TECHNICAL BULLETIN

[Issue No.] T12-0005 **[Page]** 1/5
[Title] Restrictions for Use of Absolute Position System with A1SD75M□/AD75M□ **[Date of Issue]** Oct. '98
[Relevant Models] A1SD75M1, A1SD75M2, A1SD75M3,AD75M1, AD75M2, AD75M3

Thank you for your continued patronage of the Mitsubishi general-purpose programmable controller MELSEC-A Series.

With the following positioning units, an absolute position system compatible servo amplifier can be connected to structure an absolute position system.

- A1SD75M1 type positioning unit
- A1SD75M2 type positioning unit
- A1SD75M3 type positioning unit
- AD75M1 type positioning unit
- AD75M2 type positioning unit
- AD75M3 type positioning unit

The restrictions that apply when using the A1SD75M1, A1SD75M2, A1SD75M3, AD75M1, AD75M2 and AD75M3 with the absolute position system are given in the following manual. However, as there are some unclear expressions, the restrictions are explained again in this bulletin.

- A1SD75M1/M2/M3, AD75M1/M2/M3 type Positioning Unit User's Manual (Details) IB (NA)-66715

Whereas

[Details]

When using the A1SD75M1, A1SD75M2, A1SD75M3, AD75M1, AD75M2 and AD75M3 with the absolute position system, the following operations are not possible.

- Infinite length control for controlling in a set direction, such as with a turntable
- Control in which the movement amount from the zero point address exceeds the range of condition 1 and condition 2 given on the next page.

When positioning with the absolute position system, the range must satisfy condition 1 and condition 2 given on the next page.
If used in a range that does not satisfy condition 1 and condition 2, recovery to the correct present value when the power is turned ON or reset will not be possible. Thus, the absolute position system cannot be used.

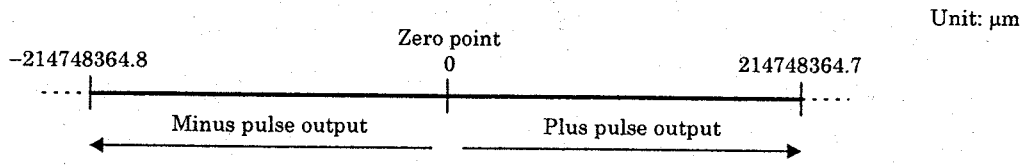
MITSUBISHI ELECTRIC CORPORATION
HEAD OFFICE MITSUBISHI DENKI BLDG. MARUNOUCHI. TOKYO 100-0005. TELEX J24532 CABLE MELCO TOKYO

Condition 1. No. of output pulses

(1) This is the No. of pulses that can be output to the servo amplifier when positioning from the zero point with the absolute position system.
With the absolute position system, pulses within the range of the following expression can be output to the servo amplifier.

[−32768 × (No. of feedback pulses)] ≤ [No. of output pulses] ≤ [32768 × (No. of feedback pulses) −1]

(2) The address incrementing direction from the zero point is plus, and the address decrementing direction from the zero point is minus.



(3) The No. of output pulses following the No. of feedback pulses is shown below.
- When feedback pulse is 8192 (pulse) : −268435456 (pulse) ~ 268435455 (pulse)
- When feedback pulse is 16384 (pulse) : −536870912 (pulse) ~ 536870911 (pulse)

Condition 2. Positioning address

(1) The positioning addresses that can be designated with the positioning unit are as follow.

- When unit is mm : −214748364.8 (μm) ~ 214748364.7 (μm)
- When unit is inch : −21474.83648 (inch) ~ 21474.83647 (inch)
- When unit is pulse : −2147483648 (pulse) ~ 2147483647 (pulse)
- When unit is degree : 0° ~ 359.99999°

[Calculation of positioning address, and ideology of absolute position system]

The positioning address is calculated with the following expression.
(Positioning address) = (Movement amount per pulse) × (No. of output pulses) + (Zero point address)
... Expression 1

1. Ideology of mm, inch and pulse unit

The range that satisfies condition 1 and condition 2 is used as the positioning address for the absolute position system.
A range that does not satisfy condition 1 and condition 2 cannot be used as the positioning address for the absolute position system.

The ideology of the positioning address is the same, so examples for a mm unit are shown on the following pages.

Example 1

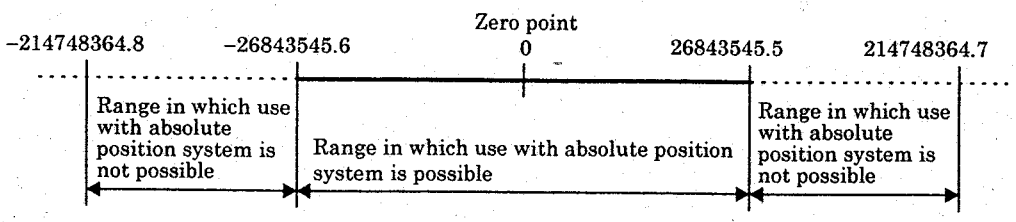
(1) The conditions for calculating the positioning address are shown below.
- Movement amount per pulse: 0.1 (μm)
- Zero point address: 0.0 (μm)
- Feedback pulse = 8192 (pulse)

(2) The upper limit and lower limit values of the positioning address that can be designated are calculated from the condition 1 No. of output pulse usage range and the positioning address calculation expression (Expression 1).
- Lower limit value of positioning address (Calculated with No. of pulses on minus side of condition 1)
(Positioning address) = (Movement amount per pulse) × (No. of output pulses) + (Zero point address)
= 0.1 × (−268435456) + 0.0
= −26843545.6 (μm)

- Upper limit value of positioning address (Calculated with No. of pulses on plus side of condition 1)
(Positioning address) = (Movement amount per pulse) × (No. of output pulses) + (Zero point address)
= 0.1 × 268435455 + 0.0
= 26843545.5 (μm)

(3) The upper limit and lower limit values of the calculated positioning address are within the range of condition 2.
With this, the positioning range = [−26843545.6 (μm) to 26843545.5 (μm)] calculated with condition 1 can be used with the absolute position system.
If the positioning exceeds −26843545.6 (μm) to 26843545.5 (μm), use is not possible with the absolute positioning system.

Unit: μm

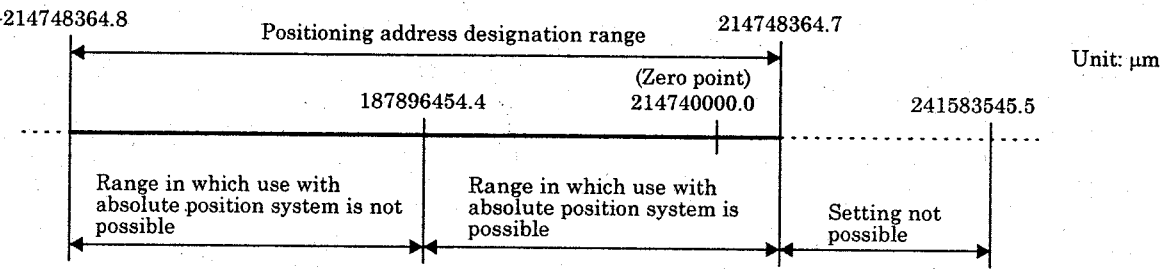


Example 2

(1) The positioning address that can be designated with a system for which the zero point address in Example 1 is set to 214740000.0 (μm) is calculated with Expression 1.
- Lower limit value of positioning address
(Positioning address) = 0.1 × (−268435456) + 214740000.0
= 187896454.4 (μm)

- Upper limit value of positioning address
(Positioning address) = 0.1 × 268435455 + 214740000.0
= 241583545.5 (μm)

(2) As the lower limit value of the calculated positioning address is within the range of condition 2, the calculated address 187896454.4 (μm) is the lower limit for positioning with the absolute position system.
As the upper limit value of the calculated positioning address exceeds the condition 2 range, the upper limit value 214748364.7 (μm) of the condition 2 positioning range will be the upper limit for positioning with the absolute position system. With the absolute position system, use within the range of 187896454.4 (μm) and 214748364.7 (μm). Positioning that exceeds 187896454.4 (μm) is not possible.



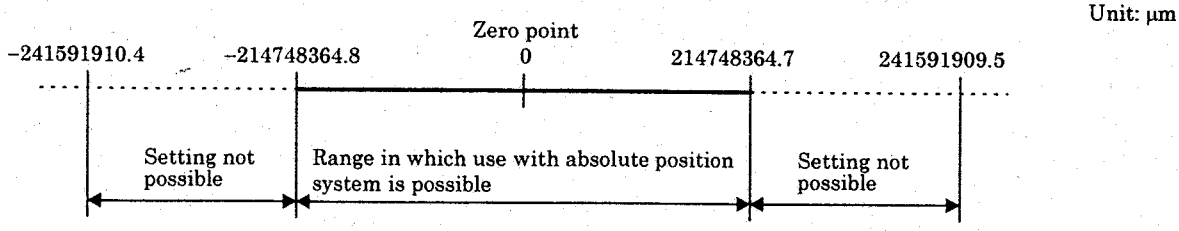
Example 3.

(1) The conditions for calculating the positioning address are shown below.
- Movement amount per pulse: 0.9 (μm)
- Zero point address: 0.0 (μm)
- Feedback pulse = 8192 (pulse)

(2) The positioning address is calculated from the condition 1 No. of output pulse usage range and the positioning address calculation expression (Expression 1).
- Lower limit value of positioning address (Calculated with No. of pulses on minus side of condition 1)
(Positioning address) = (Movement amount per pulse) x (No. of output pulses) + (Zero point address)
= 0.9 × (-268435456) + 0.0
= -241591910.4 (μm)

- Upper limit value of positioning address (Calculated with No. of pulses on plus side of condition 1)
(Positioning address) = (Movement amount per pulse) × (No. of output pulses) + (Zero point address)
= 0.9 × 268435455 + 0.0
= 241591909.5 (μm)

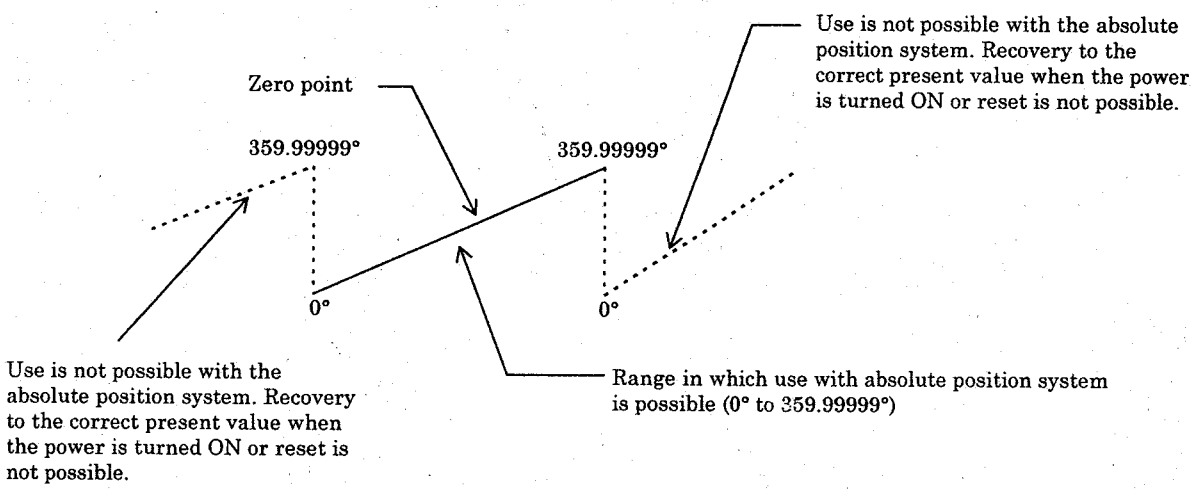
(3) The upper limit and lower limit values of the calculated positioning address exceed the range of condition 2. Thus, the address must be used within the condition 2 positioning range (-214748364.8 (μm) to 214748364.7 (μm)).



2. Ideology for degree unit

- The positioning address is within the range of 0° to 359.99999° of the position where zero point return was carried out.
  Even if the zero point position is not 0°, the range is 0° to 359.99999°.

- During positioning in the same direction, over-the-hill control (at address increment: 359.99999° to 0°, at address decrement: 0° to 359.99999°) is not possible. (Refer to following drawing.)



- When using with the absolute position system, set the upper limit and lower limit values of the software stroke limit within the range of 0° to 359.99999°.