

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
TIOAPE25-6-130T1	25 x 130mm Connection - 6m head
TIOAPE25-8-130T1	25 x 130mm Connection - 8m 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.

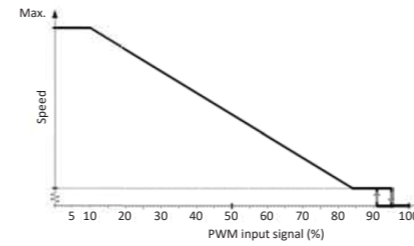
- Make sure that the pipe system is securely connected before installation and verify that the impurities, soldering leftover and wastes have been cleaned within the pipes.
- Make sure the pump is located in dry and ventilation environment to avoid short circuit due to moisture or splashing into the 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.

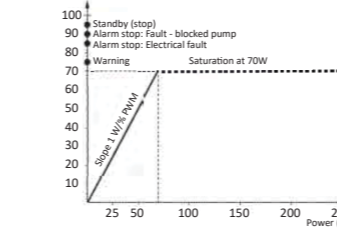
- It's strongly suggest that shutoff valves to be installed at inlet and outlet ports for the sake of following pump service and maintenance.
- When complete installing the pump, connect the power supply as pilot run and set the speed adjusting switch at max grade to check if the starting is normal. 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, 50/60Hz			
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 temperature	≤ +75°C	Min. inlet pressure	0.05bar, 0.005MPa
		+90°C		0.28bar, 0.028MPa
		+110°C		1.08bar, 0.108MPa
EMC Standard	GB 4343.1	GB 4343.2	GB 17625.1	GB 17625.2
Ambient temperature	0°C~ 40°C			
Surface temperature	Max. +125°C			
Liquid temperature	+2°C~+110°C			

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



PWM feedback signal (power consumption)



PWM output signal (%)	Qualification time or (s)	Pump information	Disqualification time or (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)	Saturation at 70W		6
Output frequency	75Hz±5%			

PWM signals

Galvanic isolation in pump	YES
PWM frequency input	1000-2500Hz
Input voltage high level U _H	4.0-5.5V
Input voltage low level U _L	< 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	< 1/1000

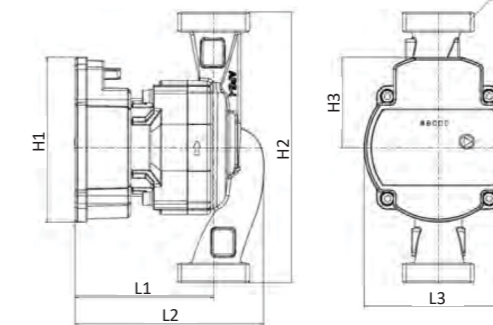
Control principles

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 from starting and stopping if the input signal fluctuates around the shifting point. At 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.

Dimensions



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

Troubleshooting

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:

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

- 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.