





MTS TESTER IN OVERVIEW

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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

\sim 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.

ERGEBNIS I. O.	
🕑 🖉 🗞 Übersicht 💿 System OK	
< Übersicht	> Test > Testübersicht
Testlauf	
Testfall	
1. Init	
2. Residual Voltage Measurement	
3. HV Measurement	
4. Insulation Resistance Measurement	
5. CAN Communication Test	
6. DCIR Test	
7. Shutdown	

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



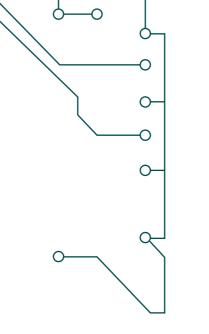
User 11:54 Till bauman

Fortschritt	Status	Dauer	
100 %	i. O.	00:00:02	\checkmark
100 %	i. O.	00:00:11	\checkmark
100 %	i. O.	00:00:15	\checkmark
100 %	L O .	00:00:36	\checkmark
100 %	i. O.	00:01:32	\checkmark
100 %	i. O.	00:02:36	\checkmark
100 %	i. O.	00:00:01	\checkmark

nformation		
Station	DESKTOP-U4GNJ2N	
SPS Seriennr.		
SPS Projekt-Version	2.15.0.0	
Testlauf Name	recipe	
Testlauf Version	1.0.6	
Abbruchgrund		
Start-Zeitstempel	02.03.2023 17:41:32	
Dauer	00:05:12	
End-Zeitstempel	02.03.2023 17:41:36	
Fortschritt	100%	
Ergebniss	e	Testrezept Laden
Schritte		Starte Auswahl
		Prüflaufdaten Löschen

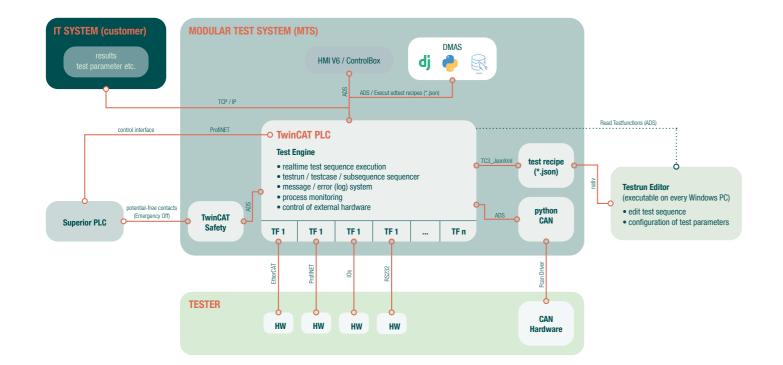


SOFTWARE AND INTERFACES



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.

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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.

6. DCIR Tes Test_Voltage Test_Current Test_Resistanc HV_Test_Voltage HV_Test_Current HV_Test_Resistanc 0.001 HV_Test_C HV_Test_Re

n. a. n. a. n. a.

00 Execute Test (id: 120)

ent range ad

sult voltage (U_RES)

ce (R_RES) sult test time (T RES)

Unit Type

STRING BOOL BOOL BOOL LREAL LREAL LREAL LREAL LREAL

A Ohm

s C

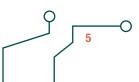
n. a. n. a. n. a. n. a. n. a. n. a.

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

	Assignmen	nt 🔶	ID	Testfunction	1 I	Description
			1 Con	nfigure Test Parame	eters	Configures test parameter.
			2 If Go	о То		Jumps to a relative sequence step if input is TRUE
			3 Wait	t		Waits for a specified time.
			4 Basi	ic Calculation		Executes basic calculations.
			5 Con	nplex Calculation		Executes complex calculations.
			6 Con	ncat String		Concats two strings to one string.
			7 Sim	ulate Tester		Can be used for Tester Simulator
			8 Exec	cute Program		Executes external Program
				act UUT Data		Extractes a String from UUT Information sent by superior PLC.
			10 Clea	ar UUT Data		Clears UUT Data information from HMI table.
				r Interaction		Opens a user dialogue window. (Pic. example: C:\STC\TestEngine\Image
				Result To Error Bit		Evaluates result and sets specified error bit in line interface
			20 Con	ntrol Relays		Controls relays.
	HV_Test_Volt			nfigure RBS		Configuration of residual bus simulation (CAN)
	HV_Test_Curr			ntrol RBS		Starts/Stops residual bus simulation
	HV_Test_Resist	tance	32 Star	t CAN Application		HW configuration and application startup for one can network
	PIV_Test_Resist					
	HV_Test_Kesist			d CAN signals		Reads the specified CAN signals and writes them to separate outputs
	HV_TESt_Kesis		34 Read	d CAN signal grou		Reads the specified CAN signals and writes them to a grouped output
	nv_test_Kesis		34 Rear 50 Rear	d CAN signal grou d Digital Input (MC		Reads the specified CAN signals and writes them to a grouped output Reads Digital Input from IO-Board
	πv_tes_ness	ł	34 Rear 50 Rear	d CAN signal grou		Reads the specified CAN signals and writes them to a grouped output
	ΠV_161_668	ŀ	34 Rear 50 Rear	d CAN signal grou d Digital Input (MC		Reads the specified CAN signals and writes them to a grouped output Reads Digital Input from IO-Board
			34 Rea	d CAN signal grou d Digital Input (MC isequence		Reads the specified CAN signals and writes them to a grouped output Reads Digital Input from IO-Board Description
risble	Upper Limit	▼ Target-Value	34 Rea	d CAN signal grou d Digital Input (MC ssequence Unit	0U-IOB)	Reads the specified CAN signals and writes them to a grouped output Reads Digital Input from IO-Board
tage	Upper Limit	▼ Target-Value	34 Rea	d CAN signal grou d Digital Input (MC sequence Unit V	n. a.	Reads the specified CAN signals and writes them to a grouped output Reads Digital Input from IO-Board Description
age ren:		Target-Value	34 Rea	d CAN signal grou d Digital Input (MC isequence Unit V mA	n. a. n. a.	Reads the specified CAN signals and writes them to a grouped output Reads Digital Input from IO-Board Description
age	Upper Limit	▼ Target-Value	34 Rea	d CAN signal grou d Digital Input (MC sequence Unit V	n. a.	Reads the specified CAN signals and writes them to a grouped output Reads Digital Input from IO-Board Description
age en:	Upper Limit	▼ Target-Value	34 Rea	d CAN signal grou d Digital Input (MC isequence Unit V mA	n. a. n. a.	Reads the specified CAN signals and writes them to a grouped output Reads Digital Input from IO-Board Description



MTS | CCU CONTROL & COMMUNICATION UNIT

MTS | MDU MEASUREMENT DISTRIBUTION UNIT

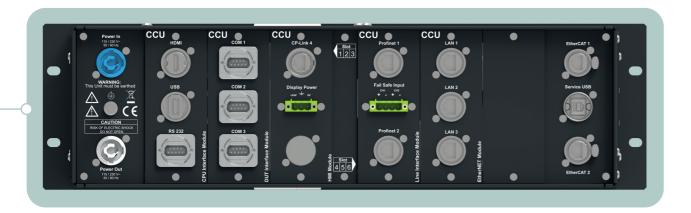


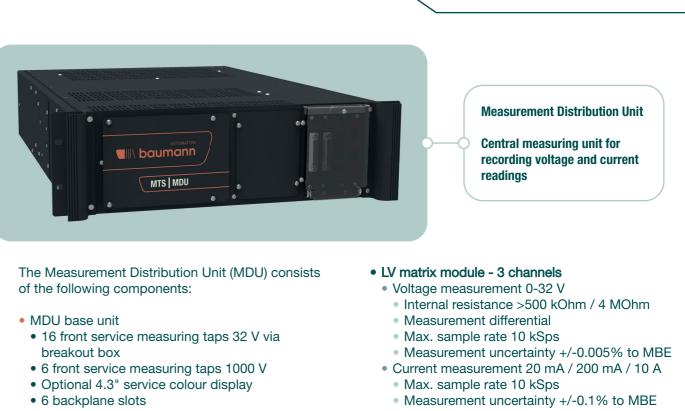
The Control & Communication Unit (CCU) consists of the following components:

- 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

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
- 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





- 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)



• 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**



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)

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.

Vario module

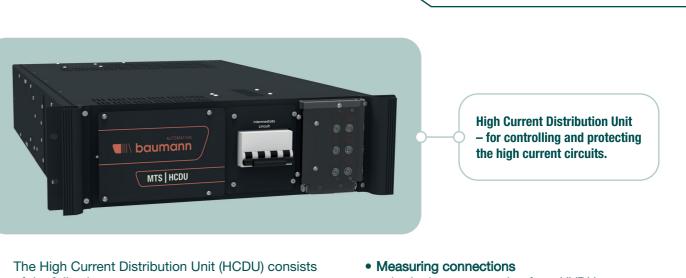
Freely configurable circuit board for resistors, capacitors, etc. (connected via HV relay)

• 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



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)





- 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

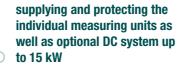
MTS I PDU POWER DISTRIBUTION UNIT



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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



Power Distribution Unit for

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

- 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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