SEM Controller Manual
(SEM-SW01N)

Version	V 1.8
Last Modified Date	2010-11-26
Author	Syswin Electronics, Inc.
	Yongbum Kim
	Tel: 82-31-203-0923
	Fax: 82-31-203-0933
	Mobile: 82-10-9128-7479
	e-mail: ybkim@syswin.co.kr
	D-1401Digital-Empire Bldg., 980-3,
	Youngtong-dong, Youngtong-gu, Suwon-si,
	Gyeonggi-do, Korea (443-813)

Syswin

Revision History

v.1.0 2010-10-1
- 1st Draft

v.1.1 2010-10-7
- Add enclosure specifications

v.1.1a 2010-10-8
- Correct the misprint

v.1.2 2010-10-8
- Add SEM Controller Emulator

v1.3 2010-10-19
- Add SEM Configuration S/W

v1.4 2010-10-20
- Add SEM Controller H/W

v1.5 2010-10-22
- Add download document & software

v1.6 2010-11-3
- Modification of SEM Manager S/W usage
- Setup communication of sensors

v1.7 2010-11-4
- Add RS-485 cable connection

v1.8 2010-11-26
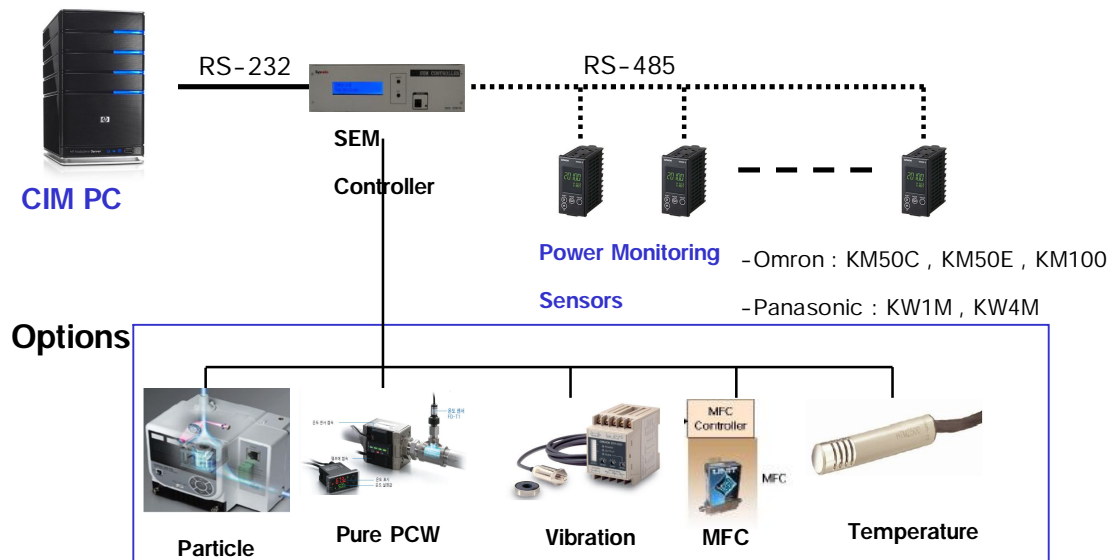- Add Error process

Table of contents

1. Introduction

SEM Controller is the environmental safety monitoring system for the equipment in the FAB. System can be installed easily by serial interface with CIM PC.

SEM: Samsung(Safety) Environment Monitoring

SEM Controller reads various information of sensor. Power monitoring, water usage, vibration and gas flow data can be read and transferred to CIM PC by SEM controller.

Real-time monitoring of the environment and safety data of equipment can reduce power consumption and implement the ECO business and the safe workplace.

SEM Controller provides a standard interface between the sensor and the CIM PC. This standard interface gives the ease of deployment, and guarantees future expandability. In the future, various sensors can be added to the equipment without any changes of CIM PC by SEM Controller.

CIM PC — RS-232 — SEM Controller — RS-485 — Power Monitoring Sensors
-Omron : KM50C , KM50E , KM100
-Panasonic : KW1M , KW4M

Options
Particle | Pure PCW | Vibration | MFC | Temperature

- Connectivity with various sensors
- Particle, temperature, pressure, leak detection, flow, MFC, concentration and water level

2. Specifications

SEM Controller has communication ports for sensors, serial ports for CIM PC and network port for Non-SECS equipment.
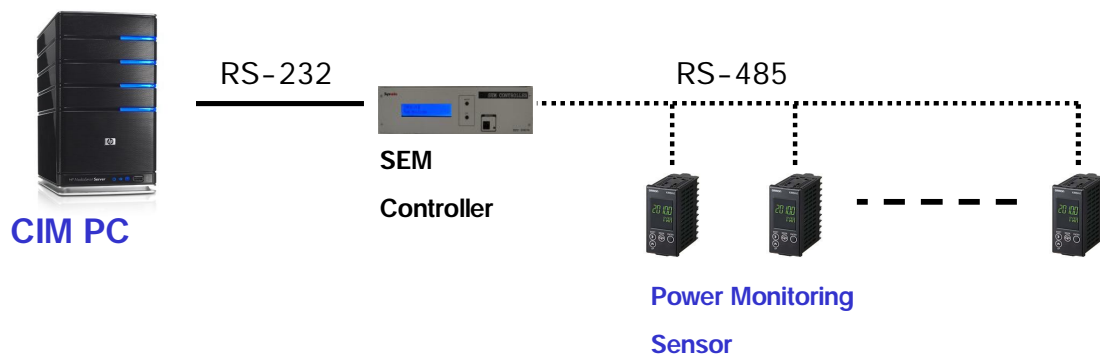
	Items	Specifications
Power	Voltage	AC 100~240V (50/60Hz)
	Current	10W
Communication	RS-232	3 Ports DB9 Female Connector
	RS-485	3 Ports Max. transmission 500m Max. 31 nodes Half duplex
	LAN	1 Port 10/100Base-T RJ-45
Analog input	A/D	4 Ports 0~5V DC input 10 bit ADC
LCD		16 characters X 2 lines (Support Korean) Blue Backlight Display status of controller
Temperature		-10 ~ +50℃
Humidity		25~80%RH

3. Communication Protocols

SEM Controller sends sensor data to the CIM PC through serial communication (RS-232). DB9 serial cable is used for the connection with CIM PC.

Connections are shown below.

CIM PC receives sensor data from SEM Controller and sends sensor data to EQ server by SECS protocol.

RS-232 cable connections are shown below.

Items	Specifications	Comments
Baud Rate	57,600 bps	
Parity	Even	
Data Bits	8	
Stop Bits	1	

(Serial Communication between CIM PC and SEM Controller)

Packet is in the form of an ASCII. STX is ¡$¡ and ETX are 0x0D and 0x0A(2B). Packet can be easily shown at the serial terminal program such as a hyper terminal of Windows OS.

Basic packet structure is as followings,

$	Data	0x0D, 0x0A

STX   Datra   ETX

(1B)   (nB)   (2B)

Example) $START(0x0D,0x0A)

Hex)   24h 53h 54h 41h 53h 54h 0Dh 0Ah

8B data should be transfer.

< Send Packet >
CIM PC → SEM Controller

Items	Packet	Description
Start	$START(0D0A)	After transmission of START command, sensor data can be received.
End	$END(0D0A)	After END command, SEM controller stops transmission of sensor data.

< Receive Packet >
SEM → CIM PC

Items	Packet	Description
Ack	$ACK(0D0A)	Response of $START and $END command
Data	$SVName(SVID)=Value, SVName(SVID)=Value,...(0D0A)	Sensor data packet
Error	$ERROR(42949)=Sensor Reading Error(0D0A)	Error packet

Data packet structure is

$SVName(SVID)=Value, SVName(SVID)=Value,...(0D0A)

Packet length is variable.

SVName and SVID are defined by customer and can be added or deleted by customer after installation of equipment.

So, CIM software should transfer sensor data without modification of SVName and SVID to the server.

SVID of environment and safety data are from 60000 to 65535. SEM Controller sends above SVID to CIM PC by the request of customer.

CIM PC has to transfer SVID to the server after receiving SVID from SEM Controller.

Sample Packet)

$N01_R_PW(60000)=200.5,N01_I_PW(60001)=100.9207.9,N01_R_VOL(60002)=207.9,N01_T_VOL(60003)=208.2,N01_R_CUR(60004)=10.5,N01_T_CUR(60005)=11.7(0D0A)

Error Packet structure is

$ERROR(Code)=Error Text(0D0A)

Error Packet)

$ERROR(1000001)=Sensor Reading Error(0D0A)

The error code of SEM Controller is 1,000,001. In the future error code 1,000,002, 1,000,003, ¡ can be used.

Communication protocols are as followings,

Error packet can be transferred after START command.

CIM PC does not respond to a specific period of time can be handled in Timeout.
(No response of $START command more than 3 seconds or No data in specific period.)

- Problem of serial port of CIM PC
- Problem of RS-232 cable
- Power failure or fault of SEM Controller

After timeout error, CIM PC should send alarm (alarm code 1,000,000) to the host and send $START command to SEM controller in every 60 seconds. Alarm can be transmitted only once, if timeout error is continued.

After fixing the problem, send $START command to resume gathering data.

Alarm Code	Alarm	Description
1,000,000	Timeout Error	CIM PC send alarm if no data from SEM Controller. Alarm can be transmitted only once.
1,000,001	SEM Controller Error	If SEM Controller detects errors of sensor, SEM Controller sends alarm message to CIM PC. Same alarm can be transmitted to the host.

Network port is ready for Non-SECS equipment. Sensor data is directly transferred to the server without CIM PC.
This feature can be applied in the future.

4. Configuration S/W (SEM Manager)

SEM Controller is provided with Configuration software.

< Configuration S/W >

Configuration S/W has following functions,

- Sensor configuration (ID, Sensor type, A/C Phase)
- Period of sensor data transfer

SEM Manager is as followings,

SEM Manager is the software that control and configure the SEM Controller at CIM PC.
To use this software on CIM PC, serial port must be connected to SEM Controller or SEM Emulator.
Connection with the SEM Controller, use general serial cable that provide with the SEM controller. SEM Emulator, use cross serial cable.

After program activation, open serial port first.

After port selection, press button.

If success, it shows below.

Configure sensors as following.

Select sensor ID at left table using mouse click first.

And, select sensor type and phase.

(Single phase-2 wires or Three phase-3 wires)

Sensor can be added or deleted using [Update] or [Delete] buttons.

Basically, SEM controller read sensor information when serial port is connected. But,

user can read manually sensor information using [Read Sensor Info.] button.

User can delete all sensor information once, click [Delete All] button. All sensor

configurations will be deleted.

After registration of sensor information, user can test SEM Controller using SEM manager.

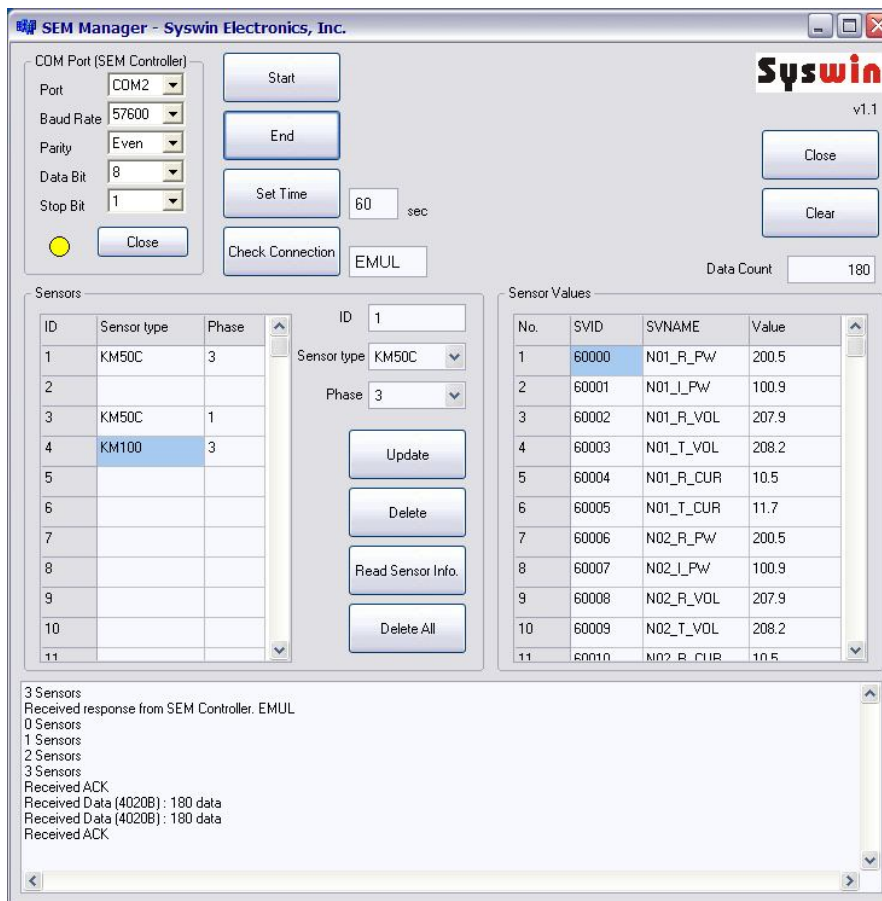 is used for test connection with SEM controller. After click the button, ¡Received response from SEM Controller¡ message will be displayed in normal case.

To test SEM controller, press button first, SEM Controller will send sensor data periodically. Please refer followings.

Sensor data transferred periodically.

Press button to stop SEM controller.

5. Emulation S/W

SEM Controller Emulation software is Windows PC version software. SEM emulator provides same communication protocol of SEM Controller. Sensor data transferred to CIM PC through RS-232 serial connection.
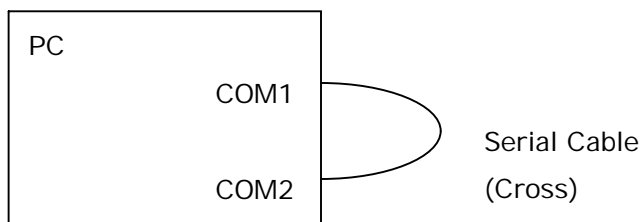
SEM emulator is used for development and test of SEM controller interface software instead of SEM controller.
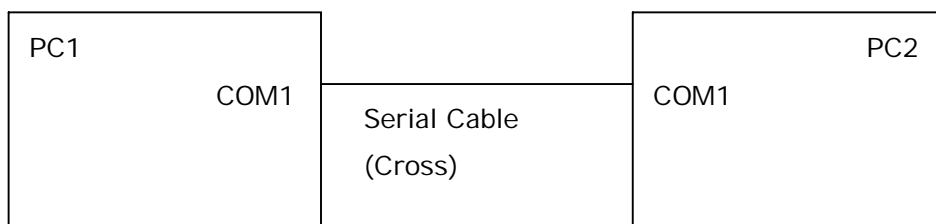
< Running environments >

OS: Windows OS

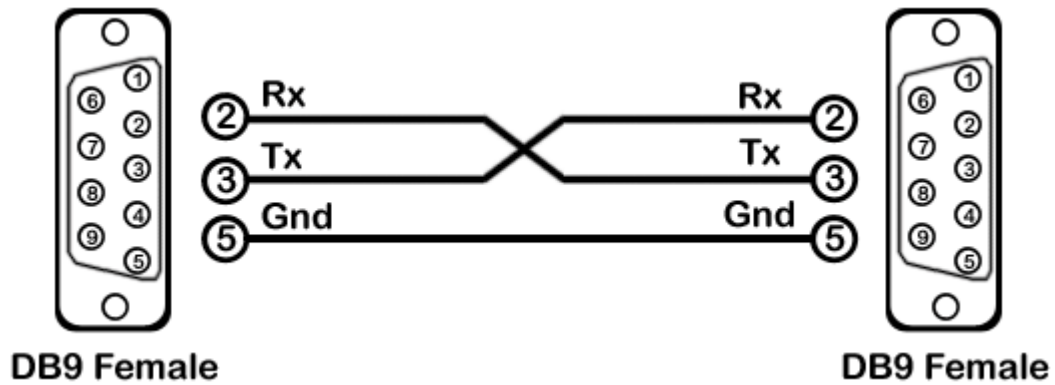COM Port: 2 serial ports (or 2 PCs with 1 serial port each)

To run the SEM emulator at CIM PC, two serial ports are required. Please connect serial port using cross serial cable as followings.

```
+----------------------+
| PC                   |
|          COM1  ------\
|                       )  Serial Cable
|          COM2  ------/   (Cross)
|                      |
+----------------------+
```

To run SEM emulator at another PC, please connect serial port as followings.

```
+------------------+                    +------------------+
| PC1              |                    |              PC2 |
|      COM1  -------+--------------------+  COM1            |
|                  |  Serial Cable      |                  |
|                  |  (Cross)           |                  |
|                  |                    |                  |
+------------------+                    +------------------+
```
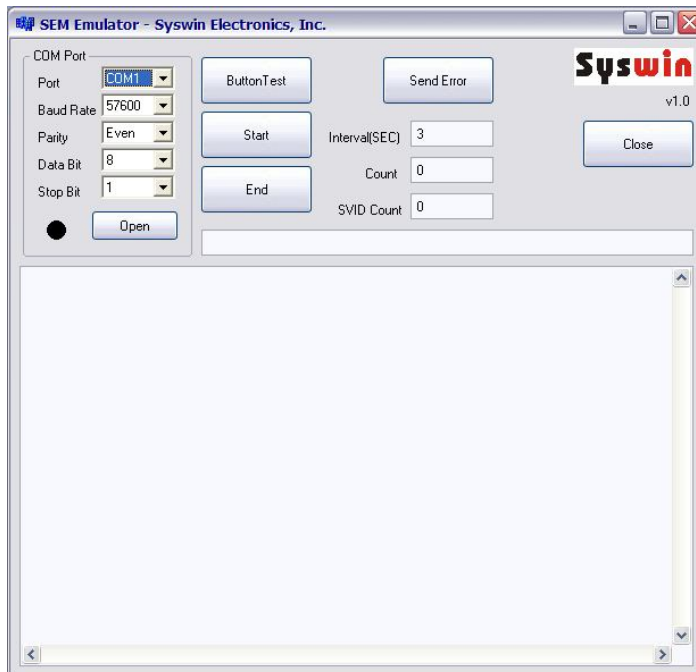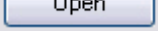
< Serial Cross Cable >

However, SEM controller uses standard serial cable. (The serial cable will be provided with SEM Controller.)
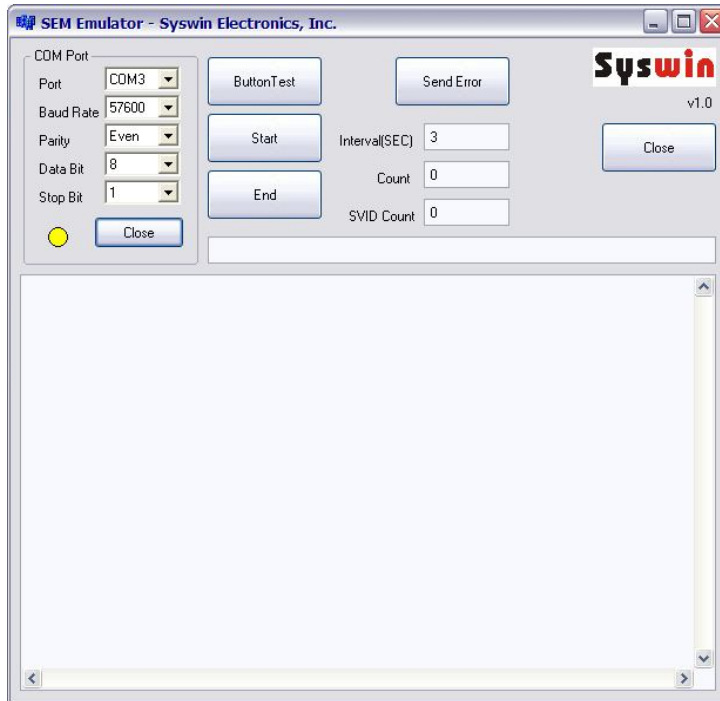
< SEM Emulator >

SEM Emulator can be downloaded at http://www.syswin.co.kr.

Decompress SEM Emulator.zip, and run SEMemulator.exe.

Select serial port first, and click [Open] button.

SEM emulator is used to test with CIM software that was developed by communication specifications of SEM controller.

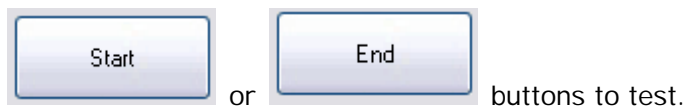When CIM software transfers $START command to SEM emulator, sensor data will be replied to CIM software.

Period of data transfer is configured at [Interval(SEC) 3] field.

Transferring data can be edited at sem.txt that was distributed with SEM emulator.

Modification of Sem.txt is allowed. After modification of sem.txt, please restart SEM emulator.

When developing CIM software, click [ButtonTest] to test one time data transfer.

Instead of sending $START or $END command at CIM software, developer can use

[Start] or [End] buttons to test.

To make error, click [Send Error] button to transfer error command.

6. Setup Sensors and Connections

SEM Controller supports the following sensors.

The sensor will be added in the future.

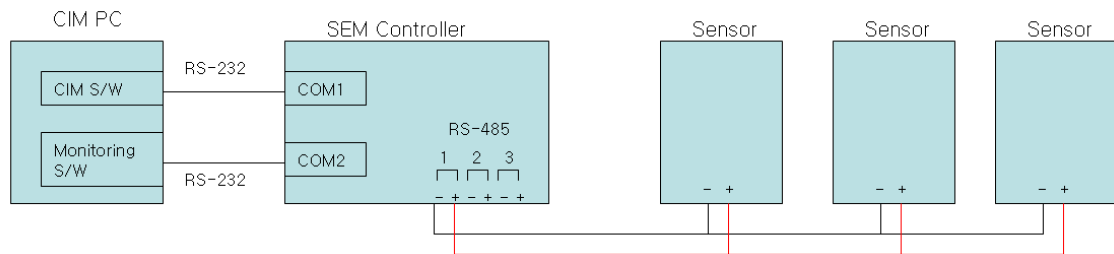| Items	Maker	Model	Comments
Power Monitor	Panasonic	KW1M	
		KW4M	
	Omron	KM50C	
		KM50E	
		KM100	

Communication Specifications are as followings,

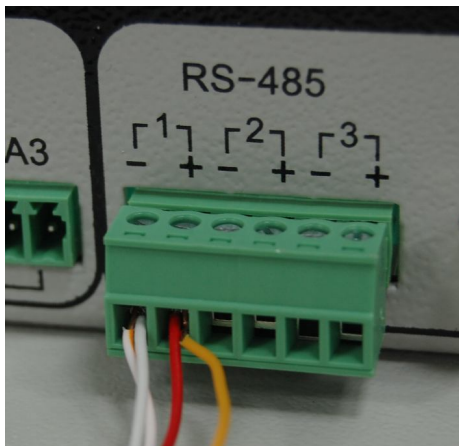Sensor No.(ID, Unit No.) is set from 1 to 31. (Use sequentially start from 1)

Maker	Model	비고
Panasonic	Protocol	MEWTOCOL
	Baud Rate	19,200 bps
	Data Bit	8 Bit
	Stop Bit	1 Bit
	Parity	Even
	Waiting Time	5ms
Omron	Protocol	CompoWay/F
	Baud Rate	19,200 bps
	Data Bit	8 Bit
	Stop Bit	1 Bit
	Parity	Even
	Waiting Tim	20ms

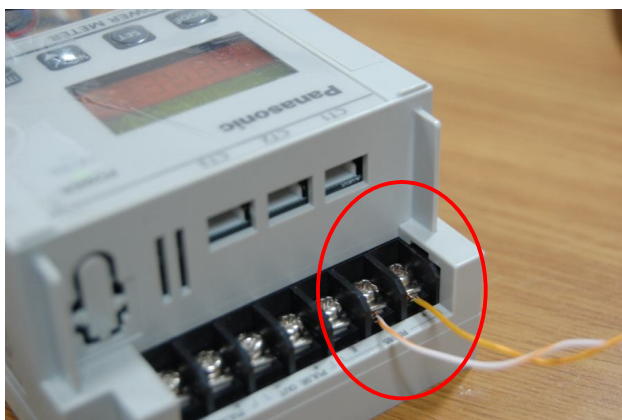Please refer to the sensor manual.

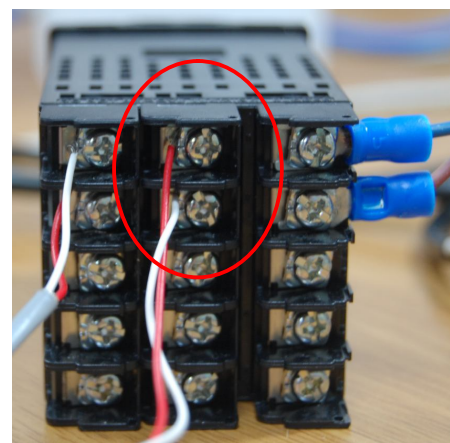RS-485 cable connection between SEM controller and sensor is following.

Maximum 31 sensors can be connected to the SEM controller. Connect Rs-485 port 1 of SEM controller to the sensors.

<SEM Controller>

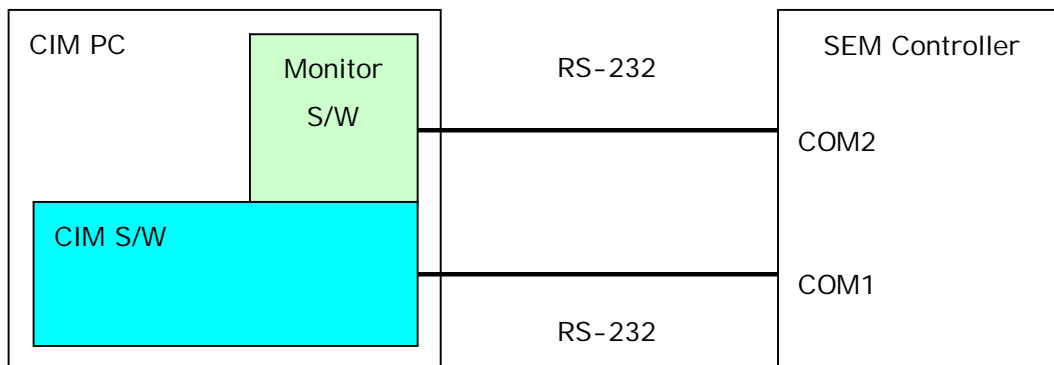<Panasonic KW1M>

<Omron KM50C>

7. Software Interface

The power monitoring software can be used with SEM controller at CIM PC simultaneously.
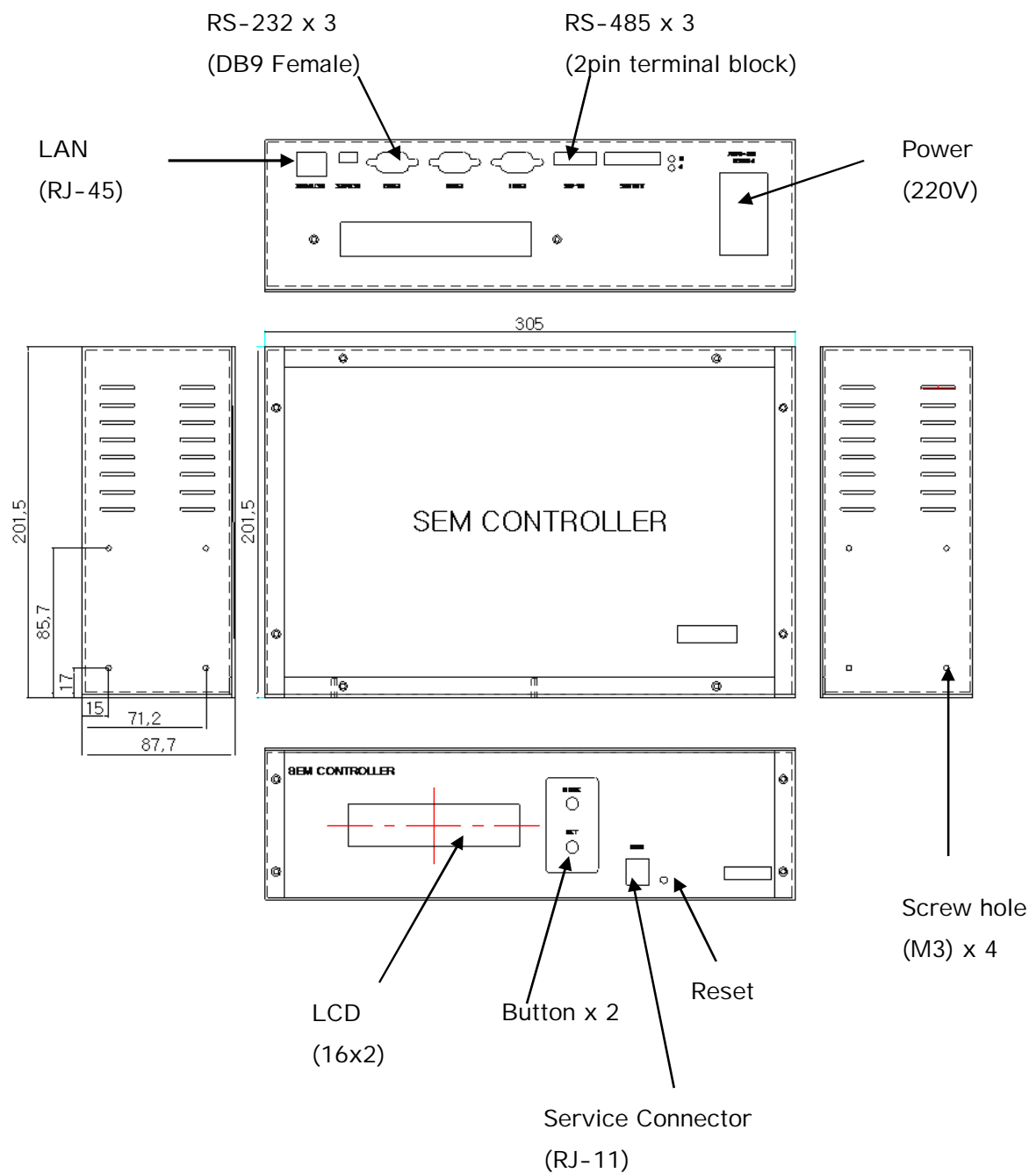
The serial cable connection is as followings.

CIM software can run with power monitoring software that provided by sensor makers at CIM PC. To use power monitoring software simultaneously, CIM PC has to have two serial ports.

Following monitoring software are supported.

Maker	S/W	
Panasonic	KW Monitor v2.0	
Omron	Easy KM Monitoring S/W	

8. Drawings

SEM Controller configuration of the enclosure as follows. (Unit: mm)
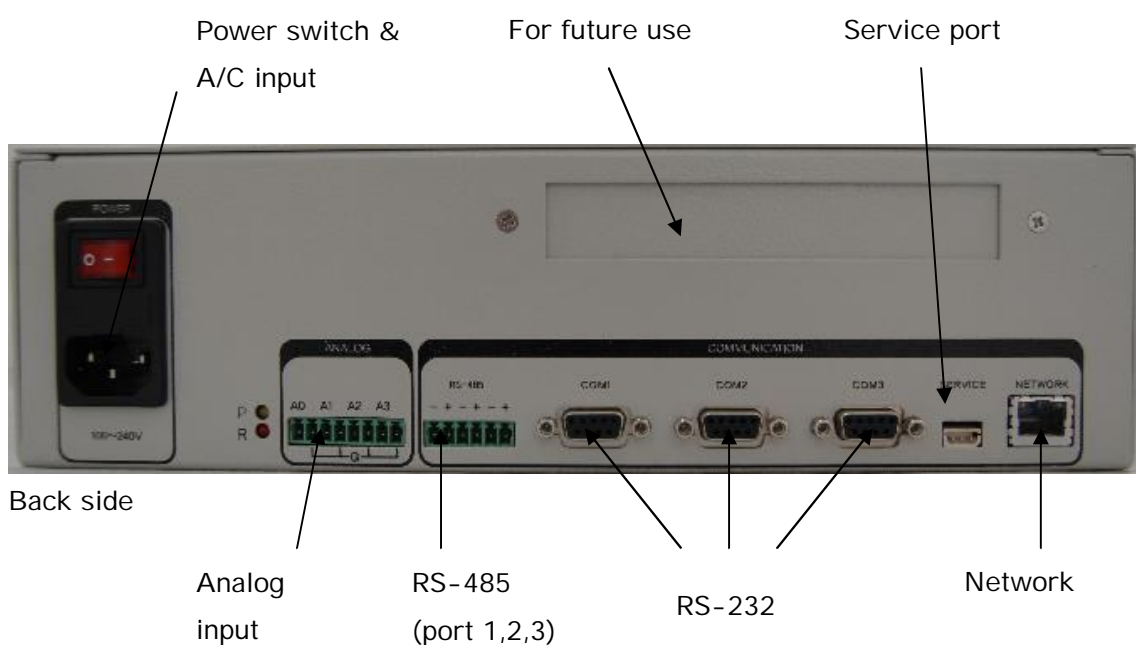
RS-232 x 3
(DB9 Female)

RS-485 x 3
(2pin terminal block)

LAN
(RJ-45)

Power
(220V)

305

201,5

201,5

85,7

17

15

71,2

87,7

SEM CONTROLLER

SEM CONTROLLER

Screw hole
(M3) x 4

LCD
(16x2)

Button x 2

Reset

Service Connector
(RJ-11)

SEM Controller

Display   Buttons

Front side

Power switch &   For future use   Service port
A/C input

Back side

Analog   RS-485   Network
input   (port 1,2,3)   RS-232

9. Download documents and software

SEM controller manuals and software can be downloaded from website of Syswin Electronics, Inc.

Please visit http://www.syswin.co.kr

Click COMMUNITY–documents (자료실)

Password is sem.