

TRZ Series

DOUBLE INLET CENTRIFUGAL FAN

With Forward Wheels

雙吸前傾離心式風機



封面風機顏色僅供參考

DOUBLE INLET CENTRIFUGAL FAN with Forward Wheels

雙吸離心式風機 前傾式葉輪



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TRZ Series

風機顏色僅供參考



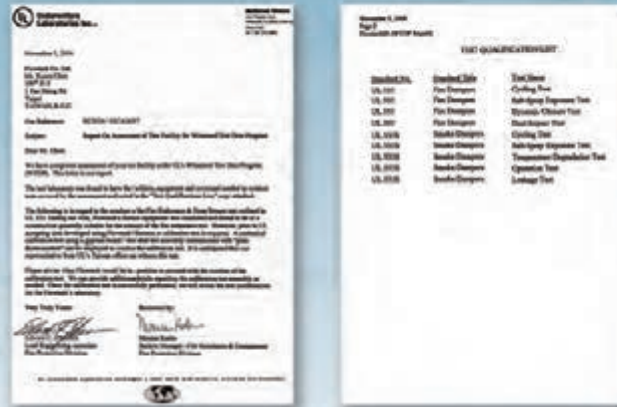
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GLOBALLY RECOGNIZED
CERTIFICATIONS AND STANDARDS

通風設備性能與耐溫測試實驗室

Ventilation Performance and Smoke Management Laboratory

舉凡通風設備產品如風機、風門所需之性能及品質要求，皆可由本實驗室提供一系列完整的測試服務。並在財團法人全國認證TAF基金會的品質及技術要求監督下，獨立並公正執行每項測試。因此，國內公共工程及消防安全之相關通風設備產品，不必再千里迢迢將產品送到國外測試，也不需業主及顧問公司人員舟車勞頓至國外見證，節省更多的時間費用。



亞洲唯一UL認證實驗室



實驗室TAF證書



常溫風機性能測試設備
Fan performance Testing Facility

- 測試標準(Standards)
- AMCA 210
 - ISO 5801
 - BS 848-1
 - DIN 24163-2

風門、百葉壓損測試設備
Louver Pressure Drop Testing Facility

- 測試標準(Standards)
- AMCA 500

隧道通風機振動/推力測試設備
Jet Fan Thrust Testing Facility

- 測試標準(Standards)
- ISO 13350
 - BS 848-10

排煙閘門洩漏測試設備
Smoke Damper Leakage Testing Facility

- 測試標準(Standards)
- AMCA 500
 - UL 555S
 - ISO 10294
 - GB 15930

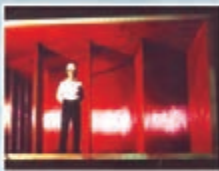
消音箱/消音百葉測試設備
Silencer / Acoustical Louver Testing Facility

- 測試標準(Standards)
- ASTM-E477
 - ISO 7235

防火風門測試設備
Fire Damper Testing Facility

- 測試標準(Standards)
- UL 555

測試標準	● AMCA 210	● ASHRAE 149	● BS 848-10	● ISO 7235
	● AMCA 300	● DIN 24163-2	● GA 211	● ISO 10294
	● AMCA 500	● BS 7346-2	● GB 15930	● ISO 13350
	● AS 4429	● BS 848-1	● EN 12101-3	● UL 555
	● ASTM-E477	● BS 848-2	● ISO 5801	● UL 555S



全響室迴風道出口
Exhaust Duct exit of Reverberant



流量噴嘴
Multiple Nozzles for Flow Measurement



全響室迴風道裝置
Silencer in Exhaust Duct



全響室
Reverberant Room
360°旋轉噪音器
360°Routing Microphone in Reverberant



整流裝置
Flow Straightener



TRZ Series Double Inlet Centrifugal Fans – Forward wheels 雙吸離心式風機-前傾式葉輪

The TRZ series is DWDI centrifugal fans with high efficiency non-overloading forward curved impellers.

The fans are auditable for supply or extract applications in commercial, process and industrial HVAC systems.

Sizes of this are in accordance with AMCA standard 99-0098 R20.

TRZ 系列為雙吸離心式風機（DWDI），其葉輪為高效率無超載的前傾式葉輪。

該系列風機適用於商業及工業通風空調系統中。該系列的規格是根據 AMCA 99-0098 R20 的標準規範。

Type / Operating Limit 型式/規格

	Model 200-250	Model 200-710	Model 280-1000
Type L	I		
Type H		I	
Type V		II	I

Each fan type has its maximum operation speed and power due to its mechanical design.

The operating limit of TRZ series fan type is design to meet the requirement of class I and II limit as defined

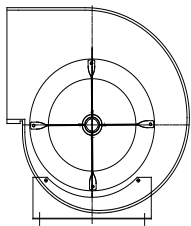
in AMCA standard 99-2408.

TRZ series is available in type L,H,V, as shown in Fig.1 :

每種風機類型由於機械設計的不同都有其最大的操作速度及功率。

TRZ 系列各種風機類型要求的 I 及 II 等級是符合 AMCA 標準 99-2408 運轉的限制和風機類型要求所設計。

TRZ 風機系列的型式包含 L,H,V 詳細內容請參照圖表.1

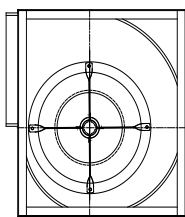


Type L This type is supplied with mounting feet and can be mounted in three different orientations. Inlet flange 'L' and outlet flange are supplied as standard. Without outlet flange, with removable feet.

Size : 200 to 250 Volume : 0.25 to 5.5 m³/s Total Pressure. : up to 2000Pa

這類型的風機由半月型腳架支撐並可變換三種不同的安裝方位。可提供移動式的半月型腳架但不提供出口法蘭。

型號：200 到 250 風量：0.25 到 5.5 m³/s 全壓：可達 2000 Pa



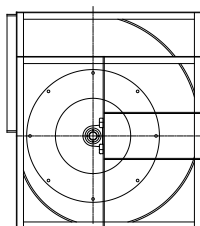
Type H This type has a frame fitted on both sides of the fan which gives better strength and rigidity and allows mounting in four different orientations.

Without outlet flange, with welded rectangular frame.

Size : 200 to 710 Volume : 0.25 to 11 m³/s Total Pressure. : up to 2000Pa

這類型的風機在兩側皆有適合的框架，以加強其強度與剛度，並可變換四種不同的安裝方位。可提供焊接式的方形框架但不提供出口法蘭。

型號：200 到 710 風量：0.25 到 11 m³/s 全壓：可達 2000 Pa



Type V This type is similar to type V but utilizes enhanced bearings to support higher load necessary for the increased performance.

Without outlet flange, with welded rectangular frame.

Size : 280 to 1400 Volume : 0.35 to 160 m³/s Total Pressure. : up to 3000Pa

這類型的風機類似於 type V，但利用增強軸承方面的結構強度，能適用於需要在高性能運轉的場合。可提供焊接式的方形框架但不提供出口法蘭。

Fig.1

Designation ,Formula signs 風機命名方式



TRZ Twin Fan 雙組式風機

TRZ series are also available in twin fan version, with two double inlet fans mounted on the same shaft.

To Select for twin fans, use the curve of single fan with the following factors :

TRZ 系列也可以採用雙組風機的形式，也就是將兩台風機的入風口安裝在同一個軸上。

在選用雙組風機的時候，將採用單一風機的曲線，並採用下列係數：

Air Volume 風量 -----x 2

Absorbed Power 輸出功率 --x 2.15

Speed 轉速 -----x 1.05

Noise 噪音-----+ 3 dB

This series is available in type G₂H (280-500), G₂ V (355-500)

這一系列可適用在 type G₂H (280-500), G₂ V (355-500)

Performances of Twin fans are not AMCA licensed.

TECHNICAL SPECIFICATION 技術要點

Wheel 葉輪



The Wheel of TRZ series is made of mild steel backward curved blades with polyester powder coating finish and fully welded. All wheels are statically and dynamically balanced to ISO1940 and AMCA 204/3-G2.5 standards.

系列的葉輪是將冷軋鋼板製成後傾式葉片之後，並在表層噴覆烤漆及焊接成形。所有葉輪的靜平衡與動平衡將符合 ISO1940 或 AMCA 204-G2.5 的標準規範。

Shaped Inlets (Inletcone) 導風圈



The aerodynamically shaped inlets are bolted in and guarantee a perfect inlet stream onto the impeller.

The inletcone is made of galvanized sheet metal or mild steel or aluminum.

透過流體力學的计算與設計，能將氣流發揮完美的導引效果至葉輪上。導風圈將利用由電鍍的薄金屬板或軟鋼或鋁所製作而成。

■ Housing 機殼

For all sizes except 1000 and above, the housing is manufactured in galvanized sheet steel with the housing fixed to the side plates in "Pittsburg lock" form system.

除了 1000 及以上的型號外，所有各種型號的機殼，均採用鍍鋅鋼板製作，另外也可使用不鏽鋼、鋁... 等其他材料製成。且機殼的腹板與側版採用“匹茲堡咬合”、“焊接”、“連續結合”的方式結合成型。型號 1000 至 1400 的機殼將利用軟鋼來製作，並在表面噴覆烤漆

■ Frame 框架

The frame is manufactured with galvanized angular bars for type "L". For type "H" and "V", They are manufactured with sections of steel and finished with polyester powder coating.

對於結構 L 的框架將利用角鐵及扁鐵製作成型，而對於結構 H 和結構 V 將利用型鋼製作成型，並在表面噴覆烤漆。

■ Shaft 軸心

Shafts are manufactured from C45 carbon steel using an automatic process for positioning and cutting of the keyways. All dimensional I tolerances of the shaft are fully checked to ensure a precision fit and then coated with an anti-corrosion varnish after assembly. Both shaft ends have as a standard feature diameters complying with ISO286. Shafts are sized to operate 20% or more below the first critical speed for each class of duty.

主要採用 C45 的碳鋼製作，軸心上的定位及鍵槽採用自動加工成型，軸心的所有公差都經過周詳的檢測及計算，以保證其符合精度的要求，並於裝配後在表面噴覆烤漆。所有軸心皆參照 ISO286 的規範進行設計，軸徑的大小取決於臨界轉速或是高於操作轉速的 20% 而設計。

■ Bearings 軸承

Bearings used are either deep groove ball bearing type with an eccentric locking collar or an adapter sleeve, or spherical roller bearings type sealed at both sides for different duty application. Bearing are selected for continuous operation and ample size for best possible operating results. They are selected for a basic rating fatigue life (L-10) per AFBMA Standards in excess of 40,000 hours at maximum operating speed for each pressure class. L-10 is the life associated with 90% reliability of a bearing s up to operating the demand for 40000 hours; In the L-50, can guarantee 50% of the bearings up to operating the demand for 200000 hours.

所有的軸承均為兩側密封的深槽滾珠軸承或是球面滾珠軸承。軸承根據不同的設計需求，可分別採用錐套固定的深槽滾珠軸承或兩側密封的球面滾珠軸承。軸承疲勞壽命的選用皆根據 AFBMA(L-10)和 (L-50)的規範，可在最高轉速運行下皆可達到 40000 和 200000 小時的運轉，依據 L-10 的規範中，可保證 90%的軸承皆能達到運轉 40000 小時的需求；L-50 的規範中，可保證 50%的軸承皆能達到運轉 200000 小時的需求。

<p>Fan Type L , H</p> 	<p>For fan type "L" and "H" are use single row, deep groove, self-aligning ball bearings with an eccentric locking collar. They are mounted in a rubber housing and sealed at both sides for light duty application. (light Duty)</p> <p>對於此類型“L”和“H”都是使用單列的滾珠軸承並鎖上偏心環的套筒加以固定，而軸承與培林架之間會有一層橡膠墊圈，能增加固定並有吸震功能。此一結構適用於輕負載的狀態下。</p>
<p>Fan Type V</p> 	<p>For fan type "V" use single row sealed ball bearings, locked on the shaft with conical sleeve and mounted inside cast-iron blocks ,with grease points, bolted to the side-frames.(Medium Duty)</p> <p>對於此類型“V”是使用單排密封的滾珠軸承，且鎖上一圓錐形套筒加以固定，並同時注入潤滑油以防止生鏽老化，安裝時會將其架設於框架上以增加穩定。此一結構適用於中負載的狀態下。</p>

The bearings are lubricated for life and maintenance-free. If re-lubrication is necessary, it is recommended to use a lithium base grease suitable for all temperatures within the operational limits.

在正常運轉下，軸承能保持潤滑與免維修。如果有必要再增加潤滑的話，建議在適當的溫度下添加適量的潤滑油，其餘保養說明請參照“風機維修保養應注意事項”。

Fan Rotation and Discharge 風機的氣流與出口方向

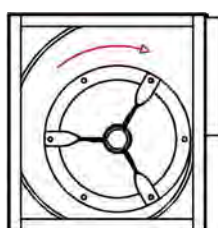
The rotation and discharge of the fan is in accordance with AMCA standard 99-2406.

The direction of rotation is determined from the drive side of fan [refer Fig.2]:

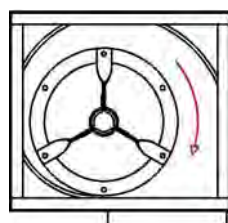
風機的氣流和出口方向是根據 AMCA99-2406 的標準規範而制定。

風機的氣流方向是由風機的傳動側視圖方向而制定的[請參照圖表.2]：

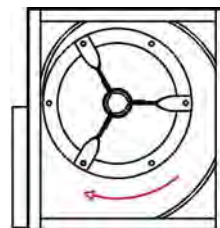
CW -clockwise rotation 順時針方向：



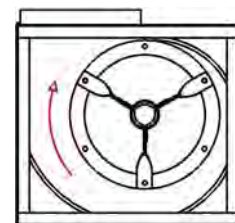
CW90



CW180



CW270



CW360

CCW -counter-clockwise rotation 逆時針方向：

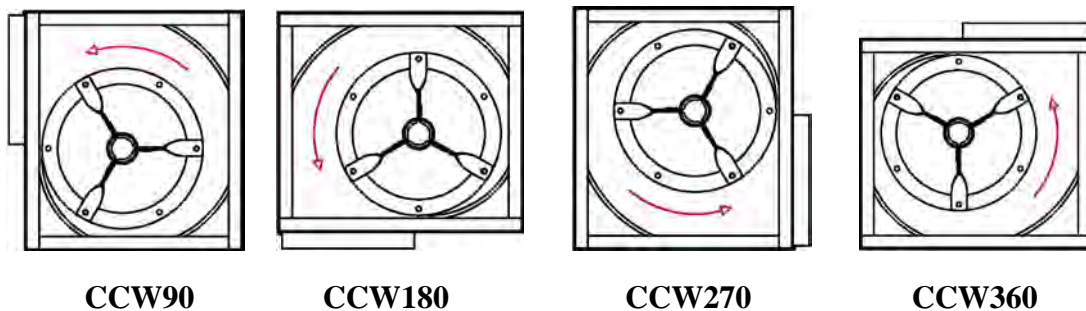


Fig.2-Fan rotation and discharge

圖表.2 - 風機的氣流與出口方向

Motor Position 馬達位置

The position of the motor for belt drive centrifugal fan is in accordance with AMCA standard 99-2407. Location of motor is determined by Facing the drive side of fan and Designating the position by letters W, X, Y or Z[refer Fig. 3]

在每一個性能曲線上所表示的功率曲線均表示風機軸上的吸收功率，且單位以 kw 表示。確認所配置的馬達功率時，應參照使用左圖表 4 的修正系數，以彌補因皮帶輪傳動而造成的傳動損失。若欲將單位千瓦 (kw) 換算為馬力 (HP)，需乘上換算系數 1.34。

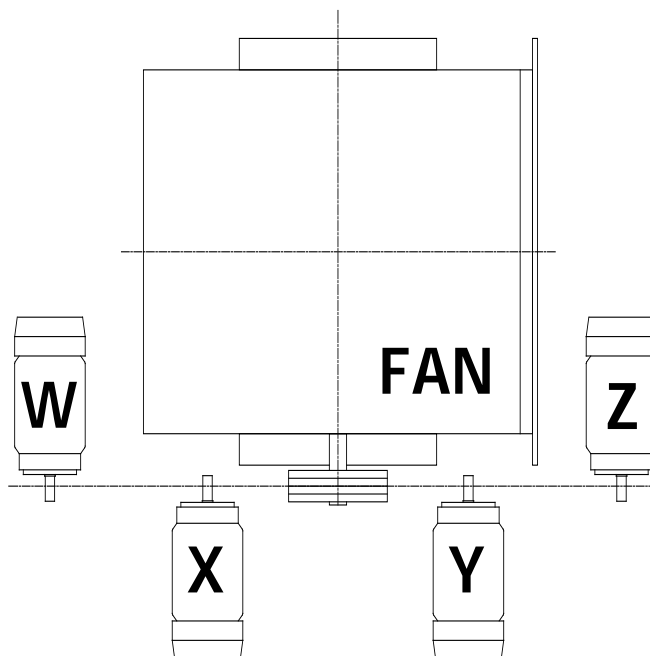
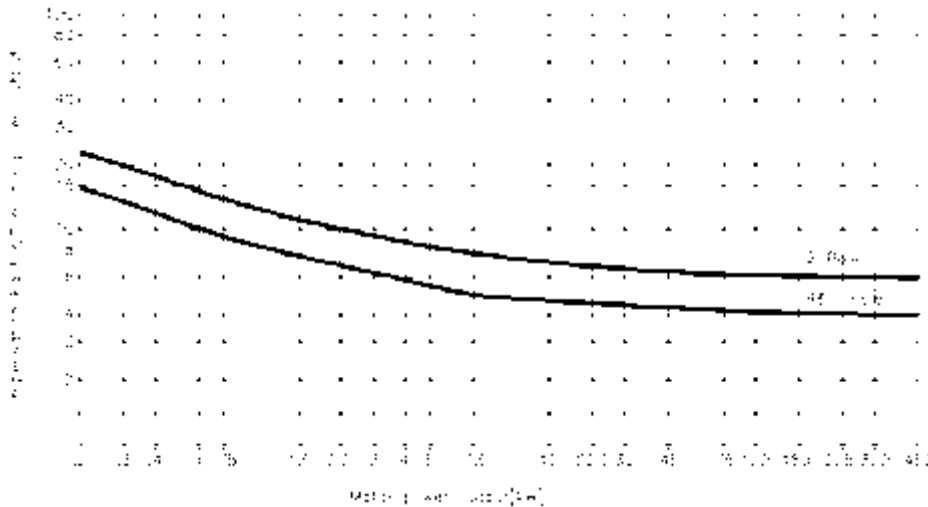


Fig. 3 - Motor Position

圖表.3 - 馬達位置

Motor Selection 馬達選用

Fig.4-Recommended for motor compensation
圖表.4 –馬達傳動損失修正系數表

The power curve shown on each Performance curve represents the Absorbed power at the shaft of the fan measured in kW.

To determine the power of the motor to be installed, a correction Factors as shown in fig. 4 should be applied to compensate for transmission losses.

For conversion to horsepower (HP), use multiplying factor 1.34.

在每一個性能曲線上所表示的功率曲線均表示風機軸上的吸收功率，且單位以 kW 表示。

確認所配置的馬達功率時，應參照使用左圖表 4 的修正系數，以彌補因皮帶輪傳動而造成的傳動損失。若欲將單位千瓦 (kW) 換算為馬力 (HP)，需乘上換算系數 1.34。

Performance 性能

The performance data show on each diagram has been tested and measured in accordance to AMCA Standard 210 – Fig. 12 – installation type B (free inlet and ducted outlet condition).

Ratings are referred to the standard air density with the total pressure as function of the air volume, using logarithmic scales.

It is essential that, the same installation type and test standards are used at all times, when comparing fan performances.

在每一張性能圖表中的性能參數都是按照 AMCA 210 – Fig. 12 – type B 標準規範的安裝方式（意指由入風口吸入大氣壓力與外接出口風管的測試條件）進行測試而取得的。

性能參數是在標準空氣密度取得下，以全壓為風量的函數，並使用對數比例表示。

此舉的主要目的是，當在進行風機性能的比較時，能有相同的安裝類型與測試標準。

Sound power 聲功率

The noise level shown on each diagram refer to the sound power “A-weighted” and the data on the inlet side has been measured in accordance with AMCA Standard 300 figure 2 – installation Type “B”.

The noise level of the fan determined as follows :

各性能曲線上所表示的噪音級別均是指“A 加權”的聲功率級，其數據是根據 AMCA 300 – Fig. 2 – type B 標準規範的安裝方式在入口側進行測試。風機的噪音級別計算如下：

- Inlet Sound power level (“A” scale) : Lwi(A) as catalogue
入口聲功率級別 (“A”加權) : Lwi (A) 如性能曲線所示
- Inlet Octave band spectrum : Lwi as catalogue
入口倍頻頻譜 : Lwi 如性能曲線所示
- Sound pressure level 聲壓級別 :
 - Free field 自由環境 : $Lp(A) = LwA - (20\log_{10}d) - 11$
 - Room conditions 室內環境 : $Lp(A) = LwA - (20\log_{10}d) - 7$

Where d : distance between the fan and the microphone in m .
上式中 d : 量測點與風機的距離。(單位 : m)

Noise 噪音

計算距風機 1.5 公尺處之音壓等級:

$$\begin{aligned}
 \text{由經驗計算公式: (室內狀態) } Lp(A) &= Lw(A) - (20\log_{10} d) - 7 \\
 &= 80 - (20 \times \log_{10} 1.5) - 7 \\
 &= 69.5 \text{ dBA}
 \end{aligned}$$

Instructions 說明

訂貨時須註明風機型號、轉速、風量、靜壓、出風口方向、和旋轉方向。若需皮帶、皮帶輪、馬達、底座等配件及其他特殊要求可在訂貨時提出。

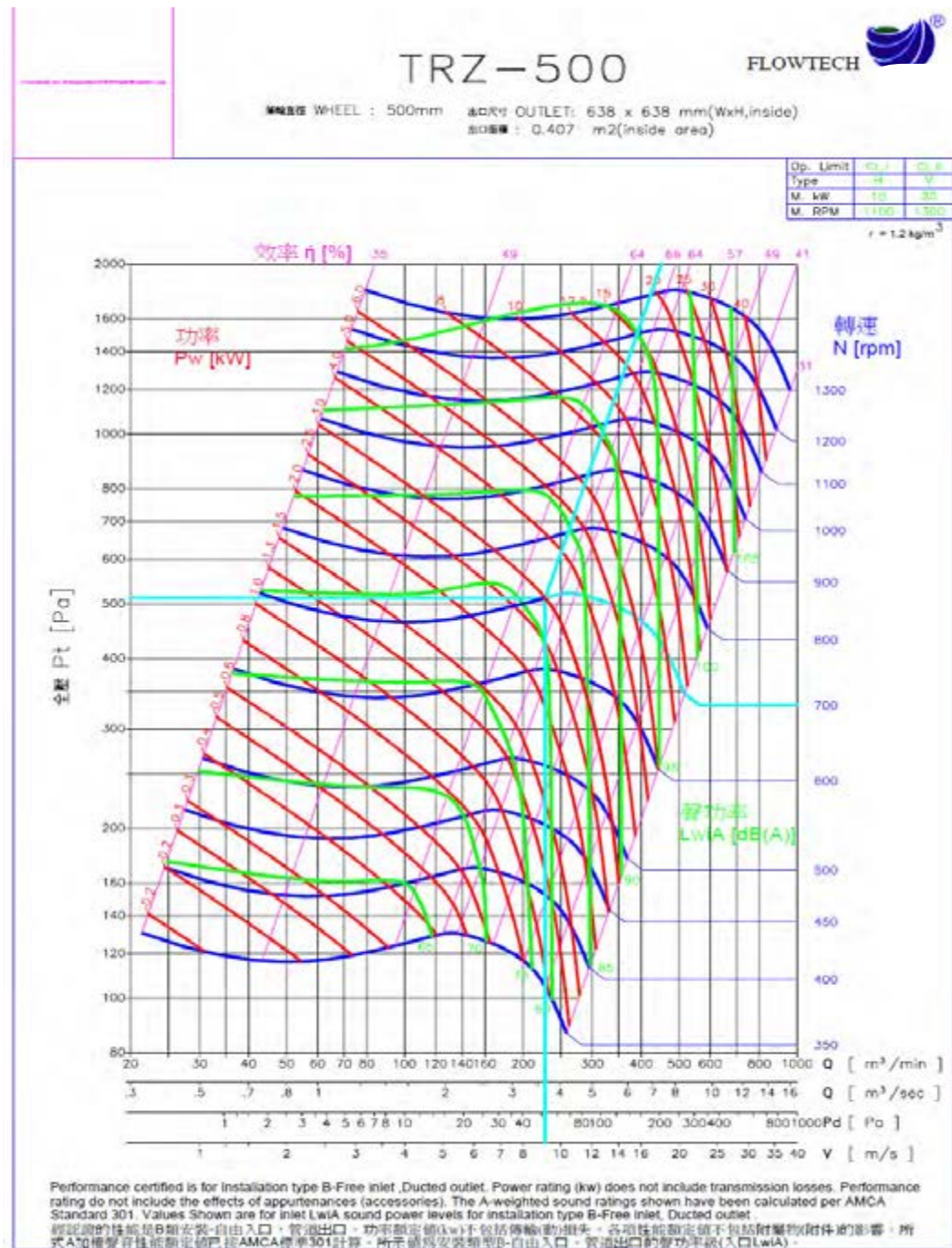
During ordering it is necessary to state the type of ventilator, Speed, air volume, air pressure, direction of air outlet, rotating direction, type of motor and its specifications.

Operational Limits - "TRZ"

TRZ 系列風機運轉極限

			200	225	250	280	315	355	400	450	500	560	630	710	800	900	1000	1120	1250	1400	
Maximum Absorbed Power 最大吸收功率	L	kW	3	3	4	-	-	-	-	-	-	-	-	-	-	-	-				
	H	kW	3	3	4	4	6	6	8	10	10	10	15	15		-	-				
	V	kW	-	-	-	6	10	15	20	20	20	30	30	40	40	60	60	60	60	60	70
Maximum Fan Speed 最高風機轉速	L	rpm	3200	2800	2400	-	-	-	-	-	-	-	-	-	-	-	-				
	H	rpm	3200	2800	2400	2200	1900	1600	1400	1300	1100	900	800	700	-	-	-				
	V	rpm	-	-	-	2500	2200	2000	1800	1600	1300	1200	1000	900	800	700	600	600	600	500	450
Air Temperature 大氣溫度 Min 最低 -20° C	L	Max. °C	85	85	85	-	-	-	-	-	-	-	-	-	-	-	-				
	H	Max. °C	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85
	V	Max. °C	-	-	-	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85
Fan weight 風機重量	L	kg	7.4	9.2	11	-	-	-	-	-	-	-	-	-	-	-	-				
	H	kg	9.4	10.8	13	19	25	36	44	57	71.5	131	156	192	-	-	-				
	V	kg	-	-	-	29	35	42	57	72	92	160	185	240	290	365	480	538	600	675	

Examples of selection 選機範例



Air Volume	Q = 230 cmm	Fan Speed	N = 700 rpm
Outlet Velocity	V = 9.3 m/s	Inner Power	Pw = 3 kW
Dynamic Pressure Pd = 54 Pa		Total Efficiency	$\eta = 65.5 \%$
Total Pressure	Pt = 520 Pa		



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