# Appendix D. Notes on the Use of 64-bit

# **Data Type**

cMT / cMT X Series models offer 64-bit data type support. The following explains limitations on the use of 64-bit data type.

Input ranges (Numeric object, Set Word object...etc)

i. unit64: 0 ~ 2^48
ii. int64: -2^48 ~ 2^48
iii. double: -2^48 ~ 2^48

## • int64 / unit64

Double is the internal data type used in computation, while it stores a mantissa with 52-bit precision. As a result, 15-digits integers and a portion of 16-digits integers may be stored exactly, but storing numbers exceeding that may result in lost precision.

In EasyBuilder Pro, inputs exceeding 48-bit may result in error; therefore, the input limit is defined as 48-bit.

#### double

In EasyBuilder Pro, the upper/lower input limit was formerly determined by the max/min of double (+/-  $1.79 * 10^308$ ), which is nearly limitless in practicality. For consistency, the upper/lower input limit is also defined as -2^48 ~ 2^48.

# Example:

The value 144,115,188,075,855,872 (a 64-bit unsigned int. value) read from PLC may be displayed as 144,115,188,075,855,870 by Numeric as precision is lost.

### Other circumstances:

As in the example above, the same problem may occur when using Recipe Import / SQL Query / Database (Data Sampling), where data is from an external source.

Please note that for double, as a floating-point number, precision issue is inherent. It should not be assumed that all numbers in the range  $+2^48 \sim -2^48$  is guaranteed to display exactly. Explanations above should apply to the use of int64 / uint64 only.



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