Fanuc Focas HSSB Driver

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Fanuc Focas HSSB Driver

Help version 1.041

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Overview

The Fanuc Focas HSSB Driver provides a reliable way to connect Fanuc 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 Fanuc Focas1 Programmable Logic Controllers.

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

External Dependencies

This driver has external dependencies. For this driver to communicate with the hardware, FANUC CNC Focas1/Ethernet Library (part number A02B-0207-K732) or FANUC Focas2 Library (part number A02B-0207-K737) must be **installed** on the system. Although the library does not need to be installed to create a server project, the project will not run without it.

Note: The Focas2 Library combines both Ethernet and HSSB capabilities and can be purchased from the FANUC distributor or by calling 1-888-326-8287. Choose CNC, PARTS to place the order, then request the part number.

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

Install Focas Library

This driver requires the Focas library to communicate with the hardware (FANUC CNC Focas1/Ethernet Library (part number A02B-0207-K732) or FANUC Focas2 Library (part number A02B-0207-K737)). Follow these steps to install the library:

1. Obtain the library from the distributor (typically Fwlib*.zip).
2. Move or paste the Fwlib*.zip file to the Windows/System32 folder.
3. Unzip / extract the contents of the Fwlib*.zip in the Windows/System32 folder.
4. Reboot the computer.
5. Run the OPC server and configure a Focas1 project.

See Also: External Dependencies

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

Device ID

This property 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.

Device Properties - Communications Parameters

Maximum Request Size: Specify 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: 8, 16, 32, 64, 128, 256, or 512. The default value is 256 bytes.

Optimizing Communications

The Fanuc 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 driver is fast, there are a couple of guidelines that can be used to control and optimize the application and gain maximum performance.

Our server refers to communications protocols like Fanuc 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 Fanuc 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 Fanuc 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 Fanuc Focas HSSB channel. In this configuration, the driver must move from one device to the next as quickly as possible 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 Fanuc Focas HSSB Driver could only define one single channel, then the example shown above would be the only option available; however, the driver can define up to 100 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 100 or fewer devices, it can be optimized exactly how it is shown here.

The performance will improve even if the application has more than 100 devices. While 100 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 driver 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: 8, 16, 32, 64, 128, 256, or 512 bytes. Depending on the model of Fanuc 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 **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.

Note: If the model of interest is listed as supported but is not selectable, use the Open model.

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 a particular device. For more information, refer to the specific device's documentation. Click the following links to jump to a 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

Address Type	Range	Data Type	Access
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 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 could 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 a particular device. For more information, refer to the specific device's documentation. Click the following links to jump to a 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

Address Type	Range	Data Type	Access
	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:

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 could 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 a particular device. For more information, refer to the specific device's documentation. Click the following links to jump to a 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

Address Type	Range	Data Type	Access
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 could 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 a particular device. For more information, refer to the specific device's documentation. Click the following links to jump to a 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	**Byte**, Char Word, Short DWord, Long, Float	Read/Write

Address Type	Range	Data Type	Access
	Exxxxx.0-Exxxxx.7	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 could 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 a particular device. For more information, refer to the specific device's documentation. Click the following links to jump to a 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	**Byte**, Char Word, Short DWord, Long, Float	Read/Write

Address Type	Range	Data Type	Access
	Dxxxxx.0-Dxxxxx.7	Boolean	
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:

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 could 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 a particular device. For more information, refer to the specific device's documentation. Click the following links to jump to a 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	**Byte**, Char Word, Short	Read/Write

Address Type	Range	Data Type	Access
	C00000-C32764 Cxxxxx.0-Cxxxxx.7	DWord, Long, Float Boolean	
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

Address Type	Range	Data Type	Access
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 could 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 are 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

	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-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

Event Log Messages

The following information concerns messages posted to the Event Log pane in the main user interface. Consult the server help on filtering and sorting the Event Log detail view. Server help contains many common messages, so should also be searched. Generally, the type of message (informational, warning) and troubleshooting information is provided whenever possible.

Unable to start the GE Focas Data Window Library services.

Error Type:
Error

Possible Cause:
The driver was unable to load the Fanuc Foacs1 Data Window Library.

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

Could not acquire library handle for device. | FWLIB error = <error>.

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.

Possible 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 set request timeout for device. | FWLIB error = <error>.

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.

Possible 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

Exception occurred while processing read request for address on device. | Start address = '<address>'

Error Type:

Warning

Possible Cause:

There is an error with the third-party DLL file.

Possible Solution:

Validate address or refer to the DLL file source.

Read error occurred for address on device. | Start address = '<address>', FWLIB error = <error>.

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.
6. There may be a cabling problem.

Possible 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

Exception occurred while processing write request on device. | Address = '<address>'

Error Type:
Warning

Possible Cause:
There is an error with the third-party DLL file.

Possible Solution:
Validate address or refer to the DLL file source.

Write error occurred for address on device. | Address = '<address>', FWLIB error = <error>.

Error Type:
Warning

Possible Cause:

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

Possible 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

Device ID is too large for device. | Specified ID = <id>, Maximum allowed ID = <max id>

Error Type:
Warning

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

Possible Solution:

Set the Device ID to a compatible node number.

Failed to read maximum node id for device. | FWLIB error = <error>.

Error Type:
Warning

Possible Cause:

1. There is something wrong with the connection.
2. An incorrect version of the Focas library is installed.
3. The HSSB interface card and/or the drivers that are required for execution are not installed.

Possible Solution:

1. Check the connection between the device and the host computer.
2. Ensure that "Focas1 for HSSB" or "Focas2 (Combined Ethernet and HSSB)" library software is installed on the host computer.
3. Install an HSSB interface card in the host computer, and use the appropriate fiber optic cable to connect it to the controller.

See Also:
Focas1 Data Window Library Error Codes

Could not read one or more vacant macros in address range. | Range start address = '<address>'

Error Type:
Warning

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

Possible Solution:
Check the tag address and device configuration.

Focas1 Data Window Library Codes

This driver uses the Fanuc 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
-15	DLL	There is no DLL file for CNC series.
-11	Bus	A bus error of the CNC system occurred. Contact the service section (or the section in charge).
-10	System	A system error of the CNC system occurred. Contact the service section (or the section in charge).
-9	Communication	Investigate the serial line or I/F board.
-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.
-5	System	A system error of CNC occurred. Contact the service section (or the section in charge).
-4	Parity	A hardware error occurred. Contact the service section.
-3	Install	The drivers required for execution are not installed.
-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.

Error Code	Error Type	Description
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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