



MC401CR Link Program Manual

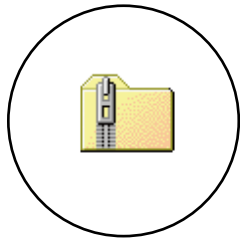
***Note:**The MC401CR Link program is for Windows Vista/XP/2000 use and is not compatible with other OS.

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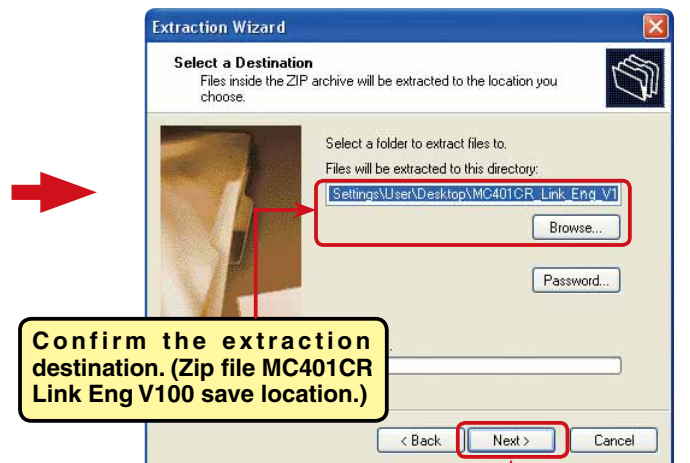
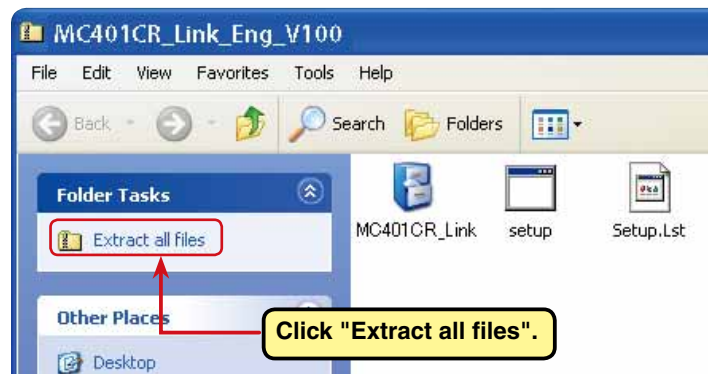
Downloaded Zip file extraction (decompression)

The downloaded MC401CR Link Eng V100 file is a Zip format file. Extract (decompress) this file. (*For Windows 2000, separate decompression software is necessary.)

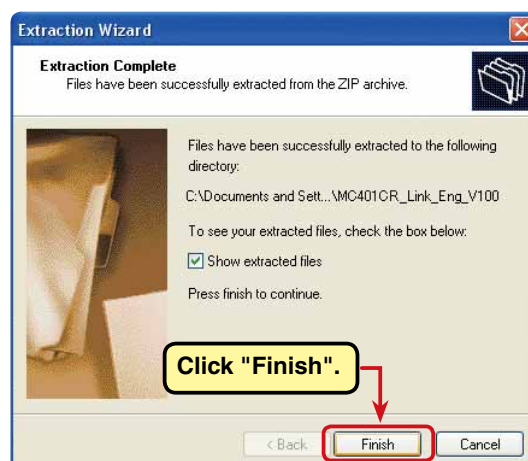
1. With Windows Vista/XP, double click file MC401CR Link Eng V100 to display its contents.
2. Click "Extract all files". The Extraction Wizard launches.
3. Extract (decompress) Zip file MC401CR Link Eng V100 to the same location as the Zip file storage location.



Double click Zip file "MC401CR Link Eng V100".



Click "Next".



Example: For Windows XP*Extracted (decompressed) file confirmation**

Let's confirm the extracted (decompressed) file.

1. At the end of extraction (decompression), a folder named MC401CR Link Eng V100 like that shown below is created.



MC401CR_Link_Eng_V100



MC401CR_Link

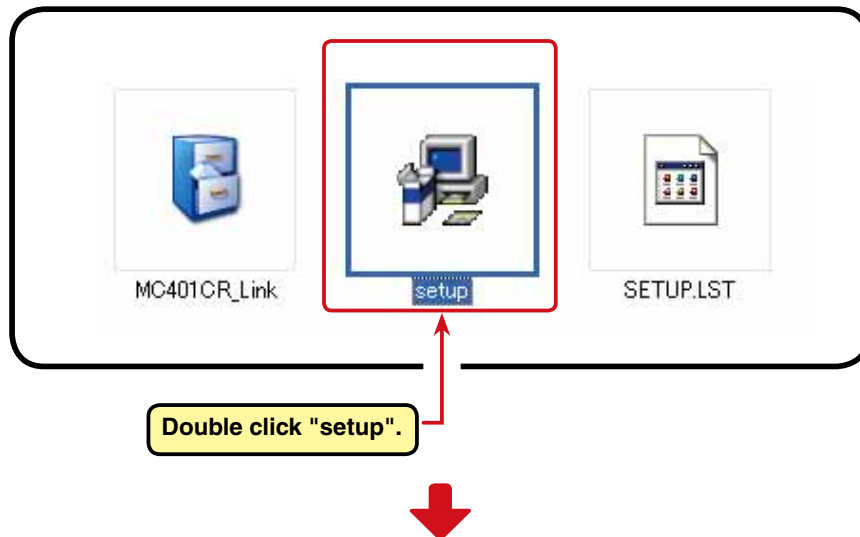


SETUP.LST

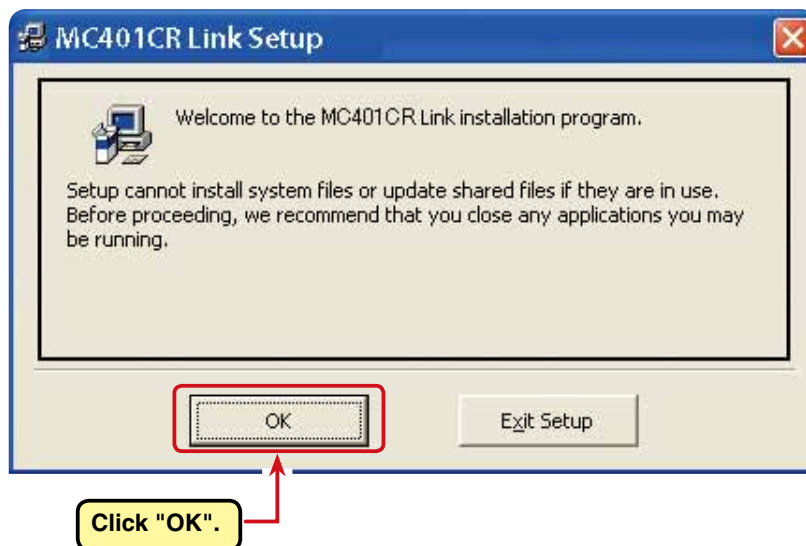
MC401CR Link program installation

Before installing the MC401CR Link program, confirm that all other applications are closed. Close all virus check and other resident programs, if any.

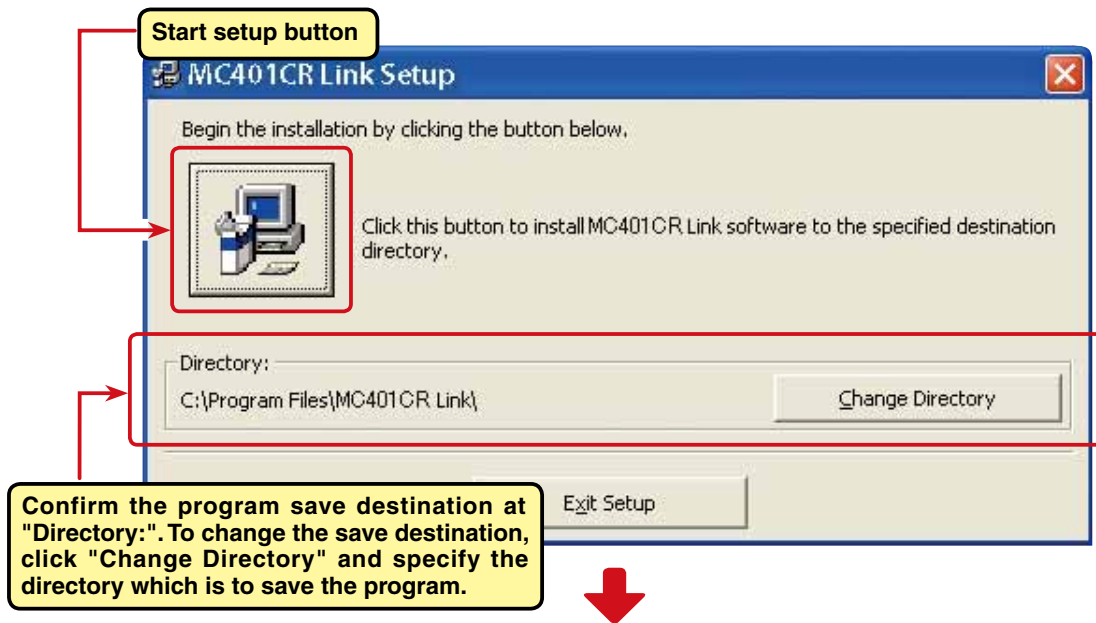
1. Select and double click the folder named MC401CR Link Eng V100 created by downloaded Zip file extraction (decompression). The contents of the folder are displayed.
2. Double click the EXE file named "setup".



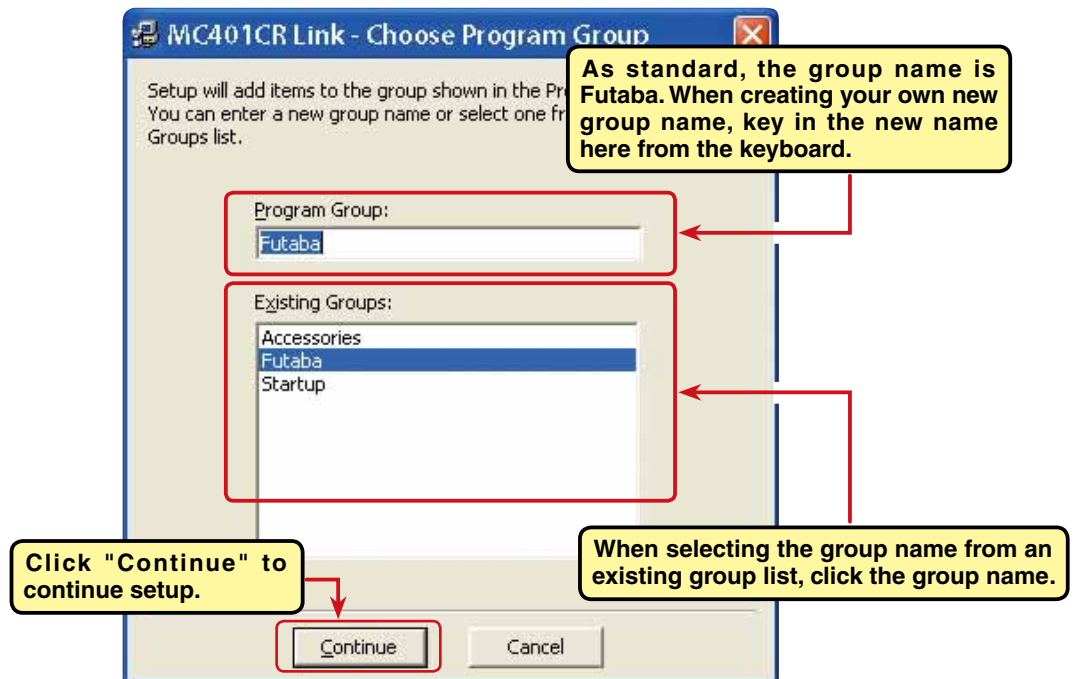
3. After the MC401CR Link Setup window appears, click "OK".



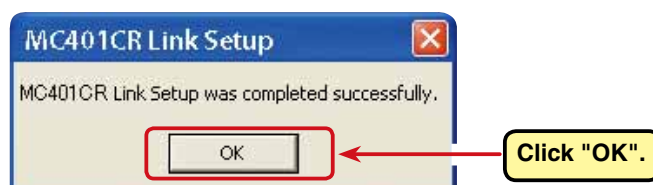
4. Confirm the program directory (save destination) at "Directory:" and click the start setup button. To change the directory, click "Change Directory" and specify the directory which is to save the program and then click the start setup button.



5. Decide the program group to be set up. As standard, a new program group named Futaba is created and the program is installed there. A new group name can also be created or selected from the existing group list. After deciding the program group, click "Continue"



6. After "MC401CR Link _Setup was completed successfully" is displayed, click "OK". The above completes MC401CR Link program installation.

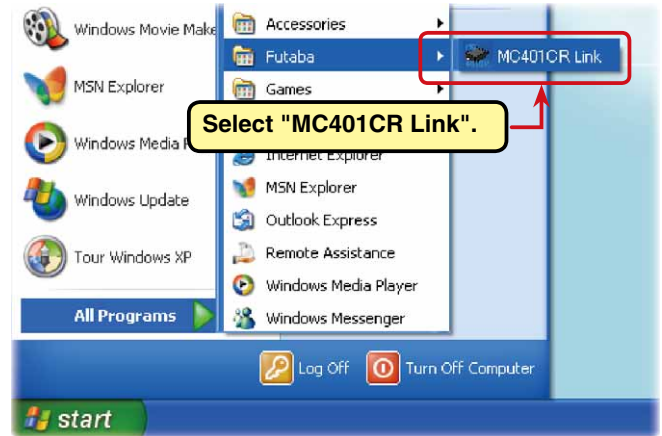


MC401CR Link program startup and termination

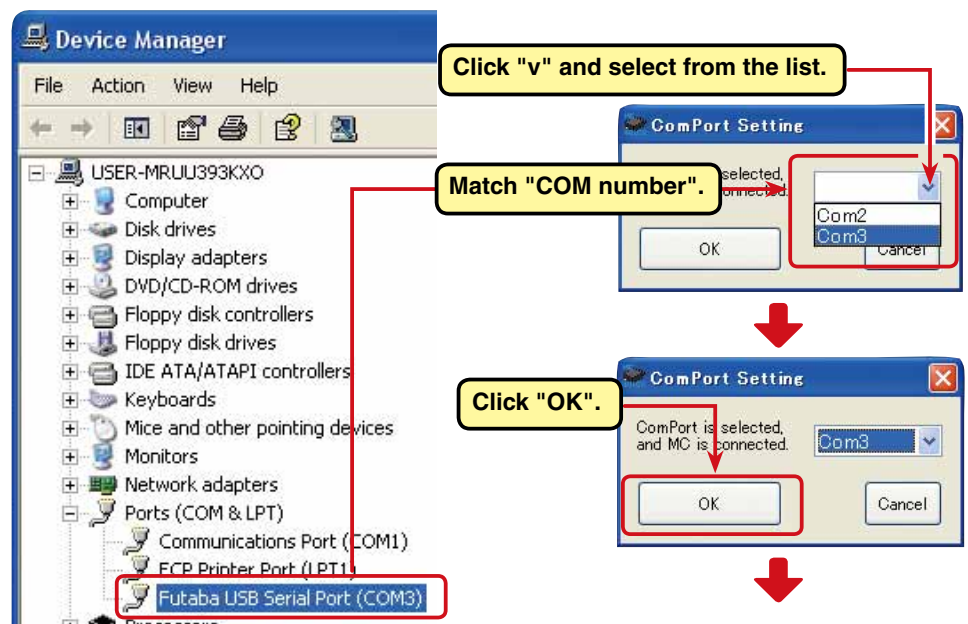
MC401CR Link program startup

1. Connect your CIU-2 to the USB port of the PC.
2. Select desktop lower left side "Start" button - "All Programs" - "Futaba" - "MC401CR Link", in that order. The MC401CR Link program starts up.

(The order above is for when the program group name was set to "Futaba" at installation step "5".)



3. After the program is installed, the CIU-2 COM number setting window is displayed simultaneously with the first starting. After installing the CIU-2 drivers, select the COM number confirmed by Device Manager and then click the "OK" button.



At the end of COM number setting, the MC401CR Link program startup window shown at the right opens.

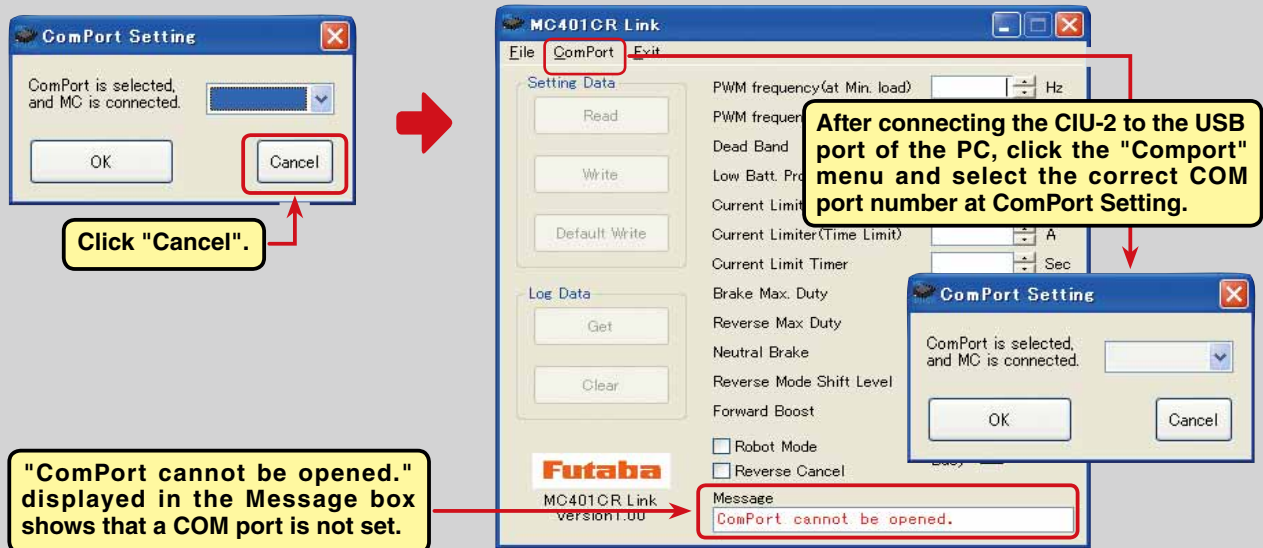
The message "ComPort was initialized" appearing in the Message box shows that a COM port was set.



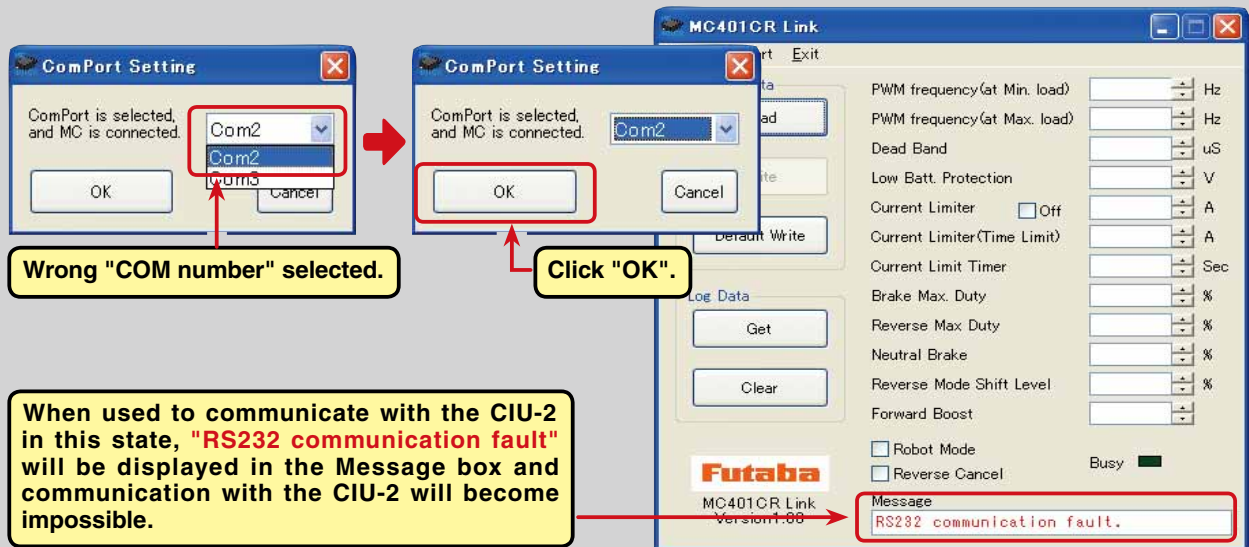
***Note:**

When the CIU-2 is not connected to the USB port of the PC at MC401CR Link program starting, the COM number confirmed by Device Manager cannot be selected. When a COM number is not selected, the MC401CR Link program will not start even when the "OK" button is clicked.

Click the "Cancel" button, wait for the MC401CR program to start and then connect the CIU-2 to the USB port of the PC and select the COM number confirmed by Device Manager from the "ComPort" menu.



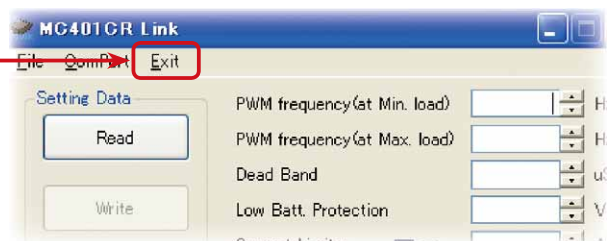
Also, when the wrong COM number is selected and the "OK" button is clicked, the MC401CR Link program is started, but communication is impossible even if a CIU-2 is connected. Select a COM number confirmed by Device Manager from the "ComPort" menu.



MC401CR Link program termination

To terminate the MC401CR Link program, click "Exit" on the menu bar.

When "Exit" is clicked, the MC401CR Link program is terminated.



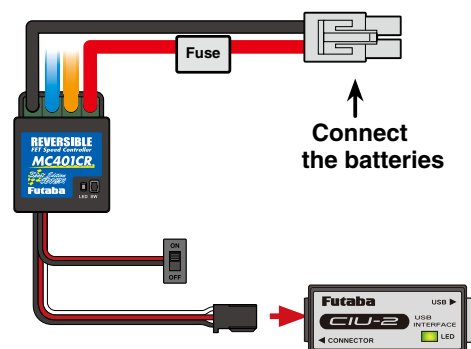
CIU-2 disconnection

The CIU-2 can be disconnected even when the PC power is on. However, do not disconnect the CIU-2 while it is communicating with the MC401CR.

Using the MC401CR Link program

CIU-2 and MC401CR connection

1. Connect the MC401CR to the CIU-2.
2. Connect the batteries to the MC401CR.
(Refer to the MC401CR instruction manual for the connection method.)
3. Set the MC401CR power SW to ON.
The MC401CR LED blinks orange. (red and green simultaneously)



MC401CR Link program startup window

Minimize button
Button which causes the program window to collapse into its taskbar button at the bottom of the Windows desktop.

Close button
Closes (exits) the program. Same as "Exit" on the menu bar.

Menu bar

File:
Menu which saves and reads the Setting and Log data.

ComPort:
COM number setting menu

Exit:
MC401CR Link program termination menu

Setting boxes
Boxes for input of each setting item.

Access lamp
Blinks green during MC401CR and program communications.

Message box

Message:
Displays the CIU-2 and MC401CR and program communications state.

Buttons

Setting Data Read:
Button which reads to the program the setting data of the connected MC401CR.

Setting Data Write:
Button which writes the setting data to the connected MC401CR.

Default Data Write:
Button which writes the standard setting data set at the factory to the connected MC401CR.

Data Get:
Button which reads to the program the log data of the connected MC401CR.

Data Clear:
Button which clears the log data of the connected MC401CR.

Reading log data recorded by the MC401CR

The logging function of the MC401CR can record a maximum of about 8 minutes of running current value and power supply voltage data at 1 second intervals. By connecting the MC401CR to a CIU-2, the recorded log data can be read and displayed by the MC401CR Link program. We recommend that this log data be referenced and made the setting data.

1. Connect the MC401CR to the CIU-2 and connect the batteries to the MC401CR.

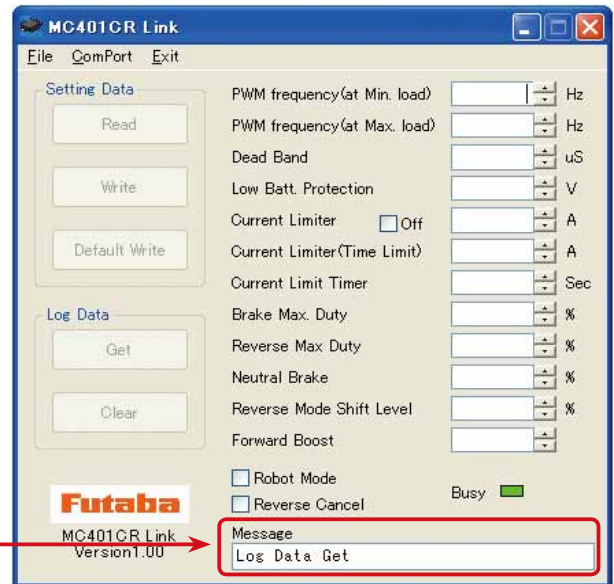
Set the MC401CR power SW to ON.

2. Click the "Data Get" button.



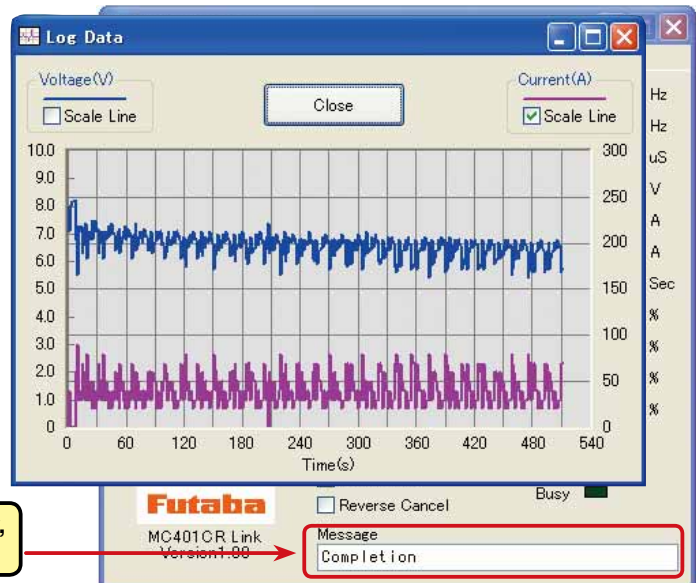
Click the "Get" button.

"Log Data Get" is displayed in the Message box and the access lamp (Busy) blinks green.



3. The log data to be recorded is read and a log data graph is displayed in a window separate from the MC401CR Link program startup window.

A log data graph is displayed in a separate window.



When reading of the log data ends normally, "Completion" is displayed.

*Note:

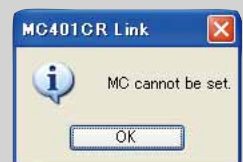
When "MC cannot be set." shown at the right is displayed when the "Data Get" button is clicked, click the "OK" button and check for the following:

Batteries not connected to the MC401CR.

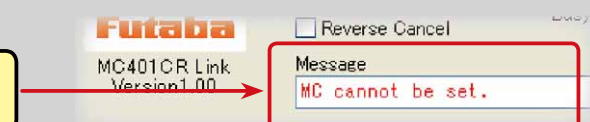
*MC401CR power is OFF.

*MC401CR is faulty.

*When "MC cannot be set." is displayed in the Message box when the "OK" button is clicked, the log data could not be read normally.



When "MC cannot be set." is displayed in the Message box, the log data could not be read normally.



Log data window

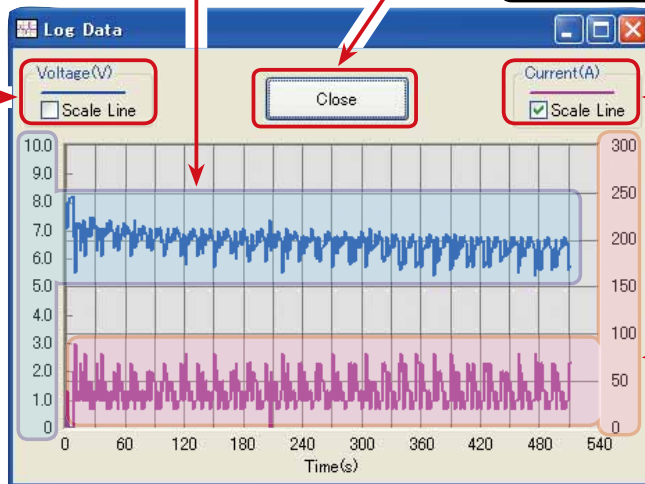
Voltage(V)-Blue line

Power supply voltage changes recorded at 1 second intervals while running.

Close button

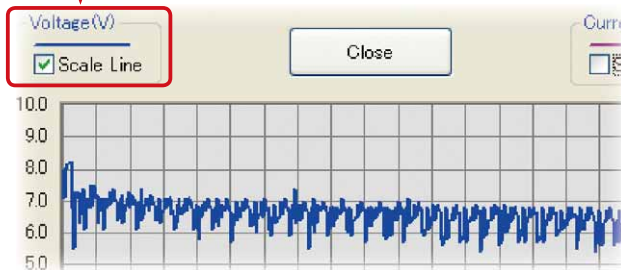
Close

Button which closes the log data graph window.



Current(A)- Red line

Current changes recorded at 1 second intervals while running.

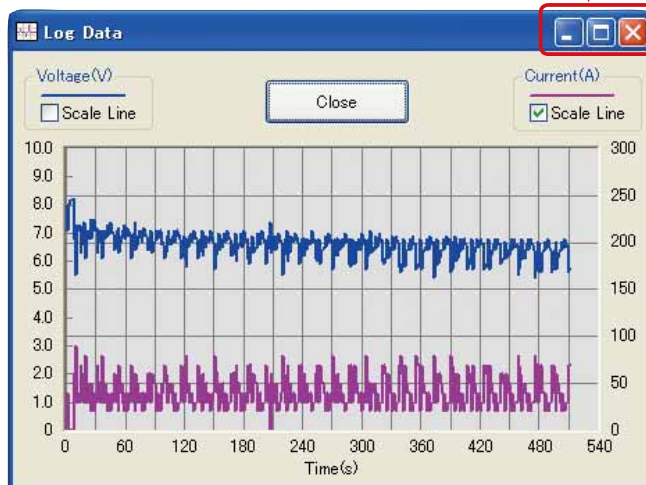
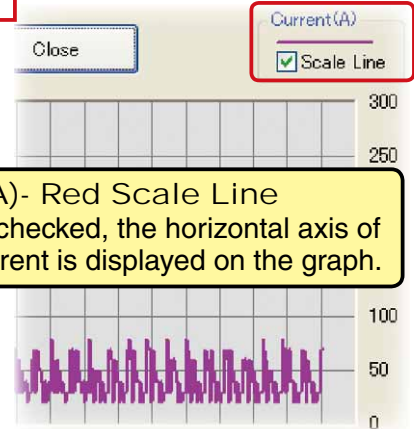


Voltage(V)-Scale Line

When checked, the horizontal axis of the voltage is displayed on the graph.

Current(A)- Red Scale Line

When checked, the horizontal axis of the current is displayed on the graph.



Minimize button

Button which collapses the log data graph window into its taskbar button at the bottom of the Windows desktop.



Maximize button



Restore button

Button which expands the log data graph window to its original size. If the log data graph window is maximized, this button functions like the Minimize button.



Close button

Button which closes the program. Same as the "Close" button.

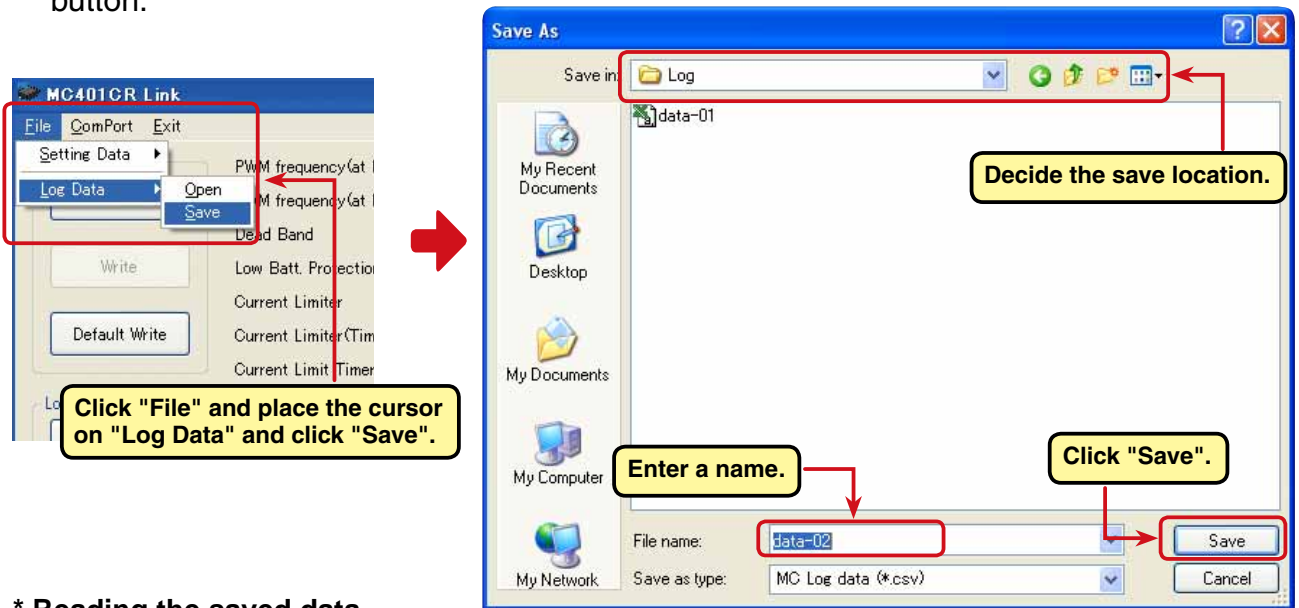
Saving log data and reading the saved data

* Save

The log data read from the MC401CR can be saved to the computer by "Data Get" button. Since the data is saved in CSV format, it can be opened by CSV format spreadsheet program, etc.

The log data can be saved even after the graph window was closed. However, save the old log data before reading the new log data.

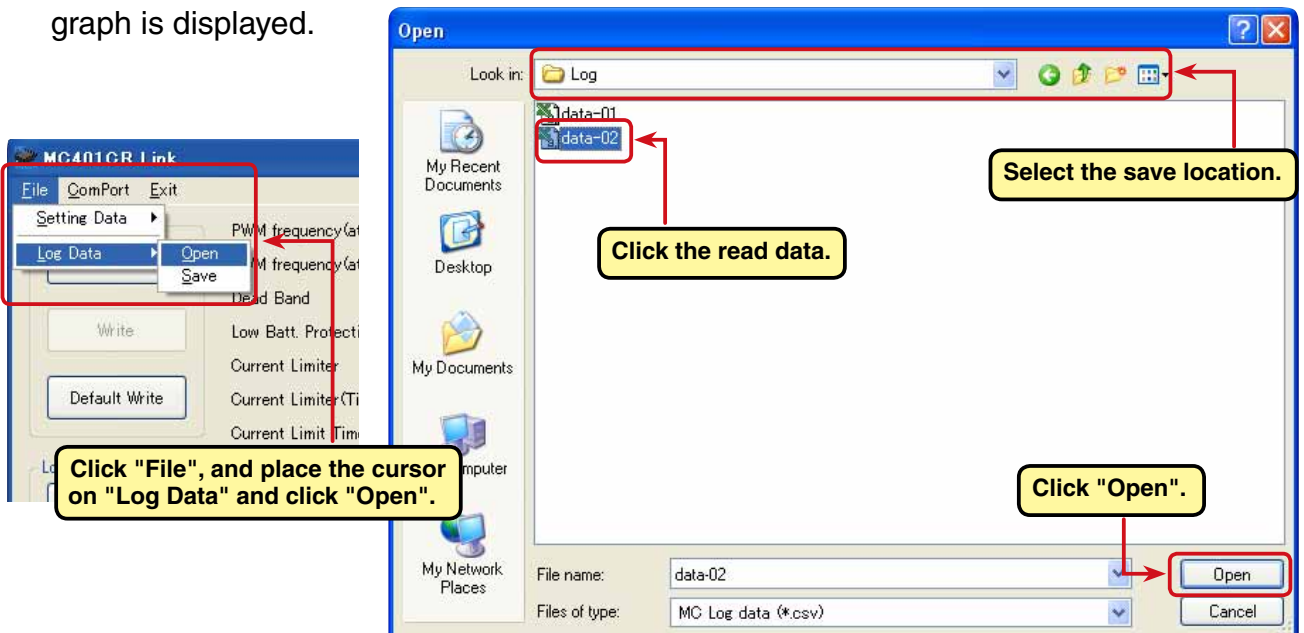
1. Click "File" on the menu bar and place the cursor on "Log Data" and click "Save". A "Save As" window opens.
2. Decide the save location and filename and save the data by clicking the "Save" button.



* Reading the saved data

The MC401CR Link program can read and display the log data saved to the computer.

1. Click "File" on the menu bar and place the cursor on "Log Data" and click "Open". An "Open" window opens.
2. Decide the save location and read data and click the "Open" button. A log data graph is displayed.



Clearing log data recorded by the MC401CR

To update the MC401CR log data, the old log data must be cleared. If the old log data is not cleared, the log data will not be updated.

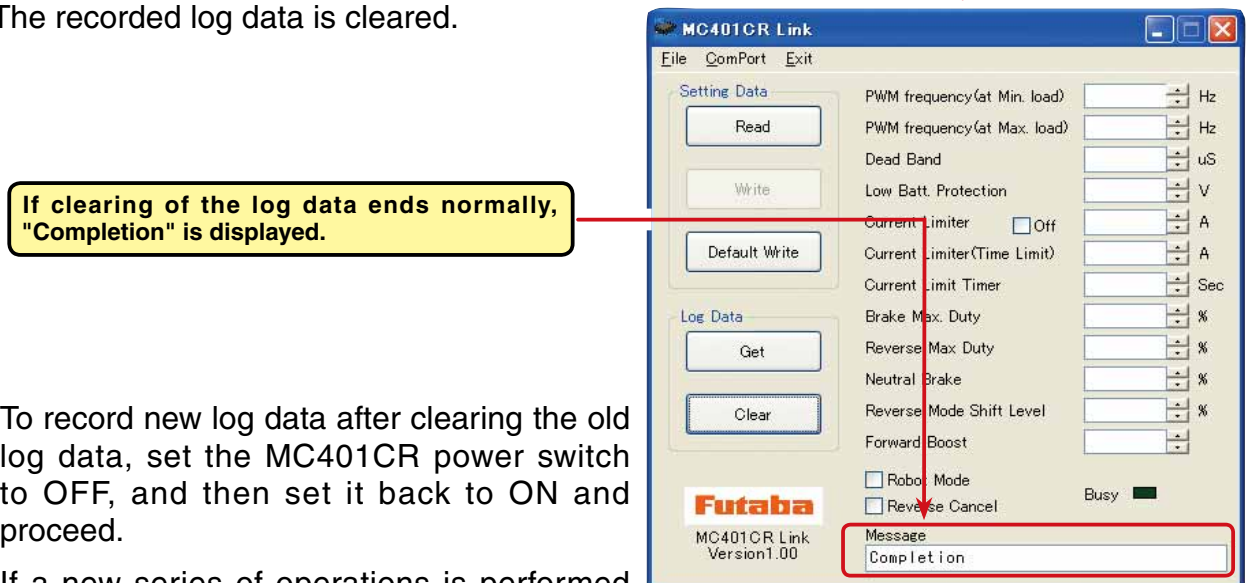
1. Connect the MC401CR to a CIU-2 and connect the batteries to the MC401CR.

Set the MC401CR power switch to ON.

2. Click the "Data Clear" button.



3. The recorded log data is cleared.



To record new log data after clearing the old log data, set the MC401CR power switch to OFF, and then set it back to ON and proceed.

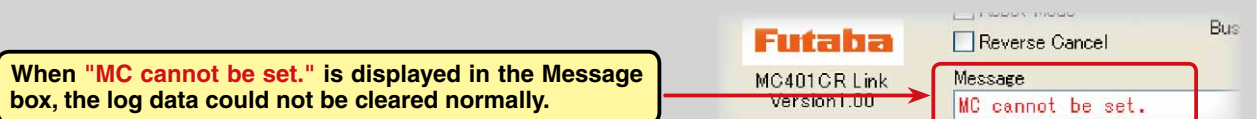
If a new series of operations is performed with the MC401CR power left on, new log data will not be recorded.

*Note:

When "MC cannot be set." shown at the right is displayed when the "Data Clear" button is clicked, click the "OK" button and check for the following:

- *Batteries are not connected to the MC401CR.
- *MC401CR power is off.
- *MC401CR is faulty

If "MC cannot be set." is displayed when the "OK" button is clicked, the log data could not be cleared normally.



Reading setting data set at the MC401CR

The setting data currently set at the MC401CR connected to a CIU-2 is read and displayed in the MC401CR Link program startup window.

1. Connect the MC401CR to a CIU-2 and connect the batteries to the MC401CR.

Set the MC401CR power switch to ON.

2. Click the "Setting Data Read" button.

Click the "Read" button.

Since it usually takes about 1 second to read the setting data, "Setting Data Read" is displayed in the Message box and the access lamp (Busy) blinks for only a moment.

3. The setting data currently set at the MC401CR is read and displayed in the MC401CR Link program startup

The setting data currently set at the connected MC401CR is displayed.

If reading of the setting data ends normally, "Completion" is displayed.

*Note:

When "MC cannot be set." shown at the right is displayed when the "Setting Data Read" button is clicked, click "OK" and check for the following:

- *Batteries are not connected to the MC401CR.
- *MC401CR power is OFF.
- *MC401CR is faulty.

When "MC cannot be set." is displayed in the Message box when the "OK" button is clicked, the setting data could not be read normally.

When "MC cannot be set." is displayed in the Message box, the setting data could not be read normally.

MC401CR Link

MC cannot be set.

OK

MC401CR Link

Message

MC cannot be set.

Setting items

The setting of each setting data can be changed by clicking ▲ or ▼ at the right side of the box of each setting item. Values can also be input directly from the keyboard.

When a value exceeding the setting range is input when entering values directly from the keyboard, the characters will turn red to show that they are unsuitable.

Values can be input directly from the keyboard.

Value can be changed by clicking ▲ or ▼.

in. load) 3000 Hz

When a value exceeding the setting range is input when entering values directly from the keyboard, the characters turn red.

10001 Hz

*PWM frequency (at Min. load)

The PWM frequency at minimum load can be input. Setting range 100Hz ~ 10000Hz

*PWM frequency (at Max. load)

The PWM frequency at maximum load can be set. Setting range 100Hz ~ 10000Hz

*Dead Band

The neutral point range can be set. Setting range $\pm 2 \mu s \sim \pm 50 \mu s$

*Low Bat. Protection

The output cutoff voltage to the motor when the battery voltage drops can be set. Setting range 2.5V ~ 6.0V

*Current Limiter

The output current limit value can be set. The limiter can be disabled by checking "OFF". Setting range 50A ~ 300A, OFF

*Current Limiter (Time Limit)

Time limit current limiter current value setting
Setting range 50A ~ 300A

*Current Limit timer

Time setting for time limit current limiter
Setting range 0 secs ~ 240 secs
Cancelled by 0 sec

*Brake Max. Duty

The braking force between the neutral and MAX brake points can be set. Setting range 0% ~ 100%

*Reverse Max. Duty

The reverse power between the neutral and MAX reverse points can be set. Setting range 0% ~ 100%

*Neutral Brake

The neutral brake amount can be set. Setting range 0% (OFF) ~ 100%

*Reverse Mode Shift Level

The value can set the amount of the brake in order to switch to the reverse operation. Setting range 0% ~ 100%

*Forward Boost

Function which adjusts the movement characteristic from the throttle neutral position. Setting range 0 ~ 100

PWM frequency(at Min. load)	3000	Hz
PWM frequency(at Max. load)	2500	Hz
Dead Band	15	μs
Low Batt. Protection	3	V
Current Limiter	<input type="checkbox"/> Off	300 A
Current Limiter(Time Limit)	300	A
Current Limit Timer	0	Sec
Brake Max. Duty	100	%
Reverse Max. Duty	50	%
Neutral Brake	0	%
Reverse Mode Shift Level	10	%
Forward Boost	28	
<input type="checkbox"/> Robot Mode		
<input type="checkbox"/> Reverse Cancel		

*Robot Mode

If the brake function is not necessary please check the box.

*Reverse Cancel

If the reverse function is not necessary please check the box.

*PWM frequency (at Max. load) PWM frequency (at Min. load) Current Limiter

- PWM frequency (at Max. load) sets the PWM frequency at maximum load at the output current limit value set by Current Limiter.
- PWM frequency (at Min. load) sets the "0" A PWM frequency at minimum load.
- Current Limiter sets the current value at maximum load here.

Since setting of the PWM frequency (at Max. load) is based on the output current limit value set by Current Limiter, Current Limiter does not have to be turned OFF except when a current exceeding 300A is generated.

PWM frequency(at Min. load)	3000	Hz
PWM frequency(at Max. load)	2500	Hz
Dead Band	15	μs
Low Batt. Protection	3	V
Current Limiter	<input type="checkbox"/> Off	300 A
Current Limiter(Time Limit)	300	A

* Using log data to set the frequency and current limiter

Study at the maximum load current from the log data read from the MC401CR.

From this data, the Current Limiter value is set about 20 ~ 30A higher than the current at maximum load.

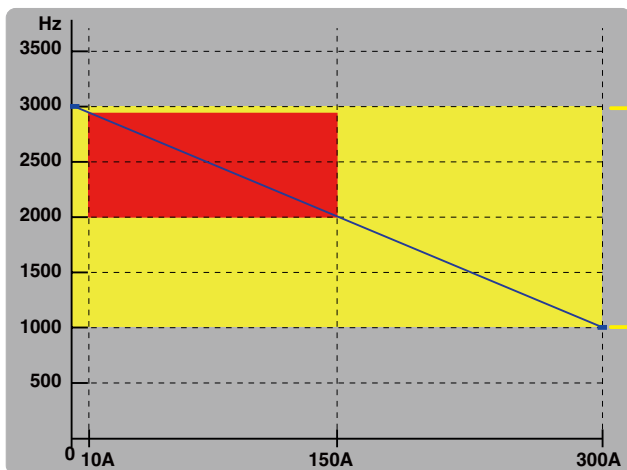
(at Min. load), which sets the frequency when the load is small, is set to the high frequency side (large value) when extension is desired after straightaways and curves.

(at Max. load), which sets the frequency when the load is large, is set to the high frequency side (large value) when you want to suppress the rise from low speed and when motor heating and commutator roughness are sensed.

When the rise from low speed is poor, and becomes bad even when (at Max. load) is set to the low frequency side, use the log data to check if there was a momentary voltage drop.

When you want to suppress the overall power, lengthen the run time, and otherwise improve efficiency, set both (at Max. load) and (at Min. load) to the high frequency side.

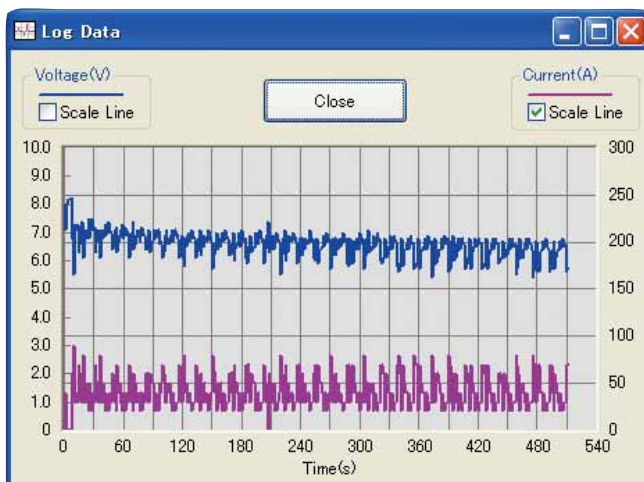
When you want to set a fixed PWM frequency at full range regardless of the load current, set PWM frequency (at Max. load) and PWM frequency (at Min. load) to the same value.



Example:

When PWM frequency (at Min. load) is set to 3000Hz, PWM frequency (at Max. load) is set to 1000Hz, and Current Limiter is set to 300A.

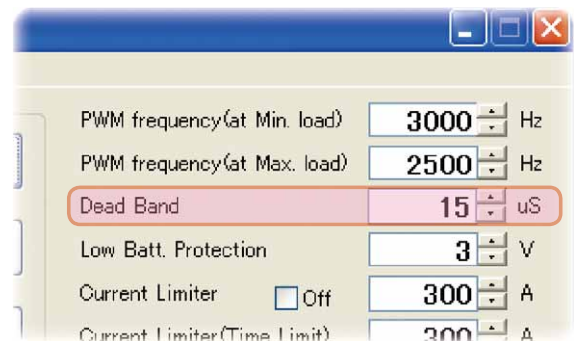
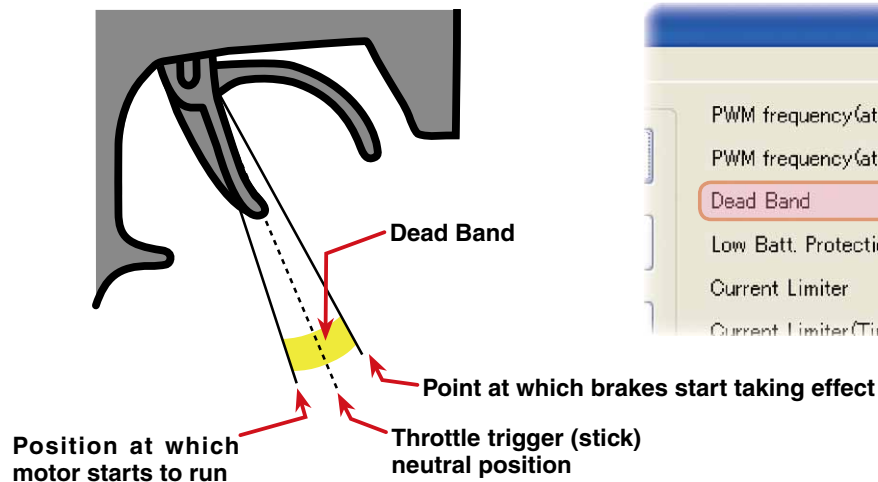
The set drive frequency variable range is within the range indicated by the yellow color. However, when minimum load = 10A and maximum load = 150A at the running log data, the variable range during running becomes the range indicated by the red color.



*Dead Band

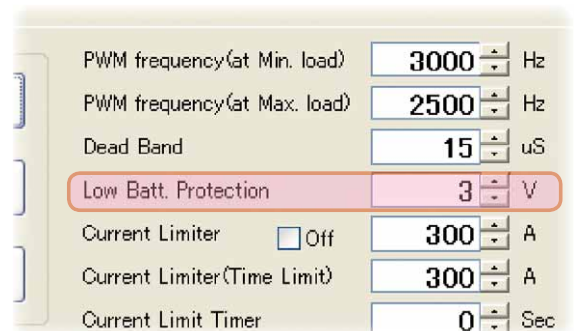
This sets the range (neutral point range) over which the MC401CR does not respond to transmitter throttle operation.

The larger the set value, the wider this range.



*Low Bat Protection

This setting cuts off the output to the motor when the running battery voltage drops to the set voltage to prevent the receiver from stopping operation when the supply of voltage to the receiver becomes insufficient while running due to a drop of the power supply voltage. When the power supply voltage recovers, power is supplied to the motor once more.

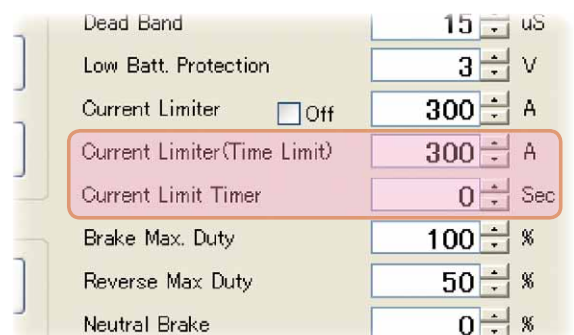


*Current Limiter (Time Limit) /Current Limit Timer

The output current can be limited up to the set time lapse from the start of running. This is effective in preventing the motor from outputting wasted energy when the voltage is high immediately after the power battery was recharged.

- Current Limiter (Time Limit) sets the maximum output current within the time the output current is limited.
- Current Limiter Timer sets the time the output current is limited. This function is disabled when set to "0" sec.

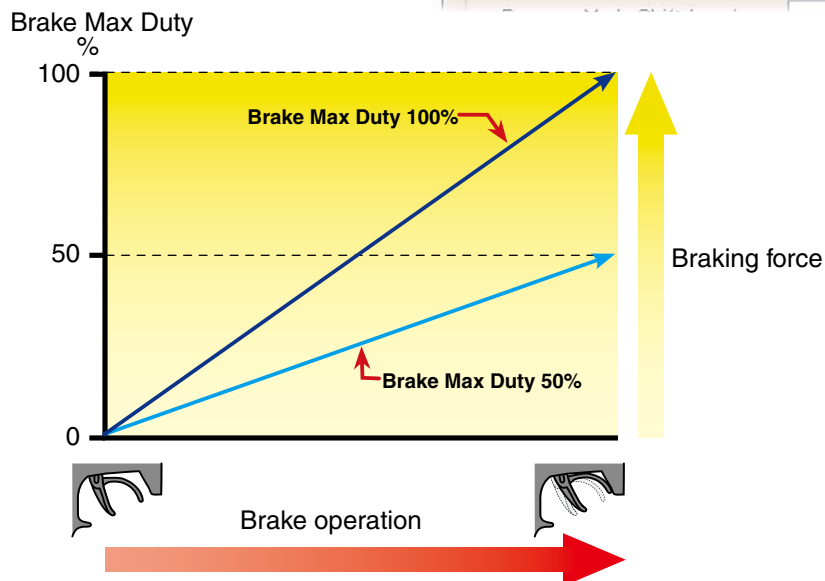
Since the Current Limit Timer starts when the throttle is operated to the forward side and current is output to the motor, this function begins to operate when the motor is run during trim adjustment, etc.



* Brake Max. Duty

This setting can set the braking force between the neutral point and Max brake point. The larger this value, the greater the braking force. When set to "0%", the brakes are not effective.

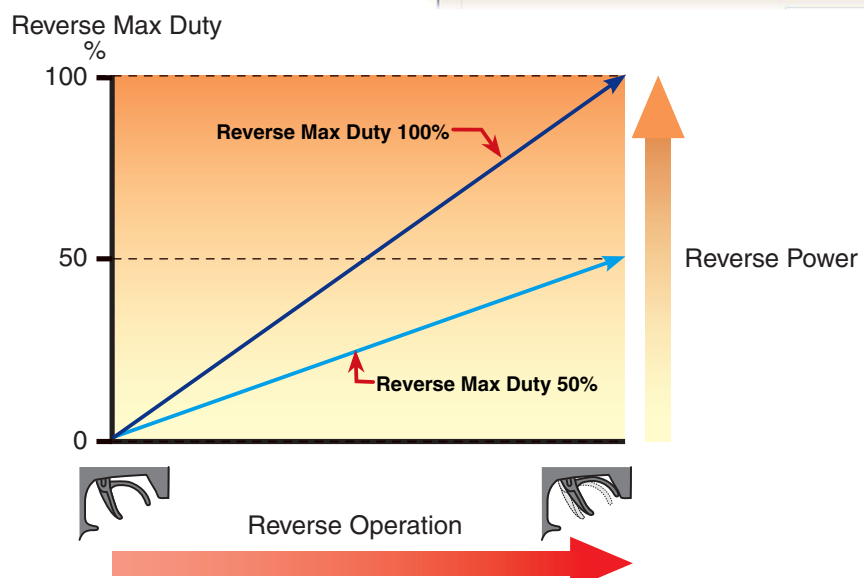
Current Limiter(Time Limit)		A
Current Limit Timer		Sec
Brake Max. Duty		%
Reverse Max Duty		%
Neutral Brake		%



* Reverse Max. Duty

This setting can set the reverse power between the neutral point and Max reverse point. The larger this value, the greater the reverse power. When set to "0%", the reverses are not effective.

Current Limiter(Time Limit)	300	A
Current Limit Timer	0	Sec
Brake Max. Duty	100	%
Reverse Max Duty	50	%
Neutral Brake	0	%
Reverse Mode Shift Level	10	%



* Neutral Brake

Make this setting when you want to use the brakes at the neutral throttle (OFF) position by throttle operation. The larger this value, the greater the braking force. When you want to use the neutral brake, set this value to "0%".

Current Limit Timer	0	Sec
Brake Max. Duty	100	%
Reverse Max Duty	50	%
Neutral Brake	0	%
Reverse Mode Shift Level	10	%
Forward Boost	28	
<input type="checkbox"/> Robot Mode		

* Reverse Mode Shift Level

The reverse operation can be done with the throttle trigger (stick) to be thrown from brake status to the neutral.

The value can set the amount of the brake in order to switch to the reverse operation.

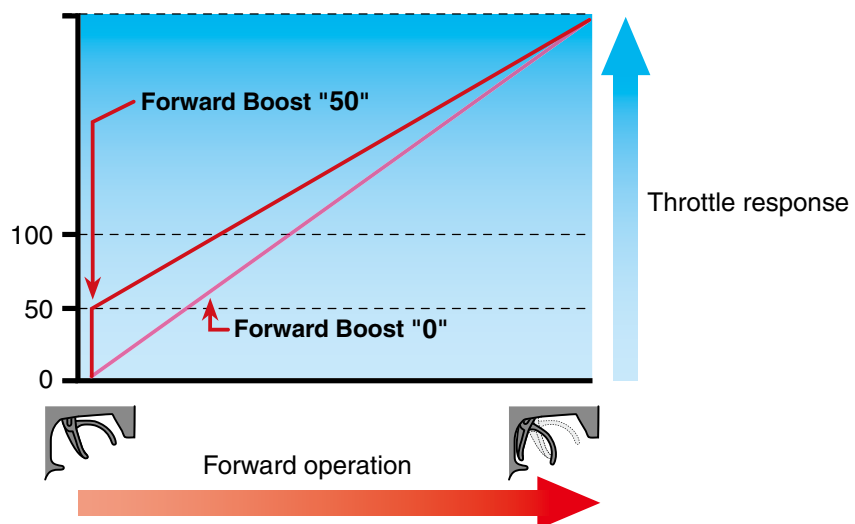
Brake Max. Duty	100	%
Reverse Max Duty	50	%
Neutral Brake	0	%
Reverse Mode Shift Level	10	%
Forward Boost	28	
<input type="checkbox"/> Robot Mode		
<input type="checkbox"/> Reverse Cancel		
		Busy

* Forward Boost

Operation near the throttle trigger (stick) neutral position becomes a sharp rise.

Neutral Brake	0	%
Reverse Mode Shift Level	10	%
Forward Boost	28	
<input type="checkbox"/> Robot Mode		
<input type="checkbox"/> Reverse Cancel		
		Busy

Forward Boost



* Robot Mode

If the brake function is not necessary please check the box.

When the box is checked there is only forward and reverse operation

Neutral Brake	0	%
Reverse Mode Shift Level	10	%
Forward Boost	28	
<input type="checkbox"/> Robot Mode		
<input type="checkbox"/> Reverse Cancel		
		Busy
Message Completion		

* Reverse Cancel

If the reverse function is not necessary please check the box.

When the box is checked there is only forward and brake operation

Reverse Mode Shift Level	10	%
Forward Boost	28	
<input type="checkbox"/> Robot Mode		
<input type="checkbox"/> Reverse Cancel		
		Busy
Message Completion		

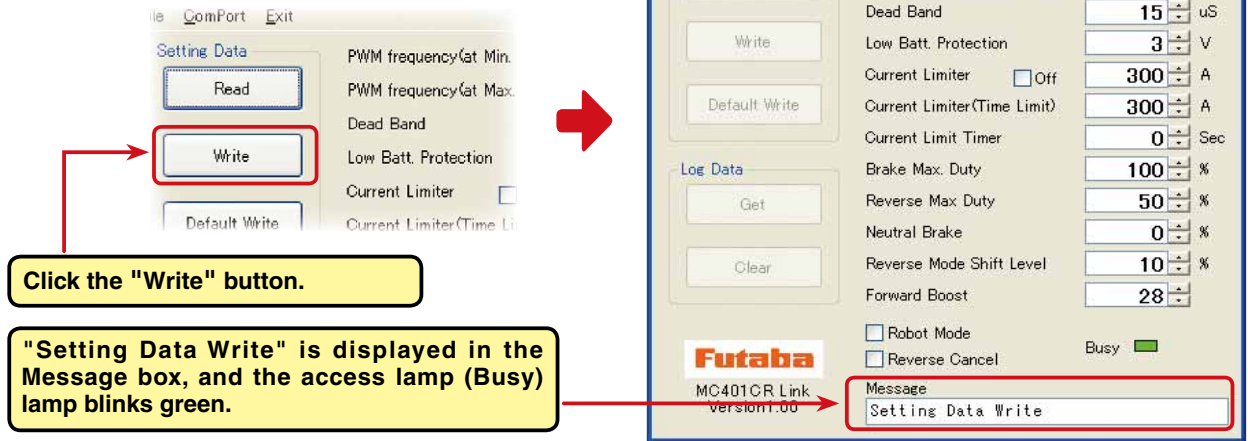
Writing setting data set to the MC401CR

Write new setting data to the MC401CR.

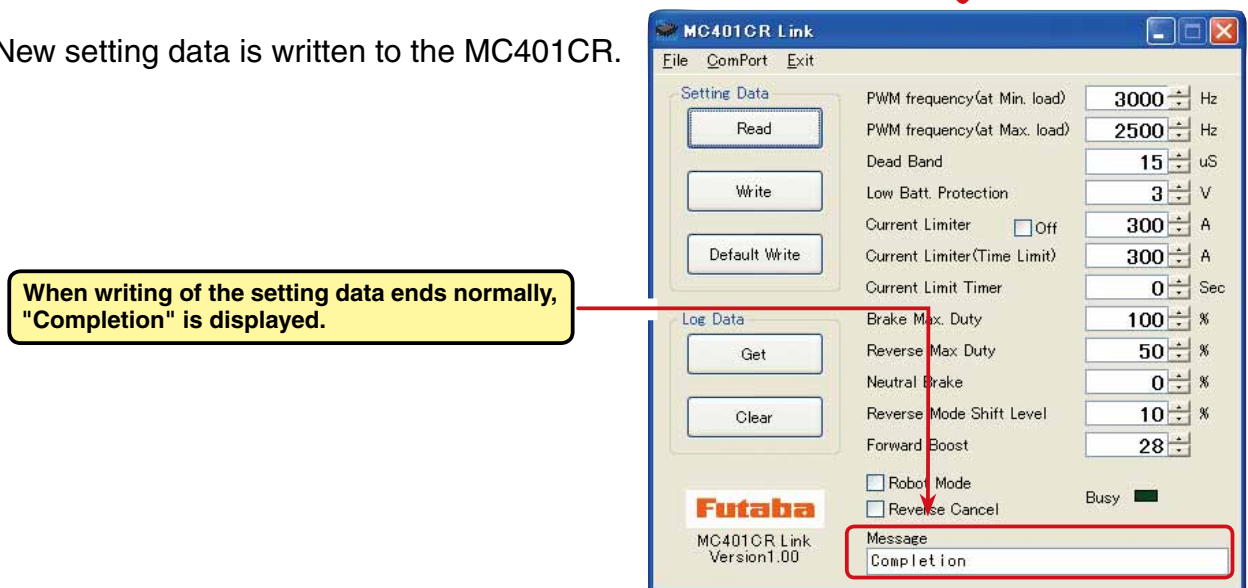
1. Connect the MC401CR to a CIU-2 and connect the batteries to the MC401CR.

Set the MC401CR power switch to ON.

2. After input of each item is complete, click the "Setting Data Write" button.



3. New setting data is written to the MC401CR.



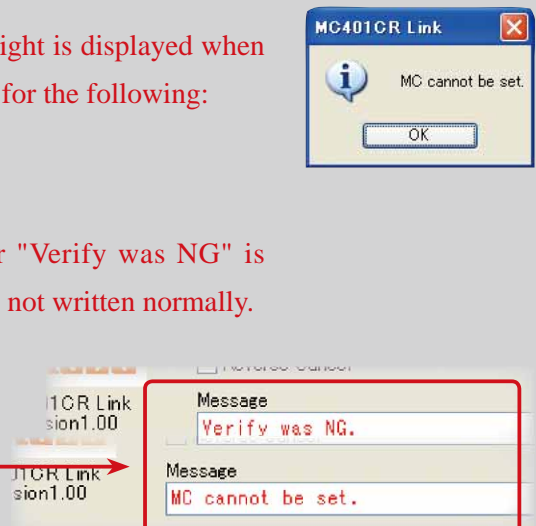
*Note

When "MC cannot be set." or "Verify was NG" shown at the right is displayed when the "Write" button is clicked, click the "OK" button and check for the following:

- *Batteries are not connected to the MC401CR.
- *MC401CR power supply is OFF.
- *MC401CR is faulty.

When the "OK" button is clicked, "MC cannot be set." or "Verify was NG" is displayed in the Message box to show that the setting data was not written normally.

"MC cannot be set." or "Verify was NG" is display in the Message box to shows that the setting data was not written normally.

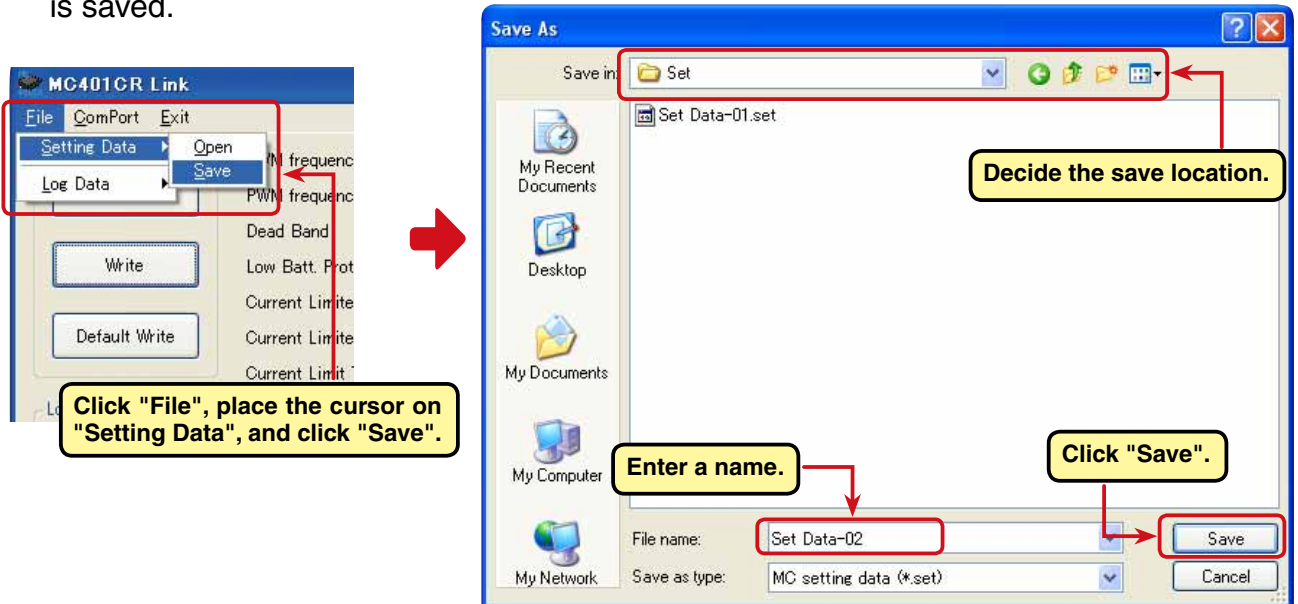


Saving setting data and reading the saved data

*Save

The setting data currently displayed in the MC401CR Link program startup window can be saved to a computer.

1. Click "File" on the menu bar and place the cursor on "Setting Data" and then click "Save". A "Save As" window opens.
2. Decide the save location and filename and click the "Save" button. The setting data is saved.

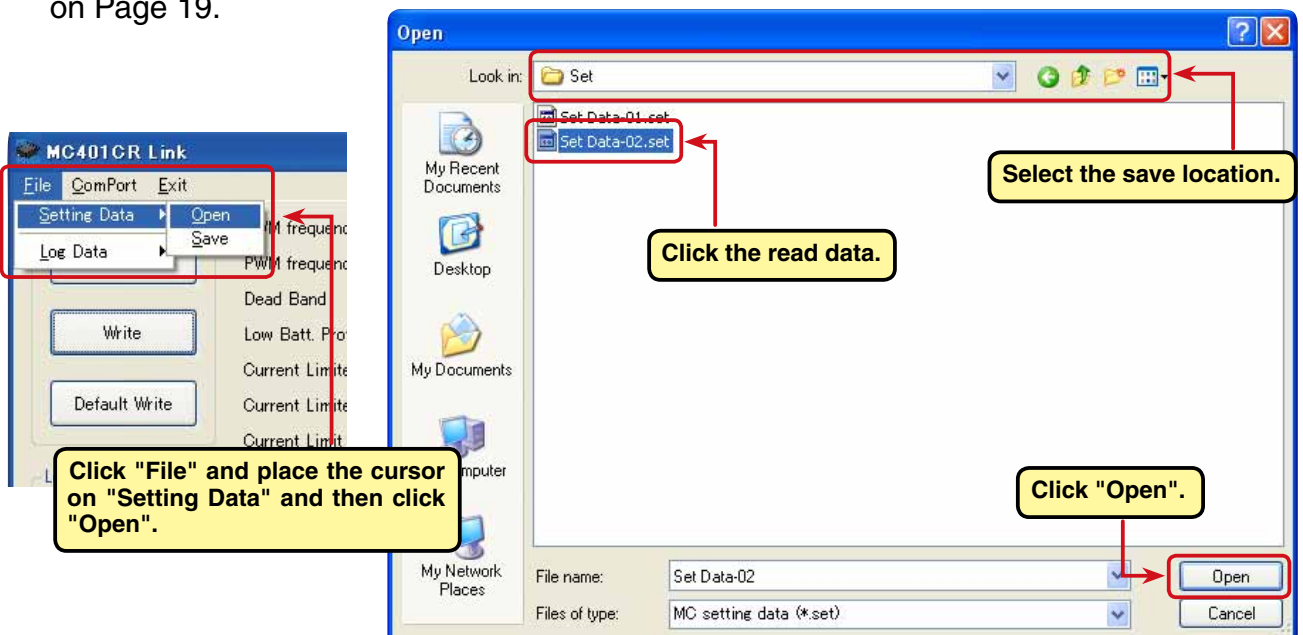


* Reading saved data

Setting data saved to a computer can be read and displayed in the MC401CR Link program startup window and written to the MC401CR.

1. Click "File" on the menu bar and place the cursor on "Setting Data" and click "Open". An "Open" window opens.
2. Decide the save location and read data and click the "Open" button. The setting data to be saved is displayed in the MC401CR Link program startup window.

To write this data directly to the MC401CR, see "Writing setting data to MC401CR" on Page 19.



Initializing the MC401CR

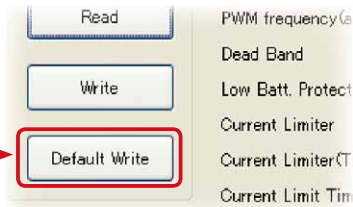
This function returns the MC401CR setting data to the factory setting.

Since the setting data, neutral, high point, and brake point are all initialized at the factory, reset them.

1. Connect the MC401CR to a CIU-2 and connect the batteries to the MC401CR.

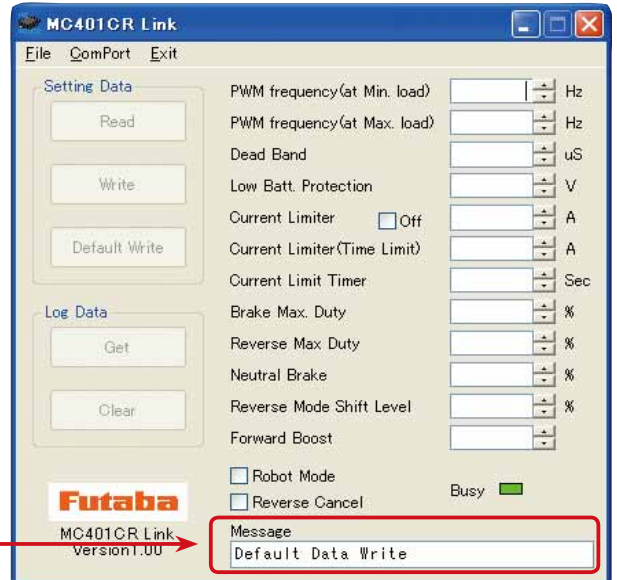
Set the MC401CR power switch to ON.

2. Click the "Default Data Write" button.



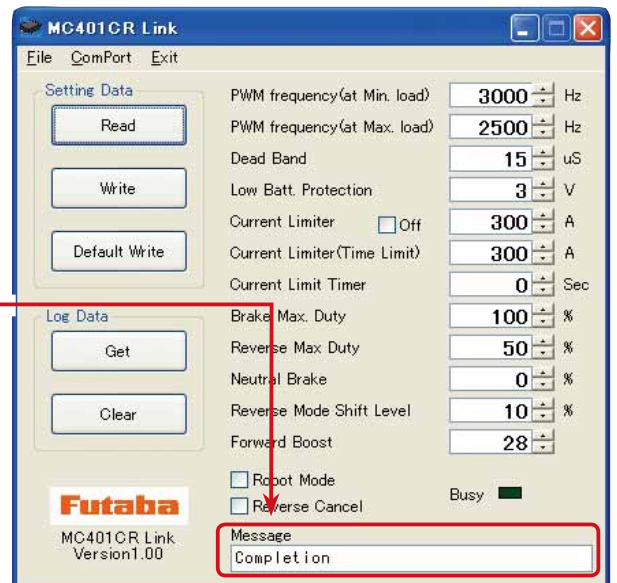
Click the "Default Write" button.

"Default Data Write" is displayed in the Message box and the access lamp (Busy) blinks green.



3. The factory setting data is written to the MC401CR and the MC401CR is initialized.

When writing of the setting data ends normally, "Completion" is displayed.



*Note:

When "MC cannot be set." shown at the right is displayed when the "Default Write" button is clicked, click the "OK" button and check for the following:

- *Batteries are not connected to the MC401CR.
- *MC401CR power is OFF.
- *MC401CR is faulty.

When "MC cannot be set." is displayed in the Message box when the "OK" button is clicked, the MC401CR could not be initialized normally.

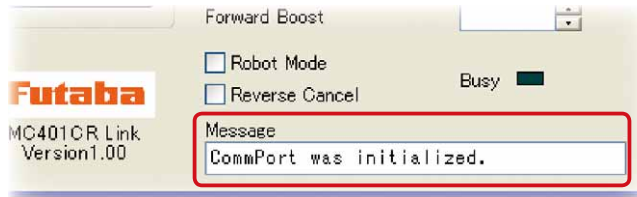


"MC cannot be set." is displayed in the Message box to show that the MC850C could not be initialized normally.



Messages List

The following shows the contents displayed in the message box (Message) in the software startup window.



"ComPort was initialized."

Shows the COM port setting state. (Displayed when MC401CR Link program starts.)

Since the COM port is set even if the wrong COM number is set, this message is displayed. However, when the MC401CR tries to communicate with the CIU-2, **"RS232 communication fault"** is displayed, and communication with the CIU-2 becomes impossible.

"ComPort cannot be opened."

COM number is not set.

Select the correct COM number from the ComPort menu. (See Page 7.)

"Data Get"

Displayed while the log data recorded by the MC401CR is being read. (See Page 9.)

"Data Clear"

Displayed while the log data recorded by the MC401CR is being cleared. (See Page 12.)

"Setting Data Read"

Displayed while the setting data set at the MC401CR is being read. (See Page 13.)

"Setting Data Write"

Displayed while the set setting data is being written to the MC401CR. (See Page 19.)

"Default Data Write"

Displayed while the MC401CR is being initialized. (See Page 21.)

"Completion"

Displayed when read, write, clear, and initialization of each data ends normally.

"MC cannot be set." or "Verify was NG"

When read, write, clear, or initialization of each data did not end normally, the message shown at the right is displayed. When the "OK" button is clicked, this message is displayed. (See Pages 12, 13, and 19.)



"RS232 communication fault."

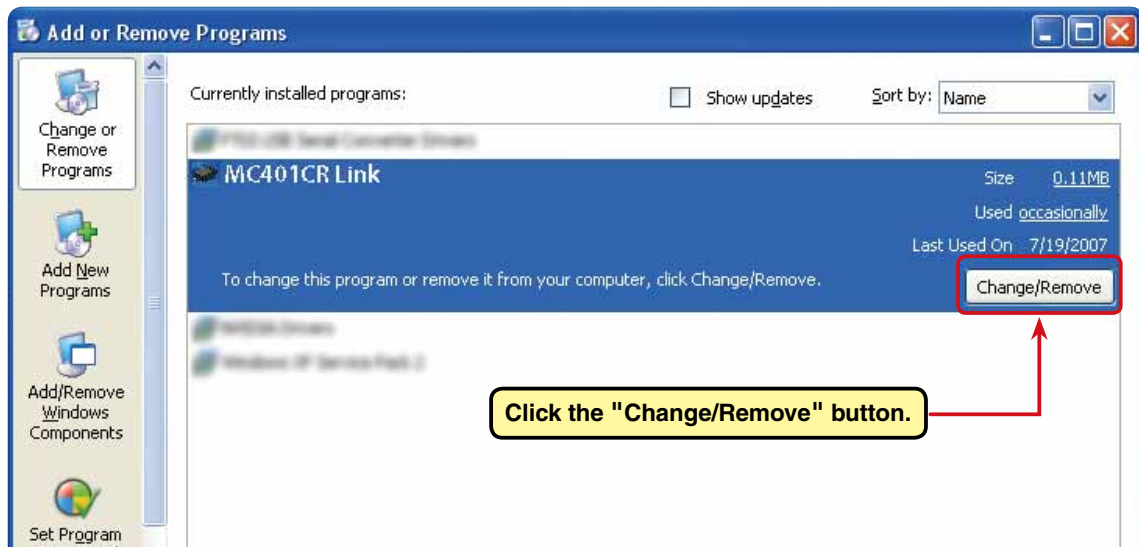
When communication with the CIU-2 was attempted when the wrong COM number was set, the message shown at the right is displayed. When the "OK" button is clicked, this message is displayed. Since the COM number is wrong, communication with the CIU-2 is impossible. Set the correct COM number at the "ComPort" menu. (See Page. 7.)



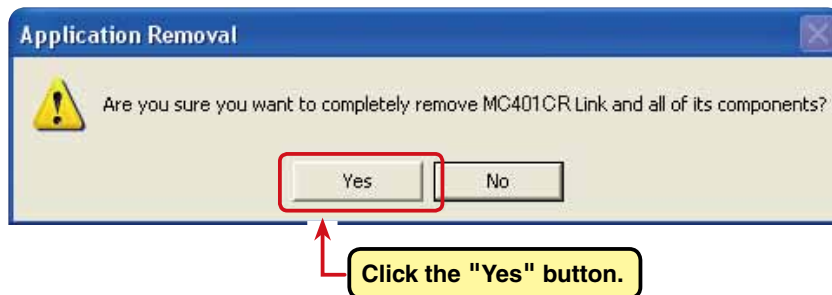
MC401CR Link program removal (uninstall)

To remove (uninstall) the MC401CR Link program from the computer, use the Windows "Add/Remove Programs" function. Since the operation method differs with the OS used, refer to Windows help, etc.

1. Open "Control Panel" from the "Start" button at the bottom right side of the Windows XP desktop.
2. Launch "Add/Remove Programs" from the opened "Control Panel".
3. After "Add/Remove Programs" is displayed, select "MC401CR Link" and click the "Change/Remove" button.



4. "Are you sure you want to completely remove MC401CR Link and all of its components?" is displayed. Click the "Yes" button.



5. "Program installation removed" is displayed. Click the "OK" button. This completes removal (uninstall) of the MC401CR Link program.

