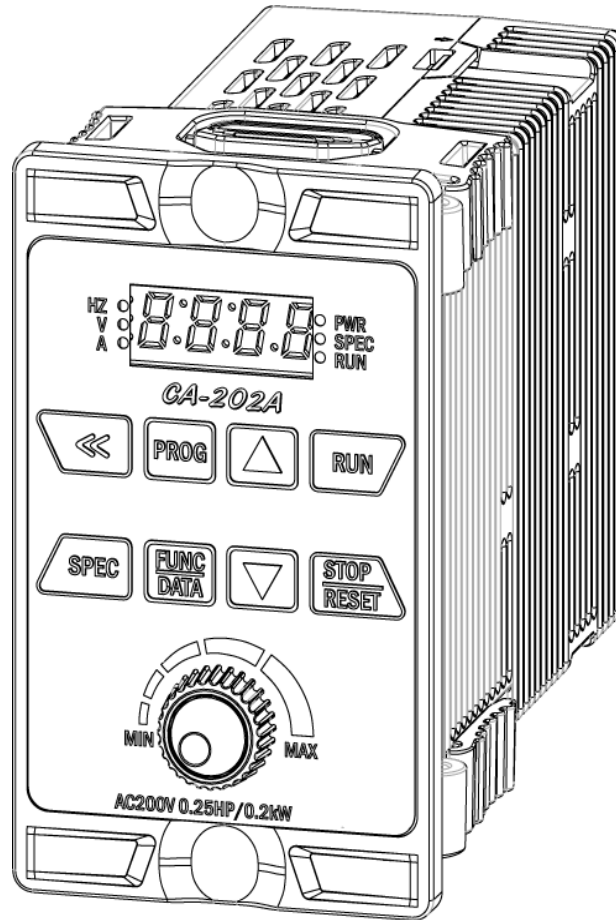**TPG®**
MOTORS & DRIVES

VARIABLE FREQUENCY DRIVE

Instruction Manual

CA Series

※This is brief instruction manual for basic review, for detail version please download in www.tpg-tw.com for further study.

Thank you for using TPG CA series drive. For proper operations and safety purposes, please do read and follow specific instructions contained in this manual before using the product.

SAFETY PRECAUTION

A. Don't touch the inverter circuit in 5 mins after the power LED indicator off, due to the remain electricity still left in the body of inverter.   Make sure to be off the power, while installation or taking-off this drive.

B. Don't put any object into this drive or touch any PC board of this

C. The earth wire must be connected with ground surely.

D. Don't touch the heat sink to avoid any burning, due to high E. temperature over 70 degree C.

F: Don't use single phase motor to matching this drive.

G. Don't connect U.V.W. points of this drive to input power.

The environment conditions:

Atmosphere	Non-corrosive or non-conductive, or non-explosive gas or liquid, and non-dusty
Surrounding temperature	-10°C (14°F) ~ +50°C (122°F) (Non-freezing and non-condensing)
Storage temperature	-20°C (-4°F) ~ +60°C (149°F)
Relative humidity	90% RH or less (No-condensing atmosphere)
Vibration	Less than 5.9m/sec² (0.6G)
Altitude	Less than 1000m (3280 ft.)

Features

1. With the temperature managemen

2. Allow RS-485 communication interface control (Modbus RTU communication protocol).

3. Special function key(SPEC):

   Programmable function key for forward/reverse running, jog speed, selection of primary/secondary frequency command…etc.

4. The switching frequency can be adjust between 800Hz ~ 16kHz.

5. Provide 8 sets of monitor displays(three of displays can be defined as another extra displays).

6. Provide PTC sensor setting functions for preventing the motor from overheating.

7. 6 sets of fault records:

   Record 4 types of information under fault condition, respectively. (fault code, output current, DC bus voltage, output frequency)

Chapter 1   Cautions Before Installation

The product has passed the strictest quality test before shipped out from the factory. However, the product might possibly sustain minor damages due to the impact, shaking, vibration, and other factors during the transportation. Please make sure to verify the following items after receiving this product. If the product verification finds anything abnormal, please contact the agent immediately for the further assistance.

1. Check up the appearance of the drive for any paint chipped off, smearing, deformation of shape, etc.
2. Check up the nameplate (as below figure) of the drive to verify the product descriptions with the order specification.

1-1 Nameplate

ISO 9001 IP20

| TYPE | CA-202A | → Model Number |
INPUT	1PH AC200-240V 3A 50/60Hz	→ Input Power Speos
OUTPUT	3PH AC200-240V1.5A 0.1-400Hz	→ Output Current & Capaoity
PGM NO.	0201-1	→ Software Number
SERIAL NO.	XXXXXXXX	→ Product Serial Number

1-2 Standard Specifications

Model name CA	CA-201A	CA-202A
Maximum applicable motor (W)	125	200
Rated output capability (VA)	400	600
Rated output current (A)	0.9	1.5
Rated output voltage (V)	Three-phase 200~240V	
Range of output frequency (Hz)	0.1~400Hz	
Power source (ψ, V, Hz)	1$\emptyset$, 200~240V , 50 / 60Hz	
Input current (A)	1.7	3
Permissible AC power source fluctuation	176V~264V 50/60Hz /±5%	
Overload protection	150% of drive rated output current for 1 min.	
Cooling method	Nature cooling	
Protective structure	IP20	
Weight / Mass(kg)	384g	

## Chapter 2   Installation and Confirmation

2-1 Installation

> For the safe operation of the drive, please be cautious to the environmental conditions where the drive is going to be installed.

1. Cleaning of Environment: The installed location of drive must consider the ventilation, cleanliness and moisture.
2. Due to the heat dissipating requirement during the drive operation, the drive must keep enough space for heat dissipation
3. Surrounding temperature -10℃～+45℃(14℉～122℉)
4. Due to the heat dissipating requirement during the drive operation, the drive must keep enough space for heat dissipation. Please keep the least clearance space when installation. (shown as below figure):
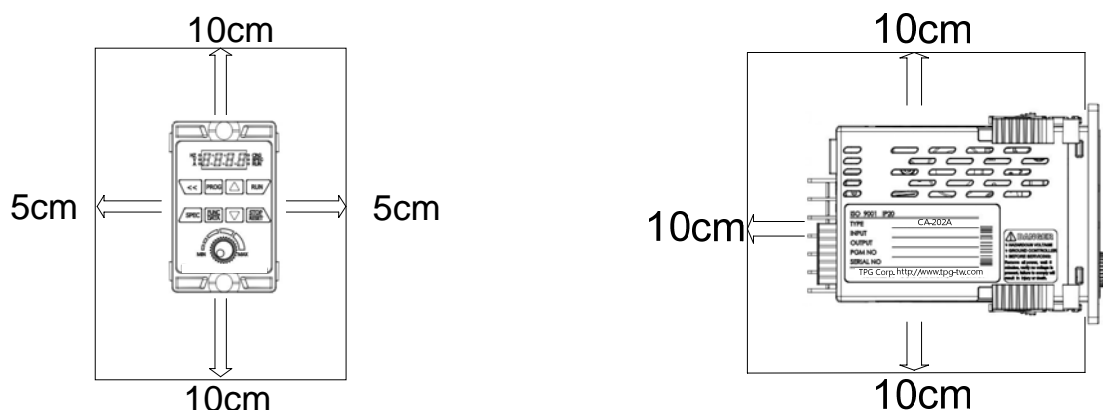
2-2 Description of Terminals
2-2-1 Wiring Diagram
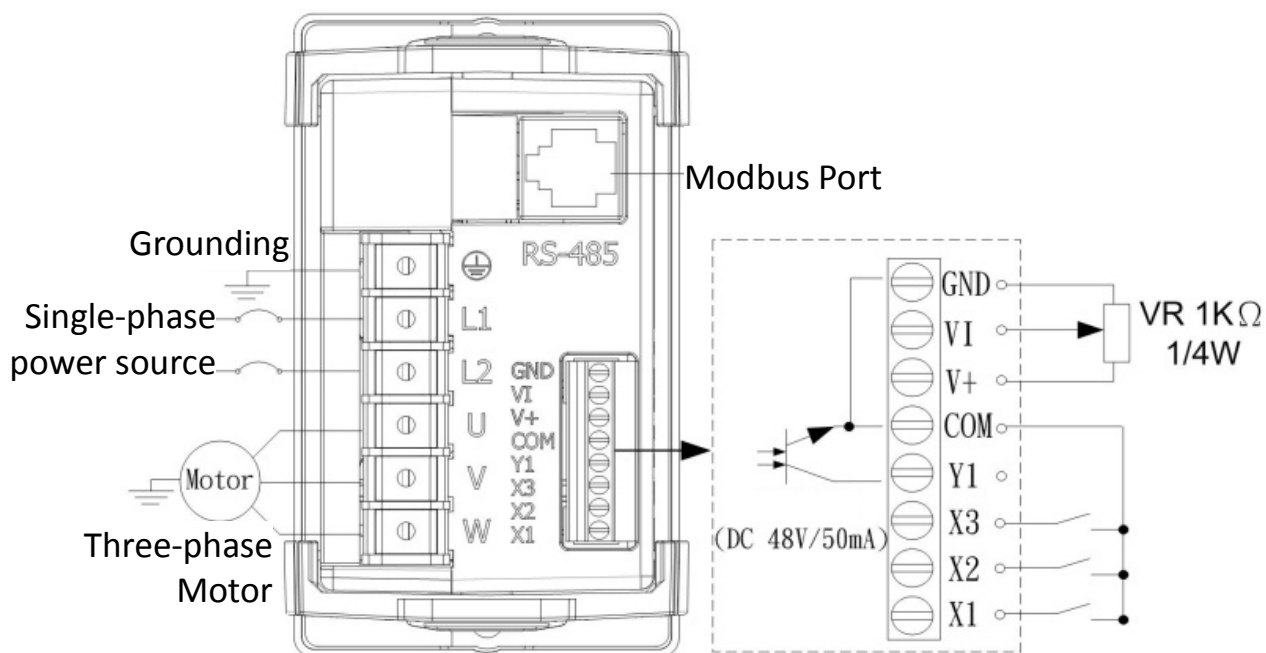
2-2-2 Main Circuit Connection

Type	Symbol	Function	Description
Power Source	L1,L2	AC power source input terminals	Single-phase; sinusoidal power source input terminal.(200~240V)
Motor	U,V,W	Drive outputs to motor terminals	The terminals output three phase variable frequency and voltage to motor.
Grounding	⏚	Grounding terminal	Ground the drive in compliance with the NEC standard or local electrical code.

2-2-3 Control Terminals

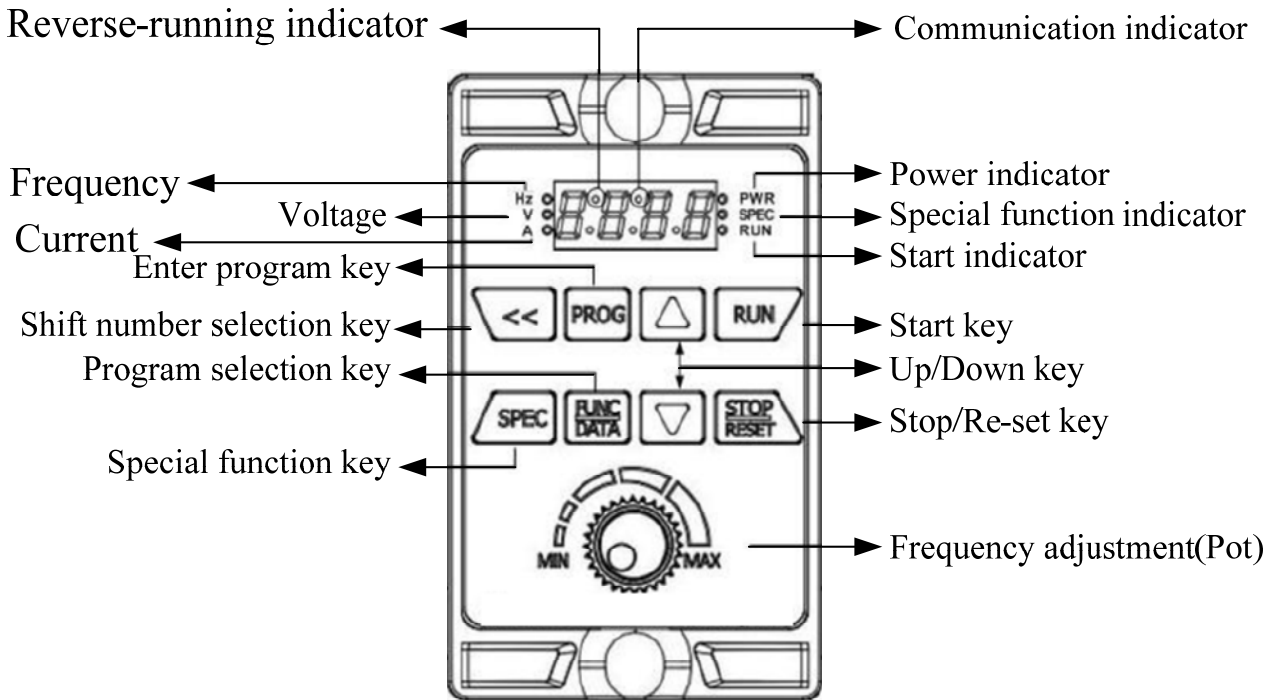| Type	Symbol	Function	Description
Input terminals	X1	Multi-function input terminal 1	Short the terminal with COM and set the function F5.19~F5.21.
	X2	Multi-function input terminal 2	
	X3	Multi-function input terminal 3	
Output terminals	Y1	Multi-function output terminal 1	Short the terminal with COM and set the function F5.26
	COM	Input/output common terminal	The common terminal of input control signal.
Control power	V+	Power terminal for analog input control	12V position: Maximum supplied current is 20mA.
	VI	Analog signal input terminal	DC 0~10V
	GND	Common terminal for analog input control	Common terminal for control power (12V/24V) and analog input terminal (AI)

2-2-4 Modbus Port (RJ-45)

Type	Pin	Function	Description
Modbus (RS-485) 8←1	1	Communication transmission terminal (DX+)	Differential input of RS-485 Modbus (RS-485)
	2	Communication transmission terminal (DX-)	
	3-8	Reserved	Reserved

Chapter 3　Common Specifications

3-1 The Features of Control and Operation

|		
Control Characteristics	Control method	• Voltage vector sinusoidal PWM control(V/F control); • Switching frequency: 800Hz~16kHz
	Range of frequency setting	0.1~400.00Hz
	Resolution of frequency setting	• Operation panel: 0.01Hz • Analog signal: 0.06Hz / 60Hz
	Resolution of output frequency	0.01Hz
	Overload protection	150% of drive rated output current for 1 minute
	DC braking	• Start/stop braking time: 0~60.0sec • Stop braking frequency: 0.1~60Hz • Braking ability: 0~150% of rated current
	Braking torque	Approximately 20%(with the external braking resistor connected, braking torque is approximately 100%)
	V/F pattern	• V/F pattern (2 V/F points) • Square curve, 1.7th power curve, 1.5th power curve. • Output voltage adjustment of V/F pattern(Variable voltage (V) adjustment of V/F pattern for acceleration / deceleration).
	Acceleration/ deceleration time	• 0sec(coast to stop), 0.0~3200.0sec(Independent setting of the acceleration / deceleration). • The time setting range of the speed acceleration from 0 to 60Hz is 0.015sec ~ 19200000sec(222 days).
	Stall prevention	Stall prevention at acceleration / constant speed(the current level of stall prevention is 30~200%), Stall prevention at deceleration
	Other functions	Slip compensation, auto-torque compensation, auto-adjustment for output voltage stability, auto-operation for energy-saving, auto-adjustment of switching frequency, restart after instantaneous power failure, speed tracing, over-torque detection, DC braking, dynamic braking duty control, sequential operation control, counter function, PID control, Modbus communication, jump frequency, holding frequency, upper/lower limits of output frequency, 16-preset speeds, acceleration/deceleration switch, S-curve acceleration/deceleration, fan control, parameters duplication, overload detection

3-2-1 Operation Panel

Reverse-running indicator

Communication indicator

Frequency

Voltage

Current

Enter program key

Shift number selection key

Program selection key

Special function key

Power indicator

Special function indicator

Start indicator

Start key

Up/Down key

Stop/Re-set key

Frequency adjustment(Pot)

3-2-2 The Operation of Operation Panel
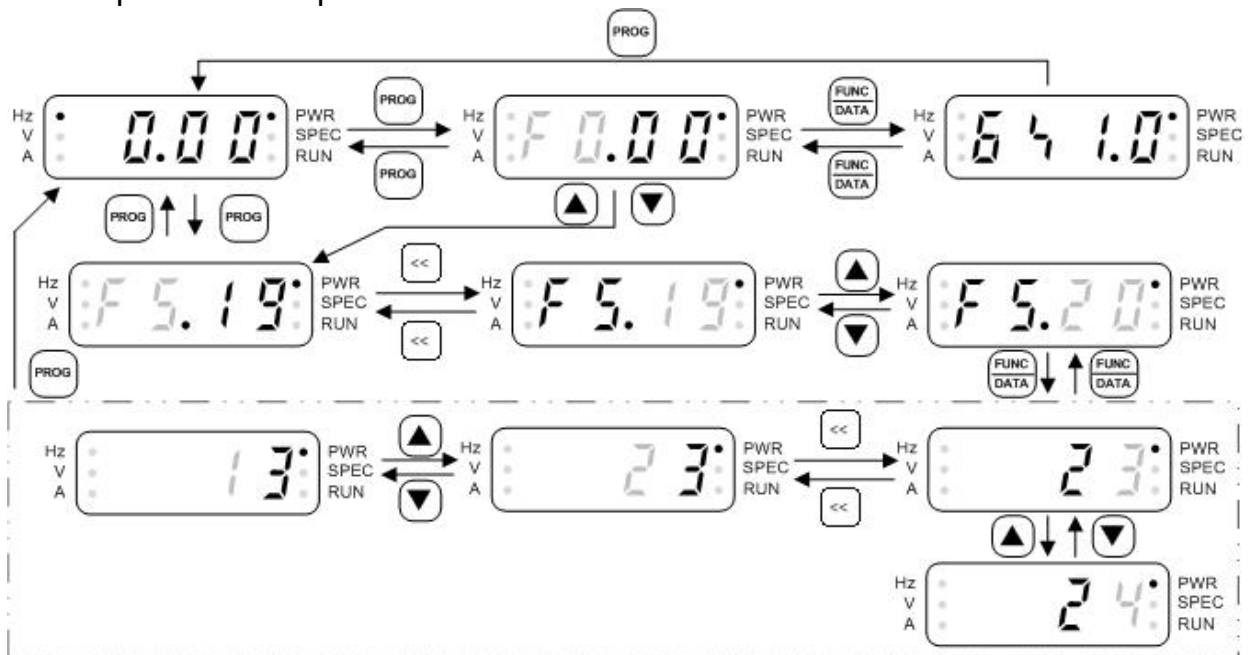
3-2-3 SPEC Programmable Special function key(SPEC) for forward/reverse

Set.
F1.00 : 5
F1.17 : 23
F1.18 : 1
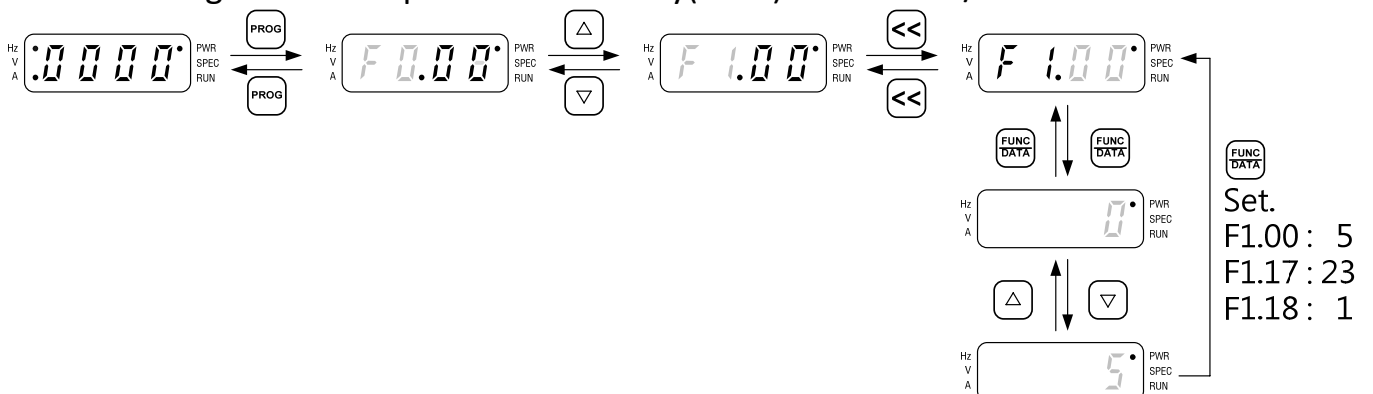
(grey-color digits in above table means digit flashing)

7

Chapter 4 Parameter List(Factory Setting: F0.18=0)

Group	brief version function (F0.18=0) Function	Group	detail function (F0.18=1)	Function
F0	System Parameters	F0		System status Parameter locking Password protection Power source voltage setting
F1	Start command selection Frequency command selection Main display selection SPEC key setting Switching frequency Stop mode	F1		Start command selection Frequency command selection Main display selection SPEC key setting Switching frequency Stop mode
F2	Frequency Parameters	F2	Frequency Parameters	Preset speed Multi-acceleration/deceleration time V/F pattern setting Upper/lower limits of output frequency
F4	Control Parameters	F3	Control Parameters	Holding frequency and time Stall prevention setting Motor slip compensation Automatic boost voltage range Current oscillation prevention Speed tracing Current compensation
F5	Protection Parameters	F4	Protection Parameters	Grounding fault protection Drive overload protection Motor overload protection Drive overheat protection Overload protection setting
		F5	Multi-function parameters	Analog input Analog output Multi-function input Multi-function output UP/DOWN setting Counting mode Frequency detection
		F6	Special parameters	Sequential operation control Modbus communication

1. Make sure to set program selection key F0.18 as number "1",for detail function status.
2. And set F0.18 as number"0" for brief version function status setting
3. The color as [　　　　] means functions can be set during the operation.

F0 System Parameters

Func.	Name	Descriptions	Range of Setting	Unit	Factory Setting
F0.01	Parameter Lock	0: Parameters are changeable 1: Parameters are locked	0，1	—	0
F0.18	Function	0：brief　　1：detail function	0，1	—	0
F0.20	Default Setting	0: Disable CLF: Clear fault records dF60: Default the factory setting of 60Hz dF50: Default the factory setting of 50Hz SAv: Store setting rES: Resume setting	—	—	0

F1 Operation Parameters

Func.	Name	Descriptions			Range of Setting	Unit	Factory Setting
F1.00	Start Command Selection		Start command	Rotation direction	0~11	—	3
		0	FWD or REV command	FWD or REV command			
		1	FWD command	REV command			
		2	Operation panel	FWD, REV command			
		3		Forward			
		4		Reverse			
		5		Reverse command			
		6~7	Reserved	Reserved			
		8	Communication control	Communication control			
		9	Communication control	Reverse command			
		10	Forward command	Communication control			
		11	Operation panel	Communication control			
F1.01	Primary	0: Frequency command by analog			0~5	—	1

	Frequency Command Selection	input selection (F1.03). 1: Frequency command by operation panel. 2: Motor rotation speed setting by operation panel. 3: Machine speed setting by operation panel. 4: Frequency command by multi-function input terminal as UP/DOWN command. 5: Frequency command by communication terminal.				
F1.03	Analog Input Selection	0：Pot＋VI 1：Pot－VI 2：VI－Pot	3：Pot or VI (switch by multi-function input terminal)4：Pot 5：VI	0~5	—	0
F1.08	Main Display Selection	Control panel have 8 display option 1: Output frequency 2: Frequency command 3: Output voltage 4: DC bus voltage 5: Output current 6: Display mode 6 (F1.09) 7: Display mode 7 (F1.10) 8: Display mode 8 (F1.11)		1~8	—	1
F1.13	Machine Speed Ratio	Set the ratio of machine speed. This function determines MPM display value.		0.00~500.00	0.01	20.00
F1.14	Digits of Decimal Value (Machine Speed)	Select the digits of decimal values displaying the machine speed.		0~3	—	0
F1.17	SPEC Key Setting	Same function as multi-function input		-28～+28	—	0
F1.18	SPEC Key Self-Holding Function	0: Disable 1: Enable		0，1	—	0
F1.19	Stop Mode	0: Ramp to stop + DC braking 1: Coast to stop 2: Coast to stop+ DC braking		0~2	—	0
F1.21	Switching Frequency	The setting value is higher and the motor noise is lower.		0~6	—	2

F2 Frequency Parameters

Func.	Name	Descriptions				Range of Setting	Unit	Factory Setting
F2.00	Primary Speed (Preset Speed 1)	Jog Speed	Multi-speed level 3 command	Multi-speed level 2 command	Multi-speed level 1 command	0.00~400.00	0.01Hz	50.00 *Note 1
		OFF	OFF	OFF	OFF			60.00 *Note 2
F2.16	Jog Speed	Jog speed				0.00~400.00	0.01Hz	6.00
F2.18	Primary Acceleration Time	The acceleration time of primary speed, preset speed 5~8, and jog speed.				0.0~3200.0	0.1sec	5.0
F2.19	Primary Deceleration Time	The deceleration time of primary speed, preset speed 5~8, and jog speed.				0.0~3200.0	0.1sec	5.0
F2.32	Maximum Output Frequency	Maximum output frequency of drive				0.1~400.0	0.1Hz	50.00 *Note 1 / 60.00 *Note 2
F2.34	Starting Voltage	The voltage corresponds to the output starting frequency.				0.1~50.0	0.1V	8.0
F2.35	Base Frequency	The frequency corresponds to the base voltage in V/F pattern.				0.1~400.0	0.1Hz	50.00 *Note 1 / 60.00 *Note 2
F2.36	Base Voltage	The voltage corresponds to the base frequency in V/F pattern.				0.1~255.0	0.1V	220.0
F2.47	Frequency Upper Limit	The upper limit of output frequency (1.00=maximum output frequency)				0.00~1.00	0.01	1.00
F2.48	Frequency Lower Limit	The lower limit of output frequency (1.00=maximum output frequency)				0.00~1.00	0.01	0.00

F4 Protection Parameters

Func.	Name	Descriptions	Range of Setting	Unit	Factory Setting
F4.08	Motor Rated Current	Current setting according to the motor rated current.	10%~150% of drive rated current	0.1A	According to the rated current of motor

F5 Multi-function Parameters

Func.	Name	Descriptions	Range of Setting	Factory Setting
F5.19	Multi-function Input Terminal X1	0: Disable ±1: Jog command ±2: Secondary accel/decel command switching ±3: Multi-speed level 1 command ±4: Multi-speed level 2 command ±5: Multi-speed level 3 command ±6: Multi-speed level 4 command ±7: Reset command ±8: External fault command(EF) ±9: Interruption of output command(bb) ±10: Coast to stop command(Fr) ±11: Speed search from the maximum frequency ±12: Speed search from the frequency ±13: Holding command ±14: UP command ±14: UP command ±15: DOWN command ±16: Clean UP/DOWN frequency command ±17: UP/DOWN command enter key ±18: Analog input source selection (Pot knob/AI) ±19: Primary and secondary frequency command option ±20: Start command of sequential operation control ±21: Pause command of sequential operation control ±22: Forward command ±23: Reverse command ±24: Stop command with 3-wire start/stop circuit	-28 ~ +28	22
F5.20	Multi-function Input Terminal X2		-28 ~ +28	23
F5.21	Multi-function Input Terminal X3		-28 ~ +28	1

			±25: DC braking enable (Stop) ±26: Counter input ±27: Counter clear ±28: Current limit enable		
F5.26	Multi-function Output Setting of Y1 Terminals	0: Disable ±1: Running detection ±2: Constant speed detection ±3: Zero speed detection ±4: Frequency detection ±5: Overload detection(OLO) ±6: Stall prevention detection ±7: Low voltage detection(LE) ±8: Braking transistor is active detection(db) ±9: Restart after instantaneous power failure detection ±10: Restart after fault condition detection	±11: Fault detection ±12：Reserved ±13：Reserved ±14：Reserved ±15：Reserved ±16: Detection of counter value1 ±17: Detection of counter value2 ±18: Reverse detection ±19: NTC temperature warning detection (OHt) ±20：Reserved ±21：Reserved	-21 ~ +21	11

(Note):
1. The default setting of 50Hz
2. The default setting of 60Hz
3 When the setting value of switching frequency(F1.21) exceeds "4", the drive must be de-rating for usage or selecting the higher capacity of drive.
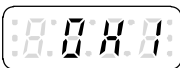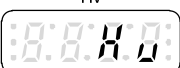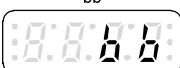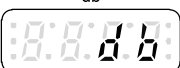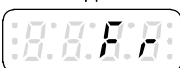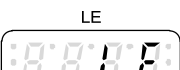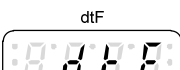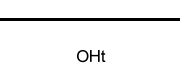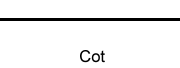
Chapter 5   Operation Procedures and Fault Protection

Fault Displays

Error Trip Messages of Drive

Display	Description	Display	Description
Fot	IGBT module error	noFb	PID feedback signal error
GF	Grounding fault	AdEr	A/D converter error
OC	Drive over current	EF	External fault
OL	Motor overload	PAdF	Keypad interruption during copy
OL1	Drive overload	EEr	EEPROM error
OL2	Drive current limit	EEr1	Internal memory error
OL3	Braking transistor overload	EEr2	Internal memory error
OLO	System overload	ntcF	Thermal sensor fault
OE	Over voltage	OH	Drive overheat
LE1	Under voltage during operation	OH2	Motor overheat

Warning Messages of Drive

| Display	Description	Display	Description
OLO	System overload	OH1	Motor overheat
Hv	Power source over voltage	bb	Drive output interruption
db	Braking transistor is active	Fr	Coast to stop
LE	Power source under voltage	dtF	Forwad/reverse command input simultaneously
OHt	Drive overheat	Cot	Modbus communication overtime

14

# Chapter 6 Outline Dimension Drawings

Overall Dimensions of Drive

Unit:mm

52

138

127

80

60

100
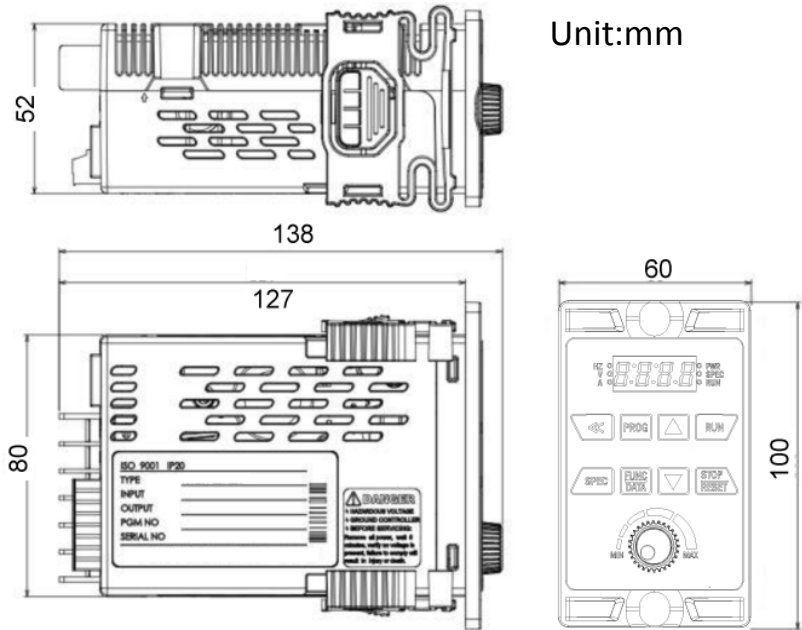
1. Removable bracket frame   2. Fixing screws

53^{+1}_{0}

81^{+1}_{0}

53^{+1}_{0}
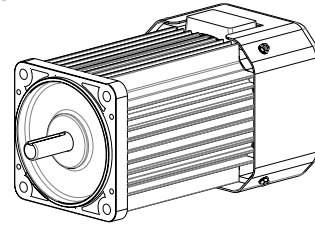
89 ± 0.2

81^{+1}_{0}

M4 screws
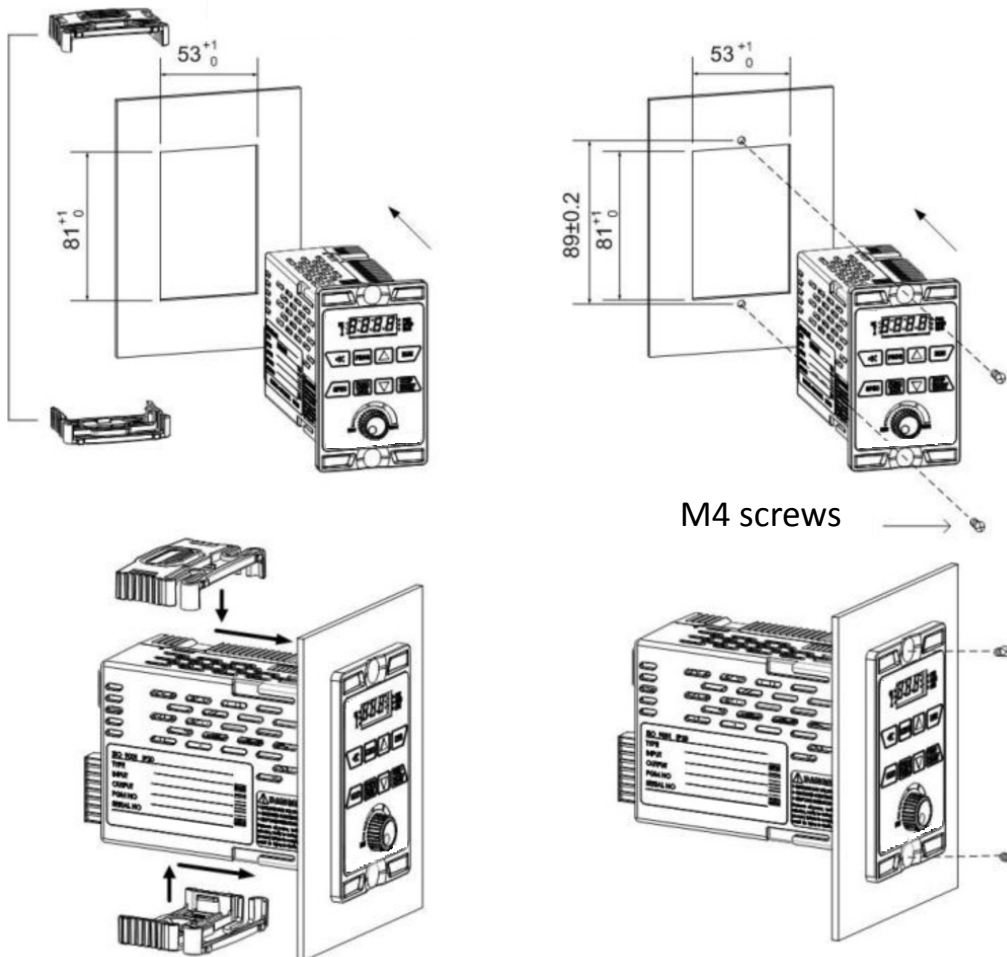
Attachment A.

Thanks for your kindly purchase TPG products, CA series AC motor drive. For the purpose to offer the full complete set service,TPG also produces all kinds motors, which can be matching with above inverters. For the detail spec. & information, please contact our agent or visit our website www.tpg-tw.com.
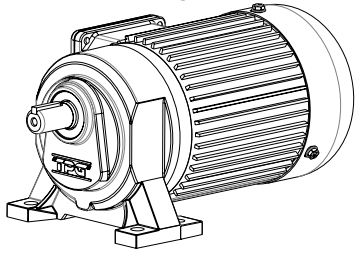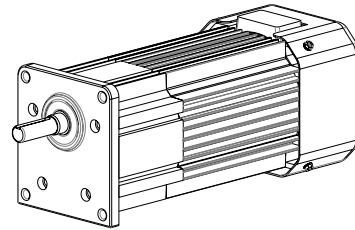

A1. Gear Motor

A2. Mighty tiny series (Motor)
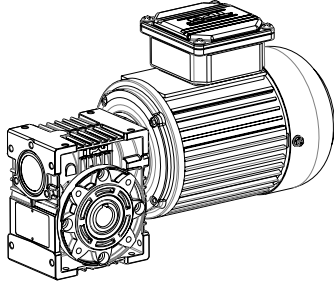
A3. Worm gear speed reducer

A4. Mighty tiny series(Gear Motor)

MOTORS & DRIVES

Warranty Card

Thanks much for your choice TPG products and TPG will supply a period of 12 months warranty from date of original purchase. TPG will repair or replace without charge devices which our examination proves to be defective in material or workmanship. This warranty is valid if the unit has not been tampered with by unauthorized persons, misused, abused, or improperly installed and has been used in accordance with the instructions and or rating supplied. The foregoing in lieu of any other warranty or guarantee, expressed or implied, and we are not responsible for any expense (including installation and removal), inconvenience, or consequential damage caused by items of our manufacture or sale. Please send back your defected products to any TPG branch office or distributors available as below showed.

IMPORTANT-fill out and mail this card. *Note: if you purchased more than(1) unit, fill out 1 card only and indicate the series number.

Pur. By：_____ Pur. Date：_____

Address：_____

Tel No.：_____

Contact name：_____Pur. From：_____

Product Name：_____Q'ty：_____

Model No.：_____

Series No.：_____