Data Sheet

# Portable High-Speed Data Acquisition System

## DAS1820


The DAS1820 is a portable high-speed data acquisition system with a dual-slot chassis. It utilizes the same module ecosystem and hardware architecture as the DAS1800, providing near-identical performance in a smaller compact solution. This shared platform ensures the DAS1820 maintains the same plug-and-play functionality and signal conditioning capabilities as the larger system, enabling reconfiguration without requiring factory recalibration.

For high-speed measurements, the D18-UNI4, D18-HVM4, and D18-HIZ4 modules offer 4 channels per module, sampling rates up to 1 MSa/s, and simultaneous sampling. The D18-HVM4 module is capable of measuring high voltage signals up to ±1500 VDC or 1000 Vrms with safety ratings for CAT III 1500 V and CATIV1000 V. For measuring low voltage and slow changing trends, the D18-MUX8 provides 8 channels per module, sampling rates up to 5 kSa/s, and multiplexed sampling.

Optimized data recording features ensure efficient memory usage when capturing trends and transients simultaneously. Configure up to 3 different sampling rates per recording and assign channels accordingly to avoid oversampling or under sampling signals. Record data in a single MDF4 file or in multiple, up to 3. With separate files, users can create independent start and stop trigger conditions to capture high-speed signals, while continuously recording long term trends in a separate file. Coupled with an internal 500 GB solid-state drive, the DAS1820 provides the longest recording time in its class.

Delivering exceptional price-performance, the DAS1820 integrates advanced power analysis and scripting capabilities directly into the system. The power analysis supports DC, single-phase, and 3-phase systems operating in 50 Hz, 60 Hz, and 400 Hz. Additionally, custom script channels enable real-time scaling and linearization for non-linear sensors, supporting single and multichannel calculations.

To gain portability, you don't have to give up features and performance with the DAS1820. The battery-configured base unit weighs about 8.6 lbs (3.9 kg), and modules only add around 1.2 lbs (0.55 kg) each. The internal battery option provides up to 4 hours of field operation (3.5 hours with two D18-UNI4 modules) and the 12" HD touchscreen allows for easy setup and data visualization.

The easy to use interface offers intuitive features like one-finger scrolling and pinch-to-zoom, along with a built-in sensor library and visualization options including real-time waveforms, numeric values, Phasor diagrams, and histogram charts. The DAS1820 supports remote control via web server and VNC, and offers free DASpro software for PC-based data viewing.

### Features and benefits:

- 2 slots and 4 measurement modules available
  - Universal (4 ch)
  - Multiplexed (8 ch)
  - High Impedance (4 ch)
  - High Voltage (4 ch)
- Measure up to ± 1500 VDC
- Up to 16 analog inputs with D18-MUX8 multiplexed module
- Temperature measurements with thermocouples and RTDs
- Onboard scripting for real-time single or multichannel calculations
- Max sampling rate of 1 MSa/s/ch (up to 8 channels)
- Memory efficient acquisition with simultaneous sampling at different rates (up to 3) and independent file recording (up to 3)
- Synchronize timing with IRIG, GPS, and PTP (DAS1820-SYNC model)
- Dedicated power analysis supports DC, single-phase, and 3-phase networks operating in 50 Hz, 60 Hz, or 400 Hz
- Dedicated sensor library to store and recall sensor information
- 12" HD touchscreen display
- Data visuals include real-time waveforms, numeric values, Phasor diagrams, and histogram charts
- 500 GB internal SSD (standard)
- Battery option (D1820-BAT) provides up to 4 hours of operation
- Interfaces include USB 3.0 (x2), and LAN 1 Gbps
- 16 digital input channels
- Rugged carrying case included

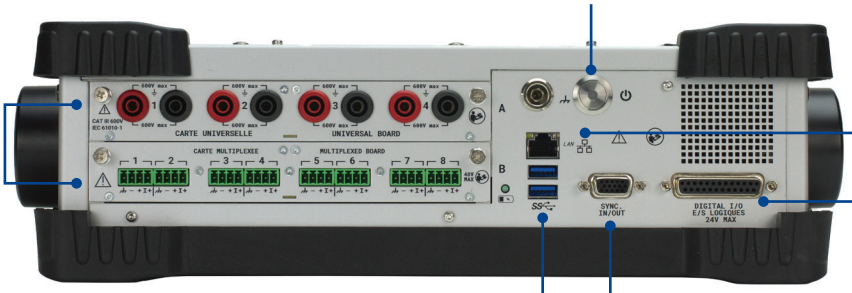
### Applications

- Monitoring and verifying power systems
- Monitoring of processes and equipment
- Product validation and verification

## Front panel


**12" touchscreen**
HD touchscreen display with multi-touch features such as one finger scrolling and pinch-to-zoom

## Top panel




**Power button**

**Standard 2 module slots**
With a plug & play design, users can easily swap between modules to meet new application requirements

**LAN**
1 Gbps LAN port for remote control, monitoring, and file transfers

**Digital inputs & outputs**
Provides 16 digital input channels and 4 digital outputs

Image displays a DAS1820 configured with 1 high voltage module and 1 multiplexed module

**USB host ports**

**Synchronization input**
SUB-D 15 HD pin terminal provides start/stop, trigger, and sampling outputs

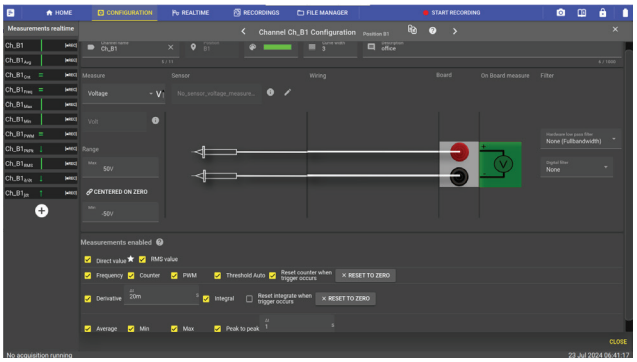
## Rear panel


**VESA-compatible mounting pattern**
Allows the instrument to be securely mounted using standard VESA brackets, arms, or stands for flexible installation and positioning

**Removable Li-Ion battery**
Battery option provides up to 4 hours of continuous use

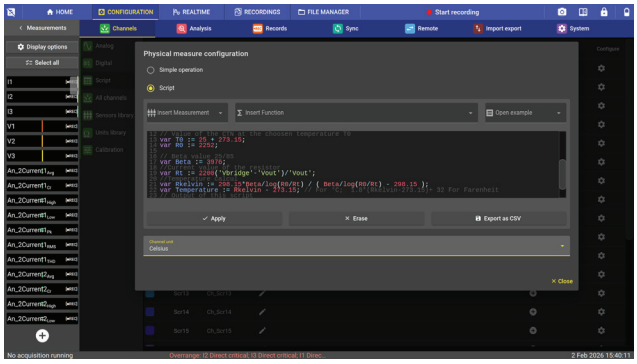
# Operation highlights

## Channel Configuration



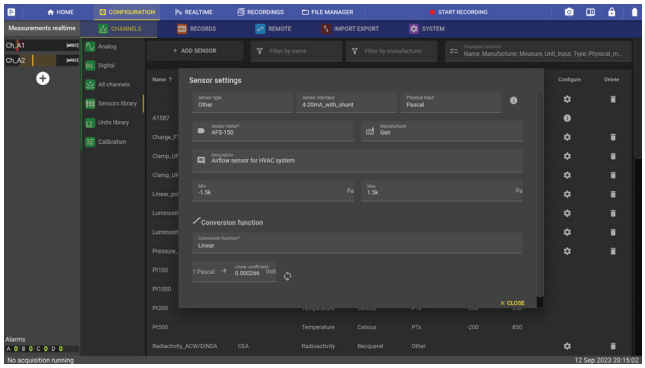
From a single input channel, the DAS1820 can be configured to perform real-time calculations such as RMS, frequency, PWM, and time-domain analysis. Sensor outputs can be converted in real time to the original measure and using the appropriate sensor parameters and conversion functions, while built-in analog and digital filters are available to condition the signal.

## Programmable Scripting Channels



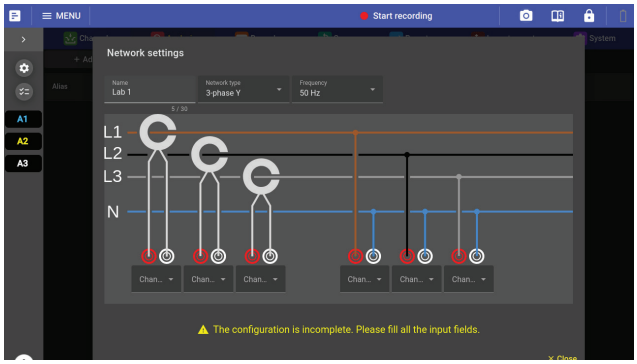
The DAS1820 provides scripting channel capabilities to reduce reliance on complex calibration curves and time-consuming post-processing. Script channels enable real-time scaling and linearization of non-linear sensors, supporting the use of custom voltage divider networks and multichannel calculations.

## Sensor Library



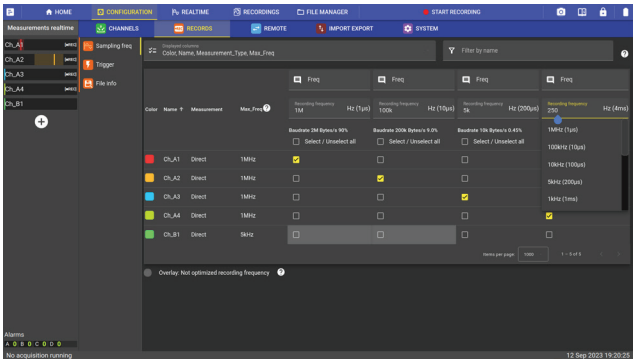
The DAS1820 provides a library of common sensor configurations to facilitate channel setup. Users can also add to the library by creating a new sensor with user-defined parameters including, name, units, and conversion function.

## Power Analysis



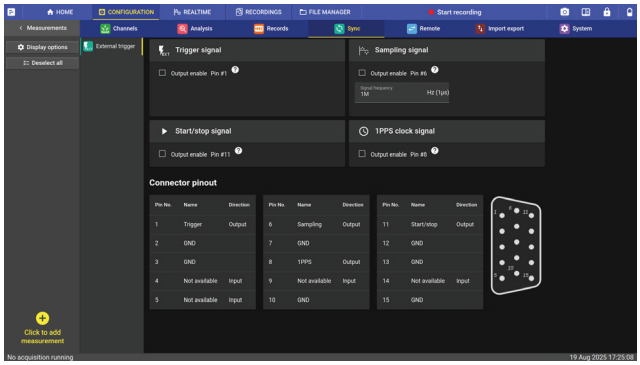

The power analysis function supports DC, single-phase, and 3-phase systems operating at 50 Hz, 60 Hz, and 400 Hz. Users can record power, energy, voltage, current, power quality, and harmonic measurements up to the 50th order, with real-time visualization using phasor diagrams and harmonic histograms.

## Advanced Sampling and Recording



Sample channels at differing sample speeds (up to 3) to avoid over sampling trends or under sampling transients. Record data into separate files (up to 3) to record long term trends while triggering separate file recordings for high speed intermittent events.

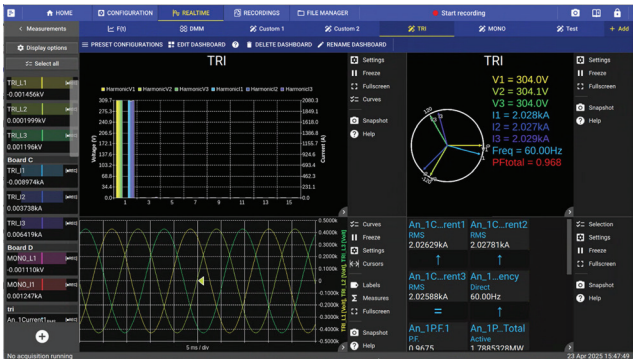
## Synchronization and Triggering




The DAS1820 combines advanced synchronization and triggering features for precise measurements. Use a variety of timing sources, including optional PTP, IRIG, and GPS, to ensure your data is perfectly synchronized across multiple systems. Trigger from external signals via the 15-pin SUB-D connector or internal software settings to start and stop manually, at a specified time, or based on channel combinations.

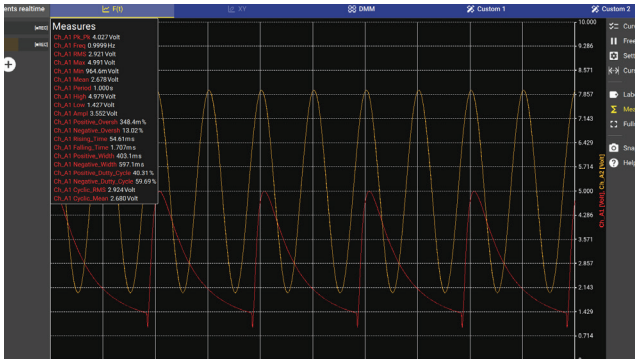
# The tools you need

## Custom Dashboards




Display and monitor data through highly customizable dashboards. Generate up to 25 widgets to display images and channel data in any combination of real-time waveforms, numeric meters, Phasor diagrams, and harmonic histograms. Create and save up to 10 custom dashboards to easily swap between.

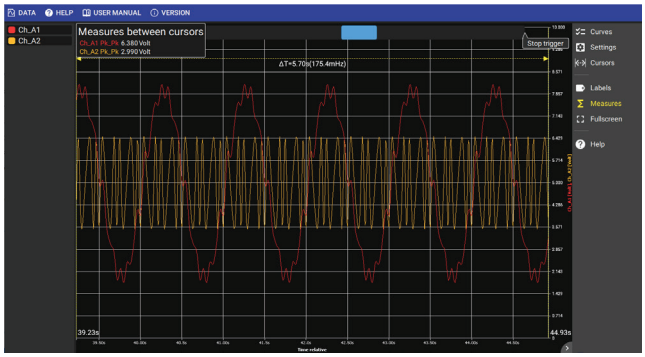
## Built-in MDF4 File Viewer




Analyze recordings instantly with the built-in MDF4 viewer. Quickly navigate through data with intuitive touch gestures like one-finger scrolling and pinch-to-zoom. When recording in multiple files, markers are automatically placed at triggered events and link to the corresponding data file.

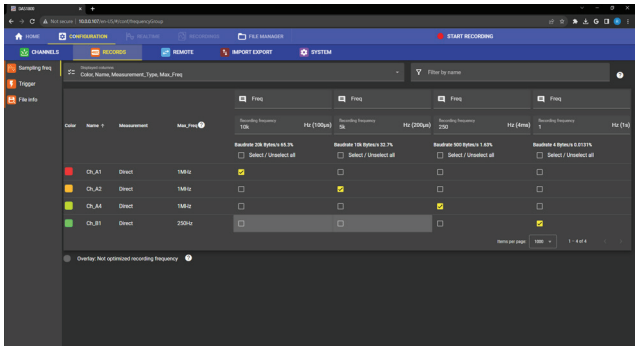
# Remote connectivity and PC software

## DASpro (PC software)




DASpro is a license free software that can be downloaded from bkprecision.com. Through this software, users can open and view the universal ASAM MDF4 file recordings saved by the DAS1820. Viewing data and analysis features are similar to the instrument, making it easy and intuitive to operate.

## Web Server



The DAS1820 provides an internal web server for remote access through any device on the same network. Configure instrument channels and trigger parameters, initialize acquisition, and easily save and transfer files to a local storage system.

## Virtual Network Computing (VNC) capability

The recorder includes a built-in VNC server that enables remote operation from a computer over a network connection. When accessed using a standard VNC client, the instrument's front panel is mirrored as a full graphical desktop on the computer, allowing users to monitor measurements and control all functions using a mouse and keyboard as if operating the unit locally.

## File Transfer Protocol (FTP) and Network-Attached Storage (NAS)

Integrated FTP and NAS support allows measurement data to be automatically transferred from the recorder to a remote server or network-attached storage. This enables easy file access from multiple computers and simplified data backup without manual file handling.

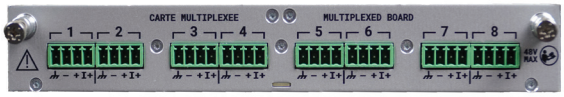
## Measurement Modules

Configure the DAS1820 to fit your needs with any combination of modules up to 2.


**Universal Module**


**High Voltage Module**


**High Impedance Module**




**Multiplexed Module**

**Measurement Modules**

| | Universal | High Impedance | High Voltage | Multiplexed |
|---|---|---|---|---|
| Channels | 4 | 4 | 4 | 8 |
| Maximum Voltage | ± 600 VDC | ± 600 VDC | ± 1500 VDC | ± 48 VDC |
| RMS Voltage | 424 VRMS | 424 VRMS | 1000 VRMS | - |
| Resolution | 16 bit | 16 bit | 16 bit | 18 bit |
| Sampling Rate | 1 MSa/s/ch | 1 MSa/s/ch | 1 MSa/s/ch | 5 kSa/s |
| Input Impedance | 1 MΩ | 10 MΩ | 10 MΩ | 2 MΩ |
| Input Type | Single ended | Single ended | Differential | Differential |
| Isolation | √ | √ | √ | - |
| Voltage | √ | √ | √ | √ |
| Current | √ | √ | √ | √ |
| Thermocouples | √ | √ | - | √ |
| RTDs | - | - | - | √ |
| Frequency | √ | √ | √ | - |
| Counter | √ | √ | √ | √ |
| PWM | √ | √ | √ | - |

### Included accessories

Bare wire to banana adapter[1]
(Set of 4 pairs)

4 pin screw terminal block[2]
(Set of 8),

Rugged case

SUB-D 25 pin connector for
digital inputs and alarms

SUB-D 15 HD pin connector for
timing and synchronization I/O

(1) A set of bare wire to banana adapters is provided with every universal and high impedance module purchased.
(2) A set of 4 pin screw terminal blocks is provided with every multiplexed module purchased.

### Optional accessories


D18-MZ250

D18-UZ001

Current shunts available for banana and 4-pin inputs

D18-UZ50 accessory

## Specifications, base unit

Note: All specifications apply to the unit after a temperature stabilization time of 60 minutes over an ambient temperature range of 23 °C ± 5 °C.

| Data Acquisition System | | |
|---|---|---|
| **Recording (files written to SSD)** | | |
| Max Sampling Rate[1] | 1 MSa/s up to 8 channels | |
| Recording Groups | 3 | |
| Write Speed | 50 MB/s | |
| File Format | ASAM MDF4 (.mf4) | |
| File Size Limit | 90% of disk capacity | |
| At End of Acquisition | Notify, rearm trigger | |
| Markers | On user action, On event | |
| **Real Time Measure** | | |
| Display Mode | F(t) | Roll mode: 100 ms/div to 10 min/div<br>Scope mode: 10 µs/div to 50 ms/div |
| | DMM | Acquisition time:<br>200ms (10 NPLC[2] at 50Hz),<br>2s (100 NPLC[2] at 50Hz) |
| | | Display mode:<br>Bargraph, reduce, MIN/MAX |
| | Record live view | Typical Refresh period 2s,<br>Zoom Mode |
| | Phasor Diagram | Data sampled at 10 kHz<br>Vector amplitude based on RMS value |
| | Histogram | 50 Hz to 60 Hz: 1 to 50 harmonics<br>400 Hz: 1 to 10 harmonics |
| | Custom | Customize up to 10 dashboards with unique widget arrangements<br>Widgets: F(t), Record Live F(t), DMM, Phasor diagrams, Histogram, Images |
| **File Viewer** | | |
| Open File Time (typical) | 10 sec per 100 GB of file[3] | |
| Subplot | 16 | |
| Cursors | Horizontal, vertical | |
| Measurements | On the data displayed or between cursors | |
| | Min, Max, Pk to Pk, Frequency, RMS, Rising time | |
| **Trigger System** | | |
| Compute Period | 1 µs | |
| Source | Analog and logic channel, external source, manual, date/time, delay (on start), duration (on stop), AND/OR combination of channels (128 max) | |
| On Analog Channel | Edge (rising, falling, both), Threshold (above, below), windows (in, out) | |
| Pre-trigger | 128 M samples | |
| Post-trigger | 1000 s maximum | |

| Digital I/O | |
|---|---|
| **Input** | |
| Number of Channels | 16 |
| Max Voltage | 24 V |
| Threshold | 1.2 V to 2.8 V |
| Sampling Interval | 1 µs (1 MSa/s) each channel |
| **Output** | |
| Number of Channels | 4 |
| Output Characteristics | TTL 5 V, 10 mA |
| Trigger Source | Analog/Digital channels, acquisition start/stop, disk full |
| Power Supply[4] | + 12 V ± 5 %, 200 mA |

| Synchronization | | |
|---|---|---|
| **Sync and Trigger I/O (SUB-D 15 HD Connector)** | | |
| Input | Signal level | TTL 3.3 V |
| | External trigger | Pull-up resistor: 10 kΩ, Rising edge sensitive<br>Minimum pulse width: 100 µs |
| | External start/stop | Pull-up resistor: 10 kΩ, Rising edge sensitive for start<br>Falling edge sensitive for stop<br>Minimum pulse width: 500 ms |
| Output | Signal level | TTL 3.3 V |
| | Trigger | 1 ms positive pulse at trig event |
| | Start/stop | Set when record is launched |
| | Sampling | Clock with 50%duty cycle at the frequency of the fastest record group |
| | PPS | 100ms pulse each second base on the main clock of the unit |
| **IRIG and GPS (option)** | | |
| IRIG/GPS Input | IRIG format B122/B126<br>Time error between reference clock and acquisition clock, < ± 10 µs | |
| **PTP (option)** | | |
| Ethernet PTPV2 IEEE1588 | Time error between reference clock and acquisition clock, < ± 10 µs | |

| Software Feature | | |
|---|---|---|
| Remote Access | VNC for remote monitoring and control | |
| | Web server | |
| | Event notify | Email |
| | File management | FTP<br>NAS (Network storage for file backup) |
| | Bench automation | SCPI command port (23 or 5025) |
| Storage Management | Cleaning policy option for automatically removing old files after exceeding a specific number of files or a date | |
| Sensor Library | Predefined sensors and user created | |
| Date and Time | Manual, NTP | |
| Software Update | Through web or USB | |
| Languages | English, French, Portuguese, Chinese, Spanish, German | |

(1) For D18-UNI4 and D18-HIZ4 Module
(2) NPLC: Number of power line cycles
(3) Time with only the 1st frequency group used
(4) Used to power the isolated digital input board

## Specifications, base unit

Note: All specifications apply to the unit after a temperature stabilization time of 30 minutes over an ambient temperature range of 23 °C ± 5 °C.

### Power Analysis

| General | | | | | |
|---|---|---|---|---|---|
| Network Type | DC; AC: Single-phase (1U/1I), 3-phase delta (3U/3I), 3-phase Wye in 3-wire (3U/3I) and 4-wire (4U/4I) | | | | |
| Network Frequency | DC, 50Hz, 60Hz, 400Hz | | | | |
| Sampling Rate | 10 kHz | | | | |
| Number of Networks | 5 | | | | |
| Compatible Modules | D18-UNIV4 & D18-HVM4 & D18-HIZ4 | | | | |
| Record File | MDF4 | | | | |
| **Calculation Interval** | | | | | |
| **Network Frequency** | **1st Interval** | **2nd Interval** | **3rd Interval** | **4th Interval** | **5th Interval (custom)** |
| DC | 200 ms | 3 s | 10 min | 2 h | 1 ms to 100 ms |
| 50 Hz | 10 periods | 150 periods | 10 min | 2 h | 1-2-5 period |
| 60 Hz | 12 periods | 180 periods | 10 min | 2 h | 1-2-5 period |
| 400 Hz | 80 periods | 1200 periods | 10 min | 2 h | 1-2-5-10-20-40 period |
| **DC Measurements** | | | | | |
| Voltage | Mean, Max, Min, peak-to-peak | | | | 0.1% Udin (1) |
| Current | Mean, Max, Min, peak-to-peak | | | | 0.1% Idin (2) |
| Power | Active | | | | 0.1% Pdin (3) |
| Energy | Active | | | | - |
| **AC Measurements** | | | | | |
| Voltage | Mean, True RMS, Max, Min, peak-to-peak, Crest factor | | | | 0.1% Udin (1) |
| | Phase to ref channel | | | | ± 0.5° |
| Current | Mean, True RMS, Max, Min, peak-to-peak, Crest factor | | | | 0.1% Idin (2) |
| | Phase | | | | ± 0.5° |
| | K factor | | | | 0.1% |
| Power | Active, Reactive, Apparent | | | | 0.1% Pdin (3) |
| Power Quality | cos (Φ) | | | | ± 0.01 |
| | tan (Φ) | | | | - |
| | Φ | | | | ± 0.5° |
| | PF | | | | ± 0.001 |
| | THD | | | | 1.0% |
| Energy | Active, Reactive | | | | - |
| Voltage Harmonics | 50 Hz, 60 Hz: 1 to 50 harmonics | | | | 0.1% Udin (1) |
| | 400 Hz: 1 to 10 harmonics | | | | |
| Current Harmonics | 50 Hz, 60 Hz: 1 to 50 harmonics | | | | 0.1% Idin (2) |
| | 400 Hz: 1 to 10 harmonics | | | | |

(1): Udin— Nominal network voltage
(2): Idin— Nominal network current
(3): Pdin— Nominal network power (Udin*Idin)

### General

| | |
|---|---|
| Internal Solid State Memory | SSD 3D NAND Flash - 500GB |
| Operating Temperature | 0 °C to 40 °C (32 °F to 104 °F) |
| Storage Temperature | -20 °C to 60 °C (-4 °F to 140 °F) |
| Display | 12" HD touchscreen (1200 x 800) |
| Power Supply | 110 VAC to 240 VAC, 50 - 60 Hz (75VA max) |
| Interfaces | USB3.0 (x2) and LAN 1Gbps (x1) |
| Battery (optional) | Removable, Lithium-ion - 10.8 V, 75 Wh |
| Battery Life (typical) | 4 hrs - One Module D18-UNI4 installed<br>3.5 hrs - Two Module D18-UNI4 installed |
| Weight | 11 lbs (5 kg) - Two Module installed + Battery option<br>9.9 lbs (4.5 kg) - One Module installed + Battery option |
| Safety | Low Voltage Directive (LVD) 2014/35/EU<br>EN 61010-2010+A1:2019, EN 61010-2-030 (2021+A11/2021) |
| Electromagnetic Compatibility | EMC directive 2014/53/EU, EN IEC 61326-2-1 (2021)<br>EN IEC 61326-1 (2021), EN 61000-3-2 (2019+A1/2021)<br>EN 61000-3-3 (2013+A1/2019) |
| Dimensions (WxHxD) | 15.7" x 9.6" x 4.7" (400 x 245 x 120 mm) |
| Warranty | Base unit and modules: 3 years<br>Battery (D1820-BAT): 1 year |
| Supplied Accessories | Power cord, SUB-D 25 pin male connector and back shell, SUB-D 15 pin male connector and back shell, rugged carrying case |
| Languages | English, French, German, Spanish, Portuguese, Chinese |

## Specifications, measurement Modules

Note: All specifications apply to the unit after a temperature stabilization time of 30 minutes over an ambient temperature range of 23 °C ± 5 °C.

| Universal Module (D18-UNI4) | | |
|---|---|---|
| Number of Channels | 4 | |
| Input Type | Isolated single ended input - 4mm Banana Plug | |
| **Voltage** | | |
| Max. Input Voltage | ± 600 VDC or 424 Vrms | |
| Common-mode Voltage | 600 V between track and ground | |
| Range (19 ranges) | ± 500 µV / 1 mV / 2.5 mV / 5 mV / 10 mV / 25 mV / 50 mV / 100 mV / 250 mV / 500 mV / 1 V / 2.5 V / 5 V / 10 V / 25 V / 50 V / 100 V / 250 V / 600 V | |
| DC Accuracy[1] | ≤ ± 25 mV | ± 0.1% of full range + 10 µV[2] |
| | ± 25 mV to ± 500 mV | ± 0.1% of full range + 10 µV |
| | ≥ ± 1 V | ± 0.06% of full range |
| Offset Drift | ± 50 ppm/°C ± 1 µV/°C | |
| Input Impedance | 1 MΩ for ranges ≥ ± 1 V, 25 MΩ for ranges ≤ ± 0.5 V | |
| Input Capacitance | 150 pF | |
| Intrinsic Noise[3] (standard deviation in % of the span) | ≤ ± 1 mV | < 0.2% |
| | ± 2.5 mV to ± 10 mV | < 0.1% |
| | ± 25 mV to ± 500 mV | < 0.05% |
| | ≥ ± 1 V | < 0.02% |
| CMRR | ≤ ± 500 mV | > 85 dB |
| | ≥ ± 1 V | > 70 dB |
| Crosstalk | > -90 dB | |
| Isolation | CH to CH and CH to GND, > 100 MΩ at 650 VDC | |
| Safety | CAT III 600 V | |
| **Bandwidth and Filters** | | |
| Bandwidth (-3 dB) | ≤ ± 2.5 mV | 1 kHz |
| | ± 5 mV to ± 25 mV | 10 kHz |
| | ± 50 mV to ± 500 mV | 60 kHz |
| | ≥ ± 1 V | 100 kHz |
| Analog Filter | 2nd Order(-20 dB/dec) | 100 Hz, 1 kHz, 10 kHz |
| Digital Filter | IIR 4th order (-80 dB/dec) | 0.01 Hz to 10 kHz |
| | Type | Low pass, high pass, band pass, band stop |
| | Filter response | Butterworth, Bessel, Chebyshev, Inverse Chebyshev, elliptic, Papoulis, Gaussian |
| **Temperature (Thermocouple)** | | |
| Compute Frequency | 4 ms | |
| Cold Junction | Uncompensated, internal, external (other channel) | |
| | Accuracy[4]: ± 1.25°C | |
| Type | J | -210 °C to 1200 °C (-346 °F to 2192 °F) |
| | K | -250 °C to 1370 °C (-418 °F to 2498 °F) |
| | T | -200 °C to 400 °C (-328 °F to 752 °F) |
| | S | -50 °C to 1760 °C (-58 °F to 3200 °F) |
| | B | 200 °C to 1820 °C (392 °F to 3308 °F) |
| | E | -250 °C to 1000 °C (-418 °F to 1832 °F) |
| | N | -250 °C to 1300 °C (-418 °F to 2372 °F) |
| | R | -50°C to 1768°C (-58 °F to 3214 °F) |

| Data Acquisition | | |
|---|---|---|
| ADC | 16 bit – SAR | |
| Sampling Interval | 1 µs (1 MSa/s) each channel | |
| **Time and Counting** | | |
| Threshold | Set by user, auto | |
| Duty Cycle | 10% minimum – (minimum pulse width, 20 µs) | |
| Counter | 48 bits | |
| Frequency | 0.1 Hz to 100 kHz | |
| | Accuracy:<br>0.01% reading, 0.1 Hz to 10 Hz<br>0.05% reading, 10 Hz to 100 kHz | |
| PWM | Absolute error:<br>0.1% from 0.1 Hz to 1 kHz<br>0.5% from 1 kHz to 5 kHz | |
| **True RMS** | | |
| Compute Period | Compute on the 1 Ms/s data flow<br>Each period until 100 Hz<br>10 ms between 100 Hz and 10 kHz | |
| Accuracy (Sine wave ≥ 1 V) | 10 Hz to 2 kHz | ± 0.1% of full range |
| | 2 kHz to 10 kHz | ± 0.3% of full range |
| **Other** | | |
| Current | Through shunt or clamp | |
| Sensor | 0 to 10 V, 4 to 20 mA (with external shunt), duty cycle or frequency sensor, other user defined settings | |
| Calculations | Min - max - avg - pk to pk on Δt, integral, and derivative | |

| High Impedance Module[5] (D18-HIZ4) | | |
|---|---|---|
| **Voltage** | | |
| Input Impedance | 10 MΩ for ranges ≥ ± 1 V, 25 MΩ for ranges ≤ ± 0.5 mV | |
| Intrinsic Noise[3] (standard deviation in % of the span) | ≤ ± 1 mV | < 0.2% |
| | ± 2.5 mV to ± 10 mV | < 0.1% |
| | ± 25 mV to ± 500 mV | < 0.05% |
| | ≥ ± 1 V | < 0.05% |
| **Bandwidth and Filters** | | |
| Bandwidth | ≤ ± 2.5 mV | 1 kHz |
| | ± 5 mV to ± 25 mV | 10 kHz |
| | ± 50 mV to ± 500 mV | 60 kHz |
| | ≥ ± 1 V to ± 10 V | 20 kHz |
| | ≥ ± 25 V | 80 kHz |

(1) Direct measure taken on DMM at 10 (50 Hz) / 12 (60 Hz) NLPC (200 ms) and full bandwidth
(2) Only when offset adjustment has been performed after installing a new module. Otherwise accuracy is ± 0.1% of full range (max. range - min. range) + 20 µV
(3) Measure ± short circuit termination to 50 Ω on chassis during 1 sec at the fastest acquisition speed and full bandwidth
(4) Only when cold junction adjustment has been performed after installing a new module and after 30 minutes of connection between TLK2B accessory, thermocouple and module terminal. Otherwise accuracy is ±3 °C
(5) For all other specs, refer to the universal module specifications

# Specifications, measurement Modules

Note: All specifications apply to the unit after a temperature stabilization time of 30 minutes over an ambient temperature range of 23 °C ± 5 °C.

| Multiplexed Module (D18-MUX8) | | |
|---|---|---|
| Number of Channels | 8 | |
| Input Type | Non-isolated differential input – 4 pin terminal block, Part: Phoenix Contact MC 1.5/ 4-ST-3.5 | |
| **Voltage** | | |
| Maximum Input Voltage | ± 48 VDC between CH to GND and between 2 poles on a channel | |
| Range (16 ranges) | ± 500 µV / 1 mV / 2.5 mV / 5 mV / 10 mV / 25 mV / 50 mV / 100 mV / 250 mV / 500 mV / 1 V / 2.5 V / 5 V / 10 V / 25 V / 48 V | |
| Admissible Common Mode | ≤ ± 1 V | ± 3 V |
| | ≥ ± 2.5 V | ± 48 V |
| DC Accuracy[1] | ≤ ± 10 mV | ± 0.1% of full range + 5µV |
| | ≥ ± 25 mV | ± 0.04% of full range |
| Offset Drift | ± 50 ppm/°C ± 0.5 µV/°C | |
| Input Impedance | 2 MΩ for ranges ≥ ± 1 V, 25 MΩ for ranges ≤ ± 0.5 V | |
| Input Capacitance | 150 pF | |
| Intrinsic Noise[2] (standard deviation in% of the span) | ≤ ± 1 mV | < 0.15% |
| | ± 2.5 mV to ± 10 mV | < 0.05% |
| | ≥ ± 25 mV | < 0.01% |
| CMRR | > 70 dB | |
| Crosstalk | > -90 dB | |
| **Bandwidth and Filters** | | |
| Bandwidth (-3 dB) | 1 kHz | |
| Digital Filter | IIR 4th order (-80 dB/dec) | 0.01 Hz to 500 Hz |
| | Type | Low pass, high pass, band pass, band stop |
| | Filter response | Butterworth, Bessel, Chebyshev, Inverse Chebyshev, elliptic, Papoulis, Gaussian |
| **Data Acquisition** | | |
| ADC | 18 bit – SAR | |
| Sampling Interval | 200 µs (5 kSa/s) each channel | |

| Temperature (RTD) | | |
|---|---|---|
| Compute Frequency | 4 ms | |
| Current | Pt100 | 1.0 mA |
| | Pt200 | 0.5 mA |
| | Pt500 | 0.2 mA |
| | Pt1000 | 0.1 mA |
| Temperature Range | -200 °C to +850 °C (-328 °F to 1562 °F ) | |
| Wiring | 2 wires | Max. corrective resistance 50 Ω |
| | 3 wires | Max. 3-wire resistance, 50 Ω |
| | 4 wires | |
| Measurement Range (7 Ranges) | ± 10 °C, ± 25 °C, ± 65 °C, ± 130 °C, ± 200 °C, [-200 °C, +380 °C], [-200 °C, +850 °C] | |
| Accuracy | 3 wires | ± 0.1% of the range ± 0.3 °C |
| | 4 wires | ± 0.1% of the range ± 0.2 °C |

| Temperature (Thermocouple) | | |
|---|---|---|
| Compute Frequency | 4 ms | |
| Cold Junction | Uncompensated, internal, external (other channel) | |
| | Accuracy[3]: ± 1.25 °C | |
| Type | J | -210 °C to 1200 °C (-346 °F to 2192 °F) |
| | K | -250 °C to 1370 °C (-418 °F to 2498 °F) |
| | T | -200 °C to 400 °C (-328 °F to 752 °F) |
| | S | -50 °C to 1760 °C (-58 °F to 3200 °F) |
| | B | 200 °C to 1820 °C (392 °F to 3308 °F) |
| | E | -250 °C to 1000 °C (-418 °F to 1832 °F) |
| | N | -250 °C to 1300 °C (-418 °F to 2372 °F) |
| | R | -50°C to 1768°C (-58 °F to 3214 °F) |
| **Resistance** | | |
| Compute Frequency | 4 ms | |
| Wiring | 2 wires | Max. corrective resistance 50 Ω |
| | 3 wires | Max. 3-wire resistance, 50 Ω |
| | 4 wires | |
| Measurement Range (4 Ranges) | 300 Ω (1 mA), 1500 Ω ( 0.5 mA), 5k Ω (0.2 mA), 10 kΩ (0.1 mA) | |
| Accuracy | ± 0.1% of the range ± 0.1 Ω | |
| **Time and Counting** | | |
| Threshold | Set by user, auto | |
| Minimum Pulse Width | 1 ms | |
| Counter | 32 bits | |
| **Other** | | |
| Current | Through shunt or clamp | |
| Sensor | 0 to 10 V, 4 to 20 mA (with external shunt), other user defined settings | |

(1) Direct measure taken on DMM at 10 (50 Hz) / 12 (60 Hz) NLPC (200 ms) and full bandwidth
(2) Measure ± short circuit termination to 50 Ω on chassis during 1 sec at the fastest acquisition speed and full bandwidth
(3) Only when cold junction adjustment has been performed after installing a new module and after 30 minutes of connection between GCM5P accessory, thermocouple and module terminal. Otherwise accuracy is ±3 °C

## Specifications, measurement Modules

Note: All specifications apply to the unit after a temperature stabilization time of 30 minutes over an ambient temperature range of 23 °C ± 5 °C.

| High Voltage Module (D18-HVM4) | | |
|---|---|---|
| Number of Channels | 4 | |
| Input Type | Isolated differential input - 4mm Banana Plug | |
| **Voltage** | | |
| Max. Input Voltage | ± 1500 VDC or 1000 Vrms | |
| Overvoltage Protection | ± 2000 VDC or 1414 Vrms (3) | |
| Range (9 ranges) | ± 5 V / 10 V / 25 V<br>± 50 V / 100 V / 250 V<br>± 500 V / 1000 V / 2000 V | |
| DC Accuracy (1) | ± 0.06% of full range | |
| Offset Drift | ± 50 ppm/°C ± 1 µV/°C | |
| Input Impedance (DC) | 10 MΩ | |
| Input Capacitance | 10 pF | |
| Intrinsic Noise (2) (standard deviation in % of the span) | < 0.02% | |
| CMRR (Common mode rejection range) | > -120 dB | |
| Crosstalk | > -120 dB | |
| Channel Isolation | CH to CH and CH to GND, > 100 MΩ at 2000 VDC | |
| Safety | CAT III 1500 VDC, CAT IV 1000 V | |
| **Bandwidth and Filters** | | |
| Bandwidth (-3 dB) | Ranges ≤ ± 2.5 V | 30 kHz |
| | Ranges ≥ ± 50 V | 100 kHz |
| Analog Filter | 3rd order(-60 dB/dec) | 100 Hz, 1 kHz, 10 kHz |
| Digital Filter | IIR 4th order (-80 dB/dec) | 0.01 Hz to 10 kHz |
| | Type | Low pass, high pass, band pass, band stop |
| | Filter response | Butterworth, Bessel, Chebyshev, Inverse Chebyshev, elliptic, Papoulis, Gaussian |

| Data Acquisition | | |
|---|---|---|
| ADC | 16 bit - SAR | |
| Sampling Interval | 1 µs (1 MSa/s) each channel | |
| **Time and Counting** | | |
| Threshold | Set by user, auto | |
| Duty Cycle | 10% minimum - minimum pulse width 20 µs | |
| Counter | 48 bits | |
| Frequency | 0.1 Hz to 50 kHz | |
| | Accuracy:<br>0.01% from 0.1 Hz to 10 Hz<br>0.05% of the value from 10 Hz to 50 kHz | |
| PWM | Absolute error:<br>0.1% - 0.1 Hz to 1 kHz<br>0.5% ≥ 1 kHz to 5 kHz | |
| **True RMS** | | |
| Compute Period | Compute on the 1 Ms/s data flow<br>Each period until 100 Hz<br>10 ms between 100 Hz and 10 kHz | |
| Accuracy (on a Sine wave for range ≥ 10 V) | 10 Hz to 2 kHz | ± 0.1% of full range |
| | 2 kHz to 10 kHz | ± 0.3% of full range |
| **Other** | | |
| Current | Through shunt or clamp | |
| Sensor | 0 to 10 V, 4 to 20 mA (with external shunt), duty cycle or frequency sensor, and other user defined settings | |
| Calculations | Derivative, integral, min - max - avg - pk to pk on Δt | |

(1) Direct measure,full bandwidth, value taken on DMM display at 10 (50 Hz) / 12 (60 Hz) NLPC (200 ms)
(2) Measure ± short circuit terminate to 50 Ω on chassis during 1 sec at the fastest acquisition speed and full bandwidth
(3) CH to Earth GND withstand voltage 6.6 kV AC for 5 seconds

## Ordering Information

### Step 1: Select base unit model and options

| Models | Description |
|---|---|
| DAS1820 (base unit) | The DAS1820 base unit includes the following standard; 2 module slots, 500 GB SSD, 16 digital channels, SUB-D 15 HD pin connector for external triggering and synchronization, 12" TFT LCD Full HD (1280 x 800), USB 3.0 (x2), and 1 Gbps LAN interfaces |
| DAS1820-SYNC | Includes the DAS1820 base unit with PTP enabled and additional hardware to support IRIG and GPS synchronization |
| **Options** | **Description** |
| D1820-BAT | Removable Lithium-ion battery providing up to 4 hours of continuous use |
| D18-PTP | Software license to enable PTPv2 (IEEE1588) time synchronization through Ethernet |

### Step 2: Determine the number and type of measurement modules for your application.

| Module | Channels | Measurements |
|---|---|---|
| Universal (D18-UNI4) | 4 | Voltage, current (shunt), temperature (thermocouple), frequency, PWM, True RMS |
| High Impedance (D18-HIZ4) | 4 | Voltage, current (shunt), temperature thermocouple), frequency, PWM, True RMS |
| Multiplexed (D18-MUX8) | 8 | Voltage, current (shunt), resistance, temperature (RTD), temperature (thermocouple) |
| High Voltage (D18-HVM4) | 4 | Voltage (± 1500 VDC), current (shunt), frequency, PWM, True RMS |

Note: Refer to the measurement modules and specifications sections for additional information.

### Step 3: Select your accessories

| Accessory | Part Number |
|---|---|
| Isolated digital channel board | 917008000 |
| Digital channels patch cord | 902407000 |
| Replacement 4 pin terminal block, pack of 8 | GCM5P |
| Replacement quick-connect banana plug, 4 pairs | TLQ2B |
| 4-pin 250 Ω shunt, 0.1%, 0.03 A max | D18-MZ250 |
| Banana 50 Ω shunt, 0.1%, 0.05 A max | D18-UZ50 |
| Banana 0.01 Ω shunt, 1%, 5 A max | D18-UZ001 |

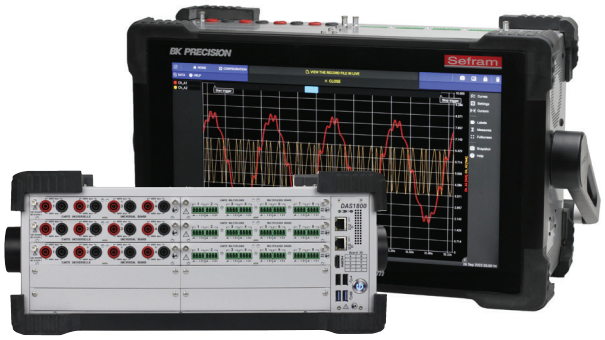
### Step 4: Contact us

For inquiries and assistance configuring your DAS1820, please fill out the DAS1820 Order Request Form.

Or, visit our Where to Buy page at bkprecision.com to view a list of authorized vendors.

## Need More Acquisition Capabilities?

For applications requiring higher signal density and extended data retention, the DAS1800 features a 10-slot chassis and 2 TB SSD standard. This system supports a maximum of 40 simultaneous or 80 multiplexed channels, providing the necessary scale for complex, multi-parameter testing environments.



# About B&K Precision

For more than 70 years, B&K Precision has provided reliable and value-priced test and measurement instruments worldwide.

Our headquarters in Yorba Linda, California houses our administrative and executive functions as well as sales and marketing, design, service, and repair. Our European customers are most familiar with B&K through our French subsidiary, Sefram. Engineers in Asia know us through our B+K Precision Taiwan operation. The independent service centers in Singapore and Brasil service customers in Singapore, Malaysia, Vietnam, Indonesia and South America, respectively.


B&K Precision group member  Independent service center  Service center location

## Quality Management System

B&K Precision Corporation is an ISO9001 registered company employing traceable quality management practices for all processes including product development, service, and calibration.

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## About Sefram

Established in 1947, Sefram has been designing and manufacturing data recorders for more than 70 years.  Sefram joined the test and measurement division of Schlumberger in 1978, and has been a subsidiary of B&K Precision since 2004.  Certified ISO 9001, Sefram's strategy is to provide innovative and high-quality test and measurement products for electronic and electrical applications.

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