TECO F510 Inverter

Quick Start Guide

This guide is to assist you in installing and running the inverter and verify that it is functioning correctly for it's main and basic features.

For detailed information and if there are any doubts please refer to the instruction manual.

Step 1	**Supply & Motor connection**

1) Ensure that the Inverter & the motor have the correct KW power and voltage ratings.
   Motor full load amps must not exceed the Inverter rating.

2) Ensure that the supply & Motor cables are connected correctly prior to power up.

3) Connect supply cable to terminals R/L1, S/L2, T/L3

4) Connect motor cable to terminals U/T1, V/T2, W/T3
   (Swap two leads if motor runs in reverse direction).

5) Connect supply Earth and the motor Earth to the drive Earth terminal.

Note:-

I) For detailed installation and wiring refer to the Instruction manual.

Step 2	Apply power to the drive

Apply power to the drive, the display will briefly show the supply voltage 440V followed by **005.00** flashing.

This is the default (factory set) frequency.
If the unit has been used previously then it will show the last frequency programmed.

Step 3	Test run from keypad

Press **RUN** KEY to run.

The frequency will ramp up to 5.0 Hz or the user pre-set frequency according to the default acceleration ramp time.

Press **STOP** key to stop.
The frequency will ramp down to zero according to the default decel ramp time.

Step 4	To alter frequency from keypad. (Default setting).

Use the Arrow keys ▲ ▼ and **</RESET** key to alter the digits to the required frequency.
To store the set frequency use **READ/ENTER** Key.
eg. 50.0 HZ then use **RUN** and **STOP** keys to start/ stop.

Remote speed reference and Remote run

Step 1	Remote mode wiring. Speed reference.

1) Ensure that you have carried out installation & wiring requirements as per step1 quick start guide on previous page before you proceed.

   - Two analogue inputs are available. AI1 & AI2
     Ensure 00-07 = 0 (Default= Main frequency source).

2) Select AI1 or AI2 as required.

AI1	Voltage only Input. Speed command	0 to +10V
AI2	Multi-function analog input terminal. Use SW2 to switch voltage or current input	0 to +10V 4 to 20 mA

Settings for AI1:

- Set 00-05=1

Settings for AI2 :

- Set 00-05 = 7 (AI2 Aux frequency)
- Set 04-05 = 0 (Default) . Aux frequency.
- Set 04-00 = 0 for (0-10v or 0-20mA)
- Set 04-00 = 1 for (2-10v or 4-20mA)

3) Connecting Remote Potentiometer:

- Terminal +10V Supply for use with the potentiometer.
- Terminal GND 0Vdc
- Terminal AI1 or AI2 Potentiometer wiper connection.

4) Connecting Remote 0-10V or 4-20mAc signal

- Use terminals AI1 or AI2 as required.
- Connect the 0 V of the analogue input signal to Terminal GND .

Step 2	Remote mode Run

1) Remote Run signal can be either a PNP or NPN input type.
   Set PNP or NPN selection as required by SW3.

   Note : PNP (positive voltage switching) selection is recommended for use in EU.

2) Connect remote start switch if required according to diagram in the instruction manual.

   Terminal 24V & S1 (Forward run)
   Terminal 24V & S2 (Reverse run)
   24V is the common terminal for PNP type inputs.
   24VG (0Vdc) terminal is common for the NPN type inputs.

Step 3	Check/ verify and alter parameters

Check / verify and alter parameters for remote start & remote frequency as necessary before you proceed. Parameters 00-02 & 00-05

See quick start parameter list & How to alter parameters.

Step 4	RUN using remote speed reference. (Potentiometer, 0-10Vdc or 4-20mA)

1) To run. Activate the remote run switch connected to terminals S1 (FWD) or S2 (REV) as required. Parameter 00-02 =1

The frequency will ramp up to the **frequency** set from keypad or analogue inputs 1 & 2.and according to the set acceleration ramp time.

2) **To Stop.** De-activate the remote run switch.
The frequency will ramp down to zero and according to decel ramp time.

How to alter Parameters from keypad

1) To alter parameters:- Press the **DSP/FUN** key, until the first parameter 00-00 is displayed.

2) Then use the arrow keys **</RESET** ▲ ▼ to select the parameter required then press **READ/ENTER** key to read the preset value.

3) Use ▲ ▼ and **</RESET** keys to alter the setting of the parameters as per **basic quick start parameter list**.

   Note:- For full parameter list refer to the instruction manual.

4) To save each parameter change, press **READ/ENTER** key then the word **END** will be displayed.

5) Use **</RESET** ▲ ▼ key to select the next parameter to alter and follow steps 2 to 4 until all changes are complete.

6) Pressing the **DSP/FUN** key repeatedly will alternate the display between the **preset frequency** (flashing display) and the last parameter accessed or other selectable displays 0 to 7 when selected by parameter 12-00 according to the table below.

【0】:Disable Display	**【1】:Output Current**
【2】:Output Voltage	**【3】:DC Bus Voltage**
【4】:Temperature	**【5】:PID Feedback**
【6】:AI1 Value	**【7】:AI2 Value**

Type	Name	Functions
Display	**Main digital displays**	Frequency, parameter, voltage, current, temperature and Fault message.
	LED status display	**FAULT:** When the inverter has a warning or fault message, the indicator lights up. **FWD:** When the inverter is in forward run mode, the indicator lights up. RUN mode: Continuously ON. Stop mode: Flashes ON/OFF. **REV:** When the inverter is in revere Run mode, the indicator lights up. RUN mode: Continuously ON. Stop mode: Flashes ON/OFF **SEQ:** When Run command source is set to external control, the indicator lights up. **REF:** When Frequency command source is set to external control, the indicator lights up.
Keys	**RUN**	**RUN: Run command at the set frequency.**
	STOP	**STOP: Stop command. Decelerate or Coast to stop.**

（**8 keys**）	▲	Increments parameter number and preset values.
	▼	Decrements parameter number and preset values.
	LOC/REM	Alternates frequency and run command source between LOCAL and REMOTE: **REMOTE mode**: inverter is controlled per parameter settings through control circuit terminals or communication. **LOCAL mode**: Inverter is controlled through digital operator. By default REMOTE mode is effective at power on. Press LOC/REM key to switch between the modes while inverter is stopped. LOC/REM key can be disabled by parameter 23-41.
	DSP/FUN	Select between **Frequency, Function** (parameters) and **Monitor displays** according to the following sequence. Frequency screen →Function selection→Monitor parameters→ Frequency screen.
	</RESET	"<" is left shift key. It's used for changing parameter or value. RESET key：Use to reset Inverter resettable faults.
	READ/ENTER	Used to display the preset value of parameters and for saving the changed parameter values.

Basic Quick Start Parameter List

Parameter	Default	Range	Note
00-00	0	0, 2, 5	**Control Mode:-** 0: V/F 2: SLV (Sensorless Vector) 5: PM SLV (Sensorless Vector for Permanent Magnet Motor)
00-02	0	0-4	**Run mode:-** 0: Keypad 1: External control terminal 2: Communication 3: PLC 4: RTC
00-05	0	0-7	**Frequency source:-** 0: Keypad 1: Remote control (Analogue Input AI1) 2: External up/down frequency control 3: Communication 4: Reserved 5: PID output 6: RTC 7: Auxiliary Frequency (AI2)
00-01	0	0-1	**Run direction:-** 0: Forward 1: Reverse
00-12	100.0%	0.1-109%	Max frequency limit. (default 100%)
00-13	0.0 %	0.0-109%	Min frequency limit. (default 0.0%)

07-09	0	0-3	**Stop method:** 0: Deceleration to stop 1: Coast to stop 2: DC injection braking 3: Run signal inhibit (timer) during Coast to stop
02-01	**A	10%~200% of rated current (V/f) 25%~200% of rated current (SLV)	Motor rated current (for Motor overload protection)
13-08	0	0-10	**Factory Reset: Inverter Supply voltage.** 2: 2 wire initialization(220/440V,60Hz) 3: 3 wire initialization(220/440V,60Hz) 4: 2 wire initialization(230/415V,50Hz) 5: 3 wire initialization(230/415V,50Hz) 6: 2 wire initialization(200/380V,50Hz) 7: 2 wire initialization(200/380V,50Hz) 8: PLC initialization 9: 2 wire initialization(230/460V,60Hz) 10: 3 wire initialization(230/460V,60Hz)

Note:- For Full Parameter List see the Instruction manual

Control Modes & Auto Tune

F510 provides three control modes.
Select the relevant control mode for the application.
Default control mode is V/f.

V/f can be used for most applications specifically multi-motor
or applications where auto tune is not successful
or when a customized v/f pattern may be required.

Several V/f patterns are available selectable by parameter 01-00.
Select the appropriate one based on the application load type and the motor base frequency of 50 or 60 Hz.

For selections of the V/f patterns, Refer to the instruction manual.
Sensorless Vector mode SLV is used for obtaining best performance from a motor.

V/f Mode Parameters

Parameter	Default	Range	Note
01-00	F	0-FF	F: General Purpose. 60Hz system 0: General Purpose. 50Hz system For full list of preset patterns set by 01-00, refer to the manual. FF: Customized V/f. Set parameters 01-02 to 01-13

For Motor parameters in V/f mode, set the name plate data in parameter Group 2.

SLV Mode set parameters in parameter Group 17

Motor parameters are automatically set when performing an auto-tune (17-10 = 1).
In most case no adjustment is required after performing an auto-tune except when using the inverter in special applications (e.g. machine tool, positioning, etc…).

Enable auto tune function by parameter 17-10.
Press RUN button (after display showing "Atrdy")

Six auto tune modes are available. Rotational, Static, Stator Resistance, and loop turning.

- Use Rotational where possible. Motor rotates the process takes about 50 secs
- Use Static when rotation of load is not possible. It takes about 35 secs.
- Use Line to Line Resistance for long cable (above 50 meters in V/f mode)
- Use Loop turning to enhance vector control performance.
- Rotational Auto-tuning .Combination (Item: 4+2+0). **V 1.41**
- Static Auto-tuning. Combination (Item: 4+2+1). **V 1.41**

Group 17 Automatic Tuning Function Group				
Code	Parameter Name	Range	Default	Unit
17-00	Mode selection of automatic tuning	0: rotational autotune 1: static autotune 2: stator resistance measurement 3: Reserved	0	-
		4: loop turning		
		5: Rotational Auto-tuning Combination (Item: 4+2+0). **V 1.41**		
		6: Static Auto-tuning Combination (Item: 4+2+1). **V 1.41** .		
17-01	Motor rated output power	0.00~600.00	-	KW
17-02	Motor rated current	0.1~999.9	-	A
17-03	Motor rated voltage	200V: 0.0~255.0	220	V
		400V:0.0~510.0	440	
17-04	Motor rated frequency	10.0~400.0	60.0	Hz
17-05	Motor rated speed	0~24000	-	rpm
17-06	Pole number of motor	2-16 (even number)	4	Pole
17-08	Motor no-load voltage	200V: 50~240	-	V
		400V:100~480		
17-09	Motor excitation current	0.01~600.00	-	A
17-10	Automatic tuning start	0: Disabled 1: Enabled	0	-
17-11	Auto tune Error History	0: No error 1: Motor data error 2: Stator resistance tuning error 3: Leakage induction tuning error 4: Rotor resistance tuning error 5: Mutual induction tuning error 6: Reserved 7: DT Error	0	-

Group 17 Automatic Tuning Function Group				
Code	Parameter Name	Range	Default	Unit
		8: Motor acceleration error 9: Warning		
17-14	Rotational Tuning Mode Selection. **V 1.41**	0: VF Mode 1: Vector Mode		

Note:-

No-load motor voltage 17-08 & (02-19)

Parameter determines the rated flux during motor's rated rotation in **SLV** control mode. Set the value of this parameter to the same value as parameter 17-08.

A value of 10~50V below the rated input voltage level (parameter 17-03) ensures that the motor is capable of providing adequate torque performance when operating at nominal speed (or higher speed).

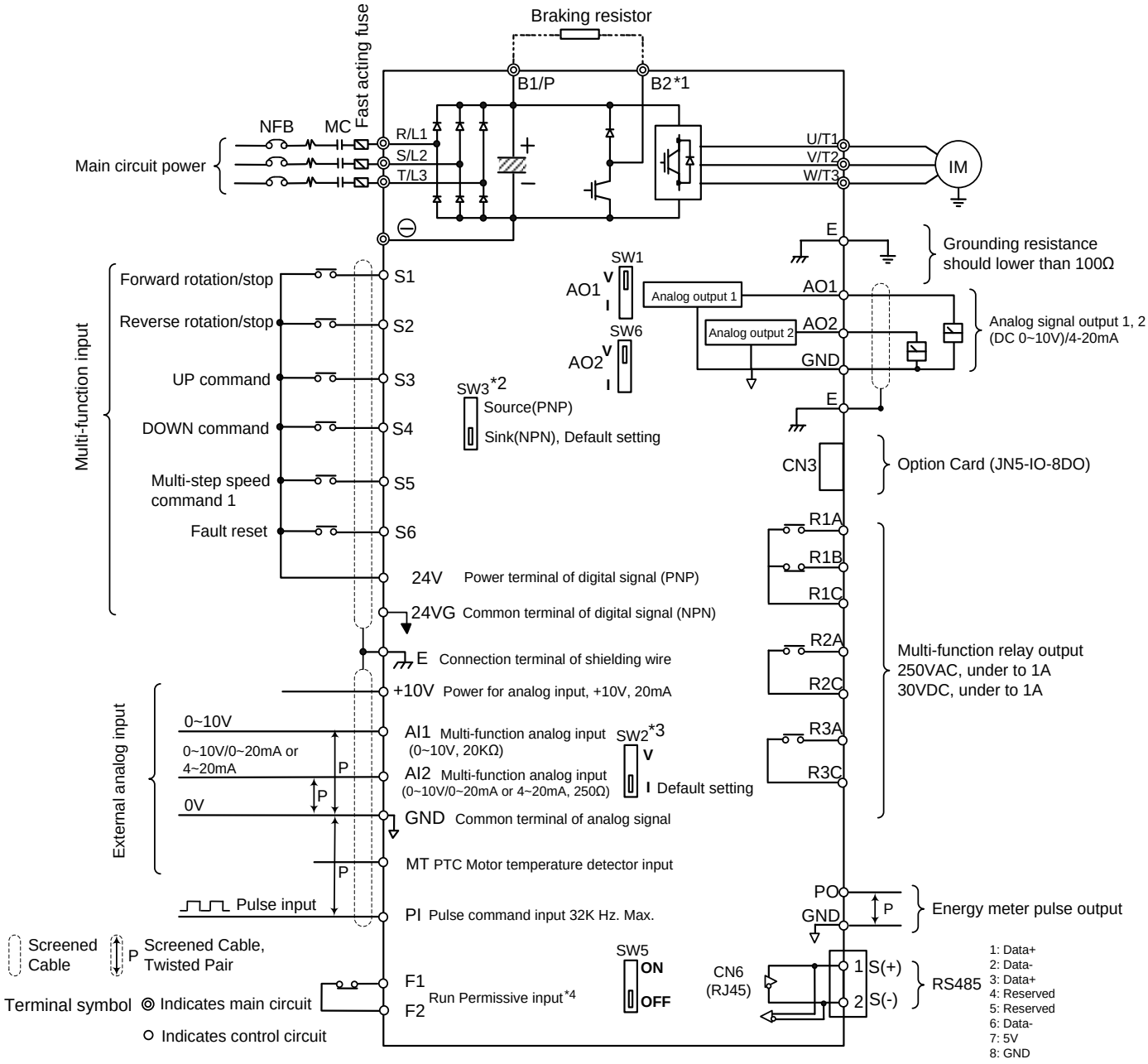
Setting the value too small can result in a reduction in no-load current, weakened motor flux and an increase in motor current while the motor is loaded, causing a reduction in torque performance.

For high KW rating (55KW and above), set this closer to the supply voltage.

Motor excitation current 17-09 & (02-09)

This parameter is automatically set during auto-tune. No adjustment required.
For static tuning & Resistance tuning this parameter needs to be adjusted
Set to 1/3 of the motor rated current parameter (17-02).

Wiring Diagram



Remark:

*1: Models IP20 200V 5~30HP, 400V 5~40HP and IP55 400V 5~25HP have a built-in braking transistor so that the braking resistor can be connected between terminal B1 and B2.

*2: The multi-function digital input terminals S1~S6 can be set to Source (PNP) or Sink (NPN) mode via SW3.

*3: The multi-function analog input 2 (AI2) can be set to the voltage command input (0~10v) or the current command input (4~20mA) via SW2.

*4: Run permissive input F1 & F2 is a normally closed input. This input should be closed to enable the inverter output. To activate this input, open the link between F1 and F2.