



#### **Battery Monitoring Device**



# **OWNER'S MANUAL**

Model Numbers: 300Q, 300B8, 310Q, 310S, and 301Q





UL Listing applies to certain models only.



# **CONTENTS**

Introduction	3
Features	4
Technical Specifications	4
Dimensions	5
Installation	6
300Q	6
300B8	10
310Q	14
310S	19
301Q	24
Visual LED Indication	28
Connectivity	29
Frequently Asked Questions (FAQs)	32
Spare Parts	33



## INTRODUCTION



The information contained in this document is critical for safe handling and proper use of the iQ Mini™ battery monitoring device. It contains a global system specification as well as related safety measures, codes of behavior, a guideline for commissioning and recommended maintenance. This document must be retained and available for users working with and responsible for the battery monitoring device. All users are responsible for ensuring that all applications of the system are appropriate and safe, based on conditions anticipated or encountered during operation.

This owner's manual contains important safety instructions. Read and understand the sections on safety and operation of the battery monitoring device before operating the battery monitoring device and the equipment into which it is installed.

It is the owner's responsibility to ensure the use of the documentation and any activities related thereto, and to follow all legal requirements applicable to themselves and the applications in the respective countries.

This owner's manual is not intended to substitute for any training on handling and operating the iQ Mini™ battery monitoring device that may be required by local laws and/or industry standards. Proper instruction and training of all users must be ensured prior to any contact with the battery system.

For service, contact your sales representative or call:

#### **EnerSys EMEA**

EH Europe GmbH Baarerstrasse 18 6300 Zug, Switzerland Tel: +41 44 215 74 10

#### **EnerSys World Headquarters**

2366 Bernville Road Reading, PA 19605, USA Tel: +1-610-208-1991 +1-800-538-3627

#### **EnerSys APAC**

No. 85, Tuas Avenue 1 Singapore 639518 +65 6558 7333

www.enersys.com

Your Safety and the Safety of others is Very Important

A WARNING You can be killed or seriously injured if you don't follow instructions.

# **FEATURES & SPECIFICATIONS**

#### **Features**

- · Real time status
- · Low voltage alert
- iQ Mini<sup>™</sup> battery monitoring device can be installed on multiple battery types
- · Single polarity input, reverse protected
- External voltage tap—measuring total battery voltage and number of cells
- · Super bright LED indicators

- iQ Mini™ battery monitoring device mode status indicators
- Multiple connection types
- · Small and slim fit
- Simple to use
- · Easy to install
- Automatic data upload

# **Technical Specifications**

	300Q	300B8	310Q	310S	301Q
Battery Technology	TPPL Battery		Flooded Battery		TPPL Battery
Connection Types	FlexiTap (Q)	Bolt (B8)	FlexiTap (Q)	M4 Screw (S)	FlexiTap (Q)
Nominal Battery Voltage		6V, 48V, 80V d in after 30 mins.		6V, 48V, 80V ed in after 30 mins.	12V, 24V, 36V, 48V, 80V *Voltage is locked in after 30 mins.
Operating Voltage	4.5V – 3	88V MAX	4.5V – 3	B8V MAX	4.5V – 38V MAX
Voltage Measurement	4.5V	– 120V	4.5V	– 120V	4.5V – 120V
Operating Current 1.6mA – 10mA		1.6mA – 10mA		1.6mA – 10mA	
Operating Temperature	-20°C to +60°C	(-4°F to +140°F)	-20°C to +60°C	(-4°F to +140°F)	-20°C to +60°C (-4°F to +140°F)
Temperature Monitoring	Interna	ıl sensor	Interna	al sensor	External sensor
Wireless Range	Up to 100m/328	ft (Unobstructed)	Up to 100m/328	ft (Unobstructed)	Up to 100m/328ft (Unobstructed)
Data Storage		ve data and data packets		ve data and data packets	Cumulative data and last 9 cycle data packets
Data Collection	Via gate	eway/app	Via gate	eway/app	Via gateway/app
Power Consumption	Nomina	al current	Nomina	al current	Nominal current
Protection		e and reverse protection		e and reverse protection	Overvoltage and reverse polarity protection
Physical Dimensions		m (W) x 20 mm (H)/ in (W) x 0.79 in (H)		m (W) x 20 mm (H)/ in (W) x 0.79 in (H)	80 mm (L) x 29 mm (W) x 20 mm (H)/ 3.14 in (L) x 1.14 in (W) x 0.79 in (H)

300Q	300B8	310Q	310S	301Q

**2014/53/EU - Radio Equipment** Safety: EN 62368-1:2014+A11:2017 EMC: EN IEC 61326-1:2021

Radio Frequency: EN IEC 62311:2020 / EN 50385:2017/EN 50665:2017

EN 300 328 V2.1.1 (2016-11) EN 300 328 V2.2.2

EN 301 489-17 - V3.2.0 Compliance 2011/65/EU - Restriction of the use of certain hazardous substances RoHS: EN 62321-8:2017 EN 62321-3-1:2013

EN 62321-4:2013/AMD1:2017

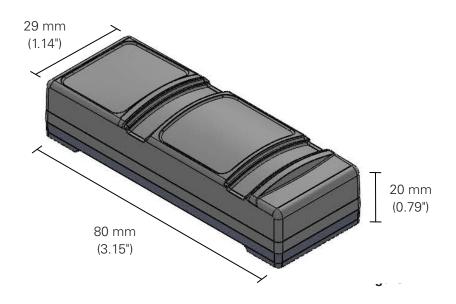
EN 62321-5:2013 EN 62321-6:2015

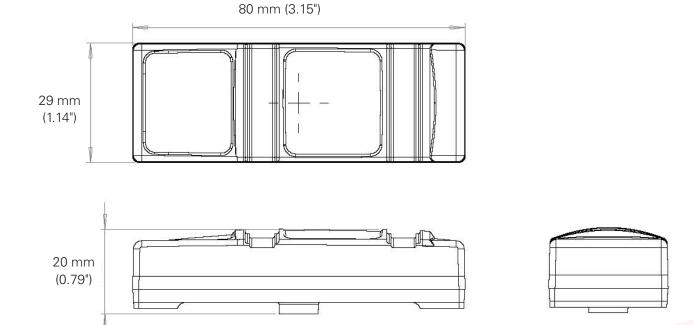
EN 62321-7-1:2015, EN 62321-7-2:2017

# **DIMENSIONS**

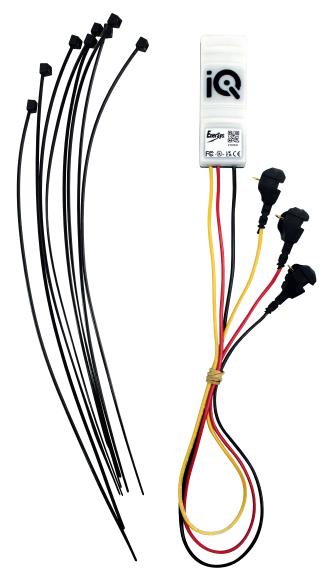
# **Dimensions**

IQ mini™ Battery Monitoring Device Overall Dimensions Figure 1: iQ Mini™ Battery Monitoring Device Dimensions





Installation: Model No. 300Q



The iQ Mini<sup>™</sup> battery monitoring device - 300Q is a battery life monitor that provides real-time status and is intended for use on 12V to 80VTPPL batteries.

The iQ Mini<sup>™</sup> battery monitoring device monitors and records cycles, temperatures, and automatically sends this data to a gateway or app for visualisation online.

It provides LED indications for overtemperature and communication. If the status of the battery is OK and the device is working OK, it will flash green every 10 seconds.

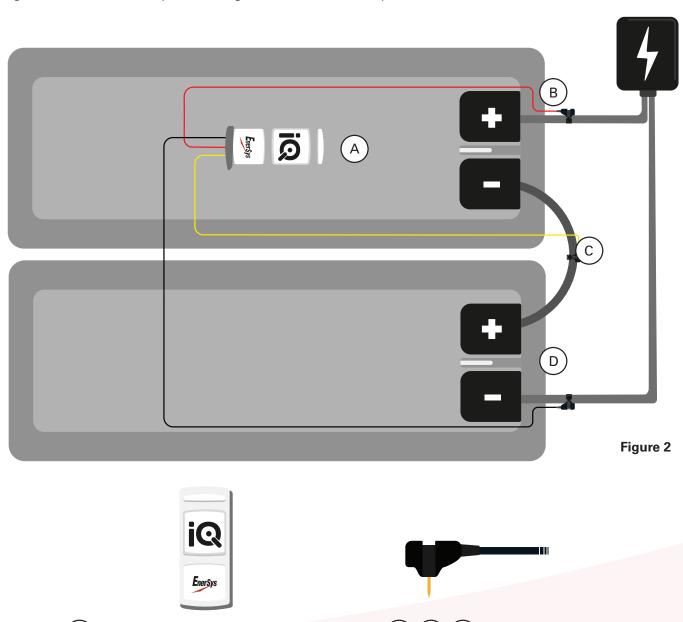
## Installation: Model No. 300Q (cont.)



Sample cells layout

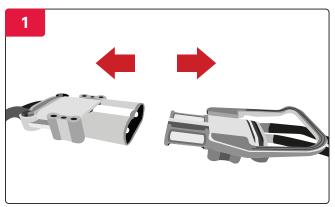
Figure 2: iQ Mini™ Battery Monitoring Device Final Assembly on 24VTPPL Batteries

iQ Mini™ Battery Monitoring Device - 300Q

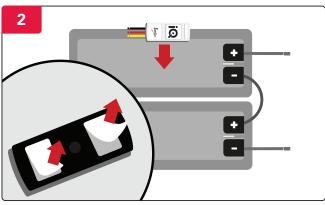


Connection - Q

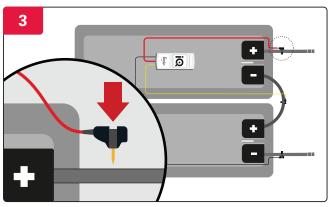
#### Installation: Model No. 300Q (cont.)



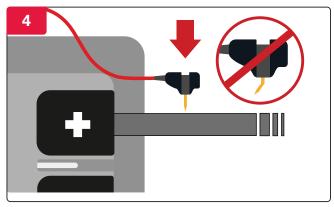
Ensure the voltage is between 2.0 and 2.25 volts per cell before installation.



Attach the iQ Mini™ Battery Monitoring Device to the top of the battery.

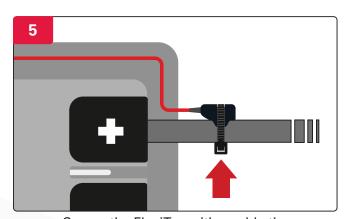


Connect the red cable to the positive terminal.

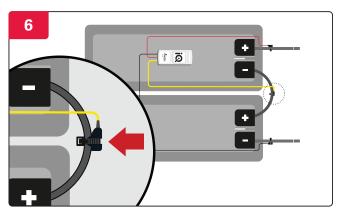


Insert the FlexiTap into the centre of the cable to ensure a good connection.

**NOTE**: Make sure it is positioned in the centre of the cable, taking care not to bend the pin.



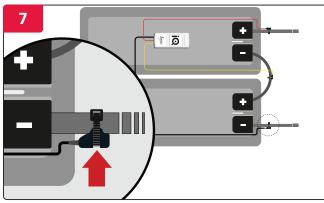
Secure the FlexiTap with a cable tie.



Connect the yellow cable to 12V/24V from the negative terminal.

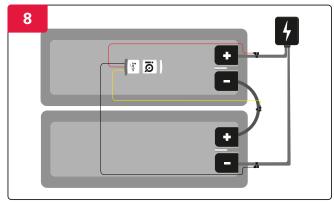
NOTE: Only connect at 24V for 80V batteries.

#### Installation: Model No. 300Q (cont.)

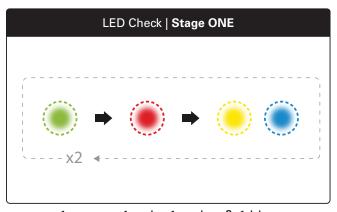


Connect the black cable to the negative terminal.

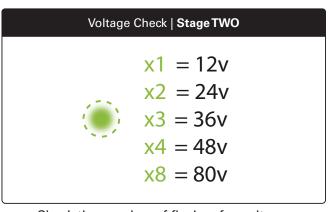
The black cable must be connected last.



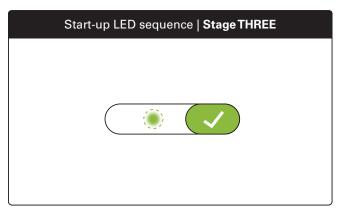
Once the power has been connected, check the following start-up LED sequence.



1 green > 1 red > 1 amber & 1 blue This flashing pattern will repeat twice before the next stage.



Check the number of flashes for voltage.



The LED flashes once to show the current battery status.

**NOTE**: For LED indications please refer to Figure 7 or 8.

Installation: Model No. 300B8



The iQ Mini™ battery monitoring device - 300B8 is a battery life monitor that provides real-time status and is intended for use on 12V to 80VTPPL batteries.

The iQ Mini<sup>™</sup> battery monitoring device monitors and records cycles, temperatures, and automatically sends this data to a gateway or app for visualisation online.

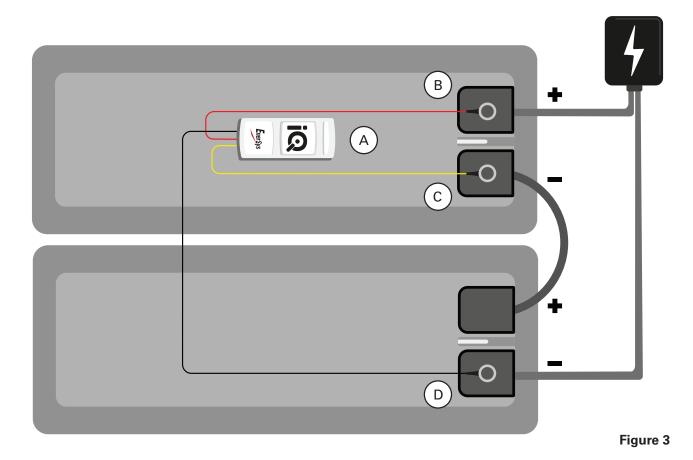
It provides LED indications for overtemperature and communication. If the status of the battery is OK and the device is working OK, it will flash green every 10 seconds.

## Installation: Model No. 300B8 (cont.)



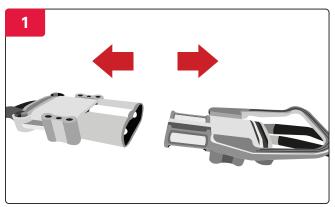
Sample cells layout

Figure 3: iQ Mini™ Battery Monitoring Device Final Assembly on 24VTPPL Batteries

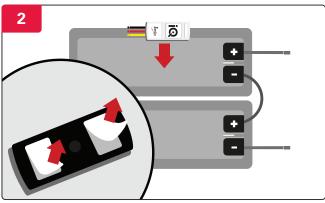




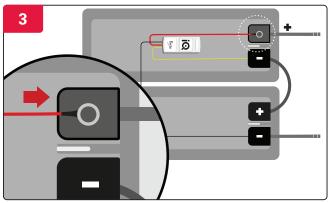
## Installation: Model No. 300B8 (cont.)



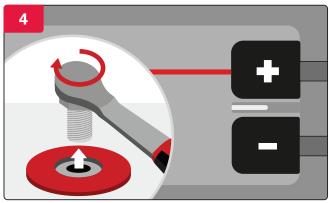
Ensure the voltage is between 2.0 and 2.25 volts per cell before installation.



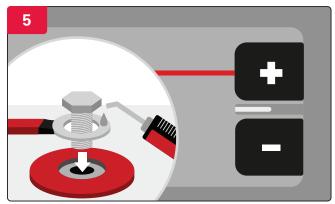
Attach the iQ Mini™ battery monitoring device to the top of the battery.



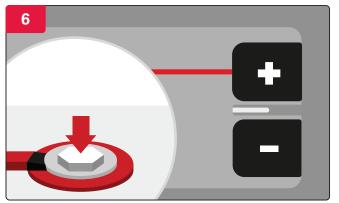
Connect the red cable to the positive terminal.



Remove the terminal bolt.



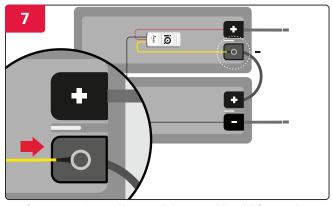
Apply the grease between the bolt and the ring terminal.



Make sure the bolt is firmly attached to the terminal.

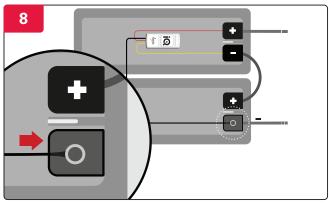
(\*N.B. Tighten the bolt to manufacturer-recommended torque settings.)

#### Installation: Model No. 300B8 (cont.)



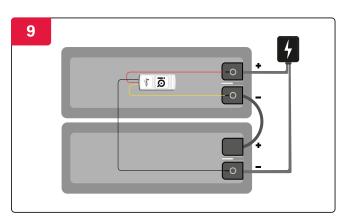
Connect the yellow cable to 12V/24V from the negative terminal.

(\*N.B. Only connect at 24V for 80V batteries)

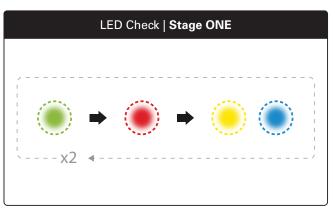


Connect the black cable to the negative terminal.

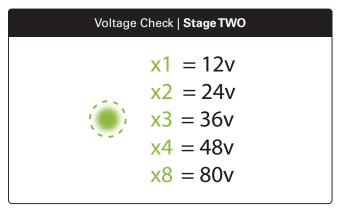
The black cable must be connected last.



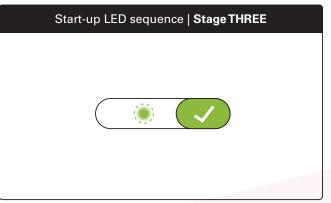
Once the power has been connected, check the following start-up LED sequence.



1 green > 1 red > 1 amber & 1 blue This flashing pattern will repeat twice before the next stage.



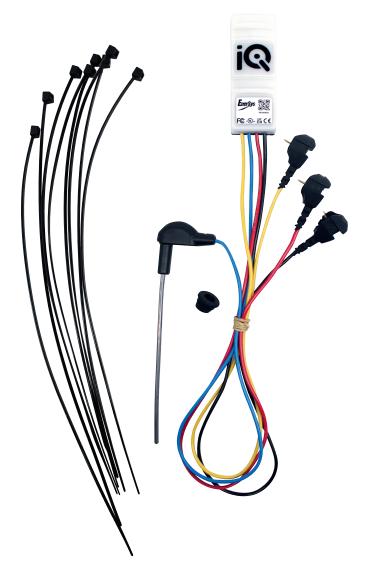
Check the number of flashes for voltage.



The LED flashes once to show the current battery status.

NOTE: For LED indications please refer to Figure 7 or 8.

#### Installation: Model No. 310Q



The iQ Mini<sup>™</sup> battery monitoring device - 310Q is a battery life monitor that provides real-time status and is intended for use on 12V to 80V flooded batteries.

The iQ Mini<sup>™</sup> battery monitoring device monitors and records cycles, temperatures, and automatically sends this data to a gateway or app for visualisation online.

It provides LED indications for electrolyte status, overtemperature and communication. If the electrolyte status of the battery is OK and the device is working, it will flash green.

## Installation: Model No. 310Q (cont.)

**Tools required** 



Sample cells layout

Figure 4: iQ Mini™ Battery Monitoring Device Final Assembly on 48V Flooded Batteries

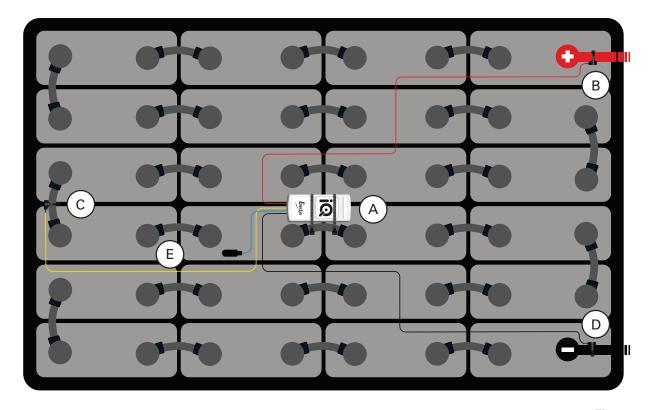
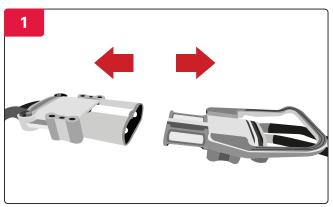


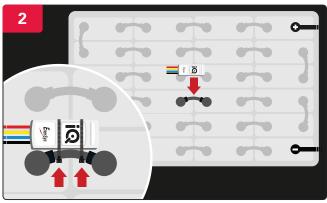
Figure 4



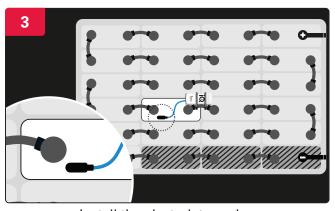
# Installation: Model No. 310Q (cont.)



Ensure the voltage is between 2.0 and 2.25 volts per cell before installation.

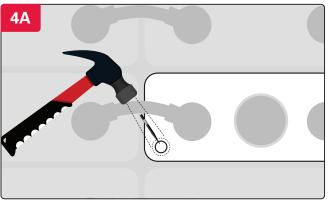


Attach the iQ Mini™ battery monitoring device to the battery and secure it with cable ties.

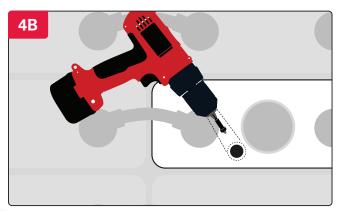


Install the electrolyte probe.

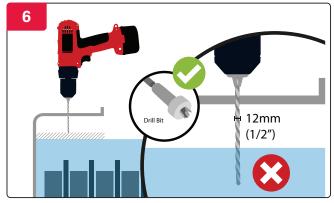
\*Probe can be installed in any cells apart from the first three cells from the negative battery terminal.



Punch a hole.

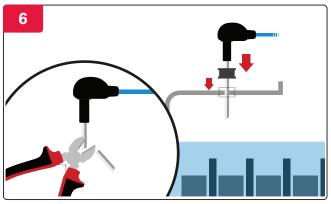


OR drill a hole.

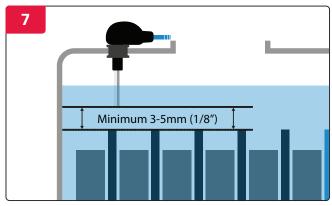


Make sure the drill does not touch the electrolyte.

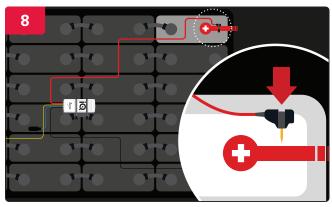
## Installation: Model No. 310Q (cont.)



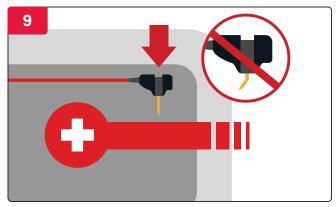
Trim the probe to the correct length and place it into the battery.



Make sure the probe is at least 3–5 mm (1/8 inch) above the plate.

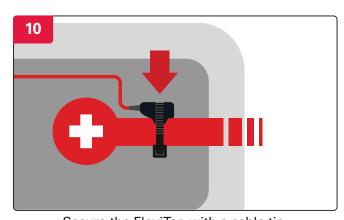


Connect the red cable to the positive terminal.

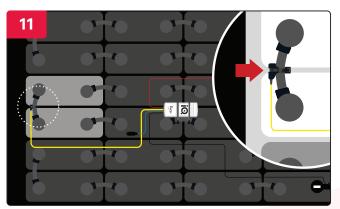


Insert the FlexiTap into the centre of the cable to ensure a good connection.

\*Make sure it is positioned in the centre of the cable, taking care not to bend the pin.



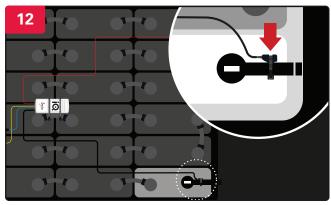
Secure the FlexiTap with a cable tie.



Connect the yellow cable to 12V/24V from the negative terminal.

NOTE: Only connect at 24V for 80V batteries.

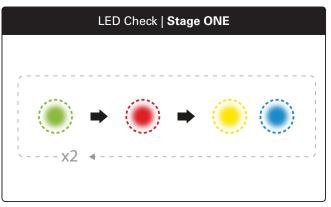
## Installation: Model No. 310Q (cont.)



Connect the black cable to the negative terminal.

Once the power has been connected, check the following start-up LED sequence.

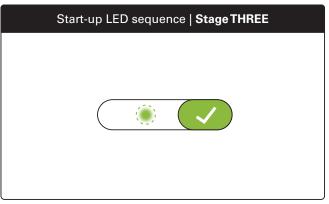
The black cable must be connected last.



1 green > 1 red > 1 amber & 1 blue This flashing pattern will repeat twice before the next stage.

#### 

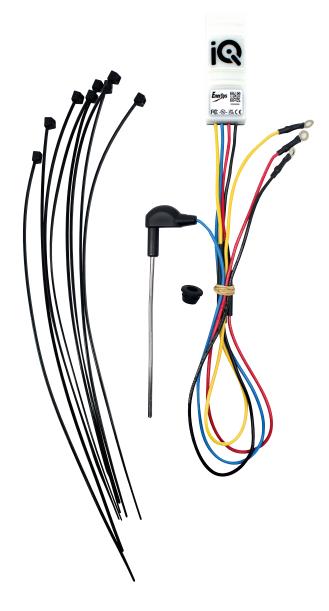
Check the number of flashes for voltage.



The LED flashes once to show the current battery status.

NOTE: For LED indications please refer to Figure 7 or 8.

#### Installation: Model No. 310S



The iQ Mini<sup>™</sup> battery monitoring device - 310S is a battery life monitor that provides real-time status and is intended for use on 12V to 80V flooded batteries.

The iQ Mini<sup>™</sup> battery monitoring device monitors and records cycles, temperatures, and automatically sends this data to a gateway or app for visualisation online.

It provides LED indications for electrolyte status, overtemperature and communication. If the electrolyte status of the battery is OK and the device is working, it will flash green.

## Installation: Model No. 310S (cont.)

**Tools required** 











Sample cells layout

Figure 5: iQ Mini™ Battery Monitoring Device Final Assembly on 48V Flooded Batteries

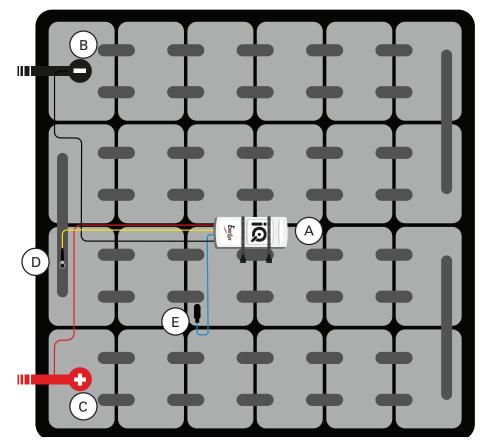


Figure 5





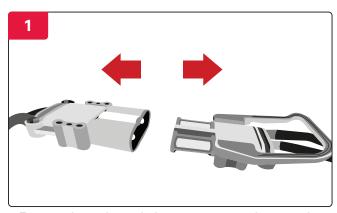




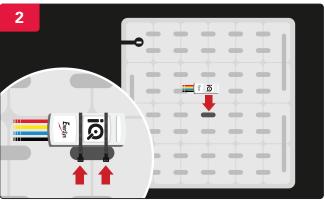




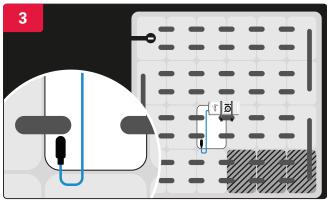
# Installation: Model No. 310S (cont.)



Ensure the voltage is between 2.0 and 2.25 volts per cell before installation.

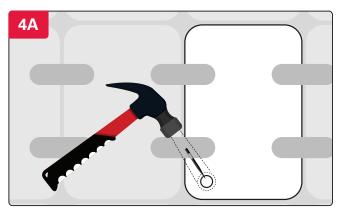


Attach the iQ Mini™ battery monitoring device to the battery and secure it with cable ties.

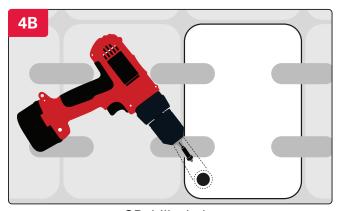


Install the electrolyte probe.

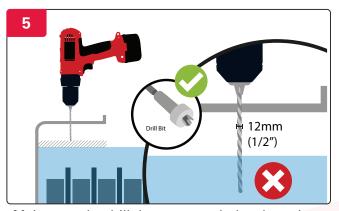
**NOTE**: Probe can be installed in any cells apart from the first three cells from the negative battery terminal.



Punch a hole.

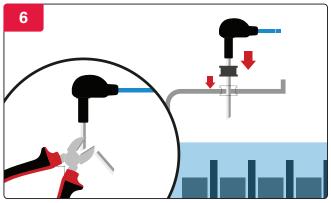


OR drill a hole.

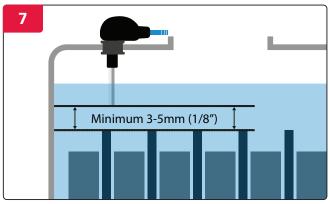


Make sure the drill does not touch the electrolyte.

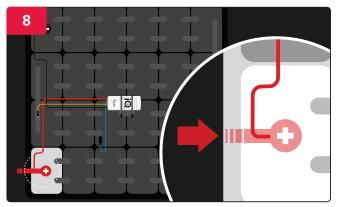
## Installation: Model No. 310S (cont.)



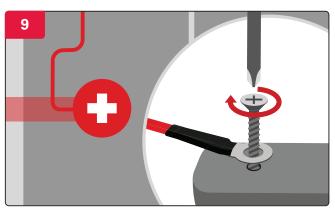
Trim the probe to the correct length and place it into the battery.



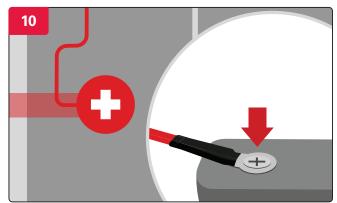
Make sure the probe is at least 3–5mm (1/8 inch) above the plate.



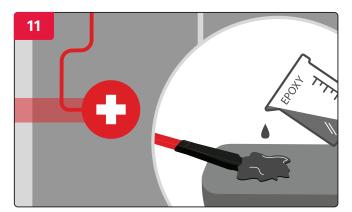
Connect the red cable to the positive terminal.



Screw the M4 connection to the terminal.

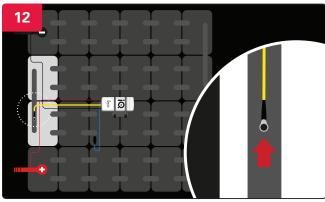


Make sure the M4 connection firmly attached to the battery.



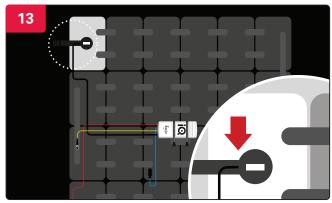
Apply epoxy on top of the screw.

## Installation: Model No. 310S (cont.)



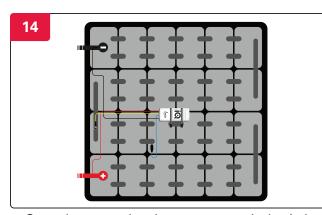
Connect the yellow cable to 12V/24V from the negative terminal.

NOTE: Only connect at 24V for 80V batteries.

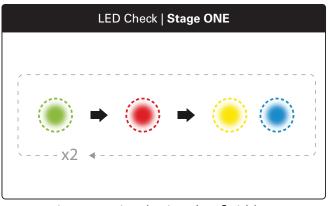


Connect the black cable to the negative terminal.

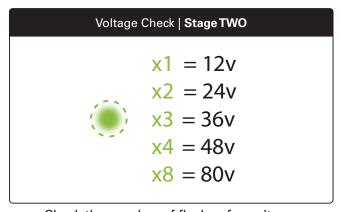
The black cable must be connected last.



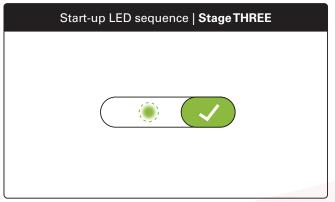
Once the power has been connected, check the following start-up LED sequence.



1 green > 1 red > 1 amber & 1 blue This flashing pattern will repeat twice before the next stage.



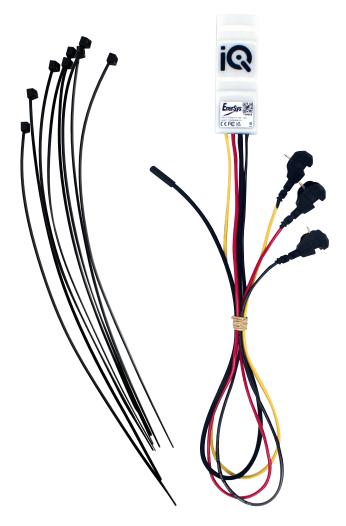
Check the number of flashes for voltage.



The LED flashes once to show the current battery status.

NOTE: For LED indications please refer to Figure 7 or 8.

Installation: Model No. 301Q



The iQ Mini<sup>™</sup> battery monitoring device - 301Q is a battery life monitor that provides real-time status and is intended for use on 12V to 80VTPPL batteries.

The iQ Mini<sup>™</sup> battery monitoring device monitors and records cycles, temperatures, and automatically sends this data to a gateway or app for visualisation online.

It provides LED indications for overtemperature and communication. This variant has an external temperature sensor.

## Installation: Model No. 301Q (cont.)

**Tools required** 





Sample cells layout

Figure 6: iQ Mini™ Battery Monitoring Device Final Assembly on 48VTPPL Batteries

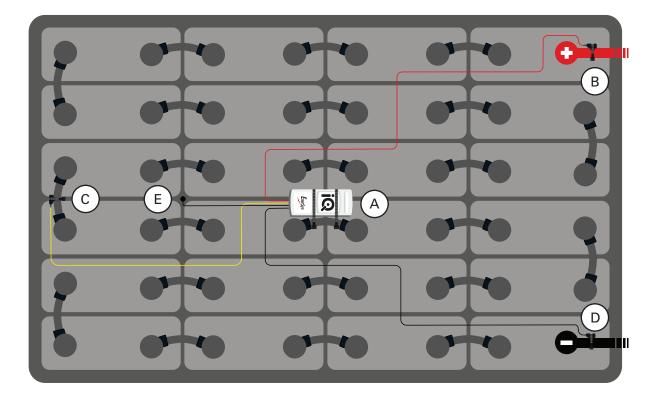
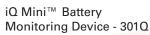


Figure 6



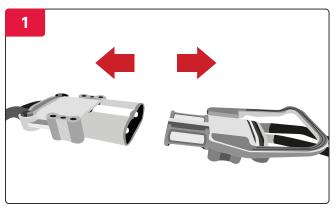




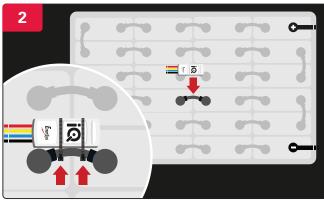




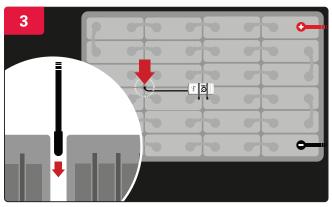
## Installation: Model No. 301Q (cont.)



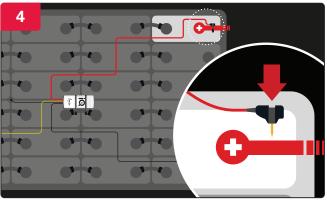
Ensure the voltage is between 2.0 and 2.25 volts per cell before installation.



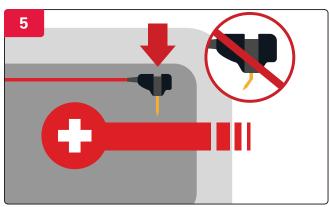
Attach the iQ Mini™ battery monitoring device to the battery and secure it with cable ties.



Install the temperature sensor probe.

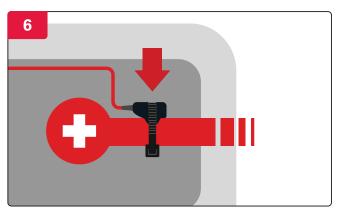


Connect the red cable to the positive terminal.



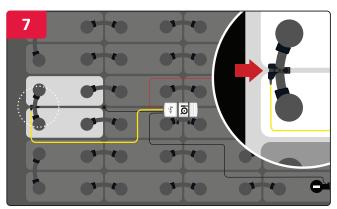
Insert the FlexiTap into the centre of the cable to ensure a good connection.

\*Make sure it is positioned in the centre of the cable, taking care not to bend the pin.



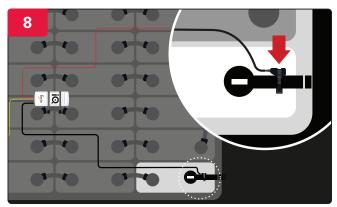
Secure the FlexiTap with a cable tie.

#### Installation: Model No. 301Q (cont.)



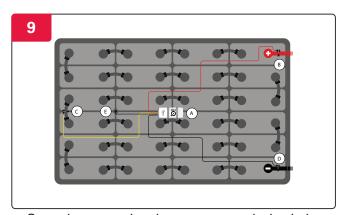
Connect the yellow cable to 12V/24V from the negative terminal.

(\*N.B. Only connect at 24V for 80V batteries)

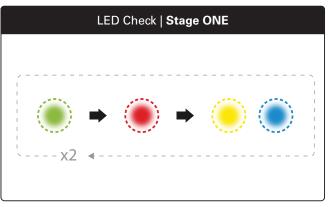


Connect the black cable to the negative terminal.

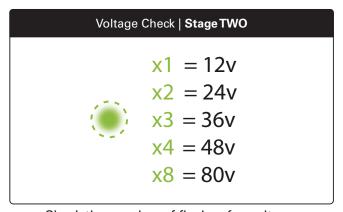
The black cable must be connected last.



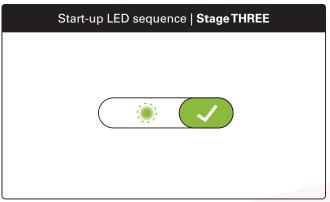
Once the power has been connected, check the following start-up LED sequence.



1 green > 1 red > 1 amber & 1 blue This flashing pattern will repeat twice before the next stage.



Check the number of flashes for voltage.



The LED flashes once to show the current battery status.

NOTE: For LED indications please refer to Figure 7 or 8.

# VISUAL LED INDICATION

#### **Visual LED Indication**

#### **Automatic Voltage Detection**

The iQ Mini™ battery monitoring device automatically detects the battery voltage. This is indicated by the green LED flash just after the initial boot-up sequence. Refer to the table below for the voltage detected by the iQ Mini™ battery monitoring device.

IMPORTANT: For the iQ Mini™ battery monitoring device to detect the correct voltage, the volts per cell must be between 2.0 and 2.25 vpc during installation.

#### **Tap Connection**

Number of Flashes	Cells Sensed (Cells)	Nominal Voltage (Voltage)
1	6	12
2	12	24
3	18	36
4	24	48
8	40	80

72V needs to be ordered separately.

#### **LED Indications**

Figure 7: LED Indications for 300Q, 300B8 & 301Q

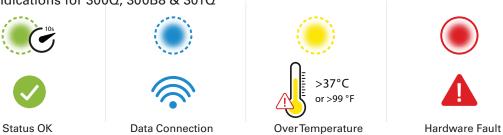
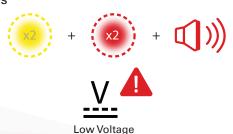


Figure 8: LED Indications for 310Q & 310S



Figure 9: Low Voltage Alert Indications



# **CONNECTIVITY**

# Connectivity

iQ gateway™ Battery Data Transmitter



The iQ GATEway™ battery data transmitter automatically collects the data from any iQ Mini™ battery monitoring devices that are within range and uploads the data directly to the online portal.

This data is available in real time and shows the status of the connected devices.

# CONNECTIVITY

# Connectivity (cont.)

**Tools required** 

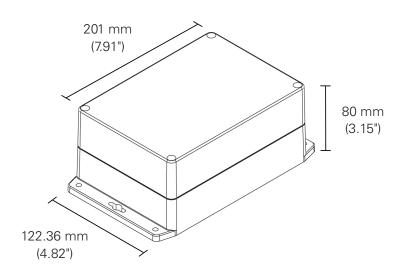


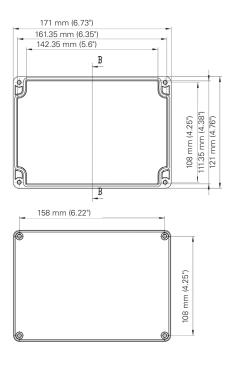




iQ GATEway™ BATTERY DATATRANSMITTER Overall Dimensions

Figure 106: iO GATEway™ Battery Data Transmitter Dimensions

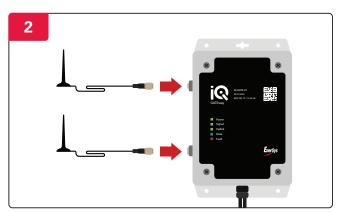




#### iQ GATEway™ Battery Data Transmitter Installation



Mount the control box to the wall using four screws/anchors and a level. Make sure it is firmly attached to the wall.

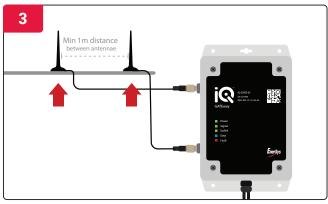


Attach antennae to the iQ GATEway $^{\text{TM}}$  battery data transmitter.

<sup>\*</sup>All dimensions are given in mm (inch).

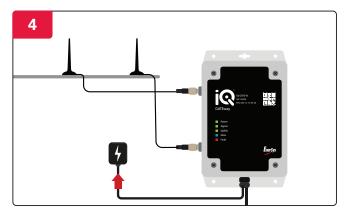
# **CONNECTIVITY**

# Connectivity (cont.)



Place both antennae as high as possible to maximise signal.

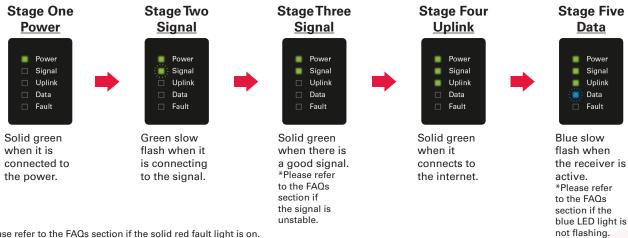
NOTE: Keep at least 1m distance between the antennae.



Powering the device.

#### **Start-up LED Sequence**





<sup>\*</sup>Please refer to the FAQs section if the solid red fault light is on.

## **CONNECTIVITY & FAQs**

# Connectivity (cont.)

#### **Installation Locations**

Recommended Locations	Avoid Locations
Battery Room	Exterior Location
Main Charging Area	Humid Areas (e.g. Boiler Room)
Central Location	Enclosed Spaces
Central Doorway	Metal Clad Areas

## Frequently Asked Questions (FAQs)

iQ Mini™Battery Monitoring Device

What data does the iQ Mini™ battery monitoring device monitor and record?



The iQ Mini™ battery monitoring device monitors and records battery voltage, temperature, electrolyte level, and battery status (i.e. real-time charge/discharge status). Additionally, it monitors and records cycles, average and min/max temperatures, min/max voltages, life history, and any abuse of the battery – overtemperature, over-discharge, and low electrolyte. This data can be visualized online or with the app and uploaded via a gateway.



I have connected the wires but there are no lit LEDs on the iQ Mini™ battery monitoring device. Check that the connections have been made in the correct sequence across the correct voltage. If these are all correct, the device may be defective. Contact your local EnerSys® service location.



What is the purpose of the green LED flash during the initial boot-up sequence?

The purpose of the green LED flash during the initial boot-up sequence is to indicate the detected battery voltage. The number of green LED flashes corresponds to the voltage of the battery. For example, one

green flash indicates a 12V battery, two green flashes indicate a 24V battery, and so on, up to eight green flashes indicating an 80V battery. This LED indication helps users verify that the iQ Mini™ battery monitoring device has correctly detected the battery voltage and is ready for operation. When installing the iQ Mini™ battery monitoring device, this must be checked.



I have connected the device and the iQ Mini<sup>™</sup> battery monitoring device powers up, but the number of green flashes does not match the voltage of the battery.

This may mean that the iQ Mini<sup>™</sup> battery monitoring device has been powered up in the incorrect sequence. Disconnect the wires and reinstall, ensuring that the yellow wire is connected before the red and black wires. The iQ Mini<sup>™</sup> battery monitoring device must be installed when the voltage is between 2.0 and 2.25 volts per cell.



I have installed the electrolyte probe, but the LED indication is not correct.

First, ensure that the electrolyte probe is not installed in the first 3 cells from the negative take-off lead. The probe must not be touching any plates or separators inside the cell. If this has been confirmed and the problem persists, contact your local EnerSys® service location.



There is a rapid flashing amber LED on the iQ Mini™ battery monitoring device – what does this mean? The flashing amber means the voltage range is not correct. Ensure that the red and black wires are connected across 12V, 18V, or 24V only. It can also mean that the voltage is not stable. Ensure that the charger has been disconnected and the battery has had enough time to reach a voltage between 2.0 and 2.25 volts per cell.



There is a flashing red indication on the iQ Mini™ battery monitoring device – what does this mean? Flashing red indicates that the electrolyte level is low.



There is a solid red LED indication on the iQ Mini™ battery monitoring device – what does this mean? The red LED indicates a fault – please contact your local EnerSys® service location for support.



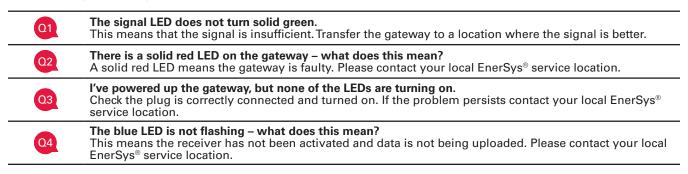
I have installed the gateway and the iQ Mini™ battery monitoring device, but I can't see the real-time status online.

The gateway must be assigned to the site online before it is installed and powered up. For further information contact your local EnerSys® service location.

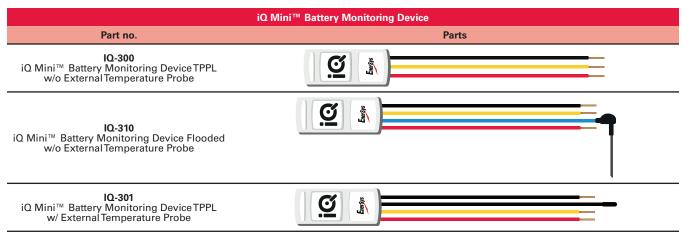
# **FAQS & SPARE PARTS**

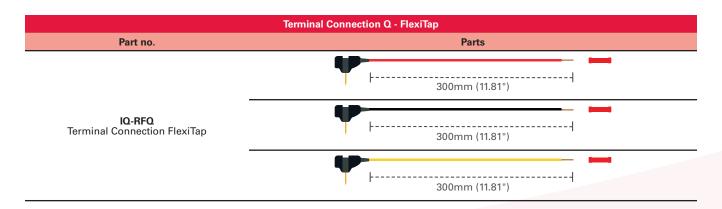
# Frequently Asked Questions (FAQs) (cont.)

iQ GATEway™ Battery Data Transmitter



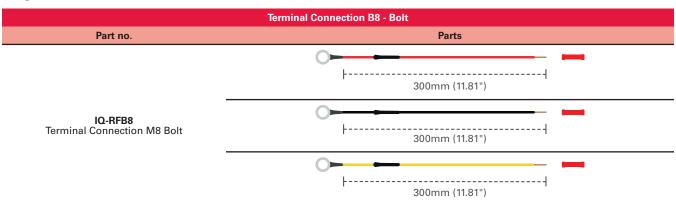
## Spare Parts

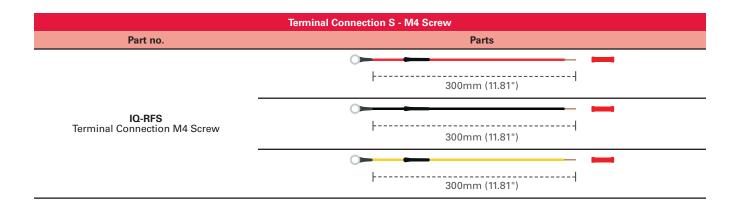


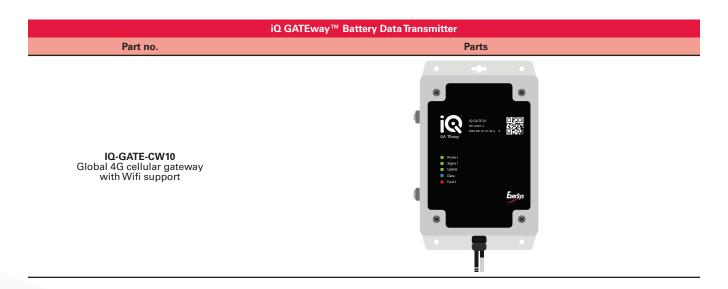


# **SPARE PARTS**

# Spare Parts (cont.)







# NOTES

# Notes

# www.enersys.com © 2024 EnerSys. All rights reserved. Unauthorised distribution prohibited. Trademarks and logos are the property of EnerSys and its affiliates except UL, CE, UKCA, IEC, Android, and iOS, which are not the property of EnerSys. Subject to revisions without prior notice. E.&O.E. GLOB-EN-OM-IQM-0924 Fower/Full Solutions