Wonderware Operations Integration – Supervisory Omron OMRONFINS Server (G-1.2 Series)

Schneider Electric

Contents

Wonderware Operations Integration - Supervisory Omron OMRONFINS Server (G-1.2 Series)

This document describes the technical specifications and configuration options for the Wonderware® Operations Integration - Supervisory Omron OMRONFINS Server (or OMRONFINS OI Server, for short).

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Legal Information

Schneider Electric Software, LLC
26561 Rancho Parkway South
Lake Forest, CA 92630 U.S.A.
(949) 727-3200

http://software.invensys.com/

For comments or suggestions about the product documentation, send an e-mail message to ProductDocumentationComments@schneider-electric.com.

Technical Support

Wonderware Technical Support offers a variety of support options to answer any questions on Wonderware products and their implementation.

Before you contact Technical Support, refer to the relevant section(s) in this documentation for a possible solution to the problem. If you need to contact technical support for help, have the following information ready:

- The type and version of the operating system you are using.
- Details of how to recreate the problem.
- The exact wording of the error messages you saw.
- Any relevant output listing from the Log Viewer or any other diagnostic applications.
- Details of what you did to try to solve the problem(s) and your results.
- If known, the Wonderware Technical Support case number assigned to your problem, if this is an ongoing problem.

Introduction to the OMRONFINS OI Server

These are the technical specifications for Wonderware Operations Integration - Supervisory Omron OMRONFINS Server.

Requirements

OMRONFINS OI Server requires Wonderware Operations Integration – Core G-1.2 or later.

Supported hardware and software

This OI Server connects to Omron PLCs on a FINS network, which includes the following devices:

- CS1, CJ1, CJ2, and CP1 series using CS1 mode;
- CV, CVM1, and CVM1D series using CV mode;
- Any other device that is FINS compatible.

For Ethernet communication, CS1 PLCs can use either the FINS – UDP (Ethernet) protocol or the RS-232 protocol. (The specific protocol can be selected in the communication settings.) .

For serial communication, CS1 PLCs use a FINS – Hostlink.

To program CS1 PLCs, you need the CX-Programmer programming software. For more information, go to: http://industrial.omron.eu/en/products/catalogue/automation_systems/software/configuration/cx-one/cx-programmer.html

> **Note:** Unsolicited messaging is not supported by this OI Server. In other words, this OI Server cannot receive unsolicited messages that are sent by Omron PLCs.

Conformance

The following hardware and software was used for conformance testing of this OI Server.

Configuration :

- Device: SYSMAC CJ1M (CPU12)
- Module Port: 10Base-T Ethernet
- Module IP Address: 10.13.63.89

Configuring the OMRONFINS OI Server

Each server instance has its own hierarchy of objects, and each object has parameters that you need to configure in order to establish communication between the OI Server and individual devices on the network.

You can view a OMRONFINS server instance's configuration hierarchy under its **Configuration** node.

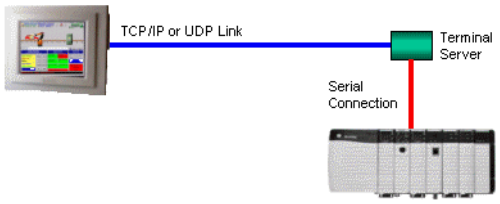
This section only describes how to configure object parameters for a OMRONFINS server instance. For more general information about adding and configuring objects, see "Configuring Your OI Server" in the *Operations Integration Server Manager Help*.

Direct Serial Communication and Serial Encapsulation

This OI Server supports direct serial communication with the target device, as well as serial encapsulation over a TCP/IP or UDP/IP network link.

Direct serial communication requires that the target device be directly connected to the computer that is running this OI Server. If you plan to use direct serial communication, you need to know the serial communication settings (e.g., baud rate, parity, etc.) that have been configured on the device, because you must configure this OI Server to match those settings.

Serial encapsulation enables serial communication with a target device that is connected to a terminal server on your TCP/IP or UDP/IP network. The terminal server is like a virtual serial port: it converts TCP or UDP messages to serial data and then relays them to the connected device. If you plan to use serial encapsulation, the target device should already be connected to the terminal server, and you need to know the IP address of the terminal server and the port number assigned to the device.



Serial encapsulation over a TCP/IP or UDP/IP link

All of the serial communication settings are included in the OI Server's channel parameters.

To configure the serial communication settings for a channel:

1. In the Operations Integration Server Manager, navigate to the ChannelSelector object that you want to configure:
   a) Expand the **Operations Integration Server Manager**, expand the node group, expand **Local** (or the remote computer name), and then expand **Operations Integration Supervisory Servers**.
   b) Locate and expand **Omron - OMRONFINS**, and then expand its **Configuration** node.
   c) Select the ChannelSelector object that you want to configure.

   The channel parameters are displayed in the details pane on the right.
2. In the **Serial Encapsulation** box, select the encapsulation mode:

Option	Description
None	Direct serial communication with the device.
TCP/IP	Serial encapsulation over a TCP/IP Ethernet connection.
UDP/IP	Serial encapsulation over a UPD/IP Ethernet connection.

3. If you selected **None** above, configure the direct serial communication settings:
   a) In the **COM** box, select the COM port to which the target device is connected.

b) In the **Baud Rate**, **Data Bits**, **Stop Bits**, and **Parity** boxes, configure the serial communication settings to match the settings that have already been configured on the target device.

4. If you selected either **TCP/IP** or **UDP/IP** above, configure the serial encapsulation settings:
   a) In the **IP Address** box, type the IP address of the terminal server.
   b) In the **Port Number** box, type the port number on the terminal server that has been assigned to the target device.
   c) If you want to make the target device responsible for establishing communication with this OI Server, select **Server Mode**.

> **Note:** This option is not available for UDP/IP.

5. Proceed with configuring the rest of the channel parameters, as described in this documentation.

Configuring a Channel's Communication Settings

Configure the communication settings for a selected channel to ensure uninterrupted communication with the device network.

Connection

The specific transport protocol to be used. Select one of the following options:

Option	Description
UDP	UDP/IP Ethernet network
Serial	Direct serial communication

If you select **Serial**, you must also configure the serial communication settings above.

Mode

The FINS compatibility mode, which determines the types of Omron devices that the OI Server can communicate with. Select one of the following options:

Option	Description
CS1	CS1, CJ1, CJ2, CP1 series
CV	CV, CVM1, CVM1D series

Ignore Non Fatal PLC Error

The error mode, determines whether to ignore non-fatal errors on devices. Select one of the following options:

Option	Description
No	When a non-fatal error happens on a device, the channel shows status code 64 and all device items are set to BAD quality.
Yes	When a non-fatal error happens on a device, the channel shows status code 0 (no errors) and sends a warning message to the log. All the device items stay at GOOD quality.

Advanced

Click this button to open the *Advanced Settings* dialog box, which provides access to additional communication settings such as timeouts, retries, and buffer sizes. You might need to change these settings if the OI Server behaves unexpectedly during run time, but the default settings should work for most network configurations. For more information about these settings, see "Advanced Settings" in *OI Server Manager Help*.

Setting a Device's Station ID

Set the station ID for a selected device so that the OI Server can identify and communicate with it on the network.

Syntax

For Ethernet communication, the device's station ID must use the following syntax:

```
[IP address]:[port number]:<subnet>:<node>:[unit ID]:[mode]
```

For serial communication, the device's station ID must use the following syntax:

```
<subnet>:<node>:[unit ID]
```

The following syntax diagram shows all of the possible options:
{ | *IP address*:*port number*: } *subnet*:*node* { | :*unit ID* { | : { CS1 | CV } } }

IP address

The IP address of the device on your UDP/IP Ethernet network.

port number

The port number used by the FINS protocol on the device. It is typically 9600, but it can be changed in the device settings.

subnet

The FINS subnet (0–127) to which the device belongs.

node

The device's node number (1–128) on the specified FINS subnet.

unit ID

The ID number used for PC interface, as configured in the PLC program.

This parameter is optional; if no value is specified, the default value is 0.

> **Note:** This is not the Unit ID that is configured in the device's hardware settings.

mode

The FINS compatibility mode, which can be one of the following:

Option	Description
CS1	CS1, CJ1, CJ2, CP1 series
CV	CV, CVM1, CVM1D series

When you specify a mode for a single device, it overrides the global **Mode** setting that you previously configured in the channel's communication settings.

This parameter is optional; if no value is specified, the global setting is used by default.

Notes

This OI Server does not support simultaneous connections when communicating with devices that use either the old Ethernet communication modules (e.g., CS1W-ETN01, CS1W-ETN11, CJ1W-ETN11) or the new Ethernet communication modules that have "ETN11-compatible mode" enabled (e.g., CS1W-ETN21, CJ1W-ETN21). To work around this limitation, configure each device to use a different port number for the FINS protocol (e.g., 9600, 9601), and then when you specify the station ID for each device, include the complete IP address and port number (e.g., 192.168.1.10:9600, 192.168.1.20:9601).

This OI Server should support simultaneous connections when communicating with devices that use only the new Ethernet communication modules that are able to send responses to the source, even if the port number used by the FINS protocol on the source is different from port numbers used by the FINS protocol on the target devices. However, you must make sure those modules do not have "ETN11-compatible mode" enabled.

Examples

Examples of valid station IDs:

```
192.168.2.4:9600:1:2:1:C
```

```
0:1:0
```

OMRONFINS OI Server Reference

Use item references to access data stored in memory registers in connected devices, as well as to access standard system items in the OI Server itself.

This section only describes the item reference syntax and options for the OMRONFINS server. For more general information about item references, see "Managing Device Items" and "Item Reference Descriptions" in the *Operations Integration Server Manager Help*.

Item Reference Syntax

Item references in this OI Server use the following syntax.

For all multi-byte memory registers, use the following syntax:

<register type><address>@[data type]

<register type><address>[data suffix]

For bit-accessible memory registers — i.e., all types except PVC and PVT — use the following syntax:

<register type><address>:<bit>

<register type><address>.<bit>

For strings, use the following syntax:

<register type><starting address>-<register type><ending address>C

The following syntax diagram shows all of the possible options:
{ { CIO | A | H | W | D | EM*area* }*address (or starting address)*{ { @Short | S } | { @BCD | B } | { @Long | L } | @DWord | { @LBCD | M } | { @Float | F } | { : | . }*bit* | -{ CIO | A | H | W | D | EM*area* }*ending address*C } | { PVC | PVT }*address (or starting address)*{ { @Short | S } | { | @Word | U } | { @BCD | B } | -{ PVC | PVT }*ending address*C } }

register type

The register type or memory area. For extended data memory (EM), the available areas include A through M.

address

The specific memory address on the device.

data type / data suffix

The formatted data type of the value read from the device memory.

This parameter is optional; if the data type is not specified, the value will be formatted as Word (i.e., unsigned,16-bit decimal) by default.

bit

The specific bit number in the memory address. Bit 0 is the low bit. Bit 15 is the high bit.

starting address, ending address

The starting and ending addresses of a string. Strings are stored as ASCII data. Each two-byte register contains two characters, and the string length can be from 1 to 40 registers (i.e., 2 to 80 characters).

Address Descriptions

The address descriptions consist of the register type, its item name and the allowable range of values, the default data type, allowable suffixes (if any), and allowable access methods.

Register Type	Item Reference		Length	Data Types	Access
	Item Name	Address Range			
CIO	CIO	0000 to 6143	2 Bytes	Short, BCD	Read/Write
		0000 to 6142	4 Bytes	Long, DWord, LBCD, Float	Read/Write
		0000.00 to 6143.15	1 Bit	Boolean	Read/Write
Auxiliary Relay	A or AR	000 to 447	2 Bytes	Short, BCD	Read only
		448 to 959	2 Bytes	Short, BCD	Read/Write
		000 to 446	4 Bytes	Long, DWord, LBCD, Float	Read only
		448 to 958	4 Bytes	Long, DWord, LBCD, Float	Read/Write
		000.00 to 447.15	1 Bit	Boolean	Read only
		448.00 to 959.15	1 Bit	Boolean	Read/Write
Holding Relay	H or HR	000 to 511	2 Bytes	Short, BCD	Read/Write
		000 to 510	4 Bytes	Long, DWord, LBCD, Float	Read/Write
		000.00 to 511.15	1 Bit	Boolean	Read/Write
Working Relay	W	000 to 511	2 Bytes	Short, BCD	Read/Write
		000 to 510	4 Bytes	Long, DWord, LBCD, Float	Read/Write
		000.00 to 511.15	1 Bit	Boolean	Read/Write
Data Memory	D or DM	0000 to 32767	2 Bytes	Short, BCD	Read/Write
		0000 to 32766	4 Bytes	Long, DWord, LBCD, Float	Read/Write
		0000.00 to 32767.15	1 Bit	Boolean	Read/Write
Expansion Data Memory	EM	A0000 to M32767	2 Bytes	Short, BCD	Read/Write
		A0000 to M32766	4 Bytes	Long, DWord, LBCD, Float	Read/Write
		A0000.00 to M32767.15	1 Bit	Boolean	Read/Write
Present Value Counter	PVC	0000 to 4095	2 Bytes	Short, Word, BCD	Read/Write
Present Value Timer	PVT	0000 to 4095	2 Bytes	Short, Word, BCD	Read/Write

Notes

Supported Data Types

The data type is specified as a suffix in the item syntax. This OI Server supports the following data types.

Data Type	Suffix	Description	Range of Values
Boolean	by bit	Single bit.	0 or 1

Data Type	Suffix	Description	Range of Values
Short	@Short, S	Signed, 16-bit decimal. Bit 0 is the low bit. Bit 14 is the high bit. Bit 15 is the sign bit.	-32768 to 32767
Word	@Word, U	Unsigned, 16-bit decimal. Bit 0 is the low bit. Bit 15 is the high bit.	0 to 65535
Long	@Long, L	Signed, 32-bit decimal. Bit 0 is the low bit. Bit 30 is the high bit. Bit 31 is the sign bit.	-2147483648 to 2147483647
DWord	@DWord	Unsigned, 32-bit decimal. Bit 0 is the low bit. Bit 31 is the high bit.	0 to 4294967295
Float	@Float, F	32-bit real number.	N/A
BCD	@BCD, B	Two-byte packed BCD. Value range is 0–9999. Behavior is undefined for values beyond this range.	0 to 9999
LBCD	@LBCD, M	Four-byte packed BCD. Value range is 0–99999999. Behavior is undefined for values beyond this range.	0 to 99999999
String	C	Null terminated ASCII string.	2 to 80 characters per string

Notes

Examples of Item References

These are examples of valid item references for this OI Server. For more information about the referenced addresses, see the manufacturer's documentation for your device.

Register Type	Address on the Device	Item Reference
CIO	CIO5000 as Short	CIO5000@Short
		CIO5000S
	CIO5000 as BCD	CIO5000@BCD
		CIO5000B
	CIO5000 as Long	CIO5000@Long
		CIO5000L
	CIO5000 as DWord	CIO5000@DWord
	CIO5000 as LBCD	CIO5000@LBCD
		CIO5000M
	CIO5000 as Float	CIO5000@Float
		CIO5000F
	CIO5000 as Bit	CIO5000.00
	CIO5000 as String (length of 8 chars)	CIO5000-CIO5003C
Auxiliary Relay	A000 as Short	A000@Short
		A000S
	A000 as BCD	A000@BCD
		A000B
	A000 as Long	A000@Long
		A000L
	A000 as DWord	A000@DWord
	A000 as LBCD	A000@LBCD

Register Type	Address on the Device	Item Reference
		A000M
	A000 as Float	A000@Float
		A000F
	A000 as Bit	A000.00
	A000 as String (length of 8 chars)	A000-A003C
Holding Relay	H023 as Short	H23@Short
		H23S
	H023 as BCD	H23@BCD
		H23B
	H023 as Long	H23@Long
		H23L
	H023 as DWord	H23@DWord
	H023 as LBCD	H23@LBCD
		H23M
	H023 as Float	H23@Float
		H23F
	H023 as Bit	H23.00
	H023 as String (length of 8 chars)	H23-H26C
Working Relay	W500 as Short	W500@Short
		W500S
	W500 as BCD	W500@BCD
		W500B
	W500 as Long	W500@Long
		W500L
	W500 as DWord	W500@DWord
	W500 as LBCD	W500@LBCD
		W500M
	W500 as Float	W500@Float
		W500F
	W500 as Bit	W500.00
	W500 as String (length of 8 chars)	W500-W503C
Data Memory	D00102 as Short	D102@Short
		D102S
	D00102 as BCD	D102@BCD
		D102B
	D00102 as Long	D102@Long
		D102L
	D00102 as DWord	D102@DWord
	D00102 as LBCD	D102@LBCD

Register Type	Address on the Device	Item Reference
		D102M
	D00102 as Float	D102@Float
		D102F
	D00102 as Bit	D102.00
	D00102 as String (length of 8 chars)	D102-D105C
Expansion Data Memory	EMA00200 as Short	EMA00200@Short
		EMA00200S
	EMA00200 as BCD	EMA00200@BCD
		EMA00200B
	EMA00200 as Long	EMA00200@Long
		EMA00200L
	EMA00200 as DWord	EMA00200@DWord
	EMA00200 as LBCD	EMA00200@LBCD
		EMA00200M
	EMA00200 as Float	EMA00200@Float
		EMA00200F
	EMA00200 as Bit	EMA00200.00
	EMA00200 as String (length of 8 chars)	EMA00200-EMA00203C
Present Value Counter	PVC100 as Short	PVC100@Short
		PVC100S
	PVC100 as Word	PVC100
		PVC100@Word
		PVC100U
	PVC100 as BCD	PVC100@BCD
		PVC100B
	PVC100 as String (length of 8 chars)	PVC100-PVC103C
Present Value Timer	PVT123 as Short	PVT123@Short
		PVT123S
	PVT123 as Word	PVT123
		PVT123@Word
		PVT123U
	PVT123 as BCD	PVT123@BCD
		PVT123B
	PVT123 as String (length of 8 chars)	PVT123-PVT126C

OMRONFINS OI Server Error Codes

The following tables describe the additional error codes that you might receive when poll/poke requests and operations fail.

Code	Description	Possible Causes	Solution
0	OK	Communication without problems.	Not applicable.
1	Invalid Unit	Unit number in the address field exceeds 31.	Fix the unit number, for serial connection the unit cannot exceed 31.
2	Fail to allocate memory	The driver could not allocate memory.	• Check the buffer configuration in the communication settings and try to reduce the size. • Increase the amount of RAM memory available on your PC or HMI.
3	Invalid Answer	The answer received from the PLC has less bytes than expected.	This error should never happen unless the OI Server is connected to an unsupported device.
4	RX Buffer Overflow	The number of bytes sent by the PLC exceeds the configured buffer size.	Increase the buffer size in the communication settings.
5	Invalid Message Size	The answer sent by the PLC does not have the expected size.	This error should never happen unless the driver is connected to an unsupported device.
33281	Invalid Subnet	The subnet configured in the Station field is invalid.	Check if the subnet configured in the station is correct and that the subnet is properly configured in the PLC routing table.
-34	Invalid Address	Invalid address specified in Address field	Specify a valid address.
-38	Invalid Station	Invalid station specified in Station field.	Specify a valid station number.
-15	Timeout waiting to start a message.	• Disconnected cables. • PLC is turned off, or it is in Stop or Error mode. • Incorrect station number. • Incorrect RTS/CTS control settings.	• Check the cable wiring. • Check the PLC state. It must be in Run mode. • Check the station number. • Check the RTS/CTS control settings in thechannel settings.
-17	Timeout between rx char.Invalid Block Size	• PLC in Stop or Error mode. • Incorrect station number. • Incorrect parity. • Incorrect RTS/CTS control settings.	• Check the cable wiring. • Check the PLC state. It must be in Run mode. • Check the station number. • Check the RTS/CTS control settings in thechannel settings.

Code	Description	Possible Causes	Solution
0	OK	Communicating without error.	None required.
-15	Timeout waiting for message to start	• Disconnected cables. • PLC is turned off, in stop mode, or in error mode. • Wrong station number. • Wrong parity (for serial communication). • Wrong RTS/CTS configuration (for serial communication).	• Check cable wiring. • Check the PLC mode — it must be RUN. • Check the station number. • Increase the timeout in the driver's advanced settings. • Check the RTS/CTS configuration (for serial communication).