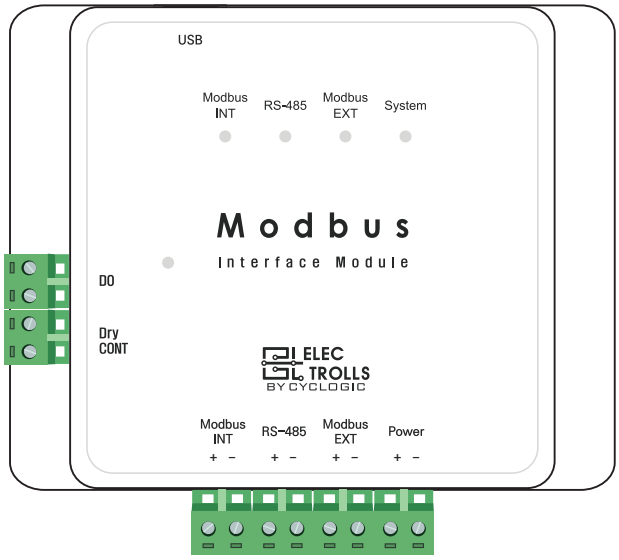
# Modbus Interface Module

## INSTRUCTION MANUAL

## Model : CL-MC03*** Series




Document Rev . 2

CYCLOGIC

**FOR INSTALLER**

**Before using the device, carefully read this installation/instruction manual to ensure proper operation. Keep this manual for future reference and give it to the technician when the device is reinstalled or repaired.**

## Contents

1. Supplied Parts
2. Safety Precautions
3. Product General
4. System Configuration before installing Modbus Interface Module
5. How to Install
6. Modbus Protocol

## 1. Confirming the supplied parts

Check that the box includes the following part(s) in addition to this installation manual:
CL-MC03*** Series Modbus Interface Module

## 2. Safety Precautions

- Thoroughly read the following safety precautions before use.
- Hazards that can occur from incorrect handling are classified by the symbols below:

| | |
|---|---|
| ⚠ Warning | Indicate a potentially hazardous situation which, if not avoided, could result in death or serious injury. |
| ⚠ Caution | Indicate a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It could also be used to alert against unsafe practices. |
| Notice | Indicates a situation that could result in equipment or property-damage only accidents. |

- After reading this manual, keep this manual for future reference. When the device is reinstalled or repaired, give this manual to those who provide these services. When the user changes, make sure that the new user receives this manual.

### ⚠ Warning

- **Only a dealer or qualified technician should install, relocate, reinstall, or repair the device.**
  Improper installation or repair may result in electrical shock or fire.
- **Properly install the device on a stable, load-bearing surface.**
  Device installed on an unstable surface may fall and cause injury.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- **Only use the specified cables; securely connect each so that the terminals do not bear any cable weight.**
  Improperly connected or short-circuited cables may produce heat and cause a fire.
- **All electrical work should be performed by an authorized electrician according to local regulations and instructions outlined in this manual.**
  Capacity shortage to the power supply circuit or improper installation may result in electrical shock or fire.
- **Do not make any modifications or alternations to the device.**
  Modifications or improper repair may result in electric shock or fire. Consult your dealer for repair.
- **Properly install the device according to the instructions in this Installation/Instruction Manual.**
  Improper installation may result in electric shock or fire.

## ⚠ Caution

- **Do not install the device in a location where a flammable gas leak may occur.**
  Gas may leak, collect around the device, ignite, and/or explode.
- **Do not install the device in environments where large amounts of oil (including machine), sulfidizing gas, or acidic, alkaline, chemical sprays are present.**
  These types of substances may damage internal parts, cause device performance to be reduced, and cause electrical shock.
- **Do not install the device in a bathroom, kitchen, or any room where steam could form.**
  Condensation may develop and cause electrical shock and/or the device to malfunction.
- **Do not install the device in a location where there is direct sunlight or where the temperature may become greater than 40°C (104°F) or less than 0°C (32°F).**
  If the device is installed in such place, it may result in deformation or malfunctions.
- **When installing the device in a hospital, communication facility, etc., provide sufficient protection against frequency noise.**
  Power generators and inverters, high-frequency medical, or radio communication equipment may interfere with the normal operation of this device. Subsequently, the device may also affect medical treatment, image broadcasting, etc., by creating frequency noise.
- **Include some slack in the power supply wires.**
  Tension on the wires may cause them to excessively heat up and/or break, resulting in a fire.
- **Use standard wires with the proper current capacity**
  to avoid the possibility of current leak, excessive heat, and/or fire.
- **Do not touch the main circuit board; also, make sure that dust does not accumulate on the circuit board.**
- **Do not immerse the device in water.**
  Doing so may lead to electric shock or malfunctions.


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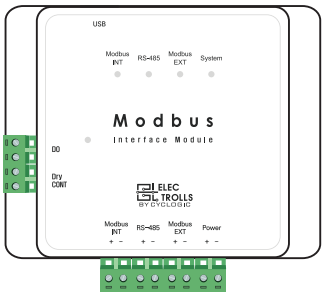
# 3. Product General

## Description

This solution enables full integration of SAMSUNG DVM, CAC, FJM & RAC equipment into BMS systems using Modbus RTU protocol.

Parameters that can be controlled include ON/OFF, Mode, Set Point, Fan Speed and louvre control where applicable. Data can be read back to the BMS system including room temperature and fault status.

## 3.1. General Specifications




| Items | Description |
|---|---|
| **Size ( W x H x D )** | 100mm x 80mm x 24mm<br>( 3.94 x 3.15 x 0.94 inch) |
| **Power Supply** | DC 12V |
| **Network** | F1/F2 Control Board Network |
| **AC Units** | Up to 64 Indoor units controlled as a group |
| **Compatibility** | SAMSUNG DVM, CAC, FJM & RAC |

| Model name | CL-MC0301C | CL-MC0308C | CL-MC0316C | CL-MC0332C | CL-MC0364C |
|---|---|---|---|---|---|
| **# of indoor unit to control & monitor** | 1 | 8 | 16 | 32 | 64 |

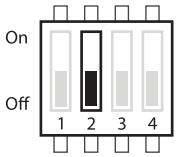
# 4. System Configuration before installing Modbus Interface Module

## 4.1. Dip Switch Settings

[ IMPORTANT ] If you set this SW wrong, until will not work or respond.

### ■ Protocol setting to control or monitor SAMSUNG AC

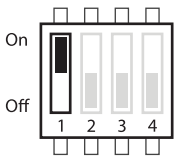
DIP SW2 : Adjust the initial setting according to the SAMSUNG AC type.




| DIP SW2 | Access |
|---|---|
| **ON** | RAC/FJM : Model number AR*****, AJ***** |
| **OFF** | DVM/CAC : Model number AM*****, AC**** |

### ■ Firmware update

DIP SW1 : In case of updating firmware, set this DIP switch.




| DIP SW1 | Access |
|---|---|
| **ON** | Disable (Default) |
| **OFF** | Enable (use when you download the firmware only) |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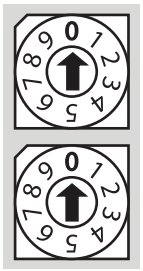
## Device Configuration

Initial settings(Modbus Address) can be configured via 2 rotary switches on the circuit board. The circuit board can be accessed by unfastening the four screws on the back of the case.

### 4.2. Modbus Slave Address Setting with Rotary Switch



RSW1 (Ten) RSW1 : 10 digit

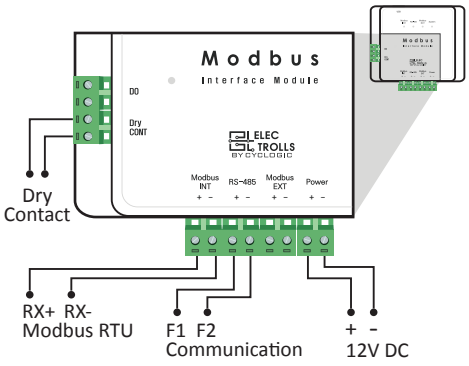
RSW2 (One) RSW2 : one digit

# 5. How to install

## NOTICE : Modbus Interface Module needs 12V DC power to operate.

### 5.1. Wire Connections

1. Choose a place where to install the CL-MC03*** series. The device provides two mounting holes that can be used to mechanically affix the case to a solid surface. Double-sided tape may be used to affix the device. When using tape, ensure that the tape is approved for use within the anticipated operating temperature ranges.
2. Connect the CL-MC03*** cable to the terminals F1/F2 on the indoor unit control board for communication between SASMUNG indoor unit and Cyclogic Modbus Interface Module.
3. Connect the CL-MC03*** cable to the terminals V1/V2 on the indoor unit control board for supplying power.
4. Connect the CL-MC03*** cable to the 3rd party controller.




| No | Connector | Description |
|---|---|---|
| 1 | **MODBUS INT** | Connection for 3rd party controller |
| 2 | **RS-485** | Connection for SAMSUNG AC's F1/F2 communication |
| 3 | **MODBUS EXT** | N/A |
| 4 | **POWER** | Connection for power supply of DC 12V |
| 5 | **DO** | Contact when error occurs (DC 12V) |
| 6 | **DRY CONT** | Connection for forced ON/OFF |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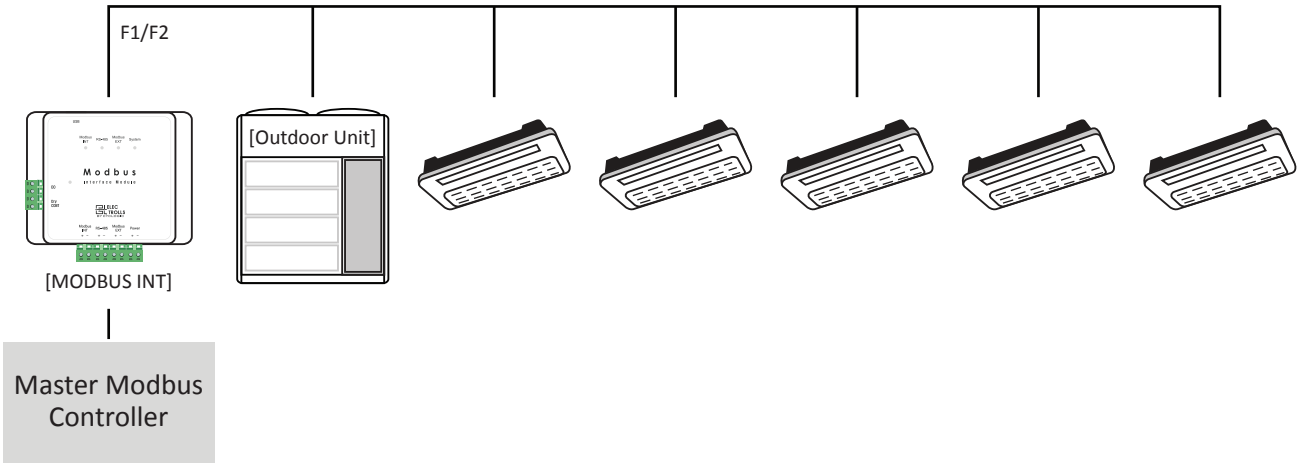
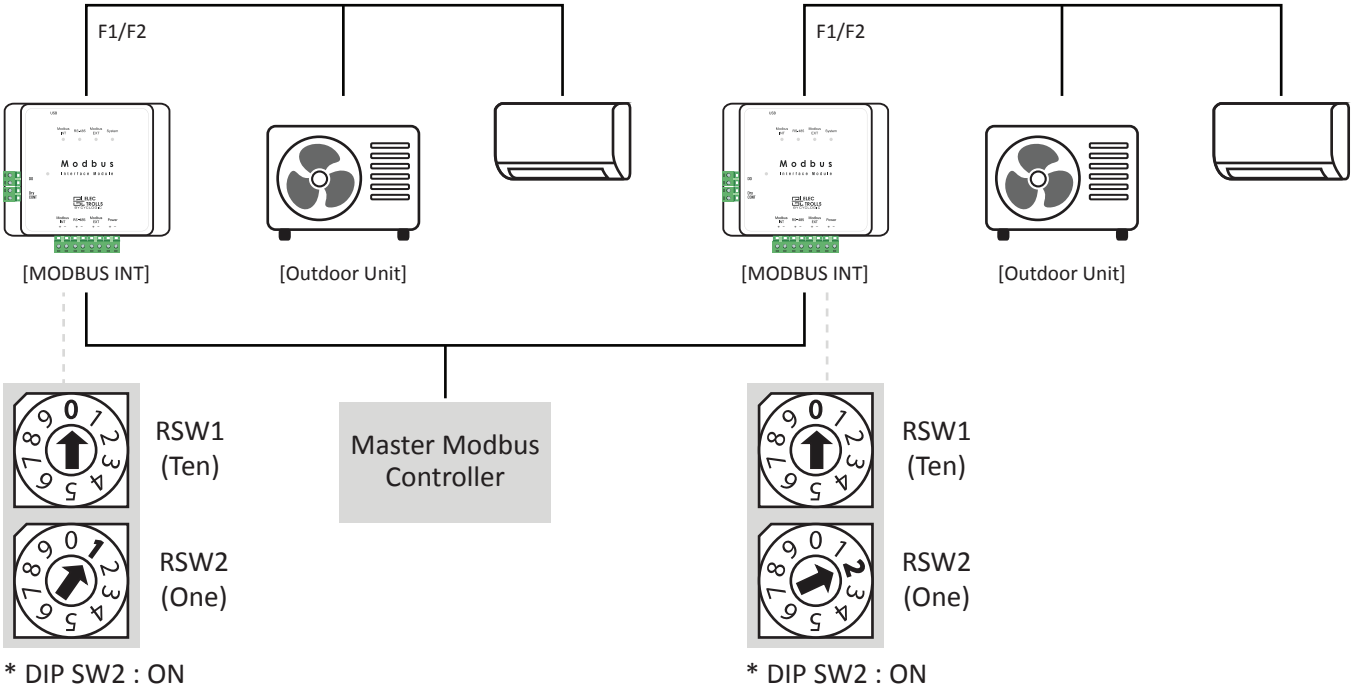
## 5.2. Connection Diagram

### Case 1 (DVM, CAC)




* DIP SW2 : OFF

### Case 2 (RAC)




* DIP SW2 : ON

* DIP SW2 : ON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# 6. Modbus Protocol

## 6.1 MODBUS CONFIGURATION

| | |
|---|---|
| ***Mode*** | Modbus RTU Slave |
| ***Length*** | 500m |
| ***Addresses*** | 0 to 63 (indoor units) |
| ***Baud*** | 19,200 bps |
| ***Parity*** | Even |
| ***Stop bits*** | 1 |

## 6.2 MODBUS REGISTER

The CL-MC03*** supports two types of register, Read Holding Registers and Preset Single Register.

| Register Type | Access | Function |
|---|---|---|
| **Preset Single Register** | Write | Controls and Command Registers |
| **Holding Register** | Read | Readback and Monitoring Registers |

All analogue and digital values are accessed through these registers. All register values are 2 byte(16bit) values.

Registers are accessed using standard Modbus functions. The following two functions are supported by the CL-MC03***.

| Function Code (hex code) | Function Name |
|---|---|
| **03 (03h)** | Read Holding Registers |
| **06 (06h)** | Preset Single Registers |


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## 6.3 Readback Data

The CL-MC03*** supports two types of register, Read Holding Registers and Preset Single Register.

Unit data is available for each of the indoor units on the F1,F2 network. Unit Input registers are numbered using the indoor unit numbering in the range 40001~40014 + N(indoor unit address) x 20 added to an offset relating to a specific feature.

| Indoor Unit Addresses | | | | Length (Byte) | Name | Value | Notes | Read/ Write |
|---|---|---|---|---|---|---|---|---|
| IDU 00 | IDU 01 | .... | IDU 63 | | | | | |
| 40001 | 40021 | .... | 41261 | 2 | IDU ON/OFF STATUS | 0 | OFF | R |
| | | | | | | 1 | ON | R |
| 40002 | 40022 | .... | 41262 | 2 | IDU OPERATION MODE | 0 | AUTO | R |
| | | | | | | 1 | COOLING | R |
| | | | | | | 2 | DRY (DEHUMIDIFICATION) | R |
| | | | | | | 3 | FAN | R |
| | | | | | | 4 | HEAT | R |
| | | | | | | 11 | AUTO COOL | R |
| | | | | | | 12 | AUTO DRY | R |
| | | | | | | 13 | AUTO FAN | R |
| | | | | | | 14 | AUTO HEAT | R |
| 40005 | 40025 | .... | 41265 | 2 | SET TEMPERATURE | | SET TEMP = Data/10 | R |
| 40006 | 40026 | .... | 41266 | 2 | ROOM TEMPERATURE | | ROOM TEMP = Data/10 | R |
| 40009 | 40029 | .... | 41269 | 2 | IDU FAN SPEED CONTROL | 0 | AUTOMATIC | R |
| | | | | | | 1 | LOW | R |
| | | | | | | 2 | MIDDLE | R |
| | | | | | | 3 | HIGH | R |
| | | | | | | 4 | TURBO | R |
| 40010 | 40030 | .... | 41270 | 2 | IDU DECO PANEL LOUVER SWING | 0 | SWING OFF | R |
| | | | | | | 1 | SWING ON : UPPER & LOWER LOUVER | R |
| | | | | | | 2 | SWING ON : RIGHT & LEFT LOUVER | R |
| | | | | | | 3 | SWING ON : UPPER&LOWER/RIGHT&LEFT LOUVER | R |
| 40011 | 40031 | .... | 41271 | 2 | Supply Air(Discharge) Temperature (Duct unit only) | | SET TEMP = Data/10 | R |
| 40012 | 40032 | .... | 41272 | 2 | States of Supply Air(Discharge) Temperature Control | 0 | DISABLE | R |
| | | | | | | 1 | ENABLE | R |
| 40013 | 40033 | .... | 41273 | 2 | Set Temp. of Cooling Supply Air (Duct unit only) | | SET TEMP = Data/10 | R |
| 40014 | 40034 | .... | 41274 | 2 | Set Temp. of Heating Supply Air (Duct unit only) | | SET TEMP = Data/10 | R |


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## 6.4 Control Data

Unit data is available for each of the indoor units on the F1,F2 network. Unit Input registers are numbered using the indoor unit numbering in the range 40001~40014 + N(indoor unit address) x 20 added to an offset relating to a specific feature.

| Indoor Unit Addresses | | | | Length (Byte) | Name | Value | Notes | Read/ Write |
|---|---|---|---|---|---|---|---|---|
| IDU 00 | IDU 01 | .... | IDU 63 | | | | | |
| 40001 | 40021 | .... | 41261 | 1 | IDU ON/OFF & MODE | | Data 1 | W |
| | | | | | | 0 | OFF | W |
| | | | | | | 1 | ON | W |
| | | | | 1 | | | Data 2 | |
| | | | | | | 0 | AUTO | W |
| | | | | | | 1 | COOLING | W |
| | | | | | | 2 | DRY (DEHUMIDIFICATION) | W |
| | | | | | | 3 | FAN | W |
| | | | | | | 4 | HEAT | W |
| | | | | | | 11 | AUTO COOL | W |
| | | | | | | 12 | AUTO DRY | W |
| | | | | | | 13 | AUTO FAN | W |
| | | | | | | 14 | AUTO HEAT | W |
| 40005 | 40025 | .... | 41265 | 2 | SET TEMPERATURE | | SET TEMP = Data/10 | W |
| 40009 | 40029 | .... | 41269 | 1 | IDU FAN SPEED CONTROL | | Data 1 | W |
| | | | | | | 0 | AUTOMATIC | W |
| | | | | | | 1 | LOW | W |
| | | | | | | 2 | MIDDLE | W |
| | | | | | | 3 | HIGH | W |
| | | | | | | 4 | TURBO | W |
| | | | | 1 | IDU DECO PANEL LOUVER SWING | | Data2 | |
| | | | | | | 0 | SWING OFF | W |
| | | | | | | 1 | SWING ON : UPPER & LOWER LOUVER | W |
| | | | | | | 2 | SWING ON : RIGHT & LEFT LOUVER | W |
| | | | | | | 3 | SWING ON : UPPER&LOWER /RIGHT&LEFT LOUVER | W |
| 40011 | 40031 | .... | 41271 | 2 | Supply Air(Discharge) Temperature (Duct unit only) | | SET TEMP = Data/10 | W |
| 40012 | 40032 | .... | 41272 | 2 | States of Supply Air(Discharge) Temperature Control | 0 | DISABLE | W |
| | | | | | | 1 | ENABLE | W |
| 40013 | 40033 | .... | 41273 | 2 | Set Temp. of Cooling Supply Air (Duct unit only) | | SET TEMP = Data/10 | W |
| 40014 | 40034 | .... | 41274 | 2 | Set Temp. of Heating Supply Air (Duct unit only) | | SET TEMP = Data/10 | W |


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