JPS

IRIS-BLDC DRIVER
USER MANUAL

Safety Precautions and Warnings!

⚠ **CAUTION! WARNING!** ⚠

Pay attention to these ⚠ **CAUTION, WARNING,** and ⚠ signals on the device or instruction documents. They indicate **danger to human body** or **damage to the device**. Before installing and putting the device into operation, please read the **safety precautions and warnings** following this page.

1. Make sure that the warning signs are kept in a legible condition and replace missing or damaged signs.

2. Before starting, familiarize yourself with the operation of the inverter. It may be too late if you start working with the inverter before read this instruction manual.

3. Never permit unqualified personnel to operate the inverter.

⚠ WARNING!

● This inverter produces dangerous electrical voltages and controls rotating mechanical parts.

● Death, severe injury or substantial damage to property can occur if the instructions in this operating manual are not completed with.

● Only personnel with appropriate qualifications should work with this inverter. These personnel must be familiar with all the warning signs and precautions laid out in these operating instructions for the transport, installation and operation of this device.

● The successful and safe use of this inverter depends on the correct installation, commissioning, operation and maintenance of the device.

● This device operates at high voltages.

⚠ CAUTION!

● The DC-link capacitors remain charged to dangerous voltages even the power is removed. For this reason it is not permissible to open the inverter cover until five (5) minutes after the power has been turned off.

● When handling the open inverter it should be noted that live parts are exposed. Do not touch these live parts.

● The terminals **R, S, T, U, V, W, P, N, B, PR, and BR** can carry dangerous voltages even if the motor is inoperative.

● Only qualified personnel may connect, start the system up and repair faults. These personnel must be thoroughly acquainted with all the warnings and operating procedures contained with this manual.

● Certain parameter settings may cause the device to start up automatically after power on or power recover.

DEFINITIONS

● **Qualified Person**

For the purposes of this manual and product labels, a **qualified person** is one who is familiar with the installation, construction, operation and maintenance of this device and with hazards involved. In addition, the person must be:

■ Trained and authorized to energize, de-energize, clear, ground and tag circuits and equipment in accordance with established safety practices.

■ Trained in the proper care and use of protective equipment in accordance with established safety practices.

■ Trained in rendering first aid.

● **DANGER**

For the purposes of this manual and product labels, DANGER indicates that loss of life, severe personal injury or substantial property damage WILL result if proper precautions are not taken.

● **WARNING**

For the purposes of this manual and product labels, WARNING indicates that loss of life, severe personal injury or substantial property damage CAN result if proper precautions are not taken.

- **CAUTION**

  For the purpose of this manual and product labels, CAUTION indicates that minor personal injury or property damage CAN result if proper precautions are not taken.

- **NOTE**

  For the purpose of this manual and product labels, NOTES merely call attention to information that is especially significant in understanding and operating the inverter.

⚠ DANGER and WARNING

- Make sure that the location selected for installation is safe, protected from moisture and splash and drip-proof!

- Children and the general public must be prevented from accessing or approaching the equipment!

- The equipment may only be used for the purpose specified by the manufacturer. Unauthorized modifications and the use of spare parts and accessories that are not sold or recommended by the manufacturer of the equipment can cause fires, electric shocks and injuries.

- Keep these operating instructions within easy reach and give them to all users!

⚠ WARNING

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Contents

1. *Description of IRIS*

1.1 Check Items

To avoid the carelessness during packing and delivery, please check the list below carefully。

Items	Amount	Contents
IRIS BLDC Manual	1 book	Please read carefully and keep with care for referring usage.
IRIS BLDC Driver	1 set	Check the spec. of the device with the case label is same or not. Check the out looking of the device to make sure that there is no defect on it. All screws should be tighten and exist.
Encoder Feedback cable	1 set	Make sure it is contented in the package (the cable had been tested before packing)。

If any miss or defect happened, please contact with the agency to get resolve of the problem.

1.2 Description of Nameplate Content

1.2.1 The Label on the Packing Case

2R5-BLDC-A-COLOR
220V

The contents of indication:

1. **2R5** → Indicates that this driver should access **220** Volt power and the rated output is **5**A.

2. **BLDC** → Suit for **BLDC** motor.

3. **A** → Indicates that this driver is an **A**dvanced type.

4. **COLOR** → Indicates that the control panel of this driver is **COLOR** type.

The types of Control Panel	
X	**The driver doesn't have a Control Panel**
MONO	**The driver has a MONOchrome LCD Control Panel**
COLOR	**The driver has a COLOR LCD Control Panel**

5. **220V** → Indicate the suitable power rating individually.

1.2.2 The Driver Rating Label

The figure below is a sample of the rating label that is put on the outside of the driver.

MODEL	2R5-BLDC-A
INPUT	AC 3Ø 220V / 50/60HZ
OUPUT	3Ø 5A/ 2KVA/ 0~400HZ
Serial NO.	080A0001
JPS	MADE IN TAIWAN CE

The contents of rating label are showed below:

MODEL：2 R □ - BLDC- A

Input voltage	2 : 220VAC
	4 : 380VAC
Model series	R : IRIS Series
Output current	According to Driver-Current
Suit motor	BLDC : Brush Less Direct Current
Function	A : Advanced

INPUT ：AC3Ø220 / 50/60HZ

Power-Type	A.C. 1 or 3 Phase, 220Volt.
Power Frequency	50Hz/60Hz

OUTPUT : 3Ø5A 2KVA / 0~400Hz

Phase / Current	3Phase/5A
Capacitance (KVA)	2KVA
Output Frequency Range	0 ~ 400HZ

1.3 The Specification of IRIS Series

1.3.1 The Rating

2R□-BLDC-A	220VAC Level			
	2	3P5	5	7
Output current(A)	2	3.5	5	7
Output horse power (HP)	0.5	1	1.5	2
Output wattage (KW)	0.3	0.75	1	1.5
Output capacity (KVA)	0.65	1.3	1.8	2.5
Max Output Voltage (V)	Up to Input Voltage			

1.3.2 The Specification of Hardware

2R◇-BLDC-□

◇Rated Current	2~7(A)
□Driver type	A Type
Digital Input	6 Unit
Digital Output(Signal)	2 Unit
Digital Output (Relay)	1 Unit
Analog Input	1 Unit(12bit resolution)
Analog Output	1 Unit
RS485 Communication Interface	2 Units
Fan Malfunction & Precaution Function	Included
Over Heat Protect Function	Included
PG Feedback Interface	1Unit
Brake Discharge MOS-FET	Included

2. *Condition of Storage Environment*

This driver should be contained in the packing case. If do not use this driver temporarily, in order to ensure this driver in our warranty scope, please follow the items below:

● The ambient temperature must be in the scope of - 20℃ to +65℃, relative humidity 0% to 95%, and no dew clings.

● Must be preserved in the environment that is dustless, stainless, and dry.

● Avoid to store under the environment that has caustic gas or liquid.

3. *Attention of Installation*

⚠ WARNING

To guarantee the safe operation of the equipment it must be installed and commissioned properly by qualified personnel in compliance with warnings laid down in these operating instructions.

Take particular note of the general and regional installation and safety regulations regarding work on high voltage regulations, as well as the relevant regulations regarding the correct use of tools and personal protective gear.

Make sure that the unobstructed clearance for each of the cooling inlets and outlets above and below the inverter is at least 100mm.

Make sure that a space of 40mm is kept free at the sides of the inverter to permit the cooling air to escape from the side slits.
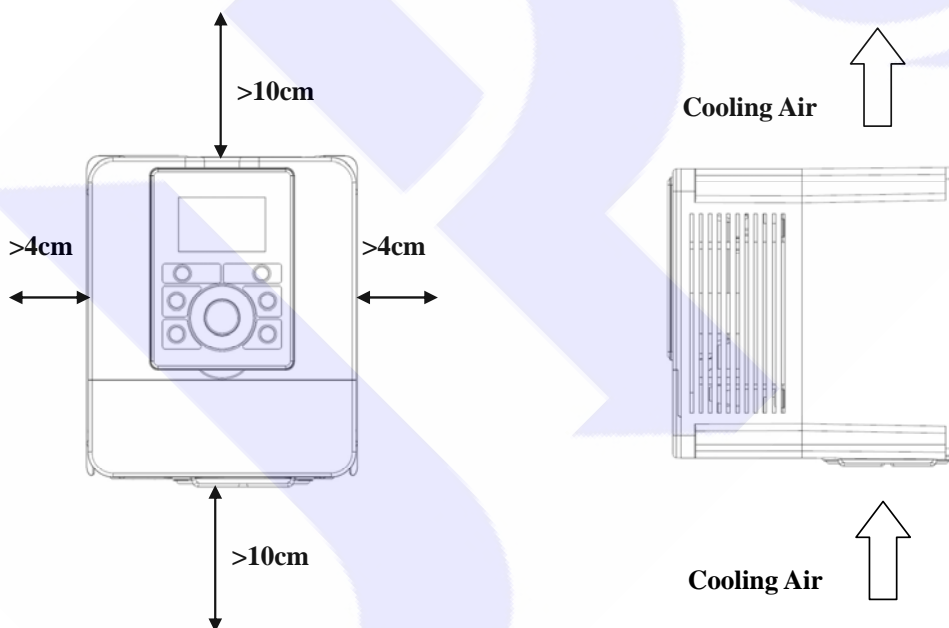
Ensure that the temperature does not exceed the specified level when the inverter is installed in cubicle. Avoid excessive vibration and shaking of the equipment.

Do not be obstructing the cooling fan that installed on the inverter, it is used to build proper airflow for heat sink thermo dissipation. And do not touch the fan hole when it is running.

Please consider the possible use of options, such as RFI suppression filters at the planning stage.

⚠ WARNING

To prevent electrical shock, do not open cover for at least 5 minutes after removing AC power to allow capacitors to discharge.

4. *Outline Dimension*

Control Panel	The fixed Support of Control Panel
	  The Fixed Support hole dimension. The Fixed Support is optional by order.

The Outline Dimension for the Model 2A、3.5A、5A，7A
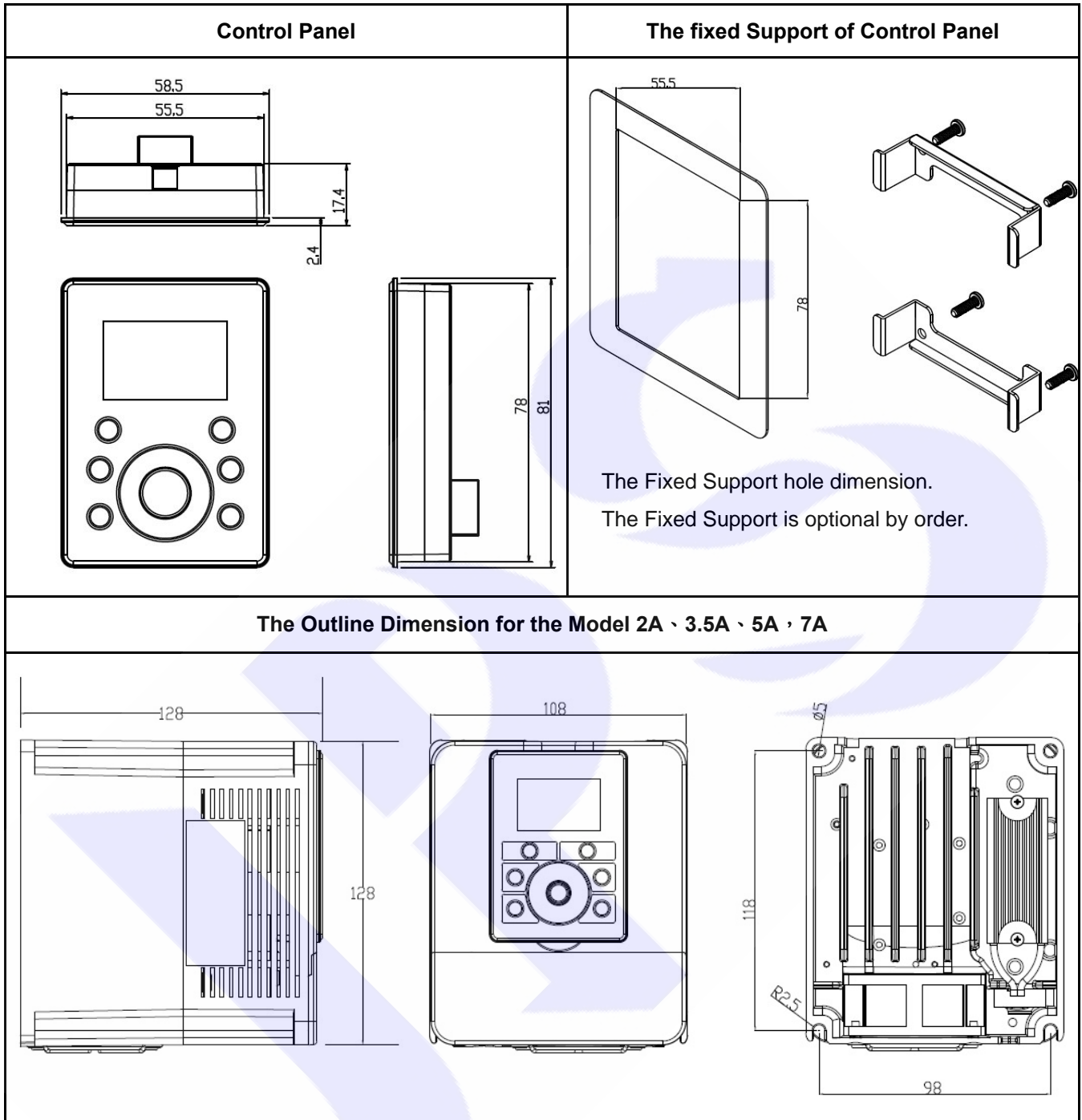
5. *Description of Wiring*

The upper cover must be removed in order to connect the electrical leads.

5.1 Power Terminal

The power terminals are divided into three portions:
1.   The power input terminals (R, S, T) receives power for the operation of the inverter.
2.   The output terminals (U, V, and W) deliver output power to motor.
3.   Brake resistor should be connects to icon ⌐⋁⋁⌐.

⚠ **NOTE: The terminal has icon ⏚ should be connected to Earth properly.**

⚠ **WARNING: Never connect power source line to U, V, W, P, N, B terminals.**

5.1.1 The Power Input Terminals (R, S, T)

⚠ **WARNING! NOTE!**

- **The power input terminals are R, S, and T. Never connect power source line to U, V, W, P, N, B terminals.**

- Between the power source and driver, add NFB for system protection.

- There are static sensitive components inside the Printed Circuit Board. Avoid touching the boards or components with your hands or metal objects.

- Make sure to connect the power terminals tight and correctly.

- Make sure that the power source supplies the correct voltage and is designed for the necessary current.

- The terminal has icon ⏚ should be connected to **Earth** properly.

5.1.2 The Output Terminals (U, V, W to Motor)

- Make sure the motor's rated voltage and current are suitable with driver's specification.

⚠**WARNING: Do not insert contactors between driver and motor; the U, V, W terminals should be connected to motor directly.**

5.2 The Control Signal Terminals

⚠**WARNING! NOTE!**

All the input/output control signal lines, or remote panel lines and communication lines must be laid separately from the high current power/motor/brake lines. They must not be fed through the same cable conduit/trucking.

5.3 Brake Resistor Terminals

⚠ **NOTE: This driver contains braking discharge circuits. The terminals have icon ⌐⋁⋁⌐ are used to connect external resistor to discharge the re-generating energy when in braking condition.**

Refer to the list below when choosing resistor for braking discharge. The wattage of resistor can be increased for heavier re-generating energy or higher discharge duty.

Model	Resistance	Wattage (W)
2R2	400	40
2R3P5	300	60
2R5	200	80
2R7	100	150
The discharge duty is 10 ％		

5.4 The Input Reactor

When power supply capacity is larger than 500KVA and /or using thyrister, phase advance capacitor etc. from same power supply, must fit an A.C.L. in front of R.S.T. power input to curb instantaneous current and to improve power efficient ratio. Refer to the list below to choose proper reactance.

Voltage (V)	Model	Current (A)	Inductance
220	2R2	6	1.8mH
	2R3P5	6	1.8mH
	2R5	6	1.8mH
	2R7	10	1.1mH

5.5 The Proper Screw Drive for Power Terminals

It is necessary to choose proper tool for wiring connection to avoid screw stripped or burst. Please refer to the list below to choose a proper screw drive for driving power terminals.
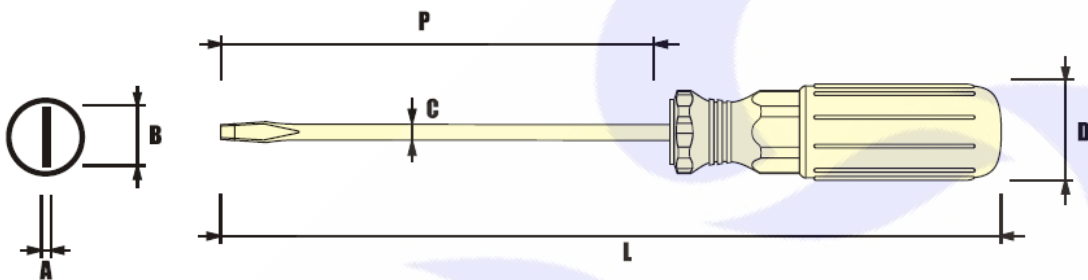
A - B mm	C mm	D mm	P mm	L mm
0.6 - 3.3	3.3	-	-	-
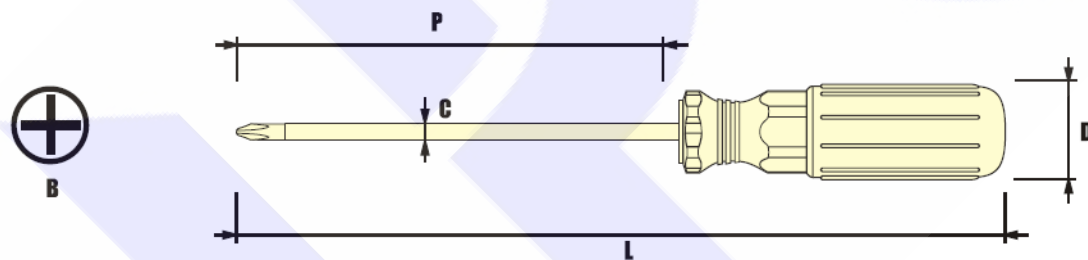
B	C mm	D mm	P mm	L mm
#0	3.3	-	-	-

6. *Basic Wiring Diagram for IRIS Series Drive*
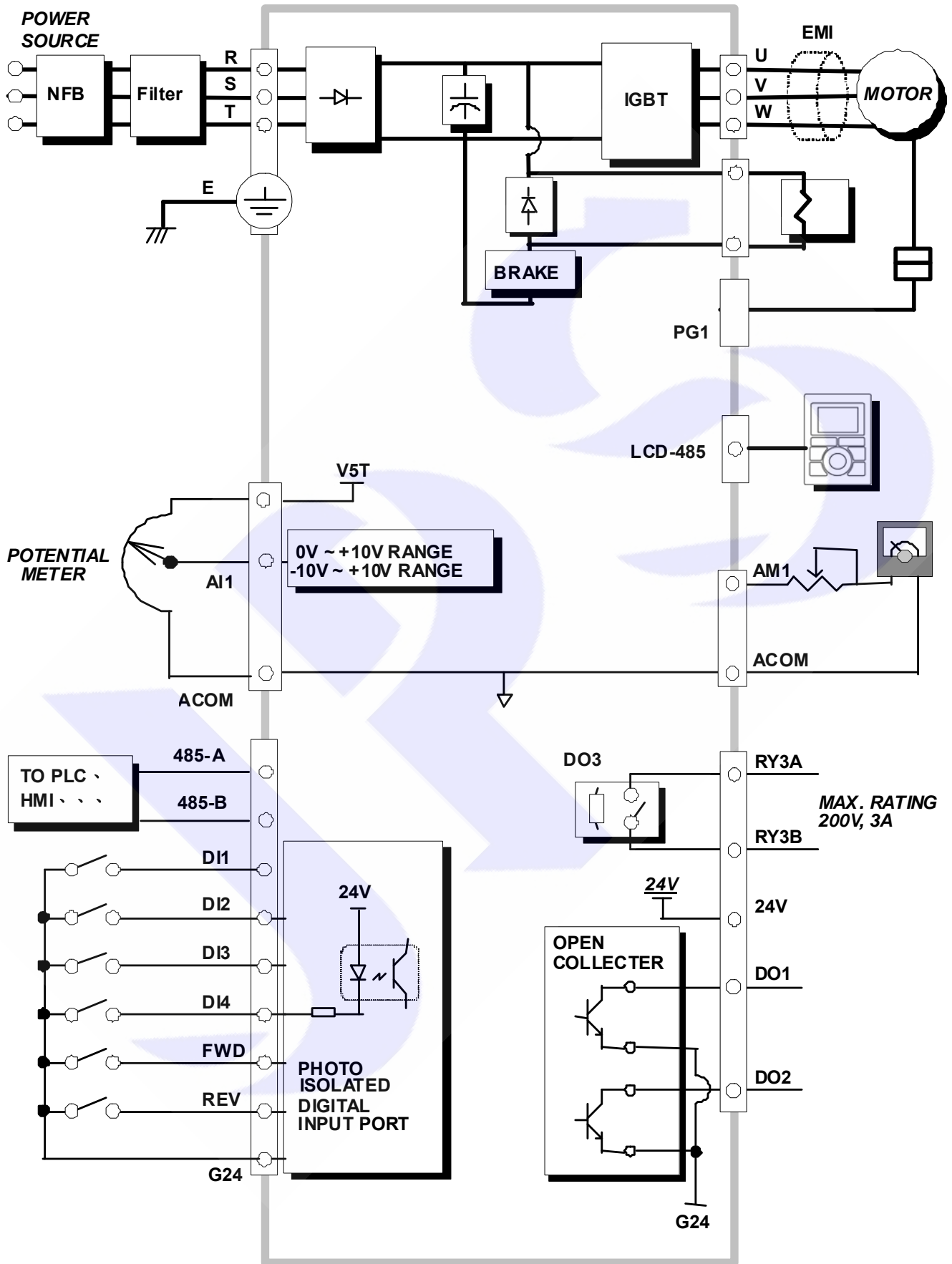
7. *I/O Interface*

7.1 The Map of I/O Terminal Position

Refer to the position map to locate the terminals or interface.
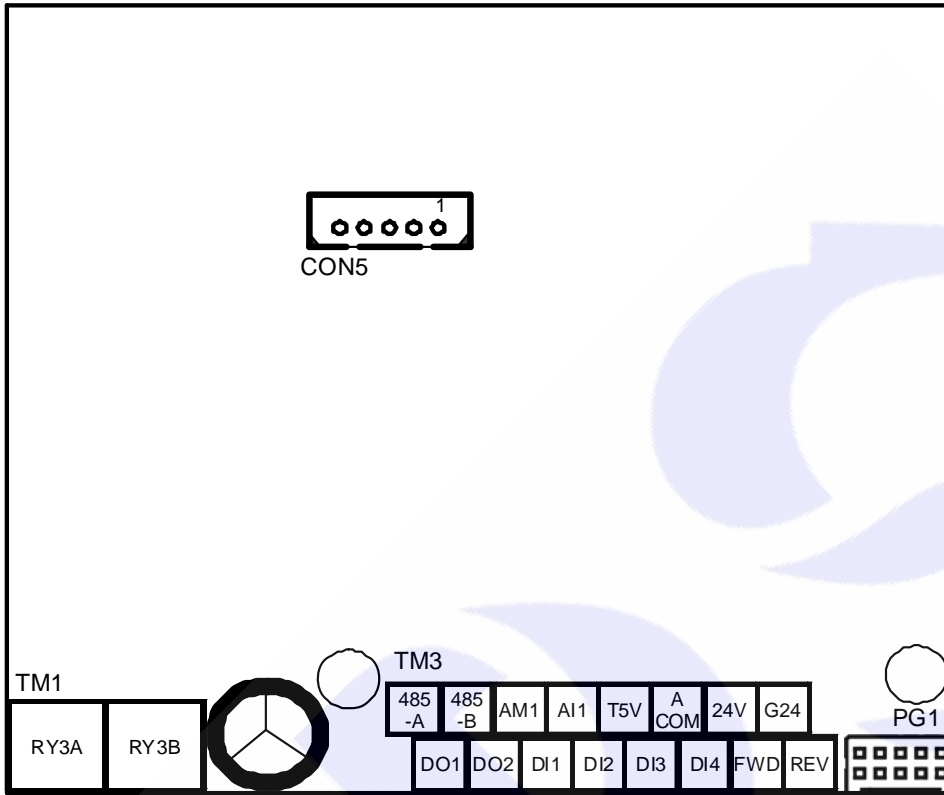
CON5 → RS485 Communication port; using to connect Control Panel.
TM1 → Relay A type output terminal.
TM3 → Digital I/O、Analog I/O、Communication port, etc.
PG1 → The PG feedback connector that comes form motor.

Refer to next Chapter for detail.
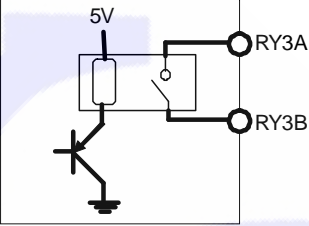
7.2 TM3 Description

Terminal	Name	Function	Hardware construction
TM3	485-A	RS485 communication port (photo coupler isolated)	
	485-B		
	AM1	Analog output (refer to ACOM)	
	AI1	Analog Input (refer to ACOM)	
	T5V	5V reference voltage (refer to ACOM)	⚠ **NOTE**
	ACOM	The reference ground of Analog signal system.	1. ACOM and G24 are not the same electric level.
	24V	24V output power (refer to G24)	2. 5V is used to be a voltage reference for analog signal; 24V is used for digital input / output signal connection; do not use both these two voltage as power supplier to external circuits.
	G24	The reference ground of digital I/O system.	
	DO1, DO2	Digital output terminals. (reference ground is G24) Only be used under 24V voltage level to keep system stable. Programmable by setting parameter value.	
	DI1~DI4, FWD, REV	Digital input terminals. (reference ground is G24) Only be used under 24V voltage level to keep system stable. Programmable by setting parameter value.	
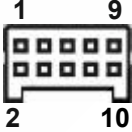
7.3 Connector CON5

Pin No.	Function	Description
Pin1	5V	Default designed to be the communication port of Control Panel. It is not suitable to apply to another communication usage.
Pin2	0V	
Pin3	LCD-A	
Pin4	LCD-B	
Pin5	N.C.	

7.4 Terminal Block TM1

Terminal	Function	Construction
RY3A	Relay A type output terminals. Rating: 200V, 3A Only be used under 24V voltage level to keep system stable. Programmable by setting parameter value	
RY3B		

RY3A/RY3B also named as DO3

7.5 Connector PG 1

Connector	PG1	9 Pin D-sub	Signal	Description
PG1 and 9-pin D-sub(male) definition	Pin1	Pin1	A+	When in closed loop mode, the motor's PG feed back signal connected by attached wire cable to this connector. The PG1 connector pin assignment show as below:
	Pin2	Pin2	A-	
	Pin3	Pin3	B+	
	Pin4	Pin4	B-	
	Pin5	Pin5	M+	
	Pin6	Pin6	M-	
	Pin7	Pin7	5V	
	Pin8	Pin8	0V	
	Pin9	Pin9+shield	Shield	
	Pin10	-		

8. *Digital Control Panel Description*

8.1 Digital Control Panel Appearance Introduction

Run the Driver → **Run**
Mode Switch → **Mode**
Read / Write → **Rd/Wt**
Lock / Unlock → **JPS**

LCD Display
Reset or Stop the Driver → **Reset / Stop**
Move Up or Add → Δ
Move Down or Decrease → ▽
Fly Wheel
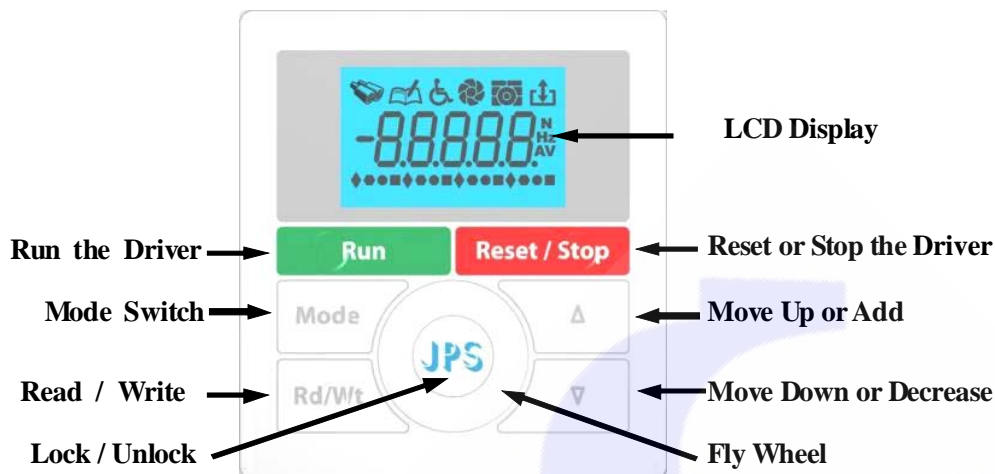
8.2 Monitor's Graphical Description

Alarm Mode
Parameter Mode
Monitor Mode
5-digital Numerical Displahy
Negative Symbol

Fly Wheel Mode
Status of Touch Key
Communication Status
N, Hz ,A, V data type indicator
DI Status Bar

Status of DI16
Status of DI1
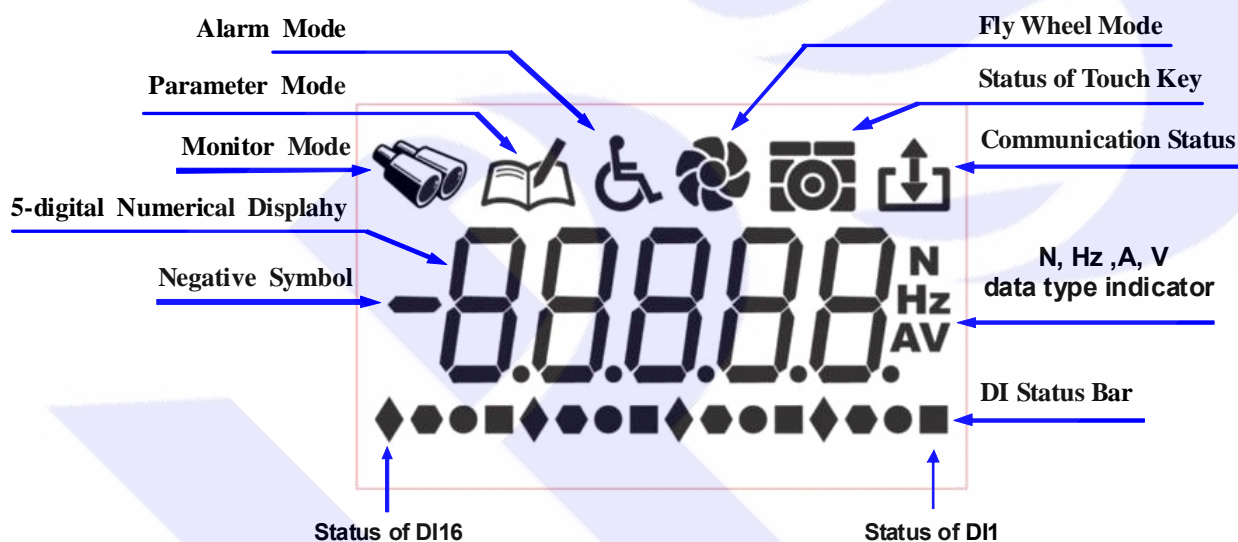
The DI Status Bar shows the on/off status of DI1 ~ DI16 for real time.

8.3 The Start up Message of Panel

(1).	After Start up the display will show the panel's software version firstly. (the sample shows the version *P8b10*)	*P8b 10*
(2).	Then the display changes the message to show company's logo. (the sample shows *-JPS-*)	*-JPS-*
(3).	Then the display changes the message to show the fitting motor type. (the sample shows *-bLdC* type)	*-bLdC*
(4).	Then the display changes the message to show the driver's software version. (the sample shows the version *v8b15*)	*u8b 15*
(5).	At last, the display changes the status to show the monitor mode. Only △ , ▽ and (JPS) keys can be operated at this status.	*00000*Hz

9.   *The Operation Guide of Digital Control Panel*

When power-on start or reset the panel, the key will be locked and need user to unlock it. After user left it after 10 minutes for not using, the panel will lock the keys automatically.

9.1   Lock and unlock

Press (JPS)   at least 1 sec, till 4 beeps sound.
The panel will be unlocked.

- After unlock the panel, to do this proceedure again will lock the panel.
- Keep unprocees this panel for 10 minutes, the panel will lock the key function automatically.
- After unlock process, the display will show "unloc"; after lock process, the display will show "loc".

9.2   Change mode

At any status ➔ Press [Mode]

By pressing this bottom, can enter these different modes sequentially:

- 👁 Monitor mode
- 📖 Parameter mode
- ♿ Alarm mode

9.3   Monitor mode

9.3.1 Select the monitoring item

When in 👁 Monitor mode   Press [△] or [▽]

By using the up/down keys, can select the monitoring item:
- **N**   Motor's speed.
- **Hz**   The output frequency.
- **A**   Output current.
- **V**   Output voltage.

9.3.2 To run or stop the motor

When in 👁 monitor mode ➔ Press [Run] twice (within 0.5sec)

Will start the motor to run, or

When in 👁 monitor mode ➔ Press [Reset / Stop] twice (within 0.5sec)

Will stop the motor.

In order to operate the run and stop function on the control panel, the condition list below should be satisfied:

- **G01-05=0**   **FWD** terminal function: no function.
- **G01-08=73**   Set the virtual input function: FWD function.
- **G01-17=1**   Control panel RUN / STOP function switch: enable.

9.3.3 Use the fly wheel function in the monitor mode

In monitor mode, can enter the fly wheel mode by touching and draw on the wheel.

or
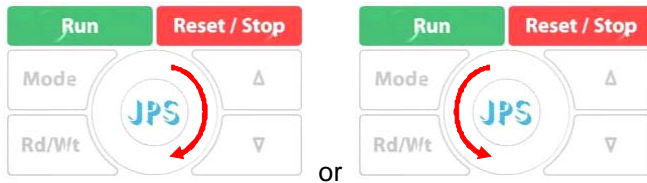
If enter the fly wheel mode successfully, the icon will be showed on the display; in the mean time, the display will show the present speed, and the latest digital will flash to notice that the data is ready to be edit.

9.3.4 Use fly wheel and the up/down keys to edit data

● **Change the edit position**

Touch the right or left side of the wheel lightly **to change the edit position.**

By using this way, can change the edit positon to save the operation time.

● **Edit the value**

1. **Using the fly wheel to change the value**

or to increase or decrease the value.

2. **Using up/down keys to change the value**

press △ **or** ▽ **to change the value.**

Bothe of these two ways can be used to change the value.

● **Write**

Press Rd/Wt **twice within 0.5sec, the value will be written into memory.**

9.4 Parameter mode (select, read, edit, write)

> **Press** [Mode] **to enter parameter mode.**

After enter parameter mode, LCD display will show **00-00**; the left side of hyphen is group number, and the left side is parameter number in the group; that is to say, the presently showed parameter is G00-00.

In the parameter mode should follow the steps list below to read or change the parameter's value.

1. **Select parameter.**
2. **Read out the value of parameter.**
3. **Enter edit mode to change the value, if you wish.**
4. **Write down the value into the parameter and save in memory.**
5. **Exit from edit mode to select another parameter, or exit to the top level to change to another operation mode.**

9.4.1 Select the parameter

【NOTICE】 **All the operation described below can only work under the condition of the** 📖

(parameter mode) or 📖 **(edit mode).**

By using the operation described below, can select parameter, read value, edit value and write the value into parameter.

1. **Select parameter**

   ● **Enter select parameter mode**

   > **Pres** [△] **or** [▽] **to enter select parameter**

   or

   > **Touch one of the left or right side of wheel lightly.** [Run] [Reset / Stop] [Mode] [JPS] [Rd/Wt] [△] [▽] **to enter select parameter mode.**

   By these processes, the least digital of displayed data will be flashed to indicate that is ready to be edit.

   ● **Change the edit position**

   > **Touch the left or right** [Run] [Reset / Stop] [Mode] [JPS] [Rd/Wt] [△] [▽] **to change the edit position.**

   ● **Enter parameter number**

   > **Press** [△] **or** [▽] **to increase or decrease value.**

   or

   > **Draw on the fly wheel circularly** [Run] [Reset / Stop] [Mode] [JPS] [Rd/Wt] [△] [▽] **to change the value.**

2. **Read the value of parameter**

> In 📖 mode ➜ press [Rd/Wt] to read parameter value.

3. **Edit parameter value**
4. **Write down the parameter value**
   The proceedures of editing and writing the parameter value are same with the proceedure that are introduced in paragraph **9.3.4Use fly wheel and the up/down keys to edit data**.

5. **Return**

> Press [Mode] to return to previous mode sequentially.

9.5 Alarm mode

> Press [Mode] to select alarm mode.

then
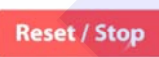
> In ♿ mode ➜ Press [△] or [▽]

By using Up or Down keys, can show A0 ~ A3 alarm messages sequentially:

- ● **A0** **Showing the present alarm message.**
- ● **A1** **Showing the alarm message previous than A0.**
- ● **A2** **Showing the alarm message previous than A1.**
- ● **A3** **Showing the alarm message previous than A2.**

** After power on or reset, all alarm record will be shift by the sequence A0➔A1➔A2➔A3, and the record A0 will be refresh by present status.

9.6 RESET

> In ♿ mode ➜Press [Reset / Stop] **Twice within 0.5sec.**

This procedure will reset the driver and panel itself, and the effect like power-on restart.

10. *Quick Start*

10.1 Run Command Set from Digital Input Terminals

Step I   Setting Basic Parameters and Auto Tuning (Close Loop)

A.   Setting the Parameter of Motor

Refer to the nameplate on motor to set the following parameters:
1. **G20-00   Full Load Current (%)**
   This parameter defines the percentage of the motor's rating and the driver's rating.
   Full Load Current (%) = (Rated Current of Motor / Rated Current of Driver) x 100%
2. **G20-02   Motor Pole No.**
3. **G22-08   Max. RPM Limit**

B.   Execute R&L Auto Tuning
1. Setting G21-00 (Motor Operation Mode) to be 17 (select R&L Auto Tuning).
2. Reset the driver.
3. Connect FWD and G24 terminals, and wait till display shows $-End-$.

After completing the R&L Auto Tuning, the driver will set the following parameters automatically:
1. **G20-05   the phase resistance of motor.**
2. **G20-06   the phase inductance of motor.**

C.   Execute Current Gain Auto Tuning
1. Setting G21-00 (Motor Operation Mode) to be 16 (select Current Gain Auto Tuning).
2. Reset the driver.
3. Connect FWD and G24 terminals, and wait till display shows $-End-$.

After completing the Current Gain Auto Tuning, the driver well set the following parameters automatically.
1. **G21-01   Current Loop P-gain**
2. **G21-02   Current Loop I-gain**

D.   Set Motor Operation Mode
1. Setting G21-00 (Motor Operation Mode) to be 11 (Close Loop Mode.
2. Reset the driver.

Step II   Start to Run

1. Setting G22-00 (Speed Set 0) = 100.   →Setting Speed Set 0 = 100 rpm.
2. Connect FWD and G24 terminals, the motor will start and run at 100 rpm speed.

10.2 RUN Command Set from Control Panel

After studying the paragraph 10.1, if want to control Run and Stop directly from Control Panel, follow the steps below:

1. G22-00 (Speed Set 0) = 100   →   Setting Speed Set 0 = 100 rpm.
2. G01-05 (FWD function select) = 0   →   Disable FWD terminal function.
3. G01-08 (Virtual terminal function select) = 73 →   Setting virtual terminal function to be 73 (FWD function).
4. G01-17 (Panel's Run / Stop Enable) = 1   →   Enable the Run / Stop function.

Now, the motor can be set to run or stop directly from Panel's run / stop keys.

10.3 Change the Definition of Motor's Direction

⚠NOTE

In normally, the definition of running direction is defined by default setting, and the wiring of motor and feed back encoder have been defined before packing. Somehow, there may happen some condition, for example the G07-00 or the wiring of motor is changed, then the definition between the driver and motor and encoder will not match and may cause serious vibration or laud noise. When in this situation, please stop to operate the driver and contact with your agency to correct all the condition.

If in regular condition, the driver can drive motor normally and want to change the direction definition of motor. Please following the steps listed below:

※ **When driver is in Forward Run condition, and the motor rotating in CCW direction (face to the motor axis):**
1.   Setting G01-05 (FWD terminal function select) to be 0 ➜ Disable FWD terminal functions.
2.   Turn off AC input power
3.   Connect the U, V, W wires to the terminals U, V, W of driver. ➜ Change the output power lines.
4.   Turn on the AC input power.
5.   Setting G07-00 (Magnetic sensor direction) to be 0.   ➜ Phase A leads phase B.
6.   Setting G01-05 = 73   ➜ Redefined the FWD terminal function.

※ **When driver is in Forward Run condition, and the motor rotating in CW direction (face to the motor axis):**
1.   Setting G01-05 (FWD terminal function select) to be 0 ➜ Disable FWD terminal functions.
2.   Turn off AC input power
3.   Connect the U, W, V wires to the terminals U, V, W of driver. ➜ Change the output power lines.
4.   Turn on the AC input power.
5.   Setting G07-00 (Magnetic sensor direction) to be 0.   ➜ Phase A leads phase B.
6.   Setting G01-05 = 73   ➜ Redefined the FWD terminal function.

11. *Parameter Description*

11.1 IRIS-BLDC Parameter List

No.	Name	Default	Min.	Max.	Unit	Type	Pr.
G00-Driver Specification Group *There is different setting for different model.							
00-00	Unit Address	1	1	63	--	FR/W；R	071
00-01	Driver system software version	--	0	FFFF	Version	F	097
00-02	Motor type	2	0	4	--	F	348
00-03	Special Function	*0	0	65535	--	F	337
00-04	AC power input voltage	*220	10	1000	Vac(rms)	FR/W	130
00-05	Rated output current	*5.0	1.0	6000.0	Ampere	FR/W	209
00-06	Carrier frequency	*10.0	2.0	16.0	Khz	FR/W；R	239
00-07	EAROM Lock	0	0	1	--	FR/W	368
00-08	Recover parameter to default	0	0	1	--	R/W	369
G01-Digital Input Group							
01-00	Status of DI1~DI16	0000	0000	FFFF	--	M	011
01-01	DI1 function select	0	0	255	--	R/W	061
01-02	DI2 function select	0	0	255	--	R/W	062
01-03	DI3 function select	0	0	255	--	R/W	063
01-04	DI4 function select	0	0	255	--	R/W	064
01-05	FWD (DI5) function select	73	0	255	--	R/W	065
01-06	REV (DI6) function select	74	0	255	--	R/W	066
01-07	FAN running status (fixed and cannot be changed)	30	30	30	--	F	0
01-08	The Run/Stop keys function select	0	0	255	--	R/W	068
01-09 ~ 01-14 are reserved							
01-15	DI15 function select (a virtual input, links to DO15)	0	0	255	--	R/W	475
01-16	DI16 function select (a virtual input, links to DO16)	0	0	255	--	R/W	476
01-17	The enable switch of panel's Run/Stop keys	0	0	1	--	R/W	059

【NOTE】

The digital input function definition can't be repeated. Check this point after finish setting this group.

No.	Name	Default	Min.	Max.	Unit	Type	Pr.
G02-Digital Output Group							
02-00	Status of DO1~DO16	0000	0000	FFFF	--	M	012
02-01	DO1 function select	0	0	255	--	R/W	111
02-02	DO2 function select	0	0	255	--	R/W	112
02-03	DO3 function select	0	0	255	--	R/W	113
02-04 ~ 02-14 are reserved							
02-15	DO15 function select (a virtual output, links to DI15)	0	0	255	--	R/W	165
02-16	DO16 function select (a virtual output, links to DI16)	0	0	255	--	R/W	166
G03-Analog Input Group							
03-00	AI1 A/D output value	0	0	4095	--	M	229
03-01	AI1 max. input value	4095	0	4095	--	FR/W	230
03-02	AI1 0V input value	2048	0	4095	--	FR/W	231
03-03	AI1 min. input value	0	0	4095	--	FR/W	232
03-04	AI1 input type	0	0	1	--	R/W;R	233
03-05	AI1 % display of input value	0.00	0.00	100.00	%	M	234
03-06	AI1 blind zone setting (used in ±10V input type)	0	0	1000	--	R/W	235
G05-Analog Output Group							
05-00	AM1 Function Select	0	0	15	--	R/W;R	370
05-01	AM1 Full Scale Data Range	0	0	65535	--	FR/W	371
05-02	AM1 Output Volume Setting (0~100% full-scale)	0.0	0.0	100.0	%	RAM	372
05-03	AM1 100% full scale adjustment	0.0	0.0	100.0	%	FR/W	373
05-04	AM1 75% scale adjustment	0.0	0.0	100.0	%	FR/W	374
05-05	AM1 50% scale adjustment	0.0	0.0	100.0	%	FR/W	375
05-06	AM1 25% scale adjustment	0.0	0.0	100.0	%	FR/W	376
05-07	AM1 12.5% scale adjustment	0.0	0.0	100.0	%	FR/W	377

G07-Magnetic Sensor Group							
No.	Name	Default	Min.	Max.	Unit	Type	Pr.
07-00	Magnetic sensor direction	0	0	1	--	FR/W；R	188
07-01	Magnetic sensor PPR	256	256	60000	--	FR/W；R	189
07-02	Magnetic sensor angle alignment (do not change)	0.0	0.0	359.9	Deg	FR/W；R	197
07-03	Magnetic sensor input buffer size	6	0	6		FR/W；R	192
07-04	Magnetic sensor A/B/M status	0	0	7	--	M	190
07-05	Magnetic sensor Counter status	0	0	65535	--	M	191
07-06	Magnetic sensor feedback angle status	0.0	0.0	359.9	Deg	M	352
07-07	Reserved						
07-08	Magnetic sensor check time	0	0	30000	ms	R/W	193
G20-BLDC Motor Group							
No.	Name	Default	Min.	Max.	Unit	Type	Pr.
20-00	Motor full load current ratio (%)	50	0	200	%	FR/W	210
20-01	Motor exciting current ratio (%)	30	0	200	%	FR/W	211
20-02	Motor pole no.	8	2	128		FR/W；R	116
20-03	Ke value	0	0	1000	V/krpm	FR/W	198
20-04	Electronic thermo relay time	3	0	120	sec	R/W	215
20-05	Phase resistance	1.000	0.000	60.000	Ohm	FR/W	216
20-06	Phase inductance	1.00	0.00	60.00	mH	FR/W	217
G21-BLDC Control Group							
No.	Name	Default	Min.	Max.	Unit	Type	Pr.
21-00	Operation mode	11	0	29		R/W；R	003
21-01	Current loop P-gain	1000	0	3000		R/W	004
21-02	Current loop I-gain	100	0	3000		R/W	005
21-03	Current loop filter level	0	0	7		R/W	008
21-04	Speed loop P/I gain select	1	1	2		R/W	018
21-05	1'st speed loop gain switch point	100	0	3000	rpm	R/W	029
21-06	1'st speed loop P-gain	500	0	1000		R/W	031
21-07	1'st speed loop I-gain	50	0	1000		R/W	032
21-08	1'st speed loop filter level	0	0	7		R/W	033
21-09	2'nd speed loop gain switch point	100	0	3000	rpm	R/W	160
21-10	2'nd speed loop P-gain	500	0	1000		R/W	161
21-11	2'nd speed loop I-gain	50	0	1000		R/W	162
21-12	2'nd speed loop filter level	0	0	7		R/W	163
21-13	Torque control mode	0	0	3		R/W	086
21-14	Torque limit-quadrant I setting	100.0	0.0	300.0	%	R/W	087
21-15	Torque limit-quadrant II setting	100.0	0.0	300.0	%	R/W	088
21-16	Torque limit-quadrant III setting	100.0	0.0	300.0	%	R/W	089
21-17	Torque limit-quadrant IV setting	100.0	0.0	300.0	%	R/W	090
21-18	Torque drooping range	10	0	100	%	R/W	108
21-19	Direction limit	0	0	2		FR/W	110
21-20	Torque compare value	100	0	300	%	R/W	95
G22-BLDC Multi-Speed Setting Group							
No.	Name	Default	Min.	Max.	Unit	Type	Pr.
22-00	Speed Set0	0	0	30000	rpm	R/W	120
22-01	Speed Set1	0	0	30000	rpm	R/W	121
22-02	Speed Set2	0	0	30000	rpm	R/W	122
22-03	Speed Set3	0	0	30000	rpm	R/W	123
22-04	Speed Set4	0	0	30000	rpm	R/W	124
22-05	Speed Set5	0	0	30000	rpm	R/W	125
22-06	Speed Set6	0	0	30000	rpm	R/W	126
22-07	Speed Set7	0	0	30000	rpm	R/W	127
22-08	Max. speed limit	3000	0	30000	rpm	FR/W	128
22-09	Speed command select	0	0	19	rpm	R/W；R	278
22-10	Actual RPM setting → Actual Command RPM Display	0	-30000	30000	rpm	M	119

G23-BLDC Acc/Dec/S-curve Group

No.	Name	Default	Min.	Max.	Unit	Type	Pr.
23-00	Acc. time (0~1000rpm)	5.00	0.00	650.00	Sec/Krpm	R/W	053
23-01	Dec. time (1000~0rpm)	5.00	0.00	650.00	Sec/Krpm	R/W	054
23-02	S-curve T1 time (start of Acc. period)	0.00	0.00	5.00	Sec	R/W	055
23-03	S-curve T2 time(end of Acc. period)	0.00	0.00	5.00	Sec	R/W	056
23-04	S-curve T3 time(start of Dec. period)	0.00	0.00	5.00	Sec	R/W	057
23-05	S-curve T4 time(end of Dec. period)	0.00	0.00	5.00	Sec	R/W	058
23-06	Brake Hold Time	1.00	0.00	60.00	Sec	R/W	291

G63-MISC. CAM Switch Group

No.	Name	Default	Min.	Max.	Unit	Type	Pr.
63-00	CAM SW1 start angle	0	0	359	Degree	R/W	360
63-01	CAM SW1 active range	0	0	359	Degree	R/W	361
63-02	CAM SW2 start angle	0	0	359	Degree	R/W	362
63-03	CAM SW2 active range	0	0	359	Degree	R/W	363
63-04	CAM SW3 start angle	0	0	359	Degree	R/W	364
63-05	CAM SW3 active range	0	0	359	Degree	R/W	365

G65-MISC. Speed Compare Group

No.	Name	Default	Min.	Max.	Unit	Type	Pr.
65-00	Speed compare value	30	0	30000	Rpm	R/W	206
65-01	Speed arrive setting	1000	0	30000	Rpm	R/W	207
65-02	Speed arrive range	30	0	30000	Rpm	R/W	208

G66-MISC. Rotary Switch Group

No.	Name	Default	Min.	Max.	Unit	Type	Pr.
66-00	RSW TYPE	0	0	3	--	R/W;R	118
66-01	RSW Data	0	0	65535	--	M	137
66-02	RSW Backup Memory	0	0	65535	--	R/W	138
66-03	RSW Max Data Limit	1000	0	65535	--	R/W	152

G82-H/W DC-BUS adjust Group

No.	Name	Default	Min.	Max.	Unit	Type	Pr.
82-00	DC bus measurement adjust	100	80	120	%	FR/W	131
82-01	DC bus voltage	0	0	1000	Vdc	M	132
82-02	Over-Discharge-Protect time	5.0	0.0	10.0	sec	R/W	151

G83-H/W THERMISTOR adjust Group

No.	Name	Default	Min.	Max.	Unit	Type	Pr.
83-00	Heat sink temperature (centigrade)	0	0	250	degC	M	140
83-01	Over-Heat protect temperature (centigrade)	80	50	100	degree	R/W	150

G84-H/W FAN adjust Group

No.	Name	Default	Min.	Max.	Unit	Type	Pr.
84-00	FAN control type	0	0	1	--	R/W	146
84-01	FAN feed back signal (Factory set)	2	1	16	--	FR/W	147
84-02	Measured FAN speed	0	0	65535	rpm	M	148
84-03	FAN low speed warning and trip level	2000	0	30000	rpm	R/W	149

11.2 Monitor Type Parameters' Address

The table showed below list the Monitor type parameters, and there address. User can read it by communication.

Name	Unit	Address (Pr.)
Driver's output voltage	V	013
Motor's actual speed	rpm	019
Driver's output frequency	Hz	030
Alarm message	--	035
Driver's output current	rms(Amp)	213

11.3 Parameter's Type

The table showed below describing the different type of all the parameter of this manual:

Type	Description
R/W	The parameter is Readable and Writable, and can be stored in EAROM. All this type parameters can be initialized by the G00-08 function.
FR/W	The parameter is Readable and Writable, and can be stored in EAROM. This type of parameter is specially set by Factory and not for user normally usage. This type of parameter only can be modified by authorized person.
RAM	The parameter is Readable and Writable, but it uses the RAM to temporally store the change of parameter. After power on or reset it will be recover to be default value.
M	The parameter is Monitor type. Only readable and no effect for writing this parameter.
F	Factory set parameter, and should not be changed.
R	To indicate that any change of this type of parameter have to Reset the driver to enable the change.

12.   *IRIS-BLDC Parameter Description*

12.1 G00 Driver Specification Group

- **G00-00 → Unit Address (for communication)**
  This parameter can be set from 1 to 63. If there are above 2 driver connected to the communication line, the unit address should be set for individual number.
  【**NOTICE**】**The communication port format should be 19200bps、8bits、1stop、no parity.**

- **G00-01 → System software version**
  Indicate the CPU software version.

- **G00-02 → Motor Type**
  Setting this parameter to choice suitable motor type; it should select 2 (BLDC type) for this driver.

- **G00-03 → Special function select**
  Set this parameter to be 0 for standard model.

- **G00-04 → Input AC power voltage**
  This parameter defines the input AC power voltage level:
  For 220V driver, it should set 220;
  For 380V driver, it should set 380.

  【**NOTE**】

  This parameter has been defined well before leaving factory. User should not change it.

  If necessary to adjust it, please measure the R, S, T voltage and get the average to write into this parameter.
  ※ **If the R, S, T input voltage is different form the designed level exceed 10%, please contact with the agency or producer to confirm. Rashly change this parameter may cause damage to this driver or public danger.**

  The driver will follow this parameter's setting to calculate the followed voltage check level:
  ※ *Over Potential* trip level = 1.414 ＊ G00-04 ＊ **130 ％**。
  ※ *OP* recover level = 1.414 * G00-04 * **120%**。
  ※ *Under Potential* trip level = 1.414 * G00-04 * **70%**。
  ※ *UP* recover level = 1.414 * G00-04 * **80%**。
  ※ CONTACTOR ON level = 1.414＊G00-04＊**69％**。
  ※ CONTACTOR OFF = 1.414＊ G00-04＊**65％**。
  【**NOTE**】**The Contactor is inside the driver to short the charging resistor.**
  ※ Brake Discharge start level = 1.414＊G00-04＊**117％**。

- **G00-05 → Rated Output Current**
  This parameter defines the rated output current of driver.
  【**NOTE**】This parameter is set as the specification of driver, and there is no need to change it.

- **G00-06 → Carrier Frequency**
  This parameter defines the PWM carrier frequency. The range can be set from 2 KHz~16 KHz.
  If setting higher carrier frequency, the output waveform will be less distortion for sinusoidal, and the human ear will hear less noise, but the electronically interference to the environment will be larger, and generate more switching loss on power module.
  If setting lower carrier frequency, the output waveform there will be more distortion for sinusoidal, and the human ear will hear more noise, but the electronically interference environment will be less, and the switching loss on power module will be less too.

- **G00-07 → EAROM Lock**

Value	Description
0	The parameter value can be changed and stored into EAROM.
1	The change of parameter value will not be stored into EAROM

  【**NOTE**】**The value of G00-07 will not be changed after reset.**
  If G00-07=0, after reset the G00-07=0.
  If G00-07=1, G00-07=1.

- **G00-08 → Recover Parameters to Default**
  If setting G00-08 to be 1, all the R/W type parameters in EAROM will be initialized to default value.
  After changing the value of this parameter, must reset the driver.

12.2 G01 Digital Input Group

● **G01-00 ➔ Status of DI1~DI16**

This parameter shows the DI1 ~ DI16 status by hexadecimal numerical data. Converting this data to be binary format, the status of DI1 ~ DI16 will be presented from LSB to MSB of the data.

For example:

if G01-00=0 ➔ Converting to binary is **"0000 0000 0000 0000"**. The DI1 ~ DI16 are OFF.

If G01-00=5 ➔ Converting to binary is **"0000 0000 0000 0101"**. The DI1 and DI3 are ON, and others are OFF.

● **G01-01 ➔ DI1 Function Select**
● **G01-02 ➔ DI2 Function Select**
● **G01-03 ➔ DI3 Function Select**
● **G01-04 ➔ DI4 Function Select**

● **G01-05 ➔ FWD (DI5) Function Select**

FWD terminal has been set to be 73 ➔ Forward Run.

● **G01-06 ➔ REV (DI6) Function Select**

REV terminal has been set to be 74 ➔ Reverse Run.

● **G01-07➔ FAN running status (Factory set, cannot be changed)**

This parameter is fixed set by factory and cannot be changed. The FAN running status will showed on the bit7 of G01-00.

● **G01-08 ➔ The Run/Stop keys function select**

Only in **Monitor mode** or **Fly wheel mode** can operate this way:

Press [**Run**] twice within 0.5 sec, the virtual input DI8 will be set to be ON, and this change can be check from G01-00.

Press [**Reset / Stop**] twice within 0.5 sec, the virtual input DI8 will be set to be OFF, and this change can be check from G01-00.

【NOTE】**Usually the G01-08 is set to be 73 (FWD) or 74 (RWD).**

● **G01-09 ~ 01-14 ➔ Reserved**

【NOTE】G01-09~G01-14 are reserved, and keep them all to be 0.

● **G01-15 ➔ DI15 Function Select (virtual input, links to DO15)**
● **G01-16 ➔ DI16 Function Select (virtual input, links to DO16)**

DI15 and DI16 are virtual inputs, and are directly links to DO15 and DO16 respectively.

【NOTE】 **About the function of such inputs DI1~DI4/FWD/REV/DI15/DI16, please refer to chapter 13 Digital Input Function.**

The digital input function definition can't be repeated. Check this point after finish setting this group.

● **G01-17 ➔ The Enable Switch of Run/Stop**

If G01-17 = 0, the Run/Stop keys have no function.

If G01-17 = 1, the Run/Stop keys have function.

【NOTE】 The Run/Stop can be enabled or disabled from Dix(21) (refer to **chapter 13 Digital Input Function**).

12.3 G02 Digital Output Group

- **G02-00 ➔ Status of DO1~DO16**
  This parameter shows the DO1 ~ DO16 status by hexadecimal numerical data. Converting this data to be binary format, the status of DI1 ~ DI16 will be presented from LSB to MSB of the data. For example:
  if G02-00=0 ➔   Converting to binary is **"0000 0000 0000 0000"**. The DO1 ~ DO16 are OFF.
  If G02-00=5 ➔   Converting to binary is **"0000 0000 0000 0101"**. The DO1 and DO3 are ON, and others are OFF.

- **G02-01 ➔ DO1 Function Select**
- **G02-02 ➔ DO2 Function Select**
  DO1~DO2 are reality output terminals. The function of these terminals can be selected by setting these parameters.

- **G02-03 ➔ DO3 Function Select**
  DO3 actual output terminals are the RY3A and RY3B of TM1. It is a A-type relay output. The function of this terminal can be selected by setting this parameter.

- **G02-04 ~ 02-14➔ Reserved**

- **G02-15 ➔ DO15 Function Select (virtual output, links to DI15)**
- **G02-16 ➔ DO16 Function Select (virtual output, links to DI16)**
  DO15 and DO16 are virtual outputs, and are directly links to DI15 and DI16 respectively.

【NOTE】**About the function of such outputs DO1~DO3/DO15/DO16, please refer to chapter 14 Digital Output Function.**

12.4 G03 Analog Input Group

- **G03-00 ➔ AI1 A/D Output Value**
  This parameter displays the A/D value of AI1 input.

- **G03-01 ➔ AI1 Max. Input Value**
  Applying the maximum input voltage to AI1 read the data from G03-00 and set into this parameter as the AI1 input maximum limit.

- **G03-02 ➔ AI1 0V Input Value**
  Appling 0V to AI1 read the data from G03-00 and set into this parameter as the AI1 0V input reference.

- **G03-03 ➔ AI1 Min. Input Value**
  Appling the minimum input voltage to AI1 read the data from G03-00 and set into this parameter as the AI1 input minimum limit.

- **G03-04 ➔AI1 Input Type**
  Select the AI1 input type of voltage range.

Value	Description
0	The input voltage range is **0 ~ +10V**.
1	The input voltage range is **-10V ~ +10V**.

- **G03-05 ➔ AI1 % Display of Input Value**
  The displayed data = (AI1 actually input voltage / AI1 input range) x 100 ％.
 The AI1 input range is adjusted by G03-01 ~ G03-03.

- **G03-06 ➔ AI1 Blind Zone Setting**
  If G03-04 select type 0, the AI1 input in the range of G03-03 +/- G03-06 will be negated.
  【NOTE】**Only when G03-04 select type 1, the function of G03-06 is available.**

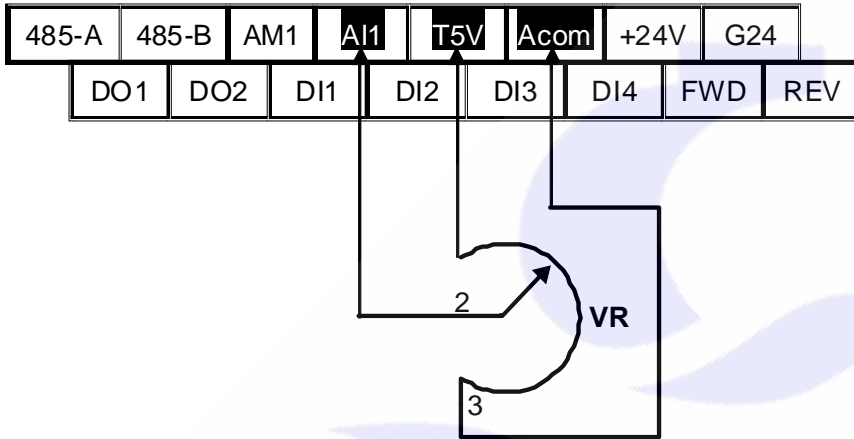**Example 1:   AI1 input range -10V ~ +10V**

AI1 input range is -10V ~ +10V, and rated speed of motor is 3000rpm. Setting G03-04 = 1, and G03-06 = 20. Please following the situation listed below to learn how to use the parameters.
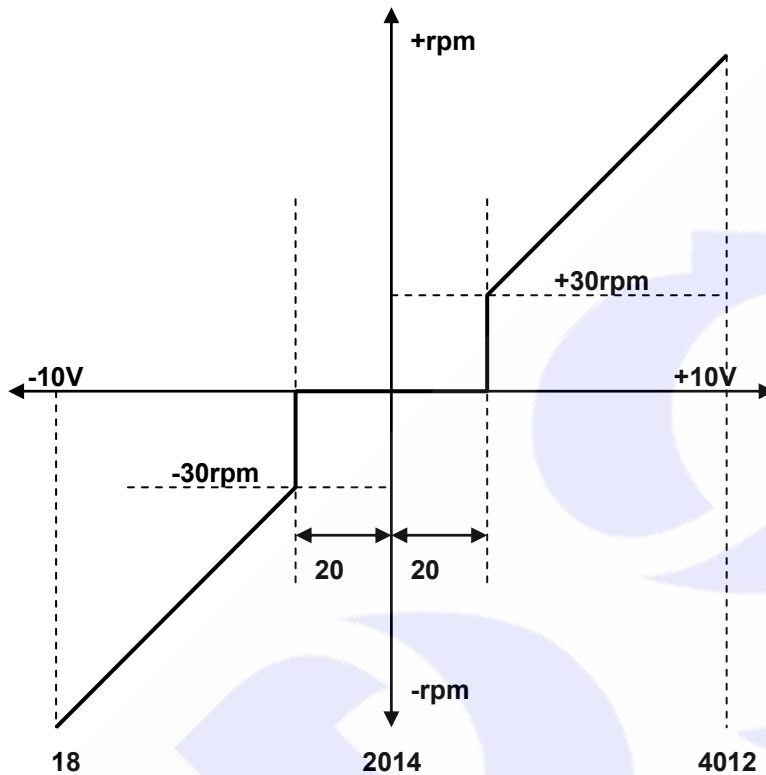
※ Input +10V to AI1, and read G03-00 = 4012.
※ Set G03-0 1= 4012.
※ Input 0V to AI1, and read G03-00 = 2014.
※ Set G03-02 = 2014.
※ Input -10V, and read G03-00 = 18.
※ Set G03-03 = 18.
※ By the equation **3000÷(4012-2014)≈1.5** to know that one **A/D count** is about **1.5rpm**.
※ By the equation **20x1.5=30** to know the range of Blind Zone is **+/-30rpm**.
If the input voltage of AI1 is in the range of 2014+/-20, the motor will not run.
If the input voltage of AI1 exceeds f the range of 2014+/-20, the motor will run, and the min. start speed of motor will be about 30rpm.

Example 2:   **Simply using a variable resistor to set the running speed**

1. Wiring the variable resistor (VR) to control input terminals as the figure showed below.
2. Setting G03-04 = 0.   ➔ Select AI1 input range (0 ~ 10V).
3. Turn the VR to the maximum input position and read G03-00.
4. Write the G03-00 value into G03-01   ➔ Setting AI1 maximum value.
5. Turn the VR to the min. input position and read G03-00.
6. Write the G03-00 value into G03-02.   ➔ Setting AI1 0V value.
7. Write the G03-00 value into G03-03   ➔ Setting AI1 min. value.
8. Setting G22-09 (Speed Command Select)=1   ➔ Select AI1 input as speed command.
9. Reset the driver.   ➔ Change G22-09, must reset driver.

485-A	485-B	AM1	AI1	T5V	Acom	+24V	G24	
	DO1	DO2	DI1	DI2	DI3	DI4	FWD	REV

2

VR

3

Example 3:   **Using external +10V ~ -10V signal as speed command.**

1. Wiring the input signal lines to control terminals as the figure showed below.
2. Setting G03-04 = 1   ➔ Select AI1 input range (-10V ~ +10V).
3. Input maximum voltage to AI1, read G03-00.
4. Write G03-00 value into G03-01.   ➔ Setting AI1 maximum value.
5. Input 0V to AI1, read G03-00.
6. Write G03-00 value into G03-02.   ➔ Setting AI1 0V value.
7. Input min. voltage to AI1, read G03-00.
8. Write G03-00 value into G03-03.   ➔ Setting AI1 min. value.
9. Setting G22-09 (Speed Command Select) =1 ➔ Select AI1 input as speed command.
10. Reset the driver.   ➔ Change G22-09, must reset driver.

485-A	485-B	AM1	AI1	T5V	Acom	+24V	G24	
	DO1	DO2	DI1	DI2	DI3	DI4	FWD	REV

0V

Vi = +10V ~ -10V
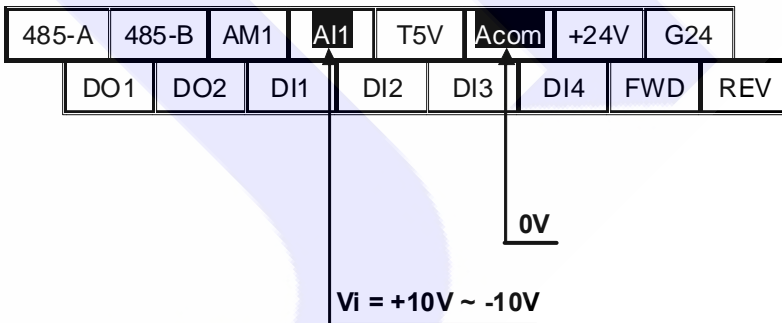
12.5 G05 Analog Output Group

【NOTE】 The output signal of AM1is used to drive the external analog meter. The rating of meter is **1V/1mA**.

● **G05-00 → AM1 Function Select**

Value	Description	
0	No output.	
1	Output Frequency.	
2	Output Current	
3	Output Voltage	
4	Motor's Actual Speed	
5~9	Reserved.	
10	100% Test Output.	【NOTE】
11	75% Test Output.	**All these 5 functions are used to adjust the**
12	50% Test Output.	**linearity of AM1 output. Normally, the**
13	25% Test Output.	**linearity had been adjusted in factory**
14	12.5% Test Output.	**already; therefore, users don't have to do it again.**
15	The output of AM1 is set by G05-02.	

Description:
Select0.   AM1 has no output.
Select1.   The output of AM1 presents the driver's output frequency. The accuracy is 0.01Hz.
Select2.   The output of AM1 presents the driver's output current. The accuracy is 0.1A.
Select3.   The output of AM1 presents the driver's output voltage. The accuracy is 1V.
Select4.   The output of AM1 presents the motor's actual speed. The accuracy is 1rpm.
Select5~9. All these are reserved. Should not select these function numbers for operation safety.
Select10.   AM1 send out **100%** volume for adjusting. The output is adjusted by **G05-03.**
Select11.   AM1 send out **75%** volume for adjusting. The output is adjusted by **G05-04.**
Select12.   AM1 send out **50%** volume for adjusting. The output is adjusted by **G05-05.**
Select13.   AM1 send out **25%** volume for adjusting. The output is adjusted by **G05-06.**
Select14.   AM1 send out **12.5%** volume for adjusting. The output is adjusted by **G05-07.**
Select15.   The output of AM1 is set by G05-02.

【NOTE】 **After change this parameter, the driver should be reset to let the changes be effect.**

● **G05-01 → AM1 Full Scale Data Range**
This parameter sets the maximum full scale of the external analog meter. Note the rules listed below:
1. When execute the adjustment of AM1 signal, the output full scale is 100.0%; therefore, this parameter should set to be 1000 for the need.
2. After finishing the adjustment of AM1 signal, the output full scale should refer to the actual external analog meter.
3. **AM1 output rating is 1V/1mA.**
Example:
■ Frequency Meter (full scale 60.00Hz) → the full scale should set to be 6000.
■ Current Meter (full scale 20.0A) → the full scale should set to be 200.
■ Voltage Meter (full scale 500V) → the full scale should set to be 500.
■ Speed Meter (full scale 1800rpm) → the full scale should set to be 1800.

● **G05-02 → AM1 Output Volume Setting**
IF G05-00 select function 15, the output of AM1 is set by this parameter. The range of this parameter is 0.0% ~ 100.0%.

● **G05-03 → AM1 100% Full Scale Adjustment**
Be used for AM1 100% output scale adjustment.

● **G05-04 → AM1 75% Scale Adjustment**
Be used for AM1 75% output scale adjustment.

● **G05-05 → AM1 50% Scale Adjustment**
Be used for AM1 50% output scale adjustment.

● **G05-06 → AM1 25% Scale Adjustment**
Be used for AM1 25% output scale adjustment.
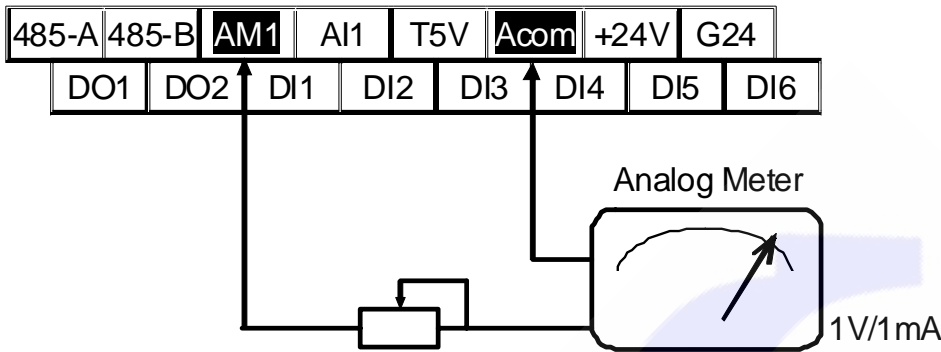
● **G05-07 → AM1 12.5% Scale Adjustment**
Be used for AM1 12.5% output scale adjustment.

EXAMPLE: Introduce how to use an external analog speed meter.

The meter's full scale is 1800rpm.
Connect the meter to the AM1 and Acom terminals as showed in the following figure.

TERMINAL

485-A	485-B	AM1	AI1	T5V	Acom	+24V	G24

DO1	DO2	DI1	DI2	DI3	DI4	DI5	DI6

Analog Meter

1V/1mA

【NOTE】AM1 output rating is 1V/1mA.

Follow these steps to use the meter properly.
1. G05-00=4 ➔ Set AM1 function to output motor's actual speed.
2. G05-01=1800rpm ➔ Set AM1 full scale data range to be 1800rpm.
3. **Execute RESET** ➔ **After reset the driver, the setting of AM1 is finished.**

【NOTE】**If there is need to adjust the output linearity of AM1, please follow below steps.**
1. G05-00=10 ➔ Set AM1 function to send 100% scale output.
2. Execute RESET ➔ Reset the driver.
3. G05-01=1000 ➔ Set AM1 Full Scale Range to be 1000.
4. G05-03=100 ➔ Check if the meter point to 1800rpm.
   　　【NOTE】**If it is not in proper position, adjust by the VR knob of the meter.**
5. G05-00=11 ➔ Set AM1 function to send 75% scale output.
6. Execute RESET ➔ Reset the driver.
7. G05-04=(check the meter to set %) ➔ Adjust the G05-04 to let the meter point to 1800x75%=1350.
8. G05-00=12 ➔ Set AM1 function to send 50% scale output.
9. Execute RESET ➔ Reset the driver.
10. G05-05=(check the meter to set %) ➔ Adjust the G05-05 to let the meter point to 1800x50%=900.
11. G05-00=13 ➔ Set AM1 function to send 25% scale output.
12. Execute RESET ➔ Reset the driver.
13. G05-06=(check the meter to set %) ➔ Adjust the G05-06 to let the meter point to 1800x25%=450.
14. G05-00=14 ➔ Set AM1 function to send 12.5% scale output.
15. Execute RESET ➔ Reset the driver.
16. G05-07=(check the meter to set %) ➔ Adjust the G05-07 to let the meter point to 800x12.5%=225.
17. G05-00=4 ➔ Set AM1 function to output motor's actual speed.
18. G05-01=1800 ➔ Set AM1 full scale data range to be 1800.
19. **Execute RESET** ➔ **After reset the driver, the setting of AM1 is finished.**

12.6   G07 Magnetic Sensor Group

- **G07-00 ➜ Magnetic Sensor Direction**
  If observe the signals A and B (of the Magnetic Sensor output):
  - If motor is running in forward direction, the A signal leads the B signal, then G07-00 should set 0.
  - If the A signal lags the B signal, then G07-00 should set 1.
  If observe G07-05 (Magnetic Sensor Counter Status) status:
  - If motor is running in forward direction, the counter value is increased, and then G07-00 should set 0.
  - If the counter value is decreased, then G07-00 should set 1.

- **G07-01 ➜ Magnetic Sensor PPR**
  Input the Magnetic Sensor ppr value in this parameter.

- **G07-02 ➜ Magnetic Sensor Angle Alignment (do not change)**
  Here records the magnetic sensor angle alignment data, and should not be changed.
  【NOTE】**This record is written by factory, and should not changed by user.**

- **G07-03 ➜ Magnetic Sensor Input Buffer Size**
  If using 256 pps sensor, G07-03 should set 6.
  If Using 1024 pps sensor, G07-03 should set 2.

- **G07-04 ➜ Magnetic Sensor A/B/M Status**
  This parameter displays the status of A/B/M of magnetic sensor.
  【NOTE】**About the detail of this status, please contact with agency or technical department of factory.**

- **G07-05 ➜ Magnetic Sensor Counter Status**
  This parameter displays the magnetic sensor counter status. The counter will increase when receive a forward direction pulse, and decrease when receive a reverse direction pulse. The range of the counter is 0 ~ 65535.

- **G07-06 ➜ Magnetic Sensor Feedback Angle Status**
  This parameter displays the feedback pole angle of the magnetic sensor. The range of this parameter is 0.0 ~ 359.9.

- **G07-08 ➜ Magnetic Sensor Check Time**
  This parameter is used to set the check time for driver to check the PG signal at every time the speed command be send to check if the magnetic sensor is in good condition. Every time the driver send a speed command to motor, and after the time which is set in this parameter the driver will check the motor's speed by checking the magnetic sensor feedback, if the speed is not match the command the driver will show *PG* alarm message. This function can be disabled by setting 0 into this parameter.

12.7   G20 BLDC Motor Group

- **G20-00 ➜ Motor Full Load Current Ratio (%)**
  Set the ratio of the motor's rating to the driver's rating.
  Motor Full Load Current ratio (%) = (motor's full load current / driver's rating current) x100%。

- **G20-01 ➜ Motor Exciting Current Ratio (%)**
  Set the ratio of the motor's exciting current to the motor's full load current.
  Motor Exciting Current Ratio (%) = (motor's exciting current / motor's full load current) x100%。

- **G20-02 ➜ Motor Pole**
  According to the data of the motor's manufacturer, set correct value.

- **G20-03 ➜ Motor's Ke Value**
  According to the data of the motor's manufacturer, set correct value.

- **G20-04 ➔ Electronic Thermo Relay Time**
  This Driver has built an electronic thermo function. If the driver volume is large then the motor which is used, this function can prevent the motor overload. If this parameter sets to be 0, the Electronic Thermo protect function is disabled.

(Irms / G20-00)
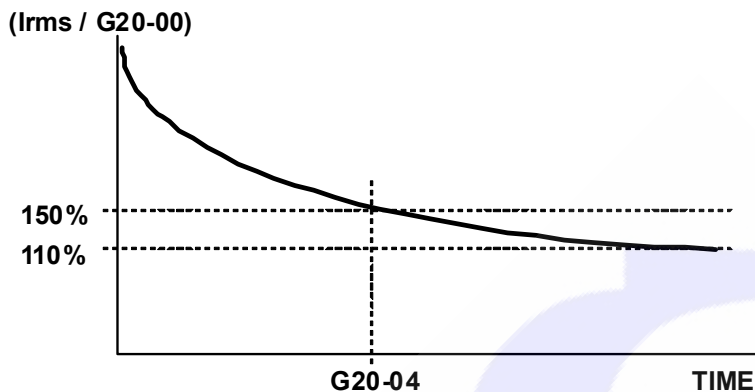
- **G20-05 ➔ Phase Resistance**
- **G20-06 ➔ Phase Inductance**
  These two parameters should refer to the data of motor's manufacturer, or can be auto tuned by driver.

12.8 G21 BLDC Control Group

- **G21-00 ➔ Operation Mode**
  Refer to the followed table to set the operation mode. Don't select other value!

Value	Description
11	BLDC close loop mode. This is standard operation mode for this driver. To operate in this mode, the motor and feedback signal should be connect correctly.
16	Execute the Auto Current Gain Tuning.
17	Execute the Auto R&L Tuning.

  【NOTE】 **After change this parameter, the driver should be reset then the change is effect. If select wrong mode may cause damage to the driver and motor or the facility that use this driver and motor.**

- **G21-01 ➔ Current Loop P-gain**
  Set the current loop P gain of the driver.

- **G21-02 ➔ Current Loop I-gain**
  Set the current loop I gain of the driver.
  【NOTE】 This parameter is auto set by executing Auto Current Gain Tuning.
  G21-01 should keep larger then G21-02.

- **G21-03 ➔ Current Loop Filter Level**
  Define the current loop filter level.

- **G21-04 ➔ Speed Loop P/I Gain Select**

Value	Description
1	Only use the 1'st Gain
2	According to the motor's speed, the driver will use 1'st or 2'nd Gain for different speed range.

- **G21-05 ➔ 1'st Speed Loop Gain Switch Point**
- **G21-06 ➔ 1'st Speed Loop P-gain**
- **G21-07 ➔ 1'st Speed Loop I-gain**
- **G21-08 ➔ 1'st Speed Loop Filter Level**
  These are the 1'st PI tuning parameter for close loop control.
  【NOTE】 **If G21-08 set too large, the response will be low, and the system will be unstable.**
  G21-06 should keep larger then G21-07.

- **G21-09 ➔ 2'nd Speed Loop Gain Switch Point**
- **G21-10 ➔ 2'nd Speed Loop P-gain**
- **G21-11 ➔ 2'nd Speed Loop I-gain**
- **G21-12 ➔ 2'nd Speed Loop Filter Level**

These are the 2'nd PI tuning parameter for close loop control.

【NOTE】**If G21-12 set too large, the response will be low, and the system will be unstable. G21-10 should keep larger then G21-11.**

Example:
If set
- **G21-05=300rpm**
- **G21-09=1500rpm**
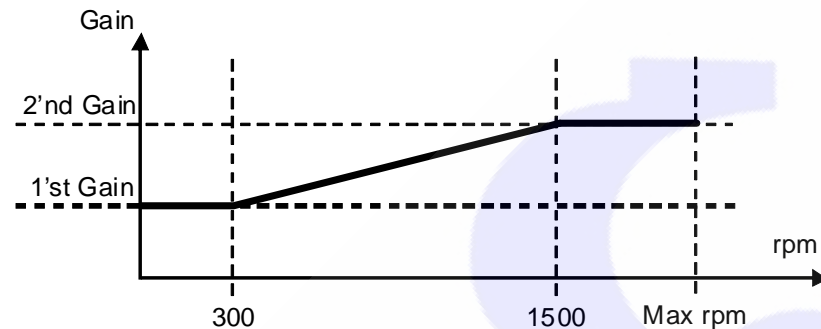
1. When speed start from 0rpm to 300rpm (under the 1'st gain switch point), the driver uses the 1'st PI tuning parameters for close loop control.
2. When speed is in the range of 300 ~ 1500rpm, the driver will change the PI tuning parameters' value from 1'st to 2'nd by linear manner.
3. When speed exceeds 1500rpm, the driver uses 2'nd PI tuning parameters for close loop control.

- **G21-13 ➔ Torque Control Mode**

Define the torque control mode.

Value	Description
0	**Only use torque limit-quadrant I setting in any operation condition.**
1	**When operate in different quadrant, the driver use different torque limit respectively. Refer to G21-14 ~ G21-17 for detail in this paragraph.**
2	**Use AI1 input as the torque limit with maximum speed limit and direction.**
3	**The torque limit and run direction are set by (AI1) x (G21-14 Torque Limit-quadrant I).**

If G21-13 select 0:
The driver uses only **Torque Limit-quadrant I** setting as torque limit.
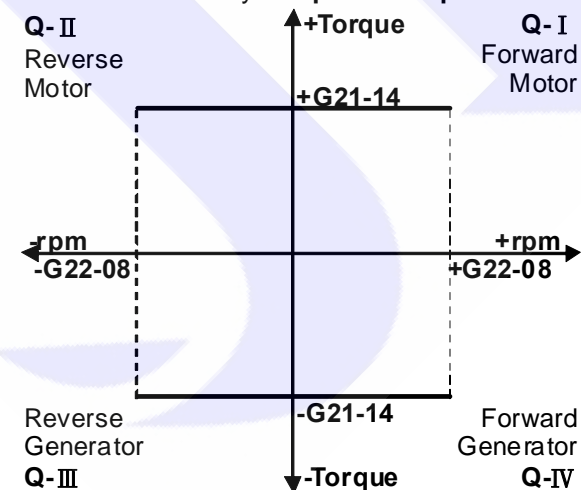
If G21-13 select 1:

When the motor runs in different guardant, the driver will use different torque limit setting respectively.
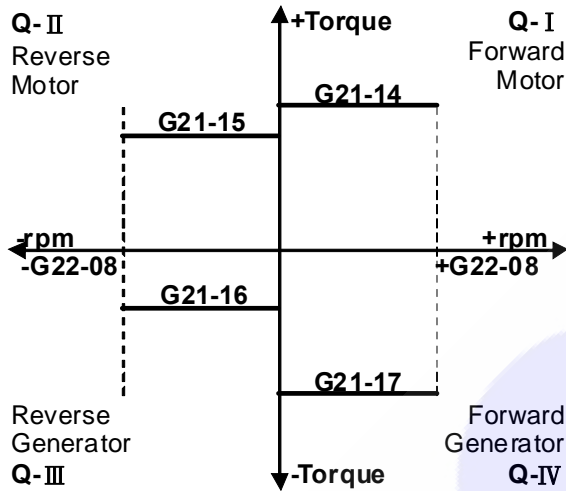
If G21-13 select 2:

Use AI1 input as the torque limit, and the motor will run in the direction of AI1 input with the limit of max speed.
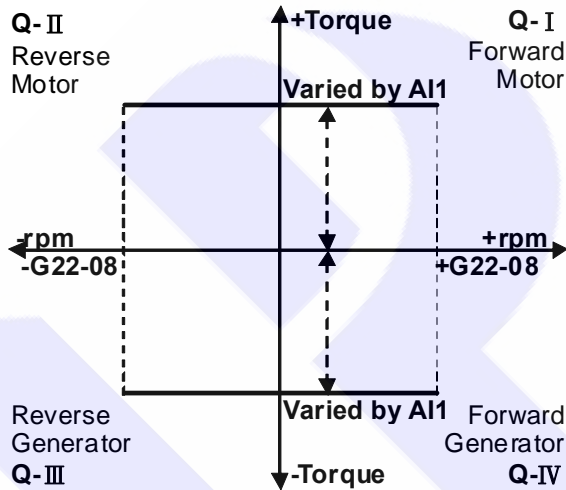

If G21-13 select 3

The torque is set by AI1 x (G21-14 Torque Limit-quadrant I).
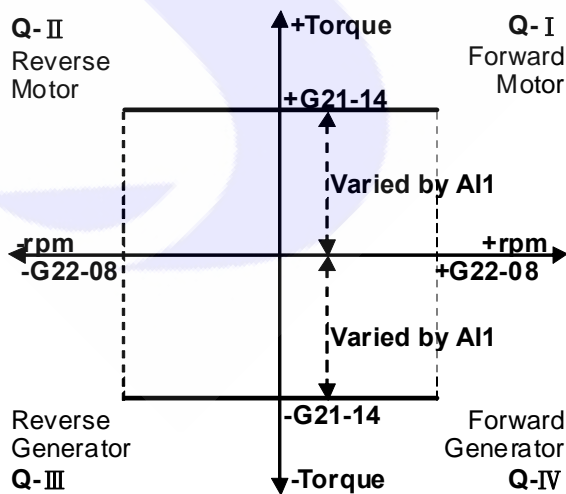
- **G21-14 → Torque Limit-quadrant I Setting**
  Set the torque limit value when motor is running in quadrant me.
  In this guardant the motor is running in forward direction and output positive torque to load.
- **G21-15 → Torque Limit-quadrant II Setting**
  Set the torque limit value when motor is running in quadrant II.
  In this guardant the motor is running in reverse direction and output positive torque to load.
- **G21-16 → Torque Limit-quadrant III Setting**
  Set the torque limit value when motor is running in quadrant III.
  In this guardant the motor is running in reverse direction and there is negative torque comes from load.
- **G21-17 → Torque Limit-quadrant IV Setting**
  Set the torque limit value when motor is running in quadrant IV.
  In this guardant the motor is running in forward direction and there is negative torque comes from load.
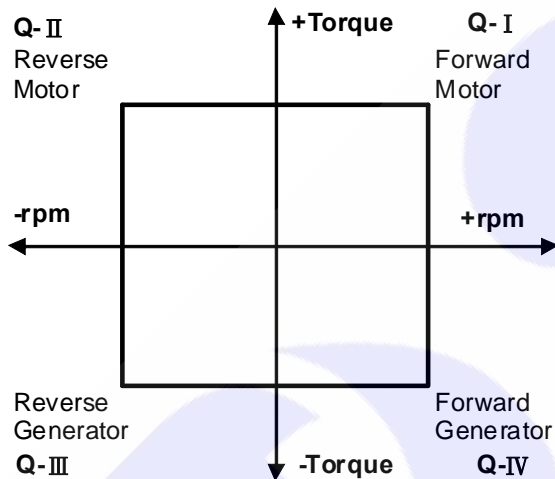
- **G21-18 → Torque Drooping Range**
  Set the Torque Drooping Range (% ratio of max. speed) to prevent the motor vibrate at the maximum speed.
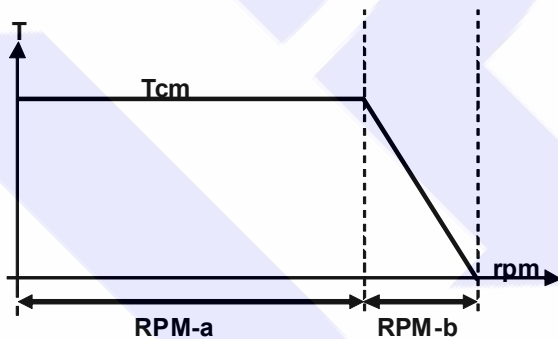
  RPM-a=(G22-08)
  RPM-b=(G22-08) x(G21-18)
  Example:
  If motor's maximum speed is 1000rpm, and set G22-08 = 1000, G21-18 = 10(%), the torque limit will droop to zero by linear manner when the speed is in the range of 1000 ~ 1100rpm.

- **G21-19 → Direction Limit**

Value	Description
0	Permit forward and reverse direction run command.
1	Only forward direction run command is permitted. The reverse direction run command will stop the motor.
2	Only reverse direction run command is permitted. The forward direction run command will stop the motor.

- **G21-20 → Torque Compare Value**
  Set the compared torque value for Over-torque-warning in this parameter.
  【NOTE】About the detail, please refer to **Chapter 14 Digital Output Function**.

12.9 G22 BLDC Multi-Speed Setting Group

- **G22-00 → Speed Set0**
- **G22-01 → Speed Set1**
- **G22-02 → Speed Set2**
- **G22-03 → Speed Set3**
- **G22-04 → Speed Set4**
- **G22-05 → Speed Set5**
- **G22-06 → Speed Set6**
- **G22-07 → Speed Set7**

    The parameters G22-00~G22-07 can set 8 sets different speed, and can be selected by digital input terminals.
    【NOTE】**If want to select G22-00 ~ G22-07 speed, the parameter G22-09 must set 0.**
    Please refer to **Chapter 13 Digital Input Function** to get more detail.

- **G22-08 → Max. Speed Limit**

    Refer to the data from motor's manufacturer to get correct setting value.

- **G22-09 → Speed Command Select**

Value	Description
0	The speed command select from G22-00 ~ G22-07 setting.
1	The speed command set from AI1 input.
2~18	Reserved
19	The speed command set from Rotary Switch. Please refer to paragraph **13 Digital Input Function** for detailed.

- **G22-10 → Actual RPM Setting**

    This parameter displays the actual speed command send to motor.

12.10 G23 BLDC Acc/Dec/S-curve Group

- **G23-00 → Acc. Time (0~1000rpm)**

    Set the speed rising ramp time, calculated from 0 to 1000rpm. Unit precision is 0.01sec.

- **G23-01 → Dec. Time (1000~0rpm)**

    Set the speed falling ramp time, calculated from 1000 to 0rpm. Unit precision is 0.01sec.
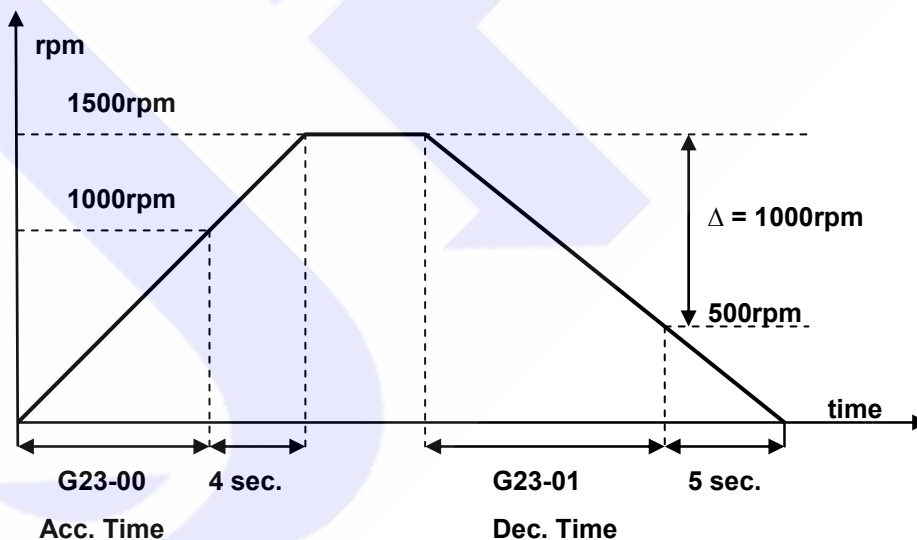
According to the front figure:
Acc. Time G23-00 = 8.00sec, Dec. Time G23-01 = 10.00sec.
The slope of rising ramp is 1000rpm/8sec; the slope of falling ramp is 1000rpm/10sec.
Therefore, from 0 to 1000rpm need 8+4 = 12sec; from 1500 to 0rpm need 10+5 = 15sec.

- **G23-02 ➜ S-curve T1 Time (Start of Acc. Period)**
- **G23-03 ➜ S-curve T2 Time (End of Acc. Period)**
- **G23-04 ➜ S-curve T3 Time (Start of Dec. Period)**
- **G23-05 ➜ S-curve T4 Time (End of Dec. Period)**

The S-curve can smooth the vibration of machine at the period of motor's speed change. To set the s-curve time longer can get more effect of smoothing, but it causes timing extends for actual acc. time and deceleration time.
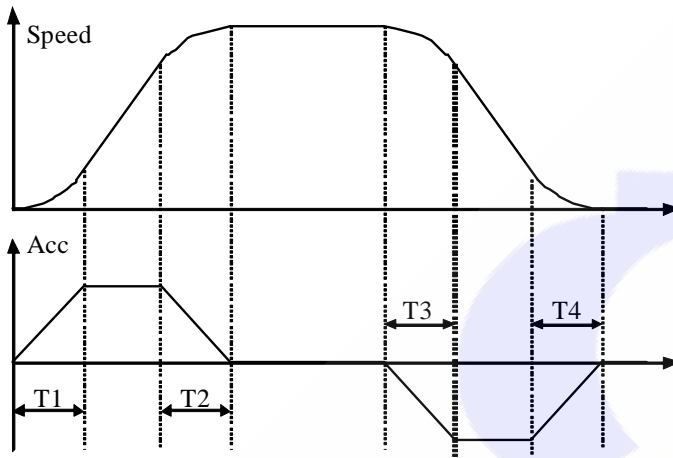
Example: Explain how the S-curve affects the Acc. and Dec. timing.
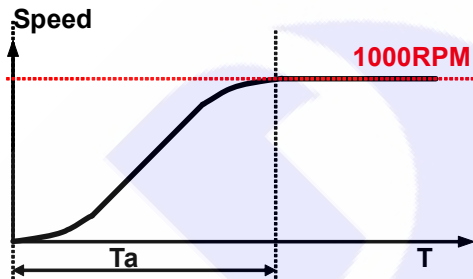
If setting **G23-00 (Acc. Time)** =1.00 (Sec/Krpm), and **G23-02 (S-curve T1 Time)** = 1.00sec, **G23-03 (S-curve T2 Time) =** 1.00sec.
Ta (totally acc. time) = (0.5 x **S-curve T1 Time**) + (**Acc. Time**) + (0.5 x **S-curveT2 Time**) = 2sec.

- **G23-06 ➜ Brake Hold Time**

This parameter sets the brake hold time for brake period. Refer to the figure below.
When driver decelerate to 0 speed, it will send a brake voltage to motor and hold for a period of time to make sure the motor actually stopped. This time is called Brake Hold Time.
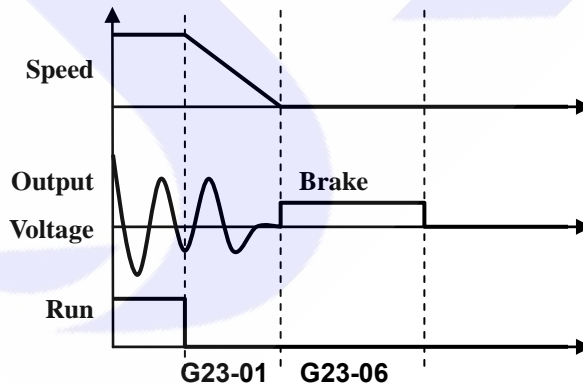
12.11 G63 MISC. CAM Switch Group

- **G63-00 ➜ CAM SW1 Start Angle**
- **G63-01 ➜ CAM SW1 Active Range**
- **G63-02 ➜ CAM SW2 Start Angle**
- **G63-03 ➜ CAM SW2 Active Range**
- **G63-04 ➜ CAM SW3 Start Angle**
- **G63-05 ➜ CAM SW3 Active Range**
  【NOTE】**Refer to Chapter 15 CAM Switch Function for detail.**

12.12 G65 MISC. Speed Compare Group

- **G65-00 ➜ Speed Compare Value**
- **G65-01 ➜ Speed Arrive Setting**
- **G65-02 ➜ Speed Arrive Range**
  【NOTE】**Refer to Chapter 14 Digital Output Function for detail.**

12.13 G66 MISC. Rotary Switch Group

The Rotary Switch function is used to set frequency or speed of the drive.

- **G66-00 ➜ RSW TYPE**
  This parameter can define the type of the Rotary Switch. There are for types can be select.

Value	description
0	After RESET, the G66-01(RSW data) will start from 0, and the max. value will be limited by the setting of G66-03.
1	After RESET, the G66-01(RSW data) will start from G66-02, and the max. value will be limited by the setting of G66-03.
2	After RESET, the G66-01(RSW data) will start from 0, and the max. value will be 65535.
3	After RESET, the G66-01(RSW data) will start from G66-02, and the max. value will be limited 65535.

  When select 0 or 1, the speed is calculated by the equation showed below:

  Rpm = G66-01 / G66-03 * G22-08

  When select 2 or 3, the speed is calculated by the equation showed below:

  Rpm = G66-01 / 65535 * G22-08

- **G66-01 ➜ RSW Data**
  This parameter can show the pulse count that come from the Rotary Switch A/B phase clock. The frequency of the A/B clock is multiplied by 4 times inside the drive.

  【NOTE】**Because the frequency of the A/B clock, every step of the Rotary Switch will cause the record of G66-01 to increase 4 or decrease 4 counts.**

- **G66-02 ➜ RSW Backup Memory**
  This parameter defines the value that can be the default of the G66-01 or save the G66-01 value.

- **G66-03 ➜ RSW Max Data Limit**
  This parameter defines the max. limit of the G66-01 value.

  【NOTE】**Please refer to paragraph 13 Digital Input Function for detailed.**

12.14　G82 H/W DC-BUS Adjust Group

- **G82-00 ➔ DC Bus Measurement Adjust**

    This parameter used to adjust the G82-01 displayed DC Bus Voltage.
    【NOTE】**This parameter is pre-adjust in the factory, user don't have the necessary to adjust it again.**
    【WARNING】**This parameter can be modified only by trained person, otherwise may cause damage to the driver.**
    Adjust method:
    1. Set G82-00 to be 100.
    2. Read the value of G82-01 (DC Bus Voltage). The value is 290 for example.
    3. Check the actual input AC input power. The measured voltage is 220Vac for example.
    4. The DC power will be 220 x 1.414=311(Vdc).
    5. The adjust value is calculated by the equation 311 / 290 x 100(%) = 107(%).
    6. Set G82-00 to be 107, then check G82-01 will get correct voltage display for DC bus.

- **G82-01 ➔ DC Bus Voltage**

    This parameter will display the measured DC bus voltage.
    The relation of input AC power and DC bus voltage is $Vdc = 1.414 * Vac$(input power)。

- **G82-02 ➔ Over Discharge Protect Time**

    This parameter can set the Over Discharge Protect Time to protect the discharge resistor. If the discharge time exceeds this setting, the driver will tip and show the *Od* alarm message.
    【NOTE】
    When G82-01 > (G00-04 x 1.17) the driver will start to discharge.

12.15　G83 H/W Thermistor Adjust Group

- **G83-00 ➔ Heat Sink Temperature (centigrade)**

    This parameter displays the temperature of the driver's heat sink.

- **G83-01 ➔ Over Heat Protect Temperature (centigrade)**

    When the heat sink temperature (displays in G83-00) exceeds the setting of this parameter, the driver will trip and show the *OH* alarm message.

12.16 G84 H/W FAN Adjust Group

- **G84-00 → FAN Control Type**

Value	Description
0	According to the temperature of heat sink to control the FAN.
1	Always run.

  If G84-00 = 0, the FAN will turn to run when the temperature of heat sink exceeds 40 centigrade, and will turn off until the temperature is lower then 35 centigrade.
  If G84-00 = 1, the FAN will be on all the time.

- **G84-01 → FAN Feed Back Signal (Factory Set)**
  【NOTE】**This parameter is set to 2, and should not change it.**

- **G84-02 → Measured FAN Speed**
  This parameter displays the speed of FAN.

- **G84-03 → FAN Low Speed Warning and Trip Level**
  This parameter is used to set the fan speed check level. It can check if the fan speed is too low or malfunctioned.
  If G84-02 < G84-03, the driver will output warning signal by using digital output function 11.
  If G84-02 < (G84-03 x 0.5), the driver will trip and show *CF* alarm message.
  【NOTE】**If set G84-03 to be 0, the protect function will be disabled.**
  【WARNING】**It is important to keep the cooling fan in ordinary condition, because there is lot of heat be generated while driving the motor. If there happened the *CF* warning, must check or replace the cooling fan to keep the driver in a well cooling condition. If not for necessary, user should not disable this protect function.**

  Example:
  If set G84-03 to be 2000rpm, and set DOx(11). When fan speed is lower then **2000rpm**, the output terminal will have warning signal output, when fan speed is lower then **1000rpm**, the driver will trip and show *CF* alarm message.
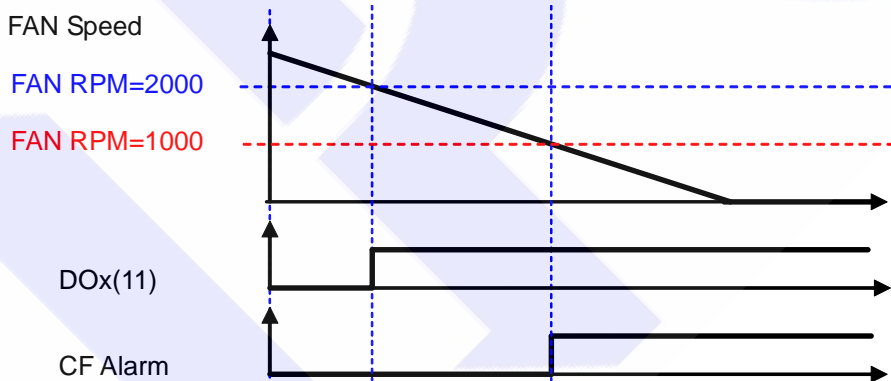
13. *Digital Input Function*

Select function	Description	
0	No function	
6	Over Heat Protect (OH)	
7	Negative Output of Over Heat Protect (/OH)	
10	Speed Select SW0	8 Speed Select
11	Speed Select SW1	
12	Speed Select SW2	
13	Speed Command Setting Select	
21	Run / Stop Enable Switch	
23	Reset	
73	Forward Run	
74	Reverse Run	
75	Change Running Direction	
203	Rotary Switch signal-A input.	
204	Rotary Switch signal-B input.	
205	Rotary Switch signal-Store input.	
249	Emergency Stop (will cause *ES* trip)	

● **DIx _ Select → 0, No function**
When select number, the output will be OFF all the time.

● **DIx _ Select → 6, Over Heat Protect (OH)**

The input terminal can accept external A type output thermo-relay signal to let driver to trip and show *OH* alarm message.

● **DIx _ Select → 7, Negative Output of Over Heat Protect (/OH)**

The input terminal can accept external B type output thermo-relay to let driver to trip and show *OH* alarm message.

● **DIx _ Select → 10, Speed Select SW0**
● **DIx _ Select → 11, Speed Select SW1**
● **DIx _ Select → 12, Speed Select SW2**
These 3 functions are used to select the pre-set speed G22-00 ~ G22-07. To use the 8 sets pre set speed function, the G22-09 must set to be 0.
Usage of **SW0 ~ SW2**:

Parameter	Selected Speed	SW2 DIx(12)	SW1 DIx(11)	SW0 DIx(10)	NOTE
G22-00	Speed Set0	0	0	0	0：DI non active
G22-01	Speed Set1	0	0	1	1：DI active
G22-02	Speed Set2	0	1	0	
G22-03	Speed Set3	0	1	1	
G22-04	Speed Set4	1	0	0	
G22-05	Speed Set5	1	0	1	
G22-06	Speed Set6	1	1	0	
G22-07	Speed Set7	1	1	1	

● **DIx _ Select → 13, Speed Command Setting Select**
If the input is active, the speed command is set from AI1.
If the input is non active, the speed command is set from digital (Speed Set0 ~ 7).

● **DIx _ Select → 21, Run / Stop Enable Switch**
If the input is active, the Run / Stop function is enabled.
If the input is non active, the Run / Stop function is disabled.
【NOTE】**This function is same with the G01-17 function, please refer to Paragraph 12.2 about the G01-17 for detail.**
The priority of these two function is: DIx(21) > G01-17.

● **DIx _ Select → 23, Reset**
If the input is active, the driver will be reset by this signal.
【NOTE】**This function only can be selected only by actual terminal, for virtual terminal can not select this function.**

- **DIx _ Select → 73, Forward Run**

   If the input is active, the driver will drive motor to forward direction.

- **DIx _ Select → 74, Reverse Run**

   If the input is active, the driver will drive motor to reverse direction.

- **DIx _ Select → 75, Change Running Direction**

   If the input is active, the driver will change the motor direction.

   The figure below shows how to use the function of 73, 74, and 75.
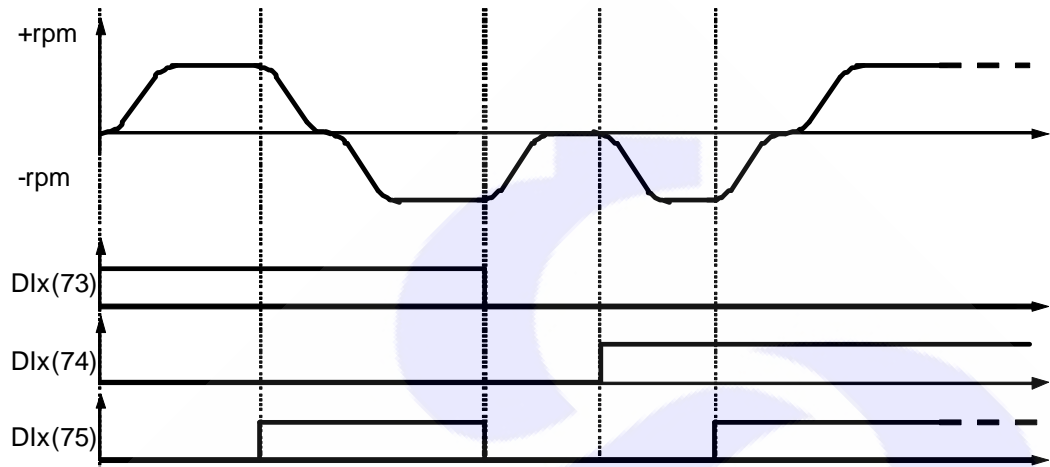
- **DIx _ Select → 203, Rotary Switch signal-A input.**

   This function defines the terminal to be the input of Rotary Switch signal-A.

- **DIx _ Select → 204, Rotary Switch signal-B input.**

   This function defines the terminal to be the input of Rotary Switch signal-B.

   【NOTE】**These two DI functions should be defined at the same time. The signal A and B are used to define the direction and 4-times frequency accuracy of the Rotary Switch pulse train.**

- **DIx _ Select → 205, Rotary Switch signal-Store input.**

   This function defines the terminal to be the input of Rotary Switch pulse count store; when this function is active, the value in G66-01 (RSW Data) will be stored into G66-02 (RSW Backup Memory).

Example for using Rotary Switch:

1. Set the speed limit G22-08 = 2000.
2. G01-05 = 73   →   Set FWD.
3. G01-06 = 74   →   Set REV.
4. G22-09 = 19   →   Select speed command set from Rotary Switch.
5. G66-00 = 0   →   Select Rotary Switch type: Start from 0, with max. limit.
6. Set DI1(203), DI2(204), DI3(205) → Set the input definition for Rotary Switch.
7. G66-03 = 1000   →   Set max. limit value of Rotary Switch.
8. Connect the signals A, B, Store of Rotary Switch to the DIs those were defined by step 6.
9. It is necessary to reset the drive to let the changes available.
10. Start to run forward and the drive will run in the speed that set by Rotary Switch. If the Rotary Switch is see in 500, the speed will be G66-01 / G66-03 * G22-08 = 1000rpm.
11. Press the Store bottom, the value in G66-01 will be stored into G66-03.

- **DIx _ Select → 249, Emergency Stop (will cause *ES* trip)**

   If the input is active, the driver will:
   - The driver will immediately trip and stop output to motor.
   - Motor will have no power and free run to stop.
   - The driver will show *ES* alarm message.

14.   *Digital Output Function*

Select function	Description
0	Always OFF
1	Always ON
2	In Running
3	Over Load Pre-Alarm
4	Alarm
5	No Alarm
6	Forward Run and Speed >= G65-00 (speed compared value).
7	Reverse Run and Speed >= G65-00 (speed compared value).
9	SPZ (Speed Zero), Speed <= G65-00.
10	NSPZ (Not Speed Zero), Speed > G65-00.
11	Fan Speed < G84-03
14	SPO (Speed Over compared value), Speed >= (G65-01+G65-02)
15	SPU (Speed Under compared value), Speed<= (G65-01-G65-02)
16	SPE (Speed Equal), the different between Speed and G65-01 < G65-02.
85	Over Torque Warning
91	CAM SW1 Output
92	CAM SW2 Output
93	CAM SW3 Output

- **DOx _ Select →0, Always OFF**
  The output terminal is always non active.

- **DOx _ Select →1, Always ON**
  The output terminal is always active.

- **DOx _ Select →2, In Running**
  If the driver is in running the terminal will be active.
  If the driver is not in running the terminal will be non active.

- **DOx _ Select →3, Over Load Pre-Alarm**
  If the electronic thermo accumulate to 50% of setting time, the terminal will be active.

- **DOx _ Select →4, Alarm**
  In normal condition, the output terminal is non active. If there is any kind of alarm happened, the output terminal will be active.

- **DOx _ Select →5, No Alarm**
  In normal condition, the output terminal is active. If there is any kind of alarm happened, the output terminal will be non active.

- **DOx _ Select →6**, **Forward Run and Speed >= G65-00 (speed compared value)**
  If the motor runs in forward direction and the speed >= G65-00, the output terminal will be active.

- **DOx _ Select →7, Reverse Run and Speed >= G65-00 (speed compared value)**
  If the motor runs in reverse direction and the speed >= G65-00, the output terminal will be active.

- **DOx _ Select →9, SPZ (Speed Zero), Speed <= G65-00**
  If the motor's speed <= G65-00, the output terminal will be active.

- **DOx _ Select →10, NSPZ (Not Speed Zero), Speed > G65-00**
  If the motor's speed > G65-00, the output terminal will be active.
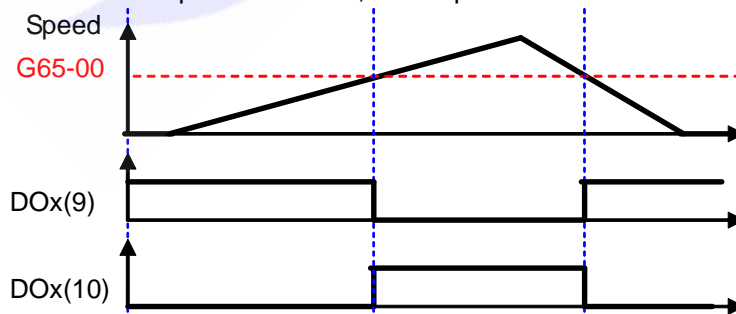
- **DOx _ Select ➔11, Fan Speed < G84-03**

    If the fan speed < G84-03, the output terminal will be active.
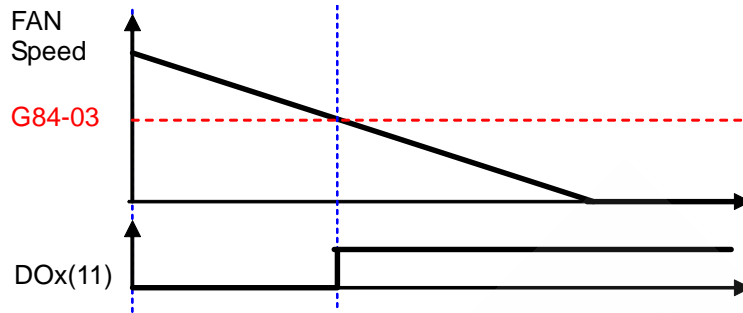

- **DOx _ Select ➔14, SPO (Speed Over compared value), Speed >= (G65-01+G65-02)**
- **DOx _ Select ➔15, SPU (Speed Under compared value), Speed<= (G65-01-G65-02)**
- **DOx _ Select ➔16, SPE (Speed Equal), the different between Speed and G65-01 < G65-02**

    Description: Refer to the figure below.

    If the motor's speed reaches or exceeds **G65-01+G65-02**, the output terminal DOx(14) will be active.

    If the motor's speed is equal or under "**G65-01** - **G65-02"**, the output terminal DOx(15) will be non active.

    If the motor's speed is between **G65-01**-**G65-02** and **G65-01+G65-02**, the output terminal DOx(16) will be active.
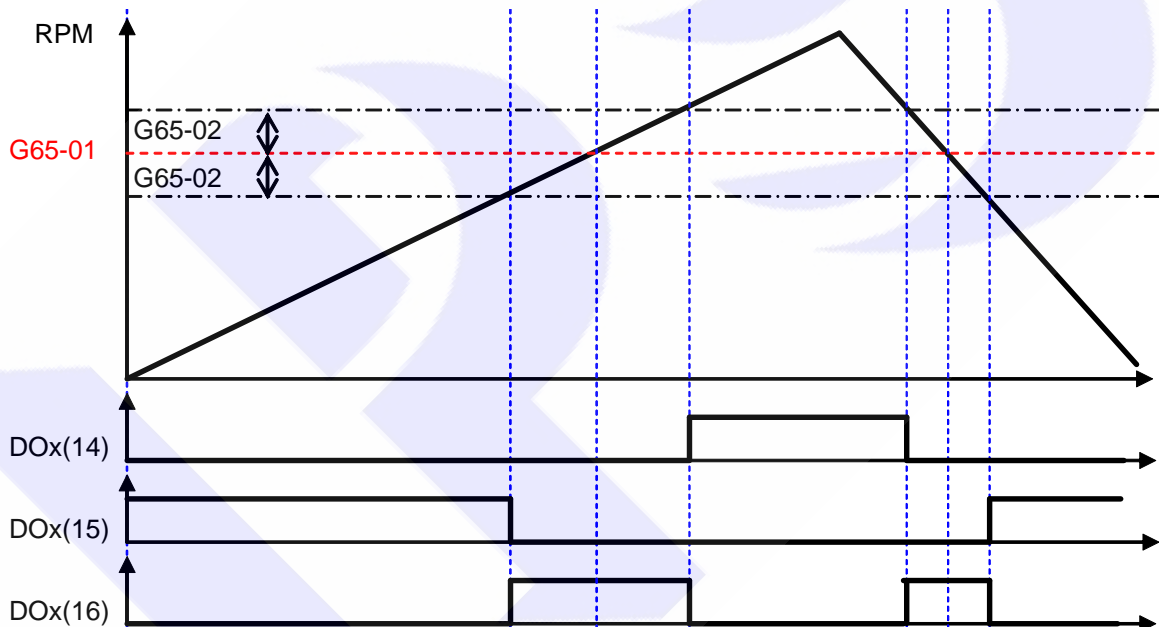
- **DOx _ Select ➔85, Over Torque Warning**

    If the driver's output torque exceeds the setting of G21-20, the output terminal will be active.

- **DOx _ Select ➔91, CAM SW1 Output**
- **DOx _ Select ➔92, CAM SW2 Output**
- **DOx _ Select ➔93, CAM SW3 Output**

    Refer to **Chapter 15 CAM Switch Function** for detail.

15. CAM Switch Function

The driver has built in an Electronic CAM Switch Function Block. It includes 3 CAM switches, each has a start angle and a active range and an output terminal can be defined individually. The start angle and active range are defined for the angle position of the motor's rotary region.

15.1 Define the Active Range of CAM Switch

About the definition of active range of CAM switch, please refer to the table below:

Parameter	Name	Default	Range	Unit	Type	Pr.
63-00	CAM SW1 Start Angle					360
63-01	CAM SW1 Active Range					361
63-02	CAM SW2 Start Angle	0	0 ~ 359	Degree	R/W	362
63-03	CAM SW2 Active Range					363
63-04	CAM SW3 Start Angle					364
63-05	CAM SW3 Active Range					365

15.2 Define the Output of CAM Switch

If the CAM switch has be defined the start angle and active range, the result of the CAM switch will be send to an output terminal. To define the output terminal function of CAM switch, please refer to the table below.

DOx(function no.)	Description
91	CAM SW1 Output
92	CAM SW2 Output
93	CAM SW3 Output

Example:

Here shows how to use a CAM switch.
If set G63-00 = 180   ➔   CAM SW1 start angle = 180
        G63-01 = 90   ➔   CAM SW1 active range = 90
Choice a DO and set DOx(91).

After these setting, the CAM SW1 will calculate the motor's rotary angle, and send the output to DOx(91). Refer to the figure below.
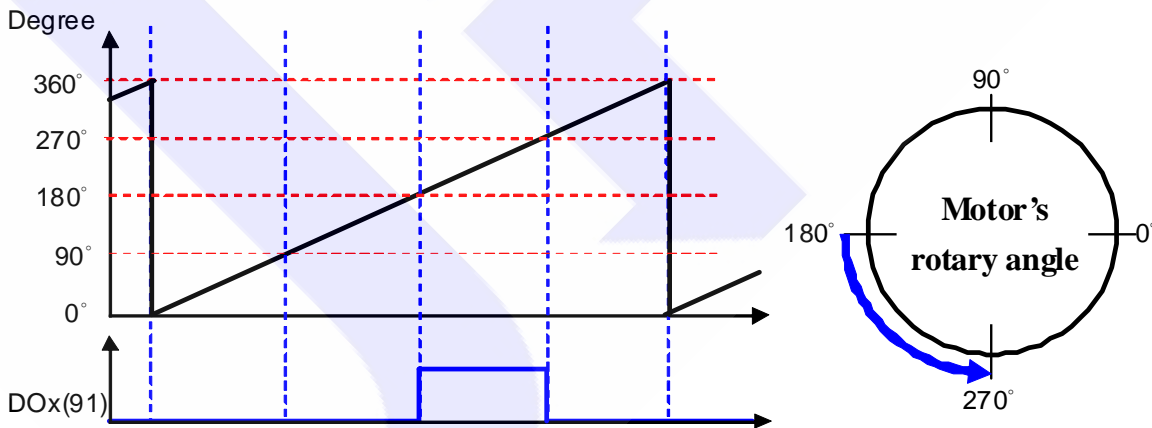
Note: the angle of motor can be read from parameter G07-06

16. *Alarm Message and Maintenance*

16.1 Alarm Message
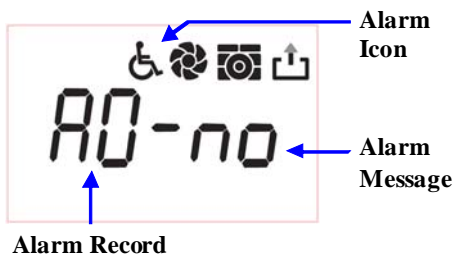
When alarm happened, the LCD display will show message as the figure showed in the left side. If used panel is COLOR type, the display back light will turn to red.

The items of the alarm message are Alarm Record and Alarm Message. The current alarm record is A0, and user can press the up or down keys to check the earlier records A1, A2, A3.

Every time the drive turned on, the alarm records will be shift to earlier position, and the A0 will be clear to record the current status.

The Alarm Message description will be explained in next paragraph.

16.2 Maintenance

When the panel enter the alarm mode, it means that there is important message to show on the LCD display. The user should treat this condition by following the setps introduced below with serious maner. If still cannot fix the problem after these methods mentioned in here, please contact with product agency or maintain department of manufacturer. The basicaly maintenance steps are described below:

Alarm message	Description and maintenance
A0-no	**A0 – no** ➔ No Alarm When showing **no** presents there is no alarm. ● If the driver is in normal condition, the display will show like this way when enter alarm mode.
A0-PG	**A0 – PG** ➔ PG feed back Alarm When showing **PG** presents the encoder feed back signal error. ● Check the connection of feed back cable. Is there any broken or defect? ● If the feed back cable is long, make sure there is no serious interference to the cable. ● Check the setting of G07-08 (Magnetic Sensor Check Time) is proper or not. ● Because the reason of this problem may includes magnetic sensor, therefore, before sending the driver for maintenance, it is better to replace the driver with another good condition one to make sure the problem is caused by driver individually.
A0-CF	**A0 – CF** ➔ FAN Alarm When showing **CF** presents the fan speed is too low or failed to run. ● Check if the fan is stalled by dust. ● Check the setting of G84-03 (FAN Low Speed Warning and Trip Level) is proper or not. Normally the fan speed is in 3000~4000rpm; therefore, this parameter should set for 2000~2500rpm for proper check level. ● Set the parameter G84-00 (FAN Control Type) = 1 to force the fan running, and check the running condition of fan to confirm the fan is in good condition or not. If the fan is out of work, replace it.
A0-SE	**A0 – SE** ➔ Memory Alarm When showing **SE** presents the EEPROM is not in good condition. ● Contact with agency or send the driver back for maintenance.
-End-	**- End -** ➔ Auto Tuning Procedure End When showing **End** presents the auto tuning procedure is finished. ● This message is used to indicate procedure status and is not an alarm message.

🦽♻️📷↥ **AO-ES**	***A0 – ES*** ➜ Emergency Stop When showing ***ES*** presents that there is an external signal to order the driver stop for emergency. ● Remove the input line of emergency stop signal from the driver's input terminal. Under safe condition, reset the driver. If the alarm message still exists, please send this driver for maintenance. ● Check the wiring condition of the emergency stop signal. Is the line broken or short with other signal? ● Check the emergency stop switch or signal generator. Is there any defect or miss? ● Is there any interference to cause the signal happened? ● If the emergency condition is indeed, contact with the system engineer to fix the condition. ● Unless the emergency condition is fixed completely, the driver shouldn't be operated to run the motor.
🦽♻️📷↥ **AO-Od**	***A0 – Od*** ➜ Over Discharge When showing ***Od*** presents the discharge time exceeds the setting in parameter G82-02 (Over Discharge Protect Time). ● Check the setting of G82-02 is proper or not. If the setting is too short, it is easily to cause alarm. To set it for longer time, should consider if the resistor's wattage is enough or not. ● Check the load of motor. Is the inertia too large to generate great feed back energy? ● Check the input power voltage of driver. Is the voltage exceeds the rating of input? ● Check if the setting of G00-04 (Input Power Voltage) is suitable or not. ● Check if the displayed message of G82-01 (DC Bus Voltage) is correct or not? ● According to the result of last 3 check items to decide if there is necessary to modify the setting of G82-00 (DC Bus Measurement Adjust).
🦽♻️📷↥ **AO-OL**	***A0 – OL*** ➜ Motor Over Load When showing ***OL*** presents the motor is over load. The over load protection is executed by the internal electronic thermo relay. When the accumulate thermo time exceeds the setting value, the driver will trip and show this message. ● Check the setting of G20-04 (Electronic Thermo Relay Time) is proper or not. ● Check the setting of G20-00 (Motor Full Load Current Ratio) is correct or not. ● Check the setting of r G20-01 (Motor Exciting Current Ratio) is correct or not. ● Check if the motor is stalled. ● Check if the load exceeds the rating of motor. ● Check if the variant of load exceeds the design specification.
🦽♻️📷↥ **AO-OH**	***A0 – OH*** ➜ Heat Sink Over Heat or External Over Heat Protect When showing ***OH*** presents the heat sink temperature exceeds the setting of G83-01 (Over Heat Protect Temperature) or there is an external over heat protect signal happened. ● Check if the setting of G83-01 (Over Heat Protect Temperature) is proper or not. ● Set the G84-00 (Fan Control Type) = 1 to check the fan function. If the fan is out of working, replace it. ● Check if the fan is stalled. ● Check if the condition of driver fit in the installation environment. ● Check if the ambient temperature exceeds the installation environment. ● The temperally variation of climate may cause ambient temperature to be high, arranging a proper cooling method to prevent over heat contition is necessary at this moment.

占念回出 **A0-OP**	**A0 – OP** ➔ Over Potential When showing $\mathbf{OP}$ presents the dc bus voltage exceeds the protect level. ● If it is caused by the regeneration when decreasing speed, apply a proper discharge resistor to discharge circuits. ● Re-calculate the value of discharge resistor to fit in the volume of regeneration energy. ● Check if the input power voltage exceeds the input rating of driver. ● Check if the setting of G00-04 (Input Power Voltage) is correct or not. ● Check if the displayed message of G82-01 (DC Bus Voltage) is correct or not. ● According to the result of last 3 check items to decide if there is necessary to modify the setting of G82-00 (DC Bus Measurement Adjust).
占念回出 **A0-UP**	**A0 – UP** ➔ Under Potential When showing $\mathbf{UP}$ presents the dc bus voltage is lower the protect level. ● Check the input power system. ● Check the input power voltage fits in the rating of driver. ● Check if the setting of G00-04 (Input AC Power Voltage) is correct or not. ● Check if the displayed message of G82-01 (DC Bus Voltage) is correct or not.
占念回出 **A0-OC**	**A0 – OC** ➔ Over Current When showing $\mathbf{OC}$ presents the output current exceeds the rating of driver. ● Check if the type of motor fits in the driver's specification. ● Check if the rating of motor's fits in the rating of driver. ● Check if the connection of U, V, and W is properly or not. ● Check if the power lines to motor is broken or short with other lines or any defect. ● Check if the motor's wires are short or not. ● Check the settings of parameter group **G20** are correct or not. ● If the *OC* happened in the accelerating period, try to increase the setting of G23-00 (Acc Time). ● If the *OC* happened in the decelerating period, try to increase the setting of G23-01 (Dec Time). ● Check if the setting of G00-04 (Input AC Power Voltage) is correct or not. ● Check if the displayed message of G82-01 (DC Bus Voltage) is correct or not.

17. *CE Certificate*

17.1 EMC Certificate

SGS

Certificate No: ED/2008/50023C

VERIFICATION OF EMC COMPLIANCE

SGS-TW Reference No. : ED/2008/50023C

Model No : IRIS-3.5A, IRIS-05A, IRIS-07A

Product Name : IRIS MOTOR DRIVE

Applicant : JOINT PEER SYSTEC CORP.

Address of Applicant : (222) 6F. , NO. 266, Sec. 3, Pei Shen Road, Shen Keng Shiang, Taipei Hsien, Taiwan

SGS approved laboratory : SGS Taiwan

Date of Issue : June 13, 2008

Test(s) Required : SGS Onsite Test Standard: 2006
EN 61000-6-2: 2005, EN 61000-6-4: 2007
CISPR 11/ EN 55011: 2007, Class A

Conclusion

The equipment complies with the principal protection requirement of the directive 89/336/EEC amended by 2004/108/EC. The apparatus meets the requirements of the above standards.
*This certification is only valid for the equipment and configuration described, and in conjunction with the test data detailed above. It contains the result of the single examination of the subject being in hand and does not represent any universally valid decision concerning the quality of any other subject of the current production.

Authorized Signatory:

Jason Lin

SGS TAIWAN LTD.
Jason Lin

Technical Manager

CE

Copyright of this certificate is owned by SGS Taiwan Electronics & Communication Services and may not be reproduced other than in full and with the prior approval of the Manager of SGS Taiwan Electronics & Communication Services.
134, Wu Kung Road, Wu Ku Ind. Zone, Taipei, Taiwan

This document is issued by the Company under its General Conditions of Service printed overleaf. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

SGSPAPER

07301280

17.2 LVD Certificate

SGS

Certificate No: EZ/2008/50019C

VERIFICATION OF LVD COMPLIANCE

SGS-TW Reference No.	:	EZ/2008/50019C
Model No	:	IRIS-3.5A, IRIS-05A, IRIS-07A
Product Name	:	IRIS MOTOR DRIVE
Applicant	:	Joint Peer Systec Corp.
Address of Applicant	:	(222) 6F., No. 266, Sec. 3, Pei Shen Road, Shen Keng Shiang, Taipei Hsien, Taiwan
Report No.	:	EZ/2008/50019
Date of Issue	:	July 08, 2008
Applicable Standards	:	IEC/EN 61010-1:2001

Conclusion

Based upon a review of the Test Report, the apparatus is deemed to meet the requirements of the above standards and hence fulfill the requirements of:

Low Voltage Directive 2006/95/EC

Note: This certificate is only valid for the equipment and configuration described, and in conjunction with the test data detailed above.

Authorized Signatory:

Jason Lin

SGS TAIWAN LTD.
Jason Lin
Technical Manager

CE

SGSPAPER
07301350

JPS

正頻企業股份有限公司
JOINT PEER SYSTEC CORP.
(222)6F., No.266, Sec.3, Pei shen
Road, Shen Keng shiang, Taipei
Hsien, Taiwan
TEL:886-2-26646866 FAX:886-2-26644889
http://www.jps.com.tw