

PDS Series UNIVERSAL SERVO DRIVE INSTRUCTION MANUAL



version: 1.2
software rel. V9.44



WARNING!



Attention to these warning signs on the drive or in this instruction book, they indicate **danger to human body** or **damage to the drive**.

Before installing and putting the drive into operation, please read the safety precautions and warnings following this page.

Safety precautions & warnings

Read carefully all the safety precautions included in these operating instructions and all the warning signs attached to the drive. Make sure that the warning signs are kept in a legible condition and replace missing or damaged signs.

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

Never permit unqualified personnel to operate the drive.



WARNING

This drive 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 drive. 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 drive. The successful and safe use of this drive depends on the correct installation, commissioning, operation and maintenance of the drive.

This drive operates at high voltages.

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



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 PDS Servo Drive	4
1.1 Brief Function Description	4
1.2 Control input & output configuration.....	4
1.2.1 A/B/C Input Interface of Motor Feedback Encoder.....	6
1.2.2 XY Pulse Input Interface.....	6
1.2.3 Digital Input (DI0~DI14)	7
1.2.4 Digital Output (DO0~DO6).....	7
1.2.5 Source/Sink Select	8
1.2.6 Analog input AI1, AI2 & AI3	8
1.2.7 Analog Output AO1, AO2 & AO3	8
1.2.8 Hardware RESET (RST)	9
1.2.9 RS485 Communication Interface	9
1.2.10 Standard Cables	9
1.2.11 Option Field Bus Interface.....	9
1.3 Electrical Rating Specifications.....	9
2. Installation.....	10
2.1 Outline Dimensions	10
2.2 Power Terminal	11
2.3 Connect Power Line Input to Driver	11
2.4 Connect Driver Output to Motor	11
2.5 Control Terminal Connection	11
2.6 DC BUS Terminal and Brake Terminal.....	12
2.7 A.C.L.	12
3. Control Panel.....	13
3.1 CTL Mode.....	13
3.2 MON mode	13
3.3 PAR mode	13
3.4 ALM mode	13
4. Start-Up Examples	14
4.1 Basic Function Block.....	14
4.2 Setup Basic Motor Parameter	15
4.3 Default Setting of some simple Examples.....	15
4.3.1 V/F Constant Mode for Induction Motor.....	15
4.3.2 Speed Mode for Induction Servo Motor.....	16
4.3.3 Tracking Mode (Pcmd) for Induction Servo Motor.....	16
4.3.4 Auto Point-to-Point control Mode for Induction Servo	17
4.3.5 Example for Brushless Servo Motor.....	17
4.4 Auto Tuning for Servo Motors	18
4.4.1 Auto Tuning for Induction Servo Motor.....	18
4.4.2 Auto Tuning for Brushless Servo Motor	18
4.4.3 Auto Tuning Resolver BL Servo Motor.....	18
5. Parameters.....	19
5.1 Parameter List	19
5.2 Parameter Description.....	23
5.2.1 Parameter Type.....	23
5.2.2 Parameter Protection.....	23
5.2.3 Parameter Initialization	23
5.2.4 Speed & Acceleration/Deceleration Time.....	23
5.2.5 Control Function.....	24
5.2.6 Analog Input/Output Function.....	26
5.2.7 Factory Adjustment Parameters.....	27
5.2.8 Monitor Function	27
5.2.9 XY Pulse Command Input Parameters	29
5.2.10 PID Function	31
5.2.11 Motor Parameter Groups.....	33
5.2.12 Auto Point-to-Point Control.....	35

6. Selection of Speed Source	37
6.1 Speed Source Selection Table.....	37
6.2 Description of Speed Source	38
6.2.1 Speed Source from Memory & Panel.....	38
6.2.2 Speed Source from Analog Input.....	38
6.2.3 Speed Source from XY Pulse Input	40
6.2.4 Speed Source from Internal Up/Down Counter.....	41
6.2.5 Set Speed from Two Speed Sources Combination.....	42
7. Selection of Digital Input Function	43
7.1 Digital Input Function Related Parameters.....	43
7.2 Selection Table of Digital Input Function	43
7.3 Description of Digital Input function.....	45
7.3.1 Control Function.....	45
7.3.2 Protection Function.....	46
7.3.3 Timer & Counter Function	46
7.3.4 Flip/Flop Function.....	48
8. Selection of Digital Output Function.....	49
8.1 Digital Output Function Related Parameters.....	49
8.2 Selection Table of Digital Output Function.....	49
8.3 Description of Digital Output Function.....	50
8.3.1 Speed Monitor Function	50
8.3.2 ON/OFF Control Function	51
8.3.3 Pulse Output Function.....	51
8.3.4 Running Status Monitor Function	51
9. RS485 Communication.....	53
9.1 RS485 Communication Port Related Parameters	53
9.2 RS485 Port Configuration.....	53
9.3 JPS Protocol & Format	54
9.3.1 Computer to Drive.....	54
9.3.2 Drive to Computer.....	55
9.4 HMI Protocol (Modbus(RTU)).....	56
9.4.1 Parameter Setting	56
9.4.2 Definition of Modbus(RTU) and Drive.....	56
10. Block Diagram of PDS Drive.....	58
11. Special Function.....	59
11.1 MARK Function	59
11.1.1 Parameters Description.....	59
11.1.2 Running Status Monitor.....	60
11.1.3 S Ramp Curve.....	62

1. Description of PDS Servo Drive

1.1 Brief Function Description

Drives Different Motor types

- Brushless Servo Motor
- Induction Servo Motor
- Open Loop Induction Motor
- Memorize Four Motor Parameter Groups

Variety Control Modes in Single Drive

- Open Loop V/F or Sensorless Speed Mode
- Close Loop Speed Mode
- Torque Control Mode
- Pulse Command Tracking Mode
- Auto Positioning Mode

Enhanced Communication

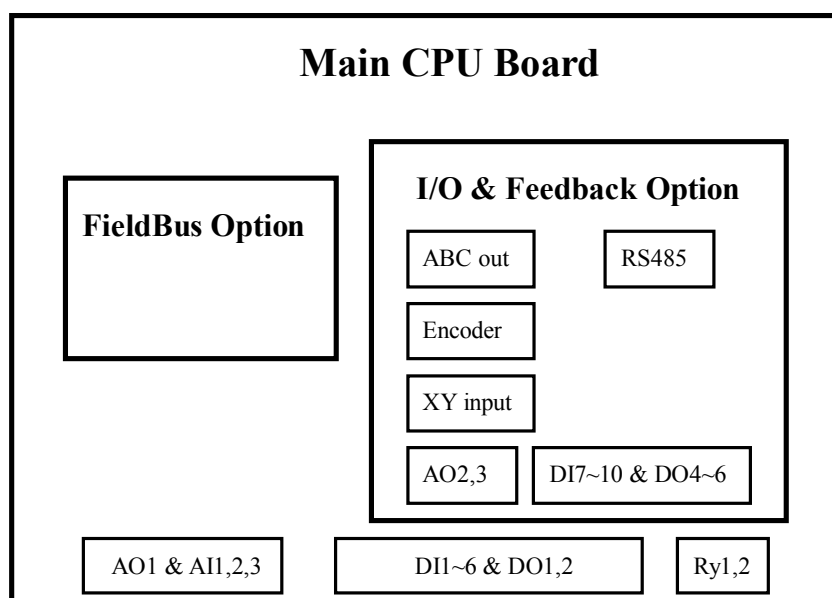
- Standard RS485 Communication Port
Simple and direct protocol embedded for Computer/PLC control.
Baud Rate up to 4800, 9600, 19200, 38400
- Option Field Bus Module
Many commonly used Fieldbus option board can be selected, such as:
 - Modbus(RTU)
 - Profibus-DP
 - InterBus
 - DeviceNet
 - ControlNet
 - CANopen

* Other systems planned

Multi-Functioned I/O

- 11 Digital Inputs (Sink or Source selectable)
- 7 Digital Outputs (Sink or Source selectable)
- 3 Analog Inputs ($\pm 10V$, $+10V$, $+5V$ or $20mA$ selectable)
- 3 Analog Output ($\pm 10V$)
- Encoder Clock Input
- Pulse Command Clock Input
- Encoder Clock Buffered Output

1.2 Control input & output configuration



The control terminals on the Main CPU board are separated into three groups.

Basic Analog I/O signals:

AO1	AI1	AI2	AI3	5V	ACOM
-----	-----	-----	-----	----	------

Basic Digital I/O signals:

DI1	DI2	DI3	DI4	DI5	DI6	RST	DO1	DO2	24V	DCOM	RY1	RY2
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	------	-----	-----

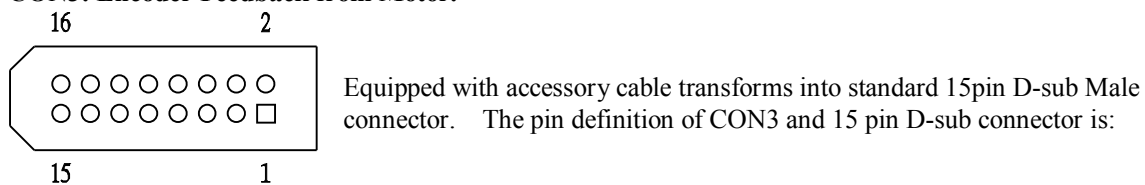
* RY1, RY2 is normal open Relay output (equivalent to DO3)

Additional control terminals on Feedback I/O board:

AO2	AO3	ACOM	DI7	DI8	DI9	DI10	DO4	DO5	DO6
-----	-----	------	-----	-----	-----	------	-----	-----	-----

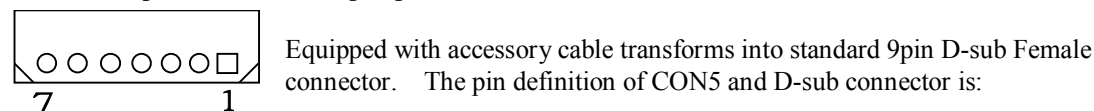
Connectors on Feedback I/O Board

CON3: Encoder Feedback from Motor.



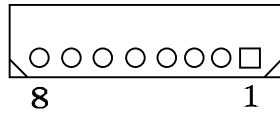
CON3	15pin D-sub Male connector	Definition	Description
Pin1	Pin1	A	● Pin1~Pin6 are used for both induction and brushless motor. ● Pin7~Pin12 used for brushless motor only. ● Encoder output should be Line Drive type. ● A, B are quadrature signals. ● Uf, Vf, Wf used for indicating the magnetic pole position of brushless motor.
Pin2	Pin2	/A	
Pin3	Pin3	B	
Pin4	Pin4	/B	
Pin5	Pin5	C	
Pin6	Pin6	/C	
Pin7	Pin7	Uf	
Pin8	Pin8	/Uf	
Pin9	Pin9	Vf	
Pin10	Pin10	/Vf	
Pin11	Pin11	Wf	
Pin12	Pin12	/Wf	
Pin13	Pin13	+5V	
Pin14	Pin14	0V	
Pin15	Pin15	0V	
Pin16	Case	Shield	

CON5: XY pulse command input port.



CON5	9pin D-sub Female connector	Definition	Description
Pin1	Pin1	X	Refer to the following parameters: Pr.130: XY Clock type select Pr.131: XY Input pin status Pr.132: XY Direction change Pr.133~136: Multiply/Division rate Pr.137: XY counter value Pr.138: XY Sampling Period Pr.139: XY Rate
Pin2	Pin2	/X	
Pin3	Pin3	Y	
Pin4	Pin4	/Y	
	Pin5	N.C.	
	Pin6	N.C.	
	Pin7	+5V	
Pin5	Pin8	0V	
Pin7	Pin9	N.C.	
Pin7	Case	Shield	

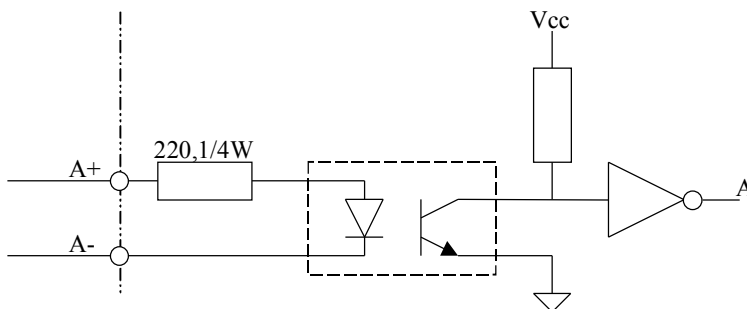
CON4: Buffered A, B, C output port.



Equipped with accessory cable transforms into standard 9pin D-sub Male connector. The pin definition of CON4 and D-sub connector is:

CON4	9pin D-sub Male connector	Definition	Description
Pin1	Pin1	Aout	Buffered output of signal A
Pin2	Pin2	/Aout	Buffered output of signal /A
Pin3	Pin3	Bout	Buffered output of signal B
Pin4	Pin4	/Bout	Buffered output of signal /B
Pin5	Pin5	Cout	Buffered output of signal C
Pin6	Pin6	/Cout	Buffered output of signal /C
	Pin7	N.C.	The above outputs are Line Driver type
Pin7	Pin8	0V	
	Pin9	N.C.	
Pin8	Case	Shield	

1.2.1 A/B/C Input Interface of Motor Feedback Encoder

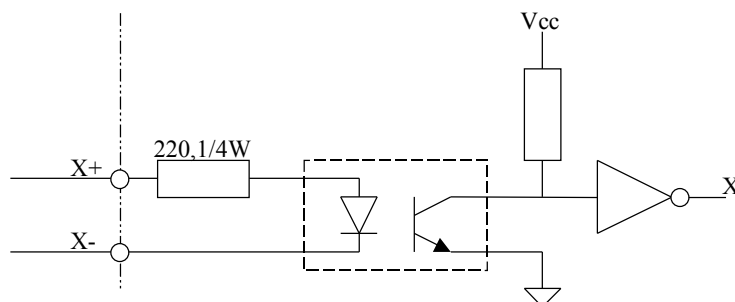


- The input hardware structure of signal B & C is same as signal A.
- The Encoder type muse be 5V Line Driver.

1.2.2 XY Pulse Input Interface

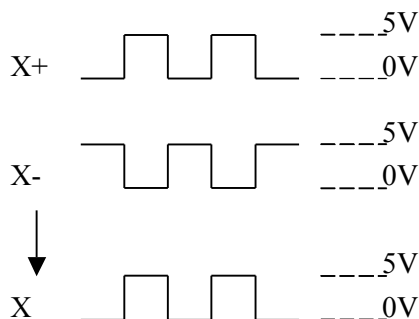
1.2.2.1 5V Line Drive Type

- The XY pulse input hardware structure is design as 5V Line Drive type input.



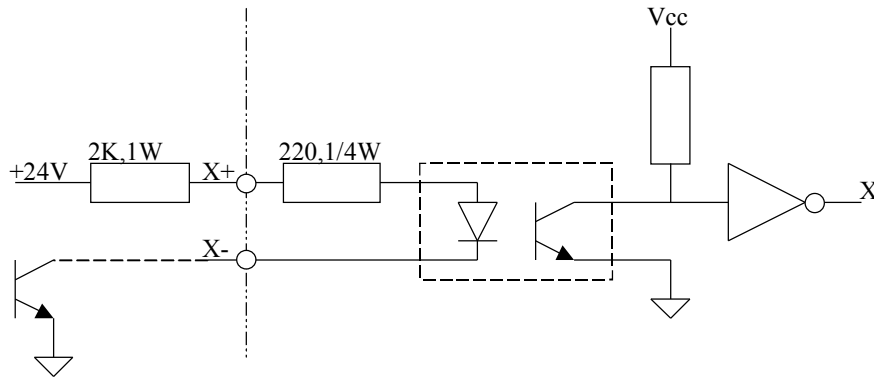
Note: The input hardware structure of signal Y is same as signal A

- Description of Line Drive input signal

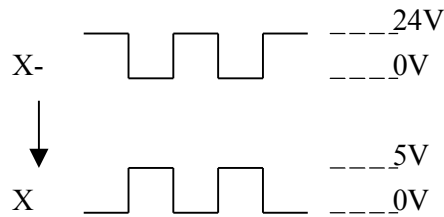


1.2.2.2 +24V Open Collector Type

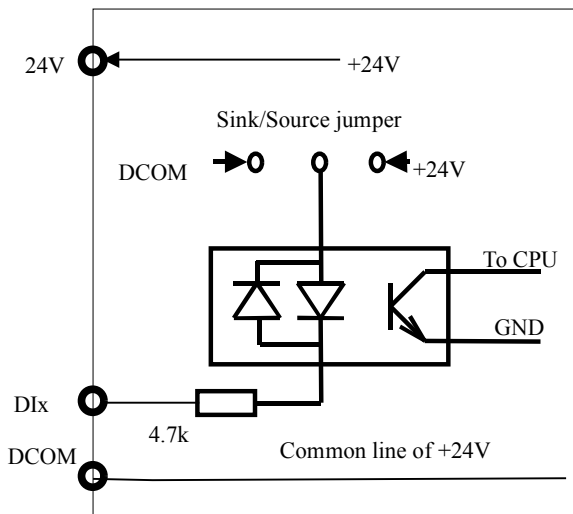
- If use 24V Open Collector type input signal, must add current limit resistor (2K,1W) as following.



- Description of Open Collector signal



1.2.3 Digital Input (DI0~DI14)



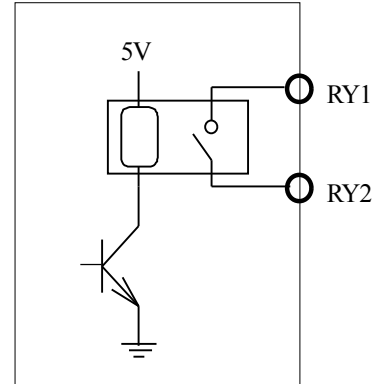
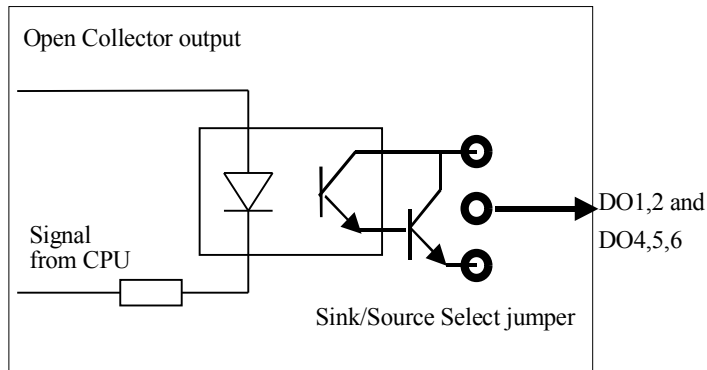
- DI1~DI10 are all identical Bi-directional digital inputs. DI1~DI6 located at Main CPU board, DI7~DI10 located at Feedback I/O board.
- DI0 do not connect to the user control terminal, and only connected to DO0 internally, and can be controlled by Pr.066 and Modbus communication.
- DI11~DI14 do not connect to the user control terminal, and can only control by Modbus communication.
- +24V is common power supply for all DIx.
- DCOM is the command reference for these digital circuits.
- Each Digital Input can be configured individually by corresponding parameter Pr.140~Pr.154.
- User can select Sink (NPN) type or Source (PNP) type by jumper JP4.

Note: The minimum input signal width is 5ms.

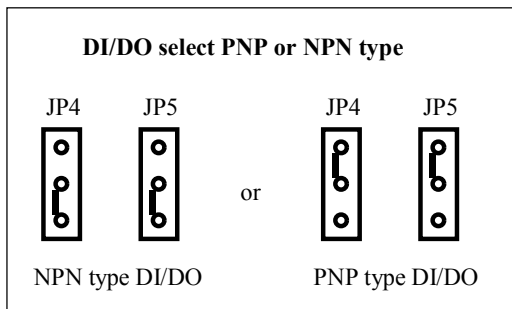
1.2.4 Digital Output (DO0~DO6)

- DO1, DO2, DO4~DO6 are open collector output,
- RY1, RY2 is voltage isolated "1a" contact of Relay output, RY1/RY2 named DO3 also.
- DO1, DO2, RY1/RY2 located at Main CPU board.
- DO4~DO6 located at Feedback I/O board.
- DO0 do not connect to the user control terminal, and only internal connected with DI0.
- Each Digital output can be configured individually by corresponding parameter Pr.160~Pr.166.
- User can select Sink (NPN) type or Source (PNP) type by jumper JP5.

Note: RY1, RY2 should drive 24V relay only



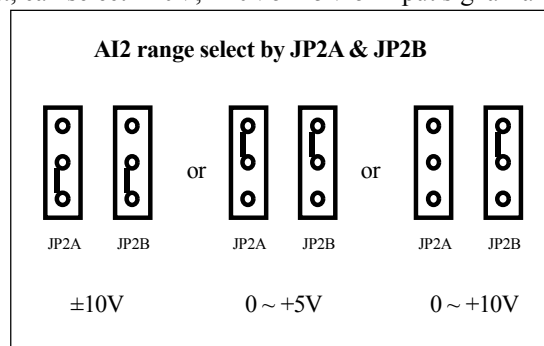
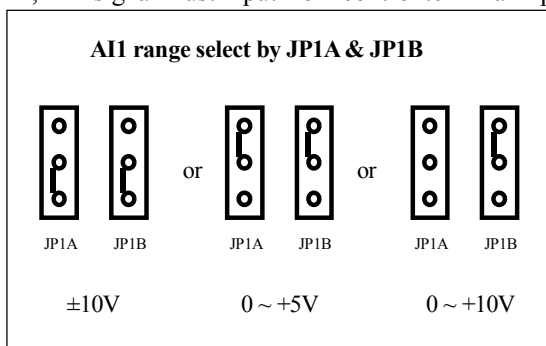
1.2.5 Source/Sink Select



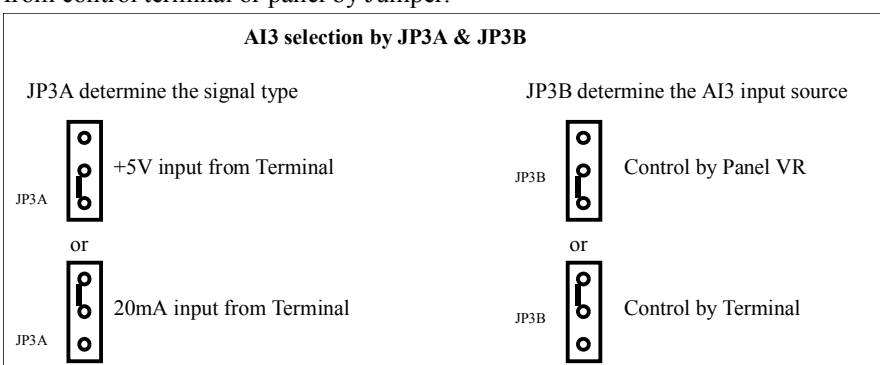
- JP4 upper position select Source input
- JP5 upper position select Source output
- JP4 lower position select Sink input
- JP5 lower position select Sink output

1.2.6 Analog input AI1, AI2 & AI3

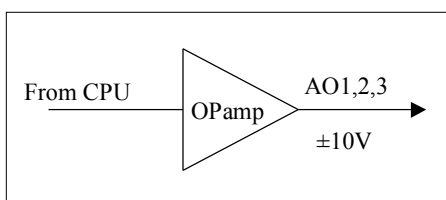
AI, AI2 signal must input from control terminal input, can select $\pm 10V$, $+10V$ or $+5V$ of input signal range by Jumper.



AI3 signal may input from control terminal or by VR of control panel, can select $+5V$ or $20mA$ of input signal and input from control terminal or panel by Jumper.



1.2.7 Analog Output AO1, AO2 & AO3



AO1, AO2 & AO3 are all identical analog outputs.

AO1 located at Main CPU board.

AO2, AO3 located at Feedback I/O board.

Each Analog Output can be configured individually by corresponding parameters. (Pr.210~213, 220~223, 230~233)

1.2.8 Hardware RESET (RST)

The hardware structure of RST terminal is similar to Digit Inputs description in Sec. 1.2.1.

Terminal **RST** is used for reset the servo drive. Under any circumstances, when **RST** terminal is activated, will force the drive execute **REST**, as if **Power on** again.

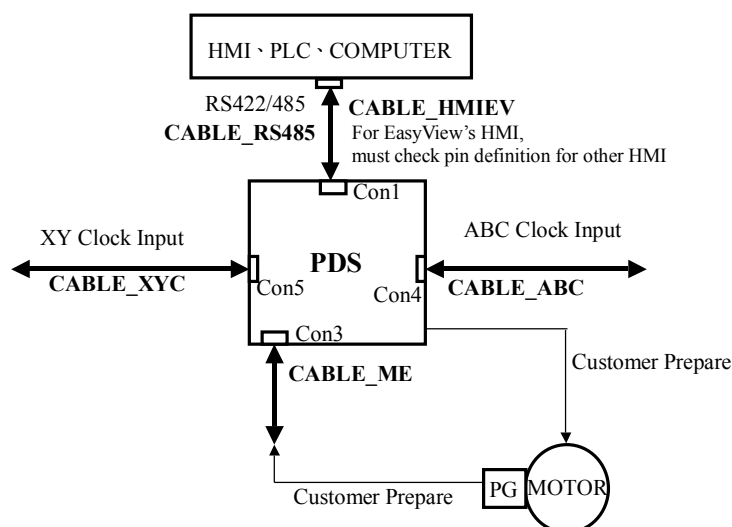
1.2.9 RS485 Communication Interface

- To use JPS protocol embedded for computer/ PLC control.
- To use Modbus(RTU) communication option, let drive simulate as Modicon PLC and can direct connect with HMI. The HMI can direct control and monitor the drive.

1.2.10 Standard Cables

The specification and application of standard cables describe as following:

Part No.	Application	Connector(1)	Connector(2)	Length(M)
CABLE_MEI	Encoder Input	D-sub 15Pin (Male)	JS091-16F	0.5
CABLE_ABCKO	A.B.C. Output	D-sub 9Pin (Male)	SC25-08HG	0.5
CABLE_XYCKI	X.Y. Input	D-sub 9Pin (Female)	SC25-07HG	0.5
CABLE_HMIEV	HMI	D-sub 9Pin (Male)	SC25-05HG	0.5
CABLE_RS485	RS485	SC25-05HG	SC25-05HG	2
CABLE_EXT2D9	Extension	D-sub 9Pin (Male)	D-sub 9Pin (Female)	2
CABLE_EXT2D15	Extension	D-sub 15Pin (Male)	D-sub 15Pin (Female)	2



1.2.11 Option Field Bus Interface

Many commonly used Fieldbus option board can be selected for complete data exchange with PLC or PC, such as:

- Profibus-DP
- InterBus
- DeviceNet
- ControlNet
- CANopen

Consult to our R&D department if needed.

1.3 Electrical Rating Specifications

Model No.		2022	2037	2055	2075	2110	2150	2225					
PDS-		4022	4037	4055	4075	4110	4150	4225	4300	4370	4450	4550	4750
HP		3	5	7.5	10	15	20	30	40	50	60	75	100
KW		2.2	3.7	5.5	7.5	11	15	22.5	30	37	45	55	75
KVA		4.0	6.5	9.5	13	19	25	34	46	57	73	84	106
Amp (rms)	PDS-2xxx	11	17	24	33	46	61	90					
	PDS-4xxx	5.5	8.5	12	17	23	31	45	57	71	91	110	140

2. 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 driver is at least 100mm.
- Make sure that a space of 40mm is kept free at the sides of the driver to permit the cooling air to escape from the side slits.
- Ensure that the temperature does not exceed the specified level when the driver is installed in cubicle.
- Avoid excessive vibration and shaking of the equipment.
- Do not obstruct the cooling fan that installed on the drive, 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.

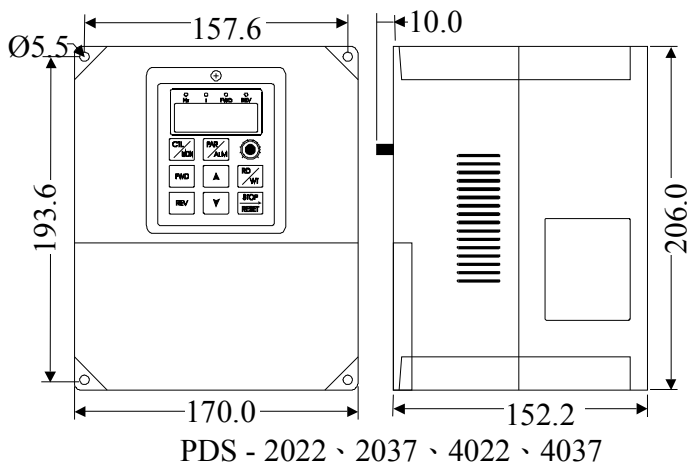


WARNING

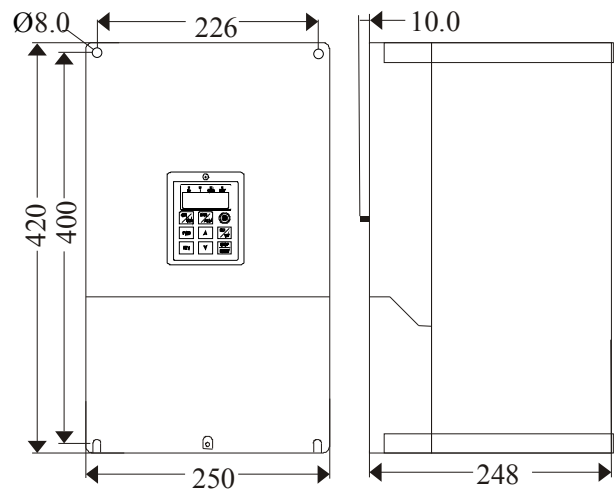
To prevent electrical shock, do not open cover for at least 5 minutes after removing AC power to allow capacitors to discharge.

2.1 Outline Dimensions

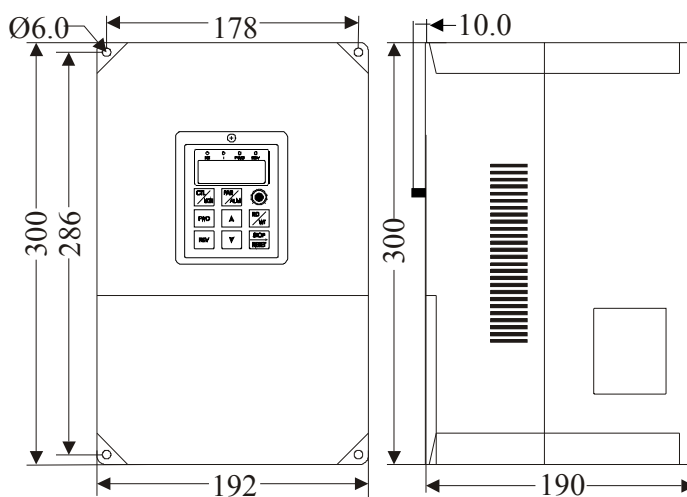
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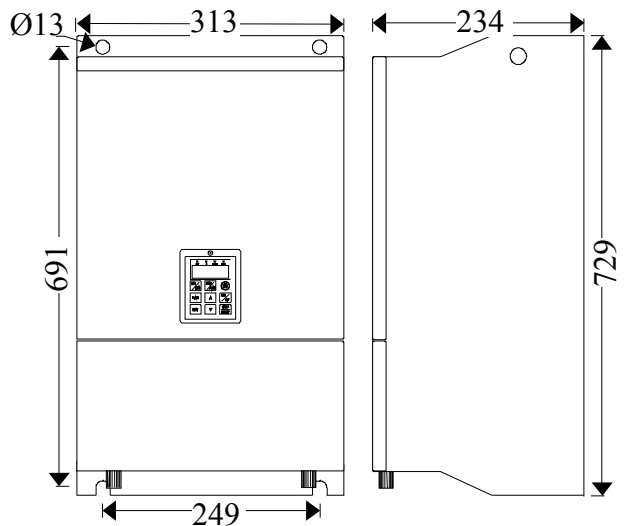
PDS - 2022、2037、4022、4037



PDS-2110N, 2150N, 2225N, 4110N, 4150N, 4225N



PDS - 2055N、2075N、4055N、4075N



PDS - 4300

2.2 Power Terminal

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

Basically, the Power terminals are divided into three portions:

1. The Power line input, (R, S, T) receives power for the operation of the driver.
2. The Motor line output, (U, V, W) delivers Variable Frequency output to motor leads.
3. Brake resistor connect to B, P terminals

NOTE: Must connect Earth properly.



WARNING: Never connect power line to U, V, W, P, N, B

2.3 Connect Power Line Input to Driver



WARNING and CAUTION

- Between the power line and the 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.
- Only the terminal screws may be touched with the insulated screwdrivers when connecting the leads.
- 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.
- Make sure the motor is configured to match the input voltage.
- Protective EARTH terminal marked with  must be connected properly.
- Take care that the appropriate circuit breakers with the specified current rating are connected between the power supply and the driver.

2.4 Connect Driver Output to Motor



WARNING

Do not insert contactors between driver output and motor.

For every model, "U, V, W " are the three phase output terminals, they should be connected to motor leads directly.

2.5 Control Terminal Connection



CAUTION

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.

2.6 DC BUS Terminal and Brake Terminal



CAUTION

Some models with power terminal marked P and N, these models does not include Brake transistor inside the driver. Customer may use extra Brake Transistor Module for discharge brake function.

For models that include braking transistor, the power terminal will mark P and B (PB or BR) User can connect suitable resistor to the P & B (PR or BR) terminals directly.

Here is the recommended table for discharge resistors:

Model	Resistance (Ohm)	Rating (Watt)
2022	60	250
2037	40	300
2055	30	500
2075	20	600
2110	15	1000
2150	10	1500
4022	250	250
4037	150	300
4055	100	500
4075	75	750
4110	50	1000
4150	40	1500
Discharge duty 10 %-		



Warning: Never connect resistor to P & N terminal

If the terminals are P & N, must add external braking unit.

2.7 A.C.L.

When power supply capacity is larger than 500KVA and /or using thyrister, phase advance capacitor etc. from same power supply, must fitting A.C.L. at R.S.T. power input side to curb instantaneous current and to improve power ratio.

Here is the recommended table for A.C.L.

Voltage (V)	Model	Current (Arms)	Induction value
220	PDS-2022	15	0.71mH
	PDS-2037	20	0.53mH
	PDS-2055	30	0.35mH
	PDS-2075	40	0.26mH
	PDS-2110	60	0.18mH
	PDS-2150	80	0.13mH
	PDS-2225	120	0.09mH
380/440	PDS-4022	7.5	3.6mH
	PDS-4037	10	2.2mH
	PDS-4055	15	1.42mH
	PDS-4075	20	1.0mH
	PDS-4110	30	0.7mH
	PDS-4150	40	0.53mH
	PDS-4225	60	0.36mH
	PDS-4300	80	0.26mH
	PDS-4370	100	0.21mH
	PDS-4450	120	0.18mH
	PDS-4550	150	0.14mH
	PDS-4750	200	0.11mH

Note: The A.C.L. for 220V and 380V/440V have different induction values, please do not mix up.

3. Control Panel

The control panel involves 4 digits 7-segment display and 4 Led-lamps, 8 keys and a potential meter (VR). It has four possible operation modes: "CTL", "MON", "PAR" and "ALM modes, described below. VR input is equivalent to AI3 input, JP3B of CPU board determine the AI3 input source.

3.1 CTL Mode



Push the "CTL/MON" key, will change the keypad operation between "CTL" and "MON" Mode. If both "HZ" and "I" Led are blank, it is under "CTL" Mode.

Under "CTL" Mode, user can control the driver running in either direction and may modify the desired running speed.

For normal run/stop control, use only the three keys:

FWD key is used for running the driver in forward direction.

REV key is used for running the driver in reverse direction.

STOP key is used to stop the driver.

If Pr.40 = 3 or 8, the running frequency shall be modified by keypad, then these keys are enabled:

RD/WT key is used to read out the internal Panel Speed Set value.

▲ key is used to increase the Panel Speed Set value

▼ key is used to decrease the Panel Speed Set value

STOP key is used for cursor shift.

Procedure:

- Under normal CTL mode, push RD/WT will enter **Panel Speed Set mode**, (if Pr.040=8, the display will show the value stored in Pr.000) and blinking the data.
- Push ▲ or ▼, the display starts to show the cursor position.
- Push ▲ or ▼, in order to modify the Panel set frequency.
- Push CTL/MON key will go back to normal CTL mode.

Note: If Pr.40=8, the new modified Panel Speed Set value will rewrite into Pr.000 automatically.

3.2 MON mode

Push the "CTL/MON" key, will change the keypad operation between "CTL" and "MON" Mode.

Under "MON" Mode, user can control the driver running in either direction and may monitor any two internal status easily.

If "HZ" Led is on, it is under "MON" Mode and 7-segment shows the "HZ" data. **(Or the desired parameter assigned by Pr.099)**

If "I" Led is on, it is under "MON" Mode and 7-segment shows the "I" data. **(Or the desired parameter assigned by Pr.098)**

FWD key is used for running the driver in forward direction.

REV key is used for running the driver in reverse direction.

STOP key is used to STOP the driver.

▲ key is used to select "HZ" or "I" data shown on the 7-segment display.

▼ key is used to select "HZ" or "I" data shown on the 7-segment display.

3.3 PAR mode

Push the "PAR/ALM" key, will change the keypad operation between "PAR" or "ALM" mode.

If push PAR/ALM key, 7-segment shows "Pr.xxx", it is under "PAR" Mode, the HZ and I lamps all ON, user can modify or monitor all the internal Parameters. To modify any parameter, follow the steps described below:

STEP 1: push "PAR/ALM" key, the 7-segment will show "Pr.nnn". (nnn is parameter number)

STEP 2: push ▲ or ▼ key to select desired parameter number, and **"STOP" key used as cursor shift**.

STEP 3: push "RD/WT" key to READ the content of the specified parameter. (The 7-segment now shows the value of this parameter.)

STEP 4: push ▲ or ▼ key to modify the displayed value, and **"STOP" key used as cursor shift**.

STEP 5: push "RD/WT" key to WRITE the new value into parameter memory.

STEP 6: push "PAR/ALM" repeat STEP 1~5 to modify next parameter.

3.4 ALM mode

Push the "PAR/ALM" key, will change the keypad operation between "PAR" or "ALM" mode.

If push PAR/ALM key, 7-segment shows "0.-xx", it is under "ALM" Mode.

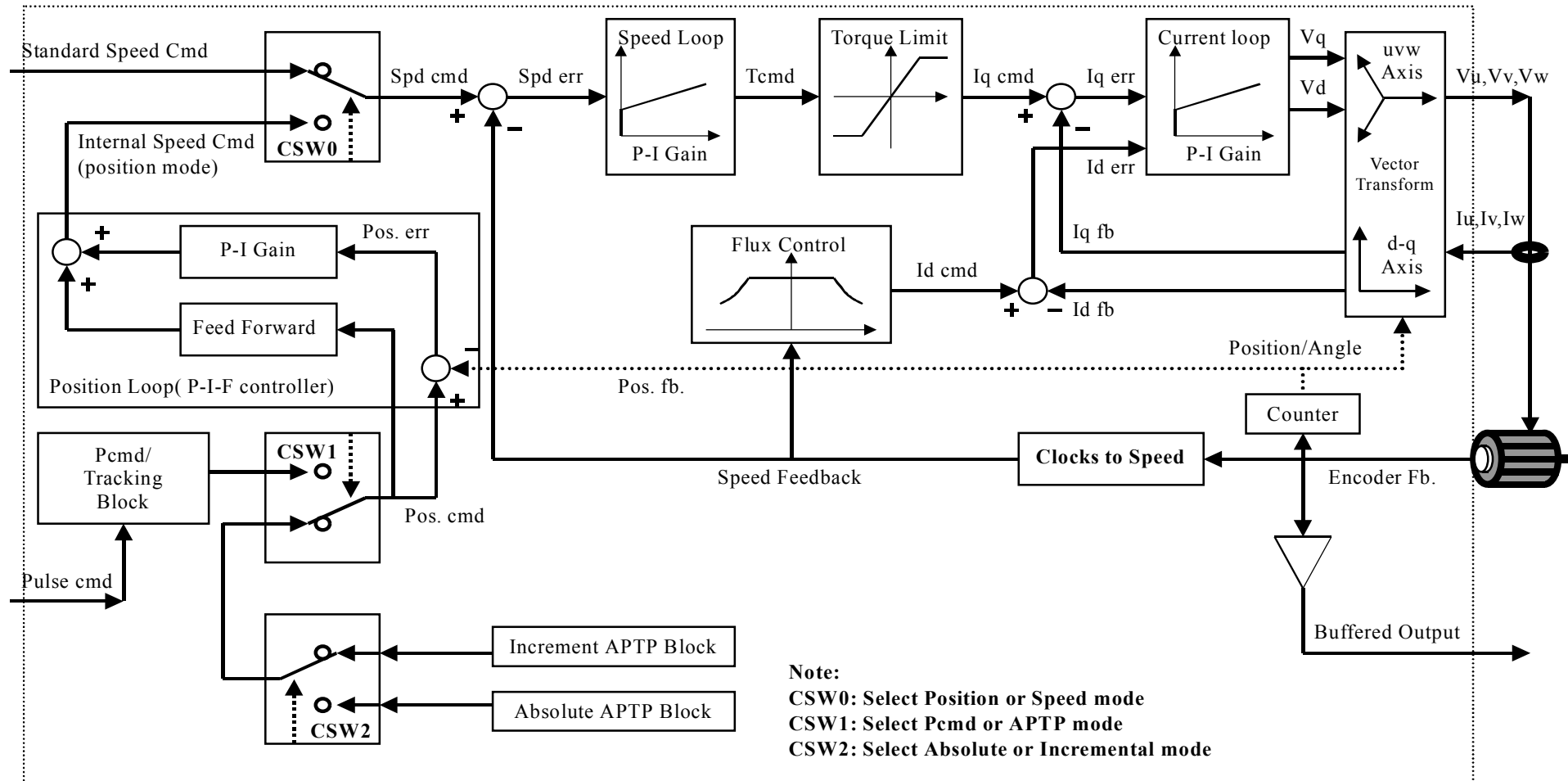
Under "ALM" Mode, the user can execute RESET function or monitor ALARM STATUS.

STOP/RESET key, the driver will execute RESET function.

▲ and ▼ key are used to check ALARM History.

4. Start-Up Examples

4.1 Basic Function Block

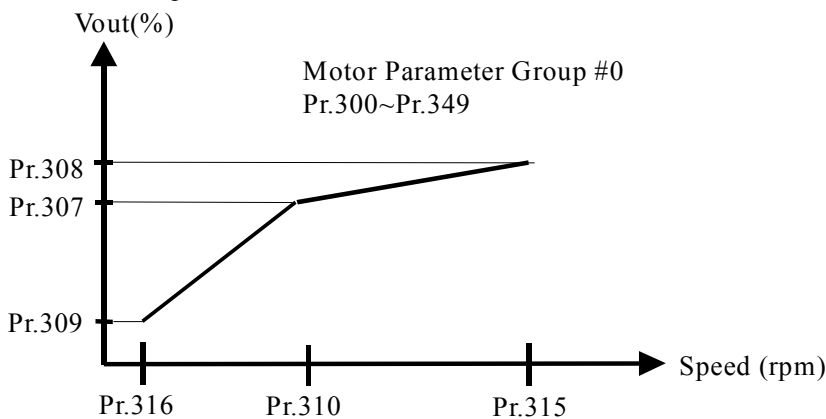


4.2 Setup Basic Motor Parameter

Refer to section 5.2.11 for detail description of motor parameter groups (Pr.300~499).

For example, if an induction motor running under V/F constant mode, user must set up the V/F curve parameters according to motor manufacturer's data.

- Select motor characteristic group#0, set Pr.188=0
- Select induction motor under V/F control mode, set Pr.300=0
- Set motor rated speed in Pr.310 (RPM)
- Set motor maximum speed in Pr.315 (RPM)
- Set motor minimum speed in Pr.316 (RPM)
- Set motor rated voltage in Pr.307 (% of Input Line Voltage)
- Set motor peak voltage in Pr.308 (% of Input Line Voltage)
- Set Boost voltage in Pr.309 (% of motor rated voltage)
- Set motor rated current in Pr.311= $(\text{MotorRatingCurrent}/\text{DriverRatingCurrent}) \times 100\%$
- Set motor peak current in Pr.312= $(\text{MotorPeakCurrent}/\text{MotorRatingCurrent}) \times 100\%$
- Set motor pole number in Pr.314



4.3 Default Setting of some simple Examples

For user convenience, some default setting for different application is embedded in the firmware.

Execute RESET operation after setting Pr.094 to specified value; the CPU will set related parameters to perform the desired operation mode.

- Pr.094=201, simple V/F mode operation for induction motor
- Pr.094=202, simple Induction Servo running under Speed mode
- Pr.094=203, simple Induction Servo running under Pcmd mode
- Pr.094=204, simple Induction Servo running under Auto Point-to-Point Positioning
- Pr.094=205, Auto Tuning for Induction Servo Motor
- Pr.094=232, simple Brushless Servo running under Speed mode
- Pr.094=233, simple Brushless Servo running under Pcmd mode
- Pr.094=234, simple Brushless Servo running under Auto Point-to-Point Positioning
- Pr.094=235, Auto Tuning for Brushless Servo Motor

NOTE: Before above setting, select Pr.094=1, then execute RESET to initialize the R/W type parameters to default value. (Refer to section 5.2.3)

4.3.1 V/F Constant Mode for Induction Motor

Select Pr.094=201, then execute RESET to initialize the parameters. After initialization, the CPU loads following parameters, then the drive standby under V/F mode.

- Pr.188=0 Choose pre-stored Group#0 motor parameters (Pr.300~Pr.349)
- Pr.300=0 Let the motor operate under V/F constant mode
- Pr.330~Pr.333=0 Always operate under open loop speed mode
- Pr.141=102 DI1(102) Drive will Enable by DI1
- Pr.145=73 DI5(73) FWD RUN (effective when control by terminal input)
- Pr.146=74 DI6(74) REV RUN (effective when control by terminal input)
- Pr.181=0 & Pr.039=0.2 FWD/REV command by LOCAL panel normally
- Pr.040=0.25 Speed command by Pr.000 normally
- Pr.000=500 Default speed = 500RPM
- Pr.001=5.00 5 seconds ramp up from zero to maximum speed
- Pr.002=5.00 5 seconds ramp down from maximum to zero speed

Procedure:

- Connect DI1 to DCOM (assume DI/DO is chosen to be SINK type) to enable the drive.
- Push FWD or REV key, then the motor speed will ramp up to 500RPM.
- Change Pr.039=2.2, transfer control to terminal input DI5 & DI6.
- Connect DI5 (or DI6) to DCOM; the motor will ramp up to 500RPM.

4.3.2 Speed Mode for Induction Servo Motor

Select Pr.094=202, then execute RESET to initialize the parameters. After initialization, the CPU loads following parameters, then the drive standby under **Speed** mode.

Pr.188=0	Choose pre-stored Group#0 motor parameters (Pr.300~Pr.349)
Pr.300=2	Select Induction servo motor for close loop control *1
Pr.330=0	Select Speed control mode
Pr.331~Pr.333=0	Always operate under speed mode, no torque control
Pr.141=102	DI1(102) Drive will Enable by DI1
Pr.145=73	DI5(73) FWD RUN (effective when control by terminal input)
Pr.146=74	DI6(74) REV RUN (effective when control by terminal input)
Pr.181=0 & Pr.039=0.2	FWD/REV command by LOCAL panel normally
Pr.040=0.25	Speed command by Pr.000 normally
Pr.000=500	Default speed = 500RPM
Pr.001=5.00	5 seconds ramp up from zero to maximum speed
Pr.002=5.00	5 seconds ramp down from maximum to zero speed

Procedure:

- Try operations similar to section 4.3.1.
- Modify Pgain and Igain if necessary.

***1: before operation start, verify following parameters (refer to section 5)**

Pr.302: PPR of Encoder
Pr.303: A/B clock Direction
Pr.313: Field Current%=(FieldCurrent/MotorRatedCurrent)*100%
Pr.317: Slip RPM
Pr.320: Pgain of Current loop
Pr.321: I gain of Current loop
Pr.323: P gain of Speed loop
Pr.324: I gain of Speed loop

4.3.3 Tracking Mode (Pcmd) for Induction Servo Motor

Select Pr.094=203, then execute RESET to initialize the parameters. After initialization, the CPU loads following parameters, then the drive standby under **tracking** mode.

Pr.188=0	Choose pre-stored Group#0 motor parameters (Pr.300~Pr.349)
Pr.300=2	Select Induction servo motor for close loop control
Pr.330=1	Position control *2
Pr.331=1	Tracking mode by Pulse Command input from XY port
Pr.332~Pr.333=0	No torque control
Pr.141=102	DI1(102) Drive will Enable by DI1
Pr.145=73	DI5(73) FWD RUN (effective when control by terminal input)
Pr.146=74	DI6(74) REV RUN (effective when control by terminal input)
Pr.181=0 & Pr.039=0.2	FWD/REV command by LOCAL panel normally
Pr.040=0.25	Speed command by Pr.000 normally
Pr.000=500	Default speed = 500RPM
Pr.130=0	select quadrature input clock to XY input
Pr.133=1000	XY multiply rate =1000
Pr.134=1000	XY division rate = 1000

***2: before operation start, verify Pr.326 (Position loop P gain) and the parameters of *1 of section 4.3.2.**

Procedure:

- Connect DI1 to DCOM
- Push FWD or REV key, then the drive is ready to accept clock input from XY port
- Change Pr.133 or Pr.134, and verify the effects.

4.3.4 Auto Point-to-Point control Mode for Induction Servo

Select Pr.094=204, then execute RESET to initialize the parameters. After initialization, the CPU loads following parameters, then the drive standby under **auto point-to-point** mode.

Pr.188=0	Choose pre-stored Group#0 motor parameters (Pr.300~Pr.349)
Pr.300=2	Select Induction servo motor for close loop control
Pr.330=1	Position control (Refer to section 4.3.3 *2)
Pr.331=0	Auto Point-to-Point control
Pr.332=0	Select Incremental type APTP
Pr.333=0	No torque control
Pr.141=102	DI1(102) Drive will Enable by DI1
Pr.142=128	DI2(128) Start Home search
Pr.143=129	DI3(129) End Home search and stop at the desired offset point
Pr.144=118	DI4(118) APTP start trigger
Pr.145=119	DI5(119) Direction control
Pr.146=120	DI6(120) Point selection Bit0
Pr.181=0 & Pr.039=0.0	FWD/REV command by LOCAL panel normally
Pr.040=0.00	Speed command by Pr.000 normally
Pr.000=500	Default speed = 500RPM
Pr.001=0.50	0.5 seconds ramp up from zero to maximum speed
Pr.002=0.50	0.5 seconds ramp down from maximum to zero speed
Pr.568/569=00000001	Offset one clock after index catch
Pr.500/501=4*PPR	One revolution when DL0 is selected
Pr.502/503=40*PPR	Ten revolutions when DL1 is selected

Procedure:

- Connect DI1 to DCOM
- Push FWD or REV key, then the drive is ready to accept Home Search Command
- Trigger DI2, the motor start run to 500RPM
- Trigger DI3 (assume DOG sensor input), the drive start search index then stop at desired offset
- Use DI5 and DI6 to select desired DLn (Destination Length) and direction
- Trigger DI4, the motor run and stop at DLn.
- Try to use DI7~DI10 and set other DLn parameters to select different length.
- If **Absolute type APTP** is desired, set Pr.332=1, execute RESET, then try again

4.3.5 Example for Brushless Servo Motor

If select Pr.094=232~234, the functions are similar to Pr.094=202~204, Except

- Pr.188=3, the motor characteristic parameters are default to group#3(Pr.450~Pr.499)
- Pr.450=3, select brushless servo motor.

***User has to prepare other parameters in group#3 to match the brushless motor in use.**

4.4 Auto Tuning for Servo Motors

4.4.1 Auto Tuning for Induction Servo Motor

If select Pr.094=205, only few parameters is necessary to set by user, then after execute RESET, this drive can detect the motor characteristic parameters itself.

For induction servo, use motor parameter group#0(Pr.300~Pr.349).

1. Set Pr.307=Rated motor Voltage=100%(Motor Rated Voltage/Line Voltage).
2. Set Pr.310=Rated motor Speed (RPM).
3. Set Pr.311=Rated motor Current=100%*(Motor Rated Current/Driver Rated Current).
4. Set Pr.094=205, inform the drive to execute Auto tuning after reset
5. Execute RESET to initiate Tuning Process.

After tuning process complete, the drive will set Pr.094=202, then reset again in order to preload the drive as speed controller. (Refer to sec.4.3.2). The following parameters will be changed after tuning process, user should verify again.

- Pr.302- Encoder PPR, set to correct value
- Pr.303- Encoder Direction, set to correct direction
- Pr.308- Set equal to Pr.307
- Pr.309- Boost Voltage (used when V/F control application)
- Pr.312- Peak Current, set to 100%
- Pr.313- Field Current, set to proper value (% of Motor Rated Current)
- Pr.314- Pole, set to correct pole number
- Pr.315- Maximum Speed, Set equal to Pr.310
- Pr.316- Minimum Speed, set to 0RPM
- Pr.317- SLIP RPM, set to 5% of Rated motor Speed(RPM)
- Pr.320- ACR Pgain, Set to proper value
- Pr.321- ACR I gain, Set to proper value
- Pr.323- ASR Pgain, Set to proper value
- Pr.324- ASR I gain, Set to proper value

4.4.2 Auto Tuning for Brushless Servo Motor

If select Pr.094=235, only few parameters is necessary to set by user, then after execute RESET, this drive can detect the motor characteristic parameters itself.

For brushless servo, use motor parameter group#3(Pr.450~Pr.499).

1. Set Pr.460=Rated motor Speed (RPM).
2. Set Pr.461=Rated motor Current=100%*(Motor Rated Current/Driver Rated Current).
3. Set Pr.094=235, inform the drive to execute Auto tuning after reset
4. Execute RESET to initiate Tuning Process.

After tuning process complete, the drive will set Pr.094=232, then reset again in order to preload the drive as speed controller. (Refer to sec.4.3.5). The following parameters will be changed after tuning process, user should verify again.

- Pr.452- Encoder PPR, set to correct value
- Pr.453- Encoder Direction, set to correct direction
- Pr.457-Rated motor Voltage, set to proper value
- Pr.458- Set equal to Pr.457
- Pr.459- Boost Voltage=0
- Pr.462- Peak Current, set to 100%
- Pr.463- Field Current=0
- Pr.464- Pole, set to correct pole number
- Pr.465- Maximum Speed, Set equal to Pr.460
- Pr.466- Minimum Speed, set to 0RPM
- Pr.467- SLIP RPM=0
- Pr.470- ACR Pgain, Set to proper value
- Pr.471- ACR I gain, Set to proper value
- Pr.473- ASR Pgain, Set to proper value
- Pr.474- ASR I gain, Set to proper value

4.4.3 Auto Tuning Resolver BL Servo Motor

If the servo motors use resolver as feedback element, then user must select resolver option card. After choosing correct feedback option card, then the drive will identify itself for controlling the resolver.

Auto tuning procedure and all parameters setting are the same as those described in section 4.4.2, except:

- Pr.340/390/440/490 Resolver Angle Shift, it defines the angle shift between motor magnetic North direction and resolver North mark.
- Pr.341/391/441/491 Resolver Polarity, it defines the polarity of Sine Cosine signal.

5. Parameters

5.1 Parameter List

Pr.xxx	Parameter Name	Default	Min.	Max.	Type	Reference
000	Main Speed Set	0 rpm	0	9000	R/W	5.2.4
001	Main Acceleration Time	5.00 sec	0.00	650.00	R/W	
002	Main Deceleration Time	5.00 sec	0.00	650.00	R/W	
005	Brake Speed	5 rpm	0	9000	R/W	5.2.5
012	PWM Carrier	8.0 KHz	8.0	8.0	R	5.2.7
013	Alarm Code	0	0	9	M	5.2.8
019	Jog Speed	10 rpm	0	9000	R/W	5.2.4
020	Jog Acceleration/Deceleration Time	5.00 sec	0.00	650.00	R/W	
021	SPD1 Speed Set	0 rpm	0	9000	R/W	5.2.4
022	SPD1 Acceleration Time	5.00 sec	0.00	650.00	R/W	
023	SPD1 Deceleration Time	5.00 sec	0.00	650.00	R/W	
024	SPD2 Speed Set	0 rpm	0	9000	R/W	5.2.4
025	SPD2 Acceleration Time	5.00 sec	0.00	650.00	R/W	
026	SPD2 Deceleration Time	5.00 sec	0.00	650.00	R/W	
027	SPD3 Speed Set	0 rpm	0	9000	R/W	5.2.4
028	SPD3 Acceleration Time	5.00 sec	0.00	650.00	R/W	
029	SPD3 Deceleration Time	5.00 sec	0.00	650.00	R/W	
031	Reverse Inhibit	0	0	1	R/W	5.2.5
033	Discharge Enable	0	0	2	R/W	5.2.5
034	UP/OP Restart Enable	0	0	1	R/W	5.2.5
039	Control Command Select	0.0	0.0	9.9	R/W	5.2.5
040	Speed Source Select	8.08	0.00	99.99	R/W	SEC. 6
048	Detect Irms	100 %	0	250	FR/W	8.3.4
049	Detect RPM	300 rpm	0	9000	FR/W	
050	Detect Tolerance	30 rpm	0	9000	FR/W	
051	Thermal Trip Time	3 sec	0	120	R/W	5.2.5
053	Gear Ratio	100.00 %	0.00	600.00	R/W	5.2.8
054	Irms Select	0	0	255	R/W	5.2.8
057	HZ	Hz			M	5.2.8
058	RPM	rpm	0	9000	M	
059	Vdc (Capacitor)	Volts DC			M	
060	Vout (r.m.s. output)	Volts AC			M	
061	Irms	Amp			M	
062	Temperature	°C	0	100	M	5.2.8
064	DI0~DI14 Input Status	0000 Hex	0000	7FFF	M	
065	DO0~DO6 Output Status	0000 Hex	0000	007F	M	
066	DI0~DI10 Simulation	0	0	2047	RAM	5.2.5
067	Torque Set (RAM)	0.00%	0.00	100.00	RAM	5.2.5
068	DO Simulation	0	0	128	RAM	5.2.5
069	Torque Set (EARAM)	0%	0	100	FR/W	5.2.5
070	Analog Input Gain	50%	0	100	R/W	6.2.4
071	Timer(1) Time	5.0 sec	0.1	6553.0	R/W	7.3.3
072	Timer(2) Time	5.0 sec	0.1	25.0	R/W	
073	S-curve Time T1	0.00 sec	0.00	2.50	R/W	5.2.4
074	S-curve Time T2	0.00 sec	0.00	2.50	R/W	
075	S-curve Time T3	0.00 sec	0.00	2.50	R/W	
076	S-curve Time T4	0.00 sec	0.00	2.50	R/W	
077	DO1 Pulse Output Ratio	1	1	100	R/W	8.3.3
083	IGBT Guard Time	3.0μsec	2.0	25.0	FR/W	5.2.7
084	Line Voltage	Volts AC	40	1000	FR/W	5.2.7
085	Rated Current	Amp	0.5	3000.0	FR/W	5.2.7
086	Irms Adjust	%	70	140	FR/W	5.2.7
087	Vdc Adjust	%	70	140	FR/W	
089	AI1 Low	12	0	1023	FR/W	5.2.6
090	AI1 High	1012	0	1023	FR/W	
091	AI2 Low	12	0	1023	FR/W	5.2.6

Pr.xxx	Parameter Name	Default	Min.	Max.	Type	Reference
092	AI2 High	1012	0	1023	FR/W	
094	Reload Parameter	0	0	250	R/W	5.2.3
095	Memory Protect	0	0	1	R/W	5.2.2
096	Factory Write Enable	0	0	1	R/W	
097	Version				R	5.2.7
098	Monitor(I)	61	0	999	R/W	5.2.8
099	Monitor(HZ)	58	0	999	R/W	
108	Counter Value	0	0	9999	M	7.3.3
109	Counter Set	0	0	9999	R/W	DIx(28)
116	Speed Set	0 rpm	0	9000	RAM	5.2.4
120	Protocol Select	0	0	3	FR/W	SEC. 9
121	Baud Rate	2	0	3	FR/W	
122	Stop Bit	1	0	1	FR/W	
123	ID	1	1	250	FR/W	
124	Queue Status	0	0	31	M	
125	Parity	0	0	2	FR/W	
130	XY Clock Type Select	0	0	6	FR/W	5.2.9
131	XY Input Pin Status	0.0.	0.0.	1.1.	M	
132	XY Direction Change	0	0	1	FR/W	
133	XY Multiply Rate 0	1000	0	9999	FR/W	
134	XY Division Rate 0	1000	0	9999	FR/W	
135	XY Multiply Rate 1	1000	0	9999	FR/W	
136	XY Division Rate 1	1000	0	9999	FR/W	
137	XY Counter Value	0000 Hex	0000	FFFF	M	
138	XY Sampling Period	50 mSec	2	250	FR/W	
139	XY Rate	0000 Hex	0000	FFFF	M	SEC .7
140	DI0 Select	0	0	250	R/W	
141	DI1 Select	0	0	250	R/W	
142	DI2 Select	0	0	250	R/W	
143	DI3 Select	0	0	250	R/W	
144	DI4 Select	0	0	250	R/W	
145	DI5 Select	0	0	250	R/W	
146	DI6 Select	0	0	250	R/W	
147	DI7 Select	0	0	250	R/W	
148	DI8 Select	0	0	250	R/W	
149	DI9 Select	0	0	250	R/W	
150	DI10 Select	0	0	250	R/W	
151	DI11 Select	0	0	250	R/W	
152	DI12 Select	0	0	250	R/W	
153	DI13 Select	0	0	250	R/W	
154	DI14 Select	0	0	250	R/W	5.2.8
157	Line Speed(1)	0	0	65530	M	
158	Line Speed(2)	0.00	0.00	655.30	M	
159	Line Speed(3)	0.0	0.0	6553.0	M	SEC. 8
160	DO0 Select	0	0	250	R/W	
161	DO1 Select	0	0	250	R/W	
162	DO2 Select	0	0	250	R/W	
163	DO3 Select	0	0	250	R/W	
164	DO4 Select	0	0	250	R/W	
165	DO5 Select	0	0	250	R/W	
166	DO6 Select	0	0	250	R/W	5.2.5
180	Fan Control	10.50 sec	5.00	99.99	FR/W	
181	Panel Command Priority	0	0	1	FR/W	
182	Panel Speed Priority	0	0	1	FR/W	5.2.5
186	Write Select	0	0	1	RAM	5.2.5
188	Motor Parameter Group Select	0	0	3	FR/W	5.2.5
189	PG Loss Check Enable	1	0	1	FR/W	5.2.5
191	AI3 Low	12	0	1023	FR/W	5.2.6
192	AI3 High	1012	0	1023	FR/W	
193	Home Direction	1	0	19	FR/W	5.2.12

Pr.xxx	Parameter Name	Default	Min.	Max.	Type	Reference
194	Home Speed and Acc/Dec	0	0	1	FR/W	5.2.12
195	Travel Limit	0	0	1	R/W	
200	Iv A/D Value		0	1023	M	
201	AI1 A/D Value		0	1023	M	5.2.8
202	AI2 A/D Value		0	1023	M	
203	AI3 A/D Value		0	1023	M	
204	Iw A/D Value		0	1023	M	
205	Idc A/D Value		0	1023	M	
206	Vcap A/D Value		0	1023	M	5.2.8
207	Temperature A/D Value		0	1023	M	
210	AO1 Select	0	0	250	FR/W	5.2.6
211	AO1 Zero	0.00	0.00	1.99	FR/W	
212	AO1 Span	100.0%	0.0	150.0	FR/W	
220	AO2 Select	0	0	250	FR/W	5.2.6
221	AO2 Zero	0.00	0.00	1.99	FR/W	
222	AO2 Span	100.0%	0.0	150.0	FR/W	
230	AO3 Select	0	0	250	FR/W	5.2.6
231	AO3 Zero	0.00	0.00	1.99	FR/W	
232	AO3 Span	100.0%	0.0	150.0	FR/W	
240	PID Input Select	0.00	0.00	99.99	FR/W	5.2.10
241	PID Default Configuration	0	0	63	FR/W	
242	PID Output Value	0000	0000	FFFF	M	
243	PID Pgain	0	0	9999	FR/W	
244	PID Igain	0	0	9999	FR/W	
245	PID Dgain	0	0	9999	FR/W	
246	PID FBgain	1.00	0.00	100.00	FR/W	
247	PID Constant Reference	0.0	0.0	100.0	FR/W	
248	PID Limit	100.0	0.0	100.0	FR/W	
249	PID Dtime	0.00 sec	0.00	2.50	FR/W	
250	PID Set Value	0000 Hex	0000	FFFF	M	
251	PID FB Value	0000 Hex	0000	FFFF	M	
252	PID Error Value	0000 Hex	0000	FFFF	M	
253	PID Auto Gain Select	0	0	7	FR/W	
300, 350, 400, 450	Motor Type Select	0	0	5	FR/W	5.2.11
301, 351, 401, 451	ABC Status	0.0.0.	0.0.0	1.1.1.	M	
302, 352, 402, 452	Encoder PPR	1024	0	9999	FR/W	
303, 353, 403, 453	A-Lead/Lag-B	0	0	1	FR/W	
304, 354, 404, 454	AB Filter	2	0	5	FR/W	
305, 355, 405, 455	AB Counter	0000 Hex	0000	FFFF	M	
306, 356, 406, 456	UVW Status	0.0.0.	0.0.0.	1.1.1.	M	
307, 357, 407, 457	Motor Rated Voltage	100%	0	100	FR/W	
308, 358, 408, 458	Motor Peak Voltage	100%	0	100	FR/W	
309, 359, 409, 459	Boost Voltage	0.0%	0	25.0	FR/W	
310, 360, 410, 460	Motor Rated RPM	1800 rpm	0	9000	FR/W	
311, 361, 411, 461	Motor Rated Current	100%	10	100	FR/W	
312, 362, 412, 462	Motor Peak Current	100%	0	300	FR/W	
313, 363, 413, 463	Field Current	20%	0	100	FR/W	
314, 364, 414, 464	Pole	4	2	250	FR/W	
315, 365, 415, 465	Maximum RPM	1800 rpm	100	9000	FR/W	
316, 366, 416, 466	Minimum RPM	0 rpm	0	9000	FR/W	
317, 367, 417, 467	Slip RPM	100 rpm	0	9000	FR/W	
318, 368, 418, 468	Encoder PPR Check	0000 Hex	0000	FFFF	M	
319, 369, 419, 469	Reserve for special function	0				
320, 370, 420, 470	P Gain (Current Loop)	50	0	2000	FR/W	
321, 371, 421, 471	I Gain (Current Loop)	50	0	2000	FR/W	
322, 372, 422, 472	Reserve for special function	0				
323, 373, 423, 473	P Gain (Speed Loop)	500	0	4000	FR/W	
324, 374, 424, 474	I Gain (Speed Loop)	50	0	2000	FR/W	
325, 375, 425, 475	Reserve for special function	0				
326, 376, 426, 476	P Gain (Position Loop)	200	0	2000	FR/W	

Pr.xxx	Parameter Name	Default	Min.	Max.	Type	Reference
327, 377, 427, 477	Reserve for special function	0				5.2.11
328, 378, 428, 478	Reserve for special function	0				
329, 379, 429, 479	Reserve for special function	0				
330, 380, 430, 480	Position/Speed Select	0	0	1	FR/W	
331, 381, 431, 481	Pcmd/APTP Select	0	0	1	FR/W	
332, 382, 432, 482	Absolute/Increment Select	0	0	1	FR/W	
333, 383, 433, 483	Torque Limit Source Select	0.0	0	9.9	FR/W	
334, 384, 434, 484	Length Conversion	0	0	16	FR/W	
335, 385, 435, 485	Length Compensation	0	0	1	FR/W	
336, 386, 436, 486	Compensation Polarity	0	0	1	FR/W	
337, 387, 437, 487	Reserve for special function	0				
338, 388, 438, 488	Reserve for special function	0				
339, 389, 439, 489	Reserve for special function	0				
340, 390, 440, 490	Resolver Shift Angle	0.0	0.0	1000.0	FR/W	
341, 391, 441, 491	Resolver Polarity	0	0	1	FR/W	
342, 392, 442, 492	BL Motor Select	0	0	1	FR/W	
343, 393, 443, 493	Direct Torque Control Select	0	0	1	FR/W	
344, 394, 444, 494	APTP S Ramp Select	0	0	1	FR/W	11.1.3
345, 395, 445, 495	Reserve for special function	0				
346, 396, 446, 496	Reserve for special function	0				
347, 397, 447, 497	Reserve for special function	0				
348, 398, 448, 498	Reserve for special function	0				
349, 399, 449, 499	Reserve for special function	0				
501	DL0 (Low)	0	0	9999	FR/W	5.2.12
502	DL0 (High)	0	0	9999	FR/W	
502	DL1 (Low)	0	0	9999	FR/W	
503	DL1 (High)	0	0	9999	FR/W	
504	DL2 (Low)	0	0	9999	FR/W	
505	DL2 (High)	0	0	9999	FR/W	
⋮	⋮	⋮	⋮	⋮	⋮	
⋮	⋮	⋮	⋮	⋮	⋮	
558	DL29 (Low)	0	0	9999	FR/W	
559	DL29 (High)	0	0	9999	FR/W	
560	DL30 (Low)	0	0	9999	FR/W	
561	DL30 (High) /AI1 Detect Level	0	0	9999	FR/W	
562	DL31 (Low) /AI2 Detect Level	0	0	9999	FR/W	5.2.12
563	DL31 (High) /AI3 Detect Level	0	0	9999	FR/W	
564	Forward Travel Limit (Low)	0	0	9999	FR/W	5.2.12
565	Forward Travel Limit (High)	0	0	9999	FR/W	
566	Reverse Travel Limit (Low)	0	0	9999	FR/W	5.2.12
567	Reverse Travel Limit (High)	0	0	9999	FR/W	
568	Index Offset (Low)	0	0	9999	FR/W	5.2.12
569	Index Offset (High)	1	0	9999	FR/W	
570	Position Error Limit	1000	0	9999	FR/W	5.2.12
571	In Position Range	10	0	9999	FR/W	
574	μm Display BCD (Low)	0	0	9999	M	5.2.8
575	μm Display BCD (High)	0	0	9999	M	
576	μm Revolution (Low)	0	0	9999	FR/W	5.2.12
577	μm Revolution (High)	0	0	9999	FR/W	
578	Position BCD (Low)	0	0	9999	M	5.2.8
579	Position BCD (High)	0	0	9999	M	
580	Position Hex (Low)	0000 Hex	0000	FFFF	M	5.2.8
581	Position Hex (High)	0000 Hex	0000	FFFF	M	
582	μm Display Hex (Low)	0000 Hex	0000	FFFF	M	5.2.8
583	μm Display Hex (High)	0000 Hex	0000	FFFF	M	
734	Last Length μm Display Hex (Low)	0000 Hex	0000	FFFF	M	11.1.3
735	Last Length μm Display Hex (High)	0000 Hex	0000	FFFF	M	

5.2 Parameter Description

5.2.1 Parameter Type

Type	Description
R/W	Type R/W parameters are stored in EAROM. They can be read/write and store in the memory permanently.
FR/W	Type FR/W parameters are stored in EAROM. Generally, they are used for factory adjustment. Only authorized engineers should modify them.
RAM	Type RAM parameters are stored in RAM; they will be changed to default after RESET or power off.
M	Type M is read only parameters for monitoring.
R	Type R is constant parameters.

5.2.2 Parameter Protection

Pr.nnn	Parameter Name	Description														
095	Memory Protect	<table><tr><th>Pr.095</th><th>Pr.096</th><th>Description</th></tr><tr><td>1</td><td>--</td><td>All parameters (except Pr.000 and Pr.095) are not allow to change.</td></tr><tr><td>0</td><td>1</td><td>Parameters with R/W and FR/W type can be changed.</td></tr><tr><td>0</td><td>0</td><td>Parameters with R/W type can be changed..</td></tr></table>			Pr.095	Pr.096	Description	1	--	All parameters (except Pr.000 and Pr.095) are not allow to change.	0	1	Parameters with R/W and FR/W type can be changed.	0	0	Parameters with R/W type can be changed..
Pr.095	Pr.096				Description											
1	--				All parameters (except Pr.000 and Pr.095) are not allow to change.											
0	1				Parameters with R/W and FR/W type can be changed.											
0	0	Parameters with R/W type can be changed..														
096	Factory Write Enable															
186	Write Select	<table><tr><th>Pr.186</th><th>Description</th></tr><tr><td>0</td><td>Any further parameter change will write to EAROM.</td></tr><tr><td>1</td><td>Any further parameter change will write to RAM only, they will be changed to original value after RESET or power off..</td></tr></table>		Pr.186	Description	0	Any further parameter change will write to EAROM.	1	Any further parameter change will write to RAM only, they will be changed to original value after RESET or power off..							
Pr.186	Description															
0	Any further parameter change will write to EAROM.															
1	Any further parameter change will write to RAM only, they will be changed to original value after RESET or power off..															

5.2.3 Parameter Initialization

Pr.nnn	Parameter Name	Description
094	Reload Parameter	Pr.094 is used for Parameter Initialization.. Follow the process to execute R/W type parameters initialization: ● Write Pr.095 = 0, and Pr.094 = 1. ● Execute “ALM” RESET (press STOP/RESET key under “ALM” mode), or Execute Hardware RESET, or Execute Power-On RESET ● After initialization process, the data of parameters with R/W type will change to DEFAULT value listed in the PARAMETER LIST table (section 5.1). Follow the process to execute all parameters initialization: ● Write Pr.094 =249 ● Execute “ALM” RESET (press STOP/RESET key under “ALM” mode), or Execute Hardware RESET, or Execute Power-On RESET ● After initialization process, all of data in EAROM memory will change to DEFAULT value listed in the PARAMETER LIST table (section 5.1). Refer to section 4.2 for default setting of different application.

5.2.4 Speed & Acceleration/Deceleration Time

Pr.nnn	Parameter Name	Description
000	Main Speed Set	Pr.027 SPD3 Speed Normal Speed Pr.021 SPD1 Speed Pr.024 SPD2 Speed Pr.019 JOG Speed DIx(5) JOG DIx(4) SPD1 DIx(3) SPD2 DIx(2) SPD3 DIx(73) RUN
001	Main Acceleration Time	
002	Main Decel Time	
019	Jog Speed	
019	Jog Speed	
020	Jog Accel/Decel Time	
021	SPD1 Speed	
022	SPD1 Acceleration Time	
023	SPD1 Deceleration Time	
024	SPD2 Speed	
025	SPD2 Acceleration Time	
026	SPD2 Deceleration Time	
027	SPD3 Speed	
028	SPD3 Acceleration Time	
029	SPD3 Deceleration Time	

		● Normal Speed: speed source defined in Pr.040. ● Acceleration Time: the period of time from 0 rpm ramp up to Maximum RPM. ● Deceleration Time: the period of time from Maximum RPM ramp down to 0rpm. ● The priority level for multi-speed operation is: JOG>SPD1>SPD2>SPD3>16 STEP>NORMAL SPEED ● When normal speed selected, Pr.001/002 determines the acceleration and deceleration time. ● When JOG speed selected, Pr.020 determines the acceleration and deceleration time ● When SPD1 speed selected, Pr.022 determines the acceleration and Pr.023 determines the deceleration time. ● When SPD2 speed selected, Pr.025 determines the acceleration and Pr.026 determines the deceleration time. ● When SPD2 speed selected, Pr.028 determines the acceleration and Pr.029 determines the deceleration time. When DIX(2)~DIX(5) are all OFF (no JOG, SPD1, SPD2, SPD3 function), DIX(80)~DIX(83) are used to assign 16-STEP speed, DIX(84)~DIX(87) can be used to select acceleration and deceleration time. ● If any of DIX(80)~DIX(83) is ON, then set speed is: Set Speed = DIX(83)*Pr.027+DIX(82)*Pr.024+DIX(81)*Pr.021+DIX(80)*Pr.019 ● When DIX(84) is ON, Pr.020 determines the acceleration and deceleration time ● When DIX(85) is O, Pr.022 determines the acceleration and Pr.023 determines the deceleration time. ● When DIX(86) is ON, Pr.025 determines the acceleration and Pr.026 determines the deceleration time ● When DIX(87) is ON, Pr.028 determines the acceleration and Pr.029 determines the deceleration time.
073	S-curve Time T1 (Begin Acceleration)	By setting an S-curve value, will smooth the motor transition at beginning and end of the acceleration and deceleration period from current running speed to another operation speed.
074	S-curve Time T2 (End Acceleration)	
075	S-curve Time T3 (Begin Deceleration)	
076	S-curve Time T4 (End Deceleration)	
116	Speed Set	The Speed Set memorized in RAM not store to EAROM. If Speed Source select Pr.040= 46, this parameter will be used as the desired speed source. Usually, use this for speed setting by communication and the application has to change speed often.

5.2.5 Control Function

Pr.nnn	Parameter Name	Description
005	Brake Speed	While deceleration to stop, if the output speed is lower than this parameter, the output speed change to 0 RPM directly.
031	Reverse Inhibit	Pr.031 Description
		0 Drive may run in both direction
		1 Reverse run is inhibited.

033	Discharge Enable	<table><tr><td>Pr.033</td><td>Description</td></tr><tr><td>0</td><td>Discharge circuit is Disabled.</td></tr><tr><td>1</td><td>The discharge transistor will ON if the following conditions are met: ● Drive is Running ● Drive has no Alarm ● $V_{dc} > Pr.084 * 1.414 * 117\%$ ● Drive under deceleration </td></tr><tr><td>2</td><td>The discharge transistor will ON if the following conditions are met: ● Drive is Running ● Drive has no Alarm ● $V_{dc} > Pr.084 * 1.414 * 117\%$ </td></tr></table>	Pr.033	Description	0	Discharge circuit is Disabled.	1	The discharge transistor will ON if the following conditions are met: ● Drive is Running ● Drive has no Alarm ● $V_{dc} > Pr.084 * 1.414 * 117\%$ ● Drive under deceleration	2	The discharge transistor will ON if the following conditions are met: ● Drive is Running ● Drive has no Alarm ● $V_{dc} > Pr.084 * 1.414 * 117\%$																								
Pr.033	Description																																	
0	Discharge circuit is Disabled.																																	
1	The discharge transistor will ON if the following conditions are met: ● Drive is Running ● Drive has no Alarm ● $V_{dc} > Pr.084 * 1.414 * 117\%$ ● Drive under deceleration																																	
2	The discharge transistor will ON if the following conditions are met: ● Drive is Running ● Drive has no Alarm ● $V_{dc} > Pr.084 * 1.414 * 117\%$																																	
034	UP/OP Restart Enable	<table><tr><td>Pr.034</td><td>Description</td></tr><tr><td>0</td><td>UP/OP Restart function is Disabled.</td></tr><tr><td>1</td><td>After UP/OP alarm, when power comes back normal, the drive will restart automatically.</td></tr></table>	Pr.034	Description	0	UP/OP Restart function is Disabled.	1	After UP/OP alarm, when power comes back normal, the drive will restart automatically.																										
Pr.034	Description																																	
0	UP/OP Restart function is Disabled.																																	
1	After UP/OP alarm, when power comes back normal, the drive will restart automatically.																																	
039	Control Command Select	This parameter is select the control command will come from panel or terminal. If the control command come from terminal, then the terminals RUN DIx(73) and REV DIx(74) are used to control the drive. ● Any digital input terminal assigned as DIX(73) will function as RUN terminal input. ● Any digital input terminal assigned as DIX(74) will function as REV terminal input. <table><tr><td>Pr.039</td><td>Description</td></tr><tr><td>0</td><td>Control command comes from the Control Panel. ● Push FWD key, the drive will run forward direction. ● Push REV key, the drive will run reverse direction. ● Push STOP key, the drive will stop. </td></tr><tr><td>1</td><td>The RUN terminal DIx(73) determines the drive running or stop. The REV terminal DIx(74) determines the running direction.</td></tr><tr><td>2</td><td>The RUN terminal DIx(73) is equivalent to FORWARD-RUN The REV terminal DIx(74) is equivalent to REVERSE-RUN</td></tr></table> Control command come from digital input terminal: <table><tr><td>Pr.039</td><td>RUN</td><td>REV</td><td>Function</td></tr><tr><td rowspan="3">1</td><td>OFF</td><td>---</td><td>STOP</td></tr><tr><td>ON</td><td>OFF</td><td>FORWARD RUN</td></tr><tr><td>ON</td><td>ON</td><td>REVERSE RUN</td></tr><tr><td rowspan="3">2</td><td>OFF</td><td>OFF</td><td>STOP</td></tr><tr><td>OFF</td><td>ON</td><td>REVERSE RUN</td></tr><tr><td>ON</td><td>---</td><td>FORWARD RUN</td></tr></table> Control command select Pr.039 = a.b, it is composed of two selection of “a” and “b” in one parameter; if DIx(89)(Control Command SW) or DIx(90)(Speed & Control SW) is ON, then control command select = “b”, otherwise control command select = “a”.	Pr.039	Description	0	Control command comes from the Control Panel. ● Push FWD key, the drive will run forward direction. ● Push REV key, the drive will run reverse direction. ● Push STOP key, the drive will stop.	1	The RUN terminal DIx(73) determines the drive running or stop. The REV terminal DIx(74) determines the running direction.	2	The RUN terminal DIx(73) is equivalent to FORWARD-RUN The REV terminal DIx(74) is equivalent to REVERSE-RUN	Pr.039	RUN	REV	Function	1	OFF	---	STOP	ON	OFF	FORWARD RUN	ON	ON	REVERSE RUN	2	OFF	OFF	STOP	OFF	ON	REVERSE RUN	ON	---	FORWARD RUN
Pr.039	Description																																	
0	Control command comes from the Control Panel. ● Push FWD key, the drive will run forward direction. ● Push REV key, the drive will run reverse direction. ● Push STOP key, the drive will stop.																																	
1	The RUN terminal DIx(73) determines the drive running or stop. The REV terminal DIx(74) determines the running direction.																																	
2	The RUN terminal DIx(73) is equivalent to FORWARD-RUN The REV terminal DIx(74) is equivalent to REVERSE-RUN																																	
Pr.039	RUN	REV	Function																															
1	OFF	---	STOP																															
	ON	OFF	FORWARD RUN																															
	ON	ON	REVERSE RUN																															
2	OFF	OFF	STOP																															
	OFF	ON	REVERSE RUN																															
	ON	---	FORWARD RUN																															
051	Thermal Trip Time	This parameter defines the OVER LOAD trip time of Internal Thermal Relay. If Pr.051=0, the Thermal Relay function is disabled. (Irms/Motor Rated Current) Pr.051																																
066	DI0~DI10 Simulation	This parameter is used for simulating the digital input signal from DI0~DI10 terminal. The input value is in BCD format; it is converted into Binary form to simulate each digital input. For example: If Pr.066=2(BCD)=00000000010(Binary), means DI1 ON. If Pr.066=42(BCD)=00000101010(Binary), means DI1, DI3 and DI5 ON.																																

067	Torque Set (RAM)	● If Pr.333/383/433/483 (Torque Limit Source Select) = 4, the torque limit is controlled by Pr.067. ● If Pr.333/383/433/483 (Torque Limit Source Select) = 6, the torque limit is controlled by Pr.069. The difference of Pr.067and Pr.069 is: <table><tr><td>Pr.</td><td>Type</td><td>Range</td></tr><tr><td>Pr.067</td><td>RAM</td><td>0.00~100.00%</td></tr><tr><td>Pr.069</td><td>FR/W</td><td>0~100%</td></tr></table>	Pr.	Type	Range	Pr.067	RAM	0.00~100.00%	Pr.069	FR/W	0~100%																
Pr.	Type		Range																								
Pr.067	RAM	0.00~100.00%																									
Pr.069	FR/W	0~100%																									
069	Torque Set (EARAM)																										
068	DO Simulation	This Parameter is used for simulating the digital output status. The input value is in BCD format; it converted into Binary form to simulate each digital output. For example: Pr.068=2(BCD)= 0000010(Binary), means DO1 ON. Pr.068=42(BCD)= 0101010(Binary), means DO1, DO3 and DO5 ON.																									
180	Fan Control	When temperature $\geq 45^{\circ}\text{C}$, Fan always ON. Pr.180 = aa.bb, it is composed of two selection of “aa” and “bb” in one parameter, when temperature $< 45^{\circ}\text{C}$, ON/OFF duty of fan is: aa: ON time (seconds) bb: OFF time (seconds)																									
181	Panel Command Priority	<table><tr><td>Pr.181</td><td>Control Command</td></tr><tr><td>0</td><td>From Control Panel</td></tr><tr><td>1</td><td>From RS485 communication port</td></tr></table>	Pr.181	Control Command	0	From Control Panel	1	From RS485 communication port																			
Pr.181	Control Command																										
0	From Control Panel																										
1	From RS485 communication port																										
182	Panel Speed Priority	<table><tr><td>Pr.182</td><td>Speed Command</td></tr><tr><td>0</td><td>From Control Panel</td></tr><tr><td>1</td><td>From RS485 communication port</td></tr></table>	Pr.182	Speed Command	0	From Control Panel	1	From RS485 communication port																			
Pr.182	Speed Command																										
0	From Control Panel																										
1	From RS485 communication port																										
188	Motor Parameter Group Select	If none of all DIx select DIx(114)(MSB0) or DIx(115)(MSB1), then Motor Parameter Group is selected by Pr.188 <table><tr><td>Pr.188</td><td>Motor Parameter Group</td></tr><tr><td>0</td><td>Use motor parameter group #0 (Pr.300~349)</td></tr><tr><td>1</td><td>Use motor parameter group #1 (Pr.350~399)</td></tr><tr><td>2</td><td>Use motor parameter group #2 (Pr.400~449)</td></tr><tr><td>3</td><td>Use motor parameter group #3 (Pr.450~499)</td></tr></table> If there exists any DIx(114)(MSB0) or DIx(115)(MSB1) selected, then Motor Parameter Group is selected by Digital Input Terminal. <table><tr><td>DIx(114) MSB0</td><td>DIx(115) MSB1</td><td>Motor Parameter Group</td></tr><tr><td>OFF</td><td>OFF</td><td>Use motor parameter group #0 (Pr.300~349)</td></tr><tr><td>OFF</td><td>ON</td><td>Use motor parameter group #1 (Pr.350~399)</td></tr><tr><td>ON</td><td>OFF</td><td>Use motor parameter group #2 (Pr.400~449)</td></tr><tr><td>ON</td><td>ON</td><td>Use motor parameter group #3 (Pr.450~499)</td></tr></table> NOTE: This function in checked only when power ON or after reset.	Pr.188	Motor Parameter Group	0	Use motor parameter group #0 (Pr.300~349)	1	Use motor parameter group #1 (Pr.350~399)	2	Use motor parameter group #2 (Pr.400~449)	3	Use motor parameter group #3 (Pr.450~499)	DIx(114) MSB0	DIx(115) MSB1	Motor Parameter Group	OFF	OFF	Use motor parameter group #0 (Pr.300~349)	OFF	ON	Use motor parameter group #1 (Pr.350~399)	ON	OFF	Use motor parameter group #2 (Pr.400~449)	ON	ON	Use motor parameter group #3 (Pr.450~499)
Pr.188	Motor Parameter Group																										
0	Use motor parameter group #0 (Pr.300~349)																										
1	Use motor parameter group #1 (Pr.350~399)																										
2	Use motor parameter group #2 (Pr.400~449)																										
3	Use motor parameter group #3 (Pr.450~499)																										
DIx(114) MSB0	DIx(115) MSB1	Motor Parameter Group																									
OFF	OFF	Use motor parameter group #0 (Pr.300~349)																									
OFF	ON	Use motor parameter group #1 (Pr.350~399)																									
ON	OFF	Use motor parameter group #2 (Pr.400~449)																									
ON	ON	Use motor parameter group #3 (Pr.450~499)																									
189	PG Loss Check Enable	<table><tr><td>Pr.189</td><td>Description</td></tr><tr><td>0</td><td>No PG Loss check</td></tr><tr><td>1</td><td>PG Loss Check enabled. When PG Loss, shown alarm message “PG” on control panel.</td></tr></table>	Pr.189	Description	0	No PG Loss check	1	PG Loss Check enabled. When PG Loss, shown alarm message “PG” on control panel.																			
Pr.189	Description																										
0	No PG Loss check																										
1	PG Loss Check enabled. When PG Loss, shown alarm message “PG” on control panel.																										

5.2.6 Analog Input/Output Function

Pr.nnn	Parameter name	Description
089	AI1 Low	This parameter is used to record the A/D converter data read from Pr.201 when “AI1” input terminal is connected to “ACOM” terminal. (AI1 select 0~+5)
090	AI1 High	This parameter is used to record the A/D converter data read from Pr.201 when “AI1” input terminal is connected to “+5V” voltage source. (AI1 select 0~+5)
091	AI2 Low	This parameter is used to record the A/D converter data read from Pr.202 when “AI2” input terminal is connected to “ACOM” terminal. (AI2 select 0~+5)
092	AI2 High	This parameter is used to record the A/D converter data read from Pr.202 when “AI2” input terminal is connected to “+5V” voltage source. (AI2 select 0~+5)
191	AI3 Low	This parameter is used to record the A/D converter data read from Pr.203 when “AI3” input terminal is connected to “ACOM” terminal. (AI3 select 0~+5)
192	AI3 High	This parameter is used to record the A/D converter data read from Pr.203 when “AI3” input terminal is connected to “+5V” voltage source. (AI3 select 0~+5)

210	AO1 Select	<table><tr><th>Setting</th><th>Analog Output Function</th></tr><tr><td>0</td><td>0V</td></tr><tr><td>1</td><td>Positive Maximum (about 10V)</td></tr><tr><td>2</td><td>Negative Maximum (about -10V)</td></tr><tr><td>3</td><td>Speed (Full-scale=Maximum RPM)</td></tr><tr><td>4</td><td>abs(Speed) (Full-scale=Maximum RPM)</td></tr><tr><td>5</td><td>Output Current (Full-scale=200% of Drive Rated Current)</td></tr><tr><td>6</td><td>Output Current (Full-scale=300% of Motor Rated Current)</td></tr><tr><td>7</td><td>PID Output</td></tr><tr><td>8</td><td>Torque (Full-scale=Maximum Torque)</td></tr><tr><td>9</td><td>abs(Torque) (Full-scale=Maximum Torque)</td></tr><tr><td>12</td><td>Position Error (Full-scale= Position Error / Position Error Limit Pr.570)</td></tr></table>	Setting	Analog Output Function	0	0V	1	Positive Maximum (about 10V)	2	Negative Maximum (about -10V)	3	Speed (Full-scale=Maximum RPM)	4	abs(Speed) (Full-scale=Maximum RPM)	5	Output Current (Full-scale=200% of Drive Rated Current)	6	Output Current (Full-scale=300% of Motor Rated Current)	7	PID Output	8	Torque (Full-scale=Maximum Torque)	9	abs(Torque) (Full-scale=Maximum Torque)	12	Position Error (Full-scale= Position Error / Position Error Limit Pr.570)
Setting	Analog Output Function																									
0	0V																									
1	Positive Maximum (about 10V)																									
2	Negative Maximum (about -10V)																									
3	Speed (Full-scale=Maximum RPM)																									
4	abs(Speed) (Full-scale=Maximum RPM)																									
5	Output Current (Full-scale=200% of Drive Rated Current)																									
6	Output Current (Full-scale=300% of Motor Rated Current)																									
7	PID Output																									
8	Torque (Full-scale=Maximum Torque)																									
9	abs(Torque) (Full-scale=Maximum Torque)																									
12	Position Error (Full-scale= Position Error / Position Error Limit Pr.570)																									
220	AO2 Select																									
230	AO3 Select																									
211	AO1 Zero	<table><tr><th>Setting</th><th>Description</th></tr><tr><td>0.00~0.99</td><td>Positive Zero Compensation (resolution 0.01 volt)</td></tr><tr><td>1.00~1.99</td><td>Negative Zero Compensation (resolution 0.01 volt)</td></tr></table>	Setting	Description	0.00~0.99	Positive Zero Compensation (resolution 0.01 volt)	1.00~1.99	Negative Zero Compensation (resolution 0.01 volt)																		
Setting	Description																									
0.00~0.99	Positive Zero Compensation (resolution 0.01 volt)																									
1.00~1.99	Negative Zero Compensation (resolution 0.01 volt)																									
221	AO2 Zero																									
231	AO3 Zero																									
212	AO1 Span	Analog output span adjustment																								
222	AO2 Span																									
232	AO3 Span																									

5.2.7 Factory Adjustment Parameters

NOTE: Only authorized engineers should modify these parameters.

Pr.nnn	Parameter Name	Description
012	PWM Carrier	Fixed frequency 8K Hz
083	IGBT Guard Time	This parameter defines the guard time for preventing IGBT short between upper and lower arm. Only factory can modify this parameter, consult factory if modification is necessary.
084	Line Voltage	This parameter defines the normal working voltage of the drive. According to this parameter, the drive calculates all voltage dependent values. - OP Trip Voltage (Vdc) = 1.414 * Pr.084 * 130 % - UP Trip Voltage (Vdc) = 1.414 * Pr.084 * 70% - OP Recover Voltage (Vdc) = 1.414 * Pr.084 * 120% - UP Recover Voltage (Vdc) = 1.414 * Pr.084 * 80% - Contactor ON Voltage (Vdc) = 1.414 * Pr.084 * 69% - Contactor OFF Voltage (Vdc) = 1.414 * Pr.084 * 65% Note: The “contactor” means the device used to BY-PASS the charging resistor. It may a RELAY or a SCR instead. - Discharge Start Voltage (Vdc) = 1.414 * Pr.084 * 117% (Refer to Pr.033)
085	Rated Current	This parameter defines the rated output current of the drive.
086	Irms Adjust	This parameter is used to adjust the Irms data reading.
087	Vdc Adjust	This parameter is used to adjust the reading of internal DC BUS.
097	Version	This parameter is indicating the software revision of this drive.

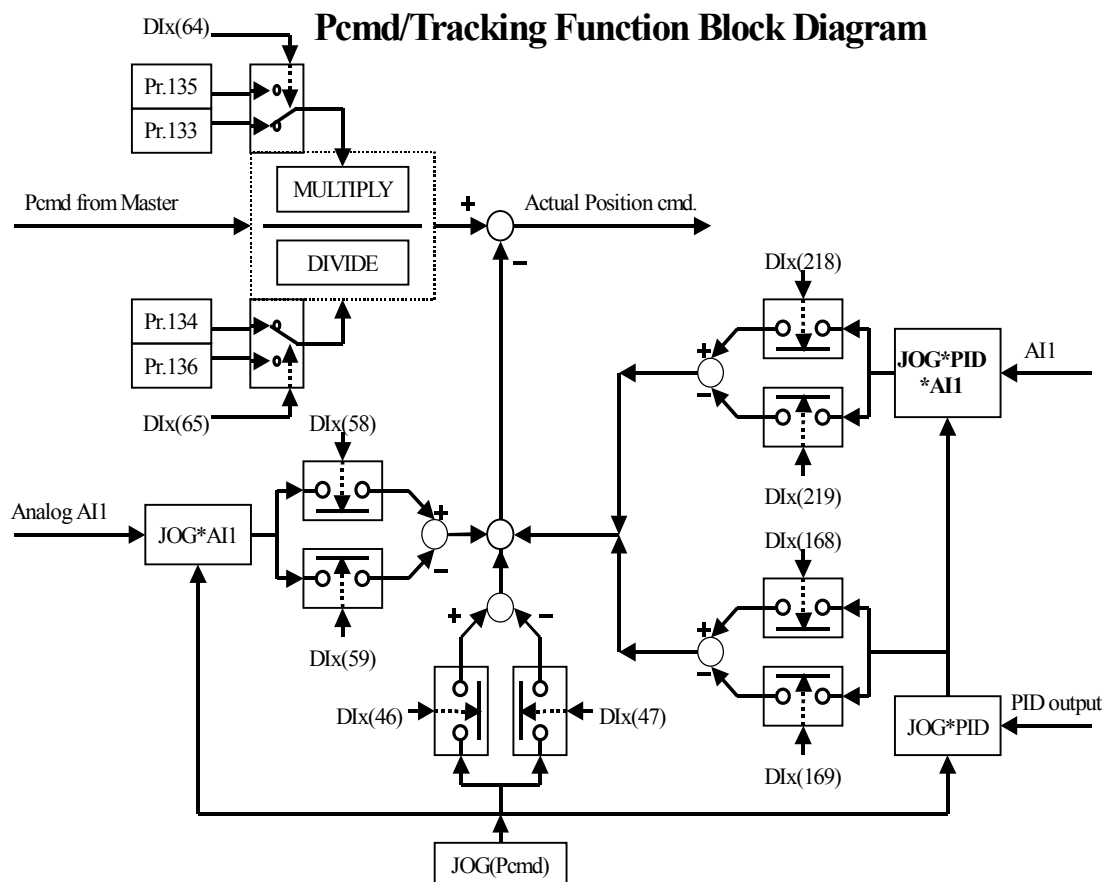
5.2.8 Monitor Function

Pr.nnn	Parameter Name	Description																											
013	Alarm Code	Display the present alarm message. <table> <tr> <th>Alarm Code</th><th>Control Panel shows</th><th>Message Description</th></tr> <tr><td>0</td><td>no</td><td>Normal</td></tr> <tr><td>1</td><td>PG</td><td>PG Loss</td></tr> <tr><td>3</td><td>OC</td><td>Over Current</td></tr> <tr><td>4</td><td>OH</td><td>Over Heat</td></tr> <tr><td>5</td><td>OP</td><td>Over Voltage</td></tr> <tr><td>6</td><td>UP</td><td>Under Voltage</td></tr> <tr><td>7</td><td>OL</td><td>Over Load</td></tr> <tr><td>9</td><td>SE</td><td>CPU Program Check Sum Error</td></tr> </table>	Alarm Code	Control Panel shows	Message Description	0	no	Normal	1	PG	PG Loss	3	OC	Over Current	4	OH	Over Heat	5	OP	Over Voltage	6	UP	Under Voltage	7	OL	Over Load	9	SE	CPU Program Check Sum Error
Alarm Code	Control Panel shows	Message Description																											
0	no	Normal																											
1	PG	PG Loss																											
3	OC	Over Current																											
4	OH	Over Heat																											
5	OP	Over Voltage																											
6	UP	Under Voltage																											
7	OL	Over Load																											
9	SE	CPU Program Check Sum Error																											
057	HZ	Monitors the output frequency of the drive.																											
058	RPM	For close loop control mode, monitors the motor rotating speed. For V/F constant mode, RPM = 120 * Hz / POLE.																											
059	Vdc (Capacitor)	Monitors the internal DC BUS voltage of the drive, Vdc = 1.414 * Vac (line input)																											
060	Vout (r.m.s. output)	Monitors the output Vrms of the drive.																											

054	Irms Select	Use Pr.054 to select the data type displays in Pr.061.		
061	Irms	Pr.054	Pr.061	
		0	Output Current Irms (Amp)	
		1	Output Current Irms (% of Drive rating)	
		2	Output Current Irms (% of motor rating)	
		11	OL accumulation level	
		28	abs(Output Torque) (% of Maximum Output Torque)	
062	Temperature	Monitors the temperature of internal heat sink. When the temperature exceeds 80 °C driver will STOP and show OH alarm.		
064	DI0~DI14 Input Status	Monitors the DI0~DI14, expressed in Hex form. It is converted into Binary form to show the status of DI0~DI14. For example: If Pr.064=0062(Hex)=00001100010(Binary), means DI1, DI5 and DI6 is ON.		
065	DO0~DO6 Output Status	Monitors the DO0~DO60, expressed in Hex form. It is converted into Binary form to show the status of DO0~DO6. For example: If Pr.065=0062(Hex)=1100010(Binary), means DO1, DO5 and DO6 is ON.		
098	Monitor(I)	While control panel is under “MON” mode, user can select which two statuses are to be monitored. Pr.098 is used to assign the parameter to be monitored when “I” LED is ON. Pr.099 is used to assign the parameter to be monitored when “HZ” LED is ON. For example, the default value in Pr.099=58 and Pr.098=61, that means, the panel will show the value of Pr.058 (rpm) while “HZ” LED is ON. And push ▲ or ▼ key to change to LED “I” ON, the panel will show the value of Pr.061 (Irms).		
099	Monitor(HZ)			
053	Gear Ratio	According to Pr.053, the drive calculates Line Speed show in Pr157~159.		
157	Line Speed(1)	Pr.xxx	Display	Data Range
158	Line Speed(2)	157	RPM(Pr.058) * Gear Ratio(Pr.053)	0~65530
159	Line Speed(3)	158	RPM(Pr.058) * Gear Ratio (Pr.053) / 100	0.00~655.30
		159	RPM(Pr.058) * Gear Ratio(Pr.053) / 10	0.0~6553.0
200	Iv A/D Value	Monitors A/D converted data of Iv.		
201	AI1 A/D Value	Monitors A/D converted data of AI1.		
202	AI2 A/D Value	Monitors A/D converted data of AI2.		
203	AI3 A/D Value	Monitors A/D converted data of AI3.		
204	Iw A/D Value	Monitors A/D converted data of Iw.		
205	Idc A/D Value	Monitors A/D converted data of Idc.		
206	Vcap A/D Value	Monitors A/D converted data of Vcap.		
207	Temperature A/D Value	Monitors A/D converted data of Temperature.		
574	μm Display BCD (Low)	Actual position expressed in μm (BCD format)		
575	μm Display BCD (High)			
578	Position BCD (Low)	Actual position expressed in clocks (BCD format)		
579	Position BCD (High)			
580	Position Hex (Low)	Actual position expressed in clocks (HEX format)		
581	Position Hex (High)			
582	μm Display Hex (Low)	Actual position expressed in μm (HEX format)		
583	μm Display Hex (High)			

5.2.9 XY Pulse Command Input Parameters

Pr.nnn	Parameter Name	Description															
130	XY Clock Type Select	<table><tr><th>Pr.130</th><th>XY Clock Type</th></tr><tr><td>0</td><td>Two phase input clocks and X4 rate Count (Pr.137) 十六進制</td></tr><tr><td>1</td><td>CLOCK and DIRECTION signals X signal: Clock Pulse Y signal: Direction Count (Pr.137)</td></tr><tr><td>2</td><td>UP-clock and DOWN-clock pulses X signal: UP-Clock Y signal: DOWN-closk Count (Pr.137)</td></tr><tr><td>3</td><td>Two phase input clocks and X2 rate Count (Pr.137)</td></tr></table> Refer to section 1.2.2 for XY Pulse input interface and signals description	Pr.130	XY Clock Type	0	Two phase input clocks and X4 rate Count (Pr.137) 十六進制	1	CLOCK and DIRECTION signals X signal: Clock Pulse Y signal: Direction Count (Pr.137)	2	UP-clock and DOWN-clock pulses X signal: UP-Clock Y signal: DOWN-closk Count (Pr.137)	3	Two phase input clocks and X2 rate Count (Pr.137)					
Pr.130	XY Clock Type																
0	Two phase input clocks and X4 rate Count (Pr.137) 十六進制																
1	CLOCK and DIRECTION signals X signal: Clock Pulse Y signal: Direction Count (Pr.137)																
2	UP-clock and DOWN-clock pulses X signal: UP-Clock Y signal: DOWN-closk Count (Pr.137)																
3	Two phase input clocks and X2 rate Count (Pr.137)																
131	XY Input Pin Status	Monitors XY pulse input pins status.															
132	XY Direction Change	Change XY counter direction. When DIx(139)(XY Direction Change) selected, DIx(139) determines XY counter direction.															
133	XY Multiply Rate 0	Use DIx(64)(XY Multiply) and DIx(65)(XY Division) to select Multiply Rate and Division Rate, and input clock rate counts as following: <table><tr><th>DIx(64)</th><th>DIx(65)</th><th>Clock Rate</th></tr><tr><td>OFF</td><td>OFF</td><td>Multiply Rate 0 / Division Rate 0</td></tr><tr><td>OFF</td><td>ON</td><td>Multiply Rate 0 / Division Rate 1</td></tr><tr><td>ON</td><td>OFF</td><td>Multiply Rate 1 / Division Rate 0</td></tr><tr><td>ON</td><td>ON</td><td>Multiply Rate 1 / Division Rate 1</td></tr></table> Pr.134=0 and Pr.136=0 means Division Rate = 10000	DIx(64)	DIx(65)	Clock Rate	OFF	OFF	Multiply Rate 0 / Division Rate 0	OFF	ON	Multiply Rate 0 / Division Rate 1	ON	OFF	Multiply Rate 1 / Division Rate 0	ON	ON	Multiply Rate 1 / Division Rate 1
DIx(64)	DIx(65)		Clock Rate														
OFF	OFF		Multiply Rate 0 / Division Rate 0														
OFF	ON		Multiply Rate 0 / Division Rate 1														
ON	OFF	Multiply Rate 1 / Division Rate 0															
ON	ON	Multiply Rate 1 / Division Rate 1															
134	XY Division Rate 0																
135	XY Multiply Rate 1																
136	XY Division Rate 1																
137	XY Counter Value	Monitors the content of pulses input to XY counter, expressed in Hex form. Pr.137=XY-input* (XY-Multiply / XY-Divide) * XY-Direction															
138	XY Sampling Period	Pr.139 XY Rate is the total pulse counter per the period of Pr.138 XY Sampling Period															
139	XY Rate																



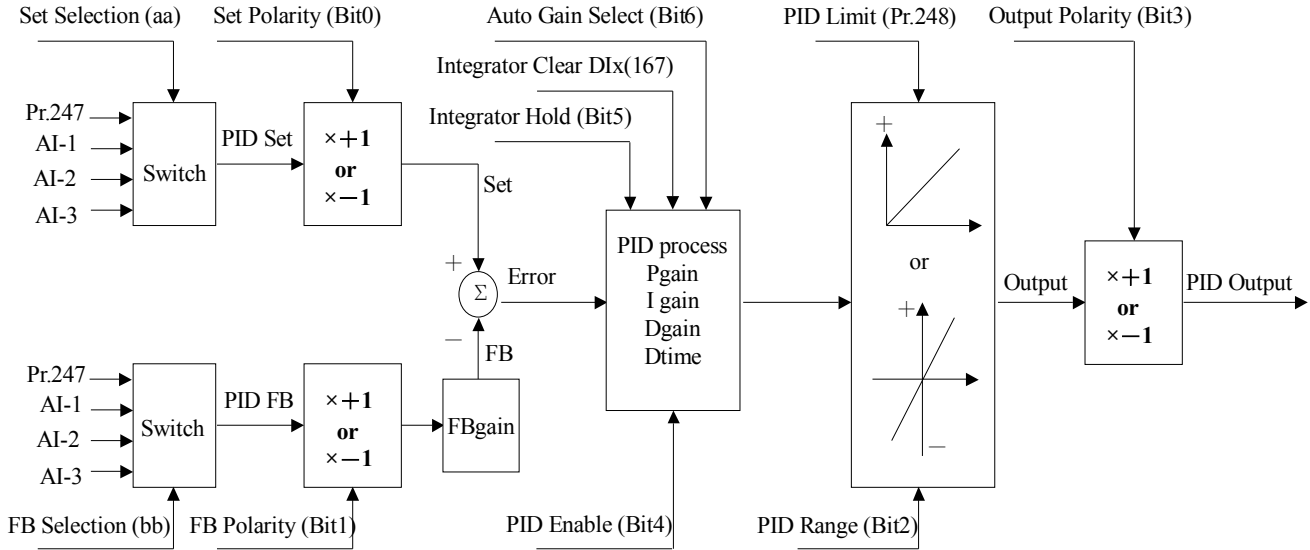
The following table lists the relative Digital Input function.

The following table lists the Relative Digital Input Function.

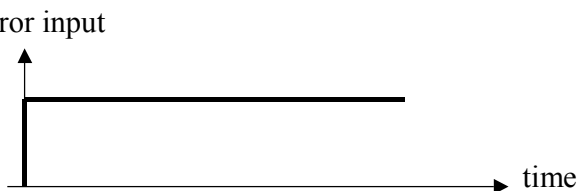
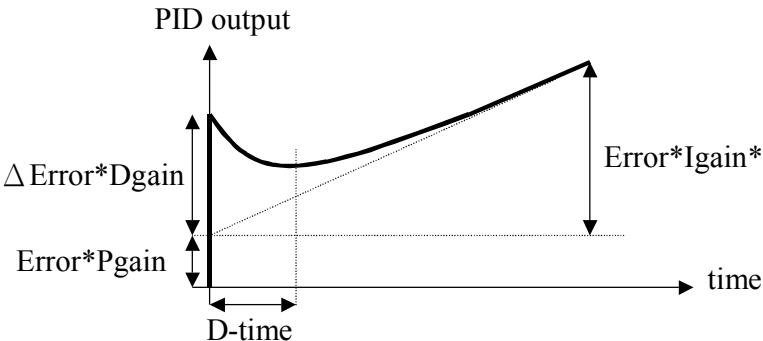
DIx	Function	Description																		
46	TRACK + JOG	DIx(46), DIx(47), DIx(58), DIx(59), DIx(168), DIx(169),DIx(218) and DIx(219) are used to assign the Set Speed under tracking mode, if the digital input terminal is ON, the Set Speed as following: <table><tr><th>DIx</th><th>Set Speed</th></tr><tr><td>46</td><td>Tracking Speed + JOG Speed (Pr.019)</td></tr><tr><td>47</td><td>Tracking Speed – JOG Speed (Pr.019)</td></tr><tr><td>58</td><td>Tracking Speed + AI1 Input * JOG Speed (Pr.019)</td></tr><tr><td>59</td><td>Tracking Speed – AI1 Input * JOG Speed (Pr.019)</td></tr><tr><td>168</td><td>Tracking Speed + PID Output * JOG Speed (Pr.019)</td></tr><tr><td>169</td><td>Tracking Speed – PID Output * JOG Speed (Pr.019)</td></tr><tr><td>218</td><td>Tracking Speed plus (PID Output*AI1*JOG Speed)</td></tr><tr><td>219</td><td>Tracking Speed minus (PID Output*AI1*JOG Speed)</td></tr></table> ● Use these functions only under tracking mode. ● AI1 range can only select 0~5V or 0~10V. ● AI1 input range = +100% ~ -100%	DIx	Set Speed	46	Tracking Speed + JOG Speed (Pr.019)	47	Tracking Speed – JOG Speed (Pr.019)	58	Tracking Speed + AI1 Input * JOG Speed (Pr.019)	59	Tracking Speed – AI1 Input * JOG Speed (Pr.019)	168	Tracking Speed + PID Output * JOG Speed (Pr.019)	169	Tracking Speed – PID Output * JOG Speed (Pr.019)	218	Tracking Speed plus (PID Output*AI1*JOG Speed)	219	Tracking Speed minus (PID Output*AI1*JOG Speed)
DIx	Set Speed																			
46	Tracking Speed + JOG Speed (Pr.019)																			
47	Tracking Speed – JOG Speed (Pr.019)																			
58	Tracking Speed + AI1 Input * JOG Speed (Pr.019)																			
59	Tracking Speed – AI1 Input * JOG Speed (Pr.019)																			
168	Tracking Speed + PID Output * JOG Speed (Pr.019)																			
169	Tracking Speed – PID Output * JOG Speed (Pr.019)																			
218	Tracking Speed plus (PID Output*AI1*JOG Speed)																			
219	Tracking Speed minus (PID Output*AI1*JOG Speed)																			
47	TRACK – JOG																			
58	TRACK + (AI1 * JOG)																			
59	TRACK – (AI1 * JOG)																			
168	TRACK + (PID Output * JOG)																			
169	TRACK – (PID Output * JOG)																			
218	TRACK + JOG * AI1 * PID OUTPUT																			
219	TRACK – JOG * AI1 * PID OUTPUT																			
104	XY CLOCK INPUT ENABLE	<table><tr><th>DIx(104)</th><th>DIx(105)</th><th>XY Clock Input</th></tr><tr><td>0FF</td><td>0N</td><td>Disable</td></tr><tr><td>ON</td><td>OFF</td><td>Enable</td></tr></table>	DIx(104)	DIx(105)	XY Clock Input	0FF	0N	Disable	ON	OFF	Enable									
DIx(104)	DIx(105)		XY Clock Input																	
0FF	0N		Disable																	
ON	OFF	Enable																		
105	/XY CLOCK INPUT ENABLE																			

5.2.10 PID Function

PID Function Block



Pr.nnn	Parameter Name	Description																																
240	PID Input Select	This parameter composed by “aa” & “bb” separated by decimal point. The aa value is used to select the PID Set signal source for PID block. The bb value is used to select the PID FB signal source for PID block. The equivalent source for selection value “aa” or “bb” is: <table><tr><th>Pr.240</th><th>Description</th></tr><tr><td>0</td><td>Constant value defined by Pr.247 (0~100%)</td></tr><tr><td>1</td><td>Bipolar input from AI1</td></tr><tr><td>2</td><td>Bipolar input from AI2</td></tr><tr><td>3</td><td>Bipolar input from AI3</td></tr><tr><td>5</td><td>Motor RPM</td></tr><tr><td>6</td><td>Motor output Tcmd</td></tr><tr><td>10</td><td>Pr.139 XY Rate</td></tr><tr><td>11</td><td>Unipolar input from AI1</td></tr><tr><td>12</td><td>Unipolar input from AI2</td></tr><tr><td>13</td><td>Unipolar input from AI3</td></tr></table>	Pr.240	Description	0	Constant value defined by Pr.247 (0~100%)	1	Bipolar input from AI1	2	Bipolar input from AI2	3	Bipolar input from AI3	5	Motor RPM	6	Motor output Tcmd	10	Pr.139 XY Rate	11	Unipolar input from AI1	12	Unipolar input from AI2	13	Unipolar input from AI3										
Pr.240	Description																																	
0	Constant value defined by Pr.247 (0~100%)																																	
1	Bipolar input from AI1																																	
2	Bipolar input from AI2																																	
3	Bipolar input from AI3																																	
5	Motor RPM																																	
6	Motor output Tcmd																																	
10	Pr.139 XY Rate																																	
11	Unipolar input from AI1																																	
12	Unipolar input from AI2																																	
13	Unipolar input from AI3																																	
241	PID Default Configuration	Pr.241=N, the value N is composed of 7 different bit switches. While Power ON or after RESET, the 7 bit switches are used to configure the PID block. N = 64*Bit6 + 32*Bit5 + 16*Bit4 + 8*Bit3 + 4*Bit2 + 2*Bit1 + 1*Bit0 If any of these switches requires random change, use DIx(160)~DIx(165) for equivalent bits. <table><tr><th>Bit n</th><th>Name</th><th>Function</th><th>Equivalent DIx</th></tr><tr><td>Bit0</td><td>Set Polarity</td><td>=0, Set = (+1) * PID Set =1, Set = (−1) * PID Set</td><td>DIx(160)</td></tr><tr><td>Bit1</td><td>FB Polarity</td><td>=0, FB = (+1) * PID FB =1, FB = (−1) * PID FB</td><td>DIx(161)</td></tr><tr><td>Bit2</td><td>PID Range</td><td>=0, Output with Bipolar value =1, Output with Unipolar value</td><td>DIx(162)</td></tr><tr><td>Bit3</td><td>Output Polarity</td><td>=0, PIDOutput = (+1) * Output =1, PID Output= (−1) * Output</td><td>DIx(163)</td></tr><tr><td>Bit4</td><td>PID Enable</td><td>=0, PID block disabled =1, PID block enabled</td><td>DIx(164)</td></tr><tr><td>Bit5</td><td>PID Hold</td><td>=0, PID Integrator normal =1, PID Integrator Hold</td><td>DIx(165)</td></tr><tr><td>Bit6</td><td>Auto Gain</td><td>=0, Auto Gain disabled =1, Auto Gain Enabled</td><td>DIx(166)</td></tr></table>	Bit n	Name	Function	Equivalent DIx	Bit0	Set Polarity	=0, Set = (+1) * PID Set =1, Set = (−1) * PID Set	DIx(160)	Bit1	FB Polarity	=0, FB = (+1) * PID FB =1, FB = (−1) * PID FB	DIx(161)	Bit2	PID Range	=0, Output with Bipolar value =1, Output with Unipolar value	DIx(162)	Bit3	Output Polarity	=0, PIDOutput = (+1) * Output =1, PID Output= (−1) * Output	DIx(163)	Bit4	PID Enable	=0, PID block disabled =1, PID block enabled	DIx(164)	Bit5	PID Hold	=0, PID Integrator normal =1, PID Integrator Hold	DIx(165)	Bit6	Auto Gain	=0, Auto Gain disabled =1, Auto Gain Enabled	DIx(166)
Bit n	Name	Function	Equivalent DIx																															
Bit0	Set Polarity	=0, Set = (+1) * PID Set =1, Set = (−1) * PID Set	DIx(160)																															
Bit1	FB Polarity	=0, FB = (+1) * PID FB =1, FB = (−1) * PID FB	DIx(161)																															
Bit2	PID Range	=0, Output with Bipolar value =1, Output with Unipolar value	DIx(162)																															
Bit3	Output Polarity	=0, PIDOutput = (+1) * Output =1, PID Output= (−1) * Output	DIx(163)																															
Bit4	PID Enable	=0, PID block disabled =1, PID block enabled	DIx(164)																															
Bit5	PID Hold	=0, PID Integrator normal =1, PID Integrator Hold	DIx(165)																															
Bit6	Auto Gain	=0, Auto Gain disabled =1, Auto Gain Enabled	DIx(166)																															
242	PID Output Value	Monitors Output value of PID block, expressed in Hex form.																																

243	PID Pgain	Error input  PID output  $PID_out = Error * \frac{Pgain}{256} + (\Delta Error * e^{-\frac{t}{Dtime}}) * \frac{Dgain}{256} + Error * \frac{Igain * 500}{65536} * t$ Note: the PID block is calculated every 2ms Pr.253 used to select Auto Gain of PID block, Pgain, Igain, Dgain = Set value * AutoGain-coefficient. <table><tr><th>Pr.253</th><th>Auto Gain Source</th><th>Range</th></tr><tr><td>0</td><td>No Auto Gain</td><td>100%</td></tr><tr><td>1</td><td>AI1 Input</td><td>0~100%</td></tr><tr><td>2</td><td>AI2 Input</td><td>0~100%</td></tr><tr><td>3</td><td>AI3 Input</td><td>0~100%</td></tr><tr><td>4</td><td>Speed / Maximum RPM</td><td>(1/16)~100%</td></tr><tr><td>5</td><td>Average Speed / Maximum RPM (Speed is average every 0.25 second))</td><td>(1/16)~100%</td></tr></table>	Pr.253	Auto Gain Source	Range	0	No Auto Gain	100%	1	AI1 Input	0~100%	2	AI2 Input	0~100%	3	AI3 Input	0~100%	4	Speed / Maximum RPM	(1/16)~100%	5	Average Speed / Maximum RPM (Speed is average every 0.25 second))	(1/16)~100%
Pr.253	Auto Gain Source		Range																				
0	No Auto Gain		100%																				
1	AI1 Input		0~100%																				
2	AI2 Input		0~100%																				
3	AI3 Input	0~100%																					
4	Speed / Maximum RPM	(1/16)~100%																					
5	Average Speed / Maximum RPM (Speed is average every 0.25 second))	(1/16)~100%																					
244	PID Igain																						
245	PID Dgain																						
249	PID Dtime																						
253	PID Auto Gain Select																						
246	PID FBgain	PID Feedback Gain																					
247	PID Constant Reference	Constant value used as PID Set or PID FB reference.																					
248	PID Limit	Maximum output limit of PID block.																					
250	PID Set Value	Monitors Set value of PID block.																					
251	PID FB Value	Monitors Feedback value of PID block																					
252	PID Error Value	Monitors Error value of PID block																					

Other information:

- When Torque Limit select (Pr.333/383/433/483) = 5, PID Output becomes the torque limit source. (Refer to Pr.333)
- When Analog Output Source Select = 7, PID Output becomes the AOx Output value. (Refer to section 5.2.6)
- When Speed Source Select (Pr.040) = 40, PID Output becomes the Main Speed Source. (Refer to section 6.2.1)
- When DIx(167) = ON, clear PID integrator value.
- When DIx(168) is selected, Set Speed = Tracking Speed + PID Output * JOG Speed (Pr.019). (Refer to section 5.2.9)
- When DIx(169) is selected, Set Speed = Tracking Speed – PID Output * JOG Speed (Pr.019). (Refer to section 5.2.9)

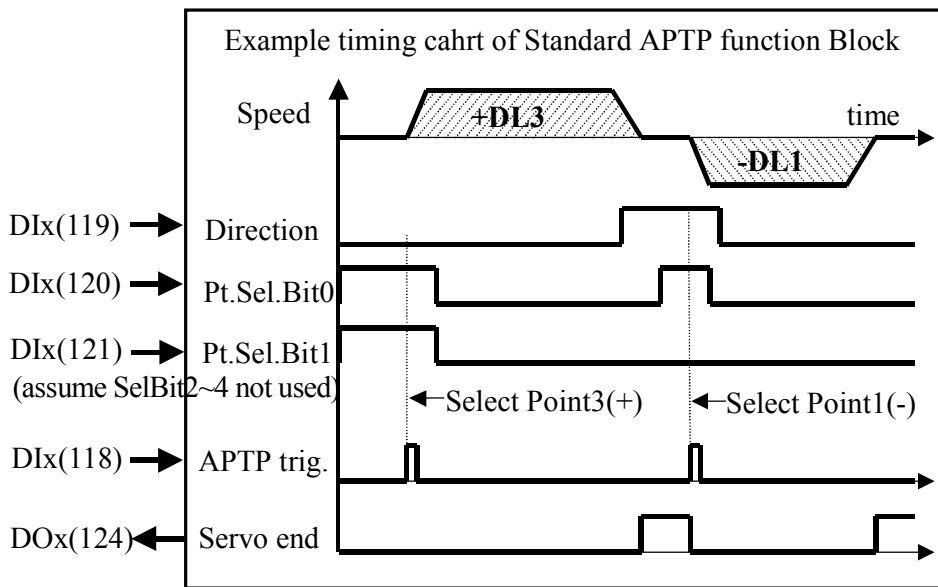
5.2.11 Motor Parameter Groups

Pr.nnn				Parameter Name	Description													
Group#0	Group#1	Group#2	Group#3															
300	350	400	450	Motor Type Select	<table><tr><td>Pr.300</td><td>Description</td></tr><tr><td>0</td><td>Induction motor V/F control</td></tr><tr><td>1</td><td>Induction motor Sensor-Less mode</td></tr><tr><td>2</td><td>Induction motor Servo mode</td></tr><tr><td>3</td><td>Brushless servo motor</td></tr></table>		Pr.300	Description	0	Induction motor V/F control	1	Induction motor Sensor-Less mode	2	Induction motor Servo mode	3	Brushless servo motor		
Pr.300	Description																	
0	Induction motor V/F control																	
1	Induction motor Sensor-Less mode																	
2	Induction motor Servo mode																	
3	Brushless servo motor																	
301	351	401	451	ABC Status	Monitors encoder status													
302	352	402	452	Encoder PPR	Pulse per revolution of encoder													
303	353	403	453	A-Lead/Lag-B	Determine encoder feedback direction													
304	354	404	454	AB Filter	Determine sampling period of encoder													
305	355	405	455	AB Counter	Monitors counter value of encoder (Hex form)													
306	356	406	456	UVW Status	Monitors Brushless servo motor UVW status													
307	357	407	457	Motor Rated Voltage	(Motor Rated Voltage / Line Voltage) * 100%													
308	358	408	458	Motor Peak Voltage	(Motor Peak Voltage / Line Voltage) * 100%													
309	359	409	459	Boost Voltage	Minimum voltage while output speed is low. For induction motor V/F mode only.													
310	360	410	460	Motor Rated RPM	Rated speed of motor													
311	361	411	461	Motor Rated Current	(Motor Rated current / Drive Rated Current) * 100%													
312	362	412	462	Motor Peak Current	(Motor Peak Current / Motor Rated Current) * 100%													
313	363	413	463	Field Current	(Motor Field Current / Motor Rated current) * 100%													
314	364	414	464	Pole	Pole number of motor													
315	365	415	465	Maximum RPM	Maximum speed of motor (RPM)													
316	366	416	466	Minimum RPM	Minimum speed of motor (RPM)													
317	367	417	467	Slip RPM	Slip speed of induction motor (RPM)													
318	368	418	468	Encoder PPR Check	Recode PPR of motor, the value is 4*Encoder PPR													
319	369	419	469	Reserve	Reserved for special use, must set to 0 normally.													
320	370	420	470	P gain (Current Loop)	P gain constant for current loop													
321	371	421	471	I gain (Current Loop)	I gain constant for current loop													
322	372	422	472	Reserve	Reserved for special use, must set to 0 normally.													
323	373	423	473	P gain (Speed Loop)	P gain constant for speed loop													
324	374	424	474	I gain (Speed Loop)	I gain constant for speed loop													
325	375	425	475	Reserve	Reserved for special use, must set to 0 normally.													
326	376	426	476	P gain (Position Loop)	P gain constant for position loop													
327~329	377~379	427~429	477~479	Reserve	Rreserved for special use, must set to 0 normally.													
330	380	430	480	Position/Speed Select	<table><tr><td>Setting</td><td>Mode</td></tr><tr><td>0</td><td>Speed Control Mode</td></tr><tr><td>1</td><td>Position Control Mode</td></tr></table> If there exists any DIx(106) or DIx(107) selected, then Position/Speed control mode is selected by Digital Input Terminal. <table><tr><td>DIx Status</td><td>Mode</td></tr><tr><td>DIx(106) ON or DIx(107) OFF</td><td>Speed Mode</td></tr><tr><td>DIx(106) OFF or DIx(107) ON</td><td>Position Mode</td></tr></table>		Setting	Mode	0	Speed Control Mode	1	Position Control Mode	DIx Status	Mode	DIx(106) ON or DIx(107) OFF	Speed Mode	DIx(106) OFF or DIx(107) ON	Position Mode
Setting	Mode																	
0	Speed Control Mode																	
1	Position Control Mode																	
DIx Status	Mode																	
DIx(106) ON or DIx(107) OFF	Speed Mode																	
DIx(106) OFF or DIx(107) ON	Position Mode																	
331	381	431	481	Pcmd/APTP Select	<table><tr><td>Setting</td><td>Mode</td></tr><tr><td>0</td><td>Auto Point to Point (APTP)</td></tr><tr><td>1</td><td>Pulse Command control (Pcmd)</td></tr></table> If there exists any DIx(126) or DIx(127) selected, then Pcmd/APTP control mode is selected by Digital Input Terminal. <table><tr><td>DIx Status</td><td>Mode</td></tr><tr><td>DIx(126) ON or DIx(127) OFF</td><td>Pcmd Mode</td></tr><tr><td>DIx(126) OFF or DIx(127) ON</td><td>APTP Mode</td></tr></table>		Setting	Mode	0	Auto Point to Point (APTP)	1	Pulse Command control (Pcmd)	DIx Status	Mode	DIx(126) ON or DIx(127) OFF	Pcmd Mode	DIx(126) OFF or DIx(127) ON	APTP Mode
Setting	Mode																	
0	Auto Point to Point (APTP)																	
1	Pulse Command control (Pcmd)																	
DIx Status	Mode																	
DIx(126) ON or DIx(127) OFF	Pcmd Mode																	
DIx(126) OFF or DIx(127) ON	APTP Mode																	
332	382	432	482	Absolute/Increment Select	<table><tr><td>Setting</td><td>Description</td></tr><tr><td>0</td><td>Increment Position control for APTP</td></tr><tr><td>1</td><td>Absolute Position control for APTP</td></tr></table>		Setting	Description	0	Increment Position control for APTP	1	Absolute Position control for APTP						
Setting	Description																	
0	Increment Position control for APTP																	
1	Absolute Position control for APTP																	

333	383	433	483	Torque Limit Source Select	Torque Limit Source Select = a.b, it is composed of two selection of “a” and “b” in one parameter, if DIx(108)(Torque Limit SW) is ON, then Torque Limit Source = “b”, otherwise Torque Limit Source = “a”. DIx(109) is complementary function of DIx(108) <table><tr><th>“a” or “b”</th><th>Torque Limit Source</th></tr><tr><td>0</td><td>No torque limit</td></tr><tr><td>1</td><td>AI1</td></tr><tr><td>2</td><td>AI2</td></tr><tr><td>3</td><td>AI3</td></tr><tr><td>4</td><td>Pr.067 (RAM)</td></tr><tr><td>5</td><td>PID Output</td></tr><tr><td>6</td><td>Pr.069 (EARAM)</td></tr><tr><td>7</td><td>Analog Input AI1 * AI2</td></tr></table>	“a” or “b”	Torque Limit Source	0	No torque limit	1	AI1	2	AI2	3	AI3	4	Pr.067 (RAM)	5	PID Output	6	Pr.069 (EARAM)	7	Analog Input AI1 * AI2						
“a” or “b”	Torque Limit Source																												
0	No torque limit																												
1	AI1																												
2	AI2																												
3	AI3																												
4	Pr.067 (RAM)																												
5	PID Output																												
6	Pr.069 (EARAM)																												
7	Analog Input AI1 * AI2																												
334	384	434	484	Length Conversion	If used micrometer as the unit of Destination Location/Length, this parameter defines the number of data to be converted micrometer into clocks. And Pr.576/577 defines the conversion rate. <table><tr><th>Setting</th><th>Conversion</th></tr><tr><td>0</td><td>No conversion</td></tr><tr><td>1~16</td><td>Select total “n” data for conversion. Example: n=1, then DL16 convert to DL0 n=2, DL16→DL0, DL17→DL1 n=16, DL16→DL0, DL17→DL1, DL18→DL2,.....,DL31→DL15</td></tr></table>	Setting	Conversion	0	No conversion	1~16	Select total “n” data for conversion. Example: n=1, then DL16 convert to DL0 n=2, DL16→DL0, DL17→DL1 n=16, DL16→DL0, DL17→DL1, DL18→DL2,.....,DL31→DL15																		
Setting	Conversion																												
0	No conversion																												
1~16	Select total “n” data for conversion. Example: n=1, then DL16 convert to DL0 n=2, DL16→DL0, DL17→DL1 n=16, DL16→DL0, DL17→DL1, DL18→DL2,.....,DL31→DL15																												
335	385	435	485	Length Compensation	When power ON, the desired length is:																								
336	386	436	486	Compensation Polarity	<table><tr><th>Length Compensation</th><th>Compensation Polarity</th><th>Desired Length</th></tr><tr><td>0</td><td>0 or 1</td><td>DLn</td></tr><tr><td>1</td><td>0</td><td>DLn+DL1</td></tr><tr><td>1</td><td>1</td><td>DLn-DL1</td></tr></table> After power ON, user can use DIx(147) and DIx(148) to change the desired length. <table><tr><th>DIx(147)</th><th>DIx(148)</th><th>Desired Length</th></tr><tr><td>OFF</td><td>ON or OFF</td><td>DLn</td></tr><tr><td>ON</td><td>OFF</td><td>DLn+DL1</td></tr><tr><td>ON</td><td>ON</td><td>DLn-DL1</td></tr></table>	Length Compensation	Compensation Polarity	Desired Length	0	0 or 1	DLn	1	0	DLn+DL1	1	1	DLn-DL1	DIx(147)	DIx(148)	Desired Length	OFF	ON or OFF	DLn	ON	OFF	DLn+DL1	ON	ON	DLn-DL1
Length Compensation	Compensation Polarity	Desired Length																											
0	0 or 1	DLn																											
1	0	DLn+DL1																											
1	1	DLn-DL1																											
DIx(147)	DIx(148)	Desired Length																											
OFF	ON or OFF	DLn																											
ON	OFF	DLn+DL1																											
ON	ON	DLn-DL1																											
337~339	387~389	437~439	487~489	Reserve	Reserved for special use, and must set to 0 normally.																								
340	390	440	490	Resolver Shift Angle	Defines the shift angle between motor and resolver.																								
341	391	441	491	Resolver Polarity	Defines the polarity of Sine Cosine signal.																								
342	392	442	492	BL Motor Select	Brushless Servo Motor type select, normal set to 0. Please consult to our R&D department for details.																								
343	393	443	493	Direct Torque Control Select	<table><tr><th>Setting</th><th>DI(208)</th><th>Torque Control Mode</th></tr><tr><td>0</td><td>OFF</td><td>Standard Torque Control Mode. This mode only control maximum torque, Torque Limit Source select by Pr.333/383/433/483</td></tr><tr><td>1</td><td>ON</td><td>Direct Torque Control Mode. This mode control both Torque and Speed; torque limit source determined by AI1; maximum forward speed determined by Pr.500; maximum reverse speed determined by Pr.502.</td></tr></table>	Setting	DI(208)	Torque Control Mode	0	OFF	Standard Torque Control Mode. This mode only control maximum torque, Torque Limit Source select by Pr.333/383/433/483	1	ON	Direct Torque Control Mode. This mode control both Torque and Speed; torque limit source determined by AI1; maximum forward speed determined by Pr.500; maximum reverse speed determined by Pr.502.															
Setting	DI(208)	Torque Control Mode																											
0	OFF	Standard Torque Control Mode. This mode only control maximum torque, Torque Limit Source select by Pr.333/383/433/483																											
1	ON	Direct Torque Control Mode. This mode control both Torque and Speed; torque limit source determined by AI1; maximum forward speed determined by Pr.500; maximum reverse speed determined by Pr.502.																											
345~349	395~399	435~439	495~499	Reserve	Reserved for special use, and must set to 0 normally.																								

5.2.12 Auto Point-to-Point Control

APTP Trapezoidal Speed Profile Generator



Pr.nnn	Parameter Name	Description	
193	Home Direction	Pr.193	Home Search Direction
194	Home Speed and Acc/Dec	0	Forward
		1	Reverse
		2	DIx(119) OFF: Forward, DIx(119) ON: Reverse
		Pr.194	Home Search Speed and Acc/Dec
		0	Normal Speed and Main Acc/Dec
		1	JOG Speed and JOG Acc/Dec
		Home Search Process	
		DIx	Description
		128 (Home Start)	For absolute position control mode, must execute Home Search process before execute APTP function.
		129 (Home Stop(1))	Pr.193 defines home search direction and Pr.194 defines Home search speed and Acc/Dec.
		170 (Home Stop(2))	- If DIx(129) is OFF and DIx(128) is triggered, the drive will start Home Search process until DIx(129) is ON. After DIx(129) ON, the drive start to search encoder index, and automatically stop at the Index Offset (Pr.568/569) position. - If DI1(170) is OFF and DIx(128) is triggered, the drive will start Home Search process until DI1(170) is ON. After DI1(170) ON, the drive automatically stop at the Index Offset (Pr.568/569) position from current position. - The DOx(56) will ON immediately after start Home Search (DIx(128) is triggered). When Home Search complete, the DOx(56) will OFF automatically. - DOx(57) is complement function of DOx(56). - If DOx(128) ON, indicating Home Search already performed. DOx(128) will OFF after drive RESET or change to Speed Mode. - DOx(129) is complement function of DOx(128). NOTE: - Only DI1 input can select DI1(170) function. - Cannot select DIx(129) and DI1(170) simultaneously.
		137 (Assign Home)	Under Absolute APTP mode, trigger DIx(137) will assign the current position as HOME position.
		138 (Return Home)	Under Absolute APTP mode, trigger DIx(138) will command the motor return to HOME position.

500	DL0 (Low)	- These parameters store 32 points data used in Auto Point-to-Point operation. - If select Incremental mode, these values mean the desired Destination Length. - If select Absolute Mode, these values mean the desired Destination Location. - Each Destination Location/Length is composed by two parameters forming an 8-digital value. Named as DL0 、DL1 、DL2…………DL31 。 DL0 = Pr.501 * 10000 + Pr.500 DL1 = Pr.503 * 10000 + Pr.502 ⋮ DL30 = Pr.561 * 10000 + Pr.560 DL31 = Pr.563 * 10000 + Pr.562										
501	DL0 (High)											
502	DL1 (Low)											
503	DL1 (High)											
504	DL2 (Low)											
505	DL2 (High)											
⋮	⋮											
558	DL29 (Low)											
559	DL29 (High)											
560	DL30 (Low)											
561	DL30 (High)											
562	DL31 (Low)											
563	DL31 (High)	Auto Point-to-Point Process <table><tr><th>DIx</th><th>Description</th></tr><tr><td>118 (APTP Trigger)</td><td> - After DLn (DIx(120)~DIx(124)) and its polarity (DIx(119)) selected, the drive will execute APTP function when DIx(118) is triggered. - DOx(126) APTP Busy, if DOx(126) is ON, indicating APTP is processing. - DOx(127) is complement function of DOx(126). </td></tr><tr><td>119 (Negative DLn)</td><td>After DLn (DIx(120)~DIx(124)) selected, - If DIX(119) OFF, the drive will execute APTP function using +DLn value. - If DIX(119) ON, the drive will execute APTP function using -DLn value. </td></tr><tr><td>120~124 (PTS0~PTS4)</td><td>DIx(120)~DIx(124) are used for DLn selection. - DIx(120): PTS0 Point Selection Bit0 - DIx(121): PTS1 Point Selection Bit1 - DIx(122): PTS2 Point Selection Bit2 - DIx(123): PTS3 Point Selection Bit3 - DIx(124): PTS4 Point Selection Bit4 After PTS0~PTS4 are selected, then DLn is selected: n = PTS4 * 16 + PTS3 * 8 + PTS2 * 4 + PTS1 * 2 + PTS0</td></tr><tr><td>135 (Clear Servo End Flag)</td><td>In APTP mode, after APTP process is completed the SERVO-END flag will set (DOx(124) will ON), and DIx(135) is used to clear SERVO-END flag. DOx(125) is complement function of DOx(124).</td></tr></table>	DIx	Description	118 (APTP Trigger)	- After DLn (DIx(120)~DIx(124)) and its polarity (DIx(119)) selected, the drive will execute APTP function when DIx(118) is triggered. - DOx(126) APTP Busy, if DOx(126) is ON, indicating APTP is processing. - DOx(127) is complement function of DOx(126).	119 (Negative DLn)	After DLn (DIx(120)~DIx(124)) selected, - If DIX(119) OFF, the drive will execute APTP function using +DLn value. - If DIX(119) ON, the drive will execute APTP function using -DLn value.	120~124 (PTS0~PTS4)	DIx(120)~DIx(124) are used for DLn selection. - DIx(120): PTS0 Point Selection Bit0 - DIx(121): PTS1 Point Selection Bit1 - DIx(122): PTS2 Point Selection Bit2 - DIx(123): PTS3 Point Selection Bit3 - DIx(124): PTS4 Point Selection Bit4 After PTS0~PTS4 are selected, then DLn is selected: n = PTS4 * 16 + PTS3 * 8 + PTS2 * 4 + PTS1 * 2 + PTS0	135 (Clear Servo End Flag)	In APTP mode, after APTP process is completed the SERVO-END flag will set (DOx(124) will ON), and DIx(135) is used to clear SERVO-END flag. DOx(125) is complement function of DOx(124).
DIx	Description											
118 (APTP Trigger)	- After DLn (DIx(120)~DIx(124)) and its polarity (DIx(119)) selected, the drive will execute APTP function when DIx(118) is triggered. - DOx(126) APTP Busy, if DOx(126) is ON, indicating APTP is processing. - DOx(127) is complement function of DOx(126).											
119 (Negative DLn)	After DLn (DIx(120)~DIx(124)) selected, - If DIX(119) OFF, the drive will execute APTP function using +DLn value. - If DIX(119) ON, the drive will execute APTP function using -DLn value.											
120~124 (PTS0~PTS4)	DIx(120)~DIx(124) are used for DLn selection. - DIx(120): PTS0 Point Selection Bit0 - DIx(121): PTS1 Point Selection Bit1 - DIx(122): PTS2 Point Selection Bit2 - DIx(123): PTS3 Point Selection Bit3 - DIx(124): PTS4 Point Selection Bit4 After PTS0~PTS4 are selected, then DLn is selected: n = PTS4 * 16 + PTS3 * 8 + PTS2 * 4 + PTS1 * 2 + PTS0											
135 (Clear Servo End Flag)	In APTP mode, after APTP process is completed the SERVO-END flag will set (DOx(124) will ON), and DIx(135) is used to clear SERVO-END flag. DOx(125) is complement function of DOx(124).											
195	Travel Limit	<table><tr><th>Pr.195</th><th>Description</th></tr><tr><td>0</td><td>No software Travel Limit</td></tr><tr><td>1</td><td>Enable Forward/Reverse software Travel Limit. - Pr.564/565 defines Forward Travel Limit value. - Pr.566/567 defines Reverse Travel Limit value. </td></tr></table> - If DOx(130) ON, indicating present position already exceeds Forward or Reverse Travel Limit. - If DOx(131) ON, indicating present position already exceeds Forward Travel Limit. - If DOx(132) ON, indicating present position already exceeds Reverse Travel Limit. The function of DOx(130)~DOx(132) is enabled if Pr.195=1 and Home Search already performed.	Pr.195	Description	0	No software Travel Limit	1	Enable Forward/Reverse software Travel Limit. - Pr.564/565 defines Forward Travel Limit value. - Pr.566/567 defines Reverse Travel Limit value.				
Pr.195	Description											
0	No software Travel Limit											
1	Enable Forward/Reverse software Travel Limit. - Pr.564/565 defines Forward Travel Limit value. - Pr.566/567 defines Reverse Travel Limit value.											
564	Forward Travel Limit (Low)											
565	Forward Travel Limit (High)											
566	Reverse Travel Limit (Low)											
567	Reverse Travel Limit (High)											
568	Index Offset (Low)	Pr.568/569 defines index offset of Home position.										
569	Index Offset (High)											
570	Position Error Limit	While the drive is working under position mode (Tracking or APTP), with this function user can monitor the status of internal position control loop. Pr.570 defines the warning clocks limitation. Pr.571 defines the tolerance clocks of In-Position judgement. Position Error = Position Desired – Position Feedback DOx(52) will ON when Position Error ≤ In Position Range DOx(53) will ON when Position Error > In Position Range DOx(54) will ON when Position Error ≥ Position Error Limit DOx(55) will ON when Position Error < Position Error Limit										
571	In Position Range											
576	μm Revolution (Low)	Pr.576/577 defines the actual physical length when motor rotates on revolution. Usually defined in micro meter. Refer to Pr.334/384/434/483.										
577	μm Revolution (High)											

6. Selection of Speed Source

Speed Source Select Pr.040 is used for speed input source selection. Through Pr.040 setting, the speed input sources may come from Control Panel, Memory, Analog Input, Up/Down Counter, or the combination of the above sources.

Speed Source Select Pr.040=cc.dd is composed of two selection “cc” and “dd” in one parameter, if Speed command SW DIx(88) or Speed & Control SW DIx(90) is ON then Speed Source =”dd”, otherwise Speed source=”cc”.

6.1 Speed Source Selection Table

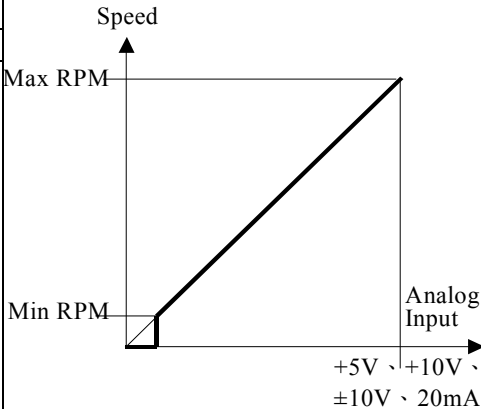
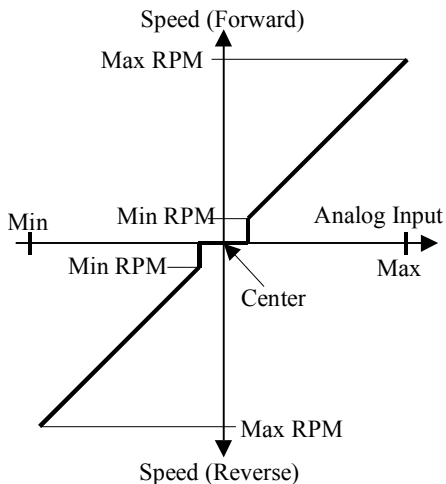
Pr.040	Speed Source	Reference
0	Set value in Pr.000	6.2.1
1	By AI1 Input	6.2.2
2	By AI2 Input	
3	Set value from Panel	6.2.1
4	Both the output Speed and direction determined by AI1	6.2.2
5	Both the output Speed and direction determined by AI2	
6	By internal Up/Down Counter	6.2.3
7	By internal Up/Down Counter, and will preload Up/Down counter from Pr.000 after RESET.	
8	Set value from Panel, with PRELOAD from & AUTO WRITE to Pr.000	6.2.1
9	Both the output Speed and direction determined by AI1, with Minimum RPM	6.2.2
10	Both the output Speed and direction determined by AI2, with Minimum RPM	
11	By internal Up/Down Counter	6.2.3
12	Speed Set = $AI1 * (1 \pm (Pr.070 * AI2))$, with Minimum RPM	6.2.4
13	Speed Set = $AI2 \pm (Pr.015 * (Pr.070 * AI1))$, with Minimum RPM	6.2.4
17	By AI1 Input, with Minimum RPM	6.2.2
18	By AI2 Input, with Minimum RPM	
19	By internal Up/Down Counter, with PRELOAD from & AUTO WRITE to Pr.000	6.2.3
20	By AI2 Input, but with Reverse Slope and Minimum RPM	6.2.2
21	Speed Set = Panel (or Computer) Set * $(1 \pm (Pr.070 * AI2))$, with Minimum RPM	6.2.4
22	Speed Set = Panel (or Computer) Set $\pm$ (Maximum RPM * $(Pr.070 * AI1)$), with Minimum RPM	6.2.2
25	By AI3 Input	6.2.2
26	Both the output Speed and direction determined by AI3.	6.2.2
27	Both the output Speed and direction determined by AI3, with Minimum RPM	6.2.2
28	Speed Set = $AI1 * (1 \pm (Pr.070 * AI3))$, with Minimum RPM	6.2.4
29	Speed Set = $AI3 \pm (Maximum RPM * (Pr.070 * AI1))$, with Minimum RPM	6.2.4
30	By AI3 Input, with Minimum RPM	6.2.2
31	By AI3 Input, but with Reverse Slope and Minimum RPM	6.2.2
32	By AI1 Input, but with Reverse Slope and Minimum RPM	
33	Speed Set = Panel (or Computer) Set * $(1 \pm (Pr.070 * AI1))$	6.2.4
34	Speed Set = Panel (or Computer) Set * $(1 \pm (Pr.070 * AI3))$	
35	Speed Set = Panel (or Computer) Set $\pm$ (Maximum RPM * $(Pr.070 * AI2)$), with Minimum RPM	6.2.4
36	Speed Set = Panel (or Computer) Set $\pm$ (Maximum RPM * $(Pr.070 * AI3)$), with Minimum RPM	
37	Forward by AI1, Reverse by AI2	6.2.2
38	Forward by AI2, Reverse by AI1	
39	Set value in Pr.000, with Minimum RPM	6.2.1
40	By PID Output	6.2.1
41	Output Speed determined by XY pulse	6.2.3
42	Both the output Speed and direction determined by XY pulse	
46	Set value in Pr.116	6.2.1
61	Both the output Speed and direction determined by AI1	6.2.2
62	Both the output Speed and direction determined by AI2.	
63	Both the output Speed and direction determined by AI3.	

6.2 Description of Speed Source

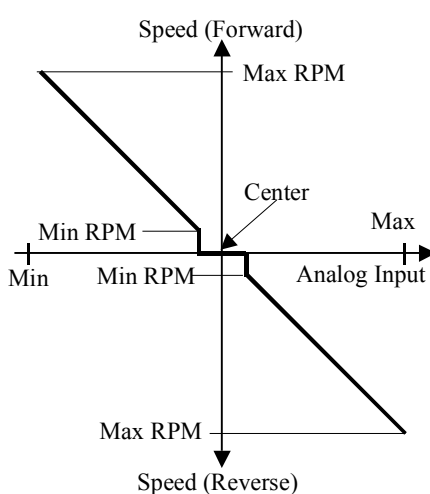
6.2.1 Speed Source from Memory & Panel

Pr.040	Speed Source	Description
0	Pr.000	- The speed value stored in Pr.000 determines the output speed of the drive while running. - The direction of the output phase sequence determined by control command (Pr.039).
3	Panel	- If Pr.182=0, the set speed comes from Control Panel directly. - If Pr.182=1, if communication option is used, the set speed comes from RS485 communication port. - The direction of the output phase sequence determined by control command (Pr.039). - While the desired output speed is lower than Minimum RPM (Pr.316/366/416/466), the actual output speed will maintain at the Minimum RPM.
8	Panel	This mode is similar to Pr.040=3, with only two differences: - When power ON or after RESET, the data in Pr.000 will preload into internal set speed buffer - When using Control Panel, after changing set speed, the value in set speed buffer will write back into Pr.000 automatically.
39	Pr.000	- The speed value stored in Pr.000 determines the output speed of the drive while running. - The direction of the output phase sequence determined by control command (Pr.039). - While the desired output speed is lower than Minimum RPM (Pr.316/366/416/466), the actual output speed will maintain at the Minimum RPM.
40	PID Output	The PID Output determines the output speed of the drive while running. Refer to section 5.2.10
46	Pr.116	- The speed value stored in Pr.116 determines the output speed of the drive while running. - The direction of the output phase sequence determined by control command (Pr.039). - This parameter stored in RAM instead of EAROM. Therefore, it can be modify randomly and quickly. Usually, it is used for computer control application.

6.2.2 Speed Source from Analog Input

Pr.040	Speed Source	Description																					
1	AI1		● The voltage (or current) signal fed into Analog Input Terminal will be used to determine the output speed of the drive while running. ● The direction of the output phase sequence determined by control command (Pr.039). ● If the input signal reaches maximum level, the set speed is equal to Maximum RPM (Pr.315/365/415/465) ● If the desired set speed is lower than minimum RPM (Pr.316/366/416/466), the drive will stop.																				
2	AI2																						
25	AI3																						
4	AI1		● The voltage (or current) signal fed into Analog Input terminal will be used to determine the output speed and the direction of the output phase sequence of the drive. ● If the input signal reaches maximum level, the set speed is equal to Maximum RPM (Pr.315/365/415/465) in forward direction. ● If the input signal reaches minimum level, the set speed is equal to Maximum RPM in reverse direction. ● If the input signal around center level, the drive will stop. <table border="1" data-bbox="888 1785 1437 1964"><thead><tr><th>Signal</th><th>Max</th><th>Center</th><th>Min</th></tr></thead><tbody><tr><td>+5V</td><td>+5V</td><td>+2.5V</td><td>0V</td></tr><tr><td>+10V</td><td>+10V</td><td>+5V</td><td>0V</td></tr><tr><td>±10V</td><td>+10V</td><td>0V</td><td>-10V</td></tr><tr><td>20mA</td><td>20mA</td><td>10mA</td><td>0mA</td></tr></tbody></table>	Signal	Max	Center	Min	+5V	+5V	+2.5V	0V	+10V	+10V	+5V	0V	±10V	+10V	0V	-10V	20mA	20mA	10mA	0mA
Signal	Max			Center	Min																		
+5V	+5V			+2.5V	0V																		
+10V	+10V	+5V	0V																				
±10V	+10V	0V	-10V																				
20mA	20mA	10mA	0mA																				
5	AI2																						
26	AI3																						

9	AI1		● The voltage (or current) signal fed into Analog Input terminal will be used to determine the output speed and the direction of the output phase sequence of the drive. ● If the input signal reaches maximum level, the set speed is equal to Maximum RPM (Pr.315/365/415/465) in forward direction. ● If the input signal reaches minimum level, the set speed is equal to Maximum RPM in reverse direction. ● If the input signal around center level, the drive will run at Minimum RPM (Pr.316/366/416/466). <table><tr><th>Signal</th><th>Max</th><th>Center</th><th>Min</th></tr><tr><td>+5V</td><td>+5V</td><td>+2.5V</td><td>0V</td></tr><tr><td>+10V</td><td>+10V</td><td>+5V</td><td>0V</td></tr><tr><td>±10V</td><td>+10V</td><td>0V</td><td>-10V</td></tr><tr><td>20mA</td><td>20mA</td><td>10mA</td><td>0mA</td></tr></table>	Signal	Max	Center	Min	+5V	+5V	+2.5V	0V	+10V	+10V	+5V	0V	±10V	+10V	0V	-10V	20mA	20mA	10mA	0mA
Signal	Max			Center	Min																		
+5V	+5V			+2.5V	0V																		
+10V	+10V	+5V	0V																				
±10V	+10V	0V	-10V																				
20mA	20mA	10mA	0mA																				
10	AI2																						
27	AI3																						
17	AI1		● The voltage (or current) signal fed into Analog Input Terminal will be used to determine the output speed of the drive while running. ● The direction of the output phase sequence determined by control command (Pr.039). ● If the input signal reaches maximum level, the set speed is equal to Maximum RPM (Pr.315/365/415/465) ● If the desired set speed is lower than minimum RPM (Pr.316/366/416/466), the drive will run at Minimum RPM.																				
18	AI2																						
30	AI3																						
20	AI2		● The voltage (or current) signal fed into Analog Input Terminal will be used to determine the output speed of the drive while running. ● The direction of the output phase sequence determined by control command (Pr.039). ● If the input signal reaches minimum level, the set speed is equal to Maximum RPM (Pr.315/365/415/465) ● If the input signal reaches maximum level, the drive will run at Minimum RPM (Pr.316/366/416/466).																				
31	AI3																						
32	AI1																						
37	AI1 & AI2	● If the motor run in FORWARD direction, it is same as Pr.040=17, use AI1 as input source. ● If the motor run in REVERSE direction, it is same as Pr.040=18, use AI2 as input source.																					
38	AI1 & AI2	● If the motor run in FORWARD direction, it is same as Pr.040=18, use AI2 as input source. ● If the motor run in REVERSE direction, it is same as Pr.040=17, use AI1 as input source.																					

61	AI1		● The voltage (or current) signal fed into Analog Input terminal will be used to determine the output speed and the direction of the output phase sequence of the drive. ● If the input signal reaches minimum level, the set speed is equal to Maximum RPM (Pr.315/365/415/465) in forward direction. ● If the input signal reaches maximum level, the set speed is equal to Maximum RPM in reverse direction. ● If the input signal around center level, the drive will stop. <table data-bbox="876 524 1426 692"><thead><tr><th>Signal</th><th>Max</th><th>Center</th><th>Min</th></tr></thead><tbody><tr><td>+5V</td><td>+5V</td><td>+2.5V</td><td>0V</td></tr><tr><td>+10V</td><td>+10V</td><td>+5V</td><td>0V</td></tr><tr><td>±10V</td><td>+10V</td><td>0V</td><td>-10V</td></tr><tr><td>20mA</td><td>20mA</td><td>10mA</td><td>0mA</td></tr></tbody></table>	Signal	Max	Center	Min	+5V	+5V	+2.5V	0V	+10V	+10V	+5V	0V	±10V	+10V	0V	-10V	20mA	20mA	10mA	0mA
Signal	Max			Center	Min																		
+5V	+5V			+2.5V	0V																		
+10V	+10V	+5V	0V																				
±10V	+10V	0V	-10V																				
20mA	20mA	10mA	0mA																				
62	AI2																						
63	AI3																						

- Set Jumper to match the input signal type and range. (Refer to section 1.2.3)
- If necessary, use Pr.089/090/091/092/191/192 to modify the input range. (Refer to section 5.2.6)

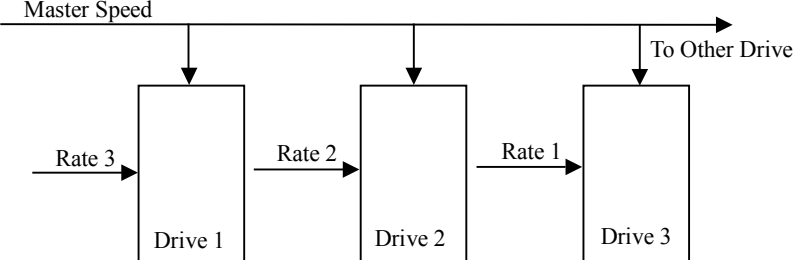
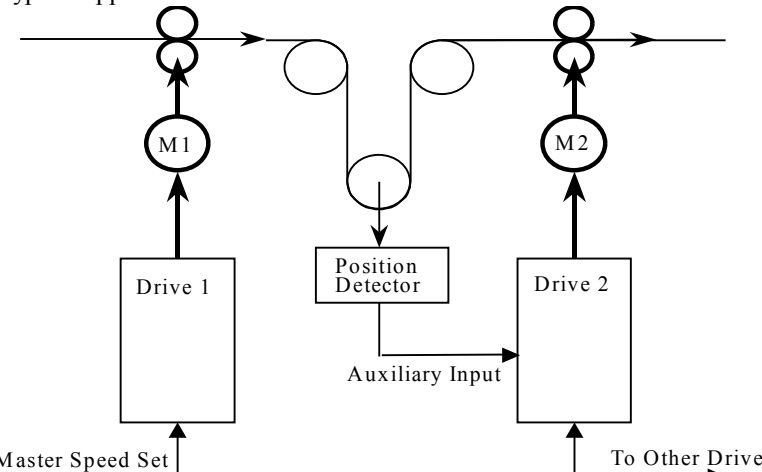
6.2.3 Speed Source from XY Pulse Input

Pr.040	Speed Source	Description
41	XY Pulse Input	The XY Pulse frequency determines the output speed of the drive while running The control command (Pr.039) determines direction of the output phase sequence. $RPM\ set = abs(Pr.139) * (Pr.135/Pr.136)$ Note: Pr.138 defines XY pulse sampling period.
42	XYPulse Input	The XY Pulse frequency determine the output speed and the direction of the output phase sequence of the drive. $RPM\ set = (Pr.139) * (Pr.135/Pr.136)$ Note: Pr.138 defines XY pulse sampling period.

6.2.4 Speed Source from Internal Up/Down Counter

Pr.040	Speed Source	Description																		
6	Up/Down Counter	1. If Pr.040=6,7,11 or 19, the up/down counter is used to determined the output speed. 2. If Pr.040=7 or 19, the data in Pr.000 will preload into the Up/Down counter when Power ON or Reset. 3. If Pr.040=19, after Up/Down execution, the content of Up/Down counter will write into Pr.000 automatically. The signals come from Digital Input (DIx) terminal describe as following: <table><thead><tr><th>DIx</th><th>Function</th><th>Description</th></tr></thead><tbody><tr><td>15</td><td>Clear</td><td>If DIx(15) is triggered, the content of the internal Up/Down Counter will be set to the value of Minimum RPM (Pr.316/366/416/466), and drive will ramp down according to the rate of Main Deceleration time (Pr.002)</td></tr><tr><td>16</td><td>Load</td><td>If DIx(16) is triggered, the content of the internal Up/Down Counter will be set to the value of Maximum RPM (Pr.315/365/415/465), and drive will ramp up according to the rate of Main Acceleration time (Pr.001)</td></tr><tr><td>17</td><td>Hold</td><td>If DIx(17) is triggered, the value of present output speed will be loaded into the internal Up/Down Counter.</td></tr><tr><td>19</td><td>Up</td><td>If DIx(19) is ON, the content of the internal Up/Down Counter will increase according to the rate of Main Acceleration Time (Pr.001).</td></tr><tr><td>20</td><td>Down</td><td>If DIx(20) is ON, the content of the internal Up/Down Counter will decrease according to the rate of Main Deceleration Time (Pr.002).</td></tr></tbody></table>	DIx	Function	Description	15	Clear	If DIx(15) is triggered, the content of the internal Up/Down Counter will be set to the value of Minimum RPM (Pr.316/366/416/466), and drive will ramp down according to the rate of Main Deceleration time (Pr.002)	16	Load	If DIx(16) is triggered, the content of the internal Up/Down Counter will be set to the value of Maximum RPM (Pr.315/365/415/465), and drive will ramp up according to the rate of Main Acceleration time (Pr.001)	17	Hold	If DIx(17) is triggered, the value of present output speed will be loaded into the internal Up/Down Counter.	19	Up	If DIx(19) is ON, the content of the internal Up/Down Counter will increase according to the rate of Main Acceleration Time (Pr.001).	20	Down	If DIx(20) is ON, the content of the internal Up/Down Counter will decrease according to the rate of Main Deceleration Time (Pr.002).
DIx			Function	Description																
15			Clear	If DIx(15) is triggered, the content of the internal Up/Down Counter will be set to the value of Minimum RPM (Pr.316/366/416/466), and drive will ramp down according to the rate of Main Deceleration time (Pr.002)																
16			Load	If DIx(16) is triggered, the content of the internal Up/Down Counter will be set to the value of Maximum RPM (Pr.315/365/415/465), and drive will ramp up according to the rate of Main Acceleration time (Pr.001)																
17	Hold	If DIx(17) is triggered, the value of present output speed will be loaded into the internal Up/Down Counter.																		
19	Up	If DIx(19) is ON, the content of the internal Up/Down Counter will increase according to the rate of Main Acceleration Time (Pr.001).																		
20	Down	If DIx(20) is ON, the content of the internal Up/Down Counter will decrease according to the rate of Main Deceleration Time (Pr.002).																		
7																				
11																				
19																				

6.2.5 Set Speed from Two Speed Sources Combination

Set Speed	Description		
Master Speed * (100% ± (Pr.070 * Proportional Rate))	Pr.040	Master Speed Source	Proportional Rate Source
	12	AI1	AI2
	28	AI1	AI3
	33	Control Panel or RS485 Port	AI1
	21	Control Panel or RS485 Port	AI2
	34	Control Panel or RS485 Port	AI3
	- Pr.070 (Analog Input Gain) defines the gain of Proportional Rate when set speed determine by the combination of two speed sources. - If the signal level of proportional rate is maximum, the modification rate is (100%+Pr.070). - If the signal level of proportional rate is minimum, the modification rate is (100%-Pr.070). - If the desired set speed is lower than minimum RPM (Pr.316/366/416/466), the drive will run at Minimum RPM. Typical application is as follows: 		
Master Speed ± (Max RPM * (Pr.070 * Auxiliary Input))	Pr.040	Master Speed Source	Auxiliary Input
	13	AI2	AI1
	29	AI3	AI1
	22	Control Panel or RS485 Port	AI1
	35	Control Panel or RS485 Port	AI2
	36	Control Panel or RS485 Port	AI3
	- Pr.070 (Analog Input Gain) defines the gain of Auxiliary Input when set speed determine by the combination of two speed sources. - If the signal level of Auxiliary Input is maximum, the modification quantity is +(Maximum RPM * Pr.70). - If the signal level of Auxiliary Input is minimum, the modification quantity is -(Maximum RPM * Pr.70). - If the desired set speed is lower than minimum RPM (Pr.316/366/416/466), the drive will run at Minimum RPM. Typical application is as follows: 		

7. Selection of Digital Input Function

7.1 Digital Input Function Related Parameters

Pr.nnn	Parameter Name	Description
140	DI0 Select	- The configuration of Digital Input refer to section 1.2.1 - All Digital Input terminals are scanned every 2.0ms. - Each Digital Input terminal can be configured individually by corresponding DIx Select parameters. - DI0 do not connect to the user control terminal, and only connected to DO0 internally. - DI11~DI14 do not connect to the user control terminal, and can only controlled by Modbus communication.
141	DI1 Select	
142	DI2 Select	
143	DI3 Select	
144	DI4 Select	
145	DI5 Select	
146	DI6 Select	
147	DI7 Select	
148	DI8 Select	
149	DI9 Select	
150	DI10 Select	
151	DI11 Select	
152	DI12 Select	
153	DI13 Select	
154	DI14 Select	

7.2 Selection Table of Digital Input Function

DIx	Function	Comment	Reference
0	NULL	Null function	
1	EMS	Emergency Stop	7.3.1
2	SPD3	SPD3 Speed Set	5.2.4
3	SPD2	SPD2 Speed Set	
4	SPD1	SPD1 Speed Set	
5	JOG	JOG Speed Set	
6	OH	Over Heat Alarm	7.3.2
7	TMIA(1)	Timer(1) Input (OFF-Delay Type)	7.3.3
9	FJR	Forward JOG Run	7.3.1
10	RJR	Reverse JOG Run	
11	TMIB(1)	Timer(1) Input (ON-Delay Type)	7.3.3
15	U/D CLEAR	Set Up/Down Counter to Minimum RPM	6.2.4
16	U/D LOAD	Set Up/Down Counter to Maximum RPM	
17	U/D HOLD	Hold Output Speed to Up/Down Counter	
19	U/D UP	Increase Up/Down Counter	
20	U/D DOWN	Decrease Up/Down Counter	7.3.1
21	ALARM CLEAR	Clear Alarm when Alarm Occur	
22	SET1(FF1)	SET Input of Flip/Flop-1	7.3.4
23	CLR1(FF1)	CLEAR Input of Flip/Flop-1	
24	SET2(FF2)	SET Input of Flip/Flop-2	
25	CLR2(FF2)	CLEAR Input of Flip/Flop-2	
26	SET(FF1&FF2)	SET Input to both Flip/Flop-1 and Flip/Flop-2	
27	CLR(FF1&FF2)	CLEAR Input to both Flip/Flop-1 and Flip/Flop-2	
28	COUNTER INPUT	Clock Input of Timer/Counter Block	7.3.3
29	COUNTER CLEAR	Clear Input of Timer/Counter Block	
30	/OH	Complement of Over Heat	7.3.2
36	TMIC(1)	Timer(1) Input (ON/OFF Type)	7.3.3
46	TRACK + JOG	Tracking Speed plus JOG Speed	5.2.9
47	TRACK – JOG	Tracking Speed minus JOG Speed	
48	SPEED HOLD	Hold Output Speed	7.3.1
58	TRACK + (AI1 * JOG)	Tracking Speed plus (AI1*JOG Speed)	
59	TRACK – (AI1 * JOG)	Tracking Speed minus (AI1*JOG Speed)	
64	XY MULTIPLY	Select Multiply Rate of XY Input Clock	5.2.9
65	XY DIVISION	Select Division Rate of XY Input Clock	(Pr.133~136)
73	RUN FUNCTION	Select RUN Function	5.2.5 (Pr.039)
74	REV FUNCTION	Select REV Function	
76	FORWARD INHIBIT	Forward run inhibit	7.3.1
77	REVERSE INHIBIT	Reverse run inhibit	

DIx	Function	Comment	Reference
80	SPEED SW 1	16 Step Speed Select	5.2.4
81	SPEED SW 2		
82	SPEED SW 3		
83	SPEED SW 4		
84	JOG ACC/DEC TIME	Acceleration/Deceleration Time Select	5.2.4
85	SPD1 ACC/DEC TIME		
86	SPD2 ACC/DEC TIME		
87	SPD3 ACC/DEC TIME		
88	SPEED COMMAND SW	Speed Command Select Switch	Sec. 6
89	CONTROL COMMAND SW	Control Command Select Switch	5.2.5 (Pr.039)
90	SPEED & CONTROL SW	Speed and Control Command Select Switch	5.2.5, Sec.6
91	/TMIA(1)	Complement of Timer(1) Input (OFF-Delay Type)	7.3.3
92	/TMIB(1)	Complement of Timer(1) Input (ON-Delay Type)	
93	/TMIC(1)	Complement of Timer(1) Input (ON/OFF Type)	
94	TMIA(2)	Timer(2) Input (OFF-Delay Type)	
95	TMIB(2)	Timer(2) Input (ON-Delay Type)	
96	TMIC(2)	Timer(2) Input (ON/OFF Type)	
97	/TMIA(2)	Complement of Timer(2) Input (OFF-Delay Type)	
98	/TMIB(2)	Complement of Timer(2) Input (ON-Delay Type)	
99	/TMIC(2)	Complement of Timer(2) Input (ON/OFF Type)	
100	DRIVE ENABLE & RUN	Enable Drive and Assert RUN Command	7.3.1
101	/(DRIVE ENABLE & RUN)	Complement of DIx(100)	
102	DRIVE ENABLE	Enable Drive to Standby State	7.3.1
103	/(DRIVE ENABLE)	Complement of DIx(102)	
104	XY CLOCK INPUT ENABLE	Enable XY Clock input	5.2.9
105	/XY CLOCK INPUT ENABLE	Complement of DIx(104)	
106	POSITION/SPEED MODE	Change between Position and Speed mode	5.2.11 (Pr.330)
107	/(POSITION/SPEED MODE)	Complement of DIx(106)	
108	TORQUE LIMIT SW	Select Torque Limit Source	5.2.11 (Pr.333)
109	/(TORQUE LIMIT SW)	Complement of DIx(108)	
114	MSB0	Motor Parameter Group Select	5.2.5 (Pr.188)
115	MSB1		
118	ATPT TRIGGER	Trigger start Auto Point-to-Point Function	5.2.12
119	NEGATIVE DLn VALUE	Use Negative DLn for ATPT Position	5.2.12
120	PTS0	Point Select Bit0	5.2.12
121	PTS1	Point Select Bit1	
122	PTS2	Point Select Bit2	
123	PTS3	Point Select Bit3	
124	PTS4	Point Select Bit4	
126	TRACK/ATPT SW	Change between TRACK and ATPT mode	5.2.11 (Pr.331)
127	/(TRACK/ATPT SW)	Complement of DIx(126)	
128	HOME START	Start Home Search Process	5.2.12
129	HOME STOP (1)	Stop Home Search Process Type 1	
133	CHANGE FF1	Change Flip/Flop-1 status	7.3.4
134	CHANGE FF2	Change Flip/Flop-2 status	
135	CLEAR SERVO END FLAG	Clear SERVO END Flag in ATPT mode	5.2.12
137	ASSIGN HOME	Assign Home Position	5.2.12
138	RETURN HOME	Command Motor return to Home Position	5.2.12
139	XY DIRECTION CHANGE	XY Pulse input direction selection	5.2.9 (Pr.132)
140	FWD TRAVEL LIMIT	Forward Travel Limit Switch	7.3.2
141	/(FWD TRAVEL LIMIT)	Complement of Forward Travel Limit Switch	
142	REV TRAVEL LIMIT	Reverse Travel Limit Switch	7.3.2
143	/(REV TRAVEL LIMIT)	Complement of Reverse Travel Limit Switch	
147	ENABLE DL1 COMPENSATION	Desired Length=DLn plus (or minus) DL1	5.2.11 (Pr.335)
148	SELECT DL1 POLARITY	Determine Plus or Minus DL1	
149	LATCH EMS	Emergency Stop and Latched until Drive Reset	7.3.1
155	MARK LENGTH	Select Mark Length	11.1.1

DIx	Function	Comment	Reference
160	PID SET POLARITY BIT	Select PID Set Polarity	5.2.10
161	PID FB POLARITY BIT	Select PID FB Polarity	
162	PID RANGE BIT	Select PID Range	
163	PID OUTPUT POLARITY BIT	Select PID Output Polarity	
164	PID ENABLE BIT	Enable PID Function	
165	PID HOLD BIT	Select PID Hold	
166	PID AUTO GAIN ENABLE BIT	Enable PID Auto Gain	
167	PID CLEAR	Clear PID integrator	
168	TRACK + (PID OUTPUT * JOG)	Tracking Speed plus (PID Output * JOG Speed)	5.2.9
169	TRACK - (PID OUTPUT * JOG)	Tracking Speed minus (PID Output * JOG Speed)	
170	HOME STOP (2)	Stop Home Search Process Type 2	5.2.12
180	MARK INPUT	Mark signal input	11.1
181	MARK INPUT (S-CURVE)	Marksignal input (S-CURVE)	
208	TORQUE CONTROL MODEL	Torque control model select	5.2.11 (Pr.343)
209	JOG+ UNDER POSITION MODE	Forward JOG run under position mode	7.3.1
210	JOG- UNDER POSITION MODE	Reverse JOG run under position mode	
218	TRACK + JOG * AI1 * PID OUTPUT	Tracking Speed plus (PID Output*AI1*JOG Speed)	5.2.9
219	TRACK - JOG * AI1 * PID OUTPUT	Tracking Speed minus (PID Output*AI1*JOG Speed)	
249	RAMP DOWN EMS	Ramp Down Emergency Stop	7.3.1

7.3 Description of Digital Input function

7.3.1 Control Function

DIx	Function	Description
1	EMS	While drive running, if the DIx(1) is ON, then drive will stop the motor to ZERO Speed immediately. If DIx(1) OFF, the drive will run at original Set Speed.
9	FJR	When DIx(9) is ON, the drive execute Forward-Jog-Run without RUN command.
10	RJR	When DIx(10) is ON, the drive execute Reverse-Jog-Run without RUN command.
21	ALARM CLEAR	If DIx(21) is ON, will RESET the drive only when ALARM had occurred. Note: the RST terminal is used to RESET the drive no matter ALARM occurred or not.
48	SPEED HOLD	When DIx(48) is ON, the drive will stop ramp up or ramp down, and hold on present running speed. If DIx(48) change to OFF, the drive will resume ramp up or ramp down.
76	FORWARD INHIBIT	If DIx(76) ON, forward run is inhibited.
77	REVERSE INHIBIT	If DIx(77) ON, reverse run is inhibited.
100	DRIVE ENABLE & RUN	If DIx(100) is ON, enabled the drive and assert RUN command.
101	/(DRIVE ENABLE & RUN)	DIx(101) is complement input of DIx(100).
102	DRIVE ENABLE	If DIx(102) is ON, enabled the drive. RUN command is separately controlled.
103	/(DRIVE ENABLE)	DIx(103) is complement input of DIx(102).
149	LATCH EMS	While drive running, if the DIx(149) triggered, then drive will stop the motor to ZERO Speed until the drive RESET or Power OFF.
209	JOG+ UNDER POSITION MODE	Under position mode, ● If DIx(209) is ON, change operation mode to speed mode, and execute Forward-Jog-Run. ● If DIx(210) is ON, change operation mode to speed mode, and execute Reverse-Jog-Run. ● When DIx(209) and DIx(210) resume to OFF, operation mode changes to Position mode automatically. ● After execute this function, original position will be cleared. ● Do not select DIx(106) or DIx(107), if DIx(209) or DIx(210) is selected.
210	JOG- UNDER POSITION MODE	
249	RAMP DOWN EMS	● While drive running, if the DIx(249) is triggered, then drive will Ramp Down to ZERO Speed immediately, and DOx(92) will ON immediately after speed down to ZERO. ● Pr.029 defines the Deceleration time. ● Execute RESET for recovery from Ramp Down EMS.

7.3.2 Protection Function

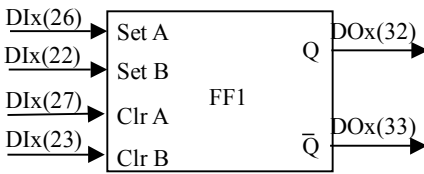
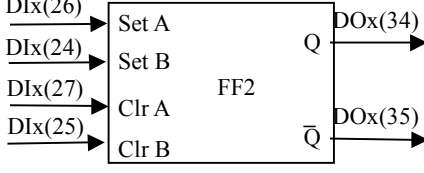
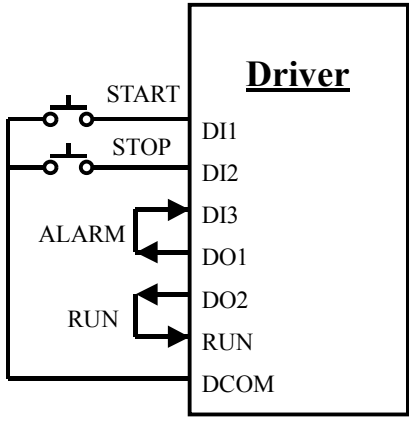
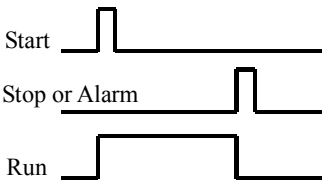
DIx	Function	Description
6	OH	If DIx(6) ON or DIx(30) OFF, the drive will disable the output transistors, and show OH alarm message on control panel.
30	/OH	
140	FWD TRAVEL LIMIT	Under Absolute APTP mode, DIx(140) can connect to Forward Travel Limit Switch, if DIx(140) is ON, then the motor will not rotate any further toward FORWARD direction. DIx(141) is complement input of DIx(140).
141	/(FWD TRAVEL LIMIT)	
142	REV TRAVEL LIMIT	Under Absolute APTP mode, DIx(142) can connect to Reverse Travel Limit Switch, if DIx(142) is ON, then the motor will not rotate any further toward REVERSE direction. DIx(143) is complement input of DIx(142).
143	/(REV TRAVEL LIMIT)	

7.3.3 Timer & Counter Function

DIx	Function	Description
7	TMIA(1)	The drive built in two general purpose TIMERS. For example of Timer(1): - Digital input DIx assigned to TMIA(1) function DIx(7), it serves as input of the OFF-DELAY timer. - To assign a digital output DOx, which select TMOA(1) function DOx(14) to serve as output of this timer. - To define the timer time in Pr.071. When the timer input TMIA(1) DIx(7) is ON, the timer output TMOA(1) DOx(14) will be ON immediately. If the timer input TMIA(1) DIx(7) become OFF, the timer will start counting time. After waiting the specified time period of Pr.071 then TMOA DOx(14) become OFF. - DIx(91) /TMIA(1) is complement input of DIx(7) TMIA(1). - DOx(40) /TMOA(1) is complement output of DOx(14) TMOA(1). The function of Timer(2) is same as Timer(1) - Pr.072 defines the timer time for Timer(2). - DIx(94) TMIA(2) is the input of Timer(2). - DIx(97) /TMIA(2) is complement input of DIx(94) TMIA(2). - DOx(94) TMOA(2) is the output of Timer(2). - DOx(97) /TMOA(2) is complement output of DOx(94) TMOA(2).
91	/TMIA(1)	
94	TMIA(2)	
97	/TMIA(2)	
11	TMIB(1)	The drive built in two general purpose TIMERS. For example of Timer(1): - Digital input DIx assigned to TMIB(1) function DIx(11), it serves as input of the ON-DELAY timer. - To assign a digital output DOx, which select TMOB(1) function DOx(20) to serve as output of this timer. - To define the timer time in Pr.071. When the timer input TMIB(1) DIx(11) is OFF, the timer output TMOB(1) DOx(20) will be OFF too. Until the timer input TMIB(1) DIx(20) is ON and continue ON for a specified time period of Pr.071 then TMOB DOx(14) become ON. - DIx(92) /TMIB(1) is complement input of DIx(11) TMIB(1). - DOx(41) /TMOB(1) is complement output of DOx(20) TMOB(1). The function of Timer(2) is same as Timer(1) - Pr.072 defines the timer time for Timer(2). - DIx(95) TMIB(2) is the input of Timer(2). - DIx(98) /TMIB(2) is complement input of DIx(95) TMIB(2). - DOx(95) TMOB(2) is the output of Timer(2). - DOx(98) /TMOB(2) is complement output of DOx(95) TMOB(2).
92	/TMIB(1)	
95	TMIB(2)	
98	/TMIB(2)	

28	COUNTER INPUT	Pr.108 (Counter Value) Monitors the value of clock input to counter.
29	COUNTER CLEAR	Pr.109 (Counter Set) defines maximum clock input value of counter. ● Digital input DIx assigned to Counter Input DIx(28), it serves as input of Counter. If DIx(28) triggered, the content of Pr.108 (Counter Value) will increase of 1. ● Digital input DIx assigned to Counter Input DIx(29), it serves as clear of Counter. If DIx(29) triggered, the content of Pr.108 (Counter Value) will clear to zero. ● To assign a digital output DOx, which select Counter Over function DOx(140) to serve as output of this counter, if $Pr.108 \geq Pr.109$, then DOx(140) become ON. ● The minimum width of trigger signal is 5ms. ° ● DOx(141) is complement output of DOx(140).
36	TMIC(1)	The drive built in two general purpose TIMERS. For example of Timer(1): ● Digital input DIx assigned to TMIC(1) function DIx(36), it serves as input of the ON/OFF timer. ● To assign a digital output DOx, which select TMOC(1) function DOx(42) to serve as output of this timer. ● To define the period of time for one ON/OFF cycle in Pr.071. When the timer input TMIC(1) DIx(36) is OFF, the timer output TMOC(1) DOx(42) is always under ON state. If the TMIC(1) DIx(36) is ON, then the TMOC DOx(42) will start the stable ON/OFF cycle. ● DIx(93) /TMIC(1) is complement input of DIx(36) TMIC(1). ● DOx(43) /TMOC(1) is complement output of DOx(42) TMOC(1). TMIC(1) DIx(36) or /TMIC(1) DIx(93) Pr.071 Pr.071 The function of Timer(2) is same as Timer(1) ● Pr.072 defines the timer time for Timer(2). ● DIx(96) TMIC(2) is the input of Timer(2). ● DIx(99) /TMIC(2) is complement input of DIx(96) TMIC(2). ● DOx(96) TMOC(2) is the output of Timer(2). ● DOx(99) /TMOC(2) is complement output of DOx(96) TMOC(2).
93	/TMIC(1)	
96	TMIC(2)	
99	/TMIC(2)	

7.3.4 Flip/Flop Function

DIx	Function	Description
22	SET1(FF1)	 The drive built in two general purpose Flip/Flops . Each Flip/Flop block has two SET inputs, two CLEAR inputs and two complementary outputs for free selection. ● If triggered Set A or Set B, will cause Q ON and /Q OFF. ● If triggered Clr A or Clr B, will cause Q OFF and /Q ON.
23	CLR1(FF1)	
24	SET2(FF2)	
25	CLR2(FF2)	
26	SET(FF1&FF2)	
27	CLR(FF1&FF2)	
		 Application example: Use DI1, DI2, DO1 and DO2 as LATCH RELAY.  Driver Pr.141=22 Pr.161=4 Pr.142=23 Pr.162=32 Pr.143=23 
133	CHANGE FF1	If DIx(133) is triggered, the status of Flip/Flop-1 (DOx(32) and DOx(33)) will be changed.
134	CHANGE FF2	If DIx(134) is triggered, the status of Flip/Flop-1 (DOx(34) and DOx(35)) will be changed.

8. Selection of Digital Output Function

8.1 Digital Output Function Related Parameters

Pr.nnn	Function	Description
161	DO0 Select	- The configuration of Digital Output refer to section 1.2.2 - Each Digital Output terminal can be configured individually by corresponding DOx Select parameters. - DO0 is connected to the Digital Input DI0 internally. - RY1 and RY2 pair terminals are NORMAL OPEN (1a) contacts of the output RELAY, and named DO3. Note: All of the Digital Outputs will go OFF for a short period when power ON or RESET.
161	DO1 Select	
162	DO2 Select	
163	DO3 Select	
164	DO4 Select	
165	DO5 Select	
166	DO6 Select	

8.2 Selection Table of Digital Output Function

DOx	Function	Comment	Reference
0	OFF	Always OFF	8.3.2
1	/(ENABLE)	Drive Not Enable	8.3.4
2	SPE	Speed Equal	8.3.1
3	SPNE	Speed Not Equal	
4	ALM	Alarm	8.3.4
5	NALM	No Alarm	
7	ENABLE	Drive Enabled	8.3.4
8	SPO	Speed Over	8.3.1
9	SPNO	Speed Not Over	
10	SPA	Speed Arrive	8.3.1
11	SPNA	Speed Not Arrive	
13	Irms > Pr.048	Irms > Pr.048	8.3.4
14	TMOA(1)	Timer(1) Output (OFF-Delay Type)	7.3.3 DIx(7)
15	SPZ	Zero Speed	8.3.1
16	SPNZ	Speed Not Zero	
20	TMOB(1)	Timer(1) Output (ON-Delay Type)	7.3.3 DIx(11)
32	Q1(FF1)	Output of Flip/Flop-1	7.3.4
33	/Q1(FF1)	Complement Output of Flip/Flop-1	
34	Q2(FF2)	Output of Flip/Flop-2	
35	/Q2(FF2)	Complement Output of Flip/Flop-2	
38	ON	Always ON	8.3.2
39	DO1 CLOCK	Clock output (for DO1 only)	8.3.3
40	/TMOA(1)	Complement of Timer(1) Output (OFF-Delay Type)	7.3.3 DIx(7)
41	/TMOB(1)	Complement of Timer(1) Output (ON-Delay Type)	7.3.3 DIx(11)
42	TMOC(1)	Timer(1) Output (ON/OFF Type)	7.3.3 DIx(36)
43	/TMOC(1)	Complement of Timer(1) Output (ON/OFF Type)	
52	IN POSITION	Position Error <= In Position Range	5.2.12 (Pr.570)
53	/(IN POSITION)	Position Error > In Position Range	
54	ERROR OVER	Position Error > Error Limit	
55	/(ERROR OVER)	Position Error <= Error Limit	
56	SEARCHING HOME	Drive is Searching Home Position	5.2.12 (DIx(128))
57	/(SEARCHING HOME)	Drive is Not Searching Home position	
70	(ENABLE) & (AI1>Pr.561)	Drive Enabled and AI1 Input Level > Pr.561	8.3.4
71	(ENABLE) & (AI1<Pr.561)	Drive Enabled and AI1 Input Level < Pr.561	
72	(ENABLE) & (AI2>Pr.562)	Drive Enabled and AI2 Input Level > Pr.562	
73	(ENABLE) & (AI2<Pr.562)	Drive is Enabled and AI2 Input Level < Pr.562	
74	(ENABLE) & (AI3>Pr.563)	Drive is Enabled and AI3 Input Level > Pr.563	
75	(ENABLE) & (AI3<Pr.563)	Drive is Enabled and AI3 Input Level < Pr.563	
78	OL WARNING	Over Load Level > 50%	8.3.4
79	/(OL WARNING)	Over Load Level < 50%	
80	AI1>Pr.561	AI1 Input Level > Pr.561	8.3.4
81	AI1<Pr.561	AI1 Input Level < Pr.561	
82	AI2>Pr.562	AI2 Input Level > Pr.562	
83	AI2<Pr.562	AI2 Input Level < Pr.562	
84	AI3>Pr.563	AI3 Input Level > Pr.563	
85	AI3<Pr.563	AI3 Input Level < Pr.563	

DOx	Function	Comment	Reference
86	ACCELERATING	Under Acceleration status for Speed mode	8.3.4
87	DECELERATING	Under Deceleration status for Speed mode	8.3.4
92	SHUTDOWN	Ramp Down EMS	7.3.1 DIx(249)
94	TMOA(2)	Timer(2) Output (OFF-Delay Type)	7.3.3 DIx(7)
95	TMOB(2)	Timer(2) Output (ON-Delay Type)	7.3.3 DIx(11)
96	TMOC(2)	Timer(2) Output (ON/OFF Type)	7.3.3 DIx(36)
97	/TMOA(2)	Complement of Timer(2) Output (OFF-Delay Type)	7.3.3 DIx(7)
98	/TMOB(2)	Complement of Timer(2) Output (ON-Delay Type)	7.3.3 DIx(11)
99	/TMOC(2)	Complement of Timer(2) Output (ON/OFF Type)	7.3.3 DIx(36)
123	ENCODER ZERO	Pass Through Encoder Zero Point	8.3.3
124	SERVO END	APTP Process is Completed	5.2.12 DIx(135)
125	/SERVO END	Complement Output of DOx(124)	
126	APTP BUSY	APTP is Processing	5.2.12 (DIx(118))
127	/APTP BUSY	Complement Output of DOx(126)	
128	HOME EXIST	Home Search is Completed	5.2.12 (DIx(128))
129	/HOME EXIST	Complement Output of DOx(128)	
130	TRAVEL LIMIT	Position Exceeds Limit in Both Direction	5.2.12 (Pr.565)
131	FWD TRAVEL LIMIT	Position Exceeds Forward Direction	
132	REV TRAVEL LIMIT	Position Exceeds Reverse Direction	
140	COUNT OVER	Counter Input Exceeds Counter Set Value	7.3.3 DIx(28)
141	/COUNT OVER	Complement Output of DOx(140)	
150	>WINDOW2	Feed Length > Lower Limit of Window2	11.1.3
151	<WINDOW2	Feed Length < Upper Limit of Window2	
152	IN WINDOW2	Feed Length in the position of Window2	
180	MARK LOSS	MARK signal loss	11.1
181	WINDOW	In Position of WINDOW	11.1.2
200	DI0 STSTUS	Monitor DI0 input status	8.3.4
201	DI1 STSTUS	Monitor DI1 input status	
202	DI2 STSTUS	Monitor DI2 input status	
203	DI3 STSTUS	Monitor DI3 input status	
204	DI4 STSTUS	Monitor DI4 input status	
205	DI5 STSTUS	Monitor DI5 input status	
206	DI6 STSTUS	Monitor DI6 input status	

8.3 Description of Digital Output Function

8.3.1 Speed Monitor Function

DOx	Function	Description
2	SPE	Pr.049 (Detect RPM) defines the threshold level for Speed Detector module. Pr.050 (Detect Tolerance) defines the allowable tolerance for Speed Detector module. ● If $\text{abs}(\text{Output Speed} - \text{Pr.049}) < \text{Pr.050}$, DOx(2) will ON. ● DOx(3) is complement output of DOx(2). ● If $\text{Output Speed} > \text{Pr.049}$, DOx(8) will ON. ● DOx(9) is complement output of DOx(8). ● If $(\text{Set Speed} - \text{Output Speed}) < \text{Pr.050}$, DOx(10) will ON. ● DOx(11) is complement output of DOx(10). ● If $\text{Output Speed} < \text{Pr.050}$, DOx(15) will ON. ● DOx(16) is complement output of DOx(15).
3	SPNE	
8	SPO	
9	SPNO	
10	SPA	
11	SPNA	
15	SPZ	
16	SPNZ	
		time
		time
		time
		time
		time

8.3.2 ON/OFF Control Function

DOx	Function	Description
0	OFF	When Digital Output DOx assigned to ON function DOx(0), the output status of DOx will always OFF. When Digital Output DOx assigned to OFF function DOx(38), the output status of DOx will always ON. This function is useful to control these Digital Outputs for other peripheral, independent to the drive operation.
38	ON	

8.3.3 Pulse Output Function

DOx	Function	Description
39	DO1 CLOCK	Pr.077 (DO1 Pulse Output Ratio) defines DO1 Pulse Output ratio, it is used for DO1 Clock frequency calculation. If Digital Output DOx assigned to DO1 CLOCK function DOx(39), it serves as CLOCK Generator. Output Frequency = (Motor Speed (RPM)/60)*(POLE)/2*(Pr.077) ● This function for DO1 only. ● Maximum output frequency is 1500Hz.
123	ENCODER ZERO	If Digital Output DOx assigned to ENCODER ZERO function DOx(123), when the motor rotates pass through Encoder Index, DOx(123) will be ON for 4ms, then change to OFF state automatically.

8.3.4 Running Status Monitor Function

DOx	Function	Description																										
1	/(ENABLE)	The output status of DOx(7) will be ON when the IGBT is triggered (drive is enabled), otherwise DOx(7) is OFF. DOx(1) is complement output of DOx(7).																										
7	ENABLE																											
4	ALM	The output status of DOx(4) is normally OFF when the drive detects No Alarm. If Alarm occurs, the output DOx(4) will ON immediately. DOx(5) is complement output of DOx(4).																										
5	NALM																											
13	Irms > Pr.048	Pr.048 (Detect Irms) defines the threshold level for Irms detector module. The ourput status of DOx(13) will be ON when Irms(%) > Pr.048.																										
70	(ENABLE) & (AI1>Pr.561)	If Digital Output DOx select DOx(70)~DOx(75) or DOx(80)~DOx(85), DOx are used to detect the input level of AIx respectively. If the comparison result is meet the condition of follows table, the output DOx will be ON, otherwise DOx is OFF. <table><tr><th>DOx</th><th>Condition</th></tr><tr><td>70</td><td>AI1 > Pr.561 and drive is enabled</td></tr><tr><td>71</td><td>AI1 < Pr.561 and drive is enabled</td></tr><tr><td>72</td><td>AI2 > Pr.562 and drive is enabled</td></tr><tr><td>73</td><td>AI2 < Pr.562 and drive is enabled</td></tr><tr><td>74</td><td>AI3 > Pr.563 and drive is enabled</td></tr><tr><td>75</td><td>AI3 < Pr.563 and drive is enabled</td></tr><tr><td>80</td><td>AI1 > Pr.561</td></tr><tr><td>81</td><td>AI1 < Pr.561</td></tr><tr><td>82</td><td>AI2 > Pr.562</td></tr><tr><td>83</td><td>AI2 < Pr.562</td></tr><tr><td>84</td><td>AI3 > Pr.563</td></tr><tr><td>85</td><td>AI3 < Pr.563</td></tr></table> ● AI1 input level can be monitored by Pr.201. ● AI2 input level can be monitored by Pr.202. ● AI3 input level can be monitored by Pr.203. ● Under this application, the value of Pr.561~Pr.563 should set in the range of 0~1023.	DOx	Condition	70	AI1 > Pr.561 and drive is enabled	71	AI1 < Pr.561 and drive is enabled	72	AI2 > Pr.562 and drive is enabled	73	AI2 < Pr.562 and drive is enabled	74	AI3 > Pr.563 and drive is enabled	75	AI3 < Pr.563 and drive is enabled	80	AI1 > Pr.561	81	AI1 < Pr.561	82	AI2 > Pr.562	83	AI2 < Pr.562	84	AI3 > Pr.563	85	AI3 < Pr.563
DOx	Condition																											
70	AI1 > Pr.561 and drive is enabled																											
71	AI1 < Pr.561 and drive is enabled																											
72	AI2 > Pr.562 and drive is enabled																											
73	AI2 < Pr.562 and drive is enabled																											
74	AI3 > Pr.563 and drive is enabled																											
75	AI3 < Pr.563 and drive is enabled																											
80	AI1 > Pr.561																											
81	AI1 < Pr.561																											
82	AI2 > Pr.562																											
83	AI2 < Pr.562																											
84	AI3 > Pr.563																											
85	AI3 < Pr.563																											
71	(ENABLE) & (AI1<Pr.561)																											
72	(ENABLE) & (AI2>Pr.562)																											
73	(ENABLE) & (AI2<Pr.562)																											
74	(ENABLE) & (AI3>Pr.563)																											
75	(ENABLE) & (AI3<Pr.563)																											
80	AI1 > Pr.561																											
81	AI1 < Pr.561																											
82	AI2 > Pr.562																											
83	AI2 < Pr.562																											
84	AI3 > Pr.563																											
85	AI3 < Pr.563																											
78	OL WARNING	When Pr.054 =11, the OL level can be monitored by Pr.061.																										
79	/(OL WARNING)	When DOx assigned to OL Warning function DOx(39), if OL level > 0%, then DOx(78) will ON. DOx(79) is complement output of DOx(78).																										
86	ACCELERATING	When DOx assigned to ACCELERATING function DOx(86), if drive is increasing its output speed, then DOx(86) will ON.																										
87	DECELERATING	When DOx assigned to DECELERATING function DOx(87), if drive is decreasing its output speed, then DOx(87) will ON.																										

200	DI0 STATUS	● When DI0~DI6 input status is ON, the corresponding digital output terminal DOx(200)~DOx(206) will ON. ● When DI0~DI6 input status is OFF, the corresponding digital output terminal DOx(200)~DOx(206) will OFF. ● This function is used to monitor DI0~DI6input status, and can used to control output status of DOx by DI0~DI6.
201	DI1 STATUS	
202	DI2 STATUS	
203	DI3 STATUS	
204	DI4 STATUS	
205	DI5 STATUS	
206	DI6 STATUS	

9. RS485 Communication

9.1 RS485 Communication Port Related Parameters

The following parameters must pre-assigned before use RS485 communication function.

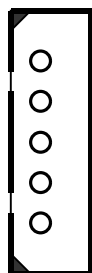
Pr.nnn	Parameter Name	Description		
120	Protocol Select	Pr.120	Protocol	Remarks
		0	JPS Protocol	
		1	JPS Modbus(RTU)	JPS Modbus Protocol, use for the master can only assign one slave ID.
		2	Profibus-DP	
		3	Modbus(RTU)	Standard Modbus protocol
121	Baud Rate	Pr.121	Baud Rate	
		0	4800	
		1	9600	
		2	19200	
		3	38400	
122	Stop Bit	Pr.122	Stop Bit	
		0	1	
		1	2	
123	ID	This parameter is used to assign the Communication Address while this drive controlled RS485 communication port. Computer may control any drive by select its corresponding ID		
		Pr.120	Pr.123 Range	
		0	1~99	
		1	0~250	
		2	Consult to our R&D department	
		3	0~250	
124	Queue Status	Monitors the number of data is queue up to write into EAROM memory.		
125	Parity	Pr.125	Parity	
		0	Even	
		1	Odd	
		2	None	

For JPS Protocol, must use Even Parity.

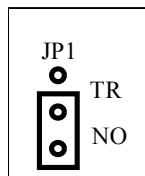
9.2 RS485 Port Configuration

The drive has a build in RS485 communication port on CON1 of Feedback I/O board, the definition of the connector pins are:

CON1 (JAM-SC25-05WS)



- 5:leave this pin open
- 4:Sig- (B)
- 3:Sig+ (A)
- 2: 0V
- 1:+5V



JP1 jumper of Feedback I/O board is used to select With/Without Terminal Resistor.

- JP1 on TR position, select with Terminal Resistor.
- JP1 on NO position, select without Terminal Resistor.

- RS485 Port can use to control multiple drives by connect the signal pin in parallel.
- The option of standard cable (CABLE_RS485) is used to transform JAM connector (CON1) into standard 9 pin D-sub Male connector. The definition of the D-sub connector is:

9pin D-sub Male Connector	Definition	JAM Connector (CON1)
PIN1~3	N.C.	
PIN4	A(SIG+)	PIN3
PIN5	B(SIG-)	PIN4
PIN6	0V	PIN2
PIN7~9	N.C.	

9.3 JPS Protocol & Format

All code transfer between Computer and Drive are ASCII code, and the “CR” code (0x0D) must add to the end of each command string.

The communication port must select 7 bit data, Even parity.

9.3.1 Computer to Drive

Computer may send three types of message to drive.

9.3.1.1 Control Command (No response will send back from drive)

Format: “C,uu,cc,ffff”

C : Head of COMMAND String.

uu : ID of drive, from 00 to 99.

If the “uu” code in command string is “00”, all drives can be controlled at the same time.

cc : Control command code, from 00 to 15.

The “cc” number is actually converted from four bits binary data.

$cc = 8 * \text{Bit-3(JOG)} + 4 * \text{Bit-2(Reverse)} + 2 * \text{Bit-1(RUN)} + \text{Bit-0(Reset)}$

Control Code	Function
cc=00	Stop
cc=01	Reset
cc=02	Forward Run
cc=06	Reverse Run
cc=10	Forward JOG Run
cc=14	Reverse JOG Run

ffff : Set speed, from 00000 to 09000.

9.3.1.2 Write Command (No response will send back from drive)

format: “W,uu,nnn,dddd”

W : Head of WRITE String.

uu : ID of drive, from 00 to 99.

If the “uu” code in command string is “00”, all drives can be controlled at the same time.

nnn : Parameter number, from 000 to 999.

dddd : data value, from 00000 to 65535.

If data exceed upper or lower limit (shown in parameter table) will be trimmed within boundary automatically.

9.3.1.3 Read Command (Drive will send back P-string after receive this string)

Format: “R,uu,nnn”

R : Head of READ String

uu : ID of drive, from 01 to 99.

Do not specify uu=00 for Read Command while multiple drives are under control.

nnn : Parameter number, from 000 to 999.

9.3.2 Drive to Computer

Drive will send back Parameter data and its Status after receive Read Command from computer.

Format: “**P,uu,nnn,tt,dddd,s,aaaa**”

- P** : P stands for PARAMETER String
uu : ID of drive, from 00 to 99.
This number is defined in Pr.093 of each drive.
nnn : Parameter number, from 000 to 999.
tt : Data type of this parameter, from 00 to 22.

tt	Data Type	Data Range	Format
0	Read/Write, store in EAROM	00000~65535	999.99
1	Read/Write, store in EAROM	00000~65535	9999.9
2	Read/Write, store in EAROM	00000~65535	99999
3	Read/Write, store in EAROM	00000~00255	999.99
4	Read/Write, store in EAROM	00000~00255	9999.9
5	Read/Write, store in EAROM	00000~00255	99999
6	Read/Write, store in EAROM	00000~00001	99999
7	Read/Write, store in RAM	00000~65535	99999
8	Read only, store in RAM	00000~65535	999.99, if data >32767 which is -(65536-ddddd)
9	Read only, store in RAM	00000~65535	999.99
10	Read only, store in RAM	00000~65535	9999.9
11	Read only, store in RAM	00000~65535	99999
12	Read only, store in RAM	00000~00255	999.99
13	Read only, store in RAM	00000~00255	9999.9
14	Read only, store in RAM	00000~00255	99999
15	Read only, store in RAM	00000~00001	99999
16	Read only, store in RAM	00000~00015	99999, (Binary)
17	Read only, store in RAM	00000~00007	99999, (Binary)
18	Read only, store in RAM	00000~00003	99999, (Binary)
19	Read only, store in RAM	00000~01023	99999
20	Read only, store in RAM	00000~00001	99999, (Hex)
22	Read only, store in RAM	00000~00001	99999, (Hex)

- dddd** : Data value, from 00000 to 65535.
s : Drive output status, from 0 to 9.
s = 1 : Drive Reverse Running
s = 2 : Drive Forward Running.
s = 3 : Drive Stop
else, undefined.
aaaa : Alarm history, from 0000 to 9999
The drive can record 4 Alarm messages.
Most significant digit stands for oldest Alarm message.
Least significant digit stands for present Alarm message.
Refer to section 5.2.8 (Pr.013) for Alarm code.

9.4 HMI Protocol (Modbus(RTU))

The option of Modbus(RTU) interface let drive simulate as Modicon PLC and can connect with HMI directly. Up to 8 drives can be controlled by one HMI for direct control and monitor.

9.4.1 Parameter Setting

9.4.1.1 HMI Setting

In fact, the drive simulate as Modicon PLC when connect with HMI, so communication protocol is similar to standard Modbus(RTU).

- Select Modbus(RTU)
- HMI serves as Master, address select "0"
- Drive serves as Slave, address select "1".
- Data Bit select 8 bit data.
- Select Baud, Stop Bit and Parity.

9.4.1.2 Drive Setting

- Pr.120 = 1 or 3, select Modbus(RTU).
- Pr.121 = 0/1/2, select Baud Rate. 0 : 4800, 1 : 9600, 2 : 19200
- Pr.122 = 0/1, select Stop Bit. 0 : 1 stop bit, 1 : 2 stop bits
- Pr.123 = ID,
- If Pr.120 = 1, select JPS Modbus(RTU) protocol, ID selection as:
 - Drive 1, select ID=01
 - Drive 2, select ID=11
 - Drive 3, select ID=21
 - ⋮
 - Drive 8, select ID=71
- If Pr.120 = 3, select Modbus(RTU) protocol, Pr.123 select as Slave ID
- Pr.125 = 0/1/2., select Parity. 0 : Even 1 : Odd, 2 : No Parity

NOTE: These parameters only effect after RESET.

9.4.2 Definition of Modbus(RTU) and Drive

When HMI communicate with Slave of Modbus(RTU), the address definition is:

- 0x 1 ~ 0x 10000, Bit for Read/Write
- 1x 1 ~ 1x 10000, Bit for Read only
- 3x 1 ~ 3x 10000, Word for Read only
- 4x 1 ~ 4x 10000, Word for Read/Write
- 4L 1 ~ 4L 10000, Long Word for Read/Write

9.4.2.1 Corresponding Table of Read/Write Bit

HMI Address	Digital Input	Description
0x 1	DI0	● If HMI input Bit (0x 1 ~ 0x 11) = 1, means the corresponding DIx is ON. ● If HMI input Bit (0x 1 ~ 0x 11) = 0, means the corresponding DIx is OFF.
0x 2	DI1	
0x 3	DI2	
0x 4	DI3	
0x 5	DI4	
0x 6	DI5	
0x 7	DI6	
0x 8	DI7	
0x 9	DI8	
0x 10	DI9	
0x 11	DI10	
0x 12	DI11	
0x 13	DI12	
0x 14	DI13	
0x 15	DI14	
0x 16	RESET	0x 16=1, drive execute RESET.

9.4.2.2 Corresponding Table of Read Only Bit

HMI Address	Status	Description
1x 1	DI0	● If the reading of HMI Bit = 1, means the input states of corresponding DIx is ON. ● If the reading of HMI Bit = 0, means the input states of corresponding DIx is OFF.
1x 2	DI1	
1x 3	DI2	
1x 4	DI3	
1x 5	DI4	
1x 6	DI5	
1x 7	DI6	
1x 8	DI7	
1x 9	DI8	
1x 10	DI9	
1x 11	DI10	
1x 12	DI11	
1x 13	DI12	
1x 14	DI13	
1x 15	DI14	
1x 16	Reserve	● If the reading of HMI Bit = 1, means the Output states of corresponding DOx is ON. ● If the reading of HMI Bit = 0, means the Output states of corresponding DOx is OFF.
1x 17	DO0	
1x 18	DO1	
1x 19	DO2	
1x 20	DO3	
1x 21	DO4	
1x 22	DO5	
1x 23	DO6	
1x 24 ~ 1x 31	Reserve	● 1x 32 =0, Drive is normal ● 1x 32 =1, Drive under Alarm
1x 32	Drive Status	

9.4.2.3 Corresponding Table of Read Only Word

HMI Address	Parameter number
3x1	Pr.000
3x 2	Pr.001
3x 3	Pr.002
⋮	⋮
3x998	Pr.997
3x999	Pr.998
3x1000	Pr.999

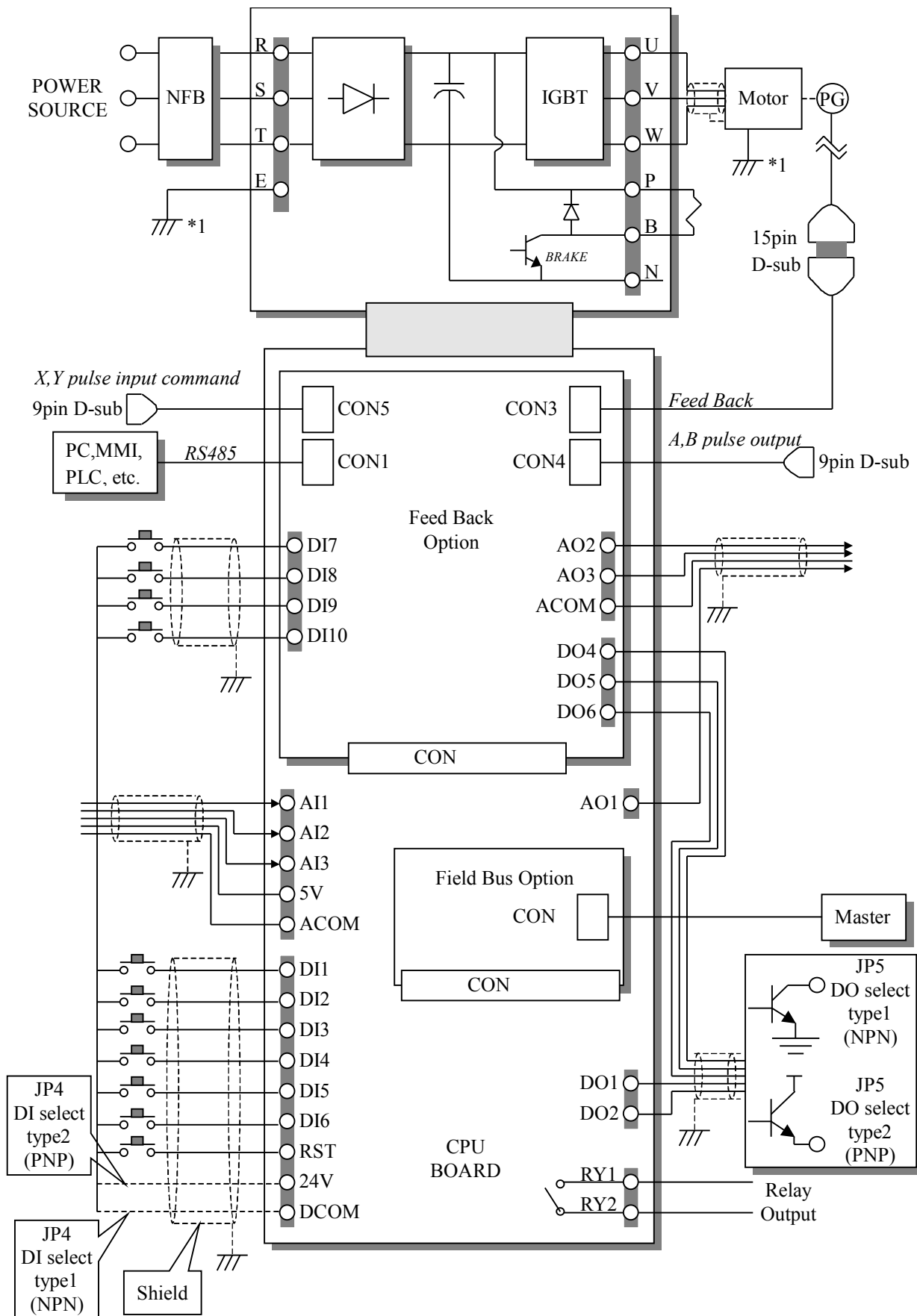
9.4.2.4 Corresponding Table of Read/Write Word

HMI Address	Parameter number
4x1	Pr.000
4x 2	Pr.001
4x 3	Pr.002
⋮	⋮
4x998	Pr.997
4x999	Pr.998
4x1000	Pr.999

9.4.2.5 Corresponding Table of Read/Write Long Word

HMI Address	Parameter number
4L1	Pr.001(H)/Pr.000(L)
4L 2	Pr.002(H)/Pr.001(L)
4L 3	Pr.003(H)/Pr.002(L)
⋮	⋮
4L998	Pr.998(H)/Pr.997(L)
4L999	Pr.999(H)/Pr.998(L)
4L1000	Not Allow

10. Block Diagram of PDS Drive



*1 Drive and Motor must connect Earth properly and separately.

11. Special Function

11.1 MARK Function

Under Auto Point-To-Point control mode, use this function to identify printing mark with Mark Sensor.

11.1.1 Parameters Description

Length parameters

- DL0(Pr.501/500) defines Cutting Length.
- DL2(Pr.505/504) defines First Length after Mark signal appeared.
- DL5(Pr.511/510) defines Second Length after Mark signal appeared.

Mark Parameters

- The areas of Mark signal may appear call “Window”.
- DL3(Pr.507/506) defines Lower Limit of Window.
- DL4(Pr.509/508) defines Upper Limit of Window.
- The Mark signal must input from DI2(180).
- The Mark signal only validate when the feed length between the length of DL4 and DL3.
- When execute Auto Point To Point function
If the Valid Mark signal appeared, the destination length is DL2 (or DL5) from Mark position.
If the Valid Mark signal not appeared, the destination length is DL0.

Mark-Loss Output

- DOx(180) serves as Mark-Loss output function
- DOx(180) will be OFF when start Auto-Point-To-Point function.
- If the Mark signal appears in the range of Window, DOx(180) remains OFF.
- If the Mark signal not appear in the range of Window, DOx(180) become ON.

Length Conversion

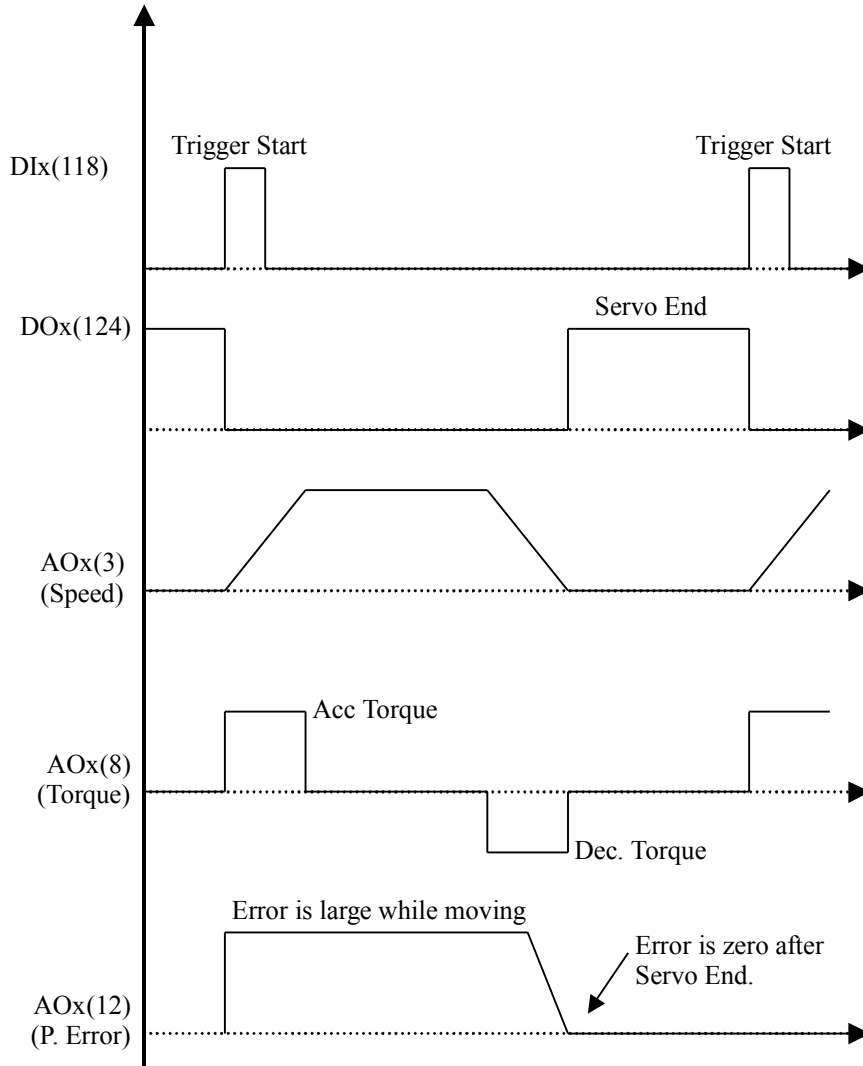
- Pr.576/577 defines the actual physical length in micrometer when motor rotates on revolution. (μm /revolution)
- Set Pr.334/384/434/484=6, 6 data to be converted micrometer into clocks.
- DL16 (μm in Pr.533/532)→DL0 (cks in Pr.501/500)
- DL18 (μm in Pr.537/536)→DL2 (cks in Pr.505/504)
- DL19 (μm in Pr.539/538)→DL3 (cks in Pr.507/506)
- DL20 (μm in Pr.541/540)→DL4 (cks in Pr.509/508)
- DL21 (μm in Pr.543/542)→DL5 (cks in Pr.511/510)
- Select DL2 or DL5 by DIx(155)
 1. If DIx(155) OFF, DL18(→DL2) selected (first Length after Mark signal appeared).
 2. If DIx(155) ON, DL21(→DL5) selected (second Length after Mark signal appeared)
 3. If DIx(155) not selected, DL18(→DL2) selected.

Mark Setting

- Set DL16 = length between two mark (Cutting Length in μm)
- Define the tolerance between two mark as MarkTolerance
- Set DL18 = 2 * MarkTolerance (first Length after Mark signal appeared)
- Set DL20 = DL16 – 1 * MarkTolerance (Window Upper Limit)
- Set DL19 $\leq$ DL16 – 3 * MarkTolerance (Window Lower Limit)

11.1.2 Running Status Monitor

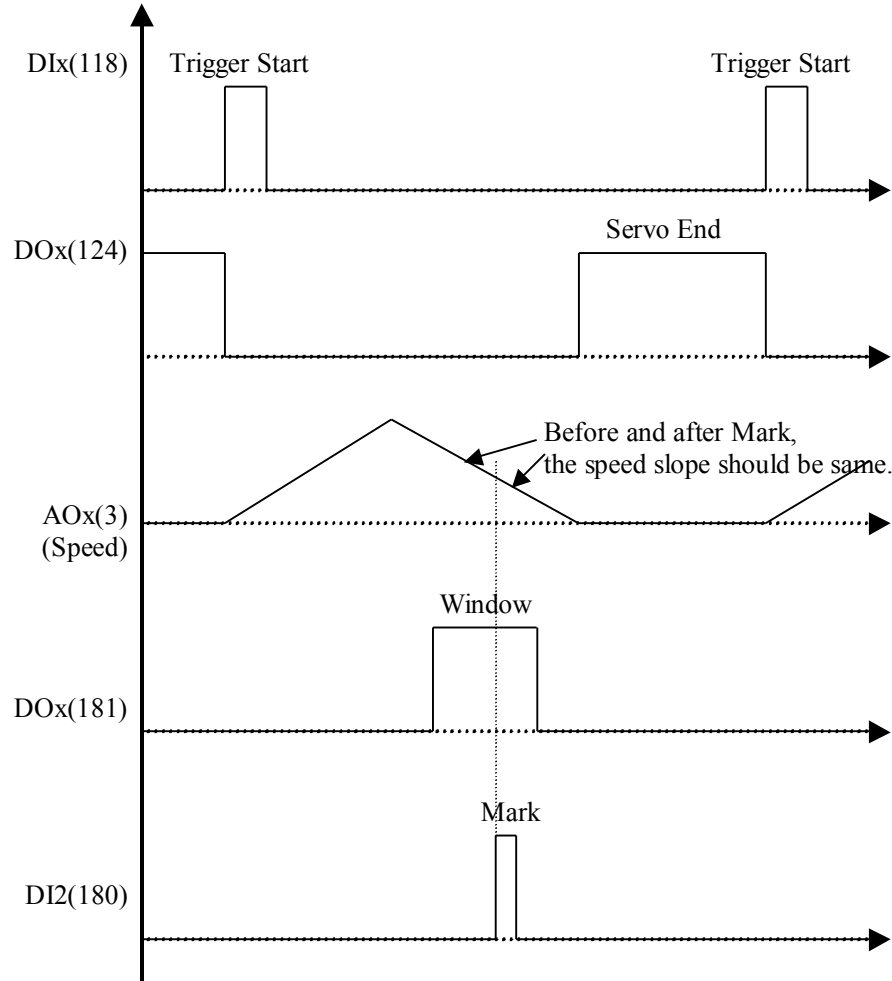
Example for Long Cutting Length



Remarks:

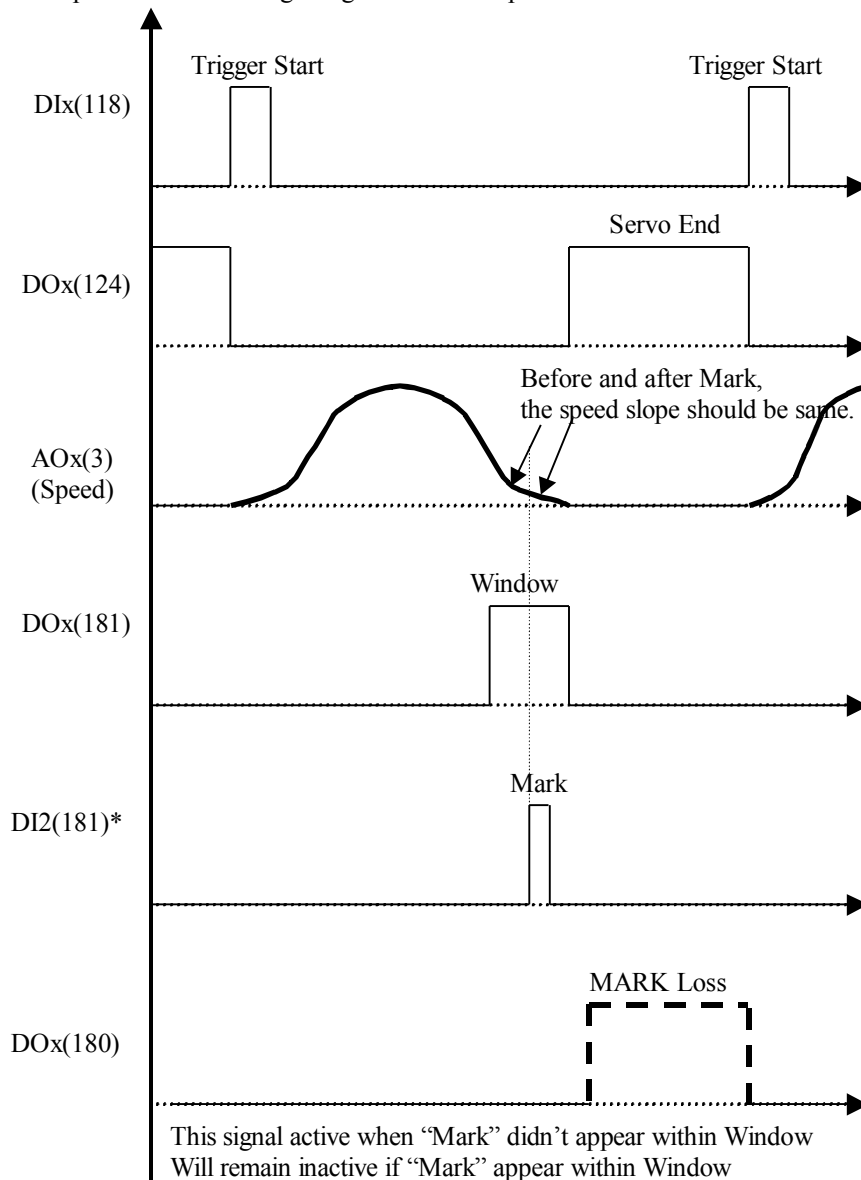
1. AOx(3), AOx(8), AOx(12) are used to monitor Running Speed Curve, Torque Demand Curve and Position Error Curve respectively. Refer to section 5.2.6
2. All the AOx outputs have 10ms RC Filter in side, the observed curve is distorted.
3. If AOx(3) = 10V, Speed = maximum speed limit (Pr.315/365/415/465)
4. If AOx(8) = 10V, Torque = maximum torque limit (Pr.312/362/412/462)
5. If AOx(12) = 10V, Error = clocks defined in Pr.570
6. The AOx(8) is used to gauge the selection of power range for drive and motor.
7. The AOx(12) is used to gauge the settling time of motor.

Example for Short Cutting Length



11.1.3 S Ramp Curve

Set Pr.344/394/444/494=1 and then RESET to select APTP S-curve acceleration/deceleration.
Example for Short Cutting Length with S Ramp



Remarks:

- The Mark signal must input from DI2(181).
- Pr.559/558, Pr.561/56, Pr.563/562 are define as new function; do not use them for length setting.
- Pr.561~Pr.563 define as Torque Compensation for improving Position Error.
 1. If Pr.561=0, Pr.562 defines the rate of Acceleration Torque Compensation (9999=99.99%)
Pr.563 defines the rate of Deceleration Torque Compensation (9999=99.99%)
 2. 令 Pr.561=1, Select Auto Torque Compensation.
- Pr.558 and Pr.559 used to define Window2
 1. Pr.558 defines Lower Limit of Window2 (9999 = 99.99% of Set Length)
 2. Pr.559 defines Upper Limit of Window2 (9999 = 99.99% of Set Length)
 3. The DOx(150) will ON, if feed length > Pr.558 (Lower Limit of Window2)
 4. The DOx(151) will ON, if feed length < Pr.559 (Upper Limit of Window2)
 5. The DOx(152) will ON, if feed length in the position rang of Window2.
- Pr.583/582 used to monitor the feed length in Hex Form.
When Mark Input (DI2(180) or DI2(181)) is selected, if DIx(118) triggered, Pr.583/582 will be cleared to 0.
- Pr.735/734 is used to display last feed length in Hex Form.

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