

Application Note	AN-MEGA-0021-v101EN
FRENIC MEGA Servo controlled by external motion controller	

Inverter type	FRENIC MEGA Servo
Software version	1700 or later
Required options	-
Related documentation	MEGA_IM_AE_1335a-E
Author	David Bedford
Use	Public, Web
Date	29/03/2012
Version	1.0.1
Languages	English

1. Introduction.

This document describes the set up of FRENIC MEGA Servo when used with external motion controller giving the speed set point by analog input.

2. System set up.

The solution explained in this document is not new. The system set up is shown in figure 1. In this solution FRENIC MEGA Servo inverter is controlled by an external motion controller that:

- Gives the speed set point by analog input (in this case input 12)
- Closes the position loop.

In order to be able to close the position loop, the motion controller receives the position information from an encoder (either the motor feedback encoder or another encoder installed in another location like the output of a gearbox).

The main points to consider are:

- RUN command (FWD or REV) has to be given to the inverter. In this AN, RUN command given by I/O terminals is considered.
- The speed reference should not have added delay by the inverter, so that the inverter can respond as fast as possible. Therefore we set to zero:
 - o The analog input 12 filter (C33=0.00 s).
 - o The speed command filter (d01=0.000 s).
 - o The speed controller output filter (d06=0.000 s).
 - o The acceleration and deceleration times of the inverter (F07=0.00 s and F08=0.00 s).
- The speed reference may have positive and negative values in order to be able to turn the motor in both clockwise and counter clockwise directions. Therefore the analog input 12 shall be configured as bipolar (C35=0).

- The inverter must be configured according to the encoder or resolver specifications. In order to do so, we must set the following parameters:
 - o Encoder input pulse format (d14).
 - o Encoder pulse resolution (d15, in pulses per revolution)
- As soon as the inverter RUN command is ON it should apply current (torque) to the motor, even if the speed reference is zero. Therefore d24=1.

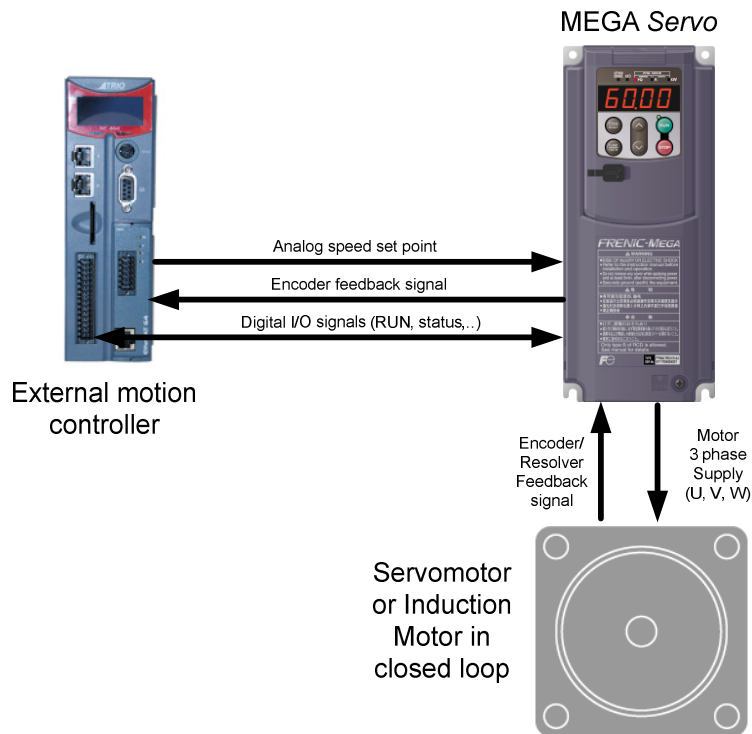


Figure 1. System set up.

Additionally we must tune (set up) the gains of the inverter speed controller (ASR), according to the motor load characteristics (inertia and load torque):

- P gain (function code d03)
- I time (function code d04)
- Feed-forward gain (function code d05)

In some cases it is also needed to adjust the analog input offset (C31) in order to compensate (cancel) any voltage offset in the analog signal (due to the external controller analog output or the inverter analog input).

3. Parameter settings.

Table 1 below describes the function codes settings of the FRENIC MEGA Servo inverter different from default. In case of function codes d14 and d15, the settings correspond to the case of using resolver option.

Table 1. Function codes different from default settings for the FRENIC MEGA Servo.

Function	Value	Description
F01	1	Frequency set point from input 12
F02	1	Terminal command FWD or REV
F07	0.00 s	Acceleration time 1
F08	0.00 s	Deceleration time 1
C31	0.1 %	Analog input 12 offset
C33	0.00 s	Analog input 12 filter time constant
C35	0	Analog input 12 polarity (must be bipolar)
d01	0.000 s	Speed command filter
d02	0.000 s	Speed detection filter
d03	20.0	Speed control P gain
d04	0.070 s	Speed control integral time
d05	0.3 s	Speed control feed-forward time
d06	0.000 s	Speed control output filter
d14	2	Feedback input pulse format (A/B quadrature)
d15	1024 ppr	Feedback encoder pulse resolution (in case of resolver, do not change this value)
d24	1	Zero speed control enabled

4. Conclusion.

This document describes the complete set up of FRENIC MEGA Servo to be able to be controlled by an external motion controller giving speed reference by analog input.

5. Document history.

Version	Changes applied	Date	Written	Checked	Approved
1.0.0	First version	19/03/2012	D. Bedford	JM Ibáñez	J. Alonso
1.0.1	Small text correction	29/03/2012	J. Alonso	D. Bedford	J. Alonso