

<b>APPLICATION NOTE</b>	<b>FECA-AN-105D</b>
<b>Pump Jack Drive Application</b>	

<b>Inverter type</b>	FRENIC MEGA
<b>Software version</b>	All
<b>Required options</b>	None
<b>Related documentation</b>	FRENIC MEGA Instruction Manual INR-SI47-1457a-E, FRENIC MEGA User's Manual MEHT536
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<b>Revision</b>	D

### Introduction

This application note will address the use of Fuji Electric inverters in the operation of pump jacks without the use of a braking resistor or braking unit.

The application of an inverter to control the motion of a pump jack can be done, while avoiding problems caused by overhauling loads with the built in features of the FRENIC MEGA. This application note will address the basic setup for the **FRENIC MEGA** drive's operation.

### Programming

The following function codes are a basis for programming the MEGA and to set up over-voltage avoidance/Anti regenerative control.

Code	Name	Data Setting Range	Set to
P01	Motor 1 number of poles	# Poles	Per motor data sheet
P02	Rated capacity	(KW when P99= 0, 2, 3, or 4 (HP when P99= 1)	Per motor data sheet
P03	Motor rated current	0.00 to 2000A	Per motor data sheet
P04	Auto tuning (Refer to instruction manual for further information)	0- Disable 1- Tune while motor is stopped (%R1, %X, and rated slip) 2- Tune rotating motor under V/f control 3- Tune rotating motor under vector control	1
P06	No load current	0.00-2000A	Per motor data sheet

P99	Motor 1 selection	0- Fuji standard 8 series motors 1- HP rated motors 2- Fuji vector designed motors 3- Fuji standard 6 series motors 4- Other motors	1
F10	Electronic thermal overload for Motor 1	1- General purpose motor with shaft driven cooling fan 2- Inverter driven motor, non ventilated motor, or motor with separately powered cooling fan	Per applied motor
F11	Overload detection level in Amps (Set to motor rated amps)	0- Disable 1% to 135% in Amperage of rated current	Per motor name plate FLA
F12	Thermal time constant	0.5 to 75 minutes	5
H69	Automatic deceleration control	0- Disable 2- Torque limit control with 3 times force to stop time 3- DC bus voltage control with 3 times forced to stop time 4- Torque limit control without forced to stop time 5- DC bus voltage control without forced to stop	4
H76	Torque limiter (Frequency increment limit for braking)	0.00-500Hz	Start at 5Hz and adjust per the application from there

**Note:** Additional function code settings may be needed per application. Program the MEGA to the needs of the system.

**Procedure**

After the weight on a Pump Jack passes either the top or bottom position the motor acts like a generator producing voltage back on the drive which can cause overvoltage faults/trips and possibly damage to the drive. Activating the torque limit control (H69 to a 04) for automatic deceleration allows the MEGA to keep the braking torque to around 0%. Setting the torque limiter output frequency increment limit for braking (Parameter H76) allows the drive to increase its output frequency thereby continuing to output power to the motor in order to avoid an overvoltage fault/trip on the drive. Care must be taken not to set the output frequency increment limit and maximum output frequency too high to avoid mechanical damage of the equipment. By setting the motor parameters and doing an auto tune, the MEGA drive will have all the characteristics to operate the motor in the most efficient manner.

For further information: Refer to the **FRENIC-MEGA Instruction Manual (INR-SI47-1457a-E)** and **FRENIC MEGA User’s Manual MEHT536**.