# Part 5 Air Conditioning Control System

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## **1. System Features**

A variety of system expansions is possible by the controller's combination use in addition to individual use of each centralized controller.

"Super-link control system" is an advanced, high-speed transfer method of which Mitsubishi Heavy Industry boasts. It is a network that can connect at most 48 air-conditioning equipments including indoor units and total heat exchanger units etc.

It is a centralized control system that can flexibly meet the needs of managing building with different usage from a large-scale building to a small and medium-sized scale building over the wide range. The controllers for achieving a fine operation and management and the equipment group for management system are abundantly prepared.

The interface equipments that expand the communication function including the charge management and the air conditioner checker are also enhanced. Moreover, because the super-link adopts two lines type with no polarity, the construction cost and the area of the wiring shaft can be reduced greatly. It takes pride in the labor saving and the construction saving of the industry-leading class as it can easily access the building managing computer.

## **Fuzzy control**

1. Response speed and stability are enhanced.

The system automatically controls changes of return air temperature, set temperature and room temperature according to the fuzzy control.

The system response speed, can keep room temperature constant, and can adjust room temperature to set temperature quickly.

2. Elimination of temperature irregularity as the time of operation ON/OF control

The system finely controls the compressor to room temperature according to the temperature sensor, air conditions room temperature consistently and improves cooling or heating feeling in each room(or minimize influence of shutdown in other room)



## "Super Link Network" Control System

1. Non-polarity twin wires allow a maximum of 48 indoor units to constitute one network.

Up to 48 indoor units can be connected to form a network by setting the address number of the indoor and outdoor units.

Only two lines are required for wiring both inside and outside, and the conventional six or eight wires are abolished, which fully satisfies the air-conditioning requirements of the new intelligent rooms, and also dramatically cuts both installation costs and wiring shaft area.

 Network control system can directly act on multi combination KX2 packaged air-conditioners. Multi combination KX packaged air-conditioners and an optional controller can be used to constitute the network and establish the system. This can be done only using one non-polarity twin signal wire for connection.



## Air Conditioning Control System (SUPERLINK Control System)



Computer for Building management

			Remote Equip	ment	Adjacent Equip	ment
	Control Method	Control Content	Name·Model	Number of Units	Description·Model	Number of Units
Standard Controller	Outdoor Unit Remote Controller	<ul> <li>Various controls for the indoor unit. Indoor remote controller or wireless remote controller.</li> <li>The cooling and heating modes of the outdoor unit are dependent on the press-first priority. The system will automatically enter into the "fan" operation upon start-up if first priority operation has already been in operating status in advance.</li> </ul>		_	Standard Remote Controller RC-D2-E	1 for each
ntroller	Outdoor Unit Remote Controller	A new standard remote controller can control up to 16 indoor units (group operation).	_	_	Standard Remote Controller RC-D2-E	1 for each group
Control by Remote Cor	Outdoor Unit B B Remote Controller	One indoor unit (1 group) can be connected up to 4 new standard remote controllers (press-last priority). Note: up to four wireless remote controllers are also included. (Resetting of automatic elevating cleaner dust filter and anomaly resetting are impossible )	_	_	Standard Remote Controller RC-D2-E	Max. 2 for each group

3. Building a diversified control system meeting the diversified air-conditioning demands of large buildings

			Remote Equip	ment	Adjacent Equip	ment
	Control Method	Control Content	Name·Model	Number of Units	Description·Model	Number of Units
	Outdoor Unit Indoor Unit Remote Controller	<ul> <li>ON/OFF of up to 16 indoor units can be individually or simultaneously controlled with one SLA-1-E central controller. (But to be used together with the new standard remote controller)</li> </ul>	■ Central Controller SLA-1-E	Max. 6 units for each network	Standard Remote Controller RC-D2-E	1 for each
Central Controller	Outdoor Unit	ON/OFF of up to 48 indoor units can be individually or simultaneously controlled with six SLA-1-E central controllers in one network. (But to be used together with the new standard remote controller)	■ Central Controller SLA-1-E	Max. 6 units for each network	Standard Remote Controller RC-D2-E	1 for each

			Remote Equip	ment	Adjacent Equip	ment
	Control Method	Control Content	Description·Model	Number of Units	Description·Model	Number of Units
	Outdoor Unit	The external timer function can be connected to the central controller SLA-1-E. Indoor units to be controlled all run according to the timer.	Central Controller SLA-1-E	Up to 6 for each network	New Standard Remote Controller RC-D2-E	1 for each
Central Controller	SLA-2AFE	<ul> <li>ON/OFF, temperature setting and fan speed setting of up to 48 indoor units can be controlled individually or by group with one central controller SLA-2A-E. Group setting function can handle up to 16 groups.</li> <li>Note 1: A part of or all new standard remote controllers can be omitted.</li> <li>The pre-set programs for every 16 groups can be run through combination of SLA-2A-E and the weekly timer.</li> </ul>	Central Controller SLA-1-E SLA-2A-E can decide "prohibited/ allowed" of the remote control through external input.	Up to 3 for each network	New Standard Remote Controller RC-D2-E	1 for each or none
	SLA-1-E SLA-1-E SLA-1-E SLA-1-E SLA-1-E SLA-2-E	<ul> <li>Up to three SLA- 2A-E can be connected in one network (with maximum 48 indoor units).</li> <li>Mixing with SLA-1- E is also allowed.</li> <li>Therefore, when using SLA-2A-E to perform the centralized On/Off management for all the floors, SLA-1-E is also applicable.</li> <li>Note 1: The number of units that can be mixed in one network is indicated in the following table.</li> <li>SLA-1-E 0 1 2 3 SLA-2A-E 3 2 2 1</li> </ul>	■ Central Controller SLA-2A-E	Up to 3 for each network	New Standard Remote Controller RC-D2-E	1 for each or none

Air Conditioning Control System

			Remote Equip	ment	Adjacent Equip	ment
	Control Method	Control Content	Description·Model	Number of Units	Description·Model	Number of Units
l Controller	Remote Board () Remote Remote Controller Controller Please use it when the operating output is a continuous contact output. Remote Board () Remote Board () Remote Remote Board () Remote Board () Remote Board () Remote Board () Remote Board () Remote Remote Board () Remote Board (_) Remote Board (_) Remote Board (_) Remote Board (_) Remote Board (_) Re	The ON,OFF and abnormality of air- conditioner can be monitored by the signal from the central board.	<ul> <li>For level input SC-RCK12 (For DC12V) SC-RCK24 (For DC24V) SC-RCK100 (For DA100V) SC-RCK12R SC-RCK24R SC-RCK24R SC-RCK24Y, P</li> </ul>	1	Remote Controller RC-D2-E	1
Centra	F Group E Group C Group B Group A Group S Grou	<ul> <li>Each group is controlled separately for 144 groups or less set arbitrarily with central console SLA-3-E.</li> <li>Note 1: Only one central console SLA-3-E can be connected to the super- link.</li> <li>Note 2: A portion or all of the remote controllers can be omitted.</li> </ul>	■ Central Controller SLA-3-E	1	Remote Controller RC-D2-E	1 for each or none

- 1-1 Applicable to individual or centralized On/Off control for up to 16 air-conditioners. Center console SLA-1-E
  - ALLI ALO

#### Combination

Туре	Combination	Remarks
Standard Remote Controller	Customized	-
Commercial Timer	O.K.	Package controlled On/Off only
Weekly Timer (SCA-WT-E)	O.K.	-
SLA-2A-E	O.K.	See the description on SLA-2A-E mentioned below

This central controller can perform individual or centralized On/Off and check control for up to 16 indoor units.

• 16 operation switches are used to control up to sixteen (16) indoor units, greatly enhancing the operability.

#### Operation condition confirmation function is available in each individual standard air-conditioner.

• The serial number of the air-conditioner in operation is displayed by a LED display composed of 16 LEDs with green light indicating the operating status, red light indicating check (fault) and no light indicating Off or disconnected status, thus indicating clearly the status of each air-conditioner.

#### Applicable to installation at each floor

#### Design of power failure compensation function

• The power failure compensation function is provided as one of the standard features. In case of a power failure during the operation, the operation can be resumed after restoration using the information stored in the memory.

#### Compact and rigid design without space occupancy

• A rigid and compact design of 120mm (4.72 in.) L by 120mm (4.72 in.) W by 15mm (0.6in.) H.

#### Simplified wiring installation work by advantage of the simple system

 Connecting the central controller to the Super Link Network can be accomplished directly by only connecting the non-polarity twin signal wire, which simplifies the wiring installation work and reduces the work hours.

1-2 ■ Up to 48 indoor units (1 to 16 groups) can be controlled simultaneously.

Center console SLA-2A-E



### Combination of SLA-1-E and SLA-2A-E

	SLA-1-E	SLA-2A-E
Case 1	6 Units	0
Case 2	0	3 Units
Case 3	3 Units	1 Units
Case 4	2 Units	1 Units

The interface is unnecessary in the connection with a weekly timer. Remote control disable and enable function is equipped with it.

#### Combination with SLA-2A-E

	Combination	Remarks				
New Standard Remote	Individual or					
Controller	Plural	Possibly without connection				
Controller	Connection					
SLA-1-E	O.K.	—				
SLA-2A-E	O.K.	—				
Weekly Timer (SCA-WT-E)	O.K.	—				
Commercial Timer	O.K.	—				
External Input	О.К.	By connecting the non-voltage contact "a", emergency stop, customized control and "allowed / prohibited" of operation can be performed.				

#### Effective thin and compact design

- 16 operation switches are used to provide the group control for up to 16 groups (48 units), greatly improving the operability.
- A large, easy-to-read LED display is adopted. The operation condition and contents of setting can be confirmed easily.
- The central controller can be connected at anywhere with the Super Link Network.

#### Free individual control by new standard remote control is possible.

- In addition to the individual and centralized control, the individual control from the new standard remote control is possible by setting the central controller and remote controller.
- The new standard remote controller can be eliminated.

#### The SLA-1-E makes ON/OFF control of one air-conditioner possible at each floor

 In case that the central controller SLA-2A-E is set individual or for each floor, connecting the SLA-1-E makes the ON/OFF control of individual / each floor possible for the SLA-1-E.

#### **Expansion of Network Control**

- Free connection is possible from 1 to 48 units per one group and up to 16 groups (totally 48 air-conditioners for the whole group) even though the addresses are not consecutive.
- Up to three SLA-2A-E can be connected in one Super Link Network.
- The Super Link can stop / start and monitor the air-conditioner individually, in package or by group, and it also can control the operation mode and temperature setting. Therefore, the Super Link creates an advanced air-conditioning control system.

## Customized control and emergency stop control

- For customized control, the external signal can be used.
- Free emergency stop control.

#### Power failure compensation (Power black out restart)

• The power failure compensation function is provided as one standard feature. In case of a power failure during the operation, the operation is resumed after restoration using the information stored in the memory.

#### Same operation for same program

• By connecting an optional weekly timer, one group of the program can operate up to 16 groups of the airconditioner.

### A simple system simplifies wiring work.

• Wiring work is greatly reduced with a simple system of two no polarity wire type.

## Connection with the weekly timer without interface

Interface used to be necessary, but now it is unnecessary.
 The weekly timer can be easily connected. Only the SLA-2A-E is equipped with the same function as that of the old SL-2.

### Central lock function is equipped.

- Disconnecting the jumper wire (J1) of SLA-2A-E, the customized function is converted into the central lock function.
- When the non-voltage contact input is added to the customized input contact of the SLA-2A-E from commercial timer, the customized status device set in the SLA-2A-E is converted into the central mode.
- In the central lock status, the central / remote changeover switch becomes invalid.



1-3 ■ It corresponds to 144 individual, concentrated operating and stop at most. Center console SLA-3-E



It is equipped with the large-scale color liquid crystal and the touch panel type, so it is easy to operate. It is three super-link systems and can connect with 144 indoor units at most.

It is possible to control.

The energy consumption calculation function has been enhanced (SLB-3-E).

• Abundant pulse input points (eight points).

- The external access of data per minute for the energy consumption calculation is possible (by way of media).
- The data per minute can be selected from three techniques (operating time, refrigerant flow rate and thermostat ON ).
- (Note) The energy consumption calculated by this unit does not conform to DIML, and there are no guarantees concerning the results of the calculations.

Enhancement of schedule function.

The number of operation that can be set during a day has been increased greatly: 16 operations

The Enable and Disable setting according to the mode are possible, and power for the management needs has been enhanced.

#### System Drawing



(a contact with no voltage, 8 points)

1-4 ■ Each system can control up to 48 indoor units. Weekly Timer (SCA-WT-E)



## Function List

- Monitor mode
- Display of current day of the week, time, and program status.
- Time setting
- Setting of current day of the week and time.
- · Timer setting
  - Setting of the timer program
- Holiday setting Setting of week and day for holidays

SW9 = Control changeover switch (SW9-1 and SW-2)

SW9-1	OFF	ON / OFF in package
SW9-1	ON	By using together with the SLA-2A-E, reservation and group setting for each group can be performed at the SLA-2A-E end.

#### The program of daily and weekly is possible by an easy operation

- The operating reservation of one week is possible.
- The ON-OFF time of three times a day can be set in minute as unit. The OFF forgetting can be prevented by setting only OFF.
- The operating reservation can be canceled temporarily by setting a day of the week when the operating reservation has been done as holiday.
- The program operating time of that day when operating reservation is done, time and a day of the week now is displayed in the graph of 24 hours.

#### Daily/weekly program can be set by the standard operation.

- Work reservation for one week can be set.
- The start/stop time can be set three times a day with minute as the smallest unit. Setting of stop (OFF) only prevents forgetting to set the stop time.
- Setting the work reservation day of the week to the holiday setting makes it possible to temporarily cancel a work reservation.
- The current time, day of the week, and a 24-hour time graph for the program operation in the day can be displayed.

#### Using together with the SLA-2A-E makes it possible to set a schedule for each group.

• One weekly timer can control up to 48 indoor units in one system. And furthermore, by combination with SLA-2A-E, the reservation plan can be set for each group (up to 16 groups).

#### Example of combined system connecting with SLA-2A-E

It is necessary to use together with SLA-2A-E for the group start/stop by the weekly timer. The allowable number
of the unit connectable with SLA-2A-E is only one per one system and connection exceeding this number is not
allowed.

#### Power failure compensation function is equipped.

- When power fails or when power is off, the work condition set by the weekly timer is stored. After the power is restored, the monitor mode is displayed according to the restoration time.
- Use the timer setting mode under the restoration status, switch the control changeover switch (SW9-2) to ON after the power failure is eliminated, and an operation (stop) command is released.
  When the timer setting mode (shown in the graph below) is ①, a stop command is transmitted because the system is in the stop mode at power restoration. When it is ②, an operation command is transmitted because the system is in the operation mode at power restoration. Pay attention that the control changeover switch is set to OFF at delivery from the factory, therefore no operation (stop) command is released after power is restored.
- Switch the control changeover switch (SW9) according to whether SLA-2A-E is used together or power is restored.



## 1-5 ■ By using WEB browser, monitor and control up to 96 units of various models for EHP, GHP and shop

Multi Thread Technology

SUPERLINK<sup>®</sup> WEB Gateway SC-WGW-A



<WEB Gateway> Make to order MHI Model SC-WGW-A Dimensions / height 200 × width 260 × depth 79mm

Can independently set functions such as ON & OFF / Operation mode, Set Temperature, Remote Controller Operation Prohibition, etc.

The "Multi Thread Technology" that conducts parallel processing of transmitted and received various data with "Thread" as the program unit, after connecting the two SUPERLINK<sup>®</sup> communication ports for the packaged air conditioner control network of our company.

## Highly Reliable Performance without Hard Disk

Adopt Lowpower Embedded CPU without cooling fan, Compact Flash ROM as without hard disk, to ensure free and highly reliable performance of the rotating parts while ensuring high-speed CPU and large-capacity memory.

#### **Safety Measures**

Can restrict accessing computers through IP address filtering, and can ensure the security of Class 3 user authentication.

uth huilding	Fast hule	tino	West huilding	North hule	ino.
-con Control	Schedule Contr	ol System St	op/Release	Configuration Menu	
PERLINK WEB GA	TEWAY	Over View	Monitor Scree	n	
Room 01	Room 02	Room 03	Room 04	Room 05	Room 06
Room 07	Room 08	Room 09	E Room 10	EROOT 11	Room 12
Room 13	Room 14	Room 15	Room 16	Room 17	Room 18
Room 19	Room 20	AN Room 21	Room 22	Room 23	Room 24
Room 25	C Room 26	Coom 27	Room 28	Room 29	Room 30
88 Room 31	Room 32	Room 33	Room 34	Room 35	Room 36
Room 37	Room 38	Room 39	Room 40	Room 41	Room 42
Room 43	Room 44	AN Room 45	A Room 46	AN Room 47	A Room 48
Room 01	Room 02	Room 03	C Room 04	Room 05	Room 06
Room 07	Room 08	Room 09	Room 10	Room 11	Room 12
Room 13	Room 14	Room 15	Room 16	Room 17	Room 18
Room 19	Room 20	A Room 21	A Room 22	A Room 23	A Room 24
Q Room 25	C Room 26	Room 27	C Room 28	Room 29	Room 30
Room 31	Room 32	Room 33	Room 34	Room 35	Room 36
Room 37	Room 38	Room 39	Room 40	Room 41	Room 42
Boom 42	Room 44	A Room 45	A Room 46	A Room 47	A Room 48

South building	ast building		West building		North builds	10	
Over View Monitor Control C	Command	System Stop/R	elease	Configurati	on Menu		
SUPERLINK WEB GATEWAY		Schedul	e Control			A MITSU	BISH
Mar 5 2004	Time	On/Off	Mode	Fan Speed	Set Point	Remocon Loci	ĸ
101.0, 2004	07 : 50	On 💌	Heat 💌	Me 💌	25 💌	Unlock 💌	
Air-con Name: Room 01 •	12 05	Off 💌					
schedule Date: Mar.5 •	12 : 55	On 💌			24 💌		
Undo	18 : 00	Off 💌					
Set							
			-		-		
					-	-	
			-	-	-	-	
This schedule will be copied to			-	-	-	<u> </u>	
Destination		<u> </u>	-	-	-	-	
Alr-con Name.					-	-	
schedule Date:			-	-	-	-	
Сору		_	-	-	-	-	
			-	-	1	-	
			-		-		
			-	-	-	-	
		-	-	-	-	-	

South huiding	Fast h	idina		West huilding		Net	h huilding	
Over View Monitor Cr	ontrol Commr	and Sc	hedule Contro	I Sy	stem Stop/Re	lease	Configura	ation Menu
SUPERLINK WEB GATEWAY		Ca	alendar C	onfigurat	tion		*	MITSUBIS
	Sun	Mon	Tue	Wed	Thu	Fri	Sat	
Select Month: Mar, 2004 🔹		1	2	3	4	5	6	Manlada
Undo		Spe Day 1 💌	Spe Day 1 💌	Spe Day 1 💌	Weekday 💌	Weekday 💌	Holiday 💌	HEEKUA
Set	7	8	9	10	11	12	13	and the second second
	Holiday	• Weekday •	Weekday 💌	Weekday 💌	Weekday 💌	Weekday 💌	Holiday 💌	monday
	14	15	16	17	18	19	20	Special
	Holiday	🔹 Weekday 💌	Weekday 💌	Weekday 💌	Weekday 💌	Weekday 💌	Holiday 💌	Day 1
	21	22	23	24	25	26	27	Special
	Holiday	• Weekday •	Weekday 💌	Weekday 💌	Weekday 💌	Weekday 💌	Holiday 💌	Day 2
	28	29	30	31				
	Holiday	• Weekday •	Weekday 💌	Weekday 💌				

Excluding engineering service cost

## 1-6 ■ Centralized control of packaged air conditioner with LONWORKS <sup>®</sup>

## Centralized control of packaged air conditioner with open network LONWORKS®

Interface equipment SC-LIF-E



Make to order (3 months) MHI product No. SC-LIF-E \*excluding technology fee

•SC-LIF-E is a device that converts the communication data of LONWORKS® into communication data of SUPERLINK. The basic operation and status monitoring that can be done with the remote controller of the packaged air conditioner can be done from the upper-stream units connected to LONWORKS®

•Up to 16 indoor units can be connected.

Control the Operation / Stop (On & Off) of each

Conduct setting of the operation mode (auto,

Determine the set temperature of indoor unit

4 Remote controller operation prohibition

Reset the filter sign of each indoor unit 6 System forced stop setting

Set value is set in the unit of 1°C. The scope is

Implement the setting of control room operation

The function of uniform permit / prohibit of remote

Immediately stop the indoor unit under control.

and prohibit operation from the remote controller.

cooling, air supply, heating) of each indoor unit.

•There are 3 installation methods available for selection. Depending on the conditions of installation space, selection can be made from 3 methods, i.e. 1) vertical installation, 2) horizontal installation and 3) flush installation.

#### I ist of functions [Control functions]

2 Operation mode setting

3 Temperature setting

1 On & Off command

indoor unit

18 ~ 30°C.

permit / prohibit.

5 Filter sign reset

controller functions

#### [Monitor functions]

- 1 On & Off status notice Inform the operation / stop status of each indoor unit.
- 2 Operation mode status notice Inform the setting of operation mode of each indoor
- unit 3 Temperature setting notice
- Inform the temperature setting of indoor unit
- 4 Filter sign notice
- Inform the filter sign that urges the cleaning of air suction filter of indoor unit.
- 5 Failure notice
- Inform with / without failure of indoor unit. 6 Room temperature notice
- Inform the temperature of air suction sensor of indoor unit (room temperature).
- 7 Temperature control status notice Inform whether there is refrigerant flowing through the indoor unit.
- 8 Indoor unit communication status notice Inform whether this interface equipment can communicate with each indoor unit

LONWORKS® is the communication network system developed by Echelon Corporation

It has gradually become the international standard

of building management system LON is the abbreviation of Local Operation Network

(LONWORKS® is the registered trademark of Echelon Corporation.)

## Interface equipment SC-LGW-A

Make to order (3 months) MHI product No. SC-LGW-A \*excluding technology fee

•SC-LGW-A is a device that converts the communication data of LonWorks® into communication data of SUPERLINK. The basic operation and status monitoring that can be done with the remote controller of the packaged air conditioner can be done from the upper-stream units connected to LONWORKS®.

•Up to 64 indoor units can be connected.

•There are 3 installation methods available for selection. Depending on the conditions of installation space, selection can be made from 3 methods, i.e. 1) vertical installation. 2) horizontal installation and 3) flush installation.

#### List of functions

- [Control functions]
- 1 On & Off command
- Control the Operation / Stop (On & Off) of each indoor unit
- 2 Operation mode setting Conduct setting of the operation mode (auto, cooling, air supply, heating) of each indoor unit.
- 3 Temperature setting Determine the set temperature of indoor unit Set value is set in the unit of 1°C. The scope is
- 18 ~ 30°C. 4 Remote controller operation prohibition Implement the setting of control room operation permit / prohibit.
- The function of uniform permit / prohibit of remote controller functions
- 5 Filter sign reset
- Reset the filter sign of each indoor unit. 6 System forced stop setting
- Immediately stop the indoor unit under control, and prohibit operation from the remote controller.
- 7 Fan speed command
- Send fanspeed select command (Hi, Me, Lo) to an indoor unit

#### [Monitor functions]

- 1 On & Off status notice Inform the operation / stop status of each indoor unit.
- 2 Operation mode status notice Inform the setting of operation mode of each indoor unit.
- 3 Temperature setting notice
- Inform the temperature setting of indoor unit.
- 4 Filter sign notice Inform the filter sign that urges the cleaning of air
- suction filter of indoor unit. 5 Failure notice
- Inform with / without failure of indoor unit.
- 6 Room temperature notice Inform the temperature of air suction sensor of indoor
  - unit (room temperature).
- 7 Fan speed status
- Monitor Fan speed select status of indoor unit. 8 Monitor All air-conditioner forced off status.

- Excluding engineering service cost
- To apply SC-LIF-E, SC-LGW-A and if consulting is needed, please contact to MHI and BMS manufacturer.

## 1-7 ■ Centralized control of packaged air conditioner with BACnet

## Centralized control of packaged air conditioner with open network BACnet

Interface equipment SC-BGW-A



Make to order (3 months) MHI product No. SC-BGW-A \*excluding technology fee

•SC-LIF-A is a device that converts the communication data of **BACnet** into communication data of SUPERLINK. The basic operation and status monitoring that can be done with the remote controller of the packaged air conditioner can be done from the upper-stream units connected to **BACnet**.

•Up to 16 indoor units can be connected.

•There are 3 installation methods available for selection. Depending on the conditions of installation space, selection can be made from 3 methods, i.e. 1) vertical installation, 2) horizontal installation and 3) flush installation.

#### List of functions

- [Control functions]
- 1 On & Off command Control the Operation / Stop (On & Off) of each indoor unit
- 2 Operation mode setting Conduct setting of the operation mode (auto,
- cooling, air supply, heating) of each indoor unit. 3 Temperature setting
- Determine the set temperature of indoor unit Set value is set in the unit of 1°C. The scope is 18 ~ 30°C.
- 4 Remote controller operation prohibition
- Implement the setting of control room operation permit / prohibit. The function of uniform permit / prohibit of remote
- controller functions 5 Filter sign reset
- Reset the filter sign of each indoor unit
- 6 System forced stop setting Immediately stop the indoor unit under control.
- and prohibit operation from the remote controller.

#### [Monitor functions]

- 1 On & Off status notice Inform the operation / stop status of each indoor unit
- 2 Operation mode status notice Inform the setting of operation mode of each indoor
- unit.
- 3 Temperature setting notice Inform the temperature setting of indoor unit.
- 4 Filter sign notice
- Inform the filter sign that urges the cleaning of air suction filter of indoor unit.
- 5 Failure notice
- Inform with / without failure of indoor unit. 6 Room temperature notice
- Inform the temperature of air return sensor of indoor unit (room temperature). 7 Temperature control status notice
- Inform whether there is refrigerant flowing through the indoor unit.
- 8 Indoor unit communication status notice Inform whether this interface equipment can communicate with each indoor unit

## It supports BACnet / IP for BACnet, utilizing the IP network technology.

BACnet I / P standard 1995 version is applied. BACnet (Building Automation Control Nerwork) is the standard prorocol establisehd by ASHRAE in 1995.

## System Structure Example



- Excluding engineering service cost and software development cost
- To apply SC-BGW-A, and if consulting is needed, please contact to MHI and BMS manufacturer.

## 2. Central controller Overview

## List of Functions

Description		Central controller SI A-1-F	Central controller SI A-2A-F	Central controller SLA-3-F
Mod	el	SC-SLA1-E	SC-SLA2-E	SC-SLA3-E
Indiv	idual Control (Number of Packaged Air	10	40	144
Con	ditioners)	16	48	144
Grou	p Control (Number of Groups)	_	16	144
	Start / stop (centralized, group, individual)	0	0	0
	Program Control	-	-	0
	Group Setting	-	0	0
	Operation Mode (cooling, drying, heating, air supply, automatic)	-	0	0
0	Priority Indication (central control, remote control)	-	_	0
ontro	Room Temperature Setting	-	0	0
ŏ	Air Flow Changeover	-	0	0
	Emergency Stop (intelocked control in case of fire accidents)	_	0	0
	Power Failure Restoration Control	0	0	O <sup>(1)</sup>
	Demand Control	_	0	0
	Filter Sign Reset	_	0	0
	Check Sign Reset	0	0	0
	Weekly Operation Setting (group, individual, weekday)	-	_	0
ram	Yearly Operation Program	_	_	0
rog	Change of Current Day Operation Program	-	-	0
ፈ	Operation Program for One Day	-	-	0
	Special Date Setting	-	-	0
	Operation Status (operation, stop)	0	0	0
	Priority Indication (central control, remote control)	_	0	0
D	Operation Mode (cooling, drying, heating, air supply, automatic)	-	0	0
orin	Air flow (High, Medium, Low)	_	0	0
onito	Set Temperature	-	0	0
Ĕ	Automatic Swing (ON, OFF)	_	0	0
	Room Temperature Display	_	0	0
	Filter Sign	-	0	0
	Check Signal (Error, Alarm)	0	0	0
	Operation Time Accumulation	_	_	_
Calculation	Power Consumption Calculation	-	-	O <sup>(2)</sup>
	Error Record	_	-	0
ord	Operation Time Record	_	_	_
Rec	Calculation of Power Consumption	_	_	O <sup>(2)</sup>
	Air-conditioning Expense	_	-	-
	Reference Page	P. 505	P. 510	P. 515

Notes (1) The group setting and the schedule setting are maintained, and the operating status is not maintained.

(2) It is possible to meet needs with SLB-3-E.

# 3. System Overview

## 3.1 Specifications

Description			Central controller SLA-1-E	Central controller SLA-2A-E			
	MHI Model			SC-SLA1-E	SC-SLA2A-E		
	Power	source			Single phas	e 220V 50Hz	
	External dimension (H × W × D) mm			$120 \times 120 \times 15$	120 × 180 × 16		
			rce	100 ×	85× 50		
	Produc	t weight	t	kg	0.64	0.96	
	Power	consum	ption	VA	5	6	
0	Display	yed com	ponent		LED (Check)	LCD display, red LED (Check, filter sign)	
hine	Operat	tion swit	ch		Function key: 18	Function key: 31	
Macl		Numbe combir	er of connec nation units	ted	Up to 16 units	Up to 48 units	
	output	Externa input	al operation		1 point, non-v	oltage contact a	
	it and	Emerg capabi	ency stop lity		-	1 point, non-voltage contact a	
	ndu	Weekly	/ timer input	t	-	1 SCA-WT-E	
	_	Operation output			-	1 Point, DC5V 30mA (Max)	
	Anomaly		aly output		-	1 Point, DC5V 30mA (Max)	
ment	Surrounding temperature and humidity		and	$0{\sim}40^{\circ}$ C, less than 75% (dew condensation not allowed)			
ron	Wiring specifications Power source Signal wire Power cord		rce	0.75mm <sup>2</sup>	(butt joint)		
NUS			9	0.75mm <sup>2</sup> ~2mm <sup>2</sup> , with a length within 1000m (connecting the terminal bloc			
on e			d	Main Body~power source kit equipped with 4m wiring connection			
Installati	Applicable models			All models			
	Individ	ual start	/ stop		ON/OFF cont	rol for each unit	
	Group start / stop			-	ON/OFF control for each group		
	Simultaneous start / stop			Simultaneous ON/OFF control for all air-conditioners (sequentially start one unit every one second)			
	Check reset		-		Check signal reset for each unit		
Introl	Filter sign			-	The filter sign can be reset to Individual/Group/Simultaneous.		
ŏ	Emerg	Emergency stop			-	Switch off all units upon signal reception.	
	Timer	operatio	n		Automatic start/stop by program tim	er and manual start/stop by switches.	
	Power control	failure r	estoration		At Stop Status after Power Failure (Record Setting Status)	Restart after power restoration (Memory setting status)	
	Demand operation			_	The thermostats of the designated units must be kept OFF upon signal reception.		

	Logon monitoring	-	Air-conditioner No. is displayed using sequential numbers from 0 to 47.
	Operation monitoring	LED display of the operation status of each unit.	LCD displays the operation status of each unit.
	Abnormality monitoring	Red LED displays each abnormal machine.	LCD displays the error codes of each abnormal machine with the check LED light ON.
itoring	Operation mode monitoring	_	LCD displays cooling, heating, air supply, drying, and automatic.
Mon	Room temperature monitoring	_	LCD displays the air suction temperature of each unit.
			13,13~35,35
	Operation status monitoring –		LCD flashes to display the operation mode of unmatch units.
	Filter sign monitoring –		LED flashes to display the filter sign.
	Priority setting monitoring	-	LCD displays remote control/central control/central control and remote control.
	Group setting	-	Individual / Group / Simultaneous
	Group Logon	-	Up to 16 groups can be logged on (free setting).
g	Priority setting –		Remote control, Central control, Central control and remote control
ttin	Function switch	-	Automatic swing ON/OFF
Se	Operation mode setting	-	Cooling, Heating, Air supply, Drying, Automatic.
	Air flow setting	-	High, Medium, Low
	Timer setting	External operation	input Valid / Invalid
	Room temperature setting	_	Every 1°C from 18 to 30°C

Note (1) (For air-conditioners connected with (SC-SIF BIF GIF) interfaces, attention should be paid to the following points:

(1) Check Reset: Please perform this setting individually on each air-conditioner. (This setting is not possible on the system side.)

(2) Operation Mode Monitoring: The display mode has nothing to do with the the actual operation mode.

③ Room Temperature Monitoring: The room temperature displayed is normally below 13°C (13 for SLA-2A-E).

(4) Filter sign monitoring: Signal on the air-conditioner side is not displayed.

(5) Priority setting: Invalid. (Operation on the standard remote controller side cannot be prohibited.)

(6) Operation mode setting: Invalid. (Operation in the mode on the standard remote controller side.)

1 Air rate setting: Invalid. (Operation in the mode on the standard remote controller side.)

(8) Room temperature setting: Invalid. (Operation in the mode on the standard remote controller side.)

Note (2) In case of any abnormality with SLA-2A-E, the mode will be automatically switched to remote control operation (remote control operation mode).

Description		SLA-3-E,SLB-3-E	
Model		SC-SLA3-E, SC-SLB3-E	
Number of units of	controlled	144 units / 144 groups (three super-link systems)	
Power		Single phase 100-240V	
Dimension (heigh	t $\times$ width $\times$ depth)	162mm × 240mm × 40 (+68) mm	
Display device		Color liquid crystal (7 inches wide)	
Operating switch		Touch panel type	
	Name of air-conditioner	SBC case eight characters	
Display	Schedule setting	Calendar display.	
	Help function	With	
	Operating / Stop unit	Group and batch	
	operation mode	Cooling, dehumidification, ventilation, heating (auto)	
	Temperature setting	18°C ~ 30°C (1°C scale)	
	Priority instruction	Remote control operation permission (center & remote) and prohibition (center) (It is possible to set permission or prohibition of Operating/Stop, operation mode and temperature setting)	
Operation setting	Wind speed setting	High, Medium, Low	
	Setting for wind direction	Auto swing (four way setting)	
	Filter reset	Available	
	Emergent stop	All stand center and the stop	
	Demand control	Switch by external demand control input (The demand object is set to each air- conditioner)	
	Monitoring unit	Block, group, and air-conditioner	
Monitoring	Monitoring contents	Operating/stop, fault, abnormality (error code), operation mode, temperature setting, indoor temperature, priority instruction, wind speed setting, setting for wind direction and periodic check (GIP)	
	Operating / stop unit	Group	
	Operating / stop frequency	16 operations / day	
Schedule	Minimum time unit	1 minute	
	Operation item	Permission / prohibition, operation mode, preset temperature operating enable	
	Schedule range	Week, year, that day	
Power blackout re	estart	With	
	Pulse input	8 points	
	Unit of calculation	Each air-conditioner	
Energy	Calculation method	Operating: ON / OFF, thermostat: ON / OFF, refrigerant flow volume	
consumption calculation	Calculation range	Consumption proportional calculation data for energy consumption calculation (The calculation is executed with personal computer *)	
function (SLB-3)	Account time zone	Setting possible	
	Account data readout	USB memory	
	Account data records	Three months	

\*The customer must prepare for the personal computer. Software for the calculation is attached to SLB-3-E.

Model	SC-WGW-A
Dimensions	200 (H) $ imes$ 260 (W) $ imes$ 79 (D) mm
Power Supply	Single phase AC100V ~ 240V (50 / 60Hz)
No. of Controllable Unit	Up to 96 indoor units
Corresponding WEB Browser	Internet Explorer 6.0
Communication	WEB browser side: Ethernet 10 / 100Mbps Air-conditioning equipment side: our company's communication protocol 9.6kbps
Function	Setting: On & Off / Operation mode, temperature setting, air volume, remote control operation Display: On & Off / Operation mode, temperature setting, air volume, room temperature, alarm, error code Schedule / Calendar

	Item	Specification	Remarks
	Dimensions	250 (H) $ imes$ 100 (W) $ imes$ 180 (D)	Excluding the protruding part
	Weight	Approx 2.6kg	
	Finish material	Zinc plate (t1.2)	
Structure	Finish paint	Bright white (Munsell color code approximation 2.5Y8.5 / 1)	
	Installation method	Screw fixing 4 points, fixing with attached installation tool	
	Power voltage	Single phase AC100V - 15% ~ AC200V + 10% (50 / 60Hz)	Main switch and power LED equipped in the front
Power supply	Wiring connection	Terminal block	Terminal block symbol L, N
	Power consumption	Max. 5W	
Ambient	Ambient temperature for application	0°C ~ 40°C	
condition	Ambient humidity for application	85% RH below (no condensing)	
	LonWorks®network		
	Wiring connection	Terminal block	Terminal block symbol 1, 2
	Radio receive- transmit device	FTT-10A	Free topological type (78kbps)
Interface equipment	Maintenance pin	Equipped on the front panel, each branch equipped with 1, totaling 4	Switch LED integrated
	SUPERLINK network	K	
	Wiring connection	Terminal block	Terminal block symbols A, B
	No. of connected units	Up to 16 indoor units	

## 3.2 List of the System Machine Combination

		Standard	Weekly timer	Central controller		
		controller (SCA-WT-E)	SLA-1-E	SLA-2A-E	SLA-3-E	
Standard remote controller		-	0	O <sup>*1</sup>	O*2	O*2
Weekly timer (SCA-WT-E)		×	-	O <sup>*3</sup>	0	х
	SLA-1-E	O *1 *4	O <sup>*3</sup>	_	0 <sup>*4</sup>	×
Central controller	SLA-2A-E	O *2 *4	0	O <sup>*4</sup>	-	O <sup>*5</sup>
Controller	SLA-3-E	O <sup>*2</sup>	×	×	O <sup>*5</sup>	_

## Symbol Description

Symbol O : Combination possible; Symbol  $\times$  : combination not possible; Symbol - : not required (already equipped as a standard part or unnecessary).

Note \*1: Standard remote controller must be used for SLA-1-E.

\*2: Operation is possible even without standard remote controller or mini remote controller. Standard remote controller must be used if the wired automatic elevating panel is used.

- \*3: All the units in the network perform start / stop simultaneously.
- \*4: Maximum 6 SLA-1-E and 3 SLA-2A-E can be used in one network. Please pay attention that the number of units used may change during combination, with details shown in the following table.

Number of	Number of
SLA-1-E	SLA-2A-E
0	3
1	2
2	2
3	1
4	0
5	0
6	0

\*5: The center console SLA-2A-E can be connected 1unit per network.

## 4. Detailed Description of the System Machines **Center Console SLA-1-E**

# 4.1

## **Outside view**



## Applicable models: all models after J series.

[Remarks] The central controller SLA-1-E must be used together with the standard remote controller. Components

Description	MHI Component No.
Center console SLA-1-E	SC-SLA1-E

## System architecture

## **Central Controller Signal Wire**

- Size: 0.75mm<sup>2</sup>~2.0mm<sup>2</sup>
- Allowed extension length: within 1,000m
- Wiring material: standard wires (use shielded wires in case of any interference)
- Recommended signal wires

No.	Description	Symbol
1	Round ethylene rubber insulated flexible cord	VCTF Twin Wire: 0.75mm <sup>2</sup> ~2.0mm <sup>2</sup>
2	Round ethylene rubber insulated flexible cable	VCT Twin Wire: 0.75mm <sup>2</sup> ~2.0mm <sup>2</sup>
3	Insulated ethylene armoured cable for control	CVV Twin Wire: 0.75mm <sup>2</sup> ~2.0mm <sup>2</sup>
4	Shielded Wire	MVVS Twin Wire: 0.75mm <sup>2</sup> ~2.0mm <sup>2</sup>

If No. 4 shielded wire is used, the shielded wire must be grounded on one end. In addition, if the shielded wire is used as signal wire, mistaken connection of DC5V and AC220V can be avoided because it is obviously distinguishable by the wiring style.



## Wiring diagram



## Outside view

• SLA-1-E





## Power source kit





## Installation dimension of central controller SLA-1-E

Unit : mm



- Air Condition Control Svst
- Operation Instructions
   Central controller SLA-1-E can control the individual ON/OFF and simultaneous operation / stop of the indoor units.

It is possible for direct operation through the central controller SLA-1-E instead of the remote controller mode display on the unit site (central controller, remote controller, central controller and remote controller).

- Unit number setting of controlled units
  - The unit number of the units controlled with central controller SLA-1-E is decided by setting the start address and the number of connected units.

## 1. Address Setting

The tens place and the ones place of the initial unit number of the units controlled by central controller SLA-1-E should be set respectively.





## 2. Setting of the Number of Connected Units

The tens place and the ones place of the number of the units controlled by central controller SLA-1-E should be set respectively.



Note: The central controller SLA-1-E can control up to 16 units. Therefore, the maximum number of connectable units is 16.

## System Drawing



#### Example 1: Control of Multiple Central Controllers SLA-1-E

It is necessary to consider using multiple SLA-1-E central controllers and adding the network management function if more than 17 air-conditioners are to be controlled by the central controller SLA-1-E. The maximum number of SLA-1-E usable in one network is 6. If each SLA-1-E is to set the number of the corresponding air-conditioner, the maximum number of controllable indoor units is 48. In this case, setting of the unit number of each unit should be performed by group. In case of any confusion of the unit number setting outside the group, the unit will not be controlled by the SLA-1-E.

## Instructions

- Use of multiple central controllers SLA-1-E.
  - Number of Air-conditioners, networks and SLA-1-E central controllers required

Number of Air-conditioners	Number of Networks	Number of SLA-1-E Used	Remarks	
1~16 (units)	1	1~6		
17~32 (units)	1	2~6	in one network.	
33~48 (units)	1	3~6		

Note (1) Up to 6 central controllers can be connected in one network. Address setting example when 6 (A~F) central controllers are used.

Group	Start Address	Number of Units Connected	Unit Number of the Controlled Units
А	00	05	00~04
В	05	15	05~19
С	20	06	20~25
D	26	08	26~33
E	34	10	34~43
F	44	04	44~47

System Drawing



(2) Repetition of unit numbers is allowed in multiple central controllers. Address setting example when 3 (a-c) central controllers are used.

Group	Address	Number of Units Connected	Unit Number of the Controlled Units
а	00	15	00~14
b	10	15	10~24
С	23	06	23~28

No. 10 to No. 14 units can be controlled by central controller a and b and No. 23 to No. 24 units by b and c. System Drawing



## Example 2: Operation of Timer Controlled by Central Controller

The external timer function can be accessed on the central controller SLA-1-E. By just connecting one timer, it is possible for the timing operation of all controlled units.

Up to 16 indoor units can be controlled by one central controller SLA-1-E in a centralized way.

## Function

For the object units controlled by the central controller SLA-1-E, ON/OFF of the timer and the indoor units can be controlled in chain.

System Drawing



## 4.2 Center Console SLA-2A-E

## **Outside view**



Up to 48 air-conditioners can be controlled by one SLA-2A-E. More than two network systems are required if more than 49 air-conditioners are controlled.

## Applicable models: all models after J series.

Remarks(1) When the external timer function is connected, the function is only valid in the central control or central / remote control mode.

- (2) When the weekly timer is connected, it must not be used together with the external timer.
- (Note) The weekly timer can be connected without interface.
- (3) Up to 3 timers can be connected to the SLA-2A-E in one network.
- (4) For connection of multiple standard remote controllers, please set the central/remote control uniformly.

## Components

Description	MHI Number
Center console SLA-2A-E	SC-SLA2A-E

## System architecture

Signal wire used by the central controller

- Size of cross section: 0.75mm<sup>2</sup>~2.0mm<sup>2</sup>
- Wiring material: standard wires (shielded wires in case of any interference)
- Allowed extension length: within 1,000m.
- Recommended signal wires: see Page 355.



Unit : mm

## Outside view

SLA-2A-E



Power source kit



## Installation dimension of central controller SLA-2A-E







Unit : mm

Note: SLA-2A-E is specially used for embedding installation. If separate setting is required, the distance between the main body and the power source kit should be controlled within 4m.

## Wiring diagram

To the network (the terminal block A, B of the indoor unit or the outdoor unit)



- 1. Example of Weekly Timer
  - When a weekly timer (SCA-WT-E) is connected



2. Example of External Timer Input



#### Scope of connection [connectable freely on the Super Link Network]

- Group Control by Central Controller SLA-2A-E
- The most appropriate group setting is possible through the group setting function. Maximum 48 air-conditioners in 16 groups can be controlled.



## Group Setting

Free group setting is possible on the menu. Up to 16 groups can be set.

Group No.	Air-conditioner Address No.
00	00, 01, 02, 18, 19, 20
01	10, 11, 24, 25, 26
1	
16	07, 08, 44, 45, 46, 47

#### **Operation Monitoring**

The operation status of each group is explicitly displayed on the LED.

Green light On : Operation

Red light On : Abnormality Light off: stop or no group set

Multi-unit Control

Up to 3 SLA-2A-E can be connected in one network. In addition, SLA-2A-E may be used together with central controller SLA-1-E. The number of the both types that may be used together in one network is indicated in the following table.

SLA-1-E	0	1	2	3	4	5	6
SLA-2A-E	3	2	1	1	0	0	0

System Drawing



Group control when multi units are used

Free group setting by each central controller SLA-2A-E is possible when multiple SLA-2A-E central controllers are connected in one network.

#### System Drawing



## **Control switching**

Switching of the following control items is possible by changing the setting of SW32 on the PCB of the central controller SLA-2A-E. Field switching is possible if necessary.

Switch Symbo		Setting	Control Content
	1	ON (At delivery from the factory)	Filter sign Valid
		OFF (Field switching)	Filter sign Invalid
SW32	2	ON (At delivery from the factory)	Power failure compensation Valid
	2	OFF (Field switching)	Power failure compensation Invalid
	3	ON	
		OFF	Preparation
	1	ON	Пераганон
	4	OFF	

Detailed Illustration J1-J3

SM32 (Higher-ON, Lower-OFF)



Jump Wire Function

Jump Wire		Function
Shut		Demand function
JI	Open	Central lock function
21	Shut	Auto mode can be set
JZ	Open	Auto mode can not be set
12	Shut	CENTER / REMOTE setting can be changed
33	Open	CENTER / REMOTE setting cannot be changed

## **Central lock function**

- Disconnecting the jumper wire (J1) of SLA-2A-E, the demand function is converted into the central lock function.
  - When the non-voltage contact input is supplied from the commercially available timer to the demand input contact of SLA-2A-E, the unit that has been set to the demand mode in SLA-2A-E is converted into the "central control" mode. Switching of the operation mode when the display is locked after the contact is released will not return to the operation mode. (Same for temperature)
  - (2) The demand input is also converted into the central control lock when the remote start/stop interface of SLA-2A-E is used.
  - (3) During the central control lock, the central / remote control changeover switch becomes invalid.

Operation SCA-WT-E Stop						
Contact input ON OFF	1 1 1 1 1			//	SLA-2A-E	SCA-WT-E
Indoor unit Stop ——				R	(Non-voltage) Contact input	
Remote control	Allowed	Prohibited	Allowed		commencially available times, etc	
operation		"Central control" in between	-			

## 4.3 Center Console SLA-3-E

(1) Model used all super lynk related models

Name	Model	Remark
Center Console SLA-3-E SLB-3-E	SC-SLA3-E SC-SLB3-E	If the SLA-3-E and SLB-3-E is buried, it must be installed in a separately sold box (SLA3-BX).

( ) 1
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Ite	m Model	SLA-3-E, SLB-3-E <sup>(9)</sup>	
Ambient temperature during use		0 ~ 40 °C	
Po	wer supply	1 Phase 100V/200~240V 50Hz	
Po	wer consumption	23W	
Ex (H	ternal dimensions eight × Width × Depth)	162mm × 240mm × 108mm	
Ne	et weight	2.2kg	
Maximum number of connectable units (Indoor units)		Maximum 48 units/system × 3 systems = 144 units	
LCD touch panel <sup>(4), (5)</sup>		Color LCD, 7 inches wide	
	SL (Super lynk) Signal inputs	3 systems	
ts	Gas, Power pulse input <sup>(2)</sup>	8-point pulse width 100 ms or more	
lnpu	Fire signal input <sup>(2)</sup>	1 point non-voltage a contact input continuous input (closed, forced stop)	
	Demand signal input <sup>(2)</sup>	1 point non-voltage a contact input continuous input (closed, demand control)	
puts	Simultaneous operation output	1 point maximum rated current 40 mA, 24 V During full stop: Open; If even 1 unit is operating, Closed	
Out	Simultaneous error output	1 point maximum rated current 40 mA, 24 V Normal: If even one unit is abnormal, Open <sup>(6)</sup>	
Use with other central control units		(8)	

- Notes (1) Some functions cannot be used depending on the indoor model used. (Refer to page 363)
  - (2) The receiving side power supply is DC 12 V (10 mA).
  - (3) If the energy consumption calculation function is necessary, use the SLB-3-E.
  - (4) The LCD has an endurance of approximately 32,000 hours, depending also upon the backlight OFF time setting.
  - (5) The touch panel has an endurance of approximately 1 million times.
  - (6) In the environment setting screen, it is also possible to change the batch error output setting as open for normal and closed for error.

- (7) The air conditioning charges calculations of this unit are not based on OIML, the international standard.
- (8) The center console SLA-2A-E can be connected 1 unit per system.
  - It cannot be combined with the center console SLA-1-E and SLA-200 series, the CHC-M\* Series, SC-WGW-A,SC-BGW-A or SC-LGW-A.
  - Multiple SLA-3-E and SLB-3-E units cannot be connected on the same network.
- (9) SLB-3-E cost calculation results cannot be guaranteed.

(3) External view



200 mm or greater on bottom

## (4) Embedded in a wall

If it is embedded in a wall, space is needed for the following installation dimensions and the opening. Note (1) If you embed it, the exclusive enclosure (SLA3-BX), sold separately, is required.



• External dimensions of wall embedded box (SLA3-BX) (for heat dissipation)





• External dimensions of spacer for wall embedded box (accessory for SLA3-BX) (for heat dissipation )



**\***\*\*



## (5) Functions

(a) Operation, Settings

Carries out batch operation and settings in group units for up to 144 groups. It is necessary that the groups for which batch operation and settings are carried out be set in advance.

No.	Item	Contents
1	Run/Stop	Starts or stops operation.
2	Mode	Sets COOL, HEAT, DRY, FAN and AUTO operation.
3	Set temperature	Sets the temperature in a range of 18 $^\circ\text{C}$ ~ 30 $^\circ\text{C}$ (in 1 $^\circ\text{C}$ units).
4	Operation permitted/ prohibited <sup>(1)</sup>	Enables or disables manual operation, enables or disables run/stop operations, enables or disables mode setting and enables or disables temperature setting.
5	Fan speeds	Sets Hi, Me or Lo fan speed.
6	Air direction	Sets auto swing ON or OFF and sets positions 1 ~ 4.
7	Filter reset	Resets (turns off) the filter sign.

Note (1) The enable or disable function for each function is enabled in EHP connections with KXE4 or subsequent indoor unit models and in combination with new remote controllers (RC-E1 or subsequent models).

### (b) Status monitor

Status monitoring is carried out in block units (only monitored operating state and breakdown), group units or air conditioner units.

No.	Item	Contents
1	Operating state	Monitors the operating and stopped state of the air conditioner. When 1 or more units is running, it shows operation and when all units are stopped, it shows that operation is stopped.
2	Mode	Displays the operation mode of a representative air conditioner.
3	Set temperature	Displays the set temperature of a representative air conditioner.
4	Room temperature	Displays the return air temperature of a representative air conditioner.
5	Operation enabled	It shows whether manual operation, the run and stop operation, mode setting and temperature setting are enabled or disabled of a representative air conditioner.
6	Fan speeds	Displays the fan speed setting for a representative air conditioner.
7	Air direction	Displays the auto swing ON/OFF setting and position setting for a representative air conditioner.
8	Filter sign	Displays the filter sign if the filter sign for one or more units is lighted up. When the filter sign is off for all units, the monitor's filter sign goes off.
9	Maintenance (Inspections 1, 2 or backup)	Displays the maintenance indicator when the <inspection 1,="" 2="" backup="" or=""> lights up on 1 or more units. When <inspection 1,="" 2="" backup="" or=""> is off on all units, the maintenance indicator goes off. Three are 3 types of inspection, 1, 2 and backup. The display priority order for these three types is as follows. Backup &gt; Inspection 1 &gt; Inspection 2</inspection></inspection>
10	Breakdown	Displays the breakdown indicator when one or more units has broken down. When all units are normal, the breakdown indicator goes off.

(c) Setting the schedule

The operation schedule can be set in group units. In one day, up to 16 schedules can be registered for operation time, run/stop, mode, operation enable, and temperature settings. Operation time settings can be set in minute units.

No.	Item	Contents
1	Yearly schedule	Set the schedule for one year as weekdays, holidays, special day 1 and special day 2.
2	Today's schedule	Sets the schedule that will be valid for the current day only. This schedule has priority over annual schedules.
3	Special day schedule	Sets each schedule of weekday, holiday, special day 1 and special day 2 in the yearly schedule.
## (d) Administration, Control

No.	Item	Contents		
1	Block definition	Sets the block name and the groups constituting the block. The groups registered in a block must first be registered by group definition. Groups that are not set in blocks cannot be set in detail from the display of all blocks or their status displayed. • Maximum number of blocks is 16 • Maximum number of groups per block is 9 • Maimum number of characters in a block name is 16 characters. The initial state is with all blocks not defined.		
2	Group definition	Sets the group name and the air conditioners constituting the group (up to 16 units per group), a representative air conditioner, and whether the group is controlled simultaneously or not. Air conditioners which are not set in groups are not subject to control by SLA-3-E or SLB-3-E. • Maximum number of groups is 144 • Maximum number of air conditioners per group is 16 • Maximum number of characters in a group name is 16 characters. In the initial state, 1 air conditioner is assigned to 1 group, and the air conditioner number is for the group name.		
3	Unit definition	The type of energy consumption and capacity of each air conditioner connected to SLB-3-E, and whether it is subject to demand control or not, are set.		
4	Time and data setting	Sets the clock used for the schedule, etc. Annual (Anno Domini) / Month / Day / Hour (24 hr. system) / Minute		
5	Alarm history	Displays the error occurrence and recovery history for up to 300 occasions in air conditioner units.		
6	Energy consumption calculation period	Sets the "regular hours" time bands used for calcuation.		
7	Energy consumption calculation cumulative operation time	Calculates the cumulative operating hours for each air conditioner, dividing them between "regular hours" or "irregular hours," and saves them.		
8	Demand control	"Starts the fan" or "Prohibits operation" for air conditioners which have previously been set by external demand signals. The air conditioners return to their original status when the demand signals are cancelled.		
9	Emergency stop	Causes all the air conditioners connected to this unit to "Stop" or "Prohibits operation" in response to an external emergency signal. When the emergency signal is cancelled, the air conditioners return to their original setting permitting or prohibiting manual operation, but all unit remain in the "Stop" state.		
10	Power failure recovery control	When the power is turned on again after a power failure, the groups set in the schedule operate in accordance with the schedule that was set most recently prior to the power failure. If Run/Stop, the operation mode, operation permitted and set temperature items are not set and "" is displayed for that item, the time is set to the time that was closest to the time of the power recovery. If there is no schedule setting for the affected date, the air conditioner is set to its initial state.		

(e) Energy consumption calculation data (SLB-3-E)

SLB-3-E outputs energy consumption calculation data using USB memory. These data can be edited using commercial spreadsheet software.

Energy consumption calculation data are created for each individual month.

<Calculation procedure>

- 1) The cumulative operating time is calculated for each air conditioner. (in minutes)
- ② The total operating time (Ki) for each air conditioner, and the operating time in each time band (regular hours, irregular hours) are calculated (in minutes).
  - Ki = Ki + Kм

 $K_M$  = Amount of air conditioner operation in 1 minute.

The amount of operation is calculated by the following 3 methods.

The amount of operation in the case calculated for the rated opening area value for that air conditioner, E.

- MULTI 1: The conversion value considering the amount of refrigerant flowing in the indoor unit is calculated (Σ Ei).
  - (Ej: Conversion value for the opening area of the indoor unit's expansion valve.)
- MULTI 2: The time that refrigerant flows through the indoor unit is additionally calculated. (Thermostat ON time  $\times$  E)
- RUN/STOP: A conversion value for the time when the remote controller is ON is added. (Operating time × E) (E: Conversion value for the capacity of the indoor unit.)

(Do not mix different methods in the same pulse system.)

• Simple software is included for editing the energy consumption calculation data.

See the included software concerning the operation method. • Energy consumption calculation data are obtained from this unit using the USB memory.



Bottom of the unit

#### ★User login

For owners the fee apportionment for multi machine air conditioners is more complicated and harder to explain to customers. In many cases it's best to use simple explanations.

In addition, consumption for multi machines are calculated based on volume, making it easy for excessive cooling and differences in building load to lead to discrepancies in electricity consumption. These different values are hard to explain. Therefore, it is easier to explain how many horsepower were used for how long.

At this point, recommend [RUN/STOP] registration.

Both multi machines and single machines use [RUN/STOP] registration.

Recommend that separate electricity meters be installed for single machine and multi machine systems.

Display every unit of electricity (kW) on the electricity consumption board. For example, register P280H as 28.0.

Current operational value = electricity volume × time of operation, calculated according to the electricity volume ratio.





Note (1) The calculation results for the SLB-3-E are not guaranteed.

- (6) Electrical wiring
  - Be sure to carry out grounding. Do not run the ground wire to a gas pipe, water pipe, electric meter, or telephone ground line.
  - Do not turn on the power until all construction operations are completed (manual switches).
  - All wiring, switches , relays, power supply and lamps, shown in the figure, besides SLA3-E (SLB3-E) , are to purchased locally.



- (2) Use an electric meter that satisfies the following specifications.
  - A meter with a pulse generator.
  - The pulse width should be 100 ms or greater.

#### (c) Signal wire for super link

- Size; 0.75mm<sup>2</sup> ~ 2.0mm<sup>2</sup>
- The total length of the signal wires should be 1000m or less. (per line)

• Recommended signal wire list

No.	Name	Symbol
1	Vinyl cabtire roung cord	VCTF double-core 0.75 to 2 mm <sup>2</sup>
2	Vinyl cabtire round cable	VCT double-core 0.75 to 2 mm <sup>2</sup>
3	Control vinyl insulated, vinyl sheathed cable	CVV double-core 0.75 to 2 mm <sup>2</sup>
4	Shielding wire	MVVS double-core 0.75 to 2 mm <sup>2</sup>

When No. 4 shielding wire is used, always ground the single wire side of the shielding wire. In addition, using the shielding wire is helpful to prevent the incorrect connection between 5V DC and 220/240V AC because the discrimination from the power supply wire is clear.

- (d) Other signal wire
  - Size; 0.75mm<sup>2</sup> ~ 1.25mm<sup>2</sup>
  - Maximum extension: 200m
- (e) Power supply wire
  - Size; 1.25mm<sup>2</sup>
- (f) Round eye-let terminal



- (7) Selecting a new pulse unit
  - 1) Input acceptor restrictions



Machine restrictions

- 1 second: 5 pulses or fewer
- 1 minute: 300 pulses or fewer
- 1 day: 1 pulse or more

2) pulse unit selection

(1) Find the total capacity of all connected air conditioners

(2) Assume that the correct electricity meter is being used

- (3) Air conditioners operating at full load: assume summer overload power consumption  $\times$  1.2
  - For example, Set the total electricity consumption = 100kw, power rate = 90%

Operating at full load = 
$$100 \times 1.2 = 120$$
kW

With 3 in conjunction,  $1=120 \times 1000/(1.732 \times 200 \times 0.9) = 385A$ 

- $\rightarrow$  Electricity meter must be 400A
  - If you use 400A Mitsubishi transmission equipment, then
    - K11 type, pulse unit at 100kmh/P
      - select while at 10kmh/P
    - K11 type, pulse unit at 100kmh/P
      - 10kመh/P
      - select while at 1kmh/P
    - There are other products with smaller pulses, ask an electric meter
    - manufacturer for details.
- (4) Inspection while electricity consumption is at 120km h
  - When pulse input is highest
    - Use 0.1kmh/P, then 1200P/h=20P/min exactly 1 minute 20 pulse ( 300pulses or fewer) 10 minutes 200 pulses OK

Use 1kmh/P, then 120P/h=2P/min exactly 1 minute 2 pulses 10 minutes 20 pulses OK

Use 10k $\varpi$ h/P, then 12P/h=0.2P/min , so 1 minute no pulses

- 10 minutes 2 pulses OK
- Lower usage rate, for example 1/10 time (12kmh), Use 0.1kmh/P, then 120P/h=2P/min so 1 minute 2 pulses 10 minutes 20 pulses OK Use 1kmh/P, then 12P/h=0.2P/min , so no pulses in 1 minute 10 minutes 2 pulses OK
  - Use 10km/P, then 12P/h=0.2P/min  $% 10^{-1}$  , so 1 minute no pulses 10 minutes no pulse NG  $^{-1}$
- (5) Pulse units should reach 0.1kmh/P.
  - 10kmh/P is NG.
  - 1kmh/P usage rate is the lowest, there might not be any pulses in 10 minutes, causing a calculation error.

3) Largest gas pulse input value

Gas amount pulse unit 0.01m <sup>3</sup> /P		0.05m <sup>3</sup> /P		0.1m <sup>3</sup> /P		0.5m <sup>3</sup> /P		
Largest measurable	4,320m <sup>3</sup> /B		21,600m <sup>3</sup> /B	4,3	200m <sup>3</sup> /B	2	1,6000m <sup>3</sup> /B	
flow volume	180m <sup>3</sup> /h		900m <sup>3</sup> /h	1,800m <sup>3</sup> /h		9,000m <sup>3</sup> /h		
			900/7=12	8 times	; 		9000/120=75 ti	imes
gas n	neter example —		Largest usec 2~7m <sup>3</sup> /r	l flow		La	rgest used flow 10~120m <sup>3</sup> /h	
0.05m <sup>3</sup> /P time: If you use 2m <sup>3</sup> /h If you use 3m <sup>3</sup> /h If you use 5m <sup>3</sup> /h If you use 7m <sup>3</sup> /h			pulse/h pulse/h pulse/h pulse/h					
0.5m <sup>3</sup> /P time: If y If y If y If y	you use 10m <sup>3</sup> /h you use 15m <sup>3</sup> /h you use 30m <sup>3</sup> /h you use 50m <sup>3</sup> /h you use 90m <sup>3</sup> /h pu use 120m <sup>3</sup> /h	20 30 60 100 180 240	pulse/h pulse/h pulse/h pulse/h pulse/h pulse/h					

4) Largest electric pulse input value

Gas amount pulse unit	0.01kመh/P	0.1k@h/P	1kϖh/P	10kmh/P
Largest measurable	4,320kmh/B	43,200kmh/B	432,000k@h/B	4320,000k@h/B
flow volume	180kመh/h	1,800kϖh/h	18,000kϖh/h	180,000kϖh/h

Note (1) Electricity meter pulse unit, please select 10kw/p or less.

(Example) using 3200V– 30A electric meters, power rate at 100%, largest flow will be 30A Electricity consumption = $\sqrt{3} \times 200 \times 30 \times 1.0$ =10, 392 kwh

This time, set to 0.1kmh/P, so 103, 920P/h=1730 pluse/minute NG

Set to 1.0kmh/P , so 10, 392P/h=173 pluse/minute OK

Set to 10.0kmh/P, so 1, 039P/h=17.3 pluse/minute OK

# 4.4 Weekly Timer SCA-WT-E

# Specifications

Descri	ption	Weekly timer		
Model		SCA-WT-E		<ul> <li>One week operation can be reserved.</li> <li>The ON/OFF time can be set 3 times a day by "minute"</li> <li>Setting is possible to avoid forgetting to disconnect.</li> </ul>
Applicable Model		MHI combination air- conditioner, model JN		
Power Source		AC220V,50Hz		Operation reservation may be temporarily cancelled by
External Dimension (mm) (H $\times$ W $\times$ L)		$\begin{array}{ll} \mbox{Main body} & 120\times120\times12\\ \mbox{Power source kit} & 100\times85\times50 \end{array}$	nction	<ul> <li>Graphic display of current time as well as the operation time of weekly program and current day program is</li> </ul>
Combinable Optional Components		Central controller SLA-2A-E	Ρu	<ul><li>possible.</li><li>Setting can be memorized during power failure.</li></ul>
Mounting screws, Power source kit Installation instruction manual Operation manual			<ul> <li>The operation program for up to 16 groups can be set separately when used together with SLA-2A-E.</li> <li>Up to 48 units can be controlled.</li> </ul>	

# **Outside view**





(2) If setting by group is not required, all the indoor units in the network will perform the programmed operation simultaneously.

### **Control switching**

The following control switching is possible through the control switch (SW9). Switch to left for OFF, right for ON.

There are 4 switches, but do not change the third and fourth ones. (set to OFF) Switching must be made before power on.

	ON	Group start / stop is possible if used together with SLA-2A-E.		
1	OFF	Facilitate the centralized start / stop of all indoor units in the network.	At delivery from the factory	SW9
	ON	The operation / stop command is issued when power is restored.		1, 2, 3 and 4 fro. top to bottom.
2	OFF	No operation / stop command is issued when power is restored.	At delivery from the factory	

Note) ■ For start / stop operation by group, be sure to use one SLA-2A-E.

- Group setting by SLA-2A-E.
- The indoor units in the network perform timed operation when Switch 1 is OFF no matter whether the central controller is used.

Only the indoor units controlled by the central controller or the central remote controller perform timed operation set through SLA-2A-E when Switch 1 is ON.

Pressing down switches "Setting" and "Setting Mode" simultaneously can clear the current time, timer setting and off-day settings.

### Power failure compensation function

- ① The set status of WT is held in case of power failure or power cut off. After power is restored, the monitor mode is displayed conforming to the time when power is restored.
- ② Operation (Stop) Command is issued based on the timer setting at the power restoration moment by pushing the control switch SW.



When the timer setting is shown as the above diagram, unit 1 is at Stop status when power is restored. Therefore, a Stop command is issued.

Unit (2) is at the operation status when power is restored. Therefore, an operation command is issued.

# 4.5 Super Link Serial Gateway CHC

### 1. MODEL

Model	Applicable
CHC-MFE4	Super-link for 4 systems (for PAC192)
CHC-MFE8	Super-link for 8 systems (for PAC384)

#### 2. SPECIFICATION

Item.	CHC-MFE4	CHC-MFE8		
Ambient operating temperature	0°C ~	40°C		
Power-supply voltage	Signal phase AC200 ~	Signal phase AC200 ~ 240V ± 10% 50 / 60Hz		
Power consumption	35	ŚW		
Dimension (height $\times$ width $\times$ depth)	200mm $ imes$ $300$ mm $ imes$ $180$ mm	200mm $ imes$ $470$ mm $ imes$ $180$ mm		
Weight	6.2kg	8.6kg		
Stretching resistance of terminal block	Less than 10kg			
Pulse input for integrating wattmeter	Max. four points and 2 non-voltag width: over 100ms 1pulse (min)	e contacts, DC24V, 20mA, Pulse , 300 pulse(max) within 1 minute		
Maximum number of units connecting with package	48 / 1 system × 4 systems=192	48 / 1 system × 8 systems=384		

Notes (1)While CHC-MFE is being connected to air-conditioning system, central console (SLA-3-E,SL-200-E), the charge management system (RKS Series), and the networked remote controller all cannot be used.

(2) When CHC-MFE is connected, central console (SLA-1-E,SLA-2A-E) can be connected under the following condition.

(a)It is possible to connect these products delivered from 1999.

(b)Change the setting of central & remote / central to the same setting CHC-MFE and SLS-2A-E. Set mode cannot be fixed if the setting is not changed to the same setting.

(c)The number of them that can coexist with a central console on the network is shown in the table below.

#### Per Super Link 1 system

CHC	SLA-2A-E	SLA-1-E
1 piece	2 pieces	0 piece
1 piece	1 piece	2 pieces
1 piece	0 piece	3 pieces

(3)When a system involves even one unit of a 5-HP GHP outdoor unit, an 8-HP GHP outdoor unit or 10-HP GHP outdoor unit, the number of indoor units will be subject to restrictions shown in the table below.

#### Per Super Link 1 system

The number of SLA-2AEs connected	A maximum number of connectable indoor units
0 piece	44 units
1 piece	32 units
2 piece	21 units

## 3. DIMENSIONS





Note(1)The numerical value inside ( ) is shown for CHC-MFE8.

#### 4. SYSTEM ARCHITECTURE

CHC monitors and controls the packaged air conditioner through the communication with BA system.



- piping system)
- 7. The group definition is not restarted to outdoor unit groups (refrigerant piping system).
- 8. The maximum number of blocks is 256, groups is 256.

#### 5. FUNCTION OF CHC

- 1) CHC-MFE is used to transfer information only, besides for the calculation of amount electric power used per minute
  - CHC receives the instruction from host unit through host side interface device and, then transfers to each air-conditioner.
  - · CHC receives information about each air-conditioner is received, and then transfers to the host unit through host side interface device.
- 2) CHC-MFE receives the power pulse input, and calculates the amount of electric power used per minute for the air-conditioning charge calculation every minute.
  - · It preserves total amount of electric power used at each block and unit, and updates every minute.
  - Replying to the request from the host unit, it transfers the total value.
  - The calculation of the amount of the electric power used at each block (charge calculation) is done by the host unit.
- 3) CHC-MFE cannot do anything alone. However, start/stop, the temperature setting, and the driving mode

switching, etc. can be done from the personal computer to every one unit or the block if the maintenance tool (personal computer) is connected with it. It is used for the test run adjustment. Moreover, it is also used for registration and the registration change.

- 4) Remedy for power failure
  - Registered setting data (Representative group identifier at every block and air-conditioner No. identifier of each group, representative air-conditioner identifier of each group, model setting of each airconditioner, and power pulse input setting value) are saved in nonvolatile memory (EEPROM) and don't disappear.
  - Set mode (preset temperature, operation mode, and central / remote) at every the block and the total amount electric power used can be remedied until 48 hours. (change for 48 hours, battery life is 10 years.)

Note (1) Please understand a block to be a unit of the instruction (start / stop). 1 piece of host side interface device can be connected with 64 blocks at most.

#### 6. FUNCTIONS OF CHC-MFE

CHC-MFE has the following functions to locally control the air-conditioner and communicate the data with the BA system.

- 1) Air-conditioner ON / OFF command Each block is started and stopped by the ON / OFF command from the air-conditioner interface.
- 2) Temperature setting The temperature setting of each block is set by the command from the air-xonditioner interface.
- Operation mode switch The operation mode (COOL, HEAT, FAN or AUTO) is switched by the command from the air-conditioner interface.
- 4) Remote controller operation mode setting The permission mode ("center & remote") or prohibition mode ("center") is set by the command from the air-conditioner interface.
- Filter sign (alarm) resetting The filter sign (alarm) sent from the air-conditioner is reset by blocks with the command from the airconditioner interface.
- 6) Power limit control

Each block is set with the setting command from the air-conditioner interface. In the power limit control mode, the operation mode of the air-conditioner is set at "FAN" and the remote controller operation mode is set at "center" (remote control operation prohibited). When the emergency control is canceled, above setting will return to the former setting when the power limit control started.

7) Emergency control (Forced all stop)

Air-conditioners are all stopped with the emergency control signal from the air-conditioner interfacewith the air-conditioner turned to "center" (remote control operation prohibited). When the emergency control is canceled by the air-conditioner interface, all air-conditioner return to former state, and keep stopping.

- 8) Monitoring air-conditioners condition (A sampling time of the state is 4 minutes)
  - a) The data of the run / stop state, malfunction, setting temperature and indoor temperature of airconditioner block are transferred to the air-conditioner interface.
  - b) The data of whether the air-conditioner is abnormal or not, are transferred to the air-conditioner interface each air-conditioner block.
  - c) The fiter sign (alarm) from the air-conditioner is transferred to the air-conditioner interface each block.
- 9) Measurement data transmission

According to the running state of the air-conditioner, the power consumption is distributed and calculated, and the integrated value of the calculated power consumption is transferred to the air-conditioner interface each block. Thedata of the integrated power is in the range of 0.0kWh to 99999.9kWh, and the monthly power consumption and other are calculated by the air-conditioner interface.

- 10) Guarantee for power outage
  - a) The set data (designation of group number for every block, designation of representative group number for every block, designation of air-conditioner number for every group, designation of representative air-conditioner number for every group, designation of model for every air-conditioner and power pulse input set value) are stored by the nonvolatile memory (E<sup>2</sup>PROM).
  - b) The run/stop, set mode (room temperature setting, operation mode and center/remote selection) and the accumulated power for every air-conditioner are stored for 48 hours. (Charge for 48 hours, battery life is 10 years.)

#### 7. SERVICE SPACE AND POINTS FOR WIRING





#### Door (service from ahead)





2) Points for wiring



(indoor unit or outdoor unit terminal block A and B)

- 3) signal wire and others
  - a) Signal wire for superlink
    - (a) size:  $0.75 \text{mm}^2 \sim 2.0 \text{mm}^2$  permissible extension length 1000m / one system
  - (b) Wiring material: Standard wire (Use the shield wire when there are influences of noises .)
  - (c) Recommended signal wire

NO.	Name	Symbol
1	Vinyl cab tire round type cord	VCTF 2 cores 0.75 ~ $2$ mm <sup>2</sup>
2	Vinyl cab tire round type cable	VCT 2 cores 0.75 ~ 2mm <sup>2</sup>
3	Vinyl insulation and vinyl sheath cable for control	CVV 2 cores 0.75 ~ $2$ mm <sup>2</sup>
4	Shield wire	MVVS 2 cores 0.75 ~ $2$ mm <sup>2</sup>

Using No.4 shield wire help to prevent mis-connection with AC200V or AC100V, because the distinction with the power supply wire is clear.

b) Wattmeter pulse signal wire

Size: 0.75mm<sup>2</sup>  $\times$  2 core or  $\phi$  0.9  $\sim \phi$  1.2  $\times$  2 core

c) Applicable crimp terminal



- d) Notices when wiring
  - · Wrap super-link signal wire 2~3 times around an attached filter core as shown in the figure below.



Note(1)Please bind these cables together so that an unacceptable load is not applied to the terminal block of CHC-MFE when wiring.

e) RS232C cable between CHC and the host I / F is not longer than15m

f) Example of system configuration diagram

The example of setting the indoor and outdoor address is shown. Moreover, SL1 and the SL2 systems are covered by one power pulse input No.1 in this case.



#### Number of connectable indoor units

- CHC-MFE4 Maximum 48 / SL × 4 system = Maximum 192 (Maximum 48 / SL 1 system)
- The unit of start / stop from the central monitor board is called as block unit. Maximum 64 blocks
- Group start / stop with remote controller in hand At most 16 indoor units can be started / stopped by one remote controller.



- · CHC identifies each indoor unit with following No.
  - · Block No
  - Group No
  - · SL system No
  - · Indoor No etc.

Selection of integral watt-hour meter

When charged according to CHC, please select the watt-hour meter for measurement of the power consumption according to the operating condition of the air conditioner (estimated maximum and minimum power consumption). Please select the pulse unit for the watt-hour meter that is more than 1 pulse but less than 300 pulses in 1 minute. (Refer to the next page)

Example About selection of pulse unit

1) Restriction on the pulse input receiving side



- 2) Selection of pulse unit
  - 1 Calculate the total power capacity necessary for the air conditioner.
  - (2) Pre-select the watt-hour meter corresponding to the total capacity.
  - 3 Maximum workload of the air conditioner: assuming overload condition in summer total power consumption  $\times$  1.2
    - Example assuming that: total power consumption = 100kW, power factor = 90%Maximum workload =  $100 \times 1.2 = 120kW$ 
      - In case of 3-phase 200V : 1 = 120 × 1000 / (1.732 × 200 × 0.9) = 385A
      - $\rightarrow$  400A class watt-hour meter is required.
        - For 400A class manufactured by Mitsubishi Electric, select signal transmitter in the following
          - · For K11 model select one from pulse unit 100kmh / P
            - 10kመh / P
          - · For K12 model select one from pulse unit 100kmh / P
            - 10komh / P
            - 1kooh/P
          - $\cdot \,$  Consult with the watt-hour meter maker for products with smaller pulse
  - (4) Check when power consumption is 120km

unit.

- When pulse input is maximum
  - If  $0.1k\varpi h / P$  is selected, 1200P / h = 20P / min, i.e. 20 pulses in 1 minute ( $\leq 300$  pulses) O If  $1k\varpi h / P$  is selected, 120P / h = 2P / min, i.e. 2 pulses in 1 minute O
  - If 10kmh / P is selected, 12P / h = 0.2P / min, i.e. 0 pulse in 1 minute  $\times$
- When the usage frequency is decreased to 1 / 10 (12K $\sigma$ h), If 0.1k $\sigma$ h / P is selected, 120P / h = 2P / min, i.e. 2 pulses in 1 minute O If 1k $\sigma$ h / P is selected, 12P / h = 0.2P / min, i.e. 0 pulse in 1 minute × If 10k $\sigma$ h / P is selected, 1.2P / h = 0.02P / min, i.e. 0 pulse in 1 minute ×
- (5) The watt-hour meter that can generate the pulse unit of  $0.1k\varpi h / P$  is desirable.
  - · 10komh / P is NG
  - · For 1kmh / P, when the usage frequency is extremely low, calculation error will occur because no pulse enters for 1 minute.

g) Fault indication list of CHC

Referring to the display content of green LED (power display and micro computer validity indicating lamp), red LED (faulty indicating lamp) and yellow LED (communication monitor), whether any fault is present or not can be found.

	Display LED	Display state	Trouble details	
	"PLIN" (groop)	Continuous flickering	Normal	
	NON (green)	Continuous lit or unlit	CPU unit PCB fault, CPU runaway	
		Unlit	Normal	
CPU unit		One-time flickering	<communication against="" fault="" slg=""> ① CPU unit PCB fault ② SLG unit PCB fault ③ Inner connection fault</communication>	
		Three-time filckering	<host fault=""> ① Fault on the host side ② Host connection fault ③ CPU unit PCB fault ④ Inner connection fault</host>	
	"Lloot	Continuous filckering	Valid (communicating with host)	
	"Host Communication monitor · SD"(yellow) "Host Communication monitor · RD"(yellow)	Unlit	<ol> <li>Power off or fault on the host side</li> <li>Communication stop (off line) on the host side</li> <li>Host connection fault</li> </ol>	
		Continuous lit	<ol> <li>Fault on the host side</li> <li>Host connection fault</li> <li>CPU unit PCB fault</li> </ol>	
	"BLIN"(green)	Continuous filckering	Normal	
	Hon (green)	Continuous lit or unlit	CPU unit PCB fault, CPU runaway	
		Unlit	Normal	
	"ALRM"(red)	One-time flickering	<super communication="" connection<br="" link="" wire="">fault&gt; <ol> <li>SLG unit PCB fault</li> <li>Air-conditioner control PCB fault</li> <li>Super link communication wire connection fault</li> </ol></super>	
SLG unit		Two-time flickering	<super communication="" connection<br="" lynk="" wire="">fault&gt; ① Wrong Connection of plural systems</super>	
	"Communication monitor	Continuous filckering	Valid (communicating with CPU unit)	
	LCL" (yellow)	Continuous lit or unlit	<ol> <li>CPU unit PCB fault</li> <li>SLG unit PCB fault</li> <li>Inner connection fault</li> </ol>	
		Continuous filckering	Valid (communicating with air-conditioner)	
	"Communication monitor PAC" (yellow)	Continuous lit or unlit	<ol> <li>SLG unit PCB fault</li> <li>Air-conditioner control PCB fault</li> <li>Super link communication wire connedtion fault</li> </ol>	

## CPU unit, master / slave PCB, dip switchì setting

	SW No.		Factor setting	Content			
		1	OFF	EEPROM zero clear			
		2	OFF / ON	Model switching OFF : CHC-M*4, ON : CHC-M*8			
		3	OFF	PC control switching (CHC-MY / MF), OFF : Host priority. ON: backup priority			
Master	SW1	4	OFF	Measured value switching, OFF: power consumption, ON: operating capacity (CHC-MY4 / 8U, MF4 / 8T)			
		5, 6	OFF	Not used			
					7	ON	Operating capacity display switching (CHC-MY4 / 8U, MF4 / 8T) OFF : 1 / 1, ON : 1 / 100
		8	OFF	Not used			
	JP1		Short circuit	Battery connection (only some models)			
Slave	SW2	ON	ON	Terminal resistance switching OFF: none, ON: 120 form			
	SW3	—	—	(actually not mounted)			

### SLG PCB, dip switch setting

			СНС	-M*4				CHC-N	Л*8			
SW	No.	SLG1	SLG2	SLG3	SLG4	SLG1 ~ 3	SLG4	SLG5	SLG6	SLG7	SLG8	Content
	1	OFF	ON	OFF	ON		ON	OFF	ON	OFF	ON	
C)//1	2	OFF	OFF	ON	ON		ON	OFF	OFF	ON	ON	SLG No.
5001	3	OFF	OFF	OFF	OFF		OFF	ON	ON	ON	ON	
	4 ~ 8	OFF	OFF	OFF	OFF		OFF	OFF	OFF	OFF	OFF	Naturad
SW2	1 ~ 4	OFF	OFF	OFF	OFF		OFF	OFF	OFF	OFF	OFF	Not used
SI	N3	OFF	OFF	OFF	ON	Same as left	OFF	OFF	OFF	OFF	ON	Terminal resistance switching OFF: none, ON: 120 form
SI	N4	OFF	OFF	OFF	OFF		OFF	OFF	OFF	OFF	OFF	Terminal resistance switching OFF: none, ON: 150 form



Air Conditioning Control System

# 4.6 Super Link Web Gateway SC-WGW-A

# **1. INTRODUCTION**

1. SCOPE

This product specification is applied to the WEB Gateway SC-WGW-A that connects a Control & Monitor personal computer with the MITSUBISHI HEAVY INDUSTRIES' "SUPERLINK" networks by the "WEB"\*1 communication protocol. This document describes the specifications of the product as for May 1, 2004. Any contents of this document may be changed without prior notification.

<sup>\*1</sup> This product uses the WEB HTTP communication protocol which is widely used in the Internet. However, this Gateway is basically for use in a local LAN.

### 2. STANDARD PACKAGE

The standard package of this product includes the followings;

- A Gateway SC-WGW-A unit
- User's manual
- Installation manual

The following materials are not included in the standard package.

- Personal computer systems for monitor and control.
- LAN materials such as Ethernet cables and switching hubs

#### 3. ENGINEERING WORK

"Engineering work" means technical service work such as dispatching engineers to the site, the address allocation planning work, configuration of this Gateway, trial operation of the system and so on. These engineering works may be paid services.

#### 4. CUSTOMIZE WORK

This WEB Gateway is a kind of ready-made product. Customization of the functions of this Gateway will not be supplied.

## 2. SYSTEM ARCHITECTURE

1. SYSTEM DIAGRAM

Fig. 5.1 shows a basic case of the system diagram of connection between the building management system host computer, the WEB Gateway and the SUPERLINK control networks.





Fig. 5.2 shows a case of the system diagram of connection between the building management system host computer, the WEB Gateway, and the SUPERLINK control networks along with SUPERLINK option controllers such as SLA-1-E or SLA-2A-E. The SC-AD-L adapter should be used for connection of MHI's single type packaged air-conditioner models.



#### 2. ETHERNET NETWORK

#### (1) Private Ethernet

As shown in Fig.2.1, recommended network environment for this Gateway system is the private local Ethernet line for exclusive use. In other words, no network nodes except this Gateway and the PCs for this system are connected to the Ethernet line. Connection to the Intranet (i.e. office LAN) or the Internet may be possible under responsibility of the network administrator on the site and with paid engineering work. Network wiring for the Ethernet line shall be done according to each network equipment manufacturer's wiring specifications. This Gateway does not require special wiring for the Ethernet line and assume the following Ethernet specifications;

- 10BASE-T or 100BASE-TX twisted-pair cable Ethernet

The IP address for this Gateway has been set before shipment as the following initial IP address for the CLASS C PRIVATE ADDRESS;

- Initial IP Address: 192. 168. 0. 110

Alternation of the IP address of this Gateway has to be done by editing the initial network configuration file for this WEB Gateway's software. This procedure requires high technical knowledge on compter networks. In the case of IP address alternation, consult the dealer of this product.

(2) Network Security

This Gateway does not have any special measures for the Ethernet network security such as counter measures for evil attacks from the network, network virus and so on. It is assumed that this Gateway will be used in the private Ethernet network. If this Gateway is connected to an office LAN or the Internet, there might be risks for injustice access, and consequently, this Gateway might be altered to be harmful communication source to other network nodes.

It is not the responsibility of this Gateway to such injustice network access and is exempted from compensation for the damage by such unexpected attacks.

#### 3. CONTROL & MONITOR PC

(1) PC Models

Personal computers used as the WEB browsers for this system are out of the product supply scope. The personal computers with relating software and hardware should be prepared by the customer. Minimum performance conditions of the PC are as follows;

- CPU clock : 500MHz or above. (2GHz or above recommended.)
- Main memory : 128MB or above. (512MB or above recommended.)
- Screen size : 1024  $\times$  768 or above. (1280  $\times$  1024 recommended.)

#### (2) Operating System and WEB Browser

The recommended Operating System and WEB Browser versions for both the Control and Monitor PC and the Monitor PCs are followings;

- Operating System : Microsoft Windows XP or 2000
- WEB Browser : Microsoft Internet Explorer, version 6.0 or above.

This Gateway system executes only the Internet Explorer on the PC side. The Gateway does not automatically download any executable codes to the PCs.

#### 4. CONNECTION WITH AIR CONDITIONER

#### (1) Models

- KX series
- GHP series
- Air conditioner with SC-AD-L adapter + split one to one PAC series.

(When using SC-AD-L some functions of air conditioner will become invalid.)

#### (2) "AIR-CON CELL"

A group of indoor units connected by the remocon line is called an "Air-con CELL" in this WEB Gateway system. An Air-con CELL is defined as a logical group of indoor units for control & monitor from this WEB Gateway. In the Fig. 5.1 and Fig. 5.2, an Air-con CELL is indicated by a surrounding dashed line. The indoor units of the CELL should be on the same SUPERLINK network. But the CELL identification numbers can be allocated over the SUPERLINK networks as shown in Table 5.1 below.

Sending a control command to a CELL is equal to sending the control command to every indoor unit of the CELL. It is possible to control and monitor each individual indoor unit by defining a CELL as an indoor unit. All indoor units in the same CELL must be connected by the same remote controller, that is, a remocon group connection.

The CELL grouping definition is common to all the functions of this Gateway. The CELL definition is provided by the PAC information file. The information file must be set before the test operation of this Gateway. This PAC information file is memorized by the non-volatile memory of this Gateway once it is uploaded.

(3) Max number of indoor units

The maximum number of indoor units connected is shown in the Table 5.1 depending on connection of the SUPERLINK option controller such as SLA-1-E or SLA-2A-E. The reason why the number of indoor units connectable is reduced in the case of option controller connection is for communication traffic limitation.

	Table 5.1	
	Without option controller	With option controller(*)
Number of SUPERLINK networks	2 networks	2 networks
Number of indoor units	Max48 units $\times$ 2 = Max 96	Max32 units $\times$ 2 = Max 64
Number of CELLs	Max48 CELLs $\times$ 2 = Max 96	Max32 CELLs $\times$ 2 = Max 64
Range of CELL number	CELL 0 to CELL 95	CELL 0 to CELL 63

(\*) Option controllers should be max. 2 of SLA-1-E or only one of SLA-2A-E for one SUPERLINK network.

## **3. FUNCTION OVERVIEW**

- 1. WEB SERVER FUNCTION OVERVIEW
  - The "WEB Server functions" mean functions as a WEB server from the WEB browser's point of view. The Table 5.2 shows the list of the WEB functions of the SC-WGW-A Gateway.

WEB Function (Screen)	Content
Login	Authentication of the user by the UserID and Password.
Overview Monitor	Display the overall status of all CELLs of the whole PAC system without scroll of the screen.
Individual Monitor	Display the detail status of each CELL in the pop up window.
Control Command	Input Control command to CELLs by the array of pull down menus.
System Stop	Stop all the CELLs and set the remote controller reject mode by one click.
PAC Configuration	Set the full room name and the short name for each CELL. These names to appear on the Monitor screen.
Config. File Transfer	Upload and Download of the PAC Information CSV file which defines the indoor unit grouping of the CELLs.
Communication Config.	Set the browser's auto-refresh interval of the Overview Monitor screen.
Security Config.	Set the accessible IP address of a PC, that is IP address filtering.
Password Change	Password can be changed from this screen.
Calendar Config.	Set the yearly calendar defining each day as "Weekday", "Holiday", etc This yearly calendar is common to all CELLs.
Master Schedule Config.	The Master Schedules are default daily operation schedules depending on a day of a week or a special day. Set each Master Schedule of a CELL. Each CELL has a different default daily schedule.
Schedule Control	Set temporarily alternation to the daily operation schedule of a CELL for maximum 7 days from the current day. The temporary alternation does not affect the Master Schedule.
Date Time Set	Adjust the date and time of the WEB server.

# Table 5.2 List of the WEB Server Functions (List of Screens)

\* "CELL" is a group of the indoor units connected by one remocon, or an indoor unit. A remocon is a packeged air-conditioner's remote controller.

### 2. CONTROL & MONITOR FUNCTION OVERVIEW

The control and monitor functions mean categories of jobs from an air-conditioning system's point of view. The Table 5.3 shows the control and monitor functions of the SC-WGW-A Gateway.

#### Table 5.3 List of Control & Monitor Functions of the SC-WGW-A

Function		Content
	On / Off command	Send the On/Off command to a CELL.
	Mode command	Send the operation mode command (Auto, Cooling, Dry, Heating, Fan) to a CELL.
Ы	Setpoint command	Send the temperature setpoint command to a CELL. The range is from 18 to 30 degrees Celsius.
ТВ	Fan Speed command	Send the fan speed select command (Hi, Me, Lo) to a CELL.
CON	Remocon Lock / Unlock command	Send the remote controller operation Lock or Unlock command to a CELL.
	Filter Sign Reset command	Send the reset command for the filter sign on the remote controller of a CELL.
	System Stop command	Send the Off commands to all CELLs and set all CELLs as the Remocon Lock mode simultaneously.
	Failure status	Monitor the failure status LED on / off on the remote controller for a CELL.
	On / Off status	Monitor the On/Off status of a CELL.
~	Mode status	Monitor the operation mode status of a CELL .
Ğ	Setpoint status	Monitor the setpoint status of a CELL
-IN	Fan Speed status	Monitor the fan speed select status of a CELL.
MO	Remocon Lock / Unlock status	Monitor the setting of the remote controller Lock/Unlock mode of a CELL.
	Filter Sign status	Monitor the status of the filter sign LED on the remote controller of a CELL.
	Room Temperature Status	Monitor the room temperature sensor data of a CELL.

\* A "CELL" is a group of the indoor units connected by one remocon, or an indoor unit.

#### 3. HARDWARE SPECIFICATIONS

- (1) Power Supply
  - AC single phase 100V 240V +10%, -15% 50/60Hz
- (2) Operation Temperature
  - Ambient Temperature : 0 to 40 degrees Celsius
    - Relative Humidity : Max 85 %RH (without dewing)
- (3) Storage Temperature
- : -10 to 50 degrees Celsius
- Ambient Temperature
   Relative Humidity
- Max 05 % DLL (After 40 has
- : Max 85 %RH (After 48 hours from out of storage, dewing should not exists)
- (4) Power Blackout Compensation
  - This Gateway does not have a battery circuit for power blackout recovery.
  - If blackout or manual power off occurs for more than 30 msec, the monitoring data and the setting of each CELL (indoor unit), such as the operation mode or set point temperature, may disappear.
  - This Gateway periodically writes the monitoring data of the CELLs to the non-volatile memory at every 24 hours. If the power supply is cut off, at the worst case, the monitoring data of 24 hours before that time will be stored. The stored settings are automatically recovered when this Gateway is restarted
  - This Gateway does not store and recover the On/Off control settings. However, depending on the setting of the remote controller, indoor units will restart when the power supplies to the whole air-conditioner system resume to normal state.
  - (3) Appearance
    - Outline drawing
    - Outline dimensions
    - Color

- : Fig 5.3 on the following page
- : 260(W)  $\times$  200(H)  $\times$  79(D) mm
- : Black







# **5.INSTALLATION**

1. INSTALLATION CONDITIONS

This Gateway SC-WGW-A has a terminal block for the AC power supply on the outside surface of the casing.

For avoiding electrical shock injury, the SC-WGW-A should be installed inside a cabinet with a lock

The direction of placement of this Gateway when installation should be such a way that the front panel is vertical and the lettering of the front panel is right direction to enable air-cooling.

The recommended service space surrouning this Gateway is as follows;

- Upper clearance
- : Minimum 30 mm
- Lower clearance
- : Minimum 30 mm
- Right side clearance
- : Minimum 50 mm (more than 200 mm is recommended)
- Left side clearance

- : Minimum 50 mm (more than 200 mm is recommended)

The side clearance is for wiring workspace.

2. WIRING

The Fig 5.4 shows the wiring of this Gateway. After wiring to the WEB Gateway, the terminal covers, which are included in this Gateway's product package, should be installed by screws as shown in the Fig 5.3. After wiring work finished, fix the terminal covers securly by the screws



#### 3. ETHERNET CABLE

This Gateway supports the Ethernet 10BASE-T or 100BASE-TX which are most popular among the standards of the Ethernet. In the case of only one PC is used for control and monitor, the PC and the Gateway can be connected directly by a cross Ethernet cable. The cross cable is a kind of Ethernet cable which connects two computers directly. In the case of using more than one PCs for control and monitor, an Ethernet HUB must be used. For both cases, the category 5 cable grade or higher must be used.

Materials for wiring the Ethernet, such as cables or HUBs, are not included this Gateway's product package. The type of the HUB may be ordinary office LAN use.

#### 4. SUPERLINK CABLE

This Gateway supports the SUPERLINK control network. The recommended specifications of the cable for the SUPERLINK are shown as follows;

(1) Size of cable : 0.75 to 2.0 square mm

- (2) Max length of wiring : 1000m/channel (loop wiring is not allowed)
- (3) Cable materials :

Twisted Vinyl Cabtyre Cable	VCTF 2 core 0.75 to 2.0 square mm
Twisted Vinyl Cabtyre Cable	VCT 2 core 0.75 to 2.0 square mm
Twisted Vinyl Cable for Control	CVV 2 core 0.75 to 2.0 square mm

(4) For prevention of electromagnetic noise malfunctions, parallel wiring with the power line should be avoided.

# 4.7 Super Link LON Gateway

# 4.7.1 SC-LIF-E

# **1. SYSTEM ARCHITECTURE**

- 1. SYSTEM DIAGRAM
  - The system configuration diagram of LonWorks interface is shown below. Outdoor units are omitted to make the diagram easy.



- Note 1) The "NODE" is a printed circuit board for LonWorks communication. This interface has four NODEs in the casing box. The Interface has one terminal block for the LonWorks line, and the four NODEs are connected to the LonWorks line inside the casing box.
  - 2) Four indoor units of packaged air-conditioners can be assigned to each NODE.
  - 3) One interface alone can be connected to each Superlink system. Accordingly, two or more Superlink systems can not be connected as one system.
  - 4) Each interface can control and monitor maximum 16 indoor units of the Superlink address No. 0 to No.15.
  - 5) If Superlink adapter is used, a group of indoor units can be regarded as one unit and can be controlled. This makes it possible to expand the number of the indoor units managed by the interface to 16 or more. For details, refer to the separate document "Appendix A Group connection with Superlink adapter (SC-AD-L)" (Document No. IST021228).

2. Assignment illustration of NODEs and indoor units

The Superlink addresses of the indoor units are assigned to each NODE in the Interface as explained below.



The Superlink addresses of the indoor units controlled by each NODE are previously fixed to each NODE, and are assigned as shown in the following table.

	1st	2nd	3rd	4th
NODE No.	Unit 0	Unit 1	Unit 2	Unit 3
NODE 0:	o	l <sub>1</sub>	2	3
NODE 1:	4	5	6	7
NODE 2:	8	9	10	I11
NODE 3:	12	13	14	15

The four indoor units assigned to each NODE are sequentially defined as the "Unit 0", "Unit 1", "Unit 2" and "Unit 3". For example, if the indoor unit of  $I_6$  is the objective for the control, the network variables of the "Unit 2" of the NODE 1 have to be bound, since  $I_6$  is the 3rd unit of the NODE 1.

The suffix number of the network variable name described in the Network Variable Assignment Table later in this document is the "Unit" number. For example, the On/Off command of  $I_6$  corresponds to the network variable of nviOnOff\_2 in NODE 1.

3. Assignment example of NODE, and indoor unit addresses In case that the indoor unit addresses 0, 1, 2, 4, 5, 7, 8, 10, 11 and 12 are to be assigned.

### Proper assignment :

If address of the indoor unit is not sequential, it is regarded as blank.



#### Wrong assignment

The indoor unit address assingned by each NODE is fixed, even if any indoor unit is not present. As shown below for example, the indoor unit I<sub>4</sub> can not be assigned as "Unit 3" of the NODE0 even if the indoor unit address I<sub>3</sub> is not present.



- 4. Notes for assignment of NODEs, and indoor unit addresses
  - 1. Remote controller group connection

If several indoor units are connected to one remote controller, the state of each indoor unit might become unmatched if each indoor unit is individually controlled with the host computer via the LonWorks Interface. In this case, the status display might be unmatchi between the remote controller and the host computer. This is because one of the indoor units is displayed on the remote controller with priority.

To prevent this, the host compter should send the input network variable of the same content for the group of indoor units connected to one remote controller. For example, in case of the On / Off command, prevent such a case as "On" is sent to one indoor unit and "Off" is sent to another indoor unit.



2. Connection without remote controller

It is strongly recommended to use the remote controller to the indoor unit, even if all controls and monitors are done from the LonWorks interface. The following functions by the remote controller cannot be supported by the LonWorks interface if the remote controllers are not connected to the indoor units.

- (1) The content (error code) of an error is not displayed anywhere.
- Though the LonWorks interface has the "Failure status" monitoring function to inform that the airconditioner is abnormally stopped, but it does not inform the error code. The error code is informed on the remote controller. Accordingly, the error code is not displayed anywhere if the remote controller is not connected.
- (2) The operation of the swing louver and the automatic elevation of the filter become impossible. Since the LonWorks interface is not provided with operation functions of the swing louvers and automatic elevation of the air filter, these functions can not be used unless the remote controller is connected.
- (3) The power failure recovering function is eliminated. LonWorks interface does not provide with the power failure recovering function. In a case of the power failure, the operation modes and settings of the packaged air-conditioner is to be recovered from the remote controller if the "Power Failure Recovering Switch" inside the remote controller is set to ON. Accordingly, any setting of the packged air-conditioners is not recovered unless the remote controller is connected.

# 2. Equipment specifications

Item		Specifications	Remarks		
	Casing box dimensions	250(H) x 100(W) x 180(D)			
Construe	Weight	Approx. 2.6kg			
Construc	Case material	Zinc-plated steel plate (t1.2)			
uon	Case painting	Color:cream			
	Installation method	Fixed with the mouting brackets			
Power	Power supply voltage	Single-phase 100VAC-15% to 200VAC+10% (50/60Hz)	The main switches and power LED are arranged on the front.		
supply	Wiring connection	Terminal block	Terminal No. "L", "N"		
	Power consumption	Max. 5W			
Environ-	Ambient temperature for operation	0°C to 40°C			
condition	Ambient humidity for operation	85%RH or less (without dewing)			
	LONWORKS®network				
	Wiring connection	Terminal block	Terminal No. "1", "2"		
	Transceiver	FTT-10A	Free topology (78kbps)		
Communi cation	Service pins	Arranged on the front panel One per NODE, 4 pins as a total	Switch and LED unitized type		
	Superlink netwo	ork			
	Wiring connection	Terminal block	Terminal No. "A", "B"		
	Number of connectable units	Max. 16 indoor units			

## 3. Function specifications

[Control function]

	1. On / Off command	The Run / Stop is applied to each indoor unit. It is the same function as the On / Off command from the remote controller connected to the indoor unit.
	2. Operation mode setting	The operation modes (Automatic, Cooling, Fan and Heating) are set for each indoor.
	3. Temperature setting	The temperature setting of each indoor unit is set. The value is set at the intervals of $1^{\circ}$ C in the range of $18^{\circ}$ C to $30^{\circ}$ C.
	4. Remote controller prohibit	Whether the operation by the remote controller is allowed or prohibited is set. The function allows/prohibits all the functions of the remote controller.
	5. Filter sign reset command	After the intake air filter sign LED of the remote controller has become lit (it is recommendation to clean the filter), this function will turn it off.
	6. System stop command	The four indoor units controlled by one NODE are all immediately stopped, and thereafter the operation from the remote controller is prohibited.
[Monitor	function]	
	1. On / Off status	The Run / Stop status of each indoor unit is informed.
	2. Operation mode status	The operation mode of each indoor unit is informed.
	3. Temperature set status	Temperature setting of each indoor unit is informed.
	4. Filter sign status	The filter sign of the remote controller is informed. When the accumulated operation time is counted up to the limit time, the filter sign of the remote controller will be lit to recommend that the air filter shall be cleaned.
	5. Failure status	Whether a trouble is present in the air conditioner is informed. The error code of the trouble is not informed by this LonWorks interface, but it is indicated on the remote controller.
	6. Room temperature	The intake sensor temperature of the indoor unit is indicated. The intake sensor temperature is sometimes called "the room temperature".
	7. Thermo status	Whether the refrigerant flows into the indoor unit or not is informed. This status corresponds to the thermostat status.
	8. Communication status	Whether the Interface can communicate with each indoor unit is informed. Normally, this status means the power on / off status of the indoor unit.
	<ul> <li>* Since each monitor function information to the LonW communication timing.</li> </ul>	stion above is checked by LonWorks interface periodically evry one minute, the orks is sometimes delayed maximum about one minute depending on

If the group connection is done with the Superlink adapter, information of the above monitor function is the content of the representative indoor unit in the group. For details, refer to Product Specification Appendix A "Group connection with Superlink adapter (SC-AD-L)".

[Setting function]		
1 Send Heartbeat	It sets the interval time for sending the following output network variables	This

1. Send Hearbeat	function is invalidated at shipment. · On / Off status · Temperature set status
2. MinimumSendTime	It sets the minimum time to send the following network variable. This function is invalidated at shipment. · Room temperature status
3. Delay Time	It sets the delay time for the data sending when the power supply is turned on. This function is invalidated at shipment.
4. Receive Heartbeat	If the following input network variable is not received for a certain time, the variable will be returned to the initial value. This function is invalidated at shipment. · Remote controller prohibit command

# [Object Request / Status function]

1. Object Request / Status	It is used to check whether the NODE malfunction is present or not.
	If it is normal, the object status will be answered back to the object request from the
	host computer of the building management system.

## [Installation function]

1. Wink function	When the wink command is received from the network control tool, the service LED of the receiving NODE flickers.
2. Service switch & LED	The LED integrated switch is provided on the front panel. When the switch is pressed, Neuron ID of corresponding NODE is sent to LonWorks network. The
	status of the NODE can be checked with this LED status.
# 4. Connection wiring diagram



Air Conditioning Control System

# 5. Outline drawing



# 4.7.2 SC-LGW-A

# **1. INTRODUCTION**

1. SCOPE

This product specification is applied to the LON Gateway SC-LGW-A which connects the LON\*1 network with the MITSUBISHI HEAVY INDUSTRIES' "SUPERLINK" networks. This document describes the specifications of the product as for Nov. 27, 2004. Any contents of this document may be changed without prior notification.

\*1 LON is a widely used control network by Echelon Co. "LON" is Echelon's registered trade name.

# 2. OUTLINE OF PRODUCT

<ul> <li>Number of SUPERLINK networks</li> <li>Number of indoor units</li> </ul>	: 2 networks : Max.48 × 2 networks = Max.96 indoor units (Max.32 × 2 networks = Max.64 indoor units in case that SLA-1/SLA-2A's are connected)
<ul> <li>Number of LON nodes</li> <li>Number of network variables</li> <li>LON transceiver</li> </ul>	: 1 node for this gateway : 1250 (implemented as 97 Functional Blocks) : FTT-10A

# 3. LONMARK

This LON Gateway is not LONMARK approved product. There is no LONMARK Functional Profile for packaged air-conditioners.

# 4. ENGINEERING WORK

"Engineering work" means technical service work such as dispatching engineers to the site, the address allocation planning work, configuration of this gateway, trial operation of the system and so on. These engineering works may be paid services.

# 5. CUSTOMIZE WORK

This LON Gateway is a kind of ready-made product. Customization of the functions of this gateway cannot be supplied.

# 2. SYSTEM ARCHITECTURE

1. SYSTEM DIAGRAM

Fig. 5.5 shows a basic case of the system diagram of connection between the Building Management System host computer, the LON Gateway and the SUPERLINK control networks.





Fig. 5.6 shows a case of the system diagram of connection between the Building Management System host computer, the LON Gateway, and the SUPERLINK control networks along with SUPERLINK option controllers SLA-1 or SLA-2A. The SC-AD-L adapter should be used for connection of MHI's single type packaged air-conditioner models.



# 2. AIR-CONDITIONER CONNECTION

- (1) Packaged Air-Conditioner Models
  - MHI's Multi KX series
  - MHI's Multi GHP series
  - SC-AD-L adapter+Separate PAC series

When the SC-AD-Ls are used, some functions will become invalid. The detail explanation of the limitations for the SC-AD-L will appear in the later version of this document.

# (2) Max number of indoor units

The maximum number of indoor units connected is shown in the Table 5.4 depending on connection of the SUPERLINK option controller such as SLA-1-E or SLA-2A-E. The reason why the number of indoor units connectable is reduced in the case of option controller connection is for communication traffic limitation.

Table 5.4

	Without option controller	With option controller(*)
Number of SUPERLINK networks	2 networks	2 networks
Number of indoor units	Max. 48 units $\times$ 2 = Max. 96	Max. 32 units $\times$ 2 = Max. 64

# 3. LON COMMUNICATION

(1) COMPATIBLE LON NETWORK

<ul> <li>Communication Protocol</li> </ul>	: LonTalk
- Transceiver Type	: FTT-10A
- Transmission Speed	: 78kbps

# (2) LON Node

This LON gateway has only one LON node. The node has 1250 network variables for 96 indoor units of airconditioners. In other words, 13 network variables for every indoor units make 1250 network variables for 96 indoor units for this gateway.

# **3. FUNCTION OVERVIEW**

1. LON NETWORK MANAGEMENT FUNCTIONS

Since this LON gateway is not LONMARK approved products, some LON network management functions are not supported by this gateway.

Function	Support	Explanation
Service PIN	Yes	Broadcasts Neuron ID by pressing Service PIN on the case
Wink	No	No response when receiving Wink message
Object Request	No	No response when receiving Object Request message
Object Status	No	No response when receiving Object Request message
Send HeatBeat	Yes	For Only output network variables for air-con On/Off status
Receive HeatBeat	No	Cannot be configured
Minimum Send Time	No	Cannot be configured
Delay Time	No	Cannot be configured

# Table 5.5 List of the LON Network Management Functions

# 2. CONTROL & MONITOR FUNCTION OVERVIEW

The control and monitor functions mean categories of jobs from an air-conditioning system's point of view. The Table 5.6 shows the control and monitor functions of the SC-LGW-A Gateway.

	Function	Explanation	
	On/Off command	Send On / Off command to an indoor unit	
	Mode command	Send Operation Mode command (Auto, Cooling, Heating, Fan) to an indoor unit.	
٥L	Setpoint command	Send Temperature Setpoint command to an indoor unit. The range is from 18 to 30 degrees Celsius.	
ITR(	Fanspeed command	Send Fanspeed select command (Hi, Me, Lo) to an indoor unit.	
C 0 2	Filter Sign Reset command	Send Reset command for Filter Sign to the remote controller of an indoor unit.	
	Remote controller Lock / Unlock command	Send the remote controller operation Lock or Unlock command to an indoor unit.	
	System Stop command	Send Forced Off commands to all indoor units and set all remocons Lock mode simultaneously.	
	On/Off status	Monitor On / Off status of an indoor unit.	
£	Mode status	Monitor Operation Mode status (Auto, Cooling, Heating, Fan) of an indoor unit.	
0	Setpoint status	Monitor Temperature Setpoint status of an indoor unit.	
	Fan Speed status	Monitor Fanspeed select status of an indoor unit.	
0	Room Temperature Status	Monitor Inlet air temperature sensor data of an indoor unit.	
Σ	Failure status	Monitor Failure status and Error Code of an indoor unit.	
	Filter Sign status	Monitor Filter Sign status of an indoor unit.	
	System Stop status	Monitor All air-conditioner Forced Off status.	

# Table 5.6 List of Control & Monitor Functions

# **4.HARDWARE SPECIFICATIONS**

- (1) Power Supply
  - AC single phase 100V 240V +10%, -15% 50/60Hz
- (2) Operation Temperature

- Relative Humidity

- Ambient Temperature : 0 to 40 degrees Celsius
  - : Max 85 %RH (without dewing)
- (3) Storage Temperature
  - : -10 to 50 degrees Celsius - Ambient Temperature
  - Relative Humidity
- : Max 85 %RH (After 48 hours from out of storage, dewing should not exists)
- (4) Power Blackout Compensation
  - This gateway does not have a battery circuit for power blackout recovery.
  - If blackout or manual power-off occurs for more than 30 msec, the monitoring data and the setting of each indoor unit, such as the operation mode or set point temperature, may disappear.
  - This gateway does not store and recover the On/Off control settings. However, depending on the setting of the remocon, indoor units will restart when the power supplies to the whole air-conditioner system resume to normal state.
  - (3) Appearance
    - Outline drawing - Outline dimensions
- : Fig 5.6 on the following page : 260 (W)  $\times$  200(H)  $\times$  79 (D) mm
- Color

: Cream





# **5.INSTALLATION**

1. INSTALLATION CONDITIONS

This gateway SC-LGW-A has a terminal block for the AC power supply on the outside surface of the casing.

For avoiding electrical shock injury, the SC-LGW-A should be installed inside a cabinet with a lock

The direction of placement of this Gateway when installation should be such a way that the front panel is vertical and the lettering of the front panel is right direction to enable air-cooling.

The recommended service space surrounding this Gateway is as follows;

- Upper clearance : Minimum 30 mm
- Lower clearance : Minimum 30 mm
- Right side clearance : Minimum 50 mm (more than 100 mm is recommended)
- Left side clearance : Minimum 50 mm (more than 200 mm is recommended)

The side clearance is for wiring workspace.

2. WIRING

The Fig 5.8 shows the wiring of this Gateway. After wiring to the LON Gateway, the terminal covers, which are included in this Gateway's product package, should be installed by screws as shown in the Fig 5.7. After wiring work finished, fix the terminal covers securely by the screws



# 3. LON CABLE

This gateway supports the LON FTT-10A twisted-pair transmission line which is the most popular network line type of LONWORKS. Follow the Building Management System vender's the LON cable selection. This gateway has both plug and receptacle for the LON connector on the side panel. Connect the end of the twisted-pair cable to the connector plug's screw.

# 4. SUPERLINK CABLE

This Gateway supports the SUPERLINK control network. The recommended specifications of the cable for the SUPERLINK are shown as follows;

- (1) Size of cable : 0.75 to 2.0 square mm
- (2) Max length of wiring : 1000m/channel (loop wiring is not allowed)
- (3) Cable materials :

Twisted Vinyl Cabtyre Cable	VCTF	2 core 0.75 to 2.0 square mm
Twisted Vinyl Cabtyre Cable	VCT	2 core 0.75 to 2.0 square mm
Twisted Vinyl Cable for Control	CVV	2 core 0.75 to 2.0 square mm

(4) For prevention of electromagnetic noise malfunctions, parallel wiring with the power line should be avoided.

# 4.8 Super Link BACnet Gateway SC-BGW-A

# **1. INTRODUCTION**

# 1. SCOPE

This preliminary product specification is applied to the communication unit SC-BGW-A that connects a Building Management System network and MITSUBISHI HEAVY INDUSTRIES' "SUPERLINK" networks by the "BACnet"\*<sup>1</sup> communication protocol. This document describes the overview specifications of the product as for April 22, 2004. Any contents of this document may be changed without prior notification. \*<sup>1</sup> BACnet : Building Automation and Control networks

2. STANDARDS/GUIDELINES

This product is designed as conforming to the following standard and guideline.

(1) BACnet/IP standard 1995 version

"ANSI/ASHRAE Standard 135-1995 : Data Communication Protocol for Building Automation and Control Networks"

(2) JRAIA Interface Committee Guideline

"BACnet Implementation Guideline for Packaged Air-conditioners" Ver.1.0 Feb.5, 2004 issued by the Interface Committee of the Japanese Refrigeration and Air-conditioning Industry Association.

(3) CE Markings

"EMC Directive, 89/336/EEC, 92/31/EEC and 93/68/EEC"

# 3. ENGINEERING WORK

"Engineering work" means technical service work such as dispatching engineers to the site, the address allocation planning work, configuration of this Gateway, trial operation of the system and so on. These engineering works may be paid services.

# 4. CUSTOMIZE WORK

This Gateway is a kind of ready-made product. Customization of the functions of this Gateway will not be accepted.

# 2. SYSTEM ARCHITECTURE

1. SYSTEM DIAGRAM

Fig. 5.9 shows a basic case of the system diagram of connection between the building management system host computer, the SC-BGW-A BACnet Gateway and the SUPERLINK control networks.



Fig. 5.9 System Diagram (Basic case)

Fig. 5.10 shows a case of the system diagram of connection between the building management system host computer, the SC-BGW-A BACnet gateway, and the SUPERLINK control networks along with SUPERLINK option controllers such as SLA-1 or SLA-2A. The SC-AD-L adapter should be used for connection of MHI's single packaged air-conditioners models.



Fig. 5.10 System Diagram (Option controller connected)

# 2. BMS CONNECTION

(1) Lower Layer of the BACnet Protocol

This gateway is to be connected to the Building Management System (BMS) network by the BACnet/IP lower layer communication protocol that works over an IP network.

- Lower layer protocol : BACnet/IP of the BACnet standard "ANSI/ASHRAE Standard 135-1995"
- Physical layer : Ethernet 10BASE-T or 100BASE-TX (Automatic selection)
- (2) Communication connection specifications To be written.
- 3. AIR-CONDITIONER CONNECTION
  - (1) Packaged Air-Conditioner Models
    - MHI's Multi KX series
    - MHI's Multi GHP series
    - SC-AD-L adapter + Separate PAC series

When the SC-AD-Ls are used, some functions will become invalid. The detail explanation of the limitations for the SC-AD-L will appear in the later version of this document.

(2) "AIR-CON CELL"

A new concept of the "Air-con CELL" is introduced in this gateway system. An Air-con CELL is defined as a logical group of indoor units for control & monitor of the air-conditioners. An Air-con CELL consists one indoor unit or more than one indoor units connected by one remote controller.

In the Fig. 5.8, an Air-con CELL is indicated by a surrounding dashed line. The indoor units of the CELL should be on the same SUPERLINK network. But the CELL identification numbers can be allocated over the SUPERLINK networks as shown in Table 2.2.

Issuing a control command to a CELL is equal to issuing the control command to every indoor unit of the CELL. Therefore, operation of each indoor unit is identical for every indoor unit within the CELL. It is possible to control and monitor each individual indoor unit by defining a CELL equals to an indoor unit. All indoor units in the same CELL must be connected by the same remote controller, that is remocon group connection.

The CELL grouping definition is common to all the functions of this gateway. The CELL definition is provided by the PAC information file. The information file must be set before the test operation of this gateway.

This PAC information file is memorized by the non-volatile memory of this gateway once it is uploaded.

(3) Max number of indoor units

The maximum number of indoor units connected is shown in the Table 2.2 depending on connection of the SUPERLINK option controller such as SLA-1 or SLA-2A. The reason why the number of indoor units connectable is reduced in the case of option controller connection is for communication traffic limitation.

	Without option controller	With option controller(*)
Number of SUPERLINK networks	2 networks	2 networks
Number of indoor units	Max48 units $\times$ 2 = Max 96	Max32unts $\times$ 2 = Max 64
Number of CELLs	Max48 CELLs $\times$ 2 = Max 96	Max32 CELLs $\times$ 2 = Max 64
Range of CELL number	CELL 0 to CELL 95	CELL 0 to CELL 63

(\*) Option controllers should be max. 2 of SLA-1 or only one of SLA-2A for one SUPERLINK network.

# **3.FUNCTION OVERVIEW**

1. COMMUNICATION FUNCTIONS

Table 5.7 shows the list of the functions of this BACnet gateway from a view point of BACnet communication between a building management system host computer and this gateway.

Function	Description
Reset start	Broadcasts BACnet "I_Am" message at the reset start.
Alive check	Broadcasts BACnet "I_Am" message every 1 minute continuously.
Write service from host	Accepts BACnet Write Services from the host computer.
Read service from host	Responds to BACnet Read Service form the host computer.
Change of Value Report	Broadcasts Change of Value of the packaged air-conditioners.
Alarm report	Broadcasts Alarm report of the packaged air-conditioners

Table 5.7	Communication	Function	List

# 2. CONTROL&MONITOR FUNCTIONS

Table 5.8 shows the list of the functions of this BACnet gateway from a view point of control & monitor of the packaged air-conditioners. An "Air-con CELL" is a logical group of indoor units for one remote controller as defined in the section 2.2 in this document.

Function		Description	
	On/Off command	Sends On/Off command to an Air-con CELL through the SUPERLINK.	
	Mode command	Sends Mode command (Cool, Heat, Fan, Auto, Dry) to an Air-con CELL through the SUPERLINK.	
ΟL	Fan speed command	Sends Fan Speed command (Hi, Me, Lo) to an Air-con CELL through the SUPERLINK.	
ITR(	Set Temp command	Sends Set Temperature (18 - 30 deg C) to an Air-con CELL through the SUPERLINK.	
C 0 2	Filter Sign Reset command	Sends Filter Sign Rest command to an Air-con CELL through the SUPERLINK.	
	Remocon Lock command (All button)	Sends Remocon Lock command to an Air-con CELL through the SUPERLINK. All the functions will be locked/ unlocked simultaneously.	
	System Stop command	Sends Off and Remocon Lock commands to all Air-con CELLS simultaneously.	
	On/Off status	Reports On/Off status of an Air-con CELL to the host computer.	
	Alarm status	Reports occurrence of failure stop of an Air-con CELL to the host computer.	
ſſ	Error Code status	Reports failure stop Error Code of an Air-con CELL to the host computer.	
ITOF	Mode status	Reports Mode status (Cool, Heat, Fan, Auto, Dry) of an Air- con CELL to the host computer.	
1 O N	Fan Speed status	Reports Fan Speed setting status of an Air-con CELL to the host computer.	
M	Room Temp status	Reports Room Temperature sensor data of an Air-con CELL to the host computer.	
	Filter Sign status	Reports Filter Sign status of an Air-con CELL to the host computer.	
	Communication status	Reports SUPERLINK communication status of an Air-con CELL to the host computer.	

Table 5.8	Control	ደ.	Monitor	Functions	Liet
Table 5.0	Control	α	WOITHOT	FUNCTIONS	LISI

# **4.HARDWARE SPECIFICATIONS**

- (1) Power Supply
  - AC single phase 100V 240V +10%, -15% 50/60Hz
- (2) Operation Temperature

- Relative Humidity

- Ambient Temperature : 0 to 40 degrees Celsius
  - : Max 85% RH (without dewing)
- (3) Storage Temperature
  - Ambient TemperatureRelative Humidity
- : -10 to 50 degrees Celsius
- : Max 85% RH (After 48 hours from out of storage, dewing should not exists)
- (4) Power Blackout Compensation
  - This gateway does not have a battery circuit for power blackout compensation.
  - If blackout or manual power off occurs for more than 30 msec, the monitoring data and the setting of each CELL (indoor unit), such as the operation mode or set point temperature, may disappear.
  - This gateway periodically writes the monitoring data of the CELLs to the non-volatile memory at every 24 hours. If the power supply is cut off, at the worst case, the monitoring data of 24 hours before that time will be stored. The stored settings are automatically recovered when this gateway is restarted.
  - This gateway does not store and recover the On/Off control settings. However, depending the setting of the remote controller, indoor units will restart when the power supply to the whole air-conditioner system resume to normal state.
  - (3) Appearance
    - Outline drawing
       Outline dimensions
- : Fig 5.11on the following page
- : 260(W)  $\times$  200(H)  $\times$  79(D) mm

- Color

: Blue



Fig. 5.11 Outline Drawing of SC-BGW-A

# 5. Operation Instructions

# 5.1 Center Console SLA-1-E

# Component description and function



# Requirements

Please make a note of the connected units on the attached switch display label, which should be placed above the switch.

# About installation

- Please do not install the equipment at places where interference exists.
- Please do not install the equipment at places with high humidity or vibration.
- Please do not install the equipment at places under direct sunshine or adjacent to heat sources.



Installation beside computers, automatic doors, elevators or machines generating interference may result in mis-operation.



Installation at places with high humidity or vibration or water splash may lead to failures.



Installations at places under direct sunshine or adjacent to heat sources may lead to failures.

# Simultaneous operation method



# Individual operation method



# 1 Press the simultaneous operation switch

All connected units start to run. The operation / check display lamp indicates the following content: In operation: green light on

Stop or not connected: off Abnormality: red light on

# To stop, press the simultaneous stop switch

All connected units stop running and the operation / check display lamp is off.

# 1 Press the individual operation / stop switch If the switch connected to one unit is pressed, only such unit

runs. The corresponding operation / check display lamp will become green light on.

# Stop Press the individual operation / stop switch during operation

The air-conditioners stop running and the operation / check display lamp is off.

# Requirements

•Please do not press the switches with sharp-pointed materials.



About settings other than the operation/stop Please make operation mode setting, temperature setting and air rate setting through the standard remote controller (attached with the air-conditioner).

# When the operation / check display lamp is red light on



- An abnormality occurs to the air-conditioner.
- In case of an abnormality, the air-conditioner stops operation and the corresponding display lamp turns red.
- Please contact the sales outlet where the unit was purchased and provide information including "type", "model and description", "failure characteristics", "failure sign" (indicated at the set temperature on the standard remote controller) of the faulty unit.
- Press the individual operation / stop switch with the red light on, the display will be off.

# 5.2 Center Console SLA-2A-E

# Component description and function

Shown below is the state of the central controller after the cover is opened. All the explanations are recorded in the LCD.



# Group setting method

Requirement: Please do not use SLA-2A-E to operate the units prior to group setting.

Please make group setting through SLA-2A-E in the following order:

- ① Setting of the units other than the control objects.
- (2) Setting of the control objects.
- ① Units other than the object units controlled by central controller SLA-2A-E (or other central controllers).



- 1 Press SET switch while ALL / GROUP / ONE (simultaneous/group/individual) switch is pressed. The setup mode is validated and characters "00 – 00" flash.
- 2 Press UNIT No. / SET TEMP (unit no. / room temperature) switch to select units other than the control objects.
   When the ▲ or ▼ buttons are pressed, the unit no. flashes and is switched at the same time.
- 3 Press the FILTER RESET (filter reset) switch Unit No. display is on and the group No. display becomes "--".
- 4 Press the FILTER RESET (filter reset) switch again "--"display is off and the unit No. display remains. The setting is done.
- 5 Press the TIMER (timer) switch To return to the operation status display of the displayed unit No.
- Setting of units controlled by central controller SLA-2A-E and subject to the group control.
   00 ~15 can be set in SLA-2A-E with up to 16 groups. Logging on to any unit in each group is possible.



- 1 Press SET (set) switch and ALL / GROUP / ONE (simultaneous/group/individual) switch at the same time. The setting mode is activated with characters "00 – 00" flashing.
- 2 Press the GROUP SET switch to select the group to be set.

The flashing display of GROUP No. turns into the selected No.

3 Press UNIT No. / SET TEMP (unit No. / room temperature) switch to select units to be set.

When the  $\blacktriangle$  or  $\checkmark$  buttons are pressed, the UNIT No. flashes and is switched at the same time.

4 Press the SET (set) switch

The GROUP No. and UNIT No. stop flashing and become on. Setting is done.

- Please repeat step 3 and 4 to set other units in the displayed group.
- The later settings take precedence. If a unit has already been set to one group before it is set to another group, this unit will join the later set group.

# 5 Press the TIMER (timer) switch

To return to the operation status display of the displayed group No.

# Individual setting method

Setting of units controlled by central controller SLA-2A-E but subject to individual control instead of group control.



- 1 Press SET (set) switch and ALL / GROUP / ONE (simultaneous/group/individual) switch at the same time. The setting mode is activated with characters "00 – 00" flashing.
- 2 Press UNIT No. / SET TEMP (unit No. / room temperature) to select units to be set for individual control.
   When the ▲ or ▼ are pressed, the UNIT No. flashes and can be switched at the same time.
- 3 Press the FILTER RESET (filter reset) switch The UNIT No. display changes from flashing to lighting and the GROUP No. display becomes "--". Setting is done.
- 4 Press the TIMER (timer) switch

To return to the operation mode display of the displayed unit No.

# About the setting of central controller / remote controller

Select the centralized control of the object units controlled by central controller SLA-2A-E or the mobile control through the remote controller on the unit side.

Setting details	Switch operability
Central controller	Only operation through central controller SLA-2A-E is possible. Operation through the remote controller on the unit side is not permitted.
Central remote controller	Operation is possible either through central controller SLA-2A-E or the remote controller on the unit side. The later setting operation takes precedence.
Remote controller	Operation through central controller SLA-2A-E is not permitted. Please use the remote controller on the unit side.

#### Setting details and switch operability

# Setting Method



1 Please make a selection from simultaneous, individual or group operations for units subject to operation/stop setting.

Press ALL / GROUP / ONE (simultaneous/group/individual) switch.

Switch following the sequence of  $\begin{bmatrix} \rightarrow ALL \rightarrow GROUP \rightarrow ONE \\ \hline & & \\ \end{bmatrix}$ .

- 2 Press SET switch The display of group No.or unit No.flashes.
- 3 Press ROOM TEMP/No. switch Press ▲ or ▼ to select group No. or unit No..
- 4 Press CENTER REMOTE (central controller / remote controller) switch.

Switch following the sequence of  $\begin{bmatrix} CENTER \rightarrow REMOTE \rightarrow CENTER REMOTE \end{bmatrix}$ 

# Simultaneous operation method

Perform simultaneous operation / stop of all the units controlled. **Method a** 



Setting of Operation Details Please set the operation mode, room temperature, air rate, etc.

#### Method b

# 213

- **Operation:** Press the simultaneous operation switch All the units controlled start running and the operation / abnormality display lamp lights in green.
- **Stop:** Press the simultaneous stop switch All the units controlled stop running and the operation / abnormality display lamp goes off.

1. Press ALL / GROUP / ONE (simultaneous/group/ individual) switch.

Switch following the sequence of  ${\overset{\rightarrow}{\square}}^{ALL \rightarrow GROUP \rightarrow ONE}$  . Please select "ALL (simultaneous)".

- 2. Set to "Central Controller" or "Central Remote Controller" through the CENTER / REMOTE (central controller / remote controller) switch.
- 3 Press the Operation or Stop switch.
   When the Operation switch is pressed... All the units controlled start running and the operation / abnormality display lamp lights in green.
  - Press the Stop switch... All the units controlled stop running and the operation / abnormality display lamp goes off.
- Setting of Operation Details Please set the operation mode, room temperature, air rate, etc.

# Group operation method

Operation and stop by group **Method a** 



Setting of Operation Details Please set the operation mode, room temperature, air rate, etc. **Operation:**When the air-conditioner stops running (the operation / abnormality display lamp is off), press the group operation / stop switch

All the air conditioners within the group start running and the operation / abnormality display lamp lights in green.

Stop: During the operation of the air-conditioner (the operation / abnormality display lamp lights in green), press the group operation/stop switch

All the air conditioners within the group stop running and the operation / abnormality display lamp goes off.

# Method b



Setting of operation details

Please set the operation mode,

room temperature, air rate, etc.

1 Press ALL / GROUP / ONE (simultaneous / group / individual) switch.

Switch following the sequence of  $\bigcirc$  ALL $\rightarrow$ GROUP $\rightarrow$ ONE. Please select "GROUP (group)".

- 2 Press the SET (set) switch. GROUP No. (group No.) display flashes.
- 3 Press UNIT No. / SET TEMP (unit No. / room temperature) switch.

Press  $\bigstar$  or  $\checkmark$  to select the group No.

•Display of the operation status of the selected group.

- 4 Press the SET (set) switch. GROUP No. (group No.) lights.
- 5 Set to "Central Controller" or "Central Remote Controller" through the CENTER / REMOTE (central controller / remote controller) switch.
- 6 Press the Operation or Stop switch.

When the Operation switch is pressed... All the air conditioners within the selected group start running and the operation / abnormality display lamp lights in green.

Press the Stop switch...

All the air conditioners within the selected group stop running and the operation / abnormality display lamp goes off.

# Individual operation method

Only operate the selected ones among the connected units.



1 Press ALL / GROUP / ONE (simultaneous / group / individual) switch. Switch the mode following the sequence

of [→ ALL → GROUP → ONE] . Select "ONE (individual)".

- 2 Press the SET (set) switch. UNIT NO. (unit No.) display flashes.
- 3 Press UNIT No. / SET TEMP (unit No. / room temperature) switch.

Press  $\bigstar$  or  $\blacktriangledown$  to select the unit No.

- Display of the operation status of the selected unit.
- 4 Press the SET (set) switch. UNIT No. (unit No.) lights.
- 5 Set to "Central Controller" or "Central Remote Controller" through the CENTER REMOTE (central controller / remote controller) switch.
- 6 Press the Operation or Stop switch.
  - When the Operation switch is pressed... The selected units start running and the operation / abnormality display lamp lights in green.
  - Press the Stop switch... The selected units stop running and the operation / abnormality display lamp goes off.
- Setting of operation details
   Please set the operation mode, room temperature, air rate, etc.

# **Operation details setting method**

Setting of the operation mode, room temperature, air rate and automatic swing.



Standard for room temperature setting

Cooling	26~28°C
Drying	21~24°C
Heating	22~24°C
Air supply	room temperature setting
	is not required

- 1 Setting of ALL / GROUP / ONE (simultaneous / group / individual)
  - For simultaneous operation, please set to "ALL (simultaneous)".
  - For group operation, please make group setting following the sequence of Step 1, 2, 3, and 4 in Method b
  - For individual operation, please set following the sequence of step 1, 2, 3, and 4 in Page 347.
- 2 Set to "Central Controller" or "Central Remote Controller" through the CENTER REMOTE (central controller / remote controller) switch.
- 3 Setting of the operation mode

Press MODE (operation mode) switch. Switch the mode following the sequence of  $\uparrow^{automatic \rightarrow drying \rightarrow heating \rightarrow coding \rightarrow air}$  supply.

# 4 Setting of room temperature

Press  $\blacktriangle$  or  $\blacktriangledown$  to set the room temperature.

# 5 Setting of air rate

Press FAN SPEED (air rate changeover) switch to switch following the sequence of fast  $\leftrightarrow$  strong  $\leftrightarrow$  weak.

# 6 Setting of automatic swing

Press AUTO SWING (automatic swing) switch to switch between AUTO SWING ON  $\leftrightarrow$  AUTO SWING OFF.

# Hints

- During the room temperature setting, please confirm the displays of GROUP No. (group No.) and UNIT No. (unit No.). Press SET (set) switch if the displays are flashing and then press ▲ or ▼ after the lighting is confirmed.
- For multi KX series, please use a uniform operation mode for each of the indoor units. In case different operation
  modes are set, the later setting will be cancelled and the unit will operate in the forced air supply mode with the
  operation mode display flashing.
- The operation may stop when the room temperature setting switch is pressed to increase or decrease the set room temperature. The reason is that the room temperature regulator is working instead of getting into trouble.
- The air rate changes automatically with the room temperature when the unit is running in the drying mode. Air rate setting through the FAN SPEED switch is not possible in this case.

# **Timer operation method**

Timer function is not available in central controller SLA-2A-E. When connected to a weekly timer and a commercially available timer, this unit is able to perform timer operation.



- 1 ALL / GROUP / ONE (simultaneous / group / individual) setting
  - For simultaneous operation, please set to "ALL (simultaneous)".
  - For group operation, please set the groups for timer operation following the sequence of step 1, 3, 4, and 5 in Method b.
  - For individual operation, please set the groups for timer operation following the sequence of step 1, 3, 4, and 5 in Page 347.
- 2 Set to "Central Controller" or "Remote Central Controller" through the CENTER / REMOTE (central controller / remote controller) switch
- 3 Press the TIMER (timer) switch

Switch the mode following the sequence of  $\Gamma$  TIMER $\rightarrow$ no display $\Gamma$ .

Select "TIMER (timer)".

Setting of units running in the timer mode is thus completed.

# Timer operation

The unit set with the timer operates / stops with the signals from the external timer.

Release of timer operation Press the TIMER switch to set the timer display to no display. The timer operation is disabled.

# Demand unit setting method

Demand control function is not available in SLA-2A-E central controller. Demand control is possible when the unit is connected to a demand controller.



- 1 ALL / GROUP / ONE (simultaneous / group / individual) setup
  - Please set to "ALL (simultaneous)" to enable all units.
  - For group settings, please set the groups for the demand setting following the sequence of step 1, 3, 4, and 5 in
     Method b
  - For individual operation, please set the groups for the demand setting following the sequence of step 1, 3, 4, and 5 in Page 347.
- 2 Set to "Central Controller" or "Remote Central Controller" through the CENTER / REMOTE (central controller / remote controller) switch
- 3 Press the SET (set) switch and the FAN SPEED / DEMAND (air rate changeover/demand) switch at the same time. Switch the mode in the sequence of <sup>DEMAND→no display</sup>. Select "DEMAND (demand)".
- Setting of the demand operation is thus completed.
- Disconnecting the jumper wire (J1) in advance can prohibit the mobile remote control over the set units by external signals.

When the external signals are released, the Central Controller / Remote Controller returns to the original status.



The demand operation does not run at this moment.

#### Demand operation

Units that have been set to the demand operation status shut down the thermostat following the signals from the external demand controllers. After the signals are released, they will return to the original operation status.

# Release of demand setting

Press SET switch and FAN SPEED / DEMAND switch at the same time to set the demand display to no display.

Demand operation is thus disabled.

# When the operation / abnormality display lamp lights in red

# An abnormality occurs to the air-conditioner

When the operation / abnormality display lamp corresponding to the group No. where the abnormal unit is
located lights in red, the abnormal unit stops running. The LCD switches to the abnormality display shown in the
following diagram and the displays of the operation mode, room temperature, air rate and automatic swing
become blank.



- Please get in touch with the sales outlet where the respective unit was purchased and provide information including the "error code", "error characteristics", "model name of the abnormal unit".
- In case of more than 2 abnormal units, the unit No. of the abnormal unit and the corresponding error code are switched to every time when the check switch is pressed.
   (Example)
   Switch the display in the sequence of [<sup>+02-10→08-05→02-00</sup>] when there are 3 abnormal units, 02-00,

- Abnormality display reset
- Press ALL / GROUP / ONE (simultaneous/group/individual) to return to the usual operation status display.

# When the filter sign lights

- Please clean the filter
  - (Refer to the operation manual attached with the air-conditioner for the cleaning method.)
- The filter sign lights when the total operation time of any one unit among the connected indoor units reaches the set time.

# Confirmation of the unit No. with the filter sign on



While the filter sign is lighting, press the check switch and the group No. and unit No. shown in the filter sign will be displayed for 10 seconds and then the original display returns.
 In case there are more than 2 units generating the filter sign, every pressing of the check switch will switch the unit No.

Check switch

Filter sign reset (Please reset the filter after the cleaning)



1 ALL / GROUP / ONE (simultaneous / group / individual) setting

2 Set to "Central Controller" or "Central Remote Controller" through the CENTER / REMOTE (central controller / remote controller) switch.

3 Press FILTER RESET (filter reset) switch. Simultaneous: The filter sign lights and all units are reset.

Group : The filter sign for the displayed groups lights and all units are reset.

Individual : Only the displayed individual units are reset.

# Hints

The filter sign can be disabled through central controller SLA-2A-E. Please get in touch with the sales outlet of the air-conditioner.

# Usage guidance

- About ROOM TEMP (air suction temperature) display
  - The following contents are displayed during the operation of the units:
  - During the simultaneous and individual operation: the air suction temperature of the displayed units is displayed.
  - During the group operation

: the air suction temperature of the unit with the smallest unit No. among the displayed groups is displayed.

Below 13°C :	displayed as 13°C
From 14°C~34°C:	display between 14°C and
	34°C by 1°C.

# About ALL / GROUP / ONE (simultaneous/group/individual) setting

- When set to ALL (simultaneous): All settings are possible for all the connected units and the operation
- When set to GROUP : Various settings are possible by group. The operation status of th
  - set to GROUP : Various settings are possible by group. The operation status of the unit with the smallest unit No. in the group is displayed.
- When set to ONE (individual) : Various settings are possible by unit. The operation status of the currently displayed unit is displayed.

# About power failure compensation

The setting status at the moment right before the power failure is memorized when the power source of the central controller SLA-2A-E is cut off due to power failure. Upon the power recovery, the air-conditioner that was running before the power failure resumes operation.

Besides, the power failure compensation function can be disabled. Please get in touch with the sales outlet of the air-conditioner.





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Control System

# 5.3 Weekly Timer SCA-WT-E

# Component description and function

All the contents are recorded on the LCD for explanation.



- switch is used to select week and program No.
   switch is used to select hour, minute and the
  - group No.

# Week & current time setting

# TIME TIME SM T W T F S AM TIME PROGRAM PROGRAM MODE SELECT CONF IRM SELECT 5.7 8 1.9 3 2.4.6

- 1 Press MODE (setting mode) switch TIME (time setting) is displayed in the setting mode.
- 2 Press SELECT (select) switch The symbol ▼ flashes on the indicator of week.
- 3 Make the symbol ◀ ▶ point to the current week by pressing ▼ switch.
- 4 Press SELECT (select) switch The "hour" part of the TIME (current time) flashes.
- 5 Adjust the "hour" of the TIME (current time) by pressing
   ▲ switch.
- 6 Press SELECT (select) switch The "minute" part of the TIME (current time) flashes.
- 8 Press SET (set) switch The display changes from flashing to lighting and the week and current time setting is done.

# Hints

- Keep the switch pressed when setting hour and minute, which can speed up the setting.
- Keep the Switch pressed when setting week, which can speed up the setting.
- When the switches are not operated for 60 seconds, the setting will automatically return to the monitor mode. Please operate once again.

9 Press MODE (setting mode) switch to change the display of the setting mode to no display. Return to the monitor mode.

# Setting of programmed operation

3-cycle programmed operation can be set for each day of a week.



# Hints

- Keep switch pressed when setting the group No., hour and minute, which can speed up the setting.
- When the switches are not operated for 60 seconds, the setting will automatically return to the monitor mode. Please operate once again.

(Example) To operate the air-conditioners in the group No. 10 on Wednesday according to the following program:

> Program : operate during 9:05 a.m.~11:50 a.m. Program : operate during 1:05 p.m.~5:00 p.m.

- 1 Press MODE (setting mode) switch to display PROGRAM (timer setting).
- 2 Press SELECT (select) switch

GROUP No. (group No.) 00 flashes.

- When not used in combination with central controller SLA-2A-E, the Group No. is not displayed and the symbol above the week flashes. Please continue the operation from Step 5.
- 3 Set GROUP No. (group No.) to 10 by pressing switch. →
- 4 Press SELECT (select) switch.

The symbol  $\checkmark$  above the week flashes.

- 5 Make the symbol point to "W (Wednesday)" by pressing ▶ switch.
- 6 Press SELECT (select) switch.

The symbol below the **PROGRAM** (program) flashes.

- 7 Make the symbol  $\checkmark$  point to  $\square$  by pressing  $\blacksquare \triangleright$  switch.
- 8 Press SELECT (select) switch. The "hour" part of **ON** (power-on time) flashes.
- 9 Make it point to AM 9:-- by pressing 🛓 switch.
- 10 Press SELECT (select) switch.

The "minute" part of **ON** (power-on time) flashes.

11 Make it point to 05 by pressing  $\begin{bmatrix} \bullet \\ \bullet \end{bmatrix}$  switch.


#### 12 Press SELECT (select) switch The "hour" part of **OFF** (power-off time) flashes.

- 13 Make it point to AM *II*:-- by pressing **A** switch.
- 14 Press SELECT (select) switch The "minute" part of **OFF** (power-off time) flashes.
- 15 Make it point to 50 by pressing a switch.

### 16 Press SET (set) switch

Setting for the program II is done. The flashing display turns into lighting. "---" is displayed below the set "W (Wednesday)" and the set time is displayed in graphics.

### 17 Continue to set the program 2

Please set according to Step 6-16 shown above.

- Press SET (set) switch to finish the setting for the program 2. The flashing display turns into lighting at this moment and the set time is displayed in graphics.
- 18 Press MODE (setting mode) switch to change the display of the setting mode to no display. Return to the monitor mode.

19 The programmed operation for other dates can be set following the same steps.

# Hints

- Setting the GROUP NO. (group No.) to 88 can make all the groups operate according to the same program.
- Move the week in proper order to select both S~S (Sunday~Saturday) and M~F (Monday~Friday). This method can be used if the same program is used for the whole week or on ordinary days.  $S(Sunday) \leftrightarrow M(Monday) \leftrightarrow$  $T(Tuesday) \leftrightarrow W(Wednesday) \leftrightarrow$  $T(Thursday) \leftrightarrow F(Friday) \leftrightarrow$  $S(Saturday) \leftrightarrow M(Monday) \sim$  $S(Saturday) \leftrightarrow S(Sunday) \sim$ 
  - $S(Saturday) \leftrightarrow S(Sunday)$
- Keep switch pressed when setting hour and minute, which can speed up the setting.
- When the switches are not operated for 60 seconds, the setting will automatically return to monitor mode. Please operate once again.

### ■ ON/OFF Time Setting Rules

- Please set the ON time to -:- a.m. (morning) if only the OFF time is set. The On time can not be set alone.
- Regard the OFF time as the one in the next day if the ON time is later than the OFF time.
  (Example) If Wednesday 10:00 p.m. ~ 7:00 a.m. is set, the operation time will be: 10:00 p.m. Wednesday to 7:00 a.m. Thursday.
- If full day operation is required, please set the time to 0:00 ~ 0:00.
- In case of overlapped programs, only the first ON time and the last OFF time are valid.

### (Example 1)



In this case, Program 2 is included in the set time of Program 1. Therefore, only the ON time and OFF time in Program 1 are valid.

### (Example 2)



In this case, the ON time of Program 1 and the OFF time of Program 2 are valid. The result is shown in the following diagram.

	ON	Time	OFF Time
Action	Operation Stop	j	t

• When the OFF time equals to the next ON time, the unit will perform the continuous operation. **(Example)** If 10:00 a.m. ~ 1:00 p.m. and 1:00 p.m. ~ 7:00 a.m. are set,

the unit will operate continuously from 10:00 a.m. to 7:00 p.m..

Program 1	Operation Stop _	ON 10:00 a.m.	OFF 1:00 p.m.	
Program 2	Operation Stop -		ON 1:00 p.m.	OFF 7:00 p.m
Action Time	Operation Stop -	ON 10:00 a.m.	·····	OFF 7:00 p.m

# **Day-off setting**

The timer setting by day can be temporarily cancelled through the day-off setting.



[Example] To set Wednesday as a day-off:

- 1 Press MODE (setting mode) switch to display DAY OFF (day-off setting).
- 2 Press SELECT (select) switch The symbol ▼ flashes on the week.
- 3 Make ▼ point to "W (Wednesday)" by pressing ◀ ► switch.
- 4 Press SET (set) switch When a square frame is added around W (Wednesday) and "W (Wednesday)" is displayed, the setting is done.
- 5 Press MODE (setting mode) switch to change the setting mode display to no display.
   Return to the monitor mode.
- To cancel the day-off setting, follow the above steps to make
  point to the weekday to be cancelled and press SET (set) switch.

# Method of clearing setting details

The timer setting, current time and day-off settings can be cleared. Press SET (set) switch and MODE (setting mode) switch at the same time. All the details set are cleared.

## Confirmation of time set by timer

The time set by the program timer can be confirmed.



- 1 Press CONFIRM (setting confirmation) switch
- 2 Press SELECT (select) switch

GROUP No. (group No.) 00 flashes.

- When not used in combination with central controller SLA-2A-E, the group No. is not displayed and ▼ symbol above the week flashes. Please continue the operation from Step 5.
- 3 Select the group No. to be confirmed by pressing witch
- 4 Press SELECT (select) switch

symbol above the week flashes.

- 5 Make ▼ symbol point to the week to be confirmed by pressing ◀ ▶ switch
- 6 Press SELECT (select) switch
  ▼ symbol above the PROGRAM (program) ① flashes.
- 7 Make the ▼ symbol point to the program No. to be confirmed by pressing ◀ ► switch.
  - The ON / OFF time of the timer is displayed.
- Press CONFIRM (confirm) switch again to return to the monitor mode.
- Communication abnormality occurs
  - In case of an abnormality, CHECK (check) is displayed above the OFF time and the error code is displayed at the display area of the OFF time. All the displays become blank except for the current time and week.
  - Please get in touch with the sales outlet where the respective unit was purchased and provide information including the "error code", "abnormality characteristics", and so on.

# Hints

 Keep switch pressed when selecting the group No., which can speed up the setting.

# When the check display appears



## About power failure compensation

### Hints

• The power failure compensation function is available in the weekly timer SCA-WT-E (which is set to invalid at the delivery from the factory).

Please get in touch with the sales outlet of the air-conditioner.

### ■ About Power Failure Compensation Function

• The setting status can be memorized when the power source for the weekly timer SCA-WT-E is disconnected due to power failure, etc.. Upon power recovery, the weekly timer may select to operate or stop based on the setting status at the time of the power recovery.

### (Example)



### When the timer is set as shown in the above diagram 1

The timer is set to stop upon the power recovery. Therefore, the air-conditioner stops.

### When the timer is set as shown in the above diagram (2)

The timer is set to operate upon the power recovery. Therefore, the air-conditioner starts to operate.

