ADLEEPOWER ®

INSTRUCTION MANUAL

HIPPOS SMART PUMP DRIVER

HS2-04 — HS2-22
HP2-04 — HP2-220
HP4-07 — HP4-220

THANK YOU VERY MUCH FOR YOUR PURCHASE OF ADLEE PUMP DRIVER HS2,HP2(4) SERIES. PLEASE READ THIS INSTRUCTION MANUAL BEFORE INSTALLATION OF THE INVERTER.

PREFACE

This Pump driver made by ADLEE Ind. Co., Ltd.

Please read this instruction manual throughly before operation.

A. General Precaution

1. There are some covers and shields on this driver. Make sure all covers and shields are replaced before operating this product.
2. This manual may be modified when necessary because of improvement of the product or changeds in specification. Such modifications are showed on version of appendix.
3. Contact your ADLEE representative to order a copy of this manual, if your copy has been damaged or lost.
4. ADLEE is not responsible for any modification of the product made by the user, since that will void your guarantee.

B. Safety symbols

Symbols which may appear on the manual

WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury to personnel.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury to personnel and damage to equipment.

RECEIVING

⚠ CAUTION

* Do not install or operate the driver which is damaged or has missing parts.
  Failure to observe this caution may result in personal injury or equipment damage.

INSTALLATION

⚠ CAUTION

* Lift the cabinet by the base. When moving the unit, never lift by the front cover.
  Otherwise, the main unit may be dropped causing damage to the unit.
* Mount the driver on nonflammable material. (i.e. metal)
  Failure to observe this caution can resoult a fire.
* When mounting units in an enclosure, install a fan or other cooling device to keep the intake air temperature below 45℃
  Overheating may cause a fire or damage to the unit.

WIRING

⚠ WARNING

* Only commence wiring after verifying that the power supply is turned OFF.
  Failure to observe this warning can result in an electrical shock or a fire.
* Wiring should be performed only by qualified personnel.
  Failure to observe this warning can result in an electrical shock or a fire.
* Make sure to ground the ground terminal
  Ground resistance : 100 Ohm or less
  Failure to observe this warning can result in an electrical shock or a fire.

⚠ CAUTION

* Verify that the driver rated voltage coincides with the AC power supply voltage.
  Failure to observe this caution can result in personal injury or a fire.

* Do not perform a withstand voltage test of the driver.
  It may cause semi-conductor elements to be damaged.

* To connect a braking resister, follow in APPENDIX A.
  Improper connection may cause the unit damaged or a fire.

* Tighten terminal screws.
  Failure to observe this caution can result a fire.

* Never connect the AC main circuit power supply to output terminals U, V and W.
  The inverter will be damaged and invalidate the guarantee.

OPERATION

⚠ WARNING

* Only turn ON the input power supply after replacing the front cover. Do not remove the cover while current is flowing.
  Failure to observe this warning can result in an electrical shock.

⚠ CAUTION

* All the constants of the driver have been preset at the factory. Do not change the settings unnecessary.

MAINTENANCE AND INSPECTION

⚠ WARNING

* Never touch high-voltage terminals in the driver.
  Failure to observe this warning can result in an electrical shock.
* Replace all protective covers before powering up the Inverter.
  To remove the cover, make sure to shut OFF the molded-case circuit breaker.
  Failure to observe this warning can result in an electrical shock.
* Perform maintenance or inspection only after verifying that the CHARGE LED goes OFF, after the main circuit power supply is turnned OFF.
  The capacitors are still charged and can be dangerous.
* Only authorized personnel should be permitted to perform maintenance, inspections or parts replacement.
  Failure to observe this warning can result in an electrical shock.

⚠ CAUTION

* The control PC board employs CMOS ICs. Do not touch the CMOS elements.
  They are easily damaged by static electricity.
* Do not connect or disconnect wires or connectors while power is applied to the circuit.
  Failure to observe this caution can result in personal injury.

OTHERS

⚠ WARNING

* Never modify the product.
  Failure to observe this warning can result in an electrical shock or personal injury and will invalidate the guarantee.

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1. RECEIVING

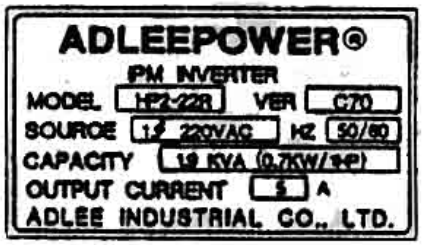
Before installation and wiring, check to see :

(1) No damage is found on each product after shipping.

(2) The product is as ordered (check the nameplate, voltage and frequency).

(3) A set of inverter unit and instruction manual are contained in the package.
For any irregularity, contact the sales shop where you purchased immediately.

(4) Description of name plate



VER C70
SOFTWARE
HARDWARE
VERSION

MODEL : HP 2 - 22R

HP series
HS series

Voltage class :
2: 200/220V
4: 380/440V

R : REMOTE CONTROL SERIES

Max Applicable motor
(4 pole)

04 : 0.4 KW	75 : 7.5 KW
07 : 0.75 KW	110 : 11 KW
15 : 1.5 KW	150 : 15 KW
22 : 2.2 KW	185 : 18.5 KW
37 : 3.7 KW	220 : 22 KW
55 : 5.5 KW	

2. SPECIFICATIONS

A. HS2-04..22

Model		HS2			
Voltage		1φ 220AC± 10%			
Model No		HS2-04	HS2-07	HS2-15	HS2-22
Input Frequency		50HZ ~ 60HZ ± 5%			
Output Voltage		3φ 220AC			
Output Frequency		0 - 65Hz			
Output Rated current(A)		3	5	8	11
Capacity(KVA)		1.1	1.9	3.1	4.2
Largest motor KW(4 poles)		0.4	0.75	1.5	2.2
Control		Sine wave pulse width modulation			
Over current Capacity		150% rated current (1 minute)			
Sensor Input		4- 20mA			
Setting unit		0.1 kg/cm^2			
Setting Range		0-10 kg/cm^2			
Pressure setting	Digital	Use keyboard  for setting Confirm save by 			
Display type		LED Digits			
Cooling Method		Self - cooled		Air - cooled	
Dimension drawing		Fig 1	Fig 1	Fig 2	Fig 2
Weight (NW . KG)		1.1	1.1	1.5	1.5

B. HP2-04..220

Model	HP2										
Voltage	1 or 3φ220V±10%				3φ220V±10%						
Model no	04	07	15	22	37	55	75	110	150	185	220
Input Frequency	50HZ ~ 60HZ ± 5%										
Output Voltage	3φ220V										
Output Frequency	0.50HZ - 65HZ										
Output Rated current(A)	3	5	8	11	17	24	33	46	61	75	90
Capacity(KVA)	1.1	1.9	3.1	4.2	6.5	9.2	12.6	17.6	23.3	28	34
Largest motor KW(2.4.6 poles)	0.4	0.7	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22
Control	Sine wave pulse width modulation										
Over current Capacity	150% rated current (1 minute)										
Sensor Input	4- 20mA (0- 10kg/cm^2)										
Setting unit	0.1 kg/cm^2										
Setting Range	0-10 kg/cm^2										
Pressure setting: Digital	Use keyboard ⏫⏬ for setting Confirm save by PROG										
Output signal	Open collector output 50V 50mA Max										
Cooling Method	Self - cooled				Air - cooled			Air - cooled			
Dimension drawing	Fig 3				Fig 4			Fig 5			
Weight (KG)	3.2	3.2	3.2	3.2	5.5	6.2	6.6	17	18	18.5	19

C. HP2-07..220

Model	HP4									
Voltage	3φ380V / 440V±10%									
Model no	07	15	22	37	55	75	110	150	185	220
Input Frequency	50HZ ~ 60HZ ± 5%									
Output Voltage	3φ380V · 440V									
Output Frequency	0.50HZ - 65HZ									
Output Rated current(A)	2.5	4	6	9	12	17	23	31	38	43
Capacity(KVA)	1.9	3.1	4.2	6.5	9.2	12.6	17	24	29	33
Largest motor KW(2.4.6 poles)	0.7	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22
Control	Sine wave pulse width modulation									
Over current Capacity	150% rated current (1 minute)									
Sensor Input	4- 20mA (0- 10kg/cm^2)									
Setting unit	0.1 kg/cm^2									
Setting Range	0-10 kg/cm^2									
Pressure setting: Digital	Use keyboard  for setting Confirm save by 									
Output signal	Open collector output 50V 50mA Max									
Cooling Method	Self · cooled			Air · cooled				Air · cooled		
Dimension drawing	Fig 3			Fig 4				Fig 5		
Weight (KG)	3.2	3.2	3.6	5.4	6.2	6.6	6.7	18.5	19	19.5

3. DIMENSION DRAWINGS

A. HS2-04 — HS2-07

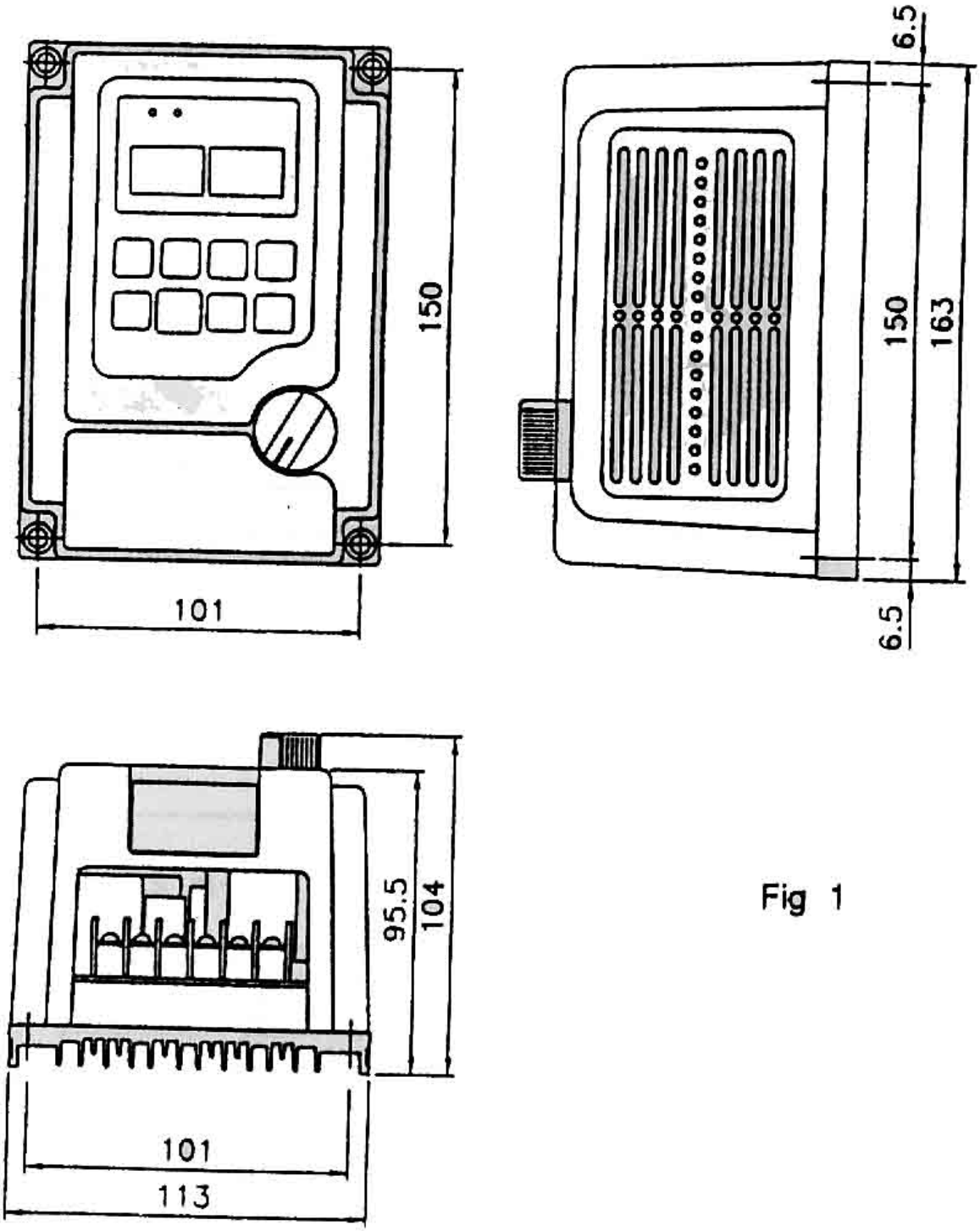


Fig 1

B. HS2-15 — HS2-22

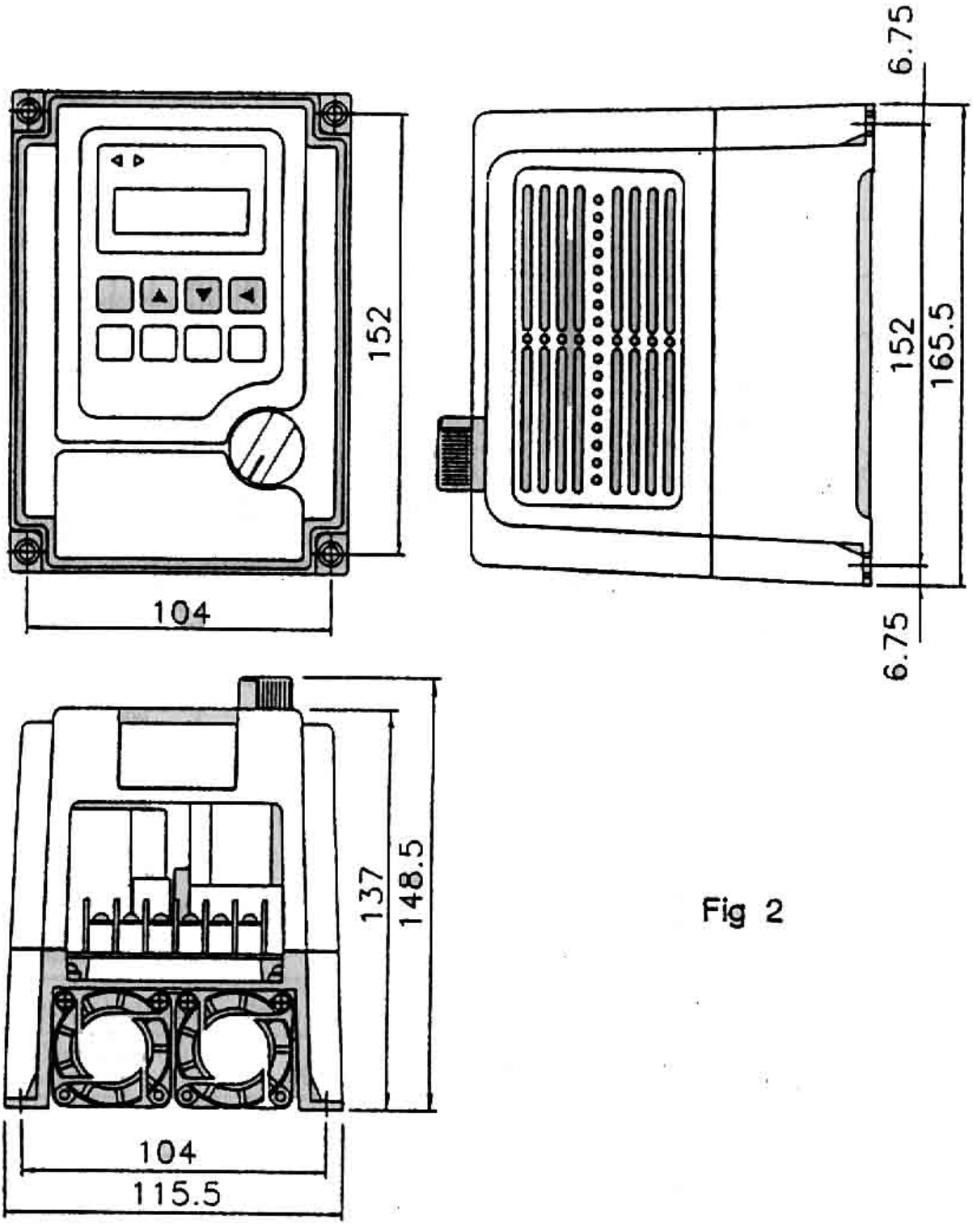


Fig 2

C. (HP2-04, HP2-07, HP2-22)
(HP4-07, HP4-15, HP4-22)

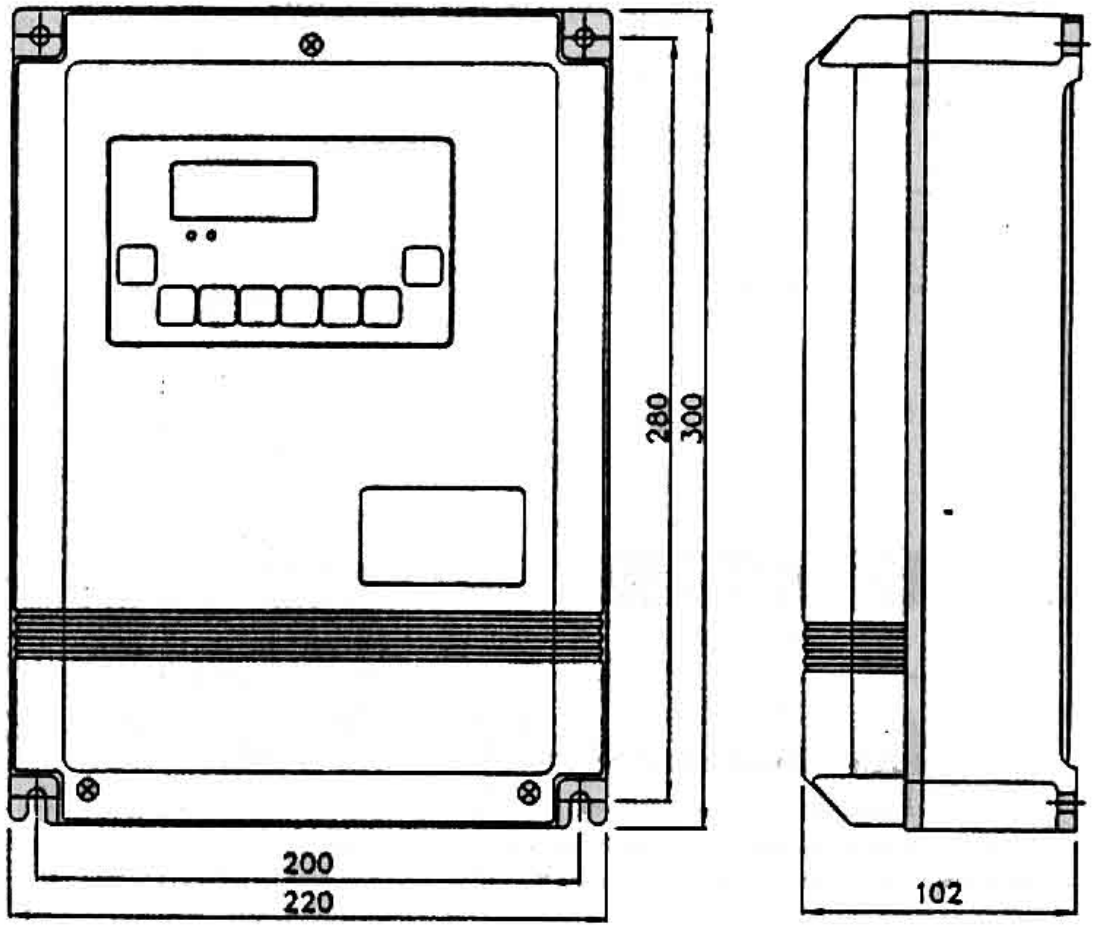
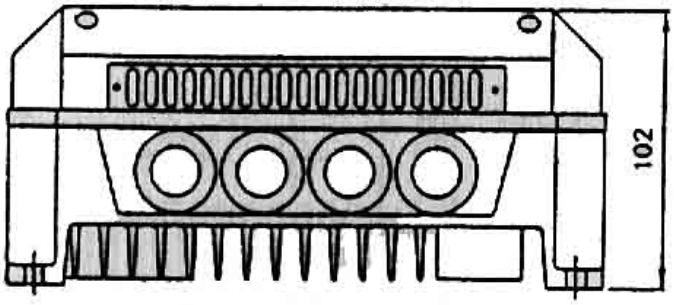


Fig 3



D. (HP2-37, HP2-55, HP2-75)
(HP4-37, HP4-55, HP4-75 HP4-110)

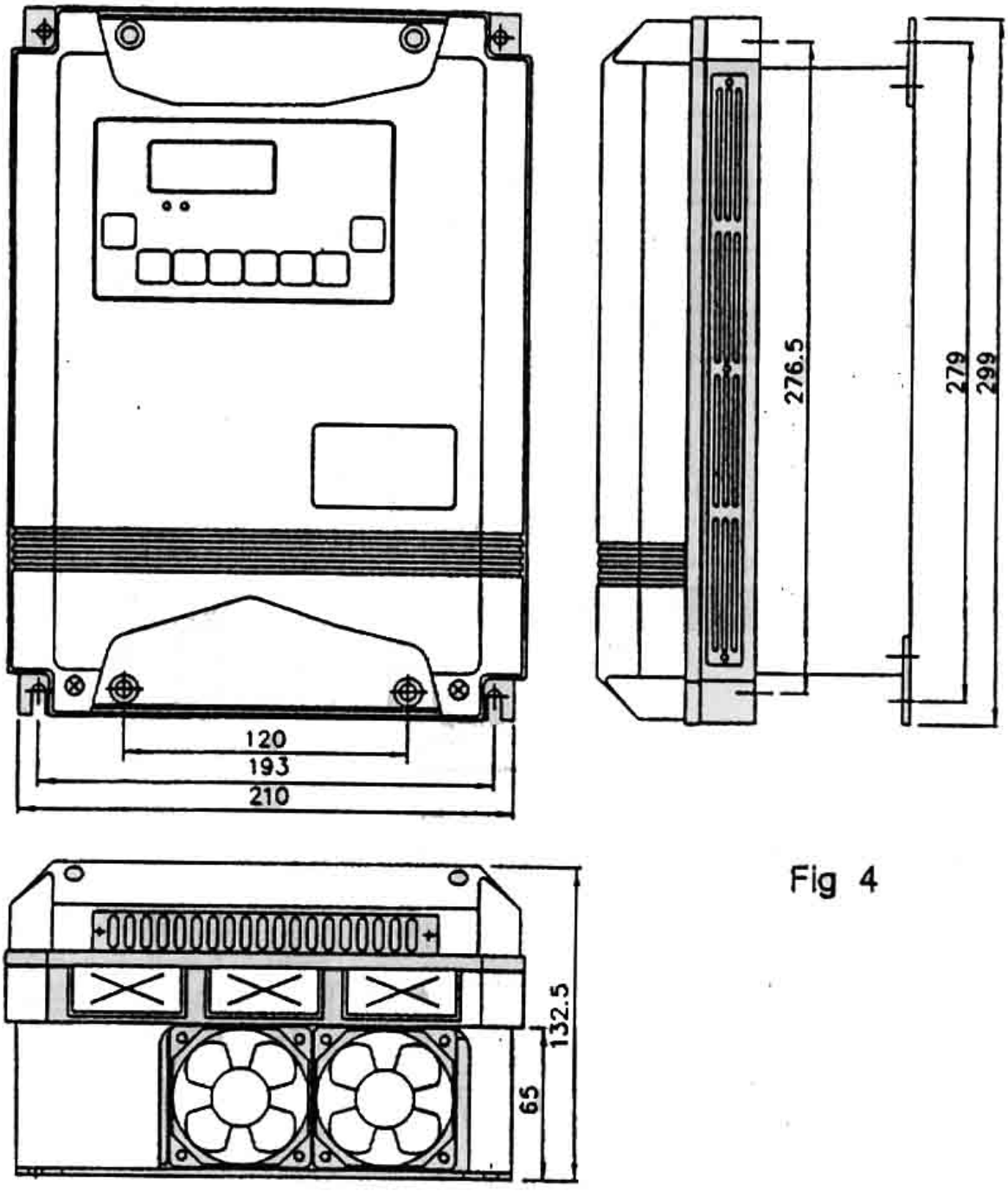


Fig 4

E. (HP2-110, HP2-150, HP2-185, HP2-220)
(HP4-150, HP4-185, HP4-220)

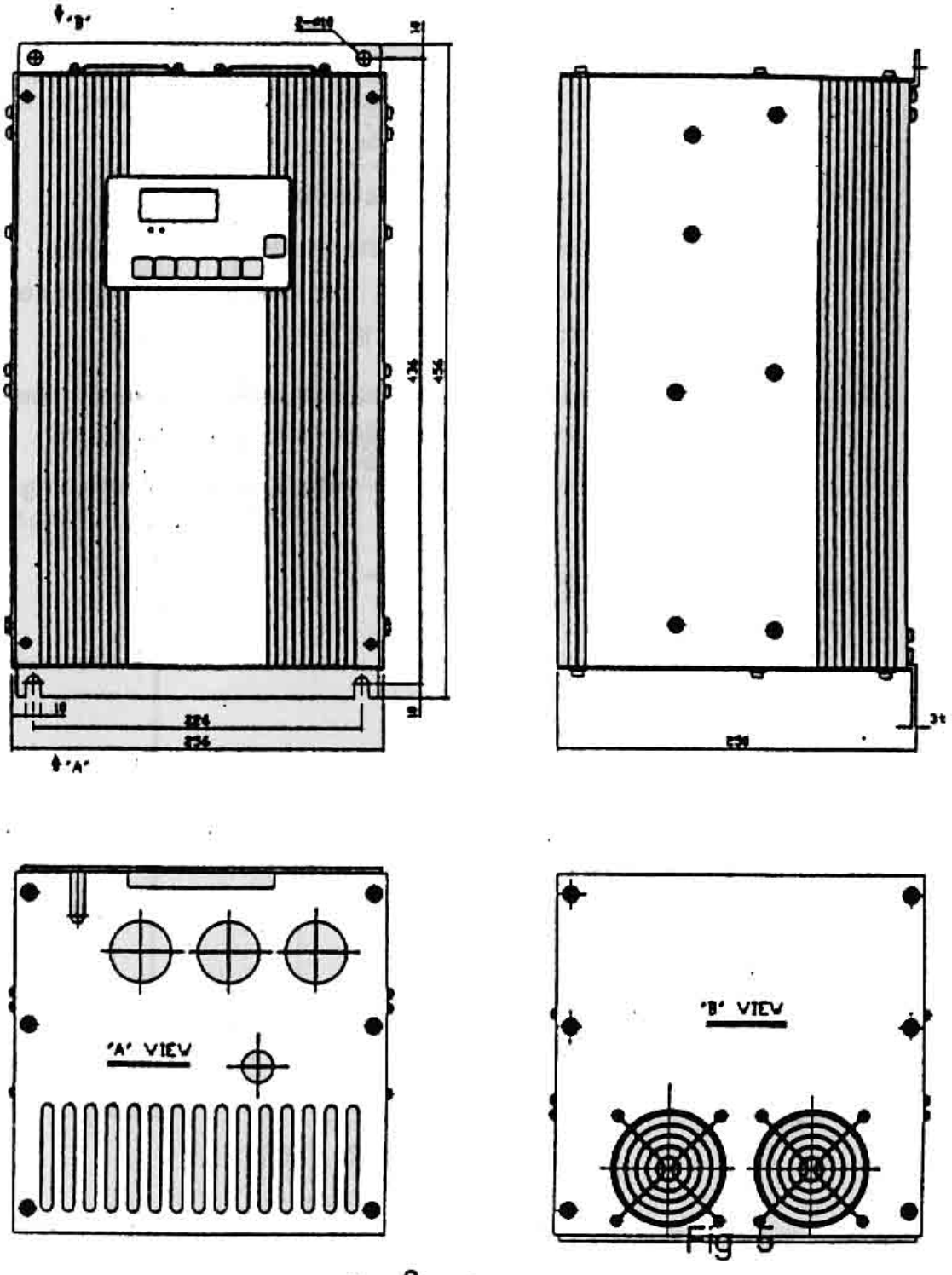


Fig 5

4. INSTALLATION

Inadequate environment around installation site and installation surface can result in damage to the inverter.

Before operating the HS2,HP2(4) series driver, please check the following points:

(1) Avoid high temperature, high humidity, easy-to-dew ambient environment. Don't expose to dust or dirt, corrosive gas, and coolant mist, and direct sunlight. Place the unit in a well-ventilated room.

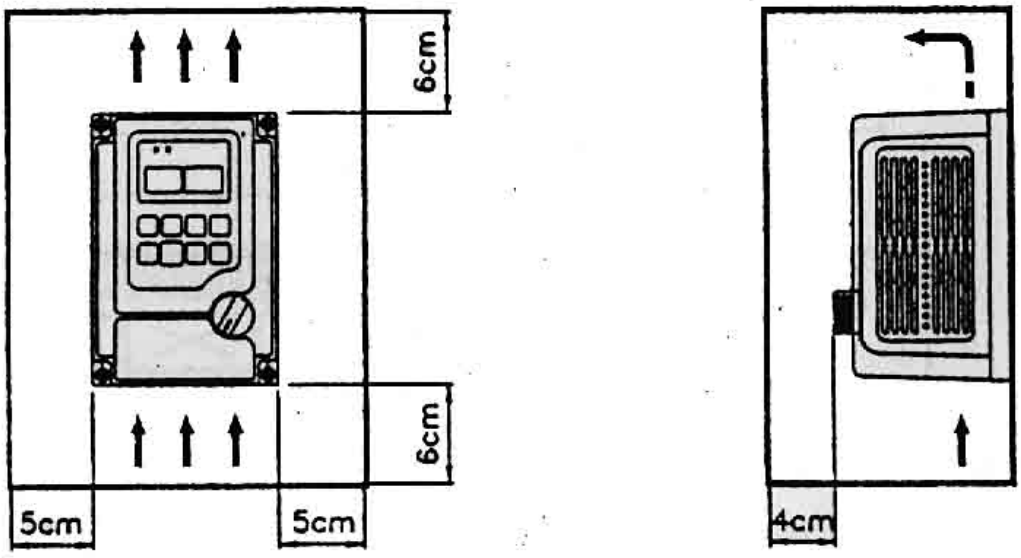
(2) Avoid a place subjected to substantial vibration.

(3) When installing the unit within the cabinet. Please pay attention to ventilation and limit the ambient temperature in between -10℃ ~ 45℃. (14℉ ~ 113℉).

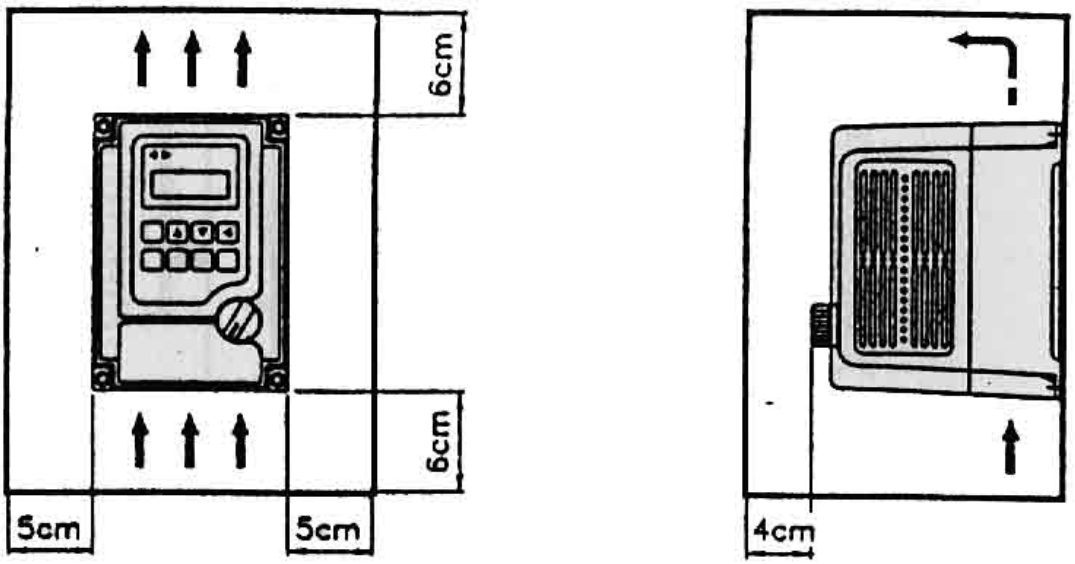
(4) Use a nonflammable material, such a steel sheet on the wall for installation. (The rear side will generate heat)

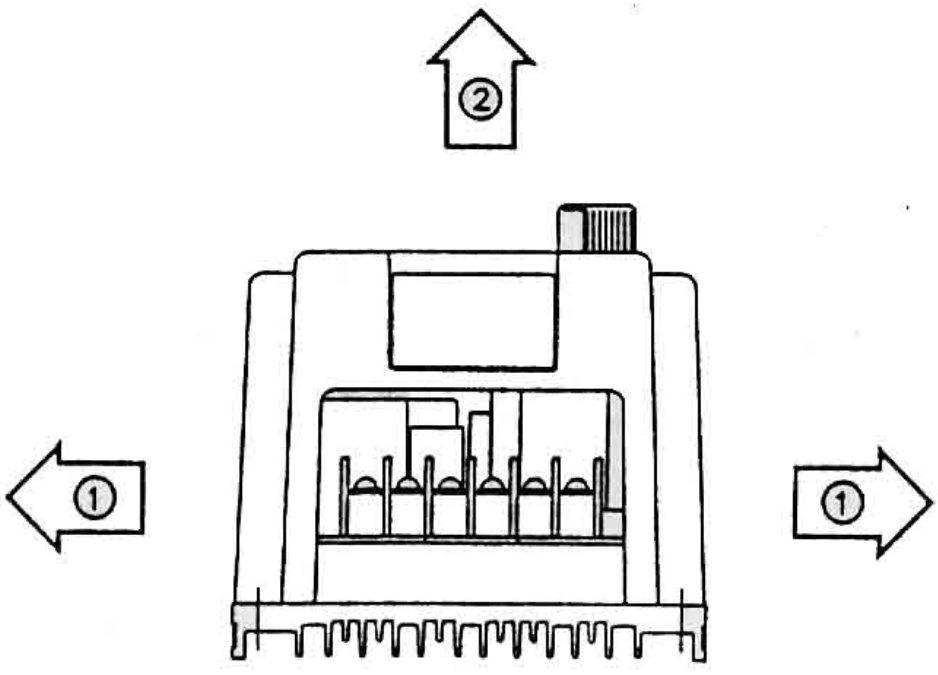
(5) Install the unit always vertically with a marginal spacing around.

HS2-04 — HS2-22

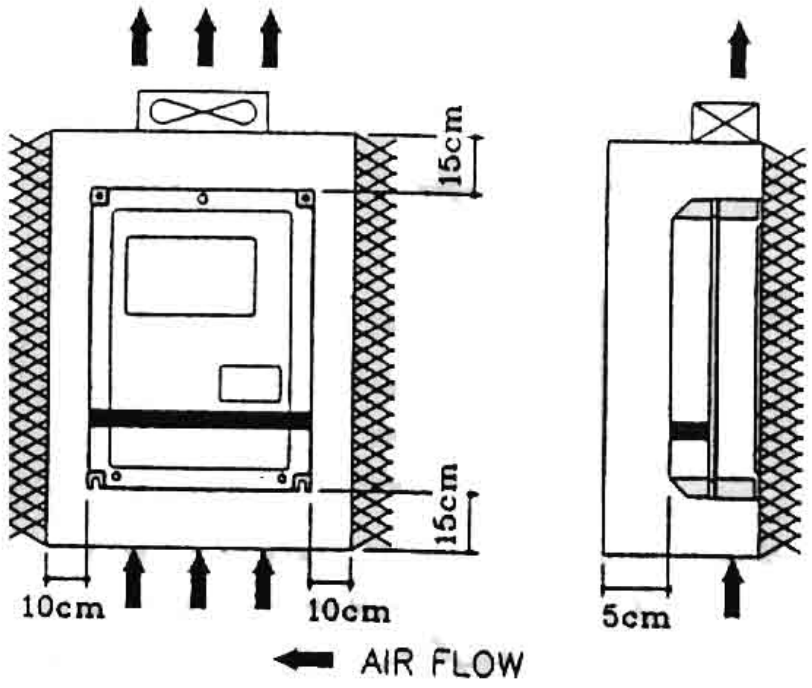


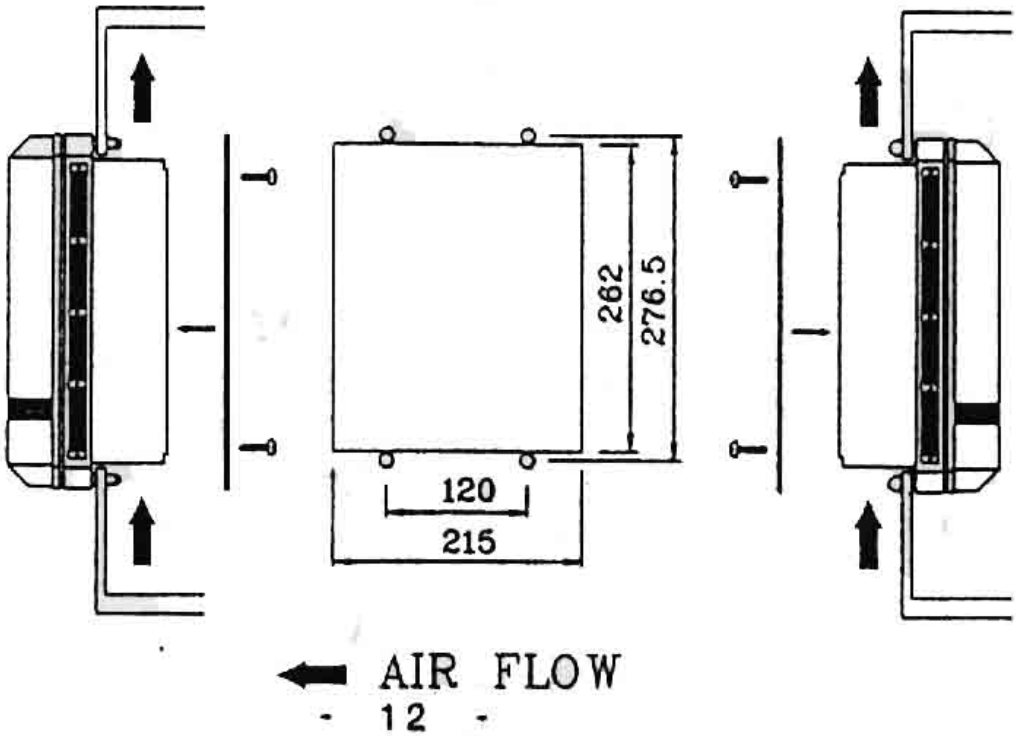
HS2-04 — HS2-22





HP2-04 — HP2-220
HP4-07 — HP4-220

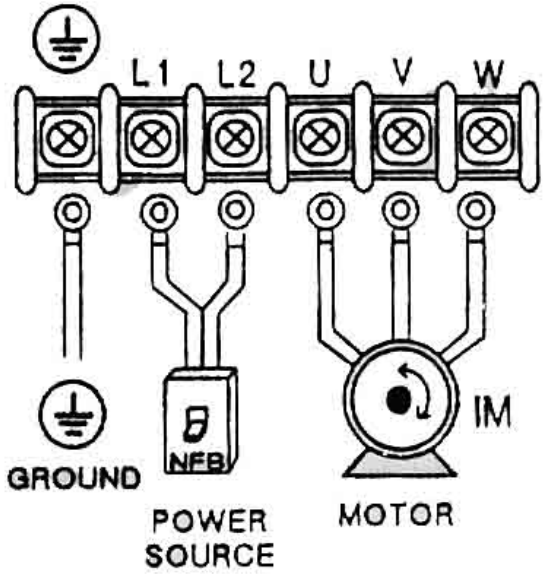




5. DESCRIPTION OF TERMINALS

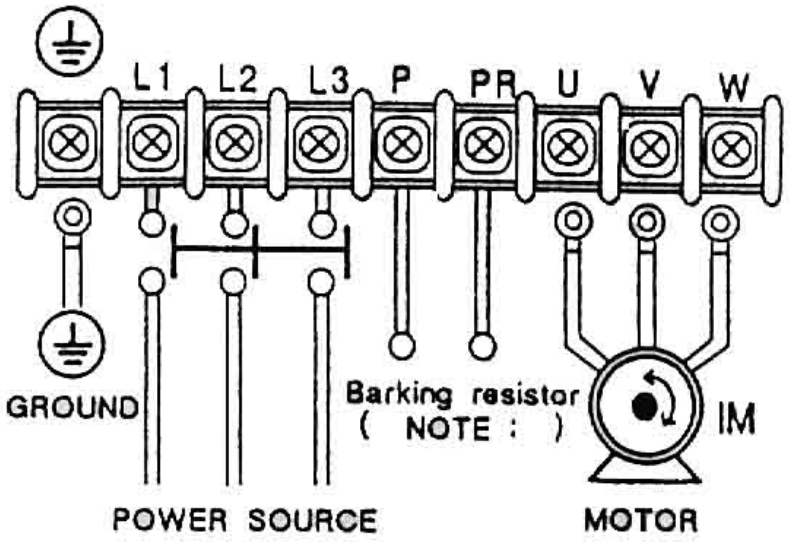
5-1 Main circuit connection diagram

A. HS2-04..22



Main circuit terminal			
No.	Symbol	Description	Terminal name
1	⏚	Ground	Ground(Earth) Terminal
2	L1	Connect power supply	Single Phase 220V±10% 50/60HZ±5%
3	L2		
4	U	Inverter output	Terminals connected to pump
5	V		
6	W		

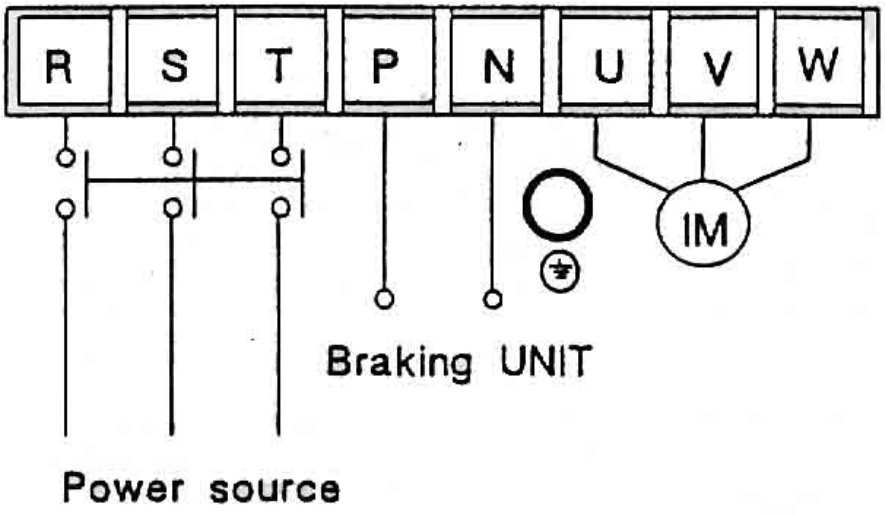
B. (HP2-04..75)(HP4-07..110)



Main circuit terminal			
No	Symbol	Terminal name	Description
1	⏚	Ground terminal	≦ 5 OHM
2	L1	Inverter power source	Terminal connecting with power source
3	L2		
4	L3		
5	U	Inverter output terminal	Terminal connecting with motor
6	V		
7	W		
8	P	DC voltage terminal	Regenerative braking resistor connecting terminal
9	PR		

NOTE : Release the internal braking resistor when connect external braking resistor.

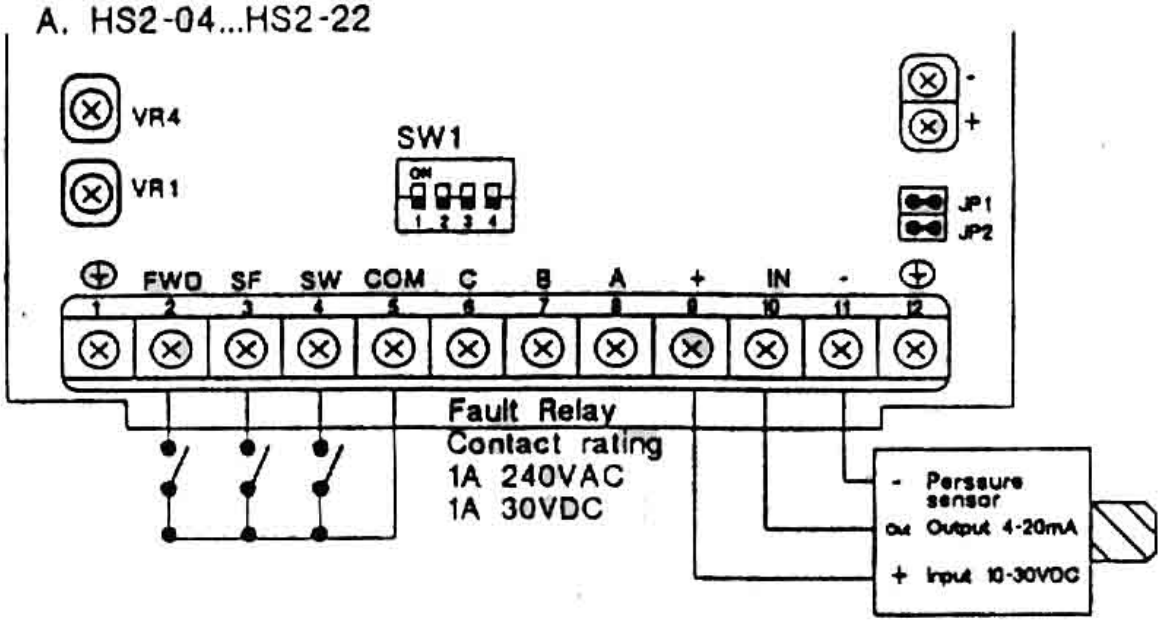
C. (HP2-110..220)(HP4-150..220)



Main circuit terminal			
No	Symbol	Terminal name	Description
1	R	Connect power supply	1 or 3φ 220V±10% 3φ 440V±10% 50/60HZ±5%
2	S		
3	T		
4	P	DC voltage terminal	Regenerative braking unit connecting terminal
5	N		
6	U	Inverter output	Terminal connecting with motor
7	V		
8	W		
9	⏚	Ground terminal	≦ 5 OHM

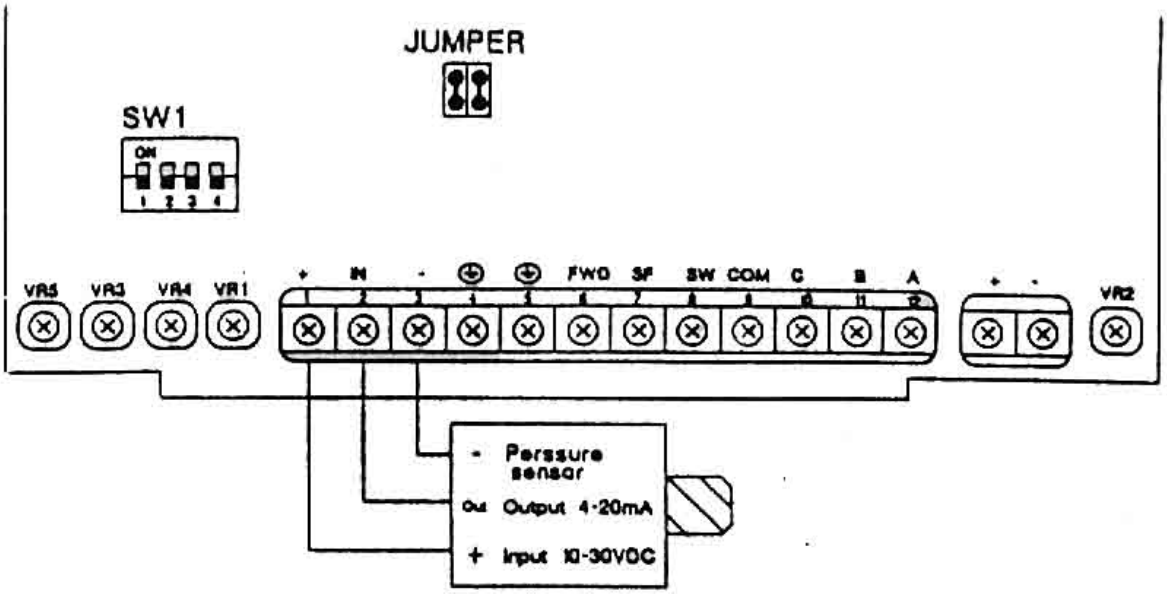
5-2 Control circuit terminal

A. HS2-04...HS2-22



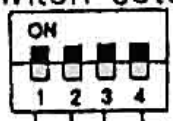
NO	Symbol	Terminal name	Description
1	⏚	Ground	Ground (Earth) terminal
2	FWD	Forward operation	Forward operation/stop terminal
3	SF	Safe terminal	Connect to other safe contact in series. ON: Output Enable. OFF: Output Disable and display SF.
4	SW	Pressure SW	Connect to pressure SW
5	COM	Common	Common terminal of control circuit
6	C	Alarm output C	Fault alarm contact (commor)
7	B	Alarm output B	Fault alarm contact (norminal close)
8	A	Alarm output A	Fault alarm contact (norminal open)
9	+	Sensor source terminal	Power source +12V of pressure sensor HS Sensor +12VDC +/- 15% HP Sensor +22VDC +/- 15%
10	IN	Sensor Input	Connect to pressure sensor output
11	-	Sensor common terminal	Common terminal of pressure sensor
12	⏚	Ground	Ground(Earth) Terminal

B. HP2-04..HP2-220, HP4-07..HP4-220



NO	Symbol	Terminal name	Description
1	+	Sensor source terminal	Power source +12V of pressure sensor HS Sensor +12VDC +/- 15% HP Sensor +22VDC +/- 15%
2	IN	Sensor Input	Connect to pressure sensor output
3	-	Sensor common terminal	Common terminal of pressure sensor
4 5	⏚	Ground	Ground(Earth) Terminal
6	FWD	Forward operation	Forward operation/stop terminal
7	SF	Safe terminal	Connect to other safe contact in series. ON: Output Enable. OFF: Output Disable and display SF.
8	SW	Pressure SW	Connect to pressure SW
9	COM	Common	Common terminal of control circuit
10	C	Alarm output C	Fault alarm contact (commor)
11	B	Alarm output B	Fault alarm contact (norminal close)
12	A	Alarm output A	Fault alarm contact (norminal open)

5-3 DIP Switch setting (SW1)



4	OFF	- - -
	ON	- - -
3	OFF	Terminal control
	ON	Keyboard control
2	OFF	Auto Strart
	ON	Manual
1	OFF	4-20mA
	ON	- - -

5-4 Adjustment

VR4	Display Scale adjustment
VR1	Maximum pressure setting limiter

5-5 Jumper Setup

A. HS2-04..HS2-22

JP1 JP2	JP1 JP2	JP1 JP2	JP1 JP2
- - ·	4-20mA	- - ·	- - ·

B. HP2-04..220, HP4-07..220

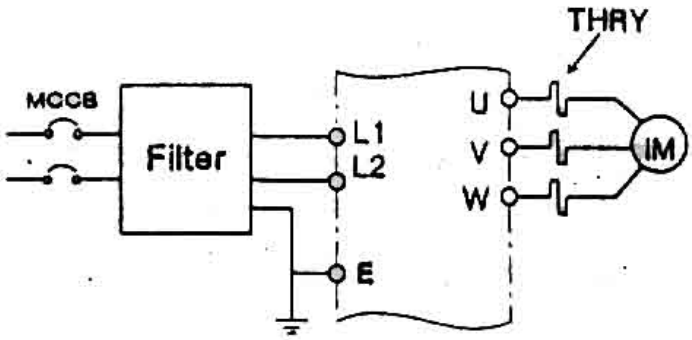
JP1 JP2	JP1 JP2
4-20mA	- - ·

5-6 WIRING

5-6-1 Wining of main circuit

A. HS2-04..22

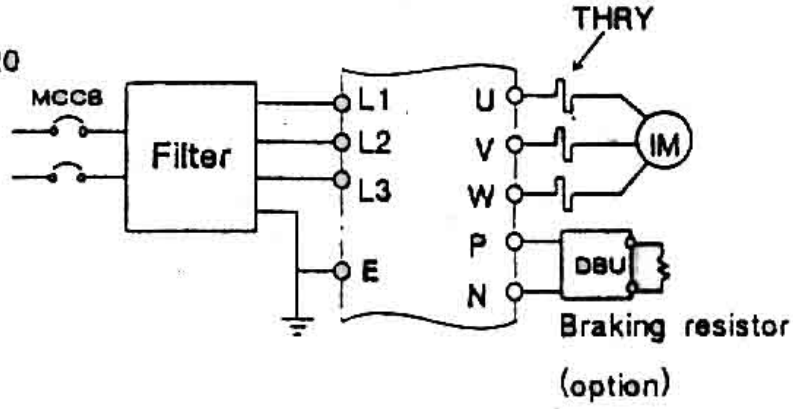
Single phase source
AC 220VAC ±10%
50/60HZ ±5%



B. HP2-04..75, HP4-07..110
HP2-110..220, HP4-110L..220

3φ 220VAC ±10%
50/60HZ ±5%

3φ 380v/440VAC ±10%
50/60HZ ±5%



5-6-2 Wining equipments

Select the wiring equipment and wiring size, refer to the table below.

1. On the input power side, a molded case circuit breaker (MCCB) to protect inverter primary wiring should be installed.
2. A leakage current breaker threshold of 200mA and above, or of inverter use is recommended.
3. Do not use the MC frequently for start/stop operation, or will lead to a reduced reliability.
4. In general, magnetic contactors on the output of the driver, Should not be used for pump control. starting a pump with the overcurrent protector to trigger.
   driver running will cause large surge currents and the driver

A. HS2-04..22

Model	HS2-04	HS2-07	HS2-15	HS2-22
Capacity (KVA)	1.1	1.9	3.1	4.2
Current (A)	3	5	8	11
Circuit Breaker (MCCB)	2P 20A			2P 40A
Electro-Magnetic Contactor	20A		26A	35A
Thermal relay RC value	2.4A	3.8A	6.8A	9A

B. HP2-04..220

Model	HP2										
Model No	04	07	15	22	37	55	75	110	150	185	220
Capacity (KVA)	1.1	1.9	3.1	4.2	6.5	9.2	12.6	17.6	23.3	28	34
Current (A)	3	5	8	11	17	24	33	46	61	75	90
Circuit Breaker (MCCB)	10	10	15	20	20	30	50	75	100	125	125
Electro-Magnetic Contactor	12	12	12	12	18	35	50	65	80	93	93
Thermal relay RC value	2.4	3.8	6.8	9	15	20	28	40	55	67	80

C. HP4-07..220

Model	HP4									
Model No	07	15	22	37	55	75	110	150	185	220
Capacity (KVA)	1.9	3.1	4.2	6.5	9.2	12.6	17	24	29	33
Current (A)	2.5	4	6	9	12	17	23	31	38	43
Circuit Breaker (MCCB)	10	10	10	15	2	30	50	50	75	75
Electro-Magnetic Contactor	12	12	12	12	18	18	35	48	50	50
Thermal relay RC value	1.9	3.4	3.8	6.8	9	15	20	28	40	40

5-6-3 Surge absorber

In order to prevent malfunction, provide the surge absorber on the coils of the electromagnetic contactors, relays and other devices which are to be used adjacent of the inverter.

5-6-4 Wiring and cautionary points

1. Main circuit

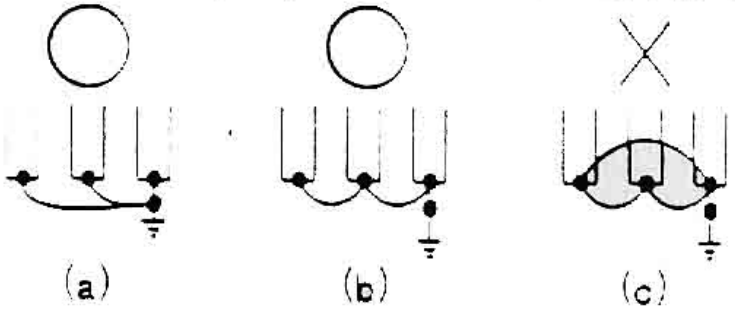
1. Connect the cables of the power supply side to the U, V and W output terminals for the pump.
2. Don't connect any electromagnetic contactor between the driver and pump. If it is inevitable, turn on the contactor when both the inverter and motor are both at stand still.
3. Don't put the advance phase capacitor between the driver and motor.
4. Put MCCB in the input power supply.

2. Control signal circuit

1. Separate the power cables of main circuit etc. from the control cables of the sequence and analog signals by passing the cables through the different ducts.
2. Use twisted pair shielded wire for control signal and connect the shield to earth terminal at on end, COMMON terminal of control board. Leave the other end of shielding open.
3. Avoid common Ground leads between high and low level voltage equipment.

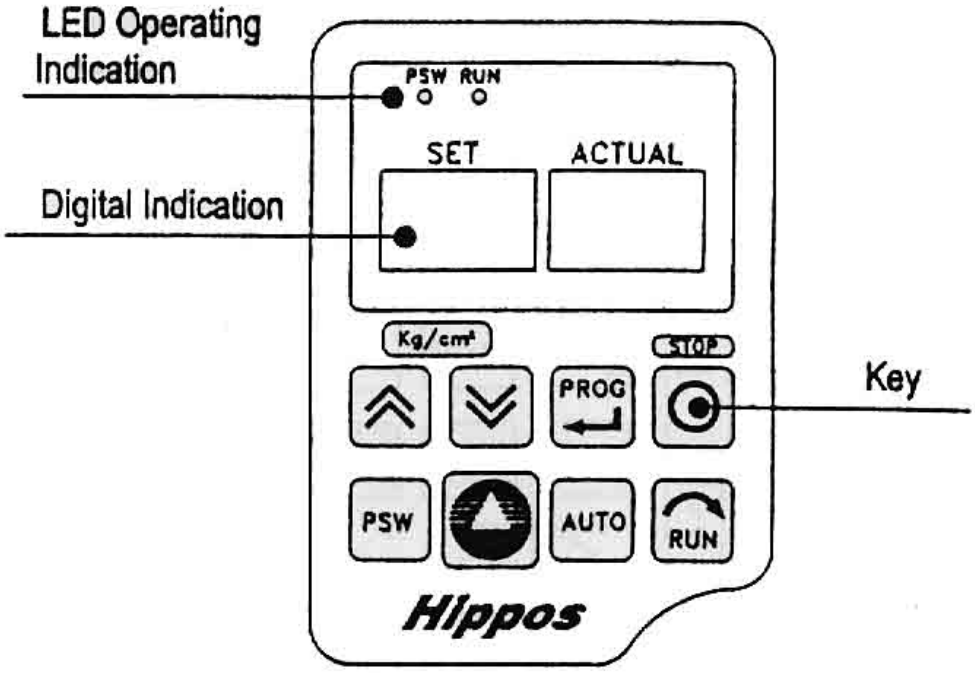
3. Grounding

1. Be sure ground both the driver and pump.
2. Keep grounded leads as short as possible.
3. Shieled cables used to protect low-level signal leads should grounded at one end point.
4. Provide class 3 grounding (100Ω or less) for a terminal.
5. When grounding several inverters, make connections as shown below, no loop is produced as shown in FIG "a", FIG "b".



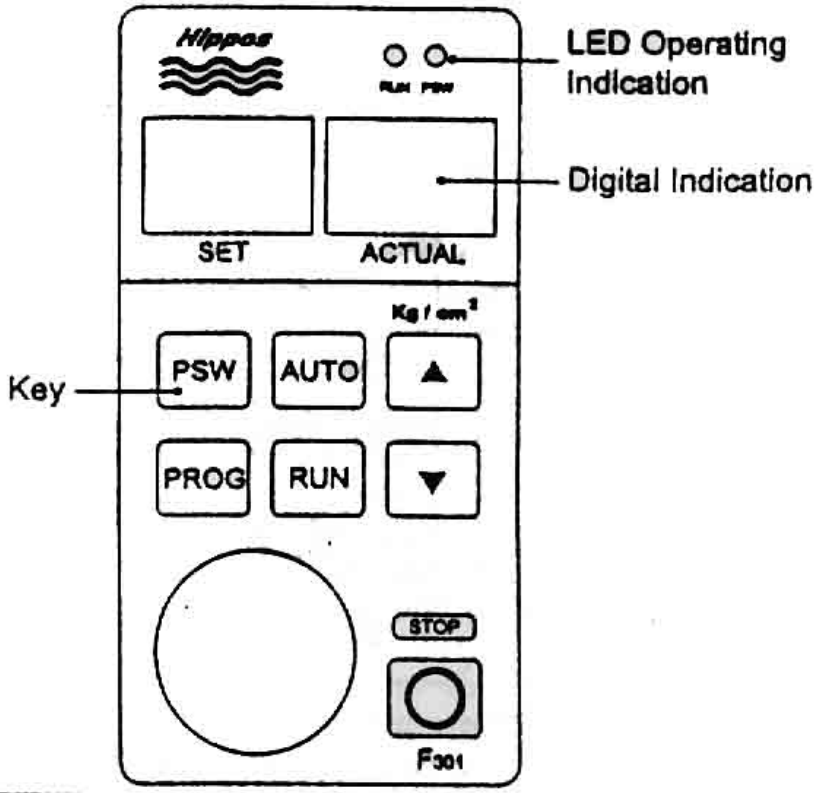
6. DIGITAL OPERATION PANEL

A. HS2-04..22



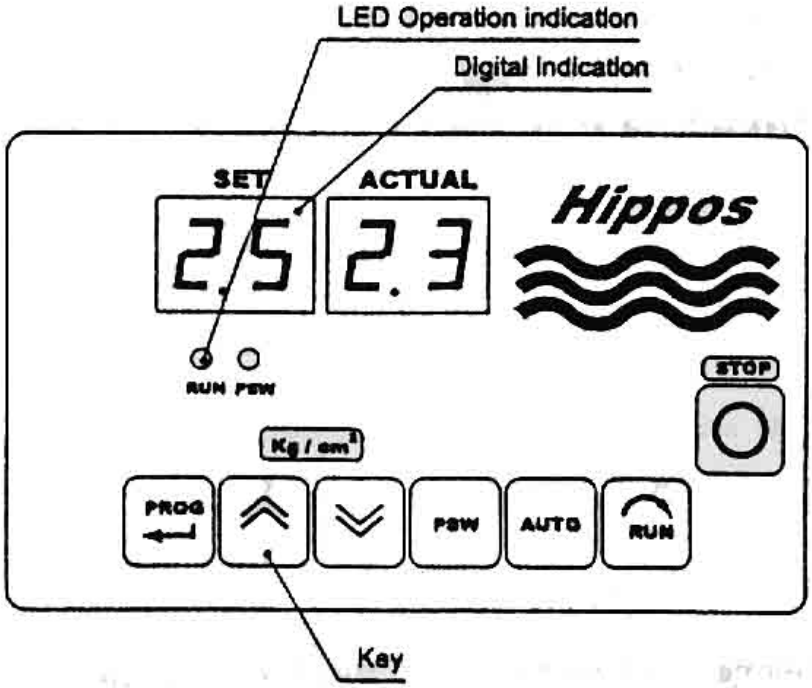
Operation key		Description
RUN	RUN	Commands pump run
⌄⌄	DOWN	Decrease the setting value
⌃⌃	UP	Increase the setting value
PROG	PROG	Saves the setting value
AUTO	AUTO	Set to auto mode
○	STOP	Stop operation
PSW	PSW	Set to PSW mode

B. F301



Operation key		Description
RUN	RUN	Commands pump run
▲	UP	Increase the setting value
▼	DOWN	Decrease the setting value
PROG	PROG	Saves the setting value
AUTO	AUTO	Set to auto mode
○	STOP	Stop operation
PSW	PSW	Set to PSW mode

C. HP2-04..220, HP4-07..220



Operation key		Description
RUN	RUN	Commands pump run
⌄⌄	DOWN	Decrease the setting value
⌃⌃	UP	Increase the setting value
PROG	PROG	Saves the setting value
AUTO	AUTO	Set to auto mode
○	STOP	Stop operation
PSW	PSW	Set to PSW mode

7. FUNCTIONS DESCRIPTION

7-1 Auto mode:

Setting Pressure from keypad ⏫ and ⏬
Confirm and save setting by PROG

System feedback the actual pressure by pressure sensor and display on the digital indicator.

The driver compensate the pressure automatically.

7-2 PSW mode:

During PSW mode PUMP running/stop command from SW terminal. which is connected to a External Pressure SW.

7-3 OL: Out of water protector

Pump running at full seed last for 2 min. If system couldn't built up the pressure reach 10% of setting value, the driver cut off the output and display OL. System restart the pump every 12 min try to built up the pressure in the next 2 min.

7-4 Low Speed or Zero Demand shut-down

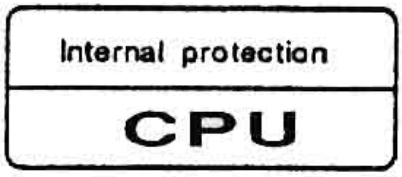
Press keypads ⏫ AUTO at the same time to entry the low speed frequency seting. With setting range from 30Hz to 65Hz. Confirm and by PROG for memory storage.

7-5 Leakage compensation

Duing zero demand shut down. System auto restart when the pressure less the 50% of setting value.

8. DISPLAY ERROR CODES

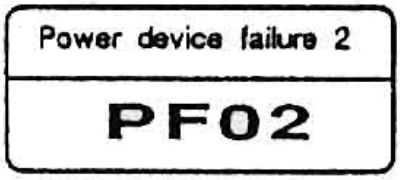
A. Inverter self-checking errors



Noise protection.

Self test failure protection

Power device failure during acceleration



Power device failure during constant frequency.

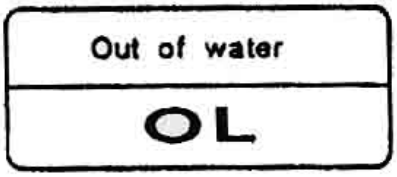
Power device failure during deceleration (stopping)

Power device failure during stand-by

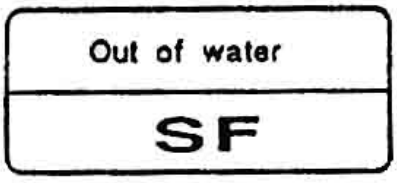
B. Operation errors

Accepu run command from control terminal only.

not operation panel.



System couldn't built up the water pressure in 2 Min.



External safe protector active.System disabled.

9. HARDWARE PROTECTIVE FUNCTIONS

(1) Over-current protection

(2) Short circuit protection

A. U V W phase short protection

B. Ground short protection

(3) Over-temperature protection

(4) Control supply under-voltage protection

(5) Power source under vpltage.

(6) Over voltage protection

10. PRECAUTIONS

10-1 Piror to maintenance, check the following:

(1) Before maintenance, be sure to turn the power off and wait until the LED digits vanish in the display. However, approx. 50 VDC still remains immediately after the display disappears, so wait a little bit longer.

(2) When removing or re-installing a connector, do not pull the cable.

(3) Take special care not to misplace the connector. Carefully note any disconnecting or poor contact. Be sure to tighten the terminals and connectors securely.

(4) It should be noted that electronic equipment is not resistant to moisture and oil mist, and intrusion of dust or iron powder will damage the insulation, leading to an unexpected accident.

10-2 Application precautions

(1) Before you start operation, thoroughly check for erroneous wiring or short circuits in the pump or in the wiring between your pump and the driver. Do not ground the natural point of the pump with a star connection.

(2) The pump driver run generates a certain amount of electromagnetic noise, as compared with that of driven directly by a commercial power supply. Thus you should be aware of such limitation when using the unit at a noise-sensitive site.

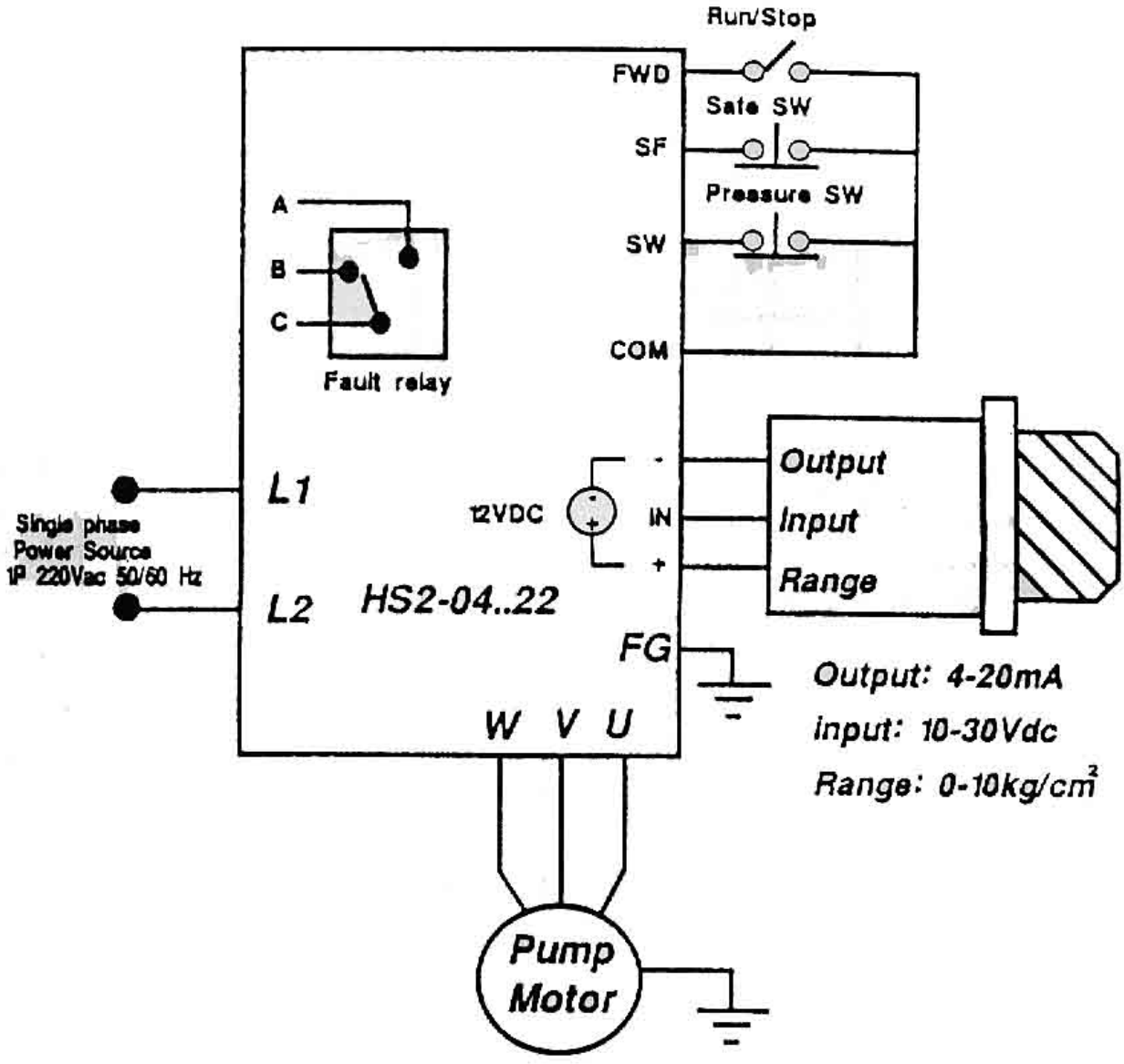
(3) When you determine an appropriate inverter capacity, ensure that the rated current of the motor does not exceed the inverter's rated current.

(4) Install a mold-case circuit breaker (MCCB) at the inverter's power supply end to protect the wiring.

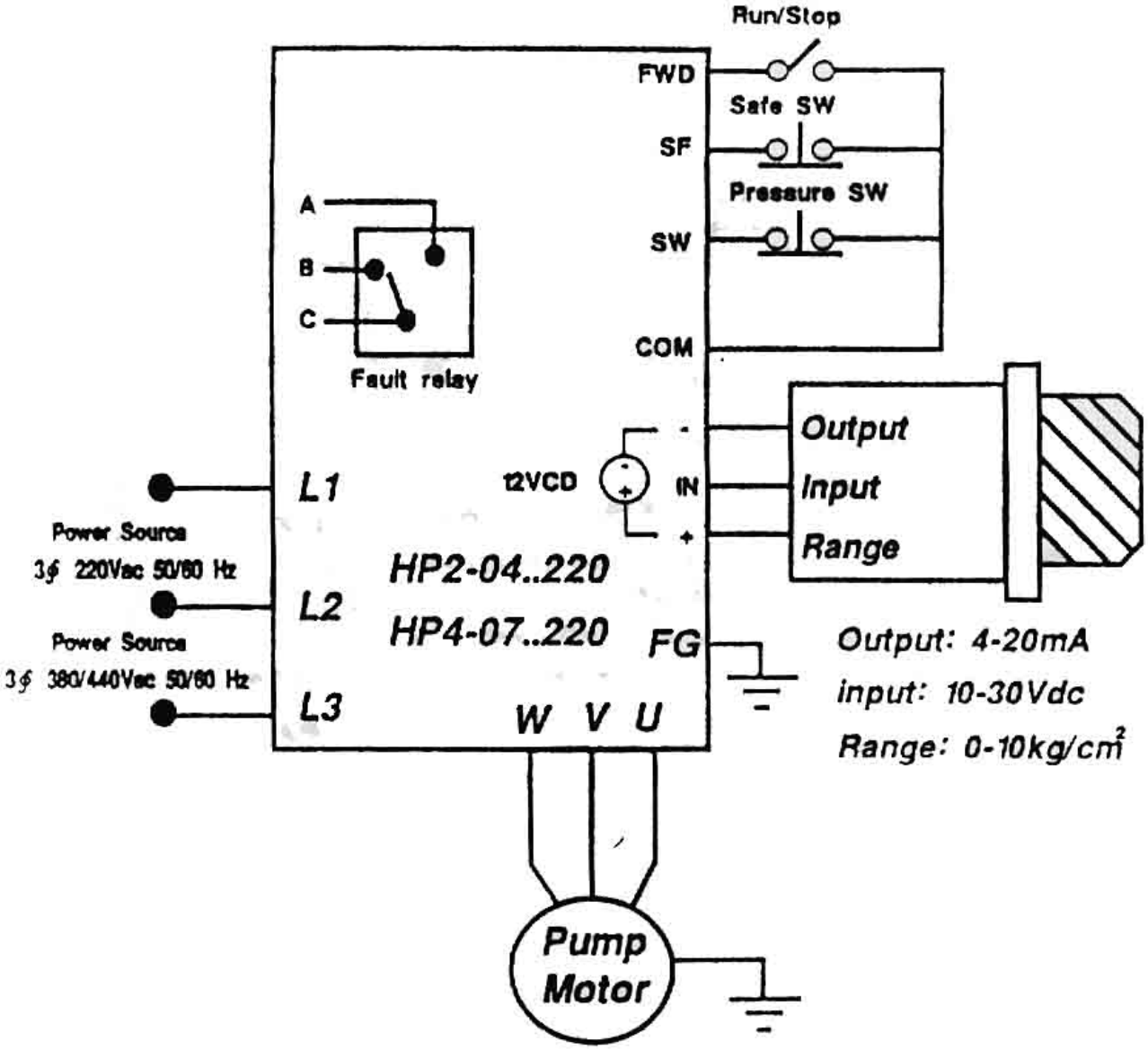
11. APPENDIX

A. Terminals wiring diagram

a. HS2-04..22



b. HP2-04..220, HP4-07..220



INSTRUCTION MANUAL
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BCIQ ISO9002

5A1Y006-00 INVERTER DRIVER MOTOR

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