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TÜV SÜD Management Service

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CHV160A Series

SPECIAL INVERTER FOR MULTI-PUMPS WATER SUPPLY

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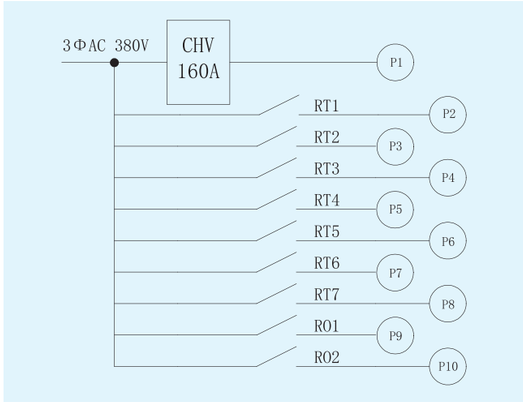
Product Introduction

CHV160A is an enhanced and special water supply inverter.
With the advanced control technology, it can adjust the speed automatically, and switch the pumps according to the pressure change of pipe.
Then the pressure control of the network will be constant.

Water Supply Mode

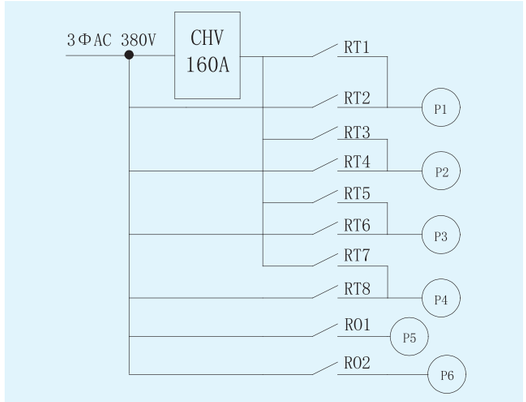
Fixed variable frequency pump mode

The inverter only drives one pump, the other pumps are controlled by the programmable relay (the maximum quantity of the pumps are 1 variable frequency pump and 9 grid frequency pumps). The pump which starts firstly will stop firstly.

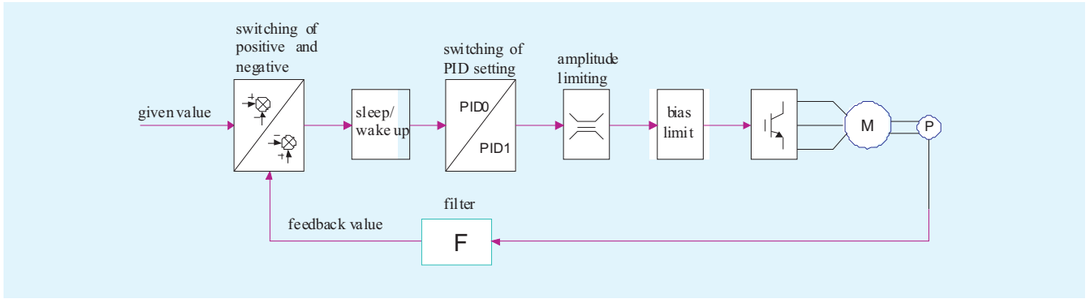


Circular variable frequency pumps mode

The system will not fixed one pump as variable frequency pump, when under pressure, the running variable frequency pump will switch to be running, then inverter will start another variable frequency pump.
And at one time there is only one variable frequency pump is running, the others are working on grid frequency mode.
(The maximum quantity of the pumps are 4 variable frequency pump and 2 grid frequency pumps), the first started pump will stop firstly.



Optimized water supply PID function



The output polarity of PID can be selected as positive (for water supply) and negative (for water pumping), and there are two sets of PID parameters can be switched, these two functions can meet special applications of some users.

Flexible control logic of add/remove pumps

(1)P3.08=0(the PID output is positive)

■ When the running frequency of current variable pump≥P8.11 (Add pump frequency), and the feedback pressure < setting pressure - add pump pressure tolerance (P8.10), and continued by the time set in P8.12. The inverter will add pump.

■ When the running frequency of current variable pump≤ P8.16 (decrease pump frequency), and the feedback pressure > setting pressure + decrease pump pressure tolerance (P8.15), and continued the time set in P8.17. The inverter will decrease pump.

(2)P3.08=1(the PID output is negative)

■ When the running frequency of current variable pump ≥ P8.11 (Add pump frequency), and the feedback pressure > setting pressure + add pump pressure tolerance (P8.10), and continued the time set in P8.12. The inverter will increase pump.

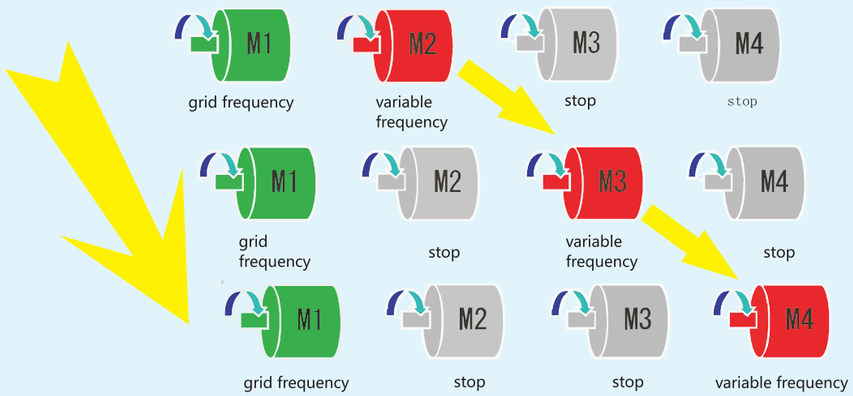
■ When the running frequency of current variable pump ≤P8.16 (decrease pump frequency), and the feedback pressure < setting pressure and decrease pump pressure tolerance (P8.15), and continued the time set in P8.17. The inverter will decrease pump.

Dormancy pump control

Dormancy conditions:
When dormancy function is valid, if there is only one variable frequency pump which is running and the current state meets the conditions of decreasing pump, the variable frequency pump will be standby and the system will be dormancy . If there are grid pumps in dormancy status, they will automatically start and continuously run till the system exiting the dormancy mode.
Dormancy wake up conditions:
In the dormant state, if the feedback pressure < setting pressure- the dormancy waking pressure tolerance (P8.22) (P3.08=0), or the feedback pressure > setting pressure + the dormancy waking pressure tolerance (P8.22) (while P3.08=1),the pump will be wake up

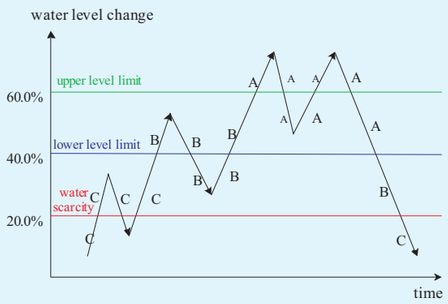
Timed circulation control function

This is to avoid one pump running for a long time and other pumps being seized by corrosion.



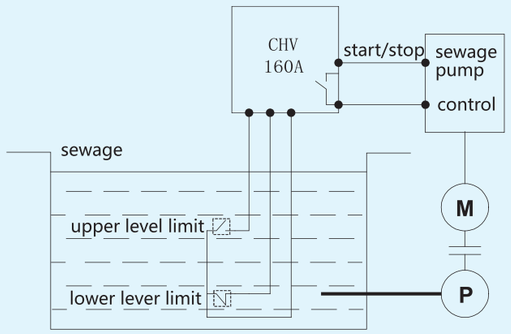
Level control of water inlet pool

There are two inputting modes for water level signal: analog signal input and on-off signal input. If the level is less than the lower level and greater than the level of water scarcity, the system will run at the non-normal pressure; if the level is less than the level of water scarcity, the system will stop.
A:Normal pressure
B:unnormal pressure
C:Water scarcity pressure



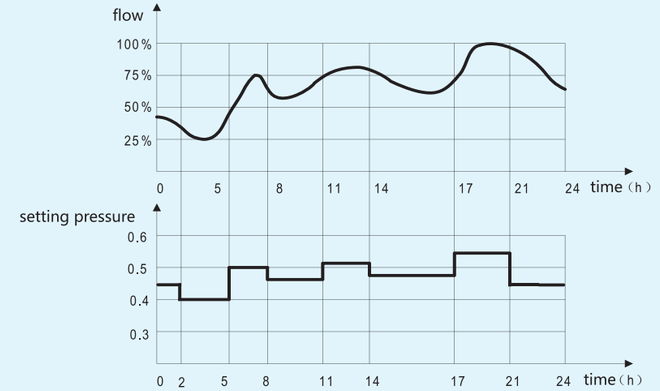
Sewage pump control

The signal of sewage pool level is on-off signal. When the level is more than the up-limit level, the sewage pump will run. When the level is less than the lower level, the sewage pump will stop.



Timing water-supply and multi-step pressures

Timing water–supply: The users can set different water pressures according to the water consumption situation at different periods (Generally divided a day into 8 periods).



Multi–step pressures water supply:
The user can set 16 multi–step pressures through the different combinations of 4 terminals.

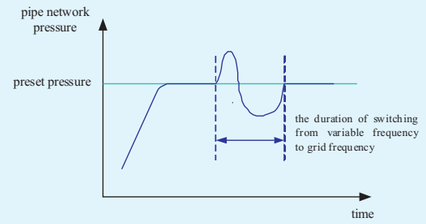
S1	OFF	ON	OFF	ON	OFF	ON	OFF	ON
S2	OFF	OFF	ON	ON	OFF	OFF	ON	ON
S3	OFF	OFF	OFF	OFF	ON	ON	ON	ON
S4	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
step	0	1	2	3	4	5	6	7
S1	OFF	ON	OFF	ON	OFF	ON	OFF	ON
S2	OFF	OFF	ON	ON	OFF	OFF	ON	ON
S3	OFF	OFF	OFF	OFF	ON	ON	ON	ON
S4	ON	ON	ON	ON	ON	ON	ON	ON
step	8	9	10	11	12	13	14	15

Manual soft-start and manual circulation debugging

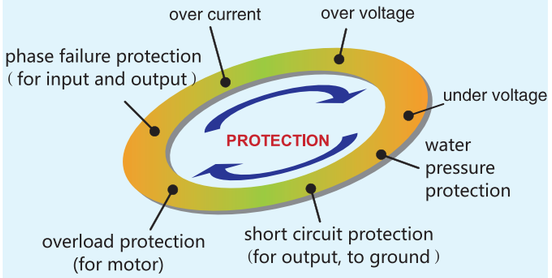
Before running the whole system, the user can check the pump by manual soft-start or manual circulation to ensure the safety.

pumps switching smoothly

The user can set the switch frequency for variable frequency switching to grid frequency. In order to make the pressure of pipe in stable, the user can switch the pump to grid frequency while the variable frequency pump works at high speed.

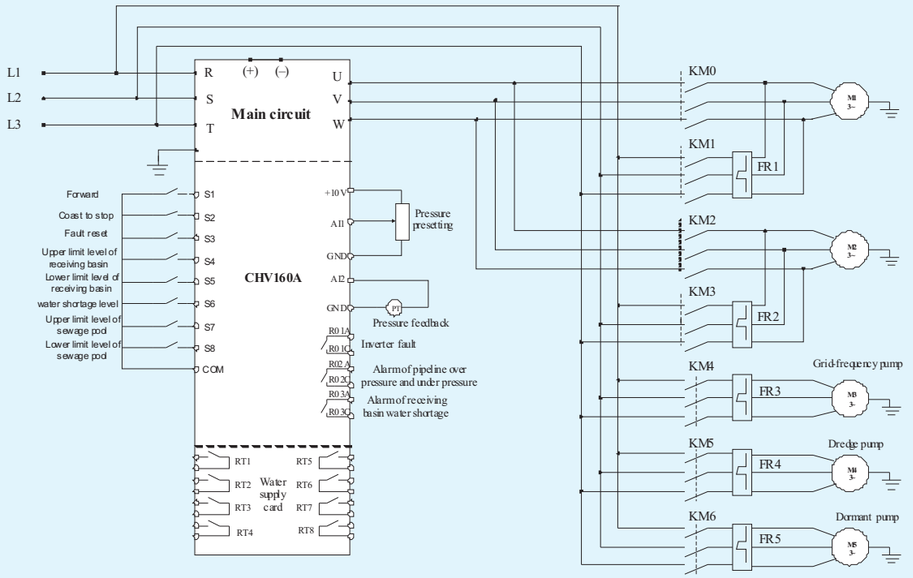


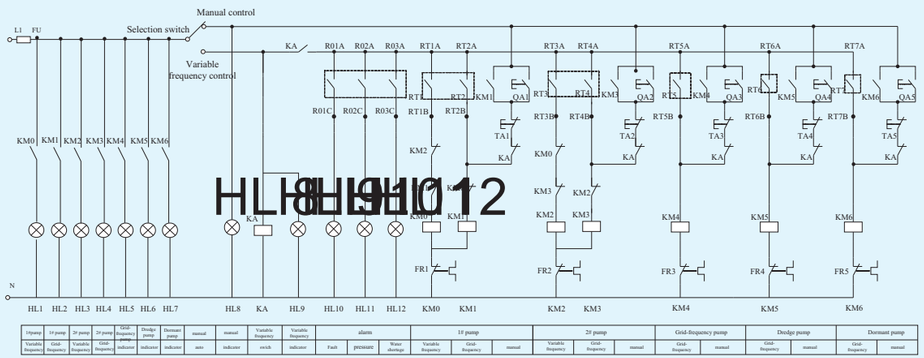
Perfect protect function:



Application

Two circular variable frequency pumps (water supply card is necessary)





HL8: Manual control indicator
HL9: Variable frequency control indicator
HL10: Alarm of inverter fault
HL11: Alarm of pipeline network over pressure and under pressure
HL12: Alarm of receiving basin water shortage

Corresponding function codes setting (For reference):

- P0.00=1(run command source: terminal);
- P1.14=1(power-off restart is valid); P1.16=1(terminal running at power-on is valid) .
- These two parameter can be select by the actual requiremnt;P2.00~P2.06 motor parameters according to the nameplate of motor;
- P3.02 (PID maximum) = range of manometer (Factory setting: 1000Mpa);
- P3.05 (keypad reference pressure) =0.5 Mpa (Factory setting) ;
- P3.18=10.0% (PID output frequency lower limit)
- P5.02=1(forward); P5.03=4(coast to stop) ;P5.04=5(fault reset); P5.05=36(upper limit level);
- P5.06=37(lower limit level); P5.07=38(water scarcity level) ;P5.08=39(sewage upper limit level)
- P5.09=40(sewage lower limit level)
- P6.00=3(fault output) ;P6.01=19(water scarcity indicate); P6.02=15(over pressure indicate);
- P6.03=1(RT1) P6.04=2(RT2) P6.05=3(RT3) P6.06=4(RT4) ;P6.07=6(RT5) ;P6.08=8(RT6) ;P6.09=10(RT7)
- P8.00=1(water supply valid) ;P8.01=1(Circular variable frequency pumps); P8.02=0(H、I grid frequency pumps invalid)
- P8.03=1(A is variable frequency pump) ;P8.04=1(B is variable frequency pump);
- P8.05=1© is grid frequency pump); P8.06=3(D is dormant pump) ;P8.07=4(E is dredge pump)
- P8.10~P8.25 please set according to the actual requirement.

P6.07-P6.10 P8.05=1 P8.06=1

Technical Features

input voltage input frequency	3AC, 380V±15% 47～63Hz
power range	5.5～350KW
output voltage	3AC, 0～Rated input voltage
output frequency	0～400Hz
control mode	V/F
overload capacity	110% rated current, continuous running 120% rated current for 60s, 150% rated current for 10s
carrier frequency	1.0K～16.0KHz
acceleration time	0～3600s
deceleration time	0～3600s

External I/O features

8 programmable digital inputs (DI)	
type	12V ~ 24V external or internal power supply
input resistance	2.4K
maximum time delay	5ms • / - 1ms
2 programmable analog inputs (AI)	
AI1 AI2	0 ~ 10V or 4 ~ 20mA
2 programmable analog outputs (AO)	
AO	0 ~ 10V or 4 ~ 20mA
communication interface	
Rs485	Modbus
3 programmable digital relay outputs (normal open or normal close selectable)	
the water supply card provides 8 relay output (normal open)	

EMC

If the installation and wiring of inverterand the EMI filter,plase according to the operation manual of CHV160A, it will meet the following criterion:

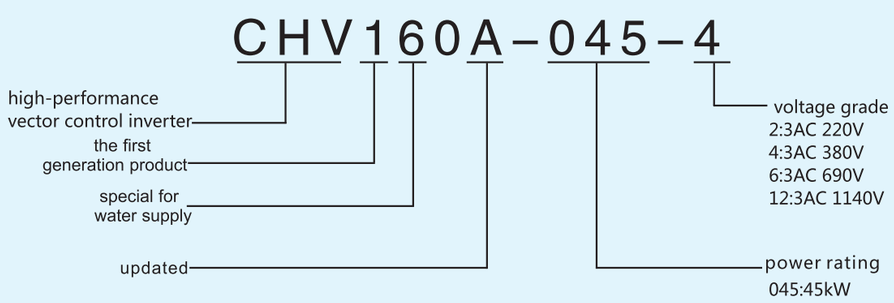
IEN61000-6-4 IEN61800-3

Normally, if the cable of motor is longer than 50m, it needs add a AC contactor or sinusoidal filter at the output side of inverter.

Environmental limitation

Temperature	-10°C ~ +40 C. Inverter will be derated if ambient temperature exceeds 40°C.
Humidity	≤95% , without dewing
Altitude	≤1000M, output rated power ＞1000M, output power with derating
Oscillation	the inverter is prohibited to drop on the floor or with suddenly impact, it also prohibited to be installed at the place where the oscillation may occur .
Electromagnetic radiation	the inverter is prohibited to be installed at the place with stronger electromagnetic radiation.
Store environment	the inverter is prohibited to be stored at the place with direct sunlight, full of oil mist, steam and with heavy oscillation.

Model instruction



Model

Each inverter only has one model; it indicates the power and the dimension of inverter clearly.

Voltage

The input voltage range of CHV160A is:
4= 380V±15% , 3AC

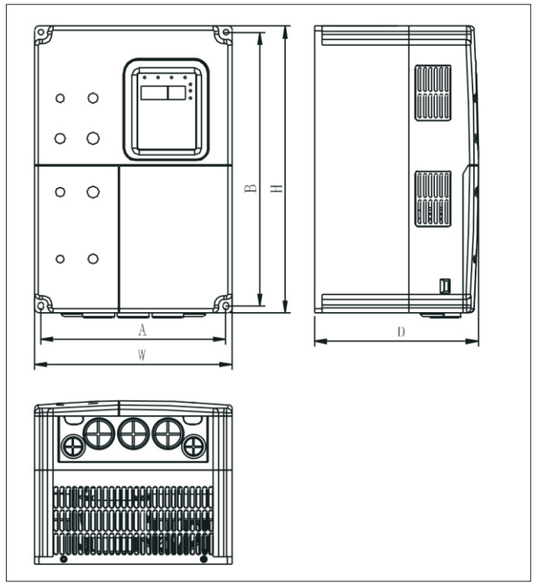
Power rating

Model	Rated output power(KW)	Rated input current(A)	Rated output current(A)
CHV160A-5R5-4	5.5	15	13
CHV160A-7R5-4	7.5	20	17
CHV160A-011-4	11	26	25
CHV160A-015-4	15	35	32
CHV160A-018-4	18.5	38	37
CHV160A-022-4	22	46	45
CHV160A-030-4	30	62	60
CHV160A-037-4	37	76	75
CHV160A-045-4	45	90	90
CHV160A-055-4	55	105	110
CHV160A-075-4	75	140	150
CHV160A-090-4	90	160	176
CHV160A-110-4	110	210	210
CHV160A-132-4	132	240	250
CHV160A-160-4	160	290	300
CHV160A-185-4	185	330	340
CHV160A-200-4	200	370	380
CHV160A-220-4	220	410	415
CHV160A-250-4	250	460	470
CHV160A-280-4	280	500	520
CHV160A-315-4	315	580	600
CHV160A-350-4	350	620	640

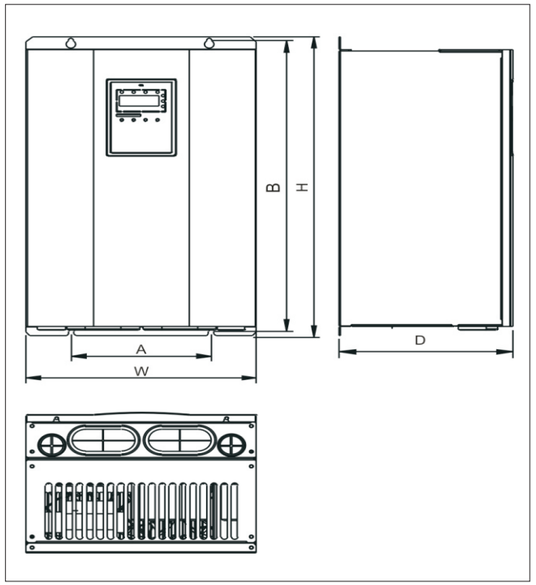
Dimension

Power(KW)	A (mm)	B (mm)	H (mm)	W (mm)	D (mm)	Mounting aperture (mm)
	Mounting dimension		Outline dimension			
5.5 ~ 7.5	147.5	237.5	250	160	175	5
11 ~ 18.5	206	305.5	320	220	180	6
22 ~ 37	176	454.5	467	290	215	6.5
45 ~ 75	230	564.5	577	375	270	7
90 ~ 132	320	738.5	755	460	330	9
160~200	270	1233	1275	490	391	13
	——	——	1490	490	391	——
220~350	500	1324	1358	750	402	12.5
	——	——	1670	750	402	——

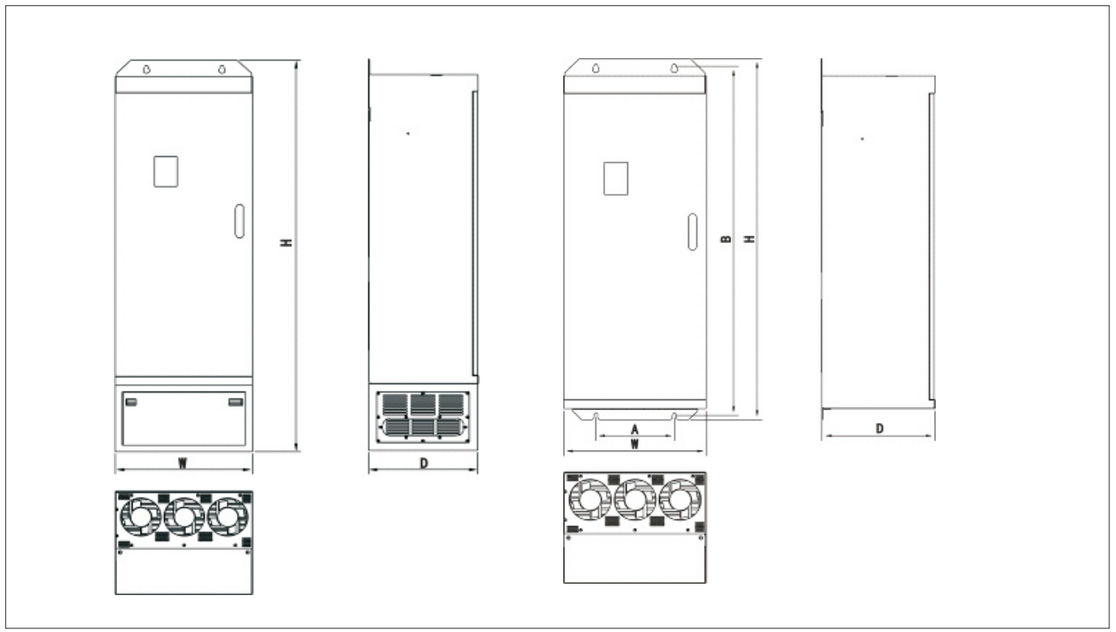
For more information about the dimension, please refer to the operation manual of CHV160A



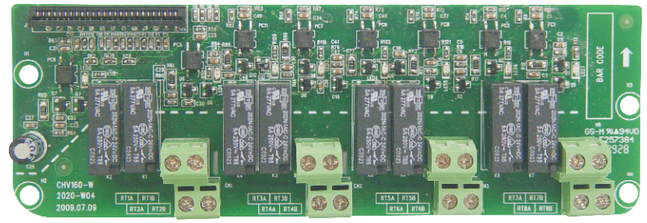
the outline dimension of 18.5KW and lower

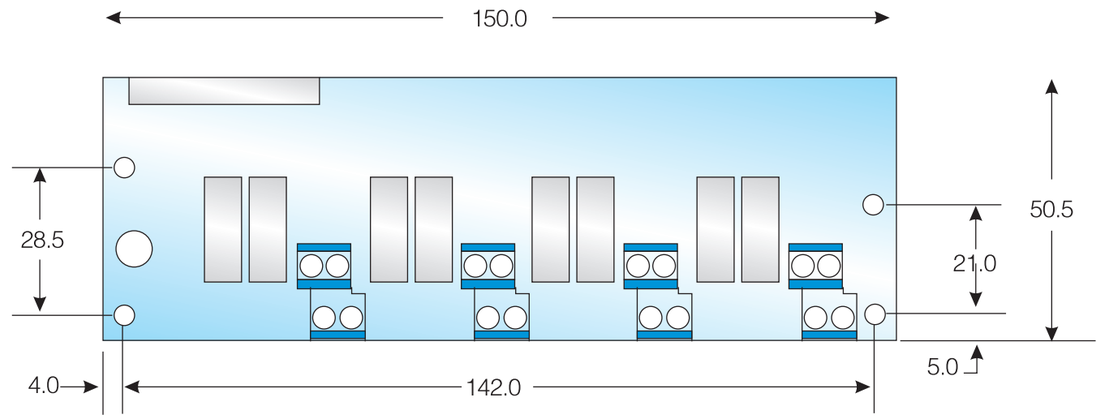


the outline dimension of 22KW ~ 132KW



the outline dimension of 160KW ~ 350KW (with base and without base)





water supply card (unit: mm)

Applications

- High-rise building , Residential, Water supply of life, heating and fire for enterprises
- Central air conditioning circulation system, Dual water supply system
- Production water supply, recirculated cooling water supply, boiler water supply system
- Constant pressure oil transportation system for oil port, oil pump station, oil warehouse and oil pipeline.
- Water plant, Booster station
- Sewage, waste water treatment
- Irrigation and drainage system for Large squares, green parks and farms