

Product Datasheet - Technical Specifications



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Tel.: **+49 - 81 41 - 52 71-0**

FAX: **+49 - 81 41 - 52 71-129**

E-Mail: sales@meilhaus.com

Downloads:

www.meilhaus.com/en/infos/download.htm

Meilhaus Electronic GmbH | Tel. **+49 - 81 41 - 52 71-0**
Am Sonnenlicht 2 | Fax **+49 - 81 41 - 52 71-129**
82239 Alling/Germany | E-Mail sales@meilhaus.com

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Mechanical drawings

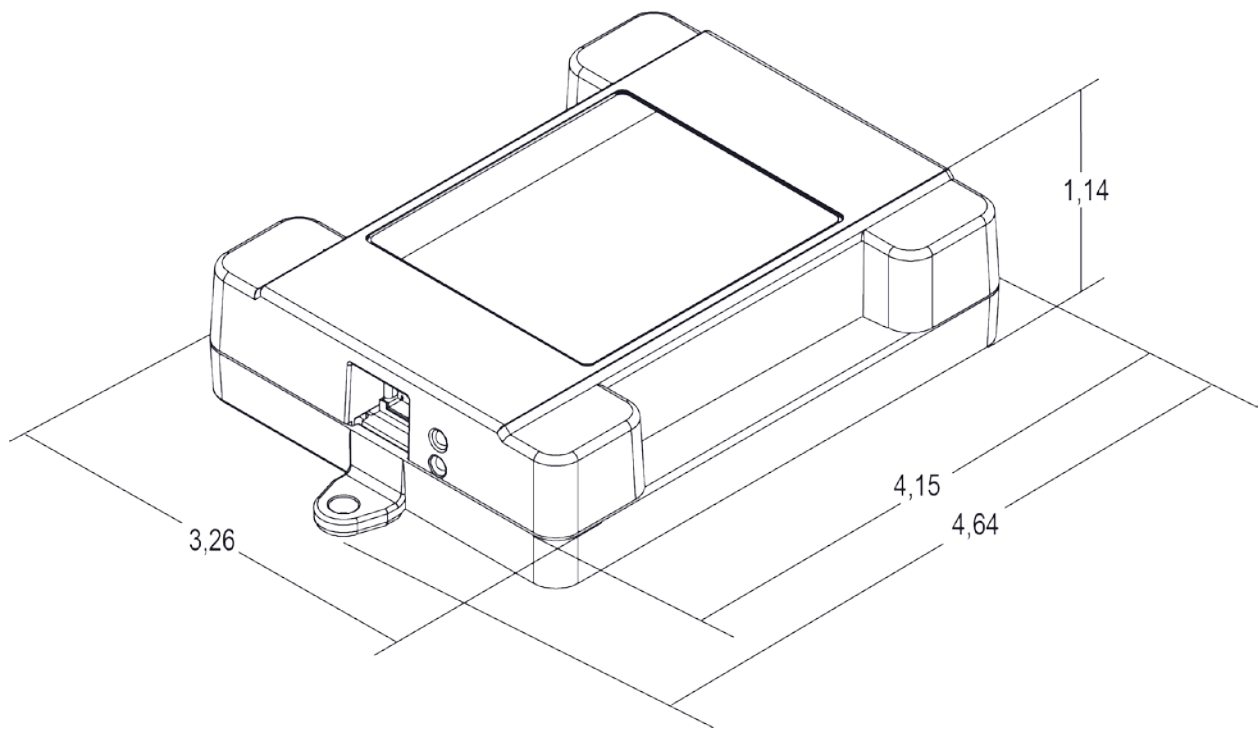
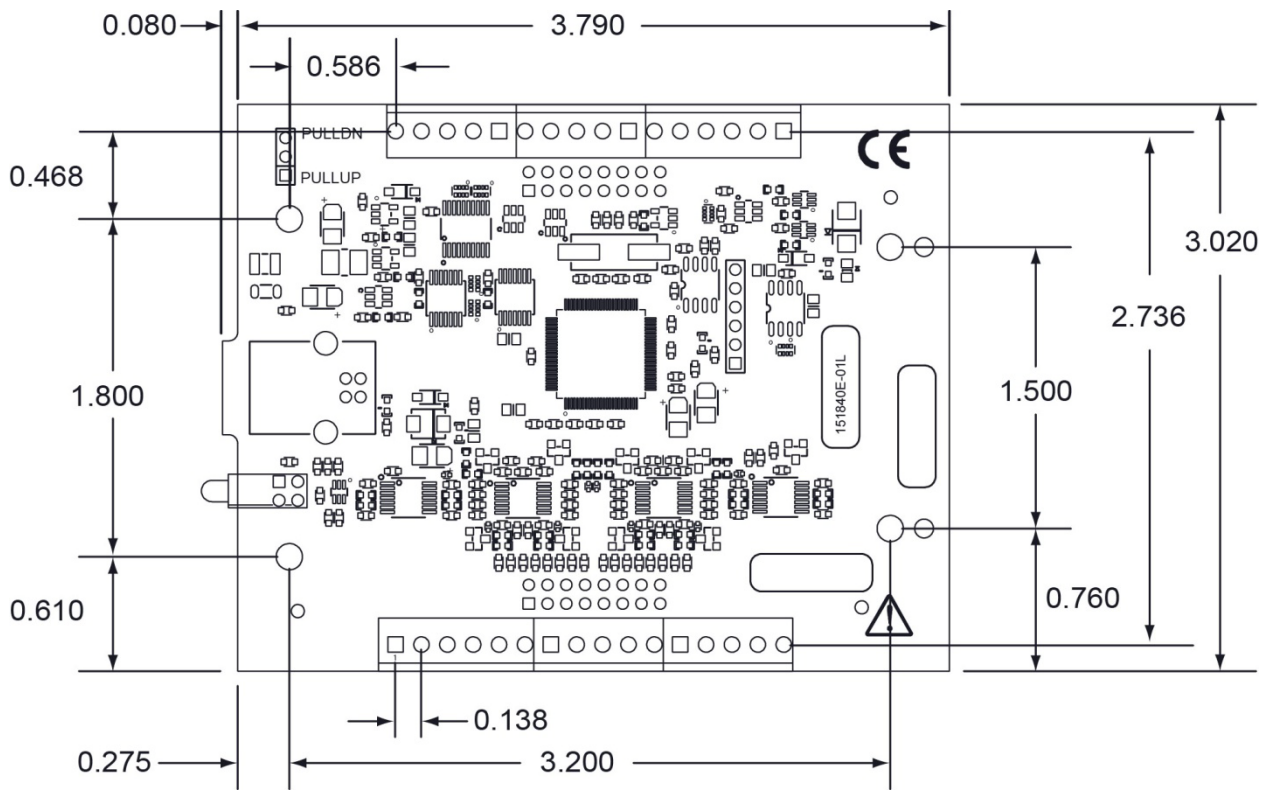


Figure 7. Circuit board (top) and housing dimensions

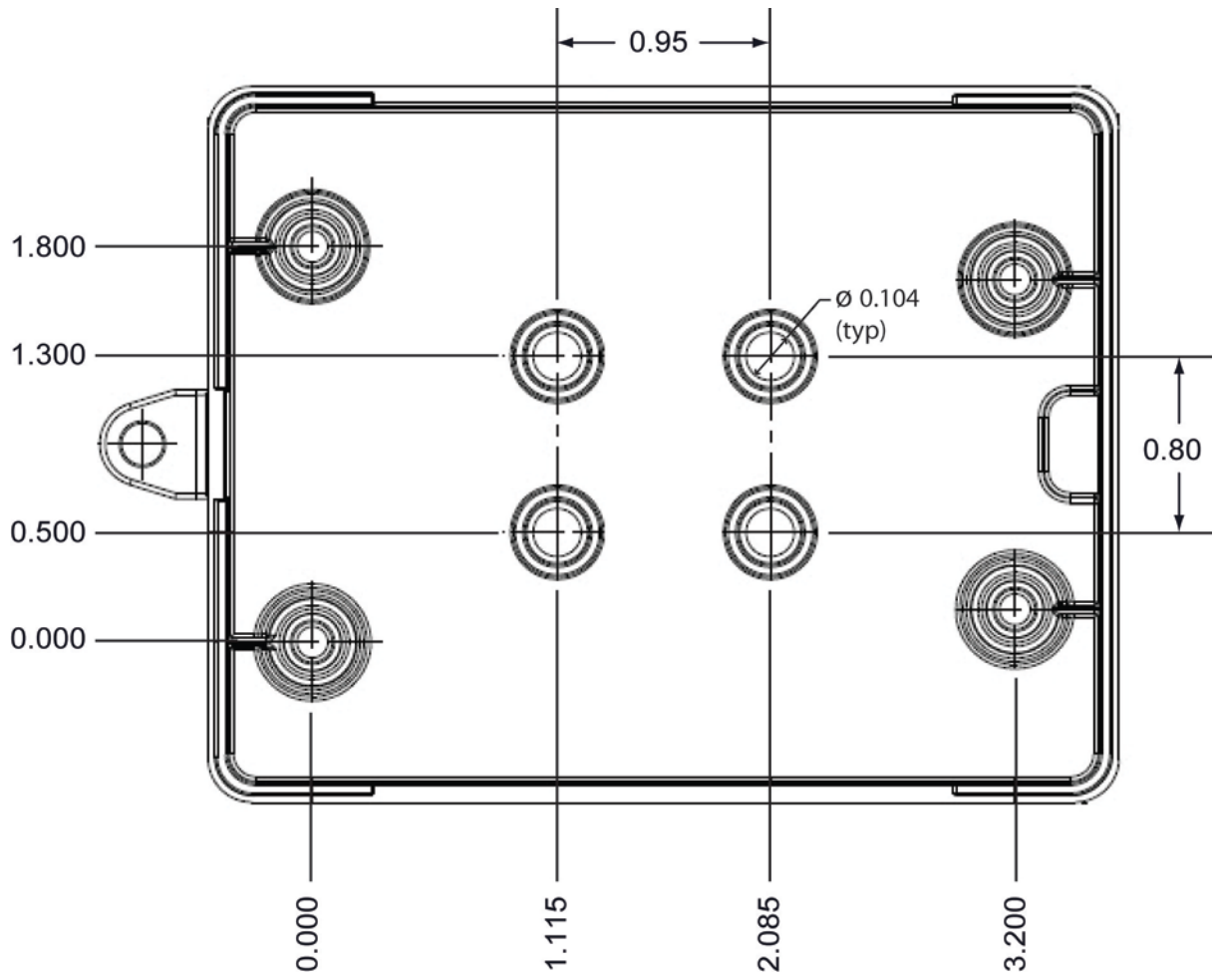


Figure 8. Housing bottom dimensions

Specifications

All specifications are subject to change without notice.

Typical for 25 °C unless otherwise specified.

Specifications in *italic* text are guaranteed by design.

Analog input

Table 1. General analog input specifications

| Parameter | Conditions | Specification |
|---------------------------------------|---------------------------------|---|
| A/D converter type | | Successive approximation |
| ADC resolution | | 12 bits |
| Number of channels | | 8 single-ended |
| Input voltage range | | ± 10 V |
| <i>Absolute maximum input voltage</i> | <i>CHx relative to AGND</i> | <ul style="list-style-type: none"> ▪ ± 25 V max (power on) ▪ ± 25 V max (power off) |
| <i>Input impedance</i> | | <ul style="list-style-type: none"> ▪ 1 MΩ (power on) ▪ 1 MΩ (power off) |
| <i>Input bias current</i> | <i>10 V input</i> | -12 μ A |
| | <i>0 V input</i> | 2 μ A |
| | <i>-10 V input</i> | 12 μ A |
| Input bandwidth | Small signal (-3 dB) | 150 kHz |
| Maximum working voltage | Input range relative to AGND | ± 10.1 V max |
| Crosstalk | Adjacent channels, DC to 10 kHz | -75 dB |
| Input coupling | | DC |
| Sampling rate | Internal pacer | 0.016 S/s to 100 kS/s, software-selectable |
| | External pacer | 100 kS/s max |
| Sample clock source | | <ul style="list-style-type: none"> ▪ Internal A/D clock ▪ Pacer input terminal AICKI |
| Channel queue | | Up to eight unique, ascending channels |
| Throughput | Software paced | 33 to 4000 S/s typ, system dependent |
| | Hardware paced | 100 kS/s max, system dependent |
| Warm-up time | | 15 minutes min |

Accuracy

Analog input DC voltage measurement accuracy

Table 2. DC Accuracy components and specifications. All values are (\pm)

| Range | Gain error (% of reading) | Offset error (mV) | Absolute accuracy at Full Scale (mV) | Gain temperature coefficient (% reading/ $^{\circ}$ C) | Offset temperature coefficient (mV/ $^{\circ}$ C) |
|------------|---------------------------|-------------------|--------------------------------------|--|---|
| ± 10 V | 0.098 | 11 | 20.8 | 0.016 | 0.87 |

Noise performance

For the peak to peak noise distribution test, the input channel is connected to AGND at the input terminal block, and 12,000 samples are acquired at the maximum throughput.

Table 3. Noise performance specifications

| Range | Counts | LSB _{rms} |
|-------|--------|--------------------|
| ±10 V | 5 | 0.76 |

Analog input calibration

Table 4. Analog input calibration specifications

| Parameter | Specification |
|--------------------------|----------------|
| Recommended warm-up time | 15 minutes min |
| Calibration method | Factory |
| Calibration interval | 1 year |

Digital input/output

Table 5. Digital input specifications

| Parameter | Specification |
|--|--|
| Digital type | TTL |
| Number of I/O | 8 |
| Configuration | Each bit may be configured as input (power on default) or output |
| Pull-up configuration | The port has 47 kΩ resistors that may be configured as pull-up or pull-down with an internal jumper. The factory configuration is pull-down. |
| Digital I/O transfer rate (system-paced) | 33 to 4000 port reads/writes per second typical, system dependent |
| Input low voltage threshold | 0.8 V max |
| Input high voltage threshold | 2.0 V min |
| Input voltage limits | 5.5 V absolute max -0.5 V absolute min 0 V recommended min |
| Output high voltage | 4.4 V min (IOH = -50 μA) 3.76 V min (IOH = -24 mA) |
| Output low voltage | 0.1 V max (IOL = 50 μA) 0.44 V max (IOL = 24 mA) |
| Output current | ±24 mA max |

External digital trigger

Table 6. External digital trigger specifications

| Parameter | Specification |
|------------------------------|--|
| Trigger source | TRIG input |
| Trigger mode | Software configurable for edge or level sensitive, rising or falling edge, high or low level. Power on default is edge sensitive, rising edge. |
| Trigger latency | 1 μ s + 1 pacer clock cycle max |
| Trigger pulse width | 125 ns min |
| Input type | Schmitt trigger, 47 k Ω pull-down to ground |
| Schmitt trigger hysteresis | 1.01 V typ 0.6 V min 1.5 V max |
| Input high voltage threshold | 2.43 V typ 1.9 V min 3.1 V max |
| Input low voltage threshold | 1.42 V typ 1.0 V min 2.0 V max |
| Input voltage limits | 5.5 V absolute max -0.5 V absolute min 0 V recommended min |

External pacer input/output

Table 7. External pacer I/O specifications

| Parameter | Specification |
|----------------------------|--|
| Terminal names | AICKI, AICKO |
| Terminal types | AICKI: Input, active on rising edge AICKO: Output, power on default is 0 V, active on rising edge |
| Terminal descriptions | AICKI: Receives pacer clock from external source AICKO: Outputs internal pacer clock |
| Input clock rate | 100 kHz max |
| Clock pulse width | AICKI: 400 ns min AICKO: 400 ns min |
| Input type | Schmitt trigger, 47 k Ω pull-down to ground |
| Schmitt trigger hysteresis | 1.01 V typ 0.6 V min 1.5 V max |
| Input high voltage | 2.43 V typ 1.9 V min 3.1 V max |
| Input low voltage | 1.42 V typ 1.0 V min 2.0 V max |
| Input voltage limits | 5.5V absolute max -0.5V absolute min 0V recommended min |
| Output high voltage | 4.4 V min (IOH = -50 μ A) 3.80 V min (IOH = -8 mA) |
| Output low voltage | 0.1 V max (IOL = 50 μ A) 0.44 V max (IOL = 8 mA) |
| Output current | \pm 8 mA max |

Counter

Table 8. CTR specifications

| Parameter | Specification |
|---|---|
| Pin name | CTR |
| Number of channels | 1 channel |
| Resolution | 32-bit |
| Counter type | Event counter |
| Input type | Schmitt trigger, 47 k Ω pull-down to ground |
| Counter read/write rates (software paced) | 33 to 4,000 reads/writes per second typ, system dependent |
| Schmitt trigger hysteresis | 1.01 V typ 0.6 V min 1.5 V max |
| Input high voltage threshold | 2.43 V typ 1.9 V min 3.1 V max |
| Input low voltage threshold | 1.42 V typ 1.0 V min 2.0 V max |
| Input voltage limits | 5.5V absolute max -0.5V absolute min 0V recommended min |
| Input frequency | 1 MHz max |
| High pulse width | 25 ns min |
| Low pulse width | 25 ns min |

Memory

Table 9. Memory specifications

| Parameter | Specification |
|---------------------|--|
| Data FIFO | 12 K (12,288) analog input samples |
| Non-volatile memory | 2 KB (768 B calibration storage, 256 B UL user data, 1 KB DAQFlex user data) |

Power

Table 10. Power specifications

| Parameter | Conditions | Specification |
|------------------------------------|---|------------------------|
| Supply current | Typical (Note 1) | 150 mA |
| | Maximum (including user voltage, DIO and AICKO loading) | 500 mA |
| User voltage output terminal (+VO) | | 4.25 V min, 5.25 V max |
| User voltage output current | | 100 mA max |

Note 1: This is the total quiescent current requirement for the device which includes up to 10 mA for the Status LED. This value does not include any potential loading of the digital I/O bits, AICKO, or user voltage.

USB specifications

Table 11. USB specifications

| Parameter | Specification |
|----------------------|--|
| USB device type | USB 2.0 (full-speed) |
| Device compatibility | USB 1.1, USB 2.0 |
| USB cable type | A-B cable, UL type AWM 2725 or equivalent. (minimum 24 AWG VBUS/GND, minimum 28 AWG D+/D-) |
| USB cable length | 3 m (9.84 ft) max |

Environmental

Table 12. Environmental specifications

| Parameter | Specification |
|-----------------------------|------------------------------|
| Operating temperature range | 0 °C to 55 °C max |
| Storage temperature range | -40 °C to 85 °C max |
| Humidity | 0% to 90% non-condensing max |

Mechanical

Table 13. Mechanical specifications

| Parameter | Specification |
|------------------------|--|
| Dimensions (L × W × H) | 117.86 × 82.80 × 28.96 mm (4.64 × 3.26 × 1.14 in.) max |

Screw terminal connector

Table 14. Screw terminal connector specifications

| Parameter | Specification |
|------------------|------------------|
| Connector type | Screw terminal |
| Wire gauge range | 16 AWG to 30 AWG |

Table 15. Screw terminal pinout

| Pin | Signal name | Pin description | Pin | Signal name | Pin description |
|-----|-------------|-----------------------------|-----|-------------|-----------------|
| 1 | GND | Digital ground | 17 | AGND | Analog ground |
| 2 | TRIG | Digital trigger input | 18 | CH7 | Channel 7 |
| 3 | CTR | Counter input | 19 | AGND | Analog ground |
| 4 | AICKI | External clock pacer input | 20 | CH6 | Channel 6 |
| 5 | AICKO | External clock pacer output | 21 | AGND | Analog ground |
| 6 | GND | Digital ground | 22 | CH5 | Channel 5 |
| 7 | +VO | User voltage output | 23 | AGND | Analog ground |
| 8 | GND | Digital ground | 24 | CH4 | Channel 4 |
| 9 | DIO7 | DIO channel 7 | 25 | AGND | Analog ground |
| 10 | DIO6 | DIO channel 6 | 26 | CH3 | Channel 3 |
| 11 | DIO5 | DIO channel 5 | 27 | AGND | Analog ground |
| 12 | DIO4 | DIO channel 4 | 28 | CH2 | Channel 2 |
| 13 | DIO3 | DIO channel 3 | 29 | AGND | Analog ground |
| 14 | DIO2 | DIO channel 2 | 30 | CH1 | Channel 1 |
| 15 | DIO1 | DIO channel 1 | 31 | AGND | Analog ground |
| 16 | DIO0 | DIO channel 0 | 32 | CH0 | Channel 0 |