



# **FFT** *igv* **ELEVATE**

„Advancing AGVs to an *intelligent* level“

one step ahead in **INTELLIGENT** production systems



## FFT *igv* ELEVATE

Your intelligent transport solution

1

### Overview

Key Facts and Dimensions

2

### Technology

Vehicle Control, Fleet Control, Drive Control, Operation

3

### Modules

Navigation, Power Supply and Charging Concept, Various Options



# 1. Overview

Key Facts and Dimensions

one step ahead in INTELLIGENT production systems

# FFT *igv* ELEVATE

## Overview

Integrated scissor lift

Bidirectional movement

Payload up to 1 ton

Length: 2500mm

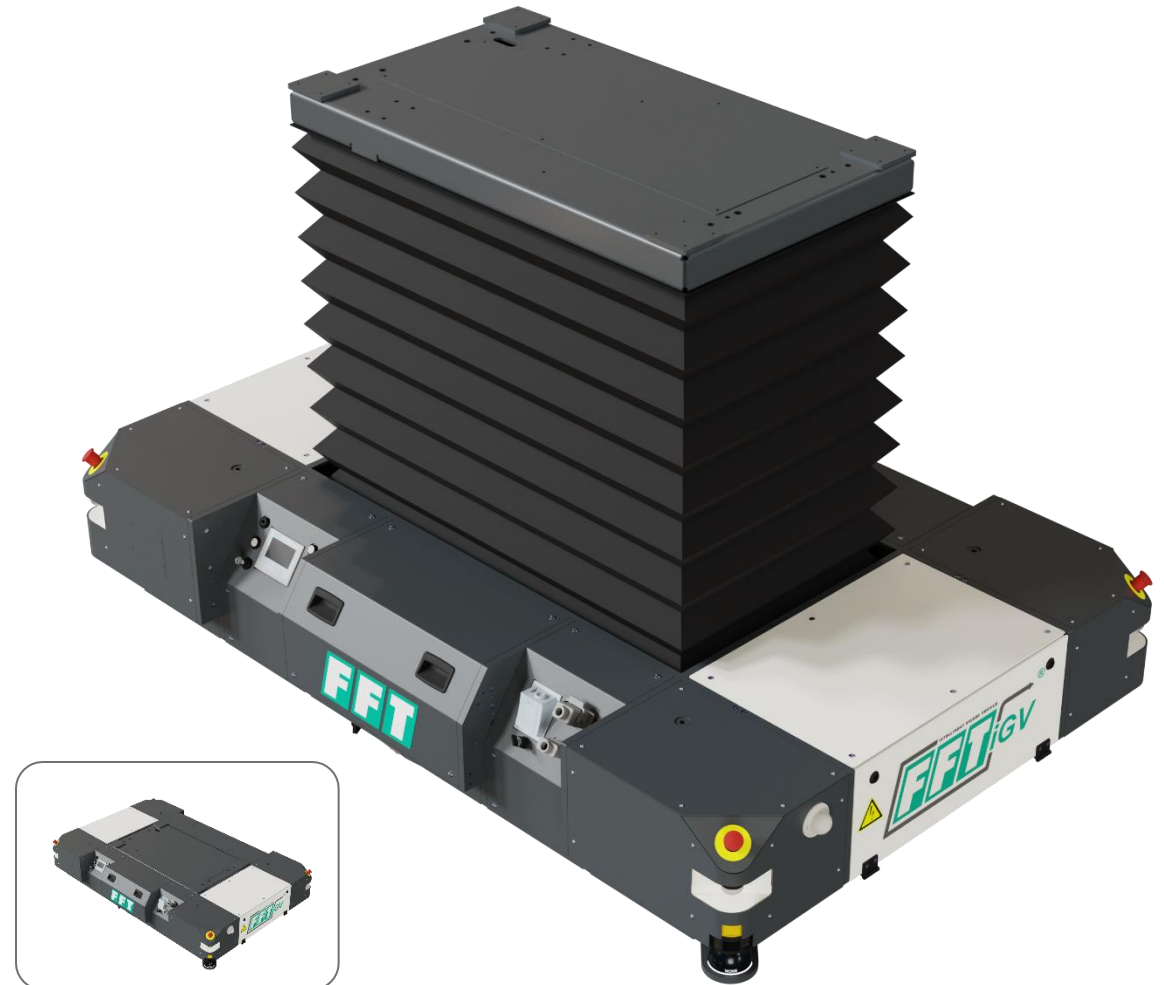
Width: 1600mm

Height: 450mm (lifting 1200mm)

Weight: 1.750kg

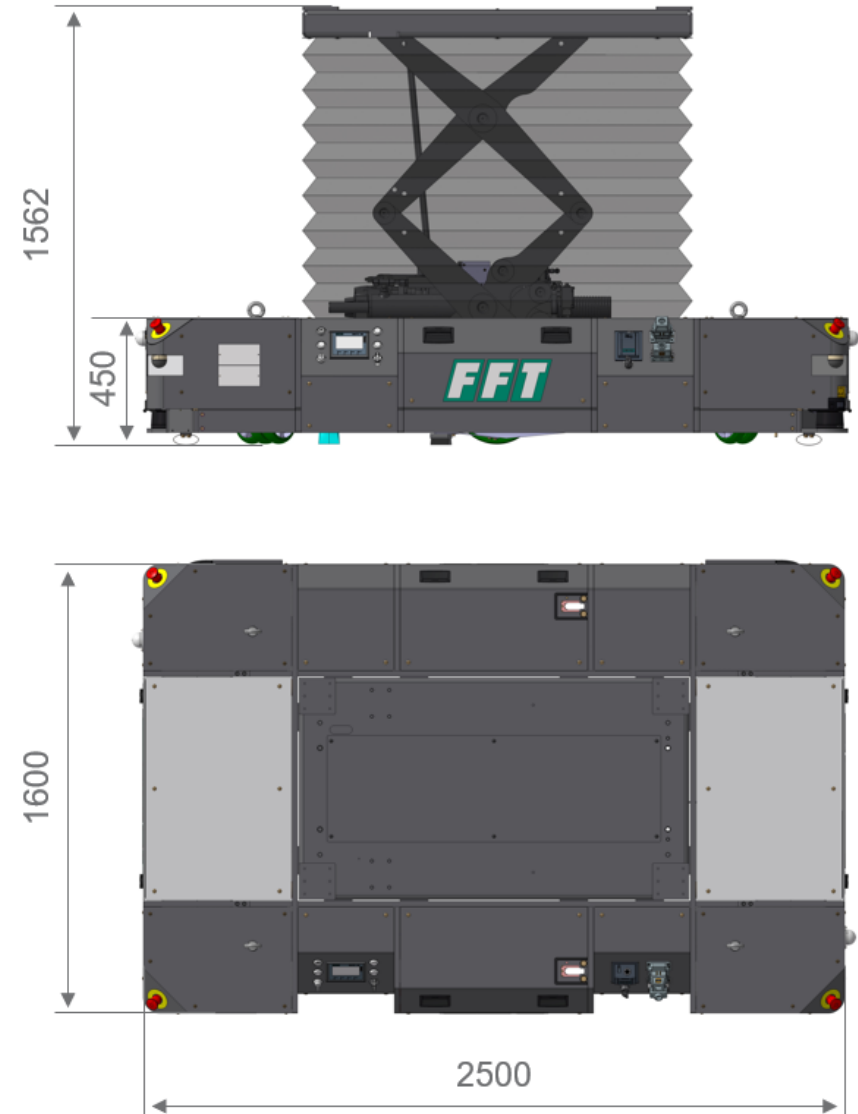
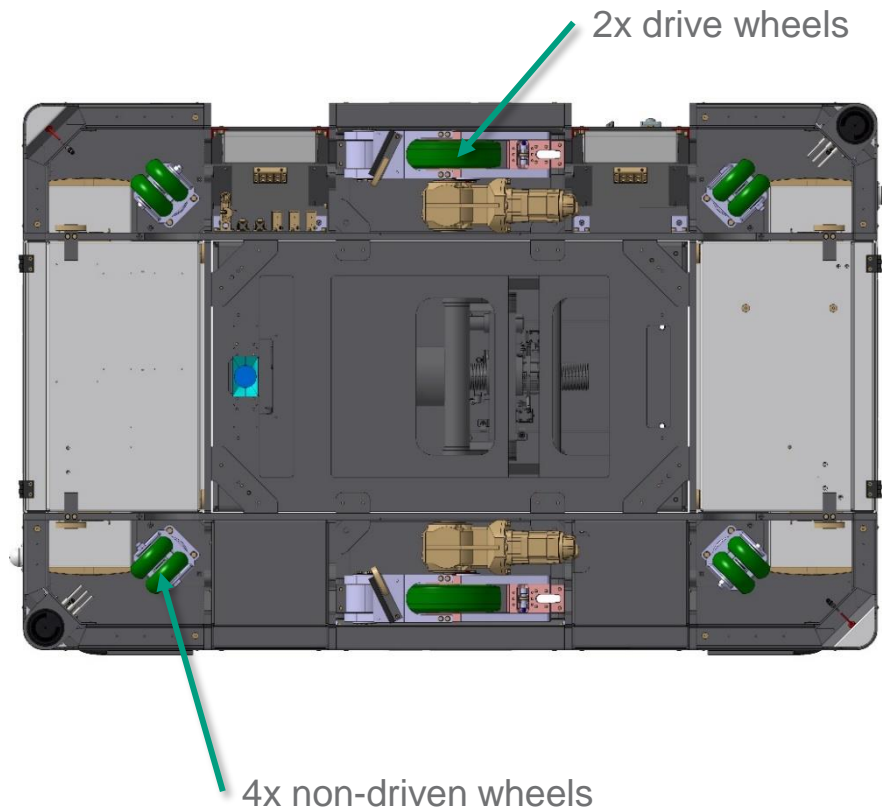
*Optional: Safe 3D camera*

*Optional:  
Robot, Lift, Roller Conveyor*



# FFT *igv* ELEVATE

## Dimensions



## 2. Technology

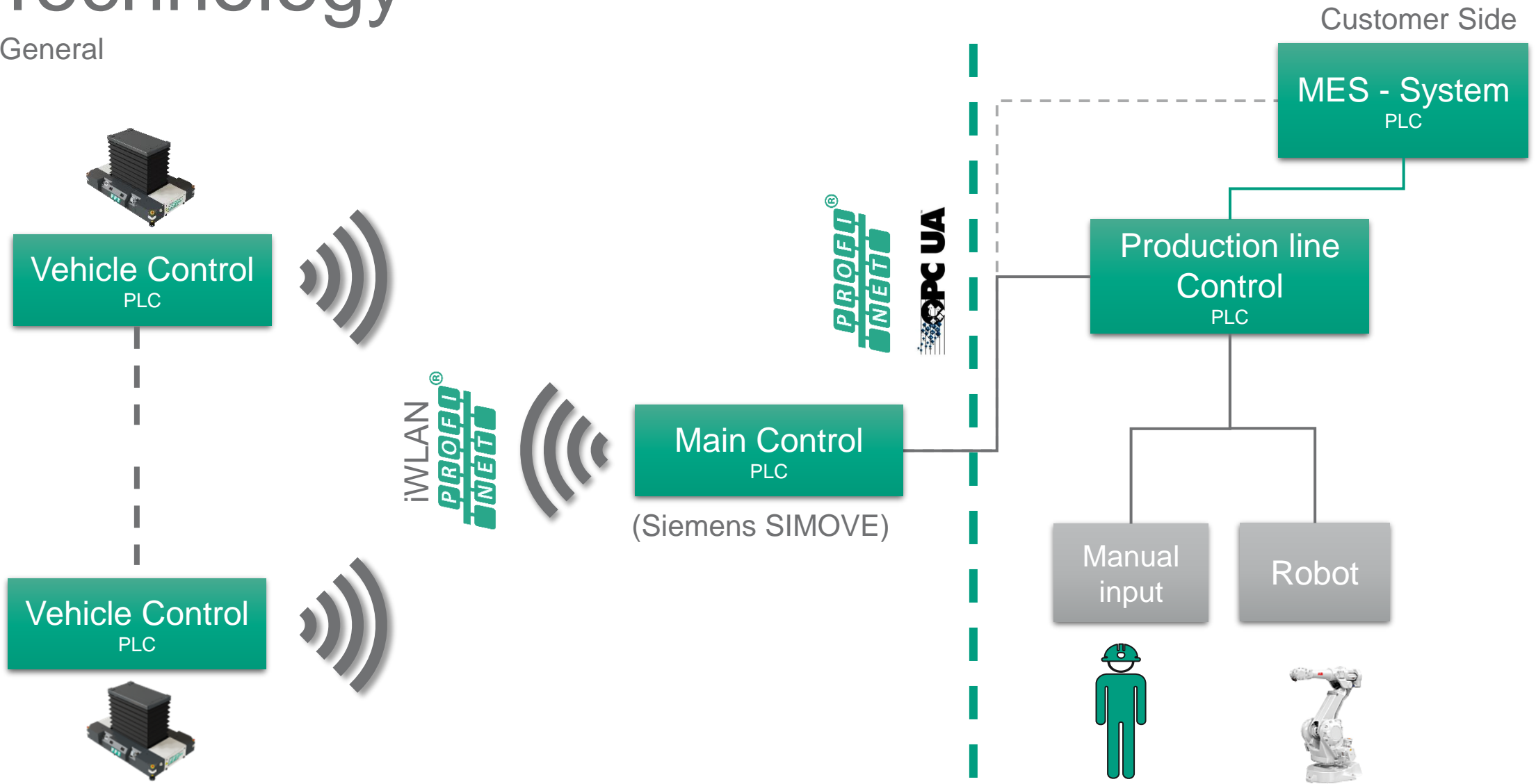
Vehicle Control, Fleet Control, Drive Control,  
Operation



one step ahead in **INTELLIGENT** production systems

# Technology

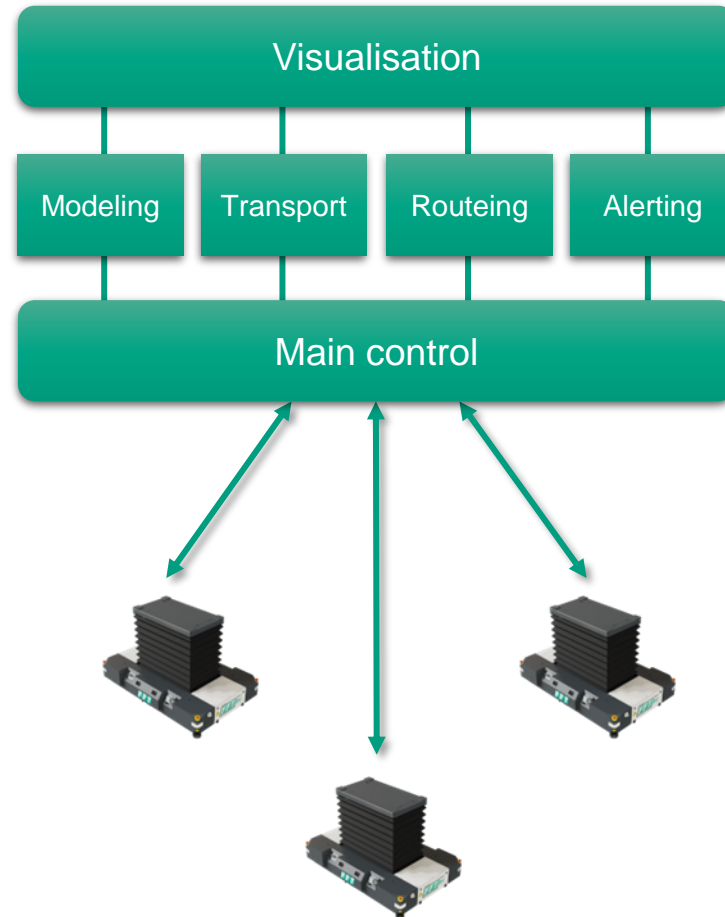
General



# Technology

Fleet control – Siemens SIMOVE Main Control

- Control of AGV applications via PLC with automation standards and integrated safety functions
- Visualization via WinCC Scada and operator panels
- Interface via PROFINET
- For safety communication use of iWLAN with iPCF configuration
- Available capacity for additional modules and superstructures



- Adaptation to customer automation standards
- Identification points
- Block areas
- Functional groups
- Safety areas





# Technology

## Software Overview

### Master Control

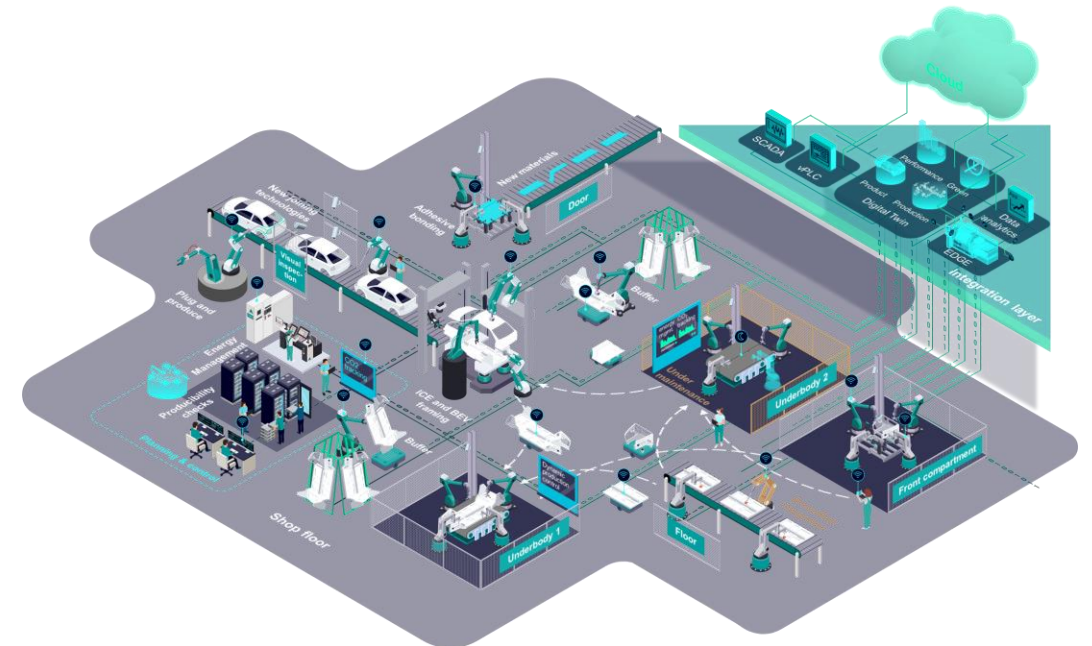
- ◆ Siemens „Simove Master Control“ – PLC based (adapted)
- ◆ Siemens „Fleet management“ – Server based
- ◆ VDA 5050 certified

### Carrier Control

- ◆ Siemens „Simove Carrier Control“ (adapted)
- ◆ VDA 5050 certified

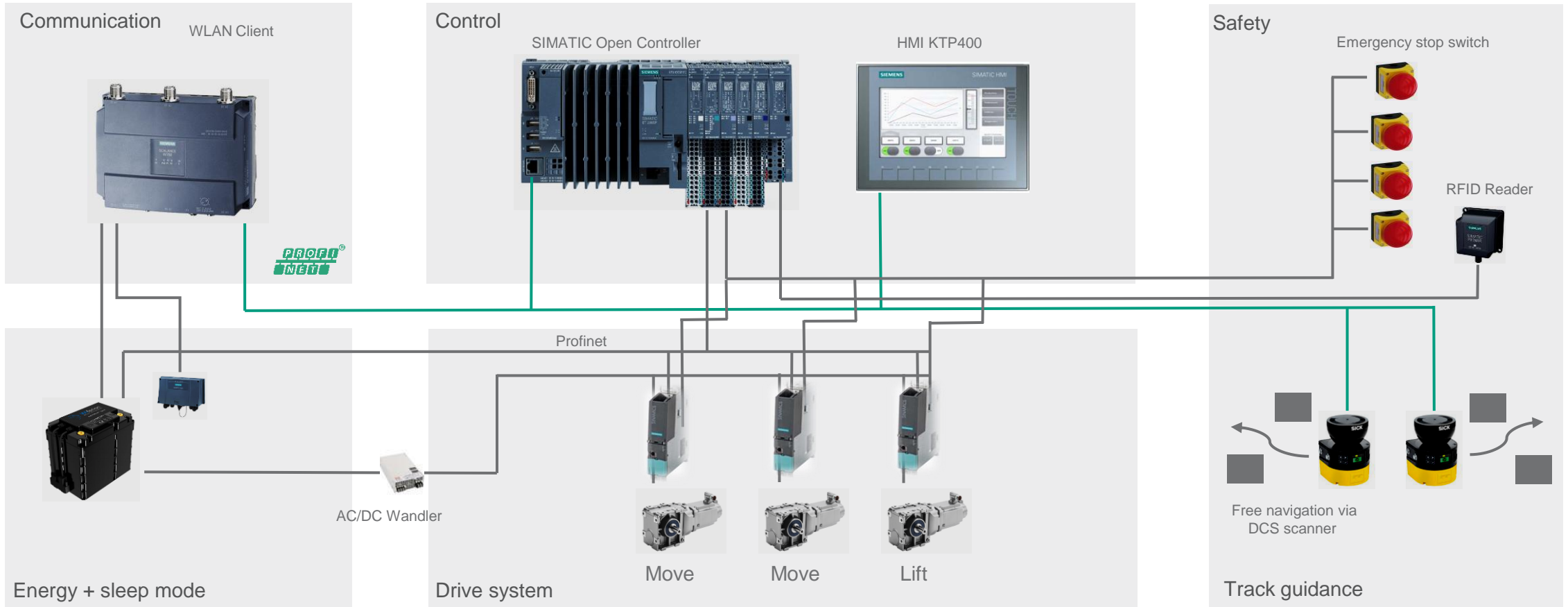
### Navigation (SLAM)

- ◆ Siemens „ANS+“



# Technology

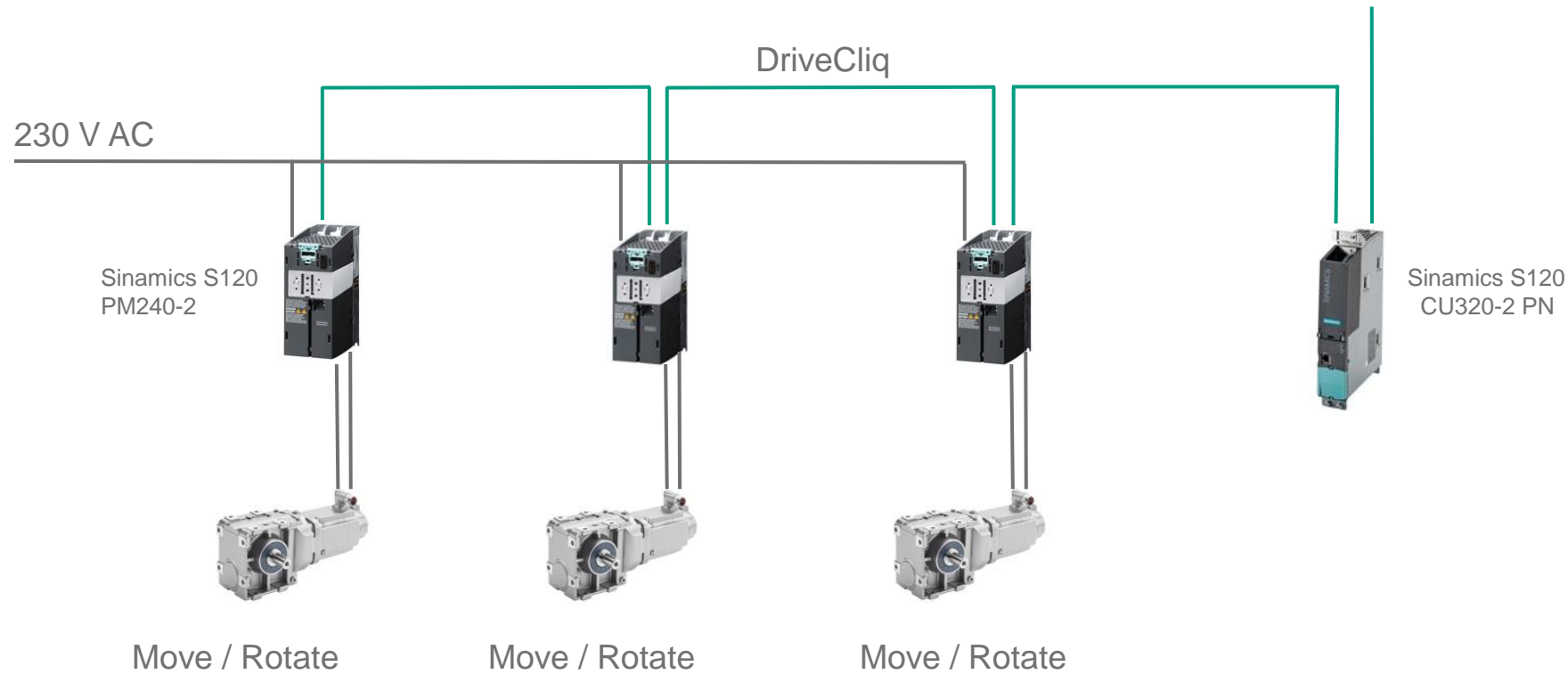
## Controls Overview ELEVATE



# Technology

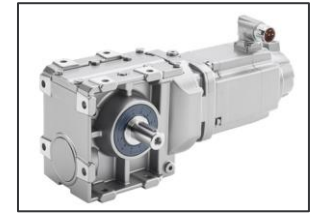
Drives Overview ELEVATE

## Siemens SINAMICS S120



If necessary, extension possible (depending on specification)

**SIMOTICS S-1FG1**  
Servo geared motors



**SINAMICS CONTROL-UNIT CU320-2 PN**



**SIPLUS SINAMIC S G120 PM 240-2**



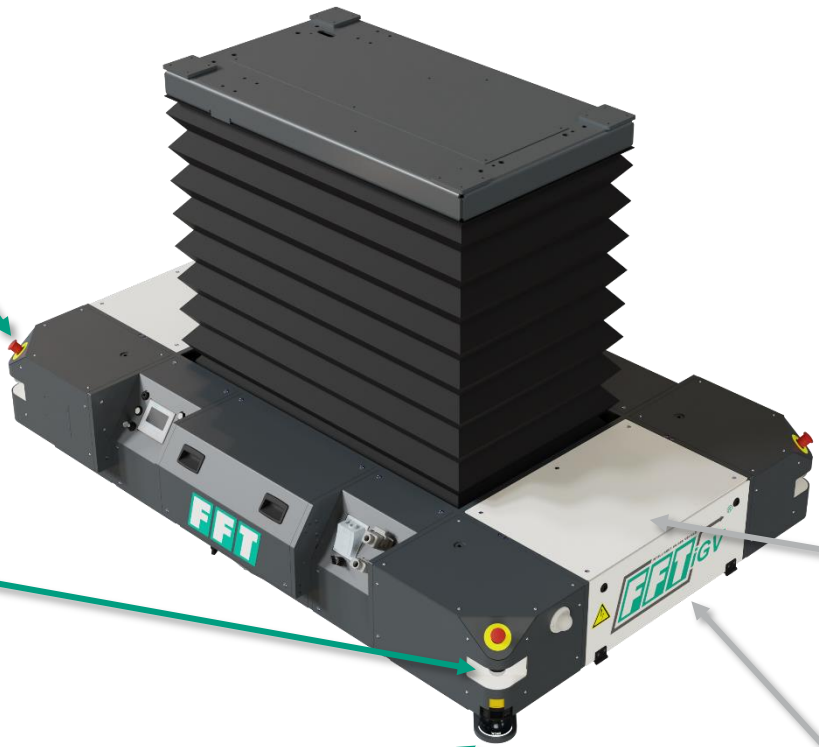
# Technology

## Safety Features

Emergency switch in every corner

Optical direction indicator and warning signals in every corner

Safety laser scanners installed diagonally opposite each other



*Optional:  
Safe 3D Camera*

*Optional:  
Safe position feedback  
"Safe QR-Code reader"*

# Technology

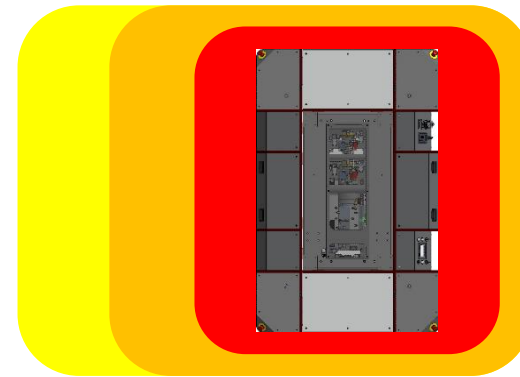
## Safety Areas

Safety scanner:  
360°-degree  
monitoring

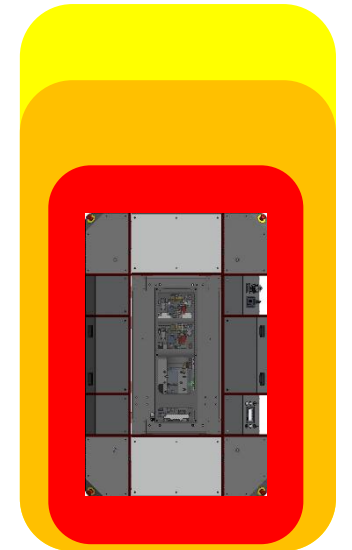
Protective fields size:  
Dependent on vehicle  
size or the dimensions  
of the loaded part and  
the driving speed



Sideways Movement



Forward Movement



### 3. Modules

Navigation, Power Supply and Charging Concept,  
Various Options



INTELLIGENT GUIDED VEHICLE

one step ahead in **INTELLIGENT** production systems

# Modules

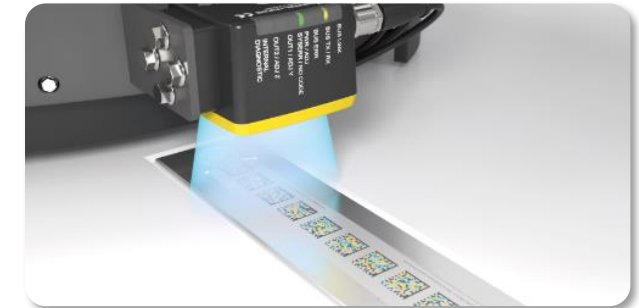
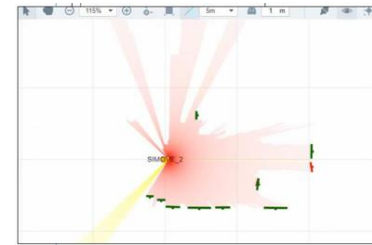
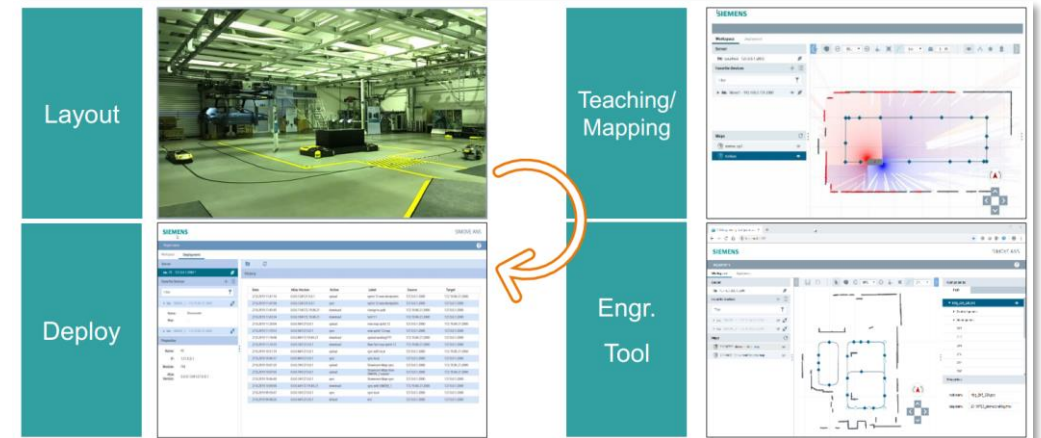
Navigation Options

Laser Navigation (SLAM)

Track guided Navigation

- ◆ QR-Code
- ◆ QR-Code (Safe)
- ◆ Coloured Tape
- ◆ Magnetic Tape
- ◆ RFID

Combination of Laser and Track guided navigation possible!

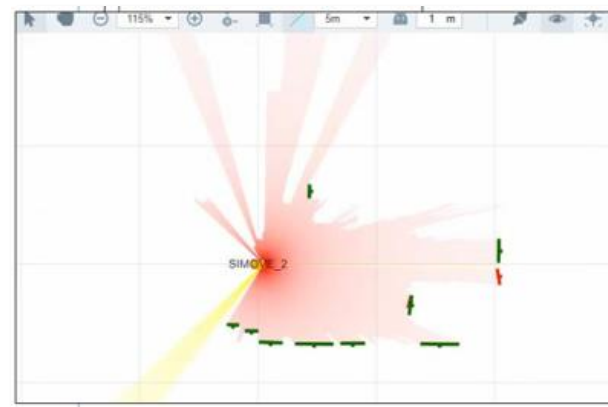
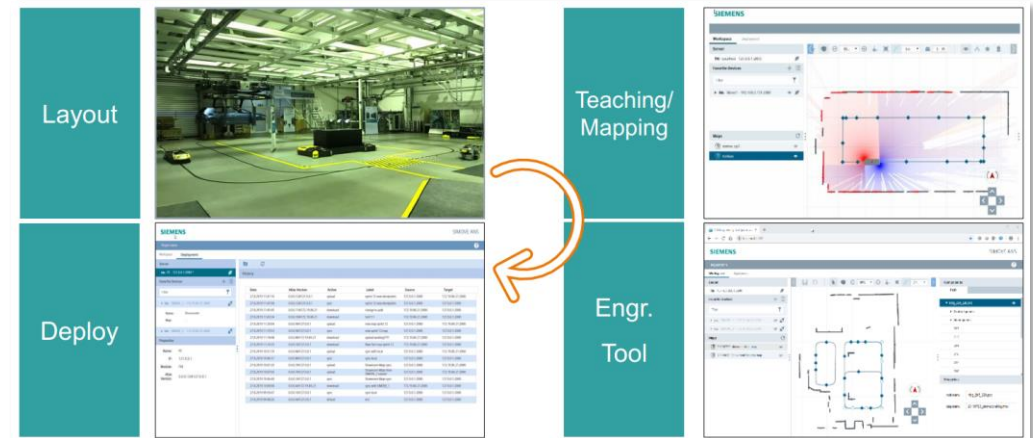


# Modules

## Navigation Options

### Laser Navigation (SLAM)

- ◆ Based on predefined routes within the digital map
- ◆ SIMOVE ANS+ can use existing features for navigation (edges, walls, reflectors, etc.)
- ◆ Outlook: Automatic obstacle bypass (mid-2023)
- ◆ No extra sensors required
- ◆ Maximum possible precision:  $\pm 1\text{cm} / 1^\circ$   
Precision in driving mode:  $\pm 5\text{cm}$





# Modules

## Navigation Options

### Track guided – QR-Code

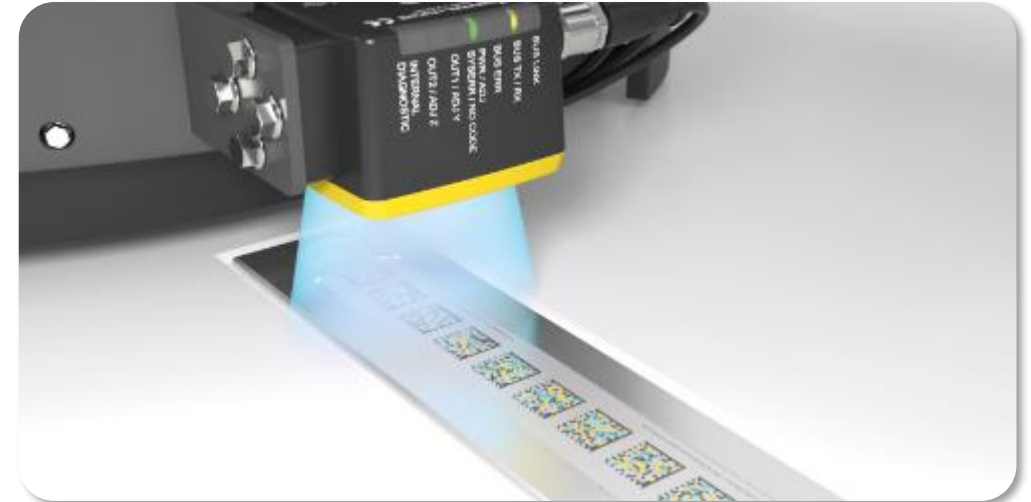
- ◆ Detail positioning
- ◆ QR-Code installation standard: aluminum protective rails
- ◆ Safe positioning as an option
- ◆ Maximum possible precision:  $\pm 5\text{mm} / 1^\circ$

#### Further Options:

QR-Code Tape

Colored Tape

Magnetic Tape



CE

# Modules

HMI – Manual Control

## HMI control panel on the vehicle (Siemens KTP 400)

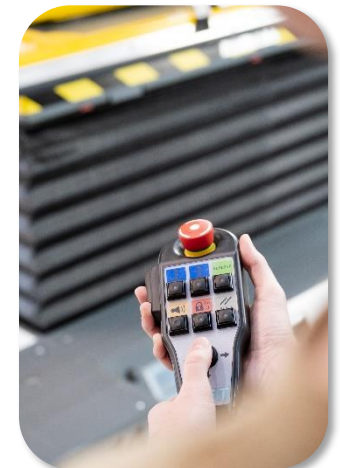
- ◆ Error handling
- ◆ Status display
- ◆ Diagnosis

## Mobile HMI control panel (Siemens KTP 700F)

- ◆ Manual control of the vehicle (if necessary)
- ◆ Error handling
- ◆ Status display
- ◆ Diagnosis

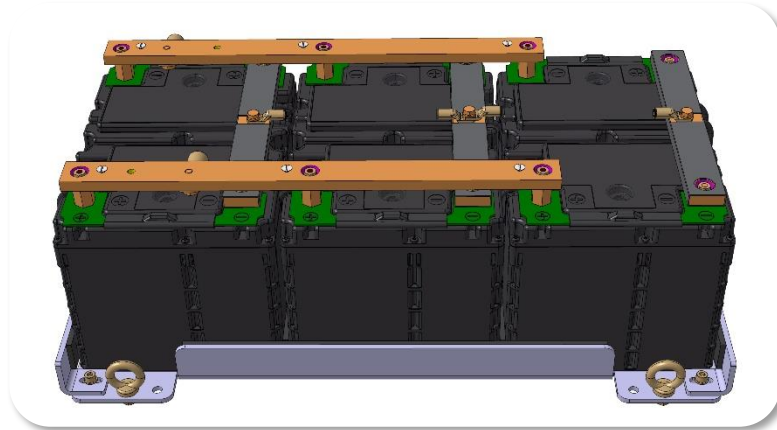
## Mobile joystick

- ◆ Manual movement of the vehicle (commissioning, maintenance)



# Modules

## Energy Supply



### Battery: 6x per vehicle

Capacitance total	63Ah
Voltage	48V
Charging rate	up to 2C
Cycles	> 7.500
Charging current	60 – 120A
Communication	CAN-Bus
Battery type	Lithium iron phosphate



### Wireless Charging: 2x per vehicle

Charging power	3000W
Charging voltage	15 – 60V
Charging current	60A x 2=120A maximum
Optimal distance	15 – 40mm
Positioning tolerance	± 30mm

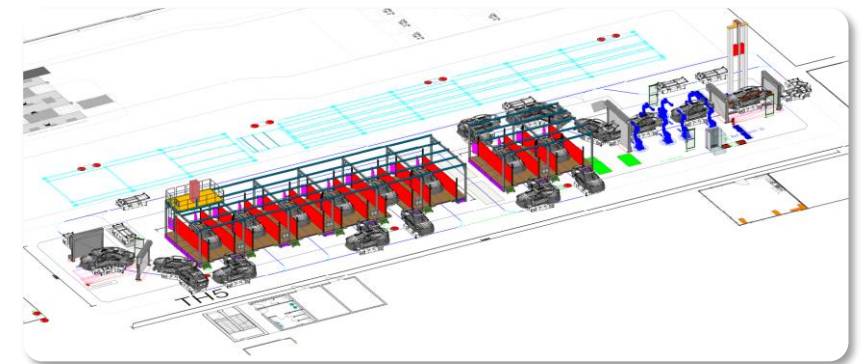
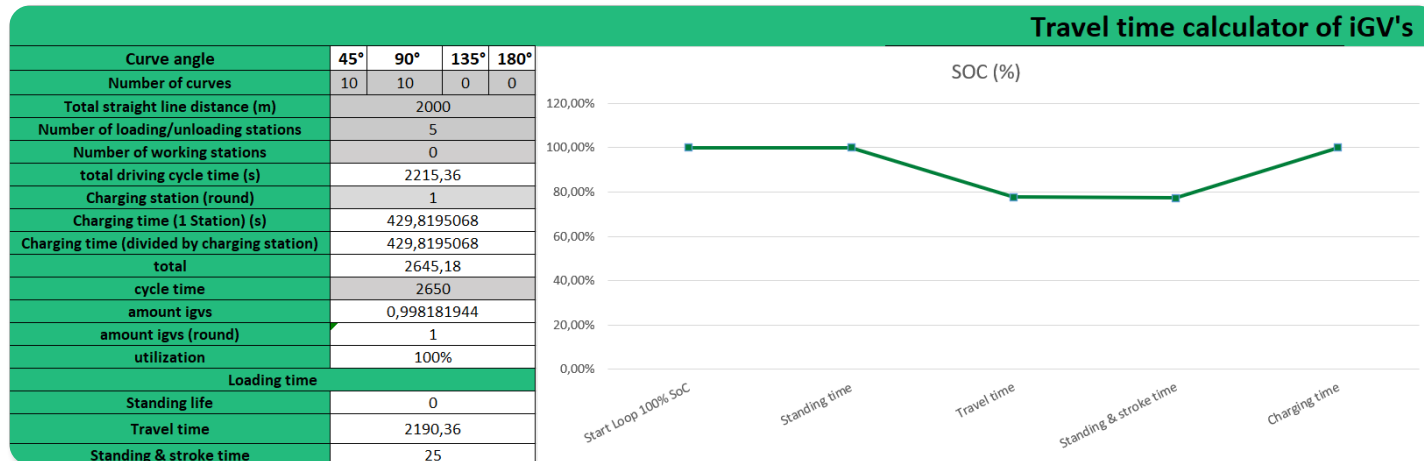
# Modules

Energy Supply – Capacity Simulation

The charging concept will be designed precisely to meet customer needs

Target: Verification of an uninterrupted production process (24/7) through simulation and placement of charging stations or **charge in process** if possible

Example:



# Modules

## Sleep Modes

### Sleep Mode & Wake up

- ◆ Activation via the Master Control via Wifi
- ◆ Activation directly at the iGV (buffer time up to 7d)

### Deep Sleep Mode

- ◆ Activation via the Master Control via Wifi
- ◆ Activation directly at the iGV
- ◆ Waking up only possible directly at the iGV (buffer time several months)



# Modules

Optional: Virtual Commissioning

## Option: Virtual Commissioning

- ◆ Vehicle Control
- ◆ Laser Navigation
- ◆ Track guided Navigation
- ◆ Master Control (SPS)



# Modules

Optional: Backup Solutions

## Setup-Tool (Lift of drivetrain)

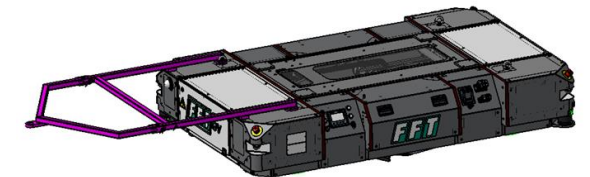
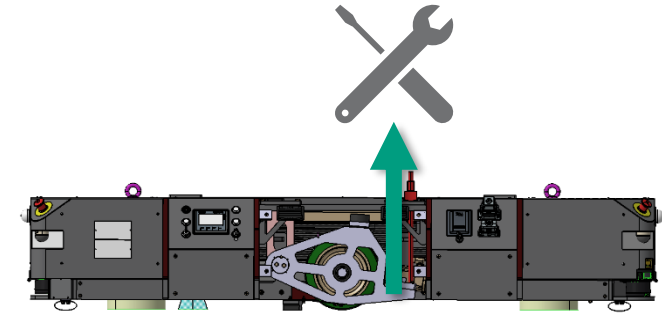
- ◆ Enables manual movement of the vehicle

Brake of the drive wheels can be opened by use of key switch

## Towing device

- ◆ Towing of the iGV (e.g., with the help of a forklift)

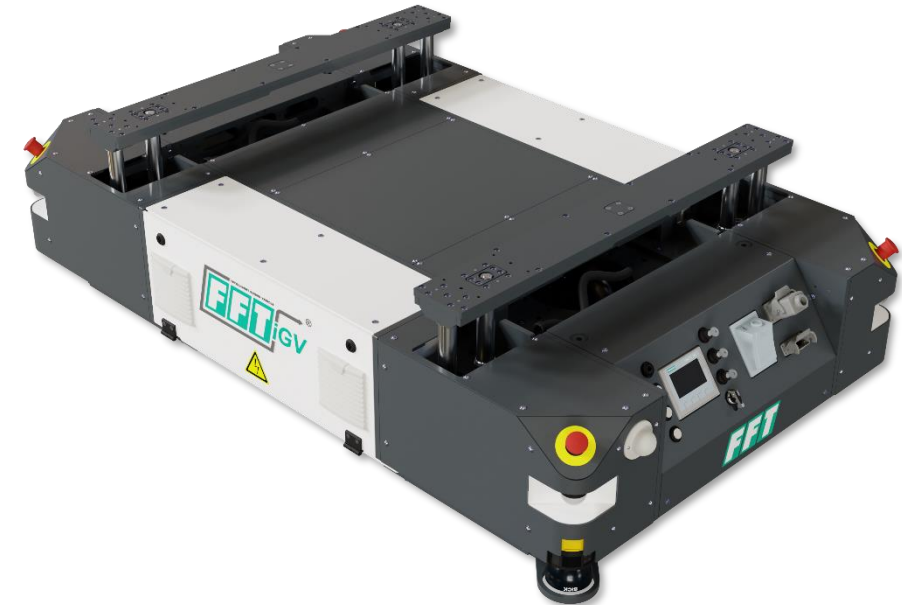
## Portable Battery charger



# Modules

## Required Floor Conditions

Floor condition requirements	
Maximum height ground obstacles	5mm
Maximum gap width	20mm
Maximum road gradient <i>*only track guided*</i>	2%
Required floor stability	C 20/25
Required floor load capacity	1500kg/qm
Surface pressure	23N/mm <sup>2</sup>







# CONTACT

## Your personal contact person

---

Christian Schuster  
Account Manager

FFT Produktionssysteme GmbH & Co. KG  
Schleyerstraße 1, DE-36041 Fulda  
Phone: +49 (0) 661 2926 - 4276  
Mobile: +49 (0) 160 - 94644642  
E-Mail: christian.schuster@fft.de  
www.fft.de

Jan Kreuzer  
Project Leader Electrical

FFT Produktionssysteme GmbH & Co. KG  
Schleyerstraße 1, DE-36041 Fulda  
Phone: +49 (0) 661 2926 - 5792  
Mobile: +49 (0) 171 - 3023531  
E-Mail: jan.kreuzer@fft.de  
www.fft.de



# THANK YOU

Feel free to contact us.

WWW.FFT.DE | INFO@FFT.DE  
TEL.: +49 (0) 661 2926-0

