900MHz/920MHz BAND WIRELESS DEVICE
PC CONFIGURATOR SOFTWARE
W920FCFG

USERS MANUAL

CONTENTS

1. INTRODUCTION

1.1. GENERAL DESCRIPTION

The W920FCFG is used to program parameters for the 900MHz wireless unit of WL40F Series and 920MHz wireless unit of WL40TW / WL40TH / WL40KR / WL40VN series (referred hereunder as 'device').

The following major functions are available:

- Editing parameters
- Downloading parameters to the device, uploading parameters from the device
- Saving parameters as files, reading parameters from files
- Confirming operating status
- Restarting the device

1.2. APPLICABLE DEVICES

The W920FCFG is applicable to the following products:

MODEL	SERIES	FUNCTION	W920FCFG VERSION
WL40MW1F	WL40F Series	Wireless Gateway (900MHz wireless – Modbus-RTU)	1.0
WL40W1F-DAC4A	WL40F Series	Wireless I/O Unit (2 Contact Inputs, 2 NPN Transistor Outputs)	1.0
WL40W1F-DS2	WL40F Series	Wireless Input Unit (2-wire Transmitter Inputs 2 points)	1.0
WL40MW1TW	WL40TW Series	Wireless Gateway (920MHz wireless – Modbus-RTU)	1.1
WL40MW1TH	WL40TH Series	Wireless Gateway (920MHz wireless – Modbus-RTU)	1.1
WL40MW1KR	WL40KR Series	Wireless Gateway (920MHz wireless – Modbus-RTU)	1.1
WL40MW1VN	WL40VN Series	Wireless Gateway (920MHz wireless – Modbus-RTU)	1.1

The software version applicable to each device is indicated in the above table.

Confirm that the software you have is compatible with the device you have.

If not in the table, the latest software and operation manual corresponding to your device are downloadable at our web site.

1.3. PC REQUIREMENTS

The following PC performance is required for adequate operation of the W920FCFG.

PC	IBM PC compatible
OS	Windows 7 (32 bit / 64 bit) Windows 8.1 (32 bit / 64 bit, except Windows RT) Windows 10 (32 bit / 64 bit) Note: Not assuring operations in all environments.
CPU	Must meet the relevant Windows' requirements.
Memory	
Communication Port	COM port (RS-232-C) or USB port (COM1 through COM16)

One of the dedicated cables as listed below is required to connect the device to the PC.

Port	PC Configurator Cable Model No.
RS-232-C	MCN-CON
USB	COP-US Note: It is necessary to install the driver software in the PC. The driver software is downloadable at our web site.

1.4. INSTALLING & UNINSTALLING THE PROGRAM

INSTALL

The program is provided as compressed archive.

Decompress the archive and execute "setup.exe" to start up the W920FCFG installer program.

Follow instructions on the Windows.

UNINSTALL

Open Control Panel > Uninstall a program (only for Windows 7).

2. GETTING STARTED

2.1. STARTING THE W920FCFG

Open the W920FCFG program on the Windows PC. The following window appears on the screen.
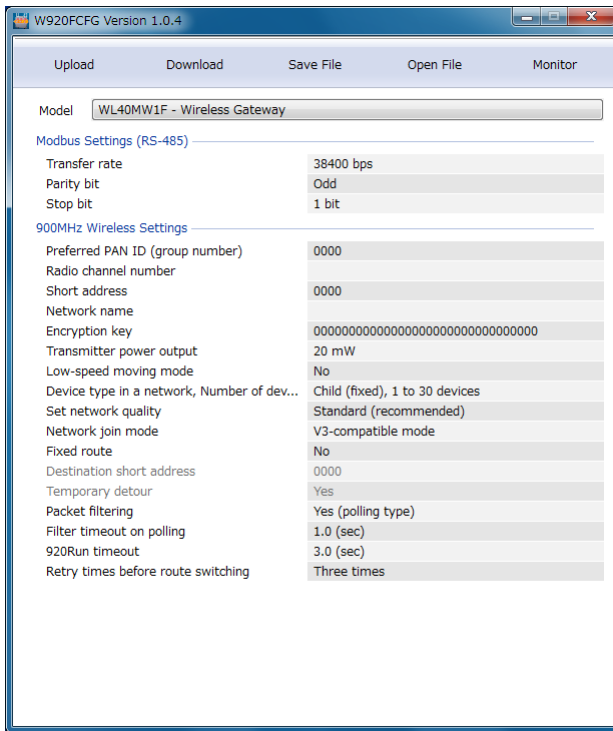
2.2. OPERATION (common setting for each device)

2.2.1. UPLOAD

Click [Upload] button to read parameters in the device via PC configurator cable and to display it on the configuration window. As the window is displayed according to the connected device, there is no need to choose [Model] in advance.

2.2.2. DOWNLOAD

Click [Download] button to write parameters on the configuration window to the device via PC configurator cable.

2.2.3. SAVE FILE

Click [Save File] button to save edited parameters in the PC as a file.

2.2.4. OPEN FILE

Click [Open File] button to read and open parameters saved in a file.

2.2.5. MONITOR

Click [Monitor] button to open the monitor window, where you can monitor the device status and restart the device. For detailed information, refer to [Monitor window] for each device.

3. CONFIGURATION

3.1. CONFIGURATION FOR WL40MW1x (x: F / TW / TH / KR / VN)

3.1.1. SETTING ITEMS

TYPE	ITEM	SETTING RANGE	DEFAULT
Modbus Settings (RS-485)	Transfer rate	38400 / 19200 / 9600 / 4800 bps	38400 bps
	Parity bit	Odd / Even / None	Odd
	Stop bit	1 bit / 2 bits	1 bit
900MHz Wireless Settings / 920MHz Wireless Settings	Preferred PAN ID (group number)	0000 – FFFE (hexadecimal, 4 digits)	0000
	Radio channel number	F: 1 – 43 (select up to 10 channels) TW / TH: 1 – 8 (up to 8 channels) KR: 1 – 14 (up to 10 channels) VN: 2 – 7 (up to 6 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 radio transmission (TH / VN models only)	10 – 3600 (sec.)	600 (sec.)
	Transmitter power output	F / TW / TH / VN: 0.16 mW / 1 mW / 20 mW KR: 0.16 mW / 1 mW / 5 mW / 12.5 mW	20 mW (KR: 5 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.)
	Retry times before route switching	Once / Twice / Three times	Three times

3.1.2. MODBUS SETTINGS (RS-485)

• **Transfer rate**

Set the same transfer rate as Modbus-RTU slaves connected via RS-485.

• **Parity bit**

Set the same parity bit as Modbus-RTU slaves connected via RS-485.

• **Stop bit**

Set the same stop bit as Modbus-RTU slaves connected via RS-485.

3.1.3. 900MHZ WIRELESS SETTINGS / 920MHZ WIRELESS SETTINGS

Restart the device after changing 900MHz / 920MHz wireless setting so that the setting is reflected.

For more information on 900MHz / 920MHz wireless settings, refer to the 900MHz / 920MHz band wireless device users manual.

FCC   : 900MHz Band Wireless Device Operating Manual (EM-9085)

Taiwan   : 920MHz Band Wireless Device (Taiwan) Operating Manual (EM-9120)

Thailand   : 920MHz Band Wireless Device (Thailand) Operating Manual (EM-9119)

Korea   : 920MHz Band Wireless Device (Korea) Operating Manual (EM-9121)

Vietnam   : 920MHz Band Wireless Device (Vietnam) Operating Manual (EM-9122)

• Preferred PAN ID (group number)

Set the preferred PAN ID. If there is no preferred PAN ID to specify in particular, set "0000".

• Radio channel number

Set the radio channel number (up to 10 channels). When no channel is set, wireless connection is disconnected.

• Short address

Set the own short address. When "0000" is set, wireless connection is disconnected.

• Network name

Set the network name. When no network name is set, wireless connection is disconnected.

• Encryption key

Set the encryption key.

• Monitoring unit time of radio transmission

Set the monitoring unit time of radio transmission.

• Transmitter power output

Set the transmitter power output level.

• Low-speed moving mode

Set the low-speed moving mode to [Yes] when the device is located on a moving equipment.

If using a child device which is set to the low-speed mode in the network, it is required to set "Device type in a network, Number of devices in a network" to "Child (fixed) + child (moving)", and "Network join mode" to "V3-compatible mode", for all the 900MHz / 920MHz communication devices in the network.

• Device type in a network, Number of devices in a network

Set the network configuration. When "Child (fixed) + child (moving)" is selected, set "Network join mode" to "V3-compatible mode".

• Set network quality

Set the network quality.

• Network join mode

Selecting "Fast join mode" enables to obtain a faster wireless connection in starting up devices.

However, to utilize the fast join mode, it is necessary to set "Fast join mode" for all the 900MHz / 920MHz communication devices in the network.

• Fixed route

Select Yes (enabled) or No (disabled) for the fixed route of network.

• Destination short address

Set the destination short address when the fixed route is enabled.

If there is no address to specify in particular, set "0000".

• Temporary detour

Select Yes (need) or No (no need) for the temporary detour when the fixed route is enabled.

• Packet filtering

Select Yes (enabled) or None (disabled) for the packet filtering function.

In the same wireless network, this function needs to be identically set.

• Filtering timeout on polling

Set the filtering timeout on polling when the packet filtering is enabled.

The filtering timeout on polling means the time-out period from when wireless module of the device sends a command received via wireless network to the CPU module till when the CPU module returns a response.

The expired response will be discarded by wireless module.

Note: For child devices other than gateway type, there is no need to change the default value of 1.0 second.

• 920Run timeout

Set the 920Run timeout period.

When the device does not receive normal Modbus commands from wireless network for more than set time, 920Run communication gets disconnected, and 920Run LED is turned off.

• Retry times before route switching

In the 900MHz / 920MHz band wireless network, when the data is sent from upper to lower child devices in a multi-hop way, the transmissions are performed up to the specified number of retry times.

If all the transmissions did not succeed, route switching is performed.

If you want to proceed quickly to the route switching, decrease the retry times.

• Modbus node address

Set the Modbus node address.

3.2. CONFIGURATION FOR WL40W1F-DAC4A

3.2.1. SETTING ITEMS

TYPE	ITEM	SETTING RANGE	DEFAULT
Transistor Output Settings	Output status at time of 920Run communication disconnect	Hold / Clear	Hold
900MHz Wireless Settings	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.)
	Retry times before route switching	Once / Twice / Three times	Three times
	Modbus node address	1 – 247	1

3.2.2. TRANSISTOR OUTPUT SETTINGS

• Output status at time of 920Run communication disconnect

Specify whether to hold the transistor output status (retaining previous data received normally) or to clear it (output is fixed to OFF) when Modbus master does not communicate for more than the time period set in '920Run timeout'.

Note: This setting is collectively configured for DO 1 and DO 2.

3.2.3. 900MHZ WIRELESS SETTINGS

Configure wireless settings referring to "3.1.3. 900MHZ WIRELESS SETTINGS / 920MHZ WIRELESS SETTINGS".

3.3. CONFIGURATION FOR WL40W1F-DS2

3.3.1. SETTING ITEMS

TYPE	ITEM	SETTING RANGE	DEFAULT
Analog Input 1 Settings	Input enabled / disabled	Enabled / Disabled	Enabled
	Zero input value	4.000 – 20.000	4.000 mA
	Full input value	4.000 – 20.000 (full input value ≥ zero input value)	20.000 mA
	Fine zero adjustment	-500 – 5.00 (%)	0.00 (%)
	Fine gain adjustment	0.9500 – 1.0500	1.0000
	Zero scaling value	-32000 – 32000	0
	Full scaling value	-32000 – 32000	10000
	First-order filter time constant	0.0 – 60.0 sec.	0.0 sec.
Analog Input 2 Settings	Input enabled / disabled	Enabled / Disabled	Enabled
	Zero input value	4.000 – 20.000	4.000 mA
	Full input value	4.000 – 20.000 (full input value ≥ zero input value)	20.000 mA
	Fine zero adjustment	-500 – 5.00 (%)	0.00 (%)
	Fine gain adjustment	0.9500 – 1.0500	1.0000
	Zero scaling value	-32000 – 32000	0
	Full scaling value	-32000 – 32000	10000
	First-order filter time constant	0.0 – 60.0 sec.	0.0 sec.
900MHz Wireless Settings	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.)
	Retry times before route switching	Once / Twice / Three times	Three times
	Modbus node address	1 – 247	1

3.3.2. ANALOG INPUT SETTINGS (INPUT 1, 2)

The settings can be individually configured for input 1, 2.

• Input enabled / disabled

Set Enabled or Disabled for input.

When Disabled is set, the data always becomes 0, and the input range error is not raised.

• Zero input value / Full input value

Set each input value to be scaled as 0% to 100%.

Note: The setting must be zero input value ≤ full input value.

• Fine zero adjustment / Fine gain adjustment

Fine adjustment is performed for the actual input and the input values scaled to percentage by zero input value/full input value settings.

For fine zero adjustment, set a percentage value as an offset value.

For fine gain adjustment, vary tilt corresponding to 0 to 100%.

• Fine adjustment method

For example, when 0% input deviates by +0.5% and 100% input deviates by +1.8%, firstly set fine zero adjustment to -0.5%. This setting clears the deviation from 0 % input and remains the deviation of +1.3% for 100% input. Then, set fine gain adjustment to 0.9872 (0.9872 ≈ 100/(100 + 1.3)).

By following this method, you can clear the deviation from 100% input without changing 0% input and complete fine adjustment.

• Zero scaling value / Full scaling value

Set each scaling value corresponding to zero input value/full input value. These are transferred as analog input data to the master.

• Setting example of fine adjustment and scaling value

[Setting example]

Input type: 0 – 20 mA

Zero/full input value: 4.000 mA/18.000 mA

Fine zero/gain adjustment: 1.70%/1.0200

Zero/full scaling value: 5000/20000

[With the above setting, analog input data with input at 14.5 mA]

$(14.5 - 4) / (18 - 4) = 75\%$ … <input % = 75%>

$(75\% \times 1.02) + 1.7\% = 78.2\%$ … <input % = 78.2%>

$78.2\% \times (20000 - 5000) + 5000 = 16730$ … <analog input data = 16730>

• First-order filter time constant

Set the time constant of first-order filter for analog input data.

The time constant is the time required for the analog input data to reach 63.2% of the input step change. If filtering is not necessary, set it to "0".

3.3.3. 900MHZ WIRELESS SETTINGS

Configure wireless settings referring to "3.1.3. 900MHZ WIRELESS SETTINGS / 920MHZ WIRELESS SETTINGS".

4. MONITOR WINDOW

Clicking [Monitor] button with the PC connected with the device via PC configurator cable enables to open the window on which to monitor statuses. Communication status with the device is indicated at the bottom left on the window.

Each status on the monitor window is automatically updated regularly when the device is connected, and you can also execute operations, such as restarting the device on the window.

Monitor Window (ex. WL40MW1F)
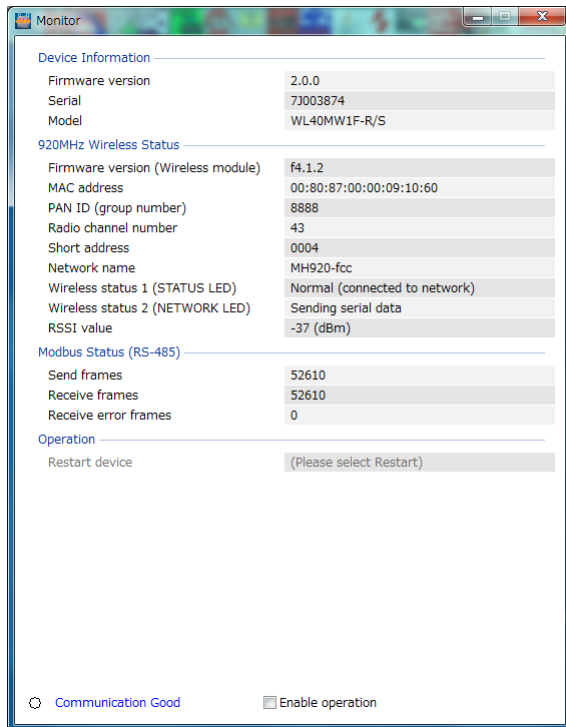
4.1. MONITORING WL40MW1x (x: F / TW / TH / KR / VN)

4.1.1. DEVICE INFORMATION

Shows the firmware version, serial number and model.

4.1.2. 900MHZ WIRELESS STATUS / 920MHZ WIRELESS STATUS

• Firmware version (wireless module)

Shows the firmware version of wireless module.

• MAC address

Shows the MAC address of wireless module.

• PAN ID

Shows the PAN ID currently connected.

• Radio channel number

Shows the radio channel number currently connected.

• Short address

Shows the short address currently used. When downloading after changing the short address, turn off and on the power supply to the device or restart it so that the short address changed becomes available.

• Network name

Shows the network name currently connected.

• Wireless status 1 (STATUS LED)

Shows the wireless status updated every 60 seconds while connected to the network. For other cases, the status is updated every several seconds.

Normal (connected to network)	Normally connected to the network.
Normal (no network connection)	Normal, but not connected to the network.
Radio transmission time exceeded (TH model only)	Radio transmission time has exceeded the limit
Alarm issued	Failure is occurring in the wireless module. If not recovering after resetting, the wireless module might be damaged.

• Wireless status 2 (NETWORK LED)

Shows the wireless status updated per 60 seconds while connected to the network. For other cases, the status is updated per several seconds.

Normal	Connected to the network.
No network connection	Not connected to the network.
Isolation	There is no detour route.
Authentication error	Network authentication failure.
Sending serial data	Sending serial data with network connection.

• RSSI value

Shows the received signal strength indication.

4.1.3. MODBUS STATUS (RS-485)

Shows the send and receive status of Modbus (RS-485).

• Send frames

Shows the total number of frames sent to Modbus slaves from the device.
The number is reset by turning off the power supply or restarting the slave.
Numerical value range: 0 – 65535 (the number returns to 0 after 65535)

• Receive frames

Shows the total number of normal receive frames from Modbus slaves.
The number is reset by turning off the power supply or restarting the slave.
Numerical value range: 0 – 65535 (the number returns to 0 after 65535)

• Receive error frames

Shows the total number of receive error frames and receive timeouts.
The number is reset by turning off the power supply or restarting the slave.
Numerical value range: 0 – 65535 (the number returns to 0 after 65535)

4.1.4. OPERATION

For WL40MW1F, the following operation can be performed. To enable the operation, check [Enable operation] check box at the bottom of the window. The greyed out field becomes enabled.

• Restart device

Enables to restart the device. Restart in boot mode is used only in updating the firmware.

Note: When you restarted the device in boot mode by mistake, wait for about one minute or turn off and on the power supply. Then restart it in normal mode.

4.2. MONITORING WL40W1F-DAC4A

4.2.1. DEVICE INFORMATION

Shows the firmware version, serial number and model.

4.2.2. 900MHZ WIRELESS STATUS

Shows various statuses of wireless module. Refer to "4.1.2. 900MHZ WIRELESS STATUS / 920MHZ WIRELESS STATUS".

4.2.3. DIGITAL I/O MONITOR

You can monitor the statuses of Di 1, 2 and Do 1, 2.

4.2.4. OPERATION

For WL40W1F-DAC4A, the following operation can be performed. To enable the operation, check [Enable operation] check box at the bottom of the window. The greyed out field becomes enabled.

• Output 1, 2

ON/OFF setting can be configured for digital output.

Note: When "Output status at time of 920Run communication disconnect" is set to "Clear" (OFF), digital output is affected and OFF during 920Run timeout. If you want to enable this ON/OFF setting, change "Clear" to "Hold".

• Restart device

Refer to "Restart device" in "4.1.4. OPERATION".

4.3. MONITORING WL40W1F-DS2

4.3.1. DEVICE INFORMATION

Shows the firmware version, serial number and model.

4.3.2. 900MHZ WIRELESS STATUS

Shows various statuses of wireless module. Refer to "4.1.2. 900MHZ WIRELESS STATUS / 920MHZ WIRELESS STATUS".

4.3.3. ANALOG INPUT MONITOR

You can monitor the analog input values and statuses (input range error) of Ai 1, 2.

4.3.4. OPERATION

For WL40W1F-DS2, the following operation can be performed. To enable the operation, check [Enable operation] check box at the bottom of the window. The greyed out field becomes enabled.

• Restart device

Refer to "Restart device" in "4.1.4. OPERATION".