APPLICATION NOTE	AN-MEGA-0005v100EN
Controlled deceleration when AC mains is lost in PG vector mode	

Inverter type	FRENIC MEGA
Software version	1000 and later
Required options	Not required
Related documentation	FRENIC MEGA User manual_MEH278a
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Use	Public, Web
Date	05/03/2009
Version	1.0.0
Languages	English

Introduction.

This document describes a special set up of FRENIC MEGA to have controlled deceleration of the motor when AC mains is lost, in case the control mode of the inverter is closed loop vector control (F42=6). The goal of this set up is to have the same behavior as F14=3, because the problem is that this function is not available (does not work) with FRENIC MEGA when closed loop vector control mode (F42=6) is used.

Description.

The principle of the idea is to use PID control when AC mains is lost. The PID control will try to keep the DC bus voltage over the LU level by using the energy recovered from the motor during deceleration. The PID control (programmed in inverse mode) will decelerate the motor in order to get the necessary energy to keep the DC bus voltage in a proper level.

The setpoint of the PID control will be set by keypad or analog input, whereas the PID control feedback is given by analog input V2, which has been connected to the analog output FM1. This analog output has been programmed to give a 0-10 VDC signal proportional to the DC bus voltage (F31=9).

The setpoint value for the PID control corresponds to the voltage given by analog output FM1 when the DC bus voltage is at rated voltage. If function F30=100 (analog output FM1 scaling) then the value of FM1 output is approximately 5.6 VDC when the inverter supply voltage is 3 ph 400 VAC.

The proportional gain (J03) and integral time (J04) values of the PID controller will depend on the mass (inertia) of the motor and the load.

Another point to consider in the proposed solution is that the PID control will be active only when AC mains is lost. The idea is to use a digital input (in this case X1) to activate the PID. This digital input is programmed to function Hz/PID (E01=20). With this setting PID control will be active only when the signal in digital input X1 is NOT active. The idea is to control this input with a contact that will be closed when the AC mains is OK and will be open when AC mains is lost. Figure 1 shows the control signal connection set up diagram when the inverter is configured in SOURCE logic.

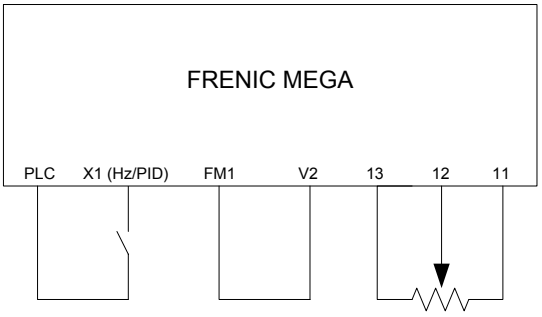

Figure 1. Control signal connection set up diagram (SOURCE logic)

Inverter function set up.

The following table shows the inverter set up from default settings

Function	Value	Description
J01	2	PID control active with inverse operation
J02	1	PID setpoint given by analog input (PID process command 1)
F31	9	Analog output FM1 configured as DC bus voltage signal
E01	20	Digital input X1 programmed to Hz/PID function
J03	1.0	PID controller proportional gain. The setting value depends on the motor and load inertia
J04	0.0 s	PID controller integral time. The setting value depends on the motor and load inertia
E61	3	Analog input 12 programmed to PID set point
E63	5	Analog input V2 programmed to PID feedback

Conclusion.

By using PID control with FRENIC MEGA is possible to have controlled deceleration when AC mains is lost even when this function (same behavior as F14=3) is not available when the inverter is set to closed loop vector control mode (F42=6).

Document history.

Version	Changes applied	Date	Written	Checked	Approved
1.0.0	First version	05/03/2009	D. Bedford	J. Català	D. Bedford