Modbus-RTU Master Datasheet

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iQ
HOME

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Contents

1 Introduction

IQ Home ModBus-RTU master device enables access to ModBus-RTU slave devices over IQRF Network. Using Modbus-RTU master device users are able to send Modbus RTU requests and receive Modbus RTU responses. The Modbus-RTU master device bridges the IQRF Network and the RS-485 communication Modbus-RTU network. The device implements slave role on IQRF Network side and Master role on RS-485 Modbus-RTU network side. ModBus-RTU master device can handle up to 31 slave devices on RS-485 Modbus-RTU network side.

1.1 Typical usage

With IQ Home ModBus-RTU master device the user can access and control ModBus-RTU devices from the cloud.

Typical request data flow:
Cloud Software ➡ [Internet connection / MQTT protocol] ➡ **IQ Home Gateway** ➡ [IQRF Network] ➡ **IQ Home ModBus RTU Master** ➡ [Modbus RTU on RS485] ➡ **Modbus slave device**

Typical response data flow:
Modbus slave device ➡ [Modbus RTU on RS485] ➡ **IQ Home ModBus RTU Master** ➡ [IQRF Network] ➡ **IQ Home Gateway** ➡ [Internet connection / MQTT protocol] ➡ **Cloud Software**

Next pictures show the typical usage architecture:
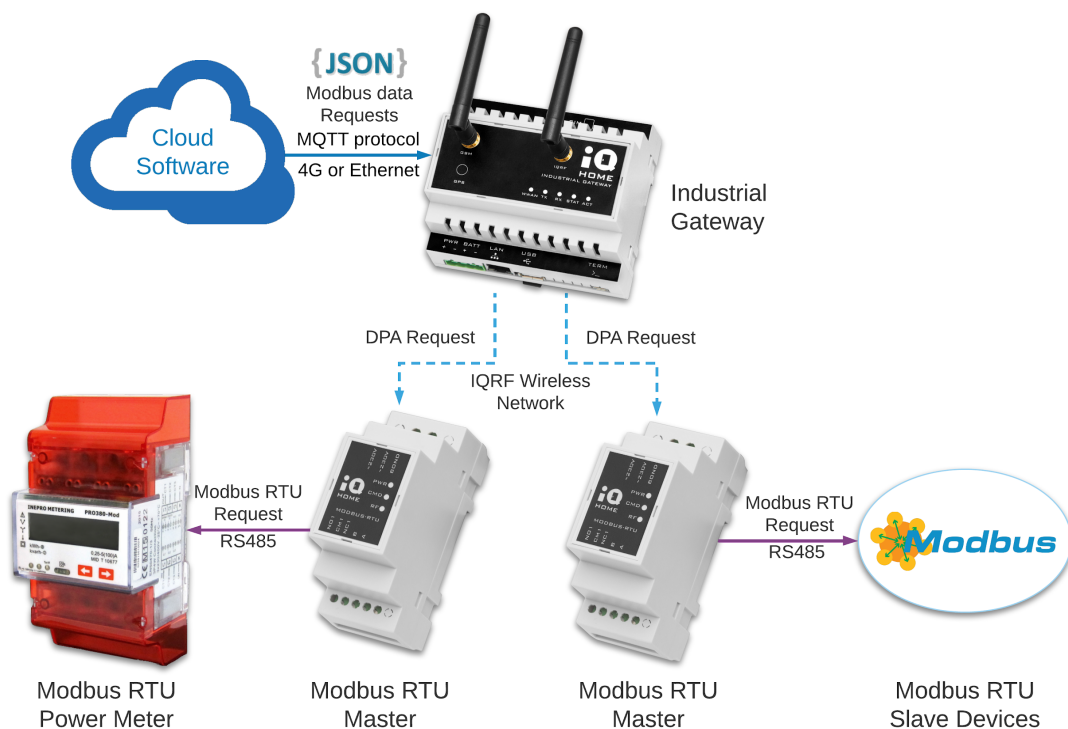
2 Product models

Model ID	Product name	Input power	RS-485
MB-RTU-01/230	ModBus-RTU master device	230V AC	✔
MB-RTU-01/24	ModBus-RTU master device	24V DC	✔

2.1 Key features

- Modbus-RTU device calculates and checks the CRC-16 error check fields. Users don't need to care about it.
- Modbus-RTU master device can address up to 31 slave devices. From slave device address 0x01 to 0x1F.
- Modbus-RTU master device can send broadcast messages. Broadcast address is 0x00.
- Automatic Time-Out control. Modbus-RTU master device generates time-out response, if the device doesn't receive any response from the slave device.
- Automatic Request resend mechanism. Modbus-RTU master device automatically re-sends the Modbus-RTU request, if the device doesn't receive any response or receives corrupted response from the slave device.
- Modbus-RTU master device communicate with two different mode:
  - **default: 1 start bit 8 data bits -> least significant bit sent first -> 1 bit for Even parity -> 1 stop bit**
  - 1 start bit -> 8 data bits -> least significant bit sent first -> 2 stop bits (no parity)

- Modbus-RTU master device can communicate with different Baud rates. Supported Baud rates:
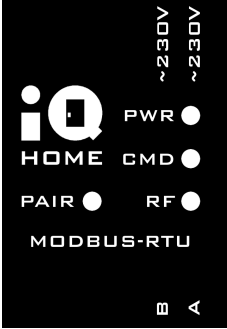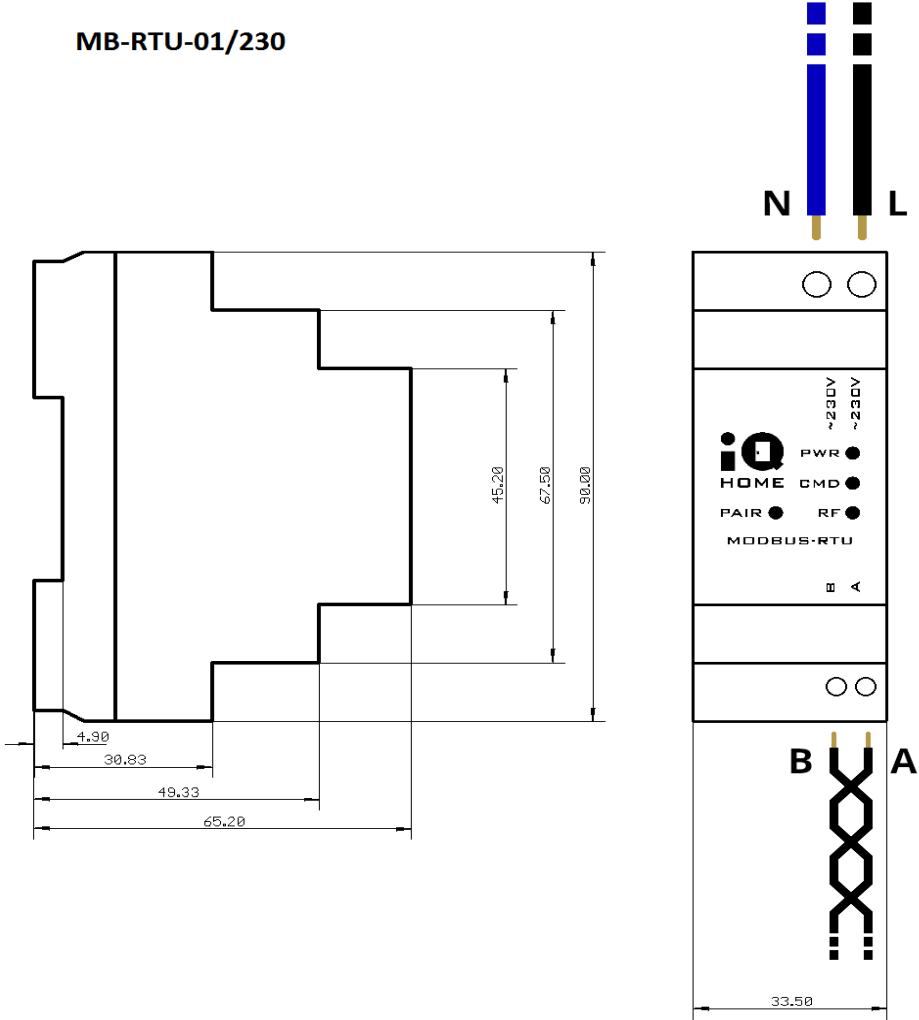 - 1200, 2400, 4800, **default: 9600,** 19200, 38400, 57600, 115200
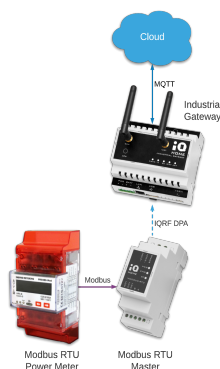
3 Specifications

RF Specification	
Communication technology	IQRF - DPA
Communication module	DCTR-76DA
IQRF-OS version	4.02D
Antenna	Internal, PCB
Local state feedback	
Power on	PWR is lighting
Active RS-485 communication	CMD is blinking
Active RF communication	RF is blinking
Environmental conditions	
Storage temperature	from -40°C to +85°C
Operation temperature	from -40 °C to +85 °C
Relative humidity	from 10 % to 85 %
Electrical specification	
Input voltage - MB-RTU-01/230	85-265 VAC (47-63 Hz) or 120-370 VDC
Input voltage - MB-RTU-01/24	6-24 VAC (47-63 Hz) or 9-36 VDC
Galvanic isolation	Main power is galvanic isolated from RS-485 bus
Power consumption	<0.5W
Mechanical and enclosure specification	
Product dimension (outline)	Box 33,5mm(W) x 65,2mm(D) x 90mm(H)
Mount type	Din Rail mountable
Enclosure material	ABS
Body colour	Light gray
Product weight	90 g
Enclosure protection level	IP35

All setup should be examined by a qualified technician!

4 Dimensions and Setup

MB-RTU-01/230

MB-RTU-01/24

45.20

67.50

90.00

4.90

30.83

49.33

65.20

+ −
12-36
VDC

iQ
HOME

PWR

CMD

PAIR

RF

MODBUS-RTU

B   A

33.50

+ −
12-36
VDC

iQ
HOME

PWR

CMD

PAIR

RF

MODBUS-RTU
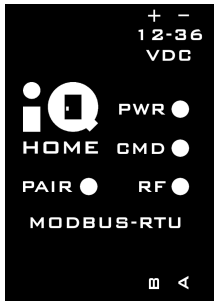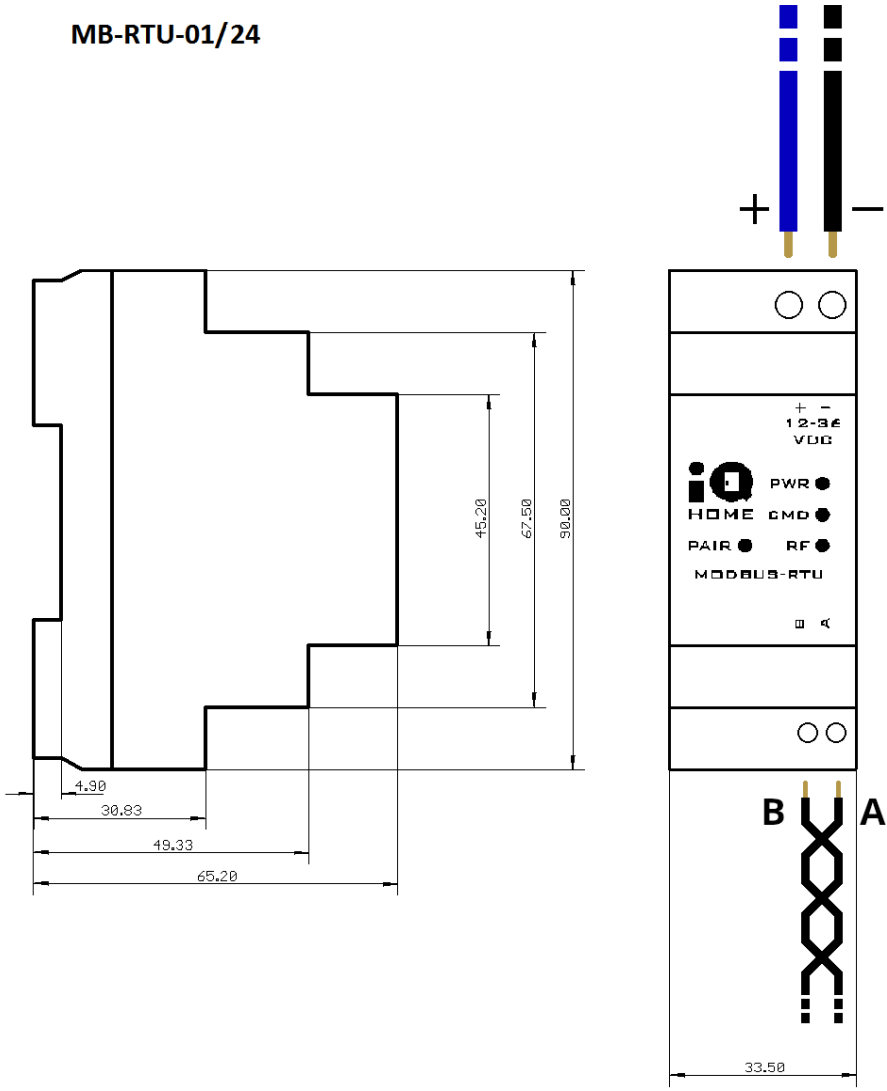
4.1 Add or remove device from the RF network

The device can be add/remove from the network with the PAIR button.

4.1.1 Add device to the RF network (Bonding)

To use DPA, all Nodes in the network must be bonded to the Coordinator.
In case the Node is already bonded the red LED once shortly flashes after power on.
If the node is not bonded the red LED is flashing continuously.
To bond a node during the bond period press the user pushbutton and the node going to bond.

4.1.2 Remove device from the RF network with user button (Unbonding)
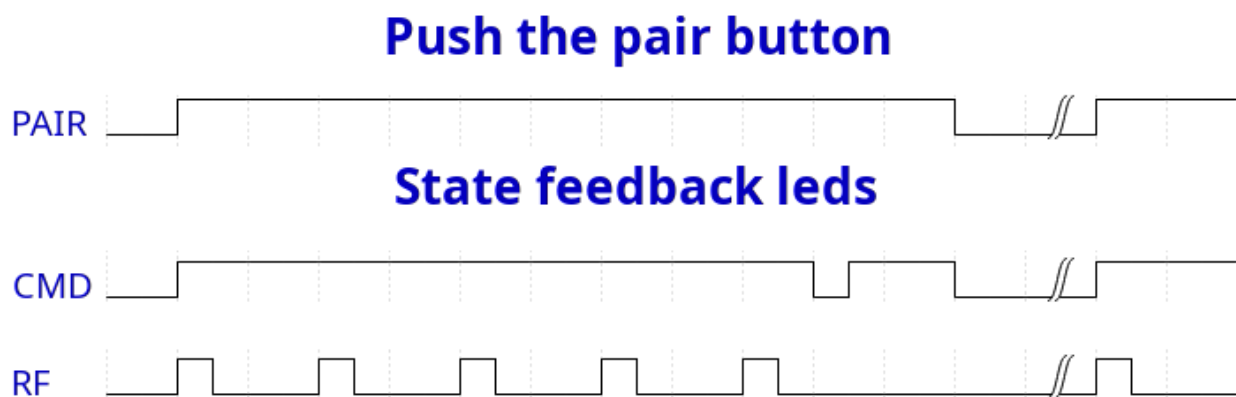
1. Push the pair button and hold it.
2. The CMD led is lighting and the RF led is flashing.
3. You have to hold it until the CMD led turn off for the second time.
4. Release the button and the device is unbonding.

4.2 RS-485

120 Ohm termination resistor is mounted in the device.

| RS485 communication specification	
Bus type	RS485
Protocol	MODBUS RTU with 16 bit CRC
Baud rate	1200, 2400, 4800, **9600 (default)**, 19200, 38400, 57600, 115200
Communicaton mode	**1 start bit, 8 data bits, 1 bit even parity, 1 stop bit (default)** 1 start bit, 8 data bits, 2 stop bits (no parity bit)
Address range	1-31 user settable
Maximum bus load	31 device per bus*
Range	≤300m

*Note that the maximum number of meters is dependent on the converter, baud rate (the higher the baud rate the smaller the number of meters which can be used) and the circumstances under which the meters are installed.

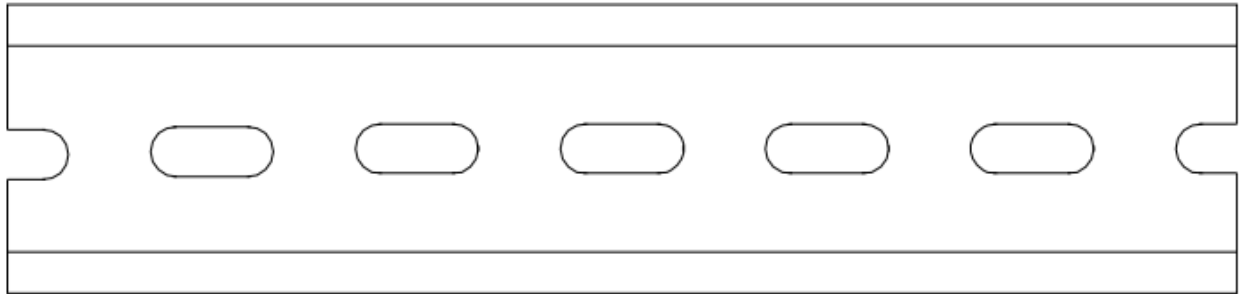## 4.2.2 Typical Connections

One device

More devices
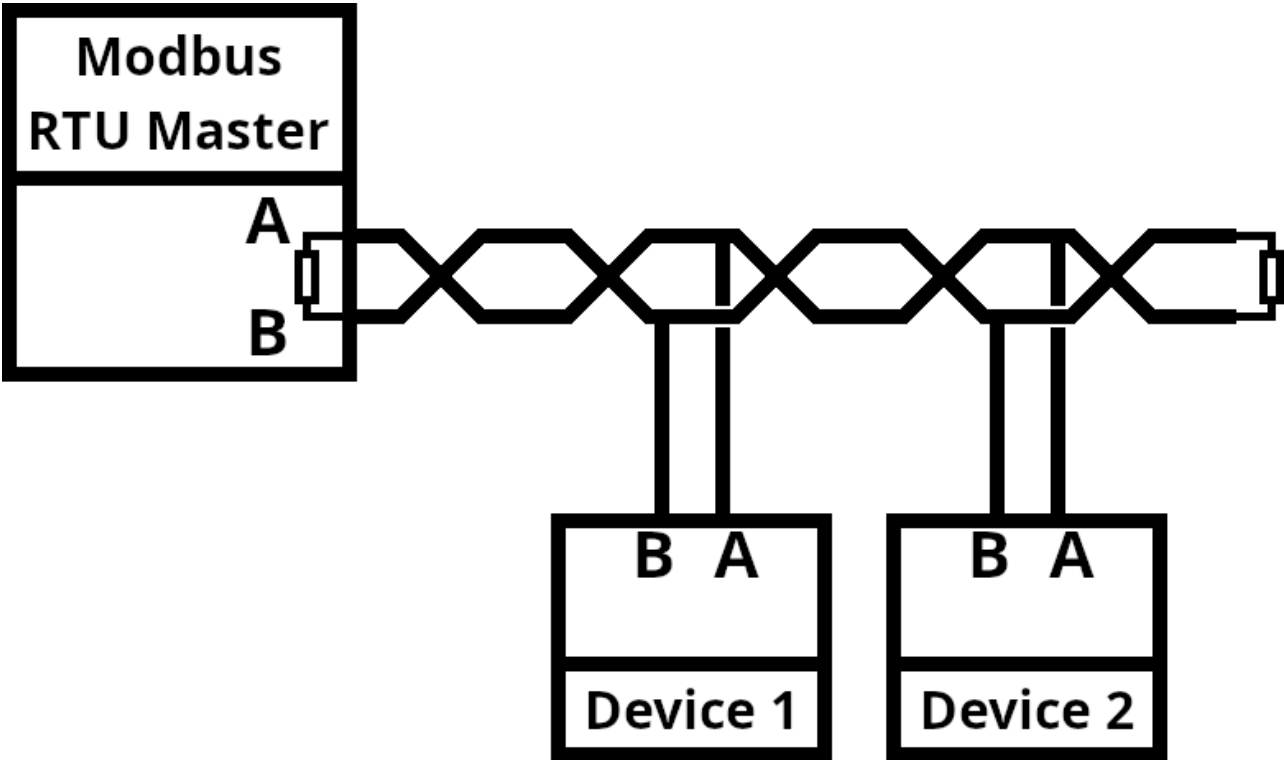
4.3 Mount on DIN Rail
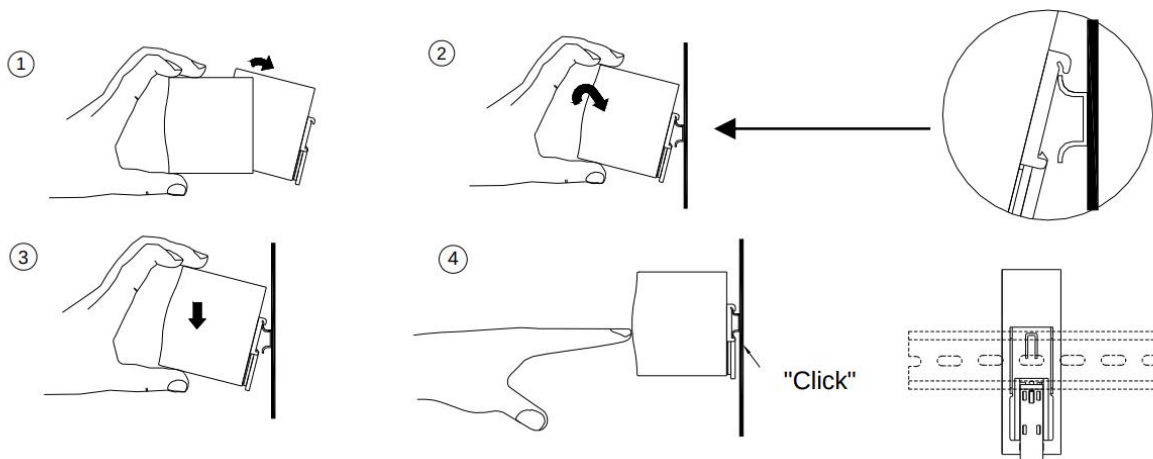
Mount as shown in figure only, with input terminals down, or else sufficient cooling will not be possible.
Admissible DIN rail：TS35/7.5 or TS35/15
For rail fastening：

1. Tilt the unit slightly rearwards.
2. Fit the unit over the top hat rail.
3. Slide it downward until it hits the stop.
4. Press against the bottom for locking.
5. Shake the unit slightly to check the locking action.

5 For your safety

To prevent damage to your product or injury to yourself or to others, read the following safety precautions before using this equipment. Keep these safety instructions where all those who use the product will read them.

5.1 WARNINGS

- Risk of electrical shock and energy hazard. All failure should be examined by a qualified technician. Please do not remove the case of the device by yourself!
- Risk of electric arcs and electric shock (danger to life). Connecting both the primary and the secondary sides together is not allowed.
- Risk of burn hazard. Do not touch the unit in operation and shortly after disconnection!
- Risk of fire and short circuit. The openings should be protected from foreign objects or dripping liquids.
- Only install the unit in a pollution degree 2 environment (where there is only non-conductive pollution that might temporarily become conductive due to occasional condensation. Generally refer to dry, well-ventilated locations, such as control cabinets.).
- Please do not install the unit in places with high moisture or near the water.
- Output current and output wattage must not exceed the rated value on its specification.
- Disconnect system from supply voltage: Before commencing any installation, maintenance or modification work: Disconnect your system from supply voltage. Make sure that inadvertent connection in circuit will be impossible!
- Note.1: Pollution Degree 2 applies where there is only non-conductive pollution that might temporarily become conductive due to occasional condensation. Generally refer to dry, well-ventilated locations, such as control cabinets.
- Turn off immediately in the event of malfunction
Should you notice smoke or an unusual smell coming from the equipment, power off the equipment and remove the battery immediately, taking care to avoid burns. Continued operation could result in injury.

5.2 Notices

- This manual included with the product may not be reproduced, translated to any language or used to any other purpose without IQ Home's written permission.
- IQ Home reserves the right to change specifications described in this manual at any time without prior notice.
- IQ Home will not be held liable for any damages resulted from the use of this product.
- We made as much effort as we could while prepared this manual to make it useful, accurate and complete. If we made mistakes, we appreciate if you contact us and let us know.

This symbol indicates that this product is to be collected separately.

This symbol on the battery indicates that the battery is to be collected separately.

- This product is designated for separate collection at an appropriate collection point. Do not dispose of as household waste.
- For more information, contact the retailer or the local authorities in charge of waste management.

- All batteries whether marked with this symbol or not, are designated for separate collection at an appropriate collection point.
- Do not dispose of as household waste. For more information, contact the retailer or the local authorities in charge of waste management.

6 Contact Us

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