分類/Classification	☐ tDS ☐ tGW ☐ PETL/tET/tPET ☐ DS/PDS/PPDS ☑ TouchPAD ☐ I/O Card ☐ VXC Card ☐ VxComm ☐ Other				
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Q: How to convert a Modbus AI or AO Data (Register) into a value we want?

A: The Modbus is a protocol which leaves the data format undefined. Users can/should define their own.
The followings we take two examples to illustrate two common situations:

1. **Linear Mapping:**
   Supposed that we have an AO output ranging from -10 ~ 10V, the Modbus uses two bytes to represent this data and then we have:
   -10 v 10
   -32768 reading 32767 (0x7FFF)
   Through linear mapping, we have the remote side AO output v:

   ,where reading is an unsigned 16 bit integer received from a Modbus channel.
   That is,

2. **Byte Swap for Floating-point number:**
   Using the Modbus protocol, the most significant byte (MSB) is transmitted first in a word (two bytes) but the float data type has four bytes with little-endian format (where LSB is stored first) in Intels CPU. Then we have the followings:

   Supposed
   In the first transmit through Modbus: bytes[0], bytes[1]
   In the second transmit though Modbus: bytes[2], bytes[3]
   Then the byte order for Intels CPU is
   bytes[1], bytes[0], bytes[3], bytes[2]
   Users can now easily put the four bytes together to form a float value.

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Code snippet in C as below:

```
int ivalue = (bytes[2]<<24)+( bytes[3]<<16)+( bytes[0]<<8)+ bytes[1];
float fvalue = *(float*)&ivalue;
```

P.S. Different platforms (PC/PLC) may have different data format.

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