

<p>WIRELESS TOWER LIGHT <small>(small size, 60 mm dia., Modbus-RTU transparent 900MHz band wireless device (child), 1 - 5 layers)</small></p>	<p>MODEL IT60SW6F</p>
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BEFORE USE

Thank you for choosing M-System. Before use, please check contents of the package you received as outlined below. If you have any problems or questions with the product, please contact M-System's Sales Office or representatives.

■ PACKAGE INCLUDES:

- Tower Light(1)
- Antenna(1)

■ MODEL NO.

Confirm Model No. marking on the product to be exactly what you ordered.

■ INSTRUCTION MANUAL

This manual describes necessary points of caution when you use this product, including installation, connection and basic maintenance procedures. For information on the introduction of wireless device, refer to the 900 MHz band wireless device operating manual (EM-9085-B). For information on Modbus specification, refer to the Modbus Protocol Reference Guide (EM-5650). These manuals are downloadable at M-System's web site (<http://www.m-system.co.jp>).

POINTS OF CAUTION

■ POWER INPUT RATING & OPERATIONAL RANGE

- Locate the power input rating marked on the product and confirm its operational range as indicated below:
 24 V DC rating: 24 V ±10%, approx. 7W

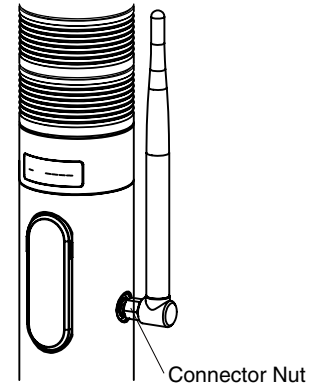
■ GENERAL PRECAUTIONS

- Before you remove the unit or mount it, turn off the power supply and input signal for safety.
- The unit must not be subjected to external force.
- Do not rub the unit with organic solvent such as paint thinner.

■ ENVIRONMENT

- Indoor use.
- Attach the antenna to the unit.
- Do not install the unit where it is subjected to continuous vibration. Do not subject the unit to physical impact.
- Environmental temperature must be within -10 to +55°C (14 to 131°F) with relative humidity within 10 to 90% RH in order to ensure adequate life span and operation.
- Mount the unit on a flat and robust plate.
- Lamps are omnidirectional.
- The buzzer sound is directional in front of the unit.
- This unit communicates by radio waves. Do not install the unit where it could be exposed to radio waves obstacles or strong electric fields.

- How to change antenna angle: Rotate the antenna after loosening the connector nut (refer to the next drawing). Tighten the nut with torque (0.98 N·m) while holding the antenna pointing to the intended direction. Otherwise, tight manually the nut, and assure it turning 10° to 15° more with a wrench.



■ INGRESS PROTECTION (IP65)

- The IP code is conformable when the unit is mounted vertically, antenna is installed and the control panel cover is locked. The compartment, where connectors are located, is not protected.
- When opening the control panel cover, avoid humidity and dust penetration. Dry and clean it if condensation is formed, and close the cover locking tightly.
- Install the antenna and tighten the connector nut tightly.
- In order to protect ingress of water or dust into the bottom compartment, mount the unit on the flat plane, and be sure that the gasket does not roll back or dust is not on the gasket.

■ WIRING

- Do not install cables close to noise sources (relay drive cable, high frequency line, etc.).
- Do not bind these cables together with those in which noises are present. Do not install them in the same duct.
- Cables to the unit must be wired indoor.

■ AND

- The unit is designed to function as soon as power is supplied, however, a warm up for 10 minutes is required for satisfying complete performance described in the data sheet.

CAUTION REGARDING RADIO FREQUENCY

■ FCC NOTICE

- 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.

■ FCC CAUTION

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

■ NOTE

- This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.
- This transmitter must not be co-located or operated in conjunction with any other antenna or transmitter.

■ FCC RF EXPOSURE INFORMATION

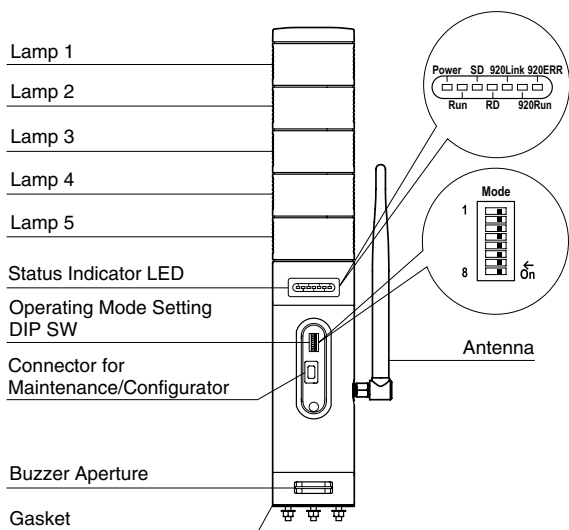
- This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment and meets the FCC radio frequency (RF) Exposure Guidelines. This equipment should be installed and operated keeping the radiator at least 20 cm or more away from person's body.

FCC ID : 2AOTF-0000007 (24V DC)

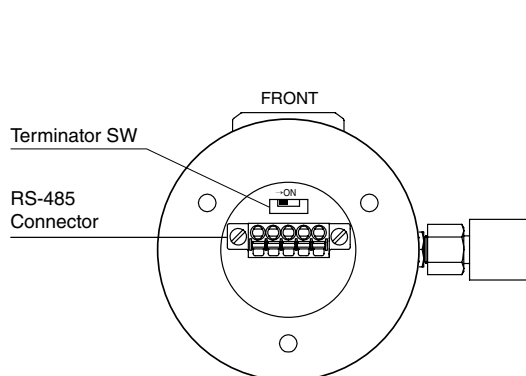
Contains FCC ID: 2AKGW-1TD3016A1

COMPONENT IDENTIFICATION

FRONT VIEW (with the cover open)



BOTTOM VIEW



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

STATUS INDICATOR LED

ID	COLOR	FUNCTION
Power	Green	On when power is supplied.
		Blinks when the IP Reset SW is on.
		Off when power is not supplied or an abnormality occurs in the unit.
Run	Green	On when Modbus communication is in normal status.
		Off at Modbus communication error or during no Modbus communication.
SD	Green	On in sending data via RS-485
RD	Green	On in receiving data via RS-485
920Link	Green	On when wireless link is working.
		Blinks with 0.5 Hz in establishing wireless link.
		Off when wireless link stops working.
920Run	Green	On when wireless communication with child device is in normal status.
		Off at a wireless communication error or during no communication.
920ERR	Red	On when there is no detour route.
		Blinks at network authentication failure.
		Off in normal status.

OPERATING MODE

(*) Factory setting

Lamp Blinking Frequency: Mode-1

Mode-1	LAMP BLINKING FREQUENCY
OFF	Approx. 2 Hz (*)
ON	Approx. 10 Hz

Buzzer Intermittent Frequency: Mode-2

Mode-2	BUZZER INTERMITTENT FREQUENCY
OFF	Approx. 2 Hz (*)
ON	Approx. 10 Hz

Buzzer Volume: Mode-3, Mode-4

Mode-3	Mode-4	BUZZER VOLUME
OFF	OFF	Quiet (*)
OFF	ON	Middle
ON	OFF	Loud
ON	ON	Maximum

Output at the Loss of Communication: Mode-6

Mode-6	OUTPUT AT THE LOSS OF COMMUNICATION
OFF	Reset the output (turned off) (*)
ON	Hold the output (maintains the last data received normally)

Available for Modbus communication.

Output Logic Reverse: Mode-7

Mode-7	OUTPUT LOGIC REVERSE
OFF	Non-inverted (*)
ON	Inverted

Available for discrete input.

Not available with blink (BLINK) or intermittence (BUZZER2), be sure to turn it off.

Input Select: Mode-8

Mode-8	INPUT SELECT
OFF	Modbus/TCP (*)
ON	Discrete input

Selects the input signal of lamp and buzzer control.

Note: Be sure to set unused Mode-5 to OFF.

TERMINATOR

To enable the terminator, turn ON the terminator SW. To disable the terminator, turn OFF the terminator SW. (Factory set to OFF)

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
Retry times before route switching	Once / Twice / Three times	Three times

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

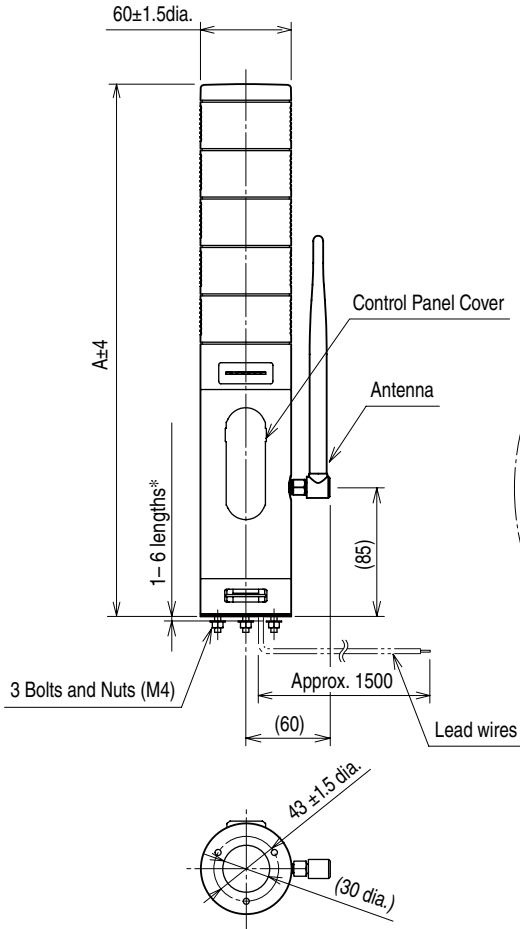
■ MODBUS SETTING

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

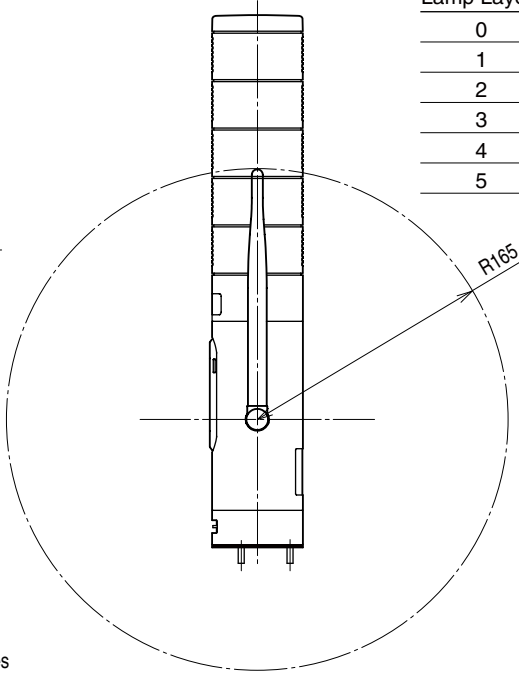
TERMINAL CONNECTIONS

Connect the unit as in the diagram below.

■ EXTERNAL DIMENSIONS unit: mm

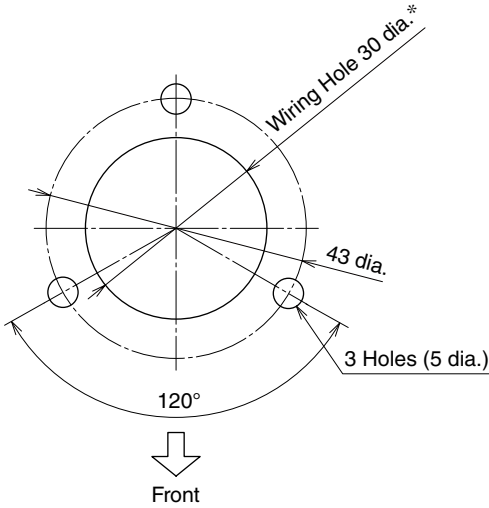


Lamp Layers	A
0	192
1	224
2	256
3	288
4	320
5	352



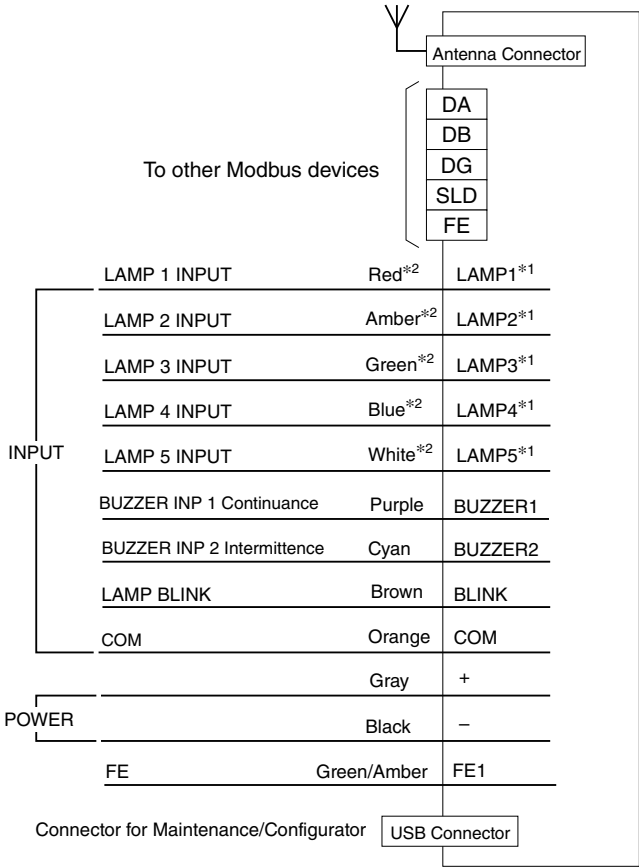
*1. Consult M-System for other bolt length.

■ MOUNTING REQUIREMENTS unit: mm



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

■ CONNECTION DIAGRAM



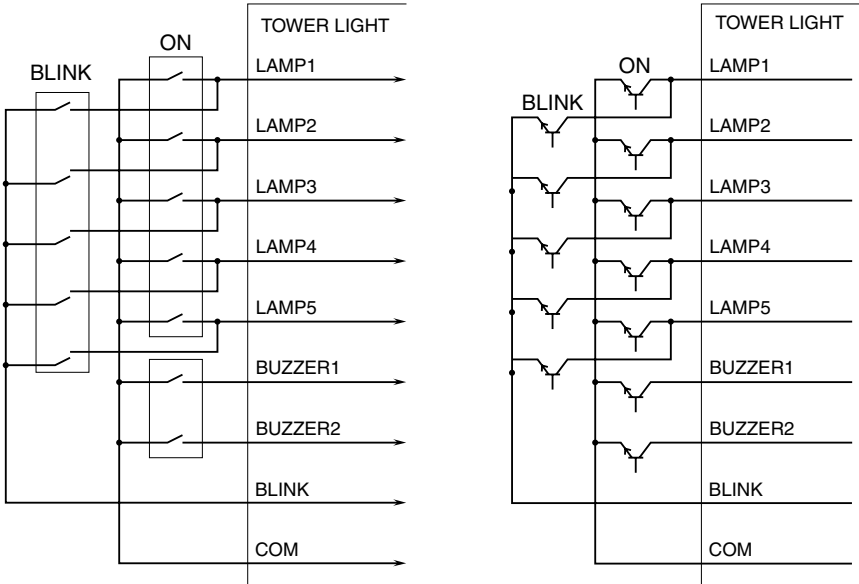
*1. Example of 5 layers in order: red, yellow, green, blue and white.
Lamp and wire color are the same.

*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.

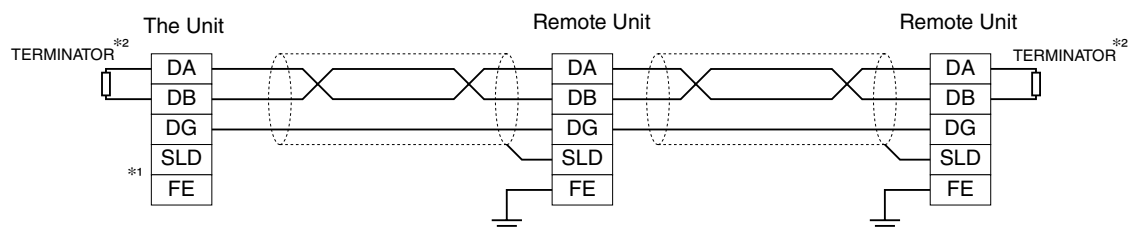
NPN input e.g.



Note: If "On" and "Blink" are set simultaneously for a single lamp, "Blink" is disabled.
At this time, if other lamps are being set to "Blink", they are also affected and work in the same manner.

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.

■ TENSION CLAMP TERMINAL BLOCK

Applicable wire size: 0.2 – 1.5 mm²

Stripped length: 10mm

Recommended solderless terminal

- AI0,25-10YE 0.25 mm² (Phoenix Contact)
- AI0,34-10TQ 0.34 mm² (Phoenix Contact)
- AI0,5-10WH 0.5 mm² (Phoenix Contact)
- AI0,75-10GY 0.75 mm² (Phoenix Contact)

MODBUS FUNCTION CODES & SUPPORTED CODES

■ DATA AND CONTROL FUNCTIONS

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 Registers	General purpose register within the slave (read/write)
15	Force Multiple Coils	Digital output from the slave (read/write)
16	Preset Multiple Registers	General purpose register within the slave (read/write)

■ EXCEPTION CODES

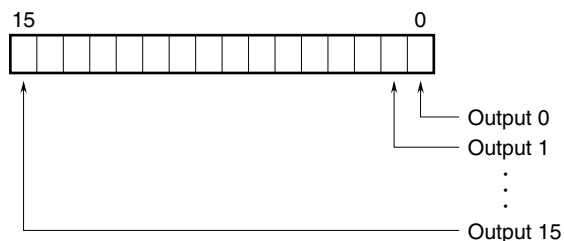
CODE	NAME	
01	Illegal Function	Function code is not allowable for the slave.
02	Illegal Data Address	Address is not available within the slave.
03	Illegal Data Value	Data is not valid for the function.
04	Slave Device Failure	
05	Acknowledge	
06	Slave Device Busy	
07	Negative Acknowledge	

MODBUS I/O ASSIGNMENTS

	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

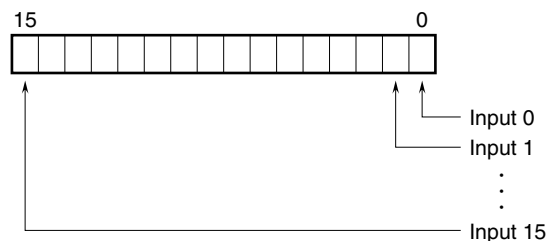
Note: DO NOT access addresses other than the above. Such access may cause problems such as inadequate operation.

■ 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.