Honeywell

DATASHEET

MasterLogic-200

AD Conver.

2MLF-AD8A

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Location	Organization	Phone
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Honeywell International
Process Solutions
2500 West Union Hills
Phoenix, AZ 85027
1-800 343-0228

Safety Precautions

- Safety Precautions is for using the product safe and correct in order to prevent the accidents and danger, so always follow the instructions.
- The precautions explained here only apply to each module. For safety precautions on the PLC system, refer to the MasterLogic-200 User's manual.
- The precautions are divided into 2 sections, 'Warning' and 'Caution'. Each of the meanings is represented as follows.

⚠ Warning — If violated instructions, it may cause death, fatal injury or considerable loss of property.

⚠ Caution — If violated instructions, it may 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

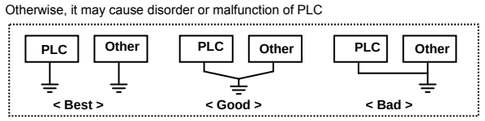
- **Do not contact the terminals while the power is applied.**
  Risk of electric shock and malfunction.
- **Do not drop or insert any metallic object into the product.**
  Risk of fire, electric shock and malfunction.
- **Do not charge, heat, short, solder and break up the battery.**
  Risk of injury and fire by explosion and ignition.

⚠ Caution

- **Before wiring the PLC, ensure to check the rated voltage and terminal arrangement for the module and observe them correctly.**
  Risk of electric shock, fire and malfunction.
- **Tighten up the terminal screw firmly to defined torque when to wire the PLC.**
  Risk of fire and electric shock if the terminal screw looses.
- **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 in any places other than PLC controlled place.
- Ensure that the FG terminal is grounded with class 3 grounding which is dedicated to the PLC. Otherwise, it may cause disorder or malfunction of PLC



- Connect expansion connector correctly when expansion modules are needed.
- Do not detach PCB from the case of the module and do not modify the module.
- Turn off the 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.

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 (data: 14 bits) specified in MasterLogic-200 CPU modules

2. General Specifications

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

No	Item	Specifications				Related specifications
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				IEC61131-2
		Frequency	Acceleration	Amplitude	Number	
		10≤f< 57Hz	-	0.075mm	Each 10 times in X,Y,Z directions	
		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: 147㎨(15G) * Authorized time: 11㎳ * 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)		IEC61131-2 IEC61000-4-2
		Radiated electromagnetic field noise		27 ~ 500MHz, 10 V/m		IEC61131-2, IEC61000-4-3
		Fast Transient /burst noise	Class	Power module	Digital/Analog I/O communication interface	IEC61131-2 IEC61000-4-4
			Voltage	2kV	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

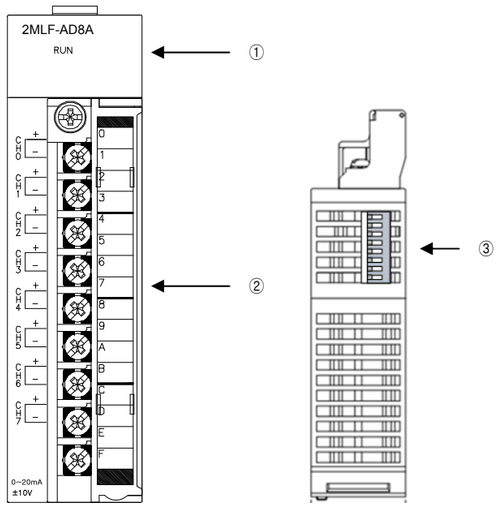
Item	Specifications	
	Voltage Input	Current Input
Analog input	DC 1 ~ 5 V DC 0 ~ 5 V DC 0 ~ 10 V DC -10 ~ 10 V (Input Resistance: 1 MΩ min.)	DC 4 ~ 20 mA DC 0 ~ 20 mA (Input Resistance 250 Ω
Analog input range setting	► Current input or Voltage input can be selected through the external switch. ► Analog input range can be selected through user program or I/O parameter. ► Respective input ranges can be set based on channels.	
Digital output	(1) Voltage Input Analog input / Digital output: 1 ~ 5 V; 0 ~ 5 V; 0 ~ 10 V; -10 ~ 10 V Unsigned Value: 0 ~ 16000 Signed Value: -8000 ~ 8000 Precise Value: 1000~5000; 0~5000; 0~10000; -10000~10000 Percentile Value: 0 ~ 10000 (2) Current Input Analog input / Digital output: 4 ~ 20 mA; 0 ~ 20 mA Unsigned Value: 0 ~ 16000 Signed Value: -8000 ~ 8000 Precise Value: 4000 ~ 20000; 0 ~ 20000 Percentile Value: 0 ~ 10000 ► 16-bit binary value (data: 14 bits) ► Format of digital output data can be set through user program or S/W package respectively based on channels.	
The max. resolution	Analog input range / Resolution (1/16000): 1 ~ 5 V — 0.250 mV; 0 ~ 5 V — 0.3125 mV; 0 ~ 10 V — 0.625 mV; -10 ~ 10 V — 1.250 mV Analog input range / Resolution (1/16000): 4 ~ 20 mA — 1.0 μA; 0 ~ 20 mA — 1.25 μA	
Accuracy	±0.2% or less (when ambient temperature is 25 ℃ ±5 ℃) ±0.3% or less (when ambient temperature is 0 ℃ ~ 55 ℃)	
Max. conversion speed	250 μs/ channel	
Absolute max. input	±15 V	±30 mA
Analog input points	8 channels	
Insulation method	Photo-coupler insulation between input terminal and PLC power (no insulation between channels)	
Terminal connected	18-point terminal	
I/O points occupied	Fixed point assignment: 64 , Variable point assignment : 16	
Internal-consumed current	560㎃	
Weight	140g	

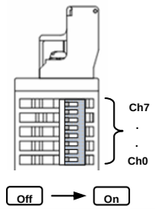
Notes

1) When A/D conversion module is released from the factory, Offset/Gain value is adjusted for respective analog input ranges, which is unavailable for user to change.
2) Offset Value: Analog input value when digitalized value is 0 in case that the range of digitalized value is 0~16000.
3) Gain Value: Analog input value when digitalized value is 16000 in case that the range of digitalized value is 0~16000.

4. Parts names of functions

Parts names of functions are as described below.



No	Name	Descriptions
①	RUN LED	▶ Displays the operation status of 2MLF-AD8A On: Operation normal Blinks: Error occurs Off: DC 5V disconnected, module error
②	Terminal	▶ Analog input terminal, whose respective channels can be connected with external devices.
③	Current/ Voltage selecting switch	▶Switch for selecting Voltage input and current input  Switch: Off → Voltage; On → Current

5. Handling precaution

1) Do not drop or give impact on 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 off the external power before mounting or removing the module and the cable.

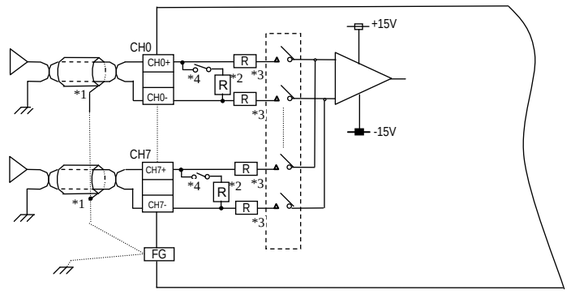
6. Wiring

6.1 Precautions for wiring

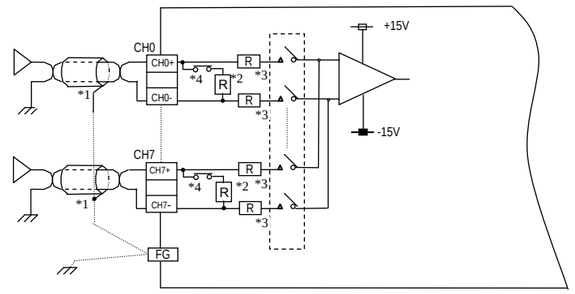
1) Do not place AC power line near to the module's external input signal line. It should be farther than minimum 100mm between both lines in order not to be affected by noise and magnetic field.
2) Cable shall be selected in due consideration of ambient temperature and allowable current, whose size is not less than the max. cable standard of AWG22 (0.3㎟).
3) Do not place 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) Current input resistance is 250 Ω (typ.).
*3) Voltage input resistance is 1 MΩ (min.).
*4) FG means PLC system's FG.

7. Configuration of internal memory

7.1 Data area

Device (2MLK)	Global variables (2MLI)	Details	R/W
Uxy.00.0	_xy_ERR	Module ERROR flag	R
Uxy.00.F	_xy_RDY	Module READY flag	
Uxy.01.0	_xy_CH0_ACT	CH0 Run flag	R
Uxy.01.1	_xy_CH1_ACT	CH1 Run flag	
Uxy.01.2	_xy_CH2_ACT	CH2 Run flag	
Uxy.01.3	_xy_CH3_ACT	CH3 Run flag	
Uxy.01.4	_xy_CH4_ACT	CH4 Run flag	
Uxy.01.5	_xy_CH5_ACT	CH5 Run flag	
Uxy.01.6	_xy_CH6_ACT	CH6 Run flag	
Uxy.01.7	_xy_CH7_ACT	CH7 Run flag	
Uxy.02	_xy_CH0_DATA	CH0 digital output value	R
Uxy.03	_xy_CH1_DATA	CH1 digital output value	R
Uxy.04	_xy_CH2_DATA	CH2 digital output value	R
Uxy.05	_xy_CH3_DATA	CH3 digital output value	R
Uxy.06	_xy_CH4_DATA	CH4 digital output value	R
Uxy.07	_xy_CH5_DATA	CH5 digital output value	R
Uxy.08	_xy_CH6_DATA	CH6 digital output value	R
Uxy.09	_xy_CH7_DATA	CH7 digital output value	R
Uxy.10.0	_xy_CH0_IDD	CH0 disconnection flag (1 ~ 5 V or 4 ~ 20 mA)	R
Uxy.10.1	_xy_CH1_IDD	CH1 disconnection flag (1 ~ 5 V or 4 ~ 20 mA)	
Uxy.10.2	_xy_CH2_IDD	CH2 disconnection flag (1 ~ 5 V or 4 ~ 20 mA)	
Uxy.10.3	_xy_CH3_IDD	CH3 disconnection flag (1 ~ 5 V or 4 ~ 20 mA)	
Uxy.10.4	_xy_CH4_IDD	CH4 disconnection flag (1 ~ 5 V or 4 ~ 20 mA)	
Uxy.10.5	_xy_CH5_IDD	CH5 disconnection flag (1 ~ 5 V or 4 ~ 20 mA)	
Uxy.10.6	_xy_CH6_IDD	CH6 disconnection flag (1 ~ 5 V or 4 ~ 20 mA)	
Uxy.10.7	_xy_CH7_IDD	CH7 disconnection flag (1 ~ 5 V or 4 ~ 20 mA)	
Uxy.11.0	_xy_ERR_CLR	Flag to request error clear	W

7.2 Parameters area

Address (2MLK) Dec	Address (2MLK) Hex	Global variables (2MLI)	Details	R/W
0_H	0	_Fxy_CH_EN	Channel enable	R/W
1_H	1	_Fxy_IN_RANGE1	Range of input voltage/current1	R/W
2_H	2	_Fxy_IN_RANGE2	Range of input voltage/current2	R/W
3_H	3	_Fxy_DATA_TYPE	Data type	R/W
4_H	4	_Fxy_AVG_SEL	Average enable	R/W
5_H	5	_Fxy_CH0_AVG_VAL	CH0 average constant	R/W
6_H	6	_Fxy_CH1_AVG_VAL	CH1 average constant	
7_H	7	_Fxy_CH2_AVG_VAL	CH2 average constant	
8_H	8	_Fxy_CH3_AVG_VAL	CH3 average constant	
9_H	9	_Fxy_CH4_AVG_VAL	CH4 average constant	
A_H	10	_Fxy_CH5_AVG_VAL	CH5 average constant	
B_H	11	_Fxy_CH6_AVG_VAL	CH6 average constant	
C_H	12	_Fxy_CH7_AVG_VAL	CH7 average constant	
D_H	13	_Fxy_ERR_CODE	Error code	R/W

8. Dimensions

Unit : ㎜