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CLIMATE COMMITMENT

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MOBILITY

iOne

Robotic Vehicular Platform

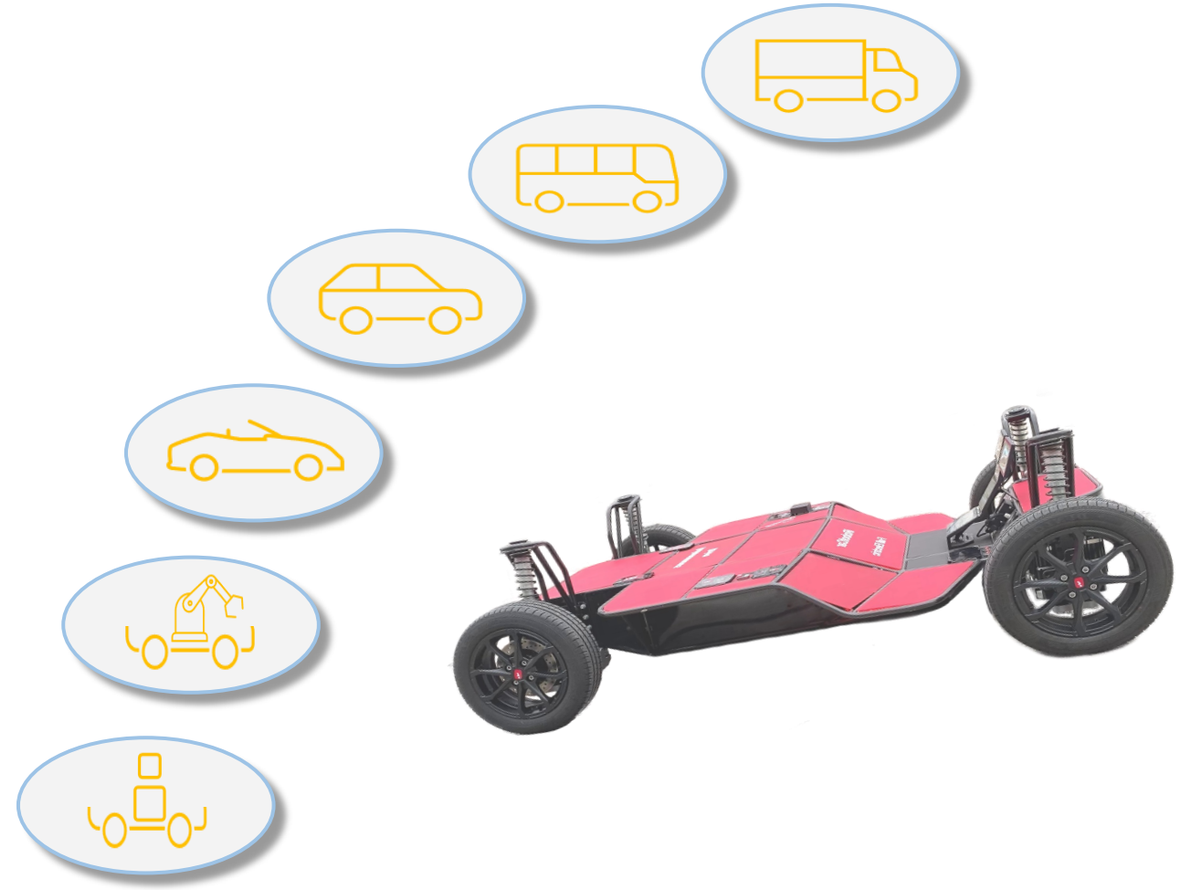
Ref : iOne_200230_v4.0

ONE PLATFORM MANY POSSIBILITIES

FOR SMART MOBILITY

iOne

Is a disruptive “Robotic Vehicular Platform” based in a modular concept allowing multiple full electric city vehicles configurations, increasing space usability while reducing size and weight and intensifying the communication interface with the environment, aligned with the new era of Smart Electro Mobility .



iOne

iOne ROBOTIC VEHICULAR PLATFORM

Modular robotic vehicular platform combining mechanical and electronic technologies , allowing the development of multiple vehicular applications for robotics , passengers and goods transportation in the cities framework.

MODULAR & RELIABLE

3 PATENTS

MECHANICS

Robust modular chassis and sub-chassis, integrating traction and steering system.

ELECTRONICS

Wide range of Power & Control & Comfort electronic modules.

iOne REFERENCES

- **Up to 8 standard iOne platform configurations.**
- **Custom iOne platform under demand.**

iONE

Standard & Custom vehicular Robotic Platforms for City applications.

RELIABILITY

Developed under Automotive Standards.

COMMUNICATIONS

Information Technologies for a friendly & powerful communications.

DRIVING

From standard till assisted and autonomous driving.

MAINTENANCE SERVICE

Hardware and Software maintenance services.
Product Innovation.

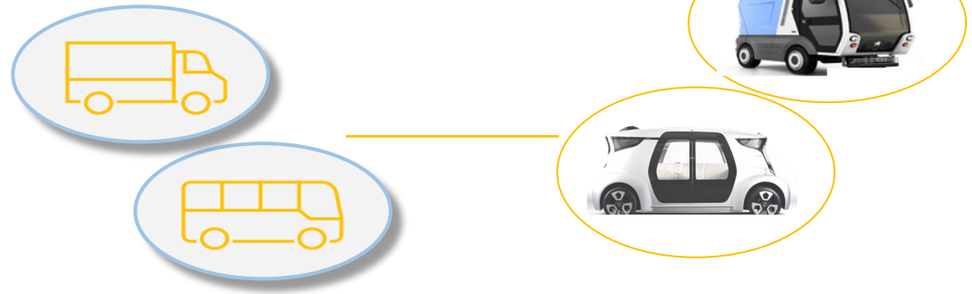
iOne

ONE PLATFORM MANY POSSIBILITIES FOR SMART MOBILITY

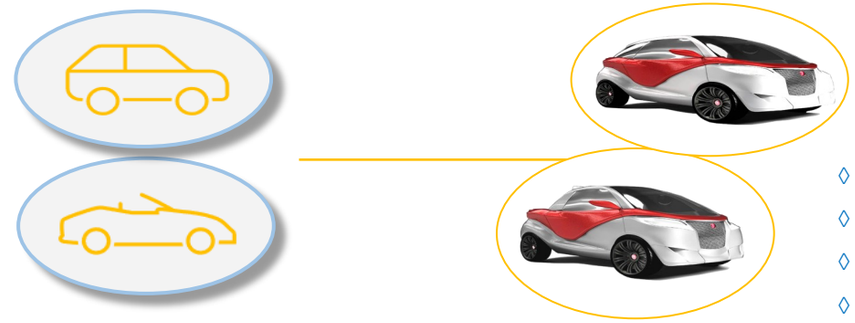
YOU DESIGN DE LIMITS

iOne Platform allows vehicles custom development based in a singular modular concept.

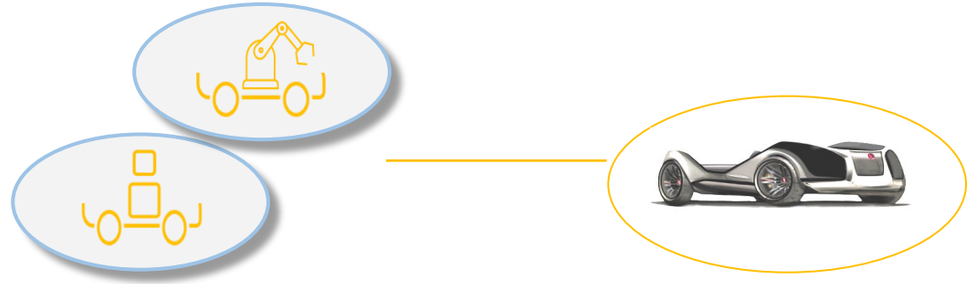
The body which can be converted for the desired application , can be quickly separated from the **iOne** platform, in which all the technology required for driving is bundled.



- Cities, Industrial areas.
- Airports , Comercial Centres, ...
- EcoHotels, Theme Parks ....



- City Car.
- Airports , Comercial Centres, ...
- EcoHotels, Theme Parks ....
- Last mile deliveries.
- CIty maintenance.
- City surveillance.



- Infrastructures Surveillance.
- Last mile deliveries.
- Indoor operations.
- Robotic vehicle , AGV , ARM.

iOne

MAIN CHARACTERISTICS

iOne 4.0 Platform Operation :

- ◊ Maximal speed : 90Kmh .
- ◊ Self weight + payload = 1100 Kgrs.
- ◊ Energy : Lithium-Ion batteries / Others.
- ◊ Assisted and Autonomous driving.
- ◊ Singular mobility : Wheel turning angle -70º to +70º.

iOne 4.0 Platform Driving System :

- ◊ Multi-Axis industrial Joystick.
- ◊ Driving mode panel.
- ◊ Brake and Throttle pedals.
- ◊ Parking brake pushbutton.
- ◊ Assisted and Autonomous driving technology.

iOne 4.0 Platform Electronics :

- ◊ Control & Power ECUs.
- ◊ V2X communications.

iOne 4.0 Platform Mechanics :

- ◊ 2 Standard Chassis : Wheelbase 2660 & 1800 mm.
- ◊ Up to 4 iRobotWheels.
- ◊ Traction motor : from 3,75 to 7,5KW each iRobotWheel.
- ◊ Steering Wheel : Drive By Wire in each iRobotWheel.
- ◊ Braking System.

iOne

MODULARITY

iRM & iFM — Vehicle Front & Rear devices control

iKeyLess — Smart Keyless Entry and Start System

iADAsys — Driving assistance and autonomous driving

iDashboard — Instrumentation and control operations display

iVDC — Vehicle safety functions (Vehicle Dynamics ….)

iTMC & iSMC — Electronic modules for Traction and Steering System electric motors.

iRobotWheel — iRobotWheel integrating: Traction, Steering System, Brake & Shock absorber

iChassis — iOne Platform Chassis

iOne

MODULES

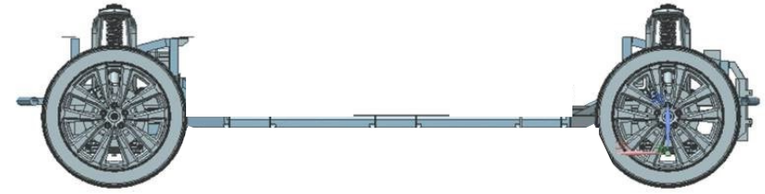
- iRM & iFM
- iKeyLess
- iADAsys
- iDashboard
- iVDC
- iTMC & iSMC
- iRobotWheel
- iChassis

iChassis for a wide range of vehicles from Robotic till City Car vehicles .

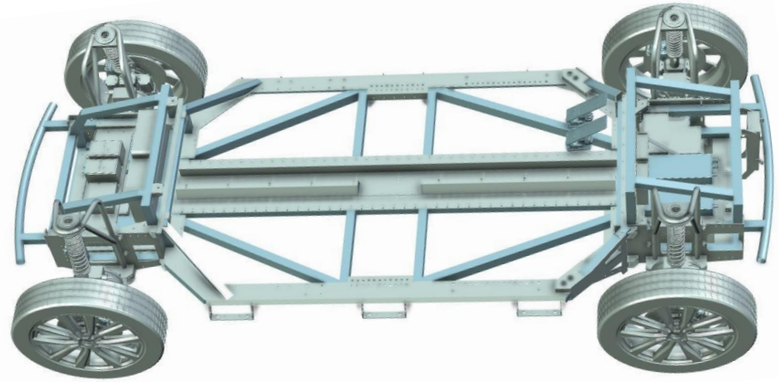
- 2 o 4 iRobotWheel with :Traction motor in 2 or 4 wheels & Steering System Drive By Wire in 2 or 4 wheels.
- Driving : Joystick, Autonomous , Mechanical
- Braking System
- Control & Power Electronics

iChassis for iOne 4.0 :

- Platform Architecture: Ladder Frame
- Material: Steel tube S235 (2mm, 3mm) and S355 (3mm)
- Topology: Steel sections, beams and support bars
- Floor enclosure: Metal sheet
- Battery Box: Floor Type

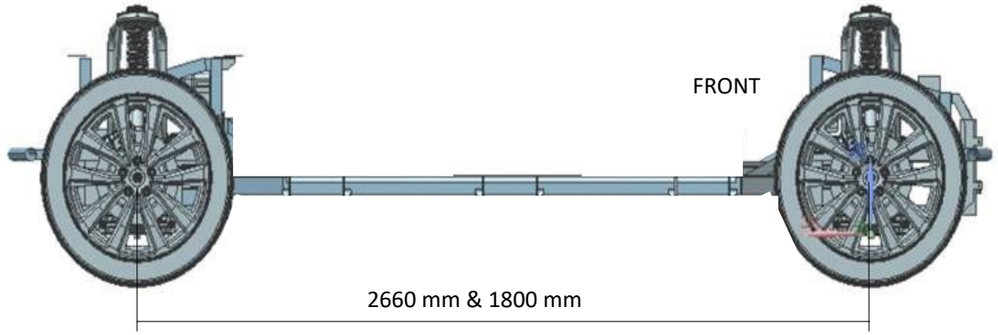


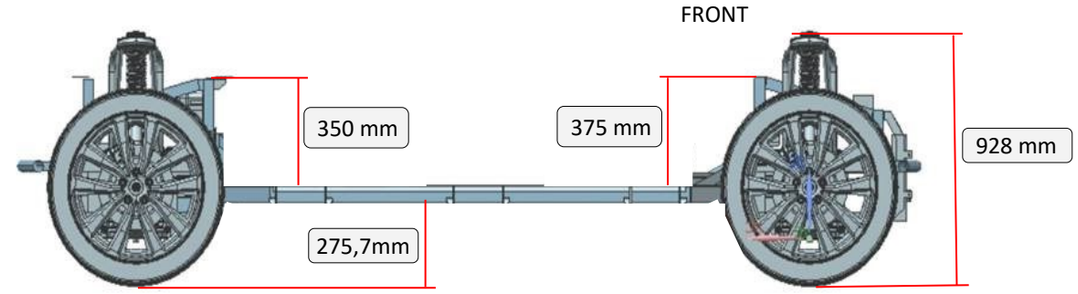
FRONT

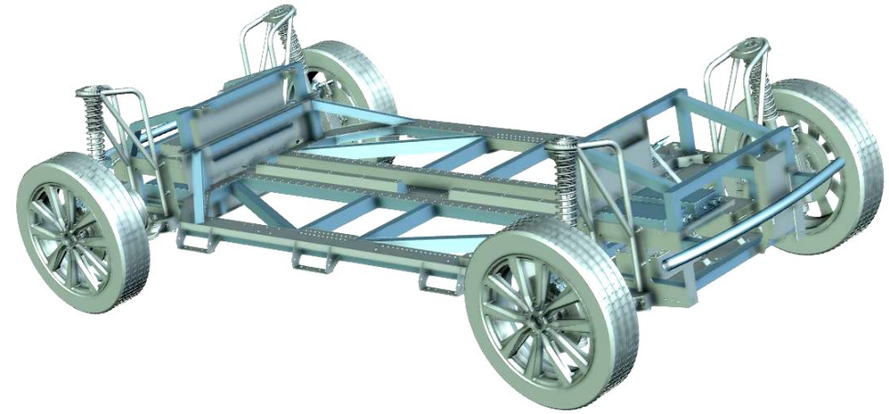


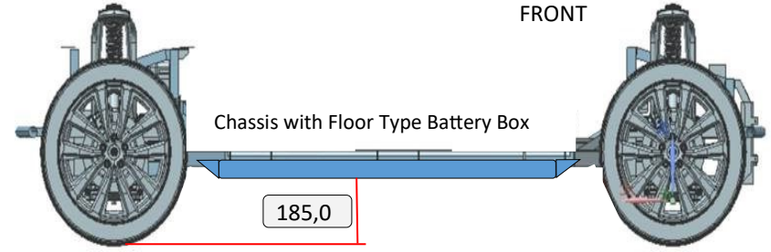
iOne

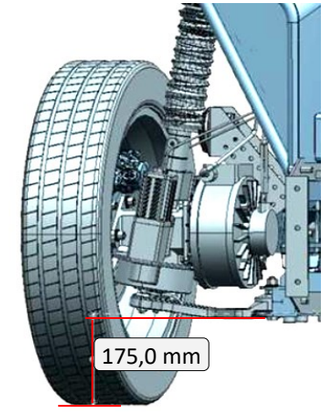
iChassis for iOne 4.0 main parameters











iChassis for iOne 4.0 :

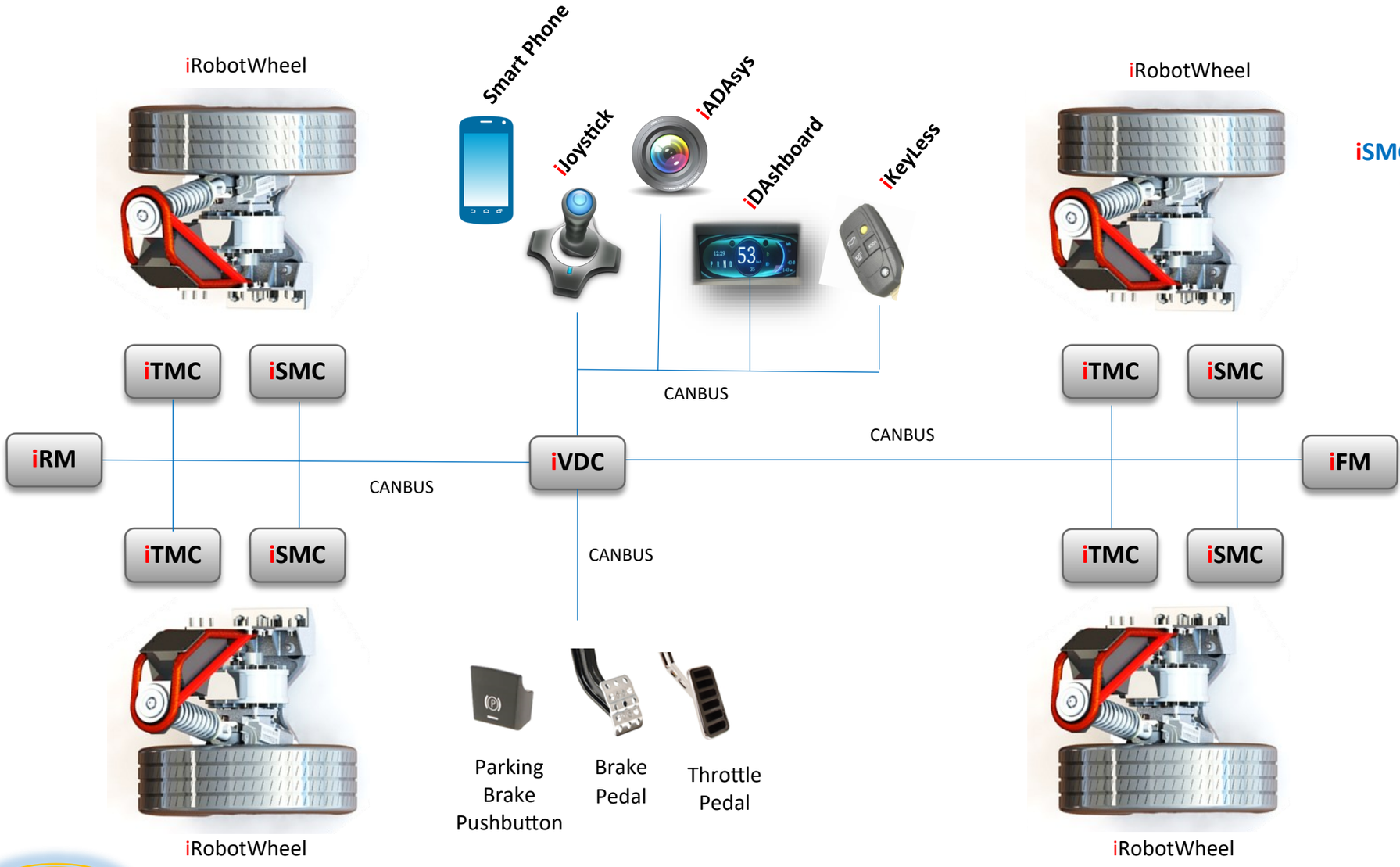
- ◊ Wheelbase : 2 standard options _ 2660 mm & 1800 mm
- ◊ Chassis width : 1452 mm & 1300 mm
- ◊ Wheel : 155/60/R19
- ◊ Ground clearance chassis: 185 mm (with floor type battery box)
- ◊ Ground clearance iRobotWheel 4.0 : 175,0 mm

- ◊ iChassis weight : 220Kg & 180Kg
- ◊ iRobotWheel 4.0 weight : Depending on iOne configuration.
  See weights in “iRoboWheel 4.0” presentation .

- ◊ Total vehicle weight with **iOne 4.0** platform = Self weight + Payload = 1100Kg

iOne

ELECTRONIC ARCHITECTURE



iRobotWheel : Drive By Wire Robot Wheel

iVDC : Vehicle Safety Functions ECU

iTMC : Power & Control ECU for Traction Motor

iSMC : Power & Control ECU for Steering System Motor

iDashboard : Instrumentation and control Display

iJoystick : Driving unit

1 PATENT

iADAsys : Advanced Driving Assistance

iFM : Vehicle front devices control

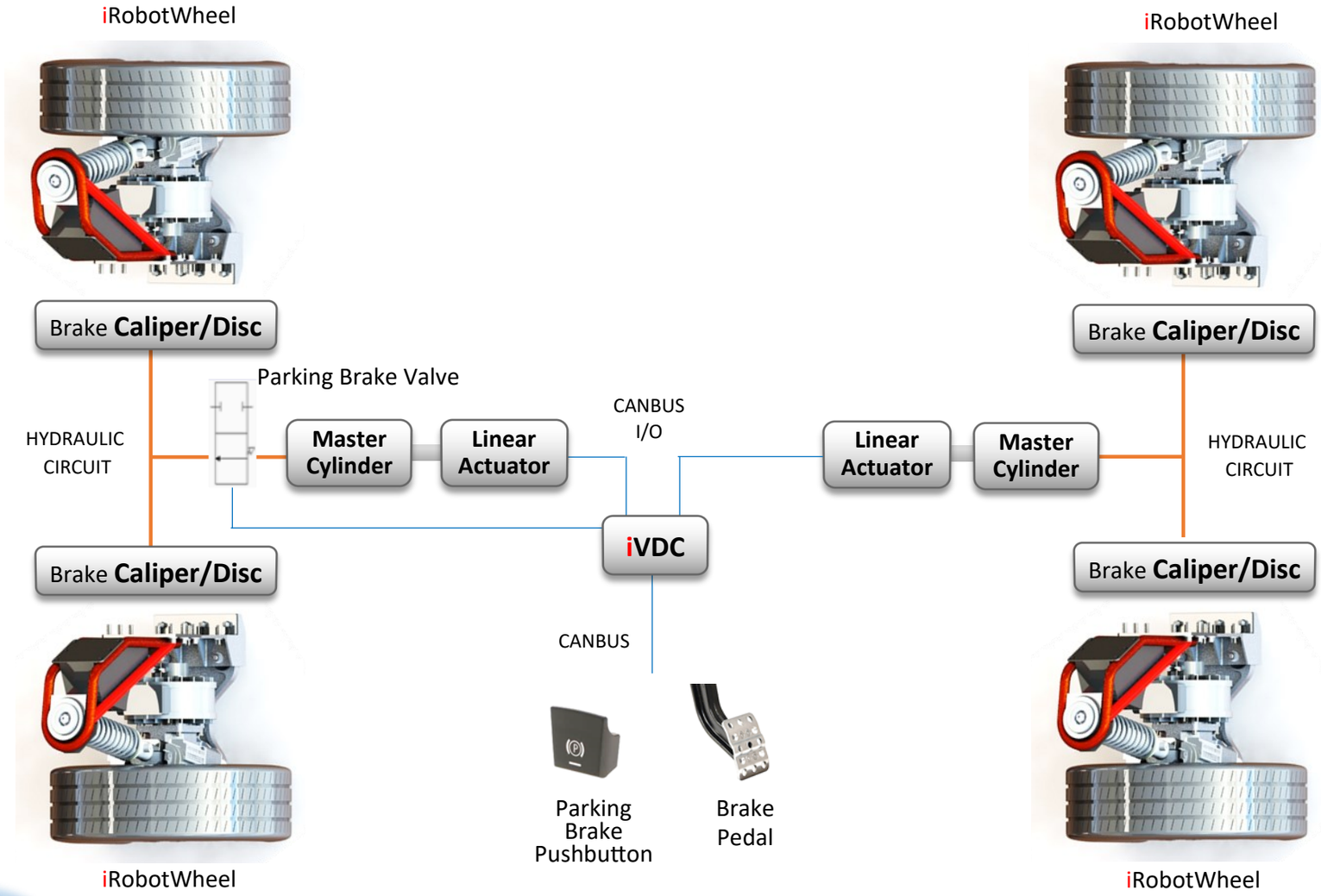
iRM : Vehicle rear devices control

iKeyLess : Smart Keyless Entry and Start System

iChassis

iOne

BRAKING SYSTEM ARCHITECTURE



iRobotWheel : Drive By Wire Robot Wheel

iVDC : Vehicle Safety Functions ECU

Linear Actuator : Electric Actuator

Master Cylinder : Hydraulic actuator

Parking Brake Valve : Hydraulic Valve for parking brake

Brake Caliper/Disc : iRobotWheel Brake components

iOne

MODULES

- iRM & iFM
- iKeyLess
- iADAsys
- iDashboard
- iVDC
- iTMC & iSMC
- iRobotWheel
- iChassis

iRobotWheel Drive By Wire for a wide range of Power Train applications . **Standard iRobotWheel & Custom** design based in specific requirements.

- Control & Power ECU
- Electric Traction
- Electric Steering System
- Brake
- Shock Absorber
- Wheel

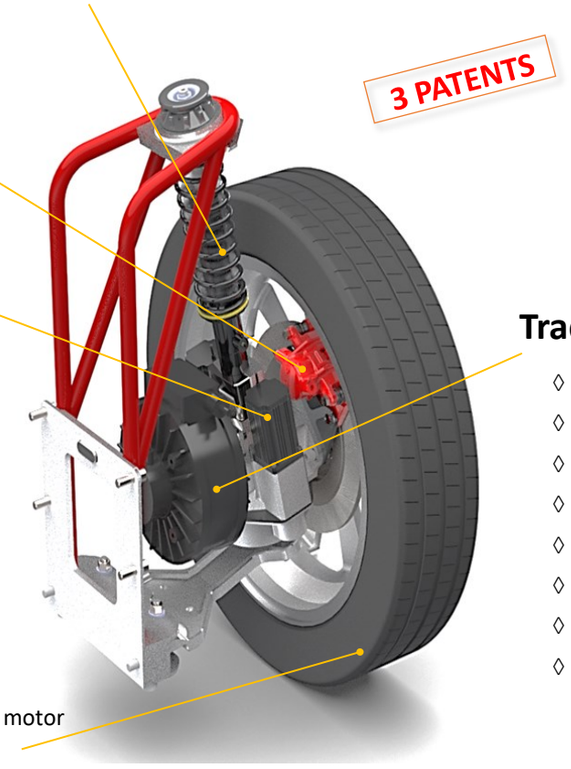
Shock Absorber :

- Technology : MacPherson

Brake :

- Technology : Brake By Wire
- Brake type : Disc

3 PATENTS



Electric Steering System motor x 2 :

- 2 Motors redundant Topology
- Rated Power : 188 W * 2
- Feedback 1 : Hall Sensor
- Cooling System : Air & Liquid Cooled (Optional)

Traction motor :

- Power Supply : 330 VDC
- Rated Power : 3.75 KW & 7,5KW
- Rated Torque : 7.96 Nm &15,9 Nm
- Feedback 1 : Encoder Incremental & Absolute
- Feedback 2 : Temperature Sensor
- Cooling System : Air Cooled & Liquid Cooled
- Protection : IP67
- Wheel Rated Torque : 55.72 Nm & 111,3 Nm

Wheel :

- Turning Angle Range : -70º to +70º (Standard)
- Size : 155/60/R19 (Standard)
- * 32Kg _ Basic version with 3.75 KW motor & 40 Kg with 7.5 KW motor

* Weight not included:

1) Wheel type should be concreted based in specific needs
2) Interface with chassis. Usually is part of the vehicle´s chassis structure

iOne

MODULES

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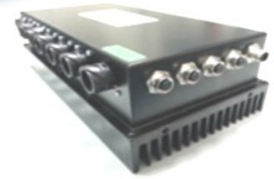


iTMC _ Power & Control ECU for PWM & PMSM motors.

Power Train Traction Motor applications based in Automotive standards.

Power & Control ECU for Sinusoidal or Trapezoidal control for 4-Quadrant PWM and PMSM motors, allowing remote : positioning, speed and torque control via CANBUS commands.

HARDWARE iTMC :

- ◊ Power Supply _ Power : 330 VDC & 12 /24 VDC
- ◊ 1 power output up to 8KW for PMSM motors
- ◊ 1 Incremental & absolute encoder input
- ◊ 1 Hall sensor input
- ◊ PWM 15 Khz
- ◊ Sensor Speed range : Up to 10K RPM
- ◊ 2 Digital inputs _ 2 Analogic inputs
- ◊ CANBUS com _ up to 1MBs
- ◊ Operation temperature range : -20ºC to +85ºC

SOFTWARE iTMC :

- ◊ User interface
- ◊ Parameters configuration (Autotuning)
- ◊ Calibration
- ◊ Main parameters monitoring and diagnostics

iSMC _ Power & Control ECU for PMSM & BLDC motors.

Power Train Steering System applications based in Automotive standards.

Power & Control ECU for PMSM & BLDC motors, allowing remote : positioning, speed and torque control via CANBUS commands.

HARDWARE iSMC :

- ◊ Power Supply : 12 VDC Redundant /24/48 VDC
- ◊ 2 power outputs for 2 PMSM - BLDC motors. Redundant topology.
- ◊ Max. Output Current : 15 A & 10 A , see versions
- ◊ 2 encoder / hall sensors inputs
- ◊ PWM : Up to 15 Khz
- ◊ Sensor Speed range : 10K RPM
- ◊ 4 Digital Inputs _ 2 Analogic inputs
- ◊ CANBUS com _ up to 1MBs
- ◊ Operation temperature range : -20ºC to + 85ºC

SOFTWARE iSMC :

- ◊ User interface
- ◊ Parameters configuration (Autotuning)
- ◊ Calibration
- ◊ 2 motors simultaneous control
- ◊ Main parameters monitoring and diagnostics

iOne

MODULES

- iRM & iFM
- iKeyLess
- iADAsys
- iDashboard
- iVDC
- iTMC & iSMC
- iRobotWheel
- iChassis

iVDC _ Vehicle Safety Functions ECU.

ECU for the vehicle safety functions (Vehicle Dynamics , …) based in Automotive standards.

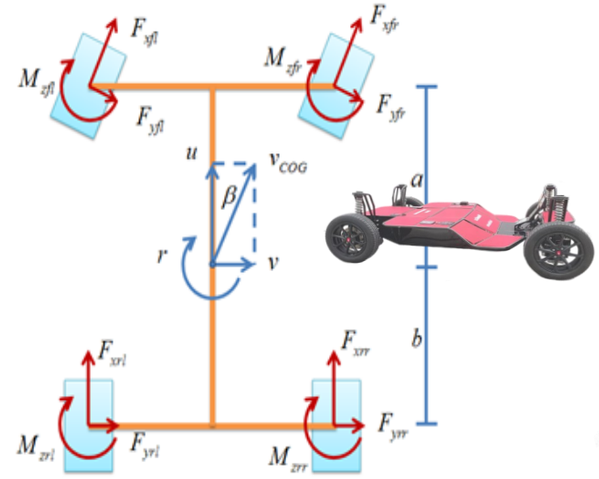
- ◊ Vehicle dynamics management
- ◊ Powertrain management
- ◊ Braking System management
- ◊ Driving Interface: Steering Wheel, Throttle, Joystick, SmartPhone, ADAS
- ◊ Communications Gateway

HARDWARE :

- ◊ Power Supply : 12 / 24 VDC redundant
- ◊ Dual core microp certified for safety applications
- ◊ 4 x CANBUS com _ up to 1MBs)
- ◊ 1 x FLEXRAY com
- ◊ 2 Accelerometer & 2 Gyroscope
- ◊ 1 Incremental encoder input
- ◊ 1 Torque sensor input
- ◊ 10 Analogic inputs _ 3.3Vdc / 5 Vdc
- ◊ Operation temperature range : -20ºC to + 85ºC

SOFTWARE :

- ◊ User interface
- ◊ Parameters configuration
- ◊ CANBUS & FLEXRAY Commands
- ◊ Matlab / Simulink supported



iOne

MODULES

- iRM & iFM
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- iDashboard
- iVDC
- iTMC & iSMC
- iRobotWheel
- iChassis

iDashboard

Dashboard for vehicle instrumentation and control operations display. Interface with passengers and V2V _ V2I interface communications.

Configurable modular dashboard systems based in 3 main screens :

- Cluster : Main vehicle parameters. Speed, odometer , ...
- Infotainment: Radio, navigation, ……..
- Comfort : Heater control, mirror configuration , …….

HARDWARE :

- ◊ Up to 3 Screens :
  - Cluster / Infotainment / Comfort
- ◊ Electronic Control:
  - Up to 2 ECU
- ◊ Local Communications :
  - CANBUS & FLEXRAY
- ◊ Interface Communications :
  - GPRS / WIFI / RF

SOFTWARE :

- ◊ User interface.
- ◊ CANBUS & FLEXRAY Commands.

iOne

MODULES

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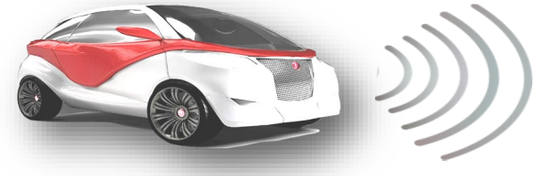


iADAsys_ CAMERAS Module :

Images capture for the execution of algorithms based on Deep Learning technologies for ADAS applications to support vehicle assistance and autonomous driving.

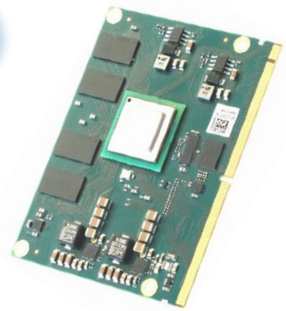
iADAsys_ Advanced Driving Assistance

- Obstacle detection: vehicles, pedestrians, bicycles, etc.
- Traffic Signals detection
- Custom solutions

iADAsys_ ECU Module.

Images and Data management . CAN bus interface with the vehicle ECUs.

- CPU: Quad ARM® Cortex® A53 cores at up to 1.3 GHz core frequency
- 1x Cortex M4 Core for real time processing
- Deep Learning Algorithms
- Safety: FCCU and FCCU output supervision unit
- Security & Encryption: CSE-FL & AES-128
- Image Cognition: 2x APEX2-CL Dual 32-bit array with 2x32 compute units
- Ethernet: 1x MII/RGMII
- Serial:2x MIPI-CSI: 2x4 lanes, up to 1.5 Gbps
- FlexCAN: 2x CAN-FD



HARDWARE :

- Sensor: Up to 3 CMOS
- Type : Color
- Format : 1/2.7”
- Temp range: -40ºC / 105ºC
- Resolution:_ 1312*828 pixels
- Application : ADAS

iOne

MODULES

- iRM & iFM
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- iRobotWheel
- iChassis

iKeyLess _ Smart Keyless Entry and Start System.

SMART KEY LESS SYSTEM for access control , safety and vehicle start/stop function.

Turnkey solution , based in a complete mechatronic solution and advanced software.

PEPS : Passive Entry Passive Start electronic unit.

- 6 LF + Immobilizer
- Encryption based in AES128
- RF Antenna (Rx / Tx)
- Smart Switch Input (Anti wet)

PKE : Remote Smart Key.

- 3D LF Coil
- Motion Sensor
- Smart Switch Input (Anti wet)

PKE : Smart Phone.

- Data transmission rate : 420Kb/s. Safe protocol.
- Frequency : 13.56 Mhz (free)
- Maximal distance : 20 cm
- APP : Digital Key application

ANTENNA : LF & NFC antenna.

ESCL : Steering Column mechanical latch.

START / STOP : Pushbutton.

PKE _ SMART PHONE

NFC / APP

PKE _ SMART KEY

LF/RF

iOne

MODULES

- iRM & iFM
- iKeyLess
- iADAsys
- iDashboard
- iVDC
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- iRobotWheel
- iChassis

iFM _ ECU for the vehicle front devices control

Digital and analogic devices control concerning the front side of the vehicle

- Front vehicle lights
- Front wiper
- Water Pump
- Horn

iRM _ ECU for the vehicle rear devices control

Digital and analogic devices control concerning the rear side of the vehicle

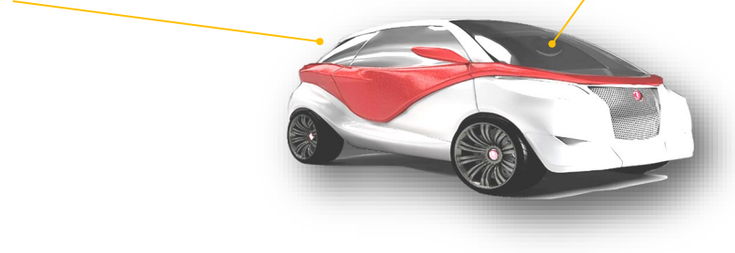
- Rear vehicle lights
- Rear Wiper
- Water Pump
- Trunk lock

HARDWARE iRM :

- ◊ Power Supply : 12 VDC
- ◊ CANBUS com _ up to 1MBs
- ◊ Up to 10 Digital outputs
- ◊ Up to 10 Digital inputs

SOFTWARE iRM :

- ◊ Application management.



HARDWARE iFM :

- ◊ Power Supply : 12 VDC
- ◊ CANBUS com _ up to 1MBs
- ◊ Up to 30 Digital outputs
- ◊ Up to 10 Digital inputs

SOFTWARE iFM :

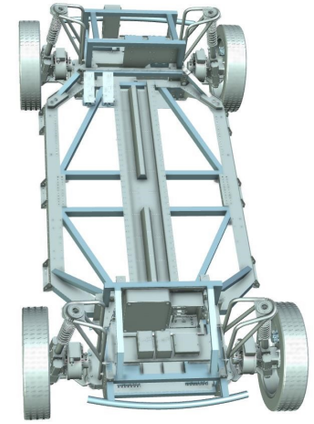
- ◊ Application management.

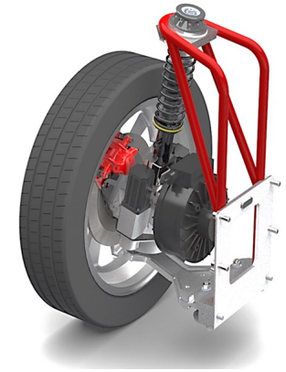
iOne

PLATFORM CONFIGURATION TABLE

iOne 4.0 Model

iOne 4.0 Configuration _ Standard	P1	P2	P3	P4	P5	P6	P7	P8
iChassis : • WheelBase 2660 mm • Braking System	1	1			1	1		
iChassis : • WheelBase 1800 mm • Braking System			1	1			1	1
iRobotWheel : • Electric Traction Motor **3,75KW** + **iTMC** • Electric Steering System + **iSMC** • Disc Brake • Shock Absorber	2 Front 2 Rear	2 Front	2 Front	2 Front				
iRobotWheel : • Electric Traction Motor **7,5 KW** + **iTMC** • Electric Steering System + **iSMC** • Disc Brake • Shock Absorber					2 Front 2 Rear	2 Front	2 Front	2 Front
iRobotWheel : • Electric Traction Motor **3,75 KW** + **iTMC** • Disc Brake • Shock Absorber		2 Rear						
iRobotWheel : • Electric Traction Motor **7,5 KW** + **iTMC** • Disc Brake • Shock Absorber						2 Rear		
iRobotWheel : • Electric Steering System + **iSMC** • Disc Brake • Shock Absorber			2 Rear				2 Rear	
iRobotWheel : • Disc Brake • Shock Absorber				2 Rear				2 Rear





iOne

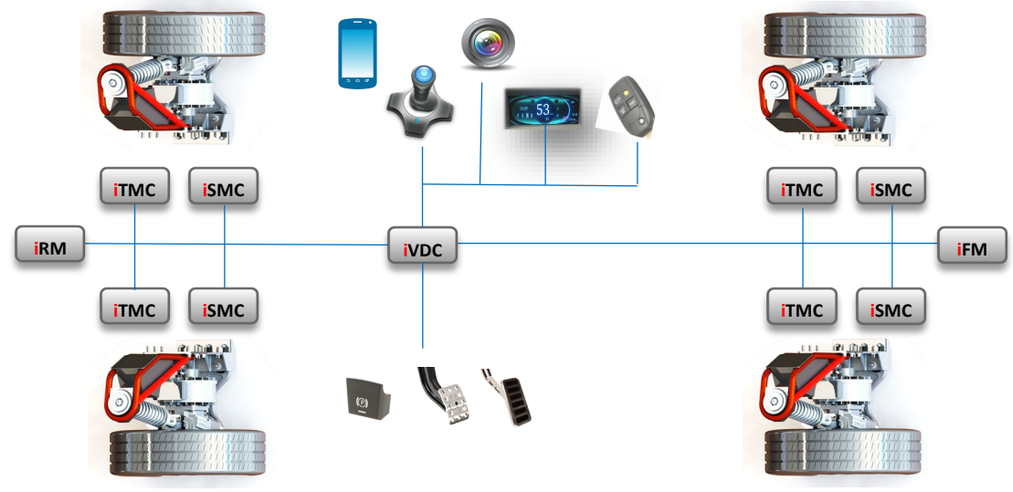
PLATFORM CONFIGURATION TABLE

iOne 4.0 Model

iOne 4.0 Configuration _ Standard	P1	P2	P3	P4	P5	P6	P7	P8
iVDC : Vehicle Safety Functions ECU	1	1	1	1	1	1	1	
iDashboard : Instrumentation and control Display	1	1	1	1	1	1	1	1
iJoystick : Driving unit	1	1	1	1	1	1	1	1

iOne 4.0 Configuration _ Optional	P1	P2	P3	P4	P5	P6	P7	P8
iFM : Vehicle front devices control								
iRM : Vehicle front devices control								
iKeyLess : Smart Keyless Entry and Start System								
iADAsys : Advanced Driving Assistance								
i**Maintenance** : iCloud data base , traceability and monitoring								
Batteries : Various capacities and technologies based in the application								

STANDARD & CUSTOM SOLUTIONS



CLIMATE COMMITMENT

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MOBILITY

iOne

Robotic Vehicular Platform

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