InTouch® Compact Edition FANUC Configuration Guide

Invensys Systems, Inc.

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Welcome

This guide shows you how to configure the FANUC Driver for InTouch Compact Edition.

This guide assumes you know how to use Microsoft Windows, including navigating menus, moving between applications and moving objects on the screen. If you need help with these tasks, see the Microsoft online help.

You can view this document online or you can print it, in part or entirely, by using the print feature in Adobe Acrobat Reader.

Documentation Conventions

This documentation uses the following conventions:

Convention	Used for
Initial Capitals	Paths and file names.
Bold	Menus, commands, dialog box names, and dialog box options.
`Monospace`	Code samples and display text.

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.

Chapter 1

About the FANUC Driver

This section explains the concepts of the FANUC driver and identifies all hardware and software components required to implement communication between InTouch Compact Edition and compatible PLCs.

About FANUC Driver

You can use the FANUC driver to establish communications between InTouch Compact Edition applications and the GE FANUC Series 90 PLCs with a direct serial port.

Device Specifications

The FANUC Driver supports any GE FANUC Series 90 PLC that is connected to the Compact Panel device using a serial connection over the PLC's SNP port.

Network Specifications

To communicate with the PLC, the Wonderware Compact Panel device must have a serial RS-232 or RS-485 connection to the PLC's SNP port.

Chapter 2

Configuring the FANUC Driver

This section explains how to configure the FANUC Driver by completing the following tasks:

- Select the PLC driver
- Configure the connection type
- Configure other PLC-specific settings
- Configure advanced settings
- Associate an InTouch Access Name with the configured driver

You configure the FANUC Driver from the **Driver Configuration** dialog box. In a managed InTouch compact application, you access this dialog box from the WindowMaker **Special**, **InTouch Compact Edition Application**, **IO Driver Configuration** menu.

For more information about configuring connection settings, see the documentation of your PLC hardware manufacturer.

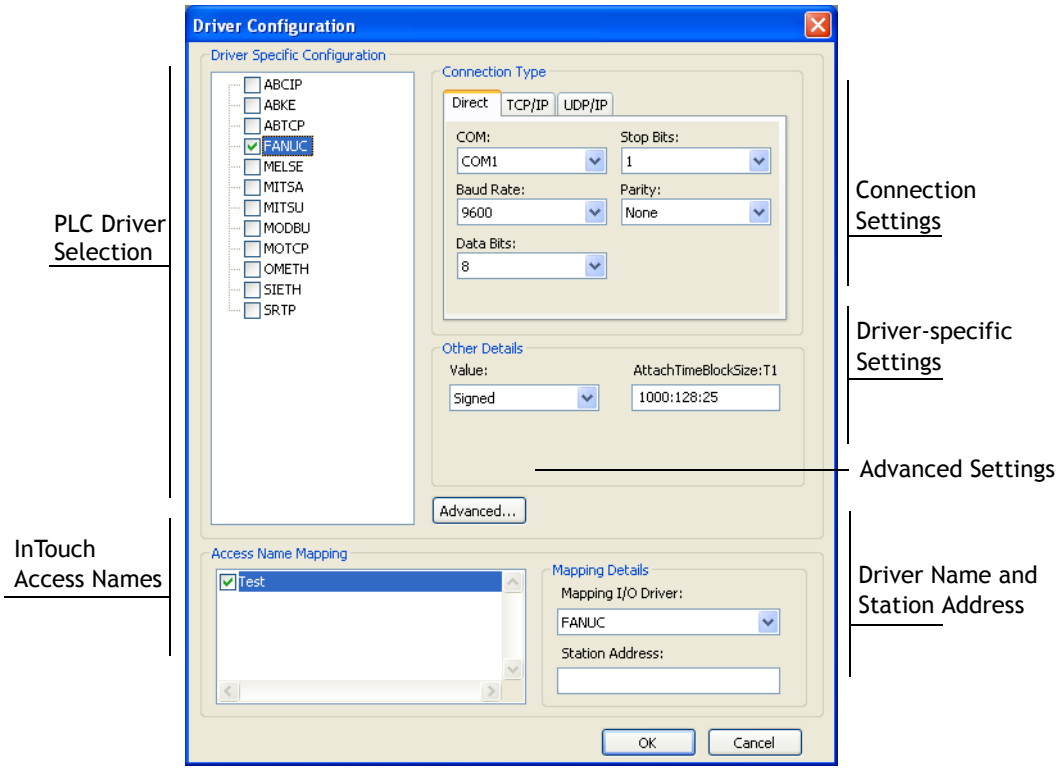
Note For each driver, you can configure only one set of driver parameters.

Selecting the PLC Driver

Before you configure the PLC driver, you need to select it in the **Driver Configuration** dialog box. You can use the Driver Configuration dialog box to configure more than one PLC driver.All selected PLC drivers can be associated with InTouch Access Names.

To select the PLC driver

1 In WindowMaker on the **Special** menu, point to **InTouch Compact Edition Application,** and then click **IO Driver Configuration**. The **Driver Configuration** dialog box appears.



2 From the list shown in the left pane, select the check box next to the PLC driver you want to configure.

The selected PLC driver appears in the **Mapping I/O Driver** list in the **Mapping Details** area of the **Driver Configuration** dialog box. You can associate it with an InTouch Access Name. For more information, refer to Associating a PLC Driver with an Access Name on page 25

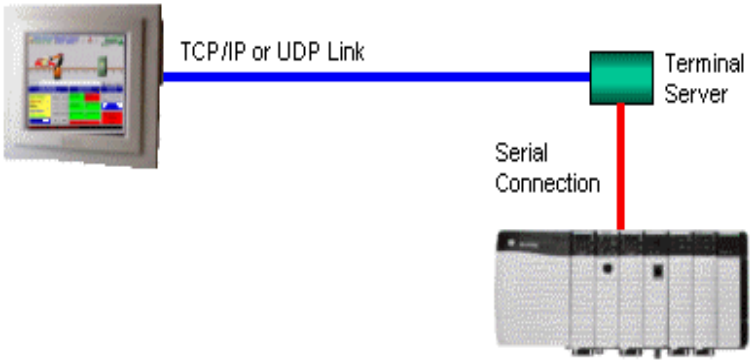
You can now configure the connection settings, advanced settings, and other PLC-specific settings on the right side of the panel.

Configuring the Connection Type

You need to configure the connection type that the Wonderware Compact Panel uses to communicate with a PLC.

The serial driver allows the use of TCP/IP or UDP/IP encapsulation. The encapsulation mode provides communication with serial devices connected to terminal servers on Ethernet or wireless networks. A terminal server converts TCP/IP or UDP/IP messages on Ethernet or wireless networks to serial data. After the message is converted to a serial form, you can connect standard devices that support serial communications to the terminal server.

The following diagram provides an example of this solution.



Note See the manufacturer documentation to configure gateway for TCP/IP and UDP/IP mode.

You can configure the following connection types:

- Direct serial
- TCP/IP
- UDP/IP

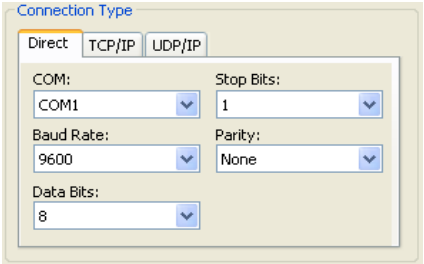
Configuring a Serial Connection

If the panel is directly connected to the PLC, you configure a serial connection using the following settings:

- **COM Port**
- **Stop Bits**
- **Baud Rate**
- **Parity**
- **Data Bits**

To configure a serial connection

1. In the **Driver Configuration** dialog box, select the driver you want to configure.
2. In the **Connection Type** area, click the **Direct** tab.



Note Depending on the PLC driver you select, one or more of these settings might be disabled.

3. Assign values to the following settings:
   - In the **COM** list, select the serial communication port.
   - In the **Stop Bits** list, select the number of stop bits.
   - In the **Baud Rate** list, select the communication speed.
   - In the **Parity** list, select the parity.
   - In the **Data Bits** list, select the number of bits per character or code word.

If you are using a Data Communication Equipment (DCE) converter (for example RS-232/485) between the Wonderware Compact Panel device and the PLC, you must also adjust the Control RTS (Request to Send) setting accordingly. See Configuring Hand Shake Settings on page 19.

Configuring a TCP/IP Connection

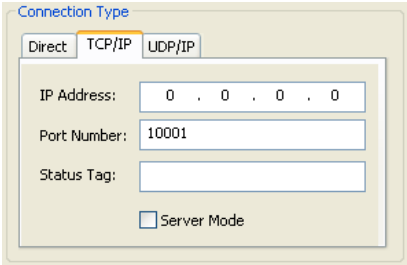
If the panel uses a TCP/IP connection to communicate with the PLC, you need to configure the following TCP/IP settings:

- **IP Address**
- **Port Number**
- **Status Tag**
- **Server Mode**

Note When **Server mode** is enabled, the driver listens to the TCP/IP port specified instead of trying to establish a connection (the driver is a TCP/IP server). The remote PLC/Device is responsible for connecting to the Wonderware Compact Panel. After TCP/IP connection has been made, all the data is sent through it. When **Server Mode** is enabled, the IP Address field is not used because the driver does not try to connect with the PLC.

To configure a TCP/IP connection

1. In the **Driver Configuration** dialog box, select the driver you want to configure.
2. In the **Connection Type** area, click the **TCP/IP** tab.



Note Depending on the PLC driver you select, one or more of these settings might be disabled.

3. Configure the following settings:
   - In the **IP Address** box, type the IP address of the terminal server that is used to support serial connection.
   - In the **TCP Port Number** box, type the port number assigned to the terminal server that is used to support serial connection.
   - In the **Status Tag** box, type the name of an InTouch discrete tag. The tag value is set to True if the TCP/IP connection is established, otherwise False.
   - Select **Server Mode**, if the remote PLC is responsible for connecting to the Wonderware Compact Panel.

Configuring a UDP/IP Connection

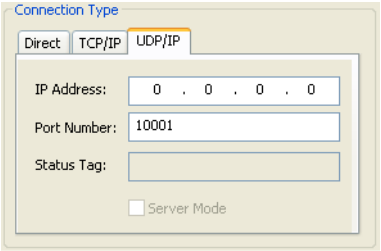
If the panel uses a UDP/IP connection to communicate with the PLC, you need to configure UDP/IP settings. You can configure the following settings:

- **IP Address**
- **Port Number**

To configure a UDP/IP connection

1. In the **Driver Configuration** dialog box, select the driver you want to configure.

2 In the **Connection Type** area, click the **UDP/IP** tab.



Note Depending on the PLC driver you select, one or more of these settings might be disabled.

3 Configure the following settings:
- In the **IP Address** box, type the IP address of the terminal server that supports serial connection.
- In the **UDP Port Number** box, type the port number assigned to the terminal server that supports serial connection.

4 Click **OK**.

Configuring PLC-specific Settings

This section shows how to configure settings that are specific to the FANUC Driver. You configure these settings in the **Other Details** area in the **Driver Configuration** dialog box.

The following table lists the settings specific to the FANUC Driver:

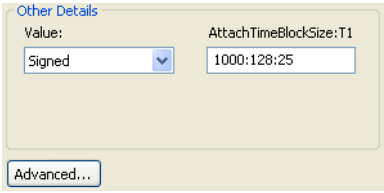
Setting	Purpose
Value	Click **Signed** to allow negative integer values. When you select signed, the range for two-byte integer values is -32768 to 32767, and the range for four-byte values is -2147483648 to 2147483647. Click **Unsigned** to disable negative integer values. When you select unsigned, the range for two-byte integer values is 0 to 65535, and the range for four-byte values is 0 to 4294967295.

Setting	Purpose
AttachTimeBlockSize:T1	Enter the **Attach Time**, **Block Size** and **T1** period, separated by colons. • The **Attach Time** is the time in milliseconds after which the driver sends an "attach" message to the PLC device if no other communication occurs. Valid values are 0 to 999,999 ms. Values lower than 1000 ms may decrease performance. • The **Block Size** is the maximum number of operands. Valid values are 128 to 512. For values greater than 128, change the size of the Tx and Rx buffers to twice the block size. See Configuring Buffer Length Settings on page 20. • The **T1** period is the amount of time in milliseconds that must elapse between the reception of the last character of one message and the transmission of the first character of the next message. It is the minimum amount of time the sending device must wait before transmitting either a message or an acknowledgement.

Note For more information about configuring FANUC Driver-specific settings, see the documentation of your PLC hardware manufacturer.

To configure the FANUC-specific settings

1. In the **Driver Configuration** dialog box, select the FANUC Driver.



2. In the **Other Details** area, assign values to the following settings:
   - **Value**
   - **AttachTimeBlockSize:T1**
3. Click **OK**.

Configuring Advanced Settings For Serial Connection

This section shows how to configure advanced settings for the FANUC Driver using a serial connection. You can configure the following settings:

- Time-out settings
- Protocol retry setting
- Hand Shake settings
- Buffer Length settings
- Setting DTR and IR

Depending on the PLC driver you select, one or more of these settings might be disabled

Note For more information about configuring advanced settings, see the documentation of your PLC hardware manufacturer.

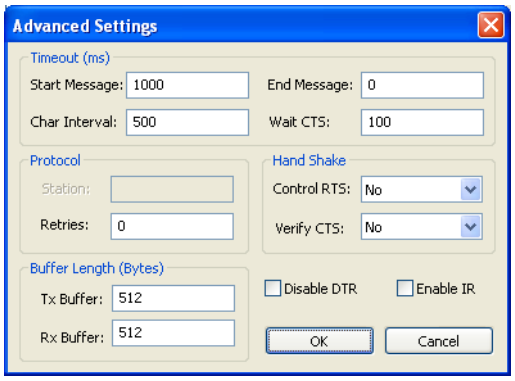
Configuring Time-out Settings

You can configure the following time-out settings:

- Start Message
- End Message
- Interval between characters
- Clear to Send wait

To configure time-out settings

1. In the **Driver Specific Configuration** dialog box, select the driver you want to configure.
2. Click **Advanced**. The **Advanced Settings** dialog box appears.



3. In the **Timeout** area, assign values to the following settings:
   - **Start Message** - Time-out period in milliseconds for the message to start.
   - **End Message** - Time-out period in milliseconds for the message to end.
   - **Char Interval** - Time-out period in milliseconds between each character.
   - **Wait CTS** - Time-out period in milliseconds for the Clear to Send wait.
4. Click **OK**.

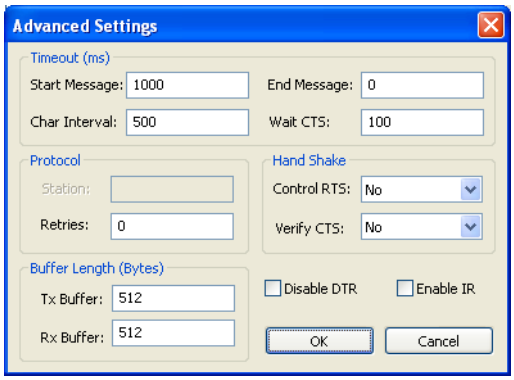
Configuring the Protocol Retry Setting

You can configure the number of attempts to retry a communication command after a previous failure. This setting specifies how many times the driver attempts to execute the same communication command before reporting a communication error.

To configure Protocol retry setting

1. In the **Driver Specific Configuration** dialog box, select the driver you want to configure.

2 Click **Advanced**. The **Advanced Settings** dialog box appears.



3 In the **Protocol** area, enter the number of retry attempts in the **Retries** box.

4 Click **OK**.

Configuring Hand Shake Settings

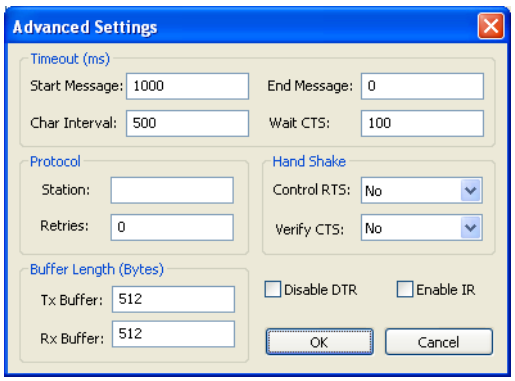
You can configure the following Hand Shake settings:

- Request to Send control
- Clear to Send verification

Hand Shake settings determine how the PLC driver communicates with the PLC over a communication channel after the physical establishment of the channel and before the normal information transfer.

To configure Hand Shake settings

1. In the **Driver Specific Configuration** dialog box, select the driver you want to configure.
2. Click **Advanced**. The **Advanced Settings** dialog box appears.



3. In the **Hand Shake** area, assign values to the following settings:
   - **Control RTS** - Specify whether to use the Request to Send control.The following options are available:

     No: Do not set the RTS (Request to Send) Hand Shake signal. Important: If you are using Windows 95/98 or Windows CE with the correct RS232/RS485 adapter (i.e. without RTS control), then you must select this option.

     Yes: Set the RTS (Request to Send) Hand Shake signal before communication. Important: If you are using Windows NT and the Cutler-Hammer RS232/RS485 adapter, then you must select this option.

     Yes+echo: Set the RTS (Request to Send) Hand Shake signal before communication, and echo the signal received from the target device.

     The default value is No.

- **Verify CTS** - Specify whether to use the Clear to Send type of verification.

  The default value is No.

4 Click **OK**.

Configuring Buffer Length Settings

You can configure the following Buffer Length settings:

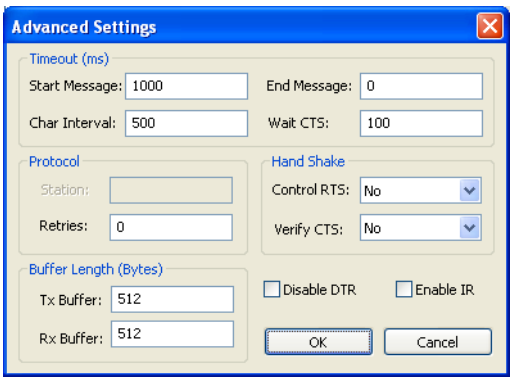
- Transmission Buffer (Tx) Length
- Reception Buffer (Rx) Length

The Buffer Length settings determine the number of bytes allocated from memory as a temporary buffer. The driver stores data in the temporary buffer while communicating with the PLC.

To configure Buffer Length settings

1 In the **Driver Specific Configuration** dialog box, select the driver you want to configure.

2 Click **Advanced**. The **Advanced Settings** dialog box appears.



3 In the **Buffer Length (Bytes)** area, assign values to the following settings:

- **Tx Buffer** - Transmission buffer size in bytes.
- **Rx Buffer** - Reception buffer size in bytes.

4 Click **OK**.

Disabling and Enabling DTR and IR Settings

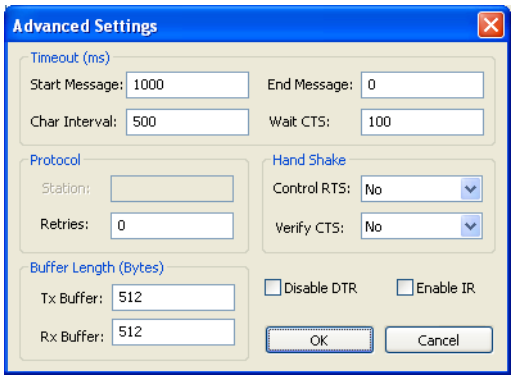
You can enable or disable the DTR and IR settings.

Setting DTR (Data Terminal Ready) means that the panel sends an additional signal to the PLC to indicate that the panel is ready to receive data.

Setting IR means that an infrared interface is used instead of a standard serial port to communicate with the device.

To enable or disable DTR and IR Settings

1. In the **Driver Specific Configuration** dialog box, select the driver you want to configure.
2. Click **Advanced**. The **Advanced Settings** dialog box appears.



3. Assign values to the following settings:
   - Select or clear the **Disable DTR** check box.
   - Select or clear the **Enable IR** check box.
4. Click **OK**.

Configuring Advanced Settings For TCP/ IP or UDP/IP Connection

This section shows you how to configure advanced settings for the FANUC Driver using TCP/IP or UDP/IP connection. You can configure the following:

- Time-out settings
- Protocol Retry setting
- Buffer Length settings

Note Depending on the PLC driver you select, one or more of these settings might be disabled

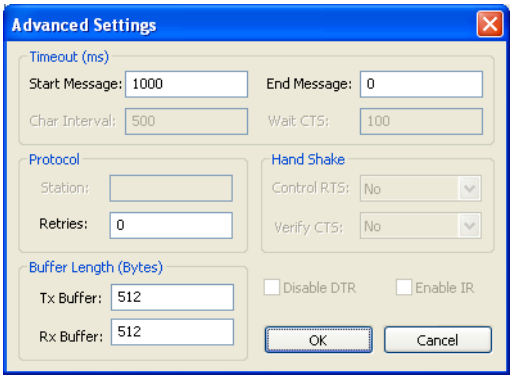
Configuring Time-out Settings

You can configure the following time-out settings:

- Start Message
- End Message

To configure time-out settings

1. In the **Driver Specific Configuration** dialog box, select the driver you want to configure.
2. Click **Advanced**. The **Advanced Settings** dialog box appears.



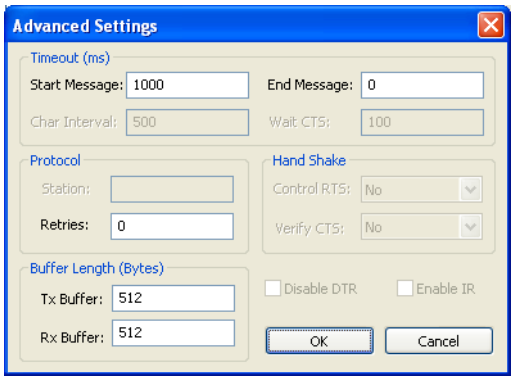
3. In the **Timeout** area, assign values to the following settings:
   - **Start Message** - Time-out period in milliseconds for the message to start.
   - **End Message** - Time-out period in milliseconds for the message to end.
4. Click **OK**.

Configuring Protocol Settings

You can configure the number of attempts to retry a communication command after a previous failure. This setting specifies how many times the driver attempts to execute the same communication command before reporting a communication error.

To configure Protocol retry setting

1. In the **Driver Specific Configuration** dialog box, select the driver you want to configure.
2. Click **Advanced**. The **Advanced Settings** dialog box appears.



3. In the **Protocol** area, enter the number of retry attempts in the **Retries** box.
4. Click **OK**.

Configuring Buffer Length Settings

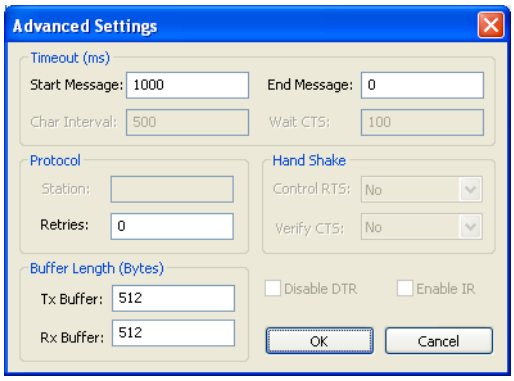
You can configure the following Buffer Length settings:

- Transmission Buffer (Tx) Length
- Reception Buffer (Rx) Length

The Buffer Length settings determine the number of bytes allocated as temporary memory. The driver uses temporary memory to communicate with the PLC.

To configure Buffer Length settings

1. In the **Driver Specific Configuration** dialog box, select the driver you want to configure.
2. Click **Advanced**. The **Advanced Settings** dialog box appears.



3. In the **Buffer Length (bytes)** area, assign values to the following settings:
   - **Tx Buffer** - Transmission buffer size in bytes.
   - **Rx Buffer** - Reception buffer size in bytes.
4. Click **OK**.

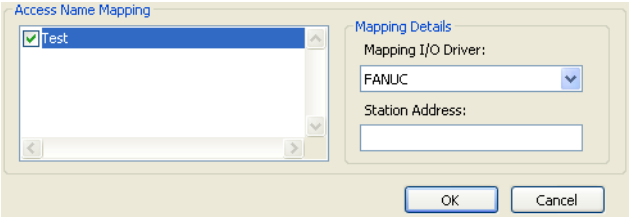
Associating a PLC Driver with an Access Name

After configuring the PLC driver, you need to associate it with an existing InTouch Access Name. For more information about creating an InTouch Access Name, see the *InTouch HMI Data Management Guide*.

When you associate a PLC driver with an Access Name, you need to also specify a Station Address. The Station Address is used by the FANUC driver to specify slave network addresses of PLCs.

To associate an PLC driver with an Access Name

1. Open the **Driver Configuration** dialog box.
2. In the **Access Name Mapping** area, locate the InTouch Access Name you want to associate.



Note If no Access Names appear in the list, you need to define an Access Name in WindowMaker.

3. Select the Access Name you want to associate.
4. In the **Mapping I/O Driver** list, select the configured driver.
5. In the **Station Address** box, type the station address.

   The station in the access name should comply with the following syntax:

   <PLC Address>

   Where,

   - PLC Address: The address of the PLC (SNPIP or CPU ID). The PLC address must be six digits.

Note When you move the mouse pointer over the **Station Address** box, a tooltip shows the required syntax for a station address.

6. Click **OK**.

Chapter 3

Troubleshooting the FANUC Driver

You can detect communication errors between an InTouch Compact Edition application and the PLC by using the following item names:

Item name	Purpose
SysReadStatus	Receives error code for a failed read operation from the PLC
SysWriteStatus	Receives error code for a failed write operation to the PLC
SysReadCompleted	Indicates if the read operation from the PLC completes (TRUE) or not (FALSE)
SysWriteCompleted	Indicates if the write operation to the PLC completes (TRUE) or not (FALSE)

Note You can associate only one InTouch tag with each item name.

To troubleshoot communication problems

1. In WindowMaker, configure a set of I/O tags to associate with the error item names:
   - An I/O discrete tag to point at the item name SysReadCompleted.
   - An I/O discrete tag to point at the item name SysWriteCompleted.

- An I/O integer tag to point at the item name SysReadStatus.
- An I/O integer tag to point at the item name SysWriteStatus.

2. Configure animation display links for the I/O tags, such as:
   - Fill color animations for the I/O tags associated with the SysReadCompleted and SysWriteCompleted items.
   - Analog value display links for the I/O tags associated with the SysReadStatus and SysWriteStatus items.
3. At run time, if a read or write error occurs between the InTouch Compact Edition and the PLC, the fill color animation indicates a problem. The value next to the fill color animation shows the error code.

Find the FANUC error codes in the following table. The table also includes typical problems associated with an error code and possible solutions.

Error Code	Description	Possible Causes	Procedure to Solve
0	OK	Communication without problems	None
1	Invalid/unsupported item name	Item name specified is either invalid or unsupported	Check item names for unsupported or invalid items
2	Invalid/unsupported item name	Item name specified is either invalid or unsupported	Check item names for unsupported or invalid items
3	Invalid block size	Internal error when generating the protocol block sizes	Contact Technical Support and send your published application
4	CheckSum	Protocol error	• Check the serial communication configuration • Verify that the settings on the Communication parameters and the device are the same

Error Code	Description	Possible Causes	Procedure to Solve
5	NACK	Protocol error	• Check the serial communication configuration • Verify that the settings on the communication parameters and the device are the same
6	Frame number	Protocol error	• Check the serial communication configuration • Verify that the settings on the communication parameters and the device are the same
7	Completion	Protocol error	• Check the serial communication configuration • Verify that the settings on the communication parameters and the device are the same
8	CheckSum attach	Protocol error	• Check the serial communication configuration • Verify that the settings on the communication parameters and the device are the same

Error Code	Description	Possible Causes	Procedure to Solve
9	Invalid ID attach	Protocol error	• Check the serial communication configuration • Verify that the settings on the communication parameters and the device are the same
10	Tx buffer empty	Internal error	Contact Technical Support and send your published application
11	Invalid bit operation	Used Bit with and invalid operand	Check item names
12	Rx buffer empty	Internal error	Contact Technical Support and send your published application
13	Rx buffer full	Internal error	Contact Technical Support and send your published application
14	Time out waiting CTS	CTS signal was not received, could not send request	• Check the cable • Check if the communication line is busy
15	Time out waiting to start a message	Response was not received from the device	• Check the cable connection • Make sure that the I/O Server settings match the PLC configuration
16	Time out waiting for message to finish	Started receiving a response but the communication was suspended	• Check the cable connection • Make sure that the I/O Server settings match the PLC configuration
17	Time out between rx char	Response was not received from the device	• Check the cable connection • Make sure that the I/O Server settings match the PLC configuration

Error Code	Description	Possible Causes	Procedure to Solve
18	Time out between tx char	Started receiving a response but the communication was suspended	• Check the cable connection • Make sure that the I/O Server settings match the PLC configuration
19	No carrier detected	Started receiving a response but the communication was suspended	• Check the cable connection • Make sure that the I/O Server settings match the PLC configuration
32	Time out waiting for tx message to finish	Started receiving a response but the communication was suspended	• Check the cable connection • Make sure that the I/O Server settings match the PLC configuration
33	Invalid driver configuration file	Internal error	Please contact Technical Support and send your published application
34	Invalid/unsupported item name	Item name specified is either invalid or unsupported	Check item names for unsupported or invalid items
35	Driver API not initialized	Internal error	Please contact Technical Support and send your published application
36	Invalid/unsupported item name	Item name specified is either invalid or unsupported	Check item names for unsupported or invalid items
37	Invalid/unsupported item name	Item name specified is either invalid or unsupported	Check item names for unsupported or invalid items
38	Invalid station address	Station address specified for this driver is invalid	Check the I/O driver configuration and specify a valid Station Address
39	Invalid block size	Internal error when generating the protocol Block Sizes	Contact Technical Support and send your published application

Error Code	Description	Possible Causes	Procedure to Solve
-15	Time out waiting to start a message	• Disconnected cables • PLC turned off, or in Stop or error mode • Wrong station number • Wrong RTS/CTS control settings	• Check the cable wiring • Check the PLC state It must be in RUN state • Check the station number
-17	Time out between rx and char	• PLC in Stop or error mode • Wrong station number • Wrong parity • Wrong RTS/CTS configuration settings	• Check the cable wiring • Check the PLC state. It must be in RUN state • Check the station number

Appendix

FANUC Driver Item References

The FANUC driver uses an item-naming convention based on the single-letter data type identifiers used in programming the GE Fanuc PLCs.

The tables in this documentation describe the item naming convention for the FANUC Driver. The ranges specified in those tables vary according to the type of the controller used.

If you advise an out-of-range variable for an item, all items in the same packet return bad quality.

The FANUC driver supports float values with 4 bytes with up to 7 digits. Therefore, the valid range for float values is 3.4E +/- 38 (7 digits). Values outside this range will result in an invalid value written to the tag. Furthermore, values with more than 7 digits of precision will be rounded on the seventh digit.

Suffixes to Explicitly Control Data Type

This section describes the single-letter suffixes used to explicitly control data type.

The following sections summarize the suffix group, suffix, restrictions, description, and result for the suffixes.

F Suffix

You can interpret a pair of analog or block registers as a floating point number by adding a blank space and an F to the item name for the lower-numbered register of the pair. For example, R1001 F.

This notation causes the server to treat R1001 and R1002 as 32-bit floating point numbers.

Supported base items are: %AI, %AO or %AQ, %R.

L Suffix

You can interpret a pair of analog or block registers as a long integer or double-precision integer by adding a blank space and an L after the item name. For example, %R100 L.

Supported base items are: %AI, %AO or %AQ, %R,

If an “OUT OF RANGE” item is used in the InTouch Compact Edition application, then the quality for that item is shown as 0 or BAD. It is also possible that the quality of one or more valid goes to 0 or BAD due to an “OUT OF RANGE” item being used.

Invalid values in items (with/without suffixes) can return unpredictable results. You should ensure that valid values are written for each data type. For example, -32768 to 32767 is the value range for short type data.

Supported Data Types and Value Ranges

The following table lists all the data types supported by the FANUC driver.

Data Type	Minimum	Maximum
Short (16 bit signed)	32768	32767
Long(32 bit signed)	-2147483648	2147483647

Base Item Names

This section describes the base item names and the conditions applicable to them:

- Item names must begin with base name strings and optionally preceded by "%."
- Item names are not case-sensitive.

The following table summarizes the base name, description, data type, read/write (R/W) designation, and offset for base item names.

Base Name	Description	Data Type	Access Rights	Offset
I*n*	Discrete inputs	Boolean	R/W	*n* = 1-2048
O*n* or Q*n*	Discrete outputs	Boolean	R/W	*n* = 1-2048
T*n*	Discrete temporary	Boolean	R/W	*n* = 1-256
M*n*	Discrete internal	Boolean	R/W	*n* = 1-4096
G*n*	Genius global data	Boolean	R/W	*n* = 1-1280
R*n*	PLC register	Short or forced by suffix	R/W	*n* = 1-32640
R*n*:*b* Similarly for data types %AI, %AO or %AQ	PLC register bit	Boolean	Read-only (R/O)	*b* = 0-15
AI*n*	Analog inputs	Short or forced by suffix	R/W	*n* = 1-32640
AO*n* or AQ*n*	Analog outputs	Short or forced by suffix	R/W	*n* = 1-32640

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