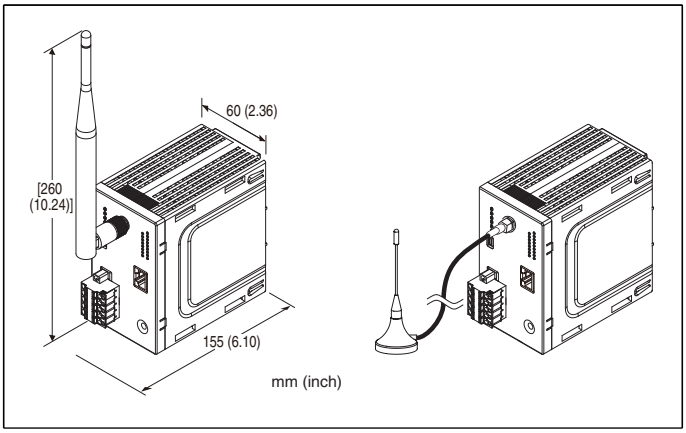
Wireless I/O WL40TH Series

WIRELESS GATEWAY

(Modbus/TCP, Modbus-RTU Transparent 920MHz Band Wireless Device (parent device) for Thailand)



MODEL: WL40EW2TH-[1][2]

ORDERING INFORMATION

• Code number: WL40EW2TH-[1][2]
Specify a code from below for each of [1] and [2].
(e.g. WL40EW2TH-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 ±10 %, ripple 10 %p-p max.)
R: 24 V DC
(Operational voltage range 24 V ±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 with RS-485 transparent type, which can communicate using Modbus-RTU protocol.
• Converts Modbus-RTU (RS-485) and Modbus/TCP (Ethernet) protocol.
• For use in Thailand only.

RELATED PRODUCTS

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

GENERAL SPECIFICATIONS

Connection
Wireless network: SMA coaxial connector
Power supply: Tension clamp (Front Twinconnection)
Applicable wire size: 0.2 - 2.5 mm^2, stripped length 10 mm
Ethernet: RJ-45 Modular Jack
Maintenance: Mini USB type B female connector
Housing material: Flame-resistant resin
Isolation: Power supply to Ethernet or FE1 to antenna connector
Switch: IP Reset
Refer to the instruction manual for details.
Indicator LED: Power

COMMUNICATION

■ **Common spec.**
Modbus protocol
Protocol: Modbus/TCP
Data: RTU (Binary)
Port No.: 502
Max. number of socket connections: 8
IP address: 192.168.0.1
(factory setting; can be changed via web browser)
■ **Ethernet**
Communication Standard: IEEE 802.3u
Transmission: 10BASE-T, 100BASE-TX
Baud rate: 10/100 Mbps (Auto Negotiation function)
Transmission media: 10BASE-T (STP, Category 5) 100BASE-

TX (STP, Category 5e)
Max. length of fieldbus segment: 100 meters
Ethernet indicator LED: Link, Link100

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
Number of child devices: Max. 100
Protocol: Modbus-RTU
Communication module: Coordinator module incorporated (Oki Electric Industry Co., Ltd.)
Radio parameters setting: by Web browser
Max. transmission distance (optical): Approx. 1 km
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: ≤ 90 mA
12 V DC: ≤ 170 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. 270 g (0.60 lb)
Sleeve antenna (standard): 27 g (0.95 oz)
Rooftop antenna: 52 g (1.83 oz)

PERFORMANCE

Insulation resistance: ≥ 100 MΩ with 500 V DC
Dielectric strength: 1500 V AC @ 1 minute
(power input to Ethernet or FE1 to antenna connector)

STANDARDS & APPROVALS

NBTC, Thailand Radio Waves Act

WEB BROWSER SETTING

With Web browser, settings shown below are available.

Refer to the operating manual (EM-9115-B) for detailed settings.

■ TCP / IP SETTING

ITEM	SETTING RANGE	DEFAULT
IP address	1.0.0.0 – 223.255.255.255	192.168.0.1
Subnet mask	224.0.0.0 – 255.255.255.255	255.255.255.0
Default gateway	0.0.0.0 – 255.255.255.255	0.0.0.0

■ MODBUS / TCP SETTING

ITEM	SETTING RANGE	DEFAULT
Port	1 – 65535	502
Modbus exception response	Not return 06 (BUSY), 0B (ERROR) / Return 06 (BUSY), 0B (ERROR)	Return 06 (BUSY), 0B (ERROR)
Communication timeout	1 – 60 (min.)	1 (min.)

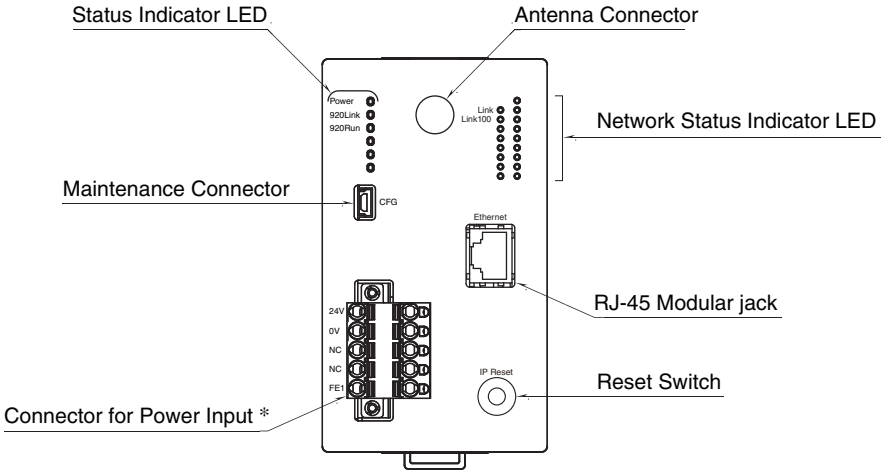
■ WIRELESS SETTING

ITEM	SETTING RANGE	DEFAULT
PAN ID (group number)	0000 – FFFE (hexadecimal, 4 digits)	0000
Radio channel number	1 – 8 ch	1 ch
Network name	English one-byte characters within 16 characters (one-byte space, “-”, “_”, “.”, “@” are usable.)	MH920
Encryption key	0000...0 – FFFF...F (hexadecimal, 32 digits)	0000...0
Prefix	2000:0000:0000:0000 – 3FFF:FFFF:FFFF:FFFF	2000:0000:0000:0000
Monitoring unit time of 1% duty (sec.)	10 – 3600 (sec.)	1800 (sec.)
Transmitter power output	0.16mW / 1mW / 20mW	20mW
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
Packet filtering	None / Yes (polling type)	Yes (polling type)
Filter timeout on polling	1.0 – 60.0 (sec.)	4.0 (sec.)
Setting mode of short address	Range mode: 1 device (max. multi drop number) Range mode: 1 to 4 devices (max. multi drop number) Range mode: 1 to 8 devices (max. multi drop number) Range mode: 1 to 16 devices (max. multi drop number) Range mode: 1 to 31 devices (max. multi drop number) List mode	List mode
920Run timeout	0.0 – 3200.0 (sec.)	5.0 (sec.)
Retry times before route switching	Once / Twice / Three times	Three times
Short address list setting	Short address	—
MAC address list setting	MAC address	—
Connection refusal list setting	MAC address	—

Note: For version confirmation of communication module, refer to the operating manual (EM-9115-B).

EXTERNAL VIEW

■ **FRONT VIEW**



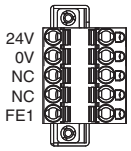
* Power input defers depending on the power input code you select.

TERMINAL ASSIGNMENTS

■ **CONNECTORS FOR POWER INPUT**

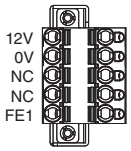
Unit side connector: MSTBV2,5/5-GF-5,08AU (Phoenix Contact)
Cable side connector: TFKC2,5/5-STF-5,08AU (Phoenix Contact)

• 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

MODBUS FUNCTION CODES & SUPPORTED CODES

Modbus function codes are shown below.

■ **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 Register	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)

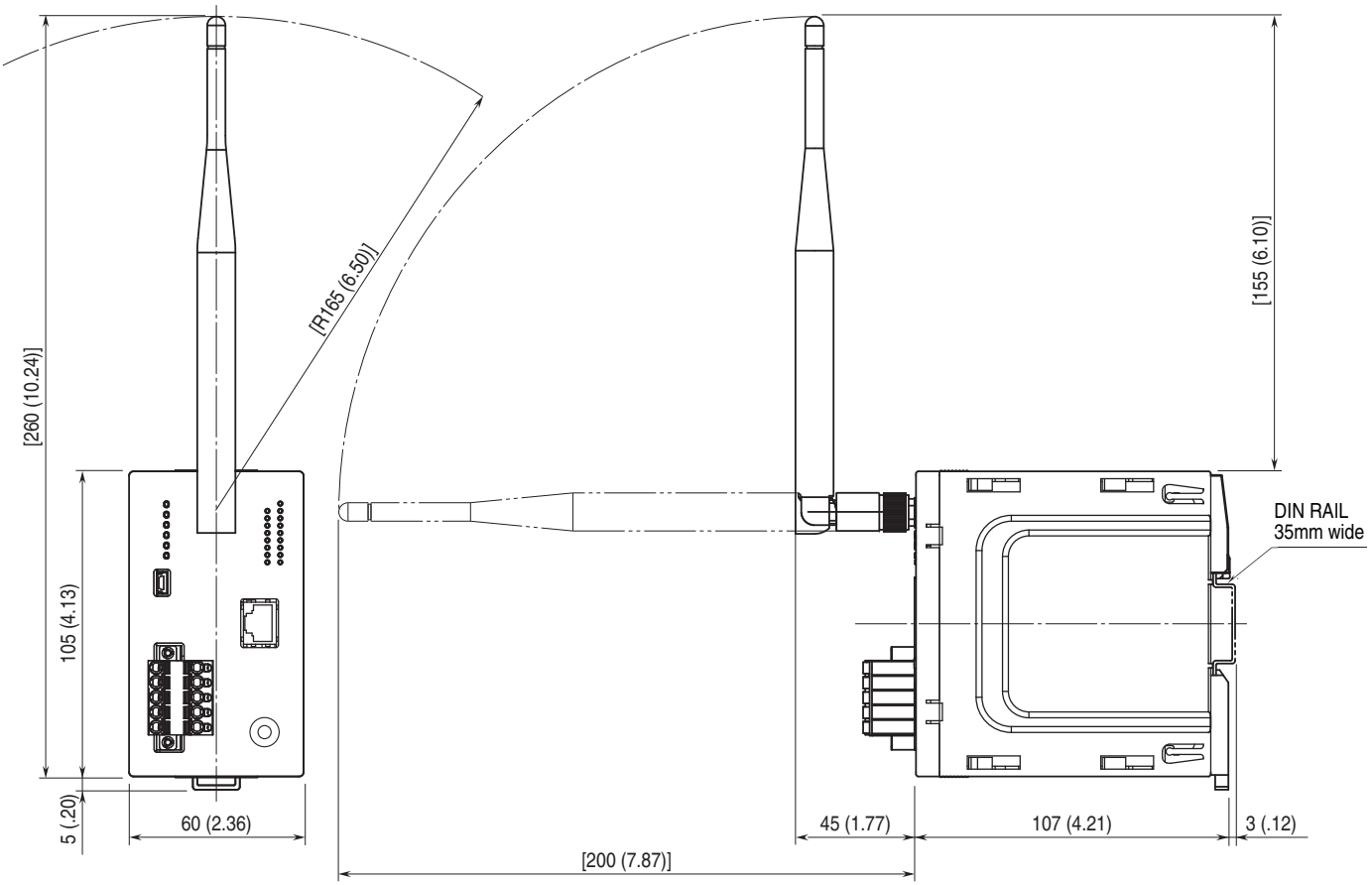
■ **EXCEPTION CODES**

CODE	NAME	
06	Slave Device Busy	Device's Modbus/TCP request queue is full.
11	Gateway Target Device Failed To Respond	Response from 920MHz band wireless device (child) is error, or response timeout occurred.

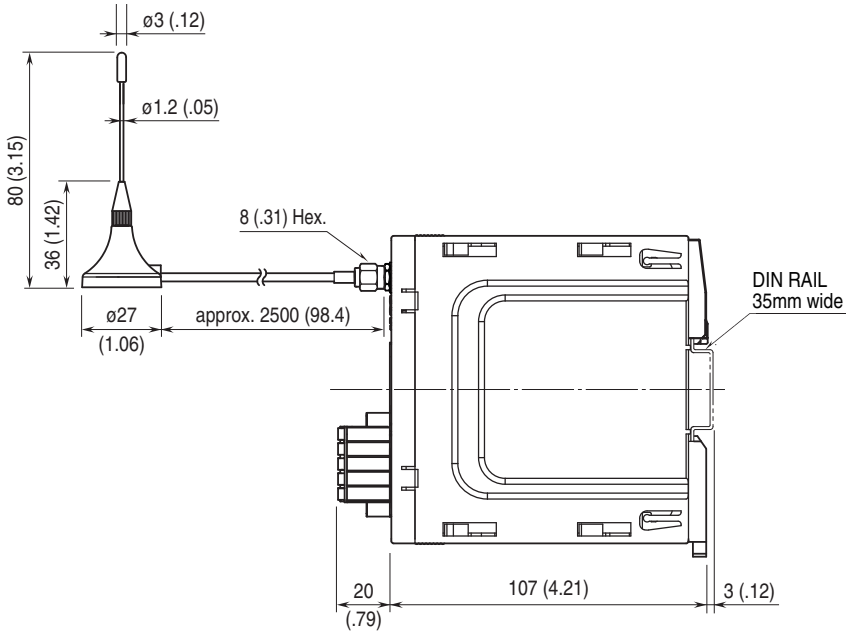
Note: When 920 MHz band wireless device (child) returns an exception code other than the above, the exception code is directly transmitted to upper devices.

EXTERNAL DIMENSIONS unit: mm (inch)

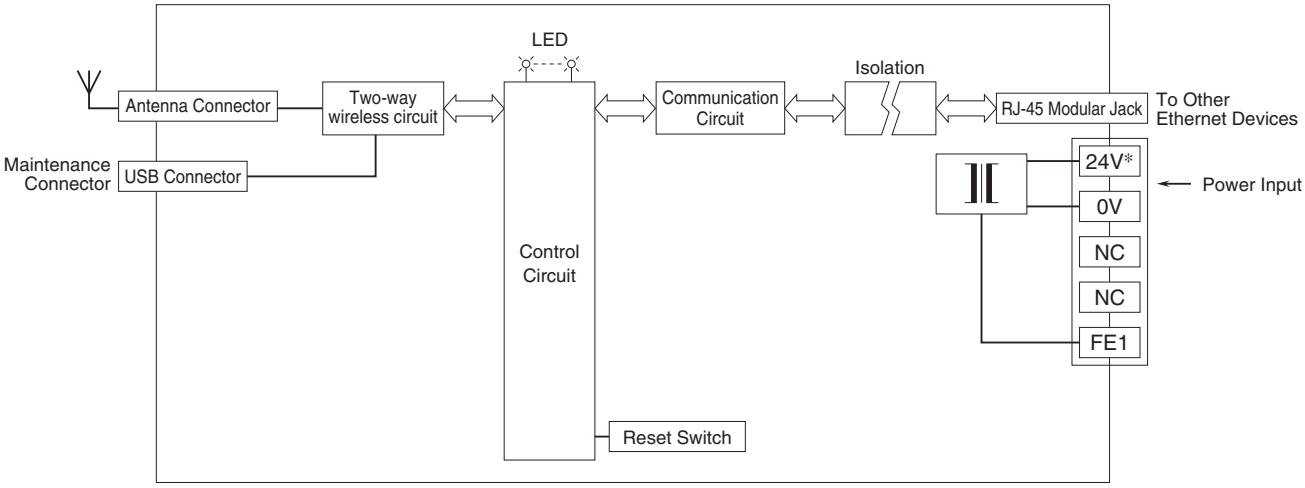
• With sleeve antenna



• With rooftop antenna



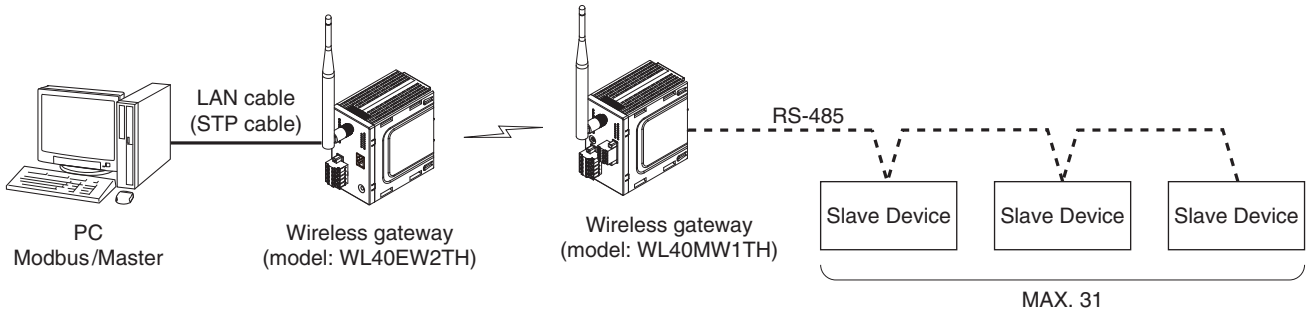
SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



* 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.