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DEWETRON



Analog Isolation Amplifiers

HSI/DAQ Series Modules

DEWETRON high precision signal conditioning amplifiers are available for almost any sensor to measure

- *Voltage*
- *Current*
- *Pressure*
- *Temperature*
- *Position*
- *Torque*
- *Velocity*
- *Acceleration*
- *Strain*
- *Force*
- *Distance*
- *RPM*
- *Resistance*
- *and more*

Key Features

- *Full isolation*
- *Single channel modularity*
- *High bandwidth*
- *High accuracy*
- *Integrated sensor supply*
- *DEWE-30 chasses for any AD card or Recorder*
- *Simple sensor connection*

DAQP series modules are signal conditioners featuring high accuracy, programmable input ranges, signal filtering and full isolation. DAQP modules are highest quality and offer best comfort in all applications by single channel modularity and convenient sensor connection.

*Due to their isolation these modules are almost indestructible and the user does not need to worry about details like common mode voltage, ground system etc – **just simply connect the signal and measure! This is saving a lot of time and money.***

Monitor e.g. temperature on a circuit breaker with cheap non-isolated thermocouples. Even current measurements using shunt resistors in the power line are no problem. There are unlimited applications where isolation is the key for success.

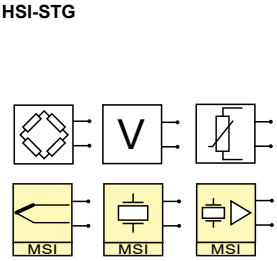
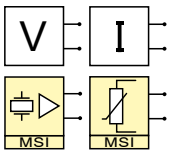
As a perfect supplementation to the dynamic DAQP modules DEWETRON offers quasi static PAD modules with integrated 24 bit A/D converters and typically 8 channels per module for slow signals.

Selection Guide

HSI Series Modules



- *Single channel*
- *High bandwidth - for dynamic signals*
- *Isolation (all models)*
- *Analog signal output (±5 V)*
- *Single channel modularity*
- *For DEWETRON systems with built-in DAQ rack*
- *Pure signal conditioning solution in conjunction with DEWE-30 series racks*

Module	Input type	Ranges	TEDS	Bandwidth (BW), Filters (LP = lowpass, HP = highpass)	Isolation (ISO), Overvoltage protection (OP)
Universal measurement					
HSI-STG  	Strain gauge, bridge sensors	±0.1 to ±1000 mV/V (@ 5 VDC_{exc})	✓	BW: up to 2 MHz LP: 100 Hz to 2 MHz HP: 1 Hz	ISO: 350 V_{DC} OP: ±50 V_{DC}
	Piezoresistive bridge	±0.5 to 10000 mV/mA (@ 1 mA_{exc})			
	Voltage	±500 µV to ±10 V			
	Resistance	25 mΩ to 100 kΩ			
	Pt100, Pt200, Pt500, Pt1000, Pt2000	-200° C to 850° C			
	IEPE® via MSI-BR-ACC	±100 to ±10000 mV			
	Thermocouple via MSI-BR-TH-x	full range of TC type			
	Charge via MSI-BR-CH-50	up to 50000 pC			
	Voltage via MSI-BR-V-200	up to ±200 V			
High voltage measurement					
HSI-HV  	High voltage	±20 to ±1400 V	-	BW: 2 MHz LP: 100 Hz to 2 MHz	ISO: 1.8 kV_{RMS}
Voltage & current measurement					
HSI-LV  	Voltage	±10 mV to ±50 V	✓	BW: 2 MHz LP: 100 Hz to 2 MHz	ISO: up to 1 kV_{RMS} OP: 350 V_{DC}
	Current with external shunt	20 mA / 5 A			
	IEPE® via MSI-V-ACC	±10 mV to 5 V			
	Pt100, Pt200, Pt500, Pt1000, Pt2000 and resistance via MSI-V-RTD	-200° C to 1000° C and 8 to 4 kΩ			

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HSI-STG — Isolated universal input module

- *Strain gauge, bridge sensors:* ±0.1 to ±1000 mV/V (@ 5 V_{DC} excitation)
- *Piezoresistive bridge:* ±0.5 to ±10000 mV/mA (@ 1 mA excitation)
- *Voltage input:* ±500 µV to ±10 V
- *RTD* Resistance Temperature Detector (Pt100 to Pt1000)
  9 resistance ranges (8 to 4000 Ω)
- *Resistance:* 25 mΩ to 100 kΩ
- *Isolation:* 350 V_{DC}
- *Signal connection:* 9-pin SUB-D socket



HSI-STG-D

Additional signal input using MSI

- *IEPE®* Constant current powered sensors (accelerometers, microphones); 12 ranges (±100 mV to 10 V); requires MSI-BR-ACC
- *THERMOCOUPLE* full range of TC type; requires MSI-BR-TH-x
- *CHARGE* Charge up to 50000 pC; requires MSI-BR-CH-50
- *VOLTAGE* up to ±200 V; requires MSI-BR-V-200

Module specifications

	HSI-STG
Gain	0.5 to 10 000; free programmable
Voltage input ranges Sensitivity @ 5 V_{DC} excitation	±0.5[3], ±1[3], ±2.5[3], ±5, ±10, ±25, ±50, ±100, ±250, ±500 mV, ±1 V, ±2V, ±5 V,±10 V[3] ±0.1[3], ±0.2[3], ±0.5[3], ±1, ±2, ±5, ±10, ±20, ±50, ±100, ±200, ±400, ±1000 mV/V
Resistance	25 mΩ to 100 kΩ
Input impedance	>100 MΩ (power off: 50 kΩ)
Input noise	7 nV * √Hz
Voltage input 1 year accuracy[1] Gain drift Offset drift linearity	±0.05 % of reading ± 0.02 % of range ±10 µV typical 10 ppm/°K max. 20 ppm/°K typical 0.3 µV/°K + 5 ppm of range/°K, max 2 µV/°K + 10 ppm of range typical 0.03 %
Input coupling	DC or AC (-3 dB @ 1 Hz); max. DC voltage when AC coupled: 35 V
Excitation voltage 1 year accuracy[1] Drift Current limit Protection	0, 0.25, 0.5, 1, 2.5, 5,10 and 12 V_{DC} software programmable (16 Bit DAC) ±0.03 % ±1 mV ±10 ppm/°K ±50 µV/°K 100 mA Continuous short to ground
Excitation current 1 year accuracy[1] Compliance voltage Output impedance	0.1, 0.2, 0.5, 1, 2, 5, 10 and 20 mA software programmable (16 Bit DAC) 0.1 mA to 5 mA: 0.05% ±0.5 µA typical 15 ppm/°C >5 mA to 60 mA: 0.3% ±20 µA typical 100 ppm/°C 12 V >1 MOhm
Supported sensors	4- or 6-wire full bridge 3- or 5-wire ½ bridge with internal completion (software programmable) 3- or 4-wire ¼ bridge with internal resistor for 120 and 350 Ohm (software programmable)[1] 4-wire full bridge with constant current excitation (piezoresistive bridge sensors) Potentiometric Resistance Resistance Temperature Detection with Software linearization: Pt100, Pt200, Pt500, Pt1000
Bridge resistance	80 Ω to 10 kΩ @ ≤ 5 V_{DC} excitation
Shunt calibration	Two internal shunt resistors 59.88 kOhm and 175 kOhm
Shunt and completion resistor accuracy	0.05 % ±15 ppm/°K
Automatic bridge balance	Input range 500 µV to 25 mV: ±400 % of Range >25 mV to 10 V : ±200% of Range, or limited by input range to maximum ±10 V
Bandwidth[2] (-3 dB)	5 mV to 5V input range: 2 MHz; 500 µV: 1 MHz; 1 mV: 1.5 MHz, 2.5 mV 1.9 Mhz, 10 V: 1 MHz
Filters (low pass)	100 Hz, 300 Hz, 1 kHz, 3 kHz, 10 kHz, 30 kHz, 100 kHz, 300 kHz, 1 MHz (±1.5 dB @ f_0)
Filter characteristics	100 Hz to 1 MHz: Butterworth or Bessel 40 dB/dec (2nd order; ±1.5 dB @ f_0) 2 MHz: Butterworth 60 dB/dec (3rd order; 0 to -3 dB @ 2 MHz)
Signal delay @ 2 MHz bandwidth	450 nsec

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Rise time @ 2 MHz bandwidth	≥ 200 nsec							
Typical THD	95 dB, 1 KHz input signal at 1 V range							
Typical SFDR and SNR	1 kHz bandwidth		10 kHz bandwidth		100 kHz bandwidth		1 MHz bandwidth	
	SFDR	SNR	SFDR	SNR	SFDR	SNR	SFDR	SNR
1 mV	80 dB	66 dB	80 dB	62 dB	80 dB	55 dB	47 dB	46 dB
100 mV	100 dB	82 dB	90 dB	78 dB	90 dB	71 dB	66 dB	60 dB
1000 mV	110 dB	100 dB	110 dB	97 dB	106 dB	91 dB	87 dB	79 dB
Typical CMRR	0.5mV to 1V range		2V to 10V range					
50Hz	160 dB		160 dB					
1kHz	126 dB		105 dB					
10kHz	104 dB		87 dB					
100kHz	87 dB		71 dB					
Isolation	±350 V_{DC} continuous (for input, excitation and TEDS interface)							
Common mode voltage	±350 V_{DC} input to housing							
Over voltage protection	±30 V_{DC} input (+) to input (-)							
ESD protection	IEC61000-4-2: ±8 kV air discharge, ±4 kV contact discharge							
Output voltage	±5 V							
Output resistance	10 Ω							
Output current	Max. 5 mA							
Output protection	Short to ground for 10 seconds							
RS-485 interface	Yes							
Special function	Integrated temperature sensor							
Supported TEDS chips	DS2406, DS2430A, DS2431, DS2432, DS2433							
MSI support	MSI-BR-TH-x, MSI-BR-ACC, MSI-BR-V-200, MSI-BR-CH-50							
Power supply voltage	±9 V_{DC} (±1 %)							
Power consumption	Typ. 1.5 W @ 350 Ohm, 2 W @ 120 Ohm (both full bridge @ 5 V_{DC} excitation) Max. 3 W (depending on sensor); overall current should not exceed DEWE-30-xx maximum power.							

[1] Conditions fo accuracy: module temperature is calibration temperature ±5 °C; humidity is 30 % to 90 % relative humidity.

[2] Please consider possible bandwidth limitation of further components in the measuring chain e.g. A/D card or signal conditioning mainframe.

[3] This range has limited full power bandwidth.

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HSI-HV — Isolated high voltage module

- *Input ranges:* 7 ranges (±20 V to ±1400 V)
- *Bandwidth:* 2 MHz
- *Isolation:* 1.8 kV_{RMS} line to line
  1.4 kV_{RMS} line to ground
- *Input impedance:* 10 MΩ
- *Protection:* 4 kV burst, surge
- *Signal connection:* Banana sockets



Module specifications

	HSI-HV							
Input ranges	±20 V[1], ±50 V[1], ±100 V, ±200 V, ±400 V, ±800 V, ±1400 V							
1 year accuracy[2]	Range	Signal frequency	Accuracy					
	20 V; 50 V	DC	±0.05 % of reading ±60 mV					
	100 V to 1400 V	DC	±0.05 % of reading ±0.05 % of range					
		0.1Hz to 500 Hz	±0.05 % of reading ±0.01 % of range					
		>500 Hz to 5 kHz	±0.1 % of reading ±0.05 % of range					
		>5 kHz to 50 kHz	±0.4 % of reading ±0.05 % of range					
		>50 kHz to 100 kHz	±(0.016*f) % of reading ±0.1 % of range					
		>100 kHz to 1 MHz	±(0.010*f) % of reading ±1 % of range					
		>1 MHz to 2 MHz	±(0.014*f) % of reading ±3 % of range					
			f = signal frequency in kHz					
Gain linearity	0.05 %							
Gain drift range	Typically 20 ppm/°C (max. 50 ppm/°C)							
Offset drift								
20 V to 100 V	typical 1.5 mV/°C of range		max. 4 mV/°C					
200 V to 1400 V	typical 5 ppm/°C		max. 20 ppm of range/°C					
Long term stability	100 ppm/sqrt (1000 hrs)							
Input resistance	10 MΩ || 2.2 pF							
-3 dB Bandwidth	2 MHz							
Signal delay @ full bandwidth	approx. 390 ns							
Filter selection	Push button or software							
Filter (lowpass)	100, 300, 1k, 3k, 10k, 30k, 100k, 300 kHz, 1 MHz, 2 MHz[3]							
Filter type	Bessel or Butterworth 40 dB/decade							
Filter characteristics								
100 Hz to 1 MHz	Butterworth or Bessel 40 dB/dec (2nd order; ±1.5 dB @ f_0)							
2 MHz	Butterworth 60 dB/dec (3rd order; 0 to -3 dB @ 2 MHz)							
Typical SFDR and SNR	10kHz bandwidth		100kHz bandwidth		1MHz bandwidth		2 MHz bandwidth	
	SFDR	SNR	SFDR	SNR	SFDR	SNR	SFDR	SNR
50 V	110 dB	91 dB	110 dB	82 dB	94 dB	76 dB	84 dB	73 dB
400 V	110 dB	95 dB	110 dB	92 dB	94 dB	82 dB	84 dB	77 dB
1400 V	110 dB	95 dB	110 dB	95 dB	94 dB	82 dB	84 dB	77 dB
Typical CMRR	>80 dB @ 50 Hz		60 dB @ 1 kHz					
	70 dB @ 400 Hz		48 dB @ 10 kHz					
Isolation voltage	Line to Ground 1.4 kVrms							
	Line to Line 1.8 kVrms							
Protection	CAT III 600							
	CAT IV 300							
Surge (1.2/50)	±4000 V							
Burst (5 kHz)	±4000 V							
Output voltage	±5 V							
Output resistance	10 Ohm							
Output current maximum	35 mA	CAUTION: do not exceed maximum output current!						
Power supply	±9 V_{DC} ± 1%							
Power consumption	1.2 W							
Power On default settings	Software programable							
Special functions	Integrated temperature sensor							
Programming interface	RS-485							

[1] 20 V and 50 V are auxiliary ranges and have a limited bandwidth.
20 V range typically 0.9 Mhz
50 V range typically 1.9 Mhz

[2] Conditions for accuracy: Module temperature is calibration temperature ±5 °C; humidity is 30 to 90 RH;
AC accuracy: the highest filter (2 Mhz) has to be activated. f = signal frequency in kHz.
for the 2 year accuracy multiply all % of range and % of reading values by 1.5.

[3] 2 MHz filter: exclusively Butterworth 60 dB/decade. Please consider possible bandwidth limitation of further components in the measuring chain, e.g. A/D cards or signal conditioning mainframe

HSI-LV — Isolated low voltage module

- *Voltage input:* 12 ranges (10 mV to 50 V)
- *Current input:* ±20 mA using SE-CUR-SHUNT-1
  ±5 A using SE-CUR-SHUNT-4 or -SHUNT-5
- *Bandwidth:* 2 MHz

Additional signal input using MSI

- *IEPE®* Constant current powered sensors (accelerometers,microphones); 12 ranges (10 mV to 5 V); requires MSI-V-ACC
- *RTD* Resistance Temperature Detector (Pt100 to Pt2000) 9 resistance ranges (8 to 4000 Ω); requires MSI-V-RTD



Module specifications

	HSI-LV							
Input ranges	10 mV, 20 mV, 50 mV, 100 mV, 200 mV, 500 mV, 1 V, 2.5 V, 5 V, 10 V, 25 V, 50 V							
Button selectable ranges	10 mV, 50 mV, 200 mV, 1 V, 5 V, 10 V, 50 V							
Rated input voltage	33 V_{RMS}, 46.7 V_{PEAK}, 70 V_{DC} according to EN-61010-1 and EN-61010-2-30							
1 year accuracy[1)]	Range	Signal frequency	Accuracy					
Bipolar	10 mV to 100 mV	DC	±0.02 % of reading ±60 µV					
	2.5 V	DC	±0.02 % of reading ±0.1 % of range					
	200 mV to 50 V	DC	±0.02 % of reading ±0.05 % of range					
	10 mV to 100 mV	0.1 Hz to 5 kHz >5 kHz to 50 kHz >50 kHz to 100 kHz >100 kHz to 1 MHz >1 MHz to 2 MHz	±0.1 % of reading ±30 µV ±0.4 % of reading ±30 µV ±(0.016*f) % of reading ±0.1 % of range ±(0.010*f) % of reading ±1 % of range ±(0.014*f) % of reading ±3 % of range					
	200 mV to 50 V	0.1 Hz to 500 Hz >500 Hz to 5 kHz >5 kHz to 50 kHz >50 kHz to 100 kHz >100 kHz to 1 MHz >1 MHz to 2 MHz	±0.05 % of reading ±0.01 % of range ±0.1 % of reading ±0.05 % of range ±0.4 % of reading ±0.05 % of range ±(0.016*f) % of reading ±0.1 % of range ±(0.010*f) % of reading ±1 % of range ±(0.014*f) % of reading ±3 % of range					
Unipolar	10 mV to 100 mV 200 mV to 50 V	DC DC	±0.02 % of reading ±60 µV ±0.02 % of reading ±0.08 % of range					
Input coupling	DC or AC software selectable (1.5 Hz standard, custom on request down to 0.01 Hz)							
Gain linearity	Typically 0.01 %; max. 0.04 % of full scale							
Gain drift range	Typically 10 ppm/°C (max. 30 ppm/°C)							
Offset drift	10 mV to 200 mV: 500 mV to 50 V:	Typically 3 µV/°C Typically 10 ppm of range/°C						
Long term stability	100 ppm/sqrt (1000 hrs)							
Input resistance	1 MOhm							
Bandwidth (-3 dB)	2 MHz							
Signal delay @ full bandwidth	approx. 405 ns							
Filter selection	Push button or software							
Filter	100 Hz, 300 Hz, 1 kHz, 3 kHz, 10 kHz, 30 kHz, 100 kHz, 300 kHz, 1 MHz, 2 MHz[2)]							
Filter type	Bessel or Butterworth 40 dB/dec							
Filter characteristics 100 Hz to 1 MHz 2 MHz	 Butterworth or Bessel 40 dB/dec (2^{nd} order; ±1.5 dB @ f_0) Butterworth 60 dB/dec (3^{rd} order; 0 to -3 dB @ 2 MHz)							
Typical SFDR and SNR:	10 kHz bandwidth		100 kHz bandwidth		1 MHz bandwidth		2 MHz bandwidth	
	SFDR	SNR	SFDR	SNR	SFDR	SNR	SFDR	SNR
20 mV	88 dB	78 dB	88 dB	71 dB	77 dB	60 dB	76 dB	56 dB
1 V	110 dB	98 dB	110 dB	95 dB	93 dB	82 dB	84 dB	75 dB
50 V	110 dB	98 dB	110 dB	95 dB	94 dB	82 dB	85 dB	75 dB
Typical CMRR	10 mV to 1 V range:		2.5 V to 50 V range:					
50 Hz	130 dB		100 dB					
1 kHz	120 dB		60 dB					
10 kHz	95 dB		40 dB					
100 kHz	75 dB		20 dB					

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Input overvoltage protection	350 V_{DC}
Isolation voltage	1 kV_{RMS} [3]
Sensor supply	±9 V (±1 %), 12 V (±5 %), 200 mA resettable fuse protected[4]
Output voltage	±5 V
Output resistance	10 Ohm
Maximum output current	5 mA
Output protection	Short to ground for 10 sec.
Power On default settings	Software programable
Power supply	±9 V_{DC} ±1 %
Power consumption	1.1 W without sensor supply
Special functions	Integrated temperature sensor
RS-485 interface	Yes
TEDS	Hardware support for TEDS (Transducer Electronic Data Sheet)
Supported TEDS chips	DS2406, DS2430A, DS2432, DS2433, DS2431
Supported MSI	MSI-V-ACC, MSI-V-RTD

[1] Conditions for accuracy: Module temperature is calibration temperature ±5 °C; humidity is 30 to 90 RH.
AC accuracy: the highest filter (2 MHz) has to be activated. f = signal frequency in kHz.
For the 2 year accuracy multiply all % of range and % of reading values by 1.5.

[2] 2 MHz filter: exclusively for Butterworth 60 dB/decade - refer to filter specifications. Please consider possible bandwidth limitation of further components in the measuring chain, e.g. A/D card or signal conditioning mainframe.

[3] Although the rated input voltage is 33 V_{RMS}, 46.7 V_{PEAK} or 70 V_{DC} according to EN-61010-1 and EN-61010-2-30, the galvanic isolation has been tested with 1 kV_{RMS} for 1 min.

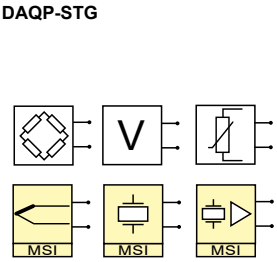
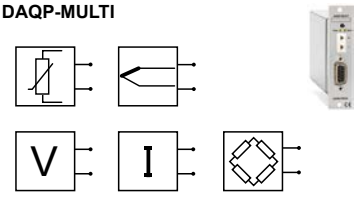
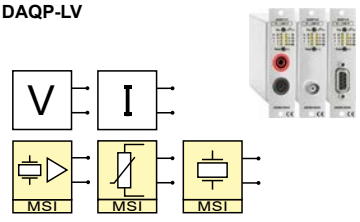
[4] Overall current should not exceed DEWE-30-xx maximum power.

Selection Guide

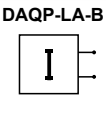
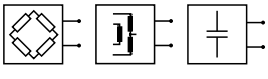
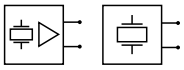
DAQ Series Modules



- *Single channel*
- *High bandwidth - for dynamic signals*
- *Isolation (most models)*
- *Analog signal output (±5 V)*
- *Pure signal conditioning solution in conjunction with DEWE-30 series racks*

Module	Input type	Ranges	TEDS	Bandwidth (BW), Filters (LP = lowpass, HP = highpass)	Isolation (ISO), Overvoltage protection (OP)
Universal measurement					
DAQP-STG 	Strain gauge, bridge sensors	±0.1 to ±1000 mV/V (@ 5 VDC_{exc})	✓	BW: 300 kHz LP: 10 Hz to 300 kHz	ISO: 350 V_{DC} OP: ±50 V_{DC}
	Piezoresistive bridge	±0.5 to 10000 mV/mA (@ 1 mA_{exc})			
	Voltage	±500 µV to ±10 V			
	Resistance	25 mΩ to 100 kΩ			
	Pt100, Pt200, Pt500, Pt1000, Pt2000	-200° C to 850° C			
	IEPE® via MSI-BR-ACC	±100 to ±10000 mV			
	Thermocouple via MSI-BR-TH-x	full range of TC type			
	Charge via MSI-BR-CH-50	up to 50000 pC			
	Voltage via MSI-BR-V-200	up to ±200 V			
DAQP-MULTI 	Thermoresistors	Pt100, Pt200, Pt500, Pt1000 and Pt2000, free programmable range	✓	BW: 3 kHz LP: 3, 10, 30, 100, 300, 1000 Hz	ISO: 1 kV_{RMS}
	Thermocouple	Type K, J, T, R, S, N, E, B, L, C, U free programmable range			
	Resistance	1 Ohm to 1 MOhm			
	Piezoresistive bridge Voltage Current (with external shunt)	13 ranges (±0.5 to 5000 mV/mA) 10 ranges from ±5 mV to ±5 V depending on external shunt			
High voltage measurement					
DAQP-HV 	High voltage	±20 to ±1400 V	-	BW: 300 kHz LP: 10 Hz to 300 kHz	ISO: 1.8 kV_{RMS}
Voltage & current measurement					
DAQP-LV 	Voltage	±10 mV to ±50 V	✓	BW: 300 kHz LP: 10 Hz to 300 kHz	ISO: up to 1 kV_{RMS} OP: 350 V_{DC}
	Current with external shunt	20 mA / 5 A			
	IEPE® via MSI-V-ACC	±10 mV to 10 V			
	Pt100, Pt200, Pt500, Pt1000, Pt2000 and resistance via MSI-V-RTD	-200° C to 1000° C and 0 to 6.5 kOhm			
	Charge via MSI-V-CH-50	up to 50000 pC			
DAQN-AIN 	Voltage	±10 V (1:1 input)	-	-	OP: < ±500 V (jumper selectable)

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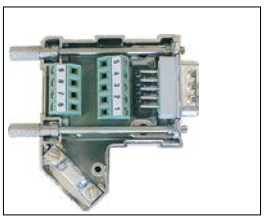
Module	Input type	Ranges	TEDS	Bandwidth (BW), Filters (LP = lowpass, HP = highpass)	Isolation (ISO), Overvoltage protection (OP)
Current measurement					
DAQP-LA-B  	Current *Note:* 5 A_{RMS} continuous	0.1 A to 30 A peak max. 5 A_{RMS} contin. current	-	BW: 300 kHz LP: 10 Hz to 300 kHz	ISO: 1.4 kV_{RMS}
DAQP-LA-B-S1  	Current *Note:* typ. 20 mA application	2 mA to 600 mA	-	BW: 300 kHz LP: 10 Hz to 300 kHz	ISO: 1.4 kV_{RMS}
Carrier frequency amplifier					
DAQP-CFB2  	AC bridge, strain gauge *Note*: programable sine wave excitation up to 20 kHz	Bridge: 0.1 to 1000 mV/V	-	BW: DC to 9.6 kHz LP: 10 Hz to 1 kHz	OP: ±10 V_{DC}
	Inductive sensors, LVDTcapacity	Inductive: 5 to 1000 mV/V			
	Capacity	20 pF to 1 µF			
Charge / IEPE® measurement					
DAQP-ACC-A  	IEPE® sensors	±50 mV to ±5 V	-	BW: 0.5 Hz to 300 kHz LP: 1 to 300 kHz HP: 0.5 Hz and 5 Hz	-
DAQP-CHARGE-A  	Charge sensors IEPE® sensors *Note:* selectable integration and double integration	Charge: 5 to 50000 pC IEPE®: ±5 mV to 5 V	-	BW: 0.1 Hz to 50 kHz LP: 100 Hz to 50 kHz HP: 0.1 Hz to 10 Hz	-
DAQP-CHARGE-B  	Charge sensors *Note:* selectable time constant for static sensors	±100 to ±1 000 000 pC	-	BW: DC to 100 kHz LP: 10 Hz to 100 kHz HP: DC, 0.001 Hz to 0.5 Hz	ISO: 350 V_{DC}
Temperature measurement					
DAQP-THERM  	Thermocouple *Note:* internal CJC and linearisation	Type K, J, T, R, S, N, E, B, L, C and U selectable free programmable range	-	BW: 3 kHz LP: 3, 10, 30, 100, 300, 1000 Hz	ISO: 1 kV_{RMS}
Frequency measurement					
DAQP-FREQ-A  	Frequency	100 Hz to 200 kHz	-	BW: according to range Output response: 1.5 ms 30 ms 500 ms	ISO: 350 V_{DC}
Voltage output module					
DAQN-V-OUT  	Voltage output	1:1 output module with isolation Input voltage: ±10 V Output voltage: ±10 V	-	BW: 400 Hz	ISO: 240 V_{DC}



ADAP-D9M-BNCF: DSUB to BNC adapter for DAQP-V series and DAQP-FREQ modules



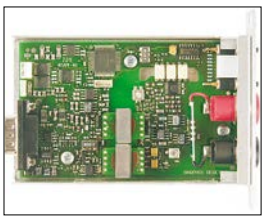
BNC to Microdot adapter (included as a standard with DAQP-CHARGE-A modules)



CONN-DSUB-9: Screw terminal adapter for all modules with 9-pin DSUB connector



BNC to banana and banana to BNC adaptors



Isolated high-voltage amplifier: DAQP-HV

DAQP-STG — Isolated universal input module

- *Strain gauge, bridge sensors:* *±0.1 to ±1000 mV/V (@ 5 V_{DC} excitation)*
- *Piezoresistive bridge:* *±0.5 to ±10000 mV/mA (@ 1 mA excitation)*
- *Voltage input:* *±500 µV to ±10 V*
- *RTD* *Resistance Temperature Detector (Pt100 to Pt2000)*
  9 resistance ranges (8 to 4000 Ω)
- *Resistance:* *25 mΩ to 100 kΩ*
- *Signal connection:* *9-pin D-SUB socket*

Additional signal input using MSI

- *IEPE®* *Constant current powered sensors (accelerometers, microphones); 12 ranges (±100 mV to 10 V); requires MSI-BR-ACC*
- *THERMOCOUPLE* *full range of TC type requires MSI-BR-TH-x*
- *CHARGE* *Charge up to 50000 pC requires MSI-BR-CH-50*
- *VOLTAGE* *higher than ±10 V requires MSI-BR-V-200*



Module specifications

	DAQP-STG
Gain	0.5 to 10 000
Voltage input ranges Sensitivity @ 5 V_{DC} excitation	±0.5, ±1, ±2.5, ±5, ±10, ±25, ±50, ±100, ±250, ±500 mV, ±1 V, ±2V, ±5 V,±10 V ±0.1, ±0.2, ±0.5, ±1, ±2, ±5, ±10, ±20, ±50, ±100, ±200, ±400, ±1000 mV/V
Resistance	25 mOhm to 100 kOhm
Input impedance	>100 MOhm (power off: 50 kOhm)
Input noise	7 nV * √Hz
Voltage input accuracy Gain drift Offset drift linearity	±0.05 % of reading ± 0.02 % of range ±10 µV typical 10 ppm/K max. 20 ppm/K typical 0.3 µV/°C + 10 ppm of range/°C, max 2 µV/°C + 20 ppm of range/°C typical 0.02 %
Excitation voltage Accuracy Drift Current limit Protection	0, 0.25, 0.5, 1, 2.5, 5,10 and 12 V_{DC} software programmable (16 Bit DAC) ±0.03 % ±1 mV ±10 ppm/K ±50 µV/K 100 mA Continuous short to ground
Excitation current Accuracy Drift Compliance voltage Output impedance	0.1, 0.2, 0.5, 1, 2, 5, 10 and 20 mA software programmable (16 Bit DAC) 0.05% ±2µA 15 ppm/K 12 V >1 MOhm
Supported sensors	4- or 6-wire full bridge 3- or 5-wire ½ bridge with internal completion (software programmable) 3- or 4-wire ¼ bridge with internal resistor for 120 and 350 Ohm (software programmable)[1)] 4-wire full bridge with constant current excitation (piezoresistive bridge sensors) Potentiometric Resistance Resistance Temperature Detection: Pt100, Pt200, Pt500, Pt1000, Pt2000
Bridge resistance	80 Ohm to 10 kOhm @ ≤ 5 V_{DC} excitation
Shunt calibration	Two internal shunt resistors 59.88 kOhm and 175 kOhm
Shunt and completion resistor accuracy	0.05 % ±15 ppm/K
Automatic bridge balance	Input range 500 µV to 1 V: ±200 % of Range 2.5 V to 5 V : ±20% of Range
Bandwidth (-3 dB)	300 kHz

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Filters (low pass)	10 Hz, 30 Hz, 100 Hz, 300 Hz, 1 kHz, 3 kHz, 10 kHz, 30 kHz, 100 kHz
Filter characteristics standard DAQP-STG	10 Hz to 100 kHz: Butterworth or Bessel 40 dB/dec (2nd order; ±1.5 dB @ f0) 300 kHz: Bessel 60 dB/dec (3rd order; 0 to -3 dB @ 300kHz)
Option S6 (DAQP-STG-S6)	10 Hz to 100 kHz: Bessel 80 dB/dec (4th order; ±1.5 dB @ f0) 300 kHz: Bessel 60 dB/dec (3rd order; 0 to -3 dB @ 300kHz)
Typical SNR @ 100 kHz [1 kHz] and 5 V_{DC} excitation	66 dB [84 dB] @ 1 mV/V 82 dB [100 dB] @ 50 mV/V
Typical CMRR @ 0.1 mV/V [1 mV/V] and 5 V_{DC} excitation	160 dB [160 dB] @ DC 115 dB [110 dB] @ 400 Hz 110 dB [105 dB] @ 1 kHz
Isolation	±350 V_{DC} [1)]
Common mode voltage	±350 V_{DC} input to housing
Over voltage protection	±50 V_{DC} input (+) to input (-)
Output voltage	±5 V
Output resistance	< 1 Ohm
Output current	Max. 5 mA; short to ground protected for 10 seconds
RS-485 interface	Yes
Supported TEDS chips	DS2406, DS2430A, DS2431, DS2432, DS2433
MSI support	MSI-BR-TH-x, MSI-BR-ACC, MSI-BR-V-200, MSI-BR-CH-50
Power supply voltage	±9 V_{DC} (±1 %)
Power consumption	Typ. 1.7 W @ 350 Ohm, 2.15 W @ 120 Ohm (both full bridge @ 5 V_{DC} excitation) Absolute max.: 3 W (maximum excitation @ maximum current)

[1)] Although the rated input voltage is 33 V_{RMS}, 46,7 V_{PEAK} or 70 V_{DC} according to EN-61010-1 and EN-61010-2-30, the galvanic isolation for input, excitation and TEDS has been tested with ±350 V_{DC} for 1 min.

DAQP-MULTI — Isolated multifunctional module

- *Thermocouple:* *Freely programmable ranges within full thermocouple input span*
- *Bridge:* *±0.5 to ±1000 mV/mA*
- *Voltage input:* *±5 mV to ±5 V (freely programmable within ±5 V)*
- *RTD* *Resistance Temperature Detector (Pt100 to Pt2000), freely programmable ranges within full RTD input span*
- *Resistance:* *1 Ω to 1 MΩ (freely programmable between 1 Ω and 1 MΩ)*
- *Bandwidth:* *3 kHz*
- *Signal connection:* *Standard miniature thermocouple socket, 9-pin D-SUB socket*



DAQP-MULTI

Module specifications

	DAQP-MULTI
Input types	High speed Resistance Temperature Detector (RTD); voltage; resistance; bridge with constant current excitation
Thermocouple	
Type	K, J, T, R, S, N, E, B, L, C, U, others on request
Range	Min. to max. of the input range is freely programmable within the full thermocouple input span
CJC absolute accuracy	±0.3 °C
CJC stability	0.03 °C/°C ambient temperature change
CJC equilibrium time	5 minutes
Accuracy	Typical 0.4° for type K including CJC error; details see table „Input ranges and detailed specifications for thermocouple“.
Linearization	DSP based linearization
Nonlinearity	> 0.01°C
Open thermocouple detection	100 MΩ pull up; software selectable
Connector	Mini thermocouple socket with integrated cold junction compensation sensor
RTD	
Type	Pt100, Pt200, Pt500, Pt1000, Pt2000, others on request
Range	Min. and max. of the input range is freely programmable within the full RTD input span
Constant current	Pt100: 1 mA; Pt200, Pt500: 0.5 mA; Pt1000, Pt2000: 0.2 mA
Accuracy	Typical accuracy 0.2 °C for Pt100, details see table „Input ranges and detailed specifications for RTD“
Linearization	DSP based linearization
Nonlinearity	> 0.01 °C
Voltage	
Input range	±5 mV, ±10 mV, ±20 mV, ±50 mV, ±100 mV, ±200 mV, ±500 mV, ±1 V, ±2 V, ±5 V, freely programmable within ±5V
Accuracy	±5 to ±100 mV Range: 0.02 % of reading ±0.02 % of Range ±5 µV ±0.1mV to ±5 V Range: 0.02 % of reading ±0.02 % of Range ±200 µV
Offset drift	Typical ±0.3 µV/°K ±10 ppm of range/°K
Gain drift	Typical 15 ppm/°K
Input impedance	> 100 MΩ (power off: 50 kΩ)
Input noise	8 nV * √Hz
Resistance	
Range	1, 3, 10, 30, 100, 300, 1k, 3k, 10k, 30k, 100k, 1M, freely programmable between 1 Ω and 1 MΩ
Accuracy	According to table „Input ranges and detailed specifications for resistance“
Drift	Typical 15 ppm/°K
Constant current	From 5 µA to 5 mA, depending on range
Bridge	
Range	0.5, 1, 2, 5, 10, 20, 50, 100, 200, 500, 1000 mV/mA
Accuracy	0.02 % of reading ±0.01 % of Range ±5 µV
Offset drift	typical ±0.3 µV/°K ±10 ppm of range/°K
Gain drift	typical 15ppm/°K
Input impedance	> 100 MΩ (power off: 50 kΩ)
Input noise	8 nV * √Hz
Automatic bridge balance	±200 % of range
Supported sensors	4 wire full bridge
Connector	D-SUB-9; DEWETRON bridge type pinout

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Excitation current	
Excitation current	1, 2, 4 mA; software programmable
Accuracy	0 to 200 µA: 0.02 % ±50 nA
	200 µA to 5 mA: 0.02 % ±1 µA
Drift	15 ppm/°K
Compliance voltage	15 V
Source resistance	>150 kΩ

Bandwidth (-3dB)	3 kHz		
Filters	3 Hz, 10 Hz, 30 Hz, 100 Hz, 300 Hz, 1 kHz, 3 kHz		
Group delay	300 µs with highest filter		
Filter characteristics	Butterworth or Bessel, 2nd, 4th, 6th 8th order programmable		
Typ. CMRR	0 to 100 mV range	100 mV to 5 V range	Thermocouple input
50 Hz	125	105	160
1 kHz	120	100	135
3 kHz	115	95	130
Isolation	1 kV_{RMS} [1)]		
Over voltage protection	±100 V between inputs (clamping voltage: 5 V @ TC input; 11 V @ Voltage input)		
Output voltage	±5 V; 0 to 5V; (±10 V and 0 to 10 V with special DEWE-30)		
Output resistance	22 Ω		
Output current	Max. 5 mA		
Output protection	Continuous short to ground		
RS-485 interface	Yes		
RS-485 data output	Yes		
Supported TEDS chips	DS2406, DS2430A, DS2431, DS2432, DS2433,DS28EC20		
MSI support	No		
Power supply voltage	±9 V_{DC} (±5 %)		
Power consumption	1 W typical		

[1)] Although the rated input voltage is 33 V_{RMS}, 46,7 V_{PEAK} or 70 V_{DC} according to EN-61010-1 and EN-61010-2-30, the galvanic isolation for input, excitation and TEDS has been tested with 1 kV_{RMS} for 1 min.

Input ranges and detailed specifications for thermocouple

Thermocouple accuracy including CJC error											
Type	Standard	Input range		Accuracy							
		min [°F] °C	max [°F] °C	-270 to -200 °C -454 to -328 °F [°F] °C	-200 to -100 °C -328 to -148 °F [°F] °C	-100 to 0 °C -148 to 32 °F [°F] °C	0 to 100 °C 32 to 212 °F [°F] °C	100 to 400 °C 212 to 752 °F [°F] °C	400 to 1000 °C 752 to 1832 °F [°F] °C	>1000 °C > 1832 °F [°F] °C	
K	DIN EN 60584-1	[-454] -270	[2501] 1372	[17.41] 9.67	[1.82] 1.01	[1.92] 0.51	[0.70] 0.39	[0.79] 0.44	[1.08] 0.6	[1.39] 0.77	
J	DIN EN 60584-1	[-346] -210	[2192] 1200	[1.76] 0.98	[1.57] 0.87	[0.85] 0.47	[0.67] 0.37	[0.76] 0.42	[0.92] 0.51	[1.01] 0.56	
T	DIN EN 60584-1	[-454] -270	[752] 400	[11.38] 6.32	[1.78] 0.99	[0.99] 0.55	[0.70] 0.39	[0.61] 0.34	-	-	
R	DIN EN 60584-1	[-58] -50	[3200] 1760	-	-	[2.30] 1.28	[1.60] 0.89	[1.17] 0.65	[0.95] 0.53	[1.28] 0.71	
S	DIN EN 60584-1	[-58] -50	[3200] 1760	-	-	[2.07] 1.15	[1.57] 0.87	[1.21] 0.67	[1.04] 0.58	[1.39] 0.77	
N	DIN EN 60584-1	[-454] -270	[2372] 1300	[23.81] 13.23	[2.02] 1.12	[0.97] 0.54	[0.67] 0.42	[0.70] 0.39	[0.86] 0.48	[1.03] 0.57	
E	DIN EN 60584-1	[-454] -270	[1832] 1000	[11.00] 6.11	[1.06] 0.87	[0.88] 0.49	[0.65] 0.36	[0.61] 0.34	[0.86] 0.48	-	
L	DIN 43710	[32] 0	[1652] 900	-	-	-	[0.65] 0.36	[0.74] 0.41	[0.77] 0.43	-	
C	ASTM E988-96	[32] 0	[4190] 2310	-	-	-	[0.88] 0.49	[0.86] 0.48	[1.06] 0.59	[1.69] 0.94	
U	DIN 43710	[-328] -200	[1112] 600	[1.67] 0.93	[1.67] 0.93	[0.99] 0.55	[0.70] 0.39	[0.63] 0.35	[0.56] 0.31	-	
B	DIN EN 60584-1	[32] 0	[3308] 1820	-	-	-	[54.56] 30.31	[5.47] 3.04	[1.40] 0.78	[0.92] 0.51	

= calculated specifications, not veryfied.

Input ranges and detailed specifications for RTD

RTD								
Type	Standard	Input range		Current	Accuracy			
		min [°F] °C	max [°F] °C	mA	-200 to -100 °C -328 to -148 °F [°F] °C	-100 to 0 °C -148 to 32 °F [°F] °C	0 °C to fullscale 32 °F to fullscale (% of reading + [°F] °C)	
Pt100 (385)	DIN EN 60751	[-328] -200	[1562] 850	0.2	[0.25] 0.14	[0.37] 0.21	0.07	[0.37] 0.21
Pt200 (385)	DIN EN 60751	[-328] -200	[1562] 850	0.1	[0.32] 0.18	[0.48] 0.27	0.10	[0.48] 0.27
Pt500 (385)	DIN EN 60751	[-328] -200	[1562] 850	0.2	[0.61] 0.34	[0.75] 0.42	0.09	[0.75] 0.42
Pt1000 (385)	DIN EN 60751	[-328] -200	[1562] 850	0.2	[0.39] 0.22	[0.52] 0.29	0.09	[0.52] 0.29
Pt2000 (385)	DIN EN 60751	[-328] -200	[1562] 850	0.2	[0.45] 0.25	[0.63] 0.35	0.12	[0.64] 0.36
Pt100 (3926)		[-328] -200	[1562] 850	0.2	[0.25] 0.14	[0.37] 0.21	0.07	[0.37] 0.21

Input ranges and detailed specifications for resistance

Resistance			
Range	**Current**	**Accuracy**	
[Ω]	[mA]	[% of reading]	[% of range]
1000000	0.005	0.04	1.02
300000	0.015	0.04	0.35
100000	0.05	0.04	0.11
30000	0.1	0.04	0.07
10000	0.1	0.04	0.08
3000	0.2	0.04	0.07
1000	0.5	0.04	0.25
300	1	0.04	0.18
100	1	0.04	0.12
30	2	0.04	0.08
10	4	0.04	0.06
3	5	0.04	0.10
1	5	0.04	0.23

Detailed specifications for excitation current

Excitation		
	[% of reading]	[µA]
0 to 200 µA	0,02	0,05
>0.2 to 5 mA	0,02	1

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DAQP-HV — *Isolated high voltage module*

- *Input ranges:* *7 ranges (±20 V to ±1400 V)*
- *Bandwidth:* *300 kHz*
- *Isolation:* *1.8 kV_{RMS} line to line*
  1.4 kV_{RMS} line to ground
- *Signal connection:* *Banana sockets*



DAQP-HV-B

Module specifications

	DAQP-HV
Input ranges	±20 V, ±50 V, ±100 V, ±200 V, ±400 V, ±800 V, ±1400 V
DC accuracy 20 V and 50 V 100 V to 1400 V	 ±0.05 % of reading ±40 mV ±0.05 % of reading ±0.05 % of range
Gain linearity	0,03 %
Gain drift range	Typically 20 ppm/°K (max. 50 ppm/°K)
Offset drift 20 V to 100 V 200 V to 1400 V	 typical 0.5 mV/°K max. 4 mV/°K typical 5 ppm/°K max. 20 ppm of Range/°K
Long term stability	100 ppm/sqrt (1000 hrs)
Input resistance	10 MOhm
-3 dB Bandwidth	300 kHz(1)
Filter selection	Push button or software
Filter (lowpass)	10 Hz, 30 Hz, 100 Hz, 300 Hz, 1 kHz, 3 kHz, 10 kHz, 30 kHz, 100 kHz
Filter characteristics	10 Hz to 100 kHz: Butterworth or Bessel 40 dB/dec (2nd order; ±1.5 dB @ f0) 300 kHz: Bessel 60 dB/dec (3rd order; 0 to -3 dB @ 300kHz)
Typical SFDR and SNR 50 V 200 V 1400 V	300 kHz 100 kHz 10 kHz SFDR SNR SFDR SNR SFDR SNR 98 76 101 81 dB 108 90 dB 98 84 101 89 dB 108 91 dB 98 86 102 91 dB 107 92 dB
Typical CMRR	>80 dB @ 50 Hz 70 dB @ 400 Hz 60 dB @ 1 kHz 48 dB @ 10 kHz
Isolation voltage	Line to Ground 1.4 kVrms Line to Line 1.8 kVrms
Protection Surge (1.2/50) Burst (5 kHz)	CAT III 600 CAT IV 300 ±4000 V ±4000 V
Output voltage	±5 V
Output resistance	<10 Ohm
Output current	5 mA
Output protection	Short to ground for 10 sec.
Power supply	±9 V_{DC} ± 1%
Power consumption	0.7 W
Power On default settings	Software programable
Interface	RS-485

(1) 300 kHz exclusively for Bessel filter characteristic

DAQP-DMM — *Isolated high voltage module*

- *Input ranges:* *6 ranges from ±10 V to ±1000 V*
- *Bandwidth:* *30 kHz max.*
- *Isolation:* *1.5 kV_{RMS}*
- *Signal connection:* *Safety banana sockets*



DAQP-DMM

Module specifications

	DAQP-DMM
Input ranges	±10, ±40, ±100, ±200, ±400, ±1000 V
Range selection	Push button or software
DC accuracy	0.1 % of reading ±0.1 % of range
Gain linearity	Better than ±0.03 %
Gain drift	Typ. 20 ppm/°K, max. 40 ppm/°K
Input resistance	10 MOhm (±0.1 %)
Bandwidth (-3 dB ±1.5 dB @ f0) 10 V to 40 V range 100 V to 200 V range 400 V to 1000 V range	 Typical 20 kHz Typical 25 kHz 30 kHz
Filters (lowpass)	10 Hz, 100 Hz, 1 kHz, 3 kHz (±1.5 dB @ f0)
Filter selection	Push button or software
Filter characteristics @ 0.01, 0.1, 1, 3 kHz @ 30 kHz	Butterworth 40 dB / decade (12 dB / octave) 100 dB / decade (30 dB / octave)
Typ. SNR @ max. bandwidth 10 V range 100 V range 1000 V range	 60 dB 76 dB 81 dB
Typical CMRR	73 dB @ 0 Hz 70 dB @ 50 Hz 57 dB @ 400 Hz
Isolation voltage	1.5 kV_{RMS}
Output voltage	±5 V
Output resistance	< 10 Ohm
Output current	Max. 5 mA
Output protection	Continuous short to ground
RS-485 interface	Yes
Power supply voltage	±9 V_{DC} (±10 %)
Power consumption	Typical 0.65 W

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DAQP-LV — Isolated low voltage module

- *Voltage input:* 12 ranges (10 mV to 50 V)
- *Current input:* ±20 mA using DAQ-SHUNT-1
±5 A using DAQ-SHUNT-4 or DAQ-SHUNT-5
- *Bandwidth:* 300 kHz



Additional signal input using MSI

- *IEPE®* — Constant current powered sensors (accelerometers,microphones); 12 ranges (10 mV to 5 V); requires MSI-V-ACC
- *RTD* — Resistance Temperature Detector (Pt100 to Pt2000) 9 resistance ranges (8 to 4000 Ω); requires MSI-V-RTD
- *CHARGE* — Charge up to 50000 pC requires MSI-V-CH-50

Module specifications

	DAQP-LV
Input ranges unipolar and bipolar	10 mV, 20 mV, 50 mV, 100 mV, 200 mV, 500 mV, 1 V, 2.5 V, 5 V, 10 V, 25 V, 50 V
Push button selectable ranges	10 mV, 50 mV, 200 mV, 1 V, 5 V, 10 V, 50 V
Rated input voltage	33 V_{RMS}, 46.7 V_{PEAK}, 70 V_{DC} according to EN-61010-1 and EN-61010-2-30
DC accuracy Bipolar Unipolar	Range — Accuracy 10 mV to 50 mV — ±0.02 % of reading ±40 µV 100 mV to 50 V — ±0.02 % of reading ±0.05 % of range 10 mV to 50 mV — ±0.04 % of reading ±40 µV 100 mV to 50 V — ±0.04 % of reading ±0.05 % of range
Input coupling	DC or AC software selectable (1.5 Hz standard, custom on request down to 0.01 Hz)
Gain linearity	0.01 % of full scale
Gain drift range	Typically 10 ppm/°K (max. 20 ppm/°K)
Offset drift 10 mV to 200 mV 500 mV to 50 V	Uni- and bipolar 3 µV/°K 10 ppm of Range/°K
Long term stability	100 ppm/sqrt (1000 hrs)
Input resistance	1 MOhm
Bandwidth (-3 dB)	300 kHz
Filter selection	Push button or software
Filters (low pass)	10 Hz, 30 Hz, 100 Hz, 300 Hz, 1 kHz, 3 kHz, 10 kHz, 30 kHz, 100 kHz
Filter characteristics	10 Hz to 100 kHz: Butterworth or Bessel 40 dB/dec (2nd order; ±1.5 dB @ f0) 300 kHz: Bessel 60 dB/dec (3rd order; 0 to -3 dB @ 300kHz)
Typical SFDR and SNR: 20 mV 1 V 50 V	300 kHz bandwidth: SFDR / SNR — 100 dB / 72 dB; 102 dB / 82 dB; 102 dB / 82 dB 100 kHz bandwidth: SFDR / SNR — 98 dB / 76 dB; 99 dB / 93 dB; 99 dB / 93 dB 10 kHz bandwidth: SFDR / SNR — 97 dB / 84 dB; 97 dB / 96 dB; 97 dB / 96 dB
Typical CMRR	10 mV to 1 V range: >100 dB @ 50 Hz; >100 dB @ 1 kHz; 83 dB @ 10 kHz 2.5 V to 50 V range: 90 dB @ 50 Hz; 65 dB @ 1 kHz; 55 dB @ 10 kHz
Input overvoltage protection	350 V_{DC}
Isolation voltage	1 kV_{RMS} [1]
Sensor supply	±9 V (±1 %), 12 V (±5 %), 200 mA resettable fuse protected[2]
Output voltage	±5 V
Output resistance	<10 Ohm
Maximum output current	5 mA
Output protection	Short to ground for 10 sec.
Power On default settings	Software programable
Power supply	±9 V_{DC} ±1 %
Power consumption	0.8 W without sensor supply
RS-485 interface	Yes
TEDS	Hardware support for TEDS (Transducer Electronic Data Sheet)
Supported TEDS chips	DS2406, DS2430A, DS2432, DS2433, DS2431
Supported MSI	MSI-V-ACC; MSI-V-RTD, MSI-V-CH-50

[1] Although the rated input voltage is 33 V_{RMS}, 46.7 V_{PEAK} or 70 V_{DC} according to EN-61010-1 and EN-61010-2-30, the galvanic isolation has been tested with 1 kV_{RMS} for 1 min.

[2] Overall current should not exceed DEWE-30-xx maximum power.

DAQP-V — Isolated low voltage module

- *Input ranges:* ±10, ±100 mV, ±1, ±5, ±10, ±50 V
- *Bandwidth:* 50 kHz
- *Isolation:* 350 V_{DC} (1 kV_{RMS} with banana socket)
- *Signal connection:* Safety banana sockets
  BNC socket
  9-pin SUB-D socket
  8-pin LEMO socket



Module specifications

	DAQP-V
Input ranges	±0.01, ±0.1, ±1, ±5, ±10, ±50 V
Range selection	Push button or software
DC accuracy 10 mV range 100 mV range 1 V to 50 V ranges	 0.05 % of reading ±40 µV 0.05 % of reading ±100 µV 0.05 % of reading ±0.05 % of range
Gain linearity	Better than ±0.03 %
Gain drift	Typ. 20 ppm/°K, max. 40 ppm/°K
Input resistance	1 MOhm (±0.1 %)
Bandwidth (-3 dB)	50 kHz (±1.5 dB @ f0)
Filters (lowpass)	10 Hz, 100 Hz, 1 kHz, 10 kHz (±1.5 dB @ f0)
Filter selection	Push button or software
Filter characteristics @ 0.01, 0.1, 1, 10 kHz @ 50 kHz	Butterworth 40 dB / decade (12 dB / octave) 100 dB / decade (30 dB / octave)
Typ. SNR @ max. bandwidth 10 mV range 10 V range 50 V range	 61 dB 78 dB 78 dB
Typical CMRR	90 dB @ 0 Hz 78 dB @ 50 Hz 60 dB @ 400 Hz
Isolation voltage	350 V_{DC} (1 kV_{RMS} with banana connector)
Overvoltage protection	±500 V_{DC} or 300 V_{RMS}
Output voltage	±5 V
Output resistance	< 10 Ohm
Output current	Max. 5 mA
Output protection	Continuous short to ground
RS-485 interface	Yes
Power supply voltage	±9 V (±10 %)
Power consumption	typical 0.85 W

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DAQN-AIN — Direct input module

- *Input ranges:* — *Voltage signals up to ±10 V with overvoltage protection*
- *Bandwidth:* — *Typ. 35 kHz (High input protection)*
Full system bandwidth (Low input protection)
- *Isolation:* — *none*
- *Signal connection:* — *Safety banana sockets*
BNC socket
9-pin SUB-D socket



Module specifications

	DAQN-AIN
Input signal	1:1 voltage input to A/D board; single ended
Accuracy	According to A/D board
High input protection Max. input voltage Max. output voltage Accuracy Bandwidth (-3 dB)	 ±10 V, higher voltages up to ±500 V will be cut off ±10 V Typ. better than ±0.25 % Typ. 35 kHz (±1.2 dB @ f0)
Low input protection Max. input voltage Max. output voltage Accuracy Bandwidth (-3 dB) Protection resistor	 ±10 V, higher voltages will destroy the protection resistor ±10 V Typ. better than ±0.02 % Full system bandwidth 10 Ohm
Isolation	none
RS-485 interface	No
Power supply	±9 V

DAQP-LA — Isolated current module

- *Input ranges:* *DAQP-LA-B: 0.1 A, 0.3 A, 1 A, 3 A, 10 A peak, 30 A peak, DAQP-LA-B-S1: 2 mA, 6 mA, 20 mA, 60 mA, 200 mA, 0.6 A,*
- *Bandwidth:* *300 kHz*
- *Signal connection:* *Safety banana sockets*



Module specifications

	DAQP-LA-B	DAQP-LA-B-S1
Input resistance (Shunt)	0.1 Ohm	5 Ohm
Shunt inductance	<10 nH	<10 nH
Input ranges	0.1 A, 0.3 A, 1 A, 3 A, 10 A peak, 30 A peak	2 mA, 6 mA, 20 mA, 60 mA, 200 mA, 0.6 A
Continuous current	max. 5 A_{RMS}	max. 0.6 A
Peak current	30 A max. 10 ms; 10 A max. 100 ms	3 A max. 10 ms; 1 A max. 100 ms
DC accuracy 100 mA and 300 mA 1 A to 30 A 2 mA and 6 mA 20 mA to 600 mA	 ±0.05 % of reading ±300 µA ±0.05 % of reading ±0.05 % of range	 ±0.05 % of reading ±6 µA ±0.05 % of reading ±0.05 % of range
Offset drift 100 mA and 300 mA 1 A to 30 A 2 mA and 6 mA 20 mA to 600 mA	typ. max. 12 20 µA/°K 20 40 ppm of Range/°K	 typ. max. 0.24 0.4 µA/°K 20 40 ppm of Range/°K
Gain linearity	0.03 %	
Gain drift range	Typically 20 ppm/°K (max. 50 ppm/°K)	
Long term stability	100 ppm/sqrt (1000 hrs)	
Bandwidth (-3 dB)	300 kHz(1)	
Filter selection	Push button or software	
Filters (low pass)	10 Hz, 30 Hz, 100 Hz, 300 Hz, 1 kHz, 3 kHz, 10 kHz, 30 kHz, 100 kHz	
Filter characterisitics	10 Hz to 100 kHz: Butterworth or Bessel 40 dB/dec (2nd order; ±1.5 dB @ f0) 300 kHz: Bessel 60 dB/dec (3rd order; 0 to -3 dB @ 300kHz)	
Typical SFDR and SNR 100 mA 1 A 30 A	300 kHz 100 kHz 10 kHz SFDR SNR SFDR SNR SFDR SNR 95 dB 64 dB 95 dB 67 dB 95 dB 77 dB 102 dB 82 dB 103 dB 85 dB 113 dB 90 dB 104 dB 89 dB 103 dB 89 dB 117 dB 91 dB	
Isolation voltage	Input to Ground 1.4 kV_{RMS}	
Protection	CAT III 300 V CAT II 600 V	
Output voltage	±5 V	
Output resistance	<10 Ohm	
Output current	5 mA	
Power On default settings	Software programable	
Output protection	Short to ground for 10 sec.	
Power supply	±9 V_{DC} ± 1%	
Power consumption	0.7 W	
Interface	RS-485	

(1) 300 kHz exclusively for Bessel filter characteristic

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DAQP-CFB2 — Carrier frequency module

- *Bandwidth* — *DC to 9.6 kHz*
- *Input ranges* — *0.1mV/V to 1000 mV/V*
- *Sensor Excitation* — *Programmable voltage and frequency up to 5 V_{RMS} /20 kHz*
  Remote sense support
- *Bridge completion* — *Internal completion for ½ and ¼ bridge (120 and 350 Ohm)*
- *Shunt* — *Two internal shunts (50 k, 100 k)*
- *TEDS* — *Support for TEDS sensors*



DAQP-CFB2

Module specifications

	DAQP-CFB2
Bridge input ranges	0.1 mV/V to 1000 mV/V
Inductive bridge input ranges	5 mV/V to 1000 mV/V
Capacitive input Ranges	20 pF to 1 µF
Bridge resistance	60 - 5000 Ω depending on excitation voltage
Excitation voltage level	1, 2, 5 V_{RMS} sensed excitation provided
Excitation voltage accuracy	0.05 % of value ± 200 µV
Excitation voltage frequency	0.6; 1; 2.5; 5; 10; 20 kHz sine wave ±100 ppm
Maximum excitation current	50 mA_{RMS} short circuit protected
Excitation voltage synchronisation	internal crystal oscillator or external
Excitation voltage drift	typically 20 ppm/K
Excitation frequency drift	typically 2 ppm/K
Nonlinearity	±0.02 % FS
Accuracy bridge mode	typically ±0.1 % of reading ±0.05 % of range
Max. offset drift	±0.003 µV/V/K ±40 ppm of Range/K
Max. gain drift	±30 ppm/K
Balance adjusting range	±400 % of Range (±200 % at 1 V excitation)
Phase adjustment range	±90° (inductive mode only)
Balance adjusting accuracy	within ±0.1 % FS
Supported sensors	4- or 6-wire full bridge 3- or 5-wire ½ bridge with internal completion (software programmable) 3-wire ¼ bridge with internal resistor for 120 and 350 Ω (software programmable) inductive full bridge inductive half bridge (typically LVDT Sensors)
Shunt calibration	internal 50 kΩ and 100 kΩ Shunt
Completion and shunt resistor accuracy	±0.05 %
-3 dB Bandwidth	max 9.6 kHz
Reconstruction filter	7th order Butterworth, automatically adjusted to excitation frequency * 0.48
Signal filters (low pass)	10, 30, 100, 300, 1 kHz, 3 kHz
Filter characteristics	2nd order Bessel or Butterworth (40 dB/ decade)
Typ. SNR @ 1000 Hz [100 Hz] and 2 V_{RMS} excitation	78 dB [85 dB] @ 1 mV/V 80 dB [87 dB] @ 100 mV/V
Over voltage protection	±10 V
Output voltage	±5 V
Out current	±5 mA
Output protection	continuous short to ground
Power consumption	max. 1.5 W
Supported TEDS chips	DS2406, DS2430, DS2432, DS2433, DS2431
Weight	within 250 (±30) g

DAQP-BRIDGE-A — *Isolated strain gauge module*

- *Input ranges:* *±5, ±10, ±25, ±50, ±100, ±250 mV*
  @ 5 V excitation: *±1, ±2, ±5, ±10, ±20, ±50 mV/V*
- *Bandwidth:* *20 kHz*
- *Isolation:* *350 V_{DC} for input and excitation*
- *Signal connection:* *9-pin SUB-D socket*
  8-pin LEMO socket



DAQP-BRIDGE-A DAQP-BRIDGE-A-LEMO

Module specifications

	DAQP-BRIDGE-A
Gain	20 to 1000
Input ranges @ 5 V_{DC} excitation	±5, ±10, ±25, ±50, ±100, ±250 mV ±1, ±2, ±5, ±10, ±20, ±50 mV/V
Range selection	Push button or software
Input impedance	> 100 MOhm
DC accuracy	±0.1 %
Gain linearity	±0.05 %
Excitation voltage Accuracy Drift Protection	0.25, 0.5, 1, 2.5, 5 and 10 V_{DC} software programmable (5 V_{DC} = default setting) 0.05 % ±1 mV typ. 20 ppm (max. 40 ppm) Continuous short to ground
Bridge types	Full bridge ½ bridge with internal completion (software programmable) ¼ bridge with internal resistor for 120 and 350 Ohm (software programmable)
Bridge resistance	120 Ohm to 10 kOhm (down to 87 Ohm on request)
Shunt calibration	Two internal shunt resistors or external resistor for shunt calibration (175k & 59k88)
Zero adjust	Full automatic, ±200 % of F.S. (via push button or software)
Bandwidth (-3 dB)	20 kHz (±1.5 dB @ f0)
Filters (lowpass)	10 Hz, 100 Hz, 1 kHz, 5 kHz, 20 kHz (±1.5 dB @ f0)
Filter selection	Push button or software
Filter characteristics	Bessel or Butterworth (software programmable) 40 dB / decade (12 dB / octave)
Typ. SNR @ max. bandwidth	71 dB @ Gain 1000 79 dB @ Gain 20
Typical CMRR	73 dB @ 0 Hz 71 dB @ 400 Hz 70 dB @ 1 kHz
Overvoltage protection	±10 V_{DC}
Isolation	350 V_{DC} (for input and excitation)
Output voltage	±5 V
Output resistance	< 10 Ohm
Output current	Max. 5 mA
Output protection	Continuous short to ground
RS-485 interface	Yes
TEDS support	No
MSI support	Manually support of MSI-BR-TH-x adapter
Power supply voltage	±9 V_{DC} (±1 %)
Power consumption	Typ. 1.44 W @ 350 Ohm, 1.83 W @ 120 Ohm (both full bridge @ 5 V_{DC} excitation) Max: 3 W (depending on sensor)*

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DAQP-ACC-A — IEPE® module

- *Input ranges:* ±5 V, ±1.66 V, ±500 mV, ±166 mV, ±50 mV
- *Excitation current:* 4 mA or 8 mA
- *Bandwidth:* 300 kHz
- *Isolation:* none
- *Signal connection:* BNC socket



DAQP-ACC-A

Module specifications

	DAQP-ACC-A					
Ranges	±5 V, ±1.66 V, ±500 mV, ±166 mV, ±50 mV					
Gain	1, 3, 10, 30, 100					
Range / gain selection	Push button or software					
Gain error	0.5 %					
Sensor types	IEPE® sensors only					
Sensor excitation	4 or 8 mA (software selection), 10 %, up to 28 V_{DC}					
Input impedance	5 or 7 MOhm (depending on time constant), in parallel with 1.2 nF					
Input voltage range Voltage < 4 V Voltage > 19 V	4 to 19 V ‚Shortcut' detection ‚No sensor' detection					
Input protection IN+ IN- (shield)	 max. -10 to 28 V max. 20 mA					
Bandwidth (-3 dB)	From selected highpass filter to 300 kHz (+2 to -5 dB @ fg)					
Filters (highpass) 0.5 Hz filter 5 Hz filter	0.5 Hz and 5 Hz (software selection) 0.32 s time constant 0.032 s time constant					
Filters (lowpass)	1 kHz, 10 kHz, 100 kHz, 300 kHz other filter steps available as an option on request					
Filter selection	Push button or software					
Filter characteristics up to 100 kHz 300 kHz	Butterworth 100 dB / decade (30 dB / octave) 80 dB / decade (24 dB / octave)					
Typical SFDR and SNR	300 kHz bandwidth		100 kHz bandwidth		10 kHz bandwidth	
	SFDR	SNR	SFDR	SNR	SFDR	SNR
5000 mV	92 dB	90 dB	100 dB	91 dB	103 dB	93 dB
500 mV	88 dB	85 dB	100 dB	89 dB	100 dB	92 dB
50 mV	71 dB	68 dB	90 dB	73 dB	82 dB	80 dB
Output voltage	±5 V					
Output resistance	< 10 Ohm					
Output current	Max. 5 mA					
Output protection	Continuous short to ground					
RS-485 interface	Yes					
Power supply voltage	±9 V_{DC} (±10 %)					
Power consumption	Typical 0.8 to 1.0 W (depending on sensor)					

DAQP-CHARGE-A — Dynamic charge module

- *Input ranges:*
  IEPE® input: *0, 20, 40, 60 dB (±5 V, ±500 mV, ±50 mV, ±5 mV)*
  Charge input: *5, 50, 500, 5000, 50000 pC*
- *Bandwidth:* *50 kHz*
- *Isolation:* *none*
- *Signal connection:* *BNC socket*
  (adapter BNC to MICRODOT included)



DAQP-CHARGE-A

Module specifications

	DAQP-CHARGE-A
Supported sensors	IEPE® and charge sensors
Sensor type selection	Push button or software
Input ranges IEPE® input Charge input	 0, 20, 40, 60 dB (±5 V, ±500 mV, ±50 mV, ±5 mV) 5, 50, 500, 5000, 50000 pC
Gain accuracy	1 % F.S.
Input range finetuning	programmable
Range selection	Push button (fixed) or software (all)
Integration	Single (velocity) or double (displacement), 0 dB at 15.9 Hz
LED indicators Range and filter ICP LED OVL LED A, V and D LED	 5 LEDs Active with connected IEPE® sensor, inactive for charge input Overload control (output voltage > 5 V) Indicator for acceleration, velocity and displacement output
Constant current source	3.2 to 5.6 mA, > 24 V
Filters (highpass)	0.1 Hz, 1 Hz, 10 Hz (±2 dB @ f0)
Filters (lowpass)	100 Hz, 1, 3, 10, 50 kHz (±2 dB @ f0)
Filter selection	Push button or software
Filter characteristics	Butterworth 80 dB / decade (24 dB / octave)
Bandwidth (-3 dB)	0.1 Hz to 50 kHz (±2 dB @ f0)
Typ. SNR @ max. bandwidth 5000 pC 500 pC 50 PC 5 pC 5 pC	 90 dB 87 dB 73 dB 54 dB 60 dB @ 10 kHz
Output voltage	±5 V (±6 V peak voltage)
Output noise	< 8 mV (all ranges with 50 kHz filter)
RS-485 interface	Yes
Power supply voltage	±9 V_{DC} (±10 %)
Power consumption	0.6 W to 1.2 W (depending on sensor)*

*) **CAUTION:** The following systems only support 10 DAQP-CHARGE-A modules at once, due to high start-up current.
DEWE-2010 series, DEWE-2500 series, DEWE-5000 series, DEWE-30-16 with DC option, DEWE-50-USB2 with DC option

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DAQP-CHARGE-B

Isolated static and dynamic charge module

- *Input ranges:* ±100 to ±1 000 000 pC
- *Bandwidth:* 100 kHz
- *Isolation:* 350 V_{DC}
- *Signal connection:* BNC socket



DAQP-CHARGE-B

Module specifications

	DAQP-CHARGE-B	
Input ranges	±100, ±500, ±2 000, ±10 000, ±40 000, ±200 000, ±1 000 000 pC	
Range selection	Push button or software	
Gain accuracy	0.5 % of range (1 % of range for 100 and 500 pC)	
Gain linearity	±0.05 %	
Bandwidth (-3 dB)	100 kHz (±1.5 dB @ f0)	
Filters (lowpass)	10 Hz, 30 Hz, 100 Hz, 300 Hz, 1 kHz, 3 kHz, 10 kHz, 30 kHz, 100 kHz (±2 dB @ f0)	
Filter selection	Push button or software	
Filter characteristics	Bessel or Butterworth (software programmable) 40 dB / decade (12 dB / octave)	
Coupling	AC or DC software selectable	
Time constant / Highpass filter 100 pC to 2000 pC 2001 pC to 40000 pC 40001 pC to 200 kpC	AC coupled 2 sec / 0.7 Hz 40 sec / 3.9 mHz 1000 sec / 0.16 mHz	DC coupled @ 25°C; max. 60 % relative humidity >20000 sec >50000 sec >70000 sec
Drift input current @ 25 °C	< ±0.03 pC/s	
Temperature range storage	-30 °C to +85 °C (-22 °F to 185 °F)	
Temperature range operating	-5 °C to +60 °C (23 °F to 140 °F)	
Relative humidity	0 to 60 % at 60 °C (140 °F), non-condensing	
Offset drift	50 ppm of Range/°K	
Amplifier reset	Push button or software	
Offset after reset	±2 mV or ±1 pC (greater value is valid)	
Typ. SNR @ max. bandwidth Range 100 pC Range > 2000 pC	 76 dB (82 dB @ 30 kHz / 85 dB @ 10 kHz) 81 dB (89 dB @ 30 kHz / 93 dB @ 10 kHz)	
Ouput noise @ 100 kHz @ 30 kHz	 0.3 mV_{RMS} + 0.01 pC_{RMS} 0.12 mV_{RMS} + 0.008 pC_{RMS}	
Cable noise	< 10^{-5} pC_{RMS}/pF	
CMR	< 0.02 pC/V (difference between input and output ground)	
Isolation	350 V_{DC}	
Input overvoltage protection	1 kV ESD	
Output voltage	±5 V	
RS-485 interface	Yes	
Power supply voltage	±9 V_{DC} (±1 %)	
Power consumption	1.5 W to 3.5 W (depending on signal range and frequency)	

DAQP-THERM

Isolated thermocouple module

- *Thermocouple:* *K, J, T, R, S, N, E, B, L, C, U (others on request)*
- *Bandwidth:* *3 kHz*
- *Signal connection:* *Universal miniature thermocouple socket*



DAQP-THERM

Module specifications

	DAQP-THERM		
Thermocouple types	K, J, T, R, S, N, E, B, L, C, U, others on request		
Ranges	Min. to max. of the input range is freely programmable within the full thermocouple input span		
CJC absolute accuracy	±0.3 °C		
CJC stability	0.03 °C/°C ambient temperature change		
CJC equilibrium time	5 minutes		
Accuracy	Typical 0.4° for type K including CJC error; details see table „Input ranges and detailed specifications for thermocouple“.		
Linearization	DSP based linearization		
Nonlinearity	> 0.01°C		
Input resistance	> 1 MOhm		
Bandwidth (-3 dB)	3 kHz		
Filters	3 Hz, 10 Hz, 30 Hz, 100 Hz, 300 Hz, 1 kHz, 3 kHz		
Filter characteristics	Butterworth or Bessel, 2nd, 4th, 6th or 8th order programmable		
Isolation	1 kV_{RMS} [1)]		
Typ. CMRR	0 to 100 mV range	100 mV to 5 V range	Thermocouple input
50 Hz	125	105	160
1 kHz	120	100	135
3 kHz	115	95	130
Open thermocouple detection	100 MΩ pull up; software selectable		
Output voltage	±5 V; 0 to 5 V; (±10 V and 0 to 10 V with special DEWE-30)		
Output resistance	22 Ω		
Output current	Max. 5 mA		
Output protection	Continuous short to ground		
RS-485 interface	Yes		
RS-485 data output	Yes		
Supported TEDS chip	DS2406, DS2430A, DS2431, DS2432, DS2433, DS28EC20		
MSI support	No		
Power supply voltage	±9 V_{DC} (±1 %)		
Power consumption	Typical 1 W		
Connector	Mini thermocouple connector with integrated cold junction compensation sensor		

[1)] Although the rated input voltage is 33 V_{RMS}, 46.7 V_{PEAK} or 70 V_{DC} according to EN-61010-1 and EN-61010-2-30, the galvanic isolation has been tested with 1 kV_{RMS} for 1 min.

Input ranges and detailed specifications for thermocouple

Thermocouple accuracy including CJC error

Type	Standard	Input range		Accuracy						
		min	max	-270 to -200 °C -454 to -328 °F	-200 to -100 °C -328 to -148 °F	-100 to 0 °C -148 to 32 °F	0 to 100 °C 32 to 212 °F	100 to 400 °C 212 to 752 °F	400 to 1000 °C 752 to 1832 °F	>1000 °C > 1832 °F
		[°F] °C	[°F] °C	[°F] °C	[°F] °C	[°F] °C	[°F] °C	[°F] °C	[°F] °C	[°F] °C
K	DIN EN 60584-1	[-454] -270	[2501] 1372	[17.41] 9.67	[1.82] 1.01	[1.92] 0.51	[0.70] 0.39	[0.79] 0.44	[1.08] 0.6	[1.39] 0.77
J	DIN EN 60584-1	[-346] -210	[2192] 1200	[1.76] 0.98	[1.57] 0.87	[0.85] 0.47	[0.67] 0.37	[0.76] 0.42	[0.92] 0.51	[1.01] 0.56
T	DIN EN 60584-1	[-454] -270	[752] 400	[11.38] 6.32	[1.78] 0.99	[0.99] 0.55	[0.70] 0.39	[0.61] 0.34	-	-
R	DIN EN 60584-1	[-58] -50	[3200] 1760	-	-	[2.30] 1.28	[1.60] 0.89	[1.17] 0.65	[0.95] 0.53	[1.28] 0.71
S	DIN EN 60584-1	[-58] -50	[3200] 1760	-	-	[2.07] 1.15	[1.57] 0.87	[1.21] 0.67	[1.04] 0.58	[1.39] 0.77
N	DIN EN 60584-1	[-454] -270	[2372] 1300	[23.81] 13.23	[2.02] 1.12	[0.97] 0.54	[0.67] 0.42	[0.70] 0.39	[0.86] 0.48	[1.03] 0.57
E	DIN EN 60584-1	[-454] -270	[1832] 1000	[11.00] 6.11	[1.06] 0.87	[0.88] 0.49	[0.65] 0.36	[0.61] 0.34	[0.86] 0.48	-
L	DIN 43710	[32] 0	[1652] 900	-	-	-	[0.65] 0.36	[0.74] 0.41	[0.77] 0.43	-
C	ASTM E988-96	[32] 0	[4190] 2310	-	-	-	[0.88] 0.49	[0.86] 0.48	[1.06] 0.59	[1.69] 0.94
U	DIN 43710	[-328] -200	[1112] 600	[1.67] 0.93	[1.67] 0.93	[0.99] 0.55	[0.70] 0.39	[0.63] 0.35	[0.56] 0.31	-
B	DIN EN 60584-1	[32] 0	[3308] 1820	-	-	-	[54.56] 30.31	[5.47] 3.04	[1.40] 0.78	[0.92] 0.51

= calculated specifications, not veryfied.

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DAQP-FREQ-A

Isolated frequency to voltage module

- *Input ranges:* 100 Hz, 1 kHz, 5 kHz, 20 kHz, 100 kHz, 200 kHz
- *Signal connection:* 9-pin D-SUB socket



DAQP-FREQ-A

Module specifications

	DAQP-FREQ-A
Input ranges	100 Hz, 1 kHz, 5 kHz, 20 kHz, 100 kHz, 200 kHz
Minimum input	2 % of selected range
Range selection	Push button or software
Accuracy	±0.05 % (from 4 % to 100 % of range)
Rated input voltage	33 V_{RMS}, 46.7 V_{PEAK}, 70 V_{DC} according to EN-61010-1 and EN-61010-2-30
Input resistance	1 MOhm
Input filters	100 Hz, 1 kHz, 5 kHz, 20 kHz, 100 kHz, 200 kHz
Filter selection	Push button or software
Coupling	DC or AC (software programmable)
Trigger level	10 mV to 130 V (software programmable)
Sensor supply	+12 V_{DC}, ±9 V_{DC} (not isolated)
Isolation	350 V_{RMS} [1)]
Overvoltage protection	±500 V_{PEAK} / 350 V_{RMS}
Output filter Filter characteristics Selection	3 ranges with 1.5, 30 and 500 ms (10 - 90 %) Butterworth, 60 dB / decade (18 dB / octave) Automatically according to input range slow (default) or fast output filter selectable within the input range
Output signals	±5 V according to input frequency TTL level trigger output signal
Output resistance	< 10 Ohm
Output current	Max. 5 mA
Output protection	Continuous short to ground
RS-485 interface	Yes
Power supply voltage	±9 V_{DC} (±5 %)
Power consumption	Typical 1.0 W

[1)] Although the rated input voltage is 33 V_{RMS}, 46.7 V_{PEAK} or 70 V_{DC} according to EN-61010-1 and EN-61010-2-30, the galvanic isolation has been tested with 350 V_{RMS} for 1 min.

DAQN-V-OUT

Isolated voltage output module

- *Input ranges:* ±10 V
- *Bandwidth:* 400 Hz
- *Isolation:* 1500 V_{RMS}
- *Signal connection:* Banana sockets
  BNC socket
  9-pin SUB-D socket



Module specifications

	DAQN-V-OUT
Input voltage ranges	±10 V
Input voltage maximum	±36 V (no damage)
Input resistance	50 MOhm
Output voltage range up to	up to ±10 V (depending on DAC output of DAQ card)
Over range capability	5 % @ 10 V output
Output drive	50 mA max.
Output resistance	0.5 Ohm
Output current under fault, max	75 mA
Output protection transient	ANSI/IEEE C37.90.1-1989
CMV, output to input, continuous Transient CMRR (50 / 60 Hz)	1500 V_{RMS} max. ANSI/IEEE C37.90.1-1989 110 dB
Accuracy	±0.05 % span (0 to 5 mA load)
NMR (-3 dB @ 400 Hz)	100 dB per decade above 400 Hz
Nonlinearity	0.02 % span
Stability Offset Span	 ±25 ppm/°C ±20 ppm/°C
Noise Output ripple, 1 kHz bandwidth	 2 mV_{pp}
Bandwidth (-3 dB)	400 Hz
Power supply voltage	9 V_{DC} ±5 %
Power supply current	350 mA full load, 135 mA no load
Power supply sensitivity	±12.5 ppm/%

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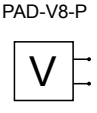
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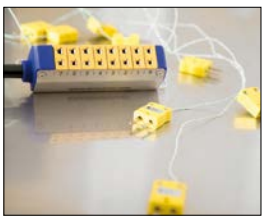
PAD Series Modules



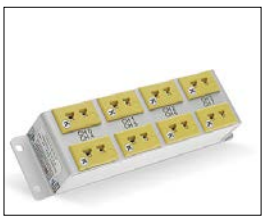


- *Multi channel*
- *Low bandwidth - for static signals*
- *Isolation*
- *Digital output (RS-485)*
- *Exchangeable*
- *For DEWETRON systems with built-in DAQ rack*

Module	# CH	Input type	Ranges	Bandwidth (BW), Filters (FILT)	Isolation (ISO), Overvoltage protection (OP)	Special functions
Voltage measurement						
PAD-V8-P  	8	Voltage,	up to ±50 V	BW: 6 Hz FILT: 1 / 4 / 8 values averaging	ISO: 350 V_{DC} OP: 150 V_{DC}	separate 24 bit A/D per channel
		current with external shunt	±20 mA			
Temperature and ohmic measurement						
PAD-TH8-P  	8	Voltage	±15, ±50, ±100, ±150 mV, -150 mV to +1.5 V,	BW: 6 Hz FILT: 1 / 4 / 8 values averaging	ISO: 350 V_{DC} OP: 15 V_{DC}	separate 24 bit A/D per channel
		Thermocouple	Thermocouple type J, K and T			
PAD-TH8-P + CB8-RTD 	8	Thermoresistors	Pt100, Pt200, Pt500, Pt1000, Pt2000, Ni120	BW: 6 Hz FILT: 1 / 4 / 8 values averaging	ISO: 350 V_{DC} OP: 15 V_{DC}	separate 24 bit A/D per channel
		Resistors	up to 2 kOhm			
Digital out, analog out						
PAD-DO7  	7	Digital output	Relay outputs (dry contacts)	-	ISO: 300 V_{DC}	max load: 0.5 A @ 60 V_{AC}, 1 A @ 24 V_{DC}



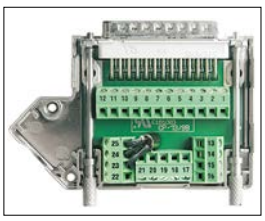
PAD-CB8-x-M
Miniature thermocouple connection block for PAD-TH8-P modules



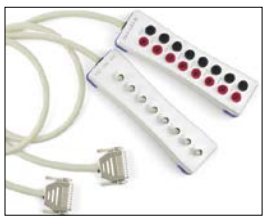
PAD-CB8-x-P2
Standard thermocouple connection block for PAD-TH8-P modules



PAD-CB8-RTD
Connect up to 8 RTD sensors (or resistors) to PAD-TH8-P modules



PAD-OPT1
Screw terminal adapter including cold junction compensation (CJC) for PAD-TH8-P modules



PAD-CB8-x
BNC or banana sockets for easy signal connection to PAD-V8-P modules

PAD-V8-P — 8 channel voltage module

- *Input channels:* 8 differential input channels
- *A/D conversion* 8 internal 24 bit A/D converters
- *Bandwidth:* 6 Hz
- *Isolation:* 350 V_{DC}
- *Signal connection:* 25-pin SUB-D socket



Module specifications (for revision 6.00 or higher)

	PAD-V8-P
Input channels	8 differential input channels
Input signals	
Voltage	±100 mV, ±150 mV, ±500 mV, ±1 V, ±2.5 V, ±5 V, ±10 V, ±50 V, -0.15 to +1.5 V
Current	With external shunt resistor
Resolution	10 µV for all ranges
Sampling rate	Max. 12 Hz per channel
Readout speed	Typ. 80 ch/sec.*
DC accuracy	±0.03 % of reading ±900 µV
Max. gain drift	20 ppm /°C
Max. offset drift	20 ppm of range /°C
Bandwidth (-3 dB)	6 Hz (±1.5 dB @ f0)
Isolation voltage	350 V_{DC} (channel to channel and input to output)
Overvoltage protection	150 V_{DC}
Common mode voltage	350 V_{DC} / 250 V_{AC} @ 50 Hz
NMR	120 dB @ 50/60 Hz
CMRR	140 dB @ DC, 120 dB @ 50 Hz
RS-485 interface	Yes
Interface speed	9600 bps (2400 to 115200)
Power supply voltage	±9 V_{DC} (±10 %)
Power consumption	Typical 0.6 W

*) Depending on system and number of channels

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PAD-TH8-P — 8 channel thermocouple and RTD module



- *Input channels:* 8 differential input channels
  - Thermocouple: requires PAD-CB8-x breakout box
  - RTD:requires PDA-CB8-RTD breakout box
- *A/D conversion* 8 internal 24 bit A/D converters
- *Bandwidth:* 6 Hz
- *Isolation:* 350 V_{DC}
- *Signal connection:* 25-pin SUB-D socket

Module specifications (for revision 6.00 or higher)

	PAD-TH8-P
Input channels	8 differential input channels
Input voltage	±1.5 V
Input resistance	1.4 MΩ
Gain linearity	0.001%
Bandwidth	6 Hz
Resolution	1 µV (24-bit)
Max. gain drift	25 ppm /°C
Max. offset drift	25 ppm of range /°C
Typical noise	2 µV
DC accuracy	Better ±0.05 % ±200 µV (typ. ±0.03 % F.S. ±20 µV)
Sampling rate	Max. 12 Hz per channel
Readout speed	Typ. 80 ch/sec.*
Isolation voltage	350 V_{DC} (channel to chassis ground) 100 V_{DC} (channel to channel)
Overvoltage protection	15 V_{DC}
NMR (50/60 Hz)	120 dB
CMRR (50/60 Hz)	130 dB
RS-485 interface	Yes
Interface speed	9600 bps (2400 to 115200)
Power supply voltage	±9 V_{DC} (±10 %)
Power consumption	Typical 0.6 W

*) Depending on system and number of channels

PAD-CB8-RTD *8 channel RTD connector block for PAD-TH8-P*

- *Input channels:* *8 RTD channels, type Pt100, Pt200, Pt500, Ni120, ...*
- *Sensor supply:* *galvanically isolated to PAD-TH8-P module*



Specifications

	PAD-CB8-RTD			
Input channels	8 RTDs			
Constant current	1250 µA (CB8-RTD-S3: 250 µA)			
Constant current drift	5 ppm/°K			
Connection types	2-, 3- or 4-wire			
Standard input ranges	Resistor 0 to 999,99 Ohm, Pt100 a = 0.00385; Pt100 a = 0.003916; Pt200; Pt500; Ni120			
CB8-RTD-S3	Resistor 0 to 999,99 Ohm, Pt100 a = 0.00385; Pt100 a = 0.003916; Pt200; Pt500; Pt1000; Pt2000			
Accuracy	Pt100 a = 0.00385 ±0.25 °C @ -200 to 100 °C ±0.4 °C @ 100 to 400 °C ±0.8 °C @ 400 to 800 °C	Pt100 a = 0.003916 ±0.25 °C @ -200 to 100 °C ±0.4 °C @ 100 to 400 °C ±0.8 °C @ 400 to 800 °C	Pt200 a = 0.00385 ±0.25 °C @ -200 to 100 °C ±0.4 °C @ 100 to 400 °C ±0.5 °C @ 400 to 630 °C	Pt500 a = 0.00385 ±0.25 °C @ -200 to 100 °C ±0.4 °C @ 100 to 250 °C
	Pt1000 a = 0.00385 ±0.25 °C @ -200 to 100 °C ±0.4 °C @ 100 to 400 °C ±0.8 °C @ 400 to 600 °C	Pt2000 a = 0.00385 ±0.25 °C @ -200 to 100 °C ±0.4 °C @ 100 to 400 °C ±0.8 °C @ 400 to 600 °C	Ni120 ±0.3 °C @ -80 to 100 °C ±0.6 °C @ 100 to 260 °C	
Typical noise	0.01 °C			
Operating temperature	-25 to +80 °C			
Cabel length	2m (up to 12 m on request)			
Dimensions (WxDxH)	approx. 196 x 57 x 32.2 mm (7.7 x 2.2 x 1.3 in.)			

PAD-CB8-x-M and PAD-CB8-x-P2 *8 channel thermocouple connector block for PAD-TH8-P*

- *Input channels:* *8 thermocouple*
- *Thermocouple type:* *versions for K, J, T*



Specifications

	PAD-CB8-x-P2 and PAD-CB8-x-M		
Input channels	8 isolated thermocouple input channels		
Accuracy	Thermocouple type J: ±1.0 °C @ -200 to -100 °C ±0.3 °C @ -100 to 150 °C ±0.4 °C @ 150 to 400 °C ±1 °C @ 400 to 1200 °C	Thermocouple type K: ±1.0 °C @ -200 to -25 °C ±0.4 °C @ -25 to 120 °C ±0.6 °C @ 120 to 400 °C ±1 °C @ 400 to 1372 °C	Thermocouple type T: ±1.0 °C @ -200 to -150 °C ±0.4 °C @ -150 to 400 °C
	Thermocouple type E, R, S, N, C or other types on request		
Typical noise	±0.1 °C @ 6 Hz sampling; no average		
CJC	Internal		
Operating temperature	-25 to +80 °C (better on request)		
Cable length	2 m (up to 12 m on request)		

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PAD-DO7 — *7 channel relay output module*

- *Output channels:* *7 relay output channels*
- *Isolation:* *300 V_{RMS}*
- *Signal connection:* *25-pin SUB-D connector*



Module specifications

	PAD-DO7
Number of channels	7 relay output channels
Relay type	Form ‚A' relay SPST N.O. with dry contacts
Max. load	0.5 A (60 V_{AC}) 1 A (24 V_{DC})
Isolation voltage	300 V_{RMS}
Relay on time	Typical 5 ms
RS-485 interface	Yes
Interface speed	9600 bps
Power supply voltage	+12 V_{DC} (±10 %)
Power consumption	Typical 1.0 W



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DEWETRON GmbH • Parkring 4 • 8074 Grambach • AUSTRIA • Tel: 0043 316 30700 • Fax: 0043 316 3070 90 • info@dewetron.com

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