

## MC-5 Series Micro Processor Temperature Controller



### Application

| Plastic, rubber, equipment                                                                                                            | Semiconductor electronic components industry                                                | Food related industry                                                                                            |
|---------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| Injection molding machinery<br>Extruding machinery<br>Mold temperature controllers<br>Vacuum forming<br>Blow molding (Thermo foaming) | Preheater<br>Cleaning equipment<br>Mold equipment<br>Bonding machine<br>Diffusion equipment | Refrigerating machine<br>(General, for fishing vessel)<br>Dryer<br>Humidifier<br>Bakery, confectionery equipment |
| Electric furnaces                                                                                                                     | Pottery manufacturing<br>Ceramic and Glass industry                                         | Packing machine industry                                                                                         |
| Baking furnace<br>Heavy oil, gas furnaces<br>Incinerator<br>Aluminum, tin, lead, zinc melting<br>furnace<br>Vacuum furnace            | Ceramic industry<br>Glass industry<br>Porcelain enameling<br>Grind stone manufacturing      | Bag-making machinery<br>Filling packing machinery<br>Hot blast sealing<br>Shrinking packing machinery            |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|



## Features

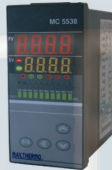
|                                                         |                                                    |
|---------------------------------------------------------|----------------------------------------------------|
| PID auto tuning                                         | Self-diagnosis function.                           |
| Two PID control processes, with two individual outputs. | Free range voltage from AC 85V~265V or DC24V.      |
| Multi range input (TC,RTD,mV), each 14 BIT resolution.  | Optional Remote SV and transmitter output.         |
| Relay output, SSR drive, 4~20mA changeable by a module. | Manual function                                    |
| Three-point alarm, with 19 alarm modes.                 | RS232 or RS485 is available for remote monitoring. |
| Auto Zero and Auto Span circuit keep good accuracy.     | 8 steps of Ramp & 8 steps of Soak                  |
| Heater broken alarm optional                            | Soft start function                                |
| Motor valve optional                                    | Multi level PID                                    |

## Panel Function



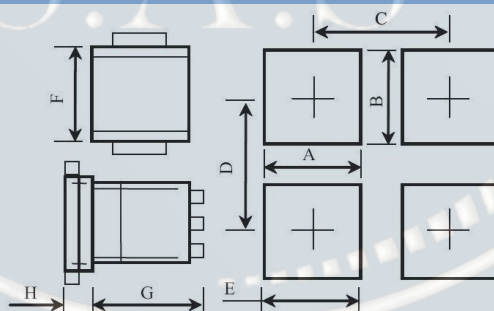
| MARKS/DESCRIPTIONDESCRIPTION |      |                               | MARKS/DESCRIPTIONDESCRIPTION |           |                           |
|------------------------------|------|-------------------------------|------------------------------|-----------|---------------------------|
| 1                            | PV   | Process value display         | 11                           | RP        | Ramp action indication    |
|                              |      |                               | 12                           | SK        | Soak action indication    |
| 2                            | SV   | Set value                     | 13                           | 1~8       | 1~8 Segment indication    |
| 3                            | PRG  | Programming action indication | 14                           | OUT1%     | Output percentage of out1 |
| 4                            | MAN  | Manual action indication      | 15                           | F/S       | Function key/Set key      |
| 5                            | AT   | Auto tuning action indication | 16                           | Shift key | Shift key                 |
| 6                            | OUT1 | Output1 action indication     | 17                           | Down key  | Down key                  |
| 7                            | OUT2 | Output2 action indication     | 18                           | Up key    | Up key                    |
| 8                            | AL1  | Alarm1 action indication      |                              |           |                           |
| 9                            | AL2  | Alarm2 action indication      |                              |           |                           |
| 10                           | AL3  | Alarm3 action indication      |                              |           |                           |

# Standard Specification

| Model                                    | MC-5438                                                                           | MC-5538                                                                           | MC-5638                                                                            | MC-5738                                                                             | MC-5838                                                                             |            |
|------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------|
| Products                                 |  |  |  |  |  |            |
| Standard specification                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |            |
| Dimension                                | 48x48mm                                                                           | 48x96mm                                                                           | 96x48mm                                                                            | 72x72mm                                                                             | 96x96mm                                                                             |            |
| Working voltage                          | AC85~265V, DC24C (Optional)                                                       |                                                                                   |                                                                                    |                                                                                     |                                                                                     |            |
| Frequency                                | 50 / 60Hz                                                                         |                                                                                   |                                                                                    |                                                                                     |                                                                                     |            |
| Power consumption                        | Approx 3VA                                                                        | Approx 4VA                                                                        | Approx 4VA                                                                         | Approx 3VA                                                                          | Approx 4VA                                                                          |            |
| Input                                    | Accuracy : 0.3%FS, Sample time : 300ms                                            |                                                                                   |                                                                                    |                                                                                     |                                                                                     |            |
| (TC)<br>(RTD)<br>(mA DC)<br>(Voltage DC) | Type                                                                              |                                                                                   | Range                                                                              |                                                                                     | Type                                                                                | Range      |
|                                          | K1                                                                                |                                                                                   | 0~200                                                                              |                                                                                     | r                                                                                   | 0~1700     |
|                                          | K2                                                                                |                                                                                   | 0~400                                                                              |                                                                                     | E                                                                                   | 0~1000     |
|                                          | K3                                                                                |                                                                                   | 0~800                                                                              |                                                                                     | S                                                                                   | 0~1700     |
|                                          | K4                                                                                |                                                                                   | 0~1000                                                                             |                                                                                     | b                                                                                   | 0~1800     |
|                                          | K5                                                                                |                                                                                   | 0~1200                                                                             |                                                                                     | n                                                                                   | -200~1300  |
|                                          | j1                                                                                |                                                                                   | 0~200                                                                              |                                                                                     | Pt1                                                                                 | -50~50     |
|                                          | j2                                                                                |                                                                                   | 0~400                                                                              |                                                                                     | Pt2                                                                                 | 0~100      |
|                                          | j3                                                                                |                                                                                   | 0~800                                                                              |                                                                                     | Pt3                                                                                 | 0~200      |
|                                          | j4                                                                                |                                                                                   | 0~1000                                                                             |                                                                                     | Pt4                                                                                 | 0~400      |
|                                          | j5                                                                                |                                                                                   | 0~1200                                                                             |                                                                                     | Pt5                                                                                 | -200~600   |
|                                          | t1                                                                                |                                                                                   | -50~50                                                                             |                                                                                     | jPt                                                                                 | -200~500   |
|                                          | t2                                                                                |                                                                                   | -100~100                                                                           |                                                                                     | Lin                                                                                 | -1999~9999 |
|                                          | t3                                                                                |                                                                                   | -200~400                                                                           |                                                                                     |                                                                                     |            |
| DP position                              | 0000, 000.0, 00.00, 0.000 (Available for mA or voltage DC input)                  |                                                                                   |                                                                                    |                                                                                     |                                                                                     |            |
| Output1                                  | Main control output (HEAT or COOL)                                                |                                                                                   |                                                                                    |                                                                                     |                                                                                     |            |
| Relay                                    | 1A or 1C<br>5A/250VAC                                                             | 1A or 1C<br>5A/250VAC                                                             | 1A or 1C<br>5A/250VAC                                                              | 1A or 1C<br>5A/250VAC                                                               | 1A or 1C<br>5A/250VAC                                                               |            |
| Voltage pulse                            | For SSR drive, 20mA / DC24V                                                       |                                                                                   |                                                                                    |                                                                                     |                                                                                     |            |
| mA DC                                    | 4~20mA, 0~20mA, Maximum load resistance : 600Ω                                    |                                                                                   |                                                                                    |                                                                                     |                                                                                     |            |
| Voltage DC                               | 0~5V, 0~10V, 1~5V, 2~10V. Maximum load current : 20mA                             |                                                                                   |                                                                                    |                                                                                     |                                                                                     |            |
| Alarm1                                   | 1A<br>5A/250VAC                                                                   | 1A<br>5A/250VAC                                                                   | 1A<br>5A/250VAC                                                                    | 1A<br>5A/250VAC                                                                     | 1A<br>5A/250VAC                                                                     |            |
| Control algorithms                       | PID, P, PI, PD, ON/OFF(P=0)                                                       |                                                                                   |                                                                                    |                                                                                     |                                                                                     |            |

|                               |                                                           |                 |                 |                 |                 |
|-------------------------------|-----------------------------------------------------------|-----------------|-----------------|-----------------|-----------------|
| <b>PID range</b>              | P : 0.0~3000, I : 0~7200 sec., D : 0~1800 sec.            |                 |                 |                 |                 |
| <b>Ramp/Soak program</b>      | 1 Ramp + 1 Soak = 1 Segment<br>8 Segments (max.)          |                 |                 |                 |                 |
| <b>Humidity range</b>         | 0~80%RH                                                   |                 |                 |                 |                 |
| <b>Operating temperature</b>  | 0~65°C / -10~50°C                                         |                 |                 |                 |                 |
| <b>Weight (approx)</b>        | Approx 170g                                               | Approx 240g     | Approx 240g     | Approx 260g     | Approx 330g     |
| <b>Optional specification</b> |                                                           |                 |                 |                 |                 |
| <b>Communication</b>          | Protocol : MODBUS RTU, Interface : RS-232 / RS-485        |                 |                 |                 |                 |
| <b>Output1</b>                | Motor Valve Control (Open loop)                           |                 |                 |                 |                 |
| <b>Output2</b>                | Cool                                                      |                 |                 |                 |                 |
| <b>Relay</b>                  | 1A<br>5A/250VAC                                           | 1A<br>5A/250VAC | 1A<br>5A/250VAC | 1A<br>5A/250VAC | 1A<br>5A/250VAC |
| <b>Voltage pulse</b>          | For SSR drive, 20mA / DC24V                               |                 |                 |                 |                 |
| <b>Transmission</b>           | Available for PV and SV transmission                      |                 |                 |                 |                 |
| <b>mA DC</b>                  | 4~20mA, 0~20mA, Maximum load resistance : 600Ω (Optional) |                 |                 |                 |                 |
| <b>Voltage DC</b>             | 0~5V, 0~10V, 1~5V, 2~10V. Maximum load current : 20mA     |                 |                 |                 |                 |
| <b>Remote SV</b>              | 4~20mA, 0~5V, 0~10V, 1~5V, 2~10V are available            |                 |                 |                 |                 |
| <b>Alarm1</b>                 | Alarm x 1 (Standard)                                      |                 |                 |                 |                 |
| <b>Alarm2</b>                 | 1A<br>5A/250VAC                                           | 1A<br>5A/250VAC | 1A<br>5A/250VAC | 1A<br>5A/250VAC | 1A<br>5A/250VAC |
| <b>Alarm3</b>                 | X                                                         | 1A<br>5A/250VAC | 1A<br>5A/250VAC | 1A<br>5A/250VAC | 1A<br>5A/250VAC |

## External Dimension



Unit : mm

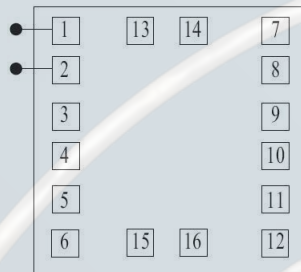
| Model          | A                                | B                                | C   | D   | E  | F  | G  | H    |
|----------------|----------------------------------|----------------------------------|-----|-----|----|----|----|------|
| <b>MC-5438</b> | 46 <sup>+0.5</sup> <sub>-0</sub> | 46 <sup>+0.5</sup> <sub>-0</sub> | 70  | 70  | 48 | 48 | 83 | 10.5 |
| <b>MC-5538</b> | 46 <sup>+0.5</sup> <sub>-0</sub> | 91 <sup>+0.5</sup> <sub>-0</sub> | 70  | 120 | 48 | 96 | 83 | 10.5 |
| <b>MC-5638</b> | 91 <sup>+0.5</sup> <sub>-0</sub> | 46 <sup>+0.5</sup> <sub>-0</sub> | 120 | 70  | 96 | 48 | 83 | 10.5 |
| <b>MC-5738</b> | 68 <sup>+0.5</sup> <sub>-0</sub> | 68 <sup>+0.5</sup> <sub>-0</sub> | 100 | 100 | 72 | 72 | 83 | 10.5 |
| <b>MC-5838</b> | 91 <sup>+0.5</sup> <sub>-0</sub> | 91 <sup>+0.5</sup> <sub>-0</sub> | 120 | 120 | 96 | 96 | 83 | 10.5 |

# Diagram

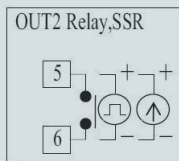
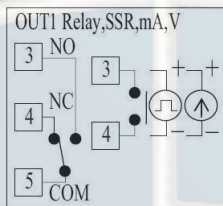
## MC-5438

### A. Power Supply

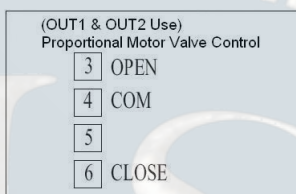
AC85~265V 50/60Hz  
or DC24V (option)



### B. Control Output

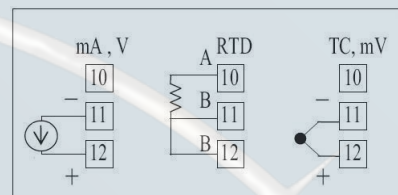


### Control Output (option)

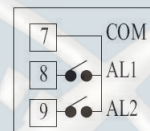


Open Loop

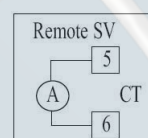
### C. Input



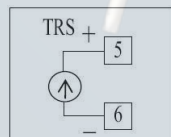
### D. Alarm



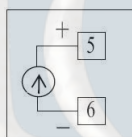
### E. CT



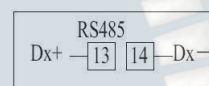
### F. Transmission



### G. Remote SV



### H. Communication



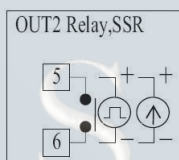
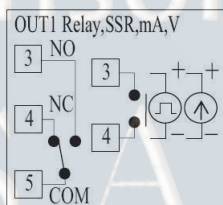
## MC-5738

### A. Power Supply

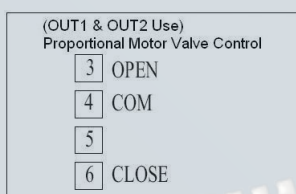
AC85~265V 50/60Hz  
or DC24V (option)



### B. Control Output

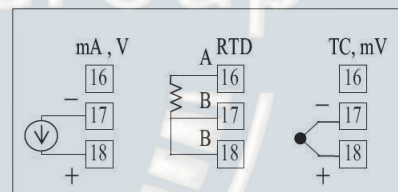


### Control Output (option)

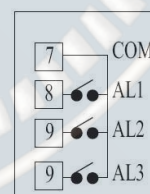


Open Loop

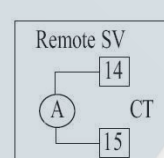
### C. Input



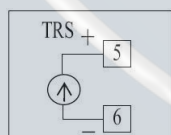
### D. Alarm



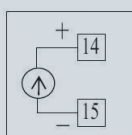
### E. CT



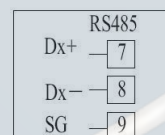
### F. Transmission



### G. Remote SV

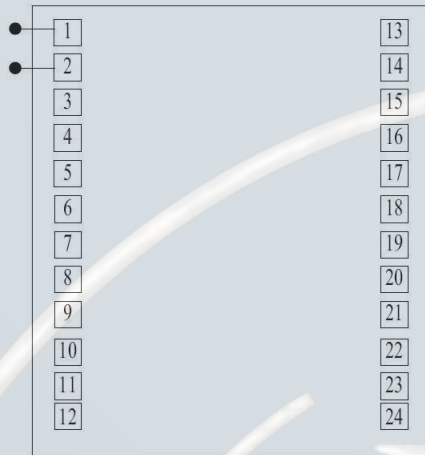


### H. Communication

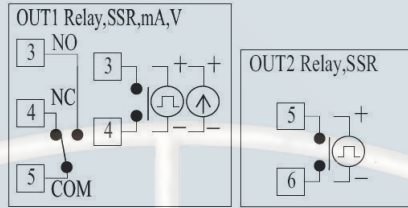


### A. Power Supply

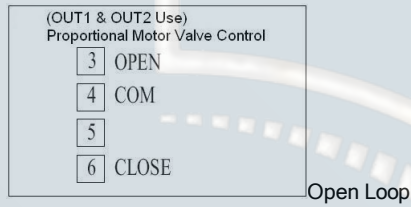
AC85~265V 50/60Hz  
or DC24V (option)



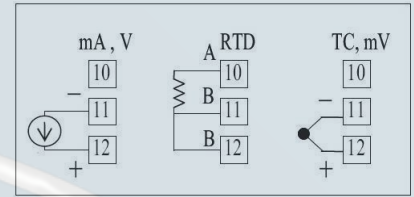
### B. Control Output



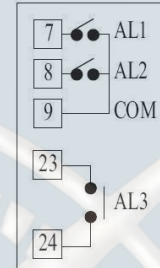
### Control Output (option)



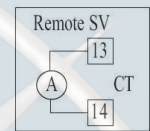
### C. Input



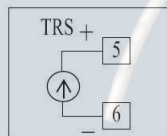
### D. Alarm



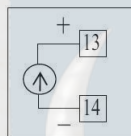
### E. CT



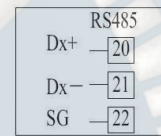
### F. Transmission



### G. Remote SV

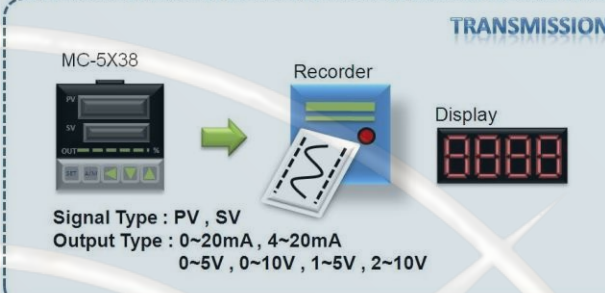
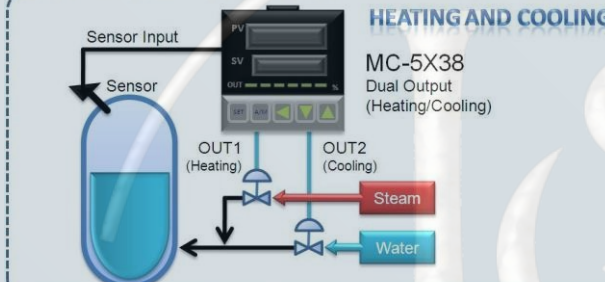
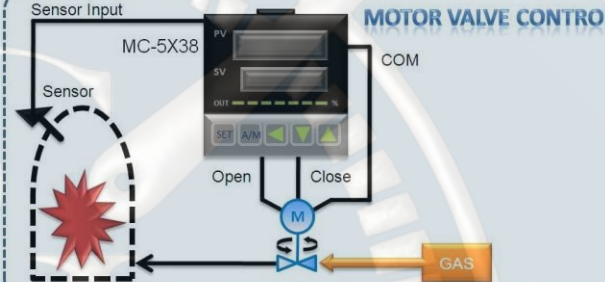
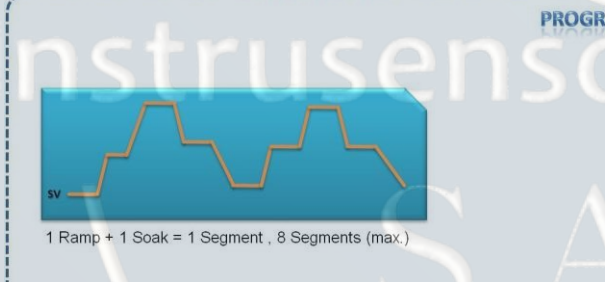
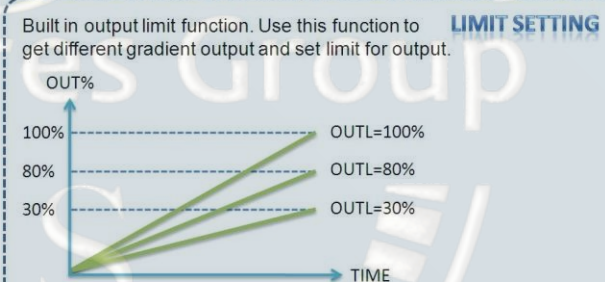
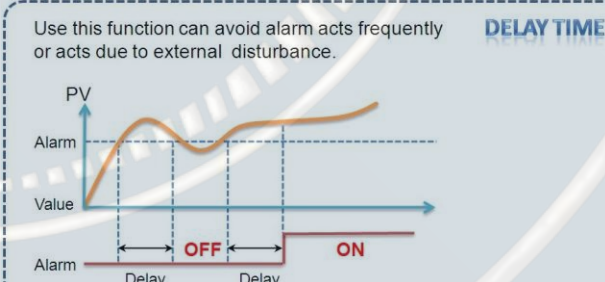


### H. Communication



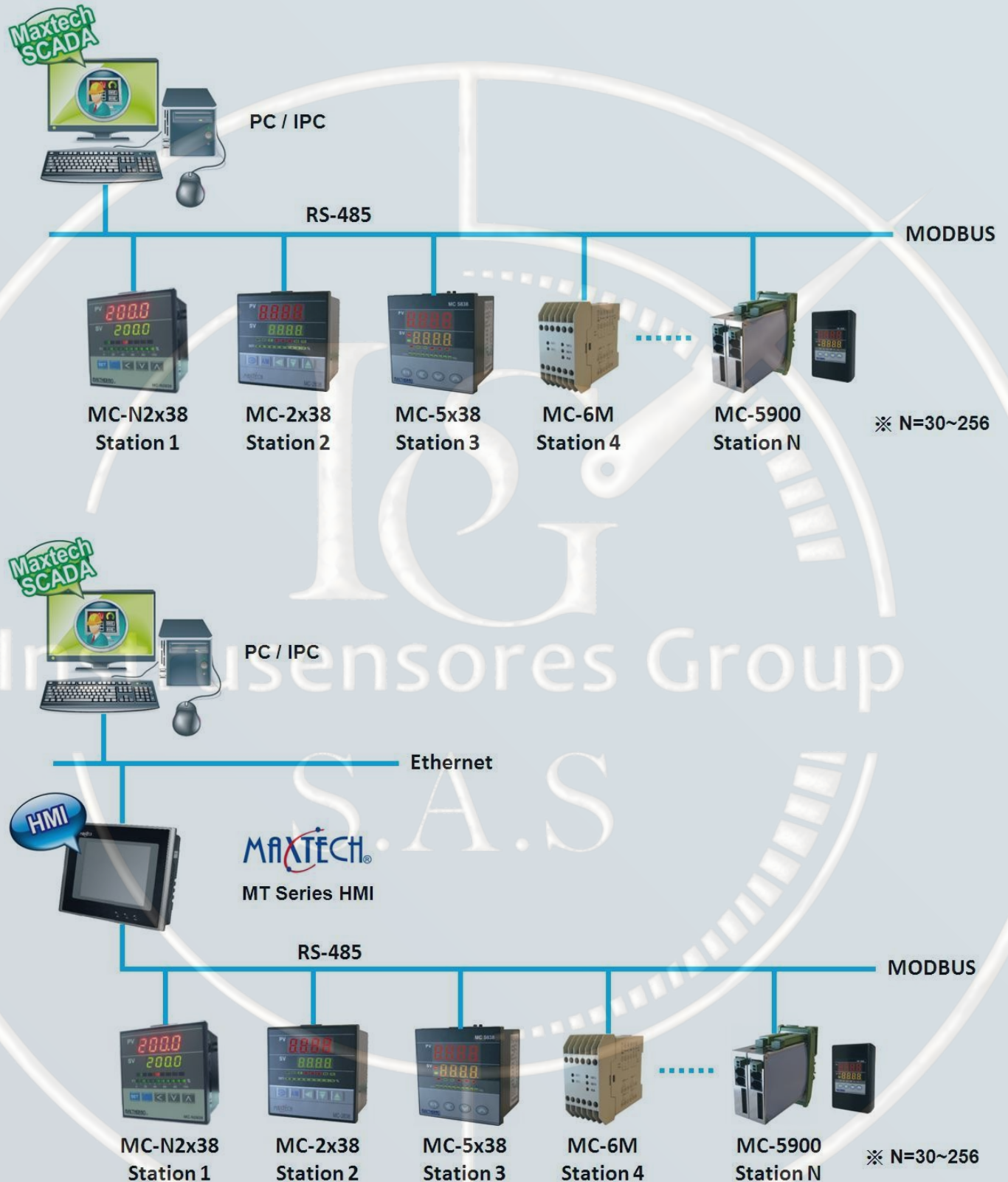
Instrusensores Group  
S.A.S

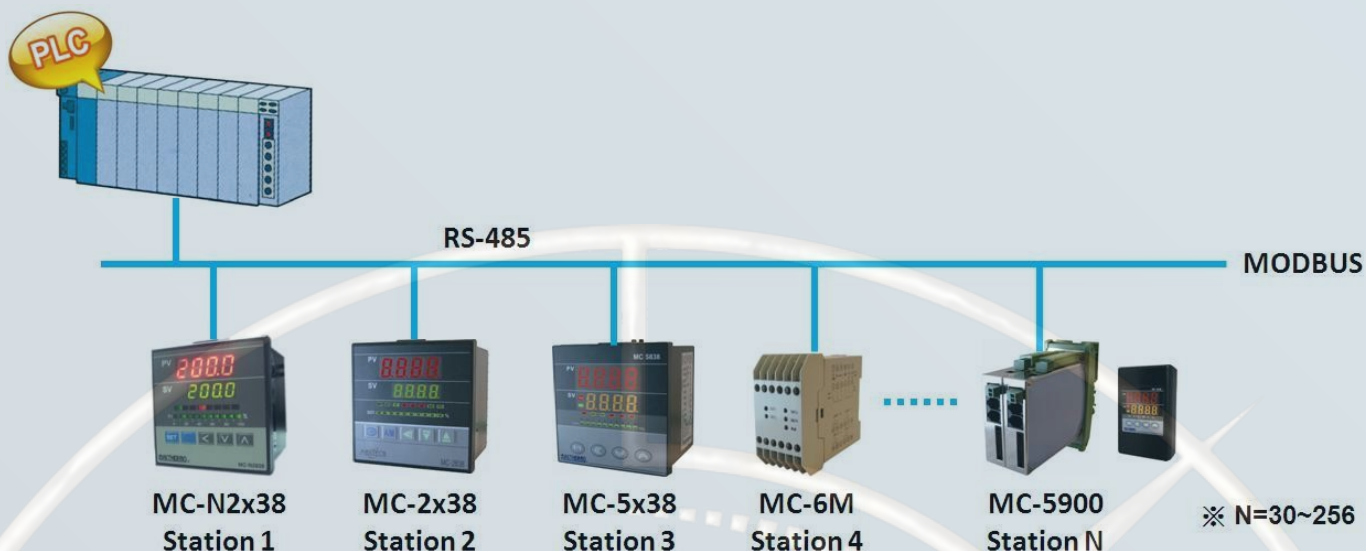
# Special functions

| <h2>Remote SV</h2>  <p>Another Controller</p> <p>PLC</p> <p>MC-5X38</p> <p>Input Type : 0~20mA , 4~20mA , 0~5V , 0~10V , 1~5V , 2~10V</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <h2>Transmission</h2>  <p>MC-5X38</p> <p>Recorder</p> <p>Display</p> <p>Signal Type : PV , SV<br/>Output Type : 0~20mA , 4~20mA , 0~5V , 0~10V , 1~5V , 2~10V</p>                                                                                        |        |                      |                     |                     |                     |                          |  |            |  |    |         |               |                   |              |                   |  |                   |                                                                                                                                                                                                                                                                                           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|----------------------|---------------------|---------------------|---------------------|--------------------------|--|------------|--|----|---------|---------------|-------------------|--------------|-------------------|--|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <h2>Dual Output (Heating and Cooling)</h2>  <p>MC-5X38<br/>Dual Output (Heating/Cooling)</p> <p>OUT1 (Heating)</p> <p>OUT2 (Cooling)</p> <p>Steam</p> <p>Water</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <h2>Motor Valve Control</h2>  <p>MC-5X38</p> <p>COM</p> <p>Open</p> <p>Close</p> <p>M</p> <p>GAS</p>                                                                                                                                                     |        |                      |                     |                     |                     |                          |  |            |  |    |         |               |                   |              |                   |  |                   |                                                                                                                                                                                                                                                                                           |
| <h2>Program</h2>  <p>SV</p> <p>1 Ramp + 1 Soak = 1 Segment , 8 Segments (max.)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <h2>Limit Setting</h2> <p>Built in output limit function. Use this function to get different gradient output and set limit for output.</p>  <p>OUT%</p> <p>100%</p> <p>80%</p> <p>30%</p> <p>OUTL=100%</p> <p>OUTL=80%</p> <p>OUTL=30%</p> <p>TIME</p> |        |                      |                     |                     |                     |                          |  |            |  |    |         |               |                   |              |                   |  |                   |                                                                                                                                                                                                                                                                                           |
| <h2>Alarm Function</h2> <p>Alarm types list as below :</p> <table border="1"> <thead> <tr> <th>Deviation</th> <th>System</th> </tr> </thead> <tbody> <tr> <td>Deviation High Alarm</td> <td>System Failed Alarm</td> </tr> <tr> <td>Deviation Low Alarm</td> <td>System Normal Alarm</td> </tr> <tr> <td>Deviation High/Low Alarm</td> <td></td> </tr> <tr> <td>Band Alarm</td> <td></td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>PV</th> <th>Program</th> </tr> </thead> <tbody> <tr> <td>PV High Alarm</td> <td>Program Run Alarm</td> </tr> <tr> <td>PV Low Alarm</td> <td>Program End Alarm</td> </tr> <tr> <td></td> <td>Segment End Alarm</td> </tr> </tbody> </table> <p>※ Inhibit means alarm doesn't work at first time</p> | Deviation                                                                                                                                                                                                                                                                                                                                  | System | Deviation High Alarm | System Failed Alarm | Deviation Low Alarm | System Normal Alarm | Deviation High/Low Alarm |  | Band Alarm |  | PV | Program | PV High Alarm | Program Run Alarm | PV Low Alarm | Program End Alarm |  | Segment End Alarm | <h2>Delay Time</h2> <p>Use this function can avoid alarm acts frequently or acts due to external disturbance.</p>  <p>PV</p> <p>Alarm</p> <p>Value</p> <p>Alarm</p> <p>Delay</p> <p>OFF</p> <p>ON</p> |
| Deviation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | System                                                                                                                                                                                                                                                                                                                                     |        |                      |                     |                     |                     |                          |  |            |  |    |         |               |                   |              |                   |  |                   |                                                                                                                                                                                                                                                                                           |
| Deviation High Alarm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | System Failed Alarm                                                                                                                                                                                                                                                                                                                        |        |                      |                     |                     |                     |                          |  |            |  |    |         |               |                   |              |                   |  |                   |                                                                                                                                                                                                                                                                                           |
| Deviation Low Alarm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | System Normal Alarm                                                                                                                                                                                                                                                                                                                        |        |                      |                     |                     |                     |                          |  |            |  |    |         |               |                   |              |                   |  |                   |                                                                                                                                                                                                                                                                                           |
| Deviation High/Low Alarm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                            |        |                      |                     |                     |                     |                          |  |            |  |    |         |               |                   |              |                   |  |                   |                                                                                                                                                                                                                                                                                           |
| Band Alarm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                            |        |                      |                     |                     |                     |                          |  |            |  |    |         |               |                   |              |                   |  |                   |                                                                                                                                                                                                                                                                                           |
| PV                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Program                                                                                                                                                                                                                                                                                                                                    |        |                      |                     |                     |                     |                          |  |            |  |    |         |               |                   |              |                   |  |                   |                                                                                                                                                                                                                                                                                           |
| PV High Alarm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Program Run Alarm                                                                                                                                                                                                                                                                                                                          |        |                      |                     |                     |                     |                          |  |            |  |    |         |               |                   |              |                   |  |                   |                                                                                                                                                                                                                                                                                           |
| PV Low Alarm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Program End Alarm                                                                                                                                                                                                                                                                                                                          |        |                      |                     |                     |                     |                          |  |            |  |    |         |               |                   |              |                   |  |                   |                                                                                                                                                                                                                                                                                           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Segment End Alarm                                                                                                                                                                                                                                                                                                                          |        |                      |                     |                     |                     |                          |  |            |  |    |         |               |                   |              |                   |  |                   |                                                                                                                                                                                                                                                                                           |

# Application Examples Of System Integration

Maxtech Temperature Controllers





## Order information

MC - **5838** - **1** **0** **1** - **0** **0** **2**

**A** **B** **C** **D** **E** **F** **G**

### A-Model NO :

MC-5438 with size 48x48mm

(DIN 1/16)

MC-5538 with size 48x96mm

(DIN1/8)

MC-5638 with size 96x48mm

(DIN1/8)

MC-5738 with size 72x72mm

MC-5838 with size 96x96mm

(DIN1/4)

### B-Out 1 control output mode for heating or cooling :

0-None

1-Relay contact, SPDT 5A/240VAC

2-SSR Voltage pulse, 24VDC/20mA

3-Current, 4-20mA

4-3 wire system motor valve control  
(5A/240VAC)

A-0~5V

B-0~10V

C-1~5V

D-2~10V

### C-Out 2 control output mode for cooling :

0-None

1-Relay contact, SPDT  
5A / 240VAC

2-SSR Voltage pulse,  
24VDC/20mA

### D-Alarm :

0-None

1-One set alarm

2-Two set alarm

3-Three set alarm \*(except  
MC-5438)

### E-Transmitter :

0-None

1-4~20mA (Adjustable)

2-0~20mA (Adjustable)

A-0~5V

B-0~10V

C-1~5V

D-2~10V

### F-Second Input :

0-None

1-4~20mA remote set point

2-0~20mA remote set point

3-CT(Heater broken alarm)

A-0~5V remote set point

B-0~10V remote set point

C-1~5V remote set point

D-2~10V remote set point

### G-Communication :

0-None

1-RS232

2-RS485

