Honeywell

Experion PKS
GE Fanuc Series 90 Interface Reference

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Document	Release	Issue	Date
EPDOC-XX39-en-431A	431	0	February 2015

Disclaimer

Contents

Planning considerations for installing and configuring GE Fanuc Series 90 controllers

This reference provides the information you need to set up, configure, and test GE Fanuc Series 90 controllers.

Revision history

Revision	Date	Description
A	February 2015	Initial release of document.

How to use this guide

Steps for connecting and configuring a GE Fanuc Series 90 controller. Complete each step before commencing the next step.

Step	Go to
Connect the controller to the server	Connecting GE Fanuc Series 90 controllers to the server
Use Quick Builder to define channels	• GE Fanuc Series 90 channel and controller reference • "Build channels" topic in the *Quick Builder User's Guide*
Use Quick Builder to define controllers	• GE Fanuc Series 90 channel and controller reference • "Build controllers" topic in the *Quick Builder User's Guide*
Download channel and controller definitions to the server	"Downloading items" topic in the *Quick Builder User's Guide*
Test communications	Testing GE Fanuc Series 90 communications with the server
Use Quick Builder to define points	Defining a GE Fanuc Series 90 address for a point parameter

Related topics

"Controller compatibility for GE Fanuc Series 90" on page 6
"Other documentation for GE Fanuc Series 90" on page 7
"Architectures for GE Fanuc Series 90" on page 8
"Connecting GE Fanuc Series 90 controllers to the server" on page 10
"GE Fanuc Series 90 channel and controller reference" on page 13
"Testing GE Fanuc Series 90 communications with the server" on page 26
"Defining a GE Fanuc Series 90 address for a point parameter" on page 20

Controller compatibility for GE Fanuc Series 90

This section describes the compatibility of the controller.

Series 90-30 (IC693 controllers) compatibility

The interface is compatible with IC693CPU364 CPU module and IC693CMM321 communications module.

The HCT used by the interface is not compatible with older IC693CPU374 CPU modules (hardware versions D and earlier) and there are no known corrective actions to enable communications with this module. Possible alternatives are:

- Use an older GE Fanuc module that is compatible with the HCT (that is, IC693CPU364 or IC693CMM321).
- Use a newer PACSystems controller that can be forced to be compatible with the HCT (see the section below titled "PACSystems RX3i and RX7i compatibility").
- Use a combination of the OPC Client Interface and the GE Fanuc OPC Server for GE SRTP instead of this interface.
- Use Modbus TCP instead of this interface.

For IC693CPU374 CPU modules with hardware versions E and later (otherwise known as CPU374 Plus modules), the Ethernet interface to the controller can be configured to run in HCT compatibility mode. This allows the interface to ignore SRTP header errors that were not detected in previous Series 90 products. Instructions for making this change can be found by searching for *chct_comp* in the GE Fanuc publication *TCP/IP Ethernet Communications for Series 90-30 CPU374 PLUS - Station Manager Manual* (GFK-2383).

Series 90-70 (IC697 controllers) compatibility

The interface is compatible with IC697CMM741 and IC697CMM742 communications modules.

PACSystems RX3i and RX7i compatibility

For these controllers using firmware release 2.57 or later, the Ethernet interface of the controller can be configured to run in HCT compatibility mode. This allows the interface to ignore SRTP header errors that were not detected in previous Series 90 products. Instructions for making this change can be found by searching for *chct_comp* in the GE Fanuc publication *TCP/IP Ethernet Communications for PACSystems* (GFK-2224C).

Other documentation for GE Fanuc Series 90

GE Fanuc documentation is available from the GE Intelligent Platforms support website. A GE Fanuc logon may be required to access this website.

Tip
For technical support information, see the *Contact Information* section contained in each of the following documents.

Series 90-30 (IC693 controllers) documentation

GFK-0356	*Series 90-30 PLC Installation and Hardware Manual*
GFK-1541	*TCP/IP Ethernet Communications for the Series 90 PLC User's Manual*

Series 90-70 (IC697 controllers) documentation

GFK-0262	*Series 90-70 Programmable Controller Installation Manual*
GFK-1541	*TCP/IP Ethernet Communications for the Series 90 PLC User's Manual*
GFK-1527	*Series 90-70 Enhanced Hot Standby CPU Redundancy User's Guide*

PACSystems RX3i documentation

GFK-2314	*PACSystems RX3i Hardware and Installation Manual*
GFK-2224	*TCP/IP Ethernet Communications for PACSystems User's Manual*

PACSystems RX7i documentation

GFK-2223	*PACSystems RX7i Installation Manual*
GFK-2224	*TCP/IP Ethernet Communications for PACSystems User's Manual*

Architectures for GE Fanuc Series 90

GE Fanuc Series 90 controllers are connected to the server via an Ethernet link or links, as shown in the following figures.

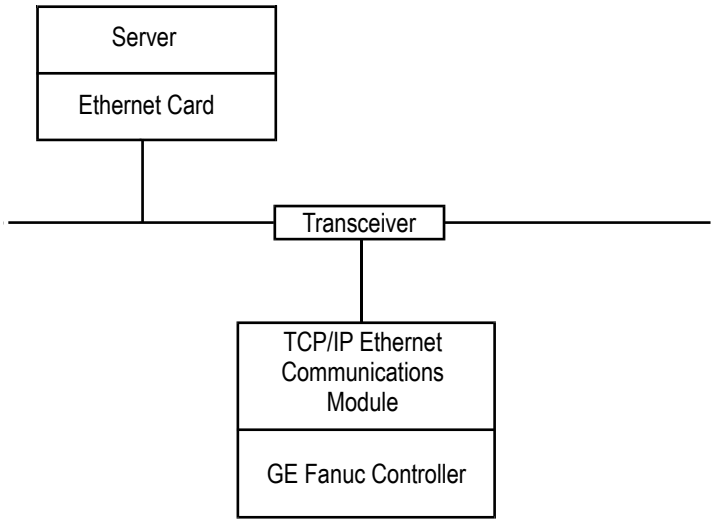


Figure 1: Non-redundant channel, non-redundant controllers

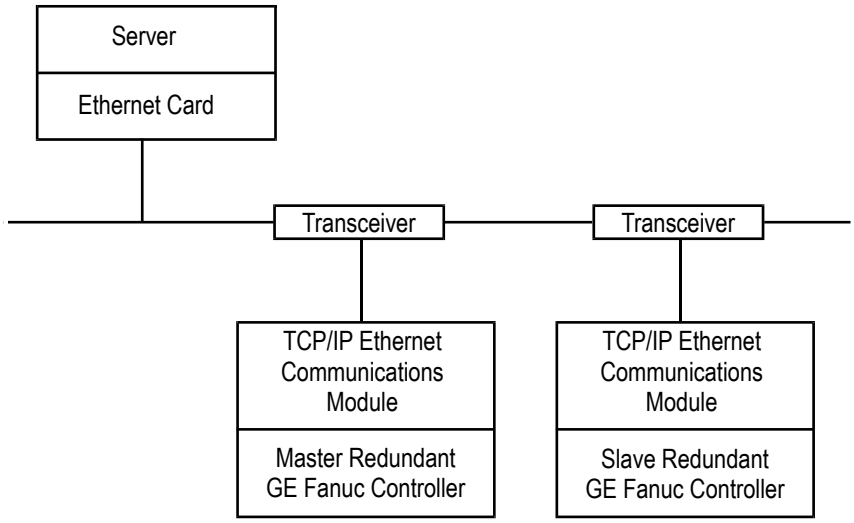


Figure 2: Non-redundant channel, redundant controller pair

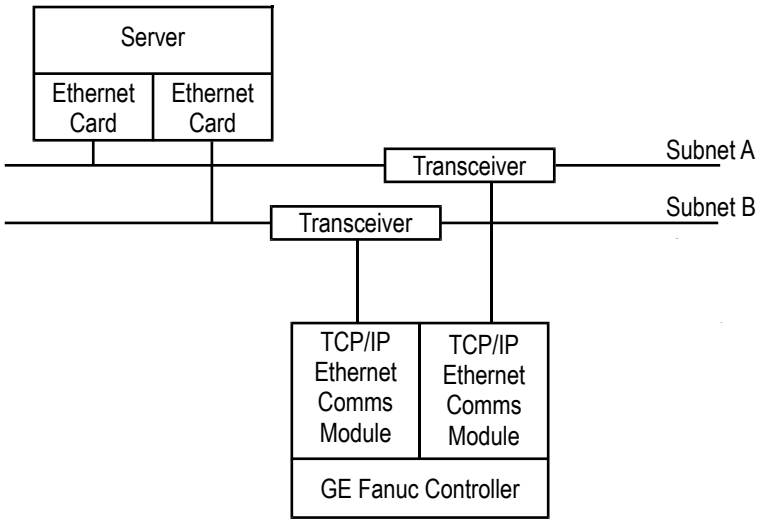


Figure 3: Redundant channel, non-redundant controllers

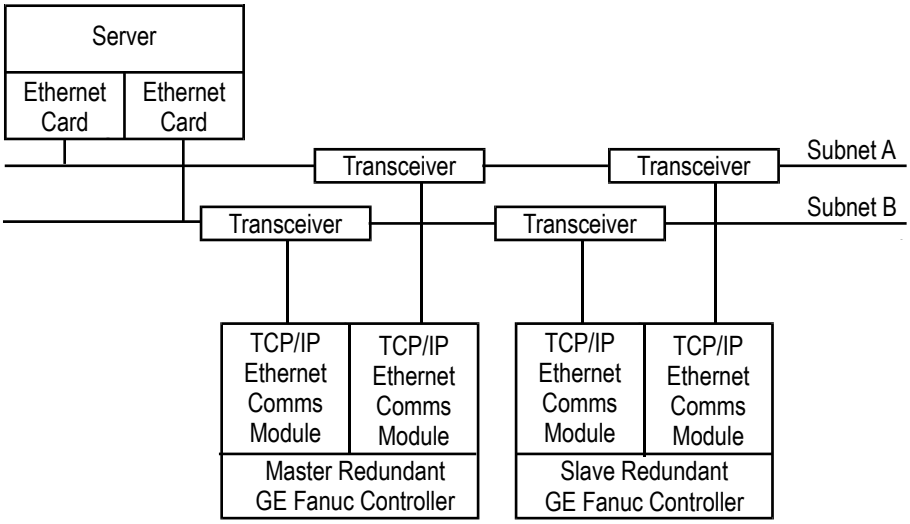


Figure 4: Redundant channel, redundant controller pair

Attention

Later model TCP/IP Ethernet communications modules allow a direct 10BaseT connection, and therefore no transceivers are required.

Connecting GE Fanuc Series 90 controllers to the server

In setting up the Ethernet connection you need to perform the following steps to enable TCP/IP communications.

To connect a GE Fanuc Series 90 controller to the server

1. Install and configure an Ethernet communications module or modules on each controller. Note that each Ethernet controller module must be assigned an IP address. See the GE Fanuc documentation for details.
2. If required, install and configure redundancy hardware and/or software on each controller.
3. Enable the TCP/IP protocol on the server.
4. Connect the controller communications modules to the server via an Ethernet LAN compliant with IEEE 802.3.
5. Create the *Gef_cfg.ini* configuration file on the server.
6. Specify the controller names and IP addresses in the server's hosts file: *C:\WINNT\system32\drivers\etc\HOSTS*.

Setting up the configuration file

In addition to defining GE Fanuc channels and controllers in Quick Builder, you must also define them in a file called *Gef_cfg.ini*, located in the root Windows folder on the server (for example, *c:\winnt\Gef_cfg.ini*).

This file must contain one entry for each channel and each Ethernet controller module. The channel entry defines how communications with the controllers on that channel are performed. The controller entries define the IP addresses that have been assigned to and configured within each controller.

If redundant channels and/or redundant controllers are to be used, an entry must appear in the *Gef_cfg.ini* file for each Ethernet controller module. The name of each entry consists of the controller name appended with one or two characters as detailed below.

- If redundant controllers are to be used without redundant channels, the master controller entry is followed by a '1,' the slave controller entry by a '2.'
- If redundant channels are to be used without redundant controllers, the subnet A entry is followed by an 'A,' the subnet B entry by a 'B.'
- If redundant controllers are to be used with redundant channels, for the master controller, the subnet A is followed by '1A,' the subnet B entry by '1B.' For the slave controller, the subnet A entry is followed by a '2A,' the subnet B entry by '2B.'

Attention
The same names must also appear in the server's *HOSTS* file.

Examples

This example shows the contents of a typical file for a non-redundant channel setup:

```
; This file contains addressing information required for HCT
; communications.
; Lines starting with a ; are considered comments.
; The Device Name of the controller is given in [] and cannot
; exceed 10 characters
; The IP_ADDR value is an IP Address given in dot decimal
; form.
; A space is required between device information
; The port TYPE specification must be TCPIP_ETH for TCP/IP
; communications/

; Controller 1 (called PLC1) :

[PLC1]
IP_ADDR = 203.17.161.4
```

```
; Controller 2 (Called PLC2) :
[PLC2]
IP_ADDR = 203.17.161.5

; Controller 3 (Called PLC3, non-redundant channel, redundant controller)
:
[PLC31]
IP_ADDR = 203.17.161.6
[PLC32]
IP_ADDR = 203.17.162.7

; Channel 1 (Called Series90) :
[Series90]
TYPE=TCPIP_ETH

; The following section is used to configure HCT timeout
; values.

[HCT_Timeout]
CONNECT_TIMEOUT=5000
REQUEST_TIMEOUT=2000
```

This example shows the contents of a typical file for a redundant channel setup:

```
; This file contains addressing information required for HCT
; communications.
; Lines starting with a ; are considered comments.
; The Device Name of the controller is given in [] and cannot
; exceed 10 characters
; The IP_ADDR value is an IP Address given in dot decimal
; form.
; A space is required between device information
; The port TYPE specification must be TCPIP_ETH for TCP/IP
; communications/

; Controller 4 (Called PLC4, redundant channel, non-redundant controller)
:
[PLC4A]
IP_ADDR = 203.17.161.8
[PLC4B]
IP_ADDR = 203.17.162.8
; Controller 5 (Called PLC5, redundant channel, redundant controller)
:

[PLC51A]IP_ADDR = 203.17.161.9
[PLC51B]
IP_ADDR = 203.17.162.9
[PLC52A]
IP_ADDR = 203.17.161.10
[PLC52B]
IP_ADDR = 203.17.162.10

; Channel 2 (Called Series90) :
[Series90]
TYPE=TCPIP_ETH
; The following section is used to configure HCT timeout
; values.
[HCT_Timeout]
CONNECT_TIMEOUT=5000
REQUEST_TIMEOUT=2000
```

Defining multiple controllers for a single physical controller

If you need to access data in a controller table beyond its default range, you need to define more than one 'logical' controller in Quick Builder for the physical controller. You must specify these logical controllers in *Gef_cfg.ini*.

Example

This example shows the contents of *Gef_cfg.ini* where you have defined two controllers, *PLC1reg* and *PLC1sta*, to represent a single physical controller with an IP address of *203.17.161.4*.

```
[PLC1reg]
IP_ADDR = 203.17.161.4
```

```
[PLC1sta]
IP_ADDR = 203.17.161.4
```

Editing the server's hosts file

You need to specify the controller names and IP addresses in the server's hosts file: *C:\WINNT\system32\drivers\etc\hosts*.

Example

```
203.17.161.4  PLC1
203.17.161.5  PLC2
203.17.161.6  PLC31
203.17.162.7  PLC32
203.17.161.8  PLC4A
203.17.162.8  PLC4B
203.17.161.9  PLC51A
203.17.162.9  PLC51B
203.17.161.10 PLC52A
203.17.162.10 PLC52B
```

GE Fanuc Series 90 channel and controller reference

This section describes the configuration and addressing information specific to GE Fanuc Series 90 channels and controllers.

In addition to the information contained in this reference, and for help to build channels and controllers, see the section titled "Building controllers or channels" in the *Quick Builder User's Guide*.

Related topics

“Main properties for a GE Fanuc Series 90 channel” on page 14
“Main properties for a GE Fanuc Series 90 controller” on page 15
“Optimizing GE Fanuc Series 90 scanning performance” on page 17
“Planning considerations for installing and configuring GE Fanuc Series 90 controllers” on page 5

Main properties for a GE Fanuc Series 90 channel

The Main tab defines the basic properties for a GE Fanuc channel.

For information about how to create a channel, see the topic titled "Building controllers and channels" in the *Quick Builder User's Guide*.

Property	Description
Name	The unique name of the channel. A maximum of *10* alphanumeric characters (no spaces or double quotes). Note: In Station displays, underscore characters (_) appear as spaces.
Description	(Optional) A description of the channel. A maximum of *132* alphanumeric characters, including spaces.
Associated Asset	The Tag Name of the Asset to be associated with the alarm group.
Marginal Alarm Limit	The communications alarm marginal limit at which the channel is declared to be marginal. When this limit is reached, a high priority alarm is generated. To change the priority of the alarm system wide, see the topic titled "Configuring system alarm priorities" in the *Server and Client Configuration Guide*. To change the priority of the alarm for one channel, see the topic titled "About configuring custom system alarm priorities for an individual channel or controller" in the *Server and Client Configuration Guide*. A channel barometer monitors the total number of requests and the number of times the controller did not respond or response was incorrect. The barometer increments by two or more, depending on the error, and decrements for each good call. To calculate an acceptable marginal alarm limit, use the formula: Square root of the number of controllers on the channel × Marginal Alarm Limit defined on those controllers (Normally, you specify the same value for all controllers on a channel). For example, if there are 9 controllers on the channel and their Marginal Alarm Limit is set to *25*, the value would be *3* (which is the square root of 9) *x 25 = 75*.
Fail Alarm Limit	The communications alarm fail limit at which the channel is declared to have failed. When this barometer limit is reached, an urgent alarm is generated. To change the priority of the alarm system wide, see the topic titled "Configuring system alarm priorities" in the *Server and Client Configuration Guide*. To change the priority of the alarm for one channel, see the topic titled "About configuring custom system alarm priorities for an individual channel or controller" in the *Server and Client Configuration Guide*. Set this to double the value specified for the channel Marginal Alarm Limit.
Redundant Channel	Specifies that the server has two Ethernet cards, one of each subnet and each controller on this channel has two Ethernet communication modules installed, one of each subnet.
Item Type	The type of channel specified when this item was created.
Last Modified	The date and time the channel properties were modified.
Last Downloaded	The date and time the channel was last downloaded to the server.
Item Number	The unique item number currently assigned to this channel, in the format *CHNcc*, where *cc* is the channel number. You can change the item number if you need to match your current server database configuration. The number must be between *01* and the maximum number of channels allowed for your system. For more information about setting the maximum value, see the topic titled "Adjusting sizing of non-licensed items" in the *Supplementary Installation Tasks Guide*.

Main properties for a GE Fanuc Series 90 controller

Tip

You may need to define up to five 'logical' controllers for one physical GE Fanuc Series 90 controller; each of which represents a different area in its address space. To determine how many controllers you need to define, see the topic "Accessing data in GE Fanuc Series 90 controllers."

The Main tab defines the basic properties for a GE Fanuc Series 90 controller.

For information about how to create a controller, see the topic titled "Building controllers and channels" in the *Quick Builder User's Guide*.

Property	Description
Name	The unique name of the controller. A maximum of *10* alphanumeric characters (no spaces or double quotes). Note: In Station displays, underscore characters (_) appear as spaces. This is the name you use in the *Gef_cfg.ini* file.
Description	(Optional) A description of the controller. A maximum of *132* alphanumeric characters, including spaces.
Associated Asset	The Tag Name of the Asset to be associated with the alarm group.
Channel Name	The name of the channel on which the controller communicates with the server. (You must have already defined a channel for it to appear in this list.)
Marginal Alarm Limit	The communications alarm marginal limit at which the controller is declared to be marginal. When this limit is reached, a high priority alarm is generated. To change the priority of the alarm system wide, see the topic titled "Configuring system alarm priorities" in the *Server and Client Configuration Guide*. To change the priority of the alarm for one controller, see the topic titled "About configuring custom system alarm priorities for an individual channel or controller" in the *Server and Client Configuration Guide*. A controller barometer monitors the total number of requests and the number of times the controller did not respond or response was incorrect. The barometer increments by two or more, depending on the error, and decrements for each good call. The default value is *25*.
Fail Alarm Limit	The communications alarm fail limit at which the controller is declared to have failed. When this barometer limit is reached, an urgent alarm is generated. To change the priority of the alarm system wide, see the topic titled "Configuring system alarm priorities" in the *Server and Client Configuration Guide*. To change the priority of the alarm for one controller, see the topic titled "About configuring custom system alarm priorities for an individual channel or controller" in the *Server and Client Configuration Guide*. Set this to double the value specified for the controller Marginal Alarm Limit. The default is *50*.
Controller Type	Specifies what type of controller data you want to access: *0* = byte address tables *1* = word address tables
Offset	Only applicable to a Type 1 controller. Specifies the address offset so that the server can access addresses beyond the default range. The default offset is *0*. For more information about offsets, see the topic "Using offsets with GE Fanuc Series 90 controllers."

Property	Description
Master/Slave bit location details	In a redundant controller configuration, these settings specify the byte and bit location of the bit that is set in the master PLC and clear in the slave PLC. See the section "Address Syntax" in the topic titled "Defining a GE Fanuc Series 90 address for a point parameter" for examples of how to specify the byte and bit numbers. For redundant controller configurations using HBR30 Hot Backup Redundancy, the byte number should be *%M00128* and the bit number *3*. These are the default values for these settings. For redundant controller configurations using Series 90-70 Hot Standby or Series 90-70 Enhanced Hot Standby, the byte number should be *%S00005* and the bit number *3*. For more information see your controller redundancy software/hardware documentation. This master/slave bit is read during each diagnostic scan. If it is NOT set and communications with the other controller can successfully be established, communications will be switched to the other redundant controller. This master/slave bit is also read immediately before sending a control request to the PLC. If it is NOT set and communications with the other controller cannot be established, the control request will be failed.
Alternate Links	If specified, process and diagnostic scans are alternated between the two links if they are available (Redundant channel configuration only). If this setting is not checked, failover from the active link to the other will only occur once the active link has failed. In a redundant controller configuration, it is recommended that this setting be checked to enable faster master controller connection recovery.
Redundant PLC	Specifies that this controller consists of a redundant controller pair. In a non-redundant channel configuration, if an error is experienced when communicating with the current controller, then communications will be switched to the other controller. In a redundant channel configuration, if consecutive errors are experienced on all in service channels, then communications will be switched to the other controller.
Item Type	The type of controller specified when this item was created.
Last Modified	The date and time the controller properties were modified.
Last Downloaded	The date and time the controller was last downloaded to the server.
Item Number	The unique item number currently assigned to this controller, in the format *RTUnnnnn*. You can change the item number if you need to match your current server database configuration. The number must be between *01* and the maximum number of controllers allowed for your system. For more information about setting the maximum value, see the topic titled "Adjusting sizing of non-licensed items" in the *Supplementary Installation Tasks Guide*.

Related topics

“Using offsets with GE Fanuc Series 90 controllers” on page 23
“Defining a GE Fanuc Series 90 address for a point parameter” on page 20

Optimizing GE Fanuc Series 90 scanning performance

Sequential addresses with the same scan period are grouped together into scan packets. If the number of scan packets becomes too great, scanning performance is impaired. To minimize the number of scan packets:

- Use a small number of available scan periods for all your point definitions.
- Closely block the registers read by the server and ensure that all addresses within a block (controller Type 0, 512 bytes; controller Type 1, 512 words) have the same scan period.
- Ensure there are no small packets being scanned at fast rates.

The scan packets that have been built can be listed by using the utility **lisscn** (list scan). Listing scan packets helps verify the scanning strategy.

For more information about **lisscn**, see the section titled "Command Reference" in the *Server and Client Configuration Guide*.

Reducing the number of scan packets for GE Fanuc Series 90 controllers

You can reduce the number of scan packets by combining data within a controller's data tables. For example, instead of addressing registers in *%R*, *%AQ*, and *%AI*, you can program the controller to transfer values from *%AI* and *%AQ* tables to the *%R* table, so that you only have to scan the *%R* table.

GE Fanuc Series 90 points reference

This section describes how to configure points for a GE Fanuc Series 90 controller using Quick Builder.

In addition to the information contained in this reference, and for help to build points, see the section titled "Building and configuring points" in the *Quick Builder User's Guide*.

Related topics

“Defining a GE Fanuc Series 90 address for a point parameter” on page 20

Defining a GE Fanuc Series 90 address for a point parameter

For **PV Source Address**, **Source Address**, and **Destination Address** the format for an GE Fanuc Series 90 controller address is:

ControllerName Address

Part	Description
ControllerName	The name of the GE Fanuc Series 90 controller.
Address	The address within the controller where the value is stored.

If you would like help when defining an address, click ... next to **Address** to display Address Builder.

Address syntax

The format for the address is:

%ttnnnnn [*DataFormat*]

Part	Description
%tt	The ID of the data table. See the topic titled "Accessing data in GE Fanuc Series 90 controllers."
nnnnn	The address within the table. For a Type 0 controller, this is a byte address. For a Type 1 controller, this is a word address.
DataFormat	The data format acronym. See the sections below, titled: • "Data format for scaling" • "Data format for reading raw values" • "Data format for reading bits" • "Data format for a mode"

Example

To address word 1 of the Register table:

```
%R00001
```

Data format for scaling

To scale point parameter values with addresses in the register tables, use the following data formats:

Format	Description	Counts
U100	0 to 100 percent	0 to 100
U1023	unsigned 0 to 1023	0 to 1,023
U4095	unsigned 0 to 4095	0 to 4,095
S9999	signed -9999 to 9999	-9,999 to 9,999
U9999	unsigned 0 to 9999	0 to 9,999
U9998	unsigned 0 to 9998	0 to 9,998
U999	unsigned 0 to 999	0 to 999

Format	Description	Counts
U8B	8-bit unsigned	0 to 255
U14B	14-bit unsigned	0 to 16,383
U15B	15-bit unsigned	0 to 32,767
U16B	16-bit unsigned	0 to 65,535
S8B	8-bit signed	-128 to 127
S16B	16 bit signed	-32,768 to 32,767
U3BCD	3 digit binary coded decimal	0 to 999
U4BCD	4 digit binary coded decimal	0 to 9,999
S32BS	32-bit signed binary little-endian	-2,147,483,648 to 2,147,483,647
U32BS	32-bit unsigned binary little-endian	0 to 4,294,967,296
S32BSB	32-bit signed binary big-endian	-2,147,483,648 to 2,147,483,647
U32BSB	32-bit unsigned binary big-endian	0 to 4,294,967,296

Example

Analog point for input temperature control:

```
%R3 S16B
```

Data format for reading raw values

To read point parameter values without scaling, use the following data formats.

Format	Description	Counts
C16 (default)	16-bit unsigned	0 to 65,535
HALFWD	upper half word	0 to 65,535
IEEEFP	single precision floating point	
REVWD	reverse word	0 to 65,535
S32B	32-bit signed binary little-endian	-2,147,483,648 to 2,147,483,647
U32B	32-bit unsigned binary little-endian	0 to 4,294,967,296
S32BB	32-bit signed binary big-endian	-2,147,483,648 to 2,147,483,647
U32BB	32-bit unsigned binary big-endian	0 to 4,294,967,296

Attention

The 32-bit data formats are only valid for values in the Register table (%R) and use two consecutive words. For example, address *%R0010 IEEEFP* actually uses words *%R0010* and *%R0011*.

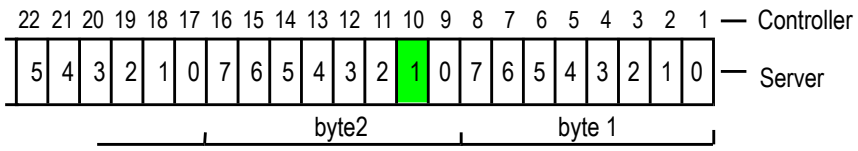
Data format for reading bits

Bits can be read from both the word tables (R, AI, or AQ) and the byte tables (I, Q, M, T, S, SA, SB, SC, or G.) The server does not support direct bit addressing. Direct bit addresses must be converted to word and bit offset format.

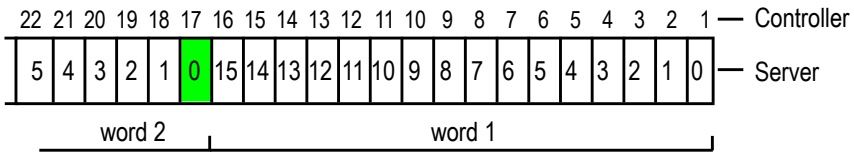
- Valid bit offsets within the register (word) tables range from *0* to *15*.
- Valid bit offsets within the byte tables range from *0* to *7*.

Example

A bit address of *%I10* converted to a byte address is *%I00002 1*.



A bit address of *%R17* converted to a word address is *%R00002 0*.



Data format for a mode

Enter a data format of *MODE* to configure a mode for a mode parameter (MD) source or destination address.

A single bit is accessed with the following meaning:

Mode	Server Value	Controller Value
Auto	1	0
Manual	0	1

The single bit that is accessed can also be specified. For example, *%R00010 3 MODE*.

Related topics

“Planning considerations for installing and configuring GE Fanuc Series 90 controllers” on page 5
“Main properties for a GE Fanuc Series 90 controller” on page 15
“Accessing data in GE Fanuc Series 90 controllers” on page 22

Accessing data in GE Fanuc Series 90 controllers

The server accesses data from the following reference tables in GE Fanuc Series 90 controllers.

Quick Builder provides two types of controller to access specific types of data: Type 1 (word) and Type 0 (byte).

To access data beyond the default range for a Type 1 controller, you need to use offsets.

Table ID	Reference Table	Range	Address Mode	Controller Type
%R	Register	1–4,196	word	1
%AI	Analog Input	1–2,048	word	1
%AQ	Analog Output	1–2,048	word	1
%I	Discrete Input	1–1,536	byte	0
%Q	Discrete Output	1–1,536	byte	0
%M	Discrete Internal	1–1,536	byte	0

Table ID	Reference Table	Range	Address Mode	Controller Type
%T	Discrete Temporary	1–32	byte	0
%S	System Fault	1–16	byte	0
%SA	Special Contacts A	1–16	byte	0
%SB	Special Contacts B	1–16	byte	0
%SC	Special Contacts C	1–16	byte	0
%G	Genius Seamless	1–960	byte	0

Related topics

"Defining a GE Fanuc Series 90 address for a point parameter" on page 20

Using offsets with GE Fanuc Series 90 controllers

Attention
Offsets are only applicable to Type 1 controllers.

Offsets allow the server to access addresses in the *%R*, *%AI*, and *%AQ* reference tables beyond the default ranges.

If you need to access addresses beyond the default ranges, you define more than one controller and specify a suitable offset for each controller.

The following table shows the addressable ranges for the allowed offsets.

	Offset			
Table ID	**0**	**1**	**2**	**3**
%R	1–4,096	4,097–8,192	8,193–12,288	12,289–16,384
%AI	1–2,048	2,049–4,096	4,197–6,144	6,145–8,192
%AQ	1–2,048	2,049–4,096	4,197–6,144	6,145–8,192

For example, to address registers *%R,100-140* and *%AI3,000-3,010*, you need to configure two Type 1 controllers. You would configure the controller for the *%R* table with an offset of *0*, and the controller for the *%AI* table with an offset of *1*.

Related topics

"Main properties for a GE Fanuc Series 90 controller" on page 15

Troubleshooting GE Fanuc Series 90 issues

This section describes troubleshooting tasks for GE Fanuc Series 90 that you can perform either on the server or from any Station.

Related topics

“Testing GE Fanuc Series 90 communications with the server” on page 26
“Troubleshooting point configuration errors” on page 27

Testing GE Fanuc Series 90 communications with the server

You use the GE Fanuc Series 90 test utility, **g90tst**, to test communications between the server and the GE Fanuc Series 90 controller after you have downloaded channel and controller definitions to the server database.

Prerequisites

- Set up the controller.
- Connect all cables.
- Define the controller and channel in Quick Builder.
- Download the Quick Builder definitions to the server, without errors.
- Ensure the channel is out of service.

To run the g90tst utility

1. Open a Command Prompt window.
2. Type **g90tst** and then press Enter.
3. Follow the directions as prompted.

Related topics

“Planning considerations for installing and configuring GE Fanuc Series 90 controllers” on page 5

Troubleshooting point configuration errors

Incorrectly configured points can reveal themselves in one of two ways.

Errors while downloading Quick Builder point definitions to the server

If this occurs, read the log file generated and correct the errors. Points might be configured with illegal configuration details (using an unknown table ID, using the wrong controller type for the table, and so on). This may cause problems when definitions are downloaded.

Errors when scanning

If you build points with addresses that are valid but not configured in the controller, they are not reported as errors until the server tries to acquire data. They are evident on the Point Detail display on Station, which will show a bad value (indicated by inverse video). If this occurs, check the points for references to addresses in the controller that are not configured within the controller.

If all the points built against a particular controller are bad and this controller fails, the configuration of this controller might be incorrect. Check that the controller name is defined in both the *Gef_cfg.ini* file and the *HOSTS* file.

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