

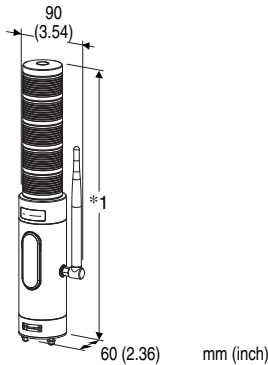
Tower Light Series

WIRELESS TOWER LIGHT

(small size, 50 mm dia., Modbus-RTU transparent 900 MHz band wireless device (child), 1 - 5 layers)

Functions & Features

- Equipped with 900 MHz band wireless device (child), which is RS-485 transparent type and enables Modbus-RTU protocol communication
- Having gateway function for connecting 900 MHz band wireless Modbus-RTU (RS-485) to the wired network
- Lighting, blinking and buzzer outputs possible with contact inputs or via wireless communication
- Wireless device which incorporates a module conforming to FCC part 15 can be used only within the United States
- Non-directional antenna (360°horizontal)



*1. 224 mm with 1 lamp, 256 mm with 2 lamps, 288 mm with 3 lamps, 320 mm with 4 lamps, 352 mm with 5 lamps
(The illustration represents the unit with 5 layers.)

MODEL: IT50SW6F-[1][2][3][4][5][6]D2U-R[7]

ORDERING INFORMATION

- Code number: IT50SW6F-[1][2][3][4][5][6]D2U-R[7]
Specify a code from below for each [1] through [7].
(e.g. IT50SW6F-5RYGBWD2U-R/Q)
- Use Ordering Information Sheet (No. ESU-2375) to select the same color for more than one layer.
- Specify the specification for option code /Q (e.g. /C01)
- * If you specify "no lamp", see the specification of IT60SW6F.

[1] LAMP LAYERS

- 1: 1 layer
- 2: 2 layers
- 3: 3 layers
- 4: 4 layers
- 5: 5 layers

[2] LAMP 1 COLOR

(1st layer from the top)

- R: Red
- Y: Amber
- G: Green
- B: Blue
- W: White

[3] LAMP 2 COLOR

(2nd layer from the top)

- R: Red
- Y: Amber
- G: Green
- B: Blue
- W: White
- N: None (not available when Lamp Layers selected are 2 - 5)

[4] LAMP 3 COLOR

(3rd layer from the top)

- R: Red
- Y: Amber
- G: Green
- B: Blue
- W: White
- N: None (not available when Lamp Layers selected are 3 - 5)

[5] LAMP 4 COLOR

(4th layer from the top)

- R: Red
- Y: Amber
- G: Green
- B: Blue
- W: White
- N: None (not available when Lamp Layers selected are 4 - 5)

[6] LAMP 5 COLOR

(5th layer from the top.)

- R: Red
- Y: Amber
- G: Green
- B: Blue
- W: White
- N: None (not available when Lamp Layers selected are 5)

* Select "None" option for the layers other than the selected.

MOUNTING

- D: Direct mounting

DESIGN TYPE

2: Type 2

(refer to outline dimensions)

COUNTRY IN WHICH IT IS INTENDED FOR USE

U: The United States

POWER INPUT

DC Power

R: 24 V DC

(Operational voltage range 24 V \pm 10 %, ripple 10 %p-p max.)

[7] OPTIONS

blank: none

/Q: With options (specify the specification)

SPECIFICATIONS OF OPTION: Q

COATING (For the detail, refer to M-System's web site.)

/C01: Silicone coating

/C02: Polyurethane coating

/C03: Rubber coating

RELATED PRODUCTS

For related products of wireless device, refer to M-System's web site.

- LAN cable (model: ITCA)
- Mounting Pole (model: ITPL)
- Mounting Adapter (model: ITAD1)
- PC configurator software (model: ITCFG)

Downloadable at M-System's web site.

A dedicated cable is required to connect the module to the PC. Please refer to the internet software download site or the users manual for the PC configurator for applicable cable types.

Maintenance software

Maintenance console: MH920 Console International (model: MH920CI) (OKI)

(Maintenance software is downloadable at M-System's web site.)

GENERAL SPECIFICATIONS

Degree of protection: IP 65, vertical mounting only (bottom connectors excluded)

Connection

- Power: UL1007 AWG20
- Input: UL1007 AWG22
- Wired communication: Separable tension clamp terminal

Applicable wire size: 0.2 to 1.5 mm², stripped length 10 mm

Recommended solderless terminal

AI0,5-10WH 0.5mm² (Phoenix Contact)

AI0,75-10GY 0.75mm² (Phoenix Contact)

- Wireless communication: SMA coaxial connector

- Maintenance: Mini USB type B female connector

Housing material: Flame-resistant resin

Lens: Flame-resistant resin (transparent)

Isolation

Power input to discrete input to communication to FE1 to antenna connector

DIP SW Setting: Frequency of lamp blinking and buzzing discontinuance, buzzing volume level, output at connection failed and so on (refer to the instruction manual)

Lamp: Red, amber, green, blue and white LEDs

on/blinking (approx. 2 Hz, 10 Hz)

Indicator LEDs: Power, Run

(Refer to the instruction manual)

Buzzing: Approx. 3.3 kHz

Interval: continuous/intermittent (approx. 2 Hz, 10 Hz)

MODBUS COMMUNICATION

Protocol: Modbus-RTU

Configuration: Bus type multi-drop

Standard: Conforms to TIA/EIA-485-A

Communication: Half-duplex, asynchronous, no procedure

Transmission distance: 500 meters max.

Transmission media: Shielded twisted-pair cable (CPEV-S 0.9 dia.)

Indicator LEDs: SD, RD

Max. no. of connections at once: 31

Transmission setting: PC configurator software

Data: RTU (Binary)

Baud rate: 4800, 9600, 19.2k, 38.4 k (bps)

Parity: None, even or odd

Stop bit: 1 or 2

WIRELESS SPECIFICATIONS

Communication Standard: IEEE 802.15.4g

Frequency: 900MHz band (902 - 928 MHz)

Max. Transmission power: 20 mW

Bandwidth: 400 kHz

Modulation: GFSK

Baud rate: Max. 100 kbps

Channels: 1 to 43 ch

Security: 128bit AES

Indicator LEDs: 920Run, 920Link, and 920ERR

Protocol: Modbus-RTU

Communication module: Router module incorporated (Oki Electric Industry Co., Ltd.)

Radio parameters setting: With configurator software

INPUT SPECIFICATIONS

■ **Discrete Input:** Dry contact, open collector NPN

Input resistance: Approx. 4.4 k Ω

Common: Negative common NPN

ON level: ≤ 5 V / ≥ 3.5 mA (Input - COM)

OFF level: ≥ 18 V DC / ≤ 1 mA (Input - COM)

Input current: ≤ 5.5 mA per point @ 24 V DC

INSTALLATION

Max. current consumption

•DC: Approx. 5.5 W (24 V DC)

Operating temperature: -10 to +55°C (14 to 131°F)

Operating humidity: 10 to 90 %RH (non-condensing)

Atmosphere: No corrosive gas or heavy dust

Mounting: Direct mounting

Mounting direction: Vertical

Weight: 700 g (1.5 lb)

PERFORMANCE

Insulation resistance: ≥ 100 M Ω with 500 V DC

Dielectric strength: 1500 V AC @ 1 minute

(Power input to discrete input to communication to FE1 to antenna connector)

STANDARDS & APPROVALS

Module conforming to FCC Part 15 incorporated

CONFIGURATOR SOFTWARE SETTING

With configurator software, settings shown below are available.
Refer to the software manual of ITCFG for detailed operation.

■ WIRELESS SETTING

| ITEM | SETTING RANGE | DEFAULT |
|---|---|--------------------------------|
| Preferred PAN ID (group number) | 0000 – FFFE (hexadecimal, 4 digits) | 0000 |
| Radio channel number | 1 – 43 (selectable up to 10 channels) | None |
| Short address | 0000 – FFFD (hexadecimal, 4 digits) | 0000 |
| Network name | English one-byte characters within 16 characters (one-byte space, “-”, “_”, “.”, “@” are usable.) | Blank |
| Encryption key | 0000...0 – FFFF...F (hexadecimal, 32 digits) | 0000...0 |
| Transmitter power output | 0.16 mW / 1 mW / 20 mW | 20 mW |
| Low-speed moving mode | No / Yes | No |
| Device type in a network, Number of devices in a network | Child (fixed), 1 to 30 devices / Child (fixed), 31 to 60 devices / Child (fixed), 61 to 100 devices / Child (fixed) + child (moving) | Child (fixed), 1 to 30 devices |
| Set network quality | Standard (recommended) / Frequency of route switching and delay (higher) / Frequency of route switching and delay (highest) | Standard (recommended) |
| Network join mode | V3-compatible mode / Fast join mode | V3-compatible mode |
| Fixed route | No / Yes | No |
| Destination short address | 0000 – FFFD (hexadecimal, 4 digits) | 0000 |
| Temporary detour | No / Yes | Yes |
| Packet filtering | None / Yes (polling type) | Yes (polling type) |
| Filter timeout on polling | 1.0 – 60.0 (sec.) | 1.0 (sec.) |
| 920Run timeout | 1.0 – 60.0 (sec.) | 3.0 (sec.) |
| Modbus node address | 1 – 247 | 1 |
| Run LED/timeout | 0.0 – 3200.0 (sec.) | 5.0 (sec.) |
| Retry times before route switching | Once / Twice / Three times | Three times |

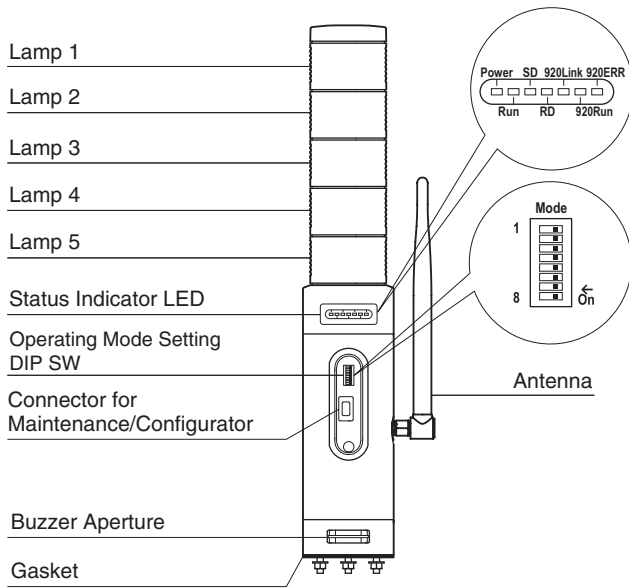
Note: For version confirmation of communication module, refer to the instruction manual of ITCFG.

■ MODBUS SETTING

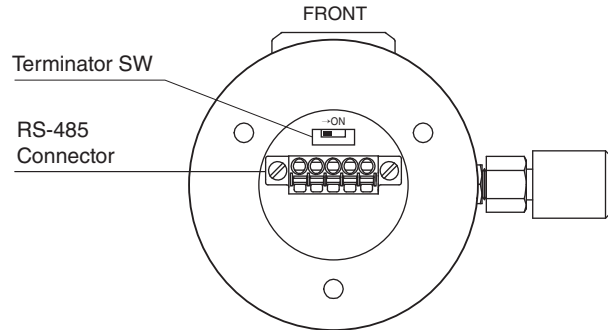
| ITEM | SETTING RANGE | DEFAULT |
|---------------|---------------------------------|-----------|
| Transfer rate | 38400 / 19200 / 9600 / 4800 bps | 38400 bps |
| Parity bit | Odd / Even / None | Odd |
| Stop bit | 1 bit / 2 bits | 1 bit |

EXTERNAL VIEW

FRONT VIEW (with the cover open)

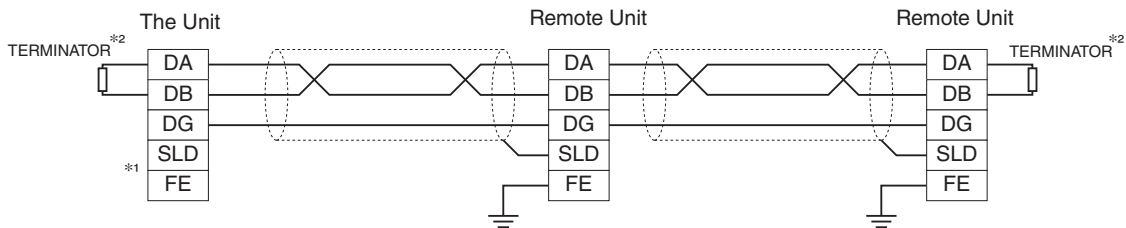


BOTTOM VIEW



COMMUNICATION CABLE CONNECTIONS

WIRING CONNECTION WITH SLAVE DEVICES



*1. Connect SLD and FE for reducing noise interference if necessary.

*2. For units at both ends of communication line, "DA" and "DB" must be connected with a terminator, however, for the unit, it is possible to set it by turning Terminator SW ON instead.

TERMINAL ASSIGNMENTS

TERMINAL ASSIGNMENT

Connector for Power Supply

Unit side connector: MC1,5/5-GF-3,5 (Phoenix Contact)

Cable side connector: FMC1,5/5-STF-3,5 (Phoenix Contact)



| ID | FUNCTION |
|-----|------------------|
| DA | DA |
| DB | DB |
| DG | DG |
| SLD | Shield |
| FE | Functional earth |

MODBUS FUNCTION CODES & SUPPORTED CODES

Modbus function codes are shown below.

■ DATA AND CONTROL FUNCTION

| CODE | NAME | |
|------|---------------------------|--|
| 01 | Read Coil Status | Digital output from the slave (read/write) |
| 02 | Read Input Status | Status of digital inputs to the slave (read only) |
| 03 | Read Holding Registers | General purpose register within the slave (read/write) |
| 04 | Read Input Registers | Collected data from the field by the slave (read only) |
| 05 | Force Single Coil | Digital output from the slave (read/write) |
| 06 | Preset Single Register | General purpose register within the slave (read/write) |
| 08 | Diagnostics | |
| 15 | Force Multiple Coils | Digital output from the slave (read/write) |
| 16 | Preset Multiple Registers | General purpose register within the slave (read/write) |

■ EXCEPTION CODE

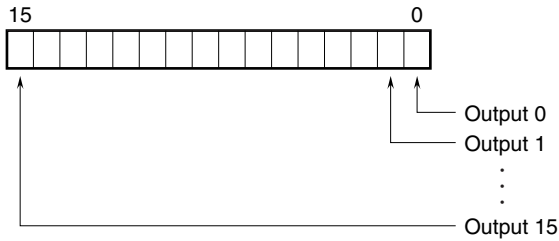
| CODE | NAME | |
|------|----------------------|--|
| 01 | Illegal Function | Function code is not allowable for the slave |
| 02 | Illegal Data Address | Address is not available within the slave |
| 03 | Illegal Data Value | Data is not valid for the function |
| 04 | Slave Device Failure | |
| 05 | Acknowledge | |
| 06 | Slave Device Busy | |
| 07 | Negative Acknowledge | |

MODBUS I/O ASSIGNMENT

| | ADDRESS | DATA TYPE | DATA |
|------------------------|---------|-----------|-------------------------------|
| Coils (0X) | 1 – 16 | | Digital Output (lamp, buzzer) |
| Inputs (1X) | 1 – 16 | | Digital Input (lamp, buzzer) |
| Input Registers (3X) | ---- | ---- | Unused |
| Holding Registers (4X) | ---- | ---- | Unused |

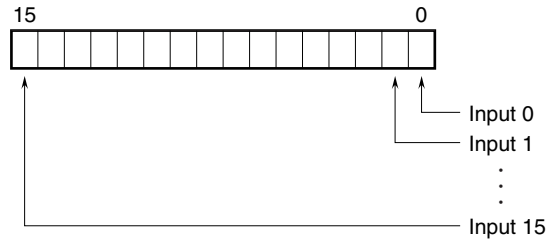
Note: DO NOT access addresses other than the above. Such access may cause problems such as inadequate operation.

■ OUTPUT DATA



| | | |
|-----------|--------|-------------------------|
| Output 0 | Lamp 1 | 0: Off, 1: On |
| Output 1 | Lamp 2 | 0: Off, 1: On |
| Output 2 | Lamp 3 | 0: Off, 1: On |
| Output 3 | Lamp 4 | 0: Off, 1: On |
| Output 4 | Lamp 5 | 0: Off, 1: On |
| Output 5 | Buzzer | 0: Off, 1: Continuous |
| Output 6 | – | – |
| Output 7 | – | – |
| Output 8 | Lamp 1 | 0: Off, 1: Blinking |
| Output 9 | Lamp 2 | 0: Off, 1: Blinking |
| Output 10 | Lamp 3 | 0: Off, 1: Blinking |
| Output 11 | Lamp 4 | 0: Off, 1: Blinking |
| Output 12 | Lamp 5 | 0: Off, 1: Blinking |
| Output 13 | Buzzer | 0: Off, 1: Intermittent |
| Output 14 | – | – |
| Output 15 | – | – |

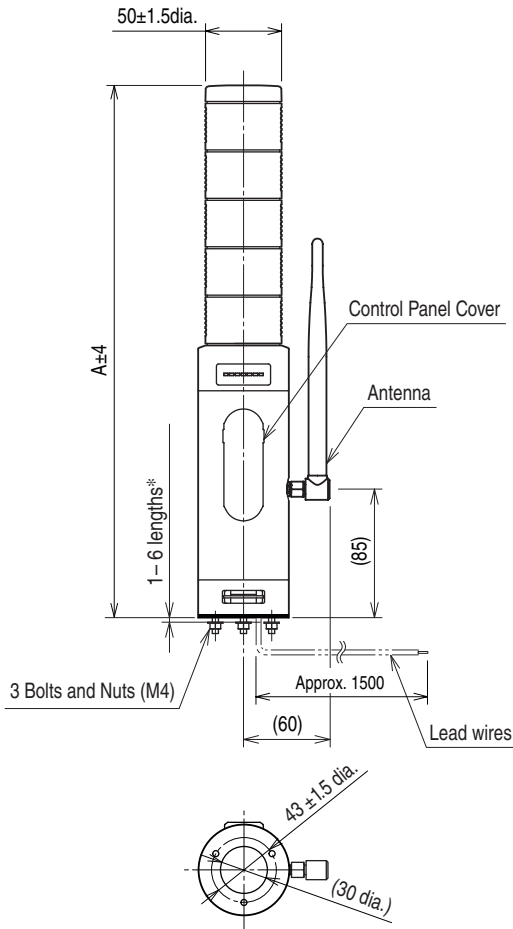
■ INPUT DATA



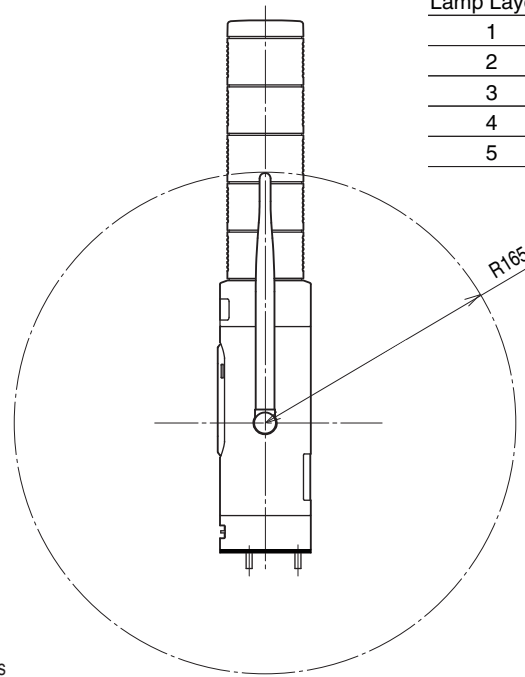
| | | |
|----------|--------|-------------------------|
| Input 0 | Lamp 1 | 0: Off, 1: On |
| Input 1 | Lamp 2 | 0: Off, 1: On |
| Input 2 | Lamp 3 | 0: Off, 1: On |
| Input 3 | Lamp 4 | 0: Off, 1: On |
| Input 4 | Lamp 5 | 0: Off, 1: On |
| Input 5 | Buzzer | 0: Off, 1: Continuous |
| Input 6 | – | – |
| Input 7 | – | – |
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| Input 12 | Lamp 5 | 0: Off, 1: Blinking |
| Input 13 | Buzzer | 0: Off, 1: Intermittent |
| Input 14 | – | – |
| Input 15 | – | – |

Note: If “On” (Continuous) and “Blinking” (Intermittent) are set simultaneously for a single lamp (buzzer), “Blinking” is disabled.

DIMENSIONS unit: mm

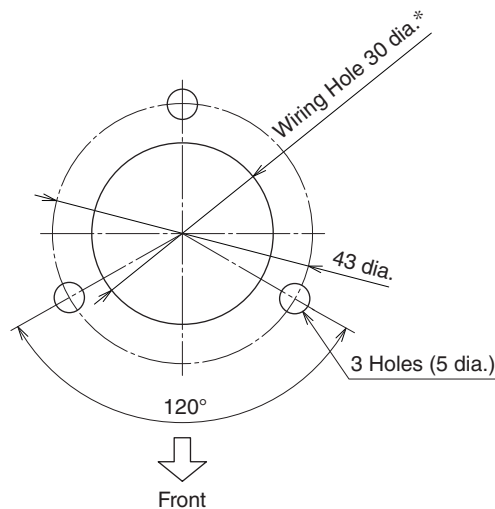


| Lamp Layers | A |
|-------------|-----|
| 1 | 224 |
| 2 | 256 |
| 3 | 288 |
| 4 | 320 |
| 5 | 352 |



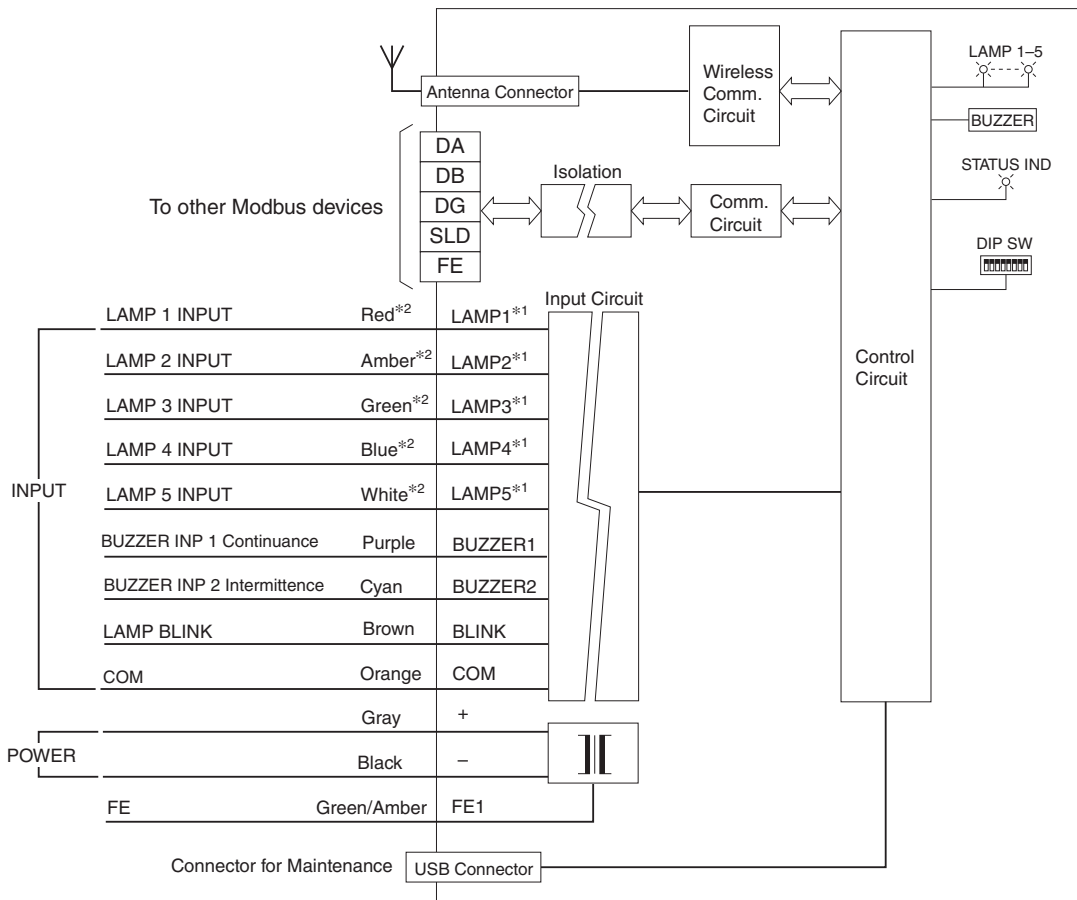
* Consult M-System for other bolt length.

MOUNTING REQUIREMENTS unit: mm



* Protect wires to prevent scratching them at the edge of the compartment.

SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

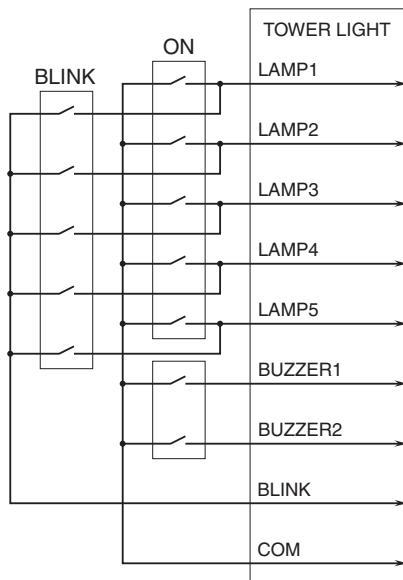


*1. Example of 5 layers in order: red, amber, green, blue and white.
Lamp and wire color are the same.

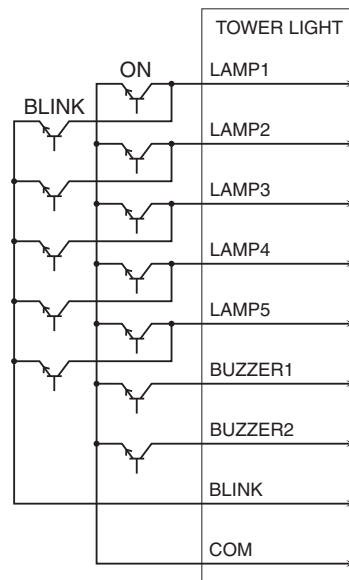
*2. When selecting the same color for more than one layer, cable colors comply with ordering information sheet.

• WIRING TO INPUT SIGNAL

Contact input e.g.



NPN input e.g.

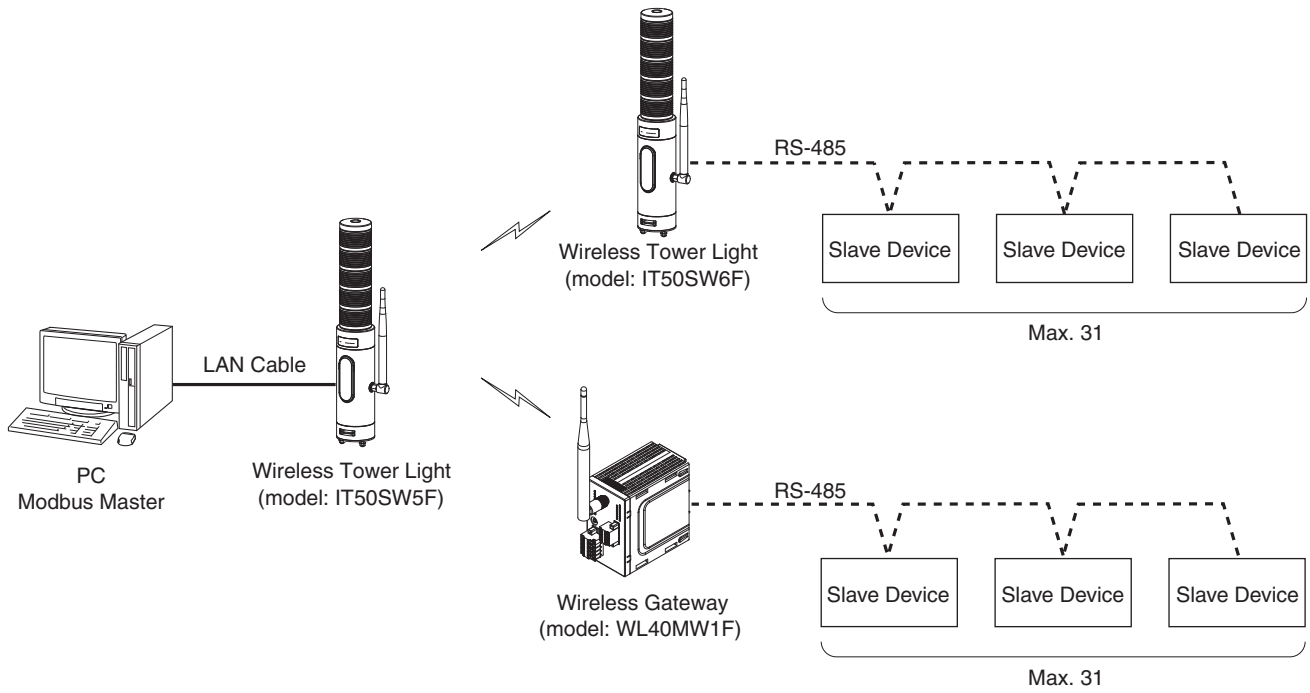


Note: If "On" and "Blink" are set simultaneously for a single lamp, "Blink" is disabled.

At this time, if other lamps are set to "Blink", they are also affected and work in the same manner.

SYSTEM CONFIGURATION EXAMPLES

- Modbus Master (PC side) communicates with child devices via wireless connection using Modbus/TCP and RTU protocols, or communicates with slave devices in multi drop connection on the wired side (RS-485).



Specifications are subject to change without notice.