

AVF PUMP RANGE

VARIABLE FREQUENCY **CANNED MOTOR PUMPS**



- ∞ CAPACITY <math>< 84 \text{ m}^3/\text{hr}</math>
- ∞ HEAD <math>< 35 \text{ Metres}</math>
- ∞ POLYPROPYLENE / ETFE CONSTRUCTION
- ∞ CANNED MOTOR, SEAL-LESS
- ∞ TOTAL CORROSION RESISTANCE
- ∞ REDUCED LIFE CYCLE COST
- ∞ LOW NOISE

Part of the **MAGNETIC DRIVE** Pump Range



∞ AVF OVERVIEW

IF YOU ARE CURRENTLY USING A PUMP WITH AN INVERTER FOR VARYING DUTY POINTS, THE AVF WILL UNDOUBTEDLY REDUCE YOUR RUNNING COSTS.

A bold statement, but the new AVF canned Magnetic drive pump leads the way in high efficiency, low energy pumping. The issue is that induction motors are bulky and low in efficiency from their very design. When an Inverter is added to control the pump, the overall system efficiency is further reduced, diminishing the effectiveness of energy consumption.

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. Because the AVF range uses a permanent magnet rotor and there is no induced current compared to an induction motor, efficiency is increased by up to 20% and power consumption reduced by 50% or more.

When specifying any pump, the user must look at the overall life cycle cost (LCC) in order to make an informed decision. The AVF range reduces the variable costs of pump ownership (energy usage, repair costs, downtime) as these account for over 80% of the LCC.

Through in depth hydraulic, rotor, electrical and magnetic analysis, AVF motors exceed current IE3 efficiency limits. As of 2018, the 1.1kW and 2.2kW models exceed IE4 standards whereas 4kW and 7.5kW models exceed future IE5 efficiency limits.



**2 YEARS
WARRANTY**



**ATEX ZONE
1/2 CERTIFIED**



**ENERGY
SAVING**



**CORROSION
RESISTANCE**



**50% ENERGY
SAVING**



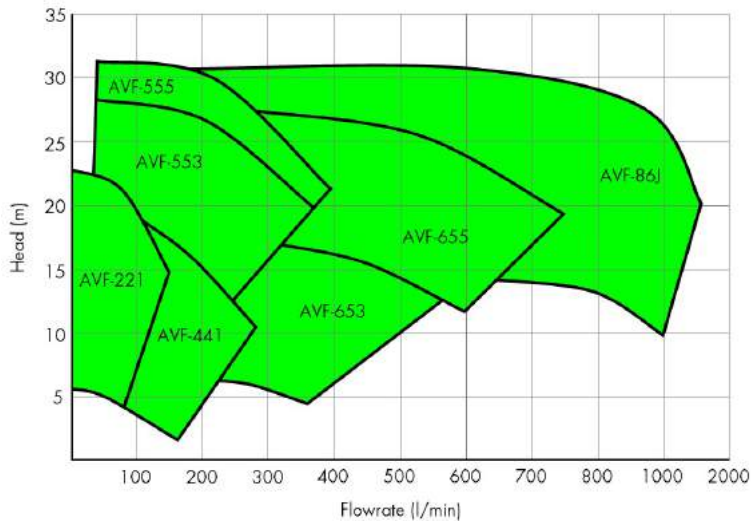
IP66

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PUMP RANGE CURVES

Pump curves for the polypropylene AVF canned Magnetic Drive pump ranges 221, 441, 553/543, 555/545 and 655.



INFORMATION

Everything's Reduced!

Because the AVF range is a fan less design, both heat and noise are significantly reduced compared to traditional mag drive pumps.

And because of the canned motor principle, they are smaller and lighter weight, taking up less floor space and easier to manouvre for maintenance.

TECHNICAL SPECIFICATION

| | | AVF-221 | AVF-441 | AVF-553 | AVF-653 | AVF-555 | AVF-655 | AVF-86J |
|-------------------------------|------|-------------|----------|----------|----------|----------|----------|-----------|
| Capacity Range (L/min) | | 10 - 80 | 20 - 300 | 40 - 450 | 60 - 600 | 60 - 500 | 80 - 750 | 80 - 1400 |
| Head Range (m) | | 6 - 23 | 5 - 21 | 8 - 31 | 4 - 22 | 8 - 31 | 7 - 28 | 10 - 31 |
| Max Motor Output (kW) | | 1.1 | 1.1 | 2.2 | 2.2 | 4 | 4 | 7.5 |
| Rated Current | 220V | 3.8 | 3.8 | 7.3 | 7.3 | 13 | 13 | 27 |
| | 380V | 2.2 | 2.2 | 4.2 | 4.2 | 7.5 | 7.5 | 15.6 |
| Speed Range (rpm) | | 1500 - 3000 | | | | | | |
| Protection Grade | | IP66 | | | | | | |



AVF PUMP RANGE

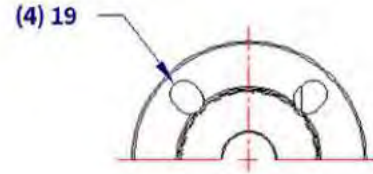
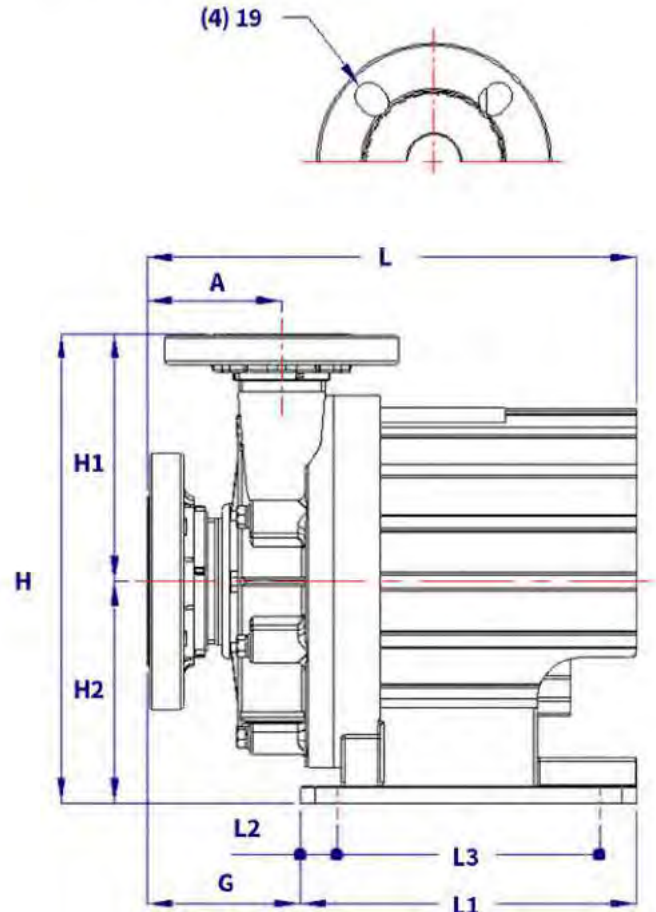
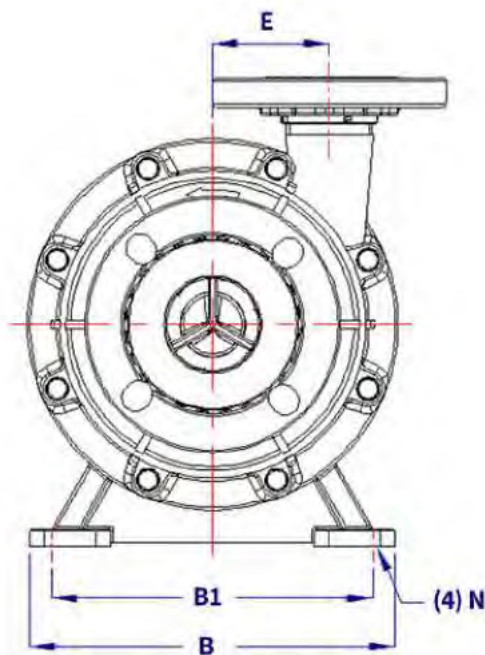
VARIABLE FREQUENCY CANNED MOTOR PUMPS

∞ RANGE DIMENSIONS

For specific 3D CAD drawings or specific pump dimensions, please contact us at info@crestpumps.co.uk or telephone +44 (0)1425 627700.

NOTE:

1. The total length and weight of the pump will differ depending on the brand of the motor.
2. All dimensions are in mm.
3. Assembly tolerances are +/- 3mm.



| MODEL | DIMENSIONS (mm) | | | | | | | | | | | | | BORE (mm) | | FLANGE | |
|---------|-----------------|-----|-----|----|-----|-----|-----|-----|-----|-----|----|-----|----|-----------|---------|--------|---------|
| | A | B | B1 | E | G | H | H1 | H2 | L | L1 | L2 | L3 | N | INLET | OUT-LET | INLET | OUT-LET |
| AVF 221 | 90 | 225 | 196 | 65 | 95 | 255 | 140 | 115 | 270 | 180 | 25 | 130 | 12 | 21 | 21 | 25A | 25A |
| AVF 441 | 106 | 225 | 196 | 72 | 111 | 258 | 143 | 115 | 286 | 180 | 25 | 130 | 12 | 21 | 21 | 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 | | | | | | | | | | 50A |
| AVF 553 | | | | | | 312 | 160 | | | | | | | | | | 50A |
| AVF 555 | | | | | | 312 | 160 | | | | | | | | | | 50A |
| AVF 655 | 92 | | | | 105 | 322 | 170 | | 335 | | | | | 65 | 50 | 65A | |
| AVF 86J | 128 | 394 | 350 | 0* | 148 | 408 | 216 | 192 | 404 | 270 | 20 | 230 | 12 | 80 | 65 | 80A | 65A |

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EXPLODED VIEW

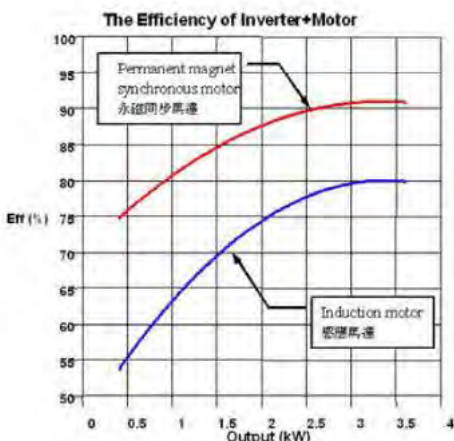


- A Maintenance-Free Pump Casing** - The flanges are socket welded to the pump casing eliminating the need for O-rings, thus requiring zero maintenance. The flanges are also adjustable in order to easily align with mating flanges for a secure and leak-free seal.
- B Patented Buffer System** - In order to increase the pumps life, the unique buffer system design absorbs any shock generated during abnormal pump operation such as cavitation.
- C High-Efficiency Impeller** - The closed impeller is precision designed to streamline flow dynamics, minimising hydraulic loss and maximising pump efficiency.
- D Increased MTBS** - The strengthened gasket seal is specially designed for extended leak-free service. This allows for a much longer Mean Time Between Servicing.
- E Rigid Shaft Support** - To improve operational reliability and an increased service life, 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.
- F Plastic Containment Shell** - The AVF is constructed using a seal-less canned design, with the motor's stator providing the direct drive to the pump's rotor. This eliminates the need for a coupling interface, thus greatly reducing the axial dimension and weight of the pumps.
- G High-Efficiency Motor** - As a permanent magnet synchronous motor, these currently exceed IE4 and future IE5 efficiency standards. Being fan-less and smaller, they generate little heat or noise, whilst taking up less space.
- H Corrosion Resistant Outer Casing** - Constructed from Engineering plastics, the entire pump is IP66 rated, providing full protection for the motor against accidental chemical drips/corrosive environments. This also acts as a secondary containment shell in the event of catastrophic pump failure.
- I Inverter Controlled** - Running the pump with an inverter means you only use the energy required for the process, and when running at lower speeds, it will extend the service life of wear parts.

HIGHER EFFICIENCY - REDUCED COST

Laboratory tests carried out show the greater efficiency of the AVF pump with synchronised motor, compared to the traditional induction motor.

----- AVF 555 at 2850 rpm ——— Magnetic drive seal-less pump with induction motor



TESTING

In our tests, we compared the AVF-555 pump at 2850 RPM with a magnetic drive seal-less pump of similar specifications coupled with an induction motor.

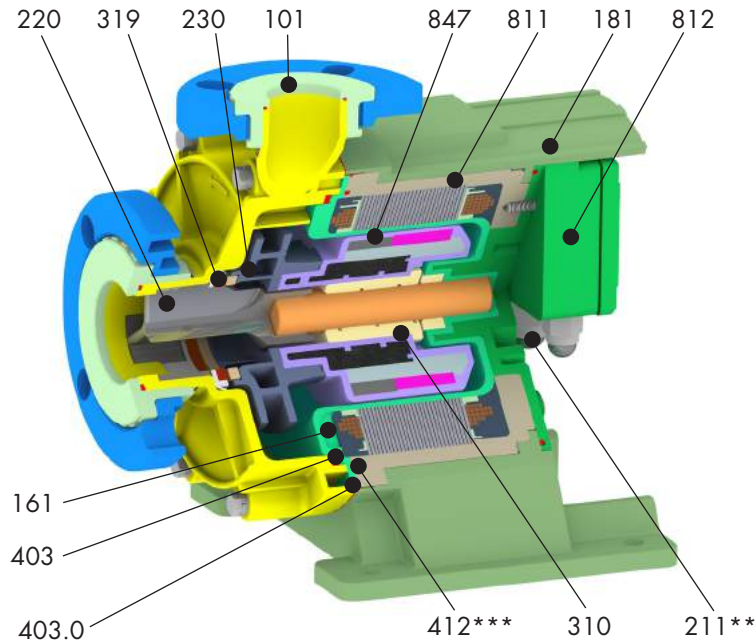
The result was a 5% higher overall efficiency with the AVF pump, saving 0.2 to 3 kW of power under the same hydraulic power output.

But the real cost saving comes when the pump is used for a duty below the rated speed. Because an AC motor with inverter becomes very inefficient at lower speeds, the input power greatly increases when compared to the AVF shaft power.

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PARTS LIST AND MATERIAL CONSTRUCTION



| MATERIAL CODE | PART | AVAILABLE MATERIAL | Q'TY |
|---------------|----------------------------|---|------|
| 101 | PUMP CASING | PP + GF / ETFE + CF | 1 |
| 161 | THRUST RING | 995 Al ₂ O ₃ / SSiC | 1 |
| 161 | CONTAINMENT SHELL | PP + GF / ETFE + CF | 1 |
| 181 | BRACKET | PP + GF | 1 |
| 211** | SHAFT | 995 Al ₂ O ₃ / SSiC | 1 |
| 220 | FRONT SUPPORT, SHAFT | ETFE + CF | 1 |
| 230 | FRONT WEARING | CARBON / SSiC / PTFE WITH FILLER | 1 |
| 230 | IMPELLER | PP + GF / ETFE + CF | 1 |
| 310 | BEARING | 995 Al ₂ O ₃ / SSiC / CARBON / PTFE WITH FILLER | 1 |
| 319 | FRONT THRUST RING | 995 Al ₂ O ₃ / SSiC | 1 |
| 319 | FRONT BUFFER | ETFE | 1 |
| 403 | GASKET | EPDM / VITON | 1 |
| 403.0 | PACKING | EPDM / VITON | 1 |
| 725.01 | INLET FLANGE ADAPTOR | PP+ GF / ETFE + CF | 1 |
| 725.02 | OUTLET FLANGE ADAPTOR | PP+ GF / ETFE + CF | 1 |
| 811/812 | MOTOR HOUSING / REAR FRAME | ALUMINIUM 356 | 1 |
| 847 | MAGNET CAPSULE | PP / ETFE, ND-FE-B | 1 |
| F21/31 | SLIDE BEARING | PP / ETFE, ND-FE-B | 1 |
| 412*** | O RING | EPDM / VITON | 1 |

211** The shaft (211) (1.1 kW) model is removable from the containment shell (161).

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

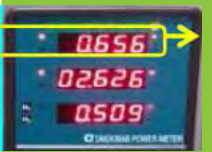

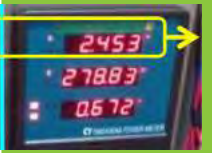
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CASE STUDY

A leading PCB manufacturer was asked to carry out an experiment to compare the real life efficiency savings of an existing application where an AMX655 with AC induction motor and inverter was currently used. A power meter was installed and the power absorbed was compared at 3 different duty points. As shown, the greater the variation in duty points required by one single pump, the greater the savings in running costs.

The PCB manufacturer which is a key supplier to Samsung has now begun to transfer all pumps to the AVF range because of the clear demonstration of cost savings that the AVF range can provide. It wasn't only the cost savings that impressed this particular client – the footprint of the AVF pump is smaller and they are also considerably quieter thanks to the fan less design.

| DUTY POINT | | OPERATING FREQ. (Hz) | | POWER CONSUMPTION (kW) | | ENERGY SAVING BY AVF |
|------------|-------|----------------------|-----|---|---|---|
| Q (l/min) | H (m) | AMX | AVF | AMX-655 | AVF-655 | |
| 320 | 2 | 30 | 95 |  |  | 0.855-0.656 =0.199 kW SAVE 23.2% |
| 485 | 8 | 44 | 136 |  |  | 2.082-1.671 =0.411 kW SAVE 19.7% |
| 540 | 11 | 50 | 156 |  |  | 2.868-2.453 =0.415 kW SAVE 14.5% |

CREST MAGNETIC DRIVE PUMPS - UTILISED BY



APPLICATIONS



CHEMICAL

Chemical applications include chemical transfer, dosing, re-circulation, filtration, fume scrubbing and tanker off-loading.



PETROCHEMICAL

Previous petrochemical installations include high temperature, high pressure, highly viscous applications as well as chemical injection, re-circulation, off-loading and solid handling.



WATER TREATMENT

Providing reliable process pumps to the UK's largest wastewater treatment providers, for chemical transfer, desalination, reverse osmosis, water treatment and tanker unloading.



PHARMACEUTICAL

Pharmaceutical companies have relied on Crest Pumps to provide pumps for ATEX requirements, chemical injection, CIP pumping, solid handling, high viscous medias and highly toxic applications.



BIOFUELS

Fully ATEX certified process pumps for transfer of liquids in explosive atmospheres, solids handling, tanker unloading, recirculation and transfer.



ENERGY GENERATION

Pumps supplied for various energy generation applications, including wind turbine, solar, and Vanadium redox flow batteries.



MARINE

Centrifugal pumps supplied for various below deck applications including ballast water treatment, electrolysis, desalination and sea water cooling systems.