

DREEM

Designing use**R** centric **E**-kickscooters &
business models for **E**nhancing
inter**M**odality

DELIVERABLE NUMBER: 2.4
DELIVERABLE TITLE: HUB MOTOR
PROTOTYPES (NATURE: PROTOTYPES)

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ABSTRACT

Two motor prototype designs with different electromagnetic structure were produced. Both were then integrated into the housing with same design.

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1 HUB MOTOR PROTOTYPES

Project status is on track. Which means that the development and optimization phases of the motor are finished. Measurements of electrical characteristics also confirmed the predicted promising performance of electric HUB motor prototypes. First sample of radial HUB motor was already exchanged between PUNCH and DOMEL in order to check integrability of mechanics and electronics. Some minor changes were proposed to improve installation of the tire. Two motor prototype designs with different electromagnetic structure were produced. Both were then integrated into the housing with same design.

1.1 HUB MOTOR HOUSING

Hub motor housing for prototypes were manufactured as per weight optimal CAD model, which included several innovative mass reduction features.

Voids for
mass
reduction



Figure 1: HUB motor rim – side view.

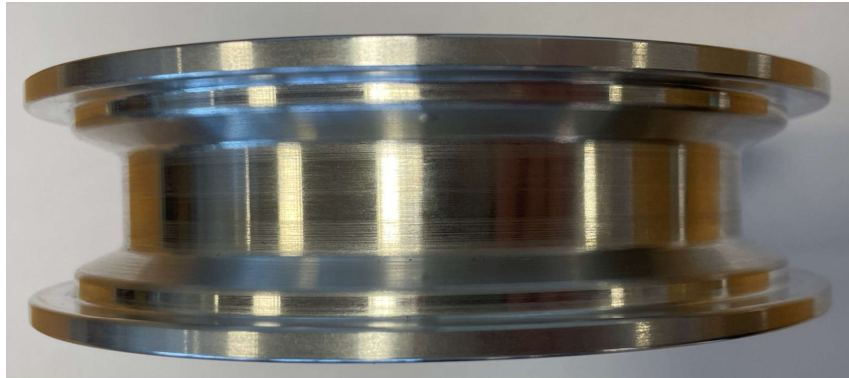


Figure 1: HUB motor rim - top view.



Figure 2: HUB motor – side cover A.



Figure 3: HUB motor cover B.

Signal cable
with connector

Phase wires
with bullet
connectors

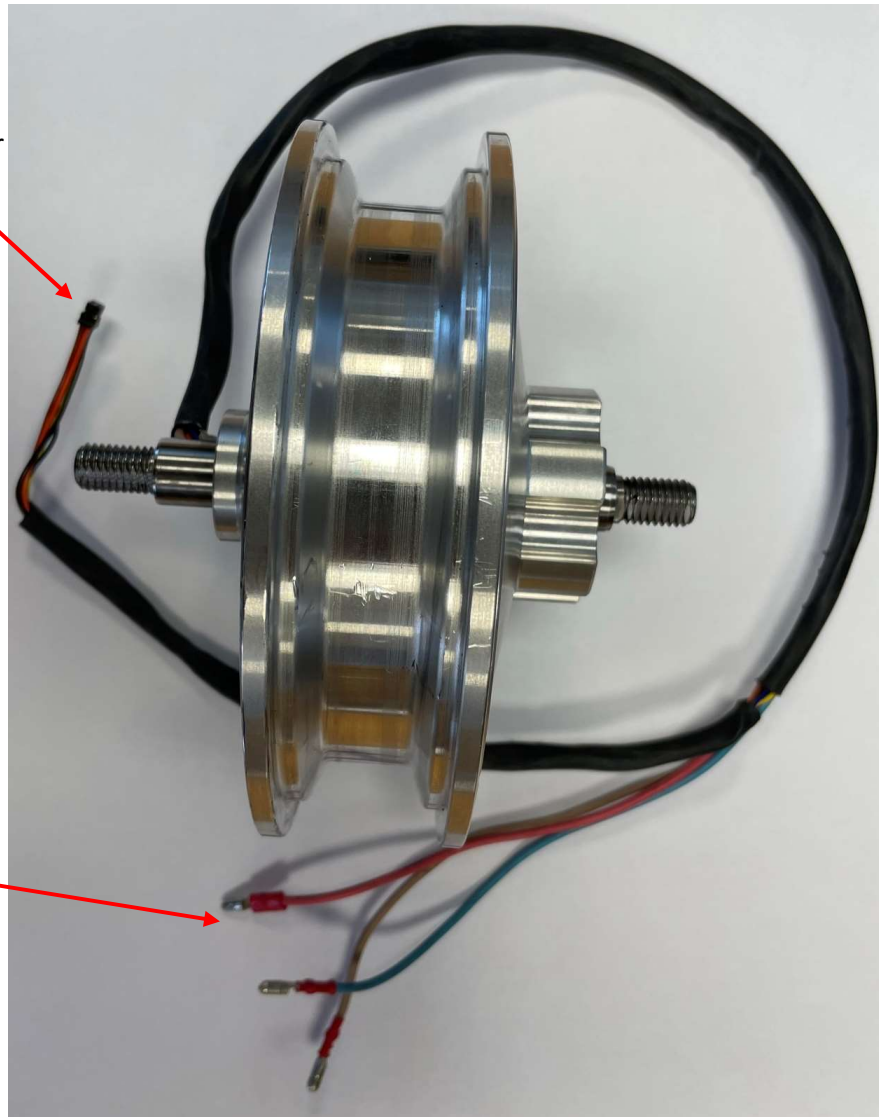


Figure 4: Complete HUB motor assembly.

HUB motor was already mounted on DREEM e-kick scooter and tested on the field. Some minor adjustments were proposed that will be included in the prototypes.



Figure 5: HUB motor integrated in e-kick scooter.

1.2 TRANSVERSAL FLUX MOTOR

Stator of transversal flux motor (TFM) was machined out of sintered soft magnetic composite material (SMC). Due to brittleness of the SMC material potting of stator was necessary.

SMC
stator



Figure 6: TFM stator – potted.

Permanent
magnets



Figure 7: TFM rotor.

1.3 RADIAL MOTOR

Radial motors are wound with aluminum wire that offers lower mass than conventional copper wire.

Hall sensor PCB

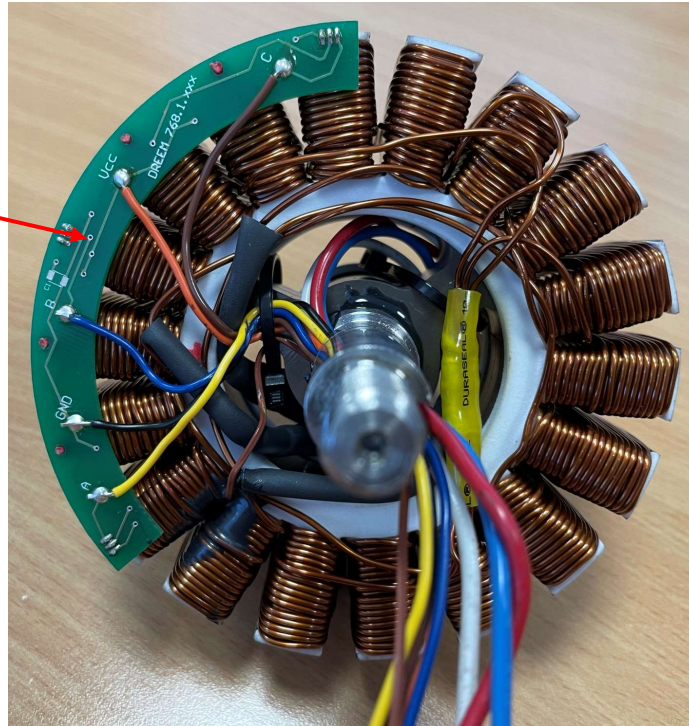


Figure 8: Wound stator of radial motor with Hall sensor PCB.

Permanent magnets



Figure 9: Radial motor rotor.



Figure 10: Wound radial motor stators.

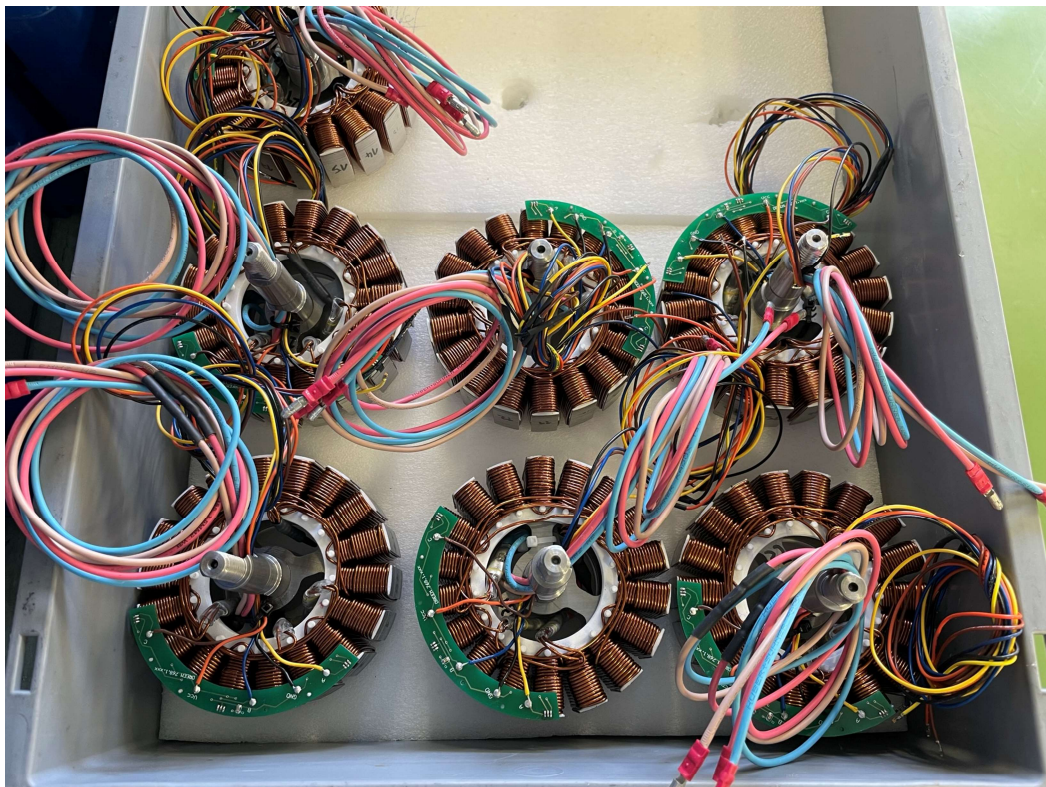


Figure 11: Complete radial motor assemblies.

DREAM

E-KICKSCOOTERS

2 PARTNERS



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