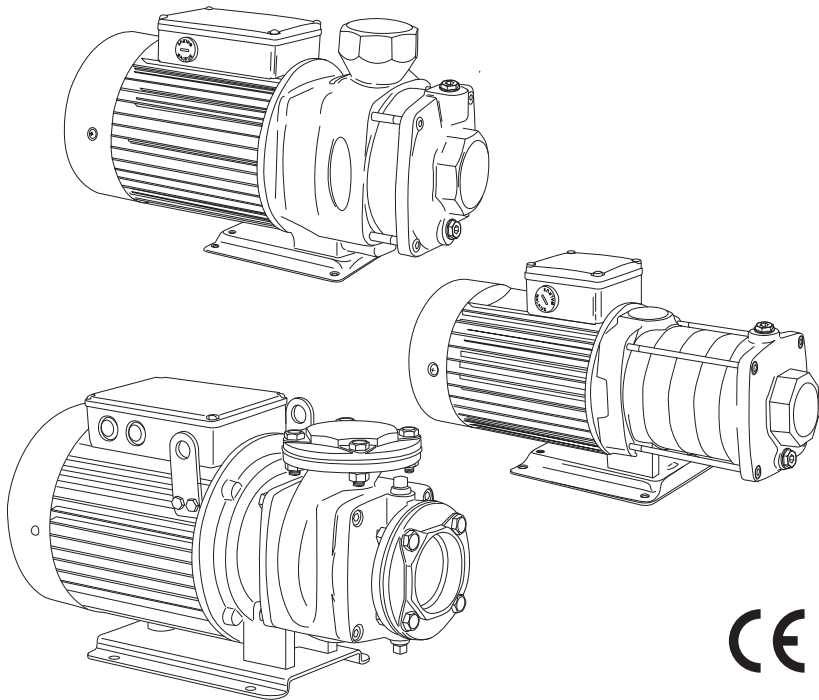




# WALRUS

## 多段離心式泵浦 TPH Multistage Centrifugal Pump

使用說明書  
Installation Manual



**ISO 9001**

大井泵浦工業股份有限公司  
**WALRUS PUMP CO., LTD.**



# EC Declaration of Conformity

Manufacturer:

Walrus Pump Co., Ltd.

Address:

No.83-14, Dapiantou, Sanzhi Dist., New Taipei City 252, Taiwan

Declare that the machinery described:

Name : Water Pump

Model : TPH Series

Conform to the following directive:

2006/42/EC—Machinery directive

2014/35/EU—Low voltage directive

2014/30/EU—EMC (Electromagnetic compatibility) directive

Refer to the following standards:

EN ISO 12100:2010

EN ISO 13857:2008

EN 809:1998+A1:2009

EN 60204-1:2006

EN 60335-1:2012

EN 60335-2-41:2003

EN 61000-6-2:2005

EN 61000-6-3:2007

R&D department manager: Kao Tien-chuan

Manager:

*Kao Tien chuan*

# TPH Instruction Manual

Please study all instructions carefully before installing your new system, as failures caused by incorrect installation and operation are not covered by the warranty.

## 1. General Data:

### 1.1 Applications

The TPH Series are modernly designed with quiet and high efficient operation pumps, suitable for dependable water transfer, circulating or booster service. It works for clean or other liquids without abrasive matters.

- Industrial circulation system
- Washing/cleaning system
- Pressure boosting system
- Water/liquid transfer
- Agricultural irrigation
- Air-conditioning

### 1.2 Pump Construction:

Horizontal multi-stage centrifugal pump, non self-priming, co-axial pump/motor design, impellers mounted on extended motor shaft. All parts in contact with the pumped liquid are made of stainless steel.

### 1.3 Operation conditions:

1. Ambient temperature: Max. 40°C
2. Liquid temperature range: 0°C to 90°C
3. Operating pressure: Max. 10 kg/cm<sup>2</sup>
4. Inlet pressure: Max. 6 kg/cm<sup>2</sup>
5. Head: 50Hz : Up to 70M  
60Hz : Up to 80M

### 1.4 Applications

TPH pumps are horizontal, multistage centrifugal pumps for the pumping of clean, thin and non-explosive liquids, not containing solid particles or fibres that may attack the pump mechanically or chemically.

The pump must not be used for the transfer of flammable or toxic liquids.

## 2. Installation and piping

### 2.1 Installation site

- 2.1.1 For secure operation, please mount and bolt the pump base to the foundation.
- 2.1.2 Select a dry and good ventilated site and provide accessible space around the pump for future maintenance and service.
- 2.1.3 Make sure the ambient temperature is below 40°C(104°F) and the flowing liquid temperature does not exceed 90°C(194°F).
- 2.1.4 Do not operate the pump under explosive environment.
- 2.1.5 Horizontal installation is recommended.

When it is installed in other positions, please provide drain holes to allow drainage of the pump. refer to below figures.

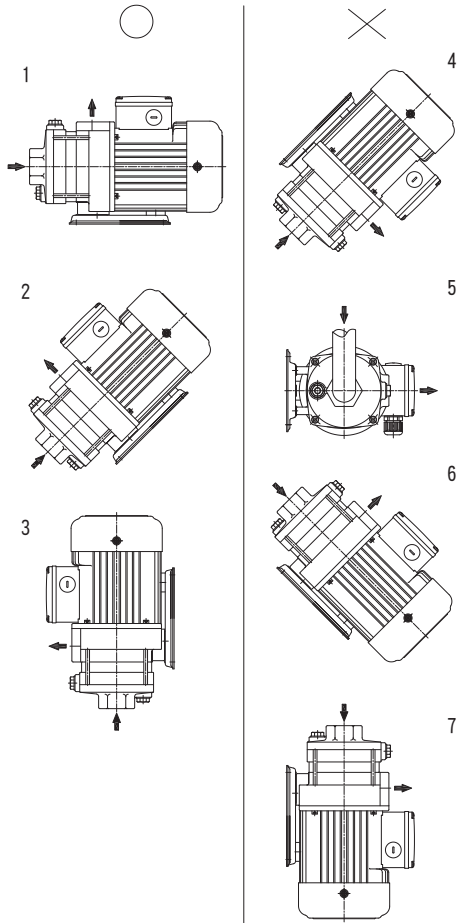



Fig.1

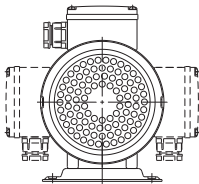
- 2.1.6 Indoor: TO avoid your furniture damage, do not install the pump on ceiling, carpet or any place close to electrical appliance, and also must provide drain hole.
- 2.1.7 Outdoor: When the pump is installed outside, please provide a suitable cover to protect it from weather and frost. Please do not allow any foreign objects fall into the motor fan cover.
- 2.2 Electrical connection
  - 2.2.1  This mark located outside the connection box is a warning for an electrical hazard.

2.2.2 The electrical connection should be carried out in accordance with local regulations. The operating voltage and frequency are marked on the nameplate. Please make sure that these data match with your job requirement. For your safety, be sure the Residual current device (RCD, 30mA) is in your system and grounding is properly connected to prevent from electric shock.

2.2.3 Motors must be connected to a motor-protective circuit breaker which can be manually reset. Set the motor-protective circuit breaker according to the rated current of the motor. See nameplate.

2.2.4 Three phase motors must be connected to a motor starter for protection of overload and single phase running. Please be sure if the direction of rotation is correct. For three phase motor you can reverse the direction of rotation by interchanging any two of the incoming supply wires. Before your first operation, please place a allen wrench against the shaft at motor end and turn by the direction of rotation to see if rotor spins freely.

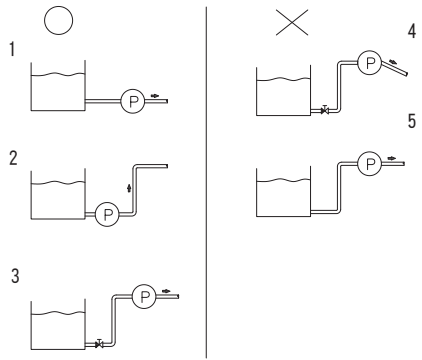
2.2.5 The position of the connection box is adjustable. It can be turned either side before the pump is installed. The preset position from the factory is on the top of the motor. To change the position of the connection box, please remove the bolts on the motor frame (4 bolts which are bolted into the chamber) and turn the stator housing to the required position. Replace the screws and tighten securely.



**Fig.2**

2.3 The pump should be installed so that the suction pipe is as short and the suction lift as small as possible.

2.4 When draw liquid from the same level of the pump suction inlet, please allow a downward slope from the liquid source to the pump suction inlet to avoid air sucked in. If it is to pump liquid from a level lower than the pump suction inlet, a foot valve must be fitted to the end of the suction pipe. refer to below figures.



**Fig.3**

- 2.5 Please select the pipe size specified in the specifications. Smaller piping will cause considerable pressure loss and affect pump efficiency.
- 2.6 All piping joints must be completely tight. Leakage in suction piping may result in the loss of the suction capability. Leakage in discharge piping may cause the "cycling" of the pump.
- 2.7 Please do not allow any foreign objects (chewing gum, dirt, and sand etc.) fall into the pump or motor.
- 2.8 The pump lifting capacity is related to the temperature of flowing liquid. Under normal flowing temperature (20°C - 30°C), it will lift up to 5M. At high temperature operation (over 60°C), the pump must be installed at the level lower than the liquid source or the pump inlet pressure must be higher than 1 atmosphere (15 PSI).
- 2.9 It is extremely dangerous to run the pump against a closed discharge valve, because it will cause extremely high liquid flow temperature and damage your pump. You may connect a bypass/a drain to the discharge pipe to allow a minimum liquid flow through the pump.
- 2.10 Metal piping is recommended when the operations require high lifting head or high liquid temperature.
- 2.11 In systems with hot liquids (over 60°C), extra caution should be exercised to prevent from personal injury caused by escaping water.
- 2.12 Pumps that are not being used during periods of frost should be drained to avoid damage.

### 3. Operation instructions

#### 3.1 Priming

Do not start the pump until it has been primed.

Follow the following priming instruction:

3.1.1 Booster systems and systems where the liquid level on the suction side is above the pump inlet:

3.1.1.1 Close the isolating valves either side of the pump.

3.1.1.2 Remove the priming plug, fig. 4.

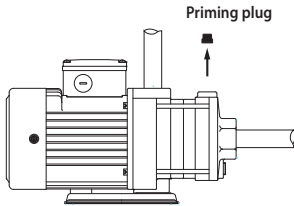


Fig.4

3.1.1.3 Slowly open the suction valve and keep it open until a steady stream of liquid runs out the priming port.

3.1.1.4 Replace the priming plug and tighten it.

3.1.2 Pumping from tanks and wells where the liquid level on the suction side is below the pump inlet:

3.1.2.1 Close the discharge isolating valve.

3.1.2.2 Remove the priming plug, fig. 5.

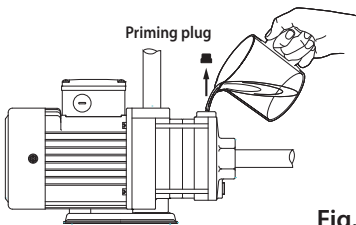


Fig.5

3.1.2.3 Pour water through the priming port. Make sure that the suction pipe and pump are completely filled with liquid and vented.

3.1.2.4 Replace the priming plug and tighten it.

3.2 Start the pump and slowly open the discharge valve until it is fully open.

3.3 If there is no discharge flow after a few minutes, please turn off the pump and repeat the Process of 3.1 Turn the pump on and off several times until it is working normally.

3.4 When pump is working on normal condition, measure the motor current and check it with

the nameplate value. If it exceeds the rated value, please reduce the lifting capacity or fully open the valve.

3.5 When pump is not in use for a period, it should be drained by removing the priming and drain plugs. For start up after long time inactivity, please check if the impeller and mechanical seal are free. If they are locked up by sand, rust or something else please clean them up.

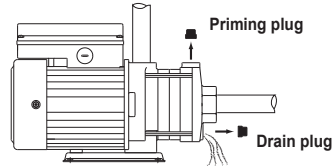


Fig.6

#### 4. Maintenance

4.1. Lubrication

The mechanical seal and shaft sleeves are lubricated by the pumped liquid.

4.2. Periodic checks

The following checks should be carried out periodically to ensure the normal operation.

4.2.1. Check the quantity of liquid and operating pressure.

4.2.2. Check there are no leaks on piping joints.

4.2.3. Check the tripping of the motor starter.

4.2.4. Check that all controls are functioned normally.

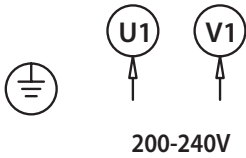
4.3. The pump must not be used to transfer explosive liquids. In systems with hot liquids (over 60°C), extra caution should be exercised to prevent from personal injury.

4.4. The pump should not be used to transfer toxic or contaminated liquids. Please carefully follow all instructions in the manual as Walrus may refuse to accept the contaminated pump for servicing.

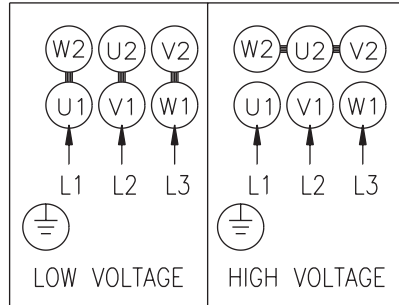
4.5. If the supply cord is damaged, it must be replaced by a special cord or assembly available from the manufacturer or its service agent.

## 5. Wiring diagram

### 5.1 Single Phase



### 5.2 Three Phase



## 6. Fault finding

(Make sure to disconnect the power before attempting to diagnose any fault.)

Fault	Cause
1. Pump does not start	1. Check if electrical power source, fuse or circuit breaker failed.
	2. Check if pump is locked up by sand, rust or any foreign objects.
	3. Check if the motor is defective due to overload or other causes.
2. Pump runs at reduced capacity or no discharge water	1. If it is a three phase motor, please check if the direction of rotation is correct.
	2. Check if the inlet source is sufficient, the suction lift is not too great and the temperature is within the normal range.
	3. Check if there is any leakage in suction pipe, check valve works normal and mechanical seal is not defective etc.
3. Pump stops during operation	1. Motor overheat due to excessive suction lift or too high liquid temperature.
	2. Control circuit has cut out (pressure switch or level controller).

## 7. Noise level

Model	$\overline{LA}$ dB(A)		Model	$\overline{LA}$ dB(A)		Model	$\overline{LA}$ dB(A)	
	50Hz	60Hz		50Hz	60Hz		50Hz	60Hz
TPH 2T2K	<70	<70	TPH8T2K	<70	<70	TPH25T2KF	76	78
TPH2T3K	<70	<70	TPH8T2.5K	-	<70	TPH25T3KF	76	78
TPH2T4K	<70	<70	TPH8T3K	<70	<70	TPH25T4KF	76	78
TPH2T5K	<70	<70	TPH8T4K	<70	71	TPH25T5KF	76	78
TPH2T6K	<70	<70	TPH8T5K	<70	71	TPH25T6KF	-	78
			TPH8T6K	<70	-			
TPH4T2K	<70	<70	TPH12T1K	-	<70	TPH50T2KF	78	-
TPH4T3K	<70	<70	TPH12T2K	<70	<70	TPH50T2.5KF	-	78
TPH4T4K	<70	<70	TPH12T3K	<70	72	TPH50T3KF	78	-
TPH4T5K	<70	<70	TPH12T4K	<70	77	TPH50T4KF	78	78
TPH4T6K	<70	<70	TPH12T5K	71	-	TPH50T5KF	-	78
			TPH12T6K	71	-			

The uncertainty is 4dB(A).





在開始安裝與操作之前，請仔細研讀本說明書裏各項的安裝與操作說明。

## 1. 一般資料

### 1.1 應用

本公司 TPH 系列產品為水平多段離心式泵浦，用途廣泛，適合一般不含雜質之清水及流體加壓、輸送、循環及機械設備之應用，如：工業系統、清洗系統、增壓系統、液體傳送、園藝灌溉等。

### 1.2 泵浦構造

水平多段離心式泵浦，非自吸，泵浦與馬達同軸，葉輪固定於加長之馬達軸心上，主要動作部位零件為不銹鋼材質。

### 1.3 使用條件

環境溫度：Max. +40°C

液體溫度：+0°C ~ +90°C

工作壓力：Max. 10 kg/cm<sup>2</sup>

入口壓力：Max. 6 kg/cm<sup>2</sup>

### 1.4 適用液體

適合一般不含雜質之清水及流體，禁止用於易燃、爆炸性、有毒等液體。

## 2. 安裝及配管注意事項

泵浦型別主要依加壓導室而來，有葉輪之加壓導室為標準加壓導室，配合無葉輪的空加壓導室組合，可應用於另外的尺寸場合，泵浦的型別編號由泵浦銘板上可查得。

### 2.1 安裝儲存場所

2.1.1 為使運轉平穩，請注意安裝時底座應確實固定。

2.1.2 安裝儲存場所必須保持乾燥且通風良好，並有足夠空間易於人員維修服務。

2.1.3 運轉的環境溫度不得高於 40°C 並且液體溫度不得高於 90°C。

2.1.4 不可以使用在具有爆炸危險之環境。

2.1.5 本產品正常以水平安裝為主，若需採取其他安裝方位，必須考慮洩水塞能將泵浦內流體完全排出為原則。如下圖例 Fig.1。

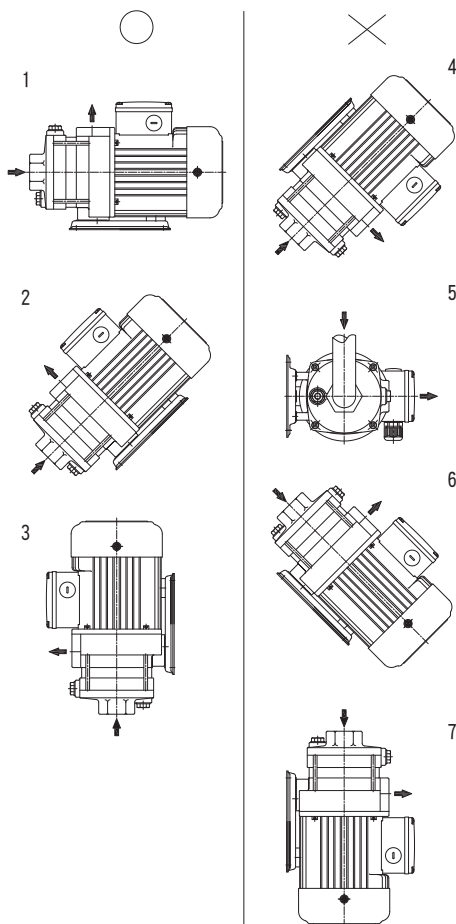


Fig.1

2.1.6 安裝於室內時，須有排水孔並保持暢通，嚴禁裝設於天花板上、地毯及電器設備附近，以防止漏水而導致裝潢或其他電氣設施損壞。

2.1.7 當安裝於室外時，必須設置適當防護措施以避免陽光直接曝曬及雨淋，並避免異物進入馬達冷卻風扇入口。

### 2.2 電源的連接

#### 2.2.1



會產生電的危險警告標示，於接線盒外明確標示，敬請小心。

- 2.2.2 請注意電源與馬達銘牌上標示之電壓及頻率是否相符，並依照當地電工法規完成配線，裝設接地線或漏電斷路器 (RCD, 30mA) 及外加過載保護，以避免發生電擊危險及過載燒損。
- 2.2.3 三相馬達需外加過載保護及欠相保護開關，以避免馬達過載或欠相燒毀。注意三相電源的連接必須使馬達轉向與風罩上標示的運轉方向相同，送電試轉向之前請以六角板手依旋轉方向轉動軸心以避免零組件卡住損壞並確保運轉平穩，若轉向不同可將三相電源中任意兩條線對調即可改變方向，轉向錯誤會產生水壓不足。
- 2.2.4 本產品馬達接線盒為可移動設計，如下圖 Fig.2 所示；調整步驟首先將馬達及泵浦間固定螺絲拆下後再轉泵浦至預定位置，再將固定螺絲鎖緊並將風罩裝回即可。

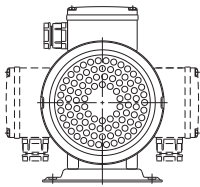


Fig.2

- 2.3 將泵浦儘可能安裝於水源附近，以減少吸入揚程，提高運轉效率。
- 2.4 吸入管路及泵室必須避免空氣堵塞，當泵浦入口高於水源時必須於吸入管前端裝設止水閥。如下圖例 Fig.3。

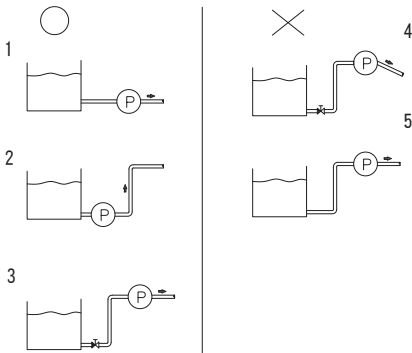


Fig.3

- 2.5 管路接頭必須確實密封，吸入端管路密封不良，將使泵浦失去吸水功能。
- 2.6 配管時需注意避免異物進入泵浦室內，特別是塑膠管用 PVC 膠水及鐵屑，以免葉輪卡死損壞。
- 2.7 為避免發生泵浦空蝕 (Cavitation) 現象，本泵浦吸水深度會隨液體溫度增加而減少。常溫時 (20°C ~30°C) 吸水深度約為 5 公尺。當流體溫度超過 60°C 時泵浦入口必須比水源低，或吸入口壓力必須大於大氣壓力。
- 2.8 出口管路規格以泵浦出口相同為原則，出口管路過小將導致壓力損失，降低使用效率。出口管路密封不良將導致加壓系統運轉頻繁。
- 2.9 本泵浦不可長時間運轉於出口全閉之場合，如此將導致流體溫度異常上升，嚴重時並將導致管路爆裂或馬達燒毀。
- 2.10 出口管路請使用金屬管以防液體溫度異常導致管路破裂。
- 2.11 使用液體溫度超過 60°C 時，需加裝防護裝置，以避免燙傷。
- 2.12 如果在霜凍期不使用，則必須排空泵浦內液體以防止泵浦損壞。

### 3. 運轉操作步驟及使用注意事項

- 3.1 當泵浦入口高於液面時，首先取下注水塞，將水灌滿泵浦室及吸入側管路，再將注水塞旋緊，如下圖 Fig.4、Fig.5。而當泵浦入口低於液面時，取下注水塞，讓液體自行流出注水至不含空氣後，再將注水塞旋緊。

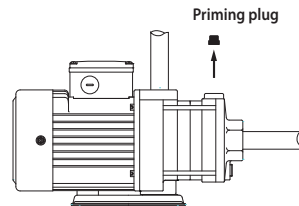


Fig.4

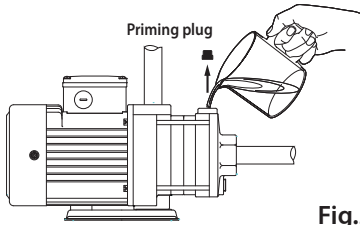


Fig.5

- 3.2 再次檢查電源電壓是否與馬達規格相符，結線是否正確後，將電源開關打開，馬達應立刻轉動。打開出口側管路之出水閥，數秒後應有水自出口端管路流出。三相馬達請再度確認轉向是否正確。
- 3.3 起動數分鐘後若泵浦仍空轉，則應立即停止供電，將注水塞打開再灌水。連續啟動數次，以使吸入管內能充滿水。
- 3.4 當馬達運轉正常後，以電流錶量測馬達運轉電流是否於馬達銘牌之標示值，若電流過高請再次檢查電壓或泵浦負載是否異常。
- 3.5 長期停用前，請利用洩水塞將泵浦內部液體排乾。欲重新供電啟動前請先確定葉輪、軸封無卡住情形，再行供電。若無法使其轉動，請把泵浦水機蓋、葉輪及軸封拆卸，清潔後再組合，如下圖 Fig.6。

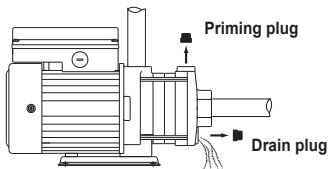


Fig.6

## 4. 操作維護

### 4.1 潤滑維護

泵浦內機械軸封與軸套皆為自潤式，由傳動液體來潤滑。

### 4.2 定期檢查

在一定的操作時間，請必須作以下的檢查：

#### 4.2.1 檢查液體的流量和操作壓力。

4.2.2 檢查管路系統是否洩漏。

4.2.3 檢查馬達的起動是否正常。

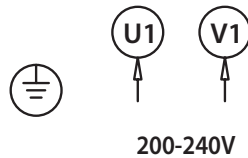
4.2.4 檢查全部的操縱器，是否都達正常的狀況。

4.3 本泵浦禁止使用於具有爆炸危險之環境，且使用液體溫度超過 60°C 時需加裝防護裝置，以避免燙傷。

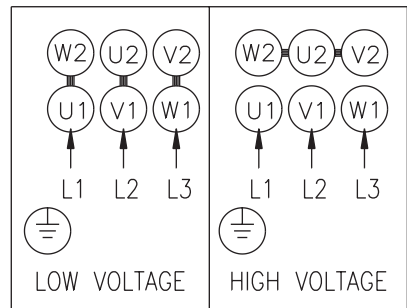
4.4 假如泵浦被用來操作有害人類健康的有毒液體或污染源的話，在非一般使用情形下故障，本公司將拒絕各項的維修服務，顧客個人造成的損害，須自行負擔。

## 5. 結線圖

### 5.1 單相



### 5.2 三相



## 6. 故障問題處理 (維護、修理處理前請先切斷電源)

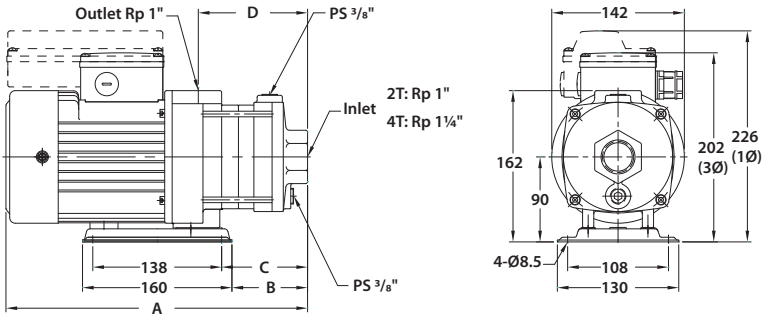
故障問題	處理方式
1. 泵浦不會啟動	1. 檢查電源開關是否打開，保險絲是否燒損。
	2. 泵浦是否被污物卡死
	3. 馬達超載導致溫度保護器跳脫或燒毀
2. 馬達運轉正常但流出水量很少或無流出水量	1. 若為三相馬達請檢查馬達轉向是否正確
	2. 確認水源是否充足，吸水高度是否適當，水溫是否過高。
	3. 檢查吸水端管路、接頭、逆止閥或軸封是否漏水或雜物堵塞。
3. 運轉中馬達忽然停止	1. 馬達超載導致溫度保護器跳脫或燒毀。
	2. 控制線路故障 (壓力開關或浮球開關等)

## 7. 噪音值

Model	$\overline{LA}$ dB(A)		Model	$\overline{LA}$ dB(A)		Model	$\overline{LA}$ dB(A)	
	50Hz	60Hz		50Hz	60Hz		50Hz	60Hz
TPH 2T2K	<70	<70	TPH8T2K	<70	<70	TPH25T2KF	76	78
TPH2T3K	<70	<70	TPH8T2.5K	-	<70	TPH25T3KF	76	78
TPH2T4K	<70	<70	TPH8T3K	<70	<70	TPH25T4KF	76	78
TPH2T5K	<70	<70	TPH8T4K	<70	71	TPH25T5KF	76	78
TPH2T6K	<70	<70	TPH8T5K	<70	71	TPH25T6KF	-	78
			TPH8T6K	<70	-			
TPH4T2K	<70	<70	TPH12T1K	-	<70	TPH50T2KF	78	-
TPH4T3K	<70	<70	TPH12T2K	<70	<70	TPH50T2.5KF	-	78
TPH4T4K	<70	<70	TPH12T3K	<70	72	TPH50T3KF	78	-
TPH4T5K	<70	<70	TPH12T4K	<70	77	TPH50T4KF	78	78
TPH4T6K	<70	<70	TPH12T5K	71	-	TPH50T5KF	-	78
			TPH12T6K	71	-			

誤差値  $\pm 4$ dB(A)。

## Dimensions (TPH 2/4)



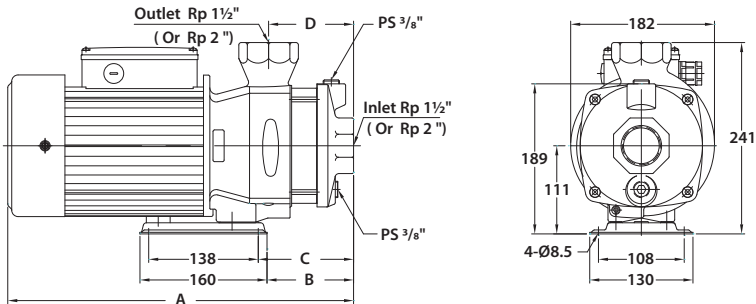
### TPH 2T

Model	A(mm)	B(mm)	C(mm)	D(mm)
TPH 2T 1K	305	63	74	99
TPH 2T 2K	305	63	74	99
TPH 2T 3K	323	81	92	117
TPH 2T 4K	341	99	110	135
TPH 2T 5K	399	117	128	153
TPH 2T 6K	417	135	146	171

### TPH 4T

Model	A(mm)	B(mm)	C(mm)	D(mm)
TPH 4T 2K	315	73	84	109
TPH 4T 3K	381	99	110	135
TPH 4T 4K	408	126	137	162
TPH 4T 5K	435	153	164	189
TPH 4T 6K	493	181	192	217

## Dimensions (TPH 8/12)



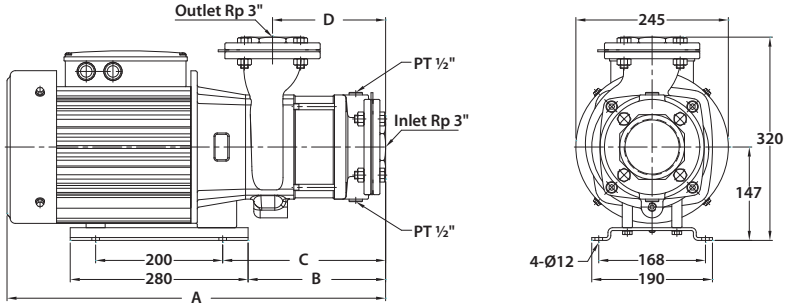
### TPH 8T

Model	A(mm)	B(mm)	C(mm)	D(mm)
TPH 8T 2K	375	77	88	75
TPH 8T 2.5K	407	109	120	107
TPH 8T 3K	407	109	120	107
TPH 8T 4K	435	109	120	107
TPH 8T 5K	473	143	154	141
TPH 8T 6K	473	143	154	141

### TPH 12T

Model	A(mm)	B(mm)	C(mm)	D(mm)
TPH 12T 1K	335	77	88	75
TPH 12T 2K	375	77	88	75
TPH 12T 3K	435	109	120	107
TPH 12T 4K	435	109	120	107
TPH 12T 5K	473	143	154	141
TPH 12T 6K	473	143	154	141

## Dimensions (TPH 25T)



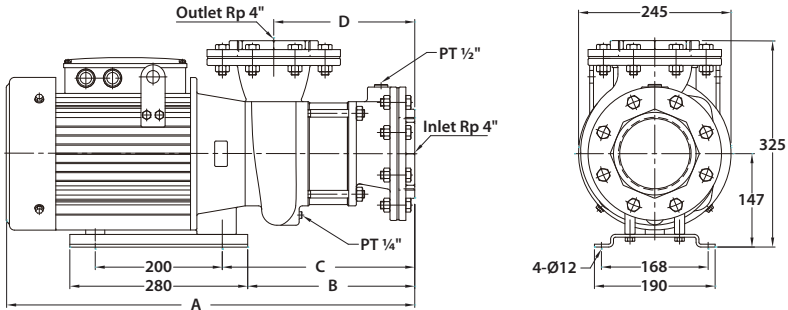
TPH 25T 50Hz

Model	A(mm)	B(mm)	C(mm)	D(mm)
TPH 25T 2KF	596	216.5	256.5	180
TPH 25T 3KF	656	276.5	316.5	240
TPH 25T 4KF	656	276.5	316.5	240
TPH 25T 5KF	766	336.5	376.5	300

TPH 25T 60Hz

Model	A(mm)	B(mm)	C(mm)	D(mm)
TPH 25T 2KF	536	156.5	196.5	120
TPH 25T 3KF	596	216.5	256.5	180
TPH 25T 4KF	596	216.5	256.5	180
TPH 25T 5KF	706	276.5	316.5	240
TPH 25T 6KF	706	276.5	316.5	240

## Dimensions (TPH 50T)



TPH 50T 50Hz

Model	A(mm)	B(mm)	C(mm)	D(mm)
TPH 50T 2KF	642.5	263	303	222
TPH 50T 3KF	752.5	323	363	282
TPH 50T 4KF	802.5	323	363	282

TPH 50T 60Hz

Model	A(mm)	B(mm)	C(mm)	D(mm)
TPH 50T2.5KF	582.5	203	243	162
TPH 50T 4KF	692.5	263	303	222
TPH 50T 5KF	742.5	263	303	222



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