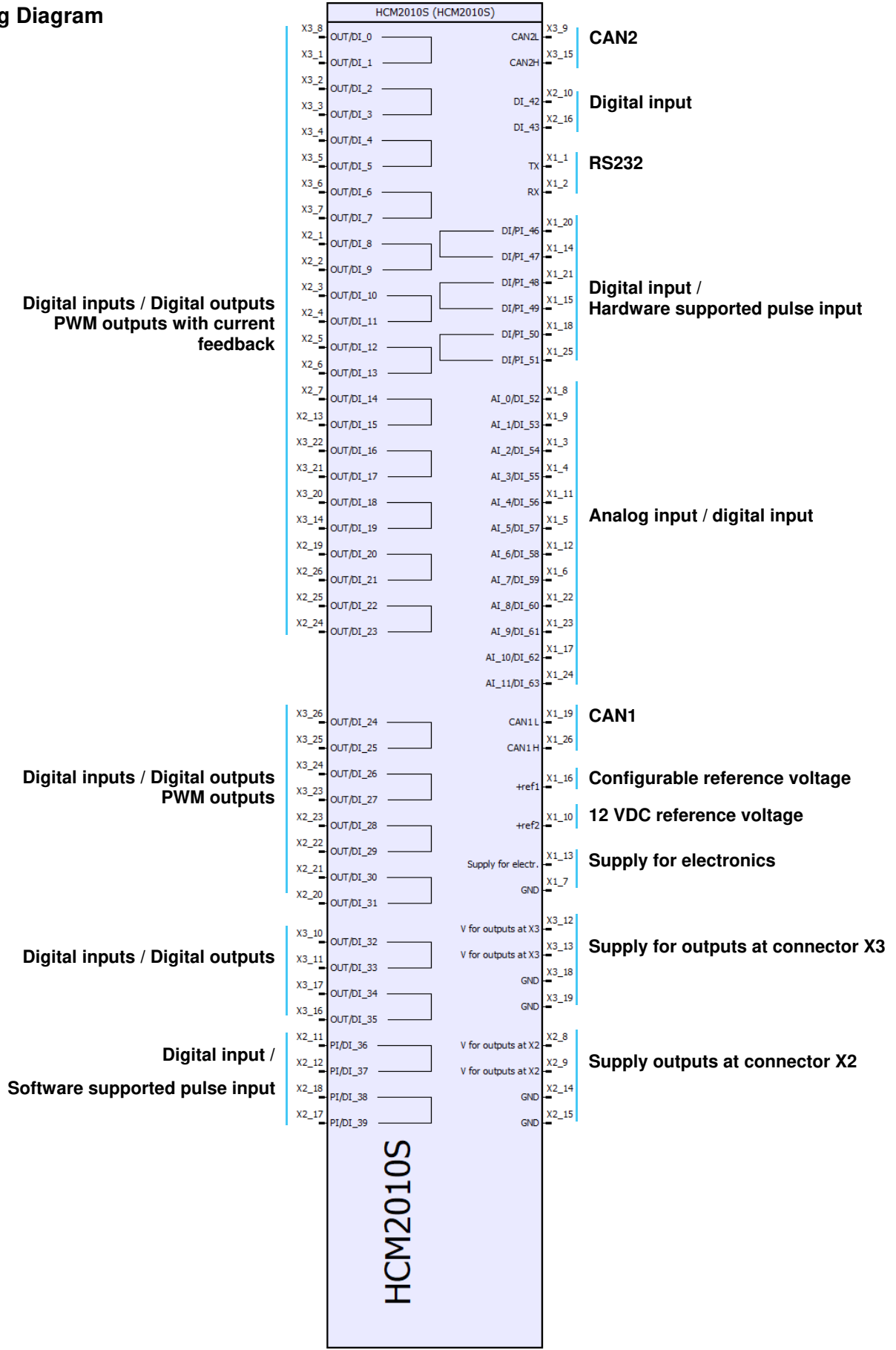
I/O Interface

- Total of 60 configurable I/O
- The I/O interface is protected against short to GND and to supply voltage
- Two reference voltage outputs:
1 configurable: 3.3 / 5 / 10 / 12 V (max 150 mA)
1 fixed: 12 V (max 150 mA)

I/O interface (continued)

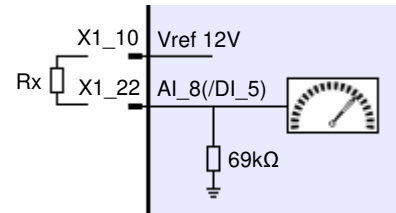
| Amount | Configurability | Details |
|---------------|---|---|
| 24 | Digital input (PNP) Digital output PWM output | Low < 3,3 V, High > 5 V, max 100 Hz High side driver with current feedback, max. 3 A High side driver with current feedback, max. 3 A |
| 12 | Digital input (PNP) Analog input | Low < 1,5 V, High > 3,2 V, max 100 Hz 12-bit AD conversion 0-10.3V, 69k Ω 0-22mA, 150 Ω |
| 6 | Digital input (PNP) Pulse input | Low < 3,3 V, High > 5 V, max 100 Hz Low < 3,3 V, High > 5 V, max 10 kHz Hardware enabled quadrature encoder |
| 8 | Digital input (PNP) Digital output PWM output | Low < 3,3 V, High > 5 V, max 100 Hz High side driver, max. 3 A High side driver, max. 3 A |
| 4 | Digital input (PNP) Pulse input | Low < 3,3 V, High > 5 V, max 100 Hz Low < 3,3 V, High > 5 V, max 10 kHz Software enabled quadrature encoder |
| 4 | Digital input (PNP) Digital output | Low < 3,3 V, High > 5 V, max 100 Hz High side driver, max 2 A |
| 2 | Digital input (PNP) | Low < 3,3 V, High > 5 V, max 100 Hz |

Wiring Diagram



Node ID

| Voltage at AI_8 | Node ID offset | R (with 12 V ref) |
|-----------------|----------------|-------------------|
| 0V | 1 | Open |
| 0.9V | 3 | 820k |
| 1.9V | 5 | 360k |
| 2.8V | 7 | 220k |
| 3.7V | 9 | 150k |
| 4.7V | 11 | 110k |
| 5.6V | 13 | 82k |
| 6.6V | 15 | 56k |
| 7.5V | 17 | 43k |
| 8.4V | 19 | 30k |
| 9.4V | 21 | 20k |
| 10.3V | 23 | Closed |



As default the unit's node address is set by voltage level at AI_8.

Node ID = Base Node ID (46) + Node ID offset. See CANopen profile for further details.

Reference voltage 1 (+ref1 / X1_16) provides 5 V during boot and reference voltage 2 (+ref2 / X1_17) provides 12 V.

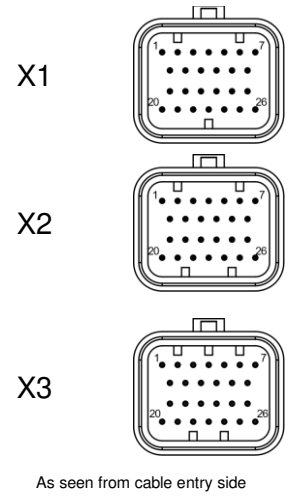
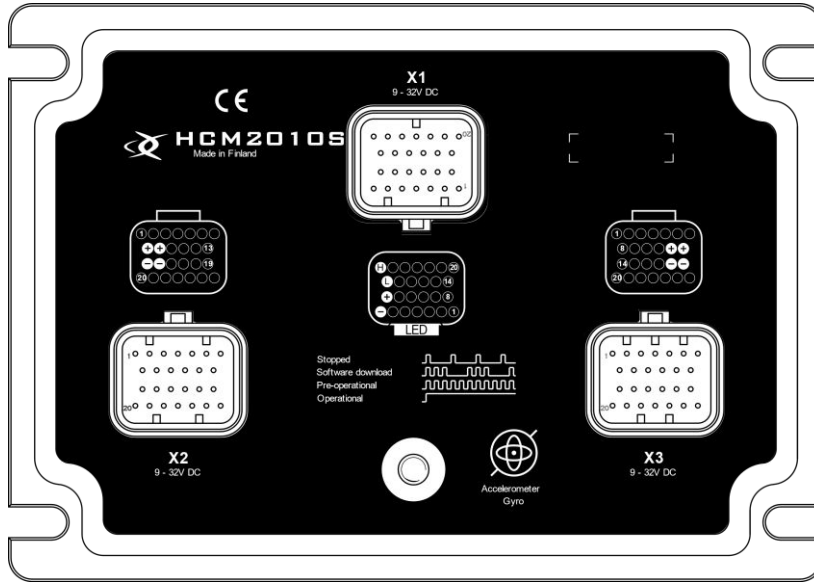
Quadrature encoders

In HCM2010S there are five separate quadrature encoders. Quadrature input signals (pairs) are compared to each other and with that information module is able to know direction. Three of this quadrature encoders are high precision, hardware enabled encoders and two of them are software enabled. High precision encoders are recommended for critical use.

Available pins are:

| Pair | Pin A | Pin B | Type |
|------|-------|-------|----------|
| 1 | X2_11 | X2_12 | Software |
| 2 | X2_18 | X2_17 | Software |
| 3 | X1_20 | X1_14 | Hardware |
| 4 | X1_21 | X1_15 | Hardware |
| 5 | X1_18 | X1_25 | Hardware |

Connectors



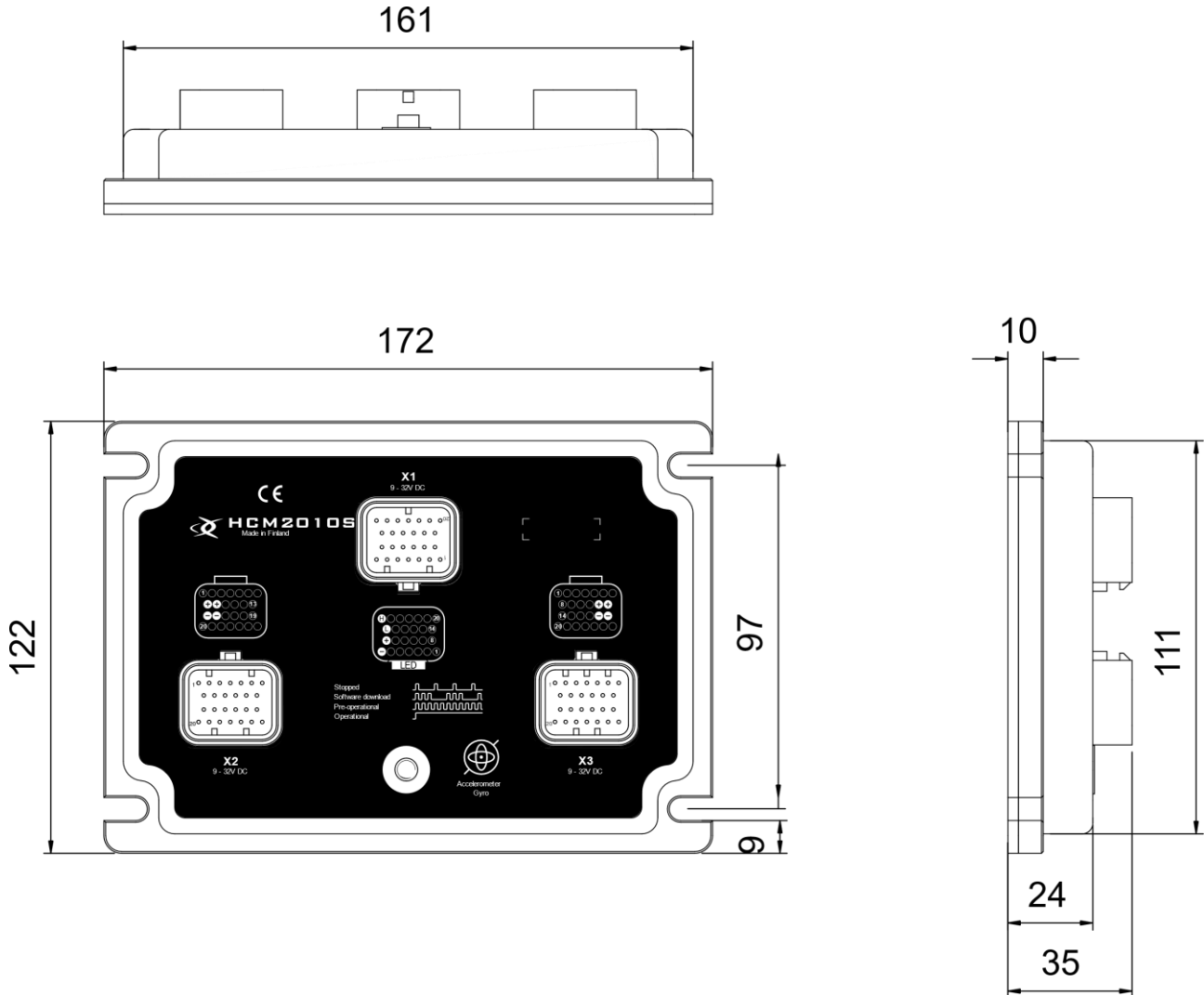
Superseal connectors

Superseal connector needed:

| | |
|--|--|
| X1: Super Seal Connector Plug Housing | Ø1.6 - 2.2 mm - AMP 3-1437290-7 |
| X2: Super Seal Connector Plug Housing | Ø1.6 - 2.2 mm - AMP 3-1437290-8 |
| X3: Super Seal Connector Plug Housing | Ø1.6 - 2.2 mm - AMP 1473416-1 |
| Receptacle Contact (0.75 – 1.25mm ²) | AMP 3-1447221-3 |
| Filler Plug *) | AMP 4-1437284-3 Deutsch 0413-204-2005 |

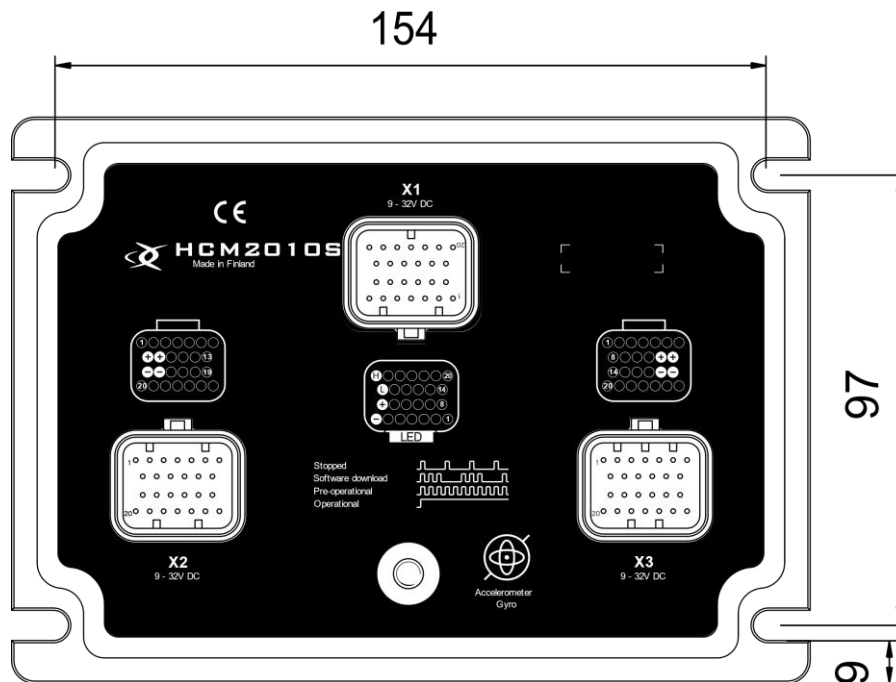
*) Filler plugs must be used on empty cavities to reach waterproofness

Dimensions



Mounting

HCM2010S is mounted on flat surface with four M5 screws



NOTE! Extra care should be paid on grounding of HCM2010S. It is recommended to use star lock washer under fastening bolt. Also, extra attention should be paid that lock washer goes through the paint layer.

The preferred mounting position is connectors pointing downwards. If the unit is mounted connectors pointing to the side, then it is vital to leave some loose cable with a downward cue to prevent the ingress of moisture through connector.

