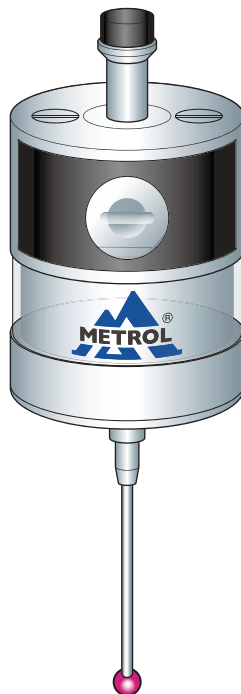
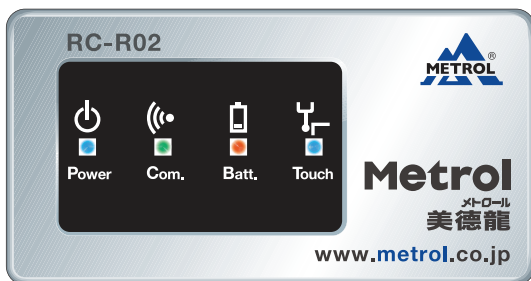


# RC series

## Instruction Manual

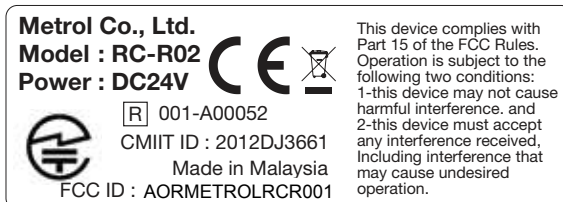


## ■Technical conformity marks



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.

The final end product should be labelled in a visible area with the following to  
reflect the module being used inside the product.  
Contains FCC ID: AORMETROLRCS001



### FCC CAUTION

Changes or modification not expressly approved by the party responsible for  
compliance could void the user's authority to operate the equipment.

This transmitter must not be co-located or operated in conjunction with any  
other antenna or transmitter.

These devices comply with FCC radiation exposure limits set forth for an  
uncontrolled environment and FCC radio Frequency (RF) Exposure Guidelines  
and have very low levels of RF energy that is deemed to comply without  
testing of specific absorption rate (SAR)

These devices should be installed and operated with minimum distance 5mm  
between the radiator & human body.

# INDEX

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|                                                                      |        |
|----------------------------------------------------------------------|--------|
| <b>1. Before using</b>                                               |        |
| Terms of Warranty                                                    | P1–2   |
| Usage precautions                                                    | P3     |
| <b>2. Basic specification</b>                                        | P5–6   |
| <b>3. Software specification</b>                                     |        |
| Transmitter                                                          | P7     |
| Receiver                                                             | P8     |
| <b>4. Matching transmitter and receiver</b>                          | P9     |
| <b>5. Parameter switch (DIP switch)</b>                              |        |
| Details of parameter switch (DIP switch)                             | P11–13 |
| Details of LED display                                               | P14–16 |
| <b>6. Transmission range when combining transmitter and receiver</b> | P17    |
| <b>7. Receiver installation</b>                                      | P19    |
| <b>8. Transmitter installation</b>                                   |        |
| Stylus attachment                                                    | P21    |
| Installing the battery                                               | P22    |
| Attachment of the transmitter to shank                               | P23    |
| Stylus centering adjustment                                          | P24    |
| <b>9. Maintenance</b>                                                | P25    |
| <b>10. Troubleshooting</b>                                           | P27–28 |

# 1.Before using

## ■Terms of Warranty

We endeavour to achieve zero claims and complaints rate with respect to product quality assurance.

Although malfunctions are a problem that comes before the warranty and even one should be prevented, malfunctions cannot be prevented through our efforts alone. We would therefore like to request that our customers have an understanding of the functions and specifications of applicable products as indicated in our catalogs, instruction manuals and web site to ensure that they are used properly under specified conditions.

Furthermore, applicable products are designed and manufactured primarily for general industrial use.

Therefore, we would also like to request our customers to cooperate in employing a safe design for preventing accidents, fires and the like through providing of fail-safe measures, preventing operational errors and employing redundant safety designs.

### 1 Applicable products

The warranty defined below is applicable to products manufactured and sold by METROL (to be referred to as the "applicable products").

### 2 Warranty period

The warranty for applicable products is valid for one year and three months from the original delivery due to the location designated by the customer.

*\*The initial three months are assumed to be a preparation period until use of the products following purchase.*

### 3 Range of coverage

a. A replacement product will be provided on an exchange basis or the malfunctioned product will be repaired free of charge within the warranty period. if the product is or becomes defective and that at the sole discretion of METROL, the defects due to faulty materials or workmanship.

However, applicable products will not covered by the warranty in the case of the following malfunctions even within the warranty period.

- ( I ) Malfunctions occurred due to use of a product in a manner that deviates from standards, specifications, environments, usage procedures or usage precautions described in the catalog, instruction manual or specifications.
- ( II ) Malfunctions having occurred for reasons other than those attributable to the delivered product.
- ( III ) Malfunctions having occurred due to modifications or repairs made by someone else other than the Metrol representative.
- ( IV ) Malfunctions or damage that results from external causes outside our control which shall include accident fire disaster, other nature disaster or other force majeure.

- 
- b. The range of coverage is limited to warranty of the applicable product only, and any other secondary loss or damage resulting from the malfunction of an applicable product is not covered by the warranty.
  - c. Please be aware that charges for service (including installation, de-installation on-site confirmation and repairs) are not included in the price of products.

## 4 Applications

Applicable products are designed and manufactured as general-purpose products used in ordinary industrial environments.

In the case of incorporating an applicable product in an apparatus, machine or system, please confirm the suitability of the application along with any related standards, regulations and restrictions.

With respect to the applications indicated below in particular, customers are requested to conduct necessary tests on an actual product in advance after consulting with the manufacturer regarding usage conditions and other details.

- a. Applications for which usage conditions or environment are outside those presumed by the manufacturer or applications unable to be confirmed as being appropriate by the manufacturer when using applicable products.
- b. Applications likely to have an effect on human life or property (such as nuclear power equipment, transportation machinery or medical devices), applications used in public utilities (such as electricity, gas or water lines), or applications applying correspondingly thereto.
- c. Applications in harsh environments (special environments requiring heat resistance, vacuum and the like)

*\*Although METROL believes that sound reliability in harsh environments is one of the characteristics of our products, there are still cases in which it is difficult to ascertain actual circumstances.*

*Since there is the potential for accidents in such cases, customers are requested to have an understanding of protective structures, materials and so forth and provide additional covers and other equipment as necessary.*

## 5 Other matters

The contents of this catalogue, including specific models and, specifications, and any other contents, are subject to change without notice at METROL's sole discretion.

Although the utmost care has been taken in producing this manual, the manufacturer is not responsible for any damages incurred as a result of clerical or other errors in this manual.

# 1.Before using

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## ■ Usage precautions

### 1 Battery

The transmitter comes with two 1 / 2AA size lithium metal batteries (non-rechargeable). Please dispose of used batteries in accordance with laws and regulations relating to the environment and safety regulations in your area. Do not attempt to recharge these batteries.

When replacing the battery, confirm that the battery is of the recommended or applicable type, and confirm that the battery is inserted while correctly aligning the electrodes in accordance with the procedure described in this manual and the indications on the product.

Please refer to the instruction manual of the battery manufacturer for guidelines relating to specific battery applications, safety and disposal.

- Please confirm that all batteries are inserted with the electrodes correctly aligned.
- Do not store batteries in locations subject to direct sunlight or rain.
- Do not allow the battery to be heated or incinerated.
- Do not intentionally discharge the battery.
- Do not allow the battery to be short-circuited.
- Do not disassemble the battery, subject the battery to excessive pressure, drill holes in the battery or allow it to be deformed.
- Take precautions so that the battery is not accidentally swallowed. Store the battery in a location out of the reach of children.
- Do not allow the battery to become wet.

### 2 Glass window

The transmitter has a glass window. In the case the glass window should happen to be broken, handle the product carefully to prevent injury.

### 3 Installation

Please confirm that the following guidelines are strictly observed at the responsibility of the person performing installation work to ensure that the product functions properly.

- Please install while placing the interface at an adequate distance from electrical noise generation sources such as transformers or servo amplifiers.
- Connect all 0V / ground connections to a central ground terminal on the machine. (The grounding and shielded cables of all devices can be connected to ground.) This is extremely important, and failure to do so can cause the generation of an electrical potential between the product and ground.
- Place cables at an adequate distance from large-current cables such as motor and other power cables as well as high-speed data cables.
- Try to keep cable lengths as short as possible at all times.

### 4) Product usage

Use of this product in a manner other than that specified by METROL may cause a decrease in the guaranteed performance and functions of the product.

[illegible]

## 2. Basic specification

The transmitter communicates with the receiver using 2.4GHz ISM band.  
The receiver receives touching signal, battery alarm signal and communication alarm signal from the transmitter and outputs the decoded signals to CNC controller through the cable.  
This system gains FCC, CE, TELEC (JAPAN), SRCC (CHINA) and Rohs, WEEE certification.

### 2-1 Common specification

|                          |                 |                      |                               |
|--------------------------|-----------------|----------------------|-------------------------------|
| Frequency range          | 2400 - 2480 MHz | Data rate            | 2Mbps.                        |
| No. of channels          | 37              | RF put               | Max. 0dBm (without antenna)   |
| Channel occupation width | 2MHz            | Sensitivity          | Max. -82dBm (without antenna) |
| Modulation               | FSK (DSSS)      | Protective structure | IEC IP67                      |

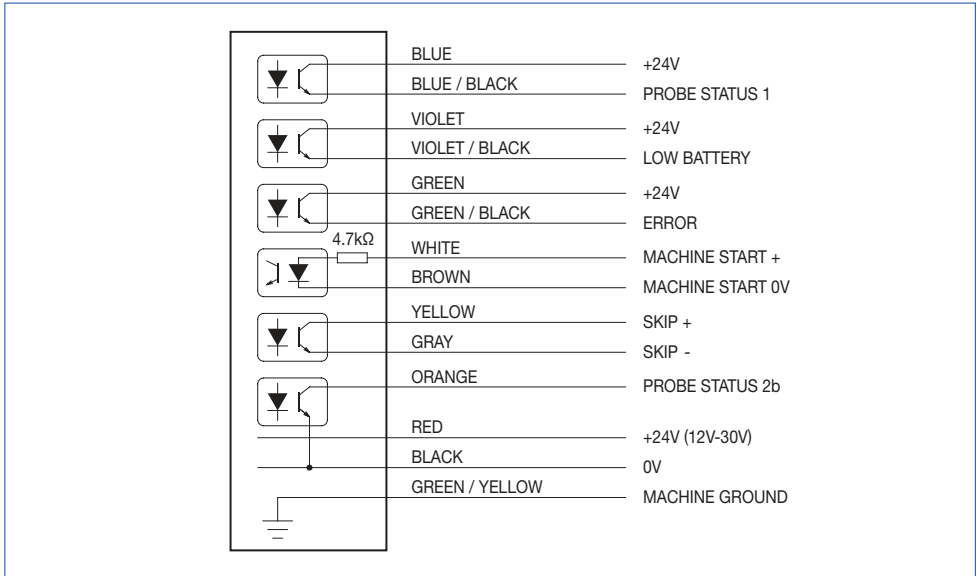
### 2-2 Transmitter specification

|                            |                                                                                                                                                                                                                 |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Communication              | Bi-direction                                                                                                                                                                                                    |
| Antenna                    | On board chip antenna                                                                                                                                                                                           |
| Contact signal             | 1 point NC                                                                                                                                                                                                      |
| LED display                | 1 LED (Red : signal output of transmitter)                                                                                                                                                                      |
| Power source               | 1/2AA thionyl chloride battery<br>Once battery is installed to the battery holder, the current consumption starts.<br>For long-term storage, it is recommendable to remove the battery from the battery holder. |
| Weight (excluding a shank) | With battery : 290g / Without battery : 280g                                                                                                                                                                    |
| Battery life (calculation) | 5% use (72min/day) : 62 days<br>Continuous use : 180 hours                                                                                                                                                      |

### 2-3 Receiver specification

|                      |                                                                                                                                                                                                                                        |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Communication        | Bi-directional                                                                                                                                                                                                                         |
| Antenna              | 1/4λ dipole antenna                                                                                                                                                                                                                    |
| Transmission range   | Max. 15m                                                                                                                                                                                                                               |
| ID control           | Receiver performs communication exclusively with the transmitter using its ID number after coupling operation.                                                                                                                         |
| LED display          | 4 LEDs (Blue : Power, Orange : Battery alarm, Green : Communication status, Blue : Skip signal output of transmitter)                                                                                                                  |
| Parameter switch     | DIP Switch on board 8bit                                                                                                                                                                                                               |
| I/O                  | φ7.2/14 cores oil resistant cable with watreproof connector<br>Input : power source (DC 24V), M code (Measurement start/measurement end)<br>Output : Skip signal (PROBE STATUS 2a), PROBE STATUS1, PROBE STATUS 2b, LOW BATTERY, ERROR |
| Response speed       | Min.1ms<br>(From transmitter turns ON until receiver skip signal activates. However, this depends on communicatin status)                                                                                                              |
| Power supply voltage | DC24V±10%                                                                                                                                                                                                                              |
| Current consumption  | Max.100mA (DC24V ± 10%)                                                                                                                                                                                                                |

## 2-3-1 Wiring diagram



## 2-3-2 LED display

System status is displayed with four LED shown at right.

- **Power LED** : Indicates status of power supply.

 : Normal power supply status  
 : Standby (approximately 60 seconds after machine tool power is switched on)

- **Com. LED** : Indicates the transmitter and receiver operation mode and communication status.

OFF : Sleep mode  
 : Communication normal in measurement mode  
 : Communication unstable in measurement mode (searching for connection channel)

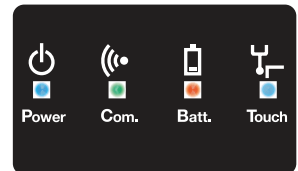
- **Batt. LED** : Indicates battery status of transmitter.

OFF : Battery normal  
 : Running low (replacement recommended)  
 : Battery dead

\*During the matching procedure, it indicates completion of matching mode (refer to P9)

- **Touch LED** : Indicates the signal output of the transmitter.

OFF : Contact OFF (transmitter signal output OFF)  
 : Contact ON (touch probe signal output ON)



## 3. Software specification

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### 3-1 Transmitter

Transmitter has 3 modes.

#### 1 Sleep mode

Unless the measurement start M-Code is sent from the receiver, the transmitter will remain in sleep mode to save power.

During sleep mode, there will be no signal transmission or LED illumination even if the contact touches the workpiece.

#### 2 Measuring mode

The transmitter receives the measurement start M-Code from the receiver and switches to measurement mode, enabling measurement.

Upon receiving the measurement end M-Code, it switches to sleep mode.

#### 3 Matching mode

This mode is the initial setting.

In this wireless communication system, the transmitter stores ID number.

By using ID number, it performs matching with the receiver so that the receiver stores ID.

Once ID number is stored in the receiver, it performs communication exclusively and is never affected by any other communication systems.

This ID number (transmitter) is stored nonvolatile.

**Note:** Matching is necessary every time transmitter is exchanged.

### 3-2 Receiver

Receiver has 3 modes.

#### 1 Sleep mode

While waiting for the measurement start M-Code from the machine, the receiver searches the ambient 2400 to 2480 MHz ISM band and identifies the optimal communication channel. During sleep mode, error signals will not be output even if communication becomes abnormal.

#### 2 Measuring mode

When the receiver receives the measurement start M-Code from the machine, it switches to measuring mode and causes the transmitter to do so as well.  
When the entire system switches to measuring mode, data transmission of measurement signals and error signals begins, with signal output and LED display according to the conditions.

| LED                | LED display                                                      | Output signal |
|--------------------|------------------------------------------------------------------|---------------|
| Power LED (Blue)   | Power supply status (Lit: Normal, Flashing: in preparation)      |               |
| Com. LED (Green)   | Communication Status (Lit: Normal, Flashing: Bad communication)  | ERROR         |
| Batt. LED (Orange) | Battery Status (Off: Normal, Flashing: Running low, Lit: Dead)   | LOW BATTERY   |
| Touch LED (Blue)   | Output signal from transmitter (Off: Sensor OFF, Lit: Sensor ON) | SKIP          |

When receiving the measurement end M-Code, the receiver switches to sleep mode and causes the transmitter to do so as well.

#### 3 Matching mode

This mode is the initial setting.  
The receiver stores the ID number of transmitter in order not to be affected by any similar signals.  
This ID number (transmitter) is stored nonvolatile.

**Note:** Matching is necessary every time the transmitter is exchanged.

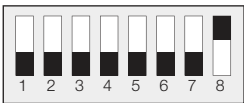
# 4. Matching transmitter and receiver

It is necessary to match the transmitter and receiver when first installing the system.  
Matching is also required when replacing either the transmitter or the receiver.  
Matching can be performed anywhere within the range of movement of the system.

## 1 Receiver matching procedure

- 1) Remove the cover of the receiver.
- 2) Switch the parameter switch #8 (DIP switch) on the receiver to OFF.

Parameter switch

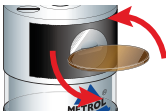


ON  
↑

|  |            |  |               |  |        |
|--|------------|--|---------------|--|--------|
|  | Power. LED |  | LED Flashing/ |  | LED ON |
|  | Com. LED   |  | LED Flashing  |  |        |
|  | Batt. LED  |  | LED OFF       |  |        |
|  | Touch. LED |  | LED OFF       |  |        |

## 2 Transmitter matching procedure

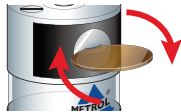
- 1) Remove the cover of the transmitter and affix it again (Restart the transmitter).



① Remove the battery cover with a screwdriver or coin



② Reinsert the battery



③ Affix the battery cover

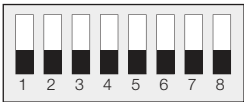
- 2) Matching is completed when the Batt. LED lights.

|  |            |  |               |  |        |
|--|------------|--|---------------|--|--------|
|  | Power. LED |  | LED Flashing/ |  | LED ON |
|  | Com. LED   |  | LED Flashing  |  |        |
|  | Batt. LED  |  | LED Flashing  |  |        |
|  | Touch. LED |  | LED OFF       |  |        |

## 3 Matching mode completion procedure

- 1) Switch the parameter switch (DIP switch) #8 on the receiver to OFF.

Parameter switch



OFF  
↓

- 2) Complete the matching procedure by attaching the receiver cover.

Note : The matching procedure is performed to record the transmitter ID number in the receiver and prevent interference by other radio signals.  
Once the matching procedure has been performed, further matching is not required provided the transmitter is not replaced (or repaired).

