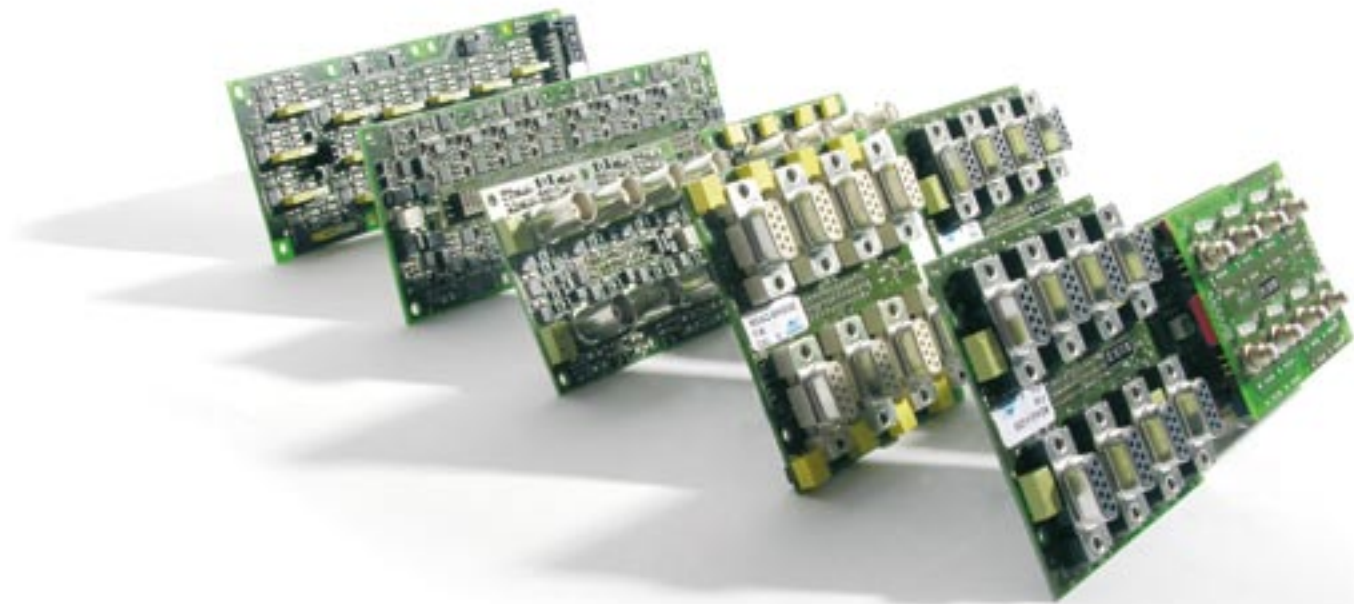




Automotive
Energy & Power Analysis
Aerospace & Defense
Transportation
General Test & Measurement



Differential Amplifiers

MDAQ Series

MDAQ series modules are dynamic differential signal amplifiers with high bandwidth.

All are multi-channel and have an analog voltage output. The configuration is done via RS-485 interface. Models with multi-pin connectors offer sensor supply for single cable sensor connection.

MDAQ series modules are cost-effective and space saving, thus the ideal solution for applications requiring hundreds of dynamic input channels. The modules fit into many DEWETRON instruments.

Configuring MDAQ inputs

MDAQ modules are configured according a building block system. There is a MDAQ-BASE, the "motherboard" which holds up to two MDAQ-SUB modules. The MDAQ-BASE defines whether the conditioned signal output is ± 5 V or ± 10 V. A range of MDAQ-SUB modules define the supported input signals. Finally a filter board MDAQ-FILT can be added.

Key Features

- Multi channel
- High bandwidth up to 300 kHz
- ± 5 V or ± 10 V conditioned signal output
- Differential inputs
- Easy configuration



MDAQ Series Amplifiers

- Multi channel
- Small form factor for high channel density
- Cost effective
- High bandwidth up to 300 kHz
- Support of MSI (Modular Smart Interface)



Selection Guide

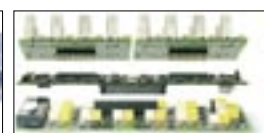
| SUB Modules for MDAQ-BASE-x | | | | | | |
|--|------|--|---|------|---------------------------------------|---|
| Module | # CH | Input type | Input ranges | TEDS | Bandwidth (BW), Highpass filters (HP) | Excitation |
| MDAQ-SUB-STG-D Connector: DB-9 | 8 | * Strain-gage (Full-, half and quarter-bridge, incl. shunt calibration) for strain gage application: * Voltage up to ±10 V: * ICP via MSI-BR-ACC: * Voltage up to 200 V via MSI-BR-V-200: * Thermocouple via MSI-BR-TH-x: * Pt100, Pt200, Pt500, Pt1000, Pt2000 and resistance via MSI-BR-RTD: | 14 ranges from ±0.5 to 1000 mV/V (@ 5 V _{DC} excitation) 15 ranges from ±2.5 mV to ±10 V 7 ranges from ±0.25 mV to ±10 V 6 ranges from ±10 to ±200 V full range of TC type -200 °C to 1000 °C and 0 to 6.5 kOhm | ■ | BW: 30 kHz | 0 to 12 V _{DC} |
| MDAQ-SUB-BRIDGE-D Connector: DB-9 | 8 | * Strain-gage (Full-, and half bridge) for strain gage sensors: * Voltage up to ±10 V: * ICP, via MSI-BR-ACC: * Voltage up to 200 V via MSI-BR-V-200: * Thermocouple via MSI-BR-TH-x: * Pt100, Pt200, Pt500, Pt1000, Pt2000 and resistance via MSI-BR-RTD: | 14 ranges from ±0.5 to 1000 mV/V (@ 5 V _{DC} excitation) 15 ranges from ±2.5 mV to ±10 V 7 ranges from ±0.25 mV to ±10 V 6 ranges from ±10 to ±200 V full range of TC type -200 °C to 1000 °C and 0 to 6.5 kOhm | ■ | BW: 30 kHz HP: 0.16 Hz | +15 V _{DC} and 0 to 12 V _{DC} |
| MDAQ-SUB-V-200-D Connector: DB-9 | 8 | * Voltage up to ±200 V: * ICP, via MSI-V-ACC: * Pt100, Pt200, Pt500, Pt1000, Pt2000 and resistance via MSI-V-RTD: <i>Note: for safety reasons, max. 120 V_{DC} or 50 V_{AC} are allowed at this connector</i> | 13 ranges from ±0.125 to ±200 V 7 ranges from ±0.25 mV to ±10 V -200 °C to 1000 °C and 0 to 6.5 kOhm | ■ | BW: 300 kHz | +15 V _{DC} and 0 to 12 V _{DC} |
| MDAQ-SUB-V-200-BNC Connector: BNC | 8 | * Voltage up to ±200 V: <i>Note: for safety reasons, max. 120 V_{DC} or 50 V_{AC} are allowed at this connector</i> | 13 ranges from ±0.125 to ±200 V | - | BW: 300 kHz | - |
| MDAQ-SUB-ACC-BNC Connector: BNC | 8 | * ICP® or voltage up to ±10 V: Single-ended or differential input and one highpass filter <i>3.4 Hz highpass filter for noise and shock response measurement</i> <i>MDAQ-SUB-ACC-BNC-S1</i> <i>0, 16 Hz for structural and modal analysis, human body vibration measurement (rest same as MDAQ-SUB-ACC-BNC)</i> | 8 ranges from ±125 mV to ±10 V | ■ | BW: 300 kHz HP: 3.4 Hz | 4 / 8 mA |
| MDAQ-SUB-ACC-A-BNC Connector: BNC | 8 | * ICP® or voltage up to ±10 V: Single-ended input and two HP filters <i>0.16 Hz for structural and modal analysis, human body vibration measurement</i> <i>3.4 Hz for noise and shock response measurement</i> | 8 ranges from ±125 mV to ±10 V | ■ | BW: 300 kHz HP: 0.16 Hz, 3.4 Hz | 4 / 8 mA |
| MDAQ-SUB-ACC-A-MD Connector: Microdot | 8 | * ICP® or voltage up to ±10 V: Single-ended input, two HP filters and sensor failure detection <i>0.16 Hz for structural and modal analysis, human body vibration measurement</i> <i>3.4 Hz for noise and shock response measurement</i> Option: test signal input for all channels | 8 ranges from ±125 mV to ±10 V | ■ | BW: 300 kHz HP: 0.16 Hz, 3.4 Hz | 4 / 8 mA |



MDAQ modules - available in most of the DEWETRON multichannel systems.







DEWE-51-USB2-32
2x MDAQ-SUB-BRIDGE-D,
2x MDAQ-SUB-ACC-A modules and USB-A/D converter





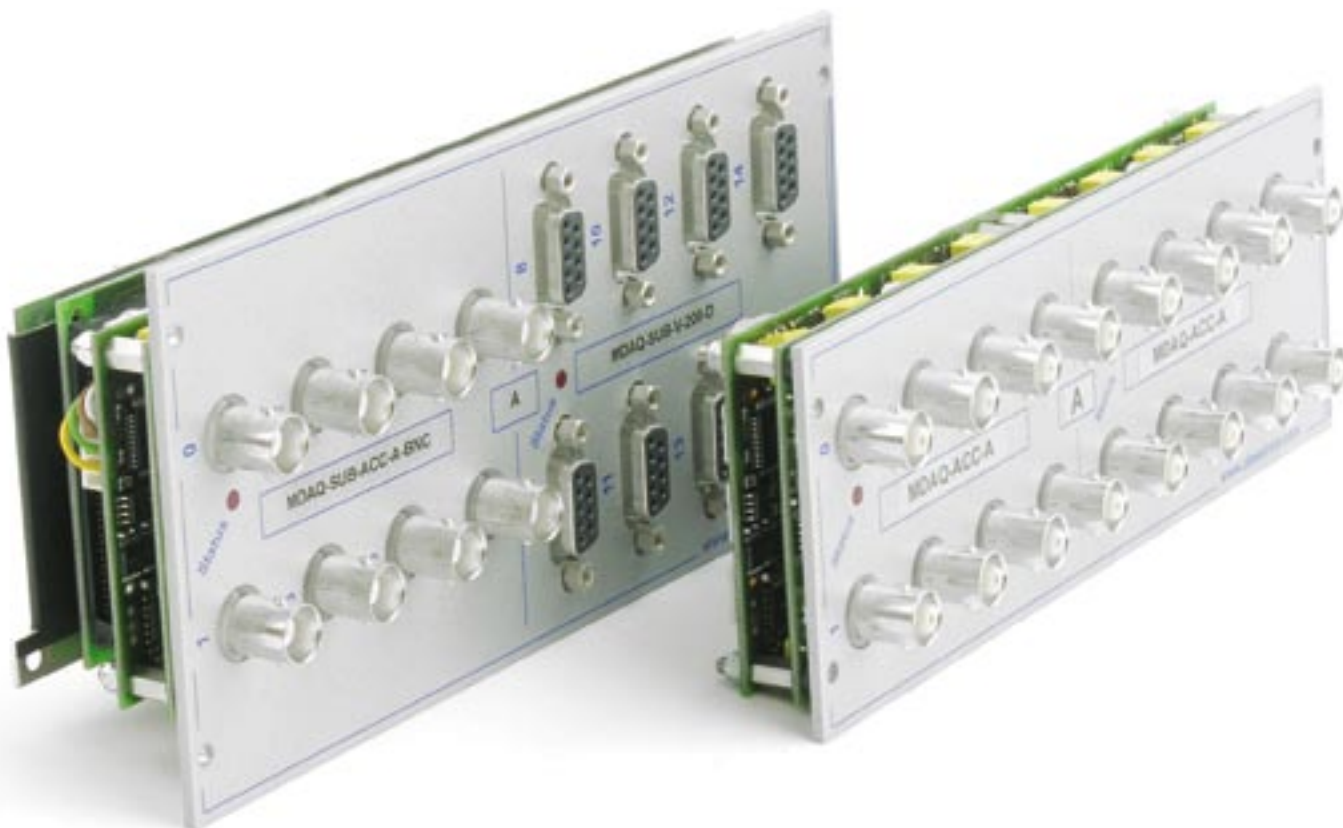
Typical combination with two SUB modules mounted on a BASE module, and FILTER board (optional)



All MDAQ boards are equipped with highest quality components

| Filter modules for MDAQ | | | | |
|--|------|------------------------|---|-----------------|
| Module | # CH | Filter characteristics | Cut-off frequencies | Order |
| MDAQ-AAF4-5-BU  | 16 | Butterworth | 100 Hz, 1, 10, 30, 100 kHz, Bypass <i>Note: not possible in all system configurations. Please contact factory for details.</i> | 4 th |
| MDAQ-FILT-5-BU  | 16 | Butterworth | 30, 100, 300 Hz, 1, 10 kHz, Bypass | 2 nd |
| MDAQ-FILT-5-BU-S1  | 16 | Butterworth | 100 Hz, 1, 10, 30, 100 kHz, Bypass | 2 nd |
| MDAQ-FILT-5-BE  | 16 | Bessel | 30, 100, 300 Hz, 1, 10 kHz, Bypass | 2 nd |

| MDAQ-BASE boards | | | |
|---|-------------|-----------|--------|
| | Sub modules | Bandwidth | Output |
| MDAQ-BASE-5  | 2 | 300 kHz | ±5 V |
| MDAQ-FILT-5-BU  | 2 | 30 KHz | ±10 V |



MDAQ-SUB-STG-D

- 15 input ranges from ± 2.5 mV to ± 10 V
- 1mV steps program able excitation from 0 to 12V
- Internal Bridge Completion for $\frac{1}{2}$ and $\frac{1}{4}$ Bridge
- Internal 50k and 100k Shunt resistor
- TEDS support



Specifications

| MDAQ-SUB-STG-D combined with MDAQ-BASE-5 | | | | |
|--|---|---------------------------|--|-----------------------------------|
| Gain | 0.5 to 2000 | | | |
| Input ranges | $\pm 2.5, 5, 10, 20, 25, 50, 100, 200, 250, 500, 1000, 1250, 2500, 5000, 10\ 000$ mV | | | |
| @ 5 V _{DC} excitation | $\pm 0.5, 1, 2, 4, 5, 10, 20, 40, 50, 100, 200, 250, 500, 1000$ mV/V | | | |
| Input impedance | >100 MOhm | | | |
| Input noise | 3.5 nV * $\sqrt{\text{Hz}}$ | | | |
| Typ. input offset drift | 0.5 $\mu\text{V/K}$ (for ranges < 200 mV) | | | |
| DC Accuracy | High Gain | | | Without software correction table |
| ± 2.5 mV; 5 mV/V; 10 mV/V; ± 25 mV | | $\pm 0.03\%$ of reading | ± 15 μV [± 3 $\mu\text{V/V}$ @5 V _{EXC}] | $\pm 0.15\%$ of reading |
| 20 mV | | $\pm 0.03\%$ of reading | $\pm 0.12\%$ of range | $\pm 0.15\%$ of reading |
| 50 mV | | $\pm 0.03\%$ of reading | $\pm 0.06\%$ of range | $\pm 0.15\%$ of reading |
| ± 100 mV to ± 200 mV | | $\pm 0.03\%$ of reading | $\pm 0.03\%$ of range | $\pm 0.15\%$ of reading |
| ± 0.250 to ± 1 V | Low Gain | $\pm 0.03\%$ of reading | 400 μV [± 80 $\mu\text{V/V}$ @5 V _{EXC}] | $\pm 0.15\%$ of reading |
| ± 1.25 V; ± 2.5 V | | $\pm 0.03\%$ of reading | ± 1 mV | $\pm 0.15\%$ of reading |
| ± 5 ; 10 V | | $\pm 0.02\%$ of reading | $\pm 0.03\%$ of range | $\pm 0.15\%$ of reading |
| Gain drift @ 5 V _{DC} excitation | 10 ppm/K of range ± 0.02 $\mu\text{V/V/K}$ | | | |
| Excitation voltage | 0 to 12 V programmable in 1 mV steps. (5 V default) | | | |
| Excitation accuracy | $\pm 0.05\%$ ± 0.7 mV | | | |
| Excitation drift | ± 10 ppm/K ± 50 $\mu\text{V/K}$ | | | |
| Excitation protection | Continuous short to ground | | | |
| Excitation current limit | 50 mA/Channel | | | |
| Bridge Types | 4- or 6-wire full bridge 3- or 5-wire $\frac{1}{2}$ bridge with internal completion (software programmable) 3- wire Quarter bridge with internal 120 Ohm and 350 Ohm completion (software programmable) | | | |
| Shunt Resistor | Internal 100 k and 50 k Resistor (software programmable) | | | |
| Completion and Shunt resistor accuracy | 0.05% 5ppm/°K | | | |
| Bridge resistance | 120 Ohm to 10 k Ohm | | | |
| Automatic bridge balance ¹⁾ | absolute Voltage | mV/V @ 5 V _{EXC} | $\mu\text{m/m}$ @ 5V _{EXC} k=2 Quarter bridge | |
| 2.5 mV to 20 mV | ± 10 mV | ± 2 mV/V | ± 4000 $\mu\text{m/m}$ | |
| 25 mV to 200 mV | ± 100 mV | ± 20 mV/V | ± 40000 $\mu\text{m/m}$ | |
| 250 mV to 1 V | ± 0.5 V | ± 100 mV/V | $\pm 200,000$ $\mu\text{m/m}$ | |
| 2 V to 10 V | ± 5 V | ± 1000 mV/V | $\pm 2,000,000$ $\mu\text{m/m}$ | |
| Bandwidth (-3 dB) | 30 kHz | | | |
| Filters (lowpass) | In combination with MDAQ-FILT-xx | | | |
| Typ. SNR @ 30 kHz [1 kHz] | 64 dB [82 dB] @ 1 mV/V | | | |
| and 5 V _{DC} excitation | 82 dB [96 dB] @ 50 mV/V | | | |
| Typ. CMR @ 0.1 mV/V [1 mV/V] | 125 dB [120 dB] @ DC | | | |
| and 5 V _{DC} excitation | 115 dB [110 dB] @ 400 Hz | | | |
| | 110 dB [105 dB] @ 1 kHz | | | |
| Max. common mode voltage range | ± 12 V | | | |
| Input overvoltage protection | ± 25 V _{DC} | | | |
| Output voltage | ± 5 V (± 10 V with MDAQ-BASE-10) | | | |
| Output resistance | < 10 Ohm | | | |
| Output current | Max. 5 mA | | | |
| Output protection | Continuous short to ground | | | |
| TEDS | Hardware support for TEDS (Transducer Electronic Data Sheet) | | | |
| Supported TEDS chips | DS2406, DS2430A, DS2432, DS2433 | | | |
| Power consumption | | | | |
| @ 5 VDC excitation | 350 Ohm 16 Channels typ. 8 W 120 Ohm 16 Channels typ. 15 W | | | |
| @ 10 VDC | 350 Ohm 16 Channels typ. 15 W | | | |
| Standard operating temperature | 0 °C to 70 °C (32 °F to 158 °F) | | | |

¹⁾ MDAQ-BASE-10A has the half offset adjustment range

MDAQ-SUB-BRIDGE-D

- High accuracy (0.05%) full bridge amplifier
- Internal half bridge completion
- Input short-circuit function for measuring absolute strain
- Bridge and voltage measurement mode
- AC/DC coupling (0.16 Hz high pass filter)
- TEDS support



Specifications

| MDAQ-SUB-BRIDGE-D combined with MDAQ-BASE-5 | | | | |
|---|--|--------------------------------------|---|--------------------------------------|
| Gain | 0.5 to 2000 | | | |
| Input ranges | ±2.5, 5, 10, 20, 25, 50, 100, 200, 250, 500, 1000, 1250, 2500, 5000, 10 000 mV | | | |
| @ 5 V _{DC} excitation | ±0.5, 1, 2, 4, 5, 10, 20, 40, 50, 100, 200, 250, 500, 1000 mV/V | | | |
| Input impedance | 1 Mohm | | | |
| Input noise | 3.5 nV * √Hz | | | |
| Typ. input offset drift | 0.5 μV/K (for ranges < 200 mV) | | | |
| DC Accuracy | High Gain | | | Without software correction table |
| ±2.5 mV; 5 mV/V; 10 mV/V; ±25 mV | ±0.03% of reading | ±15 μV [±3 μV/V@5 V _{Exc}] | ±0.15% of reading | ±15 μV [±3 μV/V@5 V _{Exc}] |
| 20 mV | ±0.03% of reading | ±0.12% of range | ±0.15% of reading | ±0.12% of range |
| 50 mV | ±0.03% of reading | ±0.06% of range | ±0.15% of reading | ±0.06% of range |
| ±100 mV to ±200 mV | ±0.03% of reading | ±0.03% of range | ±0.15% of reading | ±0.03% of range |
| ±0.250 to ±1V | Low Gain | ±0.03% of reading | 400 μV [±80 μV/V@5V _{Exc}] | ±0.15% of reading |
| ±1.25V; ±2.5V | ±0.03% of reading | ±1 mV | ±0.15% of reading | ±1 mV |
| ±5; 10V | ±0.02% of reading | ±0.03% of range | ±0.15% of reading | ±0.03% of range |
| Gain drift @ 5 V _{DC} excitation | 10 ppm/K of range ±0.02 μV/V/K | | | |
| Excitation voltage | 0.25, 0.5, 1, 2.5, 5V (default) and 10 V _{DC} software programmable | | | |
| Excitation accuracy | ±0.05 % ±0.7 mV | | | |
| Excitation drift | ±10 ppm/K ±50 μV/K | | | |
| Excitation current limit | 50 mA/Channel | | | |
| Excitation protection | Continuous short to ground | | | |
| Sensor supply (+15 V) | Accuracy: -5% to +2%; Each output separately fused; max. current 50 mA/channel | | | |
| Bridge types | 4- or 6-wire full bridge 3- or 5-wire ½ bridge with internal completion (software programmable) | | | |
| Bridge resistance | 120 Ohm to 10 k Ohm | | | |
| Automatic bridge balance ¹⁾ | Absolute voltage | mV/V @ 5V _{Exc} | μm/m @ 5 V _{Exc} k=2 Quater bridge | |
| 2.5 mV to 20 mV | ±10 mV | ±2 mV/V | ±4000 μm/m | |
| 25 mV to 200 mV | ±100 mV | ±20 mV/V | ±40000 μm/m | |
| 250 mV to 1 V | ±0.5 V | ±100 mV/V | ±200,000 μm/m | |
| 2 V to 10 V | ± 5 V | ±1000 mV/V | ±2,000,000 μm/m | |
| Bandwidth (-3dB) | 30 kHz | | | |
| Filters (lowpass) | In combination with MDAQ-FILT-xx | | | |
| Typ. SNR @ 30 kHz [1 kHz] | 64 dB [82 dB] @ 1 mV/V | | | |
| and 5 V _{DC} excitation | 82 dB [96 dB] @ 50 mV/V | | | |
| Typ. CMR @ 0.1 mV/V [1 mV/V] | 125 dB [120 dB] @ DC | | | |
| and 5 V _{DC} excitation | 115 dB [110 dB] @ 400 Hz | | | |
| | 110 dB [105 dB] @ 1 kHz | | | |
| Max. common mode voltage range | ±12 V | | | |
| Input overvoltage protection | ±25 V _{DC} | | | |
| Output voltage | ±5 V, ±10 V with MDAQ-BASE-10 | | | |
| Output resistance | < 10 Ohm | | | |
| Output current | Max. 5 mA | | | |
| Output protection | Continuous short to ground | | | |
| TEDS | Hardware support for TEDS (Transducer Electronic Data Sheet) | | | |
| Supported TEDS chips | DS2406, DS2430A, DS2432, DS2433 | | | |
| Power consumption for 16 channels | | | | |
| @ 5 V _{DC} excitation | 350 Ohm @ 10 V Exc. typ. 15 W | | | |
| | 120 Ohm @ 5 V typ. 15 W | | | |
| @ 10 VDC | 350 Ohm max. @ 15 W max. | | | |
| | 120 Ohm @ 15 W | | | |
| Standard operating temperature | 0 °C to 70 °C (32 °F to 158 °F) | | | |

¹⁾ MDAQ-BASE-10A has the half offset adjustment range

MDAQ-SUB-V-200-xx

- 16 programmable ranges from ± 0.125 V to ± 200 V
- Bandwidth 300 kHz
- Programmable sensor supply 0 to 12 V
- High signal to noise ratio
- TEDS support



Specifications

| MDAQ-SUB-V-200-xx | | | | | |
|---|-------------|--|-----------------------|-----------------------------------|-----------------------|
| Input voltage range: | Divider Off | ± 0.125 V, 0.25 V, 0.5 V, 1 V, 1.25 V, 2.5 V, 5 V, 10 V (common mode voltage up to 12 V) | | | |
| | Divider On | ± 2.5 V, 5 V, 10 V, 20 V, 25 V, 50 V, 100 V, 200 V (common mode voltage up to 250 V) | | | |
| Input impedance | | 1 MOhm to GND, 2 MOhm differential | | | |
| DC accuracy | Divider Off | | | Without software correction table | |
| ± 0.125 to ± 1 V | | $\pm 0.03\%$ of reading | ± 400 μ V | $\pm 0.15\%$ of reading | 400 μ V |
| ± 1.25 V; ± 2.5 V | | $\pm 0.03\%$ of reading | ± 1 mV | $\pm 0.15\%$ of reading | ± 1 mV |
| ± 5 ; ± 10 V | | $\pm 0.02\%$ of reading | $\pm 0.03\%$ of range | $\pm 0.15\%$ of reading | $\pm 0.03\%$ of range |
| ± 2.5 to ± 20 V | Divider On | $\pm 0.06\%$ of reading | ± 8 mV | $\pm 0.25\%$ of reading | ± 8 mV |
| ± 25 V; ± 50 V | | $\pm 0.03\%$ of reading | ± 20 mV | $\pm 0.25\%$ of reading | ± 20 mV |
| ± 100 ; ± 200 V | | $\pm 0.02\%$ of reading | $\pm 0.03\%$ of range | $\pm 0.25\%$ of reading | $\pm 0.03\%$ of range |
| Gain drift | | Typ. 15 ppm/K (max. 40 ppm/K) | | | |
| Input offset drift | | | | | |
| 125 mV to 10 V | Divider Off | Typ. 10 μ V/K (max. 20 μ V/K) | | | |
| 2.5 V to 200 V | Divider On | Typ. 100 μ V/K (max. 200 μ V/K) | | | |
| Overvoltage protection | | ± 250 V _{DC} | | | |
| Bandwidth (-3 dB) | Divider Off | 300 kHz (200 kHz at range 0.125 V and 1.25 V) | | | |
| | Divider On | 300 kHz (200 kHz at range 2.5 V and 25 V) (30 kHz with MDAQ-BASE-10) | | | |
| Channel separation @ 10 kHz | | > 80 dB | | | |
| CMRR @ 50 Hz (@ 1 kHz) | Divider Off | > 94 dB (> 80 dB) | | | |
| | Divider On | > 70 dB (> 56 dB) | | | |
| Typ. SNR @ 50 kHz BW | Divider Off | | | | |
| ± 0.125 V and ± 0.25 V | | > 87 dB | | | |
| ± 0.5 V to ± 10 V | | > 96 dB | | | |
| ± 2.5 V and ± 10 V | Divider On | > 84 dB | | | |
| ± 10 V to ± 25 V | | > 88 dB | | | |
| ± 25 V to ± 200 V | | > 93 dB | | | |
| Programmable sensor supply ⁽¹⁾ | | 0 to 12 V short circuit protected; 50 mA current limitation | | | |
| Sensor supply accuracy ⁽¹⁾ | | $\pm 0.05\%$ ± 2 mV | | | |
| Fixed sensor supply ⁽¹⁾ | | ± 15 V (50 mA) | | | |
| Output voltage | | ± 5 V (± 10 V with MDAQ-BASE-10) | | | |
| Output impedance | | 5 Ohm | | | |
| Output current | | ± 20 mA | | | |
| Programming interface | | RS-485, RS-232, USB | | | |
| Power supply | | ± 15 V | | | |
| Power consumption | | Typ. 4.5 W / 10 W ⁽¹⁾ | | | |
| Sensor connection | | BNC or DSUB ⁽¹⁾ female | | | |
| Output connector | | 68-pin Amplimite series (AMP Nr. 174339-6) | | | |
| Supported TEDS chips ⁽¹⁾ | | DS2406, DS2430A, DS2432, DS2433 | | | |
| Dimensions (W x D x H) | | BNC: 175 x 61 x 30 mm (6.9 x 2.4 x 1.2 in.) DSUB: 175 x 82 x 22 (6.9 x 3.2 x 0.9) | | | |

⁽¹⁾ MDAQ-SUB-V-200-D only!

MDAQ-SUB-ACC

- 16 channel IEPE® amplifier
- Several voltage measurement modes (AC/DC Coupling, single ended/differential)
- Bandwidth up to 300 kHz
- Channel separation 96 dB
- TEDS support
- Ideally suited for sound and vibration measurement



Specifications

| MDAQ-SUB-ACC | | | |
|------------------------------|---|-----------------|-----------------------------------|
| Input voltage range | ±0.125 V, 0.25 V, 0.5 V, 1 V, 1.25 V, 2.5 V, 5 V, 10 V | | |
| Gain | 0.5, 1, 2, 4, 5, 10, 20, 40 | | |
| Input modes Voltage modes | IEPE® or voltage Single ended or differential DC or AC coupled (3 Hz standard, on request down to 0.1 Hz) | | |
| Input impedance | 1 MOhm | | |
| DC accuracy | | | without software correction table |
| ±0.125 to ±1 V | ±0.03% of reading | 400 µV | ±0.15% of reading 400 µV |
| ±1.25 V; ±2.5 V | ±0.03% of reading | ±1 mV | ±0.15% of reading ±1 mV |
| ±5;10 V | ±0.02% of reading | ±0.03% of range | ±0.15% of reading ±0.03% of range |
| Gain drift | typ. 10 ppm/K (max. 20 ppm/K) | | |
| Input offset drift | typ. 3 µV/K (max. 12 µV/K) | | |
| Over voltage protection | IN+ differential ±40 V IN- differential: max ±40 V IN- Single ended: max 300 mA | | |
| Max. common mode voltage | IN differential mode: ±12 V | | |
| Bandwidth (-3 dB) | 300 kHz (200 kHz at range 1.25 V and 0.125 V) 30 kHz with MDAQ-BASE-10 | | |
| Channel separation @ 10 kHz | > 96 dB | | |
| CMR @ 50 Hz (@ 1 kHz) | > 94 dB (> 80 dB) | | |
| Typ. SNR @ 50 kHz bandwidth | | | |
| Range ±0.125 V | > 87 dB | | |
| Range ±0.25 V | > 93 dB | | |
| Range ±0.5 V to ±1.25 V | > 96 dB | | |
| Range ±2.5 V to ±10 V | > 100 dB | | |
| Sensor excitation | 4 or 8 mA, 5 % up to 24 V _{DC} | | |
| Current noise | 150 nA * sqrt (Hz) | | |
| Input connectors | BNC | | |
| Output voltage | ±5 V, ±10 V with MDAQ-BASE-10 | | |
| Output impedance | 5 Ohm | | |
| Output current | ±20 mA | | |
| Programming interface | RS-485, RS-232 | | |
| Power supply | ±15 V _{DC} | | |
| Power consumption: | Typ. 10 W (max 12 W @ 8 mA sensor excitation) | | |
| Sensor connection: | BNC female | | |
| Output connector | 68-pin Amplimite series (AMP Nr. 174339-6) | | |
| TEDS | DS 2406, DS 2430A, DS 2432, DS2433 | | |

MDAQ-SUB-ACC-A-BNC

- 16 channel IEPE® amplifier
- AC and DC coupled voltage measurement mode
- 2 programmable high-pass filters
- Bandwidth up to 300 kHz
- Channel separation 96 dB
- TEDS support
- Ideally suited for sound and vibration measurement

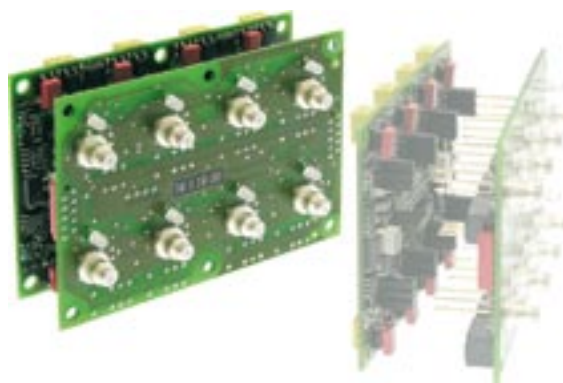


Specifications

| MDAQ-SUB-ACC-A | | | | |
|-----------------------------|---|-----------------|-----------------------------------|-----------------|
| Input voltage range | ±0.125 V, 0.25 V, 0.5 V, 1 V, 1.25 V, 2.5 V, 5 V, 10 V | | | |
| Gain | 0.5, 1, 2, 4, 5, 10, 20, 40 | | | |
| Input modes | ICP® or Voltage | | | |
| Voltage modes | Single ended DC or AC coupled with two selectable high pass filter (0.15 and 3.4 Hz as standard, others on request) | | | |
| Input impedance | 1 MOhm | | | |
| DC accuracy ¹⁾ | | | Without software correction table | |
| ±0.125 V and ±0.25 V | ±0.03% of reading | 350 µV | ±0.15% of reading | 350 µV |
| ±0.5 V to ±1.25 V | ±0.03% of reading | ±0.04% of range | ±0.15% of reading | ±0.04% of range |
| ±2.5 V to ±10 V | ±0.02% of reading | ±0.03% of range | ±0.15% of reading | ±0.03% of range |
| Gain drift | Typ. 10 ppm/K (max. 20 ppm/K) | | | |
| Input offset drift | Typ. 3 µV/K (max. 12 µV/K) | | | |
| Over voltage protection | IN+ ±40 V IN- Single ended: max 300 mA | | | |
| Bandwidth (-3 dB) | 300 kHz (200 kHz at range 1.25 V and 0.125 V) 30 kHz MDAQ-BASE-10 | | | |
| Channel separation @ 10 kHz | > 96 dB | | | |
| CMR @ 50 Hz (@ 1 kHz) | > 94 dB (> 80 dB) | | | |
| Typ. SNR @ 50 kHz bandwidth | | | | |
| Range ±0.125 V | > 87 dB | | | |
| Range ±0.25 V | > 93 dB | | | |
| Range ±0.5 V to ±1.25 V | > 96 dB | | | |
| Range ±2.5 V to ±10 V | > 100 dB | | | |
| Sensor excitation | 4 or 8 mA, 5 % up to 24 V _{DC} | | | |
| Current noise | 150 nA * sqrt (Hz) | | | |
| Input connectors | BNC | | | |
| Output voltage | ±5 V, ±10 V MDAQ-BASE-10 | | | |
| Output impedance | 5 Ohm | | | |
| Output current | ±20 mA | | | |
| Programming interface | RS-485, RS-232 | | | |
| Power supply | 15 V _{DC} | | | |
| Power consumption: | Typ. 10 W (max 12 W @ 8 mA sensor excitation) | | | |
| Sensor connection: | BNC female | | | |
| Output connector | 68-pin Amplimite series (AMP Nr. 174339-6) | | | |
| Dimensions (W x D x H) | 175 x 61 x 30 mm (6.9 x 2.4 x 1.2 in.) | | | |

MDAQ-SUB-ACC-x-MD

- Add-on for MDAQ-SUB-ACC and MDAQ-SUB-ACC-A
- Microdot sensor input connector
- LED sensor check indication
- Input multiplexer for calibration signal



Specifications

| MDAQ-SUB-ACC-x-MICRODOT | |
|-------------------------------|--|
| Input connectors | Microdot No. 031-0059-0001 |
| Sensor check (ICP® mode only) | |
| Open | $U_{exc} > 22 \text{ V}$: LED off |
| Valid | $3 \text{ V} < U_{exc} < 21 \text{ V}$: LED green |
| Short circuit | $U_{exc} < 2 \text{ V}$: LED red |
| Calibration multiplexer | Mechanical relais (NAIS TXS2) |
| Control connector | 10-pin AMP Micro Mate |
| Power supply | +5 V / +12 V |
| Power consumption | Typ. 2 W |

MDAQ-FILT-5-Bx

- MDAQ-FILT-5-BE: Bessel characteristics
MDAQ-FILT-5-BU: Butterworth characteristics
- 16 Channel 2nd order low pass filter
- 5 selectable filters including bypass function
- 5 different cut off frequencies
- Discrete low noise filter design
- Independent filter settings for each channel
- Direct control from MDAQ-xx Amplifier series



Specifications

| MDAQ-FILT-5-Bx | |
|-----------------------------------|--|
| Filter range (-3 dB) | |
| Standard MDAQ-FILT-5-Bx | 30 Hz, 100 Hz, 300 Hz, 1 kHz, 10 kHz, bypass |
| Ordering option MDAQ-FILT-5-BU-S1 | 100 Hz, 1 kHz, 10 kHz, 30 kHz, 100 kHz, bypass other frequencies on request |
| Bypass bandwidth | > 700 kHz |
| Filter characteristics | 2-Pole Bessel characteristic 2-Pole Butterworth characteristic |
| Attenuation slope | 40 dB/decade (12 dB/octave) |
| Filter accuracy | ± 1.5 dB @ f_c |
| DC gain | 1 (0 dB) |
| Offset Error | Max. 1 mV (typ <0.2 mV) Max. 0.01% of range with MDAQ-BASE-10 Max. 0.02% of range with MDAQ-BASE-5 |
| Input voltage range | ± 10 V _{pp} |
| Channel separation @ 50 kHz | > 96 dB |
| Input configuration | Single ended, designed for use with MDAQ-V; MDAQ-BASE-5 and MDAQ-BASE-10 |
| Output configuration | Single ended |
| SNR @ bandwidth | > 100 dB |
| Output impedance | 5 Ohm |
| Output current | Max. ± 20 mA |
| Output connector | 68-pin Amplimite series (AMP Nr. 174339-6), SCSI II Type |
| Power supply | ± 7.5 V to ± 15 V direct via MDAQ-BASE or -V |
| Power consumption | Typ. 3 W |
| Dimensions (W x D x H) | 175 x 61 x 14 mm (6.9 x 2.4 x 0.9 in.) |

MDAQ-AAF4-5-Bx

- MDAQ-AAF4-5-BE: Bessel characteristics
MDAQ-AAF4-5-BU: Butterworth characteristics
- 16 Channel 4th order low pass filter
- 5 selectable filters including bypass function
- 5 different cut off frequencies
- Discrete low noise filter design



Specifications

| MDAQ-AAF4-5-Bx | |
|-----------------------------------|---|
| Filter range (-3 dB) standard | 100 Hz, 1 kHz, 10 kHz, 30 kHz, 100 kHz, bypass |
| ordering option MDAQ-AAF4-5-BU-S1 | 163 Hz, 500 Hz, 2.5 kHz, 10 kHz, bypass, bypass |
| ordering option MDAQ-AAF4-5-BU-S2 | 10 Hz, 100 Hz, 1 kHz, 10 kHz, 20 kHz, bypass |
| ordering option MDAQ-AAF4-5-BE-S1 | 100 Hz, 1 kHz, 10 kHz, 20 kHz, 30 kHz, bypass other frequencies on request |
| Bypass Bandwidth | > 700 kHz |
| Filter characteristics | Ordering option BE: 4-Pole Bessel characteristic Ordering option BU: 4-Pole Butterworth characteristic |
| Attenuation slope | 80 dB/decade (24 dB/octave) |
| Filter accuracy | ± 1.5 dB @ f_0 |
| DC gain | 1 (0 dB) |
| Offset Error | Max. 1 mV (typ <0.2 mV) max. 0.01% of range with MDAQ-BASE-10 max. 0.02% of range with MDAQ-BASE-5 |
| Input voltage range ²⁾ | ± 10 V _{PP} |
| Channel separation @ 50 kHz | > 96 dB |
| Input configuration | Single ended; designed for use with MDAQ-V; MDAQ-BASE-5 and MDAQ-BASE-10 |
| Output configuration | Single ended |
| SNR @ full Bandwidth | > 100 dB |
| Output impedance | 5 Ohm |
| Output current | Max. ± 20 mA |
| Output connector | 68-pin Amplimite series (AMP Nr. 174339-6), SCSI II Type |
| Power supply | ± 7.5 V to ± 15 V direct via MDAQ-BASE or -V |
| Power consumption | Typ. 3 W |
| Dimensions (W x D x H) | 175 x 61 x 25 mm (6.9 x 2.4 x 1 in.) |

