![Your Torque Partner TOHNICHI logo]

MODULAR CONVERSION RECEIVER
MODEL: R-CM

Operating Instruction

To use this product properly and safely, please read this operating instruction carefully before use. If you have any question about the product and its operations, please contact your nearest distributor or Tohnichi Mfg. Co., Ltd.

Safety Precautions

To customers:

Before using this product, please read this operating instruction carefully to use it properly.

If you have any question, please contact your nearest distributor or Tohnichi Mfg. Co., Ltd.

This operating instruction should be stored in a safe place.

> **Safety symbol**
>
> This symbol indicates attention is required for your safety. When this symbol appears in this instrution, pay particular attention for your safety concerns. Take preventative measures according to the written message for appropriate operation and management.

Signal Words

A signal word accompanies the safety symbol, which indicates the level of cautions on safety of people and the appropriate use of the equipment. Signal words are classified into 3 levels: "danger", "warning " and "caution" by the degree of risk.

" **Danger**": Imminent danger which may cause serious damage

" **Warning**": Potential danger which may cause serious damage

" **Caution**": Potential danger which hinder ordinary operation but may not lead to serious damage.

Warning

● The power supply voltage of this product can be used only for DC18V to 36V described in this instruction manual.

● Do not drop water or oil on this instrument

  Do not use this instrument in an atmosphere of flammable gas and steam.

  Use in such an atmosphere may result in fire.

● Avoid shock or vibration to this instrument. It may cause a damage or failure.

● Before use, make a pre-operation inspection and check the settings.

● Avoid using the instrument in a place where there are metal structures around it.

● Do not install the antenna for the receiver close to any metal pole, electric wire, iron piping, etc.

   * Especially, if the antenna and piping are positioned in parallel, the communication status may be worsened.

● Avoid using the instrument near welding machines, electric discharge machines or machines producing electromagnetic noise such as PC.

● Before wiring, check that the power of the device to be connected to the receiver is in the OFF position.

● Should this instrument give out abnormal smell or catch fire during use, stop using it immediately and remove the AC adapter

  from the outlet. Then, move the instrument to a safe place and contact Tonichi Mfg. Co., Ltd.

● Do not disassemble or modify this product. It may result in loss of safety, it may be punished by law.

■Contents

1 Outline

This R-CM applied interchangeable radio modules and by attaching a Tohnichi radio module,

it can be used as various Tohnichi wireless Pokayoke receiver. This makes it easy to update the receiver from a standard tightening counting type error proofing torque wrench system to data transmission type torque wrench by changing the radio module of receiver.

In addition, it is equipped with relay contact output terminals and a RS232C output. It allows to manage the tightening count signal by an optional count checker CNA-4mk3 or manage the tightened torque value through RS232C to PC/PLC, it is possible to establish a preventing missed tightening system with traceability.

2 Specifications

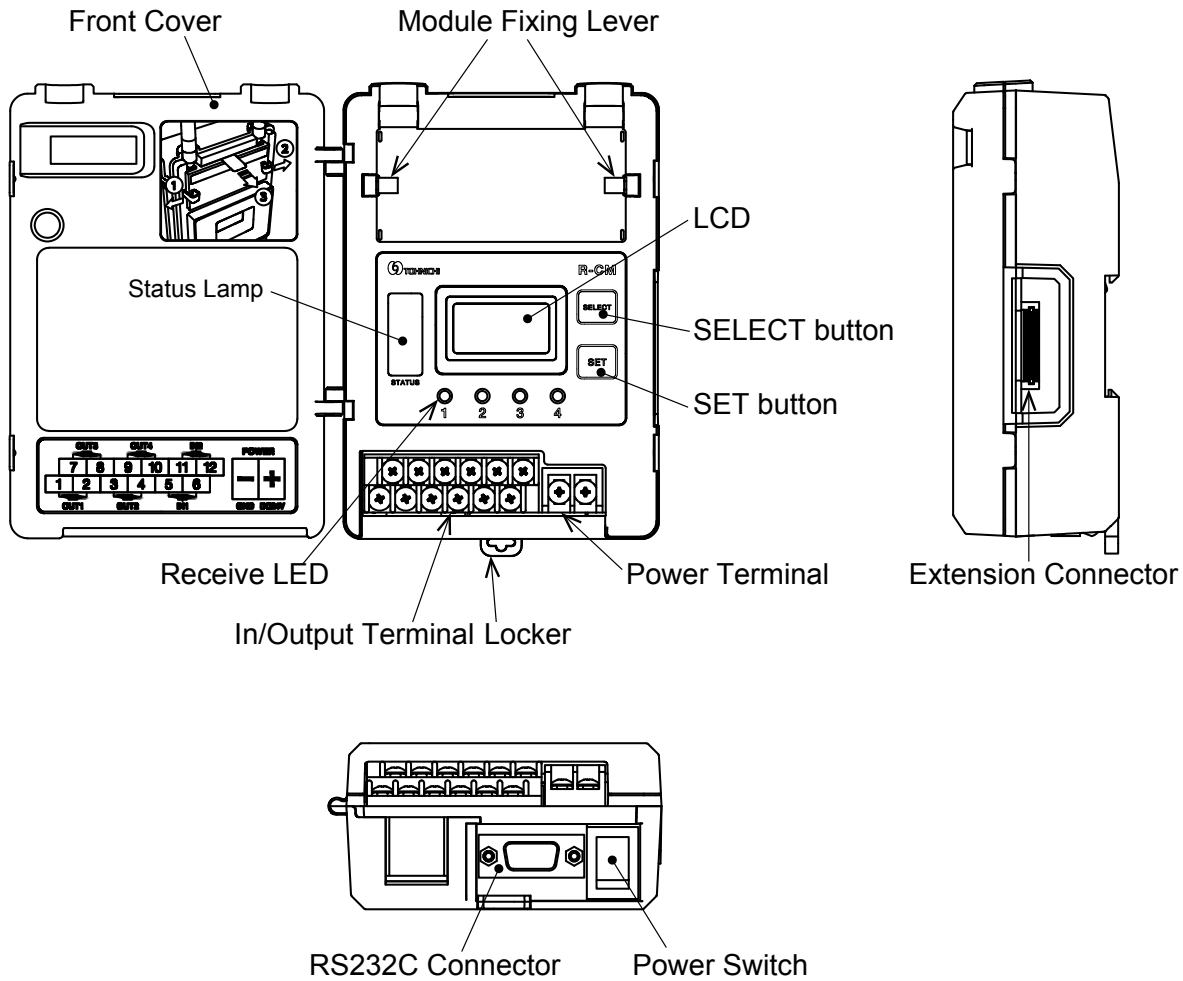| Model	R-CM
Display	Status lamp, LCD Receiving LED x 4
Input/Output	Relay output x 4 Reset input, LS IN input RS232C Input/Output
Power	DC24V (18V - 36V) *1 Power consumption: Less than 5W
Case Material	Resin
Temperature of Use	0 - 50℃ Less than 85%RH (No condensation)
Radio Frequency	Depends on a mounted radio module * 2
Communication Distance	Depends on a mounted radio module * 2
Radio License	Depends on a mounted radio module * 3
Standard Accessories	No.1070 (DIN rail) Fixturex 2pcs

*1. To use at AC100V ～ 240V, required an optional AC adapter model BA-8R.

*2. For details, refer to operating manual of each radio module.

*3. Consult Tohnichi for status of wireless certification acquisition for each country.

3 External View and Each Part Name

3-1. Figure and Name of Parts for T-FH/T-FHM and previous transmitters

Front Cover Module Fixing Lever

LCD

Status Lamp

SELECT button

SET button

Receive LED Power Terminal Extension Connector

In/Output Terminal Locker

RS232C Connector Power Switch

● Module fixing metal fixtures

It is a lever to fix when the wireless module is installed.

● Front cover

Open it when installing the wireless module or wiring the input / output terminal block.

When the cover is opened, there is an instruction sticker of the terminal block number and

how to install the radio module.

Close the cover during use.

● Status lamp

The lamp is lit blue or red accordingly the status

* The operations depend on the radio module. For details, refer to the instruction manual for each
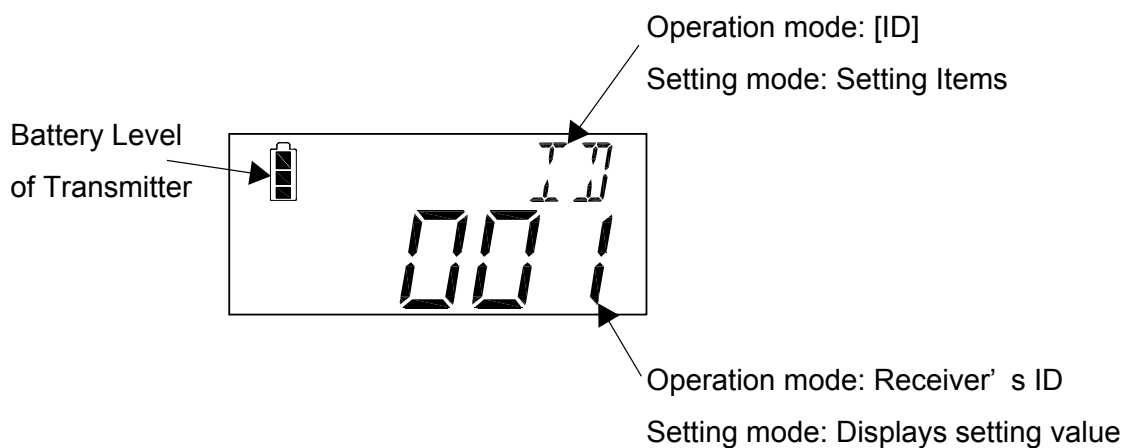
wireless module.

● RS232C connector

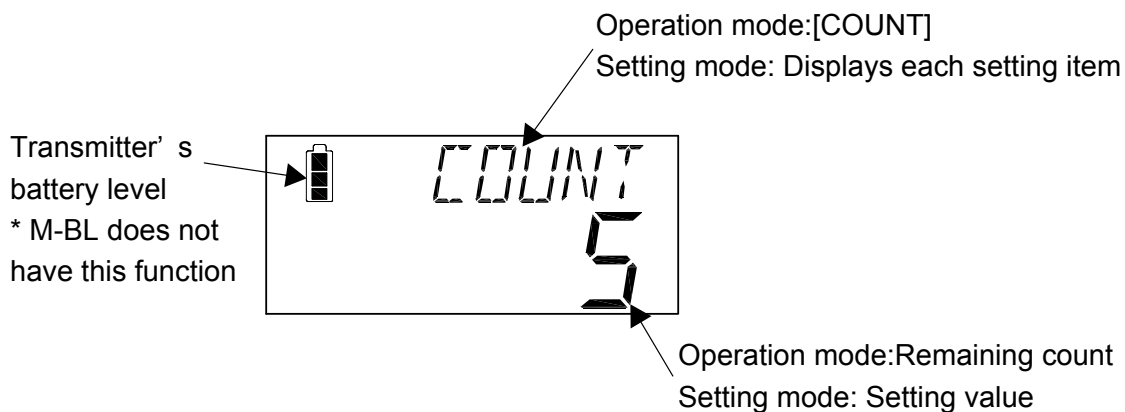Used when connecting to an external device (PC / PLC, etc.).

● Input/Output terminal

　Terminals for output, reset and LS input of tightening completion signal or OK/NG judgment result.

　*The operations depend on the radio module. For details, refer to the instruction manual for each

　 wireless module.

　●Power switch

　On/Off the power

● Receive LED

　Lights blue or red during contact output. (LED corresponding to output lights up)

　When count checker function is activated, the judgment result will be displayed on OUT1 and OUT2

　LED.

　Judment result OK: OUT1 lights on blue

　Judgment result NG: OUT2 ligths on red.

● Extension connector

　A connector for mounting an optional expansion BOX (IO-CM, BZ-CM, etc.).

　Do not remove the sticker attached on the right side of the case except when using the expansion box.

● SELECT button

　Used when changing settings. Normally not used.

● SET button

　Used when changing settings. Normally not used.

● LCD display

　Displays received ID or torque value

　*The operations depend on the radio module. For details, refer to the instruction manual for each

　wireless module.

● Locker

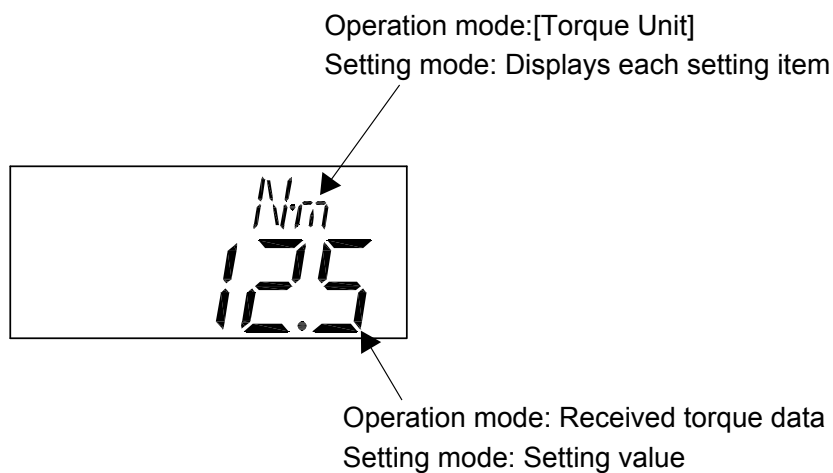　Locker for fixing the receiver on a DIN rail.

3-2. LCD Display

1. M-FH or M-BL radio module with OFF the count checker function.

Operation mode: [ID]

Setting mode: Setting Items

Battery Level
of Transmitter

ID
001

Operation mode: Receiver's ID

Setting mode: Displays setting value

2. M-FH or M-BL radio module with ON the count checker function.

Operation mode:[COUNT]
Setting mode: Displays each setting item

Transmitter's
battery level
* M-BL does not
have this function

COUNT
5

Operation mode:Remaining count
Setting mode: Setting value

3. M-FD radio module display

Operation mode:[Torque Unit]
Setting mode: Displays each setting item

Nm
12.5

Operation mode: Received torque data
Setting mode: Setting value

3-3. RS232C Connector

1. RS232C Connector Pin Assign

Pin No.	Signal	Detail	Direction
1			
2	TXD	Transmitted data signal	⟶
3	RXD	Received data signal	⟵
4			
5	GND	Ground	
6			
7	CTS	Clear to send signal	⟵
8	RTS	Request to send signal	⟶
9			

2. R-CM and PC/PLC Connection Cable, Example

R-CM: D-Sub9S Female				PC/PLC: D-Sub9S Female		
PIN #	Signal Name	Detail		PIN #	Signal Name	Detail
1			—	1	DCD	Not connected
2	TXD	Transmitted data signal	—	2	RXD	Received data signal
3	RXD	Received data signal	—	3	TXD	Transmitted data signal
4			—	4	DTR	Not connected
5	GND	Ground	—	5	GND	Ground
6			—	6	DSR	Not connected
7	CTS	Clear to send signal	—	7	RTS	Request to send signal
8	RTS	Request to send signal	—	8	CTS	Clear to send signal
9			—	9	NC	Not connected
Flame	Shield		—	Flame	Shield	

* For RS232C cable part No. 387 or standard D-Sub 9 pin (female) straight cable is available.

3-4. In/Output Connector and LED
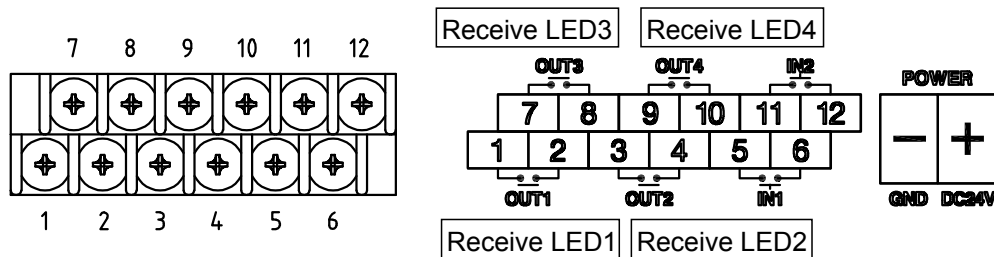
Pin No.	Terminal	Function
1 2	OUT1	**Completion signal type:** Output a relay signal when receive the same ID signal set at OUT1. **Data transfer type:** When the tightening torque value from the wrench registered in ID1 is within the set Hi/Lo limit values, a signal outputs from OUT1. * No polarity due to no voltage contact output. * Receive LED No.1 lights up during output.
3 4	OUT2	**Completion signal type:** Output a relay signal when receive the same ID signal set at OUT2. **Data transfer type:** When the tightening torque value from the wrench registered in ID1 is not within the set Hi/Lo limit values, a signal is outputs from OUT2. * No polarity due to no voltage contact output. * Receive LED No.2 lights up during output.
5 6	IN1	Input terminla for reset input. Input a reset signal to reset relay signal output. Required 0.1 seconds or more of pulse input.
7 8	OUT3	**Completion signal type:** Output a relay signal when receive the same ID signal set at OUT3. **Data transfer type:** When the tightening torque value from the wrench registered in ID2 is within the set Hi/Lo limit values, a signal is outputs from OUT3. was within Hi/Lo judgment range. * No polarity due to no voltage contact output. * Receive LED No.3 lights up during output.
9 10	OUT4	**Completion signal type:** Output a relay signal when receive the same ID signal set at OUT4. **Data transfer type:** When the tightening torque value from the wrench registered in ID2 is not within the set Hi/Lo limit values, a signal is outputs from OUT4. * No polarity due to no voltage contact output. * Receive LED No.3 lights up during output.
11 12	IN2	When the torque wrench is out of use, LS torque wrench can be wired to LS-IN and COM for back-up. * The no voltage contact output will not be sent by inputting a LS-IN signal. * During cont checker function is activate, this terminal take a role of END input terminal. Required 0.1 seconds or more of pulse input.

Terminals for Count Checker function

[INPUT TERMINAL]

● END Input terminal: IN2

Input terminal for work end signal.

By connecting it to COM terminal via 0.1 seconds or more of contact relay signal generated by a push button switch, PLC etc., pass/fail judgment is performed based on the remaining count at that time.

● RESET Input terminal: IN2

Input terminal for work end signal.

By connecting it to COM terminal via 0.1 seconds or more of contact relay signal generated by a push button switch, PLC etc., initializes the count display to the tightening number setting, and the pass/fail judgment lamp, outout it will be OFF.

[OUTPUT TERMINAL]

● OK Output terminal: OUT1

Outouts a relay signal as OK result from this terminal when the count number was "0" and END input signal is inputted or auto judgment timer is expired.

● NG Output terminal: OUT2

Outputs a relay signal as NG result from this terminal when count over Is set at NG and count exceed set count, an END signal has been inputted at the time count remaining or auto judgment timer expired.

4   Precaution for Use

4-1. Power Source

[⚠ Caution]

Be sure to use 24 V DC for the R-CM power supply.

* An optional AC adapter BA-8R is required to use AC100V - 240V power source
* Tightening torque of terminal screws are T = 50cN • m.
* Be careful not to attach 24 VDC and GND in reverse.

GND   DC24V

R-CM Power Terminals
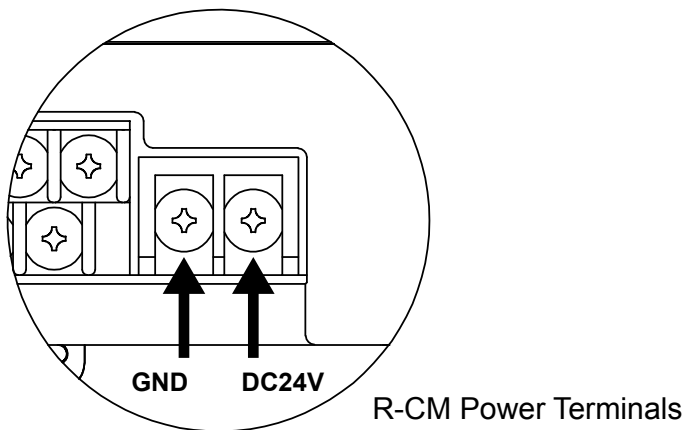
4-2. Usage Environment

● Use the product where there is no metal structure around as much as possible.
● Do not place the antenna of the receiver in the immediate vicinity of metal pillars, electric wires, iron pipes, etc. Especially when the antenna and piping are parallel, the communication status may deteriorate.
● Avoid using in the vicinity of machines that generate electromagnetic noise, such as welding machines, electrical discharge machines, and personal computers.

4-3. In/Output Terminals

● **Make sure that the power of the equipment connected to the receiver is turned off before wiring.**

● **Use crimp terminals with the following sizes for wiring to the OUT PUT terminal and power supply terminal.**

  * Tightening torque of terminal block screws are T = 50cN • m.

Bellow 5.8mm

Bellow 5.8mm
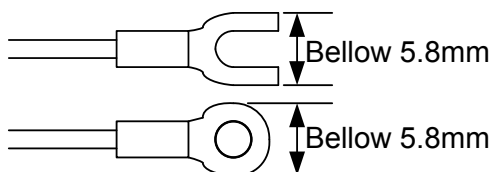
4-3-1. Caution of Input Connector Internal Circuit

● IN1 and IN2 Input terminal
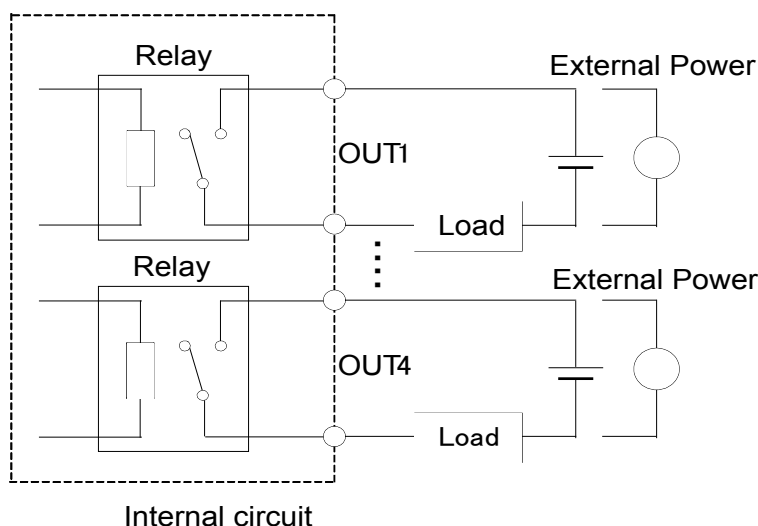

Internal circuit
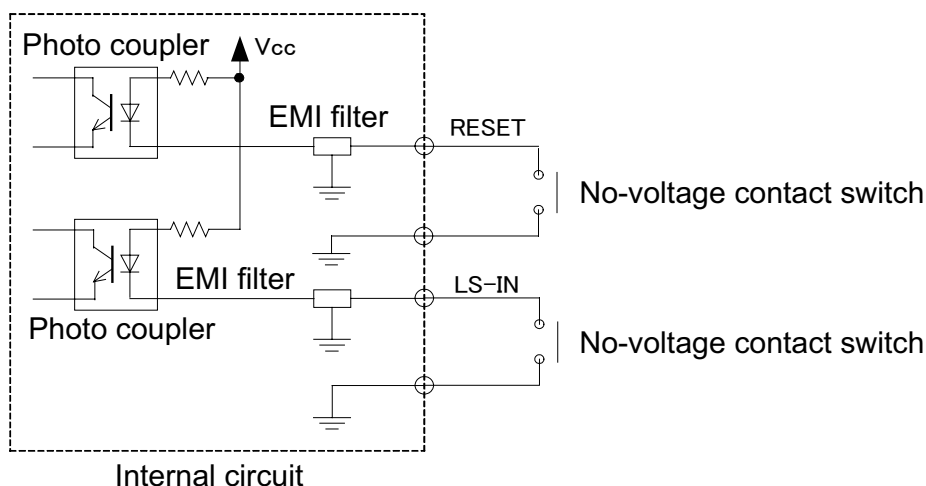
Connect this input terminal with a non-voltage contact switch such as LS torque wrench, push button switch, or relay.

* Do not use any external source to supply power to the input circuit. It may cause malfunction.

4-3-2. Caution of Output Connector Internal Circuit

● OUT1, OUT2, OUT3, OUT4 Output Terminals.

Internal circuit

Apply the rated load to the contact output. Relay rated output : DC30V 1A, AC125V 0.5A

The rated contact capacity is based on the resistance load. The steady-state current and the inrush current may differ greatly depending on the load type. The table below shows the relation between the typical loads and inrush currents.

Load type	Inrush current
Resistance load	About same as the steady-state current
Solenoid load	10 to 20 times of the steady-state current
Motor load	5 to 10 times of the steady-state current
Incandescent lamp load	10 to 15 times of the steady-state current
Mercury-vapor lamp load	About 3 times of the steady-state current
Sodium-vapor lamp load	1 to 3 times of the steady-state current
Condenser load	20 to 40 times of the steady-state current
Transformer load	5 to 15 times of as the steady-state current

4-3-3. Contact Protection Circuit

When the inductive load is opened or closed, a counter-electromotive voltage is generated.

This could cause a heavy damage to the contact, resulting in a significant shortening of operating life. Therefore, a contact protection circuit is required. The examples of contact protection circuits are shown in the table below.

Circuit Example		Apply		Feature	Selection of Elements
		AC	DC		
CR Type	**Relay contact** — Induced load (r, c)	*	OK	If this circuit is used for timer loads, leakage current flowing through cr cause faulty operation. * If used with AC voltage, impedance of the load should be lower than impedance of cr.	The standard c and r are as follows:c: 0.5 to 1 µF per contact current 1Ar: 0.5 to 1Ω per contact voltage 1V. The above values vary depending on the property of load or variations in relay characteristic. Considering that the capacitor "c" has the effect of controlling the discharge when the contacts are open and the resistor "r" plays the role of controlling the current at the next power-on, check through experiments is required. Normally, use a capacitor with a dielectric strength between 200 to 300V. In an AC circuit, use a capacitor for AC with no polarity.
	Relay contact — r, Induced load, c	OK	OK	If the load is a relay or solenoid, the reset time is delayed. It is effective to connect between the loads when the power supply voltage is 24 or 48V and to connect between the contacts when the power supply voltage is 100 to 200V.	
Diode Type	**Relay contact** — Diode, Induced load	NG	OK	Energy stored in the coil is discharged to the coil by flow of current by the diode connected in parallel to the load and is consumed by joule heat of the resistance of the inductive load. The reset time delay in this type is longer than that of the CR type.	Use a diode with a peak inverse voltage 10 times higher than the circuit voltage and a forward current as high as or higher than the load current. In an electronic circuit where the circuit voltage is not so high, a diode with a peak inverse voltage about 2 to 3 times higher than the power voltage may be used.

5 Handling

5. How to Use

5-1. Installation/Remove way of the Radio Module

5-1-1. How to Install the Radio Module to Receiver

* Be sure to attach the antenna to the radio module before mounting the module on receiver.
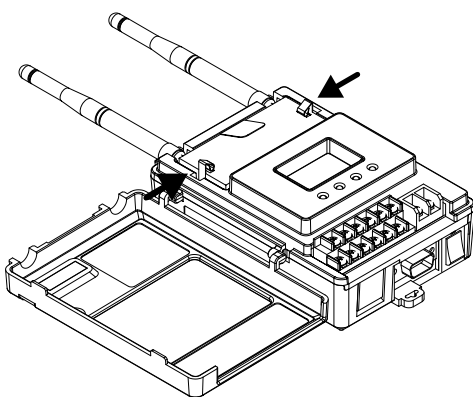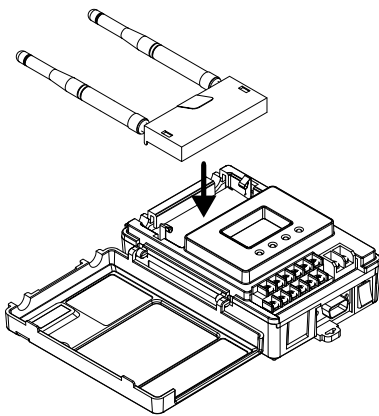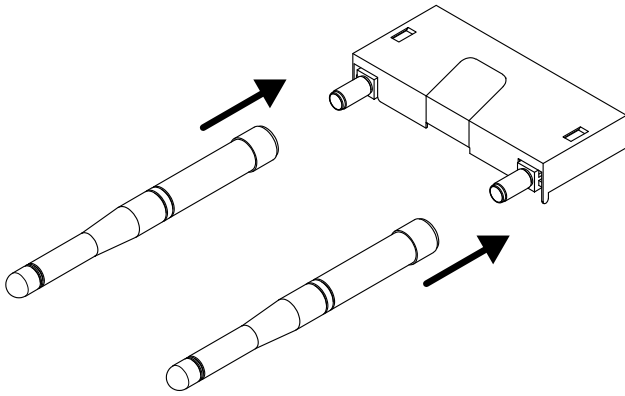

1. Open the front cover of receiver and
   fit the module to the board.

2. Take care not to pinch the metal fittings by the
   module.
   Attach the module to the board by aligning the
   protrusions on the module with the guide holes on
   the board.

3. After installing the module on the receiver,
   push it inward until the metal fittings on both sides
   enter the groove of the module.
   * If the module does not enter even if it is pressed,
     the module may not be installed correctly.
     Make sure that the module is installed correctly
     and do not push the lever in.

5-1-2. How to Remove the Radio Module from Receiver
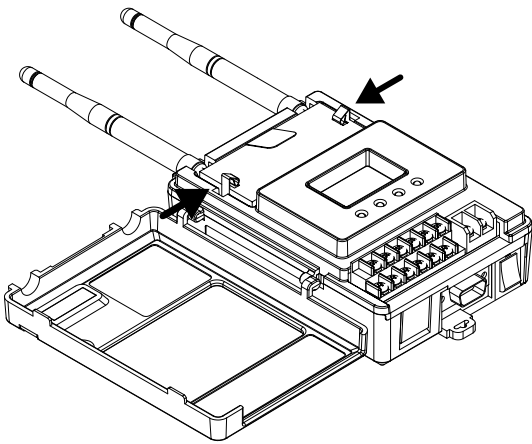
1. Release the metal fittings that fixes into the grooves of the module, and pinch and lift the sticker of the radio module.

   * Do not lift forcibly before release the metal fittings, the levers may caused deformation.
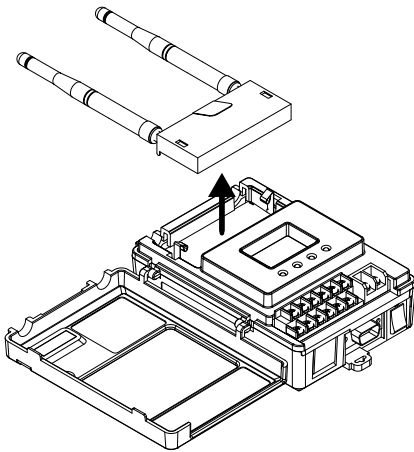
2. Store the removed radio module in consideration of humidity, static electricity, and breakage metal parts.

* For information on how to handle radio modules, refer to the instruction manual for each module.

5-2. Installation/Remove way of DIN rail

5-2-1. How to attatch on DIN rail
[Preparation]

● 35mm width DIN rail * R-CM standard accessory
    * Should be attached R-CM on the DIN ral and install the extension BOX IO-CM and BZ-CM.

1. Pull out the white rocker on the R-CM in the direction of the arrow until it clicks into place.
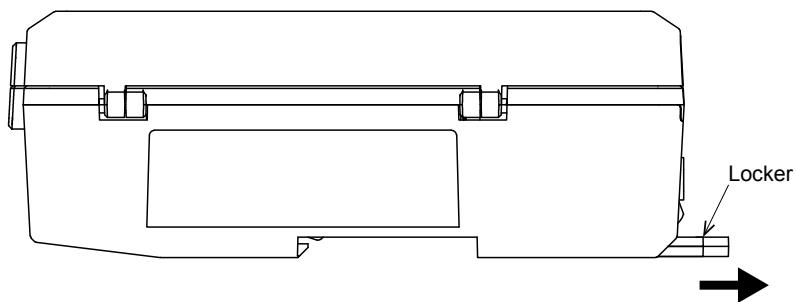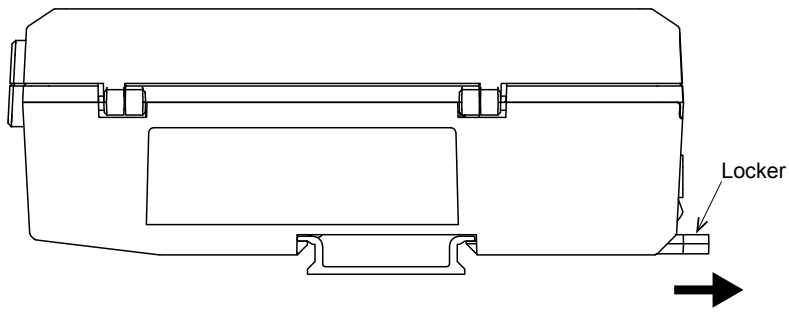
Locker

2. Hook the nail of the R-CM body on the DIN rail.

Nail   DIN rail
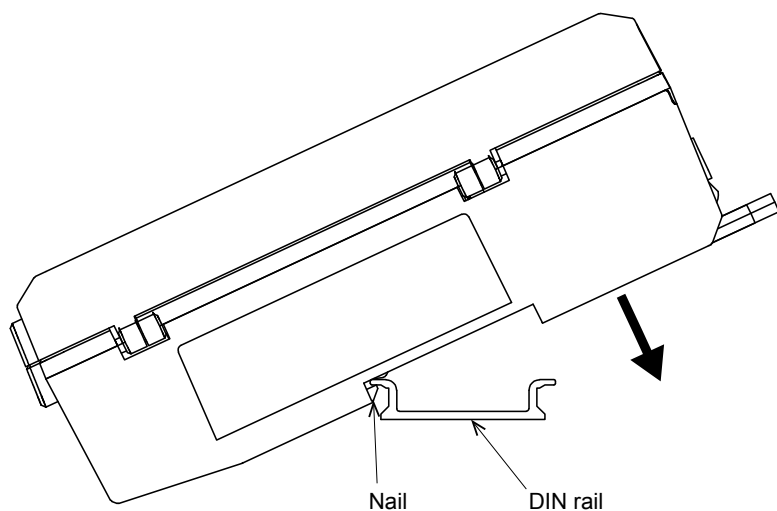
3. Push the extracted rocker in the direction of the arrow until it clicks.

   Confirm R-CM is securely fixed to the DIN rail.
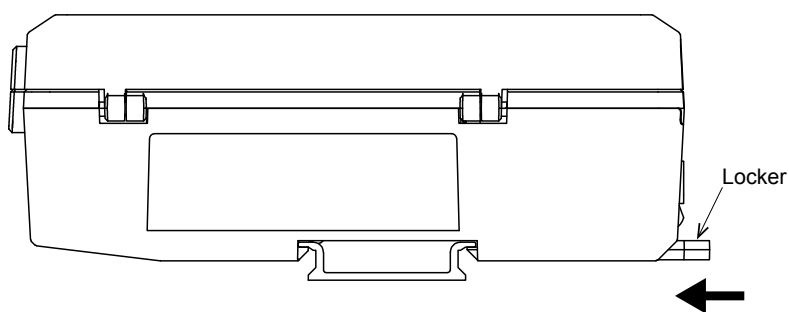
Locker

5-2-2. How to remove from DIN rail

1. Pull out the white rocker on the R-CM in the direction of the arrow until it clicks into place.

Locker

2. Pull the R-CM main body in the direction of the arrow and remove it from the DIN rail.

Nail   DIN rail
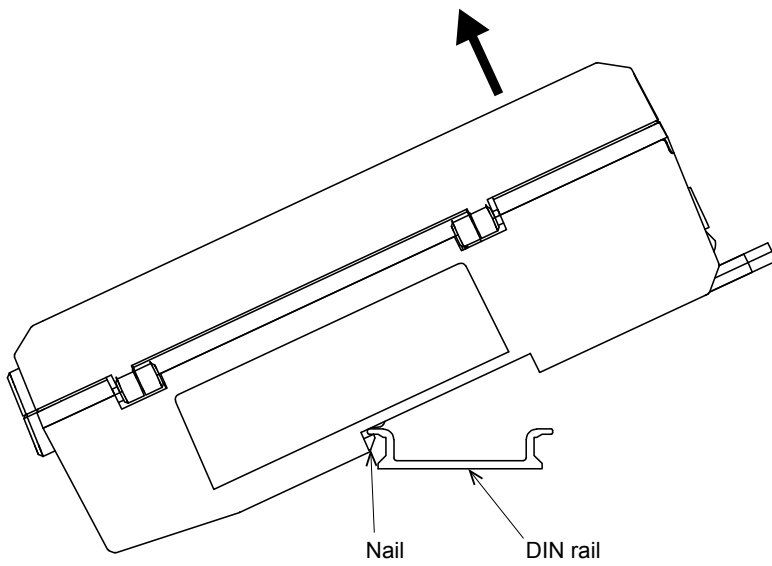
5-3. How to replace the backup battery

R-CM uses a backup battery to maintain the buit-in clock while power off.
If the clock is significantly wrong when turn on, or it passed 5 year since starting of use,
replace the battery to a new one.
* Be sure to turn off the power before replacing the battery.

[Preparation]

- Bland new coin type battery CR2032

- Torque driver, e.g. RTD60CN

- Plus bit #2 catalog No..86

1. Make sure that the R-CM is turned off, and remove the radio module referring to "5-1-2.

2. Loosen the three screws on the back of the case and remove the case lid.

Screws

Upper case
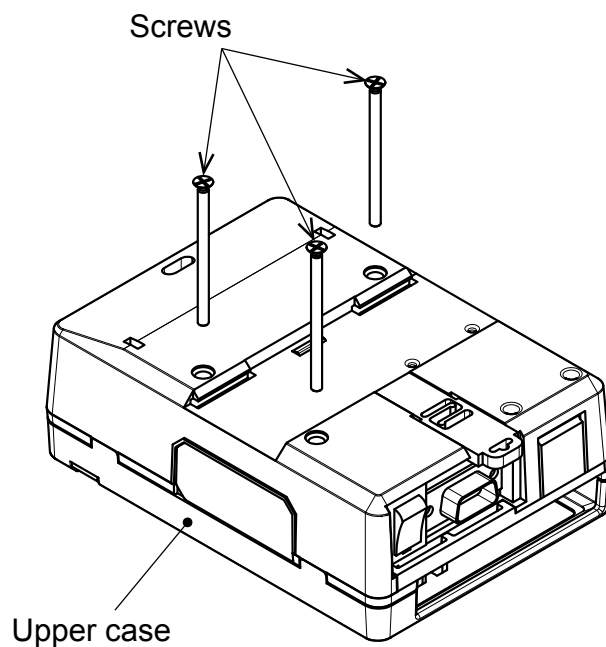
3. Remove the board from the case, take away the old battery from the battery holder on the back of the board, and insert a new battery.

Battery

Rear case

Battery holder

Electric board

Front case
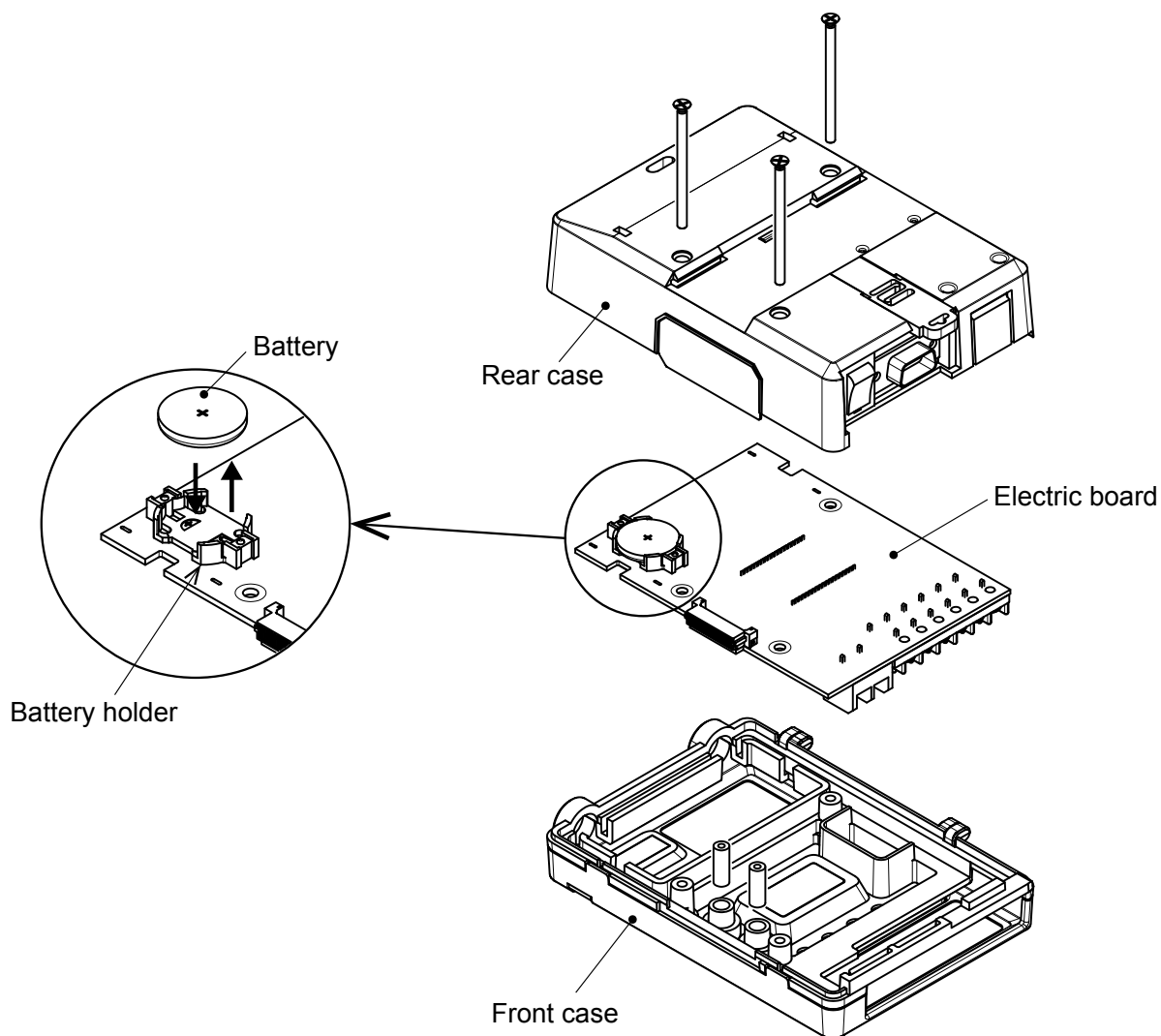
4. When battery replacement is complete, return the board to the case, taking care not to pinch the harness, attach the case top cover, and tighten the screws. Use a torque screwdriver for tightening.
   Tightening torque = 32cN▪m

5. Since the current time will bes reset, set the clock again by using the parameter setting software.
   - FHM/FH manual 8-2. Setting Software
   - FD/FDD manual 12. R-CM+M-FD Setting by setting software.

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