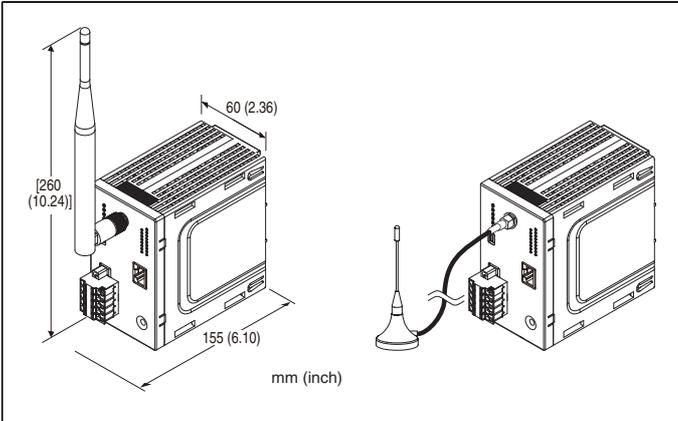


Wireless I/O WL40F Series

WIRELESS GATEWAY

Modbus/TCP (Ethernet), Modbus-RTU Transparent 900MHz Band Wireless Device (parent device)



MODEL: WL40EW2F-[1][2]

ORDERING INFORMATION

- Code number: WL40EW2F-[1][2]
- Specify a code from below for each of [1] and [2].
(e.g. WL40EW2F-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 our web site.)
/C01: Silicone coating
/C02: Polyurethane coating
/C03: Rubber coating

FUNCTIONS & FEATURES

This unit

- Incorporates 900MHz 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.
- Incorporates the module compliant with FCC Part 15, and can be used only in the United States.

RELATED PRODUCTS

For related products of wireless device, refer to our web site.

Maintenance software

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

(Maintenance software is downloadable at our 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 mm², 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

STANDARDS & APPROVALS

Module conforming to FCC Part 15 incorporated

WIRELESS SPECIFICATIONS

Communication Standard: IEEE 802.15.4g

Frequency: 900MHz band (902 - 928 MHz)

Max. Transmission power: 20mW

Bandwidth: 400 kHz

Modulation: GFSK

Baud rate: Max. 100 kbps

Channels: 1 to 43ch

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)

WEB BROWSER SETTING

With Web browser, settings shown below are available.

Refer to the operating manual (EM-9080-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.)

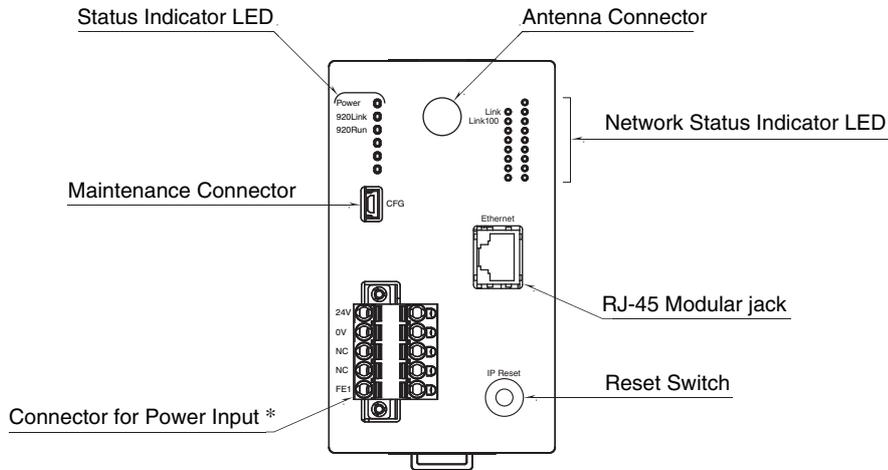
■ WIRELESS SETTING

ITEM	SETTING RANGE	DEFAULT
PAN ID (group number)	0000 – FFFF (hexadecimal, 4 digits)	0000
Radio channel number	1 – 43ch	1ch
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
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	—

* For version confirmation of communication module, refer to the operating manual (EM-9080-B).

EXTERNAL VIEW

FRONT VIEW



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

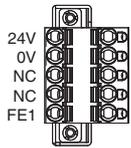
TERMINAL ASSIGNMENTS

CONNECTORS FOR POWER INPUT

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

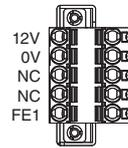
Cable side connector: TFKC2,5/5-STF-5,08AU (Phoenix Contact)

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 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)

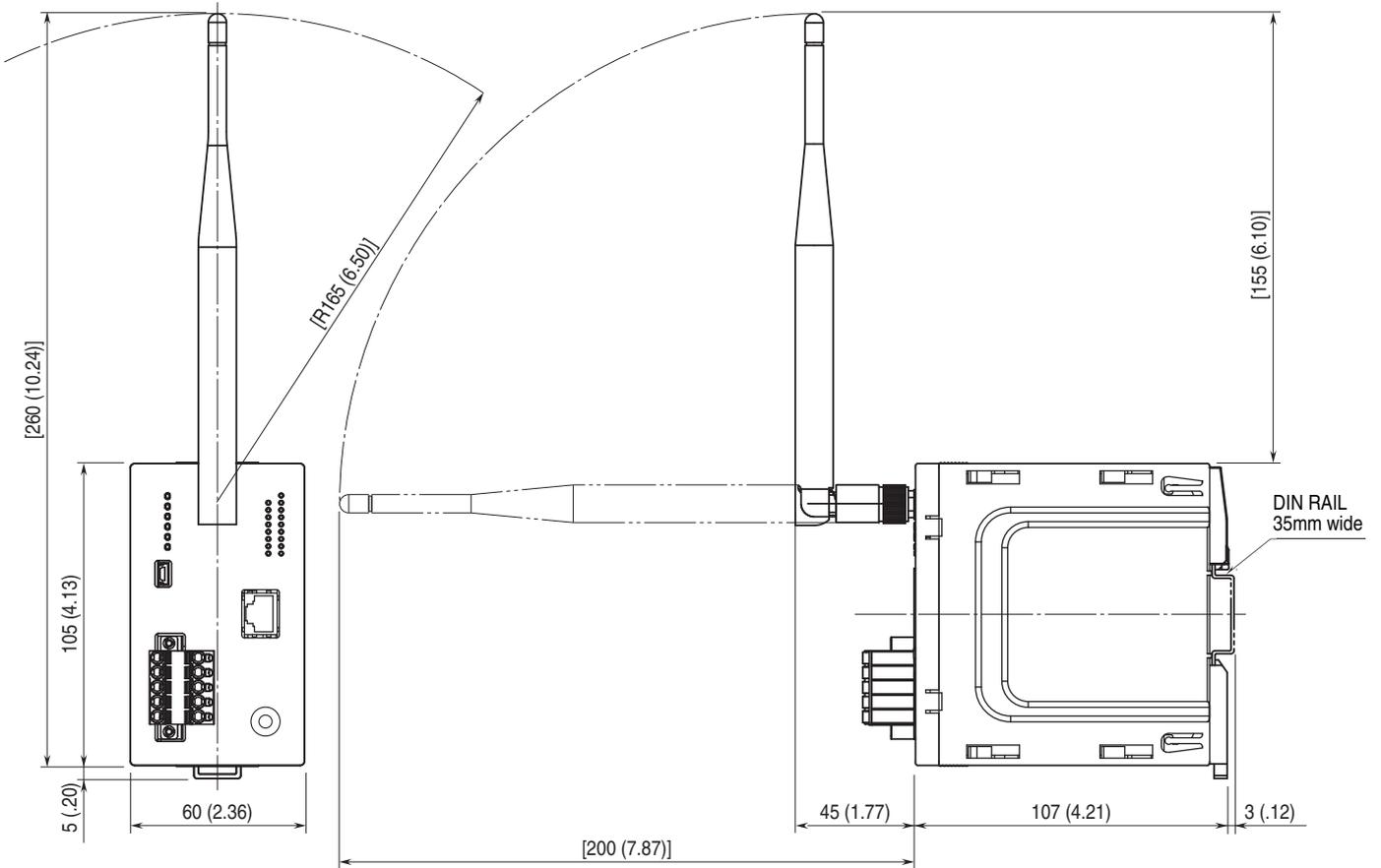
■ EXCEPTION CODES

CODE	NAME	
06	Slave Device Busy	Device's Modbus/TCP request queue is full.
11	Gateway Target Device Failed To Respond	Response from 900MHz band wireless device (child) is error, or response timeout occurred.

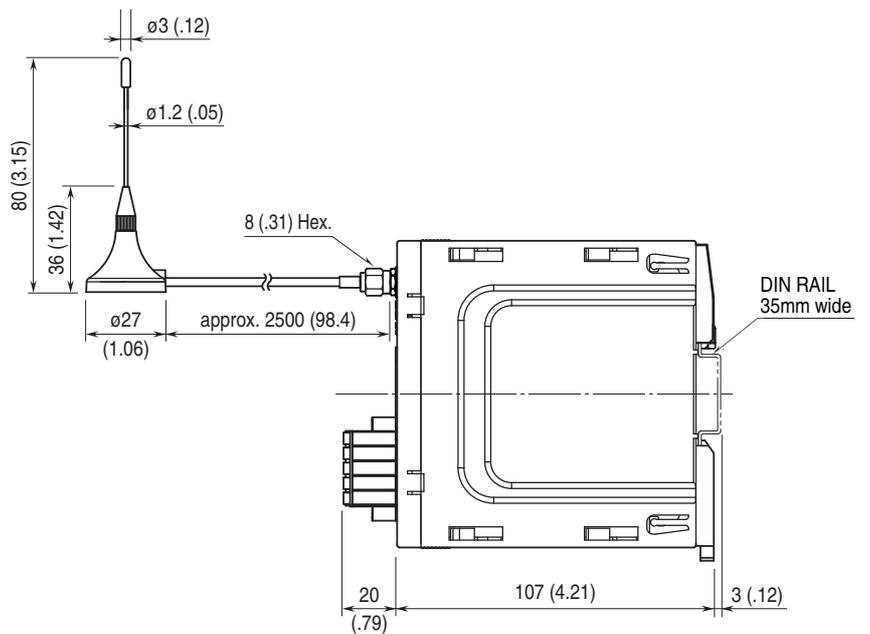
Note: When 900 MHz band wireless device (child) returns an exception code other than the above, the exception code is directly transmitted to upper devices.

EXTERNAL DIMENSIONS unit: mm [inch]

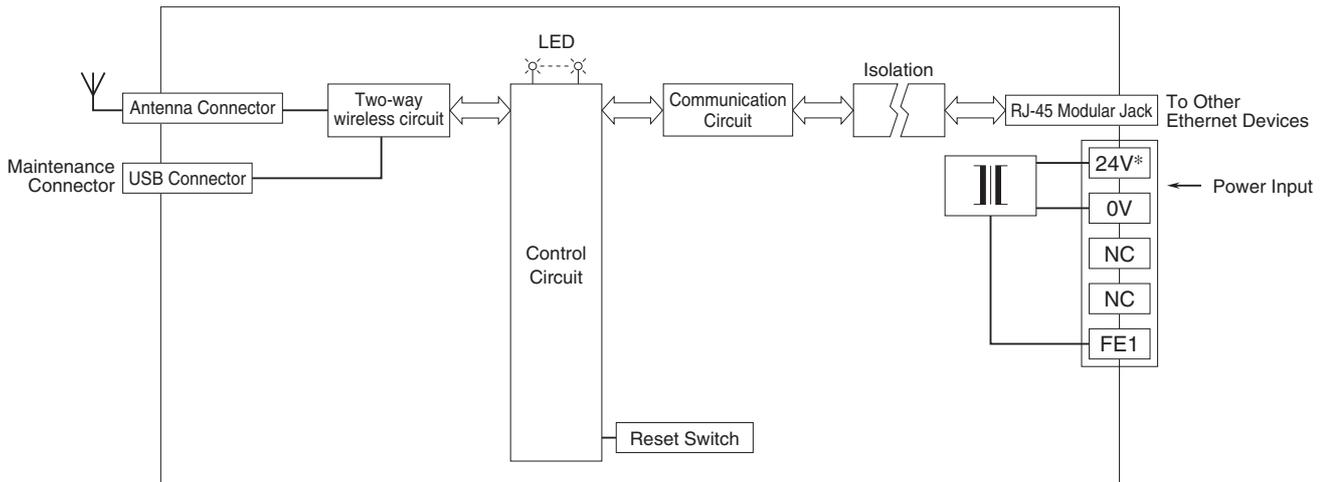
• With sleeve antenna



• With rooftop antenna



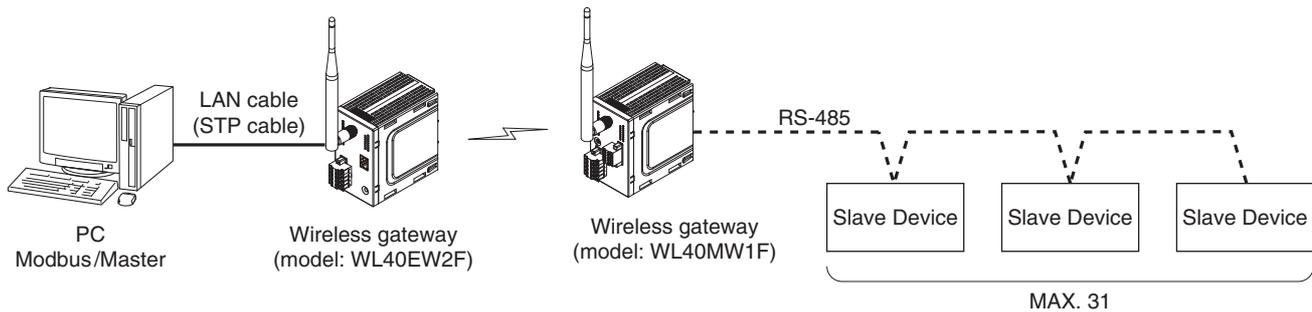
SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



* 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.