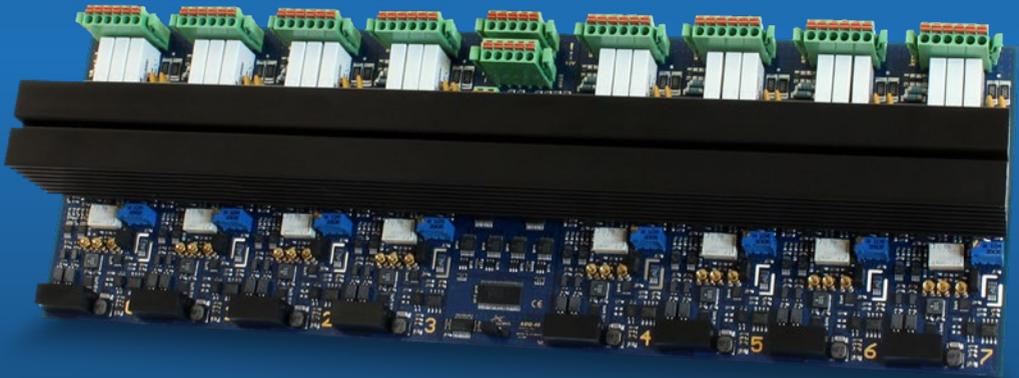




# ADQ-42/44/48 Manual

Rev. 1.0 EN



Programmable electronic load/current sink

# Imprint

Manual ADQ-42/44/48  
Rev. 1.0

## Manufacturer and support

ALLNET® and ALLDAQ® are registered trademarks of ALLNET® GmbH Computersysteme. For questions, problems and product information please contact the manufacturer directly:

### **ALLNET® GmbH Computersysteme**

Division ALLDAQ  
Maistrasse 2  
D-82110 Germering

### **Support**

E-Mail: [support@alldaq.com](mailto:support@alldaq.com)  
Phone: +49 (0)89 894 222 – 474  
Fax: +49 (0)89 894 222 – 33  
Internet: [www.alldaq.com/support](http://www.alldaq.com/support)

© Copyright 2020 ALLNET GmbH Computersysteme. All rights reserved.

All information contained in this manual has been compiled with the greatest care and to the best of our knowledge. Nevertheless, errors cannot be completely ruled out. Specifications and contents of this manual are subject to change without notice.

We are always grateful for the notification of any errors.

Mentioned trademarks are registered trademarks of the respective companies.

# Content

<b>1. Introduction</b>	<b>4</b>
1.1 Scope of delivery	4
1.2 Safety instructions	5
1.3 Installation and assembly site	6
1.4 Brief description	6
1.5 Control	6
<b>2. Start of operation</b>	<b>7</b>
2.1 Connection	7
<b>3. Function groups</b>	<b>8</b>
3.1 Block diagram	8
3.2 LED display status	8
3.3 Control options	9
3.3.1 ALLDAQ I2C	9
3.3.2 Integrated potentiometer	10
3.3.3 External control line	10
<b>4. Pin assignments</b>	<b>11</b>
4.1 Connector positions	11
4.2 Pin assignments	12
4.2.1 Würth 5-pin	12
4.2.2 Würth 2-pin	12
4.2.3 Würth 6-pin	12
4.2.4 MMCX	13
<b>5. Annex</b>	<b>14</b>
5.1 Specifications	14
5.2 Manufacturer and support	16
5.3 Packaging ordinance	16
5.4 Recycling advice and RoHS conformity	16
5.5 CE identification	17
5.6 Warranty	17

# 1. Introduction

Please check the packaging and contents for damage and completeness before commissioning. Should any defects occur, please inform us immediately.

- Does anything on the packaging indicate that anything was damaged during transport?
- Are there any signs of use on the device?

Under no circumstances may you operate the device if it is damaged. If in doubt, contact our technical service department.

Please read this manual carefully before installing the appliance!

## 1.1 Scope of delivery

- ALLDAQ card of the ADQ-40 series incl. mating connector

## 1.2 Safety instructions

### Be sure to observe the following instructions:

- Never expose the appliance to direct sunlight when operating.
- Never operate the appliance near heat sources.
- Protect the device from moisture, dust, liquids and vapours.
- Do not use the device in damp rooms and under no circumstances in potentially explosive areas.
- Repairs may only be carried out by trained, authorized personnel.
- Please observe the installation regulations and all relevant standards (including VDE standards) when commissioning the instrument, especially when operating with voltages greater than 42 V.
- We recommend to always connect unused inputs to the corresponding reference ground to avoid crosstalk between the input channels.
- Always disconnect your field wiring from the voltage source before you make or break cable connections to the card.
- When handling the card, make sure that no static discharge can occur through the device. Follow standard ESD protection measures.
- Never connect the devices to live parts, especially not to mains voltage.
- Precautions to avoid unpredictable misuse must be taken by the user.

**ALLNET® GmbH Computersysteme is not liable for improper use and resulting damage.**



**Make sure that the unit is very well ventilated, as the cooler can become as hot as 170°C at full load.**

## 1.3 Installation and assembly site

The ADQ-40 series is designed for industrial use. The board may only be used in dry rooms. Ensure adequate ventilation. Make sure that the connection cables are securely attached.

## 1.4 Brief description

The programmable current sink of the ADQ-40 series is suitable for use in industrial automation and measurement technology. The board is supplied in a trough, which allows mounting on a HUT-rail according to EN50022. Load programming can be implemented either by digital I2C data bus, by external analog control signal or by integrated potentiometer.

Depending on the version, 2/4/8 potential-free sink channels are available.

### Features:

- Potential-free sink channels (parallel connectable)
- Isolating relay in main current path
- AUX paths (switchable base load 1200hm) secured with polyfuse
- Temperature emergency shutdown per channel individually
- Voltage (Usense and Usense) up to 20.48V (opt. 40.96V)
- Max. 25W Continuous ( $Usenke \times Isenke \leq 25W$ ; max Isenke = 5A)
- Max. 100W peak power (max 5sec.)
- Internal current measurement from Isenk is measured via a 20mO SHunt
- MMCX connector for external measurement of Usenke and Isenke (over 20mOhm shunt)
- Channel-specific alert function for sink, sink and temperature shutdown per channel
- Fan output (12V/1A) controllable by software
- Heat sink temperature readable via software

## 1.5 Control

- Buffered ALLDAQ I2C-BUS
- For control, the ADQ-151 is recommended as I2C master.

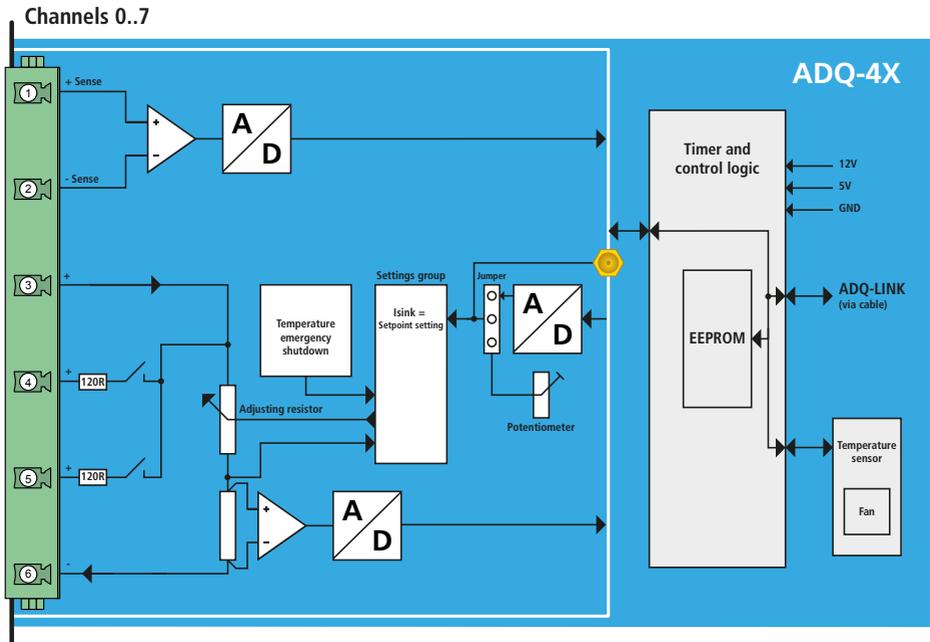
## **2. Start of operation**

### **2.1 Connection**

The box should be handled with care to ensure that the device is not damaged by electrostatic discharge (ESD), mechanical stress or unauthorized current surges. Precautions should also be taken to avoid electric shock. Follow standard ESD protection measures.

### 3. Function groups

#### 3.1 Block diagram

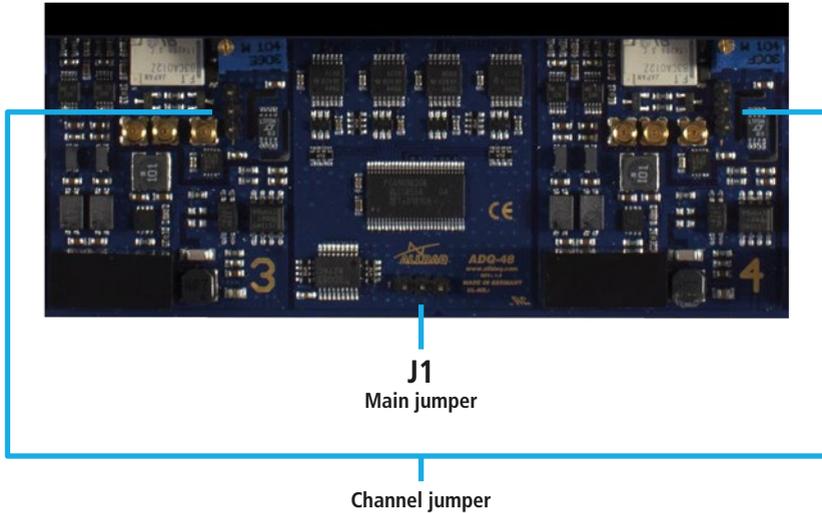


#### 3.2 LED display status

- Green = 5V supply
- Blue = 12V supply
- Red = Relay status

### 3.3 Control options

When switching to a manual control option, make sure that the main relays are switched via jumper J1 before embossing the current or commissioning. If this is not done, there is a risk of contact fire.



#### 3.3.1 ALLDAQ I2C

Control via the buffered ALLDAQ I2C bus is the recommended method of control for the ADQ-40 series. To do this, use the ADQ-4X app from the ALLDAQ driver. In addition to this APP, control via an API library is also possible. It allows full control over all functions of the ADQ-40 series.

To activate this option, jumper J1 must be in the left position and the channel jumper must be in the lower position.

### 3.3.2 Integrated potentiometer

With the analog control of the ADQ-40 series via the integrated potentiometers, the range of functions is limited to the simple embossing of a current. The temperature emergency stop is also active to protect the hardware. All other functions cannot be operated in this control option.

To activate this option, the jumper J1 must be in the right position and the channel jumper in the upper position.

### 3.3.3 External control line

With analog control of the ADQ-40 series via an external control line, the range of functions is limited to the simple stamping of a current. The temperature emergency shutdown remains active to protect the hardware. It is also possible to measure the shunt voltage and the sense voltage via external measuring devices. All other functions are not available in this control option.

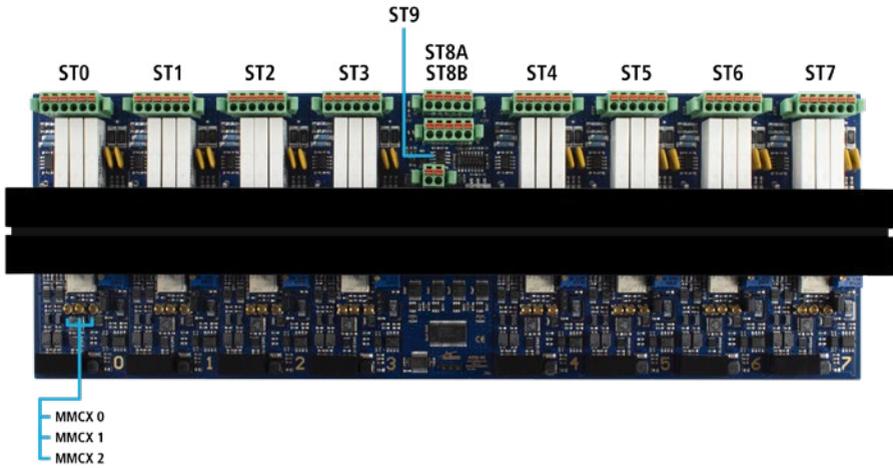
The control voltage is in the range of 0V - 4.096V. The sense current results from the following calculation:

$$U_{\text{control}} = 2.048 + 0.00038 \cdot \text{Sink (sink in mA)}$$

To activate this option, jumper J1 must be in the right position and the channel jumper must be removed.

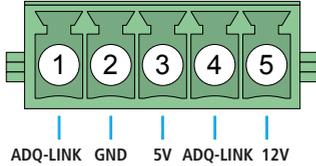
## 4. Pinn assignments

### 4.1 Connector positions



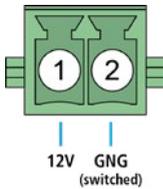
## 4.2 Pin assignments

### 4.2.1 Würth 5-pin



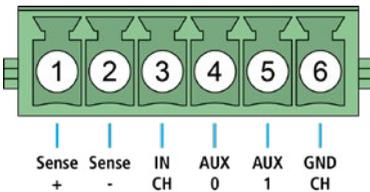
Pos	ST8A / ST8B
1	ADQ-LINK
2	GND
3	5V
4	ADQ-LINK
5	12V

### 4.2.2 Würth 2-pin



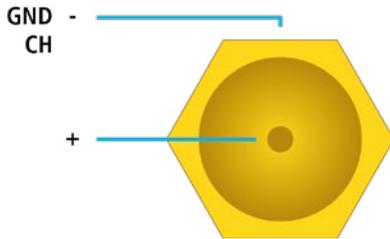
Pos	ST9
1	Fan 12V
2	Fan GND (switched)

### 4.2.3 Würth 6-pin



Pos	ST0 ... ST7
1	Sense +
2	Sense -
3	IN_CH
4	AUX 0
5	AUX 1
6	GND_CH

## 4.2.4 MMCX



Pos	MMCX0	MMCX1	MMCX2
1	Shunt_CH -	Sense_CH -	GND_CH
2	Shunt_CH +	Sense_CH +	Ext_Analog_Control

## 5. Annex

### 5.1 Specifications

Element	Condition	Specification
Channels		2/4/8 potential-free current measuring channels
Resolution/Sampling rate		16 bit / 7kHz
Shunt-Type		20mΩ precision shunt
Isenke measuring ranges		0 mA – 4000mA (125uA - 1 LSB)
Usense measuring ranges		0V – 20.48V (625uV - 1 LSB)
Power rating	constant strain max. 5 s after min. 10 s pause	25W 100W
Isolation voltage	Channel to PC ground Channel to channel	500 VDC / 500 VACeff (60Hz) 500 VDC / 500 VACeff (60Hz)
Total accuracy Isenke		max. ±0.02% at full deflection
Isenk as a function of the T <sub>case</sub> temperature (temperature drift)	2A < Isenk < 4A 30° < t <sub>case</sub> < 150° t <sub>case</sub> = temp. Mosfet	max. 0.6%
Input impedance Usense		3MΩ
Ground reference (sink)		Potential-separated channels (see pin assignment)
Ground reference (I2C interface)		GND of the control unit
Channel relay	Quantity/Type	3 normally open relays (SPST)/ channel, Type: Finder Series 34
	Contact material	silver/nickel
	Switching time	Response time max. 5 ms
		Release time max. 3 ms
	Switching cycles	min. 10.000.000 (mechanical)
	Switching current DC1	max. 6 A / 36 VDC, here max. 5 A due to maximum current of power measurement via INA226
Min. switching load	500mW (12V/10mA) must not be fallen below, whereby at 24V a minimum current of 21mA or at 10mA a minimum voltage of 50V should be given	

<b>Temperature range</b>	Operation	0..70 °C (standard), extended temperature range on request
<b>Humidity</b>	Operation	20%..55% (non-condensing)
	Storage	20%..55% (non-condensing) -40..100 °C
<b>Dimensions</b>	Top-hat rail according to DIN EN50022	ADQ-42: 105x120x75mm (LxWxH) ADQ-44: 175x120x75mm (LxWxH) ADQ-48: 315x120x75mm (LxWxH)
<b>Certifications</b>		EC Directive 2004/108/EC, Emission EN 55022, Interference immunity EN 50082-2, RoHS
<b>Manufacturer warranty</b>		36 months

## 5.2 Manufacturer and support

ALLNET® is a registered trademark of ALLNET® GmbH Computersysteme. For questions, problems and for product information of all kinds please contact the manufacturer directly:

ALLNET® GmbH Computersysteme  
Division ALLDAQ  
Maistraße 2, D-82110 Germering

E-mail: support@allda.com  
Phone: +49 (0)89 894 222 - 474  
Fax: +49 (0)89 894 222 - 33  
Internet: www.allda.com

## 5.3 Packaging ordinance

„Both manufacturers and distributors are basically obliged to ensure that sales packaging is taken back from the final consumer after use and is reused or recycled. (according to § 4 sentence 1 of the Packaging ordinance). If you as a customer have problems with the disposal of packaging and shipping materials, please write an e-mail to info@allnet.de.



## 5.4 Recycling advice and RoHS conformity

Please note that parts of the products of ALLNET® GmbH should be handed in at recycling centres or may not be disposed of with household waste (printed circuit boards, power supply unit, etc.).



ALLNET® products are manufactured RoHS compliant (RoHS = Restriction of the use of certain hazardous substances).





## 5.5 CE identification

The ADQ-SCU bears the CE marking.

This device meets the requirements of the EU Directive 2004/108/EC, Directive on Electromagnetic Compatibility and Mutual Recognition of Conformity. Conformity with the above directive is confirmed by the CE mark on the device.

## 5.6 Warranty

Within the warranty period, we will eliminate manufacturing and material defects free of charge. You will find the warranty conditions valid for your country on the homepage of your distributor. If you have any questions or problems concerning the application, you can reach us during our normal opening hours at the following telephone number +49 (0)89 894 222 - 474 or by e-mail to: [support@alldaq.com](mailto:support@alldaq.com).



ALLNET® GmbH Computersysteme  
Division ALLDAQ  
Maistrasse 2, D-82110 Germering  
E-Mail: [support@alldaq.com](mailto:support@alldaq.com)  
Phone: +49 (0)89 894 222 – 474  
Fax: +49 (0)89 894 222 – 33  
Internet: [www.alldaq.com](http://www.alldaq.com)

