GE Focas HSSB Driver Help

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GE Focas HSSB Driver Help

Help version 1.028

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Overview

The GE Focas High Speed Serial Bus (HSSB) Driver provides an easy and reliable way to connect GE Focas High Speed Serial Bus (HSSB) controllers to OPC Client applications, including HMI, SCADA, Historian, MES, ERP and countless custom applications. It is intended for use with GE Focas1 Programmable Logic Controllers.

Note: For more information on the additional hardware that is required for use with this driver, refer to **Device Setup**.

Device Setup

Supported Devices

This driver can communicate with controllers that are compatible with the Focas1 or Focas2 CNC/PMC data window control libraries. This includes, but is not limited to, the following:

Series 0i
Series 15
Series 15i
Series 16
Series 16i
Series 18
Series 18i
Series 21
Series 21i
Series 30i
Series 31i
Series 32i
Power Mate i
Open Addressing

Note: An HSSB interface card must be installed in the host computer and connected to the controller with the appropriate fiber optic cable.

Library Requirement

In order for this driver to communicate with the hardware, either the GE Open CNC Focas1/Ethernet Library (GE part number A02B-0207-K732) or GE Focas2 Library (GE part number A02B-0207-K737) must be installed on the system. Although users do not need to have the library installed in order to create a server project, the project will not run without it.

Note: The Focas2 Library combines both Ethernet and HSSB capabilities and must be purchased from GE. To do so, call 1-888-326-8287, choose CNC, PARTS to place the order, and then request A02B-0207-K737.

Connection Timeout

This parameter specifies the amount of time that the driver will wait for a connection to be made with a device. The connection time depends on network load, and may vary with each connection attempt. The valid range is 1 to 60 seconds. The default setting is 3 seconds.

Request Timeout

This parameter specifies the amount of time that the driver will wait for a response from the device before giving up and going on to the next request. Longer timeouts will only affect performance if a device is not responding. The valid range is 100 to 9999 milliseconds. The default setting is 1000 milliseconds.

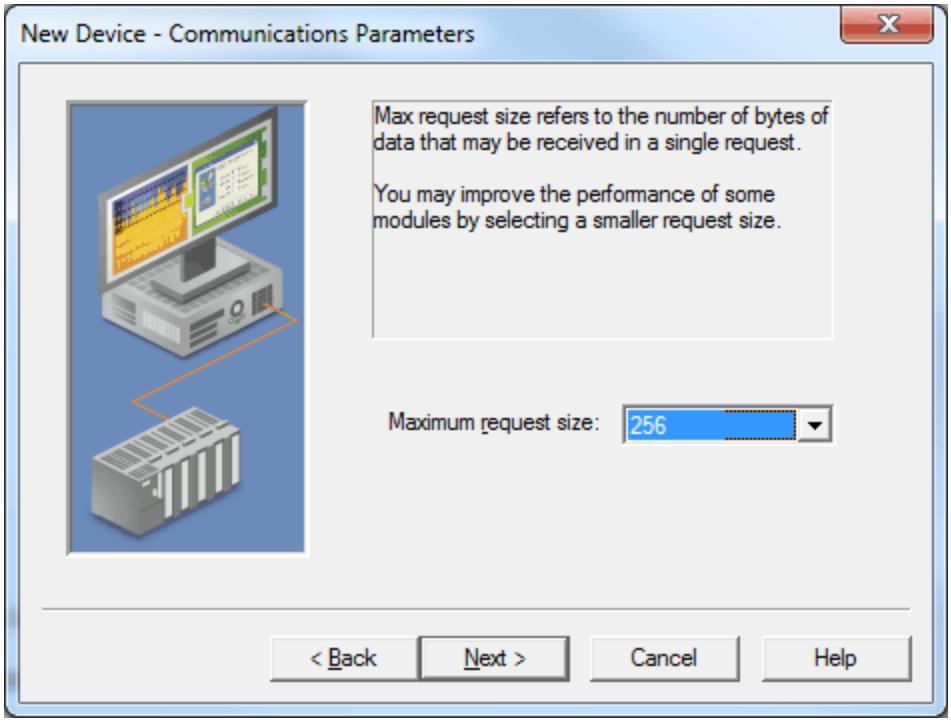
Retry Attempts

This parameter specifies the number of times that the driver will retry a message before giving up and going on to the next message. The valid range is 1 to 10. The default setting is 3.

Device ID

This parameter specifies the controller's HSSB node number. Up to 8 devices may be defined on a given channel. The valid range is 0 to 65535. The default setting is 0.

Communications Parameters



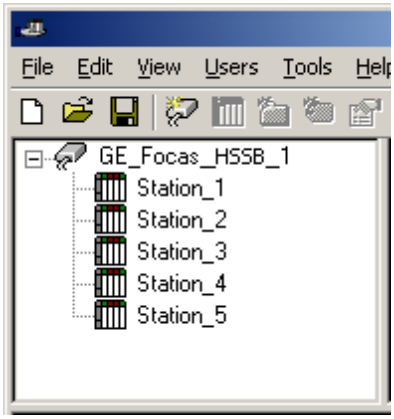
Description of the parameter is as follows:

- **Maximum Request Size:** This parameter specifies the number of bytes that may be requested from a device at one time. To refine the driver's performance, configure the request size to one of the following: 32, 64, 128, 256, or 512. The default value is 256 bytes.

Optimizing Your GE Focas HSSB Communications

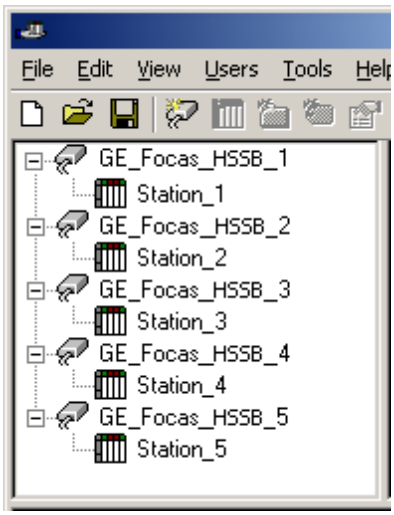
The GE Focas HSSB Driver has been designed to provide the best performance with the least amount of impact on the system's overall performance. While the GE Focas HSSB Driver is fast, there are a couple of guidelines that can be used in order to control and optimize the application and gain maximum performance.

Our server refers to communications protocols like GE Focas HSSB as a channel. Each channel defined in the application represents a separate path of execution in the server. Once a channel has been defined, a series of devices must then be defined under that channel. Each of these devices represents a single GE Focas controller from which data will be collected. While this approach to defining the application will provide a high level of performance, it won't take full advantage of the GE Focas HSSB Driver or the network. An example of how the application may appear when configured using a single channel is shown below.



Each device appears under a single GE Focas HSSB channel. In this configuration, the driver must move from one device to the next as quickly as possible in order to gather information at an effective rate. As more devices are added or more information is requested from a single device, the overall update rate begins to suffer.

If the GE Focas HSSB Driver could only define one single channel, then the example shown above would be the only option available; however, the GE Focas HSSB Driver can define up to 16 channels. Using multiple channels distributes the data collection workload by simultaneously issuing multiple requests to the network. An example of how the same application may appear when configured using multiple channels to improve performance is shown below.



Each device has now been defined under its own channel. In this new configuration, a single path of execution is dedicated to the task of gathering data from each device. If the application has 16 or fewer devices, it can be optimized exactly how it is shown here.

The performance will improve even if the application has more than 16 devices. While 16 or fewer devices may be ideal, the application will still benefit from additional channels. Although by spreading the device load across all channels will cause the server to move from device to device again, it can now do so with far less devices to process on a single channel.

Request Size can also affect the GE Focas HSSB Driver's performance. Request size refers to the number of bytes that may be requested from a device at one time, and is available on every defined device. To refine this driver's performance, configure the request size to one of the following settings: 32, 64, 128, 256, or 512 bytes. Depending on the model of GE Focas1/Focas2 device being used, the setting chosen can dramatically affect the application. The default value of 256 bytes is recommended. If the application consists of large requests for consecutively ordered data, users can try increasing the request size setting for the device. For more information, refer to **Device Setup**.

Data Types Description

Data Type	Description
Boolean	Single bit
Byte	Unsigned 8 bit value bit 0 is the low bit bit 7 is the high bit
Word	Unsigned 16 bit value bit 0 is the low bit bit 15 is the high bit
Short	Signed 16 bit value bit 0 is the low bit bit 14 is the high bit bit 15 is the sign bit
DWord	Unsigned 32 bit value bit 0 is the low bit bit 31 is the high bit
Long	Signed 32 bit value bit 0 is the low bit bit 30 is the high bit bit 31 is the sign bit
Float	32 bit floating point value
String	Null terminated ASCII string

Address Descriptions

Address specifications may vary depending on the model in use. Select a link from the following list to obtain specific address information for the model of interest.

Series 15i
Series 16i
Series 18i
Series 21i
Power Mate i
Open

Series 15i

The following addresses are supported for this model. Not all address ranges may be valid for the particular device being used. For more information, refer to the specific device's documentation. Click on the following links to jump to the specific section.

CNC Data
Arrays
Strings

PMC Data

The default data types for dynamically defined DDE tags are shown in **bold**.

Address Type	Range	Data Type	Access
A (Message demand)	A00000-A00124 A00000-A00123 A00000-A00121 Axxxxx.0-Axxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
C (Counter)	C00000-C00199 C00000-C00198 C00000-C00196 Cxxxxx.0-Cxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
D (Data table)	D00000-D09999 D00000-D09998 D00000-D09996 Dxxxxx.0-Dxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
F (Signal to CNC->PMC)	F00000-F00511 F00000-F00510 F00000-F00508 Fxxxxx.0-Fxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read Only
G (Signal to PMC->CNC)	G00000-G00511 G00000-G00510 G00000-G00508 Gxxxxx.0-Gxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
K (Keep relay)	K00000-K00909 K00000-K00908 K00000-K00906 Kxxxxx.0-Kxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
R (Internal relay)	R00000-R09199 R00000-R09198 R00000-R09196 Rxxxxx.0-Rxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
T (Changeable timer)	T00000-T00299 T00000-T00298 T00000-T00296 Txxxxx.0-Txxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
X (Signal to machine->PMC)	X00000-X00127 X00000-X00126 X00000-X00124 Xxxxxx.0-Xxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read Only
Y (Signal to PMC->machine)	Y00000-Y00127	**Byte**, Char	Read/Write

	Y00000-Y00126 Y00000-Y00124 Yxxxxx.0-Yxxxxx.7	Word, Short DWord, Long, Float Boolean	
Custom Macro Value (common range)	#0100-#0999	**Float**	Read/Write
Custom Macro Value (local range)	#0001-#0033	**Float**	Read Only
Custom Macro Value (system range)	#1000-#9999	**Float**	Read/Write

CNC Data
Tool Offset
Workpiece Zero Offset

Arrays
Arrays are supported for all PMC addresses, except for Custom Macros in the system range and where Boolean or string data types are used. Tool Offset data cannot be addressed as an array. The syntax for declaring an array is as follows:

Mxxxx[cols] with assumed row count of 1.
Mxxxxx[rows][cols] where M is the address type and *xxxxx* is the byte offset of the first element in the array.

Note: For all arrays, the total number of bytes being requested cannot exceed the specified request size.

Strings
All address types can be read and written to as ASCII strings. Each byte of memory will contain one ASCII character. The length of strings can range from 1 to 120 and is entered in place of the bit number. An additional character "M" is appended to the address to distinguish string addresses from bit addresses.

Example
To address a string of length 100 characters starting at D00200, enter D00200.100 M.

Note: Use caution when modifying Word, Short, DWord, Long, and Float types. Since all addresses start at a byte offset within the device, it is possible for the memory associated with tags to overlap. For example, word tags D00000 and D00001 overlap at byte 1. Writing to D00000 will also modify the value held in D00001. It is recommended that these memory types be used such that each value to be read and written to by the driver occupy a unique range of memory in the device. For example, users might map 3 Word values to bytes D00000-D00001, D00002-D00003, and D00004-D00005. Tags to access these values would then have addresses D00000, D00002, and D00004 respectively, and a data type of Word.

Series 16i
The following addresses are supported for this model. Not all address ranges may be valid for the particular device being used. For more information, refer to the specific device's documentation. Click on the following links to jump to the specific section.

CNC Data
Arrays
Strings

PMC Data
The default data types for dynamically defined DDE tags are shown in **bold**.

Address Type	Range	Data Type	Access
A (Message demand)	A00000-A00124 A00000-A00123 A00000-A00121 Axxxxx.0-Axxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
C (Counter)	C00000-C00199 C00000-C00198 C00000-C00196 Cxxxxx.0-Cxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
D (Data table)	D00000-D09999 D00000-D09998 D00000-D09996 Dxxxxx.0-Dxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
E (Extended relay)	E00000-E07999	**Byte**, Char	Read/Write

	E00000-E07998 E00000-E07996 Exxxxx.0-Exxxxx.7	Word, Short DWord, Long, Float Boolean	
F (Signal to CNC->PMC)	F00000-F02511 F00000-F02510 F00000-F02508 Fxxxxx.0-Fxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read Only
G (Signal to PMC->CNC)	G00000-G02511 G00000-G02510 G00000-G02508 Gxxxxx.0-Gxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
K (Keep relay)	K00000-K00909 K00000-K00908 K00000-K00906 Kxxxxx.0-Kxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
M (Input signal from other devices)	M00000-M00511 M00000-M00510 M00000-M00508 Mxxxxx.0-Mxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read Only
N (Output signal from other devices)	N00000-N00511 N00000-N00510 N00000-N00508 Nxxxxx.0-Nxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
R (Internal relay)	R00000-R09119 R00000-R09118 R00000-R09116 Rxxxxx.0-Rxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
T (Changeable timer)	T00000-T00299 T00000-T00298 T00000-T00296 Txxxxx.0-Txxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
X (Signal to machine->PMC)	X00000-X00127 X00000-X00126 X00000-X00124 Xxxxxx.0-Xxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read Only
Y (Signal to PMC->machine)	Y00000-Y00127 Y00000-Y00126 Y00000-Y00124 Yxxxxx.0-Yxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
Custom Macro Value (common range)	#0100-#0999	**Float**	Read/Write
Custom Macro Value (local range)	#0001-#0033	**Float**	Read Only
Custom Macro Value (system range)	#1000-#9999	**Float**	Read/Write

CNC Data

Tool Offset
Workpiece Zero Offset

Arrays

Arrays are supported for all PMC addresses, except for Custom Macros in the system range and where Boolean or string data types are used. Tool Offset data cannot be addressed as an array. The syntax for declaring an array is as follows:

Mxxxxx[cols] with assumed row count of 1.
Mxxxxx[rows][cols] where M is the address type and *xxxxx* is the byte offset of the first element in the array.

Note: For all arrays, the total number of bytes being requested cannot exceed the specified request size.

Strings

All address types can be read and written to as ASCII strings. Each byte of memory will contain one ASCII character. The length of strings can range from 1 to 120 and is entered in place of the bit number. An additional character "M" is appended to the address to distinguish string addresses from bit addresses.

Example

To address a string of length 100 characters starting at D00200, enter D00200.100 M.

Note: Use caution when modifying Word, Short, DWord, Long, and Float types. Since all addresses start at a byte offset within the device, it is possible for the memory associated with tags to overlap. For example, word tags D00000 and D00001 overlap at byte 1. Writing to D00000 will also modify the value held in D00001. It is recommended that these memory types be used such that each value to be read and written to by the driver occupy a unique range of memory in the device. For example, users might map 3 Word values to bytes D00000-D00001, D00002-D00003, and D00004-D00005. Tags to access these values would then have addresses D00000, D00002, and D00004 respectively, and a data type of Word.

Series 18i

The following addresses are supported for this model. Not all address ranges may be valid for the particular device being used. For more information, refer to the specific device's documentation. Click on the following links to jump to the specific section.

CNC Data
Arrays
Strings

PMC Data

The default data types for dynamically defined DDE tags are shown in **bold**.

Address Type	Range	Data Type	Access
A (Message demand)	A00000-A00124 A00000-A00123 A00000-A00121 Axxxxx.0-Axxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
C (Counter)	C00000-C00199 C00000-C00198 C00000-C00196 Cxxxxx.0-Cxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
D (Data table)	D00000-D09999 D00000-D09998 D00000-D09996 Dxxxxx.0-Dxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
E (Extended relay)	E00000-E07999 E00000-E07998 E00000-E07996 Exxxxx.0-Exxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
F (Signal to CNC->PMC)	F00000-F02511 F00000-F02510 F00000-F02508 Fxxxxx.0-Fxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read Only
G (Signal to PMC->CNC)	G00000-G02511 G00000-G02510 G00000-G02508 Gxxxxx.0-Gxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
K (Keep relay)	K00000-K00909 K00000-K00908 K00000-K00906 Kxxxxx.0-Kxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
M (Input signal from other devices)	M00000-M00511 M00000-M00510 M00000-M00508 Mxxxxx.0-Mxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read Only
N (Output signal from other devices)	N00000-N00511 N00000-N00510 N00000-N00508 Nxxxxx.0-Nxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write

R (Internal relay)	R00000-R09119 R00000-R09118 R00000-R09116 Rxxxxx.0-Rxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
T (Changeable timer)	T00000-T00299 T00000-T00298 T00000-T00296 Txxxxx.0-Txxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
X (Signal to machine->PMC)	X00000-X00127 X00000-X00126 X00000-X00124 Xxxxxx.0-Xxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read Only
Y (Signal to PMC->machine)	Y00000-Y00127 Y00000-Y00126 Y00000-Y00124 Yxxxxx.0-Yxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
Custom Macro Value (common range)	#0100-#0999	**Float**	Read/Write
Custom Macro Value (local range)	#0001-#0033	**Float**	Read Only
Custom Macro Value (system range)	#1000-#9999	**Float**	Read/Write

CNC Data

Tool Offset
Workpiece Zero Offset

Arrays

Arrays are supported for all PMC addresses, except for Custom Macros in the system range and where Boolean or string data types are used. Tool Offset data cannot be addressed as an array. The syntax for declaring an array is as follows:

Mxxxxx[cols] with assumed row count of 1.
Mxxxxx[rows][cols] where M is the address type and *xxxxx* is the byte offset of the first element in the array.

Note: For all arrays, the total number of bytes being requested cannot exceed the specified request size.

Strings

All address types can be read and written to as ASCII strings. Each byte of memory will contain one ASCII character. The length of strings can range from 1 to 120 and is entered in place of the bit number. An additional character "M" is appended to the address to distinguish string addresses from bit addresses.

Example
To address a string of length 100 characters starting at D00200, enter D00200.100 M.

Note: Use caution when modifying Word, Short, DWord, Long, and Float types. Since all addresses start at a byte offset within the device, it is possible for the memory associated with tags to overlap. For example, word tags D00000 and D00001 overlap at byte 1. Writing to D00000 will also modify the value held in D00001. It is recommended that these memory types be used such that each value to be read and written to by the driver occupy a unique range of memory in the device. For example, users might map 3 Word values to bytes D00000-D00001, D00002-D00003, and D00004-D00005. Tags to access these values would then have addresses D00000, D00002, and D00004 respectively, and a data type of Word.

Series 21i

The following addresses are supported for this model. Not all address ranges may be valid for the particular device being used. For more information, refer to the specific device's documentation. Click on the following links to jump to the specific section.

CNC Data
Arrays
Strings

PMC Data

The default data types for dynamically defined DDE tags are shown in **bold**.

Address Type	Range	Data Type	Access
A (Message demand)	A00000-A00124 A00000-A00123 A00000-A00121 Axxxxx.0-Axxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
C (Counter)	C00000-C00199 C00000-C00198 C00000-C00196 Cxxxxx.0-Cxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
D (Data table)	D00000-D09999 D00000-D09998 D00000-D09996 Dxxxxx.0-Dxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
E (Extended relay)	E00000-E07999 E00000-E07998 E00000-E07996 Exxxxx.0-Exxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
F (Signal to CNC->PMC)	F00000-F02511 F00000-F02510 F00000-F02508 Fxxxxx.0-Fxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read Only
G (Signal to PMC->CNC)	G00000-G02511 G00000-G02510 G00000-G02508 Gxxxxx.0-Gxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
K (Keep relay)	K00000-K00909 K00000-K00908 K00000-K00906 Kxxxxx.0-Kxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
M (Input signal from other devices)	M00000-M00511 M00000-M00510 M00000-M00508 Mxxxxx.0-Mxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read Only
N (Output signal from other devices)	N00000-N00511 N00000-N00510 N00000-N00508 Nxxxxx.0-Nxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
R (Internal relay)	R00000-R09119 R00000-R09118 R00000-R09116 Rxxxxx.0-Rxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
T (Changeable timer)	T00000-T00299 T00000-T00298 T00000-T00296 Txxxxx.0-Txxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
X (Signal to machine->PMC)	X00000-X00127 X00000-X00126 X00000-X00124 Xxxxxx.0-Xxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read Only
Y (Signal to PMC->machine)	Y00000-Y00127 Y00000-Y00126 Y00000-Y00124 Yxxxxx.0-Yxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
Custom Macro Value (common range)	#0100-#0999	**Float**	Read/Write
Custom Macro Value (local range)	#0001-#0033	**Float**	Read Only
Custom Macro Value (system range)	#1000-#9999	**Float**	Read/Write

CNC Data
Tool Offset
Workpiece Zero Offset

Arrays

Arrays are supported for all PMC addresses, except for Custom Macros in the system range and where Boolean or string data types are used. Tool Offset data cannot be addressed as an array. The syntax for declaring an array is as follows:

Mxxxxx[cols] with assumed row count of 1.
Mxxxxx[rows][cols] where M is the address type and *xxxxx* is the byte offset of the first element in the array.

Note: For all arrays, the total number of bytes being requested cannot exceed the specified request size.

Strings

All address types can be read and written to as ASCII strings. Each byte of memory will contain one ASCII character. The length of strings can range from 1 to 120 and is entered in place of the bit number. An additional character "M" is appended to the address to distinguish string addresses from bit addresses.

Example
To address a string of length 100 characters starting at D00200, enter D00200.100 M.

Note: Use caution when modifying Word, Short, DWord, Long, and Float types. Since all addresses start at a byte offset within the device, it is possible for the memory associated with tags to overlap. For example, word tags D00000 and D00001 overlap at byte 1. Writing to D00000 will also modify the value held in D00001. It is recommended that these memory types be used such that each value to be read and written to by the driver occupy a unique range of memory in the device. For example, users might map 3 Word values to bytes D00000-D00001, D00002-D00003, and D00004-D00005. Tags to access these values would then have addresses D00000, D00002, and D00004 respectively, and a data type of Word.

Power Mate i

The following addresses are supported for this model. Not all address ranges may be valid for the particular device being used. For more information, refer to the specific device's documentation. Click on the following links to jump to the specific section.

CNC Data
Arrays
Strings

PMC Data

The default data types for dynamically defined DDE tags are shown in **bold**.

Address Type	Range	Data Type	Access
A (Message demand)	A00000-A00124 A00000-A00123 A00000-A00121 Axxxxx.0-Axxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
C (Counter)	C00000-C00199 C00000-C00198 C00000-C00196 Cxxxxx.0-Cxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
D (Data table)	D00000-D09999 D00000-D09998 D00000-D09996 Dxxxxx.0-Dxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
E (Extended relay)	E00000-E07999 E00000-E07998 E00000-E07996 Exxxxx.0-Exxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
F (Signal to CNC->PMC)	F00000-F02511 F00000-F02510 F00000-F02508 Fxxxxx.0-Fxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read Only
G (Signal to PMC->CNC)	G00000-G02511 G00000-G02510 G00000-G02508 Gxxxxx.0-Gxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
K (Keep relay)	K00000-K00909 K00000-K00908	**Byte**, Char Word, Short	Read/Write

	K00000-K00906 Kxxxxx.0-Kxxxxx.7	DWord, Long, Float Boolean	
M (Input signal from other devices)	M00000-M00511 M00000-M00510 M00000-M00508 Mxxxxx.0-Mxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read Only
N (Output signal from other devices)	N00000-N00511 N00000-N00510 N00000-N00508 Nxxxxx.0-Nxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
R (Internal relay)	R00000-R09119 R00000-R09118 R00000-R09116 Rxxxxx.0-Rxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
T (Changeable timer)	T00000-T00299 T00000-T00298 T00000-T00296 Txxxxx.0-Txxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
X (Signal to machine->PMC)	X00000-X00127 X00000-X00126 X00000-X00124 Xxxxxx.0-Xxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read Only
Y (Signal to PMC->machine)	Y00000-Y00127 Y00000-Y00126 Y00000-Y00124 Yxxxxx.0-Yxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
Custom Macro Value (common range)	#0100-#0999	**Float**	Read/Write
Custom Macro Value (local range)	#0001-#0033	**Float**	Read Only
Custom Macro Value (system range)	#1000-#9999	**Float**	Read/Write

CNC Data

Tool Offset
Workpiece Zero Offset

Arrays

Arrays are supported for all PMC addresses, except for Custom Macros in the system range and where Boolean or string data types are used. Tool Offset data cannot be addressed as an array. The syntax for declaring an array is as follows:

Mxxxx[cols] with assumed row count of 1.
Mxxxxx[rows][cols] where M is the address type and *xxxxx* is the byte offset of the first element in the array.

Note: For all arrays, the total number of bytes being requested cannot exceed the specified request size.

Strings

All address types can be read and written to as ASCII strings. Each byte of memory will contain one ASCII character. The length of strings can range from 1 to 120 and is entered in place of the bit number. An additional character "M" is appended to the address to distinguish string addresses from bit addresses.

Example
To address a string of length 100 characters starting at D00200, enter D00200.100 M.

Note: Use caution when modifying Word, Short, DWord, Long, and Float types. Since all addresses start at a byte offset within the device, it is possible for the memory associated with tags to overlap. For example, word tags D00000 and D00001 overlap at byte 1. Writing to D00000 will also modify the value held in D00001. It is recommended that these memory types be used such that each value to be read and written to by the driver occupy a unique range of memory in the device. For example, users might map 3 Word values to bytes D00000-D00001, D00002-D00003, and D00004-D00005. Tags to access these values would then have addresses D00000, D00002, and D00004 respectively, and a data type of Word.

Open

The following addresses are supported for this model. Not all address ranges may be valid for the particular device being used. For more information, refer to the specific device's documentation. Click on the following links

to jump to the specific section.

CNC Data
Arrays
Strings

PMC Data

The default data types for dynamically defined DDE tags are shown in **bold**.

Address Type	Range	Data Type	Access
A (Message demand)	A00000-A32767 A00000-A32766 A00000-A32764 Axxxxx.0-Axxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
C (Counter)	C00000-C32767 C00000-C32766 C00000-C32764 Cxxxxx.0-Cxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
D (Data table)	D00000-D32767 D00000-D32766 D00000-D32764 Dxxxxx.0-Dxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
E (Extended relay)	E00000-E32767 E00000-E32766 E00000-E32764 Exxxxx.0-Exxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
F (Signal to CNC->PMC)	F00000-F32767 F00000-F32766 F00000-F32764 Fxxxxx.0-Fxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read Only
G (Signal to PMC->CNC)	G00000-G32767 G00000-G32766 G00000-G32764 Gxxxxx.0-Gxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
K (Keep relay)	K00000-K32767 K00000-K32766 K00000-K32764 Kxxxxx.0-Kxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
M (Input signal from other devices)	M00000-M32767 M00000-M32766 M00000-M32764 Mxxxxx.0-Mxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read Only
N (Output signal from other devices)	N00000-N32767 N00000-N32766 N00000-N32764 Nxxxxx.0-Nxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
R (Internal relay)	R00000-R32767 R00000-R32766 R00000-R32764 Rxxxxx.0-Rxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
T (Changeable timer)	T00000-T32767 T00000-T32766 T00000-T32764 Txxxxx.0-Txxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write
X (Signal to machine->PMC)	X00000-X32767 X00000-X32766 X00000-X32764 Xxxxxx.0-Xxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read Only
Y (Signal to PMC->machine)	Y00000-Y32767 Y00000-Y32766 Y00000-Y32764 Yxxxxx.0-Yxxxxx.7	**Byte**, Char Word, Short DWord, Long, Float Boolean	Read/Write

Custom Macro Value (common range)	#0100-#0999	**Float**	Read/Write
Custom Macro Value (local range)	#0001-#0033	**Float**	Read Only
Custom Macro Value (system range)	#1000-#9999	**Float**	Read/Write

CNC Data
Tool Offset
Workpiece Zero Offset

Arrays
Arrays are supported for all PMC addresses, except for Custom Macros in the system range and where Boolean or string data types are used. Tool Offset data cannot be addressed as an array. The syntax for declaring an array is as follows:

Mxxxxx[cols] with assumed row count of 1.
Mxxxxx[rows][cols] where M is the address type and *xxxxx* is the byte offset of the first element in the array.

Note: For all arrays, the total number of bytes being requested cannot exceed the specified request size.

Strings
All address types can be read and written to as ASCII strings. Each byte of memory will contain one ASCII character. The length of strings can range from 1 to 120 and is entered in place of the bit number. An additional character "M" is appended to the address to distinguish string addresses from bit addresses.

Example
To address a string of length 100 characters, starting at D00200, enter D00200.100 M.

Note: Use caution when modifying Word, Short, DWord, Long, and Float types. Since all addresses start at a byte offset within the device, it is possible for the memory associated with tags to overlap. For example, word tags D00000 and D00001 overlap at byte 1. Writing to D00000 will also modify the value held in D00001. It is recommended that these memory types be used such that each value to be read and written to by the driver occupy a unique range of memory in the device. For example, users might map 3 Word values to bytes D00000-D00001, D00002-D00003, and D00004-D00005. Tags to access these values would then have addresses D00000, D00002, and D00004 respectively, and a data type of Word.

Tool Offset

CNC Data

Address Type	Range	Data Type	Access
Tool Offset	TOFS:nn:o nn = Tool Number (01-64) o = Offset Type (0-9, see note below)	**Long**, DWord	Read/Write

Tool Offset Types
The tool offset type's meaning depends on the hardware. The following tables summarize the various offset types.

	Cutter Radius	Tool Length
Wear	0	2
Geometry	1	3

Lathe Series (T series)

	X-Axis	Z-Axis	Nose R	Imaginary Tool Nose	Y-Axis
Wear	0	2	4	6	8
Geometry	1	3	5	7	9

Tool Offset Values
Series 15, 150i

6007#0 (OFE)	6004#0 (OFD)	6002#1 (OFC)	6002#0 (OFA)	Linear axis mm input [mm]	Linear axis inch input [inch]	Rotation axis [deg]

0	0	0	1	0.01	0.001	0.01
0	0	0	0	0.001	0.0001	0.001
0	0	1	0	0.0001	0.00001	0.0001
0	1	0	0	0.00001	0.000001	0.00001
1	0	0	0	0.000001	0.0000001	0.000001

Series 16/18/21, 160/180/210, 160i/180i/210i, 0i, Power Mate, Open

	1004#1 (ISC)	1004#0 (ISA)	Linear axis mm input [mm]	Linear axis inch input [inch]	Rotation axis [deg]
IS-A*	0	1	0.01	0.001	0.01
IS-B	0	0	0.001	0.0001	0.001
IS-C**	1	0	0.0001	0.00001	0.0001

*IS-A is effective for Power Mate i-H.
**IS-C is effective for Power Mate i-D.

Workpiece Zero Offset

Not all addresses will be valid for all device models.

CNC Data

Address Type	Range	Data Type	Access
Workpiece Zero Offset	ZOFS:aa:ooo aa = axis (01-32) ooo = offset (000-306)	**Long**, DWord	Read/Write

Workpiece Zero Offset Values

Series 150

	1009#1 (ISE)	1004#5 (ISD)	1004#1 (ISF)	1004#0 (ISR)	Linear axis mm input [mm]	Linear axis inch input [inch]	Rotation axis [deg]
IS-A	0	0	0	1	0.01	0.001	0.01
IS-B	0	0	0	0	0.001	0.0001	0.001
IS-C	0	0	1	0	0.0001	0.00001	0.0001
IS-D	0	1	0	0	0.00001	0.000001	0.00001
IS-E	1	0	0	0	0.000001	0.0000001	0.000001

Series 15, 150i

	1012#3 (ISE)	1012#2 (ISD)	1012#1 (ISC)	1012#0 (ISA)	Linear axis mm input [mm]	Linear axis inch input [inch]	Rotation axis [deg]
IS-A	0	0	0	1	0.01	0.001	0.01
IS-B	0	0	0	0	0.001	0.0001	0.001
IS-C	0	0	1	0	0.0001	0.00001	0.0001
IS-D	0	1	0	0	0.00001	0.000001	0.00001
IS-E	1	0	0	0	0.000001	0.0000001	0.000001

Series 16/18/21, 160/180/210, 160i/180i/210i, 0i, Power Mate, Open

	1004#1 (ISC)	1004#0 (ISA)	Linear axis mm input [mm]	Linear axis inch input [inch]	Rotation axis [deg]
IS-A	0	1	0.01	0.001	0.01
IS-B	0	0	0.001	0.0001	0.001
IS-C	1	0	0.0001	0.00001	0.0001

Series 300i

	1013#3 (ISE)	1013#2 (ISD)	1013#1 (ISC)	1013#0 (ISA)	Linear axis mm input [mm]	Linear axis inch input [inch]	Rotation axis [deg]
IS-A	0	0	0	1	0.01	0.001	0.01
IS-B	0	0	0	0	0.001	0.0001	0.001

IS-C	0	0	1	0	0.0001	0.00001	0.0001
IS-D	0	1	0	0	0.00001	0.000001	0.00001
IS-E	1	0	0	0	0.000001	0.0000001	0.000001

Error Descriptions

The following error/warning messages may be generated. Click on the link for a description of the message.

Address Validation

Address '<address>' is out of range for the specified device or register
Array size is out of range for address '<address>'
Array support is not available for the specified address: '<address>'
Data Type '<type>' is not valid for device address '<address>'
Device address '<address>' contains a syntax error
Device address '<address>' is Read Only
Missing address

Device Status Messages

Device '<device name>' is not responding
Unable to write to '<address>' on device '<device name>'

General Driver Error Messages

Could not acquire library handle for device '<channel.device>'. FWLIB error: <code>
Could not set request timeout for device '<channel.device>'. FWLIB error: <code>
Could not read one or more vacant macros in range starting at '<address>' on device '<device>'
Device ID <node> is too large for device '<channel.device>'. The maximum allowed is '<max node>'
Failed to read maximum Node ID for device '<channel.device>'
Read error occurred for address starting at '<address>' on device '<channel.device>'. FWLIB error: <code>
Unable to start the GE Focas Data Window Library services
Write error occurred for address '<address>' on device '<channel.device>'. FWLIB error: <code>

Focas1 Data Window Library Error Codes

Focas1 Data Window Library Error Codes

Address Validation

The following error/warning messages may be generated. Click on the link for a description of the message.

Address Validation

Address '<address>' is out of range for the specified device or register
Array size is out of range for address '<address>'
Array support is not available for the specified address: '<address>'
Data Type '<type>' is not valid for device address '<address>'
Device address '<address>' contains a syntax error
Device address '<address>' is Read Only
Missing address

Address '<address>' is out of range for the specified device or register

Error Type:
Warning

Possible Cause:
A tag address that has been specified statically references a location that is beyond the range of supported locations for the device.

Solution:
Verify that the address is correct; if it is not, re-enter it in the client application.

Array size is out of range for address '<address>'

Error Type:
Warning

Possible Cause:

A tag address that has been specified statically is requesting an array size that is too large for the address type or block size of the driver.

Solution:
Re-enter the address in the client application to specify a smaller value for the array or a different starting point.

Array support is not available for the specified address: '<address>'

Error Type:
Warning

Possible Cause:
A tag address that has been specified statically contains an array reference for an address type that doesn't support arrays.

Solution:
Re-enter the address in the client application to remove the array reference or correct the address type.

Data Type '<type>' is not valid for device address '<address>'

Error Type:
Warning

Possible Cause:
A tag address that has been specified statically has been assigned an invalid data type.

Solution:
Modify the requested data type in the client application.

Device address '<address>' contains a syntax error

Error Type:
Warning

Possible Cause:
A tag address that has been specified statically contains one or more invalid characters.

Solution:
Re-enter the address in the client application.

Device address '<address>' is Read Only

Error Type:
Warning

Possible Cause:
A tag address that has been specified statically has a requested access mode that is not compatible with what the device supports for that address.

Solution:
Change the access mode in the client application.

Missing address

Error Type:
Warning

Possible Cause:
A tag address that has been specified statically has no length.

Solution:
Re-enter the address in the client application.

Device Status Messages

The following error/warning messages may be generated. Click on the link for a description of the message.

Device Status Messages
Device '<device name>' is not responding
Unable to write to '<address>' on device '<device name>'

Device '<device name>' is not responding

Error Type:
Serious

Possible Cause:
1. The connection between the device and the host PC is broken.
2. The IP address assigned to the device is incorrect.
3. The response from the device took longer to receive than the amount of time specified in the "Request Timeout" device setting.

Solution:
1. Verify the cabling between the PC and the PLC device.
2. Verify that the IP address given to the named device matches that of the actual device.
3. Increase the Request Timeout setting so that the entire response can be handled.

Unable to write to '<address>' on device '<device name>'

Error Type:
Serious

Possible Cause:
1. The connection between the device and the host PC is broken.
2. The named device may have been assigned an incorrect IP address.

Solution:
1. Verify the cabling between the PC and the PLC device.
2. Verify that the IP address given to the named device matches that of the actual device.

General Driver Error Messages

The following error/warning messages may be generated. Click on the link for a description of the message.

General Driver Error Messages
Could not acquire library handle for device '<channel.device>'. FWLIB error: <code>
Could not set request timeout for device '<channel.device>'. FWLIB error: <code>
Could not read one or more vacant macros in range starting at '<address>' on device '<device>'
Device ID <node> is too large for device '<channel.device>'. The maximum allowed is '<max node>'
Failed to read maximum Node ID for device '<channel.device>'
Read error occurred for address starting at '<address>' on device '<channel.device>'. FWLIB error: <code>
Unable to start the GE Focas Data Window Library services
Write error occurred for address '<address>' on device '<channel.device>'. FWLIB error: <code>

Could not acquire library handle for device '<channel.device>'. FWLIB error: <code>

Error Type:
Warning

Possible Cause:
1. Call to Focas1 Data Window Library to connect to device failed.
2. Invalid device IP or port number.
3. The device may not be running.
4. The device may be busy processing other requests.
5. There may be a cabling problem.

Solution:

The error code provided by the library should help diagnose the problem. If the problem is transient, the driver should be able to connect on a subsequent retry.

See Also:
Focas1 Data Window Library Error Codes

Could not read one or more vacant macros in range starting at '<address>' on device '<device>'

Error Type:
Warning

Possible Cause:
The macro number is not configured in the device.

Solution:
Check the tag address and device configuration.

Could not set request timeout for device '<channel.device>'. FWLIB error: <code>

Error Type:
Warning

Possible Cause:
1. Call to Focas1 Data Window Library to set request timeout failed.
2. Invalid timeout.
3. The device may be busy processing other requests.
4. There may be a cabling problem.

Solution:
The error code provided by the library should help diagnose the problem. If the problem is transient, the driver should be able to set the timeout on a subsequent retry.

See Also:
Focas1 Data Window Library Error Codes

Device ID <node> is too large for device '<channel.device>'. The maximum allowed is '<max node>'

Error Type:
Serious

Possible Cause:
The node number configured as the Device ID is greater than the maximum node supported by the controller.

Solution:
Set the Device ID to a compatible node number.

Failed to read maximum Node ID for device '<channel.device>'

Error Type:
Serious

Possible Cause:
1. There is something wrong with the connection.
2. An incorrect version of the Focas library is installed.

Solution:
1. Check the connection between the device and the host computer.
2. Make sure that "Focas1 for HSSB" or "Focas2 (Combined Ethernet and HSSB)" library software is installed on the host computer.

Read error occurred for address starting at '<address>' on device '<channel.device>'. FWLIB error: <code>

Error Type:
Warning

Possible Cause:
1. Call to Focas1 Data Window Library to read data failed.
2. Invalid PMC type.
3. Invalid addresses.
4. Invalid request size.
5. The device may be busy processing other requests.
5. There may be a cabling problem.

Solution:
The error code provided by the library should help diagnose the problem. If the problem is transient, the driver should be able to read the data on a subsequent retry.

See Also:
Focas1 Data Window Library Error Codes

Unable to start the GE Focas Data Window Library services

Error Type:
Fatal

Possible Cause:
The driver was unable to load the GE Focas1 Data Window Library.

Solution:
Make sure the library is installed on the computer. Contact the GE distributor for this software.

Write error occurred for address '<address>' on device '<channel.device>'. FWLIB error: <code>

Error Type:
Warning

Possible Cause:
1. Call to Focas1 Data Window Library to write data failed.
2. Invalid PMC type.
3. Invalid address.
4. Invalid request size.
5. The device may be busy processing other requests.
6. There may be a cabling problem.

Solution:
The error code provided by the library should help diagnose the problem. If the problem is transient, the driver should be able to write the data on a subsequent retry.

See Also:
Focas1 Data Window Library Error Codes

Focas1 Data Window Library Error Codes

This driver uses the GE Focas1 Data Window Library software to communicate with devices on the network. When the library cannot complete a request made by this driver, it will return an error code describing the reason. These error codes are included in the relevant driver error messages. This table is provided to aid in diagnosing the hardware or software configuration problem causing these errors.

Note: For more information, refer to Device Setup.

Error Code	Error Type	Description
-17	Protocol	Data from Ethernet board is incorrect.

-16	Socket	Investigate CNC power supply, Ethernet cable, and I/F board.
-15	DLL	There is no DLL file for CNC series.
-8	Handle	Invalid connection handle.
-7	Version	The CNC/PMC version does not match that of the library. Replace the library or the CNC/PMC control software.
-6	Unexpected	An unanticipated error occurred.
-2	Reset	The RESET or STOP button was pressed.
-1	Busy	The CNC was busy processing another request. This commonly occurs during slave device connect attempts. The driver will retry until a connection is made.
0	Normal	Function was completed without error.
1 (CNC)	Function	Function was not executed or is not available. This can occur if the Unsolicited Message Server goes down while the driver is using it. The driver will attempt to restart the message server.
1 (PMC)	No PMC	The PMC does not exist.
2	Length	Invalid data block length.
3 (CNC)	Number	Invalid data number.
3 (PMC)	Range	Invalid address range.
4 (CNC)	Attribute	Invalid data attribute. This could result from a bad address type or range for data Read/Write.
4 (PMC)	Type	Invalid address type.
5	Data	Invalid data.
6	No Option	Invalid CNC option.
7	Protection	Write operation is prohibited.
8	Overflow	CNC tape memory is overflowed.
9	Parameter	CNC parameter is set incorrectly.
10	Buffer	The buffer is empty or full. This can occur if there are more slave devices than the Unsolicited Message Server is configured to handle.
11	Path	Invalid path number.
12	Mode	Invalid CNC mode.
13	Reject	CNC rejected request. This can occur if an attempt is made to start multiple unsolicited messaging sessions with the same device.
14	Data Server	Data server error occurred.
15	Alarm	Function cannot be executed due to an alarm in CNC.
16	Stop	CNC status is stop or emergency.
17	Password	Data is protected by the CNC data protection function.

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