Honeywell

DATASHEET

MasterLogic-200R

CPU Module

2MLR-CPUH/F, 2MLR-CPUH/T

Extension Drive Module

2MLR-DBSF, 2MLR-DBST, 2MLR-DBSH

Redundant Base

2MLR-M06P, 2MLR-E12P

Redundant Power Module

2MLR-AC12, 2MLR-AC22, 2MLR-AC13, 2MLR-AC23

Printed in Korea

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Safety Precautions

- Safety Precautions are 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 ML200R CPU module. For safety precautions on the PLC system, refer to the ML200R 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 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 electric 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

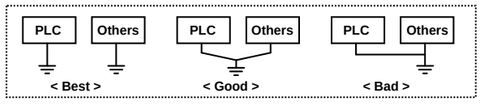
- **Do not contact the terminals while the power is applied.**
  Risk of electric shock and malfunction.
- **Do not drop or insert any metallic object into the product.**
  Risk of fire, electric shock and malfunction.
- **Do not charge, heat, short, solder and break up the battery.**
  Risk of injury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

1. Introduction

This datasheet provides brief information about characteristics, configurations, and usages of MasterLogic Redundant System.

2. General Specifications

No.	Items	Specifications				Standards
1	Operating temperature	0 to 55℃				-
2	Storage temperature	-25 to 70℃				-
3	Operating Humidity	5 to 95%RH, non-condensing				-
4	Storage humidity	5 to 95%RH, non-condensing				-
5	Vibration	Occasional vibration				IEC 61131-2
		Frequency	Acceleration	Amplitude	Sweep count	
		10≤f＜57 Hz	-	0.075 mm	10 times in each direction for X, Y, Z	
		57 ≤f≤150 Hz	9.8 ㎨ {1G}	-		
		Continuous vibration				
		Frequency	Acceleration	Amplitude		
		10≤f＜57 Hz	-	0.035 mm		
		57≤f≤150 Hz	4.9 ㎨{0.5G}	-		
6	Shocks	Maximum shock acceleration: 147 ㎨ {15G}, Duration time: 11 ms Pulse wave: half sine wave pulse (3 times in each of X, Y and Z directions)				IEC 61131-2
7	Noise immunity	Square wave impulse noise	±1,500 V			-
		Electrostatic discharge	Voltage :4kV(contact discharge)			IEC 61131-2 IEC 61000-4-2
		Radiated electromagnetic field	27 to 500 MHz, 10 V/m			IEC 61131-2 IEC 61000-4-3
		Fast transient burst noise	Severity Level	All power modules	Digital I/Os Analog I/Os communication I/Os	IEC 61131-2 IEC 61000-4-4
			Voltage	2 kV	1 kV	
8	Atmosphere	Free from corrosive gases and excessive dust				-
9	Altitude for use	Up to 2,000m				-
10	Pollution degree	2 or less				-
11	Cooling method	Self-cooling				-

3. Performance Specifications

1.The performance specifications of CPU modules are as follows.

Items			Specifications		Remarks
			2MLR-CPUH/F	2MLR-CPUH/T	
Operation method			Scan program: Reiterative operation, Fixed cycle scan Task program: Initialization, Cycle, Internal device		-
I/O control method			Scan synchronous batch processing system (refresh system)		-
Programming Language			LD (Ladder Diagram), ST (Structured Text) SFC (Sequential Function Chart) IL (Instruction List, view function only)		-
Numbers of instructions	Operator		18		-
	Basic function		136 + Floating-point Arithmetic Functions		-
	Basic function block		41		-
	Special function block		FB dedicated for special module, FB for process control.		-
Processing speed(Basic instruction)	LD		42 ㎱/Step		-
	MOVE		112 ㎱/Step		-
	Floating-point arithmetic		±: 0.602 ㎲(S), 1.078 ㎲(D) x : 1.106 ㎲(S), 2.394 ㎲(D) ÷ : 1.134 ㎲(S), 2.660 ㎲(D)		S: Single real number D: Double real number
Program memory capacity			7M byte		-
System Memory			4M byte		
Max. I/O points			23,808 points (31bases * 12slots * 64points)		-
Max. I/O points memory mapping area			131,072(128bases * 16slots * 64points)		-
Data memory	Symbolic variable area(A)		512K byte (max.256K byte retain settable)		-
	Input variable(I)		16K byte		-
	Output variable(Q)		16K byte		-
	Direct variable	M	256K byte (Max. 128K byte retain setting available)		-
		R	64K byte * 2 blocks		64K byte per 1 block
		W	128K byte		-
	Flag variable	F	4K byte		System flag
		K	18K byte(PID 256 loops)		-
		L	22K byte		-
		N	42K byte		-
		U	32K byte		-
Flash area			16M byte		-
Timer			No limit in points Time range: 0.001~ 4,294,967.295 s(1,193 hours)		-
Counter			No limit in points, Counter range: 64 bit range		-
Program types	Number of total programs		256		-
	Initialization task		1		-
	Time driven task		32		-
	Internal device task		32		-
Operation modes			RUN, STOP, DEBUG		-
Media			Optical	Electrical	
Restart modes			Cold, Warm		-
Self-diagnostic functions			Watchdog timer, Memory error detection, I/O error detection, Battery error detection, Power supply error detection, etc		
Data protection method at power failure			Set to retain area in basic parameter		-
Max. extension stages			31		-
Max. length between extension base			Optical(2km)	Electric(100m)	

Operation monitoring between CPU	Redundant monitoring by Sync. Line and ring type I/O network				Extension cable
Data backup between CPU	1 Gbps optical line, max. length 5 m (recommended)				
Data Sync. Method between CPU	Set in the Redundancy Parameter				
Delay in case of redundancy operation	Proportional to data which master transmits to backup -default: 8.2 ms/ max. 80 ms				
Master switching time	50 ms				
Operation delay in case of backup start	Max. value of redundancy operation delay				
Install position	CPU parts(CPU0, CPU1 connector) in basic base				
Weight (g)	275	256			

2. The performance specifications of Extension Drive Module are as follows.

Item	Specification			Remarks
	2MLR-DBSF	2MLR-DBST	2MLR-DBSH	
Media	Optical	Electrical	Mixed	
Max. distance between Extension bases	Optical (2km)	Electrical (100m)	Optical (2km) Electrical (100m)	
Loader connection	Extension drive USB			
Range of station no.	1 ~ 31 (other no. will generate an error)			no.0: not available
Install position	CPU parts(CPU0 connector) in extension base			
Weight (g)	99	100	102	

3. The performance specifications of Redundant Main/Extension Base are as follows.

Item \ Name	2MLR-M06P	2MLR-E12P
No. of modules	6 Module	12 Module
Installed module	FEnet, RAPIEnet	All modules except FEnet, RAPIEnet
Dimension (mm)	346 X 98 X 19	481 X 98 X 19
Distance of hole for panel attachment	326 X 75	461X 75
Specification of hole for panel attachment	ϕ 4.5 (M4 screw used)	
Specification of screw for FG connection	(+)PHM 3 X 6 washer(ϕ 5)	
Weight (g)	500	700

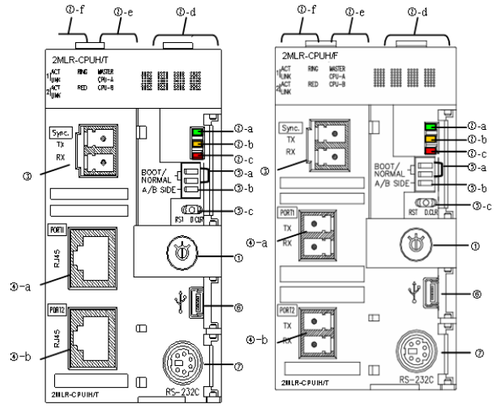
4. The performance specifications of Redundant Power Module are as follows.

Item		2MLR-AC12	2MLR-AC22	2MLR-AC13	2MLR-AC23
Input	Rated input voltage	AC110V	AC220V	AC110V	AC220V
	Input voltage range	AC85V – 132V	AC176V – 264V	AC85V – 132V	AC176V – 264V
	Input frequency	50 / 60 Hz (47 ~ 63 Hz)			
	Inrush current	20A Peak and lower			
	Efficiency	65% or higher			
	Input fuse	Built in(not replaceable by a user), AC 250V / 3.15A (Time-lag Type) UL approved			
	Allowed instantaneous interruption	Within 20 ms			
Output	Output voltage	DC5V (±2%)			
	Output current	5.5 A	5.5 A	8.5 A	8.5 A
	Over current protection	13.0 A or more	13.0 A or more	17.0 A or more	17.0 A or more
	Over voltage protection	5.5V ~ 6.5V			
RUN contact		Relay output, Rated switching voltage/current: DC24V, 0.5A			
Voltage status display		LED On when output voltage is normal			
Specification of cable		0.75 ~ 2 mm^2			
Available clamped terminal		RAV1.25-3.5,RAV2-3.5			
Applied base and install position		Power part of basic/extension base			
Weight (g)		333		385	

4. Parts Names and Descriptions

1. CPU Module (2MLR-CPUH/T, 2MLR-CPUH/F)

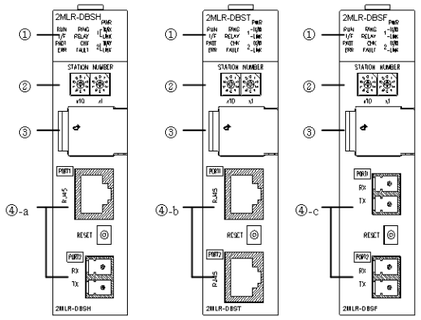
The following describes the names and functions of parts of the CPU module.



No.	Name	Description
①	Operation mode switch RUN/REM/STOP	■ Sets the operation mode of CPU module via key switch. • RUN mode: runs program • STOP mode: stops program • REM mode: mode selectable by programming tool
②-a	RUN/STOP LED	■ Indicator of CPU operation mode • ON(Green) : 'RUN' mode in normal operation • ON(Red) : 'STOP' mode in normal operation
②- b	WAR LED	• On(Yellow): displaying an error of operation disabled • Off: No error
②- c	ERR LED	• ON(Red) : Error where operation is impossible • OFF(Red) : Normal operation
②- d	BAT LED	• Displays operation status with 4 characters ▶ Normal operation, Warning
②-e	Displaying redundant status	• Displays operation/installation status of CPU system. ▶ RED: On when redundant operation, Off when single operation ▶ MASTER: on; CPU operating as master, off; standby CPU ▶ CPU-A: on when CPU position designation switch (⑤-b) set as A ▶ CPU-B: on when CPU position designation switch (⑤-b) set as B
②-f	Displaying extension network status	■ Displays communication status with extension base • ACT On (Yellow): relevant channel is operating • LINK On (Green): link of relevant channel is connected ▶ 1 indicates upper channel (④-a), 2 indicates lower channel (④-b). • RING On (Green): Extension network is configured as Ring. • RING Off: Extension network is not established or configured as Line because part of Ring fails
③	Sync. connector	■ Data sharing and monitoring between two CPUs.
④-a ④-b	Connector for extension connector	Connector used for connecting with extension base • For easy Ring configuration, two connector supported • Two types, optical/optical, electrical/electrical
⑤-a	BOOT/NORMAL switch	■ Used to download OS at first time • NORMAL (right): used for normal operation • Caution: This switch should be set as NORMAL, In case of set as BOOT, system doesn't operate properly
⑤-b	A/B side switch (CPU position designation switch)	■ Designates the logical position of CPU • Left side means CPU position is set as A • Right side means CPU position is set as B
⑤-c	Reset/D. Clear switch	■ If it is moved left side, reset will be executed. • move to left -> return to center: Reset executed • move to left -> keep 3 seconds or above -> return to center: Overall reset executed ■ If it is moved right side, data clear will be executed. • move to right -> return to center: : General data area and retain area will be cleared. • move to left -> keep 3 seconds or above -> return to center: : General data area, retain area and R data area will be cleared. • Caution: data clear is only executed in stop mode.
⑥	USB Connector	■ USB connector to connect with external device
⑦	RS-232C Connector	RS-232C connector to connect with external device

2. Extension Drive Module (2MLR-DBSH , 2MLR-DBST, 2MLR-DBSF)

The following describes the names and functions of parts of the Extension Drive module



No.	Name	Description
①	Module Status Indicator	■ Status indicator LED of extension drive module • TX/RX (Yellow): when there us communication data to the channel • LINK (Green): indicates the link connection of the channel • RING (Green) On: the extension network is ring configuration Off: the extension network connection is off, or in bus configuration from the first
②	Base Setting Switch	■ Switch for setting extension base No. • x10 for 10 digit setting, x1 for 1 digit setting • Max. 31 bases can be set up • Error LED on at station No. conflict or setting more than 31 station numbers
③	USB Connector	■ Connector for peripheral devices
④-a ④-b ④-c	Extension Network Connector	■ Connector for extension base connection • 2MLR-DBSH : optical-electrical • 2MLR-DBST : electrical-electrical • 2MLR-DBSF : Optical-optical
⑤	Extension Drive Module Reset Switch	■ Pressing this switch will trigger module reset operation. • Used to reset module only. • Make sure to skip the module before conducting module reset • Take care that resetting without skip setting of the respective base will cause module isolation error.

5. Power Supply Modules

This chapter describes the selection method, type and specification of the power supply modules.

1. Selection of power supply module

Selection of the power supply module is determined by the total current consumption of digital input/output modules, special modules and communication modules, etc. whose powers are supplied by the power supply module.
If total load overruns the rated output capacity, the system will not normally operate.
When configuring a system, select a power supply module with due consideration of current consumption of each module.

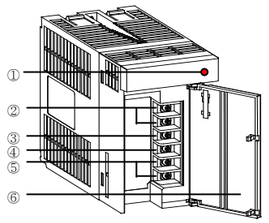
Internal Current consumption by modules (DC 5V) (Unit: ㎃)

Type	Module	Current Consumption
CPU	2MLR-CPUH/T	1,173
	2MLR-CPUH/F	1,310
24VDC Input	2MLI-D21A	20
	2MLI-D22A	30
	2MLI-D22B	30
	2MLI-D24A	50
	2MLI-D24B	50
	2MLI-D28A	60
	2MLI-D28B	60
110VAC Input	2MLI-A12A	30
220VAC Input	2MLI-A21A	20
Relay Output	2MLQ-RY1A	250
	2MLQ-RY2A	500
	2MLQ-RY2B	500
Transistor Output	2MLQ-TR2A	70
	2MLQ-TR2B	70
	2MLQ-TR4A	130
	2MLQ-TR4B	130
	2MLQ-TR8A	230
	2MLQ-TR8B	230
Triac Output	2MLQ-SS2A	300
Mixed I/O Module	2MLH-DT4A	110
Snet I/F Module	2MLL-C22A	330
	2MLL-C42A	300
	2MLL-CH2A	340
Rnet I/F Module	2MLL-RMEA	410
Pnet I/F Module	2MLL-PMEA	560
Dnet I/F Module	2MLL-DMEA	440

Type	Module	Current Consumption
Extension Drive Module	2MLR-DBST	490
	2MLR-DBSF	850
	2MLR-DBSH	660
Analog Input	2MLF-AV8A	380
	2MLF-AC8A	380
	2MLF-AD8A	380
	2MLF-AD16A	330
Analog Output	2MLF-DV4A	190(250)
	2MLF-DC4A	190(400)
	2MLF-DV8A	190(250)
	2MLF-DC8A	190(400)
Thermocouple Input	2MLF-TC4S	610
	2MLF-TC4UD	770
High-speed Counter	2MLF-HO2A	270
	2MLF-HD2A	330
Positioning	2MLF-PO3A	400
	2MLF-PO2A	360
	2MLF-PO1A	340
	2MLF-PD3A	820
	2MLF-PD2A	750
	2MLF-PD1A	510
	2MLF-M16M	640
RTD Input	2MLF-RD4A	490
Channel-Isolated Analog Input	2MLF-AD4S	580
Channel-Isolated Analog Output	2MLF-DC4S	200(200)
	2MLF-DV4S	200(500)
Base Module	2MLR-M06P	220
	2MLR-E12P	220
FEnet I/F Module	2MLL-EFMF	650
	2MLL-EFMT	420
FDEnet I/F Module (Master)	2MLL-EDMF	650
	2MLL-EDMT	420
Fiber Optic Ring Switch Module	2MLL-ESHF	1,200

( ) indicates current consumption of external 24VDC.

2. Names of Parts



No.	Name	Description
1	Power LED	DC5V Power display LED
2	RUN Terminal	Displaying RUN state of a system (1) On when CPU is normal RUN mode. (2) Off when the stop error of CPU occurs. (3) It is Off when the mode of CPU turns to STOP.
3	FG Terminal	Functional Grounding terminal for reliability of system operation.
4	LG Terminal	Grounding terminal of power filter
5	Power input Terminal	Power input terminal (1) 2MLR-AC12, 2MLP-AC13: AC110V connection (2) 2MLR-AC22, 2MLP-AC23: AC220V connection
6	Terminal cover	Terminal unit protection cover

6. Troubleshooting

The following explains contents, diagnosis and corrective actions for various errors that can occur during system operation.

1. Basic Procedures of Troubleshooting

To improve the reliability of a system, it is important to take a corrective measure promptly if a trouble occurs as well as to use highly reliable devices. To operate a system immediately, it is the most important to quickly detect potential causes of a trouble and take corrective measures. To troubleshoot the system correctly, make sure to take the following cautions and procedures..

(1) Visual checks
Check the following points
(a) Operation status(Stop, Run)
(b) Power On/Off status
(c) I/O device status
(d) Wiring status(I/O wiring, extension and communication cable)
(e) Check the status of each display(POWER LED, RUN/STOP LED, I/O LED and etc), connect to peripherals and check the operation condition and program

(2) Trouble Check
Please observe how a fault changes by executing the followings.
• Move the key switch to STOP and turn it On/Off

(3) Range limitation
Estimate by which factor a fault occurs by the following methods.
(a) Is it from the PLC or external factor?
(b) I/O module or others?
(c) PLC program?

2. Troubleshooting

Refer to ML200IEC CPU User's Manual in order to understand error contents, diagnosis and corrective actions in details.

3. Error Code List

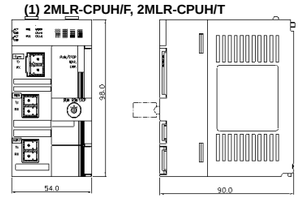
Error code	Cause	Corrective Action (Solution)	Operation status	LED status	Diagnosis timing
02	Data bus error	Contact the service center if it reactively occurs when the power is re-applied.	Defect	All LEDs flicker sequentially	When power is applied
03	Data RAM error	Contact the service center if it reactively occurs when the power is re-applied.	Defect	All LEDs flicker sequentially	When power is applied
04	RTC fault	Contact the service center if it reactively occurs when the power is re-applied.	Defect	ERR: On	When power is applied
06	Program memory error	Contact the service center if it reactively occurs when the power is re-applied.	Defect	ERR: On	When power is applied
10	USB IC error	Contact the service center if it reactively occurs when the power is re-applied.	Defect	ERR: On	When power is applied
11	Backup RAM error	Contact the service center if it reactively occurs when the power is re-applied.	Defect	ERR: On	When power is applied
12	Backup Flash memory error	Contact the service center if it reactively occurs when the power is re-applied.	Defect	ERR: On	When power is applied
13	Base information error	Contact the service center if it reactively occurs when the power is re-applied.	STOP	ERR: On	When power is applied, change into the RUN mode
22	Program error of backup flash memory	Correct the memory module program and re-operate the system	Defect	ERR: On	Reset and change into the RUN mode.
23	Abnormal program	1.Re-load program and start it. 2.Replace battery if it gets trouble. 3.Replace CPU module if it gets trouble after the program re-loading.	STOP	ERR: On	Reset and change into the RUN mode.
24	I/O parameter error	1.Re-load I/O parameter and start it. 2.Replace battery if it gets trouble. 3.Replace CPU module if it gets trouble after the I/O parameter re-loading.	STOP	ERR: On	Reset and change into the RUN mode.
25	Basic parameter error	1.Re-load basic parameter and start it. 2.Replace battery if it gets trouble. 3.Replace CPU module if it gets trouble after the basic parameter re-loading.	STOP	ERR: On	Reset and change into the RUN mode.
30	Inconsistency between the specified modules by parameters and the loaded modules	Module type inconsistency error. Check the incorrect slot or parameter by SoftMaster, and correct it and then re-start the system.	STOP (RUN)	ERR: On (PS: On)	Change into the RUN mode.
31	Module dismounting or additional mounting during run	Module mounting/dismounting error. Check the incorrect slot by SoftMaster, and correct it and then re-start the system.	STOP (RUN)	ERR: On (PS: On)	When scan is completed
32	Fuse disconnection of output module during run	Check fuse LED of output module and replace the module.	STOP (RUN)	ERR: On (PS: On)	When scan is completed
33	Abnormal I/O module data access during run	I/O module read/write error. Check the incorrect slot by SoftMaster, and replace the module and then re-start the system.	STOP (RUN)	ERR: On (PS: On)	When scan is completed
34	Abnormal special/ link module data access during run	Special/ link module interface error. Check the incorrect slot by SoftMaster, and replace the module and then re-start the system.	STOP (RUN)	ERR: On (PS: On)	When scan is completed
39	Abnormal PLC CPU completion or fault	Contact the service center if it reactively occurs when the power is re-applied.	STOP	RUN: On ERR: On	Always
40	During run, Scan time over than the scan delay time specified by parameters	Check the scan delay time specified by parameters and correct the parameters or the program, and then re-start the system.	STOP	RUN: On ERR: On	During execution of program
41	Operating error in the user program	Correct the operating error and re-load the program and then restart the system. -STOP: Check the details of the operating error using SoftMaster and correct the program. -RUN: Check the error step in F area.	STOP	RUN: On ERR: On	During execution of program
42	Stack overflow during execution of program	Re-start the system.	STOP	RUN: On ERR: On	During execution of program
44	Timer index error	Correct timer index program and re-load program and then re-start the system.	STOP (RUN)	RUN: On ERR: On	When scan is completed
50	External device fatal error	Refer to the external device fatal error flag and correct the fault devices and then re-start the system.	STOP (RUN)	ERR: On (PS: On)	When scan is completed
60	The 'E-STOP' function has been executed	Correct the program so that the error elements that invoked the 'E_STOP' function can be eliminated in the program and re-start the system	STOP	RUN: On ERR: On	During execution of program
500	Data memory backup error	If the battery has no error, re-apply the power. It is changed to STOP mode in the remote mode.	STOP	ERR: On	Reset
501	RTC data error	If the battery has no error, re-set the time using SoftMaster	-	CHK: On	Always
502	Lower battery voltage	Replace the battery when the power is applied	-	BAT: On	Always

7. Dimension (mm)

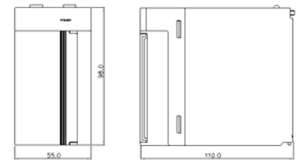
1. CPU and Power Supply Module

(Unit: mm)

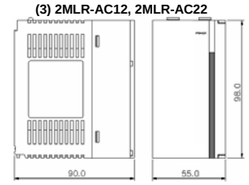
(1) 2MLR-CPUH/F, 2MLR-CPUH/T



(2) 2MLR-AC13, 2MLR-AC23

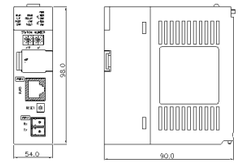


(3) 2MLR-AC12, 2MLR-AC22



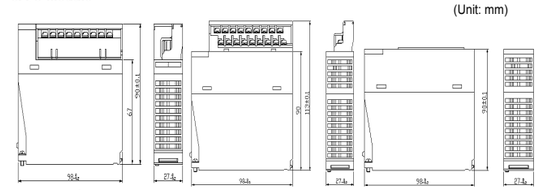
2. Extension Drive Module

(Unit: mm)



3. I/O Module

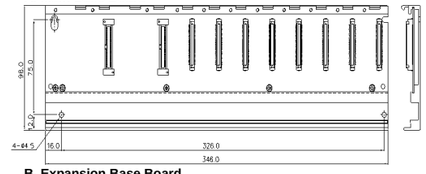
(Unit: mm)



4. Base Units

(Unit: mm)

A. Main Base Board



B. Expansion Base Board