

# LINEAR IMPACTOR SYSTEM

complexity made simple.



# HuDe GmbH

Since 1981 HuDe stands for highest quality and best service. Either in coke oven machinery or in test and measurement technology HuDe is firmly established around the world. The products are developed and produced with special attention to best

performance, newest technology, adherence of schedules and customer satisfaction. Our project teams and partners are using leading technology in design, construction, manufacturing and support to provide the best client satisfaction.

## Our Values

Our business philosophy is providing high-tech products made by outstanding people. To secure this target we permanently check and improve our processes and skills. Continuous training of our creative engineers is one of the key points of success.





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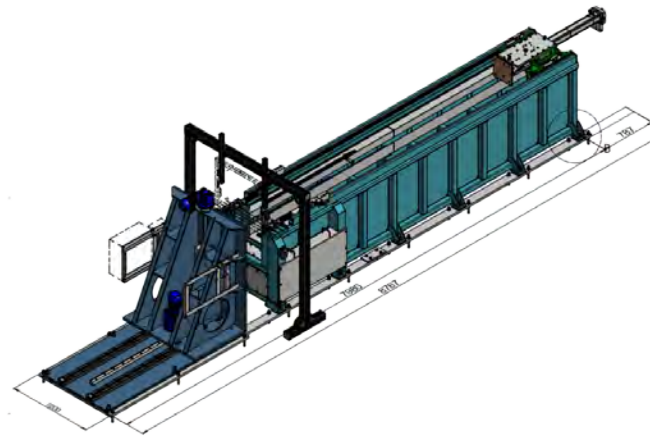
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# Linear Impactor System

The Linear Impactor designed by HuDe is perfectly suitable for the integration in small test facilities. Due to the flexible design, the system can be expanded by further modules at any time. You can cover test specification with different test variations like the common LIP plate impact, the guided motion modules such as head impact and ejection mitigation as well as the free motion modules like Maxilla / Double FMH and Body Block.



## The Modular Launcher

The impact engine is the Linear Impactor Propulsion sled. It represents a modular versatile-in-one system for the test modes Head Impact, Body Block, Linear Impactor, Maxilla and Out-of-Position. Latest addition to the launcher is the brand new Knee Impact mechanics and Double FMH.

## Basic System

A servo electric drive guarantees a high precision impact velocity by closed loop operation. Easy to maintain and replacement of impact sleds allows to change the test mode within some minutes.

Data acquisition with 32+ channels and multiple ignition channels for firing airbags are typical integrated to this test bench.





# Linear Impactor System



## Guided Motion

By easy to exchange modules different guided impact tests are possible.

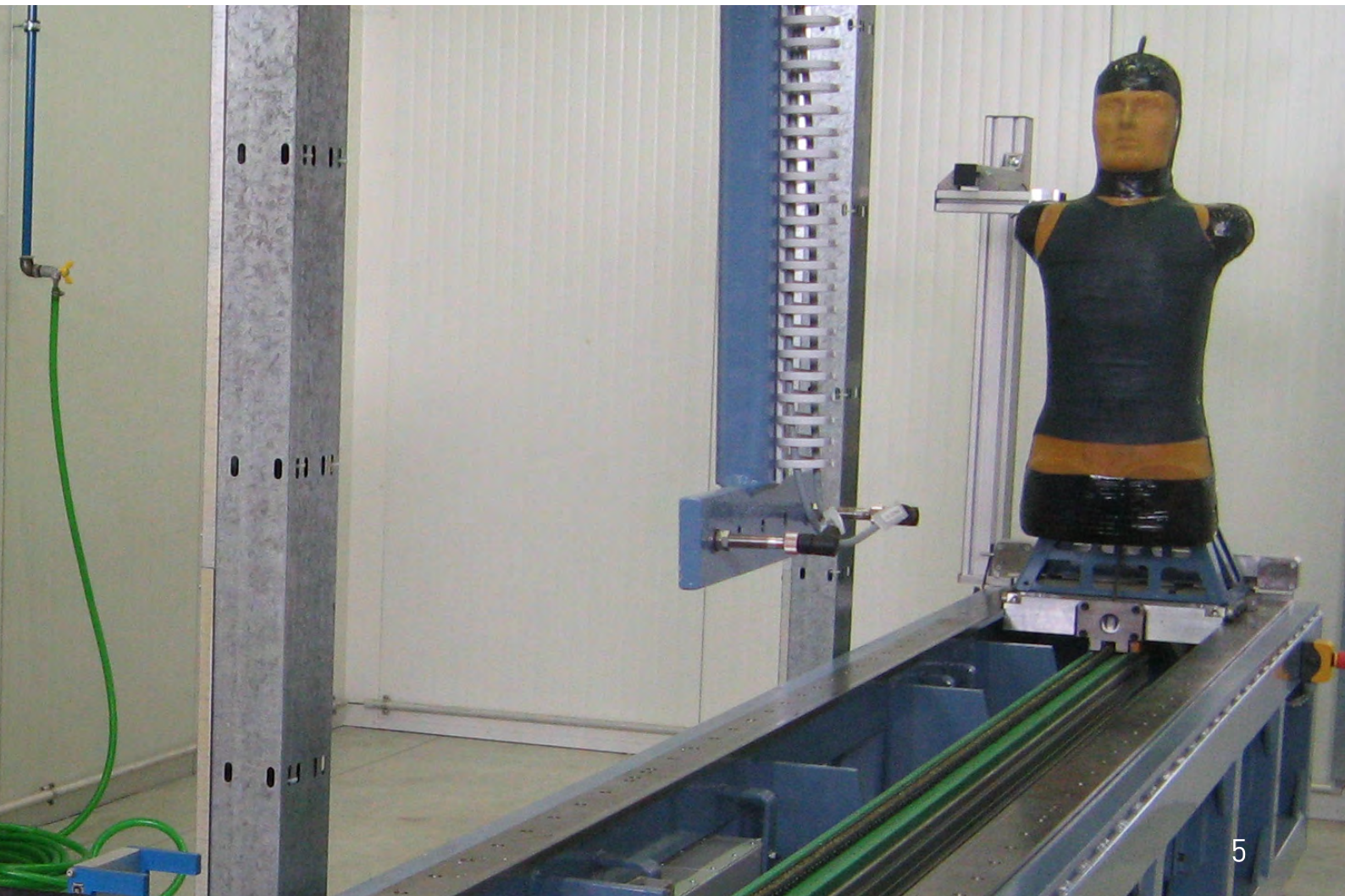
- Linear Impactor of low and high payloads in a wide range of energy input
- Head Impactor according to ECE R21
- Ejection Mitigation following FMVSS 226



## Free Motion

For the tests using free flying objects the following addons are available.

- FMH - Free Motion Headform according to FMVSS 201U
- Double Head Impactor for test of head airbags in first and second seatrow
- Body Block test according to ECE R12



# System Overview

The proven Linear Impactor Basic System provides the basis for the various test scenarios.

The versatile customer requirements are ensured by the modules.

The priority is a high reproducibility and precision. The impact speed is precisely controlled and adjustable by the sensors.

They provide an important basis for the evaluation and allocation of results.

## Customizing

According to customer requirements wide range of impact bodys and sleds is available for use with the Linear Impactor Basic System.

## Basic System

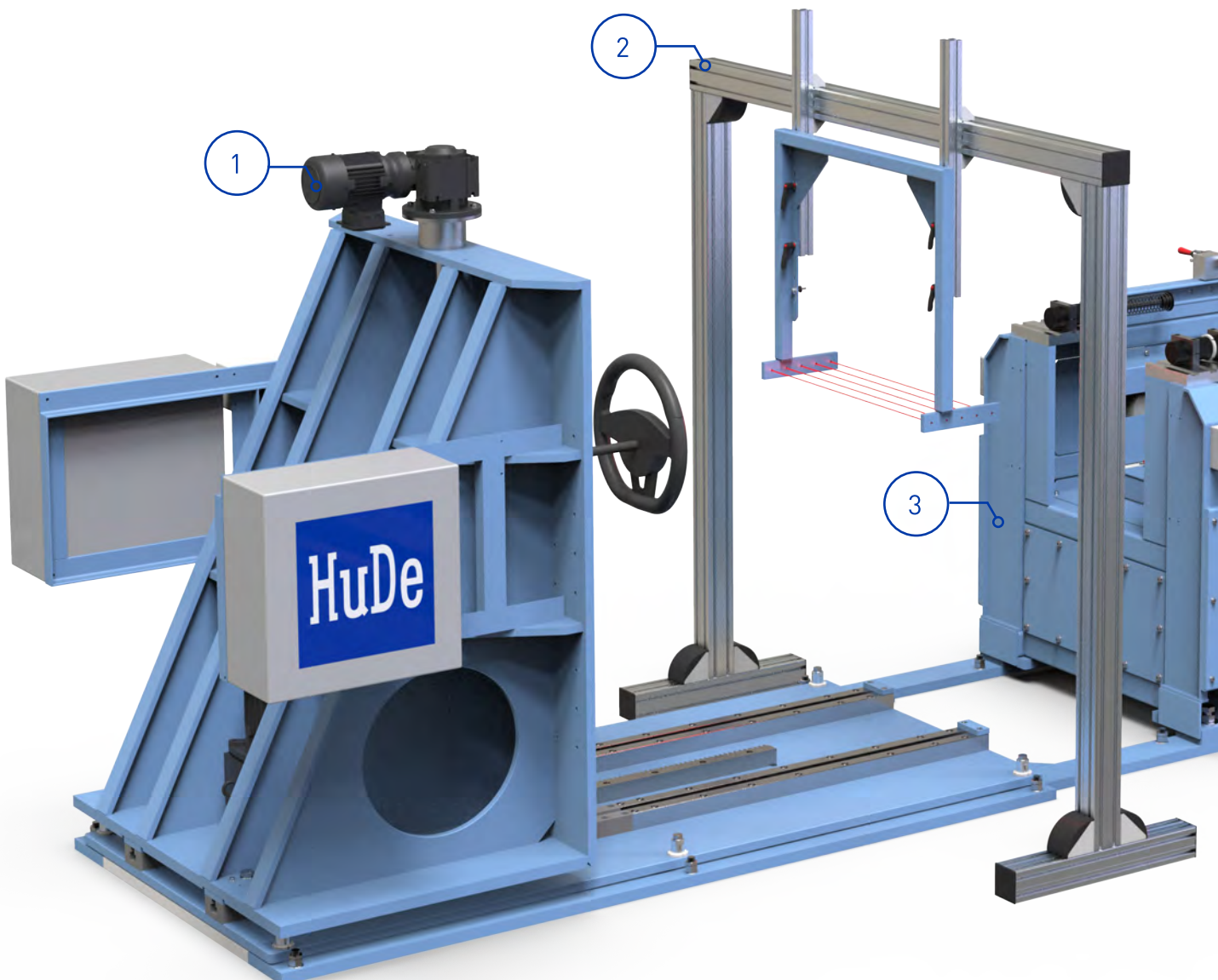
- HuDe Ignition, DAQ & control system
- Crash Barrier with sample fixing
- Light Barrier Frame
- Launcher
- Universal Sled for carrying impact modules

## Technical Data

Power Supply:	400 V / 50 Hz
Engine Power:	approx. 50 kW
Maximum Speed:	approx. 11 m/s (40 km/h)
Maximum Energy:	approx. 2,500 J

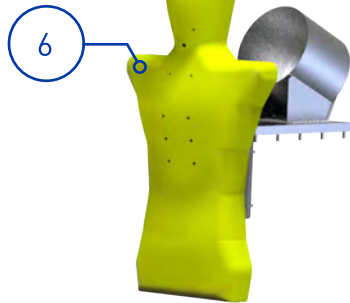
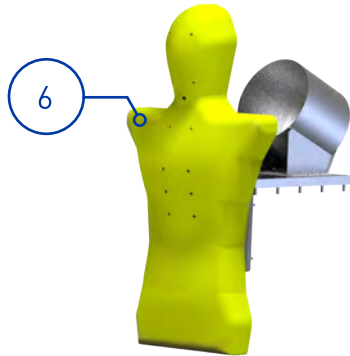
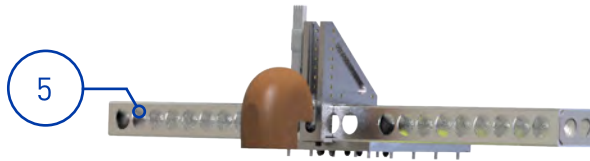
## Dimensions (approx.)

Launcher:	5,000 x 1,000 x 1,200 mm
Crash Barrier:	2,500 x 1,500 x 1,800 mm





# Module Overview



1 Crash Barrier

2 Velocity Barrier Frame

3 Launcher

4 Double FMH

5 Maxilla

6 Body Block

7 Ejection Mitigation EMI

8 Head Impactor

9 Linear Impactor

# Technical Specifications

## Basic System

### Launcher



Module	Launcher
Weight	Approx. 1,500 kg
Sensor	1x Deflection Meter
References	FMVSS 201U / 202a / 203 / 222 / 226 ECE R12 / R17 / R25 GB 11557
Optional	Customized engine power, typical 50 kW

### Crash Barrier



Module	Crash Barrier
Weight	approx. 2,000 kg
Adjustment	X and Z direction movable by motor drive swivel table for angle
Dimensions	2,300 x 1,200 mm
Features	Inverter controlled drive
Optional	Displacement sensors turnable around Z-axis

### Velocity Barrier Frame



Module	Velocity Barrier Frame
Weight	50 kg
Sensor	2x Light Barrier sensors with calibrated distance
Dimensions	1,500 x 2,500 mm
Features	No sensitivity on high energy illumination
Optional	Mounted on ground or attached to ceiling



# Technical Specifications

## Guided Motion

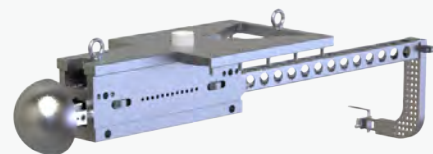
Module	Linear Impactor
Weight	33 - 100 kg
Sensor	2x Acceleration sensors 1x Displacement sensor
References	FMVSS 203 / 208 / 222 ECE R21 GB 11557 OOP - Out of Position Test
Optional	Low weight version from 17 kg is available

Linear Impactor



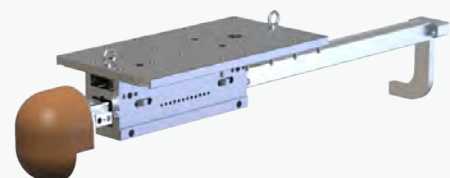
Module	Head Impactor
Weight	6.5 kg
Sensor	2x Acceleration sensors 1x Displacement sensor
References	FMVSS 201 / 203 ECE R21 GB 11557
Optional	Low weight version from 4.5 kg is available

Head Impactor



Module	Ejection Mitigation EMI
Weight	18 kg
Sensor	1x Displacement sensor
References	FMVSS 226

Ejection Mitigation EMI

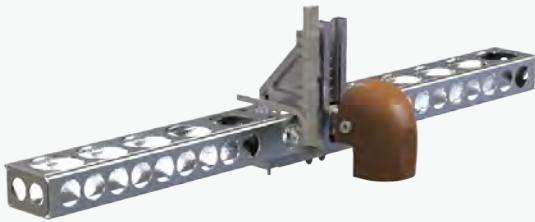


Optional	Built in calibration tool kit
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# Technical Specifications

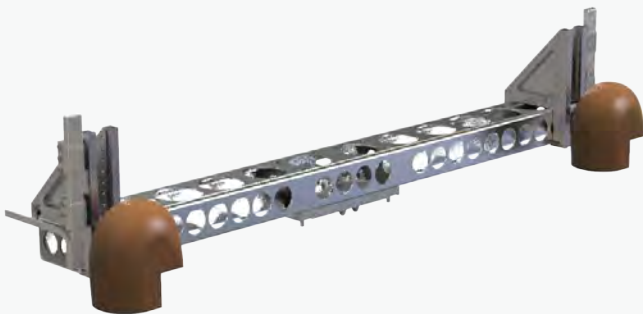
## Free Motion

### Maxilla



Module	Maxilla
Weight	4.6 kg
Sensors	1x 3D Acceleration sensor
References	FMVSS 201U / 202a ECE R17 / R25

### Double FMH



Module	Double FMH
Weight	4.6 kg per head
Sensors	2x 3D Acceleration sensors (each head)
References	FMVSS 201U / 202a ECE R17 / R25

### Body Block



Module	Body Block
Weight	35 kg
Sensors	2x Acceleration sensors 1x 3D Load Cell
References	FMVSS 203 ECE R12 / R95 GB 11557
Optional	1x 3D Acceleration sensor in head location

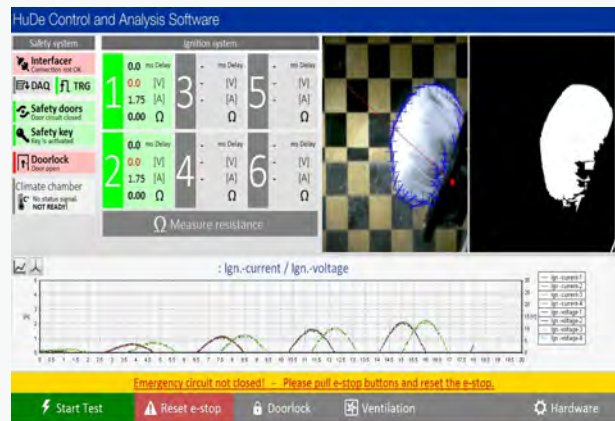


### Control and Analysis Software

CFC Filtering and calculation of crash criterias e.g. HIC, BRIC, a3ms, resulting forces, deflection, airbag pressure.

Data export for CAE Simulation input in different file types (ISO-MME, CSV, XLS, DIAdem).

Support of all state of the art high speed cameras and lighting systems.



### Optical Displacement Sensor

The high precise optical displacement IES sensor converts the movement of the sled to an analog output voltage for testing and characterization of the distance and force of the guided modules.

The sensors record the movement in both directions and provide additional informations for the analysis.



### Safety Systems

Operator safety is the main goal. With doorlocks, E-Stop, motion sensors, CCTV and access restrictions the maximum safety for operators is guaranteed.

Data security for test results of 15 years is ensured by data transfer to central SQL servers or proprietary file systems according to customer specifications.





## HuDe Mission Statement

We have realized projects in more than 25 countries and are represented around the world in all major regions of automotive development and manufacturing. Contact us today and convince yourself of our service and extensive project experience. Customer satisfaction and product quality are always our top priority.



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