

SKILLING E-VEHICLE & MECHATRONICS



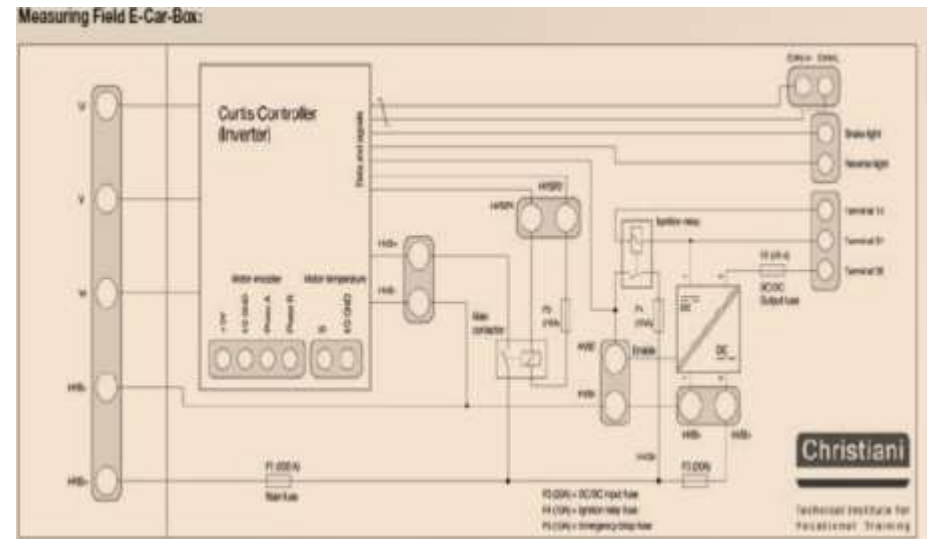
HV – Technology Training System



HV Trainer From CHRISTIANI

E – Car Box

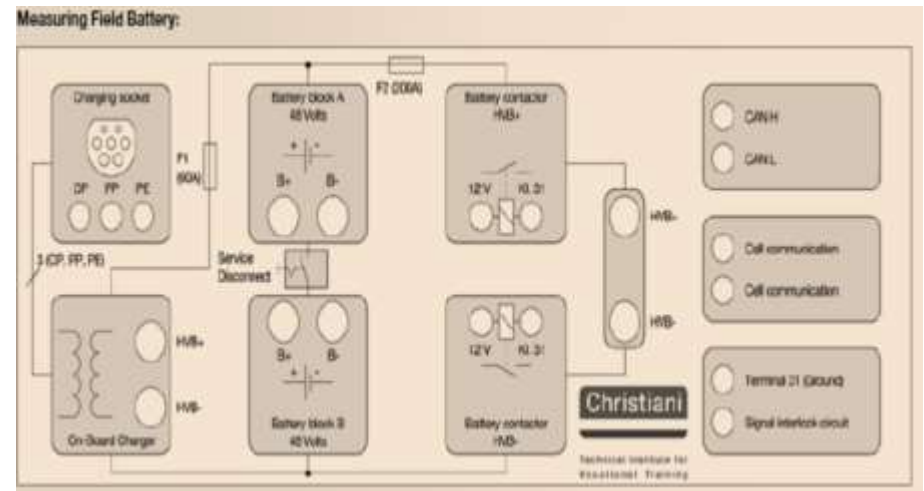
- The e-car box is the heart of the drive. All the important components for controlling the motor are installed in it in a space-saving, safe and EMC-compliant manner and wired according to the highest safety standards. In addition to the air-cooled Curtis controller for controlling the motor, it also contains the main contactor, a DC/DC converter and all the necessary high and low voltage fuses.



HV Trainer From CHRISTIANI

Battery Management System (BMS)

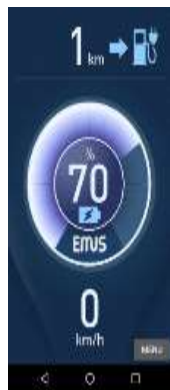
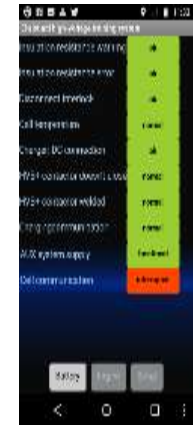
- The battery management system is used to monitor the **lithium iron phosphate battery cells** installed in the HV trainer and to protect them from overvoltage and under voltage during the charging process and while driving. The central control unit communicates with the connected charger and the motor controller via a CAN interface. The BMS has a Bluetooth module for communication between the BMS and a display instrument such as a smartphone, tablet or a Bluetooth-enabled Windows PC. With this module, the state of charge of the battery and various other parameters can be monitored. Software for Windows and an Android app are available for download.



Fully Functional Battery Management System (BMS)



Error Switching In HV System Via App And Tablet



Cell details			
Group 1	U(V)	T(°C)	B(%)
Cell 1	3.29	21	0
Cell 2	3.28	21	0
Cell 3	3.28	21	0
Cell 4	3.29	22	0
Cell 5	3.32	22	0
Cell 6	3.29	21	0
Cell 7	3.30	21	0
Cell 8	3.30	21	0
Cell 9	3.28	22	0
Cell 10	3.28	23	0
Cell 11	3.29	21	0
Cell 12	3.30	21	0
Cell 13	3.29	21	0
Cell 14	3.30	21	0

CLOSE

Average: 3.29 21 0

Cell details			
Cell 18	3,30	21	0
Cell 19	3,30	21	0
Cell 20	3,29	21	0
Cell 21	3,29	21	0
Cell 22	3,30	21	0
Cell 23	3,30	21	0
Cell 24	3,30	21	0
Cell 25	3,30	21	0
Cell 26	3,29	20	0
Cell 27	3,29	21	0
Cell 28	3,30	21	0
Cell 29	3,28	21	0
Cell 30	3,30	21	0
Cell 31	3,30	21	0
Cell 32	3,30	21	0

Average: 3,29 21



Learning Objectives

- Observing accident prevention regulations
- Avoiding dangers when working with electrical current and hazardous substances
- Selecting suitable and safe testing and measuring instruments
- Handling and using safety equipment
- Disconnecting high-voltage components, securing them against being switched back on, disconnecting from the voltage supply
- Identifying the dangers of electric storage (capacitors, high-voltage batteries)
- Identifying the general principles of electrical engineering
- Troubleshooting and interpreting the diagnostics of affected systems
- Analysing the function and interaction of components, taking into account the exchange of information between participating control units

HV Trainer – Accessories

22 KW Charging Unit “Mobile Wallbox”



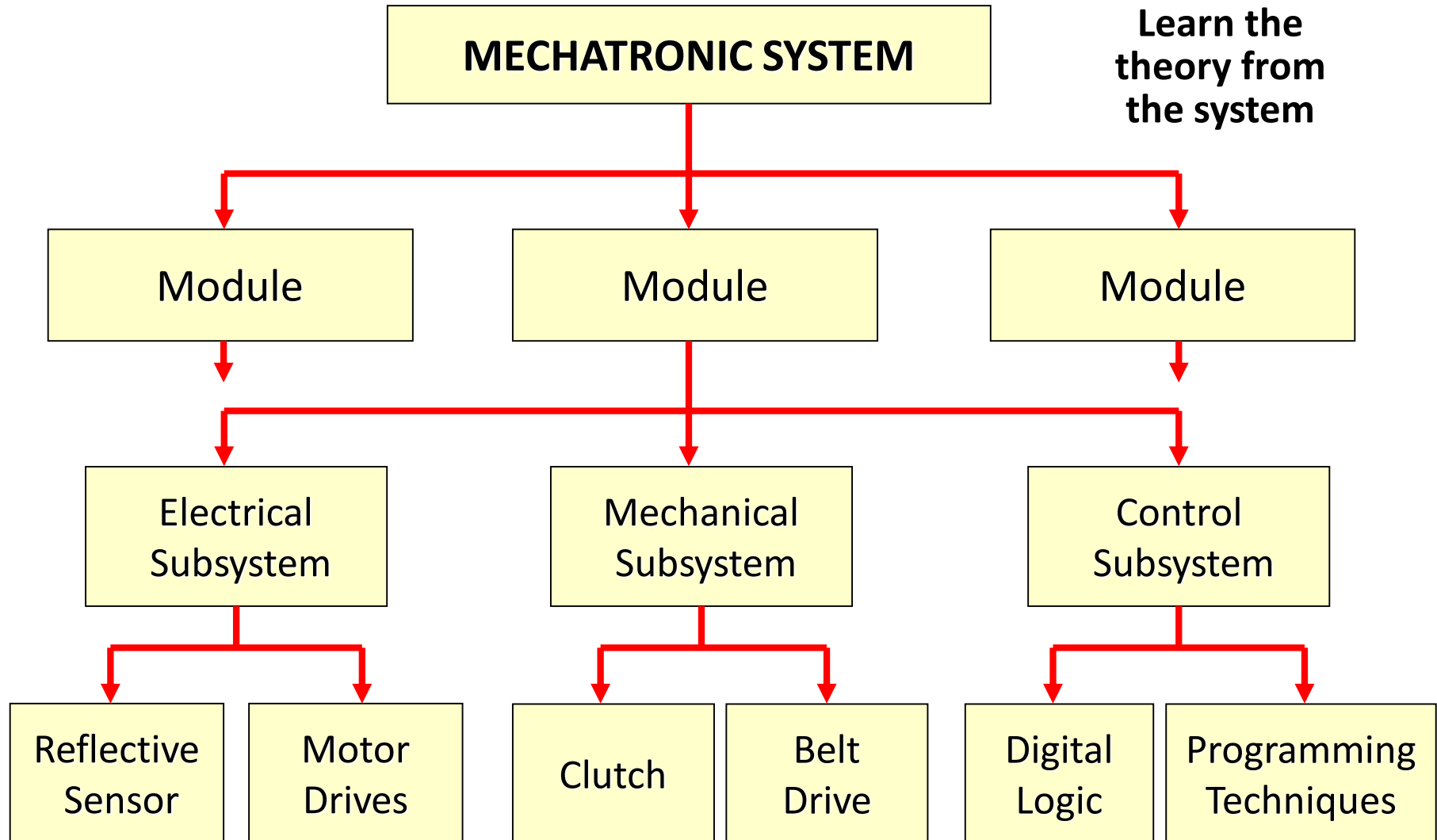
Testing & Measuring



Safety Systems



Mechatronics – System Approach



Mechatronics Kit – Sub Assembly 1



**Air
Service
Unit**



**Operator
Panel**



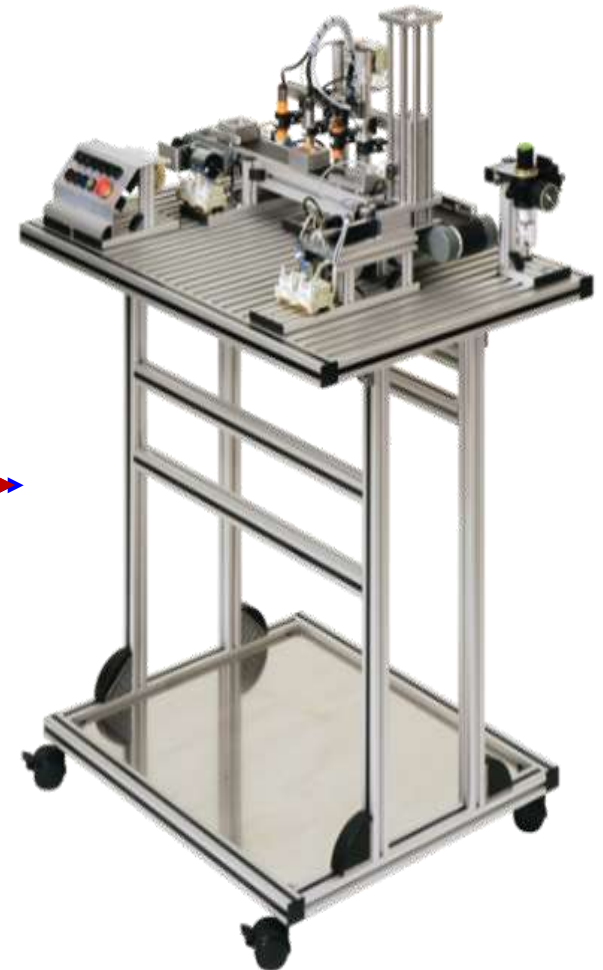
Magazine 1



Magazine 2



**Testing
Unit**



Mechatronics Kit – Sub Assembly 2 & 3

Pneumatic Press



Automatic Retrieval & Storage Station (ASRS)



Handling Arm

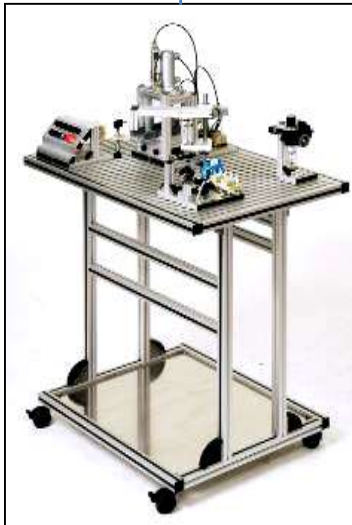


Factory Assembly Kit

Assembly 1



Assembly 2



Assembly 3



Learning Objectives

1. Understand Mechanical Fundamentals
2. Read Mechanical Drawings
3. Read Assembly Drawings
4. Do Pneumatic Circuits
5. Do Electrical Wiring Of The Machine
6. PLC Programming Of The Machine
7. Installation & Commissioning

Concept – Mechatronics System



Applications

Mechatronics is today an integral part of any Environment

- Engineering Fields,
- Packaging,
- Pharmaceuticals
- Defence
- Machine Tools
- Renewable Energy

- Automotive
- Aviation
- Aerospace
- Entertainment Industry
- Home Automation – Day To Day Applications
- Smart Cities

Modular Mechatronic System (MMS)

Learning Content

Pneumatics And E-pneumatics:

- Basics
- Measuring And Adjusting Pressure In Pneumatic Systems
- Valve Types, Selection According To Application
- Pneumatic Actuators (Cylinders)
- Safety Of/Into Pneumatic Systems
- Control And Monitoring Of Pneumatic Components
- Put Pneumatic Equipment Into Operation

Mechatronics

- Basics
- Construction Of Mechatronic Assemblies
- Modularity In Mechatronic Assemblies
- Technical Relationships And Dependencies With Mechatronic Devices (Mechanics, Electrics, Programming)
- Install, Replace, Adapt, Adjust Mechatronic Assemblies
- Testing And Adjustment Of Mechatronic Systems
- Sensors And Actuators In Mechatronic Systems

Sensors

- Basics
- Analogue Value Sensors, Digital Sensors, Io-link Sensors
- Sensor Types: Capacitive, Inductive, Optical, Ultrasonic, LASER
- Functionality Of The Different Sensor Types
- Selection And Use Of Suitable Sensors For Specific Applications
- Parameterization, Calibration And Adjustment Of Sensors
- Check And Adjust Devices For Recording Limit Values, In Particular Switches And Sensors

Modular Mechatronic System (mMS) – Future Proof System For Technical Training

Easy To Handle, Plug & Play

Own MES Without Additional Costs

Technologically Adaptable To Customer Requirements

Didactic Concept Scalable To Group Size And Knowledge Level

Attractively Priced

