

EDF VF-390 Data Sheet and Instruction Manual – 2021 PRODUCT



EDF VF-390 Standard

Internal diameter of the cylinder: 395 mm Area: 1076.7 cm²

Direction of Rotation (EDF Rotor) CCW and CW

Optimized Impeller Efficiency CFD

High Reliability Components FEA

Weight with inlet lip and mounting brackets: 3,2kg

Total weight of inrunner engine 11,2kg

Max. thrust range: 700N

Max. discharge speed range: 80m / s

Max. speed range: 10,000rpm

Max. input power: 45kw

Overall efficiency: 88%

Allowed battery: 18S - 28S 30,000 + mAh

Permitted controller (ESC): 30kw - 45kw 28S

Custom motor Tenshock 110160

High power density inrunner motor

Motor Efficiency Optimization CEM

Motor efficiency @ 70 - 80% of nominal power: 96%

Turns/min/Volt (Kv): 85kv

Torque 40Nm

Max Power 40kw

Weight 8,2kg

-VF-390 mm + 28KW engine model TS-MI-110120/28S 9,2kg - Thrust 520N continuous, 650N for a few second

-VF-390 mm + 32KW engine model TS-MI-110160/28S 11,2kg - Thrust 570N continuous, 700N for a few second



EDF VF-390 Nacelle

Internal diameter of the cylinder: 395 mm Area: 1076.7 cm²

Direction of Rotation (EDF Rotor) CCW and CW

Optimized Impeller Efficiency CFD

High Reliability Components FEA

Weight with inlet lip and mounting brackets: 4,2kg

Total weight of inrunner engine 12,2kg

Max. thrust range: 700N

Max. discharge speed range: 80m / s

Max. speed range: 10,000rpm

Max. input power: 45kw

Overall efficiency: 88%

Allowed battery: 18S - 28S 30,000 + mAh

Permitted controller (ESC): 30kw - 45kw 28S

Custom motor Tenshock 110160

High power density inrunner motor

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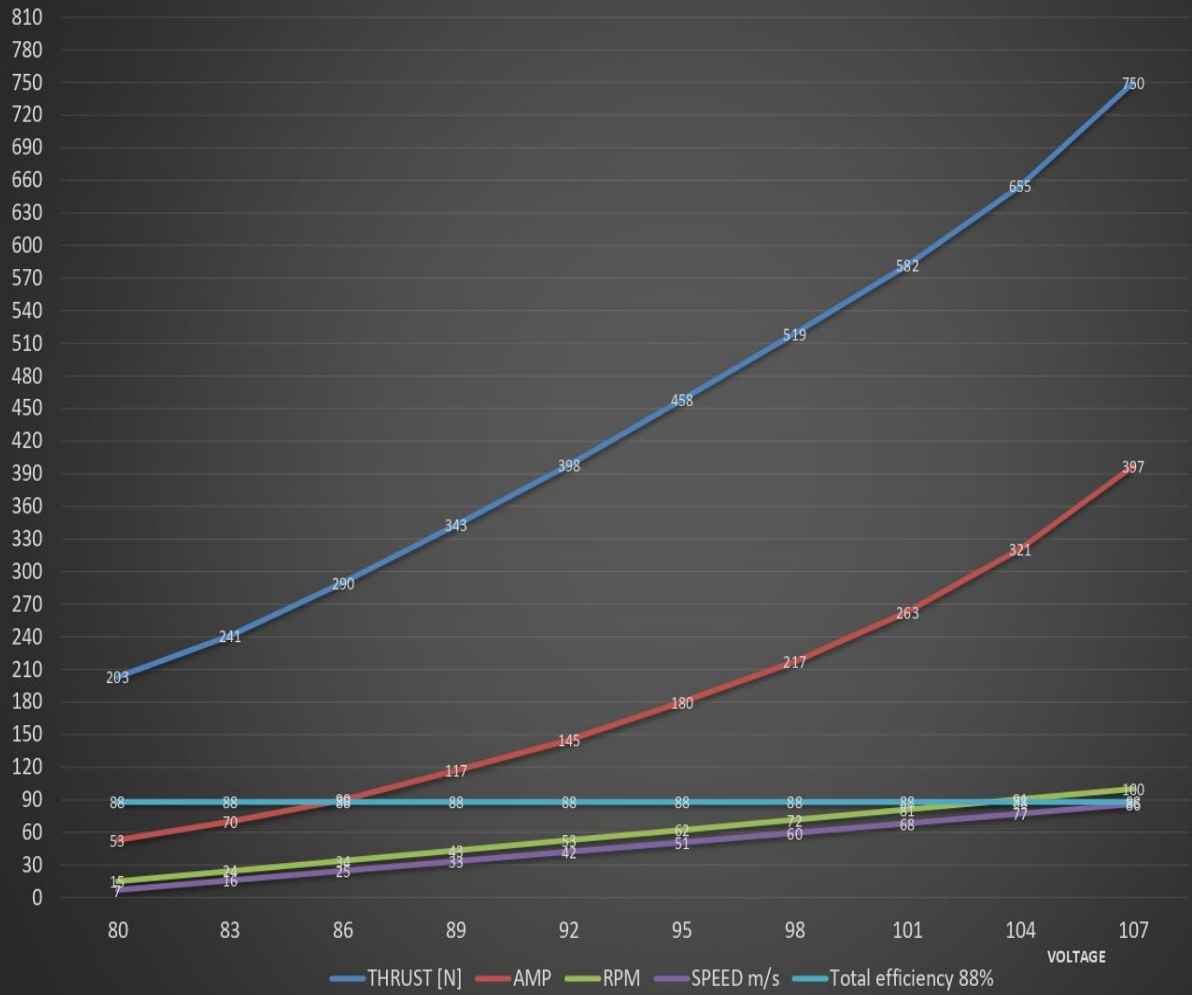
Torque 40Nm

Max Power 40kw

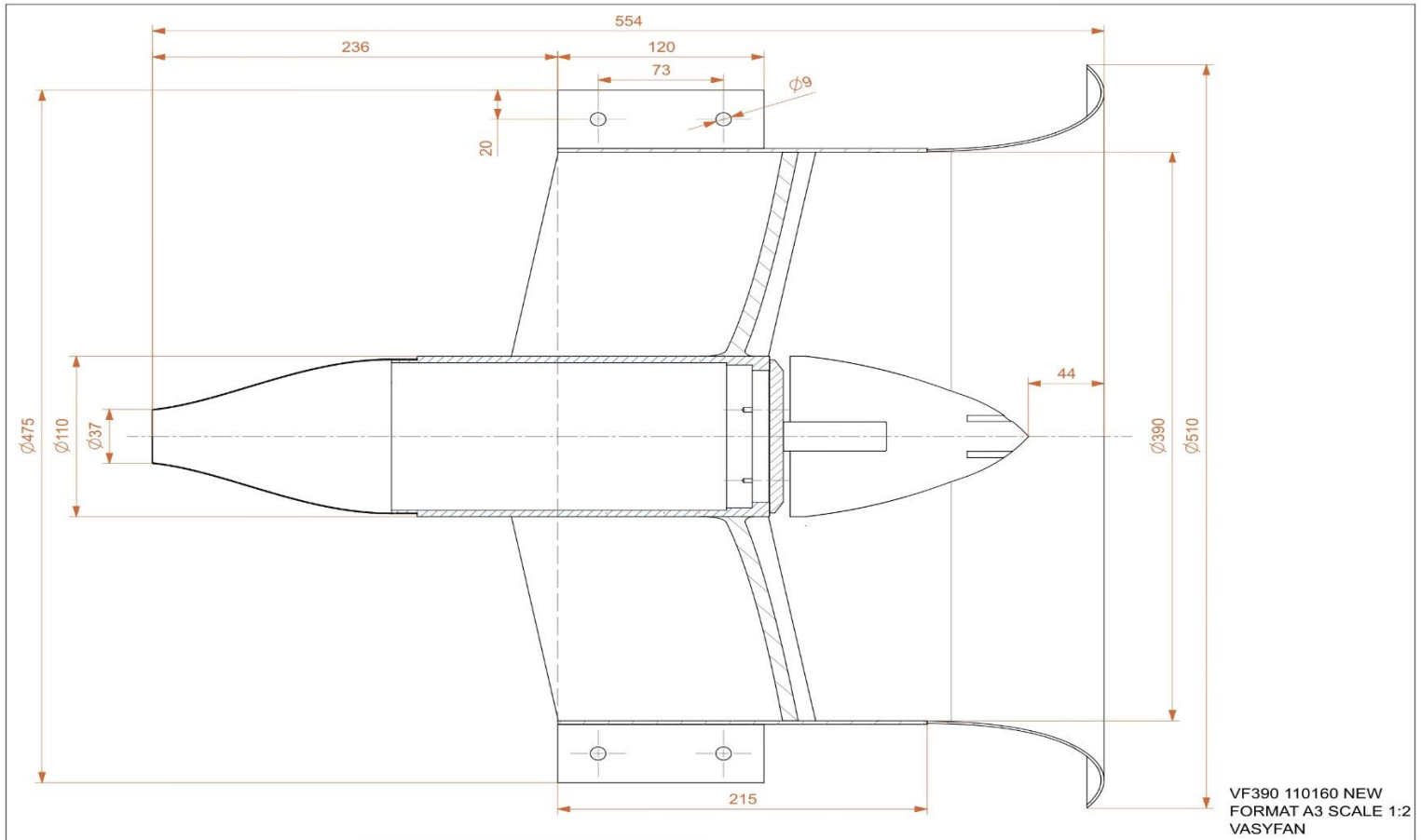
Weight 8,2kg



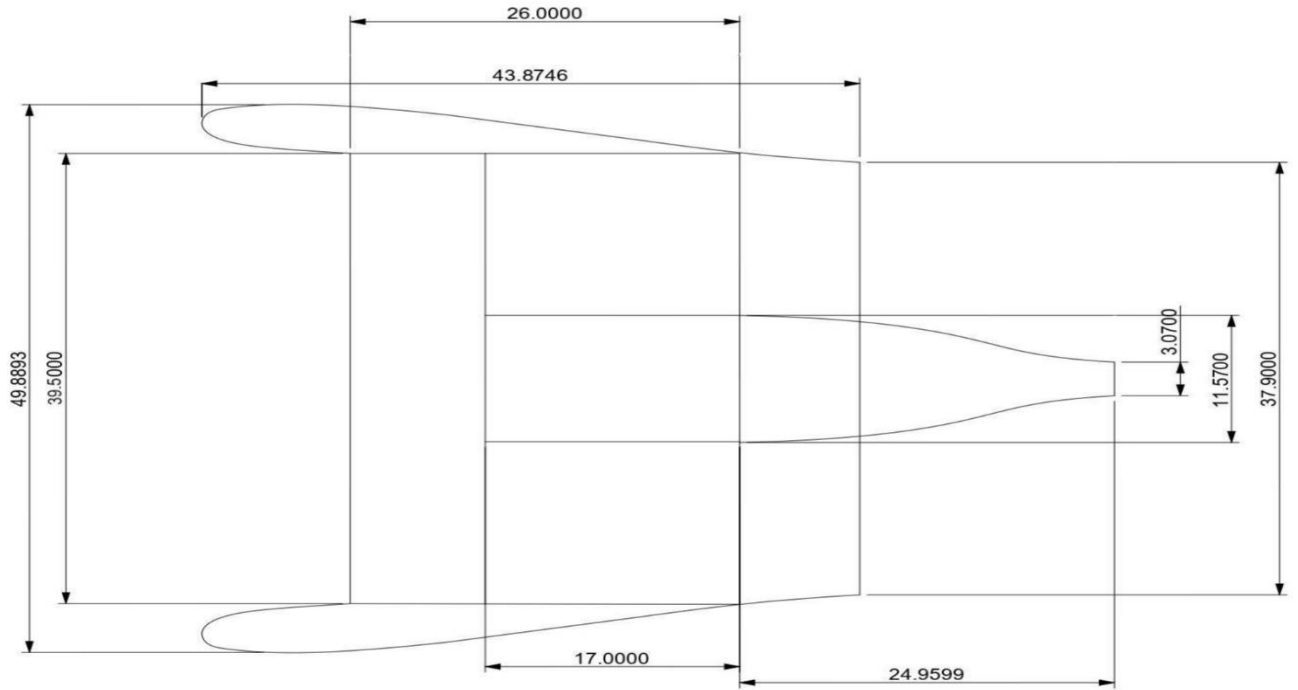
VF-390mm test run with Engine TS-MI-110160 / 85KV, 28S



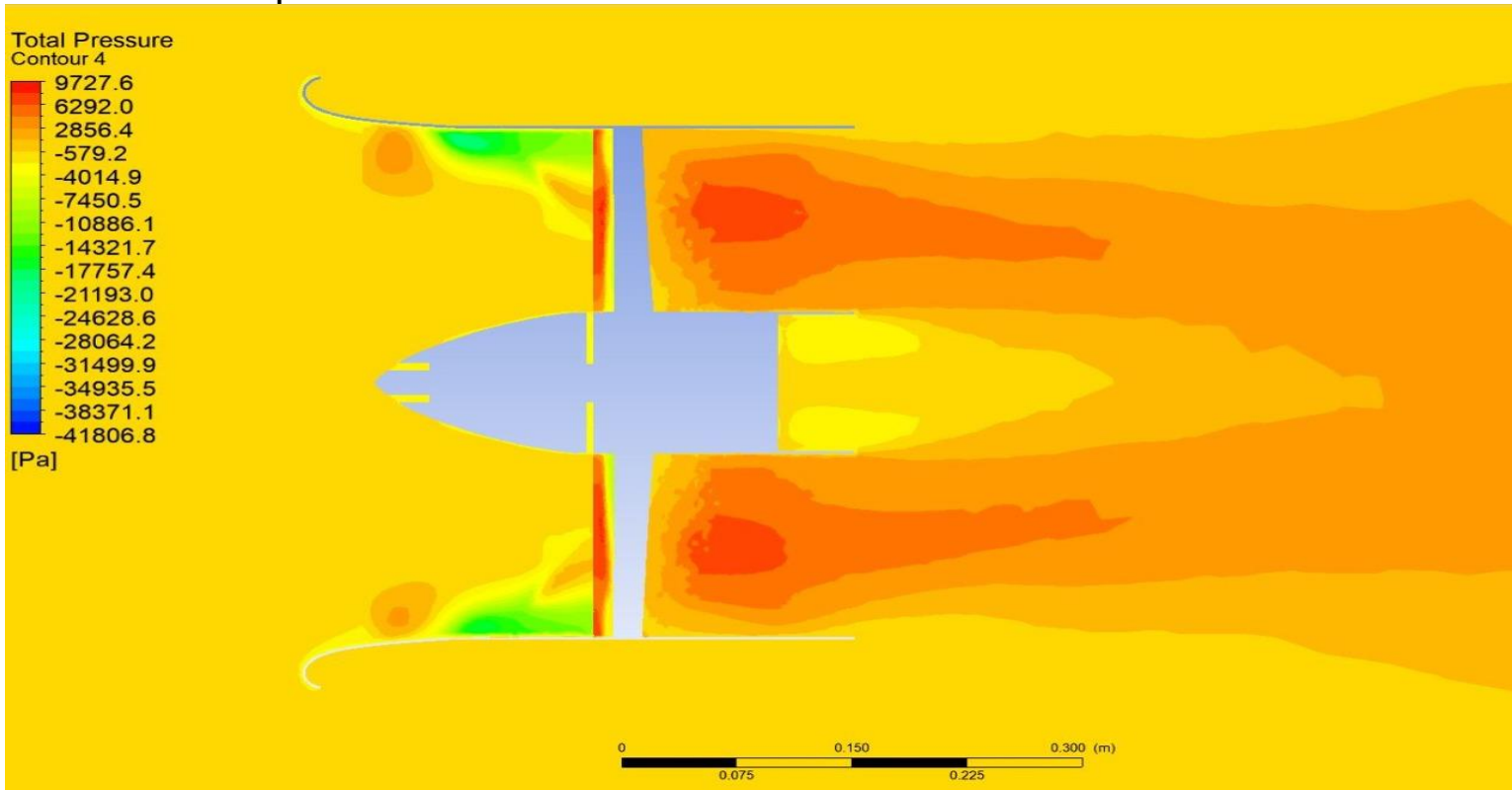
VF-390 Standard



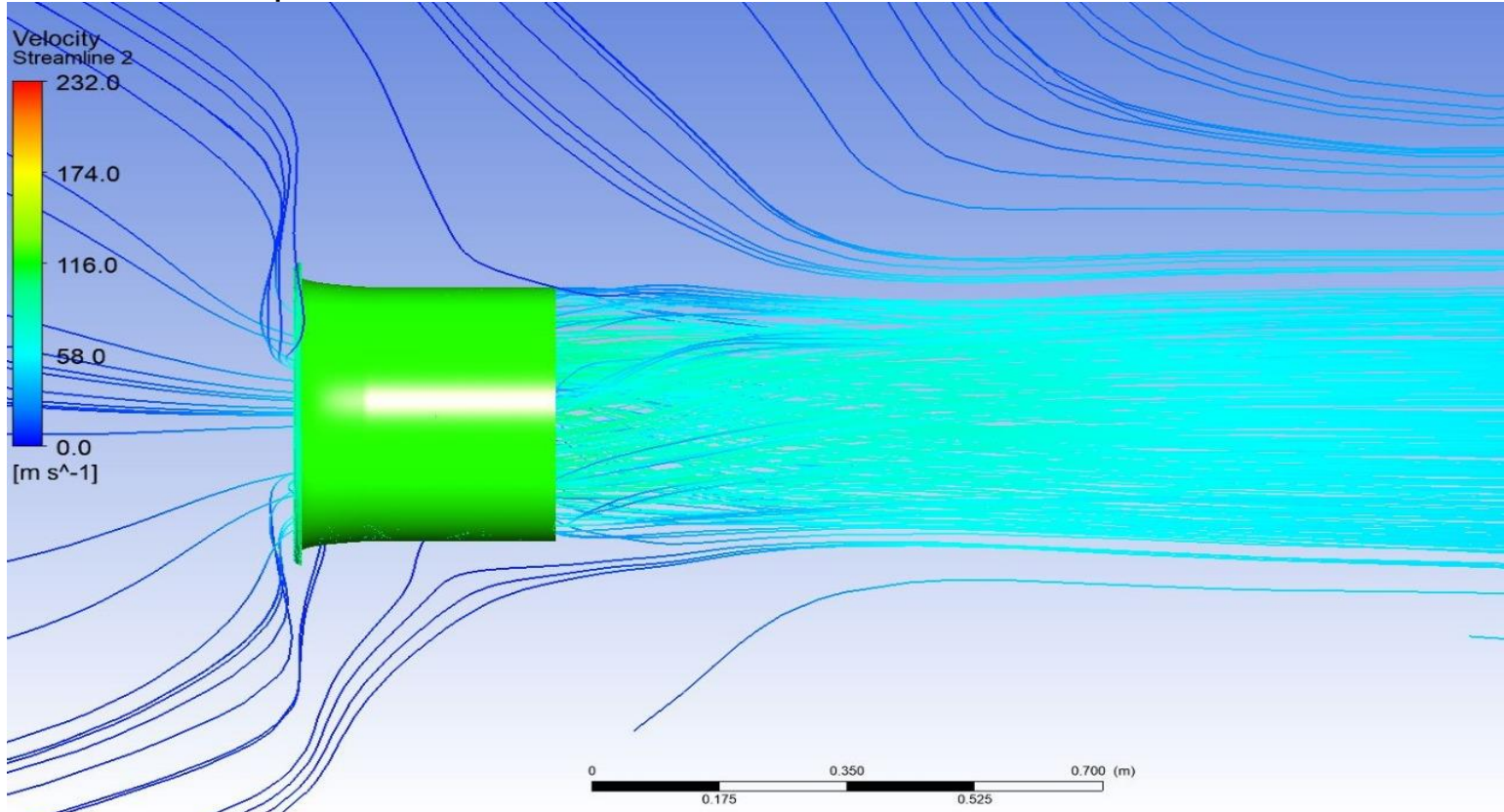
VF-390 Nacelle



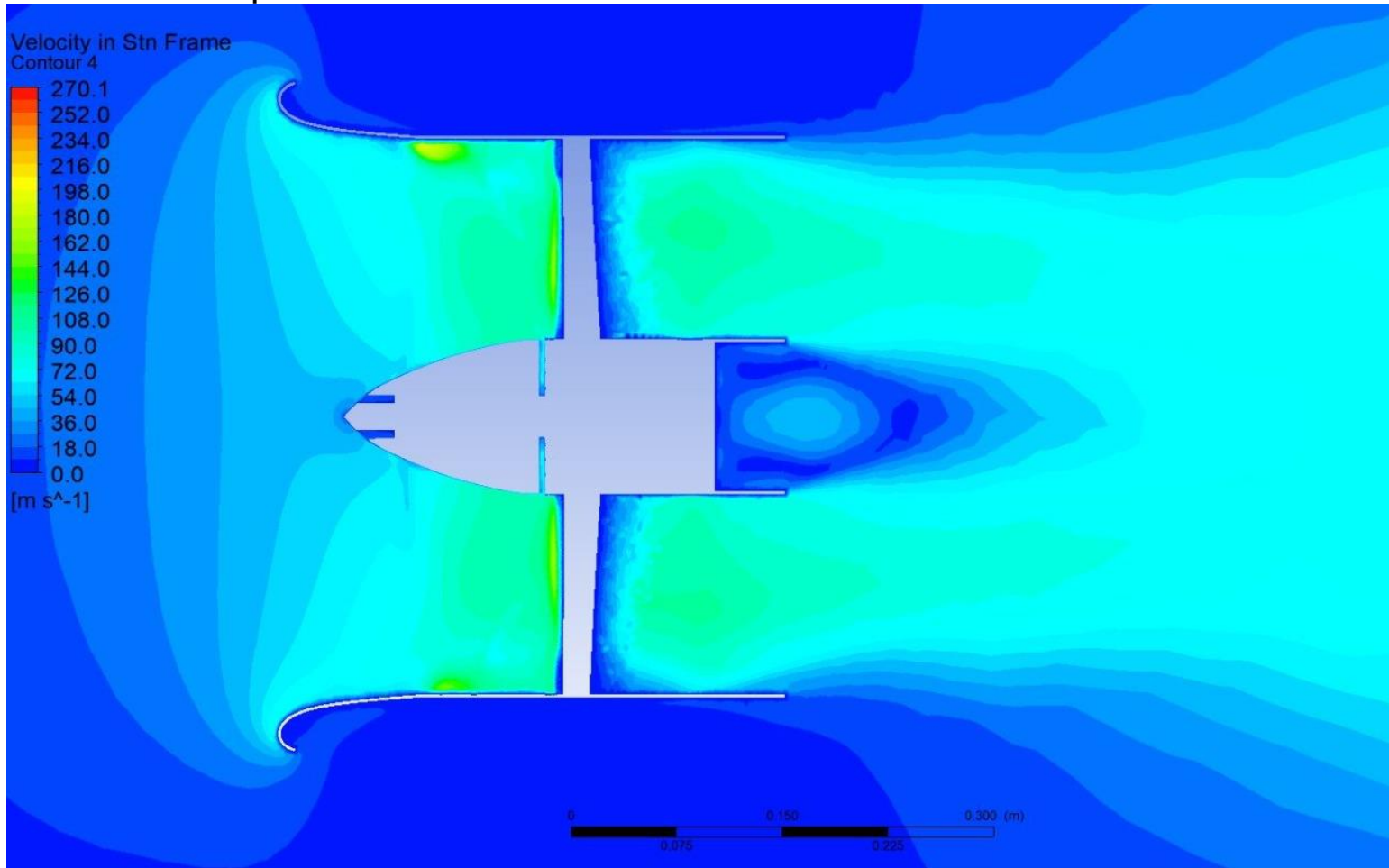
VF-390 8200 rpm



VF-390 8200 rpm



VF-390 8200 rpm



Information assembly

- The ducted fan should be fixed with the four position points of the Secure Fan Fix and the recommended screws M6 in your model or on the test bed.
Alternatively you can fix the ducted fan differently but alternative mountings should always be fixed on the casing only in the area of the stator and not in the area of the rotor.
- Attached thrust tubes and inlet ducts in a closed-duct system must not brace the ducted fan.
- During assembly, pay attention that the ducted fan has enough tolerance to all sides, so that a forced position and therefore upcoming bracing of the components can be avoided.
- Bracings inside the system can lead to a rubbing of the rotor!
- The ducted fan has always to be operated with a mounted duct or an appropriate Intake to lead the air to the rotor cleanly.

Warning Levels

Safety Colors / Signal Word Meaning



DANGER

Indicates a hazardous situation which, if not avoided, will result in death or serious injury



WARNING

Indicates a hazardous situation which, if not avoided could result in death or serious injury



CAUTION

Indicates a hazardous situation which, if not avoided, could result in minor moderate injury

Safety-Related Information

Before starting to work with the ducted fan system, please read this manual of instruction carefully.

Observe the following warnings to prevent any hazards.

User Groups

At private usage initial operation is only allowed to experienced hobby area users of full age and youths of 15 years and above, if supervised by an experienced full age user.

At commercial usage initial operation should only be performed by professionals, like mechanical technicians and mechanical engineers.

Transport and Shipment

After completed dispatch, the package and especially the product have to be checked for apparent damage, which could possibly result in the rupture of the rotor.

Intended Use

The ducted fans are only suitable for air conveying for cooling purposes, simulation purposes and propulsion purposes. It is not allowed to convey any other mediums.

Improper use **WARNING**

Serious injury or death due to improper use!

- The ducted fan system is no drive system for mancarrying aircraft or vehicles.

Operation of Model Airplanes **WARNING**

Imminent danger due to operation of model airplanes

Serious injury or death for the operator and other present people possible!

- Take care of the applicable safety instructions for the operation of model airplane

Rotating parts

Rotating parts **WARNING**

Body parts that come into contact with the rotating ducted fan system can be injured!

- Do not hold the ducted fan system in your hands during operation.
- Do not reach into the rotating parts.
- Before working with the ducted fan system, disconnect it from the supply voltage.

Flying fragments



WARNING

Danger of injuries due to flying fragments!

- Wear always protective glasses during start-up and operation in your close range.
- Keep the safety position
- Use the ducted fan system only for air conveying for cooling purposes, simulation purposes or propulsion purposes. Conveying other media or shredding material is forbidden.
- Remove loose items from the intake area of the ducted fan system.
- Make sure that there are no rubbing marks on the fan shroud.

Rotating Parts



DANGER

Serious injury due to loose clothing and long hair!

- Keep loose clothing and long hair always away from the rotating parts.

Noise Emission

Noise Emission



CAUTION

Noise emission above 80dB(A)

Risk of hearing damage!

- Wear ear protectors for short use (acoustic earmuffs) during start-up and operation in close range.

Electromagnetic Field



WARNING

Danger of cardiac arrest for persons with pacemakers!

- Operating and shutting-down of the ducted fans is prohibited for persons with pacemakers
- Take care that there are no persons with pacemakers in the close range of the ducted fan.

Flying Fragments **WARNING**

- Danger of injuries due to flying fragments!
- Keep the safety position,
- Remove loose items from the intake area of the ducted fan system.

Hot Surface **CAUTION**

- High temperature at the motor housing Danger of burns!
- Wait for 20 minutes after operating the ducted fan system before touching it.

The compulsory limit values for voltage and current especially the rpm limit , must not be exceeded. There is a high risk of damage for your ducted fan.

During operation please take care that a maximum ambient temperature of 30°C and a maximum relative humidity of 80% must not be exceeded.

The minimum ambient temperature should be -10°C. An operation beyond these ambient conditions can permanently damage your ducted fan system.

Moreover, take care that the air is clean without any hard particles; small amounts of grass are acceptable.

After the first test run, please check if there are any rubbing marks on the fan shroud.

Furthermore, there should not be any mis-commutations (jerking during run-up of the ducted fan) of your BLDC motor.

In both cases, you have to stop operation and contact the producer. Otherwise, there could occur subsequent damages.

Please consider that your ducted fan system has to cool down to ambient temperature after every flight or operating phase.

For cooling down please let your ducted fan run for another 3-4 minutes at about 20% of the full throttle rpm.

This measure protects the sensitive spinning components from too high temperature and increases the life expectancy of your ducted fan.

Malfunction During Operation, Error Search, Fault Clearance

Never do a consistent operation, when there are any uncommon vibrations or noises.

Before another use, clarify the cause and eliminate the errors, if possible.

If you are not able to do this, please contact the producer, so that the problem can be clarified.

Maintenance and Cleaning

Rotating Parts

Danger of injuries due to rotating parts!

- Before working with the ducted fan system, disconnect it from the supply voltage.

Danger of Explosion

Danger of explosion due to harmed or rubbing rotor blades!

- Examine the rotor blades according to the following instructions.

The ducted fan system can be operated in short high-performance operations, e.g. in model airplanes with phases of full throttle from 20 to 30 seconds, which alternate with part load or with complete idle running and at which the allowed maximum voltage is applied.

A long operation with full throttle is also possible.

At this long operation an engineer has to check, if the ducted fan runs thermally stable (temperature sensor at the winding back end). Generally, a lower voltage is applied in this case, which is for example 70% of the allowed maximum voltage.

The exact operating voltage has to be determined to guarantee a thermally stable operation.

During short high-performance operations, there should happen a visual examination of the rotor blades and the shroud for rubbing marks before each operating interval (flights, measuring cycles).

During long operations there has to be a visual examination of the rotor blades at least every 10 operation hours. In both cases a light cleaning of the flow guiding parts can be performed by the user, i.e. obvious dirt can be removed.

If there occur any vibrations after cleaning, you should absolutely consult the producer.

Stop the operation and contact the manufacturer for revision, if you notice any harmed rotor blades or rubbing marks on the shroud.

Both cases can lead to explosion.

Please consider that for ducted fan systems, which were heated to high temperatures, or for motors, which were damaged by heat, possibly the stability of the blades might have been impaired.