

Hydrogen Refuelling Station Availability Transmitter (HRS-AT)

Assembly Instructions



Berlin, 2019

V. 001.013, 2019-10-23

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1 Introduction

This HRS-AT has been developed for the European Hydrogen Refueling Station Availability System (E-HRS-AS) to support the rise of FCEV technology by providing availability data for FCEV drivers. It transmits the availability status information gathered from the Hydrogen Refueling Station (HRS) approximately every 60 seconds to the central HRS availability platform.

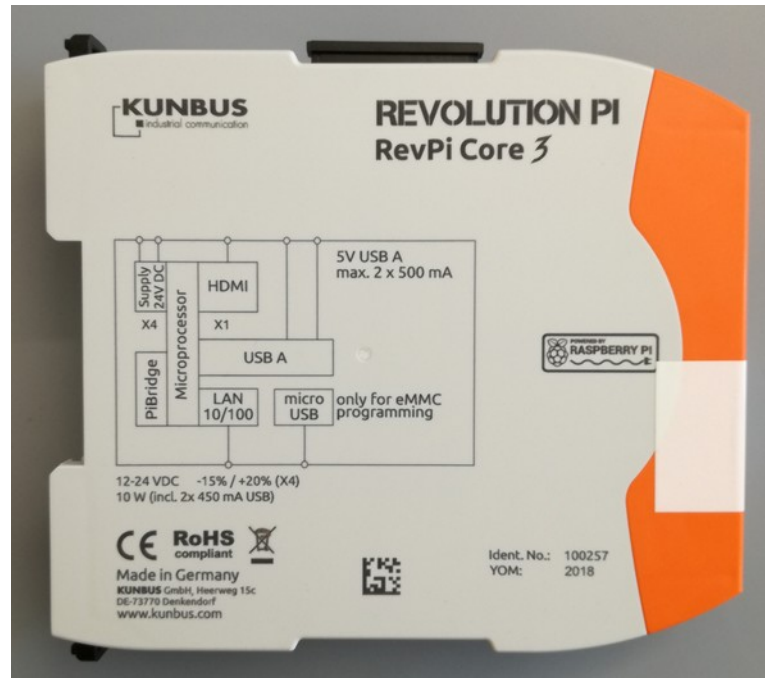
2 Contents of the HRS-AT Assembly Kit

The supplied parcel contains a separately packaged HRS-AT assembly kit consisting of the following items:

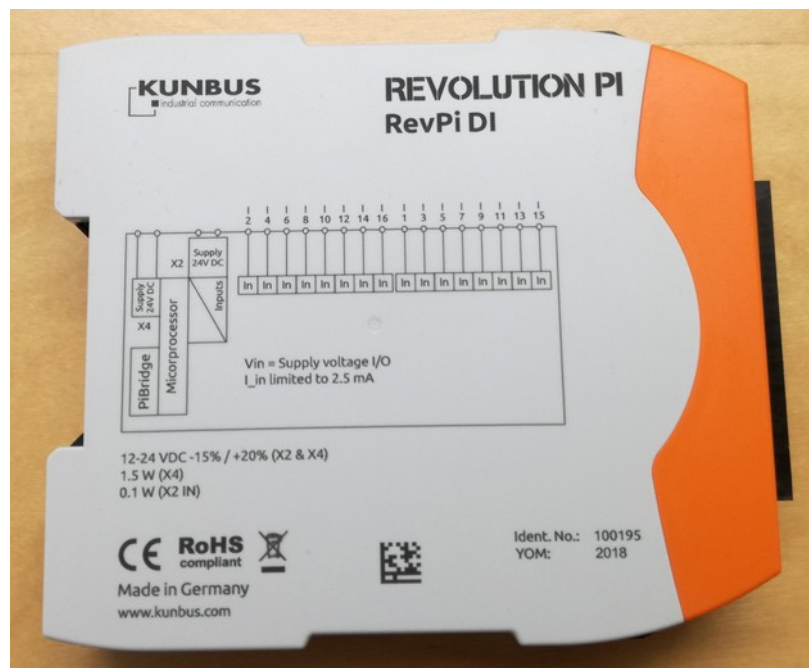
- ◆ RevPi Core 3 (compute module for DIN rail usage), cf. 2.1, page 4
- ◆ DI module (signal module for DIN rail usage), cf. 2.2, page 4
- ◆ connectors bag, cf. 2.3, page 5
- ◆ maintenance switch bag, cf. 2.4, page 6
- ◆ network cable (2 m)
- ◆ HRS-AT assembly instructions (*this manual*)
- ◆ HRS-AT Quickstart Guide and HRS-ATS (Type A) Data Sheet

Before starting the assembly go to:
<https://h2-map.eu/setup>

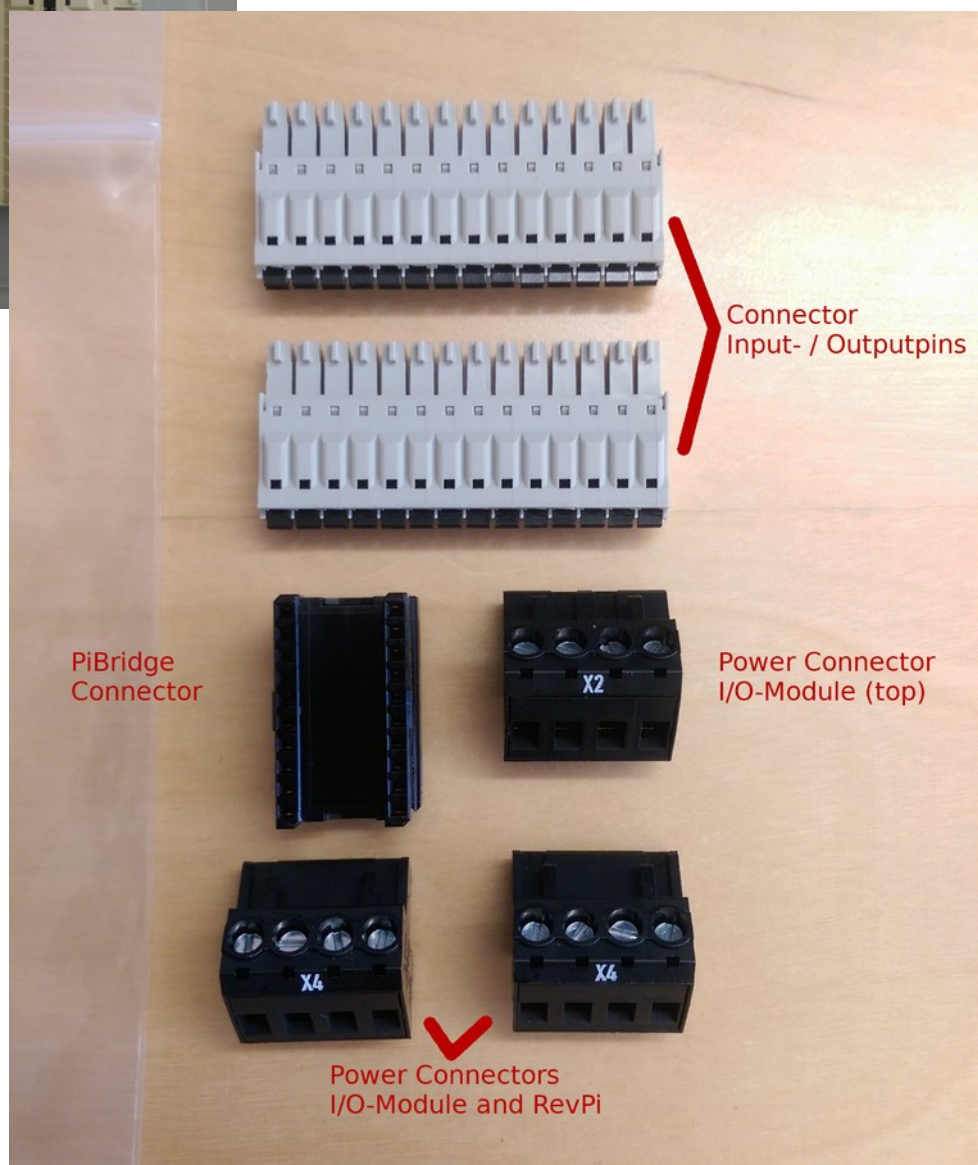
2.1 RevPi Core 3



2.2 DI Module



2.3 Connectors Bag



2.4 Maintenance Switch Bag



2.5 Additional Parts

- ◆ 2 m CAT 5e patch cable (network cable to connect the RevPi Core 3 to the internet)
- ◆ HRS-AT assembly instructions (this manual)
- ◆ HRS-AT Quickstart Guide and HRS-ATS (Type A) Data Sheet (necessary data to perform the automated setup test)

3 Operating Conditions

Voltage:	min. 10.7 V - max. 28.8 V
Max. power consumption:	12 W
Fuse:	500 mA at 24 V
Operating temperature:	-40 °C to +55 °C
Humidity:	max. 93 %, non-condensing

4 Assembly Instructions

The assembly comprises the following steps that should be carried out in this order:

1. Mounting modules in DIN rail
2. Coupling DI module and RevPi Core 3 with the PiBridge connector
3. Providing internal module power to DI module via X4 connector
4. Providing signal power to DI module via X2 connector
5. Connecting RevPi Core 3 to the internet via network cable
6. Providing internal module power to RevPi Core 3 via X4 connector
7. Mounting the maintenance switch
8. Connecting maintenance switch and plant signals to the DI module

4.1 Mounting RevPi Core 3 and DI Module on DIN Rail

Snap both, RevPi Core 3 and DI module next to each other onto the DIN rails of the plant's switch panel, DI module to the left side, RevPi Core 3 to the right side:



4.2 Coupling DI Module and RevPi Core 3 with PiBridge Connector

Couple the DI module and the RevPi Core 3 using the PiBridge connector:



4.3 Providing Internal Module Power to DI Module via X4 Connector

Please don't insert the power connector to the RevPi Core 3 now — just prepare it!

The DI module should be powered now.

Use both X4 power connectors to supply power to the DI module and the RevPi Core 3:

Each X4 power connector is to be connected as follows:

Pin 1 (leftmost):	24 V
Pin 2:	0 V
Pin 3:	not connected
Pin 4 (rightmost):	Ground



Only plug the connector to the DI module now!

The connector the the RevPi Core 3 should be plugged later, when the DI module got both power supplies and is coupled with the RevPi Core 3.

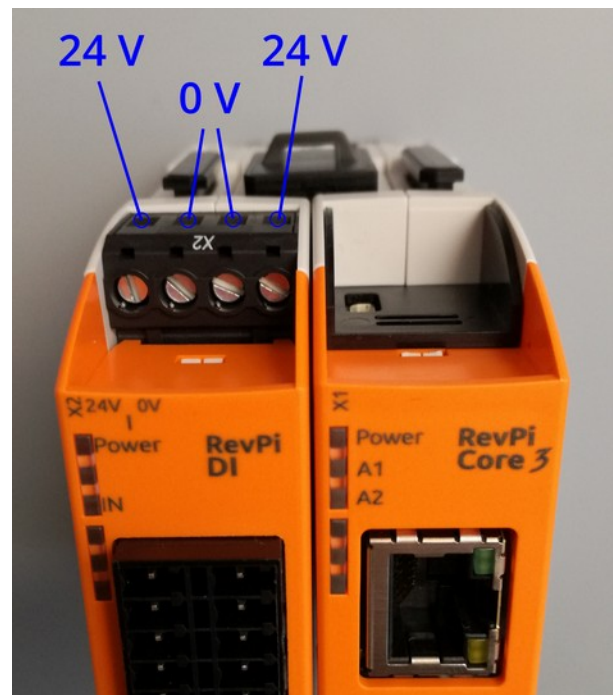
4.4 Providing Signal Power to DI Module via X2 Connector

Use the X2 signal power connector to supply signal power to the DI module:

The X2 power connector is to be connected as follows:

Pin 1 (leftmost):	24 V
Pin 2:	0 V
Pin 3:	0 V
Pin 4 (rightmost):	24 V

The pinning is symmetrically, so the outer pins get 24 V and the inner pins get 0 V.



4.5 Connecting RevPi Core 3 to the Internet via Network Cable



4.6 Providing Internal Module Power to RevPi Core 3 via X4 Connector

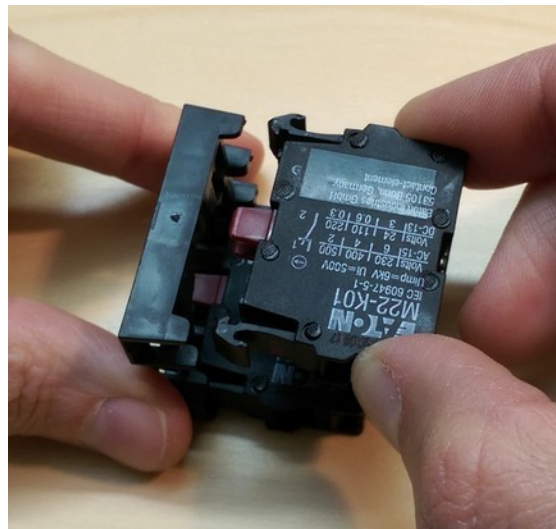
The X4 power connector for the RevPi Core 3 has already been prepared in step 4.3, "Providing Internal Module Power to DI Module via X4 Connector".

Now insert the power connector into the RevPi Core 3.

If this step accidentally was done before any of the steps above, please finish the steps above, disconnect power from RevPi Core 3 for 5 seconds and reconnect it.

4.7 Mounting the Maintenance Switch

Snap both contact blocks into the fixing adapter:



Identify a good position for mounting the maintenance switch. It should not be accessible to unauthorised persons.

Drill a 22.5 mm hole through the front door of the switchboard cabinet and prepare a cutout on the top of the hole to secure the switch actuator against twisting.

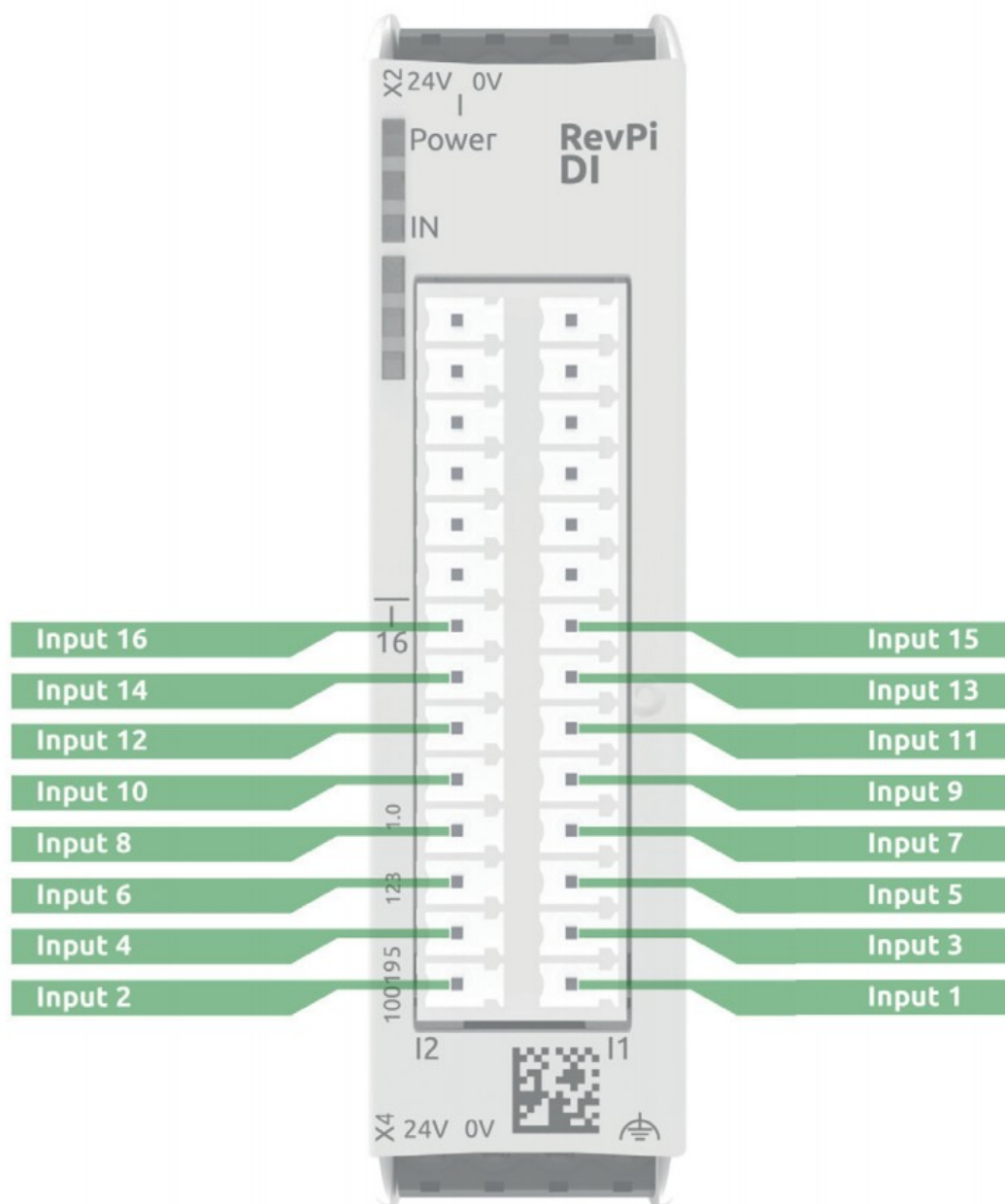
Plug the switch actuator together with the tag carrier through the hole and fix the switch with the retainer nut:



Snap the fixing adapter with the contact blocks attached to the rear of the switch actuator:



4.8 Connecting Maintenance Switch and Plant Signals to the DI Module



4.8.1 Wiring of the Maintenance Switch

Attach 24 V VCC to pin 2 on both contact blocks (working in opening mode) of the maintenance switch.

Use the grey I/O connector for the input pins on the DI module as follows:

DI input pin No.	Maintenance Signal
1	contact block pin 1 of the " Maintenance " position
3	contact block pin 1 of the " Limited avail. " position

0 V on maintenance pin (DI input 1) means, HRS is **in maintenance**.

24 V on maintenance pin (DI input 1) means, HRS is **not in maintenance**.

0 V on limited availability pin (DI input 3) means, HRS is **limited available**.

24 V on limited availability pin (DI input 3) means, HRS is **not limited available**.

The switch ensures that only one of both pins is set to 0 V VCC at the same time.

4.8.2 Wiring of the Availability Signals

Connect all of the existing availability signals to the DI module according to the following table:

DI input pin No.	Availability Signal
5	700 bar H2 car dispenser availability
7	350 bar H2 car dispenser availability
9	350 bar H2 bus dispenser availability

0 V on input pin means, the dispenser is **unavailable (defective)**.

24 V on input pin means, the dispenser is **available (operational)**.

4.8.3 Priority of Signals

- ◆ DI input 1 = maintenance = highest priority
 - ◆ ⇒ 0 V on maintenance overrides all other signals
- ◆ DI input 3 = limited available = medium priority
 - ◆ ⇒ 0 V on limited available overrides the dispenser signals but not the maintenance signal from DI Input 1
- ◆ DI input 5, 7 and 9 = lowest priority and distinct from each other
 - ◆ ⇒ Those signals are overridden by any of the maintenance / limited available signals

5 Status Codes

5.1 LED Codes RevPi Core 3:

A1: blinking: heartbeat of RevPi Core 3 module

A2: permanent green: RevPi Core 3 operational, HRS available

A2: blinking green/red: wrong wiring (maintenance and limited available are both on)

A2: blinking red: RevPi Core 3 operational, HRS in limited available mode; refuelling available on request

A2: permanent red: RevPi Core 3 operational, HRS in maintenance and not available

5.2 LED Codes DI Module:

Power LED:

permanent green: DI module operational

permanent red: DI module without connection to RevPi Core 3 (PiBridge mounted?)

blinking red: DI module is connecting to RevPi Core 3 (initialisation pending)

OUT/IN LEDs:

off: DI module is connecting RevPi Core 3 (initialisation pending)

permanent green: inputs / outputs operational

permanent red: missing signal power supply (check connector X2)

blinking red: wrong wiring of signal power (check connector X2)

6 Revision History

V. 001.013, 2019-10-22 — LED A2 state in ch. 5.1 fixed

V. 001.012, 2019-10-17 — Added notice to start with setup portal

V. 001.011, 2019-10-12 — Change in contact addresses

V. 001.010, 2019-10-11 — All Chapters improved; most images replaced; corrections

V. 001.009, 2019-06-11 — Design of page 2 (footer distance to page bottom) improved

V. 001.008, 2019-06-11 — fixed wiring of maintenance states in ch. 4.8.1

V. 001.007, 2019-02-27 — updated funding agency's contract numbers; wording

V. 001.006, 2019-02-26 — general overhaul

V. 001.005, 2018-12-10 — DI Modul

V. 001.004, 2018-01-12 — fixed typo

V. 001.003, 2018-01-12 — revision history added

V. 001.002, 2018-01-12 — signal priority and meaning of voltage levels on DI input pins added

V. 001.002, 2018-11-07 — fuse current rating added

V. 001.000, 2017-10-27 — initial revision

7 Contact Addresses



General and overall questions:

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This work has been carried out as part of the projects Hydrogen Refuelling Station (HRS) Availability System of the FCH 2 JU, REF FCH/OP/CONTRACT 185 and 214

