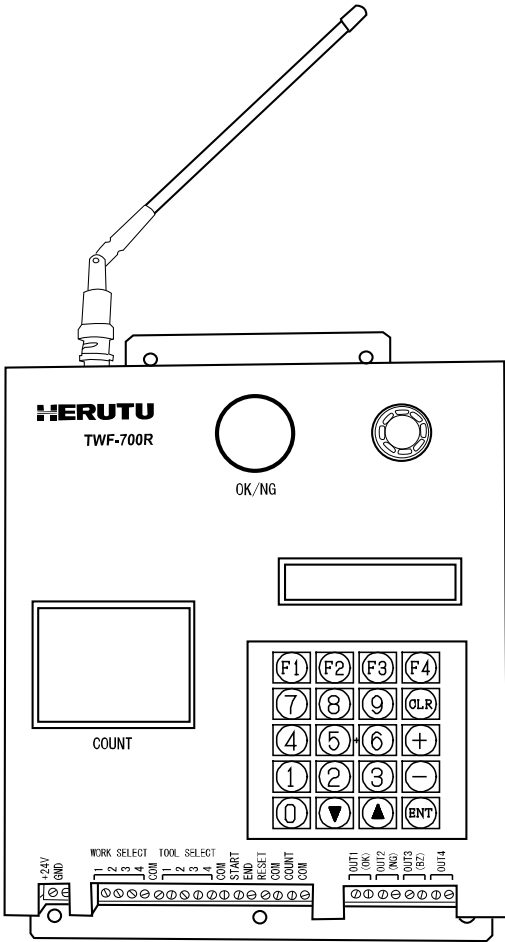# Poka-yoke (Foolproofing) Receiver

TWF-700R-ES
(Engineering Sample)

User's Manual
V1.00

1.　Before You Use this Device

1-1　Introduction

This operation manual contains necessary information for using the product, such as general description, installation, and operation of the product.

Read the manual carefully before using the product.　Also, keep it at a safe place for ready reference at anytime.

1-2　Accessories

・Antenna　1piece

<Available Accessory>

・AC adaptor (Input AC100-240V/Output DC24V)

1-3　Safety precautions (Be sure to read)

The description here highlights the precautionary matters which must be strictly observed in order to prevent physical harm to the user or other persons and damage to the property.

■ The following pictorial symbols are used to classify and explain the criticality levels of harms or damages that may result from using the product in an improper way while ignoring the instructions.

⚠ Caution	The Caution indication means that "failure to observe the instructions may result in human injury, or physical damage alone."

■ For handling this machine:

● This machine is a wireless communication device composed of precision parts. Do not overhaul/remodel.　It may cause an accident or a machine trouble. 🚫 Prohibited

■ For working/storage environment:

● To minimize the possibility of trouble, characteristic degradation, fire, or electrical shock, avoid using or storing the product in the following locations: 🚫 Prohibited
• Locations subject to direct sunlight.
• Locations where liquids, foreign objects, corrosive gas, or flammable gas may enter the product.
• Locations exposed to high humidity, oily smoke, dust, sand, or the like.
• Locations with less stability such as the top surface of an unsteady table or an inclined surface.

⚠ Warning	The Warning indication means that "failure to observe the instructions may result in death or serious injury."

■ For handling this machine:

● Do not use this product for such applications as require an extremely high level of reliability relating to human life. 🚫 Prohibited

🚫 Prohibited

● Do not use this product in locations where there is uncertainty about the coverage of radio waves.

■ For handling the power supply:

Always observe the following precautions to prevent the power cord from being heated, damaged, or ignited.

● Do not bring the power cord close to fire nor put it into fire. The power cord may be broken or ignited, resulting in an accident.	⊘ Prohibited
● Use the AC adapter and the main body only with the specified power voltage to protect them against damage or fire accidents.	⊘ Prohibited
● Do not use the main body in a wettable atmosphere. It may cause accidents or troubles such as heating, igniting, and electrical shock.	⊘ Prohibited
● Do not touch the main body, the power cord, or the plug outlet with wet hands. It may lead to accidents such as electrical shock.	⊘ Prohibited
● Do not damage the power cord. A short circuit or heating may result, causing fire or electrical shock.	⊘ Prohibited
● Do not use the power plug with dust adhered on it. A short circuit or heating may result, causing fire or electrical shock.	⊘ Prohibited
● Do not give a strong impact onto the power cord. It may cause an accident or a machine trouble.	⊘ Prohibited
● Do not use the power cord if you find out deformation etc. in it. It may cause an accident or a machine trouble.	⊘ Prohibited
● Do not charge the main body in locations where flammable gas could be generated. It may result in igniting or a fire accident.	⊘ Prohibited
● Never overhaul the main body. It may cause an accident or a machine trouble.	⊘ Prohibited

■ When something erroneous has occurred during use:

Since it may cause fire, electrical shock, or the like, remove the power plug from the plug outlet and ask the outlet store or us for repair.

● When smoke or abnormal odors come out, immediately remove the power plug from the plug outlet and ask the outlet store or us for repair.	⊘ Attention
● Do not use the power cord if it is damaged. Using the damaged power cord may result in fire or electric shock.	⊘ Prohibited

- Terms Used in this Manual

  This section defines the special terms that are used in this manual.

Terminology	Explanation
Transmitter	Refers to the TWF-600T. The transmitter can be attached to a variety of tools, such as torque wrenches and pliers.
Tool	In this manual, "tool" refers to any tool that has a transmitter attached to it.
Work	Refers to the number of movements of a tool.
ID	Refers to the unique numbers that are assigned to each TWF-600T.
Code 39	Refers to the Code 39 barcode standard.
RS-232C	Refers to the RS-232C serial communication standard.

1-4. General Description

The TWF-700R poka-yoke (foolproofing) receiver (hereinafter referred to as "the receiver") can receive signals from TWF-600T transmitters, count tool movements according to different configurations, and produce pass/fail judgments based on the movements that it has counted.
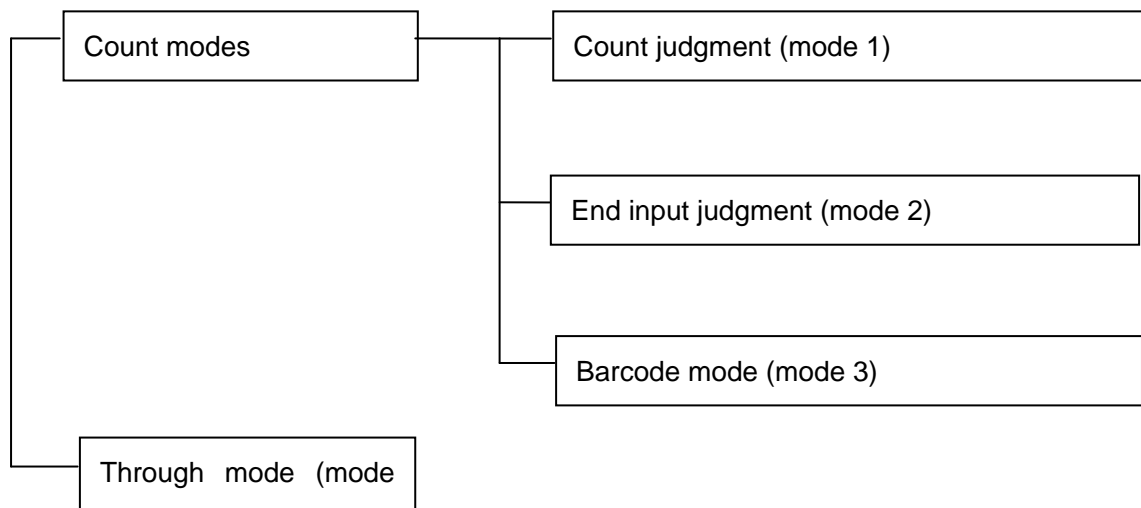
The receiver has three count modes, in which it keeps track of the number of tool movements and produces pass/fail judgments based on them, and one through mode, in which it simply relays the signals that it receives from the transmitter. You can use each of these modes as necessary for different applications.

The receiver indicates the judgment results by using LED lamps. The receiver can also transmit the results to external devices, such as revolving lights or a signal tower. In addition, the receiver is equipped with a serial port, and you can use it with a barcode reader to scan counting instructions.

With the receiver, you can construct a simple poka-yoke (foolproofing) system within the production line without installing large-scale equipment.

Features

• Because the receiver can register four different transmitter IDs, you can use it in a group with four different transmitters.

• The receiver has three count modes, in which it counts the number of tool movements, and one through mode, in which it simply relays the signal that it receives. You can use these four different modes as necessary for different applications.

```
┌─────────────────────┐              ┌──────────────────────────────┐
│   Count modes       │──────────────│  Count judgment (mode 1)     │
└─────────────────────┘              └──────────────────────────────┘
                                     ┌──────────────────────────────┐
                                     │  End input judgment (mode 2) │
                                     └──────────────────────────────┘
                                     ┌──────────────────────────────┐
                                     │  Barcode mode (mode 3)       │
                                     └──────────────────────────────┘
┌─────────────────────┐
│  Through  mode  (mode
└─────────────────────┘
```

•Through Mode

The receiver relays signals that it receives from the transmitters that have been registered on it.

Because the receiver can register up to four transmitter IDs, it can be used in a group with four transmitters.

4

•Count Modes

You can select tools (transmitters) and amounts of work (number of tool movements) for each operation, and the receiver will produce pass/fail judgments that are based on the number of signals that it receives from the selected tools.
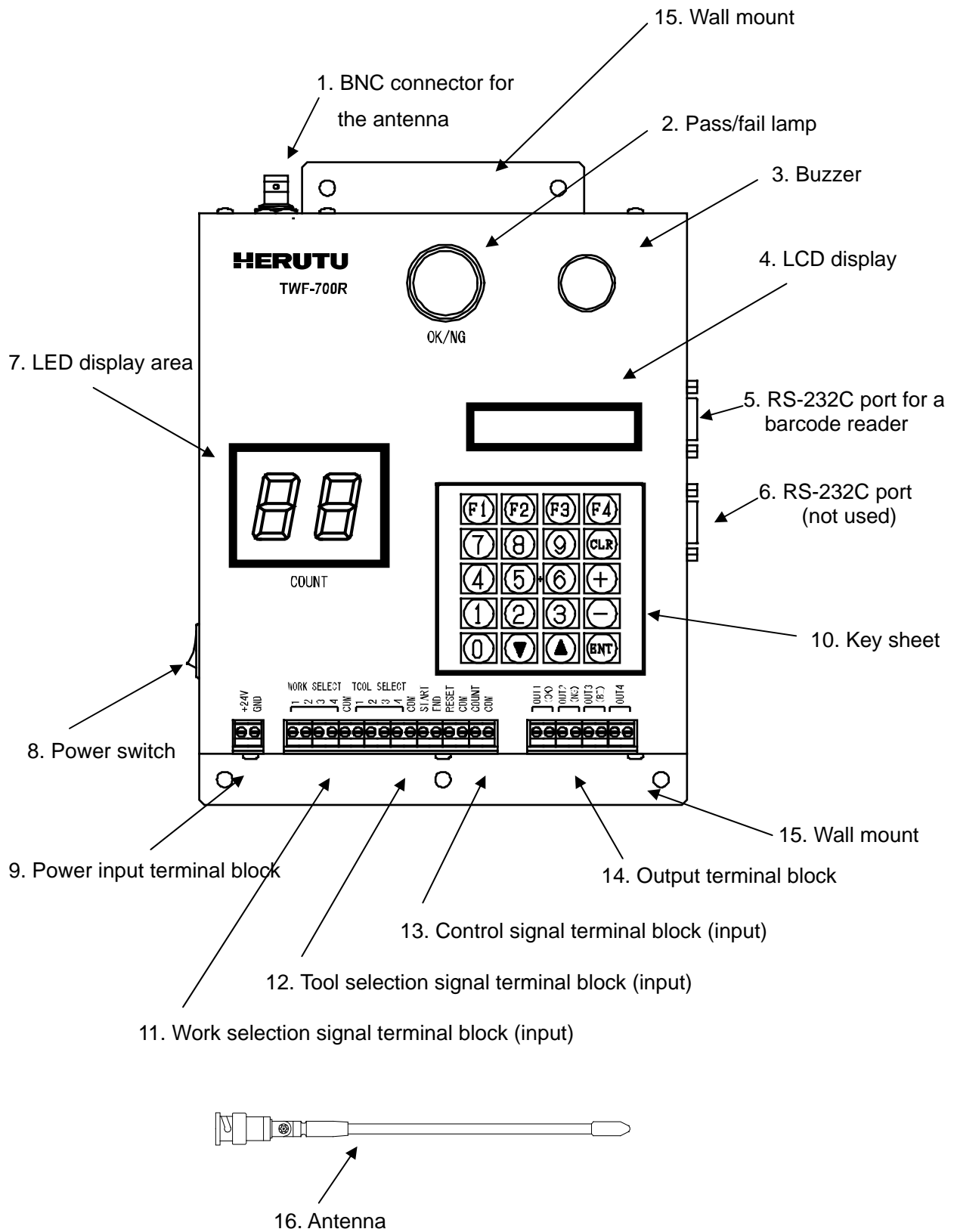
In modes 1 and 2, you set the tool (transmitter) and amount of work (number of tool movements) by applying a signal to the receiver. In mode 3, you set the tool and amount of work using external serial input (based on a bar code).

*   The receiver operates on a frequency of 426.1 MHz.
*   The receiver's indoor communication range is approximately 50 m.

1-5.   Specifications

Item	Specifications
Frequency	426.1 MHz (the same as the TWF-600T)
Antenna	Whip antenna with a BNC connector
ID configuration (tool configuration)	Up to four TWF-600T IDs can be registered.
Key sheet	14 keys (0 to 9, CLR, ENT, +, -, ▲, ▼, and F1 to F4)
Display	Character LCD with backlight 16 characters × 2 lines
Counter	7-segment LED with 2 digits 25-mm tall characters with red illumination
Pass/fail judgment display lamp	Round, two-color lamp (red and green) Green indicates pass. Red indicates fail.

Internal buzzer	Sounds after each tool movement or pass/fail judgment
	    Buzzer frequency: Approx. 2.3 kHz
	    Volume: 95 ± 10 dB (at a distance of 1 m)

16-point input (dry contact input) The terminal block is the same as that used in the WCP-300.	Four work selection connectors and one COM connector: (Five connectors)
	Four tool selection connectors and one COM connector: (Five connectors)
	Three control signal connectors and one COM connector: (Four connectors) (one start, one end, and one reset connector)
	One wired count connector and one COM connector: Two connectors
8-point output (relay output)	Four relay output connectors •During the count modes: Pass, fail, and buzzer (one unused connector) •During through mode Outputs 1 through 4
Other inputs and outputs	Two serial interfaces (one unused port) 9-pin D-sub male
Power supply	24 VDC (22 to 48 VDC)
Switches	One power switch
Current consumption	Approx. 300 mA at 24 VDC
External dimensions	190 × 210 × 50 (W × H × D; not including the antenna or protrusions)
Weight	Approx. 1.6 kg (including the antenna)

1-6. Component Names and Descriptions

15. Wall mount

1. BNC connector for
the antenna

2. Pass/fail lamp

3. Buzzer

4. LCD display

HERUTU
TWF-700R

OK/NG

7. LED display area

5. RS-232C port for a
barcode reader

6. RS-232C port
(not used)

COUNT

F1 F2 F3 F4
7 8 9 CLR
4 5 6 +
1 2 3 −
0 ▼ ▲ ENT

10. Key sheet

8. Power switch

WORK SELECT TOOL SELECT
+24V GND 1 2 3 4 COM 1 2 3 4 COM START FND RESET COM COUNT COM OUT1 COM OUT2 (NC) OUT3 (87) OUT4

9. Power input terminal block

15. Wall mount

14. Output terminal block

13. Control signal terminal block (input)

12. Tool selection signal terminal block (input)

11. Work selection signal terminal block (input)

16. Antenna

Item	Description
1. BNC connector for the antenna	A BNC connector for attaching a whip antenna.
2. Pass/fail lamp	A two-color LED lamp. Green means pass. Red means fail.
3. Buzzer	A buzzer that can be set to sound at each tool movement or at each fail judgment.
4. LCD display	A 16-character × 2-line LCD display.
5. RS-232C port for a barcode reader	A serial interface for receiving input from a barcode reader. 9-pin D-sub male
6.RS-232C port (not used)	An unused serial port reserved for future expansion. 9-pin D-sub male
7. LED display area	Displays the selected amount of work.
8. Power switch	The power switch.
9.Power input terminal block	A terminal block for connecting a 24-VDC power supply. (The input range is from 22 to 48 VDC.)
10. Key sheet	A membrane switch key sheet.
11.Work selection signal terminal block	An input terminal block used to specify the amount of work.
12.Tool selection signal terminal block	An input terminal block used to select what tool to use.
13.Control signal terminal block	An input terminal block for receiving the START, END, and RESET signals.
14.Output terminal block	An output terminal block used for relaying signals.
15. Wall mount	The mount has 6 × 5 mm diameter holes that can be used to attach the receiver to a wall.
16. Antenna	A 426-MHz helical antenna.

1-7.   External Dimensions
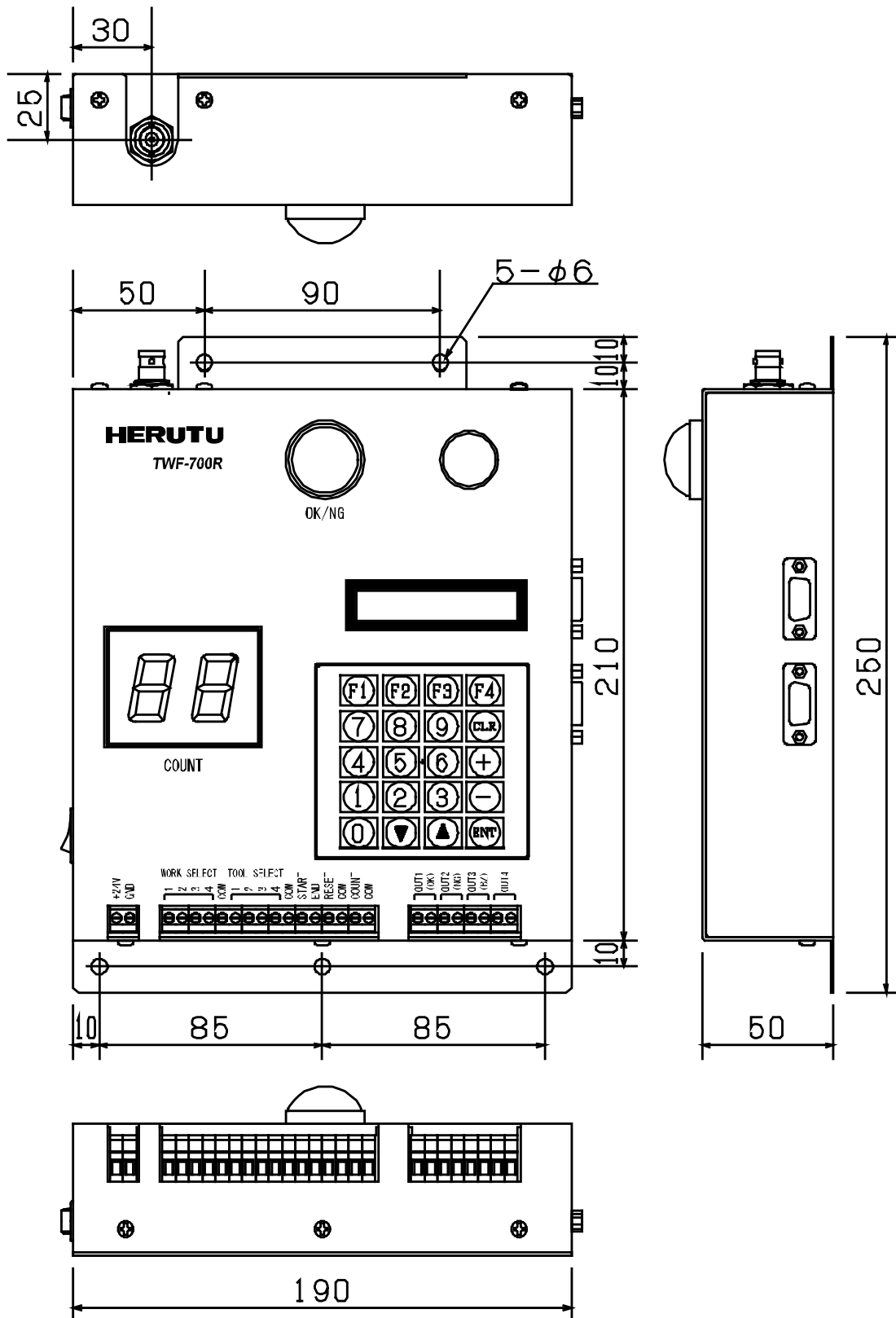
1-8. Connecting the Receiver

The receiver is equipped with input terminal blocks for work selection, tool selection, control signals, and the power supply, and it is equipped with an output terminal block that contains OUT 1 through 4. Confirm the signal specifications for each terminal block, and connect the terminals to the appropriate signals carefully. The receiver also has a 9-pin D-sub RS-232C port for use with a barcode reader. Connect it after confirming the specifications of the signal that you will connect it to.
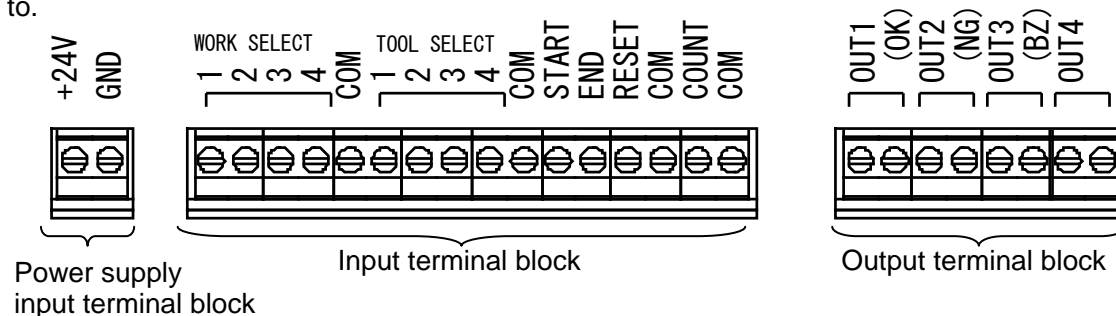
	Terminal block Signal name	Description
Power supply input	+24 V	Connect to a 24-VDC power supply.
	GND	Connect to the power supply ground.

Input (dry contact input)	WORK SELECT 1 to 4	Select one of the pre-registered work amounts (number of tool movements). You can specify one of 16 different values in binary by making connections to WORK SELECT 1 to 4. Work selection is only valid in modes 1 and 2.
	TOOL SELECT 1 to 4	Select one of the pre-registered tools (transmitter IDs). You can select one of four tools. Tool selection is only valid in modes 1 and 2.
	START	Receives the start signal at the beginning of an operation.
	END	Receives the end signal when an operation is finished.
	RESET	Receives the signal that resets the counter.
	COUNT	Receives the wired count signal.

Output (relay output)	OUT1 (pass)	Transmits the pass signal in modes 1 through 3. In mode 4, this terminal transmits output for tool 1.
	OUT2 (fail)	Transmits the fail signal in modes 1 through 3. In mode 4, this terminal transmits output for tool 2.
	OUT3 (buzzer)	Transmits the buzzer signal in modes 1 through 3. In mode 4, this terminal transmits output for tool 3.
	OUT4	Not used in modes 1 through 3. In mode 4, this terminal transmits output for tool 4.

Terminal Block Specifications

• Power wire size: 0.2 mm^2 to 2.5 mm^2 (AWG 24 to 12)

• Standard bare wire length: 8 mm

• Terminal block screw tightening torque: 0.5 N/m

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1-8-1. Power Supply Input Terminal Block

Connect a stable 24-VDC power supply to the power input terminal block.

The power supply input range is from 22 to 48 VDC.

1-8-2. Input Terminal Block

Connect the work selection, tool selection, control (start, end, and reset), and wired count signals to the input terminal block.

The input contacts are dry. Connect them to devices such as selection switches. The signal of an input will be on when its switch is shorted. For signal inputs, use a device with low chattering that can reliably switch a 12-VDC, 5-mA signal on and off.

Please be aware that applying voltage to the input terminal block can damage the internal circuitry.

• Input Circuit (Dry contact input)
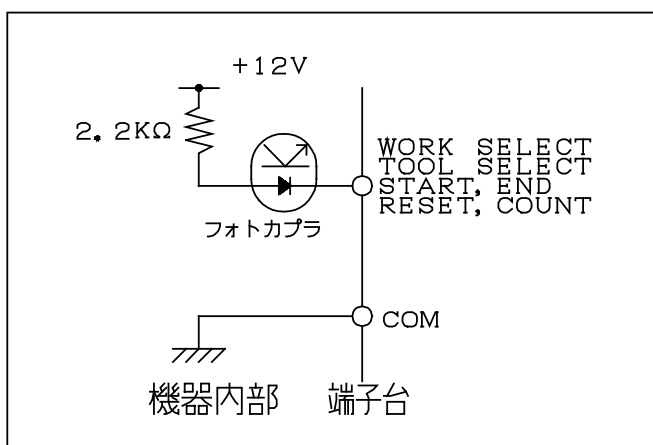
1-8-3. Output Terminal Block

The OUT1 through 4 outputs are relay outputs. (They may transmit pass, fail, and buzzer signals depending on the mode.) Each terminal is shorted when it is on. You can attach the terminals to external devices, such as revolving lights or a signal tower. Please be aware that the internal circuitry may be damaged if the rated contact load is exceeded.

• Output Circuit (Relay output)
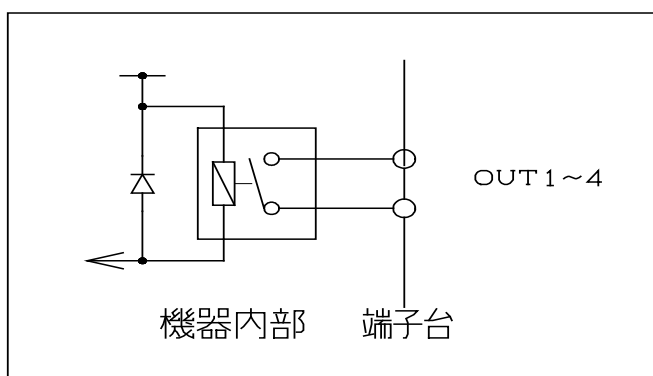
Rated Load
250 VAC: 5 A
30 VDC: 5 A

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1-8-4. 9-Pin D-Sub Serial Port (RS-232C)

The receiver is equipped with a serial port for connecting to a barcode reader and receiving barcode signals that conform to the Code 39 standard. (There is also a serial port that is reserved for future expansion and that is not currently used.)

•Signal Line Specifications (DTE specification)

Pin No.	Signal	Description	Direction	
2	RXD	Received data	Receiver←	BCR
3	TXD	Transmitted data	Receiver→	BCR
5	SG	Signal line ground	Receiver—	BCR
7	RTS	Request to send	Receiver→	BCR
8	CTS	Clear to send	Receiver←	BCR

Notes: BCR stands for barcode reader.

Only the signal lines listed above are used.

•Communication Protocol and Format

Item	Description
Baud rate	9600 bps
Stop bits	1 bit
Data length	8 bits
Parity check	None

Data Format

Tool count	Tool 1 work 2 bytes	Tool count	Tool 2 work 2 bytes	Tool count	Tool 3 work 2 bytes	Tool count	Tool 4 work 2 bytes	Wired tool work count 2 bytes

→
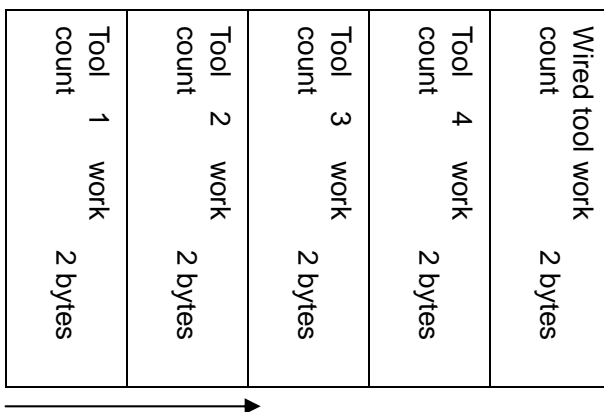
•Bar Code Communication Standard

The receiver can receive data that conforms to the Code 39 standard.

Set unused tools to 00.Set each tool that you intend to use to a value from 01 to 98.
If you try to set an unregistered tool to a value intended for a tool that will be used (01 to 98), the data will be regarded as an error and ignored.

1-9. Installing the Receiver

Please heed the following precautions when you install the receiver.

1. Keep the antenna away from metal plates and electric wiring, and make sure that it is not parallel to them.

2. Keep the receiver away from noise sources.

3. Choose a location for the receiver at which there is as little electromagnetic shielding as possible between the receiver and the transmitter (TWF-600T).

4. Transmission performance varies greatly depending upon the location. Make sure that the receiver works properly in a location before you install it there.

5. The receiver is not designed to be dust- or liquid-proof.

*Do not install the receiver:
- •In direct sunlight.
- •In an extremely humid place.
- •Near a television or radio.
- •Near a welder or any other spark-producing device.
- •Near a strong magnetic field.
- •In an area surrounded by metal framing or metal walls.
- •Near a device that may malfunction as a result of the electromagnetic waves from the receiver.

Precaution for Installing the Antenna near Metal Plates and Similar Objects

Make sure that the antenna is not parallel to the wall that the receiver is attached to.

No   Yes
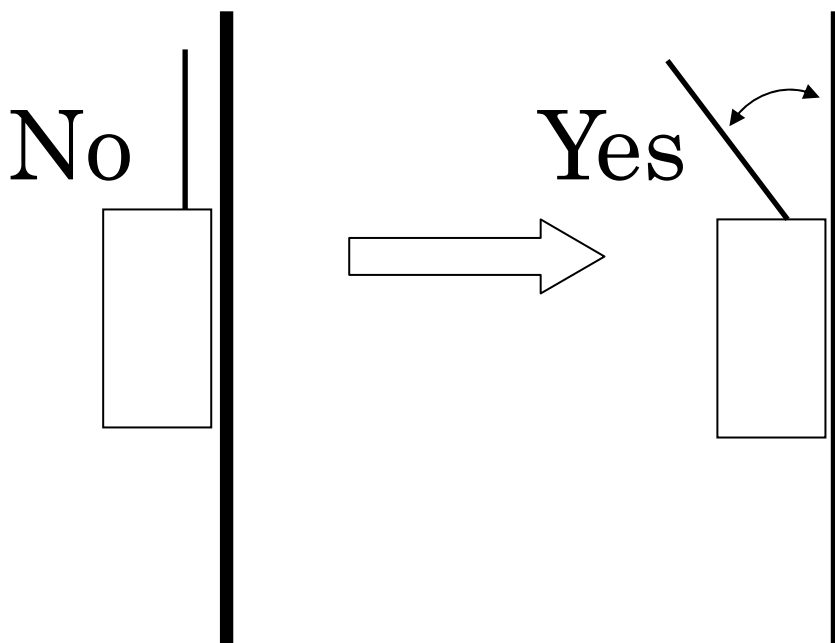
1-10. Operation Overview

1-10-1. Work Value and Count Value

The number of tightening movements required for a pass judgment is referred to as the "work value," and the number of tightening movements that have been performed using the specified method is referred to as the "count value."

You can register 16 different work values. You can set each work value to a number from 1 to 98. The state of the input to the terminal block (WORK SELECT 1 through 4) determines which registered work value is selected.

A registered work value is selected when the number that corresponds to it is specified in binary through the shorting of the work select terminals and the COM terminal.

1-10-2. ID Registration and Tool Selection

The receiver can register four transmitter IDs and assign them to tools 1 to 4. A registered tool is selected when the tool select terminal from 1 to 4 that corresponds to it and the COM terminal are shorted.

1-10-3. Double-Counting Prevention Timer

After it receives a count signal, the receiver ignores other count signals for the period of time specified by the double-counting prevention timer setting.

You can set the double-counting prevention timer to a value from 0.1 to 1.0 in 0.1-second intervals.
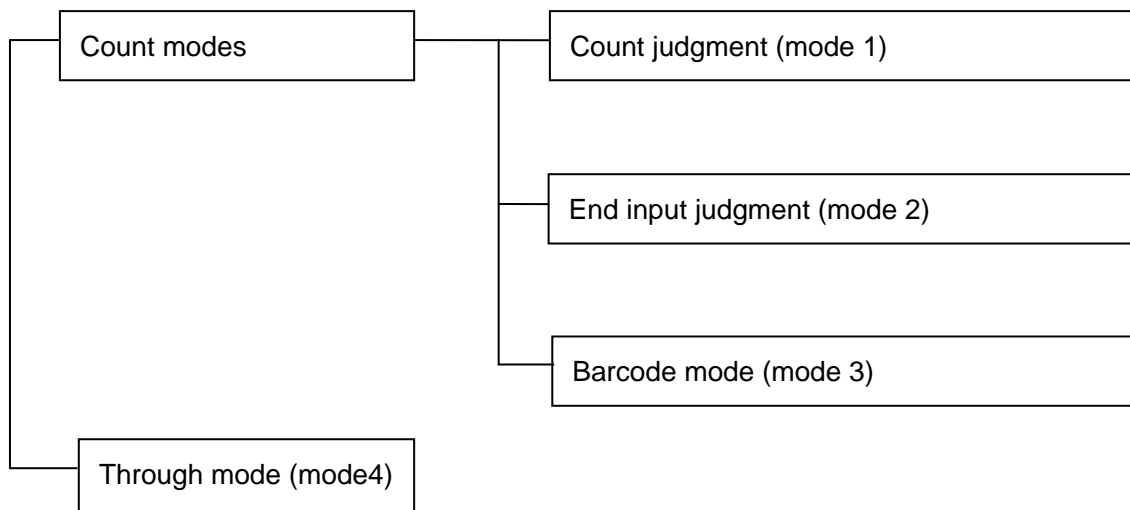
1-10-4. Output Time Setting

You can set the relay output time for OUT1 to OUT4 (pass, fail, and buzzer).

You can set the output time to a value from 0.1 to 1.0 in 0.1-second intervals.

1-10-5. Modes

The receiver has four different modes: three count modes, in which it counts the number of tool movements, and one through mode, in which it simply outputs the signal that it receives.

```
┌──────────────────┐        ┌──────────────────────────┐
│   Count modes    │────────│  Count judgment (mode 1)  │
└──────────────────┘        └──────────────────────────┘

                            ┌──────────────────────────┐
                            │ End input judgment (mode 2)│
                            └──────────────────────────┘

                            ┌──────────────────────────┐
                            │  Barcode mode (mode 3)    │
                            └──────────────────────────┘

        ┌──────────────────────────┐
        │  Through mode (mode4)     │
        └──────────────────────────┘
```

(1) Count Modes: Count Judgment (Mode 1)

In this mode, the receiver uses the count value to make pass/fail judgments.

A switch (end input) is set at the final position of an operation. The switch input is received at the end of the operation.

If the count value reaches the work value before the end input, the receiver produces a pass judgment.

If the count value does not reach the work value by the time of the end input, the receiver produces a fail judgment. The fail judgment will change to a pass judgment if youapply the remaining necessary count signals.

At the time of the end input, if a pass judgment has already been produced, the count value is reset. You can clear a fail judgment by applying a reset signal to the receiver. This also resets the count value.

The count value is reset whenever the work value is changed.

(2) Count Modes: End Input Judgment (Mode 2)

In this mode, the receiver uses the count value at the time that it receives the end signal to make pass/fail judgments.

A start input switch is set at the start position of an operation, and an end input switchis set at the final position.

The start switch input is received at the start of the operation, and then the tightening movement begins. After it receives the end input, the receiver performs pass/fail judgment by comparing the work value to the count value. If the work value and the count val

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ue are the same, the receiver produces a pass judgment. Otherwise, it produces a fail j
udgment.

If the receiver produces a fail judgment because the count value is below the work valu
e, it will produce a pass value without receiving another end signal as you apply the re
maining necessary count signals. If the receiver produces a fail judgment because the c
ount value is greater than the work value, you can clear the fail judgment by applying a
reset signal to the receiver. This also resets the count value. If the receiver produces a
pass judgment, it resets the count value after it receives the next start signal.

(3) Count Modes: Barcode Mode (Mode 3)

In this mode, instead of selecting tools and work values by applying signals to terminal blocks,
you select them by reading data from a barcode. The tool selection terminals and work
selection terminals are invalid when this mode is being used.

The work values (1 to 98) for five tools can be read from a barcode.

Tools 1 through 4 are for wireless transmissions, and tool 5 is for the wired input to the count i
nput terminal block.

Scanned Barcode Data: Fixed Length

The receiver only loads barcode data for the work values of each tool.

The barcode data must conform to the Code 39 standard.

1. Tool 1 work value (2)	2. Tool 2 work value (2)	3. Tool 3 work value (2)	4. Tool 4 work value (2)	5. Tool 5 is the wired work value (2)

The values in parentheses indicate the number of bytes.

Sounds Produced during Barcode Reading

Data OK →	Two short beeps
Data error →	Five short beeps

The scanned barcode data will be ignored and discarded when:

• When tools 1 through 4 correspond to pre-registered IDs and a work value for an unregistered
tool is specified.

• When a specified work value is outside of the range of 1 to 98.

• When all of the work values are 0.

(The data will be valid as long as one of the work values is greater than 0.)

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Pass/fail judgment is not performed on each tool. Instead, the receiver produces a pass judgment when all of the count values are equal to the work values specified in the barcode. The receiver does not manage the order in which the tools are used, so as long as the count values of all the tools reach their specified work values, the receiver produces a pass judgment.

The receiver loads the barcode at the start of the operation. The receiver receives an end signal when the operation finishes.

If the count value of each tool reaches its corresponding work value before the end input, the receiver produces a pass judgment. If the count value of one of the tools does not reach its corresponding work value by the time of the end input, the receiver produces a fail judgment. If the receiver has already produced a pass judgment by the time it receives the end signal, the work value is reset.

The method of pass/fail judgment is the same as that for mode 1.

The receiver resets the work values to the last scanned barcode values. If a new barcode has been scanned, the new data is used, but if a new barcode has not been scanned, the most recent barcode data is reused.

(4) Through Mode (Mode 4)

In this mode, the receiver simply relays the signal that it receives from the transmitter. You can determine the length of time for which the receiver will transmit relayed signals by specifying the output time setting. You can specify up to four transmitter IDs, so you can use the receiver to relay the signals of four transmitters. (However, multiple signals cannot be received at the same time.)

The pass/fail lamp lights in green in synchronization with the transmission of relayed signals. (The lamp lights for the same amount of time as the relayed signals are transmitted for.)

   The double-counting prevention timer and buzzer output settings are enabled.

The RS-232C output and the work selection, tool selection, start, end, reset, and count inputs are disabled.

Even when the double-counting prevention timer is in effect, the receiver will receive data that has a different ID than the previously received data.

The receiver will not receive any data while it is relaying a signal.

1-10-6. Over-count

The receiver normally produces a fail judgment when the count value exceeds the work value, but if you enable the over-count feature, the receiver will produce a pass judgment when the count value reaches the work value, and the pass judgment will not change even if the count value exceeds the work value.

About the Count Display
  The count display LEDs indicate the work value, and then the displayed value decreases after each count signal. Thus, when the count value reaches the work value, the displayed value is zero.
  When the count value exceeds the work value, the displayed value is 99. Afterwards, the display does not change even if the count value increases.

1-10-7. Buzzer

The receiver has an internal buzzer that sounds briefly (for approximately 0.2 seconds) after each count signal and continuously when the receiver produces a fail judgment. The receiver also has an external buzzer terminal (BZ). Signals are transmitted from this terminal under the same conditions that the internal buzzer is sounded under.

For both the internal buzzer and the external buzzer output, you can turn buzzer sounding for count signals and fail judgments off and on separately.

1-10-8. Setting Configuration

You can register and configure all of the settings of the receiver using the keypad. You can display the registered and configured contents on the LCD. The registered and configured values are stored in the receiver's internal memory. They remain stored in the memory even when the receiver is not being supplied with power.

2. Using the Device

2-1. Registration and Settings

After you have connected the receiver, you will need to register some values and configure some settings before you can use any of the receiver's various modes.

Registration

•ID registration

  Register the tools that you will use (the TWF-600T transmitter IDs). You can register up to four tools.

•Work value registration (All the initial values are 1.)

  Register work values 1 to 16. You can set each value within the range of 1 to 99.

  The initial value is 1.

•Timer settings

    •Output time setting (The initial value is 0.1 seconds.)

     Set the relay output time for OUT1 to OUT4 (pass, fail, and buzzer).

     Range:0.1 to 1.0 seconds

    •Double-counting prevention timer (The initial setting is 0.1 seconds.)

     Use the double-counting prevention timer to specify the time after count input is received for which the receiver will refuse other count input.

     Range:0.1 to 1.0 seconds

     This setting applies to all modes.

•Buzzer (BZ) output settings (In the initial settings, buzzer output is enabled for both count signals and fail judgments.)

  Enable or disable output from the buzzer output terminal for count signals and fail judgments. This setting is only applicable in modes 1 through 3.

•Buzzer (BZ) sound settings (In the initial settings, the buzzer sounds for both count signals and fail judgments.)

  Enable or disable buzzer sounding for count signals and fail judgments. This setting applies to all modes.

•Over-count setting (In the initial settings, the over-count feature is enabled.)

  Set whether or not to allow the count value to exceed the work value. This setting applies to all modes.

Keys Used for Registration and Setting Configuration

Key	Function	Description
F1	Mode selection	Use to select a mode from 1 to 4.
F2	ID registration	Use to register IDs 1 to 4 for tool selection.
1	Work count registration	Use to register one of the 16 work values.
2	Timer setting	Use to set the double-counting prevention timer and the output time.
3	Buzzer output	Use to enable or disable buzzer output at each count signal or fail judgment.
4	Buzzer sound	Use to enable or disable buzzer sounding at each count signal or fail judgment.
5	Over-count	Use to enable or disable the over-count feature.

Normal display

When you turn on the receiver, a startup display will appear, followed by one of the displays shown below, depending on the selected mode.

```
Name:TWF-700R
Ver:*.**
```
Startup display

↓The normal display will appear after approximately 2 seconds.

In modes 1, 2, and 4

```
MODE[ ]  TOOL1234
```
The registered tool numbers are indicated next to "TOOL."

In mode 3

```
1[ ]  2[  ]  3[  ]
4[ ]  5[  ]
```
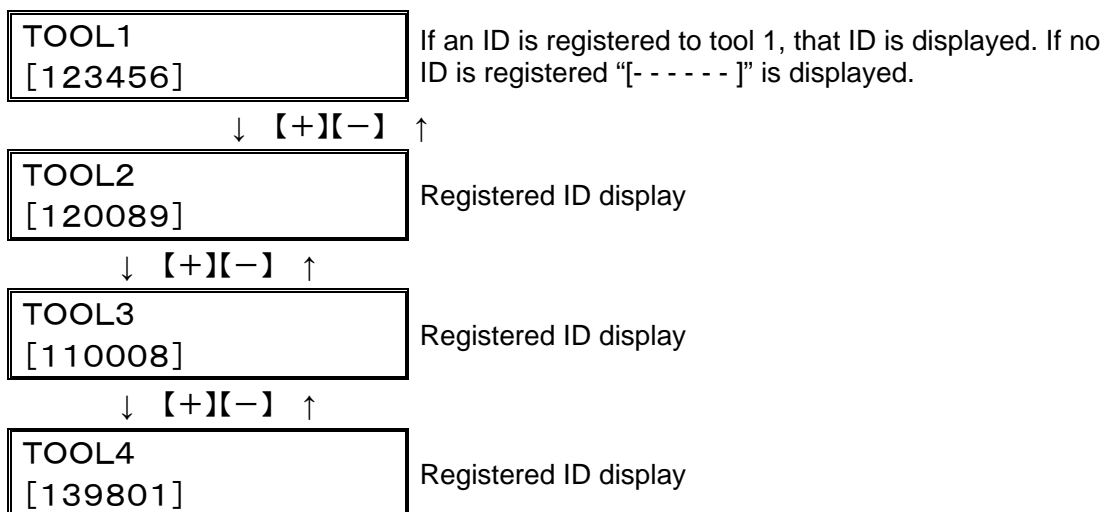An unregistered tool will be displayed with a dash.

*The count values for tools 1 through 5 appear in the brackets. The values decrease as count signals are received.

2-1-1. Registering and Deleting IDs

This section explains how to register transmitter (TWF-600T) IDs for tools 1 through 4. The IDs are unique, fixed six-digit numbers that are assigned to each transmitter (TWF-600T). (IDs are fixed when the receivers are shipped. No two receivers are assigned the same ID.) You can register and delete IDs on the receiver display.

1.   Press F2 to show the registered ID display.

| TOOL1
[123456] | If an ID is registered to tool 1, that ID is displayed. If no ID is registered "[- - - - - -]" is displayed. |

↓ 【+】【−】 ↑

| TOOL2
[120089] | Registered ID display |

↓ 【+】【−】 ↑

| TOOL3
[110008] | Registered ID display |

↓ 【+】【−】 ↑

| TOOL4
[139801] | Registered ID display |

You can view the registered IDs in the displays shown above.

To enter registration mode and register a new ID or overwrite an existing ID, press F2 in the display of the tool that you want to register.

| TOOL2 [120089]
　　　　[212121] | The current value is indicated on the top line. |
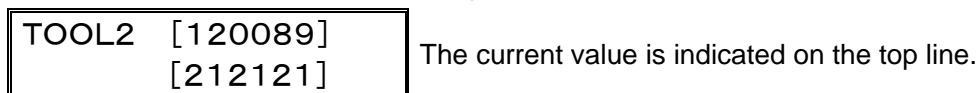
When the display shown above appears on the screen and the receiver receives the same code from a transmitter (TWF-600T) twice, the received ID appears on the bottom line of the display. Press ENT once to move the ID from the bottom line to the top line. Press ENT again to register the ID displayed in the top line and return to the registered ID display.

When the received ID is displayed on the bottom line, you can press CLR to clear the display on the bottom line. If you press ENT while the bottom line is blank, you will return to the registered ID display.

<Deleting a Registered ID>

In the registered ID display, press CLR while the tool ID that you want to delete is displayed.
The following message appears on the LCD.

```
┌─────────────────────┐
│ ERASE  TOOL ∗       │
│ 0:NO    1:YES       │
└─────────────────────┘
```

To delete the ID, press 1. If you do not want to delete the ID, press 0.
If you press 1, the ID display of the tool whose ID you deleted will show [- - - - -].

2-1-2.　Registering Work Values

This section explains how to register selectable work values 1 to 16, which are used in modes 1 and 2. The registered work values are selected through the shorting of the work select terminal block and the COM terminal.

Press 1 to display the work value display.

```
┌─────────────────────┐
│ WORK  COUNT  1      │
│ ∗                   │
└─────────────────────┘
```
The work value display appears.
You can view registered work values 1 through 16.

↓ 【+】【−】 ↑
.
.
↓ 【+】【−】 ↑

```
┌─────────────────────┐
│ WORK   COUNT16      │
│ ∗                   │
└─────────────────────┘
```
If a specified work value has already been registered, its current value appears. If no value is registered, the display is blank.

Select the number of the work value that you want to register and press ENT to enter the work value configuration display.

```
┌─────────────────────┐
│ WORK   COUNT  X     │
│ ∗ ∗                 │
│ [   ]               │
└─────────────────────┘
```
The asterisks represent the current value.

Enter a number from 1 to 98 for the work count, and press ENT. The display of the current value will change to the display of the value that you entered.
Press ENT again to register the work value and return to the work value display.

2-1-3. Timer Settings

This section explains how to set the double-counting prevention timer and the relay output time.
Press 2. Then, press + or - to switch between the double-counting prevention timer configuration display (DOUBLE COUNT) and the relay output time configuration display (OUTPUT TIME).

```
┌─────────────────────┐
│ DOUBLE   COUNT      │
│ 1. OSEC    [       ] │
└─────────────────────┘
```
The value that you enter using the keys appears in brackets. Press ENT to register the value. Range
0.1 to 1.0 seconds

↓ 【+】【−】↑

```
┌─────────────────────┐
│ OUTPUT   TIME       │
│ 1. OSEC    [       ] │
└─────────────────────┘
```
The value that you enter using the keys appears in brackets. Press ENT to register the value. Range
0.1 to 1.0 seconds

In the display for the timer that you want to set, enter a value using the keys, and the value will appear in brackets. Then, press ENT to register the value and return to the normal display.

*The double-counting prevention time is the time between the last relay output and the acceptance of the next signal. The double-counting prevention time does not include the relay output time.

2-1-4. Output Settings

This section explains how to enable or disable output from the buzzer output terminal for count signals and fail judgments.

Press 3.

```
┌─────────────────────┐
│ BZ   COUNT          │
│ *1−ON    0−OFF      │
└─────────────────────┘
```
The asterisk will move when you press a number.
Press ENT to register the setting.

↓ 【+】【−】 ↑

```
┌─────────────────────┐
│            BZ   NG  │
│ *1−ON    0−OFF      │
└─────────────────────┘
```
The asterisk will move when you press a number.
Press ENT to register the setting.

Press ENT in one of the displays shown above to register the settings and return to the normal display.

2-1-5. Sound Settings

This section explains how to enable or disable buzzer sounding for count signals and fail judgments.

Press 4.

```
┌──────────────────────┐
│ SOUNDS  COUNT        │
│ ＊1－ON  0－OFF       │
└──────────────────────┘
```
The asterisk will move when you press a number.
Press ENT to register the setting.

↓ 【＋】【－】↑

```
┌──────────────────────┐
│ SOUNDS  NG           │
│ ＊1－ON  0－OFF       │
└──────────────────────┘
```
The asterisk will move when you press a number.
Press ENT to register the setting.

Press ENT in one of the displays shown above to register the settings and return to the normal display.

2-1-6. Over-count Settings

This section explains how to enable or disable the over-count feature.

Press 5.

```
┌──────────────────────┐
│ OVER  COUNT          │
│ ＊1－ON  0－OFF       │
└──────────────────────┘
```
The asterisk will move when you press a number.
Press ENT to register the setting.

Press ENT in the above display to register the settings and return to the normal display.

2-1-7. Mode Setting

This section explains how to set the operation mode. You can choose one of the following four modes.

MODE 1   Count judge count mode

MODE 2   End input judge count mode

MODE 3   Barcode count mode

MODE 4   Through mode

Press F1.

```
┌──────────────────────┐
│ MODE                 │
│ 1－4          [    ] │
└──────────────────────┘
```
The mode selection display appears.
Select a mode number from 1 to 4.

```
┌──────────────────────┐
│ MODE                 │
│ ＊            [    ] │
└──────────────────────┘
```
The value that you enter using the keys appears in brackets. Press ENT to register the value.

Press ENT while in the display shown above to return to the normal display.

2-2. Operation Examples

2-2-1. Mode 1

When using the receiver in mode 1, configure the settings as indicated below.
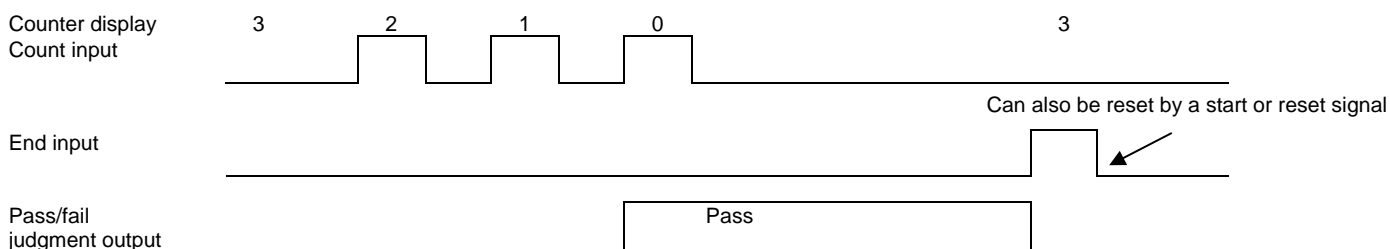
<Settings Made Using the Keypad>

• Work value (up to 16 values) • Tool ID registration (up to 4 IDs)

• Over-count setting • Double-counting prevention timer setting

• Relay output time setting • Mode selection: "MODE 1"

• Buzzer (BZ) output settings for count signals and fail judgments

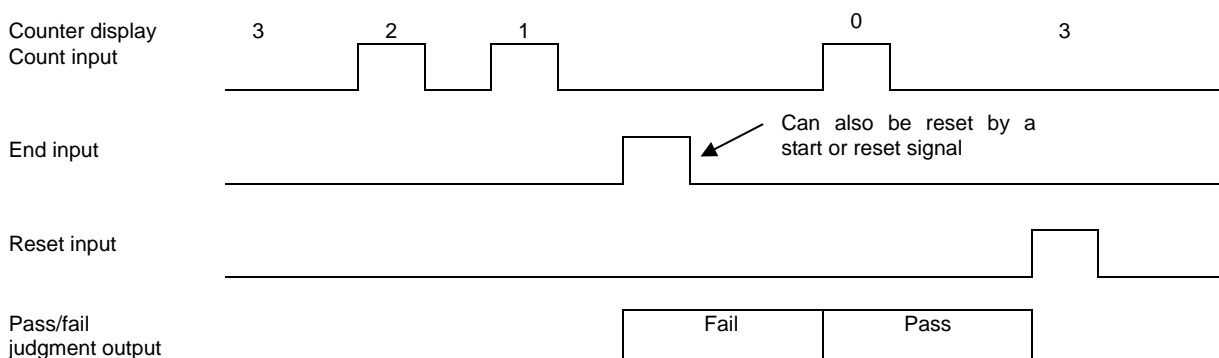• Buzzer (BZ) sound settings for count signals and fail judgments

<Settings Made Using Terminal Block Input>

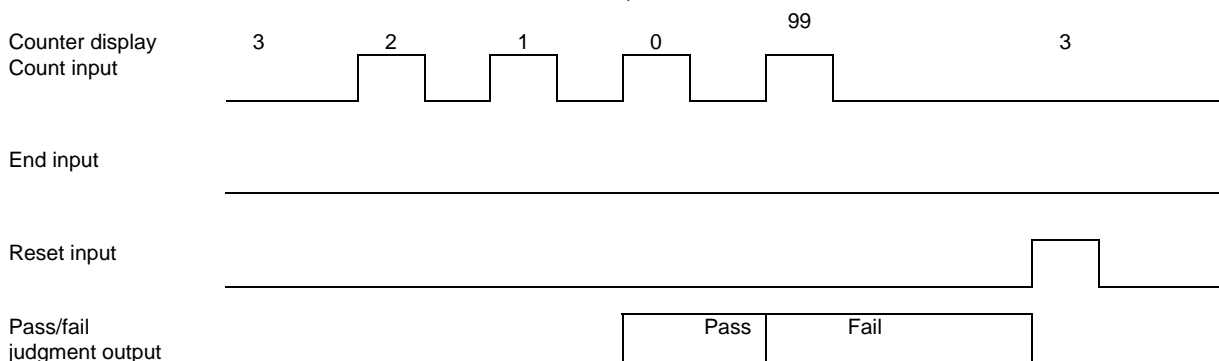•Work selection (from up to 16 values) •Tool selection (from up to 4 IDs)

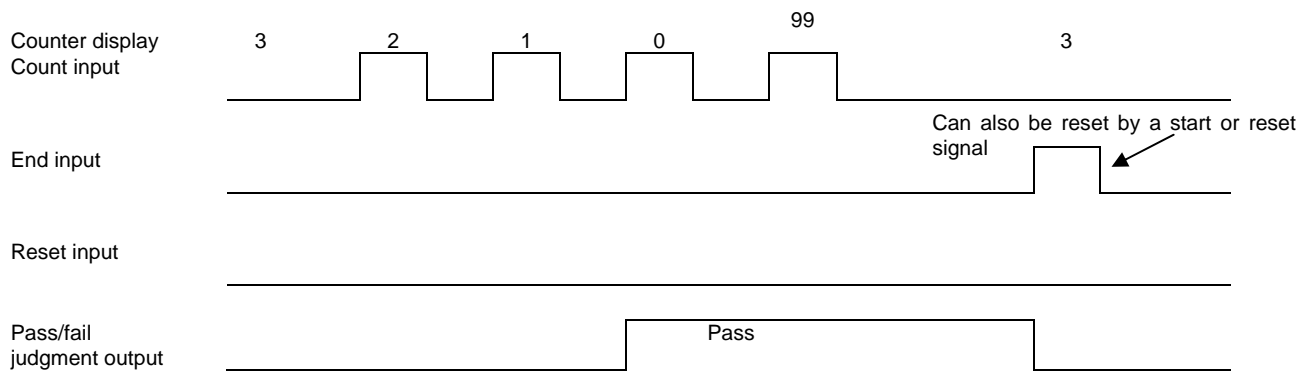•When an end signal is received and the count value is the same as the work value (The work value is 3.)

Can also be reset by a start or reset signal

•When an end signal is received and the count value is below the work value (The work value is 3.)

Can also be reset by a start or reset signal

•When the count value exceeds the work value (The work value is 3, and over-count is disabled.)

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•When over-count is enabled (The work value is 3.)

Counter display
Count input 　　　3　　　2　　　1　　　0　　　99　　　　　3

End input

Can also be reset by a start or reset signal

Reset input

Pass/fail
judgment output　　　　　Pass

2-2-2. Mode 2

When using the receiver in mode 2, configure the settings as indicated below.

<Settings Made Using the Keypad>

•Work value (up to 16 values)   •Tool ID registration (up to 4 IDs)

•Over-count setting   •Double-counting prevention timer setting

•Relay output time setting   •Mode selection: "MODE 2"

•Buzzer (BZ) output settings for count signals and fail judgments

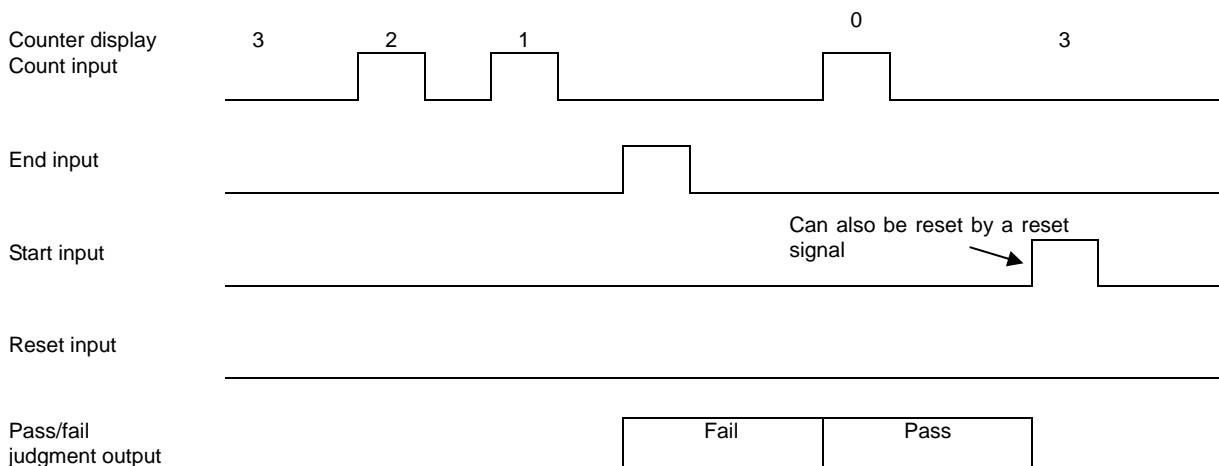•Buzzer (BZ) sound settings for count signals and fail judgments

<Settings Made Using Terminal Block Input>

•Work selection (from up to 16 values)   •Tool selection (from up to 4 IDs)

•When an end signal is received and the count value is the same as the work value (The work value is 3.)
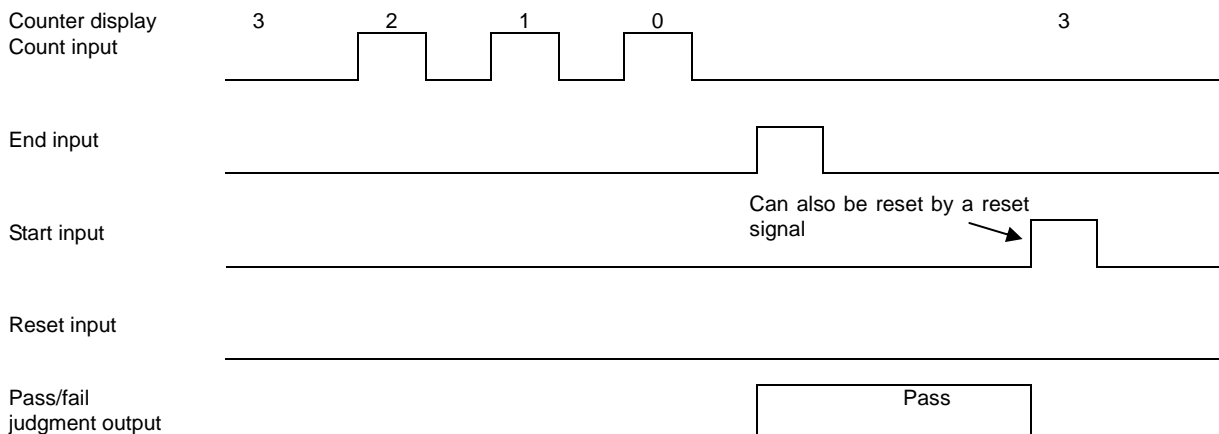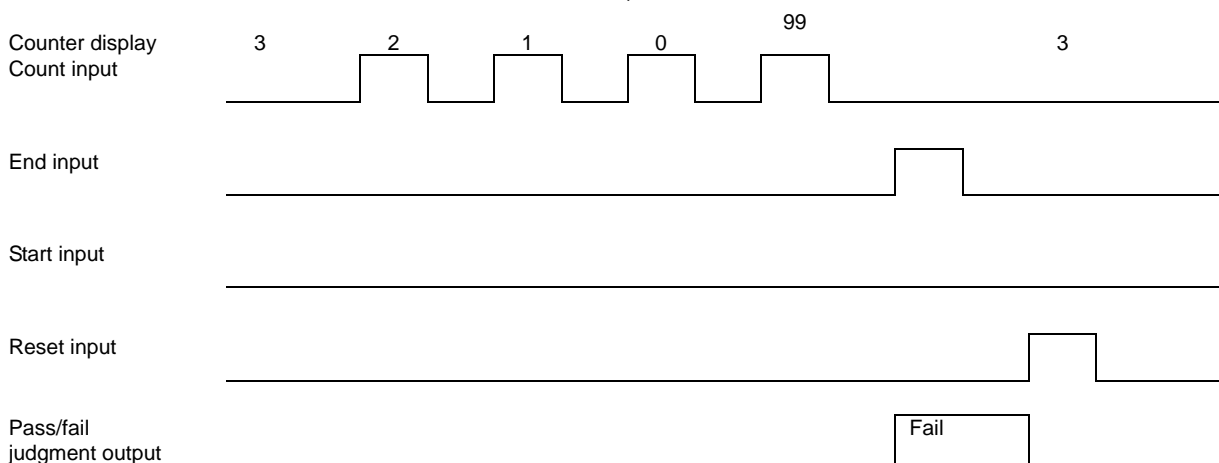

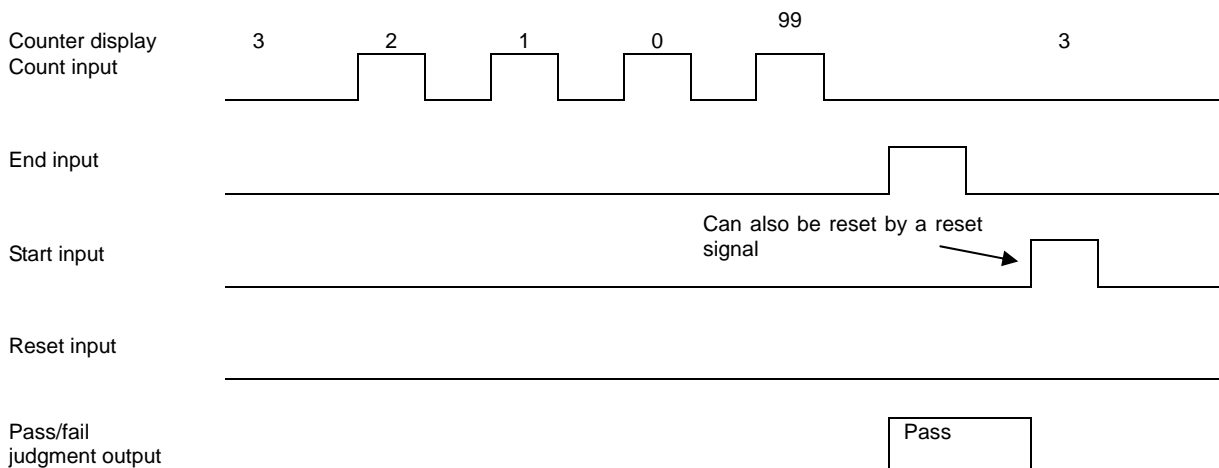•When an end signal is received and the count value is below the work value (The work value is 3.)

When a reset signal is received during a fail judgment, the judgment is cleared, and the count value is reset.
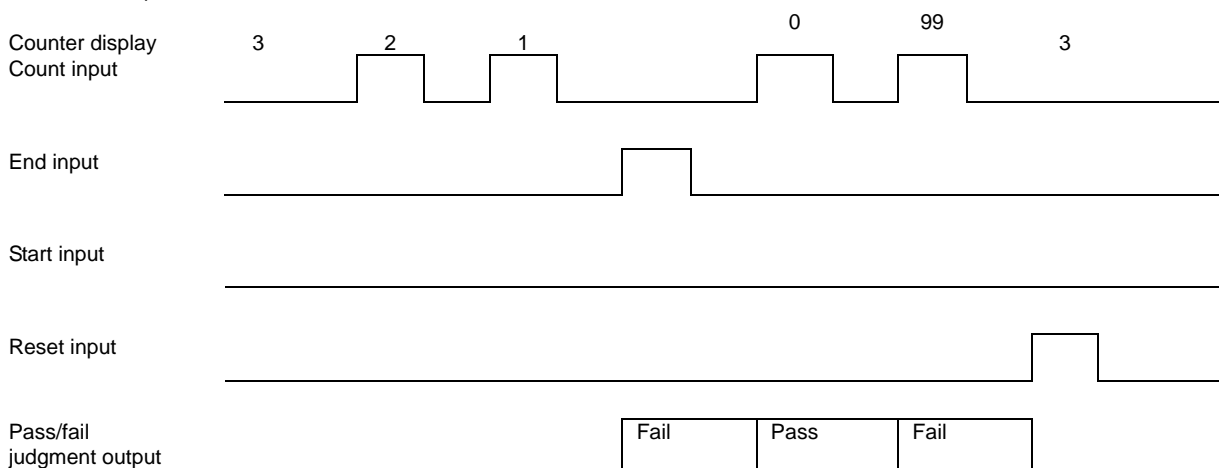
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•When the count value exceeds the work value (The work value is 3, and over-count is disabled.)

Counter display
Count input   3   2   1   0   99   3

End input

Start input

Reset input

Pass/fail
judgment output   Fail

•   When over-count is enabled (The work value is 3.)

Counter display
Count input   3   2   1   0   99   3

End input

Start input   Can also be reset by a reset signal

Reset input

Pass/fail
judgment output   Pass

•When count signals are received after a pass judgment (The work value is 3, and over-count is disabled.)

Counter display
Count input   3   2   1   0   99   3

End input

Start input

Reset input

Pass/fail
judgment output   Fail   Pass   Fail

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2-2-3. Mode 3—Barcode Count Mode

When using the receiver in mode 3, configure the settings as indicated below.

<Settings Made Using the Keypad>

•Tool ID registration (up to 4 IDs)   •Over-count setting

•Double-counting prevention timer setting

•Relay output time setting   •Mode selection: "MODE 3"

•Buzzer (BZ) output settings for count signals and fail judgments

•Buzzer (BZ) sound settings for count signals and fail judgments

<Settings Made Using Serial Port Input>

•Load each tool and work value from the barcode reader.

• Example for when the work values of tools 1 through 4 are set as indicated below

Tool 1:1 count

Tool 2:2 count

Tool 3:3 count

Tool 4:4 count

Tool 5 (wired input):0 count

0102030400

When you scan the barcode shown above, the LCD will show the following display.

```
1[ 1]  2[ 2]  3[ 3]
4[ 4]  5[ 0]
```

If a count signal is received for one of the tools, the work value will decrease by one.

After one count signal is received for tool 1, two count signals are received for tool 2, three count signals are received for tool 3, and four count signals are received for tool 4, the values shown on the LCD will all be 0, and the receiver will produce a pass judgment.

The method of pass/fail judgment is the same as that for mode 1, except that in mode 3, pass/fail judgment is not performed for each tool, but is instead performed for each scanned set of barcode data.

2-2-4. Mode 4 (Through Mode)

When using the receiver in mode 4, configure the settings as indicated below.

<Settings Made Using the Keypad>

•Tool ID registration (up to 4 IDs)   •Double-counting prevention timer setting

•Relay output time setting   •Mode selection: "MODE 4"

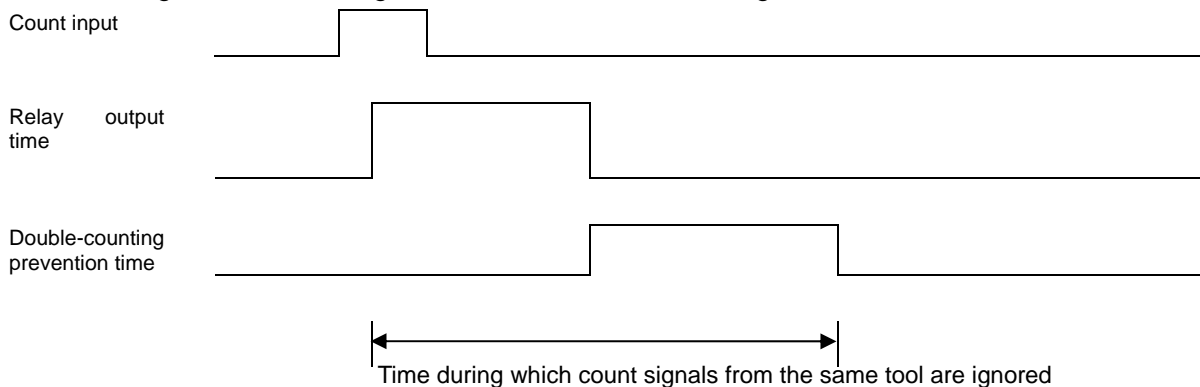•Buzzer (BZ) sound settings for count signals and fail judgments

When you use the receiver in mode 4, it relays the signals that it receives from the registered tools through its output terminals. The relationship between tool numbers and output terminals is indicated in the table below.
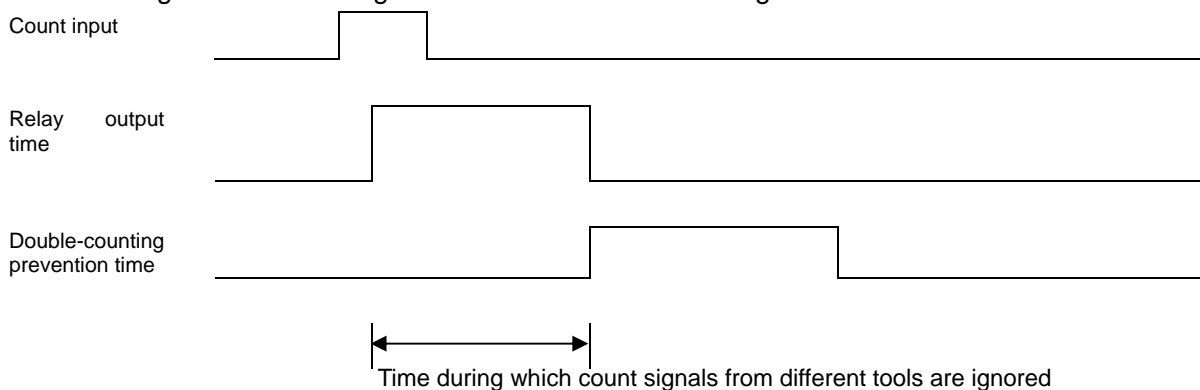
<Relationship between Tools and Output Terminal Blocks>

Tool	Output terminal block
Tool 1	OUT1
Tool 2	OUT2
Tool 3	OUT3
Tool 4	OUT4

The relay output from each terminal block conforms to the specified relay output time. All count signals received during the relay output time are ignored. Count signals from the same tool are also ignored during the specified double-counting prevention time after the relay output time.

<Time during Which Count Signals from the Same Tool Are Ignored>

Count input

Relay output time

Double-counting prevention time

Time during which count signals from the same tool are ignored

<Time during Which Count Signals from Different Tools Are Ignored>

Count input

Relay output time

Double-counting prevention time

Time during which count signals from different tools are ignored

When two different tools send signals at the same time, the TWF-700R may not be able to receive one or both of the signals. This is because of the electromagnetic interference that occurs when two transmitters emit electromagnetic waves at the same frequency.

Chapter 3.   Handling Precautions

3-1.   Handling Precautions

- When connecting a power source to the receiver's power input terminal block, make sure that the polarity and voltage rating are correct (22 to 48 VDC).
- When making connections to the receivers input and output terminals, make sure that the polarity and rating are correct.
- When configuring the receiver, make sure that you select the correct mode.
- The receiver does not back up count values or barcode operation data, so these values will be reset to 0 when the power is turned off.

3-2. What to Do When You Think There's a Problem

If you are using the device under normal circumstances and you encounter an error or malfunction, refer to section 3-3, "Troubleshooting." If you still cannot solve the problem, contact the retailer you purchased the device from or the Herutu sales office, and provide them with the following information:

> Model name, serial number, and
> operating environment
> Connected external devices
> Process leading up to the error
> Other useful information, such as a
> detailed description of the error

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E-mail   webmaster@herutu.co.jp

3-3. Troubleshooting

Symptom	Cause and Solution
Even when the power is turned on, nothing appears on the LCD display.	The receiver is not receiving power.
	→Connect the receiver to a power supply.
The count display LEDs show "——."	You are in the LCD configuration display. Or the mode is set to mode 4.
	→Return to the normal display, and check the specified mode.
Transmitter signals are not being counted.	The appropriate transmitter IDs are not registered.
	→Check the registered transmitter IDs.
	The double-counting prevention timer is set too high.
	→After a count signal is received from a transmitter, other signals from the same transmitter are ignored during the time specified by the double-counting prevention timer setting. Check the double-counting prevention timer setting.
	Wireless transmissions are not succeeding.
	→The receiver cannot receive signals from outside of the communication range. Check to see if signals emitted near the receiver can be received.
The buzzer does not sound upon the reception of a count signal.	The buzzer has been set to off.
	→Check the buzzer sound settings.
The buzzer does not sound upon the production of a fail judgment.	The buzzer has been set to off.
	→Check the buzzer sound settings.
The receiver will not read barcodes.	The barcode scanner data protocol is incorrect.
	→Check to make sure that the data from the barcode scanner conforms to the communication protocol of the receiver.
IDs cannot be registered.	The TWF-600T transmitter is not producing a signal.
	→Check the transmitter battery and other components, and make sure that the transmitter is producing signals.

3-4.Guarantee

TWF-700R-ES is engineering sample.

It doesn't become the object of the guarantee regulations similar to mass-produced goods because of the engineering sample.

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