

Installation and Quick Start Manual



Scope: The all-in-one Digital Amplifier DAD 141.1 is a universal device for any weighing, filling or loss-in-weight operation and for force measurements with strain gage sensors. The DAD141 is for DIN rail mount on TS35.

To guarantee the quality and legalize for trade the DAD141.1 is OIML R-76 approved and meets the MID E2 requirements to EMC.

The standard device includes all the communication facilities needed for industrial weighing, control and registration, i.e. analog current and voltage output Ethernet/Modbus, RS 422/485 and logic I/O's for direct control of valves or bars etc.

The device can be operated either by the front buttons, via RS 422/485 or the Ethernet interface.

2 isolated logic inputs and 3 isolated logic outputs makes complex control functions easy. The 3 logic outputs can be controlled externally, too.

The device features multi-drop communications capability and can be programmed via straightforward ASCII commands. Up to 32 DAD 141.1 on a single RS485 bus.

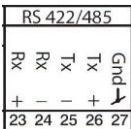
General Information

A detailed description is found in the manual **DAD 141.1 Rev. 2.2** and in the manual **DAD141.1 Modbus Communication Rev. 2.2**, or higher revisions. Available is the Windows software **DOP 4**, to be used for setup, calibration, data recording and graphical display of the measurements etc.

<http://www.haubac.com/haubac.asp?p1=167> For smart phone (OS Android) is the app **AnDOP** available for remote control via Bluetooth or WiFi of calibration, setup, data recording and graphical display of the measurements. <http://www.haubac.com/haubac.asp?p1=237>

The DAD 141.1 is a complete instrument with Type Approval Certificate, OIML R76 (Cert. DK0199-R76-422) for NAWIs, and Evaluation Certificates, OIML R51, R61 and R107 for AWIs.

Serial Interface Port RS422/485



The serial port supports two protocols:
 - ASCII (characters) and
 - Modbus RTU (binary data) with parity check.

The data format is the familiar 8/N/1 structure (8 data bits, no parity, 1 stop bit). Available baud rates are: 9600, 19200, 38400, 57600 or 115200 baud.

Ethernet Interface

The IP Address is **192.168.0.100** (default).
 Connection: RJ45, 10/100 Mbit/s, isolated.
 - Ethernet TCP/IP, protocol ASCII, TCP port 23 or
 - Modbus TCP, protocol binary data, TCP port 502.

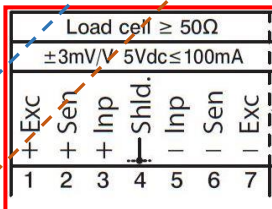


Housing & Terminals

Max
 Min T =
 e = d **M**
 -15°C/+55°C
 $\Delta U_{min} = 0,25\mu V/VSI$ n max = 10000
 OIML Type approval: DK 0199.422
 Made in EU by Hauch&Bach ApS
 Part no.
 141.10x.v.1.0x

Rear side: Scale information of application
M: Indicates that the instrument has been locally verified to be identical with the originally W&M approved device and therefore legal for trade.

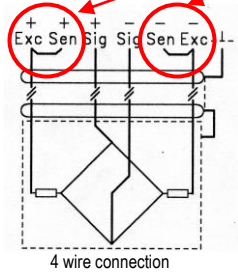
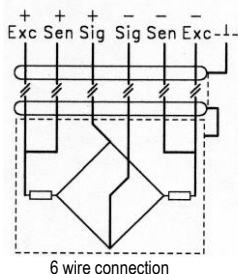
Terminals Load Cell Connection



Note: Pin 4 - Shld. - Shield of load cell cable

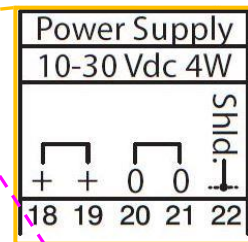
The load cell wiring should be made carefully before energizing to avoid damages to the amplifier and the load cells. The input resistance of all connected load cells must be $\geq 50 \Omega$ (ohms).

In case of using a load cell/scale with 4 wire cable, you have to short-circuit the pins 1 & 2 and 6 & 7.



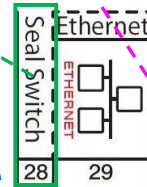
Note:
 Please don't shorten a 4 wire cable of a load cell, as the cable is part of the factory calibration (signal & temperature compensation).
 Keep the free leads and the mesh/shield connection (pig tail) shortest possible. The mesh/shield may not be connected inside the load cell. For some applications the protection against HF EMI may be improved if the mesh/shield is connected to the load cell body. The risk about doing this is to make an unwanted ground loop which tends to pick up LF EMI. The signal may be more stable connecting pin 4 and 22.

Terminals Power Supply



Note: Pin 22 - Shld. - is the chassis ground
 The Power supply 0 (pin 20/21) should be connected to the installation ground to avoid voltage potential at the device and for safety reasons. For most applications Shld. (pin 22) and 0 should be interconnected to achieve the best EMC performance. This may however make a ground loop with some of the connected devices like a PLC, printer or load cell which tend to pick up LF EMI.
 The RS485 signal Gnd. (pin 27) must always be connected to ground of the receiving device.

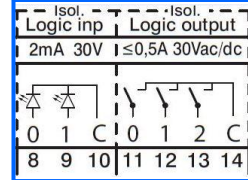
Seal Switch



Setup or changes of calibration can only be performed with an open seal switch (28). This means you have to remove the jumper with e.g. a tweezers. Changes / new calibration leads to a new value of TAC. To activate the new calibration, switch the device OFF and ON again.

Running a 'legal for trade' application, the jumper must be plugged in to the switch contacts and a seal is needed. A broken seal shows up changes of calibration, which are not allowed.

Logic Inputs & Outputs



Note:
 Pin 10 - C - common for the 'Low' signals of Logic input.
 Pin 14 - C - common for the 'Low' signals of Logic output.

The DAD 141.1 offers 2 isolated logic inputs and 3 isolated logic outputs. The 2 inputs can e.g. act as the ZERO or TARE button.

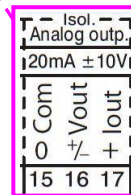
The 3 outputs act as switches for setpoints with hysteresis, switch behavior etc. Several bases can be used like net weight, peak weight or average value etc.

More detailed information to be found in the manual of DAD 141.1

Analog Outputs

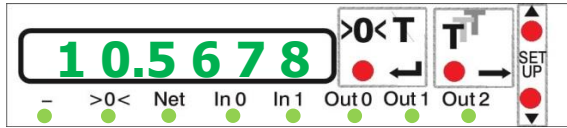
The DAD 141.1 offers 2 isolated analog outputs for current and voltage. For your application choose one of the six modes:

- 4 to 20mA or 0 to 20mA
- 0 to +5V or 0 to +10V
- 5 to +5V or -10 to +10V



Note: Pin 15 - 0 Com - connection for the low signal current / voltage

Keyboard



1. Keyboard buttons



This is the ZERO button. This button can be used for zeroing in the scale status NO MOTION within the setup limits and to clear tare.



This is the TARE button. This button can be used for taring the scale in status NO MOTION.



The two UP/DOWN buttons will be used for setup via the menu.

2. Use of keyboard buttons & menu structure for settings / calibration



Press the UP or DOWN button for more than 3 seconds to enter the setup menu of front panel. In setup menu use these buttons to select one of the menus 1 to 8 and make a selection in the sub-menus or change single characters of display values.

Note: To enable calibration – menu 1, 2 and 3 – you have to remove the jumper of seal switch (28).



Enter menu X to the different sub-menus of X. After choosing the setting with the UP or DOWN button, use this key again for storing. This is the ENTER button.



To leave menu X or sub-menu of X.
Leave with: press 1x TARE button for back to menu X.1 – 1st level or press 2x TARE button for back to menu X

3. Menu Structure DAD 141.1

Menu X	Menu X - 1st level	Menu X - 2nd level	Menu X - 3rd level	Menu 7.0.1.1 Setup value 001000
X	Menu X	Select with 'up/down' keys Enter with 'Zero' key Leave with 'Tare' key	X X X	X
X.1	Menu X - 1st level	Enter with 'Zero' key Select with 'up/down' keys Back with 'Zero' key Leave with 'Tare' key	X	X
X.1.1	Menu X - 2nd level	Enter with 'Zero' key Select with 'up/down' keys Enter with 'Zero' key Leave with 'Tare' key	X X X	X
X.1.1.1	Menu X - 3rd level	Enter with 'Zero' key Select with 'up/down' keys Enter with 'Zero' key Use 'up/down' keys for single numbers Use 'Tare' key for next number Back with 'Zero' key Leave with: 1x 'Tare' key to menu X.1 1st level or 2x 'Tare' key to menu X	0 0 1 0 0 0 x x x x x x X X	X

Setup Menu – see next page

To Enter the DAD 141.1 setup menu, press the UP or DOWN button for 3 seconds. To enable calibration, remove the jumper of seal switch (pins 28).

8. Data communication	7. Logic Output 0/1/2	6. Logic Input 0/1	5. Analog output	4. Filter & Motion	3. Display	2. Span	1. Zero
8.1. Select baud rate serial port 8.2. Select RS422 for point to point communication or RS485 for networks for RS485 networks (addr. 0 for point to point) 8.4. Autotransmit at Power ON, e.g. gross, net, etc. 8.5. Set a transmission delay in milliseconds before any transmission starts 8.6.x Set the IP-Address used by the Ethernet interface in decimal notation, e.g. 192.168.0.100 8.7. Modbus parity check no - odd - even 8.8. Protocol serial port SER = ASCII RTU = binary data	7.x.1.1 Set number of increments 'n' corresponding to the setpoint 7.x.1.2 Switch logic of ON / OFF for setpoint 7.x.2. Setup ± hysteresis in increments of the setpoint 7.x.3. Select the base for the setpoint, e.g. gross weight 7.x.4. Test mode: Open / Close contacts by using the keyboard	6.x.1. Assign a logical input to a specific function, e.g. the tare button	5.1. Set number of increments 'n' corresponding to minimum output level, e.g. 4mA 5.2. Set number of increments 'n' corresponding to maximum output level, e.g. 20mA 5.3. Select the base for the analog output, e.g. gross weight 5.4. Select the analog output mode, e.g. 4-20mA or 0 - 10V 5.5. Test the selected output using the arrow buttons	4.1. Cut-off frequency of the input low pass filter 4.2. Select IIR or FIR filter 4.3. Number of updates per second from averaging filter 4.4.1 Set no-motion range in increments 4.4.2 Set no-motion time in milliseconds	3.1. Number of increments 'n' at which the display shows overload or underload 3.2. Display step size (1, 2, 5, 10, 20 etc.) per division 'd' 3.3. Set decimal point position e.g. 0.0 or 0.00 etc.	2.1. Increments 'n' at which the span calibration is performed. Ref. 2.2 or 2.3 2.2. Calibration of span as based on the actual input (weight) electronically 2.3. Calibration of span electronically via mV/V setup 2.4. Display shows the actual load cell input in mV/V	1.1. Permit / Prohibit Zero setting and zero tracking 1.2. Set system zero as based on the actual input (weight) electronically 1.3. Set system zero via mV/V setup 1.4.1 Enable / disable actual tare value non-volatile 1.4.2 Enable / disable actual zero value non-volatile 1.4.3 Enable / disable initial zero @ power ON. 1.4.4 Define zero range setting @ power ON.

Example of a calibration procedure

A 3 leg tank or silo is fitted with 3 load cells of 1000kg; load cell signal @ 1000kg = 2 mV/V. Dead load of tank/silo is 600kg. Live range is 1500 kg, step size is 0.5kg.

It is assumed that the load cell system is connected to the DAD 141.1 and the power is ON. The maximum and minimum display values, display increment size and decimal point position should be defined prior to carrying out the calibration (See Menu 3).

For this example the display maximum is defined as 1600.0kg, the display minimum is -200.0kg, the display step value is 0.5kg and the decimal point position is 1.

Remember that all parameters under sections 1.1 - 1.3, 2.1 - 2.3 and 3.1 - 3.3 can only be accessed or changed after **remove jumper of seal switch (28)**.

- Go to Menu 3.2 (display step size) by using the UP/DOWN and ZERO buttons. The display shows the actual step size, e.g. 1. Now you can change step size by using the UP/DOWN keys and set to 5. Press the ZERO button to store & leave menu point.
- Go to Menu 1.2 by using the UP/DOWN and ZERO buttons. The display shows the actual mV/V value, e.g. 0.4107. Make sure that the tank / silo is empty or at the point where you want the display to read zero. Press the ZERO button to set the display to read 0000.0kg. This procedure defines the actual zero calibration point. Leave this menu point with ZERO button.
- Go to Menu 2.1 by using the UP/DOWN and ZERO buttons. Set the display to read the span value of the calibration weight(s) applied. For this example, if the calibration applied load is 750kg, set the display to read 750.0. By using the UP/DOWN and TARE buttons you have to setup each character of the 6 digit display to 00750.0. Press now ZERO button for storage. This procedure defines the span calibration value. Leave this menu point with ZERO button.
- Go to Menu 2.2 by using the UP/DOWN and ZERO buttons. Apply the calibration weight(s) to the weighing system. The display will show the actual input signal in mV/V, e.g. 0.9087. Press the ZERO button to set the display to read 750.0kg. The gravimetric calibration is done. Leave this menu point with ZERO button.

To leave the calibration menu, press the TARE button 2 or 3 times. When finished, put the jumper on seal switch 28 and switch OFF and ON the device for activation of the new calibration setup.

Declaration

Manufacturer: Hauch & Bach ApS, DK 3540 Lyngbe, Denmark.

As manufacturer of the Digital Amplifier for DIN rail mount, model DAD 141.1 we herewith guarantee that the article meets the requirements of the European legislation covering technical instruments and the general rules for technical safety, environmental protection and electromagnetic compatibility. It is further assured that the article is in accordance with the supporting documents as supplied by the manufacturer.

To ensure this the necessary monitoring measures during production have been strictly met. Electronic articles have been manufactured and tested according to the following regulations:

Safety regulations: CE in accordance with 2011/77/EC and 2004/108/EC

Electromagnetic Compatibility: 2004/22/EC MID E2 (for industrial applications)

Location: Lyngbe, Denmark **Date:** the 17th November 2013

Signed:

This Quick Start Manual is valid for DAD 141.1 with firmware rev. 1.07 or higher. DAD 141.1 QS-Manual_FC_ver.1.32_140325