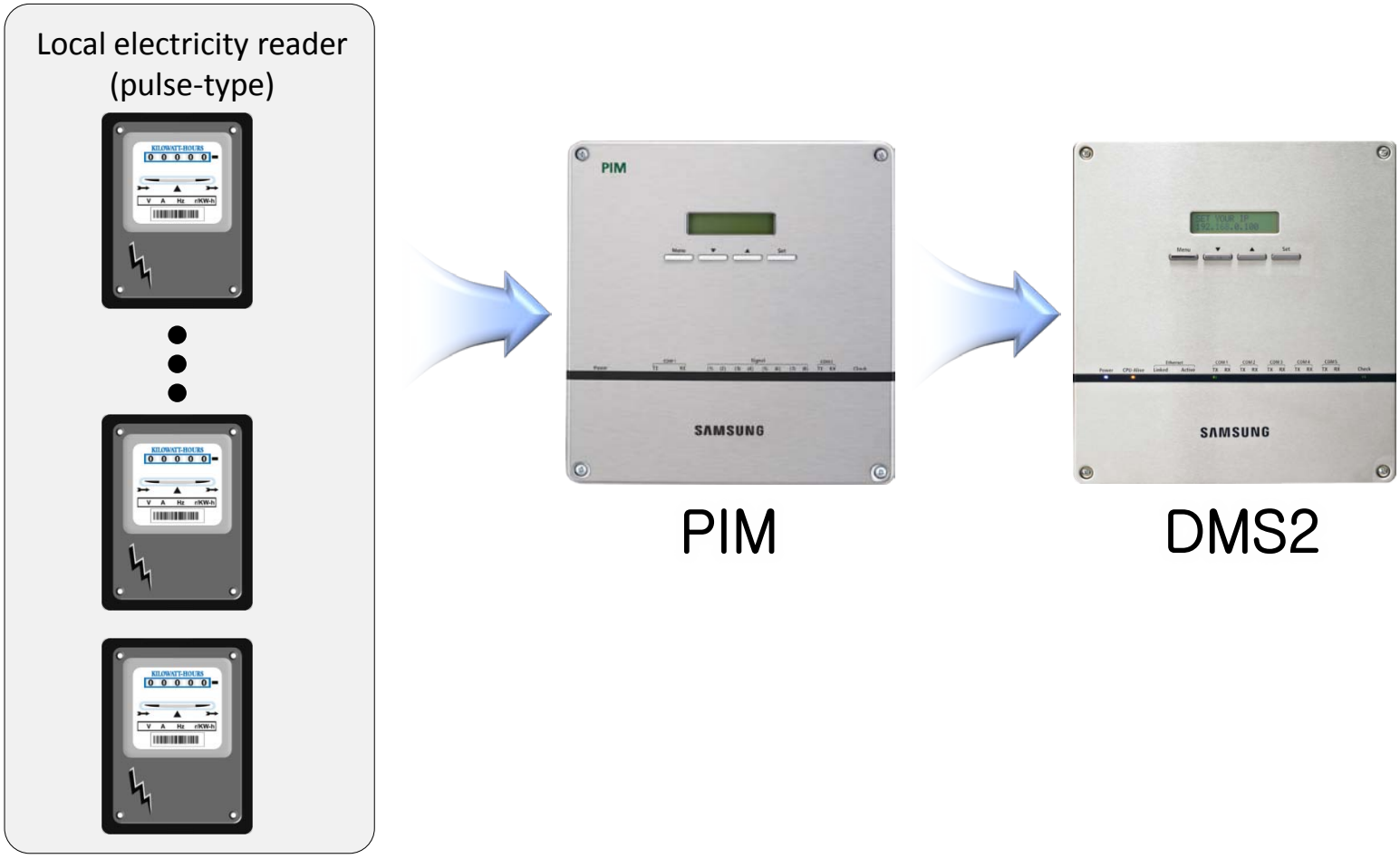
Electricity meter interface module

MIM-B16

Electricity meter interface module

- **PiM (Pulse Input Module, model name : MIM-B16)**
  - Interface module transmitting energy use reading of electricity readers to DMS1(MIM-D00) or DMS2(MIM-D00A) for electricity billing to each of tenants using air-conditioning system



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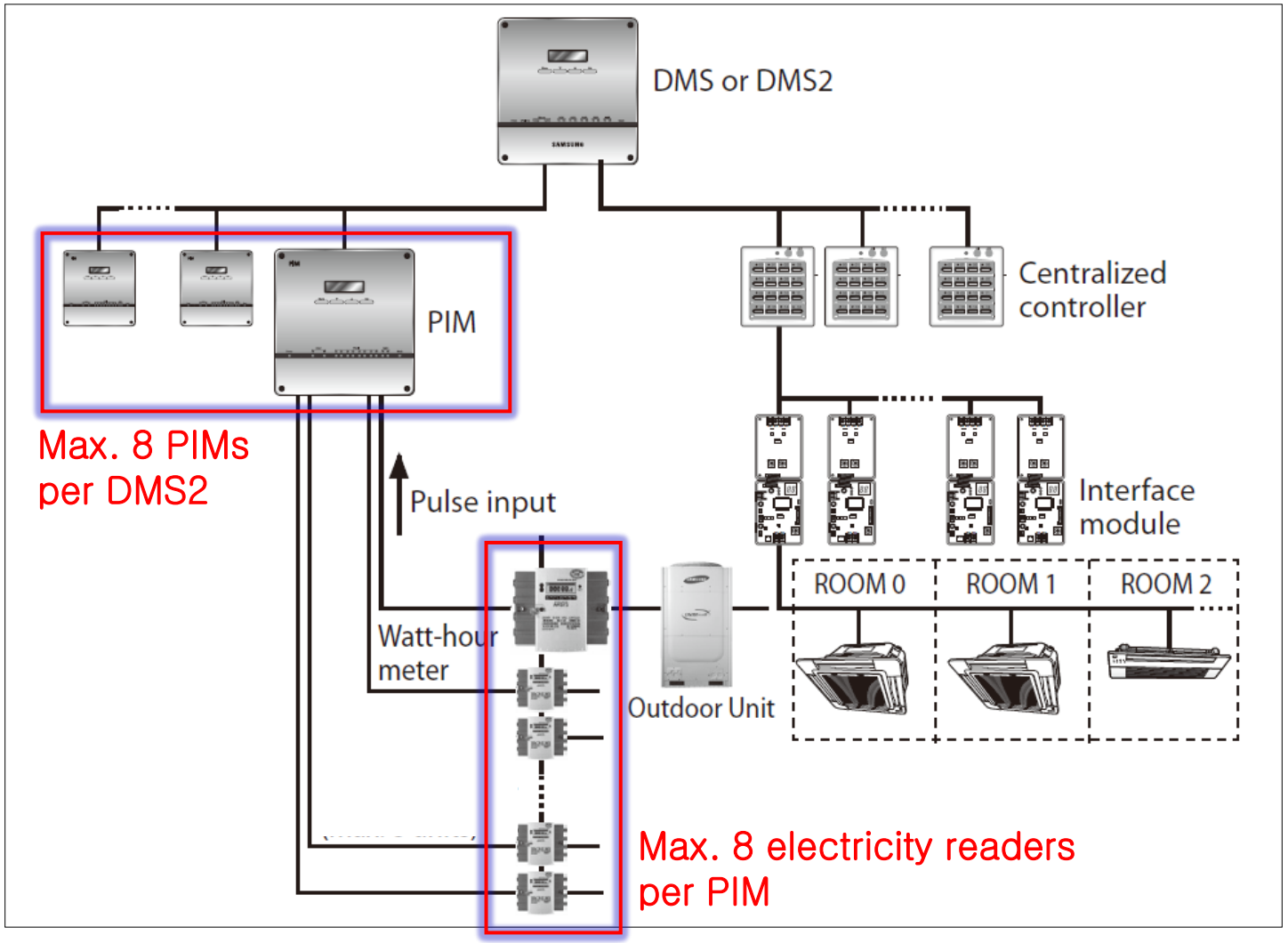
- **System diagram**



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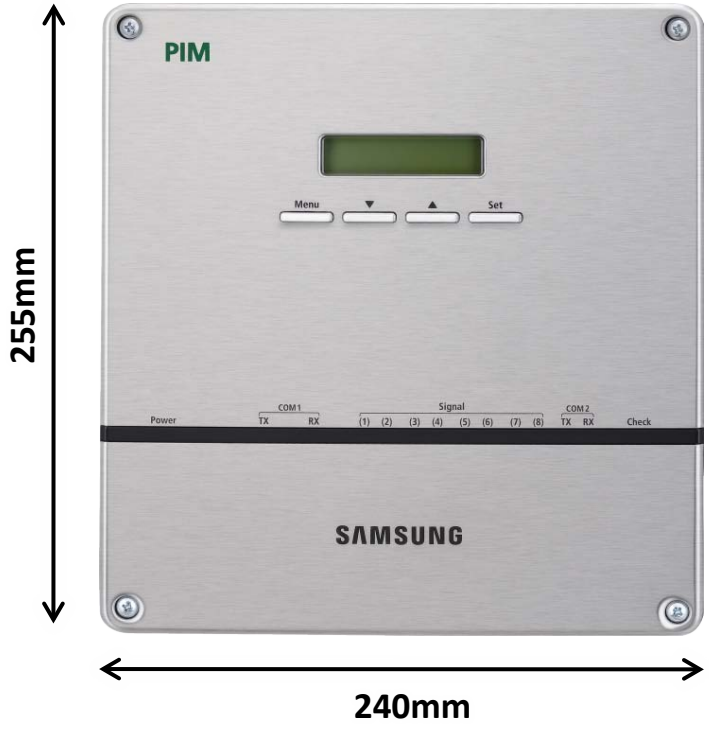
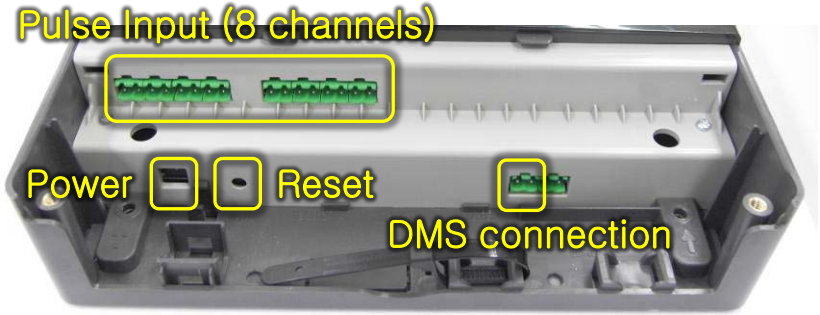
- **PiM structure**

Front view

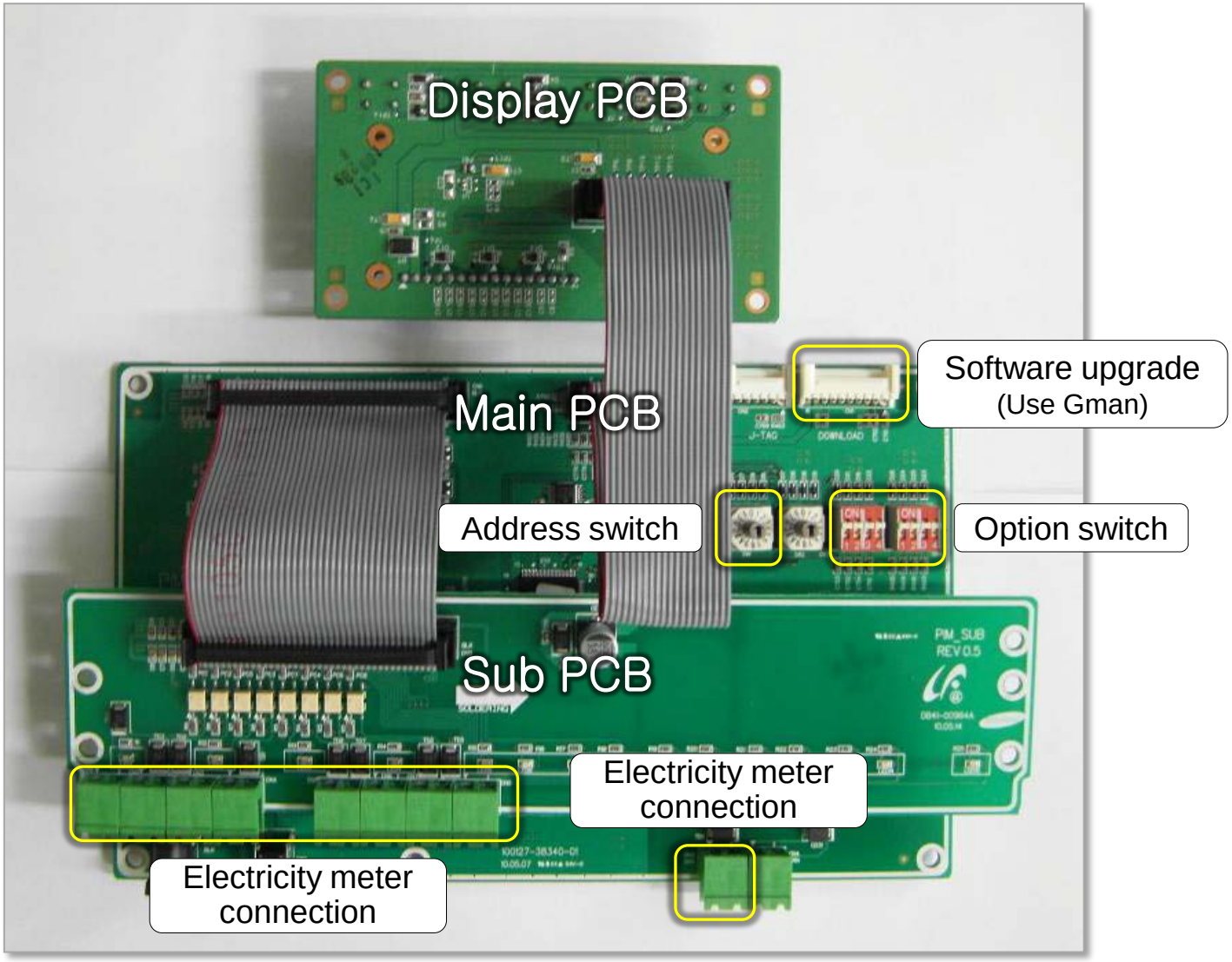


Interior view



Electricity meter interface module

- **PCB**



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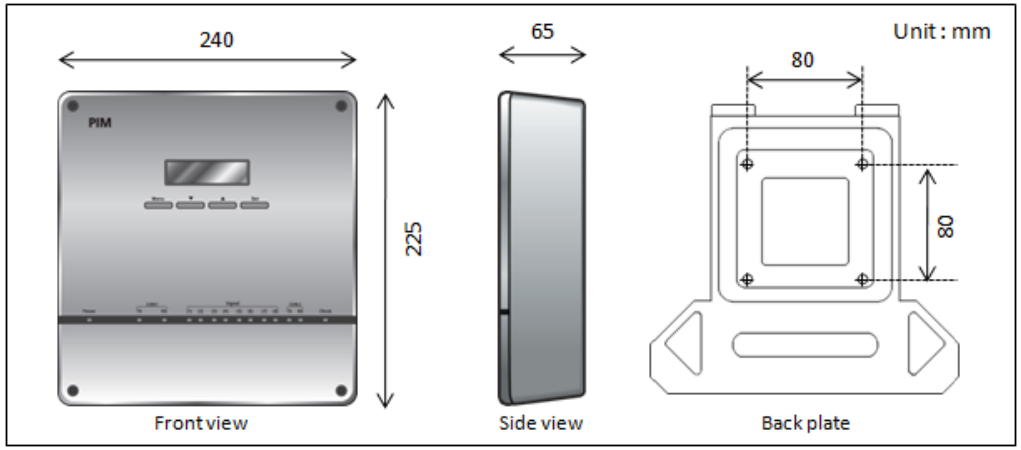
• Features

- Pulse output electricity meter interface unit (max. 8 meters)
- 8-channel energy consumption display in real time
- System configuration with button manipulation
- Various text messages in LCD
- Current communication state indication

Power supply (adapter)	Input : 100~240VAC, 50/60Hz, 1.0A, Output : 12VDC, 3.0A
Operating temperature range	0℃ ~ 40℃
Operating humidity range	0%RH ~ 90%RH
Storage temperature range	-20℃ ~ 70℃
Maximum wiring length	DMS2 : 1000m, Electricity meter : 200m
Number of electricity meters	Electricity meter : max. 8 units



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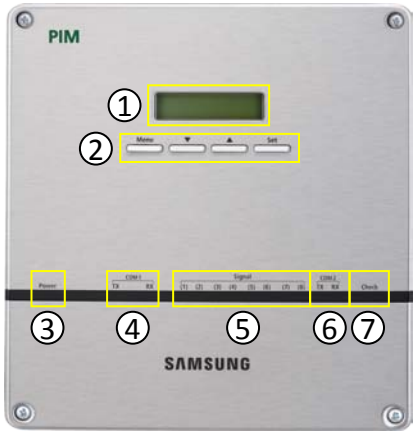
- **Display and buttons**



No	Name	Description
1	LCD window	Information on current electricity readings, settings and operation state is displayed (16 character x 2 line LCD).
2	Menu button	Various menus are selected to monitor current electricity readings, to make configuration settings for electricity meters , and to check the error/settings.
3	Power (blue)	It’s ON when power is supplied normally.
4	Communication (orange)	It blinks when communication between DMS(or DMS2) and MIM-B16 normally works.
5	Pulse input (orange)	Each of the 8 LEDs blinks whenever a pulse from an electricity meter is detected.
6	Communication (orange)	Reserved
7	Check	It’s ON when errors occur in communication or pulse input from electricity meters.

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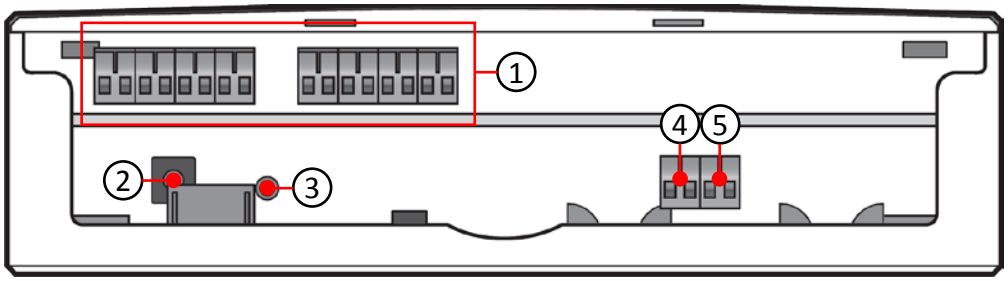
- **Connector and switch**



No	Name	Description
1	Pulse input terminals	8 terminals are allocated to interface pulse-type electricity meters. Each terminal is seen with a dedicated address on DMS (or DMS2).
2	Power input	Power supply via the power adapter
3	Reset button	Press the button to reset the MIM-B16.
4	COM1	Connection terminal for RS485 communication with DMS (or DMS2)
5	COM2	Reserved

SW1 SW2

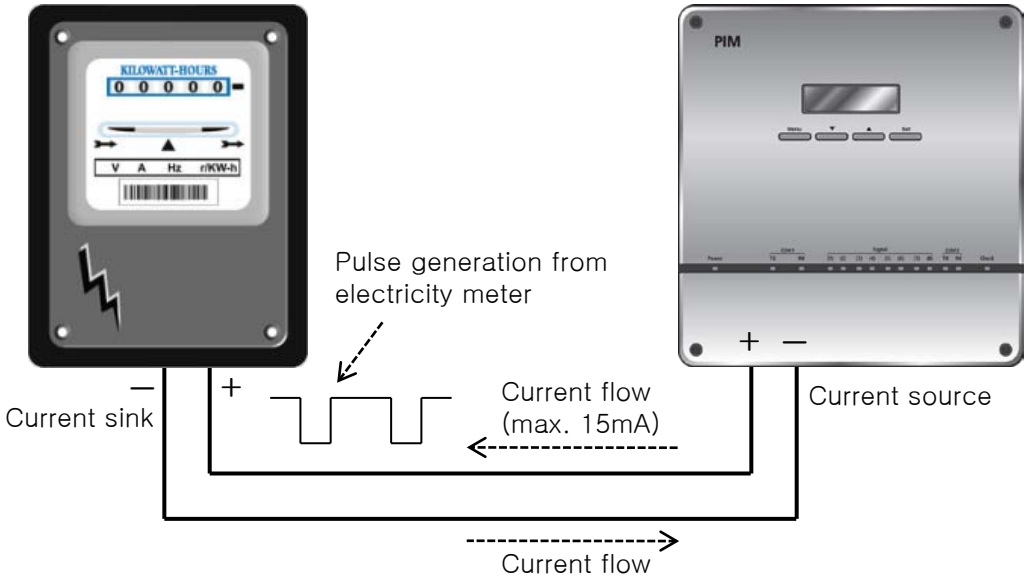
Address switch

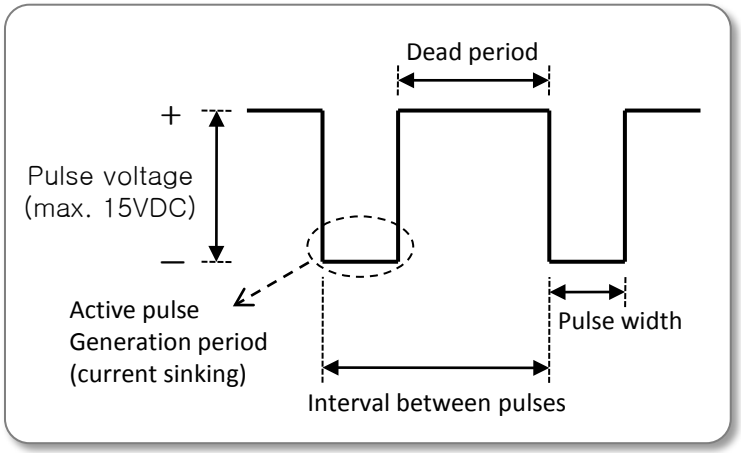
Option switch

No	Name	Description
1	SW1	No function
2	SW2	MIM-B16 address switch. Address greater than 7 (8~F) is not recognized.
3	SW3	No function
4	SW4	No function

Electricity meter interface module

- **Specifications on electricity meter**
  - a. Current flow on output : Current-sinking
  - b. Pulse rate : 1 ~ 10000 Wh/pulse (no decimal pulse rate allowed)
  - c. Pulse width : 20 ~ 400ms (in 1ms units) with +/- 5% tolerance
  - d. Time interval between pulses : min. 3ms
  - e. Allowable current sinking : min. 15mA
  - f. Withstanding voltage : min. 15VDC
  - g. Interface circuitry : Electronic isolation circuitry recommended, no voltage output





NOTE

1. Interface circuitry of an electricity meter has to withstand min. 15mA and min. 15VDC, both of which are applied by MIM-B16.
2. Although MIM-B16 interface circuitry is realized with electric isolation components, it's highly recommended that interface circuitry of an electricity meter be designed with isolation to ensure robustness from contact spike during wiring or electric interference.

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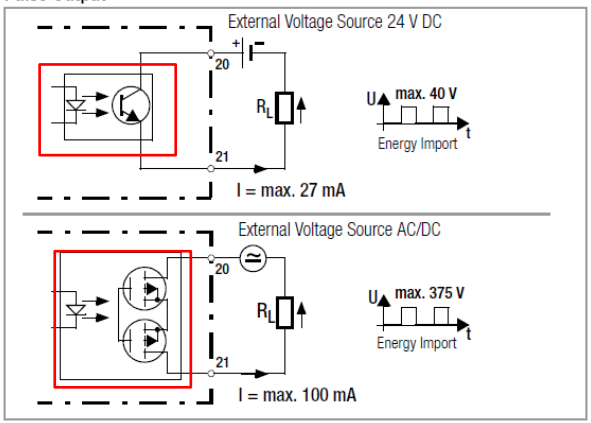
- **Example of electricity meter selection**

Model : Gossen Metrawatt GMBH (Germany)

Electrical Values

Pulse generator constants with direct connection	1000 pulses per kWh 1 Wh/pulse
Pulse generator constants with transformer connection	1000 pulses per kWh
Pulse duration	30 ms +5%
Interpulse period	>30 ms
U_{ext}	max. 40 V (375 V for feature V3, V4)
Switching current	max. 27 mA (100 mA for feature V3, V4)

Pulse Output



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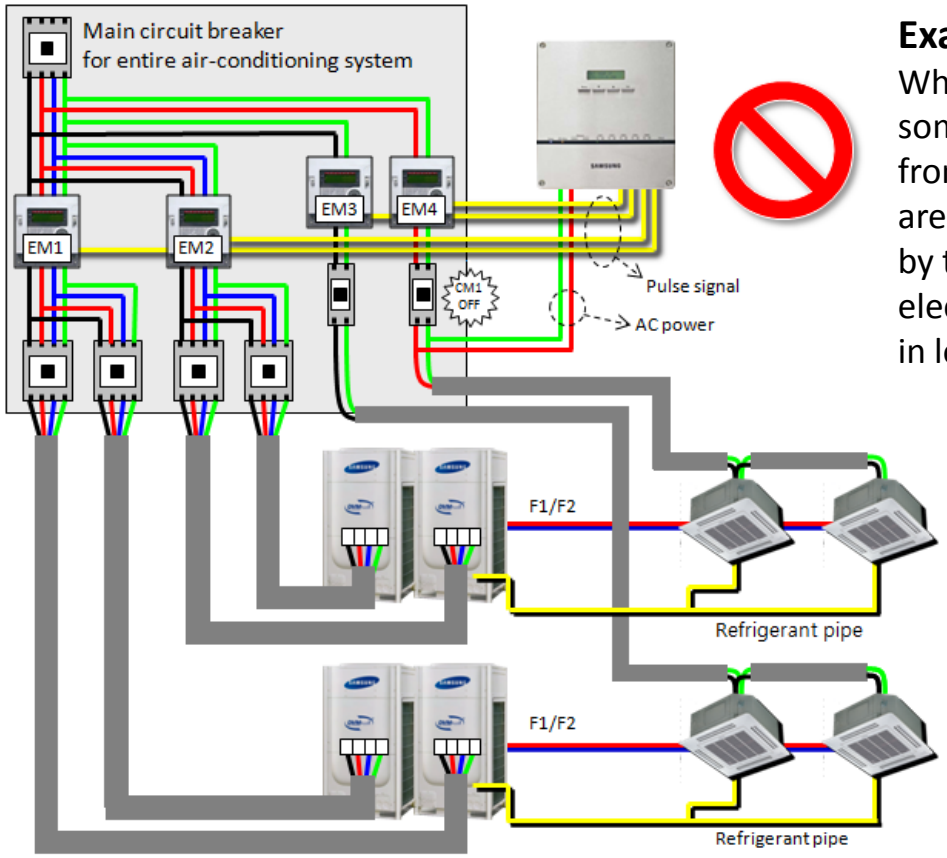
- **Installation**

MIM-B16 must not be installed in a way that power to MIM-B16 is powered off when one of the over-current circuit breakers is switched off. Power supply to MIM-B16 must be off only when all the power supplies to refrigerant systems whose power consumptions are monitored by the MIM-B16 are cut off. This is because every pulse from electricity meters of some alive refrigerant systems must be sensed normally even if power supplies to other refrigerant systems have troubles.



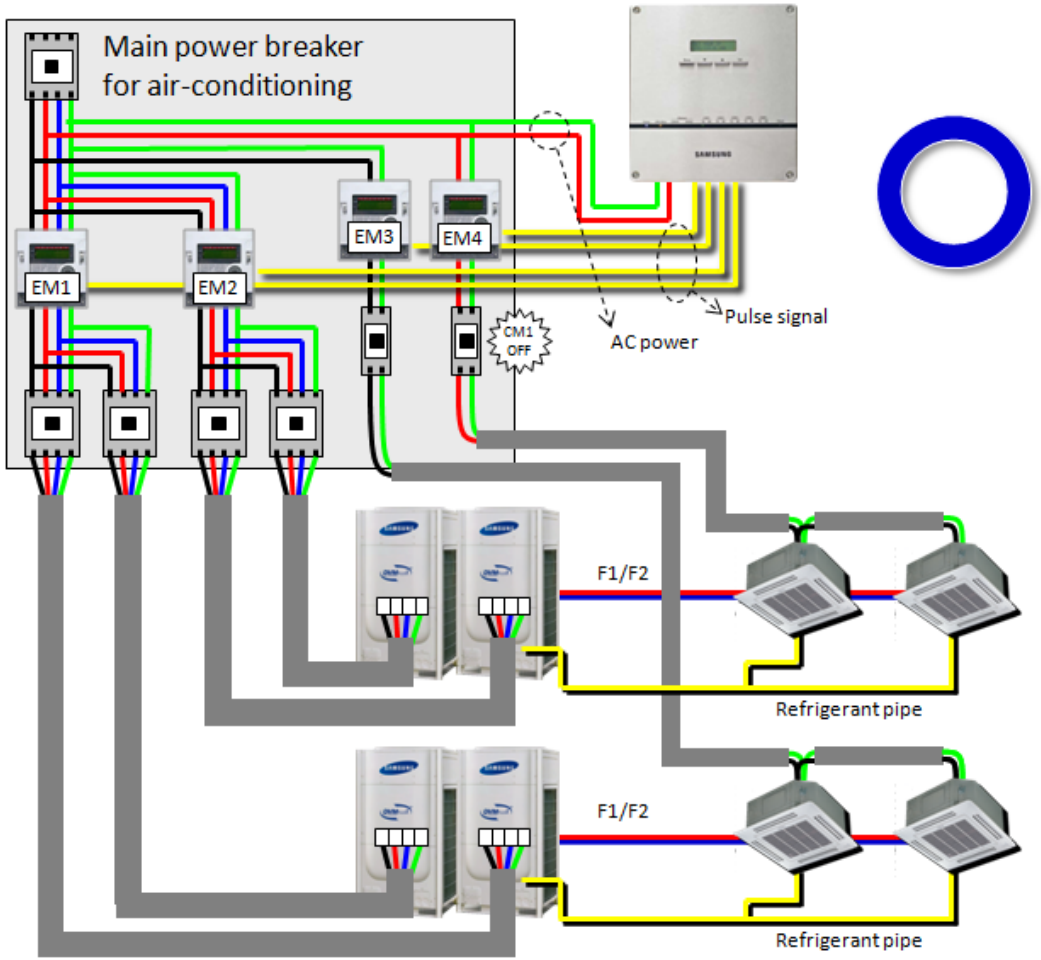
Example 1)

When the circuit breaker, CM1 is switched off for some reason while the others are still on, pulses from the electricity meters, EM1, EM2 and EM3 are not calculated by MIM-B16, whose power is off by the CM1. This installation could lead to errors in electricity billing function when power interruption in local areas occurs

Electricity meter interface module

Example 1)

Even when the circuit breaker, CM1 is switched off while the others are on, pulses from the electricity meters, EM1, EM2 and EM3 are still calculated by MIM-B16, whose power is not interrupted by CM1.

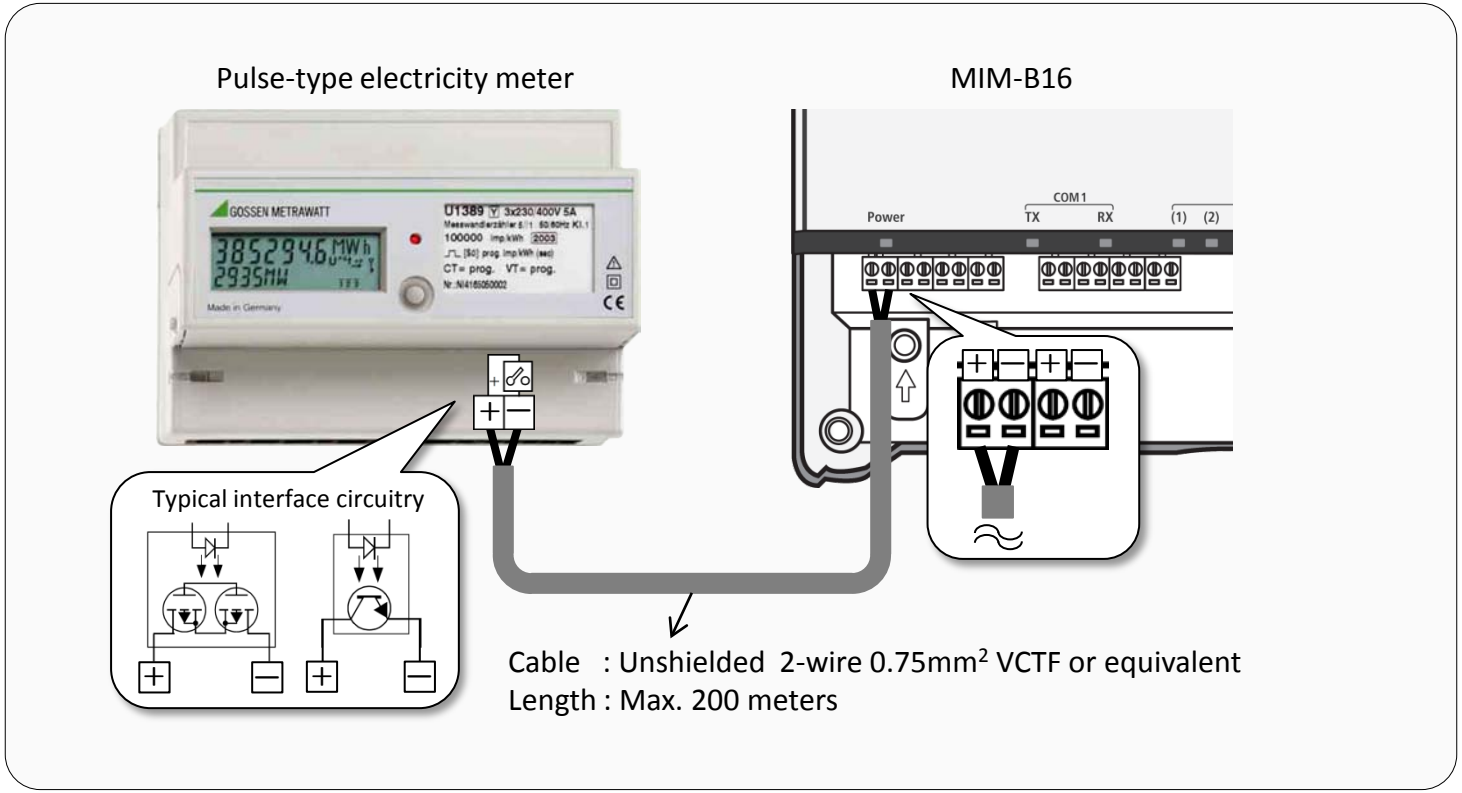


Electricity meter interface module

- **Wiring**

a. Wiring to electricity meter

- Attention must be paid to make polarized connection between an electricity meter and MIM-B16 with correct specifications on wires.



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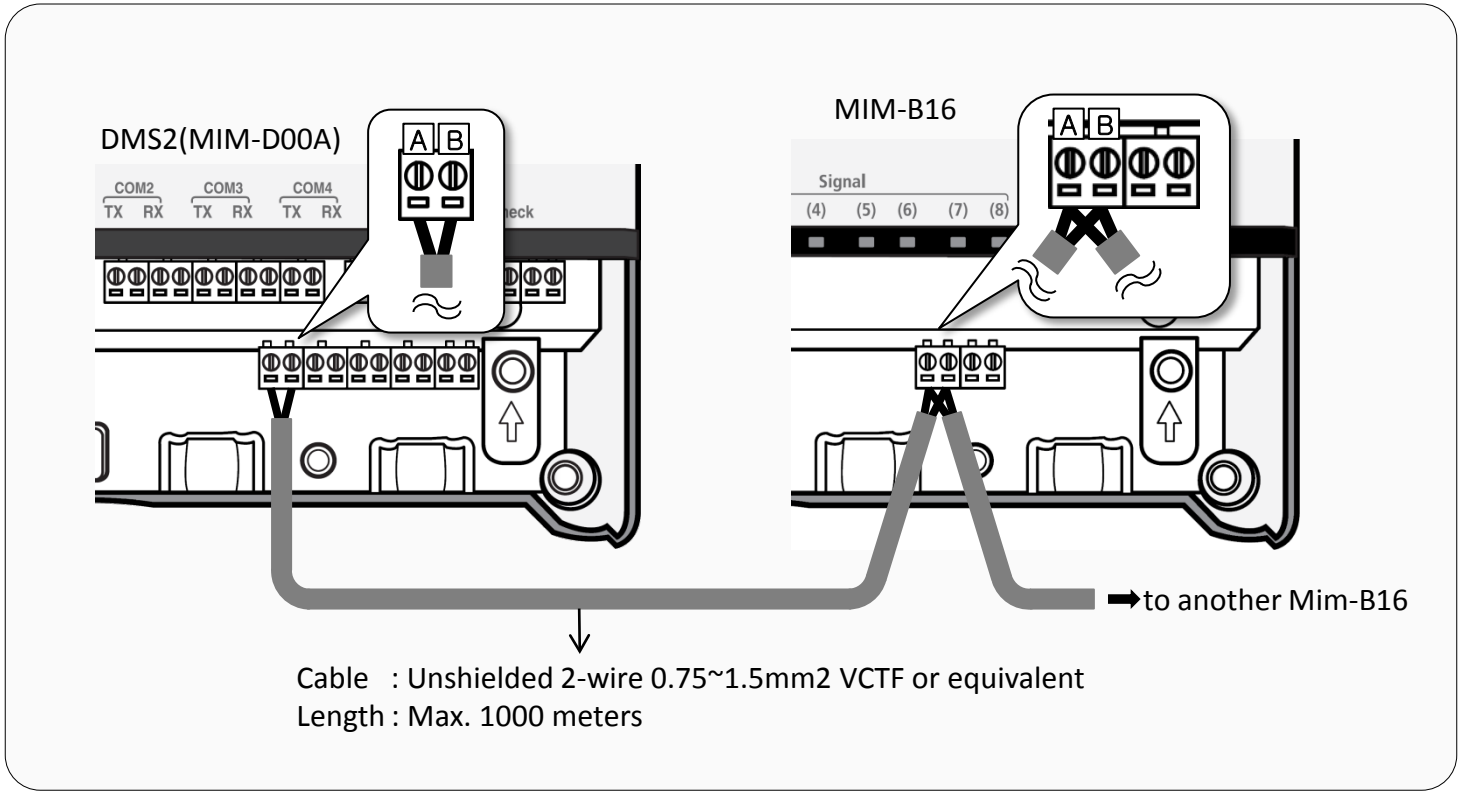
- **Wiring**

b. Wiring to DMS

- Make sure that communication cable is wired between DMS2 and MIM-B16 with the right polarity.



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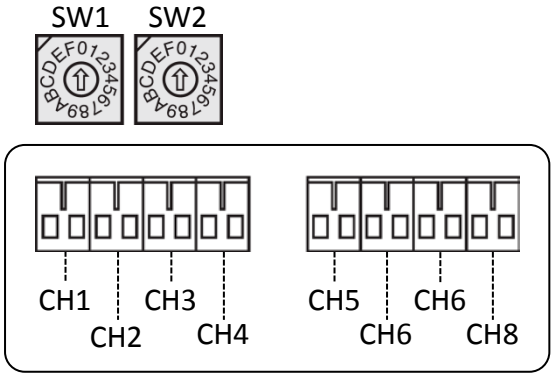
• PiM address assignment

- Each of the electricity meters is assigned with the dedicated address depending on MIM-B16 address setting and the position of the pulse input terminals.



SW2	Pulse input terminal							
	CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8
0	16.1	16.2	16.3	16.4	16.5	16.6	16.7	16.8
1	17.1	17.2	17.3	17.4	17.5	17.6	17.7	17.8
2	18.1	18.2	18.3	18.4	18.5	18.6	18.7	18.8
3	19.1	19.2	19.3	19.4	19.5	19.6	19.7	19.8
4	20.1	20.2	20.3	20.4	20.5	20.6	20.7	20.8
5	21.1	21.2	21.3	21.4	21.5	21.6	21.7	21.8
6	22.1	22.2	22.3	22.4	22.5	22.6	22.7	22.8
7	23.1	23.2	23.3	23.4	23.5	23.6	23.7	23.8
8~15	Not recognized							

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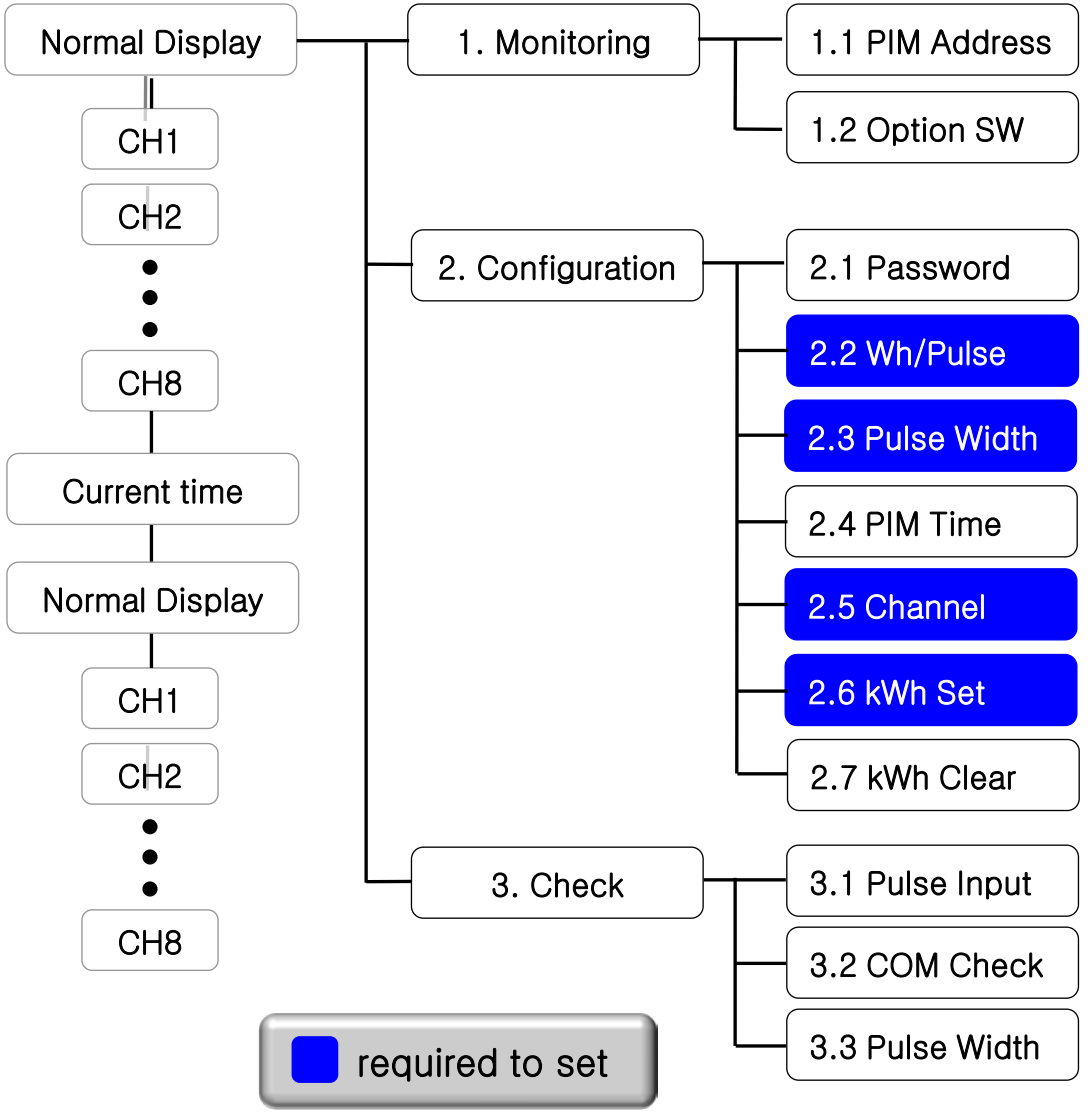
- **Menu structure**

Menu buttons



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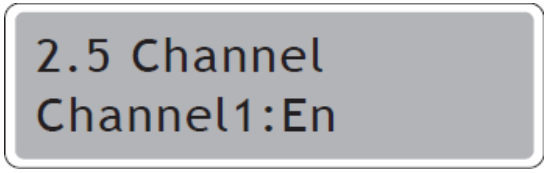
- **Menu setting**
  - Password

  - Current time

  - Pulse rate

  - Pulse width

  - Channel use



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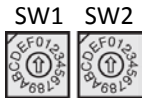
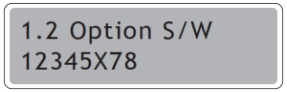
• Menu description

<table>
<tr><th>Main menu</th><th>Sub menu</th><th>Description</th></tr>
<tr><td rowspan="2">Monitoring</td><td>PIM Address</td><td>The MIM-B16 address is displayed with the physical address(SW1) added by 10H on the LCD window.
Ex)
<table>
<tr><th>LCD</th><th>SW1 setting</th></tr>
<tr><td>10H</td><td>0</td></tr>
<tr><td>11H</td><td>1</td></tr>
<tr><td>…</td><td>…</td></tr>
<tr><td>17H</td><td>7</td></tr>
</table>



</td></tr>
<tr><td>Option SW</td><td>Option switch setting to ON is displayed with the position number at the corresponding positions while setting to OFF is shown with the mark ‘X’.
Ex)



</td></tr>
<tr><td rowspan="3">Configuration</td><td>Password</td><td>The password, which is asked to enter to change the configuration setting, is used to prevent unauthorized persons from accessing MIM-B16. Factory setting is ‘0000’.</td></tr>
<tr><td>Wh/Pulse</td><td>The pulse rate of electricity meters must be set to calculate power consumption from the incoming pulse. The pulse rate in Wh/pulse must be an integer with no support of decimal numbers.
The allowable range is 1~10000 Wh/pulse.</td></tr>
<tr><td>Pulse Width</td><td>The width of the pulse from an electricity meter must be in the range between 20ms and 400ms during current sink into the meter.</td></tr>
</table>

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• Menu description

Main menu	Sub menu	Description
Configuration	PIM Time	Current time is recommended to set for future use.
	Channel	Each of the 8 electricity meter interface channels is required to set to be enabled or disabled. Channels where electricity meters are connected must be set to be enabled.
	kWh Set	Initial electricity reader value must be set as a starting point for each of the enabled interface channels.
	kWh Clear	Each or all the initial kWh values are cleared when selected.
Check	Pulse Input	When pulse input is detected during the test period, the channel numbers are displayed. Otherwise, the character 'X' is displayed on the corresponding channel position. All Check End X2XX5X7X
	COM Check	Make a loopback connection between COM1 and COM2 to check if the DMS communication channel is working or not. Be careful with polarity.   When the COM1 communication channel is normal, the message 'OK' is displayed on the LCD window.

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• Menu description

Main menu	Sub menu	Description
Check	Pulse Width	The pulse width test result is displayed with the messages “OK” or “NG” followed by the set and measured width values. CH1 Check End NG (S:020 M:000) S : set value M : measured value

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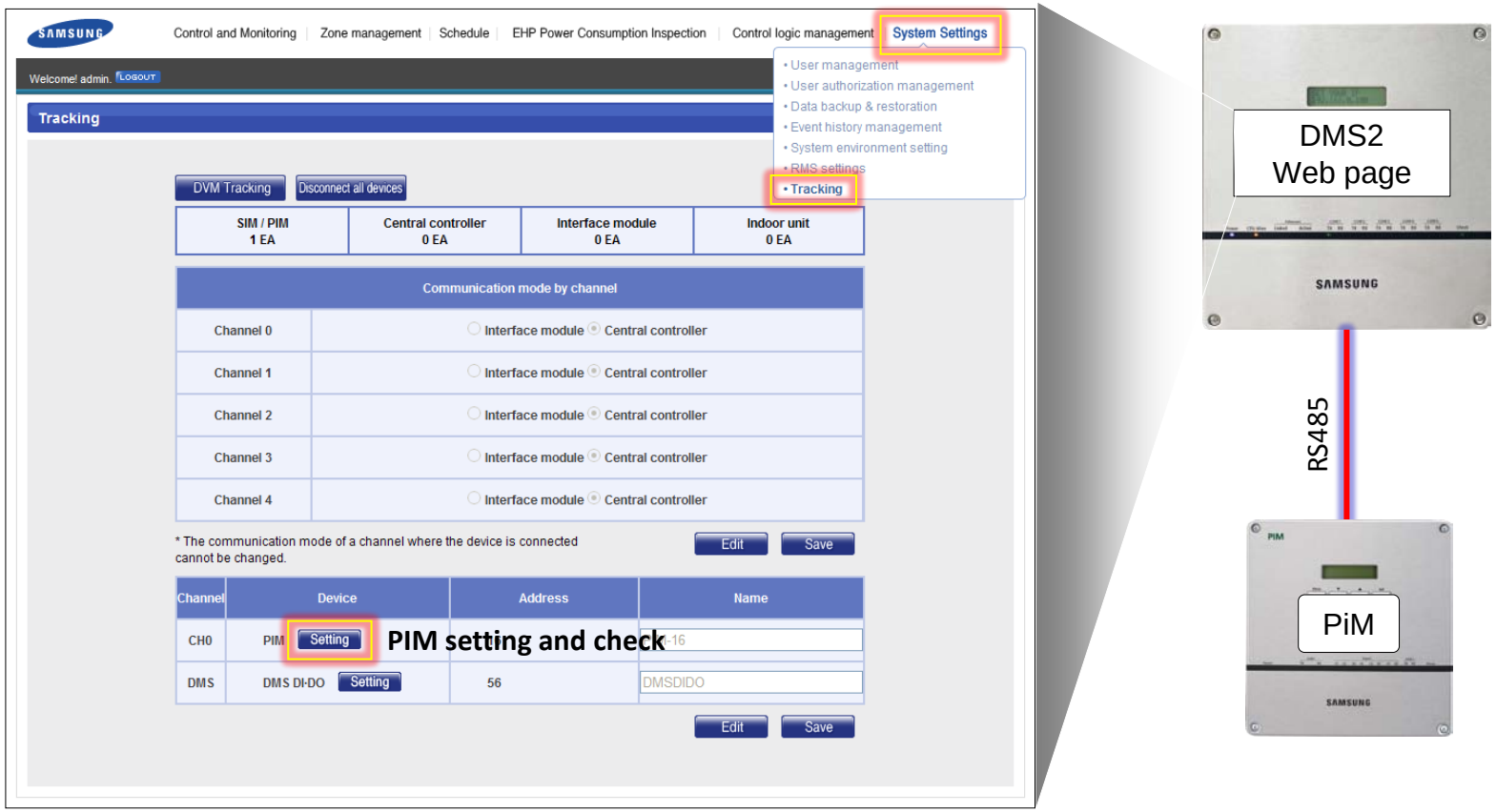
- **Setting parameters on DMS2(MIM-D00A)**

  The following parameters for MIM-B16 can be also set and monitored on DMS2(MIM-D00A)

  - Current power consumption(kWh), Pulse rate(Wh/p), Pulse width(ms)
  - Channel Enable/Disable, Current time, Password



– DMS2 web page for setting MIM-B16 parameters –

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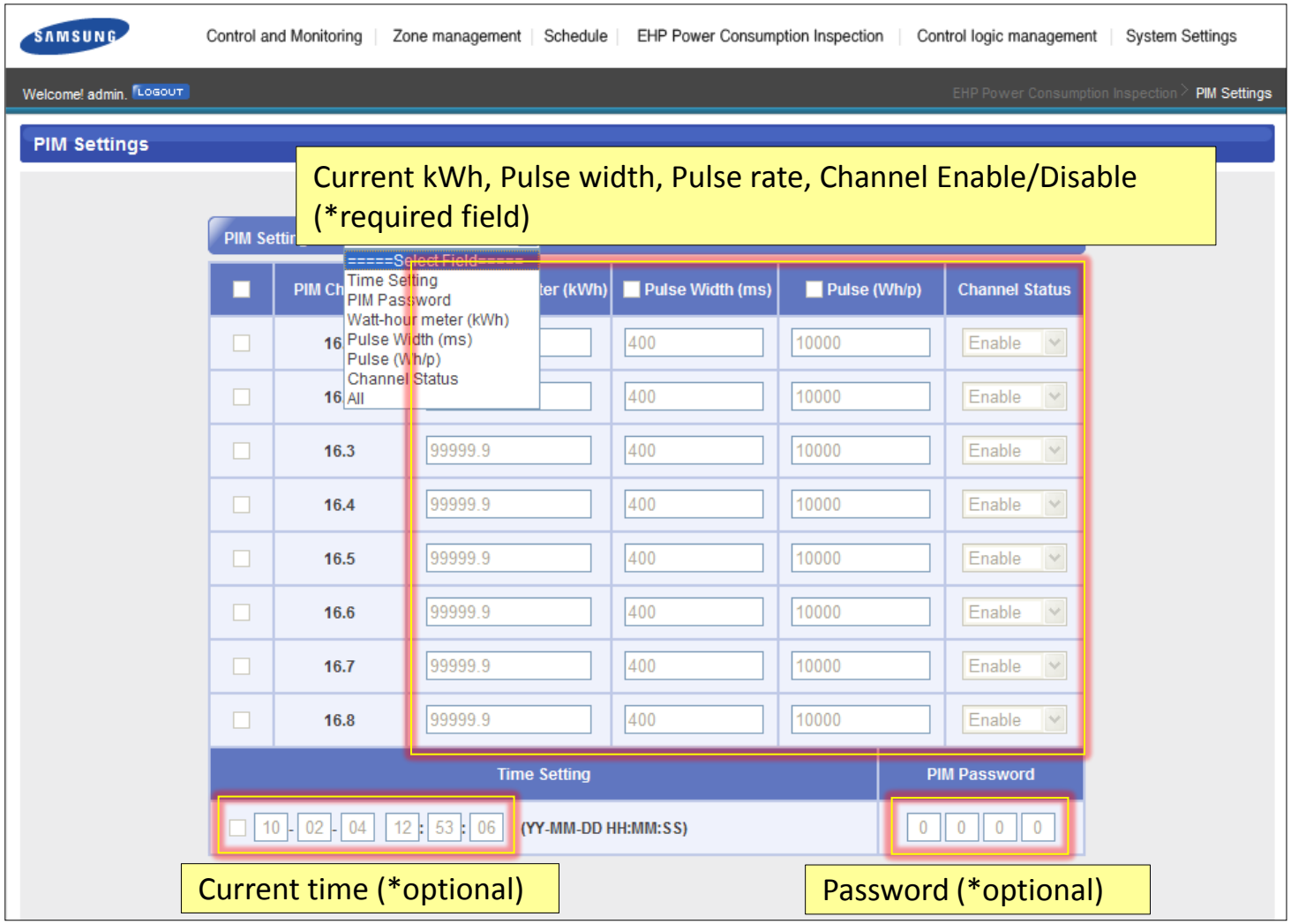
- **Setting parameters on DMS2(MIM-D00A)**



- DMS2 web page for setting MIM-B16 parameters -

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- **Error code**

Error code	Description
E613	Communication error between DMS(MIM-D00) or DMS2(MIM-D00A) and MIM-B16
E614	Pulse width setting error. E614 occurs when the pulse width of an electricity meter is out of range.
E654	Memory Read/Write failed