

# **Omron Toolbus Driver Help**

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## Omron Toolbus Driver Help

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Help version 1.012

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### Overview

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The Omron Toolbus Driver provides an easy and reliable way to connect Omron Toolbus devices to OPC Client applications, including HMI, SCADA, Historian, MES, ERP and countless custom applications. It is intended for use with CJ1-series and CS1-series models.

## Device Setup

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### Supported Devices

CJ1-series  
CS1-series

### Communication Protocol

Omron Toolbus

### Supported Communication Parameters

Baud Rate: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps  
Parity: Even, Odd or None  
Data Bits: 7 or 8  
Stop Bits: 1 or 2

### Ethernet Encapsulation

This driver supports Ethernet Encapsulation, which allows the driver to communicate with serial devices attached to an Ethernet network using a terminal server. It may be invoked through the COM ID dialog in Channel Properties. For more information, refer to the OPC server's help documentation.

### Flow Control

When using an RS232/RS485 converter, the type of flow control required depends on the needs of the converter. Some converters do not require any flow control and others require RTS flow. Consult the converter's documentation in order to determine its flow requirements. An RS485 converter that provides automatic flow control is recommended.

**Note:** When using the manufacturer's supplied communications cable, it is sometimes necessary to choose a flow control setting of **RTS** or **RTS Always** in Channel Properties.

### Device IDs

The Toolbus command system supports communication with devices on local and remote OMRON networks. The Device ID is a three-layer network address that uniquely identifies the target device. The format of the Device ID is *UU.AAA.NNN* where:

UU = Unit Number of the Host Link Unit used for the PC interface. Decimals range from 0-31.

AAA = Toolbus Destination Network Address. Decimals range from 0-127.

NNN = Toolbus Destination Node Number. Decimals range from 0-126.

**Note:** For local connections, use 0.0.0.

### Request Size

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

### Cable

An Omron CS1W-CN226 to DB-9 cable should be used.

## Modem Setup

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This driver supports modem functionality. For more information, please refer to the topic "Modem Support" in the OPC Server Help documentation.

## Data Types Description

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Data Type	Description
Boolean	Single bit
Short	Signed 16 bit value bit 0 is the low bit bit 14 is the high bit bit 15 is the sign bit
Word	Unsigned 16 bit value bit 0 is the low bit bit 15 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
DWord	Unsigned 32 bit value bit 0 is the low bit bit 31 is the high bit
Float	32-bit real
BCD	Two byte packed BCD Value range is 0-9999. Behavior is undefined for values beyond this range.
LBCD	Four byte packed BCD Value range is 0-99999999. Behavior is undefined for values beyond this range.
String	Null terminated ASCII string. Support includes HiLo and LoHi byte order selection and string lengths up to 512 characters.

## CS1/CJ1 Address Descriptions

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

Device Type	Range	Data Type	Access
Auxiliary Relay	A000-A447 A000-A446	<b>Word</b> , Short, BCD, Long, DWord, LBCD, Float	Read Only
	A448-A959 A448-A958	<b>Word</b> , Short, BCD, Long, DWord, LBCD, Float	Read/Write
	A000.00-A000.15...A447.00-A447.15	<b>Boolean</b>	Read Only
	A448.00-A448.15...A959.00-A959.15	<b>Boolean</b>	Read/Write
CIO	CIO0000-CIO6143 CIO0000-CIO6142	<b>Word</b> , Short, BCD, Long, DWord, LBCD, Float	Read/Write
	CIOxxxx.00-CIOxxxx.15	<b>Boolean</b>	
Counter	C0000-C4095	<b>BCD</b> , Word, Short	Read/Write
Counter Status	CS0000-CS4095	<b>Boolean</b>	Read/Write
Data Memory	D00000-D32767 D00000-D32766	<b>Word</b> , Short, BCD, Long, DWord, LBCD, Float	Read/Write
	Dxxxxx.00-Dxxxxx.15	<b>Boolean</b>	
Data Memory as String with HiLo Byte Order	D00000.002H-D32767.128H .l is string length, range 2 to 128 chars	<b>String</b>	Read/Write
Data Memory as String with LoHi Byte Order	D00000.002L-D32767.128L .l is string length, range 2 to 128 chars	<b>String</b>	Read/Write
Data Register	DR00-DR15 DR00-DR14	<b>Word</b> , Short, BCD, Long, DWord, LBCD, Float	Read/Write
Expansion Data Memory*	E00000-E32767 E00000-E32766	<b>Word</b> , Short, BCD, Long, DWord, LBCD, Float	Read/Write
	Exxxxx.00-Exxxxx.15	<b>Boolean</b>	
Expansion Data Memory* as String with HiLo Byte Order	E00000.002H-E32767.128H .l is string length, range 2 to 128 chars	<b>String</b>	Read/Write
Expansion Data Memory* as String with LoHi Byte Order	E00000.002L-E32767.128L .l is string length, range 2 to 128 chars	<b>String</b>	Read/Write
Expansion Data Memory	E00:00000-E12:32767 E00:00000-E12:32766	<b>Word</b> , Short, BCD, Long, DWord, LBCD, Float	Read/Write
	Ex:x.00-Exx:xxxxx.15	<b>Boolean</b>	
Expansion Data Memory as String with HiLo Byte Order	E00:00000.002H-E12:32767.128H .l is string length, range 2 to 128 chars	<b>String</b>	Read/Write
Expansion Data Memory as String with LoHi Byte Order	E00:00000.002L-E12:32767.128L .l is string length, range 2 to 128 chars	<b>String</b>	Read/Write
Holding Relay	H000-H1535 Hxxx.00-Hxxx.15	<b>Word</b> , Short, BCD Long, DWord, LBCD, Float	Read/Write
		<b>Boolean</b>	
Index Register	IR00-IR15	<b>DWord</b> , Long, LBCD, Float	Read/Write
Task Flag	TK00-TK31	<b>Boolean</b>	Read Only
Timer	T0000-T4095	<b>BCD</b> , Word, Short	Read/Write

Timer Status	TS0000-TS4095	<b>Boolean</b>	Read/Write
Working Relay	W000-W511 W000-W510	<b>Word</b> , Short, BCD, Long, DWord, LBCD, Float	Read/Write
	Wxxx.00-Wxxx.15	<b>Boolean</b>	

\*Current bank.

### String Support

The CS1 model supports reading and writing data memory (D) and expansion data memory (E) as an ASCII string. When using data memory for string data, each register will contain two bytes (two characters) of ASCII data. The order of the ASCII data within a given register can be selected when the string is defined. The length of the string can be from 2 to 128 characters and is entered in place of a bit number. The length must be entered as an even number. The range of registers spanned by the string cannot exceed the range of the device type. The byte order is specified by appending either a "H" or "L" to the address.

#### Examples

1. To address a string starting at D01000 with a length of 100 bytes and HiLo byte order, enter:  
D01000.100H
2. To address a string starting at D01100 with a length of 78 bytes and LoHi byte order, enter:  
D01100.078L

### Array Support

Arrays are supported for all data types except Boolean. There are two methods to addressing an array. Examples are given using data memory locations.

Dxxxx [rows] [cols]  
Dxxxx [cols] (this method assumes "rows" is equal to one)

Rows multiplied by cols multiplied by data size in bytes (2 for word, short and BCD and 4 for DWord, Long, LBCD and Float) cannot exceed the request size that has been assigned to the device. For example, a 5X5 array of words results in an array size of 50 bytes (which would require a request size of 64 or 128). For more information, refer to [Device Setup](#).

**Note:** Use caution when modifying 32-bit values (DWord, Long, LBCD and Float). Each address for which these data types are allowed starts at a word offset within the device. Therefore, DWords D0 and D1 overlap at Word D1 and writing to D0 will modify the value held in D1. It is recommended that these data types are used so that overlapping does not occur. For example, when using DWords, users can prevent overlapping Words by using D0, D2, D4 and so on. The exception to this is IR tags, which are native 32 bit values with MSB to LSB byte ordering for the CS1-series PLCs.

### IR, DR, CS and TS Registers

The IR, DR, CS and TS registers can only be written to when the device is in Programming Mode. If the device is in Run Mode, the write will not succeed. If a write is attempted to TS or CS registers in Run Mode, the write will not succeed and an error message will be returned. If a write is attempted to DR or IR registers in Run Mode, the write will not succeed but no error message will be returned.



## Error Descriptions

---

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

### Address Validation

#### [Missing address](#)

[Device address '<address>' contains a syntax error](#)

[Address '<address>' is out of range for the specified device or register](#)

[Device address '<address>' is not supported by model '<model name>'](#)

[Data Type '<type>' is not valid for device address '<address>'](#)

[Device address '<address>' is Read Only](#)

### Serial Communications

#### [COMn does not exist](#)

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[Unable to write to '<address>' on device '<device name>'](#)

[Unable to write to '<address>' on device '<device name>'. Checksum error](#)

[Unable to write to register <register address> for device <device name>. The device is in run mode](#)

[Device '<device name>' responded with local node error](#)

[Device '<device name>' responded with destination node error](#)

[Device '<device name>' responded with a communications error](#)

[Device '<device name>' cannot process command \(Tag '<address>', Size '<bytes>'\)](#)

[Device '<device name>' responded with routing table error](#)

[Device '<device name>' responded with a command format error \(Tag '<address>', Size '<bytes>'\)](#)

[Device '<device name>' responded with a command parameter error \(Tag '<address>', Size '<bytes>'\)](#)

[Device '<device name>' responded with error in unit](#)

[Device '<device name>' cannot accept command \(Tag '<address>', Size '<bytes>'\)](#)

[Device '<device name>' access right denied \(Tag '<address>'\)](#)

[Device '<device name>' responded with write not possible \(Tag '<address>', Size '<bytes>'\)](#)

[Device '<device name>' responded with error '<error code>' \(Tag '<address>', Size '<bytes>'\)](#)

## Address Validation

---

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

### Address Validation

#### [Missing address](#)

[Device address '<address>' contains a syntax error](#)

[Address '<address>' is out of range for the specified device or register](#)

[Device address '<address>' is not supported by model '<model name>'](#)

[Data Type '<type>' is not valid for device address '<address>'](#)

[Device address '<address>' is Read Only](#)

## Missing address

---

### Error Type:

Warning

### Possible Cause:

A tag address that has been specified dynamically has no length.

### Solution:

Re-enter the address in the client application.

---

**Device address '<address>' contains a syntax error**

---

**Error Type:**

Warning

**Possible Cause:**

A tag address that has been specified dynamically contains one or more invalid characters.

**Solution:**

Re-enter the address in the client application.

---

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

---

**Error Type:**

Warning

**Possible Cause:**

A tag address that has been specified dynamically 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.

---

**Device address '<address>' is not supported by model '<model name>'**

---

**Error Type:**

Warning

**Possible Cause:**

A tag address that has been specified dynamically references a location that is valid for the communications protocol, but not supported by the target device.

**Solution:**

Verify that the address is correct; if it is not, re-enter it in the client application. Also verify that the selected model name for the device is correct.

---

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

---

**Error Type:**

Warning

**Possible Cause:**

A tag address that has been specified dynamically has been assigned an invalid data type.

**Solution:**

Modify the requested data type in the client application.

---

**Device address '<address>' is Read Only**

---

**Error Type:**

Warning

**Possible Cause:**

A tag address that has been specified dynamically 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.

---

**Serial Communications**

---

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

**Serial Communications**

[COMn does not exist](#)

[Error opening COMn](#)[COMn is in use by another application](#)[Unable to set comm parameters on COMn](#)[Communications error on '<channel name>' \[<error mask>\]](#)

---

**COMn does not exist**

---

**Error Type:**

Fatal

**Possible Cause:**

The specified COM port is not present on the target computer.

**Solution:**

Verify that the proper COM port has been selected.

---

**Error opening COMn**

---

**Error Type:**

Fatal

**Possible Cause:**

The specified COM port could not be opened due to an internal hardware or software problem on the target computer.

**Solution:**

Verify that the COM port is functional and may be accessed by other Windows applications.

---

**COMn is in use by another application**

---

**Error Type:**

Fatal

**Possible Cause:**

The serial port assigned to a device is being used by another application.

**Solution:**

Verify that the correct port has been assigned to the channel.

---

**Unable to set comm parameters on COMn**

---

**Error Type:**

Fatal

**Possible Cause:**

The serial parameters for the specified COM port are not valid.

**Solution:**

Verify the serial parameters and make any necessary changes.

---

**Communications error on '<channel name>' [<error mask>]**

---

**Error Type:**

Serious

**Error Mask Definitions:**

**B** = Hardware break detected.

**F** = Framing error.

**E** = I/O error.

**O** = Character buffer overrun.

**R** = RX buffer overrun.

**P** = Received byte parity error.

**T** = TX buffer full.

**Possible Cause:**

1. The serial connection between the device and the Host PC is bad.
2. The communications parameters for the serial connection are incorrect.

**Solution:**

1. Verify the cabling between the PC and the PLC device.
2. Verify that the specified communications parameters match those of the device.

**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>' responded with local node error](#)

[Device '<device name>' responded with destination node error](#)

[Device '<device name>' responded with a communications error](#)

[Device '<device name>' cannot process command \(Tag '<address>', Size '<bytes>'\)](#)

[Device '<device name>' responded with routing table error](#)

[Device '<device name>' responded with a command format error \(Tag '<address>', Size '<bytes>'\)](#)

[Device '<device name>' responded with a command parameter error \(Tag '<address>', Size '<bytes>'\)](#)

[Device '<device name>' responded with error in unit](#)

[Device '<device name>' cannot accept command \(Tag '<address>', Size '<bytes>'\)](#)

[Device '<device name>' access right denied \(Tag '<address>'\)](#)

[Device '<device name>' responded with write not possible \(Tag '<address>', Size '<bytes>'\)](#)

[Device '<device name>' responded with error '<error code>' \(Tag '<address>', Size '<bytes>'\)](#)

[Unable to write to register <register address> for device <device name>. The device is in run mode](#)

[Unable to read '<address>' on device '<device name>'. Checksum error](#)

[Unable to write to '<address>' on device '<device name>'. Checksum error](#)

**Device '<device name>' is not responding**

---

**Error Type:**

Serious

**Possible Cause:**

1. The serial connection between the device and the Host PC is broken.
2. The communications parameters for the serial connection are incorrect.
3. The named device may have been assigned an incorrect Network ID.
4. 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 specified communications parameters match those of the device.
3. Verify that the Network ID given to the named device matches that of the actual device.
4. 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 serial connection between the device and the Host PC is broken.
2. The communications parameters for the serial connection are incorrect.
3. The named device may have been assigned an incorrect Network ID.

**Solution:**

1. Verify the cabling between the PC and the PLC device.
2. Verify that the specified communications parameters match those of the device.
3. Verify that the Network ID given to the named device matches that of the actual device.

---

**Device '<device name>' responded with local node error**

---

**Error Type:**

Serious

**Possible Cause:**

The named device may have been assigned an incorrect Network ID.

**Solution:**

Verify that the Network ID given to the named device matches that of the actual device.

---

**Device '<device name>' responded with destination node error**

---

**Error Type:**

Serious

**Possible Cause:**

The named device may have been assigned an incorrect Network ID.

**Solution:**

Verify that the Network ID given to the named device matches that of the actual device.

---

**Device '<device name>' responded with a communications error**

---

**Error Type:**

Serious

**Possible Cause:**

The named device may have been assigned an incorrect Network ID.

**Solution:**

Verify that the Network ID given to the named device matches that of the actual device.

---

**Device '<device name>' cannot process command (Tag '<address>', Size '<bytes>')**

---

**Error Type:**

Warning

**Possible Cause:**

The named device cannot process command for specified model.

**Solution:**

Verify the model setting.

**See Also:**

[Device Setup](#)

---

**Device '<device name>' responded with routing table error**

---

**Error Type:**

Serious

**Possible Cause:**

The named device may have been assigned an incorrect Network ID.

**Solution:**

Verify that the Network ID given to the named device matches that of the actual device.

---

**Device '<device name>' responded with a command format error (Tag '<address>', Size '<bytes>')**

---

**Error Type:**

Warning

**Possible Cause:**

1. The local node's relay table or the relay node's local network table is wrong.
2. An incorrect command format has been used.

**Solution:**

1. Verify routing table settings in the network devices.
2. Verify the model setting.

**See Also:**

[Device Setup](#)

**Device '<device name>' responded with a command parameter error (Tag '<address>', Size '<bytes>')**

---

**Error Type:**

Warning

**Possible Cause:**

The requested memory code area is not available.

**Solution:**

Check for the availability of referenced address (such as the existence of Expansion Data Memory).

**Device '<device name>' responded with error in unit**

---

**Error Type:**

Serious

**Possible Cause:**

There was a CPU bus error or memory error in named device.

**Solution:**

Check the unit for error indicator and attempt to clear errors.

**Device '<device name>' cannot accept command (Tag '<address>', Size '<bytes>')**

---

**Error Type:**

Warning

**Possible Cause:**

There are too many commands at the destination node.

**Solution:**

Wait for servicing to complete and then re-execute the command.

**Device '<device name>' access right denied (Tag '<address>')**

---

**Error Type:**

Warning

**Possible Cause:**

The access right is held by another device.

**Solution:**

Release access right and then re-execute command.

**Device '<device name>' responded with write not possible (Tag '<address>', Size '<bytes>')**

---

**Error Type:**

Warning

**Possible Cause:**

The referenced address is Read Only or write protected.

**Solution:**

Check for the write access of referenced address.

**Device '<device name>' responded with error '<error code>' (Tag '<address>', Size '<bytes>')****Error Type:**

Warning

**Possible Cause:**

An untrapped error code was received from device.

**Solution:**

Refer to the Omron FINS communication protocol manual for error information.

**Unable to write to register '<register address>' for device '<device name>'.  
The device is in run mode****Error Type:**

Warning

**Possible Cause:**

The device is in Run Mode.

**Solution:**

Set the device to Programming Mode or Monitor Mode.

**Note:**

CS and TS registers can only be written to when the device is in Programming Mode.

**Unable to read '<address>' on device '<device name>'. Checksum error****Error Type:**

Warning

**Possible Cause:**

The device could not read the referenced address and returned a checksum error.

**Solution:**

The driver will recover from this error without intervention. If this error occurs frequently, there may be an issue with the cabling or the device itself.

**Unable to write to '<address>' on device '<device name>'. Checksum error****Error Type:**

Warning

**Possible Cause:**

The device could not write to the referenced address and so returned a checksum error.

**Solution:**

The driver will recover from this error without intervention. If this error occurs frequently, there may be an issue with the cabling or the device itself.

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**W**

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