Tower Light Series

WIRELESS TOWER LIGHT

(small size, 60 mm dia., Modbus-RTU transparent 900 MHz band wireless device (child), 0 - 5 layers)

Functions & Features

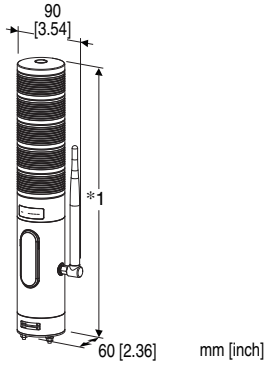
• Equipped with 900 MHz band wireless device (child), which is RS-485 transparent type and enables Modbus-RTU protocol communication

• 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. 192 mm with no lamp, 224 mm with1 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: IT60SW6F-[1][2][3][4][5][6]D2U-R[7]

ORDERING INFORMATION

• Code number: IT60SW6F-[1][2][3][4][5][6]D2U-R[7]
Specify a code from below for each of [1] through [7].
(e.g. IT60SW6F-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)

[1] LAMP LAYERS

0: 0 layer (no lamp)
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
N: None (not available when Lamp Layers selected are 1 - 5)

[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.

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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 ±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 our web site.)
/C01: Silicone coating
/C02: Polyurethane coating
/C03: Rubber coating

RELATED PRODUCTS
For the details of the wireless device related products, please refer to our website.
• Mounting Pole (model: ITPL, ITB, ITP, ITW and ITS)
• Mounting Adapter (model: ITAD1, ITAM, ITAR and ITAW)
• PC configurator software (model: ITCFG)
The configurator software is downloadable at our web site. Use a commercially available Mini-B USB cable to connect the unit to a PC. (provided by user)
Maintenance software
Maintenance console: MH920 Console International (model: MH920CI) (OKI)
(Maintenance software is downloadable at our 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 mm^2, stripped length 10 mm
Recommended solderless terminal
AI0,5-10WH 0.5mm^2 (Phoenix Contact)
AI0,75-10GY 0.75mm^2 (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)
Status indicator LEDs: Power, Run
(Refer to the insruction 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

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INPUT SPECIFICATIONS

■ **Discrete Input**: Dry contact, open collector NPN
Input resistance: Approx. 4.4 kΩ
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. 7 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: 750 g (1.65 lb)

PERFORMANCE

Insulation resistance: ≥ 100 MΩ 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

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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

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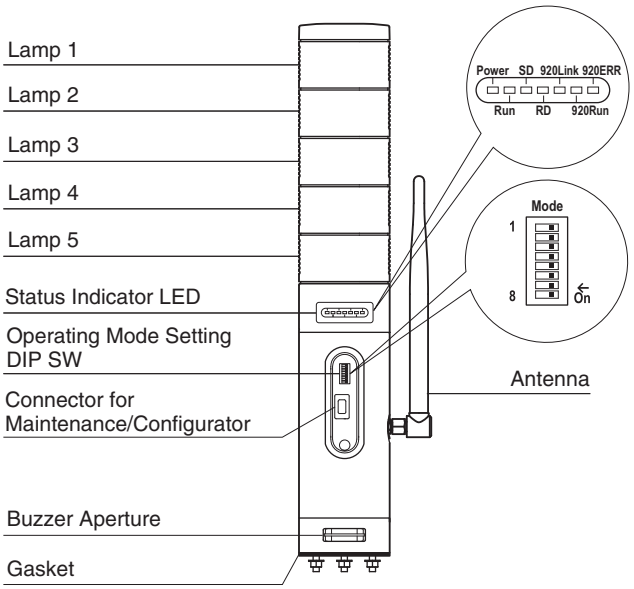
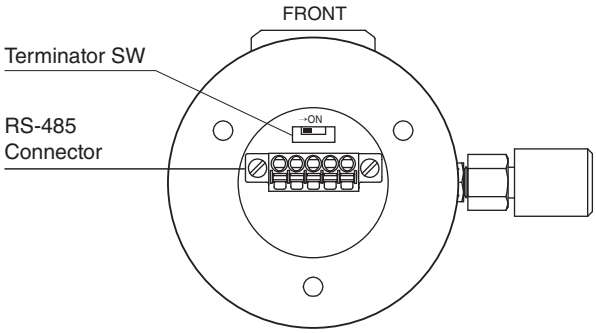
EXTERNAL VIEW

■ **FRONT VIEW (with the cover open)**

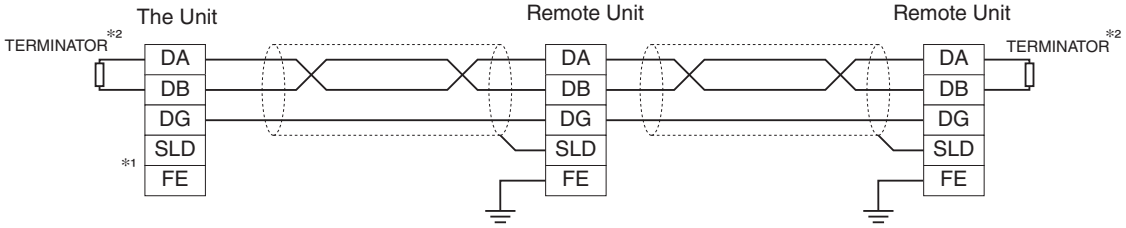


■ **BOTTOM VIEW**



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

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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
02	Read Input Status	Status of digital inputs to the slave
03	Read Holding Registers	General purpose register within the slave
04	Read Input Registers	Collected data from the field by the slave
05	Force Single Coil	Digital output from the slave
06	Preset Single Register	General purpose register within the slave
08	Diagnostics	
15	Force Multiple Coils	Digital output from the slave
16	Preset Multiple Registers	General purpose register within the slave

■ 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	

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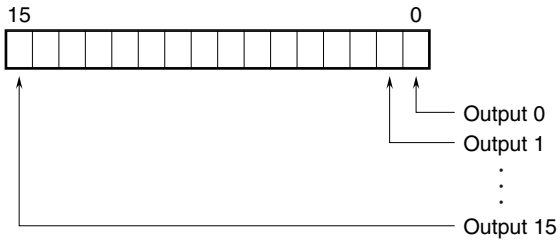
MODBUS I/O ASSIGNMENT

	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

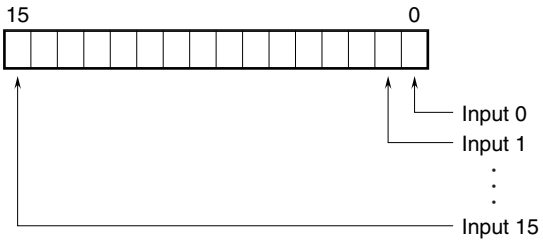
Note: DO NOT access addresses other than the above. Such access may cause problems such as inadequate operation.

■ 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	–	–
Input 8	Lamp 1	0: Off, 1: Blinking
Input 9	Lamp 2	0: Off, 1: Blinking
Input 10	Lamp 3	0: Off, 1: Blinking
Input 11	Lamp 4	0: Off, 1: Blinking
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.

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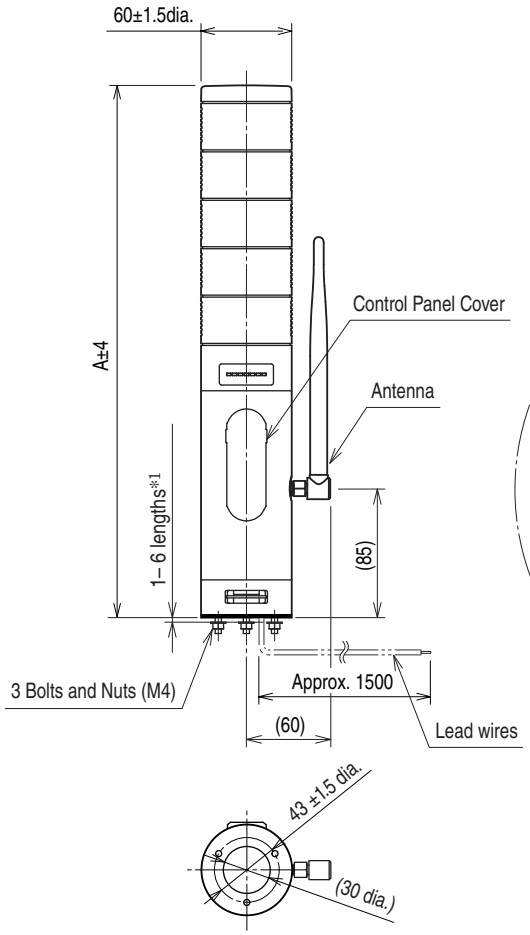
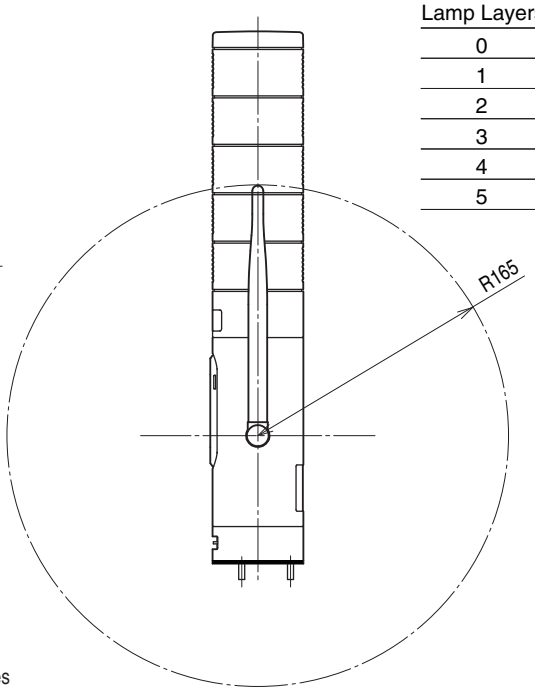
EXTERNAL DIMENSIONS unit: mm

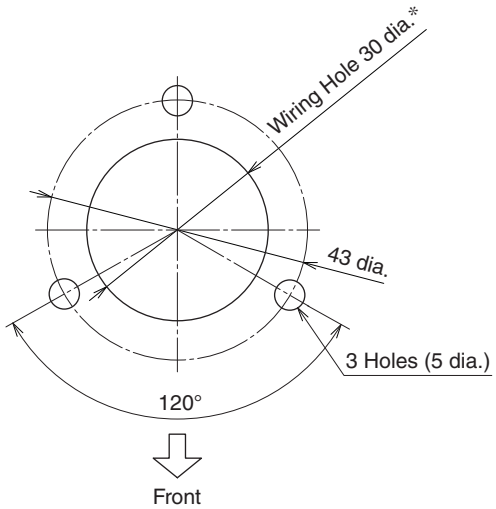


Lamp Layers	A
0	192
1	224
2	256
3	288
4	320
5	352



*1. Consult us for other bolt length.

MOUNTING REQUIREMENTS unit: mm



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

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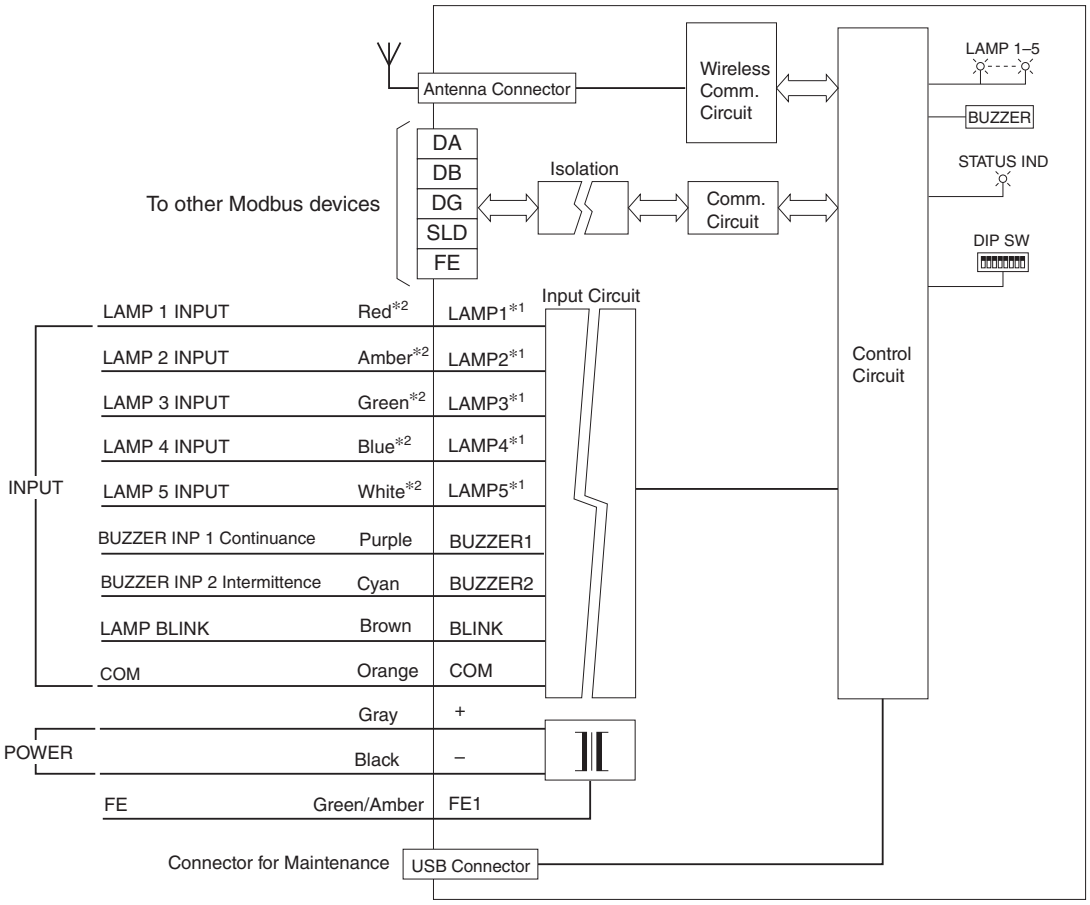
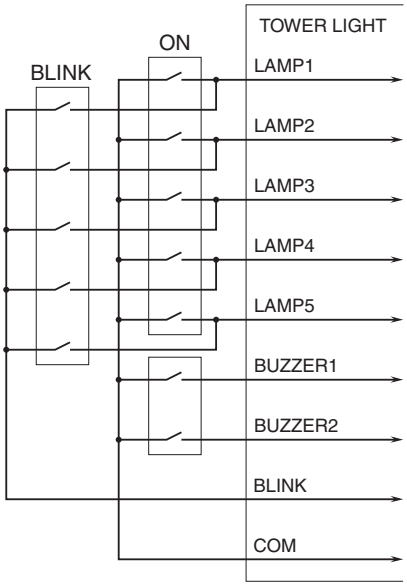
SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



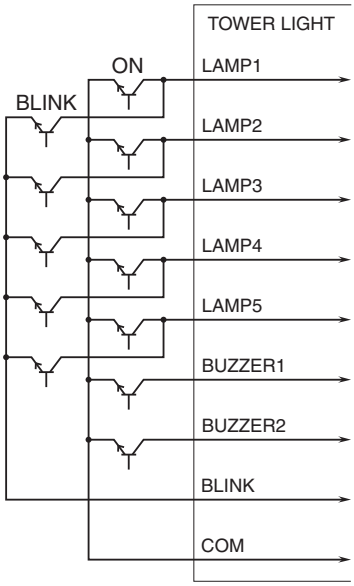
*1. Example of 5 layers in order: red, amber, green, blue and white.
Lamp and wire color are the same.
*2. When selecting the same color for more than one layer, cable colors
comply with ordering information sheet.

• 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.

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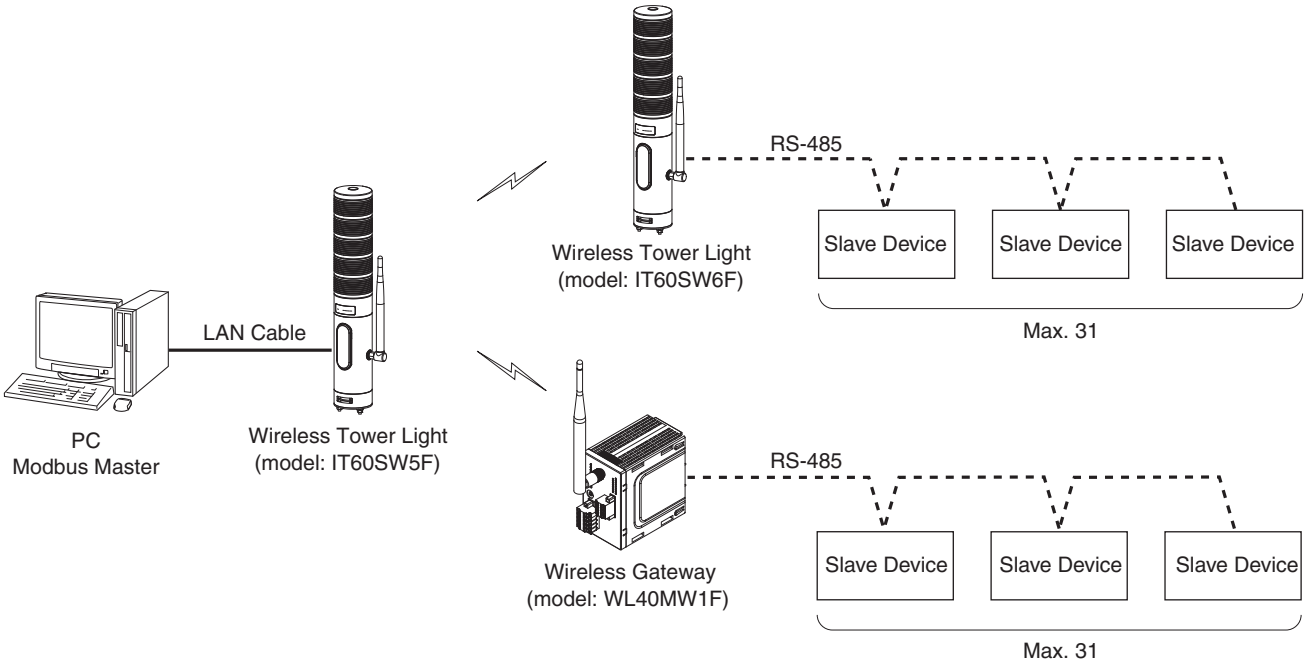
SYSTEM CONFIGURATION EXAMPLES

■ **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.

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