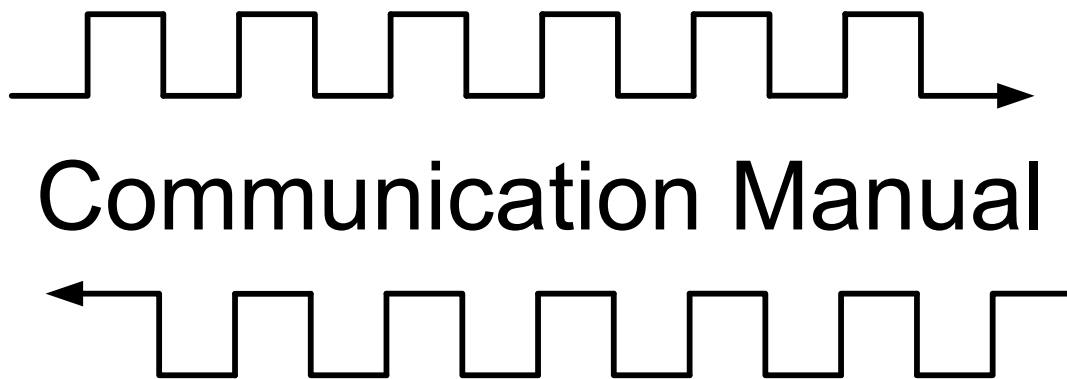


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Temperature Controller  
NFY Series  
Ver 1.0

---



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# 1. Communication Specifications

## TAIE Protocol

|                        |                                                                                 |
|------------------------|---------------------------------------------------------------------------------|
| Interface              | RS-485                                                                          |
| Baud rate              | 2400 bps 、 4800 bps 、 9600 bps 、 19200 bps 、 38400 bps 、 57600 bps 、 115200 bps |
| Data format            | Parity bit: None 、 Odd 、 Even<br>Data bit: 8<br>Stop bit: 1 or 2                |
| Interval time          | 0~250ms                                                                         |
| Function code          | 52H : Read<br>4DH : Modify<br>57H : Write                                       |
| Error check            | Sum of communication data, with Low Byte as error check.                        |
| Protocol               | TAIE                                                                            |
| MAX Number connections | Up to 31 units                                                                  |

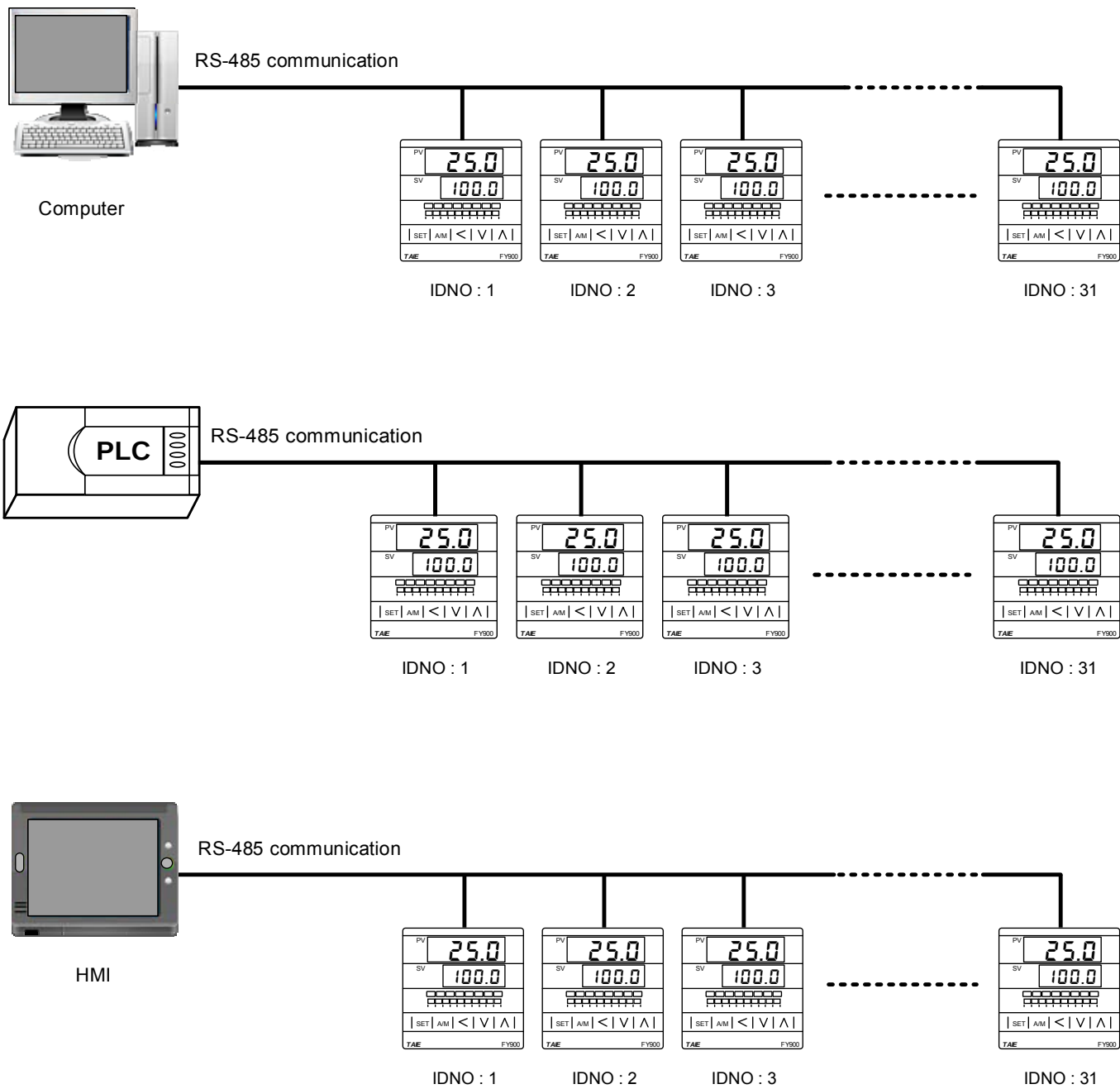
## MODBUS RTU Protocol

|                        |                                                                                     |
|------------------------|-------------------------------------------------------------------------------------|
| Interface              | RS-485                                                                              |
| Baud rate              | 2400 bps 、 4800 bps 、 9600 bps 、 19200 bps 、 38400 bps 、 57600 bps 、 115200 bps     |
| Data format            | Parity bit: None 、 Odd 、 Even<br>Data bit: 8<br>Stop bit: 1 or 2                    |
| Interval time          | 0~250ms                                                                             |
| Function code          | 03H : Read<br>06H : Write<br>10H : Multiple write                                   |
| Error check            | CRC-16                                                                              |
| Error code             | 01H : Function code error<br>02H : Register address error<br>03H : Data count error |
| Protocol               | Modbus RTU                                                                          |
| MAX Number connections | Up to 31 units                                                                      |

## 2. System Configuration

### 2.1 RS-485 Configuration

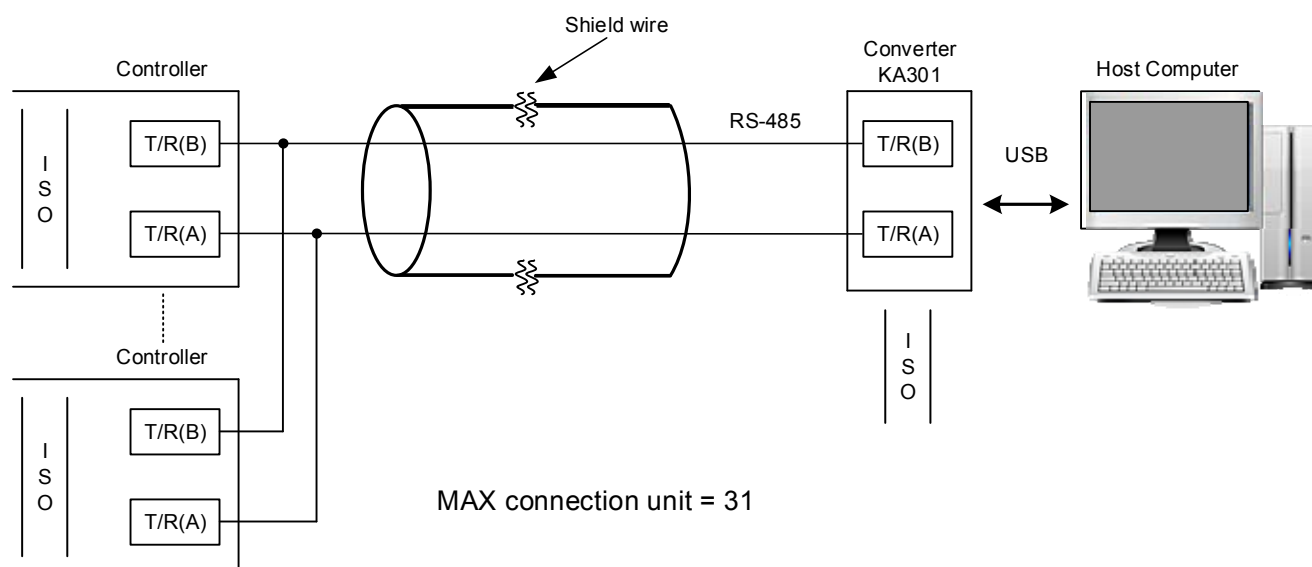
MAX number of connection unit for RS-485 communication interface is 31.  
The spanning distance for controller connection PC Cable should not be more than 1200 meters.



## 3. Wiring

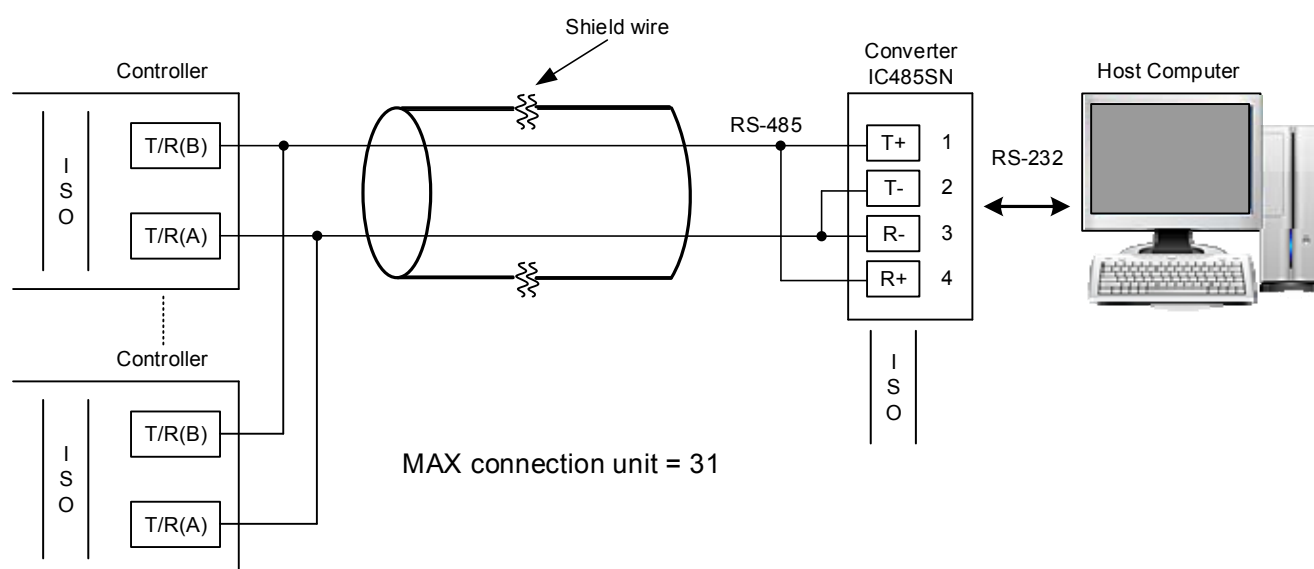
### 3.1 RS-485 Wiring

Use KA301 Converter to connect with controller



※ The spanning distance for controller connection PC Cable should not be more than 1200 meters.

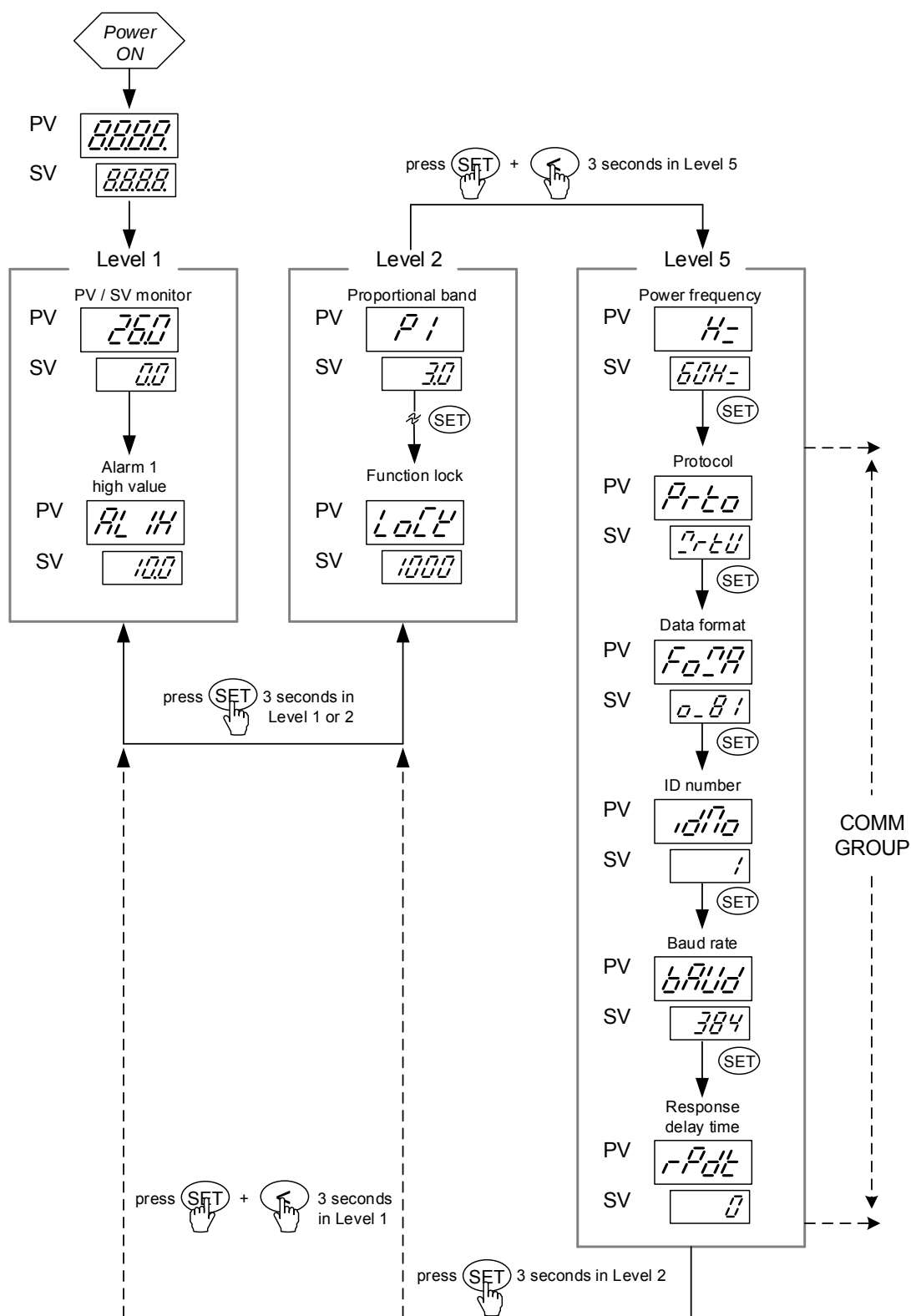
Use IC485SN Converter connected to controller



※ The spanning distance for controller connection PC Cable should not be more than 1200 meters.

## 4. Communication Parameter Setting

### 4.1 Setting Communication Parameter

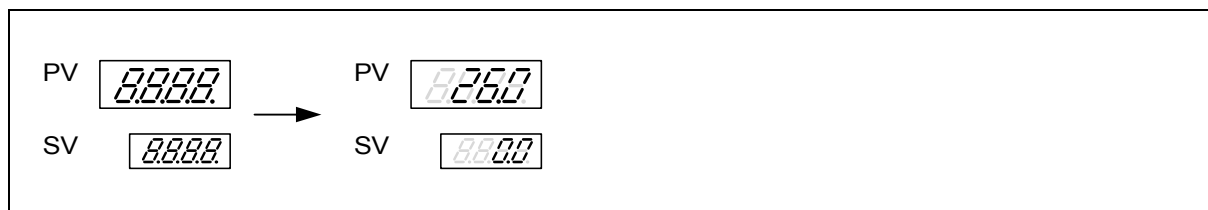


## 4.2 Communication Parameter Functionality Outline

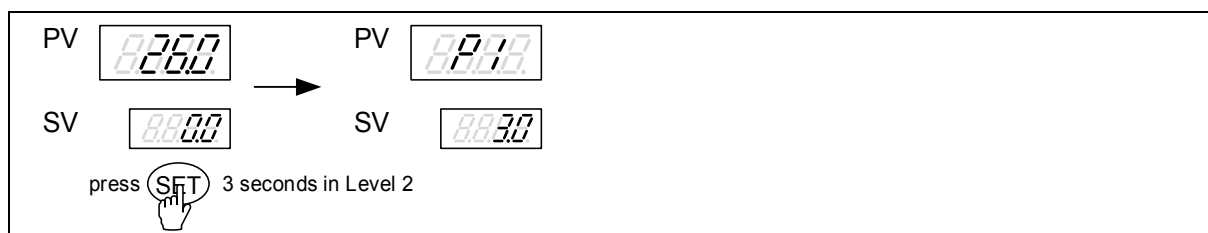
| Symbol      | Content                | Data Range                                                                                                                                                          | Initial     |
|-------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| <i>0000</i> | Communication Protocol | <i>0000</i> : Modbus RTU                                                                                                                                            | <i>0000</i> |
|             |                        | <i>0001</i> : TAIE                                                                                                                                                  |             |
| <i>0001</i> | Data format            | <i>0001</i> : None parity<br>data bits =8<br>stop bit =1                                                                                                            | <i>0001</i> |
|             |                        | <i>0002</i> : None parity<br>data bits =8<br>stop bit =2                                                                                                            |             |
|             |                        | <i>0003</i> : Odd parity<br>data bits =8<br>stop bit =1                                                                                                             |             |
|             |                        | <i>0004</i> : Odd parity<br>data bits =8<br>stop bit =2                                                                                                             |             |
|             |                        | <i>0005</i> : Even parity<br>data bits =8<br>stop bit =1                                                                                                            |             |
|             |                        | <i>0006</i> : Even parity<br>data bits =8<br>stop bit =2                                                                                                            |             |
| <i>0002</i> | Controller address     | <i>0000</i> : 0~255                                                                                                                                                 | <i>0000</i> |
| <i>0003</i> | Baud rate              | <i>0000</i> : 2400 bps                                                                                                                                              | <i>0000</i> |
|             |                        | <i>0001</i> : 4800 bps                                                                                                                                              |             |
|             |                        | <i>0002</i> : 9600 bps                                                                                                                                              |             |
|             |                        | <i>0003</i> : 19200 bps                                                                                                                                             |             |
|             |                        | <i>0004</i> : 38400 bps                                                                                                                                             |             |
|             |                        | <i>0005</i> : 57600 bps                                                                                                                                             |             |
| <i>0004</i> | Response delay time    | <i>0000</i> : 115200 bps                                                                                                                                            | <i>0000</i> |
|             |                        | Response delay time(ms)<br>When the controller receives command from master server, it will relay data back to master server in a delay of the set time value here. |             |
| <i>0005</i> | Write mode             | OFF : As controller receives write-register command, it would only write to CPU RAM, not into EEPROM.                                                               | <i>0000</i> |
|             |                        | ON : As controller receives write-register command, it would write to both CPU RAM and EEPROM , at the same time.                                                   |             |

### 4.3 Procedure for Communication Parameter Setting

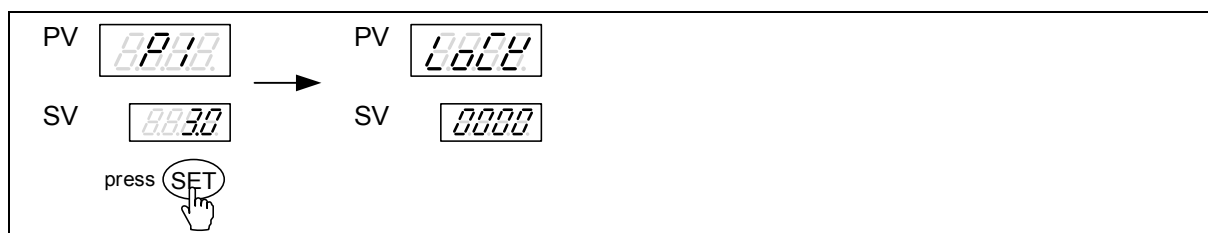
1. Power ON & Initialization completed



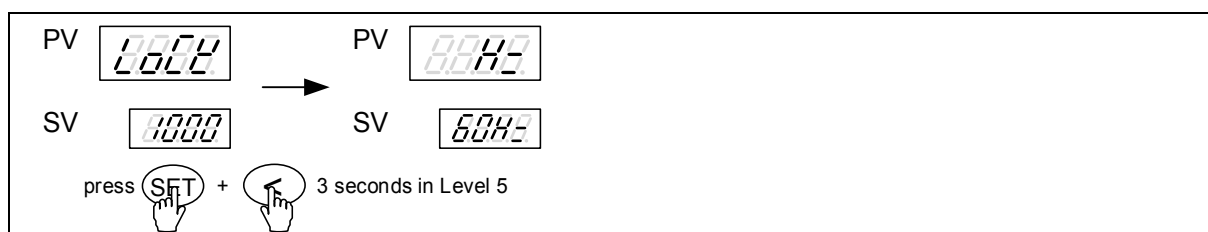
2. Press SET key 3 seconds, will enter Level2.



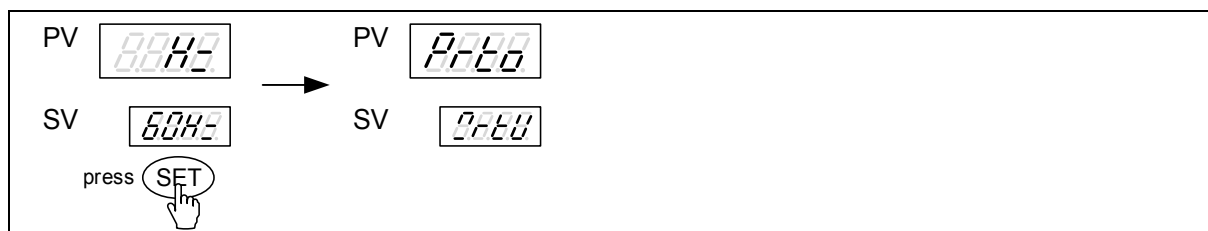
3. Press SET key to search upper display showing the value indicated here. 8888



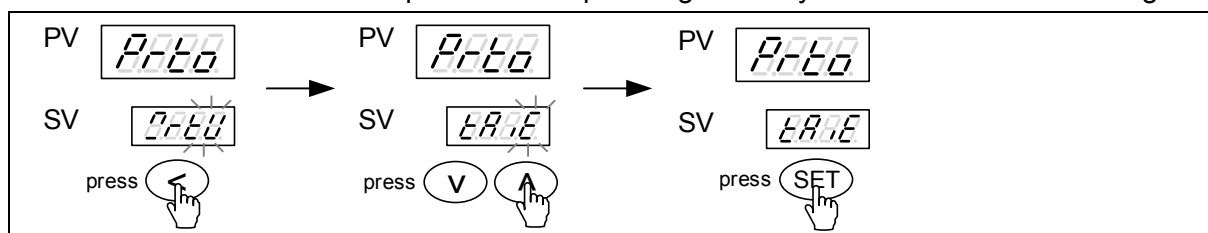
4. Set LOCK to 1000 , press SET key + SHIFT key for 3 seconds to enter Level 5



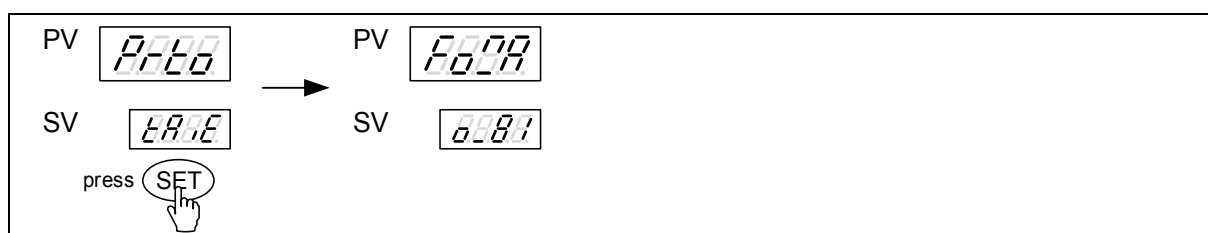
5. Press SET key to search upper display showing the value indicated here. 8888



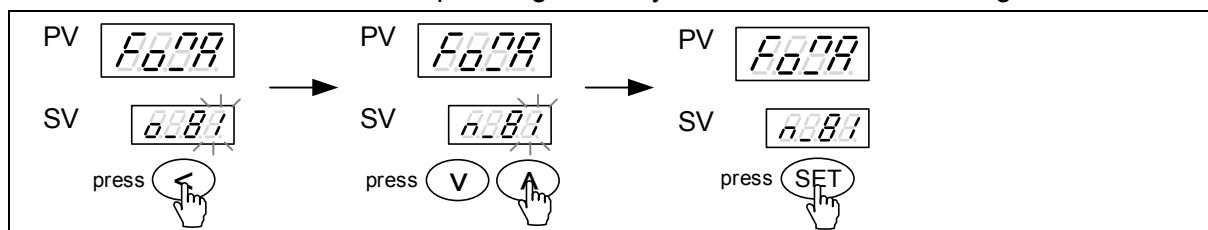
6. Press SHIFT key then lower display will start flash , press UP key or DOWN key to select communication protocol then pressing SET key to save the current setting .



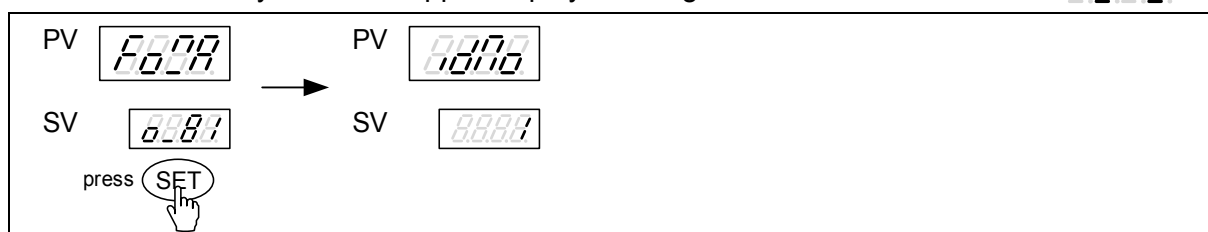
7. Press SET key to search upper display showing the value indicated here. *PrLd*



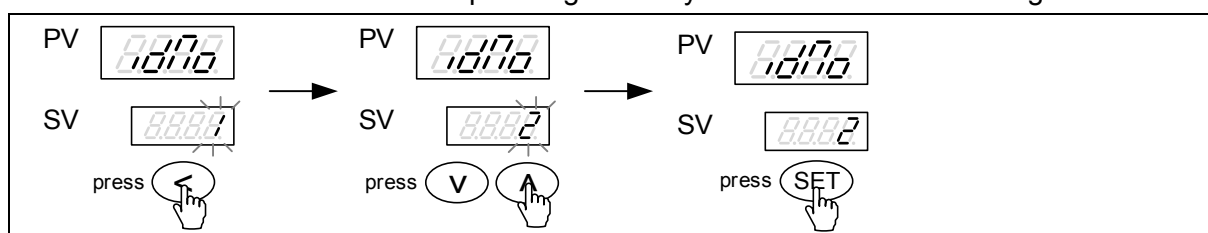
8. Press SHIFT key then lower display will start flash , press UP key or DOWN key to select DATA format then pressing SET key to save the current setting.



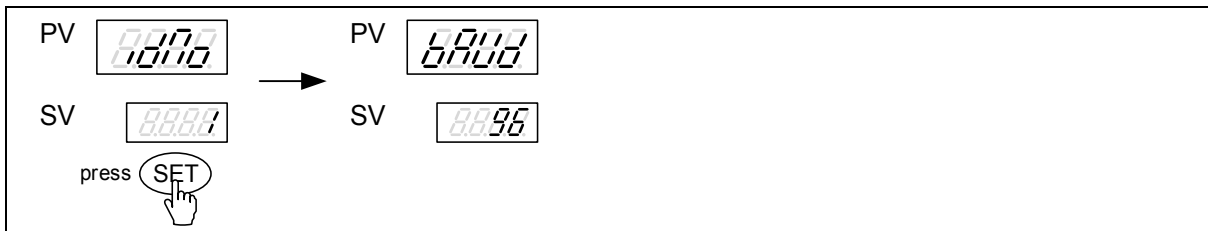
9. Press SET key to search upper display showing the value indicated here. *PrLd*



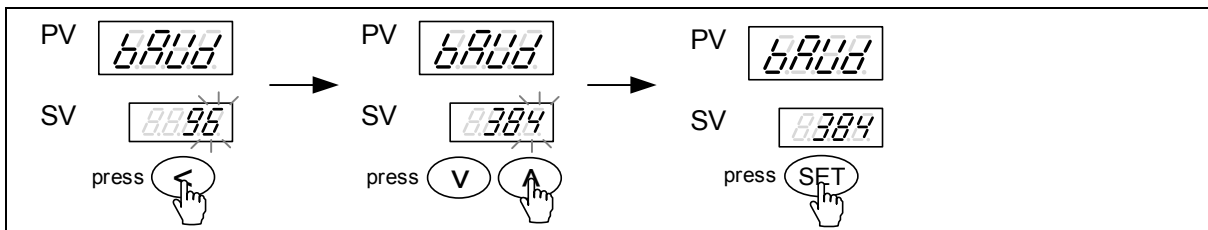
10. Press SHIFT key then lower display will start flash , press UP key or DOWN key to select slave address then pressing SET key to save the current setting.



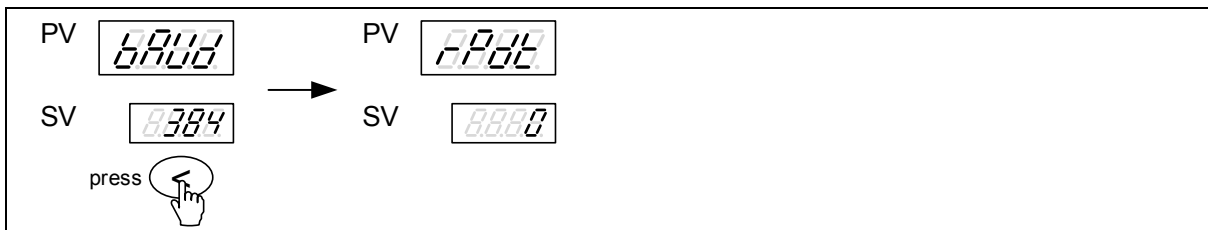
11. Press SET key to search upper display showing the value indicated here. *6800*



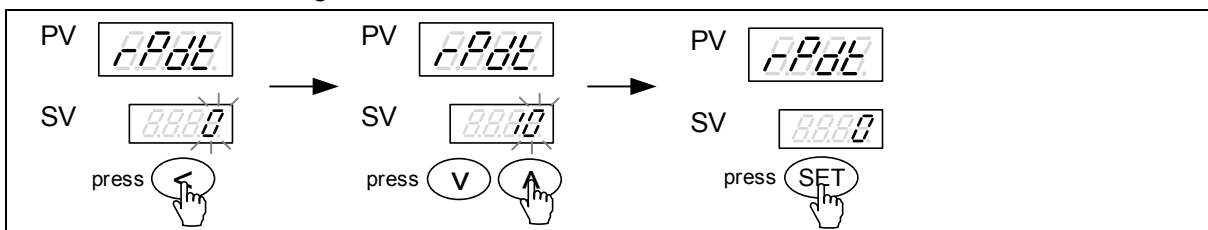
12. Press SHIFT key then lower display will start flash , press UP key or DOWN key to select baud rate then pressing SET key to save the current setting.



13. Press SET key to search upper display showing value indicated here. *8888*



14. Press SHIFT key then lower display will start flash , press UP key or DOWN key to select communication response delay time(ms) then pressing SET key to save the current setting .



## 5. TAIE Protocol

### 5.1 Function Code

| Function Code | Command | Content                                                                                                                       |
|---------------|---------|-------------------------------------------------------------------------------------------------------------------------------|
| 'R' (52H)     | Read    | Reading 1 registered value from slave controller                                                                              |
| 'M' (4DH)     | Modify  | Temporarily write 1 registered value to controller's RAM.<br>(Default value will be restored when controller is powered off ) |
| 'W' (57H)     | Write   | Write 1 registered value to controller's RAM and EEPROM.<br>(Data are maintained after power off)                             |

### 5.2 Checksum

Add all the values from "Command" to the end of "Data". The result is Checksum (1 byte).

|         |   |    |   |              |   |      |   |          |   |          |
|---------|---|----|---|--------------|---|------|---|----------|---|----------|
| Command | + | ID | + | data address | + | data | = | checksum | → | low byte |
|---------|---|----|---|--------------|---|------|---|----------|---|----------|

※ The Data response not include (Header)07H

EX (1) : Read the SV value of controller.

|            |   |         |   |                  |   |        |   |         |   |                            |
|------------|---|---------|---|------------------|---|--------|---|---------|---|----------------------------|
| command    |   | station |   | register address |   | data   |   | Add all |   | checksum<br>(get low byte) |
| ('R') 52 H | + | 01 H    | + | 0001H            | + | 03E8 H | = | 013F H  | → | 3F H                       |

EX (2) : Temporary write to SV value of controller.

|            |   |         |   |                  |   |        |   |         |   |                            |
|------------|---|---------|---|------------------|---|--------|---|---------|---|----------------------------|
| command    |   | station |   | register address |   | data   |   | Add all |   | checksum<br>(get low byte) |
| ('M') 4D H | + | 01 H    | + | 0001 H           | + | 03E8 H | = | 013A H  | → | 3A H                       |

EX (3) : Write to SV value of controller.

|            |   |         |   |                  |   |        |   |         |   |                            |
|------------|---|---------|---|------------------|---|--------|---|---------|---|----------------------------|
| command    |   | station |   | register address |   | data   |   | Add all |   | checksum<br>(get low byte) |
| ('W') 57 H | + | 01 H    | + | 0001 H           | + | 03E8 H | = | 0144 H  | → | 44 H                       |

### 5.3 Read A Register Format

Master send:

| Master Send | No. of Byte | 1               | 2          | 3                | 4          | 5          | 6          | 7          |
|-------------|-------------|-----------------|------------|------------------|------------|------------|------------|------------|
|             | Command     | <b>52H('R')</b> | <b>01H</b> | <b>00H</b>       | <b>00H</b> | <b>00H</b> | <b>00H</b> | <b>53H</b> |
|             | Comment     | Read            | ID Number  | Register Address |            | Data       |            | Checksum   |

Controller response:

| Controller response | No. of Byte | 0          | 1               | 2          | 3                | 4          | 5          | 6          | 7          |
|---------------------|-------------|------------|-----------------|------------|------------------|------------|------------|------------|------------|
|                     | Command     | <b>07H</b> | <b>4DH('M')</b> | <b>01H</b> | <b>00H</b>       | <b>00H</b> | <b>03H</b> | <b>E8H</b> | <b>39H</b> |
|                     | Comment     | Header     | Read            | ID Number  | Register Address |            | Data       |            | Checksum   |

### 5.4 Write A Register Format

Master send:

| Master Send | No. of Byte | 1               | 2          | 3                | 4          | 5          | 6          | 7          |
|-------------|-------------|-----------------|------------|------------------|------------|------------|------------|------------|
|             | Command     | <b>57H('W')</b> | <b>01H</b> | <b>00H</b>       | <b>01H</b> | <b>03H</b> | <b>E8H</b> | <b>44H</b> |
|             | Comment     | Write           | ID Number  | Register Address |            | Data       |            | Checksum   |

Controller response:

| Controller response | No. of Byte | 1               | 2               |
|---------------------|-------------|-----------------|-----------------|
|                     | Command     | <b>4FH('O')</b> | <b>4BH('K')</b> |
|                     | Comment     | Message         |                 |

### 5.5 Modify A Register Format

Master send:

| Master Send | No. of Byte | 1               | 2          | 3                | 4          | 5          | 6          | 7          |
|-------------|-------------|-----------------|------------|------------------|------------|------------|------------|------------|
|             | Command     | <b>4DH('M')</b> | <b>01H</b> | <b>00H</b>       | <b>01H</b> | <b>00H</b> | <b>64H</b> | <b>B3H</b> |
|             | Comment     | Modify          | ID Number  | Register Address |            | Data       |            | Checksum   |

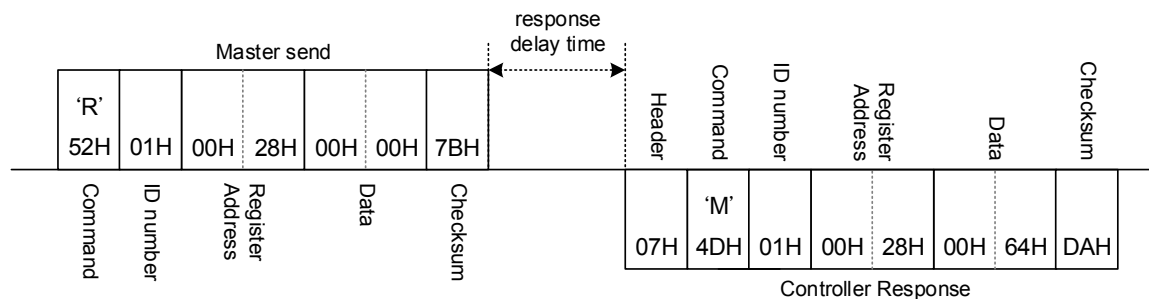
Controller response:

| Controller response | No. of Byte | 1               | 2               |
|---------------------|-------------|-----------------|-----------------|
|                     | Command     | <b>4FH('O')</b> | <b>4BH('K')</b> |
|                     | Comment     | Message         |                 |

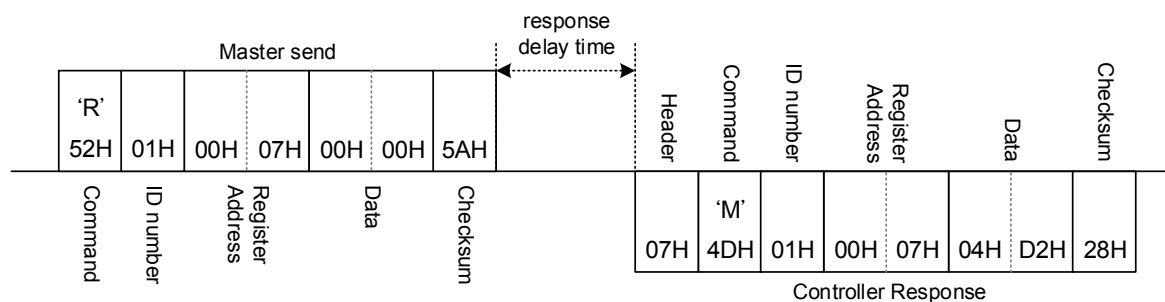
## 5.6 More Examples of Read/Write/Modify Example

### 5.6.1 Read a register

(1) Read P1, if P1=10.0

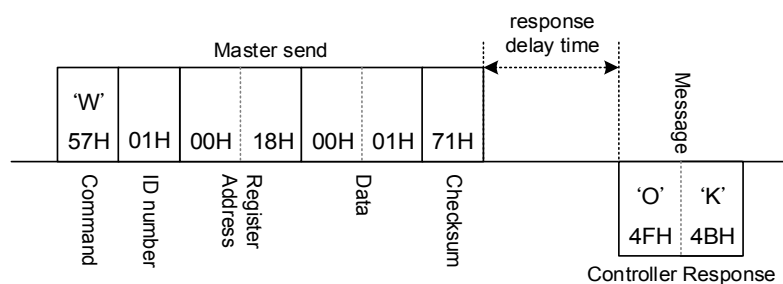


(2) Read AL1H, if AL1H =1234

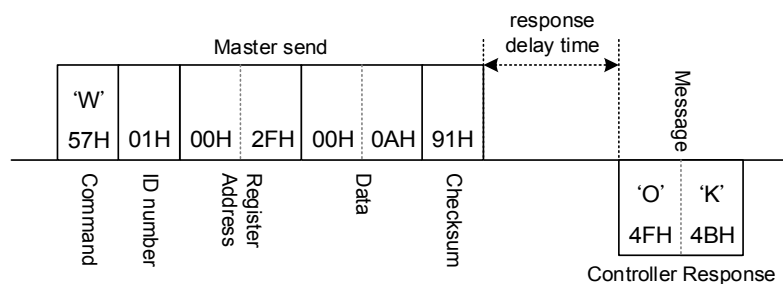


### 5.6.2 Write a register

(1) Write AT =ON

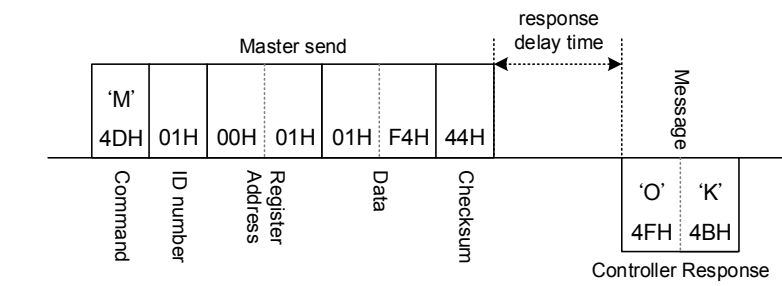


(2) Write CYT1 =10

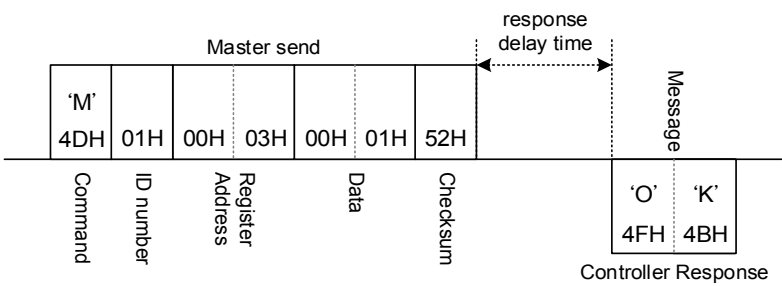


5.6.3 Modify a register

(1) Write SV =500



(2) Write R\_S =RUN



## 6. Modbus RTU Protocol

### 6.1 Message Structure

|               |
|---------------|
| ID number     |
| Function Code |
| Data          |
| CRC-16 Modbus |

ID number :

ID number range is 01H to FFH (1 to 255).

Function Code:

| command             | content                                                                                |
|---------------------|----------------------------------------------------------------------------------------|
| 03 H (Multi-Read)   | Reading multiple registers value from slave controller<br>(Max register count : 25)    |
| 06 H (Single-Write) | Write 1 register value to controller's RAM and EEPROM.                                 |
| 10 H (Multi-Write)  | Write Multi-register value to controller's RAM and EEPROM.<br>(Max register count : 8) |

CRC-16 Modbus:

CRC-16 Modbus generation step are as below:

step 1 : CRC = FFFF(Hex) 2 Byte

step 2 : Calculate XOR with 1st data (start with n=1) and the low byte of CRC.

step 3 : If CRC data byte is 1

→ CRC = CRC >> 1;

CRC<sup>^</sup> = 0XA001;

or

→ CRC = CRC >> 1;

step 4 : Repeat step 3, do 8 times.

step 5 : Repeat step 2~4 finished the end of one.

step 6 : Reverse CRC's L/H(Byte), get CRD.

EX(1) Read to SV:

| No. of Byte | 1       | 2             | 3                | 4    | 5          | 6    | 7             | 8    |
|-------------|---------|---------------|------------------|------|------------|------|---------------|------|
| Command     | 01 H    | 03 H          | 00 H             | 01 H | 00 H       | 01 H | D5H           | CA H |
| Comment     | Station | Function Code | Register Address |      | Data Count |      | CRC-16 Modbus |      |

EX(2) Write to SV =1000:

| No. of Byte | 1       | 2             | 3                | 4    | 5          | 6    | 7             | 8    |
|-------------|---------|---------------|------------------|------|------------|------|---------------|------|
| Command     | 01 H    | 06H           | 00 H             | 01 H | 03 H       | E8 H | D8 H          | B4 H |
| Comment     | Station | Function Code | Register Address |      | Data Count |      | CRC-16 Modbus |      |

EX(3) Write to AL1H =10, AL1L =5:

| No. of Byte | 1       | 2             | 3                | 4   | 5          | 6         | 7    | 8      | 9    | 10     | 11   | 12            | 13   |
|-------------|---------|---------------|------------------|-----|------------|-----------|------|--------|------|--------|------|---------------|------|
| Command     | 01 H    | 10 H          | 00 H             | 07H | 00 H       | 02 H      | 04 H | 00 H   | 0A H | 00 H   | 05 H | 52 H          | 48 H |
| Comment     | Station | Function Code | Register Address |     | Data Count | Data Byte |      | Data 1 |      | Data 2 |      | CRC-16 Modbus |      |

CRC-16 refer to: <http://www.lammertbies.nl/comm/info/crc-calculation.html>

## On-line CRC calculation and free library

- [Introduction on CRC calculations](#)
- [Free CRC calculation routines for download](#)
- [CRC calculation support forum](#) **New**

"010300000001" (hex)

|                    |            |
|--------------------|------------|
| 1 byte checksum    | 5          |
| CRC-16             | 0x1184     |
| CRC-16 (Modbus)    | 0x0A84     |
| CRC-16 (Sick)      | 0x1108     |
| CRC-CCITT (XModem) | 0xBB53     |
| CRC-CCITT (0xFFFF) | 0xB543     |
| CRC-CCITT (0x1D0F) | 0x8A6D     |
| CRC-CCITT (Kermit) | 0x6E08     |
| CRC-DNP            | 0x4C19     |
| CRC-32             | 0x4A393840 |

010300000001

Input type: ☐ ASCII ☒ Hex

## 6.2 Read Register Format

### 6.2.1 Read a register format

Master send (Read SV):

| Master Send | No. of Byte | 1         | 2       | 3                | 4   | 5          | 6   | 7             | 8   |
|-------------|-------------|-----------|---------|------------------|-----|------------|-----|---------------|-----|
|             | Command     | 01H       | 03H     | 00H              | 01H | 00H        | 01H | D5H           | CAH |
|             | Comment     | ID Number | Command | Register Address |     | Data Count |     | CRC-16 Modbus |     |

Controller response (If SV = 100.0):

| Controller response | No. of Byte | 1         | 2       | 3               | 4   | 5    | 6   | 7             |
|---------------------|-------------|-----------|---------|-----------------|-----|------|-----|---------------|
|                     | Command     | 01H       | 03H     | 02H             | 03H | E8H  | B8H | FAH           |
|                     | Comment     | ID Number | Command | Data Byte Count |     | Data |     | CRC-16 Modbus |

### 6.2.2 Read multi register format

NFY controller can read up to 25 parameter information at a time, as user can choose the number of 1~25 for the number of data can be read at a time.

Master send (Read AL1H, AL1L):

|             |             |           |         |                  |     |            |     |               |     |
|-------------|-------------|-----------|---------|------------------|-----|------------|-----|---------------|-----|
| Master Send | No. of Byte | 1         | 2       | 3                | 4   | 5          | 6   | 7             | 8   |
|             | Command     | 01H       | 03H     | 00H              | 07H | 00H        | 02H | 75H           | CAH |
|             | Comment     | ID Number | Command | Register Address |     | Data Count |     | CRC-16 Modbus |     |

Controller response:

|                     |             |           |         |                 |        |     |        |     |               |     |
|---------------------|-------------|-----------|---------|-----------------|--------|-----|--------|-----|---------------|-----|
| Controller response | No. of Byte | 1         | 2       | 3               | 4      | 5   | 6      | 7   | 8             | 9   |
|                     | Command     | 01H       | 03H     | 04H             | 00H    | 0AH | 00H    | 05H | 1AH           | 32H |
|                     | Comment     | ID Number | Command | Data Byte Count | Data 1 |     | Data 2 |     | CRC-16 Modbus |     |

## 6.3 Write Register Format

### 6.3.1 Write a register format

Master send (Write SV =100):

|             |             |           |         |                  |     |            |     |               |     |
|-------------|-------------|-----------|---------|------------------|-----|------------|-----|---------------|-----|
| Master Send | No. of Byte | 1         | 2       | 3                | 4   | 5          | 6   | 7             | 8   |
|             | Command     | 01H       | 06H     | 00H              | 01H | 00H        | 64H | D9H           | E1H |
|             | Comment     | ID Number | Command | Register Address |     | Data Count |     | CRC-16 Modbus |     |

Controller response:

|                     |             |           |         |                  |     |            |     |               |     |
|---------------------|-------------|-----------|---------|------------------|-----|------------|-----|---------------|-----|
| Controller response | No. of Byte | 1         | 2       | 3                | 4   | 5          | 6   | 7             | 8   |
|                     | Command     | 01H       | 06H     | 00H              | 01H | 00H        | 64H | D9H           | E1H |
|                     | Comment     | ID Number | Command | Register Address |     | Data Count |     | CRC-16 Modbus |     |

### 6.3.2 Write multi register format

NFY controller can read up to 8 parameter information at a time, as users can choose the number of 1~8 for the number of data can be read at a time. in multi write mode approve master device write 8 registers once, user can setting 1~8 number in Data Count field.

Master send (Write AL1H =10, AL1L =5):

|             |             |           |         |                  |     |            |     |                 |        |     |        |     |               |     |
|-------------|-------------|-----------|---------|------------------|-----|------------|-----|-----------------|--------|-----|--------|-----|---------------|-----|
| Master Send | No. of Byte | 1         | 2       | 3                | 4   | 5          | 6   | 7               | 8      | 9   | 10     | 11  | 12            | 13  |
|             | Command     | 01H       | 10H     | 00H              | 07H | 00H        | 02H | 04H             | 00H    | 0AH | 00H    | 05H | 52H           | 48H |
|             | Comment     | ID Number | Command | Register Address |     | Data Count |     | Data Byte Count | Data 1 |     | Data 2 |     | CRC-16 Modbus |     |

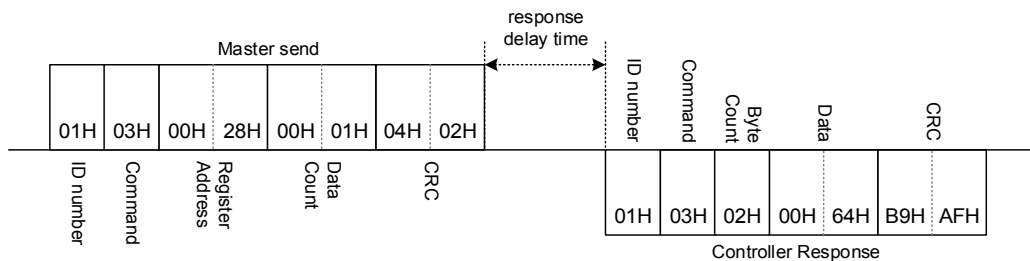
Controller response:

| Controller response | No. of Byte | 1         | 2       | 3                | 4   | 5          | 6   | 7             | 8   |
|---------------------|-------------|-----------|---------|------------------|-----|------------|-----|---------------|-----|
|                     | Command     | 01H       | 10H     | 00H              | 07H | 00H        | 02H | F0H           | 09H |
|                     | Comment     | ID Number | Command | Register Address |     | Data Count |     | CRC-16 Modbus |     |

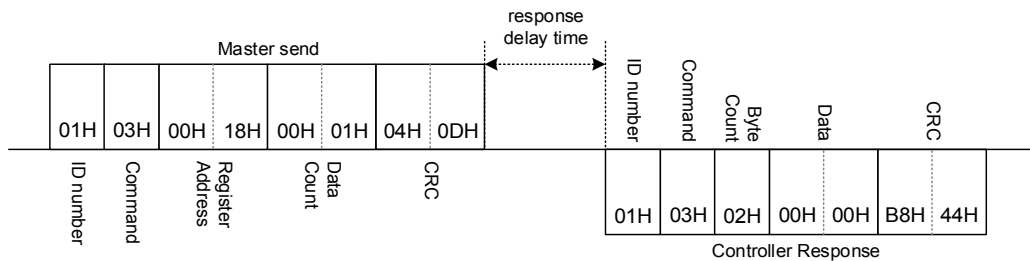
## 6.4 More Examples of Read/Write

### 6.4.1 Read a register

(1) Read P1 , If P1 =10.0

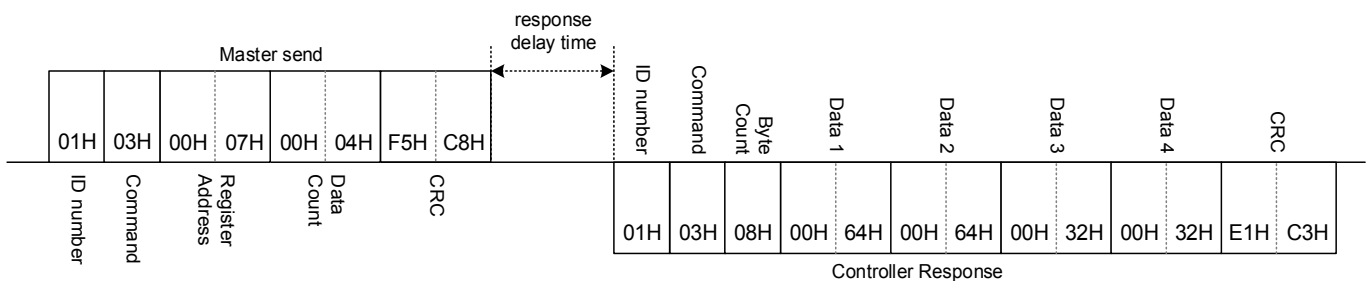


(2) Read AT , If AT =OFF



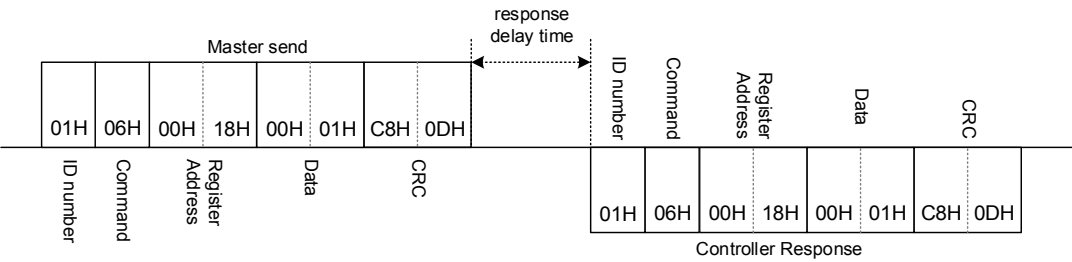
### 6.4.2 Read multi register

(1) Read AL1H, AL1L, AL2H,AL2L , If AL1H=10.0, AL1L=10.0, AL2H=5.0, AL2L=5.0

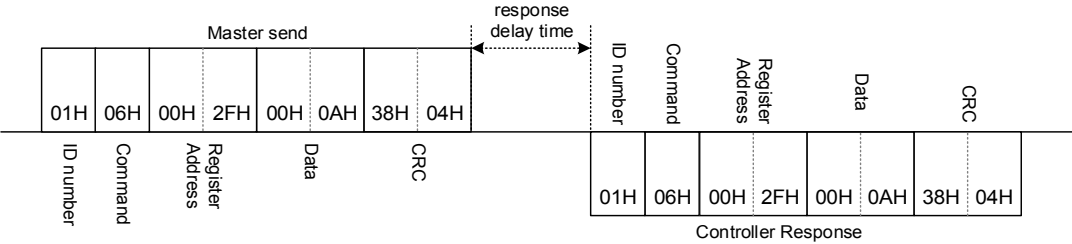


6.4.3 Write a register

(1) Write AT =ON

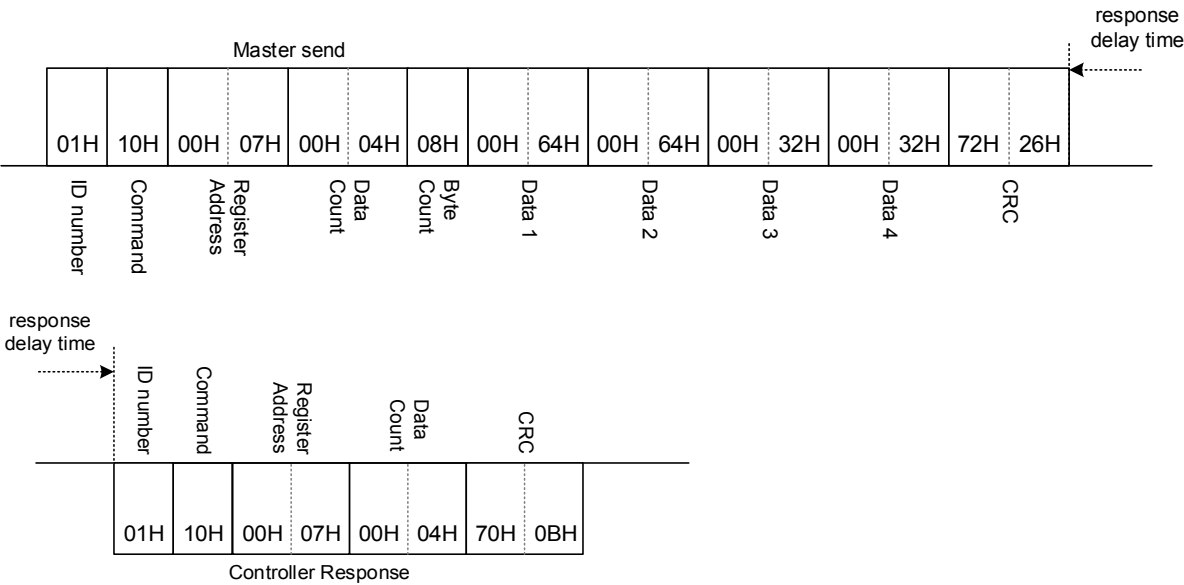


(2) Write CYT1 =10



6.4.4 Write multi register

(1) Continuous write AL1H, AL1L, AL2H,AL2L , If AL1H=10.0, AL1L=10.0, AL2H=5.0, AL2L=5.0



## 6.5 Error Code

| Code  | Content                                                     |
|-------|-------------------------------------------------------------|
| (01H) | Illegal function code (Non-existent function code)          |
| (02H) | Illegal register address (Register address is out of range) |
| (03H) | Illegal data count (Data count is out of setting range)     |

※ 1 is set to the MSB of function code in abnormal status.

### 6.5.1 Read Errors

(1) Register address is out of range

Master send:

|             |             |           |         |                         |     |            |     |               |     |
|-------------|-------------|-----------|---------|-------------------------|-----|------------|-----|---------------|-----|
| Master Send | No. of Byte | 1         | 2       | 3                       | 4   | 5          | 6   | 7             | 8   |
|             | Command     | 01H       | 03H     | FFH                     | FFH | 00H        | 01H | 84H           | 2EH |
|             | Comment     | ID Number | Command | Register Address(error) |     | Data Count |     | CRC-16 Modbus |     |

Controller response:

|                     |             |           |                 |            |               |     |
|---------------------|-------------|-----------|-----------------|------------|---------------|-----|
| Controller response | No. of Byte | 1         | 2               | 3          | 6             | 7   |
|                     | Command     | 01H       | 83H             | 02H        | C0H           | F1H |
|                     | Comment     | ID Number | Command (MSB=1) | Error Code | CRC-16 Modbus |     |

(2) Data count is out of setting range

Master send:

|             |             |           |         |                  |     |                         |     |               |     |
|-------------|-------------|-----------|---------|------------------|-----|-------------------------|-----|---------------|-----|
| Master Send | No. of Byte | 1         | 2       | 3                | 4   | 5                       | 6   | 7             | 8   |
|             | Command     | 01H       | 03H     | 00H              | 00H | 00H                     | 1EH | C5H           | C2H |
|             | Comment     | ID Number | Command | Register Address |     | Data Count (over range) |     | CRC-16 Modbus |     |

Controller response:

|                     |             |           |                 |            |               |     |
|---------------------|-------------|-----------|-----------------|------------|---------------|-----|
| Controller response | No. of Byte | 1         | 2               | 3          | 6             | 7   |
|                     | Command     | 01H       | 83H             | 03H        | 01H           | 31H |
|                     | Comment     | ID Number | Command (MSB=1) | Error Code | CRC-16 Modbus |     |

### 6.5.2 Write Errors

(1) Register address is out of range

Master send:

|             |             |           |         |                         |     |      |     |               |     |
|-------------|-------------|-----------|---------|-------------------------|-----|------|-----|---------------|-----|
| Master Send | No. of Byte | 1         | 2       | 3                       | 4   | 5    | 6   | 7             | 8   |
|             | Command     | 01H       | 06H     | FFH                     | FFH | 00H  | 00H | 89H           | EEH |
|             | Comment     | ID Number | Command | Register Address(error) |     | Data |     | CRC-16 Modbus |     |

Controller response:

|                     |             |           |                 |            |               |     |
|---------------------|-------------|-----------|-----------------|------------|---------------|-----|
| Controller response | No. of Byte | 1         | 2               | 3          | 6             | 7   |
|                     | Command     | 01H       | 86H             | 02H        | C3H           | A1H |
|                     | Comment     | ID Number | Command (MSB=1) | Error Code | CRC-16 Modbus |     |

(2) Data count is out of setting range

Master send:

|             |             |           |         |                  |                         |    |           |        |    |      |  |  |
|-------------|-------------|-----------|---------|------------------|-------------------------|----|-----------|--------|----|------|--|--|
| Master Send | No. of Byte | 1         | 2       | 3                | 4                       | 5  | 6         | 7      | 8  | 9    |  |  |
|             | Command     | 01H       | 10H     | 00H              | 02H                     | 00 | 1A        | 12     | 00 | 64   |  |  |
|             | Comment     | ID Number | Command | Register Address | Data Count (over range) |    | Data Byte | Data 1 |    | .... |  |  |

|             |             |     |  |        |    |               |    |
|-------------|-------------|-----|--|--------|----|---------------|----|
| Master Send | No. of Byte |     |  | 24     | 25 | 26            | 27 |
|             | Command     |     |  | 00     | 64 | C9            | AC |
|             | Comment     | ... |  | Data 9 |    | CRC-16 Modbus |    |

Controller response:

|                     |             |           |                 |            |               |     |
|---------------------|-------------|-----------|-----------------|------------|---------------|-----|
| Controller response | No. of Byte | 1         | 2               | 3          | 6             | 7   |
|                     | Command     | 01H       | 90H             | 03H        | 0CH           | 01H |
|                     | Comment     | ID Number | Command (MSB=1) | Error Code | CRC-16 Modbus |     |

### 6.5.3 Error command

(1) Non-existent function code

Master send

|             |             |           |                 |                  |            |     |               |     |     |
|-------------|-------------|-----------|-----------------|------------------|------------|-----|---------------|-----|-----|
| Master Send | No. of Byte | 1         | 2               | 3                | 4          | 5   | 6             | 7   | 8   |
|             | Command     | 01H       | 00H             | 00H              | 00H        | 00H | 01H           | C0H | 0AH |
|             | Comment     | ID Number | Command (error) | Register Address | Data Count |     | CRC-16 Modbus |     |     |

Controller response:

|                     |             |           |                 |            |               |     |
|---------------------|-------------|-----------|-----------------|------------|---------------|-----|
| Controller response | No. of Byte | 1         | 2               | 3          | 6             | 7   |
|                     | Command     | 01H       | 80H             | 01H        | 80H           | 00H |
|                     | Comment     | ID Number | Command (MSB=1) | Error Code | CRC-16 Modbus |     |

## 6.6 EEPROM Protection Function

NFY memory system consists of EEPROM, each EEPROM memory has its physical limit, in terms of its memory count and memory duration span, therefore, a 24C16 EEPROM is capable of having a write-in count of one million times, and having its data to be kept for up to 10 years, so in the case of high-speed communication, if the master end only sends a write-in command, then it is highly possible that there would be over-cycle in a short period of time, i.e. the physical characteristics of this particular memory unit would have been destroyed and incapacitated, so in order to prevent this kind of functional defect, NFY controllers offer two types of protection Modes, which are active protection and passive protection respectively, and for detailed information, please see the following outline.

---

### (1) Active Protection

Controller will automatically compare write-in data, whether it be Modbus RTU or TAIE communication protocol. When any received data is the same as previously received data, controller will not initiate write-in to EEPROM, and therefore, only different data shall be written in by controller to EEPROM.

EX:SV initial value =0 , Master continue write to controller's SV

1. Master send SV =1000  
NFY EEPROM : will write to 1000
  2. Master send SV =1000  
NFY EEPROM : No action
  3. Master send SV =1000  
NFY EEPROM : No action
  4. Master send SV =500  
NFY EEPROM : will write to 500
  5. Master send SV =500  
NFY EEPROM : No action
  6. Master send SV =500  
NFY EEPROM : No action
- 

### (2) Passive Protection

Set W\_MD into OFF, when controller received communication write-in command, it would only write in CPU RAM, not EEPROM, which brings relief to the potential over-cycle problem, however, its shortcoming is that, any data written in prior to system re-boot will not be kept.

EX1 : Set W\_MD into OFF , SV initial =0, Master send SV =1000

Master send : 01H 06H 00H 01H 03H E8H D8H B4H  
NFY RAM (SV) =1000  
NFY EEPROM : No action

EX2 : Set W\_MD into OFF , SV initial =0, Master send SV =1000

Master send : 01H 06H 00H 01H 03H E8H D8H B4H  
NFY RAM (SV) =1000  
NFY EEPROM : write to 1000

※ This parameter (W\_MD) cannot be written in via communication command, as it can only be set in the controller setting, as ON or OFF.

---

## 7. Communication Parameter address

### 7.1 General Parameters Address

| Param<br>eter | Display | Level   | Description                                                                                                              | Range |       | Address |     |       |     | R/W | Initial |
|---------------|---------|---------|--------------------------------------------------------------------------------------------------------------------------|-------|-------|---------|-----|-------|-----|-----|---------|
|               |         |         |                                                                                                                          | Max   | Min   | LOOP1   |     | LOOP2 |     |     |         |
|               |         |         |                                                                                                                          |       |       | Hex     | Dec | Hex   | Dec |     |         |
| PV            | 8250    | Level 1 | Process value                                                                                                            | USPL  | LSPL  | 0x00    | 0   | 0x83  | 131 | R   | ---     |
| SV            | 8800    | Level 1 | Set value                                                                                                                | USPL  | LSPL  | 0x01    | 1   | 0x84  | 132 | R/W | 0       |
| LOOP          | 0000    | Level 1 | Loop selection<br>0 : LOP1 (loop1)<br>1 : LOP2 (loop2)                                                                   | 1     | 0     | 0x02    | 2   | 0x85  | 133 | R/W | 0       |
| R_S           | 8888    | Level 1 | RUN/STOP mode selection<br>0 : STOP (output & alarm disable)<br>1 : RUN (output & alarm enable)                          | 1     | 0     | 0x03    | 3   | 0x86  | 134 | R/W | 0       |
| HBCU          | 8600    | Level 1 | HBA current display<br>unit : ampere(A)                                                                                  | 100.0 | 0.0   | 0x04    | 4   | 0x87  | 135 | R   | 0       |
| HBSV          | 8650    | Level 1 | HBA current setting<br>unit : ampere(A)                                                                                  | 100.0 | 0.0   | 0x05    | 5   | 0x88  | 136 | R/W | 0       |
| HBTM          | 8600    | Level 1 | HBA disconnection set time<br>unit : second(S)                                                                           | 5999  | 0     | 0x06    | 6   | 0x89  | 137 | R/W | 10      |
| AL1H          | 8L00    | Level 1 | Alarm1 upper set value<br>(ALD1 = DE.HI / DE.HL / BA.ND / PR.HI /<br>DEHI / DEHL / BAND / PRHI appear)                   | 9999  | -1000 | 0x07    | 7   | 0x8A  | 138 | R/W | 10      |
| AL1L          | 8L00    | Level 1 | Alarm1 lower set value<br>(ALD1 = DE.LO / DE.HL / BA.ND / PR.LO /<br>DELO / DEHL / BAND / PRLO appear)                   | 9999  | -1000 | 0x08    | 8   | 0x8B  | 139 | R/W | 10      |
| AL2H          | 8L20    | Level 1 | Alarm2 upper set value<br>(ALD2 = DE.HI / DE.HL / BA.ND / PR.HI /<br>DEHI / DEHL / BAND / PRHI appear)                   | 9999  | -1000 | 0x09    | 9   | 0x8C  | 140 | R/W | 10      |
| AL2L          | 8L20    | Level 1 | Alarm2 lower set value<br>(ALD2 = DE.LO / DE.HL / BA.ND / PR.LO /<br>DELO / DEHL / BAND / PRLO appear)                   | 9999  | -1000 | 0x0A    | 10  | 0x8D  | 141 | R/W | 10      |
| AL3H          | 8L30    | Level 1 | Alarm3 upper set value<br>(ALD3 = DE.HI / DE.HL / BA.ND / PR.HI /<br>DEHI / DEHL / BAND / PRHI appear)                   | 9999  | -1000 | 0x0B    | 11  | 0x8E  | 142 | R/W | 10      |
| AL3L          | 8L30    | Level 1 | Alarm3 lower set value<br>(ALD3 = DE.LO / DE.HL / BA.ND / PR.LO /<br>DELO / DEHL / BAND / PRLO appear)                   | 9999  | -1000 | 0x0C    | 12  | 0x8F  | 143 | R/W | 10      |
| SV1           | 8500    | Level 1 | First set value                                                                                                          | USPL  | LSPL  | 0x0D    | 13  | 0x90  | 144 | R/W | 0       |
| SV2           | 8502    | Level 1 | Second set value                                                                                                         | USPL  | LSPL  | 0x0E    | 14  | 0x91  | 145 | R/W | 0       |
| SV3           | 8503    | Level 1 | Third set value                                                                                                          | USPL  | LSPL  | 0x0F    | 15  | 0x92  | 146 | R/W | 0       |
| SV4           | 8504    | Level 1 | Fourth set value                                                                                                         | USPL  | LSPL  | 0x10    | 16  | 0x93  | 147 | R/W | 0       |
| TIM           | 8600    | Level 1 | Timer<br>PV address use for current time<br>SV address use for target time<br>※Need to use with DI function              | 5999  | 0     | 0x11    | 17  | 0x94  | 148 | R/W | 0       |
| CNT           | 8000    | Level 1 | Counter<br>PV address use for current count<br>SV address use for target count<br>※Need to use with DI function          | 9999  | 0     | 0x12    | 18  | 0x95  | 149 | R/W | 0       |
| CUTM          | 0000    | Level 1 | 24 hour timer<br>Current setting time                                                                                    | 23.59 | 00.00 | 0x13    | 19  | 0x96  | 150 | R/W | 0       |
| ONTM          | 0000    | Level 1 | 24 hour timer , action ON time<br>PV address use for display current time<br>SV address use for setting action ON time   | 23.59 | 00.00 | 0x14    | 20  | 0x97  | 151 | R/W | 0       |
| OFTM          | 0000    | Level 1 | 24 hour timer , action OFF time<br>PV address use for display current time<br>SV address use for setting action OFF time | 23.59 | 00.00 | 0x15    | 21  | 0x98  | 152 | R/W | 0       |

## 7. Communication Data List

| Parameter | Display | Level   | Description                                                                                                                                                                                                                                              | Range |        | Address |     |       |     | R/W | Initial |
|-----------|---------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|--------|---------|-----|-------|-----|-----|---------|
|           |         |         |                                                                                                                                                                                                                                                          | Max   | Min    | LOOP1   |     | LOOP2 |     |     |         |
|           |         |         |                                                                                                                                                                                                                                                          |       |        | Hex     | Dec | Hex   | Dec |     |         |
| A_M       |         | Level 1 | Auto/Manual mode switch<br>0 : AUTO (auto mode)<br>1 : MMAN (main output manual mode)<br>2 : SMAN (sub output manual mode)                                                                                                                               | 2     | 0      | 0x16    | 22  | 0x99  | 153 | R/W | 0       |
| MOUT      |         | Level 1 | manual manipulated output setting value                                                                                                                                                                                                                  | 100.0 | 0.0    | 0x17    | 23  | 0x9A  | 154 | R/W | 0       |
| AT        |         | Level 1 | Auto-tuning execute selection<br>0 : OFF PID control<br>1 : ON execute auto tuning                                                                                                                                                                       | 1     | 0      | 0x18    | 24  | 0x9B  | 155 | R/W | 0       |
| RATE      |         | Level 1 | Slave SV rate                                                                                                                                                                                                                                            | 9999  | 0      | 0x19    | 25  | 0x9C  | 156 | R/W | 9999    |
| RAMP      |         | Level 1 | The rate of change during SV ramp operation<br>format : °C / minute                                                                                                                                                                                      | 99.99 | -19.99 | 0x1A    | 26  | 0x9D  | 157 | R/W | 0       |
| SOAK      |         | Level 1 | Soak time                                                                                                                                                                                                                                                | 5999  | 0      | 0x1B    | 27  | 0x9E  | 158 | R/W | 0       |
| WAIT      |         | Level 1 | Program execution standby temperature<br>0 : when program execute do not wait for PV temperature<br>Other values : when PV= (SV-WAIT) , program entering next segment                                                                                    | 1000  | 0      | 0x1C    | 28  | 0x9F  | 159 | R/W | 0       |
| DTM1      |         | Level 1 | DO1 Timer                                                                                                                                                                                                                                                | 5999  | 0      | 0x1D    | 29  | 0xA0  | 160 | R/W | 0       |
| DTM2      |         | Level 1 | DO2 Timer                                                                                                                                                                                                                                                | 5999  | 0      | 0x1E    | 30  | 0xA1  | 161 | R/W | 0       |
| DTM3      |         | Level 1 | DO3 Timer                                                                                                                                                                                                                                                | 5999  | 0      | 0x1F    | 31  | 0xA2  | 162 | R/W | 0       |
| DTM4      |         | Level 1 | DO4 Timer                                                                                                                                                                                                                                                | 5999  | 0      | 0x20    | 32  | 0xA3  | 163 | R/W | 0       |
| DT.ST     |         | Level 1 | Digit out timer set                                                                                                                                                                                                                                      | 5999  | 0      | 0x21    | 33  | 0xA4  | 164 | R/W | 0       |
| PTN       |         | Level 1 | Program pattern selection                                                                                                                                                                                                                                | 15    | 0      | 0x22    | 34  | 0xA5  | 165 | R/W | 0       |
| SEG       |         | Level 1 | Program segment selection                                                                                                                                                                                                                                | 10    | 1      | 0x23    | 35  | 0xA6  | 166 | R/W | 1       |
| L1SV      |         | Level 1 | LOOP1 current segment temperature setting value                                                                                                                                                                                                          | USPL  | LSPL   | 0x24    | 36  | 0xA7  | 167 | R/W | 0       |
| L2SV      |         | Level 1 | LOOP2 current segment temperature setting value                                                                                                                                                                                                          | USPL  | LSPL   | 0x25    | 37  | 0xA8  | 168 | R/W | 0       |
| TIMR      |         | Level 1 | Current segment execute time setting<br>END(-1) : program end in this segment<br>00.00 : program step in this segment<br>00.01~99.58 : program in this segment execute time<br>COTI(99.59) : program continue execute this segment no end                | 5999  | 0      | 0x26    | 38  | 0xA9  | 169 | R/W | 0       |
| DOUT      |         | Level 1 | DO1~DO4 ON/OFF setting<br>0000 = 0<br>0001 = 1<br>0010 = 16<br>0011 = 17<br>0100 = 256<br>0101 = 257<br>0110 = 272<br>0111 = 273<br>1000 = 4096<br>1001 = 4097<br>1010 = 4112<br>1011 = 4113<br>1100 = 4352<br>1101 = 4353<br>1110 = 4368<br>1111 = 4369 | 4369  | 0      | 0x27    | 39  | 0xAA  | 170 | R/W | 0       |

| Param<br>eter | Display                                                                             | Level   | Description                                                                                                    | Range |       | Address |     |       |     | R/W | Initial |
|---------------|-------------------------------------------------------------------------------------|---------|----------------------------------------------------------------------------------------------------------------|-------|-------|---------|-----|-------|-----|-----|---------|
|               |                                                                                     |         |                                                                                                                | Max   | Min   | LOOP1   |     | LOOP2 |     |     |         |
|               |                                                                                     |         |                                                                                                                |       |       | Hex     | Dec | Hex   | Dec |     |         |
| P1            |    | Level 2 | Main output proportional band<br>0 : ON/OFF control<br>Other values : proportional band setting value          | 200.0 | 0.0   | 0x28    | 40  | 0xAB  | 171 | R/W | 3.0     |
| I1            |    | Level 2 | Main output integral time<br>0 : disable integral function<br>Other values : integral time setting value       | 3600  | 0     | 0x2A    | 42  | 0xAD  | 173 | R/W | 240     |
| D1            |    | Level 2 | Main output derivative time<br>0 : disable derivative function<br>Other values : derivative time setting value | 900   | 0     | 0x2C    | 44  | 0xAF  | 175 | R/W | 60      |
| HYS1          |    | Level 2 | Hysteresis for main output on/off control(when P1 = 0.0 appear)                                                | 1000  | -1000 | 0x2E    | 46  | 0xB1  | 177 | R/W | 10      |
| CYT1          |    | Level 2 | Main output control cycle<br>0 : Linear signal<br>1 : SSR drive<br>2~150 : Relay                               | 150   | 0     | 0x2F    | 47  | 0xB2  | 178 | R/W | 10      |
| MOLH          |    | Level 2 | High limit setting of manipulated value for main output                                                        | 100.0 | 0.0   | 0x30    | 48  | 0xB3  | 179 | R/W | 100.0   |
| MOLL          |    | Level 2 | low limit setting of manipulated value for main output                                                         | 100.0 | 0.0   | 0x31    | 49  | 0xB4  | 180 | R/W | 0.0     |
| P2            |  | Level 2 | sub output proportional band<br>0 : ON/OFF control<br>Other values : proportional band setting value           | 200.0 | 0.0   | 0x32    | 50  | 0xB5  | 181 | R/W | 3.0     |
| I2            |  | Level 2 | sub output integral time<br>0 : disable integral function<br>Other values : integral time setting value        | 3600  | 0     | 0x34    | 52  | 0xB7  | 183 | R/W | 240     |
| D2            |  | Level 2 | sub output derivative time<br>0 : disable derivative function<br>Other values : derivative time setting value  | 900   | 0     | 0x36    | 54  | 0xB9  | 185 | R/W | 60      |
| HYS2          |  | Level 2 | Hysteresis for sub output on/off control(when P2 = 0.0 appear)                                                 | 1000  | -1000 | 0x38    | 56  | 0xBB  | 187 | R/W | 10      |
| CYT2          |  | Level 2 | sub output control cycle<br>0 : Linear signal<br>1 : SSR drive<br>2~150 : Relay                                | 150   | 0     | 0x39    | 57  | 0xBC  | 188 | R/W | 10      |
| SOLH          |  | Level 2 | High limit setting of manipulated value for sub output                                                         | 100.0 | 0.0   | 0x3A    | 58  | 0xBD  | 189 | R/W | 100.0   |
| SOLL          |  | Level 2 | low limit setting of manipulated value for sub output                                                          | 100.0 | 0.0   | 0x3B    | 59  | 0xBE  | 190 | R/W | 0.0     |
| MGAP          |  | Level 2 | Control gap (for main output)                                                                                  | 1000  | -1000 | 0x3C    | 60  | 0xBF  | 191 | R/W | 0       |
| SGAP          |  | Level 2 | Control gap (for sub output)                                                                                   | 1000  | -1000 | 0x3D    | 61  | 0xC0  | 192 | R/W | 0       |
| COUT          |  | Level 2 | Manipulated value for output                                                                                   | 100.0 | 0.0   | 0x3E    | 62  | 0xC1  | 193 | R   | 0.0     |
| AT.VL         |  | Level 2 | Auto tuning offset value<br>execute auto tuning in (SV-ATVL) point                                             | 1000  | -1000 | 0x3F    | 63  | 0xC2  | 194 | R/W | 0       |
| SS.PO         |  | Level 2 | In manual mode or error condition controller will load this setting value as manipulate value                  | 100.0 | 0.0   | 0x40    | 64  | 0xC3  | 195 | R/W | 50.0    |

## 7. Communication Data List

| Parameter | Display                                                                             | Level   | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Range  |       | Address |     |       |     | R/W | Initial |
|-----------|-------------------------------------------------------------------------------------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------|---------|-----|-------|-----|-----|---------|
|           |                                                                                     |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Max    | Min   | LOOP1   |     | LOOP2 |     |     |         |
|           |                                                                                     |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |        |       | Hex     | Dec | Hex   | Dec |     |         |
| OPSF      |    | Level 2 | Main output special function selection<br>0 : NONE<br>(special function OFF)<br>1 : SQUA<br>(manipulated output value square)<br>2 : ROOT<br>(manipulated output value square root)<br>3 : REVE<br>(manipulated output value reverse)<br>4 : SQ.RE<br>(manipulated output value square reverse)<br>5 : RO.RE<br>(manipulated output value square root reverse)                                                                                                                         | 5      | 0     | 0x41    | 65  | 0xC4  | 196 | R/W | 0       |
| RC.TO     |    | Level 2 | Output filter<br>Unit : second                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 10.00  | 0.01  | 0x42    | 66  | 0xC5  | 197 | R/W | 0.20    |
| LOCK      |    | Level 2 | Function/level lock<br>0000 = 0<br>0001 = 1<br>0010 = 16<br>0011 = 17<br>0100 = 256<br>0101 = 257<br>0110 = 272<br>0111 = 273<br>1000 = 4096<br>1001 = 4097<br>1010 = 4112<br>1011 = 4113<br>1100 = 4352<br>1101 = 4353<br>1110 = 4368<br>1111 = 4369                                                                                                                                                                                                                                  | 4369   | 0     | 0x43    | 67  | 0xC6  | 198 | R/W | 0       |
| INPT      |  | Level 3 | Input type selection<br>0 : K1 (-50.0~600.0°C)<br>1 : K2 (-50~1200°C)<br>2 : J1 (-50.0~400.0°C)<br>3 : J2 (-50~400°C)<br>4 : R (-50~1760°C)<br>5 : S (-50~1760°C)<br>6 : B (-50~1820°C)<br>7 : E (-50~900°C)<br>8 : N (-50~1300°C)<br>9 : T1 (-199.9~400.0°C)<br>10 : T2 (-199~400°C)<br>11 : W (-50~2320°C)<br>12 : PL (-50~1200°C)<br>13 : L (-50~800°C)<br>14 : PT1 (-199.9~850.0°C)<br>15 : PT2 (-199~850°C)<br>16 : PT3 (0~850°C)<br>17 : AN1<br>18 : AN2<br>19 : AN3<br>20 : AN4 | 22     | 0     | 0x44    | 68  | 0xC7  | 199 | R/W | 17      |
| AN.LO     |  | Level 3 | Analog input zero calibration                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 9999   | -1999 | 0x45    | 69  | 0xC8  | 200 | R/W | 0       |
| AN.HI     |  | Level 3 | Analog input span calibration(hex format)                                                                                                                                                                                                                                                                                                                                                                                                                                              | 0x7FFF | 0     | 0x46    | 70  | 0xC9  | 201 | R/W | 0x5FFF  |
| DP        |  | Level 3 | Decimal point position (only available in linear signal input)<br>0 : 0000<br>1 : 000.0<br>2 : 00.00<br>3 : 0.000                                                                                                                                                                                                                                                                                                                                                                      | 3      | 0     | 0x47    | 71  | 0xCA  | 202 | R/W | 0       |

| Parameter | Display | Level   | Description                                                                                                                                                                                                                                                                                                               | Range |       | Address |     |       |     | R/W | Initial |
|-----------|---------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------|---------|-----|-------|-----|-----|---------|
|           |         |         |                                                                                                                                                                                                                                                                                                                           | Max   | Min   | LOOP1   |     | LOOP2 |     |     |         |
|           |         |         |                                                                                                                                                                                                                                                                                                                           |       |       | Hex     | Dec | Hex   | Dec |     |         |
| HI.RA     |         | Level 3 | Input scale high(for analog input)                                                                                                                                                                                                                                                                                        | 9999  | -1999 | 0x48    | 72  | 0xCB  | 203 | R/W | ---     |
| LO.RA     |         | Level 3 | Input scale low(for analog input)                                                                                                                                                                                                                                                                                         | 9999  | -1999 | 0x49    | 73  | 0xCC  | 204 | R/W | ---     |
| USPL      |         | Level 3 | Input scale high(for Thermocouple or RTD)                                                                                                                                                                                                                                                                                 | 9999  | -1999 | 0x4A    | 74  | 0xCD  | 205 | R/W | ---     |
| LSPL      |         | Level 3 | Input scale low(for Thermocouple or RTD)                                                                                                                                                                                                                                                                                  | 9999  | -1999 | 0x4B    | 75  | 0xCE  | 206 | R/W | ---     |
| ALD1      |         | Level 3 | Alarm1 mode selection<br>0 : NONE<br>1 : DE.HI<br>2 : DE.LO<br>3 : DE.HL<br>4 : BA.ND<br>5 : PR.HI<br>6 : PR.LO<br>7 : PEND<br>8 : SYAB<br>9 : HBA<br>10 : MSOK<br>11 : DEHI<br>12 : DELO<br>13 : DEHL<br>14 : BAND<br>15 : PRHI<br>16 : PRLO<br>17 : PRUN<br>18 : SYNO<br>19 : SOAK<br>20 : TIM<br>21 : CNT<br>22 : CUTM | 25    | 0     | 0x4C    | 76  | 0xCF  | 207 | R/W | 11      |
| ALT1      |         | Level 3 | FLIK (00.00) : Flicker<br>COTI (99.59) : Continued ON<br>00.01~99.58 : delay time                                                                                                                                                                                                                                         | 5999  | 0     | 0x4D    | 77  | 0xD0  | 208 | R/W | 5999    |
| HYA1      |         | Level 3 | Hysteresis setting for alarm1                                                                                                                                                                                                                                                                                             | 1000  | 0     | 0x4E    | 78  | 0xD1  | 209 | R/W | 0       |
| SEA1      |         | Level 3 | Alarm1 special function setting<br>0000 = 0<br>0001 = 1<br>0010 = 16<br>0011 = 17<br>0100 = 256<br>0101 = 257<br>0110 = 272<br>0111 = 273<br>1000 = 4096<br>1001 = 4097<br>1010 = 4112<br>1011 = 4113<br>1100 = 4352<br>1101 = 4353<br>1110 = 4368<br>1111 = 4369                                                         | 4369  | 0     | 0x4F    | 79  | 0xD2  | 210 | R/W | 0       |
| ALD2      |         | Level 3 | Alarm2 mode selection (refer to ALD1)                                                                                                                                                                                                                                                                                     | 22    | 0     | 0x50    | 80  | 0xD3  | 211 | R/W | 11      |
| ALT2      |         | Level 3 | FLIK (00.00) : Flicker<br>COTI (99.59) : Continued ON<br>00.01~99.58 : delay time                                                                                                                                                                                                                                         | 5999  | 0     | 0x51    | 81  | 0xD4  | 212 | R/W | 5999    |
| HYA2      |         | Level 3 | Hysteresis setting for alarm2                                                                                                                                                                                                                                                                                             | 1000  | 0     | 0x52    | 82  | 0xD5  | 213 | R/W | 0       |
| SEA2      |         | Level 3 | Alarm2 special function setting                                                                                                                                                                                                                                                                                           | 4369  | 0     | 0x53    | 83  | 0xD6  | 214 | R/W | 0       |
| ALD3      |         | Level 3 | Alarm1 mode selection (refer to ALD1)                                                                                                                                                                                                                                                                                     | 22    | 0     | 0x54    | 84  | 0xD7  | 215 | R/W | 11      |
| ALT3      |         | Level 3 | FLIK (00.00) : Flicker<br>COTI (99.59) : Continued ON<br>00.01~99.58 : delay time                                                                                                                                                                                                                                         | 5999  | 0     | 0x55    | 85  | 0xD8  | 216 | R/W | 5999    |
| HYA3      |         | Level 3 | Hysteresis setting for alarm3                                                                                                                                                                                                                                                                                             | 1000  | 0     | 0x56    | 86  | 0xD9  | 217 | R/W | 0       |

## 7. Communication Data List

| Param<br>eter | Display | Level   | Description                                                                                                                                                                                                                                                                                                                                                    | Range |       | Address |     |       |     | R/W | Initial |
|---------------|---------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------|---------|-----|-------|-----|-----|---------|
|               |         |         |                                                                                                                                                                                                                                                                                                                                                                | Max   | Min   | LOOP1   |     | LOOP2 |     |     |         |
|               |         |         |                                                                                                                                                                                                                                                                                                                                                                |       |       | Hex     | Dec | Hex   | Dec |     |         |
| SEA3          | 5553    | Level 3 | Alarm1 special function setting                                                                                                                                                                                                                                                                                                                                | 4369  | 0     | 0x57    | 87  | 0xDA  | 218 | R/W | 0       |
| MOCL          | 0000    | Level 3 | Main output zero calibration<br>only for linear signal                                                                                                                                                                                                                                                                                                         | 9999  | 0     | 0x58    | 88  | 0xDB  | 219 | R/W | 0       |
| MOCH          | 0000    | Level 3 | Main output span calibration<br>only for linear signal                                                                                                                                                                                                                                                                                                         | 9999  | 0     | 0x59    | 89  | 0xDC  | 220 | R/W | 3600    |
| SOCL          | 5500    | Level 3 | sub output zero calibration<br>only for linear signal                                                                                                                                                                                                                                                                                                          | 9999  | 0     | 0x5A    | 90  | 0xDD  | 221 | R/W | 0       |
| SOCH          | 5500    | Level 3 | sub output zero calibration<br>only for linear signal                                                                                                                                                                                                                                                                                                          | 9999  | 0     | 0x5B    | 91  | 0xDE  | 222 | R/W | 3600    |
| MV.SF         | 0050    | Level 3 | Analog input special function selection<br>0 : NONE (special function OFF)<br>1 : SQUA (analog input square)<br>2 : ROOT (analog input square root)<br>3 : REVE (analog input reverse)<br>4 : SQ.RE (analog input square reverse)<br>5 : RO.RE (analog input square root<br>reverse)                                                                           | 5     | 0     | 0x5C    | 92  | 0xDF  | 223 | R/W | 0       |
| RC.TI         | 0000    | Level 3 | Input digital filter<br>Unit : second                                                                                                                                                                                                                                                                                                                          | 99.99 | 0.01  | 0x5D    | 93  | 0xE0  | 224 | R/W | 0.10    |
| UNIT          | 0000    | Level 3 | Unit<br>0 : °C<br>1 : °F<br>2 : U( Linear signal)                                                                                                                                                                                                                                                                                                              | 2     | 0     | 0x5E    | 94  | 0xE1  | 225 | R/W | ---     |
| OUTM          | 0000    | Level 3 | Control action selection<br>0 : HEAT reverse action<br>1 : COOL direct action                                                                                                                                                                                                                                                                                  | 1     | 0     | 0x5F    | 95  | 0xE2  | 226 | R/W | 0       |
| SV.OS         | 5000    | Level 3 | SV bias                                                                                                                                                                                                                                                                                                                                                        | 1000  | -1000 | 0x60    | 96  | 0xE3  | 227 | R/W | 0       |
| PV.OS         | 0000    | Level 3 | PV bias(for zero)<br>PV = PV x (PV.OH / 5000) + PV.OS                                                                                                                                                                                                                                                                                                          | 1000  | -1000 | 0x61    | 97  | 0xE4  | 228 | R/W | 0       |
| PV.OH         | 0000    | Level 3 | PV bias(for span)<br>PV = PV x (PV.OH / 5000) + PV.OS                                                                                                                                                                                                                                                                                                          | 9999  | 0     | 0x62    | 98  | 0xE5  | 229 | R/W | 5000    |
| MLNB          | 0000    | Level 3 | Manual linear segment number                                                                                                                                                                                                                                                                                                                                   | 10    | 0     | 0x63    | 99  | 0xE6  | 230 | R/W | 0       |
| COMP          | 0000    | Level 3 | Manual linear compare value                                                                                                                                                                                                                                                                                                                                    | USPL  | LSPL  | 0x64    | 100 | 0xE7  | 231 | R/W | 0       |
| OFFS          | 0000    | Level 3 | Manual linear offset value                                                                                                                                                                                                                                                                                                                                     | 1500  | -1500 | 0x65    | 101 | 0xE8  | 232 | R/W | 0       |
| SV.TY         | 5000    | Level 4 | SV source selection<br>LOOP1<br>0 : FIX (local SV)<br>1 : RATE (uart + rate SV)<br>2 : ANAG (remote 4~20mA SV)<br>3 : ANRA (remote 4~20mA + rate SV)<br>4 : RAMP (ramp SV)<br>5 : PROG (program SV)<br><br>LOOP2<br>0 : FIX (local SV)<br>1 : RATE (uart + rate SV)<br>2 : ANAG (remote 4~20mA SV)<br>3 : ANRA (remote 4~20mA + rate SV)<br>4 : RAMP (ramp SV) | 5     | 0     | 0x66    | 102 | 0xE9  | 233 | R/W | 0       |

| Param<br>eter | Display                                                                             | Level   | Description                                                                                                                                                                                                                                                                                                                                                                                                                                          | Range |      | Address |     |       |     | R/W | Initial |
|---------------|-------------------------------------------------------------------------------------|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------|---------|-----|-------|-----|-----|---------|
|               |                                                                                     |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Max   | Min  | LOOP1   |     | LOOP2 |     |     |         |
|               |                                                                                     |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                      |       |      | Hex     | Dec | Hex   | Dec |     |         |
| OU.TY         |    | Level 4 | Hardware drive selection<br>LOOP1<br>0 : SING (single output)<br>1 : DOUB (dual output)<br>2 : 1SCR (single phase control)<br>3 : HLST (high low signal selection)<br>4 : FBMV (valve control with feedback)<br>5 : NFMV (valve control without feedback)<br><br>LOOP2<br>0 : SING (single output)<br>1 : DOUB (dual output)<br>2 : 1SCR (single phase control)<br>3 : HLST (high low signal selection)<br>4 : NFMV (valve control without feedback) | 5     | 0    | 0x67    | 103 | 0xEA  | 234 | R/W | 0       |
| RCGN          |    | Level 4 | Process RC constant.Gain                                                                                                                                                                                                                                                                                                                                                                                                                             | 10.0  | 0.1  | 0x68    | 104 | 0xEB  | 235 | R/W | 1.0     |
| FKSL          |    | Level 4 | FUN key function mode selection<br>0 : OFF (disable FUN key)<br>1 : R_S (switch RUN/STOP)<br>2 : A_M (switch auto/manual)<br>3 : AT (ON/OFF auto-tuning)<br>4 : LOOP (switch LOOP1/2)                                                                                                                                                                                                                                                                | 1     | 0    | 0x69    | 105 | 0xEC  | 236 | R/W | 0       |
| R_ER          |    | Level 4 | Ramp error<br>0 : OFF<br>1 : ON                                                                                                                                                                                                                                                                                                                                                                                                                      | 1     | 0    | 0x6A    | 106 | 0xED  | 237 | R/W | 1       |
| TP_K          |   | Level 4 | To target proportional band const.                                                                                                                                                                                                                                                                                                                                                                                                                   | 100.0 | 1.0  | 0x6B    | 107 | 0xEE  | 238 | R/W | 35.0    |
| SOCL          |  | Level 3 | sub output zero calibration<br>only for linear signal                                                                                                                                                                                                                                                                                                                                                                                                | 9999  | 0    | 0x5A    | 90  | 0xDD  | 221 | R/W | 0       |
| TMSL          |  | Level 4 | 24 hour timer , mode selection<br>0 : OFF (24 hour timer function disable)<br>1 : SWSV (switch SV)<br>2 : R_S (switch RUN/STOP)<br>3 : R_SO (switch to run)                                                                                                                                                                                                                                                                                          | 100   | 1    | 0x6C    | 108 | 0xEF  | 239 | R/W | 1       |
| MVRT          |  | Level 4 | Motor valve operating time                                                                                                                                                                                                                                                                                                                                                                                                                           | 150   | 5    | 0x6D    | 109 | 0xF0  | 240 | R/W | 45      |
| HYSM          |  | Level 4 | Motor valve hysteresis adjust                                                                                                                                                                                                                                                                                                                                                                                                                        | 10.0  | 1.0  | 0x6E    | 110 | 0xF1  | 241 | R/W | 1.5     |
| RH.TC         |  | Level 4 | Dehumidification temperature<br>If PV less than RH.TC manipulated value = RH.PO                                                                                                                                                                                                                                                                                                                                                                      | 100.0 | 0.0  | 0x6F    | 111 | 0xF2  | 242 | R/W | 35.0    |
| RH.PO         |  | Level 4 | Dehumidification manipulated value<br>0 : OFF disable dehumidification function<br>Other values : 0.1~100.0 manipulated value                                                                                                                                                                                                                                                                                                                        | 100.0 | 0.0  | 0x70    | 112 | 0xF3  | 243 | R/W | 0.0     |
| RH.TM         |  | Level 4 | dehumidification time<br>(time format : minute.second)<br>00.00~99.58 :execute dehumidification time                                                                                                                                                                                                                                                                                                                                                 | 5999  | 0    | 0x71    | 113 | 0xF4  | 244 | R/W | 300     |
| PR.SV         |  | Level 4 | reserve                                                                                                                                                                                                                                                                                                                                                                                                                                              | USPL  | LSPL | 0x72    | 114 | 0xF5  | 245 | R/W | 100.0   |
| AT.SV         |  | Level 4 | reserve                                                                                                                                                                                                                                                                                                                                                                                                                                              | USPL  | LSPL | 0x73    | 115 | 0xF6  | 246 | R/W | 200.0   |
| SET1          |  | Level 4 | Parameter group hide/display                                                                                                                                                                                                                                                                                                                                                                                                                         | 4369  | 0    | 0x74    | 116 | 0xF7  | 247 | R/W | ---     |
| SET2          |  | Level 4 | Parameter group hide/display                                                                                                                                                                                                                                                                                                                                                                                                                         | 4369  | 0    | 0x75    | 117 | 0xF8  | 248 | R/W | ---     |
| SET3          |  | Level 4 | Parameter group hide/display                                                                                                                                                                                                                                                                                                                                                                                                                         | 4369  | 0    | 0x76    | 118 | 0xF9  | 249 | R/W | ---     |
| SET4          |  | Level 4 | Parameter group hide/display                                                                                                                                                                                                                                                                                                                                                                                                                         | 4369  | 0    | 0x77    | 119 | 0xFA  | 250 | R/W | ---     |
| SET5          |  | Level 4 | Parameter group hide/display                                                                                                                                                                                                                                                                                                                                                                                                                         | 4369  | 0    | 0x78    | 120 | 0xFB  | 251 | R/W | ---     |
| SET6          |  | Level 4 | Parameter group hide/display                                                                                                                                                                                                                                                                                                                                                                                                                         | 4369  | 0    | 0x79    | 121 | 0xFC  | 252 | R/W | ---     |
| SET7          |  | Level 4 | Parameter group hide/display                                                                                                                                                                                                                                                                                                                                                                                                                         | 4369  | 0    | 0x7A    | 122 | 0xFD  | 253 | R/W | ---     |

## 7. Communication Data List

| Parameter | Display                                                                             | Level   | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Range |     | Address |     |       |     | R/W | Initial |
|-----------|-------------------------------------------------------------------------------------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----|---------|-----|-------|-----|-----|---------|
|           |                                                                                     |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Max   | Min | LOOP1   |     | LOOP2 |     |     |         |
|           |                                                                                     |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |     | Hex     | Dec | Hex   | Dec |     |         |
| SET8      |    | Level 4 | Parameter group hide/display                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 4369  | 0   | 0x7B    | 123 | 0xFE  | 254 | R/W | ---     |
| SET9      |    | Level 4 | Parameter group hide/display                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 4369  | 0   | 0x7C    | 124 | 0xFF  | 255 | R/W | ---     |
| SETA      |    | Level 4 | Parameter group hide/display                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 4369  | 0   | 0x7D    | 125 | 0x100 | 256 | R/W | ---     |
| SETB      |    | Level 4 | Parameter group hide/display                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 4369  | 0   | 0x7E    | 126 | 0x101 | 257 | R/W | ---     |
| SETC      |    | Level 4 | Parameter group hide/display                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 4369  | 0   | 0x7F    | 127 | 0x102 | 258 | R/W | ---     |
| SETD      |    | Level 4 | Parameter group hide/display                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 4369  | 0   | 0x80    | 128 | 0x103 | 259 | R/W | ---     |
| SETE      |    | Level 4 | Parameter group hide/display                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 4369  | 0   | 0x81    | 129 | 0x104 | 260 | R/W | ---     |
| SETF      |    | Level 4 | Parameter group hide/display                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 4369  | 0   | 0x82    | 130 | 0x105 | 261 | R/W | ---     |
| HZ        |    | Level 5 | Power frequency<br>0 : 50HZ<br>1 : 60HZ                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1     | 0   | 0x106   | 262 | 0x106 | 262 | R/W | 1       |
| PRTO      |    | Level 5 | Protocol selection<br>0 : TAIE<br>1 : MRTU                                                                                                                                                                                                                                                                                                                                                                                                                                             | 1     | 0   | 0x107   | 263 | 0x107 | 263 | R/W | 1       |
| FOMA      |    | Level 5 | Data format<br>0 : O_81<br>(parity bit=odd, stop bit=1)<br>1 : O_82<br>(parity bit=odd, stop bit=2)<br>2 : E_81<br>(parity bit=even, stop bit=1)<br>3 : E_82<br>(parity bit=even, stop bit=2)<br>4 : N_81<br>(parity bit=none, stop bit=1)<br>5 : N_82<br>(parity bit=none, stop bit=2)                                                                                                                                                                                                | 5     | 0   | 0x108   | 264 | 0x108 | 264 | R/W | 0       |
| IDNO      |    | Level 5 | Controller address                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 255   | 0   | 0x109   | 265 | 0x109 | 265 | R/W | 1       |
| BAUD      |  | Level 5 | Baud rate<br>0 : 24(2400)<br>1 : 48(4800)<br>2 : 96(9600)<br>3 : 192(19200)<br>4 : 384(38400)<br>5 : 576(57600)<br>6 : 1152(115200) bps                                                                                                                                                                                                                                                                                                                                                | 6     | 0   | 0x10A   | 266 | 0x10A | 266 | R/W | 4       |
| RPDT      |  | Level 5 | Response delay time(ms)<br>When controller receive master command<br>will delay this setting value then response<br>master                                                                                                                                                                                                                                                                                                                                                             | 250   | 0   | 0x10B   | 267 | 0x10B | 267 | R/W | 0       |
| AOEN      |  | Level 5 | Retransmission function enable<br>0 : OFF (Disable)<br>1 : ON (Enable)                                                                                                                                                                                                                                                                                                                                                                                                                 | 1     | 0   | 0x10C   | 268 | 0x10C | 268 | R/W | 0       |
| AOSL      |  | Level 5 | Retransmission output signal source<br>selection<br>0 : SV1 (Loop1 SV)<br>1 : PV1 (Loop1 PV)<br>2 : MV1 (Loop1 main out manipulated value)<br>3 : SV1R (Loop1 SV reverse)<br>4 : PV1R (Loop1 PV reverse)<br>5 : MV1R (Loop1 main out manipulated<br>reverse value)<br>6 : SV2 (Loop2 SV)<br>7 : PV2 (Loop2 PV)<br>8 : MV2 (Loop2 main out manipulated value)<br>9 : SV2R (Loop2 SV reverse)<br>10 : PV2R (Loop2 PV reverse)<br>11 : MV2R (Loop2 main out manipulated<br>reverse value) | 12    | 0   | 0x10D   | 269 | 0x10D | 269 | R/W | 0       |

| Param<br>eter | Display                                                                             | Level   | Description                                                                                                                                                                                                                                                                                                                                                       | Range |      | Address |     |       |     | R/W | Initial |
|---------------|-------------------------------------------------------------------------------------|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------|---------|-----|-------|-----|-----|---------|
|               |                                                                                     |         |                                                                                                                                                                                                                                                                                                                                                                   | Max   | Min  | LOOP1   |     | LOOP2 |     |     |         |
|               |                                                                                     |         |                                                                                                                                                                                                                                                                                                                                                                   |       |      | Hex     | Dec | Hex   | Dec |     |         |
| AO.LO         |    | Level 5 | Retransmission output scale high                                                                                                                                                                                                                                                                                                                                  | USPL  | LSPL | 0x10E   | 270 | 0x10E | 270 | R/W | LSPL    |
| AO.HI         |    | Level 5 | Retransmission output scale low                                                                                                                                                                                                                                                                                                                                   | USPL  | LSPL | 0x10F   | 271 | 0x10F | 271 | R/W | USPL    |
| AOCL          |    | Level 5 | For retransmission zero calibration                                                                                                                                                                                                                                                                                                                               | 9999  | 0    | 0x110   | 272 | 0x110 | 272 | R/W | 0       |
| AOCH          |    | Level 5 | For retransmission span calibration                                                                                                                                                                                                                                                                                                                               | 9999  | 0    | 0x111   | 273 | 0x111 | 273 | R/W | 3600    |
| CTRT          |    | Level 5 | CT(current transformer)ratio setting value                                                                                                                                                                                                                                                                                                                        | 1     | 0    | 0x112   | 274 | 0x112 | 274 | R/W | 0       |
| D1SL          |    | Level 5 | LOOP1 digital input function selection<br>0 : OFF (disable digital input function)<br>1 : SWSV (switch 4 sets of SV)<br>2 : R_S (switch RUN/STOP)<br>3 : A_M (switch Auto/Manual)<br>4 : AT (ON/OFF auto-tuning)<br>5 : RESV (ON/OFF remote SV)<br>6 : AOEN (ON/OFF retransmission)<br>7 : TIM (ON/OFF timer)<br>8 : CNT(counter)<br>9 : PROG (run/reset program) | 99    | 0    | 0x113   | 275 | 0x113 | 275 | R/W | 0       |
| D2SL          |    | Level 5 | LOOP2 digital input function selection<br>0 : OFF (disable digital input function)<br>1 : SWSV (switch 4 sets of SV)<br>2 : R_S (switch RUN/STOP)<br>3 : A_M (switch Auto/Manual)<br>4 : AT (ON/OFF auto-tuning)<br>5 : RESV (ON/OFF remote SV)<br>6 : AOEN (ON/OFF retransmission)<br>7 : TIM (ON/OFF timer)<br>8 : CNT(counter)<br>9 : PROG (run/reset program) | 99    | 0    | 0x114   | 276 | 0x114 | 276 | R/W | 0       |
| REMO          |    | Level 5 | Remote control program execute<br>OFF : program execute by key<br>ON : program execute by digital input or communication                                                                                                                                                                                                                                          | 1     | 0    | 0x115   | 277 | 0x115 | 277 | R/W | 0       |
| CJSL          |    | Level 5 | Cold junction compensation mode selection<br>0 : AUTO (auto cold junction compensation )<br>1 : MAN (manual cold junction compensation)                                                                                                                                                                                                                           | 1     | 0    | 0x116   | 278 | 0x116 | 278 | R/W | 0       |
| CJMN          |    | Level 5 | manual cold junction compensation temperature setting                                                                                                                                                                                                                                                                                                             | 500   | -100 | 0x117   | 279 | 0x117 | 279 | R/W | 25      |
| CJTC          |    | Level 5 | cold junction temperature display                                                                                                                                                                                                                                                                                                                                 | ---   | ---  | 0x118   | 280 | 0x118 | 280 | R/W | ---     |
| W_MD          |   | Level 5 | EEPROM protection<br>0 : OFF communication write command only write to CPU RAM<br>1 : ON communication write command write to CPU RAM and EEPROM                                                                                                                                                                                                                  | 1     | 0    | 0x119   | 281 | 0x119 | 281 | R   | 1       |
| RMAP          |  | Level 5 | Registered mapping<br>0 : OFF (disable registered mapping)<br>1 : FY (mapping to FY series memory address)<br>2 : FE (mapping to FE series memory address)                                                                                                                                                                                                        | 10    | 0    | 0x11A   | 282 | 0x11A | 282 | R/W | 0       |

## 7. Communication Data List

| Param<br>eter | Display | Level   | Description                                                                                                                                                                                                                                                                                                                                  | Range |        | Address |     |       |     | R/W | Initial |
|---------------|---------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|--------|---------|-----|-------|-----|-----|---------|
|               |         |         |                                                                                                                                                                                                                                                                                                                                              | Max   | Min    | LOOP1   |     | LOOP2 |     |     |         |
|               |         |         |                                                                                                                                                                                                                                                                                                                                              |       |        | Hex     | Dec | Hex   | Dec |     |         |
| OPSL          |         | Level 5 | Loop hardware distribution<br>0 : LOP1 loop1 main out drive out1 hardware , sub out drive out2 hardware (use for dual output)<br>1 : LOP2 loop2 main out drive out1 hardware , sub out drive out2 hardware (use for dual output)<br>2 : LP12 loop1 main out drive out1 hardware , loop2 main out drive out2 hardware (use for single output) | 2     | 0      | 0x11B   | 283 | 0x11B | 283 | R/W | 2       |
| POTM          |         | Level 5 | Power-on delay time setting value                                                                                                                                                                                                                                                                                                            | 5999  | 0      | 0x11C   | 284 | 0x11C | 284 | R/W | 0       |
| PTMD          |         | Level 5 | Program time format<br>0 : SEC (minute.second)<br>1 : MIN (hour.minute)<br>2 : 50MS (50ms)                                                                                                                                                                                                                                                   | 2     | 0      | 0x11D   | 285 | 0x11D | 285 | R/W | 0       |
| PVST          |         | Level 5 | Program execute start address<br>0 : OFF (execute from zero)<br>1 : FULT (execute from current PV , fully time)<br>2 : CUTT (execute from current PV , cut time)                                                                                                                                                                             | 2     | 0      | 0x11E   | 286 | 0x11E | 286 | R/W | 2       |
| REPT          |         | Level 5 | Program execute repeat<br>0 : OFF (disable repeat function)<br>1 : ON (Program execute repeat)                                                                                                                                                                                                                                               | 1     | 0      | 0x11F   | 287 | 0x11F | 287 | R/W | 0       |
| POWF          |         | Level 5 | Program execute power fail protection<br>0 : OFF (disable power fail protection)<br>1 : ON (enable power fail protection)                                                                                                                                                                                                                    | 1     | 0      | 0x120   | 288 | 0x120 | 288 | R/W | 0       |
| D01           |         | Level 5 | general register 1                                                                                                                                                                                                                                                                                                                           | 32767 | -32768 | 0x121   | 289 | 0x121 | 289 | R/W | 0       |
| D02           |         | Level 5 | general register 2                                                                                                                                                                                                                                                                                                                           | 32767 | -32768 | 0x122   | 290 | 0x122 | 290 | R/W | 0       |
| D03           |         | Level 5 | general register 3                                                                                                                                                                                                                                                                                                                           | 32767 | -32768 | 0x123   | 291 | 0x123 | 291 | R/W | 0       |
| D04           |         | Level 5 | general register 4                                                                                                                                                                                                                                                                                                                           | 32767 | -32768 | 0x124   | 292 | 0x124 | 292 | R/W | 0       |
| D05           |         | Level 5 | general register 5                                                                                                                                                                                                                                                                                                                           | 32767 | -32768 | 0x125   | 293 | 0x125 | 293 | R/W | 0       |
| D06           |         | Level 5 | general register 6                                                                                                                                                                                                                                                                                                                           | 32767 | -32768 | 0x126   | 294 | 0x126 | 294 | R/W | 0       |
| D07           |         | Level 5 | general register 7                                                                                                                                                                                                                                                                                                                           | 32767 | -32768 | 0x127   | 295 | 0x127 | 295 | R/W | 0       |
| D08           |         | Level 5 | general register 8                                                                                                                                                                                                                                                                                                                           | 32767 | -32768 | 0x128   | 296 | 0x128 | 296 | R/W | 0       |
| D09           |         | Level 5 | general register 9                                                                                                                                                                                                                                                                                                                           | 32767 | -32768 | 0x129   | 297 | 0x129 | 297 | R/W | 0       |
| D10           |         | Level 5 | general register 10                                                                                                                                                                                                                                                                                                                          | 32767 | -32768 | 0x12A   | 298 | 0x12A | 298 | R/W | 0       |
| D11           |         | Level 5 | general register 11                                                                                                                                                                                                                                                                                                                          | 32767 | -32768 | 0x12B   | 299 | 0x12B | 299 | R/W | 0       |
| D12           |         | Level 5 | general register 12                                                                                                                                                                                                                                                                                                                          | 32767 | -32768 | 0x12C   | 300 | 0x12C | 300 | R/W | 0       |
| D13           |         | Level 5 | general register 13                                                                                                                                                                                                                                                                                                                          | 32767 | -32768 | 0x12D   | 301 | 0x12D | 301 | R/W | 0       |
| D14           |         | Level 5 | general register 14                                                                                                                                                                                                                                                                                                                          | 32767 | -32768 | 0x12E   | 302 | 0x12E | 302 | R/W | 0       |
| D15           |         | Level 5 | general register 15                                                                                                                                                                                                                                                                                                                          | 32767 | -32768 | 0x12F   | 303 | 0x12F | 303 | R/W | 0       |
| D16           |         | Level 5 | general register 16                                                                                                                                                                                                                                                                                                                          | 32767 | -32768 | 0x130   | 304 | 0x130 | 304 | R/W | 0       |
| D17           |         | Level 5 | general register 17                                                                                                                                                                                                                                                                                                                          | 32767 | -32768 | 0x131   | 305 | 0x131 | 305 | R/W | 0       |

| Parameter | Display | Level   | Description                                                                                                                                                                                                                                                                                                                                                                                                                                              | Range |        | Address |      |       |      | R/W | Initial |
|-----------|---------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|--------|---------|------|-------|------|-----|---------|
|           |         |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Max   | Min    | LOOP1   |      | LOOP2 |      |     |         |
|           |         |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                          |       |        | Hex     | Dec  | Hex   | Dec  |     |         |
| D18       |         | Level 5 | general register 18                                                                                                                                                                                                                                                                                                                                                                                                                                      | 32767 | -32768 | 0x132   | 306  | 0x132 | 306  | R/W | 0       |
| D19       |         | Level 5 | general register 19                                                                                                                                                                                                                                                                                                                                                                                                                                      | 32767 | -32768 | 0x133   | 307  | 0x133 | 307  | R/W | 0       |
| D20       |         | Level 5 | general register 20                                                                                                                                                                                                                                                                                                                                                                                                                                      | 32767 | -32768 | 0x134   | 308  | 0x134 | 308  | R/W | 0       |
| MPW       | ---     | ---     | Verification code                                                                                                                                                                                                                                                                                                                                                                                                                                        | 9999  | 0      | 0x3FE   | 1022 | 0x3FE | 1022 | R/W | 0       |
| MSG1      | ---     | ---     | LOOP1 error message indictor bit<br>2 <sup>0</sup> = INER<br>2 <sup>1</sup> = UUUU<br>2 <sup>2</sup> = NNNN<br>2 <sup>3</sup> = AUTF<br>2 <sup>4</sup> = r<br>2 <sup>5</sup> = r<br>2 <sup>6</sup> = r<br>2 <sup>7</sup> = r<br>2 <sup>8</sup> = CJER<br>2 <sup>9</sup> = CJOR<br>2 <sup>10</sup> = CJNR<br>2 <sup>11</sup> = ADCF<br>2 <sup>12</sup> = RAMF<br>2 <sup>13</sup> = r<br>2 <sup>14</sup> = r<br>2 <sup>15</sup> = r<br>※ r :reserve        | 32767 | -32768 | 0x407   | 1031 | 0x407 | 1031 | R   | ---     |
| LAP1      | ---     | ---     | LOOP1 led message indictor bit<br>2 <sup>0</sup> = OUT1<br>2 <sup>1</sup> = OUT2<br>2 <sup>2</sup> = AT<br>2 <sup>3</sup> = AL1<br>2 <sup>4</sup> = AL2<br>2 <sup>5</sup> = AL3<br>2 <sup>6</sup> = COM<br>2 <sup>7</sup> = MAN<br>2 <sup>8</sup> = r<br>2 <sup>9</sup> = r<br>2 <sup>10</sup> = r<br>2 <sup>11</sup> = r<br>2 <sup>12</sup> = r<br>2 <sup>13</sup> = r<br>2 <sup>14</sup> = r<br>2 <sup>15</sup> = r<br>※ r :reserve                    | 32767 | -32768 | 0x408   | 1032 | 0x408 | 1032 | R   | ---     |
| PKE1      | ---     | ---     | LOOP1 program remote control<br>2 <sup>0</sup> = r<br>2 <sup>1</sup> = r<br>2 <sup>2</sup> = r<br>2 <sup>3</sup> = r<br>2 <sup>4</sup> = r<br>2 <sup>5</sup> = r<br>2 <sup>6</sup> = r<br>2 <sup>7</sup> = r<br>2 <sup>8</sup> = 256 (RUN)<br>2 <sup>9</sup> = 512 (HALT)<br>2 <sup>10</sup> = 1024 (JUMP)<br>2 <sup>11</sup> = 2048 (RESET)<br>2 <sup>12</sup> = r<br>2 <sup>13</sup> = r<br>2 <sup>14</sup> = r<br>2 <sup>15</sup> = r<br>※ r :reserve | 32767 | -32767 | 0x409   | 1033 | 0x409 | 1033 | R/W | ---     |

## 7. Communication Data List

| Param<br>eter | Display | Level | Description                                                                                                                                                                                                                                                                                                                                                                                                                                              | Range |        | Address |      |       |      | R/W | Initial |
|---------------|---------|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|--------|---------|------|-------|------|-----|---------|
|               |         |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Max   | Min    | LOOP1   |      | LOOP2 |      |     |         |
|               |         |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                          |       |        | Hex     | Dec  | Hex   | Dec  |     |         |
| MSG2          | ---     | ---   | LOOP2 error message indictor bit<br>2 <sup>0</sup> = INER<br>2 <sup>1</sup> = UUUU<br>2 <sup>2</sup> = NNNN<br>2 <sup>3</sup> = AUTF<br>2 <sup>4</sup> = r<br>2 <sup>5</sup> = r<br>2 <sup>6</sup> = r<br>2 <sup>7</sup> = r<br>2 <sup>8</sup> = CJER<br>2 <sup>9</sup> = CJOR<br>2 <sup>10</sup> = CJNR<br>2 <sup>11</sup> = ADCF<br>2 <sup>12</sup> = RAMF<br>2 <sup>13</sup> = r<br>2 <sup>14</sup> = r<br>2 <sup>15</sup> = r<br>※ r : reserve       | 32767 | -32767 | 0x40A   | 1034 | 0x40A | 1034 | R   | ---     |
| LAP2          | ---     | ---   | LOOP2 led message indictor bit<br>2 <sup>0</sup> = OUT1<br>2 <sup>1</sup> = OUT2<br>2 <sup>2</sup> = AT<br>2 <sup>3</sup> = AL1<br>2 <sup>4</sup> = AL2<br>2 <sup>5</sup> = AL3<br>2 <sup>6</sup> = COM<br>2 <sup>7</sup> = MAN<br>2 <sup>8</sup> = r<br>2 <sup>9</sup> = r<br>2 <sup>10</sup> = r<br>2 <sup>11</sup> = r<br>2 <sup>12</sup> = r<br>2 <sup>13</sup> = r<br>2 <sup>14</sup> = r<br>2 <sup>15</sup> = r<br>※ r : reserve                   | 32767 | -32767 | 0x40B   | 1035 | 0x40C | 1035 | R   | ---     |
| PKE2          | ---     | ---   | LOOP2 program remote control<br>2 <sup>0</sup> = r<br>2 <sup>1</sup> = r<br>2 <sup>2</sup> = r<br>2 <sup>3</sup> = r<br>2 <sup>4</sup> = r<br>2 <sup>5</sup> = r<br>2 <sup>6</sup> = r<br>2 <sup>7</sup> = r<br>2 <sup>8</sup> = 256 (RUN)<br>2 <sup>9</sup> = 512 (HALT)<br>2 <sup>10</sup> = 1024 (JUMP)<br>2 <sup>11</sup> = 2048 (RESET)<br>2 <sup>12</sup> = r<br>2 <sup>13</sup> = r<br>2 <sup>14</sup> = r<br>2 <sup>15</sup> = r<br>※ r :reserve | 32767 | -32767 | 0x40C   | 1036 | 0x40C | 1036 | R/W | ---     |
| FEDI          | ---     | ---   | Firmware edition                                                                                                                                                                                                                                                                                                                                                                                                                                         | 32767 | -32767 | 0x40E   | 1038 | 0x40E | 1038 | R   | ---     |
| 1P10          | ---     | ---   | LOOP1_PV x 10                                                                                                                                                                                                                                                                                                                                                                                                                                            | 32767 | -32767 | 0x40F   | 1039 | 0x40F | 1039 | R   | ---     |
| 2P10          | ---     | ---   | LOOP2_PV x 10                                                                                                                                                                                                                                                                                                                                                                                                                                            | 32767 | -32767 | 0x410   | 1040 | 0x410 | 1040 | R   | ---     |
| 1MMV          | ---     | ---   | LOOP1 main out manipulated value                                                                                                                                                                                                                                                                                                                                                                                                                         | 1000  | 0      | 0x411   | 1041 | 0x411 | 1041 | R   | ---     |
| 1SMV          | ---     | ---   | LOOP1 sub out manipulated value                                                                                                                                                                                                                                                                                                                                                                                                                          | 1000  | 0      | 0x412   | 1042 | 0x412 | 1042 | R   | ---     |
| 2MMV          | ---     | ---   | LOOP2 main out manipulated value                                                                                                                                                                                                                                                                                                                                                                                                                         | 1000  | 0      | 0x413   | 1043 | 0x413 | 1043 | R   | ---     |
| 2SMV          | ---     | ---   | LOOP2 sub out manipulated value                                                                                                                                                                                                                                                                                                                                                                                                                          | 1000  | 0      | 0x414   | 1044 | 0x414 | 1044 | R   | ---     |

## 7.2 Program Parameters Address

| Pattern | Segment | Parameter | Address |     |
|---------|---------|-----------|---------|-----|
|         |         |           | Hex     | Dec |
| PTN =1  | SEG =1  | L1SV      | 0x0183  | 387 |
|         |         | L2SV      | 0x0184  | 388 |
|         |         | TIMR      | 0x0185  | 389 |
|         |         | DO        | 0x0186  | 390 |
|         | SEG =2  | L1SV      | 0x0187  | 391 |
|         |         | L2SV      | 0x0188  | 392 |
|         |         | TIMR      | 0x0189  | 393 |
|         |         | DO        | 0x018A  | 394 |
|         | SEG =3  | L1SV      | 0x018B  | 395 |
|         |         | L2SV      | 0x018C  | 396 |
|         |         | TIMR      | 0x018D  | 397 |
|         |         | DO        | 0x018E  | 398 |
|         | SEG =4  | L1SV      | 0x018F  | 399 |
|         |         | L2SV      | 0x0190  | 400 |
|         |         | TIMR      | 0x0191  | 401 |
|         |         | DO        | 0x0192  | 402 |
|         | SEG =5  | L1SV      | 0x0193  | 403 |
|         |         | L2SV      | 0x0194  | 404 |
|         |         | TIMR      | 0x0195  | 405 |
|         |         | DO        | 0x0196  | 406 |
|         | SEG =6  | L1SV      | 0x0197  | 407 |
|         |         | L2SV      | 0x0198  | 408 |
|         |         | TIMR      | 0x0199  | 409 |
|         |         | DO        | 0x019A  | 410 |
|         | SEG =7  | L1SV      | 0x019B  | 411 |
|         |         | L2SV      | 0x019C  | 412 |
|         |         | TIMR      | 0x019D  | 413 |
|         |         | DO        | 0x019E  | 414 |
|         | SEG =8  | L1SV      | 0x019F  | 415 |
|         |         | L2SV      | 0x01A0  | 416 |
|         |         | TIMR      | 0x01A1  | 417 |
|         |         | DO        | 0x01A2  | 418 |
|         | SEG =9  | L1SV      | 0x01A3  | 419 |
|         |         | L2SV      | 0x01A4  | 420 |
|         |         | TIMR      | 0x01A5  | 421 |
|         |         | DO        | 0x01A6  | 422 |
|         | SEG =10 | L1SV      | 0x01A7  | 423 |
|         |         | L2SV      | 0x01A8  | 424 |
|         |         | TIMR      | 0x01A9  | 425 |
|         |         | DO        | 0x01AA  | 426 |

| Pattern | Segment | Parameter | Address |     |
|---------|---------|-----------|---------|-----|
|         |         |           | Hex     | Dec |
| PTN =2  | SEG =1  | L1SV      | 0x01AB  | 427 |
|         |         | L2SV      | 0x01AC  | 428 |
|         |         | TIMR      | 0x01AD  | 429 |
|         |         | DO        | 0x01AE  | 430 |
|         | SEG =2  | L1SV      | 0x01AF  | 431 |
|         |         | L2SV      | 0x01B0  | 432 |
|         |         | TIMR      | 0x01B1  | 433 |
|         |         | DO        | 0x01B2  | 434 |
|         | SEG =3  | L1SV      | 0x01B3  | 435 |
|         |         | L2SV      | 0x01B4  | 436 |
|         |         | TIMR      | 0x01B5  | 437 |
|         |         | DO        | 0x01B6  | 438 |
|         | SEG =4  | L1SV      | 0x01B7  | 439 |
|         |         | L2SV      | 0x01B8  | 440 |
|         |         | TIMR      | 0x01B9  | 441 |
|         |         | DO        | 0x01BA  | 442 |
|         | SEG =5  | L1SV      | 0x01BB  | 443 |
|         |         | L2SV      | 0x01BC  | 444 |
|         |         | TIMR      | 0x01BD  | 445 |
|         |         | DO        | 0x01BE  | 446 |
|         | SEG =6  | L1SV      | 0x01BF  | 447 |
|         |         | L2SV      | 0x01C0  | 448 |
|         |         | TIMR      | 0x01C1  | 449 |
|         |         | DO        | 0x01C2  | 450 |
|         | SEG =7  | L1SV      | 0x01C3  | 451 |
|         |         | L2SV      | 0x01C4  | 452 |
|         |         | TIMR      | 0x01C5  | 453 |
|         |         | DO        | 0x01C6  | 454 |
|         | SEG =8  | L1SV      | 0x01C7  | 455 |
|         |         | L2SV      | 0x01C8  | 456 |
|         |         | TIMR      | 0x01C9  | 457 |
|         |         | DO        | 0x01CA  | 458 |
|         | SEG =9  | L1SV      | 0x01CB  | 459 |
|         |         | L2SV      | 0x01CC  | 460 |
|         |         | TIMR      | 0x01CD  | 461 |
|         |         | DO        | 0x01CE  | 462 |
|         | SEG =10 | L1SV      | 0x01CF  | 463 |
|         |         | L2SV      | 0x01D0  | 464 |
|         |         | TIMR      | 0x01D1  | 465 |
|         |         | DO        | 0x01D2  | 466 |

| Pattern | Segment | Parameter | Address |     |
|---------|---------|-----------|---------|-----|
|         |         |           | Hex     | Dec |
| PTN =3  | SEG =1  | L1SV      | 0x01D3  | 467 |
|         |         | L2SV      | 0x01D4  | 468 |
|         |         | TIMR      | 0x01D5  | 469 |
|         |         | DO        | 0x01D6  | 470 |
|         | SEG =2  | L1SV      | 0x01D7  | 471 |
|         |         | L2SV      | 0x01D8  | 472 |
|         |         | TIMR      | 0x01D9  | 473 |
|         |         | DO        | 0x01DA  | 474 |
|         | SEG =3  | L1SV      | 0x01DB  | 475 |
|         |         | L2SV      | 0x01DC  | 476 |
|         |         | TIMR      | 0x01DD  | 477 |
|         |         | DO        | 0x01DE  | 478 |
|         | SEG =4  | L1SV      | 0x01DF  | 479 |
|         |         | L2SV      | 0x01E0  | 480 |
|         |         | TIMR      | 0x01E1  | 481 |
|         |         | DO        | 0x01E2  | 482 |
|         | SEG =5  | L1SV      | 0x01E3  | 483 |
|         |         | L2SV      | 0x01E4  | 484 |
|         |         | TIMR      | 0x01E5  | 485 |
|         |         | DO        | 0x01E6  | 486 |
|         | SEG =6  | L1SV      | 0x01E7  | 487 |
|         |         | L2SV      | 0x01E8  | 488 |
|         |         | TIMR      | 0x01E9  | 489 |
|         |         | DO        | 0x01EA  | 490 |
|         | SEG =7  | L1SV      | 0x01EB  | 491 |
|         |         | L2SV      | 0x01EC  | 492 |
|         |         | TIMR      | 0x01ED  | 493 |
|         |         | DO        | 0x01EE  | 494 |
|         | SEG =8  | L1SV      | 0x01EF  | 495 |
|         |         | L2SV      | 0x01F0  | 496 |
|         |         | TIMR      | 0x01F1  | 497 |
|         |         | DO        | 0x01F2  | 498 |
|         | SEG =9  | L1SV      | 0x01F3  | 499 |
|         |         | L2SV      | 0x01F4  | 500 |
|         |         | TIMR      | 0x01F5  | 501 |
|         |         | DO        | 0x01F6  | 502 |
|         | SEG =10 | L1SV      | 0x01F7  | 503 |
|         |         | L2SV      | 0x01F8  | 504 |
|         |         | TIMR      | 0x01F9  | 505 |
|         |         | DO        | 0x01FA  | 506 |

| Pattern | Segment | Parameter | Address |     |
|---------|---------|-----------|---------|-----|
|         |         |           | Hex     | Dec |
| PTN =4  | SEG =1  | L1SV      | 0x01FB  | 507 |
|         |         | L2SV      | 0x01FC  | 508 |
|         |         | TIMR      | 0x01FD  | 509 |
|         |         | DO        | 0x01FE  | 510 |
|         | SEG =2  | L1SV      | 0x01FF  | 511 |
|         |         | L2SV      | 0x0200  | 512 |
|         |         | TIMR      | 0x0201  | 513 |
|         |         | DO        | 0x0202  | 514 |
|         | SEG =3  | L1SV      | 0x0203  | 515 |
|         |         | L2SV      | 0x0204  | 516 |
|         |         | TIMR      | 0x0205  | 517 |
|         |         | DO        | 0x0206  | 518 |
|         | SEG =4  | L1SV      | 0x0207  | 519 |
|         |         | L2SV      | 0x0208  | 520 |
|         |         | TIMR      | 0x0209  | 521 |
|         |         | DO        | 0x020A  | 522 |
|         | SEG =5  | L1SV      | 0x020B  | 523 |
|         |         | L2SV      | 0x020C  | 524 |
|         |         | TIMR      | 0x020D  | 525 |
|         |         | DO        | 0x020E  | 526 |
|         | SEG =6  | L1SV      | 0x020F  | 527 |
|         |         | L2SV      | 0x0210  | 528 |
|         |         | TIMR      | 0x0211  | 529 |
|         |         | DO        | 0x0212  | 530 |
|         | SEG =7  | L1SV      | 0x0213  | 531 |
|         |         | L2SV      | 0x0214  | 532 |
|         |         | TIMR      | 0x0215  | 533 |
|         |         | DO        | 0x0216  | 534 |
|         | SEG =8  | L1SV      | 0x0217  | 535 |
|         |         | L2SV      | 0x0218  | 536 |
|         |         | TIMR      | 0x0219  | 537 |
|         |         | DO        | 0x021A  | 538 |
|         | SEG =9  | L1SV      | 0x021B  | 539 |
|         |         | L2SV      | 0x021C  | 540 |
|         |         | TIMR      | 0x021D  | 541 |
|         |         | DO        | 0x021E  | 542 |
|         | SEG =10 | L1SV      | 0x021F  | 543 |
|         |         | L2SV      | 0x0220  | 544 |
|         |         | TIMR      | 0x0221  | 545 |
|         |         | DO        | 0x0222  | 546 |

| Pattern | Segment | Parameter | Address |     |
|---------|---------|-----------|---------|-----|
|         |         |           | Hex     | Dec |
| PTN =5  | SEG =1  | L1SV      | 0x0223  | 547 |
|         |         | L2SV      | 0x0224  | 548 |
|         |         | TIMR      | 0x0225  | 549 |
|         |         | DO        | 0x0226  | 550 |
|         | SEG =2  | L1SV      | 0x0227  | 551 |
|         |         | L2SV      | 0x0228  | 552 |
|         |         | TIMR      | 0x0229  | 553 |
|         |         | DO        | 0x022A  | 554 |
|         | SEG =3  | L1SV      | 0x022B  | 555 |
|         |         | L2SV      | 0x022C  | 556 |
|         |         | TIMR      | 0x022D  | 557 |
|         |         | DO        | 0x022E  | 558 |
|         | SEG =4  | L1SV      | 0x022F  | 559 |
|         |         | L2SV      | 0x0230  | 560 |
|         |         | TIMR      | 0x0231  | 561 |
|         |         | DO        | 0x0232  | 562 |
|         | SEG =5  | L1SV      | 0x0233  | 563 |
|         |         | L2SV      | 0x0234  | 564 |
|         |         | TIMR      | 0x0235  | 565 |
|         |         | DO        | 0x0236  | 566 |
|         | SEG =6  | L1SV      | 0x0237  | 567 |
|         |         | L2SV      | 0x0238  | 568 |
|         |         | TIMR      | 0x0239  | 569 |
|         |         | DO        | 0x023A  | 570 |
|         | SEG =7  | L1SV      | 0x023B  | 571 |
|         |         | L2SV      | 0x023C  | 572 |
|         |         | TIMR      | 0x023D  | 573 |
|         |         | DO        | 0x023E  | 574 |
|         | SEG =8  | L1SV      | 0x023F  | 575 |
|         |         | L2SV      | 0x0240  | 576 |
|         |         | TIMR      | 0x0241  | 577 |
|         |         | DO        | 0x0242  | 578 |
|         | SEG =9  | L1SV      | 0x0243  | 579 |
|         |         | L2SV      | 0x0244  | 580 |
|         |         | TIMR      | 0x0245  | 581 |
|         |         | DO        | 0x0246  | 582 |
|         | SEG =10 | L1SV      | 0x0247  | 583 |
|         |         | L2SV      | 0x0248  | 584 |
|         |         | TIMR      | 0x0249  | 585 |
|         |         | DO        | 0x024A  | 586 |

| Pattern | Segment | Parameter | Address |     |
|---------|---------|-----------|---------|-----|
|         |         |           | Hex     | Dec |
| PTN =6  | SEG =1  | L1SV      | 0x024B  | 587 |
|         |         | L2SV      | 0x024C  | 588 |
|         |         | TIMR      | 0x024D  | 589 |
|         |         | DO        | 0x024E  | 590 |
|         | SEG =2  | L1SV      | 0x024F  | 591 |
|         |         | L2SV      | 0x0250  | 592 |
|         |         | TIMR      | 0x0251  | 593 |
|         |         | DO        | 0x0252  | 594 |
|         | SEG =3  | L1SV      | 0x0253  | 595 |
|         |         | L2SV      | 0x0254  | 596 |
|         |         | TIMR      | 0x0255  | 597 |
|         |         | DO        | 0x0256  | 598 |
|         | SEG =4  | L1SV      | 0x0257  | 599 |
|         |         | L2SV      | 0x0258  | 600 |
|         |         | TIMR      | 0x0259  | 601 |
|         |         | DO        | 0x025A  | 602 |
|         | SEG =5  | L1SV      | 0x025B  | 603 |
|         |         | L2SV      | 0x025C  | 604 |
|         |         | TIMR      | 0x025D  | 605 |
|         |         | DO        | 0x025E  | 606 |
|         | SEG =6  | L1SV      | 0x025F  | 607 |
|         |         | L2SV      | 0x0260  | 608 |
|         |         | TIMR      | 0x0261  | 609 |
|         |         | DO        | 0x0262  | 610 |
|         | SEG =7  | L1SV      | 0x0263  | 611 |
|         |         | L2SV      | 0x0264  | 612 |
|         |         | TIMR      | 0x0265  | 613 |
|         |         | DO        | 0x0266  | 614 |
|         | SEG =8  | L1SV      | 0x0267  | 615 |
|         |         | L2SV      | 0x0268  | 616 |
|         |         | TIMR      | 0x0269  | 617 |
|         |         | DO        | 0x026A  | 618 |
|         | SEG =9  | L1SV      | 0x026B  | 619 |
|         |         | L2SV      | 0x026C  | 620 |
|         |         | TIMR      | 0x026D  | 621 |
|         |         | DO        | 0x026E  | 622 |
|         | SEG =10 | L1SV      | 0x026F  | 623 |
|         |         | L2SV      | 0x0270  | 624 |
|         |         | TIMR      | 0x0271  | 625 |
|         |         | DO        | 0x0272  | 626 |

| Pattern | Segment | Parameter | Address |     |
|---------|---------|-----------|---------|-----|
|         |         |           | Hex     | Dec |
| PTN =7  | SEG =1  | L1SV      | 0x0273  | 627 |
|         |         | L2SV      | 0x0274  | 628 |
|         |         | TIMR      | 0x0275  | 629 |
|         |         | DO        | 0x0276  | 630 |
|         | SEG =2  | L1SV      | 0x0277  | 631 |
|         |         | L2SV      | 0x0278  | 632 |
|         |         | TIMR      | 0x0279  | 633 |
|         |         | DO        | 0x027A  | 634 |
|         | SEG =3  | L1SV      | 0x027B  | 635 |
|         |         | L2SV      | 0x027C  | 636 |
|         |         | TIMR      | 0x027D  | 637 |
|         |         | DO        | 0x027E  | 638 |
|         | SEG =4  | L1SV      | 0x027F  | 639 |
|         |         | L2SV      | 0x0280  | 640 |
|         |         | TIMR      | 0x0281  | 641 |
|         |         | DO        | 0x0282  | 642 |
|         | SEG =5  | L1SV      | 0x0283  | 643 |
|         |         | L2SV      | 0x0284  | 644 |
|         |         | TIMR      | 0x0285  | 645 |
|         |         | DO        | 0x0286  | 646 |
|         | SEG =6  | L1SV      | 0x0287  | 647 |
|         |         | L2SV      | 0x0288  | 648 |
|         |         | TIMR      | 0x0289  | 649 |
|         |         | DO        | 0x028A  | 650 |
|         | SEG =7  | L1SV      | 0x028B  | 651 |
|         |         | L2SV      | 0x028C  | 652 |
|         |         | TIMR      | 0x028D  | 653 |
|         |         | DO        | 0x028E  | 654 |
|         | SEG =8  | L1SV      | 0x028F  | 655 |
|         |         | L2SV      | 0x0290  | 656 |
|         |         | TIMR      | 0x0291  | 657 |
|         |         | DO        | 0x0292  | 658 |
|         | SEG =9  | L1SV      | 0x0293  | 659 |
|         |         | L2SV      | 0x0294  | 660 |
|         |         | TIMR      | 0x0295  | 661 |
|         |         | DO        | 0x0296  | 662 |
|         | SEG =10 | L1SV      | 0x0297  | 663 |
|         |         | L2SV      | 0x0298  | 664 |
|         |         | TIMR      | 0x0299  | 665 |
|         |         | DO        | 0x029A  | 666 |

| Pattern | Segment | Parameter | Address |     |
|---------|---------|-----------|---------|-----|
|         |         |           | Hex     | Dec |
| PTN =8  | SEG =1  | L1SV      | 0x029B  | 667 |
|         |         | L2SV      | 0x029C  | 668 |
|         |         | TIMR      | 0x029D  | 669 |
|         |         | DO        | 0x029E  | 670 |
|         | SEG =2  | L1SV      | 0x029F  | 671 |
|         |         | L2SV      | 0x02A0  | 672 |
|         |         | TIMR      | 0x02A1  | 673 |
|         |         | DO        | 0x02A2  | 674 |
|         | SEG =3  | L1SV      | 0x02A3  | 675 |
|         |         | L2SV      | 0x02A4  | 676 |
|         |         | TIMR      | 0x02A5  | 677 |
|         |         | DO        | 0x02A6  | 678 |
|         | SEG =4  | L1SV      | 0x02A7  | 679 |
|         |         | L2SV      | 0x02A8  | 680 |
|         |         | TIMR      | 0x02A9  | 681 |
|         |         | DO        | 0x02AA  | 682 |
|         | SEG =5  | L1SV      | 0x02AB  | 683 |
|         |         | L2SV      | 0x02AC  | 684 |
|         |         | TIMR      | 0x02AD  | 685 |
|         |         | DO        | 0x02AE  | 686 |
|         | SEG =6  | L1SV      | 0x02AF  | 687 |
|         |         | L2SV      | 0x02B0  | 688 |
|         |         | TIMR      | 0x02B1  | 689 |
|         |         | DO        | 0x02B2  | 690 |
|         | SEG =7  | L1SV      | 0x02B3  | 691 |
|         |         | L2SV      | 0x02B4  | 692 |
|         |         | TIMR      | 0x02B5  | 693 |
|         |         | DO        | 0x02B6  | 694 |
|         | SEG =8  | L1SV      | 0x02B7  | 695 |
|         |         | L2SV      | 0x02B8  | 696 |
|         |         | TIMR      | 0x02B9  | 697 |
|         |         | DO        | 0x02BA  | 698 |
|         | SEG =9  | L1SV      | 0x02BB  | 699 |
|         |         | L2SV      | 0x02BC  | 700 |
|         |         | TIMR      | 0x02BD  | 701 |
|         |         | DO        | 0x02BE  | 702 |
|         | SEG =10 | L1SV      | 0x02BF  | 703 |
|         |         | L2SV      | 0x02C0  | 704 |
|         |         | TIMR      | 0x02C1  | 705 |
|         |         | DO        | 0x02C2  | 706 |

| Pattern | Segment | Parameter | Address |     |
|---------|---------|-----------|---------|-----|
|         |         |           | Hex     | Dec |
| PTN =9  | SEG =1  | L1SV      | 0x02C3  | 707 |
|         |         | L2SV      | 0x02C4  | 708 |
|         |         | TIMR      | 0x02C5  | 709 |
|         |         | DO        | 0x02C6  | 710 |
|         | SEG =2  | L1SV      | 0x02C7  | 711 |
|         |         | L2SV      | 0x02C8  | 712 |
|         |         | TIMR      | 0x02C9  | 713 |
|         |         | DO        | 0x02CA  | 714 |
|         | SEG =3  | L1SV      | 0x02CB  | 715 |
|         |         | L2SV      | 0x02CC  | 716 |
|         |         | TIMR      | 0x02CD  | 717 |
|         |         | DO        | 0x02CE  | 718 |
|         | SEG =4  | L1SV      | 0x02CF  | 719 |
|         |         | L2SV      | 0x02D0  | 720 |
|         |         | TIMR      | 0x02D1  | 721 |
|         |         | DO        | 0x02D2  | 722 |
|         | SEG =5  | L1SV      | 0x02D3  | 723 |
|         |         | L2SV      | 0x02D4  | 724 |
|         |         | TIMR      | 0x02D5  | 725 |
|         |         | DO        | 0x02D6  | 726 |
|         | SEG =6  | L1SV      | 0x02D7  | 727 |
|         |         | L2SV      | 0x02D8  | 728 |
|         |         | TIMR      | 0x02D9  | 729 |
|         |         | DO        | 0x02DA  | 730 |
|         | SEG =7  | L1SV      | 0x02DB  | 731 |
|         |         | L2SV      | 0x02DC  | 732 |
|         |         | TIMR      | 0x02DD  | 733 |
|         |         | DO        | 0x02DE  | 734 |
|         | SEG =8  | L1SV      | 0x02DF  | 735 |
|         |         | L2SV      | 0x02E0  | 736 |
|         |         | TIMR      | 0x02E1  | 737 |
|         |         | DO        | 0x02E2  | 738 |
|         | SEG =9  | L1SV      | 0x02E3  | 739 |
|         |         | L2SV      | 0x02E4  | 740 |
|         |         | TIMR      | 0x02E5  | 741 |
|         |         | DO        | 0x02E6  | 742 |
|         | SEG =10 | L1SV      | 0x02E7  | 743 |
|         |         | L2SV      | 0x02E8  | 744 |
|         |         | TIMR      | 0x02E9  | 745 |
|         |         | DO        | 0x02EA  | 746 |

| Pattern | Segment | Parameter | Address |     |
|---------|---------|-----------|---------|-----|
|         |         |           | Hex     | Dec |
| PTN =10 | SEG =1  | L1SV      | 0x02EB  | 747 |
|         |         | L2SV      | 0x02EC  | 748 |
|         |         | TIMR      | 0x02ED  | 749 |
|         |         | DO        | 0x02EE  | 750 |
|         | SEG =2  | L1SV      | 0x02EF  | 751 |
|         |         | L2SV      | 0x02F0  | 752 |
|         |         | TIMR      | 0x02F1  | 753 |
|         |         | DO        | 0x02F2  | 754 |
|         | SEG =3  | L1SV      | 0x02F3  | 755 |
|         |         | L2SV      | 0x02F4  | 756 |
|         |         | TIMR      | 0x02F5  | 757 |
|         |         | DO        | 0x02F6  | 758 |
|         | SEG =4  | L1SV      | 0x02F7  | 759 |
|         |         | L2SV      | 0x02F8  | 760 |
|         |         | TIMR      | 0x02F9  | 761 |
|         |         | DO        | 0x02FA  | 762 |
|         | SEG =5  | L1SV      | 0x02FB  | 763 |
|         |         | L2SV      | 0x02FC  | 764 |
|         |         | TIMR      | 0x02FD  | 765 |
|         |         | DO        | 0x02FE  | 766 |
|         | SEG =6  | L1SV      | 0x02FF  | 767 |
|         |         | L2SV      | 0x0300  | 768 |
|         |         | TIMR      | 0x0301  | 769 |
|         |         | DO        | 0x0302  | 770 |
|         | SEG =7  | L1SV      | 0x0303  | 771 |
|         |         | L2SV      | 0x0304  | 772 |
|         |         | TIMR      | 0x0305  | 773 |
|         |         | DO        | 0x0306  | 774 |
|         | SEG =8  | L1SV      | 0x0307  | 775 |
|         |         | L2SV      | 0x0308  | 776 |
|         |         | TIMR      | 0x0309  | 777 |
|         |         | DO        | 0x030A  | 778 |
|         | SEG =9  | L1SV      | 0x030B  | 779 |
|         |         | L2SV      | 0x030C  | 780 |
|         |         | TIMR      | 0x030D  | 781 |
|         |         | DO        | 0x030E  | 782 |
|         | SEG =10 | L1SV      | 0x030F  | 783 |
|         |         | L2SV      | 0x0310  | 784 |
|         |         | TIMR      | 0x0311  | 785 |
|         |         | DO        | 0x0312  | 786 |

| Pattern | Segment | Parameter | Address |     |
|---------|---------|-----------|---------|-----|
|         |         |           | Hex     | Dec |
| PTN =11 | SEG =1  | L1SV      | 0x0313  | 787 |
|         |         | L2SV      | 0x0314  | 788 |
|         |         | TIMR      | 0x0315  | 789 |
|         |         | DO        | 0x0316  | 790 |
|         | SEG =2  | L1SV      | 0x0317  | 791 |
|         |         | L2SV      | 0x0318  | 792 |
|         |         | TIMR      | 0x0319  | 793 |
|         |         | DO        | 0x031A  | 794 |
|         | SEG =3  | L1SV      | 0x031B  | 795 |
|         |         | L2SV      | 0x031C  | 796 |
|         |         | TIMR      | 0x031D  | 797 |
|         |         | DO        | 0x031E  | 798 |
|         | SEG =4  | L1SV      | 0x031F  | 799 |
|         |         | L2SV      | 0x0320  | 800 |
|         |         | TIMR      | 0x0321  | 801 |
|         |         | DO        | 0x0322  | 802 |
|         | SEG =5  | L1SV      | 0x0323  | 803 |
|         |         | L2SV      | 0x0324  | 804 |
|         |         | TIMR      | 0x0325  | 805 |
|         |         | DO        | 0x0326  | 806 |
|         | SEG =6  | L1SV      | 0x0327  | 807 |
|         |         | L2SV      | 0x0328  | 808 |
|         |         | TIMR      | 0x0329  | 809 |
|         |         | DO        | 0x032A  | 810 |
|         | SEG =7  | L1SV      | 0x032B  | 811 |
|         |         | L2SV      | 0x032C  | 812 |
|         |         | TIMR      | 0x032D  | 813 |
|         |         | DO        | 0x032E  | 814 |
|         | SEG =8  | L1SV      | 0x032F  | 815 |
|         |         | L2SV      | 0x0330  | 816 |
|         |         | TIMR      | 0x0331  | 817 |
|         |         | DO        | 0x0332  | 818 |
|         | SEG =9  | L1SV      | 0x0333  | 819 |
|         |         | L2SV      | 0x0334  | 820 |
|         |         | TIMR      | 0x0335  | 821 |
|         |         | DO        | 0x0336  | 822 |
|         | SEG =10 | L1SV      | 0x0337  | 823 |
|         |         | L2SV      | 0x0338  | 824 |
|         |         | TIMR      | 0x0339  | 825 |
|         |         | DO        | 0x033A  | 826 |

| Pattern | Segment | Parameter | Address |     |
|---------|---------|-----------|---------|-----|
|         |         |           | Hex     | Dec |
| PTN =12 | SEG =1  | L1SV      | 0x033B  | 827 |
|         |         | L2SV      | 0x033C  | 828 |
|         |         | TIMR      | 0x033D  | 829 |
|         |         | DO        | 0x033E  | 830 |
|         | SEG =2  | L1SV      | 0x033F  | 831 |
|         |         | L2SV      | 0x0340  | 832 |
|         |         | TIMR      | 0x0341  | 833 |
|         |         | DO        | 0x0342  | 834 |
|         | SEG =3  | L1SV      | 0x0343  | 835 |
|         |         | L2SV      | 0x0344  | 836 |
|         |         | TIMR      | 0x0345  | 837 |
|         |         | DO        | 0x0346  | 838 |
|         | SEG =4  | L1SV      | 0x0347  | 839 |
|         |         | L2SV      | 0x0348  | 840 |
|         |         | TIMR      | 0x0349  | 841 |
|         |         | DO        | 0x034A  | 842 |
|         | SEG =5  | L1SV      | 0x034B  | 843 |
|         |         | L2SV      | 0x034C  | 844 |
|         |         | TIMR      | 0x034D  | 845 |
|         |         | DO        | 0x034E  | 846 |
|         | SEG =6  | L1SV      | 0x034F  | 847 |
|         |         | L2SV      | 0x0350  | 848 |
|         |         | TIMR      | 0x0351  | 849 |
|         |         | DO        | 0x0352  | 850 |
|         | SEG =7  | L1SV      | 0x0353  | 851 |
|         |         | L2SV      | 0x0354  | 852 |
|         |         | TIMR      | 0x0355  | 853 |
|         |         | DO        | 0x0356  | 854 |
|         | SEG =8  | L1SV      | 0x0357  | 855 |
|         |         | L2SV      | 0x0358  | 856 |
|         |         | TIMR      | 0x0359  | 857 |
|         |         | DO        | 0x035A  | 858 |
|         | SEG =9  | L1SV      | 0x035B  | 859 |
|         |         | L2SV      | 0x035C  | 860 |
|         |         | TIMR      | 0x035D  | 861 |
|         |         | DO        | 0x035E  | 862 |
|         | SEG =10 | L1SV      | 0x035F  | 863 |
|         |         | L2SV      | 0x0360  | 864 |
|         |         | TIMR      | 0x0361  | 865 |
|         |         | DO        | 0x0362  | 866 |

| Pattern | Segment | Parameter | Address |     |
|---------|---------|-----------|---------|-----|
|         |         |           | Hex     | Dec |
| PTN =13 | SEG =1  | L1SV      | 0x0363  | 867 |
|         |         | L2SV      | 0x0364  | 868 |
|         |         | TIMR      | 0x0365  | 869 |
|         |         | DO        | 0x0366  | 870 |
|         | SEG =2  | L1SV      | 0x0367  | 871 |
|         |         | L2SV      | 0x0368  | 872 |
|         |         | TIMR      | 0x0369  | 873 |
|         |         | DO        | 0x036A  | 874 |
|         | SEG =3  | L1SV      | 0x036B  | 875 |
|         |         | L2SV      | 0x036C  | 876 |
|         |         | TIMR      | 0x036D  | 877 |
|         |         | DO        | 0x036E  | 878 |
|         | SEG =4  | L1SV      | 0x036F  | 879 |
|         |         | L2SV      | 0x0370  | 880 |
|         |         | TIMR      | 0x0371  | 881 |
|         |         | DO        | 0x0372  | 882 |
|         | SEG =5  | L1SV      | 0x0373  | 883 |
|         |         | L2SV      | 0x0374  | 884 |
|         |         | TIMR      | 0x0375  | 885 |
|         |         | DO        | 0x0376  | 886 |
|         | SEG =6  | L1SV      | 0x0377  | 887 |
|         |         | L2SV      | 0x0378  | 888 |
|         |         | TIMR      | 0x0379  | 889 |
|         |         | DO        | 0x037A  | 890 |
|         | SEG =7  | L1SV      | 0x037B  | 891 |
|         |         | L2SV      | 0x037C  | 892 |
|         |         | TIMR      | 0x037D  | 893 |
|         |         | DO        | 0x037E  | 894 |
|         | SEG =8  | L1SV      | 0x037F  | 895 |
|         |         | L2SV      | 0x0380  | 896 |
|         |         | TIMR      | 0x0381  | 897 |
|         |         | DO        | 0x0382  | 898 |
|         | SEG =9  | L1SV      | 0x0383  | 899 |
|         |         | L2SV      | 0x0384  | 900 |
|         |         | TIMR      | 0x0385  | 901 |
|         |         | DO        | 0x0386  | 902 |
|         | SEG =10 | L1SV      | 0x0387  | 903 |
|         |         | L2SV      | 0x0388  | 904 |
|         |         | TIMR      | 0x0389  | 905 |
|         |         | DO        | 0x038A  | 906 |

| Pattern | Segment | Parameter | Address |     |
|---------|---------|-----------|---------|-----|
|         |         |           | Hex     | Dec |
| PTN =14 | SEG =1  | L1SV      | 0x038B  | 907 |
|         |         | L2SV      | 0x038C  | 908 |
|         |         | TIMR      | 0x038D  | 909 |
|         |         | DO        | 0x038E  | 910 |
|         | SEG =2  | L1SV      | 0x038F  | 911 |
|         |         | L2SV      | 0x0390  | 912 |
|         |         | TIMR      | 0x0391  | 913 |
|         |         | DO        | 0x0392  | 914 |
|         | SEG =3  | L1SV      | 0x0393  | 915 |
|         |         | L2SV      | 0x0394  | 916 |
|         |         | TIMR      | 0x0395  | 917 |
|         |         | DO        | 0x0396  | 918 |
|         | SEG =4  | L1SV      | 0x0397  | 919 |
|         |         | L2SV      | 0x0398  | 920 |
|         |         | TIMR      | 0x0399  | 921 |
|         |         | DO        | 0x039A  | 922 |
|         | SEG =5  | L1SV      | 0x039B  | 923 |
|         |         | L2SV      | 0x039C  | 924 |
|         |         | TIMR      | 0x039D  | 925 |
|         |         | DO        | 0x039E  | 926 |
|         | SEG =6  | L1SV      | 0x039F  | 927 |
|         |         | L2SV      | 0x03A0  | 928 |
|         |         | TIMR      | 0x03A1  | 929 |
|         |         | DO        | 0x03A2  | 930 |
|         | SEG =7  | L1SV      | 0x03A3  | 931 |
|         |         | L2SV      | 0x03A4  | 932 |
|         |         | TIMR      | 0x03A5  | 933 |
|         |         | DO        | 0x03A6  | 934 |
|         | SEG =8  | L1SV      | 0x03A7  | 935 |
|         |         | L2SV      | 0x03A8  | 936 |
|         |         | TIMR      | 0x03A9  | 937 |
|         |         | DO        | 0x03AA  | 938 |
|         | SEG =9  | L1SV      | 0x03AB  | 939 |
|         |         | L2SV      | 0x03AC  | 940 |
|         |         | TIMR      | 0x03AD  | 941 |
|         |         | DO        | 0x03AE  | 942 |
|         | SEG =10 | L1SV      | 0x03AF  | 943 |
|         |         | L2SV      | 0x03B0  | 944 |
|         |         | TIMR      | 0x03B1  | 945 |
|         |         | DO        | 0x03B2  | 946 |

| Pattern | Segment | Parameter | Address |     |
|---------|---------|-----------|---------|-----|
|         |         |           | Hex     | Dec |
| PTN =15 | SEG =1  | L1SV      | 0x03B3  | 947 |
|         |         | L2SV      | 0x03B4  | 948 |
|         |         | TIMR      | 0x03B5  | 949 |
|         |         | DO        | 0x03B6  | 950 |
|         | SEG =2  | L1SV      | 0x03B7  | 951 |
|         |         | L2SV      | 0x03B8  | 952 |
|         |         | TIMR      | 0x03B9  | 953 |
|         |         | DO        | 0x03BA  | 954 |
|         | SEG =3  | L1SV      | 0x03BB  | 955 |
|         |         | L2SV      | 0x03BC  | 956 |
|         |         | TIMR      | 0x03BD  | 957 |
|         |         | DO        | 0x03BE  | 958 |
|         | SEG =4  | L1SV      | 0x03BF  | 959 |
|         |         | L2SV      | 0x03C0  | 960 |
|         |         | TIMR      | 0x03C1  | 961 |
|         |         | DO        | 0x03C2  | 962 |
|         | SEG =5  | L1SV      | 0x03C3  | 963 |
|         |         | L2SV      | 0x03C4  | 964 |
|         |         | TIMR      | 0x03C5  | 965 |
|         |         | DO        | 0x03C6  | 966 |
|         | SEG =6  | L1SV      | 0x03C7  | 967 |
|         |         | L2SV      | 0x03C8  | 968 |
|         |         | TIMR      | 0x03C9  | 969 |
|         |         | DO        | 0x03CA  | 970 |
|         | SEG =7  | L1SV      | 0x03CB  | 971 |
|         |         | L2SV      | 0x03CC  | 972 |
|         |         | TIMR      | 0x03CD  | 973 |
|         |         | DO        | 0x03CE  | 974 |
|         | SEG =8  | L1SV      | 0x03CF  | 975 |
|         |         | L2SV      | 0x03D0  | 976 |
|         |         | TIMR      | 0x03D1  | 977 |
|         |         | DO        | 0x03D2  | 978 |
| SEG =9  | L1SV    | 0x03D3    | 979     |     |
|         | L2SV    | 0x03D4    | 980     |     |
|         | TIMR    | 0x03D5    | 981     |     |
|         | DO      | 0x03D6    | 982     |     |
| SEG =10 | L1SV    | 0x03D7    | 983     |     |
|         | L2SV    | 0x03D8    | 984     |     |
|         | TIMR    | 0x03D9    | 985     |     |
|         | DO      | 0x03DA    | 986     |     |

[illegible]





