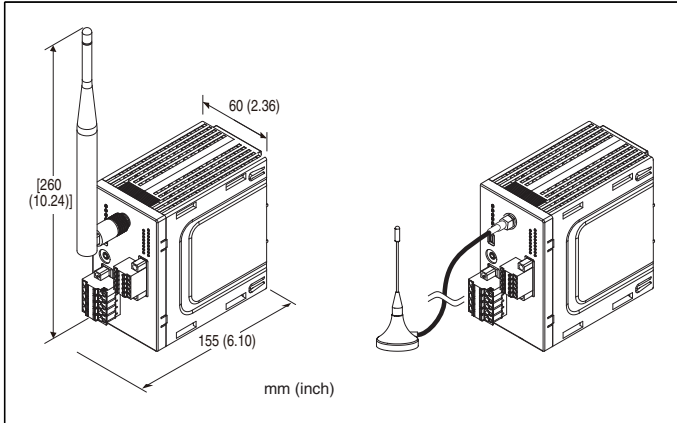


## Wireless I/O WL40TH Series

### WIRELESS GATEWAY

(Modbus-RTU Transparent 920MHz Band Wireless Device (child device) for Thailand)



### MODEL: WL40MW1TH-[1][2]

#### ORDERING INFORMATION

- Code number: WL40MW1TH-[1][2]  
Specify a code from below for each of [1] and [2].  
(e.g. WL40MW1TH-R/E/Q)
- Specify the specification for option code /Q  
(e.g. /C01)

#### [1] POWER INPUT

##### DC Power

S: 12 V DC

(Operational voltage range 12 V  $\pm$ 10 %, ripple 10 %p-p max.)

R: 24 V DC

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

#### [2] OPTIONS (multiple selections)

##### Antenna

/S: Sleeve antenna

/E: Rooftop antenna

##### Other Options

blank: none

/Q: Option other than the above (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

#### FUNCTIONS & FEATURES

This unit

- Incorporates 920MHz band wireless module.
- Works as a gateway between wireless and RS-485 using Modbus-RTU protocol.
- For use in Thailand only.

#### RELATED PRODUCTS

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

- PC configurator software (model: W920FCFG)

Downloadable at M-System's web site.

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

##### Maintenance software

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

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

##### Coaxial cable

- 7.5 m extension cable for rooftop antenna (model: CX-SAC0SAD0Q0750) (OKI)

Using 7.5 m coaxial cable for extension decreases transmission distance.

#### PACKAGE INCLUDES...

- Terminating resistor (110  $\Omega$ , 0.25 W)

#### GENERAL SPECIFICATIONS

##### Connection

**Wireless network:** SMA coaxial connector

**RS-485:** Tension clamp (Front Twinconnection)

**Applicable wire size:** 0.2 - 1.5 mm<sup>2</sup>, stripped length 10 mm

**Power supply:** Tension clamp (Front Twinconnection)

**Applicable wire size:** 0.2 - 2.5 mm<sup>2</sup>, stripped length 10 mm

**Maintenance:** Mini USB type B female connector

**Isolation:** Power input to Modbus to FE1 to antenna connector

**Indicator LED:** Power

#### 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.)

# MODEL: WL40MW1TH

Status indicator LED: ERR, RD, SD

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

(power input to Modbus to FE1 to antenna connector)

## STANDARDS & APPROVALS

NBTC, Thailand Radio Waves Act

## WIRELESS SPECIFICATIONS

Communication Standard: IEEE 802.15.4g

Frequency: 920MHz band (920.2 - 924.8 MHz)

Max. Transmission power: 20mW

Bandwidth: 400 kHz

Modulation: GFSK

Baud rate: Max. 100 kbps

Channels: 1 to 8ch

Security: 128bit AES

Indicator LEDs: 920Run, 920Link, 920ERR

Protocol: Modbus-RTU

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

Radio parameters setting: by PC configurator software

### Antenna

• Sleeve antenna (Model: MH920-ANT-F (S))

Indoor use

Non-waterproof

Non-directional

Gain: 3.0dBi max.

• Rooftop antenna (Model: MH920-ANT-F (R))

Outdoor/indoor use

Cable length: 2.5 m

Waterproof performance: IPx6 (except connector)

Non-directional

Gain: 2.0dBi max.

## INSTALLATION

### Current consumption:

24 V DC:  $\leq 70$  mA

12 V DC:  $\leq 130$  mA

Operating temperature: -20 to +60°C (-4 to +140°F)

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

Atmosphere: No corrosive gas or heavy dust

Mounting: DIN rail

### Weight

Unit: Approx. 260 g (0.57 lb)

Sleeve antenna (standard): 27 g (0.95 oz)

Rooftop antenna: 52 g (1.83 oz)

## PERFORMANCE

Insulation resistance:  $\geq 100$  M $\Omega$  with 500 V DC

Dielectric strength: 1500 V AC @ 1 minute

## CONFIGURATOR SOFTWARE SETTING

With configurator software, settings shown below are available.  
Refer to the users manual of W920FCFG for detailed operation.

### ■ WIRELESS SETTING

ITEM	SETTING RANGE	DEFAULT
Preferred PAN ID (group number)	0000 – FFFE (hexadecimal, 4 digits)	0000
Radio channel number	1 – 8 (selectable up to 8 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
Monitoring unit time of 1% duty (sec.)	10 – 3600 (sec.)	600 (sec.)
Transmitter power output	0.16mW / 1mW / 20mW	20mW
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.)
Retry times before route switching	Once / Twice / Three times	Three times

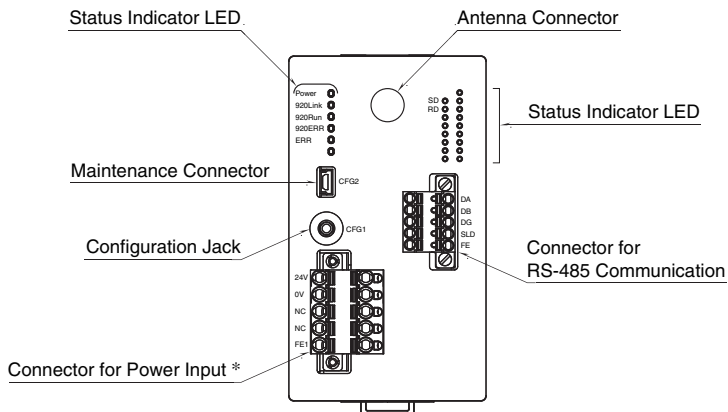
Note: For version confirmation of communication module, refer to the users manual of W920FCFG.

### ■ 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

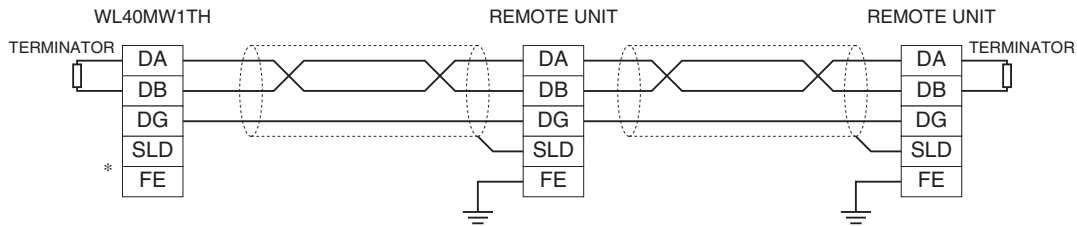
### ■ FRONT VIEW



\* Power input defers depending on the power input code you select.

## COMMUNICATION CABLE CONNECTIONS

### ■ WIRING CONNECTION WITH SLAVE DEVICES



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

Note: Be sure to connect the terminating resistor included in the product package to the unit at both ends of communication line.

The terminator must be connected across "DA" and "DB".

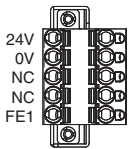
## TERMINAL ASSIGNMENTS

### ■ CONNECTORS FOR POWER INPUT

Unit side connector: MSTBV2,5/5-GF-5,08AU (Phoenix Contact)

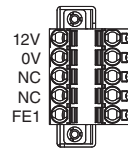
Cable side connector: TFKC2,5/5-STF-5,08AU (Phoenix Contact)

#### • Power input code: R (24 V DC)



ID	FUNCTION
24V	Power input 24 V
0V	Power input 0 V
NC	Not used
NC	Not used
FE1	Power input earth

#### • Power input code: S (12 V DC)

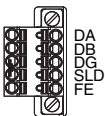


ID	FUNCTION
12V	Power input 12 V
0V	Power input 0 V
NC	Not used
NC	Not used
FE1	Power input earth

### ■ CONNECTOR FOR RS-485 COMMUNICATION

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

Cable side connector: TFMC1,5/5-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

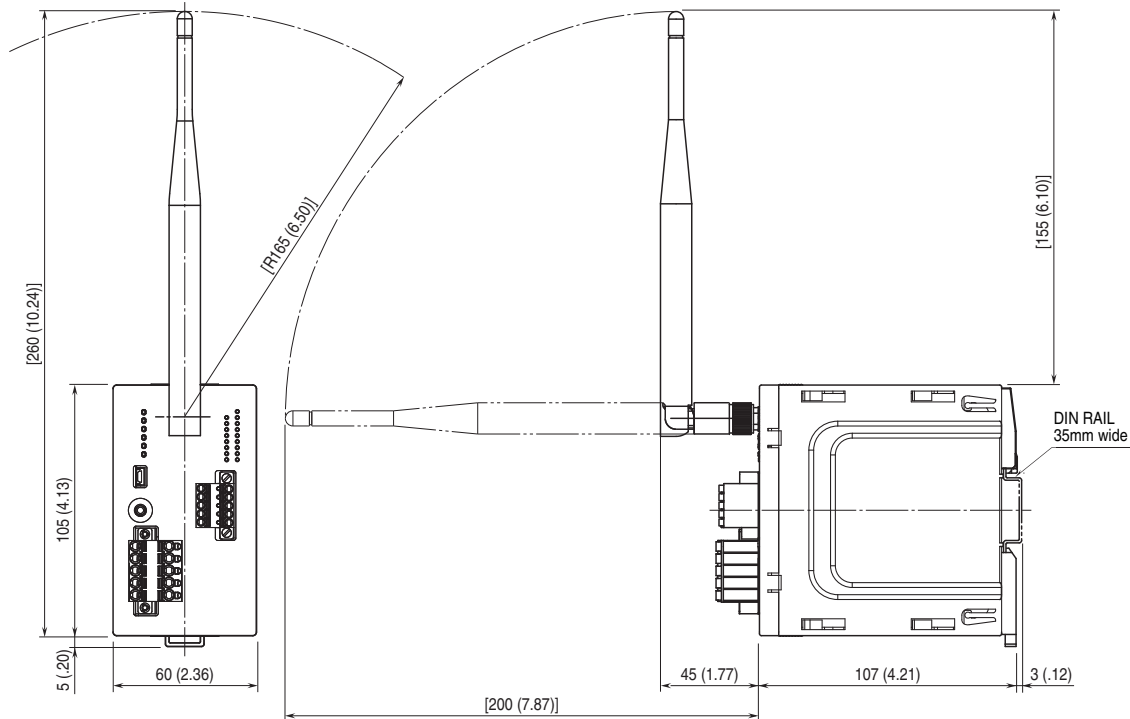
CODE	NAME	
01	Read Coil Status	Digital output from the slave (read/write)
02	Read Input Status	Status of digital inputs to the slave (read only)
03	Read Holding Registers	General purpose register within the slave (read/write)
04	Read Input Registers	Collected data from the field by the slave (read only)
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

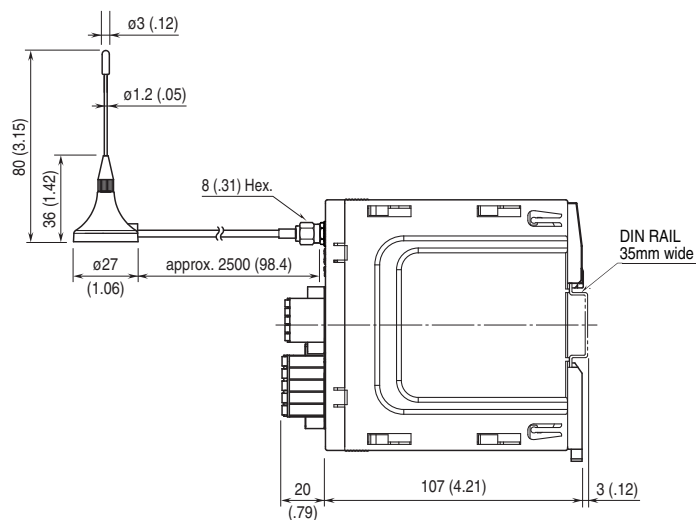
CODE	NAME	
01	Illegal Function	Function code is not allowable for the slave
02	Illegal Data Address	Address is not available within the slave
03	Illegal Data Value	Data is not valid for the function
04	Slave Device Failure	
05	Acknowledge	
06	Slave Device Busy	
07	Negative Acknowledge	

## EXTERNAL DIMENSIONS unit: mm (inch)

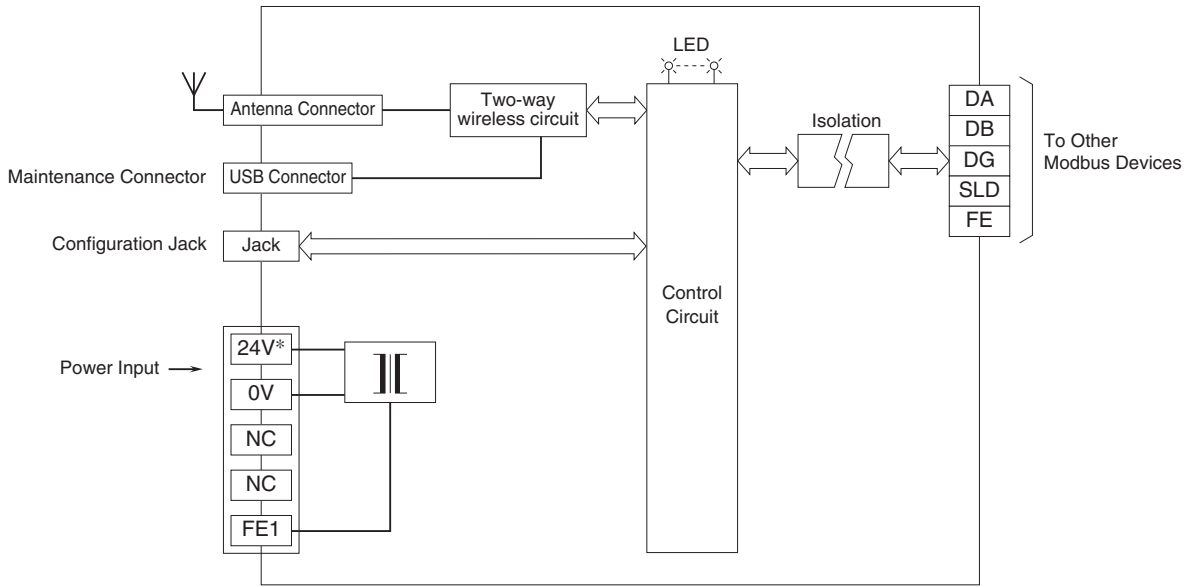
### • With sleeve antenna



### • With rooftop antenna



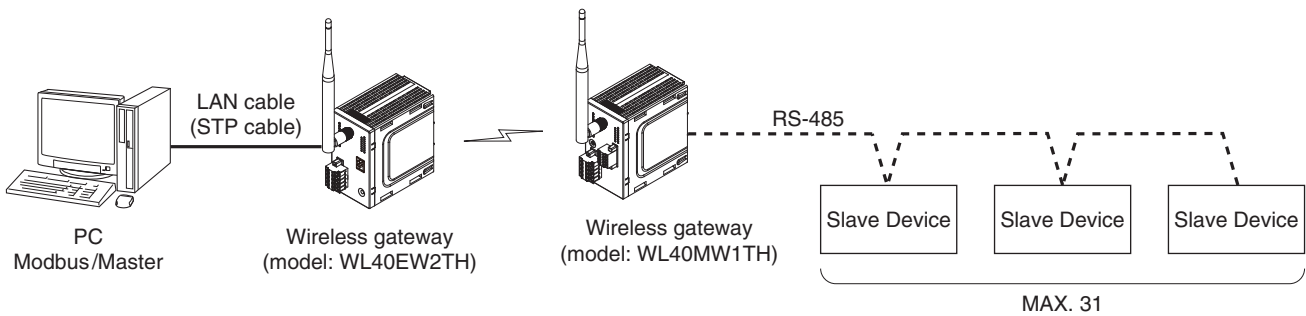
## SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



\* Power input defers depending on the power input code you select.

## SYSTEM CONFIGURATION EXAMPLES

PC side as Modbus/Master communicates with child devices via wireless module using Modbus/TCP and RTU protocol, and also communicates with slave devices in multi drop connection (RS-485).



Specifications are subject to change without notice.