

MasterLogic-200  
Analog Input Module (Isolated type)

2MLF-AD4S

10310000714 Printed in Korea

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o Safety Precautions

- Safety Precautions is for using the product safe and correct in order to prevent the accidents and danger, so please go by them.
- The precautions explained here only apply to the 2MLF-AD4S unit. For safety precautions on the PLC system, refer to the MasterLogic-200 CPU manual.
- The precautions are divided into 2 sections, 'Warning' and 'Caution'. Each of the meanings is represented as follows.

**Warning** If violated instructions, it can cause death, fatal injury or considerable loss of property.

**Caution** If violated instructions, it can cause a slight injury or slight loss of products

The symbols which are indicated in the PLC and User's Manual mean as follows  
 Gives warnings and cautions to prevent from risk of injury, fire, or malfunction

Gives warnings and cautions to prevent from risk of electrical shock.

- Store this datasheet in a safe place so that you can take out and read whenever necessary. Always forward it to the end user.

**Warning**

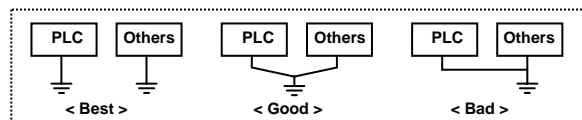
- Do not contact the terminals while the power is applied.  
Risk of electric shock and malfunction
- Protect the product from being gone into by foreign metallic matter.  
Risk of fire, electric shock and malfunction.

**Caution**

- Be sure to check the rated voltage and terminal arrangement for the module before wiring work.  
Risk of electric shock, fire and malfunction
- Tighten the screw of terminal block with the specified torque range.  
If the terminal screw looses, it can cause fire and electric shock.
- Use the PLC in an environment that meets the general specifications contained in this datasheet.  
Risk of electrical shock, fire, erroneous operation and deterioration of the PLC.
- Be sure that external load does not exceed the rating of output module.  
Risk of fire and erroneous operation.
- Do not use the PLC in the environment of direct vibration  
Risk of electrical shock, fire and erroneous operation.
- Do not disassemble, repair or modify the PLC.  
Risk of electrical shock, fire and erroneous operation.
- When disposing of PLC and battery, treat it as industrial waste.  
Risk of poisonous pollution or explosion.

Precautions for use

- Do not install other places except PLC controlled place.
- Make sure that the FG terminal is grounded with class 3 grounding which is dedicated to the PLC. Otherwise, it can cause disorder or malfunction of PLC



- Connect expansion connector correctly when expansion module are needed,
- Do not detach PCB from the case of the module and do not modify the module.
- Turn off power when attaching or detaching module.
- Cellular phone or walkie-talkie should be farther than 30cm from the PLC
- Input signal and communication line should be farther than minimum 100mm from a high-tension line and a power line in order not to be affected by noise and magnetic field.

Before handling the product

Before using the product, read the datasheet and the User's manual through to the end carefully in order to use the product efficiently.

MasterLogic-200 Series User's Manual

Name	Code
MasterLogic-200 User's manual(Programming software)	10310000512
MasterLogic-200 Basic Instruction & Programming User's manual	10310000510

1. Introduction

A/D conversion module designed for MasterLogic-200 series is used to convert analog signal (voltage or current input) to the digital value of signed 16-bit binary data specified in PLC CPU.

2. General Specifications

General specifications of MasterLogic-200 series are as specified in Table

No	Item	Specifications	Standard		
1	Operating temp.	0℃ ~ +55℃			
2	Storage temp.	-25℃ ~ +70℃			
3	Operating humidity	5 ~ 95%RH (Non-condensing)			
4	Storage humidity	5 ~ 95%RH (Non-condensing)			
5	Vibration	For discontinuous vibration		Each 10 times in X,Y,Z directions IEC61131-2	
		Frequency	Acceleration		Amplitude
		10≤f< 57Hz	-		0.075mm
		57≤f≤150Hz	9.8m/s2(1G)		-
		For continuous vibration			
		Frequency	Acceleration		Amplitude
10≤f< 57Hz	-	0.035mm			
57≤f≤150Hz	4.9m/s2(0.5G)	-			
6	Shocks	* Max. impact acceleration:147m/s²(15G) * Authorized time :11ms * Pulse wave : Sign half-wave pulse (Each 3 times in X,Y,Z directions)	IEC61131-2		
7	Noise	Square wave impulse noise	±1,500V		
		Electrostatic discharging	Voltage : 4kV(contact discharging)		
		Radiated electromagnetic field noise	27 ~ 500MHz, 10 V/m		
		Fast Transient /burst noise	Class Power module Voltage 2kV Digital/Analog I/O communication interface 1 kV		
8	Ambient conditions	No corrosive gas or dust			
9	Operating height	2000m or less			
10	Pollution degree	2 or less			
11	Cooling method	Self-cooling			

3. Performance Specifications

Performance specifications of A/D conversion module are as specified in Table

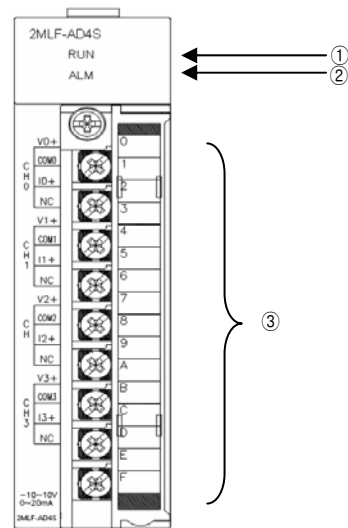
Item	Specifications				
	Voltage input		Current input		
Analog input	DC 1 ~ 5 V DC 0 ~ 5 V DC 0 ~ 10 V DC -10 ~ 10 V (Input Resistance: 1 MΩ min.)		DC 4 ~ 20 mA DC 0 ~ 20 mA (Input Resistance 250 Ω)		
Analog input range setting	▶ Analog input range can be selected through user program or Software package. (When using the current input the terminal V+ and I+ should be shorted) ▶ Respective input ranges can be set based on channels.				
Digital output	(1) Voltage Type				
	Analog input / Digital output	1 ~ 5 V	0 ~ 5 V	0 ~ 10 V	-10 ~ 10 V
	Signed Value	-32000 ~ 32000			
	Precise Value	1000 ~ 5000	0 ~ 5000	0 ~ 10000	-10000 ~ 10000
	Percentile Value	0 ~ 10000			
Digital output	(2) Current Type				
	Analog input / Digital output	4 ~ 20 mA		0 ~ 20 mA	
	Signed Value	-32000 ~ 32000			
	Precise Value	4000 ~ 20000	0 ~ 20000		
	Percentile Value	0 ~ 10000			
The max. resolution	▶ 16-bit binary value ▶ Format of digital output data can be set through user program or S/W package respectively based on channels.				
	Analog input range	Resolution (1/64000)	Analog input range	Resolution (1/64000)	
	1 ~ 5 V	62.5 μV	4 ~ 20 mA	250 nA	
	0 ~ 5 V	78.1 μV			
	0 ~ 10 V	156.3 μV	0 ~ 20 mA	312.5 nA	
-10 ~ 10 V	312.5 μV				
Accuracy	±0.05% (when ambient temperature is 25℃ ±5℃) Temperature coefficient: ±40ppm/℃ (0.0040%/℃)				
Max. conversion speed	10ms/ channel				
Absolute max. input	±15 V		±30 mA		
Analog input points	4 channels				
Insulation method	Between channels	Isolation (Trans)			
	Between terminal – PLC power supply	Isolation (Photo-Coupler)			
Terminal connected	18-point terminal				
I/O points occupied	Fixed point assignment: 64 , Variable point assignment : 16				
Internal-consumed current	DC 5 V: 610mA				
Weight	140g				

Notes

- When A/D conversion module is released from the factory, Offset/Gain value is as adjusted for respective analog input ranges, which is unavailable for user to change.

#### 4. Part names of functions

Part names of functions are as described below



No	Name	Descriptions
①	RUN LED	<ul style="list-style-type: none"> <li>▶ Displays the operation status</li> <li>On: Operation normal</li> <li>Blinks(0.2s): Error occurs (Refer to 2MLF-AD4S user's manual)</li> <li>Off: DC 5V disconnected, module error</li> </ul>
②	ALM LED	<ul style="list-style-type: none"> <li>▶ Displays the alarm status</li> <li>Blinks: Alarm (Processing alarm, Change rate alarm) detected</li> <li>Off: Operation normal</li> </ul>
③	Terminal	<ul style="list-style-type: none"> <li>▶ Analog input terminal, whose respective channels can be connected with external devices.</li> </ul>

#### 5. Handling precaution

- 1) Do not drop or impact the product.
- 2) Do not detach PCB from the case, it may cause malfunction.
- 3) During wiring or other work, do not allow any wire chips get inside the product.
- 4) Switch the external power off before mounting or removing the module and the cable.

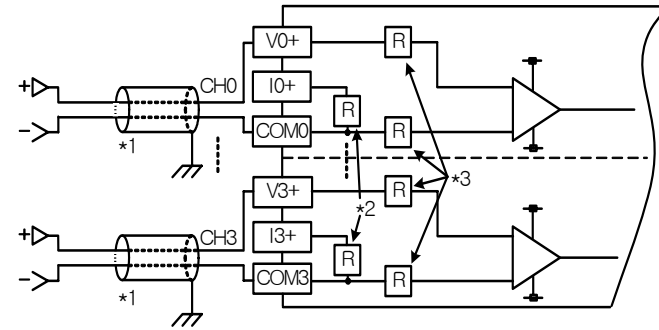
#### 6. Wiring

##### 6.1 Precautions for wiring

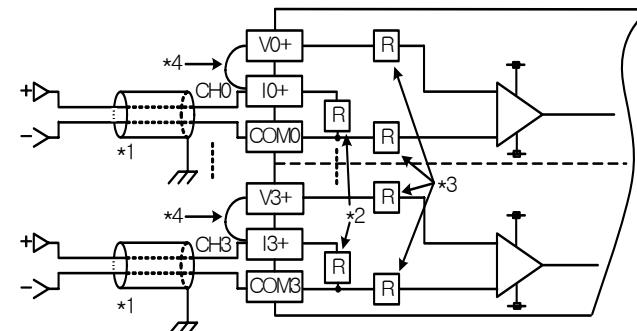
- 1) Don't let AC power line near to analog input module's external input signal line. With an enough distance kept away between, it will be free from surge or inductive noise.
- 2) Cable shall be selected in due consideration of ambient temperature and allowable current, whose size is not less than the max. cable standard of AWG22 (0.3mm<sup>2</sup>).
- 3) Don't let the cable too close to hot device and material or in direct contact with oil for long, which will cause damage or abnormal operation due to short-circuit.
- 4) Check the polarity when wiring the terminal.
- 5) Wiring with high-voltage line or power line may produce inductive hindrance causing abnormal operation or defect.

#### 6.2 Wiring Example

##### 1) Voltage input



##### 2) Current input



\*1) Use the cable of 2-core twisted shield. AWG 22 is recommended for the cable standard.

\*2) The Input resistance voltage input is 250 Ω (typ.).

\*3) The Input resistance current input is 1 MΩ (min.).

\*4) When using the current input, short the V+ terminal and I+ terminal.

#### 7. Configuration of internal memory

##### 7.1 I/O area of A/D converted data

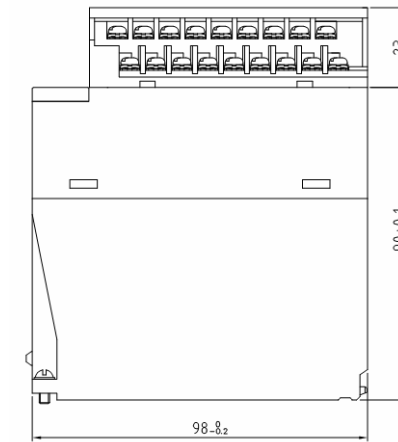
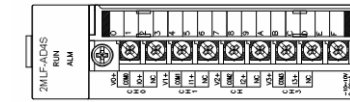
Address	Description	R/W
UXY.00.0	H/W error	R
UXY.00.F	Module ready	R
UXY.01.0	Ch0 run flag	R
UXY.01.1	Ch1 run flag	
UXY.01.2	Ch2 run flag	
UXY.01.3	Ch3 run flag	
UXY.02	CH0 digital output value	R
UXY.03	CH1 digital output value	R
UXY.04	CH2 digital output value	R
UXY.05	CH03digital output value	R
UXY.06	Reserved	R
UXY.07	Reserved	R

Address	Description	R/W
UXY.08.0	Ch0 high-high processing alarm (HH)	R
UXY.08.1	Ch0 high processing alarm (H)	
UXY.08.2	Ch0 low processing alarm (L)	
UXY.08.3	Ch0 low-low processing alarm (LL)	
UXY.08.4	Ch1 high-high processing alarm (HH)	
UXY.08.5	Ch1 high processing alarm (H)	
UXY.08.6	Ch1 low processing alarm (L)	
UXY.08.7	Ch1 low-low processing alarm (LL)	
UXY.08.8	Ch2 high-high processing alarm (HH)	
UXY.08.9	Ch2 high processing alarm (H)	
UXY.08.A	Ch2 low processing alarm (L)	
UXY.08.B	Ch2 low-low processing alarm (LL)	
UXY.08.C	Ch3 high-high processing alarm (HH)	
UXY.08.D	Ch3 high processing alarm (H)	
UXY.08.E	Ch3 low processing alarm (L)	
UXY.08.F	Ch3 low-low processing alarm (LL)	
UXY.09.0	Ch0 high alarm of change rate (H)	R
UXY.09.1	Ch0 low alarm of change rate (L)	
UXY.09.2	Ch1 high alarm of change rate (H)	
UXY.09.3	Ch1 low alarm of change rate (L)	
UXY.09.4	Ch2 high alarm of change rate (H)	
UXY.09.5	Ch2 low alarm of change rate (L)	
UXY.09.6	Ch3 high alarm of change rate (H)	
UXY.09.7	Ch3 low alarm of change rate (L)	
UXY.10.0	Flag to detect CH0 disconnection (1 ~ 5 V or 4 ~ 20 mA)	W
UXY.10.1	Flag to detect CH1 disconnection (1 ~ 5 V or 4 ~ 20 mA)	
UXY.10.2	Flag to detect CH2 disconnection (1 ~ 5 V or 4 ~ 20 mA)	
UXY.10.3	Flag to detect CH3 disconnection (1 ~ 5 V or 4 ~ 20 mA)	
UXY.11.0	Flag to request error clear	W

##### 7.2 A/D Setting area of Run parameters

Address	Description	R/W	Remark
0 <sub>H</sub>	0	R/W	PUT
1 <sub>H</sub>	1	R/W	PUT
2 <sub>H</sub>	2	R/W	PUT
3 <sub>H</sub>	3	R/W	PUT
4 <sub>H</sub>	4	R/W	PUT
5 <sub>H</sub>	5		
6 <sub>H</sub>	6		
7 <sub>H</sub>	7		
8 <sub>H</sub>	8	R/W	PUT
9 <sub>H</sub>	9	R/W	PUT
A <sub>H</sub>	10		
B <sub>H</sub>	11		
C <sub>H</sub>	12	R/W	PUT
D <sub>H</sub>	13	R/W	PUT
E <sub>H</sub>	14	R/W	PUT
F <sub>H</sub>	15		
10 <sub>H</sub>	16		
11 <sub>H</sub>	17		
12 <sub>H</sub>	18		
13 <sub>H</sub>	19		
14 <sub>H</sub>	20		
15 <sub>H</sub>	21		
16 <sub>H</sub>	22	R/W	PUT
17 <sub>H</sub>	23		
18 <sub>H</sub>	24		
19 <sub>H</sub>	25	R/W	PUT
1A <sub>H</sub>	26		
1B <sub>H</sub>	27		
1C <sub>H</sub>	28	R/W	PUT
1D <sub>H</sub>	29		
1E <sub>H</sub>	30		
1F <sub>H</sub>	31		
20 <sub>H</sub>	32		
21 <sub>H</sub>	33		
22 <sub>H</sub>	34		
23 <sub>H</sub>	35		
24 <sub>H</sub>	36	R/W	PUT
25 <sub>H</sub>	37		

#### 8. Dimensions



Unit : mm