TECHTOP

VECTOR CONTROL MICRO DRIVES

TOPDRIVE20 SERIES

Quick Startup Guide

202209 (V1.4)

Topdrive20 Series
Quick Startup Guide

SAFETY PRECAUTIONS

This document is intended as a quick start guide to get familiarity with keypad navigation, changing parameters, and setting the TD20 drive up for external start/stop and external potentiometer signal. Please note this document is not a substitute for the TD20 User Manual and it is important that you reference the TD20 user manual before proceeding.

- 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.

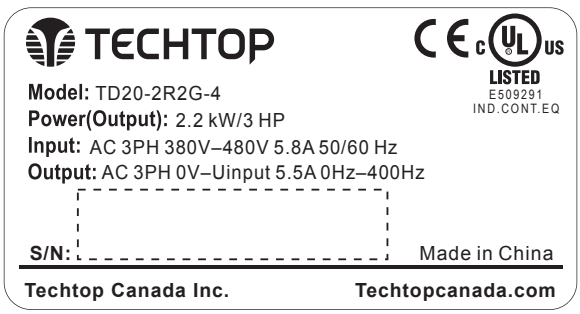
- Only qualified electricians are allowed to operate/install the inverter.
- Do not carry out any wiring and inspection or changing components when the power supply is applied. Ensure all input power supply is disconnected before wiring and checking and always wait for at least the time designated on 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
1PH 110V	0.5HP - 1.5HP	5 Minutes
1PH 220V	0.5HP - 3HP	5 Minutes
3PH 220V	0.5HP - 3HP	5 Minutes
3PH 460V	1HP - 3HP	5 Minutes

NAMEPLATE IDENTIFICATION

TD20-1R5G-S2
1 2 3

Function	No.	Description	Detailed Content
Abbreviation	1	Product Abbreviation	**TD20**: Topdrive20 series
Power Range	2	Power Range	**1R5G**: 1.5kW, **G**: Constant torque
Voltage Degree	3	Voltage Degree	**S1:** AC 1PH 100-120V Rated Voltage: 110V **S2**: AC 1PH 200~240V Rated Voltage: 220V **2**: AC 3PH 200~240V Rated Voltage: 220V **4**: AC 3PH 380~480V Rated Voltage: 460V



- 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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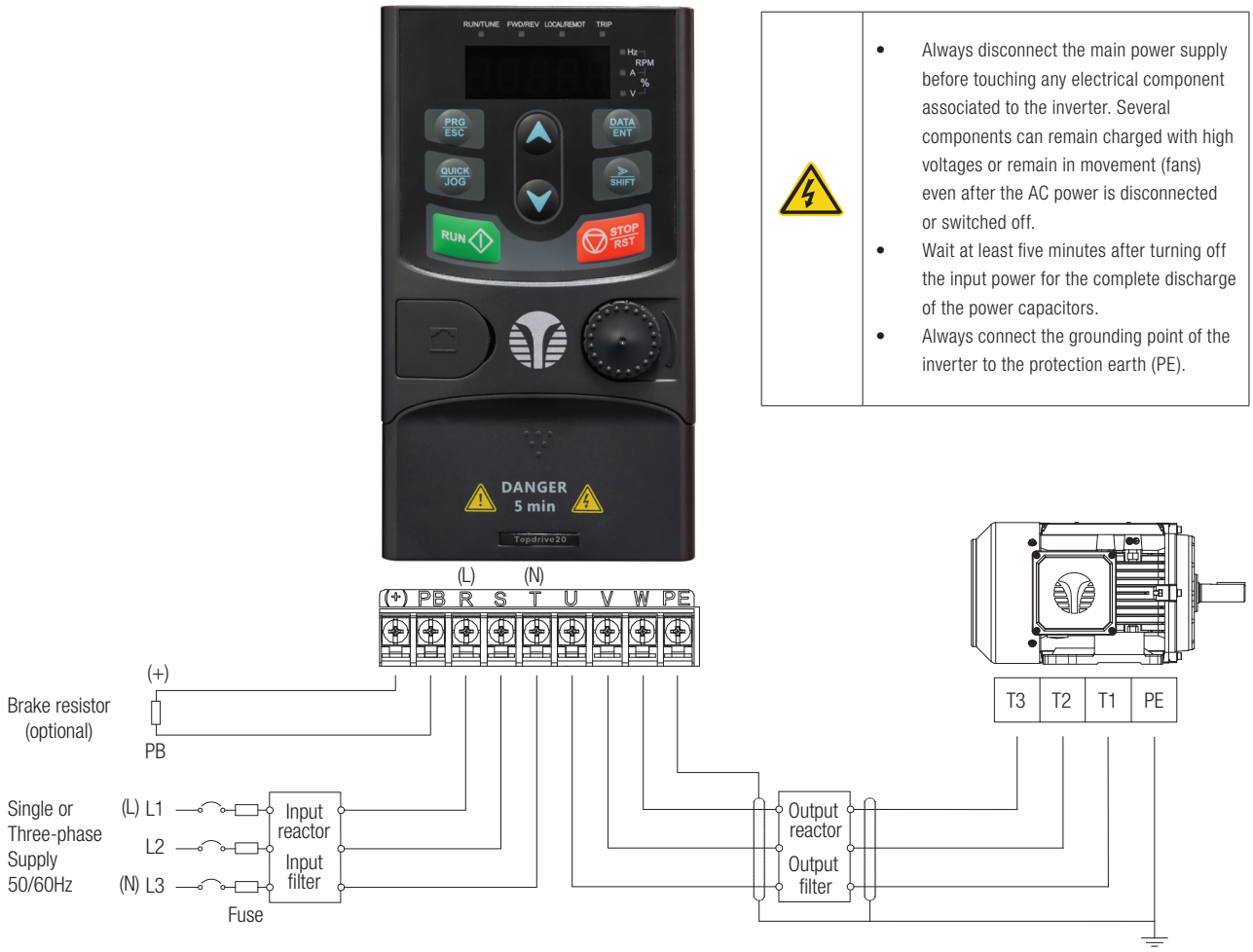
POWER CONNECTIONS



- 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).

Terminal	Function
L, N	Single phase AC input terminals which are generally connected with the power supply.
R, S, T (L1, L2, L3)	Three phase AC input terminals which are generally connected with the power supply.
PB, (+)	External dynamic braking resistor terminal.
U, V, W	Three phase AC output terminals which are generally connected to the motor.
PE	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 TD20 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
PRG ESC	Programming/ Escape Key	• Enter programming mode • Escape to previous programming level • Escape to monitoring mode
DATA ENT	Enter Key	• Enter the menu step-by-step • Confirm parameters
	Up and Down Keys	• Increase/decrease speed in local mode P00.01=0 (default) • Increase/decrease parameter settings/values
QUICK JOG	Quick/Jog Key	• The function of this key is confirmed by function code P07.02 • P07.02=1, jogging (default)
SHIFT	Shift Key	• Cycle selected LED digit when in programming mode • Adjust display value setting when in stopping or running mode
RUN	Run Key	• Run the VFD when in local mode, P00.01=0 (default)
STOP RST	Stop/Reset Key	• Stop the VFD in local mode. Limited by function code P07.04 • Reset all control modes in the fault alarm state

*Connection port for external keypad and external copy keypad. Extension cable required.

**Analog Potentiometer - AI1 is reserved for local keypad potentiometer. By default, the keypad potentiometer is disabled. To switch speed selection from the up and down keys to the keypad potentiometer, change parameter P00.06 (A frequency command selection) to = 1: Analog AI1 setting (keypad potentiometer).

AUTO-TUNING YOUR DRIVE

To auto-tune your drive, follow the instructions below.

STEP 1: Set Motor Nameplate Data

- Set motor parameter function code **P02.01** to **P02.05** based on the motor nameplate data. See TD20 User Manual page 35 for function code descriptions and instructions.

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

STEP 2: Check Motor Rotation

- Press QUICK JOG to jog the motor shaft and determine rotation direction.
- If the rotation direction is wrong, power off the drive, wait 5 minutes for drive to discharge, rotate two of the drive output leads and power on the drive.

AUTO-TUNING YOUR DRIVE CONTINUED

STEP 3: Set Auto-Tuning Parameter

- Set motor parameter function code **P00.15**, Motor Parameter Auto-Tuning. See below for parameter options:

Parameter	Type	Description
P00.15 = **1***	Rotational Auto-Tuning	Comprehensive motor parameter auto-tuning. It is recommended to use this setting when high control accuracy is needed
P00.15 = **2**	Static Auto-Tuning 1	Suitable in cases where the motor cannot be decoupled from the load
P00.15 = **3**	Static Auto-Tuning 2	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 preformed with motor decoupled and disconnected from load.

STEP 4: Set Auto-Tune RUN

- Press 

to begin motor auto-tune.
- Drive will display run-1, run-2, run-3 and then “end”.
- During auto-tune, RUN/TUNE indicator will flash GREEN for Auto-Tune operation.

STEP 5: Set Speed Control Mode

- Set motor parameter function code **P00.00**, Speed Control Mode.
- NOTE by default **P00.00** is set to **P00.00=2**: SVPWM Control (V/Hz).
- Set **P00.00=1**: SVC 1, Sensorless Vector Control suitable for high performance cases with the advantage of high accuracy of rotating speed and torque.

RESETTING YOUR DRIVE

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

Parameter	Default	Change To
P00.18	**0**: No operation	**1**: Restore the default value

Instructions to reset drive:

- **P00.18** is the Function Restore Parameter
- Follow the parameter settings in the right hand table
- Note: The Function Restore Parameter code will reset to 0 after finishing the operation of the selected function code. Restoring to the default value will cancel the user password, please use this function with caution.

PARAMETER COPY WITH COPY KEYPAD

Drive parameters can be copied using the TD20 copy keypad model **11022-00064**.
***Copy keypad is indicated with symbol shown below the LED digit display.**

Instructions to download/upload drive parameters:

- Install copy keypad using keypad extension cables. Connect to keypad extension port on the front of the TD20 drive.
- Parameter copy is performed using function code **P07.01**
- To upload drive parameters to the copy keypad, set **P07.01=1**
- To download ALL keypad stored parameters to the drive, set **P07.01=2**
- To download ALL keypad stored parameters EXCLUDING group P02 (Motor 1), set **P07.01=3**
- To download keypad stored parameters for ONLY group P02 (Motor 1), set **P07.01=4**

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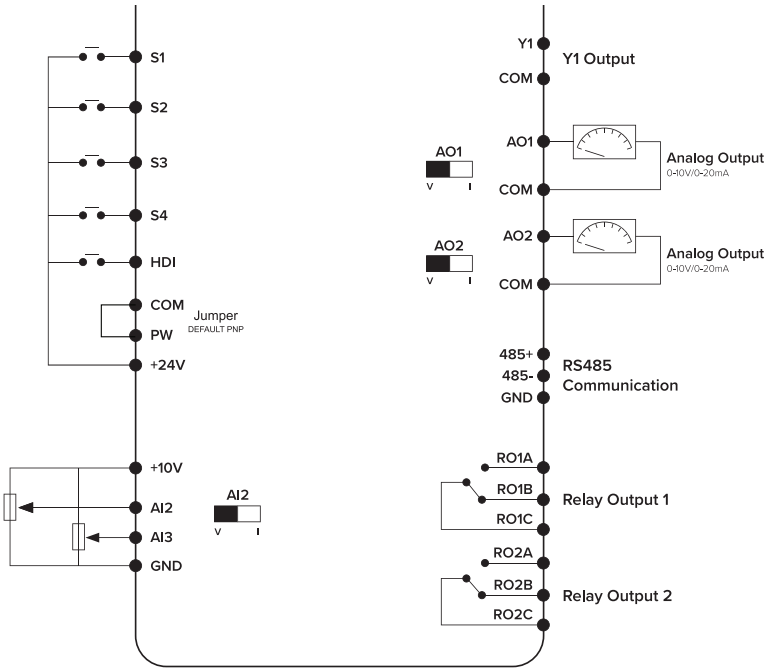
CONTROL CONNECTIONS



Terminals	Quantity	Description
Digital input	4 (S1-S4)	1kHz, NPN and PNP (default PNP)
High speed pulse input	1 (HDI)	50kHz, NPN and PNP (default PNP)
Analog input	2 (AI2-AI3)	0~10V, 0~20mA, -10V~+10V
ON-OFF output	1 (Y1)	Maximum output frequency: 1kHz
Analog output	2 (AO1-AO2)	0~10V, 0~20mA
Relay output	2 (RO1-RO2)	3A/250VAC, NO+NC

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

Default Setting: The TD20 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:**

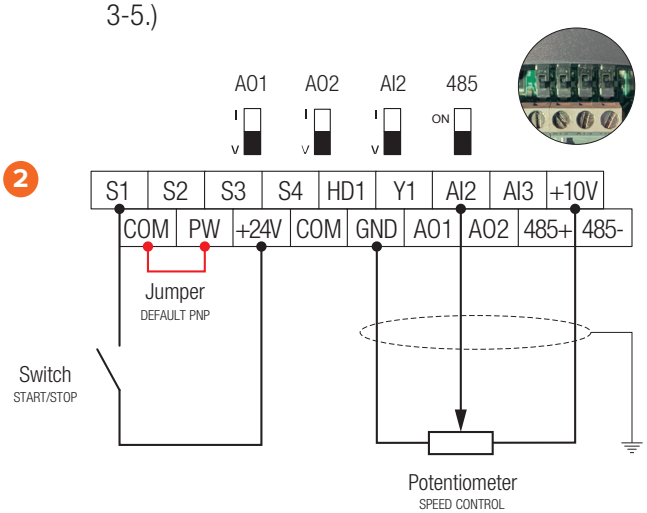
- Power down the drive, wait 5 min.
- Remove the protective covers (See TD20 User Manual) and make the connections as shown below (see step 2).
- **Verify that all connections are secure, replace covers and power-up the drive.**
- Follow the parameter settings in right hand table (see steps 3-5.)

	Parameter	Default	Change To
3	P00.01	**0**: Keypad (local) running command channel	**1**: Terminal running command channel
4	P00.09	**0**: A, the current freq. setting is A freq. command	**1**: B, the current freq. setting is B frequency command*
5	P05.01	**1**: S1 set to forward rotation operation	--

*Note B frequency command is set using P00.07. By default P00.07 is set to 2: Analog AI2 setting.

When P00.01=1 LOCAL/REMOTE indicator will flash GREEN for remote operation. **3**

2



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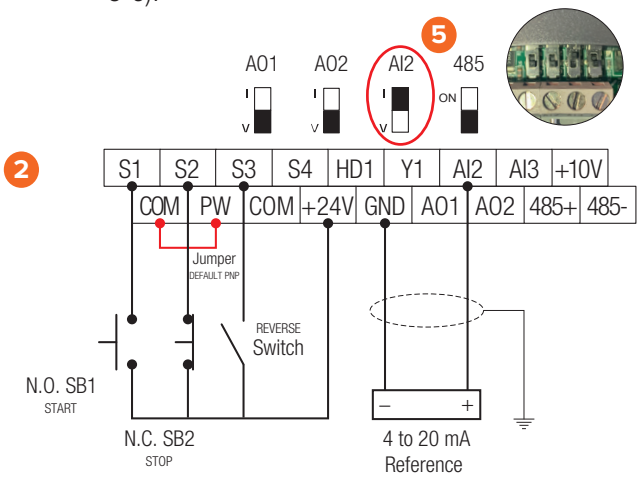
REMOTE 3-WIRE START/STOP SETUP, WITH 4-20mA REFERENCE

Default Setting: The TD20 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 TD20 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).



	Parameter	Default	Change To
3	P00.01	**0**: Keypad running command channel	**1**: Terminal running command channel
4	P00.09	**0**: A, the current freq. setting is A freq. command	**1**: B, the current freq. setting is B frequency command*
5	Change AI2 Switch	**V**: Voltage Input, 0-10V	**I**: Current Input, 4-20mA
6	P05.01	**1**: S1 set to forward rotation operation	--
7	P05.02	**4**: S2 set to forward Jogging	**3**: S2 set to 3-wire control operation
8	P05.03	**7**: S3 set to fault reset	**2**: S3 set to reverse rotation operation
9	P05.13	**0**: 2-wire contol 1	**2**: 3-wire contol 1

*Note B frequency command is set using P00.07. By default P00.07 is set to 2: Analog AI2 setting.

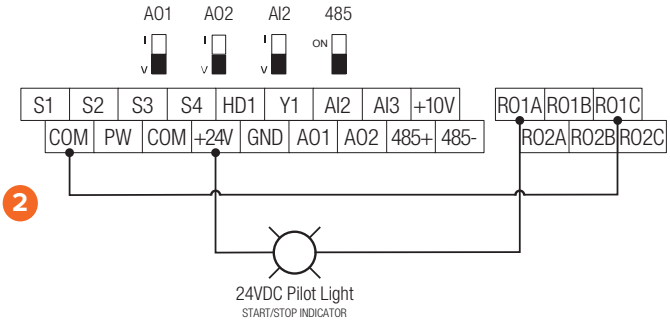
3 When P00.01=1 LOCAL/REMOTE indicator will flash GREEN for remote operation.

CONNECTING A 24VDC PILOT LIGHT TO OUTPUT RELAYS

Default Setting: The TD20 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 TD20 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



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

FREQUENTLY USED PARAMETERS

Function Code	Name	Description	Default Value
P00.00	Speed Control Mode	0: SVC 0 - Sensorless Vector Control mode 0. Suitable for apllications 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	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	Lowerr 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 Freqency Setting	Setting range: 1.0 to 15.0kHz	8kHz
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 records 3: Lock all function codes	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: Switch display state via shift key 3: Switch between FWD/REV rotation 4:Clear UP/DOWN setting 5: Coast to stop	1

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