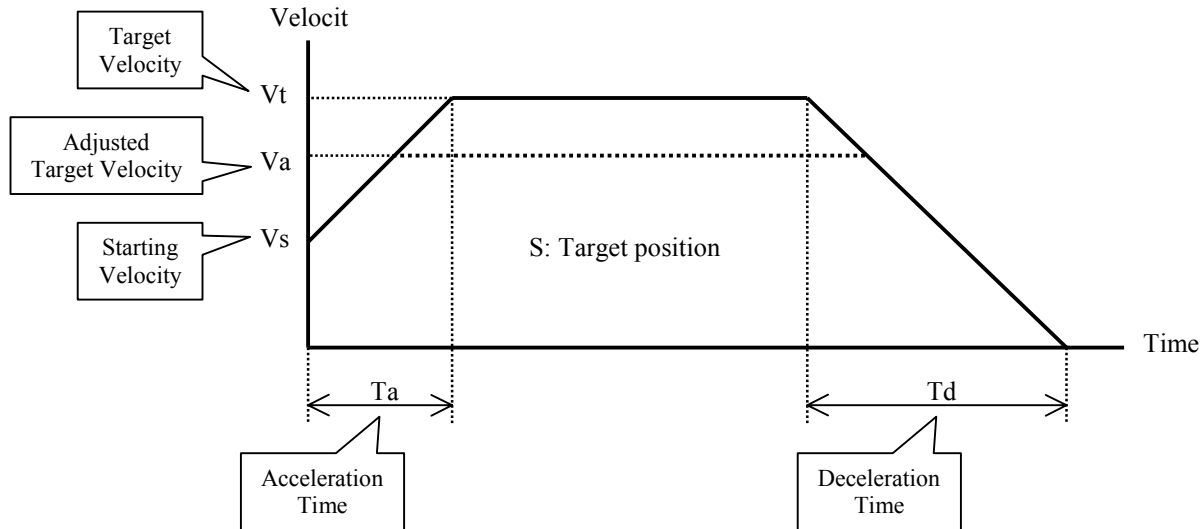


## Velocity adjustment in Mode 30

Sometime the actual target velocity outputted by the D2-CTRINT or DL05 seems to be lower than customer's setup. The reason is that Koyo's PLC re-calculates the target velocity according to the customer's setups and adjusts the target velocity to execute the profile correctly if it is necessary. This document explains the formula which Koyo's PLC is using for the velocity adjustment.



The adjusted terminal velocity ( $V_a$ ) is calculated with the following formula:

$$V_a = \sqrt{\frac{A + B}{C}}$$

$$A = 2 * (V_p - V_s) * (V_p - 40) * S$$

$$B = (V_p - 40) * T_a * V_s * V_s + (V_p - V_s) * T_d * 1600$$

$$C = V_p * T_a + V_p * T_d - 40 * T_a - V_s * T_d$$

After the calculation, if  $V_a$  is lower than  $V_p$ ,  $V_a$  is used as the target velocity to execute the profile.

[Example]

$V_p = 2000$  Hz

$S = 80$

$V_s = 40$  Hz

$T_a = 200$  msec

$T_d = 200$  msec

$$A = 2 * (2000 - 40) * (2000 - 40) * 80 = 614656000$$

$$B = (2000 - 40) * 0.2 * 40 * 40 + (2000 - 40) * 0.2 * 1600 = 1254400$$

$$C = 2000 * 0.2 + 2000 * 0.2 - 40 * 0.2 - 40 * 0.2 = 784$$

$$V_a = \sqrt{\frac{A + B}{C}} = \sqrt{\frac{614656000 + 1254400}{784}} = 886.3 \text{ Hz}$$

In this case,  $V_a (= 886.3\text{Hz})$  is lower than  $V_p (= 2000\text{Hz})$ , so 886.3Hz can be used as the target velocity.