



Unitronics Remote I/O Communication Appendix

Revision 5
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URB-TCP (URB-TCP) – Communication Coupler

1. Specifications

| Items | Specification |
|--------------------------------|------------------------------------|
| Adapter Type | Slave node (MODBUS TCP/UDP Server) |
| Protocols | MODBUS TCP/UDP, HTTP, DHCP |
| Sub-Protocol | Ethernet/IP |
| Max. Data Size(Input + Output) | Max 128 bytes each slot |

MODBUS Interface Register Map = Supported Function Codes

| Start Address | Read/Write | Description | Function Code |
|---------------|------------|---|---------------|
| 0x0000 ~ | Read | Process input image registers (Real Input Register) | 3,4,23 |
| 0x0800 ~ | Read/Write | Process output image registers (Real Output Register) | 3,16,23 |
| 0x1000 * | Read | Adapter Identification special registers. | 3,4,23 |
| 0x1020 * | Read/Write | Adapter Watchdog, other time special register. | 3,4,6,16,23 |
| 0x1100 * | Read/Write | Adapter Information special registers. | 3,4,6,16,23 |
| 0x2000 * | Read/Write | Expansion Slot Information special registers. | 3,4,6,16,23 |

MODBUS Interface Bit Map = Supported Function Codes

| Start Address | Read/Write | Description | Function Code |
|---------------|------------|---|---------------|
| 0x0000~ | Read | Process input image bits All input registers area are addressable by bit address. Size of input image bit is size of input image register * 16. | 2 |
| 0x1000~ | Read/Write | Process output image bits All output registers area are addressable by bit address. Size of output image bit is size of output image register * 16. | 1,5,15 |

Example for system Configuration

| Slot Address | Module Description |
|---------------------|---------------------------|
| #0 | Coupler |
| #1 | 8-discrete input |
| #2 | 8-discrete input |
| #3 | 4-analog input |
| #4 | 16-discrete input |
| #5 | 8-discrete input |
| #6 | 8-discrete input |
| #7 | 8-discrete input |
| #8 | 16-discrete input |
| #9 | 8-discrete input |
| #10 | 8-discrete output |
| #11 | 8-discrete output |
| #12 | 4-analog output |
| #13 | 4- relay output |
| #14 | 4-relay output |
| #15 | 8-discrete output |
| #16 | 8-discrete output |
| #17 | 4-analog output |
| #18 | 4-relay output |
| #19 | 16-discrete output |

Input Process Image

| Byte | Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
|------|-------------------------------------|-------|-------|-------|-------|-------|-------|-------|
| 0 | Discrete Input 8 pts (Slot#1) | | | | | | | |
| 1 | Discrete Input 8 pts (Slot#2) | | | | | | | |
| 2 | Analog Input Ch0 low byte (Slot#3) | | | | | | | |
| 3 | Analog Input Ch0 high byte (Slot#3) | | | | | | | |
| 4 | Analog Input Ch1 low byte (Slot#3) | | | | | | | |
| 5 | Analog Input Ch1 high byte (Slot#3) | | | | | | | |
| 6 | Analog Input Ch2 low byte (Slot#3) | | | | | | | |
| 7 | Analog Input Ch2 high byte (Slot#3) | | | | | | | |
| 8 | Analog Input Ch3 low byte (Slot#3) | | | | | | | |
| 9 | Analog Input Ch3 high byte (Slot#3) | | | | | | | |
| 10 | Discrete Input 8 pts (Slot#4) | | | | | | | |
| 11 | Discrete Input 8 pts (Slot#4) | | | | | | | |
| 12 | Discrete Input 8 pts (Slot#5) | | | | | | | |
| 13 | Discrete Input 8 pts (Slot#6) | | | | | | | |
| 14 | Discrete Input 8 pts (Slot#7) | | | | | | | |
| 15 | Discrete Input 8 pts (Slot#8) | | | | | | | |
| 16 | Discrete Input 8 pts (Slot#8) | | | | | | | |
| 17 | Discrete Input 8 pts (Slot#9) | | | | | | | |

Output Process Image

| Byte | Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
|-------------|--------------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 0 | Discrete Output 8 pts (Slot#1) | | | | | | | |
| 1 | Discrete Output 8 pts (Slot#2) | | | | | | | |
| 2 | Analog Output Ch0 low byte (Slot#3) | | | | | | | |
| 3 | Analog Output Ch0 high byte (Slot#3) | | | | | | | |
| 4 | Analog Output Ch1 low byte (Slot#3) | | | | | | | |
| 5 | Analog Output Ch1 high byte (Slot#3) | | | | | | | |
| 6 | Analog Output Ch2 low byte (Slot#3) | | | | | | | |
| 7 | Analog Output Ch2 high byte (Slot#3) | | | | | | | |
| 8 | Analog Output Ch3 low byte (Slot#3) | | | | | | | |
| 9 | Analog Output Ch3 high byte (Slot#3) | | | | | | | |
| 10 | Discrete Output low 4 pts (Slot#4) | | | | | | | |
| 12 | Discrete Output low 4 pts (Slot#5) | | | | | | | |
| 13 | Discrete Output low 8 pts (Slot#6) | | | | | | | |
| 14 | Discrete Output low 8 pts (Slot#7) | | | | | | | |
| 15 | Analog Output Ch0 low byte (Slot#8) | | | | | | | |
| 16 | Analog Output Ch0 high byte (Slot#8) | | | | | | | |
| 17 | Analog Output Ch1 low byte (Slot#8) | | | | | | | |
| 18 | Analog Output Ch1 high byte (Slot#8) | | | | | | | |
| 19 | Analog Output Ch2 low byte (Slot#8) | | | | | | | |
| 20 | Analog Output Ch2 high byte (Slot#8) | | | | | | | |
| 21 | Analog Output Ch3 low byte (Slot#8) | | | | | | | |
| 22 | Analog Output Ch3 high byte (Slot#8) | | | | | | | |
| 24 | Discrete Output low 8 pts (Slot#9) | | | | | | | |
| 25 | Discrete Output low 8 pts (Slot#10) | | | | | | | |
| 26 | Discrete Output high 8 pts (Slot#10) | | | | | | | |

2. Configuration Parameters Mapping

Coupler identification special register

| Address | Access | Type, Size | Description |
|--------------|--------|--|---|
| 0x1000(4096) | Read | 1word | Vendor ID |
| 0x1001(4097) | Read | 1word | Device type = 0x000C, Network Adapter |
| 0x1002(4098) | Read | 1word | Product Code |
| 0x1003(4099) | Read | 1word | Firmware revision, if 0x0101, revision 1.01 |
| 0x1004(4100) | Read | 2word | Product unique serial number |
| 0x1005(4101) | Read | String Up to 34 bytes | Product name string (ASCII) |
| 0x1006(4102) | Read | 1word | Sum check of EEPROM |
| 0x1010(4112) | Read | 2word | Firmware release date |
| 0x1011(4113) | Read | 2word | Product manufacturing inspection date |
| 0x101E(4126) | Read | 7word - 1word - 1word - 1word - 1word - 1word - 2word 15word - 2word - 2word - 2word - 3word - 1word - 1word - 1word - 1word - 2word | Composite Id of following address * RTU mode 0x1100(4352), Modbus RS232 Node. (Fixed 0x0001) 0x1000(4096), Vendor ID 0x1001(4097), Device type 0x1002(4098), Product code 0x1003(4099), Firmware revision 0x1004(4100), Product serial number *TCP mode 0x1050(4176), IP address 0x1051(4177), Subnet mask 0x1052(4178), Gateway 0x1053(4179), Ethernet physical address (MAC ID) 0x1000(4096), Vendor ID 0x1001(4097), Device type 0x1002(4098), Product code 0x1003(4099), Firmware revision 0x1004(4100), Product serial number |

Coupler timers special register

A watchdog timer can be configured for timeout periods up to 65535(1unit=100msec). The Watchdog timer will timeout (timer decreased, reached 0) if Modbus operation to the slave node does not occur over the configured watchdog value, then the slave adapter forces that slot output value is automatically set to user-configured fault actions and values.

| Address | Access | Type, Size | Description |
|--------------|------------|------------|--|
| 0x1020(4128) | Read/Write | 1word | Watchdog time value 16bit unsigned. The time value is represented by multiples of 100msec. The 0 (watchdog timeout disabled) is default value. A changing of watchdog time value resets watchdog error and counter. |
| 0x1021(4129) | Read | 1word | Watchdog timer remain value This value is decreased every 100msec |
| 0x1022(4130) | Read | 1word | Watchdog error counter, it is cleared by writing address 0x1020 |
| 0x1023(4131) | Read/Write | 1word | Enable/disable auto recovery Watchdog error when receiving new frame. 0=Disable, 1=Enable(default). |
| 0x1028(4136) | Read | 1word | Internal I/O update time, main loop time. (1usec unit) |

Coupler Ethernet and TCP/IP special register

| Address | Access | Type, Size | Description |
|--------------|------------|------------|--|
| 0x1040(4160) | Read | 1word | Reserved |
| 0x1041(4161) | Read/Write | 1word | MODBUS/TCP connection timeout time. (0.5sec unit) Maximum time of Modbus connection to stay to be opened without receiving a Modbus communication request. Leagel Vaules: 0~3600 The 120 (60sec) is default value. The value 0 disables connection time out specially. |
| 0x1042(4162) | Read | 1word | Number of Modbus/TCP concurrent connections |
| 0x1043(4163) | Read | 1word | Modbus/TCP port, fixed 502 |
| 0x1044(4164) | Read | 1word | Ethernet Interface Speed, 10(10Mbps) or 100(100Mbps) |
| 0x1045(4165) | Read/Write | 1word | IP Setting Method. 0: BOOTP, 1:DHCP Power on required to apply new seetings. |
| 0x1046(4166) | --- | --- | Reserved. |
| 0x1047(4167) | Read | 1word | Status of DIP Pole #9 DHCP/BOOTP(Enable/Disable). 0 : OFF, 1 : ON |
| 0x1048(4168) | Read | 1word | Enable/disable Lowest IP address via DIP Switch, 1:Enabled |
| 0x1050(4176) | Read/Write | 2word | IP address. If 192.168.123.1, then 0xA8C0, 0x017B. After update this value, IP address, Subnet mask and Gateway are applied as new one. |
| 0x1051(4177) | Read/Write | 2word | Subnet mask. If 255.255.255.0, then 0xFFFF, 0x00FF. |
| 0x1052(4178) | Read/Write | 2word | Gateway. If 192.168.123.254, then 0xA8C0, 0xFE7B. |
| 0x1053(4179) | Read | 3word | Ethernet physical address (MAC-ID). If 11-22-33-44-55-66, then 0x2211, 0x4433, 0x6655. |

Coupler information special register

| Address | Access | Type, Size | Description | | | | | | | | | | | | | | | | | | | | |
|-----------------------|---------------------------|-------------|---|---------------|---------------------|-----------------|------------------|-----------------------|----------------------|--------------------|---------------------|---------------------|---------------------|--|---------------------------|--|----------------------|--|---------------------|--|--------------------------|--|------------------|
| 0x1100(4352) | Read/Write | 1word | Master fault action option. (Disable : 0x0000, Enable : 0x0001) This option can enable Master fault action option. With master fault action, fault action can be activated with master communication failure. Default is disable. Power on required to apply new settings. | | | | | | | | | | | | | | | | | | | | |
| 0x1102(4354) | Read | 1word | Start address of input image word register. =0x0000 | | | | | | | | | | | | | | | | | | | | |
| 0x1103(4355) | Read | 1word | Start address of output image word register. =0x0800 | | | | | | | | | | | | | | | | | | | | |
| 0x1104(4356) | Read | 1word | Size of input image word register. | | | | | | | | | | | | | | | | | | | | |
| 0x1105(4357) | Read | 1word | Size of output image word register. | | | | | | | | | | | | | | | | | | | | |
| 0x1106(4358) | Read | 1word | Start address of input image bit. = 0x0000 | | | | | | | | | | | | | | | | | | | | |
| 0x1107(4359) | Read | 1word | Start address of output image bit. =0x1000 | | | | | | | | | | | | | | | | | | | | |
| 0x1108(4360) | Read | 1word | Size of input image bit. | | | | | | | | | | | | | | | | | | | | |
| 0x1109(4361) | Read | 1word | Size of output image bit. | | | | | | | | | | | | | | | | | | | | |
| 0x110A(4362) | Read | 1word | Update time for cyclic data change (same as 0x1028) | | | | | | | | | | | | | | | | | | | | |
| 0x110D(4365) | Read | 1word | Current Dip Switch State and Field Power Status (MSB) ex) DHCP/BOOTP enable, DiP SW(0x01), Field Power On = 0x8101 | | | | | | | | | | | | | | | | | | | | |
| 0x110E(4366) | Read | upto 33word | Expansion slot's number including coupler First 1 word is coupler's number | | | | | | | | | | | | | | | | | | | | |
| 0x1110(4368) | Read | 1word | Number of expansion slot | | | | | | | | | | | | | | | | | | | | |
| 0x1113(4371) | Read | upto 33word | Expansion slot Module Id. First 1word is adapter's module id. | | | | | | | | | | | | | | | | | | | | |
| 0x1119(4377) | Read | 1word | Hi byte is Modbus status, low byte is internal bus status. Zero value means 'no error'. <table border="1" data-bbox="673 997 1469 1449"> <thead> <tr> <th>Modbus status</th> <th>Internal bus status</th> </tr> </thead> <tbody> <tr> <td>0x00 : No Error</td> <td>0x00 : OPERATING</td> </tr> <tr> <td>0x01 : ERR_DIP_SWITCH</td> <td>0x02 : CONNECT_FAULT</td> </tr> <tr> <td>0x40 : ERR_CRC_LRC</td> <td>0x03 : CONFIG_FAULT</td> </tr> <tr> <td>0x80 : ERR_WATCHDOG</td> <td>0x04 : NO_EXPANSION</td> </tr> <tr> <td></td> <td>0x05 : INVALID_ATTR_VALUE</td> </tr> <tr> <td></td> <td>0x06 : TOO_MUCH_DATA</td> </tr> <tr> <td></td> <td>0x07 : VENDOR_ERROR</td> </tr> <tr> <td></td> <td>0x08 : NOT_EXPECTED_SLOT</td> </tr> <tr> <td></td> <td>0x09 : CRC_ERROR</td> </tr> </tbody> </table> | Modbus status | Internal bus status | 0x00 : No Error | 0x00 : OPERATING | 0x01 : ERR_DIP_SWITCH | 0x02 : CONNECT_FAULT | 0x40 : ERR_CRC_LRC | 0x03 : CONFIG_FAULT | 0x80 : ERR_WATCHDOG | 0x04 : NO_EXPANSION | | 0x05 : INVALID_ATTR_VALUE | | 0x06 : TOO_MUCH_DATA | | 0x07 : VENDOR_ERROR | | 0x08 : NOT_EXPECTED_SLOT | | 0x09 : CRC_ERROR |
| Modbus status | Internal bus status | | | | | | | | | | | | | | | | | | | | | | |
| 0x00 : No Error | 0x00 : OPERATING | | | | | | | | | | | | | | | | | | | | | | |
| 0x01 : ERR_DIP_SWITCH | 0x02 : CONNECT_FAULT | | | | | | | | | | | | | | | | | | | | | | |
| 0x40 : ERR_CRC_LRC | 0x03 : CONFIG_FAULT | | | | | | | | | | | | | | | | | | | | | | |
| 0x80 : ERR_WATCHDOG | 0x04 : NO_EXPANSION | | | | | | | | | | | | | | | | | | | | | | |
| | 0x05 : INVALID_ATTR_VALUE | | | | | | | | | | | | | | | | | | | | | | |
| | 0x06 : TOO_MUCH_DATA | | | | | | | | | | | | | | | | | | | | | | |
| | 0x07 : VENDOR_ERROR | | | | | | | | | | | | | | | | | | | | | | |
| | 0x08 : NOT_EXPECTED_SLOT | | | | | | | | | | | | | | | | | | | | | | |
| | 0x09 : CRC_ERROR | | | | | | | | | | | | | | | | | | | | | | |
| 0x111D(4381) | Read | 1word | Coupler Revision. | | | | | | | | | | | | | | | | | | | | |

Expansion cards information and configuration

| Start address | Read/Write | Description | Function code |
|---------------|------------|---|-----------------|
| 0x2000 | Read/Write | Expansion slot information special registers. | 3, 4, 6, 16, 23 |

- Each expansion card has an offset of 32 registers. (ex. Slot #1 data starts from 0x2000, Slot #2 data from 0x2020, etc.)

Expansion cards information and configuration breakdown

| Offset | Read/Write | Size (registers) | Description |
|--------|--------------|------------------|--|
| +2 | Read | 1 | Input start registers address of input image word this slot. |
| +4 | Read | 1 | Output start registers address of output image word this slot. |
| +16 | Read | 1 | Size of configuration parameter in bytes (Modbus length need to be divided by 2) |
| +17 | Read / Write | N | Read/write Configuration parameter data, Refer to each slot parameter specification. |

- Example: UIS-04RT register 0x2010 (decimal 8208) have value of 10 bytes = 5 registers, that means the we have to read / write 5 registers from address 8209 to read / write the slot configuration.

URD-0800 (DI08) - 8 Channels universal inputs (sink or source)**1. Process Data Mapping**

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|---------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Byte0 | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |

2. Configuration Parameters Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|---------------|---|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Byte0 | Input Filter value : 0 ~ 10 (unit : ms) | | | | | | | |
| Byte1 | Reserved | | | | | | | |

URA-04000 (AI04O) - 4 Channels Analog inputs

1. Process Data Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|----------------------------|------|------|------|------|------|------|------|
| Byte 0 | Analog Input Ch0 Low byte | | | | | | | |
| Byte 1 | Analog Input Ch0 High byte | | | | | | | |
| Byte 2 | Analog Input Ch1 Low byte | | | | | | | |
| Byte 3 | Analog Input Ch1 High byte | | | | | | | |
| Byte 4 | Analog Input Ch2 Low byte | | | | | | | |
| Byte 5 | Analog Input Ch2 High byte | | | | | | | |
| Byte 6 | Analog Input Ch3 Low byte | | | | | | | |
| Byte 7 | Analog Input Ch3 High byte | | | | | | | |

2. Configuration Parameters Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|--|------|------|------|------|------|------|------|
| Byte 0 | Current Range for Channel 0 (H00: 0~20mA, H01: 4~20mA) | | | | | | | |
| Byte 1 | Current Range for Channel 1 (H00: 0~20mA, H01: 4~20mA) | | | | | | | |
| Byte 2 | Current Range for Channel 2 (H00: 0~20mA, H01: 4~20mA) | | | | | | | |
| Byte 3 | Current Range for Channel 3 (H00: 0~20mA, H01: 4~20mA) | | | | | | | |
| Byte 4 | Filter Time (H00: Default Filter(=20) / H01: Fastest ~ / H62: Slowest) | | | | | | | |
| Byte 5 | Not used(=00) | | | | | | | |

URA-08000 (AI08O) - 8 Channels Analog inputs

1. Process Data Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|---------|----------------------------|------|------|------|------|------|------|------|
| Byte 0 | Analog Input Ch0 Low byte | | | | | | | |
| Byte 1 | Analog Input Ch0 High byte | | | | | | | |
| Byte 2 | Analog Input Ch1 Low byte | | | | | | | |
| Byte 3 | Analog Input Ch1 High byte | | | | | | | |
| Byte 4 | Analog Input Ch2 Low byte | | | | | | | |
| Byte 5 | Analog Input Ch2 High byte | | | | | | | |
| Byte 6 | Analog Input Ch3 Low byte | | | | | | | |
| Byte 7 | Analog Input Ch3 High byte | | | | | | | |
| Byte 8 | Analog Input Ch4 Low byte | | | | | | | |
| Byte 9 | Analog Input Ch4 High byte | | | | | | | |
| Byte 10 | Analog Input Ch5 Low byte | | | | | | | |
| Byte 11 | Analog Input Ch5 High byte | | | | | | | |
| Byte 12 | Analog Input Ch6 Low byte | | | | | | | |
| Byte 13 | Analog Input Ch6 High byte | | | | | | | |
| Byte 14 | Analog Input Ch7 Low byte | | | | | | | |
| Byte 15 | Analog Input Ch7 High byte | | | | | | | |

2. Configuration Parameters Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|--|------|------|------|------|------|------|------|
| Byte 0 | Current Range for Channel 0 (H00: 0~20mA, H01: 4~20mA) | | | | | | | |
| Byte 1 | Current Range for Channel 1 (H00: 0~20mA, H01: 4~20mA) | | | | | | | |
| Byte 2 | Current Range for Channel 2 (H00: 0~20mA, H01: 4~20mA) | | | | | | | |
| Byte 3 | Current Range for Channel 3 (H00: 0~20mA, H01: 4~20mA) | | | | | | | |
| Byte 4 | Current Range for Channel 4 (H00: 0~20mA, H01: 4~20mA) | | | | | | | |
| Byte 5 | Current Range for Channel 5 (H00: 0~20mA, H01: 4~20mA) | | | | | | | |
| Byte 6 | Current Range for Channel 6 (H00: 0~20mA, H01: 4~20mA) | | | | | | | |
| Byte 7 | Current Range for Channel 7 (H00: 0~20mA, H01: 4~20mA) | | | | | | | |
| Byte 8 | Filter Time (H00: Default Filter(=20) / H01: Fastest ~ / H62: Slowest) | | | | | | | |
| Byte 9 | Not used(=00) | | | | | | | |

URA-0400P (AI04P) - 4 Channels Analog inputs

1. Process Data Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|----------------------------|------|------|------|------|------|------|------|
| Byte 0 | Analog Input Ch0 Low byte | | | | | | | |
| Byte 1 | Analog Input Ch0 High byte | | | | | | | |
| Byte 2 | Analog Input Ch1 Low byte | | | | | | | |
| Byte 3 | Analog Input Ch1 High byte | | | | | | | |
| Byte 4 | Analog Input Ch2 Low byte | | | | | | | |
| Byte 5 | Analog Input Ch2 High byte | | | | | | | |
| Byte 6 | Analog Input Ch3 Low byte | | | | | | | |
| Byte 7 | Analog Input Ch3 High byte | | | | | | | |

2. Configuration Parameters Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|--|------|------|------|------|------|------|------|
| Byte 0 | Current Range for Channel 0 (H00: 0~10Vdc, H01: 0~5Vdc, H02: 1~5Vdc) | | | | | | | |
| Byte 1 | Current Range for Channel 1 (H00: 0~10Vdc, H01: 0~5Vdc, H02: 1~5Vdc) | | | | | | | |
| Byte 2 | Current Range for Channel 2 (H00: 0~10Vdc, H01: 0~5Vdc, H02: 1~5Vdc) | | | | | | | |
| Byte 3 | Current Range for Channel 3 (H00: 0~10Vdc, H01: 0~5Vdc, H02: 1~5Vdc) | | | | | | | |
| Byte 4 | Filter Time (H00: Default Filter(=20) / H01: Fastest ~ / H62: Slowest) | | | | | | | |
| Byte 5 | Not used(=00) | | | | | | | |

URA-0800P (AI08P) - 8 Channels Analog inputs

1. Process Data Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|---------|----------------------------|------|------|------|------|------|------|------|
| Byte 0 | Analog Input Ch0 Low byte | | | | | | | |
| Byte 1 | Analog Input Ch0 High byte | | | | | | | |
| Byte 2 | Analog Input Ch1 Low byte | | | | | | | |
| Byte 3 | Analog Input Ch1 High byte | | | | | | | |
| Byte 4 | Analog Input Ch2 Low byte | | | | | | | |
| Byte 5 | Analog Input Ch2 High byte | | | | | | | |
| Byte 6 | Analog Input Ch3 Low byte | | | | | | | |
| Byte 7 | Analog Input Ch3 High byte | | | | | | | |
| Byte 8 | Analog Input Ch4 Low byte | | | | | | | |
| Byte 9 | Analog Input Ch4 High byte | | | | | | | |
| Byte 10 | Analog Input Ch5 Low byte | | | | | | | |
| Byte 11 | Analog Input Ch5 High byte | | | | | | | |
| Byte 12 | Analog Input Ch6 Low byte | | | | | | | |
| Byte 13 | Analog Input Ch6 High byte | | | | | | | |
| Byte 14 | Analog Input Ch7 Low byte | | | | | | | |
| Byte 15 | Analog Input Ch7 High byte | | | | | | | |

2. Configuration Parameters Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|--|------|------|------|------|------|------|------|
| Byte 0 | Current Range for Channel 0 (H00: 0~10Vdc, H01: 0~5Vdc, H02: 1~5Vdc) | | | | | | | |
| Byte 1 | Current Range for Channel 1 (H00: 0~10Vdc, H01: 0~5Vdc, H02: 1~5Vdc) | | | | | | | |
| Byte 2 | Current Range for Channel 2 (H00: 0~10Vdc, H01: 0~5Vdc, H02: 1~5Vdc) | | | | | | | |
| Byte 3 | Current Range for Channel 3 (H00: 0~10Vdc, H01: 0~5Vdc, H02: 1~5Vdc) | | | | | | | |
| Byte 4 | Current Range for Channel 4 (H00: 0~10Vdc, H01: 0~5Vdc, H02: 1~5Vdc) | | | | | | | |
| Byte 5 | Current Range for Channel 5 (H00: 0~10Vdc, H01: 0~5Vdc, H02: 1~5Vdc) | | | | | | | |
| Byte 6 | Current Range for Channel 6 (H00: 0~10Vdc, H01: 0~5Vdc, H02: 1~5Vdc) | | | | | | | |
| Byte 7 | Current Range for Channel 7 (H00: 0~10Vdc, H01: 0~5Vdc, H02: 1~5Vdc) | | | | | | | |
| Byte 8 | Filter Time (H00: Default Filter(=20) / H01: Fastest ~ / H62: Slowest) | | | | | | | |
| Byte 9 | Not used(=00) | | | | | | | |

URA-0400T (AI04T) - 4 Analog Current Inputs 16bit

1. Process Data Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|----------------------------|------|------|------|------|------|------|------|
| Byte 0 | Analog Input Ch0 Low byte | | | | | | | |
| Byte 1 | Analog Input Ch0 High byte | | | | | | | |
| Byte 2 | Analog Input Ch1 Low byte | | | | | | | |
| Byte 3 | Analog Input Ch1 High byte | | | | | | | |
| Byte 4 | Analog Input Ch2 Low byte | | | | | | | |
| Byte 5 | Analog Input Ch2 High byte | | | | | | | |
| Byte 6 | Analog Input Ch3 Low byte | | | | | | | |
| Byte 7 | Analog Input Ch3 High byte | | | | | | | |

2. Configuration Parameters Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|--|------|------|------|------|------|------|------|
| Byte 0 | Current Range for Input 0 (H00: 0~20mA, H01: 4~20mA) | | | | | | | |
| Byte 1 | Current Range for Input 1 (H00: 0~20mA, H01: 4~20mA) | | | | | | | |
| Byte 2 | Current Range for Input 2 (H00: 0~20mA, H01: 4~20mA) | | | | | | | |
| Byte 3 | Current Range for Input 3 (H00: 0~20mA, H01: 4~20mA) | | | | | | | |
| Byte 4 | Filter Time (H00: Default Filter(=20) / H01: Fastest ~ / H62: Slowest) | | | | | | | |
| Byte 5 | Not used(=00) | | | | | | | |

URA-0400U (AI04U) - 4 Analog Voltage Inputs 16bit

1. Process Data Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|----------------------------|------|------|------|------|------|------|------|
| Byte 0 | Analog Input Ch0 Low byte | | | | | | | |
| Byte 1 | Analog Input Ch0 High byte | | | | | | | |
| Byte 2 | Analog Input Ch1 Low byte | | | | | | | |
| Byte 3 | Analog Input Ch1 High byte | | | | | | | |
| Byte 4 | Analog Input Ch2 Low byte | | | | | | | |
| Byte 5 | Analog Input Ch2 High byte | | | | | | | |
| Byte 6 | Analog Input Ch3 Low byte | | | | | | | |
| Byte 7 | Analog Input Ch3 High byte | | | | | | | |

2. Configuration Parameters Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|--|------|------|------|------|------|------|------|
| Byte 0 | Current Range for Inputs 0 (H00: 0~10 VDC, H01: 0~5 VDC, H02: 1~5VDC) | | | | | | | |
| Byte 1 | Current Range for Inputs 1 (H00: 0~10 VDC, H01: 0~5 VDC, H02: 1~5VDC) | | | | | | | |
| Byte 2 | Current Range for Inputs 2 (H00: 0~10 VDC, H01: 0~5 VDC, H02: 1~5VDC) | | | | | | | |
| Byte 3 | Current Range for Inputs 3 (H00: 0~10 VDC, H01: 0~5 VDC, H02: 1~5VDC) | | | | | | | |
| Byte 4 | Filter Time (H00: Default Filter(=20) / H01: Fastest ~ / H62: Slowest) | | | | | | | |
| Byte 5 | Not used(=00) | | | | | | | |

URD-0004RH (DO04RH) - 4 Channels relay outputs

1. Process Data Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|----------|------|------|------|------|------|------|------|
| Byte0 | Reserved | | | | D3 | D2 | D1 | D0 |

2. Configuration Parameters Mapping

| Offset | Decimal Bit | Description | Default Value |
|--------|-------------|---|-------------------|
| 0 | 00-03 | Fault Action(0~3) 0 : Fault Value, 1 : Hold last state | 0 (Fault Value) |
| 1 | 00-03 | Fault Value (0~3) 0 : off, 1 : on | 0 (off) |

URD-0008NH (DO08NH) - 8 Channels Digital output (sink)

1. Process Data Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|------|------|------|------|------|------|------|------|
| Byte 0 | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |

2. Configuration Parameters Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|--|------|------|------|------|------|------|------|
| Byte0 | Fault Action (ch0~ch7) 0: Fault value, 1:Hold last state | | | | | | | |
| Byte1 | Fault value (ch0~ch7) 0:Off, 1:On | | | | | | | |

URD-0008CH (DO08CH) - 8 Channels Digital output (source)

1. Process Data Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|------|------|------|------|------|------|------|------|
| Byte0 | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |

2. Configuration Parameters Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|--|------|------|------|------|------|------|------|
| Byte0 | Fault Action (ch0~ch7) 0: Fault value, 1:Hold last state | | | | | | | |
| Byte1 | Fault value (ch0~ch7) 0:Off, 1:On | | | | | | | |

URA-0004W (AO04W) - 4 Channels Analog Outputs

1. Process Data Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|-----------------------------|------|------|------|------|------|------|------|
| Byte 0 | Analog Output Ch0 Low byte | | | | | | | |
| Byte 1 | Analog Output Ch0 High byte | | | | | | | |
| Byte 2 | Analog Output Ch1 Low byte | | | | | | | |
| Byte 3 | Analog Output Ch1 High byte | | | | | | | |
| Byte 4 | Analog Output Ch2 Low byte | | | | | | | |
| Byte 5 | Analog Output Ch2 High byte | | | | | | | |
| Byte 6 | Analog Output Ch3 Low byte | | | | | | | |
| Byte 7 | Analog Output Ch3 High byte | | | | | | | |

2. Configuration Parameters Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|---|------|----------------------------|------|----------------------------|------|----------------------------|------|
| Byte0 | Fault Action for channel 3 | | Fault Action for channel 2 | | Fault Action for channel 1 | | Fault Action for channel 0 | |
| | 00: Fault Value 01: Hold last state 10: Low Limit 11:High Limit | | | | | | | |
| Byte1 | Not used | | | | | | | |
| Byte2 | Fault Value Low Byte | | | | | | | |
| Byte3 | Not used | | | | Fault Value High Byte | | | |

URA-0008W (AO08W) - 8 Channels Analog Outputs

1. Process Data Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|---------|-----------------------------|------|------|------|------|------|------|------|
| Byte 0 | Analog Output Ch0 Low byte | | | | | | | |
| Byte 1 | Analog Output Ch0 High byte | | | | | | | |
| Byte 2 | Analog Output Ch1 Low byte | | | | | | | |
| Byte 3 | Analog Output Ch1 High byte | | | | | | | |
| Byte 4 | Analog Output Ch2 Low byte | | | | | | | |
| Byte 5 | Analog Output Ch2 High byte | | | | | | | |
| Byte 6 | Analog Output Ch3 Low byte | | | | | | | |
| Byte 7 | Analog Output Ch3 High byte | | | | | | | |
| Byte 8 | Analog Output Ch4 Low byte | | | | | | | |
| Byte 9 | Analog Output Ch4 High byte | | | | | | | |
| Byte 10 | Analog Output Ch5 Low byte | | | | | | | |
| Byte 11 | Analog Output Ch5 High byte | | | | | | | |
| Byte 12 | Analog Output Ch6 Low byte | | | | | | | |
| Byte 13 | Analog Output Ch6 High byte | | | | | | | |
| Byte 14 | Analog Output Ch7 Low byte | | | | | | | |
| Byte 15 | Analog Output Ch7 High byte | | | | | | | |

2. Configuration Parameters Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|---|------|----------------------------|------|----------------------------|------|----------------------------|------|
| Byte0 | Fault Action for channel 3 | | Fault Action for channel 2 | | Fault Action for channel 1 | | Fault Action for channel 0 | |
| | 00: Fault Value 01: Hold last state 10: Low Limit 11:High Limit | | | | | | | |
| Byte1 | Fault Action for channel 7 | | Fault Action for channel 6 | | Fault Action for channel 5 | | Fault Action for channel 4 | |
| | 00: Fault Value 01: Hold last state 10: Low Limit 11:High Limit | | | | | | | |
| Byte2 | Fault Value Low Byte | | | | | | | |
| Byte3 | Not used | | | | Fault Value High Byte | | | |

URA-0004X (AO04X) - 4 Channels Analog Outputs

1. Process Data Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|-----------------------------|------|------|------|------|------|------|------|
| Byte 0 | Analog Output Ch0 Low byte | | | | | | | |
| Byte 1 | Analog Output Ch0 High byte | | | | | | | |
| Byte 2 | Analog Output Ch1 Low byte | | | | | | | |
| Byte 3 | Analog Output Ch1 High byte | | | | | | | |
| Byte 4 | Analog Output Ch2 Low byte | | | | | | | |
| Byte 5 | Analog Output Ch2 High byte | | | | | | | |
| Byte 6 | Analog Output Ch3 Low byte | | | | | | | |
| Byte 7 | Analog Output Ch3 High byte | | | | | | | |

2. Configuration Parameters Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|---|------|----------------------------|------|----------------------------|------|----------------------------|------|
| Byte0 | Fault Action for channel 3 | | Fault Action for channel 2 | | Fault Action for channel 1 | | Fault Action for channel 0 | |
| | 00: Fault Value 01: Hold last state 10: Low Limit 11:High Limit | | | | | | | |
| Byte1 | Not used | | | | | | | |
| Byte2 | Fault Value Low Byte | | | | | | | |
| Byte3 | Not used | | | | Fault Value High Byte | | | |

URA-0008X (AO08X) - 8 Analog Voltage Outputs 12bit

1. Process Data Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|---------|-----------------------------|------|------|------|------|------|------|------|
| Byte 0 | Analog Output Ch0 Low byte | | | | | | | |
| Byte 1 | Analog Output Ch0 High byte | | | | | | | |
| Byte 2 | Analog Output Ch1 Low byte | | | | | | | |
| Byte 3 | Analog Output Ch1 High byte | | | | | | | |
| Byte 4 | Analog Output Ch2 Low byte | | | | | | | |
| Byte 5 | Analog Output Ch2 High byte | | | | | | | |
| Byte 6 | Analog Output Ch3 Low byte | | | | | | | |
| Byte 7 | Analog Output Ch3 High byte | | | | | | | |
| Byte 8 | Analog Output Ch4 Low byte | | | | | | | |
| Byte 9 | Analog Output Ch4 High byte | | | | | | | |
| Byte 10 | Analog Output Ch5 Low byte | | | | | | | |
| Byte 11 | Analog Output Ch5 High byte | | | | | | | |
| Byte 12 | Analog Output Ch6 Low byte | | | | | | | |
| Byte 13 | Analog Output Ch6 High byte | | | | | | | |
| Byte 14 | Analog Output Ch7 Low byte | | | | | | | |
| Byte 15 | Analog Output Ch7 High byte | | | | | | | |

2. Configuration Parameters Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|---|------|---------------------------|------|---------------------------|------|---------------------------|------|
| Byte0 | Fault Action for output 3 | | Fault Action for output 2 | | Fault Action for output 1 | | Fault Action for output 0 | |
| | 00: Fault Value 01: Hold last state 10: Low Limit 11:High Limit | | | | | | | |
| Byte1 | Fault Action for output 7 | | Fault Action for output 6 | | Fault Action for output 5 | | Fault Action for output 4 | |
| Byte2 | Fault Value Low Byte | | | | | | | |
| Byte3 | Not used | | | | Fault Value High Byte | | | |

URA-0004Y (AO04Y) - 4 Analog Current Outputs 16bit

1. Process Data Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|-----------------------------|------|------|------|------|------|------|------|
| Byte 0 | Analog Output Ch0 Low byte | | | | | | | |
| Byte 1 | Analog Output Ch0 High byte | | | | | | | |
| Byte 2 | Analog Output Ch1 Low byte | | | | | | | |
| Byte 3 | Analog Output Ch1 High byte | | | | | | | |
| Byte 4 | Analog Output Ch2 Low byte | | | | | | | |
| Byte 5 | Analog Output Ch2 High byte | | | | | | | |
| Byte 6 | Analog Output Ch3 Low byte | | | | | | | |
| Byte 7 | Analog Output Ch3 High byte | | | | | | | |

2. Configuration Parameters Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|---|------|---------------------------|------|---------------------------|------|---------------------------|------|
| Byte0 | Fault Action for output 3 | | Fault Action for output 2 | | Fault Action for output 1 | | Fault Action for output 0 | |
| | 00: Fault Value 01: Hold last state 10: Low Limit 11:High Limit | | | | | | | |
| Byte1 | Not used | | | | | | | |
| Byte2 | Fault Value Low Byte | | | | | | | |
| Byte3 | Not used | | | | Fault Value High Byte | | | |

URA-0004Z (AO4Z) - 4 Analog Voltage Outputs 16bit

1. Process Data Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|-----------------------------|------|------|------|------|------|------|------|
| Byte 0 | Analog Output Ch0 Low byte | | | | | | | |
| Byte 1 | Analog Output Ch0 High byte | | | | | | | |
| Byte 2 | Analog Output Ch1 Low byte | | | | | | | |
| Byte 3 | Analog Output Ch1 High byte | | | | | | | |
| Byte 4 | Analog Output Ch2 Low byte | | | | | | | |
| Byte 5 | Analog Output Ch2 High byte | | | | | | | |
| Byte 6 | Analog Output Ch3 Low byte | | | | | | | |
| Byte 7 | Analog Output Ch3 High byte | | | | | | | |

2. Configuration Parameters Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|---|------|---------------------------|------|---------------------------|------|---------------------------|------|
| Byte0 | Fault Action for output 3 | | Fault Action for output 2 | | Fault Action for output 1 | | Fault Action for output 0 | |
| | 00: Fault Value 01: Hold last state 10: Low Limit 11:High Limit | | | | | | | |
| Byte1 | Not used | | | | | | | |
| Byte2 | Fault Value Low Byte | | | | | | | |
| Byte3 | Not used | | | | Fault Value High Byte | | | |

URD-1600-8 (DI168) – 16 Digital Inputs (SINK / SOURCE)

1. Process Data Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|------|------|------|------|------|------|------|------|
| Byte0 | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |
| Byte1 | D15 | D14 | D13 | D12 | D11 | D10 | D9 | D8 |

2. Configuration Parameters Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|---|------|------|------|------|------|------|------|
| Byte0 | Input Filter value : 0 ~ 10 (unit : ms) | | | | | | | |
| Byte1 | Reserved | | | | | | | |

URD-3200-4 (DI324) – 32 Digital Inputs (SINK / SOURCE)

1. Process Data Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|------|------|------|------|------|------|------|------|
| Byte0 | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |
| Byte1 | D15 | D14 | D13 | D12 | D11 | D10 | D9 | D8 |
| Byte2 | D23 | D22 | D21 | D20 | D19 | D18 | D17 | D16 |
| Byte3 | D31 | D30 | D29 | D28 | D27 | D26 | D25 | D24 |

2. Configuration Parameters Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|---|------|------|------|------|------|------|------|
| Byte0 | Input Filter value : 0 ~ 10 (unit : ms) | | | | | | | |
| Byte1 | Reserved | | | | | | | |

URD-0004B (DI04B) - 4 Digital Inputs 120V**1. Process Data Mapping**

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|----------|------|------|------|------|------|------|------|
| Byte0 | Reserved | | | | D3 | D2 | D1 | D0 |

URD-0004C (DI04C) - 4 Digital Inputs 240V

1. Process Data Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|----------|------|------|------|------|------|------|------|
| Byte0 | Reserved | | | | D3 | D2 | D1 | D0 |

URD-0004SK (DO04SK) – 4 Channels Solid State Relay 240V Outputs

1. Process Data Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|----------|------|------|------|------|------|------|------|
| Byte0 | Reserved | | | | D3 | D2 | D1 | D0 |

2. Configuration Parameters Mapping

| Offset | Decimal Bit | Description | Default Value |
|--------|-------------|---|-------------------|
| 0 | 00-03 | Fault Action(0~3) 0 : Fault Value, 1 : Hold last state | 0 (Fault Value) |
| 1 | 00-03 | Fault Value (0~3) 0 : off, 1 : on | 0 (off) |

URD-0004SM (DO04SM) – 4 Channels Solid State Relay 110V Outputs

1. Process Data Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|----------|------|------|------|------|------|------|------|
| Byte0 | Reserved | | | | D3 | D2 | D1 | D0 |

2. Configuration Parameters Mapping

| Offset | Decimal Bit | Description | Default Value |
|--------|-------------|---|-------------------|
| 0 | 00-03 | Fault Action(0~3) 0 : Fault Value, 1 : Hold last state | 0 (Fault Value) |
| 1 | 00-03 | Fault Value (0~3) 0 : off, 1 : on | 0 (off) |

URD-0004SN (DO04SN) – 4 Channels Solid State Relay 24V Outputs

1. Process Data Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|----------|------|------|------|------|------|------|------|
| Byte0 | Reserved | | | | D3 | D2 | D1 | D0 |

2. Configuration Parameters Mapping

| Offset | Decimal Bit | Description | Default Value |
|--------|-------------|---|-------------------|
| 0 | 00-03 | Fault Action(0~3) 0 : Fault Value, 1 : Hold last state | 0 (Fault Value) |
| 1 | 00-03 | Fault Value (0~3) 0 : off, 1 : on | 0 (off) |

URD-0200E (DI02E) – 2 High Speed Counters / Encoder 24V

1. Process Data Mapping (Inputs)

Counter value represents counter, frequency (Hz), pulse width (0.1usec) or pulse period (0.1usec).

| Byte | Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
|------|-----------------------|-------|-------|-------|-------|-------|-------|-------|
| 0 | Counter Value Ch#0 LL | | | | | | | |
| 1 | Counter Value Ch#0 LH | | | | | | | |
| 2 | Counter Value Ch#0 HL | | | | | | | |
| 3 | Counter Value Ch#0 HH | | | | | | | |
| 4 | Counter Value Ch#1 LL | | | | | | | |
| 5 | Counter Value Ch#1 LH | | | | | | | |
| 6 | Counter Value Ch#1 HL | | | | | | | |
| 7 | Counter Value Ch#1 HH | | | | | | | |

2. Process Data Mapping (Outputs)

| Byte | Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
|------|-----------------------|----------------------|-------|-------|-----------------|-------|-------|-------|
| 0 | Counter Reset ch#0 | Counter Stop ch#0 | -- | -- | Count Mode ch#0 | | | |
| 1 | Counter Reset ch#1 | Counter Stop ch#0 | -- | -- | Count Mode ch#1 | | | |

3. Count Mode Ch#0, Ch#1**Count Mode Ch#0, Ch#1**

| Value | Count Mode | Description |
|-----------------|--|---|
| B' 0000 (0x0) | Up | Up Counter - Aph Input acts as Up Clock - Bph Input is not used |
| B' 0001 (0x1) | Down | Down Counter - Aph Input acts as Down Clock - Bph Input is not used |
| B' 0010 (0x2) | - | - |
| B' 0011 (0x3) | - | - |
| B' 0100 (0x4) | Up Clock & Inhibit | Up Counter with Inhibit - Aph Input acts as Up Clock Input - Bph Input acts as Inhibit function for Up Clock Input |
| B' 0101 (0x5) | Up Clock & Reset | Up Counter with Reset - Aph Input acts as Up Clock Input - Bph Input acts as Reset function to Counter |
| B' 0110 (0x6) | Down Clock & Inhibit | Down Counter with Inhibit - Aph Input acts as Down Clock Input - Bph Input acts as Inhibit function for Down Clock Input |
| B' 0111 (0x7) | Down Clock & Reset | Down Counter with Reset - Aph Input acts as Down Clock Input - Bph Input acts as Reset function to Counter |
| B' 1000 (0x8) | Up Clock & Down Clock | Up & Down Counter - Aph Input acts as Up Clock Input - Bph Input acts as Down Clock Input |
| B' 1001 (0x9) | Clock & Direction | Up & Down with Direction - Aph Input acts as Clock Input - Bph Input acts as Direction Input (Low = Up Count, High = Down Count) |
| B' 1010 (0xA) | Encoder 1x (*1) | Encoder 1x - Frequency Range of the Encoder x1 mode (0x0A) is the same as the counting mode. (Possible Frequency ~300kHz) (*1) - Aph Input acts as Encoder's A phase Input - Bph Input acts as Encoder's B phase Input |
| B' 1011 (0xB) | Encoder 2x | Encoder 2x - Aph Input acts as Encoder's A phase Input - Bph Input acts as Encoder's B phase Input |
| B' 1100 (0xC) | Encoder 4x | Encoder 4x - Aph Input acts as Encoder's A phase Input - Bph Input acts as Encoder's B phase Input |
| B' 1101 (0xD) | Frequency Measurement (*2) 1 sec Update | Simple Frequency Measurement, updated by 1sec, Hz Unit - Frequency, B' 1101 (0xD) can't be used with other channel's Count Mode = 0x0, 0x1, 0x4 ~ 0xA (*2) - Aph Input acts as Frequency Input - Bph Input is not used |
| B' 1110 (0xE) | Pulse Width Measurement(*3) | Simple Pulse Width Measurement, 0.1usec Unit - Pulse Width(32bit), if 1234, then Pulse High(On) width is |

| | | |
|-----------------|--------------------------------------|---|
| | | 123.4usec (*3) - Aph Input acts as Pulse Input - Bph Input is not used |
| B' 1111 (0xF) | Pulse Width & Period Measurement(*4) | Simple Pulse Width & Period Measurement, 0.1usec Unit, - Available in case of Pulse Input >= 200Hz(<= 2.5msec, Pulse On Width) - Pulse Width(16bit, Low Word) + Pulse Period(16bit, High Word) (*4) - Aph Input acts as Pulse Input - Bph Input is not used |

- Frequency Range of the Encoder x1 mode is the same as the counting mode.
- Frequency, B'1101(0xD) can't be used with other channel's Count Mode = 0x0, 0x1, 0x4 ~ 0x9
- Pulse Width, B'1110(0xE) measures Aph Input's High(On) Pulse Width(32bit) in 0.1usec unit.
- Pulse Width & Period, B'1111(0xF) measures Aph's Pulse High(On) Width(16bit) & Period(16bit) in 0.1usec unit.

This encoder mode is perfectly same with mode B'0000, B'0001. This is for using Encoder module easily.

Frequency, B'1100(0xC) and B'1101(0xD) can't be used with other channel's Count Mode = 0x2 ~ 0x9

Pulse Width, B'1110(0xE) measures "A phase" Input's High (On) Pulse Width (32bit) in 0.1usec unit.

Pulse Width & Period, B'1111(0xF) measures "A phase" Pulse High (On) Width (16bit) & Period (16bit) in 0.1usec unit.

URD-0200D (DI02D) – 2 High Speed Counters / Encoder 5V

1. Process Data Mapping (Inputs)

Counter value represents counter, frequency (Hz), pulse width (0.1usec) or pulse period (0.1usec).

| Byte | Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
|------|-----------------------|-------|-------|-------|-------|-------|-------|-------|
| 0 | Counter Value Ch#0 LL | | | | | | | |
| 1 | Counter Value Ch#0 LH | | | | | | | |
| 2 | Counter Value Ch#0 HL | | | | | | | |
| 3 | Counter Value Ch#0 HH | | | | | | | |
| 4 | Counter Value Ch#1 LL | | | | | | | |
| 5 | Counter Value Ch#1 LH | | | | | | | |
| 6 | Counter Value Ch#1 HL | | | | | | | |
| 7 | Counter Value Ch#1 HH | | | | | | | |

2. Process Data Mapping (Outputs)

| Byte | Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
|------|-----------------------|----------------------|-------|-------|-----------------|-------|-------|-------|
| 0 | Counter Reset ch#0 | Counter Stop ch#0 | -- | -- | Count Mode ch#0 | | | |
| 1 | Counter Reset ch#1 | Counter Stop ch#0 | -- | -- | Count Mode ch#1 | | | |

3. Count Mode Ch#0, Ch#1

Count Mode Ch#0, Ch#1

| Value | Count Mode | Description |
|-----------------|--|---|
| B' 0000 (0x0) | Up | Up Counter - Aph Input acts as Up Clock - Bph Input is not used |
| B' 0001 (0x1) | Down | Down Counter - Aph Input acts as Down Clock - Bph Input is not used |
| B' 0010 (0x2) | - | - |
| B' 0011 (0x3) | - | - |
| B' 0100 (0x4) | Up Clock & Inhibit | Up Counter with Inhibit - Aph Input acts as Up Clock Input - Bph Input acts as Inhibit function for Up Clock Input |
| B' 0101 (0x5) | Up Clock & Reset | Up Counter with Reset - Aph Input acts as Up Clock Input - Bph Input acts as Reset function to Counter |
| B' 0110 (0x6) | Down Clock & Inhibit | Down Counter with Inhibit - Aph Input acts as Down Clock Input - Bph Input acts as Inhibit function for Down Clock Input |
| B' 0111 (0x7) | Down Clock & Reset | Down Counter with Reset - Aph Input acts as Down Clock Input - Bph Input acts as Reset function to Counter |
| B' 1000 (0x8) | Up Clock & Down Clock | Up & Down Counter - Aph Input acts as Up Clock Input - Bph Input acts as Down Clock Input |
| B' 1001 (0x9) | Clock & Direction | Up & Down with Direction - Aph Input acts as Clock Input - Bph Input acts as Direction Input (Low = Up Count, High = Down Count) |
| B' 1010 (0xA) | Encoder 1x (*1) | Encoder 1x - Frequency Range of the Encoder x1 mode (0x0A) is the same as the counting mode. (Possible Frequency ~300kHz) (*1) - Aph Input acts as Encoder's A phase Input - Bph Input acts as Encoder's B phase Input |
| B' 1011 (0xB) | Encoder 2x | Encoder 2x - Aph Input acts as Encoder's A phase Input - Bph Input acts as Encoder's B phase Input |
| B' 1100 (0xC) | Encoder 4x | Encoder 4x - Aph Input acts as Encoder's A phase Input - Bph Input acts as Encoder's B phase Input |
| B' 1101 (0xD) | Frequency Measurement (*2) 1 sec Update | Simple Frequency Measurement, updated by 1sec, Hz Unit - Frequency, B' 1101 (0xD) can't be used with other channel's Count Mode = 0x0, 0x1, 0x4 ~ 0xA (*2) - Aph Input acts as Frequency Input - Bph Input is not used |
| B' 1110 (0xE) | Pulse Width Measurement(*3) | Simple Pulse Width Measurement, 0.1usec Unit - Pulse Width(32bit), if 1234, then Pulse High(On) width is |

| | | |
|-----------------|--------------------------------------|---|
| | | 123.4usec (*3) - Aph Input acts as Pulse Input - Bph Input is not used |
| B' 1111 (0xF) | Pulse Width & Period Measurement(*4) | Simple Pulse Width & Period Measurement, 0.1usec Unit, - Available in case of Pulse Input >= 200Hz(<= 2.5msec, Pulse On Width) - Pulse Width(16bit, Low Word) + Pulse Period(16bit, High Word) (*4) - Aph Input acts as Pulse Input - Bph Input is not used |

- Frequency Range of the Encoder x1 mode is the same as the counting mode.
- Frequency, B'1101(0xD) can't be used with other channel's Count Mode = 0x0, 0x1, 0x4 ~ 0x9
- Pulse Width, B'1110(0xE) measures Aph Input's High(On) Pulse Width(32bit) in 0.1usec unit.
- Pulse Width & Period, B'1111(0xF) measures Aph's Pulse High(On) Width(16bit) & Period(16bit) in 0.1usec unit.

This encoder mode is perfectly same with mode B'0000, B'0001. This is for using Encoder module easily.

Frequency, B'1100(0xC) and B'1101(0xD) can't be used with other channel's Count Mode = 0x2 ~ 0x9

Pulse Width, B'1110(0xE) measures "A phase" Input's High (On) Pulse Width (32bit) in 0.1usec unit.

Pulse Width & Period, B'1111(0xF) measures "A phase" Pulse High (On) Width (16bit) & Period (16bit) in 0.1usec unit.

URD-0008CI (DO08CI) - 8 Channels Digital output (source)

1. Process Data Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|------|------|------|------|------|------|------|------|
| Byte0 | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |

2. Configuration Parameters Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|--|------|------|------|------|------|------|------|
| Byte0 | Fault Action (ch0~ch7) 0: Fault value, 1:Hold last state | | | | | | | |
| Byte1 | Fault value (ch0~ch7) 0:Off, 1:On | | | | | | | |

URD-0008NI (DO08NI) - 8 Channels Digital output (sink)

1. Process Data Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|------|------|------|------|------|------|------|------|
| Byte0 | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |

2. Configuration Parameters Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|--|------|------|------|------|------|------|------|
| Byte0 | Fault Action (ch0~ch7) 0: Fault value, 1:Hold last state | | | | | | | |
| Byte1 | Fault value (ch0~ch7) 0:Off, 1:On | | | | | | | |

URD-0016CG-8 (DO16C8) - 16 Channels Digital output (source)

1. Process Data Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|------|------|------|------|------|------|------|------|
| Byte0 | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |
| Byte1 | D15 | D14 | D13 | D12 | D11 | D10 | D9 | D8 |

2. Configuration Parameters Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|---|------|------|------|------|------|------|------|
| Byte0 | Fault Action (ch0~ch7) 0: Fault value, 1:Hold last state | | | | | | | |
| Byte1 | Fault Action (ch8~ch15) 0: Fault value, 1:Hold last state | | | | | | | |
| Byte2 | Fault value (ch0~ch7) 0:Off, 1:On | | | | | | | |
| Byte3 | Fault value (ch8~ch15) 0:Off, 1:On | | | | | | | |

URD-0016NG-8 (DO16N8) - 16 Channels Digital output (sink)

1. Process Data Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|------|------|------|------|------|------|------|------|
| Byte0 | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |
| Byte1 | D15 | D14 | D13 | D12 | D11 | D10 | D9 | D8 |

2. Configuration Parameters Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|---|------|------|------|------|------|------|------|
| Byte0 | Fault Action (ch0~ch7) 0: Fault value, 1:Hold last state | | | | | | | |
| Byte1 | Fault Action (ch8~ch15) 0: Fault value, 1:Hold last state | | | | | | | |
| Byte2 | Fault value (ch0~ch7) 0:Off, 1:On | | | | | | | |
| Byte3 | Fault value (ch8~ch15) 0:Off, 1:On | | | | | | | |

URD-0032NG-4 (DO32N4) - 32 Channels Digital output (sink)

3. Process Data Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|------|------|------|------|------|------|------|------|
| Byte0 | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |
| Byte1 | D15 | D14 | D13 | D12 | D11 | D10 | D9 | D8 |
| Byte2 | D23 | D22 | D21 | D20 | D19 | D18 | D17 | D16 |
| Byte3 | D31 | D30 | D29 | D28 | D27 | D26 | D25 | D24 |

4. Configuration Parameters Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------------|--|------|------|------|------|------|------|------|
| Byte0 | Fault Action (ch0~ch7) 0: Fault value, 1:Hold last state | | | | | | | |
| Byte1 | Fault Action (ch8~ch15) 0: Fault value, 1:Hold last state | | | | | | | |
| Byte2 | Fault Action (ch16~ch23) 0: Fault value, 1:Hold last state | | | | | | | |
| Byte3 | Fault Action (ch24~ch31) 0: Fault value, 1:Hold last state | | | | | | | |
| Byte4 | Fault value (ch0~ch7) 0:Off, 1:On | | | | | | | |
| Byte5 | Fault value (ch8~ch15) 0:Off, 1:On | | | | | | | |
| Byte6 | Fault value (ch16~ch23) 0:Off, 1:On | | | | | | | |
| Byte7 | Fault value (ch14~ch31) 0:Off, 1:On | | | | | | | |

URD-0032CG-4 (DO32C4) - 32 Channels Digital output (source)

1. Process Data Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|------|------|------|------|------|------|------|------|
| Byte0 | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |
| Byte1 | D15 | D14 | D13 | D12 | D11 | D10 | D9 | D8 |
| Byte2 | D23 | D22 | D21 | D20 | D19 | D18 | D17 | D16 |
| Byte3 | D31 | D30 | D29 | D28 | D27 | D26 | D25 | D24 |

2. Configuration Parameters Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------------|--|------|------|------|------|------|------|------|
| Byte0 | Fault Action (ch0~ch7) 0: Fault value, 1:Hold last state | | | | | | | |
| Byte1 | Fault Action (ch8~ch15) 0: Fault value, 1:Hold last state | | | | | | | |
| Byte2 | Fault Action (ch16~ch23) 0: Fault value, 1:Hold last state | | | | | | | |
| Byte3 | Fault Action (ch24~ch31) 0: Fault value, 1:Hold last state | | | | | | | |
| Byte4 | Fault value (ch0~ch7) 0:Off, 1:On | | | | | | | |
| Byte5 | Fault value (ch8~ch15) 0:Off, 1:On | | | | | | | |
| Byte6 | Fault value (ch16~ch23) 0:Off, 1:On | | | | | | | |
| Byte7 | Fault value (ch14~ch31) 0:Off, 1:On | | | | | | | |

URA-16000-8 (AI16O8) - 16 Channels Analog Input Current

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|---------|-----------------------------|------|------|------|------|------|------|------|
| Byte 0 | Analog Input Ch0 Low byte | | | | | | | |
| Byte 1 | Analog Input Ch0 High byte | | | | | | | |
| Byte 2 | Analog Input Ch1 Low byte | | | | | | | |
| Byte 3 | Analog Input Ch1 High byte | | | | | | | |
| Byte 4 | Analog Input Ch2 Low byte | | | | | | | |
| Byte 5 | Analog Input Ch2 High byte | | | | | | | |
| Byte 6 | Analog Input Ch3 Low byte | | | | | | | |
| Byte 7 | Analog Input Ch3 High byte | | | | | | | |
| Byte 8 | Analog Input Ch4 Low byte | | | | | | | |
| Byte 9 | Analog Input Ch4 High byte | | | | | | | |
| Byte 10 | Analog Input Ch5 Low byte | | | | | | | |
| Byte 11 | Analog Input Ch5 High byte | | | | | | | |
| Byte 12 | Analog Input Ch6 Low byte | | | | | | | |
| Byte 13 | Analog Input Ch6 High byte | | | | | | | |
| Byte 14 | Analog Input Ch7 Low byte | | | | | | | |
| Byte 15 | Analog Input Ch7 High byte | | | | | | | |
| Byte 16 | Analog Input Ch8 Low byte | | | | | | | |
| Byte 17 | Analog Input Ch8 High byte | | | | | | | |
| Byte 18 | Analog Input Ch9 Low byte | | | | | | | |
| Byte 19 | Analog Input Ch9 High byte | | | | | | | |
| Byte 20 | Analog Input Ch10 Low byte | | | | | | | |
| Byte 21 | Analog Input Ch10 High byte | | | | | | | |
| Byte 22 | Analog Input Ch11 Low byte | | | | | | | |
| Byte 23 | Analog Input Ch11 High byte | | | | | | | |
| Byte 24 | Analog Input Ch12 Low byte | | | | | | | |
| Byte 25 | Analog Input Ch12 High byte | | | | | | | |
| Byte 26 | Analog Input Ch13 Low byte | | | | | | | |
| Byte 27 | Analog Input Ch13 High byte | | | | | | | |
| Byte 28 | Analog Input Ch14 Low byte | | | | | | | |
| Byte 29 | Analog Input Ch14 High byte | | | | | | | |
| Byte 30 | Analog Input Ch15 Low byte | | | | | | | |
| Byte 31 | Analog Input Ch15 High byte | | | | | | | |

1. Process Data Mapping

2. Configuration Parameters Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|--|------|------|------|------|------|------|------|
| Byte 0 | Current Range for Channel 0 (H00: 0~20mA, H01: 4~20mA) | | | | | | | |
| Byte 1 | Current Range for Channel 1 (H00: 0~20mA, H01: 4~20mA) | | | | | | | |
| Byte 2 | Current Range for Channel 2 (H00: 0~20mA, H01: 4~20mA) | | | | | | | |
| Byte 3 | Current Range for Channel 3 (H00: 0~20mA, H01: 4~20mA) | | | | | | | |
| Byte 4 | Current Range for Channel 4 (H00: 0~20mA, H01: 4~20mA) | | | | | | | |

| | |
|----------------|--|
| Byte 5 | Current Range for Channel 5 (H00: 0~20mA, H01: 4~20mA) |
| Byte 6 | Current Range for Channel 6 (H00: 0~20mA, H01: 4~20mA) |
| Byte 7 | Current Range for Channel 7 (H00: 0~20mA, H01: 4~20mA) |
| Byte 8 | Current Range for Channel 8 (H00: 0~20mA, H01: 4~20mA) |
| Byte 9 | Current Range for Channel 9 (H00: 0~20mA, H01: 4~20mA) |
| Byte 10 | Current Range for Channel 10 (H00: 0~20mA, H01: 4~20mA) |
| Byte 11 | Current Range for Channel 11 (H00: 0~20mA, H01: 4~20mA) |
| Byte 12 | Current Range for Channel 12 (H00: 0~20mA, H01: 4~20mA) |
| Byte 13 | Current Range for Channel 13 (H00: 0~20mA, H01: 4~20mA) |
| Byte 14 | Current Range for Channel 14 (H00: 0~20mA, H01: 4~20mA) |
| Byte 15 | Current Range for Channel 15 (H00: 0~20mA, H01: 4~20mA) |
| Byte 16 | Filter Time (H00: Default Filter(=20) / H01: Fastest ~ / H62: Slowest) |
| Byte 17 | Not used(=00) |

URA-1600P-8 (AI16P8) - 16 Channels Analog Input Voltage

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|---------|-----------------------------|------|------|------|------|------|------|------|
| Byte 0 | Analog Input Ch0 Low byte | | | | | | | |
| Byte 1 | Analog Input Ch0 High byte | | | | | | | |
| Byte 2 | Analog Input Ch1 Low byte | | | | | | | |
| Byte 3 | Analog Input Ch1 High byte | | | | | | | |
| Byte 4 | Analog Input Ch2 Low byte | | | | | | | |
| Byte 5 | Analog Input Ch2 High byte | | | | | | | |
| Byte 6 | Analog Input Ch3 Low byte | | | | | | | |
| Byte 7 | Analog Input Ch3 High byte | | | | | | | |
| Byte 8 | Analog Input Ch4 Low byte | | | | | | | |
| Byte 9 | Analog Input Ch4 High byte | | | | | | | |
| Byte 10 | Analog Input Ch5 Low byte | | | | | | | |
| Byte 11 | Analog Input Ch5 High byte | | | | | | | |
| Byte 12 | Analog Input Ch6 Low byte | | | | | | | |
| Byte 13 | Analog Input Ch6 High byte | | | | | | | |
| Byte 14 | Analog Input Ch7 Low byte | | | | | | | |
| Byte 15 | Analog Input Ch7 High byte | | | | | | | |
| Byte 16 | Analog Input Ch8 Low byte | | | | | | | |
| Byte 17 | Analog Input Ch8 High byte | | | | | | | |
| Byte 18 | Analog Input Ch9 Low byte | | | | | | | |
| Byte 19 | Analog Input Ch9 High byte | | | | | | | |
| Byte 20 | Analog Input Ch10 Low byte | | | | | | | |
| Byte 21 | Analog Input Ch10 High byte | | | | | | | |
| Byte 22 | Analog Input Ch11 Low byte | | | | | | | |
| Byte 23 | Analog Input Ch11 High byte | | | | | | | |
| Byte 24 | Analog Input Ch12 Low byte | | | | | | | |
| Byte 25 | Analog Input Ch12 High byte | | | | | | | |
| Byte 26 | Analog Input Ch13 Low byte | | | | | | | |
| Byte 27 | Analog Input Ch13 High byte | | | | | | | |
| Byte 28 | Analog Input Ch14 Low byte | | | | | | | |
| Byte 29 | Analog Input Ch14 High byte | | | | | | | |
| Byte 30 | Analog Input Ch15 Low byte | | | | | | | |
| Byte 31 | Analog Input Ch15 High byte | | | | | | | |

1. Process Data Mapping

2. Configuration Parameters Mapping

| Bit N | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|---|------|------|------|------|------|------|------|
| Byte 0 | Voltage Range for Channel 0 (H00: 0~10Vdc, H01: 0~5Vdc, H02 : 1~5Vdc) | | | | | | | |
| Byte 1 | Voltage Range for Channel 1 (H00: 0~10Vdc, H01: 0~5Vdc, H02 : 1~5Vdc) | | | | | | | |
| Byte 2 | Voltage Range for Channel 2 (H00: 0~10Vdc, H01: 0~5Vdc, H02 : 1~5Vdc) | | | | | | | |
| Byte 3 | Voltage Range for Channel 3 (H00: 0~10Vdc, H01: 0~5Vdc, H02 : 1~5Vdc) | | | | | | | |
| Byte 4 | Voltage Range for Channel 4 (H00: 0~10Vdc, H01: 0~5Vdc, H02 : 1~5Vdc) | | | | | | | |
| Byte 5 | Voltage Range for Channel 5 (H00: 0~10Vdc, H01: 0~5Vdc, H02 : 1~5Vdc) | | | | | | | |
| Byte 6 | Voltage Range for Channel 6 (H00: 0~10Vdc, H01: 0~5Vdc, H02 : 1~5Vdc) | | | | | | | |
| Byte 7 | Voltage Range for Channel 7 (H00: 0~10Vdc, H01: 0~5Vdc, H02 : 1~5Vdc) | | | | | | | |

| | |
|----------------|--|
| Byte 8 | Voltage Range for Channel 8 (H00: 0~10Vdc, H01: 0~5Vdc, H02 : 1~5Vdc) |
| Byte 9 | Voltage Range for Channel 9 (H00: 0~10Vdc, H01: 0~5Vdc, H02 : 1~5Vdc) |
| Byte 10 | Voltage Range for Channel 10 (H00: 0~10Vdc, H01: 0~5Vdc, H02 : 1~5Vdc) |
| Byte 11 | Voltage Range for Channel 11 (H00: 0~10Vdc, H01: 0~5Vdc, H02 : 1~5Vdc) |
| Byte 12 | Voltage Range for Channel 12 (H00: 0~10Vdc, H01: 0~5Vdc, H02 : 1~5Vdc) |
| Byte 13 | Voltage Range for Channel 13 (H00: 0~10Vdc, H01: 0~5Vdc, H02 : 1~5Vdc) |
| Byte 14 | Voltage Range for Channel 14 (H00: 0~10Vdc, H01: 0~5Vdc, H02 : 1~5Vdc) |
| Byte 15 | Voltage Range for Channel 15 (H00: 0~10Vdc, H01: 0~5Vdc, H02 : 1~5Vdc) |
| Byte 16 | Filter Time (H00: Default Filter(=20) / H01: Fastest ~ / H62: Slowest) |
| Byte 17 | Not used(=00) |

URA-1600T-8 (AI16T8) - 16 Channels Analog Input Current

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|---------|-----------------------------|------|------|------|------|------|------|------|
| Byte 0 | Analog Input Ch0 Low byte | | | | | | | |
| Byte 1 | Analog Input Ch0 High byte | | | | | | | |
| Byte 2 | Analog Input Ch1 Low byte | | | | | | | |
| Byte 3 | Analog Input Ch1 High byte | | | | | | | |
| Byte 4 | Analog Input Ch2 Low byte | | | | | | | |
| Byte 5 | Analog Input Ch2 High byte | | | | | | | |
| Byte 6 | Analog Input Ch3 Low byte | | | | | | | |
| Byte 7 | Analog Input Ch3 High byte | | | | | | | |
| Byte 8 | Analog Input Ch4 Low byte | | | | | | | |
| Byte 9 | Analog Input Ch4 High byte | | | | | | | |
| Byte 10 | Analog Input Ch5 Low byte | | | | | | | |
| Byte 11 | Analog Input Ch5 High byte | | | | | | | |
| Byte 12 | Analog Input Ch6 Low byte | | | | | | | |
| Byte 13 | Analog Input Ch6 High byte | | | | | | | |
| Byte 14 | Analog Input Ch7 Low byte | | | | | | | |
| Byte 15 | Analog Input Ch7 High byte | | | | | | | |
| Byte 16 | Analog Input Ch8 Low byte | | | | | | | |
| Byte 17 | Analog Input Ch8 High byte | | | | | | | |
| Byte 18 | Analog Input Ch9 Low byte | | | | | | | |
| Byte 19 | Analog Input Ch9 High byte | | | | | | | |
| Byte 20 | Analog Input Ch10 Low byte | | | | | | | |
| Byte 21 | Analog Input Ch10 High byte | | | | | | | |
| Byte 22 | Analog Input Ch11 Low byte | | | | | | | |
| Byte 23 | Analog Input Ch11 High byte | | | | | | | |
| Byte 24 | Analog Input Ch12 Low byte | | | | | | | |
| Byte 25 | Analog Input Ch12 High byte | | | | | | | |
| Byte 26 | Analog Input Ch13 Low byte | | | | | | | |
| Byte 27 | Analog Input Ch13 High byte | | | | | | | |
| Byte 28 | Analog Input Ch14 Low byte | | | | | | | |
| Byte 29 | Analog Input Ch14 High byte | | | | | | | |
| Byte 30 | Analog Input Ch15 Low byte | | | | | | | |
| Byte 31 | Analog Input Ch15 High byte | | | | | | | |

3. Process Data Mapping

4. Configuration Parameters Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|--|------|------|------|------|------|------|------|
| Byte 0 | Current Range for Channel 0 (H00: 0~20mA, H01: 4~20mA) | | | | | | | |
| Byte 1 | Current Range for Channel 1 (H00: 0~20mA, H01: 4~20mA) | | | | | | | |
| Byte 2 | Current Range for Channel 2 (H00: 0~20mA, H01: 4~20mA) | | | | | | | |
| Byte 3 | Current Range for Channel 3 (H00: 0~20mA, H01: 4~20mA) | | | | | | | |
| Byte 4 | Current Range for Channel 4 (H00: 0~20mA, H01: 4~20mA) | | | | | | | |

| | |
|----------------|--|
| Byte 5 | Current Range for Channel 5 (H00: 0~20mA, H01: 4~20mA) |
| Byte 6 | Current Range for Channel 6 (H00: 0~20mA, H01: 4~20mA) |
| Byte 7 | Current Range for Channel 7 (H00: 0~20mA, H01: 4~20mA) |
| Byte 8 | Current Range for Channel 8 (H00: 0~20mA, H01: 4~20mA) |
| Byte 9 | Current Range for Channel 9 (H00: 0~20mA, H01: 4~20mA) |
| Byte 10 | Current Range for Channel 10 (H00: 0~20mA, H01: 4~20mA) |
| Byte 11 | Current Range for Channel 11 (H00: 0~20mA, H01: 4~20mA) |
| Byte 12 | Current Range for Channel 12 (H00: 0~20mA, H01: 4~20mA) |
| Byte 13 | Current Range for Channel 13 (H00: 0~20mA, H01: 4~20mA) |
| Byte 14 | Current Range for Channel 14 (H00: 0~20mA, H01: 4~20mA) |
| Byte 15 | Current Range for Channel 15 (H00: 0~20mA, H01: 4~20mA) |
| Byte 16 | Filter Time (H00: Default Filter(=20) / H01: Fastest ~ / H62: Slowest) |
| Byte 17 | Not used(=00) |

URA-1600U-8 (AI16U8) - 16 Channels Analog Input Voltage

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|---------|------|------|------|------|------|------|------|-----------------------------|
| Byte 0 | | | | | | | | Analog Input Ch0 Low byte |
| Byte 1 | | | | | | | | Analog Input Ch0 High byte |
| Byte 2 | | | | | | | | Analog Input Ch1 Low byte |
| Byte 3 | | | | | | | | Analog Input Ch1 High byte |
| Byte 4 | | | | | | | | Analog Input Ch2 Low byte |
| Byte 5 | | | | | | | | Analog Input Ch2 High byte |
| Byte 6 | | | | | | | | Analog Input Ch3 Low byte |
| Byte 7 | | | | | | | | Analog Input Ch3 High byte |
| Byte 8 | | | | | | | | Analog Input Ch4 Low byte |
| Byte 9 | | | | | | | | Analog Input Ch4 High byte |
| Byte 10 | | | | | | | | Analog Input Ch5 Low byte |
| Byte 11 | | | | | | | | Analog Input Ch5 High byte |
| Byte 12 | | | | | | | | Analog Input Ch6 Low byte |
| Byte 13 | | | | | | | | Analog Input Ch6 High byte |
| Byte 14 | | | | | | | | Analog Input Ch7 Low byte |
| Byte 15 | | | | | | | | Analog Input Ch7 High byte |
| Byte 16 | | | | | | | | Analog Input Ch8 Low byte |
| Byte 17 | | | | | | | | Analog Input Ch8 High byte |
| Byte 18 | | | | | | | | Analog Input Ch9 Low byte |
| Byte 19 | | | | | | | | Analog Input Ch9 High byte |
| Byte 20 | | | | | | | | Analog Input Ch10 Low byte |
| Byte 21 | | | | | | | | Analog Input Ch10 High byte |
| Byte 22 | | | | | | | | Analog Input Ch11 Low byte |
| Byte 23 | | | | | | | | Analog Input Ch11 High byte |
| Byte 24 | | | | | | | | Analog Input Ch12 Low byte |
| Byte 25 | | | | | | | | Analog Input Ch12 High byte |
| Byte 26 | | | | | | | | Analog Input Ch13 Low byte |
| Byte 27 | | | | | | | | Analog Input Ch13 High byte |
| Byte 28 | | | | | | | | Analog Input Ch14 Low byte |
| Byte 29 | | | | | | | | Analog Input Ch14 High byte |
| Byte 30 | | | | | | | | Analog Input Ch15 Low byte |
| Byte 31 | | | | | | | | Analog Input Ch15 High byte |

3. Process Data Mapping

4. Configuration Parameters Mapping

| Bit N | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|------|------|------|------|------|------|------|---|
| Byte 0 | | | | | | | | Voltage Range for Channel 0 (H00: 0~10Vdc, H01: 0~5Vdc, H02 : 1~5Vdc) |
| Byte 1 | | | | | | | | Voltage Range for Channel 1 (H00: 0~10Vdc, H01: 0~5Vdc, H02 : 1~5Vdc) |
| Byte 2 | | | | | | | | Voltage Range for Channel 2 (H00: 0~10Vdc, H01: 0~5Vdc, H02 : 1~5Vdc) |
| Byte 3 | | | | | | | | Voltage Range for Channel 3 (H00: 0~10Vdc, H01: 0~5Vdc, H02 : 1~5Vdc) |
| Byte 4 | | | | | | | | Voltage Range for Channel 4 (H00: 0~10Vdc, H01: 0~5Vdc, H02 : 1~5Vdc) |
| Byte 5 | | | | | | | | Voltage Range for Channel 5 (H00: 0~10Vdc, H01: 0~5Vdc, H02 : 1~5Vdc) |
| Byte 6 | | | | | | | | Voltage Range for Channel 6 (H00: 0~10Vdc, H01: 0~5Vdc, H02 : 1~5Vdc) |
| Byte 7 | | | | | | | | Voltage Range for Channel 7 (H00: 0~10Vdc, H01: 0~5Vdc, H02 : 1~5Vdc) |

| | |
|----------------|--|
| Byte 8 | Voltage Range for Channel 8 (H00: 0~10Vdc, H01: 0~5Vdc, H02 : 1~5Vdc) |
| Byte 9 | Voltage Range for Channel 9 (H00: 0~10Vdc, H01: 0~5Vdc, H02 : 1~5Vdc) |
| Byte 10 | Voltage Range for Channel 10 (H00: 0~10Vdc, H01: 0~5Vdc, H02 : 1~5Vdc) |
| Byte 11 | Voltage Range for Channel 11 (H00: 0~10Vdc, H01: 0~5Vdc, H02 : 1~5Vdc) |
| Byte 12 | Voltage Range for Channel 12 (H00: 0~10Vdc, H01: 0~5Vdc, H02 : 1~5Vdc) |
| Byte 13 | Voltage Range for Channel 13 (H00: 0~10Vdc, H01: 0~5Vdc, H02 : 1~5Vdc) |
| Byte 14 | Voltage Range for Channel 14 (H00: 0~10Vdc, H01: 0~5Vdc, H02 : 1~5Vdc) |
| Byte 15 | Voltage Range for Channel 15 (H00: 0~10Vdc, H01: 0~5Vdc, H02 : 1~5Vdc) |
| Byte 16 | Filter Time (H00: Default Filter(=20) / H01: Fastest ~ / H62: Slowest) |
| Byte 17 | Not used(=00) |

URA-1600X-8 (AI16X8) - 16 Channels Analog Output Voltage

1. Process Data Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|---------|------------------------------|------|------|------|------|------|------|------|
| Byte 0 | Analog Output Ch0 Low byte | | | | | | | |
| Byte 1 | Analog Output Ch0 High byte | | | | | | | |
| Byte 2 | Analog Output Ch1 Low byte | | | | | | | |
| Byte 3 | Analog Output Ch1 High byte | | | | | | | |
| Byte 4 | Analog Output Ch2 Low byte | | | | | | | |
| Byte 5 | Analog Output Ch2 High byte | | | | | | | |
| Byte 6 | Analog Output Ch3 Low byte | | | | | | | |
| Byte 7 | Analog Output Ch3 High byte | | | | | | | |
| Byte 8 | Analog Output Ch4 Low byte | | | | | | | |
| Byte 9 | Analog Output Ch4 High byte | | | | | | | |
| Byte 10 | Analog Output Ch5 Low byte | | | | | | | |
| Byte 11 | Analog Output Ch5 High byte | | | | | | | |
| Byte 12 | Analog Output Ch6 Low byte | | | | | | | |
| Byte 13 | Analog Output Ch6 High byte | | | | | | | |
| Byte 14 | Analog Output Ch7 Low byte | | | | | | | |
| Byte 15 | Analog Output Ch7 High byte | | | | | | | |
| Byte 16 | Analog Output Ch8 Low byte | | | | | | | |
| Byte 17 | Analog Output Ch8 High byte | | | | | | | |
| Byte 18 | Analog Output Ch9 Low byte | | | | | | | |
| Byte 19 | Analog Output Ch9 High byte | | | | | | | |
| Byte 20 | Analog Output Ch10 Low byte | | | | | | | |
| Byte 21 | Analog Output Ch10 High byte | | | | | | | |
| Byte 22 | Analog Output Ch11 Low byte | | | | | | | |
| Byte 23 | Analog Output Ch11 High byte | | | | | | | |
| Byte 24 | Analog Output Ch12 Low byte | | | | | | | |
| Byte 25 | Analog Output Ch12 High byte | | | | | | | |
| Byte 26 | Analog Output Ch13 Low byte | | | | | | | |
| Byte 27 | Analog Output Ch13 High byte | | | | | | | |
| Byte 28 | Analog Output Ch14 Low byte | | | | | | | |
| Byte 29 | Analog Output Ch14 High byte | | | | | | | |
| Byte 30 | Analog Output Ch15 Low byte | | | | | | | |
| Byte 31 | Analog Output Ch15 High byte | | | | | | | |

2. Configuration Parameters Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------------|---|------|-----------------------------|------|----------------------------|------|----------------------------|------|
| Byte0 | Fault Action for channel 3 | | Fault Action for channel 2 | | Fault Action for channel 1 | | Fault Action for channel 0 | |
| | 00: Fault Value 01: Hold last state 10: Low Limit 11:High Limit | | | | | | | |
| Byte1 | Fault Action for channel 7 | | Fault Action for channel 6 | | Fault Action for channel 5 | | Fault Action for channel 4 | |
| | 00: Fault Value 01: Hold last state 10: Low Limit 11:High Limit | | | | | | | |
| Byte2 | Fault Action for channel 11 | | Fault Action for channel 10 | | Fault Action for channel 9 | | Fault Action for channel 8 | |
| | 00: Fault Value 01: Hold last state 10: Low Limit 11:High Limit | | | | | | | |
| Byte3 | Fault Action for | | Fault Action for | | Fault Action for | | Fault Action for | |

| | channel 15 | channel 14 | channel 13 | channel 12 |
|--------------|---|------------|-----------------------|------------|
| | 00: Fault Value 01: Hold last state 10: Low Limit 11:High Limit | | | |
| Byte4 | Fault Value Low Byte | | | |
| Byte5 | Not used | | Fault Value High Byte | |

URA-1600Z-8 (AI16Z8) - 16 Channels Analog Output Voltage

1. Process Data Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|---------|------------------------------|------|------|------|------|------|------|------|
| Byte 0 | Analog Output Ch0 Low byte | | | | | | | |
| Byte 1 | Analog Output Ch0 High byte | | | | | | | |
| Byte 2 | Analog Output Ch1 Low byte | | | | | | | |
| Byte 3 | Analog Output Ch1 High byte | | | | | | | |
| Byte 4 | Analog Output Ch2 Low byte | | | | | | | |
| Byte 5 | Analog Output Ch2 High byte | | | | | | | |
| Byte 6 | Analog Output Ch3 Low byte | | | | | | | |
| Byte 7 | Analog Output Ch3 High byte | | | | | | | |
| Byte 8 | Analog Output Ch4 Low byte | | | | | | | |
| Byte 9 | Analog Output Ch4 High byte | | | | | | | |
| Byte 10 | Analog Output Ch5 Low byte | | | | | | | |
| Byte 11 | Analog Output Ch5 High byte | | | | | | | |
| Byte 12 | Analog Output Ch6 Low byte | | | | | | | |
| Byte 13 | Analog Output Ch6 High byte | | | | | | | |
| Byte 14 | Analog Output Ch7 Low byte | | | | | | | |
| Byte 15 | Analog Output Ch7 High byte | | | | | | | |
| Byte 16 | Analog Output Ch8 Low byte | | | | | | | |
| Byte 17 | Analog Output Ch8 High byte | | | | | | | |
| Byte 18 | Analog Output Ch9 Low byte | | | | | | | |
| Byte 19 | Analog Output Ch9 High byte | | | | | | | |
| Byte 20 | Analog Output Ch10 Low byte | | | | | | | |
| Byte 21 | Analog Output Ch10 High byte | | | | | | | |
| Byte 22 | Analog Output Ch11 Low byte | | | | | | | |
| Byte 23 | Analog Output Ch11 High byte | | | | | | | |
| Byte 24 | Analog Output Ch12 Low byte | | | | | | | |
| Byte 25 | Analog Output Ch12 High byte | | | | | | | |
| Byte 26 | Analog Output Ch13 Low byte | | | | | | | |
| Byte 27 | Analog Output Ch13 High byte | | | | | | | |
| Byte 28 | Analog Output Ch14 Low byte | | | | | | | |
| Byte 29 | Analog Output Ch14 High byte | | | | | | | |
| Byte 30 | Analog Output Ch15 Low byte | | | | | | | |
| Byte 31 | Analog Output Ch15 High byte | | | | | | | |

2. Configuration Parameters Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------------|---|------|-----------------------------|------|----------------------------|------|----------------------------|------|
| Byte0 | Fault Action for channel 3 | | Fault Action for channel 2 | | Fault Action for channel 1 | | Fault Action for channel 0 | |
| | 00: Fault Value 01: Hold last state 10: Low Limit 11:High Limit | | | | | | | |
| Byte1 | Fault Action for channel 7 | | Fault Action for channel 6 | | Fault Action for channel 5 | | Fault Action for channel 4 | |
| | 00: Fault Value 01: Hold last state 10: Low Limit 11:High Limit | | | | | | | |
| Byte2 | Fault Action for channel 11 | | Fault Action for channel 10 | | Fault Action for channel 9 | | Fault Action for channel 8 | |
| | 00: Fault Value 01: Hold last state 10: Low Limit 11:High Limit | | | | | | | |
| Byte3 | Fault Action for | | Fault Action for | | Fault Action for | | Fault Action for | |

| | channel 15 | channel 14 | channel 13 | channel 12 |
|--------------|---|------------|------------|------------|
| | 00: Fault Value 01: Hold last state 10: Low Limit 11:High Limit | | | |
| Byte4 | Fault Value Low Byte | | | |
| Byte5 | Fault Value High Byte | | | |

URS-04RT (S04RT) – 4 RTD / Resistance

1. Process Data Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|----------------------------|------|------|------|------|------|------|------|
| Byte 0 | Analog Input Ch0 Low byte | | | | | | | |
| Byte 1 | Analog Input Ch0 High byte | | | | | | | |
| Byte 2 | Analog Input Ch1 Low byte | | | | | | | |
| Byte 3 | Analog Input Ch1 High byte | | | | | | | |
| Byte 4 | Analog Input Ch2 Low byte | | | | | | | |
| Byte 5 | Analog Input Ch2 High byte | | | | | | | |
| Byte 6 | Analog Input Ch3 Low byte | | | | | | | |
| Byte 7 | Analog Input Ch3 High byte | | | | | | | |

2. Configuration Parameters Mapping

| Byte | Decimal Bit | Description | Default Value |
|------|-------------|---|------------------|
| 0 | 00-07 | The selection Sensor Type =00h:PT100, 0.00385, -200~850°C, 0.1°C/count =01h:PT200, 0.00385, -200~850°C, 0.1°C/count =02h:PT500, 0.00385, -200~850°C, 0.1°C/count =03h:PT1000, 0.00385, -200~350°C, 0.1°C/count =04h:PT50, 0.00385, -200~850°C, 0.1°C/count =10h:JPT100, 0.003916, -200~640°C, 0.1°C/count =11h:JPT200, 0.003916, -200~640°C, 0.1°C/count =12h:JPT500, 0.003916, -200~640°C, 0.1°C/count =13h:JPT1000, 0.003916, -200~350°C, 0.1°C/count =14h:JPT50, 0.003916, -200~640°C, 0.1°C/count =20h:NI100, 0.00618, -60~250°C, 0.1°C/count =21h:NI200, 0.00618, -60~250°C, 0.1°C/count =22h:NI500, 0.00618, -60~250°C, 0.1°C/count =23h:NI1000, 0.00618, -60~180°C, 0.1°C/count =30h:NI120, 0.00672, -80~250°C, 0.1°C/count =53h:NI1000LG, 0.00500, -50~120°C, 0.1°C/count =80h:Resistance Input, 1~2000Ω, 100mΩ /1count =81h:Resistance Input, 1~327Ω, 10mΩ /1count =82h:Resistance Input, 1~620Ω, 20mΩ /1count =83h: Resistance Input, 1~1200Ω, 50mΩ/1count =Others: Reserved | 0: PT100 |
| 1 | 00 | Temperature Type 0: Celsius(°C), 1: Fahrenheit(°F) | 0: Celsius(°C) |
| | 01 | Reserved | 0 |
| | 02 | Data Resolution 0: 0.1°C, °F/bit, 1: 1°C, °F/bit | 0 |
| | 03 | Reserved | 0 |
| | 04 | Filter Type 0: Normal Filter, 1: Enhanced Filter | 0: Normal Filter |
| | 05-07 | Reserved | 0 |
| 2~3 | | CH0 Offset value | 0 |
| 4~5 | | CH1 Offset value | 0 |
| 6~7 | | CH2 Offset value | 0 |
| 8~9 | | CH3 Offset value | 0 |

URS-08RT-2 (S08RT2) – 8 RTD / Resistance

1. Process Data Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|---------|----------------------------|------|------|------|------|------|------|------|
| Byte 0 | Analog Input Ch0 Low byte | | | | | | | |
| Byte 1 | Analog Input Ch0 High byte | | | | | | | |
| Byte 2 | Analog Input Ch1 Low byte | | | | | | | |
| Byte 3 | Analog Input Ch1 High byte | | | | | | | |
| Byte 4 | Analog Input Ch2 Low byte | | | | | | | |
| Byte 5 | Analog Input Ch2 High byte | | | | | | | |
| Byte 6 | Analog Input Ch3 Low byte | | | | | | | |
| Byte 7 | Analog Input Ch3 High byte | | | | | | | |
| Byte 8 | Analog Input Ch4 Low byte | | | | | | | |
| Byte 9 | Analog Input Ch4 High byte | | | | | | | |
| Byte 10 | Analog Input Ch5 Low byte | | | | | | | |
| Byte 11 | Analog Input Ch5 High byte | | | | | | | |
| Byte 12 | Analog Input Ch6 Low byte | | | | | | | |
| Byte 13 | Analog Input Ch6 High byte | | | | | | | |
| Byte 14 | Analog Input Ch7 Low byte | | | | | | | |
| Byte 15 | Analog Input Ch7 High byte | | | | | | | |

2. Configuration Parameters Mapping

| Byte | Decimal Bit | Description | Default Value |
|------|-------------|---|------------------|
| 0 | 00-07 | The selection Sensor Type =00h:PT100, 0.00385, -200~850°C, 0.1°C/count =01h:PT200, 0.00385, -200~850°C, 0.1°C/count =02h:PT500, 0.00385, -200~850°C, 0.1°C/count =03h:PT1000, 0.00385, -200~350°C, 0.1°C/count =04h:PT50, 0.00385, -200~850°C, 0.1°C/count =10h:JPT100, 0.003916, -200~640°C, 0.1°C/count =11h:JPT200, 0.003916, -200~640°C, 0.1°C/count =12h:JPT500, 0.003916, -200~640°C, 0.1°C/count =13h:JPT1000, 0.003916, -200~350°C, 0.1°C/count =14h:JPT50, 0.003916, -200~640°C, 0.1°C/count =20h:NI100, 0.00618, -60~250°C, 0.1°C/count =21h:NI200, 0.00618, -60~250°C, 0.1°C/count =22h:NI500, 0.00618, -60~250°C, 0.1°C/count =23h:NI1000, 0.00618, -60~180°C, 0.1°C/count =30h:NI120, 0.00672, -80~250°C, 0.1°C/count =53h:NI1000LG, 0.00500, -50~120°C, 0.1°C/count =80h:Resistance Input, 1~2000Ω, 100mΩ /1count =81h:Resistance Input, 1~327Ω, 10mΩ /1count =82h:Resistance Input, 1~620Ω, 20mΩ /1count =83h: Resistance Input, 1~1200Ω, 50mΩ/1count =Others: Reserved | 0: PT100 |
| 1 | 00 | Temperature Type 0: Celsius(°C), 1: Fahrenheit(°F) | 0: Celsius(°C) |
| | 01 | Reserved | 0 |
| | 02 | Data Resolution 0: 0.1°C, °F/bit, 1: 1°C, °F/bit | 0 |
| | 03 | Reserved | 0 |
| | 04 | Filter Type 0: Normal Filter, 1: Enhanced Filter | 0: Normal Filter |
| | 05-07 | Reserved | 0 |
| 2~3 | | CH0 Offset value | 0 |
| 4~5 | | CH1 Offset value | 0 |

| | | | |
|-------|--|------------------|---|
| 6~7 | | CH2 Offset value | 0 |
| 8~9 | | CH3 Offset value | 0 |
| 10~11 | | CH4 Offset value | 0 |
| 12~13 | | CH5 Offset value | 0 |
| 14~15 | | CH6 Offset value | 0 |
| 16~17 | | CH7 Offset value | 0 |

URS-04TC (S04TC) – 4 Thermocouple / mV

3. Process Data Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|--------|----------------------------|------|------|------|------|------|------|------|
| Byte 0 | Analog Input Ch0 Low byte | | | | | | | |
| Byte 1 | Analog Input Ch0 High byte | | | | | | | |
| Byte 2 | Analog Input Ch1 Low byte | | | | | | | |
| Byte 3 | Analog Input Ch1 High byte | | | | | | | |
| Byte 4 | Analog Input Ch2 Low byte | | | | | | | |
| Byte 5 | Analog Input Ch2 High byte | | | | | | | |
| Byte 6 | Analog Input Ch3 Low byte | | | | | | | |
| Byte 7 | Analog Input Ch3 High byte | | | | | | | |

4. Configuration Parameters Mapping

| Byte | Decimal Bit | Description | Default Value |
|------|-------------|--|--|
| 0 | 00-07 | The selection Sensor Type =00h: Type K, 0.1°C/count =01h: Type J, 0.1°C/count =02h: Type T, 0.1°C/count =03h: Type B, 0.1°C/count =04h: Type R, 0.1°C/count =05h: Type S, 0.1°C/count =06h: Type E, 0.1°C/count =07h: Type N, 0.1°C/count =08h: Type L, 0.1°C/count =09h: Type U, 0.1°C/count =0Ah: Type C, 0.1°C/count =0Bh: Type D, 0.1°C/count =80h: 10uV Input, -81.0~81.0mV, 10uV / 1count =81h: 1uV Input, -32.7~32.7mV, 1uV / 1count =82h: 2uV Input, -65.5~65.5mV, 2uV / 1count =Others: Reserved | 00 : Type K |
| 1 | 00 | Temperature Type 0: Celsius(°C), 1: Fahrenheit(°F) | 00 : Celsius(°C) Cold Junction Compensation 0.1°C Normal Filter |
| | 01* | 0: Cold Junction Compensation 1: Disable Cold Junction Compensation | |
| | 02 | Data Resolution 0: 0.1°C, °F/bit, 1: 1°C, °F/bit | |
| | 03 | Reserved | |
| | 04 | Filter Type 0: Normal Filter, 1: Enhanced Filter | |
| | 05-07 | Reserved | |
| 2 | 00-07 | Internal Cold Junction[1] Offset Data Low Byte | 0000 |
| 3 | 00-07 | Internal Cold Junction[1] Offset Data High Byte | |
| 4 | 00-07 | Internal Cold Junction[2] Offset Data Low Byte | 0000 |
| 5 | 00-07 | Internal Cold Junction[2] Offset Data High Byte | |
| 6 | 00-07 | External Cold Junction Offset Data Low Byte | 0000 |
| 7 | 00-07 | External Cold Junction Offset Data High Byte | |

URS-08TC-2 (S08TC2) – 8 Thermocouple / mV

3. Process Data Mapping

| Bit No | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|---------|----------------------------|------|------|------|------|------|------|------|
| Byte 0 | Analog Input Ch0 Low byte | | | | | | | |
| Byte 1 | Analog Input Ch0 High byte | | | | | | | |
| Byte 2 | Analog Input Ch1 Low byte | | | | | | | |
| Byte 3 | Analog Input Ch1 High byte | | | | | | | |
| Byte 4 | Analog Input Ch2 Low byte | | | | | | | |
| Byte 5 | Analog Input Ch2 High byte | | | | | | | |
| Byte 6 | Analog Input Ch3 Low byte | | | | | | | |
| Byte 7 | Analog Input Ch3 High byte | | | | | | | |
| Byte 8 | Analog Input Ch4 Low byte | | | | | | | |
| Byte 9 | Analog Input Ch4 High byte | | | | | | | |
| Byte 10 | Analog Input Ch5 Low byte | | | | | | | |
| Byte 11 | Analog Input Ch5 High byte | | | | | | | |
| Byte 12 | Analog Input Ch6 Low byte | | | | | | | |
| Byte 13 | Analog Input Ch6 High byte | | | | | | | |
| Byte 14 | Analog Input Ch7 Low byte | | | | | | | |
| Byte 15 | Analog Input Ch7 High byte | | | | | | | |

4. Configuration Parameters Mapping

| Byte | Decimal Bit | Description | Default Value |
|------|-------------|--|--|
| 0 | 00-07 | The selection Sensor Type =00h: Type K, 0.1°C/count =01h: Type J, 0.1°C/count =02h: Type T, 0.1°C/count =03h: Type B, 0.1°C/count =04h: Type R, 0.1°C/count =05h: Type S, 0.1°C/count =06h: Type E, 0.1°C/count =07h: Type N, 0.1°C/count =08h: Type L, 0.1°C/count =09h: Type U, 0.1°C/count =0Ah: Type C, 0.1°C/count =0Bh: Type D, 0.1°C/count =80h: 10uV Input, -81.0~81.0mV, 10uV / 1count =81h: 1uV Input, -32.7~32.7mV, 1uV / 1count =82h: 2uV Input, -65.5~65.5mV, 2uV / 1count =Others: Reserved | 00 : Type K |
| 1 | 00 | Temperature Type 0: Celsius(°C), 1: Fahrenheit(°F) | 00 : Celsius(°C) Cold Junction Compensation 0.1°C Normal Filter |
| | 01* | 0: Cold Junction Compensation 1: Disable Cold Junction Compensation | |
| | 02 | Data Resolution 0: 0.1°C, °F/bit, 1: 1°C, °F/bit | |
| | 03 | Reserved | |
| | 04 | Filter Type 0: Normal Filter, 1: Enhanced Filter | |
| | 05-07 | Reserved | |
| 2 | 00-07 | Internal Cold Junction[1] Offset Data Low Byte | 0000 |
| 3 | 00-07 | Internal Cold Junction[1] Offset Data High Byte | |
| 4 | 00-07 | Internal Cold Junction[2] Offset Data Low Byte | 0000 |

| | | | |
|---|-------|---|------|
| 5 | 00-07 | Internal Cold Junction[2] Offset Data High Byte | |
| 6 | 00-07 | External Cold Junction Offset Data Low Byte | 0000 |
| 7 | 00-07 | External Cold Junction Offset Data High Byte | |

Ethernet/IP Support

When using Ethernet/IP only, TCP connection timeout time value should be '0', the '0' value means TCP connection time out is disabled.

Refer to 'Coupler Ethernet and TCP/IP special register' section.

Supported Objects

| Name of Object | Type | Number of Instances | Class Code |
|--------------------|-----------------|---------------------|------------|
| Identity | Required | 1 | 01HEX |
| Message Router | Required | 1 | 02 HEX |
| Assembly | Required | 2 | 04 HEX |
| Connection Manager | Required | 1 | 06 HEX |
| Port | Required | 1 | F4 HEX |
| TCP/IP Interface | Required | 1 | F5 HEX |
| Ethernet Link | Required | 1 | F6 HEX |
| FnBus Manager | Vendor-specific | 1 | 70 HEX |
| Expansion Slot | Vendor-specific | 1~63 | 71 HEX |

1. Identity Object

Class Code: 01HEX

a. Common Services

| Service Code | Implemented for | | Service Name | Value |
|--------------|-----------------|----------|----------------------|---|
| | Class | Instance | | |
| 0x01 | Yes | Yes | Get_Attribute_All | |
| 0x05 | No | Yes | Reset | 0: Reset Only 1: Reset and Factory Default |
| 0x0E | No | Yes | Get_Attribute_Single | |

b. Class Attributes

| Instance ID | Attribute ID | Access Rule | Name | Data Type | Value |
|-------------|--------------|-------------|---------------------------------------|-----------|---------|
| 0 | 1 | Get | Revision | UINT | 0001HEX |
| | 2 | Get | Max Instance | UINT | 0001HEX |
| | 6 | Get | Maximum ID Number Class Attributes | UINT | 0000HEX |
| | 7 | Get | Maximum ID Number Instance Attributes | UINT | 0000HEX |

c. Instance Attributes

| Instance ID | Attribute ID | Access Rule | Name | Data Type | Value | |
|-------------|-----------------|-------------|---|---------------------------------|---|--|
| 1 | 1 | Get | Vendor ID | UINT | | |
| | 2 | Get | Device Type | UINT | 0CHEX (Communications Adapter) | |
| | 3 | Get | Product Code | UINT | | |
| | 4 | Get | Revision - Major - Minor | Structure of: USINT USINT | 1 ~ 9 1 ~ 255 | |
| | 5 | Get | Status | WORD | Device status. Defined in standard. | |
| | 6 | Get | Serial Number | UDINT | Unique Number | |
| | 7 | Get | Product Name - String Length - ASCII String | Short_String USINT STRING | | |
| | Vendor-specific | | | | | |
| | 100 | Get | Device Fault Code | USINT | 00HEX : Normal Operation Bit 0: No expansion slot Bit 1: Too many expansion slot Bit 2: Overflow I/O size Bit 3: I/O Configuration failure Bit 4: EEPROM Checksum fault Bit 6: Invalid Module ID Bit 7: Firmware fault | |
| | 104 | Get | Firmware Release Date | UDINT | YYYYMMDDHEX | |

2. Message Router Object

Class Code: 02HEX

a. Common Services

| Service Code | Implemented for | | Service Name |
|--------------|-----------------|----------|----------------------|
| | Class | Instance | |
| 0x01 | Yes | No | Get_Attribute_All |
| 0x0E | No | Yes | Get_Attribute_Single |

b. Class Attributes

| Instance ID | Attribute ID | Access Rule | Name | Data Type | Value |
|-------------|--------------|-------------|---------------------------------------|-----------|---------|
| 0 | 1 | Get | Revision | UINT | 0001HEX |
| | 4 | Get | Number of Attribute | UINT | 0000HEX |
| | 5 | | Number of Service | UINT | 0000HEX |
| | 6 | Get | Maximum ID Number Class Attributes | UINT | 0000HEX |
| | 7 | Get | Maximum ID Number Instance Attributes | UINT | 0000HEX |

c. Instance Attributes

| Instance ID | Attribute ID | Access Rule | Name | Data Type | Value |
|-------------|--------------|-------------|-------------------|---------------------------------------|---|
| 1 | 1 | Get | Object Class List | STRUCT of UINT Array of UINT | 10DEC 09 00 01 00 02 00 04 00 06 00 F4 00 F5 00 F6 00 70 00 71 00 |
| | 2 | Get | Number Available | UINT | 16DEC Maximum number of connections supported |

3. Assembly Object

Class Code: 04 HEX

a. Common Services

| Service Code | Implemented for | | Service Name |
|--------------|-----------------|----------|----------------------|
| | Class | Instance | |
| 0x0E | Yes | Yes | Get_Attribute_Single |
| 0x10 | No | Yes | Set_Attribute_Single |

b. Class Attributes

| Instance ID | Attribute ID | Access Rule | Name | Data Type | Value |
|-------------|--------------|-------------|----------|-----------|---------|
| 0 | 1 | Get | Revision | UINT | 0002HEX |

c. Class Attributes

| Instance ID | Attribute ID | Access Rule | Name | Data Type | Value |
|-------------|--------------|-------------|--------------------------------|-----------------|--------------------------|
| 1 | 3 | Get | Input (Produced) Process Image | Array n BYTE | Input process image data |

| | | | | | |
|---|---|---------|---|-----------------|---------------------------|
| | | | Data | | |
| 2 | 3 | Set/Get | Output (Consumed) Process Image Data | Array n BYTE | Output process image data |

4. Connection Manager Object

Class Code: 06HEX

a. Class Attributes, Instance Attribute

None

5. Port Object

Class Code: F4HEX

a. Common Services

| Service Code | Implemented for | | Service Name |
|--------------|-----------------|----------|----------------------|
| | Class | Instance | |
| 0x01 | Yes | Yes | Get_Attribute_All |
| 0x0E | Yes | Yes | Get_Attribute_Single |

b. Class Attributes

| Instance ID | Attribute ID | Access Rule | Name | Data Type | Value |
|-------------|--------------|-------------|---------------|------------------------------------|--|
| 0 | 1 | Get | Revision | UINT | 0001HEX |
| | 2 | Get | Max Instance | UINT | 0001HEX |
| | 3 | Get | Num Instances | UINT | 0001HEX |
| | 8 | Get | Entry Port | UINT | 0001HEX |
| | 9 | Get | All Ports | ARRAY of STRUCT UINT UINT | 0000HEX 0000HEX 0004HEX 0002HEX |

c. Instance Attributes

| Instance ID | Attribute ID | Access Rule | Name | Data Type | Value |
|-------------|--------------|-------------|--------------|-------------------------|---|
| 1 | 1 | Get | Port Type | UINT | 0004HEX , TCP/IP Port |
| | 2 | Get | Port Number | UINT | 0002HEX, CIP port number associate with port |
| | 3 | Get | Port Object | UINT Padded EPATH | |
| | 4 | Get | Port Name | Short_String | =0 |
| | 7 | Get | Node Address | Padded EPATH | |

6. TCP/IP Object

Class Code: F5HEX

a. Common Services

| Service Code | Implemented for | | Service Name |
|--------------|-----------------|----------|----------------------|
| | Class | Instance | |
| 0x01 | Yes | Yes | Get_Attribute_All |
| 0x0E | Yes | Yes | Get_Attribute_Single |
| 0x02 | No | Yes | Set_Attribute_All |
| 0x10 | No | Yes | Set_Attribute_Single |

b. Class Attributes

| Instance ID | Attribute ID | Access Rule | Name | Data Type | Value |
|-------------|--------------|-------------|---------------|-----------|---------|
| 0 | 1 | Get | Revision | UINT | 0001HEX |
| | 2 | Get | Max Instance | UINT | 0001HEX |
| | 3 | Get | Num Instances | UINT | |

c. Instance Attributes

| Instance ID | Attribute ID | Access Rule | Name | Data Type | Value |
|-------------|--------------|-------------|--|---|--|
| 1 | 1 | Get | Status | DWORD | See section 6.c.i |
| | 2 | Get | Configuration Capability | DWORD | 00000006HEX |
| | 3 | Get/Set | Configuration Control | DWORD | See section 6.c.ii |
| | 4 | Get | Physical Link Path Size of Path Path | STRUCT of: UINT Padded-PATH | 0002HEX 00 00 20 F6 24 01 |
| | 5 | Get/Set | Interface Configuration | STRUCT of: UDINT UDINT UDINT UDINT UDINT STRING | IP address Network Mask Gateway Address Name Server Name Server 2 Domain Name |
| | | | | | |

i. Status Instance Attributes

This attribute indicates the status of the TCP/IP network interface.

| Bit | Description |
|------|--|
| 0-3 | 0 – The Interface Configuration attribute has not been configured. 1 – The Interface Configuration attribute contains valid configuration from BOOTP, DHCP, or non-volatile storage. 2 – The Interface Configuration attribute contains valid configuration, obtained from DIP switch. 3-15 – Reserved. |
| 4 | Indicates pending configuration change in TTL and/or Mcast config. |
| 5-31 | Reserved |

ii. Configuration Control Instance Attributes

This attribute is a bitmap to control network configuration.

| Bit | Description |
|------|--|
| 0-3 | Determine how the device shall obtain its initial configuration at startup. 0 – The device shall use the interface configuration values previously stored in EEPROM. 1 – The device shall use the interface configuration values via BOOTP. 2 – The device shall use the interface configuration values via DHCP upon start-up. 3-15 – Reserved. |
| 4 | If TRUE, the device shall resolve host names by querying a DNS server. |
| 5-31 | Reserved |

7. Ethernet Link Object

Class Code: F6HEX

a. Common Services

| Service Code | Implemented for | | Service Name |
|--------------|-----------------|----------|----------------------|
| | Class | Instance | |
| 0x01 | Yes | Yes | Get_Attribute_All |
| 0x0E | Yes | Yes | Get_Attribute_Single |

b. Class Attributes

| Instance ID | Attribute ID | Access Rule | Name | Data Type | Value |
|-------------|--------------|-------------|---------------|-----------|---------|
| 0 | 1 | Get | Revision | UINT | 0002HEX |
| | 2 | Get | Max Instance | UINT | 0001HEX |
| | 3 | Get | Num Instances | UINT | 0001HEX |

c. Instance Attributes

| Instance ID | Attribute ID | Access Rule | Name | Data Type | Value |
|-------------|--------------|-------------|------------------|-------------------|---|
| 1 | 1 | Get | Interface Speed | UDINT | 10DEC, 100DEC |
| | 2 | Get | Interface Flags | DWORD | Bit 0 : Link Active Bit 1 : Full Duplex Bit 2~4 : Auto negotiation Bit 5 : Manual Setting required Reset Bit 6 : Local Hardware Fault Others : 0 |
| | 3 | Get | Physical Address | ARRAY of 6 USINTs | Same as MAC address |

8. I/O Bus Manager Object

Class Code: 70HEX

a. Common Services

| Service Code | Implemented for | | Service Name |
|--------------|-----------------|----------|----------------------|
| | Class | Instance | |
| 0x0E | No | Yes | Get_Attribute_Single |
| 0x10 | No | Yes | Set_Attribute_Single |

b. Class Attributes

None

c. Instance Attributes

| Instance ID | Attribute ID | Access Rule | Name | Data Type | Value |
|-------------|--------------|-------------|---|------------------|--|
| 1 | 1 | Get | Number of I/O Slot | USINT | (include deactivated slot) |
| | 2 | Get | Number of Activated Slot | USINT | |
| | 3 | Get | Number of Deactivated Slot | USINT | |
| | 4 | Get | External IDs | Array of 64 WORD | |
| | 5 | Get/Set* | Selection of Input (Produced) Process Image Mode | USINT | (default 2) Fixed |
| | 6 | Get/Set* | Selection of Output (Consumed) Process Image Mode | USINT | (default 0) Fixed |
| | 10 | Get | I/O Bus Status | USINT | 0: Normal Operation 1: I/O Bus Standby 2: I/O Bus Connection Fault 3: Expansion Configuration Fault 4: No expansion module |
| | 11 | Get | Input (Produced) Byte Size | UINT | IO input byte size |
| | 12 | Get | Output (Consumed) Byte Size | UINT | IO output byte size |
| | 13 | Get/Set* | Enable Input Run/Idle Header | BOOL | 0:Disabled Input Run/Idle Header (default) Fixed |
| | 14 | Get/Set* | Enable Output Run/Idle Header | BOOL | 1:Enabled Output Run/Idle Header (default) Fixed |
| | 15 | Get/Set* | Output Reset at stop | BOOL | 0:Disable(default) 1:Enable |

*After the system is reset, the new "Set Value" action is applied. If slot location is changed, default value is set automatically.

i. External ID's

| Word | Description |
|------|---|
| 0 | Network Adapter Module External ID = 0x00 |
| 1 | External ID for slot position #1 |
| 2 | External ID for slot position #2 |
| . | . |
| . | . |
| . | . |
| 62 | External ID for slot position #62 |
| 63 | External ID for slot position #63 |

9. Expansion Slot Object

Class Code: 71HEX

a. Common Services

| Service Code | Implemented for | | Service Name |
|--------------|-----------------|----------|----------------------|
| | Class | Instance | |
| 0x0E | No | Yes | Get_Attribute_Single |
| 0x10 | No | Yes | Set_Attribute_Single |

b. Class Attributes

None

c. Instance Attributes

| Instance ID | Attribute ID | Access Rule | Name | Data Type | Value |
|----------------------------|--------------|-------------|--|---------------------------------|---|
| 1~63 (Slot Address) | 1 | Get | Module External ID | USINT | Unitronics Module ID |
| | 2 | Get | I/O Data Code - Input Data Code - Output Data Code | Structure of: USINT USINT | |
| | 3 | Get | Input Offset Table - Byte Offset - Bit Offset | Structure of: USINT USINT | Byte offset in the Input Assembly Corresponding bit offset in the byte (If Input data length is zero, then return Empty.) |
| | 4 | Get | Output Offset Table - Byte Offset - Bit Offset | Structure of: USINT USINT | Byte offset in the Output Assembly Corresponding bit offset in the byte (If Output data length is zero, then return Empty.) |
| | 5 | Get | Input Data | Array of BYTE | Read Input data size defined by attribute 2. If Input data length is zero, then return Empty. |
| | 6 | Get/Set | Output Data | Array of BYTE | Read/Write Output data size defined by attribute 2. If Output data length is zero, then return Empty. |
| | 7 | Get/Set* | Active Flag | BOOL | 0: This slot is activated 1: This slot is deactivated |
| | 8 | Get | Configuration Parameter Data length | USINT | I/O Bus Parameter |
| | 9 | Get/Set | R/W Configuration Data | n Byte | Data array size defined by attribute 8. |
| | 100 | Get | Product Code | 4 Byte | See Table 4.10.2 |

| | | | | | |
|--|-----|-----|-------------------|---------------------------------|------------------------------------|
| | 101 | Get | Catalog Number | 4 Byte | |
| | 102 | Get | Firmware Revision | Structure of: USINT USINT | Expansion Module Firmware Revision |

*After the system is reset, the new “Set Value” action is applied. If slot location is changed, default value is set automatically.

i. I/O Data Code Format

| Byte# | Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
|-------|------------------|-------|--------------------|-------|-------|-------|-------|-------|
| +0 | Input Data Type | | Input Data Length | | | | | |
| +1 | Output Data Type | | Output Data Length | | | | | |

Input/output Type

0 0: No I/O Data

0 1: Byte Data

1 0: Word Data

1 1: Bit Data

Input/output Data Length

0 0 0 0 0: 0 Bit/Byte/Word

0 0 0 0 1: 1 Bit/Byte/Word

0 0 0 1 0: 2 Bit/Byte/Word

0 0 0 1 1: 3 Bit/Byte/Word

...

1 1 1 1 1: 63 Bit/Byte/Word

ii. Product Code Format

| Byte# | Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
|-------|--------------------|-------|-------|-------|-------|-------|-------|-------|
| +0 | Connection Type | | | | | | | |
| +1 | Assembly Type | | | | | | | |
| +2 | Output Information | | | | | | | |
| +3 | Input Information | | | | | | | |

Connection Type

| Byte# | Bit | Bit | Bit | Bit | Bit | Bit | Bit | Bit |
|-------|----------|-----|-----|-----|-----|-----|-----|-----|
| +0 | Reserved | | | | | | Mem | IO |

IO (Input/output Connection)

IO = 0: does not support Input/output Connection

IO = 1: support Input/output Connection

MEM (Memory Register Service)

MEM = 0: does not support Memory Register Service Connection

MEM = 1: support Memory Register Service Connection

Assembly Type

| Byte# | Bit | Bit | Bit | Bit | Bit | Bit | Bit | Bit |
|-------|-----------|-----|----------|-----|-----|----------|-----|-----|
| +1 | Unit Type | | Priority | | S | Reserved | | |

Unit Type

0 0: Not Used
 0 1: Input Module
 1 0: Output Module
 1 1: I/O Both Modules

Priority (Input/output Data Priority for assembly)

0 0: Priority 0 (low), usually it is used by Byte/Bit Type Discrete module.
 0 1: Priority 1
 1 0: Priority 2, usually it is used by Analog I/O module.
 1 1: Priority 3 (high)

| Status | Input Data |
|----------------------------------|------------------------------|
| Normal | 0x0000 (4mA) ~ 0x3FFF (20mA) |
| Open Wire or Under Range (0~3mA) | 0x8000 (-32678) |

Table 1: Example for analog current module

Input / Output Information

| Byte# | Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 | |
|-------|-----------|-------|-------------|-------|-------|-------|-------|--------------------|--|
| +2 | Data_Type | | Data_Length | | | | | Output Information | |
| +3 | Data_Type | | Data_Length | | | | | Input Information | |

Input/output Type

Input/output Data Length

| | |
|------------------|-----------------------------|
| 0 0: No I/O Data | 0 0 0 0 0: 0 Bit/Byte/Word |
| 0 1: Byte Data | 0 0 0 0 1: 1 Bit/Byte/Word |
| 1 0: Word Data | 0 0 0 1 0: 2 Bit/Byte/Word |
| 1 1: Bit Data | 0 0 0 1 1: 3 Bit/Byte/Word |
| | ... |
| | 1 1 1 1 1: 63 Bit/Byte/Word |

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