baumann

mts

AUTOMATION

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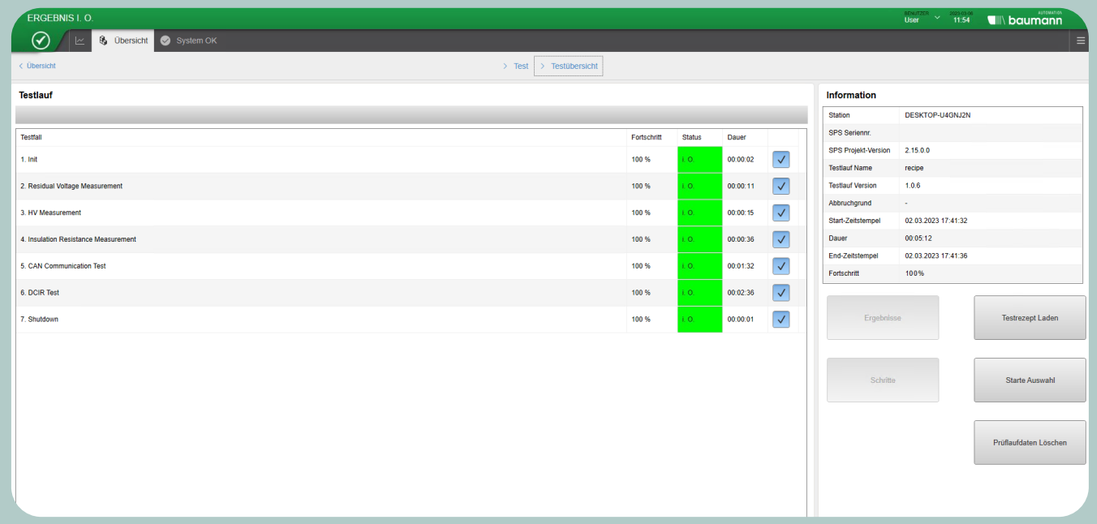
MTS TESTER
IN OVERVIEW

The Baumann MTS (Modular Test System) is a modular test system for use in laboratories or in prototype construction, as well as in series production:

- Cell, module and battery test stands (end-of-line, end-of-repair, second-life test)
- Testing of power electronics and converters
- Testing of control units
- Leak testing of housings and cooling systems



MTS HIGHLIGHTS

- Modular design and expandable as needed, modules can be reused for other projects
- Quick and flexible installation to create a complete system with the smallest possible footprint
- Simple integration of third-party systems (e.g. DC systems, cooling units, etc.)
- High energy efficiency
- Measuring taps for calibration and troubleshooting procedures
- Stand-alone functionality
- Short delivery times thanks to module stocking and pre-configuration
- Mobile version for service calls
- Internal communication between the units via EtherCAT

In addition to the MTS modules, Baumann offers manual or automated contacting of DUTs via low-voltage and high-voltage connectors.

BATTERY TEST SELECTION

- Check the software version
- Evaluate fault memory entries
- Measure battery insulation resistance and test dielectric strength
- Measure Y-capacity
- Check internal power supply for plausibility
- Measure the battery's power consumption
- Interlock function test
- Internal temperature measurement
- Current pulse test
- Check state of charge

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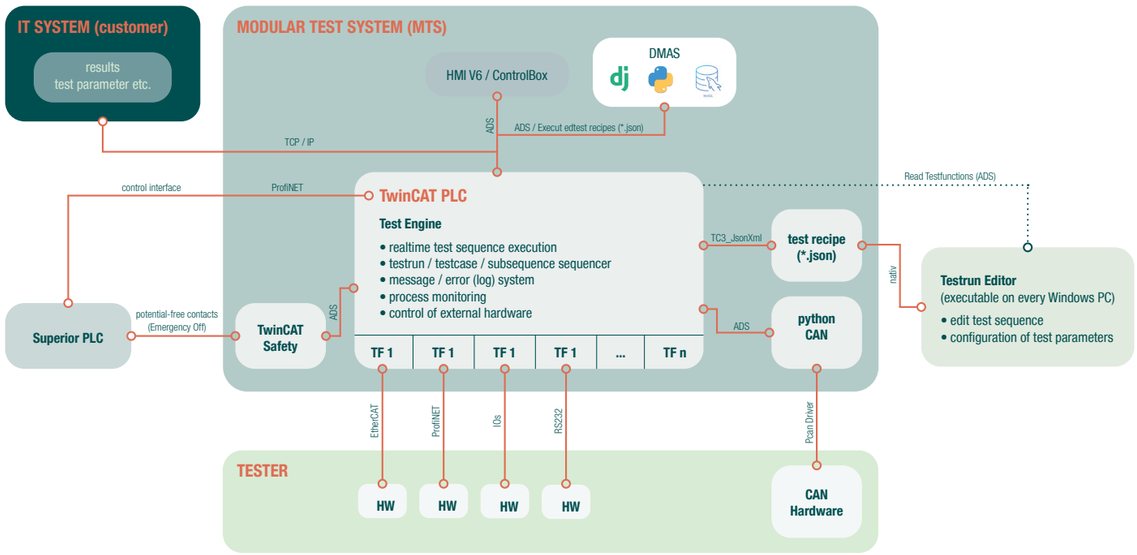
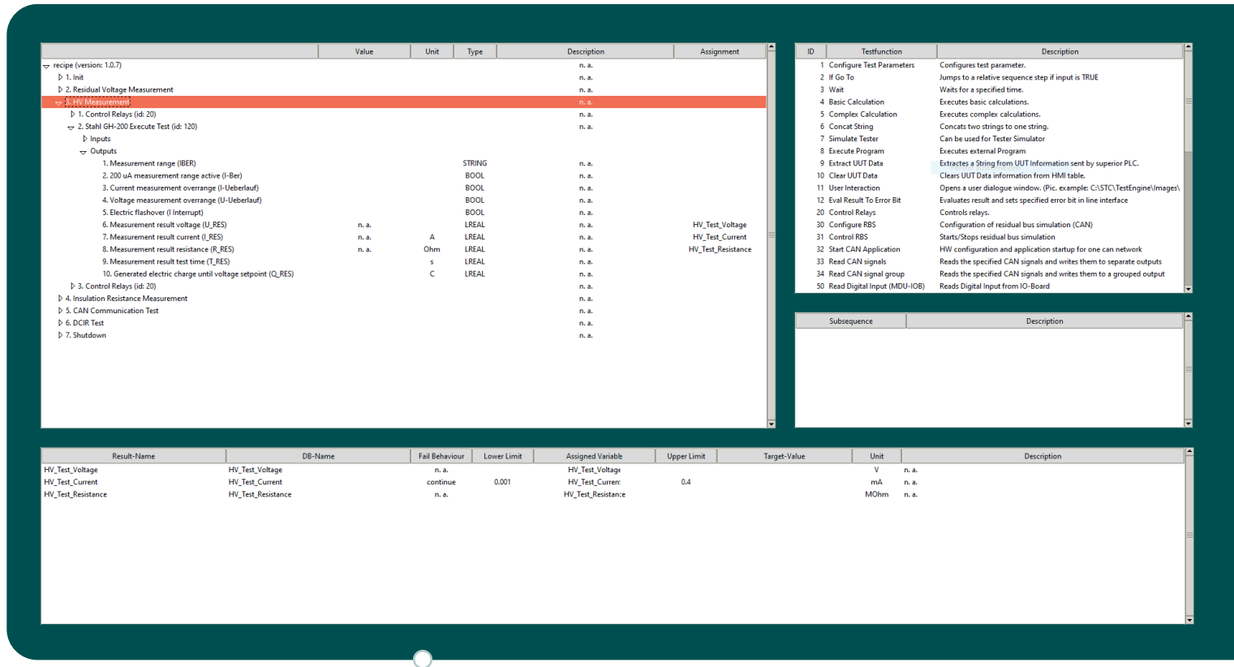
SOFTWARE AND INTERFACES

Baumann supplies a test framework tailored to the modularised hardware. On the basis of test functions, test cases can be individually composed and configured using an editor. The tests are performed on a test engine.



At the core of the architecture is the test engine, which runs the test hardware. The test recipe editor is used for test run configuration. The head system handles the data management between the customer's system and the tester.

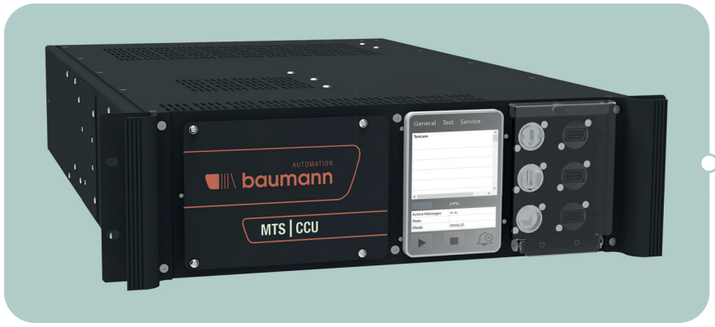


The test sequences can be defined in the top left window. All available test functions are listed in the top right part of the screen. Shown below that are so-called subsequences, within which recurring test sequences can be defined and then inserted into the overall test sequence in the form of a macro. The bottom part of the screen shows the configuration of the result entries. These can be made available to the customer's IT system for archiving once the test is complete.

BENEFITS OF THE TEST FRAMEWORK

- Test recipes and test sequences can be adapted by the customer
- Intuitive graphical user interface and numerous graphical diagnostic and analysis functionalities
- Integration of special functionalities (e.g. flashing, authentication, etc.)
- Standardised data interfaces to production and customer systems (MES systems)
- Process monitoring of DUT and test system during testing
- Communication with DUT via all common bus systems in the automotive sector (CAN, LIN, Automotive Ethernet)
- Open data storage in the form of JSON data

MTS | CCU
CONTROL & COMMUNICATION UNIT



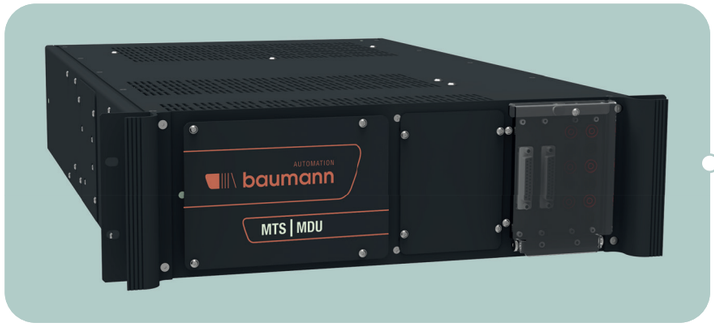
Control & Communication Unit for tester control, communication and data management

- Interface to the customer's IT equipment: Ethernet TCP/IP interface Safety circuit: two-channel input

The Control & Communication Unit (CCU) consists of the following components:

- CCU base unit
  - Front service module HDMI / USB 3.0 / Ethernet
  - Front service module DUT-COM connections – CAN / CAN-FD / LIN / optionally ISO-SPI
  - Optional 4.3" service colour display
  - Ultra-compact industrial PC
    - Intel i7 (G9 / 2.6 GHz)
    - 32 GB RAM / 320-GB-HP-M.2-SSD
    - Windows 10 IoT 64 bit
    - Integrated UPS
    - Control of test automation from an encapsulated network
  - 6 backplane slots
- Available backplane modules:
  - **CPU interface module** – HDMI / USB 3.0 / RS-232
  - **DUT interface module** – DUT-COM with 3 connection panels: CAN / CAN-FD / LIN / ISO-SPI interfaces possible
  - **HMI module** – CP Link 4 / power supply for display
  - **Line interface module** – 2x Profinet (controller or device) / fail safe input (2-channel)
  - **Ethernet module** – 3x RJ45 Ethernet

MTS | MDU
MEASUREMENT DISTRIBUTION UNIT



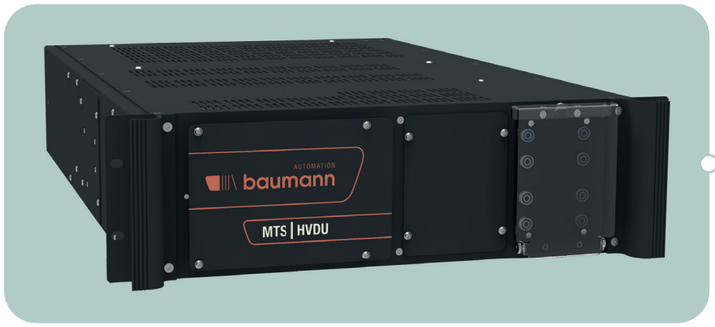
Measurement Distribution Unit

Central measuring unit for recording voltage and current readings

The Measurement Distribution Unit (MDU) consists of the following components:

- MDU base unit
  - 16 front service measuring taps 32 V via breakout box
  - 6 front service measuring taps 1000 V
  - Optional 4.3" service colour display
  - 6 backplane slots
- Available backplane modules:
  - **HV input module - 2 channels**
    - Voltage measurement 0-1000 V
      - Isolation up to 6 kV
      - Internal resistance >10 MOhm
      - Measurement differential
      - Max. sample rate 50 kSps
      - Measurement uncertainty +/-0.02% to MBE
  - **Input/output module**
    - 4 electrically isolated inputs 5-30 V
    - 4 floating outputs (changeover contacts)
  - **LV matrix module - 3 channels**
    - Voltage measurement 0-32 V
      - Internal resistance >500 kOhm / 4 MOhm
      - Measurement differential
      - Max. sample rate 10 kSps
      - Measurement uncertainty +/-0.005% to MBE
    - Current measurement 20 mA / 200 mA / 10 A
      - Max. sample rate 10 kSps
      - Measurement uncertainty +/-0.1% to MBE
  - **ECU control module - 1 channel**
    - Safe switching of terminal voltages (e.g. terminal 30)
    - 4-wire voltage measurement (source and sense)
      - Internal resistance >500 kOhm / 4 MOhm
      - Measurement differential
      - Max. sample rate 10 kSps
      - Measurement uncertainty +/-0.005% to MBE
    - Current measurement of the terminal supply 0 mA / 10 A
      - Max. sample rate 10 kSps
      - Measurement uncertainty +/-0.1% to MBE

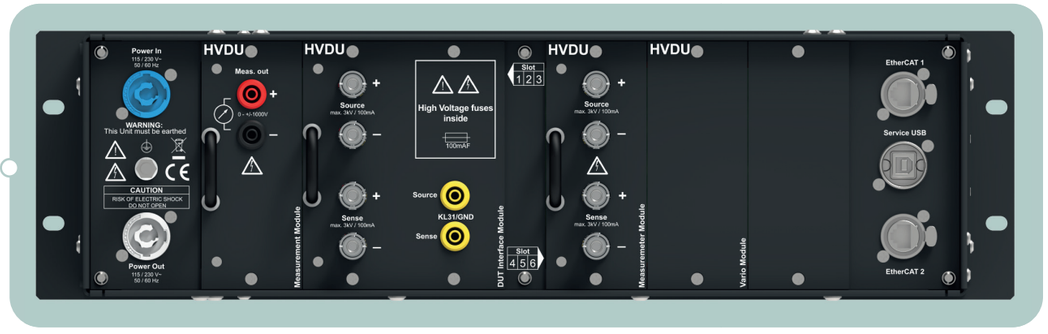
MTS | HVDU
HIGH VOLTAGE DISTRIBUTION UNIT



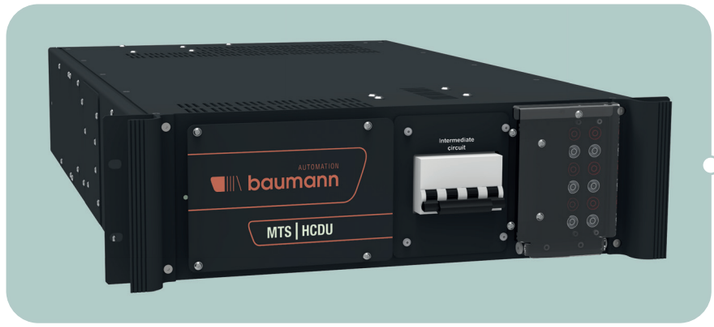
High Voltage Distribution Unit – for managing measuring circuits up to 3 kV, application control (sensing), back measurement for validation, incl. insulation and dielectric strength measuring device.

The High Voltage Distribution Unit (HDU) consists of the following components:

- HVDU base unit
  - Front service module measuring taps
  - Optional 4.3" service colour display
  - 6 backplane slots
- Available backplane modules:
  - **Measurement module**
    Measuring taps 1-channel max. 1000 V, switchable via matrix
  - **DUT interface module**
    HV matrix to DUT interface
  - **Measuremeter module**
    Connection of optional external measuring devices in 4-wire technology (e.g. voltage strength measurement, impedance measurement, insulation resistance measurement)
  - **Vario module**
    Freely configurable circuit board for resistors, capacitors, etc. (connected via HV relay)
- Optional internal HV module
  Stahl GH-200.30 A (incl. back measurement):
  - Voltage strength measurement:
    - Setpoint setting 100-3000 VDC
    - Control deviation +/-2.5 V
    - Measurement range 0-10 mA/0-200 µA
    - Measurement accuracy at 10 µA-10 mA
      <0.5% of full scale value +/-0.5 µA
  - Insulation resistance measurement
    - Setpoint setting 100-1050 VDC
    - Control deviation 0.1% +/-2 V
    - Measurement range up to 20 GOhm
    - Measuring accuracy at 100 V
      <1% of full scale value per 50 MOhm



MTS | HCDU
HIGH CURRENT DISTRIBUTION UNIT



High Current Distribution Unit – for controlling and protecting the high current circuits.

The High Current Distribution Unit (HCDU) consists of the following components:

- HCDU base unit
  - Front service module: measuring taps to 1000 V
  - 2 backplane slots
- Fixed backplane connections:
  - **Load connections:**
    - Source connection
    - Link connection (cascading of several HCDUs)
    - DUT connection (+/- contacting)
  - **Measuring connections**
    - 4-wire input contacting from HVDU
    - Connection of terminal 31 to DUT
    - DUT sense connection (+/- contacting)
    - Sense connection source/sink
    - Measuring point output to MDU (link, DUT sense connections, U source)
    - Sense link connection
    - 2x current measuring transformer connections
    - 1x temperature sensor connection
- Rated operating voltage, high-current circuit: up to max. 1000 VDC
- Rated operating current, high-current circuit: up to max. 300 ADC
- Test voltage connection: max. 3 kV

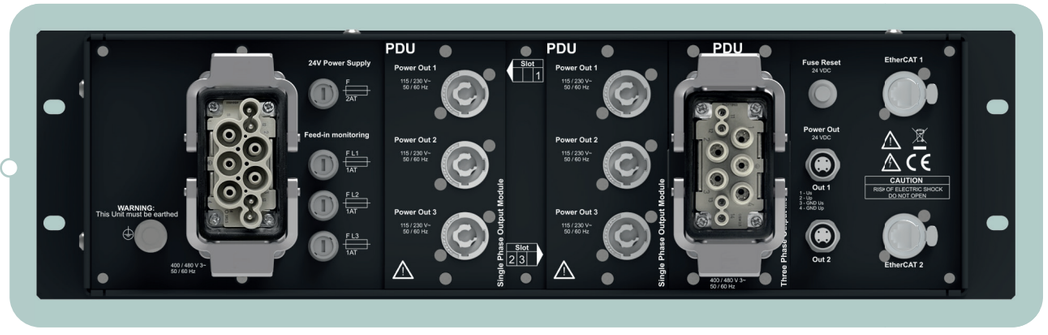
MTS | PDU
POWER DISTRIBUTION UNIT

Power Distribution Unit for supplying and protecting the individual measuring units as well as optional DC system up to 15 kW

Connection to the individual units by means of preassembled connection cables.

The Power Distribution Unit (PDU) consists of the following components:

- PDU base unit
  - 3-phase 400 VAC feed connection via Harting plug system
  - Main switch for connected measuring units
  - Mains filter
  - Energy meter for internal evaluation of the units supplied by the PDU
  - Power supply: 400 VAC/max. 63 A 3-phase
  - 3 backplane slots
- Available backplane modules:
  - **Powercon module** 3x 230 VAC / max. 16 A
  - **Harting module** 1x 400 VAC /max. 32 A 3-phase



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