Tio T6-130-L Tio high efficiency pump

Intelligent frequency conversion circulation pump. For systems which require a more powerful pump.

- No requirement for a mixing valve.
- High performance modulating pump.
- Optional pulse width modulation (PWM).
- Simple & easy retro-fit in most boiler brands.
- Easy set up to maximise boiler efficiency.
- 1-year manufacturers warranty.
- ErP Compliant.

Product Code	Product Description
TIOPUM0060	Tio T6-130-L high efficiency pump - 6m head

- Ground motor before connecting to power supply.
- Do not touch the pump while it is running.
- Do not run the pump without water.

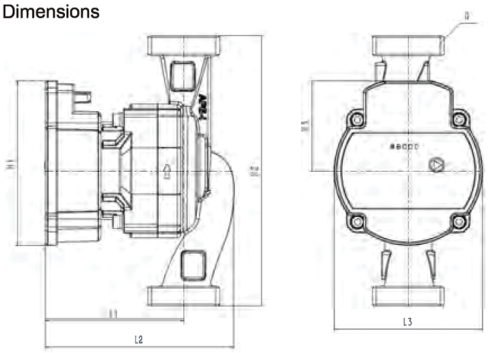
The power supply voltage of the electric pump is single phase 220-240V, and the frequency is 50/60hz.

- Make sure that the pipe system is securely connected before installation and verify that the impurities, soldering leftover and wastes have been cleaned within the pipes.
- Make sure the pump is located in dry and ventilation environment to avoid short circuit due to moisture or splashing into the casing, and guarantee its availability to service and replacement.
- The protection cover must be added, for the requirement of outdoor installation, while actions must be taken to avoid being splashed and to prevent electric shock risk in indoor installation.
Warning: Do not install in bathroom to prevent vapor or water or moisture from going into the junction box resulting in electric leakage.
- It's strongly suggest that shutoff valves to be installed at inlet and outlet ports for the sake of following pump service and maintenance.
- When complete installing the pump, connect the power supply as pilot run and set the speed adjusting switch at max grade to check if the starting is normal. But the pilot running time can not be over 10 seconds so as to avoid idle running influencing working life of the bearing.
- When the pump is supplying water to the heating system, do not touch the pump and/or other pipes to avoid burning.
- The power plug must be strictly grounded. Securely connect the GND pin of the power plug to the power plug grounded hole. Do not attempt to change the GND plug of the pump.
- The striking security caution markings must be set up during pump working to avoid any accident.
- The power supply must be firstly disconnected before adjusting pump location or before any action that may touch the pump when the pump is working to avoid any accident.
- Regularly check the pump and timely replace in case of any damage.
- The power cable can only be replaced with corresponding cords or dedicated components.
- In winter, when the environment temperature is below 0°C, the water within the pipes must be exhausted thoroughly if the pump ceases working to avoid pump frost crack.
- The heat supply pipes can not be frequently supplemented with non-soft water to avoid the accumulated calcium inside the pipe system that that may block the rotor.

Supply voltage	220-240V, 50/60 Hz			
Motor protection	Doesn't need external motor protection			
Protection class	IP44			
Insulation class	E			
Relative ambient humidity	Max. 95%			
System pressure	Max. 1.0 MPa, 10 bar			
Suction inlet pressure	Liquid temp	≤ +75℃	Min. Inlet pressure	0.05bar , 0.005MPa
		+90℃		0.28bar , 0.028MPa
		+110℃		1.08bar , 0.108MPa
EMC Standard	GB 4343.1 GB 4343.2 GB 17625.1 GB 17625.2			
Ambient temperature	0℃~40℃			
Surface temperature	Max. +125℃			
Liquid temperature	+2℃~+110℃			

Model	Internally controlled			Externally controlled
	Proportional pressure	Constant pressure	Constant curve	PWM
XX- X - XXX	I	I	I	PWM1
	II	II	II	
	III	III	III	
	AUTO	/	/	
XX- X - XXX P1	/	/	III	PWM1
XX- X - XXX P2	/	/	III	PWm2

Dimensions



Model	Size（mm）						
	L1	L2	L3	H1	H2	H3	G
20-X-130L (PWM1/PWM2)	93	126	99	110	130	60	G1
25-X-130L (PWM1/PWM2)							G1.5
25-X-180L (PWM1/PWM2)					180		
32-X-180L (PWM1/PWM2)							G2

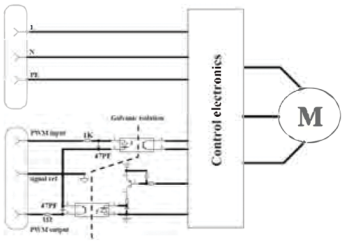
Relationship between electric pump setting and lighted area

Electric pump mode is setup with different display areas like below:

Pressing times	Model	Descriptions	Display
0	CS III Factory Settings	Constant curve, speed III	
1	AUTO	Adaptive mode	
2	PP I	Proportional pressure curve, speed I	
3	PP II	Proportional pressure curve, speed II	
4	PP III	Proportional pressure curve, speed III	
5	CP I	Constant pressure curve, speed I	
6	CP II	Constant pressure curve, speed II	
7	CP III	Constant pressure curve, speed III	
8	CS I	Constant curve, speed I	
9	CS II	Constant curve, speed II	
10	CS III	Constant curve, speed III	
/	PWM	External control of motor speed	

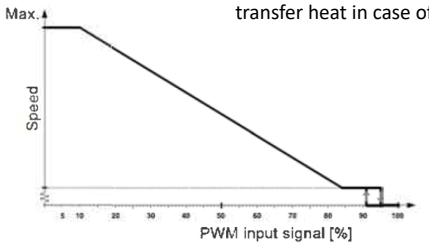
Control principles

When PWM signal is connected, the operation of circulating pump is controlled by PWM signal. If there is no PWM signal, the operation of circulating pump is controlled by internal control logic.

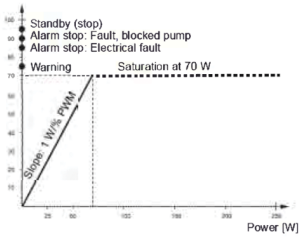


5.4.2 PWM input signal (PWM1 heating)

At high PWM signal percentages (duty cycles), a hysteresis prevents the circulating pump form starting and stopping if the input signal fluctuates around the shifting point. Al low PWM signal percentages, the circulating pump speed is high for safety reasons. In case of a cable breakage in a gas boiler system, the circulating pump will continue to run at maximum speed to transfer heat from the primary heat exchanger. This Is also suitable for heat circulating pumps to ensure that the circulating pump can transfer heat in case of a cable breakage.



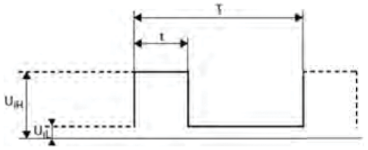
PWM feedback signal (power consumption)



PWM output signal (%)	Qualification time QT (S)	Pump information	Disqualification time DT(S)	Priority
95	0	Standby by PWM signal (STOP)	0	1
90	0~15	Alarm, stop, blocked error	0~10	2
85	0~30	Alarm, stop, electrical error	0~10	3
75	0	Warning	0	5
0-70		0—70W（slope 1W/%PWM）		6
Outputfrequency	75Hz+/-5%			

PWM signals

Galvanic isolation in pump	YES
PWM frequency input	1000—2500Hz
Input voltage high level U_{IH}	4.0— 5.5V
Input voltage low level U_{IL}	< 0.7V
Input current high level I_H	3.5mA~10mA
Input duty cycle PWM	0—100%
Signal polarity	fixed
Signal cable length	< 3m
Rise time, fall time	< T/1000



Troubleshooting

Symptom	Likely causes	What to do
The pump is not working	Loose power cable connection	Make sure the power cable is connected securely and firmly
	Control electronics damaged	Replace the control box
	The impeller, motor may be wound by fibers or jammed with sundries	Clean the fibers and sundries
Noise within system or pump casing	Impurities within pump	Dismantle the pump and clean the impurities
	Air or gas within system or pump casing	Exhaust the air or gas
The pump is working, but not generating any pressure	Intake valve is closed	Open the valve
	Air or gas within pipes or pump	Open the valve to make the pump running and meanwhile loosen the connector of the outlet ports to ensure gas emission

In case of failures, the electrical control will react to some of the faults and protect the pump. The protection code on display panel shows in the following table:

Protection type	Display	Likely causes	What to do
Locked-rotor protection		The rotor is blocked	Disassemble the motor and check if the rotor can rotate normally. If not then clean up the impurities to make the rotor part rotate flexibly
Overvoltage/undervoltage protection		The input voltage is too high or too low	Check if the voltage is within normal range, if not then adjust to normal voltage
Open phase protection		One or more phases of the internal connection circuit is disconnected	Replace the pump
Over current protection		Short circuit of internal connection circuit	Replace the pump

• All the figures in this manual are schematic diagrams, and please understand that the electric pumps and accessories you buy may be different from the diagrams in this manual.

• The performance of the product is improved constantly, and all products (including appearance and color, etc.) are subject to physical products; no further notice will be given in case of any change.