EnOcean

Energy Harvesting Magnet Contact Transmitter Module
STM 320 / STM 329 / STM 320U
(Stepcode DE and later)

Observe precautions! Electrostatic sensitive devices!

Patent protected:
WO98/36395, DE 100 25 561, DE 101 50 128,
WO 2004/051591, DE 103 01 678 A1, DE 10309334,
WO 04/109236, WO 05/096482, WO 02/095707,
US 6,747,573, US 7,019,241

REVISION HISTORY

The following major modifications and improvements have been made to the first version of this document:

No	Major Changes
0.5	Initial version
0.90	New drawings added; new energy consumption data added; application note for connecting an external battery added; Agency certifications added; new charging circuitry added; editorial changes
0.95	Editorial changes
0.99	Pin for connection of backup battery changed; section 3.4 inserted; drawings updated
1.00	Drawing updated
1.02	Remark added in 3.4; additional remarks in 2.4; label information modified in chapter 5; Shelf life added in 1.4; Conducted output power replaced by radiated output power in 1.2; other editorial changes
1.03	Duration of a sub-telegram corrected to 0.9ms in 2.3;
1.04	Specification of shelf life improved. Chapter Related Documents added
1.1	STM 320U added
1.2	STM 329 added
1.3	Added advanced security information of firmware STM 320 / STM 331
1.4	New Dolphin layout, STM 320C deleted, Added STM 331U, R&TTE -> RED
1.5	Update with long term energy storage replacement, additional transport mode for longer shelf storage & air cargo, optimized secure mode for STM 320/329 & STM 320U , additional information on market approval for secondary battery, new drawings, deleted 315 MHz antenna description and RLC storage details, changed brand
1.6	3.1 mode change text corrected

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TABLE OF CONTENT

1 RELATED DOCUMENTS

STM 32x modules are available in several frequency, antenna and button position variants:

- STM 320 (868.3MHz, helix antenna, side oriented LRN button)
- STM 329 (868.3MHz, helical antenna, vertical (backside) oriented LRN button)
- STM 320U (902.875MHz, whip antenna, side oriented LRN button)

Module can be configured and/or programmed via EDK 350 / EOP 350 programmer board.

For mechanical integration please refer to our 3D drawings found at
http://www.enocean.com/en/enocean_modules/stm-320/

In addition we recommend following our application notes, in particular AN102: Antenna Basics – Basic Antenna Design Considerations for EnOcean based Products

2 GENERAL DESCRIPTION

This user manual specifies STM 32x modules with stepcode DE or later:

- See chapter "6.1 Product Label" to find out the module stepcode
- User manual for older modules can be downloaded from the product website
- For a detailed description of product changes see Product Change Notification (PCN).

2.1 Basic functionality

The radio transmitter module STM 32x from EnOcean enables the implementation of a wireless magnet contact sensor. Powered by a solar cell, it works absolutely maintenance-free. An integrated energy store allows operation for min 10 days in total darkness.

Key applications are window and door sensors. The STM 32x supervises an integrated reed contact and reports every status change immediately (open <> closed). In addition a sign of life signal is transmitted every 20-30 minutes.

Exemplary image

A LRN button is pre-installed on the PCB. When this button is pressed a special teach-in (Learn) telegram is sent. Additionally this button is used to switch between transport, standard and secure mode. In secure mode the communication is protected by enhanced security features e.g. encryption.
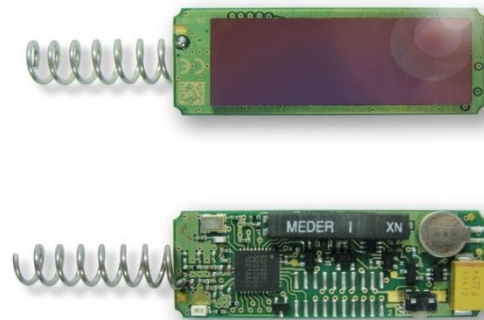
Features with built-in firmware
- Pre-installed solar cell
- On-board energy storage and charging circuit
- On-board LRN button
- On-board TX indicator LED
- On-board reed contact
- Communication protected by enhanced security features

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2.2   Technical data

Features Overview

Power supply	solar cell
Antenna	helix antenna
Frequency / Learn button	STM 320**:** 868.3 MHz, side button STM 329: 868.3 MHz, back button STM 320U: 902.875 MHz, side button
Radiated output power	STM 320: typ. 6.4 dBm (EIRP) STM 329: typ. 5 dBm (EIRP) STM 320U: +99 dBµV/m ± 2 dB
Data rate / Modulation type	125kBit/s / ASK (868.3 MHz) / FSK (902.875 MHz)
EnOcean Equipment Profile (EEP)	D5-00-01 SIGNAL 0x0E (Entering Transport Mode)
Start-up time with empty energy storage	typ. <2.5 min @ 400 lux, 25°C
Operation time in darkness @25°C[1]	min. 10 days, if energy storage fully charged
Reed contact	1x internal, Meder MK23-90-BV14496 or MK01-I
Teach-in button	1x internal
Transmission indicator	1x LED
Module dimensions	43 x 16 x 6 mm
Operating temperature[1]	-20 up to +60 °C
Encryption algorithms	VAES 128 / CMAC

[1] At 25°C with default configuration (average transmission cycle 1.500 s, 20 – 30 min).
Energy storage performance degrades over life time, especially if energy storage is long time
exposed to very high temperatures. High temperatures will accelerate aging. Very low temperature
will temporary reduce capacity of energy store and this leads to considerable shorter dark time operation.

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2.3 Physical dimensions

PCB dimensions	43±0.2 x 16±0.3 x 1±0.1 mm
Module height	6 mm
Weight	5.2 g

Drawing of STM 320:
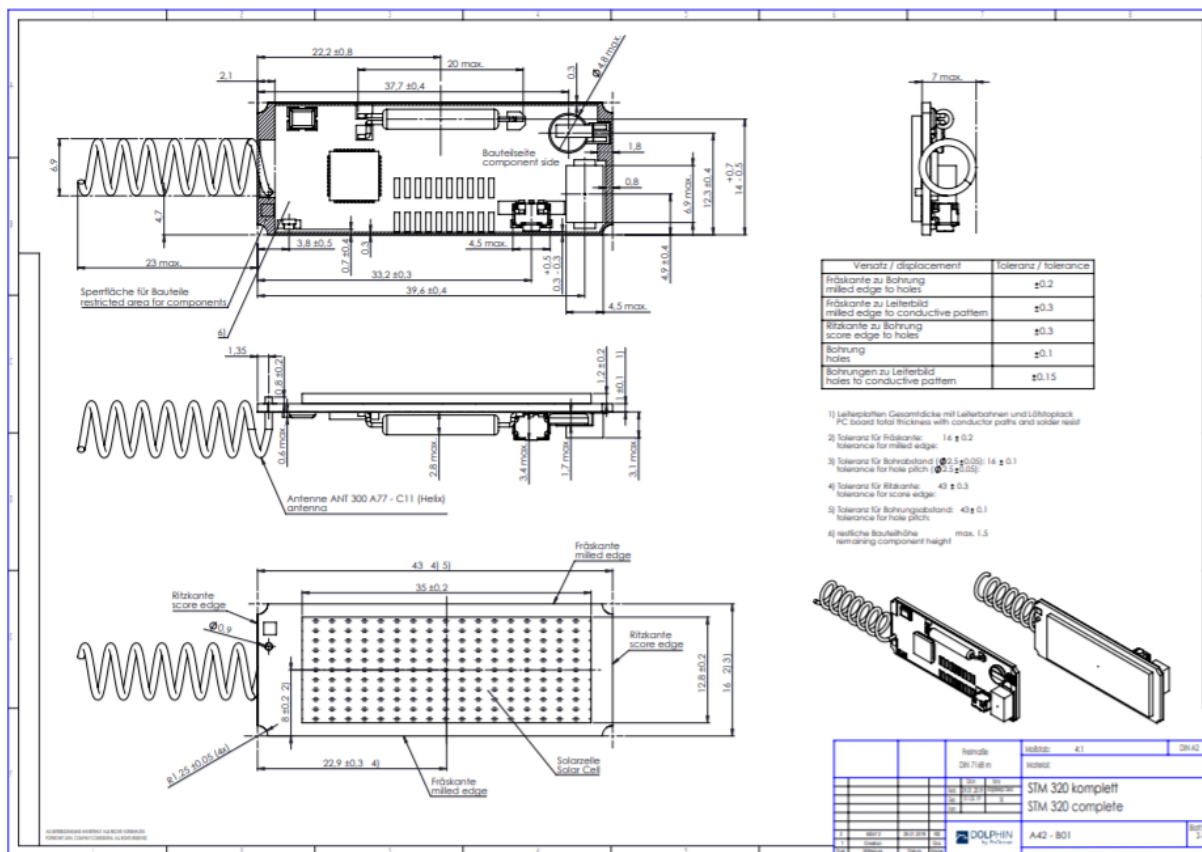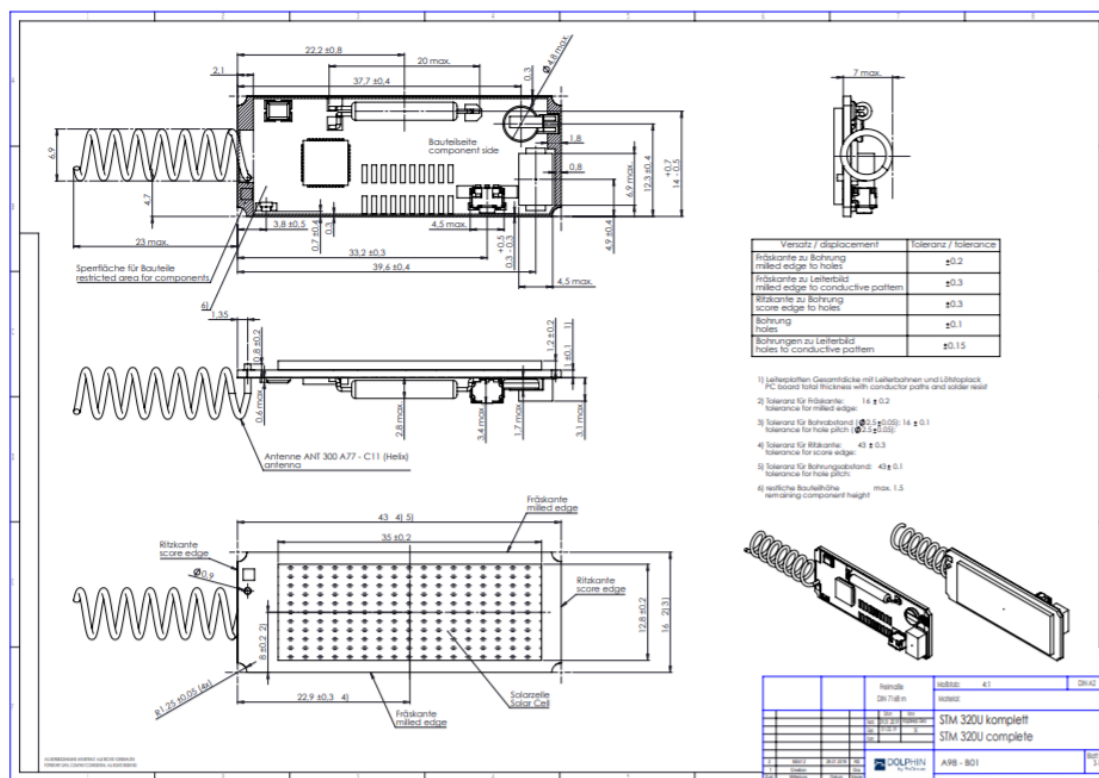
Drawing of STM 320U:

Drawing of STM 329:

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2.4   Environmental conditions

Operating temperature	-20 °C … +60 °C
Storage temperature	-20 °C … +60 °C, recommended[1]: +10 °C…+30 °C, <60%r.h.
Shelf life (in absolute darkness)	36 months after delivery[2]
Humidity	0% … 93% r.h., non-condensing

⚠ **Deep discharge of the energy storage leads to degradation of performance. Radio modules will be delivered in transport mode to avoid this. If there is a storage time after configuration or commissioning, the radio module has to be switched back to transport mode to reduce power consumption to a minimum.**

⚠ If a storage time of more than 36 months is required, the energy storage (MS414FE) has to be recharged (e.g. 2 days @ 1.000 lux) or with external 3.1 V.

⚠ The module shall not be placed on conductive materials, to prevent discharge of the internal energy storages. Even materials such as conductive foam (ESD protection) may have negative impact.

2.5   Ordering Information

Type	Ordering Code	Frequency	Note
STM 320	S3001-D320	868.3 MHz	whip antenna, side oriented LRN button
STM 329	S3001-D329	868.3 MHz	helical antenna, back oriented LRN button
STM 320U	S3051-D320	902.875 MHz	helical antenna, side oriented LRN button

3 FUNCTIONAL DESCRIPTION

3.1 Commissioning and mode change

The module will be shipped in transport mode to switch off the energy store for long term shelf storage and air cargo. The mode can be changed by pressing the learn button. The procedure for enter the standard mode has not been changed to keep compatible with modules before stepcode DE.

Make sure that the solar cell will get enough light for mode change and/or learn telegram.

■ **Change from transport to standard mode**
  After pressing learn button 1x short (1s) the radio module will enter Standard Mode (Mode 1). A standard learn telegram will be sent and the LED will flash 1x.

■ **Change from standard to secure mode**
  After pressing learn button 2x long (2x 5s, pause <1s) the radio module will enter Secure Mode (Mode 2). The LED will flash 2x and a secure learn telegram will be sent.

■ **Change from secure or standard mode to transport mode**
  After pressing learn button 1x long (5s) the radio module will enter Transport Mode (Mode 3). A signal telegram will be sent and the LED will flash 3x.

The following diagram illustrates all implemented mode transitions.
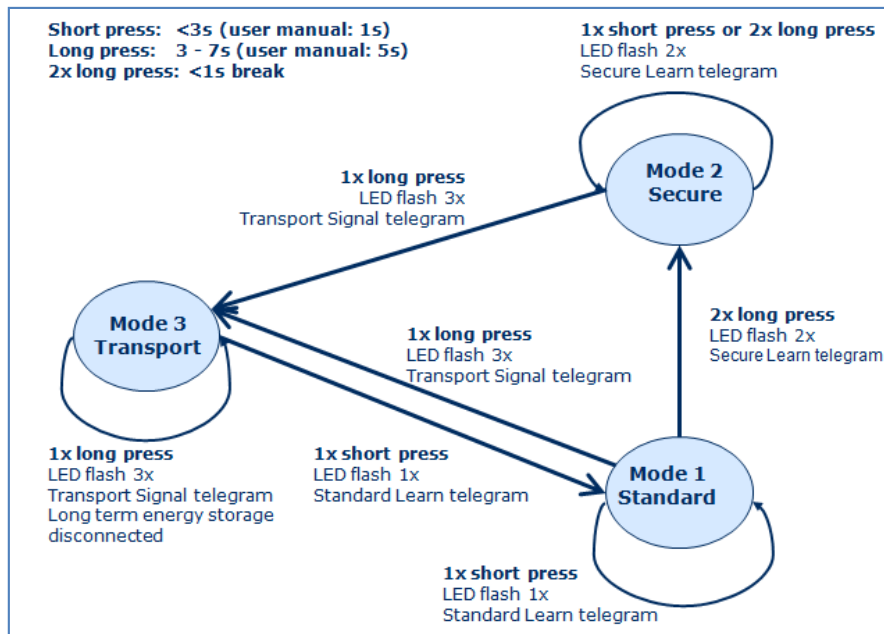
Short press: **1 s**   (firmware 0.1 – 3.0 s)
Long press: **5 s**   (firmware 3 – 7 s)
2x long press with very short pause of max. 1 s between

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Customers can adapt the mode change options via module configuration:
* Transport/Standard/Secure Mode change on (default see diagram above) or
* limited to Transport & Secure Mode (details support@enocean.com) or
* limited Transport & Standard Mode (details support@enocean.com)

⚠️ Before changing the operating mode please make sure to clear the device from all receivers which have been taught to work with this device before. Otherwise the receiver will ignore the telegrams and the application will not work.

⚠️ The flag for actual mode itself is stored in non-volatile memory. After power down reset the previous selected mode is active. The mode change is limited to 50 times. In normal application scenario only very few are required.

3.2   Block diagram
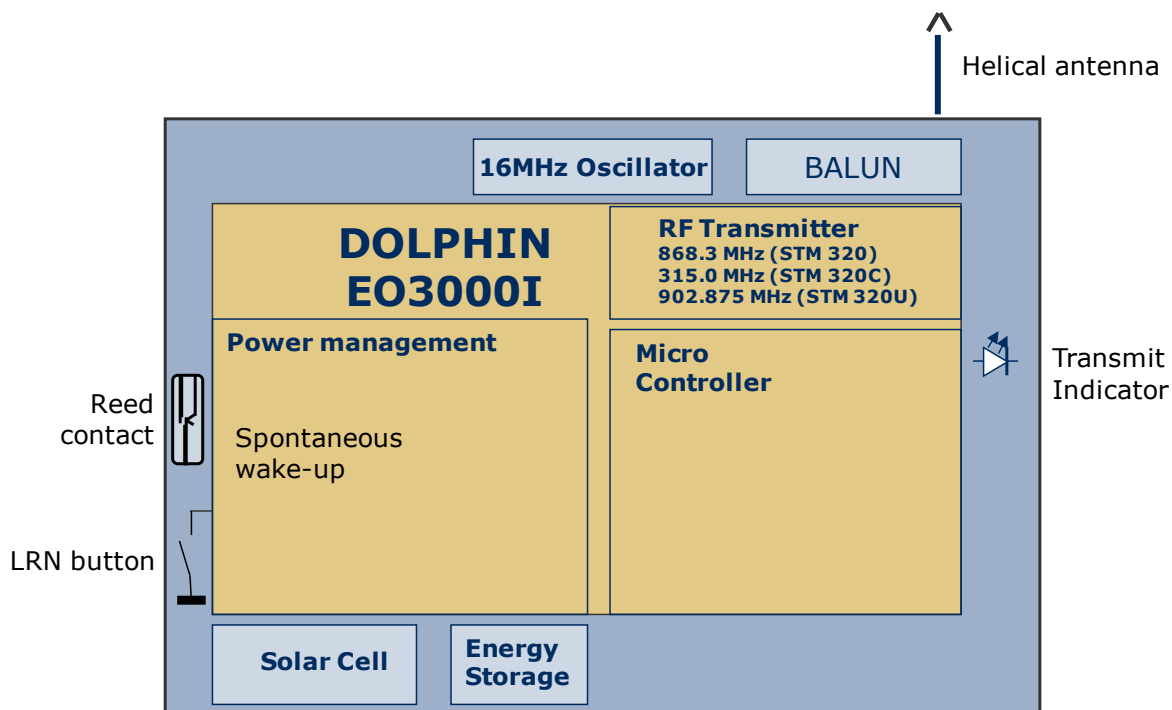
A change of the reed contact status or pushing the LRN button will wake the transmitter unit to send a radio telegram immediately (reed contact position, LRN push button status, unique 32-bit sensor ID, checksum). In addition a redundant retransmission signal is sent to announce the contact status even in case of no input signal changes. This signal transmitted every 20-30 min, affected at random. The transmit indicator LED flashes briefly at every radio transmission.

Between the wake-up phases, the device is in sleep mode for minimum power consumption.

3.3 Radio telegram

3.3.1 Default configuration and standard mode

STM 32x transmits a radio telegram according to EnOcean Equipment Profile
EEP D5-00-01 as defined in the EnOcean Equipment Profiles (EEP) specification.
(http://www.enocean-alliance.org/eep/)

By pressing the LRN button in standard mode a 1BS Teach-in telegram is transmitted.

By pressing the LRN button 1 s in standard mode a 4BS teach-in telegram is transmitted. After pressing the LRN button for 5 seconds a signal telegram (data: 0x0E) will be sent and the module enters the transport mode. For details see EnOcean Alliance EEP specification(Stepcode >=DE). In this mode the module does not send telegrams.

For details please refer to the EnOcean Equipment Profiles specification.
(http://www.enocean-alliance.org/eep/)

3.3.2 Secure mode and secure telegram

In secure mode the payload content of the telegram is always protected with advanced security features. Normal operation telegram payload and also Teach-in telegram payload are protected in the same way.
The security features used are defined by the Security Level format - SLF. This parameter is set by default to following values (Stepcode >=DE):

- 24-bit RLC which starts from 0 at production
- RLC sent explicitly
- 3-byte CMAC
- VAES encryption

The security features are added to the communication by encapsulating the payload and Teach-in telegram payload into a secured telegram. The payload itself is not changed and corresponds to the standard mode payload like defined in chapter 3.3. EEP D5-00-01.

Please refer to the EnOcean Security Specification for details
http://www.enocean.com/en/security-specification/.

Before changing the operating mode please make sure to clear the device from all receivers which have been taught to work with this device before. Otherwise the receiver will ignore the telegrams and the application will not work.

The flag for actual mode itself is stored in non-volatile memory. After power down reset the previous selected mode is active. Therefore mode change is limited to 50 times. In normal application scenario only very few are required.

The factory delivery is set to transport mode. This mode is used to switch of long term energy storage for extended shelf life and air cargo.

3.3.3 Secure learn telegram

To process security communication on a receiver the mode has to send a secure teach-in (learn) telegram to the receiver and so inform him about the used security profile, AES key and initial RLC counter. The security teach-in has to take place before any other communication can be executed (profile teach-in included). To trigger the transmission of the teach-in telegram press the LRN button. Take into account the information in mode chapter. The security teach-in and then the profile teach-in are transmitted. The profile teach-in telegram is already protected by advanced security features.

The process of sending secure teach-in telegram and profile teach-in telegram is triggered by pressing the LRN button in secure mode.

The behaviour of the LRN button is following:
1. Button is pressed
2. Secure teach-in is send.
3. Profile teach-in is send.

For more information on the structure of the teach-in telegram please refer to chapter 4.2 of http://www.enocean.com/en/security-specification/.

3.4   Transmit timing

3.4.1 Standard mode transmission timing

The setup of the transmission timing allows avoiding possible collisions with data packages of other EnOcean transmitters as well as disturbances from the environment. With each transmission cycle, 3 identical subtelegrams are transmitted within 40 ms. The transmission of a subtelegram lasts approximately 0.9 ms. The delay between the three transmission bursts is affected at random.

3.4.2 Secure mode transmission timing

In secure mode the transmission cycle includes 2 identical subtelegrams are transmitted within 20 ms. This is required to compensate the additional energy requirement of enhanced security computing and additional payload. The transmission of a subtelegram lasts approximately 1.2 ms.

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3.5   Energy consumption

Following diagram illustrates a complete cycle in standard mode which starts with controller active phase (setup, measurement etc.) immediately followed by a telegram transmit. After short sleep phase the controller will get active two times and send two telegrams.
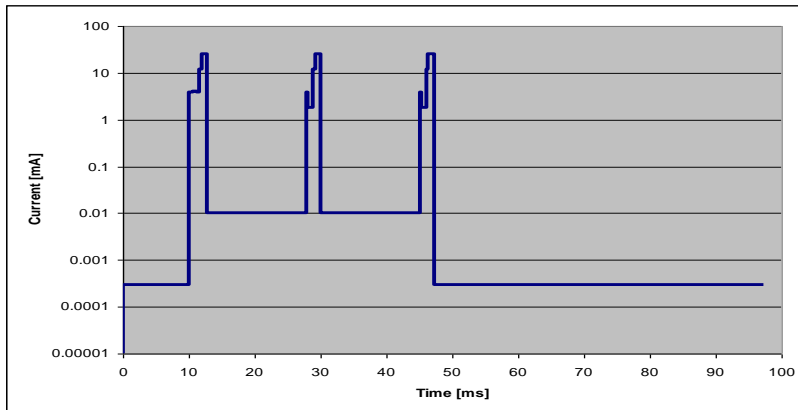
Prerequisites for example calculation:

- Internal energy storage MS412FE with usable capacity of about 0.7 mAh
   https://www.sii.co.jp/en/me/datasheets/ms-rechargeable/ms412fe-5/
   (voltage range 2.4 - 3 V at 25 °C)
- Solar cell ECS 200 delivers at 200 lux about 5 µA
   https://www.enocean.com/de/enocean-module/details/ecs-300/
- Power consumption wake-up and transmit cycle standard mode: 100 µAs
- Power consumption wake-up and transmit cycle secure mode: 140 µAs
- 10 reed contact changes per day (e.g. 5x window open/close)
- Average leak current of STM 3xy at 25°C: 0.5 uA
- Wake-up cycle 20 - 25 min (average 1.500 s) for status telegram
- 8 h light per day (24 h) light @ 200 lux and 25°C

Example calculation of the energy consumption with following parameters:

- Current consumption (depending on amount of wake-ups due to reed contact change):
  * Current consumption for status telegrams and sleep:
    100 uAs / 1,500 s + 0.5 uA = 0.57 uA
  * Power consumption for 10 reed contact changes incl. additional transmits per day:
    100 uAs / (60 x 60 x 24 s) = 1.2 nA = 0.0012 uA)
  * Average current consumption: 0.57 uA

- Average solar power harvested: 5uA / (8 h / 24 h) = 1.67 uA

- Time to fully charge energy storage (2.4 to 3.0 V) at stable temperature:
   0.7 mAh / (1.67 uA – 0.57 uA) = 636 h = 27 days

- Average operation time in darkness when fully charged (3.0 V to 2.4 V):
   0.7 mAh / 0.57 uA = 1,228 h = 51 day

Remarks:

- Calculation examples and values have tolerances of about +/- 20%.
- Energy storage performance, power consumption and solar cell performance varies over temperature.
- Energy storage performance degrades over life time, especially if energy storage is long time exposed to very high temperatures. High temperatures will accelerate aging, each 10 K increase from 25°C will half expected life time. Very low temperature will temporary reduce capacity of energy store and this leads to considerable shorter dark time operation.
- Short wake-up cycles (e.g. 1 s) and transmit intervals (e.g. 1 s) significantly reduce energy storage performance, for this use case an external power supply is recommended

3.5.1 Consumption in secure mode

Enhanced security mode requires more energy due to encryption algorithm computing time and extended telegram length because of CMAC. This added consumption is compensated by reducing the subtelegram count to 2.

3.6   Storing the Rolling code counter

For the enhanced security features a RLC counter needs to be stored in non-volatile memory. For security reasons the RLC counter is incremented by every transmitted telegram. Together with the CMAC the RLC ensures that messages cannot be reproduced or forged.

The RLC is stored in the Dolphin chip flash memory. To improve the endurance of the flash memory and also the energy budget not every increment is saved to the non-volatile flash memory. During deep sleep the RLC is stored in RAM0 memory.
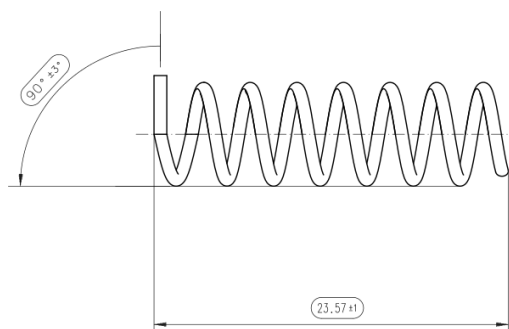
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4 APPLICATIONS INFORMATION

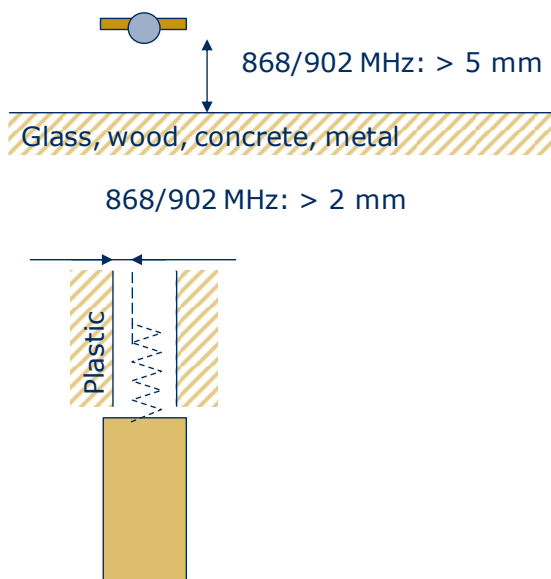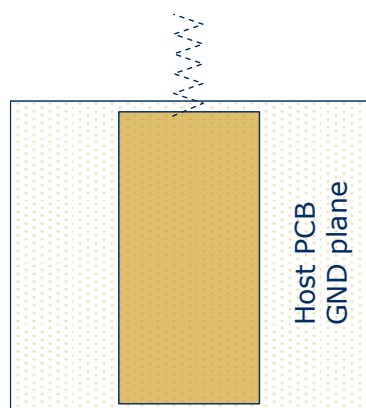## 4.1 Helical antenna

868 MHz / 902 MHz

Antenna recommendation:

STM 320 without host PCB

868/902 MHz: > 5 mm

Glass, wood, concrete, metal

868/902 MHz: > 2 mm

Plastic

STM 320 with host PCB

Host PCB GND plane

4.2 Transmission range

The main factors that influence the system transmission range are type and location of the antennas of the receiver and the transmitter, type of terrain and degree of obstruction of the link path, sources of interference affecting the receiver, and "Dead" spots caused by signal reflections from nearby conductive objects. Since the expected transmission range strongly depends on this system conditions, range tests should categorically be performed before notification of a particular range that will be attainable by a certain application.

The following figures for expected transmission range are considered by using a PTM, a STM or a TCM radio transmitter device and the TCM radio receiver device with preinstalled whip antenna and may be used as a rough guide only:

- Line-of-sight connections: Typically 30 m range in corridors, up to 100 m in halls
- Plasterboard walls / dry wood: Typically 30 m range, through max. 5 walls
- Ferroconcrete walls / ceilings: Typically 10 m range, through max. 1 ceiling
- Fire-safety walls, elevator shafts, staircases and supply areas should be considered as screening.

The angle at which the transmitted signal hits the wall is very important. The effective wall thickness – and with it the signal attenuation – varies according to this angle. Signals should be transmitted as directly as possible through the wall. Wall niches should be avoided. Other factors restricting transmission range:
- Switch mounted on metal surfaces (up to 30% loss of transmission range)
- Hollow lightweight walls filled with insulating wool on metal foil
- False ceilings with panels of metal or carbon fiber
- Lead glass or glass with metal coating, steel furniture

The distance between EnOcean receivers and other transmitting devices such as computers, audio and video equipment that also emit high-frequency signals should be at least 0.5 m.

A summarized application note to determine the transmission range within buildings is available as download from www.enocean.com.

4.3 Connecting an external backup battery

In case there is not sufficient light available for operation with solar cell an external 3 V Lithium backup battery can be connected to the module at the soldering pads shown below:
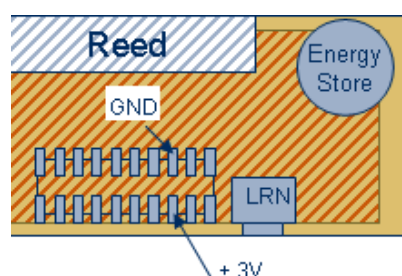
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4.4   Mounting STM 32x into a housing

The figure below shows an example of a housing in which the module can be mounted (with antenna pointing to the left). Design data of the housing and the modules is available in .igs format.
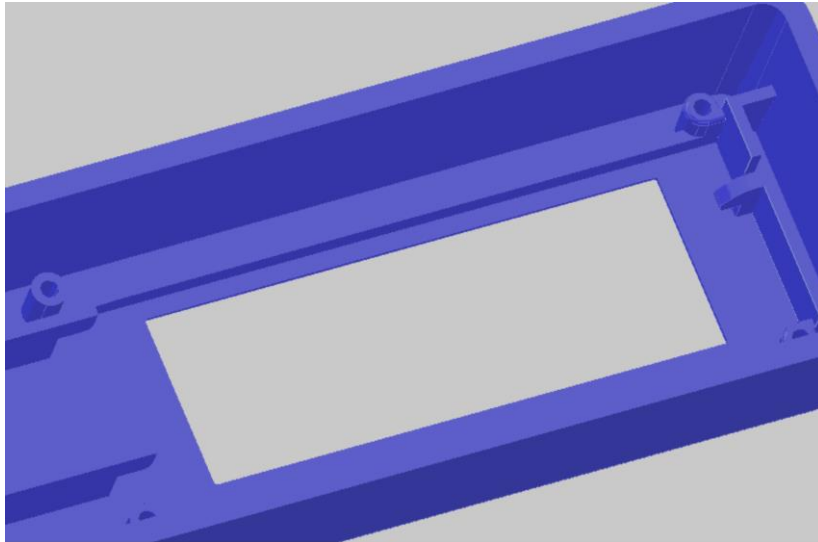
⚠ In order to prevent damage to the solar cell and the module itself, please make sure not to exert shear force (side force within the plane of the solar cell) onto the solar cell! The maximum vertical force onto the solar cell must not exceed 4 N and should be homogeneously distributed! Bending of the PCB must be avoided!

⚠ Please make sure that the housing covers 0.5 mm at the solar cell edges. Within 0.5 mm off the edge flaking is possible due to the cutting process.

5   RADIO CERTIFICATIONS

The modules have been tested to fulfil the approval requirements for RED (STM 320 / STM 329) and FCC/ISED (STM 320U) based on the built-in firmware.

⚠️ **When developing customer specific firmware based on the API for this module, special care must be taken not to exceed the specified regulatory limits, e.g. implement receiver function, change HF settings or exceed the duty cycle limitations!**

5.1   Radio Equipment Directive (RED) for the European Union

The Radio Equipment Directive (2014/53/EU, typically referred to as RED) replaces the old R&TTE directive from 1999 as regulatory framework for radio products in the European Union. All products sold to final customers after 12th of June, 2017 have to be compliant to RED. At the time of writing, the text of the RED legislation was available from this link: http://eur-lex.europa.eu/eli/dir/2014/53/oj

Dolphin radio modules such as STM 320 or STM 329 are components which are delivered to OEM manufacturers for their use in final or combined products.

It is the responsibility of the OEM manufacturer to demonstrate compliance to all applicable EU directives and standards. The attestation of conformity for STM 320 or STM 329 serves as input to the declaration of conformity for the full product.

At the time of writing, guidance on the implementation of EU product rules – the so called "Blue Guide" – was available from this link: http://ec.europa.eu/DocsRoom/documents/18027/

Specifically within the new RED framework, all OEM manufacturers have for instance to fulfill the following additional requirements:

- Provide product branding clearly identifying company name or brand and product name as well as type, charge or serial number for market surveillance

- Include documentation containing full postal address of the manufacturer as well as radio frequency band and max. transmitting power

- Include user manual, safety information and a declaration of conformity for the final product in local language

- Provide product development and test documentation upon request

Please contact an accredited test house for detailed guidance.

RED conformity has been proven and the according documentation has been deposited at

EnOcean. The modules can be operated without notification and free of charge in the area of the European Union and in Switzerland.

- EnOcean RF modules must not be modified or used outside their specification limits.

- RED approval is only valid for delivered standard hardware and software

- EnOcean RF modules must not be used with gain antennas, since this may result in allowed ERP or spurious emission levels being exceeded.

- The final product incorporating EnOcean RF modules must itself meet the essential requirement of the EU directives and a CE marking must be affixed on the final product and on the sales packaging each. Operating instructions containing a Declaration of Conformity has to be attached.

- If the STM 32x transmitter is used according to the regulations of the 868.3 MHz band, a so-called "Duty Cycle" of 1% per hour must not be exceeded. Permanent transmitters such as radio earphones are not allowed.

- The module must be used with only the following approved antenna(s).

Model	Type
STM 320	Pre-installed helix antenna
STM 329	Pre-installed helix antenna

5.2 FCC (United States) certification

5.2.1 STM 320U FCC APPROVAL

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

IMPORTANT! Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

The Original Equipment Manufacturer (OEM) must ensure that FCC labeling requirements are met. This includes a clearly visible label on the outside of the final product. Attaching a label to a removable portion of the final product, such as a battery cover, is not permitted. The label must include the following text:

STM 320U

Contains FCC ID: SZV-STM320U
The enclosed device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (i.) this device may not cause harmful interference and (ii.) this device must accept any interference received, including interference that may cause undesired operation.

When the device is so small or for such use that it is not practicable to place the statement above on it, the information required by this paragraph shall be placed in a prominent location in the instruction manual or pamphlet supplied to the user or, alternatively, shall be placed on the container in which the device is marketed. However, the FCC identifier or the unique identifier, as appropriate, must be displayed on the device.

5.2.2 STM 320U FCC Grant

TCB

**GRANT OF EQUIPMENT
AUTHORIZATION**

Certification
Issued Under the Authority of the
Federal Communications Commission
By:

TCB

EMCCert Dr. Rasek GmbH
Stoernhofer Berg 15
D-91364 Unterleinleiter,
Germany

Date of Grant: 06/20/2013

Application Dated: 06/20/2013

EnOcean GmbH
Kolpingring 18a
Oberhaching, 82041
Germany

Attention: Armin Anders , Director Product Marketing

NOT TRANSFERABLE

EQUIPMENT AUTHORIZATION is hereby issued to the named GRANTEE, and is VALID
ONLY for the equipment identified hereon for use under the Commission's Rules and
Regulations listed below.

FCC IDENTIFIER: SZV-STM320U
Name of Grantee: EnOcean GmbH
Equipment Class: Part 15 Security/Remote Control Transmitter
Notes: 902.875 MHz transmitter

Grant Notes	FCC Rule Parts	Frequency Range (MHZ)	Output Watts	Frequency Tolerance	Emission Designator
	15.231	902.875 – 902.875			

5.2.3 FCC Regulatory Statements

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Any changes or modifications not expressly approved by manufacturer could void the user's authority to operate the equipment.

IMPORTANT! Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna.
Increase the separation between the equipment and receiver.
Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
Consult the dealer or an experienced radio/ TV technician for help.

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5.3　　ISED (former Industry Canada) certification

In order to use EnOcean's IC number, the OEM must ensure that the following conditions are met:

- Labeling requirements for Industry Canada are similar to those required by the FCC. The Original Equipment Manufacturer (OEM) must ensure that IC labeling requirements are met. A clearly visible label on the outside of a non-removable part of the final product must include the following text:

  STM 320U:
  　　Contains IC: 5713A-STM320U

- The OEM must sign the OEM Limited Modular Approval Agreement with EnOcean

Pour utiliser le numéro IC EnOcean, le OEM doit s'assurer que les conditions suivantes sont remplies:

- Les exigences d'étiquetage pour Industrie Canada sont similaires à ceux exigés par la FCC. Le fabricant d'équipement d'origine (OEM) doit s'assurer que les exigences en matière d'étiquetage IC sont réunies. Une étiquette clairement visible à l'extérieur d'une partie non amovible du produit final doit contenir le texte suivant:

  STM 320U:
  　　Contains IC: 5713A-STM320U
  　　Contient le module d'émission IC: 5713A-STM320U

- L'OEM doit signer l'accord OEM limitée Approbation modulaire avec EnOcean

Energy Harvesting Magnet Contact Transmitter Module
STM 320 / STM 329 / STM 320U (Stepcode DE and later)

5.3.1 STM 320U Industry Canada Technical Approval Certificate

FCB under the Canada-EC MRA
TCB under the USA-EC MRA
RFCAB under the Japan-EC MRA
Notified Body R&TTE Directive 99/5/EC
Notified Body EMC Directive 2004/108/EC

No. ► CA001350D

TECHNICAL ACCEPTANCE CERTIFICATE CANADA

CERTIFICAT D'ACCEPTABILITÉ TECHNIQUE CANADA

CERTIFICATION No. No. DE CERTIFICATION	► 5713A-STM320U		
ISSUED TO DÉLIVRÉ A	► EnOcean GmbH		
Street Address Numéro et rue	Kolpingring 18 a	City Ville	Oberhaching
Province or State Province ou État	Germany	Postal Code Code postal	82041
TYPE OF EQUIPMENT GENRE DE MATÉRIEL	► Remote Control Device	TRADE NAME & MODEL MARQUE ET MODELE	► Transmitter Module STM 320U
FREQUENCY RANGE BANDE DE FRÉQUENCES	► 902.88 - 902.88 MHz	EMISSION TYPE GENRE D'ÉMISSION	► 322K1F1DAN
R.F. POWER PUISSANCE H.F.	► 66.58 dBµV/m @ 3m	ANTENNA ANTENNE	► Integrated Incorporé
SPECIFICATION SPÉCEFICATION	► RSS-210	ISSUE ÉDITION 8	11 December 2010
TEST LABORATORY LABORATOIRE D'ESSAI	► EMCCons DR. RAŠEK GmbH & Co. KG	CN 3464C	OATS 3461C-1
Street Address Numéro et rue	Moggast, Boelwiese 8	City Ville	Ebermannstadt
Province or State Province ou État	Germany	Postal Code Code postal	91320
Name Nom	Karlheinz Kraft	Tel	0049 9194 9016
E-mail	k.kraft@emcc.de	Fax	0049 9194 8125

Certification of equipment means only that the equipment has met the requirements of the above-noted specification. Licence applications, where applicable to use certified equipment, are acted on accordingly by the Industry Canada issuing office and will depend on the existing radio environment, service and location of operation. This certificate is issued on condition that the holder complies and will continue to comply with the requirements and procedures issued by Industry Canada. The equipment for which this certificate is issued shall not be manufactured, imported, distributed, leased, offered for sale or sold unless the equipment complies with the applicable technical specifications and procedures issued by Industry Canada.

I hereby attest that the subject equipment was tested and found in compliance with the above-noted specification.

La certification du matériel signifie seulement que le matériel a satisfait aux exigences de la norme indiquée ci-dessus. Les demandes de licences nécessaires pour l'utilisation du matériel certifié sont traitées en conséquence par le bureau de deliverance d'Industrie Canada et dépendent des conditions radio ambiantes, du service et de l'emplacement d'exploitation. Le présent certificat est délivré à la condition que le titulaire satisfasse et continue de satisfaire aux exigences et aux procedures d'Industrie Canada. Le matériel à l'égard duquel le présent certificat est délivré ne doit pas être fabriqué, importé, distribué, loué, mis en vente ou vendu à moins d'être conforme aux procédures et aux spécifications techniques applicables publiées par Industrie Canada.

J'atteste par la présente que le matériel a fait l'objet d'essai et jugé conforme à laspécification ci-dessus.

DATE   21 June 2013

Certification Officer

EMCCert DR. RAŠEK GmbH · Stoernhofer Berg 15, 91364 Unterleinleiter, Germany
Tel.: +49 9194 72279-01 · Fax: +49 9194 72279-06 · E-mail: emc.cert@emcc.de · Web: www.emcc.de

5.3.2 ISED (former Industry Canada) Regulatory Statements

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, meme si le brouillage est susceptible d'en compromettre le fonctionnement.
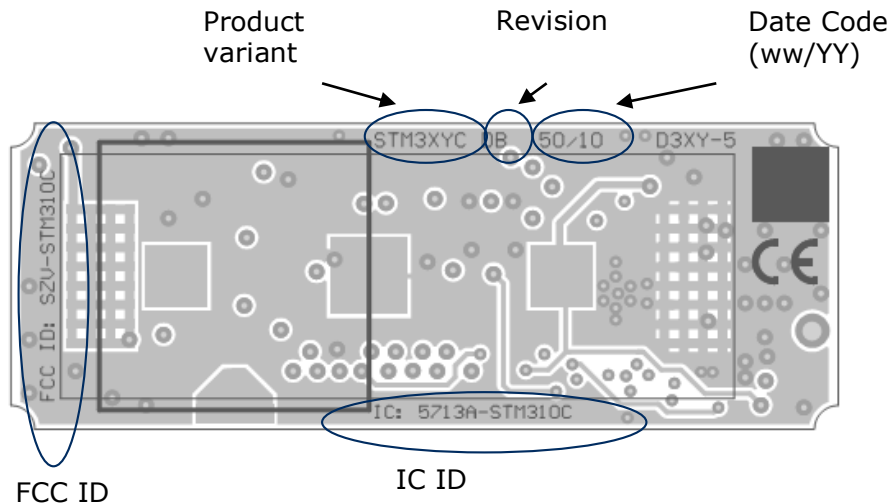
IMPORTANT! Tous les changements ou modifications pas expressément approuvés par la partie responsable de la conformité ont pu vider l'autorité de l'utilisateur pour actioner cet équipment.

This Class B digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada

6   Additional information

6.1   Product label

Product
variant

Revision

Date Code
(ww/YY)

STM3XYC QB 50/10 D3XY-5

FCC ID: S2U-STM310C

IC: 5713A-STM310C

FCC ID

IC ID

6.1.1 QR Code

In order to improve STM 3xy logistic and commissioning a QR code label is fixed on top of the radio controller. The QR code is implemented according to the EnOcean Alliance system specification: "Product ID and Standardized Labeling Specification". For details see:
https://www.enocean-alliance.org/productid/

Format (STM 329):

```
[30S00000502CB78+ 13ZBA2054A875E77768C7740157BDF9CF68+30PS3001-
D329+2PDE13+S01123456123456]

30S00000502CB78    15 CHARS     30S<6 Byte Chip-ID>
+                  1 CHAR
13ZBA2054A............68   35 CHARS     13Z<32 Digit Key>
+                  1 CHAR
30PS3001-D329      13CHARS      30P<Order code>
+                  1 CHAR
2PDE13             6 CHARS      2P<2 Digit Stepcode><2 Digit Zustand>
+                  1 CHAR
Sxxyyyyyyyyyyyy    15 CHARS     S<2 Digit manufacturer><12 Digit DMC/Seriennummer>

88 alpha numeric chars with hex coding
```

6.2   Rechargeable accumulator

■ In order to conserve the energy level of the rechargeable accumulator, OEMs should put the final product with housing to transport mode

■ In specific markets e.g. EU a rechargeable accumulator (secondary battery) requires additional markings at product label & documentation. A registration according to battery law could be required.

■ According to the manufacturer of the rechargeable battery following warnings apply:

1. Do not charge by high current or high voltage. Doing so may generate gas inside the battery, resulting swelling, catching fire, and heat generation or bursting.

2. Do not heat, disassemble nor dispose of in fire Doing so damages the insulation materials and may cause catching fire, heat generation, leakage or bursting.

3. Do not solder directly to the battery If soldering is performed directly to the battery, the battery is heated up, consequently cause leakage, explosion or fire due to over-heating from internal short-circuiting.

4. Do not short. If the (+) and (-) come into contact with metal materials, short-circuiting occurs. As a result, catching fire, heat generation, leakage or bursting.

5. Keep batteries/module out of children's reach. If leaked liquid is ingested or a battery is swallowed, consult a physician immediately.

6. Do not reverse placement of (+) and (-) If the (+) and (-) side of the battery is reverse inserted; it may cause a short-circuiting or over discharge of the battery on some equipment and it may induce overheating, explosion or fire.

7. Do not discharge by force If the battery is discharged by direct connection to an external power supply etc., voltage of the battery will decline lower than 0 volts (electrical reversal) and will cause the battery case to expand, overheat, leak, explode or burn.

8. In case of leakage or a strange-smell; keep away from fire to prevent ignition of any leaked electrolyte.

9. In case of disposal, insulate between (+) and (-) of battery by an insulating Jumbling batteries or with other metal materials cause short-circuiting. As a result, catching fire, heat generation, leakage or bursting.