

PU[REC]

PORTABLE AND RELIABLE DATA ACQUISITION SYSTEM FOR FIELD TESTS, TROUBLESHOOTING AND MAINTENANCE IN VARIOUS APPLICATION AREAS.

- > 16 analog input channels
(expandable to any signal input via Modular Smart Interfaces)
- > Quasi-static channel expansion via EPAD2
- > Available with 50 kS/s or 200 kS/s (optional) sampling rate
- > 15.6" multi-touch display
- > Rugged and portable housing for easy transportation









SPECIFICATIONS

PU[REC]	
Configuration	
Sampling rate / resolution	PUREC-50: 50 kS/s per channel 16-bit PUREC-200: 50 kS/s to 200 kS/s 18-bit 100 S/s to 50 kS/s 24-bit
Digital input	2x counter shared with 8x digital inputs; 4x digital outputs
CAN bus	1x highspeed CAN 2.0 (ordering option PUREC-OPT-CAN)
Quasi-static channel expansion	EPAD2 interface connector
Expansion	SYNC-BUS (requires ordering option OXY-OPT-NET)
Main system	
Display	15.6" multi-touch TFT (full HD 1920 x 1080)
Additional Connectors	2x Display Port; 1x HDMI; Audio interface (3x 3.5mm connectors) 4x USB 3.0; 2x Gbit LAN;
Operating system	Microsoft Windows 10 64-bit; (optional Linux OS)
Data Storage	1 TB SSD in a removable drive bay (870 GB useable for data storing) up to 7 days of recording all channels at 50 kS/s or 300 days at 1 kS/s
MTBF	27800 hours
Noise emission	system idle 38 dBA CPU max. heat; max. fan: 45 dBA
Dimensions (W x D x H)	463 x 129 x 318 mm (18.2 x 5.1 x 12.5 in.)
Weight	7.3 kg (16.1 lb.)
Power supply	
Rated input voltage	100 to 240 V _{AC} (max 90 to 264 V _{AC}), active PFC
Input frequency	47 to 63 Hz
Maximal input current	2 A (230 V _{AC}) / 4 A (115 V _{AC})
Inrush current	80 A (264 V _{AC})
Power consumption	max. 300 W; typical 65W (fully equipped with MSI, recording data)
Environmental specifications	
Operating temperature	0 to +50 °C, down to -20 °C with prewarmed unit
Storage temperature	-20 to +70 °C
Humidity	10 to 80 % non cond., 5 to 95 % rel. humidity
Max. altitude	2000 m (6561 ft)
Sine vibration (EN 60068-2-6:2008)	Acceleration: 20 m/s ² Frequency range: 10 Hz - 150 Hz Sweep: 1 oct/min 20 cycles
Shock (EN 60028-2-27:2009)	Acceleration: 15 g Duration: 11 ms Pulse form half sine 3 pumps/direction 6 directions
Random vibration (EN IEC 60721-3-2:2018)	Class 2M4 Spectral acceleration density: 1 m ² /s ³ Frequency range: 10 Hz-200 Hz Duration: 30 min/direction

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Input types					
	Input	Sensor excitation	Bandwidth ^(max.) <small>consider limit of PU[REC]</small>	Accuracy ^(typ.)	Sensor connection
Direct voltage input	±10 V; ±5 V	±5 V; 12 V	DC to 70 kHz	0.02 %	D-SUB-9
MSI2-250R-20mA ¹⁾	 4 to 20 mA sensors	n/a	DC to 70 kHz	±0.1 %	Miniature spring terminals
MSI2-STG ¹⁾	 Bridge-type sensors full-bridge, half-bridge, quarter-bridge 120 Ω and 350 Ω	5 V and 10 V	60 kHz	±0.1 %	Miniature spring terminals
MSI2-LVDT ¹⁾	 LVDT and RVDT sensors, 5- or 6-wire connection	3 V at 2.5, 5 or 18 kHz	1 kHz	±0.1 %	Soldering pads
MSI-BR-ACC ¹⁾	 IEPE® sensors, typ. accelerometer, microphone	4 mA	1.4 Hz to 70 kHz	±0.2 %	BNC
MSI2-CH-x ¹⁾	 Charge type sensors up to 100 000 pC	n/a	0.08 Hz to 70 kHz	±0.5 %	BNC
MSI2-TH-x ¹⁾	 Thermocouple sensors standard models for type K, J, T, others on request	n/a	DC to 70 kHz	±1 °C	Mini TC socket
MSI-BR-V-200 ¹⁾	 Voltage up to 200 V	n/a	DC to 60 kHz	±0.1 %	BNC
MSI2-V-600 ¹⁾	 Voltage up to 600 V	n/a	DC to 60 kHz	±0.1 %	Banana sockets
MSI-BR-RTD ¹⁾	 RTD sensors Pt100, Pt200, Pt500, Pt1000, Pt2000; 2-, 3- and 4-wire connection	1.25 mA	DC to 10 kHz	±0.1 %	Binder 712 series 5-pin socket

1) MSIs are automatically detected

Direct voltage input specification					
Input connector	16x 9-pin female D-SUB				
Input ranges	±10 V; ±5V				
Sensor excitation	±5 V	Accuracy: ±0.2 %; balanced around GND; remote sense support max. 40 mA per channel	Protection: Continuous short to GND; short circuit limit is 70 mA		
	12V	Accuracy: ±5 %; max. 1 A in total for all channels, including EPAD2 supply	Protection: Self resetting fuse."		
Input noise	0 to 10 Hz:	10 μV _{pp}	full bandwidth: 1.35 mV _{pp}		
Input impedance	1 MΩ single ended, 2 MΩ differential				
Input bias current	<25 pA				
Input coupling	DC				
Accuracy ¹⁾	Voltage	DC to 1 kHz	±0.02 % of reading ± 0.01 % of range ±20 μV		
		>1 kHz to 5 kHz	±0.5 % of reading ± 0.01 % of range ±20 μV		
		>5 kHz to 10 kHz ²⁾	±1 % of reading ± 0.01 % of range ±20 μV		
Gain drift	typical 10 ppm/°C max. 20 ppm/°C				
Offset drift	typical 0.3 μV/°C + 10 ppm of range/°C, max 15 μV/°C + 20 ppm of range/°C				
Typical Signal-to-noise ratio, Spurious-free SNR, Effective number of Bits, VPP ²⁾	10 V range				
		SNR	SFDR ³⁾	ENOB ⁴⁾	Noise peak to peak
	Sample rate	[dB]	[dB]	[Bit]	[mV _{pp}]
	0.1 kS/s	127	130	20.8	0.015
	1 kS/s	118	130	19.3	0.055
	10 kS/s	109	130	17.8	0.22
	20 kS/s	106	130	17.3	0.33
	50 kS/s ²⁾	102 ²⁾	130 ²⁾	16.7	0.52
	100 kS/s ²⁾	99 ²⁾	130 ²⁾	16.2	0.66
	200 kS/s ²⁾	96 ²⁾	125 ²⁾	15.7	1.00
Linearity	<20 ppm				
Input configuration	differential				
Typical THD	-95 dB				

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Typical CMRR in differential mode		100 dB @ 50 Hz; >70 dB @ 1 kHz
Low pass Filter (-3 dB, IIR)		1 Hz to 40 % of sample rate freely programmable or OFF
	Characteristic	Bessel or Butterworth
	Filter order	2nd , 4th, 6th, 8th
Analog antialiasing filter		3 rd order Butterworth
Bandwidth (-3 dB, deactivated IIR filter)		70 kHz 3 rd order Butterworth filter
Crosstalk fin 1 kHz [10 kHz]		>108 dB
Channel to channel phase mismatch		typically <30 nsec when using the same input range
Common mode voltage		$\pm 12.5 V_{DC}$
Overvoltage protection (IN+, IN-, Sense)		$\pm 50 V_{DC}$
Digital IN specification		
Digital Input		8 CMOS/TTL compatible digital inputs; weak pullup via 100 k Ω
Overvoltage protection		$\pm 30 V, 50 V_{pk}$ (for 100 ms)
Counter		2 counter channels; TTL input; shared with digital inputs
Counter modes		
	Event counting	Basic event counting, gated counting, up/down counting and encoder mode (X1, X2 and X4)
	Waveform timing	Period, frequency, pulse width duty cycle and edge separation
	Sensor modes	Encoder (angle and linear)
Digital OUT specification		
Digital output		4 DO; TTL
Output indication		LED (green = high; off = low)
Maximum current		25 mA continuously
Power-on default		Low
Interfaces		
CAN bus		1 CAN Bus; not isolated
	CAN specification	CAN 2.0B
	CAN Physical Layer	High Speed
	Bus pin fault protection	$\pm 36 V$
	Termination	Programmable: High impedance or 120 Ω

¹ 1 year accuracy 23 °C ± 5 °C
² LP Filter in auto mode
³ SFDR excluding harmonics
⁴ ENOB calculated from SNR