IoT Sensor Harvy2

User Manual and technical data of the Harvy2 LoRaWAN sensor

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Table of contents

Quick Start Guide

The Quick Start Guide will be updated in due course. Until then, please note the following chapters:

1. General information

Please read the following information carefully.

Keep this information in a safe place or pass it on to other users of the product. Visit our website www.dezem.de and the website corresponding to the product for further information about the product.

1.1 Safety instructions

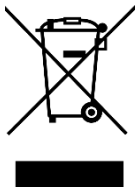
The device complies with electrical protection class III.

- To maintain protection class III, only external sensors/power sources that also fulfil the SELV (safety extra-low voltage) requirements may be connected to the device - protection class III.
- Shocks or impacts must be avoided.
- If the housing or cable are damaged, please contact deZem GmbH and do not install the device.
- deZem clamp-on current transformers must not be connected to uninsulated or damaged lines.
- The product must be installed professionally and according to the specified installation guidelines.
- The installation may only be carried out by appropriately qualified specialist personnel.
- For safety and approval reasons, unauthorized modifications to the product are not permitted.
- Maintenance, adjustment or repair work may only be carried out by qualified personnel/specialist workshops who are familiar with the associated risks and/or relevant regulations.
- The product should not be exposed to extreme temperatures, direct sunlight or strong vibrations. Protect the product from dust and dirt.

1.2 Intended use

The product is intended exclusively for use as described in this product manual. Any other use is considered improper and may result in damage to the product or in injury. Read this manual carefully before using the product.

1.3 Disposal



In Germany and for products delivered directly from Germany: All devices must be recycled properly. Due to the applicable regulations, deZem GmbH's electrical and electronic devices may not be disposed of at public collection points for electrical devices. All of deZem GmbH's old electronic devices must be returned to us for disposal. The prepaid delivery must be sent to the following address:

deZem GmbH, Wilmersdorfer Str. 60, 10627 Berlin, Germany

In European Union countries outside Germany: You can obtain information on correct disposal from your dealer or the responsible sales department.

1.4 Support

Do you have any further questions about setting up and operating the Harvy2? The deZem team will be happy to answer them for you.

Call us at: +49 30 3180 0730 or write to us at harvy-support@dezem.de.

2 Functional description

2.1 What is the Harvy2 used for?

The Harvy2[1] is used to wirelessly record AC currents via LoRaWAN[2]. It is self-powered, i.e. it does not require an external power supply or battery, and is thus maintenance-free. With its four inputs, it is particularly suitable for metering RMS currents on all electrical main and sub-distributions or directly on machines by using deZem clamp-on current transformers. When additionally using a voltage transformer on the fourth of inputs, the sensor can also determine the relevant parametres for each phase of the three-phase current, i.e. active power, power factor, reactive power, apparent power, mains voltage and mains frequency.

The intelligent event filter integrated in the sensor provides metering series (inrush currents, etc.) accurately to the second at a specified maximum rate.[3]

Optionally, the Harvy2 can be integrated into the deZem DataSuite. Metering curves are immediately available online for further purposes.

2.2 Product features

The Harvy2 current sensor is characterized by the following product features:

The sensor can record RMS currents and other relevant metering values on up to four channels using the cable included in the scope of delivery:

- Connection of the cable to the sensor via RJ45 socket
- Four reverse polarity protected and strain-relieved JST plug connections, e.g. for deZem clamp-on current transformers or deZem voltage transformers
- Labels on the four cable ends with numbers 1-4 identify the four channels in1, in2, in3, in4

[1] Patent application pending.

[2] LoRaWAN® and the LoRAWAN® logo are registered trademarks of Semtech Corporation and are used under license from the LoRa Alliance®.

[3] Available after one of the upcoming firmware updates.

Side RJ45 socket with 2 flashing LEDs:

- Green LED indicates operation (see chapter 6.1)
- Yellow LED indicates transmittal of LoRaWAN packets
- RJ45 socket: only suitable for the included deZem cable, this is not an Ethernet connection!

USB-C connection on the long side:

- To charge the capacitor during commissioning
- For configuration via web application
- For firmware updates
- For an ad-hoc display of the metering values

Reset button (small recess next to the USB-C port):

- Used for firmware updates up to v1.0.0
- Narrow, blunt object required to operate, e.g. a twist tie

Assembly:

- Freely suspended, with magnets or with cable ties
- 2 fastening straps on the long sides
  - with counter bore for attaching magnets (accessories) or, if applicable, a screw connection
  - with elongated recess for attaching cable ties without slipping

2.3 Applications

The Harvy2 is particularly suitable for two areas of application:

- For measuring RMS currents with clamp-on current transformers, and
- When using a voltage transformer, additionally for determining active power, power factor, reactive power, apparent power, mains voltage and mains frequency.

2.3.1 Metering RMS currents

Using up to four deZem clamp-on current transformers, RMS currents can be recorded in electrical mains and sub-distribution boards or directly on machines and systems.

The choice of the appropriate clamp-on current transformer depends on the primary current and the diameter of the supply wire to be measured, including insulation. The following table shows the maximum primary current and the window size of the transformer that matches the core diameter for the most common transformer types. For individual solutions please feel free to contact us.

Type of current transformer	Max. primary current [A]	Min. primary current [A][4]	Nominal secondary current [mA]	Current ratio	Window [mm]	Max. wire cross-sect. [mm²]
	Harvy2	clamp-on current transformer				
T80/26.6	80	approx. 1	26.7	3000	10.0	25
T80/40	80	approx. 0.8	40	2000	10.0	25
T150/40	150	approx. 1	40	3750	16.0	50
T300/250	300	approx. 0.9	250	1200	24.0	150
T300/40	300	approx. 1.6	40	7500	24.0	150
T500/250	500	approx. 0.8	250	2000	36.0	300
T500/40	500	approx. 2.8	40	12500	36.0	300

2.3.2 Determination of active power and other values from the three-phase network

When using a voltage transformer and deZem clamp-on current transformers, the Harvy2 is able to measure an AC voltage in the power supply network and to use phase shifts to determine the other two phases of the three-phase-system. In addition to the RMS currents, metering values such as active power, reactive power, apparent power, power factor, mains frequency, mains voltage and much more can be determined.

In order to use this option, a voltage transformer is connected to channel 4 of the Harvy2. Channels 1, 2 and 3 can be used for clamp-on current transformers that are connected to phases L1, L2 and L3. The phases and channels are assigned via the configuration interface (see Chapter 4).

When using a voltage transformer, the Harvy2 is constantly supplied with sufficient energy so that it can measure continuously and can send at the preset transmission interval or during measurement peaks.

[4]Tests to determine the minimum primary currents per transformer type are currently being prepared.

3 Installation of the hardware components

The installation includes the assembly and commissioning of all hardware components including accessories such as deZem clamp-on current transformers, voltage transformers or magnetic fasteners.

When used for the first time, the battery-free Harvy2 may be discharged after a long break in operation and might not work. All you need is a USB connection, for example with a laptop, to charge it within a few seconds (recommended). The active USB connection is indicated on the sensor by a continuously lit green LED next to the RJ45 socket. Without a USB connection, the LEDs next to the RJ45 socket indicate operation (green LED) or the sending of LoRaWAN packets (yellow LED). For details see Chapter 6.1. If installed directly without prior charging via USB-C, depending on the primary current, it may take some time until the Harvy2 is sufficiently charged to enter operating mode and to send the first metering values.

3.1 Installation with clamp-on current transformers

For installing the Harvy2 with deZem clamp-on current transformers, please follow these steps:

1. Connect the supplied adapter cable to the Harvy2 via the RJ45 connection.
2. Connect clamp-on current transformers of suitable size to the adapter inputs via the JST connections. Up to four transformers can be connected.
3. Clamp the clamp-on current transformers around the wires to be measured. If you want to measure more values than RMS currents only, pay attention to the orientation of the transformers (see tip).
4. The sensor can then either be suspended freely or be fixed with cable ties or with magnetic holders, e.g. on the inside of distribution box doors.

WARNING

NEVER connect a current transformer to a conductor if it is not connected to the Harvy2 or another terminal device. Otherwise, high voltages can build up at the transformer output. Additional insulation must be attached between the conductor and the clamp-on current transformer in order to achieve the above-mentioned SELV requirements (see safety instructions in Chapter 1.1) for sensors / power sources connected externally to the device.

TIP

You can see the orientation of the clamp-on current transformers on the inside of the window of the respective transformer. The primary winding connections are labeled with the capital letters “K” and “L” or “P1” and “P2”. The orientation must be such that the “energy flow direction” runs from K to L or from P1 to P2. This is also shown by an arrow on the clamp-on current transformer. If the clamp-on current transformer is attached against the energy flow, incorrect measurement results may occor (not relevant for RMS current measurements).

3.2 Installation with clamp-on current transformers and voltage transformer

For installing the Harvy2 with a deZem voltage transformer, please follow these steps:

1. Connect the supplied adapter cable to the Harvy2 via the RJ45 connection.
2. Connect the voltage transformer to channel 4 of the Harvy2 using the reverse polarity protected JST connection.
3. If you use a voltage transformer for mounting on a DIN rail, connect it to the desired phase L1, L2 or L3. If you use a voltage transformer with a Europlug, insert the plug into the socket. Make sure the polarity of the Europlug is correct. For deZem voltage transformers, the polarity is marked by a label, marking the conductor by an “L” and the neutral conductor by an “N”.
4. Connect one to three clamp-on current transformers of suitable size to the adapter inputs of channels 1-3 of the Harvy2 via the JST connections.
5. Clamp the clamp-on current transformer around the wires. Pay attention to the orientation of the clamp-on current transformers (see tip).
6. The sensor can then either be suspended freely or be fixed with cable ties or with magnetic holders, e.g. on the inside of distribution box doors.

WARNING

NEVER connect a current transformer to a conductor if it is not connected to the Harvy2 or another terminal device. Otherwise, high voltages can build up at the transformer output. Additional insulation must be attached between the conductor and the clamp-on current transformer in order to achieve the above-mentioned SELV requirements (see safety instructions in Chapter 1.1) for sensors / power sources connected externally to the device.

TIP

You can use a measuring device to determine which pole is L1 and which is N (voltage) or which phase the transformer must be on. The measured values can be viewed directly in the Harvy2 web application (configuration application). If you are connected to the Harvy2 in the web application, you can view the current measurement data in tabular form using the “Live Data” menu item. If the values for “Power Factor” and “Active Power [W]” are negative, this may indicate a reverse polarity of the voltage transformer or that a clamp-on current transformer has been assigned to the wrong phase.

TIP

You can see the orientation of the clamp-on current transformers on the inside of the window of the respective transformer. The primary winding connections are labeled with the capital letters “K” and “L” or “P1” and “P2”. The orientation must be such that the “energy flow direction” runs from K to L or from P1 to P2. This is also shown by an arrow on the clamp-on current transformers. If the clamp-on current transformer is attached against the energy flow incorrect measurement results may occur (not for RMS current measurements).

4 Configuration

The configuration includes configuring the Harvy2 including accessories, connecting it to a LoRaWAN server (e.g. deZem IoT platform, i.e. deZem.io), as well as setting up the new metering point in a suitable software, e.g. deZemAd. If desired, we can take care of the registration on the deZem IoT platform as well as the setup in deZemAd and can deliver the device preconfigured.

When the Harvy2 is delivered, the current firmware version is installed. For updates, see Chapter 5.

The Harvy2 is configured via a web application, which you can access e.g. on a laptop or mobile phone via your browser (currently Windows, Linux, Android and MacOS possible with Chrome or Edge, for all but MacOS also Opera). It is not necessary to install any software. However, depending on the operating system, a one-time installation of the USB driver “CP210x Universal Windows Driver” might be required, which can be found here. The web application can be accessed via the following link: https://harvy2.dezem.io/

1. Connect the Harvy2 to your PC via USB-C and open the web application. Make sure that the USB-C connection is fully established (slightly beyond an initial small resistance).
2. Click on "Connect" at the top of the web application to log the Harvy2 into the web application and gain access to its settings.
3. In the window that opens, select the sensor by clicking on the device name and confirm the registration by clicking on “Connect”.
4. In the menu under “Setup” select the sub-item “Setup Analogue Inputs”.

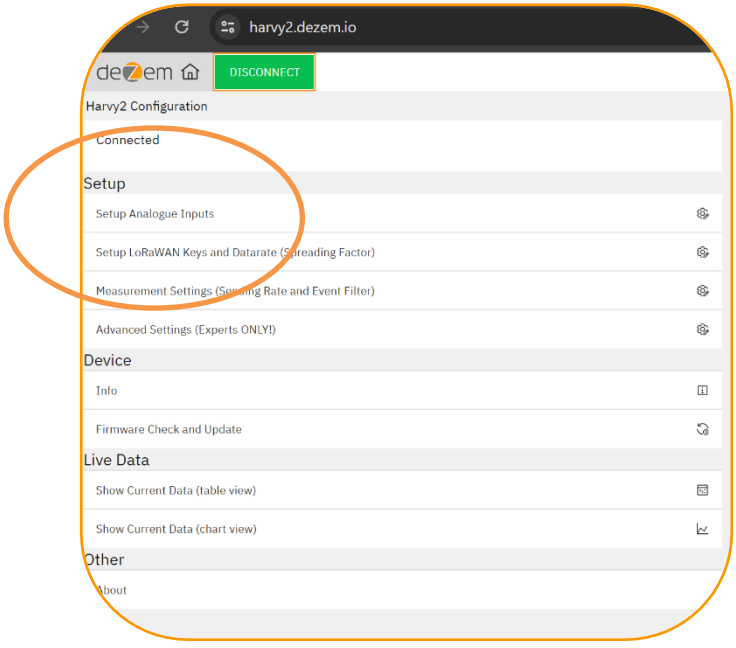


Figure 1: Home page the Harvy2 web application

5. If you have connected a voltage transformer to channel 4, set the slider under "Measurements WITH Voltage on Input 4" to "On". For mere RMS current measurements, this mode remains deactivated.

6. If you are using a voltage transformer, set the transformer factor under “IN 4 Voltage Transformer Factor” so that the output is correct:
    - For deZem voltage transformers with a Europlug, the transformer factor is 15.97.
    - For deZem DIN rail voltage transformers, the factor is 15.19.
    - If you use a different power supply, please contact us!

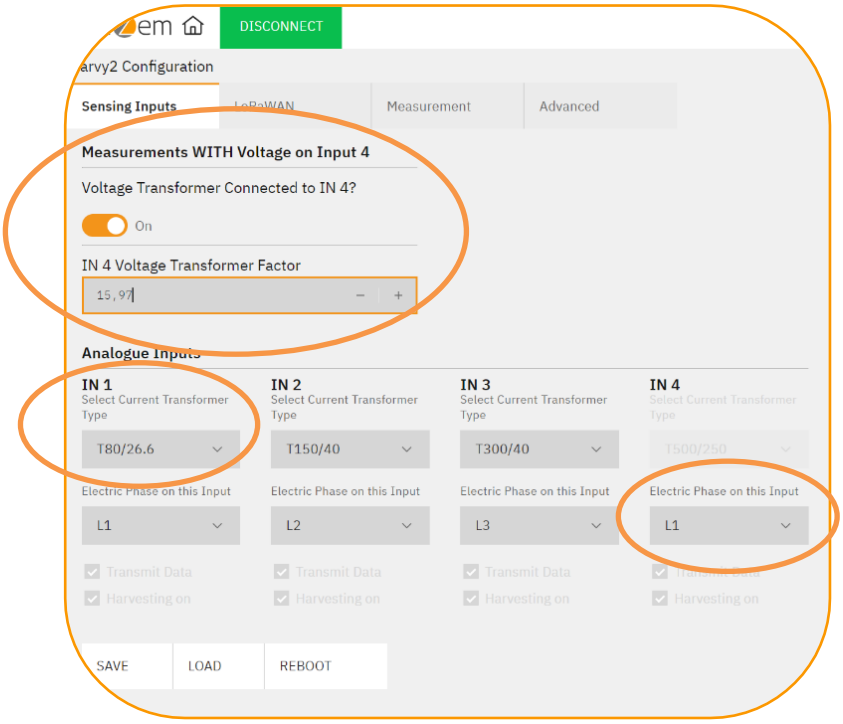


Figure 2: Configuration of channels in the Harvy2 web application

7. Under “Analogue Inputs”, select which type of clamp-on current transformer you use on which channel. If you use a voltage transformer, also select which phase L1, L2 or L3 the clamp-on current transformers and the voltage transformer are installed on.
8. By configuring the clamp-on current transformer type, the metering values are automatically scaled correctly to the respective SI unit. Additional scaling, e.g. in deZemAd, is therefore not necessary; the scaling factor is set there to “1” by default.
9. Save settings.

10. Switch to the second tab "LoRaWAN" and check whether the ADR slider under "General Settings" is set to "On" and whether the data rate is set to zero. If not, set this accordingly to ensure a stable server connection and data transmission.

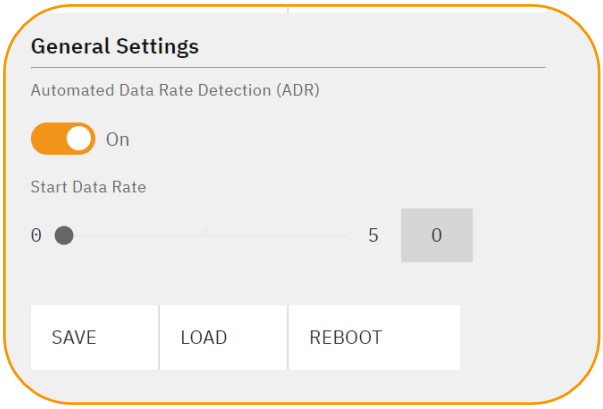


Figure 3: Configuration of the data rate in the Harvy2 web application

11. Save settings and restart Harvy2 via “Reboot”.
12. If the sensor has already been registered at the LoRaWAN server, disconnect Harvy2 via “Disconnect” and remove the USB-C cable. Otherwise, follow the next steps first and then disconnect Harvy2 from the web application as described.

If you want to register the Harvy2 at a LoRaWAN server, you will need the DevEUI, the JoinEUI and the AppKey of the sensor. You will also need the current decoder.

The DevEUI, the JoinEUI and the AppKey can be accessed in the Harvy2 web application via “Setup LoRaWAN Keys and Datarate (Spreading Factor)” in the main menu, or, if you are still in the configuration interface, switch to the the “LoRaWAN” tab.

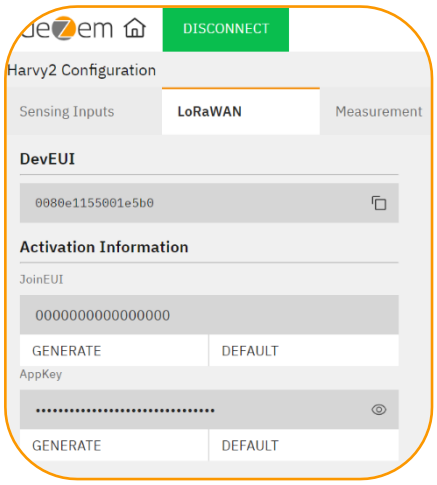


Figure 3: DevEUI, JoinEUI, AppKey

You will also need to set up the decoder for the device at the LoRaWAN server. The decoder can be accessed here for free. Of course, we are at your disposal if you need support with the configuration.

For the set-up of the metering point in deZemAd, we refer to the corresponding manual.

TIP

The configuration interface, which can be found at https://harvy2.dezem.io/, is being expanded and simplified continuously. As a result, the images shown here may differ slightly. However, all relevant steps should be intuitively and easily recognisable in the configuration interface. If you find anything unclear, please let us know.

TIP

If you are using the configuration interface on a mobile device, the application should automatically open in full screen mode. If the display on your device appears very small, either deactivate the desktop view in your settings or click on the small square symbol in the top right corner to switch to full screen mode.

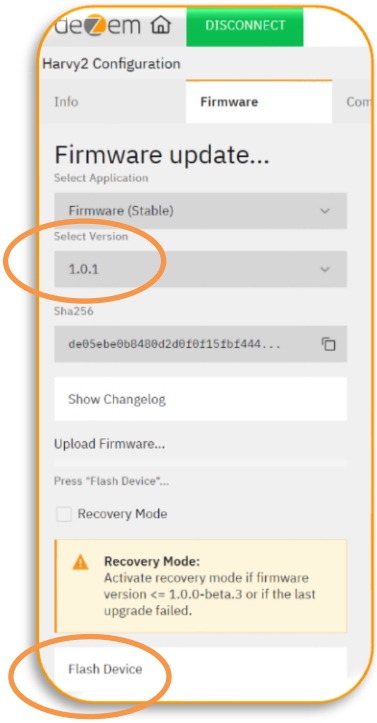
5 Firmware updates

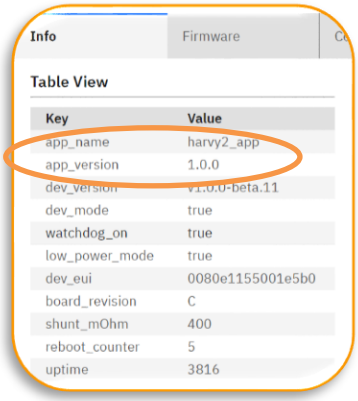
When the Harvy2 is delivered, the current firmware version is already installed. If a later update of the firmware (integrated software) is required, the latest version will automatically be made available via the Harvy2 web application. You can install the update on the sensor via USB-C as described below.

The following information applies to firmware updates as of version 1.0.0 and later. If you are using a version of the firmware older than 1.0.0, please refer to the information in the appendix .

Depending on the operating system, it may be necessary to install the USB driver “CP210x Universal Windows Driver” beforehand on your computer. The USB driver can be obtained here .

1. Connect Harvy2 to the PC via USB-C using a suitable cable.
2. Open the Harvy2 web application: https://harvy2.dezem.io/
3. Go to “Firmware Check and Update" on the main page under "Device". The latest version of the firmware is preset there.
4. Click on “Flash Device” in the web application.
5. In the window that now opens, select the sensor by clicking on the device name, then click on “Connect”.
6. Wait briefly until both the update progress bar and the subsequent check have run through.
7. If a time-out error occurs, refresh the page (press F5) and repeat the process.
8. Click on “Connect” in the web application, select the sensor and connect.
9. Check in the menu tab "Info" whether the update was successful and the new firmware version is now displayed, otherwise repeat the process.
10. Disconnect Harvy2 via “Disconnect” and unplug the USB-C cable.





6 Technical data

6.1 LED signals

LED signal pattern	The signal displays	Meaning
Green LED: flashes 4x	System voltage > 3400 mV	LoRa connection active + measurement active
Green LED: flashes 3x	System voltage > 2800 mV	LoRa connection active + measurement active
Green LED: flashes 2x	System voltage > 2400 mV	LoRa connection active + measurement inactive
Green LED: flashes 1x	System voltage < 2400 mV	LoRa connection inactive + measurement inactive
Green LED: continuously lit	USB-C port active	USB-C port active (only when connected to a PC via USB-C)
Yellow LED: Flashing	Transmittal of LoRaWAN packets	Packets are transmitted to the server at this moment

6.2 Supported LoRaWAN frequencies

- EU863-870
- AU915-928
- AS923
- KR920-923
- IN865-86
- RU864-870
- US902-928 (hardware adjustment might be required)

6.3 LoRaWAN payload encoding and decoder description

LoRaWAN Payload Decoder	The Things Stack (TTS)	ChirpStack
JS decoders	Decoder	
version	v1.0.1	v1.0.0
Decoder type	Current Data	
port	10	

Maximum payload size	50 bytes All channels IN1...4 enabled inclusive 3 Phase Measurement (with voltage transformer)
Minimum payload size	12 bytes Only vsys_V and temp_C enabled

Group	Subgroup	Variable (may change, not finalized)	Data type	Unit	Value Min	Value Max	Comment	Depends on (config)	Meaning	bytes	Byte index
Meta		usb_powered | ch_vsys_en | ch_temp_en | reserved [5...7]	BIT SET	---					device is usb powered	1	0
Config	**Global**	ct_plus_mode | 1...7 reserved	BIT SET	---						1	1
	IN1	ac_en | dc_en | freq_en | scaled_mode | voltage_mode | 5...7 reserved	BIT SET	---						1	2
	IN 2	ac_en | dc_en | freq_en | scaled_mode | voltage_mode | 5...7 reserved	BIT SET	---						1	3
	IN3	**ac_en** | dc_en | freq_en | scaled_mode | **voltage_mode** | 5...7 reserved	BIT SET	---						1	4
	IN4	ac_en | dc_en | freq_en | scaled_mode | voltage_mode | 5...7 reserved	BIT SET	---						1	5
Reserved	**RESERVED_1**		U16	---	0	65535				2	6
	RESERVED_2		U16	---	0	65535				2	8th
system	**Voltage**	vsys_V	U8	**v**	1.8	3.7125		**ch_vsys_en**	system voltage (relates to internal SuperCap load; full at 3.6V min at 2.8V)	1	10
	Temperature	temp_C	U8	**°C**	-22	80		**ch_temp_en**	temperature inside the device	1	11
Analogue input	**IN1**	in1_ac_raw_A	F16	**A**	-0.3	0.3		**ac_en**		2	12
		in1_dc_raw_A	F16	**A**	0	0.3		**dc_en**		2	14
		in1_freq	U16	**Hz**	0	655.35	1/100Hz resolution	**freq_en**		2	16
		in1_coeff	F16	---	0.1	1000		**scaled_mode | voltage_mode**		2	18
	IN 2	in2_ac_raw_A	F16	**A**				**ac_en**		2	20

Group	Subgroup	Variable (may change, not finalized)	Data type	Unit	Value Min	Value Max	Comment	Depends on (config)	Meaning	bytes	Byte index
		in2_dc_raw_A	F16	A				dc_en		2	22
		in2_freq	U16	Hz				freq_en		2	24
		in2_coeff	F16	---				scaled_mode | voltage_mode		2	26
	IN3	in3_ac_raw_A	F16	A				ac_en		2	28
		in3_dc_raw_A	F16	A				dc_en		2	30
		in3_freq	U16	Hz				freq_en		2	32
		in3_coeff	F16	---				scaled_mode | voltage_mode		2	34
	IN4	in4_ac_raw_A	F16	A				ac_en		2	36
		in4_dc_raw_A	F16	A				dc_en		2	38
		in4_freq	U16	Hz				freq_en		2	40
		in4_coeff	F16	---				scaled_mode | voltage_mode		2	42
CT Plus Fashion	IN1	in1_pow_factor	F16	---	-1	1		ct_plus_mode		2	44
	IN 2	in2_pow_factor	F16	---	-1	1				2	46
	IN3	in3_pow_factor	F16	---	-1	1				2	48
											50
Virtual Channels (Computed via TTS JS Decoder											
CT Plus Fashion	IN1	in1_pow_app_VA	F64 (JS decoder)	VA				ct_plus_mode			
		in1_pow_act_W	F64 (JS decoder)	W							
		in1_pow_react_VAR	F64 (JS decoder)	VAR							
	IN 2	in2_pow_app_VA	F64 (JS decoder)	VA							
		in2_pow_act_W	F64 (JS decoder)	W							
		in2_pow_react_VAR	F64 (JS decoder)	VAR							
	IN3	in3_pow_app_VA	F64 (JS decoder)	VA							
		in3_pow_act_W	F64 (JS decoder)	W							
		in3_pow_react_VAR	F64 (JS decoder)	VAR							
	SUM IN1...3	sum_in123_pow_app_VA	F64 (JS decoder)	VA							
		sum_in123_pow_act_W	F64 (JS decoder)	W							
		sum_in123_pow_react_VAR	F64 (JS decoder)	VAR							

Group	Subgroup	Variable (may change, not finalized)	Data type	Unit	Value Min	Value Max	Comment	Depends on (config)	Meaning	bytes	Byte index
CT Mode	IN1	in1_ac_A	F64 (JS decoder)	A				ac_en AND scaled_mode			
		in1_dc_A	F64 (JS decoder)	A				dc_en AND scaled_mode			
	IN 2	in2_ac_A	F64 (JS decoder)	A				ac_en AND scaled_mode			
		in2_dc_A	F64 (JS decoder)	A				dc_en AND scaled_mode			
	IN3	in3_ac_A	F64 (JS decoder)	A				ac_en AND scaled_mode			
		in3_dc_A	F64 (JS decoder)	A				dc_en AND scaled_mode			
	IN4	in4_ac_A	F64 (JS decoder)	A				ac_en AND scaled_mode			
		in4_dc_A	F64 (JS decoder)	A				dc_en AND scaled_mode			
	SUM IN1...4	sum_in1234_ac_A	F64 (JS decoder)	A							
		sum_in1234_dc_A	F64 (JS decoder)	A							

Further technical data will be added here in due course.

7 FAQs

Q: I had a connection loss while installing an update and can no longer carry out the update successfully. How can I install the update?

A: Do the update in recovery mode.

If there is a connection loss during the update, the firmware must be reset completely and reinstalled. To do this, simply carry out the update for versions older than 1.0.0 as described in the appendix. That is, activate recovery mode and gently press and hold the reset button on the sensor with a blunt object until the update starts.

Q: Although the Harvy2 is connected to the web application, I do not receive a DevEUI for the connection to the LoRaWAN server, why is that?

A: Log out via “Disconnect” and then log in again via “Connect”.

In rare cases, a time-out error may occur when logging into the web application. In such cases, you do not see any DevEUI. After a new login, all information is accessible again.

Q: The values measured by the Harvy2 look strange. Why is that?

A1: First check the currents and, if necessary, measure with a current clamp. If the currents are plausible, but the power output is not, then check in the web application whether a voltage transformer used has been configured correctly.

If you use a voltage transformer, the correct factor must be set in the configuration setup. For deZem voltage transformers you will find the correct factors in Chapter 4.

However, slight shifts may still occur on site. In this case, it may be advisable to measure the voltage and adjust the transformer factor. If you are using a voltage transformer other than those from deZem or your measured values are slightly shifted, please contact us so that we can find out the factor together.

A2: Alternatively, check whether the polarity of the clamp-on current transformers and/or voltage transformer you are using is correct.

If a clamp-on current transformer was installed against the energy flow or a voltage transformer was used the wrong way around, the power values may be inverted. See Chapter 3.1 and Chapter 3.2.

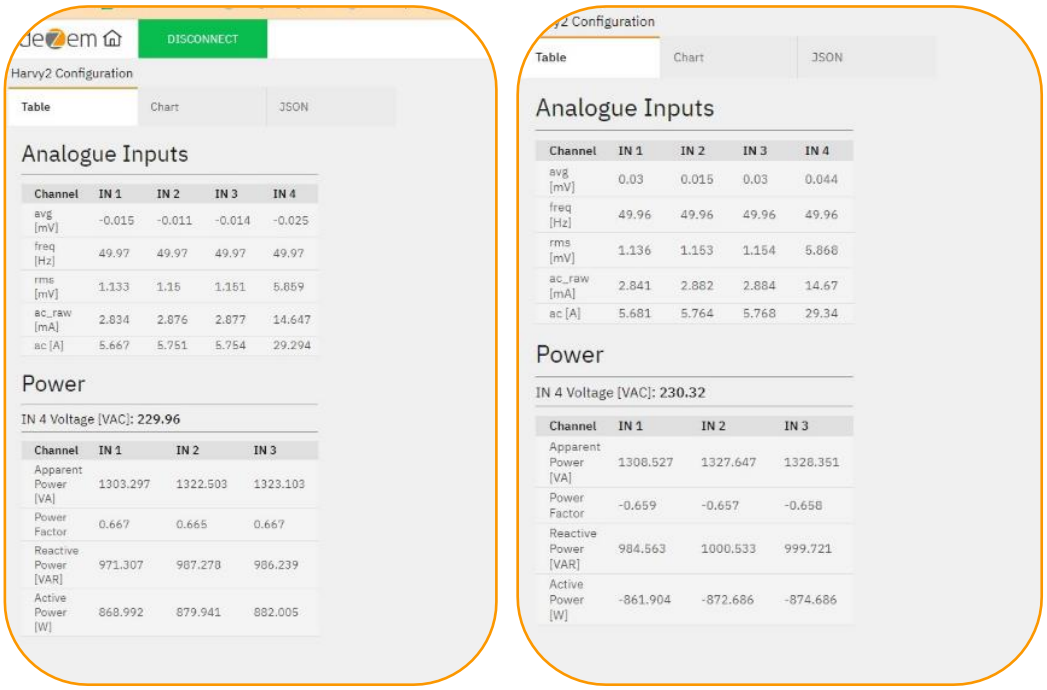


Figure 5: Positive values with correct polarity vs. inverse values with incorrect polarity

Q: What operating voltage does the Harvy2 need?

A: The Harvy2 requires an operating voltage of at least 2.8 V to record and send metering values.

The sensor draws its energy from the measurement signal without falsifying it metrologically by switching between measuring and charging ("energy harvesting"). The better the state of charge, the more frequently the sensor can transmit metering values. The more clamp-on current transformers are used, the faster the charging occurs. If the operating voltage falls below 2.8 V, the Harvy2 switches to sleep mode, where it still maintains a connection to the LoRaWAN server, but does no longer measure and send data. Below an operating voltage of 2.4 V, the connection to the LoRaWAN server is interrupted. The respective status is indicated by the flashing green LED. For details see Chapter 6.1 .

Q: Do all channels have to be used for the Harvy2 to operate "energy harvesting"?

A: Approx. 1 A on any of the measured wires is sufficient to supply the Harvy2 with enough energy for operation, i.e. approx. 200 W. The T80/26.6 folding current transformer from deZem is best suited for harvesting with very low currents. If a voltage converter is used or a permanent USB connection is established, the Harvy2 is constantly supplied with energy.

Q: Which browsers can I use to access the configuration application?

A: Preferably use Chrome or Edge.

The configuration application is suitable for the following operating systems and browsers:

- Windows, Linux: Chrome, Edge and Opera
- Android: Chrome, Edge, Opera mobile and Samsung Internet
- MAC OS: Chrome and Edge

The application does currently not work with Firefox and Safari and on iOS.

Q: I have installed the Harvy2, but the data transfer rate is slow. How can I fix this?

A: Reboot the sensor at the installation site or wait a few hours.

After installation and relocation to a different site, the Harvy2 automatically adjusts the data transfer rate by setting the optimal spreading factor and transmission power for the new location. This process can take several hours. The spreading factor influences both the transmission speed and the range, and the adjustment ensures efficient communication with the LoRaWAN server. For immediate optimisation, you can restart the sensor directly at the installation site. This results in faster adaptation, as the Harvy2 reconnects to the network and immediately sets the optimal spreading factor and the transmission power. You can simply reboot the device via the configuration interface. (Connect Harvy2, trigger a reboot, disconnect)

Q: My connection to Harvy2 is interrupted. What is the reason for this?

A: Check the preset data rate.

For the optimal data transmission, the data rate (ADR) must be configured correctly. With the current decoder and the latest firmware, this should be correctly preset. If you are experiencing problems, check the settings as described in chapter 4. If the problems persist, check whether you have stored the current decoder.

Q: I use several sensors of different types and noticed that the temperature values do not match. Are the values correct?

A: The Harvy2's temperature output refers to the built-in chip.

The temperature measurement of the Harvy2 does not refer to external temperatures, but to the internal temperature in the device, or to be more precise, to the built-in chip. Depending on the processing capacity and the current load, the temperatures of different sensors may vary.

Q: After an update I get a "DevNonce" error. What is the reason for this?

A: This is an error on the level of the LoRaWAN server. Set up the device again.

In specific cases (especially when updating prototypes), it may occur that the counters for sending LoRaWAN packets within the sensor and on the LoRaWAN server no longer match. One reason is that an update can lead to all LoRaWAN parameters in the sensor, including the counter, being reset, while the server remains unchanged. In this case, delete the affected sensor from the LoRaWAN server and set it up again to reset the counter there as well.

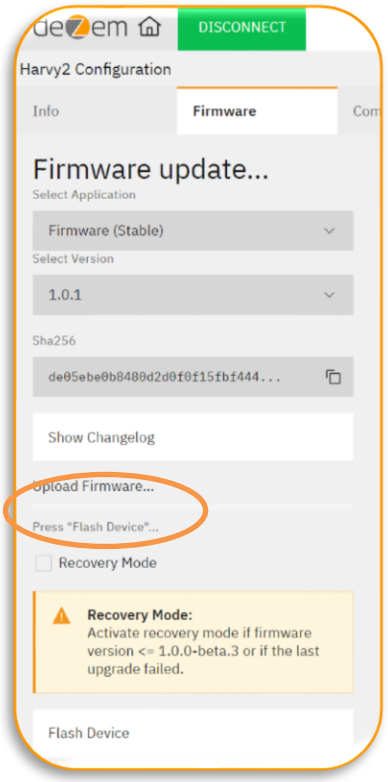
Appendix

I. Updates to firmware versions older than version 1.0.0

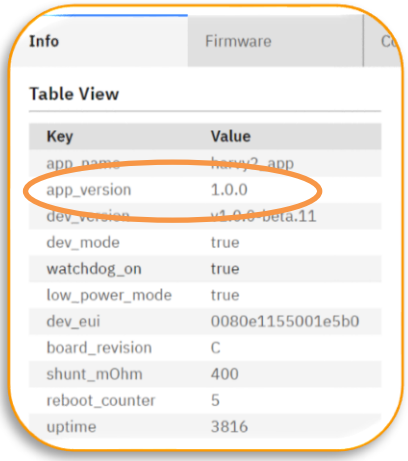
If the version currently installed on the Harvy2 is older than version 1.0.0, e.g. for prototypes, the following instructions apply for the installation of updates on the Harvy2.

Depending on the operating system, it may be necessary to install the USB driver “CP210x Universal Windows Driver” beforehand on your computer. The USB driver can be obtained here .

1. Connect the Harvy2 to the PC via USB-C using a suitable cable.
2. Open the Harvy2 web application: https://harvy2.dezem.io/
3. Select "Firmware Check and Update" under "Device" on the start page. The latest version of the firmware is preset there.
4. Activate “Recovery Mode” (tick the box).
5. Gently press and hold the reset button next to the Harvy2's USB-C port.
    - To avoid damage to the circuit board, please use a narrow but blunt object, e.g. a twist tie, that you insert vertically (not at an angle).
    - Please test the engagement of the internal reset button a few times and then keep it pressed.
6. With the reset button pressed, click on “Flash Device” in the web application.
7. In the window that now opens, select the sensor by clicking on the device name, then click on “Connect”.
8. As soon as the update progress bar starts, you can release the reset button.
9. Wait briefly until both the update progress bar and the subsequent check have run through.
10. If a time-out error occurs, refresh the page (press F5) and repeat the process.
11. Click on “Connect” in the web application, select the sensor and connect.
12. Check in the menu under “Info” whether the update was successful and the new firmware version is displayed, otherwise repeat the process.



13. Disconnect Harvy2 via “Disconnect” and unplug the USB-C cable.



Note that the decoder changed between prototype and version 1.0.0. If you have registered your Harvy2 as a prototype on a LoRaWAN server, you may need to update the decoder information there. The new decoder is can be obtained here .