

TOSVERT VF-A7/P7

Load Torque Monitoring Function Reference Manual (Torque after eliminating Acceleration/Deceleration torque)

Toshiba Schneider Inverter Corporation

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1.INTRODUCTION

Thank you for purchasing the Toshiba industrial inverter "TOSVERT VF-A7/P7".

This manual describes the functions of parameters F325 to F327 related to load torque monitoring (function number 32), one of the monitoring output functions provided by the TOSVERT VF-A7/P7 industrial-use inverter.

2.FUNCTIONS

This function (function number 32) enables to eliminate acceleration/deceleration torque from usual torque monitor function (function number 8 or 10). By using this, the load torque can be monitored.

One of application is up/down drive of a hoist crane. From this load torque, a controller estimates the load weight during acceleration/deceleration, and in case it is empty automatically increases the speed.

Also, this is useful to improve stability in drooping control mode.

The selection of base torque, output torque (function number 8) or internal torque reference (function number 10) is set by parameter F327.

3.RELATED PARAMETERS

Monitoring FM/AM/Pulse Output Function Selection

Function No.	Communication No.	Function	Communication unit	Monitor output selection	Trip hold	Meter output selection	Vector control			V/f constant control
							Speed control	Torque control	Position control	
32	FE60	Load torque	0.01%	- (Not usable)	× (Not usable)	32	-/●	-/-	-/●	-

Parameters

Title	Communication No.	Function	Adjustment range	Minimum setting unit (Panel/comm.)	Default	Writing during operation	Vector control			V/f constant control
							Speed control	Torque control	Position control	
F325	0325	Load inertia (for Acc/dec torque calculation)	0.0 - 1000	0.1/0.1	1.0	Enabled	●/●	-/-	-/-	-
F326	0326	Load torque filter (for Acc/dec torque calculation)	0.0 - 199.9 200.0 (Without filter)	0.1/0.1	200.0	Enabled	●/●	-/-	-/-	-
F327	0327	Drooping reference selection	0: Standard 1: Torque after eliminating Acc/Dec torque 2: Internal torque reference 3: Internal torque reference after eliminating Acc/Dec torque	-	0	Enabled	●/●	-/-	-/-	-

Sensorless vector/Sensor vector

● : Valid, - : Invalid

4. OPERATION

[Parameter Setting]

Title	Function	Adjustment range	Setting
<i>Pt</i>	V/f control selection	0 - 9	8 or 9 (*1)
<i>F75L</i>	FM terminal meter selection (FM terminal)	0 - 32	32 Load torque
<i>F670</i>	AM terminal meter selection (AM terminal)		
<i>F672</i>	Optional analog terminal #1 meter selection (MON1 terminal)		
<i>F674</i>	Optional analog terminal #2 meter selection (MON2 terminal)		
<i>F676</i>	FP terminal selection (FP terminal)		
<i>F325</i>	Load inertia (for Acc/dec torque calculation)	0.0 - 1000	Setting according to the load
<i>F326</i>	Load torque filter (for Acc/dec torque calculation)	0.0 - 199.9 200.0 (Without filter)	Setting according to the load
<i>F327</i>	Drooping reference selection	0: Standard 1: Torque after eliminating Acc/Dec torque 2: Internal torque reference 3: Internal torque reference after eliminating Acc/Dec torque	1 or 3

*1: Valid only for the speed control and position control functions of sensor vector control mode.

When the above parameters are set, load torque, torque after eliminating acceleration/deceleration torque can be sent to the desired monitoring output terminal (FM, AM, MON1, MON2, or FP). To perform meter adjustments (gain adjustments), use the respective adjustment parameters (FM, F671, F675, F677).

Two types of load torque data can be sent to the monitoring output terminals, and either type can be selected using the *F327* parameter.

- 1) *F327* = 1: Torque after eliminating acceleration/deceleration torque

The following value can be obtained as a monitoring output level:

Monitoring output = Torque (monitoring output function 8) - Acceleration/deceleration torque

- 2) *F327* = 3: Internal torque reference after eliminating acceleration/deceleration torque (less delay than in case *F327* = 1)

The following value can be obtained as a monitoring output level:

Monitoring output = Internal torque reference (monitoring output function 10) - Acceleration/deceleration torque

Acceleration/deceleration torque is internally calculated using the setting of the *F325* parameter.

Use the following expression to calculate the desired value of the *F325* parameter, and enter that value:

$$F325 = \frac{\text{Load inertial moment } J [\text{kgm}^2]}{\text{Rated motor torque } \tau_n [\text{Nm}]} * 1000$$

Because the load torque is calculated based on actual torque, it has delay to be established (Please refer 5.Example of application). To stabilize (eliminate transient factor) *F326* parameter can be used. The value of $1/F326$ (sec) is the appropriate amount of filtering (time).

5.EXAMPLE OF APPLICATION

For Application to a Lifter/Elevator

