PA7300

Fan and Pump AC Inverter

TECO Westinghouse

ANAB ACCREDITED

SYSTEM CERTIFICATION ISO 9001:2000 SGS

Key Features for Fan and Pump Applications

- PID and Auto Energy Saving Functions.
- Input Phase Loss and Output Phase Loss Protection.
- LCD Keypad can be used to copy parameter settings from one Inverter to another.
- Output Common Mode Choke Built-in on 230V 30HP - 125HP and 460V 40HP - 300HP ratings.
- Accessible parameters include PF, KW, KWHr, and Motor Elapsed Run Hour.
- Multi-Function Input/Output Interface.
- RS-485 Communication Cards (option) – MODBUS/METASYS (PA-C) LONWORKS (PA-L) PROFIBUS (PA-P)
- 1 - 8 PID Relay Card.
- PID Sleep/Wake Functions.
- 3 Analog Inputs (0-10V x 2, 4-20mA)
- 2 Analog Outputs (0-10V x 2, 4 - 20mA option)
- Motor Thermistor Input.
- Cooling Fan On/Off Control.
- Range: 208/230V 3ø 5 - 125HP 380/460V 3ø 5 - 500HP
- UL, cUL,CE 500/600V 3ø 5 - 100HP

Model Designation

PA7300 – **4** **125** – **N1**

Inverter Series
PA7300

Voltage
2: 230V/60Hz
4: 460V/60Hz
5: 600V/60HZ

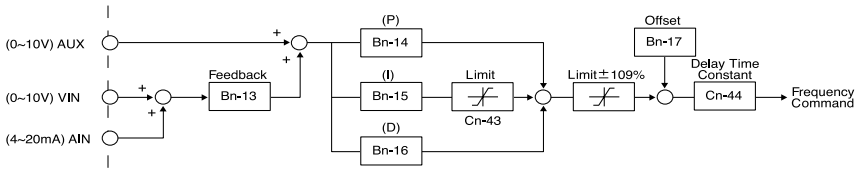
Application Maximum
Motor Output (HP)
005: 5HP
500: 500HP

Enclosure and Mounting
N1: Enclosed, Wall-Mounted
Type (NEMA1)

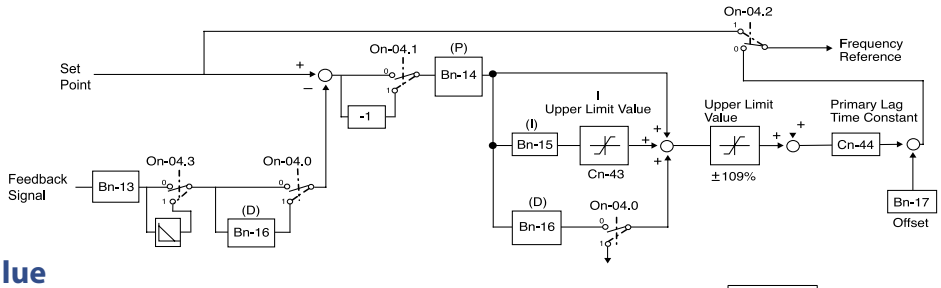
PID Function

PID Control

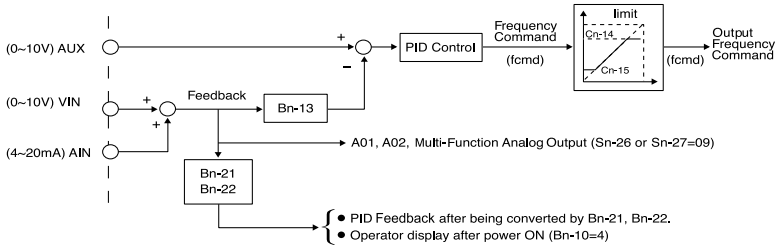
Block Diagram



Control PID Actions Through Parameters As Shown



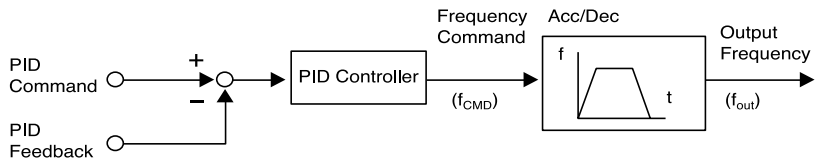
PID output value can be converted to other display unit using Bn-21 and Bn-22 (ex: 4~20mA Pressure unit; Mpa)

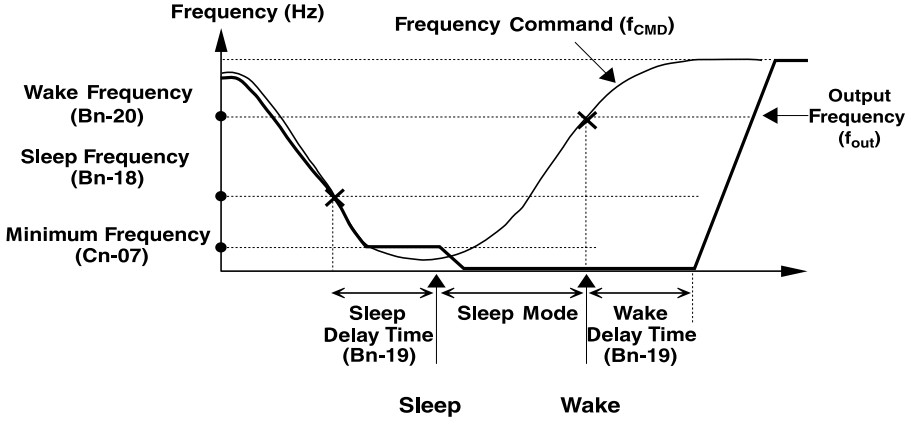


PID Sleep/Wake Functions

Sleep demand mode makes it possible to stop the motor when it is running at a low speed with light load. If the system increases, the Inverter will restart the motor. Energy savings can be achieved with this function, since the motor operates only when the system needs it.

Block Diagram



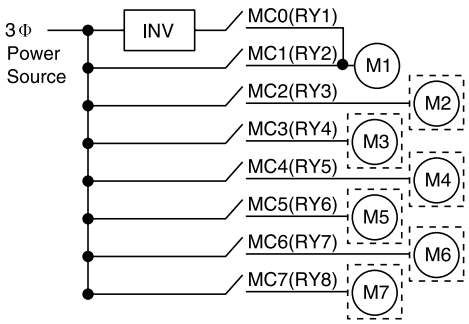


1 - 8 PID Relay Card

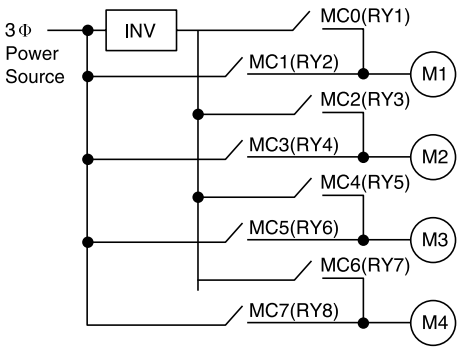
- The optional 1 - 8 PID Relay Card (PA-PID), with 8 relay contact outputs, can be used to control up to 7 pumps using the PID function in a constant pressure water supply system.
- The relay constants are described below:
  - Bn-23: Frequency Command Upper-Bound Delay Time
  - Bn-24: Frequency Command Lower-Bound Delay Time
  - Bn-25: MC ON/OFF Delay Time
  - Bn-26: Pump ON/OFF Detection Level

- Sn-30: Pump Operation Mode Selection (See diagram below)
- Sn-31: PA-PID Card Relay2 Valid/Invalid
- Sn-32: PA-PID Card Relay3 Valid/Invalid
- Sn-33: PA-PID Card Relay4 Valid/Invalid
- Sn-34: PA-PID Card Relay5 Valid/Invalid
- Sn-35: PA-PID Card Relay6 Valid/Invalid
- Sn-36: PA-PID Card Relay7 Valid/Invalid
- Sn-37: PA-PID Card Relay8 Valid/Invalid

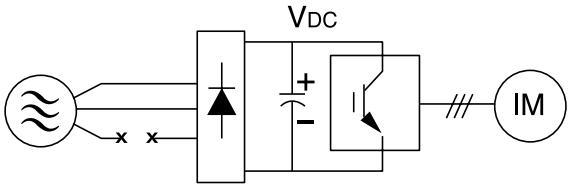
Fixed Inverter Mode



Cycled Inverter Mode



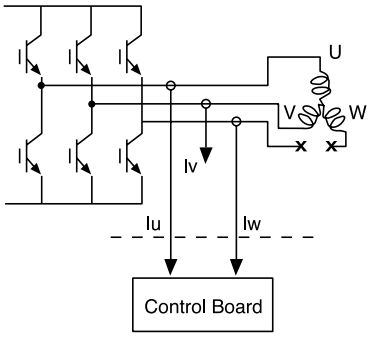
IPL-Input Phase Loss Protection



IPL function is disabled in the following cases:

- While the inverter is stopped
- While decelerating
- While the output current <=30% x the inverters rated current
- When IPL Level Δ V=100%
- When IPL protection function is disabled (Sn-13=xxx0)
- When "A/D Fault CPF05" is present

OPL-Output Phase Loss Protection



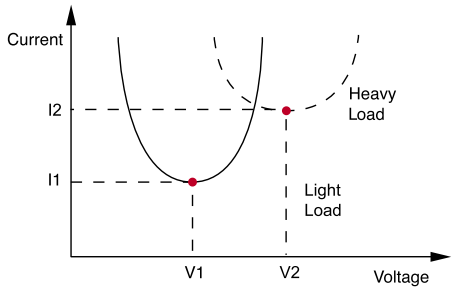
The OPL function is disabled in the following cases:

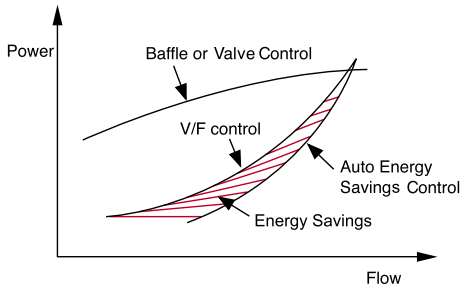
- While the inverter is stopped
- During DC injection braking of inverter
- While the output current <=30% x the inverters rated current
- When OPL Protection Function is disabled (Sn-13=xx0x)
- When "A/D Fault CPF05" is present

AES-Auto Energy Saving

The Inverter will automatically adjust voltage to minimize output current for different loads.

For fans, pumps, and HVAC applications, the auto energy saving mode will consume less power than for general V/F control.



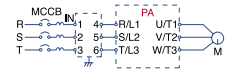


Noise Filter

When an input noise filter is installed as indicated, the Inverter will comply with the EN61800-3 (2000) noise interference suppression directive.

Inverter	Voltage(V)	460V																						
	HP	5	7.5	10	15	20	25	30	40	50	60	75	100	125	150	175	200	250	300	350	400	500
	Rated Current (A)	8	12	16	24	32	38	44	59	75	86	111	151	189	231	267	304	340	380	516	585	732
Input Noise Filter	Rated Current (A)	25	25	25	50	50	50	50	80	80	120	120	200	200	320	320	320	400	400	600	600	800

INPUT NOISE FILTER



Input Noise Filter Connection

Digital Operator

LCD Keypad (standard)

- Uses Graphic LCD, Dual Language (Chinese and English)
- English LCD operator, can function as a parameter copy unit.

LED Keypad (option)

- Large size LED operator
- Same installation and dimension as the LCD operator.

Specifications

230V Class

INVERTER (HP)		5	7.5	10	15	20	25	30	40	50	60	75	100	125
MAX. APPLICABLE MOTOR OUTPUT HP (KW)*1		5 (3.7)	7.5 (5)	10 (7.5)	15 (11)	20 (15)	25 (18.5)	30 (22)	40 (30)	50 (37)	60 (45)	75 (55)	100 (75)	125 (90)
Output Characteristics	Inverter Capacity (KVA)	6.2	9.3	12.4	18.6	24.8	27.4	33	44	55	63	81	110	125
	Rated Output Current (A)	16	24	32	48	64	72	88	117	144	167	212	288	327
	Max. Output Voltage	3-Phase, 200/208/220/230V (Proportional to input voltage)												
	Rated Output Frequency	Up to 180Hz												
Power Supply	Rated Input Voltage and Frequency	3-Phase, 200/208/220V, 50Hz 200/208/220/230V, 60Hz												
	Allowable Voltage Fluctuation	+10%~-15%												
	Allowable Frequency Fluctuation	±5%												

460V Class

INVERTER (HP)		5	7.5	10	15	20	25	30	40	50	60	75	100	125	150	175	200	250	300	350	400	500
MAX. APPLICABLE MOTOR OUTPUT HP (KW)*1		5 (3.7)	7.5 (5)	10 (7.5)	15 (11)	20 (15)	25 (18.5)	30 (22)	40 (30)	50 (37)	60 (45)	75 (55)	100 (75)	125 (90)	150 (100)	175 (132)	200 (160)	250 (185)	300 (220)	350 (260)	400 (300)	500 (375)
Output Characteristics	Inverter Capacity (KVA)	6.2	9.3	12.4	18.6	24.8	29	34	45	57	66	85	115	144	176	203	232	259	290	393	446	558
	Rated Output Current (A)	8	12	16	24	32	38	44	59	75	86	111	151	189	231	267	304	340	380	516	585	732
	Max. Output Voltage	3-Phase, 380/400/415/440/460V (Proportional to input voltage)																				
	Rated Output Frequency	Up to 180Hz																				
Power Supply	Rated Input Voltage and Frequency	3-Phase, 380/400/415/440/460V, 50/60Hz																				
	Allowable Voltage Fluctuation	+10%~-15%																				
	Allowable Frequency Fluctuation	±5%																				

*1 Based on a 4 pole motor

Characteristics

Control Characteristics	Control Method	Sine Wave PWM
	Frequency Control Range	0.1 to 180Hz
	Frequency Accuracy	Digital Command: 0.01% +14 to 104˚F -10 to 40˚C Analog Command: 0.1% 77 ± 18˚F 25± 10˚C
	Frequency Setting Resolution	Digital Operator Reference: 0.01Hz Analog Reference: 0.06Hz/60Hz
	Output Frequency Resolution	0.01Hz (1/30000)
	Overload Capacity	110% Rated Output Current for One Minute
	Frequency Setting Signal	0 to 10VDC (20K Ω), 4-20mA (250 Ω)
	Accel/Decel Time	0.1 to 6000 sec (Independent Accel/Decel Time Settings)
	Braking Torque	Approximately 20%
	No. of V/F Patterns (Total of 5)	1: Custom Pattern, 4: For Fans and Pumps
Protective Functions	Motor Overload Protection	Electric Thermal Overload Relay
	Instantaneous Overcurrent	Motor Coasts to Stop at Approximately 200% of Rated Current
	Overload	Motor Coasts to Stop after 1 minute at 110% Rated Output Current
	Overvoltage (230V)	Motor Coasts to Stop if Inverter Output Voltage exceeds 410VDC
	Overvoltage (460V)	Motor Coasts to Stop if the Inverter Output Voltage exceeds 820VDC
	Undervoltage (230V)	Motor Coasts to Stop if Inverter Output Voltage drops to 190VDC or below
	Undervoltage (460V)	Motor Coasts to Stop if Inverter Output Voltage drops to 380VDC or below
	Momentary Power Loss	Motor Coasts to Stop after Momentary Power Loss lasting over 15ms (time-setting made prior to shipment)
	Motor Overheat Protection	Motor PTC Thermistor (Active: 1330 Ω, Return: 550 Ω)
	Input Phase Loss	Single Phase Protection
	Output Phase Loss	Provided by Electronic Circuit
	Fin Overheat	Thermostat
	Stall Prevention	Stall Prevention at Acceleration/Deceleration and Constant Speed Operation
	Ground Fault	Provided by Electronic Circuit
	Power Charge Indication	Charge Lamp stays ON until Bus Voltage drops below 50V
Environmental Conditions	Location	Indoor (protected from corrosive gases and dust)
	Ambient Temperature	Wall-mounted type: +14 to 104˚F (-10 to +40˚C) not frozen Open chassis type: +14 to 113˚F (-10 to +45˚C) not frozen
	Storage Temperature	-4 to 140˚F (-20 to +60˚C)
	Humidity	95% RH (non-condensing)
	Vibration	1G at 10 to 20Hz, up to 0.2G at 20 to 50Hz
Communication Function		RS-485 Communication Card Options - MODBUS/METASYS, PROFIBUS, LONWORKS
Noise Interference Suppression		EN61800-3 (2000) with specified noise filter
Noise Immunity		EN61800-3 (2000)

Main Circuit Terminals

TERMINALS	TERMINAL FUNCTION
R / L1	Main Circuit Input Power Supply
S / L2	
T / L3	
U / T1	Inverter Output
V / T2	
W / T3	
⊕	DC Power Supply Input or Braking Unit
⊖	
B2	B2 ⊕⊖: External Braking Resistor (only for 230V 25HP, 460V 25HP and 30HP ratings)
E(PE, ⏚)	Grounding (3rd Type Grounding)

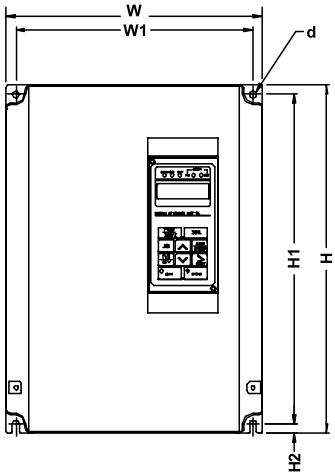
Control Circuit Terminals

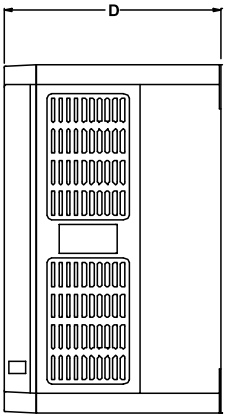
I/O	TERMINAL	FUNCTION	
Digital Input Terminals	1	Forward operation - stop signal	
	2	Reverse operation - stop signal	
	3	External fault input	
	4	Fault reset	
	5	Multi-function contact input. The following signals are available for selection: forward / reverse select,	
	6	run mode select, multi-speed select, jog frequency select, accel/decel time select, external	
	7	fault, external coast to stop, hold command, inverter overheat protection, DB command, aux.	
	8	input effective, speed search, energy-savings operation	
	24VG	SINK Common (0V)	
	24V	SOURCE Common (24V)	
	SC	Sequence Input Common (24V)	
Analog Input Terminals	+15V	+15V power supply for external frequency command	
	VIN	Master speed voltage reference (0 to 10V)	
	AIN	Master speed current reference (4 to 20mA)	
	AUX	Auxiliary analog command. One of the following signals are available for selection: Frequency command, frequency gain, frequency bias, overtorque detection level, voltage bias, accel/decel rate, DB current	
	MT	Motor temperature PTC thermistor. (Active: 1330Ω, Return: 550Ω)	
	GND	Analog signal common	
	E	Connection to shield signal lead (frame ground)	
Digital Output Terminals	R3A	Fault contact output A (closed at fault)	
	R3B	Fault contact output B (open at fault)	
	R3C	Fault contact output common	
	R2A-R2C	Multi-function contact output. One of the following signals are available for output: output during running, zero speed, synchronized speed, arbitrary speed, agreed frequency detection, overtorque, undervoltage, run mode, coast to stop, braking resistor overheat, alarm, fault	
	R1A-R1C		
	DO1	Multi-function PHC (photo-coupler) output 1 (open collector, 48VDC, 50mA)	The same functions as terminals R1A-R1C and R2A-R2C
	DCOM	Multi-function PHC output common	
Analog Output Terminals	A01	Analog multi-function output port: Frequency command, output frequency, output current, output voltage, DC voltage, output power	0~11V max. 2mA or less
	A02		
	GND	Common lead for analog port	

Dimensions

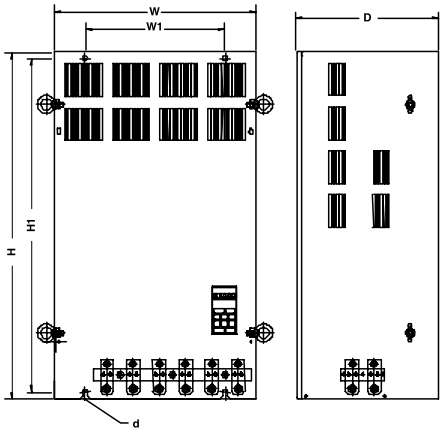
VOLTAGE (V)	INVERTER CAPACITY (HP)	OPEN CHASSIS TYPE (IP00) inches						WEIGHT (LB)	ENCLOSED TYPE (NEMA 1) inches						WEIGHT (LB)	ACL/DCL	REFERENCE FIGURE
		W	H	D	W1	H1	d		W	H	D	W1	H1	d			
230V	5	8.32	11.81	8.46	7.56	11.26	M6	13	8.32	11.81	8.46	7.56	11.26	M6	13	External ACL (option)	(a)
	7.5							13							13		
	10							13							13		
	15	10.43	14.17	8.86	9.65	13.39	M6	27	10.43	14.17	8.86	9.65	13.39	M6	27	External ACL (option)	(a)
	20							27							27		
	25							27							27		
	30	11.16	20.67	12.09	8.66	19.88	M8	80	11.48	29.33	12.09	8.66	19.88	M8	84	DCL Built-in (standard)	(b)
	40							80							84		
	50							80							84		
	60	13.54	24.80	12.78	9.84	24.02	M8	104	13.86	37.20	12.78	9.84	24.02	M8	111	DCL Built-in (standard)	
	75							109							115		
	100	18.07	31.10	12.78	12.60	29.92	M10	181	18.19	43.50	12.78	12.60	29.92	M10	192		
	125							181							192		
460V	5	8.32	11.81	8.46	7.56	11.26	M6	13	8.32	11.81	8.46	7.56	11.26	M6	13	External ACL (option)	(a)
	7.5							13							13		
	10							13							13		
	15	10.43	14.17	8.86	9.65	13.39	M6	27	10.43	14.17	8.86	9.65	13.39	M6	27	External ACL (option)	(a)
	20							27							27		
	25							27							27		
	30							27							27		
	40	11.16	20.67	12.09	8.66	19.88	M8	80	11.48	29.33	12.09	8.66	19.88	M8	84	DCL Built-in (standard)	(b)
	50							80							84		
	60	13.54	24.80	12.78	9.84	24.02	M8	104	13.86	37.20	12.78	9.84	24.02	M8	111	DCL Built-in (standard)	
	75							104							111		
	100							104							111		
	125	18.07	31.10	12.78	12.60	29.92	M10	177	18.19	43.50	12.78	12.60	29.92	M10	188	DCL Built-in (standard)	
	150							177							188		
	175							179							190		
	200	23.58	39.37	15.02	18.11	37.80	M12	283	23.70	51.38	15.02	18.11	37.80	M12	298	DCL Built-in (standard)	
	250							283							298		
	300							291							307		
	350	28.74	48.43	15.04	27.17	36.61	M12	353	28.74	52.36	15.04	27.17	36.61	M12	366	External ACL (option)	(c)
	400							375							390		
	500							419							435		

(a) 230V: 5HP - 25HP
460V: 5HP - 30HP

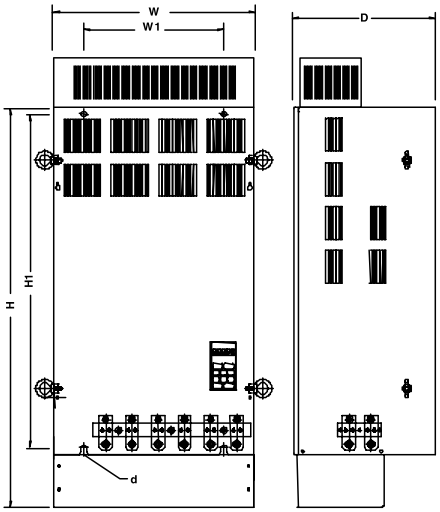




(b) 230V: 30HP – 125HP
460V: 40HP – 300HP

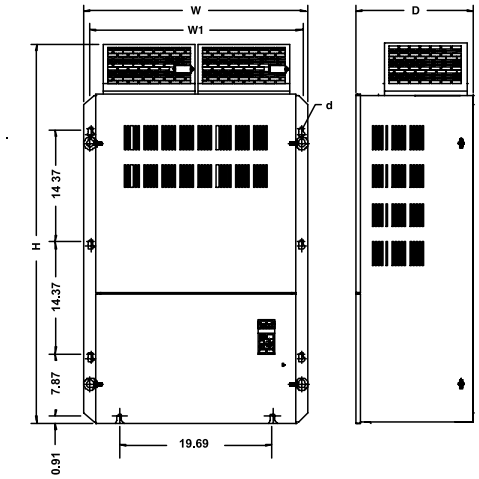


(Open Chassis Type — IP00)

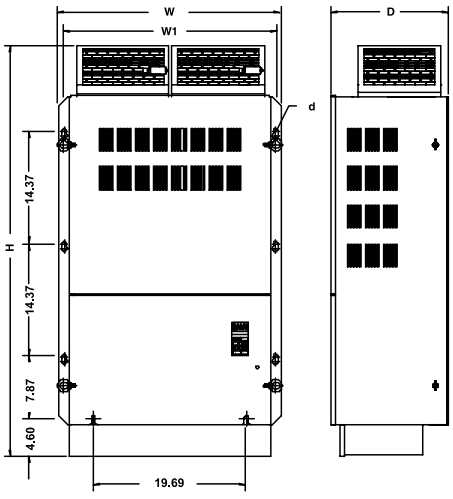


(Wall Mounted Type — NEMA1)

(c) 460V: 350HP – 500HP

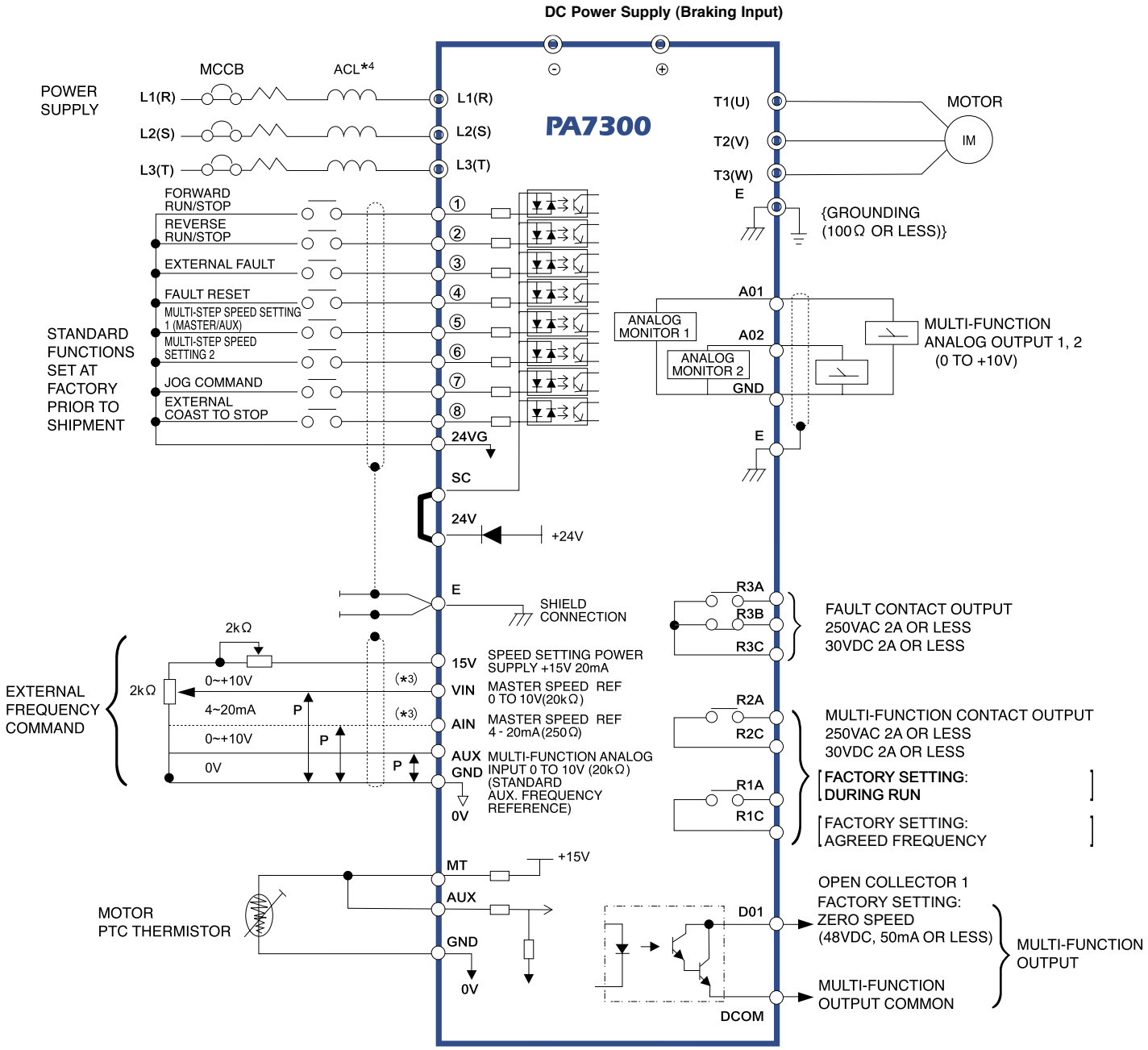


(Open Chassis Type — IP00)



(Wall Mounted Type — NEMA1)

Connection Diagram



*1 shielded wire shielded twisted wire

*2 The terminals ① - ⑧ can be connected as SINK or SOURCE type input interface.

*3 Terminal block arrangement.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	1	2	3	4	5	6	7
24VG	24VG	1	2	3	4	5	6	7	8	SC	24V	E	15V	VIN	AIN	AUX	MT	GND	A01	A02	GND	D01	DCOM	R1A	R1C	R2A	R2C	R3A	R3B	R3C

※ Shorted at factory

*4 External ACL is used for 350HP - 500HP models (DCL built-in for 40HP - 300HP).

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D-PA7300 12-05