

Topdrive350 Series

Quick Startup Guide



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SAFETY PRECAUTIONS

This document is intended as a quick start guide to get familiarity with keypad navigation, changing parameters, and setting the TD350 drive up for external start/stop and external potentiometer signal. Please note this document is not a substitute for the TD350 User Manual and it is important that you reference the TD350 user manual before proceeding.

Warning 1:

- Do not refit the inverter unauthorizedly; otherwise fire, electric shock or other injury may occur.
- Please install the inverter on fire-retardant material and keep the inverter away from combustible materials.
- Connect the braking optional parts according to the wiring diagram.
- Do not operate the inverter if there is any damage or components loss to the inverter.
- Do not touch the inverter with wet items or body, otherwise electric shock may occur.

Warning 2:

- Only qualified electricians are allowed to operate/install the inverter.
- Do not carry out any wiring and inspection or changing components when the power supply is applied. Ensure all input power supply is disconnected before wiring and checking and always wait for at least the time designated on the inverter or until the DC bus voltage is less than 36V. Below is the table of the waiting time:

| Inverter Module | | Minimum Waiting Time |
|-----------------|--------------|----------------------|
| 3PH 220V | 1HP - 75HP | 5 Minutes |
| 3PH 460V | 2HP - 100HP | 5 Minutes |
| 3PH 575V | 25HP - 100HP | 5 Minutes |

NAMEPLATE IDENTIFICATION

TD350-045G-4

| Function | No. | Description | Detailed Content |
|----------------|-----|----------------------|--|
| Abbreviation | 1 | Product Abbreviation | TD350 : Topdrive350 series |
| Power Range | 2 | Power Range | 045G : 45kW, G : Constant torque (HD) |
| Voltage Degree | 3 | Voltage Degree | 2 : AC 3PH 200~240V Rated Voltage: 220V 4 : AC 3PH 380~480V Rated Voltage: 460V 6 : AC 3PH 520~600V Rated Voltage: 575V |

TECHTOP

Model: TD350-045G-4
Power(Output): 45kW/60HP HD 55kW/75HP ND
Input: AC 3PH 380V-480V 94A/128A HD/ND 47Hz-63Hz
Output: AC 3PH 0V-Uinput 92A/115A HD/ND 0Hz-400Hz

S/N: _____ Made in China

Techtop Industries Inc. www.techtopind.com

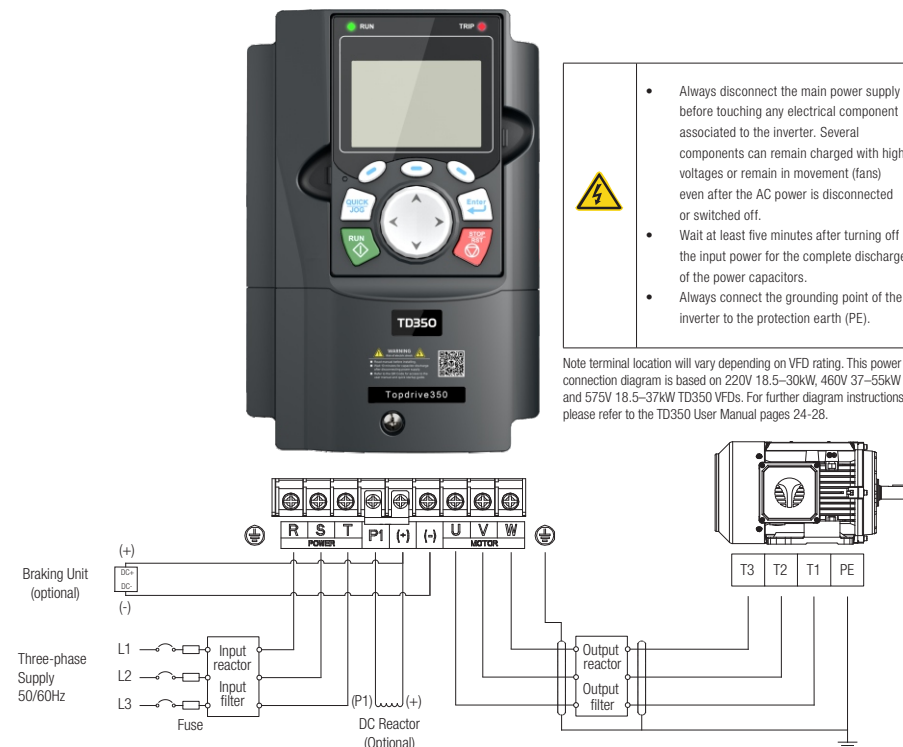
- The type designation contains information on the VFD. The user can find the type designation on the type designation label attached to the VFD or the simple nameplate.
- Check the inverter nameplate to insure that the information agrees with your order. Also insure that the power available is rated appropriately for the drive being used.

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POWER CONNECTIONS



- Always disconnect the main power supply before touching any electrical component associated to the inverter. Several components can remain charged with high voltages or remain in movement (fans) even after the AC power is disconnected or switched off.
- Wait at least five minutes after turning off the input power for the complete discharge of the power capacitors.
- Always connect the grounding point of the inverter to the protection earth (PE).

Note terminal location will vary depending on VFD rating. This power connection diagram is based on 220V 18.5~30kW, 460V 37~55kW and 575V 18.5~37kW TD350 VFDs. For further diagram instructions, please refer to the TD350 User Manual pages 24-28.

| Terminal | 220V ≤ 20HP 460V ≤ 40HP | 220V ≥ 25HP 460V > 50HP 575V ≥ 25HP | Function |
|----------------------|--|--|---|
| R, S, T (L1, L2, L3) | Power input of the main circuit | | Three phase AC input terminals which are generally connected with the power supply. |
| U, V, W | Power output of the VFD | | Three phase AC output terminals which are generally connected to the motor. |
| P1 | N/A | DC Reactor Terminal 1 | • P1 and (+) are connected with the terminals of DC reactor. |
| (+) | Brake Resistor Terminal 1 | DC reactor terminal 2, Brake unit terminal 1 | • (+) and (-) are connected with the terminals of brake unit. |
| (-) | N/A | Brake unit terminal 2 | • PB and (+) are connected with the terminals of brake resistor. |
| PB | Brake Resistor Terminal 2 | N/A | |
| PE | Protective grounding terminals, every machine is provided 2 PE terminals as the standard configuration. These terminals should be grounded with proper techniques. | | Protective grounding terminal |

BEFORE YOU START

Verify the following wiring setup before you turn on the VFD for the first time:

- Make sure the line voltage (L1/L2/L3) is NOT connected to the output terminals (U/V/W) of the VFD.
- Ensure the motor is connected to the drive before applying power to the VFD.

The fuse, braking resistor, input reactor, input filter, output reactor, output filter are optional parts. Please refer to Peripheral Optional Parts of TD350 user manual for detailed information.

Remove the yellow warning labels of PB, (+) and (-) on the terminals before connecting the braking resistor; otherwise, poor connection may occur.

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KEYPAD OPERATION



| Button | Button Name | Button Description |
|--------|-------------------------|---|
| | Confirmation Key | <ul style="list-style-type: none"> Function of this key varies with menus Confirm parameter setting/selection Entering the next menu, etc. |
| | Function Keys | <ul style="list-style-type: none"> Function of these keys varies with menus Function of the these keys will be displayed in LCD screen footer |
| | Up/Down Left/Right Keys | <ul style="list-style-type: none"> Shifting up/down the display, shifting digits, switch over monitoring interface, exit current menu, etc. Increase/decrease parameter settings/values |
| | Quick/Jog Key | <ul style="list-style-type: none"> The function of this key is confirmed by function code P07.02 P07.02=1, jogging (default) |
| | Run Key | <ul style="list-style-type: none"> Run the VFD when in local mode, P00.01=0 (default) |
| | Stop/Reset Key | <ul style="list-style-type: none"> Stop the VFD in local mode. Limited by function code P07.04 Reset all control modes in the fault alarm state |

| LCD Display | Name | Display Contents |
|-------------|--------------------|--------------------------------------|
| A | Real-time display | • Display real time of VFD |
| B | VFD running state | • Display current state of VFD |
| C | VFD station number | • Display the VFD station from 01-99 |
| D | Parameter name | • Display Parameter name and code |
| E | Parameter value | • Parameter value monitored by VFD |
| F | Function key menu | • Display of function key menu |

INITIALIZING YOUR DRIVE

To initialize your drive after power-on, please follow the steps below.

STEP 1: Select Drive Language

- Select language by using the up/down arrow keys. To make a selection press any of the following keys:



- After language selection, you can choose to re-select the language during each power-on or just once.

STEP 2: Enter the Init (initialize) Setting

- Press any of the following keys to enter init setting:



- The initialize will guide you through 14 basic parameter settings. For details on each parameter see the User Manual.

STEP 3: Basic Parameter Settings

| Parameter | Name | Selections | Default |
|-----------|-------------------|----------------|------------------|
| P00.06 | A freq cmd | 0-15 | 0: keypad |
| P00.01 | Run cmd channel | 0-2 | 0: keypad |
| P00.02 | Comm cmd channel | 0-5 | 0: MODBUS |
| P08.37 | DynBraking Enable | 0-1 | 1: enabled |
| P00.00 | Speed Ctrl | 0-3 | 2: SVPWM |
| P01.08 | Stop Mode | 0-1 | 1: Dec to stop |
| P00.11 | Acc time1 | 0.0 to 3600.0s | Depends on model |
| P00.12 | Dec time1 | 0.0 to 3600.0s | Depends on model |
| P02.00 | Motor1 Type | 0-1 | 0: Asynchronous |

- Enter the motor nameplate data in the next set of parameters:

| P02.01 | P02.02 | P02.03 | P02.04 | P02.05 |
|-------------------------|------------------|----------------|---------------|----------------|
| Motor kW 1HP=0.746kW | Motor Frequency | Motor RPM | Motor Voltage | Motor Amps |
| 0.1 to 3000kW | 0.01Hz to P00.03 | 1 to 3600r/min | 0 to 1200V | 0.8 to 6000.0A |

INITIALIZING YOUR DRIVE CONTINUED

STEP 4: Confirm Rotational Direction

- Test the motor rotating direction by selecting **Yes**
- Press the **QUICK JOG** key and confirm if the direction is

consistent with expectations. If **No** is selected the drive will change the direction by auto setting parameter P00.13=1 and the LCD header will display **Rev**.

STEP 5: Conduct Self Learning (Auto-Tuning)

- Perform motor parameter auto-tuning by selecting **Yes** when prompted. Make sure that the motor nameplate information has been entered correctly in Step 3.

STEP 5 Continued

- Select one of the three Auto-Tuning options:

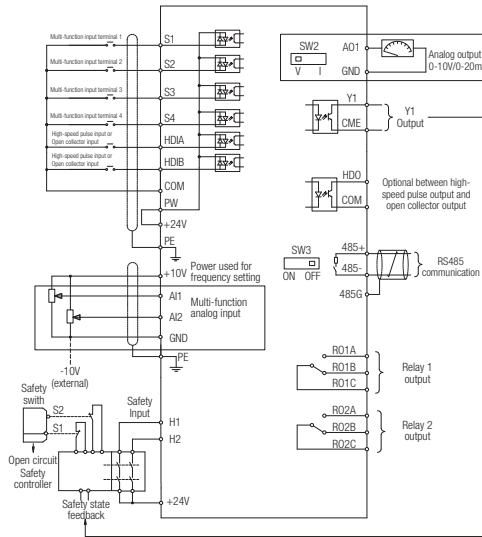
To quickly access the Auto-Tune function from the homepage, select: **Menu > Motor parameter autotuning

| **Type | Description |
|--|---|
| Complete Rotary Auto-Tuning* (P00.15=1) | Comprehensive motor parameter auto-tuning. It is recommended to use this setting when high control accuracy is needed |
| Complete Static Auto-Tuning 1 (P00.15=2) | Suitable in cases where the motor cannot be decoupled from the load |
| Partial Static Auto-Tuning 2 (P00.15=3) | Suitable in cases where the motor cannot be decoupled from the load. Only auto-tunes for P02.06, P02.07 and P02.08 |

*Recommended setting for auto-tuning. Must be performed with motor decouple and disconnected from load.

- Perform the motor auto-tune by pressing the **RUN** key.
- Once auto-tune is complete, select **confirm**.
- Speed control mode can be set using function code P00.00 (see step 3).

CONTROL CONNECTIONS



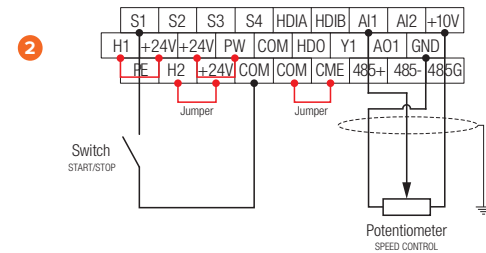
| Terminals | Quantity | Description |
|-------------------------|-------------|--------------------------------------|
| Digital input | 4 (S1-S4) | 1kHz, NPN and PNP (default NPN) |
| High speed pulse input | 2 (H1A-H1B) | 50kHz, NPN and PNP (default NPN) |
| Analog input | 2 (AI1-AI2) | 0-10V, 0-20mA, -10V-+10V |
| ON-OFF output | 1 (Y1) | Maximum output frequency: 1kHz |
| High speed pulse output | 1 (HDO) | Maximum output frequency: 50kHz |
| Analog output | 1 (AO1) | 0-10V, 0-20mA |
| Relay output | 2 (RO1-RO2) | 3A/250VAC, 1A/30VDC, NO+NC |
| Safe Torque Off (STO) | 2 (H1-H2) | Integrates safety function-STO, SIL2 |

REMOTE 2-WIRE START/STOP SETUP, WITH SPEED POTENTIOMETER

Default Setting: The TD350 by default uses the keypad command to run and stop, follow instructions below to change to a remote 2-wire start/stop with 0-10V speed reference.

1 Instructions to change to remote run/stop:

- Power down the drive, wait 5 min.
- Remove the protective covers (See TD350 User Manual) and make the connections as shown below (see step 2).
- Verify that all connections are secure, replace covers and power-up the drive.**
- Follow the parameter settings in right hand table (see steps 3-5).



*To quickly access the function codes from the homepage, select: **Menu > Parameter setting > Func code quick setting**

| *Parameter | Default | Change To |
|------------|---|-------------------------------------|
| P00.01 | 0: Keypad (local) running command channel | 1: Terminal running command channel |
| P00.06 | 0: Keypad, A frequency command | 1: AI1, A frequency command |
| P05.01 | 1: S1 set to forward rotation operation | -- |

| | | |
|--|-------------------------|-------|
| 16:02:35 Forward Local Ready 01: TD350 | Set frequency P17.00 Hz | 60.00 |
| DC bus voltage P17.11 V | 648.0 | |
| Digital input terminal state P17.12 | 0x0000 | |
| Monitoring | About | Menu |

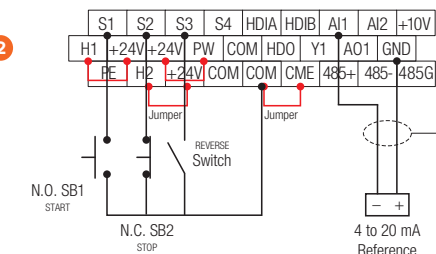
When P00.01=1 Local indicator will change to **Trml** for remote operation.

REMOTE 3-WIRE START/STOP SETUP, WITH 4-20mA REFERENCE

Default Setting: The TD350 by default uses the keypad command to run and stop, follow instructions below to change to a remote 3-wire start/stop with 4-20mA speed reference.

1 Instructions to change to remote run/stop:

- Power down the drive, wait 5 min.
- Remove the protective covers (See TD350 User Manual) and make the connections as shown below (see step 2).
- Verify that all connections are secure, replace covers and power-up the drive.**
- Follow the parameter settings in right hand table (see steps 3-9).



*To quickly access the function codes from the homepage, select: **Menu > Parameter setting > Func code quick setting**

| *Parameter | Default | Change To |
|------------|---|---|
| P00.01 | 0: Keypad running command channel | 1: Terminal running command channel |
| P00.06 | 0: Keypad, A frequency command | 1: AI1, A frequency command |
| P05.50 | 0: Voltage type | 1: Current type |
| P05.01 | 1: S1 set to forward rotation operation | -- |
| P05.02 | 4: S2 set to forward Jogging | 3: S2 set to 3-wire control operation |
| P05.03 | 7: S3 set to fault reset | 2: S3 set to reverse rotation operation |
| P05.11 | 0: 2-wire control 1 | 2: 3-wire control 1 |

| | | |
|--|-------------------------|-------|
| 16:02:35 Forward Local Ready 01: TD350 | Set frequency P17.00 Hz | 60.00 |
| DC bus voltage P17.11 V | 648.0 | |
| Digital input terminal state P17.12 | 0x0000 | |
| Monitoring | About | Menu |

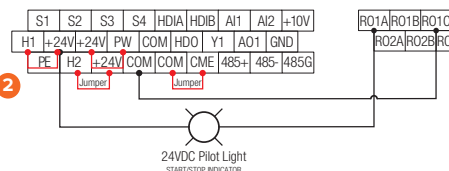
When P00.01=1 Local indicator will change to **Trml** for remote operation.

CONNECTING A 24VDC PILOT LIGHT TO OUTPUT RELAYS

Default Setting: The TD350 by default switches RO1 relay contact when drive is in the run operation command. A terminal is normally open, B is normally closed and C is common.

1 Instructions to change to remote run/stop:

- Power down the drive, wait 5 min.
- Remove the protective covers (See TD350 User Manual) and make the connections as shown (see step 2).
- Verify that all connections are secure, replace covers and power-up the drive.**
- Follow the parameter settings in right hand table (see step 3).



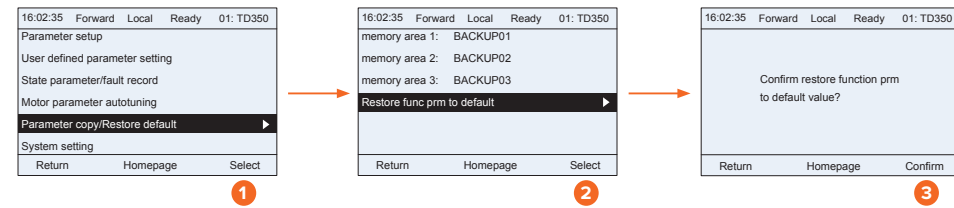
*To quickly access the function codes from the homepage, select: **Menu > Parameter setting > Func code quick setting**

| *Parameter | Default | Change To |
|------------|-----------------|-----------|
| P06.03 | 1: In operation | -- |

RESETTING YOUR DRIVE

To reset your drive to factory default settings, follow the instructions below.

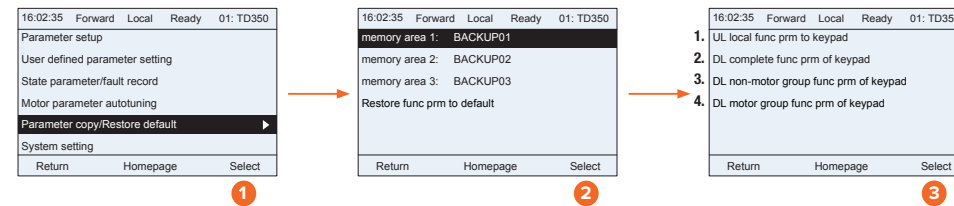
- From the **Homepage** select **Menu** by pressing function button
- Using the Up/Down keys, scroll down to find **Parameter copy/restore to default**. Follow the screens below:



PARAMETER COPY WITH KEYPAD

Drive parameters can be copied and stored using the TD350 LCD keypad.

- From the **Homepage** select **Menu** by pressing function button
- Using the Up/Down keys, scroll down to find **Parameter copy/restore to default**. Follow the screens below:



FREQUENTLY USED PARAMETERS

| Function Code | Name | Description | Default Value |
|---------------|--|--|------------------|
| P00.00 | Speed Control Mode | 0: SVC 0 - Sensorless Vector Control mode 0. Suitable for applications which need low power. 1: SVC 1 - Sensorless Vector Control mode 1. Suitable in high performance cases with the advantage of high accuracy of rotating speed and torque. 2: SVPWM Control - V/Hz control. Suitable in applications that do not require high control accuracy, such as the load of a fan or pump. One inverter can drive multiple motors. Note: Carry out motor parameter auto-tuning before selecting SVC. 0 or SVC 1 3: VC - Vector Control mode. | 2 |
| P00.01 | Run Command Channel | 0: Keypad running command channel (LOCAL) 1: Terminal running command channel (REMOTE) 2: Communication running command channel | 0 |
| P00.03 | Max Output Frequency | Setting range: P00.04 to 400.00Hz | 60.00Hz |
| P00.04 | Upper Limit of The Running Frequency | Setting range: P00.05 to P00.03 | 60.00Hz |
| P00.05 | Lower Limit of The Running Frequency | Setting range: 0.00Hz to P00.04 | 0.00Hz |
| P00.11 | ACC Time 1 (Acceleration) | Setting range: 0.0 to 3600.0s | Depends on model |
| P00.12 | DEC Time 1 (Deceleration) | Setting range: 0.0 to 3600.0s | Depends on model |
| P00.13 | Running Direction Selection | 0: Runs at default direction, the inverter runs in the forward direction. FWD/REV indicator is off. 1: Runs in the opposite direction, the inverter runs in the reverse direction. FWD/REV indicator is on. 2: Forbid to run in reverse direction: it can be used in some special cases if the reverse running is disabled. | 0 |
| P00.14 | Carrier Frequency Setting | Setting range: 1.0 to 15.0kHz | Depends on model |
| P00.15 | Motor Parameter Auto-Tuning | 0: No operation 1: Rotating Auto-Tuning (dynamic). Motor must be de-coupled from load. 2: Static Auto-Tuning 1 3: Static Auto-Tuning 2. Auto-tune for P02.06, P02.07, P02.08 | 0 |
| P00.18 | Function Restore Parameter | 0: No operation 1: Restore to default value 2: Clear fault history | 0 |
| P01.05 | ACC/DEC Selection | 0: Linear type. The output frequency increase/decreases linearly. 1: S curve. The output frequency will increase or decrease according to the S curve. | 0 |
| P01.06 | ACC time of the starting step of S curve | Setting range: 0.0 to 50.0s | 0.1s |
| P01.07 | DEC time of the starting step of S curve | Setting range: 0.0 to 50.0s | 0.1s |
| P07.00 | User Password | 0 to 65535: the password protection will be valid when setting any non-zero number 00000: Clear the previous user's password and make password invalid | 0 |
| P07.02 | QUICK/JOG Key Function Selection | 0: Null 1: Jogging 2: Reserved 3: Switch between FWD/REV rotation 4: Clear UP/DOWN setting 5: Coast to stop 6: Switch over to the running command reference in sequence | 1 |