Engineering Guide

IND360
CCLINK PLC

METTLER TOLEDO

Directory

1. Overview

This document is used in conjunction with the METTLER TOLEDO IND360 sample code and can be downloaded via link IND360 data download - METTLER TOLEDO (mt.com) to download additional related materials from the data page.

The example uses the Mitsubishi R04ENCPU and GX Work3 configuration environment.

2. Configure the development environment

2.1. Hardware connection

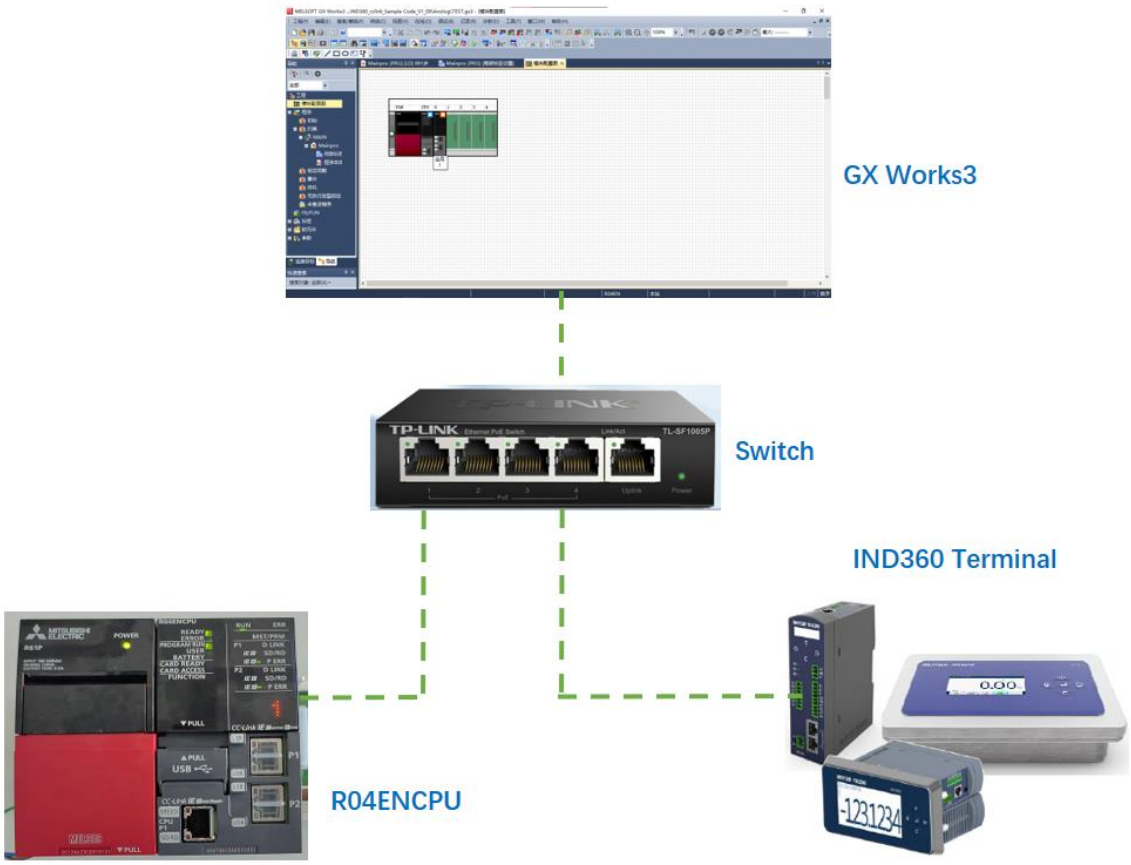

Figure 2-1：Hardware system connection

2.2. Open sample

You need GX Work3 version 1.082L or more advanced version in order to open IND360_PRNT_V1_00.gx3.

2.3. Communication Setup

After the example is opened, IND360 default PLC IP address is 192.168.0.2, service IP address is 192.168.0.8. Before communication, the PC, PLC and IND360 should be set in the same network segment to ensure communication success.

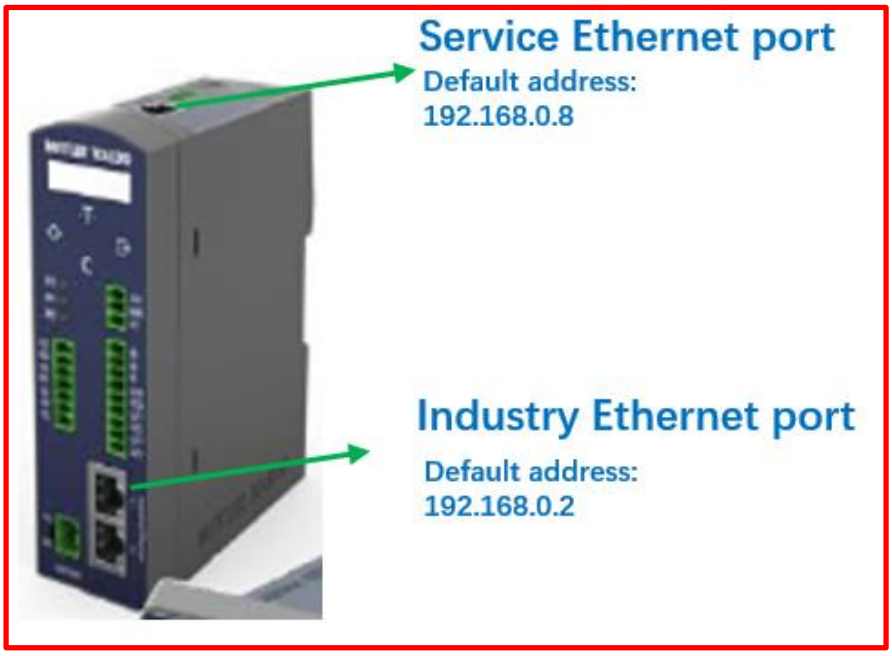

Figure 2-2：IND360 Ethernet interface

2.3.1 IP setup

2.3.1.1 PLC IP setup

“Parameter”-“Module parameter”-“Basic settings”-“Own node settings”-“IP Address”

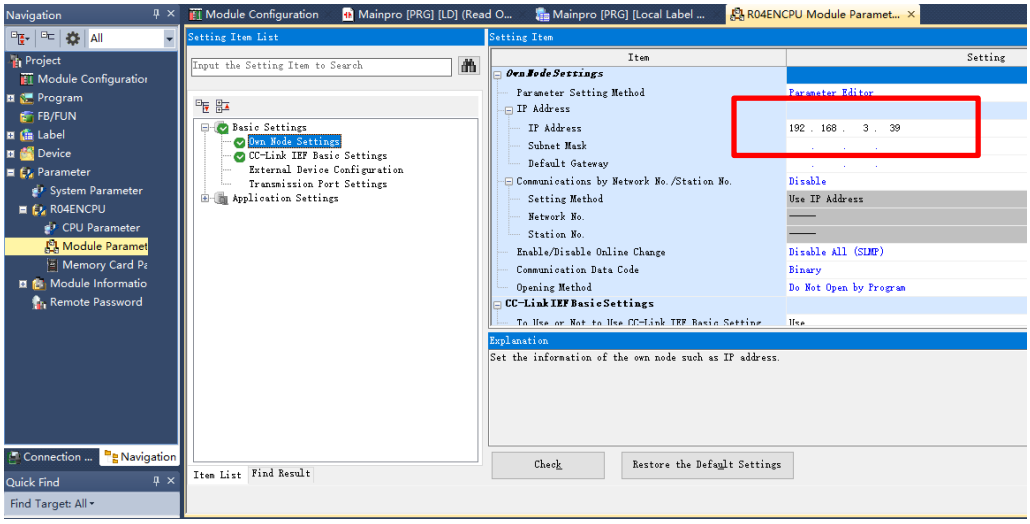

Figure 2-3：PLC IP setup

2.3.1.2 PC IP setup

“Open Network & Internet settings”-“Change adapter options”-“Ethernet connection”-“Properties”

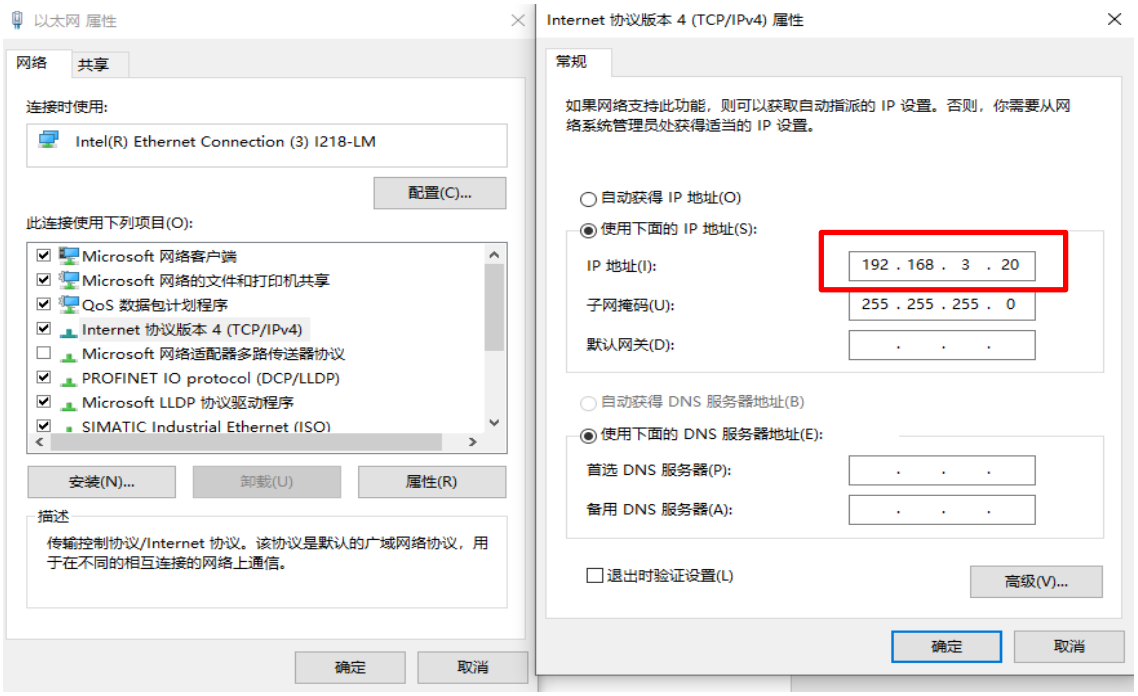

Figure 2-4：PC IP setup

2.3.1.3 IND360 IP setup

Connect the PC network port to the IND360 service network port. Enter the default IP address 192.168.0.8 in the browser.

“Communication”-“Service network”-“Ethernet”-“IP address”，then press“set”to enable.

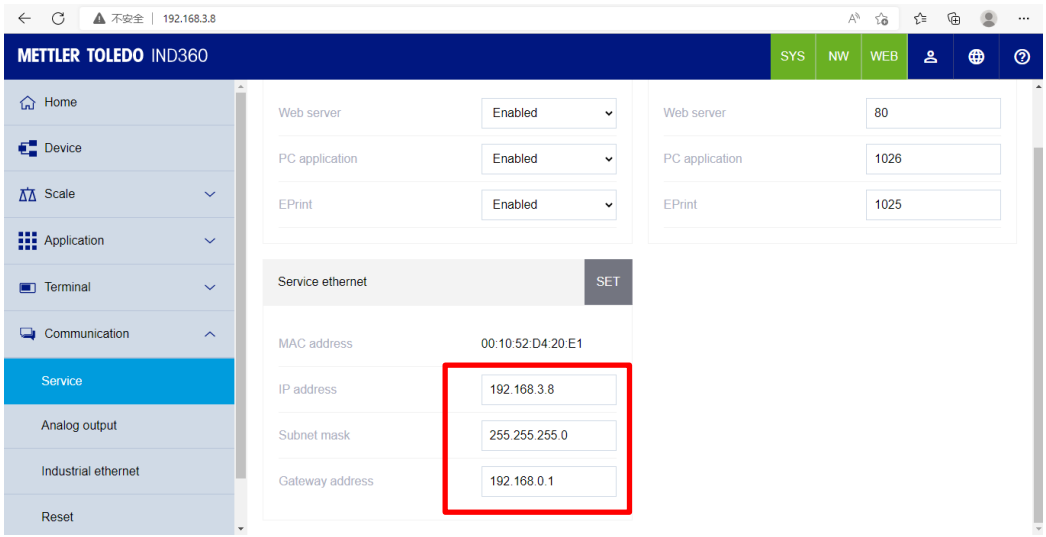

Figure 2-5：IND360 IP setup

2.3.2 Module configuration

2.3.2.1 Module connection

1) Select [Online][Current Connection Destination] from the Engineering Tools menu.

2) click the "CPU module Direct Coupled Setting" button In the "Specify Connection Destination Connection" screen.

3) Select the method of connecting to the CPU module and click [Yes].

4) click the "Connection Test" button to verify that you can connect to the CPU module In the "Specify Connection Destination Connection" screen.

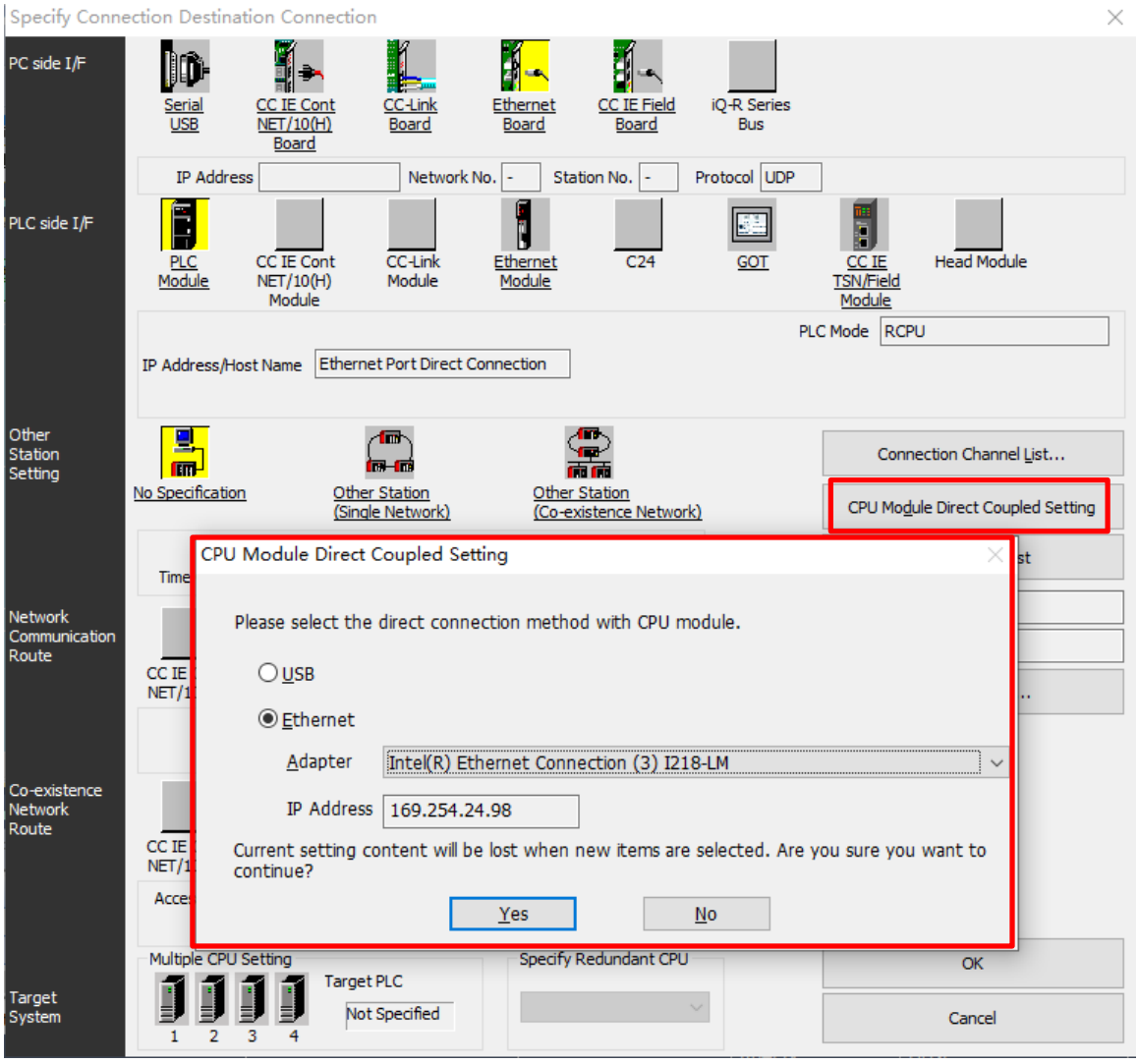

Figure 2-6：CPU module connection setup

Note: If fails to search the device, the connection between the PC and PLC will be lost. In this case, reconnect the PC to the PLC.

2.3.2.2 CPU Module Initialization

[Online][CPU Memory Operation]

1) Select “Data Memory” in “Memory management”，Press [initialization] button.

2) Select “File Storage Area” in “Memory management”，Press [initialization] button.

3) Press [Close] button after initialization finished.

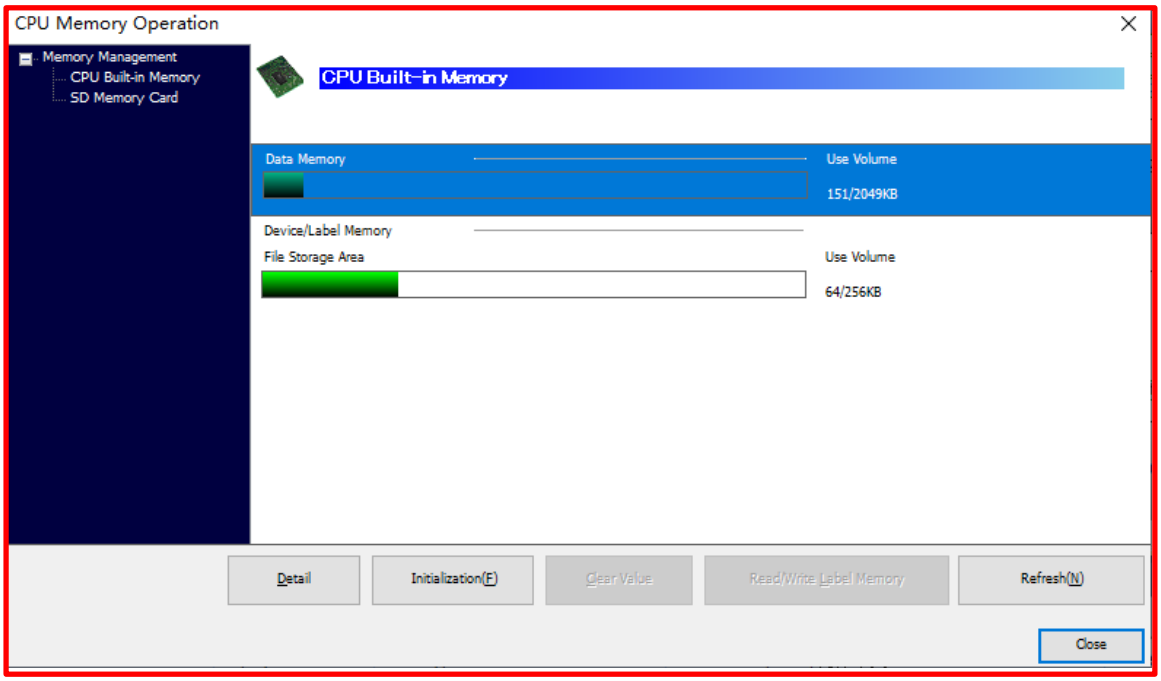

Figure 2-7：CPU Memory Operation

2.3.2.3 Parameters Setting

[Navigation Window] [Module Configuration]

1) Open “Module Configuration”, select [Online][Read Module Configuration from PLC].

2) When the module label screen of adding each module is displayed, click the [Yes] button.

3) The system parameters are set automatically, and the system configuration of the machine is displayed in the module configuration diagram.

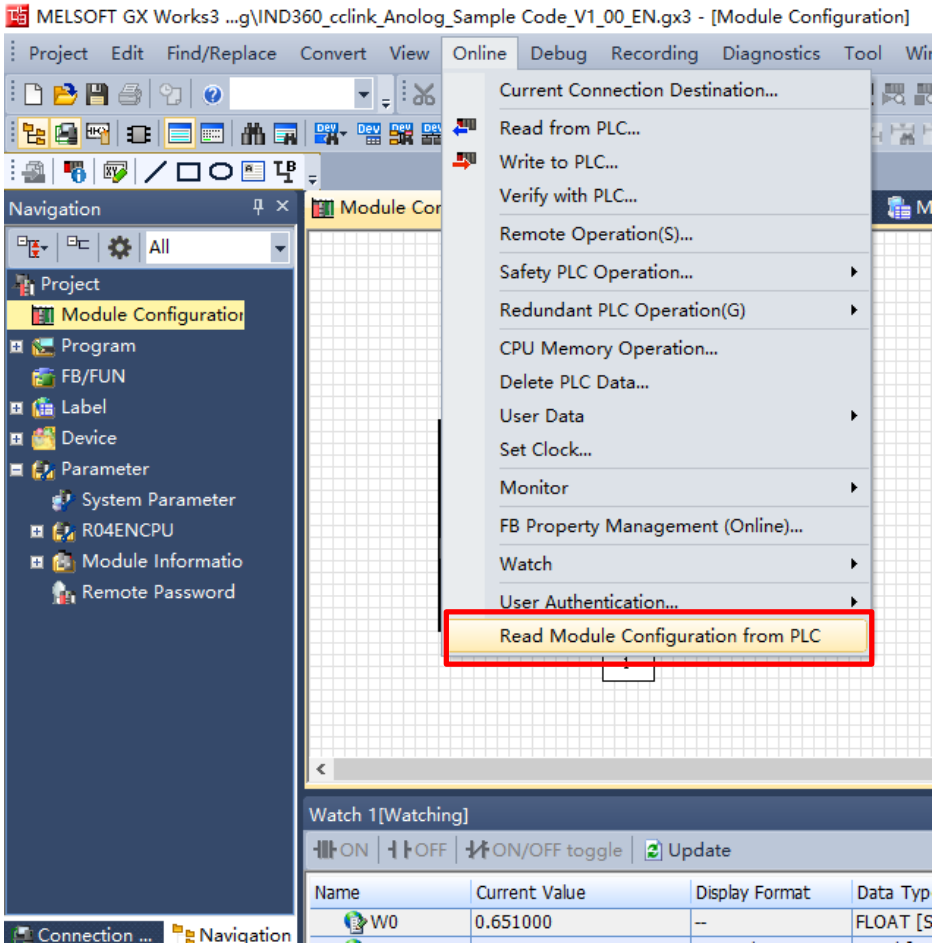

Figure 2-8：Read Module Configuration from PLC

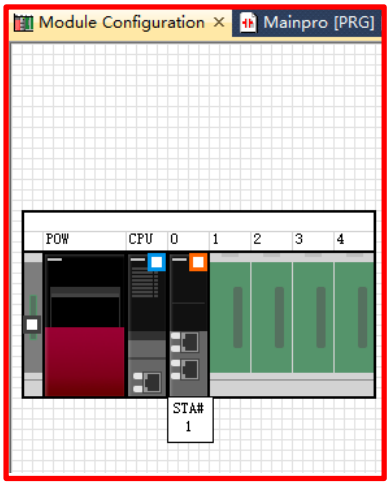

Figure 2-9：Module Configuration

4) When you double-click a CPU module, I/O module, or intelligent function module, the parameter editor of each module is displayed.

5) After setting the parameters, click the [Apply] button to close the parameter editor.

2.3.2.4 CC-Link IEF Basic Settings

[Navigation Window][Parameter] [R04ENCPU] [Module Parameter] [Basic Settings] [CC-Link IEF Basic Settings]

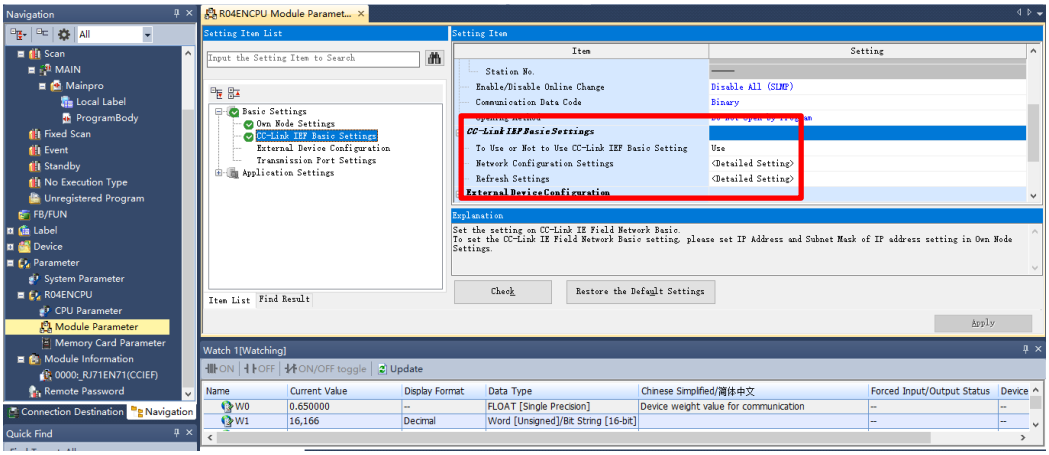

Figure 2-10：CC-Link IEF Basic Settings

Note:

1. CC-Link IEF Basic set as “use”
2. “Network Configuration Settings” and “Refresh Settings” refer to part 2.3.5 and 2.3.6.

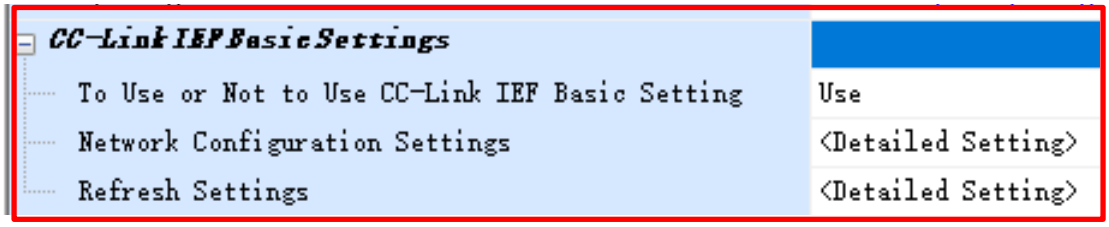

Figure 2-11：CC-Link IEF Basic Settings

2.3.2.5 CC-Link IEF Basic Network Configuration Settings

[Navigation Window][Parameter] [R04ENCPU] [Module Parameter] [Basic Settings] [CC-Link IEF Basic Settings] [Network Configuration Settings]

After connecting IND360, configure the corresponding IP address, click "Detect Now", you can get connected to IND360 equipment. The CCIEF BASIC device is also visible in the module view on the right module list.

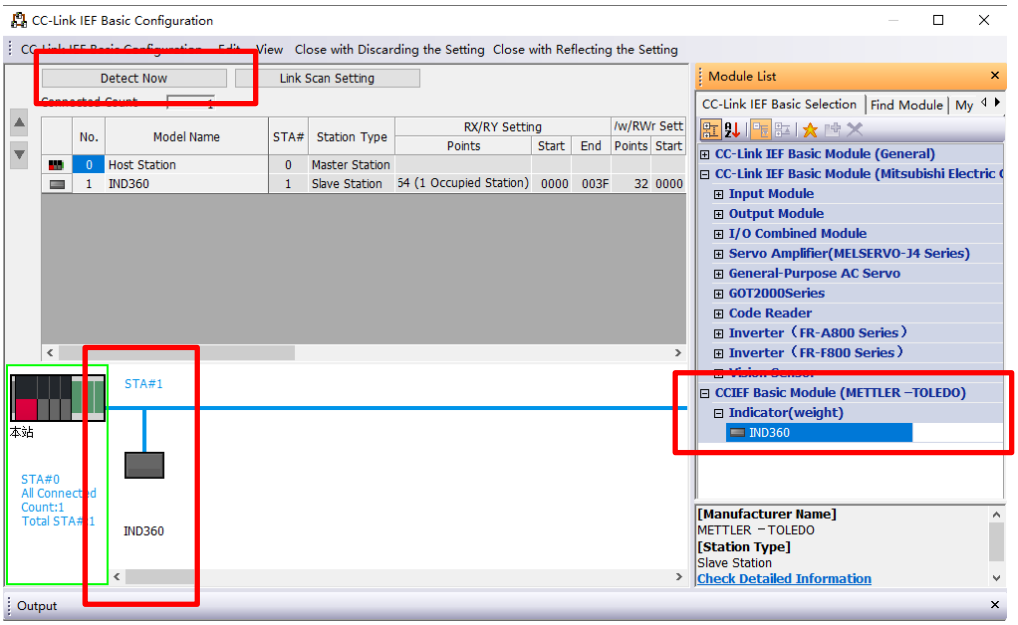

Figure 2-12：CC-Link IEF Basic Network Configuration Settings

Note: If you cannot find the IND360 device connection screen above, you need to import the CSPP file of the device before creating a new project.

Details see below figure:

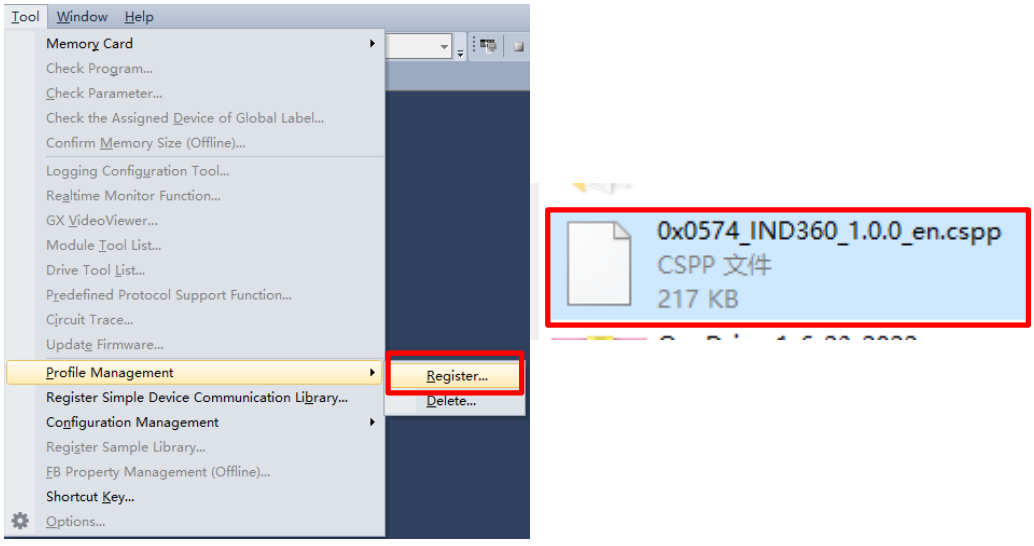

Figure 2-13：Import cspp file

2.3.2.6 CC-Link IEF Basic Refresh Settings

[Navigation Window][Parameter] [R04ENCPU] [Module Parameter] [Basic Settings] [CC-Link IEF Basic Settings] [Refresh Settings]

Recommended configurations are as follows：

Link Side					CPU Side				
Device Name	Points	Start	End		Target	Device Name	Points	Start	End
RX	64	00000	0003F	⇔	Specify Devic	X	64	01000	0103F
RY	64	00000	0003F	⇔	Specify Devic	Y	64	01100	0113F
RWr	32	00000	0001F	⇔	Specify Devic	W	32	00000	0001F
RWw	32	00000	0001F	⇔	Specify Devic	W	32	00100	0011F

Figure 2-14：CC-Link IEF Basic Refresh Settings

2.4. Network diagnostics and program writing

2.4.1 Diagnostics

Perform diagnosis after the configuration is complete：

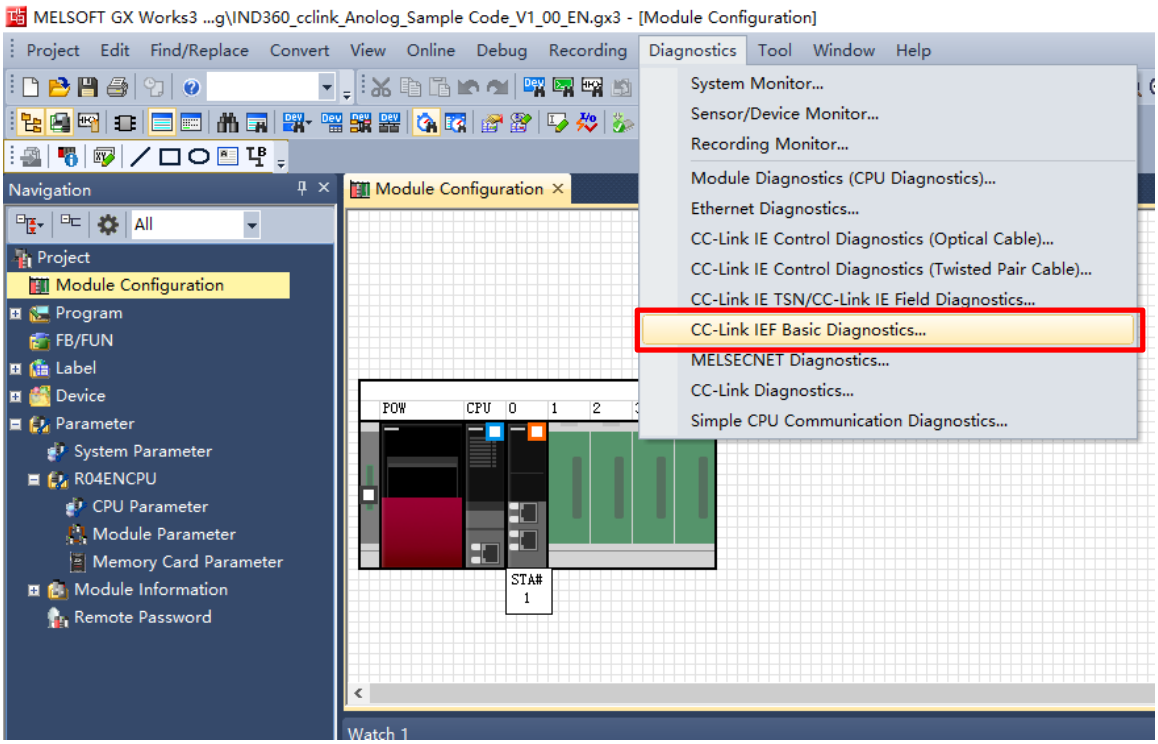

Figure 2-15：CC-Link IEF Basic Network diagnosis

2.4.2 Program write to PLC

Perform write to PLC after the diagnostics is complete：

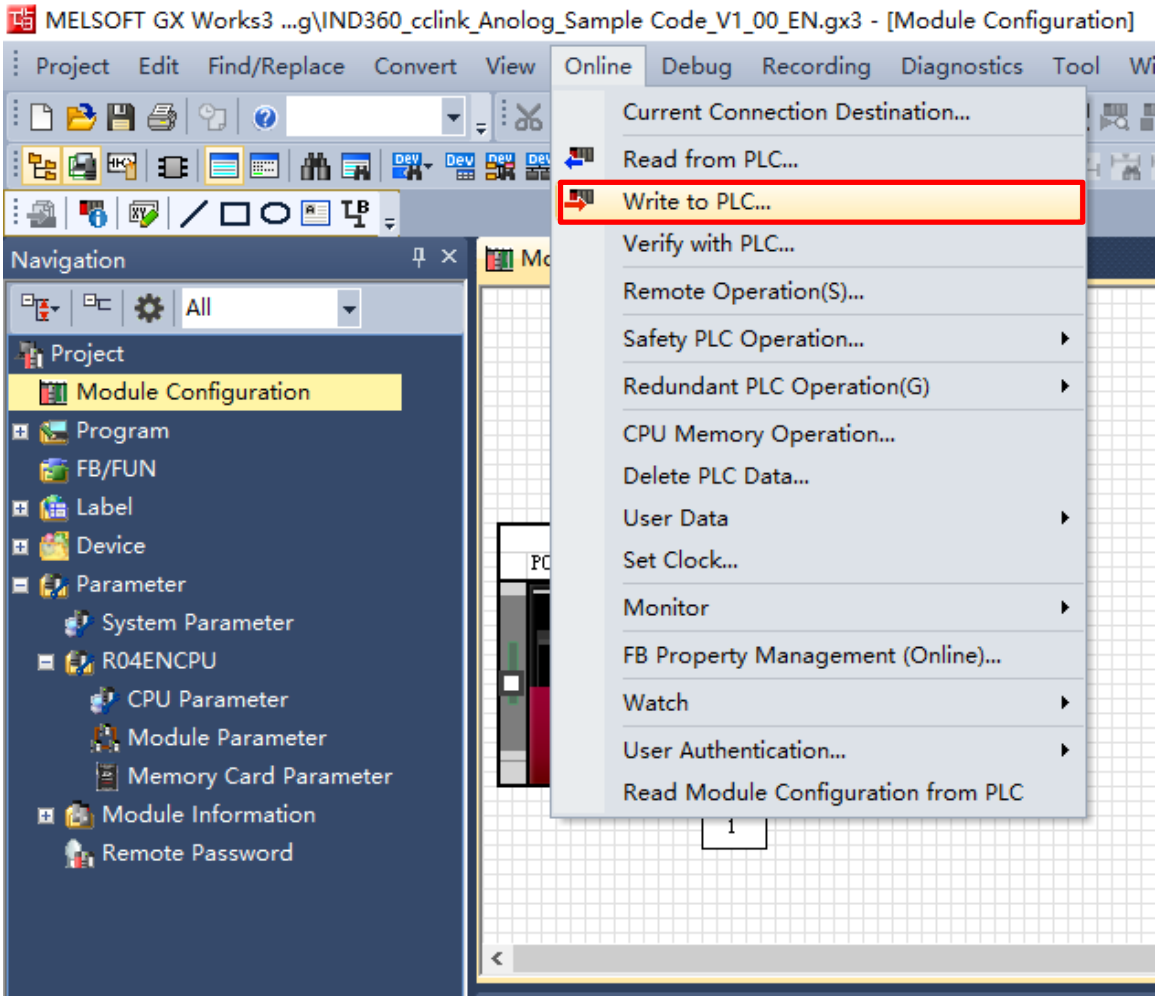

Figure 2-16：Write to PLC

Turn the PLC switch to Run (open the panel above the front of the CPU, there is a switch below, the default is STOP state), and then powered the PLC again, you can Run the program.

3. Basic Function

3.1. Programming instructions

This procedure can read IND360 current weight value, device status, zero, tare and clear function.

3.1.1 W link registers

Based on part 2.3.2.6, W0 is RWr read cyclic data from IND360. W100 is RWw write cyclic command to IND360.

W link registers data list as below：

Measuring Block		
W0	R	A 32-bit floating point number consisting of two words
W1	R	
W2	R	Device Status Word
W3	R	Command Respond Word

Figure 3-1：W link registers-reading cyclic area

Measuring Block		
W100	W	A 32-bit floating point number consisting of two words
W101	W	
W102	W	Weighing channel number
W103	W	Command word issued by a control system

Figure 3-2：W link registers-writing cyclic area

Link Side					CPU Side				
Device Name	Points	Start	End		Target	Device Name	Points	Start	End
RX	64	00000	0003F	⇔	Specify Devic	X	64	01000	0103F
RY	64	00000	0003F	⇔	Specify Devic	Y	64	01100	0113F
RWr	32	00000	0001F	⇔	Specify Devic	W	32	00000	0001F
RWw	32	00000	0001F	⇔	Specify Devic	W	32	00100	0011F

Figure 3-3：W link registers between link and CPU side

3.2. Local label establishment

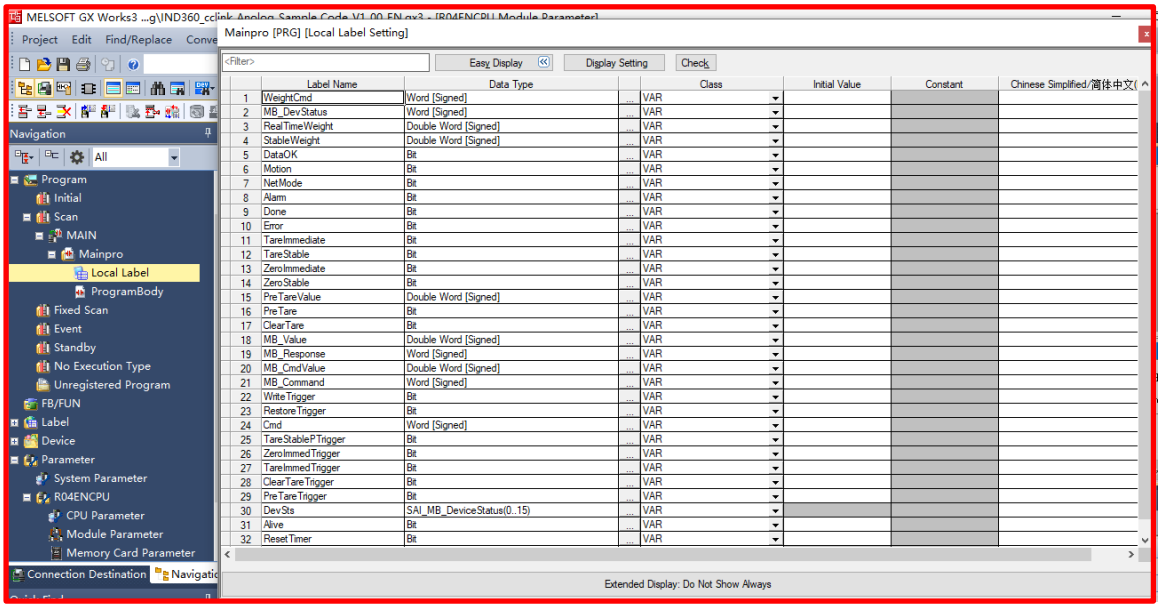

Figure 3-4：Local label establishment

3.3. Weight acquisition program

3.3.1 Device weight value conversion

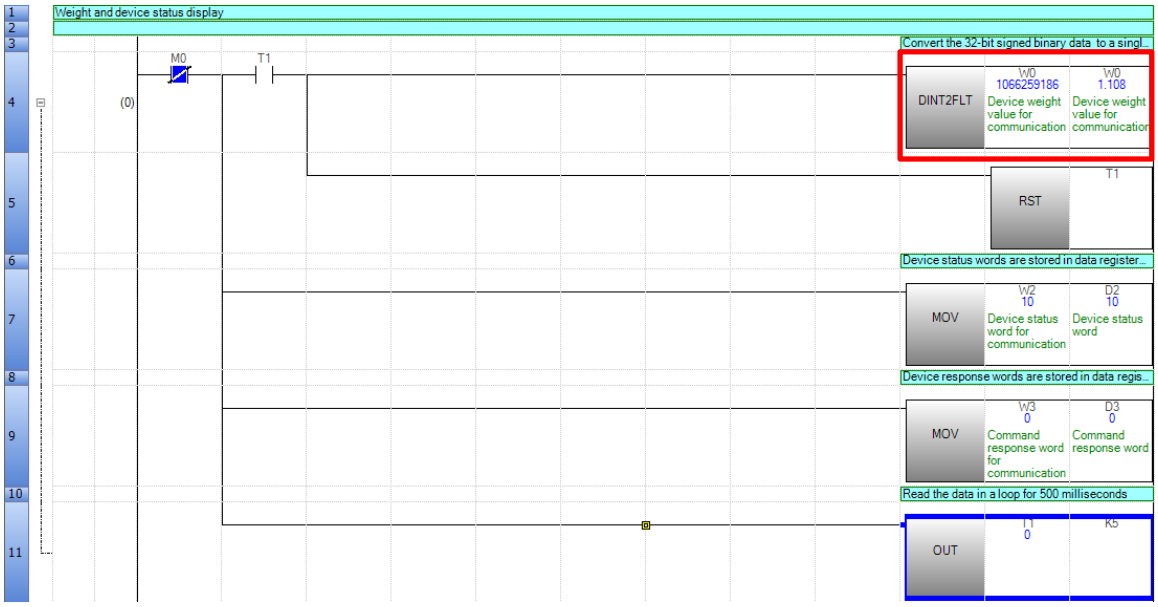

Figure 3-5：Device weight value conversion

3.3.2 Device on-line monitoring

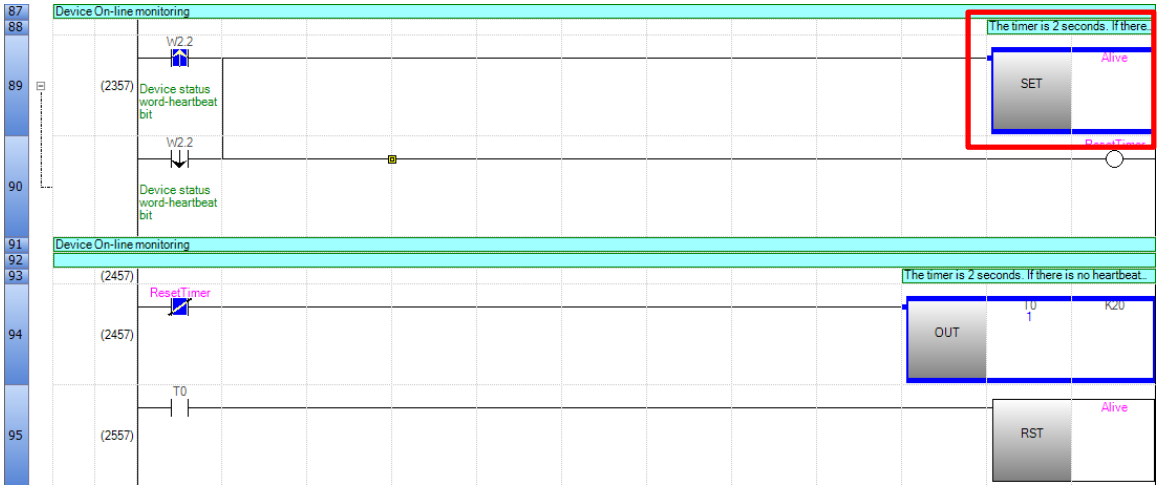

Figure 3-6：Device on-line monitoring

3.3.3 Device status monitoring

Data OK bit will be reset when overload, underload and calibration process, can be used as a judgment of abnormal conditions.

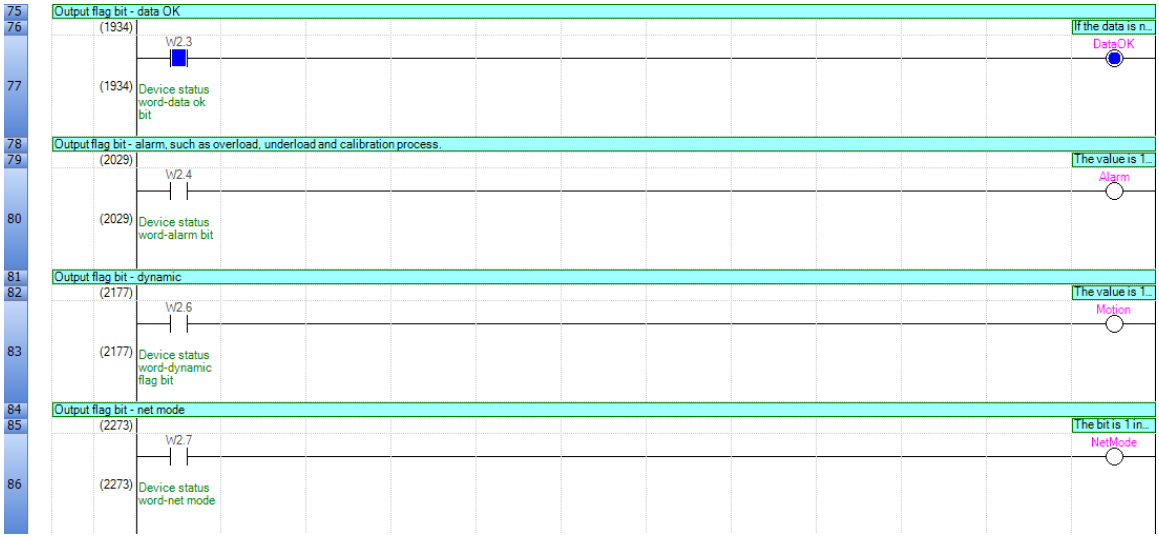

Figure 3-7：Device status monitoring

3.3.4 Stable weight acquisition

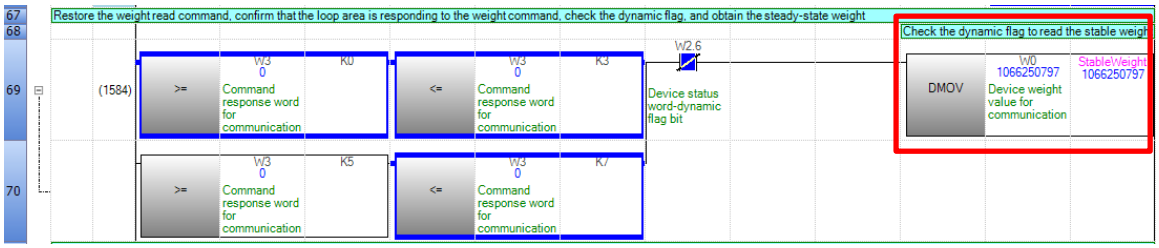

Figure 3-8：Stable weight acquisition

3.3.5 Dynamic weight acquisition

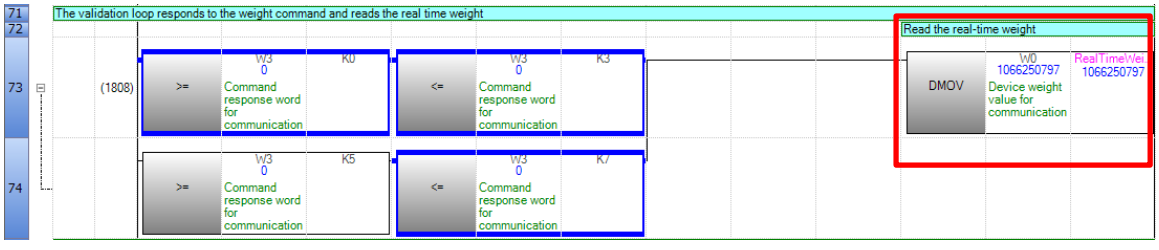

Figure 3-9：Dynamic weight acquisition

3.4. Zero & Tare & Clear program

3.4.1 Cyclic area command code

Description	Command code (Decimal)	IND360	IND360 POWERCELL	IND360 PRECISION
Read gross weight (Displayed values)	0(Default)	√		
Read gross weight (Displayed values)	1	√		
Read tare weight (Displayed values)	2	√		
Read net weight (Displayed values)	3	√		
Preset tare weight (Digital)	201	√		
Tare stable	400	√		
Zero stable	401	√		
Clear	402	√		
Tare immediately	403	√		
Zero immediately	404	√		

Figure 3-10：Cyclic area command code

3.4.2 Weight command is assigned to the cyclic area command

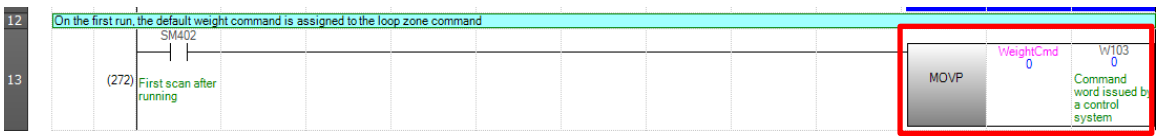

Figure 3-11：Weight command is assigned to the cyclic area command

3.4.3 Tare stable

Trigger tare stable, set command 400, set write trigger flag

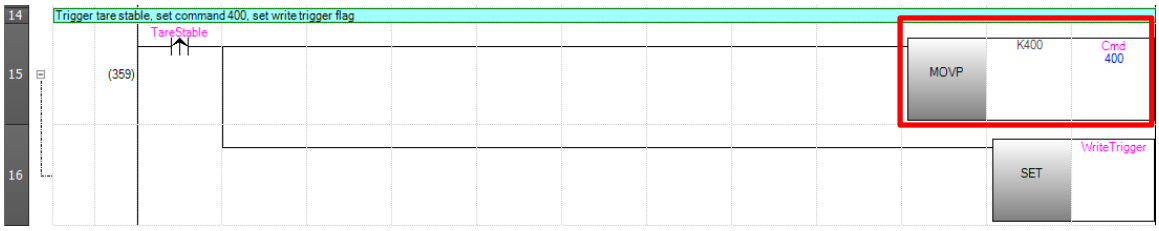

Figure 3-12：Trigger tare stable, set command 400

Assign the tare stable command value 400 to the output cyclic area, reset the flag, and clear the command value

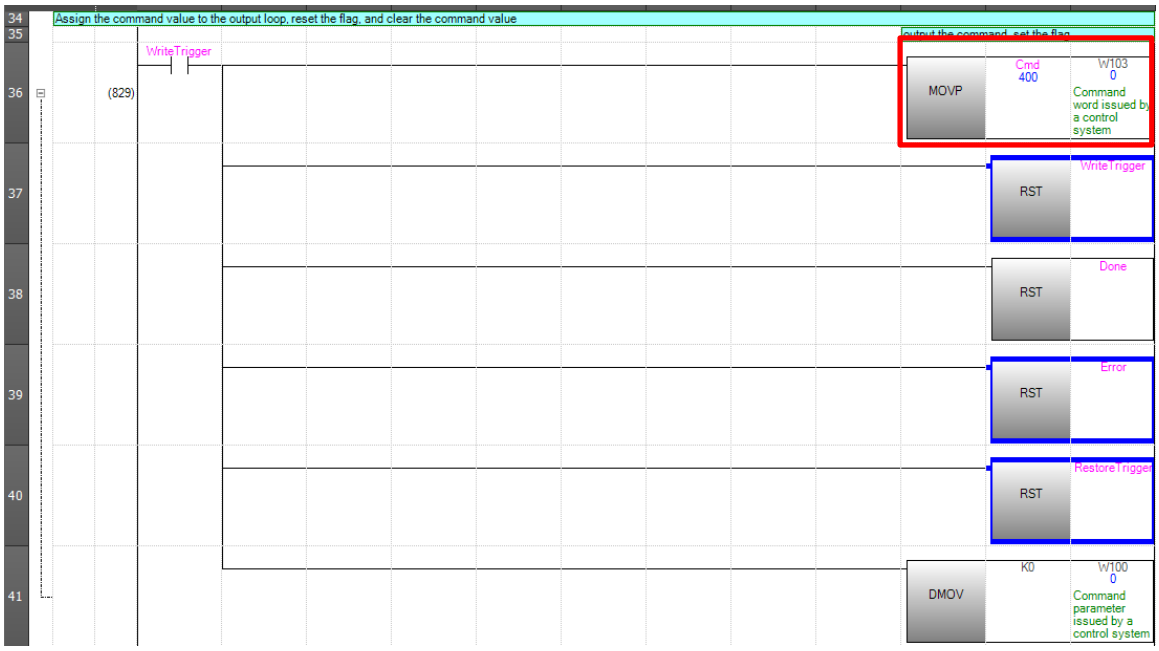

Figure 3-13：Assign the tare stable command value 400 to the output cyclic area

If the value of the response command is the same as the value of the sent command, it indicates that the command has been executed normally, set “done” flag.

If the value of the response command is less than 0, it indicates that the command execution failed, set “error” flag.

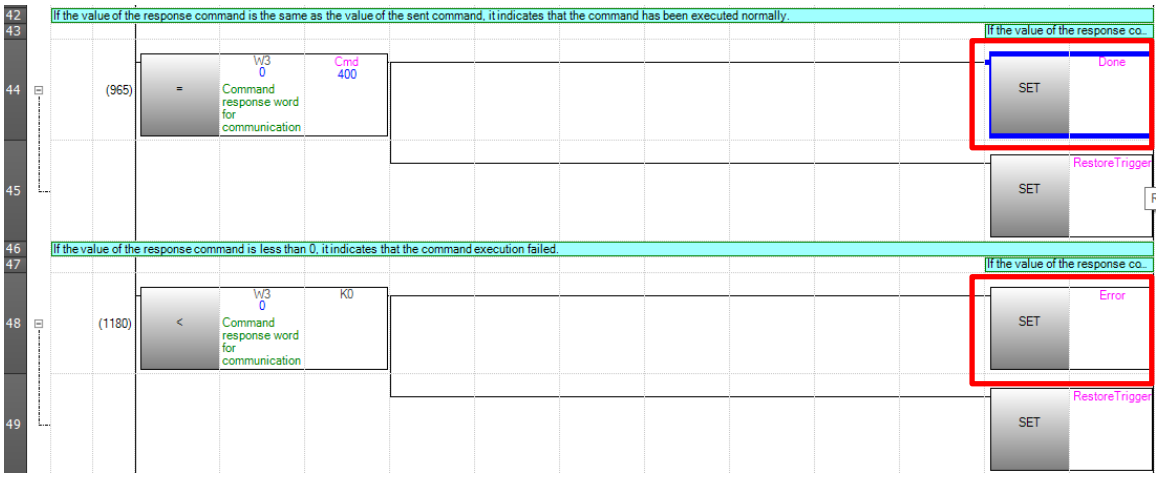

Figure 3-14：Comparison between response command and send command

3.4.4 Zero stable

Trigger zero stable, set command 401, set write trigger flag

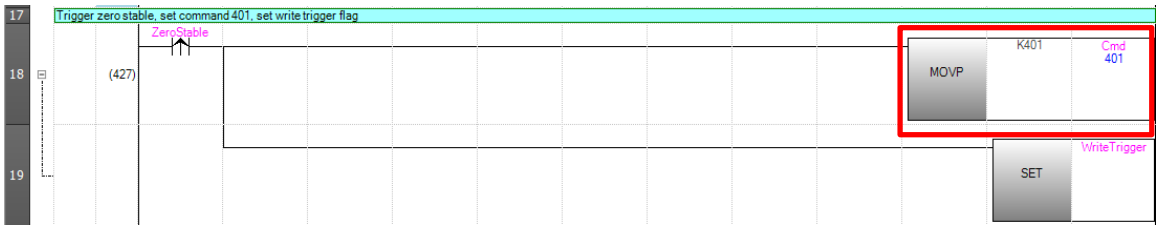

Figure 3-15：Trigger zero stable, set command 401

Assign the zero stable command value 401 to the output cyclic area, reset the flag, and clear the command value.

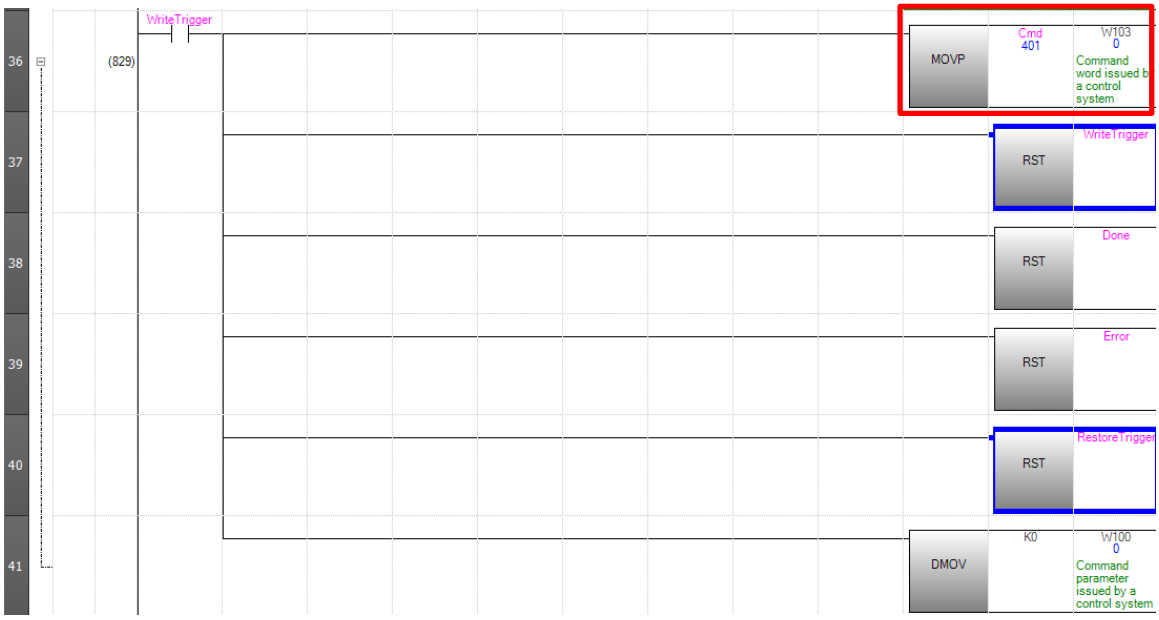

Figure 3-16：Assign the zero stable command value 401 to the output cyclic area

If the value of the response command is the same as the value of the sent command, it indicates that the command has been executed normally, set “done” flag.

If the value of the response command is less than 0, it indicates that the command execution failed, set “error” flag.

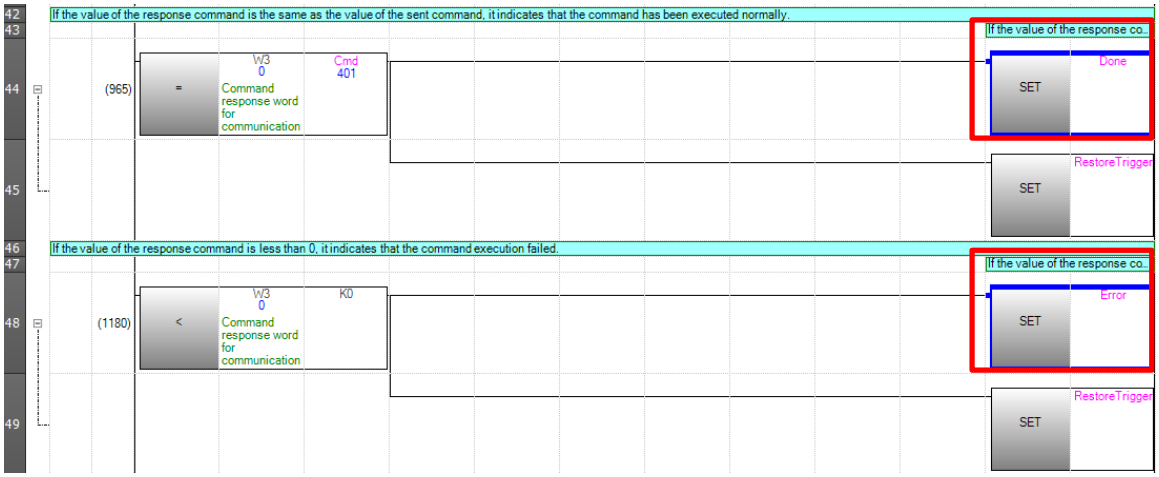

Figure 3-17：Comparison between response command and send command

3.4.5 Tare immediately

Trigger tare immediately, set command 403, set write trigger flag

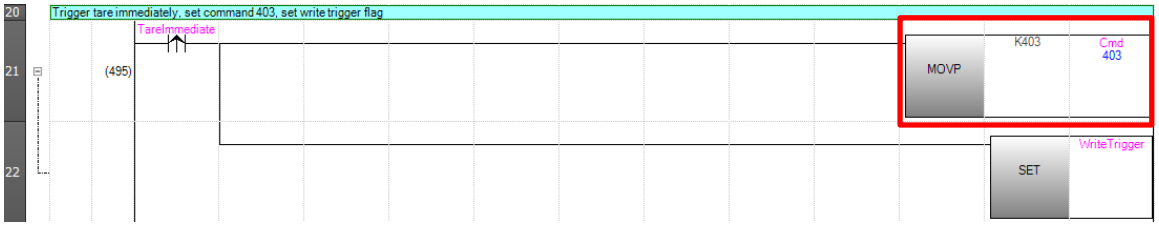

Figure 3-18：Trigger tare immediately, set command 403

Assign the tare immediately command value 403 to the output cyclic area, reset the flag, and clear the command value.

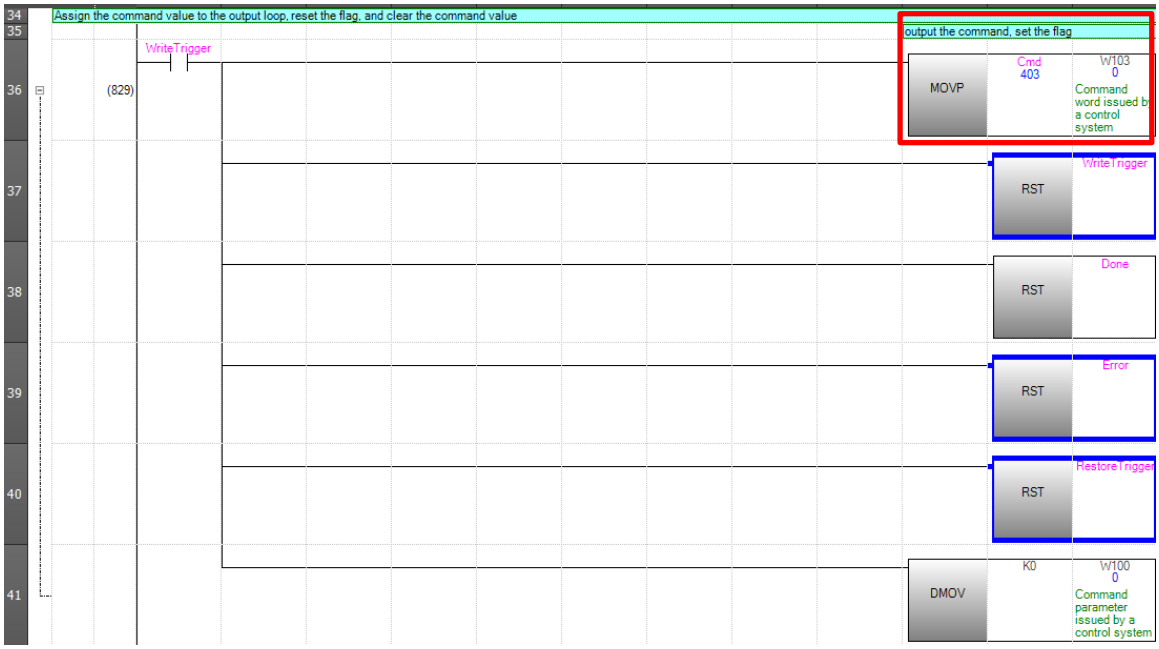

Figure 3-19：Assign the tare immediately command value 403 to the output cyclic area

If the value of the response command is the same as the value of the sent command, it indicates that the command has been executed normally, set “done” flag.

If the value of the response command is less than 0, it indicates that the command execution failed, set “error” flag.

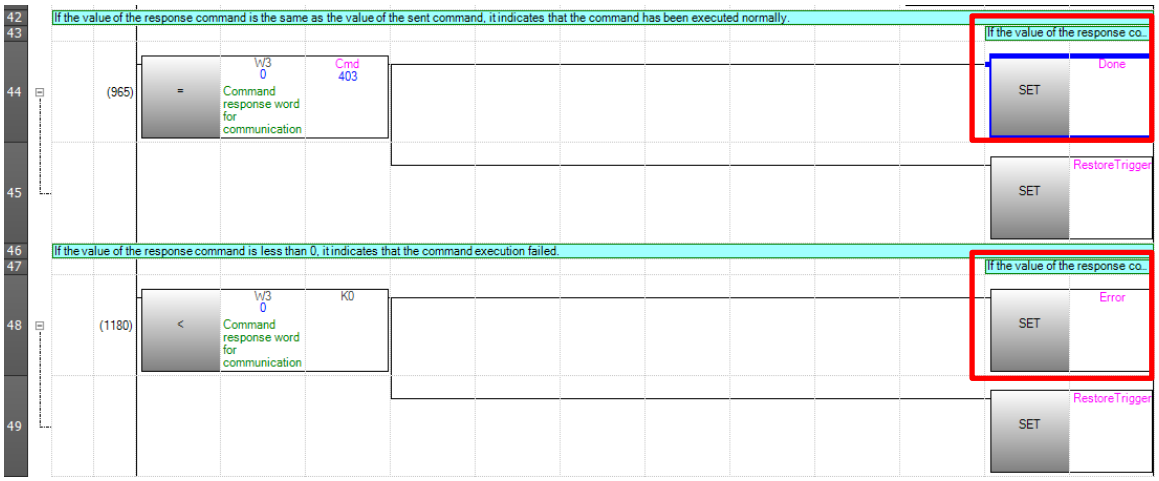

Figure 3-20：Comparison between response command and send command

3.4.6 Zero immediately

Trigger zero immediately, set command 404, set write trigger flag

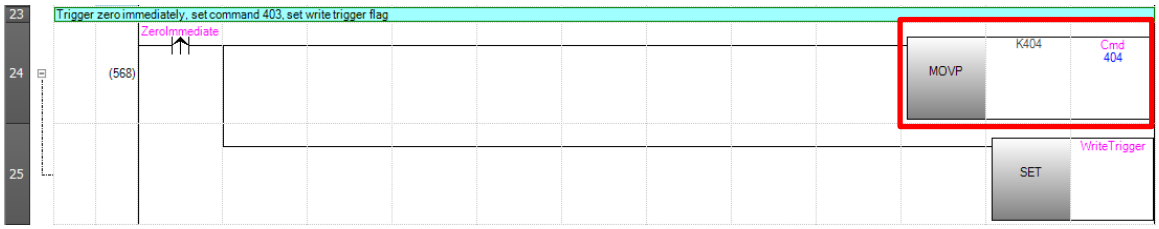

Figure 3-21：Trigger zero immediately, set command 404

Assign the zero immediately command value 404 to the output cyclic area, reset the flag, and clear the command value.

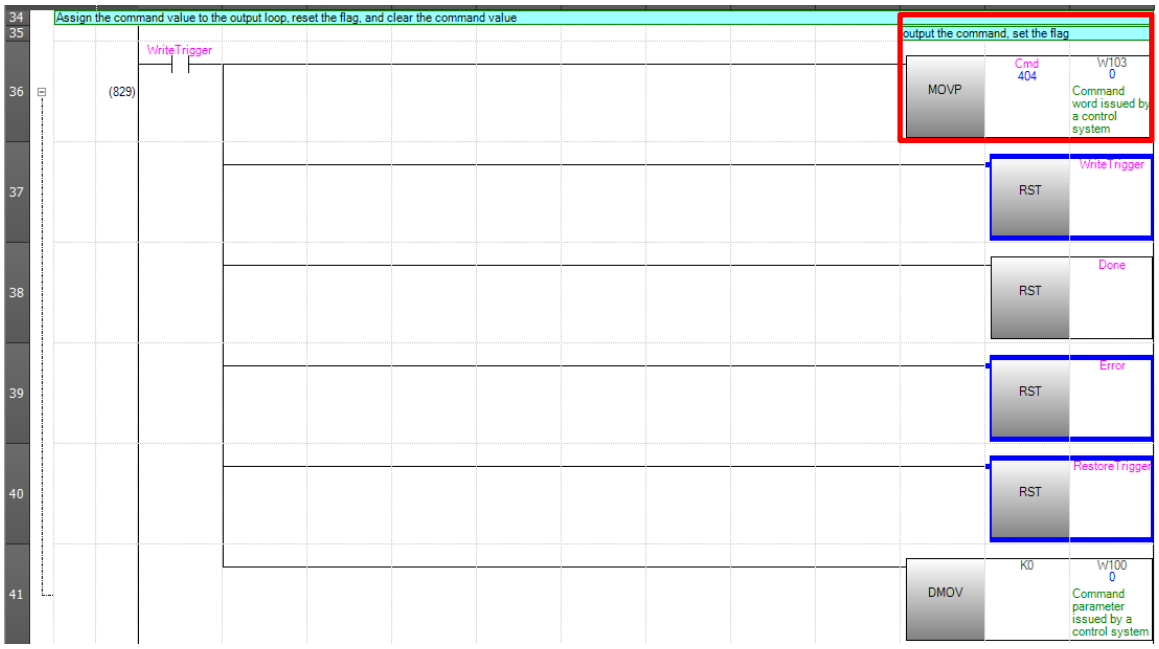

Figure 3-22：Assign the zero immediately command value 404 to the output cyclic area

If the value of the response command is the same as the value of the sent command, it indicates that the command has been executed normally, set “done” flag.

If the value of the response command is less than 0, it indicates that the command execution failed, set “error” flag.

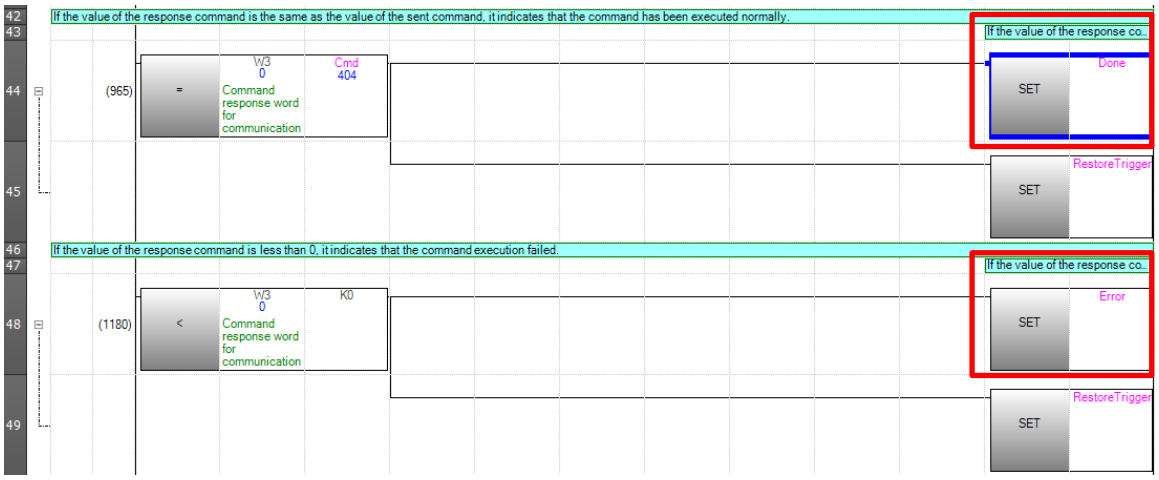

Figure 3-23：Comparison between response command and send command

3.4.7 Clear tare

Trigger clear, set command 402, set write trigger flag

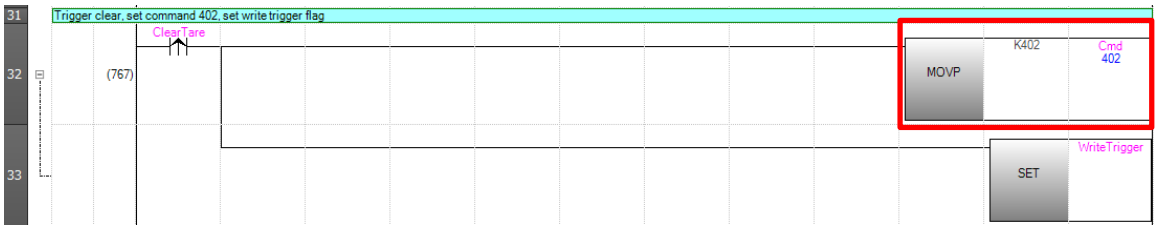

Figure 3-24：Trigger clear, set command 402

Assign the clear tare command value 402 to the output cyclic area, reset the flag, and clear the command value.

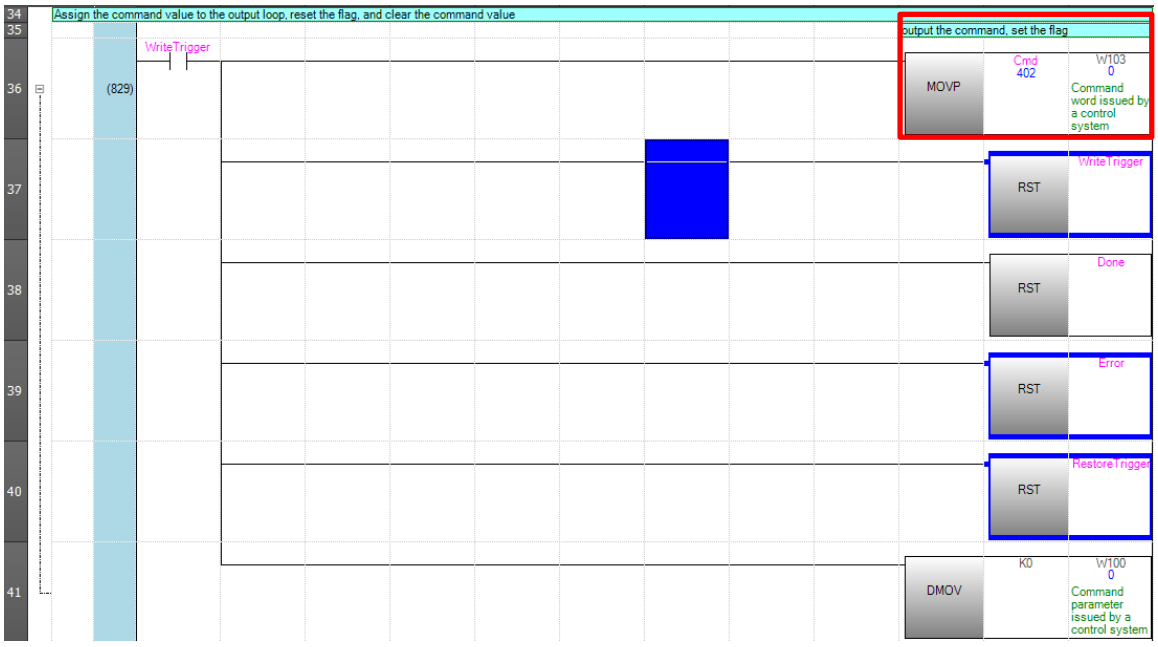

Figure 3-25：Assign the clear tare command value 402 to the output cyclic area

If the value of the response command is the same as the value of the sent command, it indicates that the command has been executed normally, set “done” flag.

If the value of the response command is less than 0, it indicates that the command execution failed, set “error” flag.

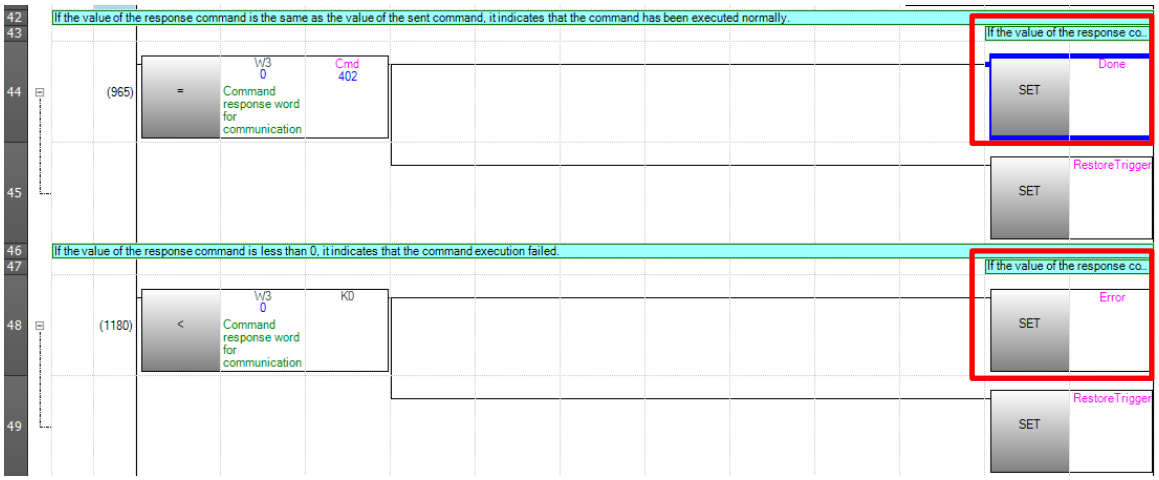

Figure 3-26：Comparison between response command and send command

3.4.8 Preset tare

Set preset tare weight value, trigger preset tare weight, set command 201, set write trigger flag

Figure 3-27：Trigger preset tare weight, set command 201

Assign the preset tare weight command value 201 to the output cyclic area, reset the flag, and clear the command value.

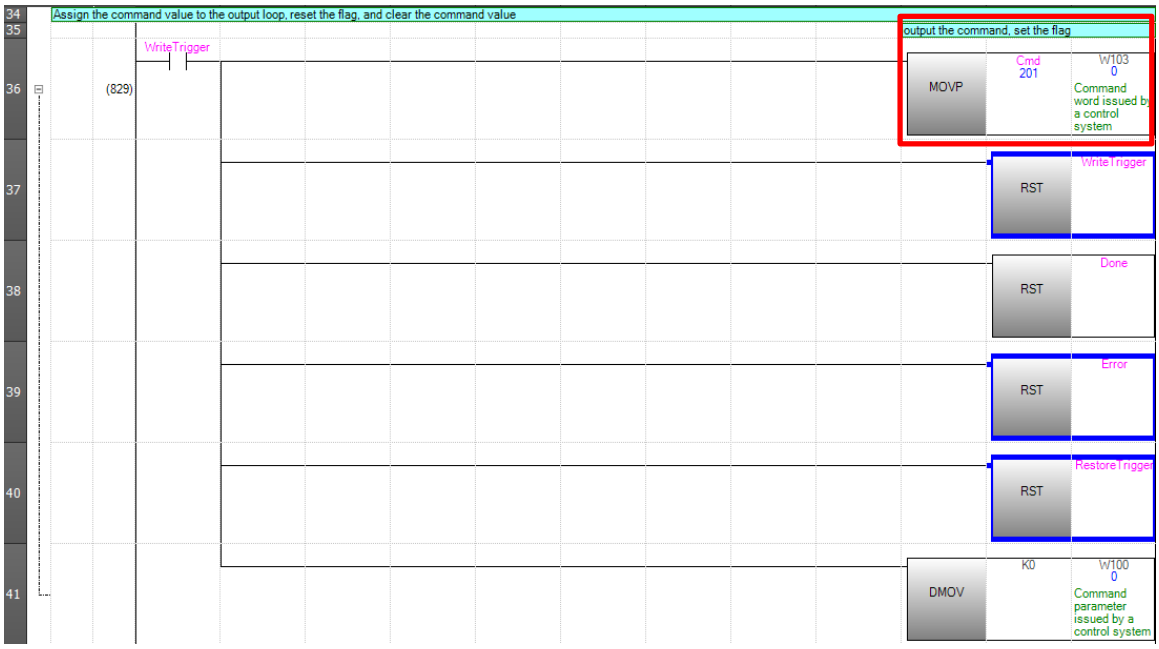

Figure 3-28：Assign the preset tare weight command value 201 to the output cyclic area

If the value of the response command is the same as the value of the sent command, it indicates that the command has been executed normally, set “done” flag.

If the value of the response command is less than 0, it indicates that the command execution failed, set “error” flag.

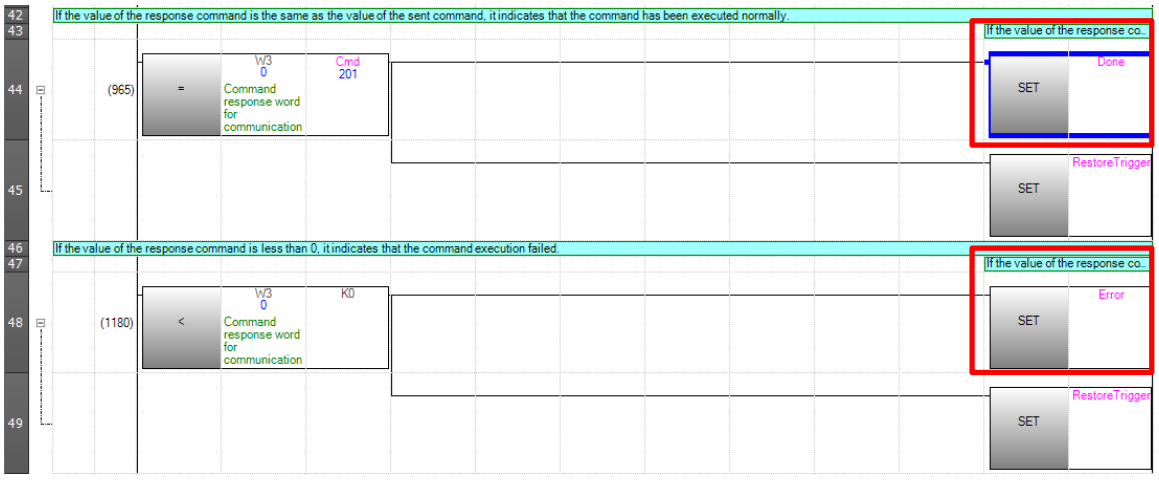

Figure 3-29：Comparison between response command and send command

3.4.9 Restore the weight read command

After the zeroing and taring are complete, the WeightCmd command is automatically sent once, allowing the MB Measuring Value cyclic area to report the weight values.

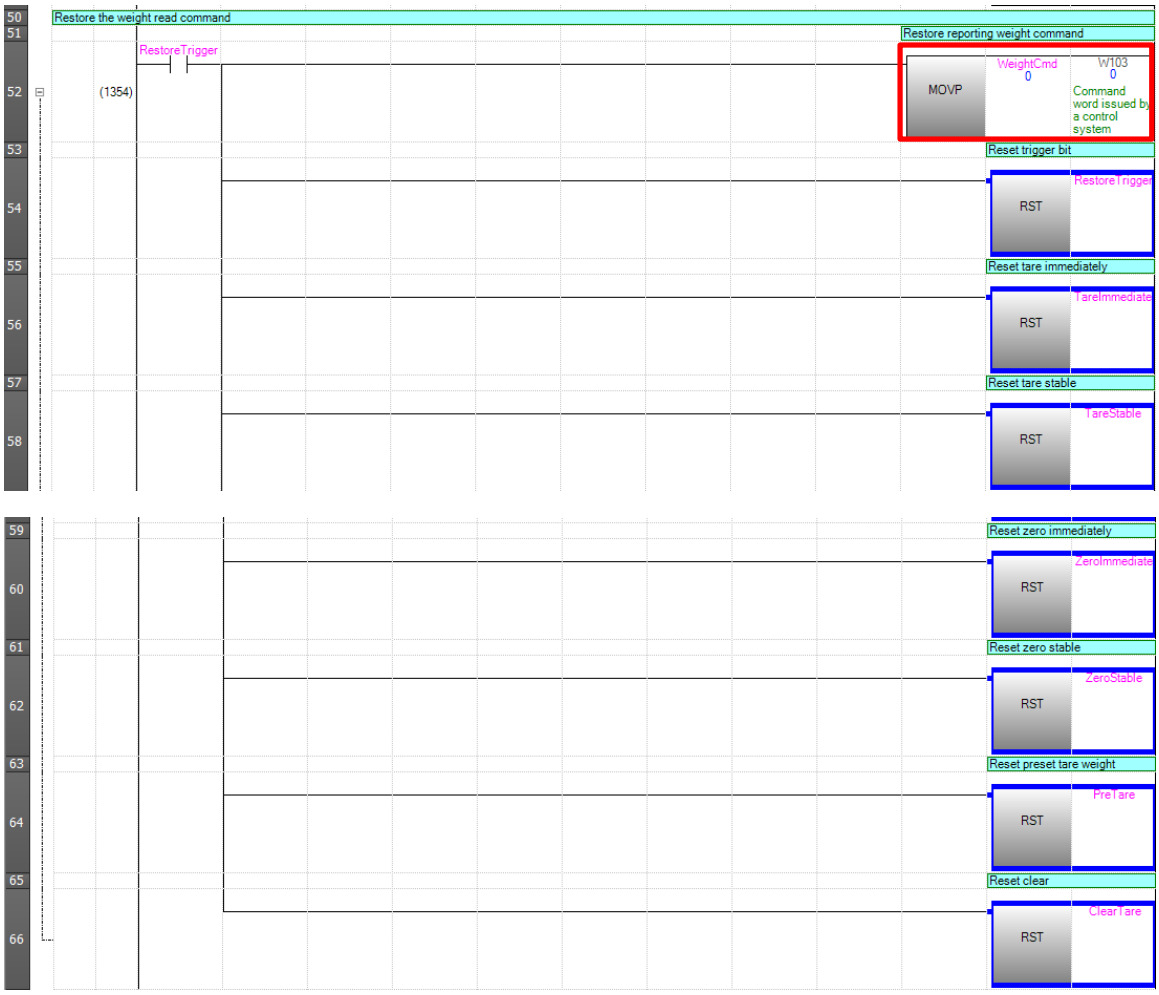

Figure 3-30：Restore the weight read command

4. Sample transplant