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lx nav
DAQ Plus Universal
Analogue Data
Acquisition Device

lxnav DAQ Plus Universal Analogue Data Acquisition Device Instruction Manual

Contents

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Ixiv DAQ Plus Universal Analogue Data Acquisition Device

Specifications

- **Product Name:** DAQ+
- **Version:** 1.00
- **Release Date:** February 2025
- **Manufacturer: L**XNAV
- **Website: www.lxnav.com**

Installation Manual

- **Important Notices**

  The LXNAV DAQ+ system is designed for monitoring auxiliary systems of aircraft. The pilot's responsibility is to ensure compliance with the aircraft flight manual and applicable airworthiness standards. A Yellow triangle indicates important sections, red triangles denote critical procedures, and bulb icons provide useful hints.
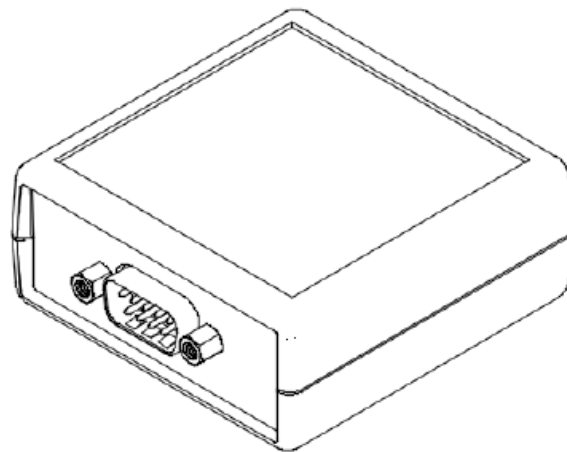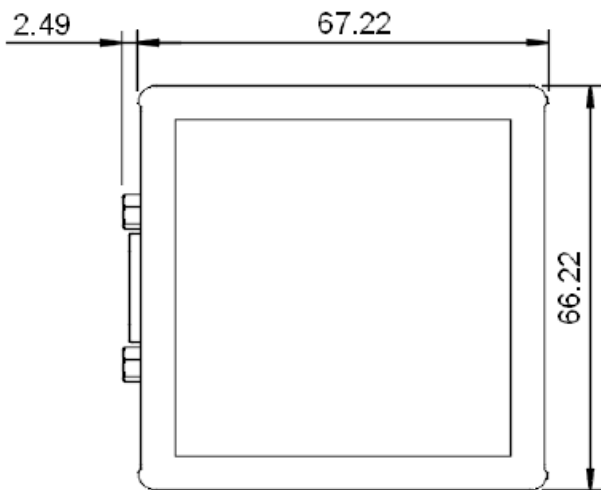
- **Limited Warranty**

  The warranty is exclusive and may vary by state. Contact a local LXNAV dealer or LXNAV directly for warranty service.

- **Packing List**

  No specific details are provided in the manual.

Dimensions

No specific details are provided in the manual.

- **Overview**

  The DAQ+ system features a built-in Bluetooth antenna for communication with battery monitors. It is recommended to install the DAQ+ behind the pilot seat if a battery monitor is installed in the tail battery.

- **Connections**

  The front side features a D-Sub 9-pin connector for RS485 bus connection and power supply. The left side has a Wi-Fi button for configuration and updates. External sensors are connected via a 12-pin terminal block connector on the backside.

Installation

Inside DAQ+ a Bluetooth antenna is built-in which is used to communicate with battery monitors. If a battery monitor is also installed in the tail battery, it is recommended to install DAQ+ behind the pilot seat.

Wi-Fi button   RS485 bus
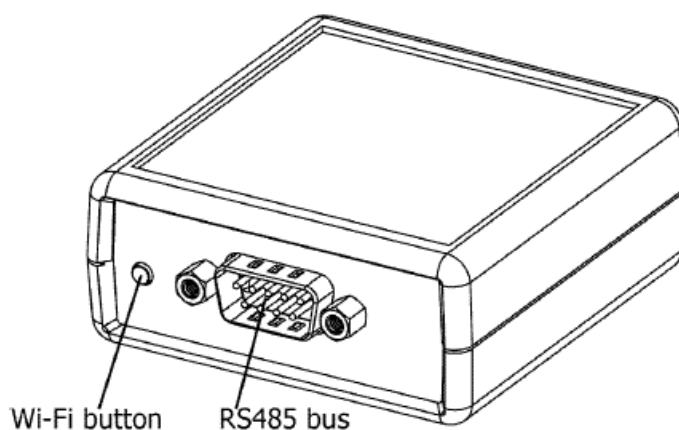
On the front side, you will find a D-Sub 9-pin connector, which connects to the RS485 bus. Power is supplied via this connector when the main device is powered on. On the left side is a Wi-Fi button, which may be used for configuration and update of the DAQ+ device. See Chapter 0 for more details, on how to use Wi-Fi. External sensors are connected on the back side via 12 12-pin terminal block connector.
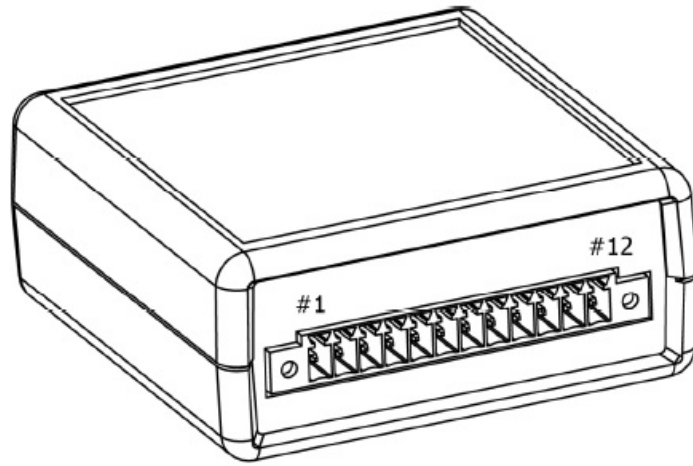
Pin assignment of the terminal block connector is the following (from left to right):

1. +12V Supply for sensors (output)
2. GND
3. Input 1 (AIN1- input)
4. GND
5. Input 2 (AIN2- input)
6. GND
7. Input 3 (AIN3- input)
8. GND
9. Input 4 (AIN4- input)
10. GND
11. Not in use (Do not connect)
12. GND
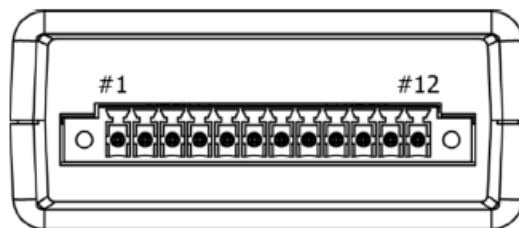
Connecting Sensors
Up to four voltage sensors can be connected to the DAQ+. Configure the sensors on the main device or through the web interface as described in Chapter 5.1 of the manual.

Important Notices

- The LXNAV DAQ+ system is designed for monitoring auxiliary systems of aircraft. All information is presented for reference only. It is ultimately the pilot's responsibility to ensure the aircraft is being flown by the manufacturer's aircraft flight manual. The DAQ+ must be installed by applicable airworthiness standards according to the country of registration of the aircraft.
- Information in this document is subject to change without notice. LXNAV reserves the right to change or improve its products and to make changes in the content of this material without obligation to notify any person

or organization of such changes or improvements.

- A Yellow triangle is shown for parts of the manual that should be read carefully and are important for operating the LXNAV DAQ+ system.
- Notes with a red triangle describe procedures that are critical and may result in loss of data or any other critical situation. A bulb icon is shown when a useful hint is provided to the reader.

Limited Warranty

This LXNAV DAQ+ product is warranted to be free from defects in materials or workmanship for two years from the date of purchase. Within this period, LXNAV will, at its sole option, repair or replace any components that fail in normal use. Such repairs or replacements will be made at no charge to the customer for parts and labor, the customer shall be responsible for any transportation cost. This warranty does not cover failures due to abuse, misuse, accident, or unauthorized alterations or repairs. THE WARRANTIES AND REMEDIES CONTAINED HEREIN ARE EXCLUSIVE AND INSTEAD OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED OR STATUTORY, INCLUDING ANY LIABILITY ARISING UNDER ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, STATUTORY OR OTHERWISE. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, WHICH MAY VARY FROM STATE TO STATE.

IN NO EVENT SHALL LXNAV BE LIABLE FOR ANY INCIDENTAL, SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES, WHETHER RESULTING FROM THE USE, MISUSE, OR INABILITY TO USE THIS PRODUCT OR FROM DEFECTS IN THE PRODUCT. Some states do not allow the exclusion of incidental or consequential damages, so the above limitations may not apply to you. LXNAV retains the exclusive right to repair or replace the unit or software, or to offer a full refund of the purchase price, at its sole discretion. SUCH REMEDY SHALL BE YOUR SOLE AND EXCLUSIVE REMEDY FOR ANY BREACH OF WARRANTY.
To obtain warranty service, contact your local LXNAV dealer or contact LXNAV directly.

Packing list

- 1x DAQ+
- 1x Terminal block plug 12pin
- RS485 bridge cable (30cm)

Connecting sensors
The picture below illustrates how to connect sensors. Up to four voltage sensors can be connected to DAQ+. Once sensors are connected you can configure them directly on your main device or through a web-interface, which is described in Chapter 5.1
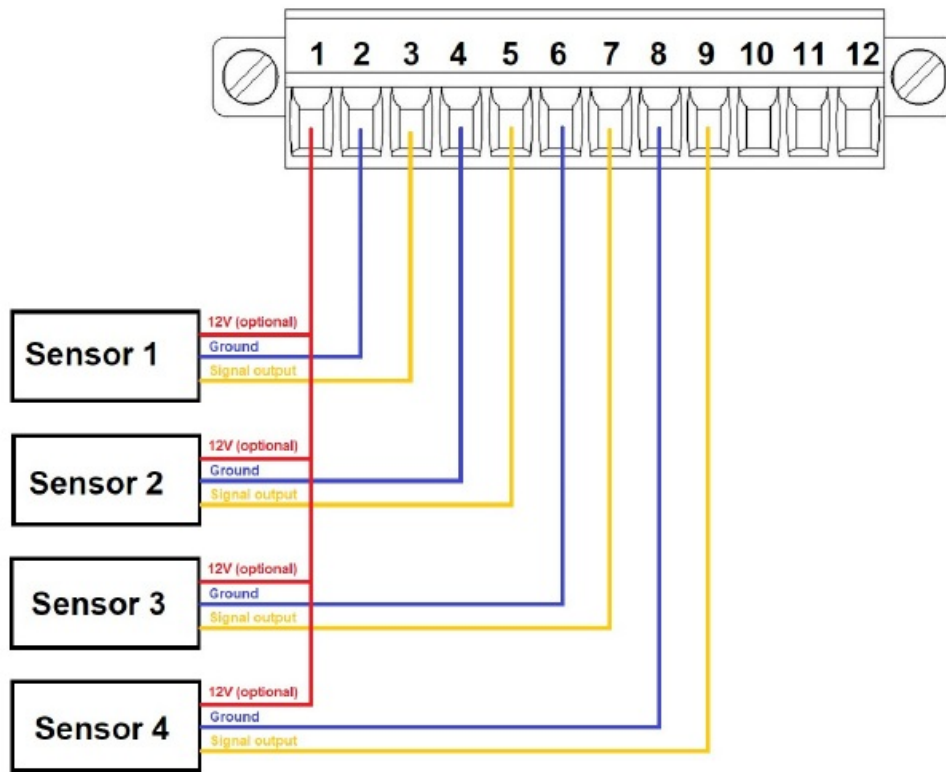
The maximum input voltage for an analog input is 12.0V on any of the four channels.

DAQ+ supports three different types of sensors: voltage sensors, current sensors, and resistive sensors. The type of sensor can be configured via integrated Wi-Fi or on LX 90xx or LX 80xx instruments. See further chapters on how to do it. Examples of different types of sensors are described in Chapter 6.

Connecting battery monitor
The battery monitor connects to DAQ+ via an integrated Bluetooth receiver. There are no cables needed for this connection. The procedure for pairing the two devices is described in Chapter 5.2 or the Battery monitor manual,

Configuration

Configuring sensors
On the main device open the Setup -> Hardware -> Analog inputs dialog. Select the analog input, you would like to configure and press the SETUP button.
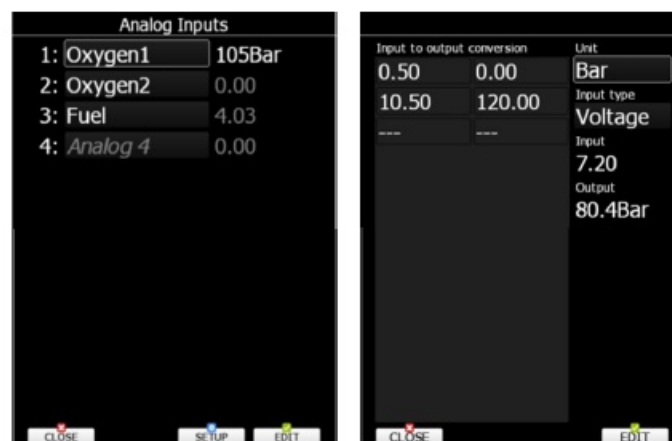
In the left list, you should enter at least two rows that will map analog input values in output value. On the right displayed units are entered, type of input sensor, current input value, and current output value are shown.

Configuring battery monitor

Connect the battery monitor to your battery. Please refer to the manual for the battery monitor. Make sure that the battery is not connected to any telephone. On the main device open Setup -> Hardware -> Battey Types. In the bottom part of the screen, the message No batteries found should be seen.

Press the button on the battery monitor for a few seconds. All LEDs should lit blue now. You can press the button on all batteries; you would like to pair with DAQ+. Press the SCAN butt the the on main devices. Very shortly a list of paired batteries will appear on the screen. Select a battery and press EDIT to modify and see details about this battery.

Using an internal Wi-Fi hotspot

Inside DAQ+ there is also a Wi-Fi hotspot, which can be used to do some basic settings and to perform updates on the device. When a button on the front side of the housing is pressed, the Wi-Fi hotspot is enabled. Scan the QR code on your DAQ+ with your phone and the configuration page will open on your phone browser. Alternatively, you can also select a Wi-Fi hotspot from the list. The name of the hotspot will be LX DAQ+ – 1, where digirepresentent the serial number of your DAQ+. Password is written on the DAQ+ label as well.
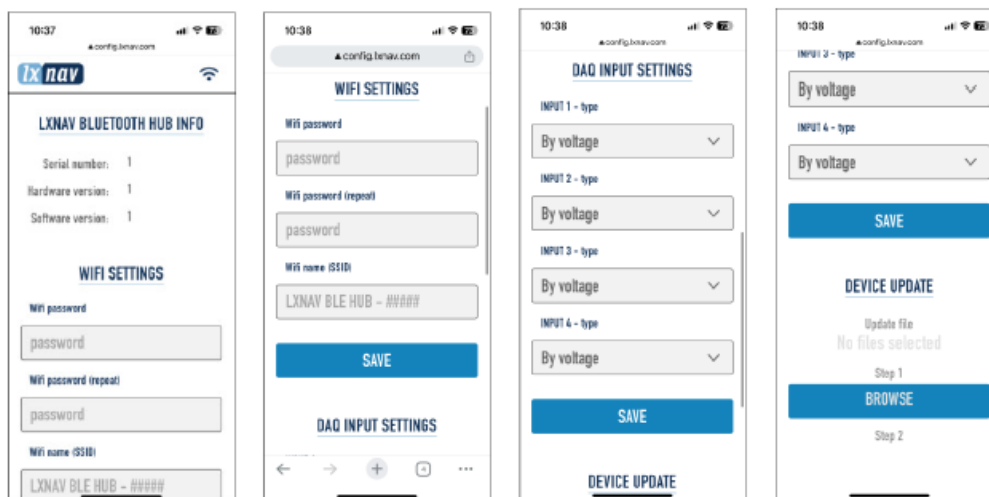

Please note once you change your password and/or SSID name, the QR code will not work anymore.

In the third section, you can set up the input type, which is also set on the LX90xx device. In the future, we might add other settings as well. Use the last section to update the DAQ+ device using the new firmware file, which you can download from our webpage **www.lxnav.com**, or was sent to you with an email.

Update of DAQ+ can also be done through LX90xx device, however, due to large update files, it is much slower than via Wi-Fi hotspot.

Sensors examples

Oxygen bottle sensor concept with WIKA MH-2

Pressure transmitter model MH-2
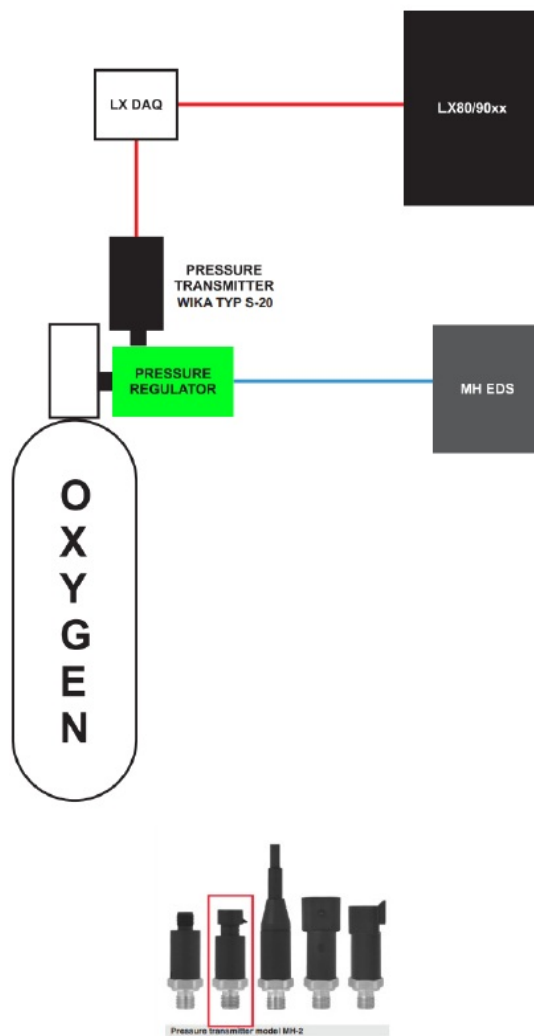
Measuring ranges

Gauge pressure in bar							
Measuring range	0 ... 40	0 ... 60	0 ... 100	0 ... 160	0 ... 250	0 ... 400	0 ... 600
Overload safety	80	120	200	320	500	800	1,200
Burst pressure	400	550	800	1,000	1,200	1,700	2,400

Measuring ranges < 40 bar on request

Vacuum tightness
Yes

Output signals

Signal type	Signal
Current (2-wire)	4 ... 20 mA
Voltage (3-wire)	DC 0 ... 10 V
	DC 1 ... 5 V
Ratiometric	DC 0.5 ... 4.5 V

Other output signals available on request

Load in Ω
- 4 ... 20 mA: ≤ (power supply - 10 V) / 0.02 A
- DC 0 ... 10 V: > 5 k
- DC 1 ... 5 V: > 2.5 k
- DC 0.5 ... 4.5 V: > 4.5 k

Voltage supply

Power supply
The power supply depends on the selected output signal
- 4 ... 20 mA: DC 10 ...36 V
- DC 0 ... 10 V: DC 14 ... 36 V
- DC 1 ... 5 V: DC 8 ... 36 V
- DC 0.5 ... 4.5 V: DC 4.5 ... 5.5 V

Accuracy data

- **Accuracy at reference conditions**
  - Maximum: ≤ #1 % of span
  - Including non-linearity, hysteresis, zero offset, and end value deviation (corresponds to measured error per IEC 61298-2).
- **Non-linearity (per IEC 61298-2)**
  - Maximum: ≤ $0.4% of span BFSL
  - Typical: ≤ $0.25 % of span BFSL
- **Temperature error at 0 … 80 °C**
  - Mean temperature coefficient of zero point:
  - Typical ≤ #0,15% of span/10K
  - Mean temperature coefficient of span:
  - Typical ≤ #0,15 % of span/10K
- **Settling time**
  - ≤2 ms
- **Long-term stability**

○ Typical: ≤ #0.2% of span/year

Operating conditions

Ingress protection (per IEC 60529)
The ingress protection depends on the type of electrical connection.

- Circular connector M12 x 1 (4-pin):   IP67
- Metri-Pack series 150 (3-pin):   IP67
- AMP Superseal 1.5 (3-pin):   IP67
- AMP Micro Quadlock (3-pin):   IP67
- Deutsch DT04-3P (3-pin):   IP67
- Cable outlet: IP69K

The stated ingress protection only applies when plugged in using mating connectors that have the appropriate ingress protection.

- **Vibration resistance**

  20 g (per IEC 60068-2-6, under resonance)
- **Shock resistance**

  500 g (per IEC 60068-2-27, mechanical)

Temperatures
Permissible temperature ranges for:

- Ambient: -40 … +100 °C
- Medium: -40 ….. +125 °C
- Storage: -40 … +100 °C

Process connections

Process connection per	Thread size
DIN 3852-E	G ¼ A
	M14 x 1.5
ANSI/ASME B1.20.1	¼ NPT
SAE J514 Fig.34B	7/16-20 UNF-2A

Sealings

Thread size	Standard	Option
G ¼ A	NBR	FKM
7/16-20 UNF-2A	O-ring BOSS from FKM	-

The sealings listed under "Standard" are included in the delivery.

CDS system

- All process connections are available with the CDS system.
- The diameter of the pressure channel is reduced to counteract pressure spikes and cavitation (see Fig. 1).
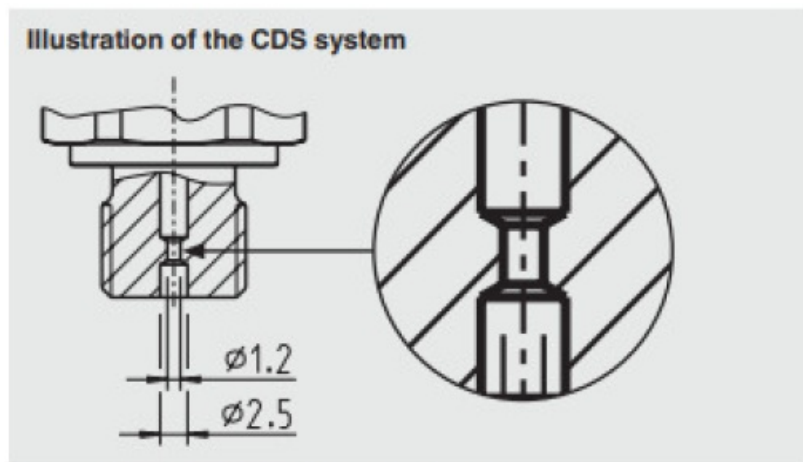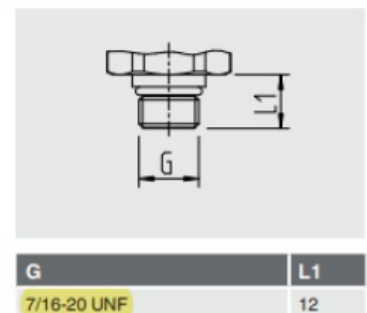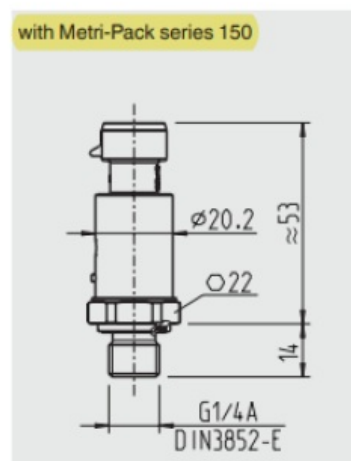
Fig. 1: Reduced diameter of the pressure channel

Materials

- **Wetted parts**

  Stainless steel
- **Non-wetted parts**

  Highly resistant glass-fibre reinforced plastic (PBT)

Snips have been taken from the Wika MH-2 datasheet (WIKA Alexander Wiegand SE & Co. KG)

Revision history

Rev	Date	Comment
1	February 2025	Initial release based on DAQ manual Rev #3
2	February 2025	Added bridge cable to packing list

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Frequently Asked Questions

Q: How many voltage sensors can be connected to the DAQ+?
A: Up to four voltage sensors can be connected to the DAQ+.

Documents / Resources

INSTALLATION MANUAL **DAQ+**	**Ixnav DAQ Plus Universal Analogue Data Acquisition Device** [pdf] Instruction Manual DAQ Plus Universal Analogue Data Acquisition Device, DAQ Plus, Universal Analogue Data Acquisition Device, Analogue Data Acquisition Device, Data Acquisition Device, Acquisition Device

References

- **User Manual**