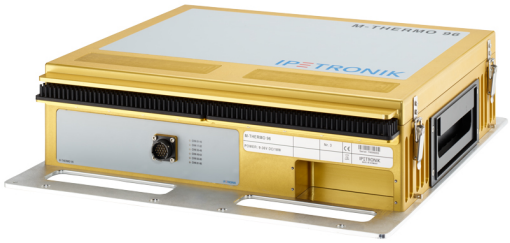
IPETRONIK

M-THERMO 96

96-channel universal thermocouple inputs type E, J, K, N, R, S, T

- Cold junction compensation per channel
- Status LED at each measurement channel
- Measurement data output to Ethernet
- Galvanic isolation (inputs, CAN, supply, enclosure)
- Compliant to requirements of the aerospace industry
- Ruggedized modules for harsh environments
- Cable relief



Device	
Maximum input protection voltage (channel)	±25 V (continuous), ±50 V (1 min), ±200 V (short-time, t < 2 ms)
Channel sampling rates	1/ 2/ 5/ 10/ min – 1/ 2/ 5/ 10/ 20/ 50/ 100 Hz
Aggregate sample rate	9600 Hz
Voltage supply	9 ... 36 VDC
Supply voltage thresholds	Switch-on 9 ±0.3 VDC / Switch-off 9 ±0.3 VDC
Power consumption, typical	<29 W
Power consumption, typical	<25 W (without IPEhub2)
Working temperature range	-50 ... 85 °C (-58 ... 185 °F)*
Storage temperature range	-50 ... 125 °C (-58 ... 257 °F)
IP-Code	IP6K6 according to DIN EN 60529: 2014-09-01 ISO 20653
Relative humidity	5 ... 95 %
Operating height (above sea level)	55000 feet
Dimensions	W 500 mm x H130 mm x D 476 mm (19.69 in x 5.12 in x 18.74 in)
Dimensions without base plate	W 476 mm x H130 mm x D 424 mm (18.74 in x 5.12 in x 16.69 in) 8.74 in)
Weight	19.6 kg (43.21 lb)
Weight	19.2 kg (42.33 lb) without IPEhub2
Weight	17.9 kg (39.46 lb) without IPEhub2 and cover
Configuration interface	Ethernet
Data transfer rate	100 Mbit Ethernet (IEEE 802.3)
Test standards	DIN EN 61326-1:2013 (EMC)
Test standards	RTCA DO-160G 2010-12-08 (Shock & Vibration)
Test standards	IEC 61010-2-201 (Safety Regulations)
Test standards	MIL-STD-810G w/Change 1 (Sound pressure)
Test standards	IEC-EN 60584-2 (TC tolerances - based on voltage / PT100

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	accuracies)	
Quality management system	ISO 9001:2015	
Pressure compensation	Available	
Desiccant	Available	
Calibration intervall	12 Months	
Input sockets	Screw terminal	
Galvanic isolation		
Input module power supply	±100 V (indefinitely), ±500 V (pulse voltage)	
Input CAN	±100 V (indefinitely), ±500 V (pulse voltage)	
Input enclosure	±100 V (indefinitely), ±500 V (pulse voltage)	
Input input	±100 V (indefinitely), ±500 V (pulse voltage)	
General channel properties		
A/D converter	24 bit (Sigma/Delta)	
Sensor break detection	Activation via software settings, with no impact on accuracy	
Channel LED	Available	
Flashing mode of channel LED	During configuration - blinking	
Flashing mode of channel LED	Break detection	
Channel impedance	4.0 MΩ	
Hardware filter (fixed)	11 Hz, filter type RC-low-pass	
Channel temperature		
Measurement range temperature	Typ E (NiCr-CuNi)	-200 ... 900 °C (-328 ... 1652 °F)
Measurement range temperature	Typ J (Fe/CuNi)	-180 ... 750 °C (-292 ... 1352 °F)
Measurement range temperature	Typ K (NiCr/NiAl)	-200 ... 1300 °C (-328 ... 2372 °F)
Measurement range temperature	Typ N (NiCrSi/NiSi)	-270 ... 1300 °C (-454 ... 2372 °F)
Measurement range temperature	Typ R (Pt13Rh/Pt)	-50 ... 1700 °C (-58 ... 3092 °F)
Measurement range temperature	Typ S (Pt10Rh/Pt)	-50 ... 1750 °C (-58 ... 3182 °F)
Measurement range temperature	Typ T (Cu/CuNi)	-250 ... 400 °C (-418 ... 752 °F)
Linearization of sensor characteristic line	Numerical interpolated	
Measurement range thermo voltage	±78125µV	
Cold junction compensation (CJC)	PT100 for each input	
Cold junction measurement range	0 ... 167.8 Ω	
Total error thermocouple type E		
Ambient temperature -40 °C	@TInput= 0 °C / 700 °C (average accuracy ±0.145 K / ±0.225 K)	
Ambient temperature 5 °C	@TInput= 0 °C / 700 °C (average accuracy ±0.132 K / ±0.213 K)	
Ambient temperature 25 °C	@TInput= 0 °C / 700 °C (average accuracy ±0.121 K / ±0.152 K)	
Ambient temperature 45 °C	@TInput= 0 °C / 700 °C (average accuracy ±0.157 K / ±0.237 K)	
Ambient temperature 85 °C	@TInput= 0 °C / 700 °C (average accuracy ±0.181 K / ±0.261 K)	
Total error thermocouple type J		

Ambient temperature -40 °C	@TInput= 0 °C / 600 °C (average accuracy ±0.129 K / ±0.158 K)
Ambient temperature 5 °C	@TInput= 0 °C / 600 °C (average accuracy ±0.155 K / ±0.227 K)
Ambient temperature 25 °C	@TInput= 0 °C / 600 °C (average accuracy ±0.142 K / ±0.214 K)
Ambient temperature 45 °C	@TInput= 0 °C / 600 °C (average accuracy ±0.166 K / ±0.238 K)
Ambient temperature 85 °C	@TInput= 0 °C / 600 °C (average accuracy ±0.191 K / ±0.263 K)
Total error thermocouple type K	
Ambient temperature -40 °C	@TInput= 0 °C / 800 °C (average accuracy ±0.174 K / ±0.273 K)
Ambient temperature 5 °C	@TInput= 0 °C / 800 °C (average accuracy ±0.161K / ±0.260 K)
Ambient temperature 25 °C	@TInput= 0 °C / 800 °C (average accuracy ±0.144 K / ±0.187 K)
Ambient temperature 45 °C	@TInput= 0 °C / 800 °C (average accuracy ±0.185 K / ±0.284 K)
Ambient temperature 85 °C	@TInput= 0 °C / 800 °C (average accuracy ±0.209 K / ±0.308 K)
Total error thermocouple type N	
Ambient temperature -40 °C	@TInput= 0 °C / 800 °C (average accuracy ±0.219 K / ±0.279 K)
Ambient temperature 5 °C	@TInput= 0 °C / 800 °C (average accuracy ±0.207 K / ±0.266 K)
Ambient temperature 25 °C	@TInput= 0 °C / 800 °C (average accuracy ±0.181 K / ±0.192 K)
Ambient temperature 45 °C	@TInput= 0 °C / 800 °C (average accuracy ±0.231 K / ±0.290 K)
Ambient temperature 85 °C	@TInput= 0 °C / 800 °C (average accuracy ±0.255 K / ±0.315 K)
Total error thermocouple type R	
Ambient temperature -40 °C	@TInput= 0 °C / 1300 °C (average accuracy ±0.740 K / ±0.482 K)
Ambient temperature 5 °C	@TInput= 0 °C / 1300 °C (average accuracy ±0.727 K / ±0.469 K)
Ambient temperature 25 °C	@TInput= 0 °C / 1300 °C (average accuracy ±0.604 K / ±0.341 K)
Ambient temperature 45 °C	@TInput= 0 °C / 1300 °C (average accuracy ±0.751 K / ±0.494 K)
Ambient temperature 85 °C	@TInput= 0 °C / 1300 °C (average accuracy ±0.776 K / ±0.518 K)
Total error thermocouple type S	
Ambient temperature -40 °C	@TInput= 0 °C / 1300 °C (average accuracy ±0.726 K / ±0,528 K)
Ambient temperature 5 °C	@TInput= 0 °C / 1300 °C (average accuracy ±0.714 K / ±0.516 K)

Ambient temperature 25 °C	@TInput= 0 °C / 1300 °C (average accuracy ±0.593 K / ±0.376 K)
Ambient temperature 45 °C	@TInput= 0 °C / 1300 °C (average accuracy ±0.738 K / ±0.540 K)
Ambient temperature 85 °C	@TInput= 0 °C / 1300 °C (average accuracy ±0.762 K / ±0.564 K)
Total error thermocouple type T	
Ambient temperature -40 °C	@TInput= 0 °C / 300 °C (average accuracy ±0.175 K / ±0.183 K)
Ambient temperature 5 °C	@TInput= 0 °C / 300 °C (average accuracy ±0.163 K / ±0.170 K)
Ambient temperature 25 °C	@TInput= 0 °C / 300 °C (average accuracy ±0.145 K / ±0.138 K)
Ambient temperature 45 °C	@TInput= 0 °C / 300 °C (average accuracy ±0.187 K / ±0.194 K)
Ambient temperature 85 °C	@TInput= 0 °C / 300 °C (average accuracy ±0.211 K / ±0.219 K)
Total error PT100 input	
Ambient temperature -40 °C	± 12.30 mΩ
Ambient temperature 5 °C	± 14.25 mΩ
Ambient temperature 25 °C	± 10.08 mΩ
Ambient temperature 45 °C	± 15.95 mΩ
Ambient temperature 85 °C	± 17.39 mΩ
Total error thermovoltage	
Ambient temperature -40 °C	@0 mV / 30mV (average accuracy ± 3.5 µV / 7.8 µV)
Ambient temperature 5 °C	@0 mV / 30mV (average accuracy ± 3.5 µV / 7.8 µV)
Ambient temperature 25 °C	@0 mV / 30mV (average accuracy ± 2.8 µV / 4.8 µV)
Ambient temperature 45 °C	@0 mV / 30mV (average accuracy ± 3.5 µV / 7.8 µV)
Ambient temperature 85 °C	@0 mV / 30mV (average accuracy ± 3.5 µV / 7.8 µV)
Accessories	
System cable	620-233.pdf

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