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CUSTOM SOFTWARE DESCRIPTION

V7 Low HP
Decel Positioning Software

CIMR-V7AMXXXXX-030
(20P1 ~ 23P7, 40P2 ~ 43P7)

Software Number: VSP018044		**Base Version:** VSP017902
Product: V7		**Part Number:** CIMR-V7AMXXXX-030
Original Release Date: 5/24/00	**Author:** Ty Phillips	☐Beta Version

Overview: For rotary indexing application. Modifies the decel time based on frequency reference. Revision History:
     VSP018040 - Original Version.
     VSP018041 - Corrected formula for alternate decel calculation 8/17/00.
     VSP018043 - Added compensation function (P-05, P-06) 11/20/03.
     VSP018044 - Added Ink Dip Function 8/5/04.		

1. Background

This software is designed for use on a rotary silkscreen-printing machine. The drive controls the rotation of the press from one station to the next. A crude positioning (indexing) scheme is achieved using slow down and in-position limit switches. The software modifies the decel time based on the speed reference so that the creep distance (and therefore the cycle time) is minimized.
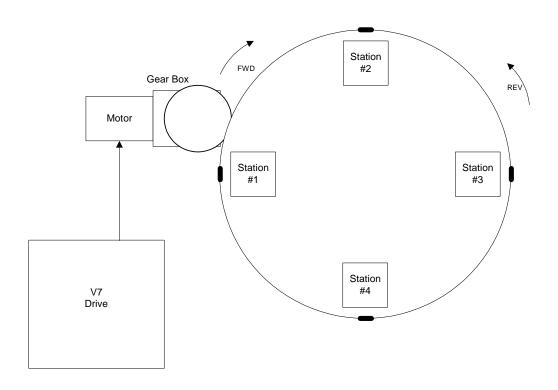
Figure 1: Picture of Rotary Silkscreen-Printing Machine

2. Overview

This software is intended for simple positioning applications using limit switches. The software modifies the deceleration time based on the speed reference so that the creep distance (and therefore the cycle time) is minimized.

3. Related Parameters and Functions

3.1 Parameters

No.	Modbus Address	Parameter Name	Description	Range	Unit	Default
P-01	0580H	Decel Positioning Function Selection	0: Decel positioning is disabled. 1: Decel positioning is enabled.	0 ~ 1	-	0
P-02	0581H	Position Speed Operation Mode Selection	0: Position speed mode is disabled. When the drive is stopped it calculates the correct decel time based on the current output frequency. 1: Position speed mode is enabled. When the position speed select multi-function input is closed, the drive decelerates to position speed (P-04), using its calculated decel time. When the run command is removed, it stops using its normal decel time. 2: Decel Positioning is enabled – during Ink Dip decel time is n022 setting.	0 ~ 2	-	0
P-03	0582H	Decel Time Limit	Sets the upper limit of the deceleration time during decel positioning.	0 ~ 300.0	0.1sec	300.0
P-04	0583H	Position Speed	Sets the creep speed for position speed mode.	0 ~ 400.0	0.01Hz*	2.00
P-05	0584H	Decel Compensation Gain	Applies a gain to the calculated decel rate when the output frequency at stopping is less than the decel compensation frequency (P-06).	1.00 ~ 2.00	-	1.00
P-06	0585H	Decel Compensation Frequency	Sets the frequency below which the decel compensation gain is applied.	0.01 ~ 400.0	0.01Hz*	50.00
P-07	0586H	Ink Dip Reference	Sets the frequency reference used during Ink Dip.	0 ~ 400.0	0.01Hz*	2.00

*For settings greater than 99.99 Hz, the unit is 0.1 Hz.
Note: P-01 ~ P-07 appear after n039 in the programming menu.

3.2 Multi-function input settings (n050 ~ n056)

Setting	Description
100	Position Speed Select
101	Ink Dip Select

3.3 Monitors

No.	Memobus Address	Monitor Name	Description	Unit
U-50	00D0H	Active Decel Time	Displays the active decel time (either n020/n022, or the calculated decel rate).	0.01sec*

*For settings greater than 99.99Hz, the unit is 0.1sec.

4. Function Description

Parameter P-01 must be set to 1 or 2 for the Decel Position function to operate. When P-01 = 0, the V7 functions as standard.

When position speed mode is disabled (P-02 = 0), the V7 functions according to Figure 2. When the run command is removed, the current frequency reference is sampled and the decel time calculated.

With position speed mode enabled (P-02 = 1), the V7 functions according to Figure 3. When the Position Speed multi-function input is closed, the current frequency reference is sampled and the decel time calculated. The inverter decelerates to the P-04 speed using the calculated decel rate. When the run command is removed, the drive will stop using the normal active decel rate.

When the Ink Dip Select multi-function input is closed, the drive changes direction and runs at the Ink Dip Reference (P-07). If P-01 = 2, the drive deceleration time during Ink Dip is Deceleration time 2 (n022). If P-01 = 1, the drive deceleration time during Ink Dip is either the programmed decel time run command is closed) or the calculated decel positioning time (run command removed). The Ink Dip multi-function input overwrites the Position Speed multi-function input.

Run Command	Ink Dip multi-function input	P-01 setting	Decel Time
OFF	OFF	1	$tdecel \times (Fmax / Fout)^2 \times K$
OFF	OFF	2	
OFF	ON	1	$tdecel \times (Fmax / Fout)^2 \times K$
OFF	ON	2	n022
ON	OFF	1	N/A
ON	OFF	2	
ON	ON	1	tdecel
ON	ON	2	n022

tdecel = n020/n022 (depending on Accel/Decel Select multi-function input)

Note: If reverse operation is disabled (n006 = 1), the drive has a forward run command and the Ink Dip Select multi-function input is closed, the drive will will run at the P-07 reference but it will continue to run in the forward direction.
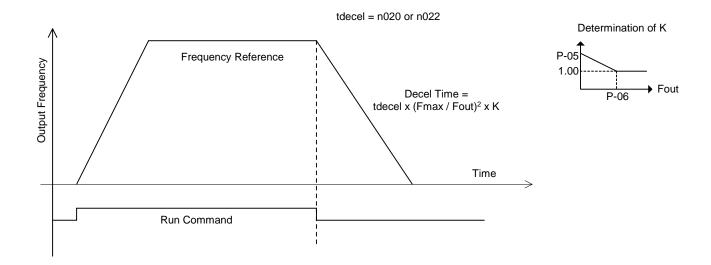
5. Timing Diagrams

tdecel = n020 or n022

Output Frequency

Frequency Reference

Determination of K

P-05

1.00

P-06

Fout

Decel Time =
tdecel x (Fmax / Fout)^2 x K

Time

Run Command

Figure 2: Operation When P-02 = 0 (Position Speed Mode Disabled)

tdecel = n020 or n022

Output Frequency

Frequency Reference

Decel Time =
tdecel x (Fmax / Fout)^2 x K

Position Speed
P-04

Determination of K
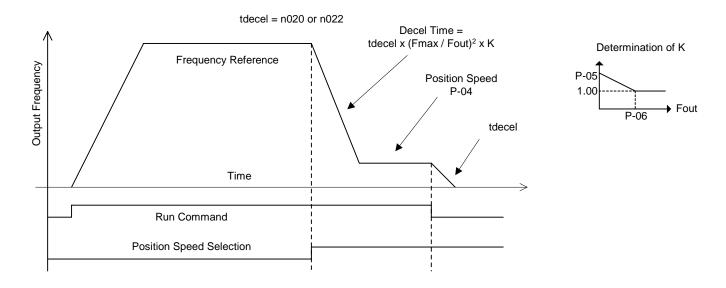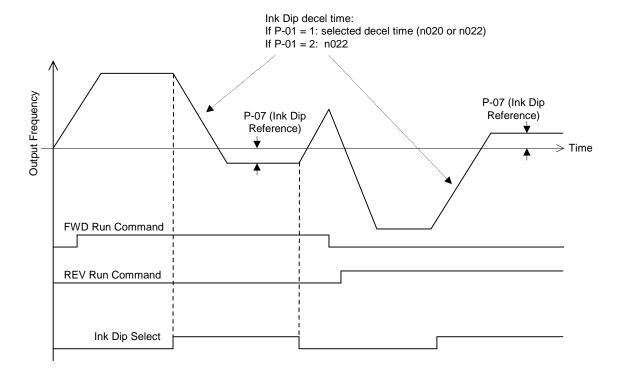
P-05

1.00

P-06

Fout

tdecel

Time

Run Command

Position Speed Selection

Figure 3: Operation When P-02 = 1 (Position Speed Mode Enabled)

Ink Dip decel time:
If P-01 = 1: selected decel time (n020 or n022)
If P-01 = 2: n022

P-07 (Ink Dip Reference)

P-07 (Ink Dip Reference)

Output Frequency

Time

FWD Run Command

REV Run Command

Ink Dip Select

Decel Time =
tdecel x (Fmax / Fout)^2 x K

Ink Dip decel time:
If P-01 = 1: tdecel x (Fmax / Fout)^2 x K
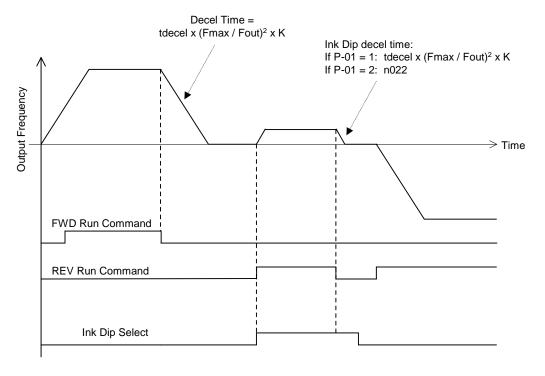If P-01 = 2: n022

Output Frequency

Time

FWD Run Command

REV Run Command

Ink Dip Select

Figure 4: Operation of Ink Dip Mode