

Author  
**Vertrieb**

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# **World Novelty Engberts-Test-Matrix**

***Test system for the production and inspection of wiring harnesses***



- ***No wiring planes  
Time-consuming adapter wiring for conversions are a thing of the past.***
- ***Free positioning of test modules in a 1 cm grid and alignment in 90° steps.***
- ***Automatic learn-in of specimen, including test set-up.***
- ***Fully automated visual guide and monitoring during conversions. Wrong test set-ups are impossible.***

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## Applications:

- From small wire groups all the way to complex assemblies
- Quantity ranges from 1 piece to large-scale serial production

***How is it possible to get a continuous documentation of simple and complex assemblies and at the same time save cost in light of the enormous variety of wire groups to be tested and the subsequent multitude of demands?***

The **Engberts-Test-Matrix** makes it possible to meet and implement these contradicting demands with a new concept of test systems.

### The advantages of the **Engberts-Test-Matrix** comprise:

- A 1 cm grid, where every test module can be positioned freely across the entire test bench. This will reduce the conversion time of the test system tremendously as cables no longer need to be laid, extended or shortened and modules do not need to be unscrewed from one position and screwed back on in another position. Furthermore, it is not necessary to parameterize the system again. The test modules are simply plugged into their new position. The test system will handle the rest automatically.
- Available standard modules which can be fitted with the individual adapters of the customer (reduction of basic module costs).
- Unique module identification on the test bench (location and positioning) warrants a correct test set-up at any given time.
- The entire test configuration is stored for every test job resulting in a sensationally fast conversion time when the test is set up again.
- All relevant QDE data is determined and stored for every test job so that each individual test step and each test can be verified.

***Of course, all the options of conventional test benches are also available with the Engberts-Test-Matrix.***

- Module electronics with high-speed switching matrix linked to the master computer via CAN-Bus.
- Computer-supported test system with database-backed user software for Windows.
- Simple setup and administration of test programs plus self-learning mode
- Import interface for test programs from external systems or Excel spreadsheets.
- Fast multimeter for component measurements and a qualitative detection of short-circuit and interruption errors.
- Possible integration of external devices without great effort.
- Component measurement
  - resistance: 10 $\Omega$  - 100k $\Omega$
  - diode measurement: 0 - 20VDC
  - capacity: 10nF - 20mF
  - test voltage: 0VDC - 25VDC
  - receiving inspections, e.g. clip queries, spacer, etc.
  - vacuum tests
  - push back test

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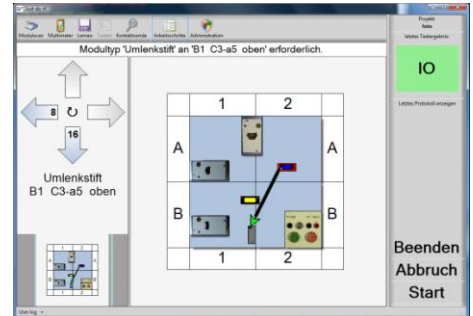
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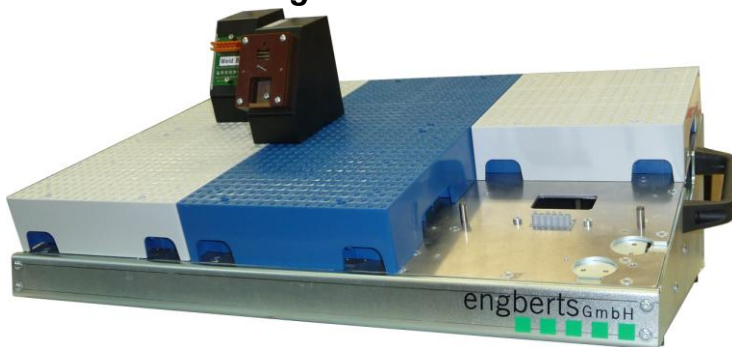
## Assembly of the *Engberts-Test-Matrix*:

### The Software

The operation of the **ETM-Control** software is self-explanatory. Every operator is capable of setting up various test jobs without any extensive training. Existing test jobs can be easily modified with the “drag ‘n drop” function and be adapted to the respective new test job without great effort. All test measurements on the test station are recorded and can be used for evaluation purposes.



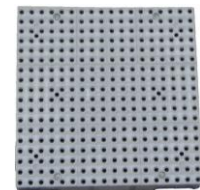
### Hardware of the *Engberts-Test-Matrix*



Test Module – plane 1



Module Holder – plane 2



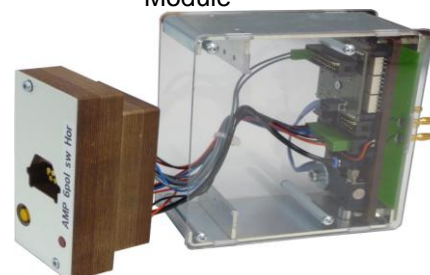
Bench Element – plane 3



### Test Module (Module & Adapter)

The test module comprises the **module**, i.e. the electronics and the **adapter**. The adapter provides the connection (e.g. mating plug) to the wiring harness.

Module



Adapter

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## Modules

The module represents the interface between the test system and the adapter.  
These are modules with either a standard adapter or with a single adapter.

### Plug-specific test module with standard adapter



These modules including the adapters are designed and built at Engberts according to the specifications and drawings provided by the customer.  
Modules, integrating standard adapters from existing test systems are also available. This will reduce the cost of converting to our new test technology tremendously.  
The modules support the operator during the assembly of a wiring harness through optical displays and thus facilitating the assembly and reducing the error rate significantly.

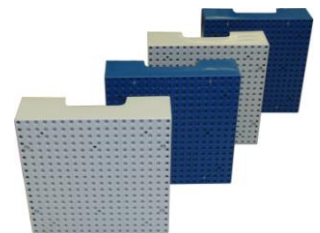
### Module for holding a single adapter



These modules can be wired and fitted with an adapter by the customer.

## Module Holder

The module holder comprises a 180 x180 mm plug-in matrix. On it, the modules can be positioned freely in a plug-in matrix. With this intelligent matrix, the system can detect the position and the rotation angle of the plugged-in modules. Configuration parameters are stored in the module and the module logs on to the system with these parameters automatically. If the bench is converted for a new cable set, the modules are automatically scanned when they are plugged in. Any wrong positioning of the modules will thus be detected and the operator will receive messages on the monitor assisting with the correct placement.



## Bench Element

The bench element has a certain number of slots. These serve as plug-in places for module holders. The bench element as well as the module holders log on to the system via network connections. The bench element is flexible in size and can be adapted to customer needs.  
The smallest available bench element offers room for 2 module holders.



aufgrund eines Beschlusses  
 des Deutschen Bundestages

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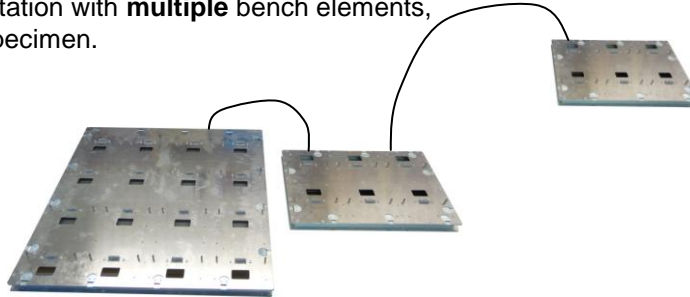
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It is also possible to build a test station with **multiple** bench elements, e.g. to suit the geometry of the specimen.

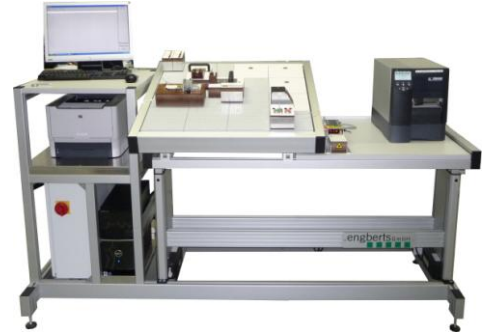


**Application illustrating the flexibility of the Engberts-Test-Matrix**

Standard test station with an 8x4 matrix



Standard test station with a 4x3 matrix



Test system for checking a control and monitoring console



Test station - passenger car roof-liner



Dieses Projekt wurde gefördert vom Bundesministerium für Wirtschaft und Technologie aufgrund eines Beschlusses des Deutschen Bundestages

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