Honeywell

DATASHEET

MasterLogic-200

AD Conver.

2MLF-AD16A

10310000929 Printed in Korea

For more information on MasterLogic PLCs, contact your nearest Honeywell office

Australia
Honeywell Ltd.
Phone : (61) 2-9353-4500
Fax : (61) 2-9353-7677

China
Honeywell (Tianjin) Ltd. – Beijing
Phone: (86-10) 8458-3280
Fax: (86-10) 8458-3102

Honeywell (Tianjin) Ltd. – Shanghai
Phone: (86-21) 6237-0237
Fax : (86-21) 6237-3102

Indonesia
PT Honeywell Indonesia
Phone : (62) 21-535-8833
Fax : (62) 21-5367-1008

India
Honeywell Automation India Ltd.
Phone: (91) 20-5603-9400
Fax: (91) 20-5603-9800

Japan
Honeywell Inc.
Phone: (81)3-5440-1395
Fax: (81)3-5440-1368

South Korea
Honeywell Co., Ltd.
Phone : (82) 2-799-6114
Fax : (82) 2-792-9015

Malaysia
Honeywell Engineering Sdn Bhd.
Phone: (603) 7958-4988
Fax: (603) 7958-8922

New Zealand
Honeywell Ltd.
Phone: (64-9) 623-5050
Fax: (64-9) 623-5060

Philippines
Honeywell Systems Inc.
Phone: (63-2) 633-2830
Fax: (63-2) 638-4013

Singapore
Honeywell Pte Ltd.
Phone: (65) 6355-2828
Fax: (65) 6445-3033

Thailand
Honeywell Systems Ltd.
Phone: (662) 693-3099
Fax: (662) 693-3085

Taiwan
Honeywell Taiwan Ltd.
Phone: (886) 2-2245-1000
Fax: (886) 2-2245-3241

For Countries (SE Asia) Listed below, call Honeywell Singapore Office
Pakistan, Cambodia, Laos, Myanmar, Vietnam and East Timor

For Countries Listed below, call Honeywell India Office
Bangladesh, Nepal, and Sri Lanka

Honeywell

Honeywell Co., Ltd.

Honeywell Process Solutions

17F, Kukje Center Building, 191 Hangangro-2ga,

Yongsan-gu, Seoul 140-702, Korea

Tel: 82-2-799-6114 / Fax: 82-2-792-9015

Email: MasterLogic_support @Honeywell.com

10310000929 Printed in Korea

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 the 2MLF-AD16A unit. For safety precautions on the PLC system, refer to the MasterLogic-200, 200I, 200R CPU 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

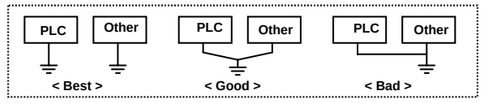
- **Do not contact the terminals while the power is applied.**
  Risk of electric shock and malfunction.
- **Do not drop or insert any metallic object into the product.**
  Risk of fire, electric shock and malfunction.
- **Do not charge, heat, short, solder and break up the battery.**
  Risk of injury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

MasterLogic-200 User's Manual

Name	Code
MasterLogic-200 User's manual(Programming software)	10310000512
MasterLogic-200I/200R User's manual(Programming software)	10310000834
MasterLogic-200 Basic Instruction & Programming User's manual	10310000510
MasterLogic-200I/200R Basic Instruction & Programming User's manual	10310000833

1. Introduction

Analog Input Module designed for MasterLogic-200 series is used to convert analog signal(voltage or current input) to the digital value of 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 Frequency / Acceleration / Amplitude / Number 10≤f< 57Hz / - / 0.075mm / Each 10 times in X,Y,Z directions 57≤f≤150Hz / 9.8m/s²(1G) / - / Each 10 times in X,Y,Z directions For continuous vibration Frequency / Acceleration / Amplitude 10≤f< 57Hz / - / 0.035mm 57≤f≤150Hz / 4.9m/s²(0.5G) / -	IEC 61131-2
6	Shocks	* Max. impact acceleration: 147㎨(15G) * Authorized time: 11㎳ * Pulse wave : Sign half-wave pulse (Each 3 times in X,Y,Z directions)	IEC 61131-2
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: Digital/Analog I/O communication interface Voltage / 2kV / 1 kV	IEC 61131-2, IEC 61000-4-3 IEC 61131-2 IEC 61000-4-4
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 Analog Input Module are as specified in Table

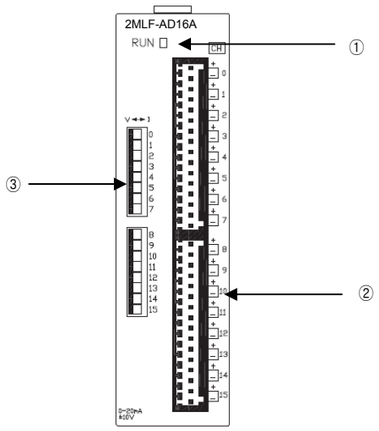
Item	Specifications	
	Voltage Input	Current Input
Analog input	DC 1 ~ 5 V DC 0 ~ 5 V DC 0 ~ 10 V DC -10 ~ 10 V (Input Resistance: 1 MΩ min.)	DC 4 ~ 20 mA DC 0 ~ 20 mA (Input Resistance 250 Ω)
Analog input range setting	►Current input or Voltage input can be selected through the external switch. ► Analog 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 ㎷ 0 ~ 5 V / 0.3125 ㎷ 0 ~ 10 V / 0.625 ㎷ -10 ~ 10 V / 1.250 ㎷	Analog input range / Resolution (1/16000) 4 ~ 20 ㎃ / 1.0 ㎂ 0 ~ 20 ㎃ / 1.25 ㎂
Accuracy	±0.2% or less (when ambient temperature is 25 ℃ ±5 ℃) ±0.3% or less (when ambient temperature is 0 ℃ ~ 55 ℃)	
Max. conversion speed	500 ㎲/ channel	
Absolute max. input	±15 V	±30 ㎃
Analog input points	16 channels	
Insulation method	Photo-coupler insulation between input terminal and PLC power (no insulation between channels)	
Terminal connected	32-point terminal	
I/O points occupied	Fixed point assignment: 64 , Variable point assignment : 16	
Internal-consumed current	330㎃	
Weight	115g	

Notes

(1) When Analog Input 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) When Analog Input Module is released from the factory, Voltage/Current selecting switch is adjusted for current input type, which is available for user to change.

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-AD16A 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

5. Handling precaution

(a) Do not drop or give impact on the product.
(b) Do not detach PCB from the case, it may cause malfunction.
(c) During wiring or other work, do not allow any wire chips get inside the product.
(d) Switch off the external power before mounting or removing the module and the cable.

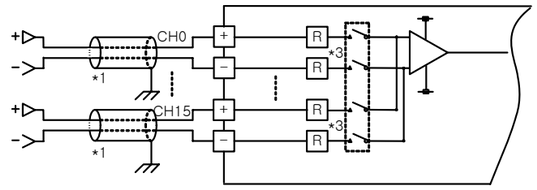
6. Wiring

(1) Precautions for wiring

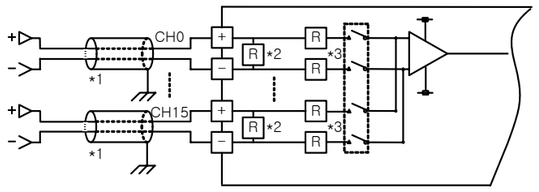
(a) Do not place AC power line near to the module's external input signal line. It should be farther than minimum 100mm between both lines in order not to be affected by noise and magnetic field.
(b) Cable shall be selected in due consideration of ambient temperature and allowable current, whose size is not less than the max. cable standard of AWG22 (0.3㎟).
(c) 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.
(d) Check the polarity when wiring the terminal.
(e) Wiring with high-voltage line or power line may produce inductive hindrance causing abnormal operation or defect.

(2) Wiring Example

(a) Voltage input



(b) 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. I/O Parameter Setting

Analog Input Module's operation parameters can be specified through XG5000's [I/O parameters].

(1) Channel RUN/STOP setting

Select Enable or Disable for each channel.

(2) Input Voltage/Current range setting

Select the range of analog input as desired.
2MLF-AD16A provides 4 Voltage input ranges and 2 Current input ranges.
(a) Voltage input range: 0~5V, 1~5V, 0~10V, -10~10V
(b) Current input range: 0~20㎃, 4~20㎃

(3) Output data format setting

Select the type of output data. 4 output data formats are provided in this module.
- Unsigned value, Signed value, Precise value, Percentile value

(4) A/D conversion methods

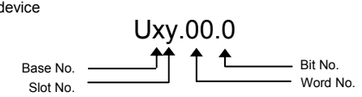
(a) Sampling processing
Sampling process will be performed if A/D conversion type is not specified.
(b) Filter processing: 1~99 (%)
Used to delay the sudden change of input value.
(c) Average processing:
Outputs average A/D conversion value based on frequency or time.
1) Time average processing: 16~16000 (ms)
2) Count average processing: 2~64000 (times)

8. Configuration of internal memory

Device (ML200)	Global variables (ML200 IEC)	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.01.8	_xy_CH8_ACT	CH8 Run flag	
Uxy.01.9	_xy_CH9_ACT	CH9 Run flag	
Uxy.01.A	_xy_CH10_ACT	CH10 Run flag	
Uxy.01.B	_xy_CH11_ACT	CH11 Run flag	
Uxy.01.C	_xy_CH12_ACT	CH12 Run flag	
Uxy.01.D	_xy_CH13_ACT	CH13 Run flag	
Uxy.01.E	_xy_CH14_ACT	CH14 Run flag	
Uxy.01.F	_xy_CH15_ACT	CH15 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	_xy_CH7_DATA	CH8 digital output value	R
Uxy.11	_xy_CH7_DATA	CH9 digital output value	R
Uxy.12	_xy_CH7_DATA	CH10 digital output value	R
Uxy.13	_xy_CH7_DATA	CH11 digital output value	R
Uxy.14	_xy_CH7_DATA	CH12 digital output value	R
Uxy.15	_xy_CH7_DATA	CH13 digital output value	R
Uxy.16	_xy_CH7_DATA	CH14 digital output value	R
Uxy.17	_xy_CH7_DATA	CH15 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.10.8	_xy_CH8_IDD	CH8 disconnection flag (1 ~ 5 V or 4 ~ 20 mA)	
Uxy.10.9	_xy_CH9_IDD	CH9 disconnection flag (1 ~ 5 V or 4 ~ 20 mA)	
Uxy.10.A	_xy_CH10_IDD	CH10 disconnection flag (1 ~ 5 V or 4 ~ 20 mA)	
Uxy.10.B	_xy_CH11_IDD	CH11 disconnection flag (1 ~ 5 V or 4 ~ 20 mA)	
Uxy.10.C	_xy_CH12_IDD	CH12 disconnection flag (1 ~ 5 V or 4 ~ 20 mA)	
Uxy.10.D	_xy_CH13_IDD	CH13 disconnection flag (1 ~ 5 V or 4 ~ 20 mA)	
Uxy.10.E	_xy_CH14_IDD	CH14 disconnection flag (1 ~ 5 V or 4 ~ 20 mA)	
Uxy.10.F	_xy_CH15_IDD	CH15 disconnection flag (1 ~ 5 V or 4 ~ 20 mA)	
Uxy.11.0	_xy_ERR_CLR	Flag to request error clear	W

Remark

How to use U device



Ex1) When reading "CH0 Active" bit of Base 1, Slot 6
-> U16.01.0
Ex2) When reading "CH0 Active" bit of Base 0, Slot 11
-> U0B.01.0

9. Dimensions

Unit : ㎜