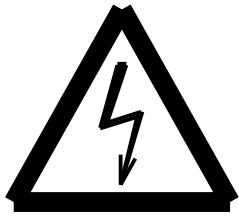




PDVip - Position Control  
VECTOR INVERTER  
INSTRUCTION MANUAL



# WARNING !



**Attention to these warning signs on the inverter or in this instruction book.**

**They indicate danger to human body or damage to the inverter.**

**Before installing and putting the inverter 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 inverter. 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 inverter. It may be too late if you start working with the inverter before read this instruction manual.

Never permit unqualified personnel to operate the inverter.



## WARNING

This inverter produces dangerous electrical voltages and controls rotating mechanical parts. Death, severe injury or substantial damage to property can occur if the instructions in this operating manual are not complied with.

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

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

**\*\* The PD inverter operates at high voltages.**

**\*\* The DC-link capacitor remain charged to dangerous voltages even the power is removed. For this reason it is not permissible to open the inverter cover until ten minutes after the power has been turned off. When handling the open inverter it should be noted that live parts are exposed. Do not touch these live parts.**

**\*\* The following terminals can carry dangerous voltages even if the motor is inoperative:**

The power supply terminal L1,L2/N (or R,S,T)

The motor terminal U,V,W

The DC-link terminal P,N

The brake resistor terminal Br+,Br-

**\*\* 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 inverter to start up automatically after an input power failure.**

# 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 inverter and with hazards involved. In addition, the person must be:

- (1) Trained and authorised to energize, de-energize, clear, ground and tag circuits and equipment in accordance with established safety practices.
- (2) Trained in the proper care and use of protective equipment in accordance with established safety practices.
- (3) 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 !**

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# 1 Description of PD Series inverter

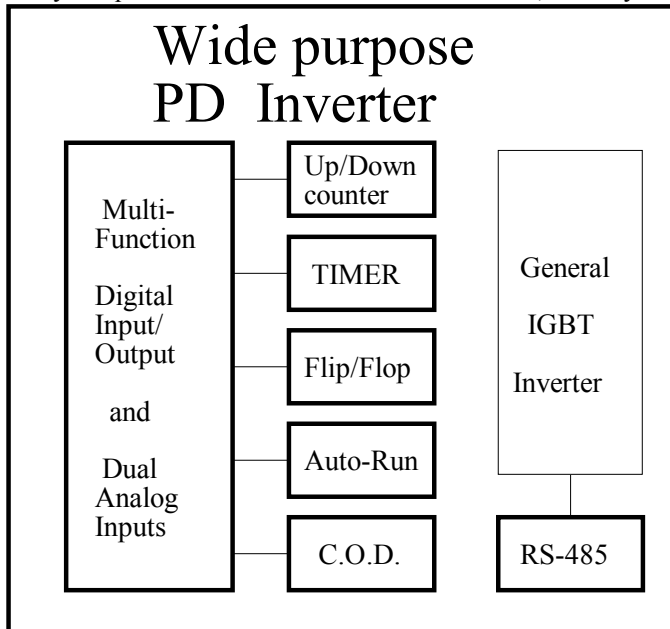
## 1.1 General description and Design philosophy

The PD Series inverter is a POWER CONVERTER for variable-speed AC drives.

It applies the Pulse Width Modulation method to control the output voltage and frequency to the motor. The design of hardware and firmware are based on advanced microprocessor technology.

Power Device "IGBT" is used to increase switching carrier frequency for eliminating the motor operation noise.

Many unique functions built in this Inverter series, are very useful to customers for all kinds of application.



Built-in standard **UP/DOWN Counter** Module, **Timer/Counter** Module and **Flip/Flop** Module which are very often used in actual application system .

Output current waveform is trimmed to run the motor smoothly even if under low running frequency.

Special **C.O.D.(Current Over Detector)** Module can monitor output current and generate warning signal for sophisticate control.

Four digital inputs and three digital outputs are all programmable to meet all kinds of applications.

Two analog inputs **AI1 & AI2** are provided for voltage, current control. Moreover, the two inputs can serve as **AI1\*AI2** or **AI2+AI1** or other combinations out of your imagination.

**RS485 serial communication** port is built in to the inverter as standard. It is very useful when inverter or many inverters would like to be dynamical controlled by master computer. With repeater one serial port can address up to 99 inverters.

(Standard RS485 driver can drive up to 31 inverters

only.)

Two types of panel **LOCAL** and **REMOTE** are designed for PD Series. Refer to **Section 3** for detail description.

The PD Series inverter is composed by three major parts : **PANEL , CONTROL BOARD & POWER CONVERSION UNIT.**

## 1.2 Hardware input & output configuration

The terminal of the control board is :

CHB	PG+	AI1	ACOM	AI2	DI1	DI2	REV	24V	DO1	DO2
-----	-----	-----	------	-----	-----	-----	-----	-----	-----	-----

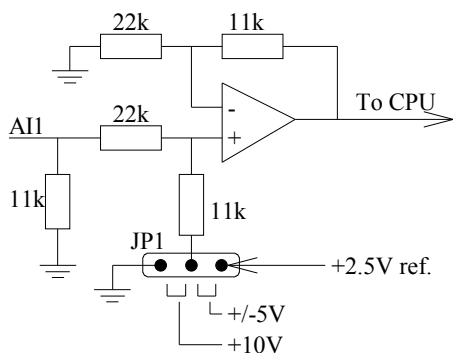
CHA	PG-	AM	5V	DI3	DI4	RST	RUN	DCOM	RY1	RY2
-----	-----	----	----	-----	-----	-----	-----	------	-----	-----

Note : Four terminals "PG+", "PG-", "CHA" and "CHB" are not used in standard PD Series, they are reserved for **PDF/PDV Series** for accurate speed feed back.

## 1.2.1 Analog input blocks (Refer to Sec. 7)

**AI1** and **AI2** are analog input terminals. **AM** terminal is used for analog signal output. **ACOM** is the common terminal for analog circuit. The **5V** terminal supply analog +5 volt. Inside the control board, there are two jumpers **JP1** and **JP2**.

### 1.2.1.a Analog input AI1 module

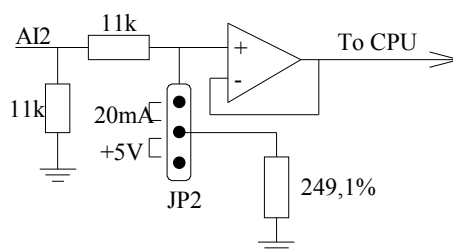


**JP1** is used to define the characteristic of the input terminals **AI1**.

If you are using external analog voltage 0 ~ +10V input, please use **AI1** and select **JP1** to **+10V** position.

If you are using external analog voltage -5V ~ +5V input, please use **AI1** and select **JP1** to **+/-5V** position.

### 1.2.1.b Analog input AI2 module

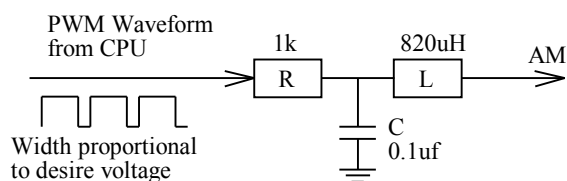


**JP2** is used to define the characteristic of the input terminal **AI2**.

If you are using 0 ~ +5V input(external or internal voltage reference), please use **AI2** and select **JP2** to **+5V** position.

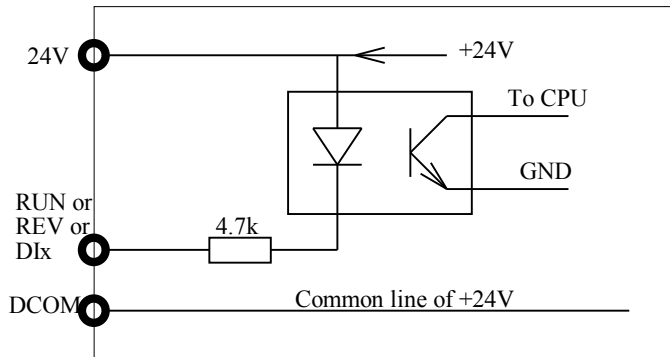
If you are using external 20mA current input, please select **AI2** and select **JP2** to **20mA** position.

## 1.2.2 AM the Analog output module (Refer to Sec.10)



The output voltage of AM terminal comes from CPU in PWM waveform. Its duty cycle is proportional to the desired analog amplitude. And the signal is filtered by internal resistor R and capacitor C.

## 1.2.3 Digital input modules ( DI1 ~ DI4 ) and Control Command inputs ( RUN & REV )



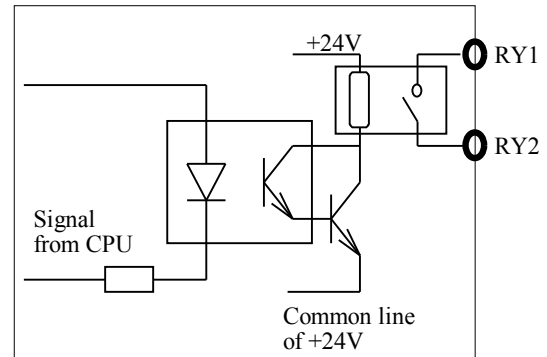
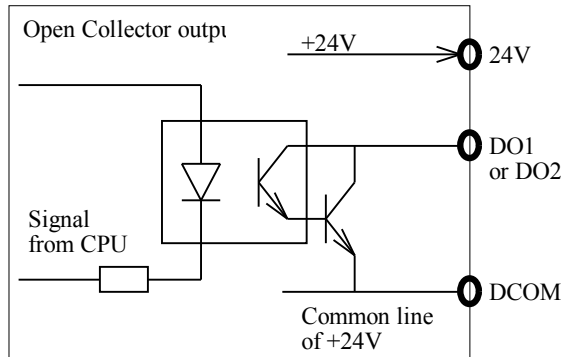
**DI1, DI2, DI3 and DI4** are identical four programmable digital input terminals. **DCOM** is the common point for the digital circuits. User should use dry contact or Open collector output between DIx and DCOM to drive these digital inputs. **RUN** and **REV** inputs have same structure as DIx.

## 1.2.4 Digital output terminals (Refer to Sec. 9)

There are three digital output signals available to the user. Two of them are designed as **open collector** output, another is voltage isolated **"1a" contact** of relay output.

**Open collector outputs** are named as **DO1** and **DO2**, **DCOM** is the common point.

The relay output is terminals **RY1, RY2**. (Note RY1,RY2 should drive 24V relay only.)



## 1.2.5 Hardware RESET terminal ( RST )

The input hardware structure is similar to DIx.

Terminal **RST** is used for reset the inverter. Under any circumstances, **RST** and **DCOM** shorted together will force the inverter execute **RESET**, as if **Power On** again.

## **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 inverter is at least 100mm.

Make sure that a space of 40mm is kept free at the sides of the inverter to permit the cooling air to escape from the side slits.

Ensure that the temperature does not exceed the specified level when the inverter is installed in cubicle.

Avoid excessive vibration and shaking of the equipment.

### **NOTE**

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

## **2.1 Outline Dimensions**

### **Outline Drawing**

Fig.1

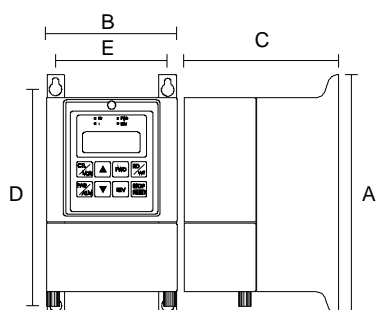


Fig.2

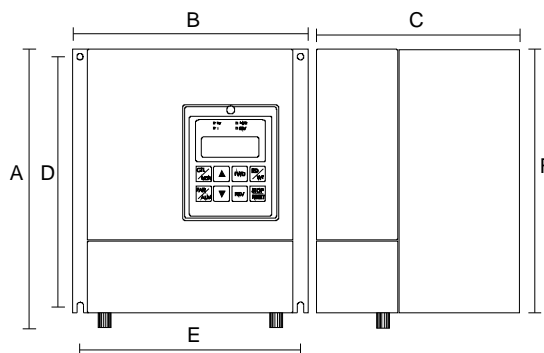


Fig.3

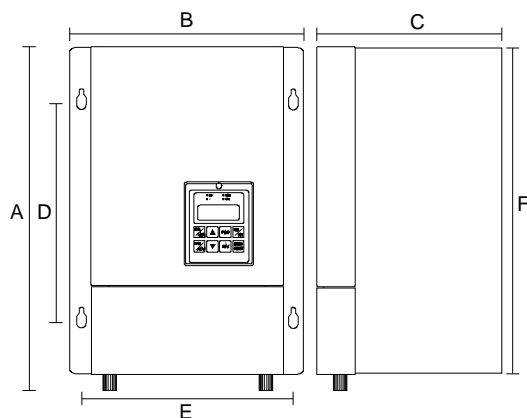
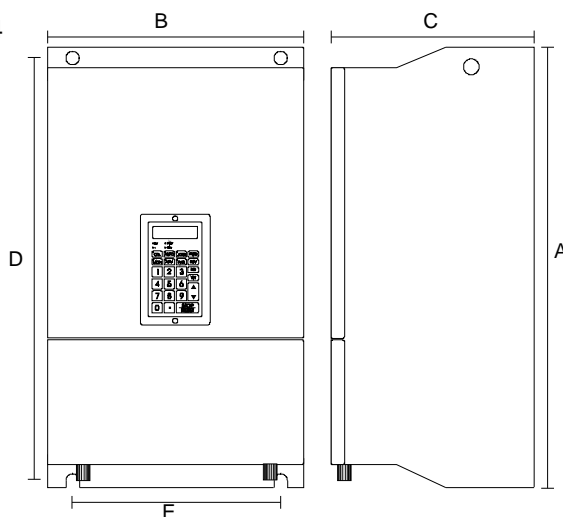


Fig.4





## Dimension Table

Model	Drawing	A	B	C	D	E	F	Mounting Screw
2007	Fig.1	204	113.5	156.8	182	98.3	-	M4
2007N 4007N	Fig.2	227	176.6	120.5	195	164.6	215	M4
2015N 4015N	Fig.2	227	176.4	140.5	195	164.4	215	M4
2022 2037 4007 4015 4022 4037	Fig.2	270	214	179	236	202	258	M4
2055 2075 4055 4075	Fig.3	385	240	218.2	270	223	373	M5
2110 2150 4110 4150	Fig.4	584	295	201.2	555.4	240	-	M8
2225 2300 4225 4300	Fig.4	729	403	247	704.6	345	-	M8

## 2.2 Power Terminal

The lower cover must be removed to connect the electrical leads.

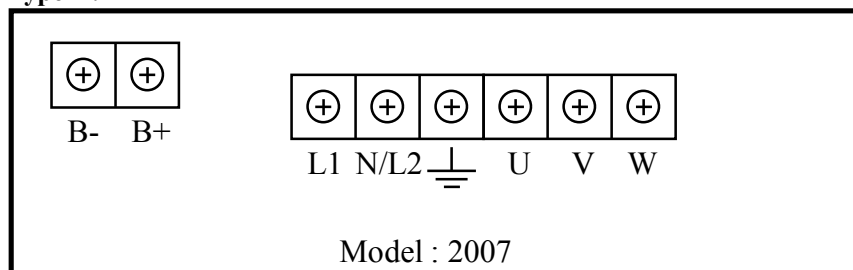
Basically, the Power terminals are divided into three portions :

- The Power line input, (R,S,T or L1,L2) receives power for the operation of the inverter.
- The Motor line output, (U,V,W) delivers Variable Frequency output to motor leads.
- the DC bus (P,N)or Discharge transistor output BR terminals.

**⚠ WARNING** : Never connect power line to U,V,W.

For different models, the power terminals may have different configurations as below :

**Type 1 :**

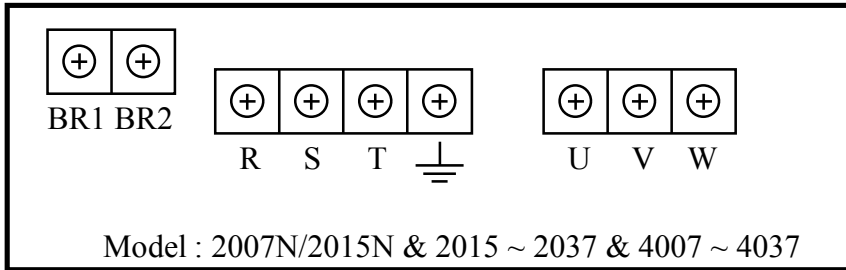


\* L1, L2 are used for 220VAC single phase power line input.

\* U,V,W are for Motor.

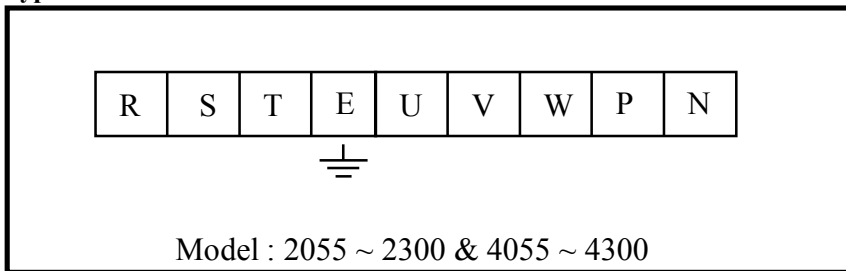
\* B+, B- connect to brake resistor.

#### Type 2 :



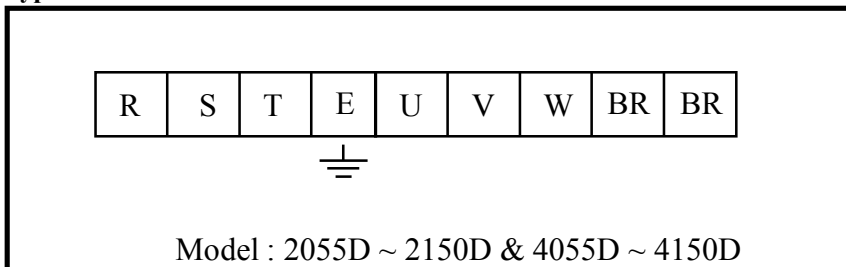
- \* For 2xxx Series , R,S,T are 220VAC three phase power line input.
- \* For 4xxx Series, user must specify exact power line input voltage. Either 380 or 440VAC.
- \* BR1, BR2 connect to brake resistor.
- \* Must connect to R & T for only single phase input.

#### Type 3 :



- \* For 2xxx Series , R,S,T are 220VAC three phase power line input.
- \* For 4xxx Series, user must specify exact power line input voltage. Either 380 or 440VAC.
- \* U,V,W connect to Motor.
- \* P, N terminals direct connect to internal condensor.
- User can connect a **STANDARD BRAKE MODULE** through P,N terminals.
- \* Must connect to R & T for only single phase input.

#### Type 4 :



- \* For 2xxx Series , R,S,T are 220VAC three phase power line input.
- \* For 4xxx Series, user must specify exact power line input voltage. Either 380 or 440VAC.
- \* U,V,W connect to Motor.
- \* BR terminals can connect to BRAKE RESISTOR
- \* Must connect to R & T for only single phase input.

## 2.3 Connect Power line input to Inverter



### WARNING and CAUTION

Between the power line and the inverter, add NFB for system protection.

In PD series, the power input terminal is (L1,L2/N) or (R,S,T).


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 inverter.

## 2.4 Connect inverter output to Motor



### WARNING :

Do not insert contactors between inverter 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 DC Bus or Brake Discharge terminal



### CAUTION :

Some smaller power rating models , the discharge transistor is built in as standard. For these models, the **BR** terminals are assigned for connecting to the external resistor.

For models without built in discharge transistor, two terminal points **P** and **N** is reserved for customer to use **Brake Discharge Unit**.

For models which have **BR** terminal , the recommended resistor is shown in the list.

However, in case the inertia is large or discharge duty cycle is high, user may increase the Wattage of the resistor.

Model	Resistor(OHM)	Watt
PD-2007	200	80
PD-2015	100	150
PD-2022	60	250
PD-2037	40	300
PD-2055-D	30	500
PD-2075-D	20	600
PD-2110-D	15	1000
PD-2150-D	10	1500
-	-	-
PD-4007	750	80
PD-4015	400	150
PD-4022	250	250
PD-4037	150	300
PD-4055-D	100	500
PD-4075-D	75	700
PD-4110-D	50	1000
PD-4150-D	40	1500
Discharge rate duty 10% .		



**WARNING :** Do not connect resistor to the P,N terminals directly.

For models with **P, N** terminal only, means no discharge transistor is inside the inverter.

If discharge function is necessary customer must use separate **Brake Discharge UNIT** .

Terminal **P** is connected to the positive point of internal **DC- bus**, and **N** is connected to the negative point.

## 2.6 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 cabel conduit/trunking.

## 3 CONTROL PANEL

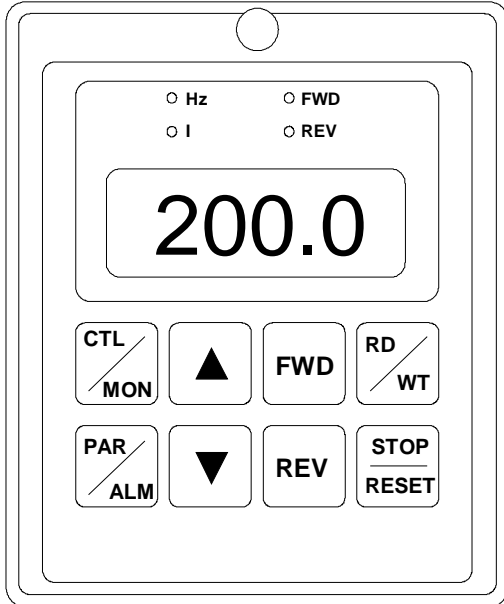
This inverter supports two types of control panel. One is called **Local Panel**, the other is **Remote Panel**. User may use both Panels one the same inverter at the same time.

Note : While both panels are used, the **Local panel** can only operate under **MONitor** mode

**Local panel** can mount on the upper cover directly and connect to the control board through a IDC-40 pins flat cable.

**Remote panel** is connected to the inverter through a 5-pin connector using RS485 serial communication signal lines.

### 3.1 LOCAL PANEL



On LOCAL Panel there are four digit 7-segment data display and four indication led's and eight membrane keys. Four possible operation modes : "CTL", "MON", "PAR" and "ALM" are described follows :

#### 3.1.1 CTL mode

Push the "CTL/MON" key, will toggle between "CTL" or "MON" Mode.

If both "HZ" and "I" Led are blank, it is under "CTL" Mode. Under "CTL" Mode, user can control the inverter running in either direction and may modify the desired running speed.

The key's functions are :

**FWD** key is used for running the inverter in forward direction.

**REV** key is used for running the inverter in reverse direction.

**STOP** key is used to stop the inverter.

**RD/WT** key has two function : READ from or WRITE to Pr.00.

▲ key is used to increase the set frequency or the data read from Pr.00.

▼ key is used to decrease the set frequency or the data read from Pr.00.

#### 3.1.2 MON mode

Push the "CTL/MON" key, will toggle the inverter between "CTL" or "MON" Mode.

Under "MON" Mode, user can control the inverter running in either direction and may monitor any two internal status easily.(Refer to Sec.13)

If "HZ" Led is on, it is under "MON" Mode and 7-segment shows the "HZ" data.(Or the desired parameter assigned by Pr.99)

If "I" Led is on, it is under "MON"Mode and 7-segment shows the "I" data.(Or the desired parameter assigned by Pr.98)

**FWD** key is used for running the inverter in forward direction.

**REV** key is used for running the inverter in reverse direction.

**STOP** key is used to STOP the inverter.



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.

#### 3.1.3 PAR mode

Push the "PAR/ALM" key, will toggle between "PAR" or "ALM" mode.

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

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

Under "PAR" Mode, user can modify or monitor all the internal PARAMETERS.

To modify a parameter, follow the steps described below :

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

STEP 2: push ▲ or ▼ key to select desired parameter number.

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

STEP 4: push ▲ or ▼ key to modify the displayed value.

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

STEP 6: push "PAR/ALM" repeat STEP 1.

### 3.1.4 ALM mode

Push the "PAR/ALM" key, will toggle the inverter between "PAR" or "ALM" mode.

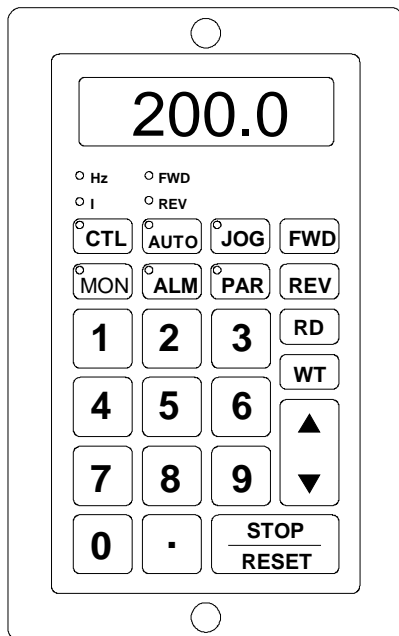
If push PAR/ALM key, 7-segment shows "0.-xx", it is under "ALM" Mode.

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

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

▲ and ▼ key are used to check ALARM History.

## 3.2 REMOTE PANEL



On REMOTE Panel there are four digit 7-segment data display , ten indication LED's and twenty-four membrane keys.

It will operate under five possible modes : "CTL", "MON", "PAR", "JOG", and "ALM" modes.

**Note : The "AUTO" key on REMOTE PANEL has no effect in PD-Series.**

### 3.2.1 CTL mode

Push "CTL" key, the Remote Panel enters CONTROL mode immediately.

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

**Example : If Pr.40=8, Just push "6", "0" & "FWD" will cause the inverter run at 60Hz.**

**If Pr.40=0, and Pr.00=50.00, Just push "FWD" will cause the inverter run at 50Hz.**

The key's functions are :

**FWD** key is used for running the inverter in forward direction.

**REV** key is used for running the inverter in reverse direction.

**STOP** key is used to stop the inverter.

**RD** key is used to READ the preset speed stored in Pr.00.

**WT** key is used to WRITE new desired speed into Pr.00.

Number & Decimal keys are used for modify the desired speed.

### 3.2.2 MON mode

Push "MON" key, the Remote Panel enters MONITOR mode immediately.

Under "MON" Mode, user can control the inverter running in either direction and may monitor any two internal status easily.(Refer to Sec. 13)

If "HZ" Led is on, 7-segment shows the "HZ" data(Or the desired parameter assigned by Pr.99)

If "I" Led is on, 7-segment shows the "I" data(Or the desired parameter assigned by Pr.98)

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

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

STOP key is used to stop the inverter.

▲ & ▼ keys are used to select "HZ" or "I" data shown on the 7-segment display.

### 3.2.3 PAR mode

Push the "PAR" key, the Remote Panel enters PARAMETER mode immediately.

Under "PAR" Mode, user can modify or monitor all the internal PARAMETERS.

To modify a parameter, follow the steps described below :

STEP 1: Select Parameter & READ.

For example, to read Pr.19, operate as follows:

push "PAR", push "1", push "9", push "RD".

Then the content of Pr.19 will show on the 7-Segment display.

STEP 2: Modify parameter & WRITE.

Follow the example to write the value 15 into Pr.19.

Select Pr.19 as explained in STEP 1.

Push "1", push "5", push "WT".

Then the Pr.19 contains the value 15.

### 3.2.4 JOG mode

**Push the "JOG" key, the Remote Panel enters JOG mode immediately.**

**FWD** key is used to run the inverter in forward direction.

**REV** key is used to run the inverter in reverse direction.

**If the FWD , REV key released, the inverter STOP.**

### 3.2.5 ALM mode

**Push the "ALM" key, the Remote Panel enters ALARM mode immediately.**

**STOP/RESET** key is used to execute software RESET function.

**▲ & ▼** keys are used to check ALARM History .

## **4 SYSTEM START-UP**

Many operation methods were designed into the PD Series inverter. Here in this section, teaching you how to start running the inverter by simplest operation method.

### **4.1 Reset & Initialize the inverter**

If the inverter is new, and you are not sure of the parameter value in the inverter, please execute **Memory Initialization**. The initialization sequence is first set **Pr.94=1**(refer to section 3 and 5.3) , then change to **ALM** mode until display show **0. xx** . Then push **STOP/RESET** key to start execute **software reset** and **memory initialization**. Or, connect **RST** terminal to **DGND** , then Inverter will execute hardware RESET immediately. After memory initialized, all parameters will be preload according to default values listed in Section 5.

### **4.2 Simple Start-up & Run by key-pad**

- a. Set Pr.00=60.00Hz
- b. Set Pr.39=0
- c. Set Pr.40=0
- d. Execute Reset

Just push **FWD** or **REV** key on the key-pad, the motor will run at frequency 60.00Hz which is assigned by Pr.00.

### **4.3 Monitor the inverter running status**

Enter MONITOR mode using LOCAL Panel :

Select MON mode by push CTL/MON key. Continuous pushing the CTL/MON will change the mode between CTL and MON mode. It is easy to distinguish that when any of Hz or I lamp is ON, the inverter is under MON mode.

Enter MONITOR mode using REMOTE Panel :

Just push "MON" key the led on the "MON"key will light up.

Under MON mode, two parameter values can be easily selected and monitored .

Parameter Pr.99 and Pr.98 are used to select the most important parameters for monitoring.

In general, for example, we like to monitor the output frequency(stored in Pr.57) and the output current(stored in Pr.61). Therefore, the default values Pr.99=57 and Pr.98=61 means selecting the output Hz and I for monitoring.

The ▲ and DOWN key is used to select the desired variable for monitoring on 7-segment display .

### **4.4 Apply inverter to your system**

Real application system is not as simple as described above. Usually, it will require some interface signals using DIx, DOx , or AIx, ...

Further studying all the functions described follows, will help you design your application system more efficiently than before.

# **5 PARAMETERS**

## **5.1 PARAMETERS LIST**

There are total 100 parameters in PDVip series inverter.

Pr.xx	PARAMETER NAME	DEFAULT	Minimum	Maximum	TYPE
Pr.00	MAIN SPEED SET	0 RPM	0	2400	R/W
Pr.01	MAIN SPEED ACC	5.0 SEC	0.1	6553.0	R/W
Pr.02	MAIN SPEED DEC	5.0 SEC	0.1	6553.0	R/W
Pr.03	GO_COMMAND	0	0	7	TR/W
Pr.04	STATUS_FLAGS	0000	0000	FFFF	M
Pr.05	BRAKE SPEED	5 RPM	0	2400	R/W
Pr.06	reserve				
Pr.07	BRAKE TIME	1.0 SEC	0.0	25.0	R/W
Pr.08	PULSE COUNTER	0	0	255	M
Pr.09	PULSE GAIN	1	0	255	FR/W
Pr.10	BASE SPEED	1800 RPM	0	2400	FR/W
Pr.11	TEMPERARY ACC RATE	(Pr.01)	0.1	6553.0	TR/W
Pr.12	TEMPERARY DEC RATE	(Pr.02)	0.1	6553.0	TR/W
Pr.13	TEMPERARY DPI-1(High)	(Pr.22)	0	9999	TR/W
Pr.14	TEMPERARY DPI-1(Low)	(Pr.23)	0	9999	TR/W
Pr.15	MAXIMUM SPEED LIMIT	2400 RPM	0	2400	FR/W
Pr.16	reserve				
Pr.17	DSP MEMORY SELECT	0	0	255	TR/W
Pr.18	DSPMEMORY DATA		0000	FFFF	M
Pr.19	JOG SPEED	30 RPM	0	2400	R/W
Pr.20	JOG ACC/DEC	5.0 SEC	0.1	25.0	R/W
Pr.21	SPD1_SPEED_SET	0 RPM	0	2400	R/W
Pr.22	DPI-1(High)	0	0	9999	R/W
Pr.23	DPI-1(Low)	0	0	9999	R/W
Pr.24	SPD2 SPEED SET	0 RPM	0	2400	R/W
Pr.25	DPI-2(High)	0	0	9999	R/W
Pr.26	DPI-2(Low)	0	0	9999	R/W
Pr.27	SPD3 SPEED SET	0 RPM	0	2400	R/W
Pr.28	DPI-3(High)	0	0	9999	R/W
Pr.29	DPI-3(Low)	0	0	9999	R/W
Pr.30	FREE RUN STOP	0	0	1	R/W
Pr.31	REVERSE INHIBIT	0	0	1	R/W
Pr.32	S_CURVE TIME	0.0 SEC	0.0	4.0	R/W
Pr.33	DISCHARGE ENABLE	0	0	1	R/W
Pr.34	UP/OP RESTART ENABLE	0	0	1	R/W
Pr.35	STALL LEVEL	160 %	10	200	R/W
Pr.36	POWER FAIL STOP TIME	2.0 SEC	0.1	25.0	R/W
Pr.37	AM SELECT	0	0	7	R/W
Pr.38	AM GAIN	255	0	255	R/W
Pr.39	CONTROL CMD SELECT	0	0	2	R/W
Pr.40	SPEED INPUT SELECT	8	0	22	R/W
Pr.41	DI1 SELECT	0	0	47	R/W
Pr.42	DI2 SELECT	0	0	47	R/W
Pr.43	DI3 SELECT	0	0	47	R/W
Pr.44	DI4 SELECT	0	0	47	R/W
Pr.45	DO1 SELECT	0	0	57	R/W
Pr.46	DO2 SELECT	0	0	57	R/W
Pr.47	RELAY SELECT	4	0	57	R/W
Pr.48	IRMS Detector LEVEL	100 %	10	150	R/W
Pr.49	SPEED Detect LEVEL	900 RPM	0	2400	R/W



Pr.xx	PARAMETER NAME	DEFAULT	Minimum	Maximum	TYPE
Pr.50	SPEED Detect TOLERANCE	5 RPM	0	250	R/W
Pr.51	THERMAL TIME	60 SEC	0	120	R/W
Pr.52	PITCH	8192	500	9999	R/W
Pr.53	reserve				
Pr.54	IRMS SELECT	0	0	1	R/W
Pr.55	A/D CHANNEL SELECT	0	0	4	R/W
Pr.56	A/D DATA				M
Pr.57	HZ				M
Pr.58	RPM				M
Pr.59	VDC INPUT				M
Pr.60	reserve				M
Pr.61	IRMS				M
Pr.62	POSITION COUNTER(High)	0	0	FFFF	M
Pr.63	POSITION COUNTER(Low)	0	0	FFFF	M
Pr.64	POSITION ERROR	0	0	FFFF	M
Pr.65	FIELD CURRENT	25%	0	50	FR/W
Pr.66	APR Pgain	5	0	255	FR/W
Pr.67	APR Igain	0	0	255	FR/W
Pr.68	APR Dgain	0	0	255	FR/W
Pr.69	IN POSITION RANGE	5	1	255	FR/W
Pr.70	POSITION ERROR LIMIT	9999	1	9999	FR/W
Pr.71	TIMER TIME	5.0 SEC	0.2	6553.0	R/W
Pr.72	ACR Pgain	100	0	9999	FR/W
Pr.73	ACR Igain	5	0	9999	FR/W
Pr.74	CONTROL TYPE SELECT	0	0	3	FR/W
Pr.75	reserve				
Pr.76	ASR Pgain	500	0	9999	FR/W
Pr.77	ASR Igain	5	0	255	FR/W
Pr.78	MOTOR RATING	100 %	0	100	FR/W
Pr.79	FULL LOAD SPEED	1740 RPM	0	2400	FR/W
Pr.80	TORQUE LIMIT-1	150	0	255	FR/W
Pr.81	TORQUE LIMIT-2	150	0	255	FR/W
Pr.82	MOTOR & PG SELECT	7	1	8	FR/W
Pr.83	IGBT GUARD TIME	3.0us	1.5	25.5	FR/W
Pr.84	LINE VOLTAGE		40	1000	FR/W
Pr.85	RATED CURRENT		0.5	3000.0	FR/W
Pr.86	IRMS ADJUST		70	140	FR/W
Pr.87	VDC ADJUST		70	140	FR/W
Pr.88	TORQUE CONTROL & FILTER	0054	0000	9999	FR/W
Pr.89	AI1 LOW	12	0	1023	FR/W
Pr.90	AI1 HIGH	1012	0	1023	FR/W
Pr.91	AI2 LOW	12	0	1023	FR/W
Pr.92	AI2 HIGH	1012	0	1023	FR/W
Pr.93	UNIT NUMBER	1	1	99	FR/W
Pr.94	RELOAD	0	0	1	R/W
Pr.95	MEMORY PROTECT	0	0	1	R/W
Pr.96	FACTORY WRITE ENABLE	0	0	1	R/W
Pr.97	VERSION		7.00	7.99	R
Pr.98	MONITOR(I)	61	0	99	R/W
Pr.99	MONITOR(HZ)	58	0	99	R/W

**Note :**

1. The second column is the function name of parameters.
2. The third column is the default value after memory initialization.
3. Fourth column is the Minimum possible value of the parameter.

4. Fifth column is the Maximum possible value of the parameter.
5. Parameter type is shown in the TYPE column.
  - a. Type **R/W** means the parameter is stored in EAROM memory and may be Read or Write.
  - b. Type **FR/W** means the parameter is stored in EAROM memory by factory control.  
**Unless by authorized engineer, this parameter is not allowed to change.**
  - c. Type **M** means the parameter is used for monitoring the status of inverter.  
 Write to this parameter has no effect.
  - d. Type **R** means the parameter is a fixed constant.
  - e. Type **TR/W** means the parameter may read or write , but data will disappear after power off .

## 5.2 PARAMETER PROTECTION

Pr.95 -- MEMORY PROTECT

Pr.96 -- FACTORY WRITE ENABLE

**If set Pr.95=1, all parameters(except Pr.95 itself) are not allow to change.**

**If set Pr.95=0, parameters with R/W type are allowed to change.**

**If set Pr.95=0 and Pr.96=1, all parameters include FR/W type may be changed.**

## 5.3 PARAMETERS INITIALIZATION

Pr.94 is used to INITIALIZE data into all parameters with R/W type.

Note : parameters with FR/W type will not be initialized by this method.

Follow the process to execute memory initialization

- Step 1 : Write Pr.95 = 0, and Pr.94 = 1
- Step 2 : Execute "ALM" RESET
- or Step 2 : Execute Hardware RESET
- or Step 2 : Execute Power-On RESET

After initialization process, the data in EAROM memory will change to the DEFAULT values listed in the PARAMETERS LIST Table.

## 5.4 Description of all parameters

Pr.00 MAIN SPEED SET

Pr.00 is the Main Speed memorized in EAROM.

If SPEED SELECT(Pr.40)=0, this MAIN\_SPEED\_SET parameter will be used as the desired speed source.

Note : while the Panel is in "CTL" mode, READ or WRITE will always points to this parameter.

Pr.01 MAIN SPEED ACC RATE

Pr.02 MAIN SPEED DEC RATE

Pr.01 & Pr.02 are the preset ACC & DEC time while inverter running.

The definition of the Pr.01(ACC) is "the period of time from 0 ramp up to 1800 RPM" .

The definition of the Pr.02(DEC) is "the period of time from 1800 RPM ramp down to 0" .

Pr.03 GO\_COMMAND

This command is usually used in position control mode. (Pr.74=2) And is very convenient while the inverter is controlled by computer.

Pr.03=0 : No function.

Pr.03=1 : GO DPI-1. (Desired Position Increment 1 )

he inverter will rotate the motor a fixed distance which is specified by Pr.22/23 .

$DPI-1 = 10000 * Pr.22 + Pr.23$

This software command is similar to Digital Input function DIx\_select=41.

Pr.03=2 : GO DPI-2. (Desired Position Increment 2 )

he inverter will rotate the motor a fixed distance which is specified by Pr.25/26.

$DPI-1 = 10000 * Pr.25 + Pr.26$

This software command is similar to Digital Input function DIx\_select=42.

Pr.03=3 : GO DPI-3. (Desired Position Increment 3 )

The inverter will rotate the motor a fixed distance which is specified by Pr.28/29.

$DPI-1 = 10000 * Pr.28 + Pr.29$

This software command is similar to Digital Input function DIx\_select=43.

Pr.03=4 : Change into speed control mode

This software command is similar to Digital Input function DIx\_select=44.

Pr.03=5 : GO HOME

This software command is similar to Digital Input function DIx\_select=45.

Pr.03=6 : Reserve

Pr.03=7 : LATCH COUNTER

The content of the 32-bits position counter will latched into Pr.62/63 .

This is used to prevent erroneous reading, because Pr.62 and Pr.63 are not read at the same instance.

#### Pr.04 STATUS FLAGS

Bit0 : status of Digital Input DI2

Bit1 : status of Digital Input DI4

Bit2 : status of Digital Input DI1

Bit3 : status of Digital Input DI3

Bit4 : status of TARGET\_REGISTER\_EMPTY flag

Bit5 : status of IN\_POSITION flag

Bit6 : status of ERROR\_OVER flag

Bit7 : status of SEARCHING\_HOME flag

Bit8~15 : Reserved

#### Pr.05 BRAKE SPEED

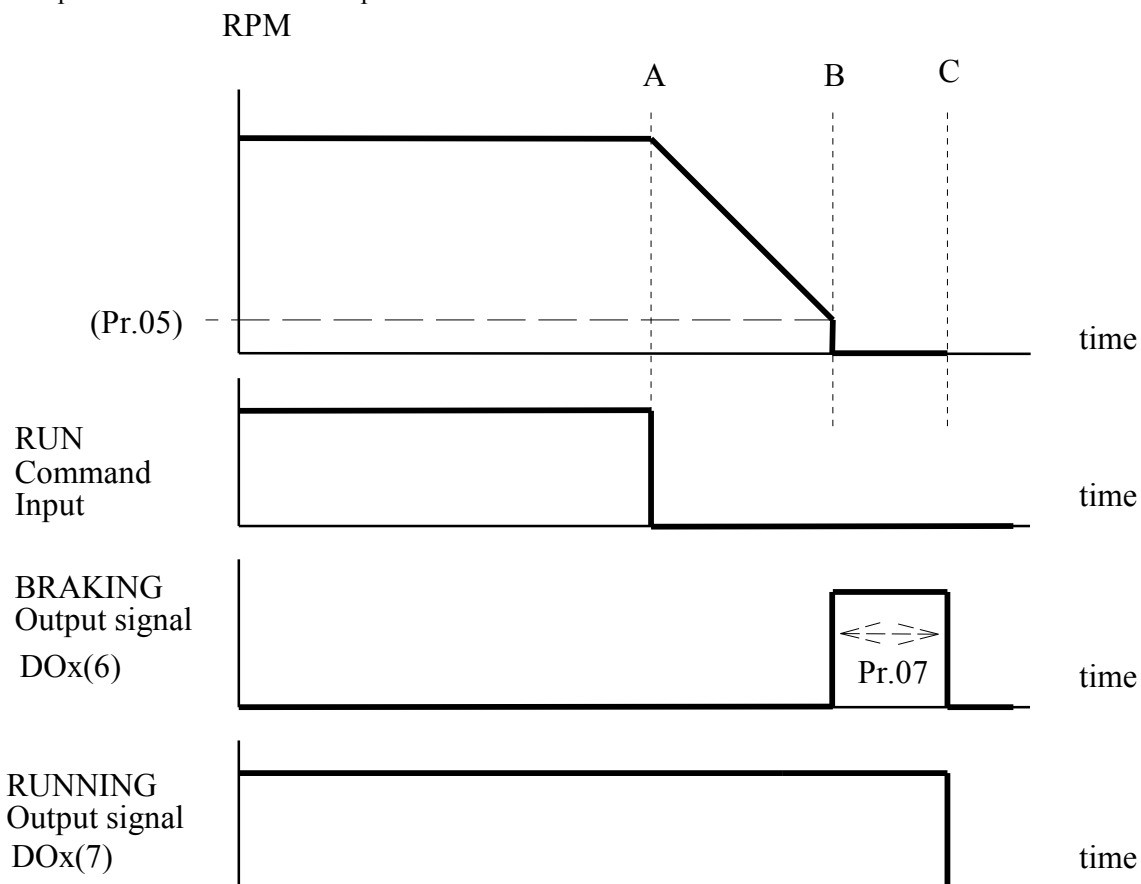
While deceleration to stop, if the output speed is lower than this parameter , then the inverter will change to Zero speed, and continue to hold in Zero speed for a time period determined by Pr.07 .

Note : If under RUN command, the inverter will not execute braking, even if speed command is zero.

Pr.06 Reserve

#### Pr.07 BRAKE TIME

This parameter defines the Zero speed time.



DOx(n) : Digital Output x , and select function-n

【Note】

**Point-A :** The RUN signal removed

**Point-B :** The motor speed is lower than Pr.05

**B--C :** Zero speed with holding torque

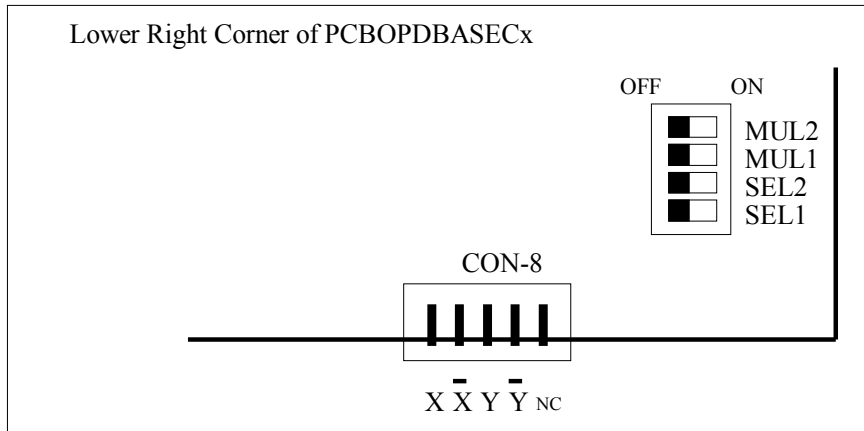
**After Point-C :** The inverter cut off, and motor free run

#### Pr.08 PULSE COUNTER

This parameter is used to monitors the content of the INPUT PULSE COUNTER.

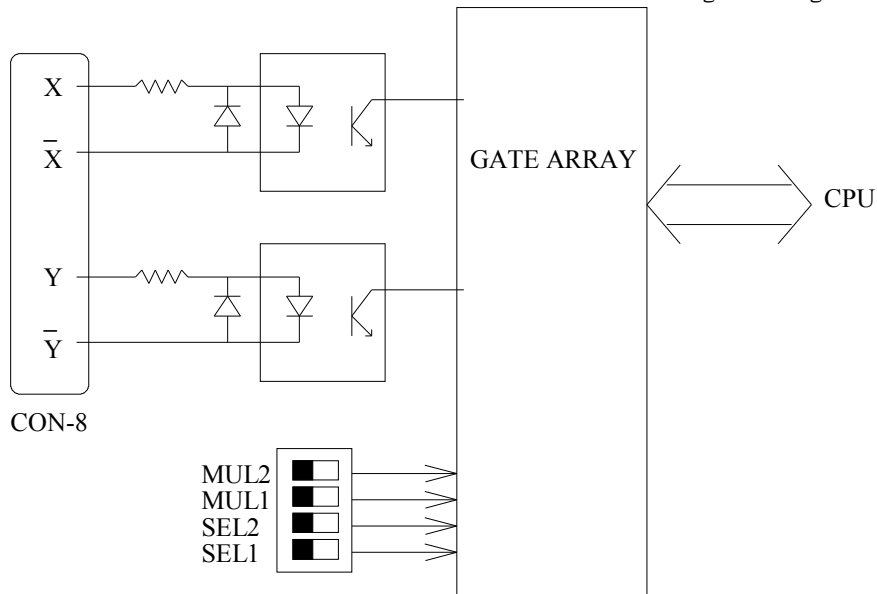
#### Pr.09 PULSE GAIN

This parameter defines the multiplication gain of input pulses from CON8.



The PDVip inverter includes an INPUT PULSE COUNTER(8-bits) in order to accumulate the input pulses from connector CON8 . And a Dip Switch is used to configure the hardware counter structure.

The internal hardware/software structure as following drawing



The INPUT PULSE COUNTER can be configured by a Dip Switch for different pulse types :

- UP pulse & DOWN pulse  
Set switch SEL1=OFF, SEL2=ON .  
The counter will count up at rising edge of X input .  
The counter will count down at rising edge of Y input .
- CLOCK pulse & DIRECTION control  
Set switch SEL1=ON, SEL2=OFF .  
If Y=1, the counter will count up at rising edge of X input .  
If Y=0, the counter will count down at rising edge of X input .
- Forward Quadrature Clock  
Set switch SEL1=ON, SEL2=ON .  
The counter will count up if signal X lead signal Y.  
And count down if signal X lag signal Y.
- Reverse Quadrature Clock  
Set switch SEL1=OFF, SEL2=OFF .  
The counter will count down if signal X lead signal Y.  
And count up if signal X lag signal Y.

For Quadrature Clock mode, the hardware multiply factor is determined by the two Dip Switches MUL1 and MUL2 :

X1 : MUL1=ON , MUL2=ON

X2 : MUL1=OFF , MUL2=ON

X3 : MUL1=ON , MUL2=OFF

X4 : MUL1=OFF , MUL2=OFF

【Note】 Pr.09 is independent software gain control.

#### Pr.10 BASE SPEED

This parameter determines the BASE SPEED of the motor.

Below BASE SPEED, the field current keep constant, the motor works under constant torque region. For speed higher than the BASE SPEED, field current will decrease , let the motor works under constant horse power region.

#### Pr.11 TEMPORARY ACC RATE

#### Pr.12 TEMPORARY DEC RATE

Similar to Pr.01 & Pr.02. After inverter power ON, changing this parameter has the same effect as changing Pr.01 & Pr.02. However, the data will lost when power OFF.

That means, changing these parameters will not cause any Read/Write operation of EARAM. By this method, the life of EARAM memory chip is extended.

This function is important when ACC/DEC rate need changing very often.

#### Pr.13 TEMPORARY Desired Position Increment-1 (High)

#### Pr.14 TEMPORARY Desired Position Increment-2 (Low)

Similar to Pr.22 & Pr.23. After inverter power ON, changing this parameter has the same effect as changing Pr.22 & Pr.23. However, the data will lost when power OFF.

That means, changing these parameters will not cause any Read/Write operation of EARAM. By this method, the life of EARAM memory chip is extended.

This function is important when Desired Position Increment need changing very often.

#### Pr.15 MAXIMUM SPEED LIMIT

Defines maximum allowable running speed of motor.

#### Pr.16 Reserve

#### Pr.17 INTERNAL MEMORY SELECT

#### Pr.18 INTERNAL MEMORY DATA

Besides the standard 100 parameters, there still exist many other important data in the internal memory of PDVip inverter . And, very often, it is necessary for the user to check the internal memory. Therefore, Pr.17 and Pr.18 are designed for monitoring the internal memory when necessary.

Use Pr.17 select the address location of the desire memory; then Pr.18 will show the content of that specified memory.

The range of Pr.17 is 0~255, and the value of Pr.18 is expressed in hexadecimal form.

Ex. Set Pr.17=0, then check Pr.18 will show the revision of the DSP chip.

#### Pr.19 JOG SPEED(Refer to Section 8.2~8.5 & 12)

This parameter determines the running speed when JOG speed is required.

#### Pr.20 JOG ACC/DEC

Defines the acceleration and deceleration rate when JOG command is in execution.

#### Pr.21 SPD1 SPEED SET(Refer to Section 8.2~8.5 & 12)

This parameter determines the running speed when SPD1 speed is required.

#### Pr.22 DPI-1(High) (DPI : Desired Position Increment )

#### Pr.23 DPI-1(Low)

The maximum possible increment value is 99999999 , which is 8 digits long.

Therefore, DPI-1 value requires two parameters

$$\text{DPI-1} = 10000 * \text{DPI-1(High)} + \text{DPI-1(Low)}$$

Two methods can start the DPI-1 incremental motion control :

a. Software Control

Set Pr.03=1

b. Hardware Control

Set Dlx\_select=41, and activate Dlx.

#### Pr.24 SPD2 SPEED SET(Refer to Section 8.2~8.5 & 12)

This parameter determines the running speed when SPD2 speed is required.

Pr.25 DPI-2(High)

Pr.26 DPI-2(Low)

The maximum possible increment value is 99999999 , which is 8 digits long.

Therefore, DPI-2 value requires two parameters

$$\text{DPI-2} = 10000 * \text{DPI-2(High)} + \text{DPI-2(Low)}$$

Two methods can start the DPI-2 incremental motion control :

a. Software Control

Set Pr.03=2

b. Hardware Control

Set DIx\_select=42, and activate DIx.

Pr.27 SPD3 SPEED SET(Refer to Section 8.2~8.5 & 12)

This parameter determines the running speed when SPD3 speed is required.

Pr.28 DPI-3(High)

Pr.29 DPI-3(Low)

The maximum possible increment value is 99999999 , which is 8 digits long.

Therefore, DPI-3 value requires two parameters

$$\text{DPI-3} = 10000 * \text{DPI-3(High)} + \text{DPI-3(Low)}$$

Two methods can start the DPI-3 incremental motion control :

a. Software Control

Set Pr.03=3

b. Hardware Control

Set DIx\_select=43, and activate DIx.

Pr.30 FREE RUN STOP

If Pr.30 = 0, when stop, inverter gradually decreasing its output frequency.

If Pr.30 = 1, when stop, inverter disables output immediately, the motor free run.

Pr.31 REVERSE INHIBIT

If Pr.31 = 0, Inverter may run in both direction.

If Pr.31 = 1, Reverse Run is inhibited.

Pr.32 S\_CURVE TIME CONSTANT

This parameter determines the time constant of the S-Curve.

Pr.33 DISCHARGE\_CONTROL

If Pr.33 = 0, Discharge circuit is Disabled.

If Pr.33 = 1, Discharge circuit is Enabled.

The discharge transistor will ON if the following conditions are met :

a. Inverter is Running , and

b. Inverter has no alarm , and

c. Inverter checks the VDC>117% , and

**no matter the inverter is deceleration or not.**

Pr.34 UP/OP RESTART\_ENABLE(Refer to Section 11)

If Pr.34 = 1, Inverter will restart automatically, after power come back normal.

Pr.35 STALL\_LEVEL

This parameter defines the current limit level(%) while STALL process.

Pr.36 POWER FAIL STOP TIME (Refer to Section 11 )

This parameter defines the minimum stop time while executing BASE BLOCK function or when UP/OP ALARM occurs.

Pr.37 AM SELECT(Refer to Section 10 )

Select desired variables to appear at analog output terminal.

Pr.38 AM GAIN(Refer to Section 10 )

Select desired gain ratio for analog output terminal.

Pr.39 CONTROL COMMAND SELECT(Refer to Section 6 )

**This parameter determines the type of RUN/STOP control method.**

Pr.40 SET SPEED INPUT SELECT(Refer to Section 7 )

**This parameter defines the source and type for determining the running frequency.**

Pr.41 DI1 FUNCTION SELECT(Refer to Section 8 )

Defines the function for input terminal DI1.

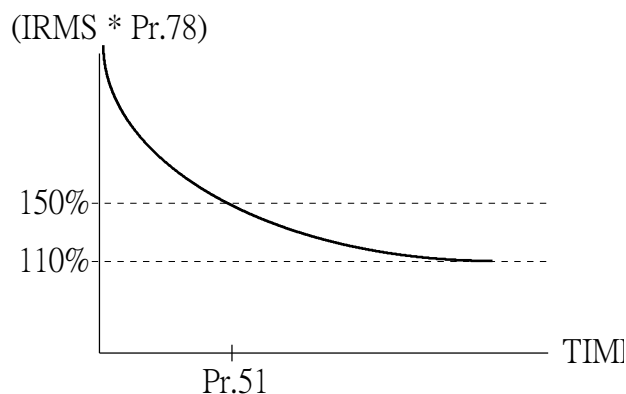
Pr.42 DI2 FUNCTION SELECT(Refer to Section 8 )

Defines the function for input terminal DI2.

Pr.43 DI3 FUNCTION SELECT(Refer to Section 8 )

Defines the function for input terminal DI3.

- Pr.44 DI4 FUNCTION SELECT(Refer to Section 8 )  
Defines the function for input terminal DI4.
- Pr.45 DO1 FUNCTION SELECT(Refer to Section 9 )  
Defines the function for output terminal DO1.
- Pr.46 DO2 FUNCTION SELECT(Refer to Section 9 )  
Defines the function for output terminal DO2.
- Pr.47 RELAY FUNCTION SELECT(Refer to Section 9 )  
Defines the function for output RELAY terminal RY1&RY2.
- Pr.48 IRMS DETECTOR THRESHOLD LEVEL(Refer to Section 9.13)  
This parameter is used to define the threshold level for **Current Over Detector** module.
- Pr.49 SPEED DETECT LEVEL(Refer to Section 9.2)
- Pr.50 SPEED DETECT TOLERANCE(Refer to Section 9.2)



Pr.49 and Pr.50 are used for **SPE, SPNE, SPO and SPNO** output functions.

Pr.51 THERMAL RELAY TRIP TIME  
This parameter defines the OVER LOAD trip time of the INTERNAL THERMAL RELAY.

**If Pr.51=0, the THERMAL RELAY function is disabled.**

#### Pr.78 MOTOR RATING

If the inverter's rating capacity is larger than the motor in use, this parameter can be adjusted to protect the motor. This parameter is defined as the percentage level of the inverter rating.

#### Pr.52 PITCH

This parameter defines the ball screw pitch for one motor revolution.

- Pr.53 Reserved
- Pr.54 IRMS\_SELECT  
If Pr.54 = 0 , IRMS(Pr.61) is expressed in AMPERE  
If Pr.54 = 1 , IRMS(Pr.61) is expressed in PERCENTAGE of inverter rated current.
- Pr.55 A/D CONVERTER CHANNEL SELECT(Refer to Section 13.3)
- Pr.56 A/D CONVERSION DATA(Refer to Section 13.3)
- Pr.57 HZ(Refer to Section 13.1)
- Pr.58 RPM(Refer to Section 13.1)
- Pr.59 VDC(Refer to Section 13.1)
- Pr.60 Reserved
- Pr.61 IRMS(Refer to Section 13.1)
- Pr.62 POSITION COUNTER(High)
- Pr.63 POSITION COUNTER(Low)  
When the inverter under RUN mode, its internal 32-bits counter will start counting feedback pulses from motor's encoder.  
The higher 16 bits are transferred to Pr.62 ; and the lower 16 bits are transferred to Pr.63.  
In order to prevent from reading error, please set Pr.03=7 before sequentially reading these two parameters.
- Pr.64 POSITION ERROR  
POSITION ERROR is the difference between desired position and actual position .  
Refer to Pr.69 and Pr.70 .
- Pr.65 FIELD CURRENT(%)
- Pr.66 APR Pgain
- Pr.67 APR Igain
- Pr.68 APR Dgain  
Parameter Pr.66, Pr.67 and Pr.68 are general P-I-D gain constants for position loop controller.  
Note : APR -- Automatic Position Regulator

Pr.69 IN POSITION RANGE

This parameter defines a reference for POSITION\_ERROR.

If

$$|POSITION\_ERROR(Pr.64)| \leq IN\_POSITION\_RANGE(Pr.69)$$

then

IN\_POSITION\_FLAG(Bit-5 of Pr.04) is set.

Pr.70 POSITION ERROR LIMIT

This parameter defines POSITION\_ERROR\_LIMIT for ERROR\_OVER flag.

If

$$|POSITION\_ERROR(Pr.64)| > POSITION\_ERROR\_LIMIT(Pr.70)$$

then

ERROR\_OVER\_FLAG(Bit-6 of Pr.04) is set.

Pr.71 TIMER TIME(Refer to Section 8.7)

Pr.72 ACR Pgain

Pr.73 ACR Igain

Parameter Pr.72 and Pr.73 are general P-I gain constants for current loop controller.

Note : ACR -- Automatic Current Regulator

Pr.74 CONTROL TYPE SELECT

This parameter determines the PDVip inverter's operation mode :

Pr.74=0 : Speed control mode

Under this mode, the speed is accurately controlled.

Low speed range extends to ZERO RPM with rated holding torque.

Pr.74=1 : Reserved

Pr.74=2 : Auto Positioning mode

There are three presettable Desired Position Incremental parameter pairs - DPI-1, DPI-2 and DPI-3, available for the user to achieve economical position control.

According to the desired speed set, and ACC/DEC rate, the inverter will generate a trapezoidal velocity profile automatically, and stop the motor just in point.

Refer to Pr.22/23, Pr.25/26, Pr.28/29, and necessary digital input/output functions.

Pr.74=3 : Tracking mode

This operation mode accept three types of pulse input command from CON-8.

It is very useful for applications that needs exact speed/position tracking between motors.

Refer to Pr.08.

Pr.75 Reserved

Pr.76 ASR Pgain

Pr.77 ASR Igain

Parameter Pr.76 and Pr.77 are general P-I gain constants for speed loop controller.

Note : ASR -- Automatic Speed Regulator

Pr.78 MOTOR RATING

Refer to the description of Pr.51.

Pr.79 FULL LOAD SPEED(RPM)

Pr.80 TORQUE LIMIT-1

Pr.81 TORQUE LIMIT-2

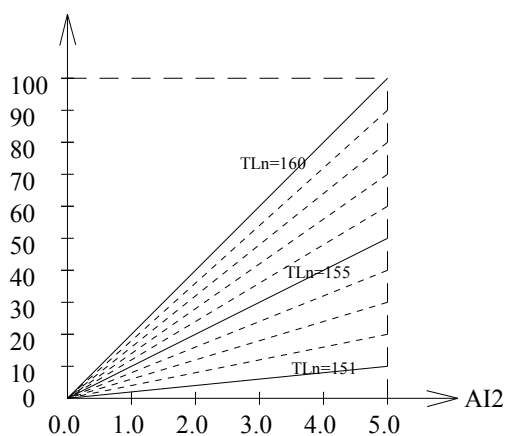
Torque limit-1 and Torque Limit-2 are identical for limiting the maximum torque of the motor while running.

If Torque Limit-n = 0~150, Standard torque limit, in percentage.

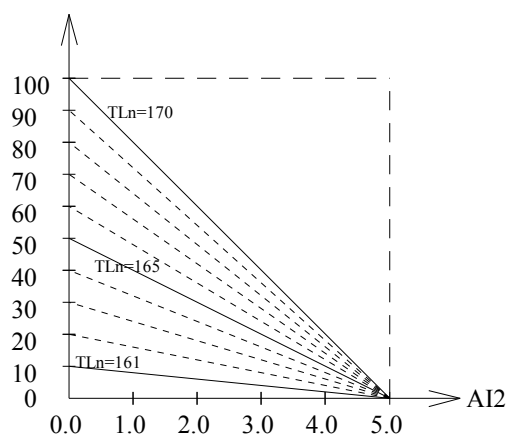
If Torque Limit-n = 151~190, the maximum torque is relate to the AI2 input.



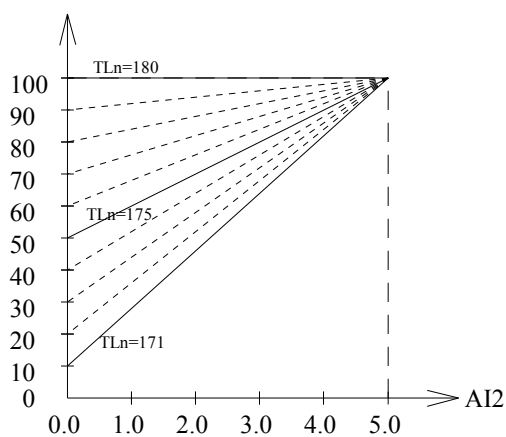
TORQUE LIMIT(%)



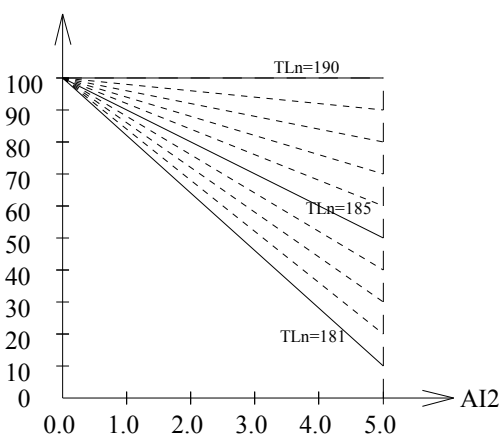
TORQUE LIMIT(%)



TORQUE LIMIT(%)



TORQUE LIMIT(%)



Note : For V7.20, Pr.81  $\leq$  150 and Pr.80  $\leq$  190

Pr.82 MOTOR & PG SELECT

This parameter must set according to the motor and encoder specification.

Pr.82	Pole no.	Encoder
1	2	128
2	2	256
3	2	512
4	2	1024
5	4	256
6	4	512
7	4	1024
8	4	2048
9	6	384
10	6	768
11	6	1536
12	6	3072
13	8	512
14	8	1024
15	8	2048
16	8	4096
17	12	768
18	12	1536
19	12	3072
20	12	6144

Pr.83 IGBE 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.**

Pr.84 LINE\_VOLTAGE

This parameter defines the normal working voltage of the inverter.

According to this parameter, the inverter calculates all voltage dependent values.

- a. OP Trip Voltage (VDC) =  $1.414 * \text{Pr.84} * 130\%$
- b. UP trip Voltage (VDC) =  $1.414 * \text{Pr.84} * 70\%$
- c. OP Recover Voltage (VDC) =  $1.414 * \text{Pr.84} * 120\%$
- d. UP Recover Voltage (VDC) =  $1.414 * \text{Pr.84} * 80\%$
- e. Contact On Voltage (VDC) =  $1.414 * \text{Pr.84} * 69\%$
- f. Contact Off Voltage (VDC) =  $1.414 * \text{Pr.84} * 65\%$

Note : The "Contact" means the device used to BY-PASS the Charging Resistor.  
or a SCR instead.

It may be a RELAY

- g. Discharge Start Voltage (VDC) =  $1.414 * \text{Pr.84} * 117\%$

Pr.85 INVERTER RATED CURRENT

This parameter defines the rated output current of the inverter.

Pr.86 IRMS ADJUST

This parameter is used to adjust the IRMS data reading.

Pr.87 VDC ADJUST

This parameter is used to adjust the VDC data reading.

Pr.88 TORQUE CONTROL & FILTER

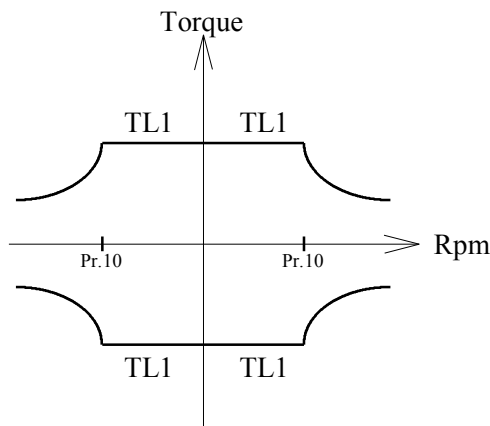
This parameter is composed by four digits : Pr.88 = D3-D2-D1-D0

D0 : Speed FeedBack Filter

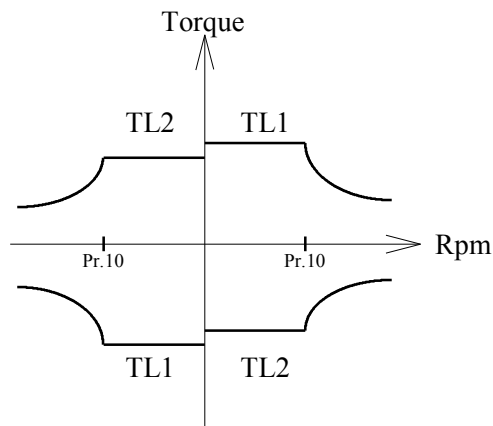
D1 : Torque Command Filter

D2 : Torque Control Type

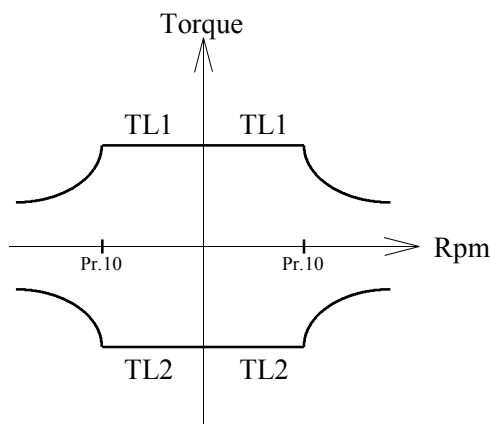
**D2=0**



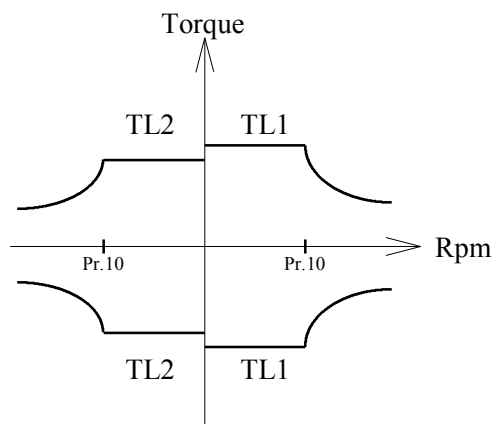
**D2=1**



**D2=2**



**D2=3**



D3 : reserved

Pr.89 AI1\_LOW

This parameter is used to record the A/D converter data when "AI1" input terminal is connected to "ACOM" terminal.(JP1 select +10V)

Pr.90 AI1\_HIGH

This parameter is used to record the A/D converter data when "AI1" input terminal is connected to "+10V" voltage source.(JP1 select +10V)

Pr.91 AI2\_LOW

This parameter is used to record the A/D converter data when "AI2" input terminal is connected to "ACOM" terminal.(JP2 select +5V)

Pr.92 AI2\_HIGH

This parameter is used to record the A/D converter data when "AI2" input terminal is connected to "+5V" terminal.(JP2 select +5V)

Pr.93 UNIT\_NUMBER

This parameter is used to assign the ADDRESS NUMBER of this INVERTER UNIT while controlled by master computer through RS485 interface.

Pr.94 PARAMETER RELOAD(Refer to Section 5.3)

Pr.95 MEMORY PROTECT(Refer to Section 5.2)

Pr.96 FACTORY WRITE ENABLE(Refer to Section 5.2)

Pr.97 VERSION

This parameter indicate the software revision of this inverter.

Pr.98 MONITOR(I) (Refer to Section 13)

Pr.99 MONITOR(HZ) (Refer to Section 13)

## **6. Selection of RUN/STOP/FWD/REV control command**

Before start running the inverter, the most important step is to select the **Control Command Source**. You can choose whether the control command will **come from panel or terminal**.

If the control command should come from terminal, then the two input terminals **RUN** and **REV** are used for controlling the inverter.

These two input terminals are **inactive** when left open and will be **active** when connected to **DCOM** terminal.

Parameter **Pr.39** is used to select the source of Control Command.

**Pr.39 -- CMD\_SELECT**

if **Pr.39=0**

The RUN and REV terminals are disabled.

Control Command will come from the **keypad panel**.

Just push **FWD key**, the inverter will run forward direction.

Push **REV key**, the inverter will run forward direction.

if **Pr.39=1**

The **RUN** terminal will start the inverter running, and **REV** terminal controls the running direction.

if **Pr.39=2**

The **RUN** terminal is equivalent to **FORWARD-RUN**.

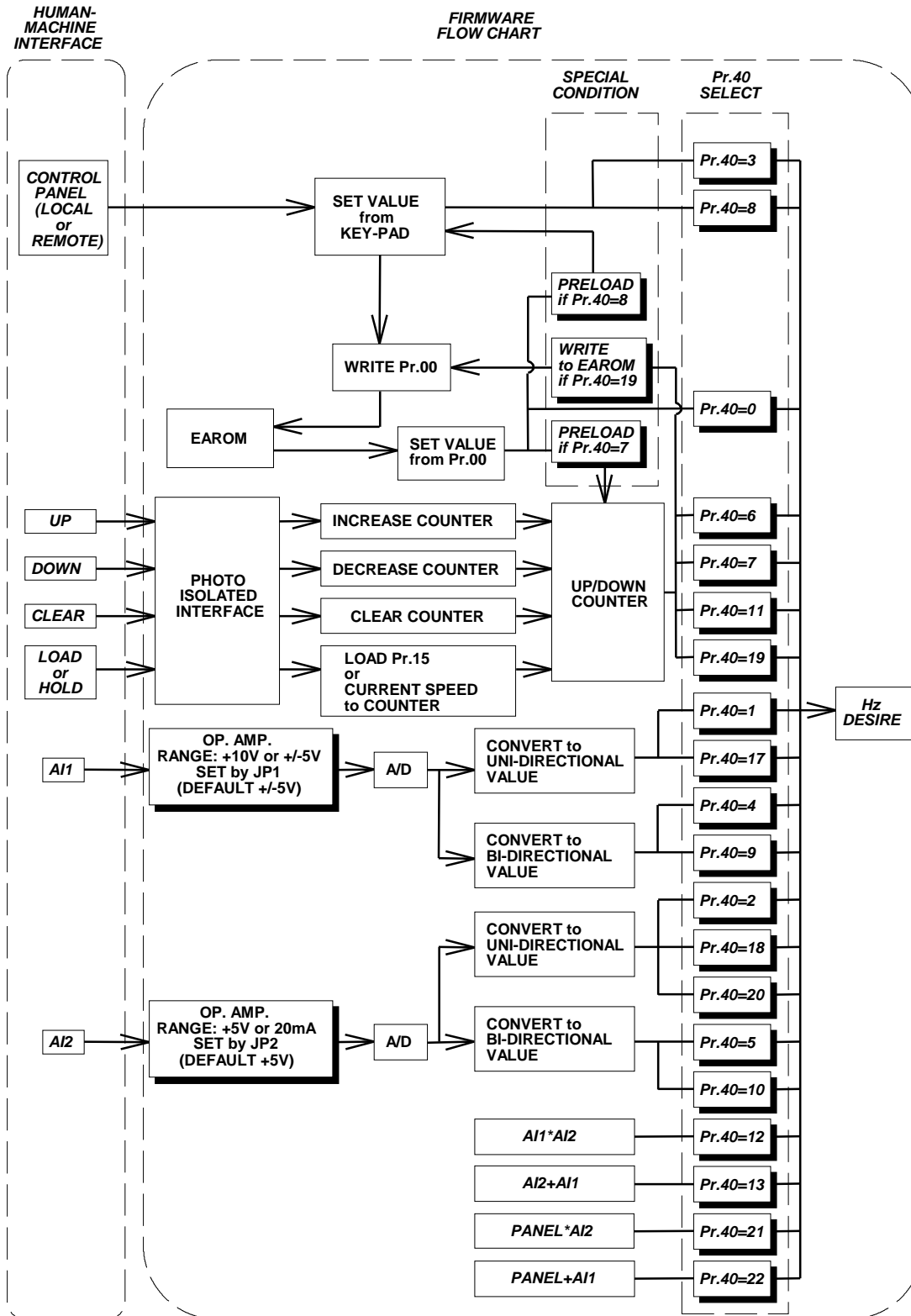
The **REV** terminal is equivalent to **REVERSE-RUN**.

**Note : Refer to Sec.7 to determine the running frequency.**

Pr.39	"RUN" Terminal	"REV" Terminal	FUNCTION
0	don't care	don't care	Command from PANEL
	OFF	don't care	STOP
1	OFF	don't care	STOP
	ON	OFF	FORWARD RUN
	ON	ON	REVERSE RUN
	OFF	OFF	STOP
2	OFF	ON	REVERSE RUN
	ON	don't care	FORWARD RUN

# 7. Selection of Set Frequency input source

## 7.1 SELECTION CHART



NOTE:

- IS FUNCTION BLOCK
- IS HARDWARE SELECT SETTING or SOFTWARE SELECT SWITCH

## 7.2 SPEED SOURCE DESCRIPTION

This section describes how to select desired input Frequency Source.

Parameter Pr.40, is the speed input source selection parameter.

The speed input sources may come from Panel , Memory , Analog input , Up/Down counter , or the combinations of the above sources.

Please refer to the following table first.

Pr.40	JP1	JP2	SPEED source	DIRECTION Source
0	don't care	don't care	Value in Pr.00	From Command
1	+ 10V	don't care	AI1 Uni-directional	From Command
2	don't care	+ 5V(or 20mA)	AI2 Uni-directional	From Command
3	don't care	don't care	Set value from Panel	From Command
4	+/- 5V	don't care	AI1 Bi-directional	By AI1 input value
5	don't care	+ 5V(or 20mA)	AI2 Bi-directional	By AI2 input value
6	don't care	don't care	By U/D counter	From Command
7	Similar to Pr.40=6, but will preload U/D counter from Pr.00 after RESET.			
8	Similar to Pr.40=3, with PRELOAD from & AUTO WRITE to Pr.00			
9	Similar to Pr.40=4, but will not STOP while desired frequency is low			
10	Similar to Pr.40=5, but will not STOP while desired frequency is low			
11	Similar to Pr.40=6, While running will only down to Low Limit.			
12	Frequency Set = AI1 * AI2			
13	Frequency Set = AI2 + AI1			
14	Reserve			
15	Reserve			
16	Reserve			
17	Similar to Pr.40=1, With Minimum = Low limit			
18	Similar to Pr.40=2, With Minimum = Low limit			
19	Similar to Pr.40=11, With Auto Reload from and Auto Write to Pr.00			
20	Reverse to Pr.40=18, +5V(or 20mA)---> Lower , 0V---> Upper Frequency			
21	Frequency Set = Panel Set * AI2 (V4.87~)			
22	Frequency Set = Panel Set + AI1 (V4.87~)			

Note : JP1 is used for changing the configuration of analog input AI1.  
It may select +/- 5V(default) or 0~+10V.

JP2 is used for changing the configuration of analog input AI2.  
It may select 0~+5V(default) or 0~20mA.

### 7.2.0 Pr.40 = 0 , Speed input come from Pr.00

Parameter Pr.00 is the **MAIN\_SPEED\_SET** parameter stored in **EAROM memory**.

The value once written into Pr.00 will never be altered, unless you re-write a new value again.

In this mode, the Hz value stored in Pr.00 will be used to determine the output frequency of the inverter while running.

The direction of the output phase sequence must be determined by control command.

It is possible to **protect the value in Pr.00 by settint Pr.95=1** .

**Note : Changing the content in Pr.00 will immediately change the output frequency even if the inverter is running.**

### 7.2.1 Pr.40 = 1 , Speed input come from AI1

In this mode , the voltage signal fed into AI1 terminal will be used to determine the output frequency of the inverter while running.

The direction of the output phase sequence must be determined by control command.

If the input signal reaches maximum level, the set frequency is equal to Pr.15(UPPER LIMIT).

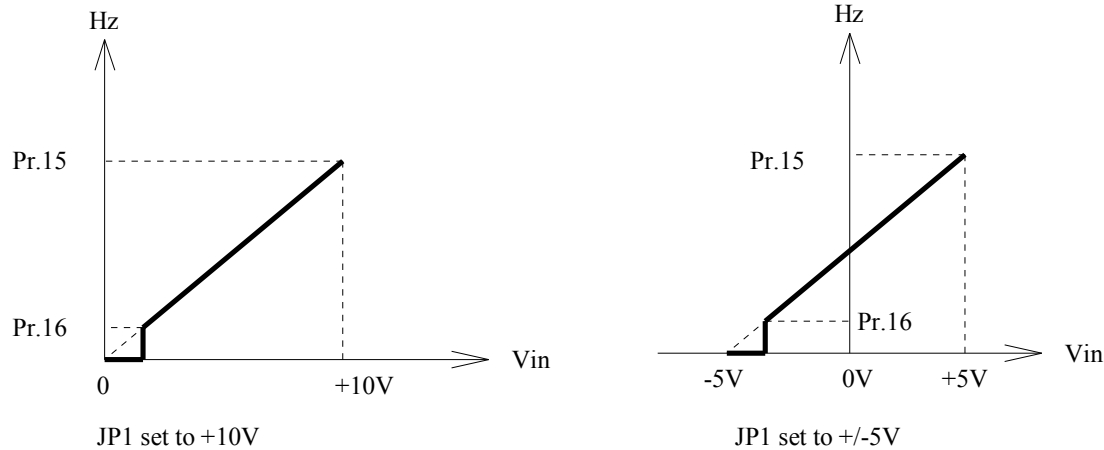
If the desired set frequency is lower than Pr.16(LOWER LIMIT), the inverter will stop.

**Note : Set jumper JP1 to match with the input voltage range.**

**If set to +10V position, input range is 0V ~ +10V.**

**If set to +/-5V position, input range is -5V ~ +5V. (Default)**

**If necessary, use Pr.89 and Pr.90 to modify the input range .**



### 7.2.2 Pr.40 = 2 , Speed input come from AI2

In this mode , the voltage signal fed into AI2 terminal will be used to determine the output frequency of the inverter while running.

The direction of the output phase sequence must be determined by control command.

If the input signal reaches maximum level, the set frequency is equal to Pr.15(UPPER LIMIT).

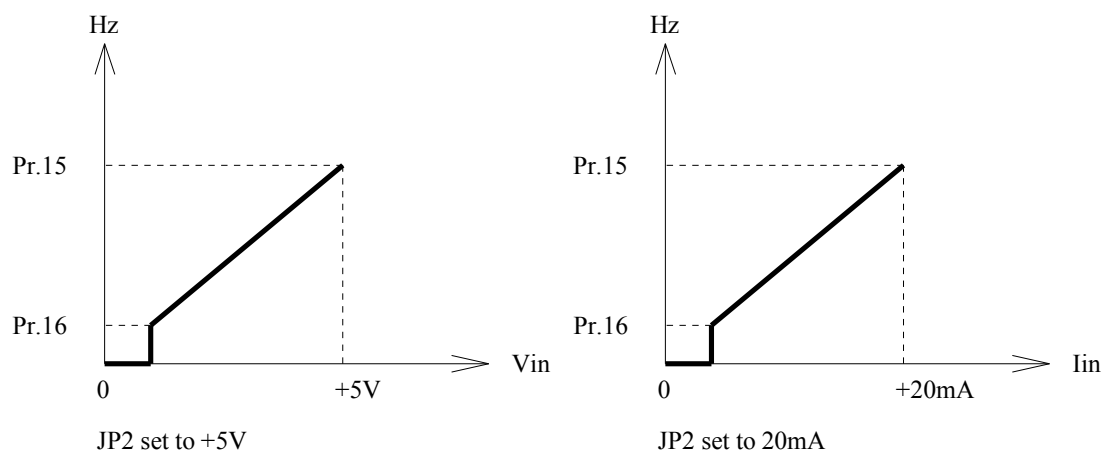
If the desired set frequency is lower than Pr.16(LOWER LIMIT), the inverter will stop.

**Note : Set jumper JP2 to match with the input signal type and range.**

**If set to +5V position, input signal type and range is 0V ~ +5V.(Default)**

**If set to 20mA position, input signal type and range is 0mA ~ 20mA.**

**If necessary, use Pr.91 and Pr.92 to modify the input range .**



### 7.2.3 Pr.40 = 3 , Speed input come from Key-pad setting

For **LOCAL** panel, change to **CTL(control) Mode** by push **CTL/MON** key .( If Hz or I lamp is on, push again until they are all off.) Then, push **UP** or **DOWN** key to modify the desired set frequency.

For **REMOTE** panel, change to **CTL Mode** by push **CTL** key. Then, modify the desired set frequency by pushing the **Number keys followed by FWD or REV key**. Or , modify it by UP and DOWN keys just like LOCAL panel.

The direction of the output phase sequence must be determined by control command.

#### 7.2.4 Pr.40 = 4 , Speed input come from **AI1 with Bi-direction** control

In this mode , the voltage signal fed into AI1 terminal will be used to determine the output frequency of the inverter while running.

The direction of the output phase sequence is determined by the input signal level.

If the input signal is positive maximum level, the set frequency is equal to Pr.15(UPPER LIMIT)

in forward direction; and if the input signal is most negative(or zero, depend on JP1), the set frequency is equal to Pr.15 in reverse direction.

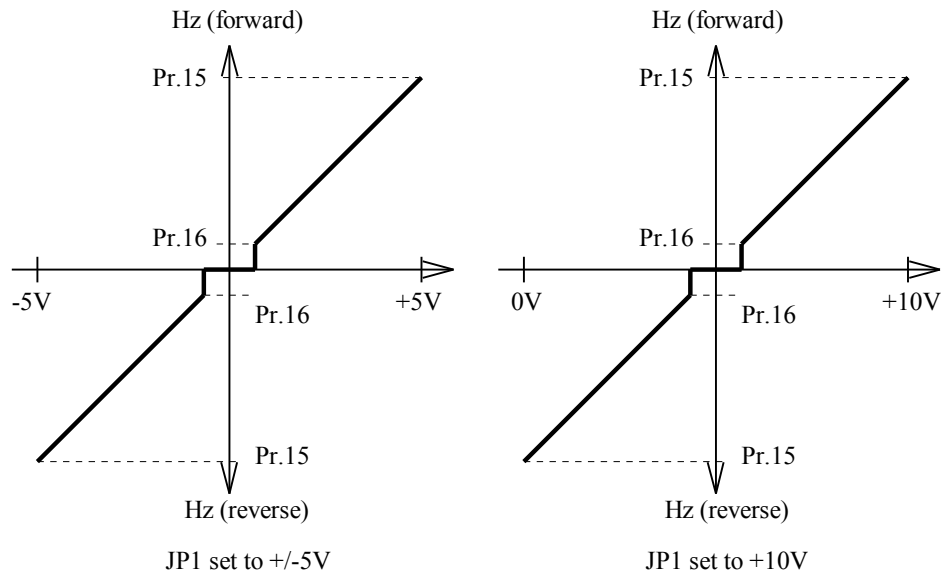
If the desired set frequency is lower than Pr.16(LOWER LIMIT), the inverter will stop.

**Note : Set jumper JP1 to match with the input voltage range.**

**If set to +10V position, input range is 0V ~ +10V.**

**If set to +/-5V position, input range is -5V ~ +5V. (Default)**

**If necessary, use Pr.89 and Pr.90 to modify the input range .**



#### 7.2.5 Pr.40 = 5 , Speed input come from **AI2 with Bi-direction** control

In this mode , the voltage signal fed into AI2 terminal will be used to determine the output frequency of the inverter while running.

The direction of the output phase sequence is determined by the input signal level.

If the input signal is positive maximum level, the set frequency is equal to Pr.15(UPPER LIMIT)

in forward direction; and if the input signal is zero, the set frequency is equal to Pr.15 in reverse direction.

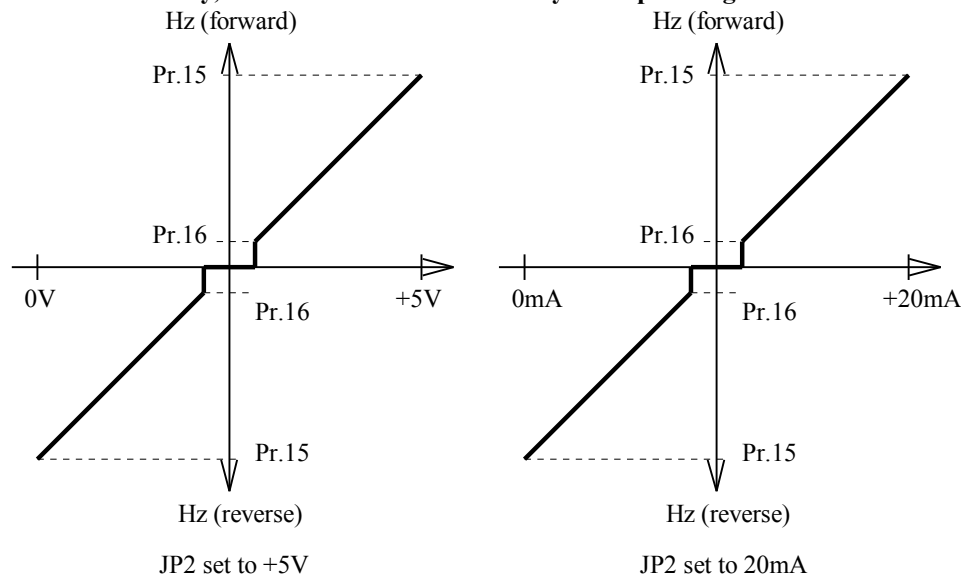
If the desired set frequency is lower than Pr.16(LOWER LIMIT), the inverter will stop.

**Note : Set jumper JP2 to match with the input signal type and range.**

**If set to +5V position, input signal type and range is 0V ~ +5V.(Default)**

**If set to 20mA position, input signal type and range is 0mA ~ 20mA.**

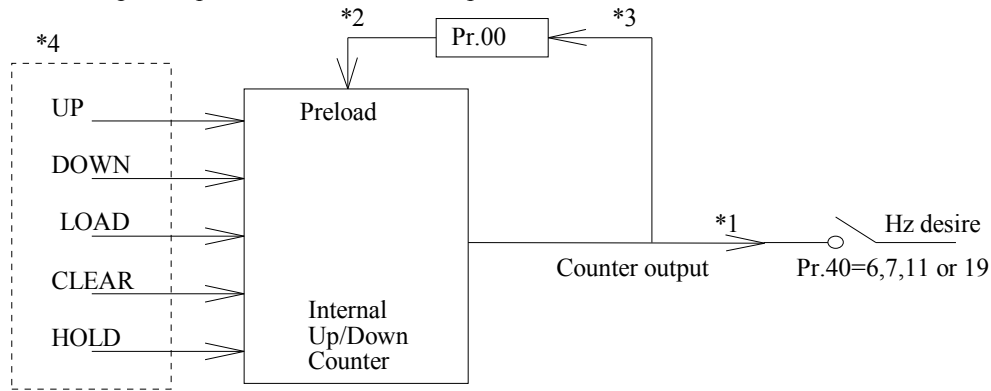
**If necessary, use Pr.91 and Pr.92 to modify the input range .**





7.2.6 Pr.40 = 6 , Speed input come from Internal Up/Down Counter

7.2.7 Pr.40 = 7 , Speed input come from Internal Up/Down Counter with Preload from Pr.00



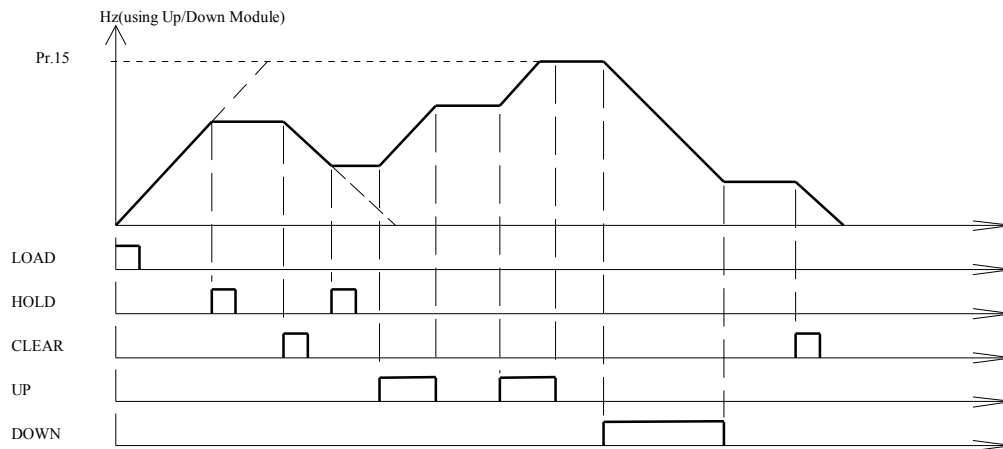
Functional Block Diagram of the Internal UP/DOWN Counter

\*1. If Pr.40=6, 7, 11, or 19, the counter output is used to determine the output frequency.

\*2. If Pr.40=7 or 19, Data in Pr.00 will preload into the counter when Power On or after Reset.

\*3. If Pr.40=19, after Up/Down execution, the content of counter will write into Pr.00 automatically.

\*4. These signals come from Digital Input(DIx) terminal. Refer to Sec.8 for detail description .



UP/DOWN COUNTER OPERATION EXAMPLE

7.2.8 Pr.40 = 8 , Similar to mode 3, with Preload from Pr.00 (and Auto Write to Pr.00,V4.69~)

This function is similar to Pr.40=3, with only two differences :

a. When Power On or after Reset, the data in Pr.00 will preload into set frequency buffer.

b. For CPU version V4.69~, when using LOCAL panel, the buffer value will write back into Pr.00 automatically.

7.2.9 **Pr.40 = 9** , Similar to mode 4, with **minimum running speed**

In this mode , the voltage signal fed into AI1 terminal will be used to determine the output frequency of the inverter while running.

The direction of the output phase sequence is determined by the input signal level.

If the input signal is positive maximum level, the set frequency is equal to Pr.15(UPPER LIMIT)

in forward direction; and if the input signal is most negative(or zero, depend on JP1), the set frequency is equal to Pr.15 in reverse direction.

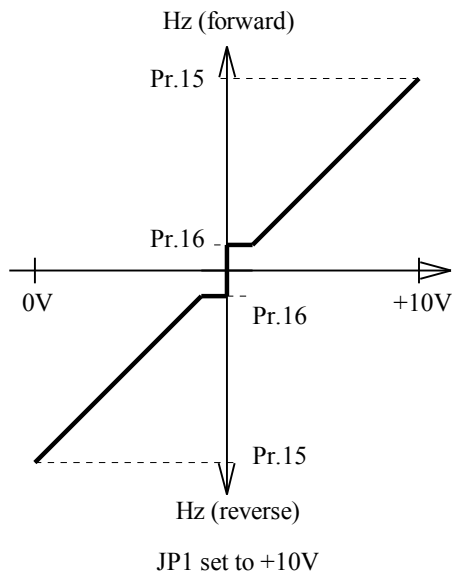
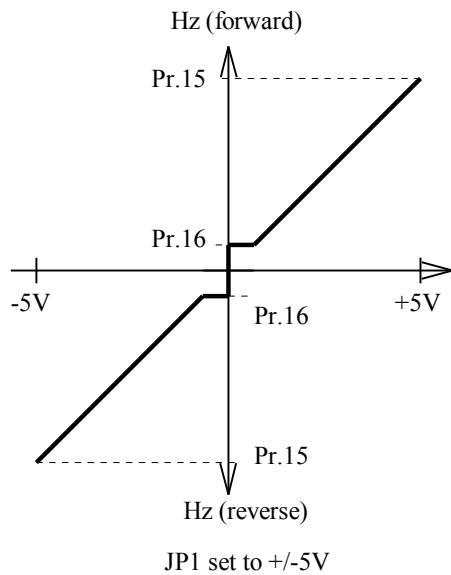
While the desired output frequency is lower than Pr.16(LOWER LIMIT), the actual output frequency will maintain at the lower frequency limit .

**Note : Set jumper JP1 to match with the input voltage range.**

**If set to +10V position, input range is 0V ~ +10V.**

**If set to +/-5V position, input range is -5V ~ +5V. (Default)**

**If necessary, use Pr.89 and Pr.90 to modify the input range .**



#### 7.2.10 Pr.40 = 10 , Similar to mode 5, with **minimum running speed**

In this mode , the voltage signal fed into AI2 terminal will be used to determine the output frequency of the inverter while running.

The direction of the output phase sequence is determined by the input signal level.

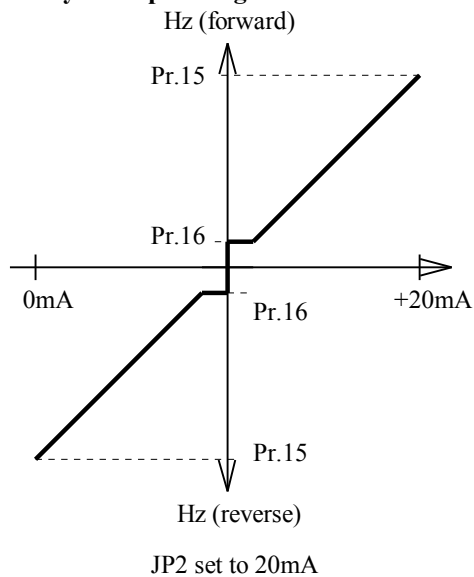
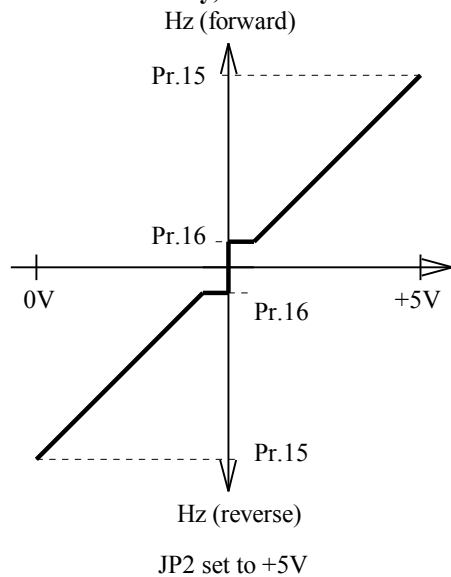
If the input signal is positive maximum level, the set frequency is equal to Pr.15(UPPER LIMIT) in forward direction; and if the input signal is zero, the set frequency is equal to Pr.15 in reverse direction. While the desired output frequency is lower than Pr.16(LOWER LIMIT), the actual output frequency will maintain at the lower frequency limit .

**Note : Set jumper JP2 to match with the input signal type and range.**

**If set to +5V position, input signal type and range is 0V ~ +5V.(Default)**

**If set to 20mA position, input signal type and range is 0mA ~ 20mA.**

**If necessary, use Pr.91 and Pr.92 to modify the input range .**



#### 7.2.11 Pr.40 = 11 , Similar to mode 6, with **minimum running speed(V4.67~)**

This function is very similar to mode-6, except :

After Up/Down execution, the minimum frequency will only go Down to Pr.16(Lower Limit).

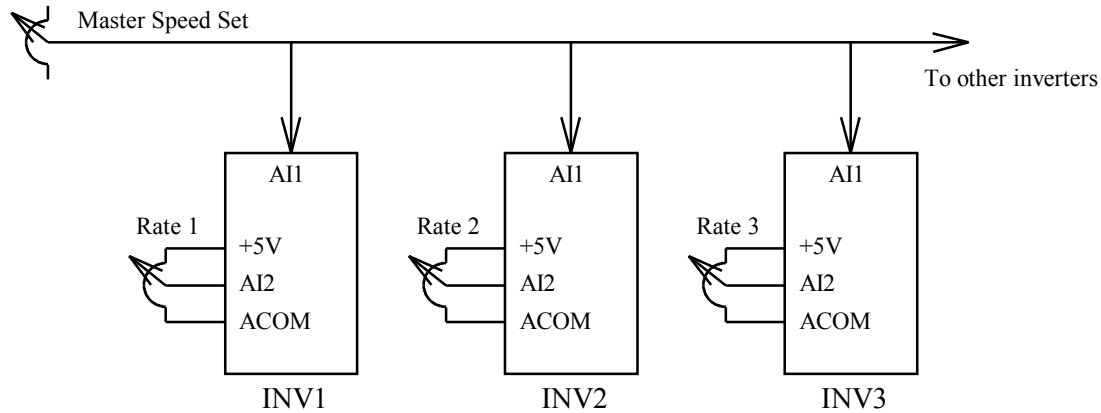
#### 7.2.12 Pr.40 = 12 , Speed input is the combination of **AI1 \* AI2(V4.68~)**

In this mode, the desired set frequency is the combination of AI1 and AI2.

Analog signal from **AI1 is selected to be the master set frequency**; and signal from **AI2 is the proportional rate input**.

When signal level of AI2 is maximum, the rate equal 100%; if AI2 is minimum, the rate is 0%.

Typical application is as follows :



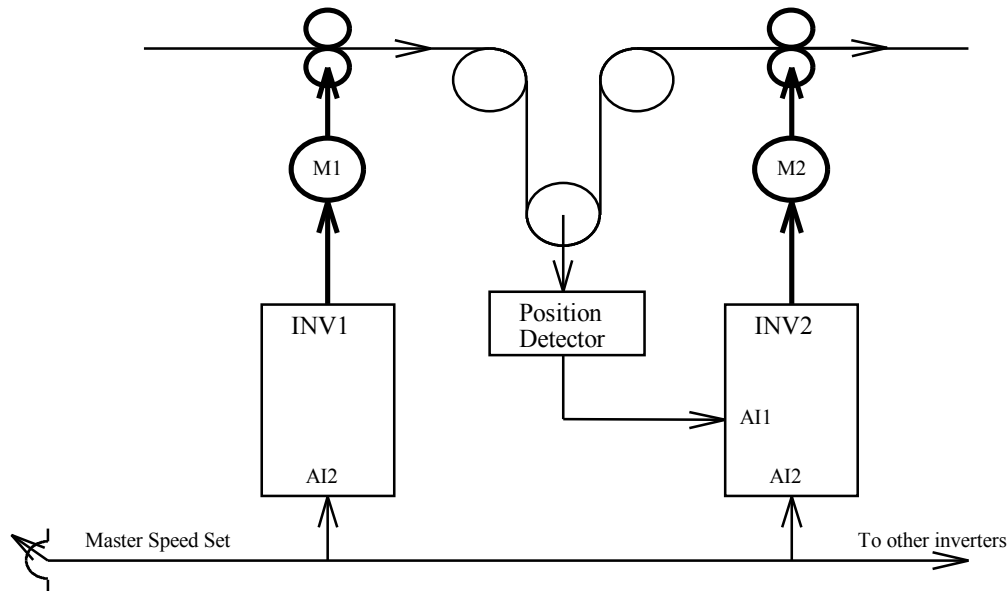
#### 7.2.13 Pr.40 = 13 , Speed input is the combination of AI2 + AI1(V4.68~)

In this mode, the desired set frequency is the combination of AI1 and AI2.

Analog signal from AI2 is selected to be the major set frequency; and signal from AI1 is the auxiliary input.

Set JP1 at +/-5V position, if the signal level of AI1 is positive, then the output frequency will increase accordingly; and if AI1 is negative, then the output frequency will decrease.

Typical application is as follows :



#### 7.2.14 Pr.40 = 14 , Reserved for factory use

#### 7.2.15 Pr.40 = 15 , Reserved for factory use

#### 7.2.16 Pr.40 = 16 , Reserved for factory use

#### 7.2.17 Pr.40 = 17 , Similar to mode 1, with minimum running speed(V4.77~)

In this mode , the voltage signal fed into AI1 terminal will be used to determine the output frequency of the inverter while running.

The direction of the output phase sequence must be determined by control command.

If the input signal reaches maximum level, the set frequency is equal to Pr.15(UPPER LIMIT).

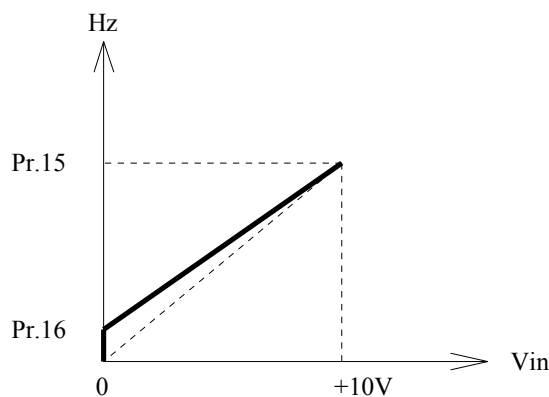
While the desired output frequency is lower than Pr.16(LOWER LIMIT), the actual output frequency will maintain at the lower frequency limit .

**Note : Set jumper JP1 to match with the input voltage range.**

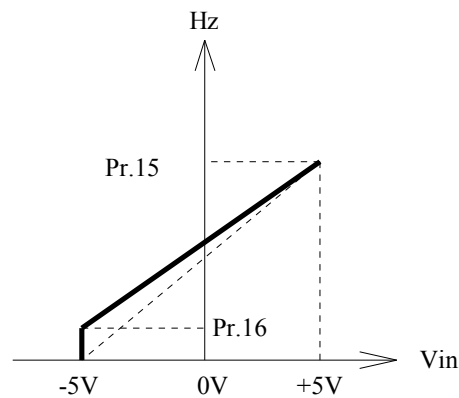
**If set to +10V position, input range is 0V ~ +10V.**

**If set to +/-5V position, input range is -5V ~ +5V. (Default)**

**If necessary, use Pr.89 and Pr.90 to modify the input range .**



JP1 set to +10V



JP1 set to +/-5V

7.2.18 Pr.40 = 18 , Similar to mode 2, with minimum running speed(V4.77~)

In this mode , the voltage signal fed into AI2 terminal will be used to determine the output frequency of the inverter while running.

The direction of the output phase sequence must be determined by control command.

If the input signal reaches maximum level, the set frequency is equal to Pr.15(UPPER LIMIT).

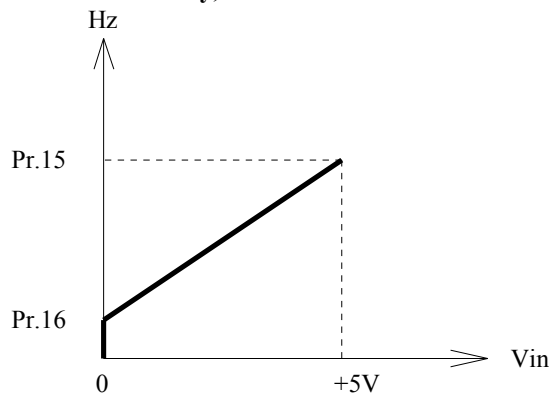
While the desired output frequency is lower than Pr.16(LOWER LIMIT), the actual output frequency will maintain at the lower frequency limit .

**Note : Set jumper JP2 to match with the input signal type and range.**

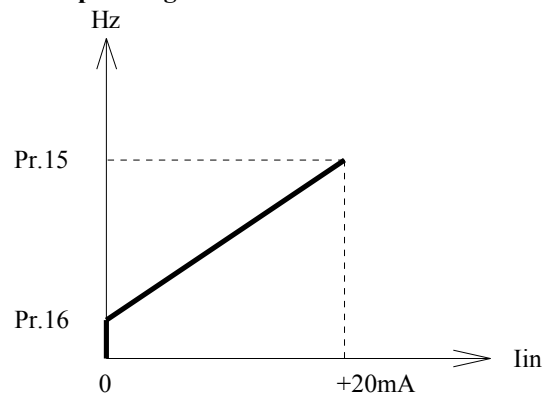
**If set to +5V position, input signal type and range is 0V ~ +5V.(Default)**

**If set to 20mA position, input signal type and range is 0mA ~ 20mA.**

**If necessary, use Pr.91 and Pr.92 to modify the input range .**



JP2 set to +5V



JP2 set to 20mA

7.2.19 Pr.40 = 19 , Similar to mode 11, with Preload and Auto Write(V4.77~)

Refer to Sec.7.2.6 , Sec.7.2.7 .

Note : Using this mode, the Computer Control function will be affected.

7.2.20 Pr.40 = 20 , Similar to mode 18, with **Reverse Slope**(V4.80~)

In this mode , the voltage signal fed into AI2 terminal will be used to determine the output frequency of the inverter while running.

The direction of the output phase sequence must be determined by control command.

If the input signal reaches maximum level, the set frequency is equal to Pr.16(LOWER LIMIT).

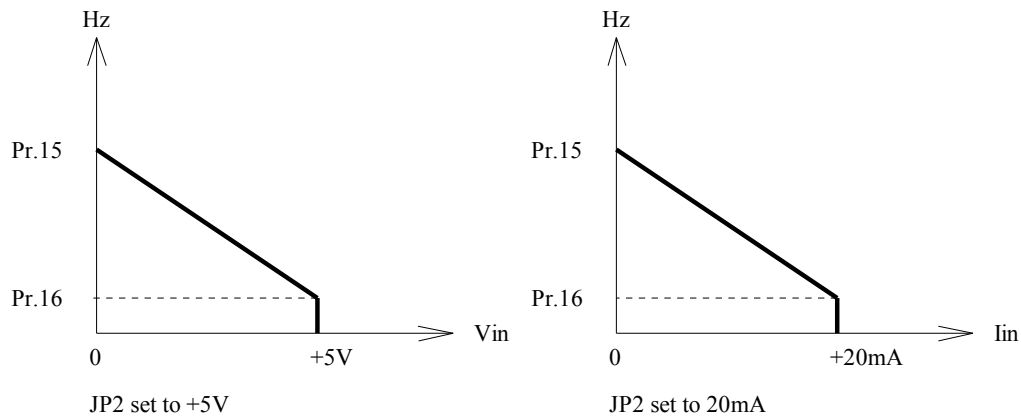
If the input signal is zero, the set frequency is equal to Pr.15(UPPER LIMIT).

**Note : Set jumper JP2 to match with the input signal type and range.**

**If set to +5V position, input signal type and range is 0V ~ +5V.(Default)**

**If set to 20mA position, input signal type and range is 0mA ~ 20mA.**

**If necessary, use Pr.91 and Pr.92 to modify the input range .**



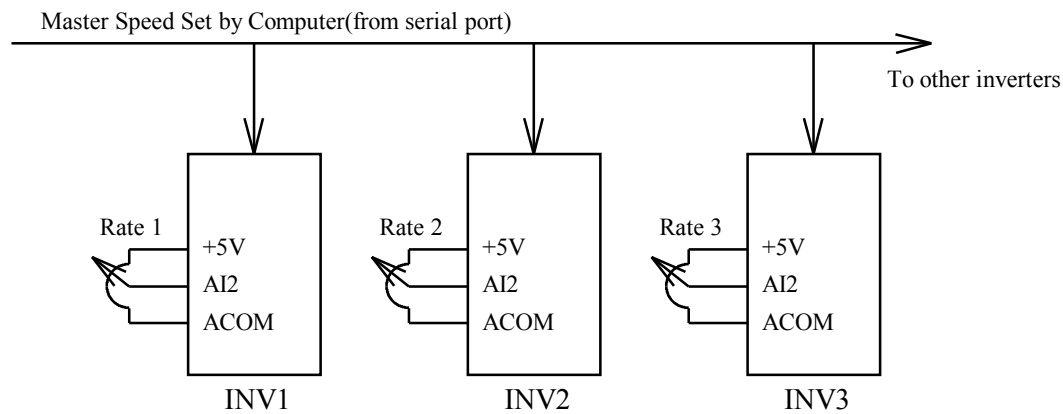
7.2.21 Pr.40=21(V4.87~), Set frequency = Panel set frequency \* AI2

**This mode is similar to mode-3.**

**However, the output frequency will be modified by the input signal from AI2.**

**AI2 is treated as percentage input. +5V is 100%, and 0V equal to 0%.**

**This function is useful when multiple inverters are controlled by master computer.**



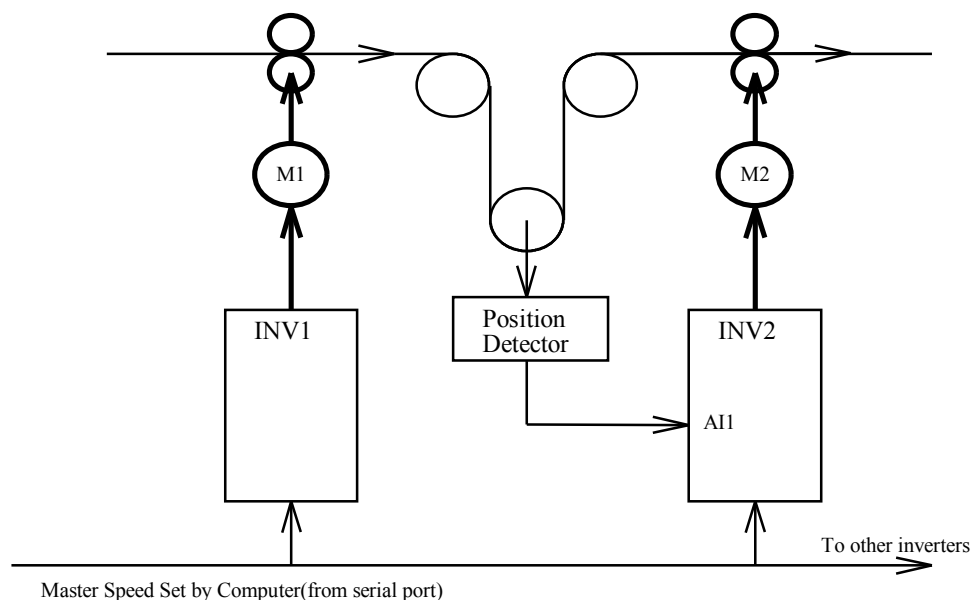
7.2.22 Pr.40=22(V4.87~), Set frequency = Panel set frequency + AI1

**This mode is similar to mode-3.**

**However, the output frequency will be modified by the input signal from AI1.**

**Set JP1 to +/-5V position. If AI1 >0, the ourput frequency will increase; and if AI1<0, the output frequency will decrease.**

**This function is useful when multiple inverters are controlled by master computer.**



## **8. Selection of Digital input function**

The terminals DI1, DI2, DI3, & DI4 are multi-functioned Digital Input terminals.

**【Note】** All the DIx terminals are scanned once every 2.5ms.

These four terminals are exactly identical in its hardware/software configurations.

When left open, they are inactive. And will become active when connected to DCOM.

Each input terminal can be configured individually by corresponding DIx\_SELECT parameters.

The four DIx\_SELECT parameters are :

Pr.41 -- DI1\_SELECT, used for DI1

Pr.42 -- DI2\_SELECT, used for DI2

Pr.43 -- DI3\_SELECT, used for DI3

Pr.44 -- DI4\_SELECT, used for DI4

Any digital input can select one of the following special functions individually.

Pr.41,42,43,44	FUNCTION	COMMENT
0	NULL	NO FUNCTION
1	EMS	EMERGENCY STOP
2	SPD3	SPEED SET
3	SPD2	SPEED SET
4	SPD1	SPEED SET
5	JOG	JOG SPEED SET
6	OH	OVER HEAT ERROR, (if input closed)
7	TMIA	TIMER INPUT TYPE A
8	ON_BB	BASE BLOCK if DIx is ON
9	FJR	FORWARD JOG RUN
10	RJR	REVERSE JOG RUN
11	TMIB	TIMER INPUT TYPE B
12	SAVE	SAVE ENERGY
13	UP(fix rate)	INCREASE UP/DOWN COUNTER(fix rate)
14	DOWN(fix rate)	DECREASE UP/ DOWN COUNTER(fix rate)
15	U/D CLEAR	CLEAR UP/DOWN COUNTER
16	U/D LOAD	LOAD Pr.15 to UP/DOWN COUNTER
17	U/D HOLD	HOLD "Output HZ" to UP/DOWN COUNTER
18	OFF_BB	BASE BLOCK if DIx is OFF
19	UP	INCREASE UP/DOWN COUNTER
20	DOWN	DECREASE UP/DOWN COUNTER
21	ALARM CLEAR	CLEAR ALARM WHEN ALARM OCCUR
22	SET1(FF1)	SET input of Flip/Flop-1
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 FF1 & FF2
27	CLR(FF1&FF2)	CLEAR input to both FF1& FF2
28	CLK Input	Input CLOCK to Timer/Counter Block
29	Reserve	
30	/OH	OVER HEAT ERROR, (if input open)
31	Normal/Auto SW	Change Over Switch for Normal or Auto Run

### **8.0 DIx\_Select = 0, NULL function**

The input terminal is disabled into **inactive** state when select NULL function.

### **8.1 DIx\_Select = 1, EMS Emergency Stop function(Refer to Section 5.4, Pr.05~Pr.08)**

While inverter running, if the input terminal is active, then inverter will start delivering DC voltage instead of AC voltage to motor. The DC voltage level is assigned by Pr.06, and will remain a period of time determined by Pr.07.

8.2 **DIx\_Select = 2 , SPD3** (Also refer to Section 12)

8.3 **DIx\_Select = 3 , SPD2**

8.4 **DIx\_Select = 4 , SPD1**

8.5 **DIx\_Select = 5 , JOG**

In addition to Pr.00 Main\_Speed\_Set, there are other four presettable speeds : JOG Speed, SPD1, SPD2, and SPD3.

The following table list the corresponding parameters :

PARAMETER	FUNCTION	COMMENT
Pr.00	MAIN SPD SET	Main preset speed
Pr.01	MAIN SPD ACC	ACC rate for Main speed
Pr.02	MAIN SPD DEC	DEC rate for Main speed
Pr.19	JOG FREQUENCY	Desired JOG Frequency
Pr.20	JOG ACC/DEC TIME	ACC/DEC rate when select JOG
Pr.21	SPD1 FREQUENCY	Desire SPD1 Frequency
Pr.22	SPD1 ACC TIME	ACC rate when select SPD1
Pr.23	SPD1 DEC TIME	DEC rate when select SPD1
Pr.24	SPD2 FREQUENCY	Desire SPD2 Frequency
Pr.25	SPD2 ACC TIME	ACC rate when select SPD2
Pr.26	SPD2 DEC TIME	DEC rate when select SPD2
Pr.27	SPD3 FREQUENCY	Desire SPD3 Frequency
Pr.28	SPD3 ACC TIME	ACC rate when select SPD3
Pr.29	SPD3 DEC TIME	DEC rate when select SPD3

While using REMOTE PANEL, it is possible to JOG-RUN the inverter through the "JOG", "FWD" & "REV" keys. When applications use only LOCAL PANEL & Terminals to control the inverter, only multi-function inputs DIx may serve the JOG function.

**The priority level for multi-speed operation is :**

**JOG > SPD1 > SPD2 > SPD3 > NORMAL\_SPEED\_REQUEST.**

**NORMAL\_SPEED\_REQUEST** stands for the speed set from Pr.00, or Panel, or UP/DOWN counter, or AIx, according to the user's selection defined in Pr.40 .

Normally the JOG, SPD1, SPD2, & SPD3 functions must be combined with RUN Command.

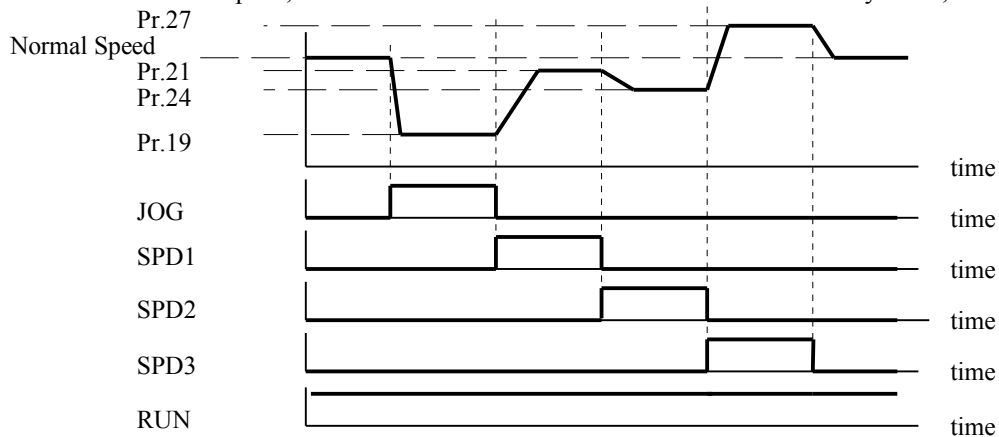
Refer to DIx mode 9 and 10, for JOG run without RUN command.

When inverter selects JOG speed, the acceleration and deceleration rate is determined by Pr.20 .

When inverter selects SPD1 speed, the acceleration and deceleration rate is determined by Pr.22,23 .

When inverter selects SPD2 speed, the acceleration and deceleration rate is determined by Pr.25,26 .

When inverter selects SPD3 speed, the acceleration and deceleration rate is determined by Pr.28,29 .

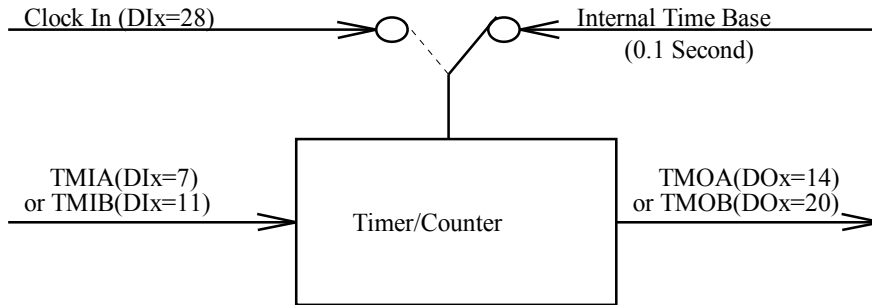


8.6 **DIx\_Select = 6 , OH(Over Heat) function** ( Also refer to Section 8.30 )

When the input terminal is activated, the inverter will disable the output transistors, and show **OH** alarm message on the display.

Refer to mode-30, for complementary function.

### 8.7 DIx\_Select = 7, TMIA



Functional block diagram of Timer/Counter module

**Note :** When any of the four DIx digital inputs select mode-28, the Timer/Counter Module will be configured as Counter Module. Otherwise, it is configured as Timer Module.

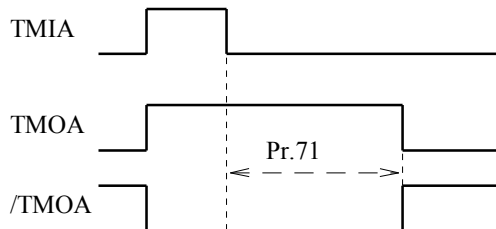
When configured as a Timer, the Internal 0.1 Second time base signal is selected to be the clock input of the Timer/Counter Module.

If configured as a Counter, the DIx terminal which was assigned to mode-28 will become the clock input of the Timer/Counter Module.

When digital input DIx is assigned to TMIA function, it serves as **Input of the OFF-DELAY** timer. User must assign a digital output DOx, which select TMOA function to serve as the output of this timer. And the **timer time** will be defined in Pr.71.

When the **timer input TMIA is active**, the **timer output TMOA** will be active immediately.

If the TMIA become inactive, the timer will start counting time. After waiting the specified time period of Pr.71, then the TMOA become inactive too.



After V4.33, the timer block is modified to "Timer/Counter Block".

If counter function is desired, just select any digital input( DIx) to serve as the clock input terminal, and let the corresponding parameter(DIx\_Select) set to 28.

**Note :**

The maximum clock input rate is 100Hz.

There is only one internal Timer/Counter Block, you can use only one Timer/Counter, either TYPE A or TYPE B.

Output function /TMOA is available after V4.90~.

### 8.8 DIx\_Select = 8, ON-BB

When any DIx selecting this function, activate the input DIx will **BLOCK the BASE** signal to all transistors immediately in order to disable the inverter output. When the input is inactive again, the inverter will execute **Speed Search process**.

Refer to Sec.11, the special function for **Speed Search process**.

Also Refer to Sec.8.18 for complement function.

### 8.9 DIx\_Select = 9, FJR

When selected DIx is active, it will force the inverter execute **Forward-Jog-Run** without RUN Command.

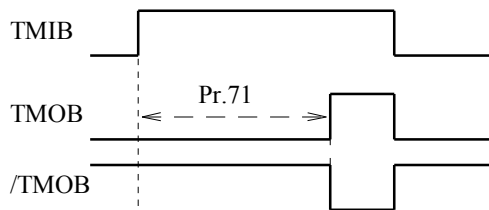
### 8.10 DIx\_Select = 10, RJR

When selected DIx is active, it will force the inverter execute **Reverse-Jog-Run** without RUN Command.



#### 8.11 DIx\_Select = 11 , TMIB

Refer to the Functional block diagram of Timer/Counter module in Sec.8.7 .



When digital input DIx is assigned to **TMIB** function, it serves as **Input of the ON-DELAY timer**. User must assign a digital output DOx , which select **TMOB** function to serve as the output of this timer. And the **timer time** will be defined in Pr.71.

When the **timer input TMIB is inactive**, the **timer output TMOB will be inactive** too.

Until the input TMIB is active and **continue active for a specified time period of Pr.71**, then the TMOB will become active .

Output function /TMOB is available after V4.90~ .

#### 8.12 DIx\_Select = 12 , SAVE-ENERGY

When any input select this function, the output voltage of inverter will decrease 20% when the input is active.

It is useful when the load condition is light, decreasing the output voltage will **increase the Power Factor and efficiency**.

#### 8.13 DIx\_Select = 13 , UP the content of UP/DOWN COUNTER

#### 8.14 DIx\_Select = 14 , DOWN the content of UP/DOWN COUNTER

#### 8.15 DIx\_Select = 15 , CLEAR the content of UP/DOWN COUNTER

#### 8.16 DIx\_Select = 16 , LOAD the content of UP/DOWN COUNTER

#### 8.17 DIx\_Select = 17 , HOLD output HZ to UP/DOWN COUNTER

Refer to Sec.7.6 Functional Block Diagram of Internal UP/DOWN counter.

Note : These digital function may be selected as the input terminals when Pr.40=6, 7, 11, and 19, using the content of the UP/DOWN counter as the NORMAL\_SPEED\_REQUEST.

When activate the DIx terminal which is assigned as UP function(mode-13), the content of the internal UP/DOWN COUNTER will increase at 4.00Hz/Second rate. Let the DIx inactive again will stop the UP function.

When activate the DIx terminal which is assigned as DOWN function(mode-14), the content of the internal UP/DOWN COUNTER will decrease at 4.00Hz/Second rate. Let the DIx inactive again will stop the DOWN function.

Once activating the DIx terminal which is assigned as CLEAR function, the content of the internal UP/DOWN COUNTER will be cleared to zero immediately.

Once activating the DIx terminal which is assigned as LOAD function, the content of the internal UP/DOWN COUNTER will be set to the value of Pr.15(Upper Limit).

**Once activating the DIx terminal which is assigned as HOLD function, the value of present output frequency will be loaded to the internal UP/DOWN COUNTER.**

#### 8.18 DIx\_Select = 18 , OFF-BB

When any DIx selecting this function, the input terminal must remain in activate state for normal operation.

If the input terminal is left open to inactive state, it will **BLOCK the BASE** signal to all transistors immediately in order to disable the inverter output. When the input is active again, the inverter will execute **Speed Search process**.

Refer to Sec.11, the special function for **Speed Search process**.

Also Refer to Sec.8.8 for complement function.

#### 8.19 DIx\_Select = 19 , UP (V4.22~)

**This function is similar to mode 13. However, the acceleration and deceleration rate will follow the time specified in Pr.01 and Pr.02 respectively.**

#### 8.20 DIx\_Select = 20 , DOWN(V4.22~)

**This function is similar to mode 13. However, the acceleration and deceleration rate will follow the time specified in Pr.01 and Pr.02 respectively.**

#### 8.21 DIx\_Select = 21 , ALARM CLEAR(V4.18~)

If user choose this function, then activate the DIx terminal will reset the inverter only when alarm had occurred .

Note : The **RST terminal** is used to **RESET** the whole inverter no matter alarm occurred or not.

- 8.22 DIx\_Select = 22 , SET Flip/Flop-1(V4.29~)  
 8.23 DIx\_Select = 23 , CLEAR Flip/Flop-1(V4.29~)  
 8.24 DIx\_Select = 24 , SET Flip/Flop-2(V4.29~)  
 8.25 DIx\_Select = 25 , CLEAR Flip/Flop-2(V4.29~)

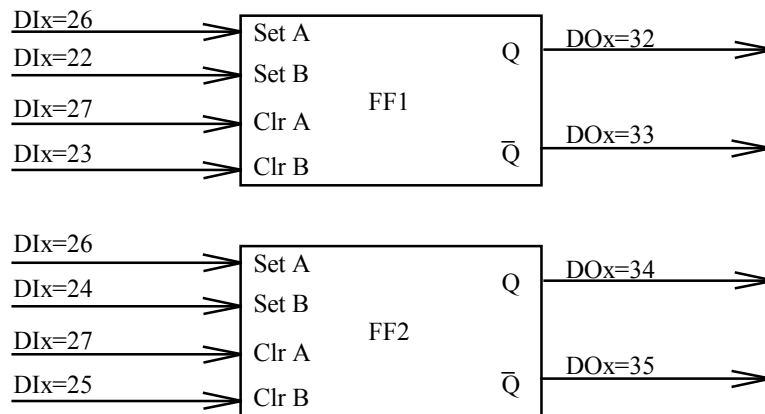
Two general purpose Flip/Flops were built in for many application in order to minimize the necessary external components. Each Flip/Flop block has two SET inputs, two CLEAR inputs and two complementary outputs for free selection.

For example, Let DI1\_Select(Pr.41) = 22 , select DI1 to be the SET input of FF1  
 DI2\_Select(Pr.42) = 23 , select DI2 to be the CLEAR input of FF1  
 DO1\_Select(Pr.45)=32 , select DO1 to be the output Q of FF1

then, **the combination of inputs DI1,DI2 and output DO1 will serve as a Latch Relay.**

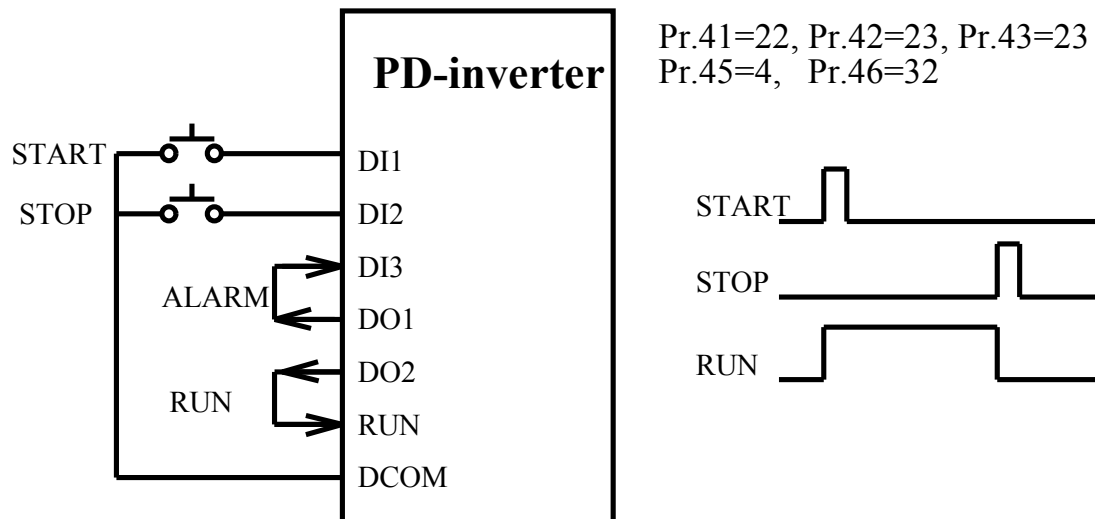
Momentary active signal apply to DI1 will cause DO1 enter active state. On the contrary, active signal apply to DI2 will cause DO1 back to inactive state again.

**Note : Multiple assignment to the same input function is acceptable.**



Functional Block diagram of Internal Flip/Flop Modules

Application example : Use DI1,DI2,DO1 as a LATCH RELAY.



- 8.26 DIx\_Select = 26 , SET both Flip/Flop-1& Flip/Flop-2 (V4.29~)  
 8.27 DIx\_Select = 27 , CLEAR both Flip/Flop-1 & Flip/Flop-2(V4.29~)

Refer to the Functional Block diagram of internal Flip/Flop Modules in Sec.8.22.

If digital input function select is DIx\_select=26, then active input to DIx will SET both FF1 & FF2.

If digital input function select is DIx\_select=27, then active input to DIx will CLEAR both FF1 & FF2.

8.28 DIx\_Select = 28 , CLOCK input of Timer/Counter(V4.30~)

Refer to Sec.8.7 , the Functional Block Diagram of the Internal Timer/Counter Module.

Note : When any of the four DIx terminals select this mode, the Timer/Counter Module will become Counter Module.

If this function is used, the Counter Module will advance one count when the input status of DIx change from inactive to active.

The maximum input clock rate is limited to 100 Transitions/Second .

8.29 DIx\_Select = 29 , NULL function

8.30 DIx\_Select = 30 , /OH function(V4.77~)

When any digital input terminal select this function, it must remain in **active state for normal operation**.

Else if the input is **inactive**, the inverter will disable the output transistors, and show **OH** alarm message on the display.

Refer to mode-6, for complementary function.

8.31 DIx\_Select = 31 , Normal/Auto Switch(V4.83~)

Refer to Sec.12, the description of AUTO RUN Function.

Parameter Pr.72 determines the Auto Run Mode of the inverter.

This Digital Input function provides an easy way to change between Normal or Auto Run mode.

When the selected DIx input is inactive, then the inverter running mode is determined by Pr.72.

If the input is active, then it will force the inverter to run under Normal mode(equal to Pr.72=0).

**Note :**     **a. If Pr.72=0, selects Normal Run Mode.**

**b. The status change of the DIx will be effective only when the inverter is stop.**

## ***9. Selection of Digital output and Relay function***

The **DO1, DO2 , RY1 and RY2** terminals are defined as multi-functional **DIGITAL OUTPUTS**.

The output circuit structure of **DO1 & DO2** are Transistor **OPEN COLLECTOR** outputs.

The **RY1and RY2** pair terminals are **NORMAL OPEN(1a)** contacts of the output **RELAY** .

The parameters for configuring the digital outputs are :

**Pr.45 -- DO1\_SELECT , used for DO1 output function select**

**Pr.46 -- DO2\_SELECT , used for DO2 output function select**

**Pr.47 -- RELAY\_SELECT , used for Relay output function select**

Each of the three digital outputs may select any of the following output functions :

Pr.45,46,47	FUNCTION	COMMENT
0	NULL	NO FUNCTION
1	NOT RUN	NOT RUNNING
2	SPE	SPEED EQUAL
3	SPNE	SPEED NOT EQUAL
4	ALM	ALARM
5	NALM	NO ALARM
6	BRAKING	UNDER BRAKING
7	RUNNING	UNDER RUNNING
8	SPO	SPEED OVER
9	SPNO	SPEED NOT OVER
10	SPA	SPEED ARRIVE
11	SPNA	SPEED NOT ARRIVE
12	DIR	OUTPUT DIRECTION
13	COD	CURRENT OVER DETECT
14	TMOA	TIMER OUTPUT TYPE A
15	SPZ	ZERO SPEED
16	SPNZ	NOT ZERO SPEED
17	STALLING	OUTPUT WHILE STALLING
18	SLOW ACC	ACC TIME EXTENSION
19	SLOW DEC	DEC TIME EXTENSION
20	TMOB	TIMER OUTPUT TYPE B
21	STEP1	AUTO RUNNING AT STEP 1
22	STEP2	AUTO RUNNING AT STEP 2
23	STEP3	AUTO RUNNING AT STEP 3
24	STEP4	AUTO RUNNING AT STEP 4
25	STEP5	AUTO RUNNING AT STEP 5
26	STEP6	AUTO RUNNING AT STEP 6
27	STEP7	AUTO RUNNING AT STEP 7
28	STEP8	AUTO RUNNING AT STEP 8
29	STEP9	AUTO RUNNING AT STEP 9
30	STEP10	AUTO RUNNING AT STEP 10
31	RESERVE	
32	Q1(FF1)	Output of Flip/Flop-1
33	/Q1(FF1)	Complement Output of FF1
34	Q2(FF2)	Output of Flip/Flop-2
35	/Q2(FF2)	Complement Output of FF2
36	RESERVE	
Pr.45,46,47	FUNCTION	COMMENT
37	RESERVE	
38	Output ON	The Output terminal always ON
39	Clock Output	Clock rate is 10 times output Hz
40	/TMOA	Complement of TMOA
41	/TMOB	Complement of TMOB

**Note :** When power on, or the inverter will executing **INITIALIZE** function, all of the outputs will go inactive for a short period of time about 1 second .

## 9.0 NULL function

The output status of DOx will always under **inactive state** when selecting this mode.

This function is complement function of **Always ON** function. Refer to Sec.9.38 .

This function is useful when the inverter is controlled by a master computer. The master computer can control these digital outputs for other peripheral, independent to the inverter operation.

## 9.1 NOT RUNNING function (complement of Sec.9.7)

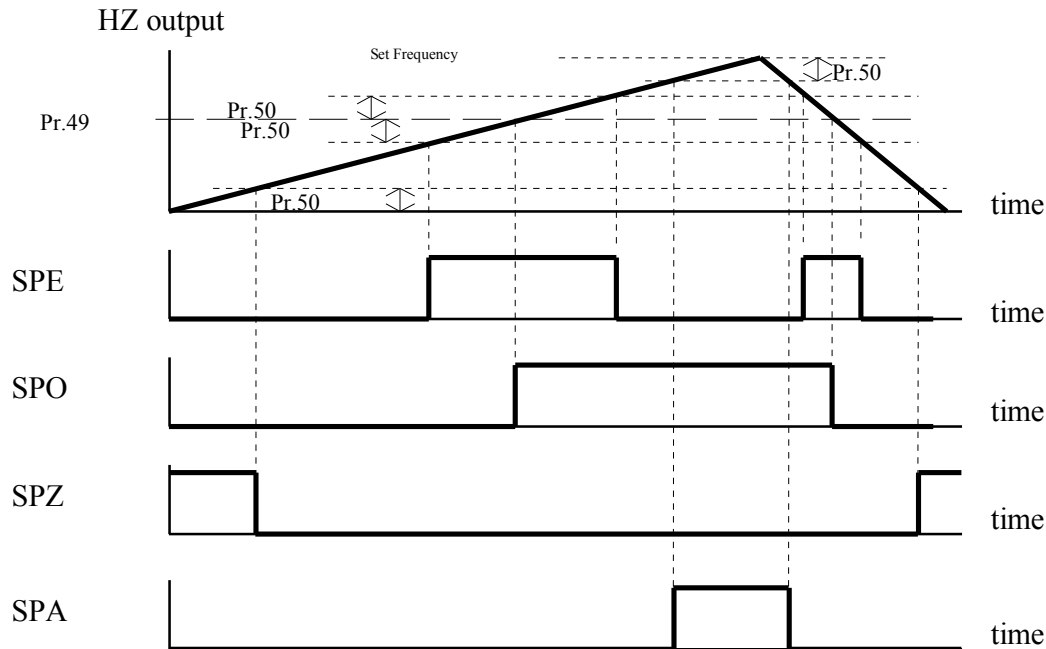
The output status of DOx will be **active** when the inverter is under **standby** mode.

Inverter under standby mode means the output transistors are all OFF .

If the inverter start **running** or under **DC injection braking** mode, the output status will be **inactive**.

## 9.2 SPE Speed Equal function

## 9.3 SPNE Speed Not Equal function(complement of Sec.9.2)



The output status of DOx will be **active**, if the output frequency is **EQUAL** to the preset frequency defined in **Pr.49** .

**Definition of EQUAL means : Difference is within the allowable tolerance defined in Pr.50.**

\* Relative functions are SPO, SPZ, and SPA.

## 9.4 ALARM output function (complement of Sec.9.5)

The output status of DOx is normally **inactive** when the inverter detects **no error**.

If **error occurs**, the output will be **active** immediately .

## 9.5 NOT ALARM output function(complement of Sec.9.4)

The output status of DOx is normally **active** when the inverter detects **no error**.

If **error occurs**, the output will be **inactive** immediately.

## 9.6 BRAKING function(Refer to Section 5.4, Pr.05~Pr.08)

The output status of DOx will be **active** when the inverter is under **DC injection braking** mode.

## 9.7 RUNNING function (Refer to Section 5.4, Pr.05~Pr.08)

The output status of DOx will be **inactive** when the inverter is under **standby** mode.

Inverter under standby mode means the output transistors are all OFF .

If the inverter start running or under DC injection braking mode, the output status will be **active**.

## 9.8 SPO Speed Over function (Refer to Section 9.2)

The output status of DOx will be **active**, if the absolute value of output frequency is **OVER** the preset frequency defined in **Pr.49** .

## 9.9 SPNO Speed Not Over function(complement of Sec.9.8)

## 9.10 SPA Speed Arrive function(Refer to Section 9.2)

The output status of DOx will be **active**, if the output frequency is **EQUAL** to the Set frequency.

**Definition of EQUAL means : Difference between output Hz and desired frequency is within the allowable tolerance defined in Pr.50.**

V4.89~, the SPA signal is always inactive if inverter is not running or is under DC injection braking.

On the contrary, the SPNA is always active if inverter is not running or is under DC injection braking.

### 9.11 SPNA Speed Not Arrive function(complement of Sec.9.10)

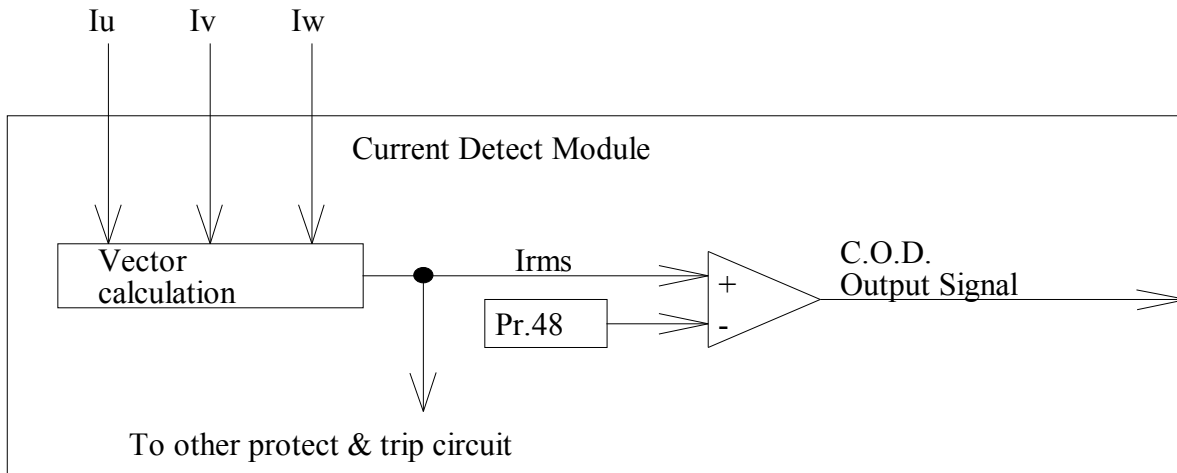
### 9.12 DIRECTION output function

The output status of DOx will be **active**, if the output frequency is in **forward** direction.

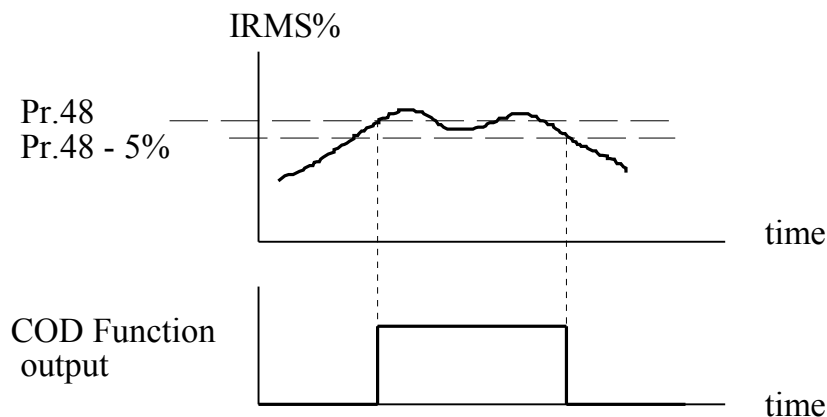
The output status of DOx will be **inactive**, if the output frequency is in **reverse** direction.

When inverter stop, the output status of DIx is **active**.

### 9.13 COD Current Over Detection function



$$\text{Note : } I_{rms} = \text{Sqrt}( I_u \cdot I_u + I_v \cdot I_v + I_w \cdot I_w )$$



The output status of DOx will be **active** when the output current is greater than the threshold value defined in Pr.48 .

And it will **keep on active** until the output current falls under Pr.48-5% .

The parameter **Pr.48** is expressed in % value of rated current.

### 9.14 TMOA Timer Output A-type function(Refer to Section 8.7)

Refer to the **Functional block diagram of Timer/Counter module** in Sec.8.7 and the related descriptions.

### 9.15 SPZ Speed Zero function (Refer to Section 9.2)

The output status of DOx will be **active**, if the output frequency is **EQUAL to Zero**.

**Definition of EQUAL means : Difference is within the allowable tolerance defined in Pr.50.**

### 9.16 SPNZ Speed Not Zero function(complement of Sec.9.15)

### 9.17 STALLING function

While inverter running, if the output current exceeds hardware limit or the level specified in Pr.35, the output frequency will decrease automatically to reduce the output current. Inverter running under such condition is called Stalling, and output status DOx will be active to indicate this situation.

### 9.18 SLOW ACC, indication of executing Acceleration Extension

While acceleration, if the output current exceeds hardware limit or the level specified in Pr.35, the inverter will decrease the acceleration rate automatically. In the mean time, the output status DOx will be **active indicating the acceleration extension status**.

### 9.19 SLOW DEC, indication of executing Deceleration Extension

While deceleration, if the capacitor voltage is over 115%, the inverter will decrease the deceleration rate automatically. In the mean time, the output status DOx will be **active indicating the deceleration extension status**.

### 9.20 TMOB Timer Output B-type function(Refer to Section 8.7)

Refer to the **Functional block diagram of Timer/Counter module** in Sec.8.7 and the related descriptions in Sec.8.11 .

- 9.21 STEP1 output indicating Auto running at step1(Refer to Section 12.2)
- 9.22 STEP2 output indicating Auto running at step2(Refer to Section 12.2)
- 9.23 STEP3 output indicating Auto running at step3(Refer to Section 12.2)
- 9.24 STEP4 output indicating Auto running at step4(Refer to Section 12.2)
- 9.25 STEP5 output indicating Auto running at step5(Refer to Section 12.2)
- 9.26 STEP6 output indicating Auto running at step6(Refer to Section 12.2)
- 9.27 STEP7 output indicating Auto running at step7(Refer to Section 12.2)
- 9.28 STEP8 output indicating Auto running at step8(Refer to Section 12.2)
- 9.29 STEP9 output indicating Auto running at step9(Refer to Section 12.2)
- 9.30 STEP10 output indicating Auto running at step10(Refer to Section 12.2)
- 9.31 Reserve
- 9.32 Q1 output of Flip/Flop-1(Refer to Section 8.22)
- 9.33 /Q1 output of Flip/Flop-1(Refer to Section 8.22)
- 9.34 Q2 output of Flip/Flop-2(Refer to Section 8.22)
- 9.35 /Q2 output of Flip/Flop-2(Refer to Section 8.22)

Outputs of internal Flip/Flops.

9.36 Reserve

9.37 Reserve

#### 9.38 Always ON(V4.71~)

The output status of DOx will always under **active state** when selecting this mode.

This function is complement function of **NULL** function. Refer to Sec.9.0 .

This function is useful when the inverter is controlled by a master computer. The master computer can control these digital outputs for other peripheral, independent to the inverter operation.

#### 9.39 10X Hz Clock output(V4.88~)

When select this function, the output will become a digital clock signal output.

The clock rate is equal to output frequency multiply by 10 .

【Note】 This function is available only for DO1.

#### 9.40 /TMOA Complement function of TMOA (V4.90~ )

Refer to 9.14 .

#### 9.41 /TMOB Complement function of TMOB (V4.90~ )

Refer to 9.20 .

# 10. Selection of Analog output function

This section describes the definition of analog output voltage between "AM" & "ACOM".  
Refer to Section-1.2.2 for the internal circuit structure.

Relative parameter

**Pr.37 -- AM\_SELECT**

**Pr.38 -- AM\_GAIN**

Auxiliary Analog Output Terminal "AM" is provided for analog meter display, or other applications requiring the analog output signal.

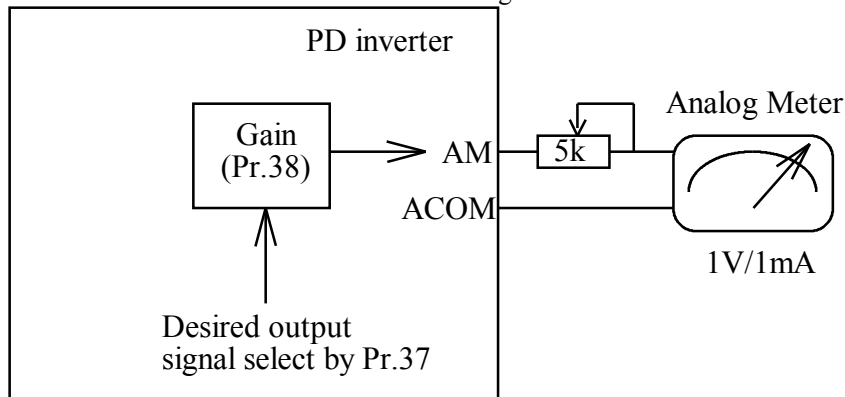
"AM\_SELECT" is used to select desired signal which will output to AM terminal.

"AM\_GAIN" is used to fine tuning the output voltage level.

User may select any of the four signals in the Table for output to the "AM" terminal.

Pr.37	AM Terminal Function	Output Ratio
0	HZ_Signal	Output Hz / ( Pr.15 )
1	IRMS_Signal	Output Irms / ( 2 * Pr.85 )
2	VDC_Signal	Vcap / 1000 V
3	VOUT_Signal	Vout / ( 2 * Pr.84 )
4	Reserve	
5	Internal UP/DOWN Counter(V4.82~)	Counter Value / (Pr.15)

Recommend interface circuit to external analog meter :



First use Pr.37 to select desired output signal.

And let Pr.38=250.

Then adjust variable resistor for trimming to correct position.

If necessary, modify Pr.38 for fine tuning.

Refer to Sec.1.2 for hardware structure.



# **11. Speed search and Base Block function**

Pr.79 to Pr.82 are used to define the inverter's speed searching characteristics for restart process.

The Speed Search function may be initiated by two methods :

## **1. By Digital Input to initiate the speed search process**

LET DIX\_SELECT=8, selects "Base Block" input function.

If terminal DIX is active, then the inverter will disable IGBT output causing the motor **FREE RUN** to stop .

When DIX inactive again, the inverter will still remain in the BLOCK state for a period of time defined in the parameter **BASE BLOCK TIME(Pr.36)**.

After the period of BASE BLOCK TIME, Then the restart process begins.

## **2. Power come back normal after UP/OP alarm to initiate the speed search process**

LET Pr.34 = 1, enables UP/OP restart function.

If "UP" or "OP" alarm appear while inverter running, Then the inverter will disable IGBT output causing the motor **FREE RUN**.

When Power come back to normal again, the inverter will still remain in the BLOCK state for a period of time defined in the parameter **BASE BLOCK TIME(Pr.36)**.

After the period of BASE BLOCK TIME, Then the restart process begins.

PARAMETER	FUNCTION	DESCRIPTION
Pr.79	RESTART TYPE	SELECT RESTART TYPE
Pr.80	RESTART STALL LEVEL	STALL LEVEL WHILE RESTARTING
Pr.81	RESTART DEC TIME	DEC TIME WHILE SPEED SEARCH
Pr.82	VOLTAGE RECOVER TIME	VOLTAGE INCREASING RATE WHILE RESTARTING

## **13. MONITOR function**

While Panel is in MON mode, user can select which two status are to be monitored.

**Pr.98 is used to assign the parameter to be monitored, when "I" LED is on.**

**Pr.99 is used to assign the parameter to be monitored, when "HZ" LED is on.**

For example, the default value in Pr.99 is 57. That means, 7-segment will display the value of Pr.57 while "HZ" LED is on.

**Note :** Under CTL mode, the display will show the paramter assigned by Pr.99 .

### **13.1 OPERATING STATUS CHECK**

Parameters from Pr.57 ~ Pr.61 are inverter running status for user monitoring purpose.

**Pr.57 HZ** HZ status shows the running frequency.

**Pr.58 RPM** RPM status is calculated by HZ status.

$$\text{RPM} = (120 * \text{HZ} / \text{POLE}) * \text{GEAR\_RATIO}\%$$

Refer to Section 5.4, description of Pr.52 & Pr.53.

**Pr.59 VDC** VDC is the DC voltage measured from internal Smoothing Capacitor.

$$\text{VDC} = \text{Pr.87}(\%) * \text{Pr.56}(\text{when Pr.55}=0)$$

**Pr.60 VOUT** VOUT is the Root-Mean-Square value of inverter output voltage.

**Pr.61 IRMS** IRMS is the Root-Mean-Square value of inverter output current.

### **13.2 TERMINAL STATUS CHECK**

User can easily check the input or output terminal status from following parameters :

TERMINAL STATUS is easily verified by select the corresponding parameter number.

PARAMETER	TERMINAL STATUS
Pr.62	DI1 INPUT TERMINAL STATUS
Pr.63	DI2 INPUT TERMINAL STATUS
Pr.64	DI3 INPUT TERMINAL STATUS
Pr.65	DI4 INPUT TERMINAL STATUS
Pr.66	RUN INPUT TERMINAL STATUS
Pr.67	REV INPUT TERMINAL STATUS
Pr.68	DO1 OUTPUT TERMINAL STATUS
Pr.69	DO2 OUTPUT TERMINAL STATUS
Pr.70	RELAY OUTPUT STATUS

### **13.3 A/D CONVERTER CHECK**

Pr.55 A/D CHANNEL SELECT

Pr.56 A/D CONVERSION DATA

The PD Series inverter can monitor 5 analog input signals.

Use Pr.55 to select the desired channel for monitoring, then the 10-bits A/D converter of CPU will execute Analog to Digital conversion and put the conversion result in Pr.56.

The range of the converted data is between 0 to 1023 corresponding to full range input.

Pr.55	Pr.56 (A/D DATA)
0	VDC channel A/D value
1	IU channel A/D value
2	IV channel A/D value
3	AI1 channel A/D value
4	AI2 channel A/D value

# ***14 MAINTENANCE & ERROR MESSAGE***

## **Monthly maintenance**

- a. Inverter running  
Monitor and record the running status(ex. output current). Compare the data with the previous recorded .
- b. Inverter power off  
Check and Ensure all ventilation Fans are un-obstructed.  
Examine the input and output power terminals for signs of overheating.

## **Three-Monthly maintenance**

- Perform monthly maintenance as described above.
- Remove any accumulated dust from the equipment . Using a suction type cleaner with a non-conducting nozzle.

## **Error Messages :**

ERROR CODE	MESSAGE DESCRIPTION	
n. --	NO ALARM	
n. OP	OVER VOLTAGE	
n. UP	UNDER VOLTAGE	Note: n=0, present alarm type.
n. OL	OVER LOAD	n=1, alarm type before.
n. OH	OVER HEAT	n=2, alarm type twice before.
n. OC	OVER CURRENT when normal run	n=3, alarm type three times before.
n. CA	OC when acceleration	
n. CD	OC when deceleration	
n. CB	OC when braking	
n. CS	OC detect by Software	
E-SP	Serial Port communication Error ( REMOTE PANEL only)	

## **Counter Measure**

- OP : Check input voltage or modify deceleration rate
- UP : Check input voltage
- OL : Check load current
- OH : If the OH is caused by external Digital Input, check external input source. Otherwise, check load current or decrease carrier frequency.
- OC : Check motor wiring, or check inverter itself.
- CA : Decrease acceleration rate.
- CD : Decrease deceleration rate.
- CB : Modify Pr.05, Pr.06, Pr.07, Pr.08 .
- CS : Check inverter by qualified engineer.
- E-SP : Push any key will retry again. Or Power off the inverter, Check the cable for remote panel.  
Avoid noise interference by otherpower cable

# **15 COMPUTER CONTROL**

The PD Series Inverter has a build in RS-485 communication port on CON3 of CPU-Board.  
CON3 is a 5-pin connector. The definition of all the connector pins are :

Pin 1 : +5V  
Pin 2 : 0V  
Pin 3 : SIG+  
Pin 4 : SIG-  
Pin 5 : RESET OUTPUT(NOT USED BY COMPUTER)

## **15.1 PROTOCOL & FORMAT**

**Baud Rate : 4800, 7 Bit data, Even parity, 2 Stop Bit.**

Each PD-Series inverter has a pre-assigned **UNIT ADDRESS in Pr.93**. Computer may control any Inverter unit by select its corresponding UNIT ADDRESS.

Furthermore, the Computer may control all Inverter units at the same time if the "uu" code in command string is "00".

**NOTE : All code transfer between Computer and Inverter are ASCII code.**

## **15.2 Computer to Inverter**

Computer may send three types of message to Inverter

**15.2.1 Control Command :(No response will send back from Inverter)**

"C,uu,cc,ffff"

**C** : Head of COMMAND String  
**uu** : unit number, from 00 to 99  
When uu = 00, all inverter unit must accept.  
**cc** : control command code, from 00 to 15  
The "cc" number is actually converted from four bits binary data,  
 $cc = 8 * \text{Bit-3} + 4 * \text{Bit-2} + 2 * \text{Bit-1} + \text{Bit-0}$   
Bit-0 : RESET INVERTER  
Bit-1 : RUN  
Bit-2 : REVERSE  
Bit-3 : JOG  
**ffff** : set frequency, from 00000 to 20000, representing desired Hz = 0.00 to 200.00Hz.

**15.2.2 Write Command :(No response will send back from Inverter)**

"W,uu,nn,dddd"

**W** : Head of WRITE String  
**uu** : unit number, from 00 to 99  
When uu = 00, all inverter unit must accept.  
**nn** : parameter number, from 00 to 99  
**dddd** : data value, from 00000 to 65535, if data exceed upper and lower limits (shown in parameter table) will be trimmed within boundary automatically.

**15.2.3 Read Command :(Inverter will send back P-String after receive this string)**

"R,uu,nn"

**R** : Head of READ String  
**uu** : unit number, from 00 to 99  
When uu = 00, all inverter unit must accept.  
Do not specify uu=00 for R-String while multiple inverters are under control.  
**nn** : parameter number, from 00 to 99

## 15.3 Inverter to Computer

Parameter & Status Response( Response to Computer for R-string)

"P,uu,nn,tt,dddd,s,aaaa"

**P** : P stands for PARAMETER String

**uu** : unit number, from 00 to 99.  
This number is defined in Pr.93 of each inverter.

**nn** : parameter number, from 00 to 99

**tt** : data type of this parameter, from 00 to 15  
 tt = 00 : data WORD from EAROM, format 999.99.  
 tt = 01 : data WORD from EAROM, format 9999.9  
 tt = 02 : data WORD from EAROM, format 99999  
 tt = 03 : data BYTE from EAROM, format 999.99  
 tt = 04 : data BYTE from EAROM, format 9999.9  
 tt = 05 : data BYTE from EAROM, format 99999  
 tt = 06 : data BIT from EAROM, format 99999  
 tt = 07 : data from CPU memory, format 99999  
 tt = 08 : signed data from CPU memory. format +/-999.99  
     If followed data <32768, the data is valid and positive.  
     Else the data is negative, which is -(65536-ddddd).  
 tt = 09 : data WORD from CPU memory, format 999.99  
 tt = 10 : data WORD from CPU memory, format 9999.9  
 tt = 11 : data WORD from CPU memory, format 99999  
 tt = 12 : data BYTE from CPU memory, format 999.99  
 tt = 13 : data BYTE from CPU memory, format 9999.9  
 tt = 14 : data BYTE from CPU memory, format 99999  
 tt = 15 : data BIT from CPU memory, format 99999

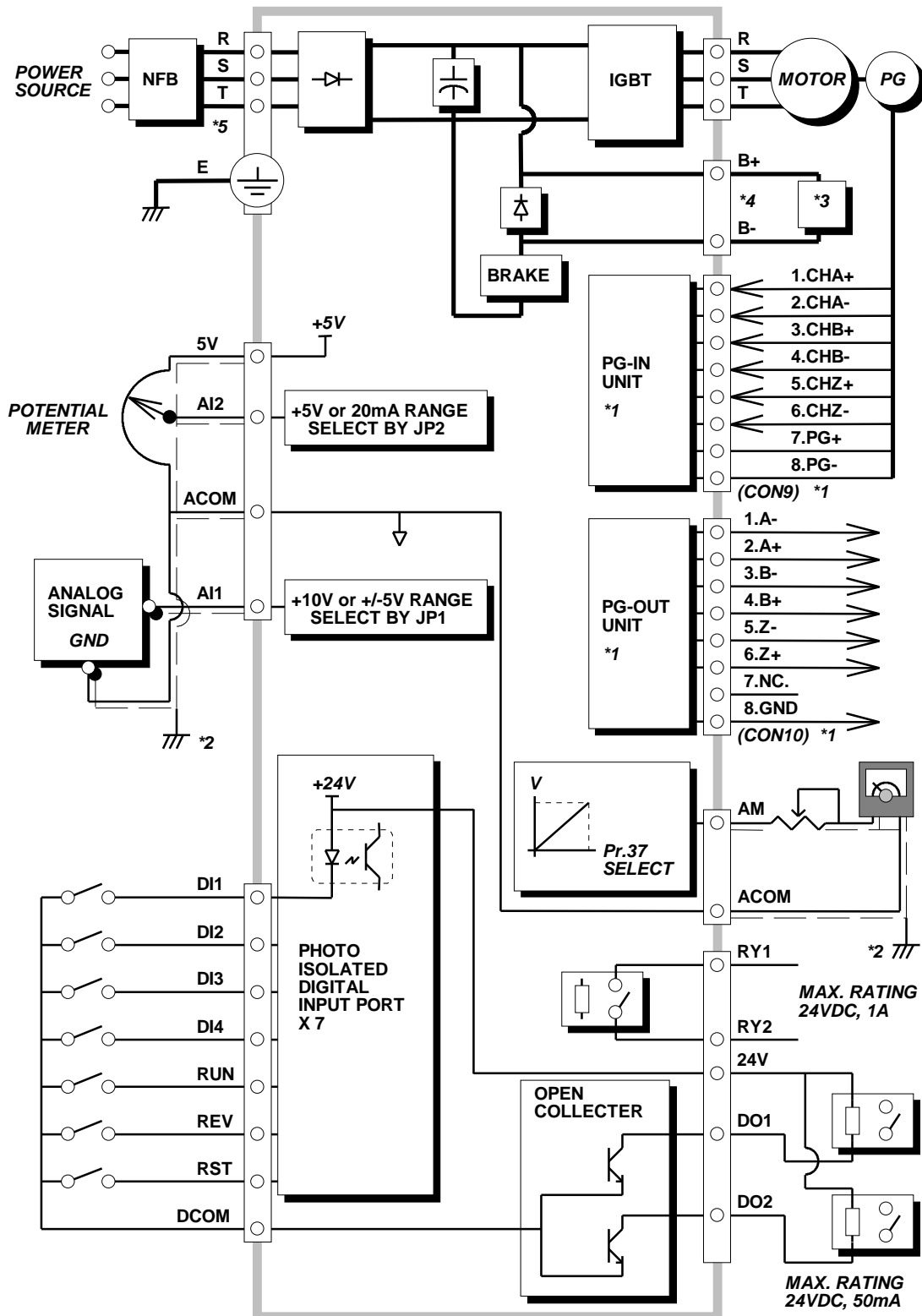
Note : Only those parameters with type 00~07 may be written by Host Computer.

**dddd** : data value, from 00000 to 65535

**s** : inverter output status, from 0 to 9  
 s = 1 : INVERTER REVERSE RUNNING  
 s = 2 : INVERTER FORWARD RUNNING  
 s = 3 : INVERTER STOP  
 else , undefined

**aaaa** : alarm history, from 0000 to 9999  
 The PD-Series inverter may record 4 Error messages.  
 Most significant digit stands for oldest error message.  
 Least significant digit stands for present error message.  
 a = 0 : No alarm  
 a = 1 : CA Over Current when acceleration  
 a = 2 : CD Over Current when deceleration  
 a = 3 : OC Over Current when not acceleration or deceleration.  
 a = 4 : OH Over Heat  
 a = 5 : OP Over Potential  
 a = 6 : UP Under Potential  
 a = 7 : OL Over Load  
 a = 8 : CB Over Current when DC Braking  
 a = 9 : CS 200% Over Current detected by Software

# 16 BLOCK DIAGRAM OF PD-INVERTER



## Note:

- \*1. Only for PDF/PDV series inverter have PG feed back terminal.
- \*2. The analog signal wires should be shielded & connected to the Earth.
- \*3. Refer to the section 2.5 to select proper discharge resistor.
- \*4. For the models with P,N terminal, must use separate **Brake Discharge Unit** and do not connect resistor to the P,N terminals directly.

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