Hybrid Propulsion Technology

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CONSUMER PREFERENCES

CONSUMERS LIKE HYBRID ELECTRIC VEHICLES FOR THEIR HIGHER EFFICIENCY AND LOWER EMISSIONS COMPARED TO PURE GAS ENGINES.

CONSUMERS PREFER HYBRIDS TO FULLY ELECTRIC VEHICLES:

- NO RANGE ANXIETY, ESPECIALLY IN COLDER WEATHER CONDITIONS
- NO NEED FOR LONG STOPS AT SCARSE CHARGING STATIONS
- LOWER TOTAL COST OF OWNERSHIP AND HIGHER RESALE VALUE

Ford Slows Its Push Into Electric Vehicles - The New York Times (nytimes.com)

"The automaker said it would delay new battery-powered models and shift its focus to hybrid cars, sales of which are rising fast."

OPPORTUNITY

WHILE HYBRIDS ARE BECOMING INCREASINGLY POPULAR FOR CAR PURCHASERS, HYBRID TECHNOLOGY HAS NOT BEEN EXPLOITED FOR OTHER ROAD AND OFF-ROAD VEHICLES (LIKE ATVs, UTVs, 3-WHEELERS), SNOW VEHICLES, WATERCRAFT, FARM AND CONSTRUCTION VEHICLES, ETC.

A COMPACT AND INEXPENSIVE TECHNOLOGY TAILORED FOR THESE SEGMENTS WOULD HAVE MASS-MARKET POTENTIAL.

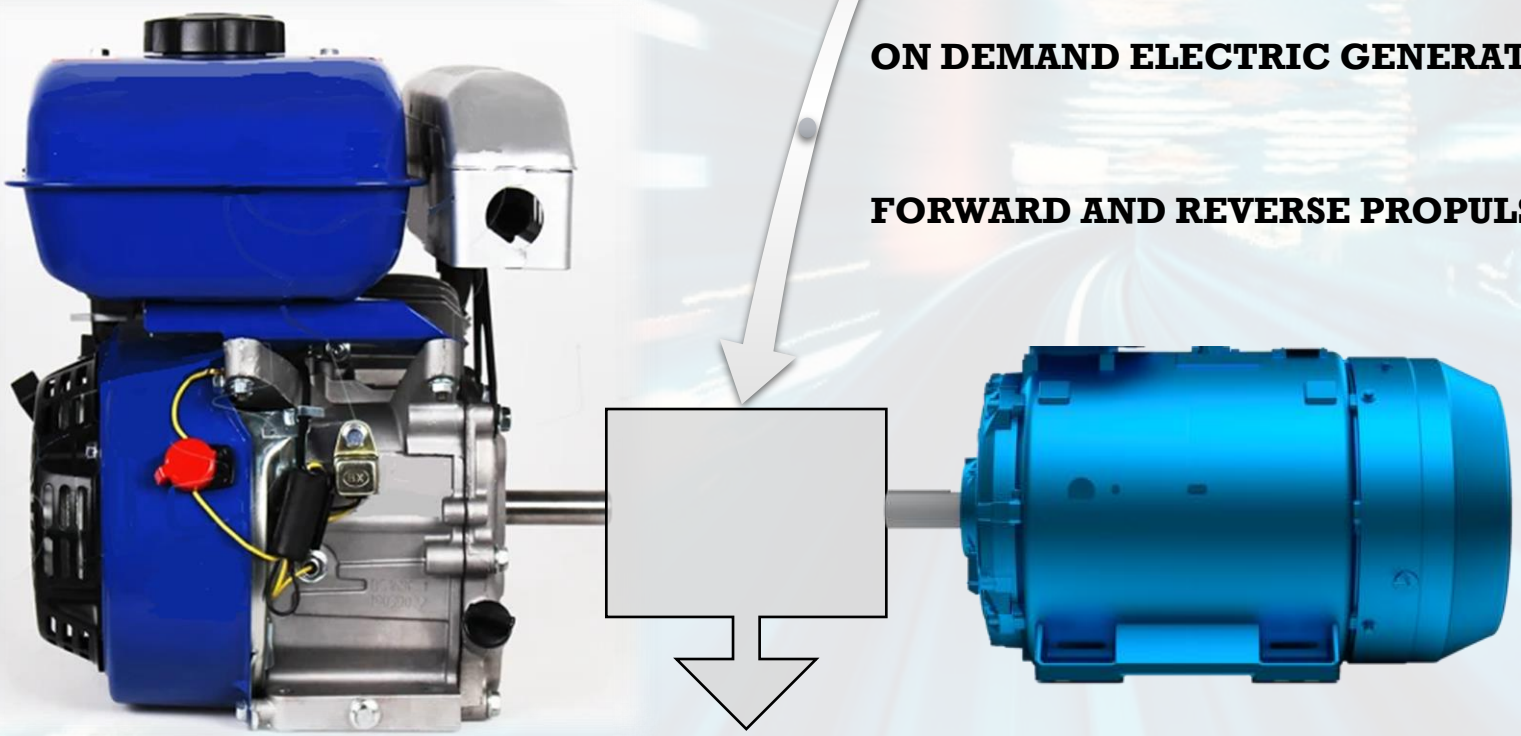
INNOVATIVE SOLUTION

ECONOMICAL GEARLESS PARALLEL HYBRID POWERTRAIN WITH A SINGLE CLUTCH SYSTEM AND ONE ELECTRIC MOTOR/GENERATOR

ENGINE STARTER MOTOR

ON DEMAND ELECTRIC GENERATOR

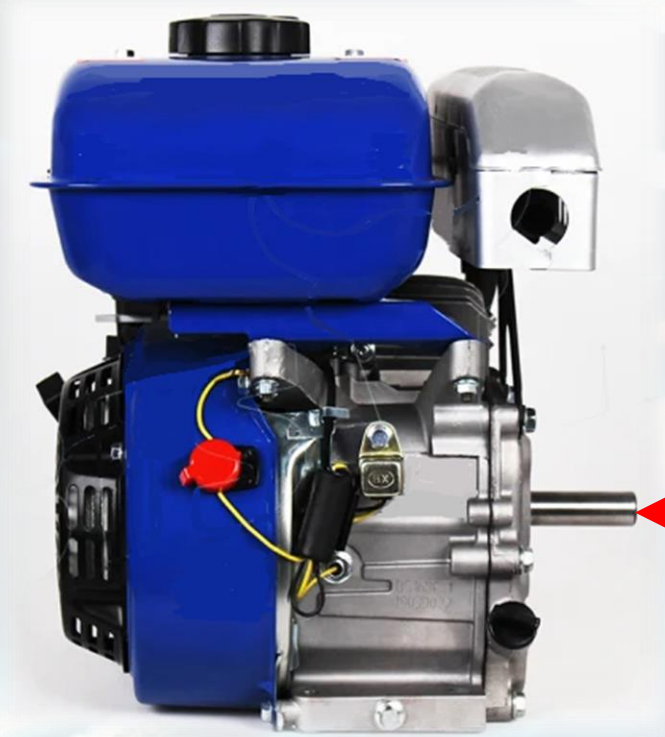
FORWARD AND REVERSE PROPULSION

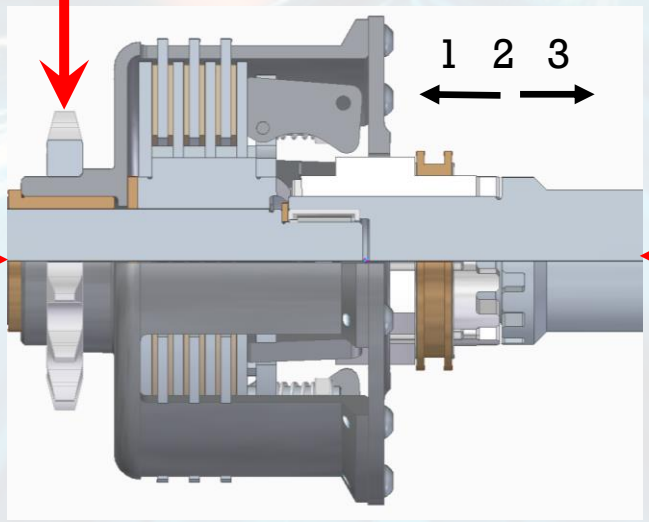


PATENTED DESIGN

CLUTCH WORK POSITIONS:

1. ENGINE STARTER
2. GENERATOR
3. DRIVE





DRIVELINE

DESIGN ADVANCEMENTS

4. FOURTH POSITION TO START THE ENGINE WHILE IN ELECTRIC DRIVE MODE

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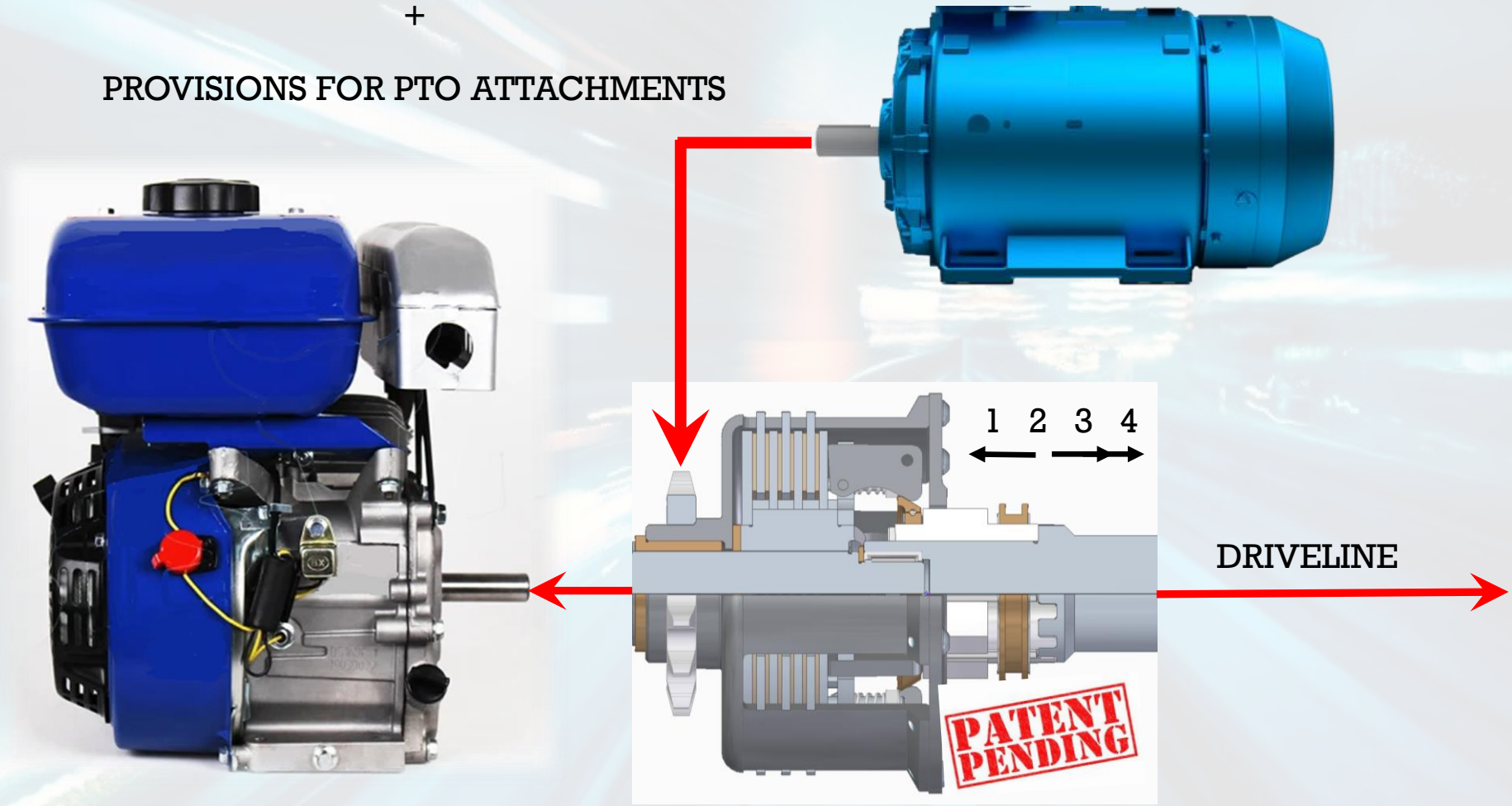
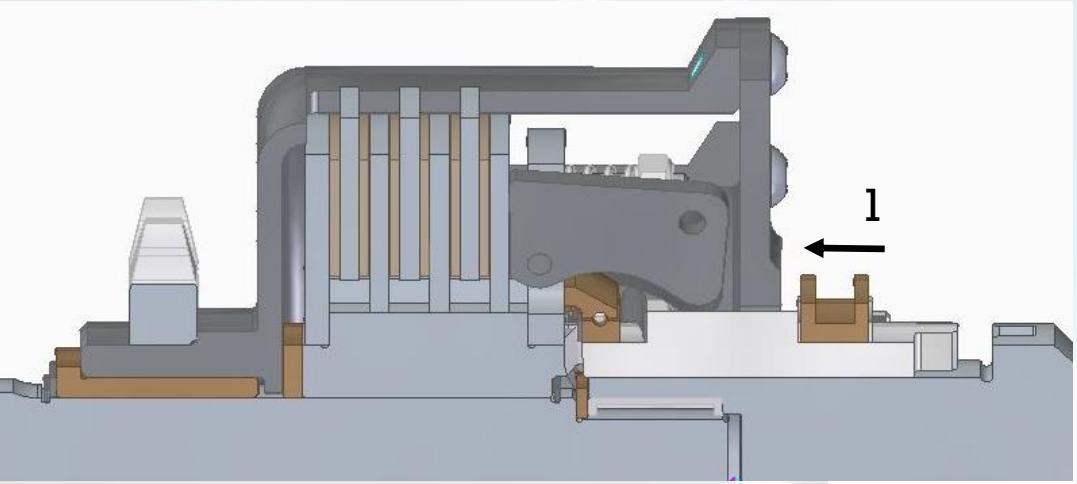
PROVISIONS FOR PTO ATTACHMENTS



TECHNOLOGY DETAILS

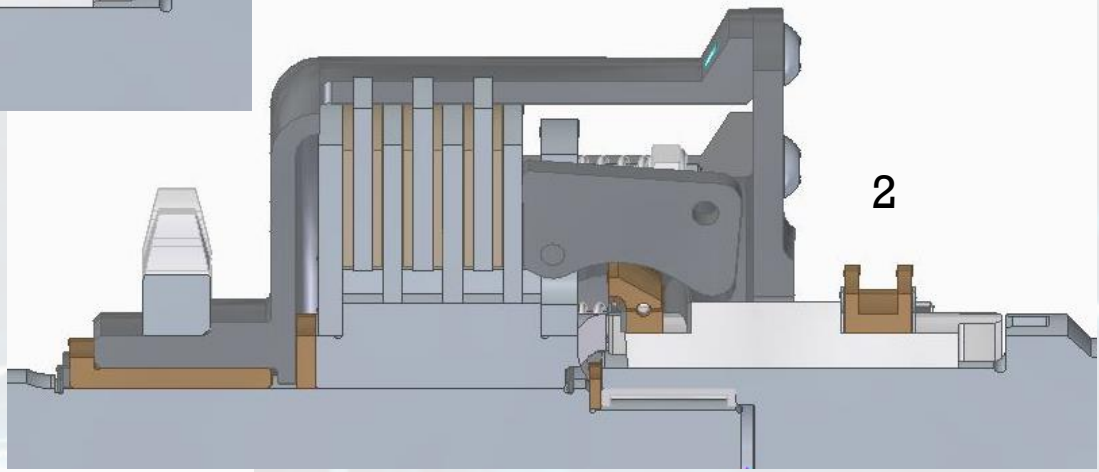


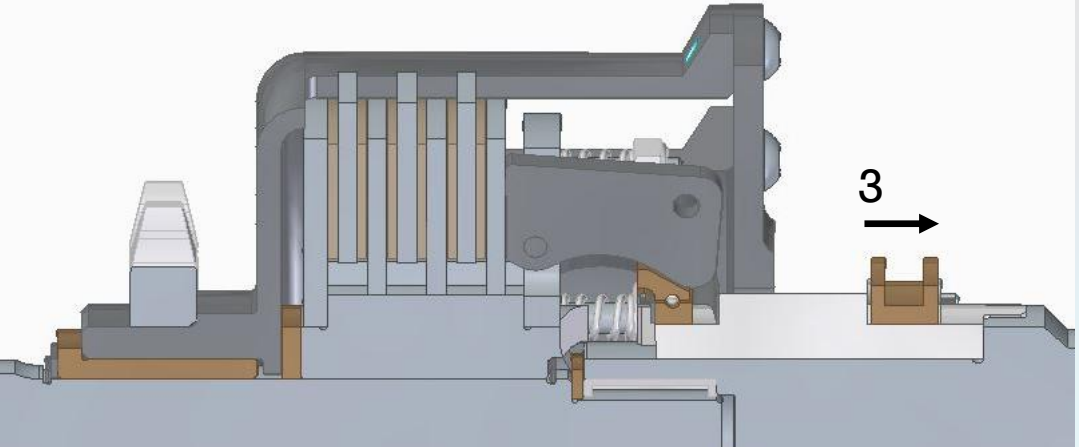
1. ENGINE STARTER

The dog clutch engages the inner hub of the centrifugal clutch, connecting the electric motor to the engine crankshaft

2. GENERATOR

The dog clutch is NOT engaged and the engine can drive the electric generator via the centrifugal clutch





3. DRIVE

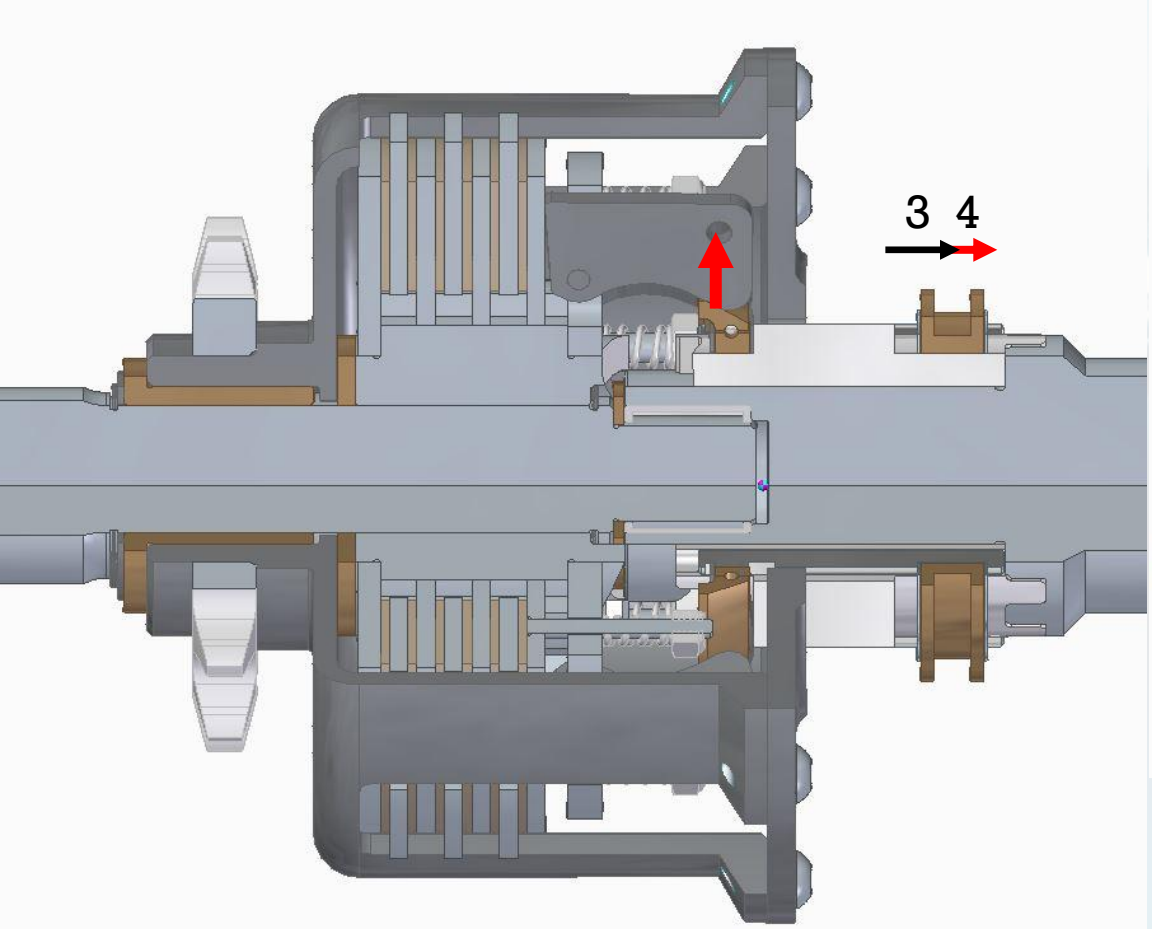
The dog clutch engages the drive shaft. The engine and the motor can drive the vehicle. The electric motor can reverse the motion with the engine idle or off.

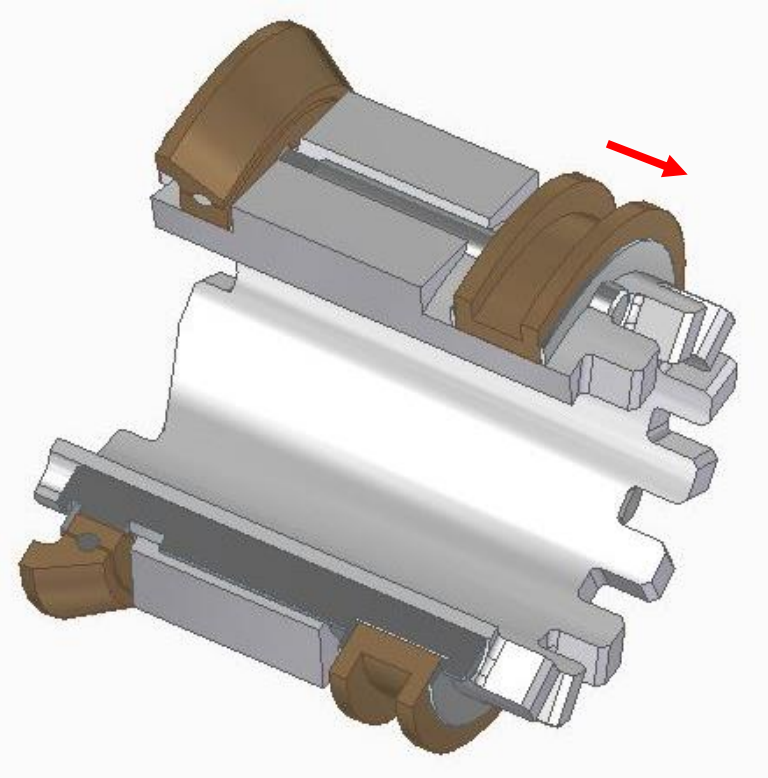
TECHNOLOGY DETAILS

4. ENGINE START FROM ELECTRIC DRIVE MODE

In electric drive mode, the dog clutch engages the drive shaft and the motor propels the vehicle.

A fourth position of the dog clutch can force the engagement of the centrifugal clutch, allowing to smoothly switch to hybrid drive by starting the engine without disengaging the drive shaft.





MINIMUM VIABLE PRODUCT TESTED

KIT TO RETROFIT A GO-KART WITH A DC MOTOR/GENERATOR TO

i) START THE ENGINE, ii) REVERSE THE MOTION, iii) GENERATE ELECTRICITY

TECHNOLOGY ROADMAP

2020	IDEA AND CONCEPT DEVELOPMENT (TRL 1, 2) / PROVISIONAL PATENT
2021	COMPONENTS VALIDATION ACTIVITIES (TRL 3) / PATENT APPLICATION
2022	FIRST FUNCTIONAL PROTOTYPE (TRL 4) / GRANTED US PATENT
2023	SECOND MORE ADVANCED PROTOTYPE (TRL 5) / NEW PROVISIONALS
2024 2025	MINIMUM VIABLE PRODUCT INTEGRATION (TRL 6) / PCT APPLICATION
2025	MINIMUM VIABLE PRODUCT DEMONSTRATION AND TESTING (TRL 7)
2025 2026	MINIMUM VIABLE PRODUCT REGULATORY COMPLIANCE (TRL 8)

COMMERCIAL PARTNER

WE ARE SEEKING THE BEST PARTNER TO INTEGRATE OUR TECHNOLOGY INTO VEHICLES SUCH AS ATVs, UTVs, 3-WHEELERS, SNOW, FARM, CONSTRUCTION VEHICLES AND/OR WATERCRAFT.

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