MELSEC-L Digital-Analog Converter Module Sample Ladder Reference Manual

Applicable modules:
L60DA4

<Contents>

Reference Manual Revision History

Reference Manual Number	Date	Description
LDM-M020-A	2011/09/26	First edition

1. Overview

Overview of the Sample Ladder Program

The sample ladder programs support a system that uses the MELSEC-L digital-analog converter module (L60DA4).

Sample Ladder Program Functions

The programs have the following functions.

(1) When Using the Module in Standard System Configuration (When Using Intelligent Function Module Parameters)

No.	Project name	Program name	Item	Description	Version
1	LD-L60DA4_PRM_V100A_E	01OutDA	D/A conversion value output	Outputs an analog value that was D/A converted by the digital-analog converter module using the configuration function.	1.00A

(2) When Using the Module in Standard System Configuration (When Not Using Intelligent Function Module Parameters)

No.	Project name	Program name	Item	Description	Version
1	LD-L60DA4_NPM_V100A_E	01OutDA	D/A conversion value output	Outputs an analog value that was D/A converted by the digital-analog converter module without using the configuration function.	1.00A

(3) When Connecting the Module to the Head Module

No.	Project name	Program name	Item	Description	Version
1	LD-L60DA4_IEF_V100A_E	01OutDA	D/A conversion value output	Outputs an analog value that was D/A converted by the digital-analog converter module on the intelligent device station using CC-Link IE Field Network.	1.00A

Relevant Manuals

MELSEC-L Digital-Analog Converter Module User's Manual

MELSEC-Q CC-Link IE Field Network Master/Local Module User's Manual

MELSEC-L CC-Link IE Field Network Master/Local Module User's Manual

MELSEC-L CC-Link IE Field Network Head Module User's Manual

QCPU User's Manual(Hardware Design, Maintenance and Inspection)

MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)

GX Works2 Version 1 Operating Manual (Common)

GX Developer Version 8 Operating Manual

Note

This manual describes the functions of the sample ladder programs. It does not include information on restrictions of use such as combination with modules or programmable controller CPUs. Before using any Mitsubishi products, please read all the relevant manuals.

For information on the detailed specifications and operation timings of the sample ladder programs, refer to the MELSEC-L Digital-Analog Converter Module User's Manual. The descriptions of the sample ladder programs in this manual may be different from the ones found in the MELSEC-L Digital-Analog Converter Module User's Manual depending on the date created.

2. When Using the Module in Standard System Configuration (When Using Intelligent Function Module Parameters)

2.1 D/A conversion value output

Function Overview

This program outputs an analog value that was D/A converted by the digital-analog converter module in a standard system configuration using the intelligent module parameters.

Program

This function uses the project (program name).

•LD-L60DA4_PRM_V100A_E(01OutDA)

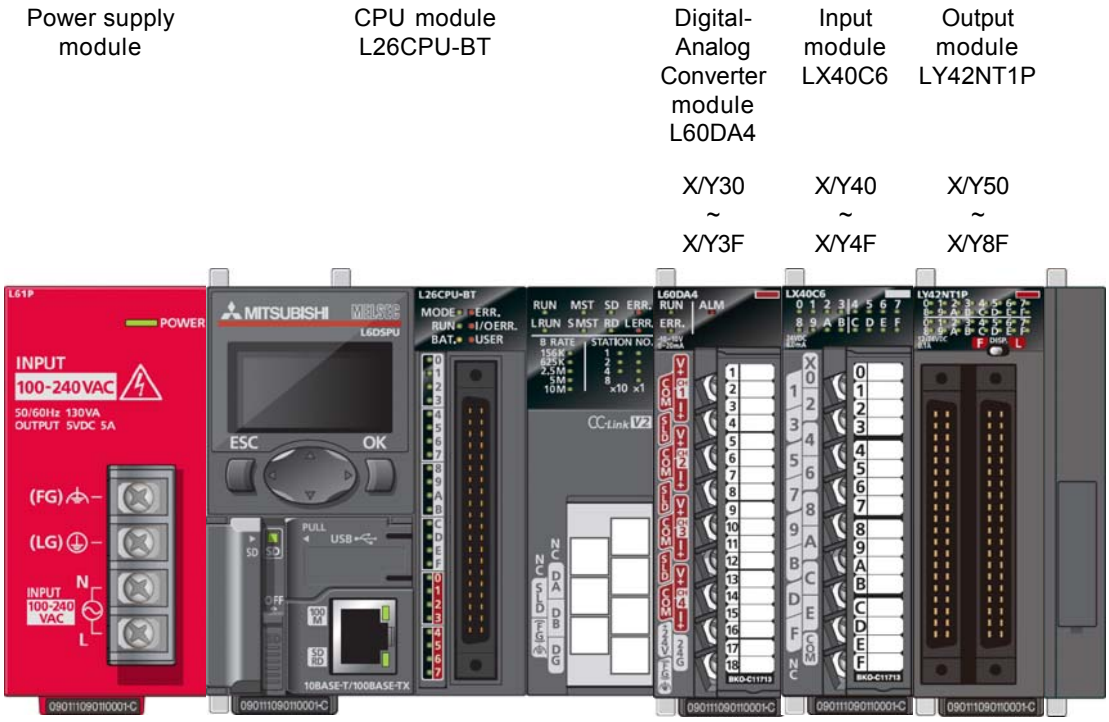
Applicable Hardware and Software

The following are the hardware and software applicable to the sample ladder programs.

Model	Description
Digital-analog converter module	L60DA4
CPU module	<table><tr><td>Series</td><td>Model</td></tr><tr><td>MELSEC-L series</td><td>LCPU</td></tr></table>
Input Module	MELSEC-L series input module
Output Module	MELSEC-L series output module
Compatible software	GX Works2, GX Developer *1 *2 *1 For software versions applicable to the module used, refer to "Relevant manuals". *2 When using GX Developer, use GX Configurator-DA to set the intelligent function module parameters.

System Configuration

The following system configuration is used for the sample ladder programs.



This program uses the following devices.

No.	Device	Data Type	Application	Remarks
1	X30	Bit	Module READY	-
2	X37	Bit	External power supply READY flag	-
3	X3E	Bit	Warning output signal	-
4	X3F	Bit	Error occurrence flag	-
5	X41	Bit	Batch output enable signal	-
6	X42	Bit	Digital value write command input signal	-
7	X44	Bit	Warning output reset signal	-
8	X45	Bit	Error reset signal	-
9	Y31	Bit	CH1 Output enable/disable flag	-
10	Y32	Bit	CH2 Output enable/disable flag	-
11	Y3E	Bit	Warning output clear request	Turns OFF→ON to reset the warning output.
12	Y3F	Bit	Error clear request	Turns OFF→ON to reset the error.
13	Y50 to Y5F	Bit	Error code display (BCD 4 digits)	-

Conditions for Using Sample Ladder Programs

●Parameter Settings for the Digital-Analog Converter Module

The following explains the settings for the L60DA4 digital-analog converter module that the programs use.

(1) Switch Setting

a) Open the switch setting screen and configure the setting as follows.

Project window→[Intelligent Function Module]→Module name→[Switch Setting]

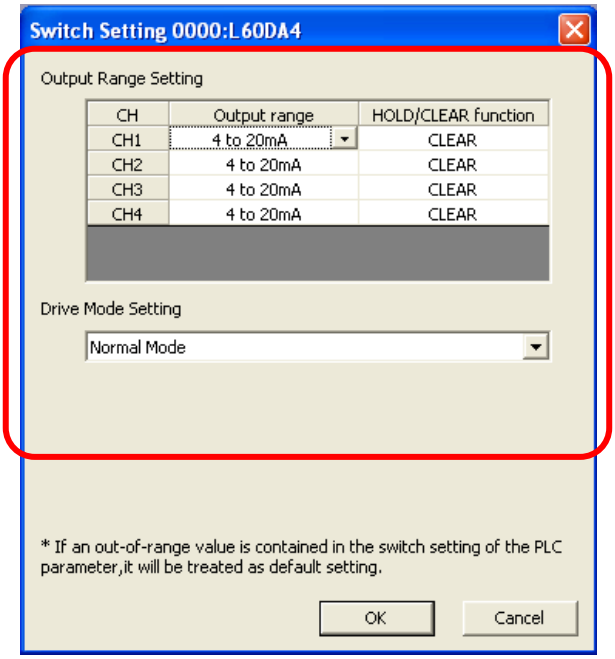


Table 2-1 Switch setting

	Setting value	(HOLD/CLEAR function)
CH1	4to20mA	(CLEAR)
CH2	4to20mA	(CLEAR)
CH3	4to20mA	(CLEAR)
CH4	4to20mA	(CLEAR)
Drive Mode Setting	Normal Mode	

(2) Parameter Setting

a) Open the parameter setting screen and configure the setting as follows.

Project window→[Intelligent Function Module]→Module name→[Parameter]

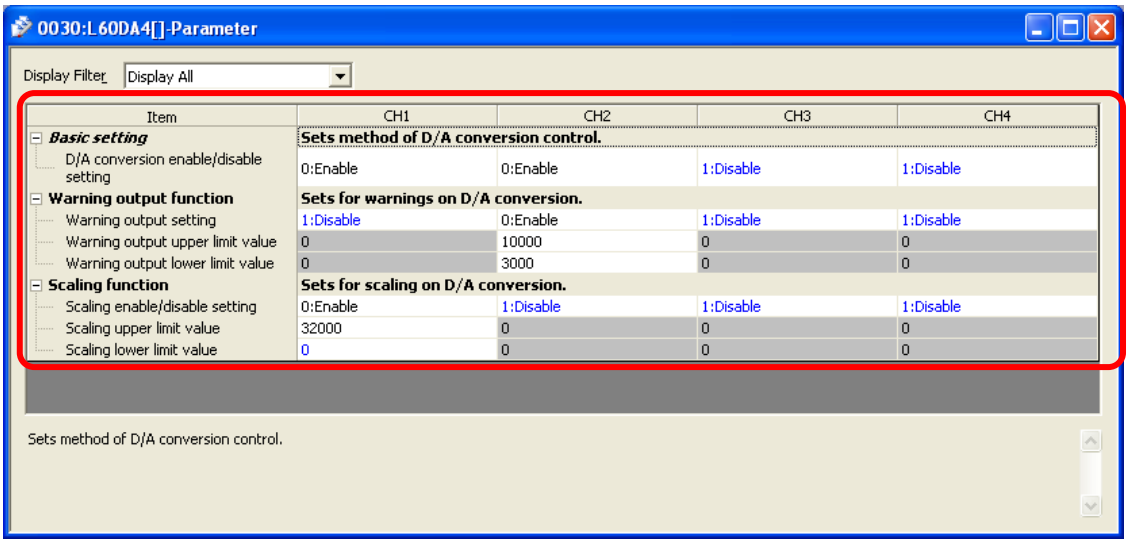


Table 2-2 Parameter setting

		CH1	CH2	CH3	CH4
Basic setting	D/A conversion enable/disable setting	0: Enable	0: Enable	1:Disable	1:Disable
Warning output function	Warning output setting	1:Disable	0: Enable	1:Disable	1:Disable
	Warning output upper limit value		10000		
	Warning output lower limit value		3000		
Scaling function	Scaling enable/disable setting	0: Enable	1: Disable	1:Disable	1:Disable
	Scaling upper limit value	32000			
	Scaling lower limit value	0			

(3) Auto Refresh Setting

a) Open the auto refresh setting screen and configure the setting as follows.

Project window→[Intelligent Function Module]→Module name→[Auto Refresh]

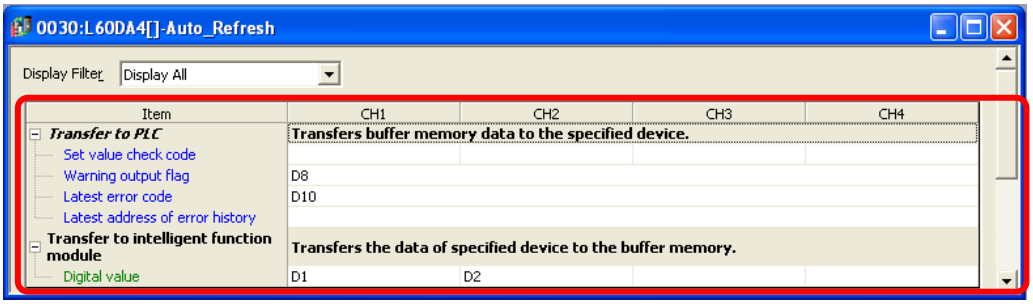


Table 2-3 Auto refresh setting

		CH1	CH2	CH3	CH4
Transfer to PLC	Set value check code	-	-	-	-
	Warning output flag	D8			
	Latest error code	D10			
	Latest address of error history	-			
Transfer to intelligent function module	Digital value	D1	D2	-	-

Devices

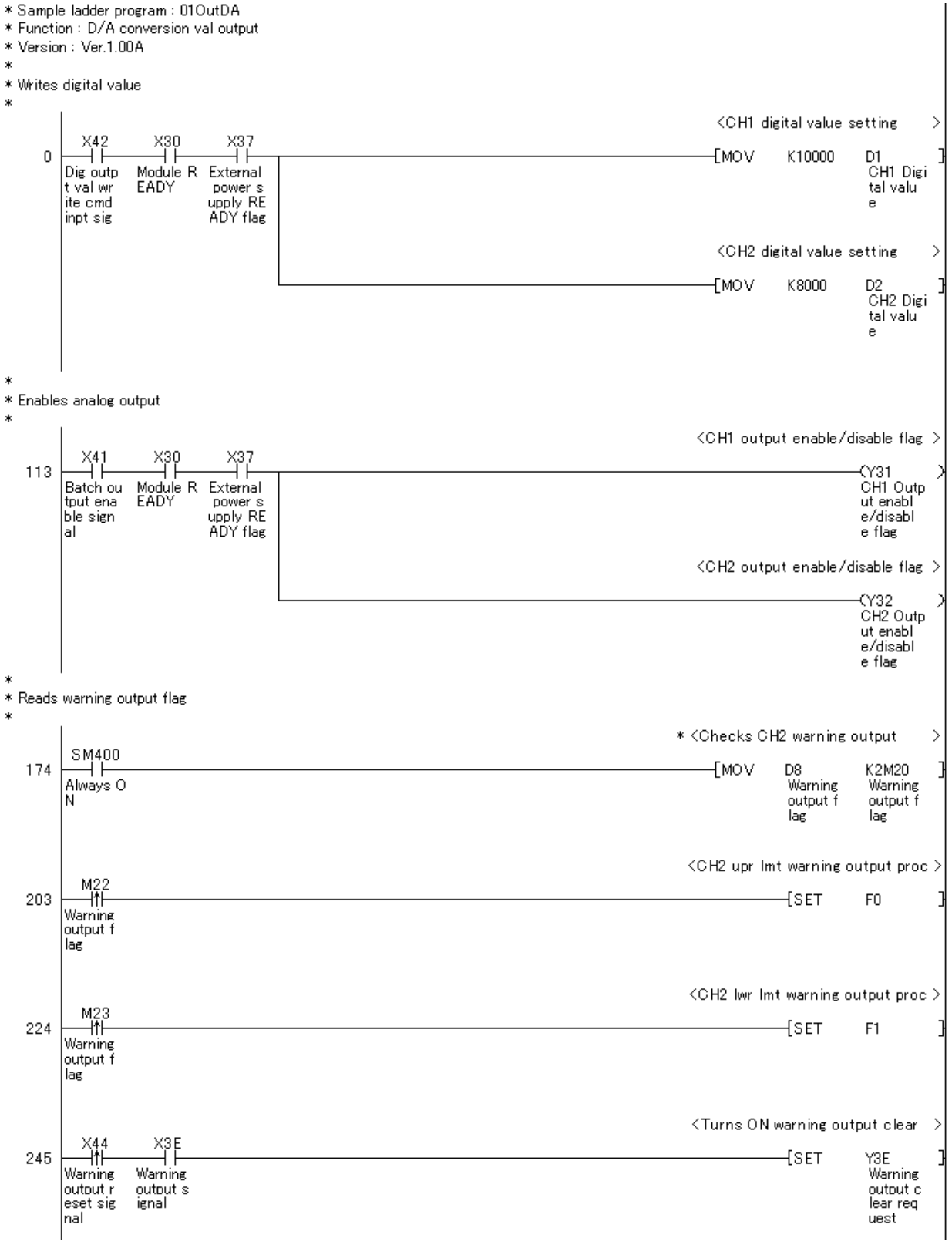
This program uses the following devices.

No.	Device	Data Type	Application	Remarks
1	SM400	Bit	Warning output flag read	Always ON
2	X30	Bit	Module READY	-
3	X37	Bit	External power supply READY flag	-
4	X3E	Bit	Warning output signal	-
5	X3F	Bit	Error occurrence flag	-
6	X41	Bit	Batch output enable signal	-
7	X42	Bit	Digital value write command input signal	-
8	X44	Bit	Warning output reset signal	-
9	X45	Bit	Error reset signal	-
10	Y31	Bit	CH1 Output enable/disable flag	-
11	Y32	Bit	CH2 Output enable/disable flag	-
12	Y3E	Bit	Warning output clear request	Turns OFF→ON to reset the warning output.
13	Y3F	Bit	Error clear request	Turns OFF→ON to reset the error.
14	Y50 to Y5F	Bit	Error code display (BCD 4 digits)	-
15	M20 to M27	Bit	Warning output flag	-
16	D1	Word	CH1 Digital value	Stores the CH1 digital output value.
17	D2	Word	CH2 Digital value	Stores the CH1 digital output value.
18	D8	Word	Warning output flag	-
19	D10	Word	Error code	Stores the error code.

Version Upgrade History

Version	Date	Description
1.00A	2011/09/26	First edition

Program



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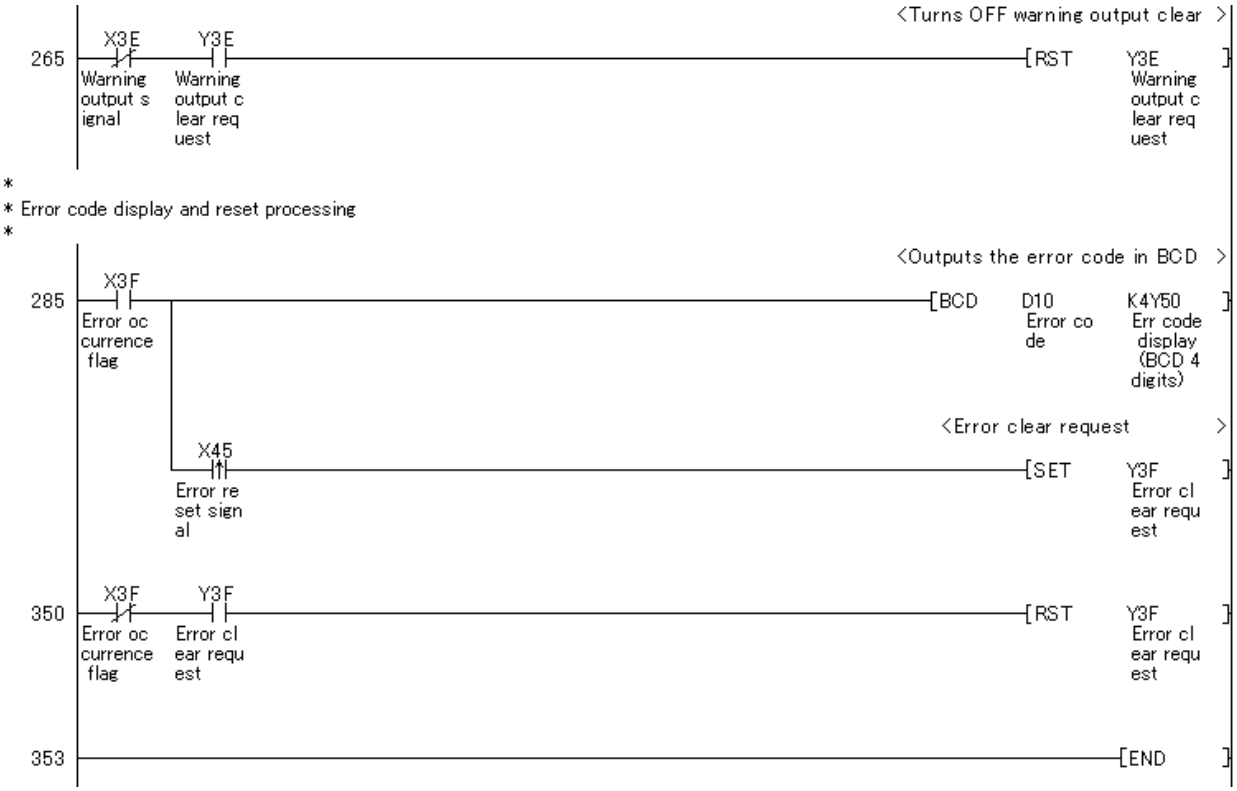

265
X3E
Warning output signal
Y3E
Warning output clear request
<Turns OFF warning output clear >
RST
Y3E
Warning output clear request
*
* Error code display and reset processing
*
285
X3F
Error occurrence flag
<Outputs the error code in BCD >
BCD
D10
Error code
K4Y50
Err code display (BCD 4 digits)
<Error clear request >
X45
Error reset signal
SET
Y3F
Error clear request
350
X3F
Error occurrence flag
Y3F
Error clear request
RST
Y3F
Error clear request
353
END

3. When Using the Module in Standard System Configuration (When Not Using Intelligent Function Module Parameters)

3.1 D/A conversion value output

Function Overview

This program outputs an analog value that was D/A converted by the digital-analog converter module in a standard system configuration without using the intelligent module parameters.

Program

This function uses the project (program name).

•LD-L60DA4_NPM_V100A_E(01OutDA)

Applicable Hardware and Software

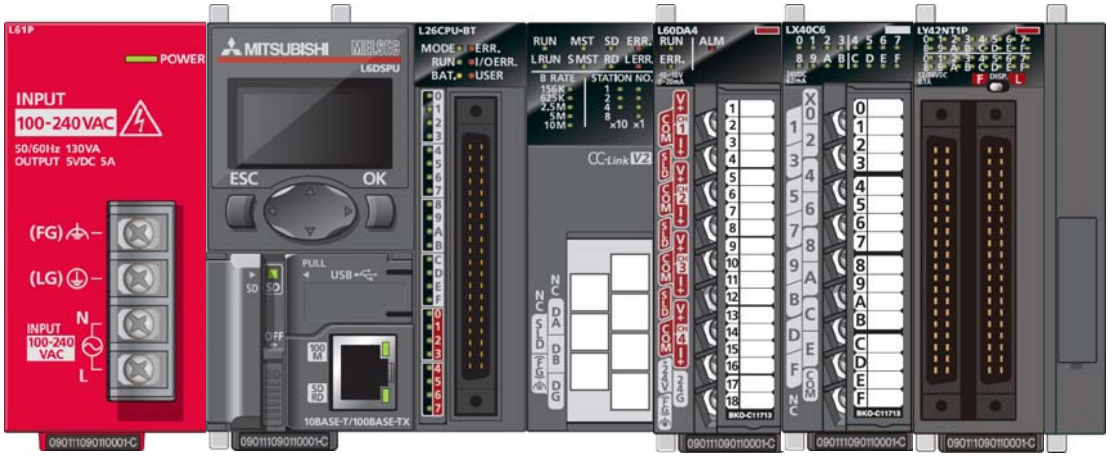
The following are the hardware and software applicable to the sample ladder programs.

Model	Description
Digital-analog converter module	L60DA4
CPU module	<table><tr><td>Series</td><td>Model</td></tr><tr><td>MELSEC-L series</td><td>LCPU</td></tr></table>
Input Module	MELSEC-L series input module
Output Module	MELSEC-L series output module
Compatible software	GX Works2, GX Developer *1 *1 For software versions applicable to the module used, refer to "Relevant manuals".

System Configuration

The following system configuration is used for the sample ladder programs.

Power supply module	CPU module L26CPU-BT	Digital-Analog Converter module L60DA4	Input module LX40C6	Output module LY42NT1P
		X/Y30 ~ X/Y3F	X/Y40 ~ X/Y4F	X/Y50 ~ X/Y8F



This program uses the following devices.

No.	Device	Data Type	Application	Remarks
1	X30	Bit	Module READY	-
2	X37	Bit	External power supply READY flag	-
3	X39	Bit	Operating condition setting completed flag	-
4	X3E	Bit	Warning output signal	-
5	X3F	Bit	Error occurrence flag	-
6	X41	Bit	Batch output enable signal	-
7	X42	Bit	Digital value write command input signal	-
8	X44	Bit	Warning output reset signal	-
9	X45	Bit	Error reset signal	-
10	Y31	Bit	CH1 Output enable/disable flag	-
11	Y32	Bit	CH2 Output enable/disable flag	-
12	Y39	Bit	Operation condition setting request	-
13	Y3E	Bit	Warning output clear request	Turns OFF→ON to reset the warning output.
14	Y3F	Bit	Error clear request	Turns OFF→ON to reset the error.
15	Y50 to Y5F	Bit	Error code display (BCD 4 digits)	-

Conditions for Using Sample Ladder Programs

●Parameter Settings for the Digital-Analog Converter Module

The following explains the settings for the L60DA4 digital-analog converter module that the programs use.

(1) Switch Setting

a) Open the switch setting screen and configure the setting as follows.

Project window→[Intelligent Function Module]→Module name→[Switch Setting]

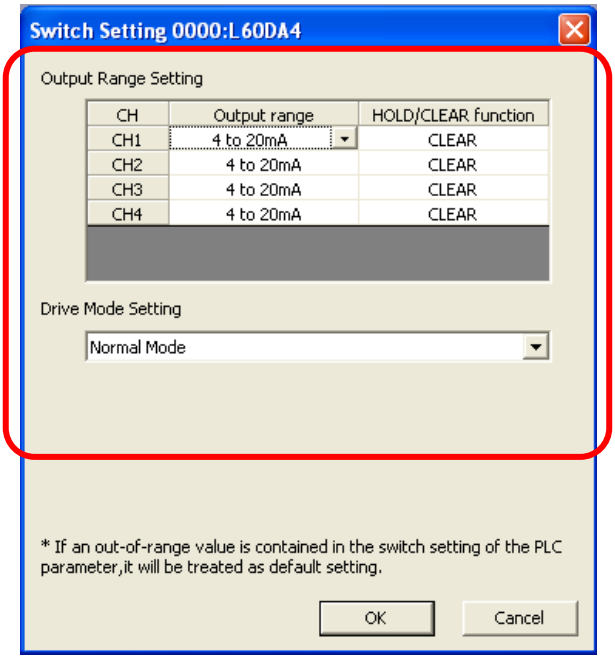


Table 3-1 Switch setting

	Setting value	(HOLD/CLEAR function)
CH1	4to20mA	(CLEAR)
CH2	4to20mA	(CLEAR)
CH3	4to20mA	(CLEAR)
CH4	4to20mA	(CLEAR)
Drive Mode Setting	Normal Mode	

Devices

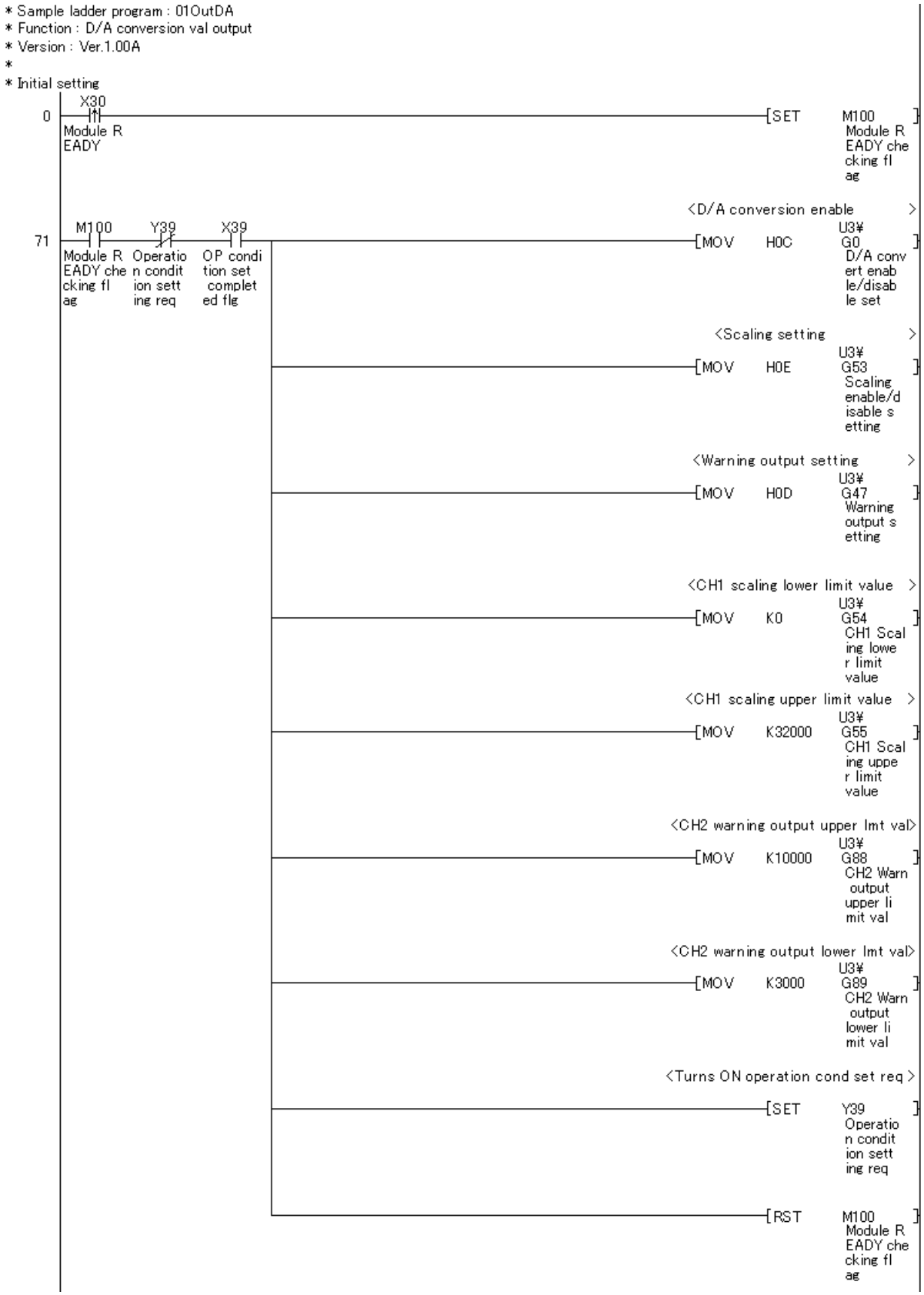
This program uses the following devices.

No.	Device	Data Type	Application	Remarks
1	SM400	Bit	Warning output flag read	Always ON
2	X30	Bit	Module READY	-
3	X37	Bit	External power supply READY flag	-
4	X39	Bit	Operating condition setting completed flag	-
5	X3E	Bit	Warning output signal	-
6	X3F	Bit	Error occurrence flag	-
7	X41	Bit	Batch output enable signal	-
8	X42	Bit	Digital value write command input signal	-
9	X44	Bit	Warning output reset signal	-
10	X45	Bit	Error reset signal	-
11	Y31	Bit	CH1 Output enable/disable flag	-
12	Y32	Bit	CH2 Output enable/disable flag	-
13	Y39	Bit	Operation condition setting request	-
14	Y3E	Bit	Warning output clear request	Turns OFF→ON to reset the warning output.
15	Y3F	Bit	Error clear request	Turns OFF→ON to reset the error.
16	Y50 to Y5F	Bit	Error code display (BCD 4 digits)	-
17	M20 to M27	Bit	Warning output flag	-
18	M100	Bit	Module READY checking flag	-

Version Upgrade History

Version	Date	Description
1.00A	2011/09/26	First edition

Program



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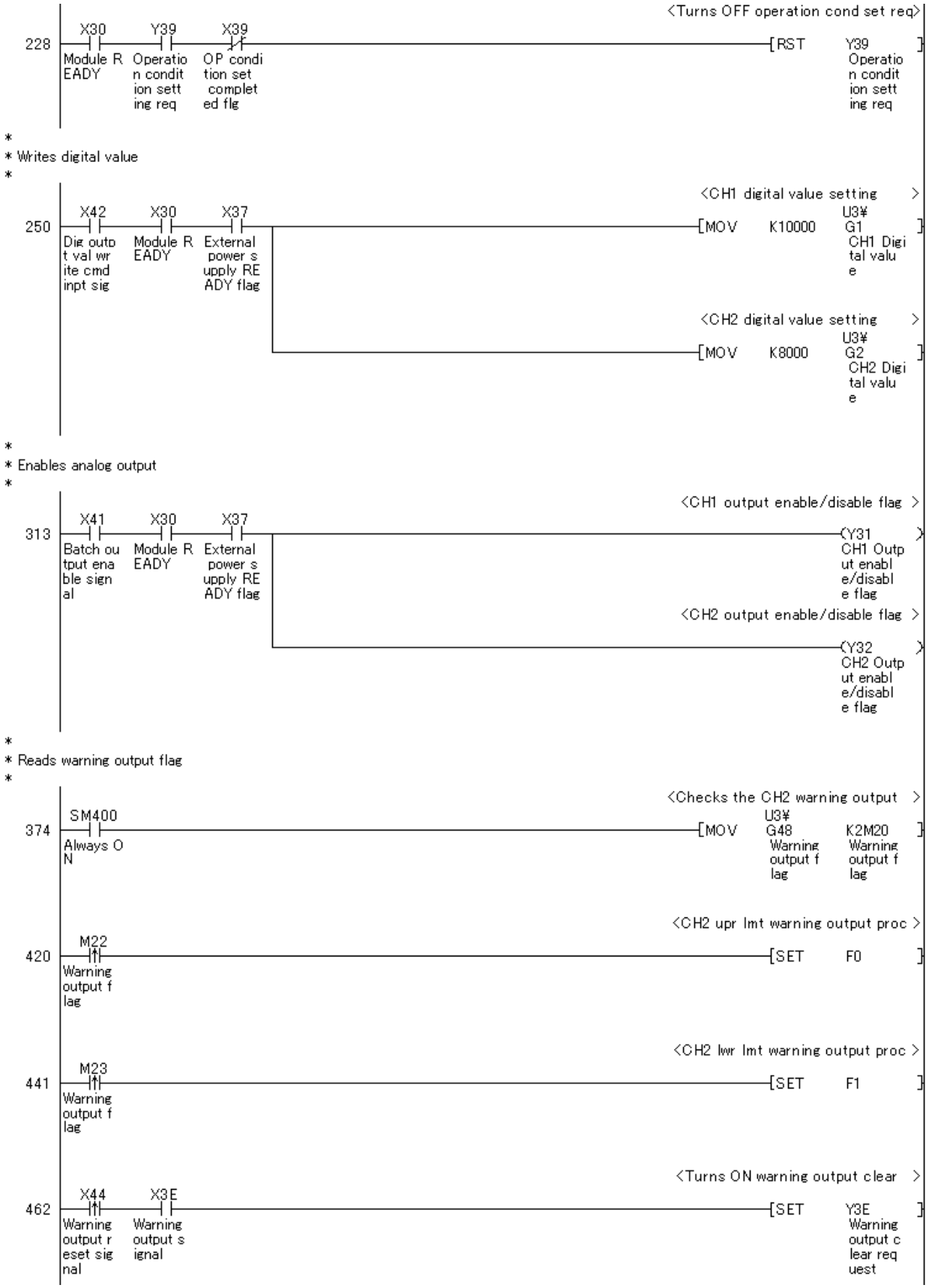

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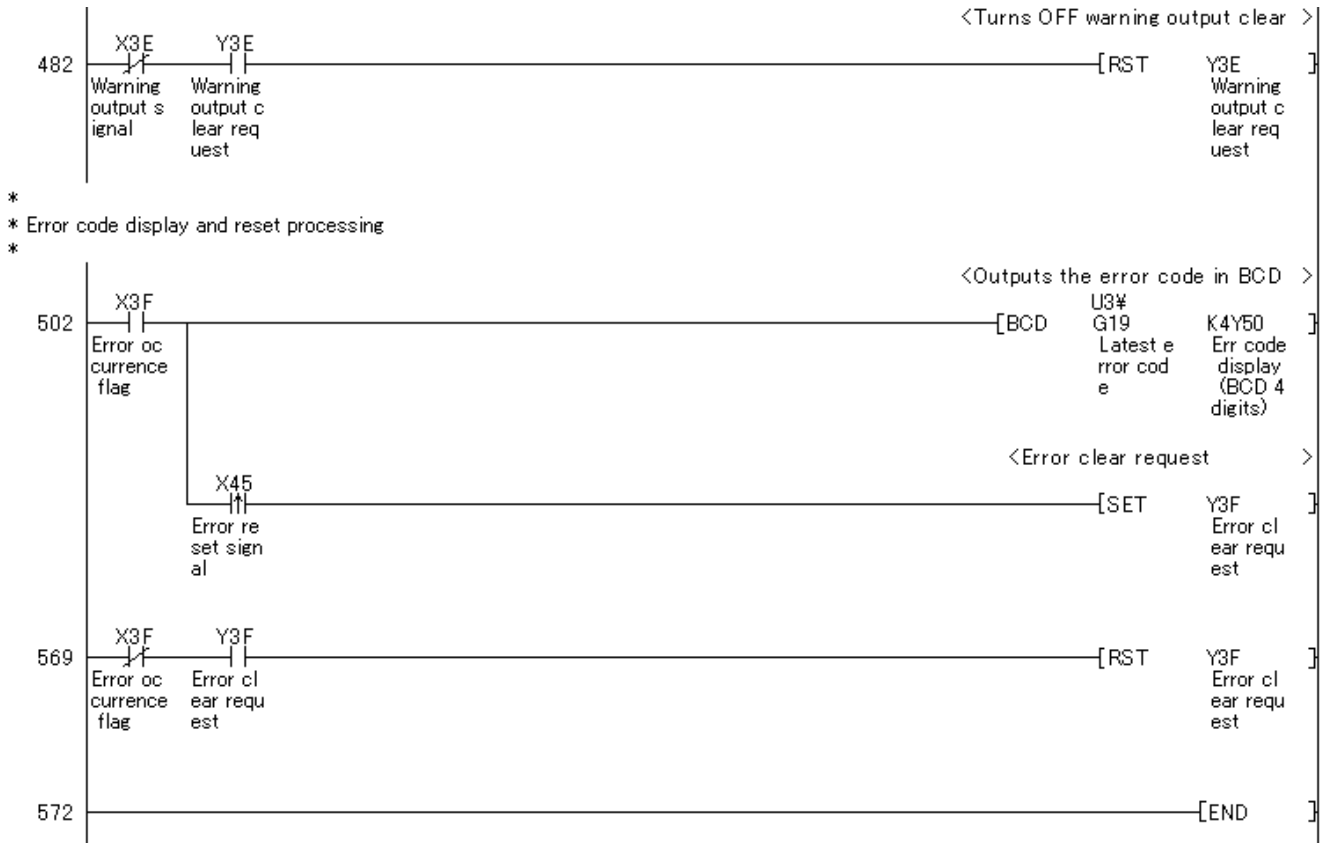

Turns OFF warning output clear
482
X3E
Warning output signal
Y3E
Warning output clear request
RST
Y3E
Warning output clear request
*
* Error code display and reset processing
*
Outputs the error code in BCD
502
X3F
Error occurrence flag
BCD
U3¥G19
Latest error code
K4Y50
Err code display (BCD 4 digits)
Error clear request
X45
Error reset signal
SET
Y3F
Error clear request
569
X3F
Error occurrence flag
Y3F
Error clear request
RST
Y3F
Error clear request
572
END

4. When Connecting the Module to the Head Module

4.1 D/A conversion value output

Function Overview

This program outputs an analog value that was D/A converted by the digital-analog converter module on the intelligent device station in a system configuration where a head module is connected.

Program

This function uses the project (program name).

•LD-L60DA4_IEF_V100A_E(01OutDA)

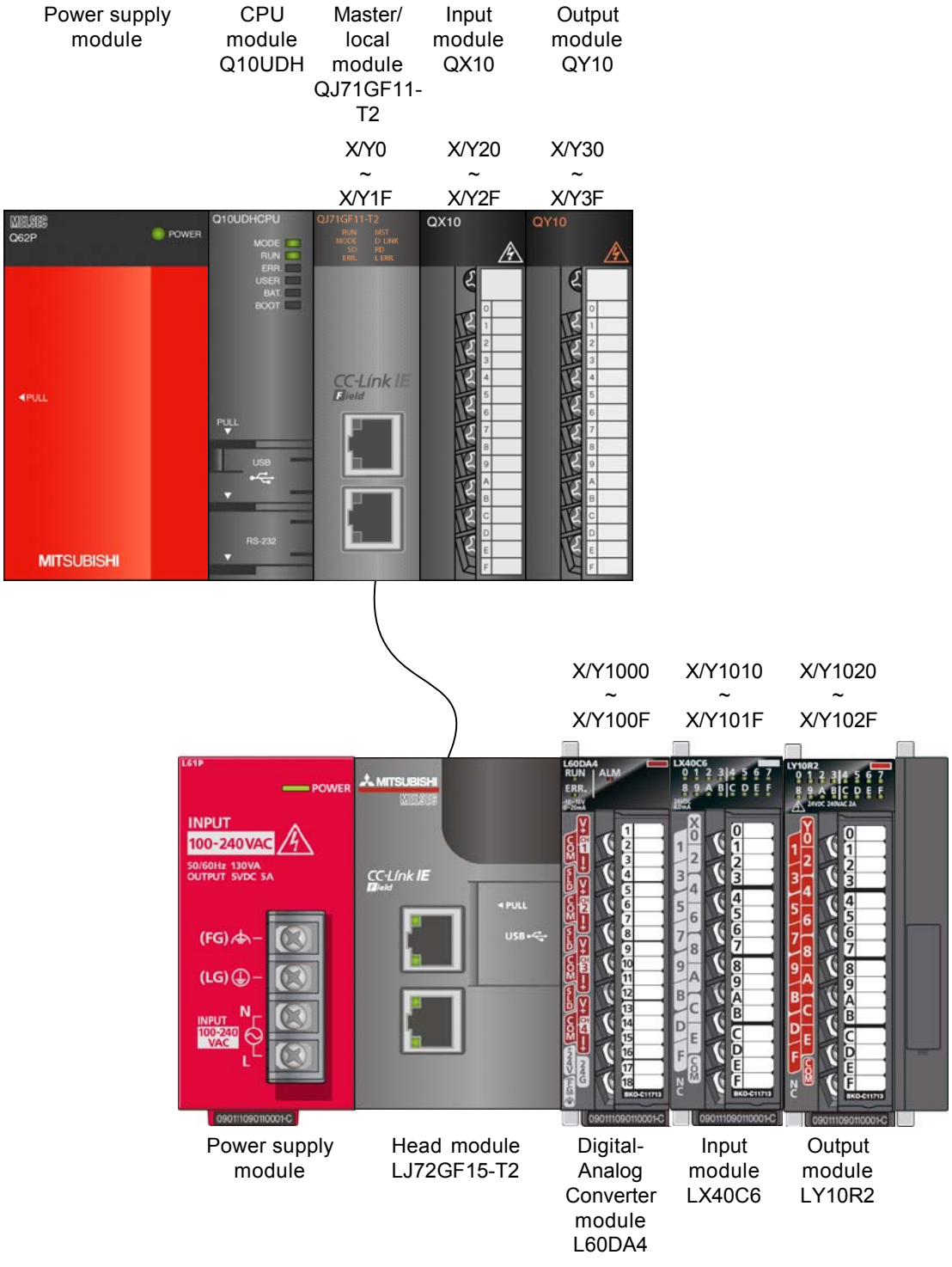
Applicable Hardware and Software

The following are the hardware and software applicable to the sample ladder programs.

<table>
<tr><th>Model</th><th>Description</th></tr>
<tr><td>Digital-analog converter module</td><td>L60DA4</td></tr>
<tr><td>CC-Link IE Field Network module</td><td>CC-Link IE Field Network master/local module
CC-Link IE Field Network head module</td></tr>
<tr><td>CPU module</td><td><table><tr><td>Series</td><td>Model</td></tr><tr><td>MELSEC-Q series</td><td>Universal model QCPU *1</td></tr><tr><td>MELSEC-L series</td><td>LCPU *2</td></tr></table>*1 The first five digits of the serial number are "12012" or later.
*2 The first five digits of the serial number are "13012" or later.</td></tr>
<tr><td>Input Module</td><td>MELSEC-Q/L series input module</td></tr>
<tr><td>Output Module</td><td>MELSEC-Q/L series output module</td></tr>
<tr><td>Compatible software</td><td>GX Works2 *1
*1 For software versions applicable to the module used, refer to "Relevant manuals".</td></tr>
</table>

System Configuration

The following system configuration is used for the sample ladder programs.



This program uses the following devices.

No.	Device	Data Type	Application	Remarks
1	X21	Bit	Batch output enable signal	-
2	X22	Bit	Digital value write command input signal	-
3	X24	Bit	Warning output reset signal	-
4	X25	Bit	Error reset signal	-
5	X1000	Bit	Module READY	-
6	X1007	Bit	External power supply READY flag	-
7	X100E	Bit	Warning output signal	-
8	X100F	Bit	Error occurrence flag	-
9	Y30 to Y3F	Bit	Error code display (BCD 4 digits)	-
10	Y1001	Bit	CH1 Output enable/disable flag	-
11	Y1002	Bit	CH2 Output enable/disable flag	-
12	Y100E	Bit	Warning output clear request	Turns OFF→ON→OFF to reset the warning output.
13	Y100F	Bit	Error clear request	Turns OFF→ON→OFF to reset the error.

Conditions for Using Sample Ladder Programs

Use GX Works2 when connecting to the head module.

●Parameter Settings for the Digital-Analog Converter Module

The following explains the settings for the L60DA4 digital-analog converter module that the programs use.

(1) Settings for the Master Station

a) Configure settings for the master station.

Project window→[Parameter] → [Network Parameter] →[Ethernet/CC IE/MELSECNET]

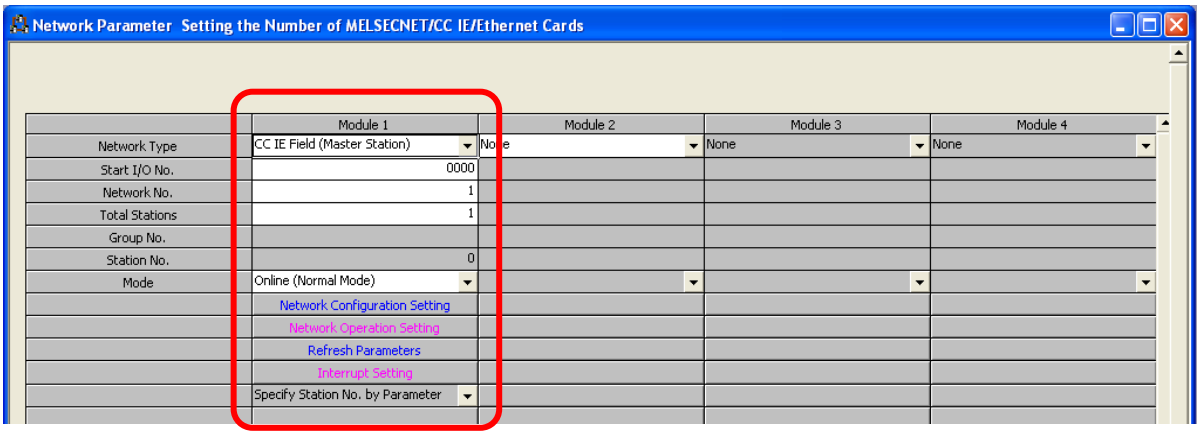


Table 4-1 Network parameter setting

	Module 1
Network Type	CC IE Field (Master Station)
Start I/O No.	0000
Network No.	1
Total Stations	1

b) Open the network configuration setting screen and configure the setting as follows.

Project window→[Parameter]→[Network Parameter]→[Ethernet/CC IE/MELSECNET]→Network Configuration Setting

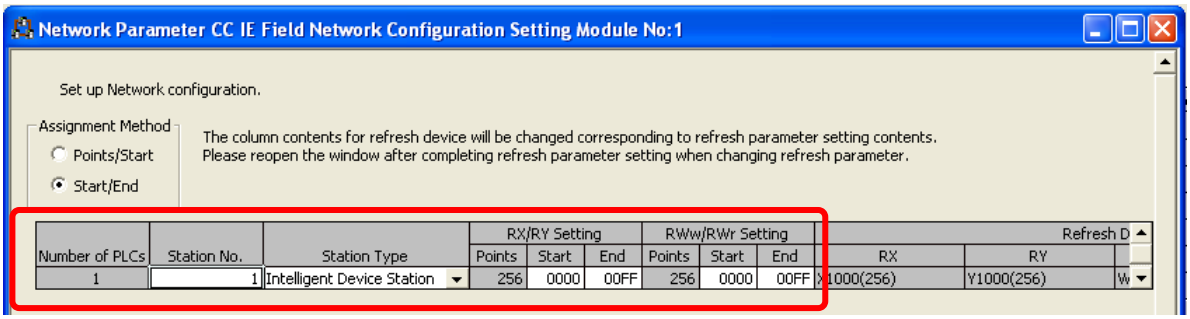


Table 4-2 Network configuration setting

	Station No.	Station Type	RX/RY Setting		RWw/RWr Setting	
			Start	End	Start	End
1	1	Intelligent Device Station	0000	00FF	0000	00FF

c) Open the refresh parameter setting screen and configure the setting as follows.

Project window→[Parameter]→[Network Parameter]→[Ethernet/CC IE/MELSECNET]→Refresh Parameters

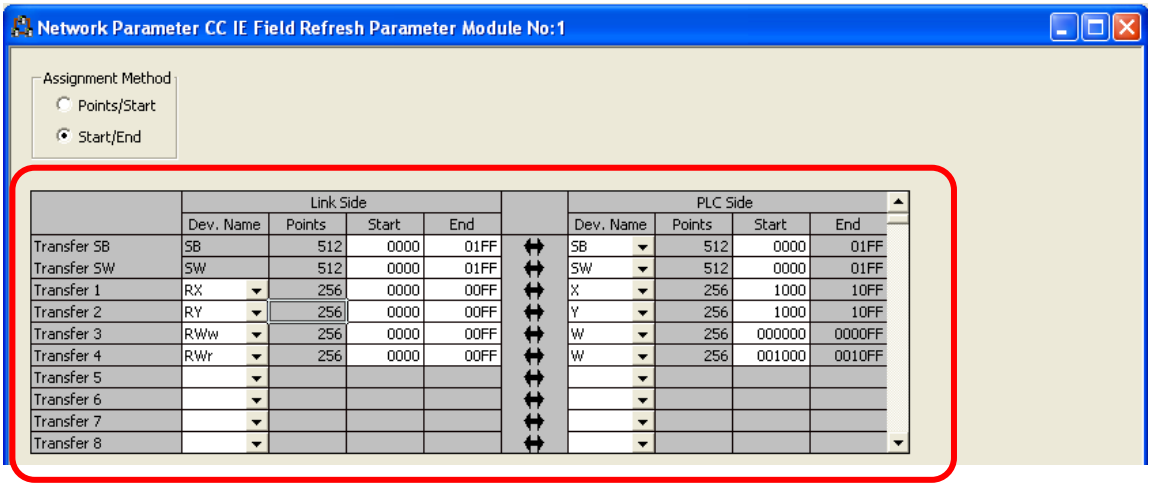


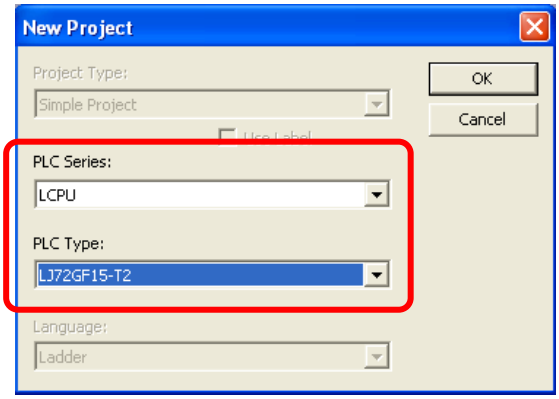
Table 4-3 Refresh parameter setting

Link Side				CPU Side	
Device Name	Start	End		Device Name	Start
SB	0000	01FF	↔	SB	0000
SW	0000	01FF	↔	SW	0000
RX	0000	00FF	↔	X	1000
RY	0000	00FF	↔	Y	1000
RWw	0000	00FF	↔	W	000000
RWr	0000	00FF	↔	W	001000

(2) Settings for the intelligent device station.

a) Select "LCPU" in "PLC Series" and "LJ72GF15-T2" for "PLC Type" and create a project.

[Project]→[New Project]



b) Open the PLC parameter setting screen and configure the setting as follows.

Project window→[Parameter]→[PLC Parameter]→[Communication Head Setting]

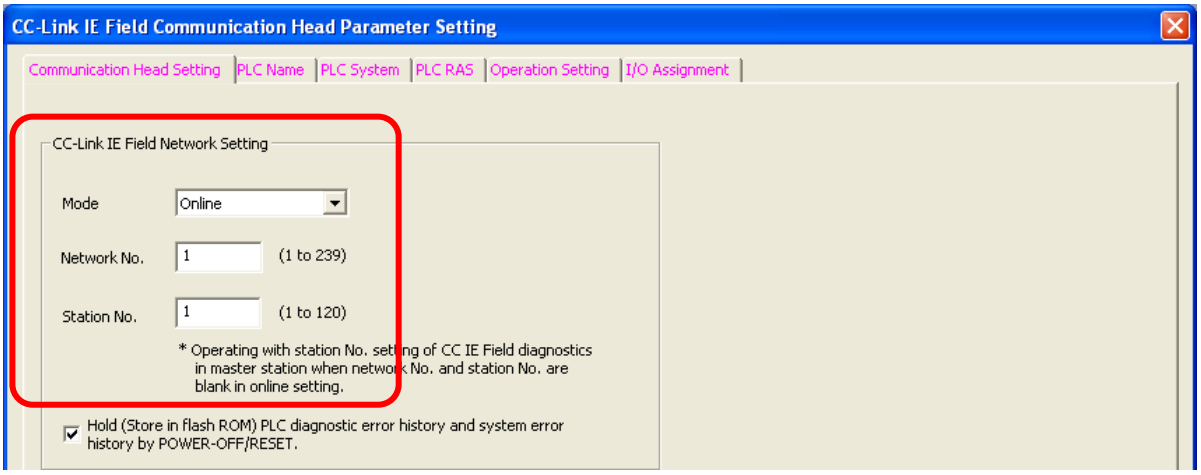
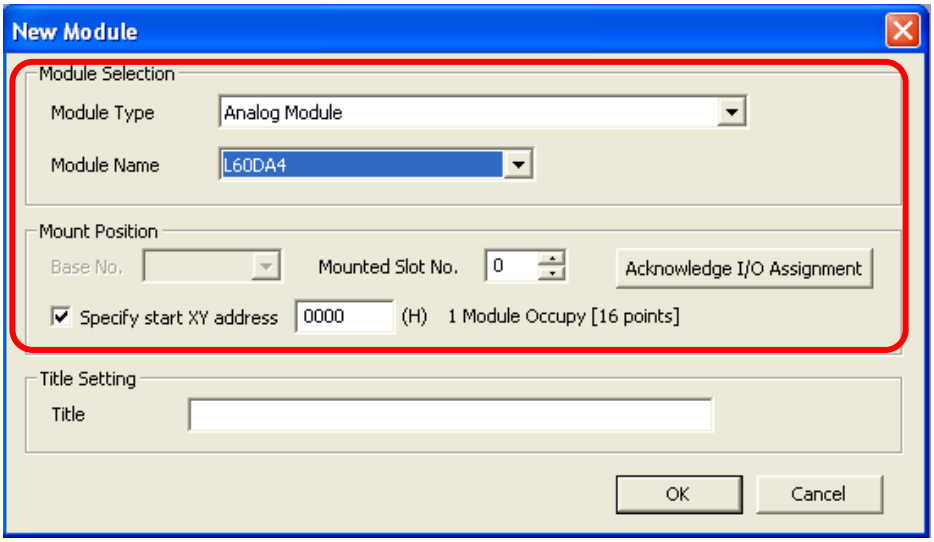


Table 4-4 Communication head setting

	Setting value
Mode	Online
Network No.	1
Station No.	1

c) Open the new module setting screen and configure the setting as follows.

Project window→[Intelligent Function Module]→right-click→[New Module]



d) Open the switch setting screen and configure the setting as follows.

Project window→[Intelligent Function Module]→Module name→[Switch Setting]

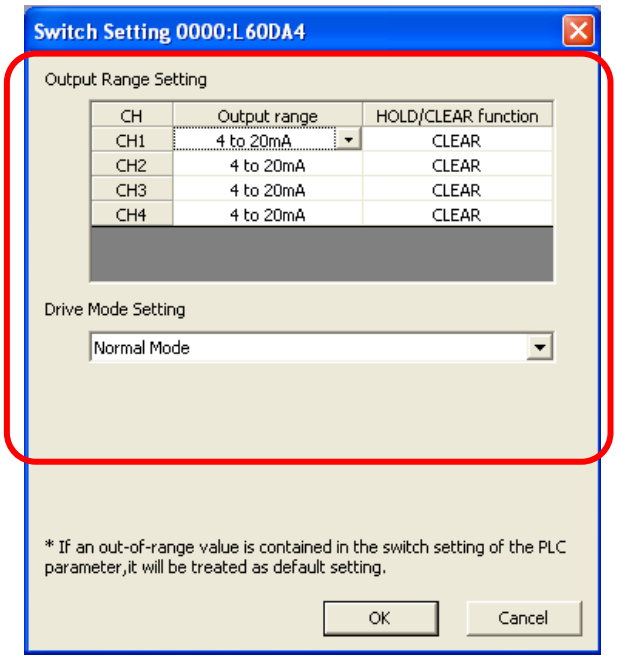


Table 4-5 Switch setting

	Setting value	(HOLD/CLEAR function)
CH1	4to20mA	(CLEAR)
CH2	4to20mA	(CLEAR)
CH3	4to20mA	(CLEAR)
CH4	4to20mA	(CLEAR)
Drive Mode Setting	Normal Mode	

e) Open the parameter setting screen and configure the setting as follows.

Project window→[Intelligent Function Module]→Module name→[Parameter]

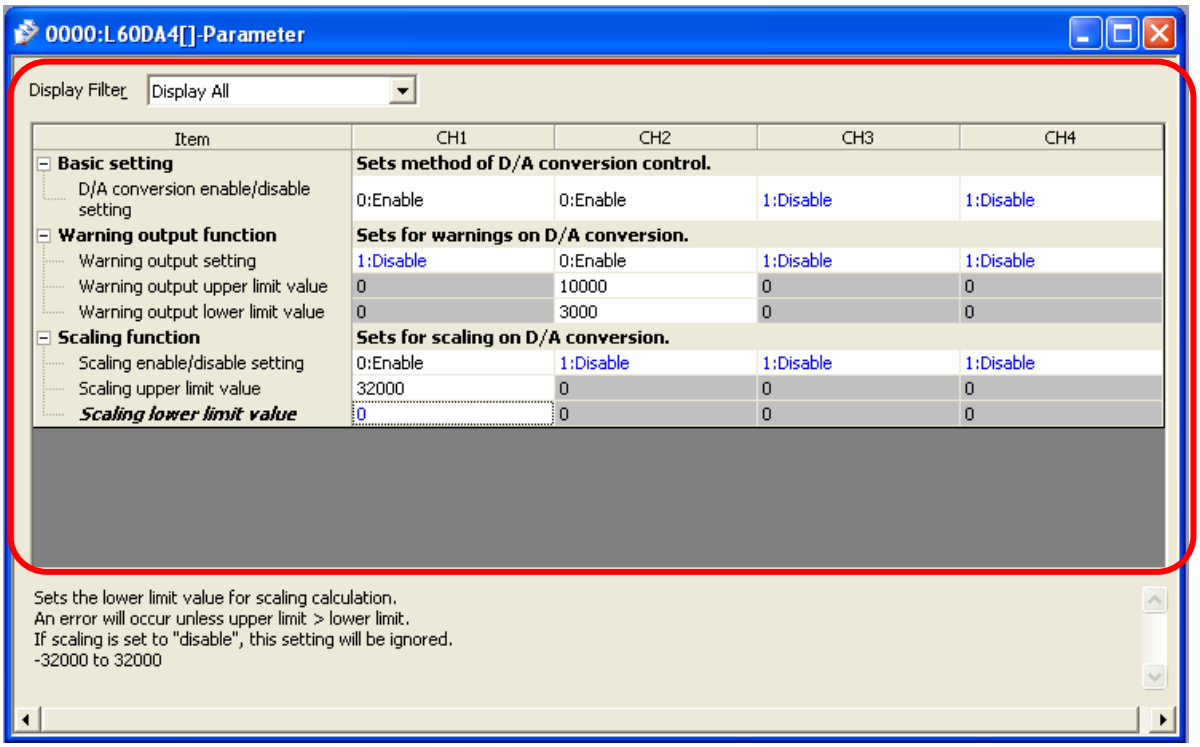


Table 4-6 Parameter setting

		CH1	CH2	CH3	CH4
Basic setting	D/A conversion enable/disable setting	0: Enable	0: Enable	1: Disable	1: Disable
Warning Output Function	Warning output setting	1: Disable	0: Enable	1: Disable	1: Disable
	Warning output upper limit value		10000		
	Warning output lower limit value		3000		
Scaling function	Scaling function	0: Enable	1: Disable	1: Disable	1: Disable
	Scaling upper limit value	32000			
	Scaling lower limit value	0			

f) Open the auto refresh setting screen and configure the setting as follows.

Project window→[Intelligent Function Module]→Module name→[Auto Refresh]

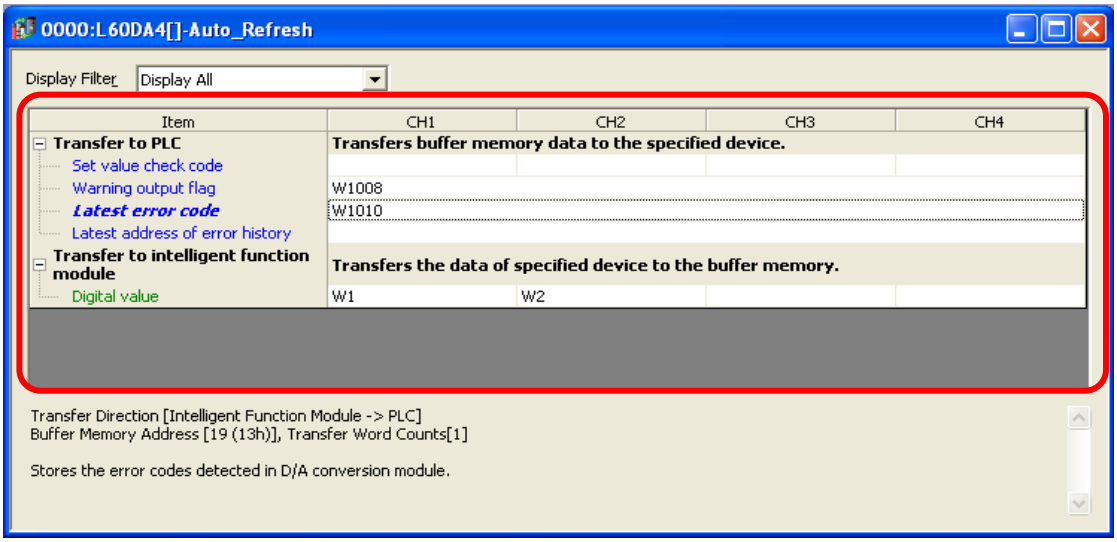


Table 4-7 Auto refresh setting

		CH1	CH2	CH3	CH4
Transfer to PLC	Set value check code	-	-	-	-
	Warning output flag	W1008			
	Latest error code	W1010			
	Latest address of error history	-			
Transfer to intelligent function module	Digital value	W1	W2	-	-

Devices

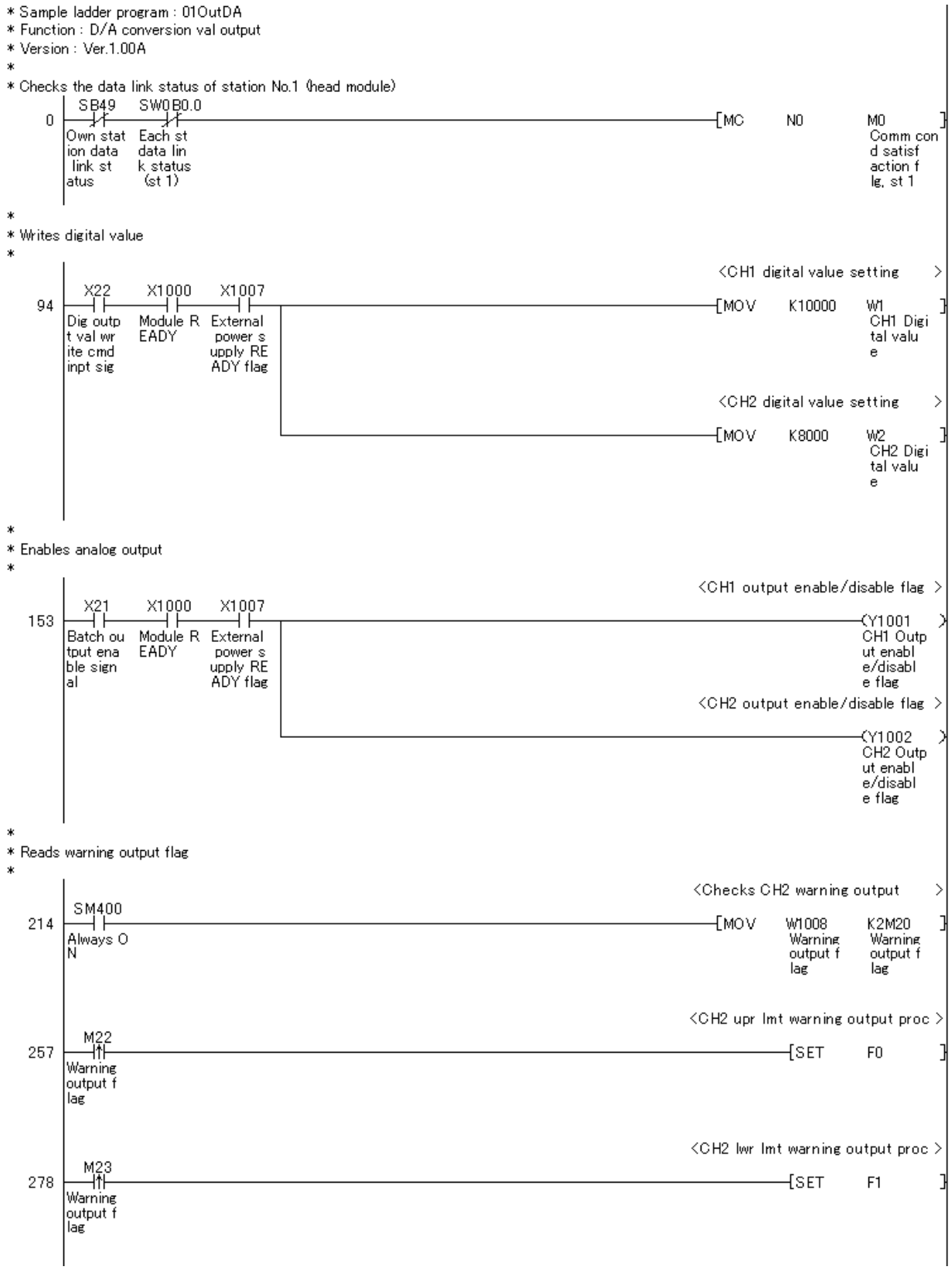
This program uses the following devices.

No.	Device	Data Type	Application	Remarks
1	SM400	Bit	Warning output flag read	Always ON
2	SB49	Bit	Data link status of the own station	-
3	SW0B0.0	Bit	Data link status of each station (station No.1)	-
4	X21	Bit	Batch output enable signal	-
5	X22	Bit	Digital value write command input signal	-
6	X24	Bit	Warning output reset signal	-
7	X25	Bit	Error reset signal	-
8	X1000	Bit	Module READY	-
9	X1007	Bit	External power supply READY flag	-
10	X100E	Bit	Warning output signal	-
11	X100F	Bit	Error occurrence flag	-
12	Y30 to Y3F	Bit	Error code display (BCD 4 digits)	-
13	Y1001	Bit	CH1 Output enable/disable flag	-
14	Y1002	Bit	CH2 Output enable/disable flag	-
15	Y100E	Bit	Warning output clear request	Turns OFF→ON→OFF to reset the warning output.
16	Y100F	Bit	Error clear request	Turns OFF→ON→OFF to reset the error.
17	M0	Bit	Communication condition satisfaction flag (station No.1)	-
18	M20 to M27	Bit	Warning output flag	-
19	W1	Word	CH1 Digital value	Stores the CH1 digital conversion value.
20	W2	Word	CH2 Digital value	Stores the CH2 digital conversion value.
21	W1008	Word	Warning output flag	Stores the warning output flat.
22	W1010	Word	Latest error code	Stores the latest error code.

Version Upgrade History

Version	Date	Description
1.00A	2011/09/26	First edition

Program



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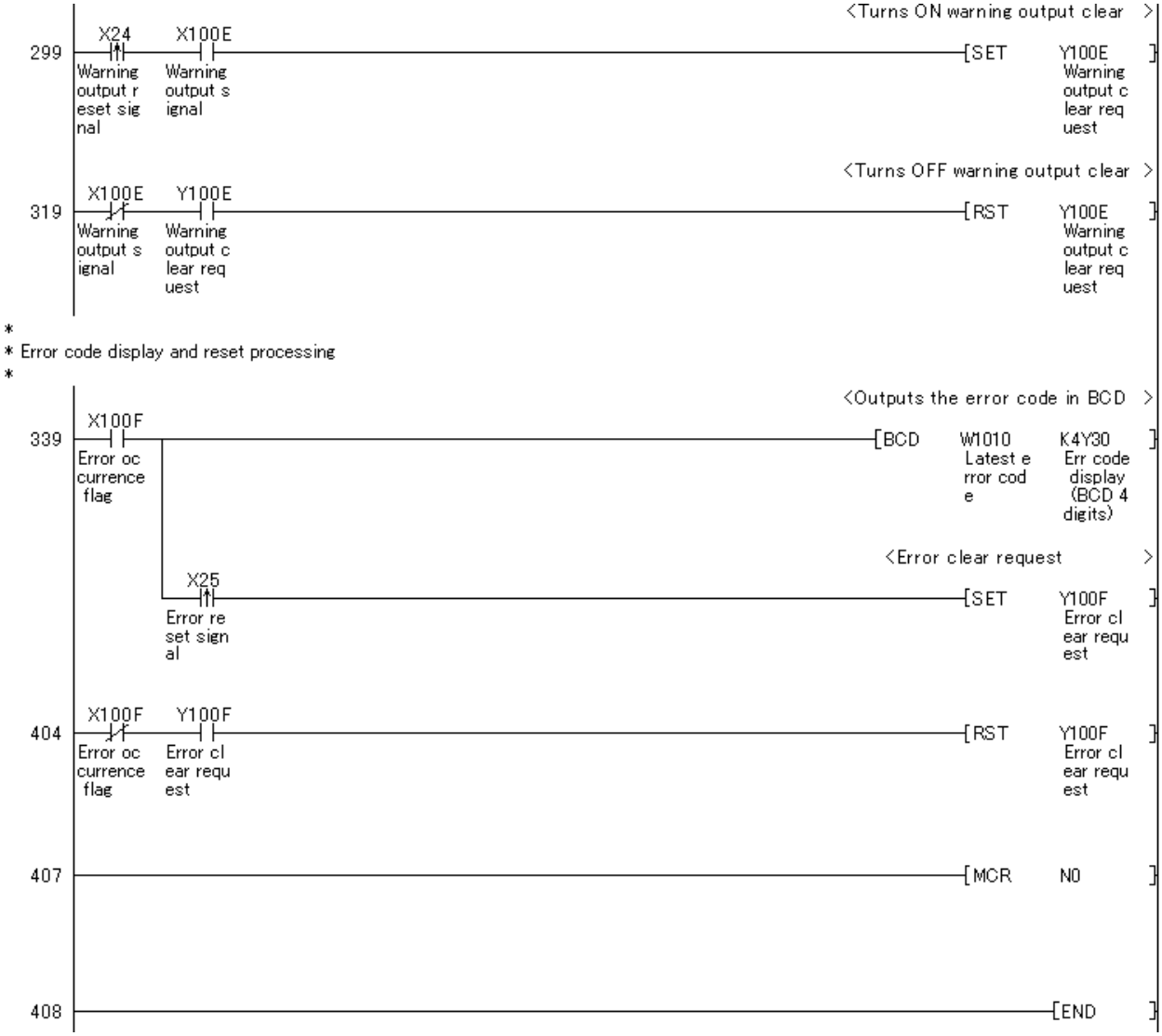
299
X24
Warning output reset signal
X100E
Warning output signal
<Turns ON warning output clear >
[SET Y100E Warning output clear request]
319
X100E
Warning output signal
Y100E
Warning output clear request
<Turns OFF warning output clear >
[RST Y100E Warning output clear request]
*
* Error code display and reset processing
*
339
X100F
Error occurrence flag
<Outputs the error code in BCD >
[BCD W1010 Latest error code K4Y30 Err code display (BCD 4 digits)]
X25
Error reset signal
<Error clear request >
[SET Y100F Error clear request]
404
X100F
Error occurrence flag
Y100F
Error clear request
[RST Y100F Error clear request]
407
[MCR N0]
408
[END]