## Values

A non-empty value field must be assigned to each mandatory keyword except for \*‘\_START’ and \*‘\_STOP’ keyword values.

Comments and free-text value fields may be in any case (or mix of case) desired by the user.

Apart from comments and free-text fields, normative text value fields must be constructed using only **exclusively all uppercase** or **exclusively all lowercase**.

Integer values shall consist of a sequence of decimal digits with an optional leading sign (‘+’ or ‘-’). If the sign is omitted, ‘+’ shall be assumed. Leading zeroes may be used. The range of values that may be expressed as an integer is:

-2,147,483,648 ≤ x ≤ +2,147,483,647 (i.e., -231 ≤ x ≤ 231-1).

NOTE – The commas in the range of values above are thousands separators and are used only for readability. They should not appear in an actual message.

Non-integer numeric values may be expressed in either fixed-point or floating-point notation. Both representations may be used within an OPM, OMM, OEM, or OCM.

Non-integer numeric values expressed in fixed-point notation shall consist of a sequence of decimal digits separated by a period as a decimal point indicator, with an optional leading sign (‘+’ or ‘-’). If the sign is omitted, ‘+’ shall be assumed. Leading and trailing zeroes may be used. At least one digit shall appear before and after a decimal point.

Non-integer numeric values expressed in floating point notation shall consist of an optional sign, a mantissa string, an alphabetic character (either ‘E’ or ‘e’) indicating the division between the mantissa and exponent, and an exponent, constructed according to the following rules:

1. The optional sign character may be ‘+’ or ‘-’. If the sign is omitted, ‘+’ shall be assumed.
2. The mantissa shall be a string consisting of decimal digits, with a decimal point (‘.’) in the second position of the ASCII mantissa string separating the integer portion of the mantissa from its fractional part. The integer part shall consist of a single digit, and the fractional part shall contain at least one digit.
3. The character used to denote exponentiation shall be ‘E’ or ‘e’. If the character indicating exponentiation and the following exponent are omitted, an exponent value of zero shall be assumed (essentially yielding a fixed-point value).
4. The exponent must be an integer, optionally preceded by a ‘+’ or ‘-’ sign (if the sign is omitted, then ‘+’ shall be assumed).
5. The maximum positive floating-point value is approximately 1.798E+308, with 16 significant decimal digits precision. The minimum positive floating-point value is approximately 4.94E-324, with 16 significant decimal digits precision.

Blanks shall not be permitted within numeric values and time strings.

In value fields that are text, an underscore shall be equivalent to a single blank. Individual blanks shall be retained (shall be significant), but multiple contiguous blanks shall be equivalent to a single blank.

In value fields that represent an absolute time tag or epoch, times shall be given in one of the following two formats[[1]](#endnote-1):

YYYY-MM-DDThh:mm:ss[.d→d][Z]

or

YYYY-DDDThh:mm:ss[.d→d][Z]

where ‘YYYY’ is the year, ‘MM’ is the two-digit month, ‘DD’ is the two-digit day, ‘DDD’ is the three-digit day of year, ‘T’ is constant, ‘hh:mm:ss[.d→d]’ is the time in hours, minutes, seconds, and optional fractional seconds; ‘Z’ is an optional time code terminator (the only permitted value is ‘Z’ for Zulu, i.e., UTC). As many ‘d’ characters to the right of the period as required may be used to obtain the required precision, up to the maximum allowed for a fixed-point number. All fields shall have leading zeros. (See reference 2, ASCII Time Code A or B.).

NOTE: During a leap second introduction, the value of the two-digit integer seconds (ss) field shall be ‘60’ as specified on page 3-6 of reference [2].

The time system for CREATION\_DATE is UTC; for all other keywords representing times or epochs, the time system is determined by the TIME\_SYSTEM metadata keyword.

1. ISO 8601: Data elements and interchange formats – Information interchange – Representation of dates and times – Part 1, 2016. [↑](#endnote-ref-1)