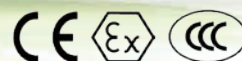




www.assoma.com

AVF Series AVF 系列



榮獲多國發明專利，請參閱協磁官網內容

Patented in Multiple Countries,
Please refer to our website for details.

Specifications

Horizontal, single-stage, centrifugal pump

Canned motor, seal-less

Wetted Material: PP+GF, ETFE+CF

Power Range: 1.1 – 7.5 kW (1.5 to 10 hp)

Maximum Capacity: 84 m³/h

Maximum Head: 31 m

規格一覽表

臥式單段離心泵

無軸封，罐裝結構

接液材質：PP+GF，ETFE+CF

馬力範圍：1.1 – 7.5 kW (1.5 – 10 hp)

最大流量：84 m³/h

最高揚程：31 m

AVF-Series Pumps AVF 系列泵浦

The AVF is a line of corrosion resistant pumps designed for chemical applications where process control is crucial. It is designed to minimize the life-cycle cost (LCC) of pump ownership.

The small size of the pump is ideal for tight installations in equipment or in places where space is at a premium. The AVF pump is of canned motor construction, which is a leak-free, seal-less design.

AVF 系列泵浦是專為需精準控制製程條件所設計的耐腐蝕泵浦。AVF 系列突破傳統，不只性能佳，也考量透過設計為顧客將產品的生命週期成本降至最低。

AVF 泵浦的體積小，可安裝在空間狹小的設備機台內或是有空間限制的場所。AVF 泵浦為罐裝結構，無軸封、零洩漏。

How do canned motor pumps work? 罐裝泵浦操作原理

Canned motor pumps integrate the design of the electric motor and magnetic drive pumps into one. The stator of the motor directly drives the inner magnet of the pump, eliminating the motor rotor and the drive magnet. Like the magnetic drive pump, the magnetic flux between the stator and the inner magnet passes through the containment shell (can), allowing the pump to be hermetically sealed for leak-free operation.

罐裝泵浦的設計原理是將磁力驅動泵浦與馬達結合為一體，由馬達線圈產生感應磁場直接與泵浦的內磁鐵耦合，省略了感應馬達的轉子與磁驅泵浦的驅動磁鐵。與磁驅泵浦相同的是馬達線圈與內磁鐵的磁力線通過泵浦後蓋（罐封）形成迴路，達到無需軸封並完全密封的狀態。

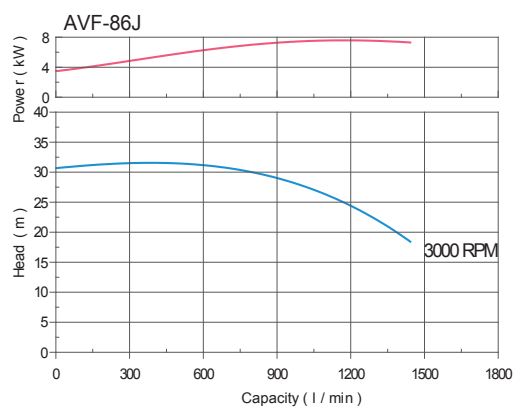
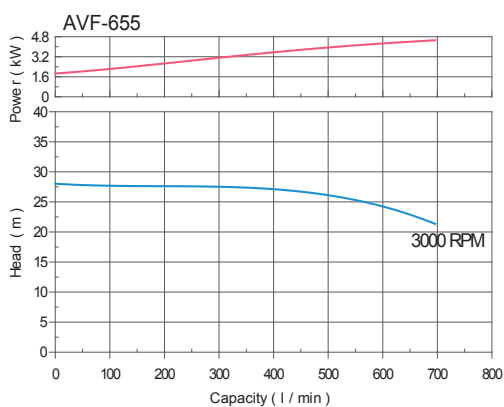
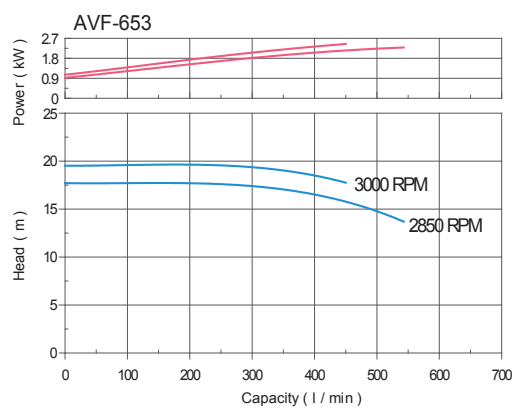
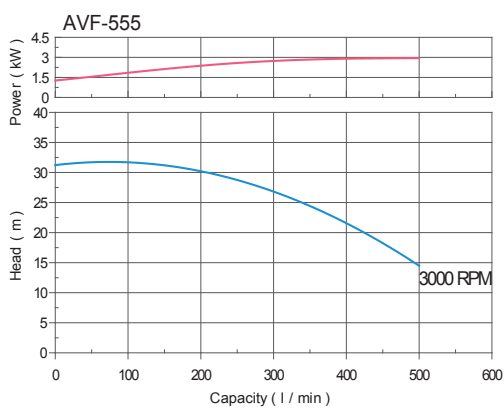
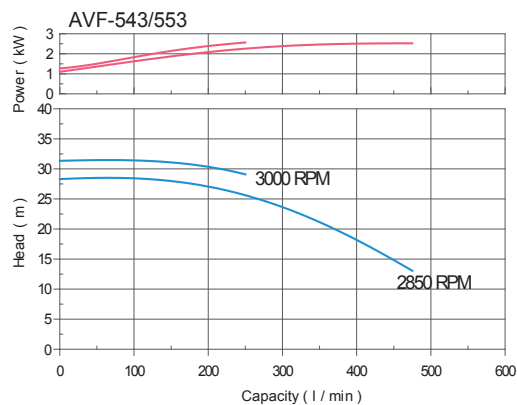
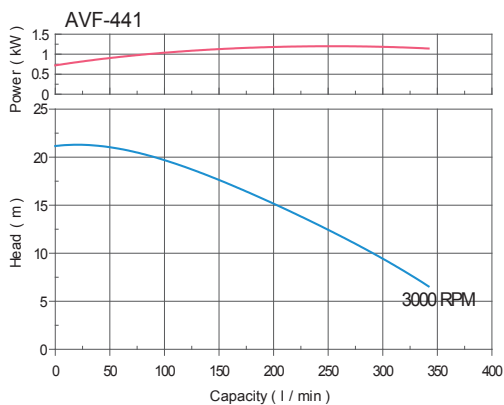
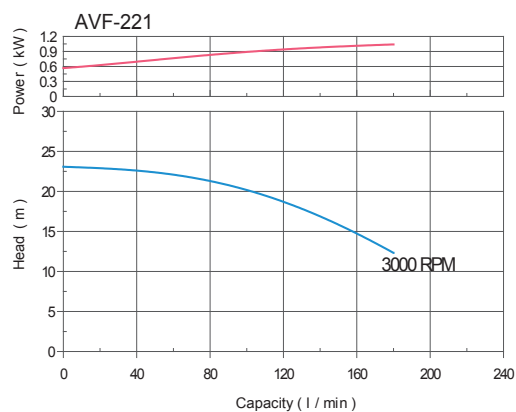
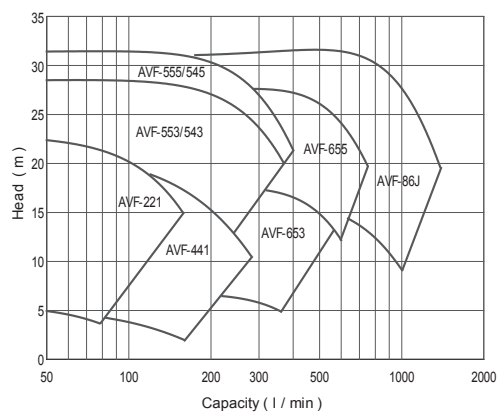
Where can I use AVF-Series pumps? AVF 系列的運用領域

- Chemicals where leakage must be avoided, including corrosive, toxic, and strong oxidizing agents.
- Highly volatile chemicals harmful to the environment.
- Chemicals that react when exposed to atmosphere or chemicals that can degrade with atmospheric exposure.
- Chemicals that are very expensive.
- Process control is crucial.
- Long-term energy saving needs.
- Clean room environment.
- 絕對不能洩漏之化學藥液，譬如：腐蝕性、有毒性以及強氧化劑
- 對環境有害之高揮發性化學藥液
- 容易與空氣反應或暴露於空氣會造成裂解的化學藥液
- 昂貴之藥水
- 需精密的製程控制
- 有長期節能需求
- 潔淨室環境

Limitations of AVF-Series pumps? AVF 泵浦的注意事項

- Should not be used for chemicals with large amounts of solids.
- Dry-running should be avoided.
- Cavitation should be avoided.
- Operating temperature
 - PP+GF material: 0 - 80 °C
 - ETFE+CF material: 0 - 95 °C
- 不可用於含有大量雜質液體
- 嚴禁空轉
- 避免空蝕
- 操作溫度範圍
 - PP+GF 材質：0 - 80 °C
 - ETFE+CF 材質：0 - 95 °C

Performance Curves 性能曲線圖



Reducing Life-cycle Costs 降低泵浦的生命週期成本

Fixed vs. Variable Costs

There are many different costs incurred throughout the lifetime of a pump. Some are fixed costs, like the purchase and installation costs of the pump at the beginning of its life-cycle, and decommissioning/disposal costs at the end of the cycle. The AVF aims at reducing variable costs of pump ownership, which accounts for the bulk of the LCC (over 80%), which includes energy, operation, maintenance & Repair, downtime, and environmental costs.

Cost Factors					Benefits of the AVF-Series Pumps
					
Rigid Shaft Support					
					Improves operation reliability, increased pump service life
IE4 / IE5 Motor					
					Exceeds current IE3 motor efficiency limits
					Generate little heat and fanless, suitable for clean room applications Does not dissipate much heat into the work environment which needs to be air-cooled (a highly inefficient process)
Inverter Control					
					Uses only the energy required for the process
					Eliminate excessive use of process chemicals
					Reduced speed extends the service life of wear parts
					The inverter can be used for protecting the pump from running dry
Small size / Lightweight					
					Reduced installation footprint, crucial for space constrained places like process equipment and laboratories (fixed cost)
					Light-weight requires minimal manpower for maintenance and repairs.
Canned Motor Construction / IP66					
					The motor acts as secondary containment shell in the event of catastrophic pump failure



Energy



Operation



Maintenance & Repair



Down-time



Environmental

固定與變動成本

一台泵浦從採購、使用至最終的拆除、廢棄，當中包含了各類的成本與費用。在泵浦的生命週期計算中，除了採購、安裝、廢棄為固定成本以外，其餘都是變動成本。因為變動成本佔了生命週期八成以上的比重，因此，AVF 泵浦的設計著重於降低顧客的變動成本，包含能源消耗、操作管理、設備維護、非預期停工損失及環境影響成本等。

成本類別					AVF 系列泵浦提供的益處
					
高剛性軸心支撐					
					提高運轉可靠度，延長泵浦使用壽命
IE4 / IE5 馬達					
					超越現有 IE3 或 GB2 馬達能效等級
					低發熱量，無外部冷卻風扇，適合使用於潔淨室 不會將太多熱量散發至工作環境中，造成空調系統的負擔
變頻控制					
					只使用製程所需的能量
					消除製程化學藥液的過度使用
					降轉速使用可延長磨耗件的壽命
					可透過變頻器設定提供泵浦空轉保護
體積小、重量輕					
					體積小，大幅降低安裝所需空間，適合空間受限場所如製程設備、實驗室等。(固定成本)
					輕量化，減少維修保養的人力與時間資源
罐裝結構與 IP66 防護等級					
					發生嚴重泵浦故障時，馬達的絕緣防護可做為第二層罐封，降低環境汙染的風險



能源消耗



操作管理



設備維護



非預期停工



環境影響

A. Maintenance-Free Pump Casing 無需保養泵殼

The flanges are socket welded to the pump casing, eliminating O-Rings, thus, requiring no maintenance. The flanges are adjustable to easily align with mating flanges for a secure and leak-free seal.

泵浦法蘭與泵前蓋套接為一體，去除了O形環，也省略了更換O形環的保養需求，配合可調整式的法蘭可輕鬆與配對法蘭對齊，實現安全無洩漏密封。

B. Pump-Protection Buffer System 泵浦緩衝保護

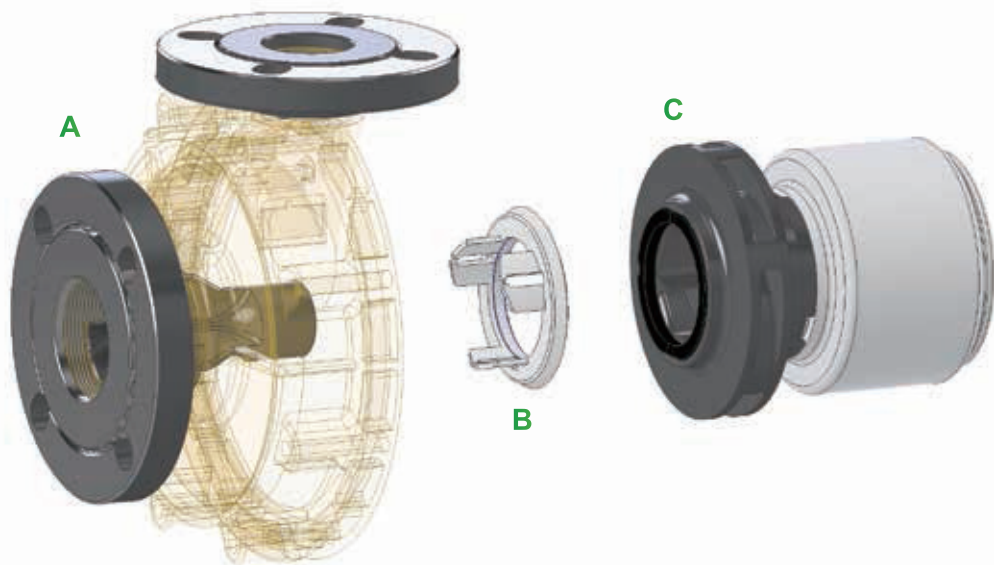
The unique buffer system absorbs shock generated during abnormal pump operation such as cavitation, protecting the pump from damage.

獨特的緩衝系統可吸收泵浦異常運轉時（如氣蝕）所產生的衝擊，防止泵浦受損。

C. High-Efficiency Impeller 高效率葉片

Closed impeller precision designed to streamline flow dynamics, minimizing hydraulic loss and maximizing pump efficiency.

密閉式葉輪，結合最佳化流力設計，降低水力損失，提高泵浦效率。



F. Plastic Containment Shell 全塑料泵浦後蓋 / 罐封

The plastic containment shell does not generate any eddy current loss, therefore, no additional heating of the pumped chemical. The AVF containment shell is supported on the sides and end by the stator and the frame of the motor.

塑料後蓋 / 罐封無渦電流的產生，避免渦電流所產生的能量損失與對藥液加熱。AVF 的後蓋 / 罐封完全由強固的馬達定子軛與後框支撐。

G. High-Efficiency Motor 高效率馬達

The motor is a permanent magnet synchronous motor, allowing our motors to exceed IE4 and future IE5 standards.

AVF 使用永磁同步馬達，其電機效率超越歐盟現有 IE4 與未來 IE5 標準。

D. Long-Service Gasket 長效密封墊片

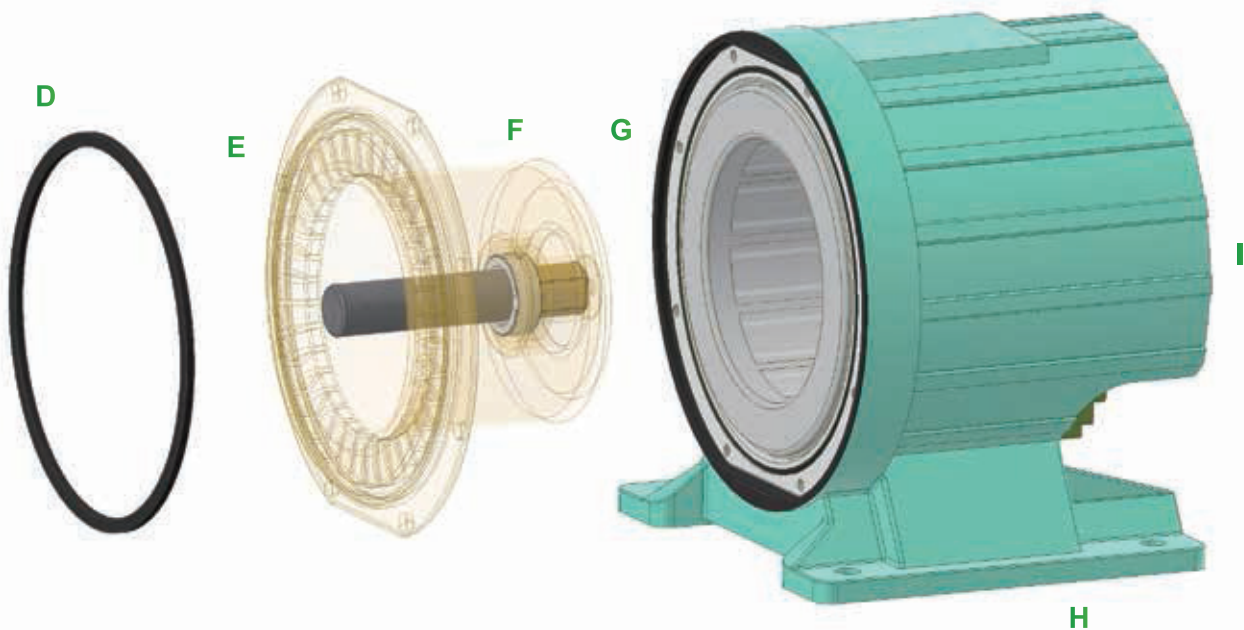
Strengthened gasket seal specially designed for extended leak-free service. Greatly reduces the need to service the pump.

強化的密封墊片設計可延長零洩漏的使用壽命，大幅減少維護泵浦的需求。

E. Rigid Shaft Support 高剛性軸心支撐

The stationary shaft is supported on both ends. It is tightly fitted in the containment shell and supported by the strong metallic frame of the motor.

雙邊支撐的固定軸，後端緊配於泵浦後蓋並由強固的馬達金屬後框支撐。



H. Corrosion-Resistant Bracket 抗腐蝕托架

Made of engineering plastics, the bracket provides full protection for the motor against accidental chemical drips.

泵浦托架由工程塑料製成，給予馬達全面的保護，避免意外滴落藥水損壞電機。

I. Environment-Proof Outer Casing 環境防護外殼

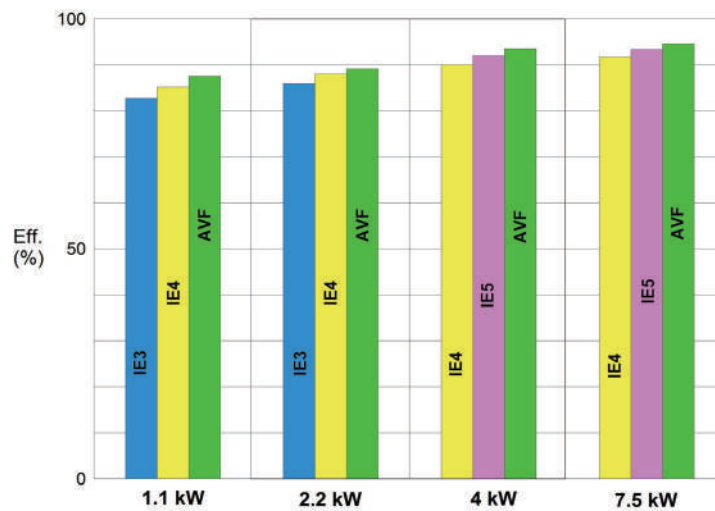
The entire pump is rated IP66, protecting the motor under the most acidic or saline environments.

整機 IP66 防護等級，在酸性與高鹽含量的環境都可使用。

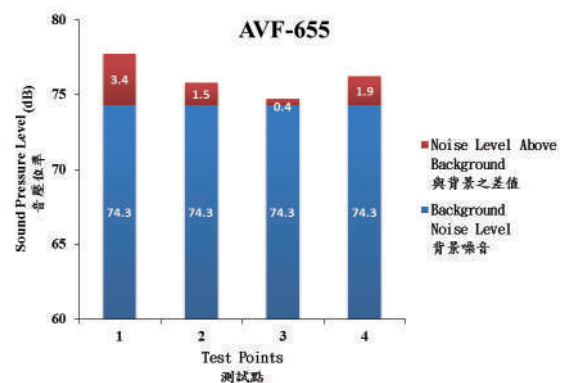
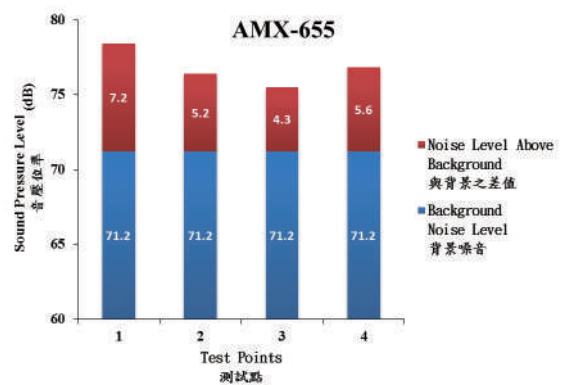
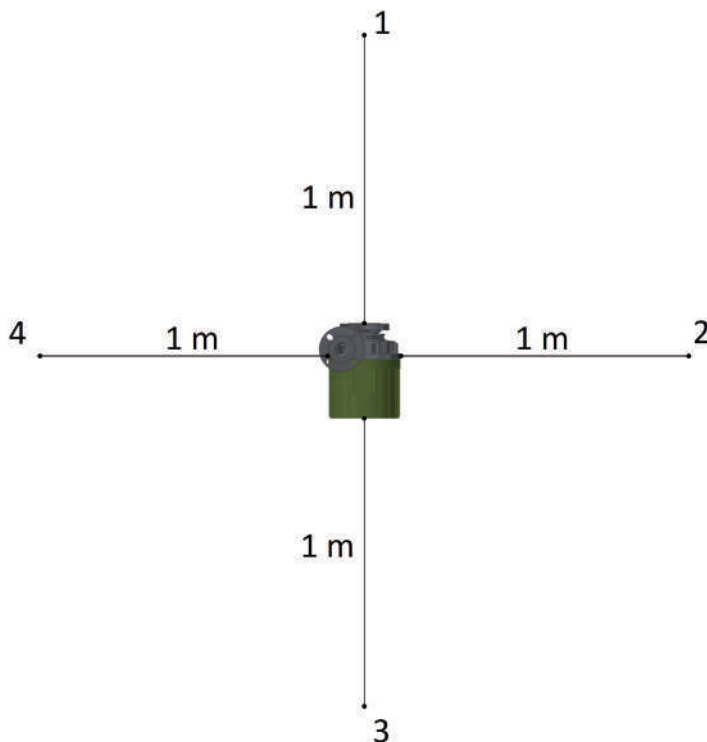
IE4/Future IE5 Comparison IE4/ 未來 IE5 能效比較

We have designed the AVF motors to exceed current IE3 efficiency limits. The 1.1 kW and 2.2 kW models exceed IE4 standards whereas 4 kW and 7.5 kW models exceed future IE5 efficiency limits.

AVF 的高效率馬達不僅超越各國所要求的 IE3 或 GB2 能效標準，1.1 kW 與 2.2 kW 機型電機超越 IE4 能效等級，4 kW 與 7.5 kW 機型更是超越未來 IE5 能效等級的標準。



Noise Comparison Chart 噪音能效比較



Specifications 規格表

		AVF-221	AVF-441	AVF-543 AVF-553	AVF-653	AVF-545 AVF-555	AVF-655	AVF-86J
流量範圍 Capacity range		10-180 l/min	20-300 l/min	40-450 l/min	60-600 l/min	60-500 l/min	80-750 l/min	80 - 1400 l/min
揚程範圍 Head range		6-23 m	5-21 m	8-31 m	4-22 m	8 - 31 m	7 - 28 m	10-31 m
馬達最大輸出 Max. motor output		1.1 kW	1.1 kW	2.2 kW	2.2 kW	4 kW	4 kW	7.5 kW
額定電流 Rated current	220V	3.8 A	3.8 A	7.3 A	7.3 A	13 A	13A	27 A
	380V	2.2 A	2.2 A	4.2 A	4.2 A	7.5 A	7.5A	15.6 A
轉速範圍 Rotation speed range		1500 – 3000 RPM						
保護等級 Protection grade		IP66						

Pump identification 型式表示

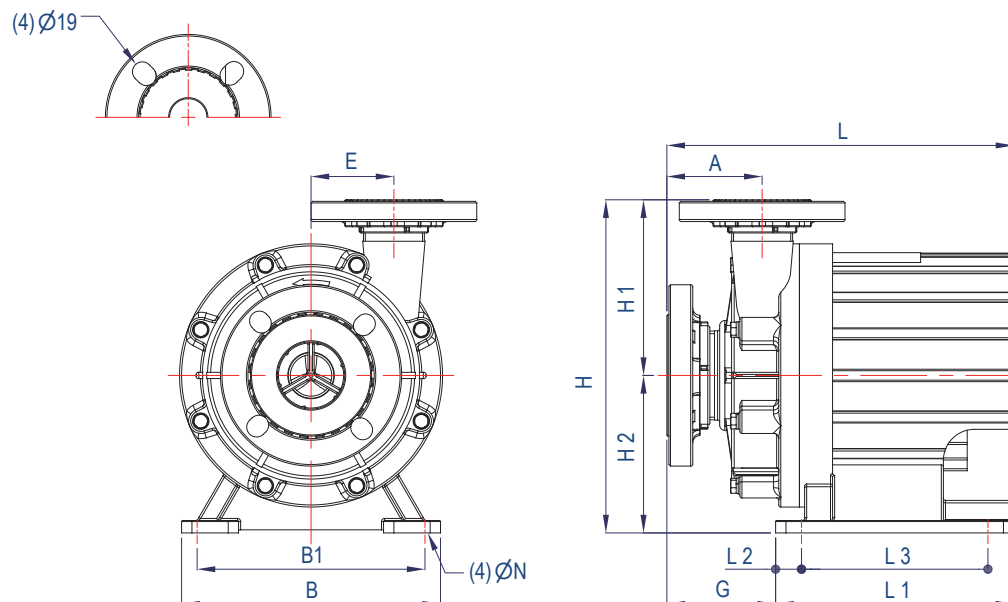
AVF - 6 5 5 F G A C V - 3

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

① 泵浦系列 Series	AVF 系列 AVF Series
② 入口口徑 Suction Size	2 : 25A(1") 4 : 40A(1.5") 5 : 50A(2") 6 : 65A(2.5") 8 : 80A(3")
③ 出口口徑 Discharge Size	2 : 25A(1") 4 : 40A(1.5") 5 : 50A(2") 6 : 65A(2.5")
④ 額定功率 Motor Power	1 : 1.5 hp (1.1 kW) 3 : 3 hp (2.2 kW) 5 : 5.5 hp (4 kW) J : 10 hp (7.5 kW)
⑤ 配管形式 Type of Connection	F : 法蘭 Flange U : 由任 Union

⑥ 本體材質 Casing Material	E : ETFE+CF G : PP+GF
⑦ 軸心材質 Shaft Material	A : 995 Al2O3 S : SSiC
⑧ 軸承材質 Bearing Material	A : 995 Al2O3 C : CARBON R : PTFE+CF S : SSiC
⑨ 密封材質 Sealing Material	E : EPDM V : FKM
⑩ 變頻器額定電壓 Rated Voltage of Inverter	2 : 200V-240V 3 : 380V-480V

AVF Dimensions 外形尺寸圖



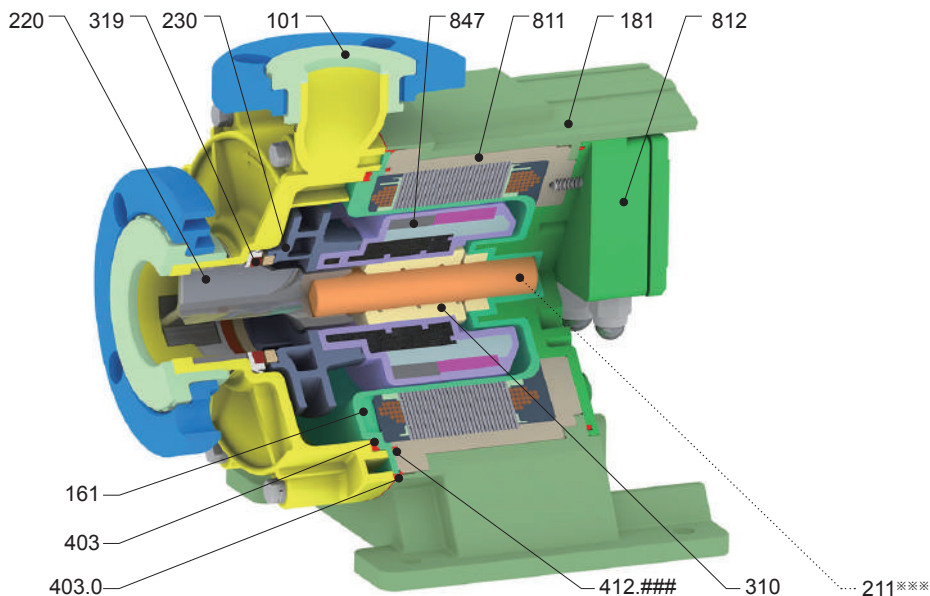
項目 Item 形式 Model	尺寸 Dimension (mm)													口徑 Bore (mm)		法蘭 Flange (mm)	
	A	B	B1	E	G	H	H1	H2	L	L1	L2	L3	N	Inlet	Outlet	Inlet	Outlet
AVF-221	90	225	196	65	95	255	140	115	270	180	25	130	12	21	21	25A	25A
AVF-441	106			72	111	258	143		286					40	40	40A	40A
AVF-543	91	250	210	80	99	313	161	152	329	230	25	180	14	50	40	50A	40A
AVF-545						312	160										335
AVF-553																	
AVF-555																	
AVF-655	92	394	350	80	105	322	170	192	404	270	20	230	14	65	50	65A	65A
AVF-86J	128			0*	148	408	216							80	65	80A	

*Top centerline discharge 上方中心出口

Weight / Size Comparison 重量長度比較

項目 Item	型式 Model	AMX 傳統無軸封泵浦 Traditional Seal-less Pump with Induction Motor	AVF 變頻罐裝泵浦 Variable Frequency Pump
重量比 Weight Ratio	86J		
	655/545		
	653/543		
	441/221		
長度比 Length Ratio	86J		
	655/545		
	653/543		
	441/221		

Material 材質構造圖



編號 Part code	名稱 Part name		可選用材質 Available Materials
101	前蓋組 Pump casing assembly	前蓋 Pump casing	PP+GF / ETFE+CF
		入口活動法蘭 Inlet adjustable flange *	PP+GF
		出口活動法蘭 Outlet adjustable flange *	PP+GF
		入口法蘭連結件 Inlet flange adapter	PP+GF / ETFE+CF
		出口法蘭連結件 Outlet flange adapter	PP+GF / ETFE+CF
161	罐封止推組 Containment shell / thrust ring	罐封 Containment shell	PP+GF / ETFE+CF
		軸心 Shaft * * *	995 Al ₂ O ₃ / SSiC
		後止推環 Rear thrust ring	995 Al ₂ O ₃ / SSiC
181	托架 Bracket		PP+GF
220	前軸心支撐 Front support, shaft		ETFE+CF
230	葉片磨損環組 Impeller wear ring assembly	葉片組 Impeller	PP+GF / ETFE+CF
		前磨損環 Front wear ring	CARBON / SSiC / PTFE+CF
310	軸承 Bearing		995 Al ₂ O ₃ / CARBON / SSiC / PTFE+CF
319	止推環組 Thrust ring & buffer	前緩衝座 Front buffer (86J 除外 Except 86J)	ETFE
		前止推環 Front thrust ring	995 Al ₂ O ₃ / SSiC
403	密封墊片 Gasket		EPDM / FKM
403.0	迫緊 Packing		EPDM / FKM
811	中框 Motor housing		Aluminum 356
812	後框 Rear frame		Aluminum 356
847	包膠內輪 Magnet capsule		PP / ETFE , Nd-Fe-B
412.###	O 形環 O-ring * *		EPDM / FKM

備註 Note :

* AVF 系列泵浦法蘭結構為一獨特結構設計 (含連結件及活動法蘭)。因連結件是接液部件，活動法蘭為非接液部件，所以 AVF 系列活動法蘭標準材質均可為 PP+GF；但活動法蘭材質亦可依客戶需求選擇與泵殼本體相同的材質，詳情請洽協磁公司。
The AVF pumps have a unique 2-piece flange design, the flange adaptor and adjustable flange. Since the flange itself is not a wetted part, we offer PP+GF as standard material for the flange. ETFE+CF flanges are available by request only.

** O 形環 / 密封墊片材質尚有其他種類可供選擇，詳情可洽協磁公司。

Alternative O-ring / Gasket materials are available for critical applications. Please contact us for further information.

*** 221/441(1.1 kW) 機型，軸心 (編號 211) 為獨立元件。

The shaft (211) for the 221/441 (1.1 kW) model is removable from the containment shell (161).



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