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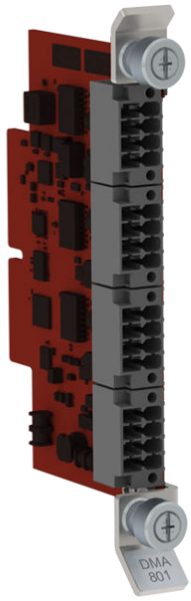
Analog Measurement Module DMA801



Vaisala Analog Measurement Module DMA801 provides analog channels to Vaisala Data Management Unit DMU801. Each DMA801 includes 4 differential analog channels, 2 additional single-ended high voltage channels, and 2 frequency channels. Depending on the size of DMU801, it is possible to add up to 8 DMA801 modules to DMU801.

Features

- Allows connecting analog sensors to Vaisala Data Management Unit DMU801
- One plug-in module adds 4 differential analog inputs to the system
- Converts analog signals into digital format with 24-bit resolution
- Rejection filter for 50/60 Hz frequencies
- 2 × 0–30 V single-ended measurement channel
- Sophisticated, software-controllable sensor power control
- Heating power connection with overcurrent and surge protection (surge protectors on baseboard)
- Rugged lightning surge protection for all sensor connections

For analog sensor interfaces

Many sensors for measuring temperature, pressure, and solar radiation have analog interfaces. DMA801 provides analog channels and converts the analog data into digital format for DMU801.

Analog inputs of DMA801 support Pt100, Pt1000, NTC thermistor, and voltage-out sensors such as pyranometers.

4–20 mA current loop measurement can be supported with an additional DCA420 adapter module or with external shunt resistor.

Highly accurate

DMA801 has excellent accuracy and is thus well suited for various analog measurement applications.

Rugged solution with internal surge protection

DMA801 operates in a wide temperature range and withstands fast temperature changes. Because of its rugged internal surge protection (up to 3 kA), external surge protection is not required.

Easy expansion when needed

DMA801 is easy to install during initial system setup and can also be plugged in later to expand the sensor selection. Several DMA801 modules can be plugged into the same DMU801 base unit. DMA801 can be configured with the intuitive, node-based Vaisala Kaiku Designer.

Technical data

Accuracy specifications

Temperature measurement (Pt100 sensor) [1) 2)]	
Measurement range	−60 … +85 °C (−76 … +185 °F)
Uncertainty over temperature range −60 … +85 °C (−76 … +185 °F)	< ±0.04 °C
Typical error at 0 °C (+32 °F) [3)]	< ±0.01 °C
Temperature measurement (Pt1000 sensor) [1) 2)]	
Measurement range	−60 … +85 °C (−76 … +185 °F)
Uncertainty over temperature range −60 … +85 °C (−76 … +185 °F)	< ±0.35 °C
Typical error at 0 °C (+32 °F) [3)]	< ±0.2 °C
NTC thermistor [2)]	
Uncertainty over temperature range −60 … +85 °C (−76 … +185 °F)	
1–360 kΩ	±0.14 %
360 kΩ – 1.5 MΩ	±0.7 %
Voltage measurement	
Uncertainty over temperature range −40 … +70 °C (−40 … +158 °F):	
±2.5 V range	< 0.05 % of reading ±1.85 µV
±1.25 V range	< 0.04 % of reading ±2.3 µV
±620 mV range	< 0.04 % of reading ±0.9 µV
±310 mV range	< 0.04 % of reading ±0.75 µV
±156 mV range	< 0.04 % of reading ±0.8 µV
±78 mV range	< 0.04 % of reading ±1.25 µV
±39 mV range	< 0.04 % of reading ±0.8 µV
Uncertainty over temperature range −60 … +85 °C (−76 … +185 °F):	
±2.5 V range	< 0.05 % of reading ±1.85 µV
±1.25 V range	< 0.04 % of reading ±2.3 µV
±620 mV range	< 0.04 % of reading ±0.9 µV
±310 mV range	< 0.04 % of reading ±0.85 µV
±156 mV range	< 0.04 % of reading ±1.2 µV
±78 mV range	< 0.05 % of reading ±1.25 µV
±39 mV range	< 0.06 % of reading ±0.95 µV
Common mode range	+2.5 V / −0.9 V
Voltage measurement 0–30 V	
Uncertainty over temperature range −60 … +50 °C (−76 … +122 °F)	±0.3 % of reading ±3 mV, typical
Uncertainty over temperature range −60 … +85 °C (−76 … +185 °F)	±1.2 % of reading ±3 mV, typical
Input impedance	> 900 kΩ
Maximum measurable voltage	32.765 V
Frequency measurement	
Measurement range	0–10 000 Hz
Uncertainty over temperature range −60 … +85 °C (−76 … +158 °F):	
3–100 Hz	< 0.04 % of reading
100–1000 Hz	< 0.082 % of reading
1000–10 000 Hz	< 0.82 % of reading

1) Verified by measuring ±20 °C from ambient temperature, while ambient temperature spreads across the entire range.
2) Confidence level k=2.
3) Verified with DMU801 at 0 °C (+32 °F).

Frequency and counter measurements

Frequency and counter measurement capabilities of the DMU801 base unit are accessed with DMA801. DMA801 also provides overvoltage protection for these measurement channels.	
Frequency input voltage ranges	
AC mode	Minimum 140 mVpp, maximum 15 Vpp (from low impedance source)
Pulse mode	Minimum 2.5 V, maximum 12 V

Operating environment

Operating temperature	−40 … +85 °C (−40 … +185 °F)
Extended operating temperature (available on request)	−60 … +85 °C (−76 … +185 °F)
Storage temperature	−60 … +85 °C (−76 … +185 °F)
Operating humidity	0–100 %RH, non-condensing

Powering specifications

Sensor supply voltage	3–26 V, software controllable
Current limit	0.7 A, −25 % … +20 % per port
Sensor heating current limit	2 A per plug-in module

Inputs and outputs

Inputs	• 4 × differential analog inputs • 2 × 0–30 V single-ended measurement channels • 2 × frequency/counter measurement channels
Mating connectors	4 × Phoenix Contact DFMC 1,5/4-ST-3,5-LR (included)
Power output	Each port has a separate, software-controllable power output pin and a separate excitation pin
Heating output	Each port has separate heating power supply pins
A/D conversion	Low noise 24-bit A/D converter with internal diagnostics

Mechanical specifications

Dimensions (H x D)	123 × 79 mm (4.84 × 3.11 in)
Distance between 2 plug-in module slots in DMU801 frame	18 mm (0.71 in)
Weight	64 g (2.26 oz)
Material	UL-rated fire-resistive FR4
Handles	Stainless steel
Coating	Conformally coated against humidity

Compliance

EU directives and regulations	EMC, RoHS	
EMC immunity	EN 61326-1, industrial environment	
EMC emissions	CISPR 32 / EN 55032, Class B FCC part 15 B, Class B ICES-3 / NMB-3 (Class B)	
Cybersecurity	Developed in accordance with ISO/IEC 27001 and IEC 62443-4-1 for secure product development practices	
Compliance marks	CE, FCC, ICES, RCM, UKCA	
Test	**Applied standard**	**Description/Value**
Maritime	IEC 60945	–
Vibration (sinusoidal)	IEC 60068-2-6	5–13.2 Hz, 1 mm (0.04 in) amplitude 13.2–200 Hz, 0.7 g
Rough handling	IEC 60068-2-31	Drop height 100 cm (39.37 in)
Shock	IEC 60068-2-27	15 g, 11 ms, saw-tooth
Dry heat	IEC 60068-2-2	+85 °C (+185 °F)
Damp heat	IEC 60068-2-78	+40 °C (+104 °F), 95 %RH
Cold	IEC 60068-2-1	−60 °C (−76 °F)

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