DIGILENT®
Digilent is now part of Emerson.

WebDAQ 904 Datasheet

Internet Enabled Universal Input Logger

The WebDAQ 904 intelligent logger features universal inputs and remote monitoring and control of real-time data.

Highlighted Features

- Four 24-bit simultaneous analog inputs; individually configurable:
  - Voltage (up to ±60 V), current, RTD, thermocouples, resistance, bridge-based sensors
- 100 S/s/ch sample rate, max
- Voltage and current excitation
- Four isolated DIO for triggers and alarms
- Log data to internal storage or mapped network storage
- Share folders to view files over a local network
- Export data to csv, UFF, or binary for use in other applications
- Alarm and event notifications with email and SMS messaging
- Easy, flexible task scheduling
- Configurable read/write access
- No driver software to install
- Built-in web server
- Remote monitoring and control
- WiFi support

Overview

The WebDAQ 904 is a stand-alone universal input logger designed for remote monitoring and control. All the intelligence is built into the WebDAQ, eliminating the need for a PC or additional software. By using the embedded WebDAQ web server, users can easily configure simple or sophisticated applications, log sensor data, update digital outputs and/or send notifications based on alarm conditions, and view real-time data from any location and any device with a web browser.

The WebDAQ 904 performs high-accuracy measurements from up to four analog inputs. Users can measure several signals from sensors such as strain gauges, RTDs, thermocouples, and load cells. Housed in a heavy-duty chassis, the WebDAQ 904 is rugged enough for industrial applications.

Integrated Software and Hardware

The WebDAQ Series embedded OS and web server provides an all-in-one package for stand-alone data logging and alarming. Users can monitor and control their applications from anywhere with a web browser.

The WebDAQ web server is optimized for both desktop and mobile use. Users can perform data acquisition tasks from phones, tablets, and laptops with a single, intuitive user interface.

Remote Access and Control

Install the WebDAQ 904 on any network and access it using any device with a web browser to remotely monitor and control all operations.

Wireless Communication

After the WebDAQ is detected on a wired network, users can connect an approved WiFi adapter to the rear panel and communicate with the WebDAQ over a wireless network. Refer to our website for a list of the WiFi adapters approved for use with WebDAQ Series hardware.

Flexible Triggering

Start or stop the acquisition based on analog or digital thresholds, alarm states, or date/time values. On-demand push button triggering is also supported.

WebDAQ Web Interface

An embedded web server provides a clean, intuitive interface to access all configuration and data management tasks.

Hardware, trigger, and alarm settings are contained in a single task, or "job". Multiple "jobs" can be run in a "schedule" for more complex data logging applications.

For example, users can create a schedule of jobs in which one job automatically runs after an alarm condition is triggered on a different job, such as when a temperature is reached or when a digital input changes.
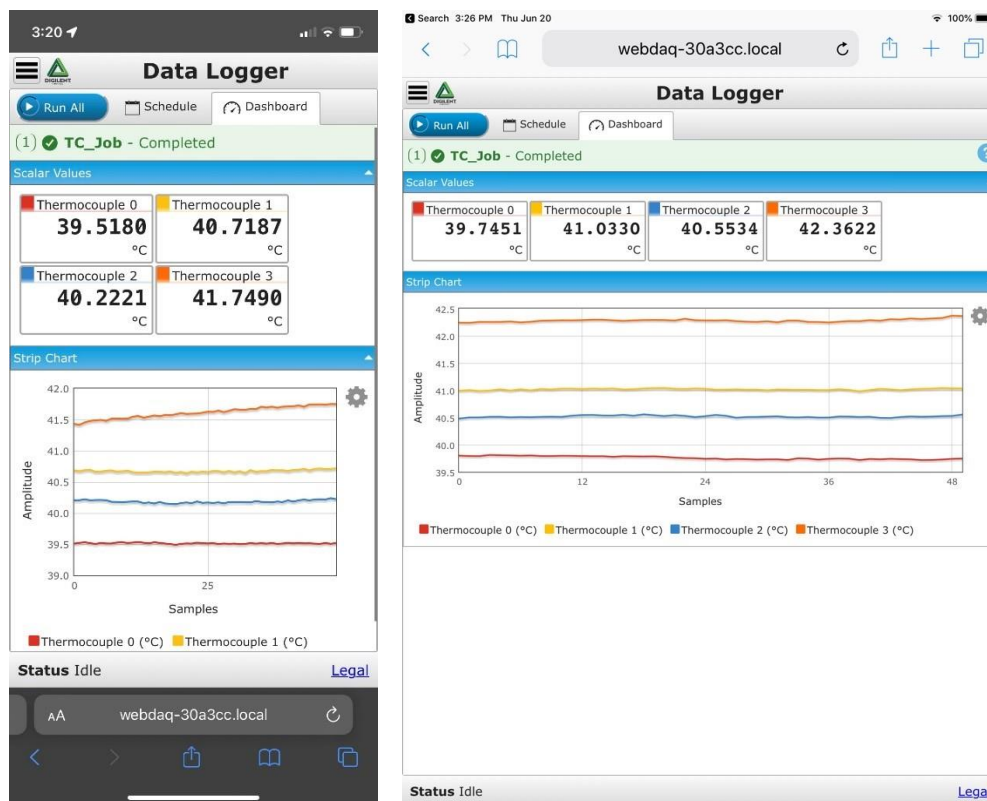
Device-independent operation lets you remotely monitor and control the WebDAQ 904 from any device with a web browser.

Introduction

Easy Setup – Powerful Capabilities

Jobs are the building blocks of WebDAQ. The ability to define different data logging jobs, or tasks, and add them to a schedule unleashes flexibility not seen in any other data logger.

Whether you want to set up a simple logging task or a complex task, jobs and a schedule make it easy and straightforward.

What is a Job?

The basic building block of WebDAQ, a job defines channel configuration, logging options, start and stop conditions, and alarming.

What is a Schedule?

A schedule is a collection of jobs that gives flexibility to dynamically change data logging attributes, such as sampling rate, active channels configuration, or alarm levels.

Example:

Switching from static acquisition to dynamic acquisition.

1 Schedule and 2 Jobs

Users can easily set up a job for a slow, static acquisition and a fast dynamic acquisition. When a trigger condition is met (i.e. over/under alarm), Job 1 (slow acquisition) ends and Job 2 (fast acquisition) begins. When the trigger condition returns to normal, job 1 can be restarted.
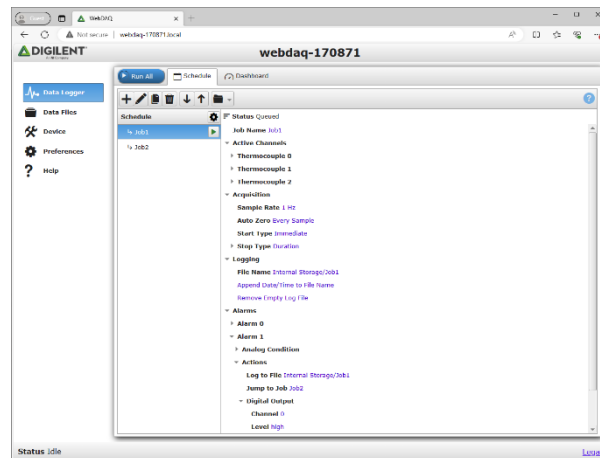
Clear, Concise, Data Displays

WebDAQ users don't need to rely on the small screens and difficult to navigate displays of most other loggers. With WebDAQ's intuitive web interface, users can easily see their data and alarm conditions in real time or after the acquisition is complete.
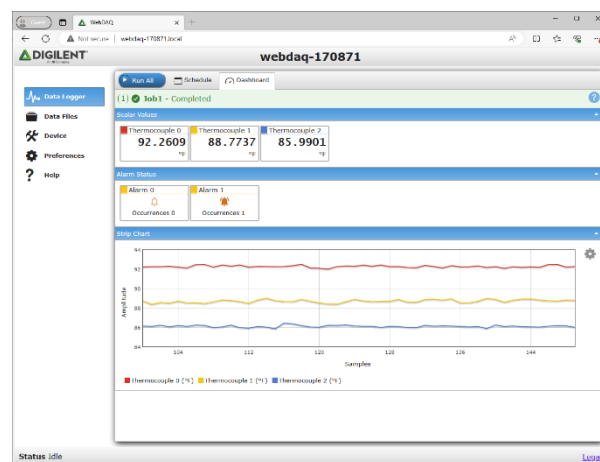
Features

Alarm and Event Notifications

Create multiple alarms using analog or digital channel sources. Configure alarms to reset and re-arm when the condition clears or reset them remotely with your browser. View the alarm status on the web interface. Users can configure one or more events to record when a job is started, stopped, or triggered, or if an error condition is detected.

Receive alarm and event notifications on one or more addresses using email and SMS messaging.

Virtually Unlimited Storage

Store data files and configuration settings locally in internal flash memory or save to external media or network folders. Users can map a network drive or FTP server as the location to log data or store files. Easily transfer files between WebDAQ storage locations and mapped network storage locations.

Share Folders

Users can share a WebDAQ storage location or specific folder over a local network.

Real-Time Data Display

View data as it is acquired or from a stored file. Users can specify a range of data to view and zoom in or out. Data is plotted on strip chart and scalar displays.

Control Read and Write Access

Users can control who can view and modify job settings by defining a password and setting the security level for the admin account. A "share" password can be used to access a shared folder or FTP server running on the WebDAQ.

Run the Schedule on Startup

Automatically run the schedule when the system starts up. Multiple jobs in the schedule are run consecutively.

Real-Time Clock

A real-time clock provides an absolute time reference for timestamping data. The clock can be set to any time zone and may be synchronized to the internet time server.

Analog Input

The WebDAQ 904 provides four individually configurable channels of 24-bit universal analog input. All channels are measured simultaneously at rates of up to 10 ms (high speed mode) or 510 ms (high resolution mode). Refer to the Specifications section for the conversion times for all timing modes.

Universal Input Modes

Each channel is configurable for a different input mode:

- Voltage
- Current
- Thermocouples
- RTD (4-wire and 3-wire)
- Resistance (4-wire and 2-wire)
- Bridge-based sensors (half- and full-bridge, and other powered load cells)

Measurement ranges vary for each type of measurement; refer to the Specifications section for range values per input mode. The max sample rate is 100 S/s per channel.

Voltage and current excitation is provided for applicable input modes. Each channel has a built-in thermistor for cold-junction compensation (CJC) calculations when measuring thermocouples. An analog pre-filter removes noise that may be present in the signals prior to conversion.

Timing Modes

The WebDAQ 904 supports high resolution, 50 Hz rejection, 60 Hz rejection, and high-speed timing modes.

- High resolution mode optimizes maximum overall noise rejection and provides rejection of 50 Hz and 60 Hz noise.
- 50 Hz rejection mode optimizes 50 Hz noise rejection.
- 60 Hz rejection mode optimizes 60 Hz noise rejection.
- High speed timing mode optimizes the sample rate.

Isolated Digital I/O

The four isolated digital I/O lines can be used either as triggers to start or stop the acquisition or as alarm outputs.

Flexible Power Requirements

Provide power with the 9 volt, 2.2 amp supply that ships with the device, or connect any 6 to 16 DC supply.

Firmware Updates

Device firmware is bundled with the operating system and web server in one update file. This allows the WebDAQ to be updated in the field.

Calibration

The WebDAQ is factory-calibrated using a NIST-traceable calibration process. Specifications are guaranteed for one year. Return the device to the factory for recalibration.

REST API

The WebDAQ REST API allows users to communicate with the device outside of the web interface to retrieve information about the system, schedules, and jobs, get acquisition and alarm status, and to start/stop an acquisition.
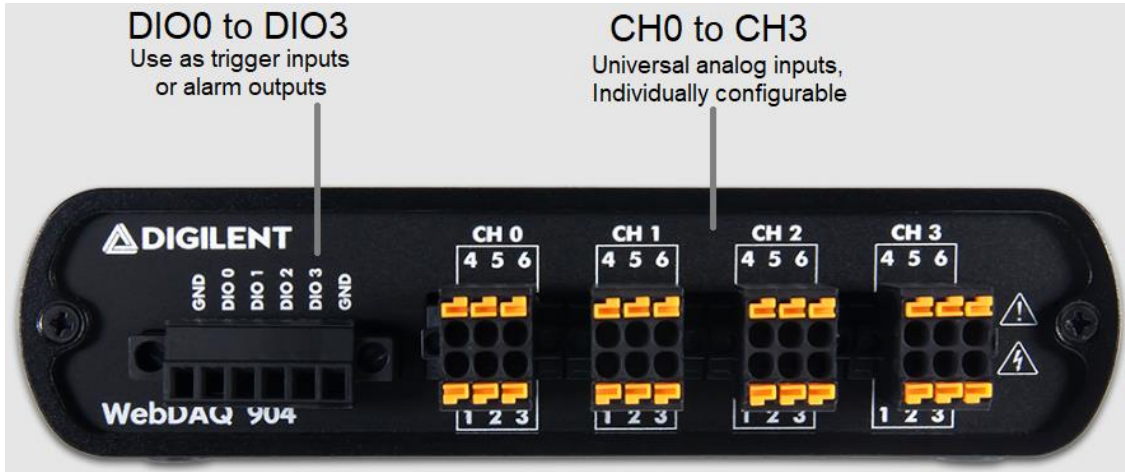
Functional Block Diagram
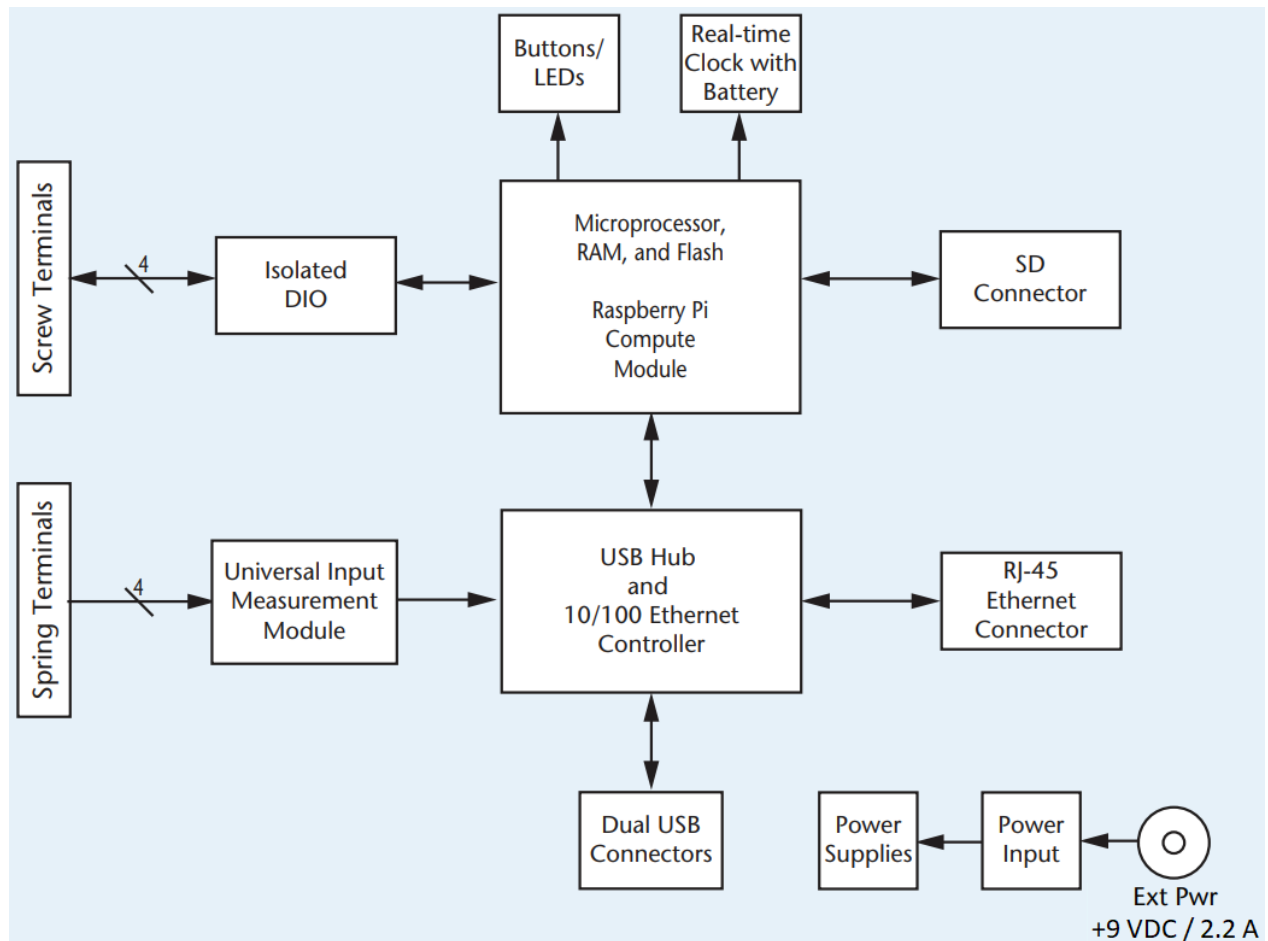
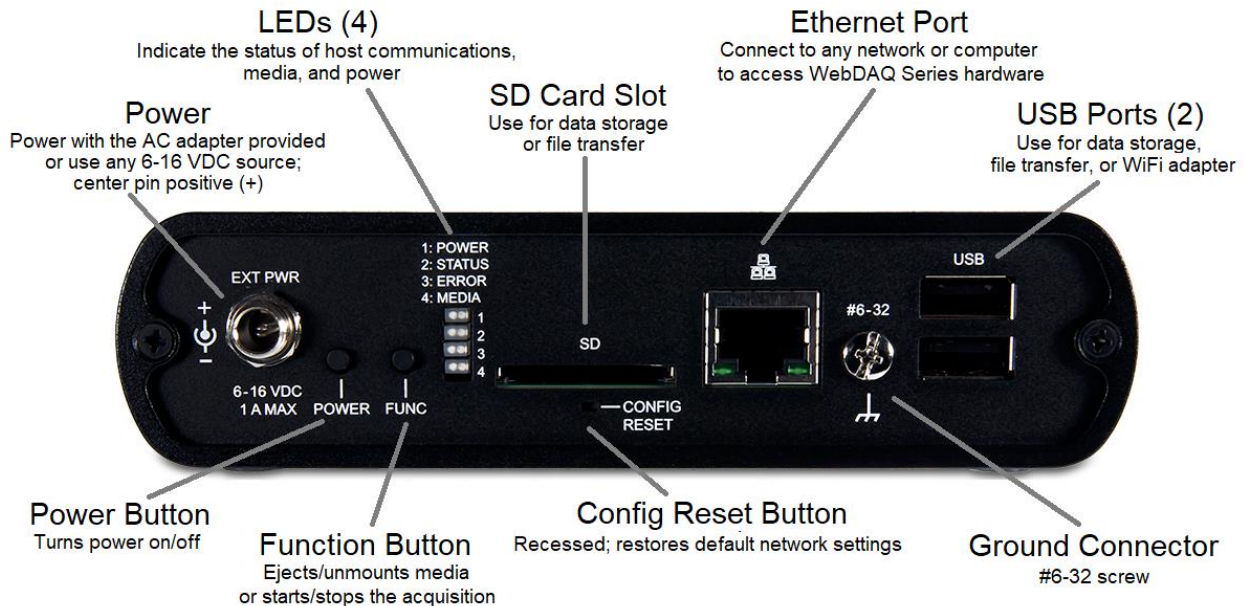# Front and Rear Panels

Front Panel

Detachable spring and screw terminals allow quick analog and digital connections.

Rear Panel

The rear panel provides Ethernet and power connections, LED indicators, dual USB ports, one SD card slot, buttons, and a ground connector.

Specifications

All specifications are subject to change without notice. Typical for 0 °C to 50 °C unless otherwise specified.

Analog Input

- Number of channels: 4 analog input channels
- ADC resolution: 24 bits
- Type of ADC: Delta-Sigma (with analog prefiltering)
- Sampling mode: Simultaneous
- Input modes: Voltage, Current, Resistance (4-wire and 2-wire), RTD (3-wire and 4-wire), Thermocouple, Quarter-bridge, Half-bridge, Full-bridge
- Conversion time, no channels in TC mode
    - High speed: 10 ms for all channels
    - Best 60 Hz rejection: 110 ms for all channels
    - Best 50 Hz rejection: 130 ms for all channels
    - High resolution: 500 ms for all channels
- Conversion time, one or more channels in TC mode
    - High speed: 20 ms for all channels
    - Best 60 Hz rejection: 120 ms for all channels
    - Best 50 Hz rejection: 140 ms for all channels
    - High resolution: 510 ms for all channels
- Overvoltage protection: terminals 3 through 6, across any combination: ±60 V
- Input impedance
    - Voltage mode (±60 V, ±15 V, ±4 V): 1 MΩ
    - Current mode: <40 Ω
    - All other modes: 1 GΩ
- Input bias current: <1 nA
- Integral non-linearity (INL): ±15 ppm
- Common mode rejection ratio (CMRR)
    - f_{in} = 60 Hz: >100 dB
- Normal mode rejection ratio (NMRR)
    - Best 60 Hz rejection: 90 dB at 60 Hz
    - Best 50 Hz rejection: 80 dB at 50 Hz
    - High resolution: 65 dB at 50 Hz and 60 Hz

Input mode ranges		
Input mode	**Nominal range(s)**	**Actual range(s)**
Voltage	±60 V, ±15 V, ±4 V, ±1 V, ±125 mV	±60 V, ±15 V, ±4 V, ±1 V, ±125 mV
Current	±25 mA	±25 mA
Thermocouple	±125 mV	±125 mV
4-wire and 2-wire resistance	10 kΩ, 1 kΩ	10.5 kΩ, 1.05 kΩ
4-wire and 3-wire RTD	Pt 1000, Pt 100	5.05 kΩ, 505 Ω
Quarter-bridge	350 Ω, 120 Ω	390 Ω, 150 Ω
Half-bridge	±500 mV/V	±500 mV/V
Full-bridge	±62.5 mV/V, ±7.8 mV/V	±62.5 mV/V, ±7.8125 mV/V

Accuracy		
Mode, range	**Gain error (% of reading)**	**Offset error (ppm of range)**
	Typical 25 ºC, ±5 ºC, –40 to 70 ºC max	
Voltage, ±60 V	±0.3, ±0.4	±20, ±50
Voltage, ±15 V	±0.3, ±0.4	±60, ±180
Voltage, ±4 V	±0.3, ±0.4	±240, ±720
Voltage, ±1 V	±0.1, ±0.18	±15, ±45
Voltage/Thermocouple, ±125 mV	±0.1, ±0.18	±120, ±360
Current, ±25 mA	±0.1, ±0.6	±30, ±100
4-wire and 2-wire resistance, 10 kΩ*	±0.1, ±0.5	±120, ±320
4-wire and 2-wire resistance, 1 kΩ*	±0.1, ±0.5	±1200, ±3200
4-wire and 3-wire RTD, Pt 1000	±0.1, ±0.5	±240, ±640
4-wire and 3-wire RTD, Pt 100	±0.1, ±0.5	±2400, ±6400
Quarter-bridge, 350 Ω	±0.1, ±0.5	±2400, ±6400
Quarter-bridge, 120 Ω	±0.1, ±0.5	±2400, ±6400
Half-bridge, ±500 mV/V	±0.03, ±0.07	±300, ±450
Full-bridge, ±62.5 mV/V	±0.03, ±0.08	±300, ±1000
Full-bridge, ±7.8 mV/V	±0.03, ±0.08	±2200, ±8000
CJC sensor accuracy		±1 ºC, typical

*2-wire resistance mode accuracy depends on the lead wire resistance. This table assumes 0 Ω of lead wire resistance.

Stability		
Mode, range	**Gain drift (ppm of reading/ºC)**	**Offset drift (ppm of reading/ºC)**
Voltage, ±60 V	±20	±0.2
Voltage, ±15 V	±20	±0.8
Voltage, ±4 V	±20	±3.2
Voltage, ±1 V	±10	±0.2
Voltage/thermocouple, ±125 mV ±	±10	±1.6
Current, ±25 mA	±15	±0.4
4-wire and 2-wire resistance, 10 kΩ	±15	±3
4-wire and 2-wire resistance, 1 kΩ	±15	±30
4-wire and 3-wire RTD, Pt 1000	±15	±6
4-wire and 3-wire RTD, Pt 100	±15	±60
Quarter-bridge, 350 Ω	±15	±120
Quarter-bridge, 120 Ω	±15	±240
Half-bridge, ±500 mV/V	±3	±20
Full-bridge, ±62.5 mV/V	±3	±20
Full-bridge, ±7.8 mV/V	±3	±20

Input Noise				
Mode, range	**Conversion time**			
	High speed	**Best 60 Hz rej.**	**Best 50 Hz rej.**	**High resolution**
Voltage, ±60 V	7.6	1.3	1.3	0.5
Voltage, ±15 V	10.8	1.9	1.9	0.7
Voltage, ±4 V	10.8	2.7	2.7	1.3
Voltage, ±1 V	7.6	1.3	1.3	0.5

Input Noise				
Mode, range	**Conversion time**			
	High speed	**Best 60 Hz rej.**	**Best 50 Hz rej.**	**High resolution**
Voltage/thermocouple, ±125 mV ±	10.8	1.9	1.9	1.0
Current, ±25 mA	10.8	1.9	1.9	1.0
4-wire and 2-wire resistance, 10 kΩ	4.1	1.3	0.8	0.3
4-wire and 2-wire resistance, 1 kΩ	7.1	1.8	1.2	0.7
4-wire and 3-wire RTD, Pt 1000	7.6	1.7	1.1	0.4
4-wire and 3-wire RTD, Pt 100	10.8	1.9	1.9	0.9
Quarter-bridge, 350 Ω	5.4	1.0	1.0	0.7
Quarter-bridge, 120 Ω	5.4	1.0	1.0	0.7
Half-bridge, ±500 mV/V	3.8	0.5	0.5	0.2
Full-bridge, ±62.5 mV/V	5.4	1.0	1.0	0.8
Full-bridge, ±7.8 mV/V	30	4.7	4.7	2.3

Excitation level		
Measurement conditions	**Load resistance (Ω)**	**Excitation (V)**
Half-bridge	700	2.5
	240	2.0
Full-bridge	350	2.7
	120	2.2

Resistance, RTD, and quarter-bridge mode excitation level	
Load resistance (Ω)	**Excitation (V)**
120	50
350	150
1,000	430
10,000	2,200

Digital input/output

- Digital type: CMOS (Schmitt trigger) input / open drain output
- Number of I/O: One port of 4 bits
- Configuration: Bit configurable for input or output
- Power on conditions: Power on reset is input mode
- Pull-up configuration: Each bit is pulled up to 5 V with a 100 kΩ resistor
- Input frequency range: DC – 10 kHz. Applying a signal with a higher frequency will adversely affect system performance and could cause errors.
- Input high voltage threshold: 1.9 V min, 3.6 V max
- Input low voltage threshold: 2.3 V max, 1.0 V min
- Schmitt trigger hysteresis: 0.6 V min, 1.7 V max

- Input high voltage limit: 15 V absolute max
- Input low voltage limit: –0.5 V absolute min, 0 V recommended min
- Output voltage range: 0 V to +5 V (no external pull up resistor), 0 V to +15 V max**
- Output off state leakage current: 10 µA max
- Output sink current capability: 100 mA max (continuous) per output pin
- Output transistor on-resistance (drain to source): 1.6 Ω

*** The external pull-up resistor is connected between the digital output bit and external supply. Adding an external pull-up resistor connects it in parallel with the internal 100 kΩ pull-up resistor of that particular digital input/output bit to the internal 5 V supply.*

Network

- Ethernet type: 100 Base-TX, 10 Base-T
- Communication rates: 10/100 Mbps, auto-negotiated
- Connector: RJ-45, 8 position
- Cable length: 3 meters (9.84 feet) max
- Additional parameters: HP Auto-MDIX support

Network configuration

- Network IP configuration: DHCP, link-local, static DHCP may be disabled by the user and a static IP address assigned. If DHCP is enabled but is unsuccessful at obtaining an IP address the device will fall back to link-local and request the IP address 169.254.100.100.
- Network device name: The name used for detecting the device using mDNS (zero-conf). This name may be changed using the web interface.
- Network name publication: By mDNS
- User accounts: *admin* and *share*. These accounts are case-sensitive and cannot be changed using the web interface.

Factory default settings

- Factory default IP address: 192.168.0.101
- Factory default subnet mask: 255.255.255.0
- Factory default Gateway: 192.168.0.1
- Factory default DHCP setting: DHCP + link-local enabled
- Factory default password for admin account: *admin*. Passwords are case sensitive and can be changed using the web interface.
- Factory default password for share account: *share*. Passwords are case sensitive and can be changed using the web interface.
- Factory default device name: webdaq-xxxxxx, where xxxxxx is the last 6 digits of the MAC address (printed on the label on the underside of the device).
- **Note**: When factory defaults are restored, any shared folders or mapped drives are reset.

USB ports

- Number of USB ports: Two, for connection to a mass storage device or approved WiFi adapter.
- USB device type: USB 2.0 (high-speed).
- Device compatibility: USB 1.1, USB 2.0, USB 3.0

SD memory card slot

- Memory card type: SD, SDHC, SDXC, MMC, TransFlash.
- File systems supported: FAT16, FAT32, exFAT, ext2/3/4, NTFS.

Push buttons

- Power (POWER):
  - W1 jumper installed (factory default): Turns device on or off.
  - W1 jumper removed (device on when power is applied): Reboots the device.
- Function (FUNC): Unmounts external media, or starts/stops an acquisition.
- Reset (CONFIG RESET): Restores network and alarm settings to factory default values.

Ground connector

- Connector port for the #6-32 ground screw.

Power

- Input voltage: Center positive. 6 VDC to 16 VDC.
- Input wattage: 4 W typ, 10 W max.
- External AC adapter: 9 VDC, 2.2 amps, 110 VAC to 240 VAC input range.
- Battery: One 3 V button cell lithium battery required to maintain time of day clock when device is powered off. Replace with Panasonic BR-1225 3V lithium coin cell battery or equivalent. See user's guide for the replacement procedure.
- **Note**: refer to the user's guide for behavior when jumper W1 is installed or removed.

Shock

- Operating shock: 30 g, 11 ms half sine; 18 shocks at 6 orientations.

Mechanical

- Dimensions (L × W × H): 158.8 × 146.1 × 38.1 mm (6.25 × 5.75 × 1.50 in.).
  - With BNC connectors: 178.8 × 146.1 × 38.1 mm (7.04 × 5.75 × 1.50 in.)
- Weight: 680 g (1.5 lb).

Environmental

- Temperature range: 0 °C to 50 °C max (Operating), –40 °C to 85 °C (Storage).
- Ingress protection: IP 30.
- Humidity: 10- 90% RH, noncondensing (Operating), 5-95% RH (Storage).
- Maximum altitude: 2,000 m (6,562 ft)
- Pollution degree: 2
- The WebDAQ 904 is intended for indoor use only.

Order Information

Hardware

Part No.	Description
6069-410-007-1	WebDAQ 904: Internet enabled universal input logger with four analog inputs, simultaneous sampling, support for multiple measurement types, embedded operating system and web server; includes the ATS018T-W090V power supply with USA, UK, and Europe plugs.

Accessories

Part No.	Description
6069-240-005	ACC-205: DIN-rail mounting kit; requires the ACC-404 panel/ wall mounting kit.
6069-240-006	ACC-404: Panel/wall mounting kit; use with the ACC-205 to mount on a DIN rail.
6069-240-000	J Type Thermocouple (Length: 1 Meter)
6069-240-001	J Type Thermocouple (Length: 2 Meter)
6069-240-004	T Type Thermocouple (Length: 2 Meter)
6069-240-002	K Type Thermocouple (Length: 1 Meter)
6069-240-003	K Type Thermocouple (Length: 2 Meter)

WebDAQ Series

6069-410-005-1	WebDAQ 316: Internet enabled data logger with 16 thermocouple inputs and 4 DIO lines, embedded operating system and web server; includes the ATS018T-W090V power supply with USA, UK, and Europe plugs.

6069-410-006-1

WebDAQ 504: Internet enabled vibration and acoustic logger with four analog inputs, simultaneous sampling, IEPE signal conditioning, embedded operating system and web server; includes the ATS018T-W090V power supply with USA, UK, and Europe plugs.

About Digilent

Digilent is committed to making engineering accessible, offering competitive pricing, portable products, and comprehensive documentation. Specializing in test and measurement devices, Xilinx-based FPGA development boards, a variety of expansion modules for customizing applications, and robust options for DAQ and datalogging, our design philosophy champions your creativity. By emphasizing speed, modularity, customizability, and world-class support, we provide the building blocks while you bring the brilliance.